

SCHMIDT® Flow Sensor

SS 20.60



Product Description

Flow sensor with integrated microcontroller transducer for the measurement of air-flow velocity and for the determination of flow rate or flow volume.

The aerodynamically styled chamber head of the sensor provides optimized flow properties in respect of an extremely small flow resistance. It creates no additional loss of the line pressure and is not sensitive to dirt and dust.

The output signal is linearized via a stored digitized flow characteristic curve and is independent of the medium pressure. The electronic temperature compensation is effective within the overall specified working temperature range.

Besides the analog output, a binary signal output is available. It allows a direct consumption measurement of the air flow in connection with an integrating meter.

Measuring Principle

The principle of the flow measurement is based on the heat-transfer calorimetric method.

An electrically heated thermo-resistor is kept at a constant higher temperature relative to the medium (CTD mode). The heat dissipation into the medium increases with increasing mass flow. The heater voltage is thus a direct measure for the standard flow velocity.

The Credit Points

- + Independent of temperature and pressure
- + Large measuring-range dynamics
- + High temperature gradient permissible
- + Measurement without additional pressure drop
- + Leakage detection
- + Linearized output signal
- + Calibrated binary output for consumption metering
- + Immersion sensor for various tube diameters
- + Single-point mounting
- + Pressure-proof design
- + Calibration certificate

Applications

- Compressed-air supply
- Variable-air-volume control
- Ventilator control
- Air conditioning
- Air intake and exhaust control
- Filter monitoring
- Laminar-flow control
- Air-massflow control of burners and combustion engines
- Energy management
- Facility management

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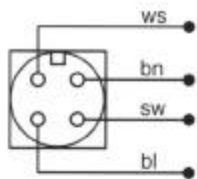
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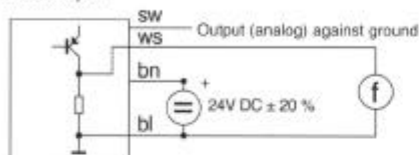
Technical Data

Measuring parameter	Standard flow velocity w_N normalized to $\vartheta_N = 20\text{ °C}$, $p_N = 1,013.25\text{ hPa}$	Pulse / Switching frequency ($0 \dots f_{\max}$)	0 ... 100 Hz 0 ... 40 Hz 0 ... 20 Hz 0 ... 16 Hz 0 ... 10 Hz optional
Measuring fluid	Air		
Measuring range (w_N)	0 ... 60 m/s 0 ... 40 m/s 0 ... 20 m/s 0 ... 10 m/s 0 ... 2.5 m/s optional	Pulse duration min.	$1 / (2 \times f_{\max})$
Lower range limit	0.2 m/s	Supply voltage (U_B)	24 VDC $\pm 20\%$
Lower detection limit	0.1 m/s	Current consumption	75 mA typ. @ $w_N = 0\text{ m/s}$ 110 mA typ. @ $w_N = 60\text{ m/s}$
Measurement inaccuracy	$\pm 3\%$ of measurement value plus 0.4 % of measuring range final value but at least 0.04 m/s	Switch-on current	130 mA for 5 s max.
Repeatability	$\pm 2\%$ of measurement value	Stabilization time	approx. 10 s after switch-on
Response time (t_{90})	3 s (0 to 5 m/s transient)	Electrical connections	Plug-in connection via 4-wire connection cable with plug, 4 x 0.34 mm ² , blank core ends tinned
Operating temperature		Cable length	5 m
– Compact sensor	– 20 ... + 85 °C	Extension length (perm.)	
– Remote sensor	– 20 ... + 120 °C	– Voltage output	15 m
– Electronics	0 ... + 60 °C	– Current output	100 m
		– Binary output	100 m
Storage temperature	– 20 ... + 85 °C	Housing	Aluminium anodized
Humidity range	0 ... 95 % RF	Probe tube	Stainless steel X6 CrNiMoTi
Pressure range		Sensor head	Thermoplast PPO/PA
– Atmospheric	700 ... 1300 hPa	Mounting	Tube throughpassage, brass, pressure-proof, probe tube adjustable, mounting thread G 1/2 x 12
– Overpressure	0 ... 16 bar	Mounting tolerance	$\pm 5^\circ$ relative to flow direction
Temperature gradient	8 K / min @ $w_N = 5\text{ m/s}$	Dimensions	
Recovery time constant	6 s at temperature jump $\Delta\vartheta_{\text{air}} = 40\text{ K}$ and $w_N = 5\text{ m/s}$	– Housing	$\varnothing 67.3 \times 56.5\text{ (mm)}$
Temperature dependence	Compensated within operating temperature range	– Sensor head (W x H x D)	8 x 15.2 x 12.5 (mm)
Pressure dependence	Independent of medium pressure within pressure range	– Probe tube	$\varnothing 15\text{ mm}$
Analog zero correction	Pressure-related adaptation of flow characteristics	Mounting length (L)	
Analog output	0 ... 10 V 0 ... 20 mA 4 ... 20 mA optional	– Compact sensor	120, 180, 250, 400 (mm) optional
Load resistance (perm.)		– Remote sensor	190 mm, remote from housing, with 3m flexible connection
– Voltage output	$\geq 10\text{ k}\Omega$	Weight by mass	450 g max. (without cable)
– Current output	$\leq 300\ \Omega$	Enclosure class	IP 65 (housing)
Binary output	Rectangular-shaped signal Output stage alternatively as	Electrical protection	class 3 (according to DIN VDE 0106 part 1)
– Pulse output	High level: $\geq U_B - 3\text{ V}$ Low level: $< 0.7\text{ V}$ Load resistance: $\geq 2\text{ k}\Omega$	CE conformity	EN 50081-2 (emission) EN 50082-2 (immunity)
– Switched output	Current feed externally with 27 mA max. in accordance with DIN 43 864 High level: $\geq 10\text{ mA}$ Low level: $\leq 2\text{ mA}$		

