KÄRCHER®

Service Handbook

High-Pressure Washer Pump 3.532-629.0

10.00

How to Use This Manual

It is not necessary to read this entire manual to find a solution to a problem. This manual identifies four basic ways the pump may malfunction. Find the section that defines the malfunction of the pump. Turn to that section's overview page and identify the specific problem. Then go to the solutions page for that specific problem. If you don't know what the problem is, work your way through the section until you find and correct the problem.

Always wear safety rated eye protection and clothing.

For any other problems contact KARCHER® technical support at **1-800-877-2424.**

Tools Necessary to Service the KARCHER® High-Pressure Washer Pump Part 3.532-629.0

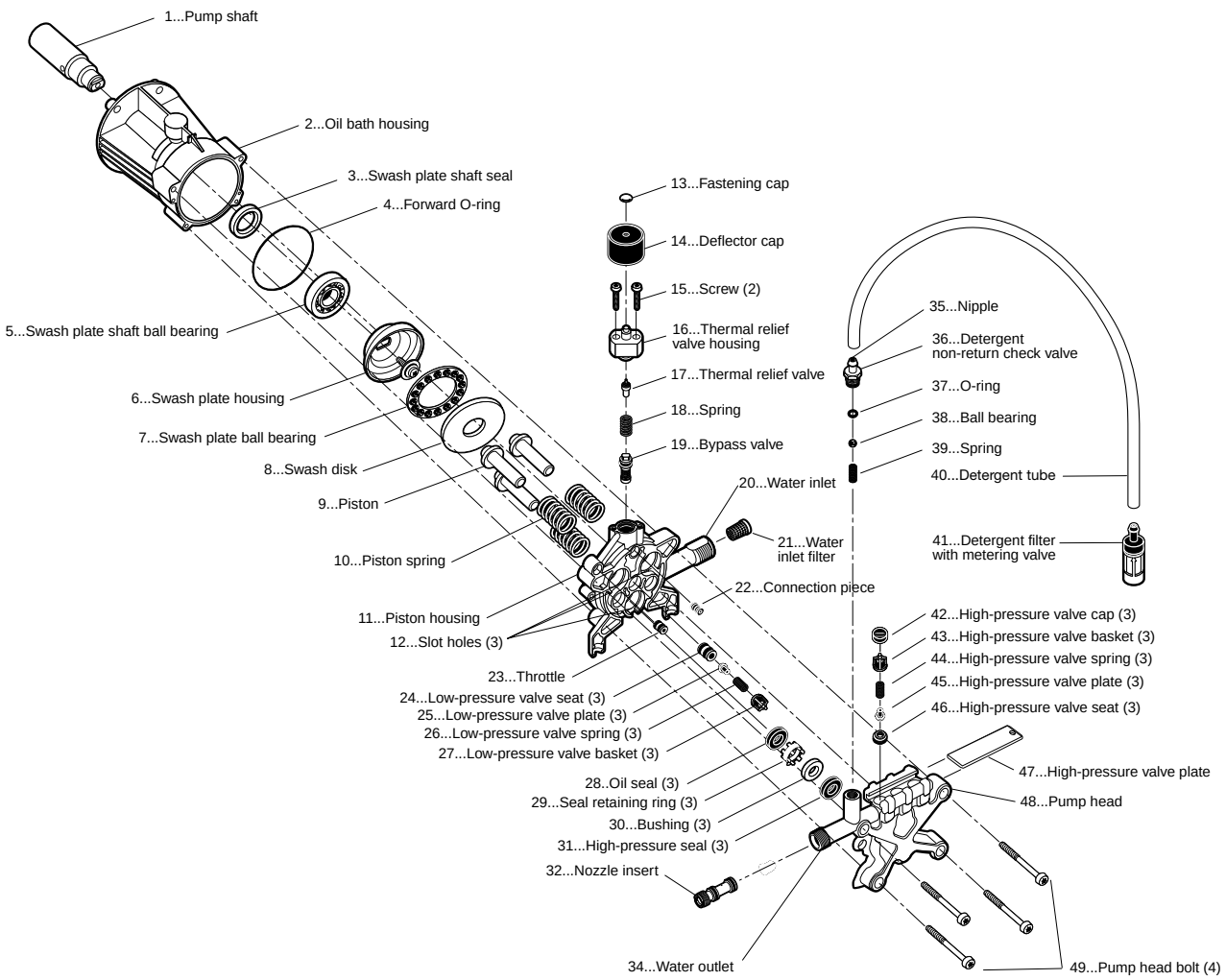
Special Tools

- Valve pliers 4.901-062
- Installation tool . . . . . 2.901-036 (HP seal, oil seal)
- Silicon grease . . . . . 6.288-044 (for packing and O-rings)
- Lithium grease . . . . . 6.288-079 (for O-rings on bypass valve)
- Non-detergent pump oil 15W40 . . . . . .6.288-050.0

Generic Tools

- Allen Wrench 8mm
- Allen Wrench 6mm
- Socket Wrench 13mm
- Torx TX30 Socket Wrench
- Needle Nose Pliers
- Rubber Mallet
- Pliers
- Flat Head Screwdriver
- Phillips Head Screwdriver
- Hammer
- Safety Goggles

MASTER DIAGRAM



Swash Plate Assembly

The three pistons (9) are driven by the swash plate assembly (6,7,8), which is mounted on a pump shaft (3). In the case of a vertically configured machine, a drive bolt is screwed into the engine shaft and then inserted into the pump shaft. As soon as the engine shaft rotates, the swash plate assembly (6,7,8) rotates as well. This causes the pistons (9) to move backwards and forwards. The piston stroke depends upon the angle of the swash plate assembly (6,7,8). The greater the angle of the swash plate, the longer the piston stroke. One revolution of the swash plate gives the pistons one suction stroke and one pressure stroke.

Oil Bath

The swash plate and pistons are bathed in oil (oil type 15W40 non-detergent).

This pump does not have a drain plug, oil reservoir and sight glass. In order to add oil in this case, the pump head (48) and piston housing (11) will have to be removed. If servicing a pump without a sight glass, the oil level is just above the high side of the swash disk (8).

Pistons With Seals

The three pistons (9) are pressed against the swash disk (8) of the swash plate assembly (6,7,8) by powerful piston springs (10). These three pistons are manufactured from tempered, surface-hardened steel and are non-corrosive with regards to detergents and rust.

