

Optimized CO₂ Concentrations in Greenhouses Translate into Higher Productivity and Higher Quality



The Vaisala GMP252 gives continuous and accurate measurements of CO₂ concentrations for the operation of the fertilization system.

Carbon dioxide enhances plant growth. In greenhouses, the growth rate and development of all plants can be improved by controlling CO₂ concentrations. This requires continuous and accurate measurement – an area in which Vaisala excels.

Carbon dioxide is perhaps better known for its harmful effects on health and as one of the greenhouse gases contributing to global warming, than for its beneficial effects in the more traditional types of greenhouse. CO₂ is the 'fuel' for photosynthesis, a process by which plants convert solar energy into biomass. It is an important growth factor beside warmth, light, nutrients and water in greenhouse cultivation. Consequently, carbon dioxide fertilization is essential for

any greenhouse that aims for better productivity.

First-Class Products with CO₂ Fertilization

Carbon dioxide fertilization is an efficient and safe way of ensuring high-class products and good yield. Its principle is very simple. The CO₂ concentration is monitored and adjusted in greenhouses to enhance photosynthesis in the plants. This is very important, especially in that

period of the year when there is very little light.

Optimized CO₂ concentrations not only raise productivity considerably (by as much as 40 % in the darkest time of the year), but also improve, for example, the quality of the cucumbers. If the CO₂ level is ideal in the greenhouse, the plants will produce nice produce of uniform quality that will qualify for the best class.

GMP252 Smart Probe

Vaisala Carbon Dioxide Probe GMP252 is ideal for monitoring the CO₂ concentrations at greenhouses. Designed for harsh and humid environments, the GMP252 has a dustproof and waterproof housing (IP65/NEMA4) with high corrosion resistance. The greenhouse control system that automatically controls and adjusts the CO₂ concentration can be equipped with the CO₂ probe. When greenhouses have several measurement points for CO₂ readings, the right concentration is shown throughout the greenhouse.

Ideal Environment for Growth - All Year Round

When the CO₂ concentration falls below the ideal level in the greenhouse, more carbon dioxide is automatically fed in through a system of pipes and nozzles. To distribute it evenly, the nozzles are located in several points of the greenhouse at a distance of two meters from each other. The CO₂ is either produced by a liquid gas-fueled boiler or is

Tips for Selecting a Measurement Instrument

- Required accuracy and long-term stability
- Instrument degree of protection IP65/NEMA4 minimum
- Operating range in high relative humidity
- Capability to recover from condensation
- Sensor response time
- Solar shield for the temperature and humidity sensors
- Compatibility of the sensor signal output with the control system
- Required sensor calibration interval and ease of calibration
- Potential wear and tear of moving parts
- Spare parts availability

Tips for Transmitter Placement in the Greenhouse

- Select a location for the sensor that well represents the greenhouse climate.
- CO₂ sensor should not be placed near a vent or exhaust duct.
- Temperature sensor should be placed within the plant zone. Temperature sensor on the wall, close to the roof or close to heating pipelines does not represent the climate around the plants.
- Humidity sensor should not be located close to heaters, heating pipelines, fans, walls or irrigation water sprays.

administered in pure form. It is essential to maintain the right level, which lies in the range of 800 to 1000 ppm, as too high concentrations can have an adverse effect on the plants. The optimal temperature in the greenhouse depends on the plant species grown and the desired level of photosynthetic activity varying between 15–24 °C (60–75 °F). Also optimal relative humidity depends on the plant species grown with a typical range varying between 50% and 70%. The interaction of all growth factors must be taken into account to ensure the wellbeing of the plants.

The CO₂ fertilization also works in the dark season, enhancing the effect of artificial light, thus compensating for the lack of light that would otherwise hamper plant growth. This is crucial in greenhouse cultivation, especially up in Northern Europe. With the right CO₂ concentration, the plants will start producing earlier than they normally do. This fertilization method produces no toxic by-products and creates no excessive moisture. Rather, it produces healthy plants and a good yield.



GMP252 is an intelligent, stand-alone probe with analog (V, mA) and digital outputs (RS485 with Vaisala protocol or Modbus). The GMP252 probe can be connected to the Indigo 200 Series host device to extend its features, for example, for a display or relays. Learn more about GMP252 on our [web pages](#).

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