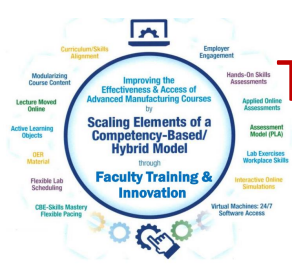




Virtual Machines & Simulations to Accelerate Student Learning

Presented by:

Tom Wylie, Northwest State CC
Archbold, OH



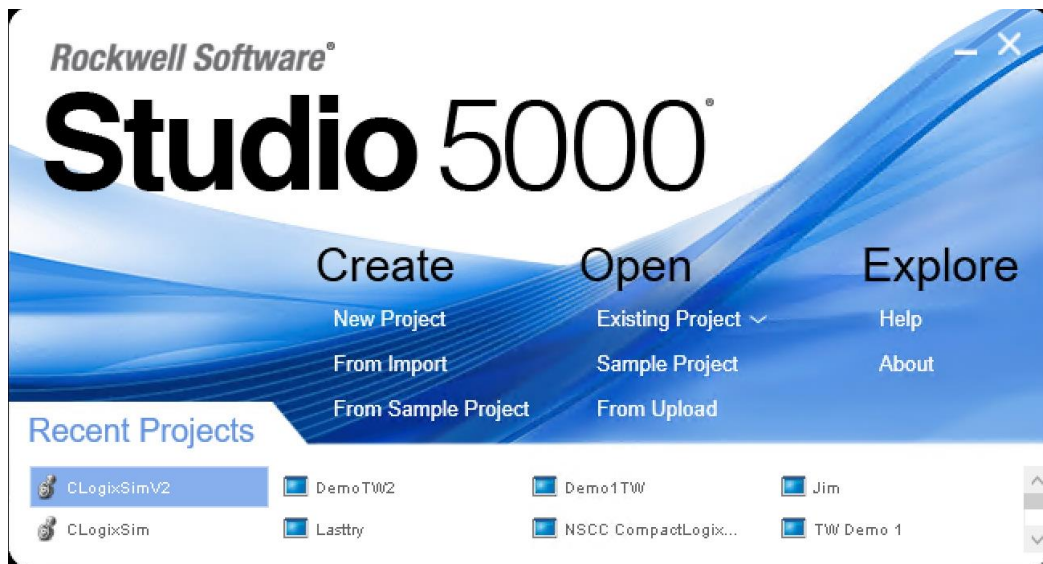
The purpose of the Scaling Elements (NSF) grant is to assist/mentor Faculty to improve their courses by implementing/enhancing elements used in successful competency based instructional models (listed outside the circle in the graphic below).





Purpose of a Virtual Machine (Computer)?

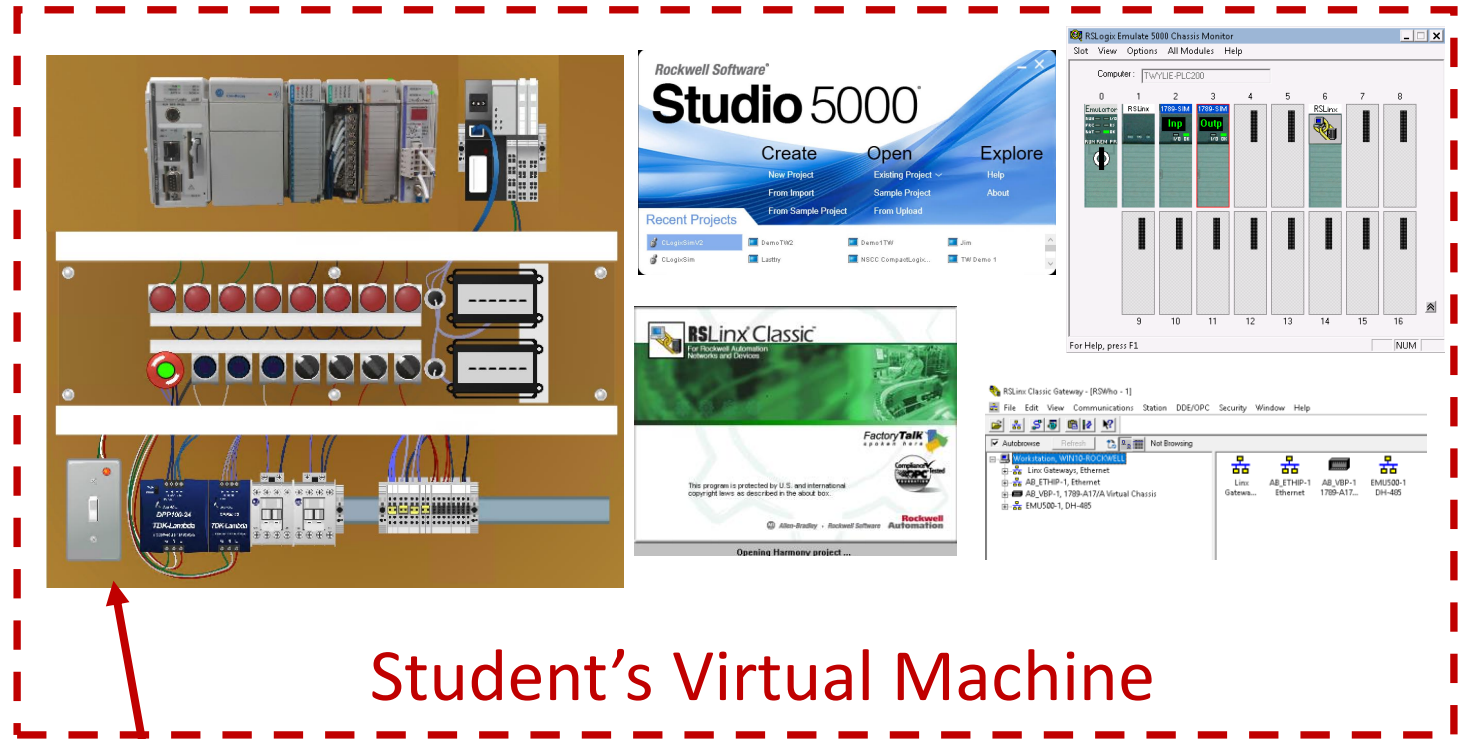
- Give students 24/7 access to Software
- Give students 24/7 access to Simulations



PLC Lab on campus



The content of the virtual machine will have all of the same functionality as being in the PLC Lab



Student's Virtual Machine



Virtual PLC Simulator

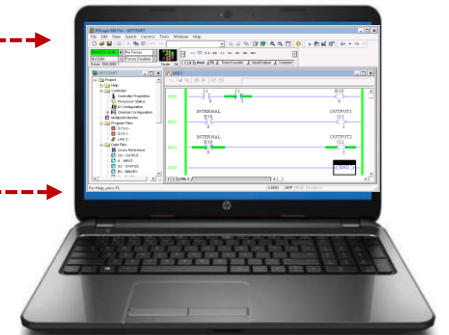
College Firewall

Internet

Student Computer at Home



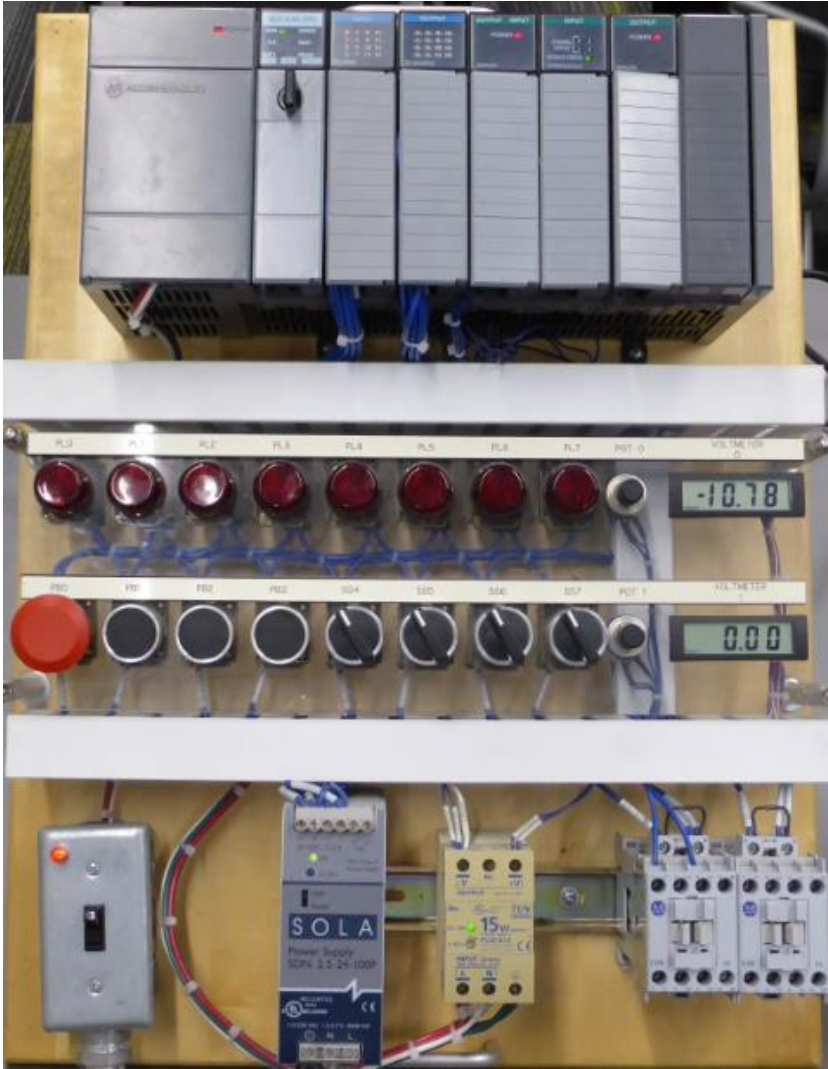
Wireless Router (Home)



