

- Animal off-gas maintenance
- Fits/controls CO₂ in most semi-sealable chambers
- Assures environmental quality
- *In vivo* applications
- Reduced stress on animals for definitive results



Single 10 -10,000 ppm CO₂

VERSATILE CO₂ TOOL

The ProCO₂ P120ppm is a parts-per-million limit controller primarily used for assuring consistent and acceptable off-gas levels in a variety of animal enclosures.

WORKS IN ANY CHAMBER

The ProCO₂ P120ppm fits and controls CO₂ inside any semi-sealable enclosure. Whatever size, shape, rigidity, or isolation level, most chambers can be fitted in minutes. The ProCO₂ P120ppm works from outside the host chamber by remotely sensing the CO₂ inside the chamber. It infuses compressed dry air to lower CO₂ levels.

WORKS WITH OTHER CONTROLLERS

The ProCO₂ P120ppm can monitor and control off-gas alongside any BioSpherix oxygen or OxyCycler AT Series controllers. Maintain air quality while running O₂, NO, or CO sensitive experiments without disturbing their levels.

CONTROL IS EFFICIENT

The ProCO₂ P120ppm gains feedback from the CO₂ sensor in order to precisely regulate gas infusion according to the set point. No gas is ever wasted.

OPERATION IS SIMPLE

CO₂ is quickly pushed to set point and held beneath the limit indefinitely. Any disturbances are instantly detected and corrected immediately. Calibration and gas supply must be checked occasionally. Everything else is automatic.

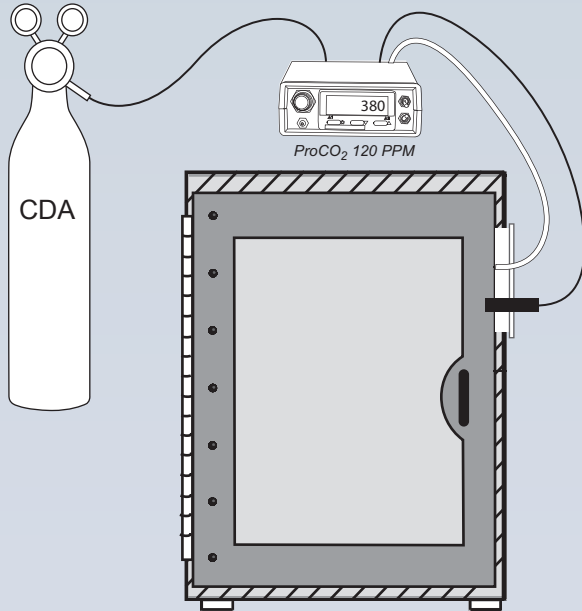
HANDLES CO₂ :

- When ambient CO₂ is raised.
- In a closed chamber, it can restore and maintain air at OSHA human limit equivalent CO₂.
- Where CO₂ generative processes need to be countered, the ProCO₂ P120ppm can hold CO₂ stable.
- Run it continuously year-round, or on occasion as needed. No other CO₂ controller offers so much value.

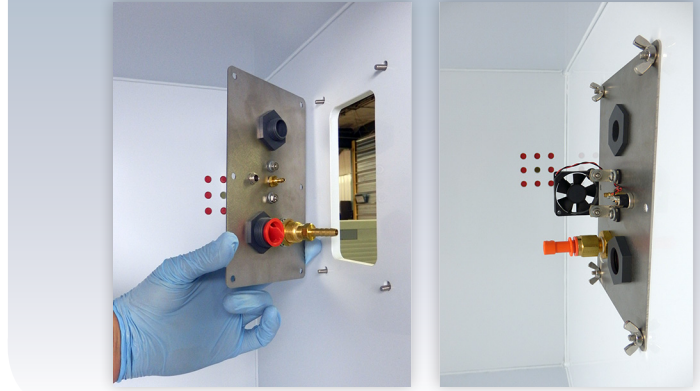


Compact design takes up minimal lab space.

Installation Schematic



How It Works



The ProCO₂ P120ppm attaches to animal chambers via an adapter plate. BioSpherix A-Chambers have a standard sized cut-out that accommodates all of our controllers.

The ProCO₂ P120ppm works in semi-sealable chambers by forced displacement of gas via dilution with control gas. Pressure inside the chamber stays the same as pressure outside (normobaric). Dilution is a logarithmic process. The further the setpoint is from ambient levels, the slower it is reached, but closed-loop control is efficient. By constantly monitoring chamber CO₂, it responds immediately to correct any disturbance from the set point. It automatically adjusts to different loads. In the process, it uses the least amount of gas possible. The ProCO₂ P120ppm works day in and day out, year after year.

Installation

1. Set ProCO₂ P120ppm on or near host chambers and plug it in.
2. Mount the adapter plate to its host chamber.
3. Hook up gas supply.

