P15318 – Gaseous Mass Flow Rate Controller
Last Revision – 5/16/15

Action Plans for Unmet Engineering Requirements:

Requirements Not Met:

Leak Rate of Device
- Look into a different valve design, as the current design will not allow for appropriate sealing and ease of actuator movement.

Production Cost
- Research more into the mass production cost of all parts to see if the production unit cost is actually over the $100 budget.
- Design the distribution plate with less complex geometries so that the machining cost would be significantly less.
- Look into cheaper sensors that can accomplish the same task.

Response Time
- Optimize the control algorithm by removing floating point math.
- Optimize code structure by minimizing amount of code in blocking functions (i.e. interrupts).
- Investigate alternative methods of control such as PI/PID.

Requirements Marginally Met

Accuracy of Mass Flow Rate Control
- Get a mass flow meter to accurately measure the mass flow coming from the device.
- Use pressure and temperature sensor readings to compensate mass flow rate.
- Determine reason for lower accuracy at higher positions.

Operating Voltage
- Find a new H-bridge that does not have a 2V offset.
- If not possible, find one that minimizes this offset or look into alternative control hardware

Dynamic Range
- Make a disk that has sharp points at the ends of the slot cut into it (wire EDM); the current disk slot was ground, which left rounded points at the ends.
- If moving forward with the cam and ball design, determine the parameters needed to get a dynamic range of 100:1 (ball size, cam profile, etc.)

Size Envelope of Production Unit
- Look and see if there are smaller components that can accomplish the same task.

- Since the current valve design is not going to be used, see if the metric for size envelope is even feasible using a new valve design.

Total Weight of Production Unit

- The production unit will have a slot cut into the housing that the PCB will be mounted in, which will reduce the weight of the overall prototype.