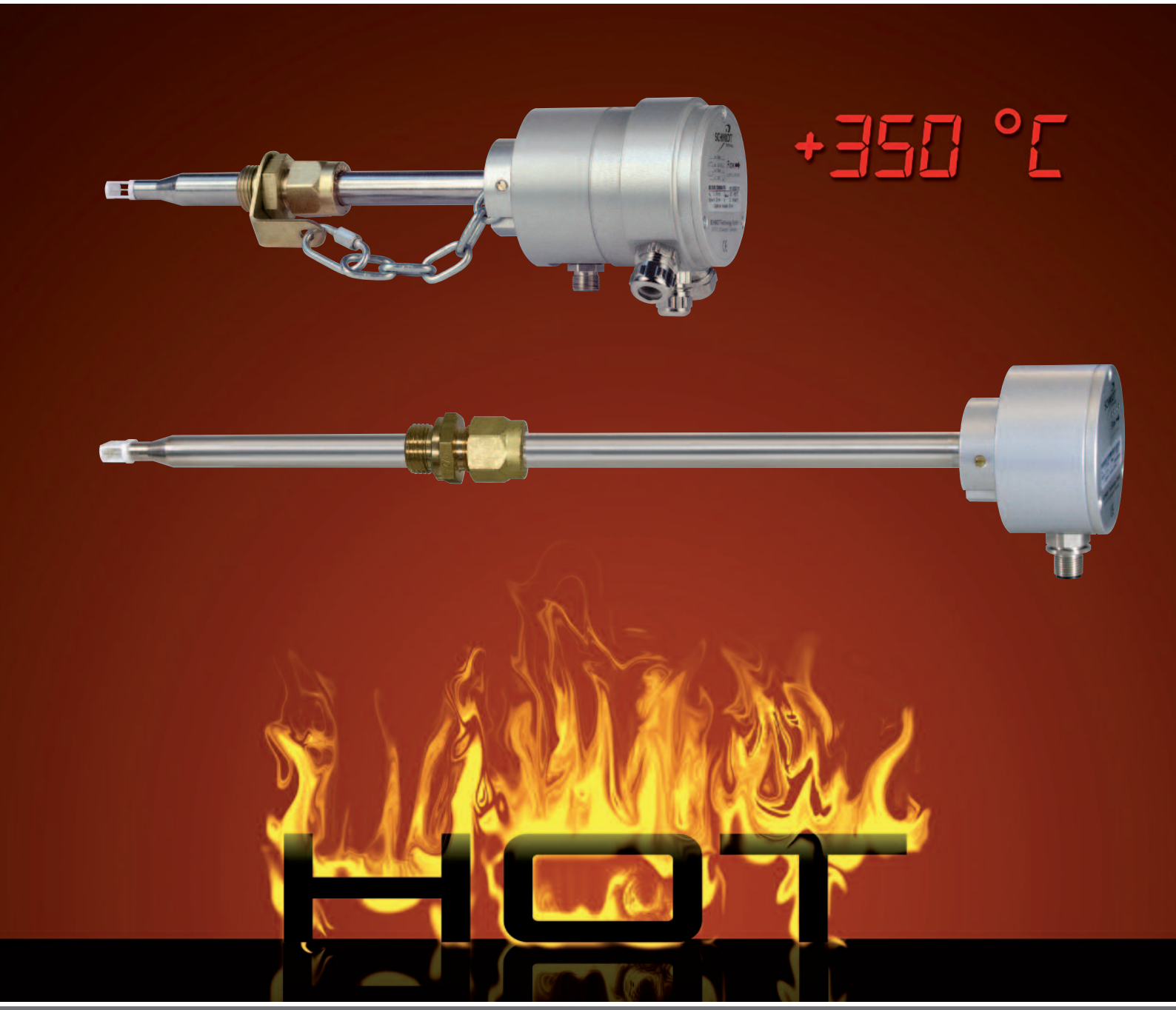
SCHMIDT® Technology

Easy Improved Measurement!
SCHMIDT® Flow Sensor SS 20.650



The maintenance-free flow sensor for high air and gas temperatures, with fast reactions from 0.2 m/s.

