

Proven Performance

K-BAR Industries, Faribault, MN, 55021

M157294F

ITEM NUMBER:	157294
SERIAL NUMBER:	_____
Engine Model:	_____
Pump Model:	_____
Flow:	_____ Pressure: _____
Hose Length:	_____ Lance Length: _____
Nozzle Size:	_____

Installation, Operation, and Maintenance Manual

HOT WATER PRESSURE WASHER: *Cleans dirty surfaces with high pressure hot water.*

To the Owner:

Thank you for purchasing a NorthStar hot water 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 NorthStar hot water pressure washer, the industry leader! The manufacturer reserves the right to make improvements in design and/or changes in specifications at any time without incurring any obligation to install them on units previously sold.

Quick Facts

Engine Oil	Engine is shipped without oil. Fill before starting. Use SAE 10W-30 motor oil.	
Pump Oil	Pump is shipped with oil. Change oil plug and check pump oil level before starting. Use SAE 30 Non-detergent pump oil (item# 4043) for oil changes.	
Water	Make sure your water flow is 20% higher than the pressure washer's flow rate. Make sure your water is clean and particle free.	
Storage	Do not allow water to freeze in the pump, hose, coil, or spray gun.	
Spraying Chemicals	Use any NorthStar brand or equivalent pressure washer chemicals. Adjust soap adjustment knob to regulate cleaning power.	
Maintenance Schedule	Engine:	Oil: change after first 20 hours, then annually or every 100 hours. Spark Plug: clean every 100 hours, replace annually or every 300 hours. Air Filter: clean every 100 hours, replace annually or every 300 hours.
	Pump:	Oil: change after first 40 hours, then every 3 months or 500 hours.

Read and understand all manuals before operating.

Any Questions, Comments, Problems or Parts Orders

In the United States

Northstar Customer Service

Call 1-800-270-0810

Hours: Monday - Friday 7:00 AM to 5:30 PM

Saturday 7:30 AM-11:30 AM Central Time

In the United Kingdom

Call 02392639752

Northern Tool and Equipment Co. (UK) Ltd.

Unit 2, Keel Close,

Portsmouth, Hants PO3 5QD, England

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Important Safety Instructions

- WARNING** -Risk of injection or injury to persons - Do not direct discharge stream at persons. - Do not use a hose if exterior damage is evident.
- CAUTION** -Risk of explosion. Do not spray flammable liquids. Do not operate in a flammable environment.
- Risk of asphyxiation. Exhaust fumes are deadly. For outdoor use only. Avoid inhaling exhaust fumes.
- Risk of fire. Do not add fuel when the product is operating or hot.
- Gun kicks back, hold with both hands.
- To reduce the risk of injury, read and understand operating instructions carefully before use.
- WARNING** - When using this product basic precautions should always be followed, including the following:
- 1.) Read all the instructions before using the product.
 - 2.) To reduce the risk of injury, close supervision is necessary when the product is used near children. Do not allow irresponsible use by children. Always stop the product and bleed pressures before leaving unattended, disconnecting hoses, or servicing the pump.
 - 3.) Know how to stop the product and bleed pressures quickly. Be thoroughly familiar with the controls.
 - 4.) Stay alert - watch what you are doing.
 - 5.) Do not operate the product when fatigued or under the influence of alcohol or drugs. Never smoke while operating or fueling this machine.
 - 6.) Keep operating area clear of all persons.
 - 7.) Do not overreach or stand on unstable support. Keep good footing and balance at all times. Wear footwear capable of maintaining a good grip on wet surfaces - Do not place the machine on soft or unstable ground.
 - 8.) Follow the maintenance instructions specified in all manuals. Do not run machine without sufficient lubrication or sufficient water to cool the pump.
 - 9.) Wear safety glasses, gloves, face protection and appropriate clothing when operating the machine.
 - 10.) Do not operate this machine with broken or missing parts. - Never alter the manufacturer's original design or deactivate any safety device on the machine.
 - 11.) Risk of exposure to dangerous chemicals. Wear protective gloves when handling and cleaning with chemicals. Follow the chemical manufacturer's directions. Understand all safety hazards and first aid for all chemicals being used. Check whether dangerous chemicals have been used and take any precautions that may have been recommended by the supplier of these chemicals when cleaning filters. Do not pump highly abrasive fluids or use with incompatible chemicals or solvents.
 - 12.) Know the pressure and temperature limits of your machine. Be sure all high pressure accessories meet or exceed your machine's limits. Do not set the pressure relief valve above the machine's limit.
 - 13.) Do not move this machine by pulling on the hose. Do not use the pump to support other items of equipment that impose unacceptable loads on the pump. Do not attempt to use this machine as a prop.
 - 14.) To reduce risk of injury, do not secure the spray gun open. Your spray gun is equipped with a built-in trigger safety latch to guard against accidental trigger release and potentially dangerous high pressure spray. Rotate the safety latch to the locked position when not spraying.
 - 15.) Do not clean this machine with its own spray. Cleaning should be done with a damp sponge with the engine OFF.
 - 16.) NEVER attempt to immediately run or re-light the burner if it doesn't ignite the first time. Unburned oil or gas may have accumulated causing potential explosion or fire hazard.
 - 17.) Always make sure all switches and controls are in the OFF position prior to starting the engine.

SAVE THESE INSTRUCTIONS

Specifications

ITEM	157294
Pressure Rating	3000 psi
Flow Output	4 gpm
Pump Type	General TS1511
Water Supply	Standard tap water @ 20-100 psi
Engine Horsepower	13 hp
BTU Output	353,700 BTU
Temperature Rise	140° F
Maximum Temperature	210° F
Approved Fuels	#1 or #2 Diesel, Kerosene, Fuel Oil
Fuel Capacity	8.5 Gal
Gasoline Capacity	8.5 Gal
Discharge Hose	3/8" X 50'
Dimensions	
Length	49"
Width	34"
Height	44"
Weight (shipping)	655 lbs
Weight (dry)	557 lbs
Weight (fueled)	710 lbs

