

CO₂ Measurement Tutorial

Carbon dioxide gas (CO₂) is a component of the earth's atmosphere. Although carbon dioxide is invisible and odorless, an increased CO₂ content in the indoor air leads to fatigue and reduced concentration for humans. In rooms with high occupancy, such as conference rooms and theatres, the negative effects on humans becomes all the more evident.

High concentrations of CO₂ are used for instance in the agriculture, refrigeration or beverage industry, whereby leakages can be dangerous for the living beings and require special safety measures.

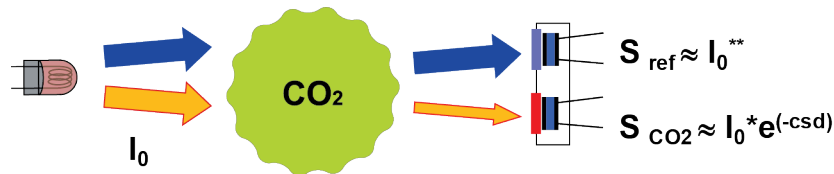
CO₂ concentrations guide:

~ 40,000ppm	Exhaled human breath (20L CO ₂ /h / 0.7ft ³ /h)
~ 5,000ppm	Limit of CO ₂ concentration at the workplace
> 1,000ppm	Fatigue and reduced concentration
~ 1,000ppm	Recommended max. CO ₂ level in indoor air
~ 400ppm	Outdoor air

E+E CO₂ sensors for industrial process control

CO₂ is a relevant parameter for optimizing incubators, hatchers, greenhouses, stables, storage rooms or ripening chambers as well as for safety issues in bottling plants and modern refrigeration and air conditioning installations.

The E+E CO₂ sensors for demanding applications feature the dual wavelength/dual detector NDIR principle. One detector is tuned to 4.2µm wavelengths, which is absorbed by CO₂, the second detector is tuned to 3.9µm, which is not affected by any gas. For every single measurement the CO₂ concentration is calculated from the outputs of both detectors.



This procedure is highly insensitive to pollution. A multiple point CO₂ and temperature adjustment procedure leads to excellent CO₂ measurement accuracy over the entire temperature working range.

E+E CO₂ sensors for indoor air quality (IAQ)

The CO₂ concentration is one of the most important parameters in modern building automation. Demand controlled ventilation assures optimal indoor air quality by adjusting the fresh air supply based on the CO₂ concentration in the indoor air and leads to relevant energy savings.

The E+E CO₂ sensors for building automation feature the patented auto-calibration procedure based on a dual source/single wavelength NDIR. One IR source is used for taking measurements every 15 seconds. The other IR source serves as a reference for auto-calibration and is activated only twice in 24h.



Due to minimal operating time, the aging of the reference source is virtually zero and therefore negligible. During the autocalibration procedure the signal from the measurement source is brought in line with the reference signal.