![CO2Meter.com - CO2 Measurement Specialists logo]

eSENSE
CO$_2$ Transmitter and Alarm

Installation & Manual

SE-0010, SE-0012, SE-0013, SE-0014

Table of Contents

General

The eSense alarm is designed to measure carbon dioxide (CO_2) in rooms. It displays the measured CO_2 value in ppm (parts-per-million) on the LCD. LEDs give an overview of the CO_2 value.

On alarm models, an acoustic alarm sounds when the CO_2 goes above the set value. The acoustic alarm can be silenced with a push button on the front of the meter.

In addition, the eSense may be connected to a Direct Digital Control (DDC) with 0-10V analog signal outputs corresponding to 0-2,000ppm CO_2 by default, 0-2,000ppm for the LEED variation, and 0-9,999ppm for the OSHA variation. 4-20mA output is also available for the model SE=0012 only.
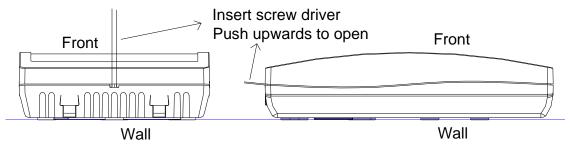
Opening the Housing

Figure 1. Closed housing seen from the top and the side. The housing is opened by inserting a screw driver and pushing to the front side of the housing. The locking hooks will then be released.

Figure 2. Closed housing seen from the side. The housing is opened by inserting a screwdriver and pushing left (to the front side).

Figure 3. Closed housing seen from the side. Never push to the right. The locking hooks may break and damage the housing.

The locking hooks will then be released.

Recommended Mounting Height from Floor

- 18-36 inches for OSHA, CO2 storage applications, fermentation IAQ level applications
- 48-60 inches for LEED, Indoor Air Quality applications
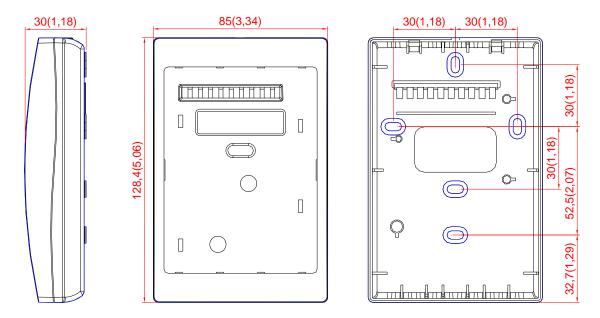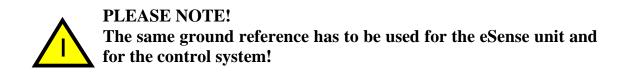- As required for custom indoor horticultural cultivation applications

Dimensions

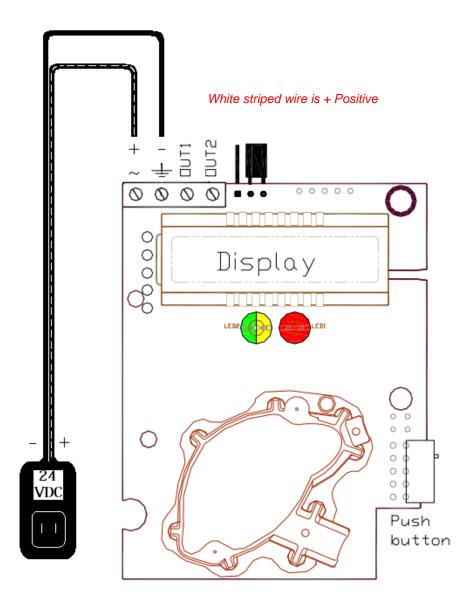*Figure 3. The dimensions of the sensor in mm and (inches)*

Electrical Connections

The power supply has to be connected to **+~** and ⏚ .

⏚ is considered as system ground. *The same ground reference has to be used for the eSense 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!

