

Industrial Automation (PLC Programming)

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1. Hardware Logic Control

Relay

Contactor

Sensor

2. Programmable Logic Control

The Processor

The processor, or the brain of the PLC system, is a solid-state device designed to perform a wide variety of production, machine tool, and process-control functions. Conventional electromechanical devices, relays, and their associated wiring formerly performed these functions. Processors provide these same functions, in a wider scope and variety of control functions, with minimal effort, making the PLC a much more popular choice

The Power Supply

The Power supply for a Programmable Logic Controller converts the input source power into voltages required for internal circuitry. In some cases, it also provides an isolated VDC supply to power DC input circuits, switches, and other indicators. The Power Supply of the PLC is an essential component to running the PLC.

The PLC Input/Output (I/O)

Electrical noise, such as spikes in the power lines or load kick-back would have serious impact on a PLC's internal circuits since its CPU operates at very low voltages levels. This is where the Input/Output (I/O) portion of a PLC plays a critical role. The I/O, both inputs and outputs, protects the CPU from electrical noise. The I/O section is where status signals are filtered to remove noise, validate voltage levels, and CPU decisions are made and put into operation. The PLC Inputs provide their status to a storage area within the CPU and outputs are driven from similar stored status in the CPU.

Real world devices such as pushbuttons, limit switches and sensors are connected through the input modules in the PLC. These modules detect a change in the state of input signals and provide a stored image to input elements in ladder logic. The input elements simulate the actions of relay contacts within the Programmable Logic Controller. In turn, output elements are "energized," which produces desired output signals to drive loads such as motor controllers, contactors, solenoids, and pilot lights, via the output modules in the I/O's. As a general rule, each instruction in ladder logic requires one word of memory. Each instruction is programmed so that series contacts are ANDed and parallel contacts are ORed.

PLC Programming

Programmable Logic Controllers are simple to program. They use a relay ladder language that's very similar to magnetic relay circuitry. Engineers, technicians, and electricians can learn to program the PLC without extensive training or experience. There are numerous advantages in using Programmable Logic Controllers versus a relay or solid-state electronics. In a PLC, changes can be accomplished quickly, and in most cases, without hardware modifications to the controller. PLC's are reusable and indicator lights on the PLC at major diagnostic points assist in troubleshooting. It's reliable, designed for the industrial environment and easy to maintain. Along with its cost savings, the Programmable Logic Controller is flexible and able to perform multiple functions.

Simatic Manager is **the container for the combined utilities required to program a S7-300 or S7-400 PLC**. Step 7/Microwin is the software required to program and communicate with a S7-200 PLC.

Communication Of PLC

1. PLC - PLC