SCHMIDT® Technology

Simply a question of
better measurement

SCHMIDT® Technology

Order information SCHMIDT® Flow Sensor SS 20.500

	Description	Article number					
Basic sensor	SCHMIDT® Flow Sensor SS 20.500; output signal 4 ... 20 mA and 0 ... 10 V	521 501 -	X	Y	Z	P	A
	Options						
Mechanical type	Sensor length 100 mm		1				
	Sensor length 150 mm		2				
	Sensor length 350 mm		3				
	Sensor special length (> 100 ... 1,000 mm): _____mm		9				
	Remote sensor with 3 m cable		4				
	Remote sensor with special cable length: _____ m (1 ... 30 m; 1 m steps)		5				
Measuring range, adjustment accuracy and calibration	Measuring range 0 ... 1 m/s			1			
	Measuring range 0 ... 2.5 m/s			6			
	Measuring range 0 ... 5 m/s			2			
	Measuring range 0 ... 10 m/s			3			
	Measuring range 0 ... 20 m/s			4			
	Measuring range 0 ... 35 m/s			5			
	Measuring range 0 ... 50 m/s			7			
	Standard adjustment				1		
	Standard adjustment with factory calibration certificate				5		
	High precision adjustment with factory calibration certificate (only at Y = 1; 0 … 1 m/s)				2		
	Standard adjustment 4 … 20 mA				3		
	Standard adjustment with factory calibration certificate 4 … 20 mA				6		
	High precision adjustment 4 ... 20 mA with factory calibration certificate (only at Y = 1; 0 … 1 m/s)				4		
Protection type	Without protective coating					1	
	With protective coating PU (black)					2	
	With protective coating Parylene (transparent)					5	
	No ATEX design (SS 20.500)						1
	ATEX design (SS 20.500 Ex)						2

	Description	Article number
Accessories	Connection cable 5-pin, length 5 m, with coupler socket and open cable ends	523 565
	Connection cable 5-pin, selectable length (2 … 100 m; 1 m-steps), with coupler socket and cable end sleeves, halogen free	523 566
	Coupler socket 5-pin, with screw type terminals for cable Ø 4 … 6 mm	523 562
	Mounting flange made of galvanized steel	301 048
	Wall-mounting flange, stainless steel, 1.4404, PTFE	520 181
	Compression fitting stainless steel G ½, atmospheric pressure	532 160
	Compression fitting brass G ½, atmospheric pressure	517 206
	Compression fitting brass G ½, max. 10 bar, with protection against pressure losses	524 891
	Compression fitting stainless steel G ½, max. 10 bar, with protection against pressure losses	524 919
	Welding sleeve steel G ½, according to EN 10241, 5 pieces	524 916
	Welding sleeve stainless steel G ½, according to EN 10241, 2 pieces	524 882
	Attachable protective clip for protection against mechanical influences, stainless steel	531 026
	Attachable protective 2-wires-clip for protection against mechanical influences, stainless steel, H_2O_2-resistant	559 124
	Power supply: output 24 V DC / 1 A; input 115 / 230 V AC	535 282
	LED display MD 10.010; in wall housing to show the volume flow and flow velocity, 85 … 230 V AC and sensor supply	527 320
	LED display MD 10.010; similar to 527 320, but with 24 V DC voltage supply	528 240
	LED display MD 10.015; similar to 527 320, with additional sum function and second measuring input	527 330
	LED display MD 10.015; similar to 527 330, but with 24 V DC voltage supply	528 250
	Assembly kit for pipe assembly suitable for MD 10.010 / 10.015, including pipe clamps and collar for adjustment to the pipe diameter	531 394

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SCHMIDT® Flow Sensor SS 20.500

The ideal solution for flow measurement – even for dusty air and gases. Highly precise and compact!

- Industrial processes
- Cleanroom / pharmaceuticals
- Ventilation / air-conditioning

Flow measurement easily handled

To be able to measure air and gas flows precisely and with repeatability a number of ‘correct’ parameters are required. For many flow sensors orientation relative to flow direction is essential for quality of results. The choice of the right sensor is also dependent on the gas to be measured. Dust and aggressive gases will also impact on the quality of results and also causes increased maintenance and replacement, with evident additional costs. In areas with potential for explosion hazard, as found in powder handling and oil/gas plants for example, sensors with appropriate approval are required, and limits the options of sensor supplier.