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Flow measurement at high temperature and pressure

The measurement of the flow velocity and/or the volume flow at higher temperatures up to +350 °C is very important in many fields with regard to energy efficiency, quantity detection and system control. The requirements of the stationary flow sensor are very high. The following properties are relevant for the sensor selection:

Mechanical robustness

The sensor is exposed to high temperatures and forces due to the gas flow. Due to the sometimes very difficult installation sites, special importance must be given to a long and maintenance-free operating time. Sensors without wearing parts are particularly economic.

Exact and long-term stable measuring values

You need to rely on a correct quantity detection of gases. Even after using the device for years, the measuring values must be correct like on the first day. A “drift” of the zero point or the measuring value in the course of time is not allowed. Cross sensitivities, such as pressure or temperature variations must not influence the measurement results.

Different installation sites

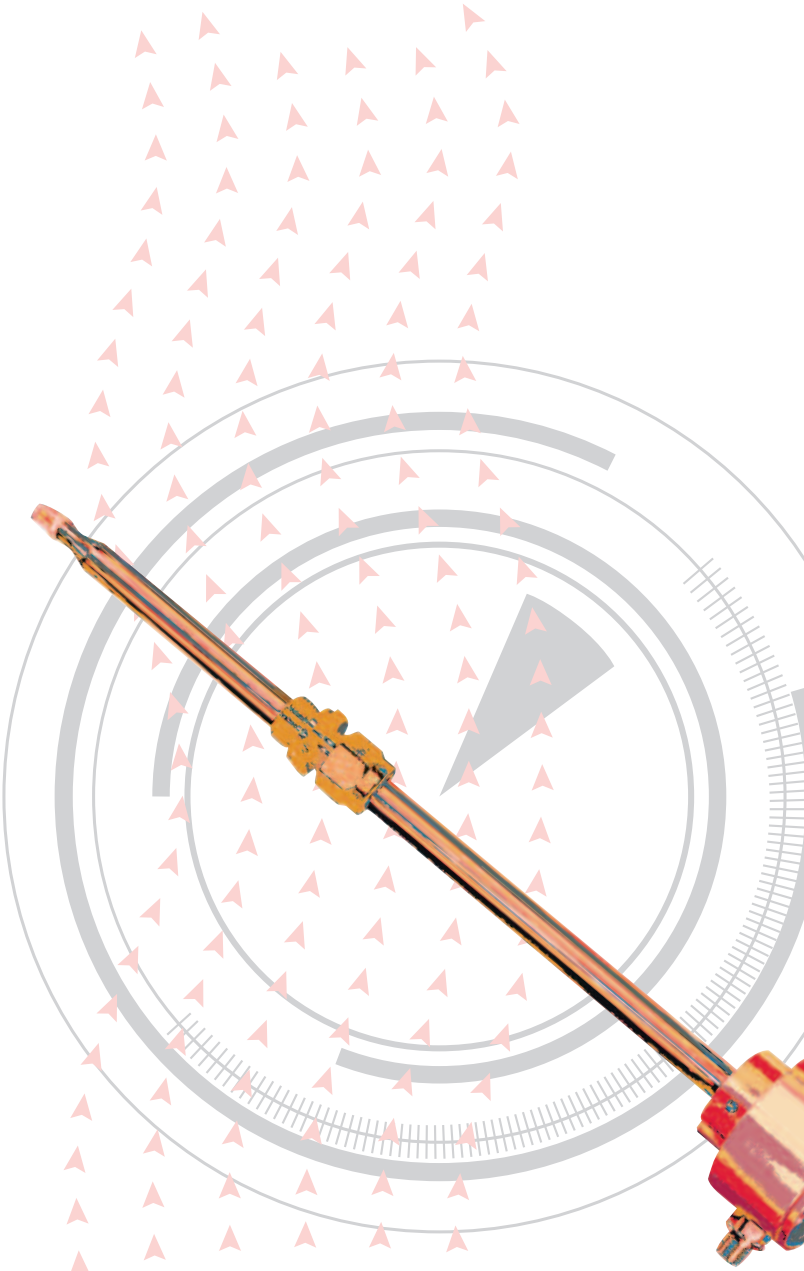
No two installation sites are alike and the possible installation sites often are very limited. Thus, the sensor must offer various mounting lengths or a sensor element that also allows a suboptimal orientation in the flow. Also the size of the sensor is important - the bigger it is the more limitation must be considered for the installation site.

