Electro-Pneumatic Circuits

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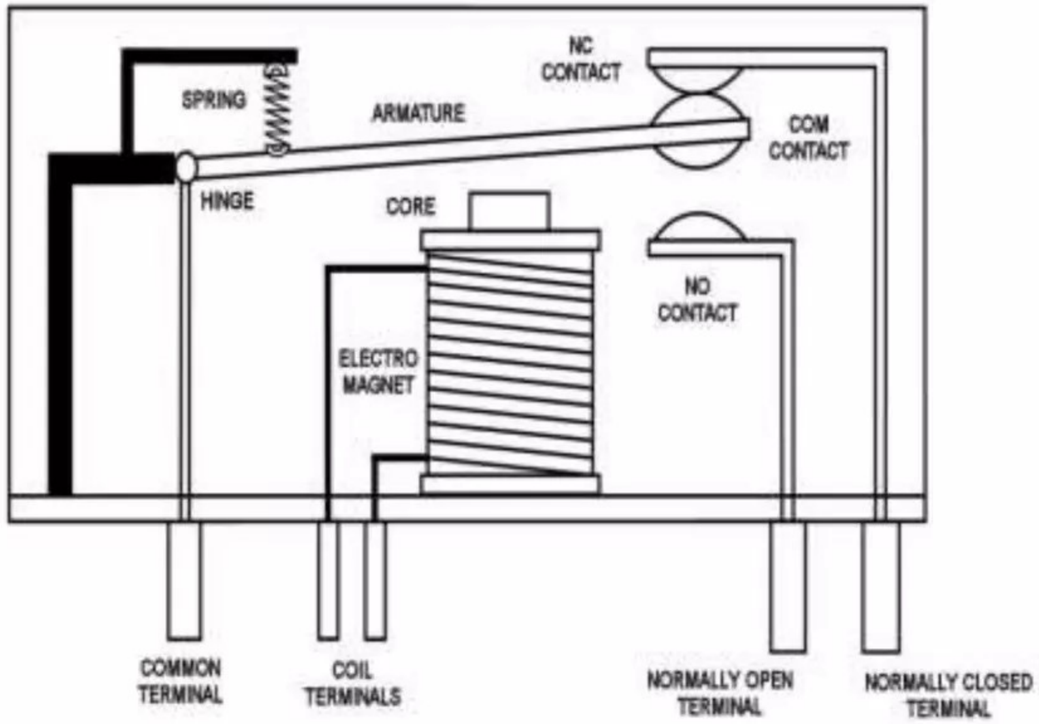
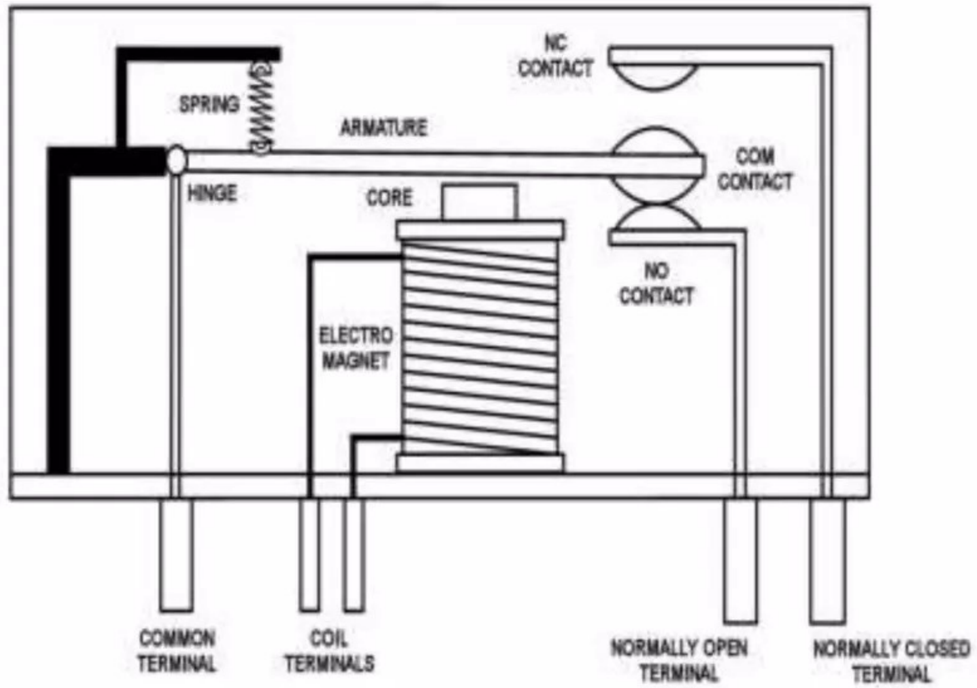
Electro-Pneumatic Circuit

Que1: Explain about Relay.

Solution: A relay is an electrically operated switch. It consists of a set of input terminals for a single or multiple control signals, and a set of operating contact terminals. The switch may have any number of contacts in multiple contact forms, such as make contacts, break contacts, or combinations thereof.



This is a drawing of a de-energized relay, When no current is flowing in the electromagnet coil the armature is pulled up by the spring and its COM contact connects to the NC contact.



This is a drawing of an energized relay. When a voltage is applied to the electromagnet coil the current flowing in the coil produces magnetic energy in the iron core which pulls the armature down. When the armature pulls down the COM contact switches from NC to NO.

Electro-Pneumatic Circuit

Que 2: Draw electric circuit for AND logic using direct and indirect method.

Solution:

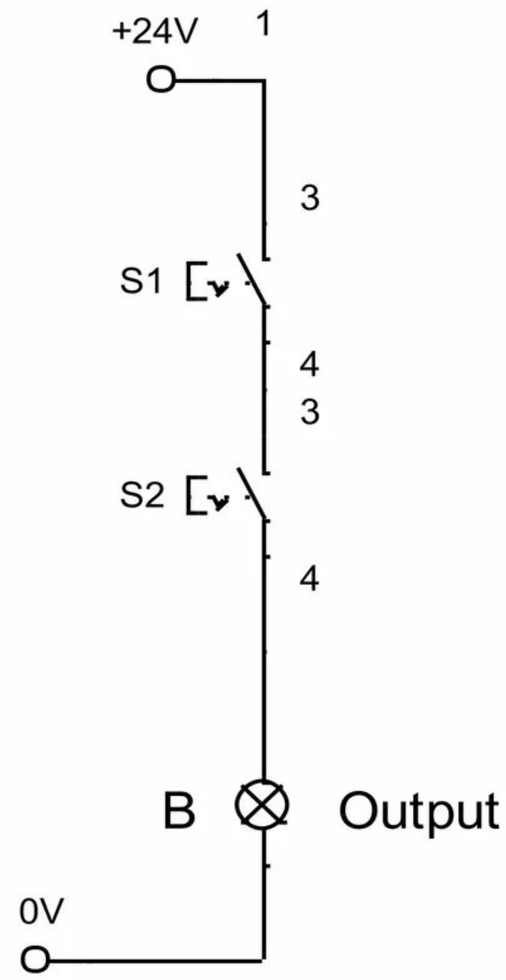
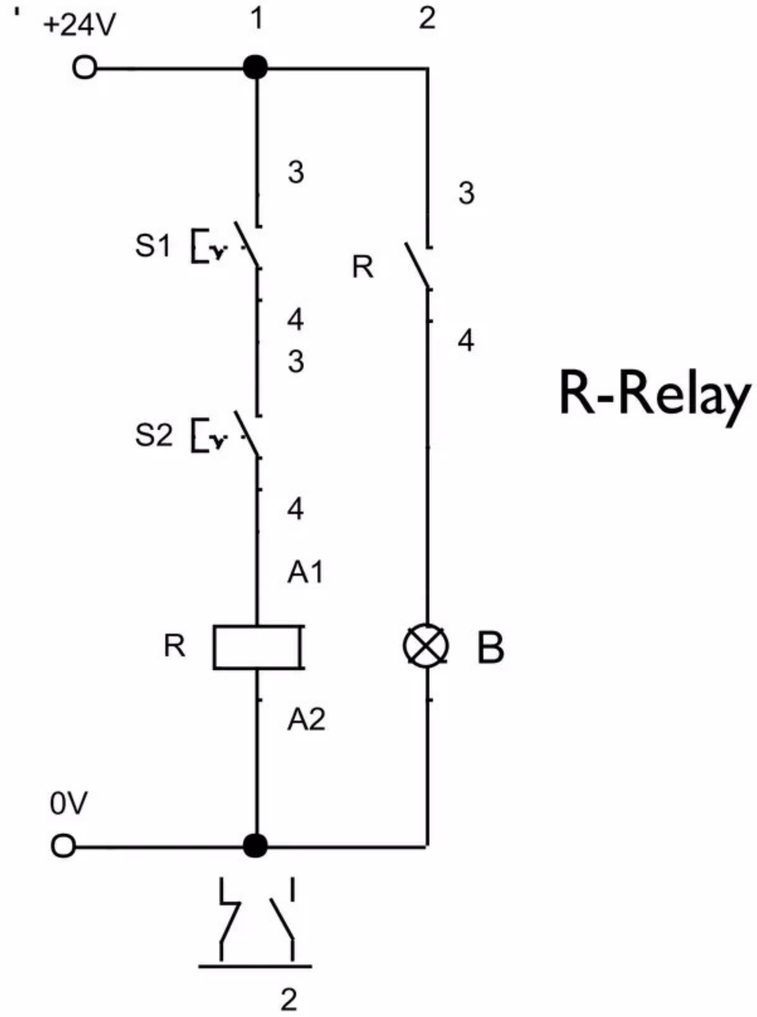


Fig: Direct Method



R-Relay

Fig: In Direct Method

Electro-Pneumatic Circuit

Que 3: Draw electric circuit for OR logic using direct and indirect method.

Solution:

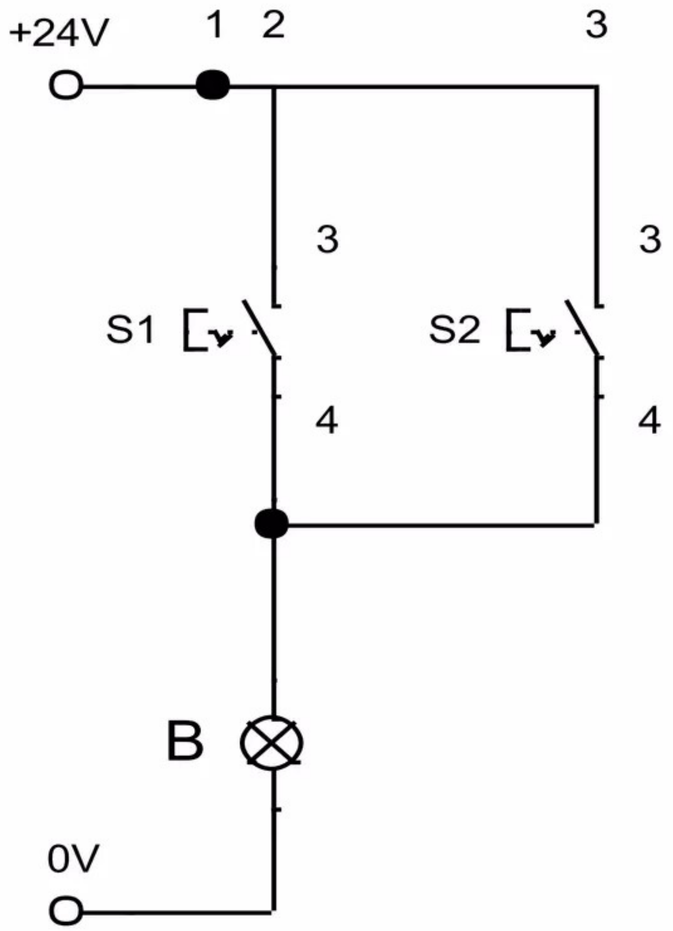


Fig: Direct Method

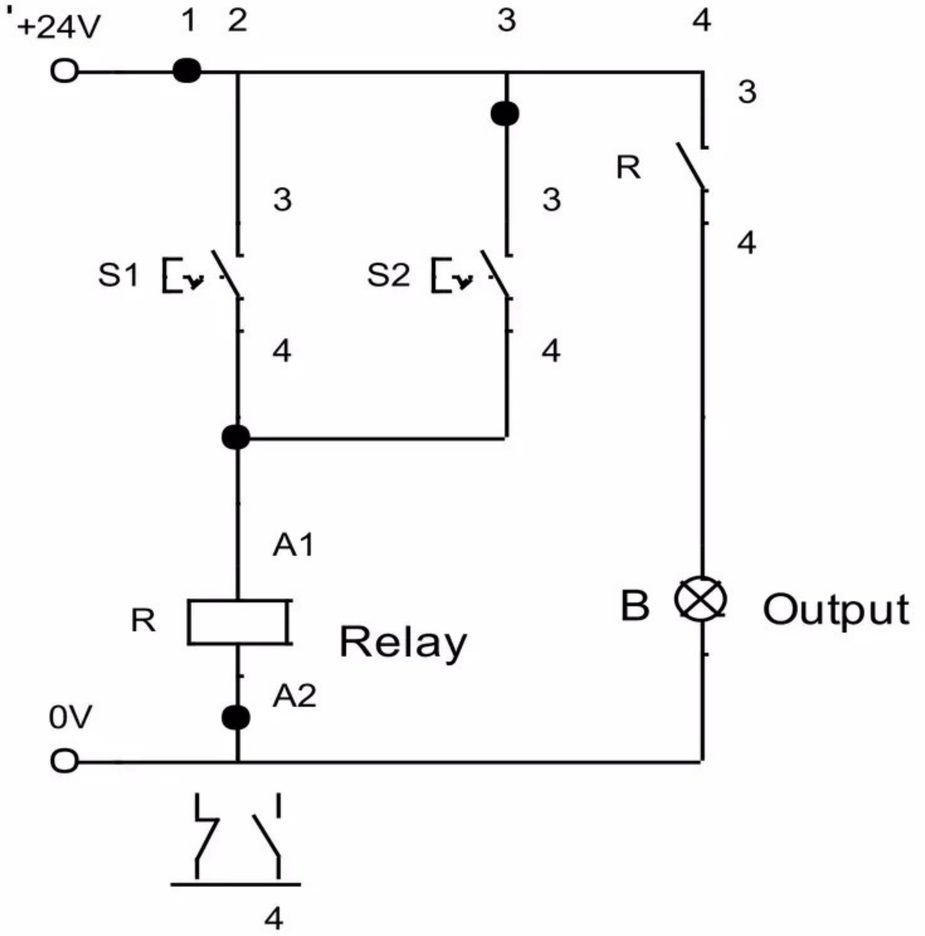


Fig: In Direct Method

Electro-Pneumatic Circuit

Que 4: Explain Latching logic Concept.

Solution: A simple example of such a situation is a bulb, which is started by pressing a button switch. Although the switch contacts do not remain closed, it is required that the bulb continue to run until a stop button switch is pressed.
The latching used to stay the bulb run until the push button is pressed again.
START- Normally Open (NO) Push button; OFF- Normally Closed (NC) Push button.

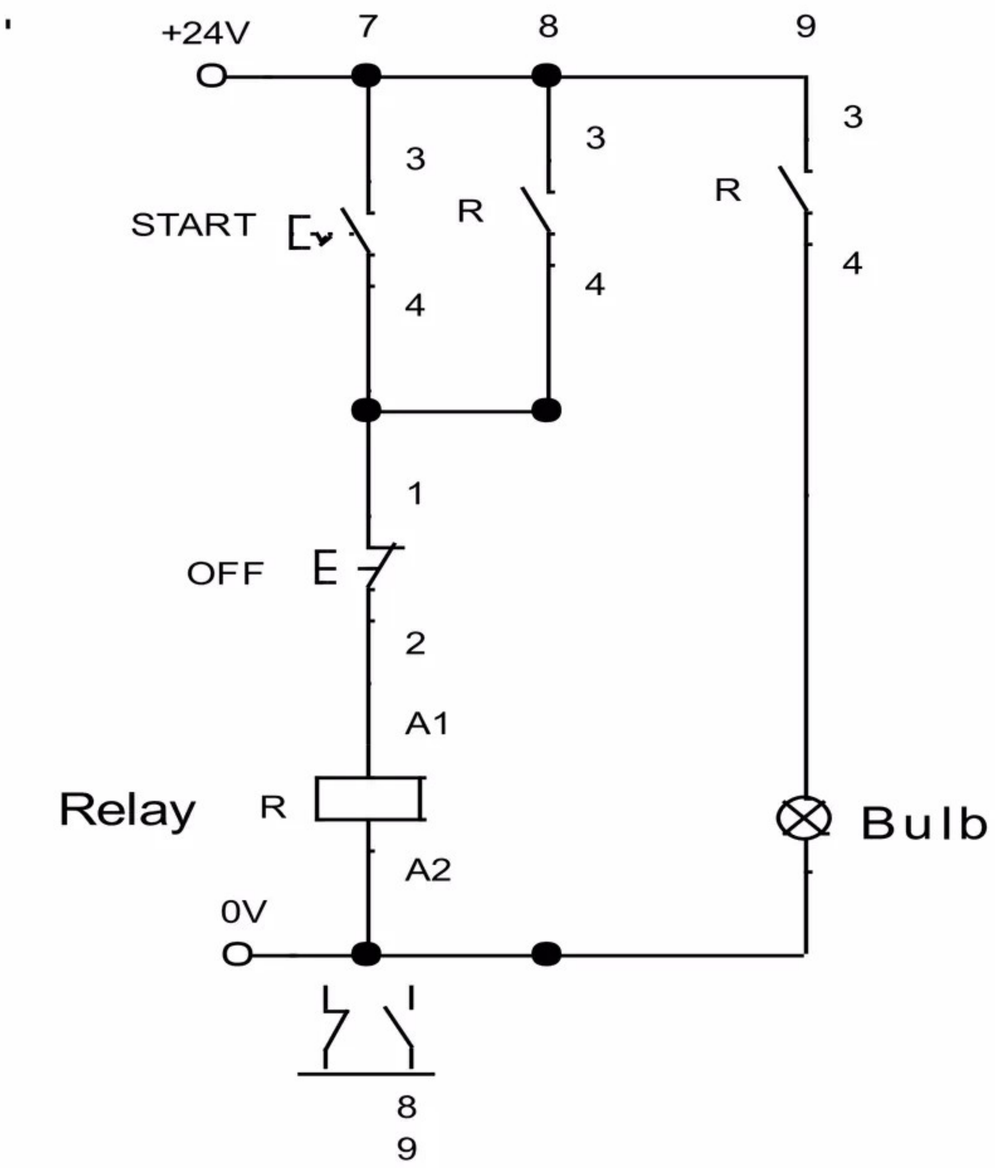


Fig: Latching

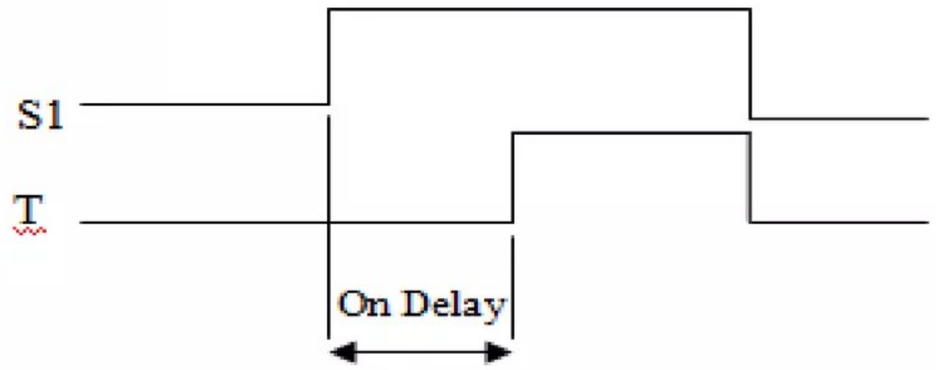
Electro-Pneumatic Circuit

Que 5: Explain on-delay and off-delay timer.

Solution:

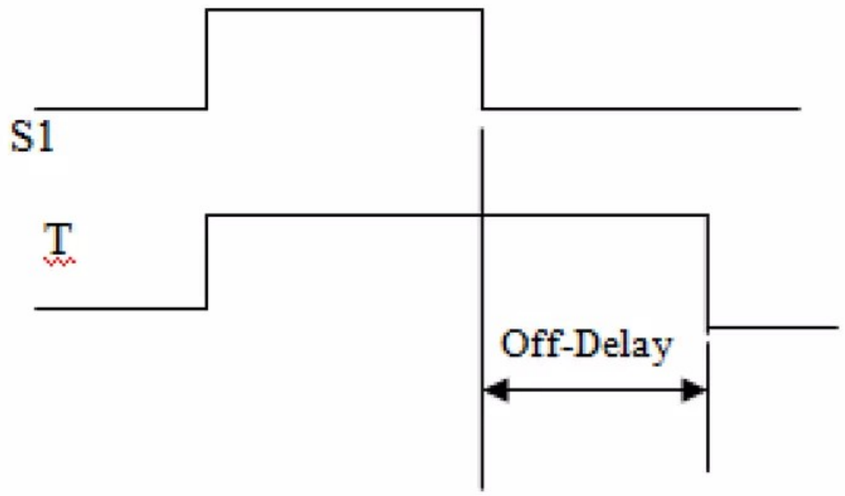
On-delay Timer:

Ex: When the S1 switch is on the lubricant pump (LP) will start immediately, but grinding machine (GM) will start after preset time(say 8 Sec) of timer. Here T is On-delay Timer.



Off –Delay Timer:

Ex: In a car when key (Switch) is on both Engine(E) and fan are on at time. When key is off , the engine will off immediately but fan(F) will off after preset time of timer (Say 15 Sec) .



Electro-Pneumatic Circuit

Que 6: if Switch S1 is on then Bulb A is on but Bulb B is on after 5 sec. If Switch S1 is off, both Bulb should off. Draw a Electric logic ladder.

