BioSpherix

Animal Equipment Catalog

v1.0

Sometimes Cells Need To Still Be In The Body

... to complement *in vitro* data with *in vivo* data.

Cell Research:
Whole organism modeling is sometimes necessary in order to complement and substantiate cell culture data. Some cellular phenomena can only be modeled by exposure of whole organisms during different stages of development to various physiologic gases. Not surprising, these are the same gases important for cells in the dish. In contrast to cells in vitro, cells in vivo still have local communication ties to neighboring cells. They also still have humoral and neural communication lines to distant cells and organs intact. These communications are some of the most difficult simulations to create in vitro, even for Cytocentric cell incubation and processing.

... to discover and develop new medicines and therapies.

Disease Research:
Animal models of the disease are often necessary to discover the underlying molecular, genetic, and cellular mechanisms causing the disease, and to develop new therapeutic approaches.

Drug Development:
Animal models are absolutely necessary for pre-clinical testing of new pharmaceuticals in order to assure safety and efficacy before testing in humans.

Therapeutic Modeling:
Animal models are necessary for refining traditional respiratory therapies and developing new respiratory therapies.

Animal Modeling Equipment:
Equipment consists of various chambers designed to hold animal cages and various compatible controllers that generate appropriate physiologic or pathologic exposures inside the chambers to create the models.

Every system provides the highest level of GLP compliance available.

DISEASE MODELS

• Ocular Angiogenesis (ROP, OIR)
• Pulmonary Hypertension (PAH)
• Systemic Hypertension
• Apnea
• Sleep Apnea (OSA, IH)
• Apnea of Prematurity
• SIDS (Sudden Infant Death Syndrome)
• Atherosclerosis Ischemia (Cardiac Infarction, Stroke, etc.)
• COPD (Chronic Obstructive Pulmonary Disease)
• Pulmonary Fibrosis
• ADHD (Attention Deficit Hyperactivity Disorder)
• Polycythemia – Chronic hypoxia
• Developmental Disabilities / Eclampsia
• Recreational Hyperoxia (Oxygen Bars, athletic oxygen supplementation)
• Recreational Hypoxia (Athletic conditioning)
• Occupational Hypoxia / Altitude Sickness (airline, observatory astronomers, mining)
• Acute Mountain Sickness

THERAPEUTIC MODELS

• Traditional Respiratory Therapy
• New Carbon Monoxide Therapy
• New Nitric Oxide Therapy
• New Hypoxia Therapy

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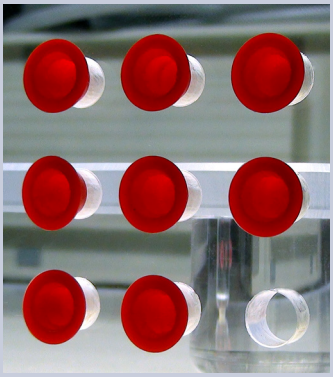
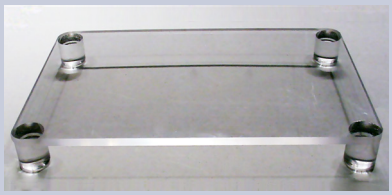
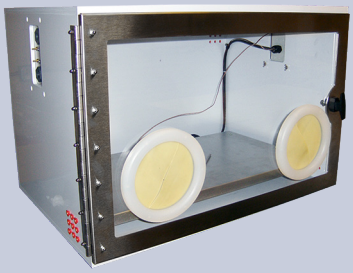


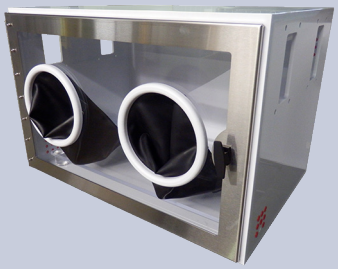
Up to 81 degrees of ventilation adjustment can be metered by simply adding or removing plugs from ventilation holes.



A clear acrylic riser plate allows circular air flow under animal cages. The area beneath the riser can be host to carbon scrubbers, desiccants, etc.

Door Options





Every Chamber can be configured with iris ports or gloves to allow animal manipulation without disruption of controlled exposure.

Options

- Clear acrylic / white polypropylene
- Small, Medium, Large
- Custom options available

A-Chamber

Animal Isolation Chamber

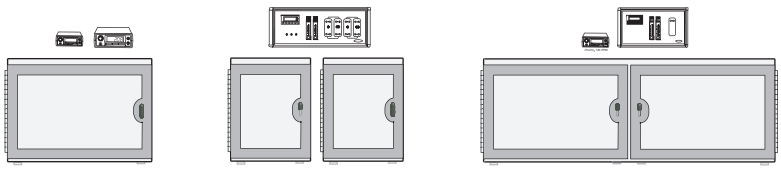
BioSpherix A-Chambers are designed to provide controlled, isolated environments for animal modeling. All A-Chambers have ample space for the easy access and handling of animal cages. Control off-gases and protect immunocompromised animals.

