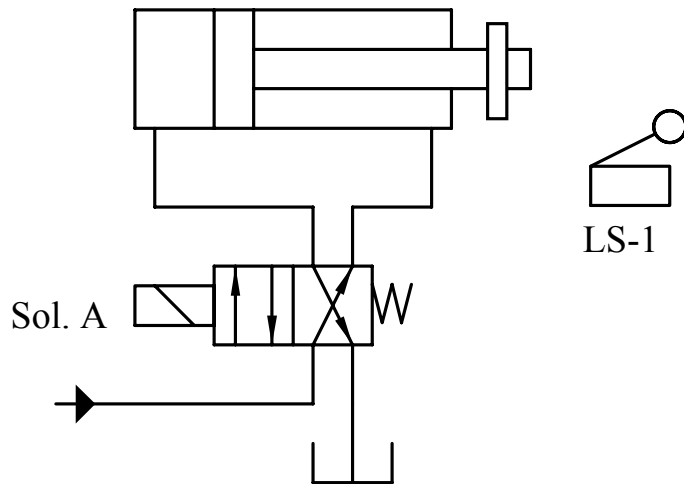


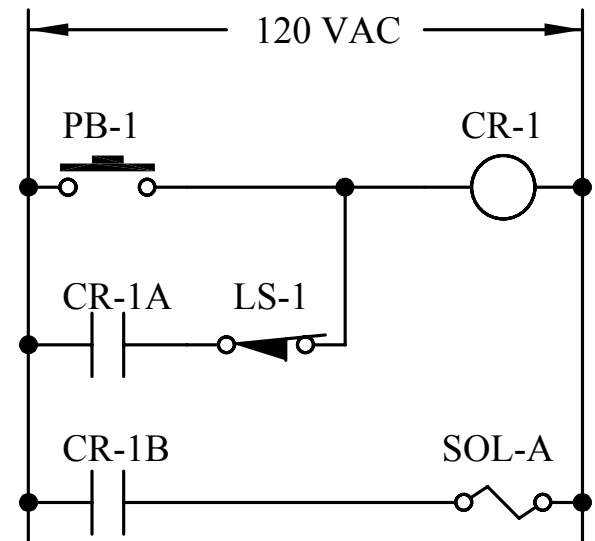
Relay Ladder Logic Control Systems

Ladder Logic Control

- ▶ Logic control is used with relatively simple ON/OFF systems - like pneumatics

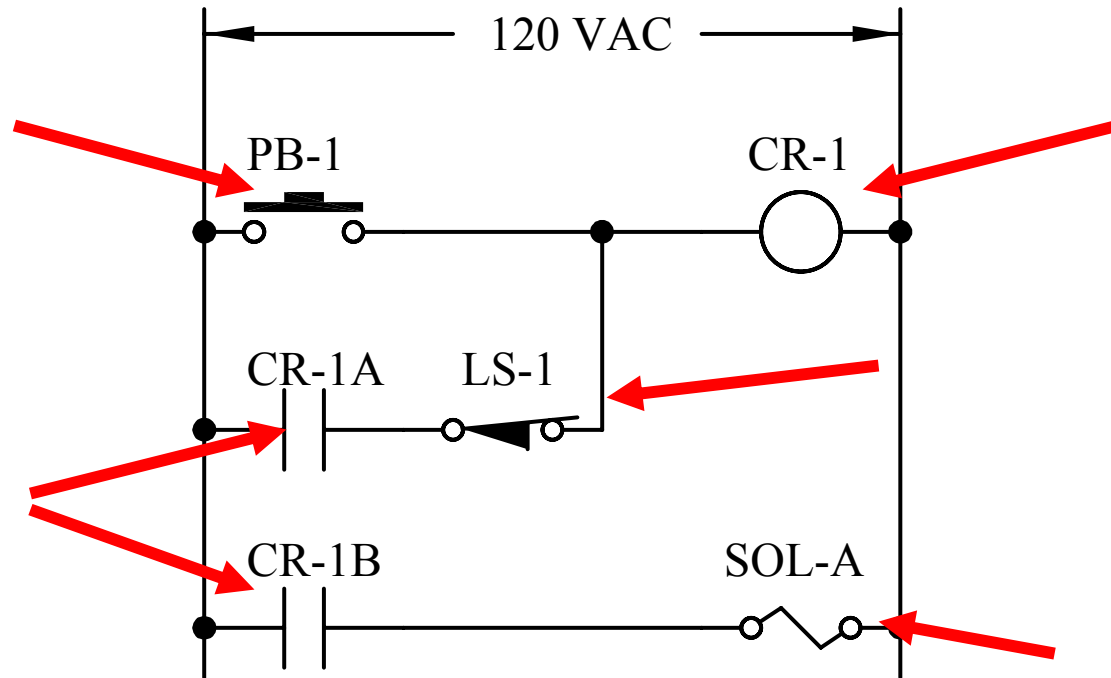


Pneumatic System

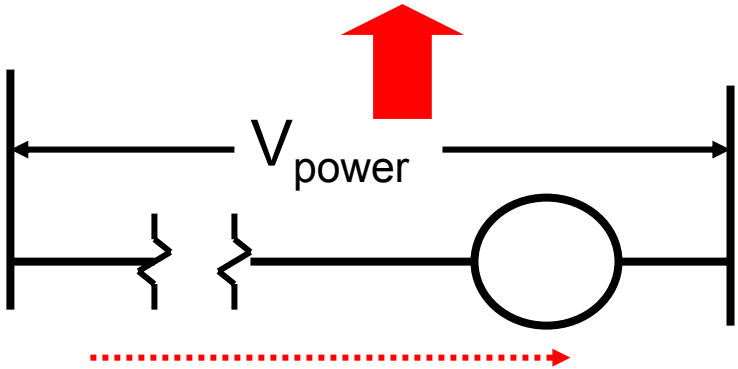
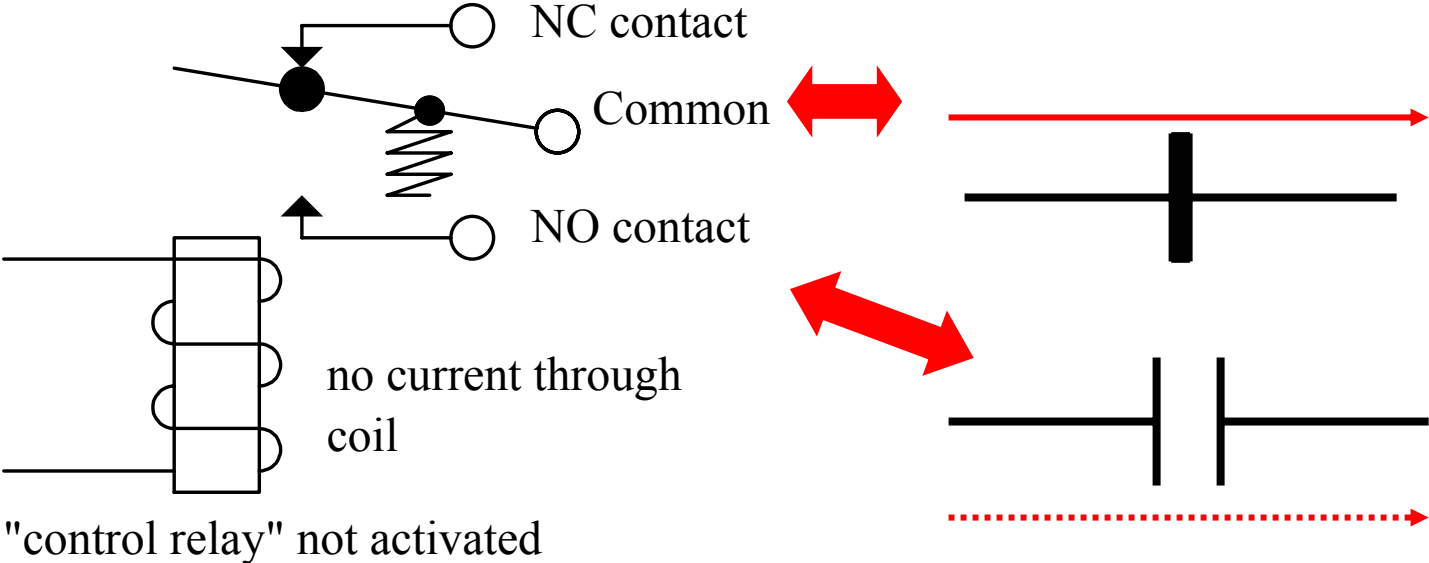


