

Design and Implementation of Epoxy Dispenser

Smith Systems Inc.



PROBLEM STATEMENT

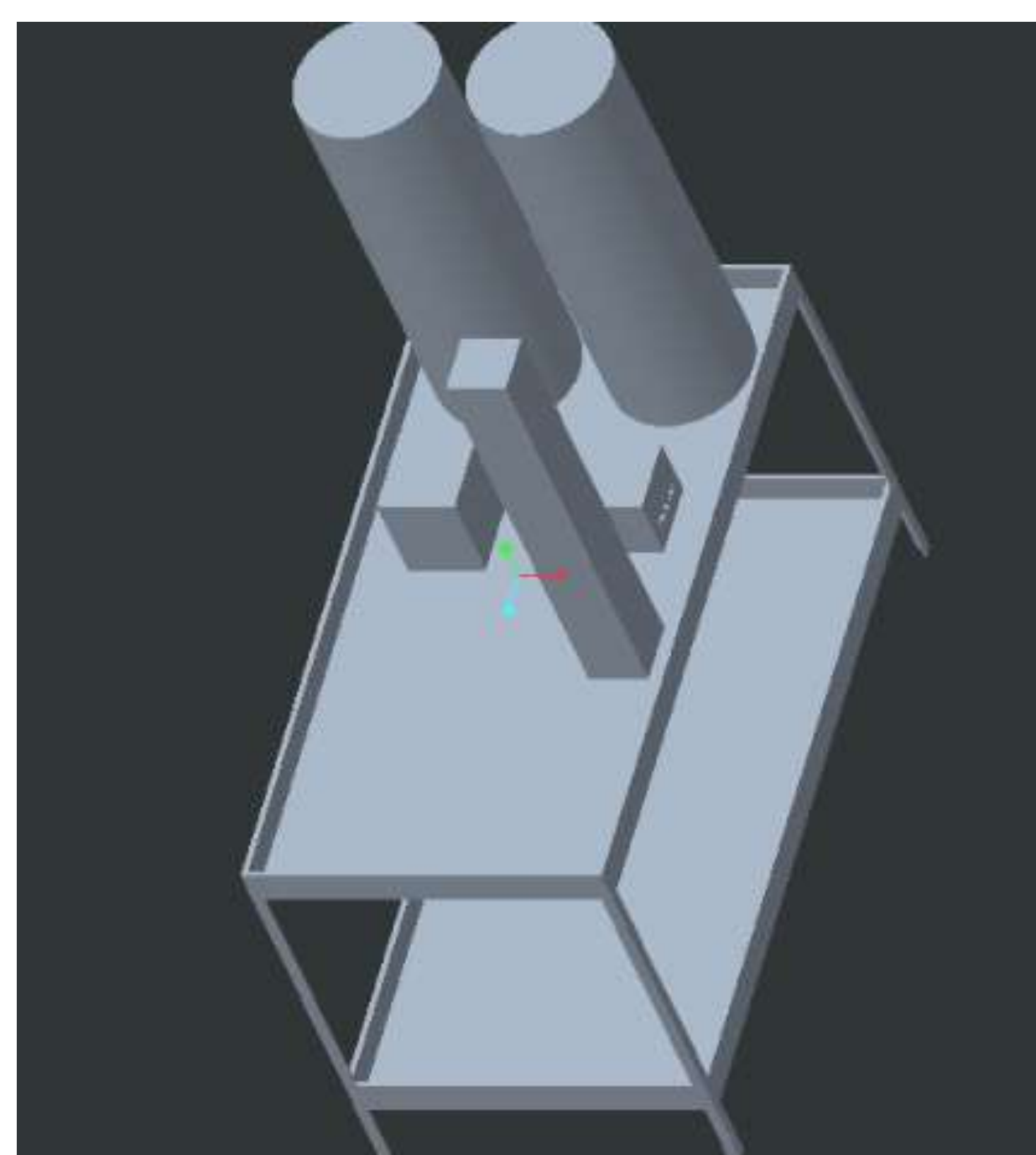
- Epoxies are used to encapsulate Smith Systems sensor products. Dispensing the epoxy's two components (resin and catalyst) is a time-consuming process. Commercially purchased dispensers have been unreliable/difficult to maintain and are currently offline. Smith Systems seeks creative solutions to develop an epoxy dispenser system, including possible reuse or redesign of other equipment

REQUIREMENTS

| # | Description |
|---|---|
| 1 | Temperature control to keep the resin between 120-150°F |
| 2 | Valve seals need to be able to withstand highly corrosive materials |
| 3 | Motor with high speed and torque of at least 1800 RPM and 500 in-lb |
| 4 | Maintenance routine to disassemble, repair/replace and clean in less than an hour |
| 5 | Provide adjustable epoxy shot sizes |