Terminal	Function	Electrical data	Remarks
+~	Power (+)	24 VAC/DC+ (+-20%), 2W	
⏚	Power ground (-)	24 VAC/DC-	System voltage reference
OUT1	Analog Output 1 (+)	0-10 VDC	0-2,000 ppm CO_2 default 0-9,999 ppm CO_2 OSHA 0-2,000 ppm CO_2 LEED
OUT2	Acoustic Alarm SE-0010, 0013,0014	Buzzer	Push button silences the acoustic alarm for 30 minutes.
	SE-0012	0-10VDC/4-20mA	Select via Jumper

Table I. Connections of the main terminal

White striped wire is + Positive

Buzzer & Jumper Settings
Models SE-0010, SE-0013, SE-0014 Analog Output 2 Voltage & Buzzer Only

Figure 3. The eSense PCB

Model SE-0012 only. Analog Output 2 options:

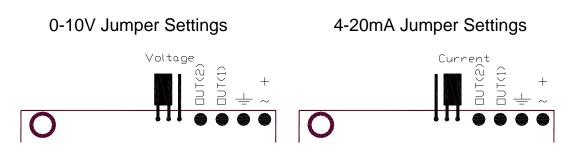## 0-10V Jumper Settings   4-20mA Jumper Settings

Figure 4. The upper part of the eSense PCB seen from the back with the jumper in voltage (default) or current position.

LED Display Configuration

LED Colour	eSense	eSense Programmable	eSense LEED	eSense OSHA
Green	n/a	User-Defined. Limit must be less than Yellow	Green < 800 ppm CO_2	Green < 4500 ppm CO_2
Yellow	n/a	User-Defined. Limit must be between Green & Red	Yellow 801-1400 ppm CO_2	Yellow 4501-5000 ppm CO_2
Red	n/a	User-Defined. Limit must be higher than Yellow	Red > 1401 ppm CO_2. Buzzer sounds.	Red > 5001 ppm CO_2. Buzzer sounds.

Self Diagnostics

The system contains complete self-diagnostic procedures that are executed automatically when the sensor is in operation. Sensors with display show a *wrench* if an error is found. The wrench is shown during the first seconds after power up and if the measuring range is exceeded.

Maintenance

The eSense is basically maintenance free in normal environments thanks to the built-in self-correcting *ABC* algorithm. Discuss your application with your distributor in order to get advice for a proper calibration strategy.

Theory of Operation

The CO2 sensor inside this meter uses NDIR (non-dispersive infrared) technology to sense, as a function of transmitted light, the concentration of CO2 in the air. It has been factory calibrated to operate within the specified range and precision.

Calibration Options

The CO2 sensor has 2 calibration modes: manual, and Automatic Background Calibration (ABC). Manual calibration is required if the sensor does not regularly sense 400ppm CO2 (fresh outdoor air) at least once every 7 days. ABC calibration may be used to ensure maximum accuracy by continuously adjusting the zero-point. However, it requires the sensor be exposed to fresh air at least once every 7 days.

ABC calibration mode is default for Model SE-0010 LEED units. For all others, manual calibration mode is pre-set at the factory.

You may request ABC calibration be enabled at time of purchase, or the calibration mode can be changed using our GasLab® Software and eSense programming cable (sold separately).

The ABC algorithm allows the CO2 sensor to dynamically shift its CO2 reading by a constant. It works via storing the lowest CO2 sample taken over the ABC Period and assuming that this low value is equal to a known value (the target value). It then adjusts the output of the CO2 reading by the delta between these values. This algorithm does not affect the linearization of the output signal.

Manual Calibration

There are 2 methods of manual calibration:

1. **Fresh Air (400ppm CO2) Calibration**: if Din3 is shorted for a minimum time of 8 seconds, the internal calibration code **bCAL** *(background calibration)* is executed. The sensor must be operating in a fresh air environment (400 ppm CO_2). Do not blow or breathe near the sensor.