Relay Ladder Logic (RLL) Control

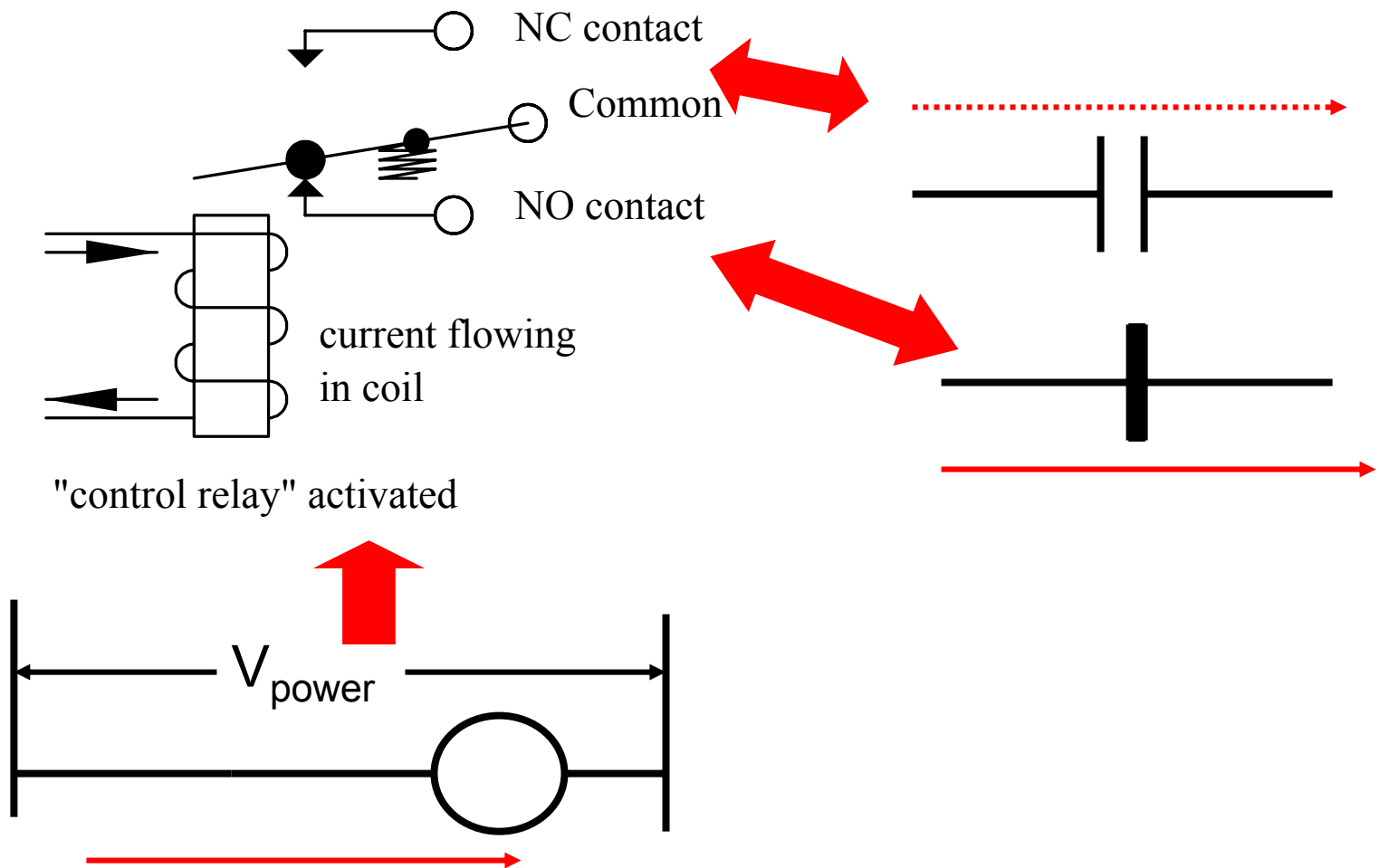
Logic Control Components



Control Relay - Not Activated



Control Relay - Activated



Normally Open Schematics



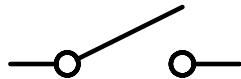
**Limit
Switch**



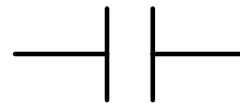
**Momentary
Contact
Pushbutton**



**Pressure
Switch**



**Manual
Switch**



Contacts

Normally Closed Schematics



**Limit
Switch**



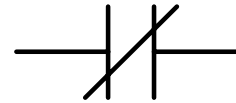
**Momentary
Contact
Pushbutton**



**Pressure
Switch**

