AH203 Basic Level: Mobile Hydraulics – Working Hydraulics User Manual

Jinan Should Shine Import And Export Co. Ltd.

Catalogue

Electro-hydraulic control technology training device

I. Product description

1.1 Overview

This hydraulic training device adopts the open structure operation panel design according to the syllabus requirements of mechanical and electrical integration of colleges and universities for gas, electricity and hydraulic control, combined with the advantages of pneumatic relay control and hydraulic relay control experimental equipment. Various hydraulic components can be flexibly installed on the operating panel. All joints adopt open-close quick joints at both ends, which solves the problem of oil leakage in the hydraulic circuit, is convenient and durable, reduces losses and also helps maintain environmental sanitation. Arbitrary combination of various components to form a hydraulic system with certain functions, with strong practicality.

1.2 Features

(1) The equipment is composed of a high-strength sheet metal frame, which is beautiful and durable. The bottom is equipped with universal wheels for easy movement; equipped with a cabinet for storing tools and devices, and the hydraulic station is integrated in the lower part of the equipment; various hydraulic valve blocks are fixed The substrate adopts special substrate profiles, and the groove interval of the panel is 25mm, which can easily plug various components on it; the upper part of the electronic control hanging box is placed, the whole is compact.

(2) Equipped with industrial series hydraulic valves, the maximum working pressure can reach 35Mpa. Each hydraulic component is equipped with an oil circuit transition base plate, which can be conveniently and freely placed on the panel. The oil circuit lap connection adopts open-close quick-change joints, which is convenient for disassembly and connection, does not leak oil, reduces loss and also helps maintain environmental sanitation.

II. Performance parameter

(1) Input power: AC: 220V

(2) Experimental table size: 1650 (length) × 700 (width) × 1800 (height)

(3) Aluminum alloy panel size: 1200 (length) × 750 (width)

(4) Groove interval: 25mm

(5) Specifications: Cabinet: 1

(6) Desktop structure: 1

(7) Casters with split grooves: 4

(8) Safety limit speed range: 1000-1500 rpm

(9) The noise at a distance of 1.5m from the hydraulic platform when the hydraulic pump is working is less than or equal to 58dB0

(10) Demonstration experiment requires only 4-6Mpa for fluid flow pressure

(11) Fuel tank: Nominal volume 35L

III. Product composition

3.1 Electric control unit

The electrical control unit includes a master control switch hanging box, a DC power supply hanging box, an emergency stop hanging box, a relay hanging box, and a button hanging box.

3.2 Training platform

The training platform is composed of aluminum profiles and aluminum alloy substrates, which can be moved and positioned flexibly. The actuator control box is installed on the base plate, which is beautiful and generous.

3.3 Power configuration

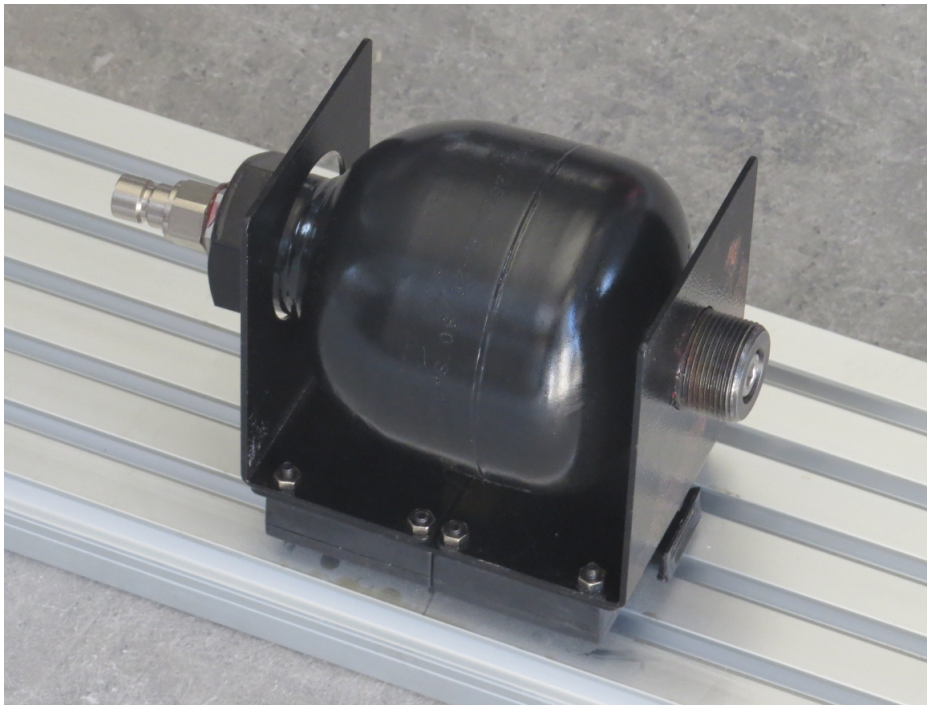
Single-phase three-wire power input, protected by insurance, is equipped with a main power switch. In an emergency, turn off the main power switch to stop the execution object.

3.4 Hydraulic Components

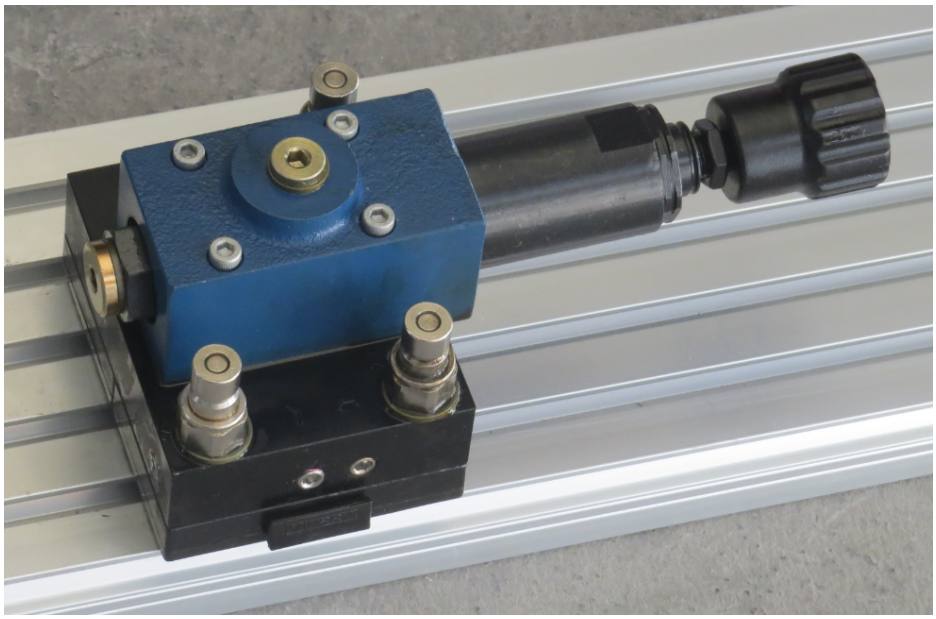
Picture, model and Chinese name of hydraulic components.