- Optimized for gas efficiency
- Compatible with all BioSpherix controllers
- Stainless steel reinforced positive latching door
- Riser plate allows for circular air flow and room for scrubbers/desiccants
- Available in 3 standard sizes as well as custom designs
- Rugged construction

The A-Chamber comes in three standard sizes that will meet the needs of most labs. Sometimes scientists have unique needs, and BioSpherix works to meet them with custom chambers (pictured above: medium chambers with custom shelves).

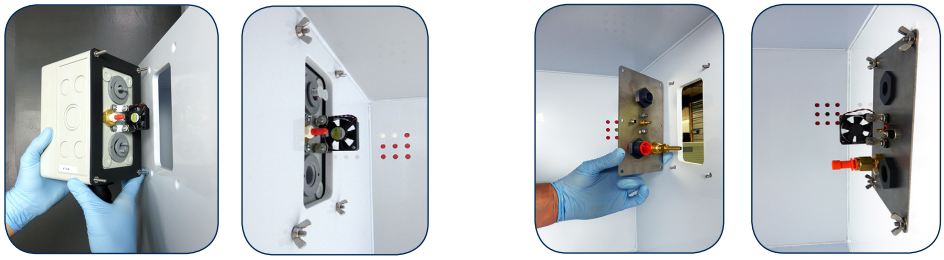
The Foundation for Good Laboratory Practices

When combined with one or more controllers, the A-Chamber becomes its own environment, where the atmosphere can be monitored and maintained. The gases the animals are exposed to can be for an experimental disease model, or to keep valuable animals separate from technicians without dangerous off gas build up. If used with controllers featuring a monitor pod or limit controller, CO_2 can be controlled at 1200ppm, OSHA's standard of air quality for humans, or even lower. Since CO_2 is the most-produced off product of animals, keeping CO_2 in check means all other off products will also be kept under control. The possible exception is RH when there is a source of excess humidity, such as damp litter.



All of our controllers are compatible with all of our chambers. Most controllers are compatible with each other. We have enough combinations to suit any lab's needs. If not, we will build you something custom.

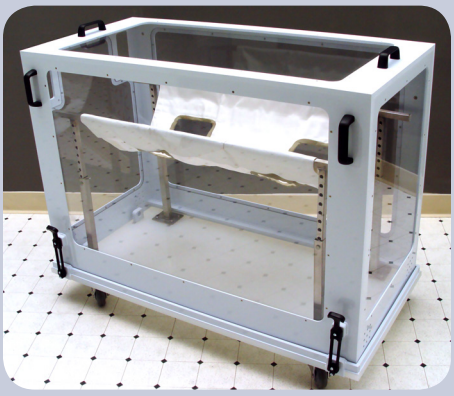
Maintain Great Air Quality For Valuable Animal Models



Through the use of adapter pods and plates, every BioSpherix animal controller works especially well with A-Chambers. Precisely control ventilation, using the least amount of gas needed to maintain high air quality. Use a controller with a monitor pod to characterize a chamber, finding the best ventilation set up.

Sturdy construction allows the stacking of A-Chambers. Arrange them to fit within your labspace. Set equipment such as controllers on them.

Custom Chambers



From simple modifications to include shelves within a custom sized chamber to complex one-of-a-kind chambers, BioSpherix has always helped build labs exactly what they need.

The A84XOV can use a PC interface (desktop or laptop) to control and monitor oxygen with ease.

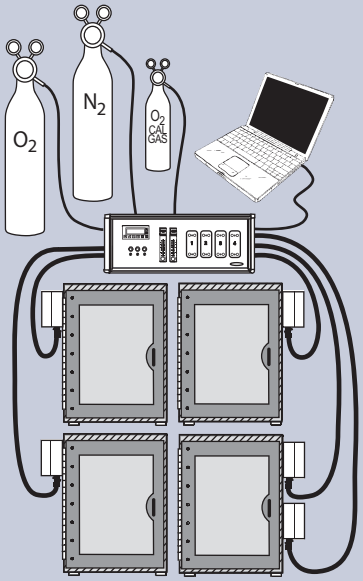
OxyCycler A84XOV

Multi-Chamber Dynamic Oxygen Controller

The Oxycycler A84XOV is a powerful research tool for scientists who do oxygen sensitive work. It makes complex oxygen profile control easy. Using a PC interface, you can create four independent, controlled profiles in up to four different chambers. Control oxygen profiles with multiple setpoints anywhere from 0.1-99.9% oxygen. Control both the time between setpoints and how many times the protocol repeats (1-999 or loop infinitely).

