

Operation Instructions

SPS Series Hand Hydraulic 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 SPS series hand hydraulic pump.

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. Warnings and Precautions

Safety First

Please carefully read and understand the operation contents of these instructions before use and abide by these operation rules to prevent the personal injuries and equipment damages during operations of the equipment. ASIVS will not be liable for any damage arising from the incorrect operations.



Notice: This series pump adopts 32# wear-resistant hydraulic oil as the working medium. The oil must be filtered by GFW0.045 wire filter screen before use and it's prohibited to replace with any working medium of other trademark.



Notice: Before operations, please observe the oil level of the oil tank. Generally, the oil level shall be approximately 1cm reach from the oil inlet. Add the oil from the filler port of the oil tank. Do not top up the oil tank, in order to prevent the overflow of oil from oil inlet.



Notice: This series hand pump is suitable for the operations within 5~35°C.



Notice: For a cylinder with gravity return function, ensure to apply an external force to the top of piston rod to retract the piston rod.



Warning: During the disassembling and installation of quick couplings and high pressure hoses, operate strictly as per specified procedures, otherwise it will easily cause damages. At completion of use, disassemble the high pressure hoses and install dust caps to the connectors on both ends to prevent the ingress of impurities from blocking the pipeline. The bending radius shall be higher than 200mm for 70MPa high pressure hoses (no matter these hoses are used or not) and shall be higher than 300mm for 125MPa high pressure hoses.



Warning: The user shall check periodically depending on the working condition. In event of malfunction, please contact our company as soon as possible. Do not check, repair, disassemble, or assemble by self, otherwise our company will not be liable for any adverse consequence arising thereof.



Notice: During the frequent operations, generally clean the oil filter once every two months and clean the oil tank and replace with new oil once a half year.



Warning: The pressure of safety valve for the hand pump is properly set before the delivery. The user is prohibited to increase this pressure setting.



Danger: It's prohibited to add oil into the oil tank while the hydraulic pump is working, in order to prevent the overflow of oil from polluting the environment.



Warning: It's prohibited to drag the equipment by connected high pressure hoses.



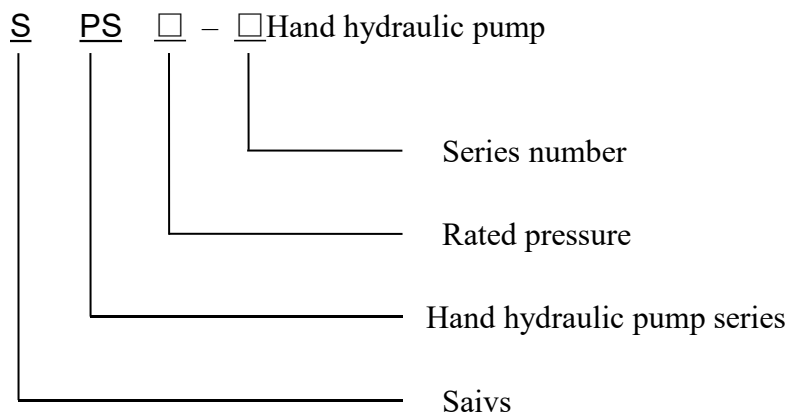
Warning: The high pressure equipment can generate strong forces. Ensure to keep highly alerted during operations. Bear in mind that the hydraulic filled into the hand pump oil tank is free of pressure originally and the hydraulic return oil contains a pressure.

III. Overview

SPS series super-pressure hand hydraulic pump (hereafter referred to as hand pump) is a new portable hydraulic pump developed independently by our company. Featuring novel design, compact shape, and portable convenience, it's especially suitable for the mobile applications.

- The double-speed acting design and the built-in high-precision high/low pressure automatic changeover valve can provide a high flow at low pressure to charge the oil rapidly, save the time, and improve working efficiency.
- The double plunger sleeve guide design can ensure stable force application for compression bar and low force application for handle. Compared with the pumps of same pressure grade, it can reduce the application force of handle by approximately 30% and greatly relieve the labor strength.
- It's made of aviation Al-Ti alloy, featuring light weight, high strength, and high corrosion and impact resistance. It can work together with the single-acting thin cylinder manufactured by our company and is suitable for the hydraulic tests for industrial and mining sites, workshops, and labs.

