

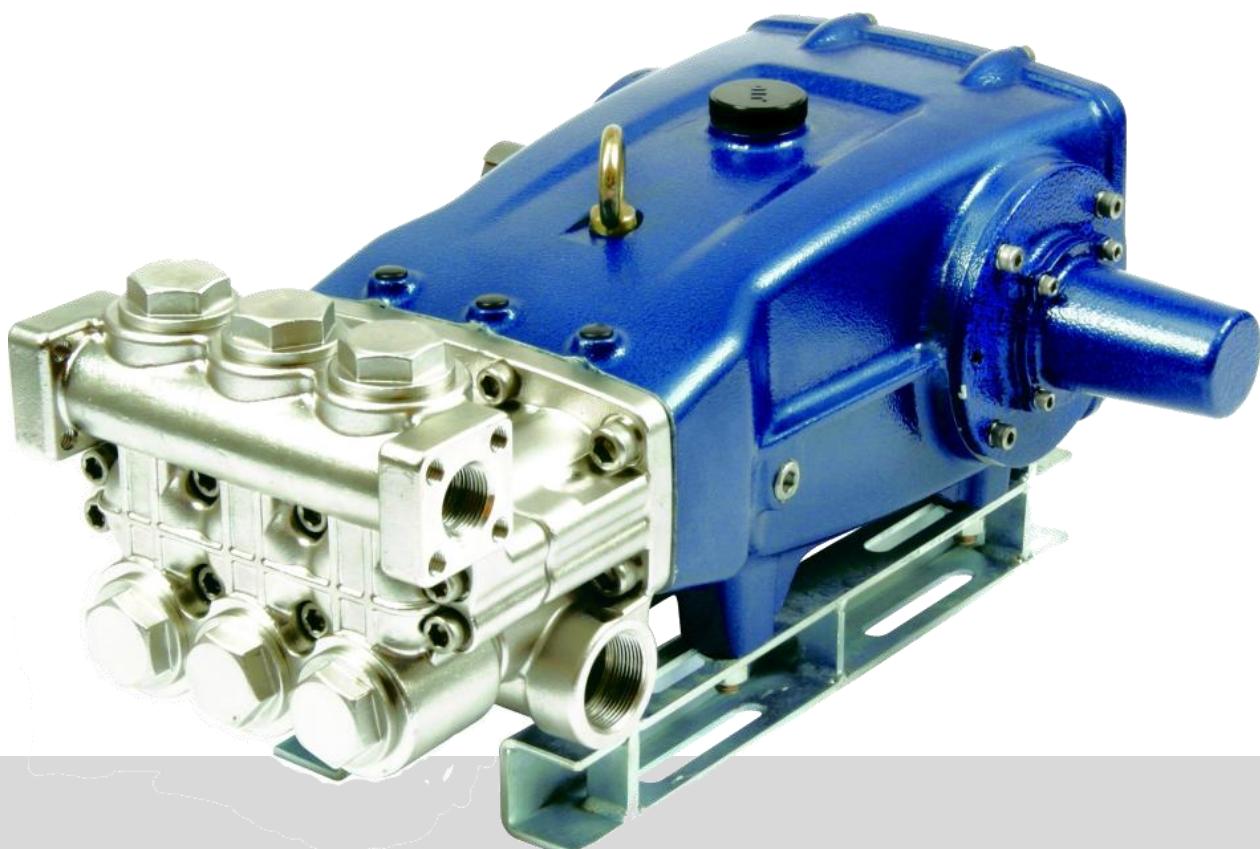
物理農業機械股份有限公司

**WULI AGRICULTURE MACHINE CO., LTD.**

動力噴霧機、高壓清洗機、微霧系統、高壓泵浦專業設計製造

**WH-WS-12140 SERIES USER'S MANUAL**

**WH-WS-12140 系列 操作手冊**



感謝您購買物理產品，使用前請詳閱本說明。

Thank you for choosing our product.

Please read the manual before use.

2026.01V

W U L I   A G R I C U L T U R E   M A C H I N E   C O . ,   L T D .

## General Safety Information

1. **WARNING: Use a pressure relief device on the discharge side of the pump to prevent damage from pressure buildup when the pump discharge is blocked or otherwise closed and the power source is still running. For trigger gun operation, or where discharge is frequently shut off, pressure unloader valves are recommended. FAILURE TO FOLLOW THIS WARNING MAY RESULT IN PERSONAL INJURY AND/OR PROPERTY DAMAGE AND WILL VOID THE PRODUCT WARRANTY.**
2. **WARNING: Do not pump flammable or explosive fluids such as gasoline, fuel oil, kerosene, etc. Do not use in explosive atmospheres. The pump should be used only with liquids that are compatible with the pump component materials. Failure to follow this warning may result in personal injury and/or property damage and will void the product warranty.**
3. Do not run the pump faster than maximum recommended speed.
4. Do not pump at pressures higher than the maximum recommended pressure.
5. The maximum liquid temperature is 160°F(70°C).
6. Make certain that the power source conforms to the requirements of your equipment.
7. Provide adequate protection in guarding around the moving parts such as the shaft and pulleys.
8. Disconnect the power before servicing.
9. Release all pressure within the system before servicing any component.
10. Drain all liquids from the system before servicing any component.
11. Secure the discharge lines before starting the pump. An unsecured line may whip, causing personal injury and/or property damage.
12. Check the hose for weak or worn condition before each use. Make certain that all connections are tight and secure.
13. Periodically inspect the pump and the system components. Perform routine maintenance as required. (See Maintenance section.)

### **WARNING: RISK OF ELECTRIC SHOCK!**

To reduce the risk of electric shock, adequately ground the electric motor to a grounded metal raceway system, or use a separate grounding wire that is connected to bare metal on the motor frame or to the grounding screw located inside motor terminal box; or ground by other suitable means. Refer to the most recent National Electric Code (NEC) Article 250 (Grounding) for additional information. **ALL WIRING SHOULD BE PERFORMED BY A QUALIFIED ELECTRICIAN.**

### **WARNING: Do not handle a pump or pump motor with wet hands or when standing on a wet/damp surface or in water.**

14. Use only pipe, hose and fittings rated for the maximum psi rating of the pump. If an unloader is used, then the pipe should be rated for pressure at which the unloader operates.
15. Do not use these pumps for pumping water or other liquids for human or animal consumption.

## Unloader Valve Safety Information

1. Always size your unloader valve to match the capabilities of your system for pressure (psi) and volume (gpm).
2. In rigid-piped systems, a pulsation dampener or accumulator **MUST** be installed in the system. Select a dampener which conforms to the rated capacity.
3. Never replace the main spring with one of heavier tension to increase pressure. Never add washers to increase spring tension.
4. Always replace safety shield caps.
5. Secure all locking devices to eliminate the unloader from vibrating out of adjustment during operation.

## Belt/Pulley Drive Installation

This pump was designed for rotation in one direction, which is toward the pump head when looking at the top of the pulley. There is a rotation direction sticker located on crankcase bearing cover. Reverse rotation is acceptable if the oil level is increased by 1/2 quart.

