



2500 psi Pressure Washer Manual

Item #1576751

M1576751A

Thank you for purchasing a North Star pressure washer. Your machine is designed for long life, dependability, and the top performance you demand. Take time now to read through this manual so you better understand the machine's operation, maintenance and safety precautions. Everyone who operates this machine must read and understand this manual. The time you take now will prolong your machine's life and prepare you for its safe operation. Enjoy the exceptional performance of your North Star pressure washer, the industry leader!

6.5HP Honda Engine

- OHV
- Low oil shutdown
- Cast iron sleeve

Pneumatic Tires

- Steel Hubs
- 3/4" Bearings

Steel Frame

- Baked-on Enamel Powder Coat
- 1 1/4" Round Tubing Handle
- 10 Ga. Steel Base

3 GPM, 2500 psi CAT Pump

- Industrial Triplex Plunger Pump
- E-Z Start Unloader
- Safety Relief Backup
- Thermal Protection
- Quick Couple Chemical Injection
- Quick Couple Outlet
- Quick Couple Inlet

2 Piece Quick Connect Lance

- 3 ft. Length
- Splits in Two for Storage & Attaching Accessories
- Quick Couple Nozzle System
- 0°, 15°, 25°, & 40° High Pressure Nozzles
- 65° Low Pressure Soap Injection Nozzle

3/8" High Pressure Hose

- 40 ft. Long
- Quick Couples to gun and pump

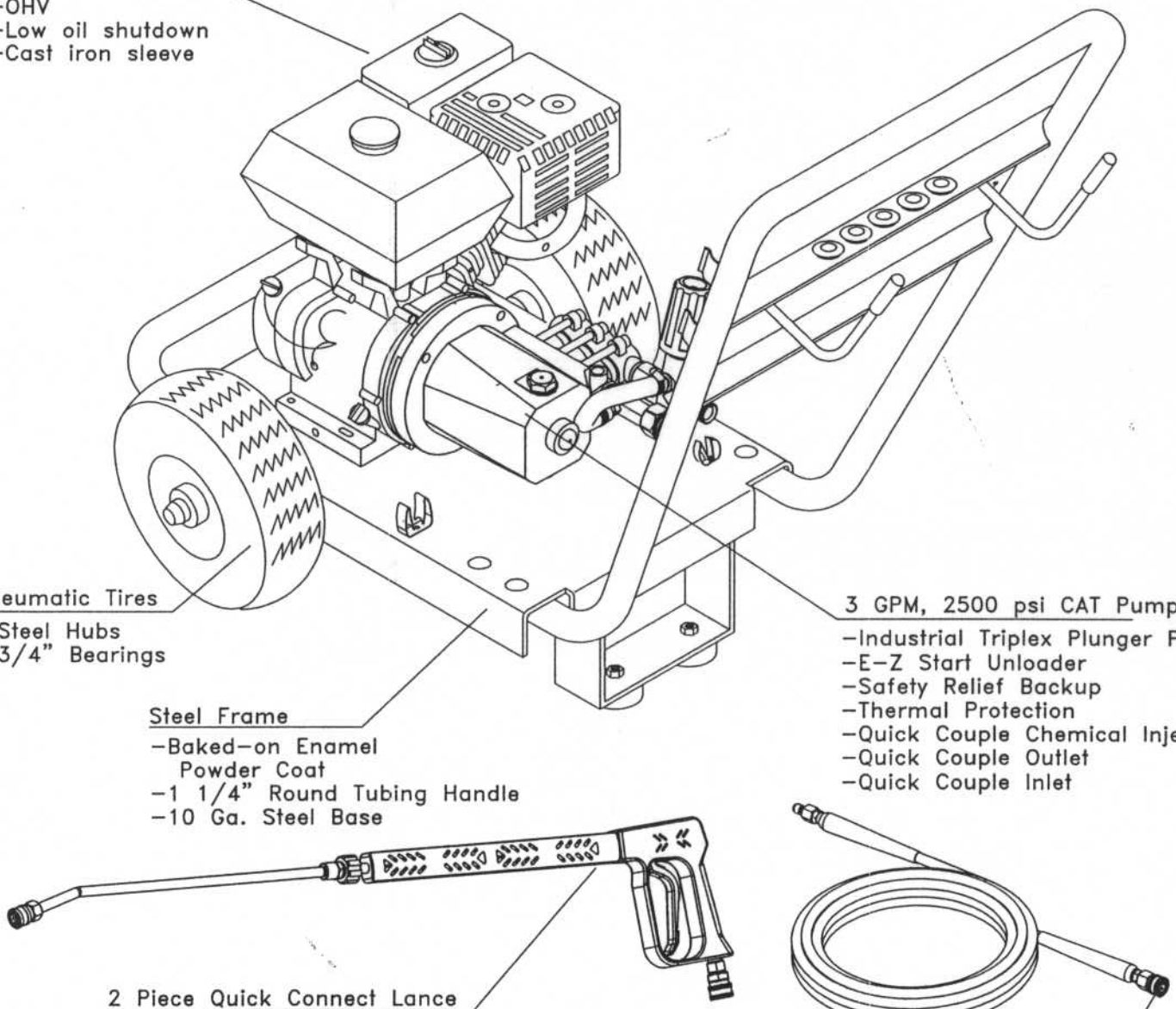


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Safety Instructions



Read and understand these instructions because they deal with safety. Pay particular attention to this safety symbol throughout this manual. Failure to comply with these instructions may result in personal injury or property damage.

BEFORE OPERATING PRESSURE WASHER

NEVER allow children to operate or play on or around the machine.

ALWAYS wear safety glasses or goggles and appropriate clothing when operating unit.

NEVER operate the machine in or around an explosive environment.

ALWAYS place the machine on a level surface.

ALWAYS locate the machine so it is protected from external damage.

NEVER operate the machine indoors. Carbon monoxide fumes are colorless and odorless. They can cause serious illness or death.

NEVER operate the machine with broken or missing parts.

NEVER alter the machine from the manufacturer's original design.

ALWAYS keep all safety devices active on the machine.

ALWAYS use water that is clear and free of particles.

NEVER run preheated water over 140 degrees F into the machine.

ALWAYS follow the chemical manufacturer's recommendations when using chemicals in the soap injector.

ALWAYS understand all safety precautions and first aid for the chemicals being used.

ALWAYS check and maintain proper oil levels in the pump and engine.

NEVER modify or adjust the unloader valve above 2500 psi.

WHILE OPERATING PRESSURE WASHER

NEVER spray flammable liquids.

NEVER point the lance or nozzle at people or animals. The high pressure the machine generates is very dangerous.

NEVER use an undersized spray nozzle.

ALWAYS keep the pressure hose connected to the machine and the spray gun while the unit is pressurized.

ALWAYS seek emergency medical care if any fluid penetrates the skin. The cut may be deeper and more serious than it appears.

NEVER move the machine by pulling on the hose.

NEVER secure the spray gun in the "ON" or "SQUEEZED" position.

NEVER use the unit when under the influence of alcohol.

NEVER operate the machine with insufficient water supply to the pump. Damage occurs to the pump if run with an insufficient or no water supply.

ALWAYS protect your machine from freezing during storage as described on page 15 of this manual.

NEVER smoke while operating or fueling this machine. Only add fuel to the machine when the engine is OFF and cool.

NEVER attempt to clean the machine with its own spray. Cleaning should only be done with a damp sponge with the unit turned OFF.

NEVER leave an operating machine unattended. Always shut the machine OFF and relieve the pressure before leaving the machine.

ALWAYS follow all other guidelines and safety instructions as described in this manual.