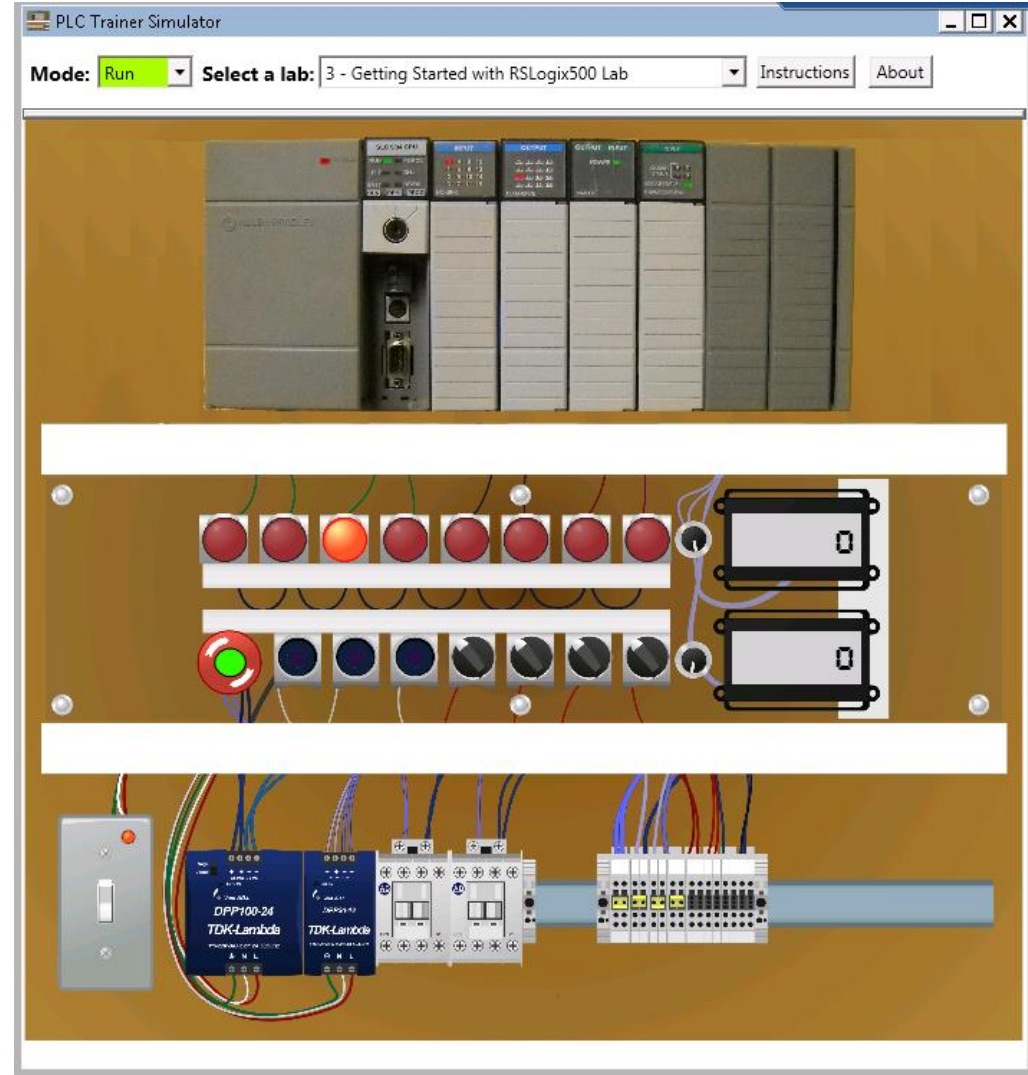


The Virtual PLC Simulator created to replicate the functionality of the SLC-500 training unit.

Hardware Simulator



Virtual Simulator



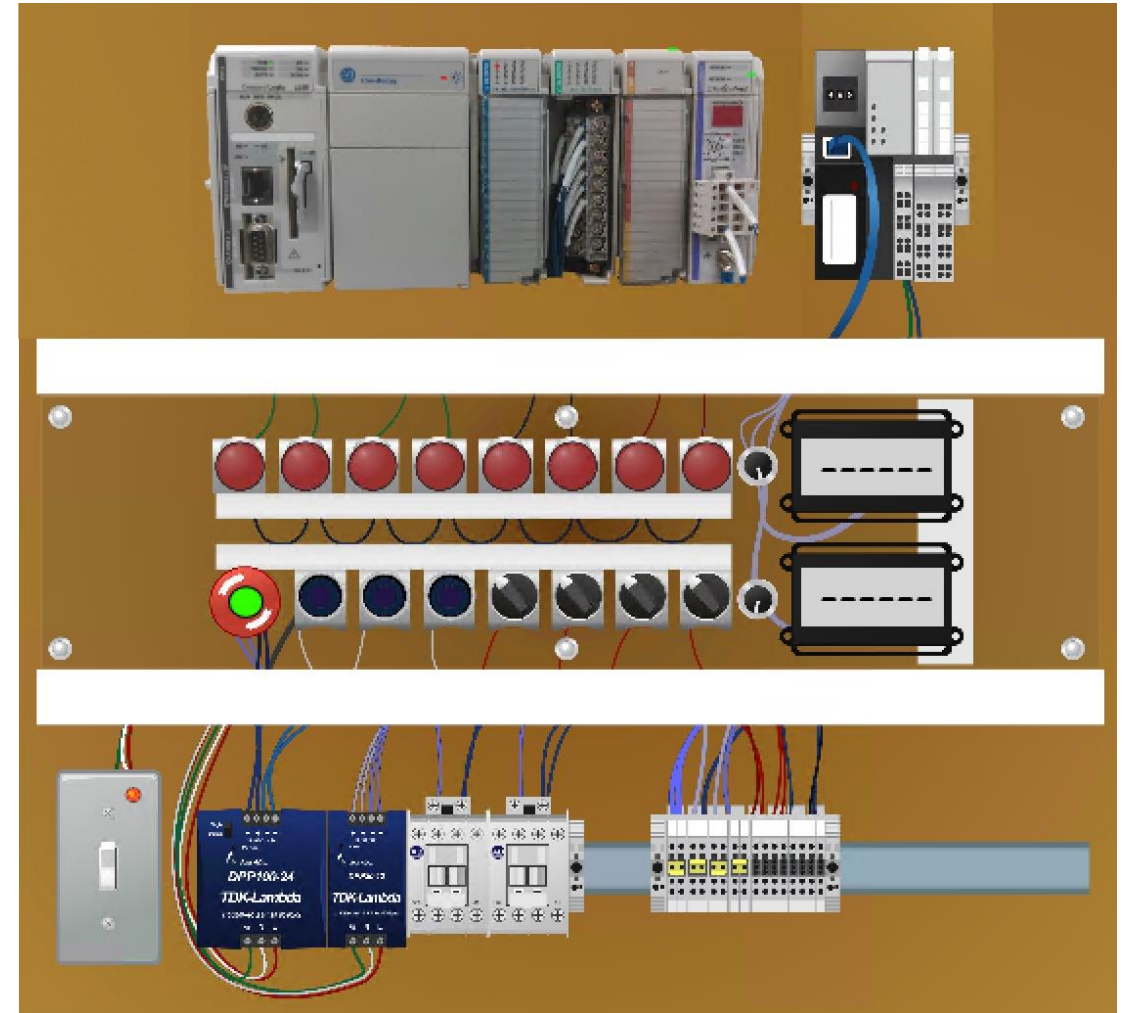


The Virtual PLC Simulator created to replicate the functionality of the CompactLogix training unit.