IV. Model Description



V. Technical Specification

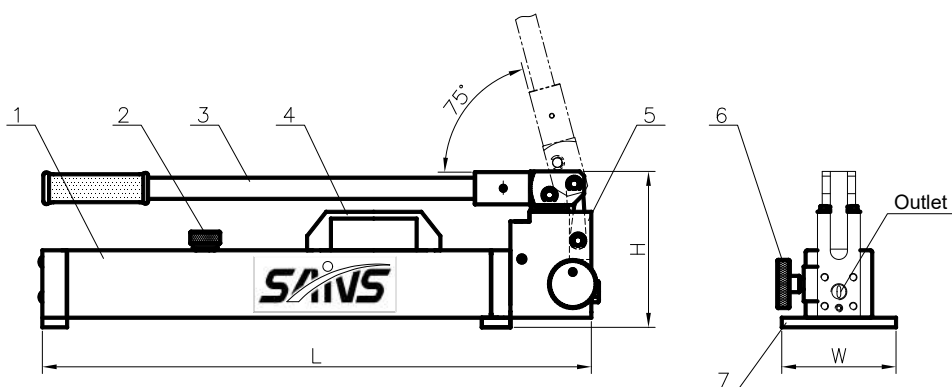


Figure (I)

1- Oil tank 2- Oil filler and ventilator plug 3- Handle 4 - Handle 6 - Unloading valve 7 - Base

Item	Rated pressure (MPa)		Oil output per stroke (cm ³)		Capacity of oil tank (cm ³)	Usable oil volume (cm ³)	Applied force of handle (N)	Overall dimensions				Weight (kg)
	Low pressure	High pressure	Low pressure	High pressure				L	W	H	Output interface	
SPS7-0.7	2.5	70	32	2.5	720	655	300	520	133	119	NPT3/8"	5.3
SPS7-1					1670	1440		577	120	170		6.3
SPSD7-2					2400	2200		539	146	170		8
SPS7-3					3580	3240		582	200	170		10
SPS7-4					6480	5860		667	250	172		14.5
SPS7-8					8000	7500		742	308	270		27
SPS10-1	1.5	100	32	2.5	1670	1440	350	577	120	170	G1/4"	6.3
SPS10-2					2259	1980		577	120	170		8
SPS10-3					3580	3240		577	140	190		10
SPS16-1	1.5	160	32	2.5	1670	1440	375	577	120	170	G1/4"	6.3
SPS16-2					2259	1980		577	120	170		8
SPS16-3					3580	3240		577	140	190		10

VI. Working Principle and Hydraulic System

1. Hydraulic System Diagram

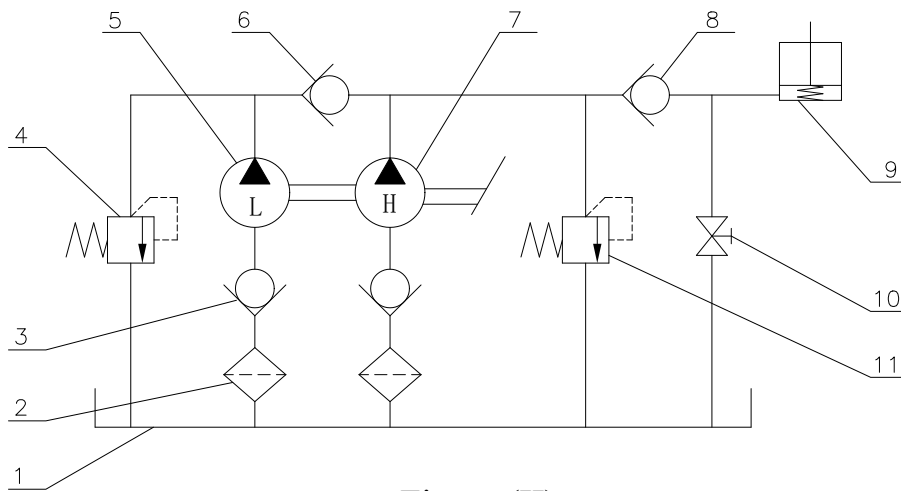


Figure (II)

