

Chamber head

A ceramic chamber head in aerodynamic design protects the sensor element, which is also made of high-temperature resistant ceramic substrate.



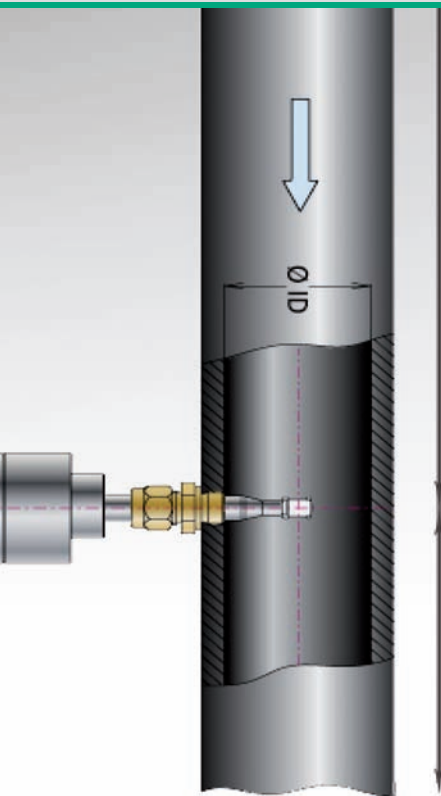
Direct measurement of volume flows

Thermal flow sensors are often used for measurement of volume or mass flows of gases. This maintenance-free and robust method of measurement, however, has so far reached its limits with higher temperatures. An innovation from Schmidt Technology now allows measurements of up to 350 °C and does not only open up a wider range of application but can also be used as universal solution.

There are several methods for measuring flow velocity and volume flow. One of them is thermal anemometry. With this method, a sensor element is continuously heated to a temperature which is maintained, via a regulating circuit, at a constant value of about 40 °C above the medium temperature. Immersed in a medium to

be measured, the sensor element cools down by the air or gas flow. The energy required for keeping the temperature at the same level is measured. The heat transition from the heating element to the medium is a measure of the medium's flow velocity or the number of flowing molecules. As the flow velocity depends on the mass of the

medium that passes by the sensor, temperature and pressure need not to be compensated. This is the big advantage of thermal flow sensors when determining volume and mass flow. The manufacturer adjusts the sensors to a standardized barometric pressure and ambient temperature. Therefore, it is also called standard flow velocity. The advantages of this method lie in the measurability of very low air flows from 0.2 Nm/s up to very high volume flows, such as exist in compressed air. Moreover, a thermal flow sensor is very robust, maintenance-free and quick-acting.

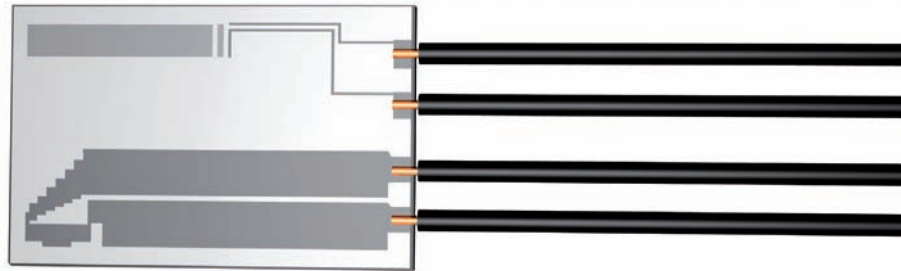


Fitting note

Considering the variable flow profile in a tube, the sensor tip needs to be immersed up to the tube center.

Termopile

The newly developed, maintenance-free sensor element is not only suitable for measurements at temperatures of up to 350 °C, but also able to measure temperature and flow in one step as it contains a heating element and a temperature sensor.



