Model εSENSE®

Carbon dioxide transmitter

PRODUCT DESCRIPTION

εSENSE® *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.*

εSENSE® *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.*

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

εSENSE®
IP20 wall housing
without display

εSENSE®-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 CO_2
- two analogue outputs (not model –I):

  OUT1: 0 - 10 V (= 0 - 2 000 ppm CO_2)
  OUT2: 2 - 10 V (= 0 - 2 000 ppm CO_2)

- 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

εSENSE® *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!

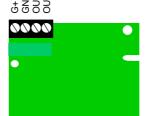The three different housing options makes the εSENSE® available to almost any application or environment.

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

εSENSE®-485 and εSENSE®-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	$\leq$ 1 min. (@ full specs $\leq$ 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	$4 \times 1,5$ 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	$2 \times 1,5$ mm^2 for passive resistive output (Y, M) for option *-Tr*

CO_2 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 ppm$_{vol.}$
OUT2 linear conversion range	2 -10 VDC for 0 - 2 000 ppm$_{vol.}$ 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*)

Housing options

WALL HOUSING (standard)	DUCT HOUSING (model *–K*)	ALL-ROUND HOUSING (model *–IP50*)
Dim.: 100 x 80 x 27 mm (H x W x D)	Dim.: 142 x 84 x 46 mm (H x W x D)	Dim.: 106 x 67 x 26 mm (H x W x D)
Protection class: IP20	Duct probe length: 245 mm	Protection class: IP50
60 mm hole separation for European	(adjustable according to duct dimension)	Connection: 34 cm 3-wire pigtail (no OUT2)
standard J-boxes.	Protection class: IP65	For both wall and duct applications.

eSENSE   *eSENSE-D*   *eSENSE-K*   *eSENSE-K-D*   *eSENSE-IP50*

Note 1:   The SO$_2$ 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 incertainty.
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 mounteed by the user. Can be factory pre-mounted upon request.