The pump delivery capacity is determined by
- the rotational speed of the motor
- the diameter of the pistons
- the length of the piston stroke.

The pistons (9) are fitted with a high-pressure bushing (30).

The three pistons each have an oil seal (28) mounted in the piston housing (11). These three oil seals, along with the shaft seal (3), retain the oil in the oil bath housing. The slot holes (12) are in the piston housing (11) and allow water or oil to drip out into the open.

A water leakage rate of one drop per piston per minute is allowable during high-pressure operation. If oil is leaking from the slot holes (12), there is either a leak in the oil seals or there is piston damage.

Low-Pressure and High-Pressure Check Valves

Each piston (9) works with one low-pressure check valve (24-27) and one high-pressure check valve (43-46). Each of these check valves is constructed of the same basic components: the valve basket, spring, valve plate with guide shaft and the valve seat with O-ring.

The sealing surface between the valve plate (25) and the valve seat (24) is conical. The valve plate and valve seat are manufactured from either plastic or stainless steel depending upon the particular unit involved.

When the piston (9) is forced backwards by the piston spring (10) in the oil bath housing (1), the high-pressure check valve (43-46) closes and water is drawn in through the supply line / suction chamber at the water inlet (20), through the inlet filter (21), and through the open low-pressure check valve (24-27).

When the piston (9) is pushed forward by the swash disk (8), the low-pressure check valve closes and water is conveyed through the open high-pressure check valve to the high-pressure outlet. The pressure that is generated is dependent upon the flow rate and the orifice diameter of the of the high-pressure nozzle.

Bypass Valve

When the trigger of the spray gun is pulled, the entire pump capacity flows through the nozzle insert (32) to the water outlet (34). At this time, the bypass valve remains in the upper position and closes off the path between the pressure chamber and the suction chamber.

When the trigger of the spray gun is released, water ceases to flow through the nozzle insert (32). The pressure above the bypass valve (19) rises, which causes the bypass valve to be pressed downwards. This will cause the pump to run in the bypass mode. The pump continues to run, but only maintains the circulation pressure.

When the trigger of the spray gun is again pulled, the pressure in the high-pressure hose drops suddenly. The spring inside the bypass valve (19), together with the restricted pressure at the entrance to the nozzle insert (32), pushes the bypass valve upwards. This causes the bypass valve to close, and the pump builds up pressure once more.

Thermal Relief Valve

If the pump should continue to run in bypass mode for an extended amount of time (max 5 min.), the water circulating within the pump will reach a temperature level that will cause internal damage. This is prevented by the thermal relief valve (17). The thermal relief valve will release the hot water and then automatically reset itself.

Detergent Delivery System

In this system there is a nozzle insert (32) in the water outlet (34). The entire pump capacity flows through the nozzle insert to the spray gun.

Detergent can only be drawn in by the nozzle insert (32) if the nozzle of the spray wand has been set to low pressure. This causes the pump pressure to fall to approximately 435 PSI (low pressure), and the greatest degree of negative pressure (11.6 PSI) is generated at the lateral hole in the nozzle insert so that detergent can be drawn into the unit via the detergent suction tube (40) and detergent filter (41).

If the spray nozzle on the spray wand is set for high-pressure operation, the hole in the nozzle insert (32) does not create any negative pressure, and no detergent can be drawn into the unit.

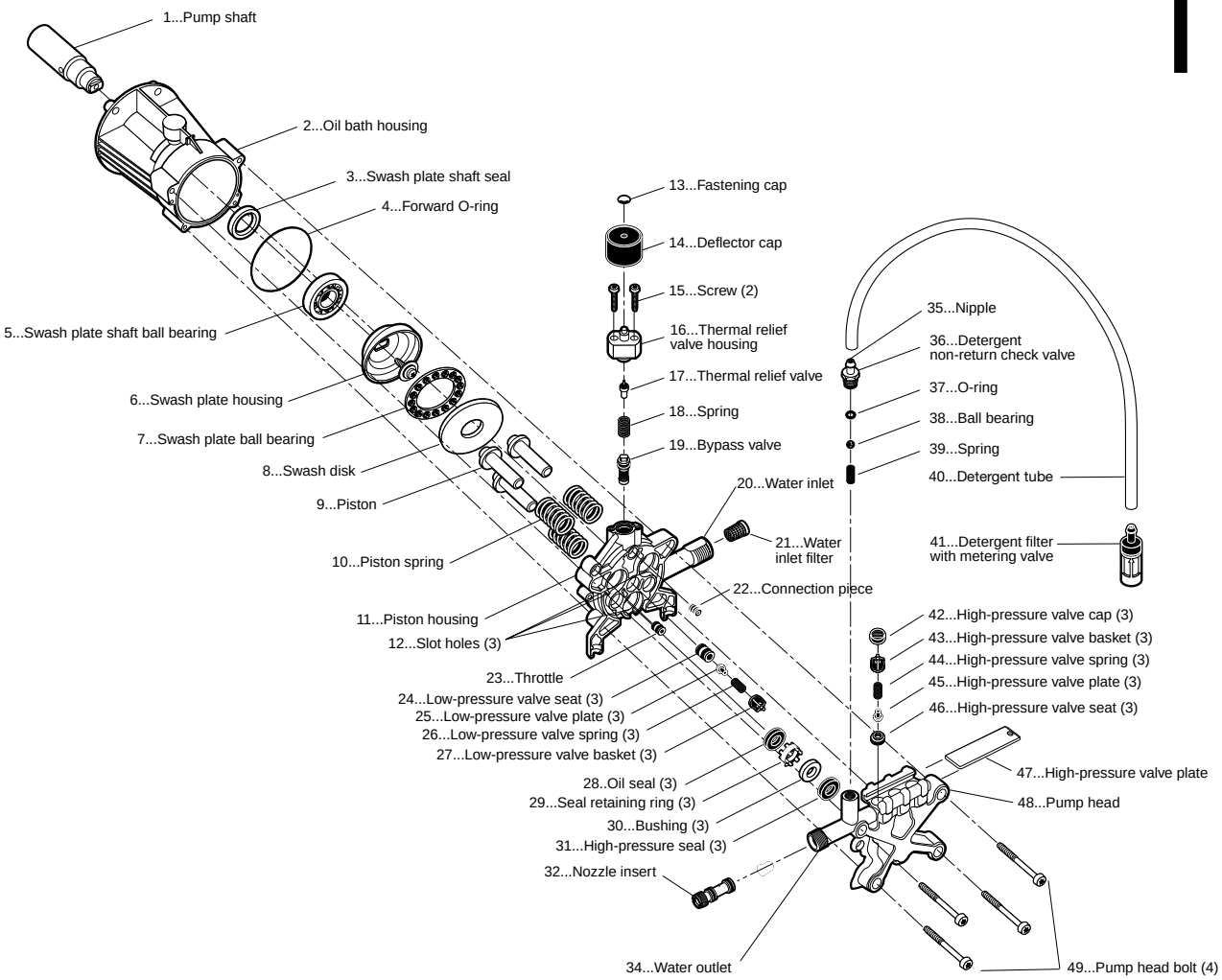
The detergent non-return valve (36) consists of a small spring (39) with a ball (38), O-ring (37) and nipple (35). When operating in the detergent mode, the negative pressure created by the nozzle insert (32) causes the ball to be drawn away from the O-ring (37), against the tension of the spring (39). Detergent can then be drawn into the unit.

