

Operation Instructions

SFBP Series Explosion-Proof Electric-Driven Hydraulic Torque Wrench Pump



Please read these instructions carefully before operating. And keep instructions properly for future reference.



These instructions contain warnings, precautions, operation practices, and troubleshooting for explosion-proof electric-driven hydraulic torque wrench pump station.

These operation instructions are only for the reference of the end users.

I. Receiving Notice (Unpacking Inspection)

Visually inspect all components for shipping damage. Shipping damage is not covered by warranty. If shipping damage is found, notify carrier at once. The carrier is responsible for all repair and replacement costs resulting from damage in shipment.

II. Overview

The SFBP series explosion-proof electric-driven hydraulic torque wrench pump is a kind of independently integral hydraulic device assembled in integrated mode and is composed of power unit, electric units, and control devices, featuring high flow, small volume, light weight, simple structure, easy operations, high operating pressure, and high energy-saving and environmental-friendliness. It's used for explosion-proof applications.

1. It improves the efficiency by at least 50% against common two-stage pump, featuring high speed and high efficiency.
2. The manual directional control mode features better safety and reliability.
3. The EXDIICT4 three-phase motor features high safety, high output torque, low noise, and high efficiency.
4. The electronic control system adopts EXDIICT4 explosion-proof magnetic starter.
5. High capacity aluminum oil tank features better heat dissipation and longer continuous working time.
6. The special pressure regulator valve can guarantee the long-term continuous working and stable pressure.
7. It's capable of start under pressurized state at all times.
8. It features automatic switchover among three flows and three pressure outputs.
9. Two output pressures are provided, of which the high pressure output port (port A) is fitted with high pressure relief valve adjustable within 7~70MPa and the low pressure output port (port R) is fitted with low pressure relief valve regulated at 7MPa at the time of delivery.

III. Safety Instructions

Safety First

The explosion-proof electric-driven hydraulic pump station is a kind of power source. Before use, please carefully read all instructions, warnings, and precautions and abide by the safety measures to prevent personal injuries and equipment damages during operations. SAIVS will not be liable for any damage arising from unsafe or incorrect operations.

In event of abnormality during operations, please turn off the power switch, unplug the power connector, and then consult with SAVIS or SAIVS' authorized dealer.

Please ensure to abide by the following precautions and warnings.

Precautions

1. The hydraulic pump is connected by high pressure hoses, high pressure connectors, and wrenches. Please use the SAIVS supplied high pressure hoses, high pressure connectors, and hydraulic torque wrenches.
2. The used scrap hydraulic oil is an industrial waste. Please have it collected and disposed by an industrial waste processing company.
3. Operating environment: Please operate this pump indoors whenever possible. For outdoors applications, ensure to take the rainproof measures. Applicable for explosion-proof applications.
4. Power supply: Please ensure that the operating voltage of the hydraulic pump is consistent with the operating voltage in the site. The input power of the single-phase power supply shall be at least 3 times of the power of the pump station and the input power of three-phase power supply shall be at least 9 times of the power of the pump station.
5. Hydraulic oil selection: The hydraulic pump adopts 32# wear-resistant hydraulic oil and the working environment temperature is -10~60°C. Under the temperature of <0°C, to prevent the hydraulic oil from freezing the pump, warm up the pump for 10~30min before use. To use this product under -10~-30°C temperature, please replace with corresponding low trademark hydraulic oil.

Warnings

1. While using the hydraulic pump, all personnel must keep away from hydraulic oil outlet to prevent the potential personal and property loss in event of leakage of hydraulic oil. The hydraulic pump station must be away from fire source.
2. Before applying the pressure, ensure to install hose or quick coupling to prevent the spray of high pressure oil from causing personal injuries.
3. The maximum operating pressure of this hydraulic pump station is 70MPa. The low pressure relief valve is set as 7MPa before delivery. It's prohibited to adjust the pressure beyond this value.
4. To operate other equipment by this pump station, it's necessary to adjust the pressure of this pump to the operating pressure of the equipment (The regulated pressure must be less than the maximum operating pressure of this hydraulic pump).
5. Cut off the power supply during repairs.
6. Ensure the grounding of this pump to prevent electric shock.
7. It's prohibited to start the hydraulic pump station without oil, otherwise it will cause equipment damage.
8. Adjust the pressure regulator valve to 0MPa before adjusting the pressure and ensure to increase gradually the pressure during the pressure test.
9. It's prohibited to refit this pump station. If the refitting is absolutely needed, please consult with SAIVS or SAIVS' authorized dealer. All refitting works without the written consent of SAIVS will not be covered by warranty scope.
10. It's prohibited to use this pump station if the temperature of pump station exceeds 85°C. Wait for the pump station to cool before use, otherwise it will impair the life of the pump station.
11. Do not fill the oil to be above the capacity of the oil tank, otherwise the hydraulic oil in the oil tank will overflow to pollute the environment and equipment.
12. When the pressure regulator valve is not to be used for a long time, completely loosen the relief valve to prolong the service life of valve.
13. Ensure the complete engagement (Figure 1) while connecting the quick coupling, in order to ensure that the check valve in the connector is opened to prevent oil line blockage.

