Team Influunt Presents:
Fluidra's Particle Measurement Test System for Pool Filtration

INFLUUNT

FLUIDRA

SAN DIEGO STATE UNIVERSITY

Project Objective

Fluidra wants to be able to test the effectiveness of their pool filters in order to understand them better so they can better inform their customers. Fluidra requires a system that is capable of measuring and counting particles passing through their filtration devices, capture flow rate, temperature, pressure, water line velocity, and NTU (turbidity). System must be able to interface between 2 water tanks. This will allow Fluidra to understand:

• How particle size and quantity affects the turbidity of the water
• How particle size affects the effectiveness of the sand, cartridge, and diatomaceous earth filters
• The effectiveness and pressure loss changes as the filters become dirty
• How flow rate and velocity affect filter performance
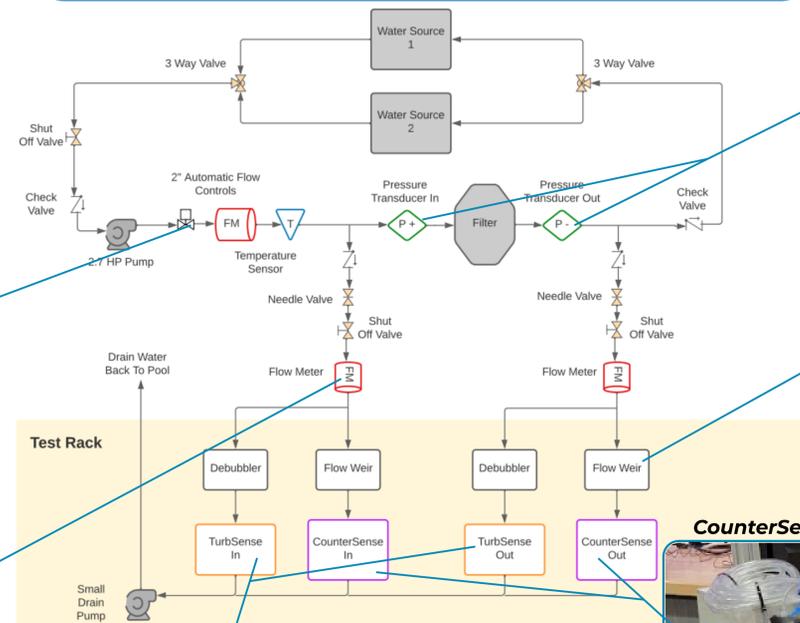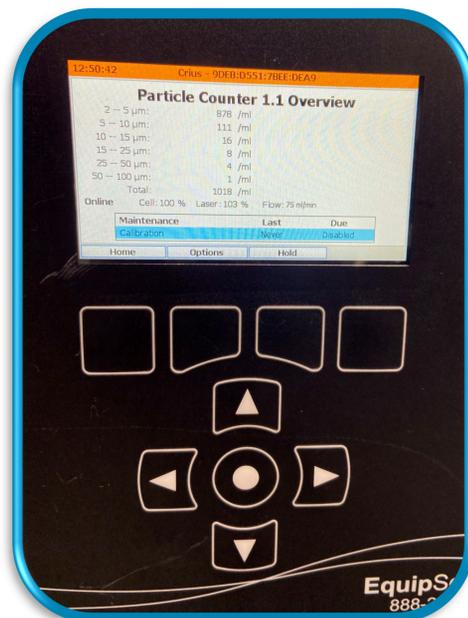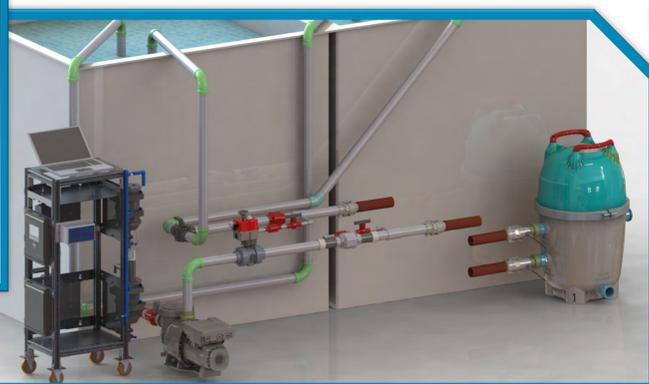
System Description

The proposed test rig will allow the operator to read flow rate, temperature, the differential pressure between the filter's input and output, and particle count and size. In order to capture data in real-time, the test rig must be operational at all times.

The operator will be capable of: regulating the flow rate of the system, reading the temperature, pressure, and particle size/count through a computer GUI. The filter evaluation test rig measures incoming and outgoing particle size and count using methods such as light blockage and laser diffraction

The plumbing design will consist of a system that pumps water flow into a mainline that inputs into the filter and then outputs back into the water tank. At the input and output of the filter, the water flow will be split into a separate path with a controlled flow rate area where particle size and quantity will be determined using either single or multiple particle analyzers.

A microcontroller will be used to interpret real-time data into graphs. A secondary feature of the system will be comparing various flow rates through the filters by controlling the pump's output and/or through the use of valves. The client has requested that all data acquisition be presented in a clean and easy-to-read program for the user in real time.

The TEAM

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Testing and Results

System Level Diagram

Electric Valve

Flow Meter

Pressure Transducer

Flow Weir

CounterSense

TurbSense

Theoretical(CAD)

Actual(Physical Build)

System Specs

Range of Particles	2-127 Microns
Max Flow Rate (@ 3450 RPM)	112 GPM
Able to divert flow intake from 2 different Pool tanks	
Additional Particle Analyzer Option is Viable	
Pump/Valve Controlled by Arduino/GUI	

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