



Operation Manual

(Valve Test Bench)

Issued by

Chongqing Weiyun Technology Development Co.,Ltd



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1. Safety Instructions

1.1 Safety Instructions for Staff

The operator of this testing machine must be familiar with the operating techniques, master the safety instructions in this manual, and understand the structure of each component of the machine before being allowed to participate in the operation of this machine.

1.2 Safety Instructions for Preparing the Testing Machine Before Operation

Check the current status and intact condition of the equipment, check whether the pressure gauges and buttons of each instrument are damaged during transportation. When the testing machine detects faults or abnormal noise in the hydraulic system, cut off the power supply and stop working to eliminate the fault. It is strictly prohibited to test the tested valve on this machine beyond the specified range.

1.3 Safety Instructions Regarding Electrical Appliances

The testing machine adopts three-phase four wire, AC power supply: voltage 380V, 50Hz; Control circuit, voltage 220V, 50Hz; Non professional staff are prohibited from touching the power control device to avoid danger. Due to the large number of electrical buttons on the testing machine, it is reminded that operators and maintenance personnel must attach great importance to safety issues. It is strictly prohibited to work without learning this instruction.

1. Check whether the grounding wire of the power supply is reliable and whether the wire diameter meets the requirements;
2. Check if the phase sequence of the power supply is correct;
3. Check if the electrical buttons are correct;
4. When there is a malfunction in the electrical equipment of the testing machine, the power should be turned off first, and the fault should not be resolved. No one is allowed to power on;
5. Electrical maintenance personnel must wear electrical insulation tools according to the electrician's operating procedures for work. During the maintenance period, there must be a dedicated person to supervise or hang a warning sign at the power source.

2. Introduction

The valve test bench is a product developed by our company based on years of accumulated production of valve testing and testing equipment technology, in accordance with national standards such as GB/T13927-2008 *"Pressure Testing of General Valves"* and ZBJ16006-90 *"Testing and Testing of Valves"*, and in accordance with international standards such as ISO5208 *"Pressure Testing of Industrial Valves"* and American Petroleum Institute standard API1598 *"Valve Inspection and Testing"*, Valves can undergo shell testing, upper sealing testing, high-pressure water sealing testing, and low-pressure air sealing testing.

This machine integrates electromechanical, hydraulic, and pressure testing liquid medium storage and circulation, with the characteristics of complete functionality, stable performance, and high degree of automation. The entire process of pressure testing is controlled by hydraulic transmission and

electrical appliances, and external forces are applied to the tested valve without any additional impact on the test results. It is widely used in straight through flange structures with a nominal diameter of DN15-DN300mm, as well as sealing and strength testing of valves such as high, medium, and low pressure gate valves, ball valves, globe valves, check valves, and plug valves. Test media: water, gas, oil. The maximum sealing test pressure is 25MPa, and the strength is 37.5MPa. It can greatly improve work efficiency and reduce labor, and is an advanced and ideal valve testing and testing equipment for valve manufacturing, usage, maintenance and other units.

3. Working Principle

Vertical valve test bench, during testing, place one end of the tested valve flange on the sealing plate of the workbench of the machine, and use the top pressure hydro-cylinder to press the other end of the valve flange for valve strength testing. On the lower main panel, a positioning seal is used with the valve flange end face, and the back of the valve flange is clamped by the movable claw of the machine for sealing test. There is no external force that affects the test results of the tested valve, and it meets the valve testing requirements specified in national standards.

The structure of this machine can be roughly divided into hydraulic system, mechanical system, electrical control system, etc. The top pressing horizontal arm can rotate 90 degrees backwards. It provides great convenience for observing the sealing of the tested valve and lifting the workpiece. There are radial advance and retreat, axial clamping, and relaxation at the bottom. Adjust the flange size of valves with different diameters. The radial advance and retreat device adopts a lever type principle structure, which realizes synchronous movement of each claw's radial advance and retreat, and has the characteristics of good performance, simple and compact structure. The

clamping device is achieved by directly driving each hydro-cylinder, ensuring that the clamping force on each claw workpiece is uniform and reliable. The machine is equipped with a hydraulic pressure supply device, a low-pressure water pump, and a medium circulation water tank system, among other components. The high and low pressure water pumps are fixedly installed inside the front of the testing machine to circulate the medium. The pressure gauge, water control valve, and electrical button switch are all designed in front of the testing machine for operation control, which can coordinate the actions of various mechanisms, make the operation convenient, safe and reliable, and satisfy the testing needs of users.

4. Usage Requirements and Precautions

4.1 Usage Requirements

1. Equipment installation, calibrate the level of equipment installation, and use concrete to fix foot bolts on the bottom surface of the equipment. Drainage and water supply systems should be installed around the testing area.
2. Choose N32-46 # ordinary hydraulic oil, N46 # anti-wear hydraulic liquid, or 20-30 # mechanical oil. Inject into the fuel tank and check if the oil level exceeds 1/2 of the liquid level.
3. Power on: press the start button of the oil pump, check the direction of the motor and whether it is correct (clockwise). After 5-10 minutes of no-load operation, adjust the overflow valve to adjust the system pressure to 5.0Mpa for commissioning. Check whether various actions are normal. Check whether there is leakage in each oil pipeline. If any undesirable phenomenon is found, immediately shut down the machine for troubleshooting.
4. The medium for the experiment is generally water, which has the advantages of convenience and no environmental pollution. Therefore, it is

widely used to ensure that the tested valve will not corrode, as required by the medium requirements of the testing machine. Add rust proof powder or commonly used oil as the test medium to the water tank.



NOTICE

Commonly used anti rust powders include sodium nitrite, sodium sulfonate, and sodium benzenesulfonate .(non-toxic powder)

5. When testing valves, first refer to the test pressure of the tested valve and the hydraulic system pressure value in the "*Pressure Comparison Table for Tightening Hydro-Cylinder*" to adjust the boost pressure. It is strictly prohibited to exceed the boost pressure value to prevent deformation and damage of the tested valve.
6. Before starting the operation of the low-pressure water pump (vortex pump), first open a small square screw above the inlet of the pump body, inject clean water (about 1 kilogram), and then open a small ball valve next to the outlet of the pump body to start the low-pressure water pump. When the output of the small ball valve at the outlet of the low-pressure water pump body increases, close the outlet ball valve.
7. Before starting the operation of the hydraulic pressure pump, adjust the electric contact pressure gauge to match the test pressure of the tested valve, and then proceed with the operation. During the valve test, operators should pay attention to safety and use it correctly. After the valve test is completed, the pressure of the medium inside the valve should be drained before pressing the claw to release the button.
8. The pressure gauge of the pressure testing device must be certified by the Local metrology department and used within the validity period of the certificate. When conducting water pressure testing, the water pressure

pressure cannot exceed two-thirds of the pressure gauge, and the accuracy of the pressure gauge cannot be lower than level 1.5.

4.2 Points for Attention

1. The working surface of the testing machine should be kept clean and tidy, and there should be no other debris on the contact surface between the flange of the tested valve and the sealing plate. The O-ring should be checked for damage at all times.
2. The moving parts of the testing machine should be lubricated regularly to maintain cleanliness and lubrication.
3. Hydraulic fluid should be checked regularly. For newly used equipment, the oil tank should be cleaned and replaced with new oil every 3 months. Afterwards, it should be cleaned and replaced every year. The oil level should not be lower than the lower limit of the oil level gauge, and the oil temperature in the oil tank should not exceed 55 degrees. When testing high-pressure or ultra-high pressure test valves with liquid, the gas inside the valve chamber should be discharged. During the high-pressure boosting process, do not approach the test valve, and pay attention to personal safety, Security measures should be taken.
4. During the working test of the valve, it is strictly prohibited to perform welding and wind cutting operations on the testing machine, except for other phenomena such as air holes and sand holes found on the surface of the valve body, to prevent electrical appliances, wires, and equipment parts from being burned or damaged.
5. After the valve test is completed, the pressure relief switch must be opened first to relieve the pressure inside the tested valve, and then the tested valve must be relaxed.