Hardware Simulator



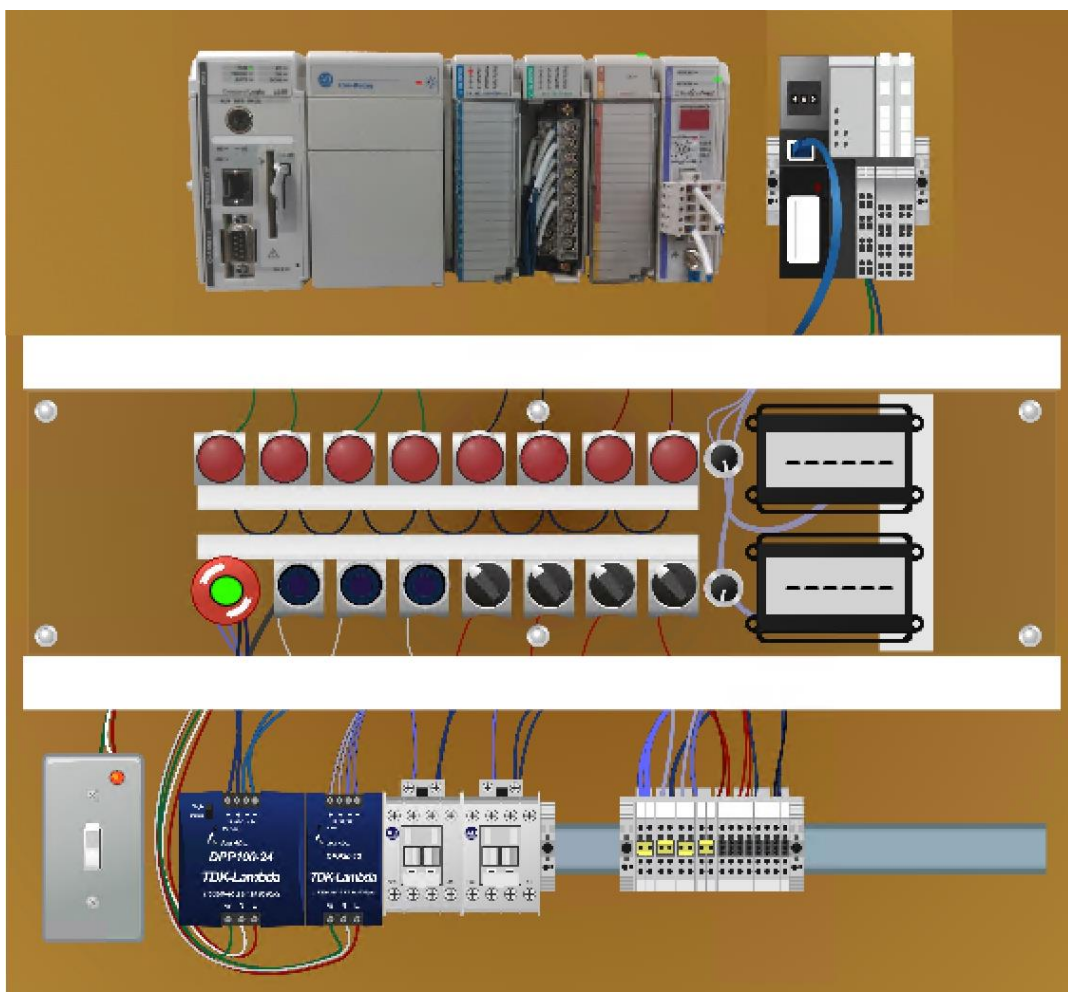
Virtual Simulator



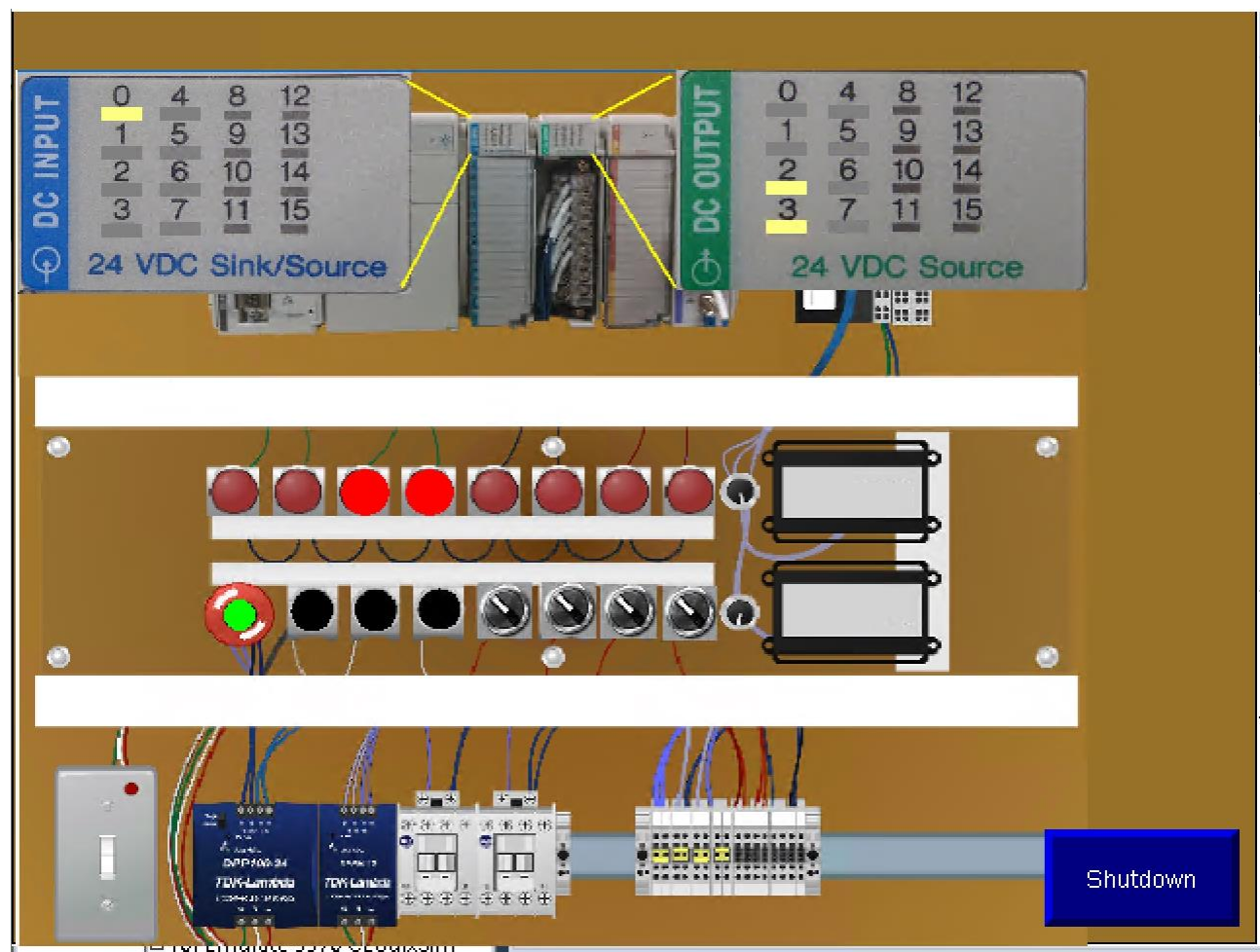


The Virtual PLC Simulator, enhanced with Factory Talk View Studio, which will allow the unit to communicate with the Studio 5000 Emulator with FactoryTalk Linx. This will allow students to run their programs on the simulator that were created in Studio 5000

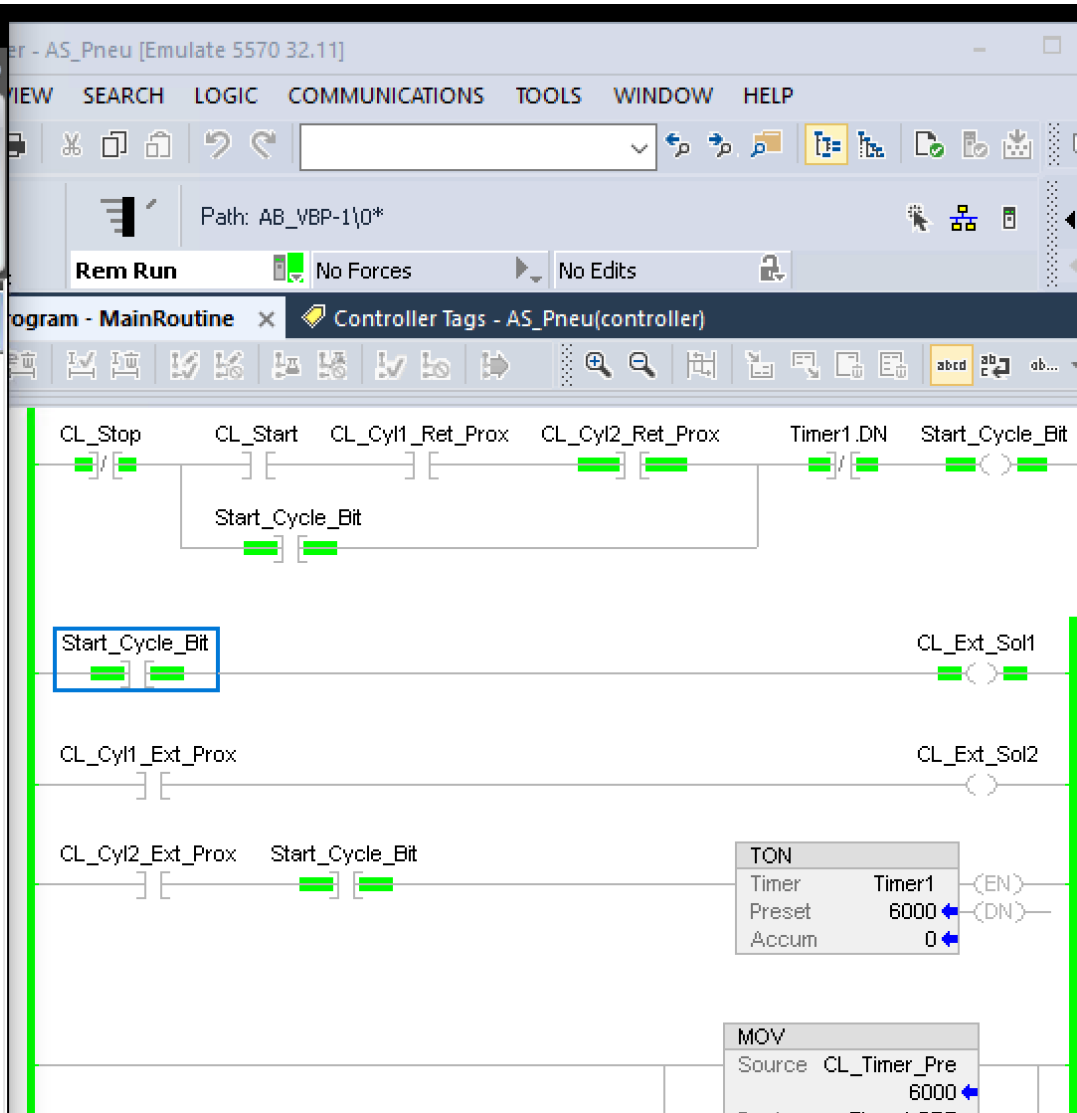
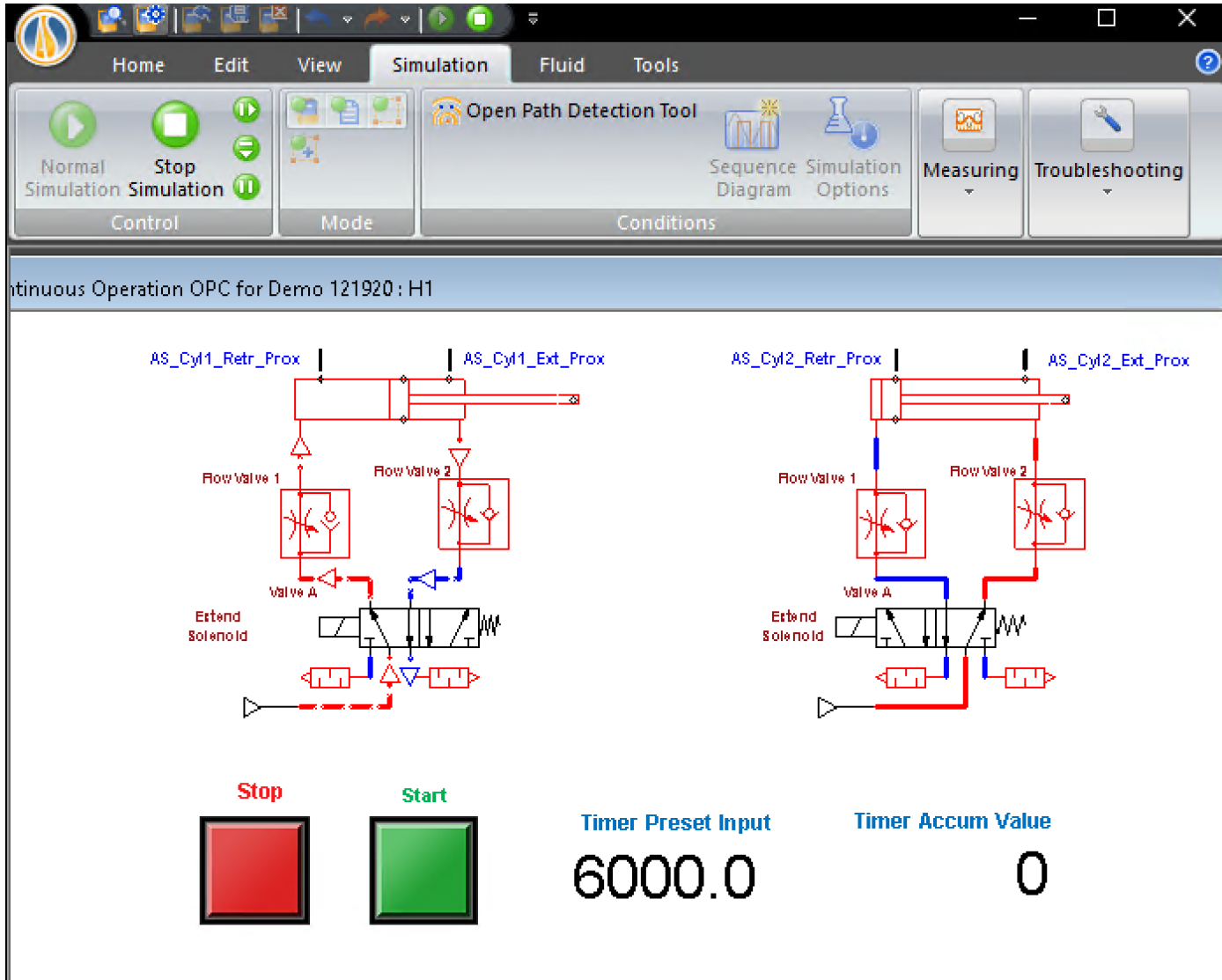
Virtual Simulator