- Full range O_2 control from 0.1-99.9%
- Dynamic Protocol
- Controls four chambers independently and simultaneously
- Computer System for easy interface, real time trend charting, data logging, and remote operation
- Optional Monitor Pod

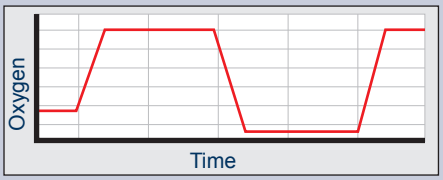
Typical Configuration



From outside host chamber(s), the OxyCycler A84XOV works by remotely sensing oxygen in each independent chamber and infusing gas to raise and lower oxygen levels according to user-set protocols. Simultaneous and independent control of four chambers.

Monitor Pod: Can move between chambers and keep tabs on PPM CO_2, temperature and humidity over the time of the exposure.

Performance



OxyCyclers have programmable setpoints to create virtually any dynamic exposure which is critical for certain disease models.

The A84XOV can be used in conjunction with other gas controllers to simulate the widest variety of conditions. Shown above, many chambers controlled by multiple BioSpherix controllers alongside an A84XOV.

OxyCycler A41OV

Dynamic Oxygen Controller

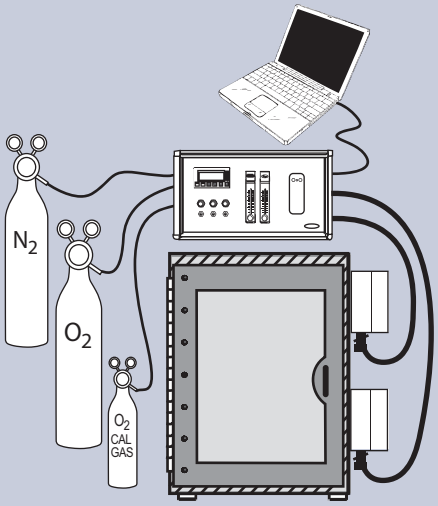
The OxyCycler A41OV controls a single chamber with programmable, dynamic Oxygen. Create a scheduled pattern for oxygen levels that can repeat as often as you need. This allows you to simulate a great range of conditions. From sleep apnea to recreating a heart attack's effect on O_2 within the body and more, this controller is ideal for scenarios where a technician only needs one chamber masterfully controlled.

- Dynamic setpoint (0.1-99.9%) chronic hypoxia controller
- Easy hypoxic/hyperoxic control of one animal chamber
- O_2 is quickly taken to setpoints and protocols are looped as many times as the user desires: 1-999 or infinite
- Disturbances are immediately detected and corrected
- Computer System for easy interface, real time trend charting, data logging, and remote operation
- Optional Monitor Pod

The OxyCycler A41OV controls a single chamber with precise, dynamic oxygen levels.

The A41OV can use a PC interface (desktop or laptop) to control and monitor oxygen with ease.

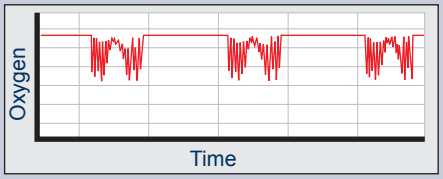
Typical Configuration



From outside the host chamber, the OxyCycler A41OV works by remotely sensing oxygen inside the chamber and infusing gas to raise and lower oxygen levels according to user-set protocol.

Monitor Pod: Can move between chambers and keep tabs on PPM CO_2 and humidity over the time of the exposure. Measurements are recorded and logged to ensure Good Laboratory Practices.

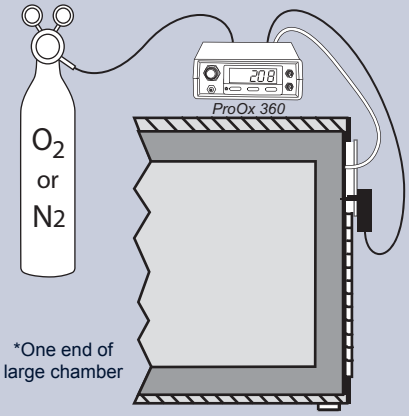
Performance



OxyCyclers have programmable setpoints to create virtually any dynamic exposure which is critical for certain disease models.

The ProOx P360 is easily operated via front panel interface. Optionally, the controller can be built to work via PC software, adding trend plotting.

Typical Configuration



Installation is easy. Simply insert sensor and nozzle of infusion tube into chamber through any convenient passageway. Doors, windows, sample ports, access ports, holes (built-in or custom-drilled) all work.

