

SCW 2.4/25G

Service Manual



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1 Preface

Good service work requires extensive and practice-oriented training as well as well-structured training materials. Hence we offer regular basic, advanced and expert training programs covering the entire product range for all certified distributor technicians. In addition to this, we also prepare service manuals for important appliances—these can be initially used as instruction guides and later on as reference guides. Apart from this, we offer regular information about product enhancements and their servicing.

If you should require additional assistance, have corrections or questions regarding this document, please do not hesitate contacting us at: www.karcher.com/us and click on customer feedback to enter any info you may have for us or you can also contact any of our Technical Support Specialists at 800-347-6116.

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2 Safety instructions

Service and maintenance tasks may only be performed by qualified and specially trained specialists.

Observe safety information in the chapters!

⚠ DANGER

Please read the operating instructions for your machine before using it, and pay particular attention to the following safety instructions.

Warning and information plates on the machine provide important directions for safe operation.

Apart from the notes contained herein the general safety provisions and rules for the prevention of accidents of the legislator must be observed.

Switch off the appliance and, in case of appliances connected to mains, pull out the power cord before cleaning and performing any maintenance tasks on the machine.

Relieve the high pressure system of all pressure prior to all work on the appliance and the accessories.

Only use accessories and spare parts which have been approved by the manufacturer. The exclusive use of original accessories and original spare parts ensures that the appliance can be operated safely and trouble free.

Only use the fuels specified in the Operations

Manual. Risk of explosion due to the use of inappropriate fuels.

In petrol engine appliances, ensure that no petrol comes in contact with hot surfaces.

Ensure that there is adequate ventilation or provision for diverting the exhaust gas while operating the appliance in closed rooms (risk of poisoning).

Do not close the exhaust.

Please ensure that there are no exhaust emissions near the air inlets.

Do not use high pressure cleaners when there has been an oil spill; move the appliance to another spot and avoid any sort of spark formation.

Do not store, spill or use fuel in the vicinity of open flames or appliances such as ovens, boilers, water heaters, etc. that have an ignition flame or can generate sparks.

Do not use unsuitable fuels, as they may be dangerous.

Keep even mildly inflammable objects and materials away from the muffler (at least 2 m).

⚠ Warning

Do not bend over the exhaust or touch it.

2.1 Hazard levels

⚠ DANGER

For an immediate danger which can lead to severe injuries or death

⚠ WARNING

For a possibly dangerous situation which could lead to severe injuries or death.

⚠ CAUTION

For a possibly dangerous situation which can lead to minor injuries or property damage.

ATTENTION

Pointer to a possibly dangerous situation, which can lead to property damage.

3 Description in this service manual

3.1 Service groups

Example: Remove/install ANRA wheel axle

AN	RA	Remove/install wheel axle
Service group	Component	Activity

4 Technical Features

Water inlet with large water filter	Trigger gun
Hot water inlet up to 60° C max	Spray lance
Engine switch	Power nozzle
Devices with gas engine (depending on engine model)	Compact frame
3-piston crankshaft pump, piston with ceramic sleeves	Flat free tires
Pump head made of brass	21" stainless steel surface cleaner
Suction and high-pressure valves made of stainless steel	Folding handle
Unloader / bypass valve	Bristle brush skirt

4.1 Intended use

Flat surface cleaning—I.E. Business entrances, parking lots, tennis courts, pool decks and sidewalks

4.2 Field of application

This service manual describes the following appliance:

Appliance type	Appliance no.	Operating instructions	Spare parts list
SCW 2.4/25 G	1.107-380.0	9.802-898.0	9.802-898.0

4.3 Safety installations

Safety devices serve to protect the user and must not be rendered in operational or their functions bypassed.

Observe safety information in the chapters!

4.4 Safety catch

The safety catch on the trigger gun prevents the appliance from being switched on unintentionally.

4.5 Unloader / bypass valve

If the hand trigger bar or trigger gun is closed, the unloader / bypass valve opens and the entire water volume will flow back to the suction side of the pump.

The unloader / bypass valve is set by the manufacturer and sealed. Setting should only be performed by trained technical service personnel.

4.6 Thermal relief valve

The thermal relief valve helps to protect the high-pressure pump from unacceptable heating during released trigger operation.

4.7 Symbols on the machine



Keep hands and feet away from rotating spray bar.

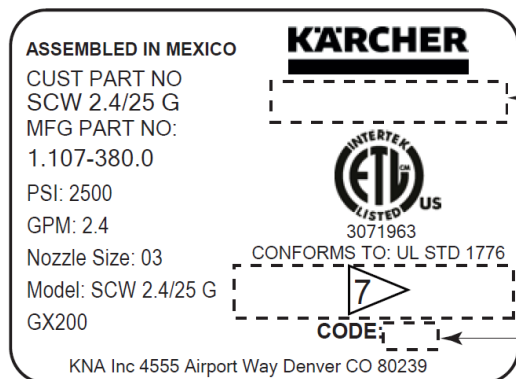


This product and accessories may contain a chemical known to the State of California to cause cancer and birth defects or other reproductive harm. Operation of this product may create sparks that can start fires around dry vegetation. A spark arrestor may be required. The operator should contact local fire agencies for laws or regulations relating to fire prevention requirements.



Read operator's manuals for both this unit and the attached machine before operating. This machine to be used only by qualified operators. High pressure developed by the machine attached to this unit can cause personal injury. Use caution when operating. Do not direct discharge stream at persons or severe injury will result. Keep hands and feet away from rotating spray bar. High pressure can cause dirt and other particles to become airborne and fly at high speeds. Eye protection, safety clothing and foot protection must be worn when using this equipment. Spray gun kicks back — hold with both hands. Before disconnecting hose, turn attached machine off and open spray gun to relieve pressure.

4.8 Type plate



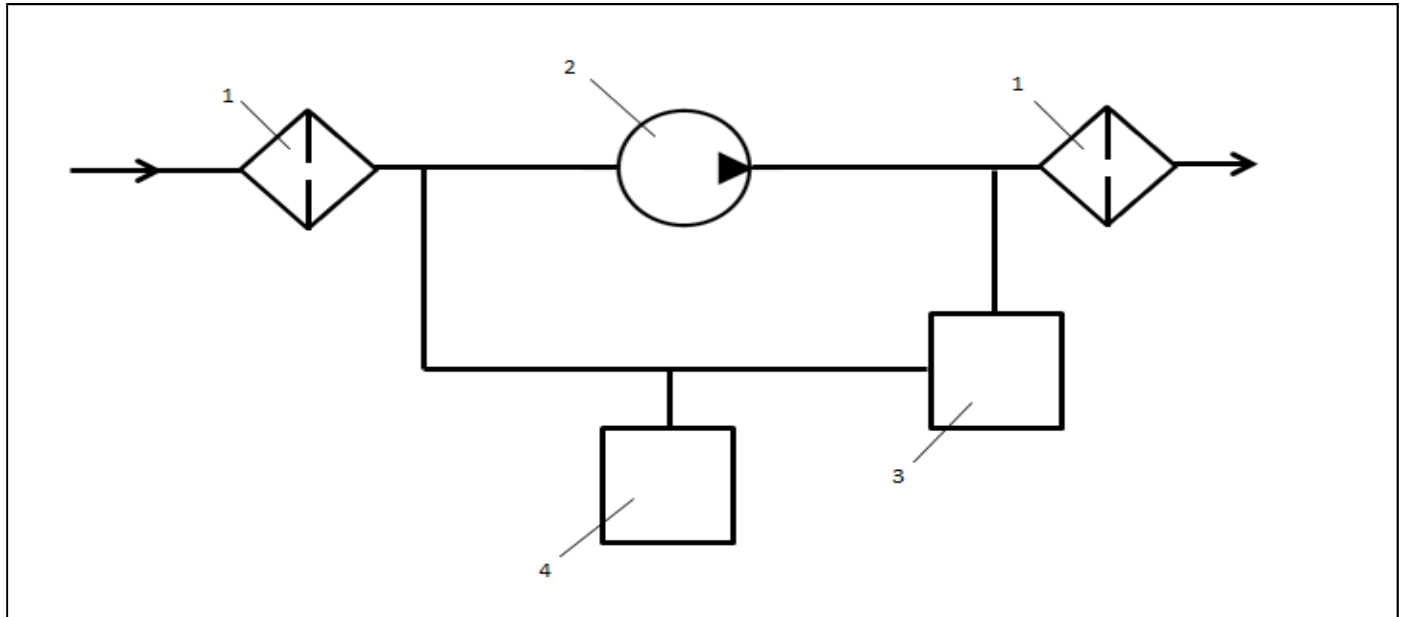
The type plate is located on the frame, next to the engine.

6. Code consisting of 2 digit for week and 2 digit for year machine was manufactured

7. Bar code consisting of part number and serial number

8. Code consisting of part number—serial number

4.9 Flow pattern



1 Water filter

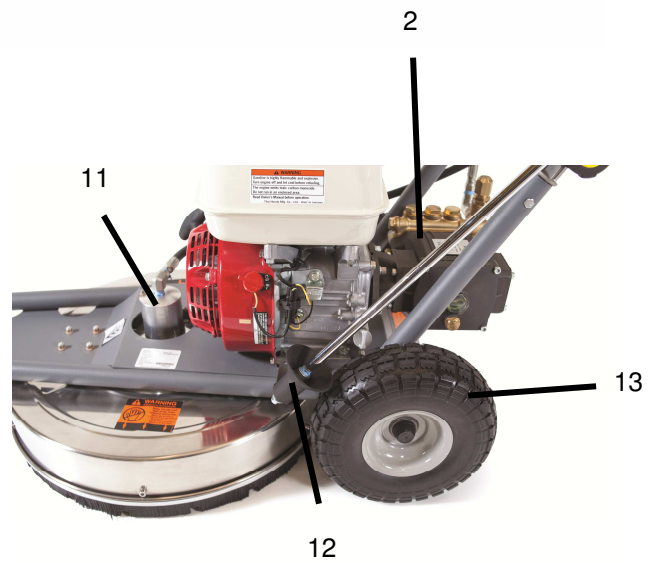
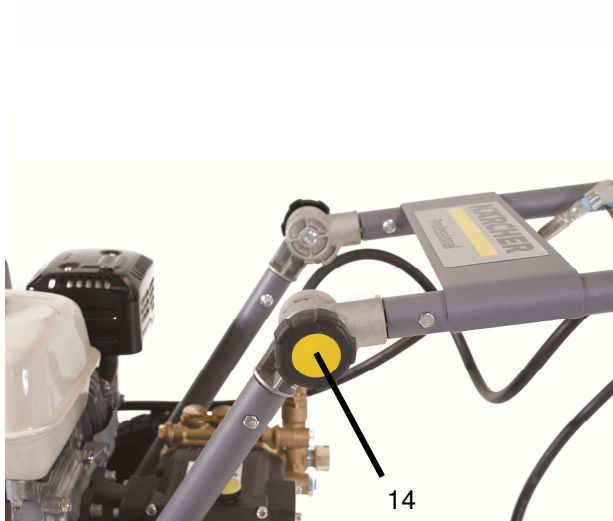
2 High-pressure pump