Wide flow measuring range

Due to the different operating conditions or duty cycles, the flow sensor must record minimum and maximum volume flows with maximum accuracy.

Temperature recording

In flow measurement the temperature is another interesting measured variable and recording and evaluating it at the same time offers advantages.



Burner regulation on process ovens

Innovative ceramic products are being used more and more in medical, environmental and automotive engineering. The requirements of the products are varied and the complex Firing process is connected to high process requirements. The manufacturers of burners must meet the challenge to develop future-oriented technologies that guarantee highest temperature accuracy, atmosphere regulation and efficient use of energy by heat recovery. The measuring device has a particular importance. The **SCHMIDT® Flow Sensor SS 20.650** has been developed for precise regulation of the combustion air preheated up to 350 °C. The direct measurement of the mass flow without additional sensors allows an accurate stoichiometry of the combustion.

"With the flow sensor SS 20.650 we have found the perfect flow sensor for our burner control. Without wear parts and easy to install. The sensor is also very suitable for retrofitting already existing systems thanks to its compact structure"
Bernd Geismar, CTB ceramic technology gmbh berlin

Monitoring of drying processes

In coating technology the drying process plays an important role for the product quality and for avoiding rejected parts. With the **SCHMIDT® Flow Sensor SS 20.650** the drying air is controlled exactly by means of a volume flow regulation. The simultaneous temperature recording at the measuring point is also important for the production results. Another advantage of these sensors is the fact that they are maintenance-free because they often are installed on sites difficult to access.

Monitoring of air compressors

When monitoring the power of modern air compressors, temperatures of up to 200 °C may occur depending on the technique. At the same time, depending on the power, there is an overpressure up to 16 bar that the flow sensor must resist. With the **SCHMIDT® Flow Sensor SS 20.650** you can perform power measurements and leakage controls thanks to the wide measuring range of 0.2 to 60 m/s. The precision of the measurement also allows you to calculate exactly the quantity of compressed air.

"With the SS 20.650 you can optimally measure all compressor types. Especially where high precision calibration is required the calibration certificate is very important for the correct system analysis"
Torsten Staffeldt, GASEX Technology GmbH

