

Controller with sensors for Carbon dioxide, Humidity and Temperature

PRODUCT DESCRIPTION

aSENSE-VAV-RH is a microprocessor based controller with built-in sensors for temperature, humidity and carbon dioxide. The unit measures the ambient air, transforms the measurements to analogue and digital control signals used for controlling different actuators on demand based on temperature and CO₂ levels. Additional cooling compressor for dehumidification may also be controlled. aSENSE-VAV-RH is a flexible key-component for energy saving and yet healthy climate control of rooms with varying load.



aSENSE-VAV-RH (basic model)

MODEL aSENSE-VAV-RH

- cost optimized for direct control of dampers and speed regulated fans
- alternative control outputs
- contributes to lower energy costs when it is applied in *Demand Controlled Ventilation*
- internal automatic self diagnostics. Maintenance interval > 5 years
- available for different measurement ranges and with several housing options
- serial communication port for connection to a PC or a GSM module
- optional LonWorks™ digital network communication interface for advanced building automation

APPLICATIONS

A common application for aSENSE-VAV-RH is controlling the ventilation in rooms occupied by people, or where objects need to be stored at a certain level of humidity. 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. The sensor is a basic component to be used in a lot of different ventilation applications, as well as in industrial/agriculture process controls.

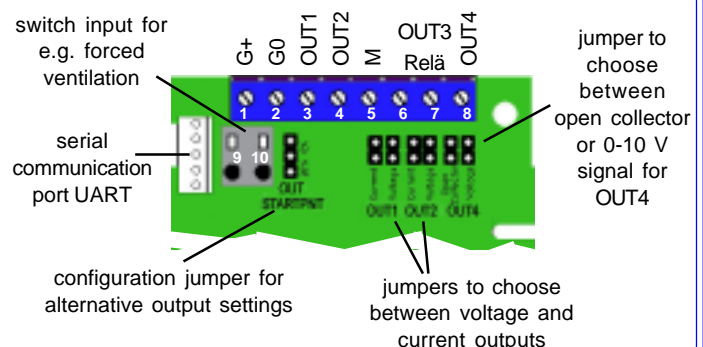
CONNECTIONS

Screw terminal:

1	G+	24 V AC/DC
2	G0	system ground
3	OUT1	control signal (+) < 10 V / 20 mA
4	OUT2	control signal (+) < 10 V / 20 mA
5	M	signal ground (-)
6,7	OUT3	ON/OFF relay
8	OUT4	control signal (+) < 10 V or open collector

Extra terminal:

9,10	DI1	switch input to delay timer and regulators
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FUNCTIONAL DESCRIPTION ***



aSENSE-VAV-RH can be programmed from a PC to a variety of control tasks. Any change from the default is programmed from the free software *UIP (version 4.0)*. In the tool box there are 6 programmable *P-bands* (linear functions) with set points, 2 additional general purpose *P-bands*, plus 1 timer function regulator controlled by the *DI1* input. In addition, the different regulator blocks may be mixed together using 3 logical multiplexers (4:1). To each of the 4 hardware outputs the largest value of 4 regulator blocks is transformed to an output signal. The outputs can be limited within defined *MIN* and *MAX* values that can be set/updated from the push button menu.

Default settings: In the standard configuration the outputs are pre-programmed as *linear transmitters* for carbon dioxide, temperature and relative humidity. In addition, there is one sum alarm output that indicates if any one of carbon dioxide, temperature or humidity has EXCEEDED its preset limit:

- *CO₂ transmitter* 0...10V / 0...2000 ppm
- *Temperature transmitter* 0...10V / 0...50 °C
- *Humidity transmitter* 0...10V / 0...100 %RH
- *Sum alarm ON/OFF* 2000 / 1900 ppm
 38 / 36 °C
 85 / 75 %RH

Set points of a control parameter are defined as the value where the control signal starts. For carbon dioxide and temperature these values can be adjusted by the *maintenance push buttons*. An application example where this feature is meaningful is shown to the right. When a set point value is changed the control curves of that parameter are parallel displaced!

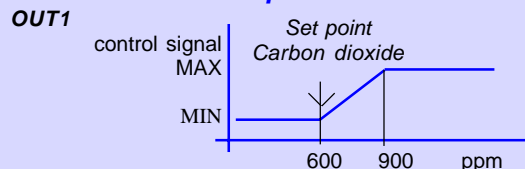
PUSH BUTTON FUNCTIONS

Two push buttons are used for service and setting of parameters. The push buttons give access to functions according to the table. In display mode the user cannot change the settings - only change the display presentation. The service mode is reached by a PIN code push button sequence.

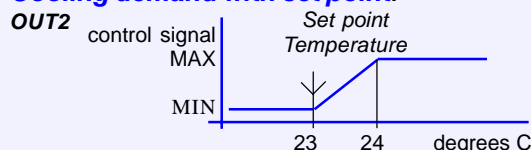
Application example: A linear control of carbon dioxide, temperature and relative humidity, with mal function alarm output

- *OUT1* = control signal for demand of CO₂ ventilation
- *OUT2* = control signal for cooling demand
- *OUT3* = ON/OFF sum alarm
- *OUT4* = control signal for demand of humidifying

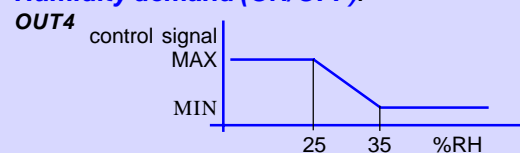
Air demand with set point:



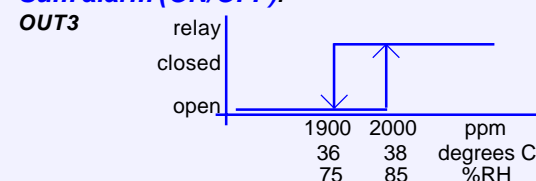
Cooling demand with set point:



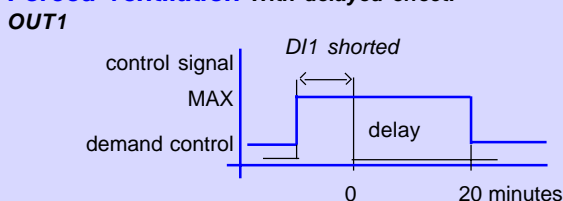
Humidity demand (ON/OFF):



Sum alarm (ON/OFF):



Forced ventilation With delayed effect:



*** Function description in detailed block diagram form, installation manuals etc, are available on the Internet!

function	display	description
default mode status info parameter info	temp / CO ₂ / %RH diagnostic code present set points	present values (alternating) information after push button press
service mode increase/decrease temp. increase/decrease CO ₂ select output increase/decrease MIN limit increase/decrease MAX limit calibration of CO ₂ sensor	temp set point CO ₂ set point OUt1...OUt4 SEtL MIN limit (%) SEtH MAX limit (%) bCAL CAL	push button +/- push button +/- address output for temporary work puts selected output in MIN position push button +/- gives new MIN limit puts selected output in MAX position push button +/- gives new MAX limit calibration with fresh air calibration with zero gas (<i>art.nr.F0005</i>)