For determining proper pulley sizes, use the formula below as a guideline and use "A" or "B" section belts.

$$\text{MOTOR RPM} = \text{FLOW (@RATED SPEED)} = \text{PUMP PULLEY DIA.}$$
$$\frac{\text{PUMP RPM}}{\text{FLOW (DESIRED)}} = \text{MOTOR PULLEY DIA.}$$

EXAMPLE: : Use a 1725 rpm electric motor to drive the pump at 800 rpm.

A typical pulley diameter on the motor is 7.25 inches. The pump pulley diameter can be determined from the formula above:

$$\frac{1725}{800} = \frac{\text{PUMP PULLEY DIAMETER}}{7.25 \text{ INCHES}}$$
$$\frac{1725 \times 7.25 \text{ INCHES}}{800} = 15.6 \text{ INCHES}$$

1. Install the pulley or bushing/sheave combination (See Figure 1) onto the pump and motor shaft. Mount the pump next to the motor making sure the pulleys are lined up properly. Use a straightedge as shown in Figure 2. Rotate to check for runout and bent shafts.
2. Install belt(s) and use slots in the pump mounting rails to tighten the belts. Make sure the belts have proper tension. Belts that are too tight will cause bearing wear, and belts that are too loose will cause slipping. (See Figure 3.)

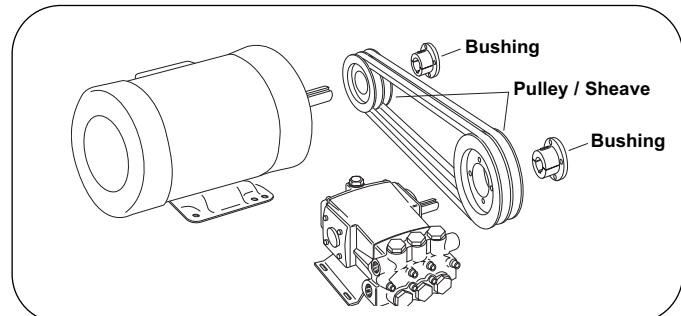


Figure 1

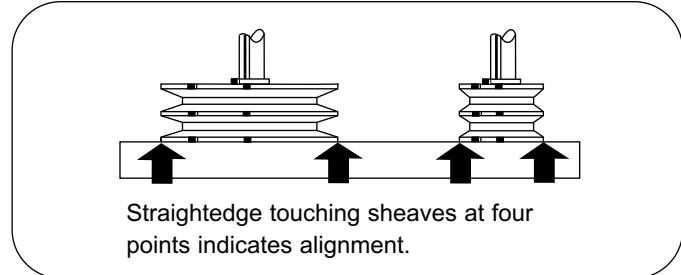


Figure 2

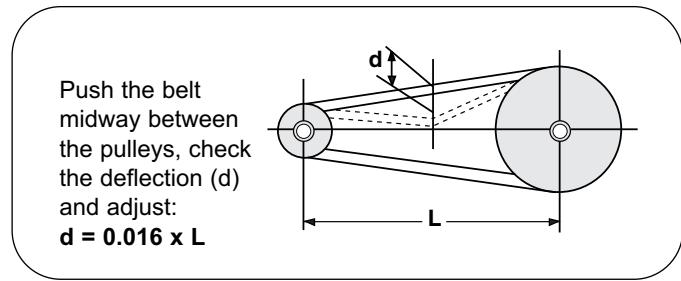


Figure 3

## System Installation

1. In general, select an adequate size drive unit to avoid overloading. Avoid unnecessary restrictions in the line such as elbows, check valves, and all extraneous curves and bends.
2. Avoid using a looped section which might permit air to become trapped.
3. Use pipe joint sealant on the pipe threads to assure airtight connections.
4. **Selection of the right type and size of hose is vital to good performance. Be sure to hook the lines to the proper ports on the pump.**
5. Always use genuine suction hose of at least one size larger than the inlet port of the pump. If the suction (inlet) hose is more than four feet long, use the next larger size.
6. Use one or two braid reinforced hose to prevent collapse of suction line.
7. Use only approved, high pressure hose on the discharge side, and make sure all connections are tight.

**NOTE:** Use only pipe, fittings, accessories, hose, etc. rated for the maximum pressure rating of the pump.

### Pump

1. Before installing the pump, clean all fittings and hoses.
2. Rotate the pump by hand to make sure it turns freely.
3. Make sure that all hose connections are tight and use the proper size fittings that are capable of safe operation.

**Warning: The pumps are shipped from the factory without oil. Wuli recommends changing oil after 40 hours of break-in operation and every three months or 500 hours, whichever comes first.**

**Use SAE 30~40 weight, non-detergent motor oil.**

**Crankcase capacity: 4.5 Quarts**

### Discharge Side Installation

From the pump to the discharge hose, the following accessories are recommended: a damped pressure

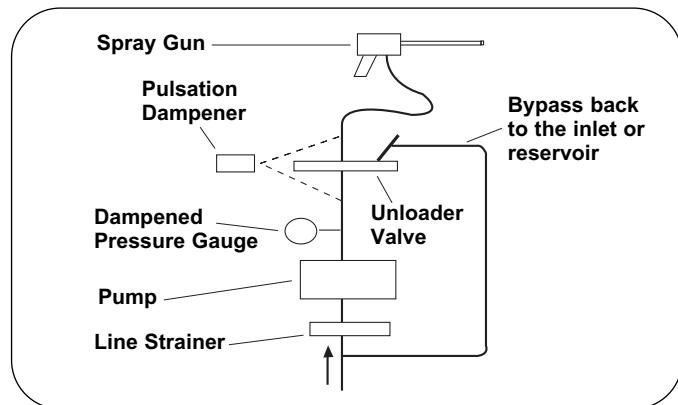


Figure 4

gauge with a face pressure double the maximum operating pressure, an unloader valve, a pulsation damper, an optional pressure gauge to monitor unloader, and discharge hose.

Accessories such as an unloader valve, a pressure gauge, a pulsation damper - should be installed as close to the pump as possible. A hose must be used right after the accessories. If solid piping is used, a two to four foot section of hose must be installed between the accessories and the piping.

### Inlet Side Installation

From the source of liquid to the pump, the following components are recommended: a shut-off valve, a bypass return tee from the unloader, a line strainer, and a compound pressure gauge.

### Inlet Water Supply

Inlet filters should be an 80 mesh screen. Only use flexible hose. Do not use rigid pipe. Optimum pump performance is obtained with a positive lead on the inlet - 15 to 20 psi is ideal - but simply flooded is adequate.

## Operation

**WARNING: DO NOT pump flammable or explosive liquids such as gasoline, kerosene, etc. DO NOT pump corrosive or abrasive liquids because these will cause rapid wear or deterioration of plungers, valves and seals in the pump. The pump should be used only with liquids compatible with pump component materials. Do not exceed the maximum specified rpm and pressure. Observe the lubrication instructions. Failure to follow this warning will void the product warranty.**

### Lubrication

**Before running the pump, check the oil level using the dipstick.**

Use SAE 30~40 weight non-detergent motor oil to prolong pump life.