Machine Component Identification

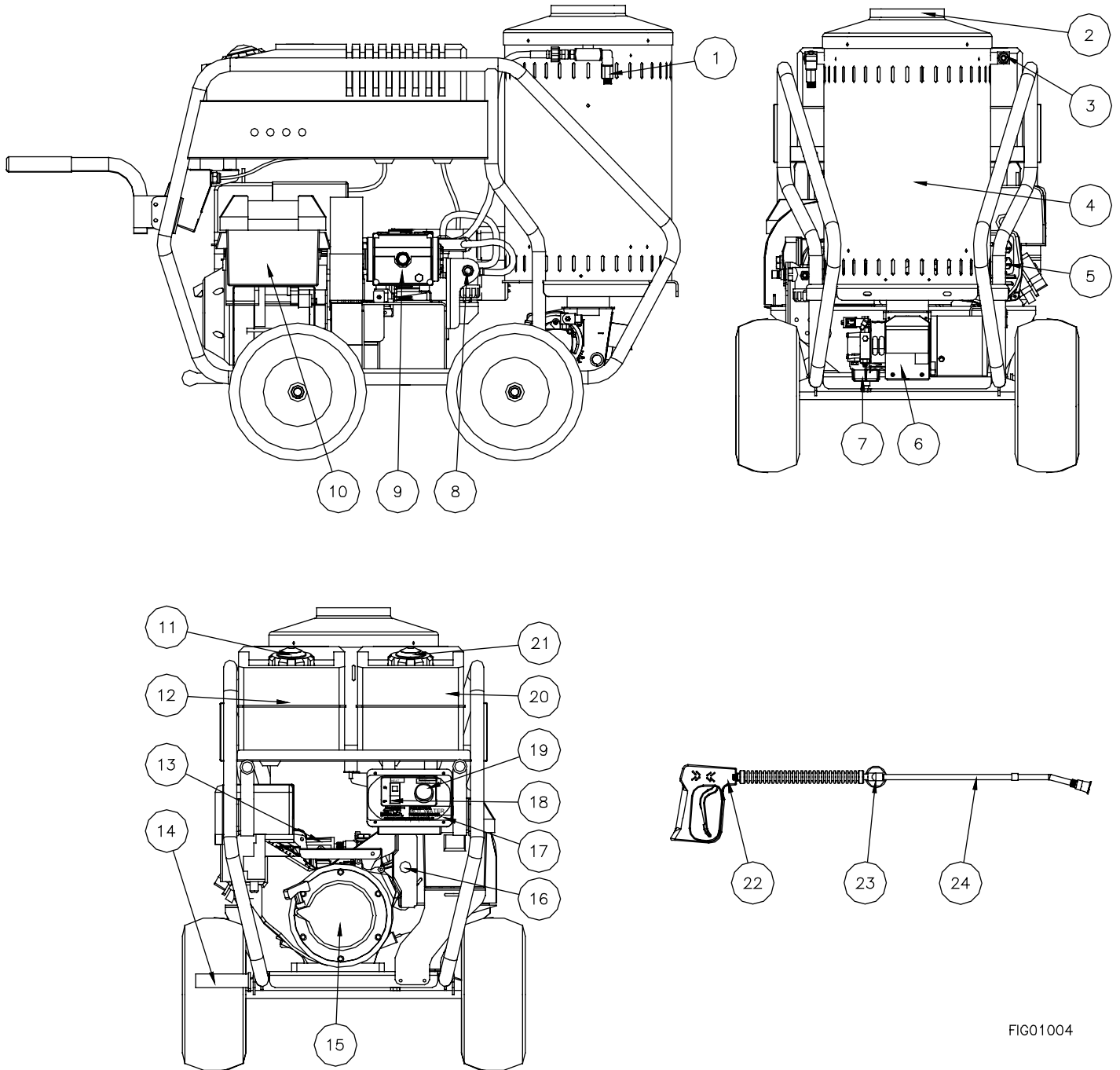


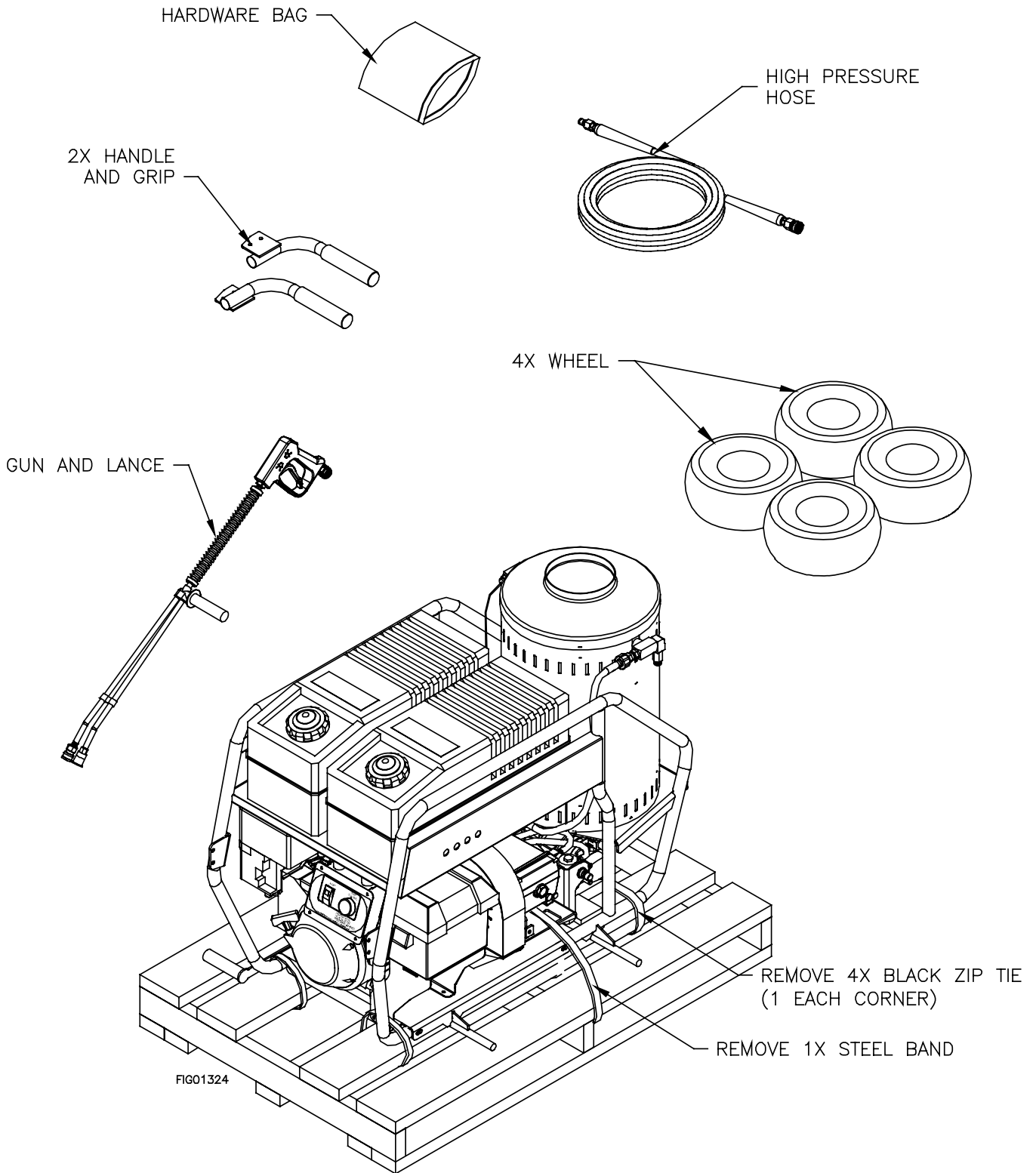
FIG01004

Ref #	Description	Ref #	Description	Ref #	Description
1	High Pressure Relief Valve	9	Pump	17	Control Panel
2	Exhaust Vent	10	Battery	18	Heat Switch
3	High Pressure Output	11	Gas Cap	19	Thermostat
4	Heating Coil	12	Gas Tank	20	Fuel Tank
5	Generator Head	13	Unloader (psi adjustment)	21	Fuel Cap
6	Burner	14	Brake	22	Spray Gun
7	Fuel Filter	15	Engine	23	Grip
