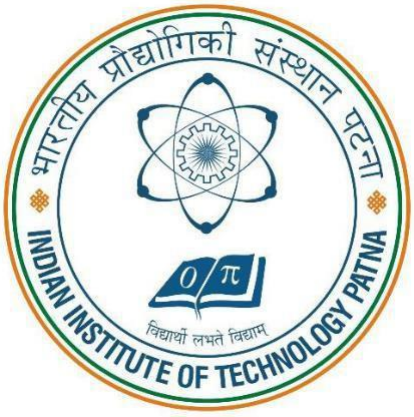
Indian Institute of Technology Patna



Mechatronics, Instrumentation And Controls Laboratory

Lab 10 Report

Topic:

Pneumatic Circuit

Submitted by: Aditya Shah**(**2011mt02**)**
(MTech-Mechatronics)

1. Aim of the Experiments.

1. Actuate one double acting cylinder using AND gate (to and fro can be any actuation/return type) using single DCV .
2. Simultaneously expand two double acting cylinders (retraction can be any) using air pilot valve.
3. Make a circuit of retention switch using push button
4.Expand single double acting cylinder using relay and retraction can be any way
5. Actuate two double acting cylinders in which 2nd one should start expanded once the 1st one fully expanded and both should retract automatically after both cylinders got expanded.