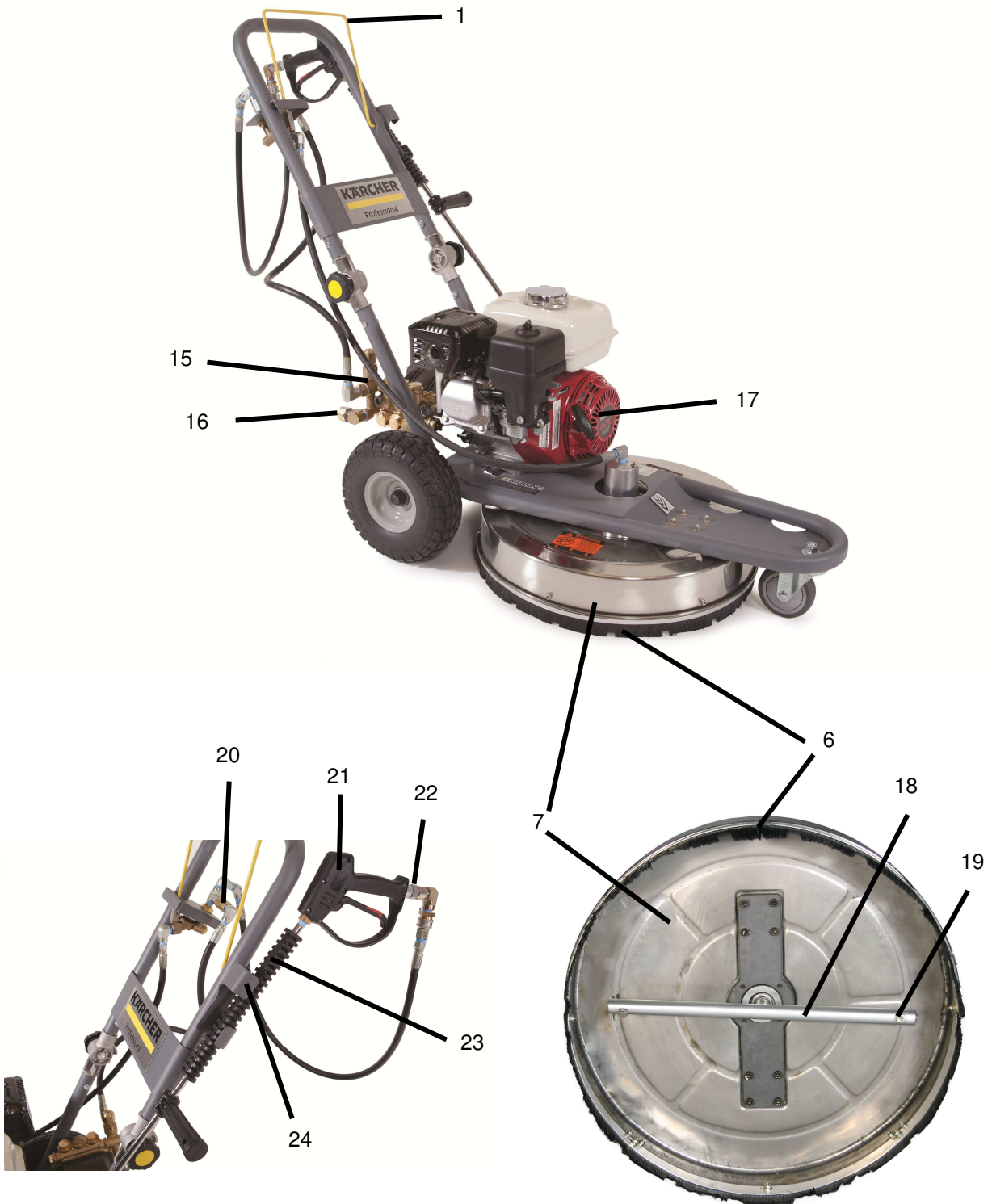
3 Unloader valve

4 Thermal relief valve

5 Overview of the appliance

5.1 Call outs SCW 2.4/25G



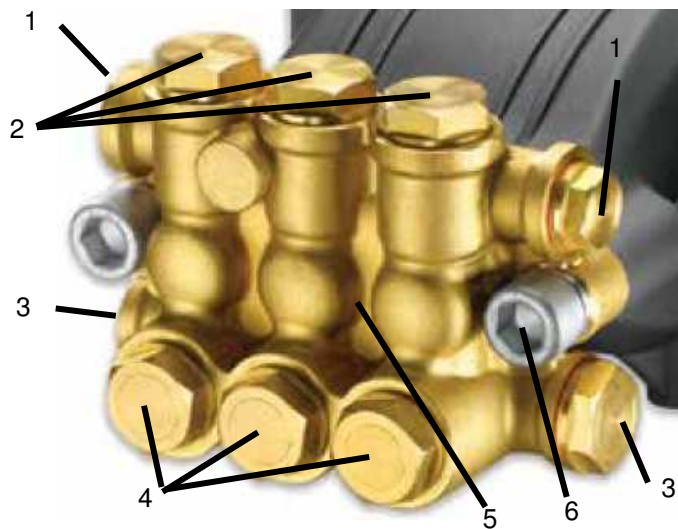




- | | |
|----------------------------|-------------------------------|
| 1 Trigger bar | 13 Tire, flat free |
| 2 Pump, pressure | 14 Knob, handle adjustment |
| 3 Tank, gas | 15 Unloader / by-pass valve |
| 4 Filter, air | 16 Inlet, fresh water |
| 5 Caster, front | 17 Starter, manual, recoil |
| 6 Brush skirt | 18 Spray bar |
| 7 Surface cleaner | 19 Nozzle |
| 8 Dip stick, oil, engine | 20 Filter, high pressure |
| 9 Switch, on/off | 21 Gun, trigger |
| 10 Dip stick, oil, pump | 22 Swivel, high pressure |
| 11 Swivel, surface cleaner | 23 Wand, spray, high pressure |
| 12 Storage for spray wand | 24 Holder, wand |

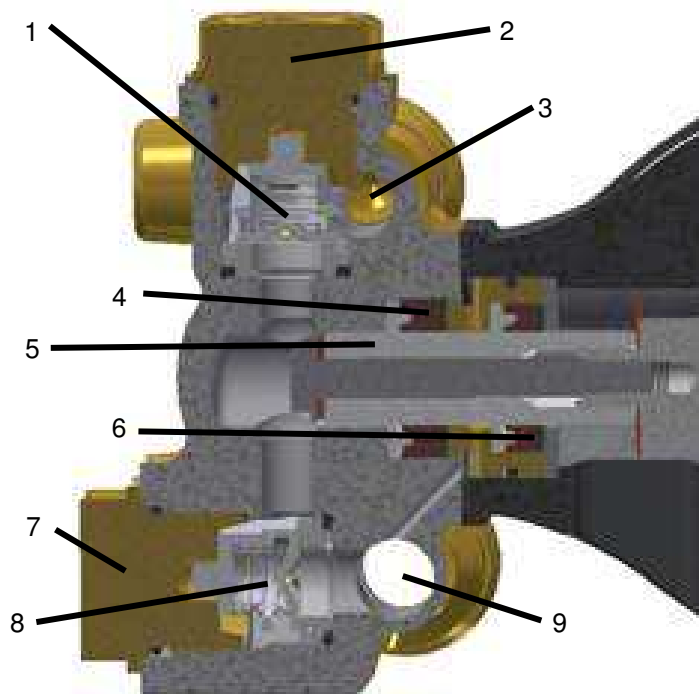
5.2 Pump overview

5.2.1 Pump head overview



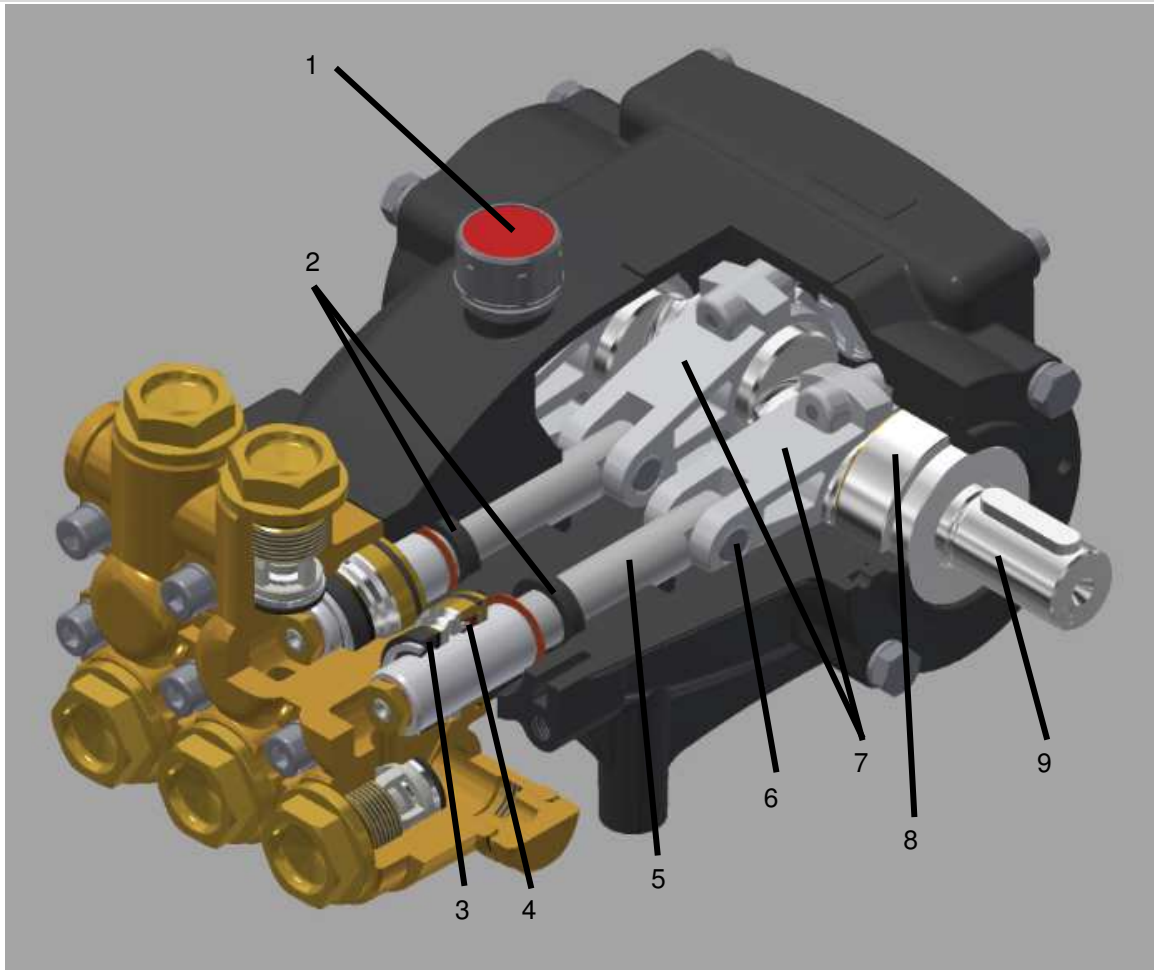
- 1 Outlet ports
- 2 Outlet / high pressure valve caps
- 3 Inlet ports
- 4 Inlet / low pressure valve caps
- 5 Manifold
- 6 Manifold bolt

