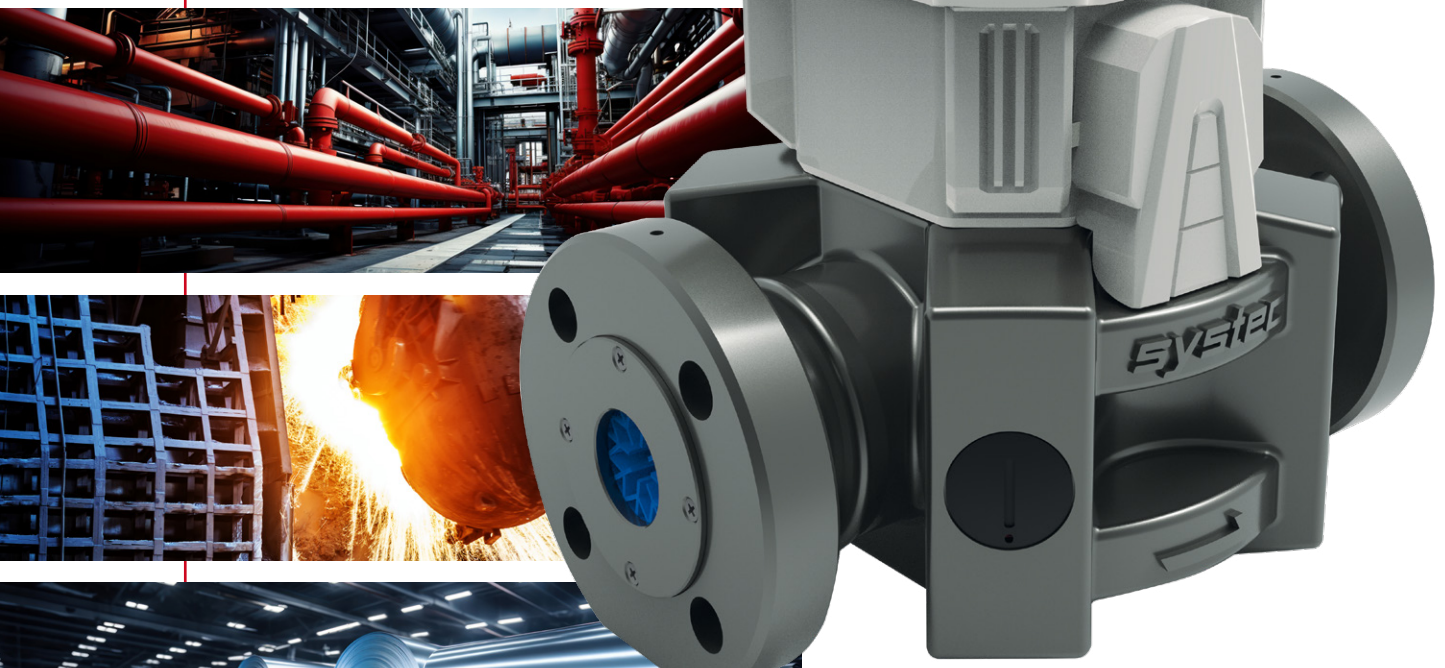
deltawaveSUF

- Precise gas mass flow measurement
- Billing certainty
- Maintenance-free

deltawaveSUF

Ultrasonic gas flow meter



systec CONTROLS

deltawaveSUF gas meter: Precise, simple, economical

deltawaveSUF - the perfect alternative for mechanical gas meters

Until now, the precise measurement of gas volumes has been very complex and expensive. Mechanical meters measure the volume flow very accurately, but ignore the influence of pressure and temperature fluctuations, which leads to very large errors. Therefore mechanical meters are supplemented with pressure and temperature sensors and their influence is then calculated in volume correctors and displayed corrected. This not only sounds complicated, but is also expensive and makes the effort required for accurate measurement very high.

