វិទ្យាស្ថានពហុបច្ចេកទេសភូមិភាគតេជោសែនស្វាយរៀង

Regional Polytechnic Institute Techo Sen Svay Rieng

Pneumatic and Hydraulic Technology Trainer

Presented by: Chork Ratana

PART A

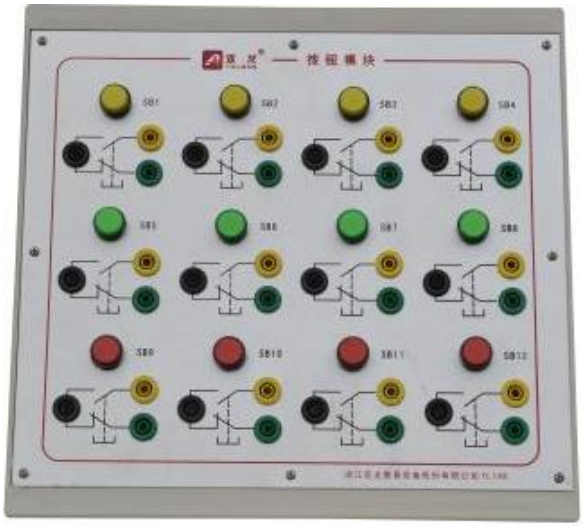
PNEUMATIC TECHNOLOGY TRAINER

I.Pneumatic part

YL-1330A Pneumatic & Electrical Technology Trainer

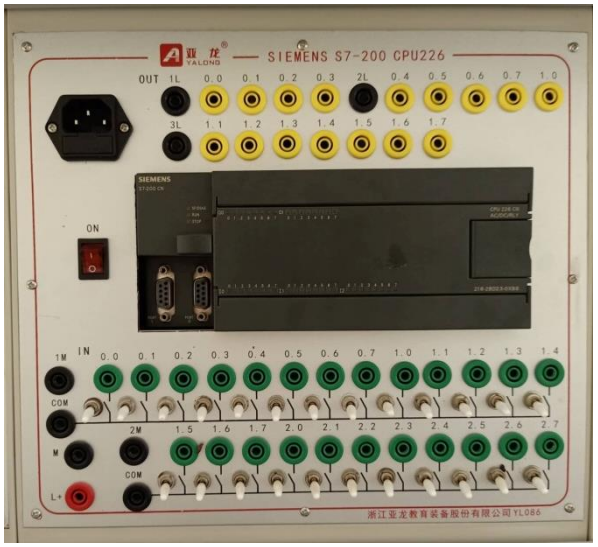
I.Pneumatic part

Power supply module



Button switch unit

Intermediate relay unit



PLC control unit

I.Pneumatic part


SHAKO
ST-01
0-10kgf/cm²


SHAKO
STH-01
0-9.9kgf/cm²


Q-O
A
P
R
JELPC CO.,LTD.

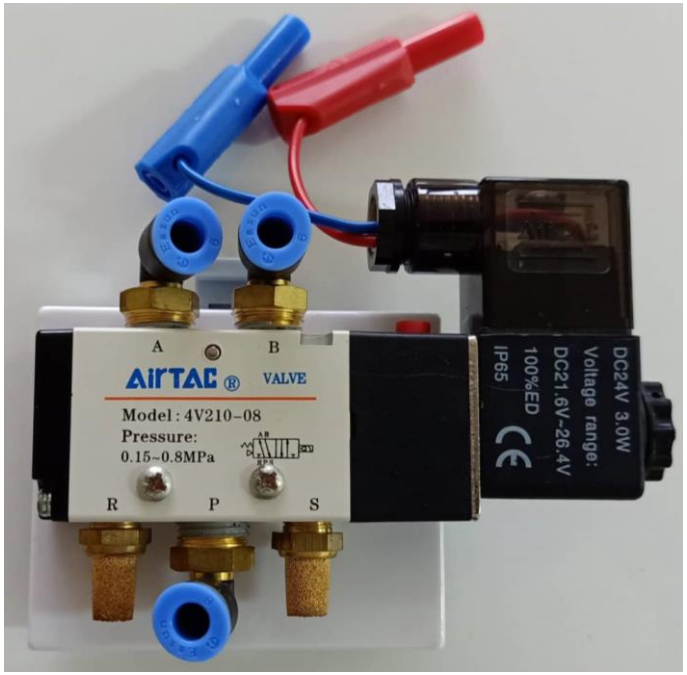

AirTAC
Model: ASC200-08
Pressure:
0.05~0.95MPa
P
A

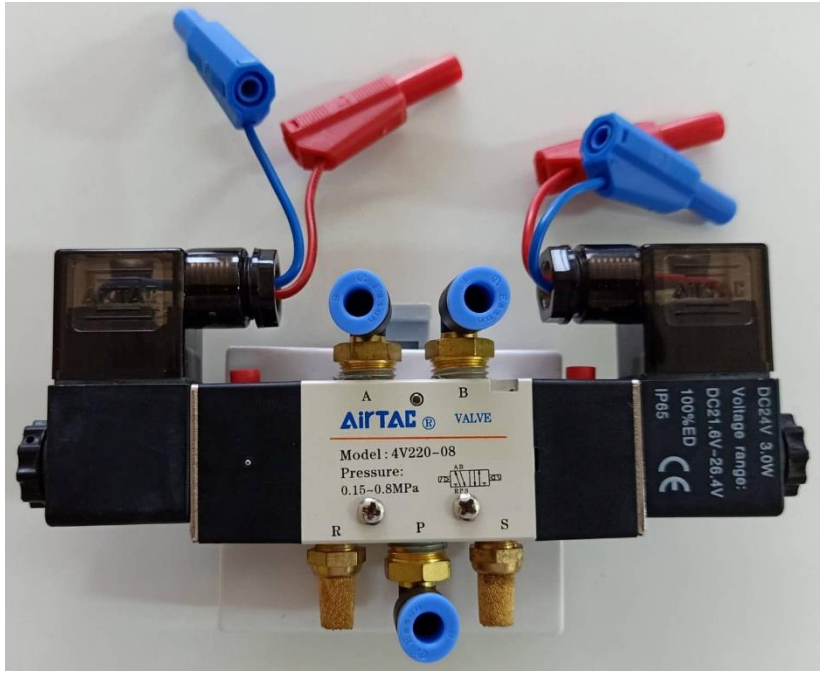

A
B
AirTAC ® VALVE
Model : 4A210-08
Pressure:
0.15~0.8MPa
R
P
S

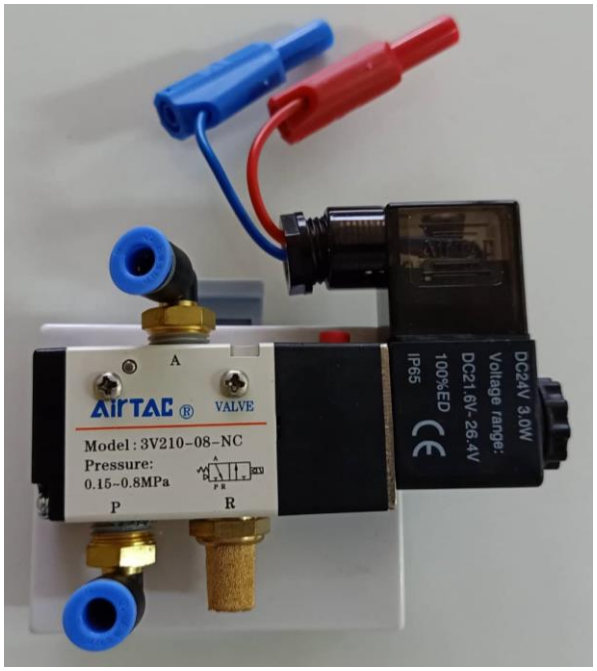

A
B
AirTAC ® VALVE
Model : 4A230C-08
Pressure:
0.15~0.8MPa
R
P
S

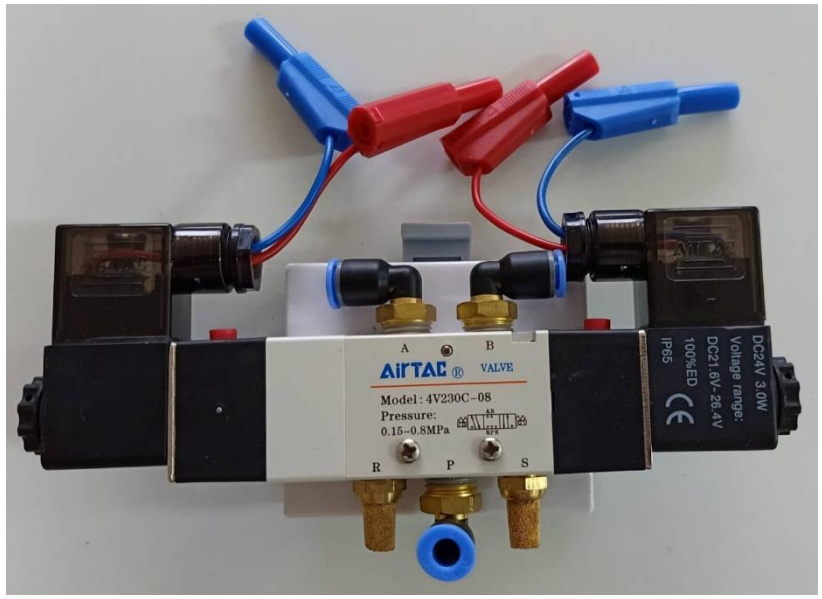

A
B
AirTAC ® VALVE
Model: 4H210-08
Pressure:
0~0.8MPa
R
P
S


A
B
AirTAC ® VALVE
Model : 4A220-08
Pressure:
0.15~0.8MPa
R
P
S


A
B
AIRTAC ® VALVE
Model : 4V210-08
Pressure:
0.15~0.8MPa
R
P
S
DC24V 3.0W
Voltage range:
DC21.6V~26.4V
100%ED
IP65


A
B
AIRTAC ® VALVE
Model : 4V220-08
Pressure:
0.15~0.8MPa
R
P
S
DC24V 3.0W
Voltage range:
DC21.6V~26.4V
100%ED
IP65


A
AIRTAC ® VALVE
Model : 3V210-08-NC
Pressure:
0.15~0.8MPa
P
R
DC24V 3.0W
Voltage range:
DC21.6V~26.4V
100%ED
IP65


A
B
AIRTAC ® VALVE
Model : 4V230C-08
Pressure:
0.15~0.8MPa
R
P
S
DC24V 3.0W
Voltage range:
DC21.6V~26.4V
100%ED
IP65

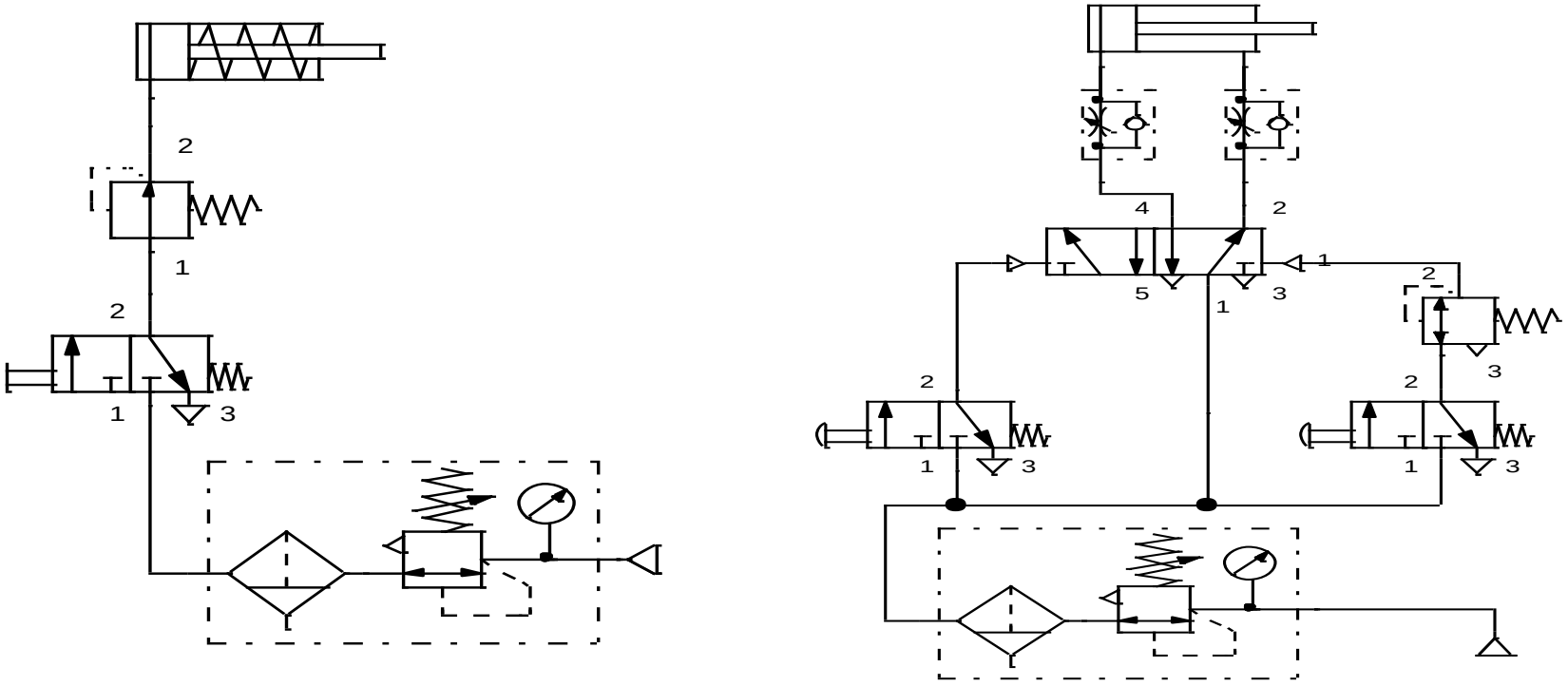

AirTAC®
MECHANICAL VALVE
R
A
P
Model :M3R210-08
Pressure : 0~1.0MPa


B
VALVE
AirTAC®
Model: 4H210-08
Pressure:
0~0.8MPa
S
P
A
R


AirTAC®
MECHANICAL VALVE
R
A
P
Model : M3PP210-08
Pressure : 0~1.0MPa

I.Pneumatic part

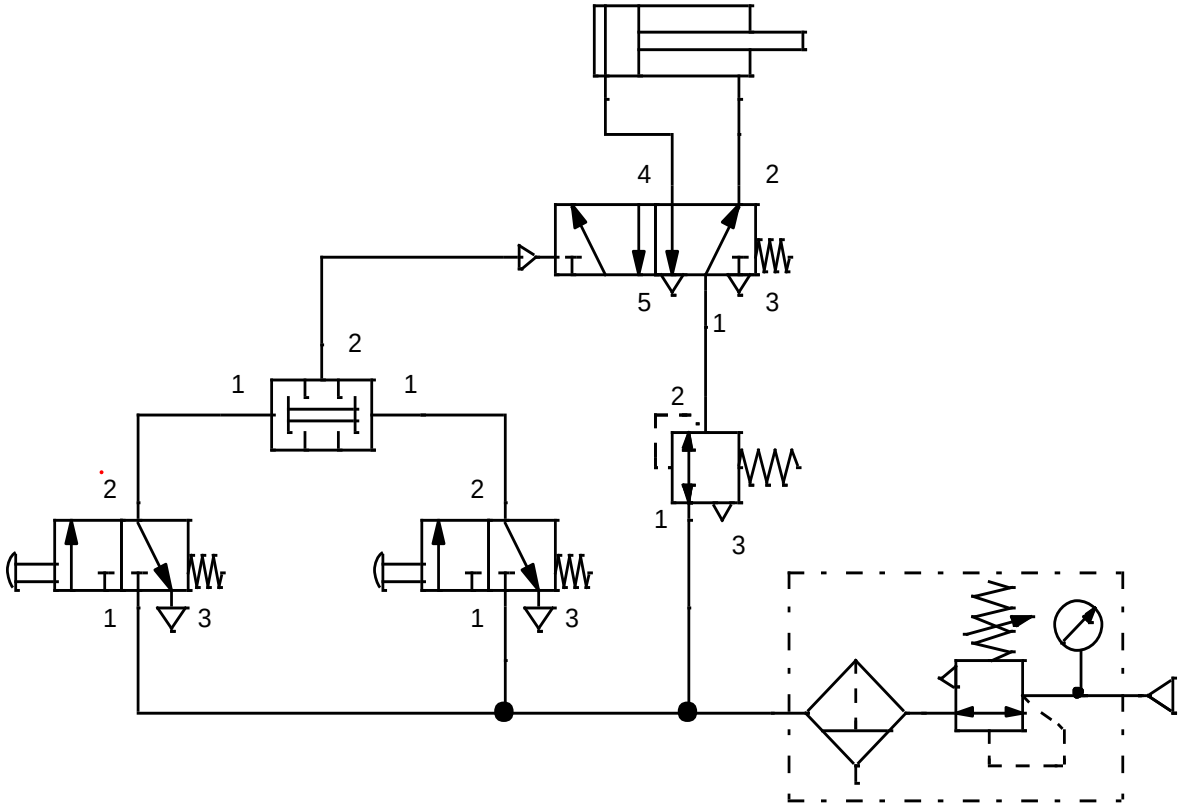
1.1 One single action cylinder direct control and One-dual action cylinder speed control



