

## Model aSENSE™ - VAV

carbon dioxide, temperature and humidity controller for wall and duct mounting

### PRODUCT DESCRIPTION

*aSENSE™ - VAV is a stand alone controller with built-in sensors for temperature, humidity and carbon dioxide. The unit measures both CO<sub>2</sub> concentration and temperature in ambient air, transforms the data into analogue and digital output signals, which are used for controlling air supply on demand.*

*Additional cooling compressor for dehumidification may also be controlled.*

*aSENSE™ - VAV is for installation in the climate zone or in a ventilation duct.*



### FEATURES

- Cost-optimized for direct linear control of dampers and speed regulated fans
- Alternative control outputs
- Contributes to lower energy costs when applied in *Demand Controlled Ventilation*
- Internal automatic self diagnostics.
- Maintenance interval > 5 years
- Available with different measurement ranges and several housing options
- Serial communication port for connection to a PC or a GSM module and local network

### APPLICATIONS

A common application for aSENSE™- VAV is controlling ventilation in rooms occupied by people. The sensor is flexible and designed to suit many different ventilation strategies. It is a key component for energy-effective, healthy climate control of rooms with varying load like *schools / nurseries, cinemas/theatres, sports centers* etc.

*Museums and libraries* are rooms where the control of the ventilation is based on temperature and carbon dioxide measurements. It can be combined with control of humidity to secure the optimal environment of the objects.

To avoid condensation problems it is often necessary to measure humidity in air conditioning and in other cooling applications. With aSENSE™-VAV-RH all parameters can be measured and controlled from the same unit. This sensor is a basic component to be used in a lot of different ventilation applications, as well as in industrial / agriculture process controls.

# aSENSE™ - VAV Technical Specification\* carbon dioxide & temperature controller

## General Performance

Operating Temperature Range	0 - 50 °C (Lower temperature operation range can be reached by adding a box heater assembly)
Storage Temperature Range	-20 to +70 °C
Operating Humidity Range	0 to 95% RH (non-condensing)
Warm-up Time	≤ 1 min. (@ full specs ≤ 15 minutes)
Sensor Life Expectancy	> 15 years
Maintenance Interval	no maintenance required <sup>1,2</sup>
Self Diagnostics	complete function check of the sensor
Status LED Indicators	yellow = maintenance support, red = relay closed
Display	4 Digits, 7 segments LCD with ppm / °C / % indicator
Pushbuttons <sup>3</sup>	offer a selection of installation support, calibration and operation functions

## Electrical/Mechanical

Power Input	24 VAC/VDC±20%, 50-60 Hz ≤ 3 Watts average
Wiring Connections	max 1,5 mm <sup>2</sup> wires
Main terminal block	screw terminals
Digital/Analog inputs block	spring load terminals
UART connector	5-pin, 2.54 mm pitch, slide connector
Dimensions without housing	9.7 x 6.1 x 1.9 cm (L x W x D)

## Output

### Analogue <sup>4</sup>

Protection	PTC fuse (auto reset) on signal return <i>M</i> , short-circuit safe
Output limits	MIN & MAX limits may be individually set to all outputs
Linear outputs OUT1 & OUT2	0/2-10 VDC (0/1-5 VDC optional) 0/4-20 mA R <sub>load</sub> < 500 OHM
Linear output OUT4	0-10 VDC R <sub>OUT</sub> < 100 OHM, R <sub>load</sub> > 5k OHM
D/A Resolution	10 bits, 10 mV / 0.016 mA
D/A Conversion Accuracy	voltage mode: ± 2% of reading ± 50 mV, current loop : ± 2% of reading ± 0.3 mA
Relay (OUT3)	isolated N.O., 1mA/5V up to 1A/50VAC/24VDC.
Open collector OUT4	in ON/OFF mode: max 0.5A/55VDC (halfwave rectifier for AC)

### UART Serial com port

Protocol	SenseAir protocol (see <i>comprot 0700xx rev 3_04.pdf</i> ) <sup>7</sup>
PC-interface	RS232 UART cable with sliding contact and driver (model A232 Cable)
PC User Interface Program	UIP version 4.0 (or higher) <sup>6</sup> Free download from SenseAir's home page <a href="http://www.senseair.com">www.senseair.com</a>
LonWorks™ network com.	(accessory -LON) LonWorks™ add-on PCB
RS485 network com.	(accessory -485) RS485 terminal slide-on port Option Modbus RTU

## Inputs

Inputs	9,10 DI1 switch input to delay timer & regulators
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## CO<sub>2</sub> Measurement

Operating Principle	Non-dispersive infrared (NDIR) with Automatic Baseline Correction (ABC) <sup>8</sup>
Gas Sampling Mode	diffusion
Response Time (T <sub>1/e</sub> )	2 min. diffusion time (20 sec. with tube connection at 0.1 litre/minute gas flow)
Accuracy <sup>9</sup>	± 1% of measurement range ± 5 % of measured value
Pressure Dependence	+ 1.58 % reading per kPa deviation from normal pressure, 100 kPa
Annual Zero Drift <sup>8</sup>	< ±0.3 % of measurement range
Measurement ranges	5 different sensor models from 0 - 3 000 ppm (standard) to 0 - 10 % <sub>vol</sub> .

## Temperature Measurement

Operating Principle	Thermistor
Measurement Range	-20 to +60 °C
Accuracy	± 0.5 °C ; Digital Resolution 0.1 °C (0.01 °C via UART)

## Relative Humidity Measurement (model options -RH)

Operating Principle	capacitive polymer in a monolithic IC
Measurement Range <sup>10</sup>	0 to 100 % RH
Accuracy	± 2 % RH
Digital Resolution	0.1 %RH (0.01 %RH via UART)

**Note 1:** In normal IAQ applications. Some industrial applications may require an annual zero gas purge, which automatically recalibrates the CO<sub>2</sub> sensor

**Note 2:** For -RH models, in applications with elevated temperatures and high humidity levels the relative humidity probe calibration may have to be maintained

**Note 3:** Different menus exist for different models. Push-buttons are available only in models having a LCD.

**Note 4:** The specifications are valid for the output load connected to ground G0 or common signal return

**Note 6:** Free download from SenseAir's home page [www.senseair.com](http://www.senseair.com)

**Note 7:** For more information, please contact SenseAir AB

**Note 8:** The ABC function is the key for maintenance free operation. It assumes normal IAQ environments, or applications where some ventilation will occur (at least during some moment over a week period). For CO<sub>2</sub> sensors this function automatically corrects for any possible zero drift.

**Note 9:** In normal indoor air environment. Accuracy is defined at continuous operation (3 weeks minimum after installation)

**Note 10:** Extended exposure to > 90 % RH causes reversible shift of 3 %.

\*Can be changed without notice

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