Otherwise, the check valve in the connector can't be opened after connection to obstruct the oil line, in which case the pump station is pressurized after the application of pressure and the wrench can't work to probably damage the quick coupling and wrench and even cause personal injuries. For quick coupling, directly insert the male connector into the female connector to the end and then tighten the sleeve. In such case, if the connector can't be inserted to the end, press the directional control valve to unload (Figure 6) and relieve the pressure from the connector, till the steel ball in the connector can be pushed down by hand.

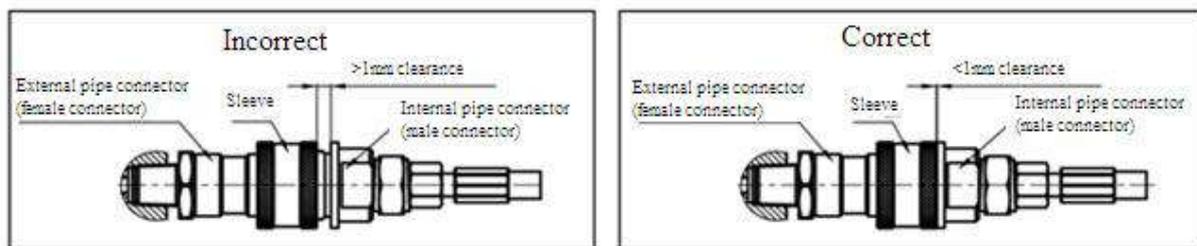
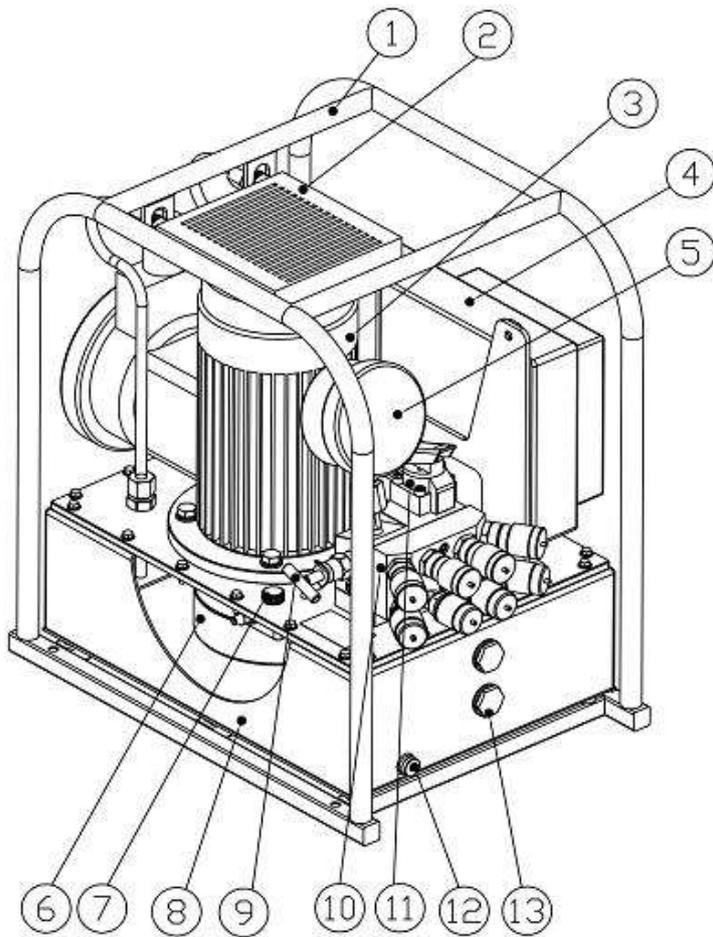


Figure (1)

14. Ensure to keep clean the hydraulic pump station, connecting equipment cylinder, and pipeline, especially the oil outlet and the quick coupling. The dirty hydraulic oil is a main cause leading to malfunction of hydraulic pump.
15. Use 30# or 46# wear-resistant hydraulic oil for the hydraulic pump. It's prohibited to use a hydraulic oil with oil content or corrosive to the steel or aluminum.
16. In event of splash of hydraulic oil into your eyes, flush with clean water immediately for at least 15min and then seek for medical treatment.
17. The hydraulic hoses are wearing parts and are vulnerable to aging and difficult to observe. Therefore, ensure to replace the hoses periodically.
18. Keep away from all positions with possible overflow of super-pressure hydraulic oil and never touch any pressurized hose. The spray of hydraulic oil will cause serious injuries.

IV. Exterior View of Pump Station and Overview of Main Parts



13	Level gauge	1
12	Drainage port	1
11	Directional control valve	1
10	Group valve	1
9	Directional control valve	1
8	Oil tank	1
7	Oil filler and ventilator plug	1
6	Pump head	1
5	Pressure gauge	1
4	Explosion-proof electromagnetic starter	1
3	Motor (See nameplate for parameters)	
2	Cooler subassembly	
1	Protective cage	
No.	Name	Quantity

1. Protective cage: It's installed on the oil tank for carrying and protection of hydraulic pump.
2. Cooler subassembly: It's functioned to reduce the oil temperature during working of oil pump (The installation of cooler is at the customer's choice).
3. Motor: Explosion-proof motor, it's functioned as the power source (Refer to nameplate for detailed parameters).
4. Explosion-proof electromagnetic starter: It's used to control the direct start of motor and play the protection role against the overload and phase loss of the motor.
5. Pressure gauge: This pressure gauge indicates the operating pressure of hydraulic pump, with the measurement range at 100MPa and the accuracy at 1MPa.
6. Pump head: This radial plunger pump realizes three-stage flow output.
7. Oil filler and ventilation plug: Oil filler port.
8. Oil tank: It's functioned for storage of hydraulic oil (The oil tank must contain sufficient oil).
9. High pressure relief valve: Also referred to as pressure regulator valve, this relief valve

adjusts the operating pressure of hydraulic pump (The maximum operating pressure is limited at 70MPa at the time of delivery. It's prohibited to adjust the pressure above this maximum pressure).

