



Model eSENSE®

Carbon dioxide transmitter

PRODUCT DESCRIPTION

eSENSE® is a new simple, low cost, state-of-the-art, infrared and maintenance-free carbon dioxide transmitter for installation in the climate zone or in the ventilation duct.

eSENSE® measures the carbon dioxide concentration in the ambient air up to 2 000 ppm and transforms the data into an analogue 0/2-10 V output signal.

eSENSE® helps you save money by decreasing your energy consumption while creating a healthier indoor climate!



*eSENSE®
IP20 wall housing
without display*



*eSENSE®-D
IP20 wall housing
with display*

FEATURES

SenseAir's patented state-of-the-art gold-plated infrared (NDIR) waveguide technology offers reliable measurements

- measurement range: 0 - 2 000 ppm CO₂
- two analogue outputs (not model -I):
OUT1: 0 - 10 V (= 0 - 2 000 ppm CO₂)
OUT2: 2 - 10 V (= 0 - 2 000 ppm CO₂)
- internal automatic self-diagnostics.
- maintenance-free in normal applications
- cost-optimized for connection to DDC:s
- prepared for complementary passive temperature element (model -Tr).
- RS485 / ModBus net work communication as option
- three different housing options:
 - 1) IP20 WALL housing (with / without display)
 - 2) IP65 DUCT housing (with / without display)
 - 3) IP50 INDUSTRIAL "all-round" housing (for both wall and duct applications)

APPLICATIONS

eSENSE® is an extremely cost-optimized sensor solution for climate control of buildings and other processes where measured carbon dioxide values in voltage format are requested.

By controlling the ventilation based on actual demand, it helps you decrease your energy consumption and yet have a healthy indoor climate!

The three different housing options makes the eSENSE® available to almost any application or environment.

eSENSE®-Tr is also prepared for quick mounting of a complementary passive temperature element, which can easily be done by the customer.

eSENSE®-485 and eSENSE®-MB offers RS485 communication with ModBus protocol as option (see separate data sheet).

CONNECTIONS

Screw terminal

1	G+	24 V AC/DC (+)
2	GND	system ground (-)
3	OUT1	linear output (+) 0-10 V = 0 - 2 000 ppm CO ₂
4	OUT2	linear output (+) 2-10 V = 0 - 2 000 ppm CO ₂

G+
GND
OUT1
OUT2



Power supply has to be connected to G+ and GND. GND is considered as system ground. If the analogue output is connected to a controller the same ground reference has to be used for the eSENSE unit and for the control system



eSENSE[®] technical specification (rev nr: 030919)

General Performance

Compliance with	EMC directive 89/336/EEC
Operating Temperature Range	0 - 50 °C
Storage Temperature Range	-40 to +70 °C (display model -D: -20 to +70 °C)
Operating Humidity Range	0 to 95% RH (non-condensing)
Operating Environment	residential, commercial and industrial spaces ¹
Warm-up Time	≤ 1 min. (@ full specs ≤ 15 minutes)
Sensor Life Expectancy	> 15 years
Maintenance Interval	no maintenance required ²
Self Diagnostics	complete function-check, LCD error indication (display model -D)
Display (model -D)	4 Digits, 7 segments LCD with ppm indicator

Electrical

Power Input	24 VAC/VDC ±20%, 50 Hz (half-wave rectifier input)
Power Consumption	< 1 Watt average
Connection screw terminal A	4 x 1,5 mm ² for power input (G+, G0) and voltage outputs (OUT1, OUT2) 34 cm 3-wire pigtail. Please note that OUT2 is not made available (model -I).
Connection screw terminal B	2 x 1,5 mm ² for passive resistive output (Y, M) for option -Tr

CO₂ Measurement

Sensing method	Gold-plated infrared (NDIR) waveguide technology with Automatic Background Calibration (ABC) and passive gas diffusion (no moving parts)
Response Time (T _{1/e})	< 10 sec. @ 30 cc/min. flow rate < 3 min. diffusion time
Repeatability	± 20 ppm ± 1 % of reading
Accuracy ²	± 30 ppm ± 2 % of reading
Annual Zero Drift ²	< ± 10 ppm
Pressure Dependence	+ 1.6 % reading per hPa
Installation support	Zero point Calibration by CO ₂ -free gas purge and background level calibration adjustment jumper trigger (bCAL).

Outputs

Voltage signal terminal CO₂ ³

OUT1 linear conversion range	0 -10 VDC for 0 - 2 000 ppmvol.
OUT2 linear conversion range	2 -10 VDC for 0 - 2 000 ppmvol. with 1 VDC used as FAULT status signal (Please note that OUT2 is not made available on model eSENSE-I)
D/A resolution.....	10 bits, 10 mV
D/A conversion accuracy	± 2 % of reading ± 50 mV
Electrical characteristics.....	R _{OUT} < 100 Ohm, R _{LOAD} > 5 kOhm

Resistive terminals ⁴

Thermistor outputs	temperature measurement resistor terminal output with signal return connected to ground terminal (option -Tr)
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Housing options

WALL HOUSING (standard)

Dim.: 100 x 80 x 27 mm (H x W x D)
Protection class: IP20
60 mm hole separation for European standard J-boxes.

DUCT HOUSING (model -K)

Dim.: 142 x 84 x 46 mm (H x W x D)
Duct probe length: 245 mm
(adjustable according to duct dimension)
Protection class: IP65

ALL-ROUND HOUSING (model -IP50)

Dim.: 106 x 67 x 26 mm (H x W x D)
Protection class: IP50
Connection: 34 cm 3-wire pigtail (no OUT2)
For both wall and duct applications.



eSENSE

eSENSE-D



eSENSE-K

eSENSE-K-D



eSENSE-IP50 0.6/2/4/10% option

Note 1: The SO₂ enriched environments are excluded.

Note 2: In normal IAQ applications (@ NTP). Accuracy is defined after minimum 3 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. Other outputs and measurement ranges are available per request.

Note 4: Resistive probe is to be mounted by the user. Can be factory pre-mounted upon request.