No more complicated and expensive

The multi-path systec SUF ultrasonic gas meter puts an end to expensive, complicated gas flow measurement. It works according to the transit time principle with an integrated p&T sensor. The gas meter can be operated with a built-in battery or with 24 VDC. Up to 5 years of uninterrupted operation is possible with a single battery pack operation is possible.

Ultrasonic experience becomes gas measurement expertise

systec has been developing ultrasonic meters for over 20 years. Flow measurement using the ultrasonic transit time method has many benefits, in particular very large measuring ranges, excellent accuracy, practically no drift in measured values as it is a digital time measurement. There are no moving parts and no analogue components subject to wear or ageing.

Mechanical meter out – deltawaveSUF in

Developing the process for a stationary gas meter was a request from our customers in the gas supply industry.
As a result, deltawaveSUF was designed to be as compatible as possible with existing mechanical gas meters. In most cases, it can simply replace previously installed turbine meters. Both the dimensions and the measuring range have been adapted accordingly.

deltawaveSUF has been customised for gas quantity billing. Measuring ranges and dimensions are identical to many mechanical gas meters, making replacement as easy as possible.

Where no power supply is available, deltawaveSUF runs for 5 years on the integrated battery. Pressure, temperature, volume flow, standard volume flow and the counters can be read on the large display. Daily and hourly values are securely stored in the integrated data logger.

Thanks to the powerful battery and low energy consumption, it even works in places where there is no external power supply.

The special features of the deltawaveSUF

- All SUF gas meter series utilise multi-channel technology, the turn-down ratio is 1:100 for the perfect class 1, optionally even 0,5. In contrast to mechanical flow meters, you also do not need any “flow energy” to drive a turbine, which is why the creeping quantities are almost zero.
- Thanks to ultra-low power technology, the deltawaveSUF only requires 1,8 µA in standard operation. The standard battery pack can therefore be used continuously for 5 years.
- The built-in diffuser and honeycomb flow straightener effectively reduce the required inlet distances.
- The automatic temperature and pressure compensation in combination with high-precision pressure and temperature sensors enables extremely high measuring accuracy. Compensation happens in real time!
- The fail-safe automatic data backup leaves nothing to be desired: Whether the battery is empty or the power supply fails, parameters and values are not lost.
- The advanced design concept and state-of-the-art manufacturing processes ensure efficient gas flow measurement, high reliability and cost-effective gas meters.

Perfectly equipped, powerful, maintenance-free and precise

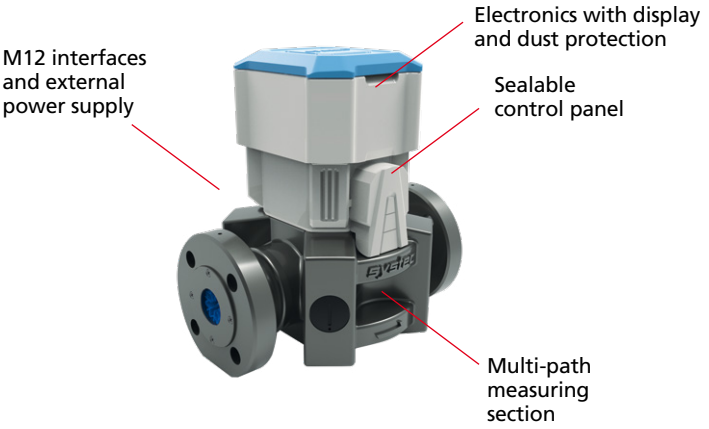
Precisely measure standard volumetric flow – not only of natural gas

The deltawaveSUF takes care of all gas flow measurement tasks: the maintenance-free device is ideal for measuring the flow of single-phase gases, for example in the town gas, petroleum, chemical, electrical energy, metallurgy and other industries.
It measures the volume flow very precisely over a huge measuring range thanks to multi-path ultrasonic measurement. Thanks to the integrated flow straightener, this also works with very short inlet sections. Pressure and temperature sensors are already integrated in deltawaveSUF, as is the volume corrector, which compensates the results to standardised values (Nm³).