10. Group valve: The diversified types of hydraulic control valves in the hydraulic system are connected to realize the control on the output and return of the hydraulic oil and guarantee the normal working of system under preset pressure (The installed group valve is at the customer's choice depending on the customer's application).
11. Directional control valve: It realizes the directional control function for output and return of high and low pressure hydraulic oil and the unloading function.
12. Drainage port: It's functioned to drain the hydraulic oil from the oil tank (during replacement of hydraulic oil).
13. Level gauge: It's functioned to observe the level of hydraulic oil, in order to guarantee the supply of the optimal oil volume.

V. Operation Procedure

1. Preparations

- 1) Oil level: Check the pump oil level before start. If the oil level reaches the maximum level of the level gauge (13) (Figure 2), it indicates that the oil tank is full. When the oil level drops to the minimum level, it indicates that the oil refilling is required. In such case, open the oil filler and ventilation plug (7) and slowly add the oil of appropriate volume.

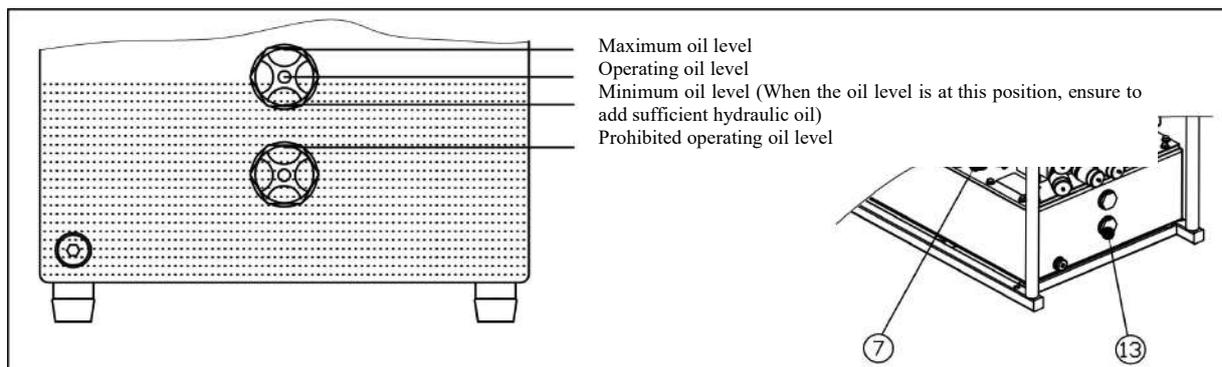


Figure (2)

- 2) Explosion-proof motor: Please provide the power supply as per the designated voltage on the pump nameplate or motor nameplate.

Start of motor: Connect the power supply and press the starter button on the explosion-proof electromagnetic starter to start the motor.

Stop of motor: Press the stop button on the explosion-proof electromagnetic starter to stop the motor and unplug the connector to power off the motor.

- 3) Prestart: The prestart is required for the first operation, after oil replacement or long-term unused of pump station, or under cold weather. Loosen the pressure regulator valve (9) counter-clockwise to complete relief. Start the motor to idle the pump station for a while. After the air in the pump is completely bled and the oil pressure is stable without any abnormality, put the pump into operation. (Notice: Upon detection of any noise, immediately cut off the power supply and consult with SAIVS or SAIVS' authorized dealer).

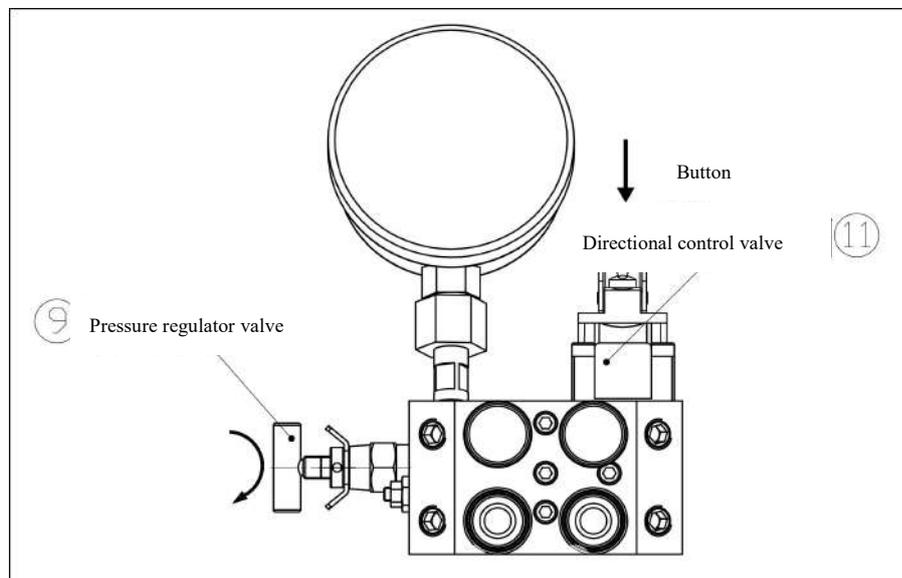


Figure (3)

- 4) Connections of oil lines: Connect the high pressure port (port A) of pump to the high pressure port (port A) of hydraulic torque wrench and the low pressure port (port R) of pump to low pressure port (port R) of hydraulic torque wrench respectively by 70MPa high pressure hoses (Figure 5). Ensure that the quick couplings are connected properly before operations (Figure 1).