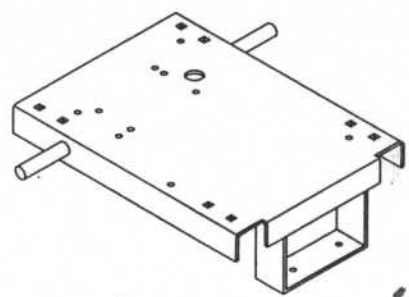
Any Questions, Comments or Problems
Call Customer Service 1-800-270-0810
Hours: Monday - Friday 7:30 AM to 5:00 PM CST
Saturday 7:30 AM - 11:30 AM CST

Assembly Instructions

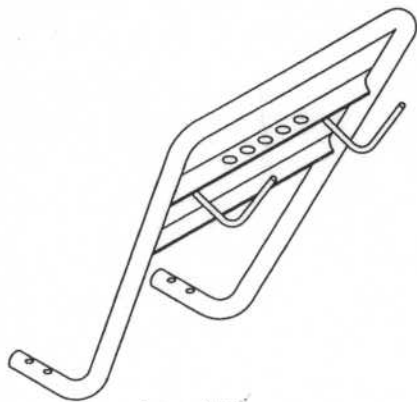
You will need the following tools to assemble your pressure washer cart:
open end wrench set and/or socket set, phillips screwdriver, rubber mallet.

STEP 1

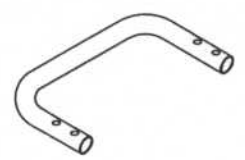
Your pressure washer is shipped in two boxes. Separate and identify the components found in both boxes.



base
red
qty - 1



handle
black
qty - 1



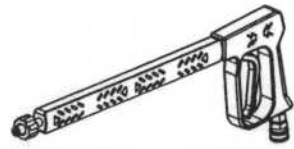
bumper
black
qty - 1



wheel
pneumatic
qty - 2



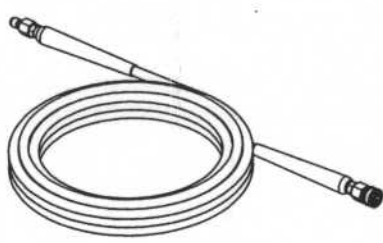
lance extension
qty - 1



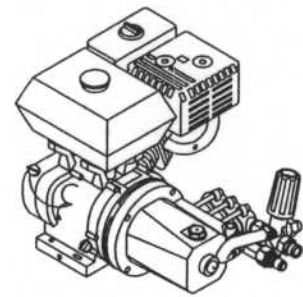
gun & grip
qty - 1



chemical injector
quick couple
qty - 1



hose
quick couple
qty - 1



pump/engine
assembly
qty - 1



quick coupler
socket
qty - 1



red



yellow



green



white



black

quick couple nozzles
qty - 1 each

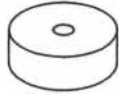
Assembly Instructions

STEP 2

Separate and identify the components found in the hardware bag.



wheel retainer
steel
qty - 2



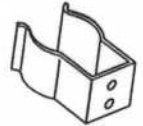
rubber foot
black
qty - 2



gripper clip
small
qty - 2



gripper clip
large
qty - 1



gripper clip
x-large
qty - 2



rubber grommet
black
qty - 13

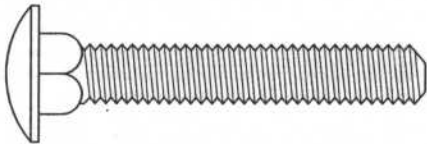


rubber cap
grey
qty - 2

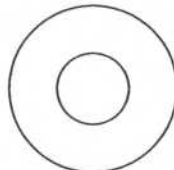


hex key
black
qty - 1

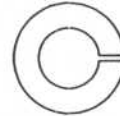
FASTENERS



5/16-18 X 2
CARRIAGE BOLT
QTY - 8



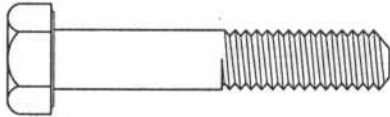
5/16 FLAT WASHER
QTY - 18



5/16 LOCK WASHER
QTY - 6



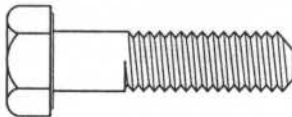
5/16-18 NUT
QTY - 6



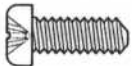
5/16-18 X 1 3/4
HEX HEAD BOLT
QTY - 4



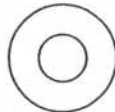
5/16-18 NYLOC NUT
QTY - 8



5/16-18 X 1 1/4
HEX HEAD BOLT
QTY - 2



#10-24 X 1/2
PHILLIPS HEAD BOLT
QTY - 7



#10 FLAT WASHER
QTY - 7



#10 LOCK WASHER
QTY - 7



#10-24 NUT
QTY - 7

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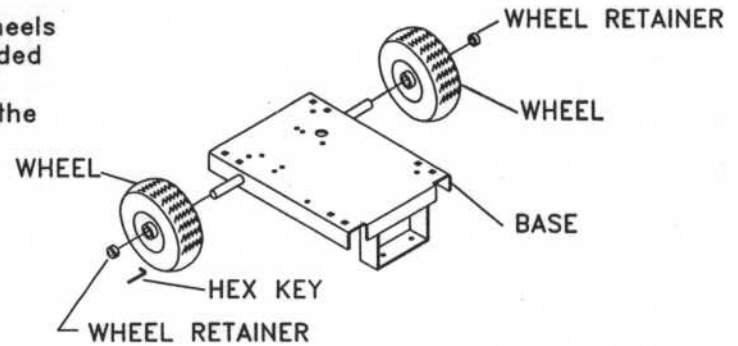
Assembly Instructions

STEP 3

Remove the plastic caps from the axle. Slide the wheels onto the axles on the base. Use the hex key provided to secure the wheels with the wheel retainers. To reduce vibration during operation, inflate or deflate the tire pressure to 20psi.

ITEMS NEEDED FOR THIS STEP

QTY	DESCRIPTION
1	BASE
2	WHEEL/TIRE
2	WHEEL RETAINER
1	HEX KEY

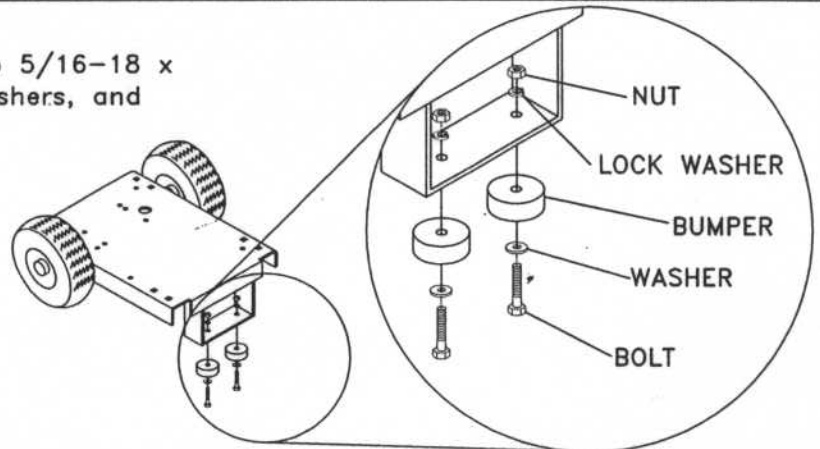


STEP 4

Fasten the rubber feet to the base using two 5/16-18 x 1 1/4 hex head bolts, flat washers, lock washers, and nuts.