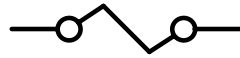


**Manual
Switch**

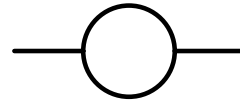


Contacts

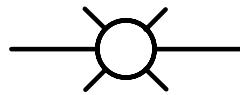
Output Schematics



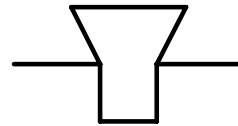
**Solenoid
Coil**



**Control
Relay Coil**



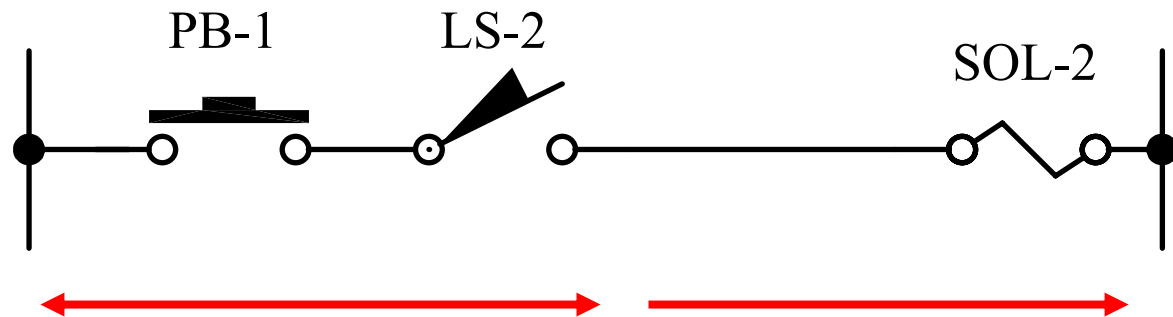
Lamp



**Annunciator
(Horn)**

Why is it called "Logic Control?"

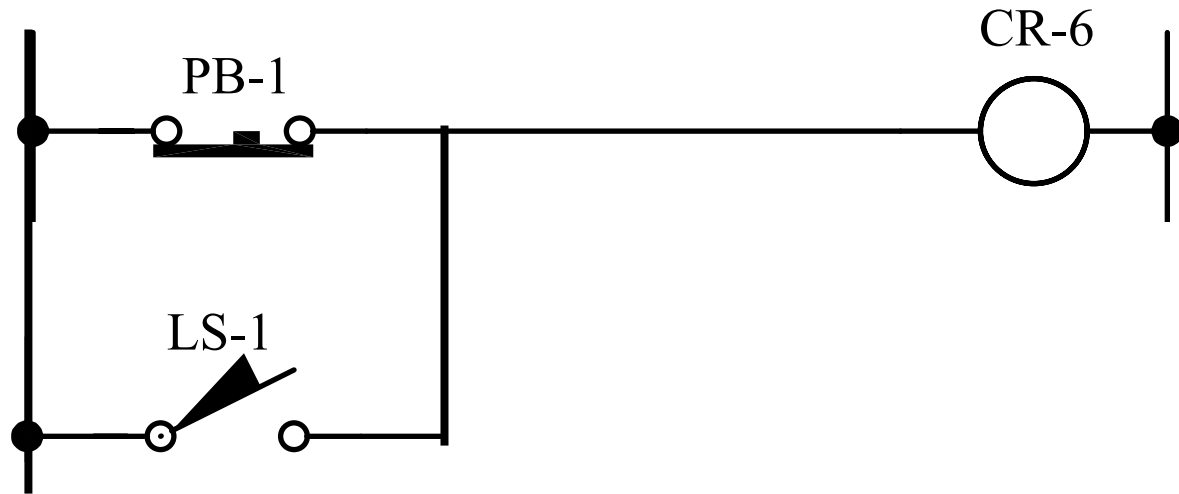
IF _____ **AND** _____
THEN _____



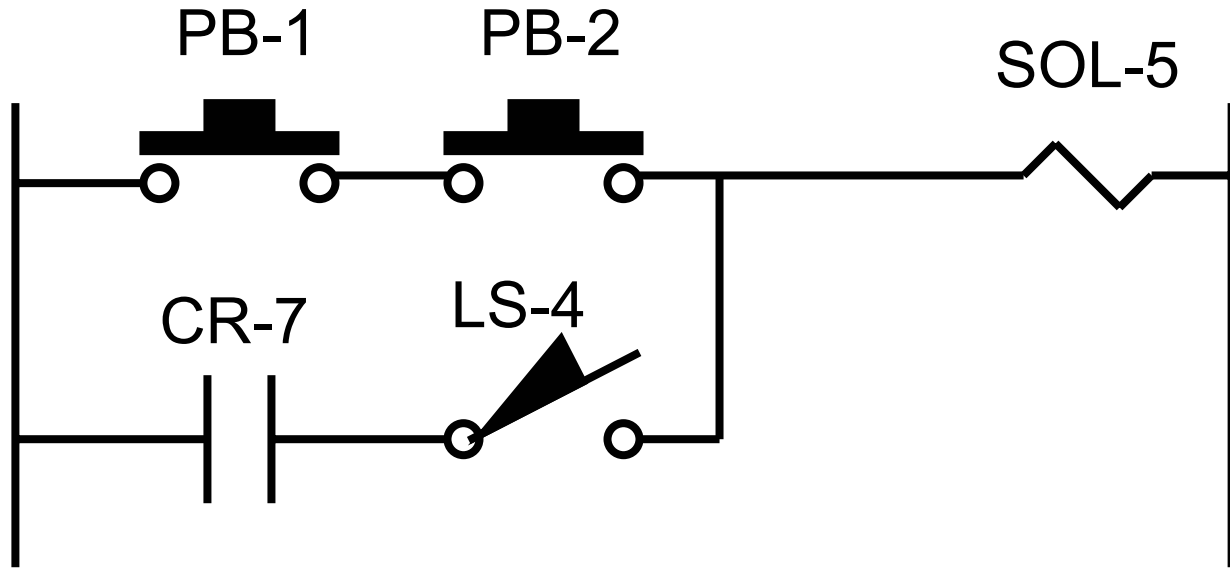
**IF there is
continuity across
the inputs**