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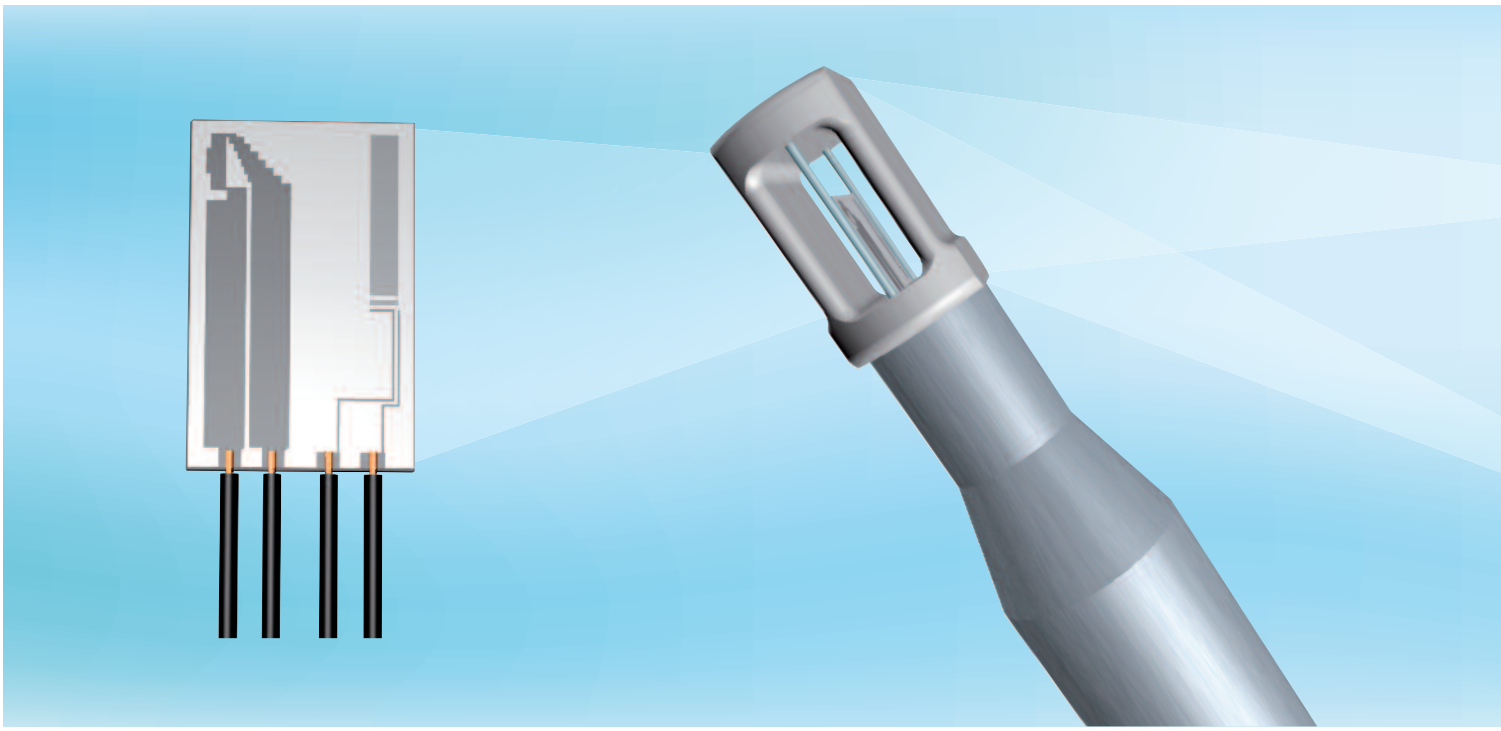


Innovative flow measurement technology

The **SCHMIDT® Flow Sensor SS 20.650** works on the maintenance-free thermal measuring principle that does not use moving parts. The advantage of this measuring principle is the measurement of the flow velocity at normal conditions without the additional calculation of other measured variables (e. g. pressure and temperature). In case of tube measurements, the user easily gets the desired standard flow.
In its basic version, the flow sensor is available in four measuring ranges 0 ... 10 / 20 / 40 and 60 m/s and with a maximum temperature of 200 °C. A version with up to +350 °C and pressure-tight up to 16 bar is optionally available. It is also possible to record brief temperature overshooting exceeding the nominal temperature up to 10 %.
The **SCHMIDT® Flow Sensor SS 20.650** is equipped with an integrated temperature measurement. The temperature signal is output as a separate measuring signal and can be used for a separate control.