The crankcase capacity for these pumps is 4.5 quarts.

### Priming the Pump

To prime the pump, adjust the unloader valve to its lowest pressure setting. After starting the pump, open and close the gun to aid priming and to clear the valves of air. If the pump does not prime within a few seconds, stop the motor and inspect the installation for suction line leaks and obstructions. In general, keep suction lift to a minimum and avoid unnecessary bends in the suction line. The unloader valve must be readjusted after the prime has been obtained.

### Care of the Pump

Generally, after each use, flush the pump with a neutralizing solution for the liquid pumped. Follow with a clear water rinse. For storage under freezing conditions, flush the pump with a 50% mixture of automotive antifreeze and water.

### VALVE SERVICE

#### DISASSEMBLY

1. Remove (6) 41mm hex valve plug (Fig. 5).
2. Remove the coil spring and thread a M10mm bolt into valve assembly (Fig. 6). Use a pliers to grip the bolt and remove valve assembly (Fig. 7). If resistance is encountered, gently rock bolt until valve comes free.
3. After removing, threading bolt more deeply into the assembly will separate the components.

#### REASSEMBLY

1. Inspect components and replace worn items as necessary.
2. Assemble valve cage, spring retainer, spring, disc, and valve seat by snapping together (Fig. 8).
3. Thread M10 bolt into assembly for installation.
4. Lubricate outer o-ring, back-up ring and walls of valve chamber. Install valve assembly squarely into the chamber. Remove M10 bolt.
5. Examine valve plug components and replace if worn. Lubricate back-up ring and o-ring before installing on valve cap to prevent damage. Install back-up ring first and then o-ring.
6. Place the spring over the top of the spring retainer.
7. Apply anti-seize compound to the threads of the valve cap and carefully thread it into the manifold. Torque to specifications.  
(See Torque Specification Chart on Page 11.)

**WARNING: Anti-seize must be applied to all valve caps to avoid the galling of components.**



Figure 5



Figure 6



Figure 7



Figure 8

## REMOVING THE DISCHARGE MANIFOLD

1. Using a 10mm hex allen wrench, remove (8) socket head cap screws (Fig. 9).
2. While supporting manifold, tap backside of discharge manifold with soft mallet, removing inlet manifold (Fig. 10).
3. Remove o-rings from the interior face of the inlet manifold.

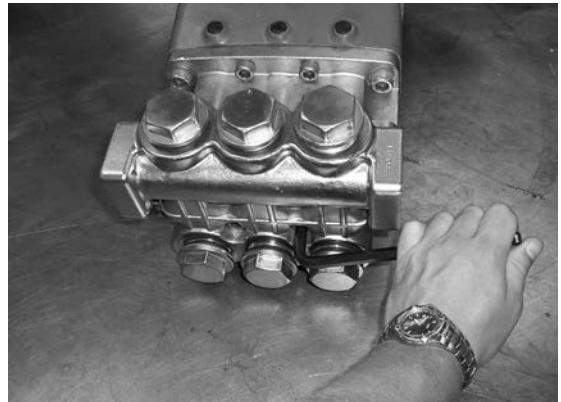


Figure 9



Figure 10

## REMOVING THE INLET MANIFOLD

1. Using a 12mm hex allen wrench, remove (4) outer socket head cap screws. Using 10 mm hex allen wrench, remove (4) inner socket head cap screws (Fig. 11).
2. While supporting manifold, tap rear of inlet manifold with soft mallet and gradually work from pump. If necessary, use flat head screwdrivers to gently pry manifold off (Fig. 12).



Figure 11



Figure 12

## PACKING SERVICE

### DISASSEMBLING THE PACKINGS

1. Place inlet and discharge manifold spacer side up on work surface.
2. Remove the spacer. If spacer is stuck, two screwdrivers may be used on opposite sides to gently pry it out (Fig. 13).
3. Remove spring, spreader, packings and packing retainer from inlet manifold (Fig. 14).
4. Reinstall inlet manifold using proper torque specifications and torquing sequence. Add antiseize to all bolts prior to installation. (See Torque Specification Chart on page 11.)
5. Inspect components and replace worn items as necessary. It is recommended to replace spacer o-rings and back-up rings at this time.
6. Lubricate packing cylinder and reinstall packing retainer.
7. Fit the packings together. Lightly lubricate the outside of the packings and insert, groove up, into the inlet manifold. Turn the crankshaft. Use the spreader and spring to help guide packings around the plunger and into the manifold until seated properly. If packings are tight, they can be started by tapping them into the manifold using the spreader, a 1.5" PVC pipe against the spreader, and a soft mallet.
8. Reinstall spreader so it meshes with packings; then install spring.
9. Lubricate spacer o-rings and back-up rings and install on spacer. Squarely reinstall packing spacer taking care not to damage o-rings.
10. Reinstall 3 o-rings on the interior face of the inlet manifold. Grease may be applied to hold o-rings in place.
11. Reinstall discharge manifold using proper torque specifications and torquing sequence. **Add anti-seize to all bolts prior to re-installation.** (See Torque Specification Chart on page 11.)

### REMOVING AND INSTALLING OIL SEALS

1. Remove the seal retainer, wick, plunger retainer, plunger, washer, slinger, and insert. If plunger is not loose, reassemble the plunger retainer a few threads on the stud and tap with a soft mallet until loose (Fig. 15).
2. The oil seal can be removed from the bottom side of the insert using a reverse pliers, or tapped out with a punch and hammer from the plunger side of the insert.
3. If the studs attached to the plunger rod have become loose, remove and buff clean. Reinstall to the plunger rod using high strength threadlocker.
4. Reinstall oil seal by lubricating and pressing into insert. Replace o-ring.
5. Make sure washer is seated properly in the crankcase. Place insert in crankcase and seat in place using the handle of a soft mallet.
6. Install the plunger by sliding the slinger in place, cupped side toward the front, followed by the plunger and washer. Lubricate o-ring and back-up ring. Apply medium strength threadlocker to the plunger retainer and torque to specifications.