Optional Configuration

ProOx P360 Redundancy: Two ProOx P360s can be "daisy chained" to one another to act as a failsafe in applications. This runs the gases being infused past two oxygen sensors, and any deviation between the two readings will indicate an issue needing to be addressed (sensor reading drift associated with sensor age).

ProOx P360

High Infusion Rate Oxygen Controller

The ProOx P360 was designed to handle the oxygen demands of large chambers, typically found in animal modeling applications, more efficiently. With a maximum flow rate 10 times that of the ProOx P110 (also shown in this catalog), your chamber gas adjustments happen much more rapidly. The integrated flow rate adjuster allows you to dial in your desired flow rate with a simple twist of a knob.

- Large volume, static and adjustable setpoints (0.1-99.9%)
- Easy, inexpensive hypoxic/hyperoxic control of animal chambers
- Efficient and accurate closed-loop feedback control
- O_2 is quickly taken to setpoint and held there indefinitely
- Disturbances are immediately detected and corrected
- Optional RS485 connection for trend charting, data logging, etc.

The ProOx P360 has a high flow rate making it ideal for accurately controlling large chambers. Any disruptions from opening doors are corrected quickly.

ProOx P110

Compact Oxygen Controller

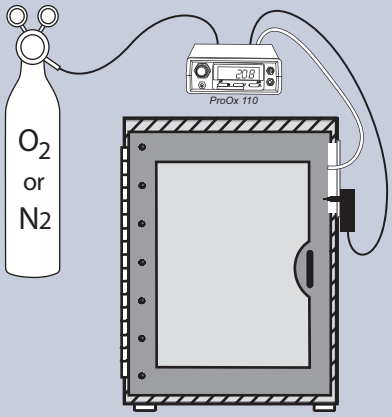
The ProOx P110 is a versatile and compact oxygen controller for O_2 sensitive work. Though designed to work with all BioSpherix chambers, it can also work with any variety of animal enclosures. With the feedback control system oxygen is quickly taken to the setpoint and held there indefinitely. Any disturbances are instantly detected and immediately corrected.

- Full range oxygen control (0.1-99.9%)
- Static and adjustable setpoints
- Gas efficient
- Versatile & compact
- Fits any semi-sealable enclosure
- Easy to install, operate and relocate
- Optional RS485 connection for trend charting, data logging, etc.

The ProOx P110 integrates with A-Chambers via stainless steel adapter plate.

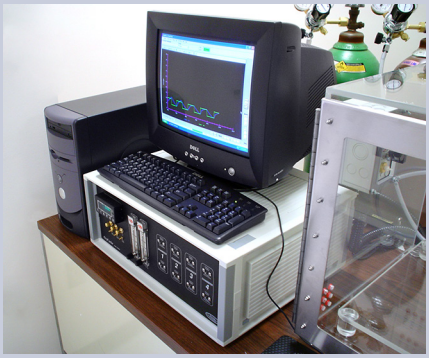
Compact design requires minimal lab space.

Typical Configuration



From outside the host chamber, the ProOx P110 works by remotely sensing oxygen inside the chamber and infusing gas to control to setpoint.

3 applications: hypoxia, hyperoxia, and to maintain normal air equivalent levels of O_2 in the face of excessive consumption or generation of O_2 in a variety of applications.



The OxyCycler A44C can use a PC interface (desktop or laptop) to control and monitor carbon dioxide with ease.

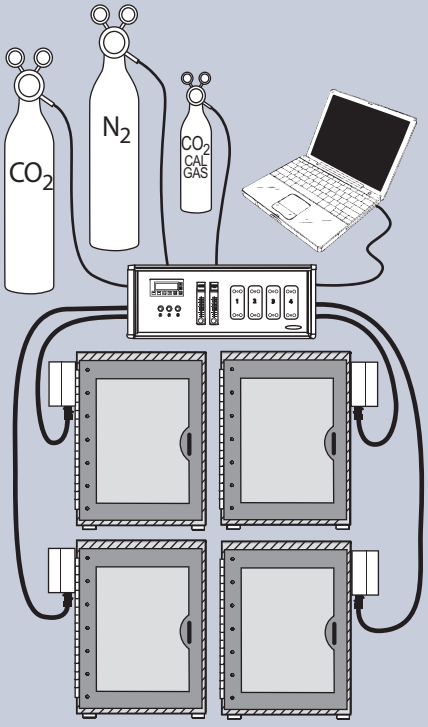
OxyCycler A44C

Multi-Chamber Carbon Dioxide Controller

The OxyCycler A44C is a valuable tool for all carbon dioxide sensitive research. Set the OxyCycler A44C for a protocol with any shifts in CO_2 levels between 0.1 and 20%, set the changes to happen as quickly or slowly as you need, and set the protocol to repeat any number of times 1-999, or indefinitely.

