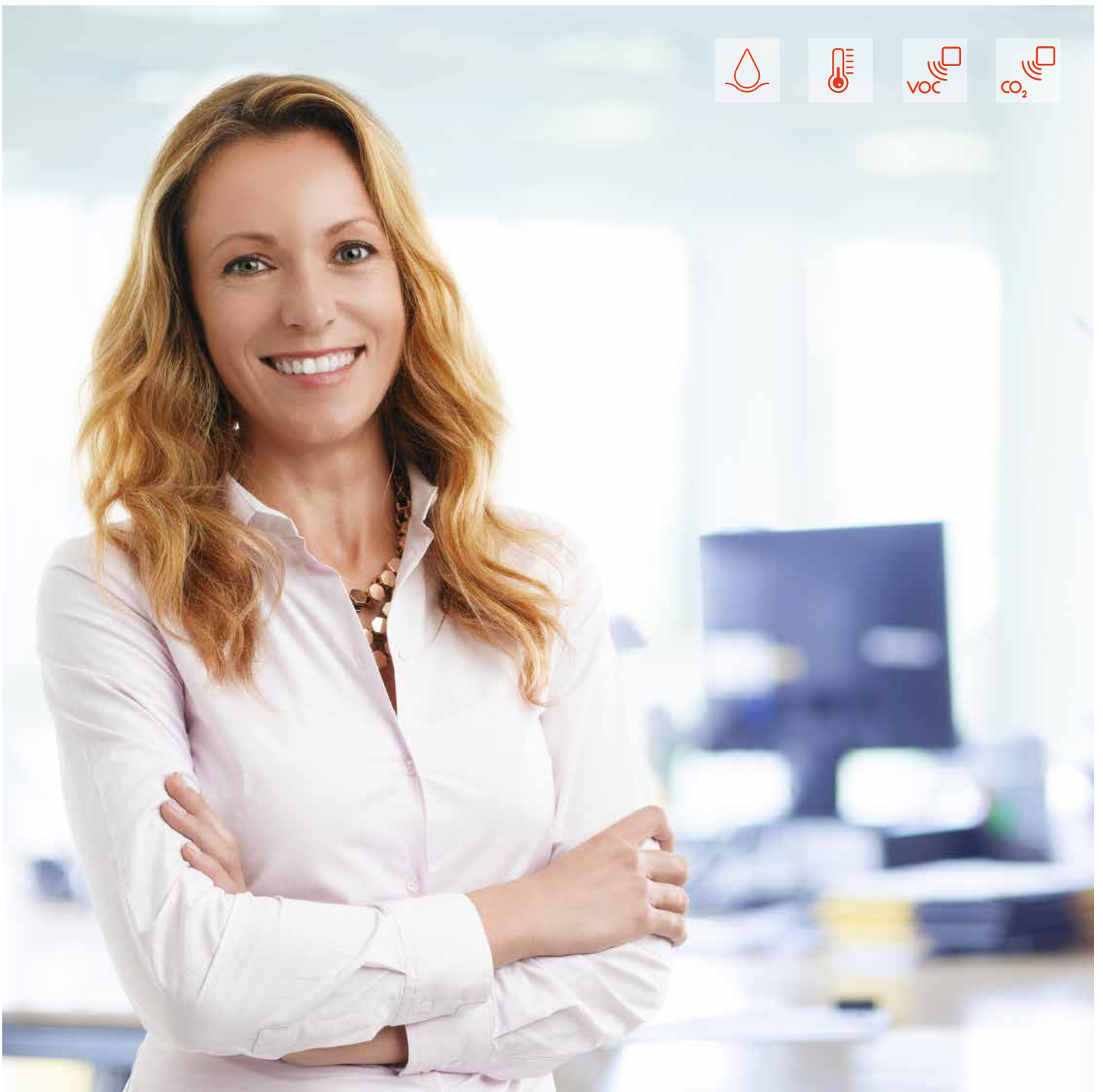




**S-SERIE INDOOR AIR QUALITY SENSORS**  
OPTIMIZE AIR QUALITY AND ENERGY OF YOUR HVAC  
INSTALLATIONS WITH THE NEW S-SERIE SENSORS



## INDOOR AIR QUALITY, A QUESTION OF BALANCE

Most of the new constructions in developed countries have high air tightness which induces a potential risk of bad indoor air quality in case of lack of ventilation. Good air quality is necessary to maintain all human faculties and to prevent the building from damaging. Indoor air quality is also a major parameter for people's comfort, concentration, and productivity. Ventilation, which consists in replacing the stale air by new clean air, remains the most efficient solution to manage indoor air quality.

