# eSENSE™ Family

## Carbon dioxide transmitter

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

*eSENSE™ measures the carbon dioxide concentration in the ambient air up to 2000 ppm and transforms the data into an analogue output.*

## STANDARD SPECIFICATION*

| | |
|---|---|
| Measured gas | Carbon dioxide ($CO_2$) |
| Operating Principle | Non-dispersive infrared (NDIR) |
| Measurement range | 0 - 2000ppm* |
| OUT1 | 0 - 10V for 0 - 2000ppm |
| | ±2% of reading ±50mV |
| OUT2 | 2 - 10V (or 4 - 20mA) |
| | for 0 - 2000ppm |
| | ±2% of reading ±50mV |
| Accuracy | ±30ppm ±3% of reading |
| | |
| Dimensions: | (H x W x D) |
| *Disp* | 100 x 80 x 28mm |
| *Slim* | 106 x 67 x 26mm |
| *II, II Disp* | 130 x 85 x 30mm |
| *Duct Disp, Ind Disp* | 142 x 84 x 46mm |
| Life Expectancy | >15years |
| Operation temperature range | 0 - 50°C |
| Operation humidity range | 0 - 95%RH (non-condensing) |
| Power supply | 24VAC/DC |

** Available in different carbon dioxide measurement ranges and different housings.*

## APPLICATIONS

*eSENSE™ is an extremely cost-optimized sensor solution. By controlling the ventilation based on actual demand, it helps you decreasing the energy consumption and having a healthy indoor climate in both residential and commercial buildings. eSENSE™ family is also available to other normal applications or environments for example in greenhouse.*

## KEY BENEFITS

- Maintenance-free
- Available in different carbon dioxide measurement ranges and different housings
- Internal automatic self-diagnostics
- Cost-optimized for connection to DDC:s

SenseAir®

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# *eSENSE*™ *carbon dioxide transmitter Technical Specification*

## *General Performance*:

Conformance with standards ..... EMC 2004/108/EC directive
..... EN 61326-1:2006, Class B equipment, Table 1 – Basic immunity test requirements
..... RoHS directive 2011/65/EU
Operating Temperature Range ..... 0 - 50°C
Storage Temperature Range ..... -40 - 70°C (display model *Disp*: -20 - 50°C)
Operating Humidity Range ..... 0 - 95%RH (non-condensing)
Operating Environment ..... residential, commercial and industrial spaces [1]
Warm-up Time ..... 1min. (@ full specs 15 min.)
Sensor Life Expectancy ..... >15years
Maintenance Interval ..... no maintenance required[2]
Self-Diagnostics ..... complete function-check, LCD error indication (display model *Disp*)
Display *(Disp)* ..... 4 Digits, 7 segments LCD with ppm indicator

## *Electrical:*

Power Input ..... 24VAC/VDC ±20%, 50Hz (half-wave rectifier input)
Power Consumption ..... <1W average
Connection screw terminal A ..... 4 x 1.5mm$^2$ for power input (G+, G0) and voltage outputs (OUT1, OUT2)
Connection screw terminal B ..... 2 x 1.5mm$^2$ for passive resistive output (Y, M) for option *-TR*
Model IP50 ..... 34cm 3-wire pigtail. Please note that OUT2 is not made available.

## *$CO_2$ Measurement*:

Sensing Method ..... EQC (Ethernal Quality Coating) technology with Automatic
..... Background Calibration (ABC) and passive gas diffusio
..... (no moving parts)
Diffusion Time ($T_{1/e}$) ..... <3min.
Accuracy[2] ..... EQC±30ppm ±3% of reading
Annual Zero Drift[2] ..... <±10ppm
Pressure Dependence ..... +1.6% reading per kPa
Measurement Range ..... 0 - 2000ppm

*eSENSE™ Duct Disp eSENSE™ Ind Disp*
*Dim: 142 x 84 x 46 mm*

## *Outputs*:

**Output Signal Terminal $CO_2$**[3]

OUT1 Linear Conversion Range ..... 0 - 10VDC for 0 - 2000ppm
OUT2 Linear Conversion Range ..... 2 - 10VDC, or 4 - 20mA for 0 - 2000ppm
D/A Resolution ..... 10 bits, 10mV

**Voltage Outputs:**

D/A Conversion Accuracy ..... ±2% of reading ±20mV
D/A Resolution ..... 10mV
Electrical Characteristics ..... $R_{OUT}$ <100Ω, $R_{LOAD}$ >5kΩ

**Current Loop Output:**

D/A Conversion Accuracy ..... ±2% of reading ±0.3mA
D/A Resolution ..... 0.02mA
Electrical Characteristics ..... $R_{LOAD}$ >500Ω

*eSENSE™ Disp eSENSE™*
*Dim: 100 x 80 x 28 mm*

**Resistive Terminals**[4]

Thermistor Outputs ..... temperature measurement
..... resistor terminal output with signal return
..... connected to ground terminal(option *TR*)

*eSENSE™ Slim*
*Dim: 106 x 67 x 26 mm*

## *eSENSE™ Family*

| Art.no | Product | Additional features |
|---|---|---|
| **050-8-0002** | *eSENSE™* | No display |
| **050-8-0005** | *eSENSE™ Disp* | Display |
| **050-8-0026** | *eSENSE™ -TR* | No display, terminal for resistive temperature probe |
| **050-8-0004** | *eSENSE™ Duct* | No display |
| **050-8-0009** | *eSENSE™ Duct Disp* | Display |
| **050-8-0047** | *eSENSE™ Duct* | No display, OUT1= 0 – 5 V |
| **050-8-0032** | *eSENSE™ Ind* | No display |
| **050-8-0033** | *eSENSE™ Ind Disp* | Display |
| **050-8-0003** | *eSENSE™ Slim* | No Display, protection class IP50 |
| **050-8-0045** | *eSENSE™ Slim* | OUT1 = 0 – 5 V |
| **050-8-0014** | *eSENSE ™II* | No display |
| **050-8-0012** | *eSENSE ™II Disp* | Display |

*Available in different carbon dioxide measurement ranges and different housings*

*eSENSE ™II Disp eSENSE ™ II*
Dim: 130 x 85 x 30 mm

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 uncertainty.
Note 3: The specifications are valid for the output load connected to ground G0. Other outputs and measurement ranges are available per request.