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# ***Industrial Controls (1)***

*By*



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*Lecture (8)*  
*17– 12 - 2020*

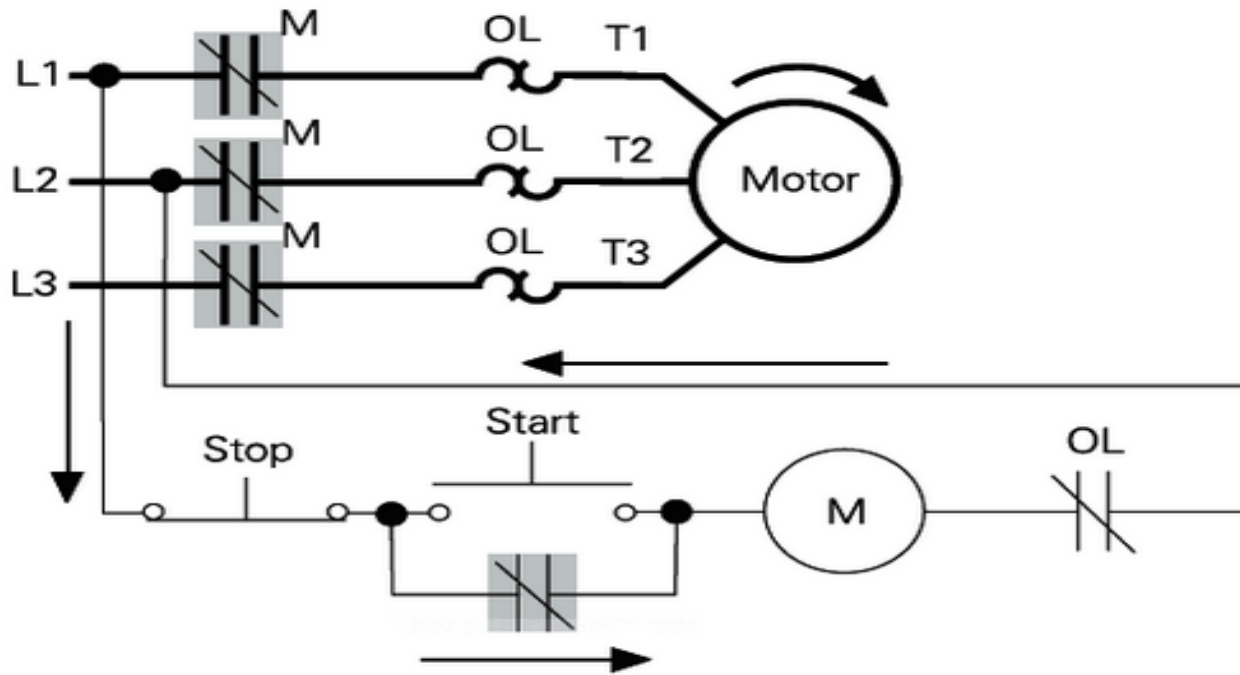


# *PLC Industrial applications*

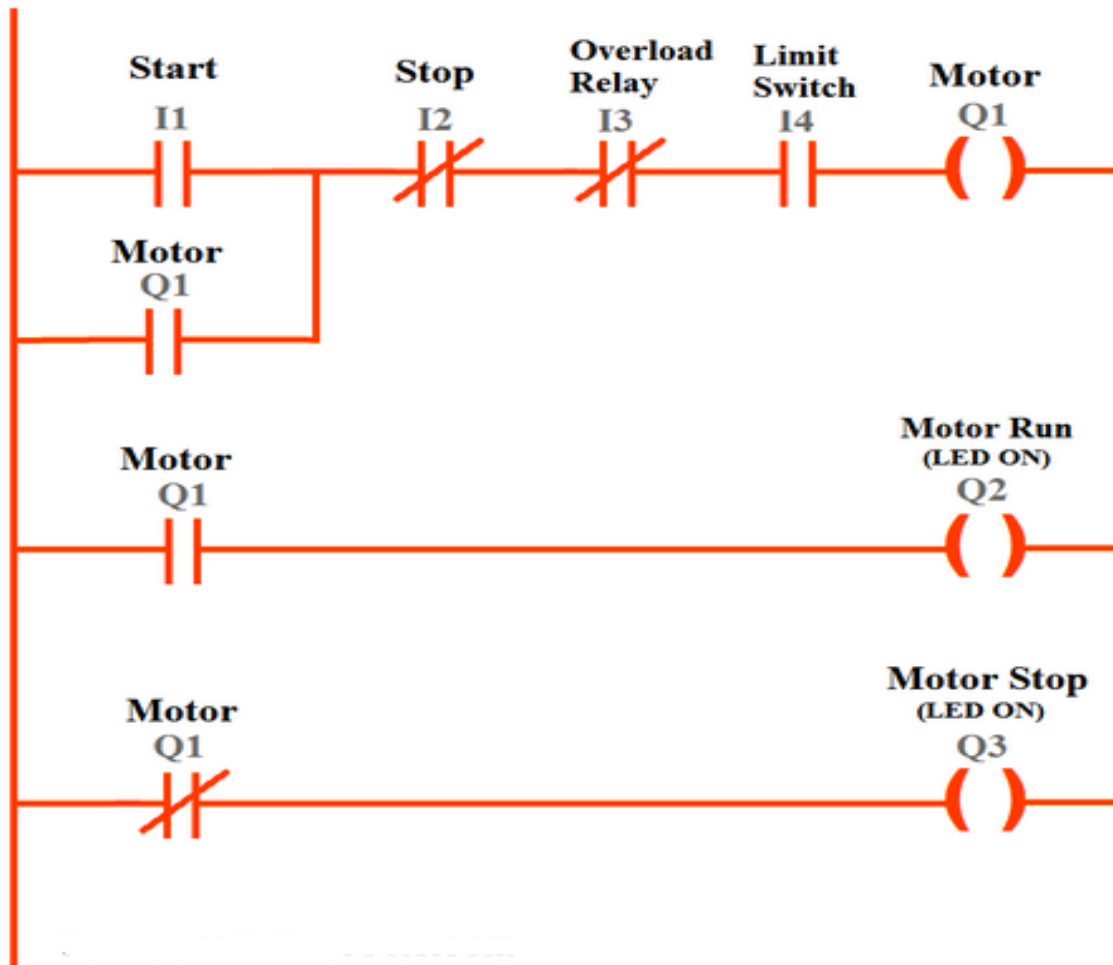
*Prof. Mohamed Ahmed Ebrahim*

# EX:(1): PLC Program for Motor Starter

- **PLC for motor starter It should have the following provisions:**
  1. **Push button:** to start the motor, The motor should continue to rotate even when the push button is released.
  2. **Stop Push button:** to halt the motor after it started.
  3. **Over current protection :** In case of over load, the motor should stop automatically by the signal coming from contactors of overload relay.
  4. **Limit switch :** It should prevent the motor from starting and can also stop the running motor.
  5. The motor starter should also have **indicator** (Lights) to show ON or OFF status of motor.



**Figure (1): Motor Electrical Schematic**



*Ladder (1): Ladder diagram for Motor starter*

- **Observation:-**

1. **Start Button I1:**

Normally open contact (Make contact) is used because the motor should only **start when the button is pressed**.

2. **Stop Button I2 :**

Normally close (break contact) contact is used because the button should **normally be closed** or high so that the motor keeps on running. It should open when the button is pressed. It is opposite to start push button.

3. **Overload relay I3 :**

In normal condition, this relay should allow the motor to rotate so normally close contact is selected for it. In case of overload it will stop the motor by opening its contact.

4. **Limit switch I4 :**

The motor should only rotate when the limit switch is closed therefore normally open contact is used.



#### **4. Output Q1, Q2, Q3 :**

Relay coil Q1, Q2 and Q3 represent motor output, motor indication ON and indication OFF respectively.

