2015

# SIEMENS SIMATIC S7

HOW TO PROGRAM

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# Introduction

In this seminar, a handout practical in how to program Siemens Simatic S7 will be given to the trainees. It assumes no previous knowledge of Ladder Programming. The seminar will summarize the implementation of both methods in programming Classical and SR flip flop. At the end of this seminar the trainee will be able to implement ladder programs using S7-300 PLC.

## ADDRESSES FOR S7-314C-2DP

### Addresses for digital I/O as configured on the lab
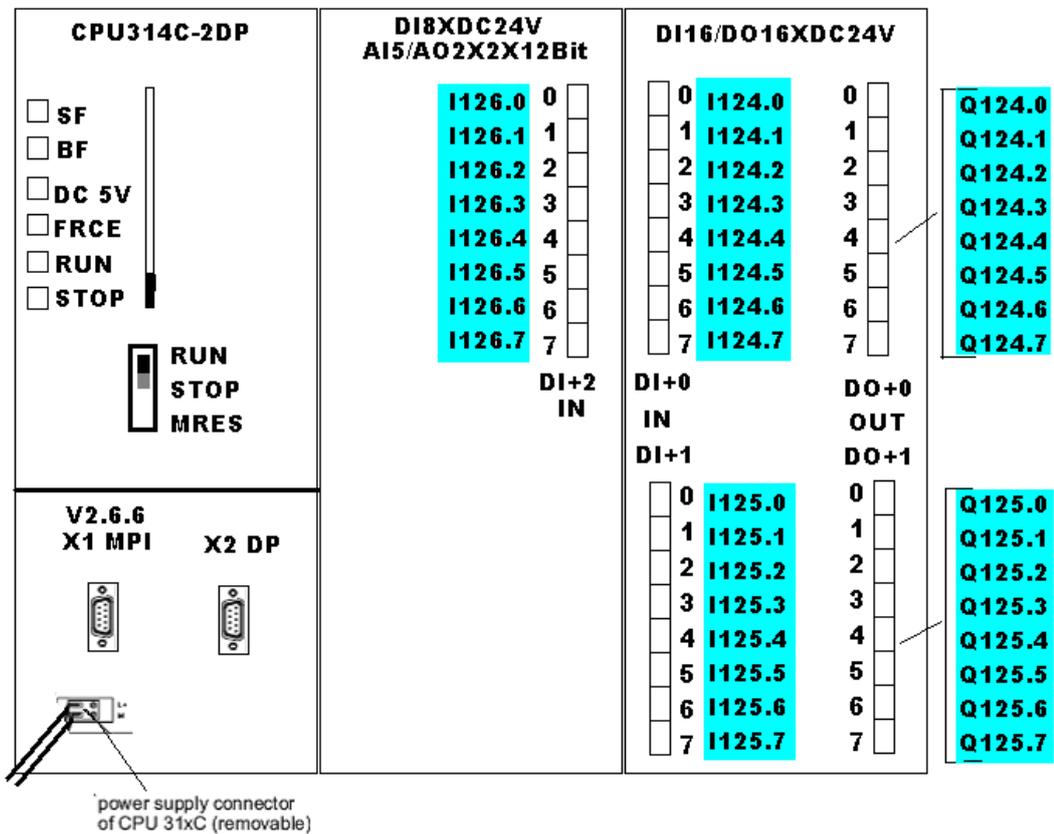
# NO / NC CONTACT TYPES IN PLC

Dealing with different types of contacts is very important when preparing ladder diagrams. There are two types of contacts (i.e. NO- Normally open and NC- Normally close), Programmer should know what the type of input contacts is before designing the ladder program.

Before exploring the figure 1.1 below let us discuss the instructions in Ladder and how to form logics AND, OR and NOT.

Two contacts in series means AND operation, both switches must be close to light the lamp. On the other hand two switches in parallel means either one or both switches must be on to make the lamp on. The Contact with diagonal mark means NOT operation. In our example if switch SW1 is off and switch SW2 is on the lamp will light.