1 - Oil tank 2 - Oil filter 3 - Check valve 4 - Low pressure relief valve 5 - Low pressure pump 6 - High/low pressure changeover valve 7 - High pressure pump 8 - Oil outlet check valve 9 - Cylinder 10 - Unloading valve 11 - Safety valve

2. Working Principle

SPS series hand pump is a device that manually converts mechanical energy to hydraulic energy. This pump adopts double speed design (See Figure II), of which there are two piston diameters (large and small). At the start of operations, due to low pressure in oil line, the low pressure pump 5 mainly supplies a great amount of pressure oil to rapidly fill the oil line (step 1: Low pressure and high flow). Under loaded condition, the pressure increases. When the low pressure setting is exceeded, the valve 6 closes and the low pressure relief valve 4 opens so that the low pressure oil returns to oil tank. In such case, the high pressure pump 7 supplies low-flow high-pressure oil to drive the operations of cylinder 9 (step 2: High pressure and low flow).

VII. Skills for Choice of Pump

- (1) Choose pump based on control mode: This series pump only has one oil delivery port that is controlled by three-way valve (unloading valve) so that it's only applicable for single-acting cylinder. However, based on the operating needs, the two-way valve, four-way valve, and corresponding pressure gauges can be installed to prevent the overload from damaging the equipment.
- (2) Choose pump based on required oil volume: Estimate the required oil volume. The usable oil volume of the pump must be capable of fully filling the oil line and cylinder. If a great amount of oil is required to fully fill the system and enable the piston to come into contact with the weight, it's recommended to choose a high-flow low-pressure pump. The hand pump is recommended for low-speed operations. If the high-speed operations are required, it's recommended to select an electric pump (A super-pressure electric pump manufactured by our company may be chosen).

VIII. Operation Methods and Maintenances

1. Threaded connections: The threads of the oil ports for this series hand pump are of NPT3/8" or G1/4" and the corresponding connectors or two-way or three-way connectors shall be installed. During the tightening, notice not to damage the threads and wrap the threads by thread table, instead of hemp rope or cloth strip, in order to prevent contaminating the oil.

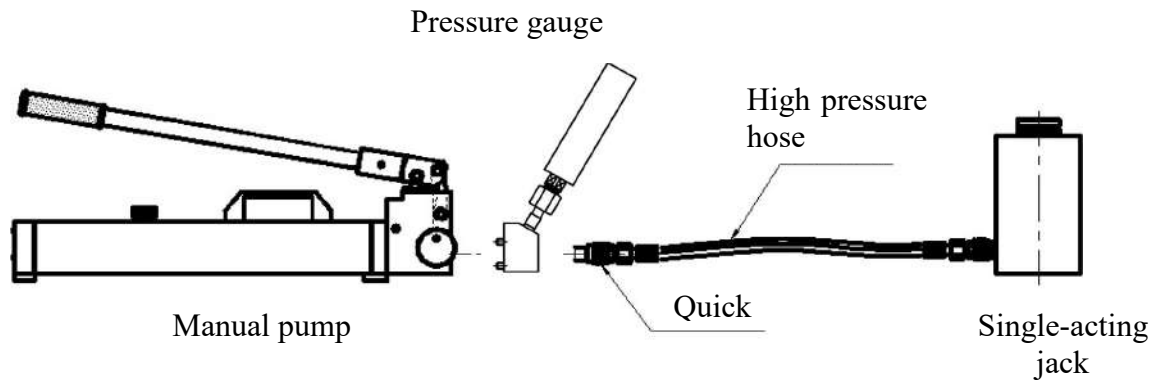


Figure (III)

2. Pipeline connections: As shown in Figure III, connect the hand pump to single-acting cylinder or other hydraulic device by high pressure hoses with quick couplings. The connection method for quick coupling is shown in figure (IV) below: Directly connect the male connector with the female connector axially to the end and then tighten the sleeve. To detach the quick coupling, unscrew the sleeve, pull out the female (male) connector axially, and install the dust caps.