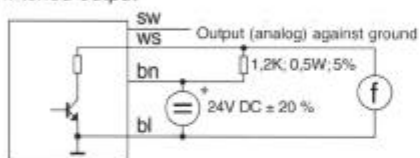
Electrical Connections



Pulse output



Switched output



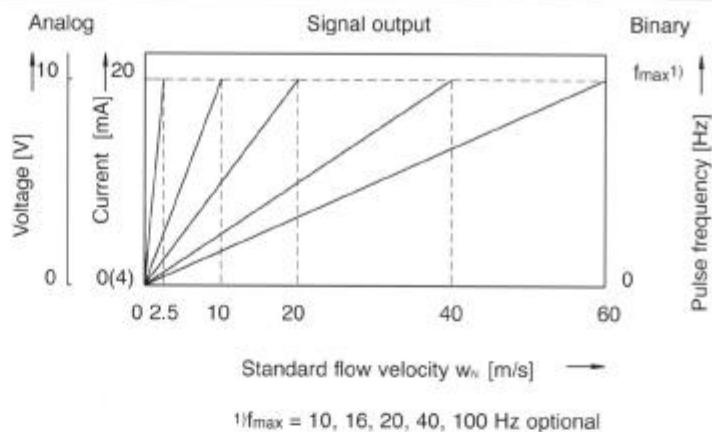
Cable assignment:

ws: Binary output (0...fmax)
 bn : +24 VDC $\pm$ 20%
 sw: Output (analog)
 bl: $\perp$ (GND)

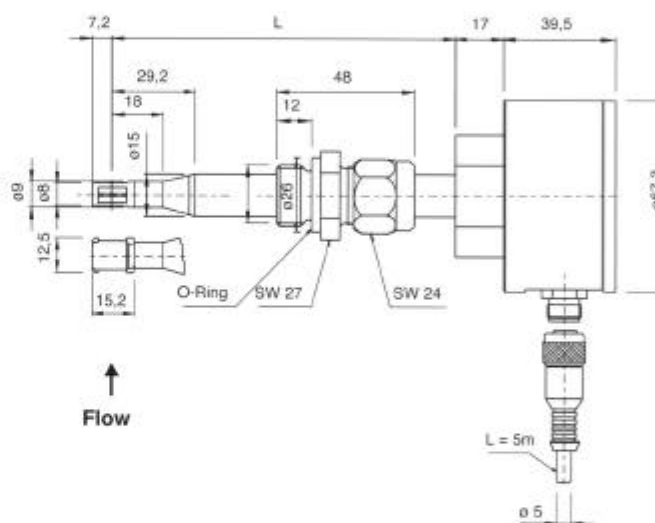
Colour code:

ws = white
 bn = brown
 sw = black
 bl = blue

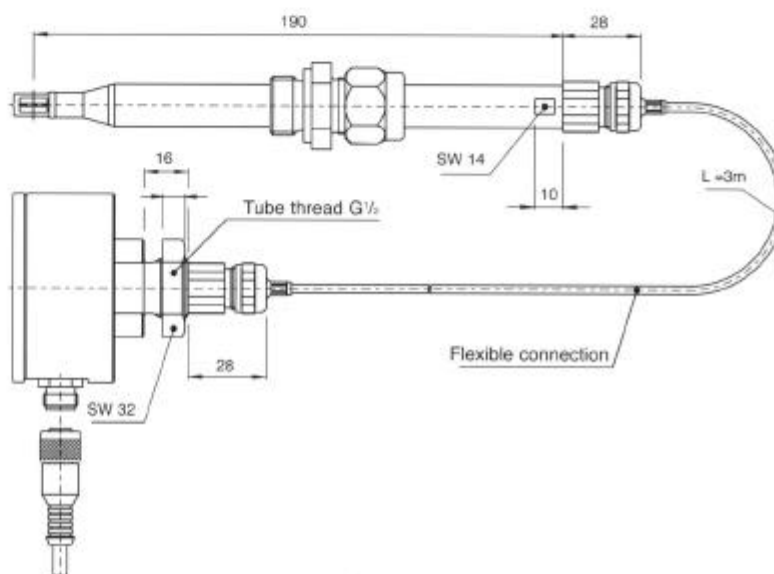
Flow Characteristics



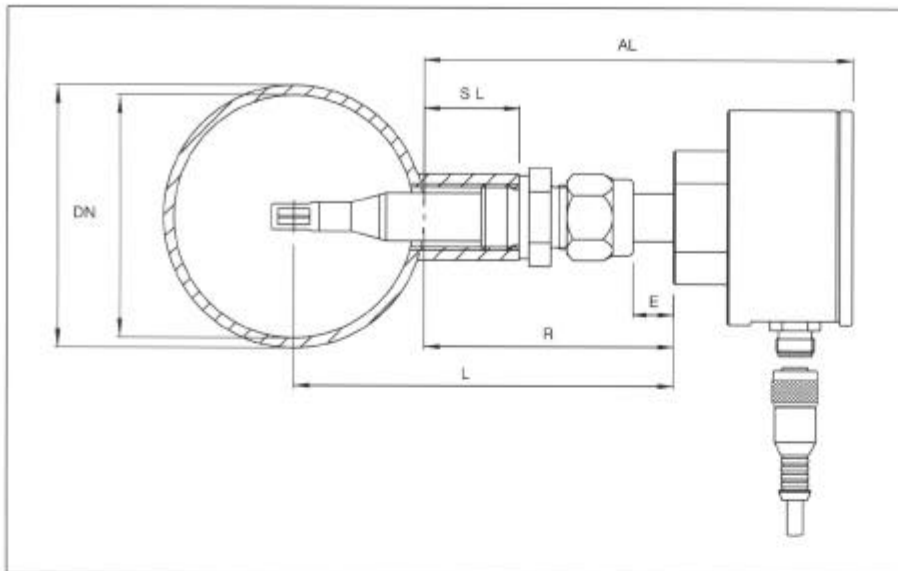
Dimensions Compact Sensor



Dimensions Remote Sensor



Mounting Parameters



- L = Probe-tube mounting length
- AL = Compact-sensor stand-out length
- E = Probe-tube setting length
- SL = Welding-stud length
- DN = Nominal tube diameters inside / outside
- R = Reference length