This flow sensor makes selection easier

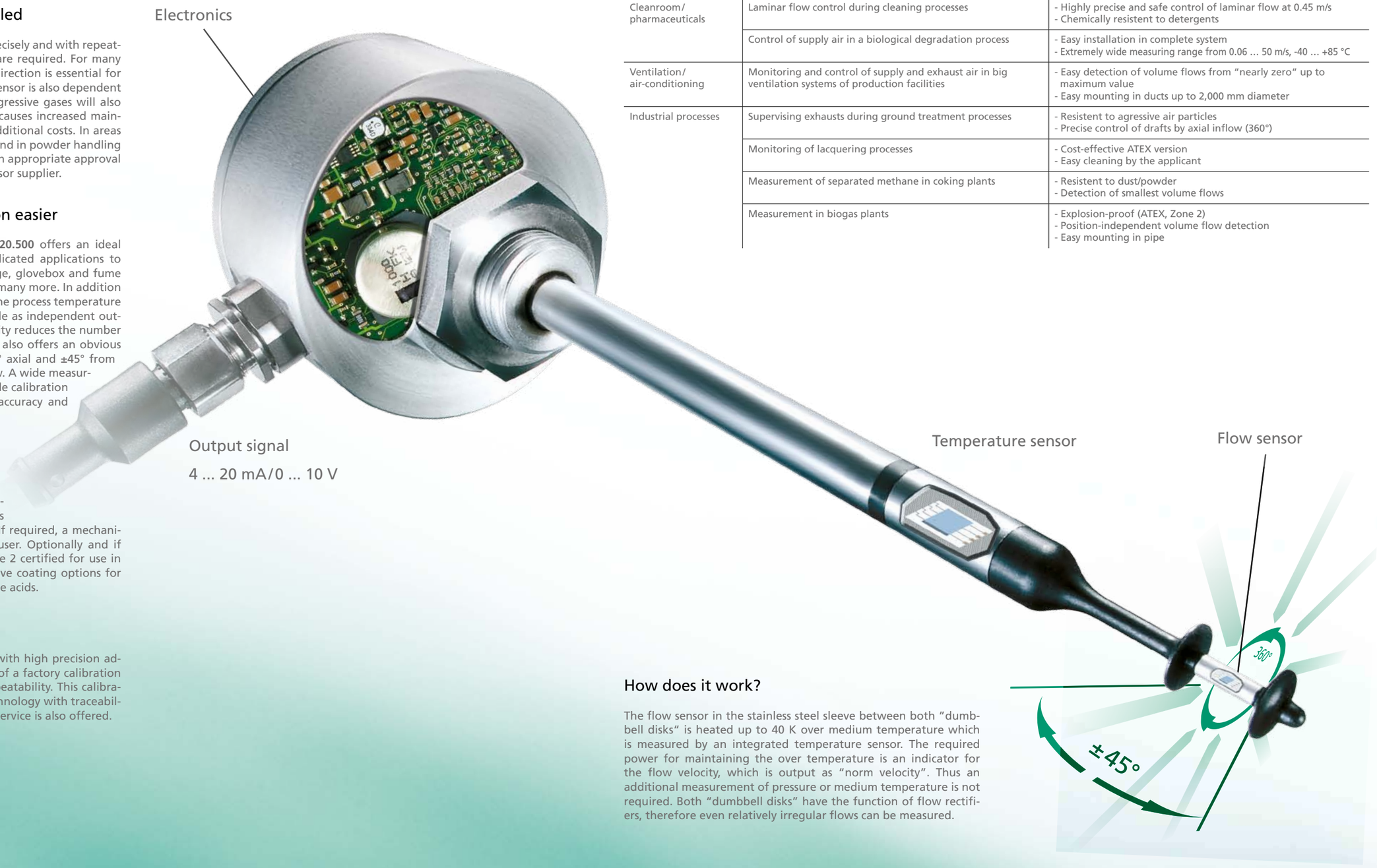
The **thermal SCHMIDT® Flow Sensor SS 20.500** offers an ideal solution for energy efficiency and complicated applications to include drying processes, exhaust discharge, glovebox and fume cupboard flows, volume flow control and many more. In addition to flow velocity the sensor also measures the process temperature and both of these parameters are available as independent outputs. This combined measurement capability reduces the number of tapping points, easing installation and also offers an obvious cost benefit. Extreme flow angles of 360° axial and ±45° from vertical simplify positioning in the gas flow. A wide measuring range of 0.06 up to 50 m/s and traceable calibration via a high precision adjustment ensures accuracy and reliability of measurement.