6. Operators must pay attention to personal safety during the clamping process and are strictly prohibited from touching moving parts of the machine to harm their bodies.

7. Regular inspection and maintenance should be carried out, and the power should be cut off during maintenance or non use time.

5. Main Technical Specifications

Product name		Top pressure valve test bench
Model specifications		WY-380AW-TJ1
Test medium		Water (anti-corrosion water), air
Applicable valve types		Straight through type: flange type, threaded type; safety valve
Allow testing of valve diameter pressure	Nominal diameter DN/mm	DN15-300/1” -12”
	Nominal pressure PN/MPa	1.6-25MPa
	Maximum test pressure	37.5Mpa
Allow testing of valve flanges	Maximum flange diameter mm	530
	Minimum flange diameter mm	15
Allow test valve length	The longest valve mm	≧ 750
	The shortest valve	≧ 178

	mm	
Structure parameters	Maximum gear opening (length) mm	$\cong 900$
	Bar diameter mm	110
	Tightening hydro-cylinder diameter mm	$\Phi 200$
	Design negative compression force T (approximately)	100 ton
hydraulic system	High pressure supply pump	Maximum output pressure 40MPa
	Low pressure water injection pump	Flow rate of 3M ³ /h, output pressure of 0-1.5MPa
Pneumatic Test	Air compressor/air source	User configured connection for operating
	High pressure gas driven pump	Maximum output pressure 40MPa
Power source	Voltage V/Frequency Hz	380/50
electrical machinery	Power Kw/Number of Poles p	3/6
External dimensions	Long × wide × Height mm (approximately)	2900×950×2300

Theoretical weight	KG	(暫未称重)
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● **Comparison Table of Equipment Testing Pressure Range**

Allow testing Valve specifications DN (mm)	Test working pressure range (MPa)		
	Valve diameter DN (in)	Valve nominal pressure PN (MPa/Lb)	Maximum test pressure PS (MPa)
15-300	15/1/2 "	1.6-25/1500	37.5
	25/1 "	1.6-25/1500	37.5
	32/11/4 "	1.6-25/1500	37.5
	40/11/2 "	1.6-25/1500	37.5
	50/2 "	1.6-25/1500	37.5
	65/21/2 "	1.6-25/1500	37.5
	80/3 "	1.6-25/1500	37.5
	100/4 "	1.6-25/1500	37.5
	125/5 "	1.6-25/1500	37.5
	150/6 "	1.6-20/900	30.0
	200/8 "	1.6-16/900	24.0
	250/10 "	1.6-10/600	15.0
	300/12 "	1.6-6.4/400	10.0

6. Installation Steps for Valve Test Bench

6.1 Use lifting rings to lift the top pressure oil cylinder and crossbeam using an aerial crane (lifting capacity>1T);

6.2 Install the right hole of the crossbeam onto the right pull rod of the pressure test bench and secure it with a compression nut;



6.3 Rotate the crossbeam to the left slot and insert it into the left pull rod of the pressure test bench; And fix it with a compression nut;

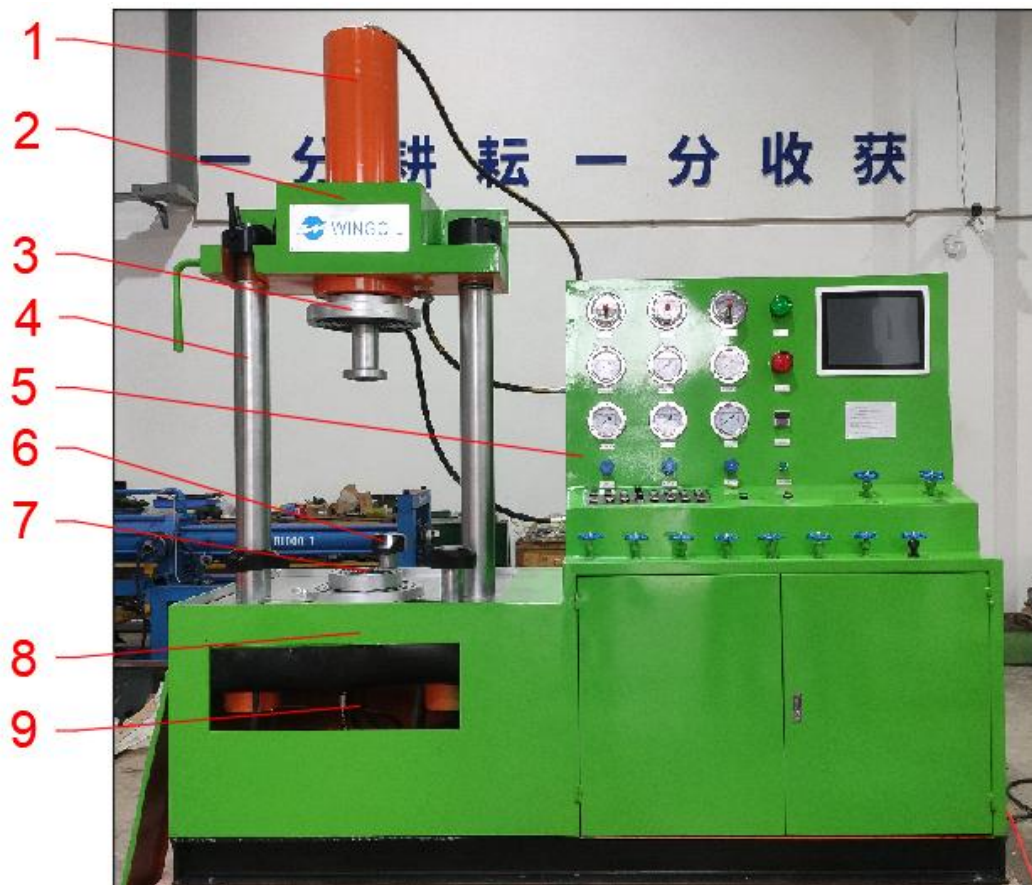


6.4 Use a hook wrench to tighten the compression nut;

6.5 Remove the lifting tool;

7. Equipment Composition and Functional Indicators

7.1 The Main Components of the Valve Test Bench



Number	Name	Application
1	Top pressure hydro-cylinder	Controlled by hydraulic station, clamp the valve from top to bottom;

2	movable cross-beam	Fixed top pressure hydro-cylinder, can move backwards, used to test valves that exceed height;
3	Upper sealing plate	Sealing pressure testing valve;
4	Bar	Support moving crossbeam;
5	Console	Clamp the valve by operating valve buttons, etc., and control and display the pressure test pressure;
6	Clamping jaw	Clamp pressure test valve;
7	Lower sealing plate	Sealing pressure testing valve;
8	Water box	Storage of pressure test water;
9	Water inlet	The inlet for adding water to the water box;

7.2 Main Components of Hydraulic Station



Number	Name	Function	Remark
1	Hydraulic station motor	Provide power to the hydraulic station;	The motor should rotate clockwise after being powered on;
2	Oil injection port	Inject hydraulic fluid into the oil tank from here;	
3	Oil box	Storing hydraulic fluid;	
4	Electromagnetic valve group	Switch for controlling the movement of hydraulic cylinders;	


7.3 Console Functional Area Indication











The device console can be divided into five areas as shown in the above image.

