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Gas Injection System Instruction Manual

INTRODUCTION

The Automatic Gas Injection System is designed to maintain a constant level of hydrogen gas mix in your chamber. It accomplishes this by injecting the gas mix into your chamber for fixed time period on a fixed time schedule. Both of these time periods are adjustable by the user to suit the chamber activity and size.

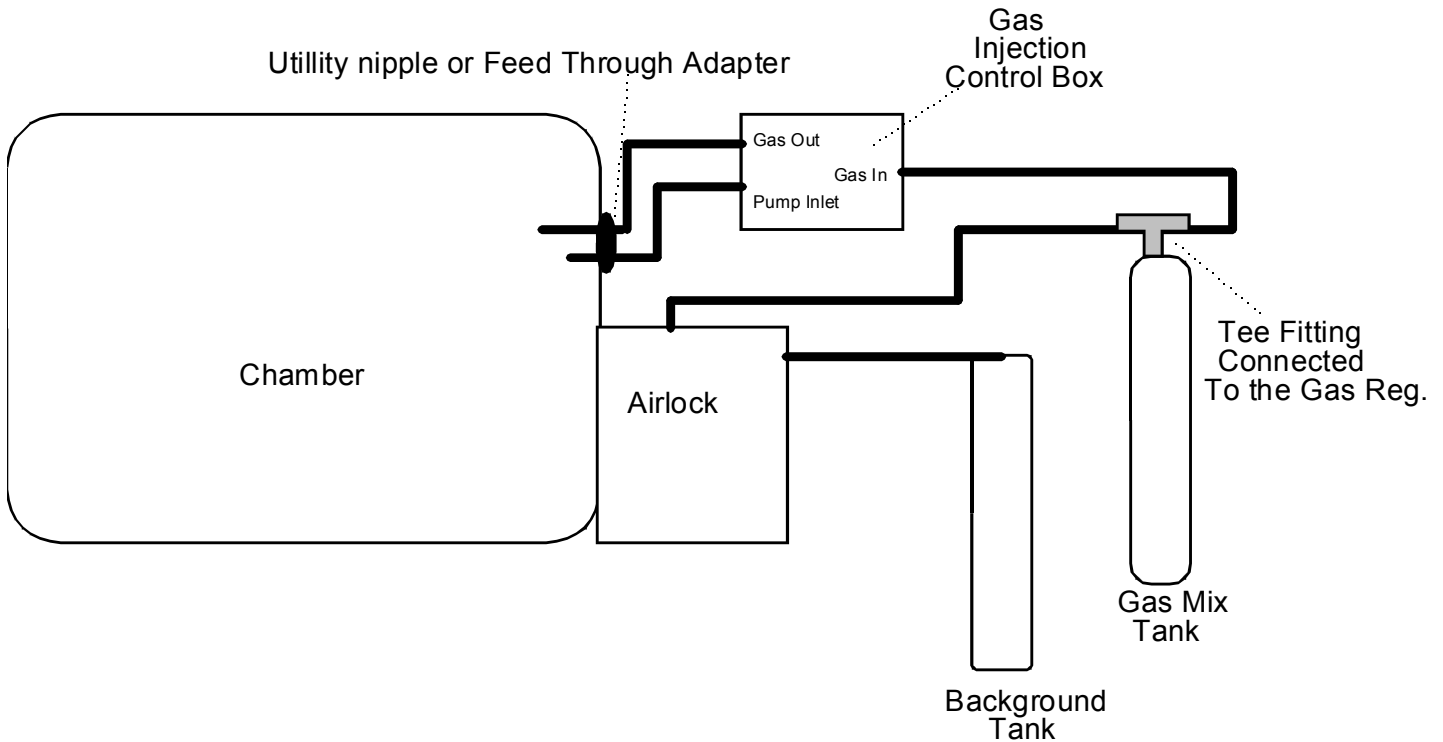
The injection system will attach to most existing chamber designs, assuming there is appropriate gas inlet and outlet fittings. Units ordered with a new anaerobic chamber will have fittings dedicated to the Gas Injection System.