ITEMS NEEDED FOR THIS STEP

QTY	DESCRIPTION
2	RUBBER FOOT
2	5/16-18 X 1 1/4 BOLT
2	5/16 FLAT WASHER
2	5/16 LOCK WASHER
2	5/16-18 NUT

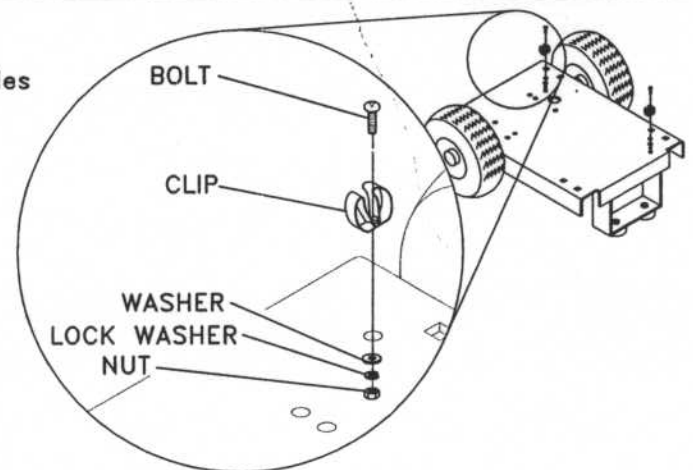


STEP 5

Fasten two small gripper clips to the small round holes in the base using two #10-24 x 1/2 phillips head bolts, flat washers, lock washers, and nuts.

ITEMS NEEDED FOR THIS STEP

QTY	DESCRIPTION
2	SMALL GRIPPER CLIP
2	#10-24 X 1/2 BOLT
2	#10 FLAT WASHER
2	#10 LOCK WASHER
2	#10-24 NUT

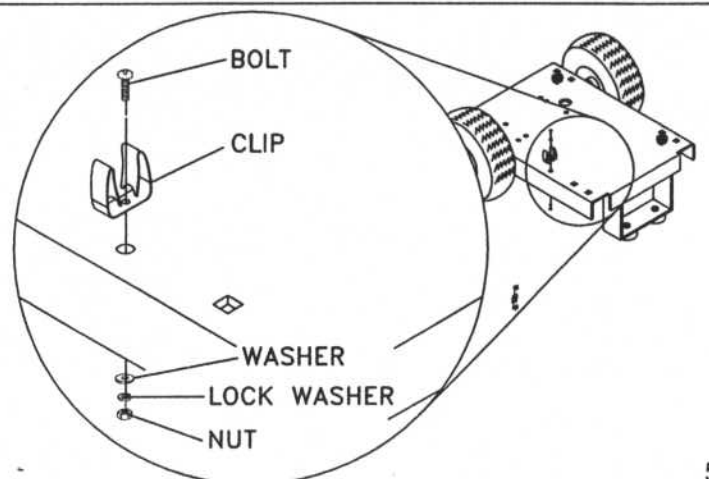


STEP 6

Fasten a large gripper clip to the base using one #10-24 x 1/2 phillips head bolt, flat washer, lock washer, and nut.

ITEMS NEEDED FOR THIS STEP

QTY	DESCRIPTION
1	LARGE GRIPPER CLIP
1	#10-24 X 1/2 BOLT
1	#10 FLAT WASHER
1	#10 LOCK WASHER
1	#10-24 NUT



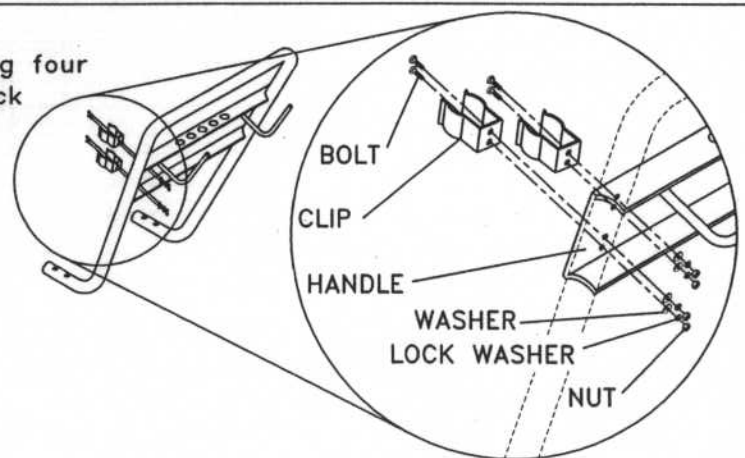
Assembly Instructions

STEP 7

Fasten the x-large gripper clips to the handle using four #10-24 x 1/2 phillips head bolts, flat washers, lock washers, and nuts.

ITEMS NEEDED FOR THIS STEP

QTY	DESCRIPTION
1	HANDLE
1	X-LARGE GRIPPER CLIP
4	#10-24 X 1/2 BOLT
4	#10 FLAT WASHER
4	#10 LOCK WASHER
4	#10-24 NUT

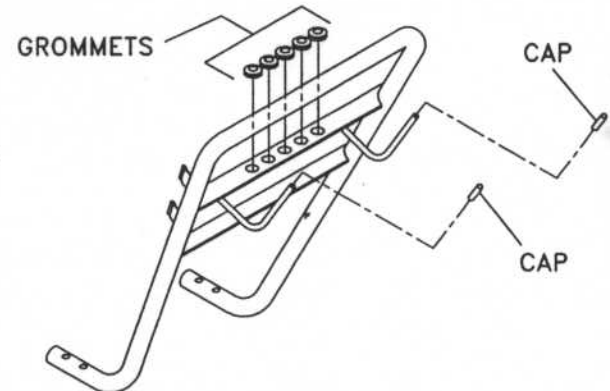


STEP 8

Press the black rubber grommets into the five holes located on the handle. Also, slide the grey rubber caps onto the hose hooks.