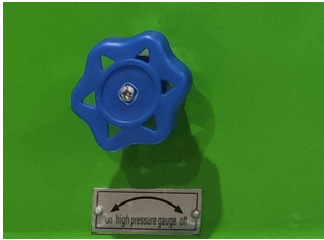

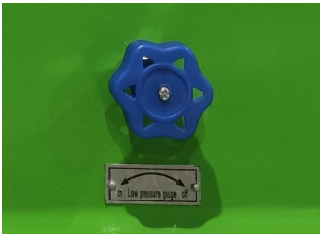
7.3.1 Pressure Display Area



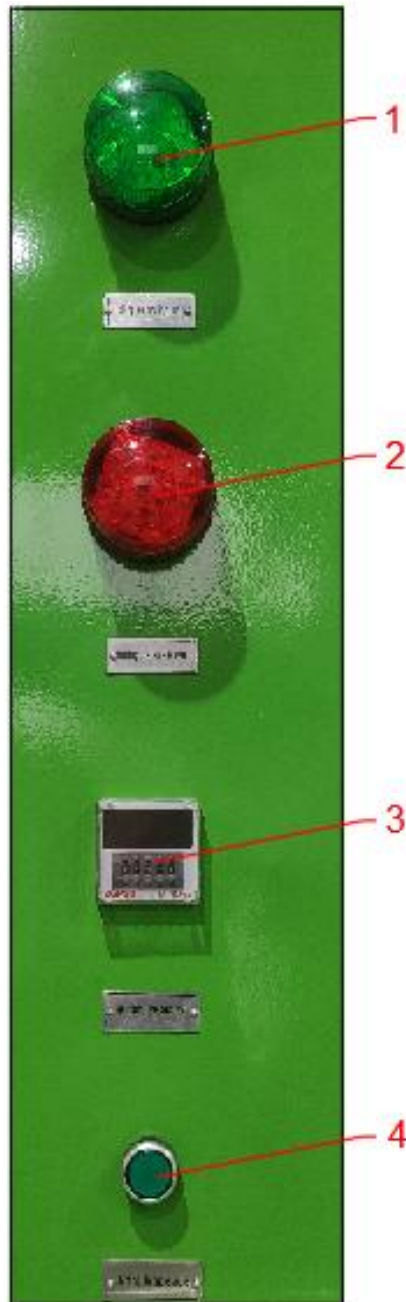
Number	Picture	Name	Function	Remark
1		High pressure adjusting gauge	Limiting water pressure and high pressure;	Use the adjustment knob to adjust the red pointer to the pressure that needs to be

				limited;
2		Low pressure water pump gauge	Limiting the output pressure of low-pressure water pumps;	Use the adjustment knob to adjust the red pointer to the pressure that needs to be limited;
3		Barometric regulator gauge	Limiting gas high-pressure output pressure;	Use the adjustment knob to adjust the red pointer to the pressure that needs to be limited;
4		Top boost gauge	Display the downward pressure of the top pressure cylinder on the valve pressure test bench;	





5		Claw boost gauge	Display the clamping force of the gripper	
6		Oil pump gauge	Display the output pressure of the hydraulic station	
7		High pressure gauge	Display the high-pressure test pressure of the valve	
8		Medium pressure gauge	Display the medium pressure test pressure of the valve	When the pressure test pressure exceeds 16MPa, the pressure gauge should be stopped;
9		Low pressure gauge	Display the low-pressure test pressure of the valve;	When the pressure test pressure exceeds 4MPa, the pressure gauge should be

				stopped;
10		On high pressure gauge off	Open/close High pressure gauge;	Counter clockwise rotation-open, clockwise rotation-close, Initial state -close;
11		On Medium pressure gauge off	Open/close Medium pressure gauge;	Counter clockwise rotation-open, clockwise rotation-close, Initial state -close;
12		On Low pressure gauge off	Open/close Low pressure gauge;	Counter clockwise rotation-open, clockwise rotation-close, Initial state -close;

7.3.2 Pressure Holding Timing Area



Number	Picture	Name	Function	Remark
		Holding pressure is running	The pressure holding timer display light	

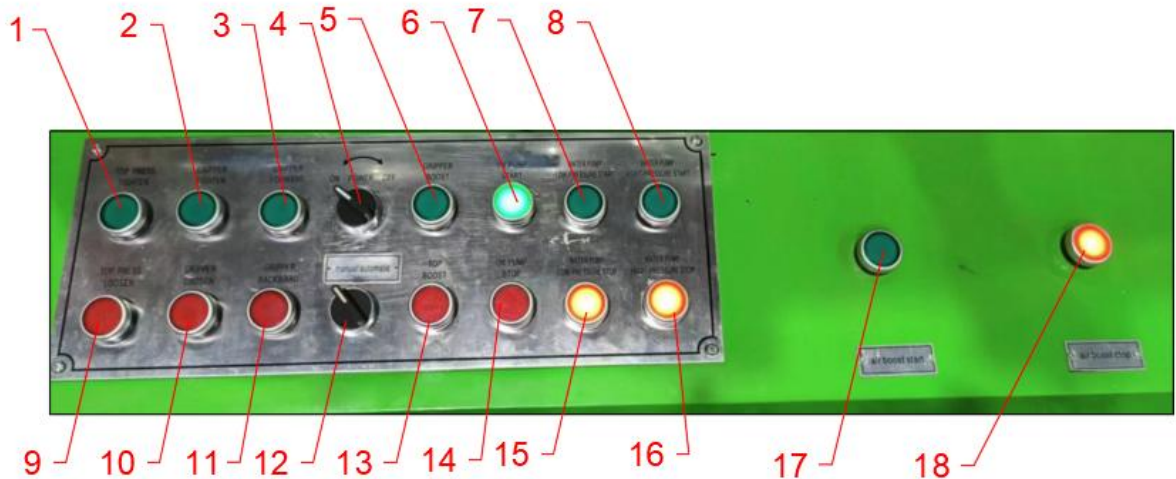
<p>1</p>			<p>lights up when the pressure holding timer is in progress;</p>	
<p>2</p>		<p>Holding pressure is over</p>	<p>The pressure gauge stop display light will light up when the pressure gauge ends;</p>	
<p>3</p>		<p>Set hold pressure time</p>	<p>Pressure holding time setter, capable of setting the duration of pressure holding;</p>	
<p>4</p>		<p>Start holding pressure</p>	<p>Start holding pressure button, press to start holding pressure timing;</p>	

7.3.3 Data Recording System










PLC can display real-time pressure curves, record and save pressure test operation data, and can also be transmitted to a printer for printing (Refer to electrical manual).