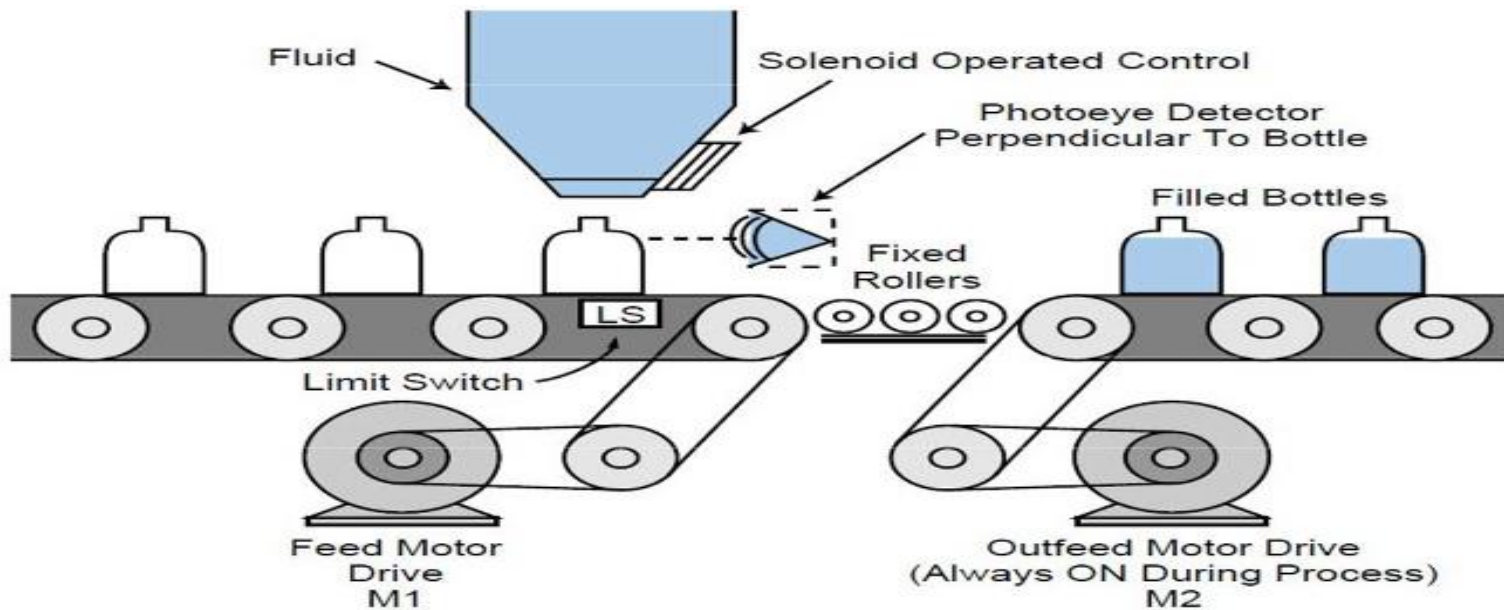
ON indicator gets input from normally open input which depends upon output Q1. OFF indicator is fed by normally close input which depends upon output Q2.

#### **5. Input Q1 ( for continuous rotation):**

Since it is required that once push button is pressed, motor should run continuously even if the push button is released.

# EX:(2): Continuous bottle filling system

- **Objective:**
  1. will implement a control program that detects the position of a bottle via a **limit switch** then waits for 0.5 secs.
  2. and then fills the bottle until a **photodetector** detects the filled condition of the bottle.
  3. After the bottle is filled ,the **buzzer** sounds and the control program will again wait for 0.7 secs. before moving to the next bottle.
  4. Until the limit switch signals ,the feed motor,**M1** runs while there are fixed rollers which carries the filled bottles. Motor,**M2** keeps running after the process has been started.

