



SENSIRION SFM3003-CL Gas Flow Sensors User Guide

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SENSIRION

SENSIRION SFM3003-CL Gas Flow Sensors



Specifications

- Form factor: Medical cones 22mm (ISO5356)
- Supply Voltage: 3.3V (2.7 – 5.5V)

Product Information

The Sensirion gas flow sensors offer a comprehensive range of products optimized for medical applications, specifically for medical ventilation. The sensors are organized into three families based on their position in the ventilation system: Inspiratory, Expiratory, and Proximal.

Inspiratory Flow Sensors

If you have multiple sensor options, it is recommended to evaluate the sensors in your device as the design can impact measurement accuracy.

Proximal Flow Sensors

Gage pressure describes the pressure difference between the gas pressure in the tubes/flow sensor and the ambient pressure.

Expiratory Flow Sensors

The SFM3200-AW is designed for the expiratory position with features like minimized pressure drop, washability, a heater, and the capability to measure vapor-saturated gas/air.

Product Usage Instructions

Inspiratory Flow Sensors

Choose the appropriate sensor based on the flow range and pressure drop requirements for your medical ventilation system.

Proximal Flow Sensors

Consider the gage pressure difference and compatibility with your ventilation system when selecting a proximal flow sensor.

Expiratory Flow Sensors

For expiratory flow sensing, ensure that the SFM3200-AW is used to meet specific design requirements and environmental conditions.

FAQ

Q: Can Inspiratory sensors be cleaned or disinfected?

A: No, Inspiratory sensors are not designed to be cleaned or disinfected and require non-condensing operating conditions.

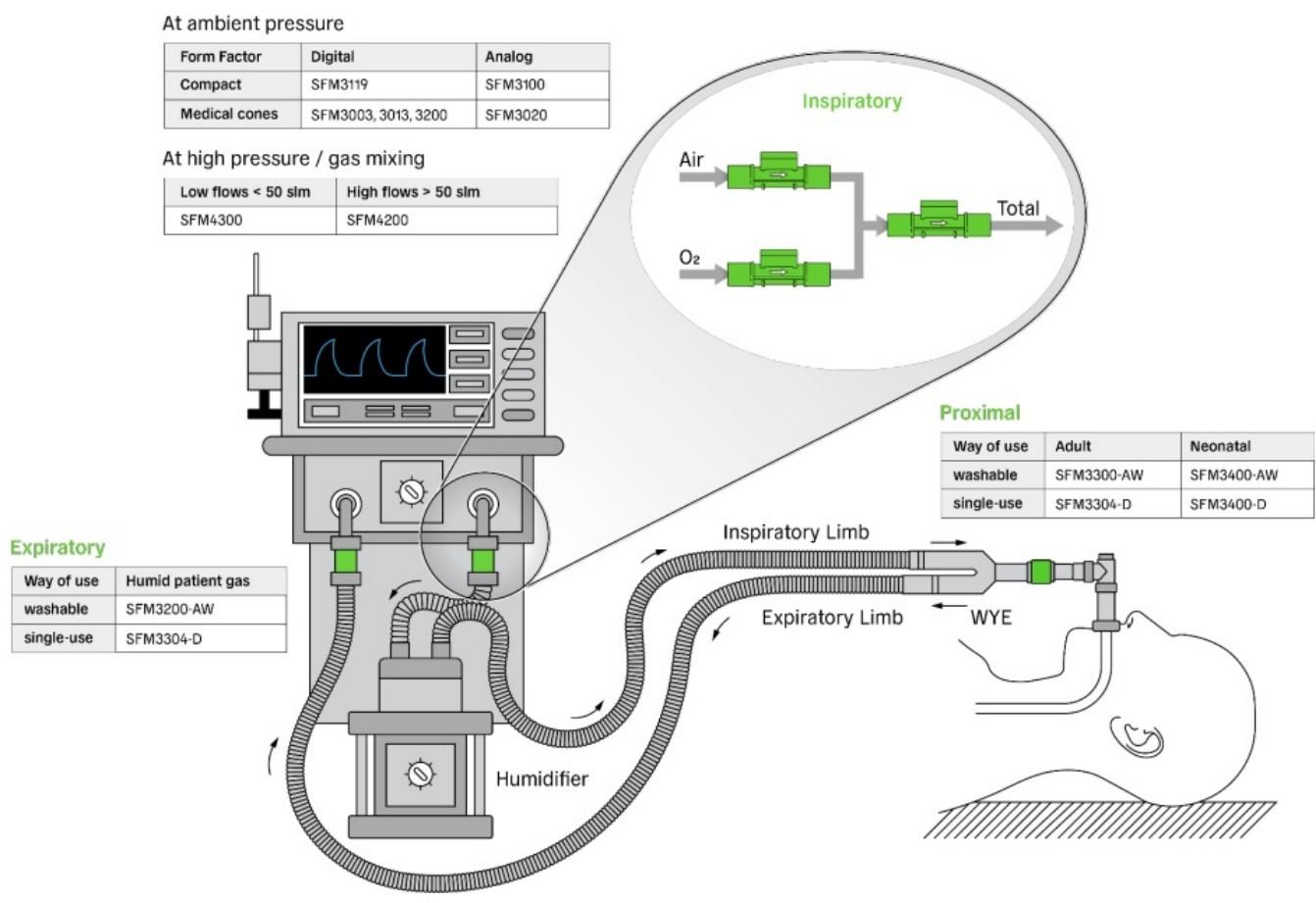
Selection guide for Sensirion gas flow sensors

Finding the right flow sensor (SFM) for your medical ventilation or high flow device.

