

PLC

Programmable Logic Controller

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Nội dung

- Tổng quan và cấu trúc phần cứng PLC
- Cơ bản về lập trình PLC và phần mềm Step 7 (**TIA Portal V11**)
- Lập trình Timer, Counter
- Các lệnh xử lý dữ liệu
- Các lệnh dịch thanh ghi và tuần tự
- Kỹ thuật lập trình cấu trúc
- Các module chức năng
- Điều khiển quá trình, hệ thống mạng và SCADA

Tài liệu

- Sách, Giáo trình chính:

- [1] Nguyễn Đức Thành. *Giáo trình PLC*. NXB ĐHQG. 2009
- [2] Nguyễn Doãn Phước. *Tự động hóa với S7-300*. NXB KHKT. 2003

- Sách tham khảo:

- [1] E.A. Parr. *Programmable controllers, An engineer's guide*. Newnes. 2003.
- [2] Tài liệu về PLC các hãng Siemens, Schneider, ...
- [3] Phần mềm. *Step 7, TwidoSuite*
- [4] Thiết bị: *PLC S7-300, PLC Twido*

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Đánh giá

- Tài liệu được đưa lên BKEl hàng tuần. Sinh viên tải về, in ra và mang theo khi lên lớp học. Điểm tổng kết môn học được đánh giá xuyên suốt quá trình học

- **Bài tập: 40%**

- **Thi: 60%**

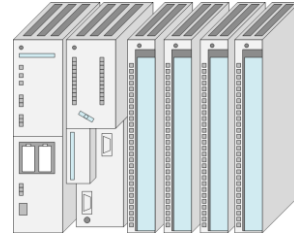
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- Điều kiện dự thi:

- Sinh viên được yêu cầu không được điểm **0** phần bài tập trên lớp và về nhà.

SIMATIC Controller (PLC)

S7-200



S7-400

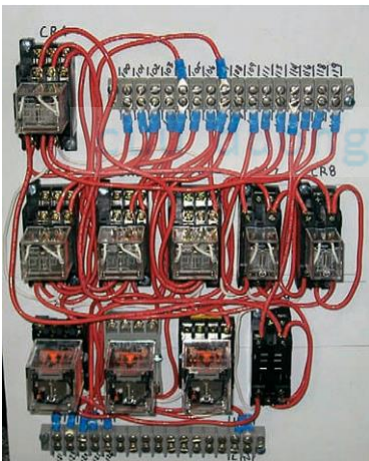
S7-300



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Programmable Logic Controllers (PLCs) An Overview

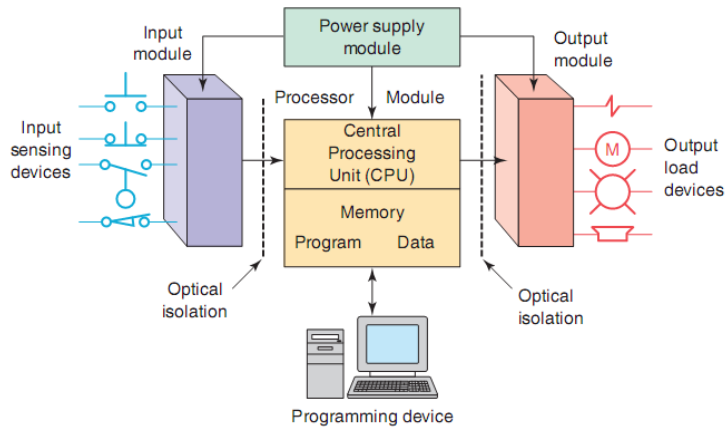
Relay- based control panel



PLC-based control panel



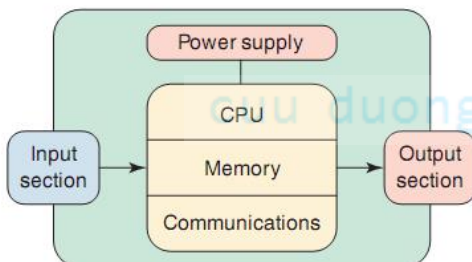
Parts of a PLC



a. Modular type (Mitsubishi Automation)