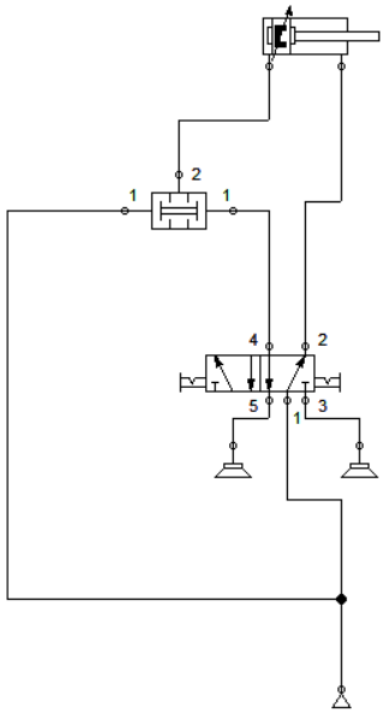
2. Pre-Requisites/Components Required

Software Used:-

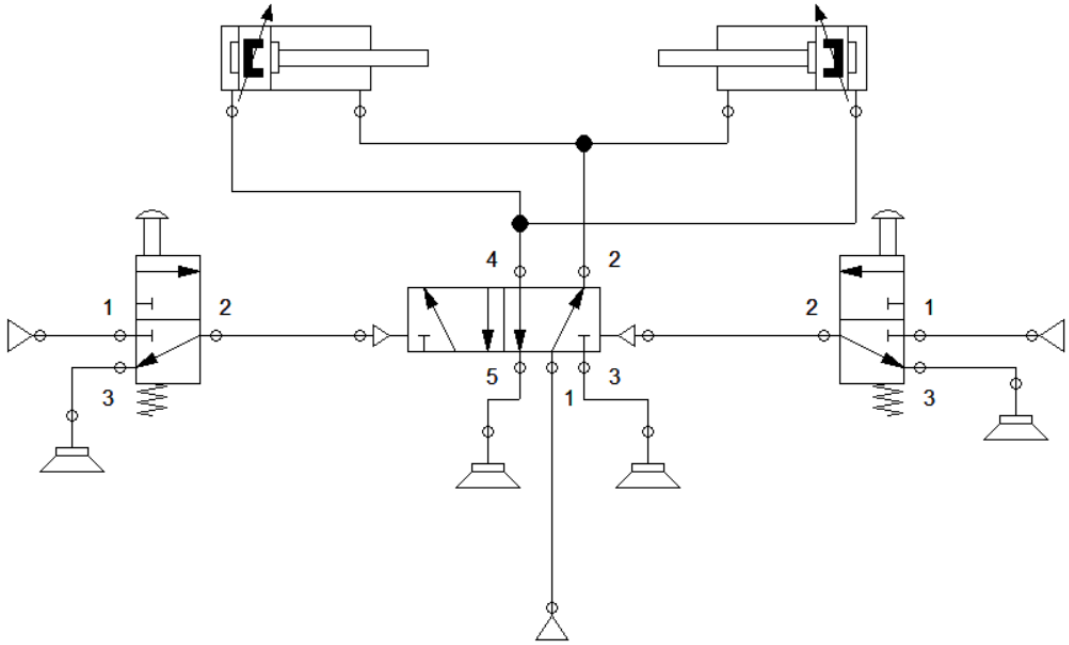
- FESTO FluidSIM®4

3. Circuit Diagram

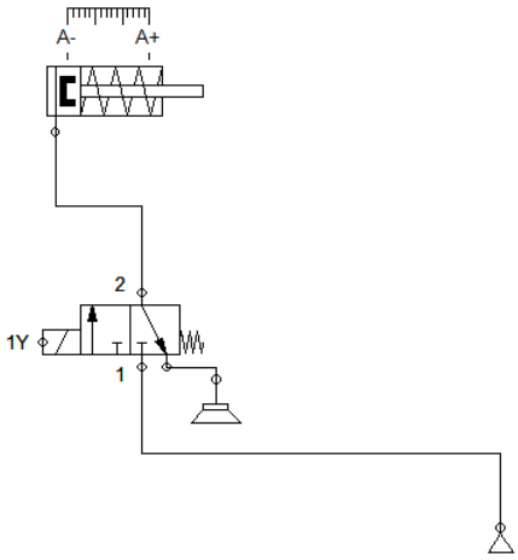
1.1

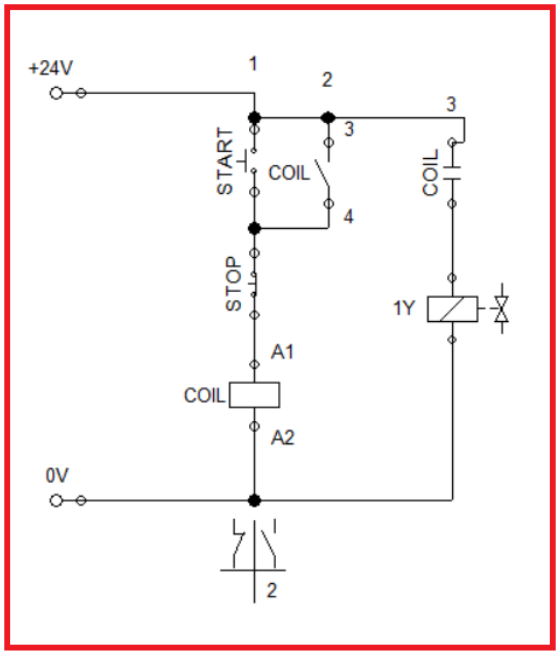


1.2

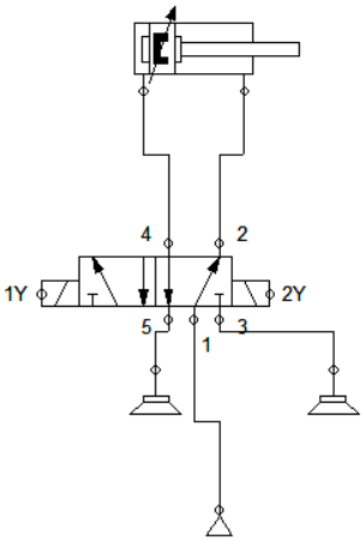

1
2
3
4
5
1
3
2
1
3

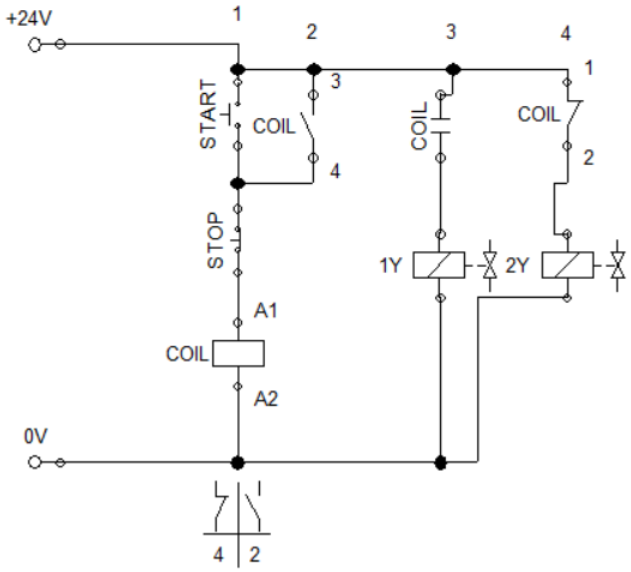
1.3


A-
A+
2
1Y
1

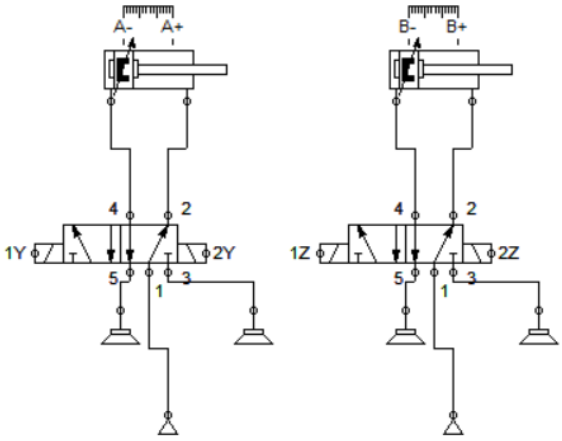

+24V
1
2
3
START
COIL
3
4
COIL
STOP
1Y
A1
COIL
A2
0V
2

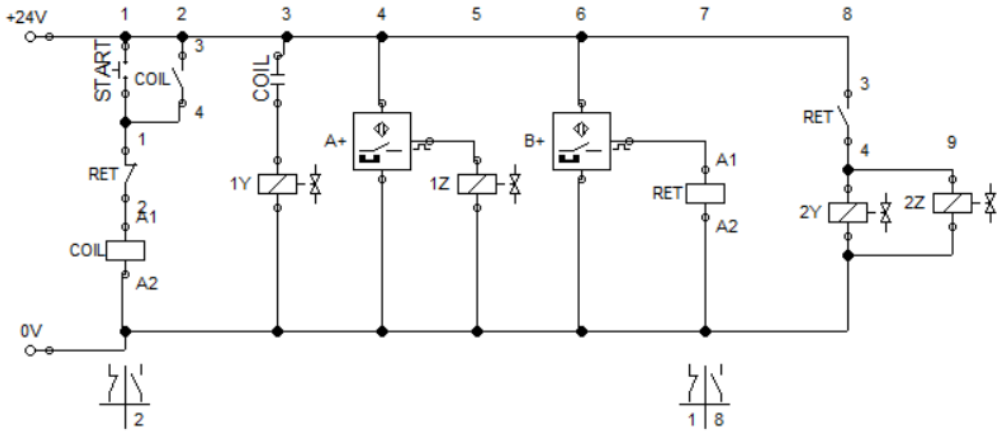
1.4


4
2
1Y
2Y
5
1
3


+24V
1
2
3
4
START
COIL
3
4
COIL
COIL
1
2
STOP
1Y
2Y
A1
COIL
A2
0V
4
2

1.5


A-
A+
4
2
1Y
2Y
5
1
3
B-
B+
4
2
1Z
2Z
5
1
3


+24V
1
2
3
4
5
6
7
8
START
COIL
3
4
1
RET
2
A1
COIL
A2
0V
2
COIL
1Y
A+
1Z
B+
A1
RET
A2
1
8
RET
3
4
9
2Y
2Z

Question: -

1.What is relay and what is the use of it?
2.Name the DCVs

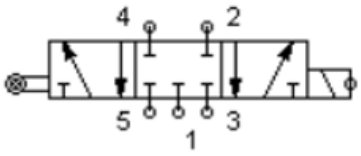


Fig-01

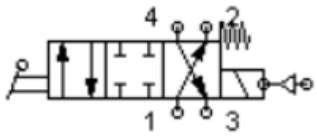


Fig-02

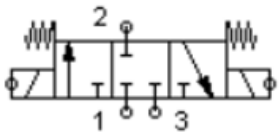


Fig-03

Answer: -

1.)
Relays are the switches which aim at closing and opening the circuits electronically as well as electromechanically, by a low power signal, or where several circuits must be controlled by one signal. It controls the opening and closing of the circuit contacts of an electronic circuit. When the relay contact is open (NO), the relay isn't energize with the open contact. However, if it is closed (NC), the relay isn't energize given the closed contact. However, when energy (electricity or charge) is supplied, the states are prone to change.

