BioSpherix

part of the Breeze Group

OxyCycler GT Series

Gasotransmitter-Capable Gas Control System

Applications:

- Cytotoxicity
- Ischemia/reperfusion
- Pulmonary hypertension
- Obstructive Sleep Apnea (OSA)
- Chronic Intermittent Hypoxia (CIH)
- Cancer studies
- Cell signaling
- Stem cells
- Cardiology
- Oxidative stress
- **Many more!**

Scan to read how the OxyCycler GT Series is used in research

Gasotransmitter Control Options

The OxyCycler GT Series is a family of controllers providing precise control of O_2 (0.1–99.9%), CO_2 (0.1–20.0%), and relative humidity (RH) (GT41), with optional control of CO (0–400 ppm) (GT4181C), NO (0–50 ppm) (GT4181N), or combined CO/NO (GT4181CN).

Comprehensive Application

Featuring both static and dynamic programming, the GT Series supports a wide range of physiologic and pathophysiologic applications. Because many pathophysiologic processes and gasotransmitter responses are interrelated, the ability to add CO and NO exposure provides a logical and scalable upgrade path.

Efficient Operation

The GT Series controllers remotely sense gas levels inside the C-Chamber. They precisely infuse gases to increase concentrations, or nitrogen to displace and reduce levels as needed.

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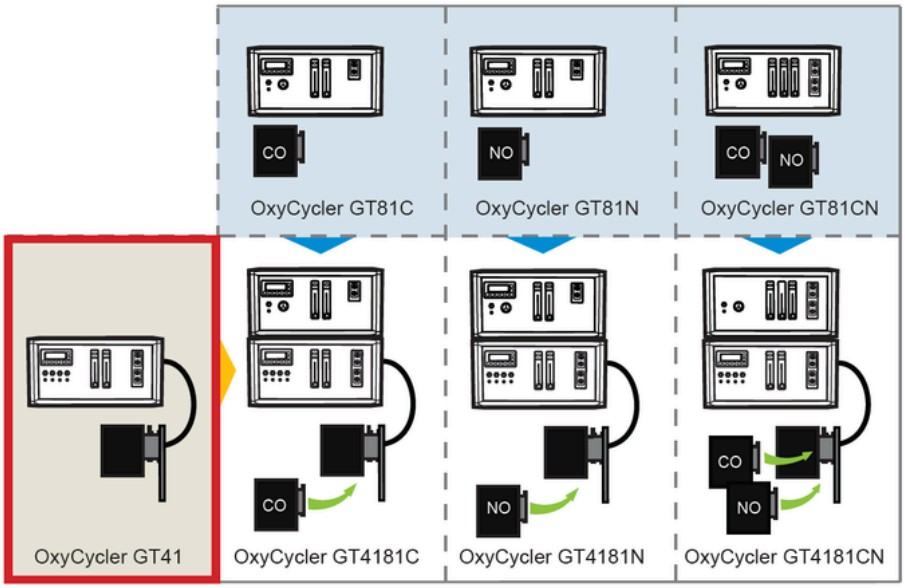
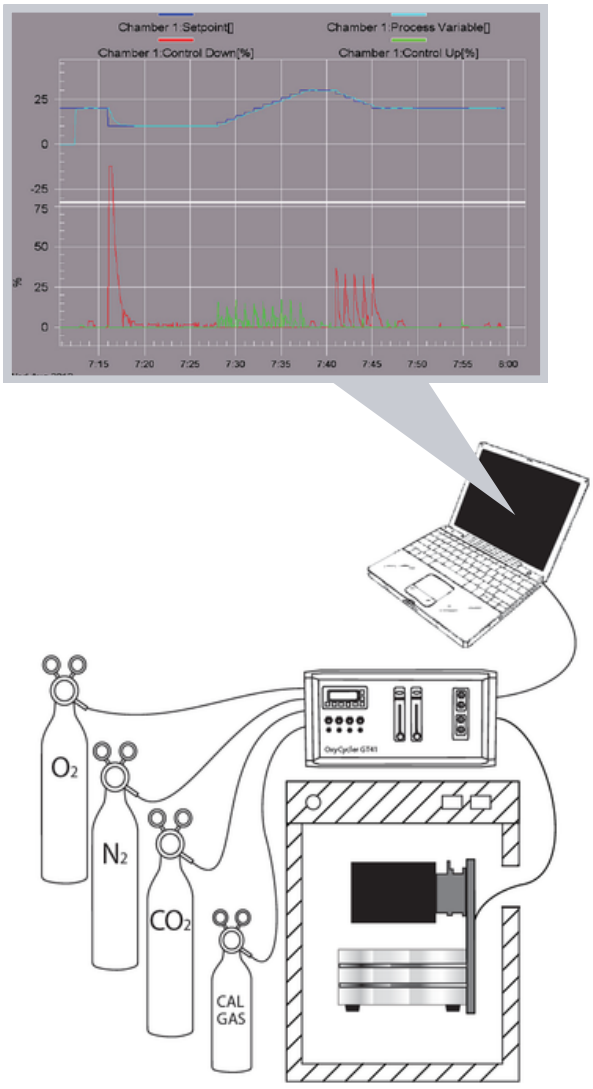
OxyCycler GT Series