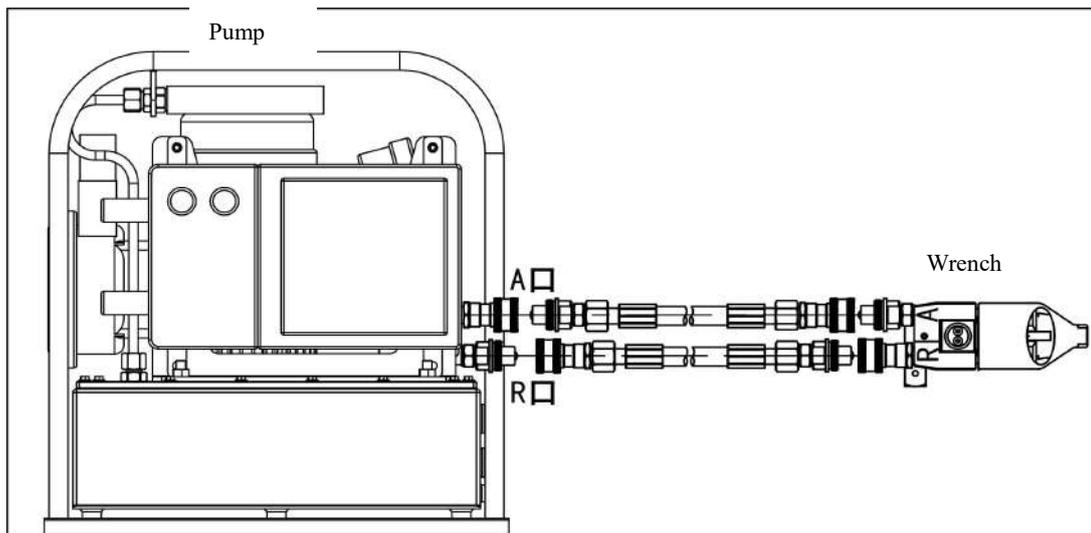


Figure (4)

 **Notice:** Do not loosen any high pressure oil hose during working of pump.

 **Notice:** Do not connect the oil hoses while the pneumatic motor is running.

2. Adjustment of pressure

- 1) Pressure regulation: After the start of motor, completely loosen counter-clockwise the handle of pressure regulator valve (5). In such case, the pressure is almost zero. Then, depress and hold the button of directional control valve (11) and at the same time rotate the handle of pressure regulator valve (5) clockwise to increase the pressure gradually to your desired value.
- 2) Pressure verification: After the proper adjustment of pressure, press the button of directional control valve (11) again to verify the pressure.

 **Notice:** When the pump is not to be used for a long time, completely loosen the pressure regulator valve counter-clockwise to prolong the service life of valve.

 **Warning:** Adjust the pressure before placing the wrench onto the head of nuts or bolts. The pressure setting of the pump shall not exceed the pressure required to meet the demanded torque. Exceeding the demanded torque will probably damage the equipment and cause serious personal injuries.

3. Operations

- 1) Operation of wrench: After the above-mentioned preparations and pressure regulation, depress and hold the button of directional control valve (11) so that the pump station outputs high pressure oil to operate the wrench and release the button so that the pump station outputs low pressure oil to return the wrench.
- 2) At completion of operation: Press the stop button on the explosion-proof electromagnetic starter to stop the rotation of motor, unplug the power plug, and disassemble the high pressure hoses and install the dust caps.

VI. Maintenances

1. Maintenances before operations

- 1) Before operations, check all electric parts for presence of looseness and poor contact. If yes, repair immediately.
- 2) Check the motor for proper grounding. Ensure that the motor is reliably grounded.
- 3) Check whether the operating voltage in the site is within $\pm 10\%$ of the specified voltage of the hydraulic pump and whether the voltage is stable. If the operating voltage is below the specified voltage of the pump station, the pump station will automatically cut off power supply due to under-voltage protection.
- 4) Check whether the hydraulic oil level reaches the specified level. If insufficient, timely add hydraulic oil.
- 5) Check the piping and equipment for presence of oil leakage. In event of oil leakage, determine the cause and treat accordingly.
- 6) Upon detection of electric leakage in the equipment, immediately turn off the power supply and solve the malfunction before use, otherwise it will cause personal safety accidents.

2. Maintenances during operations: Upon detection of any abnormality in the following checking items, immediately stop the pump station for treatment.

- 1) Check for presence of abnormal noise, vibration, and smell and check for presence of clearly reduced speed during the working of motor (pneumatic motor).