Solution:

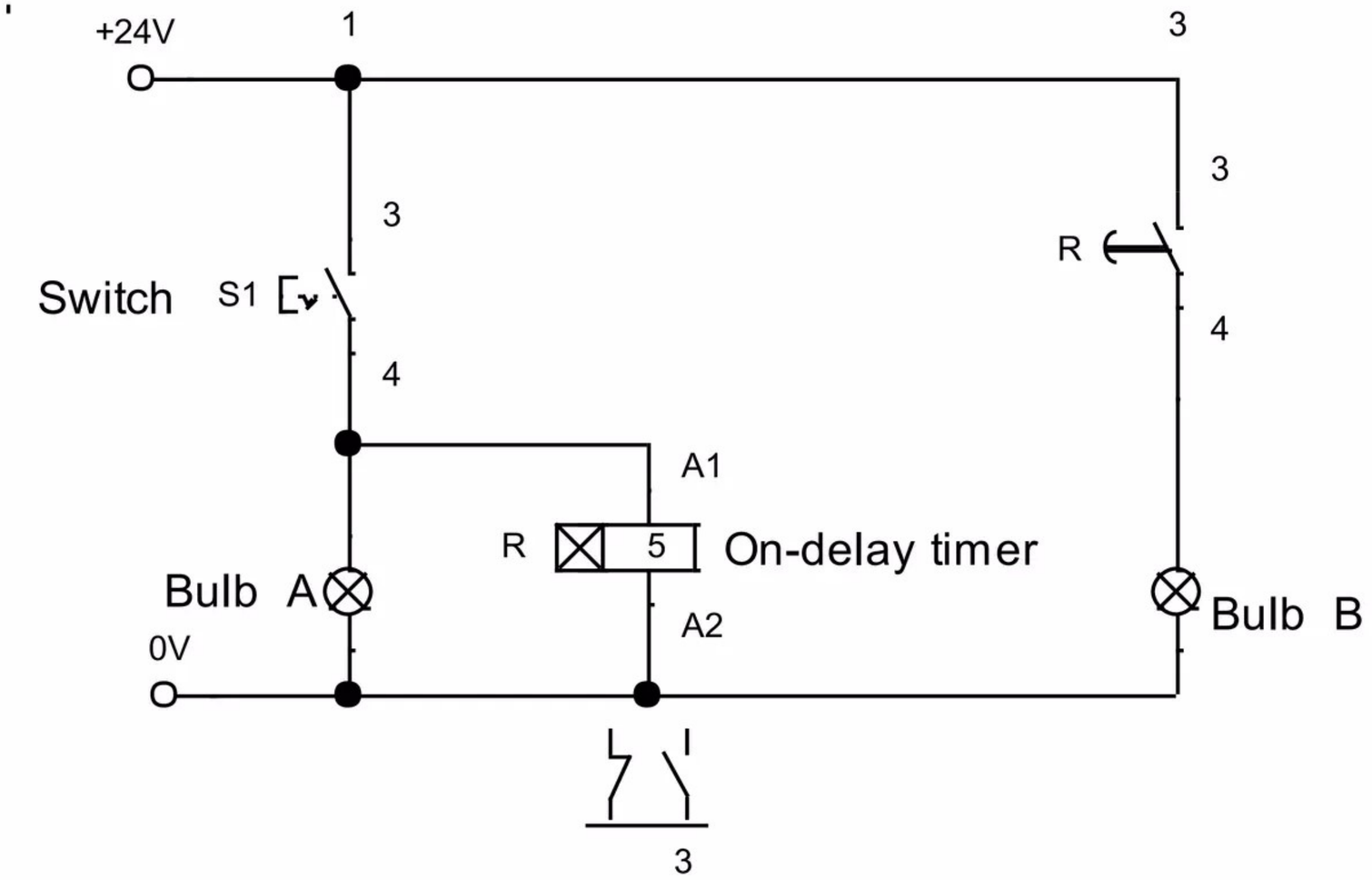


Fig: On-delay Timer

Electro-Pneumatic Circuit

Que 7: If Switch S1 is on both bulbs on same time and if switch s1 is off both bulb should off after 4 Second. Draw a Electric logic ladder.

Solution:

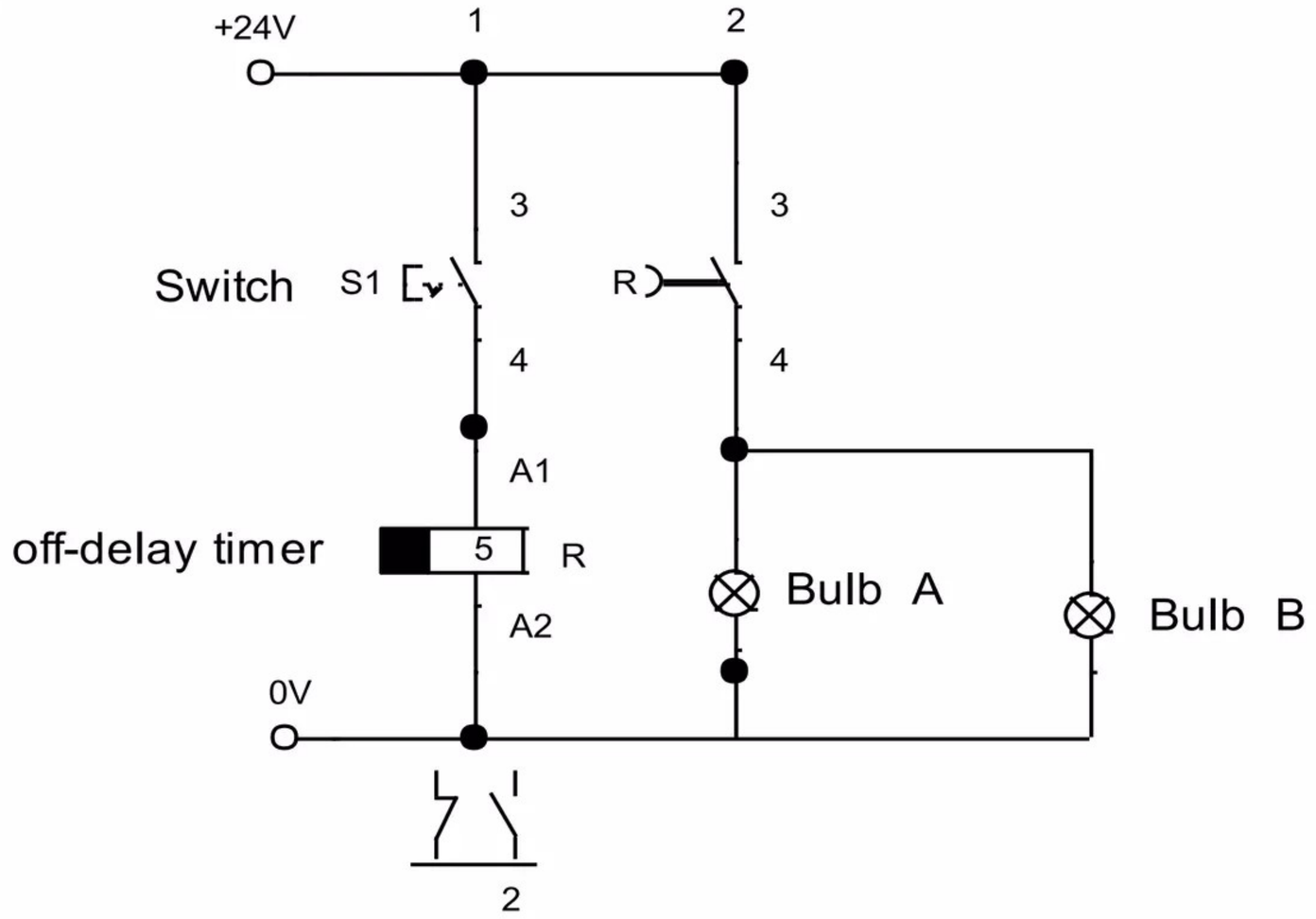


Fig: Off-delay Timer

Electro-Pneumatic Circuit

Que 8: Draw Electro-pneumatic Circuit for A+A-

Solution: S1 and S2 are sensors; A+ and A- are Solenoids

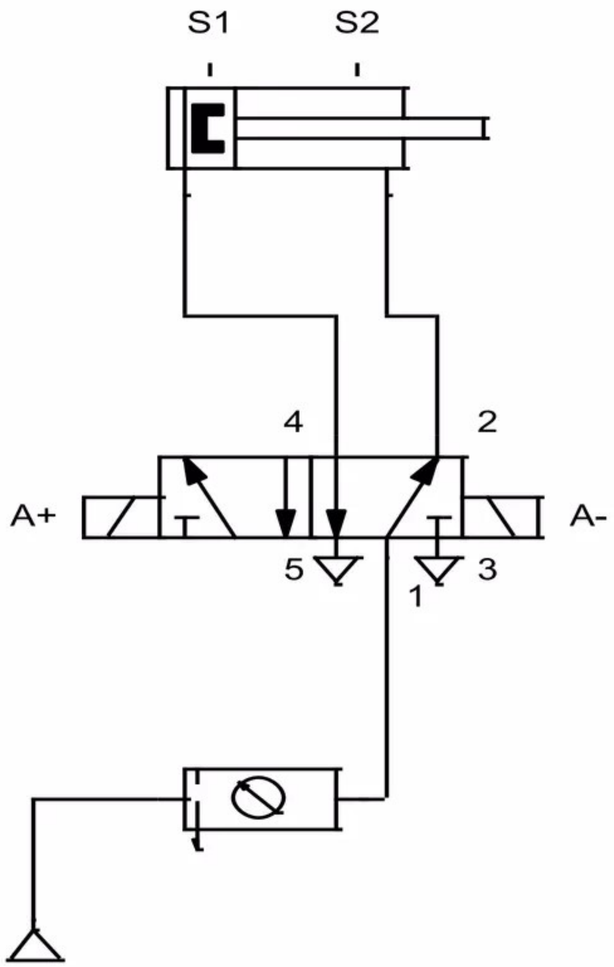


Fig: Pneumatic Circuit

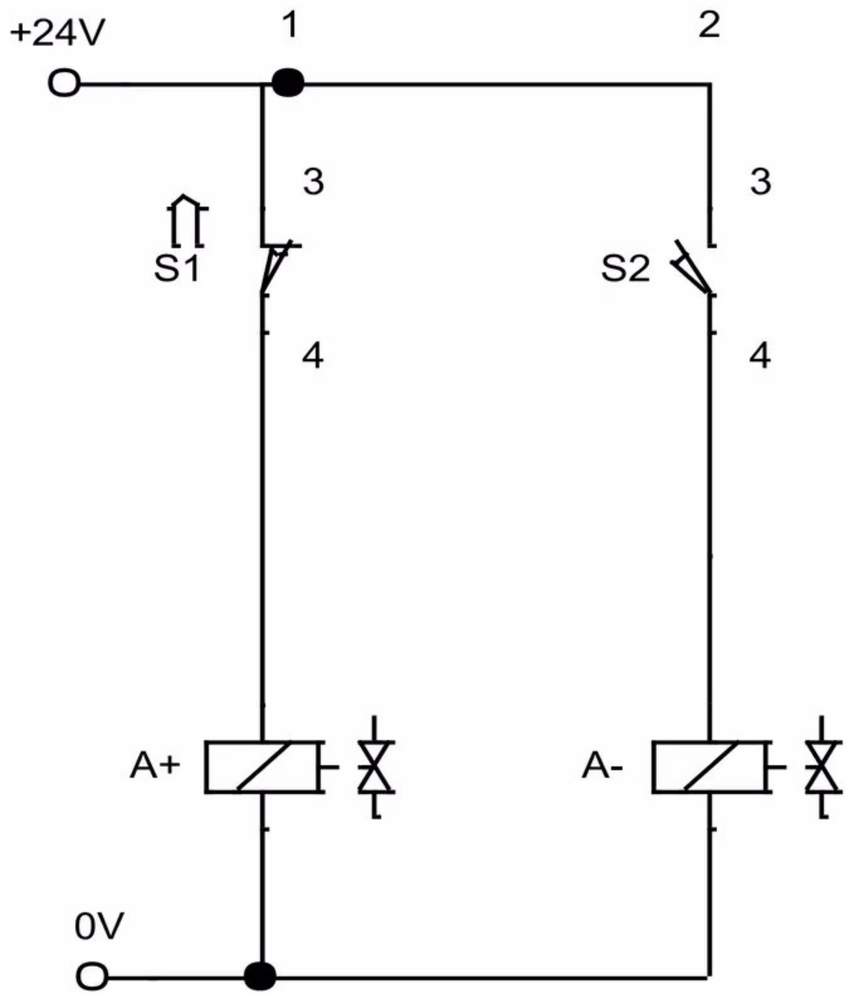


Fig: Electric Ladder Logic Circuit

Electro-Pneumatic Circuit

Que 9: Draw Electro-pneumatic Circuit for A+A- using Relay.