When operating in the high-pressure mode, the ball (38) seals off the detergent connection so that no water can flow into the container of detergent.

PART NUMBERS

High Pressure Washer Pump 3.532-629.0

ITEM #(S)	DESCRIPTION	PART #	QTY. IN PUMP
1	Oil bath housing	5.093-106.0	1
2	Forward o-ring	6.362-471.0	1
3	Pump shaft	5.471-088.0	1
4	Swach plate shaft ball bearing	7.401-155.0	1
5	Swash plate shaft seal	7.367-018.0	1
6	Swash plate assembly	6.401-289.0	1
7	Swash plate ball bearing (incl with #6)	NA	1
8	Swash disk (incl with #6)	NA	1
9	Piston	4.553-173.0	3
10	Piston spring	5.332-391.0	3
11	Piston housing	5.060.647.0	1
12	Weep holes (incl. with item # 11)	NA	4
13	Fastening cap (incl. with item #17)	NA	1
14	Deflector cap (incl. with item #17)	NA	1
15	Screw	7.306-066.0	2
16	Thermal relief valve housing (in.w/#17)	NA	1
17	Thermal relief valve complete	4.580-360.0	1
18	Spring (incl. with item #17)	NA	1
19	Bypass valve	4.590-036.0	1
20	Water inlet (included with item #11)	NA	1
21	Water inlet filter	6.414-252.0	1
22	Connection piece	4.030-045.0	1
23	Throttle	4.030-109.0	1
24, 25 26, 27	Low-pressure valve seat, plate, spring, basket	4.580-330.0	3
28	Oil seal	6.365-393.0	3
29	Seal retaining ring	5.110-707.0	3
30	Bushing	6.226-730.0	3
31	High-pressure seal	6.365-394.0	3
32	Nozzle insert	4.769-034.0	1
34	Water outlet (included with item #45)	NA	1
35	Nipple (included with item #34)	NA	1
36	Detergent non-return check valve	2.883-862.0	1
37	O-ring (included with part #34)		
38	Ball bearing (included with part #34)		
39	Spring (included with part #34)		
40	Detergent tube	9.162-101.0	1
41	Detergent filter with metering valve	4.862-032.0	1
42	High-pressure valve cap	4.132-007.0	3
43, 44 45, 46	High-pressure valve cage, spring, plate and seat	4.580-331.0	3 3
47	High-pressure valve plate	5.003-062.0	1
48	Pump head	5.550-249.0	1
49	Pump head bolts	7.304-097.0	4
	NOT PICTURED IN DIAGRAM		
	Garden hose connection	9.154-009.0	1
	Piston spring retaining clip	5.030-625.0	3



Problems That Cause Low Water Pressure

A. Water Supply
A problem with the water supply. Use cold water only.

B. Worn Nozzle
A worn nozzle on the spray gun.

C. Water Inlet Filter
A clogged water inlet filter (20).

D. Bypass Valve
Worn O-rings on the bypass valve (19), or a bypass valve hanging up.

E. High-Pressure Check Valve
High-pressure valve (43-46) fails to function properly.

F. Low Pressure Check Valve
Low-pressure valve (24-27) fails to function properly.

G Water Leaks – See Section 2 / Water Leaks
Water leaks

H. Pump is Cycling – See Section 4 / Detergent Delivery Failure
Nozzle insert (32) is damaged and must be replaced.

SECTION 1 / LOW WATER PRESSURE SOLUTIONS

A. Water Supply
B. Nozzle
C. Water Inlet Filter
D. Bypass Valve
E. High Pressure Check Valve

A. Water Supply (Cold Water Only)

1. Check faucet. 4.0 gpm is required.
2. Outside diameter of hose should be 3/4".
3. Maximum length of hose should be 50'.
4. The inlet water pressure should not exceed 90 psi.
5. Hose should not be kinked or damaged.

B. Nozzle

1. Check function and setting of original spray wand nozzle (not pictured) by using an in-house nozzle. If pump functions properly with in-house nozzle but malfunctions with original nozzle, replace nozzle.

C. Water Inlet Filter

1. Remove filter with pair of valve pliers. (figure 1)

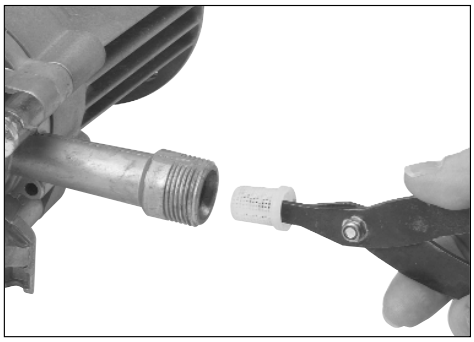


figure 1

2. Clean filter.
3. Replace filter if it is torn, bent or missing.
4. Reinstall filter.

Note: If water inlet filter is missing or damaged, further damage may have occurred inside the pump.