ITEMS NEEDED FOR THIS STEP

QTY	DESCRIPTION
5	BLACK RUBBER GROMMET
2	GRAY RUBBER CAP

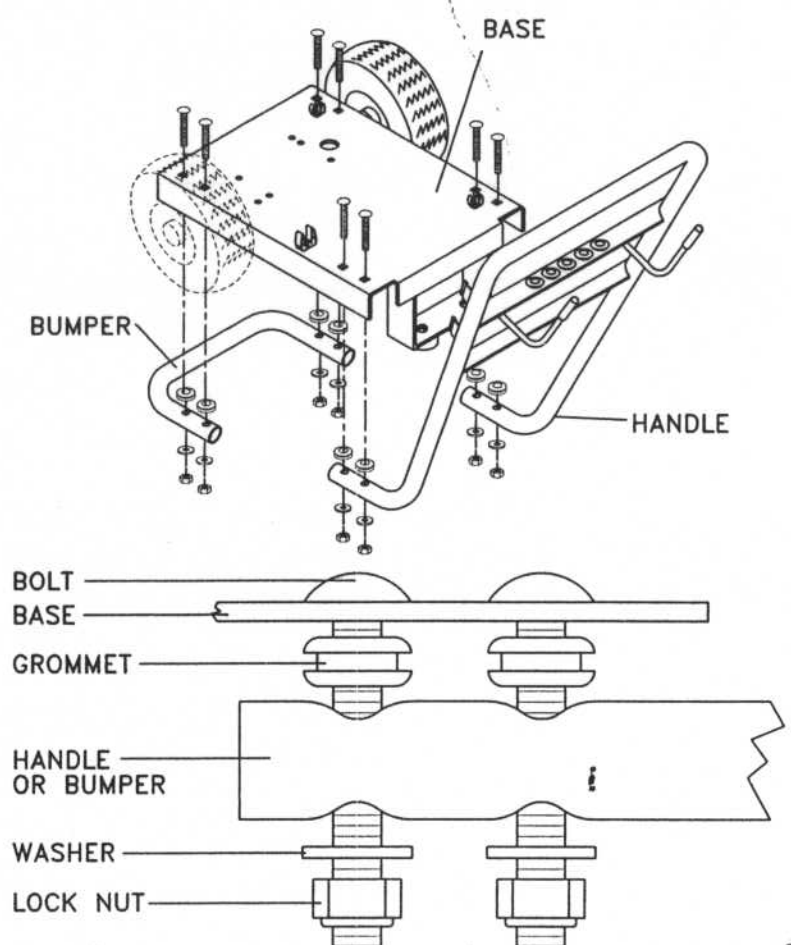


STEP 9

Fasten the handle and the bumper to the base. Use eight 5/16-18 x 2 carriage bolts, grommets, washers, and lock nuts. Place the grommets between the base and the handle, and the base and the bumper. The grommets help reduce vibration. Tighten the lock nuts until the grommets begin to compress. You can fine tune the vibration of your pressure washer by changing the tightness of these eight bolts.

ITEMS NEEDED FOR THIS STEP

QTY	DESCRIPTION
1	BASE
1	HANDLE
1	BUMPER
8	BLACK RUBBER GROMMET
8	5/16-18 X 2 BOLT
8	5/16 FLAT WASHER
8	5/16-18 NYLOC NUT



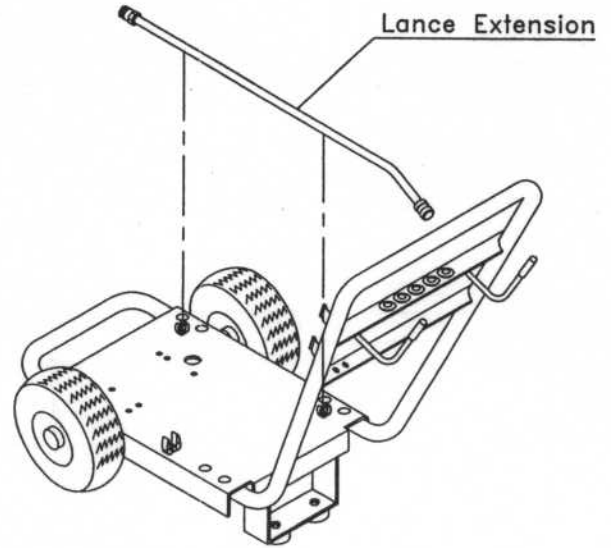
Assembly Instructions

STEP 10

Press the lance extension into the small gripper clips.

ITEMS NEEDED FOR THIS STEP

QTY	DESCRIPTION
1	LANCE EXTENSION



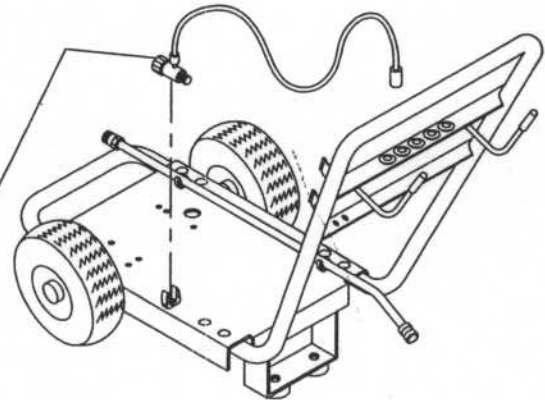
STEP 11

Press the quick couple chemical injector into the large gripper clip. Wrap the clear hose around the handle when not in use.

ITEMS NEEDED FOR THIS STEP

QTY	DESCRIPTION
1	Q. COUPLE CHEM. INJECTOR

Q. Couple Chemical Injector

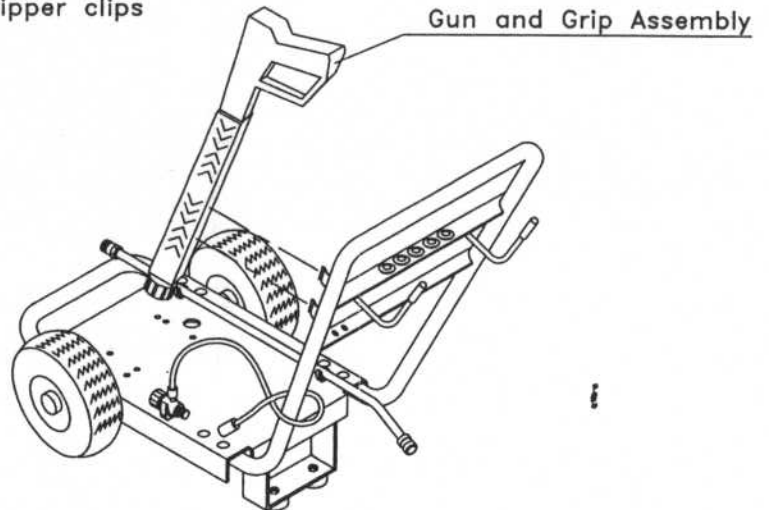


STEP 12

Press the gun and grip into the extra large gripper clips located on the handle.

ITEMS NEEDED FOR THIS STEP

QTY	DESCRIPTION
1	GUN AND GRIP ASSEMBLY



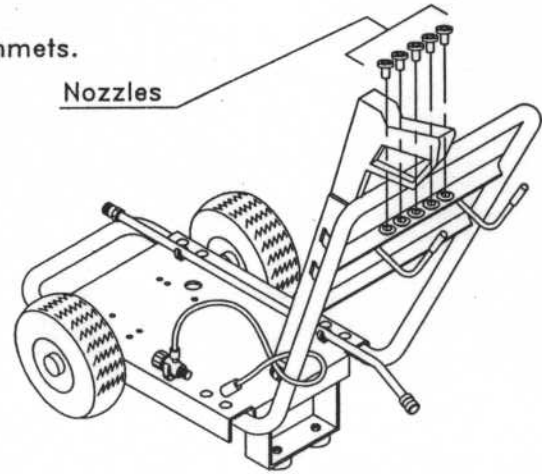
Assembly Instructions

STEP 13

Press the quick couple nozzles into the five rubber grommets.

ITEMS NEEDED FOR THIS STEP

QTY	DESCRIPTION
1	0° #3.5 NOZZLE (RED)
1	15° #3.5 NOZZLE (YELLOW)
1	25° #3.5 NOZZLE (GREEN)
1	40° #3.5 NOZZLE (WHITE)
1	CHEMICAL NOZZLE (BLACK)

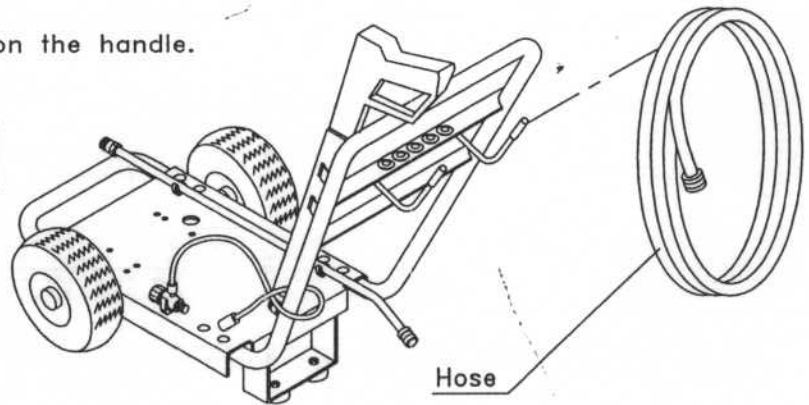


STEP 14

Hang the hose on the hose hooks located on the handle.