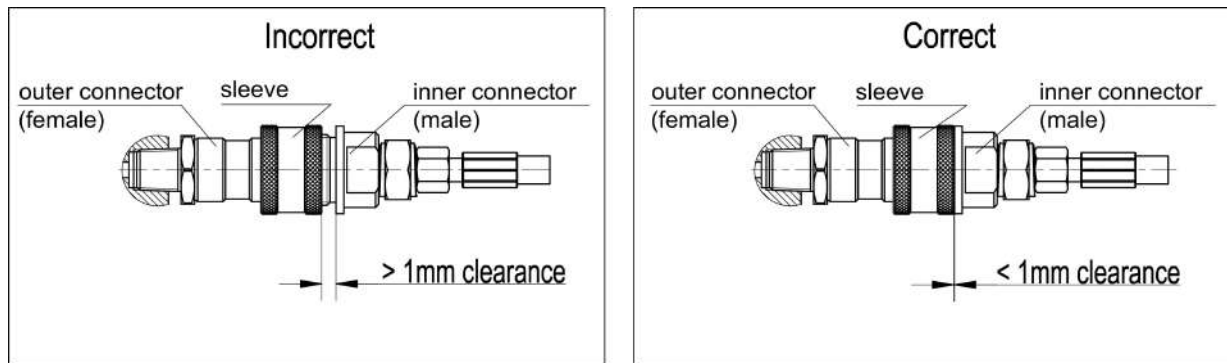


Figure (IV)



Warning: Ensure the complete engagement 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 connected coupling can't open to cause obstructed oil line.



Notice: Ensure to apply the force axially during the disassembling and assembling, in order to prevent damaging O-rings or blocking the external hose connectors.



Notice: Keep clean the hose connectors against the ingress of impurities into pipeline, otherwise it will lead to pipeline leakage or blockage.



Notice: Do not loosen any high pressure oil hose during the running of pump.

3. Correct Operations:

- (1) A base is installed beneath the oil tank of this series hand pump (As shown in Figure V). During operations, fix the base to other object by bolts. For horizontal placement, the base may not be fixed, provided that the base is placed stably, in order to prevent rollover during operations.
- (2) The circulation direction from pump to hydraulic circuit (oil delivery) or from circuit to pump (oil return) is controlled by the control valve on the hand pump head. As shown in Figure V, the pump is fitted with two-way valve (thru valve) to operate the single-acting cylinder or spring compression: The pump head only has one oil delivery port. When the valve hand wheel is tightened clockwise completely, repeatedly apply force to the handle to compress oil into oil line. Loosen the hand wheel counter-clockwise to return oil into oil tank. When the hand wheel is loosened, the handle is in neutral position so that the oil returns into the oil tank immediately.
- (3) During operations, stably shake the handle to prevent the impact symptom in the oil line, in order to guarantee the durable working of valves. To reduce the pressure, slowly rotate the hand wheel of two-way valve and do not reduce the pressure too fast.
- (4) Air bleeding of equipment: During the operations of this pump, ensure to loosen

the oil filler and ventilation plug on the oil tank to prevent the formation of vacuum pressure in the oil tank from causing oil output failure.

In event of air ingress into the equipment, bleed the air easily as per the following instructions:

- Continuously operate the pump, till the stroke of the cylinder piston is completed.
- Overturn the cylinder to place the head onto the ground.
- Place the pump higher than the cylinder.
- Open the valves of pump.
- Compress the bottom of cylinder to retract the piston so that the air flows from cylinder and oil hoses into the oil tank and stays into the oil tank to eliminate all inconveniences.