Operation



FRONT PANEL INTERFACE

All operators are conveniently located on the front panel. All connections are on the back panel, out of the way.

Carbon Dioxide concentration at sensor continuously displays in bright green digits that can easily be read from across the room.

Manual switch for gas provides convenient shut off. It saves gas when the chamber door is open. Just don't forget to turn it back on! The alarm buzzer also has a manual switch.



CALIBRATION

Use the calibration cup to expose the sensor to a calibration gas with a known CO₂ level.

There are no third party carbon dioxide analyzers needed.

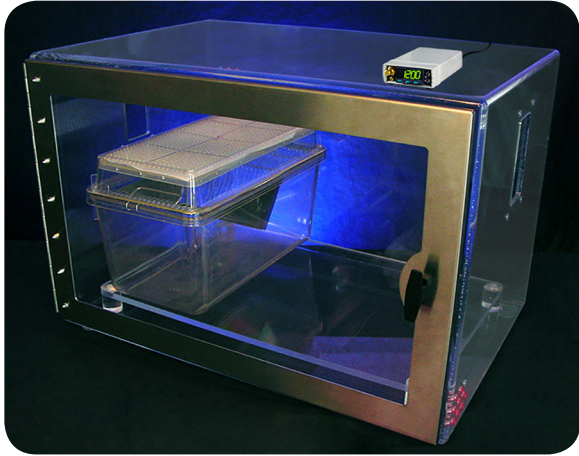
Gas

USE ANY GAS SUPPLY

Conveniently utilizes gas from any source. Best supply depends on consumption. Compressed gas is best in low consumption applications. Generator is best in high consumption applications. Liquid is best in between.

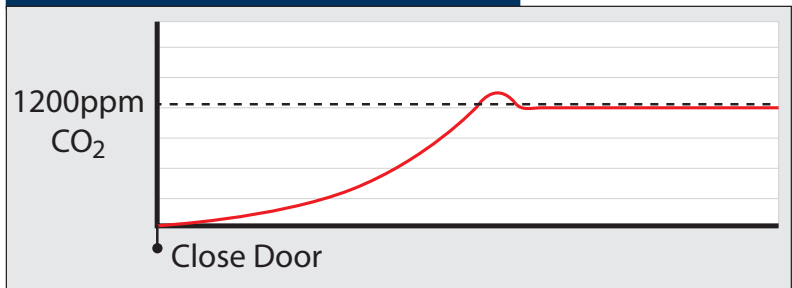
SAVES GAS AND MONEY

Chamber gas consumption varies widely, but in every case the ProCO₂ P120ppm always and absolutely minimizes gas consumption. It's maximally efficient! Gas costs are reduced to absolute minimum.



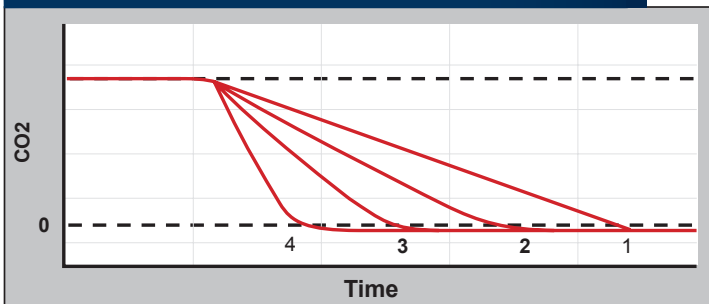
The ProCO₂ P120ppm is versatile; it works in any semi-sealable chamber. It works exceptionally well with BioSpherix A-Chambers (pictured above) that were designed specifically for animal experiments.

CO₂ Limit Control



The setpoint of 1200ppm is automatically limited by the controller as soon as off-gases accumulate to that level. The variations caused by different animals and different activity levels are all eliminated and made constant at a 1200ppm limit by the controller, and it is done in the most efficient way possible. Able to work with any or all other controllers simultaneously controlling other gases at the same time.

Power



Power is a function of infusion rate of control gas. The higher the infusion rate, the faster to setpoint. Above: infusion rate #4>#3>#2>#1. Infusion rate is a function of control gas supply pressure. The higher the pressure, the higher the infusion rate. Maximum 25 PSIG provides 35 SCFH.

NORMOBARIC FEEDBACK CONTROL

ProCO₂ P120ppm controls chamber carbon dioxide by infusing compressed dry air, displacing some of the current gaseous contents. Pressure inside the chamber stays the same as pressure outside.

Dilution is a logarithmic process. The further away from ambient the setpoint is, the slower it goes. But closed-loop control is efficient. By constantly monitoring chamber carbon dioxide, it reacts promptly to hold CO₂ beneath the set limit. It responds immediately to correct any increase. It automatically adjusts to different loads. And in the process, it uses the least amount of gas possible!