ITEMS NEEDED FOR THIS STEP

QTY	DESCRIPTION
1	HOSE

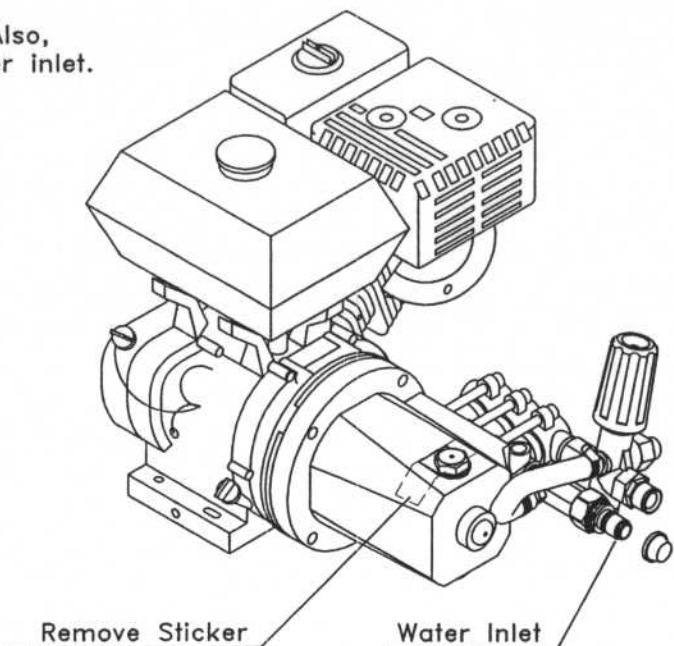


STEP 15

Remove the sticker covering the oil fill hole. Also, remove and discard the red cap from the water inlet.

ITEMS NEEDED FOR THIS STEP

QTY	DESCRIPTION
1	PUMP/ ENGINE ASSEMBLY



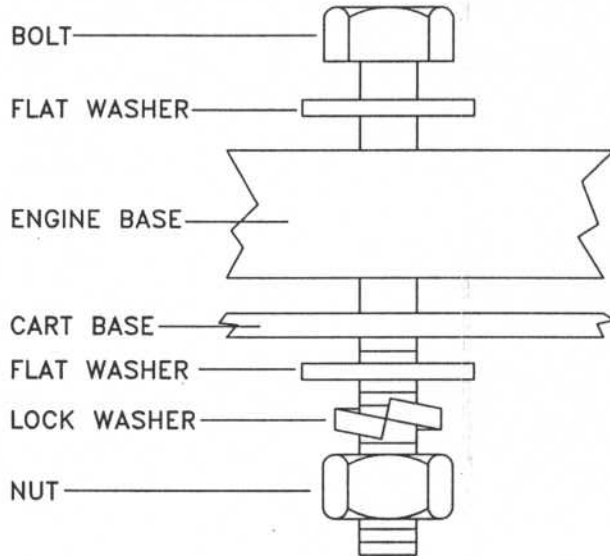
Assembly Instructions

STEP 16

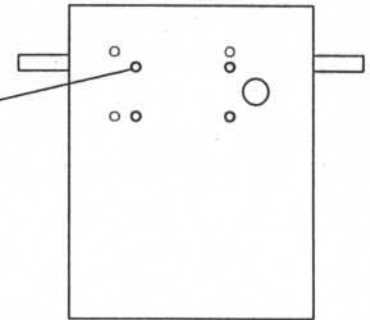
Mount the pump/engine assembly to the base using four 5/16-18 x 1 3/4 bolts, flat washers, lock washers and nuts. Use the bolt pattern shown in bold below. Be careful during this step, the pump/engine assembly is heavy. After this step, your pressure washer is ready for storage or transportation.

ITEMS NEEDED FOR THIS STEP

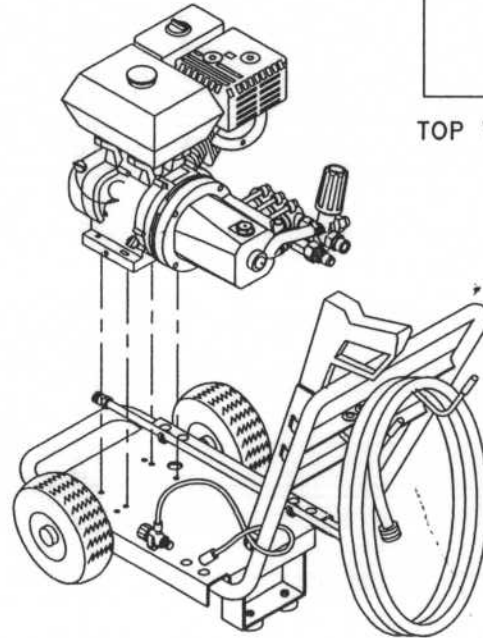
QTY	DESCRIPTION
1	PUMP/ENGINE ASSEMBLY
4	5/16-18 X 1 3/4 BOLT
8	5/16 FLAT WASHER
4	5/16 LOCK WASHER
4	5/16-18 NUT



USE THE BOLT PATTERN SHOWN IN BOLD



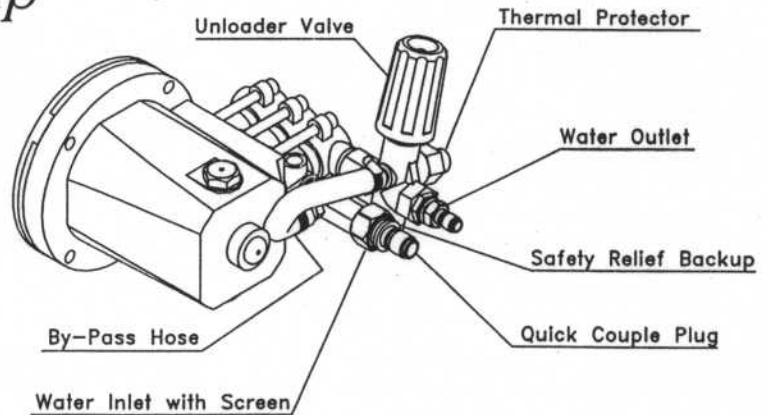
TOP VIEW OF BASE



Your High Pressure Pump

This pump is an industrial quality, crankcase style, triplex plunger pump. If used and maintained properly, it will give you years of trouble free service. Read this entire manual before operating this pressure washer.

Unloader Valve – The unloader determines the pressure the pump will start recirculating water when you release the trigger. You can adjust the pressure by turning the black knob. However, the unloader is factory pre-set to the maximum system pressure.



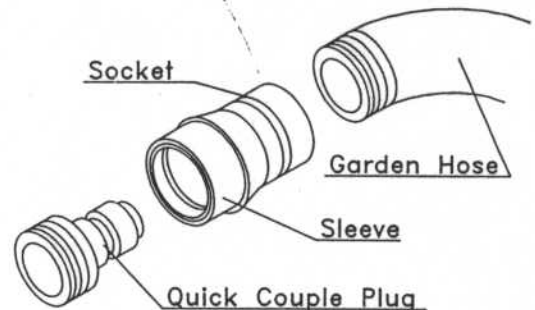
Caution NEVER alter the unloader valve from the manufacturer's design. Excess pressures could cause serious injury and/or pump damage. Any alteration other than turning the black knob will void your warranty.