- 2) Check for presence of abnormality during the pressure rise.
- 3) Check the hydraulic oil for over-high temperature.
- 4) Check the piping and equipment for the presence of oil leakage.
- 5) Check for serious pressure pulsation ($>5\text{MPa}$).
- 6) Check for reduced rotation speed under high pressure.

3. Maintenances after operations

- 1) Ensure to cut off the power supply after operations.
- 2) Check for presence of oil leakage. Upon detection of any abnormality, determine the cause and treat accordingly.
- 3) After the operations, clean the pump station and install dust caps to quick couplings.

VII. Replacement of Hydraulic Oil

1. Replace the oil after the first 100 working hours and afterwards replace the oil once every 300 working hours. Before oil replacement, fully drain the oil from the oil tank and clear up the oil tank. Under severe working environment, shorten the oil replacement interval depending on the actual conditions.

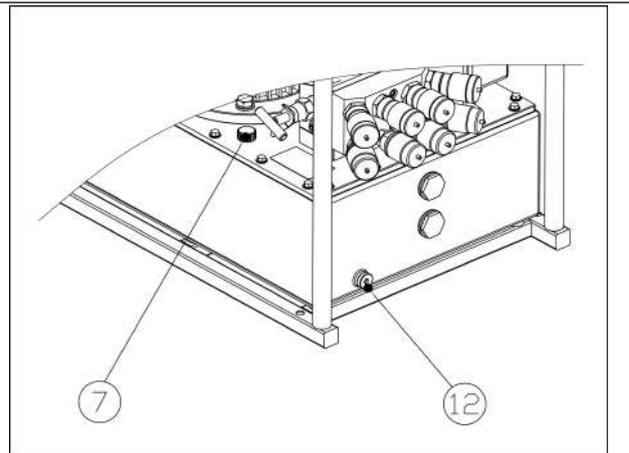


图 (5)

Figure (5)

Detailed operations: Open the oil filler and ventilator plug (7) on the hydraulic pump, unscrew the drainage plug (12) from the side drainage port of oil tank to fully drain the hydraulic oil into an appropriate container, and then clean and reinstall the drainage plug (Figure 5).

2. When necessary, disassemble the oil tank and clean the inside of oil tank and the pump head filter screen.

Detailed operations: Unscrew 18 connecting screws between oil tank cover plate and oil tank body. In such case, the entire pump head can be taken from the oil tank. Disassemble the pump head filter screen, clean the filter screen by solvent and a soft brush, and then reinstall the cleaned filter screen.

VIII. Specification

Model	Name	Flow (high/medium/low) L/min	Pressure (High/medium/low) MPa	Input power HZ	Motor power	Standard power cable length (m)	Net weight (Kg)	Capacity of oil tank (L)	Overall dimensions (mm)
SFBP400	Explosion-proof hydraulic torque wrench pump	0.85/1.7/8	70/28/7	380V/50 HZ	1.1KW	5	50	17	490*350* 470