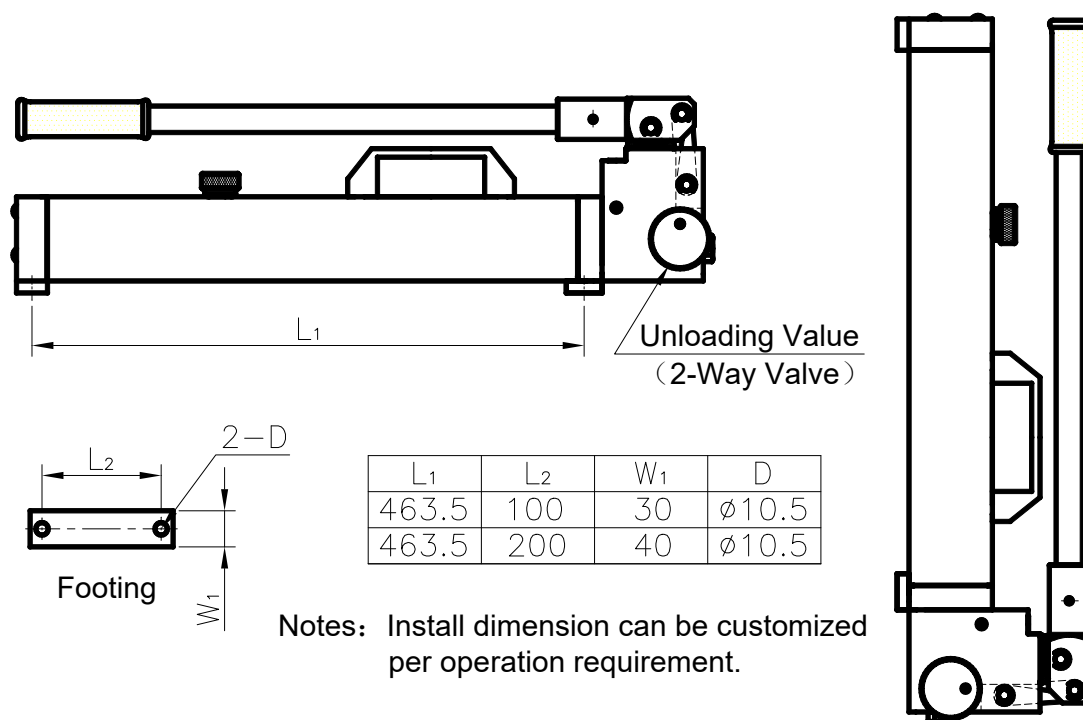


Figure (V)

IX. Troubleshooting

1. No lifting of cylinder piston

- Damage of pump high pressure relief valve and elasticity loss or breakage of spring: Notify our after-service department for repair.
- Direct return of pressure oil into oil tank due to non-tightened two-way valve: Check and tighten the two-way valve.
- Insufficient working capacity of cylinder: Replace with cylinder of other model.

2. Incomplete lifting of cylinder piston

- Air content in system: Bleed air as per above-mentioned procedure.
- Insufficient oil volume of pump: Add hydraulic oil.
- Oil volume of cylinder beyond oil tank: Replace with hand pump of higher oil volume.

3. Pressure maintaining failure of cylinder piston

- Damage of valve: Notify our after-service department for repair.
- Leakage due to aging or damage of cylinder seals: Replace seals.

4. Incomplete or slow return of cylinder piston

- Leakage of hydraulic oil at hose connectors: Check connectors for correct connections and, if damaged, replace hose or connector.
- Closed two-way valve of hand pump: Open valve.

5. Slow pressure reduction during static pressure operations

- Leakage due to ageing or damage of seals: Check all sealed positions and replace seals.

6. Interrupted oil supply of pump, with noise

- Insufficient oil volume or air content in oil tank: Bleed air from circuit and add oil.
- Blockage of oil suction port: Clear impurities from oil suction port.
- Reduced air pressure in oil tank due to closed oil filler and ventilation plug: Loosen oil filler and ventilator plug.

7. Automatic bounce of plunger and compression bar

- Damage of oil inlet or outlet check valve: Check and repair check valve.
- Blockage of pipeline due to dirty oil: Clean oil filter screen, dredge pipeline, and filter or replace hydraulic oil.

Note:

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

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