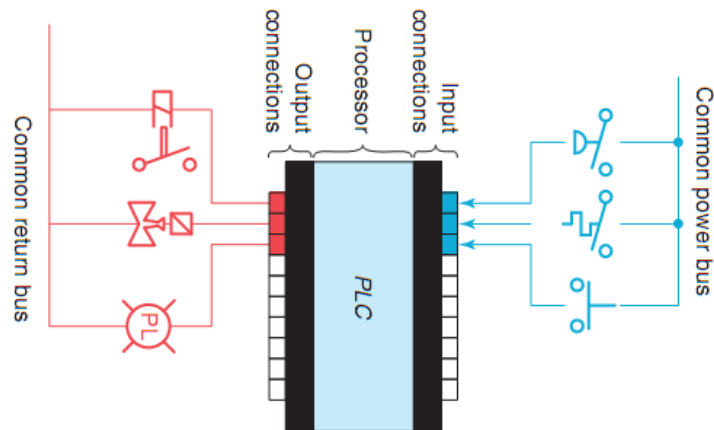
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Parts of a PLC



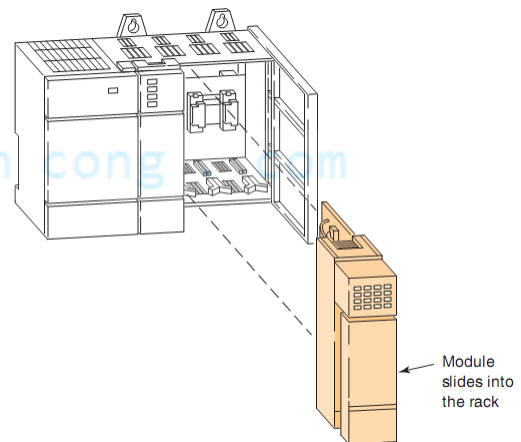
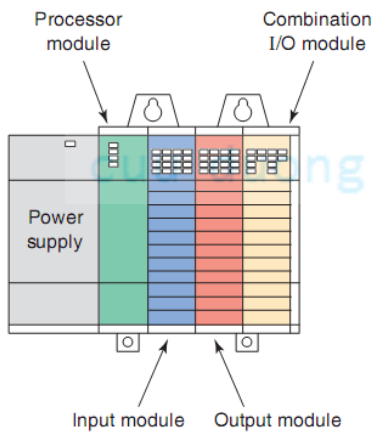
b. Fixed type (Rockwell Automation)

