



Andhra Pradesh State Skill Development Corporation



Basics of PLC

A task using logic gates



EXAMPLES:

1. Use of logic gates

- There are three switches s1, s2 and s3, and, there are three lamps L1,L2 and L3.
- If any of switch s1, s2 and s3 is “ON”, then lamp L1 must glow. (L2 & L3 must be “off”)
- If any 2 switches among s1, s2 and s3 are “ON”, then lamp L2 must glow. (L 1& L3 must be off)
- If all three switches are “ON”, then lamp L3 must glow. (L1 & L2 must be off)

2. Use of “Clock Memory” function(Fan Control Unit)

There are three fans: Fan f1,fan f2 & “Stand-By” fan f3 along with a Main Contactor.

- Fans start only after Main Contactor is started. A push button is used to start main contactor.
- If any one fan fails then “Stand-By” fan f3 goes “ON”.
- If any two fans fail, then main contactor must stop and a lamp must flash at 5 Hz frequency.

Note: here fan failure indication is to provide by input switches.

3. Use of “SET-RESET” function (forward-reverse)

- A motor can be rotated in forward direction as well as in reverse direction.
- The motor is supplied power through a “Main Contactor” along-with an “Over-Load protection relay”.
- There are two separate contactors for forward and reverse directions of motor, in parallel, with one input phase is interchanged for reverse direction.
- The contactors for forward-reverse are supplied power through Main Contactor.
- There are 2 switches “Stop” and “Start” for controlling Main Contactor.
- Now to rotate motor in forward direction switch s1 is used and for reverse direction switch s2 is used.
- To change direction of motor, the motor must first be stopped and then the forward or reverse switch must be pressed.
- When “stop” button is pressed or OLR trips the motor must get disconnected from power supply.
- If motor is in stop mode “OFF” LED must glow, if motor stopped due to “OLR tripping” “Fault” LED must glow.

4. Use of “Comparator” function

- A temperature sensor is used to monitor the temperature of a process continuously.
- If process temperature is between 95 to 105 degrees then lamp L1 must be “Steady-ON”.



- If temperature is less than 95 degrees then lamp L1 must flash slowly.
- If temperature is more than 105 degrees then lamp L1 must flash fastly.

5. Use of “Rising edge & Falling Edge” function

- On the first press of a remote button, television must switch “ON”.
- On the second press of button television must switch “OFF”.

6. Use of Timer function:

- When a “Start” button is pressed, Lamp L1 and lamp L2 must glow in such a way that when L1 is ON,L2 must be OFF and vice-a-versa. This opposite blinking is a continuous process and will only be stopped when Start button is released.

7. Use of Timer function:

- There are two push buttons “START” & “STOP”.
- When “start” is pressed Conveyor 1 must switch ON and Conveyor 2 must start 5secs after Conveyor 1 has started.
- When pressing “stop” conveyor 2 switches “off” immediately and conveyor 1 stops 10 secs after the conveyor 2 has stopped.

8. Use of Timer function:

- Motor 1 must be ON 5 secs after “Start” push-button is pressed. Motor 2 will start 5 secs after motor 1 is On and
- 3 will start 5 secs after motor 2 is on.
- When “stop” is pressed, motor 3 gets “off” after 5secs, motor 2 gets “off” 5 secs after motor 3 stops and motor 1 gets off 5 secs after motor 2 stops.

9. Use of Timer Function:

- When pressing “Start” button immediately the motor, fan and pump must start.
- When pressing “Stop”, pump switches off 7 secs after stop is pressed, fan switches off 10 secs after the pump is off and motor switches off 15 secs after fan is off.

10. Use of Timer function(Traffic signal)

- When “start” switch is pressed RED light goes on for 10 secs
- Yellow light goes ON for 7 secs after red light goes off
- Green light goes ON for 15 secs after yellow is off.



- When releasing Start button process must stop.

11.Use of “UP-Down Counter” function

- There is an “Entry” and “Exit” in a parking area. Car is sensed at Entry and Exit.
- When there is no car in parking area Yellow light must be ON.
- When there are cars between 1-9 present in parking area, Green light must be ON.
- When there are 10 cars Red light must be on.

12.Use of “UP-Counter”

- There is a selector switch s1, one “start” button and one “stop” button.
- IF S.S pressed one along with start button then motor 1 must be ON.
- If S.S is pressed two times along with Start then motor 2 must be ON.
- If S.S is pressed three times along with Start motor 3 must be ON.
- IF S.S pressed one time along with stop button then motor 1 must be OFF.
- If S.S is pressed two times along with Stop then motor 2 must be OFF.
- If S.S is pressed three times along with Stop motor 3 must be OFF.

13.Use of “Comparators & math functions”

- In a Biscuit manufacturing company, there is one packaging line for Sweet biscuits and a separate packaging line for Salt biscuits.
- A customer has ordered 15 sweet biscuit packets and 10 salt biscuit packets.
- Salt biscuits packaging line has to start after 5 sweet biscuit packets are already packed.
- When his order of sweet biscuits is packed L1 must be high and when his order of salt biscuits is packed L2 must be high.
- Once his complete order is ready for loading L3 must be high.