Team 04: Foam Buddy

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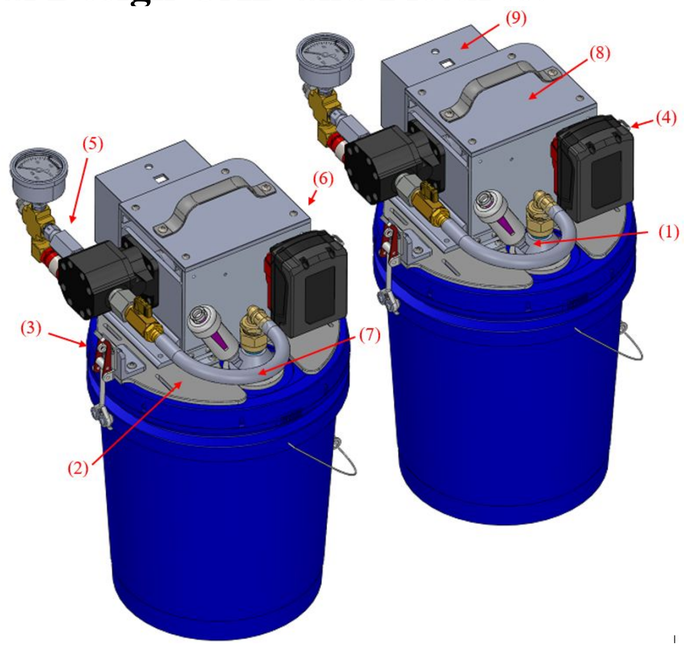
Problem Statement/Objective:

Two-component foams are used in a variety of applications such as insulation and joint filling. The cost to perform small scale jobs with these foams is high when compared to the relative cost of a larger job. A lack of portable dispensing systems as well as high power and pressure requirements for some applications exacerbates this problem and often contractors are forced to use large truck-mounted spray systems or expensive single use froth packs for small jobs. The goal of the Foam Buddy is to serve as a low-cost, portable foam insulation machine that increases the ability of users to tackle small scale jobs.

Key Specifications:

- Adjustable output ratio
- Volumetric output of 0.25-0.65 gpm per side
- Weight of less than 50 pounds
- Cost of less than $2000
- Powered by rechargeable tool battery
- Device should last the duration of emptying two 5-gallon pails of material
- Device must communicate the state of pressure in each line
- Each line must have pressure sensing feedback to shut off the motors at a defined pressure setpoint

Final Design CAD and Pictures:



1) Dip Tube Holder Subassembly
2) Baseplate Subassembly
3) Clamp Assembly
4) Battery Subassembly
5) Output Side Fitting Subassembly
6) Motor Controller
7) Input Side Fitting Subassembly
8) Mechanical Cover
9) Control Box

Final Picture:

Prototyping Phases:

Phase 1:
- Component testing
- Pump water
- Prove out circuit logic


Phase 2:
- Full prototype
- Two sides mirror each other
- Connector between buckets
- Pressure switches in series
- A-side disconnect

Phase 3:
- Single device repeated side-by-side
- 2 independent devices in order to use digital pressure switches
- Two batteries
- Met all specifications



Testing Conducted:

- Volumetric output
- Battery Life
- Instant spray caused by backpressure
- Weight of the machine
- Pressure sensing verification
- Dip tube connector vacuum seal
- User manual and troubleshooting guide assessment