Recommended maximum length of welding stud: 30 mm

Nominal Tube Diameters and Mounting Measures

DN	Inside-ø	Outside-ø	L	AL	E ²⁾	R
25	28.5	33.7	120	159.7	37.1 57.1 ³⁾	103.2 103.2
40	39.3	44.5	120	154.3	31.7	97.8
	43.1	48.3		152.4	29.8	95.9
	45.8	51.0		151.0	28.5	94.5
50	51.2	57.0	120	148.0	25.5	91.5
	54.5	60.3		146.4	23.8	89.9
	57.5	63.5		144.8	22.2	88.3
	64.2	70.0		141.5	19.0	85.0
65	70.3	76.1	120	138.5	15.9	82.0
	76.1	82.5		135.3	12.7	78.8
65	70.3	76.1	180	198.5	75.9	142.0
	76.1	82.5		195.3	72.7	138.8
80	82.5	88.9	180	192.1	69.5	135.6
100	100.8	108.0	180	182.5	60.0	126.0
	107.1	114.3		179.4	56.8	122.9
125	125.0	133.0	180	170.0	47.5	113.5
	131.7	139.7		166.7	44.1	110.2
150	150.0	159.0	180	157.0	34.5	100.5
	159.3	168.3		152.4	29.8	95.9
	182.5	193.7		139.7	17.1	83.2
200	206.5	219.1	250	197.0	74.5	140.5
250	260.4	273.0	250	170.0	47.5	113.5
300	309.7	323.9	250	144.6	22.1	88.1
300	309.7	323.9	400	294.6	172.1	238.1
350	339.6	355.6	400	278.7	156.2	222.2
400	388.8	406.4	400	253.3	130.8	196.8
450	437.0	457.0	400	228.0	105.5	171.5
500	486.0	508.0	400	202.5	80.0	146.0
550	534.0	559.0	400	177.0	54.5	120.5
600	585.0	610.0	400	151.5	29.0	95.0

²⁾ at SL = 30

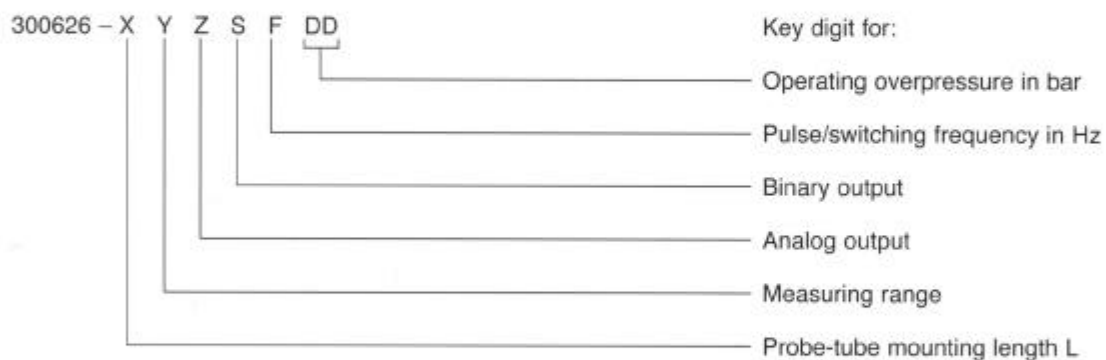
³⁾ at SL = 10

All measures in units of mm

Order Information

Order No.	Description
300626-XYZSFDD	Flow Sensor SS 20.60
3000815	Calibration certificate

Order key



Application range	Mounting length L (mm)	X	Measuring range w_N (m/s)	Y	Analog output	Z	Binary output	S	Pulse/Switching frequency (Hz)	F	Operating overpressure ⁴⁾ (bar)	DD
- 20 ... + 85 °C	120	1	0 ... 60	1	0 ... 10 V	1	Pulse output	1	–	1	0 ⁵⁾	00
Atmospheric	180	2	0 ... 40	2	0 ... 20 mA	2	output		0 ... 100	2	1	01
Overpressure	250	4	0 ... 20	3	4 ... 20 mA	3	Switched output	2	0 ... 40	3	2	02
	400	5	0 ... 10	4					0 ... 20	4	...	...
0 ... + 120 °C	190 / 3m	3	0 ... 2.5	5					0 ... 16	5	...	...
Atmospheric									0 ... 10	6	16	16

⁴⁾ Air overpressure at mounting location

⁵⁾ Atmospheric air pressure