Solution: S1 and S2 are sensors; A+ and A- are Solenoids; K1 and K2 are Relays

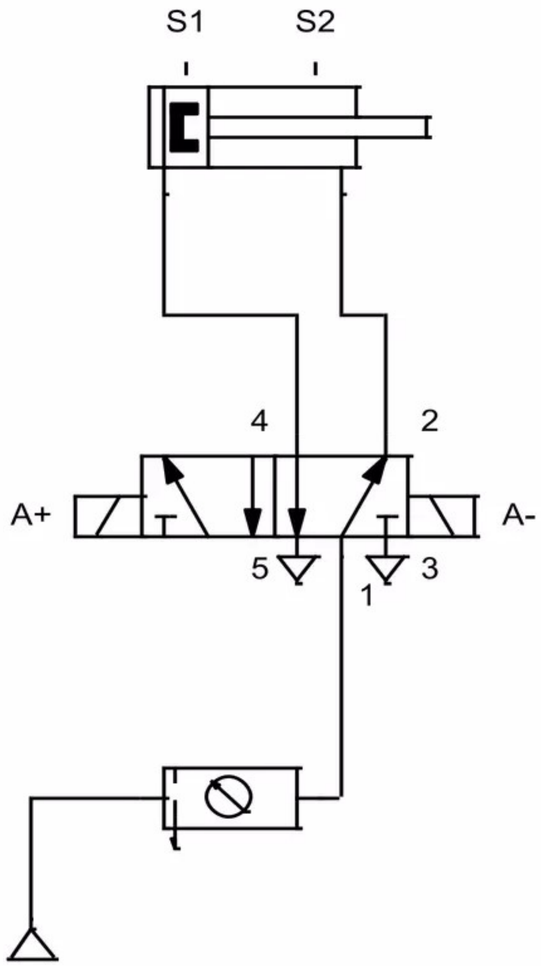


Fig: Pneumatic Circuit

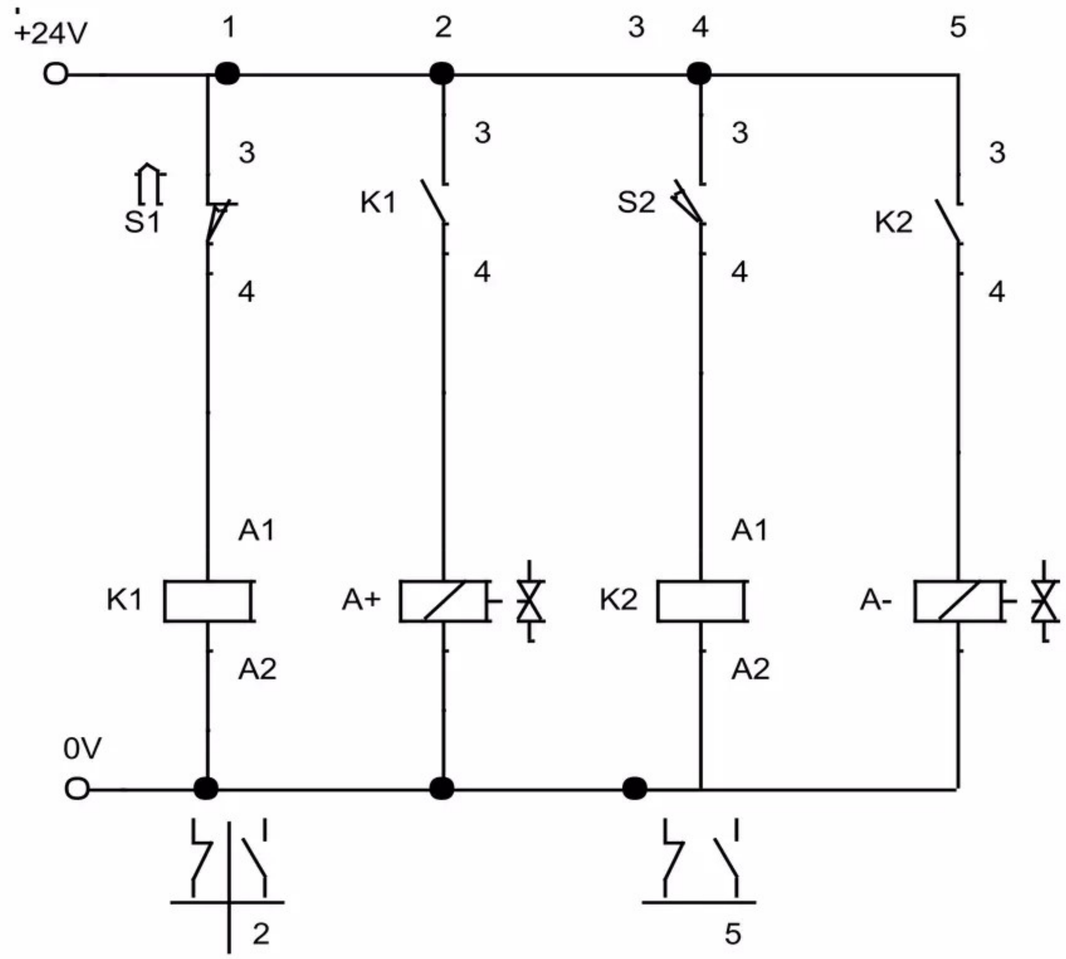


Fig: Electric Ladder Logic Circuit

Electro-Pneumatic Circuit

Que 10: Draw Electro-Pneumatic Circuit for A+ A- using latching Circuit.

Solution: S1 and S2 are sensors; A+ and A- are Solenoids; K1 and K2 are Relays

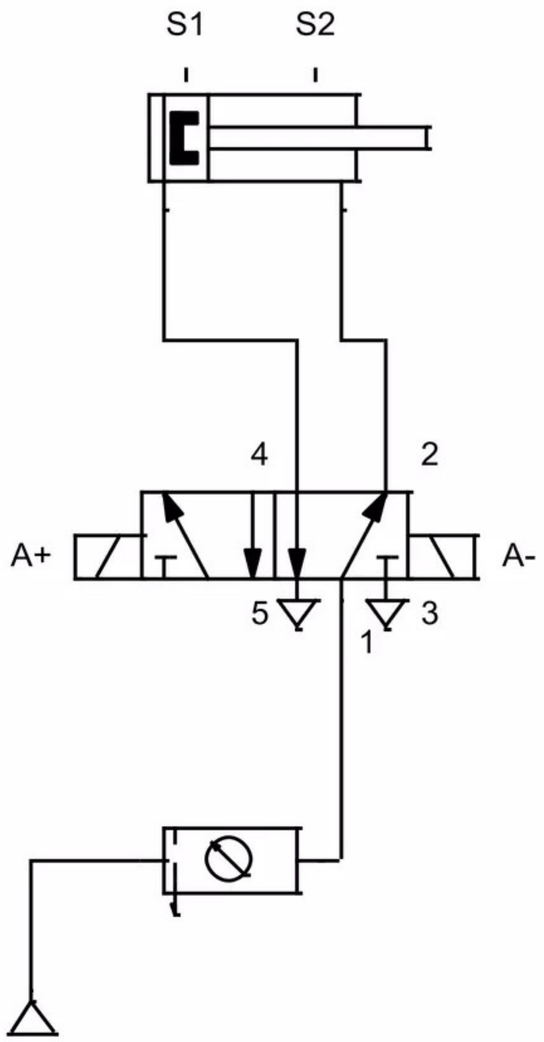


Fig: Pneumatic Circuit

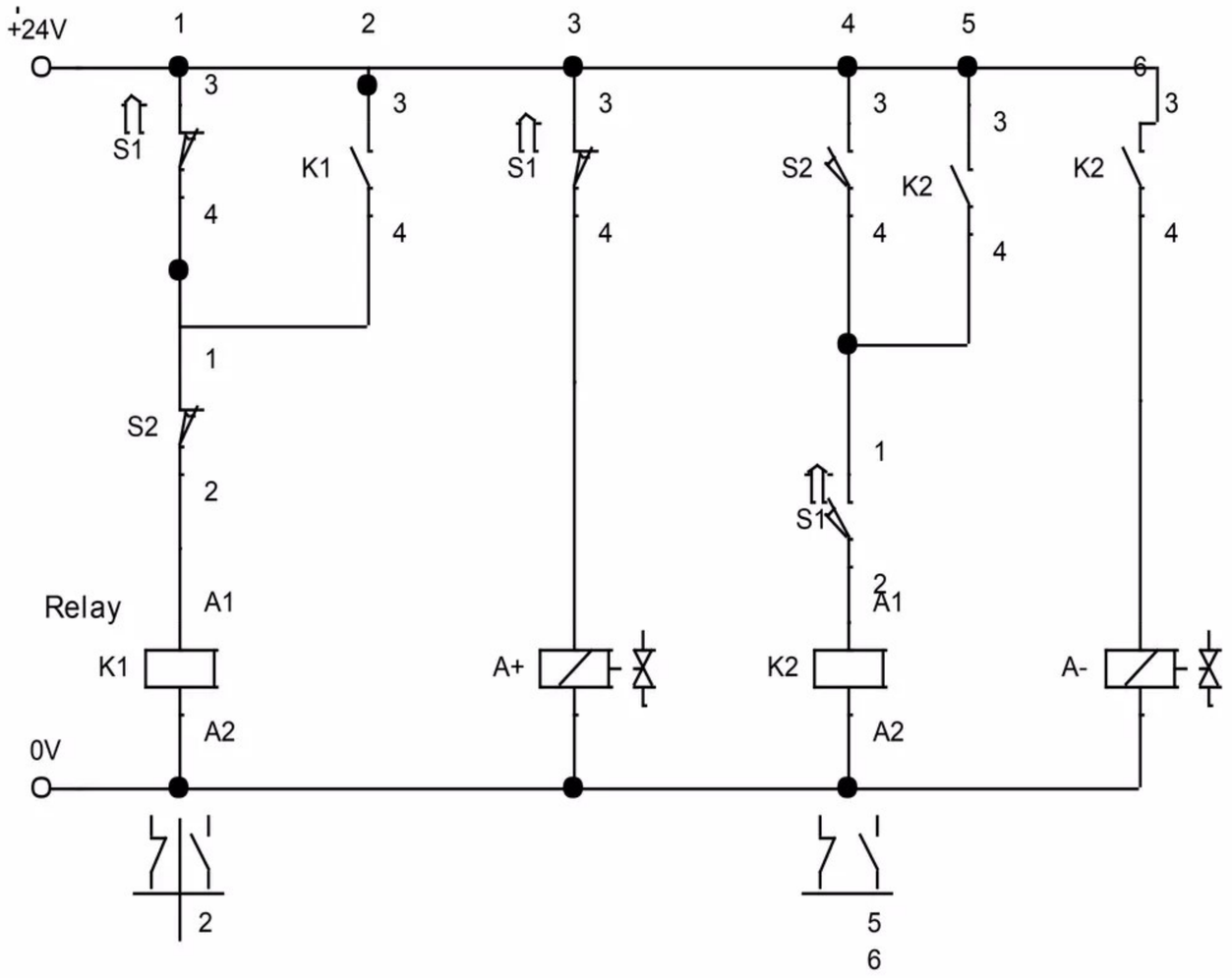


Fig: Electric Ladder Logic Circuit

Electro-Pneumatic Circuit

Que1 1: Draw an Electro-Pneumatic Ckt for (Delay)A+(Delay)A-.