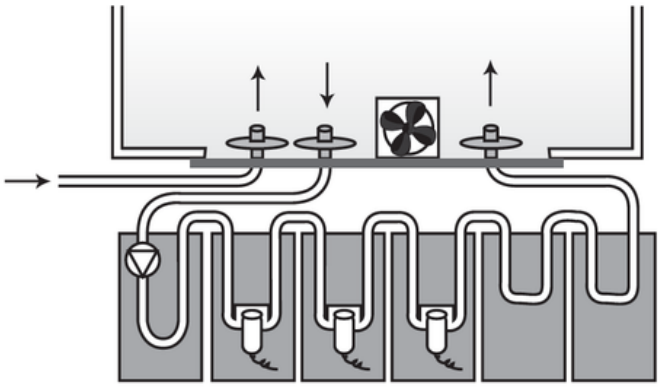
The GT41 is the core controller for GT Series, and comes with O_2/CO_2 and RH control in a modular system designed to support three gasotransmitter cell culture configurations: carbon monoxide (CO) and/or nitric oxide (NO). Depending on the piggyback controller selected, the system can provide CO-only, NO-only, or combined CO and NO control within a single platform.





Installation

1. Set the GT41 on or near incubator and plug it in to standard outlet.
2. Connect gas supply. Compressed gas is recommended for low consumption applications, and liquid for medium to high consumption.
3. Use computer software to monitor and control gas levels.



Hot-swap multipod adapter plates use disposable microbial barrier filters to isolate cell cultures from all sensors and control mechanisms regulating O_2, CO_2, RH, CO, NO/NO_2, and temperature. A pump continuously samples chamber atmosphere, passes it by sensors, and returns it through microbial filters, while controllers infuse gases as needed. A removable, sterilizable fan ensures uniform gas mixing. Loop pods maintain continuous flow when CO or NO/NO_2 multipods are not installed and can be easily replaced during future system upgrades.