Our flow sensor portfolio offers a comprehensive range of gas flow sensors optimized for medical applications. The SFM product range is specifically engineered for medical ventilation, addresses all relevant flow monitoring requirements and is organized in three families, depending on the position of the sensor in the ventilation system:

1. Inspiratory
2. Expiratory
3. Proximal

The figure below provides a first guideline to select a suitable sensor depending on the before mentioned position in the application.



In addition, some sensors offer unique features and characteristics that may be considered during sensor selection. These features are summarized in the following while the table on page 4-6 provides a comprehensive overview.

Inspiratory flow sensors

Our inspiratory flow sensors are typically used inside the ventilator to measure the individual air/O₂/heliox gas lines as well as the total flow of the mixed gas before delivery to the patient.

- Selection based on operating gage pressure¹
 - > 1bar → SFM4300 (or SFM4200 for flows > 50slm)
 - > 150mbar → SFM3013
- Lower operating pressure: all other sensors (SFM3003 family, SFM3100, SFM3119 and SFM3200).
- Consider the following criteria according to your requirements to identify the most suitable sensor in the table on page 4:
 - Form factor and size
 - Mechanical connection
 - Measured gases
 - Flow range and range of best performance (low or high flows)
 - Analog or digital output
 - Special features like gas NTC temperature sensor etc.

If you identify more than one sensor option, it is recommended to evaluate the sensor(s) in your device as the specific device design can influence the measurement.

Proximal flow sensors

Gas flow sensors specifically designed to monitor flow in close proximity to the patient, where the following main challenges have been resolved by our portfolio:

- **High humidity and condensation**

All our proximal sensors are capable to measure saturated gas/air and feature a heater to prevent condensation at the sensor's chip, therefore ensuring continued accuracy.

- **Contamination**

We offer both single-use and washable sensors.

- **Sensor handling by medical personnel**

All our proximal sensors feature a mechanical interface allowing a clip-on connection, easy to disconnect and reconnect.

- **Inspiration and expiration flow**

All our proximal sensors allow bi-directional flow sensing.

- **Individual sensor packaging for single-use sensors**

Individual sensors are protected against contamination from their production until their use by caregivers.

Quality control is improved, supply chain management is simplified, and a customized label brings all needed information to the users.

The selection of the right sensor is based on two main criteria

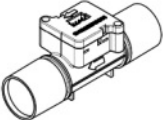
- Patient group: neonates or adults/pediatric
- Use in clinical setting: single use/disposable or washable

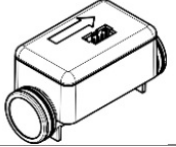

Expiratory flow sensors


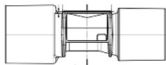
SFM3200-AW has been specifically designed for the expiratory position with a minimized pressure drop, washability, a heater and the capability to measure vapor-saturated gas/air.


Alternative options

- Proximal sensors can be used further from the patient in expiratory position, in case a disposable option is preferred.
- Inspiratory sensors can be placed in the expiratory position if measures are taken against contamination (like HMF filters) and condensation (water traps). Inspiratory sensors are not designed to be cleaned or disinfected and require non-condensing operating conditions.

Form factor	Sensor	Measured gases	Flow range [slm]	Pressure drop @flow[slm]	Typ. accuracy [%m.v.] @flow[slm]	Recommended supply voltage (allowed)	Special features
Inspiratory flow sensors							
Medical cones 22mm (ISO5356)	SFM3003-CL _____ _____ —		-30 to +300	@60: 80Pa @200: 500Pa	@200: ±2%	3.3V (2.7 – 5.5V)	Low pressure drop
<i>This form factor usually gives better accuracy at</i>	SFM3003-CE		–150 to +300	@60: 100Pa @200: 600Pa	@200: ±2.5%	3.3V (2.7 – 5.5V)	Extended negative flow range
<i>higher flows</i>	SFM3003-CET _____ _____ _____		–150 to +300	@60: 100Pa @200: 600Pa	@200: ±2.5%	3.3V (2.7 – 5.5V)	<ul style="list-style-type: none"> Extended negative flow range NTC temperature sensor in gas path
		<ul style="list-style-type: none"> Air O2 Air/O2 mixtures 					
	SFM3013-CL		-30 to +300	@60: 80Pa @200: 500Pa	@200: ±2%	3.3V (2.7 – 5.5V)	<ul style="list-style-type: none"> Low pressure drop Higher pressure resistance up to 1bar gauge
	SFM3013-CL M		Air/O2: -30 to +300 HeliOx : -30 to +200	@60: 80Pa @200: 500Pa	@200: ±2% Heliox: ±4.5%	3.3V (2.7 – 5.5V)	<ul style="list-style-type: none"> Higher pressure resistance up to 1bar gauge Additional HeliOx calibration