Clearly organised display and settings

The LCD display of the SUF gas flow meter provides the user with all the important information about the measurement and device settings. Total (m³, Nm³), flow rate (m³/h, Nm³/h), temperature, pressure, battery, alarm, radio signal are displayed.

deltawaveSUF is fully parameterised and calibrated at the factory. The 4-button operation is sealed to make deltawaveSUF safe for billing purposes.



Security for your systems

The complete series of SUF flowmeters is intrinsically safe explosion protection certified according to "Ex ic IIB T4 Gb"; national type approval and EU certification are in preparation. The RS485 connection ensures reliable signal transmission over long distances as well as in harsh environments.

Reliable and precise at all times

Accuracy class 0,5%, 1%, sealable, short inlet distances due to intelligent flow rectifiers, data stored in a fail-safe memory, works with and without power supply.

Advantages at a glance

- Huge measurement range (1:100)
- High accuracy even with the smallest flow rates
- Integrated pressure and temperature compensation, no external volume corrector required
- Extremely simple operation: Install – done
- Display shows flow rate and counter value in m³/h and Nm³/h
- Tamper-proof due to sealing
- Integrated data logger with 11-year storage capacity
- Optionally with 4..20 mA and RS485 for connection to DCS
- Long-term battery operation, up to 5 years
- Short inlet sections due to integrated flow straightener
- Very affordable to purchase, around 40% cheaper than other solutions (turbine gas meter with p&T sensors and volume corrector)
- Perfect measurement dynamics thanks to intelligent Kalman filter

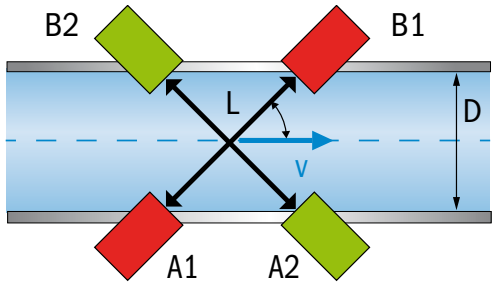
Ultrasonic transit time: Huge measuring range, Mini pressure loss

The measuring principle is based on the effect that the speed of travel of ultrasonic waves changes with the change in flow rate. The transit time technology used in deltawaveSUF allows a calibrated measuring range of up to 1:100 and a lower detection limit of up to 1:500 (depending on the model). This means that even the smallest quantities of gas can be reliably detected.