5.2.2 Pump head cross-section overview



- 1 Outlet high pressure check valve
- 2 Outlet / high pressure valve cap
- 3 Outlet port
- 4 High pressure packing
- 5 Ceramic piston
- 6 Low pressure packing
- 7 Inlet / low pressure valve cap
- 8 Inlet / low pressure check valve
- 9 Inlet port

5.2.3 Pump cross-section overview



1 Dipstick, oil

2 Oil seal

3 High pressure packing

4 Low pressure packing

5 Piston guide

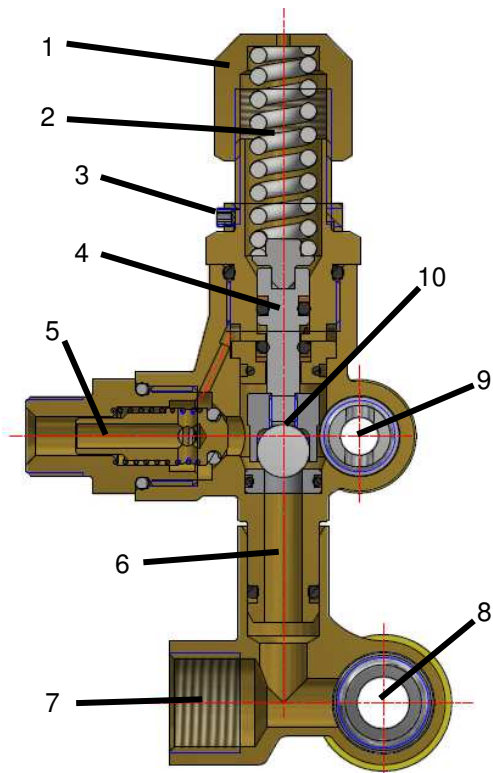
6 Wrist pin

7 Connecting rod

8 bearing, crankshaft

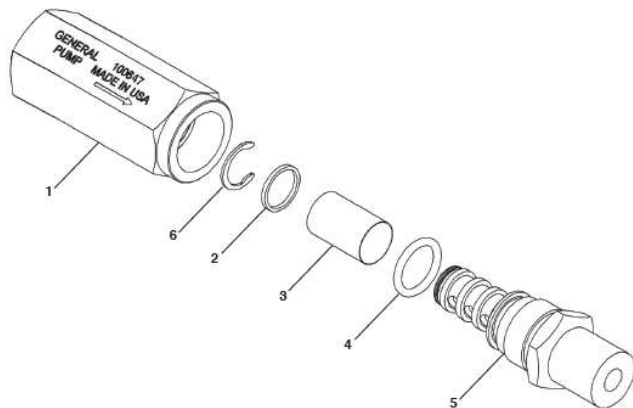
9 Crankshaft

5.3 Unloader / Bypass valve overview



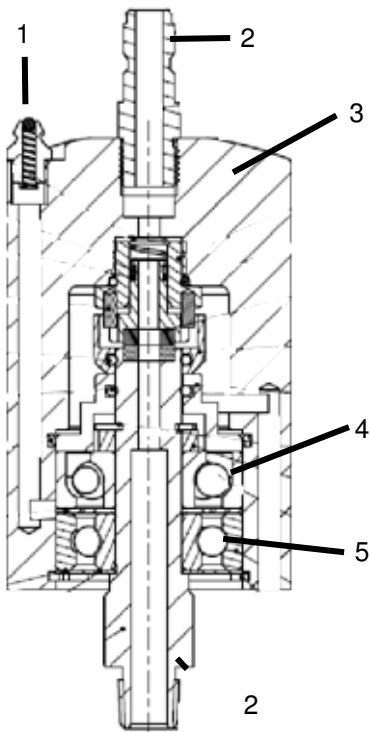
- 1 Knob, adjustment, by-pass pressure
- 2 Spring, pressure
- 3 Nut, lock
- 4 Piston, stem
- 5 Outlet port
- 6 By-pass port
- 7 Inlet port
- 8 Banjo bolt, inlet, pump
- 9 Banjo bolt, outlet, pump
- 10 Ball subassembly

5.4 Filter, high pressure overview



- 1 Housing, nozzle filter, 1/4 NPT-F
- 2 Retainer, filter
- 3 Screen, 100 Mesh, T304SS
- 4 O-Ring, 70 Duro, Buna-N
- 5 Outlet fitting, nozzle filter, 1/4 NTP-M
- 6 Retainer, external, SS

5.5 Swivel, High pressure overview

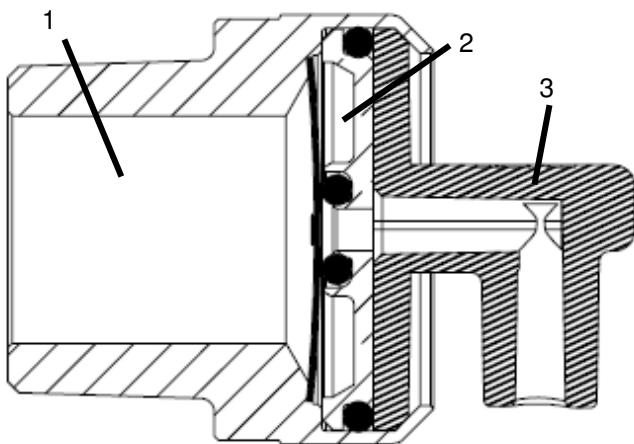


- 1 Grease nipple
- 2 Rotor shaft
- 3 Swivel housing
- 4 Upper bearing
- 5 Lower bearing

The Surface Cleaner Unit high pressure swivel will “weep” water from underneath the cover. This weeping is normal for this swivel. The swivel uses water to lubricate its floating seal face to keep wear down to a minimum.

Also, the high pressure swivel is equipped with a grease fitting and should be greased at least **once every three months**. A good quality ball bearing grease is recommended. **DO NOT OVER GREASE THE BEARING!**

5.6 Thermal relief valve overview



- 1 inlet port
- 2 Thermal plate
- 3 Outlet directional elbow

The thermal relief valve protects the pump from damaging heat build-up while the unit is in bypass mode. Sensing a rise in temperature, the valve opens and discharges a small amount of heated fluid. This allows cooler water to enter the system and cool the pump. When the unit starts cleaning mode the cooler water entering the pump will cause the valve to close immediately.

6 Service group

6.1 Scheduled maintenance chart

MAINTENANCE ITEM	ACTION	TIME FRAME	REFERENCE SECTION
ENGINE OIL	Inspect	Daily	6.4.1
	Change	First 5 hrs. Every 50 hrs. or every 6 months after first month	6.4.2
AIR CLEANER/FILTER	Inspect	Every 50 hours	6.4.3
	Clean	Monthly or as needed	6.4.4
ENGINE FUEL FILTER	Change	500 hours or 6 months	6.4.5
FUEL LINES	Change	Annually	6.4.6
FUEL TANK	Clean	Annually	6.4.7
SPARK PLUG	Check—adjust	100 hours or 6 months	6.4.8
	Change	300 hours or yearly	6.4.9
PUMP OIL	Inspect	Oil level daily	6.4.10
	Change	After first 50 hours, then every 500 hours or annually	6.4.11
SURFACE CLEANER SWIVEL	Weeping	Swivel will weep underneath cover. Weeping is normal. Swivel uses water to lubricate it's floating seal	Not shown
	Grease	Every 3 months	6.4.12
HIGH PRESSURE NOZZLE(S)	Change	6 months	6.4.13
QUICK CONNECTS/O-RINGS	Change	Annually / As needed	6.4.14
HIGH PRESSURE WATER SCREEN/FILTER	Clean	Weekly / Replace as needed	6.4.15
HIGH PRESSURE HOSE	Replace	Annually (if there are any signs of wear)	Not shown

6.2 Trouble shooting chart



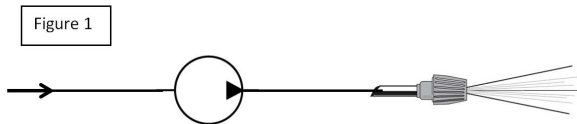
Troubleshooting is defined as a systematic approach to problem solving. Gathering information on the problem issue and eliminating what works in the system to narrow down to what doesn't work.

COMPONENT AREA	PROBLEM	TROUBLESHOOTING REFERENCE SECTION
ENGINE ISSUES	Karcher does not support nor warranty engines used on this piece of equipment. It is recommended that all issues be taken to an authorized engine repair center.	
INADEQUATE CLEANING POWER / LOW PRESSURE ISSUES	Understanding the difference between low, cavitation and pulsating pressure	6.3.1
	Pulsating	6.3.2
	Cavitation	6.3.3
	Low pressure	6.3.4
SPRAY BAR WON'T SPIN	Spray bar not spinning	6.3.5
EXCESSIVE VIBRATION OF SURFACE CLEANER OR CLEANER BASE IS CREATING A SUCTION TO THE SURFACE	Vibration	6.3.6
CLEANING PATTERN NOT GOOD / STREAKING	Cleaning pattern is "streaked"	6.3.7
SPRAY BAR SWIVEL LEAKING WATER	Spray bar swivel is "weeping" or dripping water	6.3.8.1
	Spray bar swivel is leaking lots of water	6.3.8.2
WATER LEAKING FROM THERMAL RELIEF VALVE	Water is leaking out of thermal relief valve	6.3.9
WATER LEAKING FROM UNDER PUMP	Water is leaking from under pump	6.3.10
OIL LEAKING FROM UNDER PUMP	Oil is leaking from under pump	6.3.11
PUMP OIL IS MILKY	Pump oil is milky	6.3.12
PRESSURE WASHER UNLOADER CYCLES WHEN TRIGGER AND SPRAY BAR TRIGGER IS RELEASED	Pressure washer unloader is cycling	6.3.13

6.3 Trouble shooting process

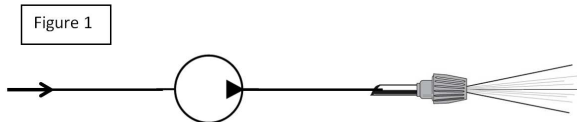
6.3.1 Understanding the difference between low, cavitation and pulsating pressure

Pulsation is the feeling in your hand when holding the trigger gun and/or wand that feels like a water pick. It is caused by an interruption in the high pressure stream. Figure 1 represents a constant pressure washing stream.