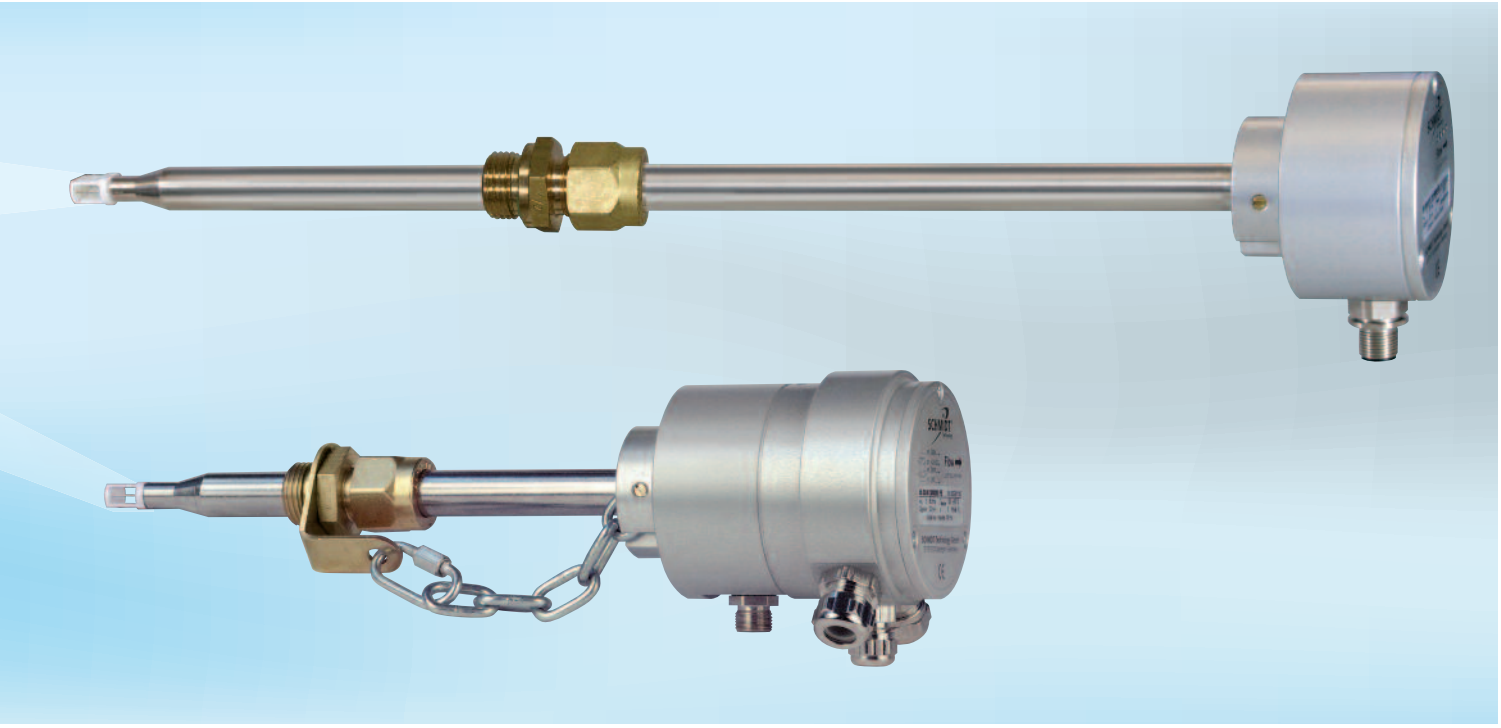
The robust sensor element

The sensor element developed by **SCHMIDT Technology** uses a high-temperature-resistant ceramic substrate as carrier. This sensor element is positioned in an aerodynamically efficient and protected way inside the aerodynamically designed chamber head. The chamber head is also made of heat-resisting ceramic material.
The deposits and dust can be eliminated by cleaning the sensor elements with compressed air.

Flexible mounting lengths and small dimensions for simple installation

The standard mounting lengths are 400, 600 and 1,000 mm. For special mounting situations it is possible to realize customer-specific mounting lengths between 400 and 1,000 mm. The measured current is not influenced (blocked) thanks to the small structure of the sensor element and the small diameter of the sensor tube.
The sensor is supplied with a through bolt joint – as pressure-tight version (+350 °C, 16 bar) with safety chain.

The installation is very easy: Screw the sensor in the welded sleeve, adjust the sensor tip in the center of the tube and tighten the screw. Now you can start the flow analysis!



Which output signals do you need?

Upon request, the **SCHMIDT® Flow Sensor SS 20.650** is supplied with linear 0 ... 10 Volt or 4 ... 20 mA output signals – as standard with an additional digital output for the direct consumption measurement of the gas flow.
Versions with PROFIBUS DP or DeviceNet can be supplied for the connection to field bus networks.

Accuracy in black and white

Upon request, the sensor can be supplied with a high precision calibration. The high precision and repeatability is documented in an ISO calibration certificate. The measurement is realized on reference measuring channels at **SCHMIDT Technology**. This calibration can be renewed at any time upon request of the user.

