



Total control of operations...



...with Siemens mass flowmeters

Sensor Systems

Answers for industry.

SIEMENS

SITRANS F C flowmeters...



In the automotive industry, gaining an edge on competition is a matter of hard work and new thinking. But sometimes, it is a matter of opportunity, too. In this case, the opportunity is called SITRANS F C – the extremely accurate coriolis mass flowmeter from Siemens.

Where is SITRANS F C adding value in the automotive industry today?

Testing and quality assurance for R&D or production

- Engine Test Beds
- Nozzle Test Beds
- ABS Test Beds
- Fuel Pump Testing
- Fuel Conditioning Management

Process automatization and optimisation operations

- Dosing of engine and gearbox fluids and additives
- Dosing of ABS and other brake fluids
- Nozzle production involving highly abrasive or electrochemical production processes
- Filling air conditioning units
- Car painting and car body protection processes
- Energy management and monitoring

The benchmark for innovative flowmetering

The SITRANS F C flowmeter is engineered to improve R&D testing capabilities, drive out costs and ignite major process improvements, and has proven its value in a wide range of demanding industries.

SITRANS F C flowmeters are a better measure by any measure:

- Ideal for high pressure flowmetering up to 410 bar/5,945 psi, compared to traditional mechanical meters with a maximum operational pressure of 10 bar/145 psi
- Flexible and accurate dosing at both high and low pressure ratings
- Accurate performance, independent of liquid density, temperature viscosity and pressure
- Rapid response to flow transients in high-pressure applications such as testing nozzles, injectors, pumps and fuel rails
- Durable construction able to withstand high pressures and pressure pulsations, with a burst pressure of more than 1,834 bar/26,593 psi

...deliver competitive advantages



Rapid step response and extended dynamic measuring range

SITRANS F C delivers the fastest step response of any flowmeter available today, due to

- a dedicated intelligent mass flow processor
- the latest Siemens patented ASIC chip technology ...so it is ideal for the new generation of diesel and petrol engine nozzles

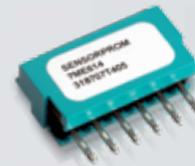
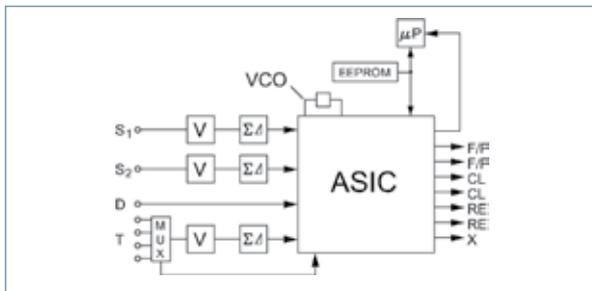
Furthermore, its dynamic range is wide (100:1) with no compromise on quality

- patented DFT (Discrete Fourier Transfer) and ASIC chip give
- fully digital signal conversion and filtering, and thus
- resultant time resolution better than 0.35 ns

Costs less to buy. Costs less to own.

You might think that with all these benefits that SITRANS F C would be expensive to own. Surprisingly, it isn't, because:

- repairs and calibration are much less frequent
- calibration is easily performed, and easily traceable



Sensorprom

The sensorprom unit contains calibration data and specific user values or settings and automatically programmes the SITRANS F C meter with full information during power up.



Communication Modules

"Plug & Play" communication modules provide modularity on a new level. The USM II (Universal Signal Module) makes flowmeter networking installation and configuration easy. Its modularity makes it future proof and compatible with virtually every communication standard.

Improving efficiency by minimizing maintenance



In flowmetering, every second counts

Traditional flowmeters are notorious for needing a lot of maintenance and re-calibration, so it is easy to see how other technologies can be a burden to any car manufacturer.

This is where SITRANS F C mass flowmeters prove their value – every minute of every day.

We offer:

- More up time, minutes to commission and install
- Less downtime, simply plug & play
- Longer life of problem-free performance
- In-line measurement for pressures up to 410 bar/5,945 psi
- Robust and failsafe sensor design
- Excellent resistance to corrosive and highly aggressive media

SITRANS F C means accuracy to within 0.1%

SITRANS F C offers an accuracy rate to meet or exceed the most demanding tolerance targets, thanks to the incorporation of customer-driven innovations like Coriolis-based technology.

With Coriolis technology and noise immunity protection, SITRANS F C delivers spectacular 0.1% accuracy. That's up to 50% greater accuracy than conventional flowmeters.



Coriolis flowmeters are the state-of-the-art in flowmeter technology

They measure mass flow directly so they are unaffected by changes in fluid density, pressure, viscosity and temperature. This makes them extremely accurate.