Relays are highly versatile components that are just as effective in complex circuits as in simple ones.
Uses: -

- A relay circuit is used to realize logic functions. They play a very important role in providing safety critical logic.
- They can be used in the place of other forms of switches, or they can be specifically designed based on factors such as required amperage. Relays can reduce the need for high-amperage wiring and switches, which are expensive and take up space. Therefore, switching to relays in our electronic systems can reduce the size or weight of a casing, for instance, or allow manufacturers to fit more functionality into a space of the same size.
- As said, the main operation of a relay comes in places where only a low-power signal can be used to control a circuit. But for the high-end applications of relays, it requires high power (electric motors application and so on), then such relays are called contactors.
- They are also used as protective relays. By this function all the faults during transmission and reception can be detected and isolated.
- They are also used to provide time delay functions. They are used to time the delay open and delay close of contacts.

2.)

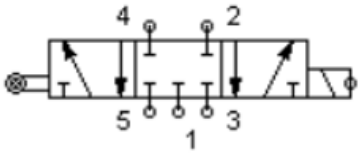


Fig-01

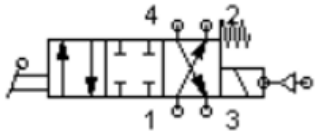


Fig-02

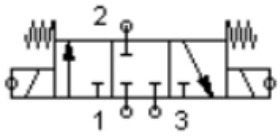


Fig-03

Fig:1 →Directional control valves: 5/3-way, Left actuation by roller(Mechanically),Right actuation by solenoid(Electrically).