Solution: S1& S2 are sensors; A+& A- are Solenoids; T1&T2 are on-delay timers

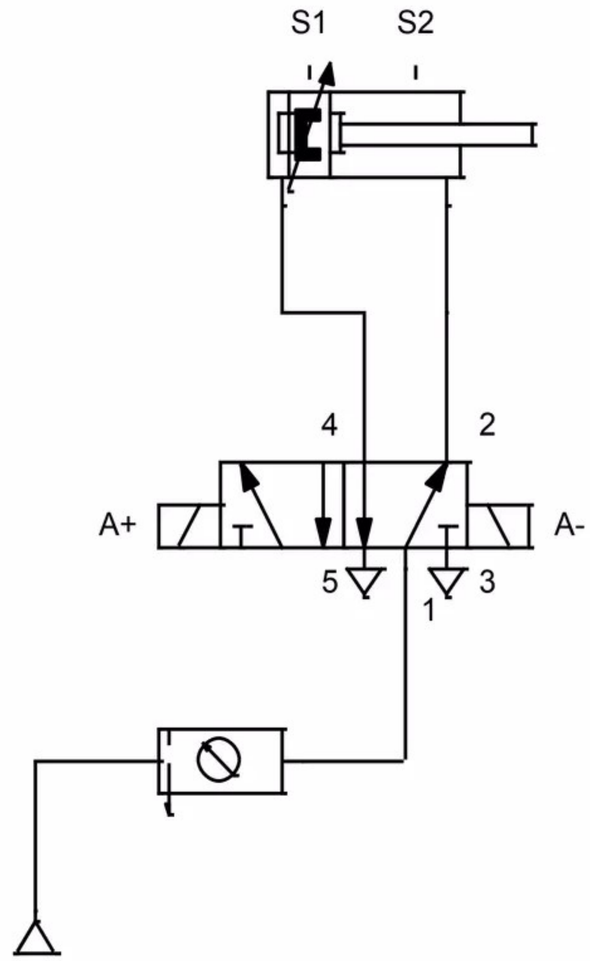


Fig: Pneumatic Circuit

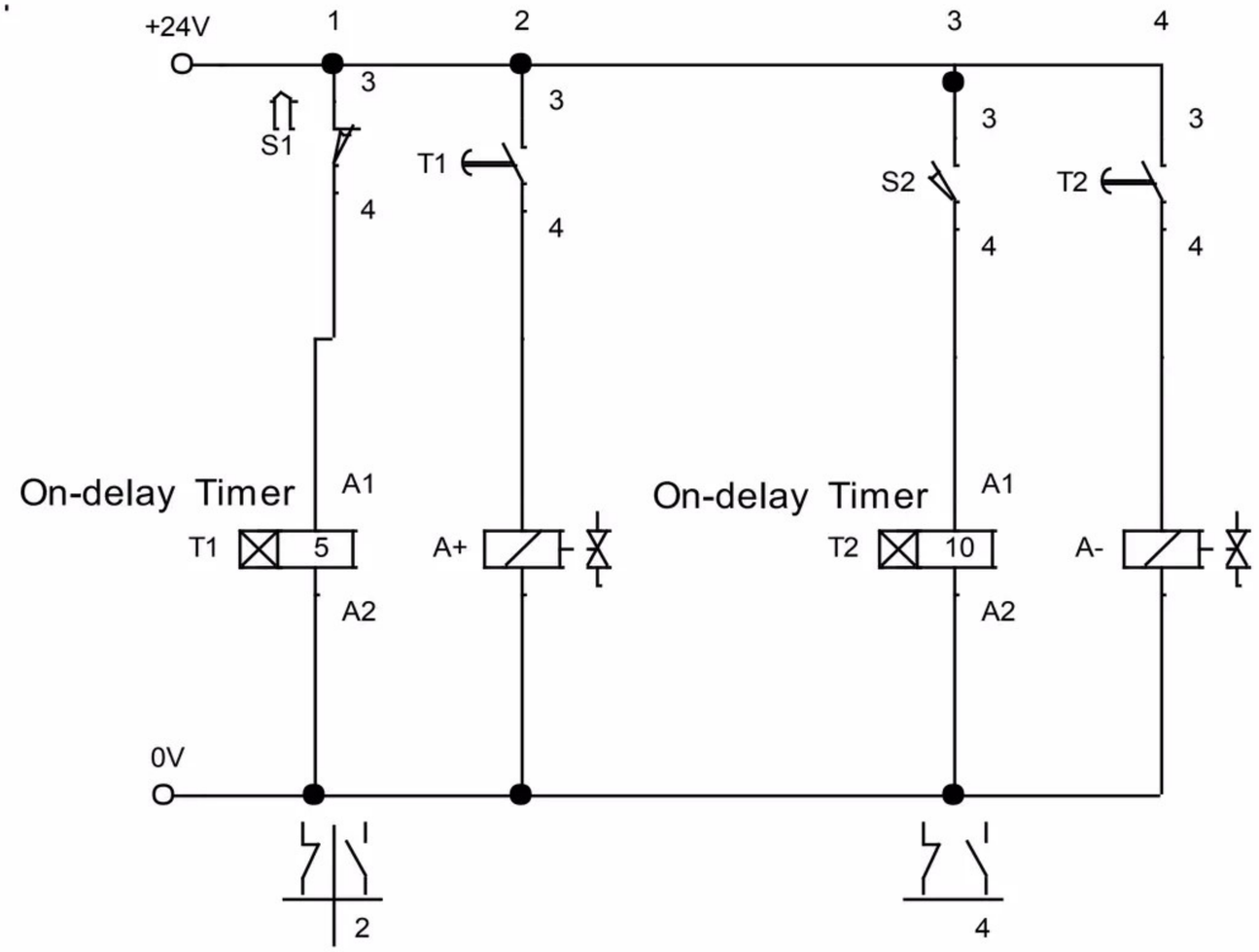


Fig: Electric Ladder Logic Circuit

Electro-Pneumatic Circuit

Que12: Draw Electro-Pneumatic circuit for A+ (delay) for multi-cycle.

Solution: S1& S2 are sensors; A+& A- are Solenoids; T is on-delay timer.

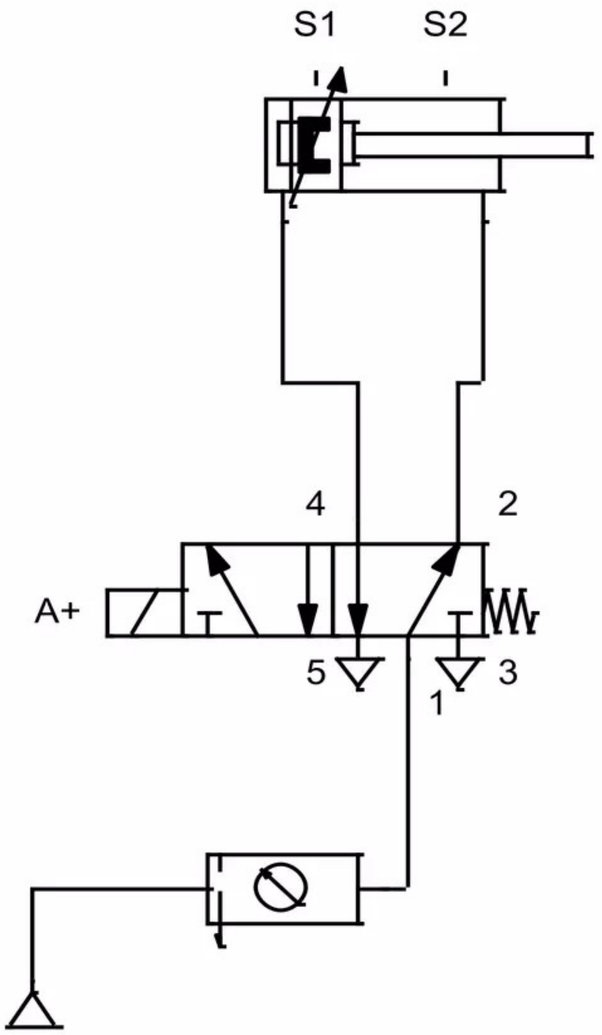


Fig: Pneumatic Circuit

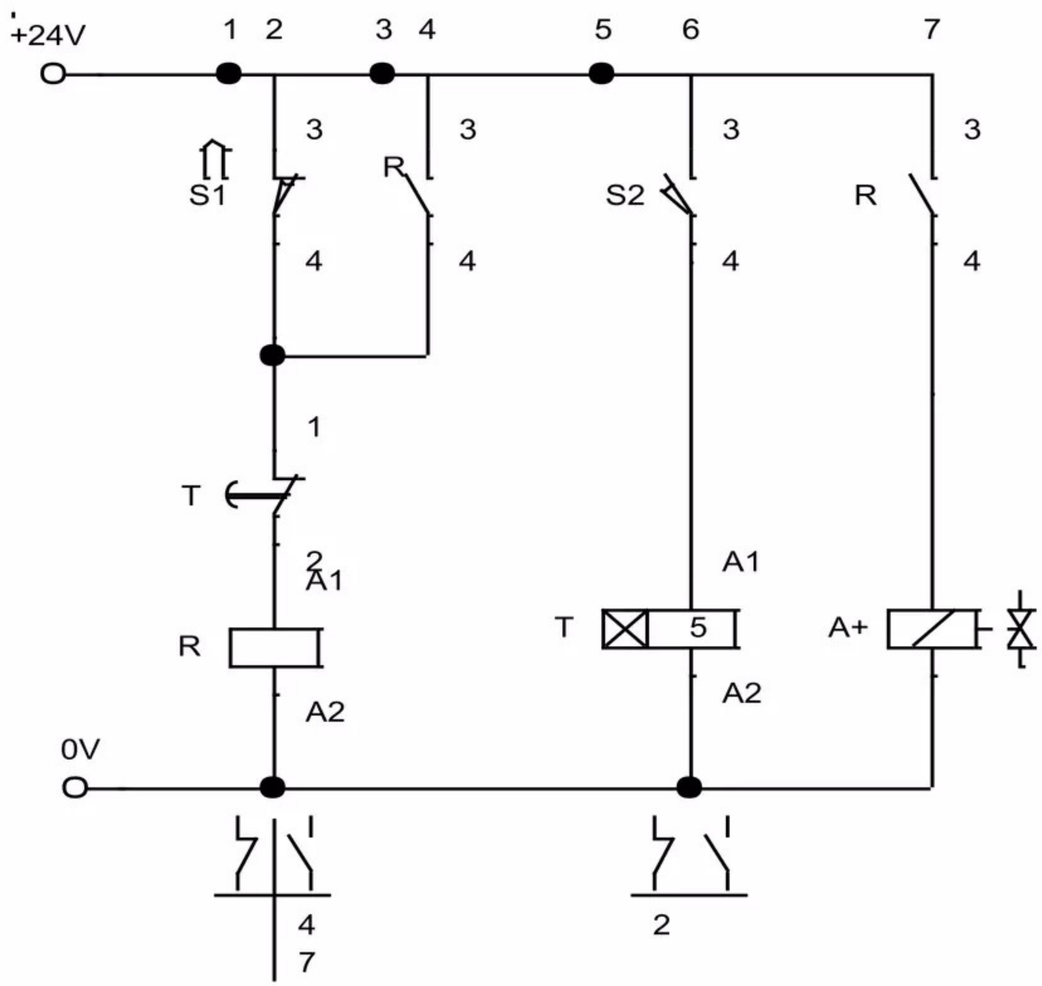


Fig: Electric Ladder Logic Circuit

Electro-Pneumatic Circuit

Que l 3: Draw the Electro-pneumatic circuit for A+B+(AB)-

Solution:

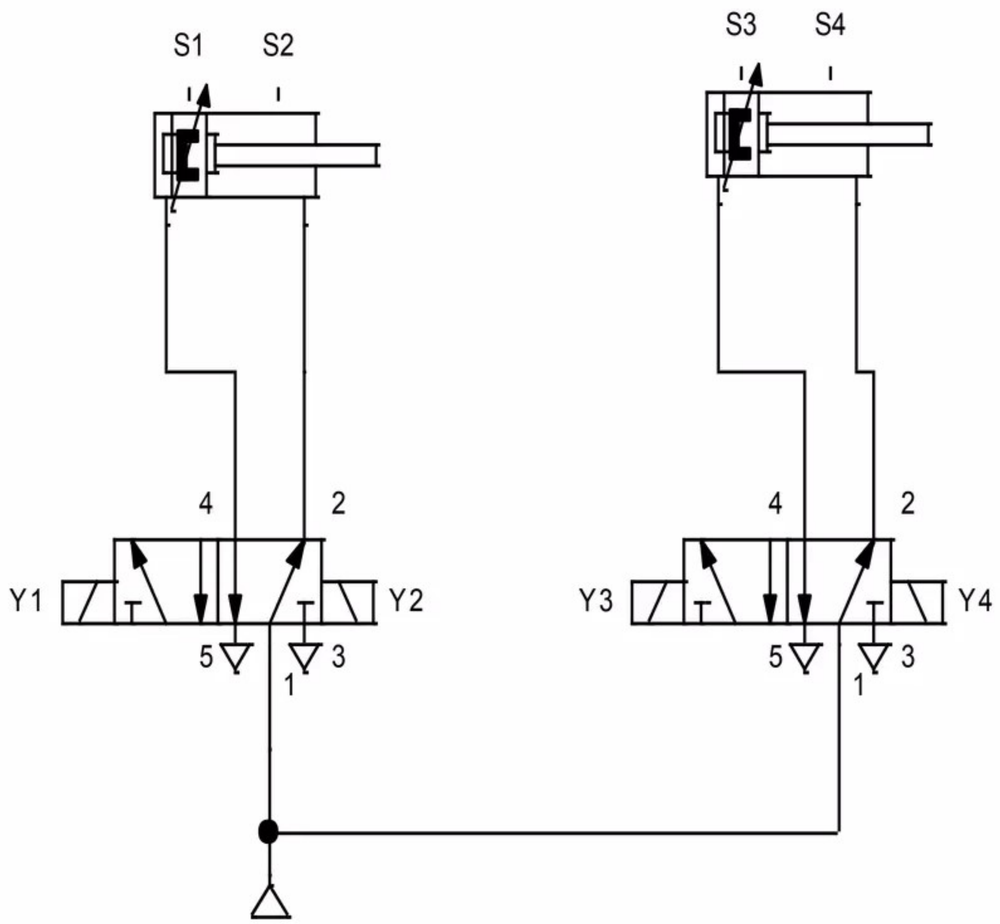


Fig: Pneumatic Circuit

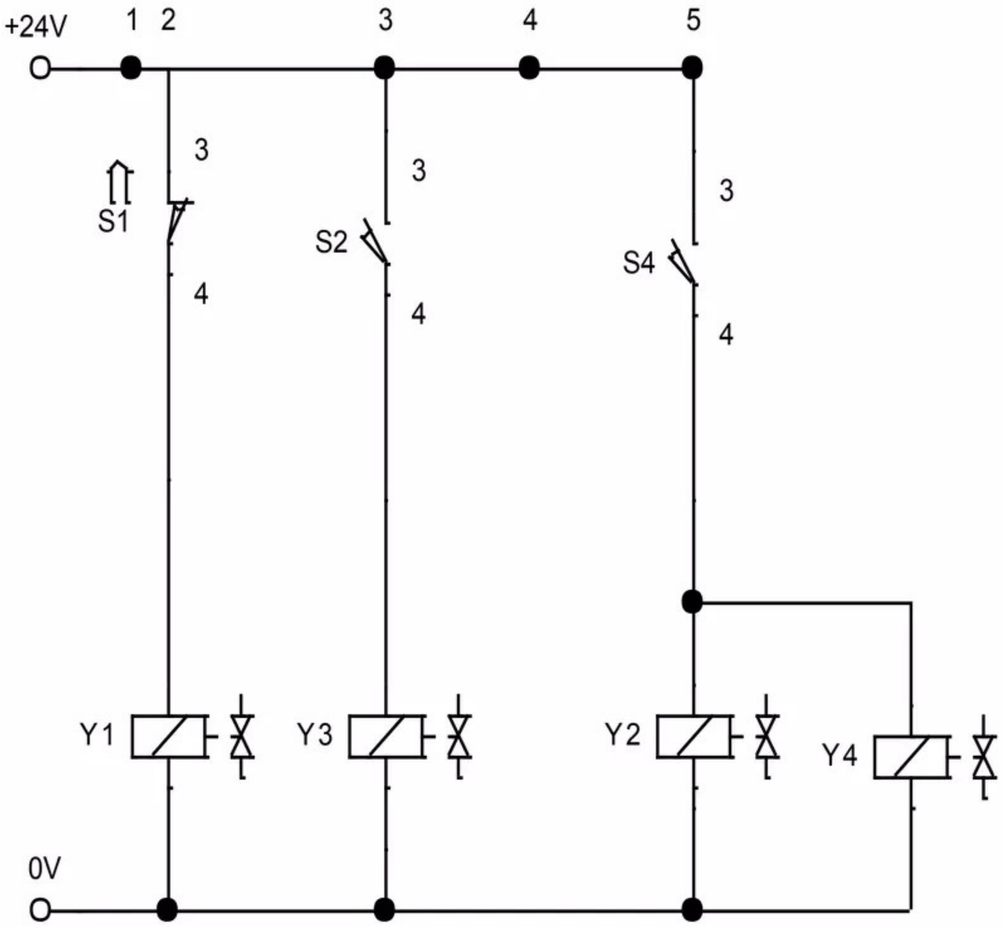


Fig: Electric Ladder Logic Circuit

Electro-Pneumatic Circuit

Que l 4: Design Electro-Pneumatic Circuit for A+B+B-A-

Solution:

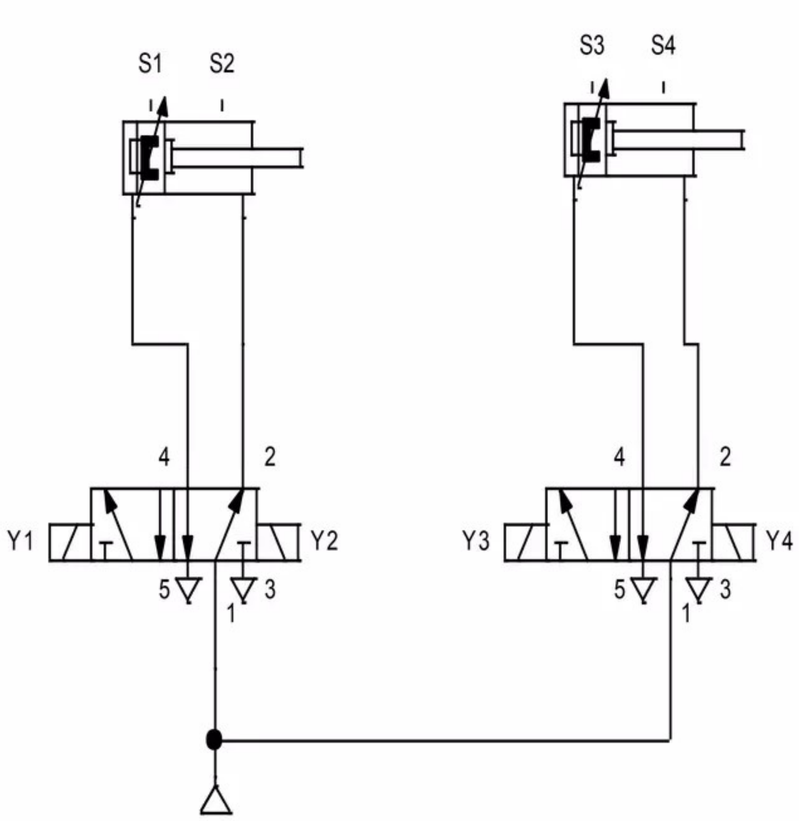


Fig: Pneumatic Circuit

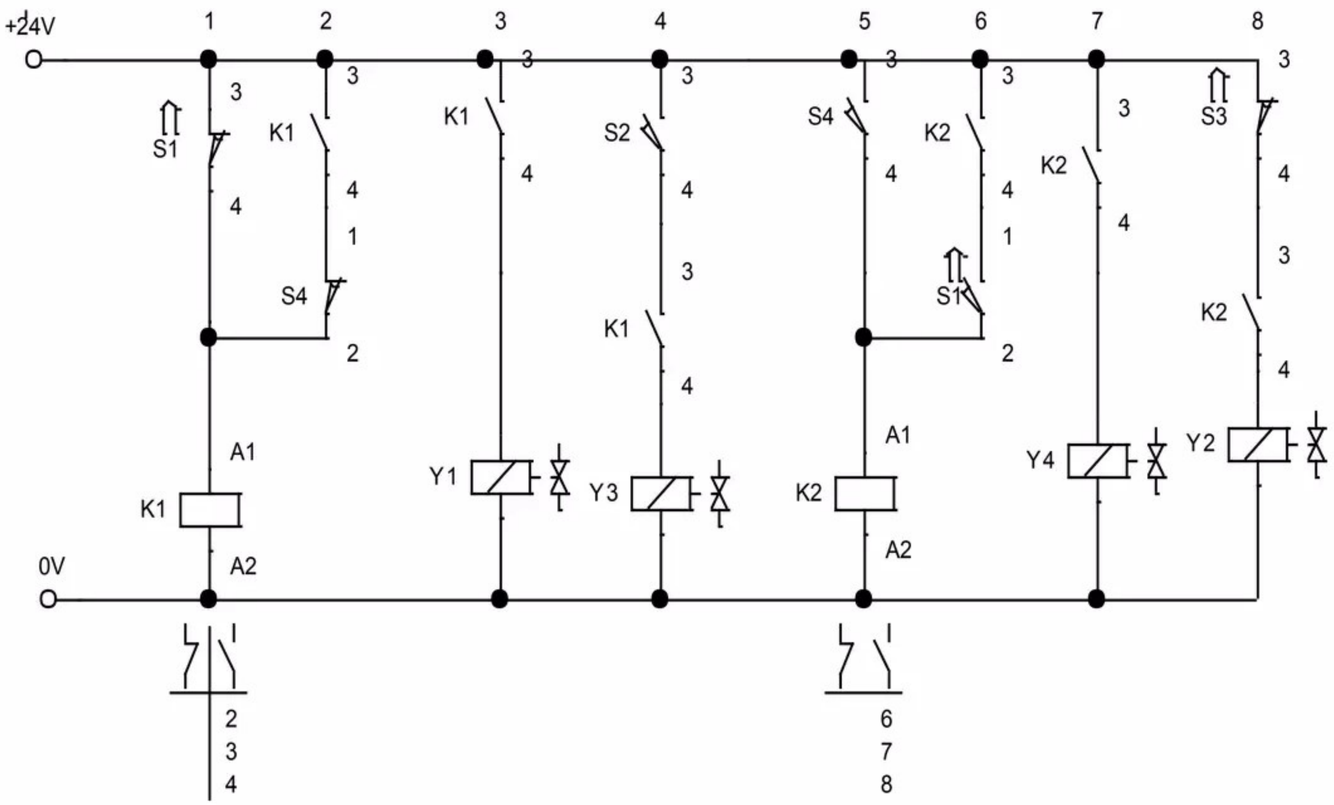


Fig: Electric Ladder Logic Circuit

Electro-Pneumatic Circuit

Que l 5: Design Electro-Pneumatic Circuit for A+A-B+B-

Solution:

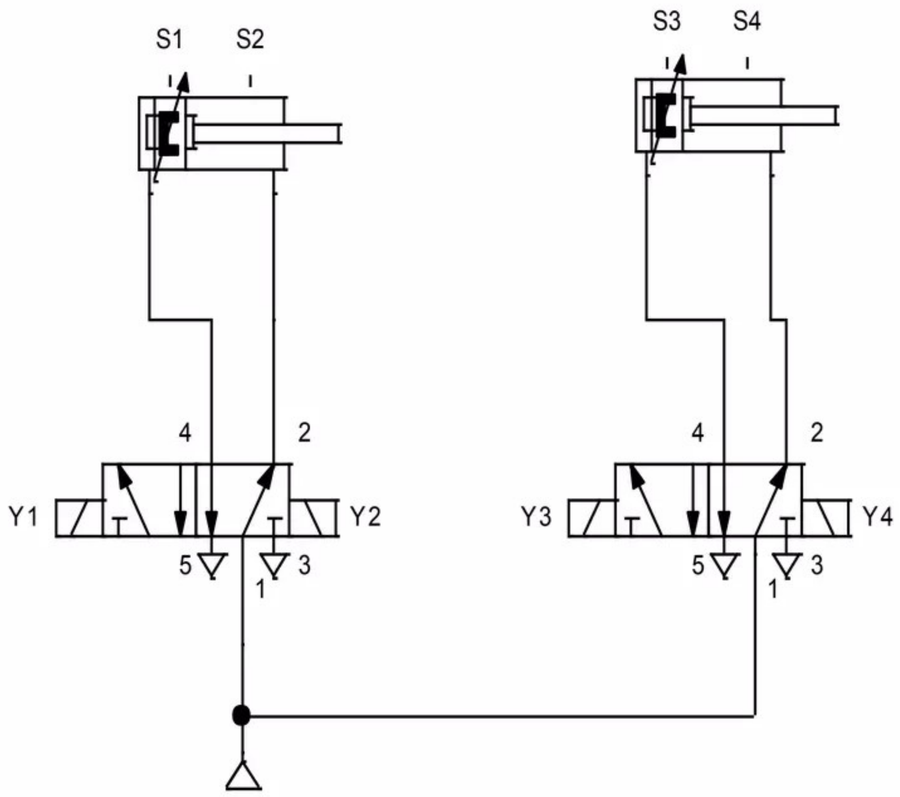


Fig: Pneumatic Circuit

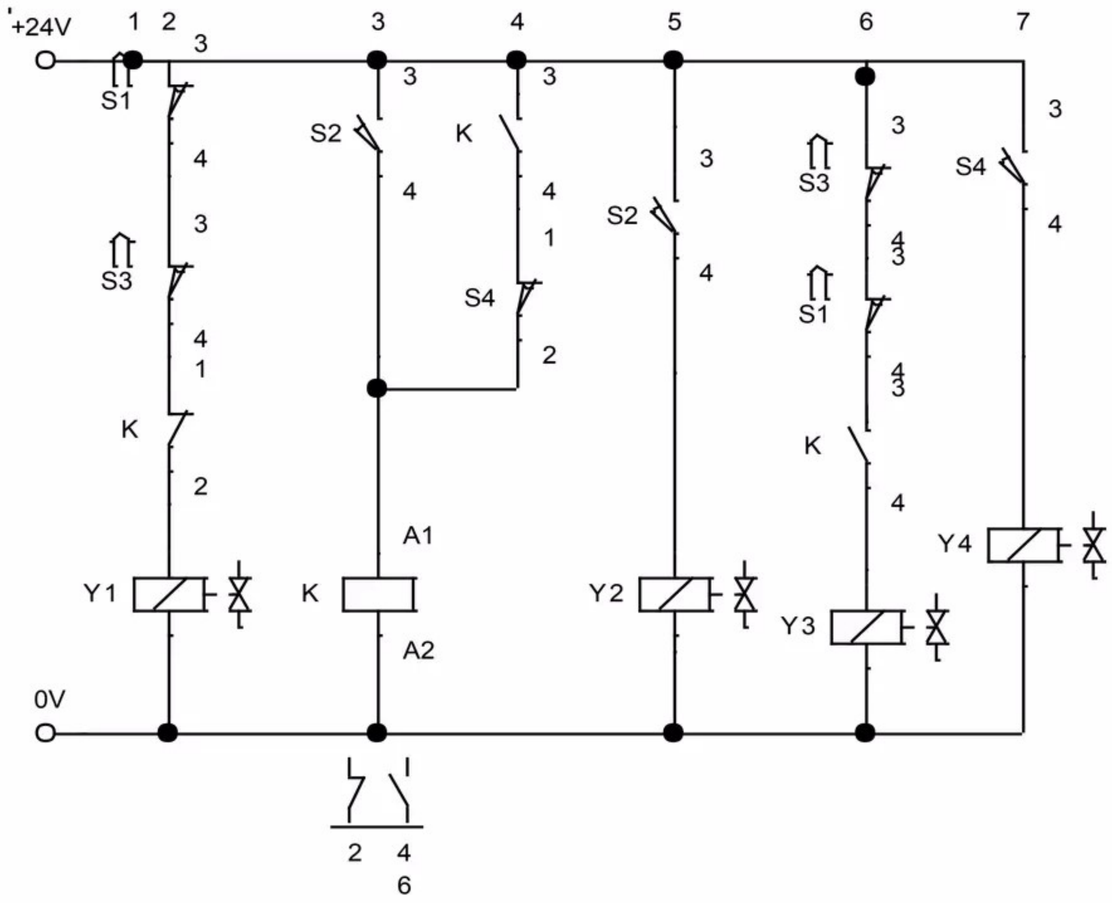


Fig: Electric Ladder Logic Circuit

Electro-Pneumatic Circuit

Que 16: Design Electro-Pneumatic Circuit for A-B+(delay)B-A+

Solution:

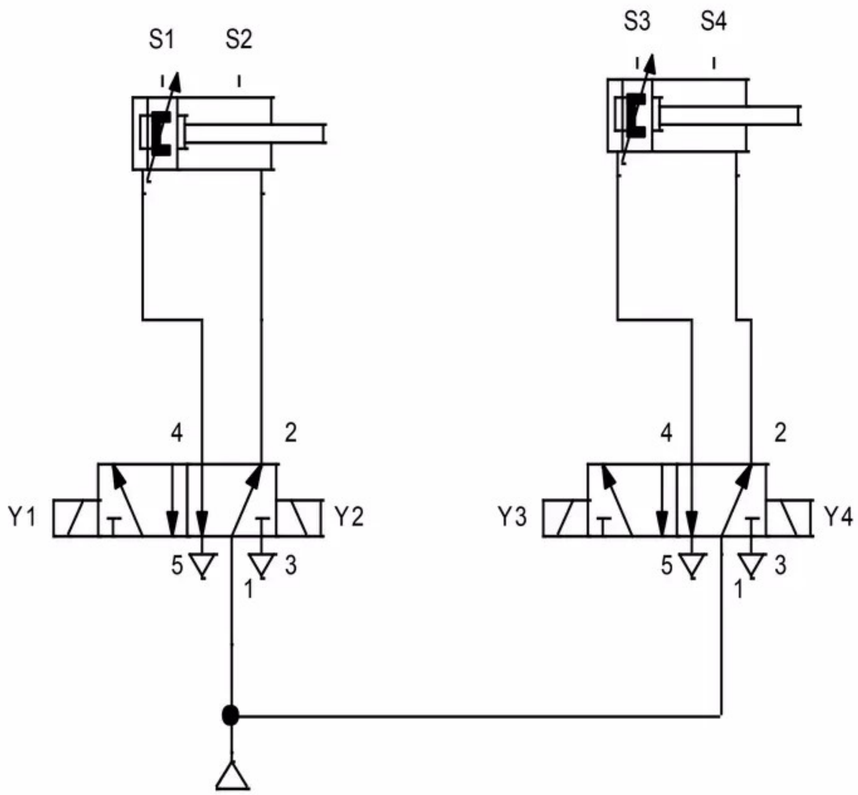


Fig: Pneumatic Circuit

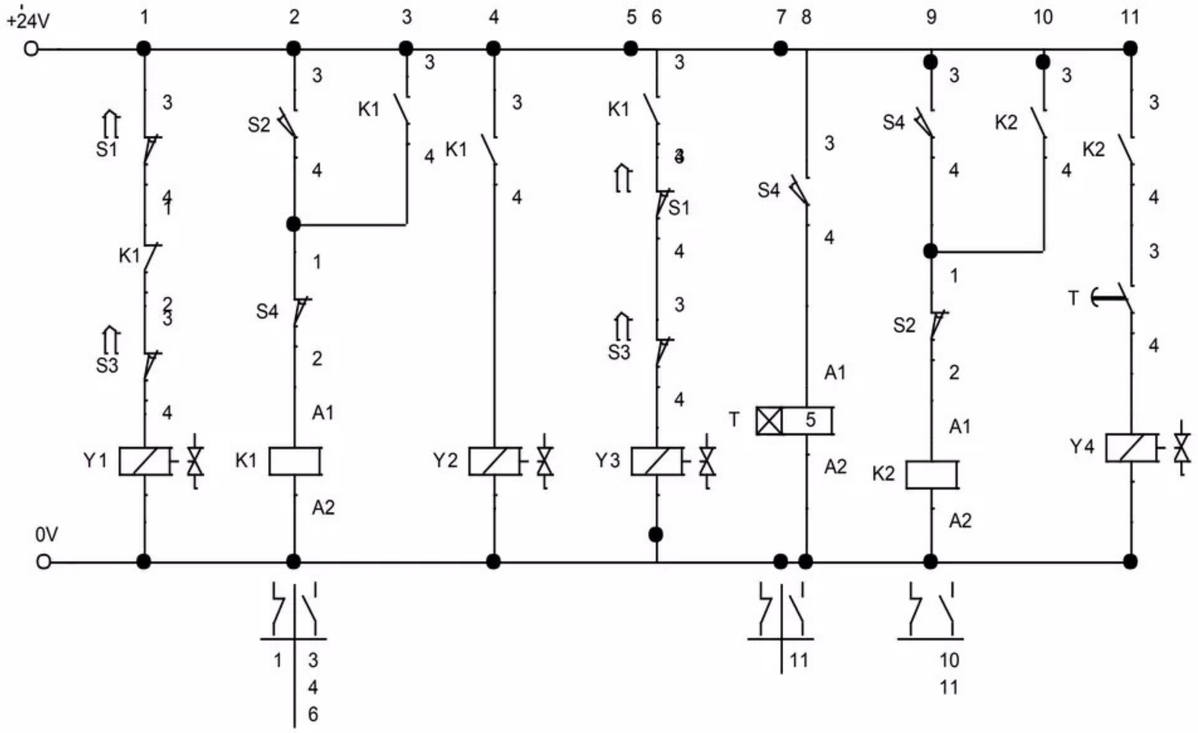
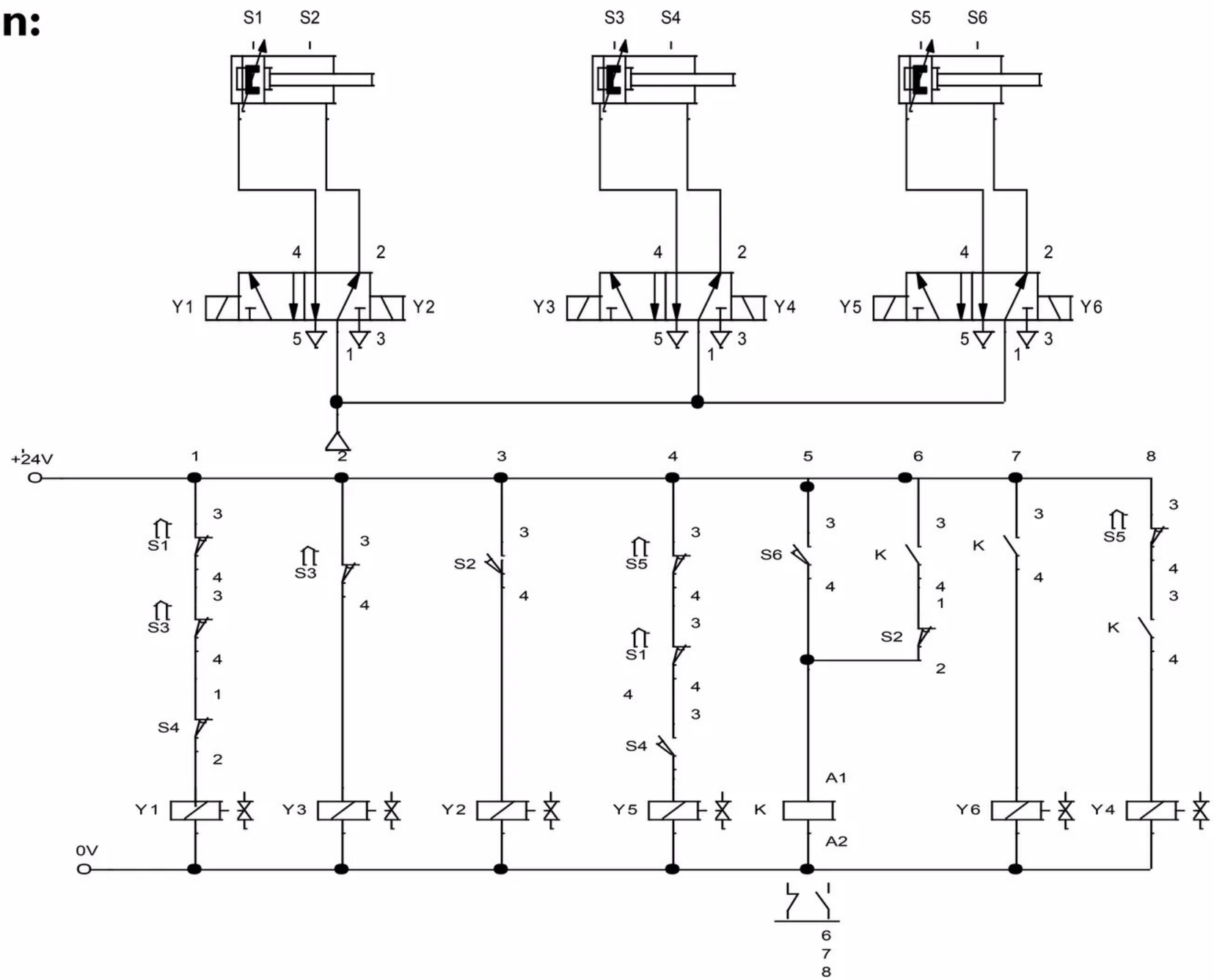


