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THE FPDA   
MOTION & CONTROL NETWORK

## Level 3 Pneumatics

### Introduction to Design and Sizing

**Course Description:** This course follows our Level 1 and Level 2 Pneumatics course and builds on the fundamentals and principles presented in those classes. Students will obtain a strong foundation on the design considerations needed for designing and building pneumatic systems. There is emphasis on hands-on exercises and Pneumatic Certification requirements. This course can be used to prepare the student for the International Fluid Power Society's Pneumatic Specialist Certification.

**Prerequisites:** Level 1, Level 2, and Troubleshooting or equivalent knowledge.

**Textbook:** TBD. Parker, Festo, Bosch, or SMC books are possible options.

### Learning Objectives:

- Identify the most and least important safety considerations in the design of an air circuit
- Demonstrate ability to select and size compressors
- Explain steps to properly install a compressor
- Describe how to use regulators to lower CFM consumption and thus reduce compressor size and costs.
- Describe Cv factors and their effect on sizing components
- Describe how to size air lubricators for a given system
- Describe how to size and install air lines
- Describe proper filter placement
- Understand specifications available from a component model number
- Describe proper flow control placement
- Compare methods of removing moisture from compressed air with costs
- Describe how pressure, air consumption rate and time relate to air receiver size
- Calculate pressure drop in an air line
- Explain how pressure and area relationships affect cylinder output force
- Solve for the reaction force on a cylinder rod bearing, from the stroke, mechanical advantage and side load on the rod
- Describe how to choose the proper directional control valve need for a system
- Calculate the pressure and suction area necessary to provide a required lifting force using vacuum cups
- Use manufacturer graphs and formulas to determine CFM requirements for air motors
- Select silencers using calculation charts
- Predict operation of pneumatic circuit from the placement of components in the circuit