"OR" Example

IF _____ **OR** _____
THEN _____



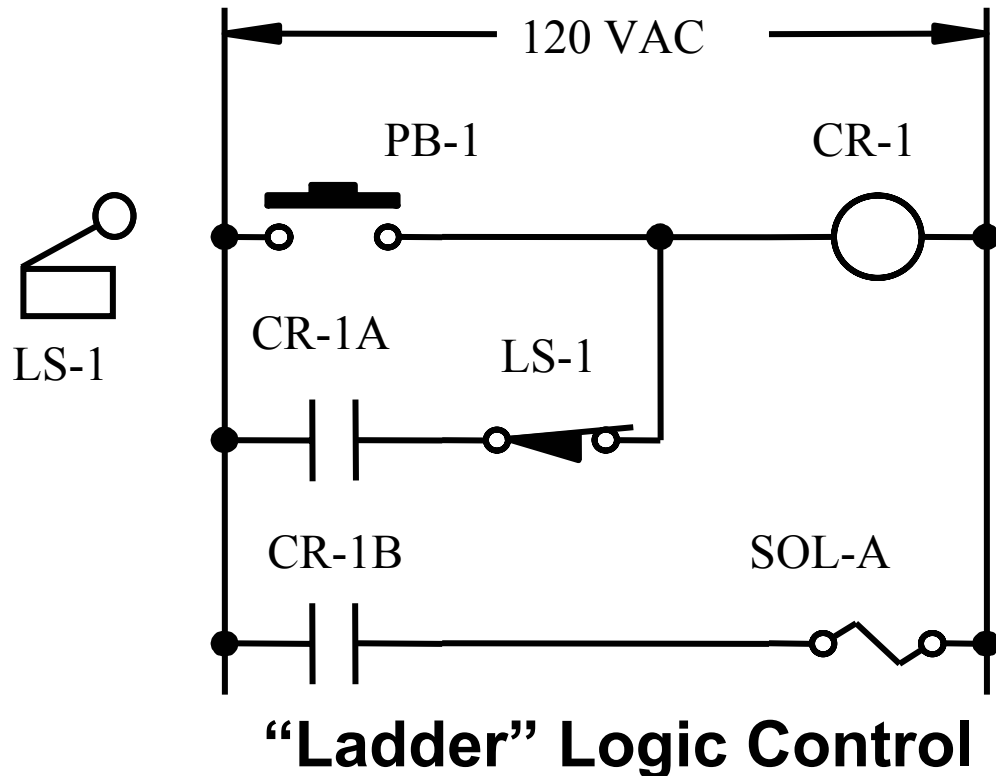
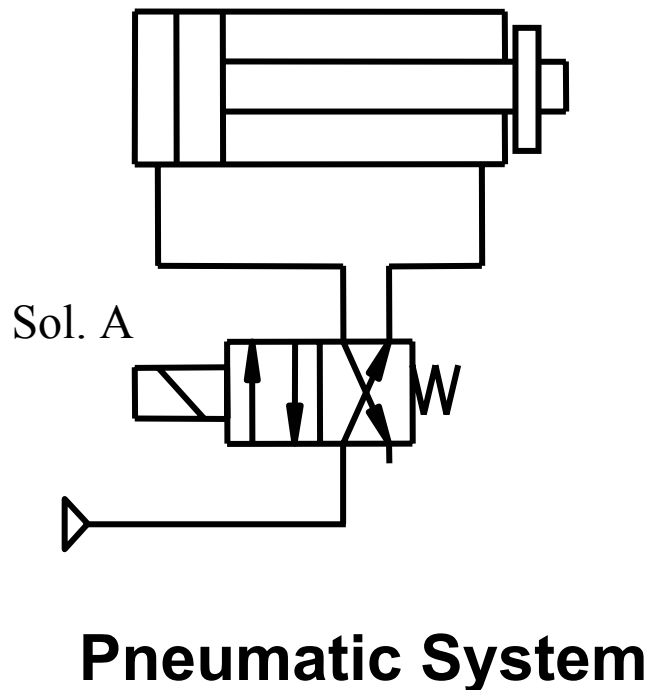
Write the Logic for this Rung



IF { _____ **AND** _____ }
OR { _____ **AND** _____ }
THEN _____

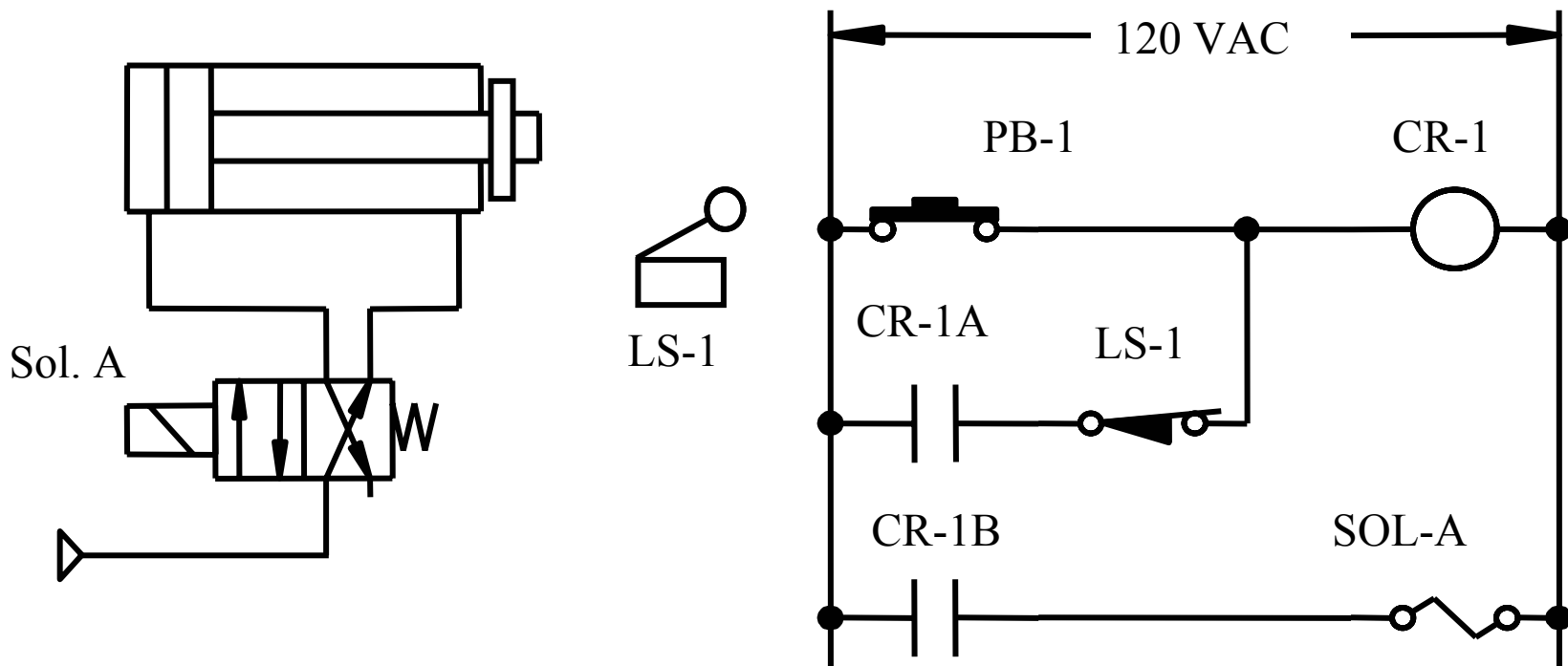
"One Shot" - Single Stroke

- ▶ Pressing the pushbutton PB-1 will cause the cylinder to extend and retract one time



