Gas and Air Sensors

Installation Manual

eSENSE Outdoor ™

CO_2 transmitter with heater and inline thermostat mounted in IP65 housing

eSENSE Outdoor Product # 050-8-NA01

The *eSENSE Outdoor* PCB is housed in an IP65 housing with breathers to

support the flow of outdoor air. If for some reason the PCB must be removed care must be taken to protect from electrostatic discharge! Normally, removing the PCB is NOT required.

The eSENSE Outdoor includes an in-line thermostat in order that heating of the housing only takes place when the outdoor temperature warrants the use of the energy to maintain an above freezing temperature in the housing. Maintaining an above freezing temperature prevents the accumulation of ice crystals inside the Optical Bench Assembly, which could cause inaccurate CO_2 measurements.

Electrical connections

⚠ **The power supply** must be connected to **+** and $\perp$ 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!* Unless different transformers are used, special precautions need to be taken.
PLEASE NOTE! The eSENSE signal ground *is not* galvanically separated from the eSENSE power supply!

⚠ **Please NOTE!**
The same ground reference has to be used for the eSENSE unit and for the control system!

The eSENSE Outdoor can be mounted to a wall or other supporting structure using the four corner mounting holes or the top and bottom mounting holes.

Connection of Power to Terminal 1 and Ground to Terminal 2 must maintain the 2 connections associated with the heater. The eSENSE Outdoor is shipped with the heater connections already in place for ease of installation.
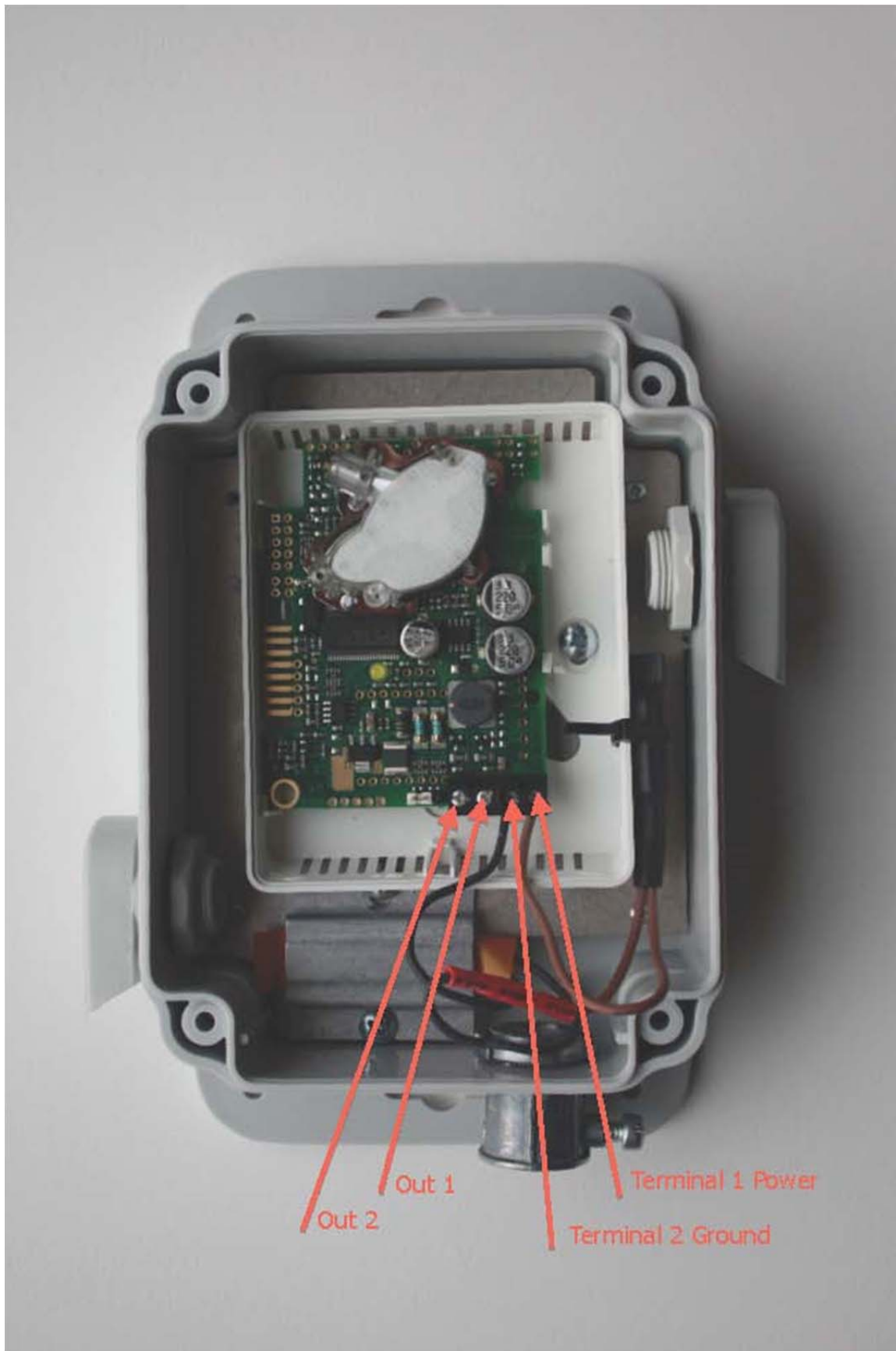
Out 1

Out 2

Terminal 1 Power

Terminal 2 Ground

Connect the power after mounting.