IX. Troubleshooting

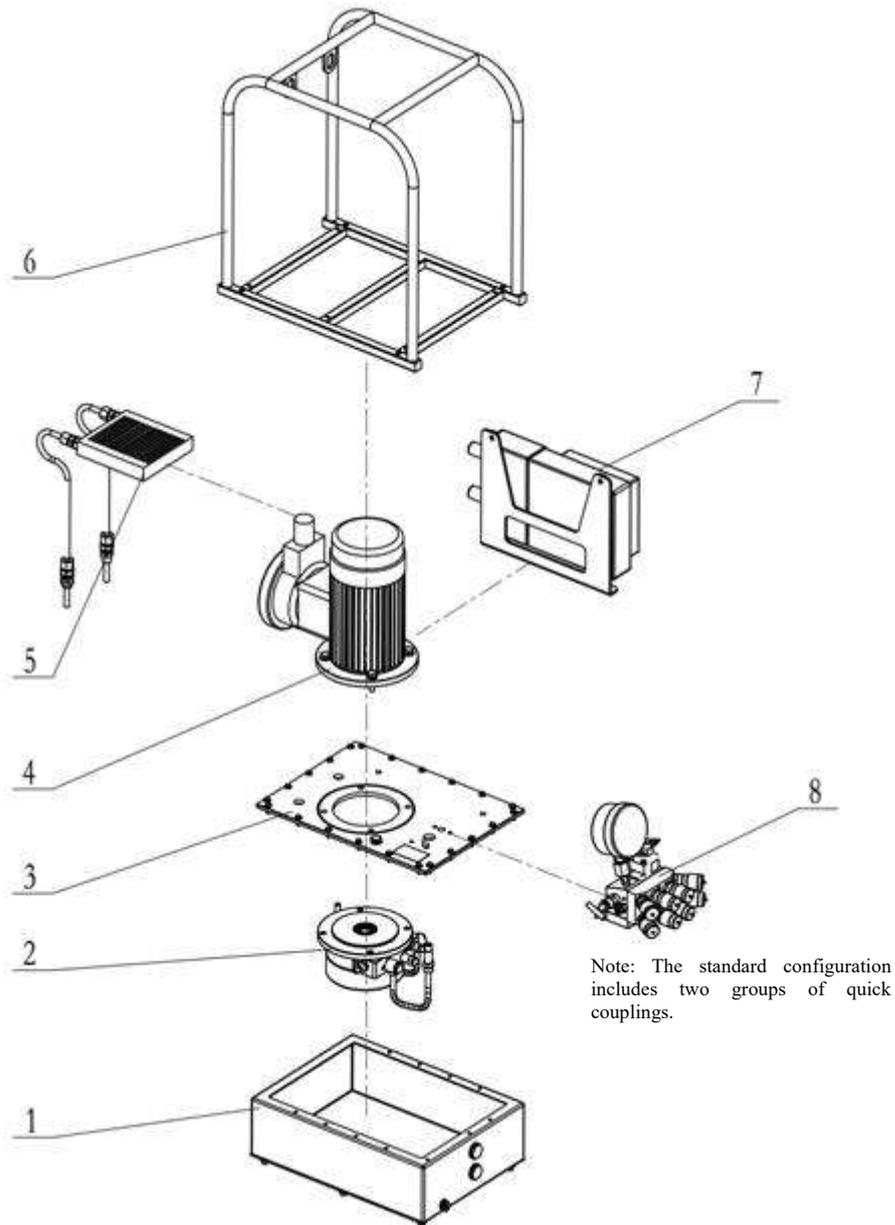
Symptom	Malfunction analysis	Solution
Start failure of pump station	1. Inconsistency between voltage and specified voltage of this pump station	1. Ensure the consistent voltage
	2. No power supply for motor	2. Check all parts and ensure that the power supply is supplied.
	3. Damage of motor	3. Replace motor
No system pressure	1. No oil or insufficient oil in oil tank	1. Add hydraulic oil to specified level.
	2. Low pressure setting of relief valve	2. Adjust relief valve to required pressure.
	3. Blockage due to dirty oil	3. Replace hydraulic oil and clean hydraulic pump and filter screen.
	4. No oil suction of plunger pair	4. Open air bleeding valve (AIR VENT) to bleed air from pump head and ensure that the pump head is full of hydraulic oil (See Air Bleeding in Operation Procedure).
Failure of rated system pressure	1. Low pressure setting of relief valve	1. Adjust to rated pressure.
	2. Serious wear of plunger pair	2. Replace plunger pair.
	3. Serious wear of directional control valve core	3. Replace directional control valve.
	4. Damage of relief valve	4. Replace relief valve.
	5. Air content in system	5. Operate repeatedly to fully bleed air.
	6. Blockage of directional control valve by dirt	6. Clean directional control valve
Unstable system pressure	1. Dirty oil	1. Clean pump station and replace hydraulic oil.
	2. Damage of relief valve	2. Replace relief valve.
	3. Serious wear of plunger pair	3. Replace plunger pair.
	4. Air content in system	4. Operate repeatedly to fully bleed air.

	5. Blockage of directional control valve by dirt	5. Clean directional control valve
Slow return speed of driven wrench		1. Replace with shorter oil hoses.

Note: If the above-mentioned problems can't be solved, please timely contact SAIVS or SAIVS' authorized dealer for troubleshooting by professionals.

