Simply a question of
better measurement

SCHMIDT® Technology

SCHMIDT® Flow Switch
SS 20.200
Instructions for Use

SCHMIDT® Flow Switch

SS 20.200

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Imprint:

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Subject to modifications

1 Important Information

These instructions for use must be read completely and observed carefully, before putting the unit into operation.

Any claims under the manufacturer's liability for damage resulting from non-observance or non-compliance with these instructions will become void.

Tampering with the device in any way whatsoever - with the exception of the designated use and the operations described in these instructions for use - will forfeit any warranty and exclude any liability.

The unit is designed exclusively for the use described below (s. chapter 2). In particular, it is not designed for direct or indirect personal protection.

SCHMIDT Technology cannot give any warranty as to its suitability for a certain purpose and cannot be held liable for errors contained in these instructions for use or for accidental or sequential damage in connection with the delivery, performance or use of this unit.

2 Field of Application

The **SCHMIDT® Flow Switch SS 20.200** has been designed for stationary use in cleanrooms, air ducts or air shafts under atmospheric pressure conditions. The sensor measures the flow velocity of the measuring medium as standard velocity (unit m/s), relative to the standard pressure of 1013.25 hPa and the standard temperature of 20 °C. The switching threshold is independent of the pressure and temperature of the medium.

One type of the **SS 20.200** is provided with a protective coating above the sensor head, allowing its use in slightly aggressive media. The resistance of the coating to the media occurring during operation must be checked in each individual case.

The **SS 20.200** is designed for the use inside closed rooms and is not suitable for outdoor use.

3 Mounting Information

The **SS 20.200** is a high-precision and sensitive measuring device. Accordingly, the mechanical stress on the probe head must be minimised in all mounting steps.

Avoid mechanical stress of the sensor tip as much as possible, since otherwise irreversible damage can occur.

Mounting position

In order to achieve maximum measuring sensitivity, the sensor head should be mounted pointing upwards. A sensor head pointing downwards must be avoided, since this will increase the measuring range limit (nominal value 0.06 m/s).

In order to obtain good measurement results, the flow measuring sleeve must always be in the centre of the flow duct.

The sensor head must immerse completely (that is, including the temperature measuring sleeve) into the air flow. If this is not the case, the measured value can be completely wrong.

The sensor should not be mounted in the proximity of heat sources, since this may result in measurement errors. When used in ventilation pipes equipped with heat exchangers, the sensor should always be mounted upstream of the heat exchanger.

Wall mounting

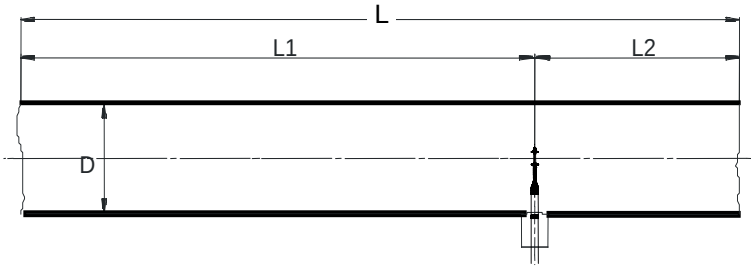
First the protective cover must be pulled off the sensor head. Then the sensor together with the threaded piece (M 18 x 1 fine pitch thread) is screwed in the appropriate threaded bore of the duct wall. Set the desired position and secure it with a counter nut.

Alternative **SCHMIDT Technology** offers auxiliary equipment for installing 9mm probes (please refer to www.schmidttechnology.de for details).

Pipe-bound flow

To reach the accuracy specified in the data sheets, the sensor has to be positioned in a straight conduit and at a place with undisturbed flow profile. An undisturbed flow profile can be achieved if a sufficiently long distance in front of the sensor (run-in distance L1) and behind the sensor (run-out distance L2) is held absolutely straight and without disturbances (such as edges, seams, bends, etc.).

The design of the run-out distance is also important, since disturbances act not only **in** the direction of the air flow but can also lead to disturbances **opposite** to the flow direction.



L Total length of measuring distance

L1 Length of run-in distance

L2 Length of run-out distance

D Diameter of the measuring distance

The following table shows the necessary straight conduit lengths as a function of the pipe diameter D for various scenarios.