①. Balance valve DC6G-1-10B/50/2

②. Diaphragm accumulator：



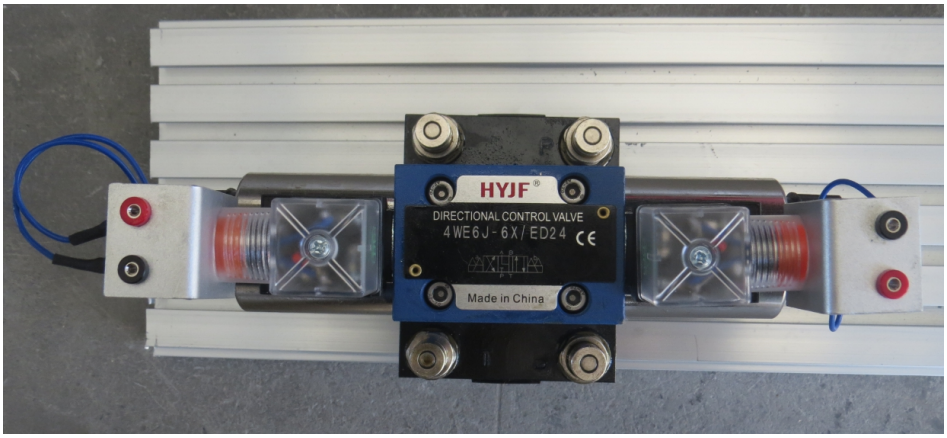
③. 3-way pressure regulator：DR6DP-50/75



④. pressure relief DBDH6P/100

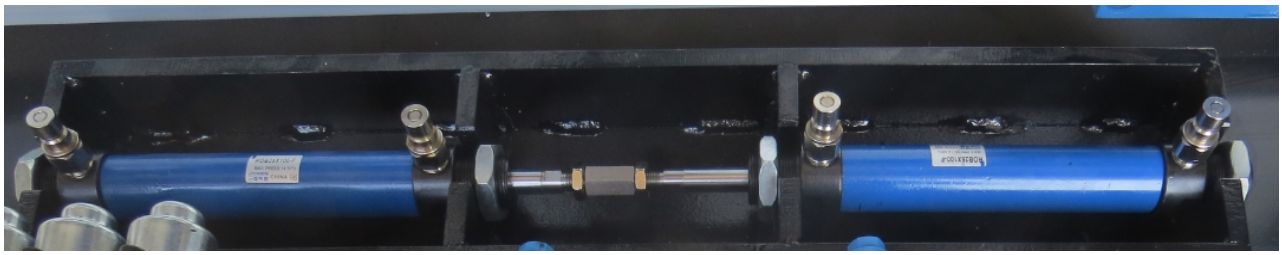
⑤. flow control valve DV8/1

⑥. 1 unit shuttle valve double nonreturn valve, delockable 4WE6J-6X /ED24V



⑦. 6/3-way proportional units: hand lever valve

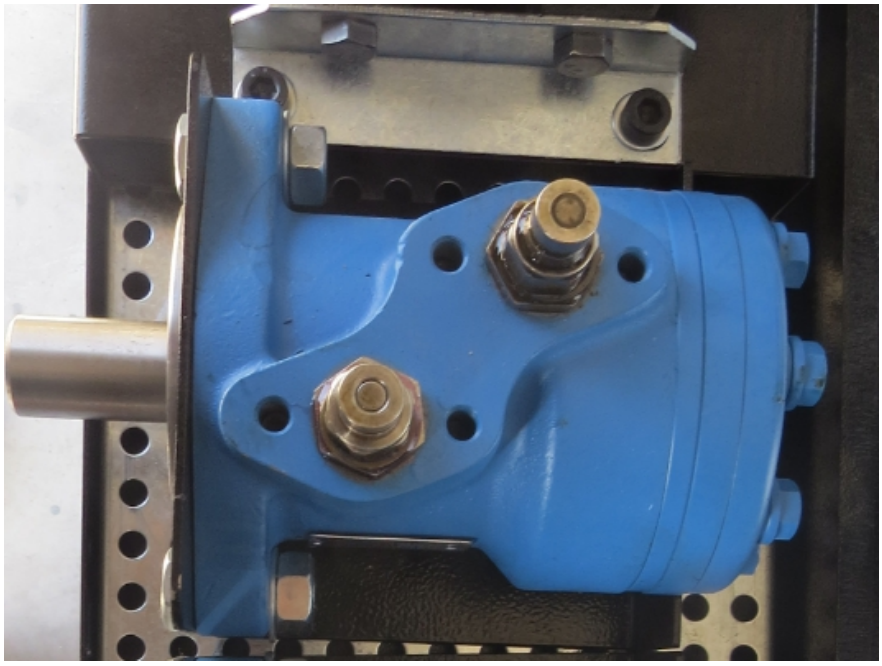
⑧. loading unit / cylinder



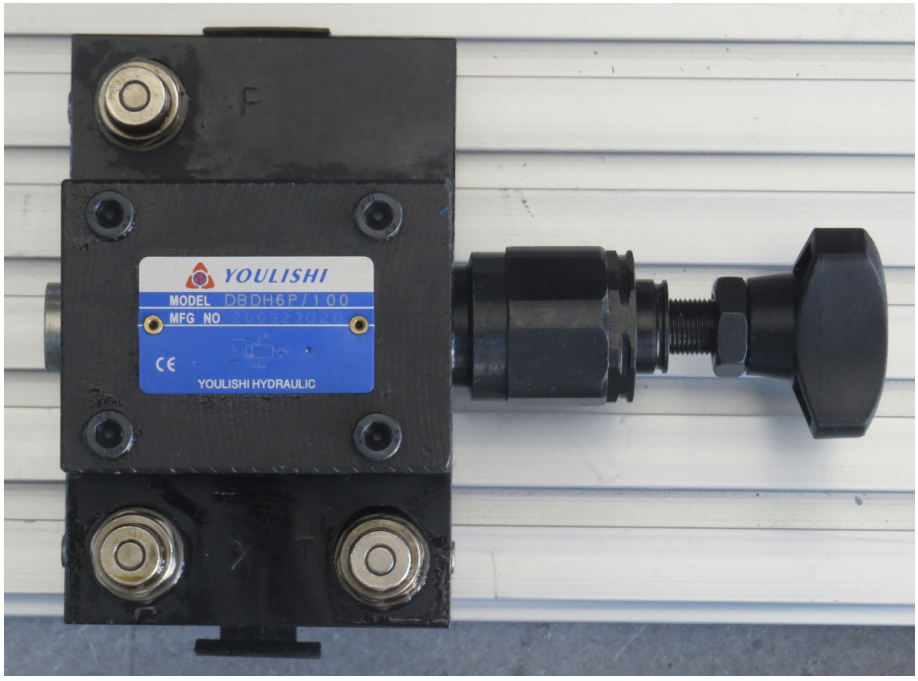
⑨. loading unit / cylinder

⑩. pressure compensator for open center load sensing：

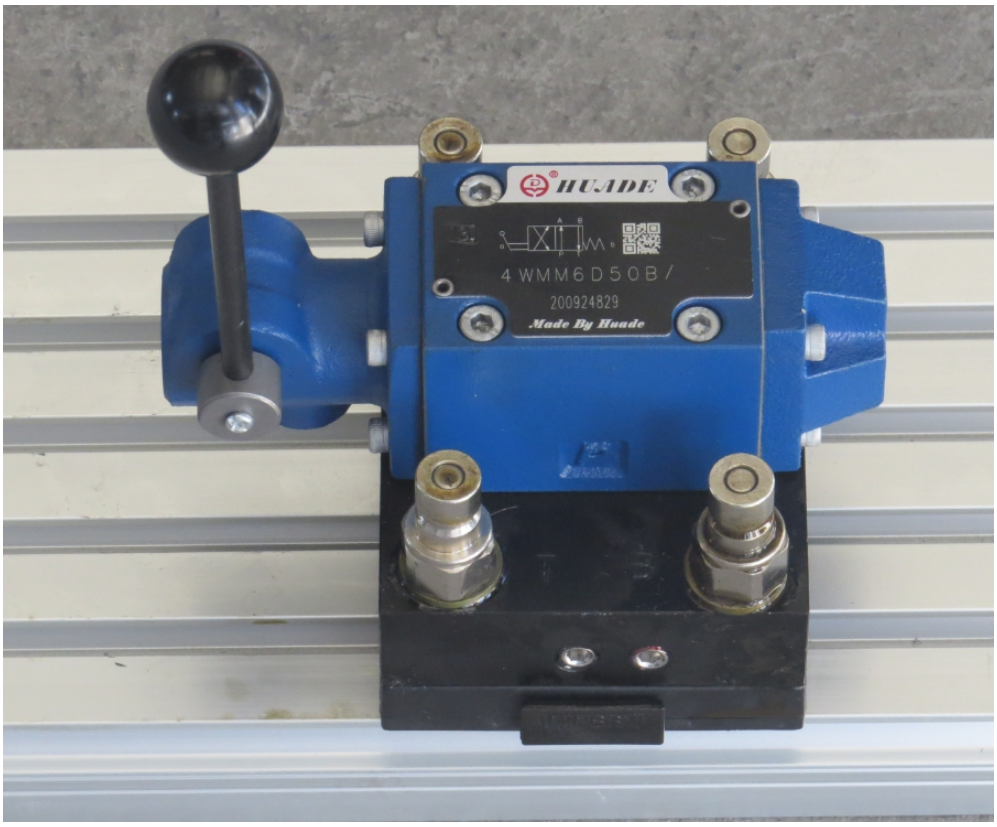
⑪.　　hydraulic motor



⑫.　　anti-shock unit and anti-cavitation block：Direct-acting relief valve DBDH6P/100



⑬. 4/3-way hand lever valve:4WMM6D50B/



⑭. Electronics pressure switch：Setting method:

Connect the red and black wires to the power cord, turn off the run button, press the SET button twice, AL (lower limit pressure) will appear, press the upper button to adjust the lower limit start value,

Press SET again, AH (upper limit pressure) will appear, press the upper key to adjust the upper limit stop value,

Press SET again, SAVE (data saving) appears,

Press SET again to return to the measurement interface,

Click to run, you can use it.

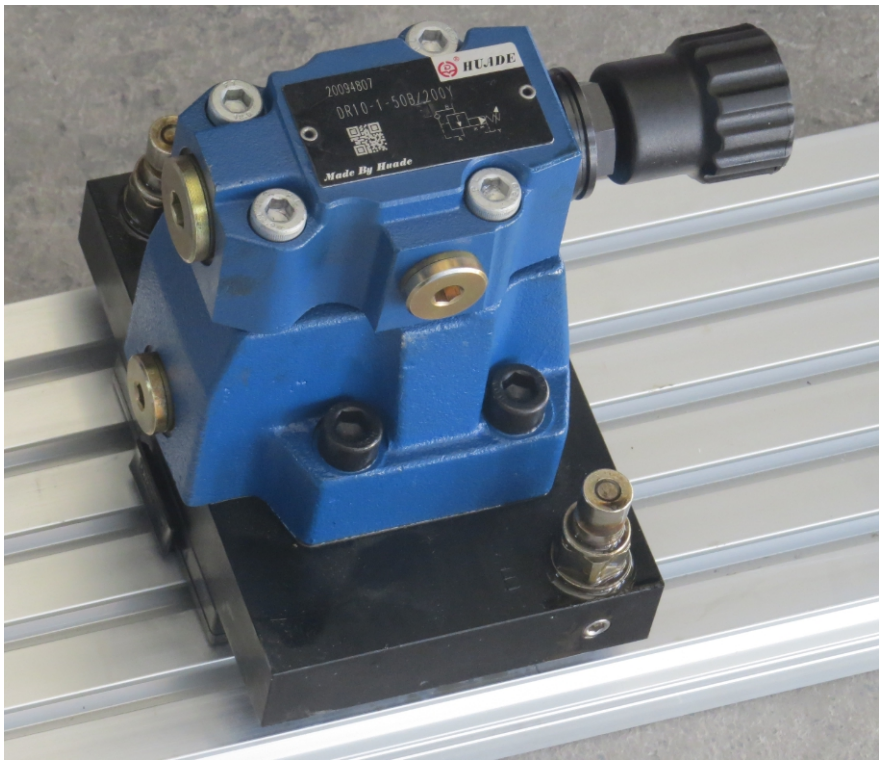
For example: 0.5Mpa start 0.8mpa stop

AL is set to 0.5mpa, AH is set to 0.8mpa, the contact between yellow and blue is normally open, and the pressure is within the setting range.

⑮. Flow sensor

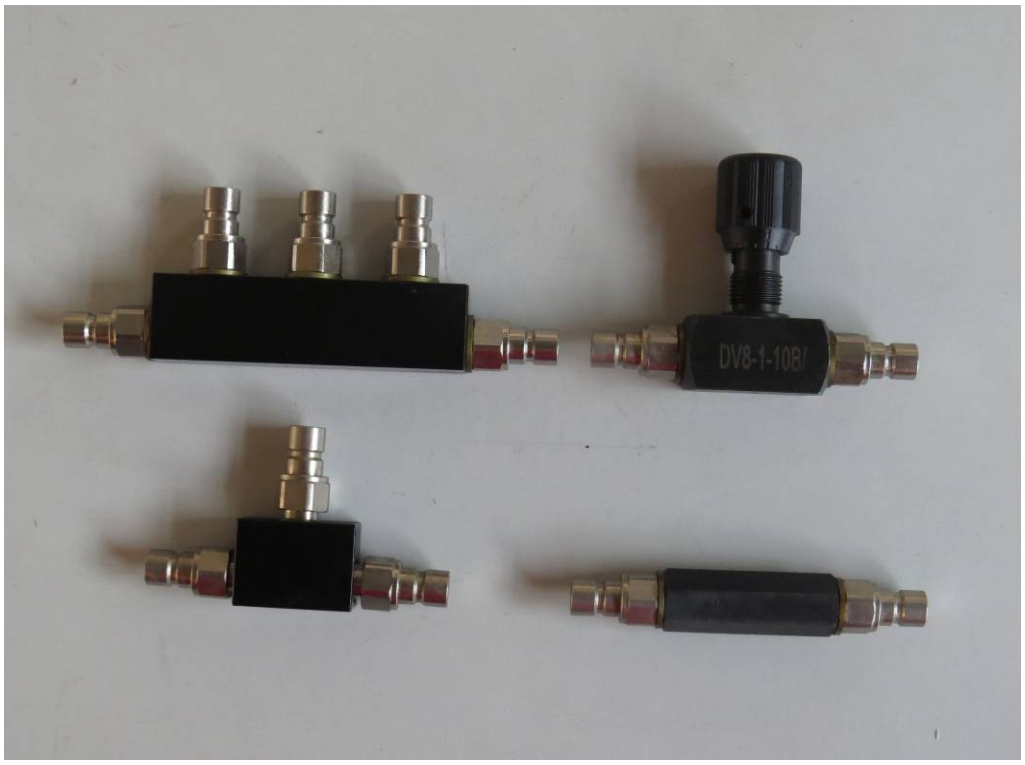
⑯. Steering valve(orbitrol)

⑰. Tubing line for pressureless DR10/200Y



⑱. manifold plates

⑲. T-distributors、return header, 4-way, pressureless and nonreturn valve



⑳. Oil tube

㉑. Hydraulic power station

IV. Precautions

1. The incoming power supply of the experimental device should be correctly connected, and the grounding should be good and reliable.

2. When using, keep your hands dry and clean, and pay attention not to scratch the surface of the equipment with sharp objects.

3. During the experiment, after the wiring is correctly connected, the instructor should confirm that it is correct before energizing the experiment. It is strictly forbidden to touch the live parts with your hands or conductive objects, and you will be responsible for the electric shock in violation of regulations.

4. After using the experimental device, turn off the main power switch and unplug the power plug from the socket.

5. When the cylinder and conveyor belt are working, it is strictly forbidden to touch the cylinder push rod and the motor rotating shaft with your hands to avoid accidental injury.

6. When encountering an emergency, disconnect the system power supply or turn off the main power switch of the control box in time.

V. Experiment content：

Experiment 1. Reversing circuit of hand lever valve

Experiment 2. The reversing circuit of the shuttle valve double nonreturn valve,delockable

Experiment 3. Single-stage regulator circuit

Experiment 4. Single-stage pressure reducing circuit

Experiment 5. Secondary pressure reducing circuit

Experiment 6. Unloading circuit using 4/3-way hand lever valve

Experiment 7. Unloading circuit using 4/2-way lever valve

Experiment 8. Balance circuit with sequence valve

Experiment 9. Brake circuit with overflow valve

Experiment 10 Secondary pressure circuit

Experiment 11. Throttle speed regulating circuit of oil inlet

Experiment 12 Throttle and speed control circuit

Experiment 13. Throttle speed regulation circuit

Experiment 14. Throttle valve parallel circuit

Experiment 15. flow control valveseries circuit

Experiment 16. Locking circuit using shuttle valve double nonreturn valve,Delockable

Experiment 17. loading unit test loop

VI. Experiment Guide

Experiment 1. Reversing circuit of hand lever valve

1.Experiment Purpose

(1) Understand the structure, performance and principle of hand lever valve

(2) Learn about the composition and principle of the reversing circuit by disassembling the hand lever valve and reversing circuit.

2.experiment equipment

Hydraulic station, relief valve, manual reversing valve, hydraulic cylinder, oil tube, three-way plate

3. working principle

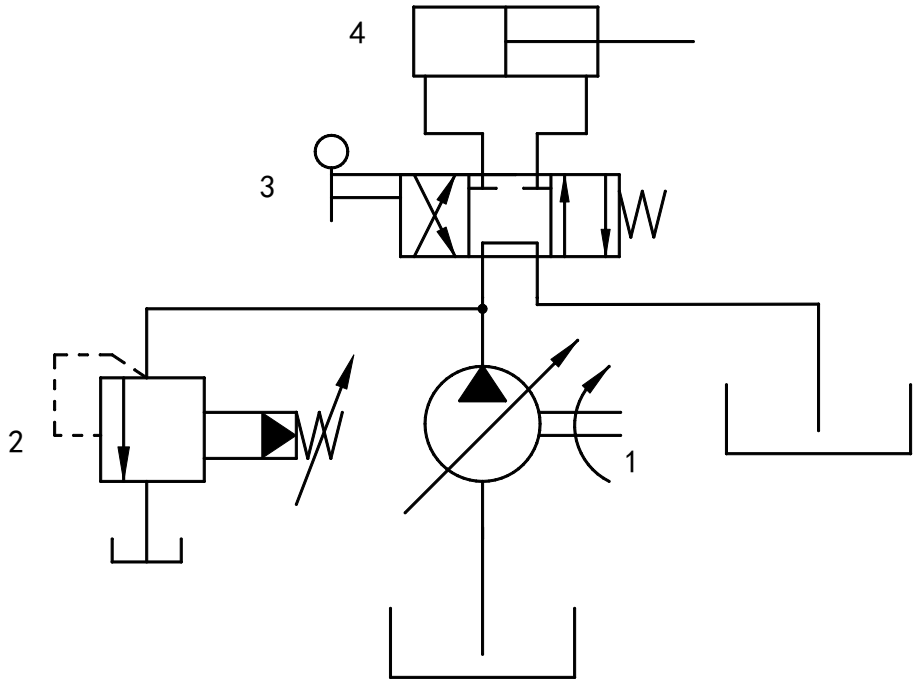


Figure 1-1 Reversing circuit of hand lever valve

1—Hydraulic station 2—relief valve 3—hand lever valve 4—hydraulic cylinder

Figure 1-1 shows the reversing circuit using hand lever valve. When the system provides pressure, the pressure oil enters the right cavity of the hydraulic cylinder through the reversing valve, and the oil in

the left cavity flows back to the tank through the reversing valve, and the piston extends; when the reversing valve is pushed to reverse, the pressure oil enters the hydraulic cylinder through the reversing valve The oil in the left and right chambers flows back to the tank through the reversing valve, and the piston retracts.