Easy to install

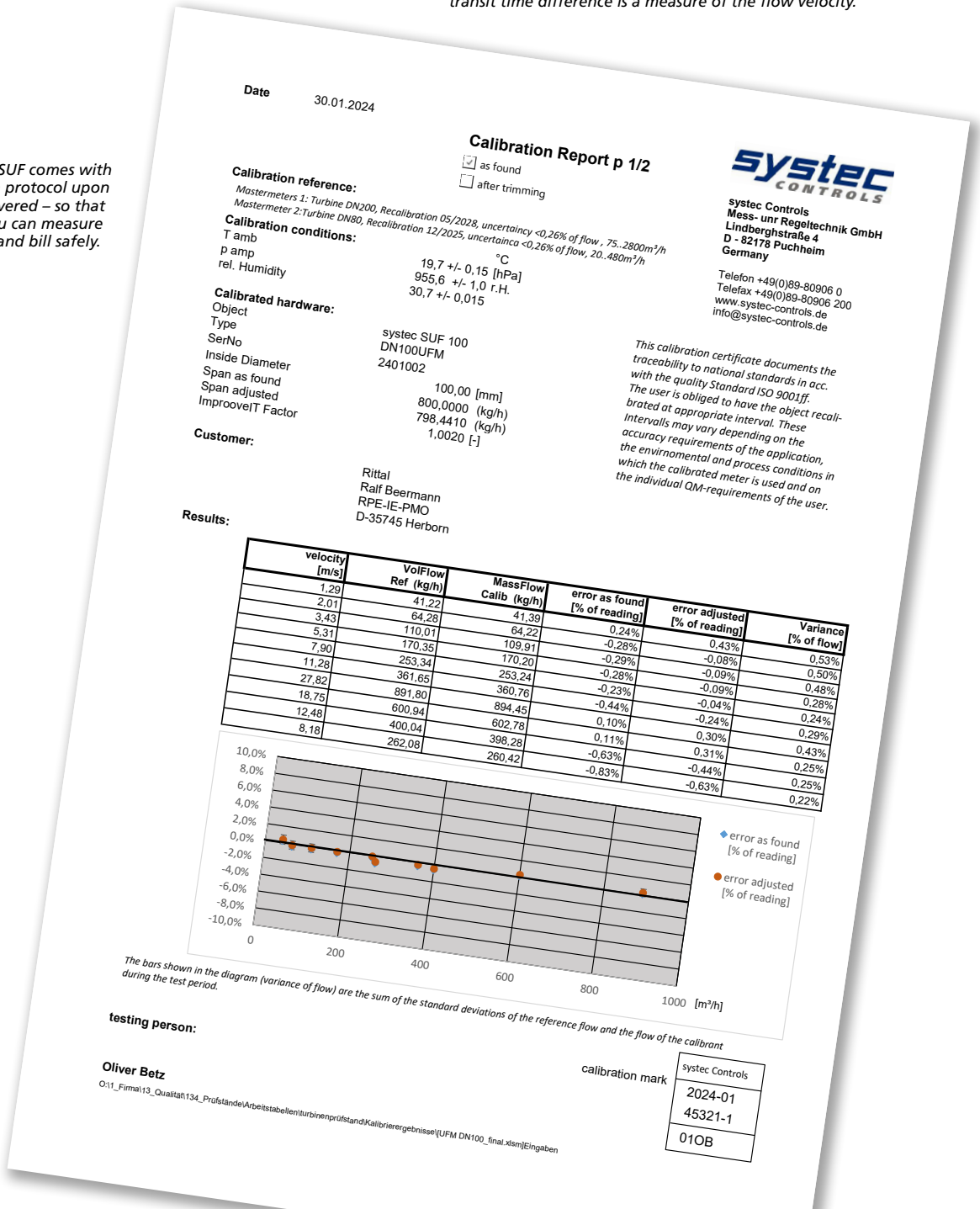
The basic version of deltawaveSUF has HF and LF counting pulses, Modbus and 4..20 mA outputs are also available as options. M12 connection cable and operating instructions are included in the delivery.

Reliable and precise at all times



In the time-of-flight technique, sound waves are sent with (A->B) and against (B->A) the direction of flow and accelerated or decelerated in the process. The transit time difference is a measure of the flow velocity.

deltawaveSUF comes with a calibration protocol upon request delivered – so that you can measure and bill safely.



Date 30.01.2024

Calibration Report p 1/2

☑ as found
☐ after trimming

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info@systec-controls.de

Calibration reference:
Mastermeters 1: Turbine DN200, Recalibration 05/2028, uncertaincy <0,26% of flow , 75..2800m³/h
Mastermeter 2:Turbine DN80, Recalibration 12/2025, uncertainca <0,26% of flow, 20..480m³/h

Calibration conditions:

T amb	°C	
p amp	19,7 +/- 0,15	[hPa]
rel. Humidity	955,6 +/- 1,0	r.H.
	30,7 +/- 0,015	

Calibrated hardware:

Object	systec SUF 100	
Type	DN100UFM	
SerNo	2401002	
Inside Diameter	100,00	[mm]
Span as found	800,0000	(kg/h)
Span adjusted	798,4410	(kg/h)
ImprooveIT Factor	1,0020	[-]

This calibration certificate documents the traceability to national standards in acc. with the quality Standard ISO 9001ff. The user is obliged to have the object recalibrated at appropriate interval. These intervalls may vary depending on the accuracy requirements of the application, the envirnomental and process conditions in which the calibrated meter is used and on the individual QM-requirements of the user.

