|  |  |  |  |
| --- | --- | --- | --- |
| **Course Name:** | **Virtual Instrumentation and Automation lab** | **Semester:** | **V** |
| **Date of Performance:** | **13/10/2021** | **Batch No:** | **B1** |
| **Faculty Name:** |  | **Roll No:** | **1912052** |
| **Faculty Sign & Date:** |  | **Grade/Marks:** |  |

**Experiment No: 7**

**Title: Simulation of Single and double acting cylinder in Pneumatic system**

|  |
| --- |
| **Aim and Objective of the Experiment:** |
| Simulation of Single and double acting cylinder in Pneumatic system |

|  |
| --- |
| **COs to be achieved:** |
| CO4: Interface PLC using proper communication device |

|  |
| --- |
| **Theory:**  Pneumatic systems used in industry are commonly powered by compressed air or compressed inert gases. A centrally located and electrically-powered compressor powers cylinders, air motors, pneumatic actuators, and other pneumatic devices. A pneumatic system controlled through manual or automatic solenoid valves is selected when it provides a lower cost, more flexible, or safer alternative to electric motors, and hydraulic actuators.  Pneumatic systems in fixed installations, such as factories, use compressed air because a sustainable supply can be made by compressing atmospheric air. The air usually has moisture removed, and a small quantity of oil is added at the compressor to prevent corrosion and lubricate mechanical components.  Factory-plumbed pneumatic-power users need not worry about poisonous leakage, as the gas is usually just air. Smaller or stand-alone systems can use other compressed gases that present an asphyxiation hazard, such as nitrogen—often referred to as OFN (oxygen-free nitrogen) when supplied in cylinders.  Any compressed gas other than air is an asphyxiation hazard—including nitrogen, which makes up 78% of air. Compressed oxygen (approx. 21% of air) would not asphyxiate, but is not used in pneumatically-powered devices because it is a fire hazard, more expensive, and offers no performance advantage over air.  Portable pneumatic tools and small vehicles, such as Robot Wars machines and other hobbyist applications are often powered by compressed carbon dioxide, because containers designed to hold it such as soda stream canisters and fire extinguishers are readily available, and the phase change between liquid and gas makes it possible to obtain a larger volume of compressed gas from a lighter container than compressed air requires. Carbon dioxide is an asphyxiant and can be a freezing hazard if vented improperly. |

|  |
| --- |
| **Circuit Diagram/ Block Diagram:** |
| Parts (Bottom to up) :  1.Air Compressor  2. Air Service unit  3. 4/2 Directional Valve  4. Flow control valve(Forward and reverse path)  5. Double acting cylinder    Parts (Right) :  1.Air Compressor  2. ASU  3. 3/2 DCV  4. FCV  5. Single acting spring return cylinder  Parts(left)  1.Air Compressor  2. ASU  3. 3/2 DCV  4. FCV (Forward and reverse path)  5. Double acting cylinder  Task: Observe the flow in FCV change the setting and observe for different values in FCV for forward and reverse path both) |

|  |
| --- |
| **Post Lab Subjective/Objective type Questions:**  **Give application and details of following valves :**   1. **Quick exhaust valve**   In a typical application, the exhaust valve is installed in the inlet of a spring return or double acting pneumatic cylinder. Supply air from a control valve is directed into the inlet port of the exhaust valve   1. **Flow control valve**   System operators can use a flow control valve to rapidly depressurize a serviceable hose and change fittings quickly. They are also used in many consumer applications such as showers, faucets, and lawn watering systems to easily reduce the amount of water consumed without impacting the overall system performance   1. **Directional control valve**   Directional control valves allow fluids or gases to flow into different paths from valve ports, which provide a passageway for flow to or from other components/sources. They are one of the most important parts of hydraulic and pneumatic systems. |
| **Conclusion:**  We implemented a single and double acting cylinder pneumatic system on fluidsim and checked for both the conditions, the desired output was obtained and completed successfully**.** |

|  |
| --- |
| **Signature of faculty in-charge with Date:** |