

# CO<sub>2</sub> O<sub>2</sub> Control

## User's Guide



### CO<sub>2</sub> & O<sub>2</sub> Controller for miniature incubators

- Precise CO<sub>2</sub> & O<sub>2</sub> Control throughout the experiment
- Media pH control
- Compatible with any perfusion system
- Miniature incubators for any microscope
- Compatible with Imaging systems

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# Specifications

**Range** 0 to 20% CO<sub>2</sub>; ships calibrated to provide 5% level of CO<sub>2</sub> inside miniature incubators;  
0 to 20% O<sub>2</sub> (taken from the air)  
up to 750 SCCM output flow

**Input**  
300PSI max

**Size (Controller) :** 12Wx6Hx8D in.

**Power Supply**  
94 to 234 V AC, 50/60 Hz 35W

**Input Port**  
4mm O.D. tubing (10-32 threaded)  
includes adapters for different size tubing

**Output Port**

# Introduction

The controller ships with tubing to connect to miniature incubators, and fitting to connect to a source of CO<sub>2</sub>/N<sub>2</sub> (a cylinder, for example, or a wall outlet). A source of CO<sub>2</sub>/N<sub>2</sub> is required to operate the system. The CO<sub>2</sub> and N<sub>2</sub> sources need to be regulated, since the maximum input pressure should not exceed 300 PSI. The controller ships adjusted for input pressure 40 PSI. During operation, the controller is continuously monitoring CO<sub>2</sub> and O<sub>2</sub> content of the output gas mixture.

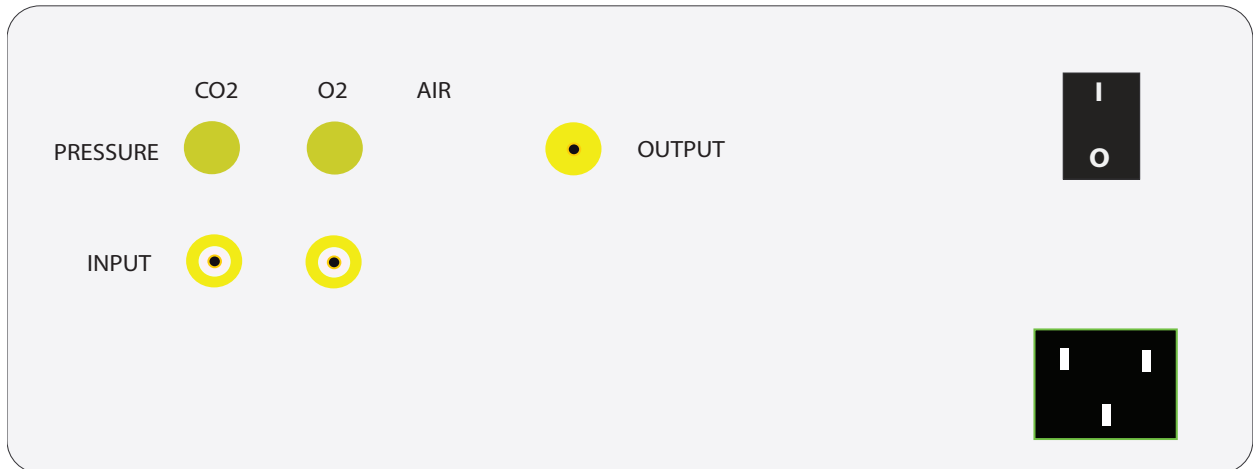
# Installation Guide

**1** Using provided fitting and clamps, connect CO<sub>2</sub> (and N<sub>2</sub>, if planning to reduce O<sub>2</sub> concentration) source (cylinder or wall outlet) to the controller. Some tubing and additional fitting might be required to connect to your source as designs vary. Usually some luer-lock fitting or other easy-connect adapters are used to splice different diameter tubing connecting your source to 4mm O.D. translucent tubing, which fits inside INPUT ports on the back of the controller. After splicing provided 4mm tubing to CO<sub>2</sub>/N<sub>2</sub> source, simply push the tubing inside INPUT ports all way, and slightly pull back to clamp. In order to disconnect the source, push YELLOW rim inside the connector, and pull the tubing out. Make sure the regulator on CO<sub>2</sub>/N<sub>2</sub> source does not show more than 300 PSI of output pressure. Pressures around 40 PSI should be sufficient to operate the system. The controller ships tuned to work with 40 PSI input pressure

Similarly, insert a piece of 1/8in. O.D. BLACK tubing inside OUTPUT port on the back of the controller, and connect the other end of tubing to the incubator, or heated humidifier CO<sub>2</sub>-500ML. If a humidifier is used, connect the output of humidifier to the incubator.