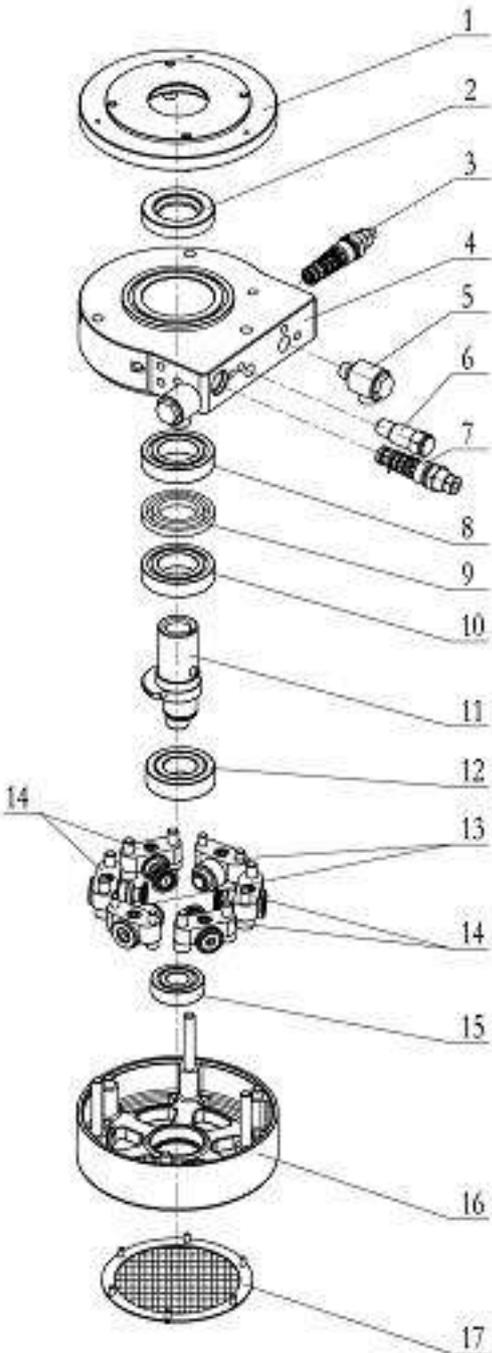
X. Explosive View of Hydraulic Pump

Assembling Explosive View of Pump



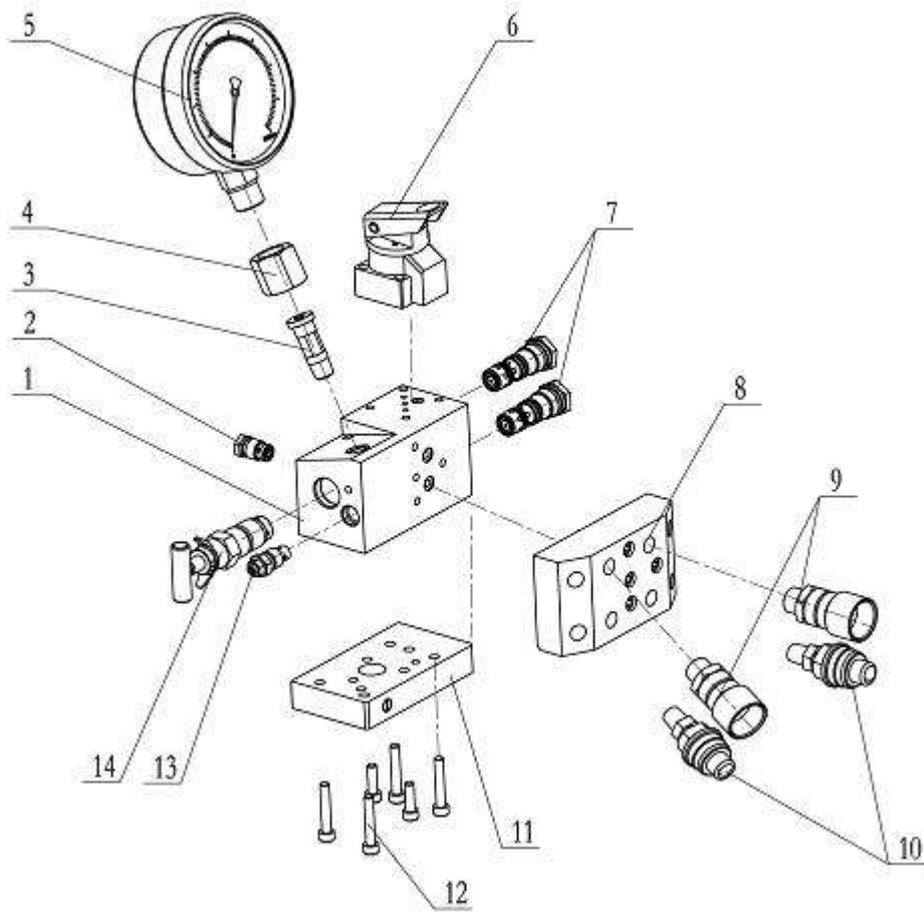
5	Air cooler subassembly	10	
4	Explosion-proof motor	9	
3	Oil tank cover	8	Integrated subassembly
2	Pump head	7	Explosion-proof electromagnetic starter
1	Oil tank subassembly	6	Protective cage
No.	Name	No.	Name

Explosive View of Pump Head



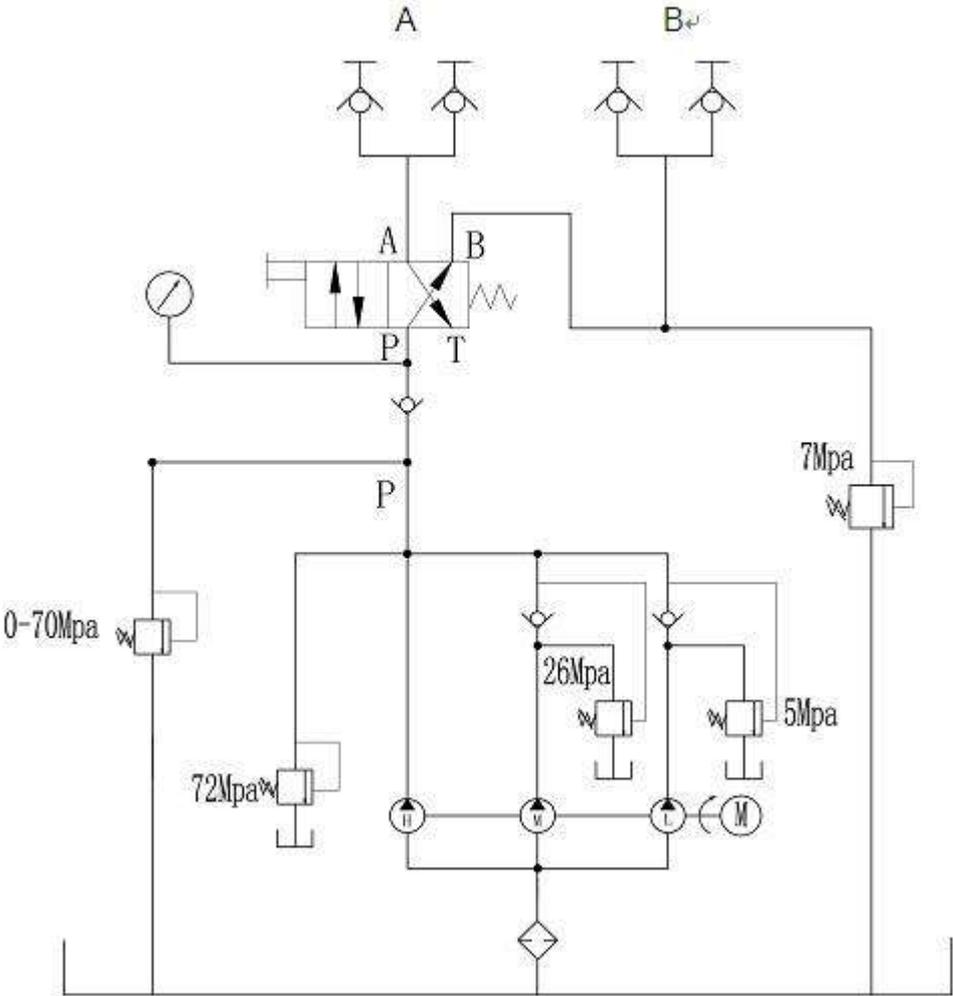
No.	Name
1	Flange
2	TC framework oil seal
3	Base
4	High/medium pressure switchover valve
5	Two-way connector
6	Safety valve
7	High/low pressure switchover valve
8	Deep groove ball bearing
9	Washer
10	Deep groove ball bearing
11	Crankshaft
12	Cylindrical roller bearing
13	Plunger pair 1
14	Plunger pair 2
15	Deep groove ball bearing
16	Bearing block
17	Filter screen

