SYS-MMF/-MTF

Mass flow measurement of gases, steam and liquids

- precision
- simplicity
- economy

SYS-MMF and SYS-MTF

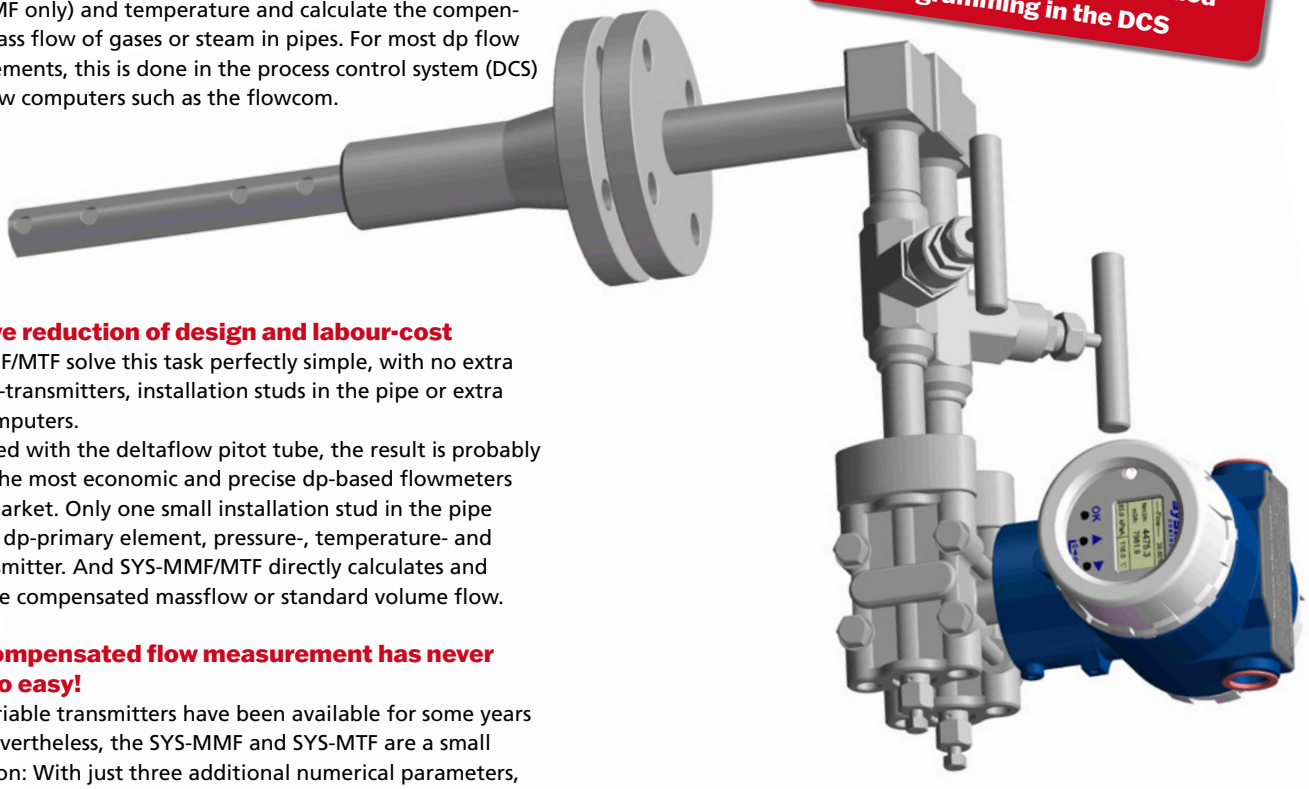
The multivariable differential pressure transmitters

systec CONTROLS

Convert your differential pressure-meter to a mass flow meter

YOUR ADVANTAGES
- Saves additional transmitters
- No extra flow computer needed
- No programming in the DCS

SYS-MMF and SYS-MTF are multivariable transmitters that simultaneously measure differential pressure, absolute pressure (SYS-MMF only) and temperature and calculate the compensated mass flow of gases or steam in pipes. For most dp flow measurements, this is done in the process control system (DCS) or in flow computers such as the flowcom.