4.Experimental steps

1. After entering the laboratory, first understand the components, find out the name and appearance of the components.

2. Familiar with the system schematic diagram.

3. Choose hydraulic components according to your needs.

4. Start the motor.

5. Realize the reversing circuit of the hand lever valve.

Experiment 2. The reversing circuit of the shuttle valve double nonreturn valve,delockable

1. Purpose

(1). Understand the structure, performance and principle of "H" type electromagnetic directional valve.

(2). Understand the composition and principle of the reversing circuit by assembling the reversing circuit of the electromagnetic reversing valve.

2. experiment equipment

Hydraulic station, pilot relief valve, "O" type shuttle valve double nonreturn valve, delockable, hydraulic cylinder, oil tube, three-way plate

3. working principle

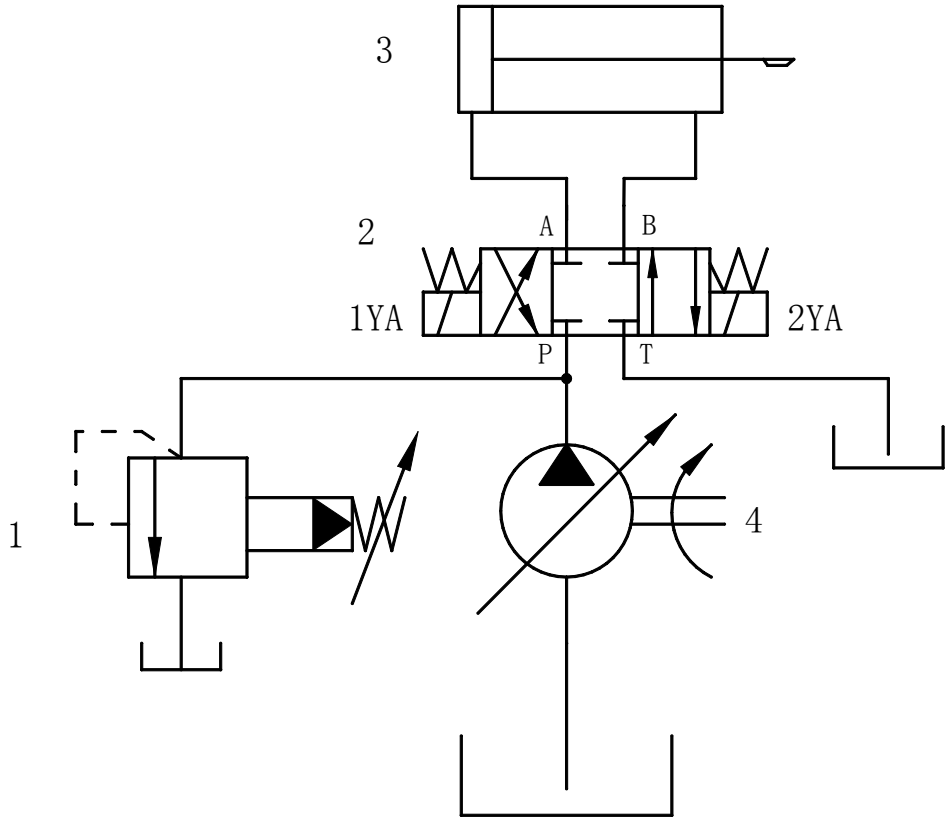
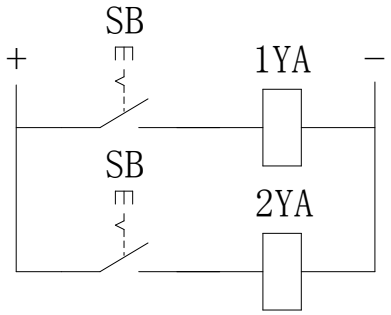


Figure 1-2 Reversing circuit of shuttle valve double nonreturn valve, delockable

1—relief valve 2—Otype shuttle valve double nonreturn valve, delockable 3—hydraulic cylinder 4—Hydraulic station



SB is a self-locking button.

The shuttle valve double nonreturn valve, delockable is directly controlled by the button to get and lose power.

Electrical schematic diagram

Figure 1-2 uses the reversing circuit of the shuttle valve double nonreturn valve, delockable. When the system provides pressure, the shuttle valve double nonreturn valve, delockable 1YA is energized, the pressure oil enters the right cavity of the hydraulic cylinder through the reversing valve, and the left cavity oil flows back to the oil tank through the reversing valve, and the piston extends; when the shuttle valve double nonreturn valve, delockable 1YA is de-energized and 2YA is energized, the pressure oil

passes through The reversing valve enters the left cavity of the hydraulic cylinder, and the oil in the right cavity flows back to the oil tank through the reversing valve, and the piston retracts.

4. experimental steps

(1). After entering the laboratory, first understand the components, find out the name and appearance of the components.

(2). Familiar with the system schematic diagram.

(3). Select hydraulic components according to requirements, and assemble the reversing circuit according to the hydraulic schematic diagram. Connect the control circuit according to the electrical schematic diagram.

(4). Start the motor.

(5). Realize the reversing loop of the shuttle valve double nonreturn valve, delockable

Experiment 3. Single-stage regulator circuit

1.Purpose

(1). Grasp the structure, performance and principle of flow control valve and hydraulic cylinder.

(2). Familiar with the principle of overflow valve regulating system pressure.

(3). Understand the circuit composition and principle by disassembling and assembling the single-stage pressure regulating circuit.

2.experiment equipment

Hydraulic station, pilot relief valve, flow control valve, "O" type shuttle valve double nonreturn valve, delockable, hydraulic cylinder, oil tube, three-way plate

3. working principle

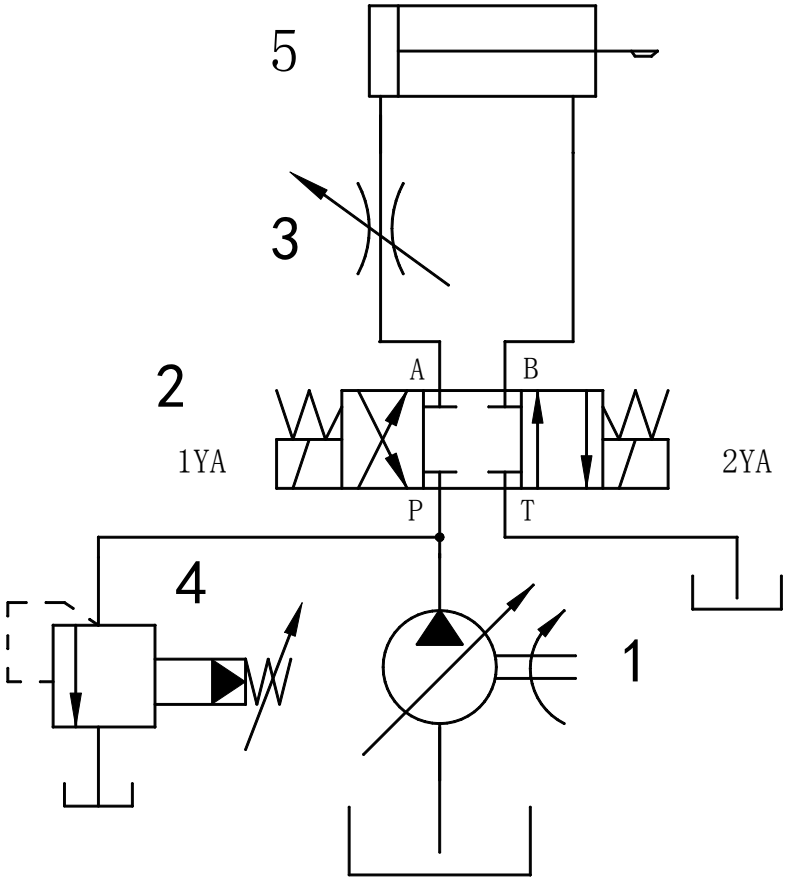
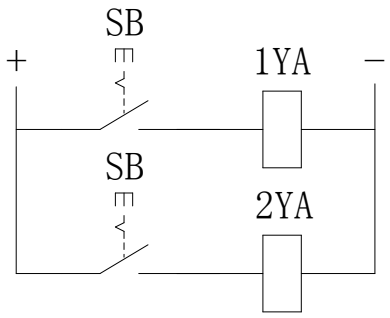


Figure 3-1 Single-stage voltage regulating circuit

1- Hydraulic station 2- shuttle valve double nonreturn valve, delockable 3- flow control valve 4- pilot relief valve 5- hydraulic cylinder



SB is a self-locking button.

The shuttle valve double nonreturn valve, delockable is directly controlled by the button to get and lose power.

Electrical schematic diagram

The function of the pressure regulating circuit is to set or limit the maximum pressure of the hydraulic system or to achieve multi-stage pressure conversion.

Figure 3-1 shows the most basic voltage regulating circuit-a single-stage voltage regulating circuit.

When the flow control valve 3 is used to adjust the speed of the hydraulic cylinder, the overflow valve 4 begins to overflow, and the outlet pressure of the pump is stabilized at the set pressure of the overflow valve. Adjust the overflow valve, you can adjust the pump oil supply pressure.

4.Experimental steps

1. After entering the laboratory, first understand the components, find out the name and appearance of the components.

2. Familiar with the system schematic diagram.

3. Select components as required.

4. Connect the pipeline according to the system schematic diagram.

5. Start the motor.

6. Realize single-stage voltage regulation loop.

Experiment 4. Single-stage pressure reducing circuit

1.Purpose

(1). Master the structure, performance, principle and application of Tubing line for pressureless

(2). Master the structure, performance, principle and application of the nonreturn valve

(3). Understand the circuit composition and principle through disassembly and assembly of single-stage decompression circuit.

2. experiment equipment

Hydraulic station, relief valve, Tubing line for pressureless, the nonreturn valve, "O" type shuttle valve double nonreturn valve, delockable, hydraulic cylinder, 2 pressure gauges, adapter plate, oil tube

3. working principle

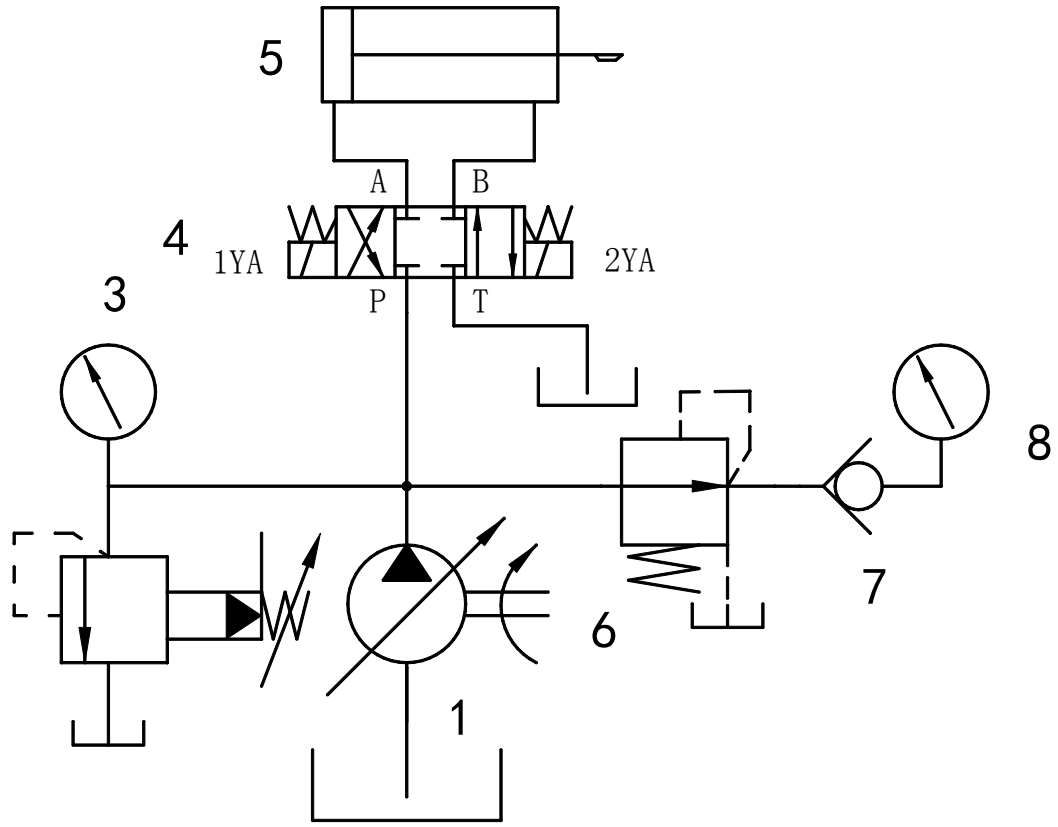
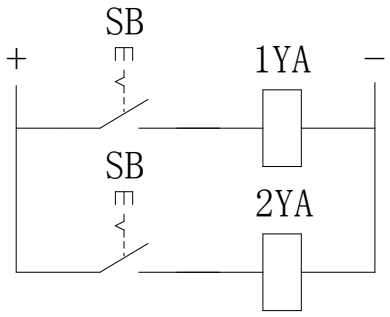


Figure 4-1 Single-stage pressure reducing circuit



SB is a self-locking button.