- Dynamic Protocols (0.1-20.0%)
- Reproducible hypercapnia exposures
- Easy CO_2 management in animal chambers
- Efficient and accurate closed-loop feedback control
- PC interface makes setting up protocols easy

Typical Configuration



From outside host chamber(s), the OxyCycler A44C works by remotely sensing carbon dioxide in each independent chamber then infusing gas to raise or lower CO_2 levels according to user-set protocols. Simultaneous and independent control of four chambers.

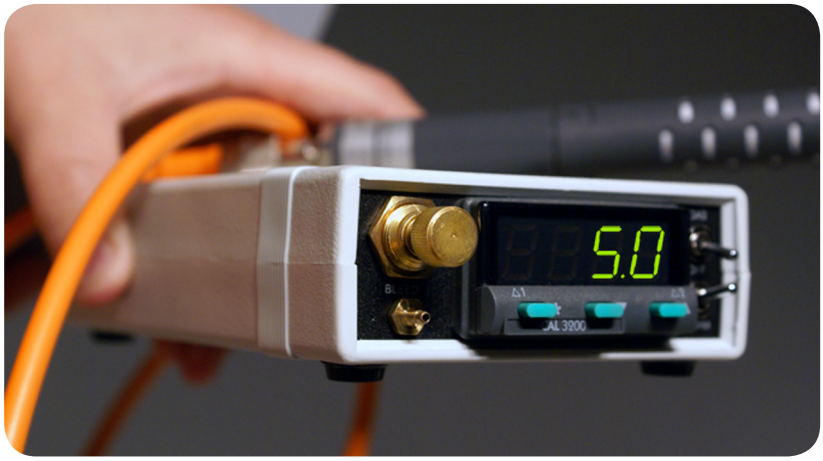
The OxyCycler A44C manages control of carbon dioxide in up to four chambers.

ProCO$_2$ P120

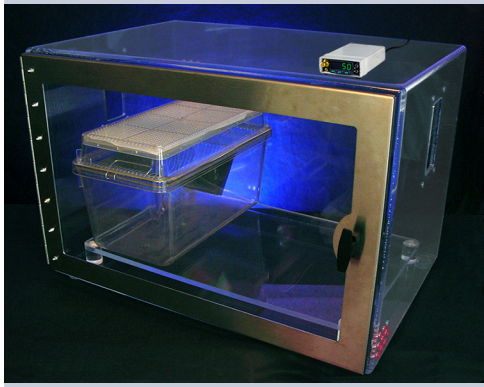
Compact Carbon Dioxide Controller

The ProCO$_2$ P120 is a percent range CO$_2$ controller predominately used for hypercapnia. It is a versatile and compact carbon dioxide controller for CO$_2$ sensitive work. Carbon dioxide is quickly taken to the desired setpoint and held there indefinitely. Disturbances are instantly detected and immediately corrected via gas infusion.

- Static control setpoint: 0.1-20.0% CO$_2$ for most physiologic or pathologic concentrations.
- Automatic operation
- Gas efficient
- Quick Recovery to setpoint
- Versatile & Compact
- Fits any semi-sealable enclosure.
- Easy to install, operate and relocate.

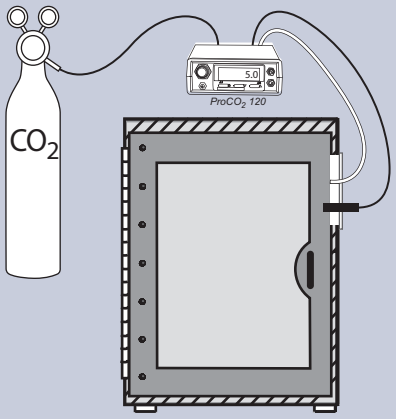


The compact design takes up very little lab space and controls CO$_2$ remotely, assuring that animals are never disturbed unnecessarily.



The ProCO2 P120 works especially well with an A-Chamber for animal modeling. It connects via adapter plate and accurately controls the semi-sealed chambers.

Typical Configuration



From outside the host chamber, the ProCO$_2$ P120 works by remotely sensing carbon dioxide inside the chamber and infusing gas to control to setpoint.

Front panel interface with bright LED readout displaying PPM CO_2 levels that can easily be read from across the room.