Figure 13



Figure 14

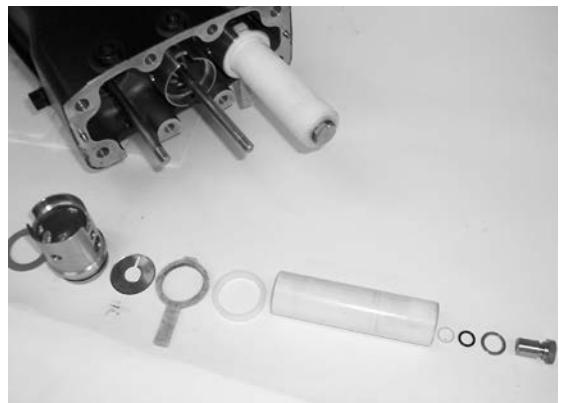
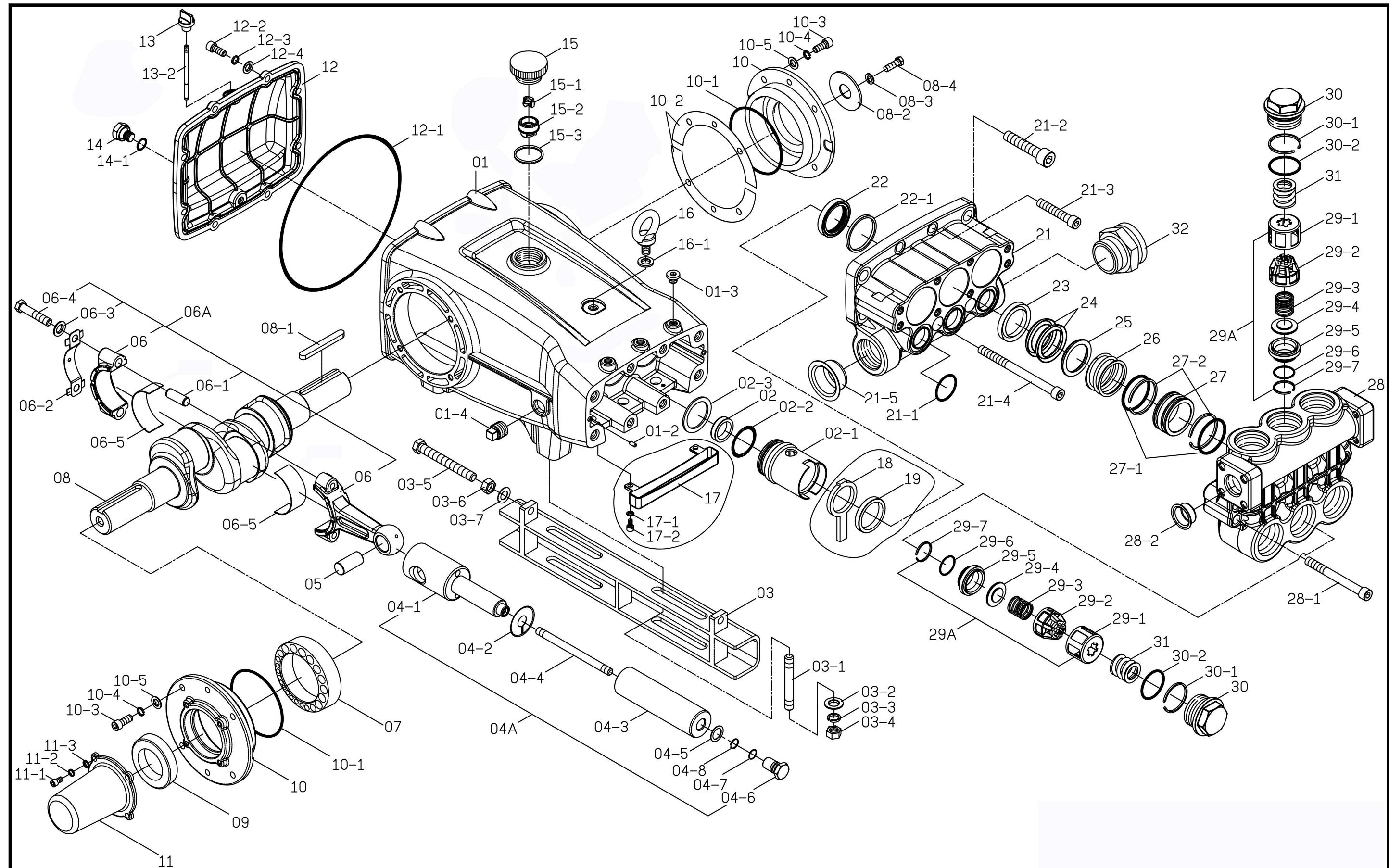


Figure 15



圖號 NO.	編號 CODE				名稱	Description	QTY
	<u>WH-12140</u>	<u>WH-12170</u>	<u>WS-12140</u>	<u>WS-12170</u>			
01	B010119320				曲軸箱	CRANKCASE	1
01-2	B012919000				汽缸銷	SET PIN	2
01-3	B100519050				圓內塞頭 1/4"	PLUG 1/4"	3
01-4	BS50016010				四角塞頭 PT1/2	PLUG PT1/2	1
02	B010219010				柱塞油封	PISTON OIL SEAL	3
02-1	B014419000	B014419210	B014419000	B014419210	柱塞油封套	PISTON OIL SEAL SLEEVE	3
02-2	BG10430049050				O形環	O-RING	3
02-3	B014519000				柱塞油封墊圈	GASKET	3
03	B010319000				腳座	CRANKCASE STAND	2
03-1	BS15214057300				雙頭牙螺絲	DOUBLE-END SCREW	4
03-2	BS31214200				平面華司	WASHER	4
03-3	BS32214300				彈簧華司	SPRING WASHER	4
03-4	BS21214300				六角螺帽	NUT	4
03-5	BS11212100300				六角螺絲	SCREW	2
03-6	BS21212300				六角螺帽	NUT	2
03-7	BS31212201				平面華司	WASHER	2
04A	B013019001	B013019010	<b>B013019003</b>	<b>B013019012</b>	柱塞組	CERAMIC PISTON ASSY	3
04-1	B013119010				柱塞桿 S630	PISTON ROD S630	3
04-2	B013519010	B013519210	B013519010	B013519210	柱塞套透氣墊圈 S304	GASKET S304	3
04-3	B013219000	B013219210	B013219000	B013219210	柱塞套	CERAMIC PISTON SLEEVE	3
04-4	B013319000				柱塞套固定螺絲	PISTON SET SCREW	3
04-5	B013519001				柱塞套平墊圈 S316	GASKET S316	3
04-6	B013419000	B013419000	<b>B013419011</b>	<b>B013419011</b>	柱塞套固定螺帽	PISTON SET NUT	3
04-7	BG10110015020				O形環	O-RING	3
04-8	BG30123015900				背托環	BACK-UP RING	3
05	B010519000				柱塞銷	PISTON PIN	3
06A	B010619001				連桿	CONNECTING ROD ASSY	3
06	N/A				連桿	CONNECTING ROD	3
06-1	B014119000				連桿軸套	CONNECTING ROD SLEEVE	6
06-2	B014319000				螺絲防鬆片	LOCK WASHER	3
06-3	BS31210500				平面華司	WASHER	6
06-4	BS11210055500				六角螺絲	SCREW	6
06-5	B014219000				引擎培林	ENGINE BEARING	3
07	B010719000				軸承	BEARING	2
08	B010819001				曲軸	CRANKSHAFT STROKE	1
08-1	B012119000				曲軸鍵	CRANKSHAFT KEY	1
08-2	B013905000				皮帶輪保護墊圈	GASKET	1
08-3	BS32212300				彈簧華司	SPRING WASHER	1
08-4	BS11212025300				六角螺絲	SCREW	1
09	B010919010				曲軸油封	CRANKSHAFT OIL SEAL	2
10	B011019320				軸承油封蓋	OIL SEAL COVER	2
10-1	BG11144120630				O形環	O-RING	2
10-2	B012619000				軸承蓋平墊圈	SHIM	4
10-3	BS16208025300				內六角螺絲	SCREW	8
10-4	BS32208300				彈簧華司	SPRING WASHER	8
10-5	BS31208306				平面華司	WASHER	8
11	B011119310				曲軸蓋	CRANKSHAFT COVER	1
11-1	BS16206016300				內六角螺絲	SCREW	4
11-2	BS32206300				彈簧華司	SPRING WASHER	4
11-3	BS31206309				平面華司	WASHER	4
12	B011619322				曲軸箱後蓋	REAR COVER	1