8	Garden Hose Water Inlet	16	Engine Start Switch	24	Dual Lance Wand

Installation Instructions

I.) Unpack

Your pressure washer is shipped on one pallet. Separate and identify the components and use the assembly instructions in this manual for assembly.



Hardware Bag

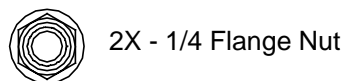
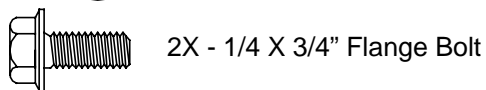
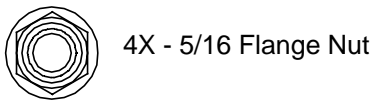
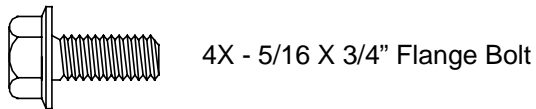
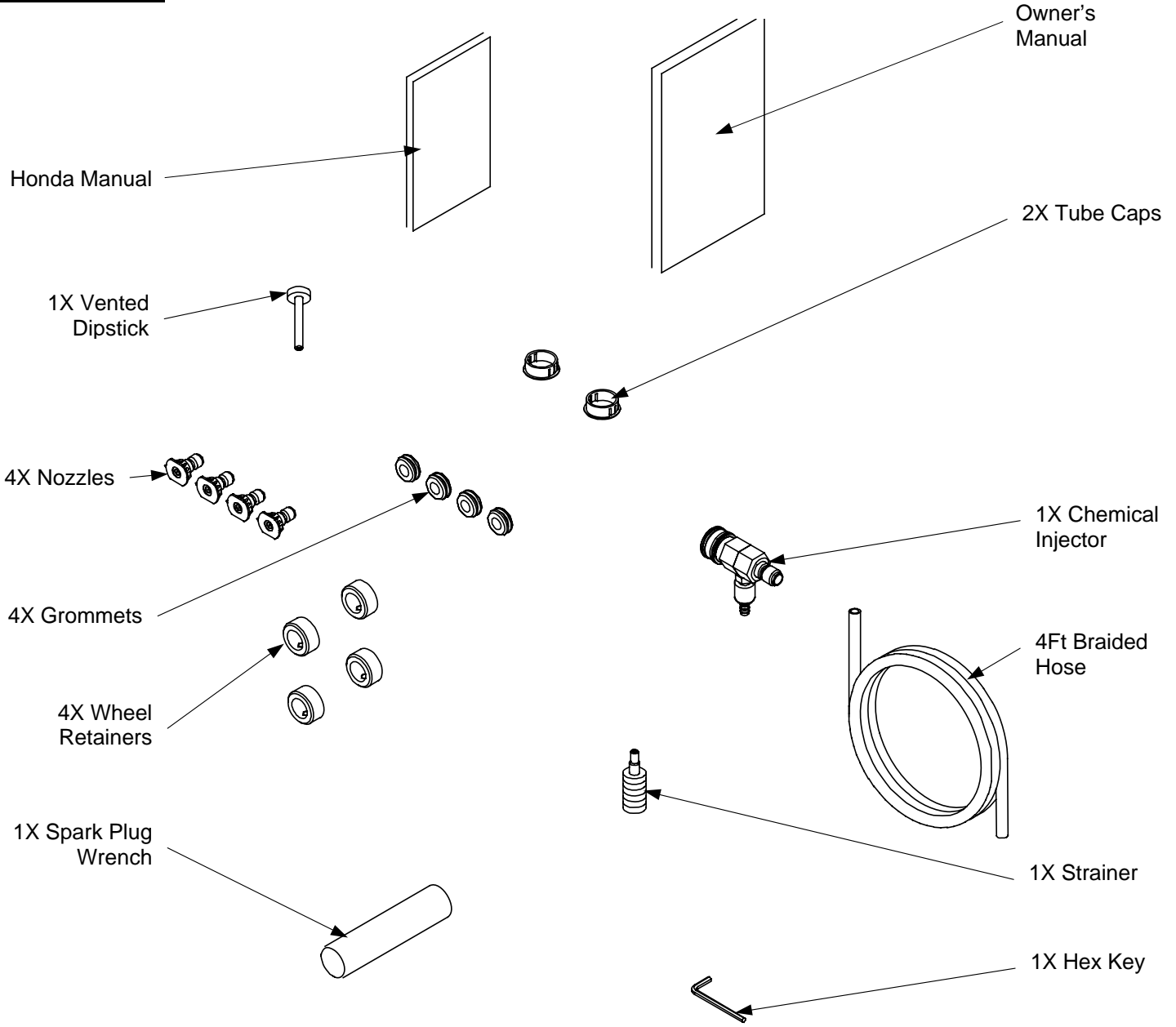
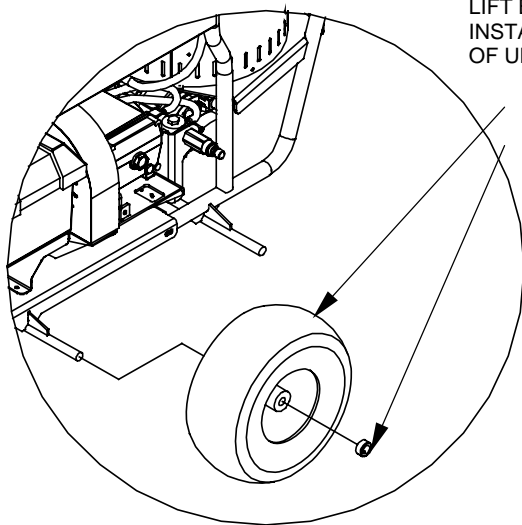