Even good alternatives also have disadvantages

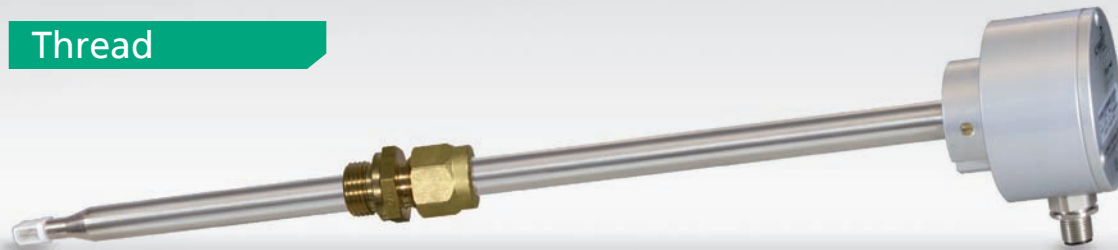
A mechanical measurement method is an impeller wheel that works just as a propeller. If the sensor axis is placed into the flow direction of the medium, its flow velocity produces a proportional number of revolutions of the impeller wheel. This may be measured, for example, based on the inductivity change. An impeller wheel just measures the velocity of the flowing molecules - and they have the same velocity at a pressure of 1 bar as they have at 2 bar. Therefore, the pressure must be measured in addition to the temperature so that the

standard volume flow may be calculated. This measurement method is very accurate with average flow velocities and average ambient temperatures. Its big disadvantage lies in the mechanical wear parts and the high failure rate at slower velocities due to the start torque. Too high temperatures also show the limits of the impeller wheel when the impellers expand due to the heat and press the bearings.

A popular method at very high temperatures is measuring the differential pressure. The air flow is determined based on dynamic and static pressure using an orifice plate and a pilot tube. Pilot tubes are robust and also suitable for high flow velocities. Low flow velocities, however, cannot be measured by means of these devices, and their accuracy is limited depending on the temperature. Furthermore, the pressure and the temperature must be known with this method to include them in the calculation.



Thread



New materials resist high temperatures

The sensible sensors and their sensitivity with regard to mechanical load and dirt have always been considered disadvantages of the thermal sensors. By combining long experience in manufacturing flow sensors with latest technologies and materials, Schmidt Technology has now been able to present a new generation of sensors enabling measurement of the actually prevailing volume flow even at high temperatures.

SS 20.650 is the name of the newest innovation which

features special connecting elements and a sensor element made of high temperature resistant ceramic material. The chamber head, which is also made of high-temperature resistant ceramic material, protects the sensor element against mechanical strain or high pressures. The sensor itself contains the thermal resistor and the temperature sensor.

With a pressure resistance of 16 bar, the new flow sensor can now also be used for measurements at a maxi-

mum temperature of 350 °C, a temperature that occurs in processes with pre-heated combustion air. The mounting lengths range from 400 mm to 1000 mm; customer-specific lengths are also available to cope with any installation situation.

Upon request, the sensor can be supplied with high-precision calibration. For this purpose, Schmidt calibrates each sensor against reference measurement channels and records precision and reproducibility in an ISO calibration certificate.



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More information

<http://www.schmidttechnology.com>

Process ovens

The direct measurement of the mass flow without additional sensors allows an accurate stoichiometry of the combustion in process ovens.

New fields of application thanks to measurement range and no maintenance

SS 20.650 opens up another field of application by measuring the actual volume flow without auxiliary variables and calculations. The fact that it guarantees a high long-term stability without requiring maintenance and without risk of drift also adds to it. The compact sensor that can be used even with tubes from 25 mm is thus the first choice if you want to measure at points that are difficult to access. Especially since it is mounted quickly and easily thanks to its brass through-bolt joint.

Different operating states and load times require that a flow sensor is able to determine both low and maximum volume flows precisely. The users benefit from the high dynamic measuring range of SS 20.650 from 0.2 Nm/s to 60 Nm/s. Therefore, the sensor also captures the compressed air measurement because it can be used for leakage checks in addition to the power measurements.

All in all, the users may cover the complete regulation range of their installations by means of the innovation from Schmidt with just one

sensor instead of minimum one extra measurement method that has previously been required. This includes monitoring drying processes. In addition to the precise volume flow regulation of the drying air, the simultaneous temperature recording on the point of measurement is important for the production result in surface coating. Being maintenance-free and featuring pressure and high-temperature resistance, the universal SS 20.650 smoothes out the negative aspects of its predecessors.