

Datasheet SDP1108-R

Low Differential Pressure Sensor with fast response time

- For medical ventilators (ICU and home care)
- High sensitivity below 10 Pa to measure small volume flow (neonatal)
- Fast response time for efficient trigger function
- Unsurpassed performance thanks to CMOSens® technology
- Offset and hysteresis free
- Fully calibrated and temperature compensated
- Not sensitive to the mounting orientation and vibrations



SDP1108-R Product Summary

The SDP1108-R sensor is a differential pressure sensor for air based on the successful SDP1000 sensor from Sensirion. The response time of the SDP1108-R has been optimized for medical ventilation applications.

Mounted in a rugged, chemically inert PPS housing the SDP1108-R differential pressure sensors feature a unique dynamic range, zero offset and unsurpassed **long term stability**. This makes it an ideal fit for demanding yet cost sensitive OEM applications in medical and HVAC equipment.

The SDP1108-R is supplied with **5.0 V** and provides a **0.25...4.0 V output**. Although the output of the sensor is analog, the internal linearization and **temperature compensation** is performed digitally. This results in a

superior accuracy, outstanding resolution (up to 0.05 Pa), and lowest temperature dependence.

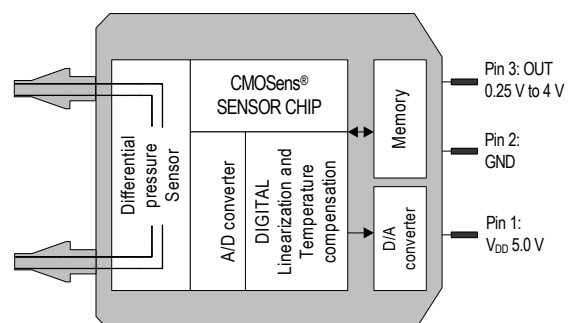
Its leading performance is based on Sensirion's proprietary CMOSens® sensor technology which combines the sensor element with amplification and A/D conversion on one single silicon chip. The differential pressure is measured by a thermal sensing element. In contrast to other thermal differential pressure sensors only a very small amount of air is required. This leads to a reliable operation even under harsh conditions. In comparison to membrane and piezo-resistive based sensors the SDP1108-R differential pressure sensors show an extended measurement range, better **offset stability** and improved reproducibility even at lowest pressure ranges. In addition the SDP1108-R is robust against pressure bursts and shows no sensitivity to the mounting orientation.

Applications

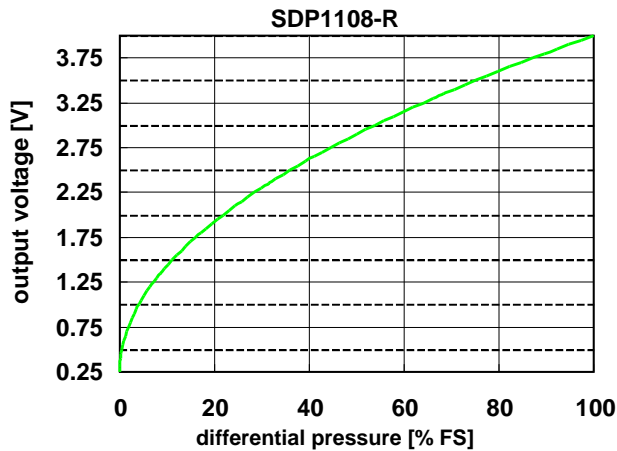
Medical applications:

- Homecare ventilation
- Intensive care ventilation (ICU)

Block Diagram



1 Sensor Output Characteristics¹



The SDP1108-R provides a fully calibrated voltage output. To enhance the sensitivity at very low differential pressures, the SDP1108-R comes with a root-square output characteristic.

$$\text{Diff. Press [Pa]} = \left(\frac{\text{Output Voltage} - 0.25\text{V}}{3.75\text{V}} \right)^2 \cdot 500$$

Use this formula to convert the sensor output into physical value.

¹Calibration conditions apply unless otherwise noted: 23°C and $p_{\text{absolute}} = 966 \text{ mbar}$, dry air, $V_{\text{DD}} = 5.000 \text{ V}$.

2 Specifications

Table 1: SDP1108-R Sensor specifications¹

Parameter		SDP1108-R			Unit
		Min	Typ	Max	
Measurement range		0.25	-	4	Volts
		0	-	500	Pa
		0	-	2	Inch water
Accuracy ³	20% FS to 100% FS	-	1.0	2.0	% Measured Value ⁴
	0 to 20% FS	-	0.2	0.4	% Full Span ⁵
	zero ²	-	15 0.01	40 0.06	mV Pa
Repeatability	100 to 500 Pa	-	0.3	1.0	% Measured Value
	0 to 100 Pa	-	0.05	0.2	% Full Span ⁵
Null drift per year ⁶		-	0	0.1	Pa / year
Additional error over temperature ⁷ (T ≠ 23°C)	0 to 100 % FS	-	0.03	0.05	% Measured Value ⁴ / °C
	zero	-	1	2	mV/°C
Response time ⁽⁸⁾		6.6	8.0	10.1	ms
Cut off frequency of internal filter		17	20	24	Hz

¹ Calibration conditions apply unless otherwise noted: 23°C and $p_{\text{absolute}} = 966 \text{ mbar}$, dry air, $V_{\text{DD}} = 5.000 \text{ V}$

² Variance between the zero point (offset) of different sensors measured under the same conditions (e.g. same supply voltage, temperature, ...)

³ Include deviations due to linearity, hysteresis, and repeatability

⁴ % Measured value = (SDP1108-R output [Pa] - output of reference instrument [Pa]) / output of reference instrument [Pa].

⁵ Full span is defined as 3750 mV / 500 Pa for SDP1108-R

⁶ Drift over time due to aging, pressure cycles... Test results can be provided.

⁷ The additional error due to temperature variation is temporary. Once the sensor is back to the calibration temperature, the shift disappears (no hysteresis).

⁸ Tau= 0 to 63%, filter response time = 8ms.