Massive reduction of design and labour-cost

SYS-MMF/MTF solve this task perfectly simple, with no extra p- and T-transmitters, installation studs in the pipe or extra flow computers.
Combined with the deltaflow pitot tube, the result is probably one of the most economic and precise dp-based flowmeters in the market. Only one small installation stud in the pipe installes dp-primary element, pressure-, temperature- and dp-transmitter. And SYS-MMF/MTF directly calculates and reads the compensated massflow or standard volume flow.

p&T-compensated flow measurement has never been so easy!

Multivariable transmitters have been available for some years now. Nevertheless, the SYS-MMF and SYS-MTF are a small revolution: With just three additional numerical parameters, the transmitter can be setup in seconds - without costly software, without complicated interfaces, without a 3-day training course at the manufacturer.

With the three front keys and the backlit display, only three variables need to be entered and the SYS-MMF perfectly compensates for pressure and temperature and outputs the mass, volume or standard volume flow.

SYS-MMF/MTF work perfect with the deltaflow. But it can also be used together with any other primary element such as ISO 5167-orifices, -venturis and -nozzles, cone-meters, wedge meters or any type of pitot tubes.

Specifications

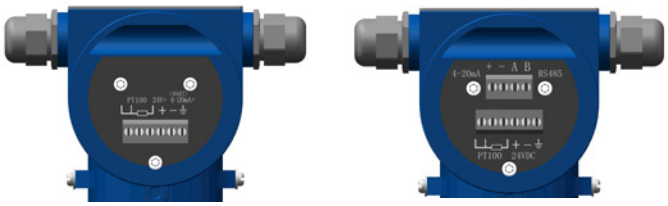
Description	
Measuring principle	Flow transmitters based on the differential pressure principle
Measured values	dp, p_abs (only TYPE MMF), T via external PT100 3 wire
Calculated values	Mass, standard volume or volume flow and totalizers thereof
Media	Gases, steam, liquids
Primary elements	deltaflow pitot tubes, standard ISO 5167 elements such as orifices, venturis, nozzles. Pitot tubes. General primary elements with quadratic characteristic curve.

Cells	Description
Type BB*	dp 0...10 mbar, pabs 0...20 bara, PN40, 316L measuring cell, silicone oil filling
Type BD*	dp 0...60 mbar, pabs 0...20 bar, PN40, 316L measuring cell, silicone oil filling
Type DE*	dp 0...400 mbar, pabs 0...100 bar, PN160, 316L measuring cell, silicone oil filling
Type EDN	dp 0...2500 mbar, pabs 0...250 bar, PN250, 316L measuring cell, silicone oil filling
Type BBG	dp 0...10 mbar, pabs 0...20 bar, PN40, Measuring cell gold-plated, silicone oil filling
Type BDG	dp 0...60 mbar, pabs 0...20 bar, PN40, Measuring cell gold-plated, silicone oil filling
Type DEG	dp 0...400 mbar, pabs 0...100 bar, PN160, Measuring cell gold-plated, silicone oil filling
Type EDNG	dp 0...2500 mbar, pabs 0.. 250 bar, PN250, Measuring cell gold-plated, silicone oil filling

SYS-MMF/MTF combines dp-, pabs-, T-sensor with a flow computer in a single device

2-wire HART transmitter or intelligent MODBUS sensor

The SYS transmitters are available as 2-wire 4...20 mA transmitters with HART protocol or, on request, with MODBUS interface for digital transmission.
With MODBUS, you can read out the absolute pressure, temperature and totaliser (counter value) in addition to the compensated flow rate.



The SYS-MMF is available as an analogue HART 2-wire transmitter type HT (left) or alternatively as an intelligent MODBUS RTU measuring device type RS (right).