## ENABLE SMART BUILDING MANAGEMENT

With the numerous rooms in tertiary buildings, it is difficult for operation staff to remain fully aware of the indoor air and system conditions. BMS (Building Management System) that includes reliable components can efficiently help improving the comfort and security for the occupants, while increasing energy efficiency.

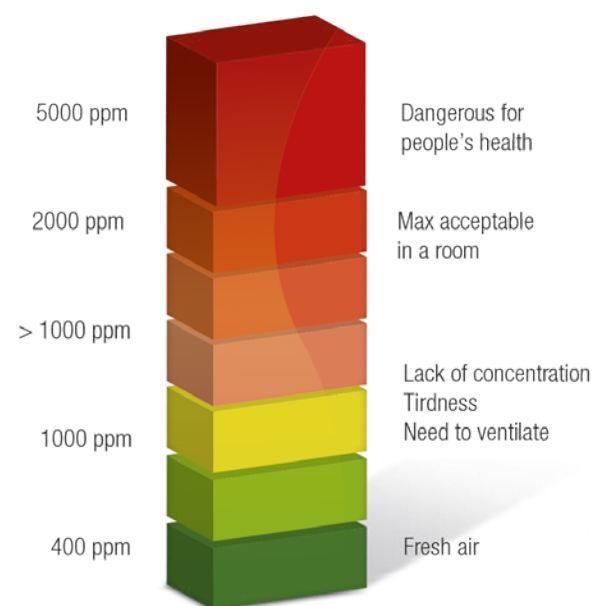
Aereco introduces its new range of sensors to measure the concentrations of CO<sub>2</sub>, VOCs and humidity and to control your building's HVAC system (Heating, Ventilation, Air conditioning, etc.).

Fully calibrated, the three sensors can be easily integrated to your HVAC system to guarantee a smart and simple building management.



### CO<sub>2</sub>

An excessive CO<sub>2</sub> concentration can negatively impact on indoor air quality and on people's comfort.



Main impacts of CO<sub>2</sub> absolute concentration on human health



## VOCs

VOCs, invisible particles present in the air that can impact on people's health.

Volatile organic compounds (VOCs) are also air quality index. People breath VOCs as well as CO<sub>2</sub>, as they are naturally present in the air. VOCs are not only emitted by human metabolism (human breathing and perspiration) but also by indoor environment (building materials, cleaners, paints...). Some of them can directly affect the health and the comfort of the occupants.

CO<sub>2</sub>

LPG Ketones

Amines

Aromatic Hydrocarbons

Organic Acids

CH<sub>4</sub>

Aliphatic Hydrocarbons

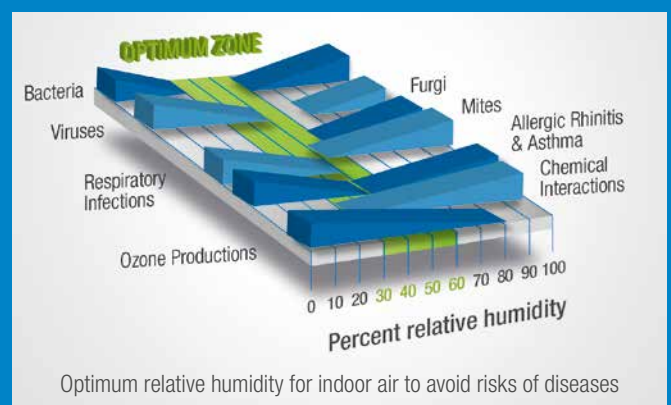
Main VOC particles present in the indoor air

## INDOOR HUMIDITY

Preventing from excess of humidity to improve people's comfort and avoid building damages.

Humidity in some rooms of a building can be generated by people (perspiration, breathing, sport activity), and humid areas such as lavatories, showers, etc. If not controlled in the rooms where its rate can rise to high levels, moisture and condensation will begin to appear and people's health can be impacted (respiratory problems, cold, etc.).

That is why it is necessary to reliably measure the relative humidity of the rooms and then adapt the ventilation system.



## S-C02

# AN INNOVATIVE TECHNOLOGY FOR A TOP QUALITY MEASUREMENT



Adaptable to various applications, it can be easily integrated to your system to drive ventilation, air conditioning and be part of your building management system (BMS).

S-C02 meets the needs of premises of specialized facilities such as offices, locker rooms, classrooms, etc.





Accurate device to measure CO<sub>2</sub> concentration reliably

Long-term stability and dependability

Dual detection measurement

Non-dispersive infrared (NDIR)

2 outputs for easy connection: analog (0-10V) and digital (PWM)



Can be adapted to different markets and applications



Compact design, simple to install, ready to use



No maintenance

The Indoor air quality can generally be accessed through the measurement of carbon dioxide concentration, known as a representative index.