FIG01325

II.) Assembly Instructions



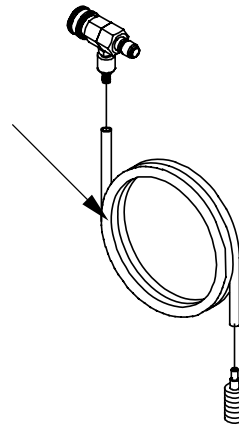
LIFT BACK OF UNIT BY HANDLES TO
INSTALL REAR WHEELS, THEN LIFT FRONT
OF UNIT TO INSTALL FRONT WHEELS

INSTALL WHEEL ONTO AXLE

FASTEN WHEEL WITH RETAINER,
SECURE RETAINER WITH WRENCH PROVIDED

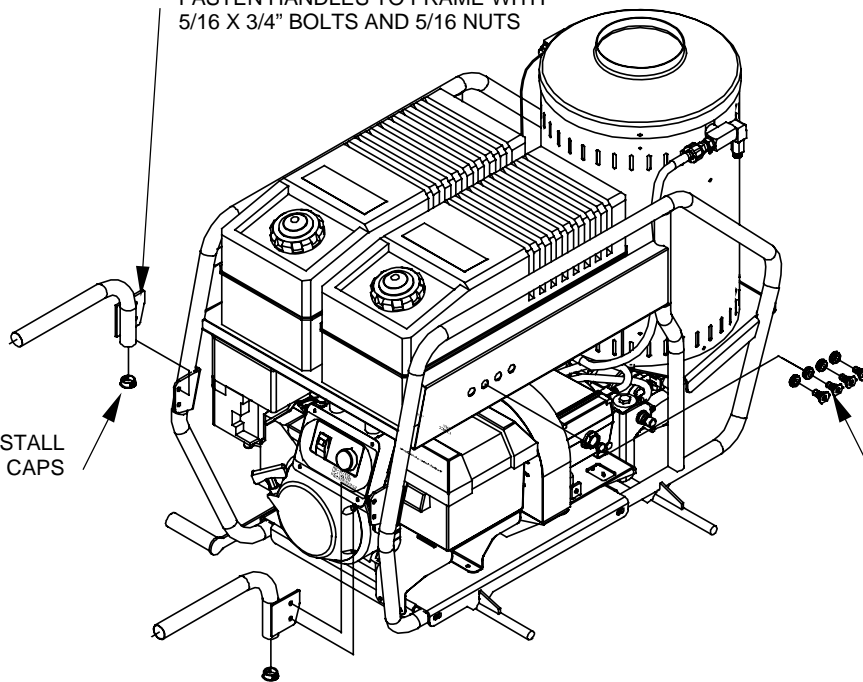
NOTE: IT IS RECOMMENDED THAT TWO
PEOPLE LIFT THIS UNIT WHILE A THIRD
SLIDES THE WHEELS ONTO THE AXLES

PRESS BRAIDED HOSE ONTO
INJECTOR AND STRAINER



FASTEN HANDLES TO FRAME WITH
5/16 X 3/4" BOLTS AND 5/16 NUTS

INSTALL
TUBE CAPS



INSTALL GROMMETS
AND NOZZLES INTO
HOLES IN FRAME

FIG01007

III.) Pump Preparation

- Remove red shipping plug from oil fill hole.
- Install vented dipstick into oil fill hole.
- Make sure the oil is 1/2 way up oil sight glass.

IV.) Engine Preparation

- Fill engine with 1.16 qt of oil.
- Fill fuel tank with unleaded gasoline, 86 octane min.

Quantities Of Fluid

Engine/Pump	Type of Fluid	QTY
Honda GX390	SAE 10W30	1.16 qt (1.1L)
General TS1511	SAE 30**	40.60oz (1.2L)

**SAE Non-Detergent (Item# 4043)

V.) Battery Preparation

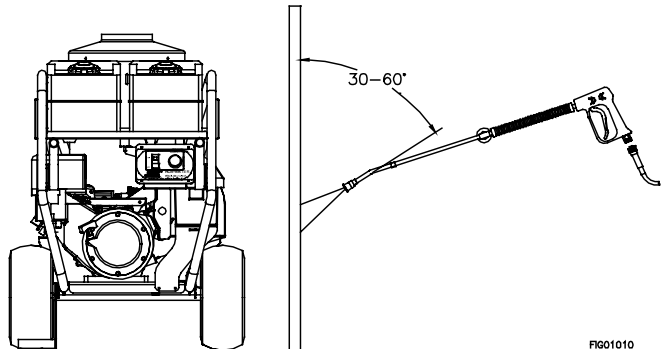
- Battery is shipped without electrolyte.
- Fill each battery cell to the fill line with locally purchased electrolyte (sulfuric acid and water).
WARNING Sulfuric acid is a corrosive poison. Avoid contact with skin, eyes or clothing.
- Connect battery cables to battery terminals.
WARNING To connect the battery:
Always connect the red, "+", or positive battery cable first, then connect the black, "-", or negative battery cable.
Always disconnect the black, "-", or negative cable first, then disconnect the red, "+", or positive cable.

VI.) Getting Started

IMPORTANT: Proper initial installation of equipment will assure more satisfactory performance, longer service life, and lower maintenance cost.

IMPORTANT: The use of a back flow preventer (Part #222815 call 1-800-270-0810 to order) on the water supply hose is recommended and may be required by local code.

Make sure the pressure washer is on a level surface and in a protected area where it is not readily influenced by outside forces such as strong winds, freezing temperatures, rain, etc. Locate the pressure washer for easy access for filling fluids, adjustments, and maintenance.



It is recommended that a partition be made between the wash area and the pressure washer to prevent direct nozzle spray from coming in contact with the pressure washer. Moisture reaching the equipment will reduce the pressure washer's service life.

VII.) Venting

DANGER: Do not run machine indoors or in an enclosed area without adequate ventilation, or in areas where flammable vapors, (gasoline, solvents, etc.) may be present. Do not vent exhaust gases into a wall, a ceiling, or a concealed place.