Penumatic connection diagram

I.Pneumatic part

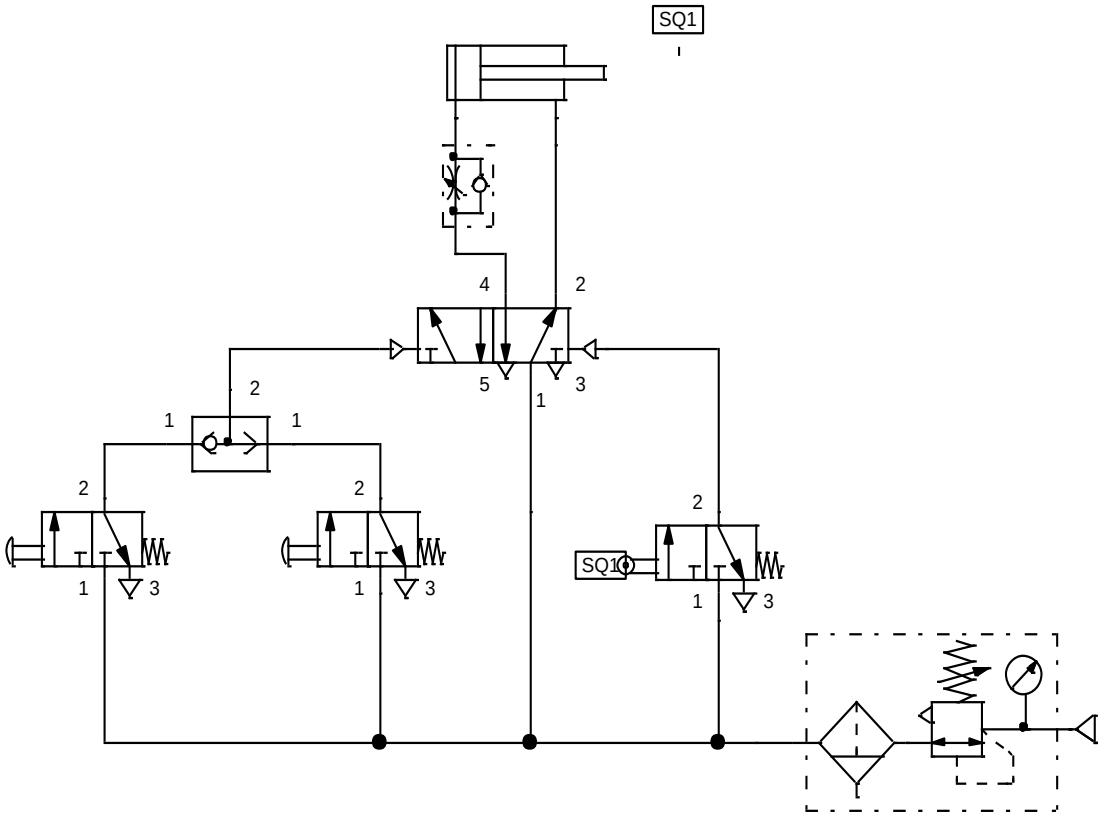
1.2. One dual-action cylinder AND logic function direct control



Penumatic connection diagram

I.Pneumatic part

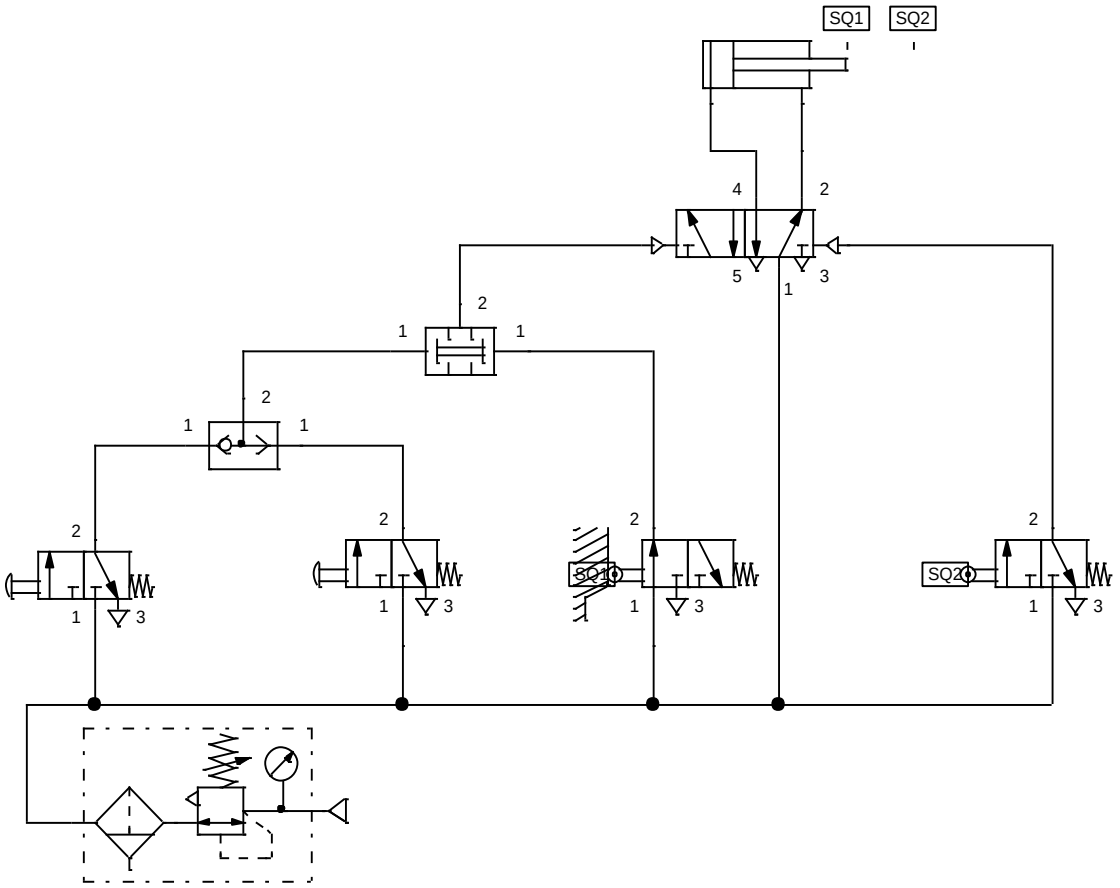
1.3 One dual-action cylinder OR logic function control



Penumatic connection diagram

I.Pneumatic part

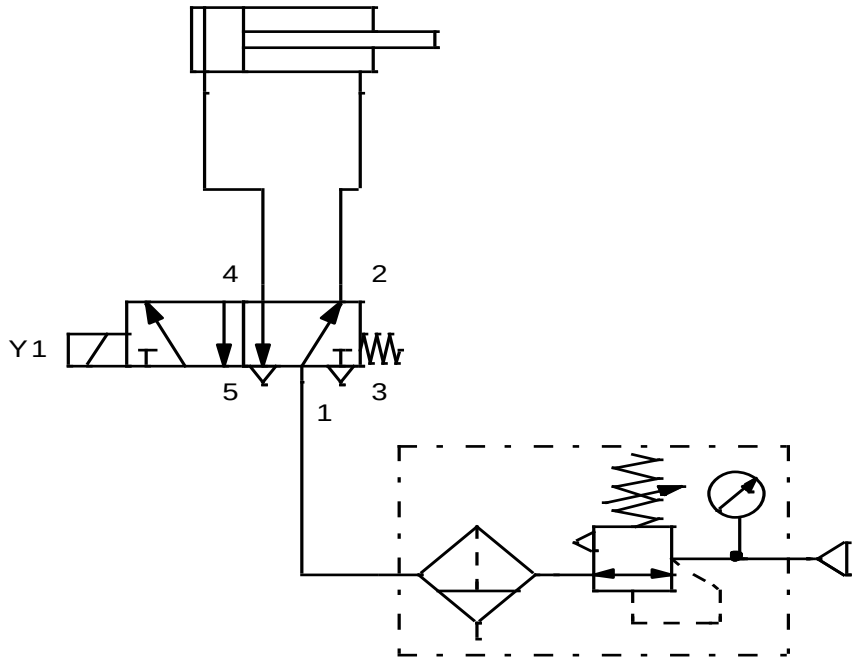
1.4 One dual action cylinder AND, OR logic function indirect control