All advantages at a glance:

- direct measurement of the standard flow velocity up to +350 °C
- maintenance-free and without moving parts
- high turn down ratio of up to 1:300
- integrated temperature measurement
- high precision calibration with ISO calibration certificate (optional)
- analog and digital output
- field bus output (optional)
- easy to clean
- robust and compact housing
- two-color LED status display
- flexible mounting lengths up to 1,000 mm
- economic basic version up to +200 °C

The LED display is used for function monitoring and for a quick error analysis on site. With the field bus versions, the status of the communication is displayed.

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Technical data

Measuring quantity	standard velocity wN based on standard conditions of T_N = 20 °C and p_N = 1,013.25 hPa
Medium to be measured	air, nitrogen, other gases upon request
Measuring range flow w_N	0 ... 10 / 20 / 40 / 60 m/s (40 / 60 m/s to $T_{max.}$ +200 °C)
Lower measuring range limit	
Measurement accuracy	
Standard	±(3 % of measuring value + 0.4 % of measuring range) 1
High precision (optional)	±(1 % of measuring value + 0.4 % of measuring range) 1
Repeatability w_N	±0.5 % of measuring value
Response time t_{90}	3 s (jump from 0 to 5 m/s)
Temperature gradient	8 K/min @ wN = 5 m/s
Pressure dependence	independent of pressure of the medium
Measuring range temperature	0 … +200 °C / +350 °C
Measurement accuracy temp.	±1 % of measured value (min. 1 K)
Operating temperature	
- Sensor	0 … +200 °C / +350 °C
- Electronics	-20 ... +70 °C
Operating pressure	basic design: 700 ... 1300 hPa pressure-tight high-temperature design: 0 to 16 bar
Supply voltage U_B	24 V DC ±20 %
Current consumption	100 mA typ. @ wN = 20 m/s and TM = 350 °C
Switch-on current	140 mA for max. 5 s
Stabilization time	approx. 10 s after switch-on
Connection	plug (male), M12, 8-pin

Cable length (admissible)	
- Voltage output	15 m
- Current output	100 m
- Digital output	100 m
Analog outputs	type selectable when ordering
- Function	1 flow, 1 temperature
- Voltage type	0 ... 10 V RL ≥ 10 kΩ
- Current type	4 ... 20 mA RL ≤ 400 Ω
Digital output w_N	pulse output
	high level: ≥ U_B -1.5 V
	low level: ≤£ 0.7 V
	load current: ≤ 400 mA
Digital output frequency	0 ... 10 / 16 / 20 / 40 / 100 Hz (selectable when ordering)
Pulse duration min.	1 / (2 x f_{max})
Material	
- Housing	aluminum AlMgSiPb, anodized
- Sensor tube	stainless steel X6 CrNiMoTi 1.4571
- Sensor head	ceramics
- Sensor element	platinum resistor element, passivated glass
Mounting	through bolt joint made of brass, mounting thread G 1/2 x 12
Mounting tolerance	±3° relative to flow direction
Installation position	as desired 2
Probe length (L)	400/600/1,000 mm; special lengths upon request
Weight	550 g max. (400 mm input length) 800 g (field bus version)
Protection type housing	IP 65
Protection type sensor	IP 67 (pressure-tight high-temperature design)

Field bus DeviceNet version (option)

