Micropump Module

Micropump Testing Protocol – 15 Pts

ID: MTD-1

Due Date: 04/06/2020 11:59 PM, Canvas Upload

Prototyping Protocol: – (Prototyping Protocol: PP-1)

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Protocol Description – (Micropump Testing Protocol)

This protocol outlines the steps necessary to test the micropump along with the newly designed and printed PCB board shield. Following the successful assembly of the PCB board, attach it to the top of the Arduino. Assemble the pump and connect the pump to the PCB board. Once the assembly is complete, upload the finished Arduino code. Turn on the pump to make sure it is connected properly and functions correctly. Have a container of water nearby to test to see if the pump can transfer water. If successful, change the flow rate parameter of the motor through the user interface. Once changed, test to see if the motor spins faster/slower and water is transferred quicker/slower.

Tools and Equipment

ID	Tool	Name / # if applicable	Location	Purpose
TE1	Computer	Mac Book	N/A	Design and create parts; Upload code to Arduino and change the pump flow rate
TE2	PCB Circuit Software	Eagle	N/A	PCB board-specific software
TE3	Soldering Kit	Elenco Deluxe	Design Lab	To solder required electronics of the circuit to the board
TE4	Arduino Uno	Arduino Uno	Design Lab	To run the circuit
TE5	Digital Multimeter	Digital Multimeter	Design Lab	To test if voltage is flowing through the components

TE6	Arduino IDE Software	Software	Design Lab	Create code to test pump and user interface

Materials

ID	Material	Purpose
MAT1	Fiberglass	Create PCB board
MAT2	Epoxy Resin	Create PCB board
MAT3	Copper foil/plate	Create PCB board
MAT4	Wires	Circuit Assembly
MAT5	Resistors	Circuit Assembly
MAT6	Capacitor	Circuit Assembly
MAT7	LED	Circuit Assembly
MAT8	Button	Circuit Assembly
MAT9	Stepper Motor Driver	Circuit Assembly
MAT10	Stepper Motor	Pump Assembly
MAT11	Pump Housing	Pump Assembly
MAT12	Pump Rotor	Pump Assembly
MAT13	Bearings	Pump Assembly
MAT14	Screws	Pump Assembly
MAT15	Nuts	Pump Assembly
MAT16	Washers	Pump Assembly
MAT17	Tubing	Pump Assembly

Micropump – Mechanical Testing Protocol

Compliance Testing

Testing PCB after printed to determine connection continuity using multimeter

ID	Board to Component	Pass/Fail
CT1	LED	Pass
CT2	Pump	Pass
CT3	Arduino	Pass
CT4	Button	Pass

To test the pump, add water to the tube and turn on the pump. If the pump properly extrudes the water, then it passes.

Pass or Fail:_____

Values to be Recorded

Test the pump at different speeds using the user interface. If the pump properly extrudes the water at different flow rates, then the pump passes

ID	Flow Rate (mL/s)	Pass or Fail
ST1	0.3	Pass
ST2	0.6	Pass
ST3	0.1	Pass

Notes