圖號 NO.	編號 CODE				名稱	Description	QTY
	WH-12140	WH-12170	WS-12140	WS-12170			
12-1	B011719000				後蓋迫緊	REAR COVER PACKING	1
12-2	BS16208025300				內六角螺絲	SCREW	8
12-3	BS32208300				彈簧華司	SPRING WASHER	8
12-4	BS31208306				平面華司	WASHER	8
13	B012219050				油量指示螺絲	DIPSTICK SCREW	1
13-2	B012219000				油量指示棒	DIPSTICK	1
14	B011810000				排油螺絲	DRAINAGE SCREW	1
14-1	BG10106017700				O形環	O-RING	1
15	B011905000				加油蓋	OIL INLET COVER	1
15-1	B012719010				擋油片	DAMPER PLATE	1
15-2	B014619310				擋油盒	OIL PAN	1
15-3	B012005000				加油蓋方形環	SQUARE RING	1
16	BS81212100				環首螺栓	EYE BOLT	1
16-1	BS31212201				平面華司	WASHER	1
*17	B014619000				油盒(外銷)	OIL PAN (EXPORT)	1
*17-1	BS31206310				平面華司(外銷)	WASHER (EXPORT)	2
*17-2	BS16206016300				內六角螺絲(外銷)	SCREW (EXPORT)	2
*18	B011319010	B011319210	B011319010	B011319210	潤滑棉(外銷)	FELT COLLAR (EXPORT)	3
*19	B023819110	B023819111	B023819110	B023819111	潤滑棉固定片(外銷)	SEAL RETAINER (EXPORT)	3
21	B031419010	B031419110	B031419011	B031419111	汽缸後座	INLET MANIFOLD	1
21-1	BG10320040	BG10345041500	BG10320040	BG10345041500	O形環	O-RING	3
21-2	BS16214040300				內六角螺絲	SCREW	4
21-3	BS16212040300				內六角螺絲	SCREW	2
21-4	BS16212100300				內六角螺絲	SCREW	2
21-5	B100519030				圓內塞頭 1-1/2"	PLUG 1-1/2"	2
22	B021019000	B021019210	B021019020	B021019220	防水油封	WATERPROOF OIL SEAL	3
22-1	B024019000	N/A	B024019000	N/A	防水油封墊圈	SPACER	3
23	B021219021	B021219211	B021219021	B021219211	V迫緊套	PACKING RETAINER	3
24	B020319040	B020319210	B020319050	B020319220	V迫緊	V-PACKING	6
25	B020219000	B020219210	B020219011	B020219111	V迫緊底座	V-PACKING SEAT	3
26	BJ61901021	BJ61901211	BJ61901021	BJ61901211	V迫緊彈簧	SPRING	3
27	B021119000	B021119210	B021119011	B021119111	迫緊上環	PACKING UPPER RING	3
27-1	BG10472054230	BG10504057400	BG10472054230	BG10504057400	O形環	O-RING	6
27-2	BG30490054810	BG30515056800	BG30490054810	BG30515056800	背托環	BACK-UP RING	6
28	B020119010	B020119110	B020119011	B020119111	汽缸前座	DISCHARGE MANIFOLD	1
28-1	BS16212070300				內六角螺絲	SCREW	8
28-2	B100519040				圓內塞頭 NPT1"	PLUG NPT1"	2
29A	B040019005	B040019015	B040019003	B040019012	活門組	VALVE ASSY	6
29-1	B040819000				活門套 S316	SPRING RETAINER S316	6
29-2	B040319010				活門帽	VALVE CAGE	6
29-3	BJ21901001	BJ21901001	BJ21901002	BJ21901002	活門彈簧	VALVE SPRING	6
29-4	B040119001	B040119001	B040119011	B040119011	活門塞	VALVE PLUG	6
29-5	B040219000	B040219210	B040219011	B040219111	活門座	VALVE SEAT	6
29-6	BG10280032030	BG10315035500	BG10280032030	BG10315035500	O形環	O-RING	6
29-7	BG30290031810	BG30320034800	BG30290031810	BG30320034800	背托環	BACK-UP RING	6
30	B021319010	B021319010	B021319111	B021319111	活門固定螺絲	VALVE BOLT	6
30-1	BG30400045810				背托環	BACK-UP RING	6
30-2	BG10387045730				O形環	O-RING	6
31	BJ21901211				活門輔助彈簧	SPRING	6
32	B021719001	N/A	B021719001	N/A	進水接頭	INLET CONNECTOR	1
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## Performance Chart

Model	RPM	GPM	PSI	HP
WH-WS-12140	800	38	1200	31.2
WH-WS-12170	750	47	1200	36.1

## Torque Specifications

Part Description	Ref. No.	Torque
Valve Bolts **	30	110 ft.lbs.
Inlet Chamber Screws **	21-2, 21-3, 21-4	40 ft.lbs.
Discharge Manifold Screws **	28-1	30 ft.lbs.
Piston Set Nuts *	04-6	18 ft.lbs.
Rear Cover Screws	12-2	10 ft.lbs.
Bearing Cover Screws	10-3	10 ft.lbs.
Connecting Rod Screws	06-4	32 ft.lbs.

\* Use Medium Strength Threadlocker on Assembly

\*\* Use Anti-Seize on Assembly

**Note:** Use the following torquing pattern when mounting the Inlet and Discharge Manifold

8	1	3	5
7	4	2	6

## Maintenance Schedule

Check	Daily	Weekly	40 hrs.	500 hrs.	1500 hrs.
Clean Filters	X				
Oil Level	X				
Oil Leaks	X				
Water Leaks	X				
Belts, Pulleys		X			
Plumbing		X			
Initial Oil Change			X		
Oil Change*				X	
Seal Service					X
Valve Service					X
Accessories					X

**Note:** Maintenance cycles will vary by system design. If a negative change in system performance is noticed, promptly check pump and review checklist items.