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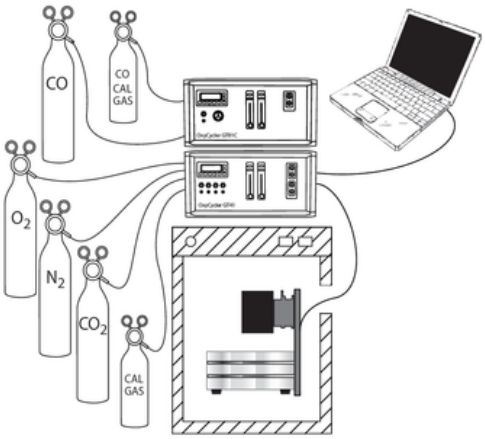
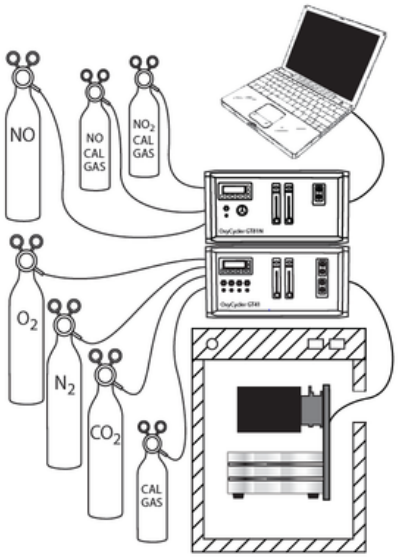
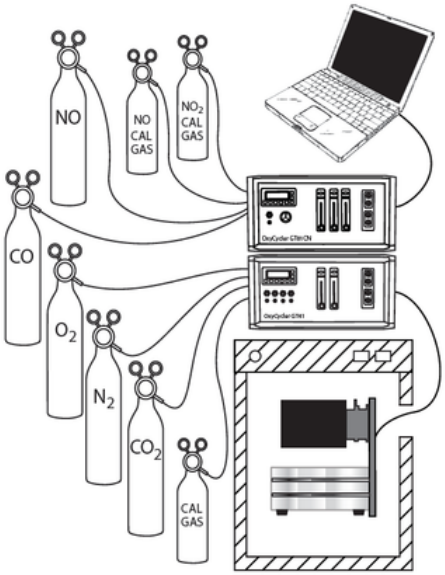
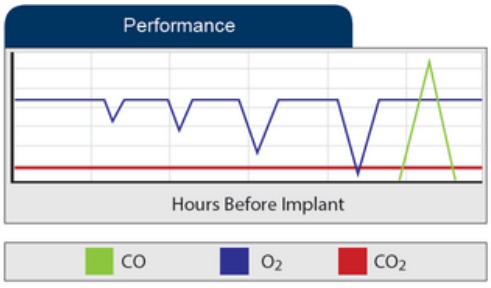
OxyCycler GT Series