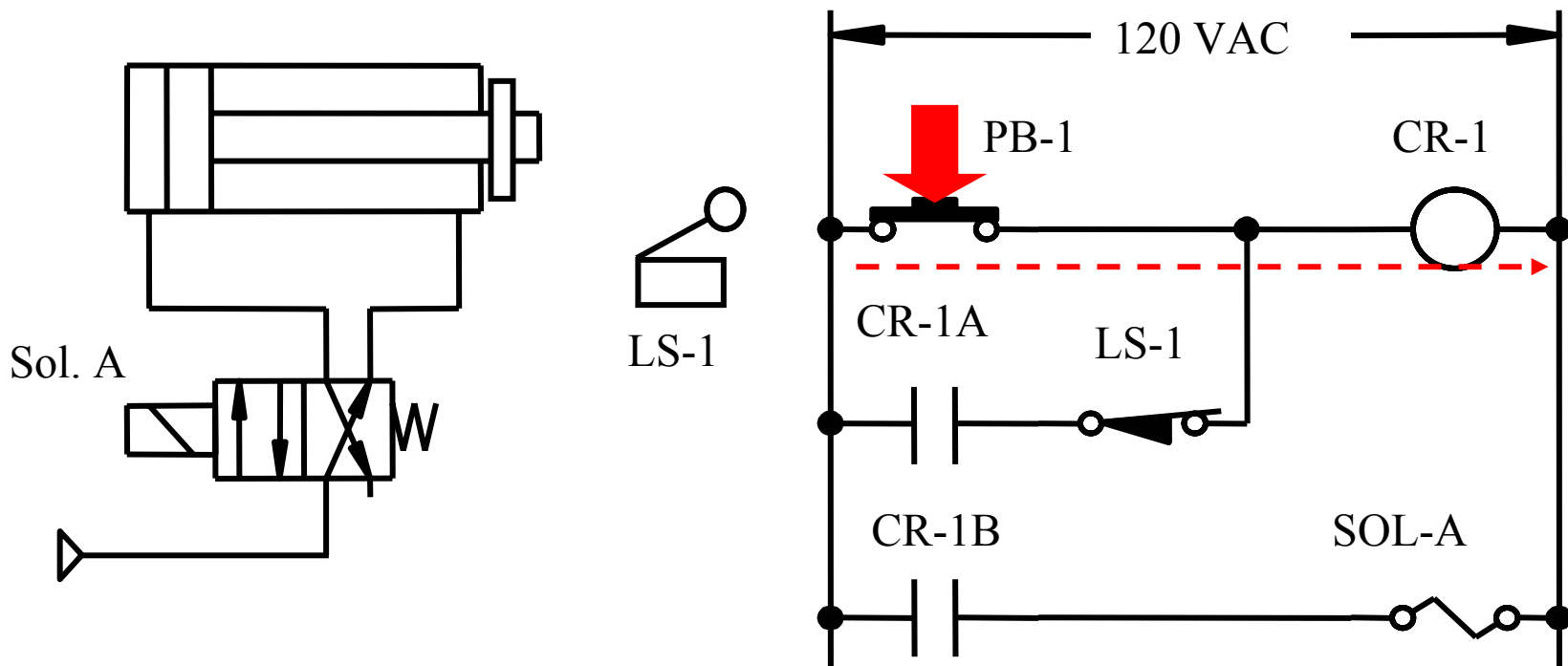
"One Shot" - Step #1

- ▶ Pressing the momentary contact pushbutton PB-1 energizes the control relay CR-1



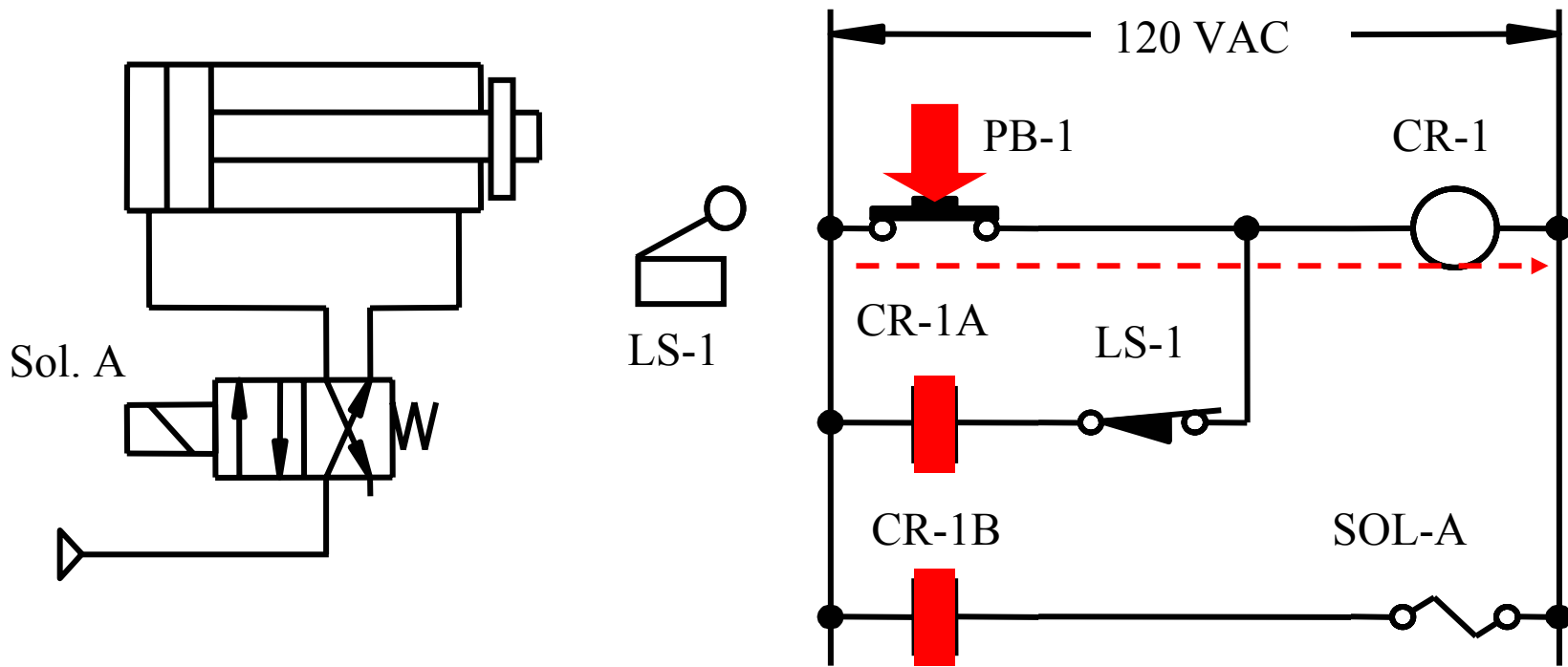
"One Shot" - Step #2

- ▶ After control relay CR-1 energizes, normally open contacts CR-1A and CR-1B activate