The shuttle valve double nonreturn valve, delockable is directly controlled by the button to get and lose power.

Electrical schematic diagram

Figure 4-1 shows the most common pressure reducing circuit, which is a the nonreturn valve connected in series on the low pressure oil circuit. The pressure of the pressure reducing oil circuit is determined by the Tubing line for pressureless. the nonreturn valve in the circuit is used to prevent the oil from flowing back when the pressure of the main oil circuit is lower than the setting value of the Tubing line for pressureless and play a short-term protective effect.

4. experimental steps

(1). After entering the laboratory, first understand the components, find out the name and appearance of the components.

(2). Familiar with the system schematic diagram.

(3). Select components as required.

(4). Connect the pipeline according to the system schematic diagram.

(5). Start the motor. Realize a single-stage pressure reducing circuit.

Experiment 5. Secondary pressure reducing circuit

1. The purpose of the experiment

(1). Master the structure, performance, principle and application of Tubing line for pressureless.

(2). Master the structure, performance, principle and application of remote pressure regulating valve.

(3). Understand the circuit composition and principle through disassembly and assembly of the secondary pressure reducing circuit.

2.experiment equipment

Hydraulic station, pilot relief valve, Tubing line for pressureless, relief valve, 4/2-way lever valve, "O" type shuttle valve double nonreturn valve, delockable, 2 pressure gauges, 2 hydraulic cylinders, three-way plate , oil tube

3. working principle

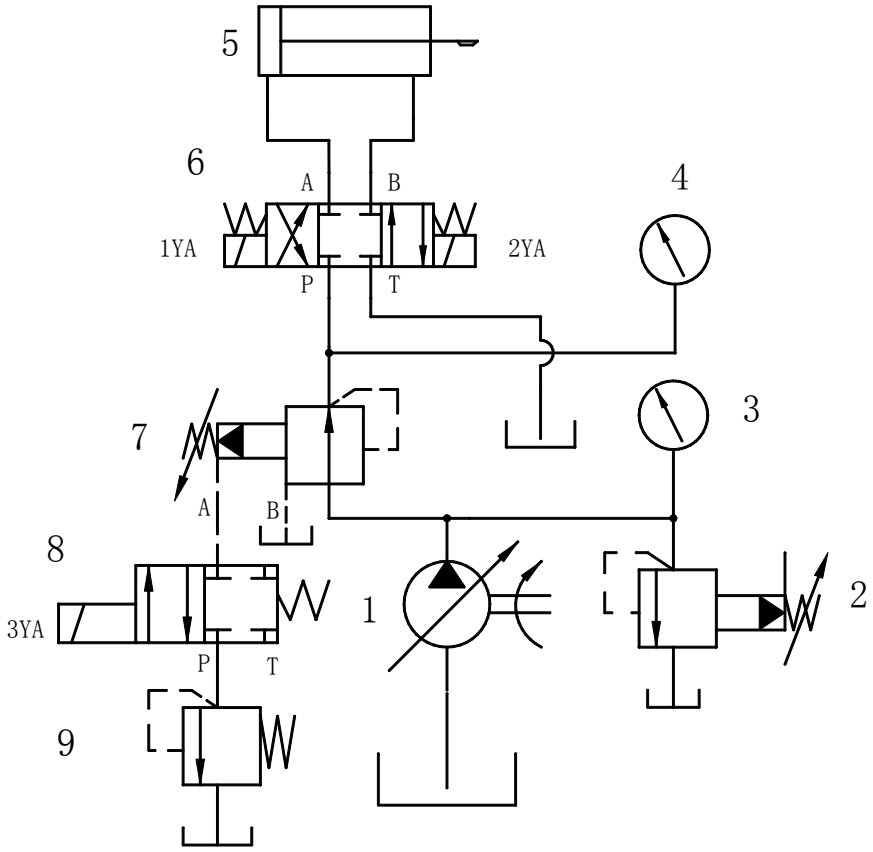
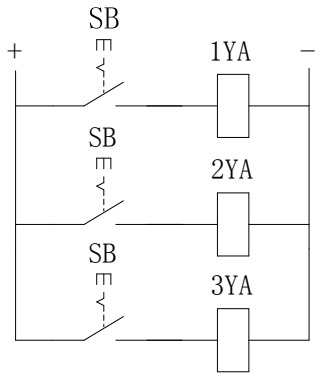


Figure 5-1 Secondary pressure reducing circuit

1-Hydraulic station 2-Relief valve 3、4-Pressure gauge 5-Hydraulic cylinder 6- shuttle valve double nonreturn valve, delockable 7- Tubing line for pressureless 8-4/2-way lever valve 9-Relief valve



SB is a self-locking button.

The shuttle valve double nonreturn valve, delockable is directly controlled by the button to get and lose power.

Electrical schematic diagram

The function of the pressure reducing circuit is to make a part of the oil circuit in the system obtain a lower and stable working pressure than the system pressure. For example: common decompression circuits such as work tightening of lathes, guide rail lubrication and control oil circuits of hydraulic

systems.

Figure 5-1 shows the most common pressure reducing circuit. A 4/2-way lever valve and a remote pressure regulating valve (overflow valve 9) are connected in series to the remote control port of the pilot Tubing line for pressureless 7. When the shuttle valve double nonreturn valve, delockable 8 is de-energized, the pressure of the pressure reducing circuit is adjusted by the pressure reducing valve 7. The fixed value is determined; when the shuttle valve double nonreturn valve, delockable 8 is energized, the pressure of the pressure reducing circuit is determined by the setting value of the remote pressure regulating valve (overflow valve 9). It must be pointed out that the setting value of the remote pressure regulating valve (overflow valve 9) must be lower than the setting value of the pressure reducing valve, so that the secondary pressure can be obtained. The main circuit pressure is set by the pilot relief valve 2.

4. experimental steps

(1). After entering the laboratory, first understand the components, find out the name and appearance of the components.

(2). Familiar with the system schematic diagram and electrical schematic diagram.

(3.) Select components as required.

(4). Connect pipelines and circuits according to the system schematic diagram and electrical schematic diagram.

(5). Start the motor.

(6). Realize the secondary pressure reducing circuit.

Experiment 6. Unloading circuit using 4/3-way hand lever valve

1. The purpose of the experiment

(1). Master the structure, principle and performance of the nonreturn valve

(2). Familiar with the type of unloading circuit.

(3). Understand the circuit composition and principle through disassembly and assembly of the unloading circuit using the nonreturn valve

2. Experimental equipment

Hydraulic station, relief valve, shuttle valve double nonreturn valve, delockable, hydraulic cylinder, adapter plate, oil pipe

3. working principle

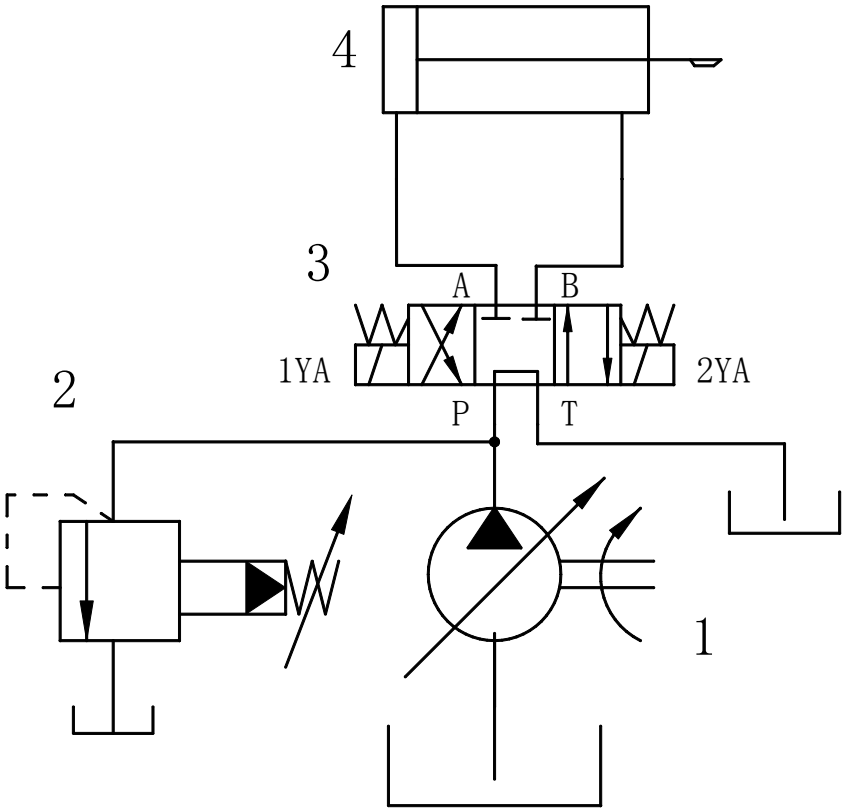
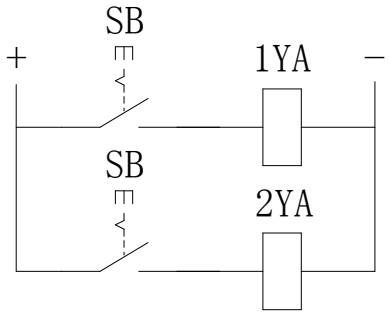


Figure 7-1 Unloading circuit with the neutral function of the nonreturn valve (M type)

1 — Hydraulic station 2 — Relief valve 3 — shuttle valve double nonreturn valve, delockable 4—hydraulic cylinder



SB is a self-locking button.

The shuttle valve double nonreturn valve, delockable is directly controlled by the button to get and lose power.

Electrical schematic diagram

The function of the unloading circuit is to not frequently open and close the motor driving the pump when the system's executive components are not working for a short time, so that the hydraulic pump can run at zero pressure or very low pressure to reduce power loss, reduce system heat, and extend the

pump And the service life of the motor.

Figure 7-1 shows the unloading circuit using the neutral function of the nonreturn valve. It can be seen from the figure that the hydraulic pump is unloaded when the nonreturn valve is in the neutral position. This unloading method has a simple structure. The hydraulic pump operates at a lower pressure, but it has a greater impact on the system capacity with higher pressure and larger flow, and is only suitable for low-pressure and small-flow systems.

4． experimental steps

（1）. After entering the laboratory, first understand the components, find out the name and appearance of the components.

（2）. Familiar with the system schematic diagram and electrical schematic diagram.

(3). Select components as required.

(4). Connect pipelines and circuits according to the system schematic diagram and electrical schematic diagram.

（5）. Start the motor.

(6). Realize the unloading circuit using the nonreturn valve

Experiment 7. Unloading circuit using 4/2-way lever valve

1. The purpose of the experiment

1. Master the structure, principle and performance of 4/2-way lever valve

2. Familiar with the type of unloading circuit.

3. Understand the circuit composition and principle through disassembly and assembly of the unloading circuit using the reversing valve.