Safety Relief Backup – The safety relief or "pop-off" valve is a backup safety feature located at the bottom of the unloader valve. In the unlikely event the unloader malfunctions, the safety relief valve will open before the pressure reaches a dangerous level.

Caution If the safety relief valve ever discharges water, turn the engine off and do not use the machine. See a dealer or call Customer Service at 1-800-270-0810.

Thermal Protector – The thermal protector or "pump saver" valve protects your pump from overheated water. When the spray gun trigger is released, the pump DOES NOT stop pumping. Water is recirculated through the unloader valve and by-pass hose. The recirculating water heats up quickly. The thermal protector senses the overheated water and discharges it when it reaches 140 degrees F preventing pump damage.

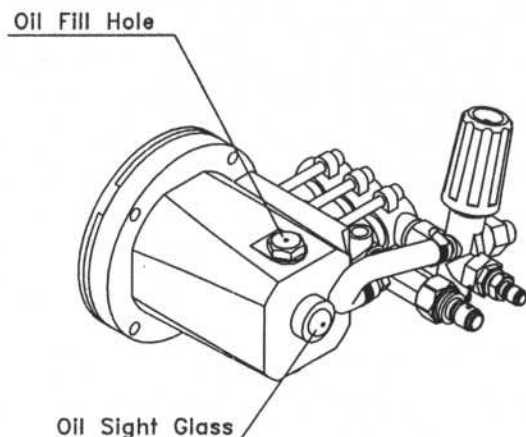
Water Inlet – Attach a garden hose to the water inlet using the quick couplers supplied. Spin the socket onto your garden hose, pull back the sleeve and push it onto the quick couple plug. Check and clean the water inlet screens each time you run this pressure washer. One screen is located behind the quick couple plug and the other is located in the quick couple socket. The screens help stop debris from entering the pump. However, never run dirty water through the pump.



Water Outlet – Attach the high pressure hose quick coupler here.

PUMP OIL

- 1.) Your pump is shipped with oil.
- 2.) Remove the shipping cap from the oil fill hole and replace it with the black vented dipstick found on the pump.
- 3.) Make sure oil is to the top of the knotch in the dipstick or half way up the sight glass.
- 4.) When changing the pump oil, we recommend North Star pressure washer pump oil (Item# 4043) which contains oil/water separation additives. A NON-DETERGENT SAE-30W oil can also be used.



Pump Maintenance Schedule

**Refer to the pump manual for complete maintenance schedule and pump component identification.

Item	Service Period	each use	first 40 hrs	every 3 months or 500 hrs
Pump Oil	Check Level	X		
	Change		X	X
Inlet Screens	Check & Clean	X		
Fittings	Check for leaks	X		
Nozzles*	Check & Clean	X		

*Use a pin to dislodge any debris in the nozzle orifice.

Caution



NEVER examine a nozzle orifice while the machine is pressurized.
NEVER attempt to remove a nozzle while spraying water.

Your Honda Engine

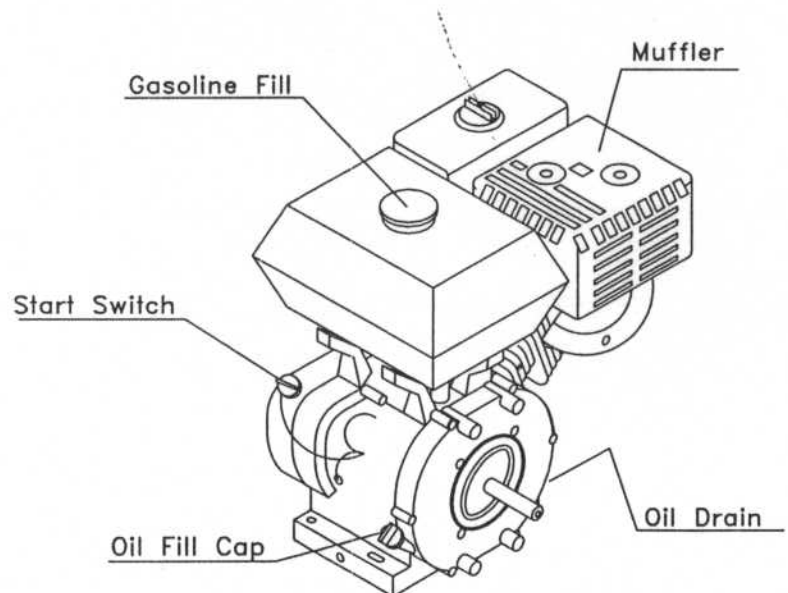
**REFER TO THE ENGINE MANUAL FOR COMPLETE MAINTENANCE SCHEDULE AND ENGINE COMPONENT IDENTIFICATION

Oil

- 1.) Your engine is shipped without oil.
- 2.) Your engine has low oil shutdown, it will not start without oil.
- 3.) Use SAE 10W-30 high detergent motor oil for general all-temperature use. For extremely hot environments, refer to the engine manual for the proper viscosity oil.
- 4.) Remove the oil fill cap/dipstick and fill the engine with oil to the top of the fill neck.
- 5.) Reinstall the oil fill cap/dipstick.
- 6.) Drain old oil by removing the oil plug found near the base of the engine on the muffler side. There is a large hole punched in the base for the oil to drain.

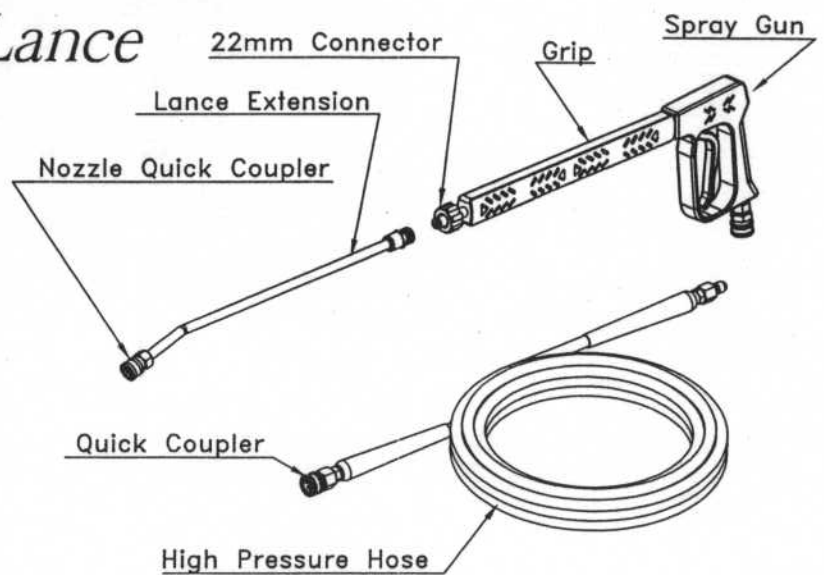
Gasoline

- 1.) Use unleaded gasoline with an octane rating of 86 or higher.
- 2.) Refer to the engine manual for additional fuel recommendations.




Your Spray Gun and Lance

The gun is equipped with a built-in trigger safety latch to guard against accidental trigger release and potentially dangerous high pressure spray. Fold the latch in the full down position when you're not spraying.



Hose

Your pressure washer is equipped with a 40 ft. high pressure hose that quick couples onto the pump and gun. It is a neoprene, 1 wire hose that is rated at 3000 psi from 40 to 250 degrees F.

Caution ALWAYS make sure all fittings are tight before operating pressure washer.
 NEVER disconnect the hose from the pump or the spray gun while spraying water.

