THE UNIVERSITY OF TEXAS AT ARLINGTON

COMPUTER SCIENCE AND ENGINEERING

MECHATRONICS

LAB 1 REPORT

**ELECTROMECHANICAL SYSTEMS & SENSORS**

Submitted toward the partial completion of the requirements for CSE 5355-001

**Submitted by,**

Servando Olvera &

Jennifer Hernandez

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4. When the power is removed from the coil, the cathode in the neon tube is the one that glows. When reversing the power, the cathode still glows relative to the new polarity.

6. Oscilloscope armed for a single capture. Voltage measurements after powering and un-powering the solenoid.

A screen with colorful lines on it

Description automatically generated🡪 only pic I had…

7. When the solenoid plunger is in the lower position, the green switch is pressed and the GREEN wire will read 12V and when it is released, it will be 0V.

|  |  |
| --- | --- |
| Pressed | Released |
|  |  |

8. When the solenoid plunger is in the upper position, the blue switch is pressed and the BLUE wire will read 12V and when it is released, it will be 0V.

|  |  |
| --- | --- |
| Pressed | Released |
| MISSING PIC!  I CANNOT FIND IT. I SWEAR WE TOOK THIS DAMN PIC |  |

10. Only measuring across coil

|  |  |
| --- | --- |
| Circuit | Reading |
| *Pic* | *pic* |

Voltage spike amplitude: -344 V

Time until solenoid fully releases: 109 ms

Spike to lower limit: 101 ms

Spike to upper limit: 37 ms

11. Introduced the1N5819 Schottky diode (flyback diode) across the coil.

|  |  |
| --- | --- |
| Circuit | Reading |
| *Pic* | *pic* |

Voltage spike amplitude: -6.1 V

Time until solenoid fully releases: 441 ms

Spike to lower limit: 379 ms

Spike to upper limit: 278 ms

12. Introduced 2 different voltage zener diodes in series with the 1N5819 diode across the coil.

|  |  |
| --- | --- |
| Circuit | Reading |
| *Pic* | *pic* |

Voltage spike amplitude: -2.72 V

Time until solenoid fully releases: 392 ms

Spike to lower limit: 310 ms

Spike to upper limit: 204 ms

* Negative voltage spike was further reduced with the introduction of the two zener diodes, and the timing for the solenoid to fully released was slightly shortened. The same can be said for the timing on both lower and upper limits.

15.

16.