**The S-CO2 is a performing CO<sub>2</sub> sensor which has been specially designed to accurately assess the indoor CO<sub>2</sub> concentration.**

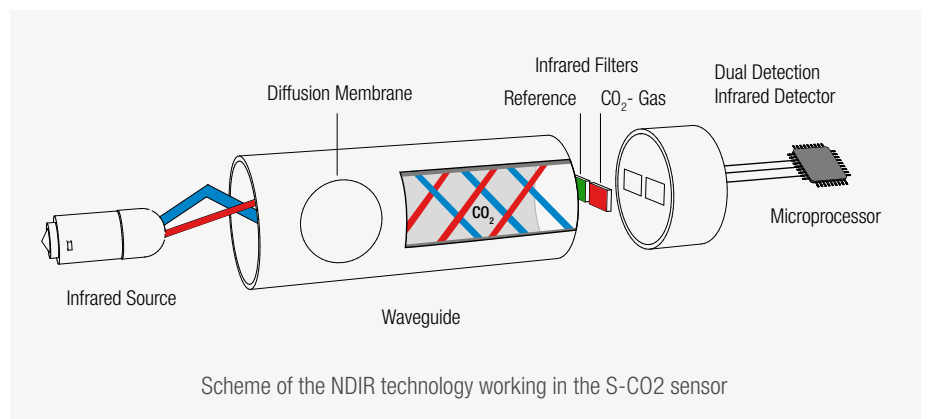
Adaptable for different applications, it can be used to drive ventilation, air conditioning, and other HVAC systems. The compact and small design of the sensor allows a discreet installation.

**S-CO2, a reliable and accurate device that enables systems to optimize indoor air quality.**

Its technologies allow long term stability and performance. Indeed, the S-CO2 is pre-calibrated to measure at a real-time the indoor CO<sub>2</sub> concentration levels from 0 to 2000 ppm and outputs both 0-10 V analog and digital (PWM) signals. Thanks to its dual detection measurement technology, the S-CO2 can be placed in any room at any time.

This smart device allows continuous dependability whatever the use of the room.

The S-CO2 is tested, validated, documented and flexible according to the life cycle of the installation. Moreover, the Aereco CO<sub>2</sub> sensor integrates the NDIR technology, a selective auto-calibrated technology that allows a good assessment of the indoor air quality.



## S-VOC

# A SMART SENSOR FOR HOLISTIC ASSESSMENT OF INDOOR AIR QUALITY



Adaptable to various applications, it can be easily integrated to your system to drive ventilation, air conditioning and be part of your building management system.

S-VOC meets the needs of premises of specialized facilities such as restaurants, fitness rooms, locker rooms, classrooms, etc.





Accurate measurement of VOC concentration and odours

Long-term stability and performance

MOS\* technology



Equivalence of CO<sub>2</sub> concentration

2 outputs for easy connection: analog (0-10V) and digital (PWM)



Can be adapted to different markets and applications



Compact design, simple to install, ready to use



No maintenance

\*\* The correlation between human CO<sub>2</sub> and VOC production provides a standardized output signal in CO<sub>2</sub> equivalents units [ppm]

Indoor environments contain various gases and microscopic particles that can impact human health.

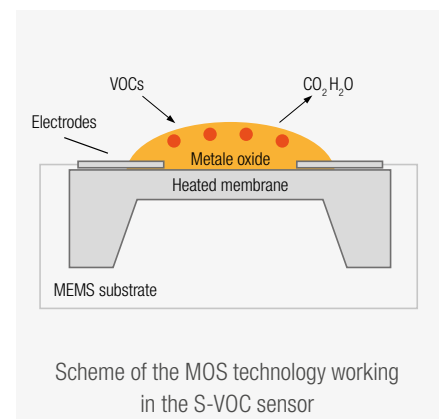
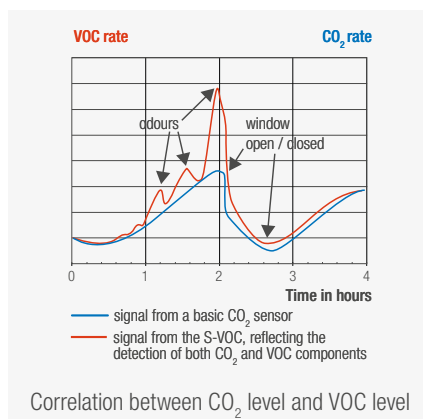
**The S-VOC is designed to accurately and reliably assess the level of volatile organic compounds (VOCs) typically associated with cigarette smoke, cooking smells and other pollutants.**

The S-VOC also evaluates the concentration of carbon dioxide, an essential criterion in indoor air quality measurement (see graph below). In any environment requiring demand-controlled ventilation, such as commercial facilities, offices, classrooms, the S-VOC now makes it possible to assess more than just the CO<sub>2</sub> criterion of IAQ, and to come closer to the perceived air quality. Thanks to its compact design, the S-VOC is simple to fit into your installation and your room.