D. Bypass Valve

1. Remove fastening cap and deflector cap. (figure 2)

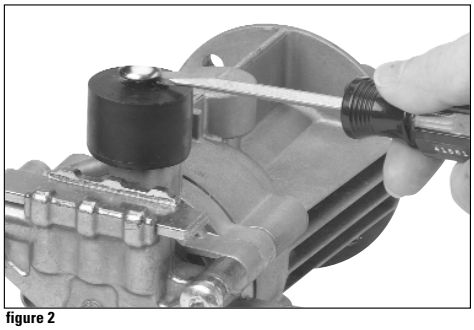


figure 2

2. Remove thermal relief valve housing. (figure 3)

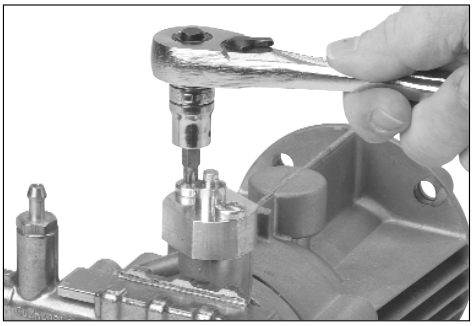


figure 3

3. Pull out bypass valve. (figure 4)

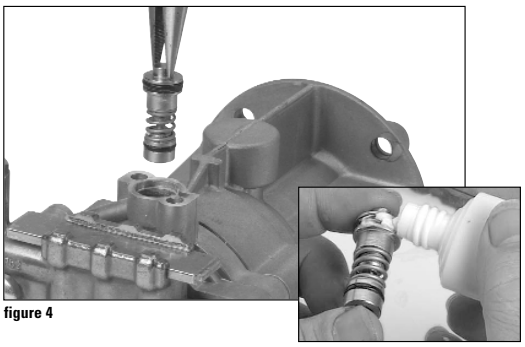


figure 4

4. Inspect bypass valve for damage and lubrication. Inadequate lubrication will cause valve to stick.
5. Inspect O-rings for nicks or cuts. Replace if necessary.
6. Grease only large O-rings with lithium grease. (figure 4 inset)
7. Replace bypass valve.

E. High-Pressure Check Valve

1. Remove valve plate by tapping plate with screwdriver and hammer. (figure 5)
2. Remove 3 plastic valve caps. (figure 5 inset)

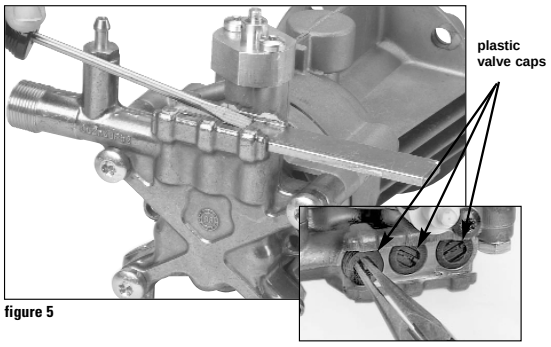


figure 5

3. Remove valve with valve pliers. (figure 6)

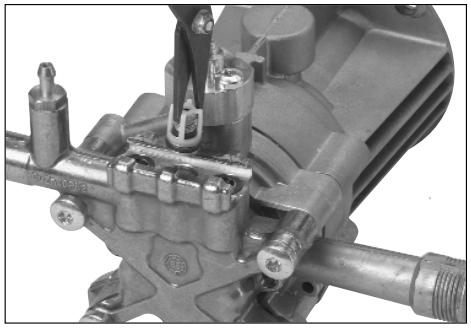


figure 6

4. Check valve for wear, debris and pitting. (figure 7) Replace if necessary.

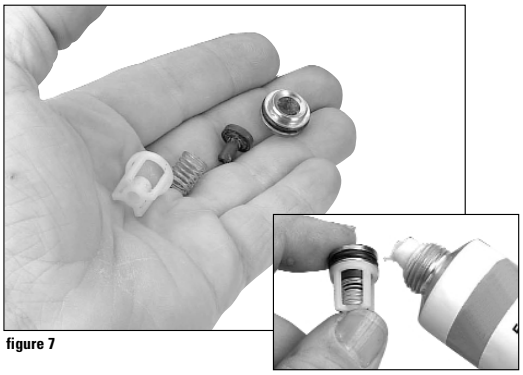


figure 7

5. Grease O-rings lightly with silicone grease and reassemble. (figure 7 inset)

F. Low-Pressure Check Valve

1. Remove water inlet housing with socket wrench (4 bolts). (figure 8)

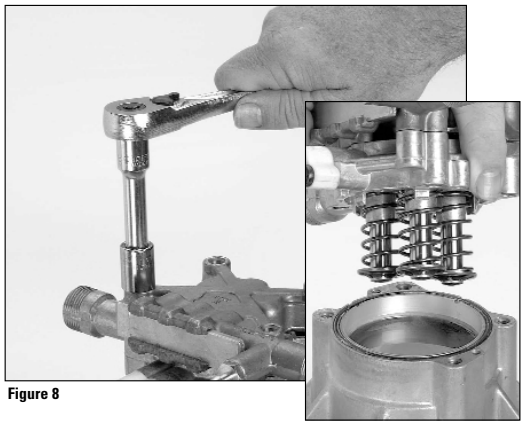


Figure 8

2. Remove piston housing. (figure 8 inset)
3. Remove low-pressure check valves, including valve disks and springs. (figure 9)

