



Compatible with:

- Incubators
- Gloveboxes
- Refrigerators
- in vivo enclosures
- Plant chambers
- Bagged areas
- Ice boxes
- Tents
- Others

Applications:

- Hyperoxia
- Hypoxia
- Retinopathy
- Ischemia
- Neurology
- Vascularization
- Metabolism
- Gene expression
- **Many more!**

Versatile O₂ Tool

The ProOx P110 is a compact oxygen controller with a wide range of applications. It offers a control range of 0.1-99.9% O₂, covering nearly all physiologic concentrations.

Flexible Functionality

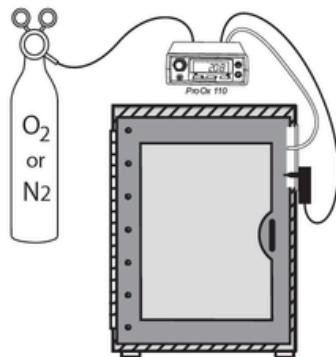
The ProOx P110 is designed to fit and control oxygen levels within any semi-sealable enclosure, offering quick and easy integration across a wide range of systems.

Efficient Operation

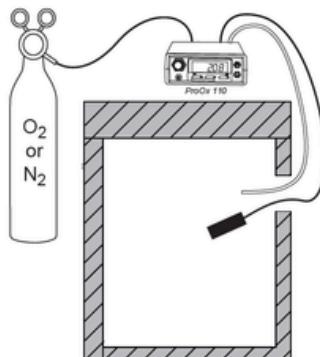
The ProOx 110 remotely senses oxygen levels inside the host chamber. It precisely infuses O₂ gas to increase concentration or nitrogen to displace and reduce O₂ levels as needed. Efficient, closed-loop control ensures accuracy without waste. Continuous feedback from the sensor allows for precise gas infusion to the setpoint, so gas is used only when necessary.

ProOx P110

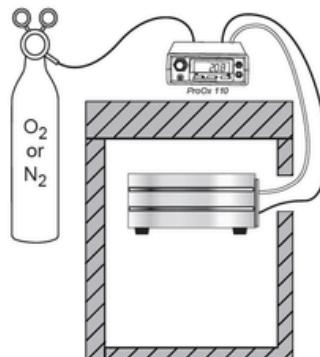
ProOx P110 can control any semi-sealable chamber by one of the methods shown below. Installation may vary based on chamber.



Control via adapter plate
as shown on BioSpherix
A-Chamber



Direct insertion of sensor
tubing as shown on generic
enclosure chamber

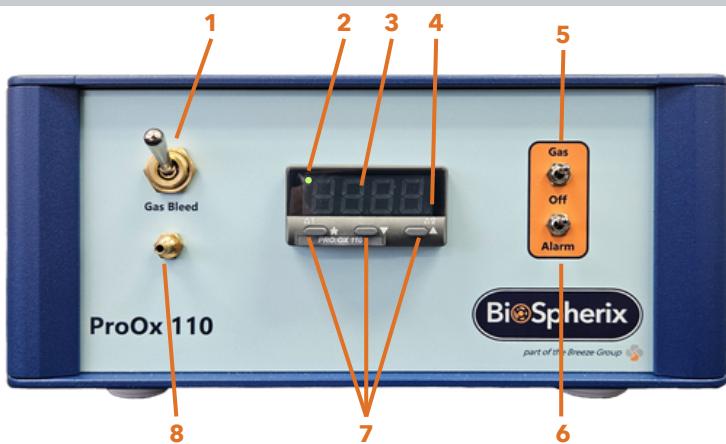


Subchamber via adapter
plate shown on BioSpherix
C-Chamber

Installation

1. Set ProOx P110 on or near host chamber and plug it in to standard outlet.
2. Hook up sensor and gas infusion tube and insert both into chamber.
3. Attach gas supply. Compressed gas is recommended for low consumption applications, liquid for medium consumption, and generator for high consumption.
4. Turn on controller by flipping the switch on the front panel. Use buttons to control O₂ levels.

Front Panel



1. Bleed Valve Switch: Bleeds gas out of supply line
2. Control Indicator Light: On when gas is infused
3. Digital Oxygen Level Display
4. Alarm Indicator Light: Flashes during alarm
5. Gas Switch: Manual gas shut off
6. Alarm Switch: Manual alarm shut off
7. Control keys
8. Bleed Barb: 1/8" hose barb where gas bleeds out from bleed valve.

Back Panel



1. Power Connection (12VDC)
2. Sensor Input Jack: Locking sensor cable connects here by finger-tightened locking nut
3. Gas Supply Inlet: 1/4" O.D. connection for control gas supply line. Pressure rated to 25 P.S.I.G.
4. Control Gas Outlet: 1/4" O.D. connection for infusion tubing to host chamber



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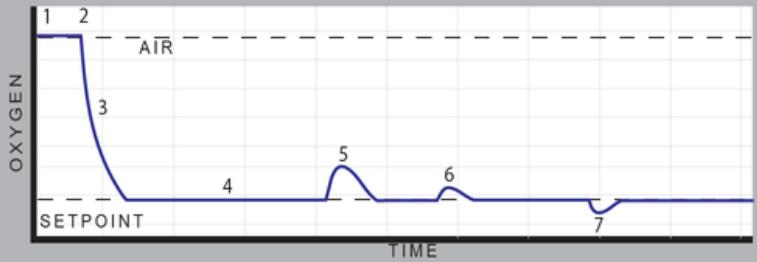