Customized Virtual Simulator



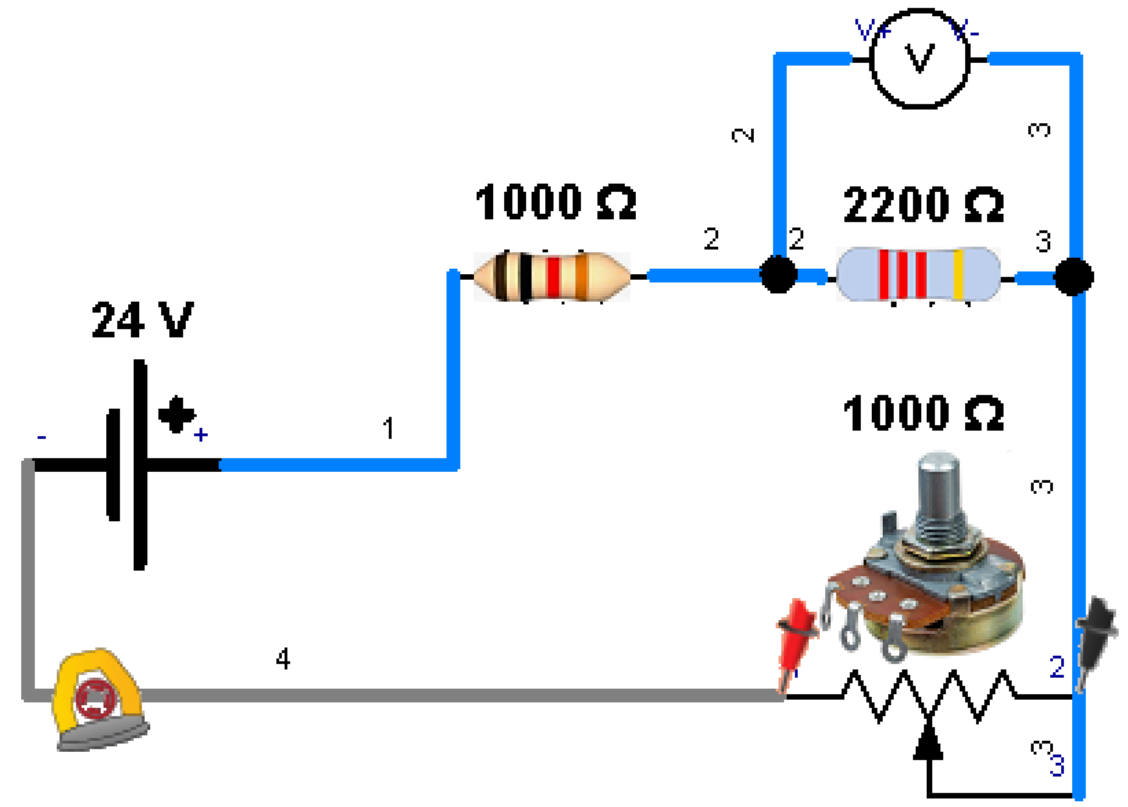
Having a CompactLogix program running in the Studio 5000 Emulator, control a pneumatic circuit in Automation Studio, using OPC communications between the applications. Both Automation Studio and the Rockwell Software are in the same Virtual Machine.



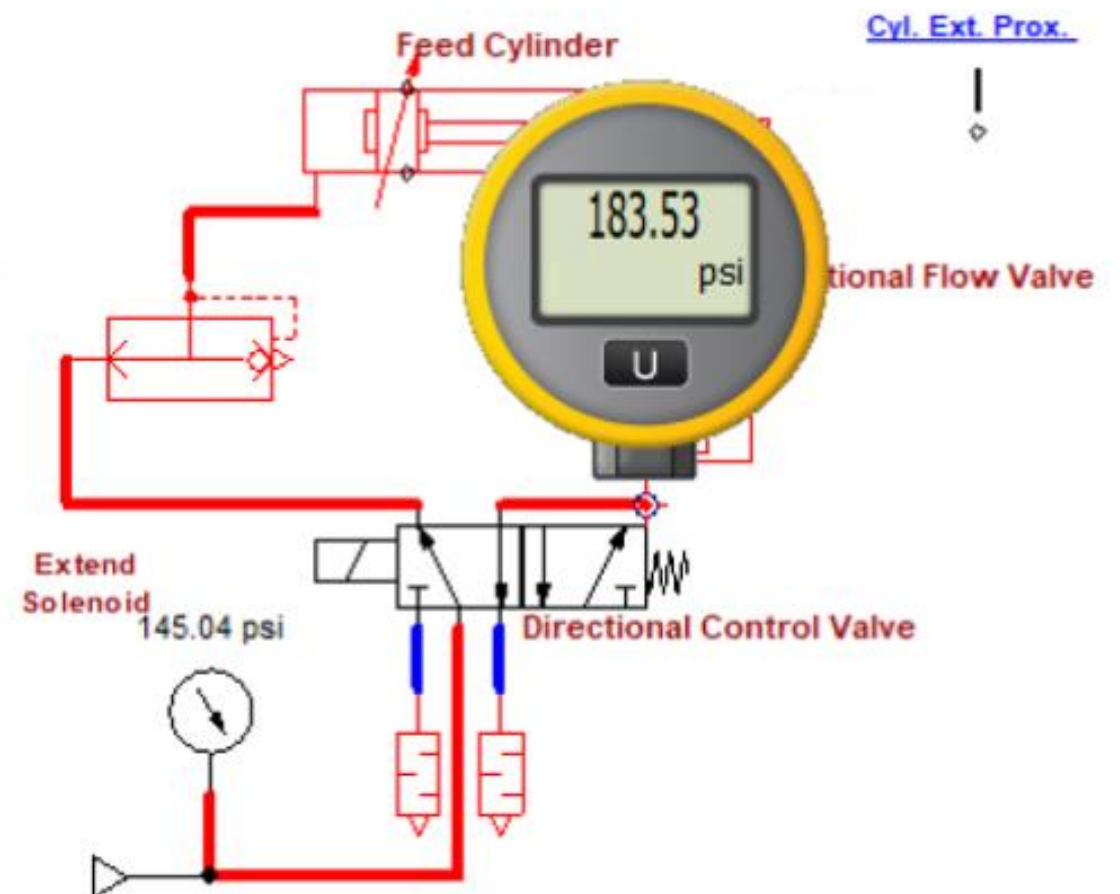
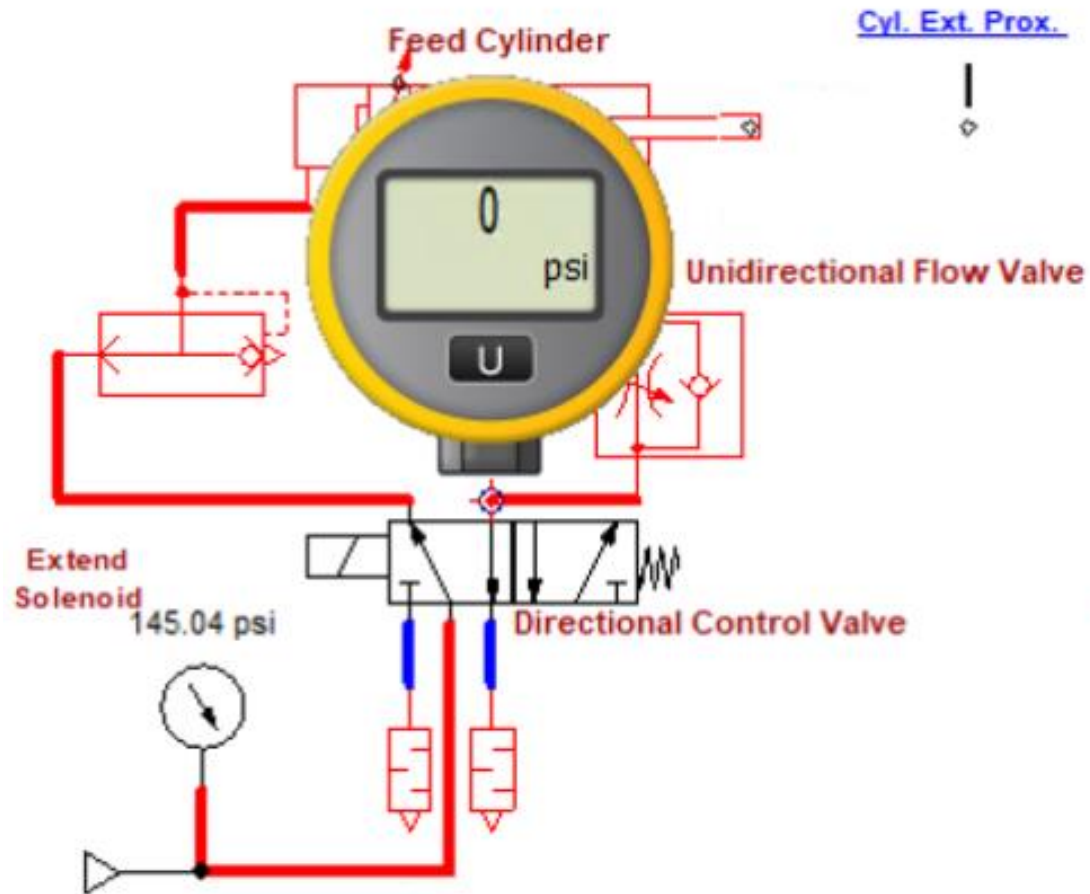
Simulation in Automation Studio for basic electrical course. Multi-meter or clamp-on ammeter can be used for testing the circuit.



