

CPAP devices

Preventing breathing cessations in sleep apnea patients

Continuous Positive Airway Pressure (CPAP) therapy is used to manage sleep apnea and provide respiratory support in various conditions. It is primarily employed to treat obstructive sleep apnea (OSA), a condition where the upper airway becomes partially or completely blocked during sleep, leading to interrupted breathing and decreased oxygen levels. CPAP therapy involves the application of a flow of pressurized air through a mask that a patient wears over their nose and sometimes mouth during sleep. This prevents airway collapse during sleep, leading to improved breathing and better sleep quality.

Target customers:

- CPAP device manufacturers



Application challenges

- 1 Patient comfort relies on fast reaction upon breathing
- 2 Trend towards compact and battery-driven devices
- 3 Sensor is part of patient air path requiring airtight sealing and material biocompatibility
- 4 Preventing airway injuries require heated and humidified air without condensation



Sensirion's solutions

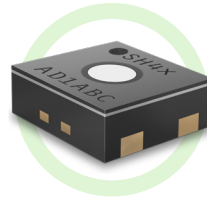
- 1 Precise measurement of air flow, fast response time, no zero-flow drift
- 2 Small sensor size, low power consumption
- 3 Adequate choice of materials to comply with regulations
- 4 Precise and reliable measurement of RHT conditions, heater to improve operation in condensing conditions

Sensirion sensor solution:



SDP3x, SDP8x: Differential pressure sensors

Size (LxWxH): 80 x 30 x 20 mm³



SHT40: Humidity and temperature sensor

Size (LxWxH): 48 x 15.5 x 8.9 mm³

Additional sensor features

- Measurement range with up to ± 500 Pa
- Manifold and tube connectors
- Independent on mounting position
- High sensitivity: accuracy better than 0.2% FS near zero
- No drift at zero-flow over time
- Analog and digital (I²C) versions

Other applications

- BiPAP, APAP ventilators
- Oxygen therapy
- Respiratory monitoring
- Smart inhaler
- Cough assist
- Gamification of treatment in pediatric care

FAQs

- **How to determine flow using a differential pressure (DP) sensor?**
Flow is measured via a pressure drop over a flow restrictor. The pressure drop increases with increasing flow. Relative changes in flow can be reflected in DP directly. For conversion to flow, a characterization of flow vs. DP in the final device can be used. See the application note “Engineering Guidelines”
- **How to design the sensor into the flow path?**
SDP3x is designed for pick-and-place assembly onto the PCB, while SDP8x has pins that are soldered on the PCB. Please see the application note “Engineering Guidelines”
- **My setup incorporates tubing. How to connect these to the sensor?**
For tube connections, we recommend using an adaptor piece. Please consider the SDP8xx sensor series, which is suitable for tube connection.
- **Adding a flow restrictor to the airpath is not an option in my application. How can I still measure flow inside the airpath?**
In absence of a dedicated flow restrictor, inherent geometry of the flow path can be used to determine the flow inside the airpath.

Getting started



SEK-SDP31



SEK-SHT40

Useful documents



Datasheets, application notes, handling instructions, sample codes, step files, certificates

Related sensors

[↗ SHT40 humidity & temperature sensor](#)

[↗ SDP3x differential pressure sensor](#)

[↗ SDP8x differential pressure sensor](#)