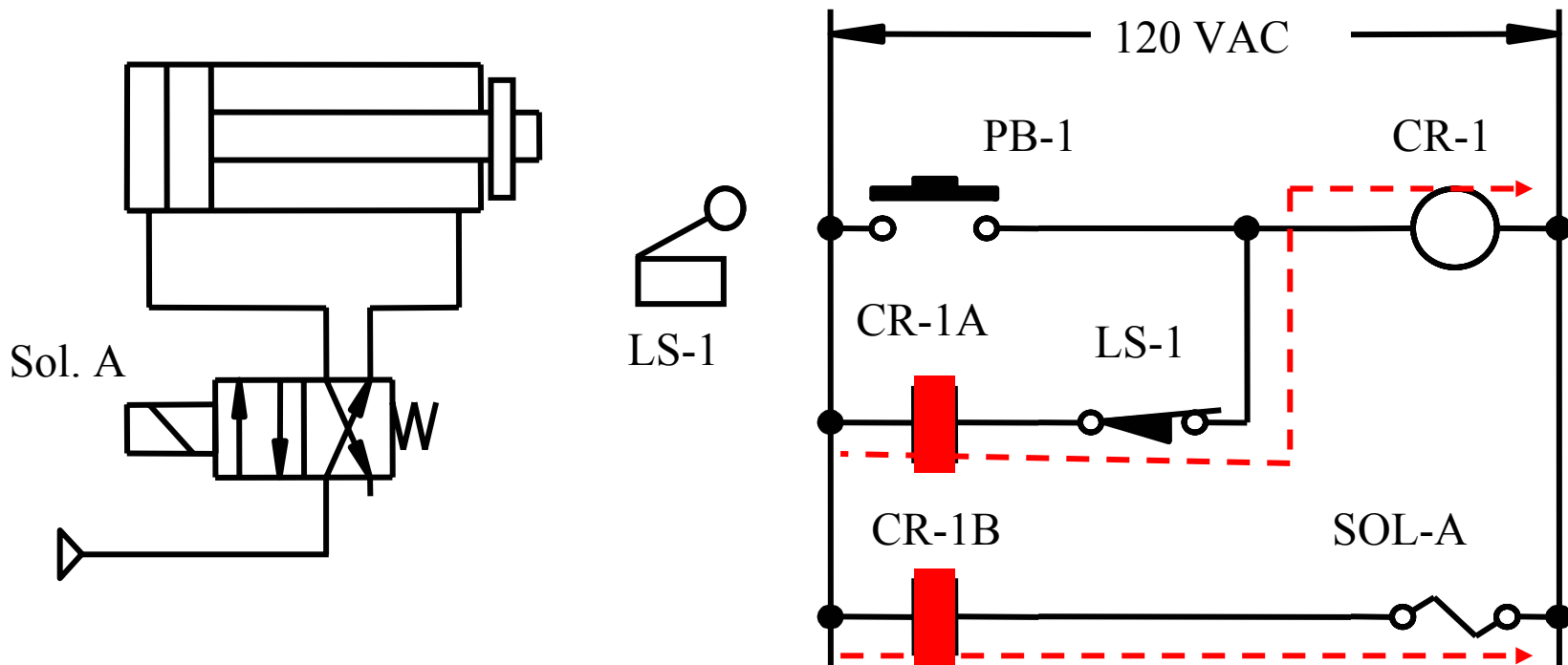
"One Shot" - Step #3

- ▶ Control relay CR-1 is now energized by a 2nd path, solenoid SOL-A also activates



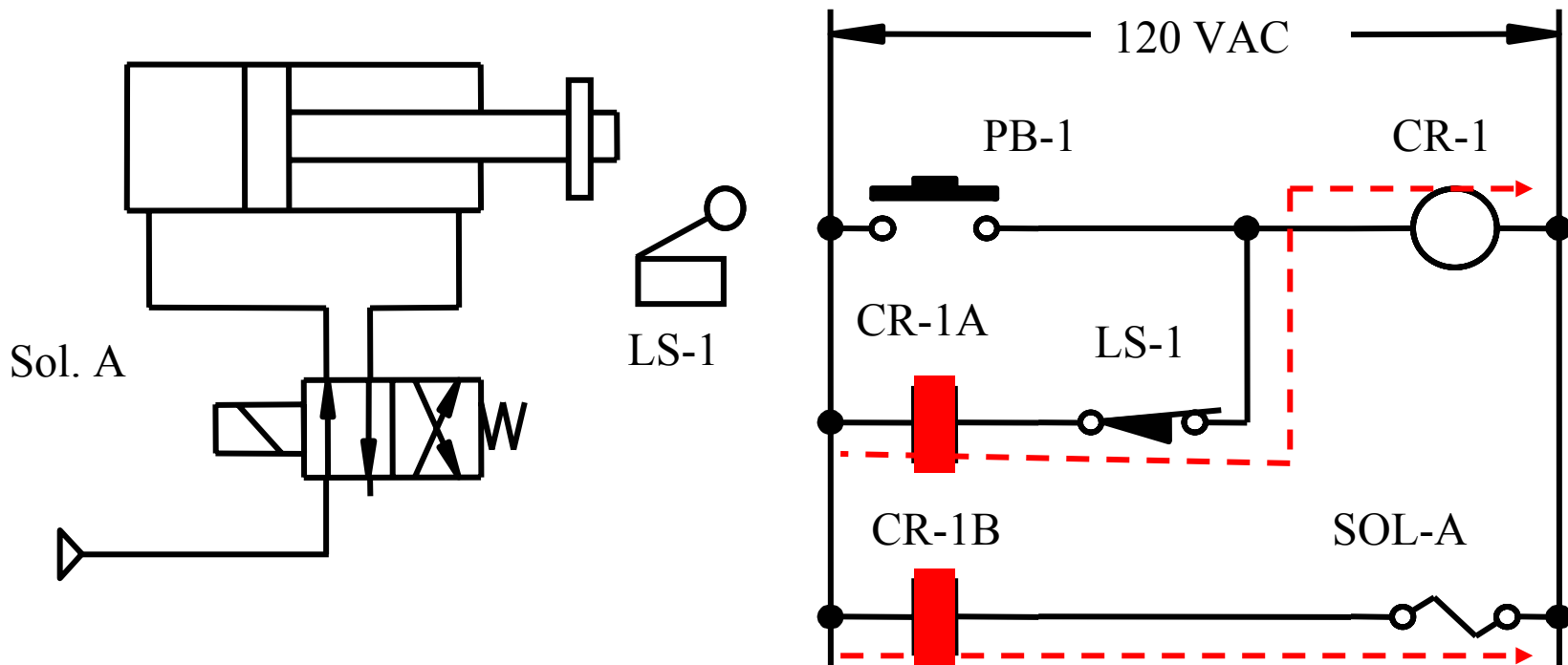
"One Shot" - Step #4

- ▶ PB-1 is released, but control relay CR-1 is still energized by the 2nd path ("hold" circuit)