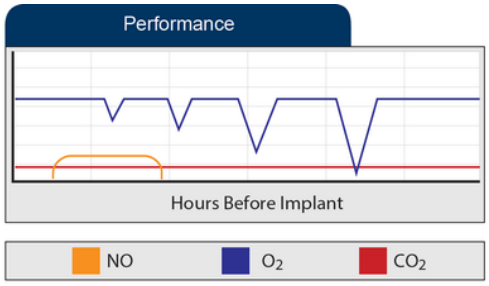
GT81C	GT81N	GT81CN

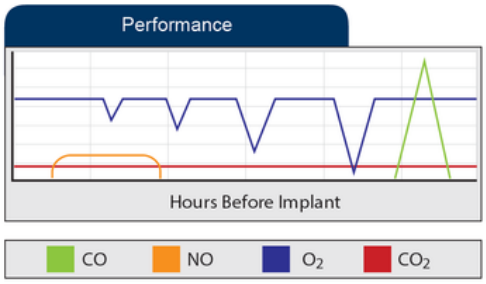










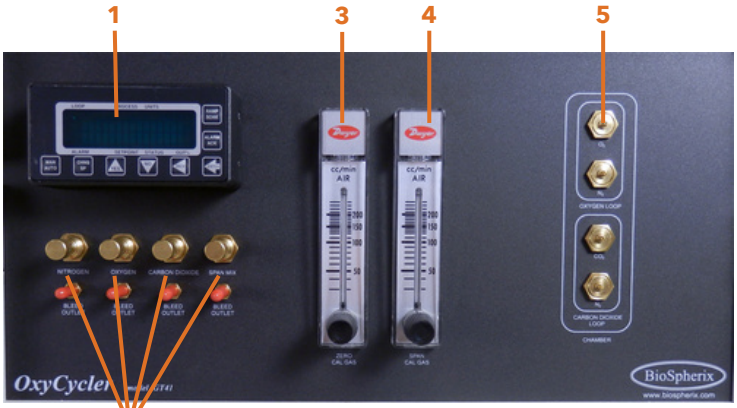


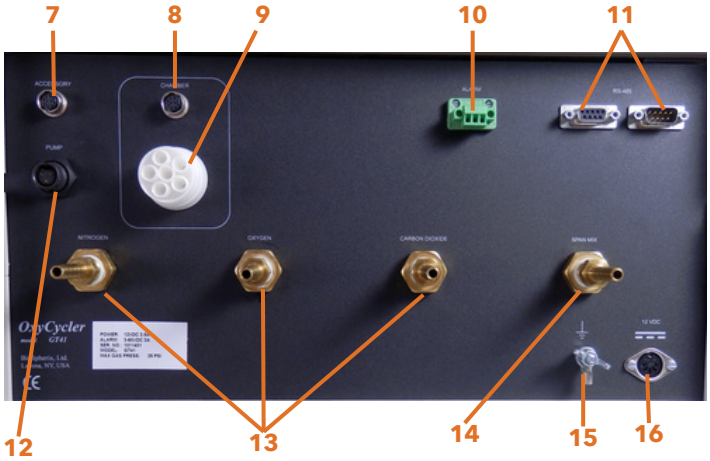
Safety Considerations

1. Always place gas tanks in a well-ventilated room away from flame or heat sources
2. Do not use gas mixtures that exceed OSHA danger levels
3. Check all tubing for leaks prior to use
4. To avoid unwanted exposure, set gasotransmitter control levels to zero and wait until setpoint is reached before opening culture chamber