### A pertinent and extended measurement of indoor air quality

Using the MOS technology, the S-VOC measures the concentration of VOC and odours at a real time and evaluates the CO<sub>2</sub> level of the room. Its output signal reports values from 0 to 2000 on a “ppm CO<sub>2</sub> equivalent\*\*” IAQ scale. This output signal is available simultaneously in two forms: analog (0-10V) and digital (PWM).

\* MOS (Metal Oxide Semiconductor) technology: change of the electrical characteristics of the sensing layer depending on the nature and the concentration of the VOCs which are detected.



## S-RH/T

# A VERSATILE UNIT THAT MEASURES HUMIDITY AND TEMPERATURE



Adaptable to various applications, it can be easily integrated to your system to drive ventilation, air conditioning and be part of your building management system.

S-RH/T meets the needs of premises of specialized facilities such as school lavatories, fitness center showers, locker rooms, hotels bathrooms, etc.







Digital humidity and temperature sensor

Fully calibrated

High accuracy

Excellent long-term performance



Capacitive technology for humidity measurement



Band gap technology for temperature measurement



No maintenance

The S-RH/T is designed for applications such as demand-controlled ventilation and air conditioning where accurate measurements, excellent long-term stability, and maintenance free-operation are absolute musts.

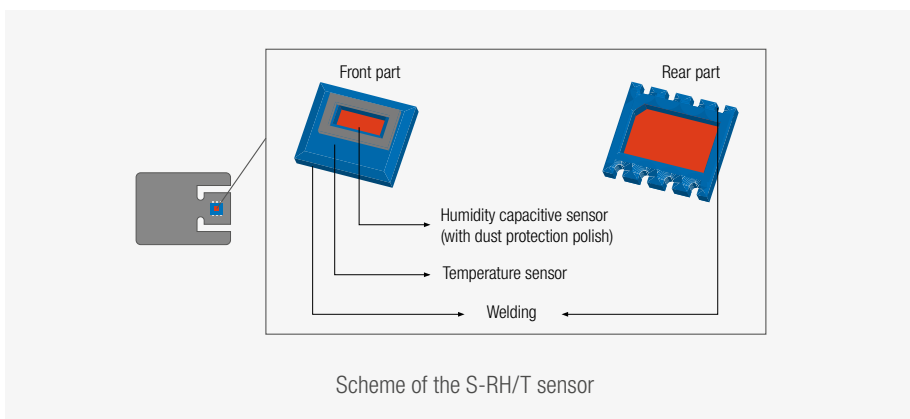
Wherever the unit is installed (schools, cloakrooms, etc.), the temperature and humidity measurements are available simultaneously to optimize their contribution to comfort and health.

### A smart and effective device

Using the dependable capacitive technology to measure humidity and the band gap technology for temperatures, each sensor is fully calibrated for best accuracy:  $\pm 2\%$  RH\* and  $\pm 0.3^\circ\text{C}^{**}$ . The user can choose between two signals: analog (0-10V) and digital (PWM) (both available simultaneously for both humidity and temperature).

\*typical accuracy for RH from 20 % to 80 %

\*\*typical accuracy for T from 5°C to 60°C



# S-SERIE, SIMPLY MODULAR ACCORDING TO YOUR NEEDS

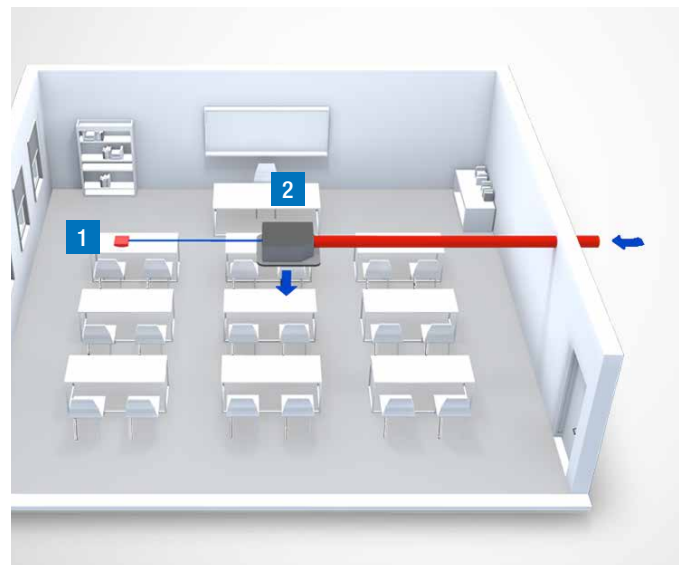
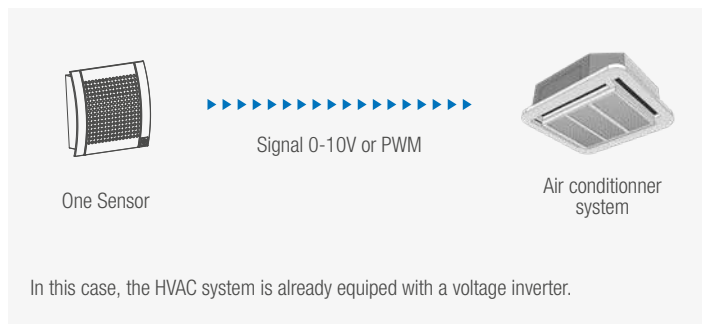
## INSTALLATION OF ONE SENSOR

