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| --- | --- |
| **Arduino**  **Testing Protocol – 30 Pts** | **ID: TP-1** |
| **Due Date: 4/6/2020 11:59 PM, Canvas Upload** |  |

**Testing Protocol: – (Testing Protocol 1)**

**Date Written –** 4/6/2020

**Date Revised –** 4/6/2020

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**Protocol Description – (Testing Protocol 1)**

This protocol describes the process of testing the newly created Matlab GUI or a prototype peristalsis pump to deliver pulses of fluid to cells in an incubator. This GUI allows for the user to set the Flowrate and Tube Diameter values and then begin pumping the motor. The GUI shall be able to pass all the tests stated.

**Tools and Equipment**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **ID** | **Tool** | **Name / # if applicable** | **Location** | **Purpose** |
| PT1 | Microcontroller Board | Arduino Uno | N/A | Pump control |
| PT2 | Stepper motor | P/N  17HS15-1504S-X1  S/N 190625000583 | N/A | Rotate pump head |
| PT3 | Stepper motor driver | A4988 Stepper Motor Driver | N/A | Connect stepper motor to PT1 |
| PT4 | Pump head | N/A | N/A | Push fluid through tube |
| PT5 | Pump casing | N/A | N/A | Supports the Pump head as the fluid is pushed through |
| PT6 | Laptop/Desktop | N/A | N/A | Run MATLAB |

**Materials**

|  |  |  |
| --- | --- | --- |
| **ID** | **Material** | **Purpose** |
| PM1 | Resistors | Prototyping circuit |
| PM2 | Capacitors | Prototyping circuit |
| PM3 | Wires | Prototyping circuit |
| PM4 | Breadboard | Prototyping circuit |
| PM5 | Tubing | Carries fluid through pump |
| PT6 | Fasteners and washers | Pump assembly |

**Machine Settings – Machine / Test Name and settings needed to perform test**

|  |  |  |  |
| --- | --- | --- | --- |
| **#** | **Setting** | **Value** | **Units** |
| MS1 | Motor Speed Test 1 | 5 | RPM |
| MS2 | Motor Speed Test 2 | 7 | RPM |
| MS3 | Motor Speed Test 3 | 10 | RPM |

**Values to be Recorded**

|  |  |  |  |
| --- | --- | --- | --- |
| **#** | **Test 1** | **Test 2** | **Test 3** |
| VR1 | Display initial test Flow Rate entered by user | Display second test Flow Rate entered by user | Display third test Flow Rate entered by user |
| VR2 | Display initial test Tube Diameter entered by user | Display second test Tube Diameter entered by user | Display third test Tube Diameter entered by user |
| VR3 | Display calculated Stepper Delay for the initial test | Display calculated Stepper Delay for the second test | Display calculated Stepper Delay for the third test |

**NOTES:**