

Microfabrication Furnace Upgrade

Objective

Upgrade current system gas delivery and user interface to streamline usability and increase reliability

Prior Design

Did not have any covers and had exposed tubing.

Small and cumbersome UI



Final System



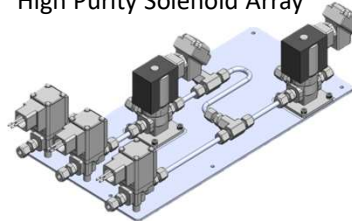
Implementation

3 Main Components

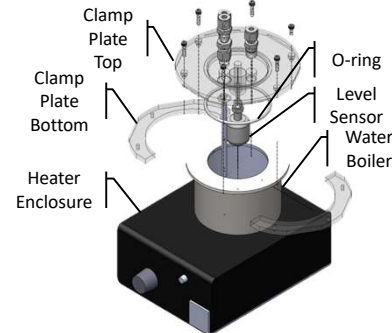
Solenoid Assembly/Steam Generator

The solenoid box contains the electrical box, steam generator, and solenoid assembly. This allows us to have a condensed design that is functional, repairable, and aesthetic.

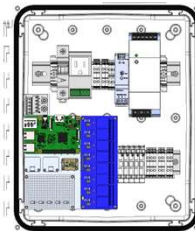
High Purity Solenoid Array



Steam Generator



Electrical/UI Box



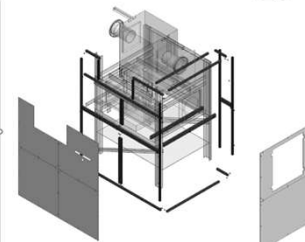
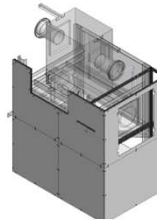
Electrical Box: This is a water-resistant box to prevent electrical damage given the presence of steam in the bubbler.

UI Box: Focused on a simple design to be easily understood for labs



Frame

The frame was a simple 8020 acrylic panel that hides most of the unnecessary components and provides a clean aesthetic to the system. Around the furnace



The systems we built were predominately off the shelf parts so that future modifications or repairs would be easy to do.

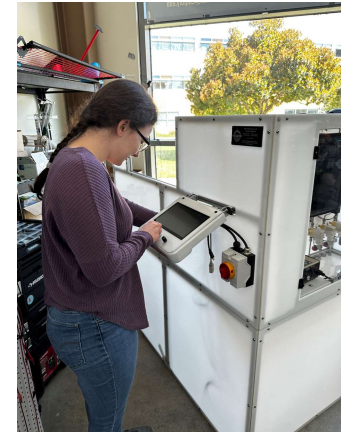
Testing

Test List:

- Initial Burn In:** (PASS) Prolonged Duty Cycle
- Leak Test:** (PASS) Fittings don't leak
- User Implementation:** (PASS) Usability of UI
- Final Design:** (PASS) Does the system work

Results

In the end, our system worked as intended and will be implemented for lab use.



Possible Future Plans

- Add wireless monitoring functionality
- Add Furnace Control Systems
- More duty cycle settings for lab tests