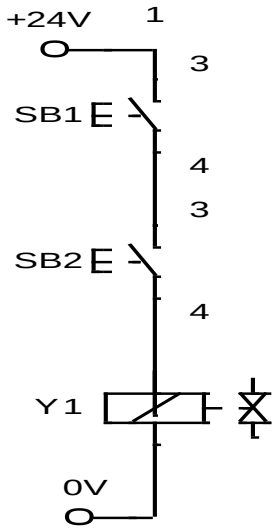
Penumatic connection diagram

II. Electric part

2.1 Manual operation (serial) circuit



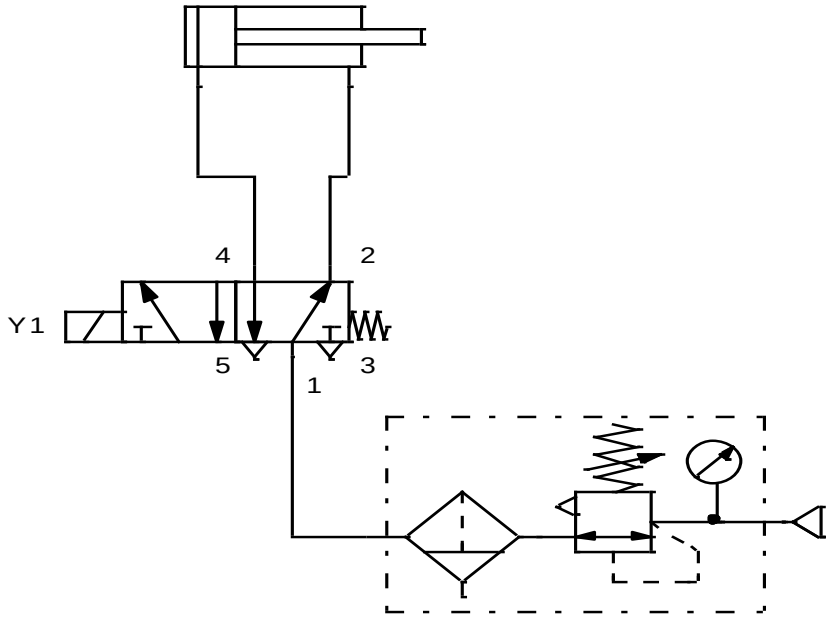
Connect pneumatic diagram



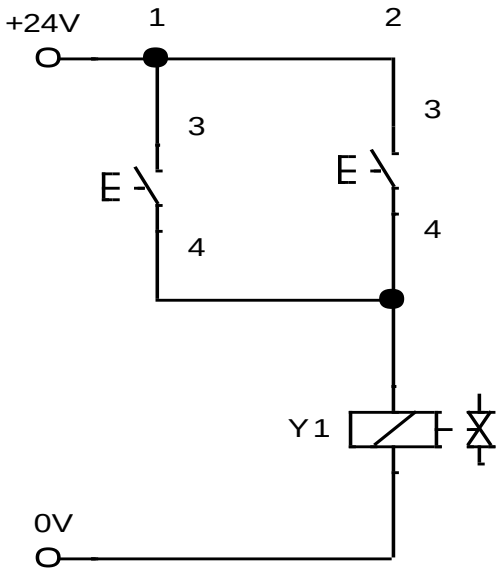
Connect circuit diagram

II. Electric part

2.2. ‘‘Remote’’ control operation (parallel) circuit



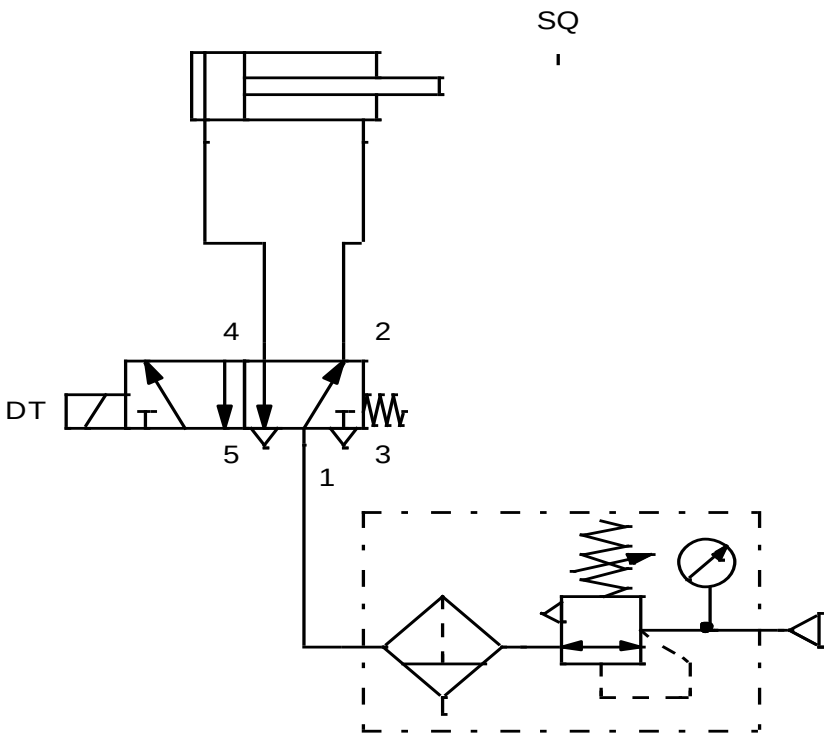
Connect pneumatic diagram



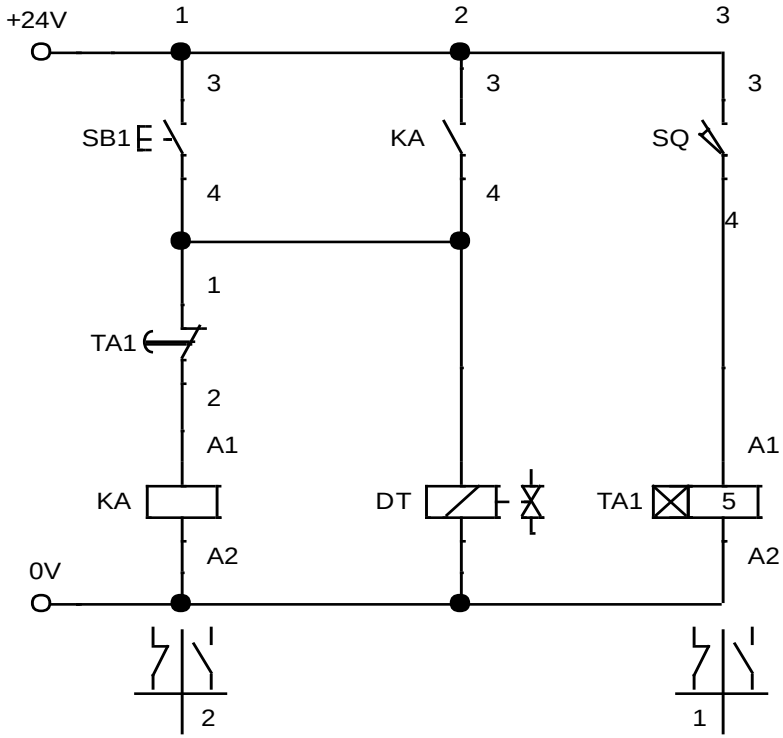
Connect circuit diagram

II. Electric part

2.3. Delay forward-back circuit



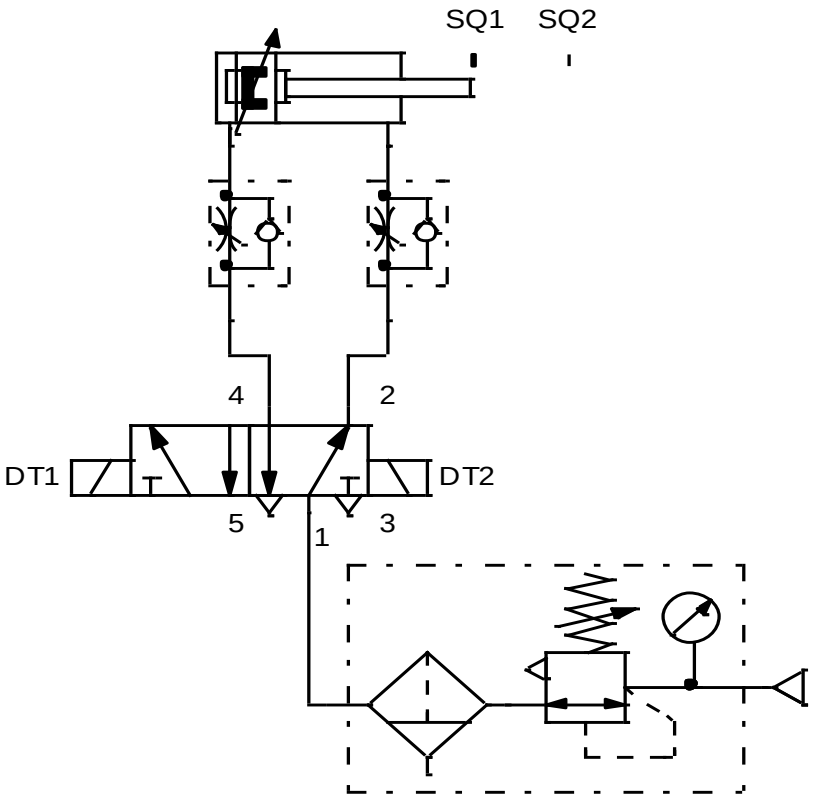
Connect pneumatic diagram



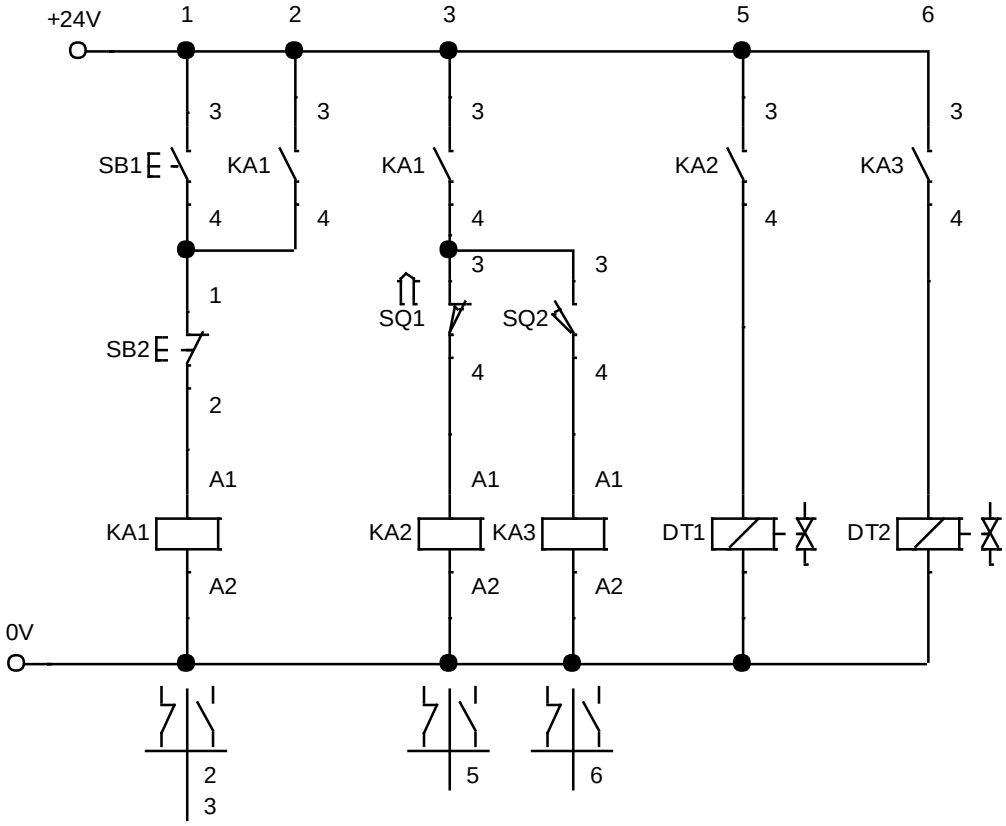
Connect circuit diagram

I.Pneumatic part

2.4 2-position & 5-way valve continuous forward-back circuit



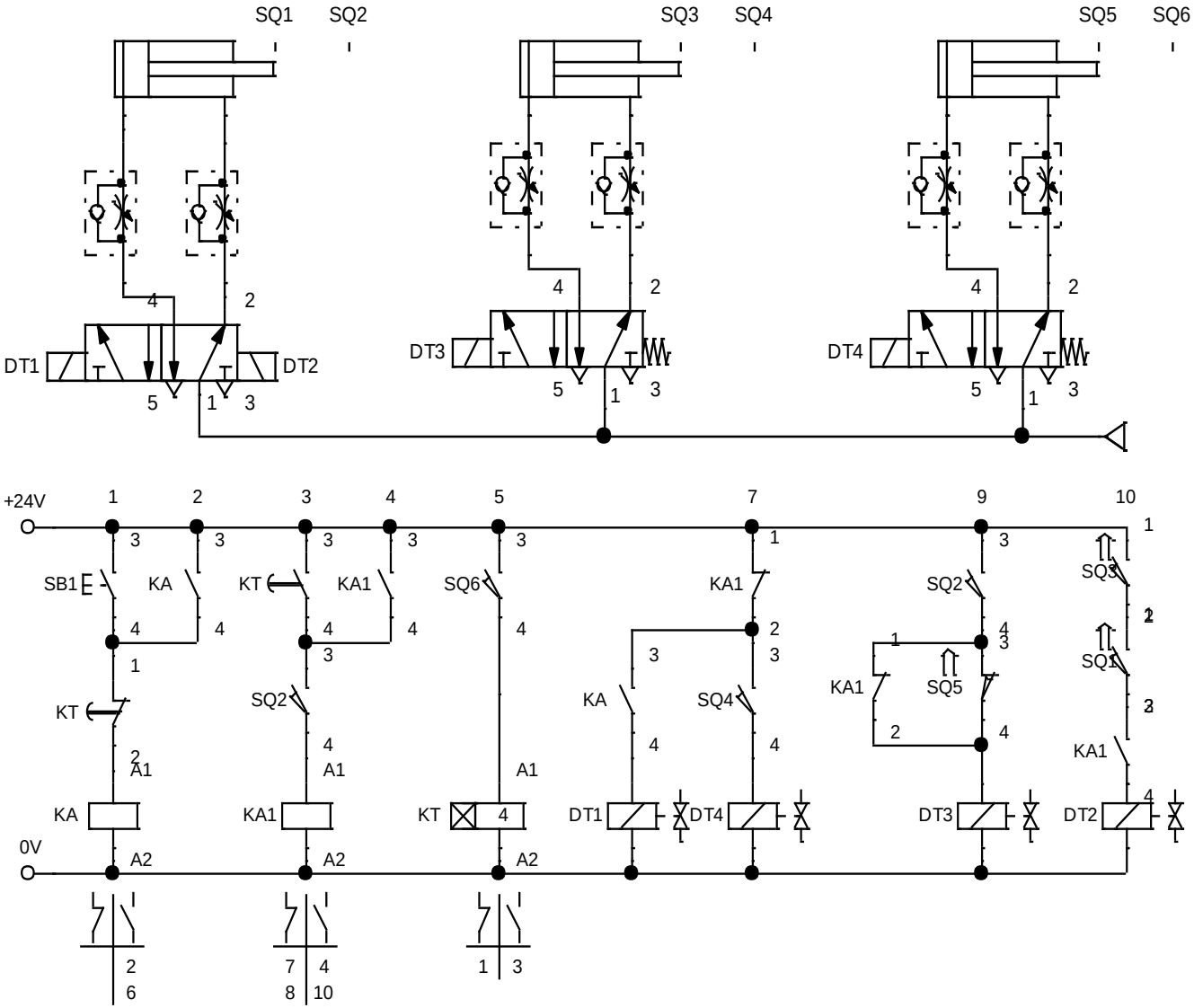
Connect pneumatic diagram



Connect circuit diagram

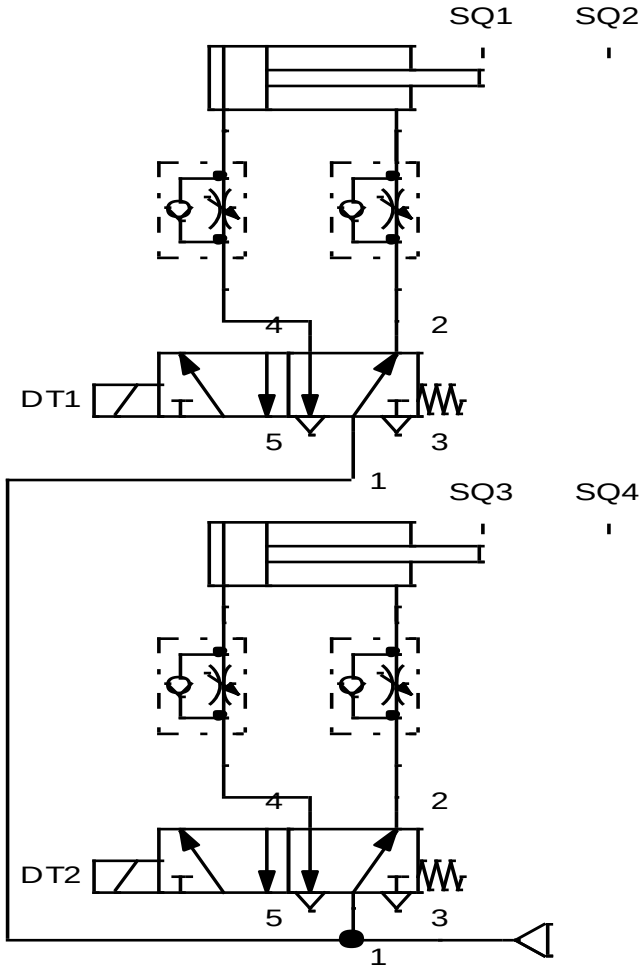
I.Pneumatic part

2.5. Multi-cylinder solenoid electric-pneumatic delay control circuit

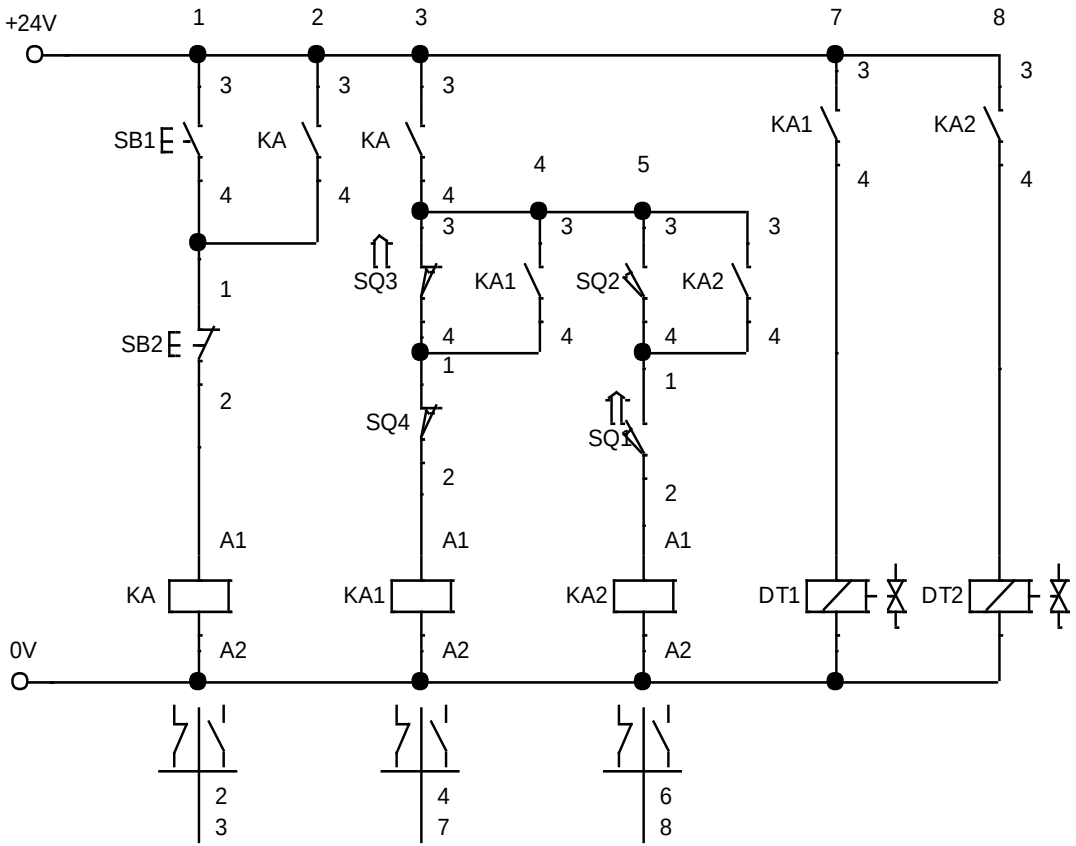


II. Electric part

2.5 dual-cylinder forward-back electric-pneumatic control circuit



Connect pneumatic diagram

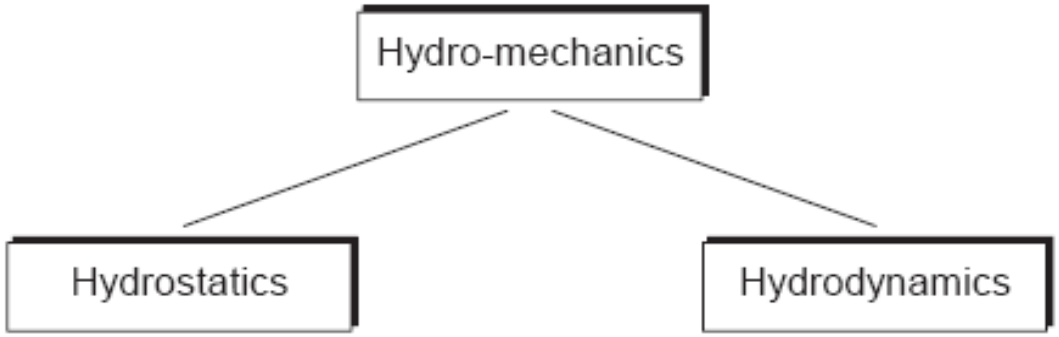


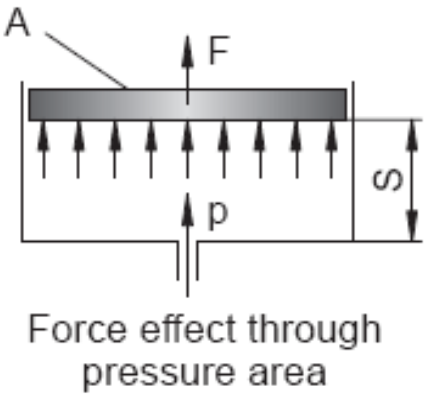
Connect circuit diagram

PART B

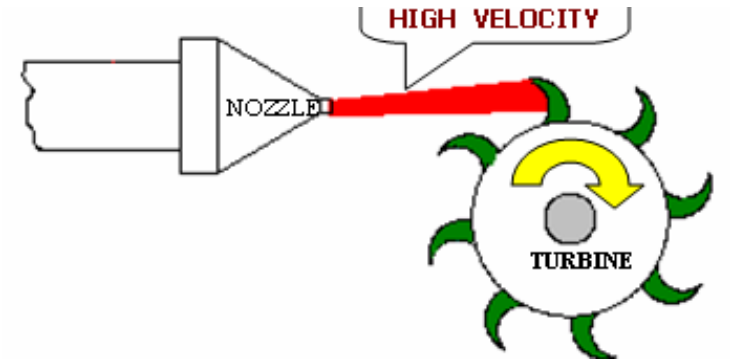
HYDRAULIC TECHNOLOGY TRAINER

Pressure





Hydrostatics



Hydrodynamics

Hydrostatic pressure

$$p_s = h \bullet \rho \bullet g$$

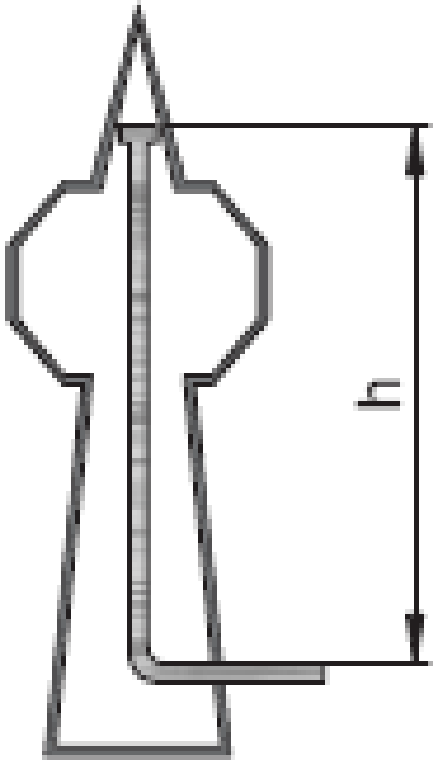
ps = hydrostatic pressure (gravitational pressure) [Pa]