2. **Nitrogen (0ppm CO_2) Calibration**: If Din2 is shorted for a minimum time of 8 seconds, the operation code **CAL** *(zero calibration)* is executed. The sensor must already be purged by some gas mixture free from CO_2 (i.e. Nitrogen or Soda Lime CO_2 scrubbed air) in a sealed calibration chamber.

For the vast majority of applications, fresh air calibration is recommended. If your company has ISO, LEED or OSHA environmental systems requirements documentation, you should verify that zero calibration is not required.
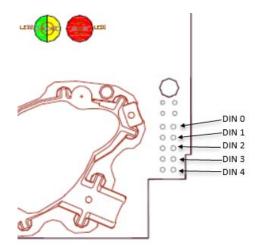
Input Switch Terminal *(normally open)*	Default function *(when closed for minimum 8 seconds)*
Din3	**bCAL** (background calibration) assuming 400 ppm CO_2 sensor exposure
Din2	**CAL** (zero calibration) assuming 0 ppm CO_2 sensor exposure

Table I. Switch input default configurations

Manual Calibration Procedure:
1. Separate the Top and Bottom halves of the device
2. Remove the PCB from the top half by depressing the plastic tabs
3. Reset the PCB and its pins into the bottom half of the device
4. Short either Din3 or Din2 (not both) for a minimum of 8 seconds
5. Reassemble the device

If calibration is unsuccessful, wait at least 10 seconds before repeating either procedure again. Make sure that the sensor is not exposed to human breath, or it will be mis-calibrated.

Jumper Din2 for 0 ppm CO2 calibration or Din3 for 400 ppm CO2 for a minimum of 8 seconds

Addtional Notes

The sensor accuracy is defined at continuous operation (at least 3 weeks after installation). Electronic products should be disposed of via a suitable recycling center.

EMC Directives

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 fulfils 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

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Support

The quickest way to obtain technical support is via email. Please send all support inquires to support@co2meter.com. Please include a clear, concise definition of the problem and any relevant troubleshooting information or steps taken so far, so we can duplicate the problem and quickly respond to your inquiry.

Warranty

This meter comes with a 1YEAR (warranty period) limited manufacturer's warranty, starting from the date the meter was shipped to the buyer.

During this period of time, CO2Meter, Inc. warrants our products to be free from defects in materials and workmanship when used for their intended purpose and agrees to fix or replace (at our discretion) any part or product that fails under normal use. To take advantage of this warranty, the product must be returned to CO2Meter, Inc. at your expense. If, after examination, we determine the product is defective, we will repair or replace it at no additional cost to you.

This warranty does not cover any products that have been subjected to misuse, neglect, accident, modifications or repairs by you or by a third party. No employee or reseller of CO2Meter, Inc. products may alter this warranty verbally or in writing.

Returns

If the product fails under normal use it may be returned. An RMA (Return Material Authorization) number is required to process any return no matter the reason. To obtain an RMA number, please send an email to: support@co2meter.com

When requesting an RMA number, please provide the reason for return and original order number.

Once you have an authorization code you may complete your return processing by visiting www.co2metersupport.com/rma. When asked, enter the authorization code you were provided.

Please use the original packaging (if available) when returning the meter to CO2Meter. Include the provided RMA number on the outside of the box, preferably on the shipping label. Secure the meter inside the package properly to prevent any damage during transit. Ship your meter to the address listed on your RMA paperwork.

CO2Meter, Inc. will not, under any circumstances, be responsible or issue refunds for any shipment expenses.

NOTE: For items returned during the warranty period, return shipping will not be charged. Meters that are have failed due to improper use, damaged, abuse, or are out of warranty period will be examined and an estimate of repair/replacement will be provided to you.

Liability

All liabilities under this agreement shall be limited to the actual cost of the product paid to CO2Meter, Inc. In no event shall CO2Meter, Inc. be liable for any incidental or consequential damages, lost profits, loss of time, lost sales or loss or damage to data, injury to person or personal property or any other indirect damages as the result of use of our products.

Contact Us

We are here to help!

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