## Troubleshooting

Symptom	Probable Cause(s)	Corrective Action
Pump runs, but produces no flow.	Pump is not primed.	Flood suction, then restart pump.
Pump fails to prime.	Air is trapped inside pump.	Disconnect discharge hose from pump. Flood suction hose, restart pump, and run pump until all air has been evacuated.
Pump loses prime. Chattering noise.	Air leak in suction hose or inlet fittings.	Remove suction hose and test for leaks by pressurizing hose with water.
Pressure fluctuates.	Suction line is blocked, collapsed or too small.	Make sure thread sealant has been used on all fittings.
	Clogged suction strainer.	Remove suction line and inspect it for a loose liner or debris lodged in hose. Avoid all unnecessary bends. Do not kink hose.
		Clean strainer.
Low pressure at nozzle.	Unloader valve is bypassing.	Make sure unloader is adjusted properly and bypass seat is not leaking.
	Incorrect or worn nozzle.	Make sure nozzle is matched to the flow and pressure of the pump. If the nozzle is worn, replace.
	Restricted intake.	Refer to above priming information.
Pressure loss in general.	Screen clogged.	Check the screen for debris and clean or replace.
	Inlet size too small.	Make sure it is big enough.
	Worn or clogged valves are stuck due to corrosion.	Inspect valves for corrosion, wear, pitting and debris, and replace if necessary.
	Unloader bypassing.	Plumbed wrong. See if the flow is diverting out of the bypass line.
	System leaks.	Check for leaks.

### **Note: Cavitation Will Damage Your Pump!**

Cavitation occurs when an inadequate amount of fluid is available for feeding the pump.

If it takes the supply water noticeably longer to fill the test container to the gallons per minute that your system requires, your pump could be experiencing cavitation.

Cavitation can severely damage seals, pistons and valves and will shorten the life of all components in the hydraulic system.

#### **To Avoid Cavitation:**

- Keep the size of the suction line as large as possible, preferably the same size (or larger) as the inlet port.
- Use high-capacity, clean line strainers.
- Install a fitting at the suction side so you can check the vacuum periodically. The vacuum should not exceed 2-3 inches of Hg to obtain the best operation.

- Protect the pump from overheating.
  - Protect it from direct sunlight in hot weather.
  - Maintain adequate ventilation.
  - Keep lubricating fluids clean and at full levels.
- Protect the pump from severe cold by covering or operating indoors.
- Make sure the pump is secure and can't move around.
- Control the pressure with unloader valves and balanced relief valves. To prevent pressure spikes, don't over tighten the control valves.
- Use a pulsation dampener. Soft hose works well.
- To avoid vacuum leak, prevent the system from flowing against gravity.
- In a gravity-fed system, keep the rate of flow from gravity the same (or more) as the feed requirements of the pump.

## 一般安全訊息

1. 警告：請在泵浦的出水口加裝洩壓閥，以避免因為泵浦的出水被阻塞後馬達/引擎仍在運行時產生的壓力累積而造成泵浦損壞。搭配噴槍使用或經常關閉出水的情況下，建議使用洩壓閥。  
**未能遵循此警告可能會導致人身傷害和/或財產損壞，且因此原因造成的產品損壞不在產品保固範圍內。**
2. 警告：請勿抽送易燃或易爆的液體，例如汽油，燃油，煤油等。請勿在易爆環境中使用。本機械只能用來輸送與泵浦材料相容的液體。  
**未能遵循此警告可能會導致人身傷害和/或財產損壞，且因此原因造成的產品損壞不在產品保固範圍內。**
3. 泵浦的運轉速度不得超過建議值的最快速度。
4. 請勿以高於最大建議運轉壓力進行液體抽送。
5. 最高液體溫度為 70°C。
6. 確保電源符合設備要求。
7. 提供足夠的保護網/蓋，以保護曲軸和皮帶輪等會轉動的組件。
8. 維修前，請先關閉電源。
9. 維修前，請釋放泵浦系統內所有壓力。
10. 維修前，請排出泵浦系統中的所有液體。
11. 在啟動泵浦之前，請固定出水排放管路。不牢固的線路可能會亂竄，造成人身傷害和/或財產損失。
12. 每次使用前，請檢查水管是否脆化或磨損。確保所有接頭都連接牢固。
13. 定期檢查泵浦和系統組件。根據需要執行例行維護（請參閱維護部分）。
14. 請用適合於泵浦最大 psi 值的水管和接頭。如果使用洩壓閥，相對應的管路及接頭應符合洩壓閥壓力值上限。
15. 請勿使用泵浦輸送飲用水或其他液體供人類或動物食用。

### 警告：有觸電危險！

為減少電擊的危險，請將馬達充分接地到金屬電線管上，或使用單獨的接地線連接到馬達架上的金屬或馬達接線盒內的接地螺絲；或其他合適的方式接地。

所有接線均應由合格的電工執行。

警告：當手部潮溼或在站在潮濕的地面/水中時，請勿使用或碰觸馬達。

## 洩壓閥安全訊息

1. 使用符合泵浦系統壓力 (psi) 和水量 (gpm) 的洩壓閥。
2. 當使用在硬管的管路系統時，必須在系統中安裝脈衝緩衝器或蓄壓器。選擇相符合的脈衝緩衝器。
3. 切勿自行更換較大的應力的主彈簧以增加壓力。切勿添加墊圈以增加彈簧應力。
4. 務必更換安全防護蓋。
5. 固定所有鎖定裝置，以防止洩壓閥在運轉過程中因調整而跳脫。

## 皮帶/皮帶輪安裝

此泵浦應朝一個方向旋轉，意即從皮帶輪頂部看時朝向泵浦的汽缸方向旋轉。曲軸箱軸承蓋上有一張方向旋轉標籤。如要反向旋轉，請將油位增加 1/2 壓脫的油。

要確定合適的皮帶輪尺寸，請參考以下公式，並使用“ A” 或“ B” 型皮帶。

**馬達轉速 ÷ 泵浦轉速 = 流量(@額定速度) ÷ 流量(需要值) = 泵浦皮帶輪直徑 ÷ 馬達皮帶輪直徑**

例如：使用 1725 rpm 的馬達以 800 rpm 的速度驅動泵浦。

馬達的標準皮帶輪直徑為 7.25 英寸。

泵輪直徑可通過上面的公式確定：

$$1725 \div 800 = \text{泵浦皮帶輪直徑} \div 7.25$$

$$1725 \times 7.25 \div 800 = 15.6 = \text{泵浦皮帶輪直徑}$$

1. 將皮帶輪或襯套/皮帶輪組合(請參見第 3 頁 Figure 1)安裝到泵浦和馬達軸上。將泵浦安裝在馬達旁邊，確保皮帶輪對齊。如第 3 頁 Figure 2 所示，使用直尺。旋轉以檢查曲軸是否會空轉/跳動。
2. 安裝皮帶並在泵浦皮帶輪中使用插槽以收緊皮帶。確認皮帶有適當的拉緊。皮帶太緊會導致軸承磨損，皮帶太鬆會導致打滑(請參見第 3 頁 Figure 3)。