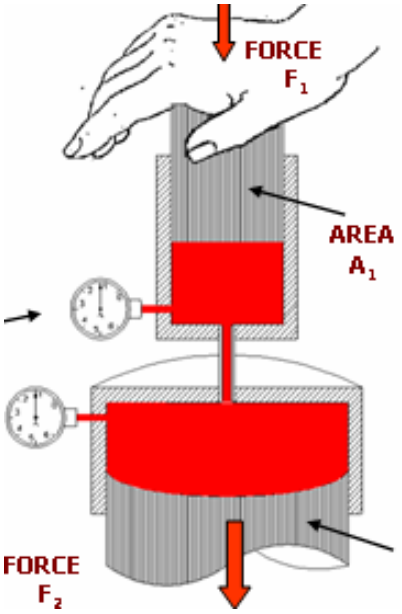
h = level of the column of liquid [m]

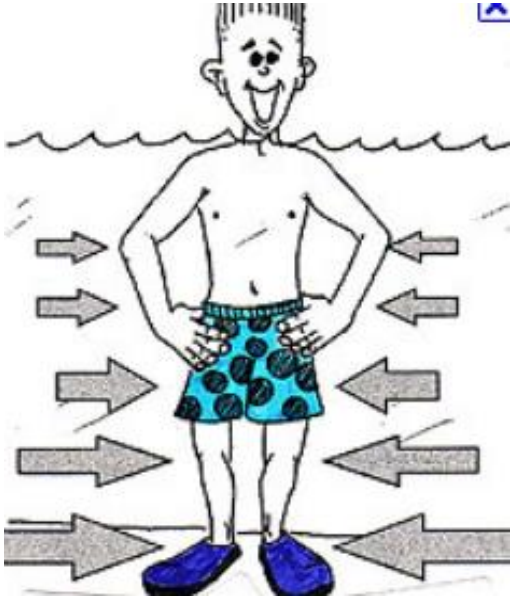
ρ = density of the liquid [kg/m^3]

g = acceleration due to gravity [m/s^2]

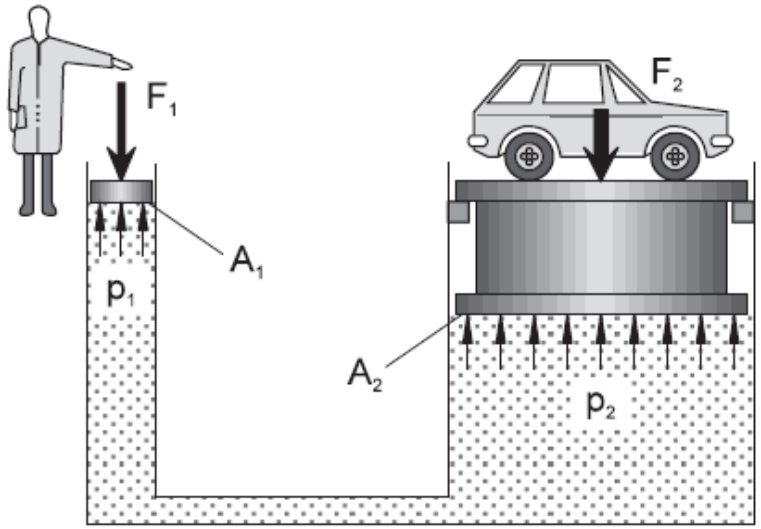
Hydrostatic pressure







Power transmission



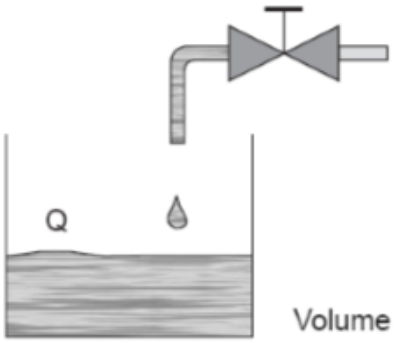
$$V_1 = s_1 \bullet A_1 \quad \text{and} \quad V_2 = s_2 \bullet A_2$$

ដោយ $V_1 = V_2$

$$s_1 \bullet A_1 = s_2 \bullet A_2$$

$$s_2 = \frac{s_1 \bullet A_1}{A_2} \quad \text{and} \quad A_1 = \frac{s_2 \bullet A_2}{s_1}$$

Flow rate



$$Q = \frac{V}{t}$$

Q = Flow rate [m^3/s]
V = volume [m^3]
t = time [s]

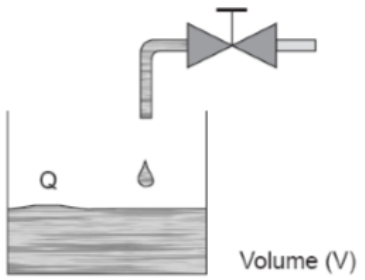
$$V = Q \bullet t$$

Continuity equation

$$Q = A \bullet v$$

Q = flow rate [m^3/s]
v = flow velocity [m/s]
A = pipe cross-section [m^2]

$$A = \frac{Q}{v}, \qquad v = \frac{Q}{A}$$

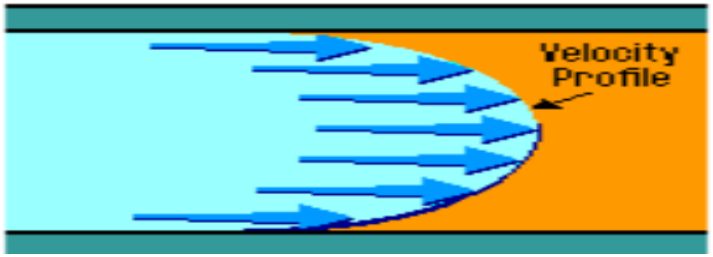


$$Q = \frac{V}{t}$$

Q = Flow rate [m^3/s]
V = volume [m^3]
t = time [s]

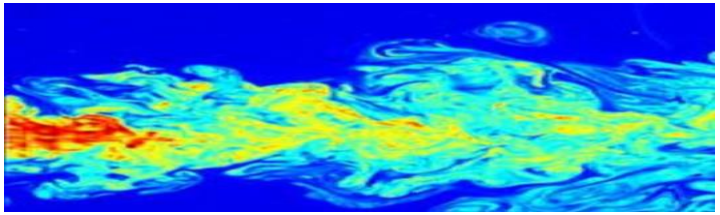
$$V = Q \bullet t$$

របបលំហូរ (Flow regime)



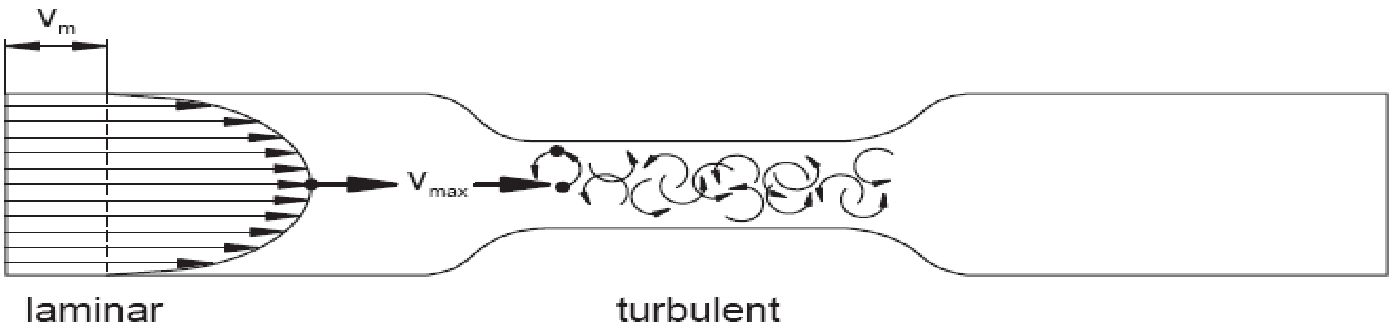
Laminar flow

become turbulent or transition flow



Turbulent flow

របបលំហូរ (Flow regime)



❖ [illegible] ***Re (Reynolds Number):***

- the flow velocity of the liquid v (m/s)
- the pipe diameter d (m)
- and the kinetic viscosity n (m^2/s)

$$Re = \frac{v \bullet d}{\nu}$$

របបលំហូរ (Flow regime)

[illegible] Re (Reynolds Number) [illegible]:

laminar flow: Re < 2300

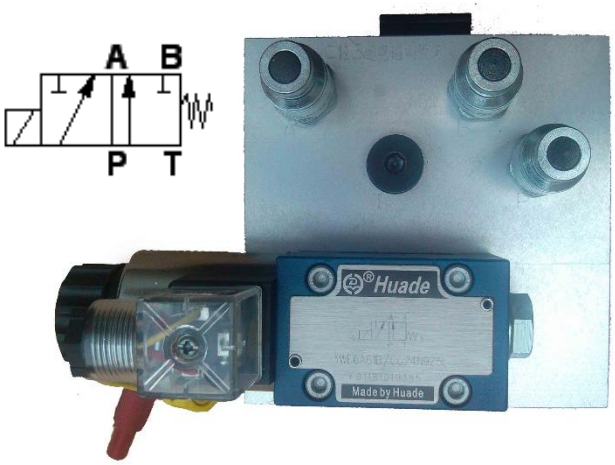
turbulent flow: Re > 2300

Hydraulic part

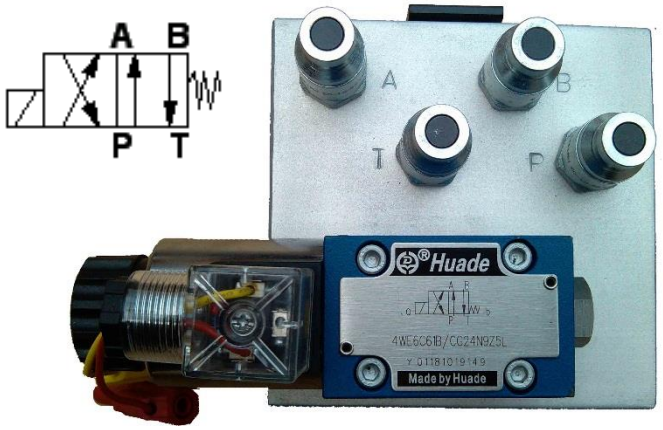
YL-1330A Pneumatic & Electrical Technology Trainer

Hydraulic valve port layout and detailed symbol

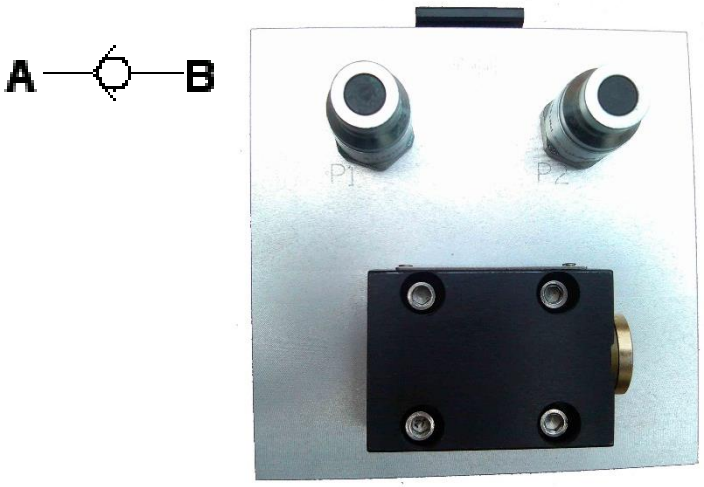
1) Two-position three-way electromagnetic directional valve (model: 3WE6A61B)



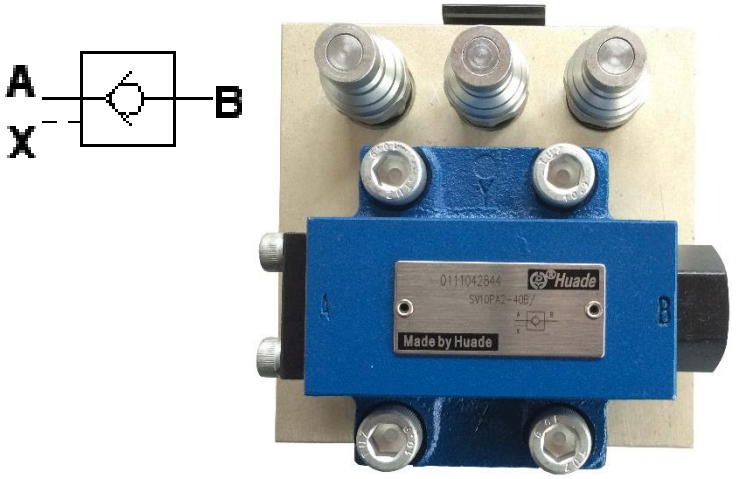
2）Two-position four-way electromagnetic directional valve (model: 4WE6C61B)



3）One-way valve (model: RVP8)

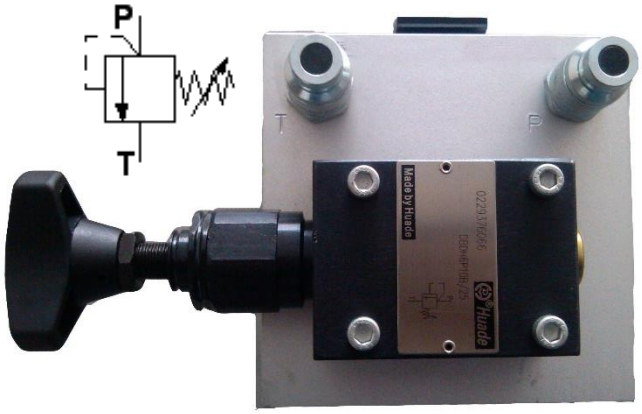


4）Liquid control one-way valve (model: SV10PA2)

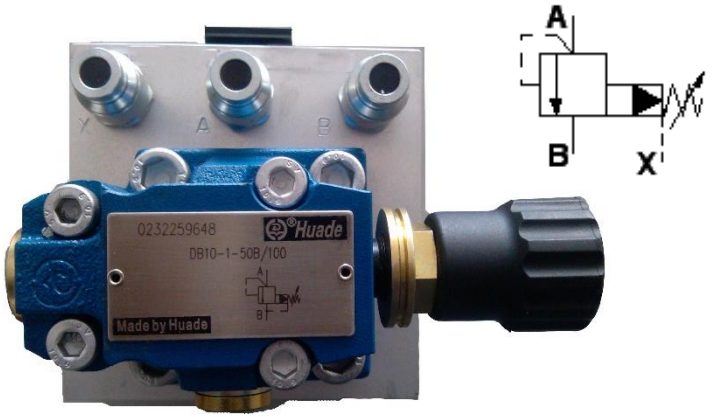


Hydraulic valve port layout and detailed symbol

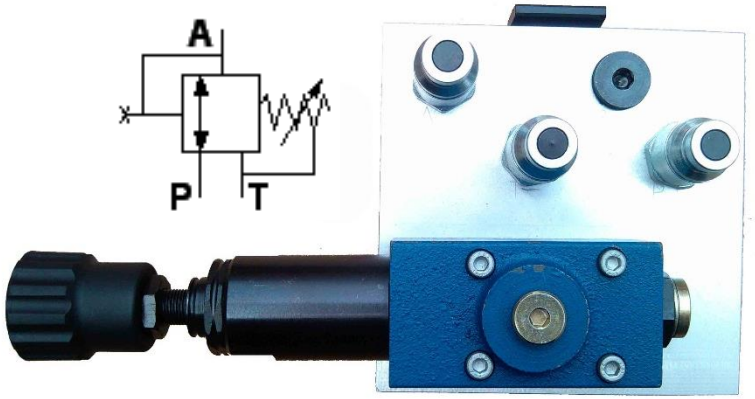
5）Direct action type overflow valve (model: DBDH6P10B)