Fixed I/O configuration



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Modular I/O configuration

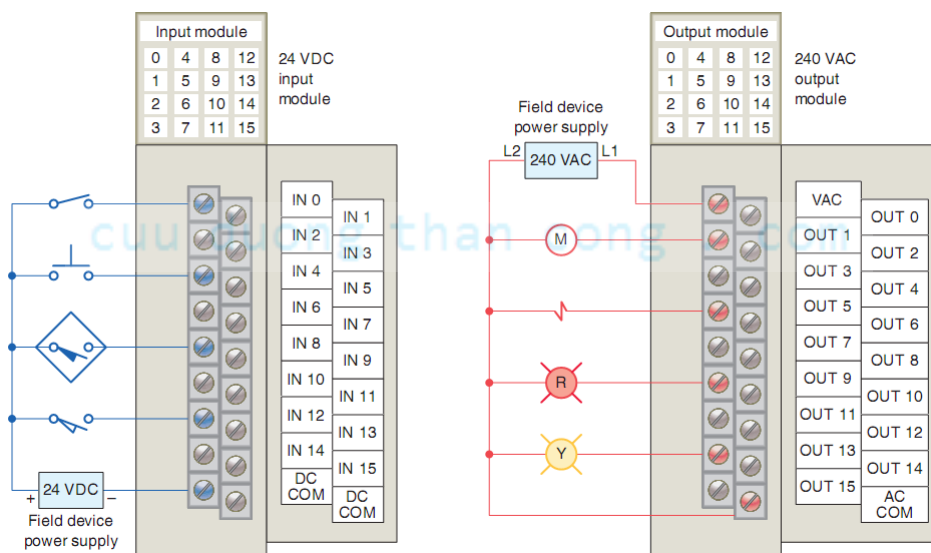


PLC processor module

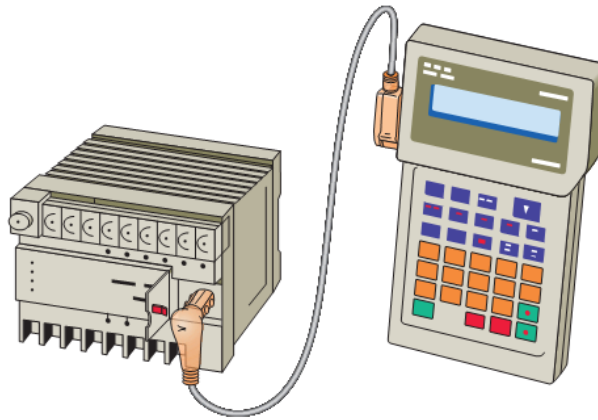


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PLC input/output (I/O) system connections

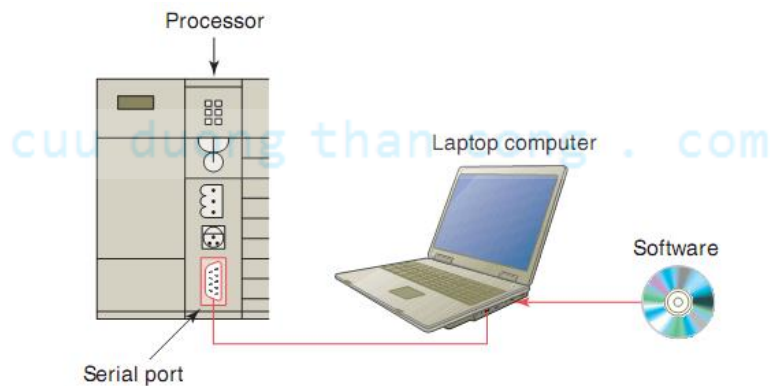


Hand-held programming device

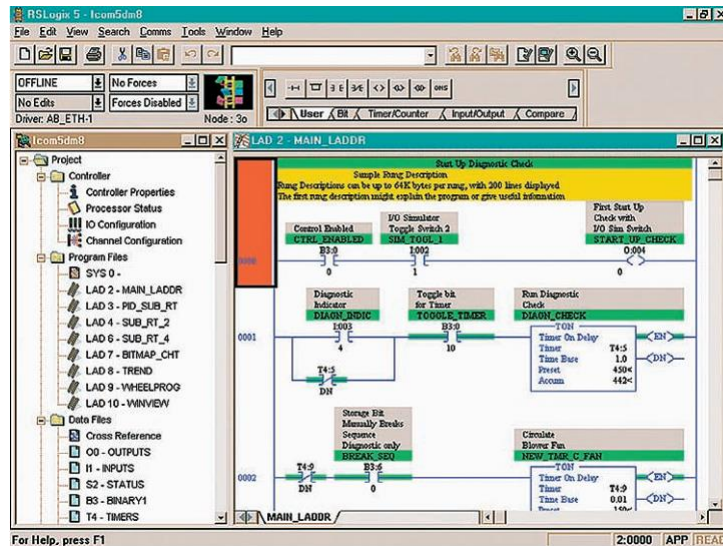


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Personal computer used as the programming device



Program and programming language



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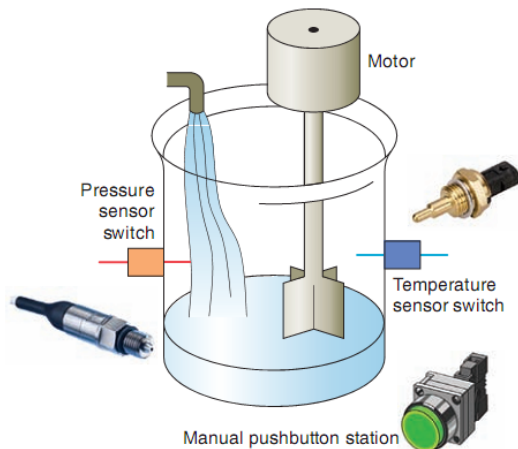
PLC scan cycle