Form factor	Sensor	Measured gases	Flow range [slm]	Pressure drop @flow[slm]	Typ. accuracy [%m.v.] @flow[slm]	Recommended supply voltage (allowed)	Special features
Compact <i>This form factor usually gives better accuracy at low flows/smaller offset</i>	SFM3100-VC	<ul style="list-style-type: none"> Air O₂ Air/O₂ mixtures formula provided 	-24 to +240	@60: 300Pa @200: 1600Pa	@60: 2.5%	5V (4.75 – 5.25V)	<ul style="list-style-type: none"> NTC temperature sensor in gas path Analog output 0.095 – 2.45V See successor SFM3119 (digital)
	SFM3119	<ul style="list-style-type: none"> Air O₂ Air/ O₂ mixtures 	-10 to +240	@60: 200Pa @200: 1600Pa	@100: 2%	3.3V (2.7 – 5.5V)	Digital output
	SFM4200	<ul style="list-style-type: none"> Air O₂ Air/O₂ mixtures formula provided 	0 to 160		@80: 2.5%	5V	<ul style="list-style-type: none"> Air, O₂ Down-mount only Operating pressures up to 8 bar
O-ring / Push-in Legris / Down-mount				@60: 200Pa @160: 900Pa			
	SFM4300	<ul style="list-style-type: none"> Air O₂ CO₂ N₂O Mixtures 	0 to 20 0 to 50	@20: 2500Pa @50: 1000Pa	@20: 2% @50: 4%	3.3V (3.0 – 5.5V)	<ul style="list-style-type: none"> Air, O₂, CO₂, N₂O and mixtures up to 20slm Air, O₂ and mixtures up to 50slm High resolution 0.4sccm for 20slm ranges Operating pressures up to 7 bar

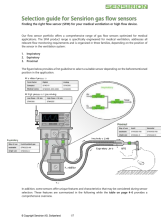
Form factor	Sensor	Measured gases	Flow range [slm]	Pressure drop @flow[slm]	Typ. accuracy [%m.v.] @flow[slm]	Recommended supply voltage (allowed)	Special features
Expiratory flow sensors							
Medical cones 22mm (ISO 5356-1) 	SFM3200-AW	<ul style="list-style-type: none"> • Air • O₂ • Air/ O₂ mixtures formula provided 	-100 to +250	@60: 100Pa @200: 750Pa	@100: 3%	5V	<ul style="list-style-type: none"> • Bidirectional • Autoclavable & cleanable • Integrated heater to prevent condensation
Proximal flow sensors							
Medical cones 22mm (ISO 5356-1) 	SFM3300-D	<ul style="list-style-type: none"> • Air • O₂ • Air/ O₂ mixtures formula provided 	-250 to +250	@60: 180Pa @200: 1400Pa	@100: 3%	5V	<ul style="list-style-type: none"> • See successor SFM3304-D for OEM projects • Suitable for adults and children • Single-use • Integrated heater to prevent condensation • Available in catalog distribution
	SFM3300-AW		-250 to +250		@100: 3%	5V	
		<ul style="list-style-type: none"> • Air • O₂ • Air/ O₂ mixtures formula provided 					<ul style="list-style-type: none"> • Suitable for adults and children • Autoclavable & cleanable • Integrated heater to prevent condensation

15mm (ISO5356-1)	SFM3300-D	<ul style="list-style-type: none"> Air O2 Air/ O2 mixtures formula provided 	-250 to +250	@60: 100Pa @200: 1150Pa	@100: 3%	3.3V (3.15 – 3.45V)	<ul style="list-style-type: none"> Improved independence to inlet conditions Suitable for adults and children Single-use Integrated heater to prevent condensation Includes individual sensor packaging Only available for OEM projects
	SFM3400-D	<ul style="list-style-type: none"> Air O2 Air/ O2 mixtures formula provided 	-33 to +33	@5: 100Pa @25: 900Pa	@33: 3%	5V	<ul style="list-style-type: none"> Suitable for neonates Single-use Integrated heater to prevent condensation
	SFM3400-AW	<ul style="list-style-type: none"> Air O2 Air/ O2 mixtures 	-33 to +33	@5: 100Pa @25: 900Pa	@33: 3%	5V	<ul style="list-style-type: none"> Suitable for neonates Autoclavable & cleanable Integrated heater to prevent condensation
		_____ _____ _____ _____ <u>_____ formula provided</u> _____ _____ _____ _____ _____					

Revision history

Date	Version	Pages	Changes
July 2024	1.0	all	First version

Documents / Resources

	<p>SENSIRION SFM3003-CL Gas Flow Sensors [pdf] User Guide</p> <p>SFM3003-CL Gas Flow Sensors, SFM3003-CL, Gas Flow Sensors, Flow Sensors, Sensors</p>
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References

- [User Manual](#)

Manuals+. [Privacy Policy](#)

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