7.3.4 Valve Clamping and Booster Pump Switch



Number	Picture	Name	Function	Remark
1		TOP PRESS TIGHTEN	Press the top pressure hydro-cylinder down and clamp the valve;	Long press to continuously press down, click once and move once, release to stop moving;
2		GRIPPER TIGHTEN	Clamp the valve by pressing down with the gripper;	Long press to continuously press down, click once and press down once, release to stop moving;
3		GRIPPER FORWARD	The gripper moves inward;	Long press to move continuously, click once and move once, release to stop moving;
4		ON POWER OFF	power switch;	
5		GRIPPER BOOST	Increase the clamping pressure of the gripper;	Long press for sustainable pressurize, click once and pressurize once, release to stop pressurizing;

<p>6</p>		<p>OIL PUMP START</p>	<p>Press to start the hydraulic station operation after it lights up;</p>	
<p>7</p>		<p>WATER PUMP LOW-PRE SSURE START</p>	<p>Switch on the low-pressure water injection pump, press it to start the low-pressure water injection pump;</p>	
<p>8</p>		<p>WATER PUMP HIGHT-PR ESSURE START</p>	<p>Control the switch of the gas-liquid booster pump to drive the air, and start the high-pressure water pump after pressing the light;</p>	
<p>9</p>		<p>TOP PRESS LOOSEN</p>	<p>Run the top pressure hydro-cylinder upwards and release the valve;</p>	<p>Long press to continuously move up, click once and move up once , release to stop moving;</p>

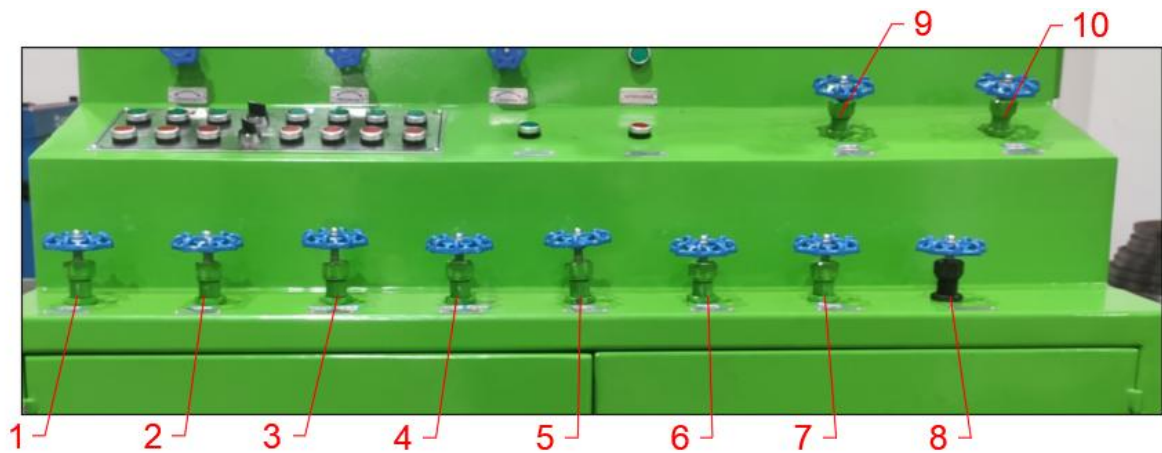
<p>10</p>	 <p>GRIPPER LOOSEN</p>	<p>GRIPPER LOOSEN</p>	<p>Move the gripper upwards to release the valve;</p>	<p>Long press to continuously move up, click once move up once, release to stop moving;</p>
<p>11</p>	 <p>GRIPPER BACKWARD</p>	<p>GRIPPER BACKWARD</p>	<p>The gripper moves outward;</p>	<p>Long press to continuously move up, click once move once, release to stop moving;</p>
<p>12</p>	 <p>• manual/automatic •</p>	<p>Manual/automatic</p>	<p>Manual/automatic boost switch;</p>	<p>Manual mode using "High pressure adjusting gauge" and "Low pressure water pump gauge", when the low-pressure water pump reaches the pressure, it is necessary to manually press "WATER PUMP HIGH -PRESSURE START" to start the high-pressure water</p>

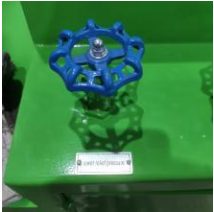
				<p>pump. The automatic mode will automatically start the high-pressure water pump;</p>
13		<p>TOP BOOST</p>	<p>Increase the clamping force of the top pressure hydro-cylinder for downward pressure;</p>	<p>Long press for sustainable pressurize, click once pressurize once, release to stop pressurizing;</p>
14		<p>OIL PUMP STOP</p>	<p>After pressing the light- turn off the hydraulic station</p>	
15		<p>WATER PUMP LOW-PRE SSURE STOP</p>	<p>Low-pressure water injection pump switch-Stop the low-pressure water injection pump after pressing the light button;</p>	


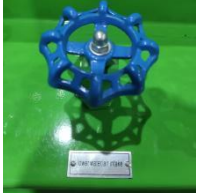
<p>16</p>		<p>WATER PUMP HIGHT-PR ESSURE STOP</p>	<p>Switch for controlling the driving air of the gas booster pump- Stop the high-pressure water pump after pressing the light button;</p>	
<p>17</p>		<p>air boost start</p>	<p>Switch for controlling the driving air of the gas booster pump-Turn on the air high-pressure pump after pressing the light button;</p>	
<p>18</p>		<p>air boost stop</p>	<p>Switch for controlling the driving air of the gas booster pump-Turn off the air</p>	

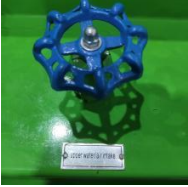


			high-pressure pump after pressing the light button;	
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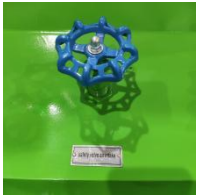
7.3.5 Valve Switch

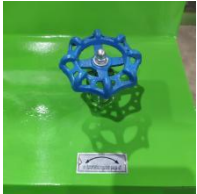


Number	Picture	Name	Function	Remark	Initial Status
1		lower relief pressure	When opened, the pressure inlet pipeline under the test bench is unloaded;	Rotate counterclockwise to open the valve, clockwise to close the valve, and during pressure testing, the valve should be in a closed state;	Open

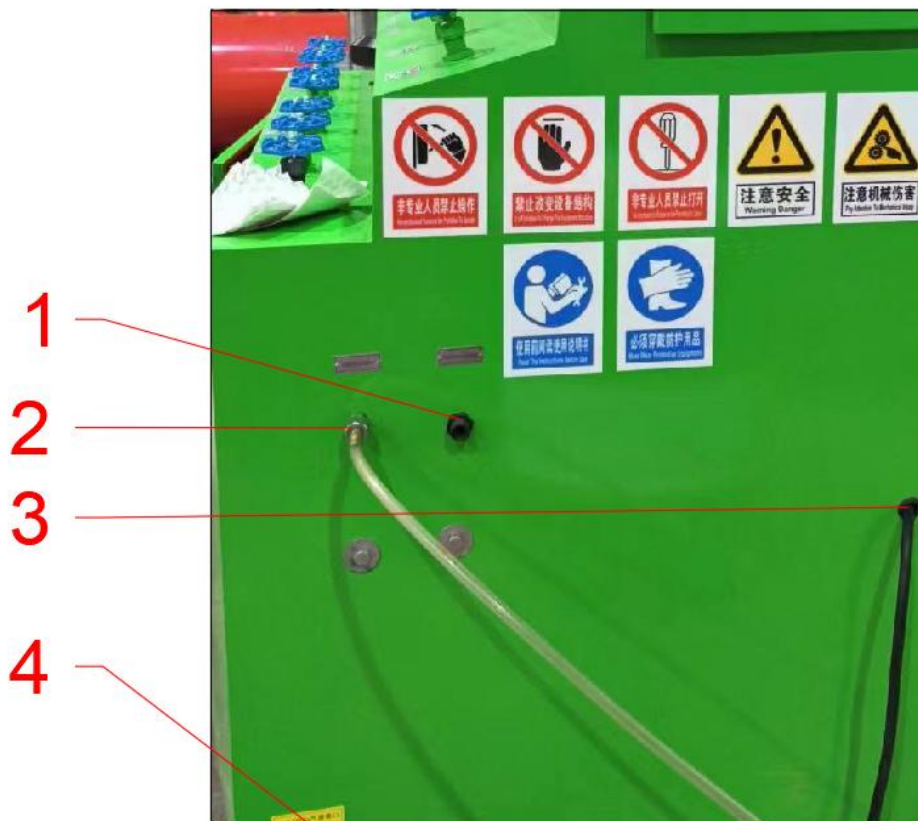
<p>2</p>		<p>upper relief pressure</p>	<p>When opened, the pressure inlet pipeline on the test bench is unloaded</p>	<p>Rotate counterclockwise to open the valve, clockwise to close the valve, and the valve should be in the closed state during pressure testing;</p>	<p>Open</p>
<p>3</p>		<p>lower water/air intake</p>	<p>The shut-off valve of the pressure pipeline under the test bench is opened, and the pressure is applied from the pressure inlet under the test bench;</p>	<p>Rotate counterclockwise to open the valve, and clockwise to close the valve;</p>	<p>Open</p>

