

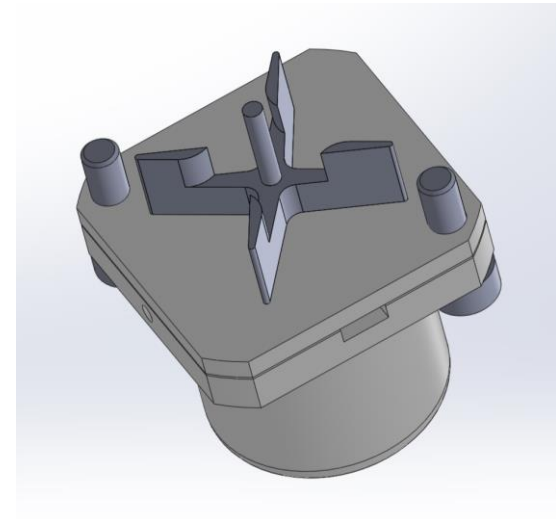
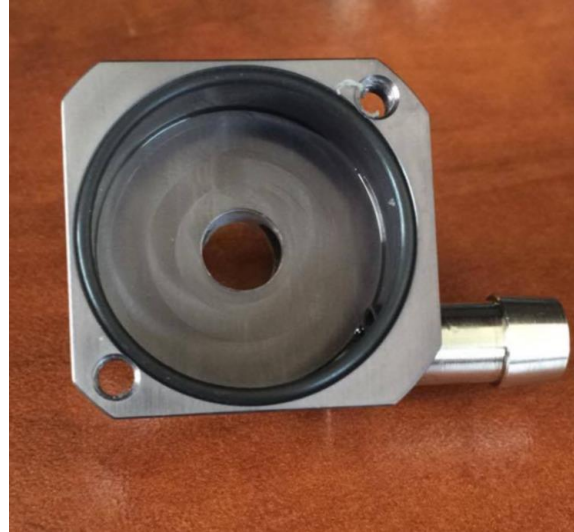
Update

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July 10, 2017

Pump Modeling

- Finished modeling inner components
- Starting simulations
- Finding correct sized o-ring



Controls

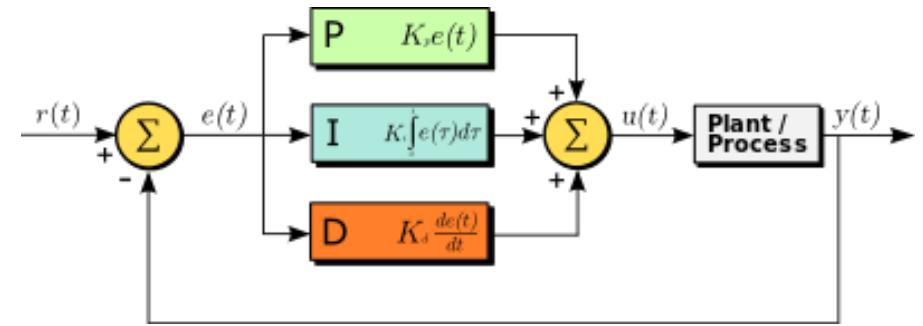
- General Overview:
 - Sensor input
 - Sensor data combination
 - Closed loop control
 - Pump mapping
 - Pump output
- Kalman Filter
- PID control

Kalman Filter

- Combines information from many sensors
- Weighs their effect base on the accuracy of the sensor
 - Does this using a Kalman gain function which is optimized to minimize the error
- Provides estimate of it current state and prediction of its future state

PID Control

- Used to minimize error between a setpoint and a measured value
- Corrects the error using proportional, integral, and derivative terms
- Outputs a command which will reduce the error



Arduino UNO

- Set up basic motor controls
 - Start, stop and direction changes
- Attempting to create PID control using DC motor and temperature sensor