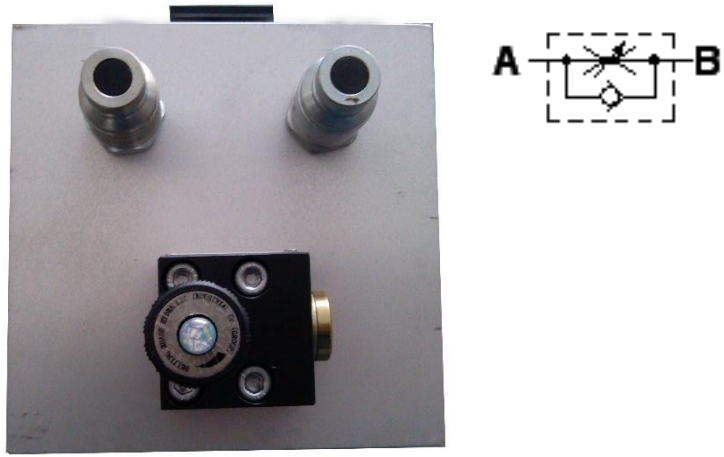
6）Pilot type overflow valve (model: db10-1-50b)



7）Direct pressure relief valve (model: dr6dp1-5x)

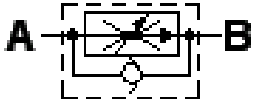


8）One-way throttle valve (model: DRVP8)



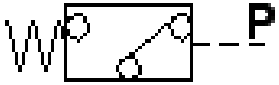
Hydraulic valve port layout and detailed symbol

9）One-way speed regulating valve (valve port layout and proportional speed regulation) (model: 2frm 5-31b)

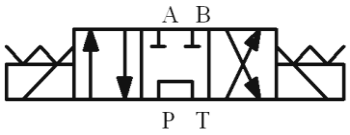


10）Pressure relay (model: HED4OP)

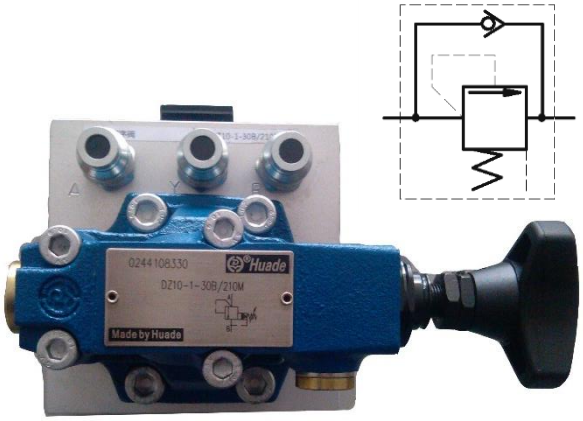
Note: electrical interface is normally open contact.



11）Three four-way electromagnetic directional valve (model: 4WE6E61B)

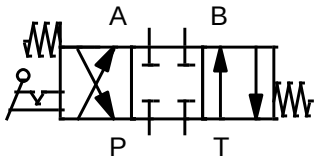


12）Sequence valve (model: dz10-1-30b)

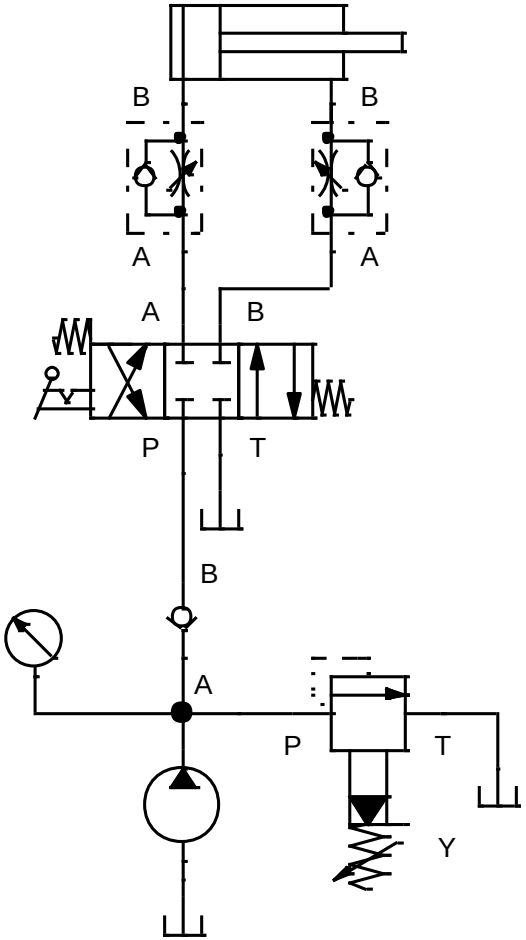


Hydraulic valve port layout and detailed symbol

13）Manual reversing valve (model: 4wm6e50b)

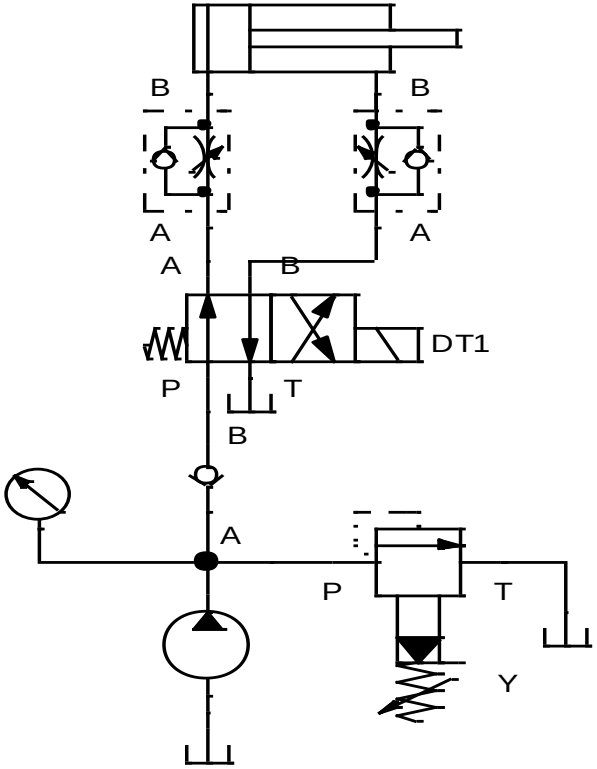


Manual valve

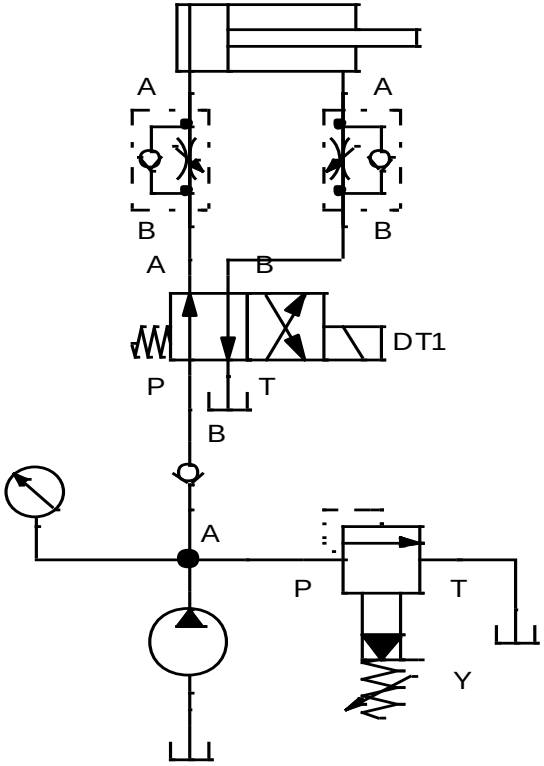


1. Throttle valve speed regulation circuit

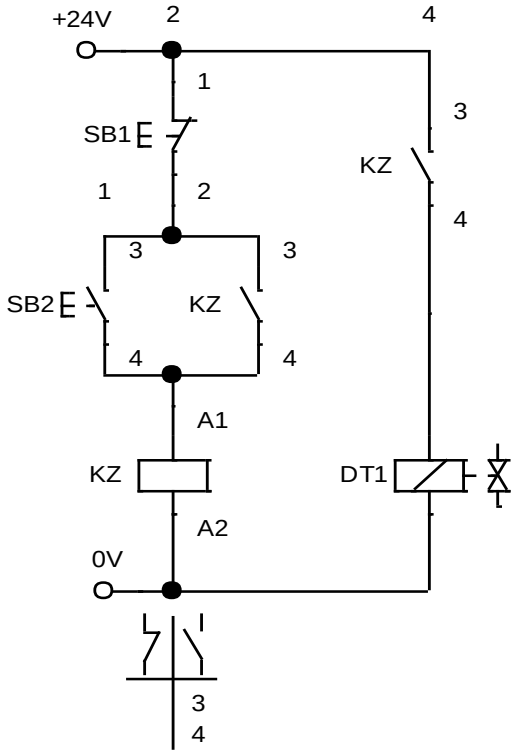
1.1 Constant-pressure throttle speed regulation circuit



Oil inlet throttle speed regulation



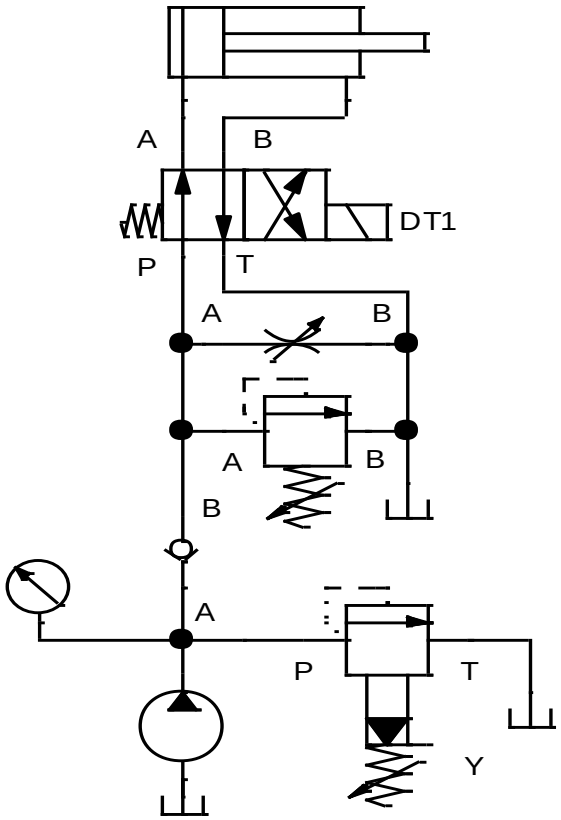
Oil return throttle speed regulation



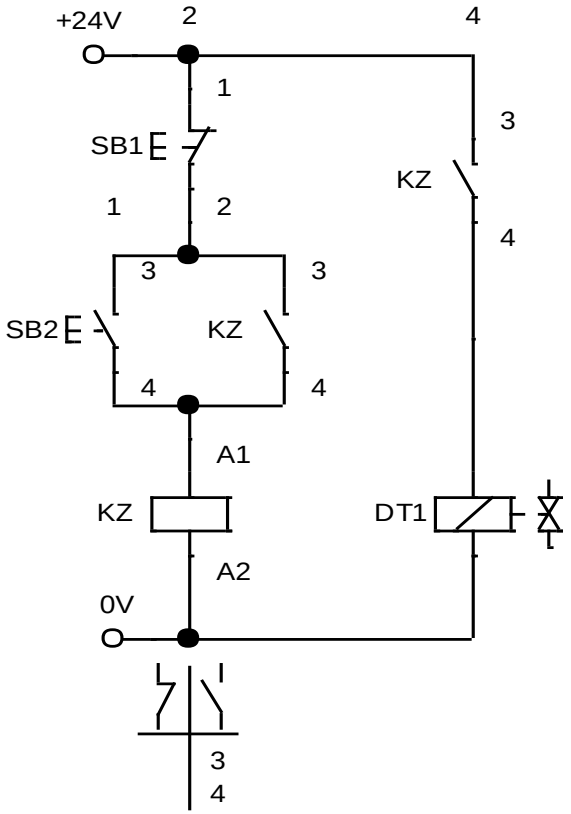
Connect circuit diagram

1. Throttle valve speed regulation circuit

1.2 Variable-pressure throttle speed regulation circuit



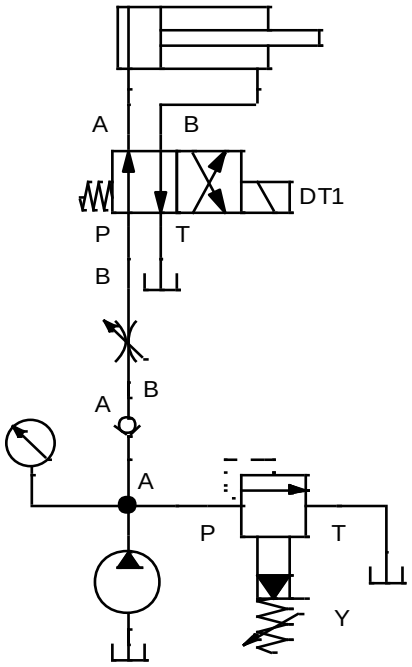
Connect pneumatic diagram



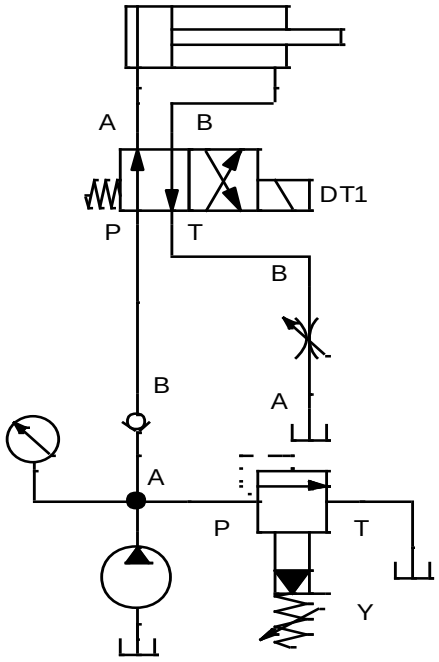
Connect circuit diagram

2. Speed regulation valve throttle speed regulation circuit

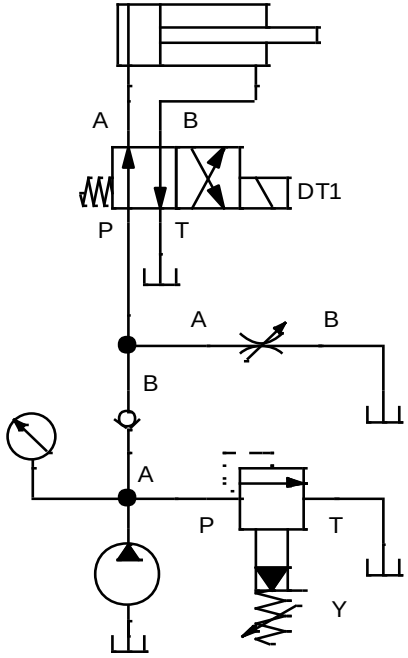
2.1 Constant-pressure throttle speed regulation circuit