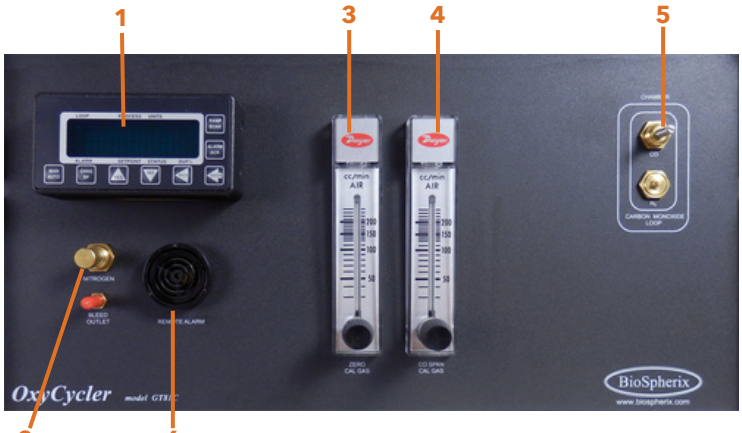
OxyCycler GT Series

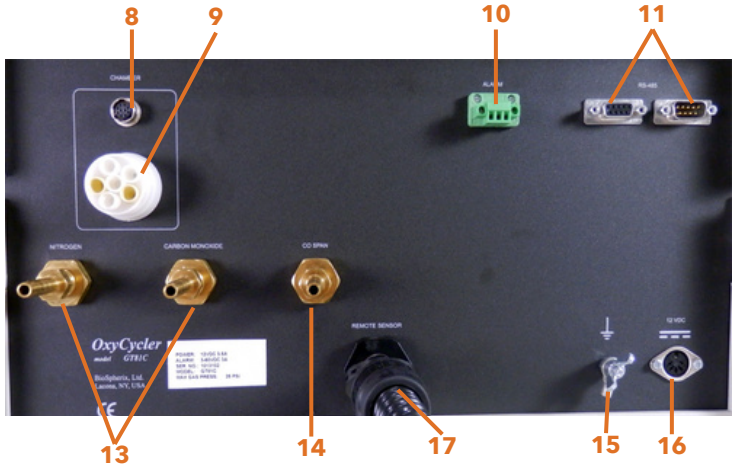
GT41



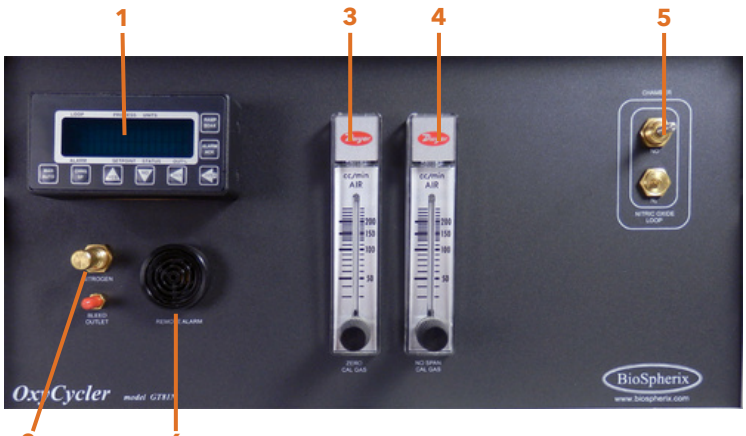


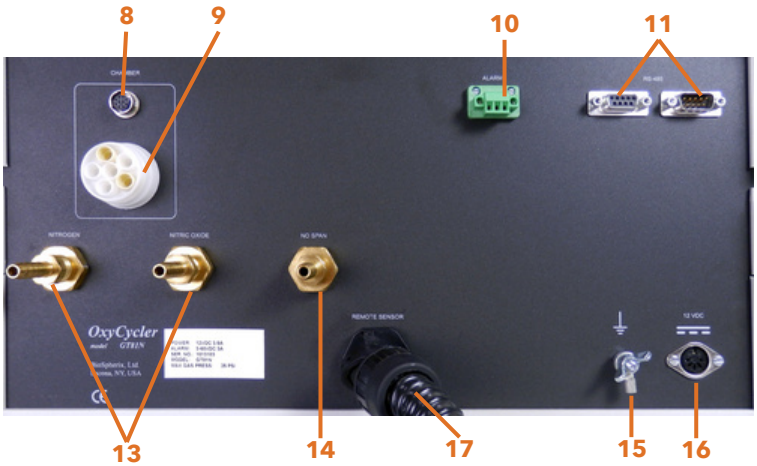
GT4181C





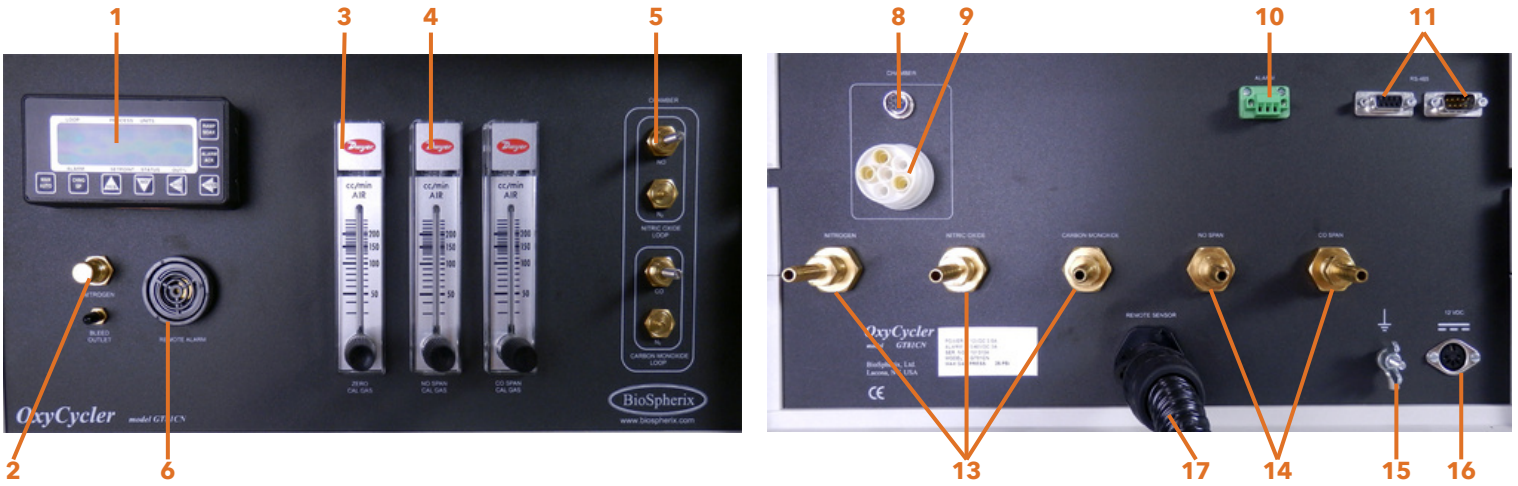
GT4181N





OxyCycler GT Series

GT4181CN

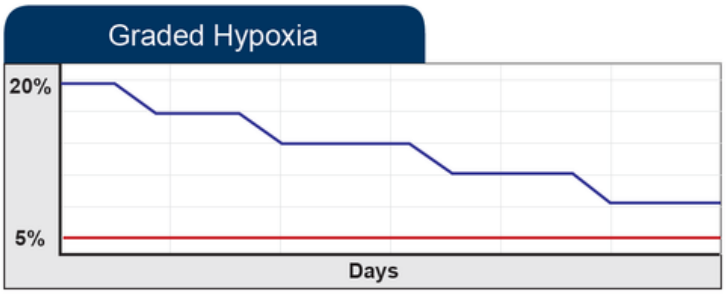


1. Digital Display: Continuously displays current gas concentration, control status, and alarm status in all chambers. Displays menu items and settings during programming
2. Bleed Valves: Bleeds gases out of gas supply lines
3. ZERO Cal Gas Flowmeter: Used for calibration
4. SPAN Cal Gas Flowmeter: Used for calibration
5. Needle Valves: Sets infusion rate of control gases in each chamber to accommodate different dynamics. Can manually override controller to shut off gas
6. Alarm: will sound if ambient monitor detects unsafe gas levels
7. Accessory Jack: Port for accessories to attach to the controller
8. Communications Cable Jack: Relays information for the sensors