Lance Extension

Your pressure washer has a 3 ft. lance for easy cleaning and for safety. The lance disconnects at the end of the grip for quick accessory changes and easier storage. To attach the lance extension to the spray gun grip, push the 22mm connector onto the lance extension and spin the coupler on hand tight.

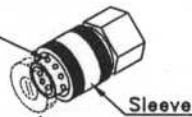
High Pressure Nozzles

The four high pressure nozzles provided with your pressure washer allow you to tackle a variety of cleaning jobs. The white nozzle has a 40 degree wide spray angle for blowing away big chunks of dirt and water sweeping. The green nozzle has a 25 degree fan spray for general cleaning. The yellow nozzle has a 15 degree fan for stubborn stains. The red nozzle sprays a 0 degree stream for the toughest cleaning jobs. To remove a nozzle pull back the sleeve on the nozzle quick coupler and pull the nozzle out. To insert a nozzle pull back the sleeve on the nozzle quick coupler and push in the new nozzle.

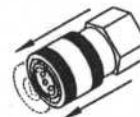
Caution ALWAYS make sure the sleeve on the nozzle quick coupler slides completely forward over the steel balls before attempting to spray water.



Steel Balls



NO



YES

NEVER examine a nozzle while it is still inserted into the nozzle quick coupler.

NEVER attempt to remove a nozzle while spraying water.

Low Pressure Soap Injection Nozzle

Use the black nozzle to apply chemicals to the cleaning surface. The black nozzle reduces the pressure making the chemical injector draw chemicals. Allow the chemicals to react with the cleaning surface. Change to a high pressure nozzle to scour and rinse the surface. To remove a nozzle pull back the nozzle quick coupler sleeve and pull the nozzle out. To insert a nozzle pull back the sleeve and push in the new nozzle.

Operation Instructions

CAUTION



Read and understand the entire manual before operating the pressure washer. Pay particular attention to all safety instructions.

PRE-OPERATION CHECK LIST

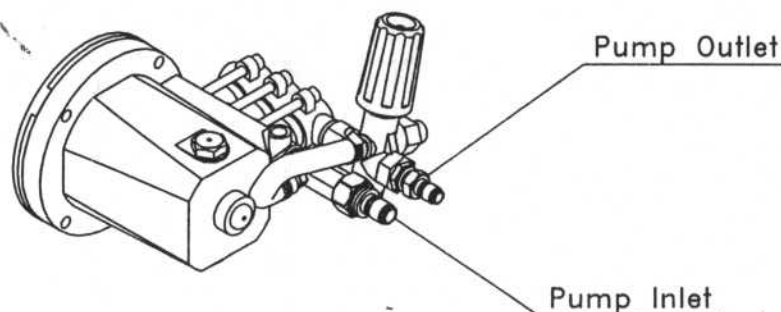
- 1.) Check the engine oil. Use a high detergent oil, SAE 10W-30.
- 2.) Check the gasoline supply. Use unleaded gasoline, octane 86 or higher.
- 3.) Check pump oil. Make sure it is half way up the sight glass. Use a NON-DETERGENT SAE-30W oil (item# 4043).
- 4.) Check for worn or damaged equipment. Replace if necessary.
- 5.) Check nozzle orifice. Remove any debris.
- 6.) Check inlet screens behind the quick couple plug and in the quick couple socket. Remove any debris.

WATER SUPPLY CHECK LIST

- 1.) Make sure the water supply is clean. Debris can cause excess pump wear and reduced performance.
- 2.) Make sure the water supply is steady and is more than 3 GPM. An insufficient water supply will damage your pump. If you can fill a 1 gallon pail in less than 20 seconds, then you have a sufficient water supply.
- 3.) The water supply garden hose must have an inside diameter of at least 5/8". If the hose is more than 100 ft. long, the inside diameter must be at least 3/4".
- 4.) When using a reservoir tank as a water source, the tank must be higher than the pump. Also, the supply hose must be at least 1" inside diameter and less than 5 ft. long.

PREPARING THE SYSTEM FOR OPERATION

- 1.) Attach quick couple socket to garden hose. Quick connect the garden hose to the pump inlet.
- 2.) Attach the high pressure hose to the pump outlet and gun inlet. Refer to the Spray Gun and Lance section for proper attachment.
- 3.) Attach the lance extension to the spray gun. Refer to the Spray Gun and Lance section.
- 4.) Turn ON the water supply.
- 5.) Squeeze the spray gun trigger until a steady flow of water sprays out the nozzle. Make sure all the air is out of the hoses before running the pressure washer. This step is very important, it will prolong the pump's life. NEVER run the pump dry.
- 6.) Insert a nozzle into the nozzle quick coupler. Refer to the Spray Gun and Lance section.



Operation Instructions

CAUTION



Read and understand the entire manual before operating the pressure washer. Pay particular attention to all safety instructions.

STARTING YOUR PRESSURE WASHER

- 1.) Refer to the engine manual to start your engine.
- 2.) Once your engine is started, begin cleaning.

STOPPING YOUR PRESSURE WASHER

- 1.) Turn the engine OFF. Refer to the engine manual.
- 2.) Turn the water supply OFF.
- 3.) Squeeze the spray gun trigger to relieve the system pressure.
- 4.) Remove the water supply garden hose from the pump inlet.
- 5.) Remove the high pressure hose from the pump outlet.

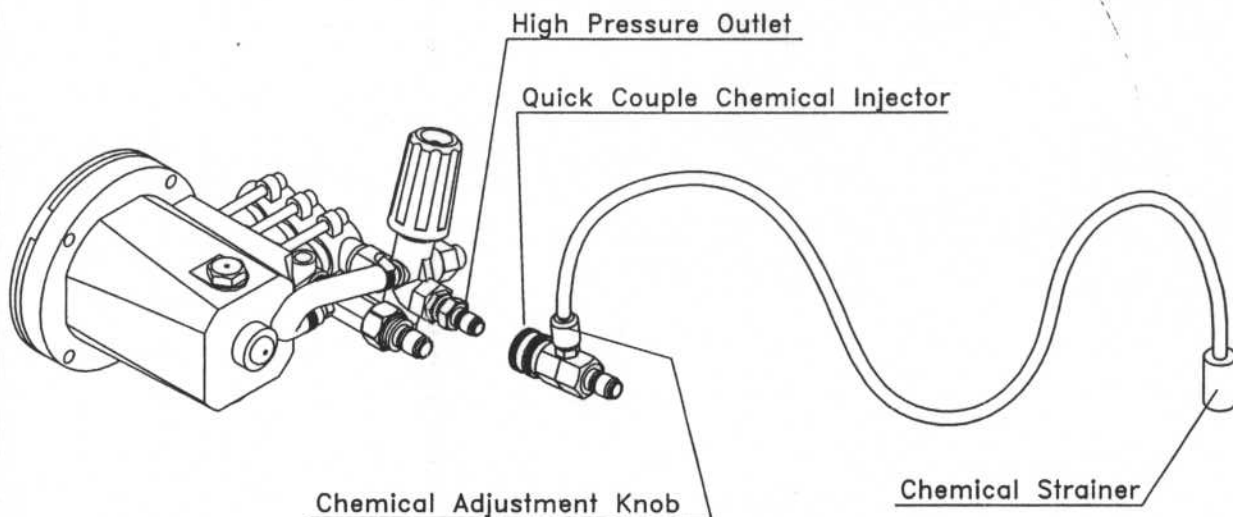
CAUTION



NEVER disconnect the high pressure hose from the pump or spray gun while the system is pressurized. Depressurize the system by squeezing the spray gun trigger after the engine is turned OFF.