According to your HVAC system compatibility, you can connect the sensor directly or install an additional device (a voltage inverter or variable frequency drive).

If the HVAC system includes a variable frequency drive, then you can directly connect the sensor to it.  
If it isn't included, then you need to install an additional variable frequency drive.

### Examples of installations

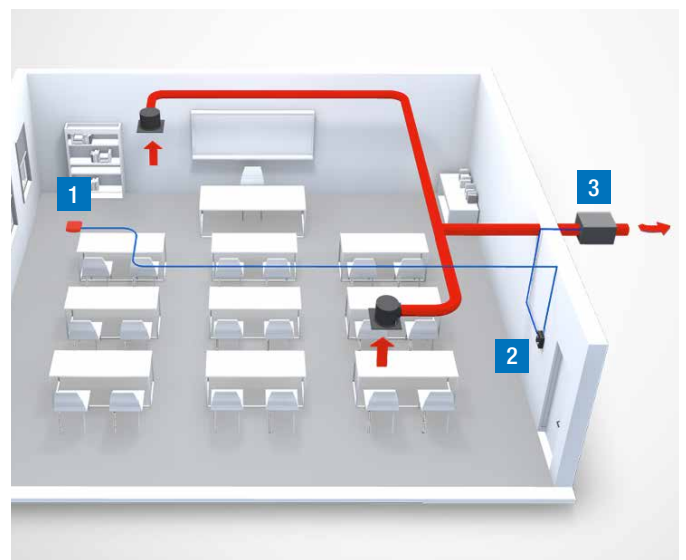
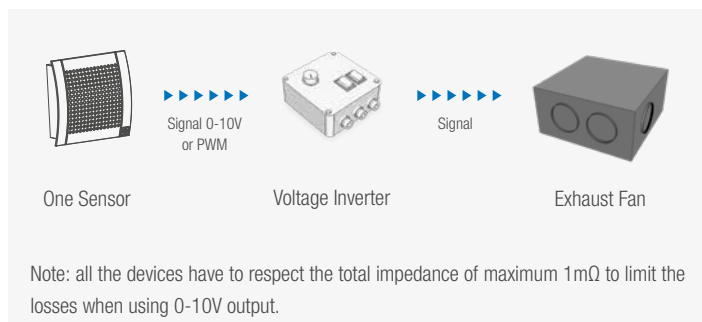
- **Direct connection to the air conditioner system**



1 Sensor 2 Air conditioner system

- **Installation of an additional device**

If your HVAC system isn't compatible with the Aereco Sensors signals, you must install an additional voltage inverter that will convert the Aereco sensors signals into a signal or a frequency that the HVAC system is able to use.