Cavitation is the fluctuation of pressure up and down and is caused by air being drawn into the suction side of the pump. The water gaps or air bubbles will “explode” when the water is trying to be pressurized producing vibration, noise and damage to many components.

Figure 1 represents a constant pressure washing stream.



Low pressure is the result of lower volume passing through the nozzle or the resistance of the nozzle being less than designed.

Figure 1 represents a correct pressure washing stream.

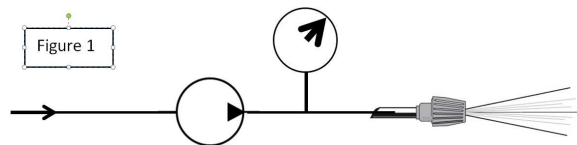


Figure 2 represents a pulsation in a pressure washer stream.

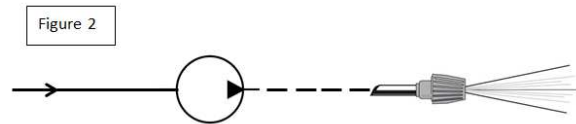
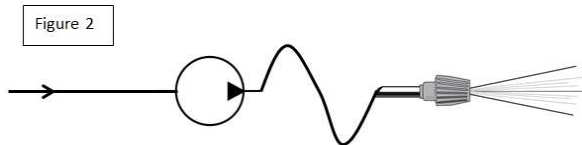
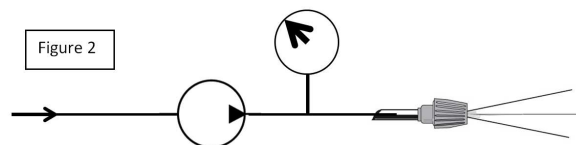


Figure 2 represents a cavitation in a pressure washer stream where the pressure fluctuates up and down.



Most common causes of cavitation are air being drawn into the system from loose/broken inlet fittings, kinked or restricted inlet flow or heat.

Figure 2 represents a low pressure stream.



6.3.2 Pulsation

1. Inspect the inlet and outlet check valves for debris, function and condition. See section 6.5.1. If check valves are good continue to #2.
2. Inspect packings, ceramic pistons and connecting rod connection. See section 6.5.2. If packings, pistons and connecting rod connects are good continue to #3.
3. Call Technical support for further instruction.

6.3.3 Cavitation

1. Inspect the inlet screen for debris, function and condition. See section 6.5.3. If inlet screen is good continue to #2.
2. Connect an adequate water supply to inlet of machine. NOTE: an adequate water supply is 1 gallon a minute more the specification of the machine no more than 8 bar (116 PSI). Visually inspect the machine for ANY water drips or leaks, including under pump. Drips or leaks from the inlet plumbing can allow air to be introduced into the water stream when pump is working. If there are no leaks continue to #3.
3. Remove thermal protector and plug plumbing where thermal protection was (only for testing purposes). See section 6.5.4. If thermal protector is good continue to #4
4. Inspect packings and ceramic pistons. See section 6.5.2. If packings and ceramic pistons are good continue to #5
5. Call Technical support for further instruction.

6.3.4 Low pressure

1. Inspect the pressure nozzles. See section 6.4.13. If the nozzles are good continue to #2.
2. Test pressure reading at trigger gun quick disconnect. See section 6.5.5. If pressure reading is low continue to #3.
3. Inspect the high pressure filter. See section 6.4.15. If pressure reading is low continue to #4
4. Remove unloader outlet hose. Install test gauge, test hose, trigger gun and correct size nozzle. Test pressure washer. See section 6.5.6. If pressure tests low continue to #5
5. Remove the unloader valve and test the pump for pressure. NOTE: **DO NOT STOP THE OUTLET WATER STREAM** See section 6.5.7. If pressure tests low continue to #6
6. Inspect packings, ceramic pistons, and connecting rods. See section 6.5.2. If pieces are good continue to #7.
7. Call Technical support for further instruction.

6.3.5 Spray bar will not spin

1. Inspect swivel See section 6.5.8. If the swivel is good continue to #2.
2. Inspect the pressure nozzles. See section 6.4.13. If the nozzles are good continue to #3.
3. Test for low pressure. See section 6.2. If pressure tests good continue to #4
4. Call Technical support for further instruction.

6.3.6 Vibration

1. Inspect the pressure nozzles. See section 6.4.13. If the nozzles are good continue to #2.
2. Inspect spray bar. See section 6.5.9. If the spray bar is in good condition continue to #3.
3. Inspect spray bar bolts and fittings. See section 6.5.10. If the spray bar bolts and fittings are in good condition continue to #4
4. Inspect swivel. See section 6.5.8. If the swivel is good continue to #5
5. Inspect for cavitation. See section 6.2. If cavitation is not the issue continue to #6
6. Call Technical support for further instruction.

6.3.7 Streaked cleaning pattern

1. Inspect the pressure nozzles. See section 6.4.13. If the nozzles are good continue to #2.
2. Inspect spray bar rotation. See section 6.5.9. If the spray bar rotation is good continue to #3.
3. Inspect for pulsation. See section 6.2. If machine does not have a pulsation issue continue to #4
4. Inspect for low pressure. See section 6.2. If machine does not have a low pressure issue continue to #5
5. Inspect cleaning speed. See section 6.5.11. If cleaning speed is good continue to #6.
6. Call Technical support for further instruction.

6.3.8 Spray bar swivel leaking water

6.3.8.1 “Weeping” / dripping

1. The swivel will weep underneath cover. Weeping is normal. The swivel uses water to help lubricate it's floating seal.

6.3.8.2 Leaking

1. Inspect the plumbing fittings going to and out of the spray bar swivel. See section 6.5.8. If the plumbing fittings are good continue to #2.
2. Rebuild or replace spray bar swivel. See section 6.5.13. If leaking continues continue to #3.
3. Call Technical support for further instruction.

6.3.9 Replacing leaking thermal relief valve

The thermal relief valve protects the pump from damaging heat build-up while the unit is in bypass mode. Sensing a rise in temperature, the valve opens and discharges a small amount of heated fluid. This allows cooler water to enter the system and cool the pump. When the unit starts cleaning mode the cooler water entering the pump will cause the valve to close immediately. If cold water is leaking out of the thermal relief valve then it probably has failed from being opened too many times.

1. Replace thermal relief valve. See section 6.5.12. If the thermal relief valve continues to leak continue to #2.
2. Call Technical support for further instruction.

6.3.10 Water leaking from under pump

1. Remove the pump manifold and inspect system. See section 6.5.2. If the pump parts are in good condition continue to #2.
2. Call Technical support for further instruction.

6.3.11 Oil is leaking from under pump

There are many seal point on the pump crankcase that help keep oil in the pump. Inspect all sides of the pump to determine where the oil is coming from.

1. If the oil is leaking from the back of the pump (the back of the pump is where the sight glass is—opposite of the manifold) see section 6.5.16. If the back of the pump is not leaking continue to #2.
2. If the oil is leaking from the engine side of the pump see section 6.5.17. If the oil is not leaking from the engine side of the pump then continue to #3.
3. If the oil is leaking from the opposite side of the pump (away from the engine) see section 6.5.18. If the oil is not leaking from the opposite side of the pump from the engine continue to #4
4. If the oil is leaking from under the pump manifold side see section 6.5.19. If the oil is not leaking from under the manifold or continues to leak after repairs continue to #5
5. Call Technical support for further instruction.

6.3.12 Oil is milky

Milky oil is an indication what water has been introduced to the oil.

1. Water can be introduced from cleaning the pump. The oil dipstick is also a breather and can allow water to be introduced to oil if a stream of water is used to clean the pump. If this is the cause then change the pump oil. Test machine to see if milky oil returns. If pump oil is again milky or water has not been introduced to the oil from cleaning continue to #2.
2. Water can be introduced from condensation. This can occur if the machine has been sitting a long time. If this is the cause then change the pump oil. Test machine to see if milky oil returns or water was not introduced to the oil from condensation continue to #3.
3. Water can be introduced to the oil via the pump manifold side. Inspect the water moving side of the pump. See section 6.5.2. If the water moving side of the pump looks good or oil continues to become milky continue to #4.
4. Call Technical support for further instruction.

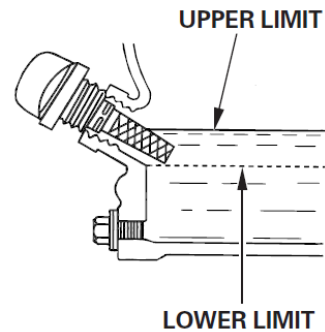
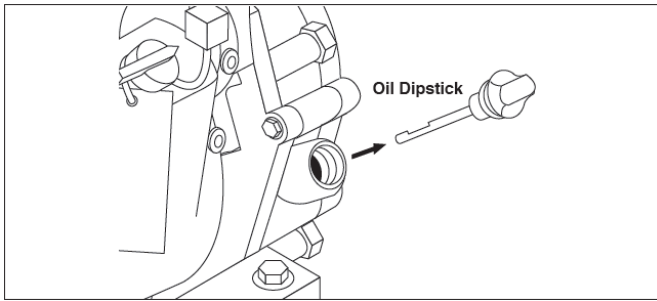
6.3.13 Pressure washer unloader cycles when trigger or spray bar trigger is released

If the pressure trapped on the outlet side of the unloader is released the unloader will think the trigger has been pulled and will come out of bypass. If the machine is not in washing mode then this is usually caused by a leak in the pressure system between the unloader and the trigger gun or spray bar on/off trigger.

1. Inspect pressure system between unloader and trigger gun and spray bar on off trigger. Repair any leaks. If there are not any leaks or the repairs didn't solve the issue continue to #2.
2. Inspect the trigger gun for leaks. See section 6.5.20. If there are not any leaks or the repairs didn't solve the issue continue to #3.
3. Inspect the spray bar on/off trigger. See section 6.5.21. If there are not any leaks or the repairs didn't solve the issue continue to #4
4. Call Technical support for further instruction.