SPRAYING CHEMICALS

- 1.) Spin the quick couple chemical injector onto the pump hand tight.
- 2.) Submerge the chemical strainer in a chemical solution.
- 3.) Adjust the nozzle holder to low pressure. Refer to the Spray Gun and Lance section for changing to low pressure.
- 4.) Squeeze the spray gun trigger until chemical discharges from the nozzle.
- 5.) Adjust the chemical adjustment knob to increase or decrease the chemical concentration.



CAUTION



ALWAYS follow the chemical manufacturer's recommendations when using chemicals in the chemical injector.

ALWAYS understand all safety precautions and first aid for the chemicals being used.

Long Term Storage

Storage:

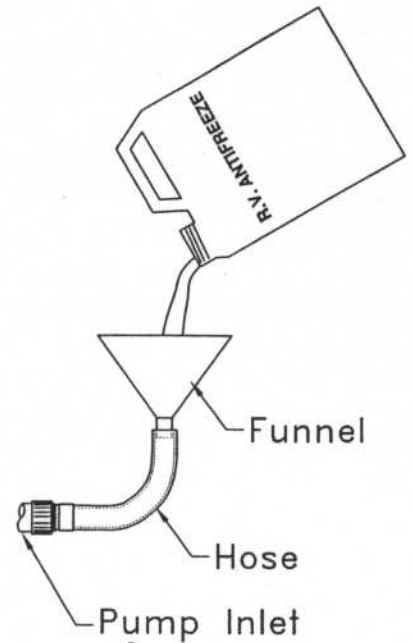
Before you store the pressure washer, make sure you do the following:

1. Remove gasoline from engine or add fuel stabilizer, such as "Sta-Bil" to the gasoline to prevent gumming.
2. If adding stabilizer, run the pressure washer with high pressure hose for five minutes.
3. Shut down the pressure washer and disconnect the high pressure and garden hose.
4. Remove the spark plug and pour one teaspoon of engine oil into the spark plug hole. Cover the spark plug hole and turn the engine over several times to lubricate the cylinder.

Winter Storage:

Items needed: 12" piece of garden hose or equivalent, funnel and R.V. antifreeze (approximately 6 oz.)

1. Follow the previous storage instructions.
2. Disconnect the spark plug wire.
3. Attach the garden hose with funnel to the pump inlet (see illustration).
4. Pour R.V. antifreeze into the funnel, turn the engine over until antifreeze comes out the pump outlet.
5. Remove all water from the high pressure hose, gun and wand. Depress trigger on gun to assure gun/wand does not have any water in it.



Cleaning Tips

CAUTION



Read and understand the entire manual before operating the pressure washer. Pay particular attention to all safety instructions.

Nozzles

Your pressure washer comes with four high pressure cleaning nozzles. Each nozzle is rated at the same psi, but they have different spray angles. Small spray angles impact the cleaning surface harder. Wide angles cover larger areas in less time.

General Cleaning

- 1.) Choose the appropriate nozzle for your application.
- 2.) Hold the nozzle 6" to 12" from the cleaning surface.
- 3.) Use long, slow, deliberate strokes from side to side similar to using a paint sprayer. This technique will provide the most effective cleaning impact and minimize streaks and skips in the cleaning surface.

CAUTION



NEVER point the nozzle or lance at people or animals. The high pressure the machine creates is very dangerous.

ALWAYS keep the high pressure hose connected to the machine and the spray gun while spraying water.

Applying Chemicals

- 1.) Apply chemicals evenly to the cleaning surface. Allow the chemicals to react with the dirt, then rinse at high pressure.
- 2.) Never use more chemical than is necessary to clean the surface.

CAUTION



ALWAYS follow the chemical manufacturer's recommendations when using chemicals in the chemical injector.

ALWAYS understand all safety precautions and first aid for the chemicals being used.

Troubleshooting

LOW NOZZLE PRESSURE	
Causes	Solutions
Plugged nozzle.	Remove nozzle, check for blockage and clean if necessary.
Worn nozzle	Replace nozzle (#3.5)
Plugged water inlet screen	Pull screen out carefully and clean.
Unloader valve stuck open	Contact Customer Service.
Restrictive water supply hose	Use larger diameter water supply hose and/or hose fittings.
Insufficient flow of water to the pump	Increase water flow. Check for kinked or pinched water supply hose.
Leak in high pressure hose	Check connections. Replace if cracked or punctured.

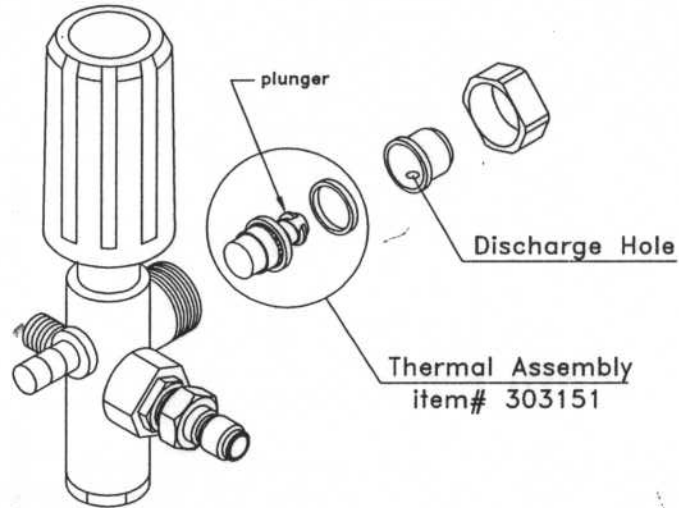
SURGING PRESSURE	
Causes	Solutions
Restrictive water supply hose	Use larger diameter water supply hose and/or hose fittings.
Plugged water inlet screen	Pull screens out carefully and clean.
Insufficient flow of water to the pump	Increase water flow. Check for kinked or pinched water supply hose.
Air trapped in pump head	With unit off, purge air by squeezing spray gun until water flows steadily out the nozzle.
Leak in high pressure hose	Check connections. Replace if cracked or punctured.

CHEMICAL INJECTOR NOT WORKING	
Causes	Solutions
Using high pressure nozzle.	Change to chemical nozzle (black)
Back pressure from extra long hose	Don't use additional high pressure hose.
Chemical adjustment knob turned too low or off.	Turn chemical adjustment knob on (counter-clockwise).
Plugged chemical injector.	Check and clean chemical injector.
Leak in clear chemical hose.	Replace hose. Use hose clamp to seal the hose around the chemical hose barb.
Chemical strainer not submerged in chemical solution.	Completely submerge strainer in chemical solution.

ENGINE WILL NOT START	
Causes	Solutions
Oil level is low.	Fill engine with SAE 10W-30 oil, see engine manual.

Troubleshooting

LEAKY THERMAL PROTECTOR	
Causes	Solutions
Debris trapped inside thermal assembly.	Remove thermal assembly and press plunger in and out to dislodge debris. Reassemble with discharge hole pointed downward.
Poor seal inside thermal assembly.	Replace thermal assembly. Reassemble new thermal assembly with discharge hole pointed downward.



EXCESS VIBRATION	
Causes	Solutions
Tire pressure	Increase or decrease the tire pressure to 20 psi.
Loose bolts	Check and tighten any loose bolts.

**Any Questions, Comments or Problems
 Call Customer Service 1-800-270-0810
 Hours: Monday - Friday 7:30 AM to 5:00 PM CST
 Saturday 7:30 AM - 11:30 AM CST**