2. Experimental equipment

Hydraulic station, overflow valve, 4/2-way lever valve, shuttle valve double nonreturn valve, delockable, hydraulic cylinder, three-way plate, oil tube

3. working principle

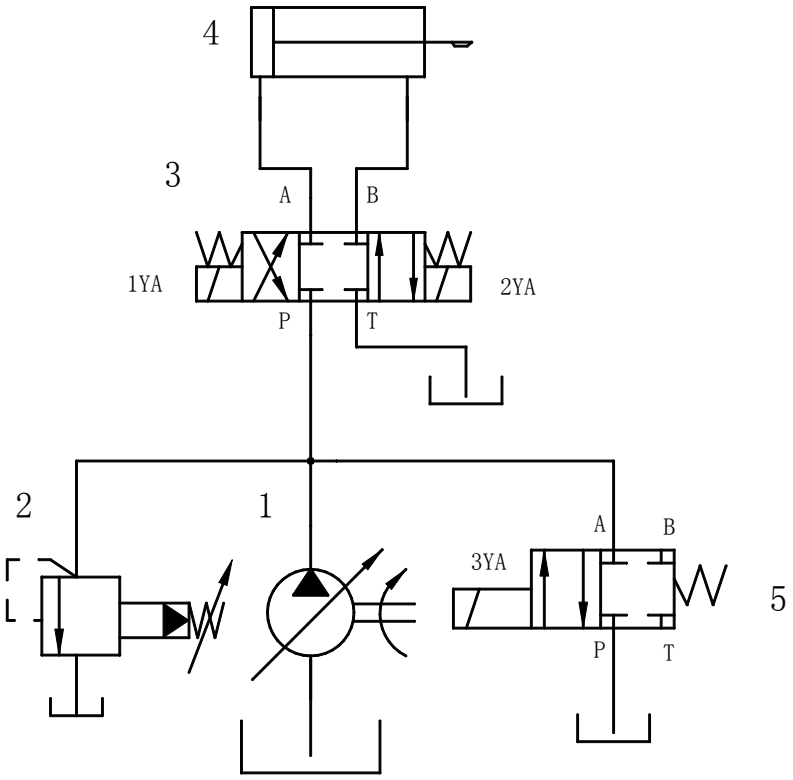
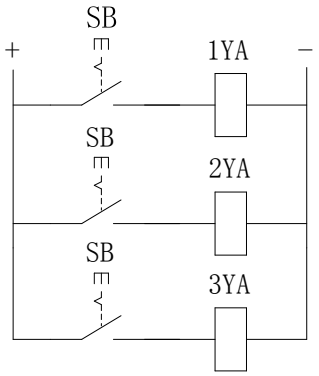


Figure 8-1 Unloading circuit of 4/2-way lever valve

1-Hydraulic station 2-Pilot relief valve 3-shuttle valve double nonreturn valve, delockable 4-Hydraulic cylinder 5-4/2-way lever valve



SB is a self-locking button.

The shuttle valve double nonreturn valve, delockable is directly controlled by the button to get and lose power.

Electrical schematic diagram

Figure 8-1 shows the unloading circuit of the 4/2-way lever valve. When the actuator stops working, the handle of the 4/2-way lever valve is toggled, and the output oil of the hydraulic pump flows back to the tank through the 4/2-way lever valve. The effect of this kind of unloading circuit is better, but it should be noted that the specification of the 4/2-way lever valve is compatible with the rated flow of the pump.

4. experimental steps

(1). After entering the laboratory, first understand the components, find out the name and appearance of the components.

(2). Familiar with the system schematic diagram and electrical schematic diagram.

（3）. Select components as required.

(4). Connect pipelines and circuits according to the system schematic diagram and electrical schematic diagram.

(5). Start the motor.

(6). Realize the unloading circuit using 4/2-way lever valve

Experiment 8. Balance circuit with sequence valve

1. The purpose of the experiment

(1). Master the structure, principle and performance of the one-way sequence valve.

(2). Familiar with the function of the balance circuit.

(3). Understand the circuit composition and principle by disassembling the balance circuit using sequence valve.

2. Experimental equipment

Hydraulic station, overflow valve, balance valve, shuttle valve double nonreturn valve, delockable, hydraulic cylinder, adapter plate, oil pipe

3. working principle

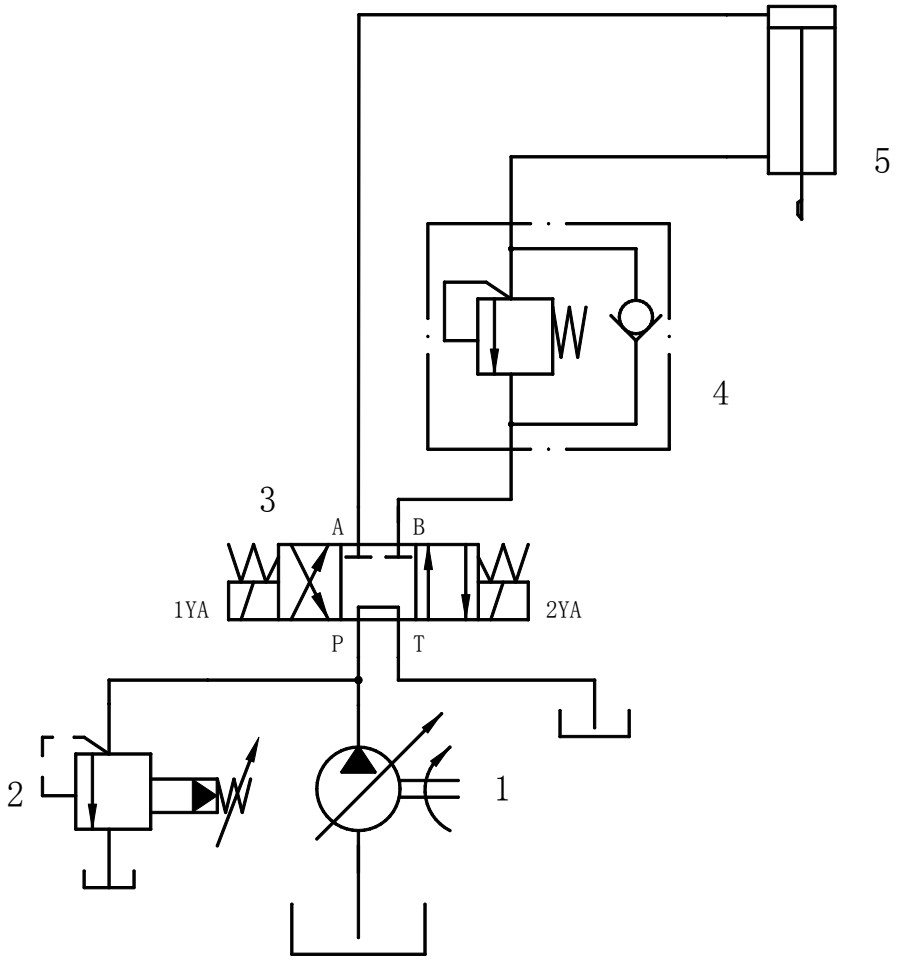
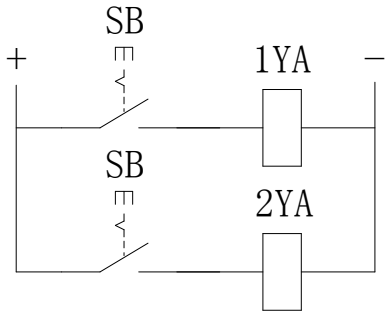


Figure 9-1 Balance circuit of sequence valve

1-Hydraulic station 2-Pilot relief valve 3- shuttle valve double nonreturn valve, delockable 4-Balance valve 5-Hydraulic cylinder



SB is a self-locking button.

The shuttle valve double nonreturn valve, delockable is directly controlled by the button to get and lose power.

Electrical schematic diagram

The function of the balance circuit is to make the oil return path of the actuator have a certain back pressure value to balance the gravity load and prevent the moving parts from falling due to their own weight.

Figure 9-1 shows the balance circuit of the sequence valve. When the electromagnetic directional

valve is in the right position, pressure oil enters the upper cavity of the hydraulic cylinder and pushes the piston down. Due to the effect of the sequence valve back pressure, the piston descends relatively smoothly; When the electromagnetic reversing valve is in the neutral position, the piston stops; when the electromagnetic reversing valve is in the left position, pressure oil enters the lower cavity of the hydraulic cylinder through the one-way valve, causing the piston to move up.

In this balance circuit, after the set pressure of the sequence valve is determined, if the working load becomes smaller, the power loss of the system will increase. Because of the leakage of the reversing valve and sequence valve of the spool valve structure, the piston cannot stay in a certain position for a long time. Therefore, this circuit is only suitable for occasions where the working load is fixed and the positioning requirements are not high when the piston is locked.

4. experimental steps

(1). After entering the laboratory, first understand the components, find out the name and appearance of the components.

(2). Familiar with the system schematic diagram and electrical schematic diagram.

(3). Select components as required.

(4). Connect pipelines and circuits according to the system schematic diagram and electrical schematic diagram.

(5). Start the motor.

(6). Realize the use of a balanced loop.

Experiment 9. Brake circuit with overflow valve

1. The purpose of the experiment

(1). Master the structure, performance and principle of the overflow valve.

(2). Master the structure, performance and principle of the nonreturn valve

(3). Understand the circuit composition and principle through disassembly and assembly of the brake circuit with overflow valve.

2. Experimental equipment

Hydraulic station, hand lever valve, 3 relief valves, 2 nonreturn valve, hydraulic cylinder, oil pipe,

adapter plate

3. working principle

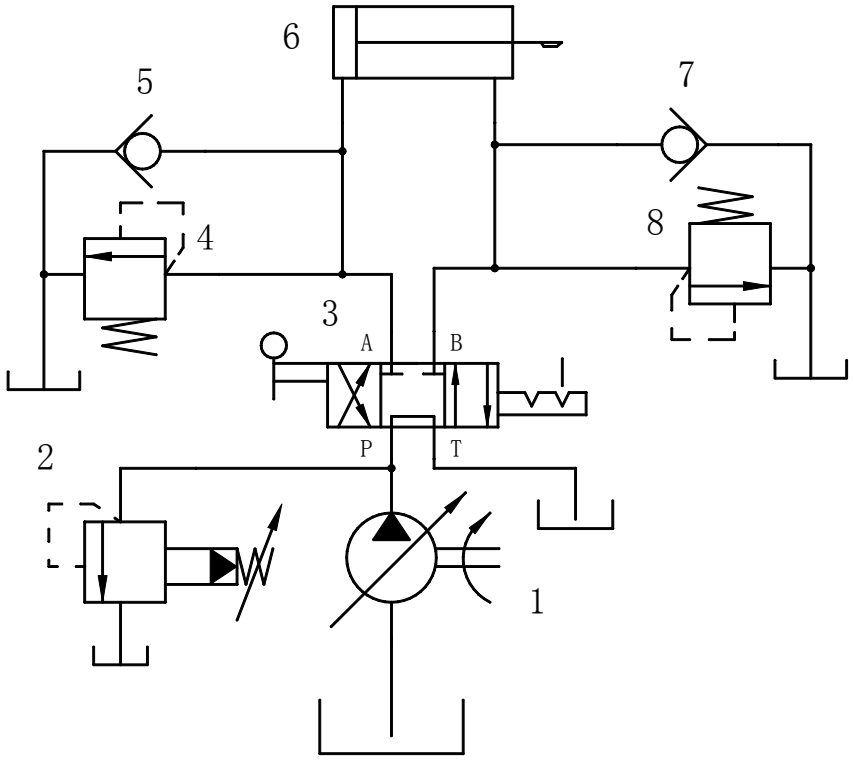


Figure 10-1 Brake circuit with overflow valve

1-Hydraulic station 2-Pilot relief valve 3- hand lever valve 4, 8-Relief valve 5, 7- nonreturn valve 6-Hydraulic cylinder

The function of the brake circuit is to make the actuator smoothly transition from a moving state to a static state. It is required to respond quickly to the abnormal high pressure and negative pressure in the oil circuit, shorten the braking time and reduce the impact.

Figure 10-1 shows the brake circuit of the relief valve. Small, reactive, direct-acting relief valves 4 and 8 are arranged on both sides of the hydraulic cylinder. When the reversing valve is switched, the piston will brake under the set pressure value of the relief valve 8 or 4. For example, when the piston moves to the right and the reversing valve suddenly switches, the oil pressure on the right side of the piston suddenly rises due to the inertia of the moving parts. When the pressure exceeds the set pressure of valve 4, valve 4 opens and overflows to ease the hydraulic pressure in the pipeline. At the same time, the left cavity of the hydraulic cylinder is filled with oil through the one-way valve 5. The piston moves to the left, and the overflow valve 4 and the one-way valve 5 play the role of buffering and replenishing oil.

The set pressures of the buffer relief valves 8 and 4 are generally 5% to 10% higher than the set pressure of the main oil circuit relief valve 2.

4. experimental steps

(1). After entering the laboratory, first understand the components, find out the name and appearance of the components.

(2). Familiar with the system schematic diagram.

(3). Select components as required.

(4). Connect the pipeline according to the system schematic diagram.

(5). Start the motor.

(6). Realize the brake circuit with overflow valve.

Experiment 10 Secondary pressure circuit

1. The purpose of the experiment

(1). Grasp the role of pressure transformation.

(2). Understand the circuit composition and principle through disassembly and assembly of the secondary pressure circuit.