CONCEPTS

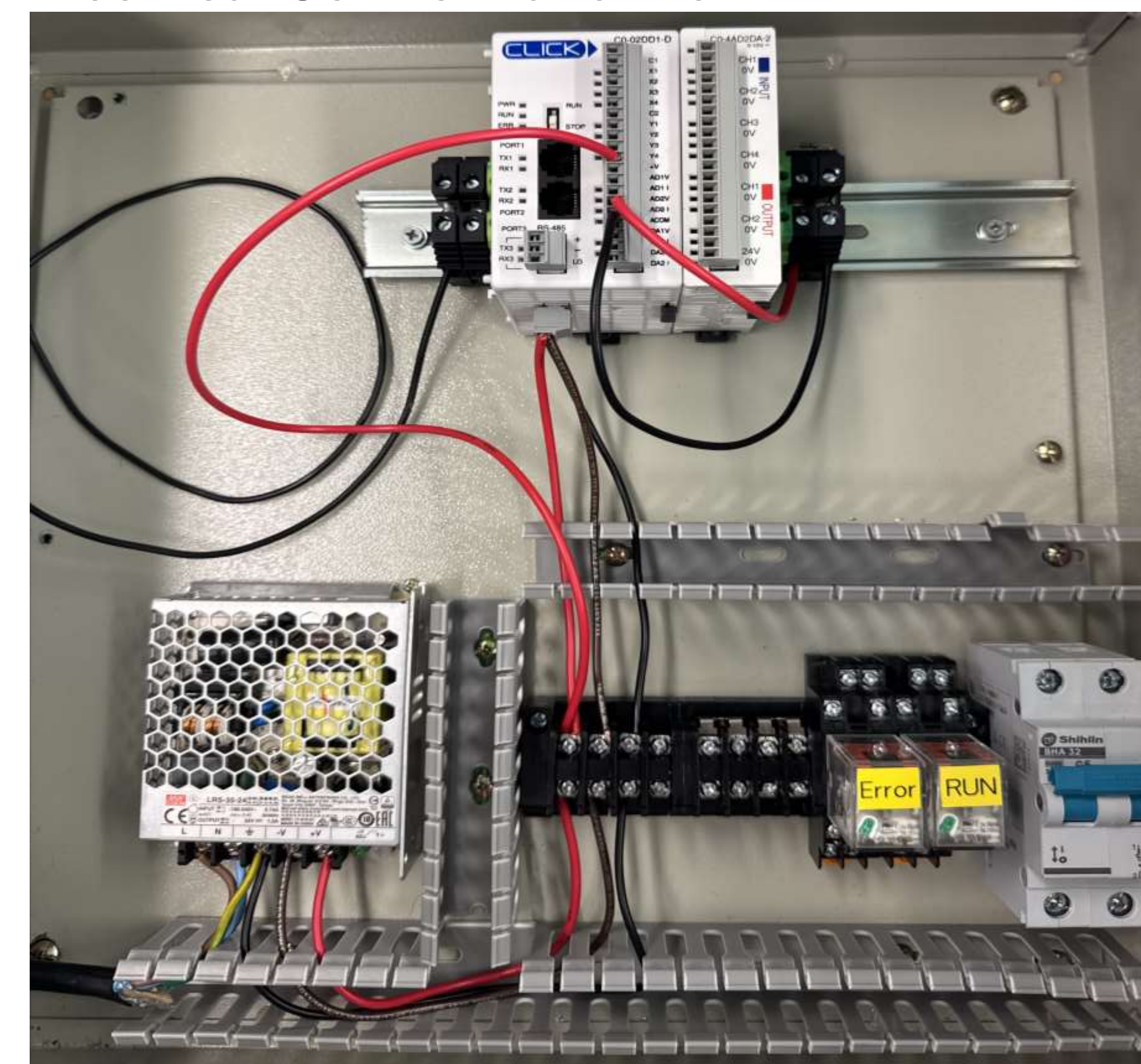
- Initial layout was on a larger cart
 - Takes up 60"x30"
- Researched non-corrosive materials