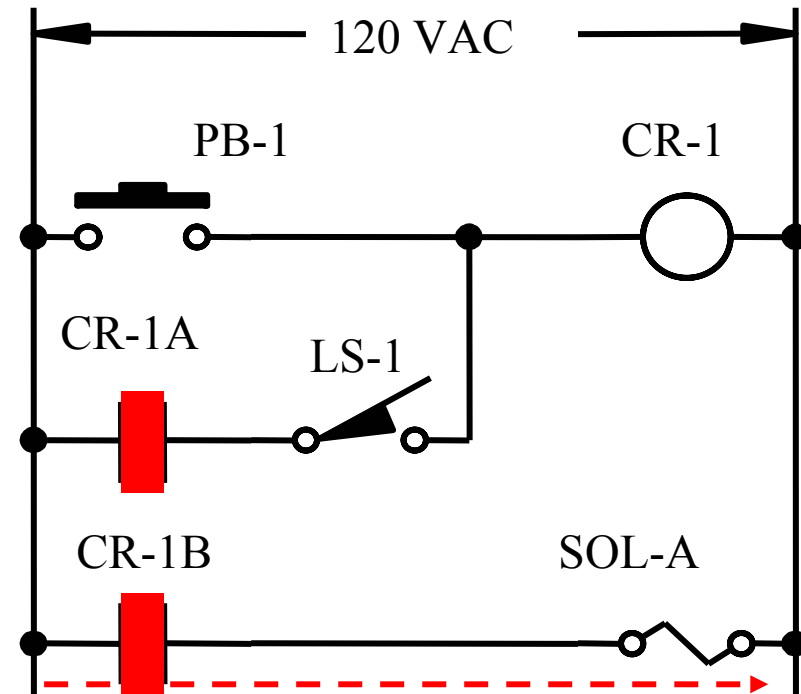
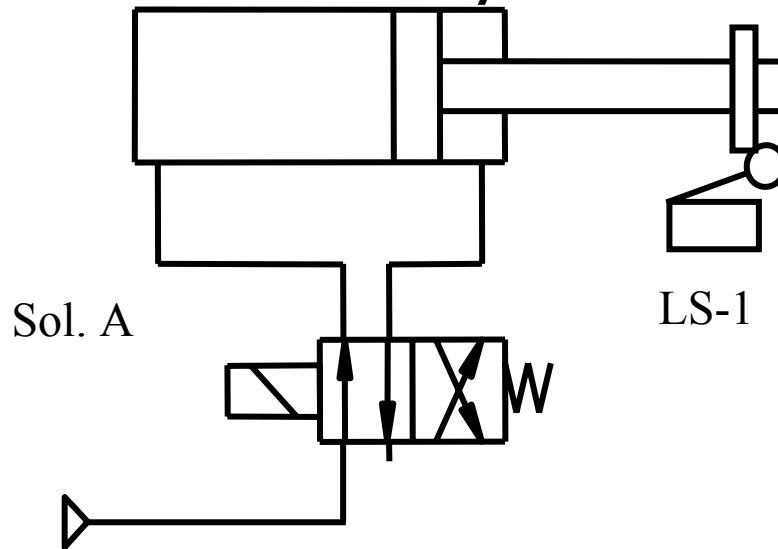
"One Shot" - Step #5

- ▶ Solenoid A shifts the valve spool to the right, and the cylinder begins to extend



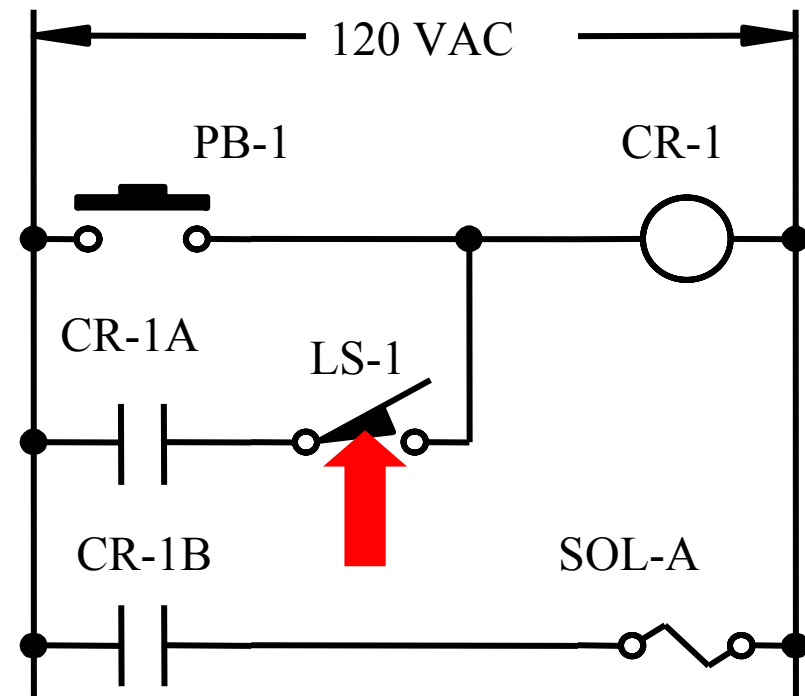
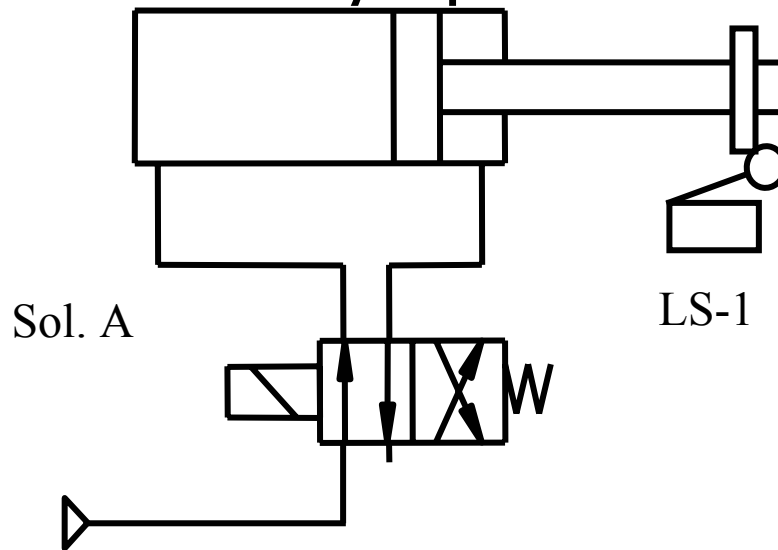
"One Shot" - Step #6

- ▶ Cylinder activates the normally closed limit switch LS-1, which "kills" the hold circuit for control relay CR-1