Connect power cable. Plug the power cable into wall outlet. Connect grey cable to DB-9 connector on one end, and to the incubator lid on another end.





**2** Turn the controller ON. The controller will self-calibrate itself for 5min. After 5min, the display will show concentrations of CO2 and O2 in the output mixture and start making the mixture according to factory settings of 5% CO2 and 20% O2.

CO2 %	0.0
O2 %	20.5

To adjust settings press the front knob to go to CO2/O2/FLOW rate menu and rotate the knob to adjust:

SET CO2 %	5.0
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SET O2 %	20.0
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SET FLOW	200
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**IMPORTANT:** If you are not planning to reduce O2 concentration in the output mixture - you should leave O2% setting at 20.0%

**3** ERROR MESSAGES:

**AIR CLOSED** - the air source is closed - press AIR button on the front to open - GREEN LED will be ON.

**CO2 LOW** - CO2 source might not be connected. If connected, rotate CO2 pressure regulator on the back clock-wise slowly until the message disappears.

**CO2 HIGH** - the input CO2 pressure is too high. Rotate CO2 pressure regulator on the back anti-clock-wise until the message disappears.

CO2 CLOSED - CO2 input is closed - press CO2 button on the front - GREEN LED will be ON.

N2 LOW - N2 source might not be connected. If connected, rotate N2 pressure regulator on the back clock-wise slowly until the message disappears.

N2 HIGH - the input N2 pressure is too high. Rotate N2 pressure regulator on the back anti-clock-wise until the message disappears.

N2 CLOSED - N2 input is closed - press N2 button on the front - GREEN LED will be ON.

REPLACE THE PUMP - the air pump needs to be replaced.

## 4

The controller also allows you to see other measured parameters:

1. Actual output flow rate in SCCM. Press the front knob until the display shows:

SET FLOW	300
FLOW	299

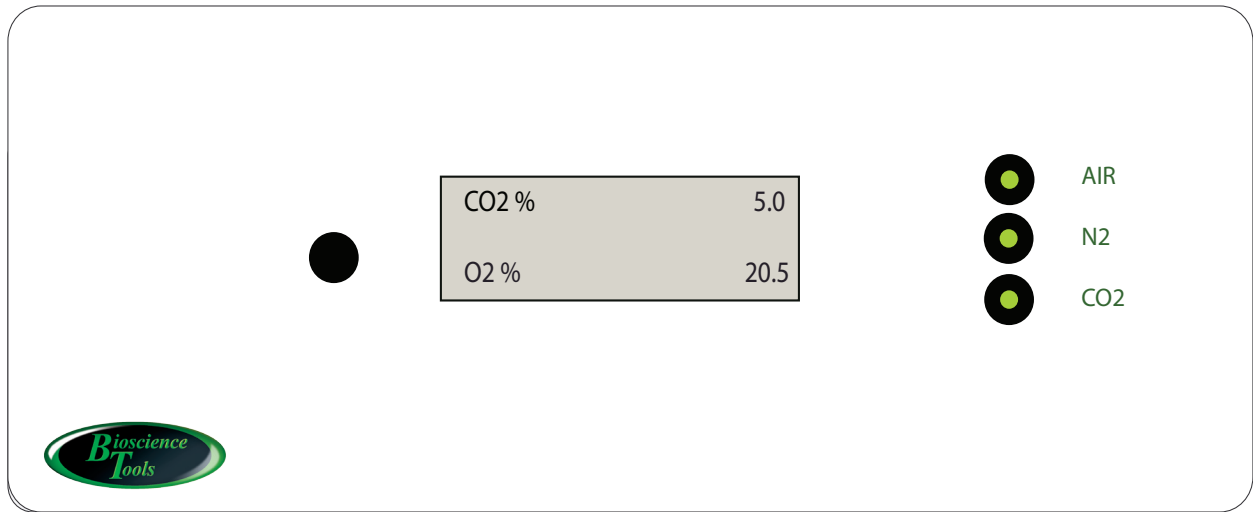
2. CO2 flow rate. Press the front button until the display shows:

CO2 %	5.0
FLOW CO2	32

3. N2 flow rate. Press the front knob until the display shows:

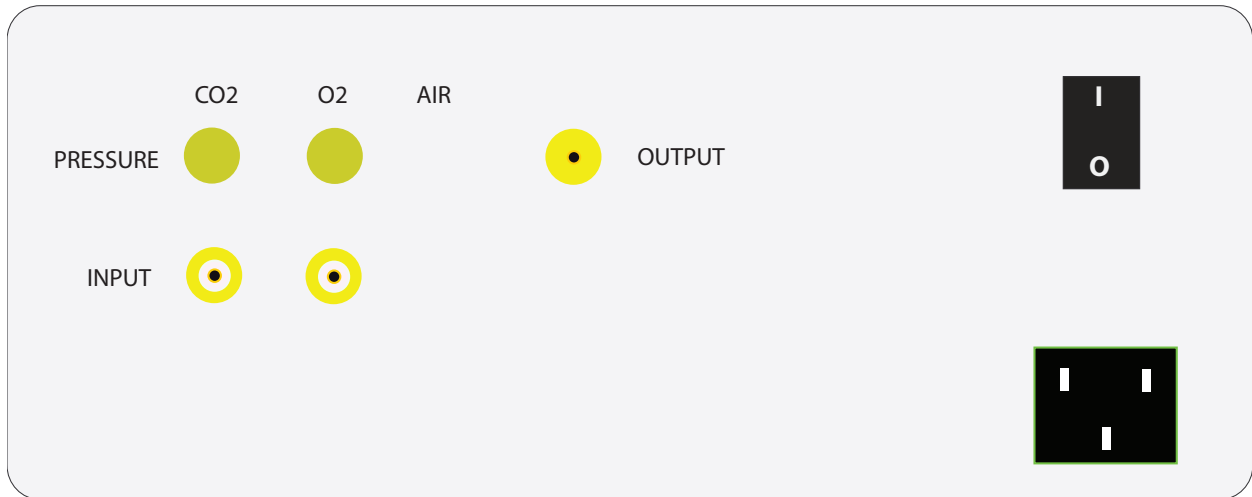
FLOW N2	000
02 %	19.3

# Front Panel Controls



Front Panel Controls	
Knob	Sets CO2 level, O2 level and FLOW rate

# Inputs, Outputs and Back Panel controls



Inputs & Outputs	
INPUT ports	Connects to a source of CO2/N2. Maximum input pressure is 300 PSI.
OUTPUT port	Connects to the incubator to supply CO2/O2/N2 mixture.
PRESSURE regulators	Adjust input pressure inside the controller.

Back Panel Controls	
Input Pressure regulators	Turn CLOCK-wise to increase inside pressure and turn ANTI-clockwise to reduce available pressure..



## Using Heated Humidifier CO2-500ML

A heated humidifier can be used to pre-heat and saturate the gas mixture with water, before the mixture enters the incubator. The humidifier consists of a heated base and a reservoir, which needs to be filled with distilled water. Fill the reservoir just enough to observe bubbles of gas coming out of input tubing, which has a female luer connector. The input tubing should be connected to BLACK output tubing coming out from a CO2 controller., with the check-valve placed between After connecting tubing, place the reservoir on the base.

Plug provided DC power adapter into the base and a wall power outlet. Turn the humidifier ON - an LED indicator will be ON. Let the base to warm up to facilitate water evaporation. After gas mixture enters the reservoir, it will be heated and mixed with water vapors.

NOTE: You can use the reservoir as an indicator of gas mixture flow rate. Usually, enough gas flow is provided to the incubator, as long as you can observe slow but continuous stream of bubbles coming up from the inflow tubing.

Using provided tubing, or any other tubing, connect the outflow MALE luer port to the incubator. Turn the CO2 controller ON to provide gas flow inside the incubator.

## Warranty

This product is warranted to be free from defects in material and workmanship for the duration of one year. Normal wear, or damage resulting from abuse, accident, alteration, misuse, service by an unauthorized party or shipping damage, are excluded from this warranty and are not covered. Bioscience Tools will repair or replace the defective product covered by this warranty free of charge if it is returned, postage prepaid, to Bioscience Tools, ph: 1-877-853-9755.