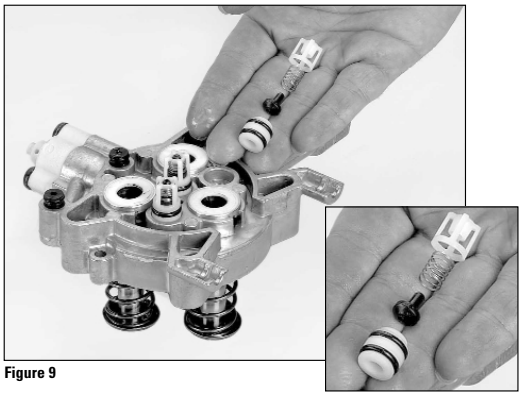


Figure 9

4. Check valve for wear, debris and pitting. (inset figure 9)

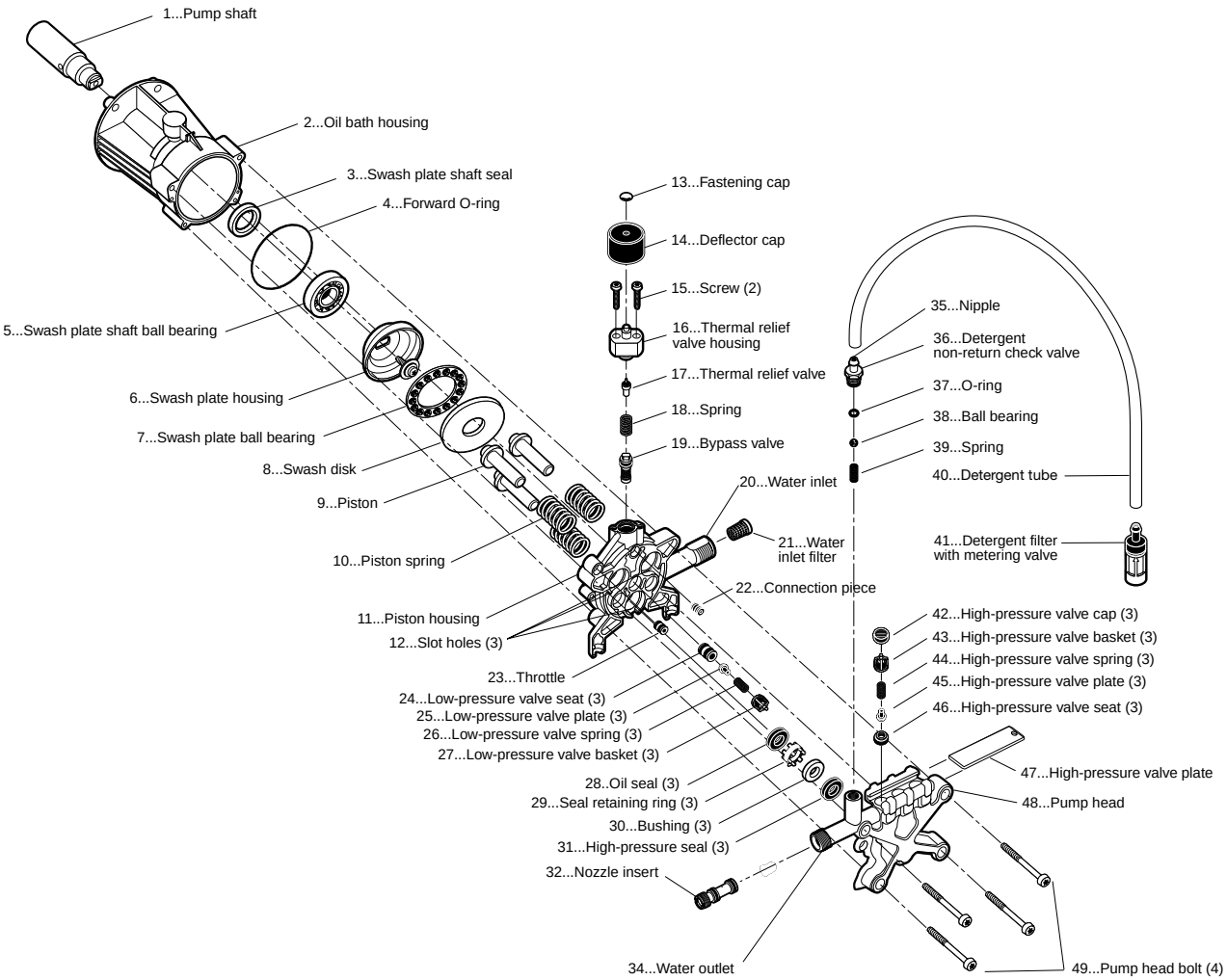
Note: If any one low-pressure valve is damaged, all three valves should be replaced.

5. Lightly grease 0-rings with silicone grease.
6. Reassemble and reinstall.

Note: low-pressure check valves must be ordered as a unit. Individual check valve parts can not be ordered separately.

G. Water Leaks–See Section 2 / Water Leaks

H. Pump is Cycling – See Section 4 / Detergent Delivery Failure



Problems That Cause Water Leaks

A. Thermal Relief Valve

The thermal relief valve (17) protects the pump from hot water temperatures in bypass mode. If the thermal relief valve is damaged or does not reset, there will be a continual leak. Check thermal relief valve (17).

B. Weep Holes – High-Pressure Seals

Water leaking from the weep holes (12) can indicate a leak in the high-pressure seals. Check seals (31) for damage.

A. Thermal Relief Valve

1. Remove fastening cap and deflector cap. (figure 2)

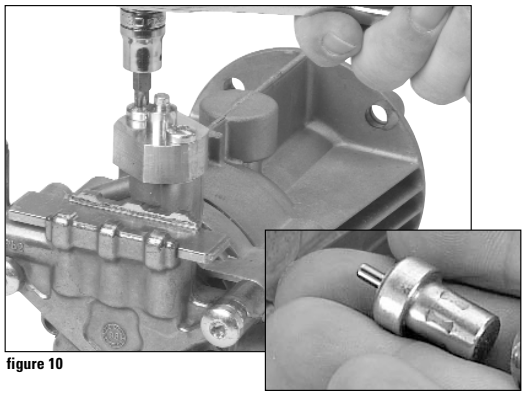


figure 10

2. Remove thermal relief valve housing. (figure 10)
3. Remove thermal relief valve. (figure 10 inset)
4. Inspect valve and replace with new valve if necessary.

B. Weep Holes – High-Pressure Seals

1. Remove 4 pump head bolts using socket wrench. (figure 11)

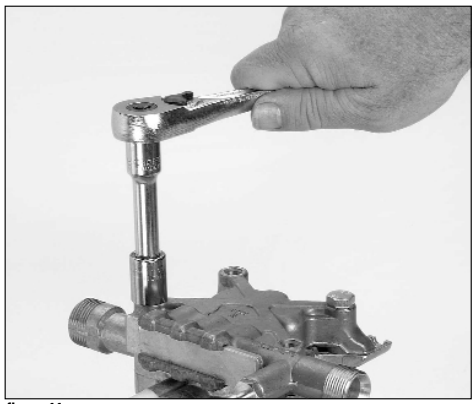


figure 11

2. Remove pump head.

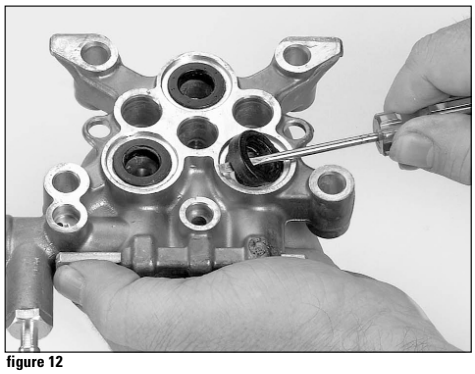


figure 12

3. Turn the pump head over and carefully remove the three high pressure seals. (figure 12)
4. Replace all three seals using installation tool.
   - Place seal, flat side down, on installation tool.
   - Fill groove with silicone grease. (figure 12)
   - Place brass sleeve in pump head.