<p>4</p>		<p>upper water/air intake</p>	<p>The shut-off valve of the pressure pipeline on the test bench is opened, and the pressure is applied from the pressure inlet on the test bench;</p>	<p>Rotate counterclockwise to open the valve, and clockwise to close the valve;</p>	<p>Open</p>
<p>5</p>		<p>total water intake</p>	<p>The water inlet valve can be opened for water pressure testing</p>		<p>Open</p>
<p>6</p>		<p>total air intake</p>	<p>After opening, the external source is directly connected to the pressure inlet of the</p>	<p>The pressure test pressure was not increased and was directly connected to the valve;</p>	<p>Open</p>

			valve pressure testing platform;		
7		safety valve air supply	After opening, connect the air source to the air pump for high-pressur e pressure testing;		Close
8		Reserved interface	Reserve interface valve, which can output pressure from the reserved interface after opening;		Close
9		safety valve air intake	Gas pressure output shut-off valve, can be opened		Close

			for air pressure testing;		
10		on barometric regulator gauge off	After opening, the "Barometric regulator gauge" can be used to adjust the gas output pressure;		Close

7.4 Pipeline Connection Port Indication



Number	Name	Function	Remark
1	Reserved interface	Interface for outputting test pressure outward, used to test larger valves;	M20*1.5
2	total air intake	Gas medium inlet for pressure testing;	M18*1.5
3	Power line connection inlet	Power cord connection inlet;	
4	0-0.8MPa air source interface	Interface for connecting to the driving air;	G1/2

8. Equipment Operation Tutorial

Connect the power and air sources according to the interface, add anti-corrosion water to the water tank until it exceeds the water inlet, and add enough hydraulic fluid to the oil tank from the oil inlet.

8.1 Clamping Steps

8.1.1 Clamping of Threaded Valves

1. Point the **"ON POWER OFF"** arrow to **"ON"** and turn on the power switch;
2. Press the **"Oil Pump START"** button to start the hydraulic station;
3. Press the **"GRIPPER LOOSEN"** and **"GRIPPER Backward"** buttons to retract the gripper to the outermost position, and long press the **"TOP PRESS LOOSEN"** to push the hydraulic cylinder back to a height that does not interfere with the installation fixture;
4. Install the thread sealing fixture on the valve pressure test bench;



Thread tooling

5. Place the valve steadily in the middle of the sealing plate under the valve pressure test bench;
6. Long press and hold **"TOP PRESS TIGHTEN"** to press down the top pressure hydro-cylinder until the upper sealing surface stops contacting the upper end face of the valve;

7. Press the **"TOP BOOST"** button to increase the pressure of the top pressure cylinder on the valve until the pressure displayed on the **"Top boost gauge"** can tighten the valve and release the **"TOP BOOST"** button during the pressure test. Tighten the pressure according to the **"Pressure gauge required for clamping the valve cylinder"**;

8.1.2 Clamping of Flange Valves

1. Press the **"Oil PUMP START"** button to start the hydraulic station;
2. Press the **"GRIPPER LOOSEN"** and **"GRIPPER BACKWARD"** buttons to retract the gripper to the outermost position, and long press the **"TOP PRESS LOOSEN"** to push the hydraulic cylinder back to a height that does not interfere with the installation fixture;
3. Place the valve steadily in the middle of the sealing plate under the valve pressure test bench;
4. Adjust the positions of the three clamps according to **"GRIPPER TIGHTEN"** and **"GRIPPER FORWARD"** to clamp the lower flange of the valve;
5. Long press and hold **"TOP PRESS TIGHTEN"** to press the top pressure cylinder against the flange on the valve (clamp the straight valve, ignore this step for safety valves);
6. Press the **"TOP BOOST"** button to increase the pressure of the top pressure cylinder on the valve until the pressure displayed on the **"Top boost gauge"** can tighten the valve and release the **"TOP BOOST"** button during the pressure test (clamp the straight valve, ignore this step for safety valves). Tighten the pressure according to the **"Pressure gauge required for clamping valve cylinders"**;
7. Press the **"GRIPPER BOOST"** button to increase the pressure of the top pressure cylinder on the valve until the pressure displayed on the **"Claw boost gauge"** can tighten the valve and release the **"GRIPPER BOOST"** button

during the pressure test. Tighten the pressure according to the **"Pressure gauge required for clamping valve cylinders"**;



NOTICE

*Axial clamping and top pressure cylinder pressurization: According to the nominal diameter DN and nominal pressure PN of the tested valve, refer to the **"Pressure Comparison Table for Clamping Cylinder"**, press the **"TOP BOOST"** button or **"GRIPPER BOOST"** button to pressurize the clamping cylinder pressure to the required pressure. The pressurization button can be pressed multiple times, with an interval of about 5-10 seconds each time.*

8.2 Stress Testing Operation Process

8.2.1 Valve Status Table

Adjust the valve to the corresponding state according to different needs.

Upper water inlet pressure:

Number	Valve Name	Status
1	lower relief pressure	Close
2	upper relief pressure	Close
3	lower water/air intake	Close
4	upper water/air intake	Open

5	total water intake	Open
6	total air intake	Close
7	safety valve air supply	Close
8	Reserved interface	Close
9	safety valve air intake	Close
10	on barometric regulator gauge off	Close

Lower water inlet pressure:

Number	Valve Name	Status
1	lower relief pressure	Close
2	upper relief pressure	Close
3	lower water/air intake	Open
4	upper water/air intake	Close
5	total water intake	Open
6	total air intake	Close
7	safety valve air supply	Close
8	Reserved interface	Close
9	safety valve air intake	Close
10	on barometric regulator gauge off	Close

Gas inlet pressure at both ends:

Number	Valve Name	Status
1	lower relief pressure	Close
2	upper relief pressure	Close
3	lower water/air intake	Open
4	upper water/air intake	Open
5	total water intake	Close
6	total air intake	Open
7	safety valve air supply	Open
8	Reserved interface	Close
9	safety valve air intake	Open
10	on barometric regulator gauge off	Open



NOTICE

When the connected pressure testing medium gas does not need to be pressurized, the "safety valve air supply" valve can be closed, and the "total air intake" valve can be opened as a direct intake valve. The status of other valves can refer to the status of the gas inlet valve.

