

# PLC Technology 4: PLC-Controlled Hydraulic Systems

## Course Outline

Catalog number	8220-0040
Category	Electronics and Electrical Control
Duration	15 Hours
Software supplied	Siemens STEP7 TIA Portal
Prerequisites	PLC Technology 1, 2, and 3

### Activity 1: Getting Started

Hydraulics: The Basics  
Electrical Control vs. Manual and Hydraulic Control  
Using PLC to Control Hydraulic Systems  
The Hydraulic HMI

### Activity 2: Using a 4/2 Sol-Sol Valve to Control a Double-Acting Cylinder

Using a PLC to Control a Roadblock  
Double-Acting Cylinder with Magnetic Sensors  
The 4/2 Solenoid-Solenoid Valve  
Designing the Ladder Diagram  
Task: Programming the Roadblock Control System  
Task: Simulating the Roadblock Control System  
Task: Modifying the System  
Task: Simulating the Modified Program

### Activity 3: The Sol-Spring Valve

Dissecting The 4/2 Solenoid-Spring Valve  
Using a PLC to Control a Hydraulic Roadblock  
Designing the Ladder Diagram  
Task: Programming the Roadblock Control System  
Task: Simulating the Roadblock Control System  
Task: Modifying the System  
Task: Simulating the New Program

#### **Activity 4: Controlling A Hydraulic Press**

Using a PLC to Control a Double-Acting Cylinder in a Press Machine

Designing the Ladder Diagram

Task: Programming the Fully Automatic Press Machine

Task: Simulating the Fully Automatic Press Machine

Task: Modifying the Ladder Diagram to Include an Emergency Stop Button

Task: Simulating the New Program

#### **Activity 5: The Press Machine with a Timer**

Using a PLC to Control a Press Machine with a Timer

Timer ON Delay

Designing the Ladder Diagram

Task: Programming the Press Machine

Task: Simulating the Press Machine

Task: Modifying the Role of Lamp #1 and Lamp #2

Task: Simulating the Modified Program

#### **Activity 6: The Hydraulic Punch**

Using a PLC to Control a Hydraulic Punch

The Count Up Instruction

Designing the Ladder Diagram

Task: Programming Control for the Hydraulic Punch

Task: Simulating the Punch Machine

### **Activity 7: The Hydraulic Metal Cutter**

Using a PLC to Control a Metal Cutting Machine

Designing the Ladder Diagram

One Shot Instructions

Task: Programming Control for the Metal Cutting Machine

Task: Simulating the Metal Cutting Machine

Task: Adding a Delay to the Control Program

Task: Simulating the Modified Program

### **Activity 8: At the Safari**

Using a PLC to Control a Gate System

Designing the Ladder Diagram

Task: Programming the Gate System

Task: Simulating the Gate System

### **Activity 9: Sequential Operation with Three Cylinders**

Using a PLC to Control a Metal Press

Designing the Ladder Diagram

Task: Programming the Metal Press

Task: Simulating the Metal Press

### **Activity 10: The Concrete Mold**

Using PLC to Mold a Concrete Block

Designing the Ladder Diagram

Task: Programming the Creation of a Concrete Block

Task: Simulating the Creation of a Concrete Block

Task: Modifying the Program so that the Lamp Flashes Once Every Two Seconds

Task: Simulating the Modified Program

### **Activity 11: Three Cylinders and a Delay**

Using a PLC to Control a Metal Press with a Delay

Designing the Ladder Diagram

Task: Programming the Metal Press with a Delay

Task: Simulating the Metal Press with a Delay



### **Activity 12: Variable Counters**

Using a PLC to Control a Rivet Hammer

Designing the Ladder Diagram

Task: Programming the System

Task: Simulating the System

### **Final Project: Port Soil Removal System**

Using a PLC to Control a Port Soil Removal System

Designing the Ladder Diagram

Task: Programming the System

Task: Simulating the System