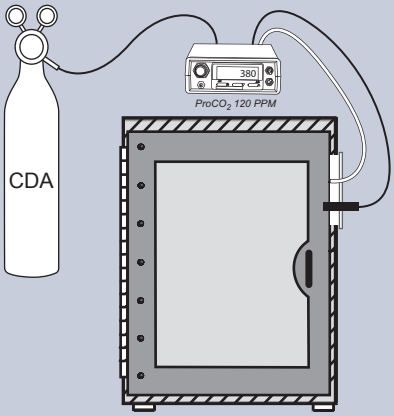
ProCO_2 120 PPM

A-Chamber Off Gas Limit Controller

The ProCO_2 120 PPM (Parts Per Million) limit controller detects carbon dioxide and holds it beneath a set threshold. Primarily, this device protects animals from dangerous off-gas build up. When carbon dioxide surpasses the user-set limit, the chamber is infused with compressed dry air to immediately lower it. Fits a variety of animal enclosures.

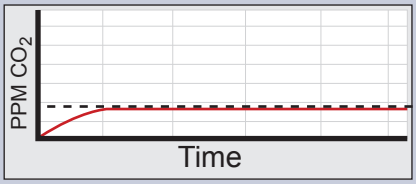
- Control setpoint: 10-10,000 parts per million
- Works with all BioSpherix O_2, CO and NO controllers
- Protect animals from dangerous off-gas build-up
- Automatic operation
- Gas efficient
- Easy to install, operate and relocate
- Takes up very little lab space

Typical Configuration



From outside the host chamber, the ProCO_2 120ppm works by remotely sensing carbon dioxide inside the chamber and infusing compressed dry air to keep levels beneath specified threshold.

Performance



Set a CO_2 threshold and the ProCO_2 P120ppm will hold CO_2 beneath it. You can adjust the ventilation holes to ensure absolute minimal gas usage to maintain GLP quality chamber air.

The ProCO_2 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.

OxyCycler A42OC

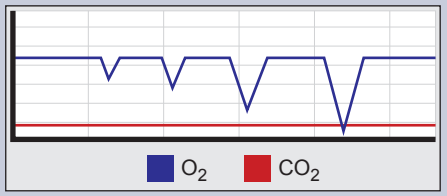
Oxygen and Carbon Dioxide Controller

The OxyCycler A42OC is a unique dual channel/dual gas controller for animal chambers. Controlling O_2 and CO_2 offers independently programmable channels for optimum control. No other instrument has such fine simulation of dynamic exposure.

- Dynamic O_2 exposures
- O_2 profile 0.1-99.9%
- CO_2 profile 0.1-20.0%
- Independently control and profile up to two chambers simultaneously.
- Computer System for easy interface, real time trend charting, data logging, and remote operation

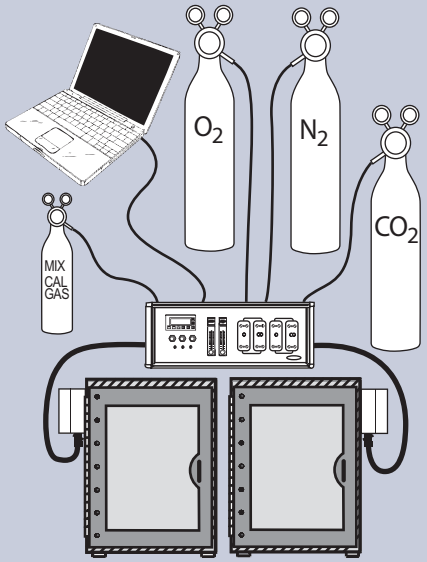
A complete OxyCycler A42OC system installed in two A-Chambers.

Performance

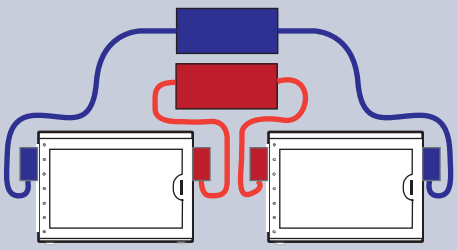


The A42OC can control dynamic exposures of O_2 and CO_2 simultaneously or more importantly can run either gas dynamically while holding the other gas constant.

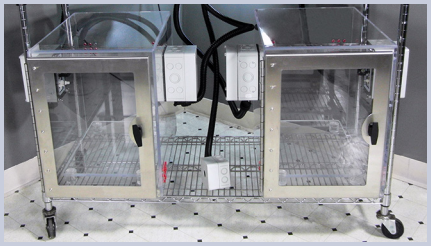
Typical Configuration



The system can also utilize a PC Interface, should the user desire that convenience.