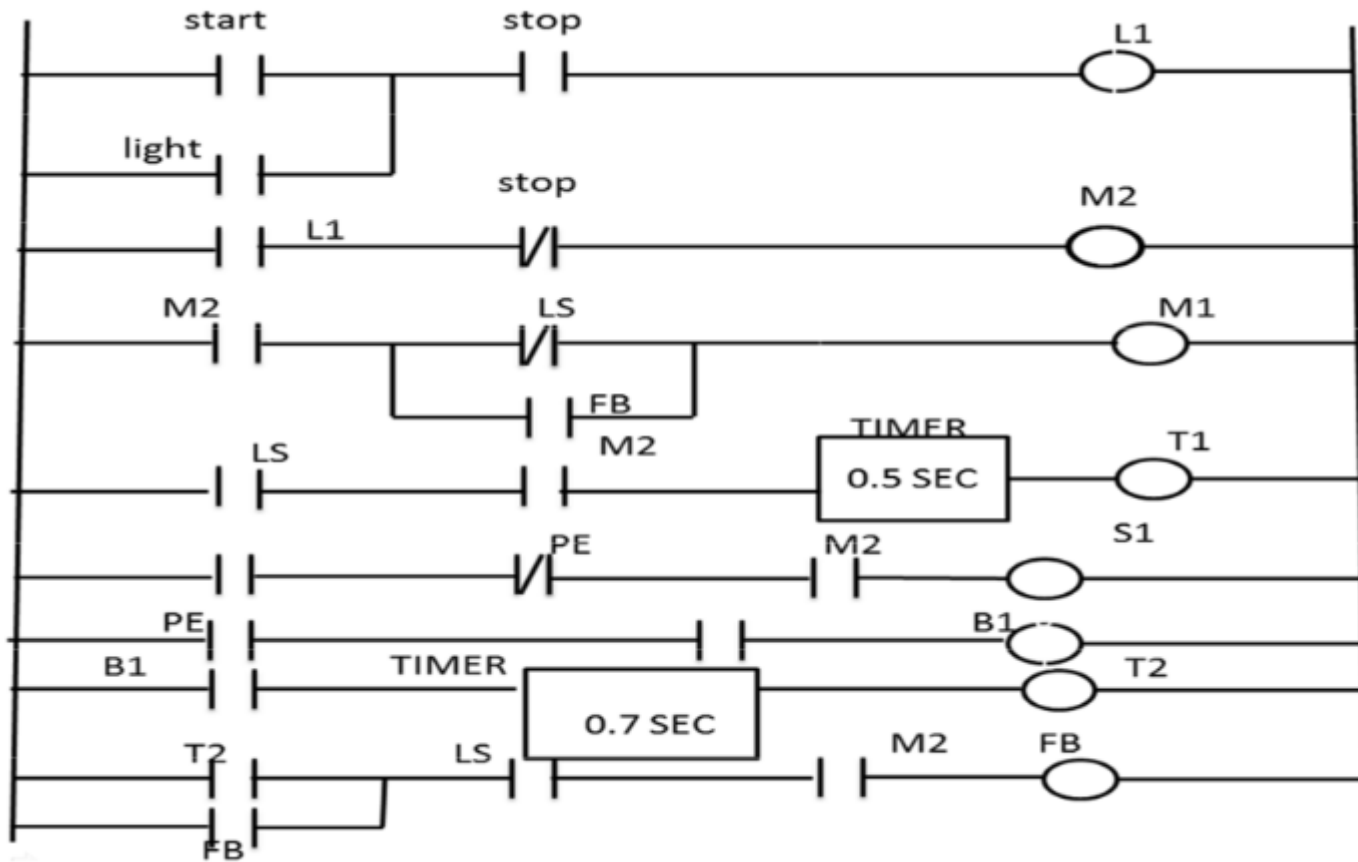


**Figure (2): Bottle filling system**

Inputs	address
Start	I0:15
Stop	I1:15
Limit switch(LS)	I2:15
Photo detector(PE)	I3:15

Outputs	address
Feed motor(M1)	O0:15
Outfeed motor(M2)	O1:15
Solenoid valve(S1)	O2:15
Light(L1)	O3:15
Buzzer(B1)	O4:15

**Table (2): Inputs and outputs employed**



*ladder (2): ladder diagram for bottle filling system*

- **Observation:-**

1. Once the start button is pressed the green light (L1) turns ON and remains ON until stop button is pressed. As light turns ON outfeed motor(M2) starts running.
2. After M2 runs and if either limit switch(LS) has not signaled or filled bottle condition is fulfilled motor(M1) starts.
3. After limit switch has signaled timer,T1 gets activated.
4. After T1 gives done (DN) signal and photo eye detector (PE) is disabled ,solenoid valve gets in operation. As PE signals solenoid stops and buzzer(B1) sounds after which timer,T2 gets enabled which stops the process for 0.7 seconds.
5. Once the filled bottle condition is activated the cycle starts again.

**Thank You**  
**For Your Attention**



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