2. Experimental equipment

Hydraulic station, 2 relief valves, shuttle valve double nonreturn valve, delockable, hydraulic cylinder, pressure gauge, three-way plate, oil pipe

3. working principle

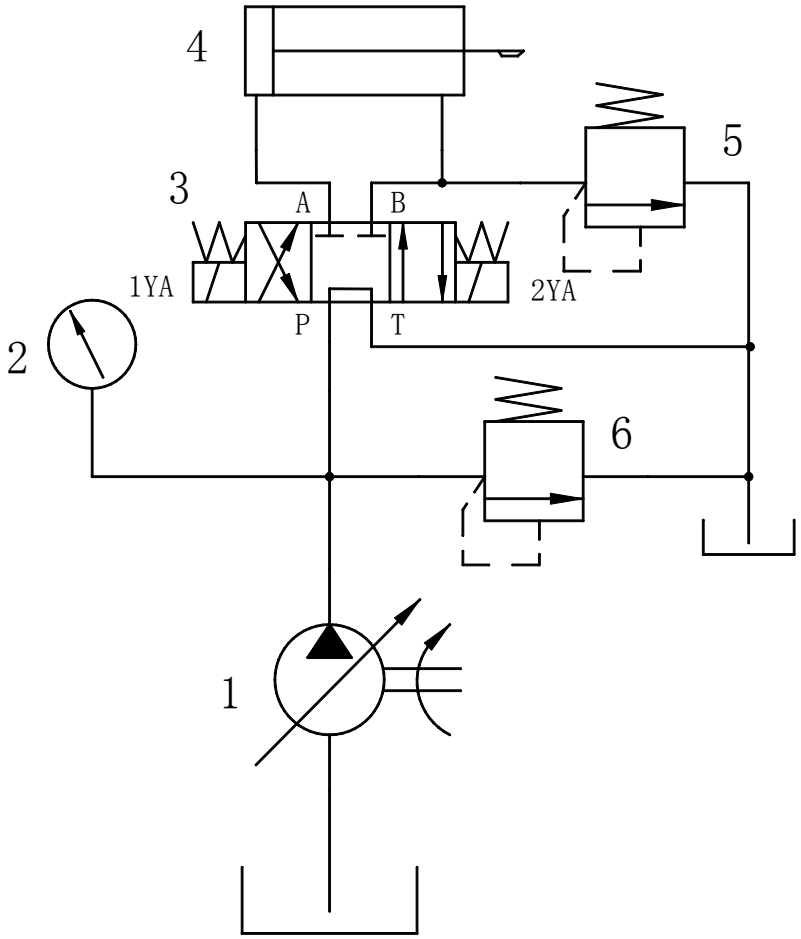
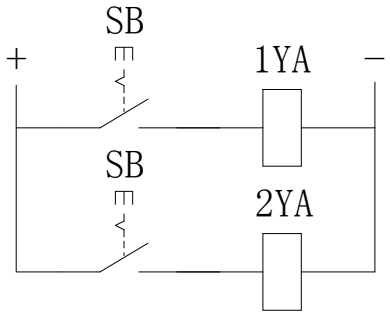


Figure 11-1 Secondary pressure circuit'=

1-Hydraulic station 2-Pressure gauge 3- shuttle valve double nonreturn valve,

delockable 4-Hydraulic cylinder 5, 6-Relief valve



SB is a self-locking button.

The shuttle valve double nonreturn valve, delockable is directly controlled by the button to get and lose power.

Electrical schematic diagram

Figure 11-1 shows the secondary pressure circuit. Through the adjustment of the overflow valve, the secondary pressure is realized. This circuit is only used in special occasions.

4. experimental steps

(1). After entering the laboratory, first understand the components, find out the name and

appearance of the components.

(2). Familiar with the system schematic diagram and electrical schematic diagram.

(3). Select components as required.

(4). Connect pipelines and circuits according to the system schematic diagram and electrical schematic diagram.

(5). Start the motor.

(6). Realize the secondary pressure loop.

Experiment 11. Throttle speed regulating circuit of oil inlet

1. The purpose of the experiment

(1). Grasp the structure, performance and principle of the flow control valve

2. Familiar with the application of speed control loop.

3. Understand the circuit composition and principle through disassembly and assembly of the throttle and speed control circuit of the oil passage.

2. Experimental equipment

Hydraulic station, relief valve, flow control valve, shuttle valve double nonreturn valve, delockable, hydraulic cylinder, adapter plate, oil pipe

3. working principle

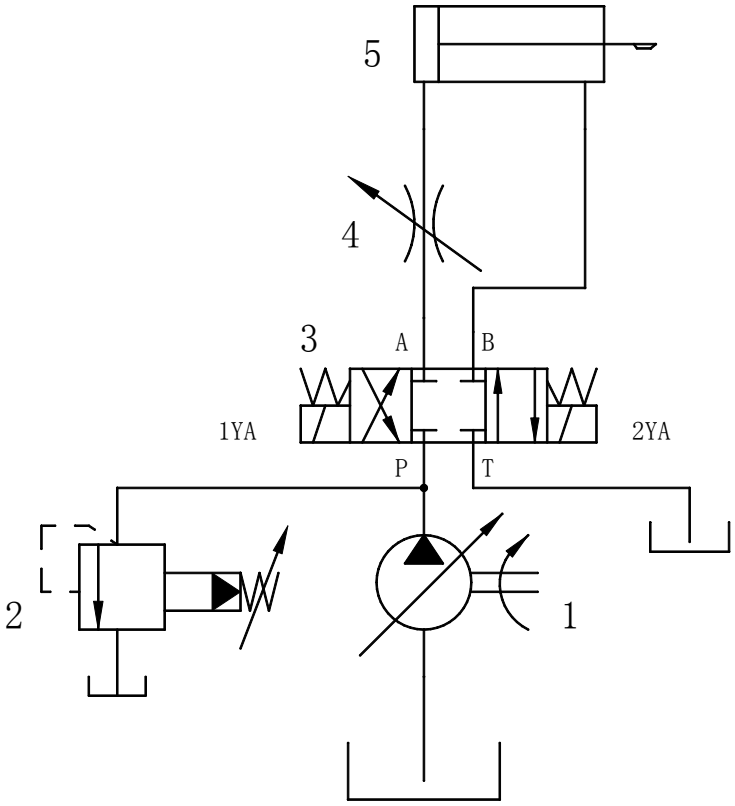
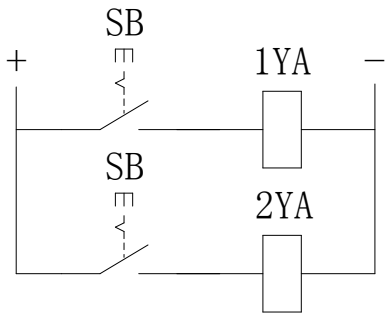


Figure 12-1 Throttle speed control circuit of the oil inlet

1-Hydraulic station 2-Overflow valve 3- shuttle valve double nonreturn valve, delockable4- flow control valve 5-Hydraulic cylinder



SB is a self-locking button.

The shuttle valve double nonreturn valve, delockable is directly controlled by the button to get and lose power.

Electrical schematic diagram

The function of the speed control loop is to adjust the speed of the actuator.

Figure 12-1 shows the throttle speed control circuit of the oil inlet. In this circuit, the flow control valve is connected in series between the hydraulic pump and the actuator (hydraulic cylinder), and the oil output from the pump enters the working chamber of the hydraulic cylinder through the flow control valve to push the piston to move. Adjusting the flow cross-sectional area of the throttle valve can adjust the

flow into the hydraulic cylinder, thereby adjusting the movement speed of the hydraulic cylinder, and the excess oil returns to the oil tank through the overflow valve. In addition, because the oil enters the hydraulic cylinder only after passing through the throttle valve, the oil temperature is high and the leakage is large; there is no back pressure, so the smoothness of movement is poor. This circuit is suitable for occasions where the load is light or the load changes little, and the speed is not high.

Four, experimental steps

1. After entering the laboratory, first understand the components, find out the name and appearance of the components.

2. Familiar with the system schematic diagram.

3. Select components as required.

4. Connect the pipeline according to the system schematic diagram.

5. Start the motor.

6. Realize the throttle and speed control loop of the oil inlet.

Experiment 12 Throttle and speed control circuit

1. The purpose of the experiment

(1). Grasp the structure, performance and principle of the flow control valve

(2). Familiar with the application of speed control loop.

(3). Understand the circuit composition and principle by disassembling and assembling the throttle speed control circuit of the return oil circuit.

2. Experimental equipment

Hydraulic station, relief valve, flow control valve, shuttle valve double nonreturn valve,

Delockable, hydraulic cylinder, adapter plate, oil tube

4. working principle

The function of the speed control loop is to adjust the speed of the actuator.

Figure 13-1 shows the throttle and speed control circuit of the return line. In this circuit, the flow control valve is connected in series between the hydraulic pump and the actuator (hydraulic cylinder), and the oil output from the pump enters the working chamber of the hydraulic cylinder to push the piston

to move. Adjusting the flow cross-sectional area of the flow control valve can adjust the flow out of the hydraulic cylinder, thereby adjusting the movement speed of the hydraulic cylinder, and the excess oil returns to the oil tank through the overflow valve. In addition, the oil enters the oil tank after passing through the flow control valve, which can reduce system heating and leakage. At the same time, the flow control valve acts as a back pressure, so the movement is smooth. Because the overflow valve always overflows, the output power of the pump is a fixed value, which will cause power loss and lower efficiency. This kind of circuit is commonly used in hydraulic systems with low power, large load changes, and high movement stability.

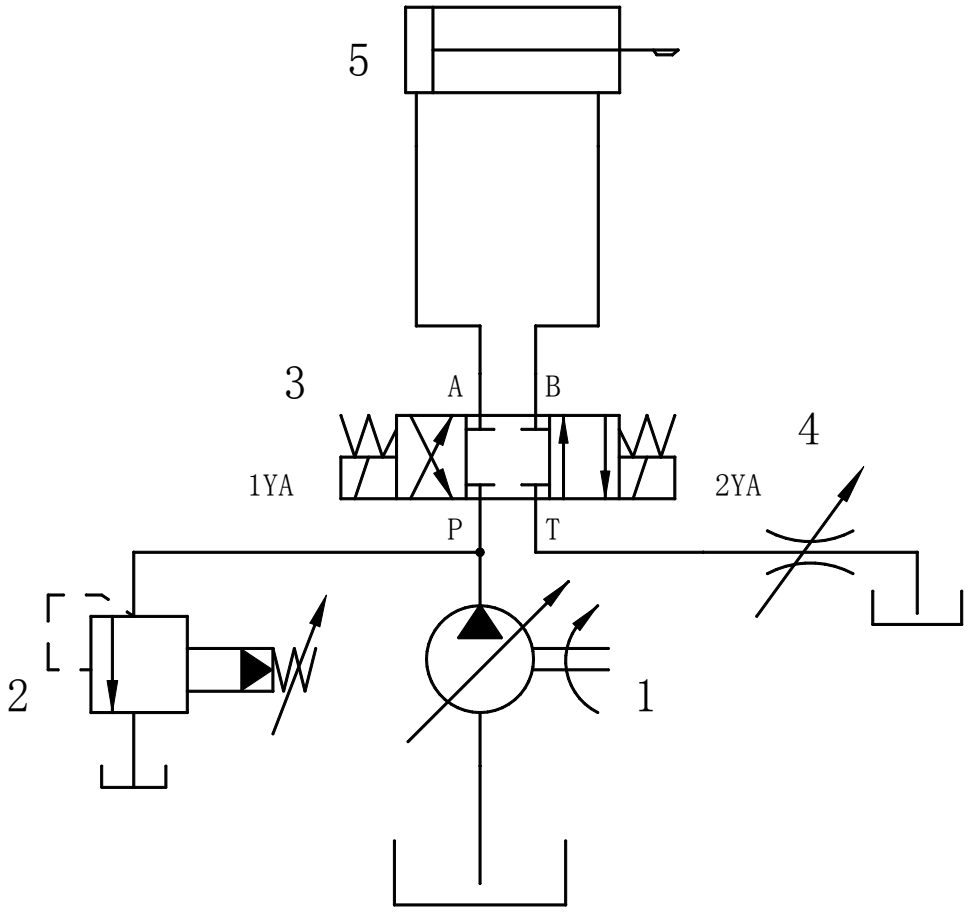
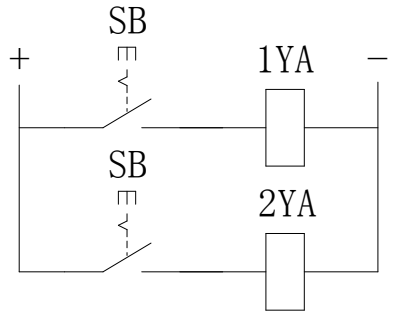


Figure 13-1 Throttle and speed regulation of oil return line

1—Hydraulic station 2—Relief valve 3—shuttle valve double nonreturn valve, delockable 4—flow control valve 5—hydraulic cylinder



SB is a self-locking button.