Lamp = SW1 . SW2

Lamp = SW1 + SW2

Lamp = $\overline{SW1}$ . SW2
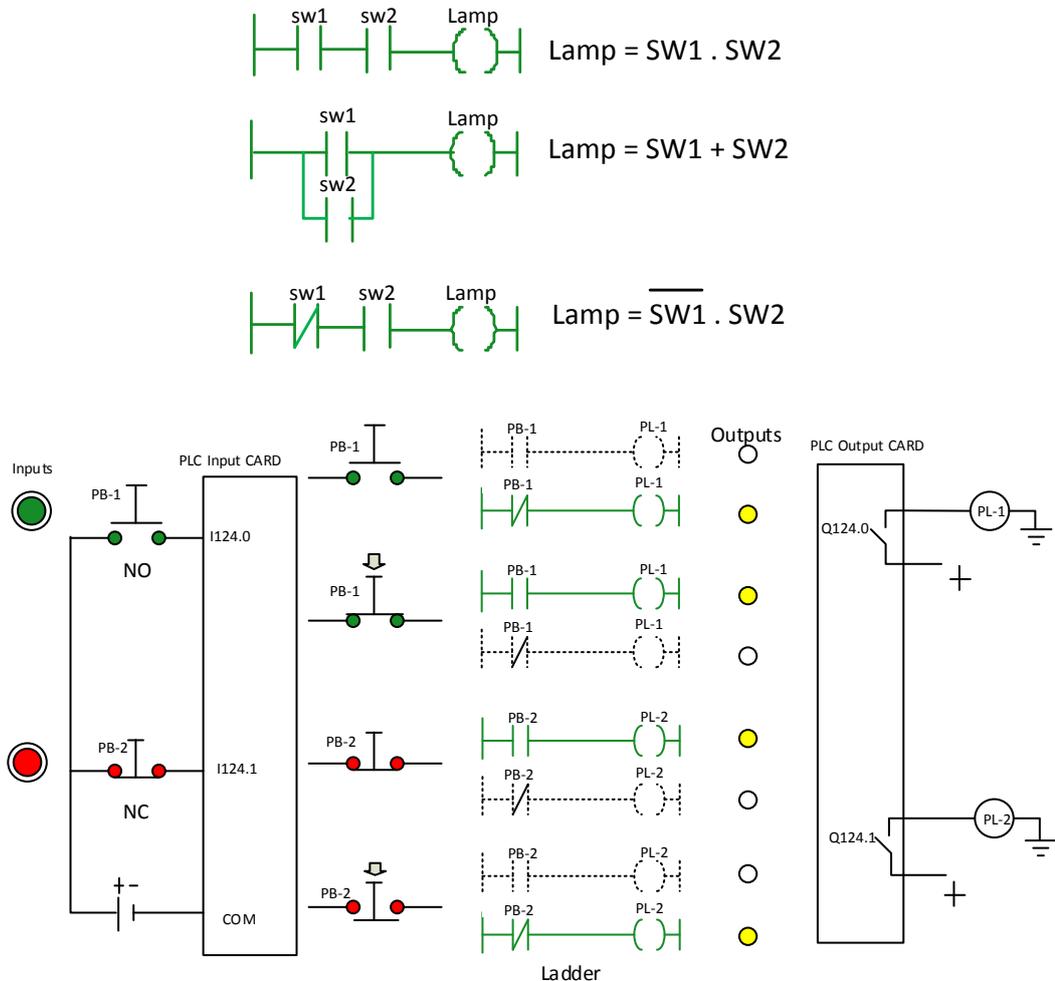


Ladder

**FIGURE 1.1**

The figure 1.1 illustrates the ladder program for one input (Push button) and one output (Pilot Light).