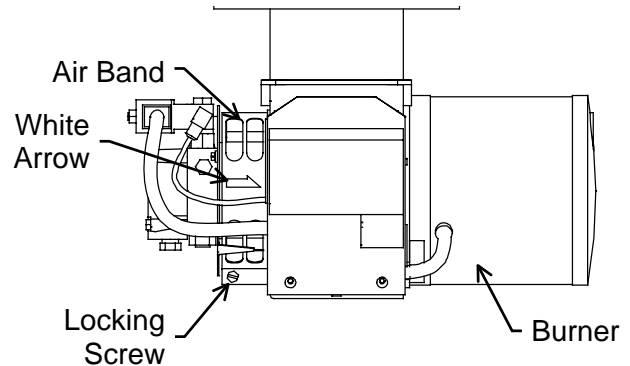
CAUTION: All venting must be in accordance with applicable state and federal laws, and local ordinances. Consult local heating contractors.

If the pressure washer is to be used in an enclosed area, a flue must be installed to vent burner exhaust to the outside atmosphere. Be sure the flue is the same size as the burner exhaust vent on the pressure washer lid. Poor draft will cause the pressure washer to soot and not operate properly. When selecting the location for installation, beware of poorly ventilated locations or areas where exhaust fans may cause an insufficient supply of oxygen. Proper combustion can only be obtained when there is a sufficient supply of oxygen available for the amount of fuel being burned. If it is necessary to install a unit in a poorly ventilated area, outside fresh air may have to be piped to the burner and a fan installed to bring sufficient air into the unit. Locate the pressure washer in such a manner that the flue will be as straight as possible and protrude through the roof

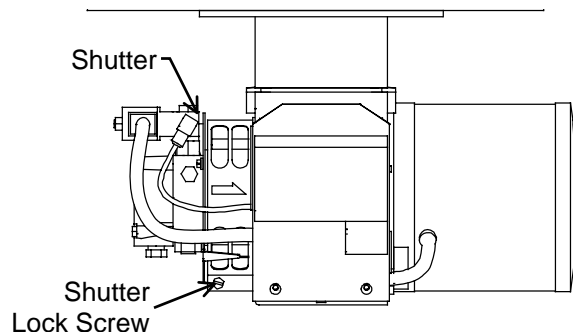
at a proper height and location to provide adequate draft. This oil fired unit must have a draft controller installed in the flue (Part #18007 call 1-800-270-0810 to order). A draft controller will permit proper upward air flow of exhaust flue gases.

VIII.) Oil Burner

Burner Air Adjustment: The oil burner is preset and performance tested at the factory (elevation 1100 feet). Different altitudes may require a one-time initial burner correction.



- 1.) Turn the engine and heat switches ON (Refer to "Operation" for details). Have someone operate the spray gun so the burner fires.
- 2.) Loosen the locking screw and close the air band until black smoke appears from the burner exhaust vent. Note the position of the white arrow on the air band.
- 3.) Slowly open the air band until white smoke just starts to appear.
- 4.) Turn the air band half way back to the black smoke position previously noted. Tighten the locking screw.
- 5.) Fine tune the burner air by loosening the shutter lock screw and turning the shutter until the exhaust is cleanest. Tighten the shutter lock screw.



CAUTION: If white smoke appears from the burner exhaust vent during start-up or operation, discontinue use and readjust air bands.

NOTE: If a flue is installed, have a professional serviceman adjust your burner for a #1 or #2 smoke spot on the Bacharach scale.

Operating Instructions

Read and understand the entire manual before operating the pressure washer.
Follow these instructions every time you use the pressure washer.

I.) Pre-Operation

- ☑ A.) Position the machine for easy access to all controls.
- ☑ B.) Position the machine on a solid surface, with less than a three degree slope, and so it is protected from external damage.
- ☑ C.) Position the machine so that ambient lighting is sufficient for the surface you are cleaning to be seen with ease. Use artificial light if needed.
- ☑ D.) Check hoses, fittings, wand, trigger gun and fuel connections for signs of wear, cracks and looseness, and replace as required.
- ☑ E.) Check and clean the nozzle orifice.
- ☑ F.) Check and clean the water inlet screen and filter.
- ☑ G.) Read entire manual, especially the important safety instructions listed on page 2.
- ☑ H.) Check and maintain proper oil levels in the pump and engine.

II.) Check Your Water Supply

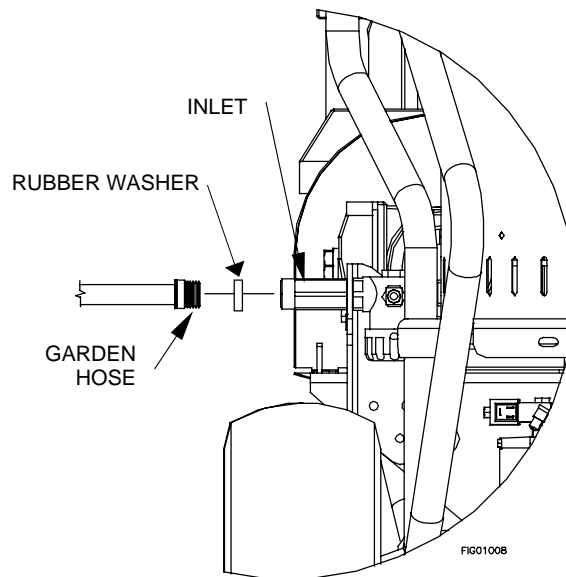
- ☑ A.) Make sure the water supply is clean. Debris can cause excess pump wear and reduce performance.
- ☑ B.) An insufficient water supply will damage your pump. Make sure the water supply is steady and is 20% over the rated flow of your pump. Use a stopwatch to time how long it takes to fill a 5 gallon bucket with your garden hose.

Example: If the rated flow is = 4gpm
Then required flow = $4 \times 1.20 = 4.8\text{gpm}$
 $5\text{gallons} / 4.8\text{gpm} = 1.04\text{ minutes}$
 $1.04\text{min} \times 60\text{sec}/\text{min} = 62\text{ seconds}$
Therefore, you must be able to fill a 5 gallon bucket in 62 seconds or faster.

- ☑ C.) 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 diameter must be at least 3/4".
- ☑ D.) Never use a reservoir tank as a water source. This pressure washer is designed for a pressurized water source such as a city water faucet. Sucking water out of a tank may cause pump cavitation and damage to your pump. However, the inlet pressure of the pump must not exceed 75 psi (5.25 bar).
- ☑ E.) Always use a flexible rubber hose for your water supply. Do not use rigid piping.
- ☑ F.) Do not pump flammable liquids or liquids containing incompatible chemicals or solvents.

