

Manufacturing

Industrial Air Controls (Pneumatic) Fundamentals Course Description

COURSE AGENDA

Day 1

- Pneumatic Safety
- Physical vs. Chemical State Change
- Physical States of Matter
 - Water, Relative Humidity and Dew Point
- Pressure Fundamentals
- Pneumatic Terms
- Advantages/Disadvantages of Pneumatics

Day 2

- Constituents of Air
- Characteristics of Gases vs. Liquids
- Gas Laws and Concepts
 - Constant Temperature, Boyle's Law
 - Constant Pressure, Charles' Law
 - Constant Volume
 - General Gas Laws
- Compressibility
- Pressure Scales
- Measuring Atmospheric Pressure
- Atmospheric Pressure
- Pressure at Various Altitudes
- "HG/PSI Conversions
 - Comparing "Hg Vacuum to Hg "Absolute
- Pressure Ranges
- Gage Operation
 - Bourdon Tube
 - Plunger Gage
- Gage Reading Basics
- Vacuum Gage
- Pneumatic Transmission of Energy
 - Force Transmission Through Solid, Liquid, Gas



COURSE NUMBER: MFG202

Course Purpose

This course provides the knowledge and skills required during the installation, maintenance and troubleshooting of pneumatic machine controls.

At the completion of this course, you will be able to:

- Demonstrate good safety procedures when working with pneumatic and air controls
- Determine potential pneumatic hazards
- Explain the basics of pneumatic components, functions, and symbols
- Use pneumatic trainers to safely connect, operate, analyze, and troubleshoot sample circuits
- Interpret basic pneumatic symbols

COURSE AGENDA

Day 2 (continued)

- Pneumatic Transmission of Energy
 - Force Transmission Through Solid, Liquid, Gas
- Force Transmission Through a Fluid
- Primary Air Treatment
- Intake Air Filters
- Air Compressors
 - Common Types of Air Compressors
- Intercoolers
 - Why are Intercoolers Necessary?
- What is Heat?
 - Heat is Energy
- Compressed Air and Temperature
- When Compressed Air Expands, Temperature Falls
 - Aftercoolers
 - Separation
 - Refrigeration Units, Oil Scrubbers, Heatless Desiccant Dryer
 - Absorption

Day 3

- Air Distribution Systems
- Water Traps
- Schematic Symbols
 - Pressure Controls and Operation, Switch and Relief Valve Operation
 - Pressure Regulator Components and Operation
- Common Types of Cylinders
- Directional Control Valves
 - Positions and Schematic Symbols
- Low Pressure Pneumatic Fittings
- Secondary Air Treatment
 - Strainers, Separators, Filters, Lubricators
- Pneumatic Problems

Who Should Attend

Maintenance engineers, supervisors or other personnel responsible for operation of pneumatic machine controls should attend this course.

Prerequisites

None

Student Materials

To enhance and facilitate your learning experience, the following materials are provided as part of the course package:

- *Student Manual*, which contains the topical outline, safety precautions, and course related hand-outs
- *Basic Pneumatics*, which contains the fundamental concepts, basic pneumatic components, symbols, valve design information, and hands-on exercises

Hands-On Practice

Throughout this course, you will have the opportunity to practice the skills you have learned through a variety of instructor led demonstrations and hands-on exercises. These exercises focus on the skills introduced in each lesson.

To complete the exercises, pneumatic training workstations will be used reinforcing safe work practice, connecting, operating, and analyzing simple pneumatic system operations. Because the basic skills taught in the course apply to all pneumatic applications, the hands-on exercises permit you to apply what you have learned in your workplace environment.

Course Length

This is a three-day course.

Course Number

The course number is MFG202.

IACET CEUs

CEUs Awarded: 2.1



To Register

To register for this or any other Rockwell Automation training course, contact your local authorized Allen-Bradley Distributor or your local Sales/Support office for a complete listing of courses, descriptions, prices, and schedules.

You can also access course information via the Web at <http://www.rockwellautomation.com/training>

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