# ON / OFF OF A LAMP
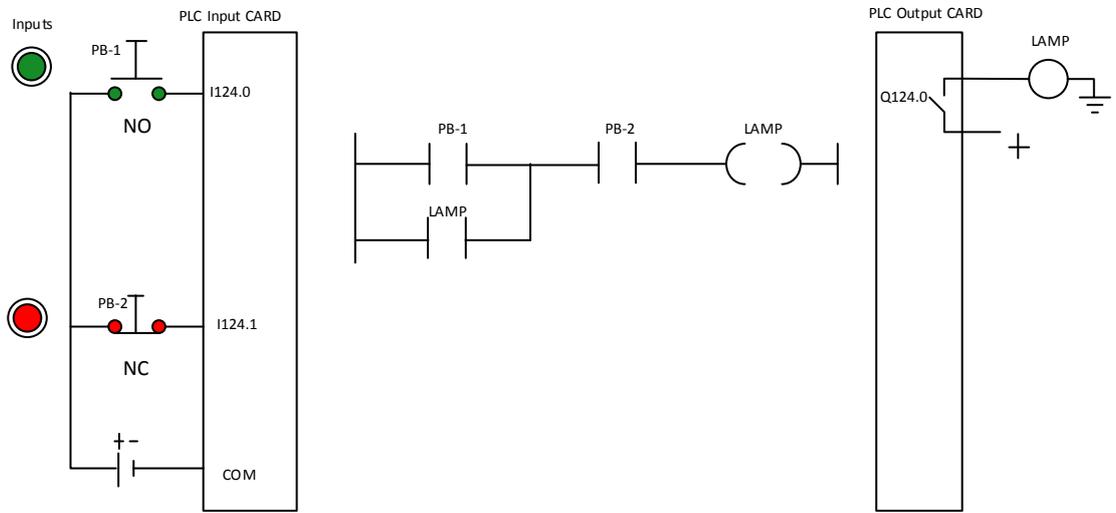


**FIGURE 1.2**

Equivalent Ladder/Logic and their truth tables



SAFE

UNSAFE

| PB-1 | PB-2 | LAMP |
|------|------|------|
| 0 | 0 | 0 |
| 0 | 1 | 0 |
| 1 | 0 | 1 |
| 1 | 1 | 0 |

| PB-1 | PB-2 | LAMP |
|------|------|------|
| 0 | 0 | 0 |
| 0 | 1 | 0 |
| 1 | 0 | 0 |
| 1 | 1 | 1 |
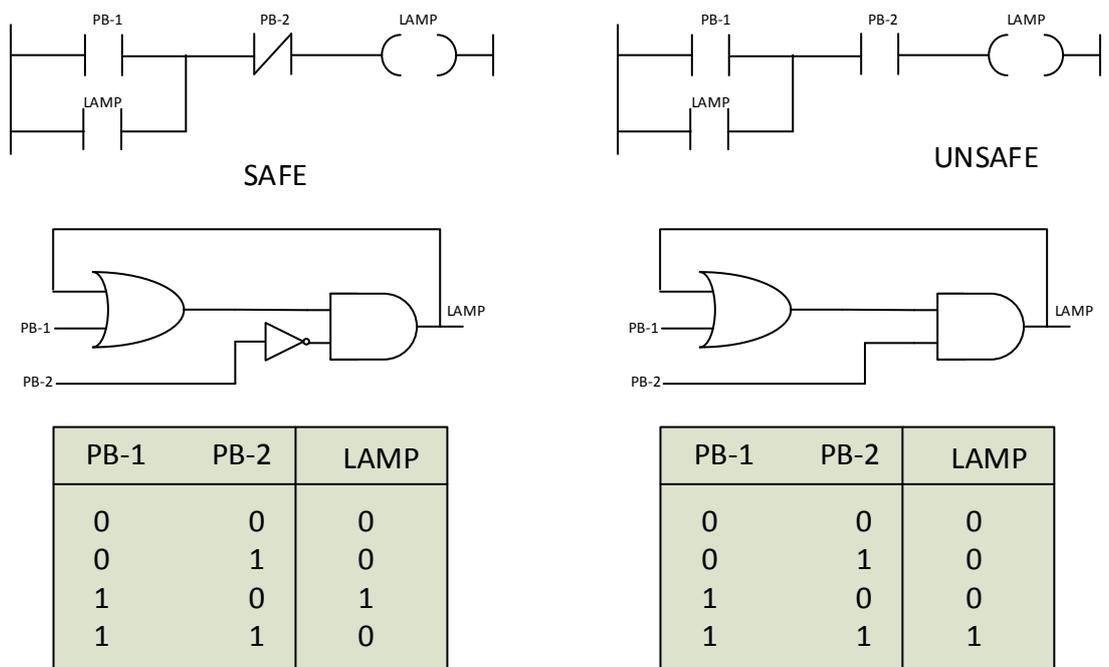
**FIGURE 1.3**