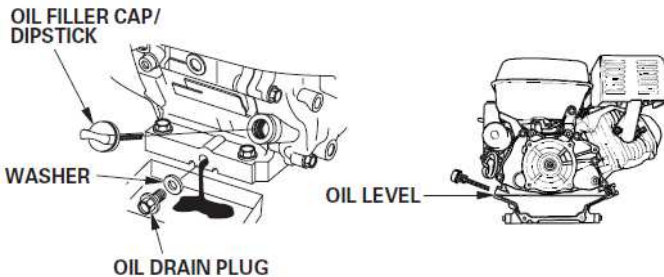
6.4 Scheduled maintenance activities

6.4.1 Inspecting engine oil



1. Check the engine oil levels daily. Oil level should be level with the bottom of the oil filler neck. Be sure the machine is level when checking the oil level. (Refer to the engine's operating manual included with the machine.) We recommend that the oil be changed after the first 5 hours of use, then once every 50 hours. **Note:** Improper oil levels will cause low oil sensor to shut off engine. **IMPORTANT! Do not run engine with high or low oil levels as this will cause engine damage.**

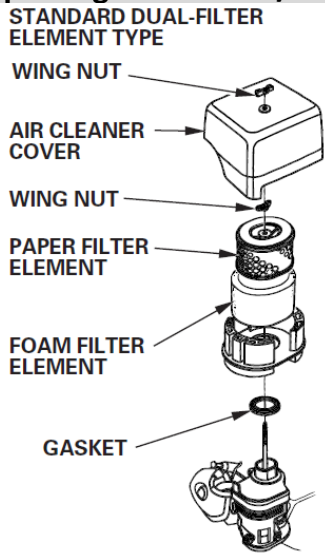
6.4.2 Changing engine oil



Drain the used oil when the engine is warm. Warm oil drains quickly and completely.

1. Place a suitable container below the engine to catch the used oil, then remove the oil filler cap/dipstick, oil drain plug and washer.
2. Allow the used oil to drain completely, then reinstall the oil drain plug and a new washer, and tighten the oil drain plug securely. **Note:** Please dispose of used motor oil in a manner that is compatible with the environment.
3. With the engine in a level position, fill with the recommended oil to the upper limit mark on the dipstick.

6.4.3 Inspecting air cleaner / filter

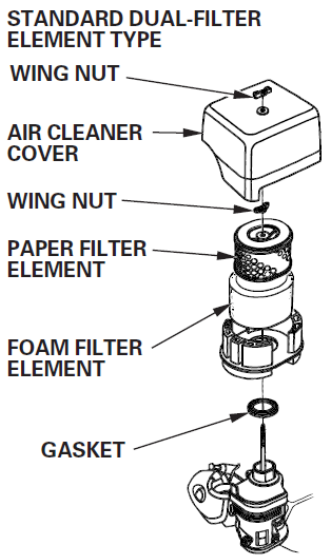


A dirty air cleaner will restrict air flow to the carburetor, reducing engine performance. If you operate the engine in very dusty areas, clean the air filter more often than specified in the maintenance schedule.

Operating the engine without an air filter, or with a damaged air filter, will allow dirt to enter the engine, causing rapid engine wear.

1. Remove the air cleaner cover
2. Inspect the filter elements and clean or replace dirty filter elements. Always replace damaged filter elements. See section 6.4.4

6.4.4 Cleaning air cleaner / filter

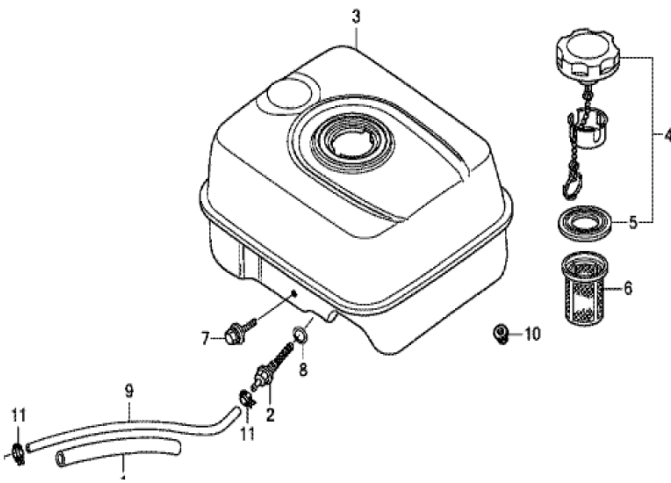


1. Foam air filter element: Clean in warm soapy water, rinse, and allow to dry thoroughly. Or clean in non-flammable solvent and allow to dry. Dip the filter element in clean engine oil, then squeeze out all excess oil. The engine will smoke when started if too much oil is left in the foam.
2. Paper air filter element: Tap the filter element several times on a hard surface to remove dirt, or blow compressed air (not exceeding 30 psi) through the filter element from the inside. Never try to brush off dirt; brushing will force dirt into the fibers.
3. Wipe dirt from the inside of the air cleaner case and cover using a moist rag. Be careful to prevent dirt from entering the air duct that leads to the carburetor.
4. Place the foam air filter element over the paper element, and reinstall the assembled air filter. Be sure the gasket is in place beneath the air filter. Tighten the air filter wing nut securely.
5. Install the air cleaner cover and tighten the wing nut securely.

A dirty air cleaner will restrict air flow to the carburetor, reducing engine performance. If you operate the engine in very dusty areas, clean the air filter more often than specified in the maintenance schedule.

Operating the engine without an air filter, or with a damaged air filter, will allow dirt to enter the engine, causing rapid engine wear.

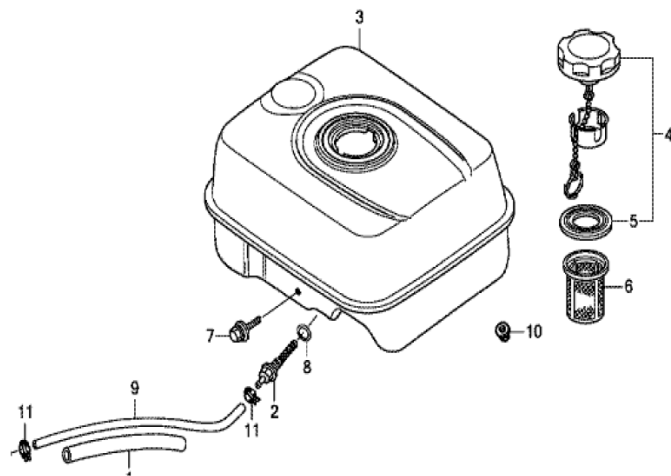
6.4.5 Changing fuel filter



The engine fuel filter should be changed every 500 hours or 6 months. The fuel filter is located in the fuel tank (#2).

1. Drain the fuel tank of all the gas.
2. Remove the bolts holding the fuel tank to the engine.
3. Remove the fuel tank from the engine.
4. Clean the fuel tank with a wire brush.
5. Wash the fuel tank with a degreaser.
6. Rinse the fuel tank with water.
7. Dry the fuel tank with a clean cloth.
8. Reinstall the fuel tank on the engine.
9. Fill with fuel and inspect for leaks. Do not run engine if there are any leaks in fuel tank or fuel line system.

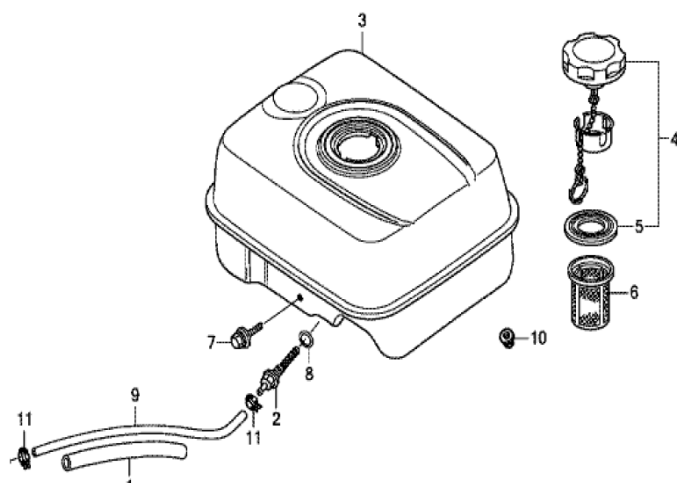
6.4.6 Changing fuel line—engine



The engine fuel lines should be changed annually.

1. Drain the fuel tank of all the gas.
2. Carefully remove the fuel line (#11) from the fuel filter barb and carburetor.
3. Install new fuel line.
4. Fill with fuel and inspect for leaks. Do not run engine if there are any leaks in fuel tank or fuel line system.

6.4.7 Cleaning fuel tank—engine

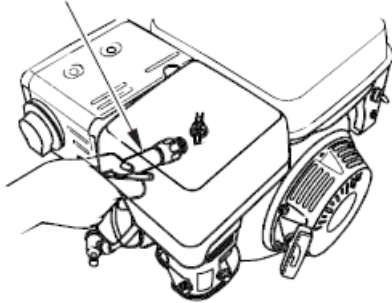


The engine fuel tank should be cleaned annually.

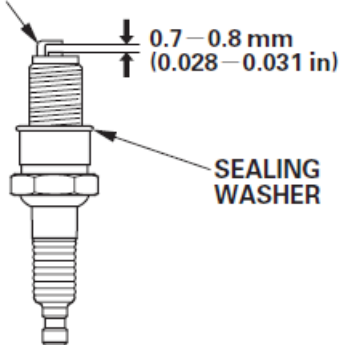
1. Drain the fuel tank of all the gas.
2. Remove the bolts holding the fuel tank to the engine.
3. Carefully remove the fuel line (#11) from the fuel filter barb.
4. The filter is threaded into the tank and can be seen when looking into the fuel tank. Inspect the filter to see if it needs to be replaced. See section 6.4.5.
5. Clean the fuel tank with non-flammable solvent, and allow it to dry thoroughly.
6. Install fuel tank back on to engine.
7. Install fuel line. Make sure to inspect the fuel line and replace if needed. See section 6.4.6.
8. Fill with fuel and inspect for leaks. Do not run engine if there are any leaks in fuel tank or fuel line system.

6.4.8 Checking / adjusting spark plug

SPARK PLUG WRENCH



SIDE ELECTRODE



The recommended spark plug has the correct heat range for normal engine operating temperatures. An incorrect spark plug can cause engine damage.

If the engine has been running, let it cool before servicing the spark plug.

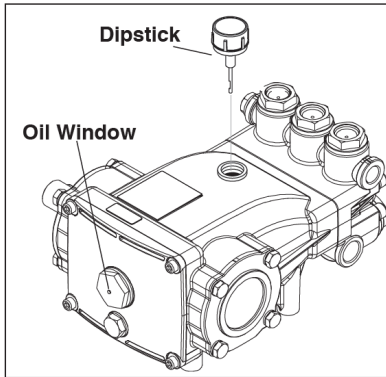
For good performance, the spark plug must be properly gapped and free of deposits.