Dust and aggressive gases? No problem!

The patented dumbbell head makes measurement possible in dust laden applications without influencing the measured value. If required, a mechanical cleaning is easily carried out by the user. Optionally and if required the sensor is available ATEX Zone 2 certified for use in hazardous areas and with special protective coating options for resistance to aggressive mediums, e.g. trace acids.

Accuracy in black and white

Also as an option the sensor is available with high precision adjustment. This option includes the supply of a factory calibration certificate with recorded accuracy and repeatability. This calibration is carried out in-house at Schmidt Technology with traceability to National Standards. A recalibration service is also offered.

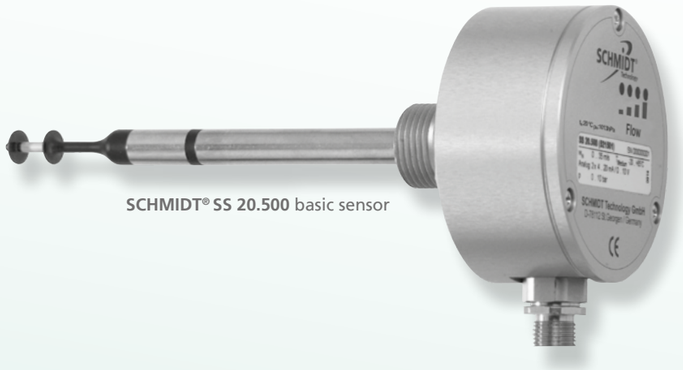


Practical examples

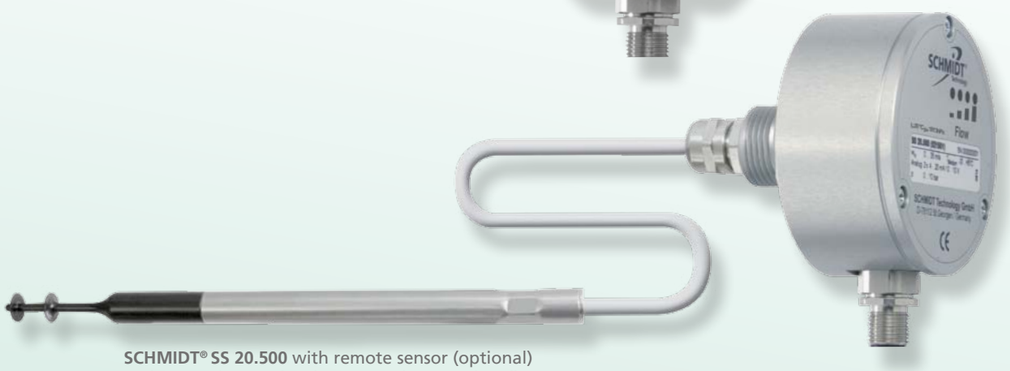
Branch	application	The solution with SS 20.500
Cleanroom/ pharmaceuticals	Laminar flow control during cleaning processes	- Highly precise and safe control of laminar flow at 0.45 m/s - Chemically resistent to detergents
	Control of supply air in a biological degradation process	- Easy installation in complete system - Extremely wide measuring range from 0.06 … 50 m/s, -40 … +85 °C
Ventilation/ air-conditioning	Monitoring and control of supply and exhaust air in big ventilation systems of production facilities	- Easy detection of volume flows from “nearly zero“ up to maximum value - Easy mounting in ducts up to 2,000 mm diameter
Industrial processes	Supervising exhausts during ground treatment processes	- Resistent to agressive air particles - Precise control of drafts by axial inflow (360°)
	Monitoring of lacquering processes	- Cost-effective ATEX version - Easy cleaning by the applicant
	Measurement of separated methane in coking plants	- Resistent to dust/powder - Detection of smallest volume flows
	Measurement in biogas plants	- Explosion-proof (ATEX, Zone 2) - Position-independent volume flow detection - Easy mounting in pipe

How does it work?