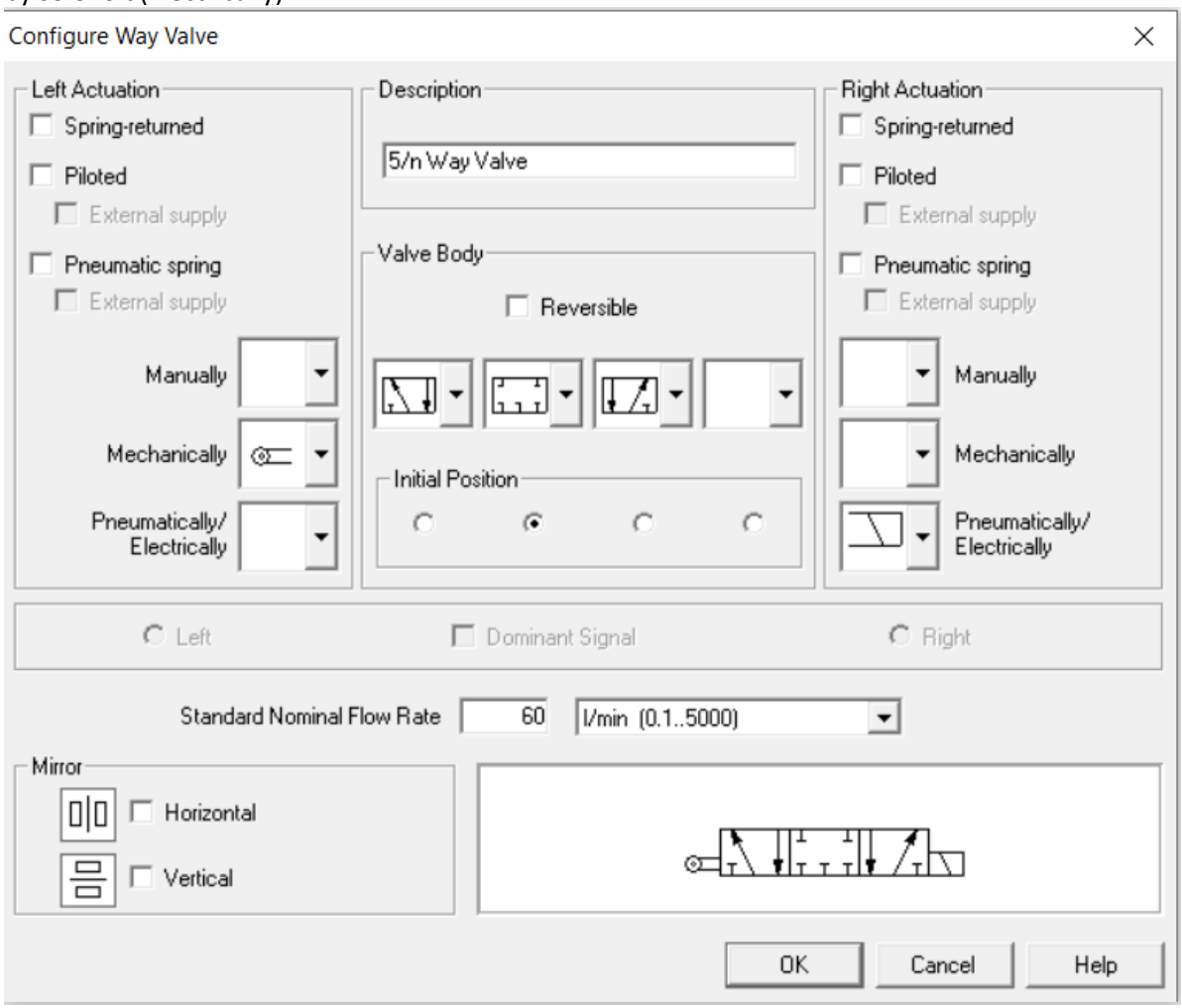


Fig:2 → Directional control valves: 4/3-way, Left actuation by Lever(Manually), Right actuated by solenoid and pneumatic piloting (Pneumatically-Electrically),with spring return.