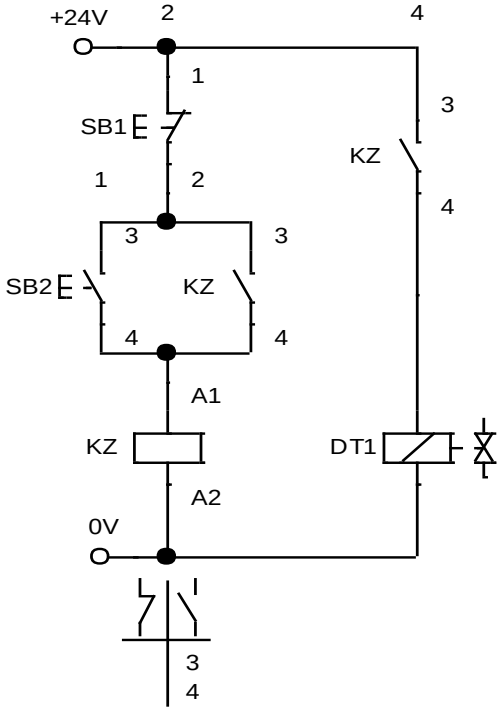
Oil inlet throttle speed regulation



Oil return throttle speed regulation

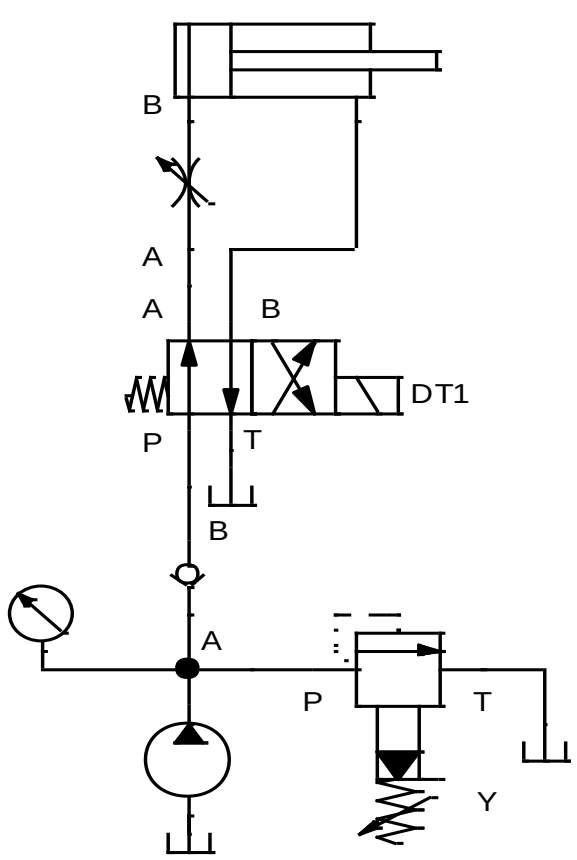


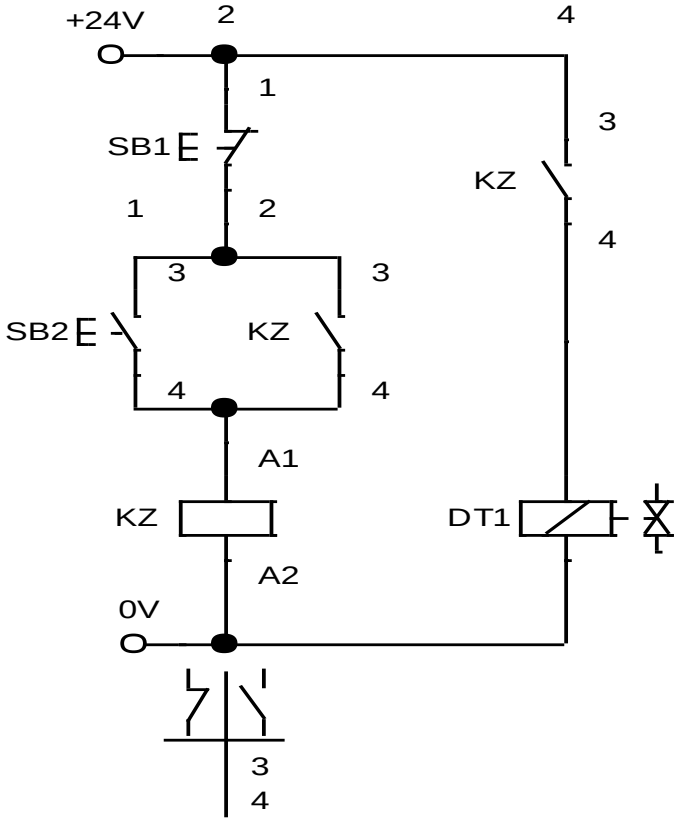
Bypass throttle speed regulation



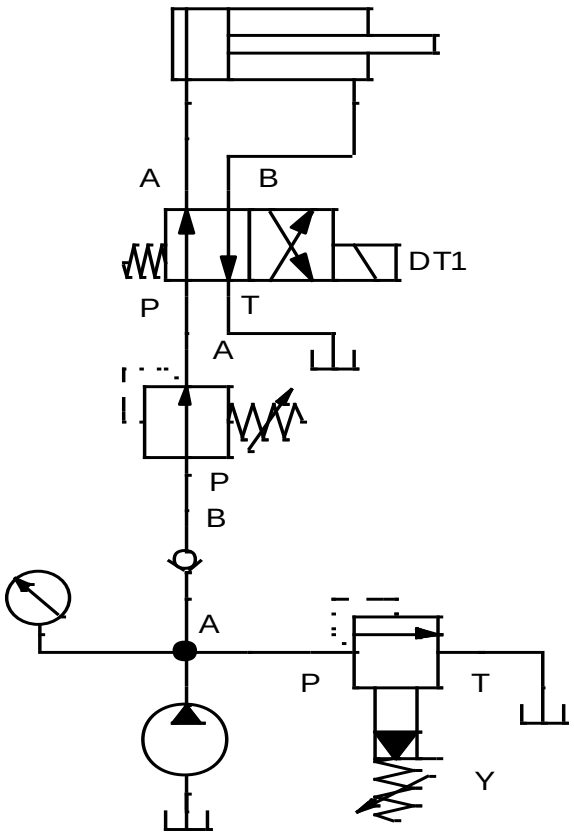
Connect circuit diagram

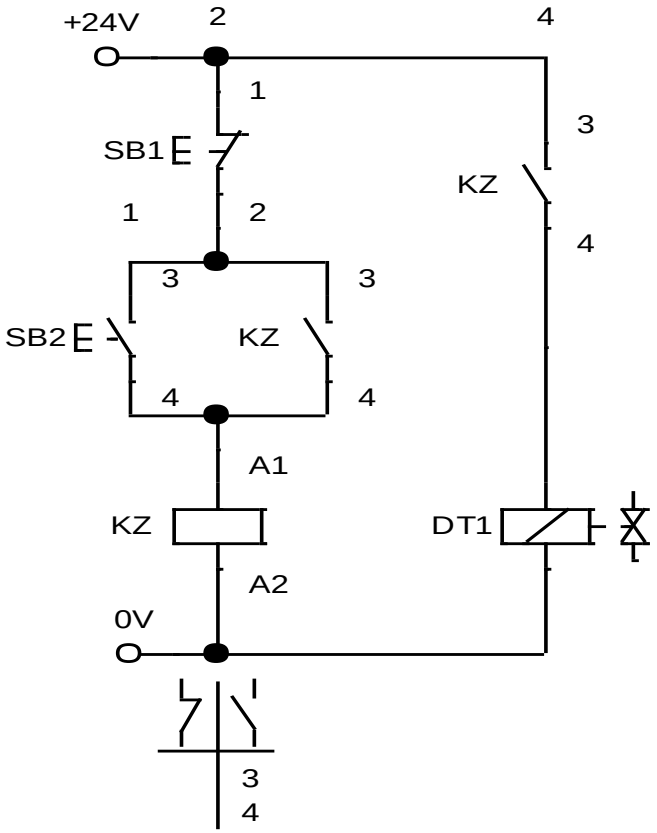
3. Simple pressure regulation



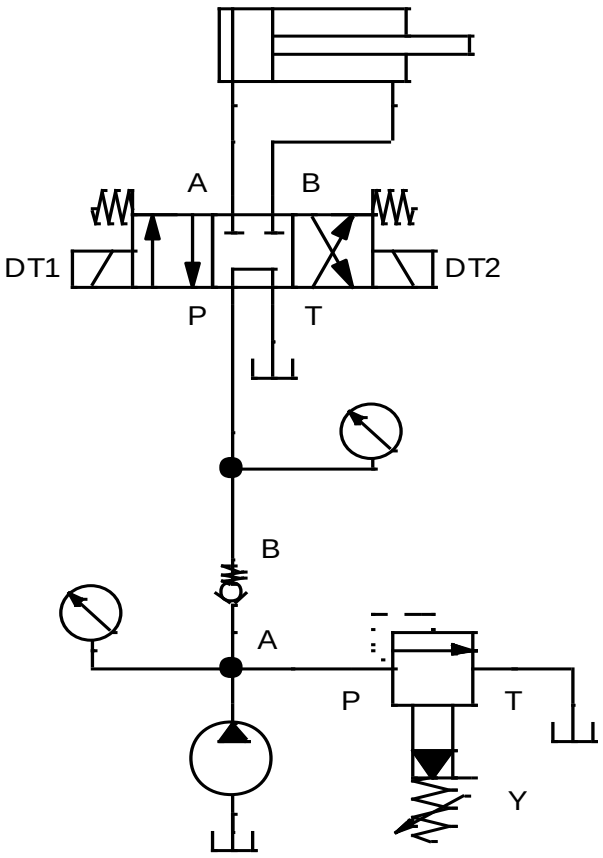


4. Pressure reduction valve circuit

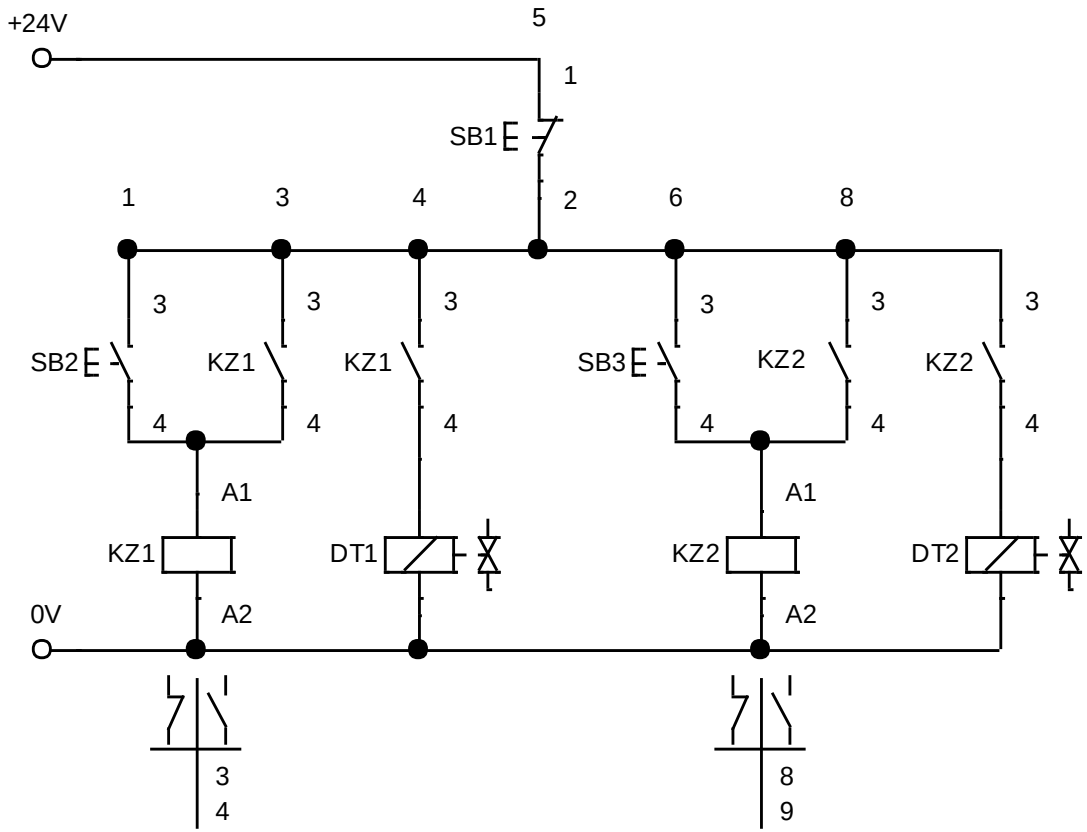




5. 3-position switching valve discharging circuit

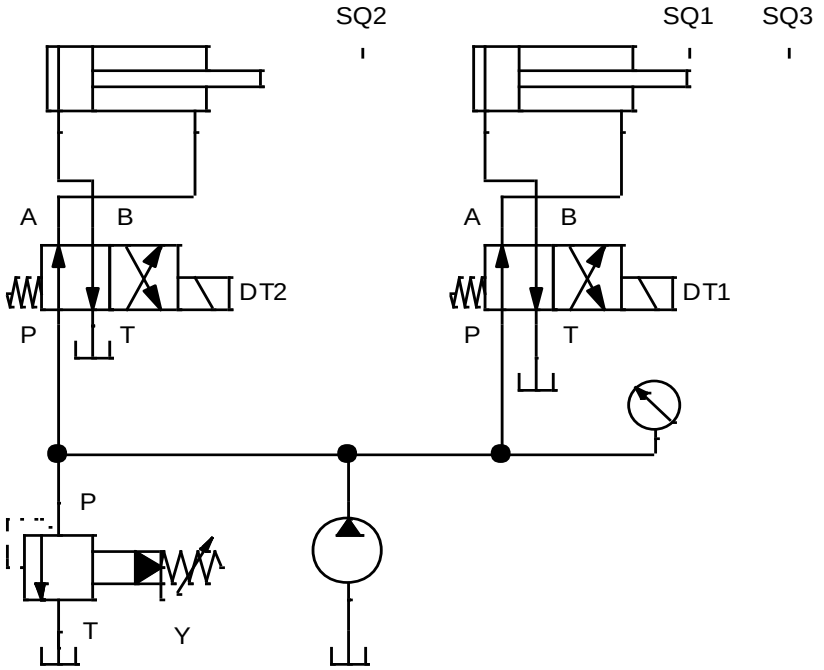


Connect hydraulic diagram