1. Disconnect the spark plug cap, and remove any dirt from around the spark plug area.
2. Remove the spark plug.
3. Visually inspect the spark plug. Replace it if damaged or badly fouled, if the sealing washer is in poor condition, or if the electrode is worn.
4. Measure the spark plug electrode gap with a wire-type feeler gauge. Correct the gap, if necessary, by carefully bending the side electrode.
5. Install the spark plug carefully, by hand, to avoid cross threading.
6. After the spark plug is seated, tighten to compress the sealing washer. Tighten 1/8—1/4 turn after the spark plug seats to compress the washer. Note: A loose spark plug can overheat and damage the engine. Over tightening the spark plug can damage the threads in the cylinder head.
7. Attach the spark plug cap to the spark plug.

6.4.9 Changing spark plug

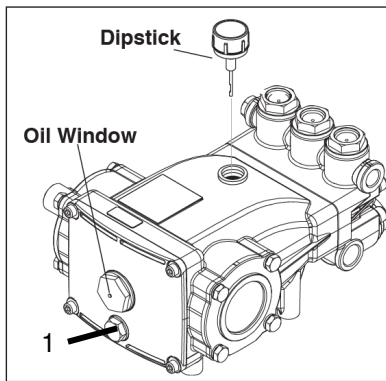
1. Disconnect the spark plug cap, and remove any dirt from around the spark plug area.
2. Remove the spark plug.
3. Measure the new spark plug's electrode gap with a wire-type feeler gauge. Correct the gap, if necessary, by carefully bending the side electrode.
4. Install the spark plug carefully, by hand, to avoid cross threading.
5. After the spark plug is seated, tighten to compress the sealing washer. Tighten 1/2 turn after the spark plug seats to compress the washer. Note: A loose spark plug can overheat and damage the engine. Over tightening the spark plug can damage the threads in the cylinder head.
6. Attach the spark plug cap to the spark plug.

6.4.10 Inspecting pump oil



1. Check the pump oil level daily.
2. Check the pump oil level when the pump is cold and on a level surface.
3. Check the amount and condition of the oil using the dipstick located on the top of the pump. Oil level should be between the oil indicators. Remove the dipstick, clean and re-install in pump. Remove again and check oil level.
4. Oil level should also be checked by looking in the sight glass located in the back of the pump.

6.4.11 Changing pump oil



Drain the used oil when the pump is warm. Warm oil drains quickly and completely.

1. Put the machine where the pump is on a perfectly level surface.
2. Place a suitable container below the pump oil drain plug (#1) to catch the used oil, then remove the oil drain plug and washer (#1).
3. Let all the oil drain out completely and replace drain plug.
4. Remove dipstick. Pour new oil into the filling hole up to the correct level (see 6.4.10).
5. Put dipstick back in pump.

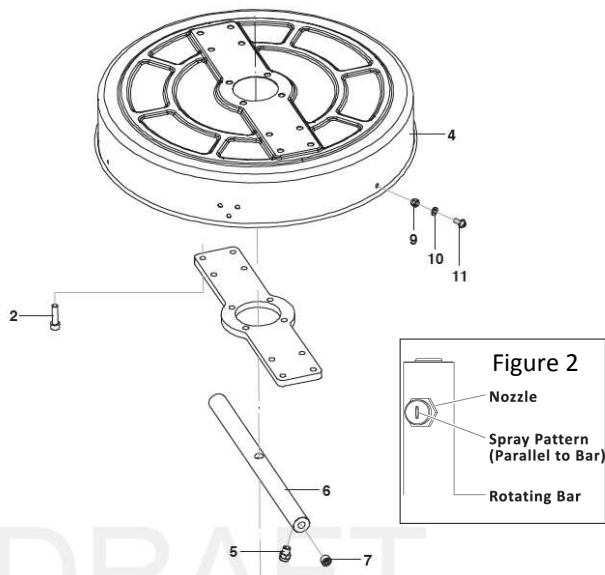
6.4.12 Greasing surface cleaner swivel

The high pressure swivel is equipped with a grease fitting and should be greased at least once every three months. A good quality ball bearing grease is recommended. **DO NOT OVER GREASE THE BEARING!**



1. Add about 5mL of grease to the swivel. Adding too much grease will cause it to come out of the bottom of the swivel housing.

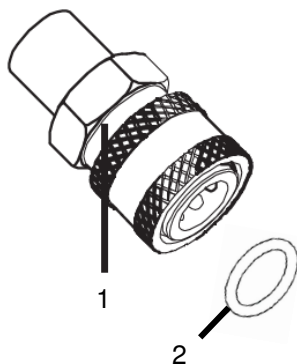
6.4.13 Changing high pressure nozzles



The Rotary Surface Cleaner comes standard with 25020 nozzles (25 degree and 2.0 orifice). These 2 nozzles should be 1/2 the orifice size listed on the machine serial plate.

1. Discharge any pressure trapped in the system by pulling the trigger or activating the spray bar.
2. Tilt the spray deck back to expose spray nozzles (#5). Do not tip unit over. Engine oil and/or fuel will leak.
3. Remove pressure nozzles (#5).
4. Install new pressure nozzles. Nozzles should be installed into the rotating bar with the spray fan parallel to the rotating bar. See figure 2.
5. NOTE: There is also a single high pressure nozzle at the end of the spray wand. See #23 section 5.1. This nozzle should have the orifice size listed on the serial plate.

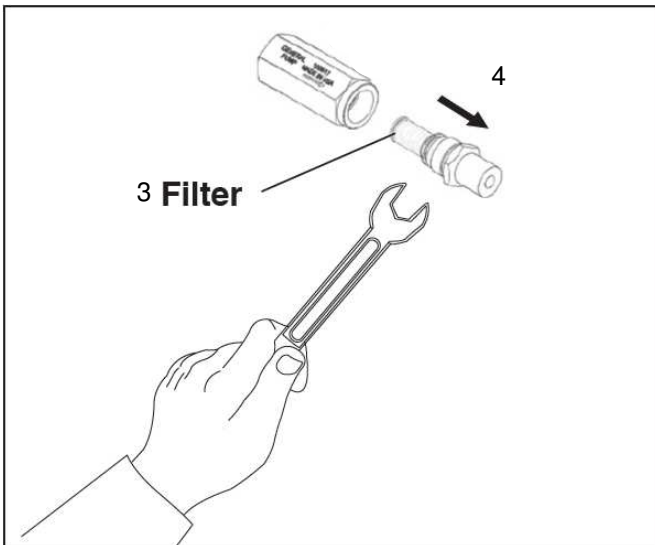
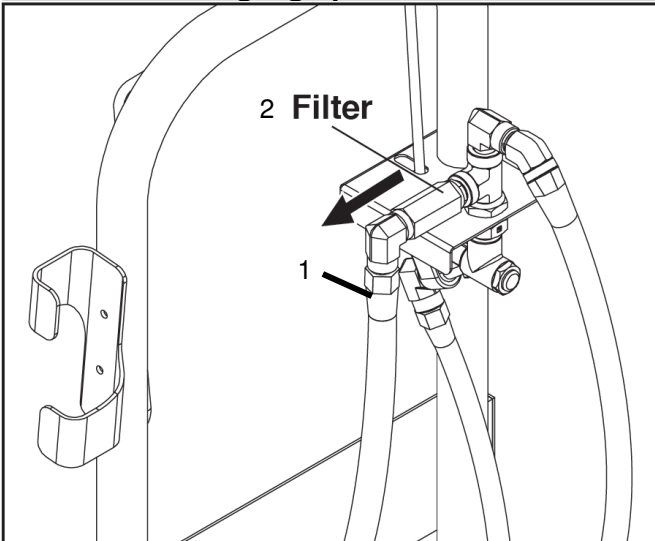
6.4.14 Changing quick connects / o-rings



Inside the quick disconnect is an o-ring. This o-ring is a wear part and should be replaced when coupler starts to drip/leak water.

1. Remove o-ring with an o-ring pick.
2. Install new o-ring.

6.4.15 Cleaning high pressure screen / filter



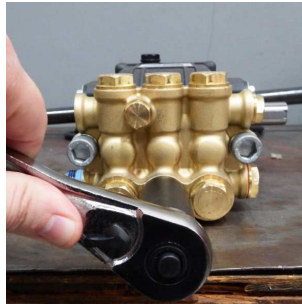
1. Disconnect hose (#1) from elbow.
2. Remove filter assembly (#2) from tee.
3. Pull out high pressure filter (#3).
4. Rinse out or replace high pressure filter screen.
5. Put the high pressure filter assembly back together.
6. Install the high pressure filter (#2) back into the tee. The filter is directional (#4). Make sure it is plumbed correctly with the water flow towards the tee. Make sure to use the correct amount of Teflon tape when plumbing back together.
7. Connect the hose (#1) back to the elbow. Make sure to use the correct amount of Teflon tape when plumbing back together.

6.5 Trouble shooting activities

6.5.1 Check valve inspection / replacement



1. Using a 24 mm socket remove the low pressure and high pressure valve caps. See section 5.2.1 for part identification.



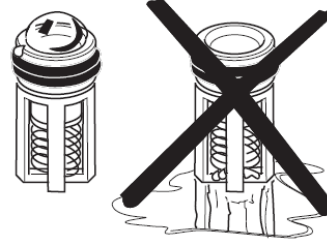
2. Inspect valve caps and valve cap O-rings for damage. Replace as needed.



3. Remove inlet and outlet check valves.

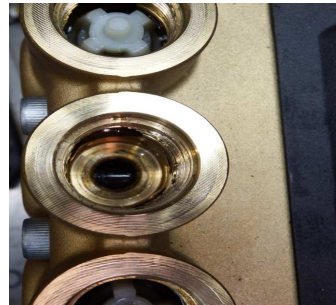


4. Remove inlet and outlet check valve O-rings.



5. Inspect check valves, and check valve O-rings for damage. Replace if needed

To test the check valves, stand the valves with their seats facing upwards. Fill them with water. If a valve is leaking, the water will seep out of the bottom.



6. Inspect each valve cylinder for cracking or damage. Replace manifold if needed.

7. Install check valve O-rings back into manifold (with new if needed).

8. Install inlet and outlet check valves (with new if needed).

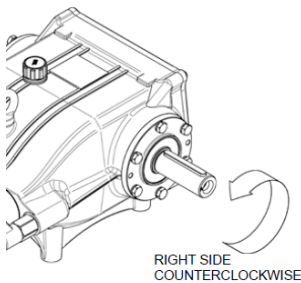


7. Install high pressure and low pressure valve caps (with new if needed) to torque. See section 7.3. for torque specifications.

6.5.2 Inspect packings, ceramic pistons and connecting rod connection



1. Remove the pump from the engine. Then using a 12 mm Allen wrench remove the pump manifold bolts. See section 5.2.1 for part identification.



2. Remove the pump manifold. If needed, sometimes turning the crankshaft can supply a gap between the manifold and crankcase. This will allow space to put two screw drivers in the gap to be used lightly as pry points.



3. Use a dirty or greasy rag to wipe the ceramic piston. This will help to inspect ceramic piston for damage and/or cracks. Replace if needed. Make sure to clean piston prior to putting pump back together.