Just three setting parameters

The three additional setting parameters are the selection of the medium, the flow coefficient FlowCoef and the compensation factor for the expansion coefficient KEPS. You receive the three values from systec with your deltaflow probe design or you can use the free Excel-based deltacalc design software to easily design your dp measurement yourself.

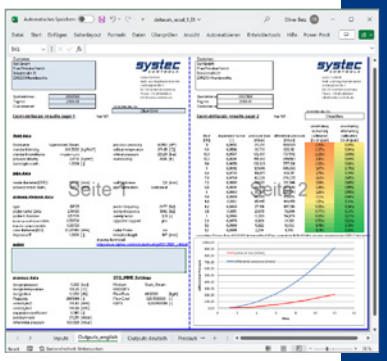
Perfect accuracy, with complete calibration on request.

SYS-MMF together with the deltaflow makes a perfect pair that you can get fully calibrated. The accuracy is impressive: SYS-MMF not only compensates for pressure and temperature, but also calculates the expansion factor. The real gas constants are already taken into account in the design. This allows a system accuracy of up to 0.5% to be achieved - an excellent value for a p&T-compensated measurement.

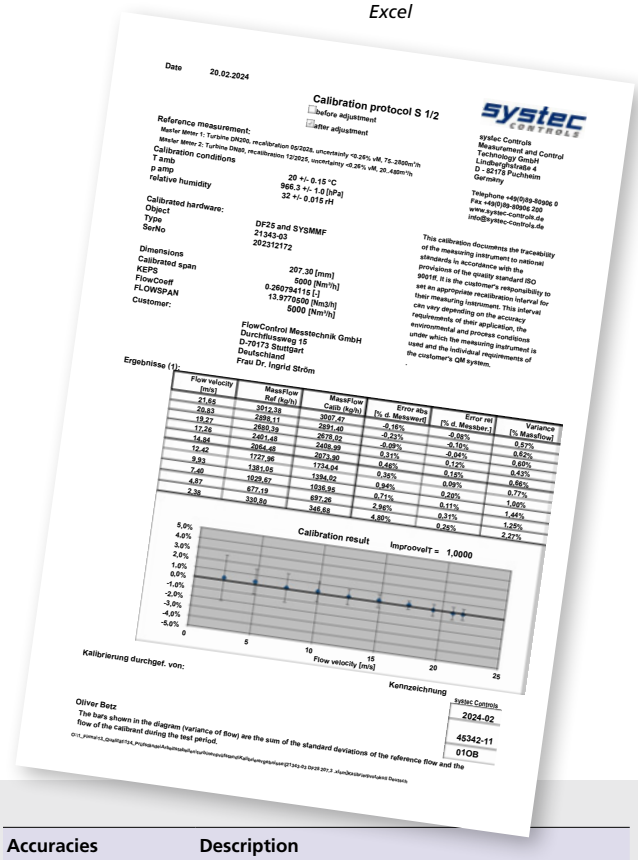
Ask for a factory calibration in accordance with ISO 9001 or a DAkkS calibration.

Free of charge: Valuable design tool deltacalc Excel

With deltacalc Excel, the design of a differential pressure measurement is perfectly easy, regardless of whether you are using a deltaflow integrating pitot tube, an orifice, venturi, nozzle or any other primary element.
deltacalc calculates the complete process data including pressure drop, fluid density and expected overall accuracy as well as the three necessary setting parameters for SYS-MMF/-MTF. These can be easily set via the front keypad on the transmitter or transferred with HART.