Flow obstacle upstream of measuring conduit	**Minimum length of run-in distance (L1)**	**Minimum length of run-out distance (L2)**
Light bend (< 90°)	**10 x D**	**5 x D**
Contraction / reduction / 90° bend	**15 x D**	**5 x D**
2 bends 90° in one plane (2-dimensional)	**20 x D**	**5 x D**
2 bends 90° (3-dimensional change in two directions)	**35 x D**	**5 x D**
Shut-off valve	**45 x D**	**5 x D**

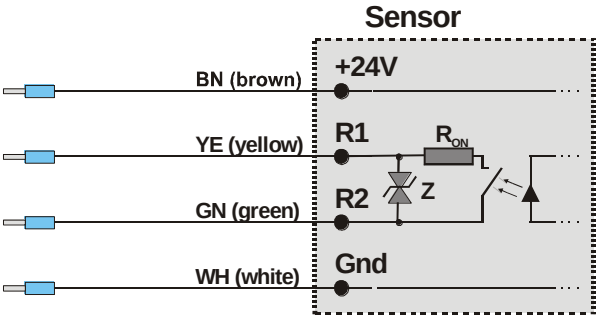
This table lists the **minimum values** required in each case. If the listed straight conduit lengths cannot be achieved, the measurement accuracy may be impaired.

Electrical connections

For its operation, the sensor requires a DC power supply of 24 V nominal value at a current consumption of 40 … 70 mA (without load at the switching output), depending on the flow velocity.

Only operate sensor in the defined range of operating voltage (24 V_{DC} ± 20 %).
Undervoltage may result in malfunction.
Overvoltage may lead to irreversible damage of the sensor.

Connecting cable assignment



For signalling, a semiconductor relay is used whose galvanically decoupled switching output has a maximum permanent switching power of 300 mW (at an R_{on} of typically 20 to 25 Ω max.). The switching current should be at most 100 mA, the peak value of the switching voltage (AC or DC) must not exceed 30 V, since otherwise the bidirectional protecting diode (Z) between the load circuit terminals will break down and can be thermally destroyed (see connecting diagram).

The specified electrical operating values must not be exceeded. Exceeding them may lead to irreversible damage.

4 Putting into Operation

Status signalling

The **SS 20.200** has two luminous diodes (LED) of different colours, which indicate the current status (depending on the switching behaviour ordered).

The following table shows the signalling options and their cause.

Status	LED green	LED red	Relay
Supply voltage < 19.2 V	○	○	Open
Initialisation	◐	○	Open
Sensor defective	○	◐	Open
Sensor ready Value exceeded / dropped below switching threshold[1]	●	○	Close / Open
Sensor ready Value exceeded / dropped below switching threshold[1]	●	●	Open / Close

Legend: ○ **= LED off** ◐ **= LED flashing** ● **= LED on**

Switching on

The sensor is ready within 20 s, after applying the operating voltage. During this initialisation stage, the green LED is flashing.

As soon as the green LED is lit permanently, the sensor is ready.

[1] Depending on the sensor configuration ordered.

5 Switching Threshold

The sensor has a switching output, which will trip at an adjustable flow velocity. A distinction must be made between two basic types of switching threshold settings:

Order code L = P and L = F

Manual setting (order code L = P)

The switching threshold is set on a potentiometer mounted on the front side of the **SS 20.200**. To increase the switching threshold, rotate the potentiometer clockwise and, to lower it, rotate it counter-clockwise. The measuring range of the sensor is correlated linearly with the 270 degrees of the potentiometer, i.e., at the counter-clockwise end, the switching threshold is 5 % of the measuring range, and at the clockwise end, the switching threshold is 95 % of the measuring range.

The potentiometer has a slot size of 2.5mm x 0.5mm. To avoid damage to the sensor, it is absolutely necessary to use a suitable screwdriver. The maximum allowed torque at the potentiometer dead stops is 3.5 Ncm.

With order code xx = 00, the potentiometer is at about 50% (default). At a value xx > 00, the potentiometer is set ex works to the desired switching threshold („xx“% of measuring range).

The individual setting of the switching point is done by moving the flow to the value to be monitored. Then the potentiometer is rotated from the zero point clockwise until the relay is switching. The release point is then offset downward by the hysteresis (see also chapter: *Hysteresis of switching threshold*). For fine adjustment, the potentiometer can now be rotated back a little bit. The release of the sensor then signals that the hysteresis has been reached.

Preprogramed switching threshold (order code L = F)

If the flow velocity to be monitored is already known at the time of ordering, the sensor can be ordered with a fixed, preprogramed switching threshold. In this case, the potentiometer is put out of action and a sticker on the front side of the sensor informs about the programmed switching threshold.

Hysteresis of switching threshold

The hysteresis of the switching threshold is defined as the value that separates the switching point (SP) from the release point (RP). It is important which switching logic (S) was selected.