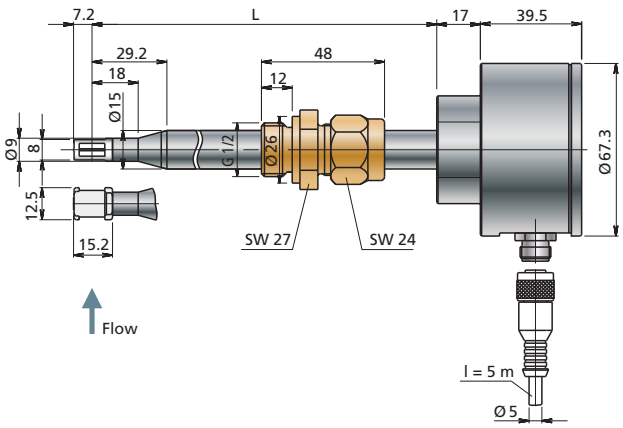
Standardization	ISO /DIS 11 898 DeviceNet Specification Volume I + II release 2.0
Electrical connection	8-pin screw-type terminal inside the housing cable feed via 3 cable bushings
Terminal resistor	the terminal resistor (120 Ohm, 0.25 W) is disabled on delivery and can be activated by a single-pole DIP switch.
Baud rate	125 / 250 / 500 kbit/s, default value 125 kbit/s, adjustable via DIP switches or by software
Address	0 ... 63, default value of address 63 (MAC ID 63), can be configured via rotary switch or by software
Operating modes	poll mode, Change of State (COS), cyclic
Process data	32 bits; volume flow, alternatively flow velocity selectable
Switch thresholds	upper and lower switch threshold adjustable for flow velocity and volume flow
Warning flag	signal when exceeding measuring range
Alarm flag	signal of a defective sensor
Status display	two-color LED indicates status of field bus communication

PROFIBUS DP version (option)

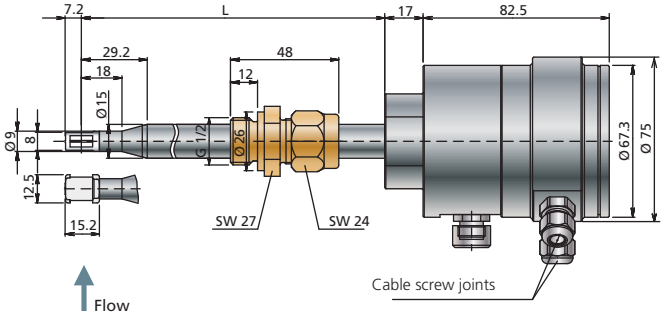
Standardization	Profibus standard EN 50 170
Electrical connection	8-pin screw-type terminal inside the housing cable feed via 3 cable bushings
Terminal resistor	The activated network terminal resistor (390-220-390 Ohm) is disabled on delivery and can be activated by a two-pole DIP switch.
Baud rate	9600 Bd – 12 MBd, adjustment automatically via Profibus master
Address	00 ... 99, adjustable via BCD rotary switch
Operating modes	"Data Exchange" to Profibus DP-V0
Process data	32 bits; volume flow, alternatively flow velocity selectable
Switch thresholds	upper and lower switch threshold adjustable for flow velocity and volume flow
Warning flag	signal when exceeding measuring range
Alarm flag	signal of a defective sensor
Status display	two-color LED indicates status of field bus communication

1) under reference conditions
2) limited with downdraft flow < 2 m/s and simultaneous overpressure

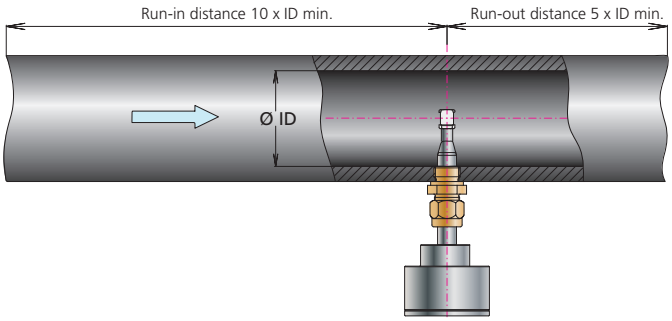
Dimensions standard sensor



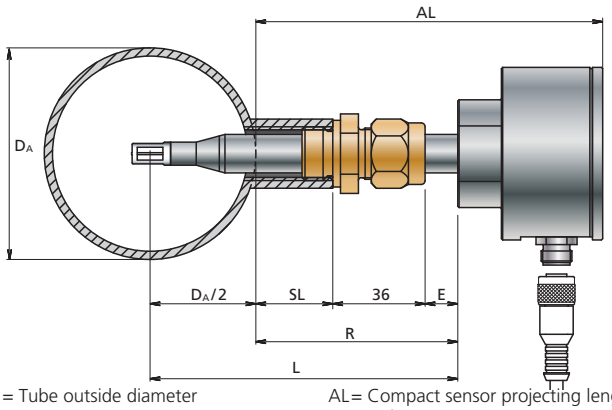
Dimensions field bus or PROFIBUS version



Mounting instructions



Mounting parameters



D_A = Tube outside diameter
SL = Welding stud length
E = Probe tube setting length
AL = Compact sensor projecting length
R = Reference length
L = Probe length

In order to avoid overheating of the sensor electronics, a length of E > 70 mm of the probe tube must be free (without insulation) and project out of the measuring tube.