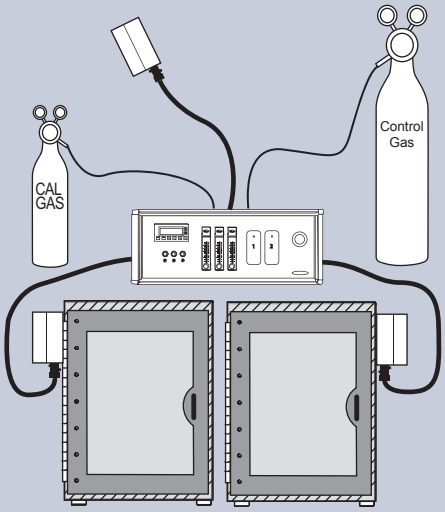


The OxyCycler's flexible design and standard cutouts on the A-Chambers allow multiple controllers to work together on the same chamber.



All AT controllers, including the AT42CO, control two separate chambers simultaneously and independently. Run one experimental protocol and one control protocol simultaneously.

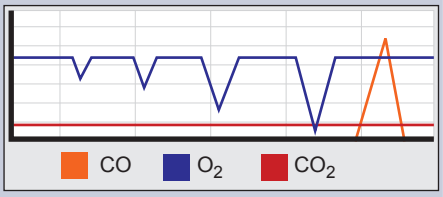
Typical Configuration



From outside the host chambers, the OxyCycler AT42CO works by remotely sensing carbon monoxide inside the chamber and infusing gas (CO to increase, N_2 to decrease) to follow user-set protocols.

A third pod remotely monitors gas levels in the room.

Performance



The OxyCycler A42CO is designed to work synchronously with the AT42CO, to create a variety of dynamic and/or static O_2/CO_2/CO exposures.

OxyCycler AT42CO

Dual Chamber Carbon Monoxide Controller

The AT42CO is a gasotransmitter controller that can supplement the A42OC or function independently, should no O_2 or CO_2 control be desired. It controls two host chambers, simultaneously and independently, allowing users to set up a control profile to supplement their experiment data.

- Dynamic or static CO exposures
- Controls CO precisely
- Protect Your Animal Investment
- Ensure The Safety of Your Lab
- Sensors in controller, remote pod, and adapter pod
- Alarms will sound if exotic gas levels become dangerous
- Computer System for easy interface, real time trend charting, data logging, and remote operation

The OxyCycler AT42CO is capable of working alongside the A42OC. It has its own gas tanks and pods that will be utilized in addition to the A42OC gas/pods. Control for O_2, CO_2 and CO simultaneously in two chambers.

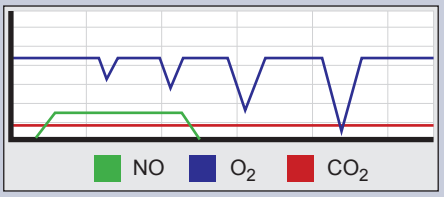
OxyCycler AT42N

Dual Chamber Nitric Oxide Controller

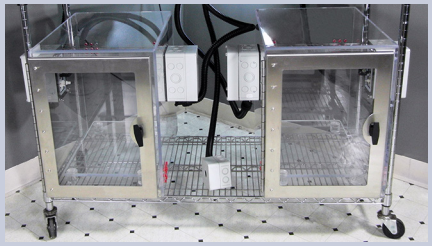
The AT42N is a gasotransmitter controller that can supplement the A42OC or function independently, should no O_2 and CO_2 control be desired. Nitric Oxide levels are monitored both in chamber and remotely, and all data is logged to a computer. Precise, monitored control is safer and more reliable than using NO donors. Experiments are highly reproducible.

- Dynamic or static NO exposures
- Remove excess bioactive gas
- Protect Your Animal Investment
- Ensure The Safety of Your Lab
- Sensors in controller, remote pod, and adapter pod
- Alarms will sound if gasotransmitter levels become dangerous
- Computer System for easy interface, real time trend charting, data logging, and remote operation

Performance

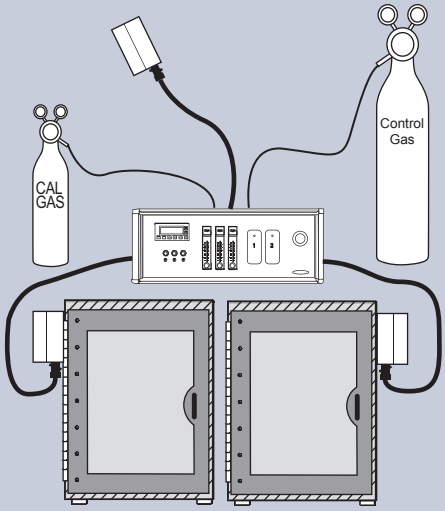


The AT42N can control static or dynamic exposures of NO easily. While it can function independently, it is often paired with an A42OC to also control O_2 and CO_2, which can run dynamic protocols simultaneously, or simply maintain CO_2 and O_2 levels during NO protocols.