figure 13

   - Put tool into sleeve and press until seal pops into place. (figure 14)

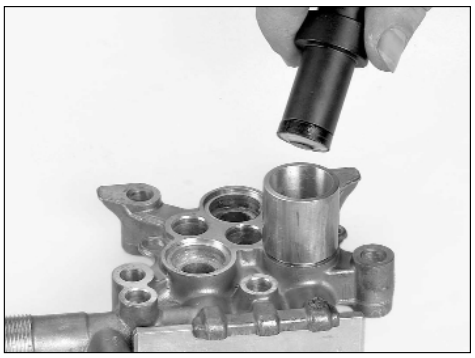


figure 14

   - Remove tool and then remove sleeve. (figure 15)

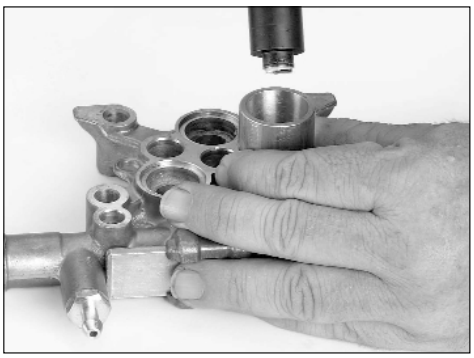
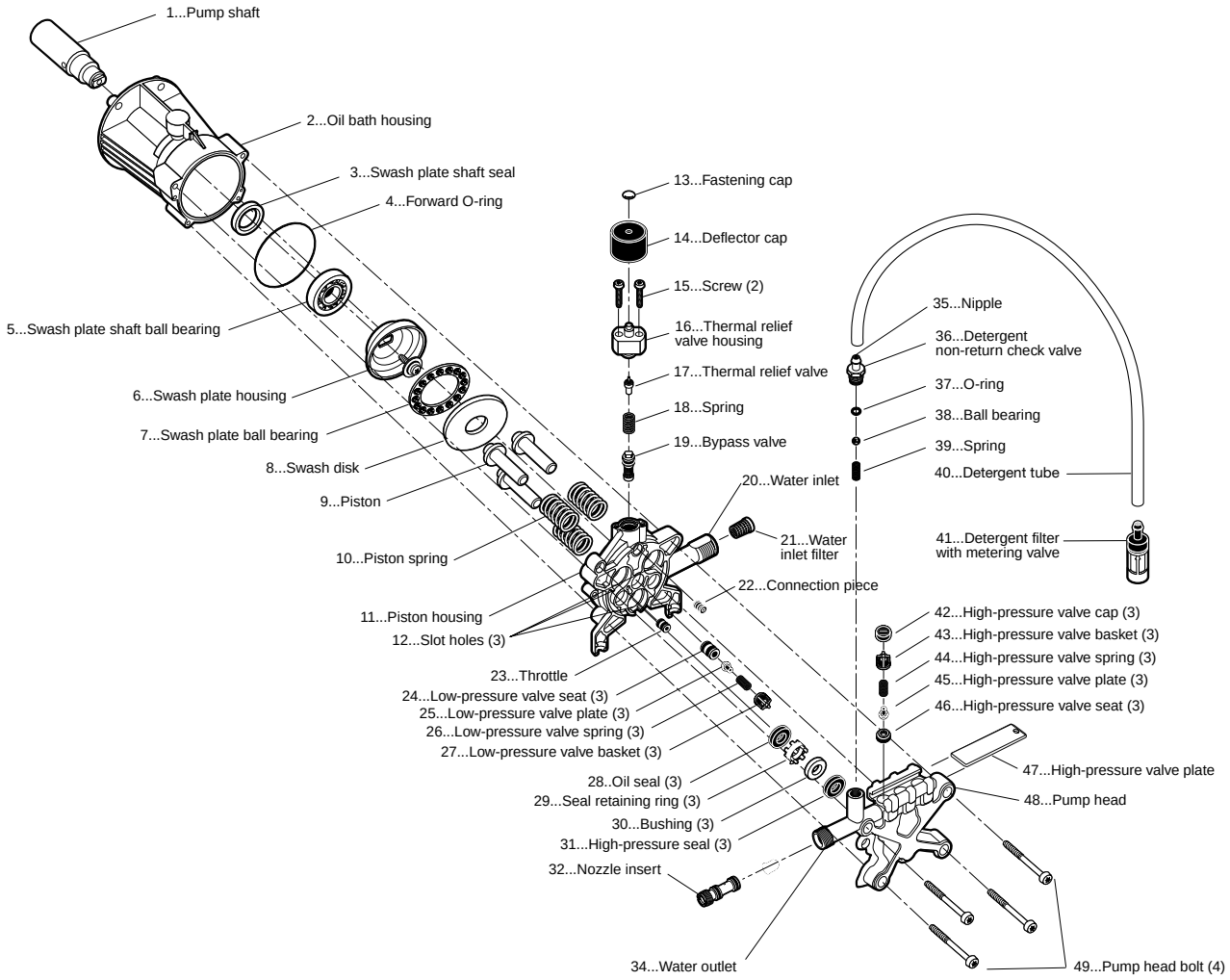


figure 15

3. Reassemble pump head.



Problems That Cause Oil Leaks

A. Oil Reservoir

If the oil bath housing (2) is overfilled, oil will leak.

B. Weep Holes – Oil Seals or Piston Damage

If oil is leaking from the weep holes (12) , there is a leak in the oil seals (28 or 31) or there is piston damage.

C. Pump Shaft Seal

A damaged or worn pump shaft seal (3).