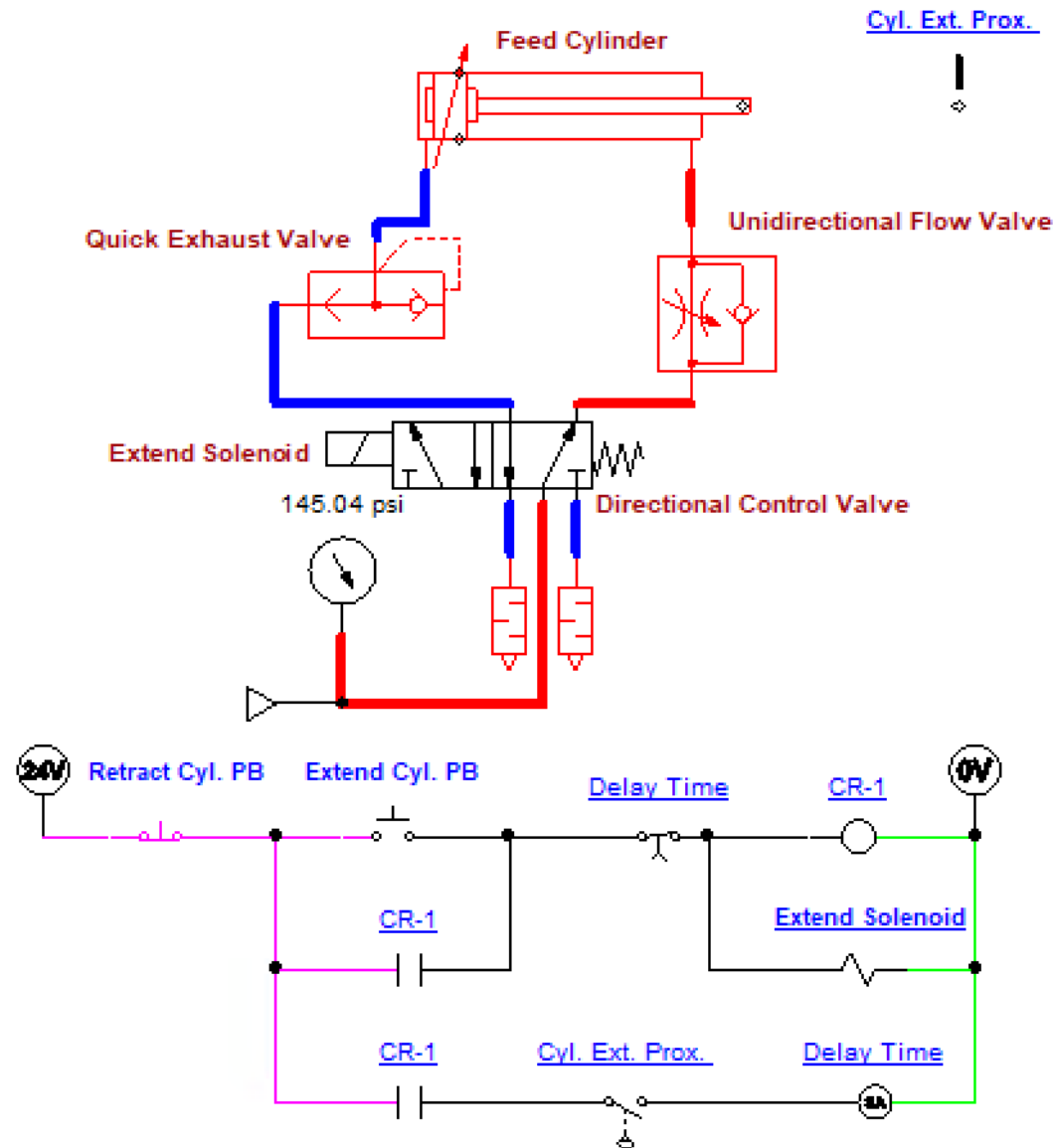
RMS Voltage 14.3 V



Simulation in Automation Studio for basic pneumatic circuit operation and troubleshooting



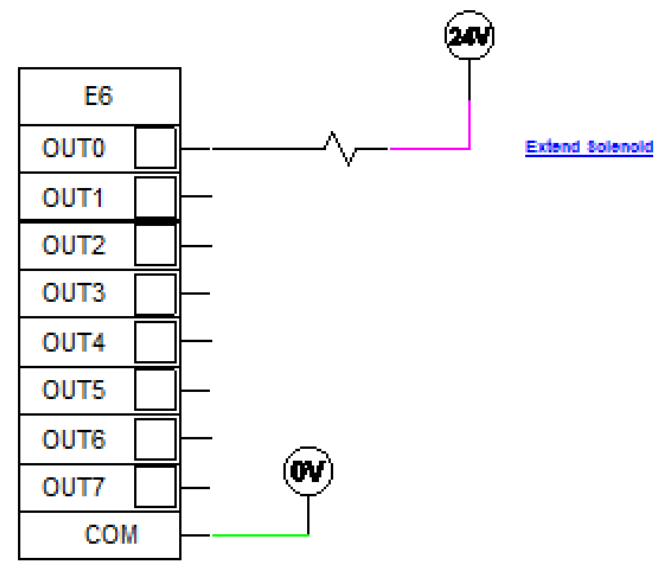
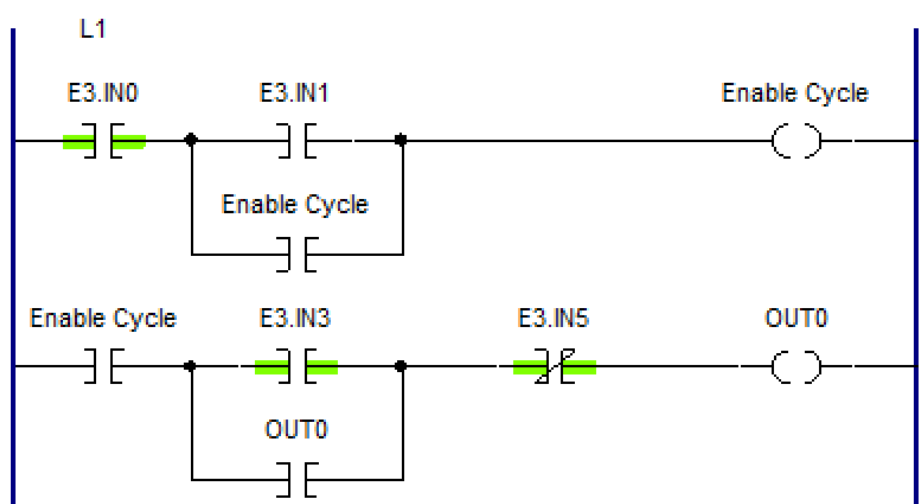
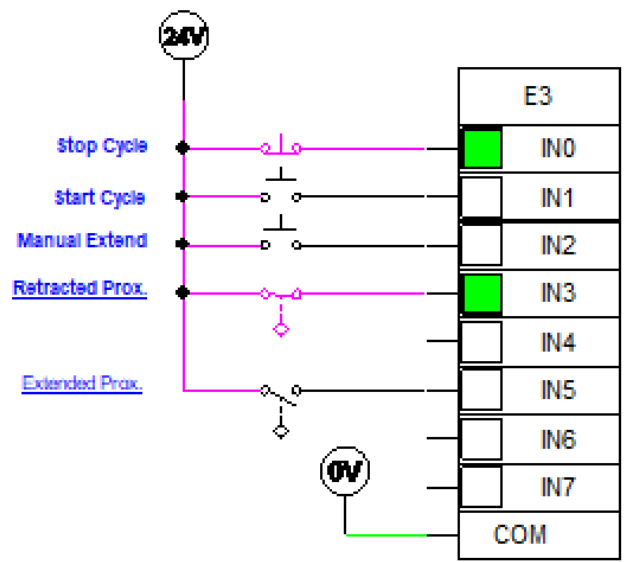
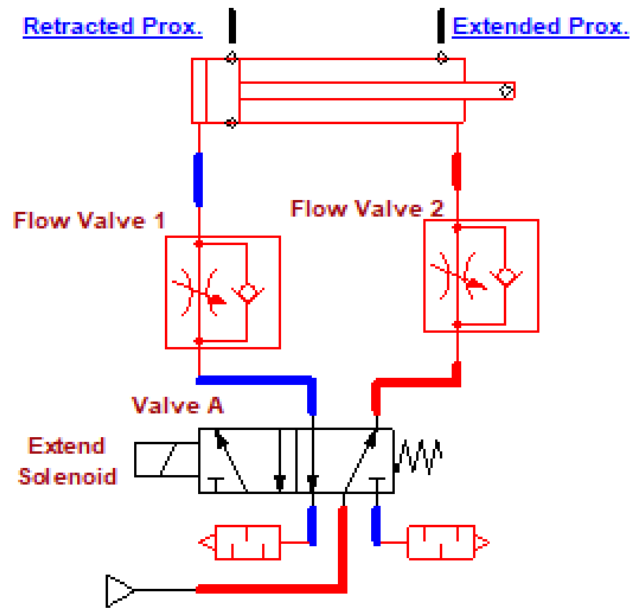
Simulation in Automation Studio for basic pneumatic circuit controlled by an electrical circuit