Explosive View of Manifold Block (with Hawe valves)



8	Quick coupling mounting plate	16	
7	Hydraulic directional control valve	15	
6	Manual directional control valve (Hawe valve)	14	High pressure relief valve
5	Pressure gauge	13	Low pressure relief valve
4	Nut	12	Hexagon socket cylindrical head screw M6*20
3	Pressure gauge connector	11	Transition plate
2	5-way check valve	10	Male connector
1	Valve block	9	Female connector
No.	Name	No.	Name

XI. Hydraulic Schematic Diagram of Pump Station



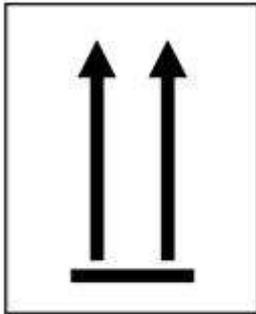
Schematic Diagram

Notice: The above parameters are the settings before delivery, of which the high pressure relief valve at port A can be set by the customer depending on own demands and other parameters are prohibited for adjustment.

XII. Transport

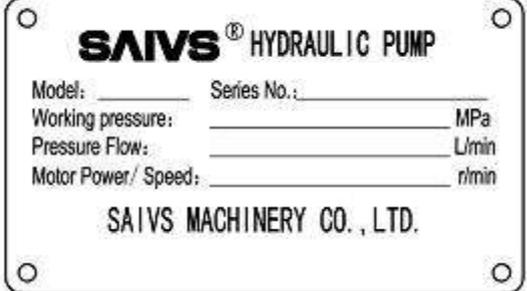
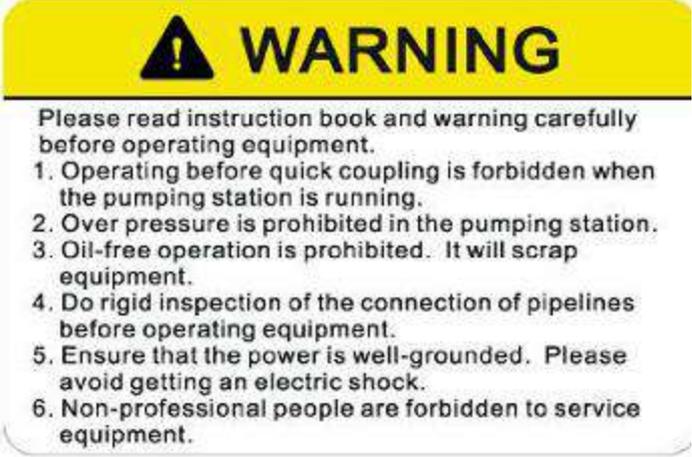
Transport precautions:

- 1) Handle with care during handling.
- 2) During loading and transport, face the product vertically upward and take the moist-proof measure, as shown in the figure:



- 3) Generally, handle the product by hand or trolley.

XIII. Warning Sign and Nameplate

Name	Description	Sticking location
Nameplate	 <p>SAIVS[®] HYDRAULIC PUMP Model: _____ Series No.: _____ Working pressure: _____ MPa Pressure Flow: _____ L/min Motor Power/ Speed: _____ r/min SAIVS MACHINERY CO., LTD.</p>	On oil tank cover plate
Warning sign	 <p>! WARNING</p> <p>Please read instruction book and warning carefully before operating equipment.</p> <ol style="list-style-type: none"> 1. Operating before quick coupling is forbidden when the pumping station is running. 2. Over pressure is prohibited in the pumping station. 3. Oil-free operation is prohibited. It will scrap equipment. 4. Do rigid inspection of the connection of pipelines before operating equipment. 5. Ensure that the power is well-grounded. Please avoid getting an electric shock. 6. Non-professional people are forbidden to service equipment. 	Back face of oil tank

Note:

- 1. Our company reserves the modification right for these operation instructions of this explosion-proof pump without further notice.**
- 2. For more detailed information, please contact our company.**

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