Control Valves & Actuators

SERIES SPECIFICATIONS & COURSE OUTLINE

CONTENTS
Produced in cooperation with ISA – The Instrumentation, Systems and Automation Society (ISA™) – this instrumentation series shows participants how the control valve operates and functions in its different applications in industrial settings. The series covers the types of control valves and actuators, choosing the correct type, and sizing and installation procedures.

AUDIENCE
The Control Valves and Actuators series is designed for mechanics and technicians who have no prior experience in determining which control valve is best suited for a particular application.

LEARNER EXPECTATIONS
This series is intended to be used as an essential component in your instrumentation curriculum. Each lesson has specific objectives associated with the information presented. Our experience indicates that those who complete the training are likely to accomplish the stated objectives. Furthermore, if these lessons are built into a total curriculum which includes practice in the working environment, it will help provide participants with the knowledge necessary to master the subject.
Control Valves & Actuators

**CVA001 Basics & Function**

**Purpose:** In this course, participants explore the basics of a control valve, a rotary valve, an actuator, and other components associated with the function and operation of these control elements. It also shows them how to identify the factors that affect the selection of the type of actuator.

**Objectives:** Identify the characteristics, functions, and applications of the control valve; describe the factors that must be considered when selecting the proper control valve; and describe the functions of a valve actuator and a control valve positioner and how these work within a control system.

**CVA002 Types & Design**

**Purpose:** This course shows participants how to determine which type of control valve is needed. Control valves come in limitless types, sizes, designs, and materials but basically fall under two distinct categories: linear motion and rotary motion. It also covers how to evaluate the factors that determine which type of linear motion control valve to use and which type of rotary motion control valve to use.

**Objectives:** Describe the functions, applications, and differences of linear motion control valves and rotary motion control valves; describe the functions, applications, and differences of pneumatically operated actuators, electrically operated actuators, and rotary motion actuators; describe the basic operation and function of the components of the control valve; and identify factors that affect control valve safety.

**CVA003 Fundamentals & Selection**

**Purpose:** Explore how to select the proper control valve by considering many factors, including flow characteristics, environmental conditions, and safety issues with this course. It also covers the formulas and calculations that are needed in the selection process. In addition, it discusses the general criteria that must be followed when selecting an actuator and associated auxiliary devices.

**Objectives:** Describe the different types of fluid flow; identify the factors that affect fluid flow; explain the formulas used for determining valve selection; describe the conditions of fluid flowing through a restriction such as a Herschel venture, a concentric orifice, and Vena Contracta; explain cavitation, flashing, and fluid flow; explain the considerations for selecting a control valve; and describe the preliminary criteria for selecting the proper actuator and auxiliary devices.

**CVA004 Sizing & Installation**

**Purpose:** This course teaches participants the steps needed for determining control valve sizing and the various factors involved in actuator sizing. It also covers how to verify that the selected actuator is appropriate for industrial needs and how to install and maintain control valves.

**Objectives:** Describe the factors to consider for correctly sizing a valve; recognize what items are needed to determine proper valve sizing; presented with sample problems, determine the proper control valve to be used for a liquid application and for a gas and vapor application; describe the factors involved with actuator sizing such as static force, valve leakage classification, and dynamic forces; and recognize the proper installation and maintenance procedures of a control valve.