eSENSE Outdoor [TM] carbon dioxide transmitter Technical Specification

General Performance

Compliance with ....EMC directive 89/336/EEC. RoHS directive 2002/95/EG
Operating Temperature Range ....-22 to +115 °F
Storage Temperature Range ....-4 to +122 °F[1]
Operating Humidity Range ....0 to 95% RH (non-condensing)
Operating Environment ....Outdoor
Warm-up Time ....< 1 min. (@ full specs < 15 minutes)
Sensor Life Expectancy ....> 15 years
Maintenance Interval ....no maintenance required
Self Diagnostics ....complete function-check

Electrical

Power Input ....24 VAC/VDC ±20%, 50 Hz (half-wave rectifier input)
Power Consumption ....< 1 Watt average (Heater Off)
Connection screw terminal A ....4 x 1,5 mm^2 for power input (G+, G0) and voltage outputs (OUT1, OUT2)

CO_2 Measurement

Sensing method ....Infrared (NDIR) waveguide technology with Automatic Baseline
                                                                          Correction (ABC) and passive gas diffusion (no moving parts)
Response Time ($T_{1/e}$) ....< 30 sec. @ 30 cc/min. flow rate, < 3 min. diffusion time
Repeatability...± 20 ppm ± 1 % of reading
Accuracy[3] ....± 30 ppm ± 3 % of reading
Annual Zero Drift[3] ....< ± 10 ppm
Pressure Dependence ....+1.6% of reading per kPa deviation from normal pressure 101.3kPa[4]

Outputs

Output signal terminal CO_2[5]
OUT1 linear conversion range...........................0 - 10 VDC for 0 - 2 000 ppm.
OUT2 linear conversion range...........................4 - 20 mA or 2 – 10VDC for 0 - 2 000 ppm.
....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 (Heater Off)

Note 1: After long-term storage a zero calibration is recommended.
Note 2: All corrosive environments are excluded.
Note 3: Accuracy is defined after zero calibration or after minimum 23 days of continuous operation. The tolerance of the span gas (2% unless otherwise requested) and test gas adds to the total uncertainty.
Note 4: For reference see TN-025 "on pressure sensitivity".
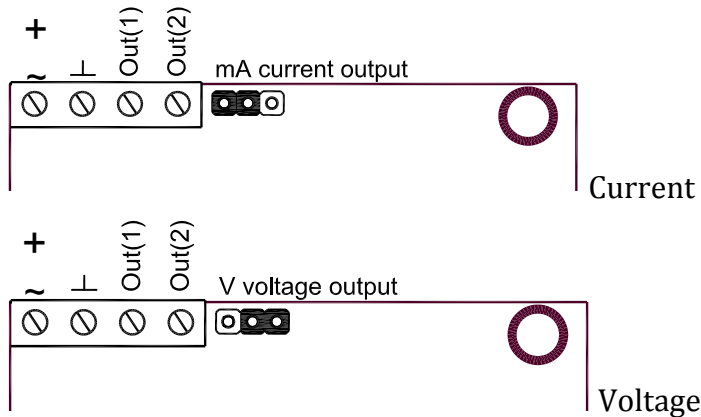Note 5: The specifications are valid for the output load connected to Ground G0.

Figure 1 Picture of the PCB with the jumper for setting Out(2) to current output (left position) or voltage output (right position)

Electrical connections

⚠ The power supply must connected to $\overset{\sim}{+}$ and ⊥. ⊥ is considered as system ground. *The same ground reference has to be used for the eSENSE unit and for the DDC/signal receiver.*

PLEASE NOTE! The same ground reference has to be used for the *eSENSE* unit and for the control system!

Connection Terminal	Function	Electrical Data	Remarks
$\overset{\sim}{+}$ ⊥	Power (+)	24 VAC/DC+ (+-20%), 2W	
	Power ground (-)	24 VAC/DC-	
Out(1)	Analogue Output 1 (+)	0-10 VDC	0-2000 ppm CO_2
Out(2)	Analogue Output 2 (+)	2,0-10,0 VDC or 4,0-20,0 mA	0-2000 ppm CO_2
		0,9-1,6 VDC or 1,5-2,5 mA	Status = ERROR
		0 VDC or 0mA	Status = NOT READY

Table I. Electrical terminal connections for eSENSE

WARRANTY AND LIMITATION OF LIABILITY

1. SenseAir warrants that for a period of twenty-four (24) months following receipt by Buyer the Product supplied by SenseAir to Buyer will be, under normal use and care, free from defects in workmanship or material and to be in material conformity with SenseAir's specifications. Units returned to SenseAir for warranty repairs shall be shipped to SenseAir, at Buyer's expense, according to SenseAir's instruction. Within ninety, (90) days of the receipt of product, SenseAir shall replace or repair such units and shall ship them to Buyer's designated return destination freight pre-paid.

2. Warranty Limitations. This warranty does not extend to any unit that has been subject to misuse, neglect or accident; that has been damaged by causes external to the unit; that has been used in violation of SenseAir's instructions; that has been affixed to any non-standard Accessory attachment; or that has been modified, disassembled, or reassembled by anyone other than SenseAir.

3. The retailer is not responsible for any consequential loss or damages, which may occur by reason of purchase and use of this product. The warranty is, in any event, strictly limited to the replacement/repair of the product.

This product is in accordance with the EMC 2004/108/EC, 92/31/EEG including amendments by the CE-marking Directive 93/68/EEC.
The product fulfills the following demands: EN 61000-4-2 level 2, EN 61000-4-3 level 2, EN 61000-4-4 level 4, EN 61000-4-6, EN 61000-4-8 level 4, EN 55022 class B

$C\epsilon$