

# GSM-3 Gas Mixer

Accurate fast-response blender for custom gas mixtures



The **GSM-3 Gas Mixer** is a versatile and accurate device for creating custom respiratory gas mixtures. Any three gasses can be connected as inputs, and the output is the user-programmed mixture of these gasses. The instrument can operate in a stand-alone mode, with mixture programming done from the front panel controls, or it can be controlled using an attached computer running the supplied software. Besides the mixing function, the GSM-3 can operate as an accurate flow source for a single gas.

The mixer uses thermal mass flow controllers to provide any programmed mixture in the range of 0 - 10 lpm for each gas with a resolution of 0.1% concentration. Front panel controls are used to set the total desired total output flow, as well as the concentration of each of the three component gasses. The LCD display shows the set concentrations, as well as the computed flow rates for each gas.

Up to four custom mixtures can be created and stored in non-volatile memory for future use. Any of these stored mixtures can be immediately selected and executed. This function allows rapid step-changes in concentrations to be performed

with the push of a button.

The flow controllers are pre-calibrated for the three most commonly used respiratory gasses: O<sub>2</sub>, CO<sub>2</sub>, and N<sub>2</sub>. Other gasses can also be selected, and internal correction factors are automatically applied to compensate the flow controllers for differing gas densities.

Besides operation as a stand-alone gas mixer, the GSM-3 can also be programmed and operated from an attached computer using a serial port. A Windows™ software application is provided with the instrument. This software allows convenient setting up and storage of any gas mixtures. In addition, it allows timed protocols to be set up and executed. For example, a program could be created that periodically changes the gas mixture from room air O<sub>2</sub> concentrations to hypoxic values over a set period of time. Any Windows-based PC with an available serial port can be used.

The GSM-3 Gas Mixer comes ready to use with CD-ROM software and a serial cable. Up to three input gasses can be attached, with a minimum pressure requirement of 20psi.

## **Standard Features:**

- Accurate custom gas mixtures
- 0 - 10 lpm for each of three gasses
- Stored programs for immediate retrieval
- Stand-alone or computer controlled
- Software allows timed protocols

## **Applications:**

- Gas mixtures for *in vivo* or *in vitro* studies
- Control of breathing studies
- Environmental chambers
- Gas analyzer calibration mixtures
- Hypoxia and sleep studies

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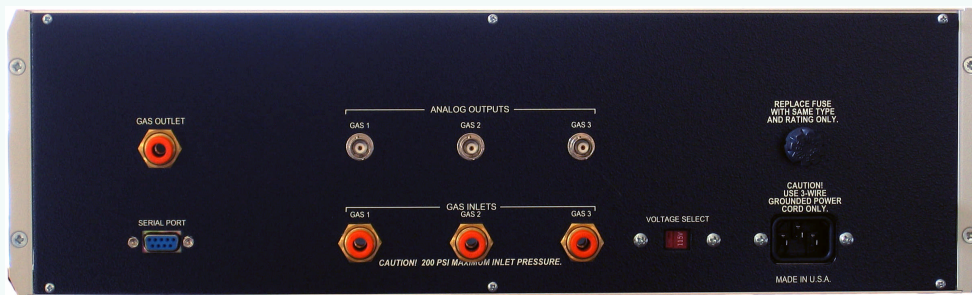
# GSM-3 Gas Mixer

## Specifications: (Note 1)

Controlled flow range for any input gas	0 - 10 liters/min
Flow accuracy	±1.0%
Flow setting repeatability	±0.15%
Resolution	0.1%
Temperature coefficient	0.05% / °C
Pressure coefficient	0.01% / °C
Response time (to 0.2%)	1 second
Materials exposed to gas	Delrin with Viton seals
Standard gasses for input (Note 2)	Air, O <sub>2</sub> , CO <sub>2</sub> , and N <sub>2</sub>
Operating temperature range	5 - 40° C
Input gas temperature range	0 - 50° C
Minimum input gas pressure	20psi
Maximum input gas pressure	200psi
Gas inlet connections	quick push/pull 1/4" OD tubing connectors
Gas mixture outlet connection	quick push/pull 1/4" OD tubing connector
Analog gas concentration output scaling for each channel	0.1V / %
Serial data format	9600 baud, 8 data, no parity, 1 stop bit
Electrical requirements	120VAC/220VAC switchable, 35VA
Dimensions	19W x 5.25H x 12D in., 49W x 13H x 30D cm
Weight	.20 lbs. (9kg)

Note 1: Not to be used for Human Life Support applications.

Note 2: Many other gasses can be selected, except explosive mixtures, which MAY NOT be used.



*Rear-panel view of the GSM-3 Gas Mixer, showing the three gas inlet connections and the mixture outlet to the left (1/4" quick push/pull connectors). The three BNC jacks provide an analog voltage corresponding to the concentration of each input gas in the programmed mixture.*

## Ordering Information

18-10000 GSM-3 Gas Mixer with software and serial cable

*Related instruments:*

- 12-01100 SAR-830/A Small animal ventilator, volume-cycled with internal air pump
- 12-02100 SAR-830/AP Small animal ventilator, volume/pressure-cycled, with internal air pump
- 11-10000 CapStar-100 End-Tidal CO<sub>2</sub> Analyzer
- 14-11000 OxyStar O<sub>2</sub> analyzer
- 15-10000 MicroCapStar End-Tidal CO<sub>2</sub> analyzer for mice

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