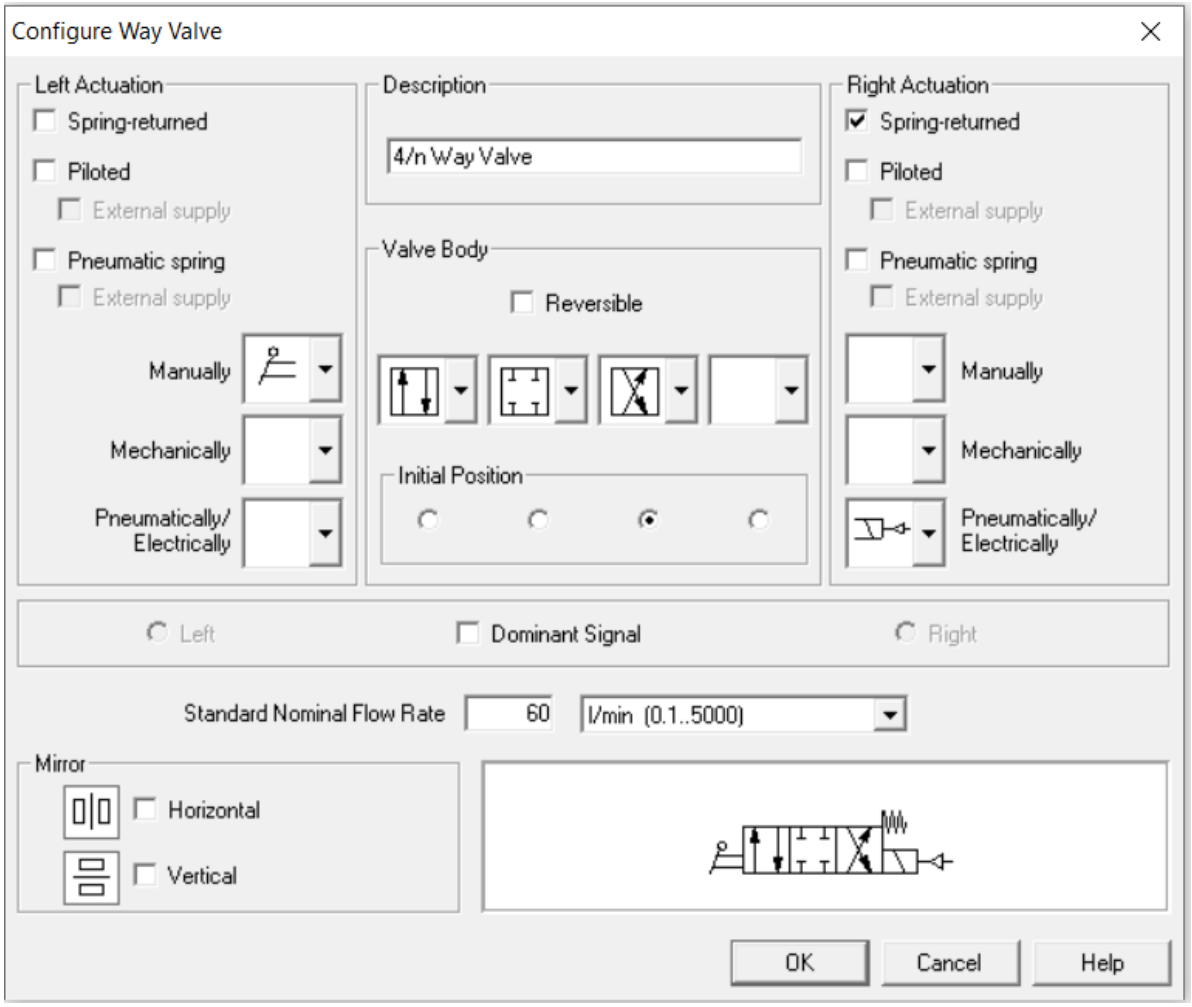
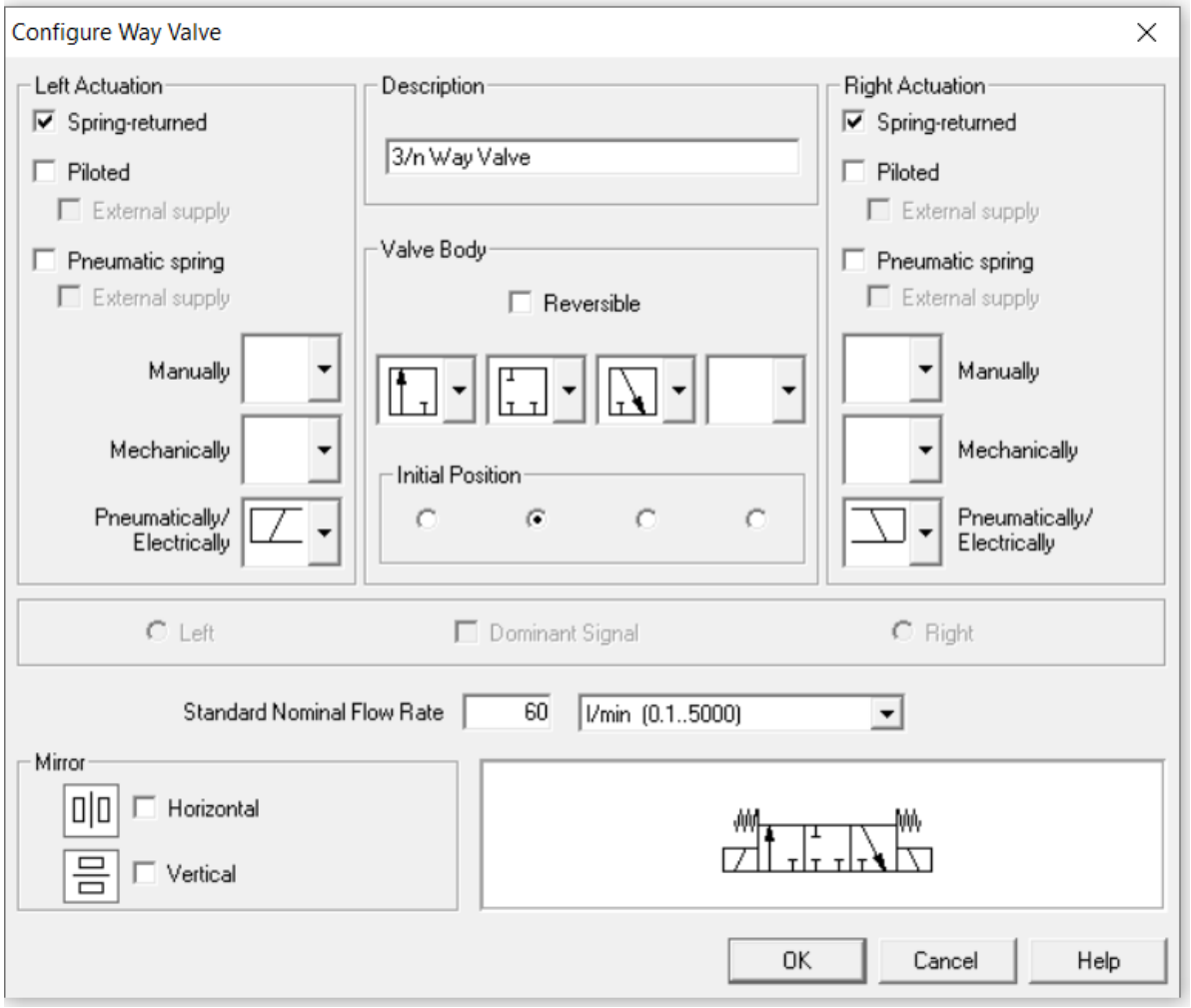


Fig:3 → Directional control valves: 3/3-way, actuated by solenoid(Electrically) in both directions, Mid-position spring-centered(Spring return on both side).



To view the Zip file of all experiment and demonstration video, click on the following Link: -

- Zip File & Demonstration Video