Selection table measuring range when using it in tubes

Nominal tube width	Measuring range of volume flow in m³/h for sensor measuring range:			
DN	10 m/s	20 m/s	40 m/s*	60 m/s*
65	109	219	439	659
80	153	306	613	920
100	231	462	924	1.386
125	358	717	1.434	2.152
150	519	1.039	2.079	3.119
200	999	1.999	3.998	5.997
250	1.600	3.200	6.401	9.602
300	2.278	4.556	9.112	13.668
350	2.745	5.491	10.982	16.474
400	3.611	7.223	14.446	21.670
450	4.573	9.146	18.293	27.440
500	5.676	11.353	22.706	34.059
550	6.869	13.738	27.477	41.216
600	8.308	16.617	33.234	49.851

*) Max. gas temperature +200 °C

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Order information on the flow sensor SS 20.650

	Description	Article number							
Basic sensor	**SCHMIDT® Flow Sensor SS 20.650**; $T_{max.}$ +200 °C; atmospheric; with through bolt joint	524 500- KXYZPFDD	K (output)	X (length)	Y (measuring range)	Z (calibration)	P (version)	F (frequency)	DD (pressure range)
	Options:								
Output signals	2 x 0 ... 10 V (m/s and °C), digital output (pulse)		1						
	2 x 4 ... 20 mA (m/s and °C), digital output (pulse)		2						
	DeviceNet cable bushing		3						
	PROFIBUS DP with cable bushing		4						
	Frequency digital output 0 ... 100 Hz							2	
	Frequency digital output (selection 0 ... 40 / 20 / 16 / 10 Hz): 0 ..._ Hz							3	
Mechanical version	Mounting length 400mm			1					
	Mounting length 600 mm			2					
	Mounting length 1,000 mm			3					
	Special length (> 400 mm to 1,000 mm): Length: _____ mm			9					
Temperature and pressure	Basic version (atmospheric pressure); $T_{max.}$ +200 °C						1		
	Pressure-tight high-temperature version (16 bar overpressure) and $T_{max.}$ up to +350 °C, with pressure-tight through bolt joint						2		
	Operating pressure DD: 00 (atmosphere) ... 16 (16 bar overpressure)								00 ... 16
Measuring ranges and calibration	Measuring range 0 ... 10 m/s				2				
	Measuring range 0 ... 20 m/s				3				
	Measuring range 0 ... 40 m/s (with pressure-tight high-temperature version $T_{max.}$ +200 °C)				4				
	Measuring range 0 ... 60 m/s (with pressure-tight high-temperature version $T_{max.}$ +200 °C)				5				
	Standard calibration					1			
	High precision calibration with ISO calibration certificate					2			

Accessories	Description	Art. no.
	Connecting cable 8-pin, length 5 m, with coupler socket and open cable end sleeves	524 921
	Coupler socket 8-pin, cable length selectable, free of halogen, with cable end sleeves	524 942
	Coupler socket 8-pin, with screw connections, for cable diameter 6 ... 8 mm	524 929
	Welding sleeve G1/2", steel, according to EN 10241, 5 pieces	524 916
	Welding sleeve G1/2", stainless steel 1.4571, according to EN 10241, 2 pieces	524 882
	Display module, 8 digit display, dimensions 72 x 72 x 108 mm, with pulse input, 24 V DC / 6 W	300 838
	24 V DC power supply unit, terminal strip connection	300 640
	Power/voltage supply	Upon request
	LED display in wall housing	Upon request

Form 1085/11/09/2500/2 · art. no. 524509.02 · Subject to technical modifications

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