4. Push and pull on each piston to check for any play in the connecting rod, piston guide, wrist pin or piston bolt. If there is significant movement replace pump.



5. Remove packings from manifold.



6. Inspect packings, brass retainer, head ring and O-ring for wear and/or damage. Replace if needed.



7. Install packing assemblies into manifold.



8. Grease pistons and packings with white lithium grease.



9. Install manifold onto pump. Make sure to torque manifold bolts. See section 7.3 for torque specifications if needed.

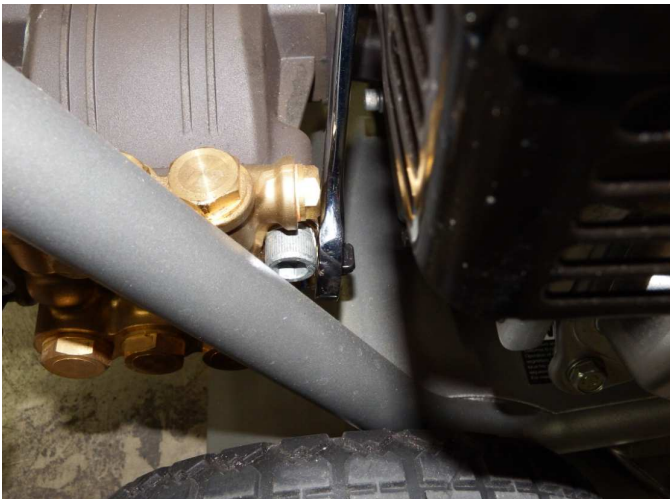
6.5.3 Inspect inlet screen



1. Remove inlet screen.
2. Inspect for good seal to garden hose, debris, damage to rubber gasket and/or damage to mesh screen. Clean if needed. Replace if needed.
3. Install inlet screen.

6.5.4 Bypass thermal protector

A thermal protector can go bad and not leak water. If this happens the pump could suck air through the damaged thermal protector.



1. With a 1" open end wrench remove the thermal protector for the inlet plumbing.



2. Install a threaded 1/2" plug into inlet plumbing where the thermal protector was.



3. Coupler a test gauge between the pressure hose and the gun, test machine. If the machine cavitation stopped replace thermal protector with a new one.



4. Install thermal protector. Make sure to seal pipe threads with approved sealant.

6.5.5 Test pressure of machine



1. Install test gauge between the pressure hose and trigger gun.
2. Test machine with trigger gun, spray wand and pressure nozzle.

Machine should have a running pressure of 2500 psi and a spike pressure of less than 500 psi.

Spike is the pressure read on the gauge when you release the trigger minus the running pressure of the machine.

Example: Running pressure = 2500 psi.

Pressure reading when trigger is released = 2900 psi.

Spike pressure = 400 psi (2900 - 2500)

6.5.6 Test pressure off the unloader



1. Using a 3/4" open end wrench remove hose from outlet of unloader.



2. Install quick disconnect nipple



3. Install test gauge, test hose, test gun, test nozzle (make sure to use size of nozzle listed on the serial plate)
4. Test machine with spray wand trigger.

Machine should have a running pressure of 2500 psi and a spike pressure of less than 500 psi.

Spike is the pressure read on the gauge when you release the trigger minus the running pressure of the machine.

Example:

running pressure = 2500 psi.

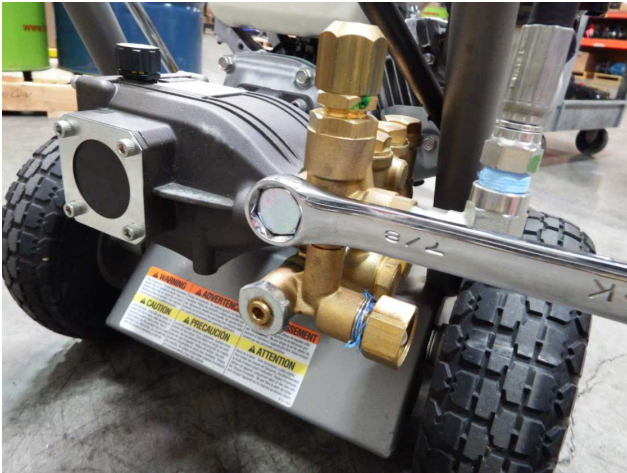
Pressure reading when trigger is released = 2900 psi.

Spike pressure = 400 psi (2500 - 2900)

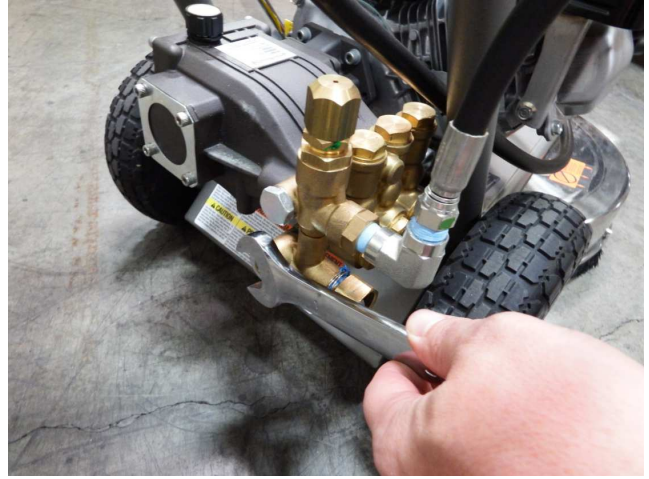
6.5.7 Test pressure off the pump



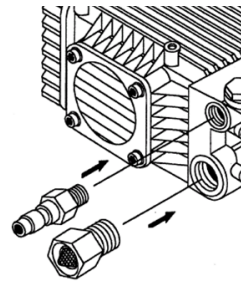
1. Remove the unloader from the pump. First, remove the high pressure outlet hose from the unloader.



2. Then with a 7/8" box wrench remove the top banjo bolt fittings from the pump.



3. Then with a 1 1/4" open end wrench remove the bottom banjo bolt fitting from the pump.



4. Install a quick disconnect nipple to the pump outlet and the garden hose fittings back to the pump inlet.
1. Install test gauge, test hose, test gun, test nozzle (make sure to use size of nozzle listed on the serial plate)
2. Test machine with spray wand trigger. **DO NOT LET GO OF THE TRIGGER.** There is no longer a safety bypass valve. If the trigger is released the system will over pressurize and major damage or severe injury will occur.

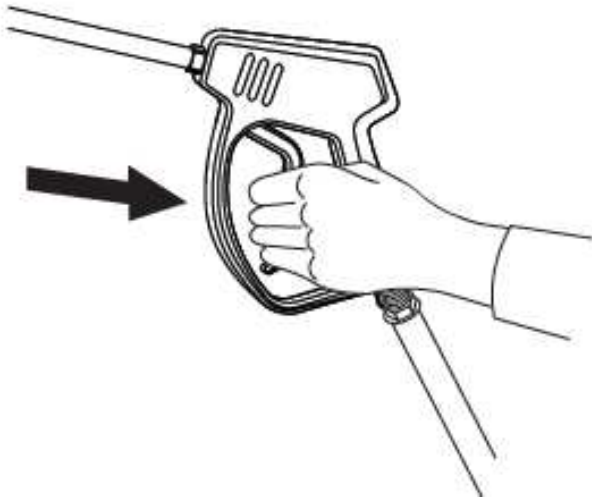
Machine should have a running pressure of 2500 psi.

If 3000 psi then replace and set unloader. See section 6.5.15

6.5.8 Inspecting spray bar swivel



1. Visually inspect top side and bottom side of the spray bar swivel to see if there is any damage that would keep the spray bar from turning or make it loose or leak.



2. Make sure all the pressure is released from the system.



3. Manually turn/spin the spray bar to see if the swivel is locked or bound or loose or leaking. If it is and there is nothing from #1 that is restricting it try greasing the swivel. See section 6.4.12
4. If greasing swivel did not free the binding of the swivel then replace the swivel. See section 6.5.13.

6.5.9 Inspecting spray bar

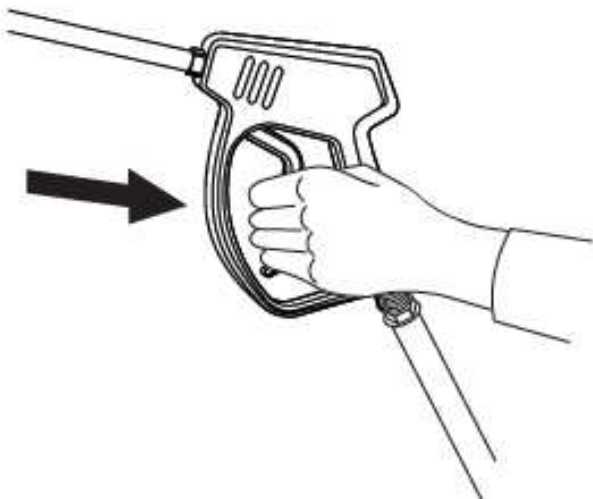


1. Visually inspect spray bar to see if it is bent or damaged. A bent or damaged spray bar can cause vibration as it spins because it causes the system to be out of balance.

6.5.10 Inspecting spray bar swivel mounting



1. Visually inspect top side and bottom side of the spray bar swivel to see if there is any damage that would allow the swivel mounting to be loose.



3. Manually move the spray bar trying to pivot the bar. The swivel should be securely mounted. If there is any movement other than rotary then correct the issue.