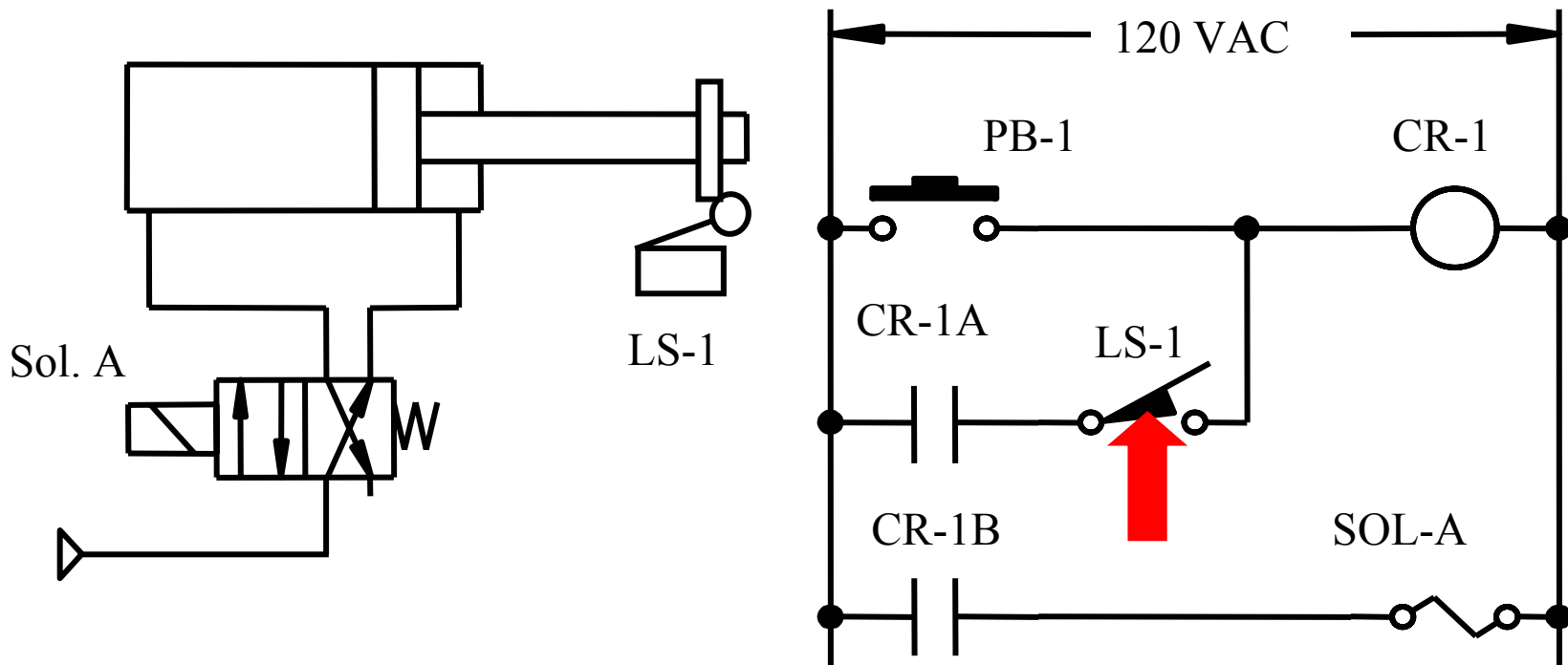
"One Shot" - Step #7

- ▶ With control relay CR-1 de-activated, the contacts CR-1A and CR-1B return to their normally open state



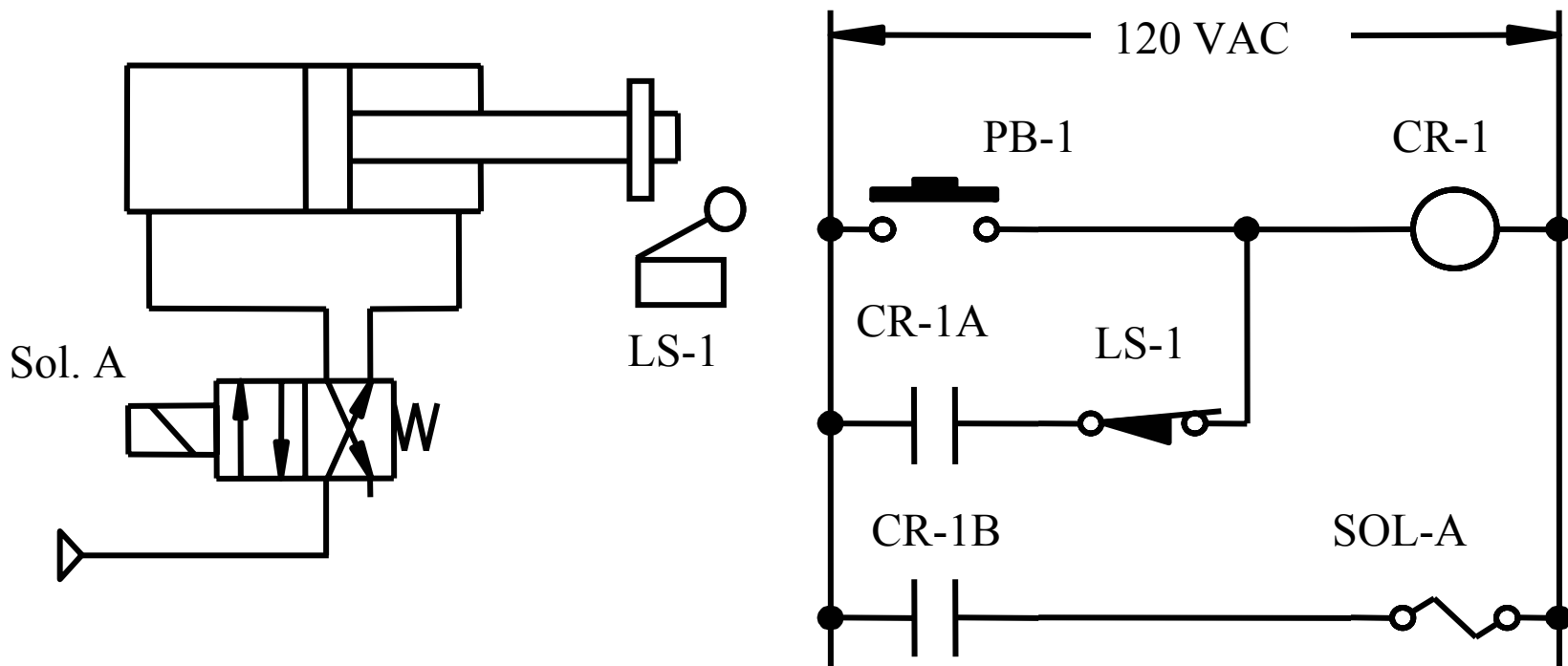
"One Shot" - Step #8

- ▶ CR-1B is now open, SOL-A is de-activated, spring returns valve to default state



"One Shot" - Step #9

- ▶ Cylinder begins to retract, and "rolls off" of LS-1, which returns to its N.C. state



"One Shot" - Step #10

- ▶ Cylinder fully retracts and system has returned to the start-up configuration