The flow sensor in the stainless steel sleeve between both ”dumbbell disks“ is heated up to 40 K over medium temperature which is measured by an integrated temperature sensor. The required power for maintaining the over temperature is an indicator for the flow velocity, which is output as ”norm velocity“. Thus an additional measurement of pressure or medium temperature is not required. Both ”dumbbell disks“ have the function of flow rectifiers, therefore even relatively irregular flows can be measured.



SCHMIDT® SS 20.500 basic sensor



SCHMIDT® SS 20.500 with remote sensor (optional)
and protective coating (PU or parylene, optional)

You have the choice!

Besides standard sensor lengths, customized lengths from 100 … 1000 mm are available on request. Selecting a customized length allows ideal positioning of the measuring element in the flow stream.

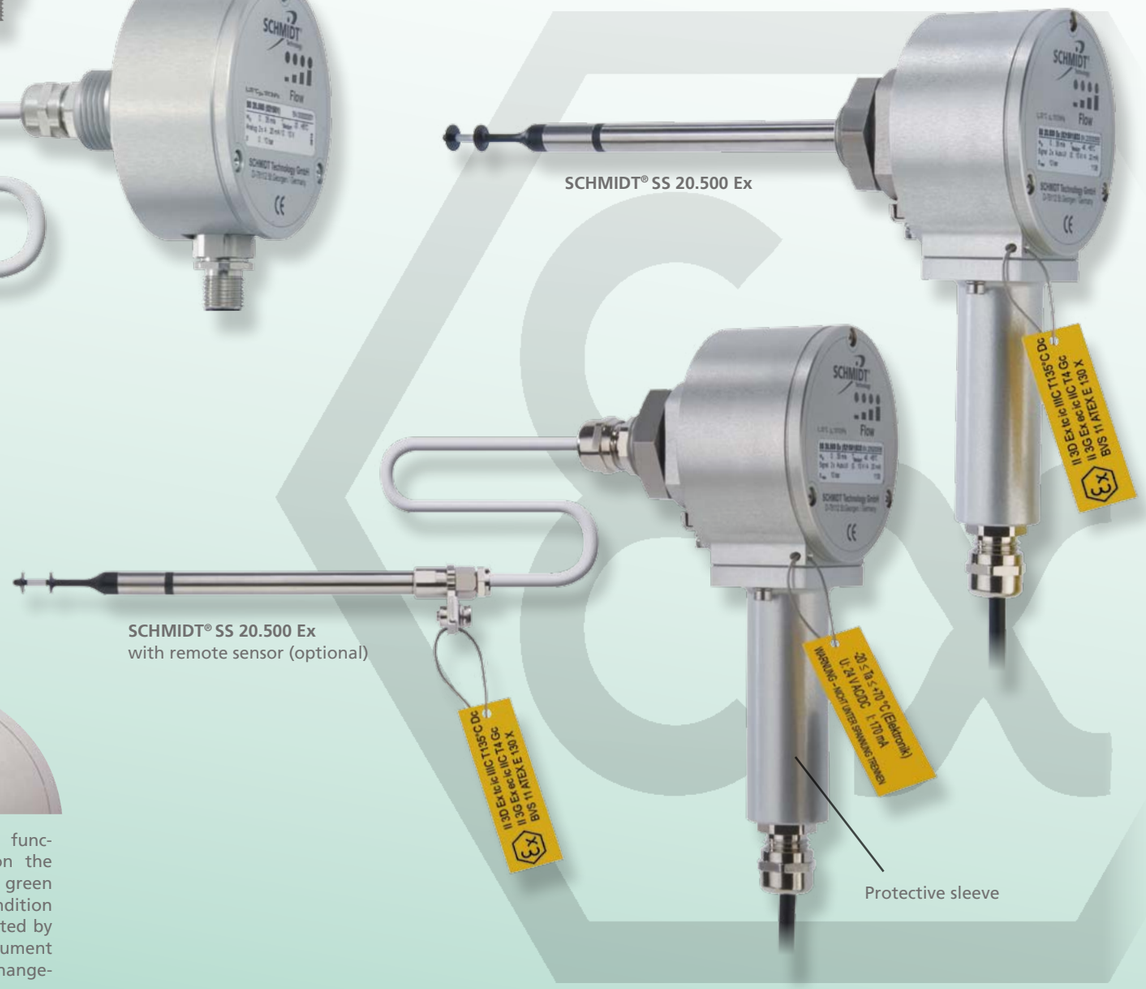
The aerodynamically shaped dumbbell head offers optimal performance where problematic flow characteristics exist and the crevice free design allows easy cleaning. As an option and where applications demand two special protective coating is available.