The pipe is vibrated at its resonant frequency by an electromechanical driver (1). The motion at any point on the tube represents a sine wave, and when flow moves through the

pipe, it will twist proportionally to the mass flow rate detected by 2 pickups (2). This is referred to as the "Coriolis Effect".

The resonant frequency of the tube corresponds to the density of the fluids: thus, the density of fluids can be accurately measured as well. Temperature measured with a PT 1000 makes this a true multi-parameter device.

Seamless integration with SIFLOW FC070



SIFLOW FC070 coriolis mass flow transmitter takes the advantages of the coriolis measuring principle into the SIMATIC world.

System integration

With SIFLOW FC070 Siemens has developed a true multi-parameter coriolis mass flow transmitter covering the full repertoire within flow applications, ready for quick installation and system integration. SIFLOW FC070 is the most compact, space-saving and versatile transmitter available.

Easy programming via standard software package offering:

- Predefined function blocks for S7
- Drivers and faceplates for PCS7
- PDM device driver

Insert the transmitter in the rack, turn on the power, and flow rate is immediately displayed. Standardized SIMATIC front connector enables installation or replacement within seconds.

- Direct integration into S7-300
- Decentralized in ET 200M for use with S7-300 and S7-400 or third party PLC systems with PROFIBUS DP masters
- MODBUS RTU RS232/485 interface for stand alone operation via MODBUS RTU master or connection to SIMATIC PDM

Five-step integration – as easy as it gets



The components of a complete coriolis mass flow meter system



Insert the SENSORPROM



Snap-in SIFLOW FC070 to the SIMATIC rail



Connect the sensor to the transmitter



Turn on power and the system is ready to operate

Repeatable accurate measurement in almost any field of manufacturing and testing



Engine consumption measurement

SITRANS F C flowmeters are deployed in fuel conditioning and consumption measurement applications from FEV Motorentchnik GmbH.

SITRANS F C flowmeters facilitate continuous measurement, with a capacity ranging from 0.05 kg/h up to 600 kg/h with an overall accuracy better than 0.1% of rate. Since all engine characteristics can be measured in one test session, SITRANS F C flowmeters have helped cut test rig time by 40% on a daily basis.

EQUIPMENT: MASS 2100 DI 3 and MASS 6000 were specified because they offer accurate temperature and density measurement as a part of a standard multi-parameter package, making it ideal for optimized fuel conditioning.

The displayed fuel conditioning unit from FEV, FuelCon, offers a temperature stability on fuel supply better than $\pm 0.1\%$ under stationary operation.

Pump life cycle testing for ABS control systems

SITRANS F C flowmeters in test benches developed for Bosch perform vastly better than previous mechanical systems, demonstrating absolutely repeatable accuracy of $\pm 0.1\%$ of volume flow measurement, despite temperatures varying from $-40\text{ }^{\circ}\text{C}$ to $+120\text{ }^{\circ}\text{C}$ and pressures of up to 1 bar.

Developer Raith Maschinenbau GmbH used SITRANS F C flowmeters to build a hydraulic pump life cycle testing system of wide dynamic range, and insensitive to particles in the medium.

EQUIPMENT: FC300 sensors were chosen for their customized flat housing. Combined with MASS 6000 transmitters, an important selection factor was the virtual immunity of these flowmeters to external noise. Vibration absorbers are mounted to further enhance immunity in the compact installation.

Low cost of flowmeter ownership, and simple installation and operation were also attractive parameters for Bosch.

Ensuring efficient operations – and saving time and money



Fuel injection nozzle testing

SITRANS F C flowmeters play an integral role in manufacturing and quality processes for the latest diesel technology. Here, a Bosch production line deploys a hydro-erosive technique developed by the company of Gluth Systemtechnik GmbH to grind the injection heads with an abrasive liquid to obtain the desired flow rate and geometry. Mass flow rate is used to control the process and measure the abrasive liquids as well as diesel in the final flow test.

EQUIPMENT: A MASS 2100 DI 3 and MASS 6000 with PROFIBUS DP add on module work together to feed real-time data to the test rig, enabling it to automatically optimize the grinding process on a continuous basis.

PROFIBUS DP also makes remote access possible for support and maintenance from around the world.



Fuel pump testing

Duration testing of fuel pumps for high pressure applications is conducted in these four identical test beds made by the company of Sonplas.

EQUIPMENT: Four MASS 2100 DI 15 flowmeters. Pressure and pump revolution can be programmed to run an automatic test sequence via the test computer from 20 to 200 l/h at 0 to 160 bar with an overall accuracy of $\pm 0.2\%$.

Each rig is Ex approved for installation in hazardous area.

Get more information

www.siemens.com/processautomation
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