Principles of Pneumatics (P.O.P.) *New & Upgraded for 2018!*

- Introduction to compressed air systems – compressors, pressure relief, compressor air regulation methods, conditioning of air, the receiver, compressed air piping, service units, pneumatic control valves, the air actuator
- Pneumatic valve symbols (on-going throughout the training course)
- Understanding pneumatic actuators
- Air pressure calculations – PSIG, PSIA
- Air flow calculations – CFM, SCFM, Free Air, ACFM
- HP required per CFM
- Cost of air leaks
- Proper air distribution piping layout and installation
- Calculation of cylinder cycle air consumption
- Calculation for application of an air motor
- Understanding the generation, use, measurement of vacuum
- Calculation of the holding/lifting power of vacuum
- Direct acting ball and seat or disk and seat directional control valves, spool valves as directional control valves
- Single acting vs. double acting cylinders – cylinder cushions
- The pneumatic service unit – filters, regulators, mist oil lubricators
- Safety shut-off valves
- Indirect control/pilot operation
- Internal piloting of pneumatic valves
- Understanding pneumatic valve port nomenclature
- 3/2, 4/2, 4/3, 5/3 and 5/2 directional control valve characteristics and effects of various spool types in the control of a pneumatic cylinders and air motors
- Pneumatic operated directional control valves vs. electrical solenoid operated valves
- Understanding the operation and uses of 5/2 'memory valves'
- Automatic return of a cylinder with pneumatic control circuits
- layout and organization of a pneumatic system schematic
- Air logic functions – and, or, time delay, sequencing, quick exhaust
- Introduction to Cv factors as it applies to maintenance of pneumatic system
- Pneumatic machine schematic reading exercises
- Special pneumatic control system lab exercises

Pneumatic Ideas You Will Use on the Job

1. Read and interpret pneumatic circuit schematics
2. Properly set a pressure regulating valve
3. Understand the proper use and setup of a pressure relief valve – know the difference between pressure regulators and pressure relief valves
4. Identify the pneumatic port functions using either a standard number ID's or letter Id's
5. Correctly install and connect pneumatic valves
6. Use Cv air valve ratings to 1 flow path or 2 flow path valve flow capabilities
7. Maintain vacuum lifting systems

8. Avoid unwanted time delays with speed control systems
9. Create actuator time delays when needed to avoid unwanted overlapping actuator operation
10. The importance of eliminating air leaks – the cost inefficient compressed air systems – employ proper compressed air maintenance procedures
11. Why it is very important to remove water from the compressed air
12. Proper compressed air distribution system requirements