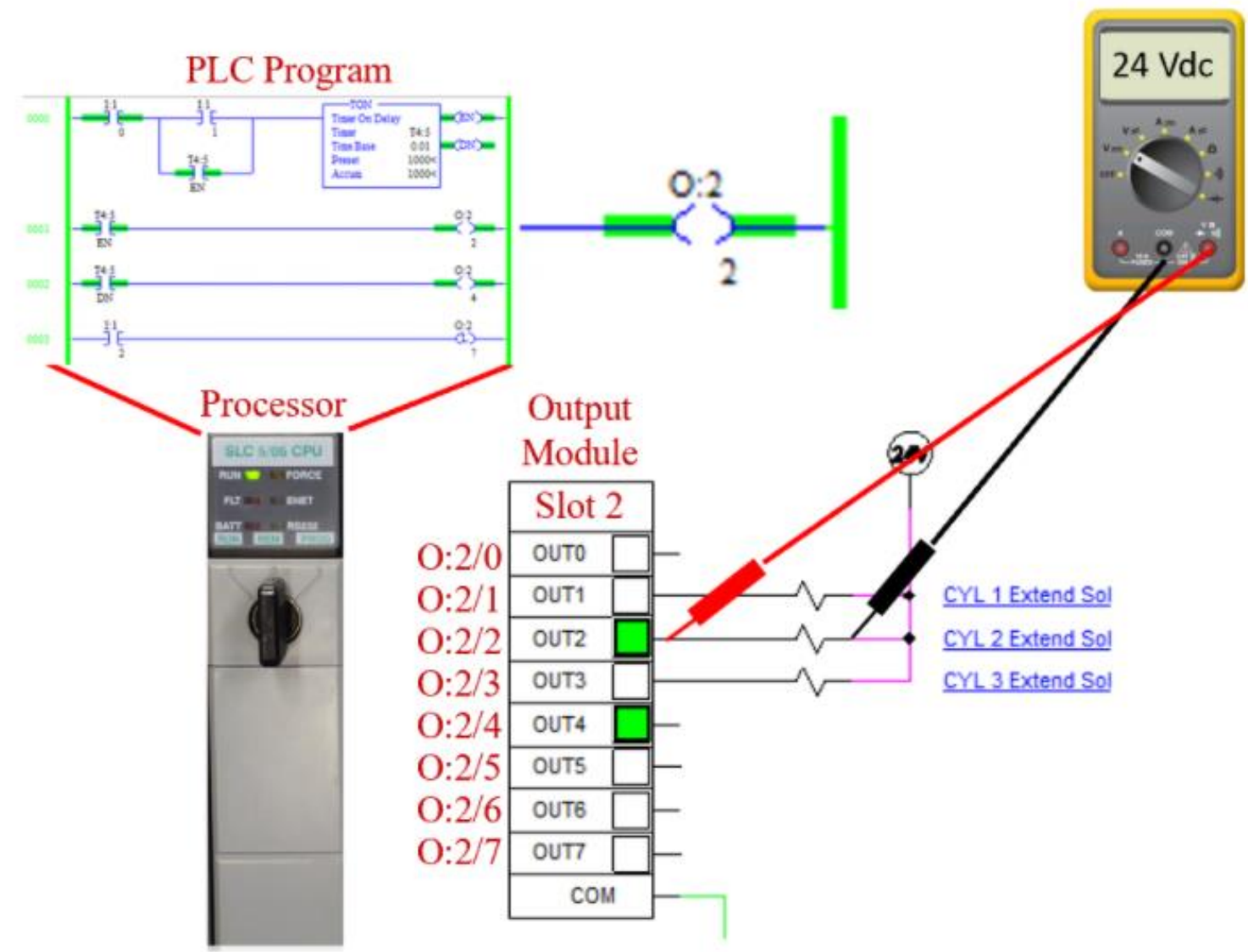
Simulation in Automation Studio for basic pneumatic circuit controlled by a PLC circuit