The shuttle valve double nonreturn valve, delockable is directly controlled by the button to get and lose power.

Electrical schematic diagram

4. experimental steps

(1). After entering the laboratory, first understand the components, find out the name and appearance of the components.

(2). Familiar with the system schematic diagram.

(3). Select components as required.

（4）. Connect the pipeline according to the system schematic diagram.

（5）. Start the motor.

（6）. Realize the throttle and speed control loop of the oil inlet.

Experiment 13. Throttle speed regulation circuit

1. The purpose of the experiment

(1). Grasp the structure, performance and principle of the flow control valve.

(2). Familiar with the application of speed control loop.

(3). Understand the circuit composition and principle by disassembling and assembling the throttle speed control circuit of the side oil circuit.

2. Experimental equipment

Hydraulic station, relief valve, flow control valve, shuttle valve double nonreturn valve, delockable, hydraulic cylinder, adapter plate, oil tube

3. working principle

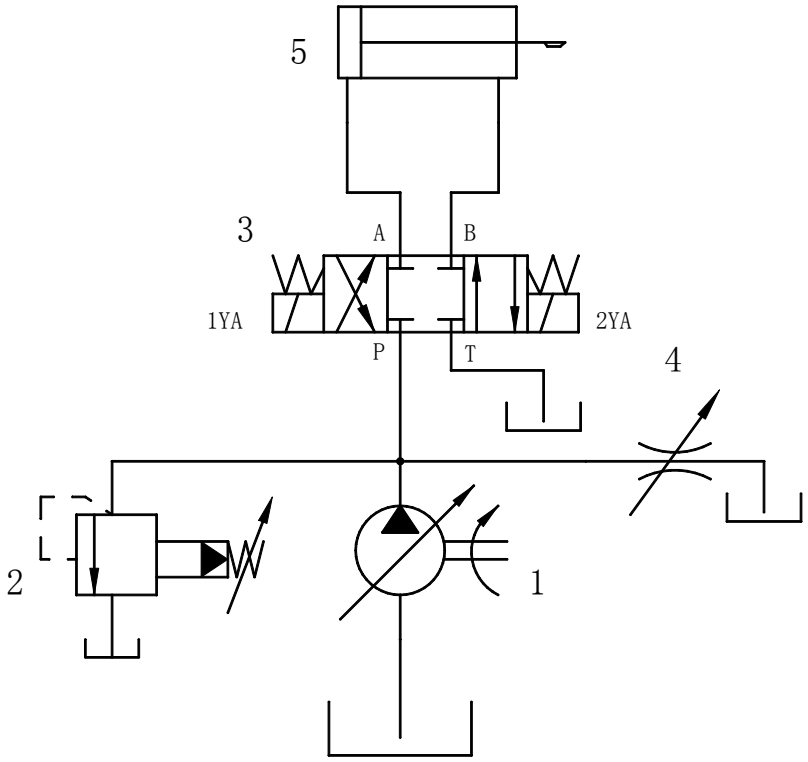
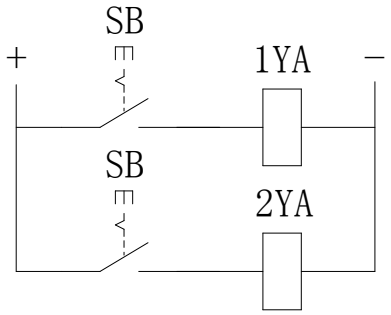


Figure 14-1 Throttle speed regulation circuit of bypass oil circuit

1-Hydraulic station 2-Overflow valve 3- shuttle valve double nonreturn valve, delockable 4- flow control valve 5-Hydraulic cylinder



SB is a self-locking button.

The shuttle valve double nonreturn valve, delockable is directly controlled by the button to get and lose power.

Electrical schematic diagram

The function of the speed control loop is to adjust the speed of the actuator.

Figure 14-1 shows the throttle speed control circuit of the bypass oil circuit. In this circuit, the flow control valve is connected in series between the hydraulic pump and the actuator (hydraulic cylinder), and the oil output from the pump enters the working chamber of the hydraulic cylinder to push the piston to move. Adjusting the flow cross-sectional area of the flow control valve can adjust the flow out of the hydraulic cylinder, thereby adjusting the movement speed of the hydraulic cylinder. The flow area of

the flow control valve is large, the flow through the flow control valve is large, and the flow entering the hydraulic cylinder is small, so the movement speed of the piston is low; otherwise, the movement speed is high. Since the overflow function is completed by the flow control valve, under normal circumstances, the overflow valve is closed. Only when the system is overloaded, the overflow valve opens to play a safety protection role. The pressure output by the pump varies with the load. This kind of circuit is often used in high-speed and high-power situations where the load changes are small, the smoothness of motion is not high, and the speed range is small.

4. experimental steps

1. After entering the laboratory, first understand the components, find out the name and appearance of the components.

2. Familiar with the system schematic diagram.

3. Select components as required.

4. Connect the pipeline according to the system schematic diagram.

5. Start the motor.

6. Realize the throttle and speed control loop of the oil inlet.

Experiment 14. Throttle valve parallel circuit

1. The purpose of the experiment

1. Master the structure, function and principle of the flow control valve

2. Understand the application of reversing valve.

3. Understand the circuit composition and principle by disassembling the flow control valve parallel circuit.

2. Experimental equipment

Hydraulic station, 2 flow control valves, 3/2-way lever valve, relief valve, hydraulic cylinder, adapter plate, oil pipe

3. working principle

Some machine tools require two feed speeds for the working stroke. Generally, the first feed speed is greater than the second feed speed. In order to achieve two working speeds, two flow control valves

are usually connected in series or parallel in the oil circuit. Switch to the valve.

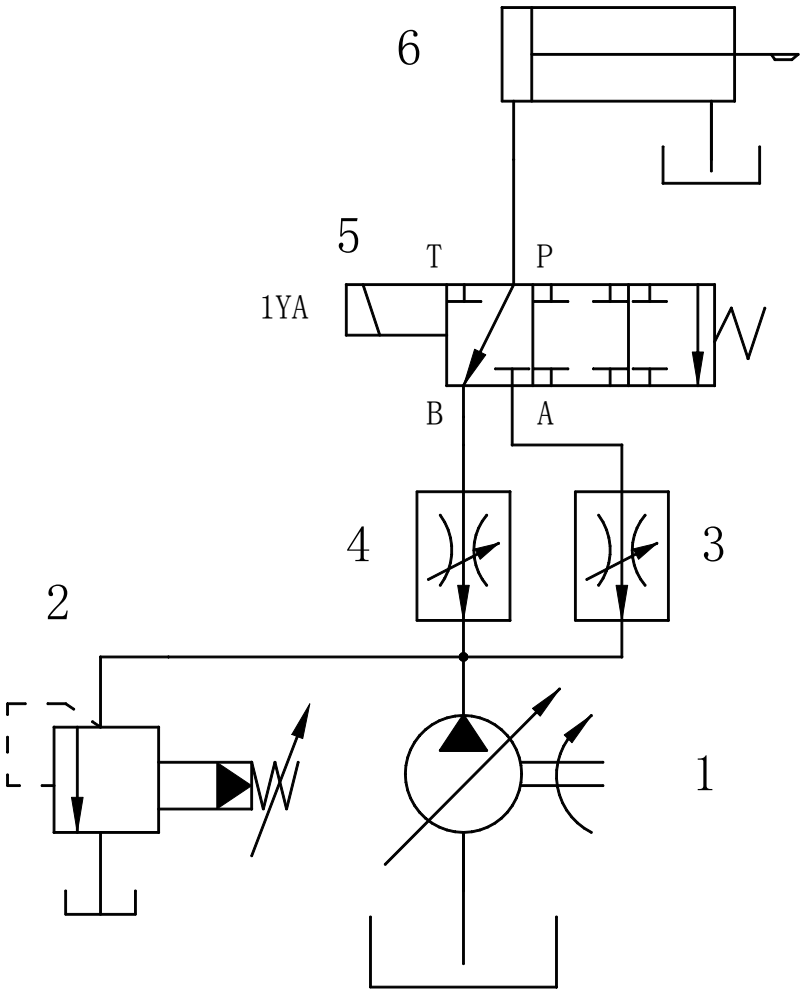


Figure 16-1 flow control valve parallel circuit

1-Hydraulic station 2-Overflow valve 3,4- flow control valve 5-4/2-way lever valve 6-Hydraulic cylinder

Figure 16-1 shows a switching circuit where two flow control valves are connected in parallel to achieve two feed speeds. Here, the two feed speeds can be adjusted separately without affecting each other. However, when one flow control valve is working, the other flow control valve does not pass through, and its fixed differential pressure reducing valve is at the maximum opening position. Therefore, at the moment of speed conversion, excessive flow through the flow control valve will cause the feed component to suddenly forward. Therefore, this kind of circuit is not suitable for the conversion of two feedrates in the same stroke, and can only be used for speed preselection occasions.

4. experimental steps

1. After entering the laboratory, first understand the components, find out the name and appearance

of the components.

2. Familiar with the system schematic diagram and electrical schematic diagram.

3. Select components as required.

4. Connect pipelines and circuits according to the system schematic diagram and electrical schematic diagram.

5. Start the motor.

6. Realize the flow control valve parallel circuit.

Experiment 15. flow control valveseries circuit

1. The purpose of the experiment

1. Master the structure, function and principle of the flow control valve

2. Understand the application of reversing valve.

3. Understand the circuit composition and principle by disassembling the flow control valveparallel circuit.

2. Experimental equipment

Hydraulic station, 2 flow control valvea, 4/2-way lever valve, relief valve, hydraulic cylinder, 2 three-way plates, oil tube

3. working principle

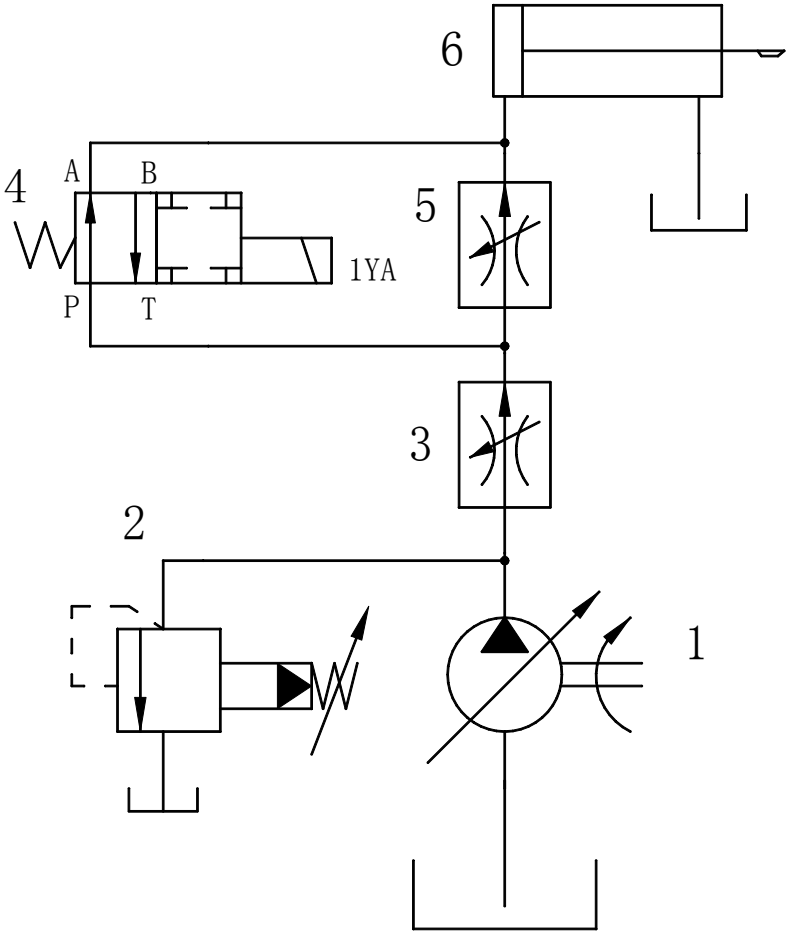


Figure 17-1 Throttle valve series circuit

1-Hydraulic station 2-Relief valve 3,5- flow control valve 4-4/2-way lever valve 6-Hydraulic cylinder

Figure 17-1 shows the flow control valve series circuit, which realizes the switching of two speeds. The flow control valve 5 is shorted by the reversing valve 4, and the flow rate of the input hydraulic cylinder is controlled by the flow control valve 3. When the reversing valve 4 is energized, the opening of the speed regulating valve 5 should be adjusted to be smaller than the opening of the speed regulating valve 3, so the flow into the hydraulic cylinder is controlled by the flow control valve 5. Since the flow control valve 3 is always in working condition, it limits the flow into the flow control valve 5 when the speed is changed, so the speed change of the throttle loop is smooth.