External interface output pressure:

Water pressure:

Number	Valve Name	Status
1	lower relief pressure	Close
2	upper relief pressure	Close
3	lower water/air intake	Water pressure
4	upper water/air intake	Close
5	total water intake	Open
6	total air intake	Close
7	safety valve air supply	Close
8	Reserved interface	Open
9	safety valve air intake	Close
10	on barometric regulator gauge off	Close

Gas pressure:

Number	Valve Name	Status
1	lower relief pressure	Close
2	upper relief pressure	Close
3	lower water/air intake	Close
4	upper water/air intake	Close
5	total water intake	Open
6	total air intake	Close
7	safety valve air supply	Open
8	Reserved interface	Open
9	safety valve air intake	Open
10	on barometric regulator gauge off	Open

8.3 Water Pressure Test

1. Adjust the **"High pressure adjusting gauge"** and **"Low pressure water pump gauge"** electrical contact pressure gauge, and select the appropriate pressure gauge from **"High pressure gauge"**, **"Medium pressure gauge"**, and **"Low pressure gauge"** according to the test pressure;



NOTICE

The adjustment value for "High pressure adjusting gauge" is the test pressure, while the adjustment value for "Low pressure water pump gauge" is generally between 1-1.6MPa.

2. Press **"WATER PUMP LOW-PRESSURE START"** to start the low-pressure water pump;

3. When the **"Low pressure water pump gauge"** pressure reaches the set pressure, press **"WATER PUMP HIGH PRESSURE START"** to start the high-pressure water pump (this step can be ignored in automatic mode);
4. When the pressure reaches the set pressure of **"High pressure adjusting gauge"**, the water pump automatically stops pressurizing, and the operator can conduct pressure holding experiments according to needs (pressure holding timer function can be used to assist pressure testing);
5. After the pressure test is completed, open the **"lower relief pressure"** and **"upper relief pressure"** valves for unloading until the pressure gauge returns to zero;
6. Operate the top pressure hydro-cylinder and clamp to release the valve, and the pressure test is completed.



NOTICE

*The unloading operation should be carried out slowly when opening **"lower relief pressure"** and **"upper relief pressure"**.*

8.4 Gas Pressure Test

1. Adjust the **"Barometric regulator gauge"** electrical contact pressure gauge and select the appropriate pressure gauge from **"High pressure gauge"**, **"Medium pressure gauge"**, and **"Low pressure gauge"** according to the test pressure;



NOTICE

*The adjustment value of **"Barometric regulator gauge"** is the test pressure.*

2. Press **"air boost start"** to start the gas booster pump;

3. When the pressure reaches the pressure set by the **"Barometric regulator gauge"**, the air pump automatically stops pressurizing, and the operator can conduct pressure holding experiments according to needs (pressure holding timer function can be used to assist pressure testing);
4. After the pressure test is completed, open the **"lower relief pressure"** and **"upper relief pressure"** valves for unloading until the pressure gauge returns to zero;
5. Operate the top pressure hydro-cylinder and clamp to release the valve, and the pressure test is completed.



NOTICE

*When performing gas unloading operations, the **"lower relief pressure"** and **"upper relief pressure"** should be twisted slowly, and then loosened a little before being twisted back. Multiple times of loosening and twisting should be used for unloading.*

8.5 Pressure Test Precautions

1. Due to the different nominal sizes and pressures of the tested valves, attention should be paid to the conversion between high-pressure and low-pressure pressure gauges during the pressure testing process. When the pressure of the tested valve is greater than two-thirds of the low-pressure gauge, turn off the switch of the low-pressure pressure gauge to Prevent damage to the low pressure gauge.
2. The test medium shall be selected by the user, but shall comply with the regulations: shell, high-pressure upper sealing, high-pressure sealing test. The test medium shall be used for kerosene, water (anti rust powder can be added), or other suitable non corrosive liquids with a viscosity not greater than water; Low pressure sealing test: The test medium should be air or other suitable gases, and the temperature of the test medium should not exceed 50 degrees.

When using liquid for testing, the gas inside the valve chamber should be eliminated. When using gas for testing, safety precautions should be taken.

9. Pressure Gauge Required for Clamping Valve Hydro-Cylinder

Nominal Diameter (DN)		Valve Nominal Pressure MPa / Class																	
		1.6		2.5		4.0		6.4		10		16		20		25		32	
				150		300		400		600		900				1500		2000	
		Recommended Hydraulic System Pressure																	
in	mm	PN	PS	PN	PS	PN	PS	PN	PS	PN	PS	PN	PS	PN	PS	PN	PS	PN	PS
1/2	15	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
1	25	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	4.0	3.0	4.0
2	50	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	4.0	4.0	6.0	5.0	6.5	5.0	6.5
3	80	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	4.0	4.0	6.0	5.0	7.5	6.0	9.0	8.0	12.0
4	100	3.0	3.0	3.0	3.0	3.0	3.0	3.0	4.0	4.0	6.0	6.0	9.0	7.0	11.0	9.0	13.5	12.0	18.0
5	125	3.0	3.0	3.0	3.0	3.0	4.0	4.0	6.0	6.0	9.0	9.0	13.5	11.0	16.5	14.0	21.0		
6	150	3.0	3.0	3.0	3.0	4.0	5.0	5.0	7.5	7.5	11.0	12.0	18.0	15.0	22.5				
8	200	3.0	3.0	3.0	4.0	4.5	7.0	8.0	12.0	12.0	18.0	19.5	30.0						
10	250	3.0	5.0	5.0	7.0	7.5	11.0	12.0	18.0	18.0	27.0								
12	300	4.0	6.0	6.5	10.0	10.5	16.0	17.0	25.5										

Note:

1. When testing valves, PN (valve sealing test) and PS (valve strength test) are used.
2. If the valve is less than DN125-2.5Mpa, fine tune the hydraulic system pressure to below 3.0Mpa, and the hydro-cylinder can move.

10. Principle and Troubleshooting of Pneumatic Pressure Supply Device

10.1 Working Principle of Pneumatic System

The pump is powered by the pressure of the gas system, electrically controlled by an electromagnetic directional valve, which automatically shuts the hydro-cylinder back and forth. It is equipped with a two-stage water pump pressure device, which can improve the pressurization flow function. The electric contact controls the ultra-high pressure stop.

10.2 Working Principle of High-pressure Water Pump

During the reciprocating movement of air pressure, cylinder A begins to absorb water, and the suction check valve opens. The electromagnetic directional valve of the air pressure system automatically reverses and pushes the suction check valve of cylinder A to close. The outlet check valve of cylinder A opens and enters the inner chamber of cylinder B and the tested valve. When the pressure inside the tested valve chamber is the same as that inside cylinder A (the highest pressure of cylinder A has been adjusted to 10.0Mpa at the factory), excess medium flows out of the pressure regulating valve of cylinder A. After multiple reciprocating movements of cylinders AB, the pressure is increased to the set value on the electric contact pressure gauge, and the pressure supply water pump automatically stops.

10.3 Troubleshooting Methods for High-pressure

Water Pump

1. If there is no water absorption and the air pressure system is normal, first check the circulating water level, whether the water absorption pipeline joint is loose, and whether there is air entering.
2. The electromagnetic directional valve core of the air pressure system component is stuck. Remove the electromagnetic directional valve, clean it, and reinstall it. If the damage is severe, please grind and replace it.
3. The high-pressure water pump does not discharge water. Remove the suction check valve and the discharge check valve (1), inspect and clean them. If they are severely damaged, please replace them.
4. The output of the high-pressure water pump is normal, but the pressure gauge will drop and cannot maintain pressure. Remove the one-way valve (2) for water outlet, inspect and clean it. If it is severely damaged, please replace it.
5. The use of water cylinder sealing rings in unclean media can shorten their lifespan and prevent water pressure from increasing. It is necessary to replace the media in a timely manner and add appropriate rust inhibitors.