All AT controllers, including the AT42N, control two separate chambers simultaneously and independently. Run one experimental protocol and one control protocol simultaneously.

Typical Configuration

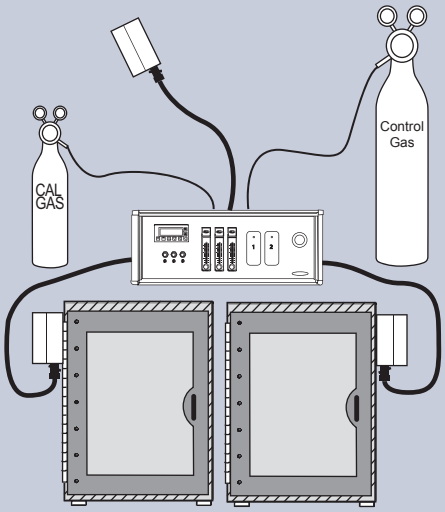


From outside the host chambers, the OxyCycler AT42N works by remotely sensing nitric oxide inside the chamber and infusing gas (NO to increase, N_2 to decrease) to follow user-set protocols.

A third pod remotely monitors gas levels in the room.

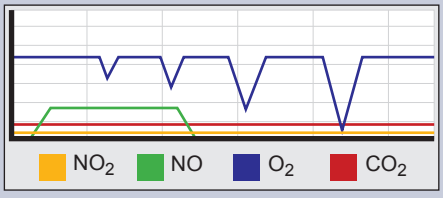
The AT Series controllers often work alongside the A42OC. It has its own gas tanks and pods that will be utilized in addition to the A42OC gas/pods. The two systems can be stacked to save space.

Typical Configuration



The OxyCycler AT82NN controls two chambers from outside. It attaches to the chambers via actuator pods at the end of a flexible umbilical. A remote monitor pod sets anywhere within 12ft of the controller.

Performance



The AT42N can control static or dynamic exposures of NO easily. While it can function independently, it is often paired with an A42OC to also control O_2 and CO_2, which can also run dynamic protocols simultaneously, or simply maintain CO_2 and O_2 levels during NO protocols.

OxyCycler AT82NN

Dual Chamber Dynamic Nitric Oxide Controller

The OxyCycler AT82NN controls both NO and NO_2. It can supplement the A42OC or function independently, should no O_2 or CO_2 control be desired. It controls two host chambers, simultaneously and independently, allowing users to set up a control profile to supplement their experiment data. Nitric Oxide levels are monitored both in chamber and remotely, and all data is logged to a computer. Precise, monitored control is safer and more reliable than using NO donors. Experiments are highly reproducible.

- Dynamic or static NO exposures
- Controls NO precisely
- Protect Your Animal Investment
- Ensure The Safety of Your Lab
- Sensors in controller, remote pod, and adapter pod
- Alarms will sound if NO or NO_2 detected outside chamber
- Computer System for easy interface, real time trend charting, data logging, and remote operation

Safety Hood

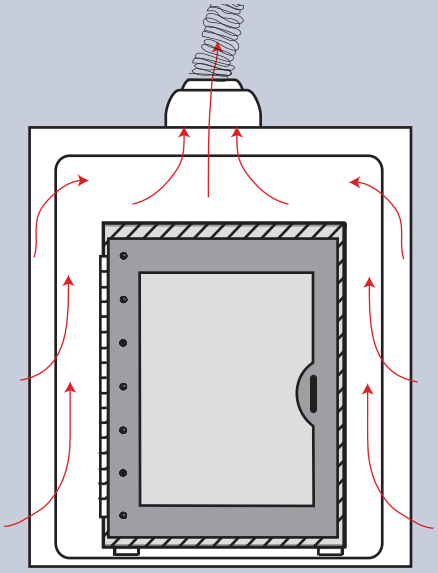
Active Gas Evacuation System

Intermittently, animal chambers contain various contaminants or other unwanted substances that are not welcome in the laboratory. The Safety Hood exhaust system ensures a safe controlled environment for your laboratory animals. The Safety Hood will house any chamber and continuously sweep all exhaust and fumes away.

- Sweep away dangerous off-gas from animals
- Removes excess bioactive/exotic gas
- Help control odor in the lab
- Protect Your Animal Investment
- Ensure The Safety of Your Lab
- Easily Duct Into Your Laboratory's Exhaust

The ventilation fan is attached to the top of the chamber, where it pulls ambient air past the chambers contained within the Safety Hood. Connect to your lab's ventilation system.

Typical Configuration



The ventilation fan pulls room air into the fume shroud, effectively sweeping away any dangerous airborne particles/vapors and unpleasant odor.

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systems

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