A. Oil Reservoir

1. Oil level should be 1/8”above swash disk. Overfilling causes oil leaks. (figure 16)

figure 16

B. Weep Holes – Oil Seals

1. Remove piston guide housing and water inlet housing.
2. Pull out piston guide assembly.
3. Drain oil into suitable container.
4. Turn over piston guide housing and pry out bushings. (figure 17)

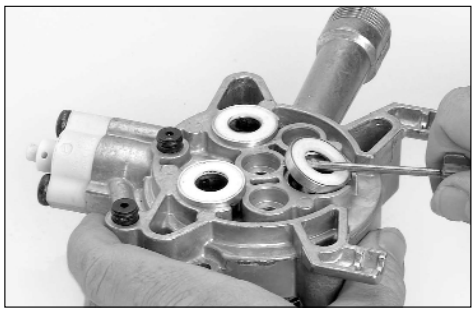


Figure 17

5. Inspect bushings and replace if necessary.
6. Remove the three oil seals with flat head screwdriver. (figure 18)

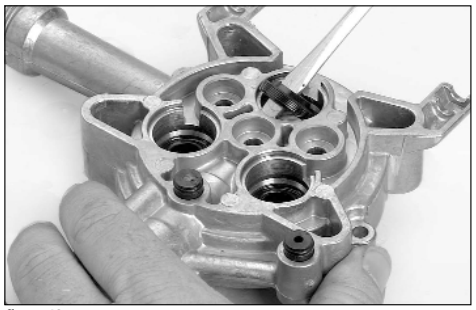


figure 18

7. Inspect oil seals and replace if necessary.
   - Soak new oil seals in water for 10 minutes. (inset figure 19)
   - Make sure housing is clean and dry.
   - Place oil seal in to recessed end of installation tool. Groove in seal should face oil. Brass sleeve is not used.
   - Do not grease groove in oil seal.

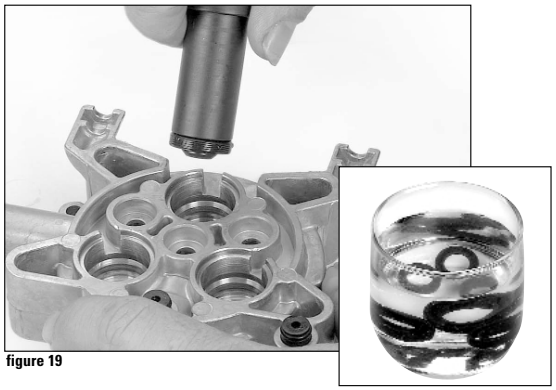


figure 19

   - Place seal in housing using installation tool. (figure 19)
   - Push until seal hits bottom.
7. Check pistons for damage and scoring. (figure 20) Replace if necessary.

Figure 20

8. Clean piston surface.
9. Reassemble.

C. Pump Shaft Seal

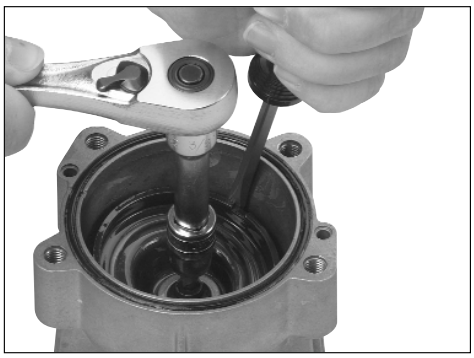


figure 21

1. Unscrew nut on swash plate housing (figure 21) and remove.

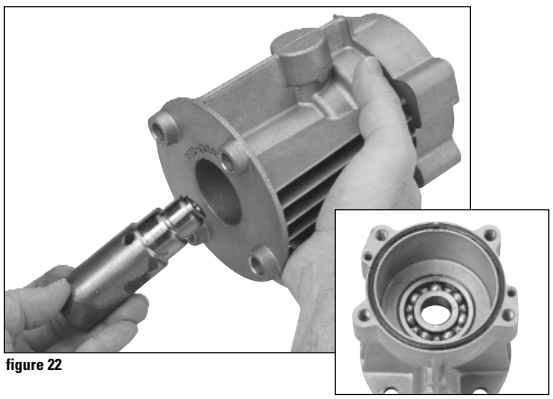


figure 22

2. Remove the pump shaft from the rear of the oil bath housing.

figure 23

3. Turn housing over and knock out the bearing by tapping it towards the front of the oil the reservoir using a suitable tool. (figure 22)