Everything in view

The LED display is dual function. In ‘normal’ operation the 4 x LEDs illuminate steady green in sequence. In ‘fault’ condition reportable faults are indicated by red flashing LEDs. The instrument will output V and mA and changeover is automatic.

ATEX design
Applicable in inflammable environments

The optional ATEX version SS 20.500 Ex has been designed for applications in potentially explosive atmospheres – gases and dusts – of zone 2. For this purpose special protective functions are integrated amongst others, e.g. the protective sleeve for the plug-in connector of connecting cable and the earthing terminal on the housing. For difficult installation situations the version “remote” is recommended. In this case the additional earthing on the sensor tube has to be considered for the ATEX version.



SCHMIDT® SS 20.500 Ex
with remote sensor (optional)

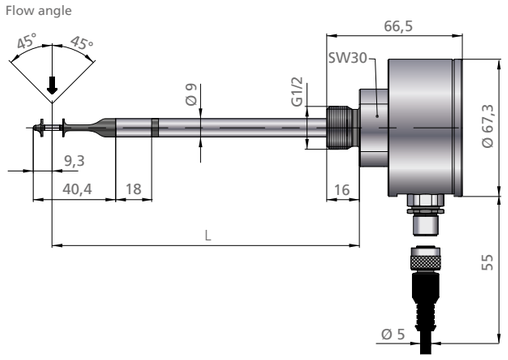
Technical Data

Data	
Measuring values	Standard flow velocity w_N normalized to T_N = 20 °C and p_N = 1,013.25 hPa Temperature of medium T_M
Measuring fluid	Air / nitrogen or other gases on request
Measuring range w_N	0 … 1/2,5/5/10/20/35/50 m/s
Lower detection limit w_N	0.06 m/s
Temperature range measuring T_M	-40 … +85 °C
Accuracy	
Standard w_N [1)]	±(3 % of measured value + [0.4 % of end of measuring range; min. 0.02 m/s])
High precision (optional) w_N [1)]	±(1 % of measured value + [0.4 % of end of measuring range; min. 0.02 m/s]) [2)]
Repeatability w_N	±1 % of measured value
Response time t_{90} w_N	3 s (jump from 0 to 5 m/s air)
Temperature gradient w_N	≤ 2 K/min at 5 m/s
Measuring accuracy T_M (w_N > 1 m/s)	±1 K (10 … 30 °C); ±2 K (remaining measuring range)
Operating temperature	
Sensor	-40 … +85 °C
Electronics	-20 … +70 °C
Storage temperature	-40 … +85 °C
Material	
Housing	Aluminium, anodised
Sensor tube	Stainless steel 1.4404
Sensor head	PBT fibre-glass reinforced, stainless steel 1.4404
Protective coating (optional)	Polyurethane derivative / Parylene
Protective sleeve (ATEX)	Aluminium, anodized
Sensor cable (remote sensor)	(TPE, halogenfree)
General Data	
Medium environment	Non-condensing (up to 95 % RH)
Maximum pressure - compact sensor - remote sensor	 10 bar (overpressure) Atmospheric (700 hPa … 1,300 hPa)
Display	4 x Duo-LEDs (green/red/orange)
Supply voltage	24 V AC/DC ± 20 %
Current consumption	60 mA typ. (max. 170 mA)
Analog outputs for velocity and temperature - Type Auto-U/I	0 … 10 V / 4 … 20 mA (short-circuit protected) Voltage output: R_L > 500 Ω Current output: R_L < 500 Ω Hysteresis: 50 Ω
Electrical connection	Plug-in connection M12, screwed, 5-pin, male
Maximum cable length	Voltage output: 15 m, current output: 100 m
Mounting position	Arbitrary
Minimum immersion depth	58 mm (< 58 mm on request)
Type / class of protection	IP67 (sensor head) / IP65 (housing) / III (SELV) or PELV
ATEX-category	II 3D Ex tc ic IIIC T135°C Dc II 3G Ex ec ic IIC T4 Gc
Sensor length	100/150/161.5 (remote version)/350/≤ 1000 mm
Weight by mass	400 g max. (without cable)