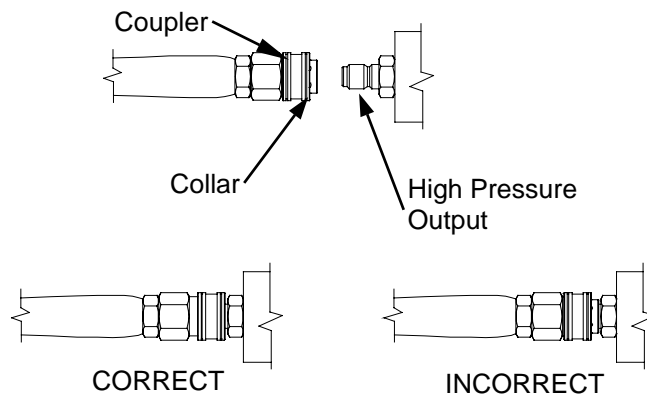
III.) Attach Garden Hose

Remove shipping plug from pump inlet and confirm rubber washer is in place. Attach garden hose.



IV.) Attach High Pressure Hose

Your pressure washer hose is equipped with quick couplers. Simply pull the collar back and push the coupler onto the nipple. Make sure the collar slides over the ball bearings. Once the connection is made, pull on the hose to assure a positive connection.



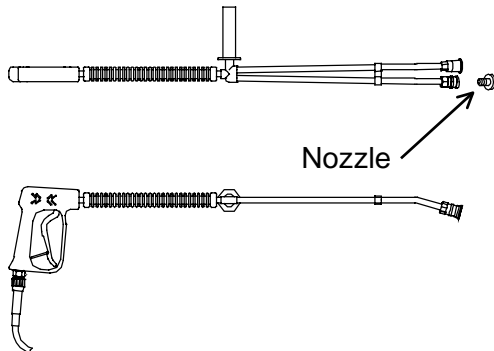
V.) Turn Water Supply ON

Make sure the hose is not "kinked". A kinked hose will provide insufficient water supply to the pump and will reduce its life. Make sure the hose remains unkinked after moving the pressure washer.

VI.) Squeeze Trigger

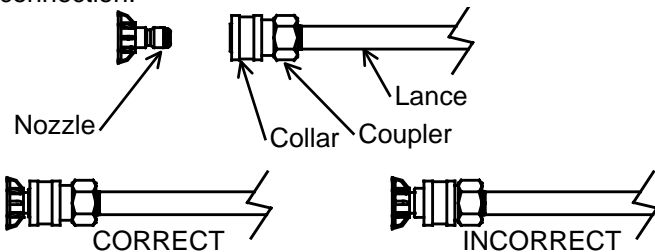
Squeeze the trigger until a steady flow of water sprays out the nozzle. Make sure all the air is out of the hoses before running the pressure washer. This step is very important, it will prolong the pump's life. NEVER run the pump dry.

VII.) Attach Nozzle



Color of Nozzle:	Spray Angle	Used For:
Red	0	Highest Impact
Yellow	15	Tough Stains/ Stripping
Green	25	General
White	40	Light Cleaning
-	65	Chemicals

Your pressure washer is equipped with four high pressure nozzles. To install a nozzle simply pull back the collar and push the nozzle into the coupler. Once the connection is made, pull on the nozzle to assure a tight connection.



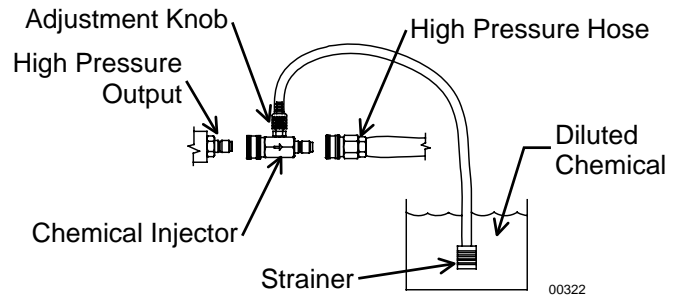
WARNING: Make sure the nozzle is correctly inserted. The nozzle may become a projectile if not inserted correctly. Do not attempt to use different types of nozzles that may not fit the coupler.

VIII.) Applying Chemicals

WARNING: Only use NorthStar pressure washer chemicals or chemicals specifically formulated for pressure washers. Follow the chemical manufacturer's recommendations. Understand all safety precautions and first aid for all chemicals.

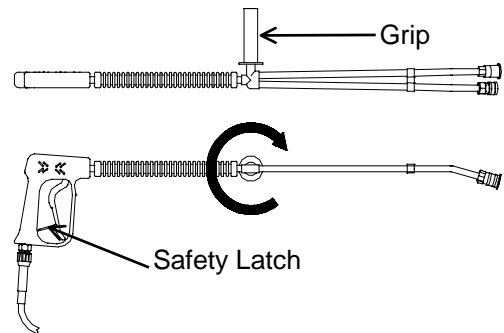
NOTE: Your pressure washer is equipped with a low pressure chemical injector. The proper chemical used for the proper application can speed up cleaning jobs tremendously.

A.) Snap the quick couple chemical injector onto the high pressure outlet and high pressure hose and submerge the suction strainer into the chemical solution.



B.) You need to use the low pressure nozzle to spray chemicals onto the cleaning surface.

C.) Rotate the grip on the dual lance wand to change to low pressure and start the detergent flow.



D.) The amount of chemical applied can be changed by turning the chemical adjustment knob located on the chemical injector.

E.) Squeeze the spray gun trigger. The chemical injector will draw the chemical into the water stream

F.) Apply chemicals evenly to the cleaning surface. Allow the chemicals to react with the dirt, then clean at high pressure with green nozzle.

G.) Never use more chemical than is necessary to clean the surface.

H.) If you do not intend on using chemicals, we suggest removing the chemical injector to obtain maximum cleaning pressure.

IX.) Start Engine

*Refer to the engine manual to start your engine.

IMPORTANT: The water must be turned on before starting. Running the pump dry will cause damage and void the warranty.

IMPORTANT: Make sure the fuel shutoff valve located under the fuel tank is in the ON position.

IMPORTANT: Make sure that the engine throttle is all the way open. If it is not, the generator will not

supply adequate voltage to the burner, resulting in smoke coming from the heat exchanger during operation.

WARNING: Check that there are no leaks in the vicinity of the pump before starting engine.

Once the engine is started, begin cleaning. If the engine doesn't start on the first try, pressure may build up in the pump. Relieve the pump pressure by squeezing the spray gun trigger. This will make starting easier.

WARNING: Do not inhale the exhaust from the engine. Do not point the lance at anyone even if the engine has stopped because there could be a release of water under retained pressure if the spray gun trigger is actuated.