Customer:
Rittal
Ralf Beermann
RPE-IE-PMO
D-35745 Herborn

Results:

velocity [m/s]	VolFlow Ref (kg/h)	MassFlow Calib (kg/h)	error as found [% of reading]	error adjusted [% of reading]	Variance [% of flow]
1,29	41,22	41,39	0,24%	0,43%	0,53%
2,01	64,28	64,22	-0,28%	-0,08%	0,50%
3,43	110,01	109,91	-0,29%	-0,09%	0,48%
5,31	170,35	170,20	-0,28%	-0,09%	0,28%
7,90	253,34	253,24	-0,23%	-0,04%	0,24%
11,28	361,65	360,76	-0,44%	-0,24%	0,29%
27,82	891,80	894,45	0,10%	0,30%	0,43%
18,75	600,94	602,78	0,11%	0,31%	0,25%
12,48	400,04	398,28	-0,63%	-0,44%	0,25%
8,18	262,08	260,42	-0,83%	-0,63%	0,22%

The bars shown in the diagram (variance of flow) are the sum of the standard deviations of the reference flow and the flow of the calibrant during the test period.

testing person:
Oliver Betz

O:\1_Firma\13_Qualität\134_Prüfstände\Arbeitstabellen\turbinenprüfstand\Kalibrierergebnisse\[UFM DN100_final.xlsm]Eingaben

calibration mark

systec Controls
2024-01
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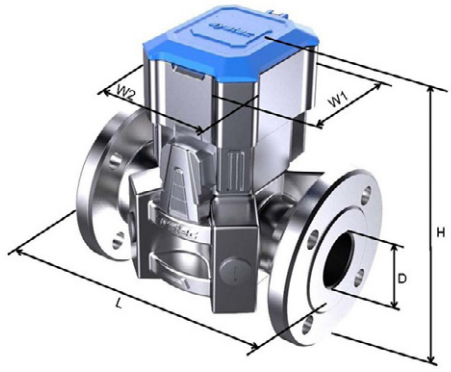
Technical data

Description	Specification
Pipe diameter	DN25 ~ 200 (1 "~ 8")
Media-contacted material	Aluminium, stainless steel, glass
Pressure loss	Less than 1,0 kPa (10 mbar)
Signal output	Frequency output 0...4 kHz, counting pulses, Optional: 4..20 mA, ModBus RTU, NB-IOT, GPRS
Ex	CNEX Ex ic IIB T4 Gc. (ATEX i.V.)
Data storage	60 days with 1 h values, 11 years daily values, readable via RS485
Insulation resistance	The insulation resistance between the external power terminals, signal output terminals and the housing is more than 20 MΩ.



Nominal diameter DN (mm)	Model specification	Measuring start (m³/h)	Measurement range (m³/h)	Accuracy class (m³/h)		Number of measuring paths
				±1,0 %	±0,5 % optional	
25 (1")	DN25	0.5	1-50	1-50		2
32 (1")	DN32	0.5	1-70	1-70		2
40 (1")	DN40	0.5	2-130	2-130		2
50 (2")	DN50	0.5	2-220	3-200	5-180	2
80 (3")	DN80	1.2	5-550	5-500	10-450	2
100 (4")	DN100	2.0	12-800	12-800	20-700	4
150 (6")	DN150	4.5	15-1700	15-1700		4
200 (8")	DN200	9.0	27-3000	27-3000		4
300	DN300	12	70-7000	70-7000		4

Nominal diameter	Dimensions (in mm)				
	D	L	H	W1	W2
DN25	25	241	220	142	120
DN32	32	241	240	142	120
DN40	40	241	255	142	120
DN50	50	241	267	142	120
DN80	80	241	300	142	120
DN100	100	241	320	142	120
DN150	150	450	430	142	120
DN200	200	600	480	142	120