Principles of Operation

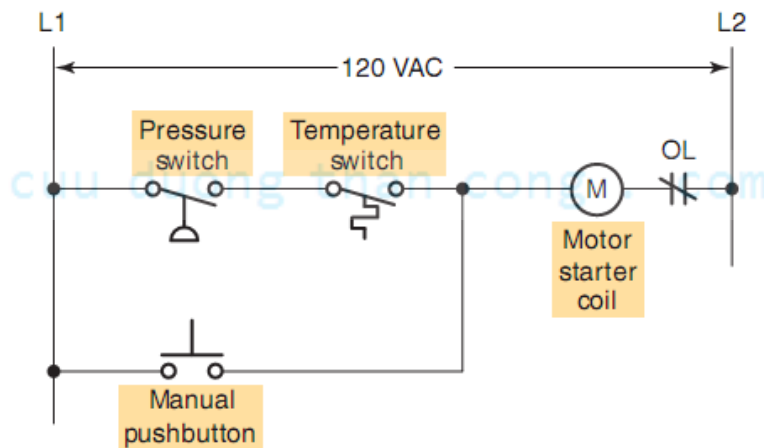
Mixer process control problem

Here a mixer motor is to be used to automatically stir the liquid in a vat when the temperature and pressure reach preset values. In addition, direct manual operation of the motor is provided by means of a separate pushbutton station.



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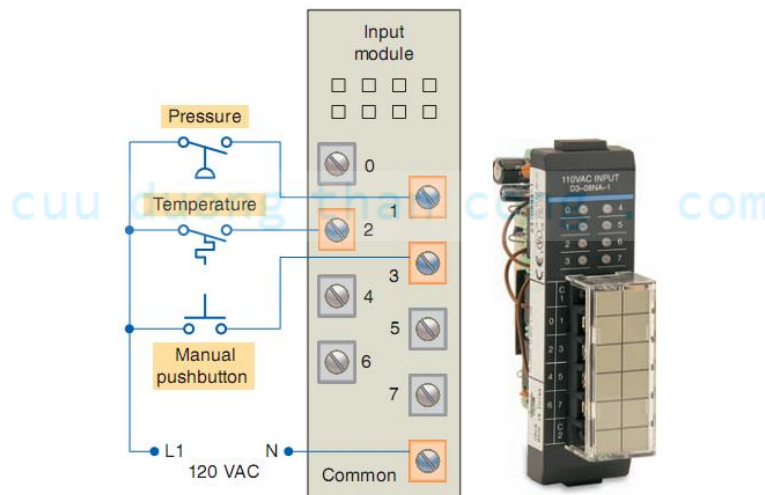
Process control relay ladder diagram



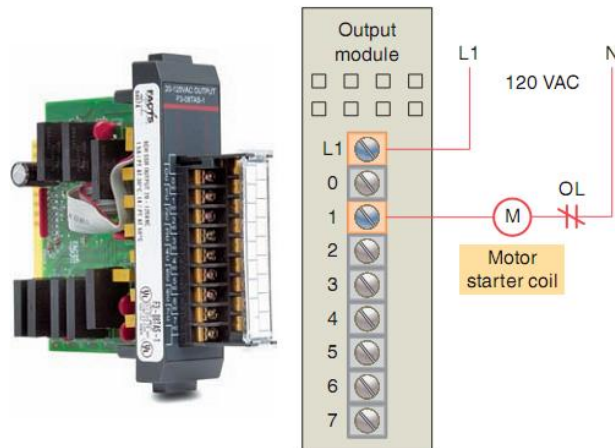
How a PLC might be used for this application ?