Free Excel design software for dp measurements deltacalc Excel


Calibration protocol S 1/2

Technical data	Description
Pneumatic Connection	Flange connection to DIN EN 61518 with 1/4" NPT female thread Mounting screws 7/16 UNF
Electrical connection	Type HT: 2 wires 4...20 mA, 11-30VDC, PT100 3-wire (see picture 1) Type RS: 4...20mA Output, Modbus RT, PT100-3-Wire, 11-20VDC, approx. 45 mA (see Pic. 2)
Sizes (ca)	185 x 90 x 137 mm (without cable glands and locking bolts), 2.7kg

Ex2 Explosion protection Zone 2, ATEX Eex II 3G Ex dp IIC T6 Gc

Ex1 Explosion protection Zone 1, ATEX Zone 1 II 2G Ex dp IIC T6 Gb

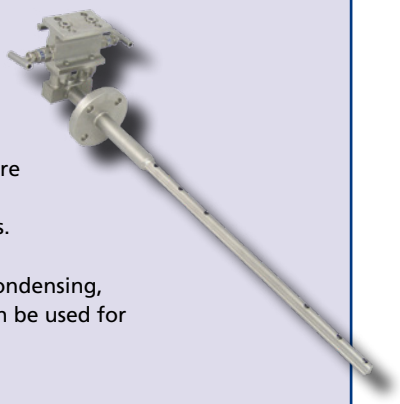
Accuracies	Description	
dp measuring cell	Type BB/BBG:	0,2% m.v. + 0,03 mbar
	Type BD/BDG:	0,15% m.v. + 0,05 mbar
	Type DE/DEG:	0,1% m.v. + 0,2 mbar
	Type EDN/EDNG:	0,1% m.v. + 0,5 mbar
pabs measuring cell*	0.2% f.m. + 0.1% f.s	
PT100 Measurement	+/- 0.5K plus class of PT100	
Mass Flow Calculation	Standard: Typical 1% F.S. plus class of primary element high presision transmitter (option 10P) with calibration: Typical 0.5% F.S. plus class of primary element Calibration of SYS MMF with primary element results in accuracies of down to 0.5% o.s. and better of mass flow reading.	

(m.v. = measured value, f.s. = full span)

Flow measurement technology „by systec“

deltaflowC2

The deltaflowC measures the mass flow of gases in pipes and channels. Thanks to the integrated differential pressure, pressure and temperature sensors and patented microprocessor technology, measurement accuracies of better than 2% can be achieved. The deltaflowC2 is particularly impressive on the strength of its high dynamic performance, zero-point stability and ease of operation. Practical, maintenance-free and available at good value for money, deltaflowC enables you to keep your process costs under control. In addition, deltaflowC2 offers numerous connection options to your process control system with 4...20 mA, 0...10 V, pulse output, CAN and Modbus.



deltaflow for flow metering of gas, steam and liquids

The deltaflow integrating pitot tube proves its quality in thousands of gas-, steam- and liquid pipes around the globe. Per day they save several hundred tons of CO_2 which is good for the planet and good for the plant operators. Some of the deltaflows have been in operation for more than 30 years without wear and tear.
The deltaflow has a perfect accuracy of 1% and better. German PtB tested it with 0.4% for gases. deltaflow works reliable under hardest industrial conditions.
deltaflow is extremely robust and TÜV (German Technical Inspection Agency) tested for use in condensing, aggressive and dirty flue gases. deltaflow is available for pipe diameters from 1 mm – 15 m. It can be used for pressures up to 690 bars and temperatures up to 1280°C (2336°F).

deltaflowC

The deltaflowC measures the mass flow of gases in pipelines and sewers. Thanks to the integrated differential pressure, pressure and temperature sensors together with patented microprocessor technology, measuring accuracies of better than 2% are achieved.
The deltaflowC is characterized by high dynamics, zero-point stability and ease of use. Virtually maintenance-free and at an attractive price, deltaflowC keeps your process costs under control.

The head office of systec Controls is located in Puchheim, near Munich. Here, we develop and manufacture our products according to DIN EN ISO 9001. But innovation and product quality alone are not enough for us. We regulary test our products by third parties – with clear, proven success.

And of course, we are there for you even after the installation of your products. Our service-crew will assist you at your plant.
systec Controls – the specialist in flow measurement technology.

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