9. Actuator Pod Connectors: Flexible tubing connects remote actuator pods to back panel
10. Alarm Receptacle
11. RS-485 Connections: Cable attachments to computer and additional controller unit
12. Pump Connection: Supplies power to mini pod pump
13. Supply Gas Hose Inputs: 1/4" ID hose from gas sources pressure rated up to 40 PSIG
14. Span Mix Barb: 1/4" ID hose input
15. Ground Stud: Protects the controller from electrical damage
16. Power Connection (12VDC)
17. Monitor Pod Umbilical: Flexible tubing connects monitor pod to back panel

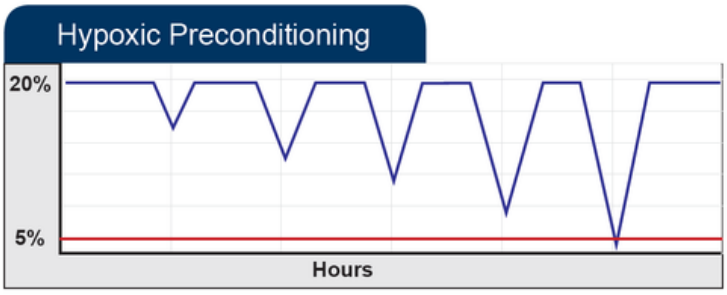
Visit our YouTube channel for calibration and installation how-to's

OxyCycler GT Series

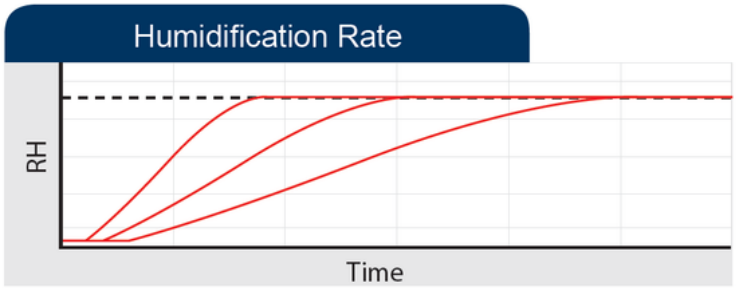
Control Scenarios



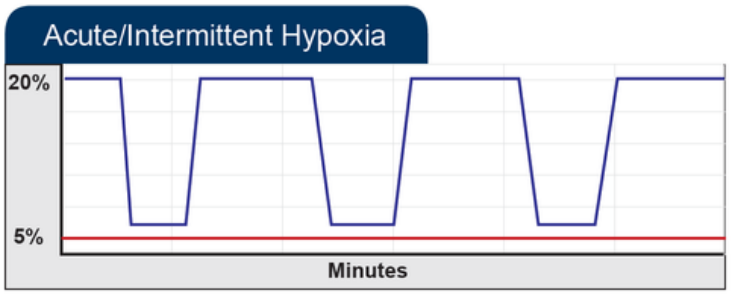
Step reduction in oxygen, such as that during altitude acclimation, is used to gradually condition cells for hypoxia. The rate of change and duration between any two levels is adjustable and repeatable.