## 系統安裝

1. 通常，選擇適當規格的動力驅動，以避免過載。避免管線上不必要的彎曲，逆止閥以及所有多餘的彎曲和彎折。
2. 避免使用可能使空氣滯留的環狀物。
3. 在管螺紋上使用管接頭密封劑以確保氣密連結良好。
4. 選擇正確的軟管類型和尺寸對於良好的性能極為重要。確保將管路連接到泵浦的正確接口上。
5. 始終使用比泵浦的入口至少大一號尺寸的原裝進水軟管。如果進水軟管超過四英尺長，請使用下一碼更大的尺寸。
6. 使用一根或兩根編織增強軟管，以防止吸水管路塌陷。
7. 出水請使用經認可的高壓軟管，並確保所有接頭都牢固。

**注意：僅使用符合泵浦最大壓力值的管路，接頭，附件，軟管等。**

### 泵浦

1. 在安裝泵浦之前，請清潔所有接頭和軟管。
2. 用手旋轉泵浦以確保其自由旋轉。
3. 確保所有軟管連接牢固，並使用適當尺寸的接頭符合安全操作。

**警告：泵浦出廠時沒有油。磨合運行 40 小時後，每三個月或 500 小時(以先到者為準)，換油。使用 SAE 30~40 的非洗滌劑機油。曲軸箱容量：4.25 升**

### 出水端的安裝

從泵浦到出水排放軟管，建議使用以下附件：壓力為最大工作壓力兩倍的壓力表、洩壓閥、脈動緩衝器，監測洩壓閥和出水排放軟管的壓力表。洩壓閥，壓力表，脈動緩衝器之類的配件應安裝在靠近泵浦的位置。配件之後必須安裝軟管。如果使用硬管，則必須在配件和管路之間安裝兩到四英尺長的軟管。

### 進水端安裝

從液體源到泵浦，建議使用以下組件：關閉閥，有迴水接頭的洩壓閥，管路過濾器和復合壓力表。

### 進水供水

入口過濾器應為 80 目網。請使用軟管，不要使用硬管。正進水壓力 15 至 20 psi 是理想的，不過僅注水也可以。

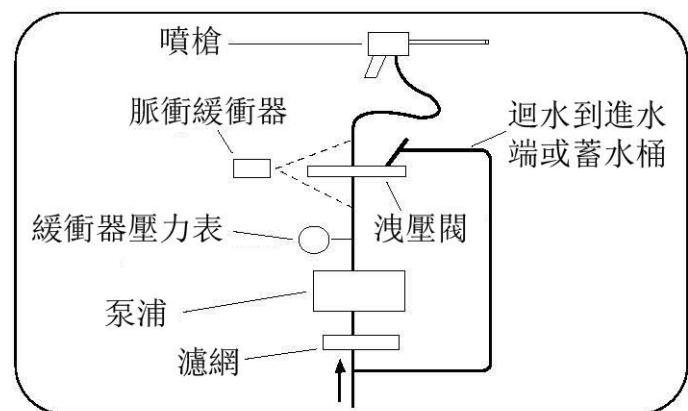


Figure 4

## 操作方式

**警告：**泵浦請勿用來抽送易燃或易爆液體，例如汽油，煤油等。請勿抽送腐蝕性或磨蝕性液體，因為它們會導致泵浦中的柱塞，活門和密封件等迅速磨損或變質。泵浦只能與組件材料相容的液體使用。不要超過規定的最大轉速和壓力。請遵守潤滑說明。不遵循此警告將使產品保固無效。

## 潤滑方式

在運轉泵浦之前，請使用量油棒檢查油位。使用 SAE 30 油。泵浦的曲軸箱容量為 4.25 升。

## 啟動泵浦

要灌注泵浦，請將洩壓閥調節至最低壓力。啟動泵浦後，打開和關閉噴槍以輔助灌注並清除活門裡的空氣。如果泵浦在幾秒內沒有啟動，請停止馬達，檢查安裝是否有管路洩漏和阻塞。通常，將吸力提升保持在最低水平，並避免吸水管路不必要的彎曲。洩壓閥在管路空氣排出後必須重新調節。

## 保養泵浦

通常，每次使用後，請用中和溶液沖洗泵浦，然後用清水沖洗。為了在冰凍條件下存儲，請用 50 % 的汽車防凍劑和水的混合物沖洗泵浦。

### 活門維修

#### 拆卸

1. 卸下 (6) 41 毫米六角活門固定螺絲 (請參見第 5 頁 Figure 5)。
2. 卸下活門固定螺絲彈簧，然後將 M10mm 螺栓鎖入活門組中 (請參見第 5 頁 Figure 6)。用鉗子抓住螺栓並拆下活門組 (請參見第 5 頁 Figure 7)。如果遇到阻力，請輕輕搖動螺栓，直到活門組鬆動。
3. 卸下後，將螺栓更深地鎖入組件，將組件分開。

#### 重新組裝

1. 檢查組件並根據需要更換磨損的零件。
2. 組裝活門帽，彈簧固定座，彈簧，活門塞和活門座 (請參見第 5 頁 Figure 8)。
3. 將 M10 螺栓鎖入組件以進行安裝。
4. 潤滑外部 O 形環，背托環和汽缸在活門位置的內壁。將活門組直角安裝到腔室中。卸下 M10 螺栓。
5. 檢查活門固定螺絲組件，如有磨損則更換。在安裝活門固定螺絲前，潤滑背托環和 O 形環，以防止損壞。首先安裝背托環，再安裝 O 形環。
6. 將彈簧放在彈簧固定座的上面。
7. 在活門固定螺絲的螺紋上塗抹防卡劑，然後小心地將其鎖入汽缸中。鎖緊至規格要求。(請參見第 19 頁的扭力規格表。)

**警告：必須在所有活門固定螺絲的螺紋上塗抹防卡劑，以免活門固定螺絲的螺紋毀損。**

#### 拆卸汽缸前座

1. 使用 10mm 六角內六角扳手卸下 (8) 活門固定螺絲 (請參見第 6 頁 Figure 9)。
2. 支撐汽缸時，用軟槌敲打汽缸前座的背面，卸下汽缸前座 (請參見第 6 頁 Figure 10)。
3. 拆下汽缸前座表面的 O 形環。

#### 拆卸汽缸後座

1. 使用 12mm 六角內六角扳手卸下 (4) 內六角汽缸固定螺絲。使用 10 毫米六角內六角扳手卸下 (4) 內六角汽缸固定螺絲 (請參見第 6 頁 Figure 11)。
2. 在支撐汽缸的同時，用軟槌敲打汽缸後座的後部。如有必要，請使用平頭螺絲板手輕輕撬開汽缸 (請參見第 6 頁 Figure 12)。