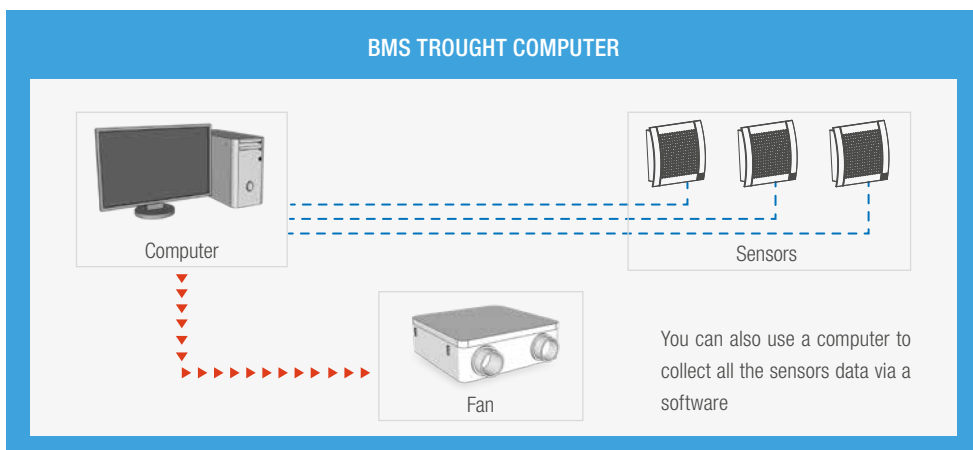
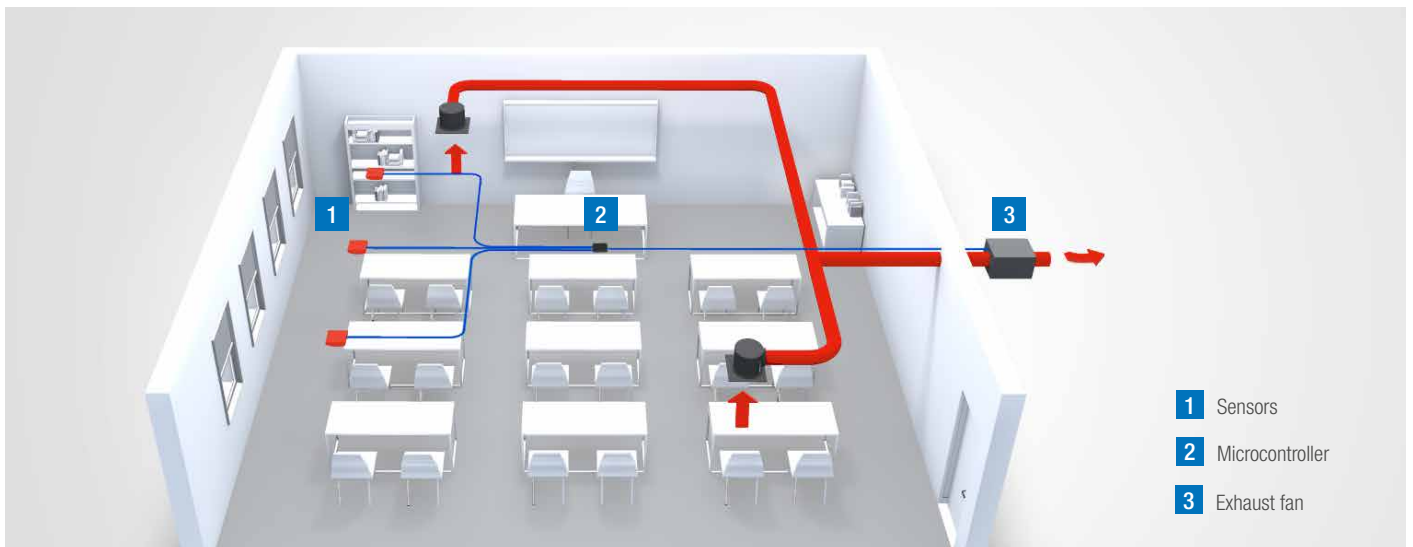
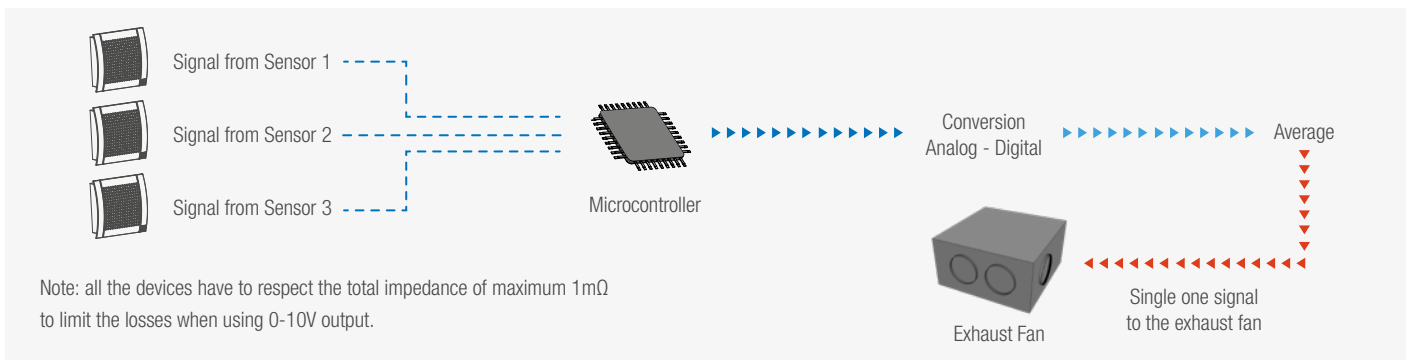
1 Sensor 2 Voltage inverter 3 Exhaust Fan

### INSTALLATION OF SEVERAL SENSORS

According to the volume or the use of the room, you can also install several sensors. Then you must add a microcontroller which has been previously computerized.