Lab 6:3

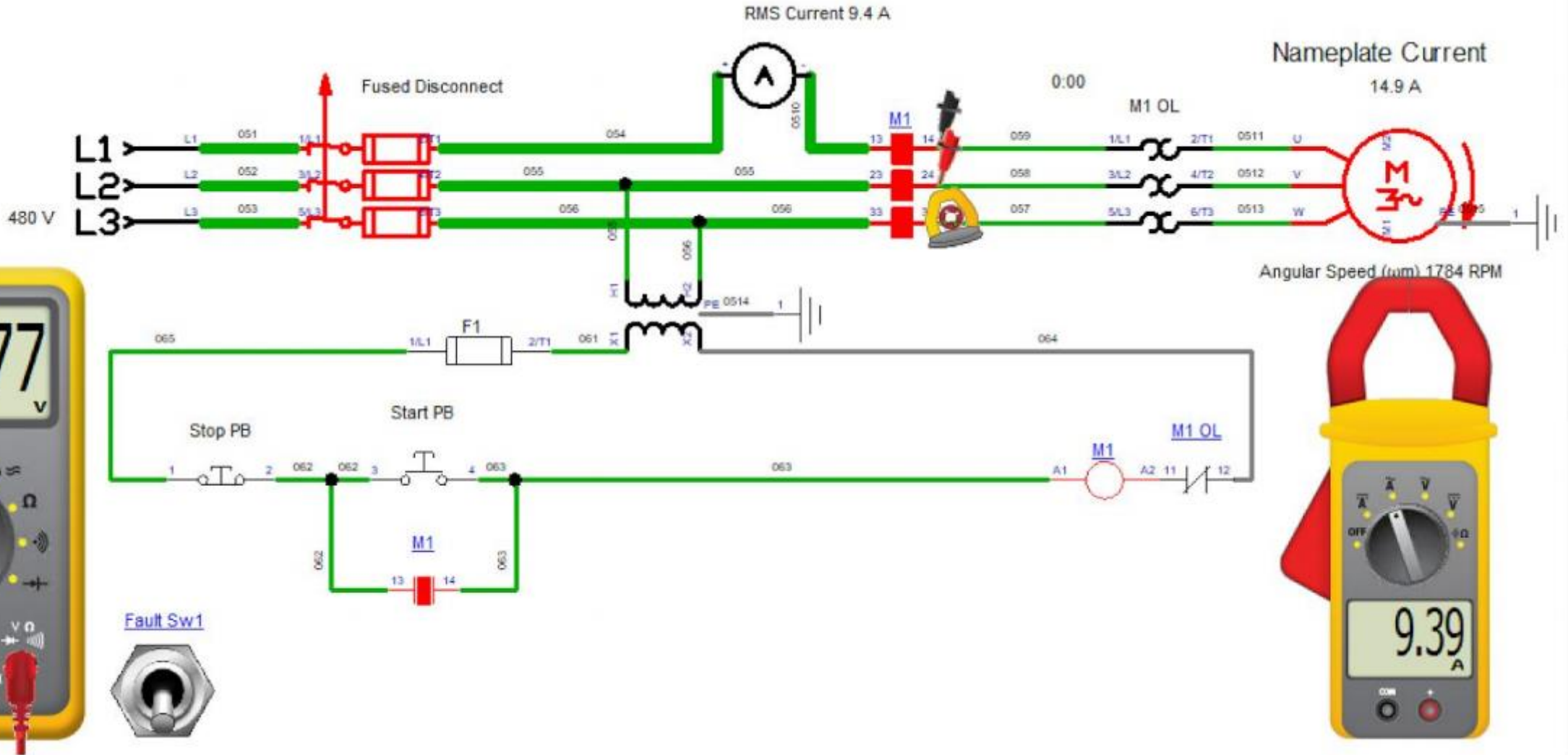




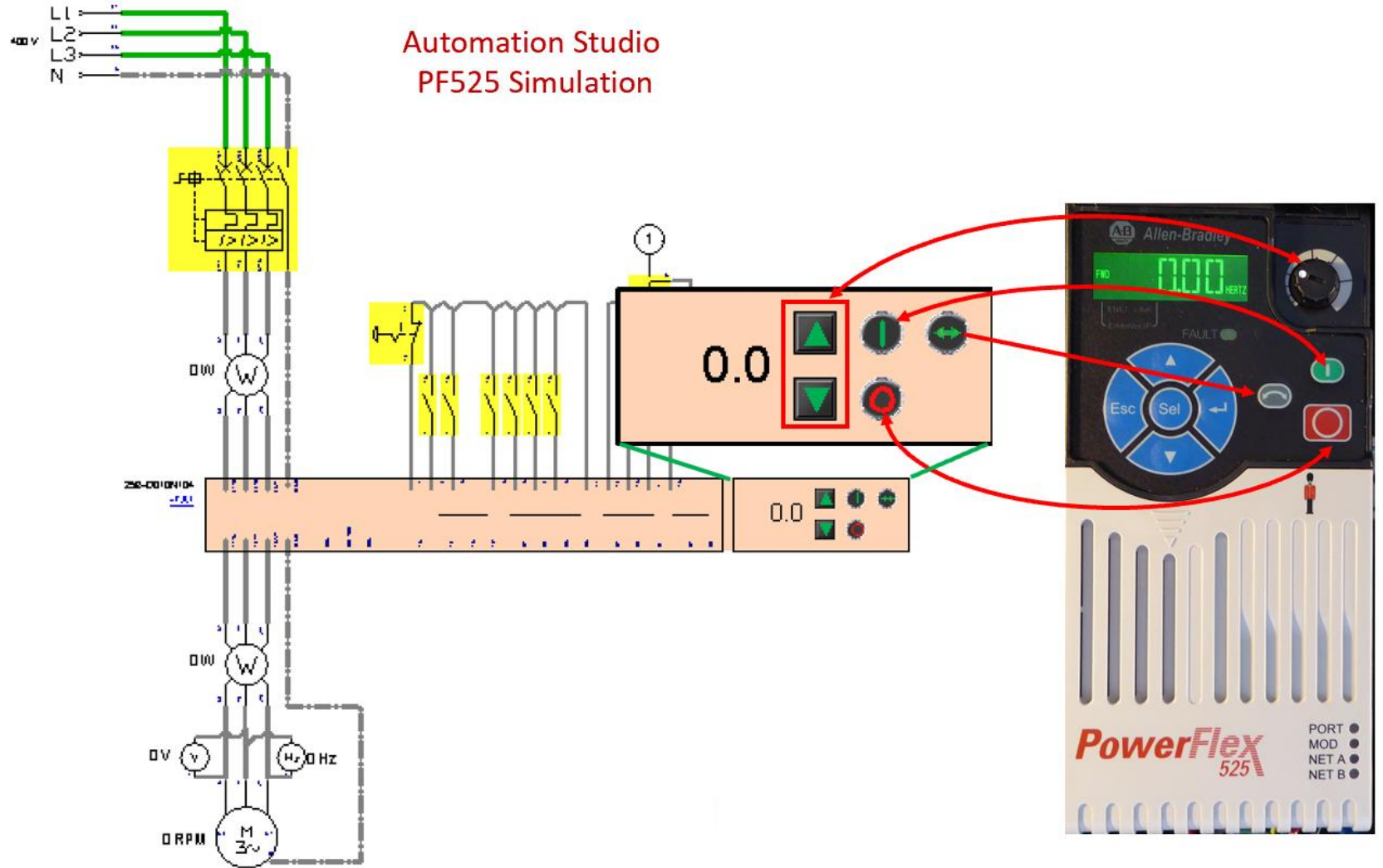
Visual objects created in PowerPoint of the simulation circuit, used to create test questions or illustrations



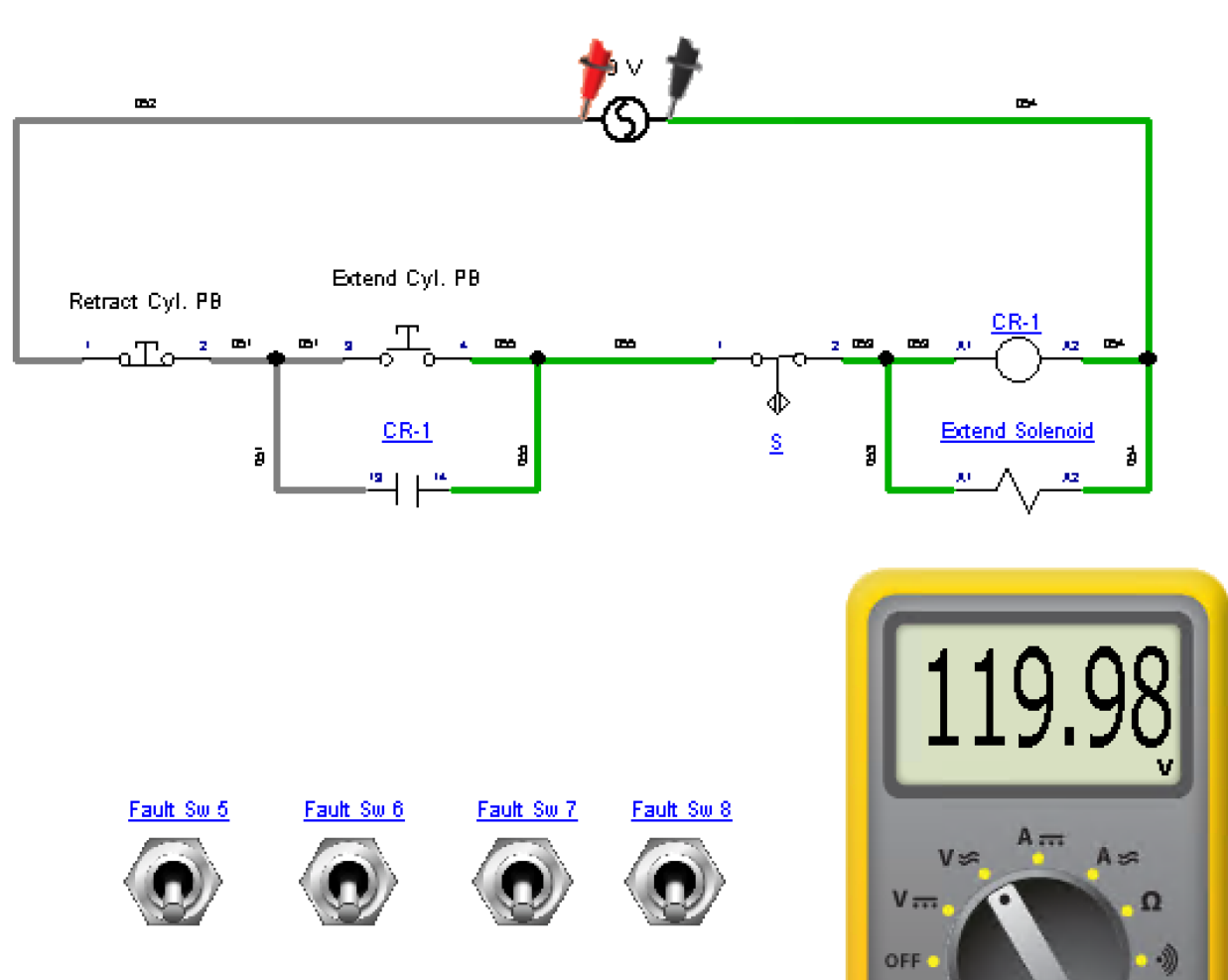
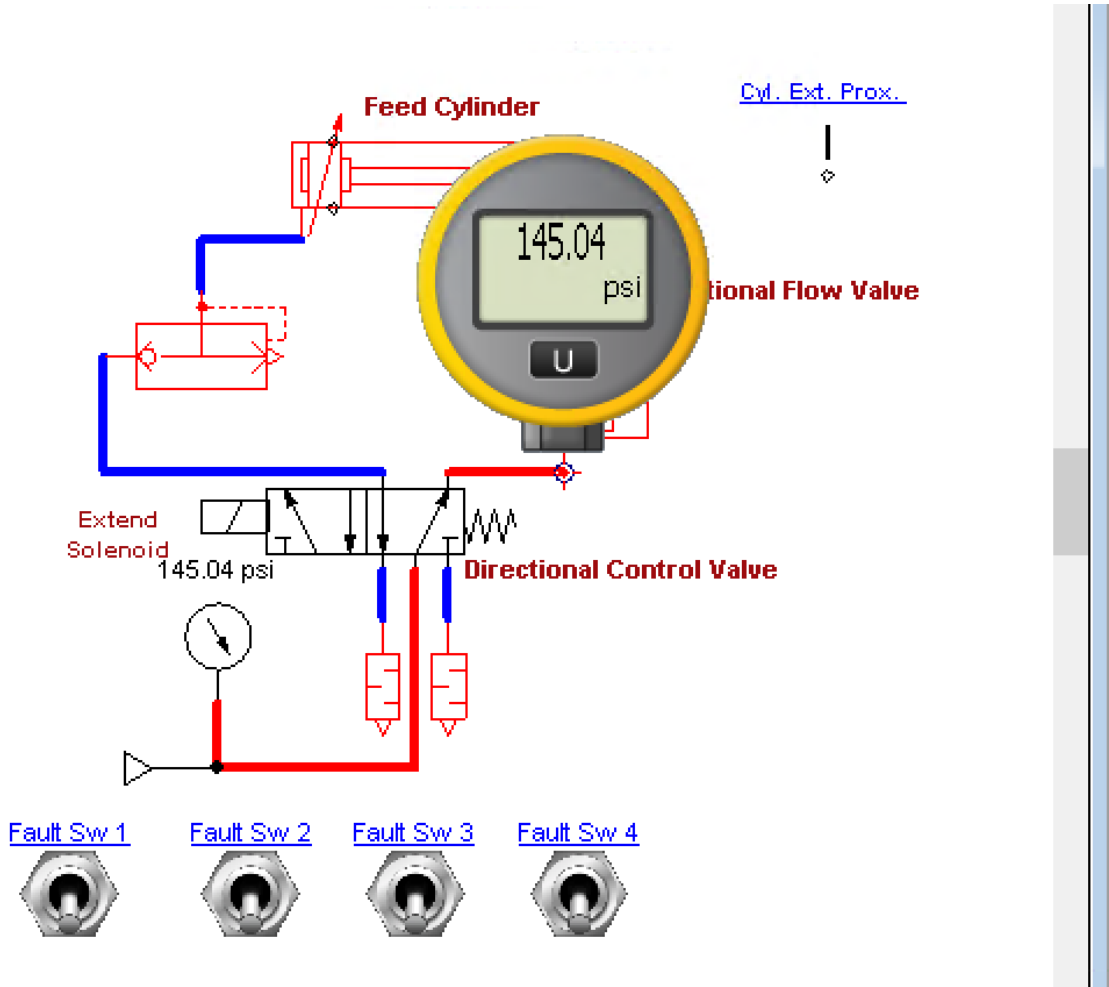
Simulation in Automation Studio of a motor branch circuit.
Students see how the control circuit and power circuit works.
Fault switch is used to open a power line for student troubleshooting.