Animal Off-Gas Maintenance



CO₂ is used because it is the best surrogate for all the other off-gases. CO₂ is constantly exhaled in relatively high quantities, so by limiting CO₂ within the chamber you can assume that all other off-gases will be fine.

One exception may be relative humidity. When an excessive source of humidity such as overly moist litter (animal urination, water bottles dripping) or animal exposures that require activity (amount of moist air exhaled is increased), relative humidity may raise faster than ambient CO₂.

OSHA limits the indoor air quality for people to be no more than 1200ppm. The ProCO₂ P120ppm can easily maintain this setpoint (as well as higher/lower) for your valuable animal models.

Specs

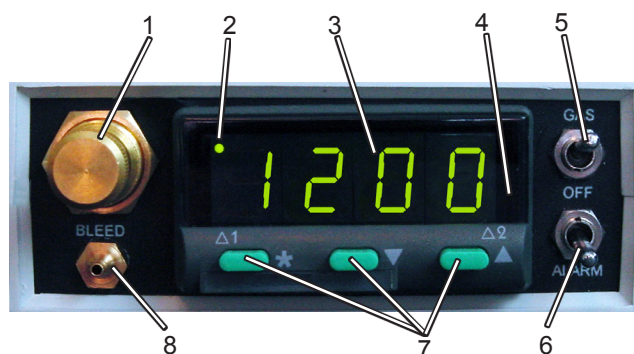
ELECTRICAL POWER: 12 VDC at 2.5A.
CONTROL RANGE: 10 to 10,000ppm (depending on the power/ load balance)
ACCURACY: ±150ppm (@0ppm) to ±350ppm (@1000ppm) @25C and 1013hPa
RESOLUTION: 1ppm
CARBON DIOXIDE SENSOR: various application specific sensors are available.
GAS SOURCE: compressed gas tanks, liquid carboys (from headspace), or generators.
GAS SUPPLY: compressed dry air (CDA).
GAS SUPPLY LINE: 1/8" I.D. hose pressure rated to 25 PSIG.
GAS SUPPLY LINE PRESSURE: 1-25 P.S.I.G.
GAS INFUSION RATE: 0-25 S.C.F.H.
GAS CONSUMPTION: depends on (1) size and leakiness of host chamber, (2) frequency and duration of opening chamber doors, and (3) carbon dioxide level controlled.
GAS SUPPLY HOSE FITTING: 1/8" hose barb.
INFUSION TUBING HOSE FITTING: 1/8" ID hose barb.
INFUSION TUBING DIAMETER: 1/4" O.D. x 1/8" I.D. (special tubing sizes available).
INFUSION TUBING LENGTH: 10 ft. (custom lengths available).
SENSOR CABLE LENGTH: 6'8"
SENSOR CABLE DIAMETER: 6mm.
ALARM OUTPUT: audible 40dB alarm and visible flashing indicator.
ALARM MODES: process high, process low, deviation high, deviation low, deviation band.
WEIGHT: .7 lbs (Controller Only)
DIMENSIONS: 1.5"H x 3.5"W x 7"D

Sensor Operational Parameters

HOST CHAMBER SIZE: depends on the chamber gas dynamics and carbon dioxide level controlled.
HOST CHAMBER TEMPERATURE: -20-50°C (depending on sensor).
HOST CHAMBER CO₂: 0-99% (depending on sensor)

Optional: Windows® based software package that provides trend plotting, data logging, and remote operation via RS connection to your PC. Multiple ProCO₂ P120ppms can be daisy-chained via optional RS-485 interface.

Front Panel



- 1. Bleed Valve:** Bleeds gas (nitrogen or oxygen) out of gas supply line. Used for calibrating sensor and depressurizing gas supply.
- 2. Control Indicator Light:** Flashes when gas is infused.
- 3. Digital Display:** Bright green 0.4 inch digits. Continuously displays CO₂ concentration at sensor, unless pre-empted by other operations. Displays menu items and settings during programming.
- 4. Alarm Indicator Light:** Flashes when alarm output is actuated.
- 5. Gas Switch:** Manually overrides controller to shut off gas.
- 6. Alarm Switch:** Manually overrides controller to shut off alarm.
- 7. Touch Keys:** 3 amply spaced tactile keys for setting configuration and control parameters.
- 8. Bleed Outlet:** 1/8" hose barb where gas bleeds out from bleed valve. Calibration tubing for sensor attaches here.

Back Panel



- 9. Sensor Input Jack:** Sensor cable connects here by twisting the sensor cable into the port until it pushes in and a "click" is heard.
- 10. Electrical Power Inlet Jack:** Plug from 12VDC wall mount power supply connects here.
- 11. Gas Supply Inlet:** Brass 1/8" hose barb where in-coming control gas supply line connects. Can handle up to 25 PSIG pressure.
- 12. Control Gas Outlet:** Brass 1/8" hose barb where infusion tubing into host chamber connects.



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