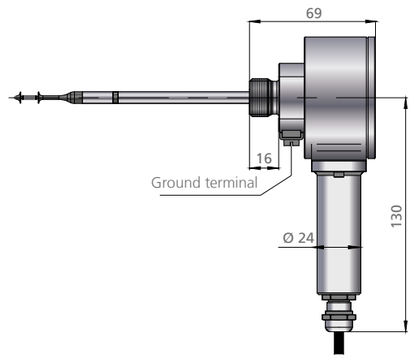
[1)] under reference conditions, related to the calibration reference
[2)] only available for measuring range 0 … 1 m/s

Physical Dimensions (mm)

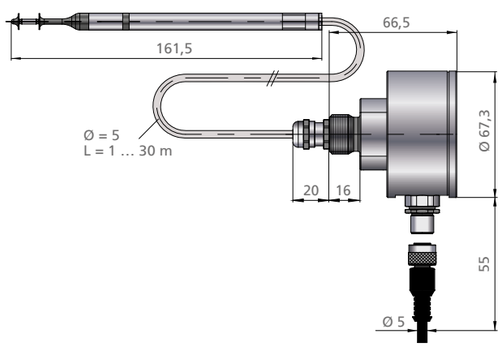
Basic sensor



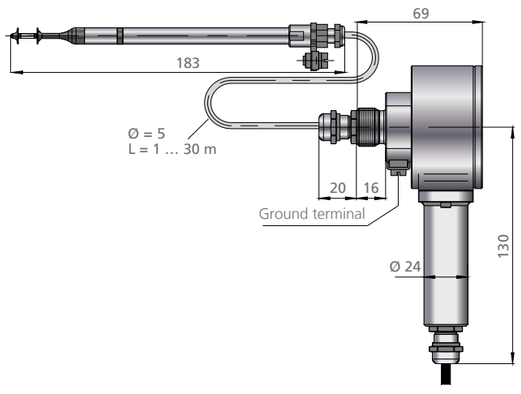
ATEX design SS 20.500 Ex (optional)



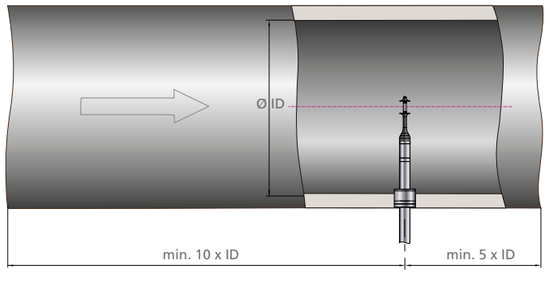
Remote sensor

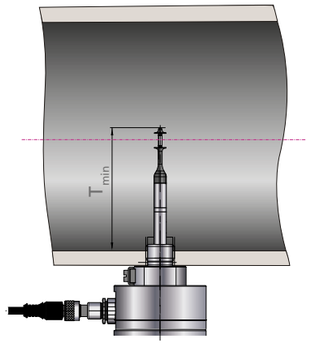


Remote sensor ATEX design (optional)



Mounting instructions





T_{min}: Minimum inmersion depth > 58 mm
(smaller depth of immersion on inquiry)

Accessories

LED wall display (accessories)
(see separate brochure)
For local indication an LED wall display is available.
The advantages:
- Display in m/s or m³/h
- Programmable output signal
- Two programmable relay outputs
- Voltage supply 85 … 230 V AC
- Voltage supply of the connected sensor
- Separate version with sum function

Compression fitting in stainless steel, max. 10 bar over-pressure [1]

Compression fitting in brass, max. 10 bar over-pressure [1]

[1] also available as compression fitting for atmospheric pressure (without overpressure protection kit)

Protective clip
To protect the dumbbell head from serious mechanical influences a protective clip made of stainless steel can be attached to the sensor tube. This accessory part is especially recommendable e.g. in “clean workbenches”, to avoid unintended contact during operation. The protective clip is designed in a way to eliminate aerodynamic influence.

Coupler socket with screw type terminals

Mounting flange

Compression fitting in brass or stainless steel for atmospheric pressure

Weelding sleeve steel or stainless steel