# SR FLIP FLOP AND THEIR FUNCTION IN PLC LADDER



| S | R | Output Q |
|---|---|----------|
| 0 | 0 | No change |
| 0 | 1 | Reset |
| 1 | 0 | Set |
| 1 | 1 | Priority reset |
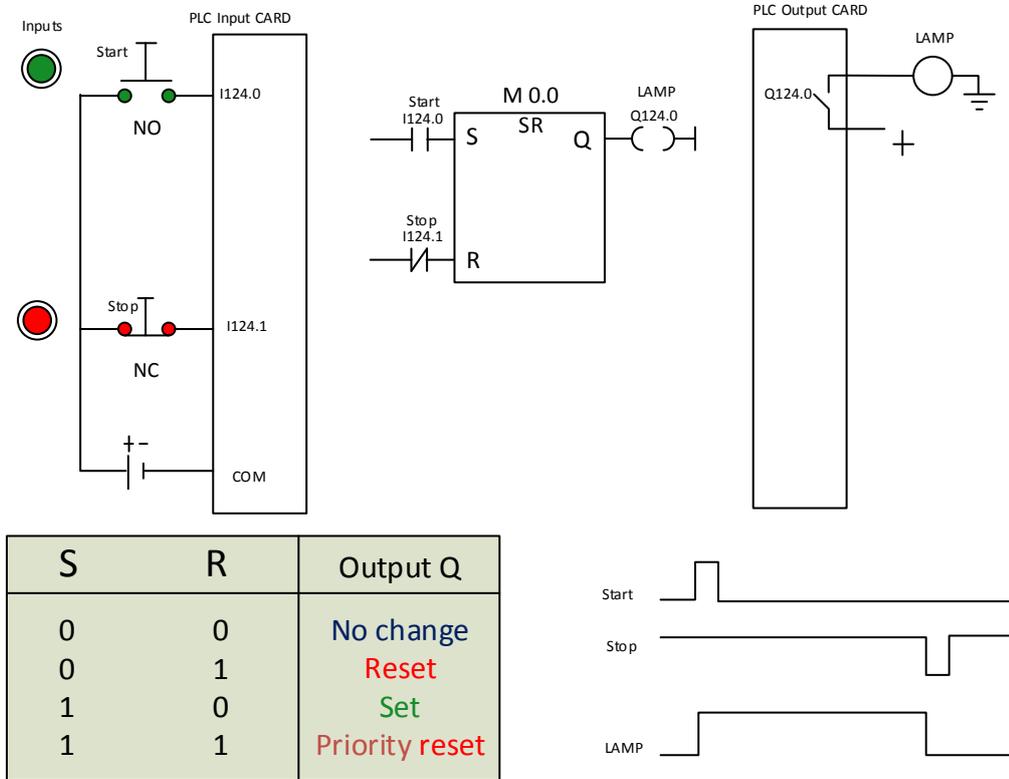
**FIGURE 1.4**

# SIEMENS SIMATIC S7 TIMERS
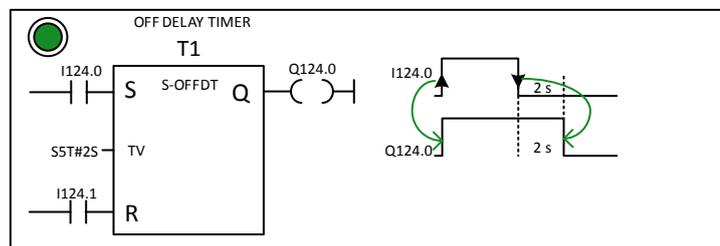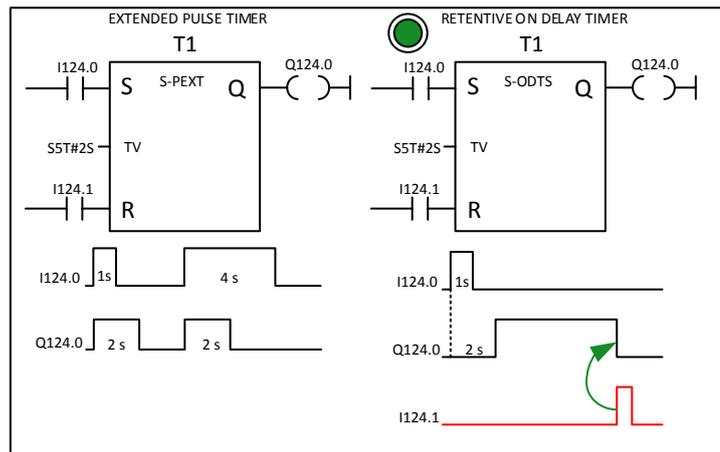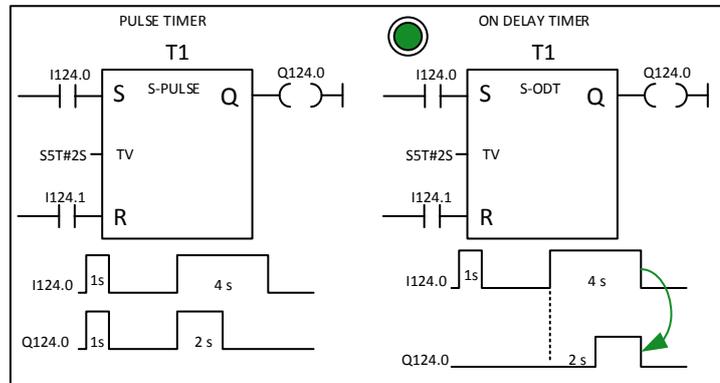


**FIGURE 1.5**

# Classical Method AND SR METHOD OF PROGRAMMING



**FIGURE 1.6**