For S = 1 and S = 2, the sensor switches directly at the defined SP. RP is lower by 5 % of the measuring range.

For S = 3 and S = 4, SP is 5 % above the preset value. In this case, RP coincides exactly with the preset value.

6 Service Information

Service

The sensor head must be checked regularly for soiling and cleaned when required. Soiling of the sensor tip may lead to a wrong measuring result. It is recommended checking it once a year and more frequently if it is heavily soiled.

Cleaning the sensor tip

The sensor tip can be cleaned to remove dust/soiling by moving it carefully in warm water containing a washing-up liquid (e.g. Pril), if necessary a very soft brush can be used. Before putting it again into operation, wait until the sensor tip is completely dry.

Do not use strong cleaners, solvents, brush or other hard objects for cleaning!

If the cleaning procedure is unsuccessful or if there are doubts as to the correctness of the switching value, it is recommended sending it to the factory for a check and/or recalibration.

Spare parts or repair

No spare parts are available, since a repair is only possible at the manufacturer's. In case of defects, the sensors must be sent in to the supplier for repair.

When the sensor is used in systems important for operation, we recommend keeping a replacement sensor in stock.

7 Technical Data

Parameter	
Measuring quantity	Standard velocity w_N (standard conditions 20 °C and 1013.25 hPa)
Measuring medium	Air or nitrogen
Measuring range	0 ... 1 / 2.5 / 10 / 20 m/s
Switching threshold (w_N)	5 ... 95 % of set value; min. 0.1 m/s
Switching threshold setting	Potentiometer (single turn: 270°)
Switching hysteresis	5 % of switching threshold, min. 0.05 m/s
Reproducibility	± (2 % of switching threshold + 0.1 m/s)
Response time (t_{90})	3 s when jumping from 0 to 5 m/s
Switch-on delay during start-up	20 s
Operating temperature	Sensor: -20 ... +85 °C Electronics: -20 ... +70 °C
Storage temperature	-20 ... +85 °C
Humidity range	0 ... 95 % of rel. humidity (RH)
Operating voltage U_B	24 V_{DC} (± 20%)
Switching relay	Load: 30 V_{Peak} / 100 mA / 300 mW Insulation voltage: 1500 Vrms
Display LED green	- constant: sensor and U_B OK - flashing: sensor defective (2 Hz) - off: operating voltage U_B < 19.2 V
Display LED red	- constant: value exceeded / dropped below threshold
Connecting cable	Structure: 4 x 0.14 mm^2 Insulation: PVC, grey Outer-Ø: 3.8 mm Length: 2 m
Connecting plug	pigtail
Protection type of housing	IP65 (with plug); IP52 (potentiometer open)
Protection type of probe tip	IP67
Protection class	III (EN / IEC 60950-1) or PELV
Housing material	Injection moulded plastic (UL-HB) Ultradur B4300 G4
Sensor tube diameter	9 mm
Mounting length	100 / 200 / 350 / 500 mm

8 Certificate of Conformity

EG-Konformitätserklärung

Certificate of Conformity

Déclaration de conformité CE

SCHMIDT Technology GmbH erklärt, dass das Produkt
SCHMIDT Technology GmbH herewith declares that the product
SCHMIDT Technology GmbH déclare que le produit

SCHMIDT® Flow-Switch **SS 20.200** Part-No.: **504475 / 505504**

den wesentlichen Schutzanforderungen entspricht, die in der Richtlinie des Rates zur Angleichung der Rechtsvorschriften der Mitgliedsstaaten über elektromagnetische Verträglichkeit (**2004/108/EG**) festgelegt sind.

is in compliance with the relevant protection requirements in respect of the electromagnetical compatibility (EMC) which are laid down in the guidelines of the council for the harmonization of the regulations of the members within the European community (**2004/108/EG**).

correspond aux prescriptions de protection établies dans la norme du conseil pour l'harmonisation de règles de droit des Etats membre sur la compatibilité électromagnétique (**2004/108/EG**).

Zur Beurteilung hinsichtlich elektromagnetischer Verträglichkeit wurden folgende Normen herangezogen:

The assessment of EMC for industrial applications refers to the following European standards:

Pour le jugement de la compatibilité électromagnétique normes suivantes sont appliquées:

a) Störaussendung (Emission) / Electromagnetic Emission / Interférence
EN 61000-6-3:2002

b) Störfestigkeit / Electromagnetic Immunity / Immunité aux parasites
EN 61000-6-2:2001

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