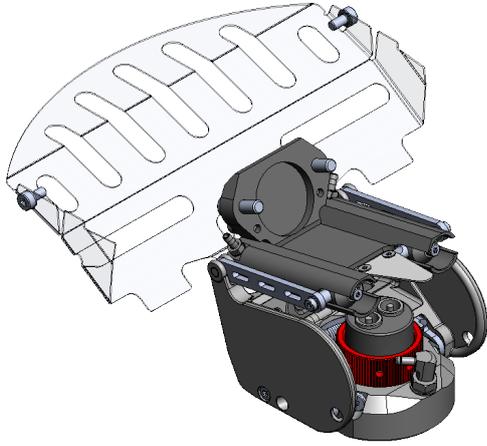


Smart Pump

The Smart Pump project was created to facilitate the work of a tank system inspector. The robot, made by Waygate Technologies Robotics, has a probe holder with an ultrasonic sensor that can be adjusted in height with a pump and retracted with a cylinder.



Probe holder
(source: Waygate Technologies Robotics)



Smart pump
(source: Waygate Technologies Robotics)

Introduction

The pump can only be controlled via a potentiometer and only receives feedback about the position of the probe holder through the signal of the sensor. In addition, it can happen that there is a difference in height between the pump and the robot, which presses the probe holder down through the water column in the hose. The customer now wants a software-controlled pump with a flow a pressure control system to regulate the sensor position.

Components

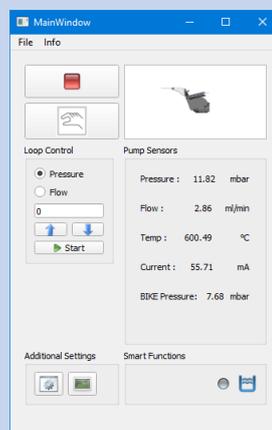
Inside the smart pump a control printed circuit board (PCB) is placed behind the front panel. A gear pump transports the water. Two valves are used to switch flow directions. A flow and a pressure sensor are included and provide information about the hydraulic system. At the front panel a potentiometer and a button allow manual control without software. An external sensor connector allows a sensor feedback for the control system.

Results

The implemented controller works in flow or pressure control mode and reaches the target value within 6 s and with a accuracy of 10 % without disturbance. There are problems with disturbances at higher or lower positions.

Software

The software has a manual control mode and a loop control mode. In the manual control mode the flow can be increased or decreased. In the loop control mode it can be chosen between flow and pressure control. If the reference value is entered and the start button pressed, the controller follows the reference value. If the pump is connected the sensor values are displayed in the software.



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