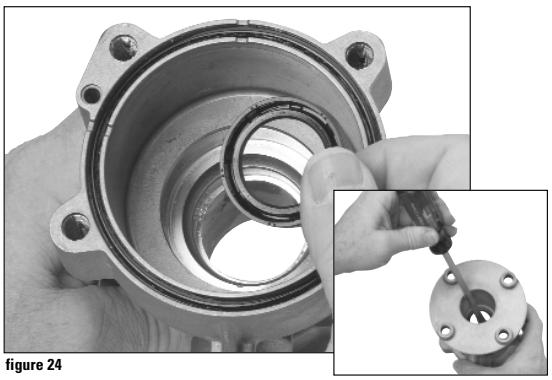
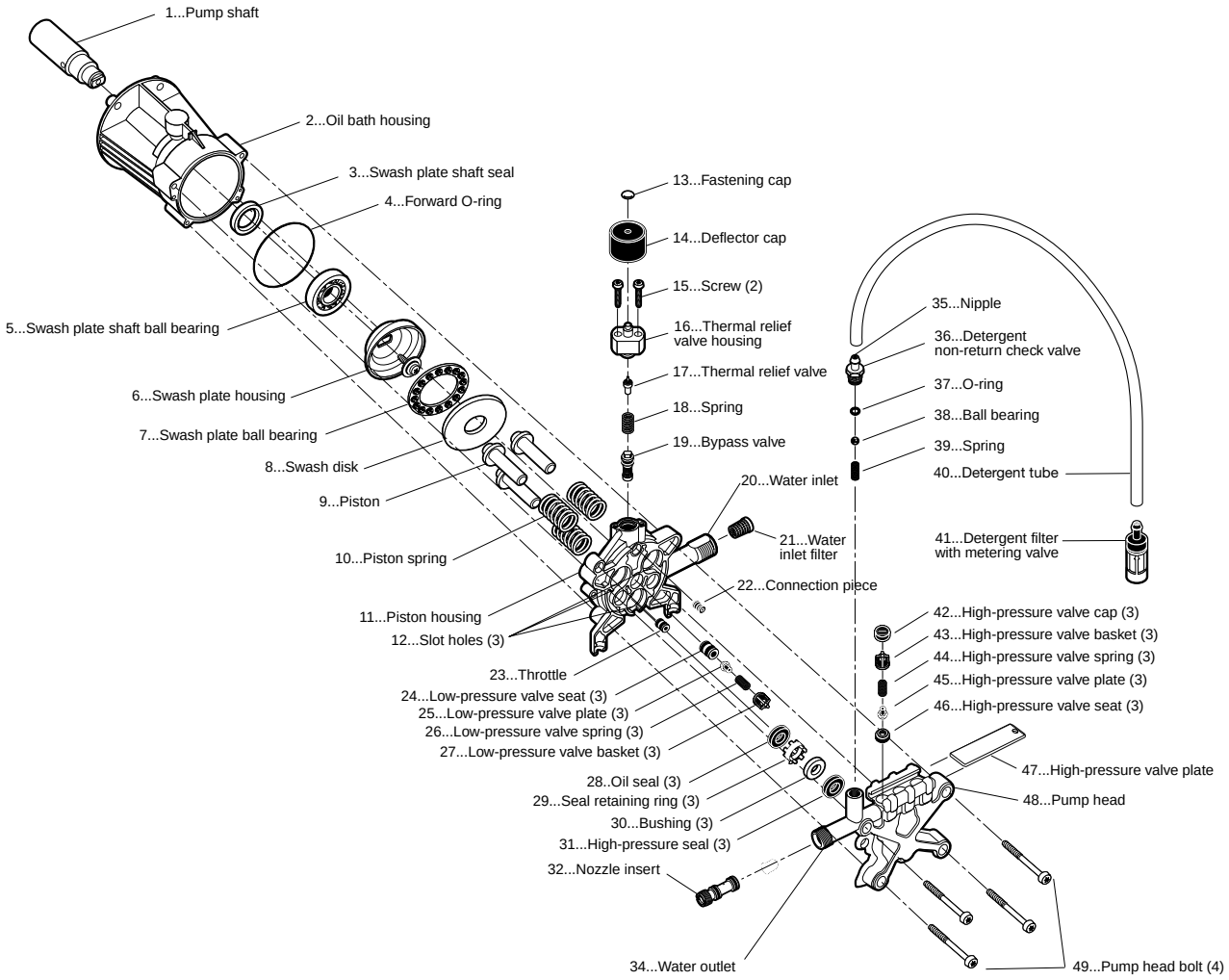


figure 24

3. Remove the pump shaft seal by tapping the seal towards the front of the oil reservoir using a suitable tool. (inset figure 24)
4. Clean pump shaft seal surface.
   - To replace pump shaft seal, place seal into oil bath housing. (figure 23).
   - Push into place.



Detergent Delivery Failure

A. Pump Not Drawing Detergent or Water Exiting Detergent Tube

Detergent filter (41) or check valve (36) may be clogged or damaged.
High-pressure nozzle on trigger gun may be damaged.

B. Pump Is Cycling

Nozzle insert (32) is damaged and must be replaced.

SECTION 4 / DETERGENT DELIVERY FAILURE SOLUTIONS

A. Pump Not Drawing Detergent or Water Exiting Detergent Tube
B. Pump is Cycling

1. Pump Not Drawing Detergent or Water Exiting Detergent Tube

1. Check that nozzle is in low/chemical position. (figure 25)
2. Check that metering valve on pickup filter is open. (figure 25)
3. Check pickup filter for clogs.

figure 25

4. Check detergent tube for holes and kinks.
5. Remove detergent check valve assembly.
   - Remove detergent tube.
   - Unscrew nipple.

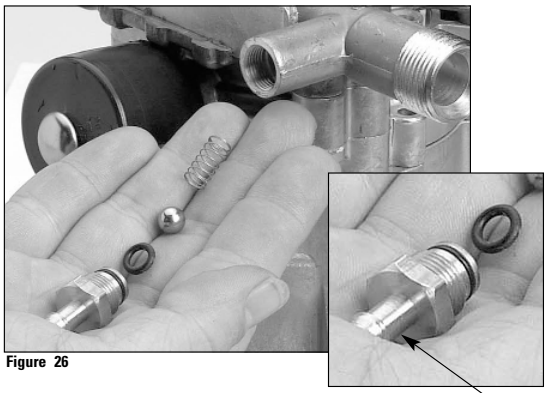


Figure 26

   - Remove detergent check valve. (figure 26)
   - Inspect O-ring, ball and spring. (inset figure 26)
   - If necessary, replace ball, spring and O-ring.
   - If ball sticks to O-ring, use screw driver or paper clip to push ball back.

Note: Leaving detergent in pump will cause ball to stick.

6. Put silicone grease on hose nipple and place O-ring on nipple. The grease holds the O-ring to the nipple.
7. Reassemble, placing spring behind ball to push against detergent check valve.
8. Reassemble and reinstall nipple and hose.

B. Nozzle Insert

1. Remove nozzle insert with a screwdriver. (figure 27)
2. Pull out nozzle insert. (figure 28)

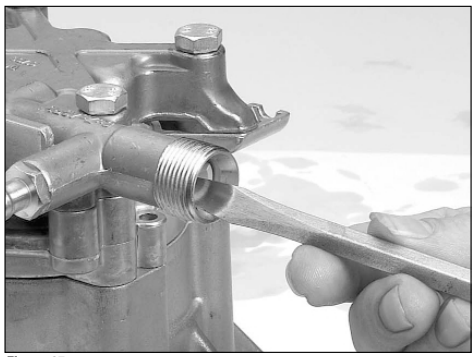


Figure 27

3. Check nozzle for wear and damage.
4. Check that opening through nozzle is not clogged and clear if necessary.

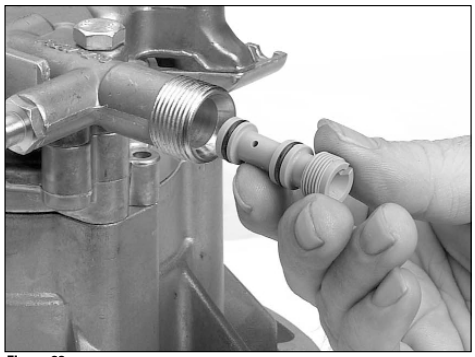


Figure 28