10.4 Common Faults and Troubleshooting Methods

Malfunction		Cause of Malfunction	Troubleshooting Methods
Hydro-cylinder crawling	Hydraulic system	Air enters the hydraulic system, causing the hydro-cylinder to stop and vibrate continuously;	Loosen the hydro-cylinder joint and exhaust the air in the reciprocating hydro-cylinder direction;
		The system pressure is lower than the frictional resistance;	Pressure required for regulating the system;

		The hydro-cylinder and valve are not sealed and enter the air;	Install and replace sealing rings;
The hydro-cylinder does not move	Selector valve	Spool valve pulled or stuck;	Cleaning and repairing the slide valve;
		Control pressure oil pressure too low;	Increase control pressure oil pressure;
		Control oil pipe blockage;	Clear and control the oil circuit;
		Difficulty in reversing, valve core not in center position;	Inspection and cleaning;
	Electrical equipment	Poor insulation of electromagnetic iron coil;	Replace the electromagnet;
		There is dirt on the iron core of the electromagnetic iron door;	Sanding cleaning;
		Control button damaged;	Replace again;
		Incorrect voltage;	Correct voltage;
		Poor wire welding leads to loose joints;	Re weld and tighten the screws;
	Boosting cylinder	Electrical equipment	The one-way valve core is stuck due to dirt;
Damaged one-way valve core;			Grinding and replacement (model :FZSI01);
Deformation of one-way valve spring;			Check and replace the spring;
Oil leakage at the connection part;			Check and replace the O-ring;
No oil suction, no pressure	Not maintaining pressure	There is dirt on the boost electromagnetic directional valve;	Inspection and cleaning;
		Boosting hydro-cylinder and sealing components damaged;	Replacing seals
		Damage to the cone of	Grinding, cleaning,

		the pressure regulating valve;	and replacement;
		Boost control button, damaged;	Replace button;
	Unpressurized	The direction of motor rotation is incorrect;	Swap power input lines and correct motor direction;
		The oil level is too low and cannot be sucked in;	Regularly check the oil in the tank and add oil to the specified line on the oil label;
		The high viscosity of the oil causes the blade pump and blades to move inflexibly;	Replace with low viscosity (equivalent to ISOVG46, 56, 68, oil liquid);
Pressure gauge malfunction, blockage, inability to reflect pressure;	Measurement, cleaning, and replacement;		
Voltage regulation failure	Relief valve	The valve core is stuck in the fully open position, and the pump outputs no oil entering the system;	Troubleshooting stuck issues;
		The valve core has burrs and dirt;	Inspection, trimming, grinding, cleaning;
		Damping hole blockage;	Cleaning and unblocking damping holes;
		Poor contact between cone valve and valve seat hole;	Repair or replace the cone valve;
		Excessive clearance between valve core and valve body;	Replace the valve core and adjust the clearance;
Severe noise and vibration	Oil pump	The oil suction pipe enters the air and the oil filter is blocked;	Check, tighten, eliminate, clean, and replace;
		Insufficient oil in the fuel tank, inhaling air;	Add hydraulic fluid and follow the specified line according to the oil

			standard;
		The oil pump has been used for a long time, and internal parts such as stator and blades are pulled and worn	Dismantling and repairing blade pumps, adopting grinding and grinding methods, and repairing relevant parts;
	Relief valve	The spring of the relief valve is deformed and does not recover;	Check and replace the spring';
		The damping hole on the valve core is blocked by dirt;	Thread 1mm steel wire through the damping hole of the valve core and clean it;
		Oil viscosity too high;	Properly reduce oil viscosity;
Resonance with others, collision with pipes;	Long oil pipes should be separated from each other;		

11. Hydraulic Device Maintenance and Repair

Inspection Items		Inspection Method	Period	During Inspection		Maintenance Requirements	Repair/Replacement Requirements
				Run	Halt		
Electrical equipment	Motor	Insulation	Measure with a 500 volt megger	1 time/ year		√	The insulation resistance between the ground wire should be above 10M Ω· m; According to the requirements of relevant motor standards;
	Control motor						
	Electrical equipment						

Hydraulic pressure	Hydraulic fluid	Oil mass	Observing the oil level gauge	1 time/day		√	To be in the middle of the specified oil level;	
		Oil temperature	Thermometer	1 time/day	√		Between 20 °C and 55 °C;	
		Cleanliness level		1 time/10 days	√	√	According to hydraulic fluid standards;	

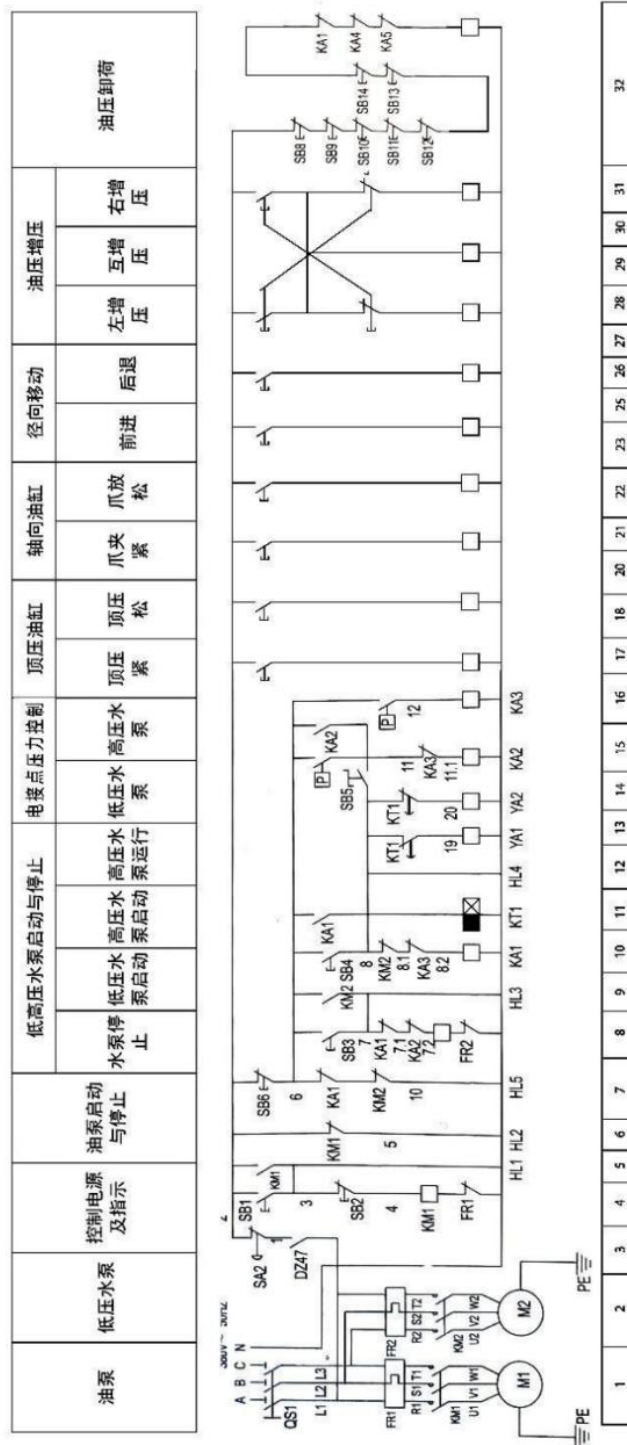
	Pressure gauge	Pressure measurement	metering	1 time/year	√	√	Error within 1/2 of the minimum scale;	Replace the pressure gauge when there is a large error or when the pressure gauge is damaged;
	Solenoid valve	Working voice	Ear listening	1 time/day	√		No abnormal sounds allowed;	Inspection and repair;
		Wear of push rod	Check shape	1 time /year		√	The end machine must not have any wear and tear;	Replace when worn to avoid increased leakage and poor operation;
		Loose screws	Check if the wiring terminals, housing, and screws are loose or detached;	1 time/10 days		√	All parts must not loosen;	If there is looseness, reinstall the screws that have fallen off to avoid causing the coil to burn out and malfunction;