The system consists of a Control Box, Chamber Gas Inlet/Outlet, Tubing, and “T” fittings. The Control Box contains the gas flow timers, a small vacuum pump and a solenoid valve for gas flow shut off.

SET UP

1. Position the Control Box close to the large utility nipples on a Flexible Vinyl chamber. See Figure 1 for a rough schematic of equipment and tank layout and piping.
2. Attach the hydrogen gas mix regulator to the gas tank. The “T” fitting supplied as part of this regulator set is equipped with fittings to connect to copper tubing on one leg and PVC flexible tubing on the other. Run copper tubing to the vacuum airlock and the supplied PVC tubing to the “Gas In” fitting on the Control Box. We recommend a maximum 15 psi gas pressure out of the regulator.

Figure # 1 Gas Connections for vinyl chamber



3. A large rubber stopper with two installed lengths of flexible tubing is supplied with the Gas Injection System. Connect one of the flexible tubes to the “Gas Out” fitting on the back of the Control Box. Connect the other tube to the “Vacuum Pump Inlet”. The Vacuum Pump Inlet includes a moisture trap to protect the internal vacuum pump and a length of flexible tubing with a check valve installed to prevent leakage back into the chamber when the pump is not running. These are important components of the entire system. See Figure # 3.
4. Insert the large rubber stopper into the available utility nipple. Make sure the stopper is securely positioned in the nipple to prevent chamber leaks.
5. Plug the Control Box power cord into a convenient electrical wall outlet.
6. To initialize the Gas Injection Control System, flip the rear-mounted On/Off toggle switch to the “On” position.

OPERATION

Each vinyl anaerobic chamber is different, influenced by a number of variables, including the size of chamber, the volume of equipment installed inside the chamber, and the activity being carried out within the chamber. As a result, there is no single program for operating the Gas Injection System – **the program must be adapted to the specific configuration and application.** What follows are general guidelines to help you adjust your Injection System for maximum efficiency.

1. As supplied, the three control timers are set as follows:

Timer Function	Setting	Units
Vacuum	30.00	Seconds
Gas Mix Purge	10.00	Seconds
Cycle Interval	1.00	Hours

These settings are based on what would be appropriate for an empty Coy Type B chamber (56 cubic foot volume) with the gas regulator set at the recommended 15 psi.

2. The Pump timer should **always** be set higher than gas mix timer to keep the balance correct between what is injected and what is removed from the bag. The objective is to have both the gas flow and the pump operating at the same volume to maintain the proper pressure balance in the chamber.

The recommended short cut to tune in the right settings is to reduce the Cycle Interval Timer to zero and allow the Gas Injection System to run at a fast interval cycle while observing the bag. With the bag slightly inflated (gloves sticking out), observe whether the gloves are becoming more or less inflated as the system runs through repeated cycles. If the bag appears to be deflating, either increase the “Gas Mix Purge” time, or decrease the “Vacuum” time. If the bag appears to be inflating, make the opposite adjustment(s).

3. Changing the pressure on the regulator will directly affect all aspects of the Injection System. Turning down the pressure will force you to increase the Gas Purge Time and/or reduce the Vacuum time. Increasing the pressure will have the opposite effect. The recommended pressure setting is 15 psi.

4. In order to adjust the timers, use the four buttons on the face of the timers, labeled 1 through 4. Each button is dedicated to one digit position on the timer (1's, 10's, 100's, 1000's) and depressing a button will step that digit position from 0 through 9 and back to 0. Once the desired setting has been entered via the buttons, press the reset (RST) button to have the new setting take immediate effect, or do nothing and the new value will take effect at the end of the current cycle.

5. **ALWAYS CAREFULLY MONITOR YOUR CHAMBER AFTER YOU'VE MADE CHANGES TO THE SETTINGS OF THE GAS INJECTION SYSTEM.!!!**

NOTE: If at any time you need to inflate the chamber, the "Continuous Gas Injection" switch on the back of the cabinet may be used to override the automatic system. While the "Continuous" override switch is held in the "ON" position, the gas mix will flow continuously until you release the spring-loaded momentary switch. The automatic system will then resume its function according to the timer program.

NOTE: See Figures #2 and #3 for layout of the front and rear panels of the Control Box.



Figure #2



Figure #3