Fig: Electric Ladder Logic Circuit

Electro-Pneumatic Circuit

Que 17: Design Electro-Pneumatic Circuit for (AB)+A-C+C-B-

Solution:



Electro-Pneumatic Circuit

Que 18: Draw an Electro-Pneumatic Circuit for 4(A+A-) delay for multi-cycle.

Solution:

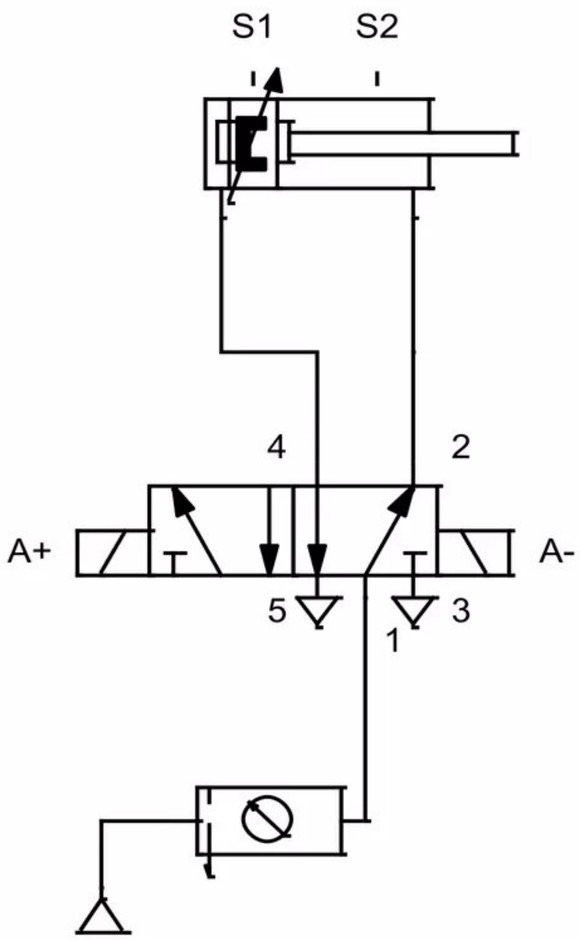


Fig: Pneumatic Circuit

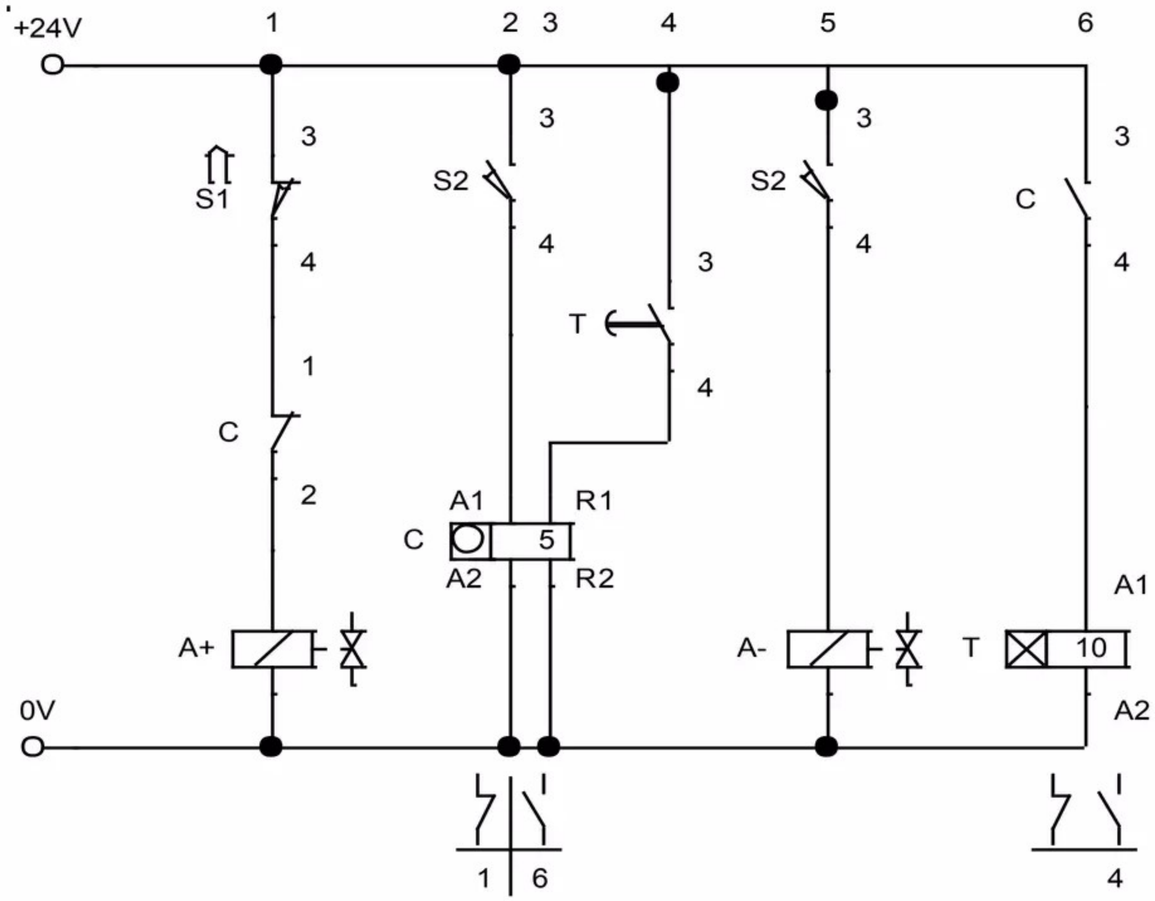
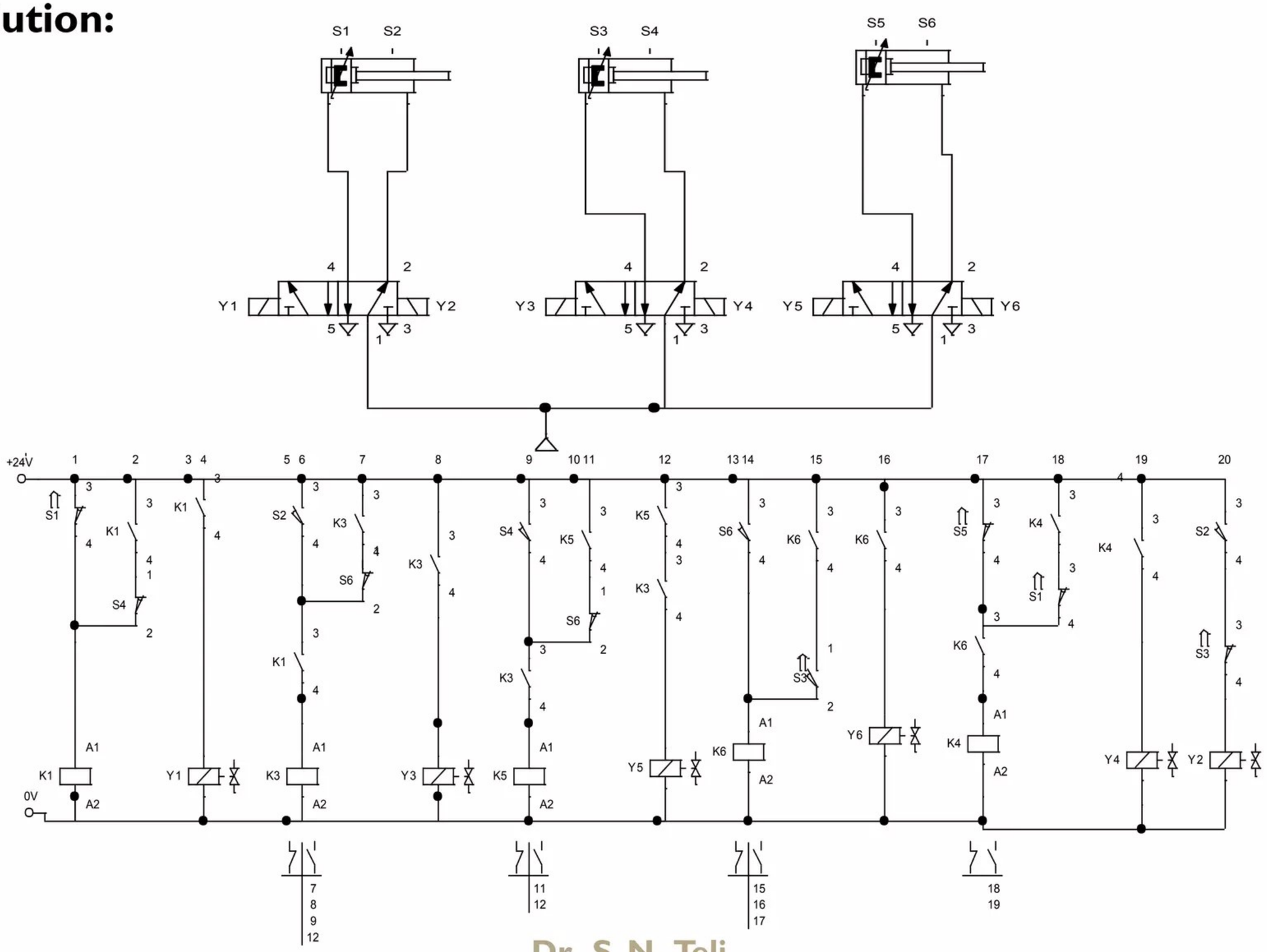


Fig: Electric Ladder Logic Circuit

Electro-Pneumatic Circuit

Que 19: Draw an Electro-Pneumatic Circuit for A+B+C+C-B-A-

- **Solution:**




Thank you