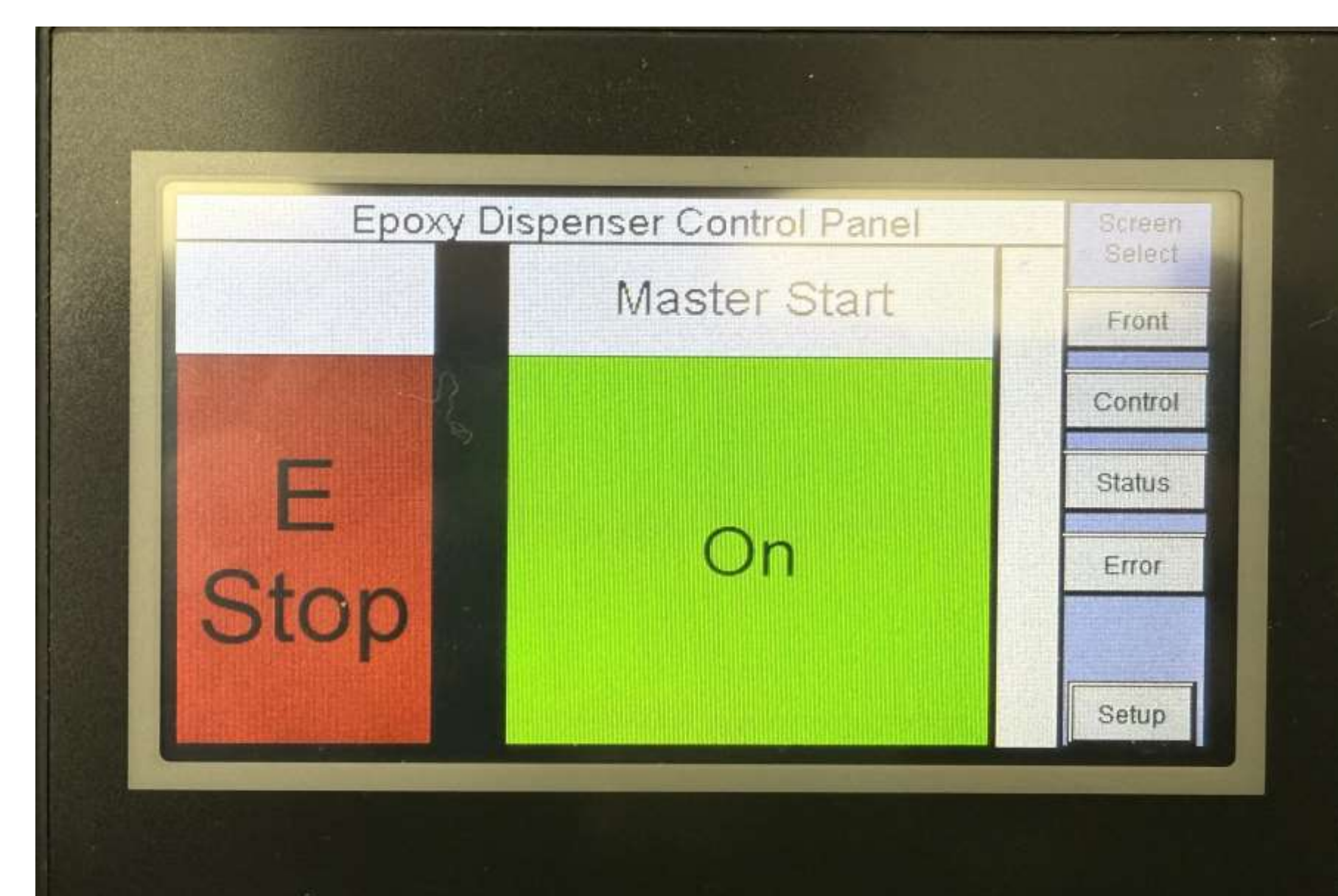
FINAL DESIGN, APPROACH, PLAN

- Non-corrosive seals: Viton
- Pump: more efficient and easier to clean than piston
- Cart is 31"x 18"
- Higher torque motor for stirring
- Click PLC to control the pumps and motor
- 24V power supply