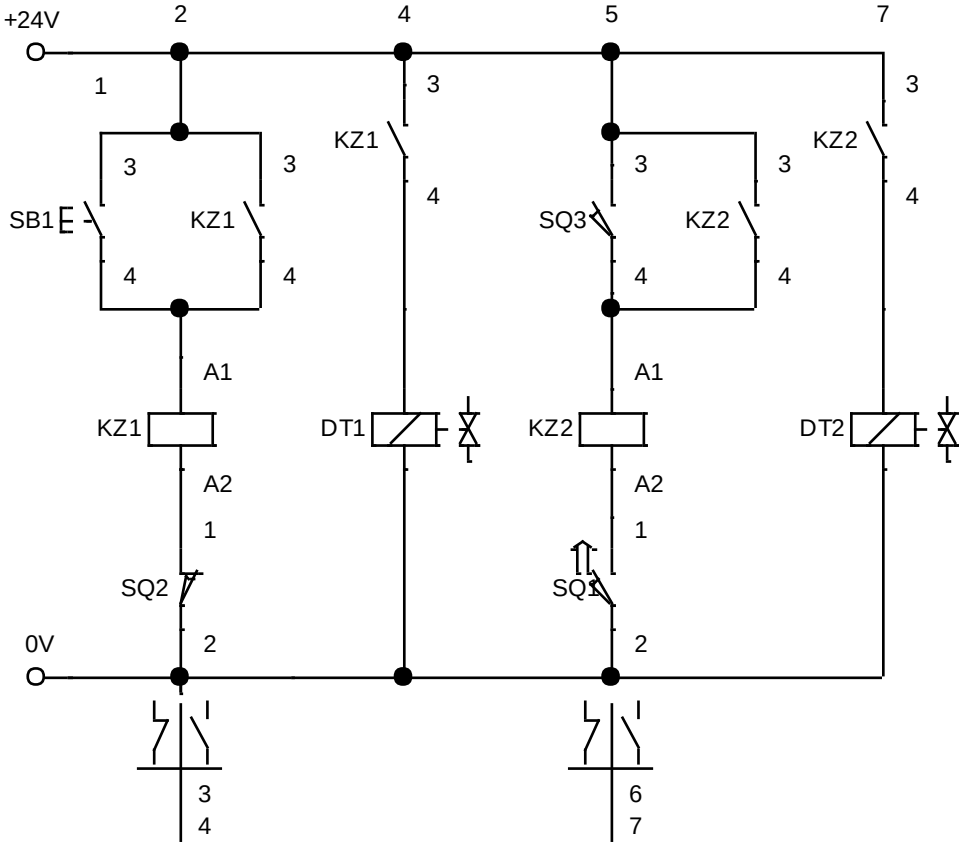


Connect circuit diagram

6. Travel sequence circuit

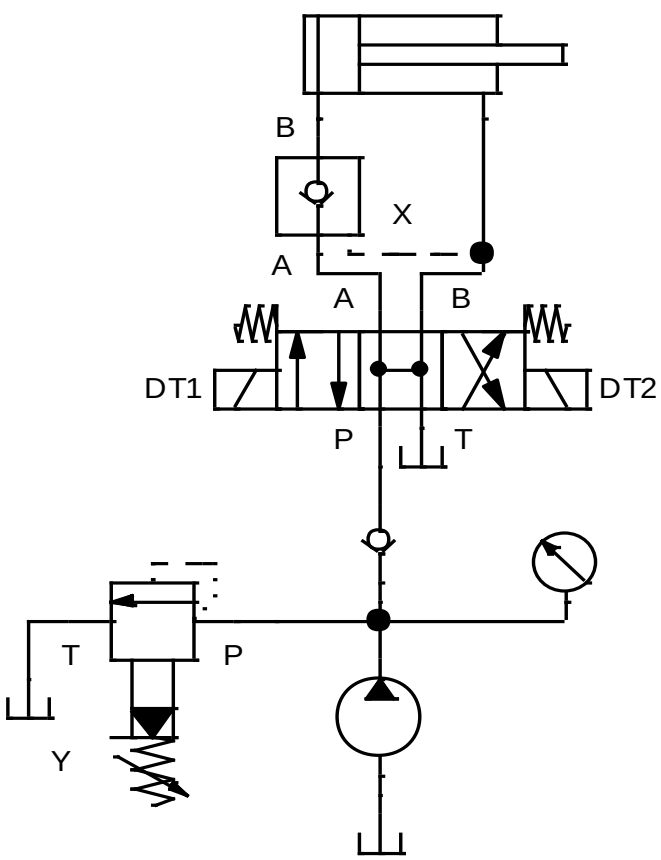


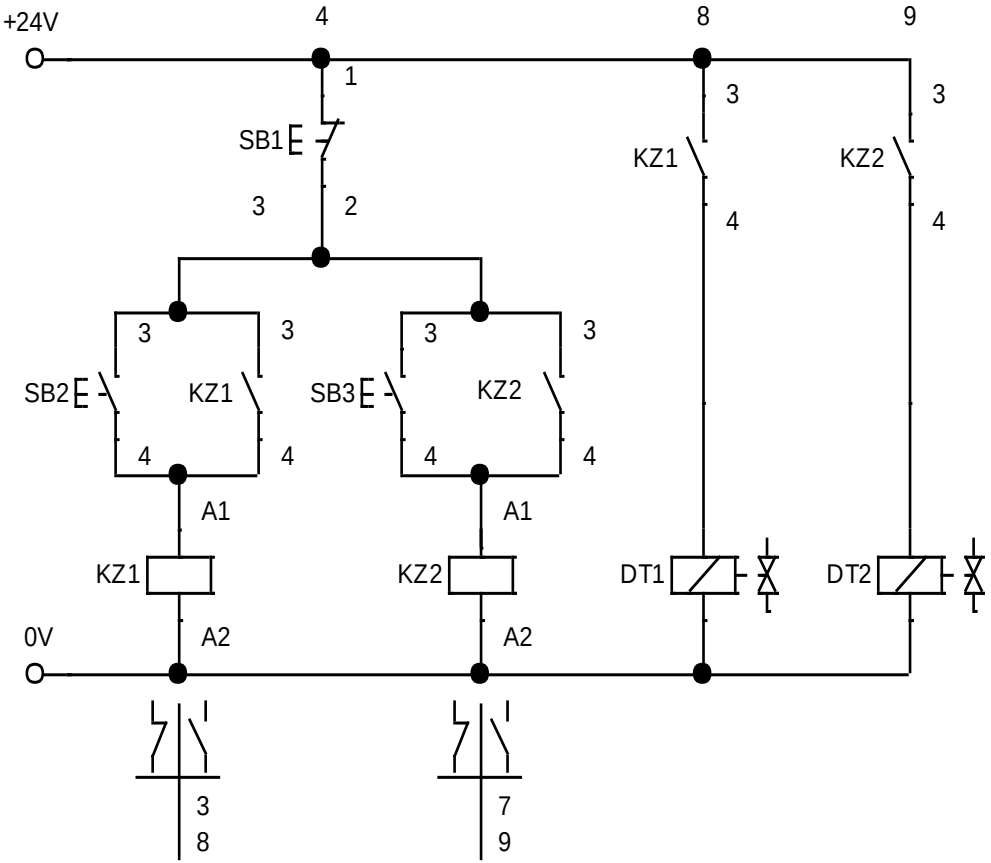
Connect hydraulic diagram



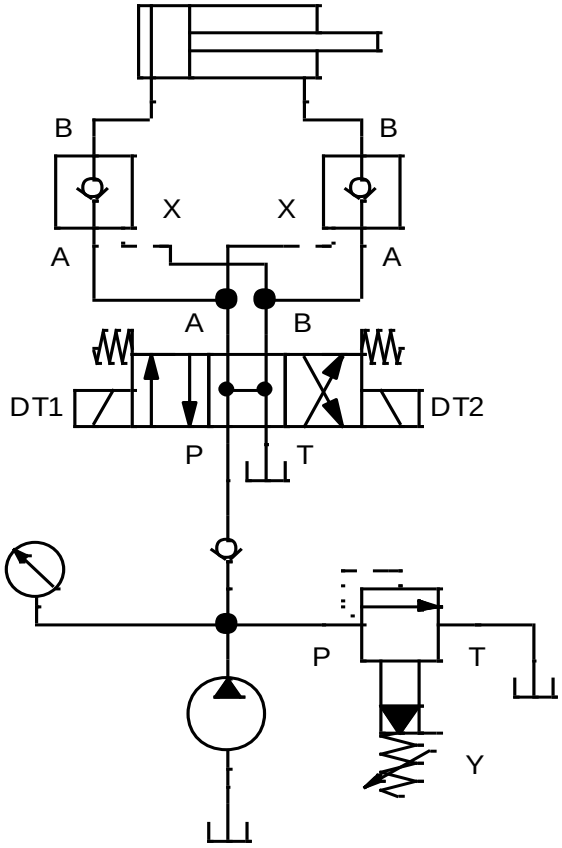
Connect circuit diagram

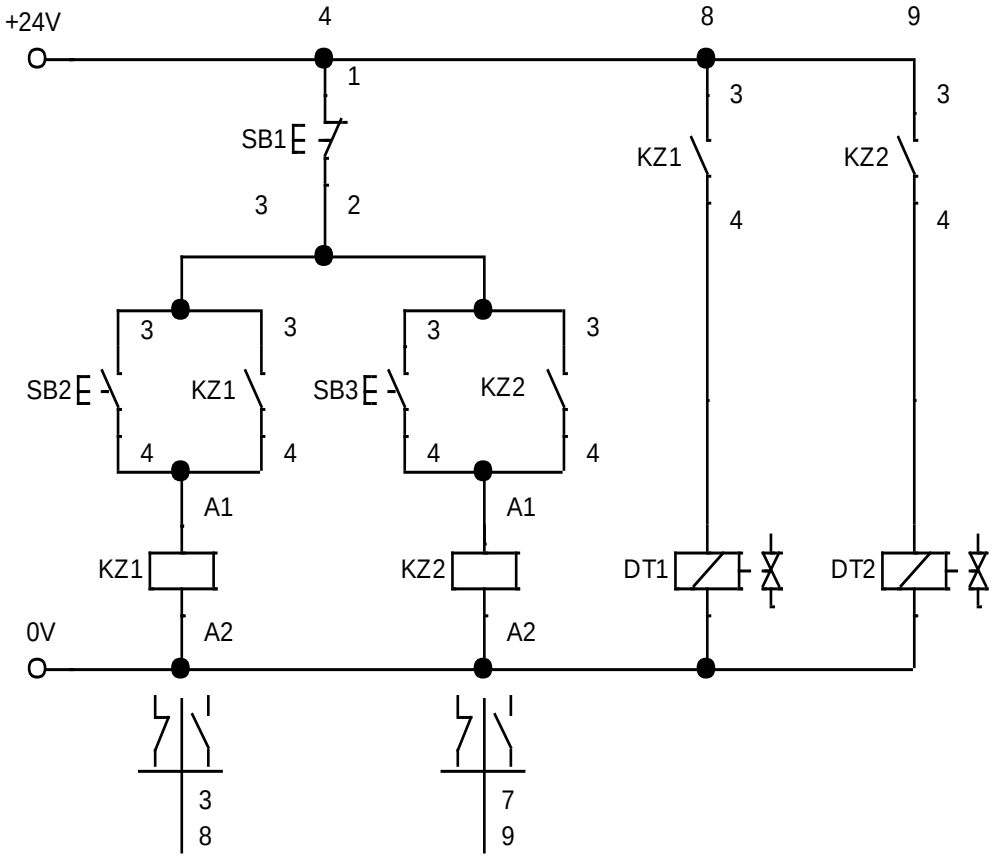
7. Hydraulic 1-way valve lock circuit



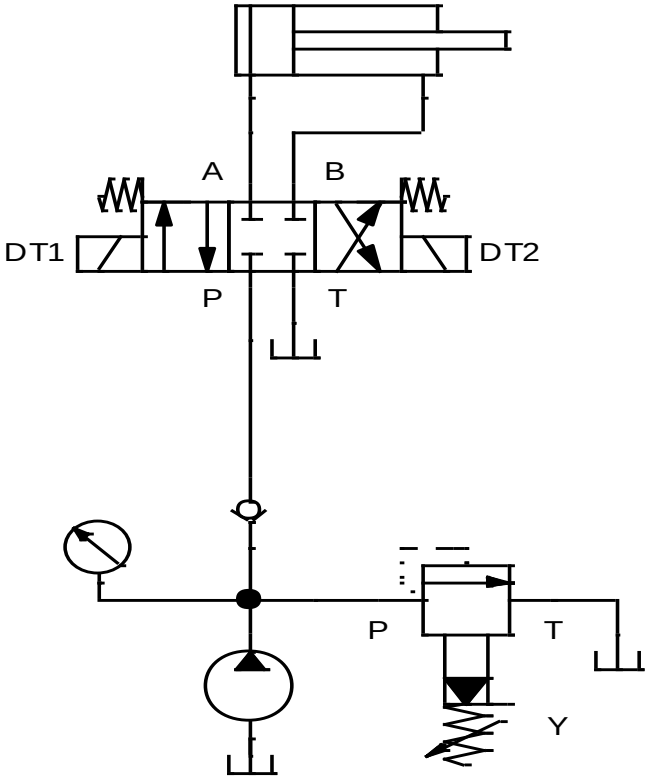


8. Hydraulic control check valve two way block circuit

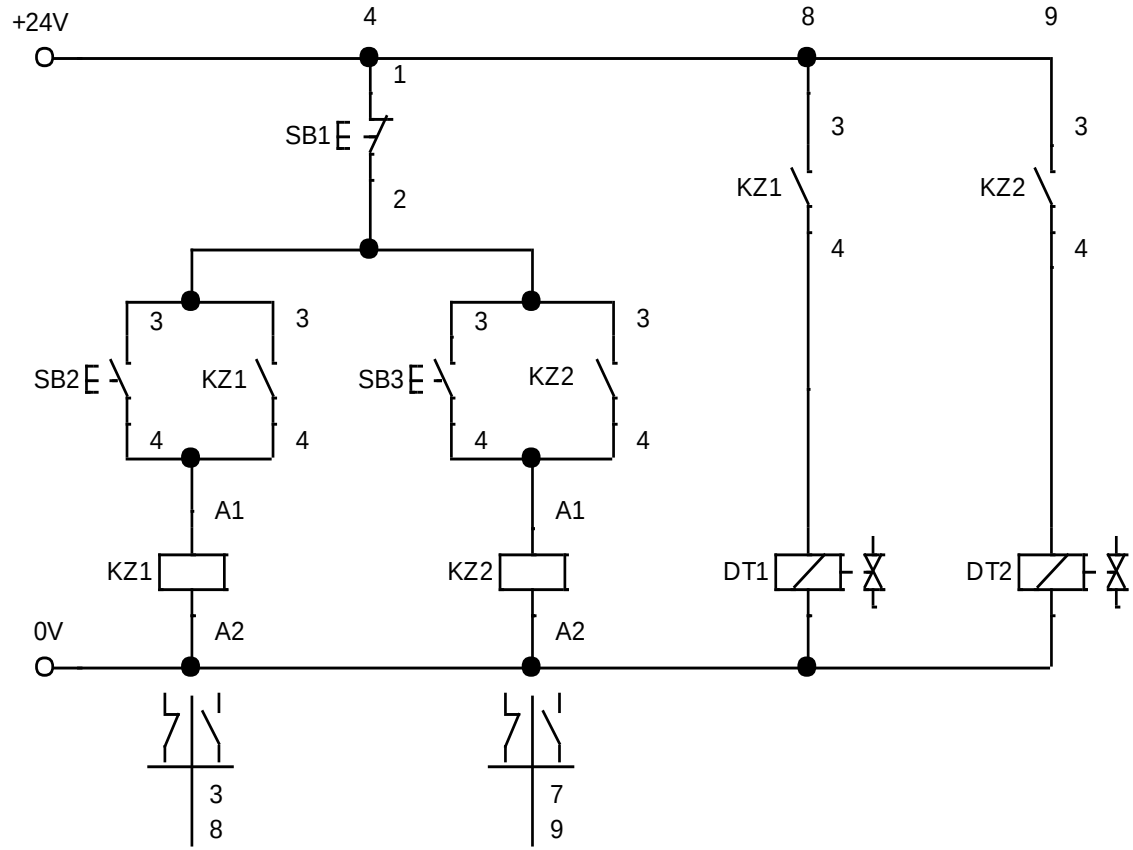




9. Directional valve (O) block circuit

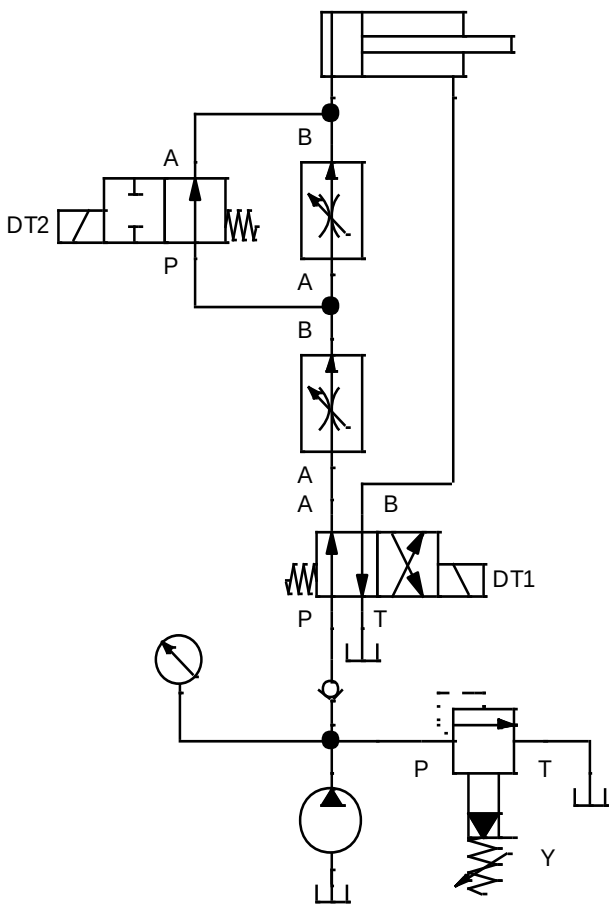


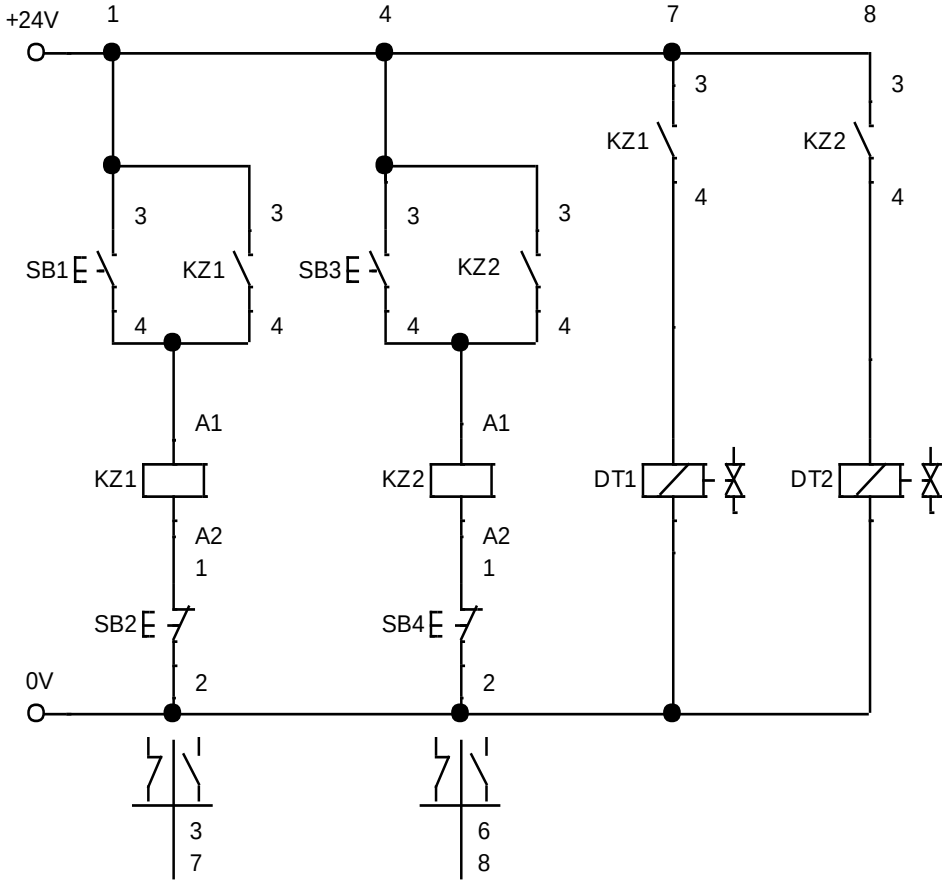
Connect hydraulic diagram



