Model εSENSE®-Duo

Dew point & Carbon dioxide Dual Sensor Transmitter

PRODUCT DESCRIPTION

εSENSE® -Duo is a new, state-of-the-art, low cost infrared dew point and carbon dioxide sensor transmitter, primarily intended for climate control in buildings. Another application area for this combination sensor is growth control in greenhouses, incubators, and pharmaceutical industry.

εSENSE®-Duo measures carbon dioxide and water vapour content in the ambient air, together with the space temperature. It calculates the Dew Point, Humidity Mixing Ratio, or Enthalpy, and outputs two selected variables as linearized 0-10 V signals, suitable for most building management systems

The small εSENSE® -Duo unit fits directly on top of a standard electrical wall box.
It helps you save money by minimizing your energy consumption while maintaining correct indoor air climate in whatever environmental circumstances!

εSENSE® -Duo combination sensor

FEATURES

- measures ambient air *carbon dioxide* (CO_2) in the 0..2000 ppm range at high accuracy
- measures water vapour content in the range -30^0..+40^0 *Dew Point* / 0...50 g/kg *Mixing Ratio*
- measures the space *Temperature*
- easy to install and to check on-site
- maintenance friendly with push-buttons support for exact, single point dry gas calibration of humidity IR measurement.
- LCD configuration jumper to select *Temperature/Dew Point* units to be shown in ^{0}C or ^{0}F
- *Enthalpy* linear output as an optionModbus on RS485 twisted pair network as a digital communication option

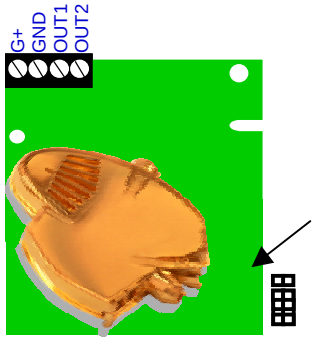
APPLICATIONS

εSENSE®-Duo combination sensor, measuring both *carbon dioxide* and *dew point*, is ideal for *climate control* in buildings. The humidity levels are important wherever chillers and coolers are involved and thus condensation problems must be prevented. Where the humidity levels have to be controlled, for example in *storage situations* (i.e. in museums, libraries, archives) *εSENSE®-Duo* is the perfect choice.
The carbon dioxide is a direct measure on the human occupancy, and hence a good control parameter for the fresh air ventilation rate. This is commonly used in demand controlled ventilation (DCV) systems to reduce energy consumption and to assure a healthy indoor air quality.
Growth control in *greenhouses, incubators,* and *pharmaceutical industry* are obvious examples where this combination sensor has a large potential to increase productivity at very low cost.

CONNECTIONS

Screw terminal

1	G+	24 VAC/DC (+)
2	GND	System ground (-)
3	OUT1	Linear output (+) 0…10 V = 0…2 000 ppm CO2
4	OUT2	Linear output (+) 2…10 V = -30…40^0 Dew Point



Maintenance switches:
CO_2 400 ppm calibration
CO_2 zero point calibration
Moisture zero point calibration

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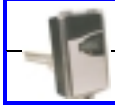
eSENSE® - Duo technical specification (rev.nr:040317)

Models:

Market name	SenseAir code number	Housing option	LCD option
 **eSense-Duo**	*081101*	wall mount	no
eSense-Duo -D	*081102*	wall mount	*YES*
 **eSense-Duo -K**	*081103*	duct aspiration	no
eSense-Duo -K-D	*081104*	duct aspiration	*YES*

General Performance:

Compliance with ..... EMC directive 89/336/EEC
Operating Temperature Range ..... 0 - 50 °C
Storage Temperature Range ..... -40 to +70 °C (*-D* options -20 to +70 °C)
Operating Humidity Range ..... 0 to 95% RH (non-condensing)
Operating Environment ..... Residential, commercial and industrial spaces and Potentially dusty air ducts used in HVAC (Heating Ventilation and Air-Conditioning) systems[1]
Warm-up Time ..... ≤ 1 min. (@ full specs ≤ 15 minutes)
Sensor Life Expectancy ..... > 15 years
Self Diagnostics ..... continuous function check with LED +LCD wrench icon (*-D* options) error indication

Electrical / Mechanical:

Power Input ..... 24 VAC/VDC±20%, 50/60 Hz (half-wave rectifier input)
Power Consumption ..... < 1 Watts average
Connection Screw Terminal ..... 4 x 1,5 mm^2 ; for power input (G+, G0) and 2 x voltage analog outputs (with ground G0)
Configuration Jumper ..... °C / °F LCD units configuration selector for Space Temperature and Space Dew Point
Dimensions ..... 10,0 x 7,8 x 2,8 cm wall mount IP30 enclosure (H x W x D)

Gas Analysis:

Sensing Method..... Gold plated infrared (NDIR) waveguide technology with automatic background calibration (ABC for CO_2) and passive gas diffusion (no moving parts)
Response Time ($T_{1/e}$) <10 sec @ 200cc/min flow rate
< 3 minutes diffusion time
Maintenance support switches..... 3 x Calibration support functions: zero point Moisture, zero point CO_2, and CO_2 background 400 ppm level calibration adjustment triggers

Measurement	CO_2	Humidity (H_2O) to Dry Air Mixing Ratio	Dew Point @25°C	Dew Point @37°C
Repeatability	± 10 ppm ± 1 % of reading	± 0,15 g/kg ± 1 % of reading	± 0,3 °C Dew Point	± 0,3 °C Dew Point
Accuracy[2]	± 15 ppm ± 2 % of reading	± 0,7 g/kg ± 2 % of reading	± 1,5 °C Dew Point	± 1,2 °C Dew Point

Temperature Measurement:

Sensing Method..... 10 kΩ NTC resistor
Measurement Range ..... 0 °C…+50 °C with linearization @ ±0,5 °C accuracy

Outputs:[3]

Linear Conversion Range ..... 0 -10 VDC
D/A Resolution..... 10 bits, 10 mV
D/A Conversion Accuracy..... ± 2 % of reading ± 50 mV
Electrical Characteristics..... R_{OUT} < 100 Ω, R_{LOAD} > 5 kΩ
Terminal OUT1 / OUT2..... **CO_2** 0…2 000 $ppm_{vol.}$ / **Dew Point** -30…40 °C
Optional output configurations ..... **Space Temp**. 0…50 °C / **Humidity-to-Dry-Air Mixing Ratio** 0…50 g/kg / **Enthalpy**

UART Serial com port
Protocol ..... SenseAir protocol, or MODBUS-on-RS485 (optional)
PC-interface ..... UART, optional D-SUB9 cable with RS232 com driver (*model A232 Cable*)

Note 1: The SO_2 enriched environments are excluded.
Note 2: In normal IAQ applications (@NTP). Accuracy is defined after performing dry gas zero calibration followed by 4 weeks of continuous operation. The tolerance of the span calibration gas (2 % unless otherwise requested), and test gas, adds to the total uncertainty
Note 3: The specifications are valid for the output load connected to ground G0 or M.

* PATENTED