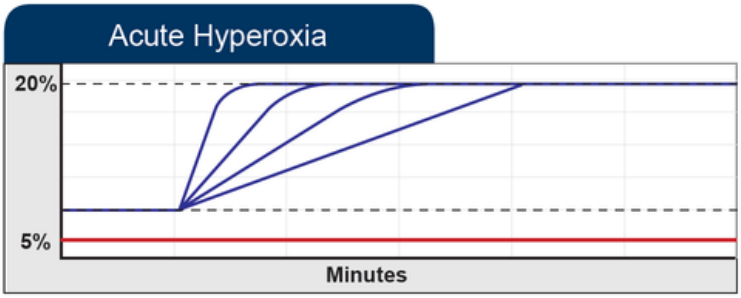
Precondition cells to an hypoxic or ischemic environment prior to implantation.



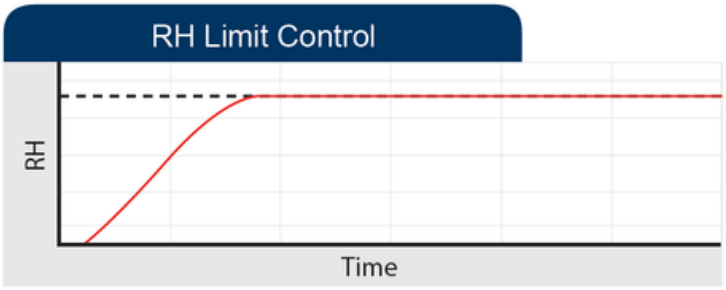
Humidification rate is a function of the surface area of open water in the chamber.



Hypoxic stress can be used to model key aspects of severe diseases such as heart attack, stroke, asthma, and epilepsy. The frequency, duration, and severity of oxygen deprivation can all be precisely controlled.



Sudden increases in oxygen levels can damage cells. Hyperoxia, such as that experienced by athletes, therapeutic oxygen administration in critical care, and other acute high-oxygen exposures, can easily be modeled with the GT Series. Rapid shifts in oxygen can overwhelm cellular antioxidants, while slower increases can precondition cells to enhance antioxidant defenses.



Humidity is often a neglected condition of cell culture, leading to high contamination risk and equipment malfunction. The GT41 limits humidity to desired levels.

OxyCycler GT Series

Electrical Requirements

Electrical Power: 12 VDC, 6.6AMP

Physical Specifications

Weight: 22 lbs/controller

Controller Dimensions: 9"H x 17"W x 17"D/controller

Monitor Pod Dimensions: 4.25"H x 7.06"W x 4.25"D

Gas Control Performance

Control Range: 0.1-99.9% O_2, 0.1-20.0% CO_2, 0-400 ppm CO, 0-50 ppm NO

Accuracy: O_2: ±1% at constant temperature/pressure, ±2% over entire temperature range. CO_2: ±5% of measurement or 0.1%. Temperature: ±0.6%°C. Relative Humidity: ±3% between 0-40°C. CO: varies based on calibration. NO: varies based on calibration

Resolution: 0.1%

Sensor Types: Infrared (CO_2), electro-galvanic fuel cell (CO, NO, NO_2)

Alarms & Safety

Alarm Output: 12V output adaptable to external systems

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

Gas Delivery Performance

Gas Infusion Rate: 1-25 SCFH (GT41)

Gas Consumption: depends on 1) size and leakiness of host chamber 2) frequency and duration of chamber door openings 3) controller setpoint

Gas Supply & Compatibility

Gas Source: compressed gas tanks, liquid carboys, generators

Gas Supply: pressurized O_2, N_2, CO_2, NO/N-mixture, CO, O_2/CO_2 CAL gas

Gas Supply Line: 1/4" ID hose pressure rated to 25 PSIG

Connector Specifications

Umbilical Length: 12' (custom lengths available)

Umbilical Diameter: 1/16" I.D.

Sensor Cable Length: 12'

Sensor Cable Diameter: 6mm

Operation Parameters

Host Chamber Temperature: 5-40°C

Host Chamber Humidity: 5-95%