4. experimental steps

1. After entering the laboratory, first understand the components, find out the name and appearance of the components.

2. Familiar with the system schematic diagram and electrical schematic diagram.

3. Select components as required.

4. Connect pipelines and circuits according to the system schematic diagram and electrical schematic diagram.

5. Start the motor.

6. Realize the flow control valve parallel circuit.

Experiment 16. Locking circuit using shuttle valve double nonreturn valve,Delockable

1. The purpose of the experiment

（1） Master the circuit composition principle by disassembling and installing the locking circuit.

(2). Familiar with the application of the locking circuit.

2. Experimental equipment

Hydraulic station, relief valve, shuttle valve double nonreturn valve,Delockable, hydraulc cylinder, adapter plate, oil tube

3. working principle

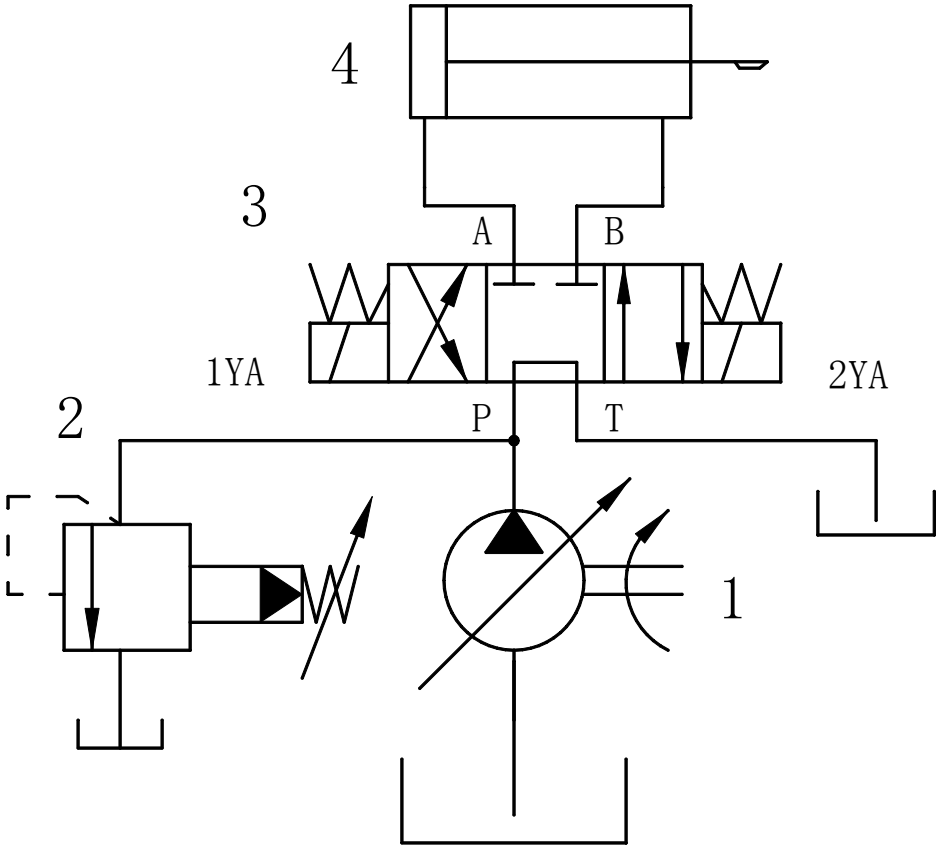
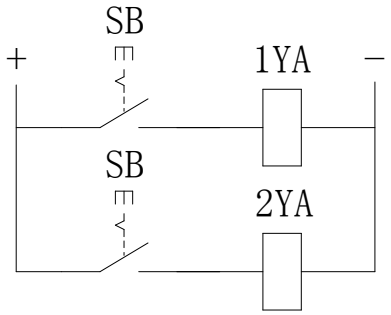


Figure 20-1 Locking circuit

1-Hydraulic station 2-Overflow valve 3- shuttle valve double nonreturn valve,Delockable 4-Hydraulic cylinder



SB is a self-locking button.

The shuttle valve double nonreturn valve, delockable is directly controlled by the button to get and lose power.

Electrical schematic diagram

Figure 20-1 shows the locking circuit of the shuttle valve double nonreturn valve, delockable. This circuit uses the structure of the shuttle valve double nonreturn valve, delockable to achieve system locking, so that the actuator is fixed in certain positions. The reversing valve 2YA is energized and the piston extends; when the reversing valve is in the neutral position, the piston stops and the system is unloaded. The reversing valve 1YA is energized and the piston retracts.

Four, experimental steps

1. After entering the laboratory, first understand the components, find out the name and appearance of the components.

2. Familiar with the system schematic diagram and electrical schematic diagram.

3. Select components as required.

4. Connect pipelines and circuits according to the system schematic diagram and electrical schematic diagram.

5. Start the motor.

6. Realize the locking loop.

Experiment 17. loading unit test loop

1. The purpose of the experiment

1. Master the circuit composition principle by disassembling the loading unit.

2. Familiar with the application of load simulator circuit.

2. Experimental equipment

Hydraulic station, Tubing line for pressureless, shuttle valve double nonreturn valve, delockable, loading unit, adapter plate, pressure gauge, oil pipe

3. working principle

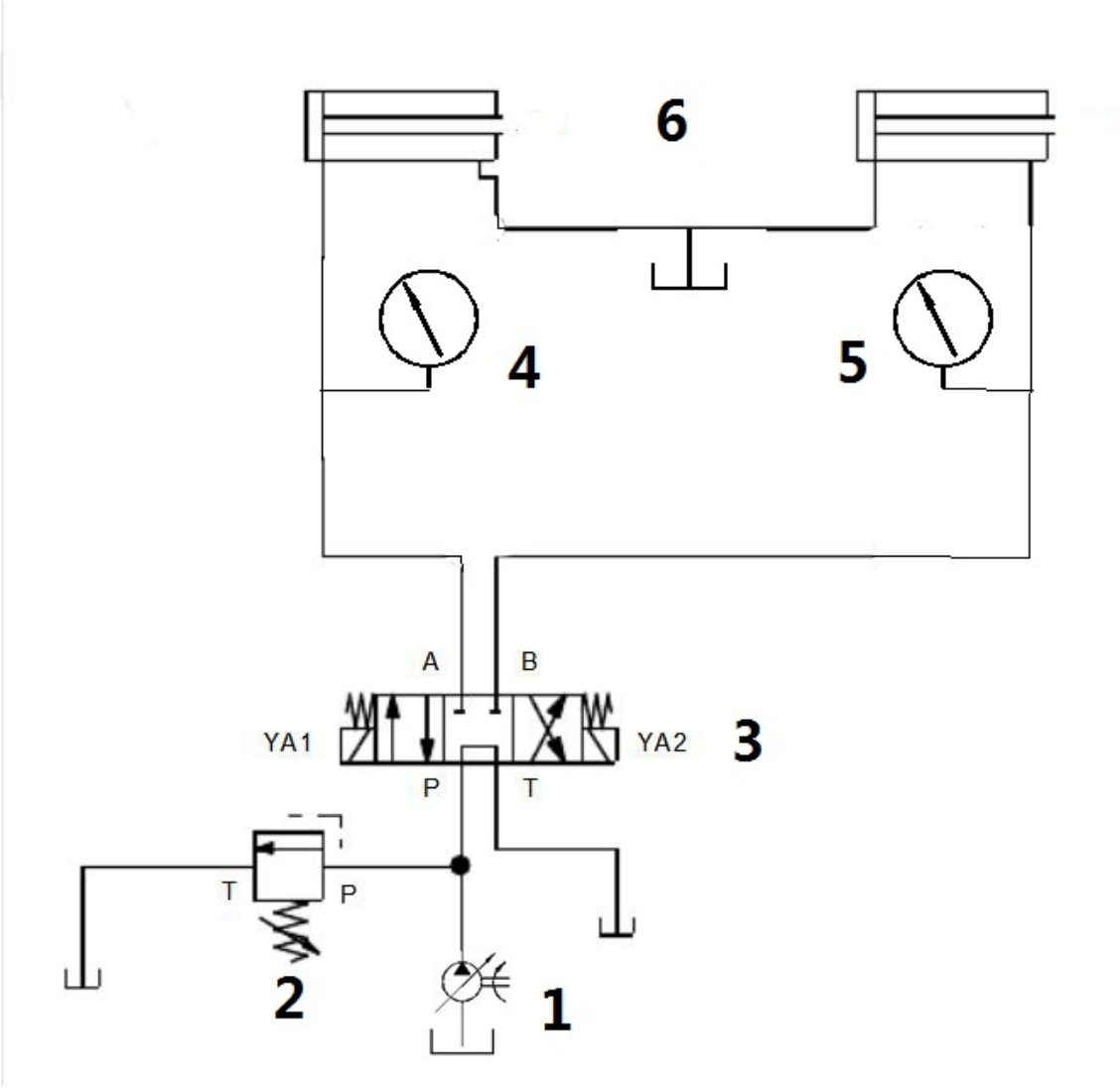
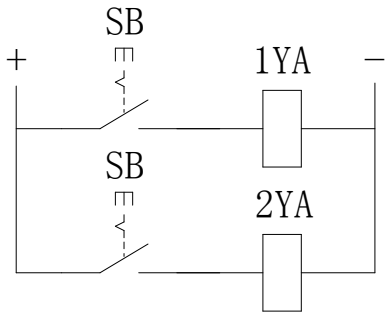


Figure 21-1 loading unit circuit

1-Hydraulic station 2-Tubing line for pressureless 3- shuttle valve double nonreturn valve, delockable 4, 5-Pressure gauge 6 loading unit



SB is a self-locking button.

The shuttle valve double nonreturn valve, delockable is directly controlled by the button to get and lose power.

Electrical schematic diagram

Figure 21-1 shows the loading unit circuit. Observe the pressure changes on both sides of the loading unit by adjusting the pressure of the pressure reducing valve. The cylinder on the side with

higher pressure moves to the cylinder on the side with lower pressure. The loading unit reciprocates through the electromagnetic reversing valve.

Four, experimental steps

1. After entering the laboratory, first understand the components, find out the name and appearance of the components.

2. Familiar with the system schematic diagram and electrical schematic diagram.

3. Select components as required.

4. Connect pipelines and circuits according to the system schematic diagram and electrical schematic diagram.

5. Start the motor.

6. Realize the loading unit loop.

Attachment: Use of accumulator and matters needing attention:

1. Installation

1. The accumulator should be installed as close to the device as possible. When used for buffering and absorbing pulsation, it should be installed as close to the vibration source as possible. In order to give full play to the function of the accumulator, the accumulator should be installed vertically. To facilitate the maintenance and inspection of the accumulator, a certain space should be left above and around the accumulator.

2. To install the accumulator, it should be firmly supported on the bracket or on the wall. When the diameter-to-length ratio is too large, hoop reinforcement should be provided.

3. The accumulator is connected to the pipeline through a transition joint. The connector connected to the oil inlet valve should be screwed into the port and the inner hole size should not be too small to prevent the valve stem from being stuck against the connector and causing the capsule to break.

4. Welding, riveting or machining is not allowed on the accumulator;

5. An easy-to-operate shut-off valve should be set between the accumulator and the pipeline

system. This valve is used for charging, checking the accumulator, adjusting the oil discharge speed or stopping for a long time;

6. A one-way valve should be installed between the accumulator and the hydraulic pump to prevent the pressure oil stored in the accumulator from flowing back when the pump motor stops running;

7. In order to prevent the accumulator from harming the piping system, for accumulators greater than or equal to 10L, a safety valve or overflow valve should be installed at the position where the accumulator enters;

8. Only nitrogen gas is allowed in the capsule of the accumulator, and air or oxygen is strictly prohibited.

2. use

1. The accumulator capsule should be filled with nitrogen before the accumulator is put into use;

2. After the inflation is completed, you need to use a brush to dip in the washing powder liquid or soapy water and apply it to the interfaces and seals of the accumulator. If any air leakage is found, the pressure should be relieved and repaired in time

3. maintenance

1. After the accumulator is put into operation, the pressure in the capsule should be checked regularly. If there is leakage, the gas should be added in time. If the leakage is serious, the cause should be found out (the capsule is damaged, the inflation valve is not tightly sealed or the inflation valve is The valve seat is not tightly sealed, etc.), and repair it in time.

2. When the accumulator is not used for a long time, the shut-off valve between the oil port and the pressure oil pipe should be closed to keep the oil pressure in the accumulator above the charging pressure.

3. The service life of the capsule depends on the cleanliness of the oil, the working temperature and the oil medium. Metal particles or impurities in the oil will cause abrasion on all surfaces of the shell and capsule. It is recommended to use filters and heat exchangers as preventive measures to protect the accumulator and all components.

4. maintenance

If the liquid pressure or gas pressure is not completely released, please do not disassemble any parts of the accumulator.