2. Make sure all the pressure is released from the system.

6.5.11 Cleaning speed



1. If the user walks too fast during cleaning you can get streaking or uneven cleaning.

6.5.12 Replacing a thermal relief valve

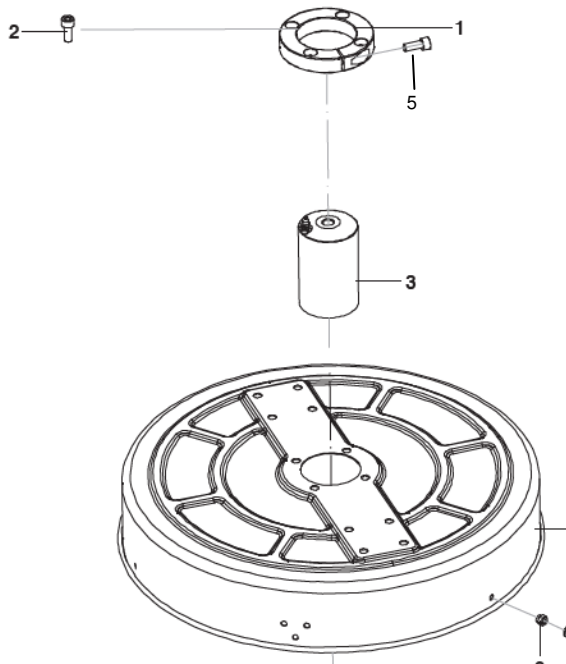


1. With a 1" open end wrench remove the thermal protector for the inlet plumbing.



2. Install new thermal relief valve. Make sure to use the correct thread sealant.

6.5.13 Changing spray bar swivel



1. Remove spray bar. See section 6.5.14.
2. Using a 6 mm hex wrench remove the swivel clamp bolts (2).
3. Lift swivel and clamp off of surface clean deck.
4. Using a 6 mm hex wrench loosen the clamp bolt (5)



5. Install new swivel. Make sure to use the correct thread sealant.

6.5.14 Changing spray bar



1. Tilt the machine back



2. With a 3/4" open end wrench hold the swivel shaft from moving.



3. Remove the spray bar by holding the swivel rod and rotating it counter clockwise by hand.

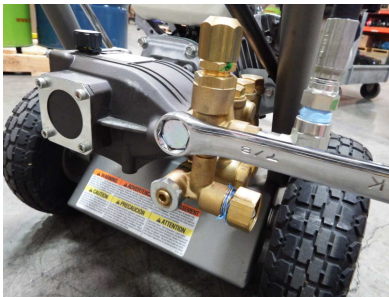


4. Install new spray bar. Make sure to use the correct thread sealant.

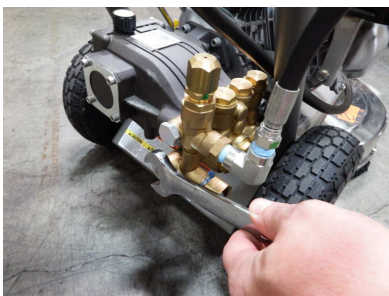
6.5.15 Changing and setting the unloader



1. Remove the unloader from the pump. First, remove the high pressure outlet hose from the unloader.



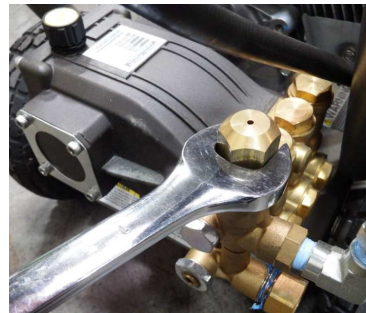
2. Then with a 7/8" open end wrench remove the top banjo bolt fittings from the pump.



3. Then with a 1 1/4" open end wrench remove the bottom banjo bolt fitting from the pump.

4. Install the new unloader.

5. Install test gauge, test hose, test gun, test nozzle (make sure to use size of nozzle listed on the serial plate)



1. Test machine with spray wand trigger. Turn the adjustment knob until you reach the required 2500 psi. Then release the trigger and look for the spike. If spike is too high turn the adjustment knob until spike is under 500 psi.



Then Tighten the lock nut

Machine should have a running pressure of 2500 psi and a spike pressure of less than 500 psi.

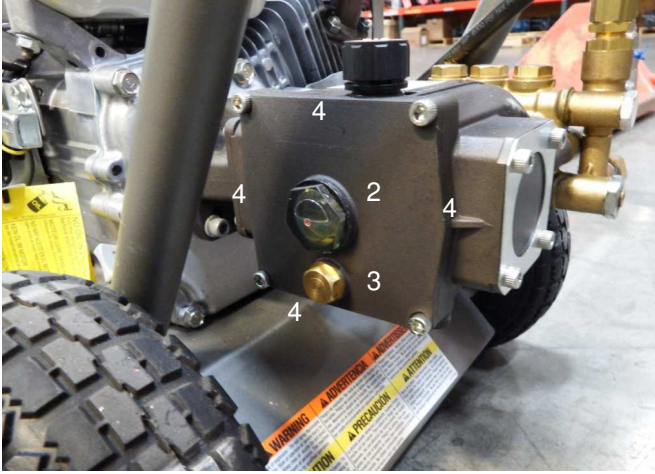
Spike is the pressure read on the gauge when you release the trigger minus the running pressure of the machine.

Example: running pressure = 2500 psi.

Pressure reading when trigger is released = 2900 psi.

Spike pressure = 400 psi (2500 - 2900)

6.5.16 Inspecting back side of pump for oil leak



The back side of the pump has a few spots that oil can leak from. The crankcase cover, sight glass and the oil drain plug.

1. Inspect around the sight glass. If oil is leaking from the sight glass then replace the sight glass gasket and/or the sight glass.
2. Inspect around the oil drain plug. If oil is leaking from the oil drain plug then replace the oil drain plug gasket and/or the oil drain plug.
3. Inspect around the crankcase cover. If oil is leaking from the crankcase cover then replace the crankcase cover gasket and/or the crankcase cover.
4. Test machine for a short period of time to get the seal and oil warm. Let machine sit to confirm there is not an oil leak.

6.5.17 Inspecting engine side of pump for oil leak



1. Remove the pump from the engine.
2. Inspect the engine shaft to make sure the engine crankshaft seal is not the problem.

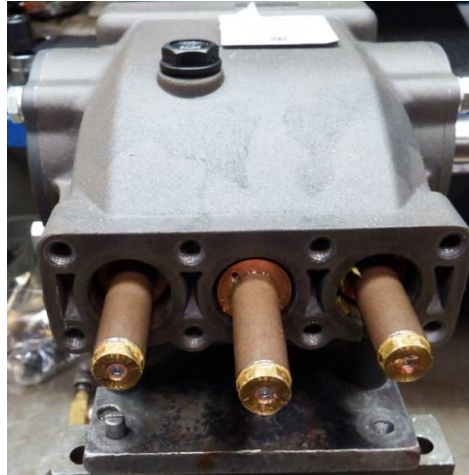
3. If oil is leaking from pump crankshaft, drain the oil from the pump. See the first part of section 6.4.11.
4. Remove and replace the crankshaft oil seal.
5. Fill the pump with new oil. See the second part of section 6.4.
6. Confirm there is no oil leak
7. Put the pump back on the engine.
8. Test machine for a short period of time to get the seal and oil warm. Let machine sit to confirm there is no oil leak.

6.5.18 Inspecting crankshaft cap side of pump for oil leak



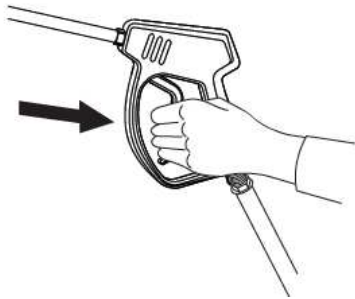
1. Inspect to see if oil is leaking from crankshaft cap side of pump.
2. If it is, drain the oil from the pump. See the first part of section 6.4.11.
3. Remove and replace the crankshaft cap seal and/or cap.
4. Fill the pump with new oil. See the second part of section 6.4.11.
5. Confirm there is no oil leak
6. Test machine for a short period of time to get the seal and oil warm. Let machine sit to confirm there is no oil leak.

6.5.19 Inspecting piston guide oil seals for oil leak



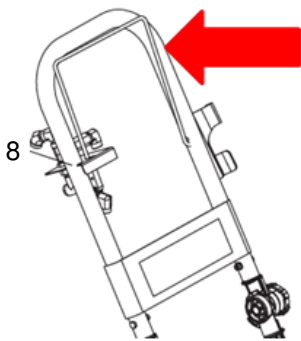
1. Inspect to see if oil is leaking from under the pump manifold.
2. If it is, remove the pump from the engine then remove the pump manifold from the crankcase.
3. Inspect where the piston guides come out of the crankcase.
4. If oil is leaking out of the piston guide oil seals, drain the oil from the pump. See the first part of section 6.4.11.
5. Remove and replace the piston guide oil seals.
6. Fill the pump with new oil. See the second part of section 6.4.11.
7. Confirm there is no oil leak
8. Test machine for a short period of time to get the seal and oil warm. Let machine sit to confirm there is no oil leak.

6.5.20 Inspecting trigger gun for leak

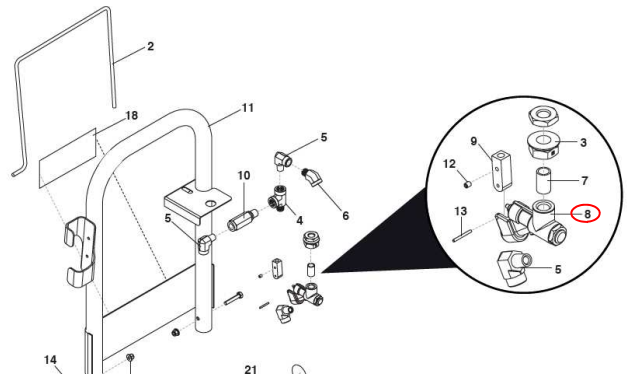


1. Test machine with pressure. Release the trigger gun. Inspect for leaking out of the end of the wand.
2. If there is leaking out of the end of the wand then rebuild or replace trigger gun.
3. Test for leak again to confirm problem is corrected.

6.5.21 Inspecting spray bar trigger for leak



1. Test machine with pressure. Release the spray bar trigger gun. Inspect for leaking out of the end of the spray bar.
2. If there is leaking out of the end of the spray bar then rebuild or replace spray bar trigger #8.
3. Test for leak again to confirm problem is corrected.



7 Technical documentation


7.1 Technical specifications SCW 2.4/25 G

GPM	2.5
PSI	2500
Drive	Direct
Engine	Honda GX 200
Engine CC	200
Pump	Tri-Plex LP3035G
Cleaning Width	21 Inches

7.2 Tools required

 <p>SERVICE CONSUMABLES</p>		 <p>SPECIAL TOOLS</p>	
Kärcher service consumables catalog	Available on DISISplus in the chapter "Catalogue"	Kärcher special tools catalog	Available on DISISplus in the chapter "Catalogue"
			
Kärcher standard tool trolley	Equipped with tools and foam inserts 0.022-980.0	Grease gun	6.417-023.0
			
Mechanical RPM gauge	6.491-361.0	Torque wrench	6.815-900.0

7.2 Tools required

			
O-ring pick	8.707-467.0	Pressure test gauge, 5000 psi, cold water	8.712-208.0
			
Pressure packing insertion and oil seal removal tool kit	8.756-590.0		
			
Safety goggle set	6.025-488.0	Hearing protection	6.025-513.0

7.3 Torque specifications

PART NUMBER	TORQUE SPECIFICATION
8.706-321.0	12 N-m
8.718-829.0	50 — 66 N-m
8.733-007.0	8 — 10 N-m
8.750-768.0	7 — 8 N-m
8.752-824.0	10 Ft.-lbs
8.754-854.0	55 Ft.-lbs
8.754-855.0	10 Ft.-lbs
8.933-020.0	10 Ft.-lbs
9.196-307.0	7 — 8 N-m
9.802-713.0	8 — 10 N-m
9.802-939.0	8 Ft.-lbs
9.803-949.0	65 Ft.-lbs



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