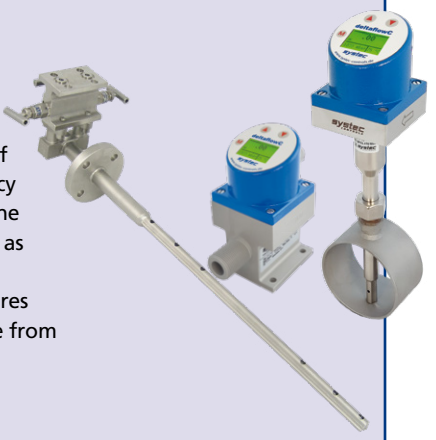
SUF specifications – all series at a glance:

Model	SUF-025	SUF-032	SUF-040	SUF-050	SUF-080	SUF-100	SUF-150	SUF-200
Specification (mm)	25	32	40	50	80	100	150	200
Flow range (m³/h)	1-50	1-70	2-130	2-220	5-550	12-800	15-1700	27-3000
Power supply	Battery operation without external power supply: At least 4 years. External supply 5 - 26 VDC							
Insulation resistance	The insulation resistance is higher than 20 MΩ							
Media	Natural gas, propane, butane, LPG, air, nitrogen and other gases							
Temperature range (medium)	-25°C … +60°C							
Pressure range	0..4 bar abs							
Temperature and pressure measurement	Built-in digital temperature and pressure sensor, pressure error less than 0,5 kPa, temperature error less than 0,5°C							
Ambient conditions	-25°C … +60°C, ≤ 90% RH							
Pressure loss	Less than 1,0 kPa							
Accuracy class	Class 1,0; optional class 0,5							
Signal output	HF pulse: external driver voltage 2,5-30 VDC, output test pulse signal, maximum frequency 5 kHz AF pulse: external actuator voltage 2,5-26 VDC, output measuring pulse signal, 1/1 m³							
Digital interface (optional)	RS485, Modbus-RTU, NB-IOT, GPRS							
Analogue output (optional)	Compensated flow rate (Nm³/h) as 4..20 mA (passive)							
LCD display	Total volume, flow rate, temperature, pressure, battery, NB-IOT signal, alarm							
Explosion protection	Ex ic Zone 1 CNEX, IEC (in preparation) ATEX (in preparation)							
Calibratability	In preparation							

Flow metering technology „by systec“

Clamp-On, the flexible solution for many applications

The deltawaveC devices are available in two different series: The deltawaveC-P for mobile / sampling measurement tasks and the deltawaveC-F for fixed, continuous measurements. Both devices use the proven and highly accurate ultrasonic transit time difference method. Thanks to the use of the latest digital signal processors, these robust measuring devices are extremely precise and drift-free. Thanks to the clamp-on technology, the ultrasonic transducers can be mounted in just a few minutes. Time-consuming separation of the pipework is not necessary. As a result, and by avoiding process downtimes, deltawaveC devices make a decisive contribution to optimising operating costs.
The proven deltawaveC technology for liquid measurements is also available as deltawaveCoG for measurements with gaseous media.



deltaflow and deltaflowC, differential pressure flow measurement

The deltaflow and deltaflowC family of dynamic pressure probes has proven itself thousands of times over in the measurement of gases, liquids and vapours. Low pressure loss, perfect accuracy and unbeatable robustness make systec Controls the world market leader in this technology. The deltaflowC are for gases and already have the three measured variables dp, pabs and T as well as the gas volume calculator integrated in the connection head.
The deltaflow for gases, vapour and liquids can be used for pressures up to 600 bar, temperatures up to 1240°C, contamination and condensation. Whether you only want to purchase the probe from systec or complete measurements including sensors and evaluation, you decide.

Coriolis flow meter SYS-SMF

The SYS-SMF Coriolis flow meter combines maximum precision and reliability. Accuracies from 0,05% and measuring ranges of 1:100 are the current state of the art in this technology. Developed together with the University of Oxford, TÜV, PtB and systec, the devices are not only very powerful, but also very reliable and easy to operate.

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 have also had our systems tested by independent institutes – with clear, proven success. And of course, we are there for you even after the installation of your system. Our service-crew will assist you at your plant.
systec Controls – the specialist in flow measurement technology.

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