- **Microcontroller**

The microcontroller will take all the sensor's data, and make an average to send a single signal to drive the HVAC system.



## Recommended uses of S-Serie sensors



Type of room / building	Location	S-CO2	S-VOC	S-RH/T
School	Classrooms	++++	++++	
	Lavatories	++	+++	+++
Companies administration	Offices	++++	++++	
	Meeting rooms	++++	++++	
Fitness center	Locker rooms	++++	++++	+++
	Showers			++++
Hotel	Bedrooms	++++	++	
	Bathrooms		++	++++



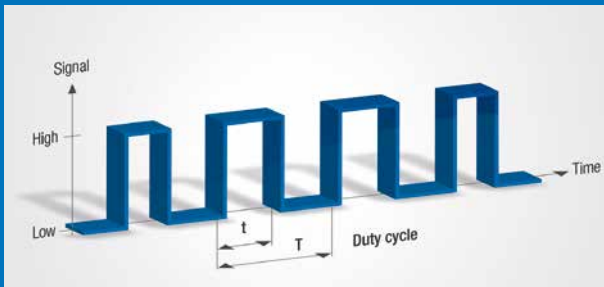
## DID YOU KNOW?

### PWM SIGNAL

A Pulse-Width Modulation is a technique used into a pulsing signal. It is a type of modulation.

Pulse-width modulation uses a rectangular pulse wave whose pulse width is modulated resulting in the variation of the average value of the waveform.

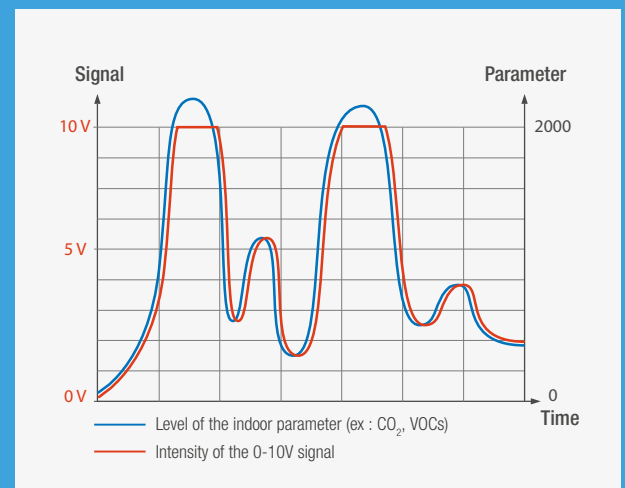
The main advantage of PWM is that power loss in the switching devices is very low. In the example below the information sent is a 40% duty cycle ( $t / T$ ).



### 0-10V

A 0-10V output is a voltage output with limit values : 0 and 10V.

It is a variation of voltage proportional to a measured parameter at a real time.







## S-C02 CO<sub>2</sub> sensor with digital and analogic outputs

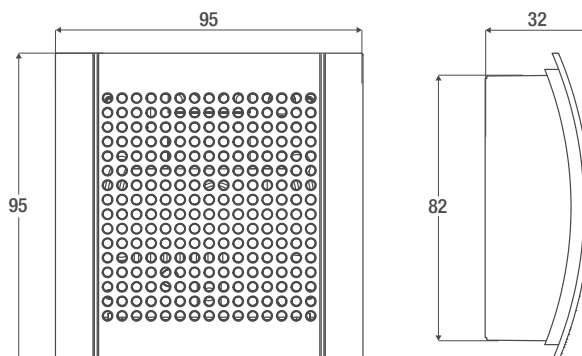
### S-C02

CAP1159

Non-Dispersive Infrared Technology (NDIR), Dual-Source Infrared System

Standard code		S-C02	
Measurement principle		CAP1159	
Working range	ppm CO <sub>2</sub>	Non-Dispersive Infrared Technology (NDIR), Dual-Source Infrared System	
Accuracy at 25°C and 1 013 mbar	ppm	0... 2 000 ppm CO <sub>2</sub>	
Response time	s	± (60 ppm +2 % of measured value in a [0 ppm; 2000 ppm] range)	
Temperature dependence	CO <sub>2</sub> / °C	< 195 s	
Long-term stability	ppm / year	typ. 2 ppm CO <sub>2</sub> / °C (0...50°C)	
Measurement reporting interval	s	typ. 20 ppm / year	
Supply voltage	VDC	60 s	
Average power consumption	A	12 VDC +/- 10 %.	
Max. peak current	A	120 mA (reading), 10 mA (base).	
Enclosure protection		1 A (use for fuse sizing)	
Working and storage conditions		IP 20	
		-40...60°C 5...95 % RH (without condensating) 85...110 kPa	
<b>PWM digital output</b>			
Output data	ppm	0 % = 0 ppm ; 100 % = 2 000 ppm	
Voltage	VDC	12 VDC +/- 10 %.	
Frequency	KHz	1 KHz	
<b>0-10 V analog output</b>			
Output data		0 to 10 V. 0 V = 0 ppm ; 10 V = 2 000 ppm	
Voltage	V	0 to 10 V	
Required impedance	Ω	>1MΩ	
<b>Characteristics</b>			
Weight	g	80.5 g	
Colour		white	
Material		ABS	