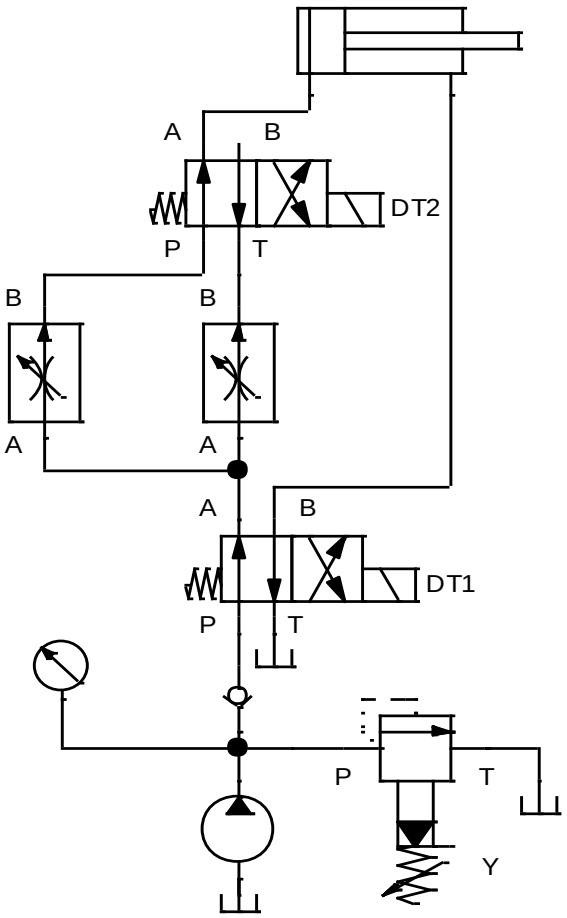
Connect circuit diagram

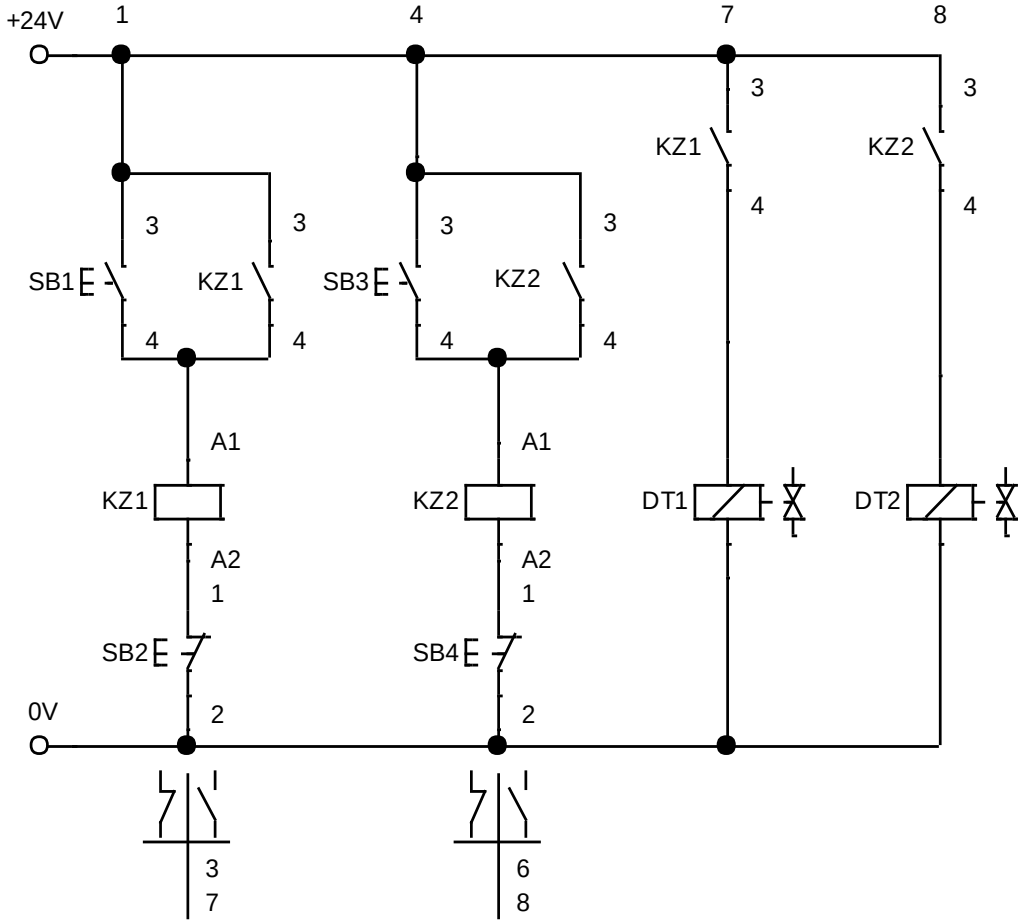
10. Speed regulation valve serial speed regulation circuit



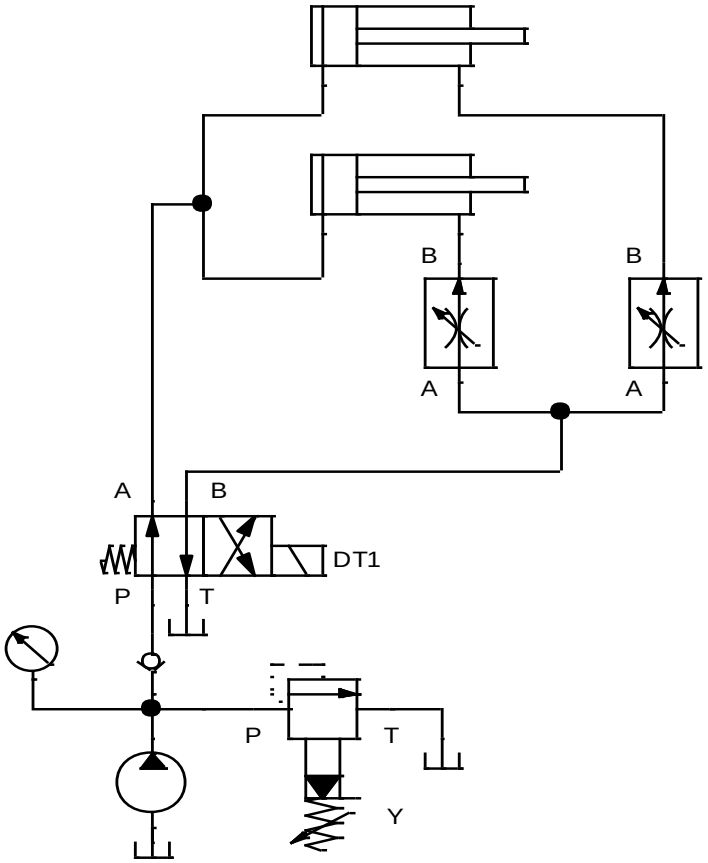


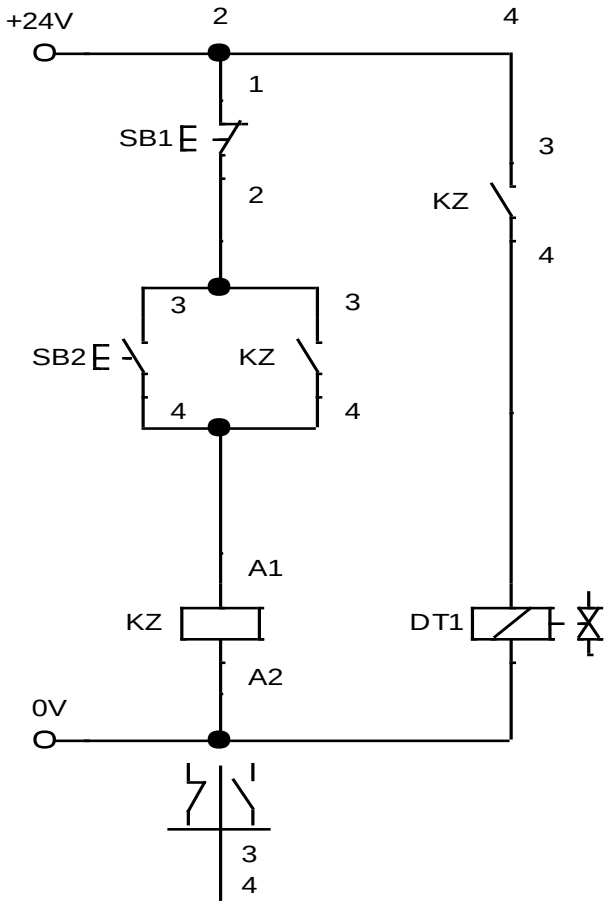
11. Speed regulation valve parallel circuit



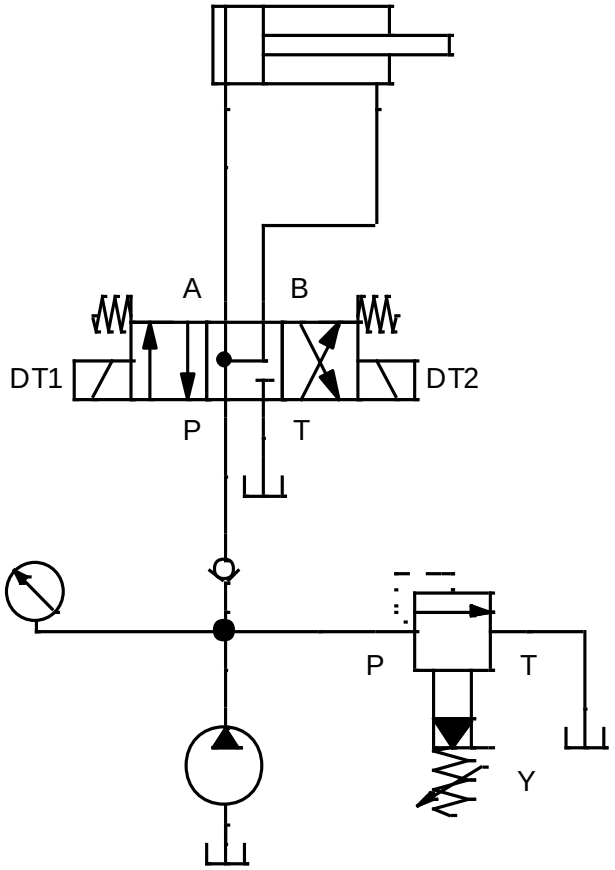


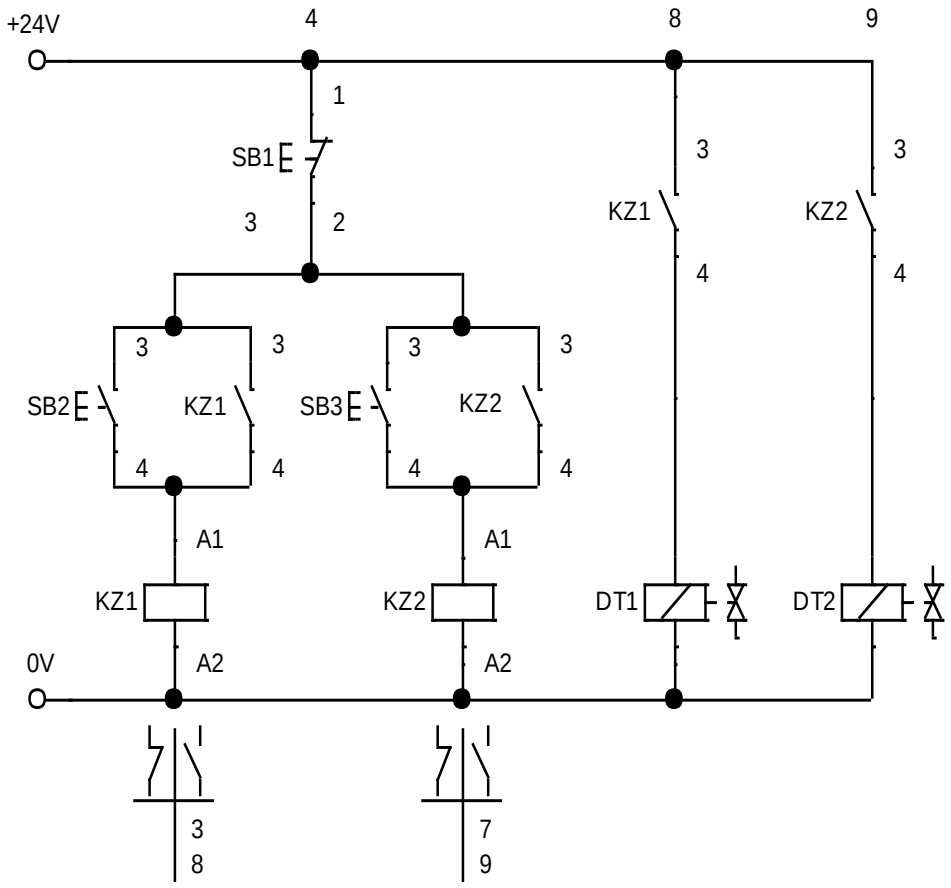
12. Parallel speed regulation valve synchronous circuit



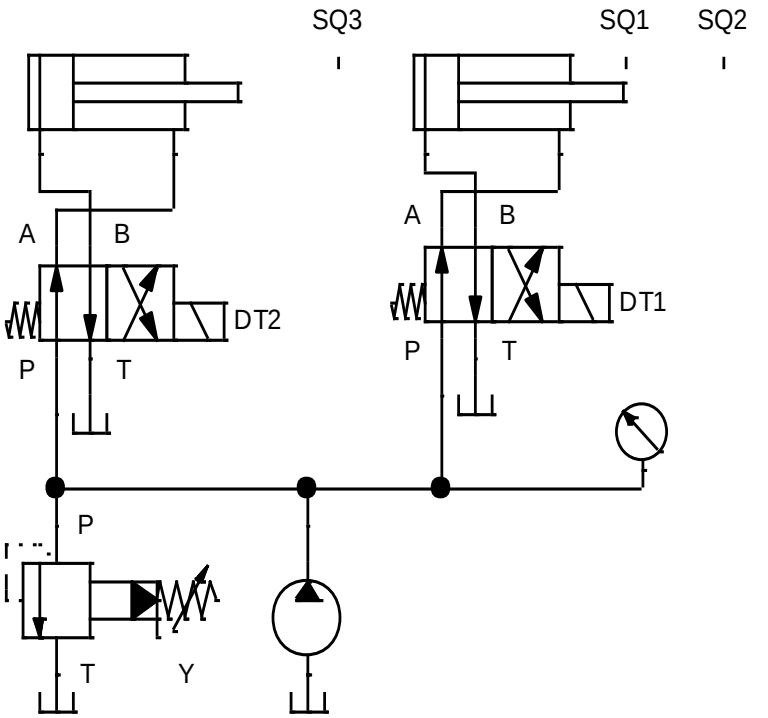


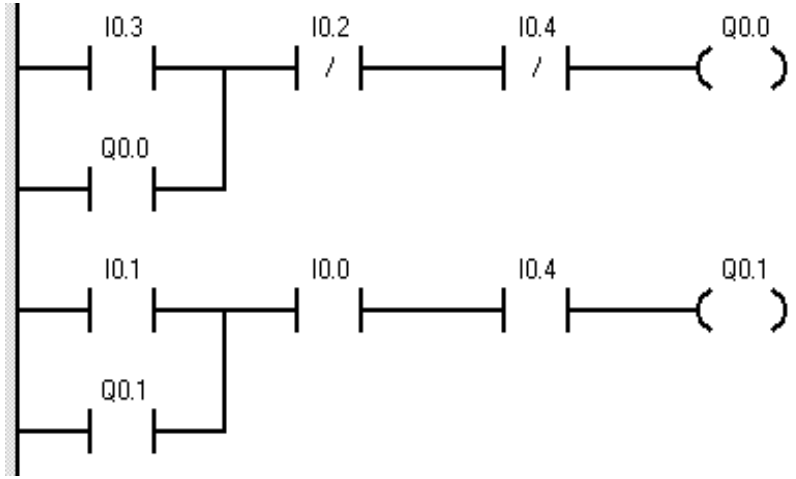
13. Differential control circuit





14. PLC controlled proximity switch order circuit





THANKS YOU!

Q & A