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ProOx P110

Control Scenarios

Hypoxia Control Scenario

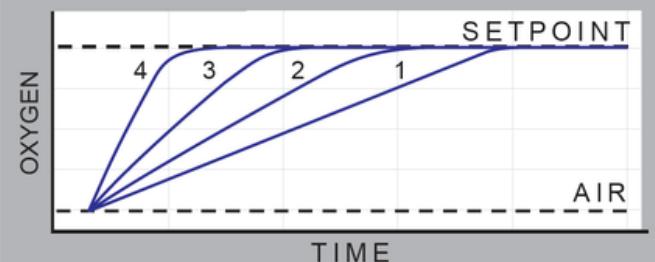


1. Chamber O₂ is ambient air (21% O₂).
2. Environmental control starts. Infusion of nitrogen starts to displace oxygen.
3. O₂ is taken to setpoint.
4. Steady-state control at setpoint is established. Gas consumption is a function of chamber leakage.
5. Door of chamber is suddenly opened and closed, disrupting steady-state. Disturbance is detected and chamber O₂ is promptly returned to setpoint.
6. Door is unlatched, increasing gas leakage. ProOx 110 re-establishes steady set point.
7. Door is latched, reducing leakage. Steady-state is established at setpoint.

To check calibration, remove the sensor from the chamber and read against room air (~21% O₂). Then, verify against the control gas (0% nitrogen or 100% oxygen) using the front-panel bleed valve if needed. No third-party oxygen analyzers are required.

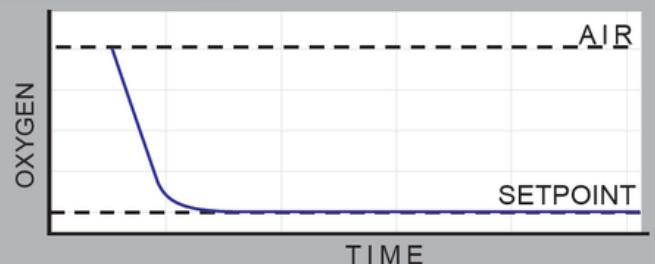


Power



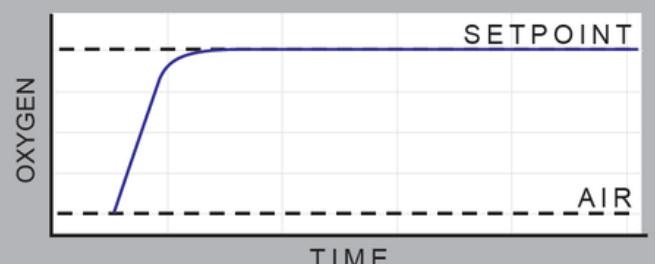
Power is a function of the infusion rate of control gas: the higher the infusion rate, the faster to setpoint. Above: infusion rate 4>3>2>1. Infusion rate is a function of control gas supply pressure. The higher the pressure, the higher the infusion rate. Maximum 40 P.S.I.G. provides up to 140 S.C.F.H.

Hypoxia



In hypoxic conditions, nitrogen serves as the control gas. Setpoints range from 0.1% to 20.7% oxygen, with lower setpoints requiring less time and nitrogen flow to achieve and maintain the desired level.

Hyperoxia



In hyperoxic conditions, oxygen serves as the control gas. Setpoints range from 20.9% to 99.9% oxygen, with higher setpoints requiring increased time and oxygen flow to achieve and maintain the desired level.



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ProOx P110

Electrical Requirements

Electrical Power: 12 VDC at 2.5A

Physical Specifications

Weight: 0.7 lbs (controller only)

Dimensions: 1.5"H x 3.75"W x 7"D (controller only)

O₂ Control Performance

Control Range: 0.1-99.9% O₂

Accuracy: $\pm 1\%$ (at constant temperature and pressure), and $\pm 2\%$ full scale over operating temperature range

Resolution: 0.1%

Alarms & Safety

Alarm Output: Audible (40 dB), visible flashing indicator

Alarm Modes: 1) process high 2) process low 3) deviation high 4) deviation low 5) deviation band

Sensor Specifications

Sensor Cable Length: 10'

Sensor Cable Diameter: 4mm

Gas Delivery & Tubing

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 chamber door openings 3) controller setpoint

Infusion Tubing Hose Fitting: 1/4" O.D.

Infusion Tubing Diameter: 1/4" O.D. x 1/8" I.D. (special sizes available)

Infusion Tubing Length: 10' (custom lengths available)

Gas Supply & Compatibility

Gas Source: compressed gas tanks, liquid carboys, generators

Gas Supply: pressurized O₂ and N₂

Gas Supply Line: 1/4" O.D.

Gas Supply Line Pressure: 1-25 P.S.I.G.

Gas Supply Hose Fitting: 1/4" O.D.

Operation Parameters

Host Chamber Temperature: 5-40°C

Host Chamber CO₂: 0-100% (depending on sensor)

Host Sensor Humidity: 0-95%, non-condensing



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