

Understanding your CO2 Sensor

The CO2 meter you have just purchased is not a typical analog sensor. It incorporates a powerful microcontroller and processes the raw signal for the IR lamp using a variety of sophisticated algorithms. In order to best integrate the sensor into your intended application it is vital to have a working knowledge of these algorithms and know when to disable them. This knowledge will allow you to keep your sensor maintenance and calibration free throughout in a wide variety of situations.

Automatic Background Calibration (ABC)

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.

For example, by default ABC is enabled with an ABC Period of 180 hours, a target value of 400ppm, and a maximum delta of 30ppm. This operates under the principle that ambient, outdoor air is at 400ppm.

The sensor will keep track of the lowest CO2 reading recorded over a period of 180 hours and then apply the following logic to it:

$$\begin{aligned} \text{ABC Offset} &= 400 - \text{Lowest Reading} \\ \text{New CO2 Reading} &= \text{Old CO2 Reading} + \text{ABC} \end{aligned}$$

While using the CO2 sensor in outdoor applications this ensures that the value will always remain accurate and will counteract drift in sensor readings as components age.

When to enable:

- Outdoor CO2 measurement.
- CO2 measurement in an environment with a known low value. (adjust the target PPM to this value)

When to disable:

- In green-house and elevated CO2 environments.
- In dynamic environments with unpredictable CO2 concentrations

If you choose to disable this algorithm we recommend performing periodic CO2 calibrations. These calibrations can be done via test gas purchased from CO2Meter.com or by taking your sensor outside and calibrating against 400ppm.