		Condition of moving parts	Check the smoothness of the action	1 time/10days	√		According to design requirements;	Poor operation, check and repair. If the seal is aging, replace it in a timely manner;
	Hydro-cylinder	External leakage	Look with your eyes, touch with your hands	1 time/10days	√		There should be no leakage in all parts;	If there is a leak, replace the sealing ring;
		Internal leakage	Check if the piston seal is leaking	1 time/1s	√		According to the action requirements of the hydro-cylinder;	If the sealing ring ages and leaks internally, replace the sealing ring;

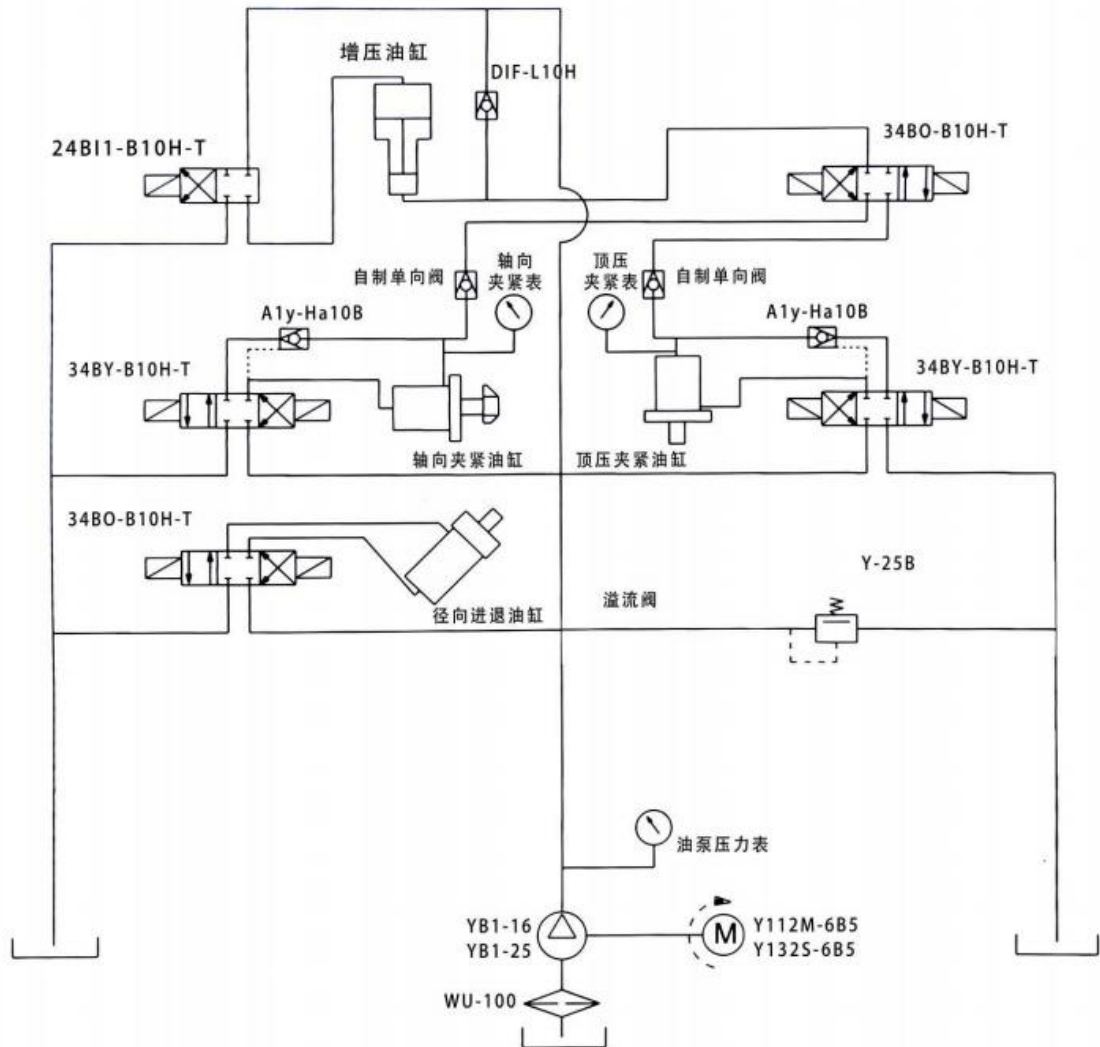
	Hose	External damage	Look with your eyes, touch with your hands	1 time/10 days	√		Cannot be damaged;	When there is damage, replace the hose;
		Oil leakage	Look with your eyes, touch with your hands	1 次/10 days	√		No oil leakage	Replace the O-ring in a timely manner;
		Distort	Look with your eyes	1 time/10 days	√	√	No distortion allowed;	Timely correction of distortion;

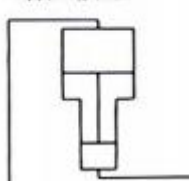
12. Schematic Diagram



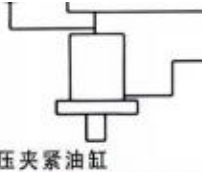

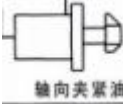

12.1 Electrical Schematic Diagram

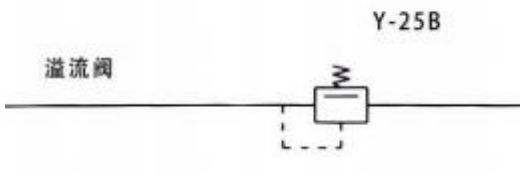



12.2 Hydraulic Schematic Diagram



Number	Picture	Name
1	 <p>增压油缸</p>	Boosting hydro-cylinder

2	<p>轴向 夹紧表</p> 	Axial clamping gauge
3	<p>顶压 夹紧表</p> 	Top pressure clamping gauge
4	 <p>顶压夹紧油缸</p>	Top pressure clamping hydro- cylinder
5	 <p>自制单向阀</p>	Self made one-way valve
6	 <p>轴向夹紧油缸</p>	Axial clamping hydro-cylinder
7	 <p>径向进退油缸</p>	Radial inlet and outlet hydro-cylinder

8	 <p>The diagram shows a horizontal line representing a pipe. On the left side, the Chinese characters '溢流阀' (Relief valve) are written. On the right side, a rectangular symbol with a spring symbol (a zigzag line) above it represents the valve. Above this symbol is the label 'Y-25B'. A dashed line indicates the return path for the valve.</p>	Relief valve
9	 <p>The diagram shows a circular gauge symbol with a needle and a scale. To its right, the Chinese characters '油泵压力表' (Oil pump pressure gauge) are written. A line connects the gauge to the left side of the table cell.</p>	Oil pump pressure gauge

12.3 Schematic Diagram of Water and Gas Boosting Pipeline