## 迫緊維修

### 拆卸迫緊

1. 將汽缸前座及後座的迫緊上環面朝上。放在工作檯上。
2. 拆下迫緊上環。如果迫緊上環卡住了，則可以用兩把螺絲起子以相反兩邊的作用力輕輕地將其撬出（請參見第 7 頁 Figure 13）。
3. 從汽缸後座上拆下彈簧，V 迫緊底座，迫緊和 V 迫緊套（請參見第 7 頁 Figure 14）。
4. 使用適當的扭力和扭矩重新安裝汽缸後座。在安裝前，在所有活門固定螺絲上添加防卡劑（請參閱第 10 頁的扭矩規格表）。
5. 檢查零件，根據需要更換磨損的零件。建議此時更換迫緊上環的墊片 O 形環和背托環。
6. 潤滑迫緊並重新安裝 V 迫緊套。
7. 將迫緊裝在一起。輕輕潤滑迫緊的外圍，然後裝入汽缸後座的溝槽。轉動曲軸。使用 V 迫緊底座和彈簧引導迫緊至柱塞周圍並進入汽缸後座，直至正確位置。如果迫緊很緊，則可以借用 V 迫緊底座，將 1.5 英寸 PVC 管靠在 V 迫緊底座，並用軟槌將 V 迫緊敲入汽缸後座。
8. 重新安裝 V 迫緊底座，使其與 V 迫緊貼合。然後安裝彈簧。
9. 潤滑墊片 O 形環和背托環，然後安裝在迫緊上環上。重新方正地安裝迫緊上環，注意不要損壞 O 形環。
10. 將 3 個 O 形環重新安裝在汽缸後座的內表面上。可以使用潤滑脂將 O 形環固定到位。
11. 使用適當的扭矩規格和螺絲安裝順序重新安裝汽缸前座。重新安裝前，在所有螺絲上添加防卡劑（請參閱第 19 頁的扭矩規格表）。

### 拆卸和安裝油封

1. 拆下潤滑棉固定片，潤滑棉，柱塞，華司，透氣墊圈和 O 形環。如果柱塞不鬆動，則將柱塞油封套重新組裝到柱塞套固定螺帽上，然後用軟槌敲擊直至鬆動（請參見第 7 頁 Figure 15）。
2. 可以使用反向尖嘴鉗將柱塞油封從柱塞油封取下，或者用尖鑽和槌子輕敲挖出來。
3. 如果連接在柱塞桿上的柱塞套固定螺絲變鬆，請卸下並擦拭乾淨。使用高強度的螺絲固定劑將其重新安裝到柱塞桿上。
4. 重新潤滑柱塞油封，安裝在柱塞油封套上。更換 O 形環。
5. 確認柱塞油封墊圈正確放置在曲軸箱中。使用軟槌的手柄將汽缸與曲軸箱組立，使其固定到位。
6. 定位柱塞套透氣墊圈，將其凹面朝前，然後裝上柱塞和柱塞套平墊圈。潤滑 O 型環和背托環。將中等強度的螺紋防卡劑在柱塞油封套上，並按扭矩標準鎖緊。

## 性能表

型號	轉速 (RPM)	水量(GPM)	壓力(PSI)	馬力(HP)
WH-/WS-12140	800	38	1200	31.2
WH-/WS-12170	750	47	1200	36.1

## 扭力規格表

部件名稱	圖號(Ref. No.)	扭力(英尺磅力/ft.lbs.)
活門固定螺絲 **	30	110
(汽缸後座)內六角螺絲 **	21-2, 21-3, 21-4	40
(汽缸前座)內六角螺絲 **	28-1	30
柱塞套固定螺帽 *	04-6	18
(後蓋)內六角螺絲	12-2	10
(軸承油封蓋)內六角螺絲	10-3	10
(連桿)內六角螺絲	06-4	32

\*在裝配時使用中等強度的螺紋防卡劑

\*\*在裝配時使用防卡劑

注意：安裝汽缸後座和汽缸前座時，請依照下列螺絲安裝順序：

8	1	3	5
7	4	2	6

## 保養維護時間表

檢查項目	頻率	一天一次	一週一次	40 小時	500 小時	1500 小時
清潔濾網		X				
油位		X				
是否漏油		X				
是否漏水		X				
皮帶,皮帶輪			X			
管路			X			
初始磨合運行				X		
換油					X	
活門維修						X
迫緊維修						X
配件						X

注意：維護週期將因系統設計而異。如果系統性能發生異常，請立即檢查泵浦並查看所有檢查項目。

症狀	可能的原因	糾正措施
泵浦運行，但沒出水。	泵浦無進水。	吸水，然後重新啟動泵浦。
泵浦無法進水。	空氣滯留在泵浦內。	斷開泵浦的出水軟管。
泵浦無進水。	進水軟管吸入空氣或進水口配件漏氣。	充水至進水軟管，重新啟動泵浦，然後運行泵浦，直到排出所有空氣。
顫音。		確保所有配件上均已使用螺紋密封劑。
壓力波動。	進水軟管堵塞，塌陷或尺寸過小。	拆下吸水管，檢查其內襯是否鬆動或軟管中是否有碎屑。避免所有不必要的彎曲。不要扭結軟管。
噴嘴壓力低。	洩壓閥在迴水。 噴嘴尺寸不正確或磨損。	確保洩壓閥調整正確，並且迴水沒有洩漏。 確保噴嘴與泵浦的流量和壓力相匹配。如果噴嘴磨損，請更換。
	限制攝入。	請參閱上面的灌注信息。
沒有壓力。	濾網堵塞。 入口尺寸太小。 活門因腐蝕而磨損或堵塞。 洩壓閥在迴水。 系統洩漏。	檢查濾網是否有碎屑，然後清洗或更換。 確保它足夠大。 檢查活門是否腐蝕，磨損，點蝕和碎屑，必要時進行更換。 查看流量是否從迴水管路分流。 檢查是否洩漏。

### 注意：氣蝕會損壞您的泵浦！

當沒有足夠的流體送入泵浦時，就會發生氣蝕現象。如果供水每分鐘容量小於泵浦每分鐘加侖量，則可能導致泵浦出現氣蝕現象。無水空轉會嚴重損壞密封件、柱塞和活門，並會縮短系統中所有組件的壽命。

### 避免氣蝕方法如下：

- 保持進水管的尺寸盡可能大，最好與進水口的尺寸相同（或更大）。
- 使用大容量、乾淨的過濾器。
- 在進水側安裝接頭，以便您可以定期檢查真空度。真空度不應超過 2-3 英寸汞柱，以獲得最佳操作。
- 防止泵浦過熱。
  - 在炎熱的天氣中避免陽光直射。
  - 保持足夠的通風。
  - 保持潤滑液清潔並隨時充足。
- 為防泵浦受到嚴酷的寒冷損害，將泵浦遮蓋或在室內操作。
- 確保泵浦是安裝牢固，並且不能四處移動。
- 用自動洩壓閥和平衡溢流閥控制壓力。為防止壓力竄升，請勿過度擰緊控制閥。
- 使用脈動緩衝器。軟管效果很好。
- 為避免真空洩漏，請防止系統因重力而流動。
- 在重力供水系統中，使重力流率保持與泵浦的進水速度要求相同（或更高）。