X.) For Hot Water

1. If HOT water is desired, make sure there is fuel in the fuel tank, turn the heat switch ON, and adjust the thermostat to the desired temperature. The burner will fire when the trigger is squeezed. You may need to initially adjust your burner for peak performance. See the "Oil Burner" section under INSTALLATION. When the trigger is released or the temperature setting is reached, the burner will automatically turn off.

IMPORTANT: Do not run the machine in hot mode without any fuel in the fuel tank. *The fuel pump will be damaged if it is run dry.*

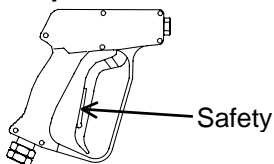
XI.) Cleaning

WARNING: Wear eye, ear, hand, foot and skin protection at all times while operating this pressure washer.

DANGER: Do not point the spray wand at yourself or at any person. *Bodily injury may result from water under high pressure.*

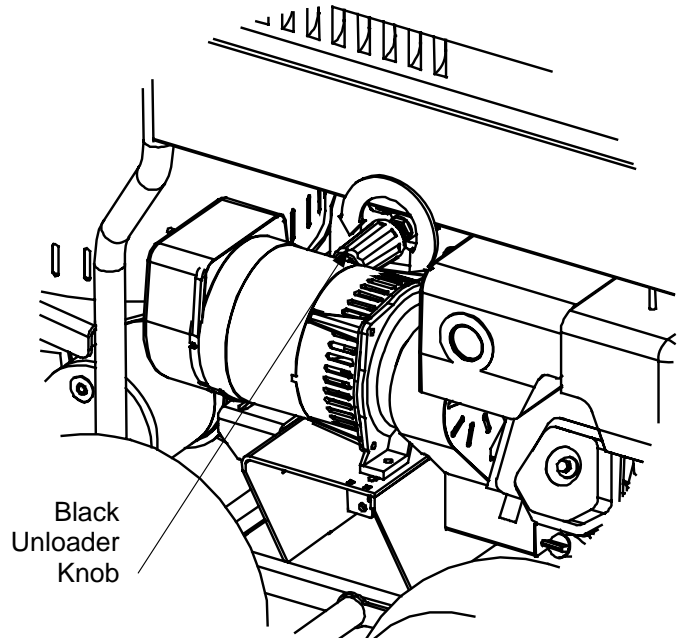
CAUTION: Be careful on painted or delicate surfaces. *The pressure may damage the surface if the nozzle is too close.*

IMPORTANT: Your spray gun is equipped with a built-in trigger safety latch to guard against accidental trigger actuation and potentially dangerous high pressure spray. *Rotate the safety latch to the locked position when not spraying.*



- A.) Hold the lance with two hands, have a sturdy stance.
- B.) Point lance at dirty surface and squeeze trigger.
- C.) Wash from the bottom to the top, using side to side motions. This washes away heavy dirt and allows the detergent to soak as you work toward the top.
- D.) Use the width of the spray pattern to wash in a wide path. Overlap spray paths for complete coverage.
- E.) The nozzle should be 12" to 24" from the work, closer for tough areas.

- F.) Small parts should be washed in a basket so the pressure does not push them away. Larger, light weight parts should be clamped down.
- G.) The pressure washer is set and locked to the maximum rated pressure when it leaves the factory. There are two easy ways to adjust your pressure.
 - a. Rotate the grip slightly to allow some flow to pass through the left lance. See section VIII, step C.
 - b. Or, turn the black unloader knob counterclockwise.



WARNING: Do not alter the unloader valve's maximum pressure. *Excess pressures could cause serious injury and/or pump damage. Any alteration other than turning the adjustment knob will void your warranty.*

XII.) Shut-Down Instructions

WARNING: Do not leave an operating machine unattended. Always shut the machine OFF and relieve the pressure before leaving the machine. *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.*

- A.) Turn heat switch OFF and run cold water through the coil for 3 minutes.
- B.) Turn engine OFF.
- C.) Turn water supply OFF.
- D.) Actuate spray gun trigger to relieve system pressure.
- E.) Remove garden hose.
- F.) Remove pressure hose.

Safety Features

I.) Safety Relief

The safety relief valve is a backup safety feature. If the unloader malfunctions, the safety relief valve will open and relieve system pressure.

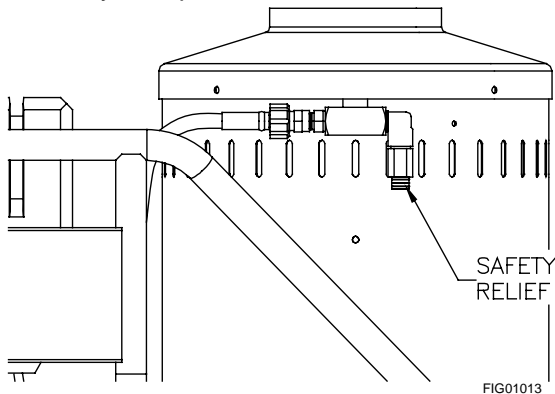


FIG01013

WARNING: 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.

II.) High Temperature Limit

The high temperature limit is another safety feature. If the discharge water overheats, the unit will shut down.

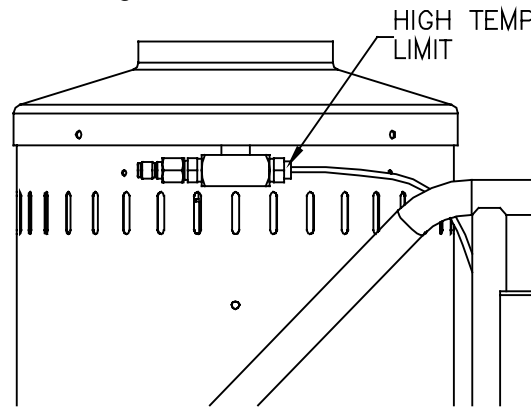


FIG01014

Maintenance Instructions

WARNING: Unauthorized machine modification or use of non-approved replacement parts may cause personal injury and/or property damage and will void the manufacturer warranty.

All mechanical equipment, no matter how well designed, will need repairs. A North Star pressure washer is no exception. At times, a North Star pressure washer may be inoperable because repairs are required. North Star Customer Service will assist in these repairs as needed, but if an inoperable pressure washer creates a major expense to your business then we strongly recommend the following:

1. Have someone on staff who is trained in the operation of the pressure washer and is capable of making minor repairs and performing all preventative maintenance procedures as outlined in the provided manuals.
2. Keep a stock of recommended service parts for maintenance and minor repairs.

Recommended Service Parts List

Following is a list of the service parts we recommend stocking.