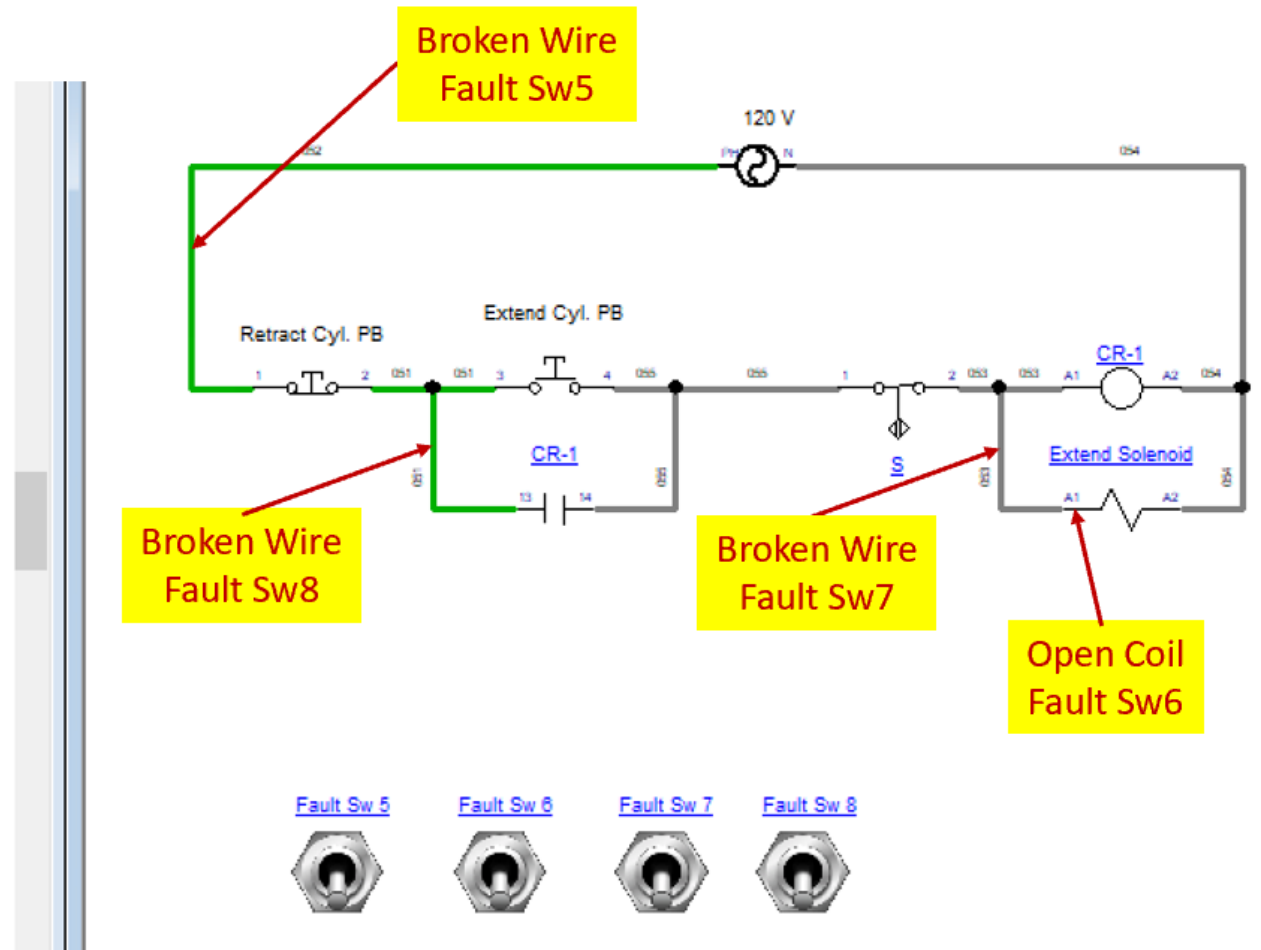
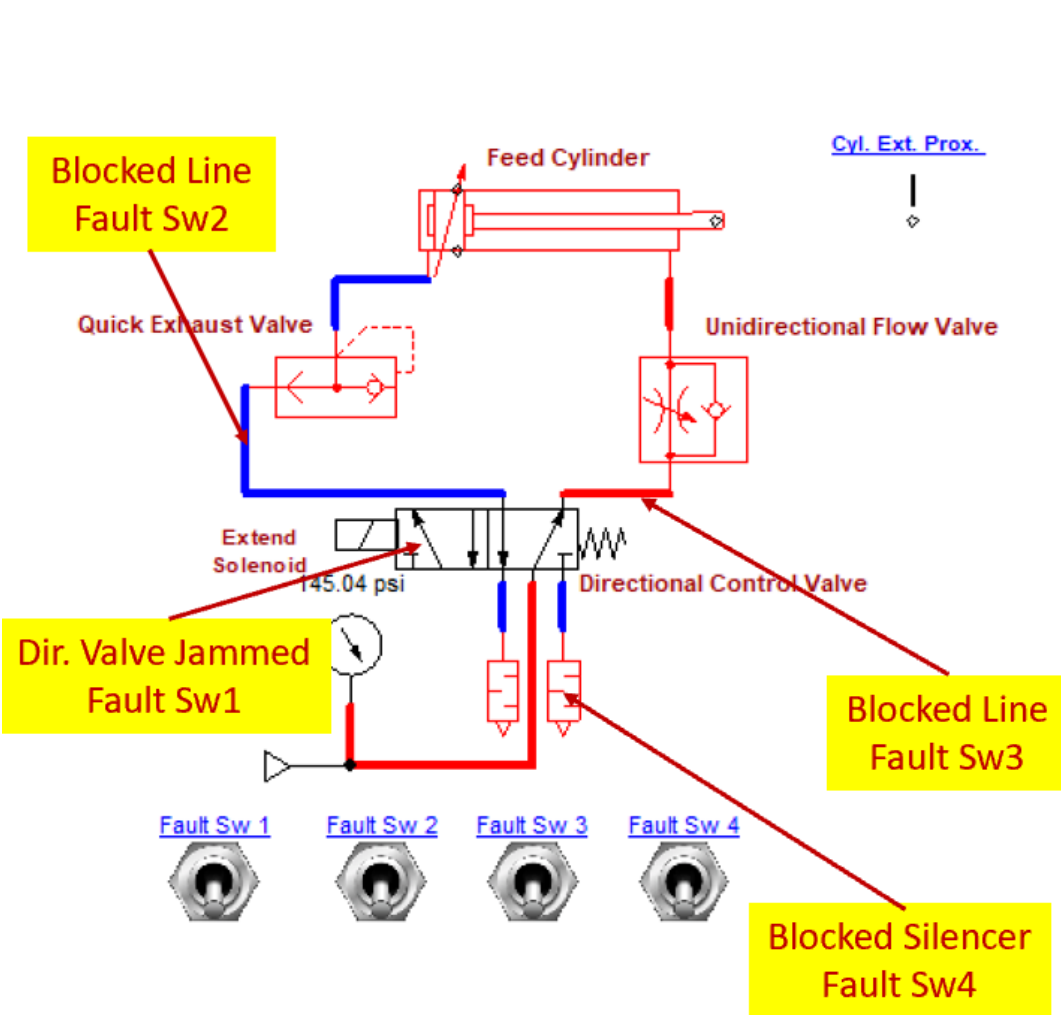
Simulation in Automation Studio for VFD operation. This simulation is using an AB PowerFlex 525. Students see how changing the frequency changes the motor speed, output voltage and power consumption.



Simulation in Automation Studio of an electrical circuit, controlling a pneumatic circuit. Faults are inserted for student troubleshooting. This slide show a virtual pressure gauge, and a multi-meter used to troubleshoot the pneumatic and electrical circuits where faults can be inserted from the fault switches.



Simulation in Automation Studio of an electrical circuit, controlling a pneumatic circuit. Faults are inserted for student troubleshooting. This document is for the Instructor to reference what fault is inserted. All components and lines can have a fault inserted by the instructor, and assigned to a fault switch.





The End of the Presentation