Dimensions in mm



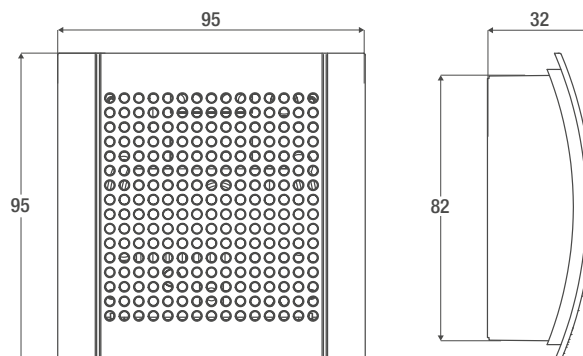


# S-VOC

VOC sensor with digital and analog outputs

		<b>S-VOC</b>
<b>Standard code</b>		CAP1160
Measurement principle		Micro-machined metal oxide semiconductor (MOS) technology
Working range	CO <sub>2</sub> eq	0...2 000 ppm CO <sub>2</sub> eq
Measurement reporting interval	s	60 s
Supply voltage	VDC	12 VDC +/- 10 %
Average power consumption	A	40 mA
Max. peak current	A	1 A (use for fuse sizing)
Enclosure protection		IP 20
Storage conditions		-25...50°C 5...95 % RH (without condensation) 85...110 kPa
Working conditions		0...50°C 5...95 % RH (without condensation) 85...110 kPa
<b>PWM digital output</b>		
Output data		0 to 100 % 0 % = 0 ppm CO <sub>2</sub> eq ; 100 % = 2 000 ppm CO <sub>2</sub> eq
Voltage	VDC	12 VDC +/- 10 %.
Frequency	KHz	1 KHz
<b>Output 0-10 V (analog)</b>		
Output data		0 to 10 V 0 V = 0 ppm CO <sub>2</sub> eq ; 10 V = 2 000 ppm CO <sub>2</sub> eq
Voltage	V	0 to 10 V
Required impedance	Ω	>1MΩ
<b>Characteristics</b>		
Weight	g	80.5 g
Colour		white
Material		ABS

Dimensions in mm







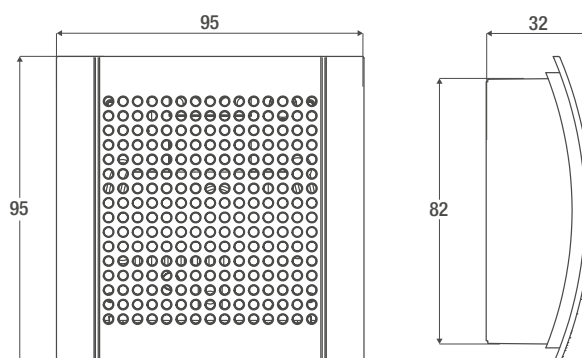
# S-RH/T

Relative humidity and temperature sensor with digital and analog outputs

## S-RH/T

<b>Standard code</b>		CAP1161
Measurement principle		Capacitive humidity sensor Band gap temperature sensor
Working range	°C / RH%	0°C +50°C 0 % - 100 % Relative Humidity
Precision RH		typical +/-2,5 %, max +/-3,5 % RH at 25°C in 20 % -80 % range
Accuracy of temperature		max +/-0,6°C in [5°C ; 50°C] range, typical 0,5°C
Measurement reporting interval	s	60 s
Supply voltage	VDC	12 VDC +/- 10 %
Average power consumption	A	15 mA
Max. peak current	A	1 A (use for fuse sizing)
Enclosure Protection		IP 20
Storage conditions		10...50°C 0...60 % RH
<b>PWM digital output</b>		
Output data		0 to 100 % 0 % = 0 % RH - 100 % = 100 % RH 0 % = 0°C - 100 % = + 50°C
Voltage	VDC	12 VDC +/- 10 %
Frequency	KHz	1 KHz
<b>0-10 V analog output</b>		
Output data		0 to 10 V 0V = 0 % RH - 10 V = 100 % RH 0V = 0°C - 10 V = + 50°C
Voltage	V	0 to 10 V
Required impedance	Ω	>1MΩ
<b>Characteristics</b>		
Weight	g	80.5 g
Colour		white
Material		ABS

Dimensions in mm









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