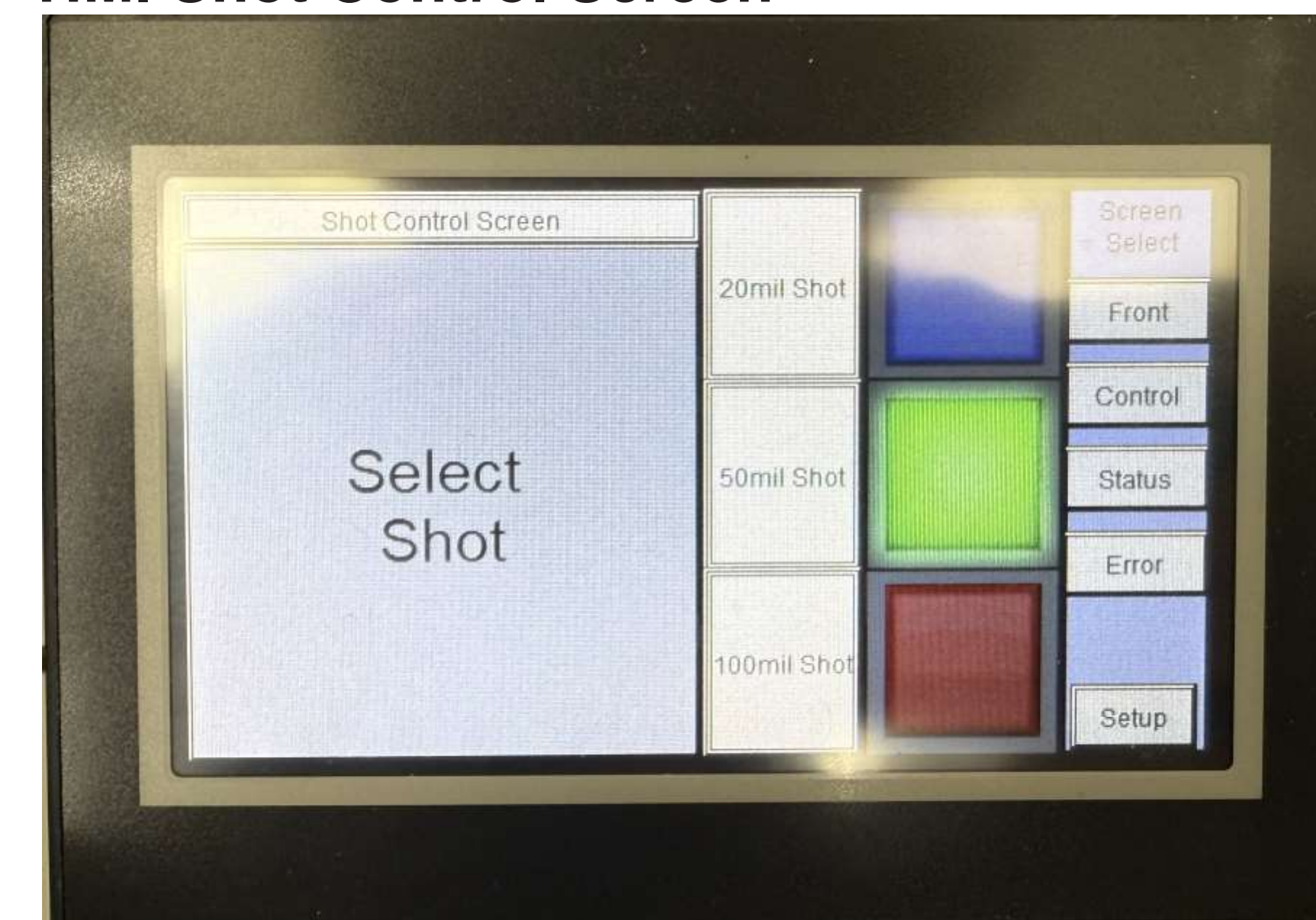
Electrical Control Panel Box



HMI Front Panel Screen



HMI Shot Control Screen



RESULTS

- Tanks for holding the resin/catalyst
- Cart to allow the dispenser to be mobile
- Tubing that is easy to connect/disconnect for cleaning
- Pumps to get the fluid from the tanks to the nozzle
- PLC to supply power/control the system
- HMI to select shot sizes, have visual feedback, and stop the system in case of emergency

Individual Parts On Cart



Last Minute Touch Ups

Team 24 still has some assembling left to do before the project is ready for use at Smith Systems, Inc. The pictures shown above are the pre-assembled project as 3-D printed parts are still in progress.

Waiting on these parts has delayed the wiring of some of the components in the control panel box. All the parts need to be assembled before cutting wires to prevent loose wires.

SUMMARY AND CONCLUSIONS

Team 24 decided to switch up the design that Smith Systems, Inc. was originally using. There were too many moving parts with a piston driven system, and this required the containers to be pressurized. Changing the system to a pump driven system will allow for Smith Systems, Inc. to dispense the epoxy quietly and efficiently. Team 24 also used an HMI so that the operator will have visual feedback of the system.

- Pumps have parts that are easy to replace in case of them breaking/failing.
- No air compressor needed to run the system anymore.
- Upgraded stirring motor for the resin.
- Variable shot sizes, selectable on the HMI.

FUTURE WORK

Since team 24 cannot handle the corrosive materials on campus, the timing for each shot size will be different. This means that Smith Systems, Inc. will have to go and fine tune the timing to get their desired shot sizes. Team 24 has designed the code in a way that will make it very easy for the company to change the timing

TEAM & ACKNOWLEDGEMENTS

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