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Wiring connections for a 120 VAC modular configured input module

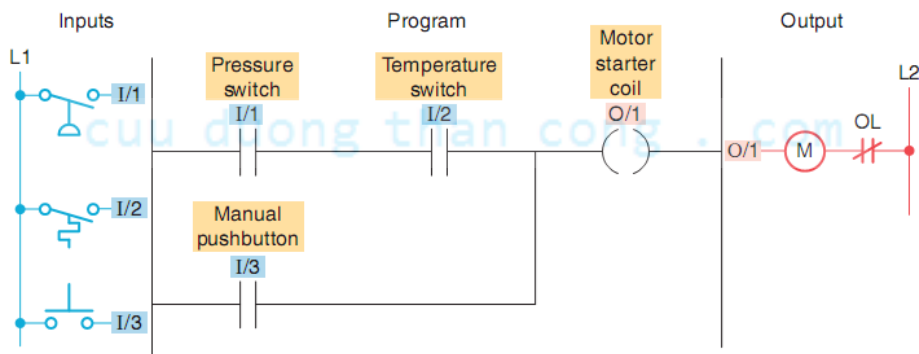


Wiring connections for a 120 VAC modular configured output module

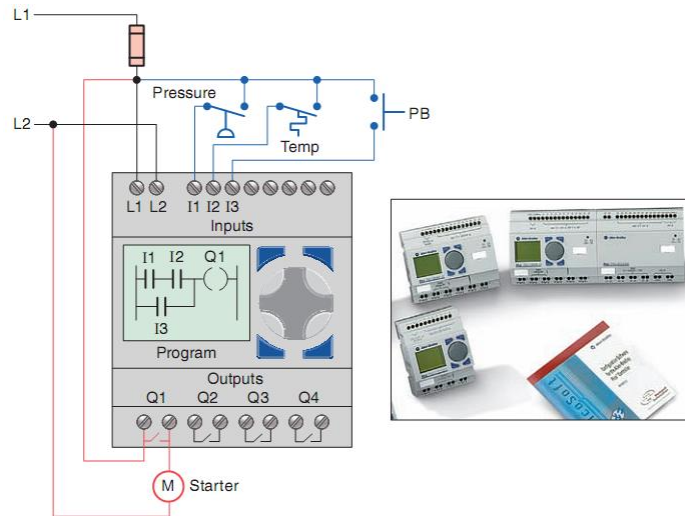


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Process control PLC ladder logic program



Wiring required to implement the process control scheme using a fixed PLC controller (Allen-Bradley Pico)



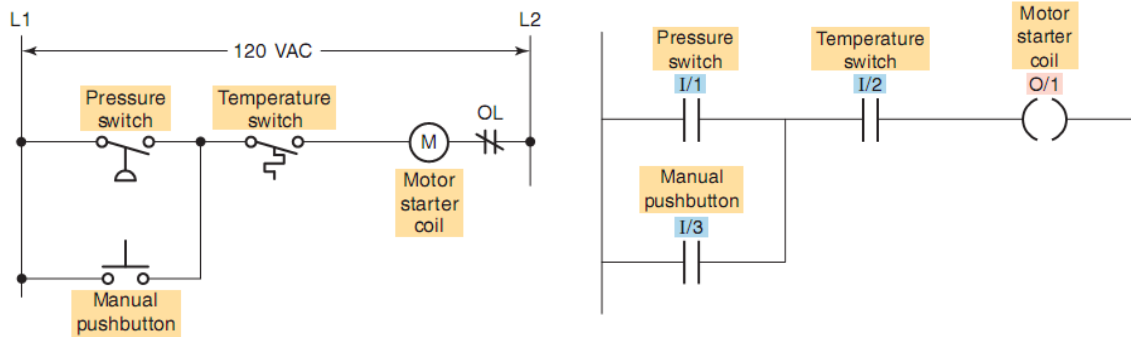
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Modifying the Operation

- Modify original process control :
Requires that the manual pushbutton control be permitted to operate at any pressure, but not unless the specified temperature setting has been reached.

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Relay ladder diagram and PLC ladder logic program for the modified process



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Problems 1

- Write a program for the relay ladder diagram