Description	Part Number
0° Nozzle	253092
15° Nozzle	253093
25° Nozzle	253094
40° Nozzle	253095
O-Ring for Hose	30784
Pump Oil	4043
Chemical Injector	31935
Spray Gun	319153
50' Pressure Hose	32276
Pump Seal Kit	GPK28
Pump Valve Kit	GPK1
Electrode Kit	RWB5780U
Fuel Pump	RWB21844
Unloader w/ Switch	34962
Pressure Gauge	226882
Coil Cleaner	222210
Fuel Filter Element	RCR12T

Maintenance Mode

Before performing any maintenance on the pressure washer, it must be placed in maintenance mode.

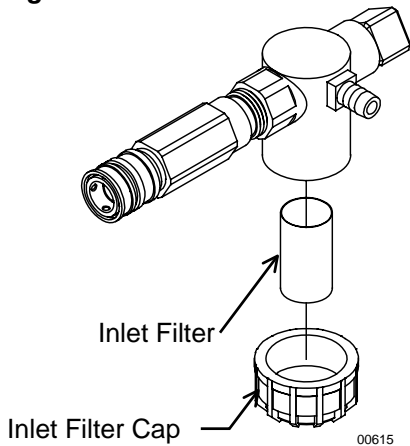
- A.) Turn off water supply.
- B.) Bleed water from system.
- C.) Turn off engine and disconnect the spark plug cable.

Maintenance Schedule

What to Check	When To Check	What to Do
Inlet Filter	Each Use	Clean
Tires	Each Use	Check Pressure
Hoses	Each Use	Check for Wear
Bolts	Each Use	Check for Loose Bolts

Cleaning The Inlet Filter

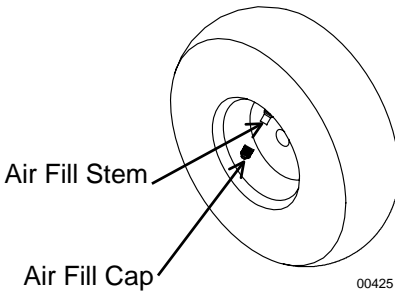
WARNING: Check whether dangerous chemicals have been used, and take precautions when handling filters.



- A.) Unscrew inlet filter cap.
- B.) Remove inlet filter.
- C.) Run water through to clean filter.

Checking the Tire Air Pressure

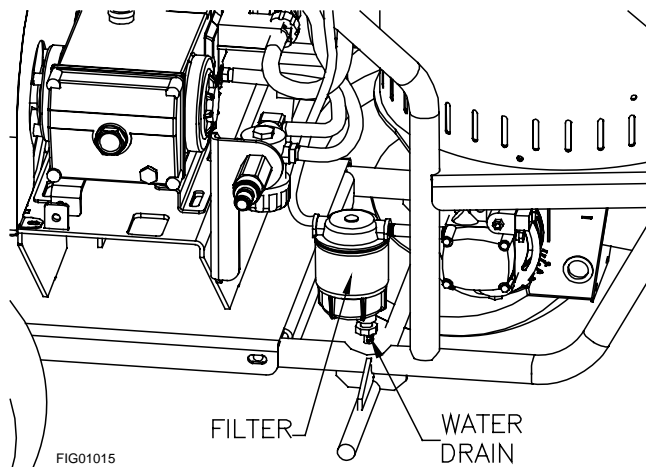
- A.) Remove air fill cap.
- B.) Fill tire to 14psi (.965 bar).
- C.) Replace air fill cap.



Burner Fuel Filter

IMPORTANT: Make sure to close the valve on the fuel tank before removing the filter bowl.

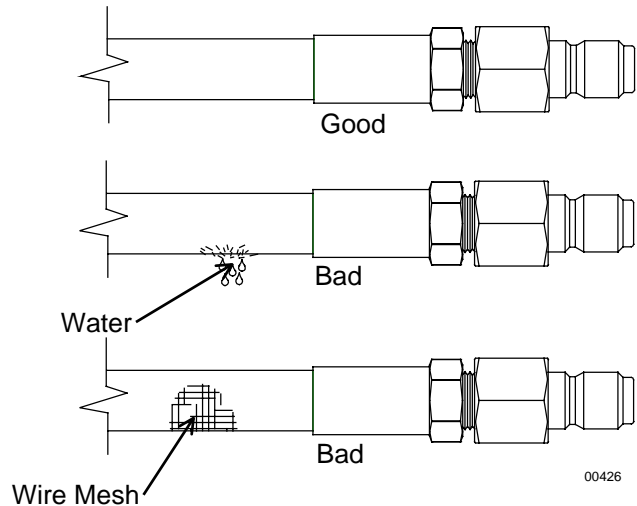
Drain water which has accumulated in the fuel filter bowl and replace the filter as needed.



Checking the Hoses

WARNING: Do not use a finger or skin to check for leaks. Escaping fluid under pressure has sufficient force to penetrate the skin, causing serious injury. Do not operate the pressure washer if the hose is cracked, worn, or leaking.

- A.) Check all hoses for leaks.
- B.) Check all hoses for worn areas.



Changing The Pump Oil

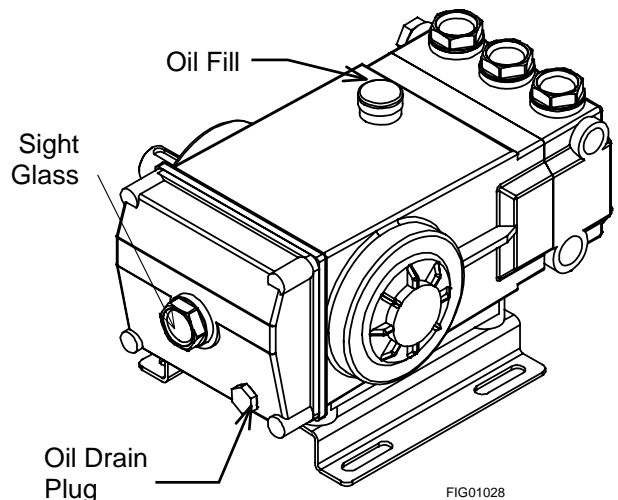
*Change oil after first 40 hours, then every 3 months or 500 hours

- 1.) Remove oil drain plug
- 2.) Drain pump oil
- 3.) Replace oil drain plug
- 4.) Fill pump with SAE 30 non-detergent pump oil.
- 5.) Fill to middle of sight glass window.

Quantities Of Fluid

Pump	Type of Fluid	QTY
General TS1511	SAE 30**	40.6oz (1.20L)

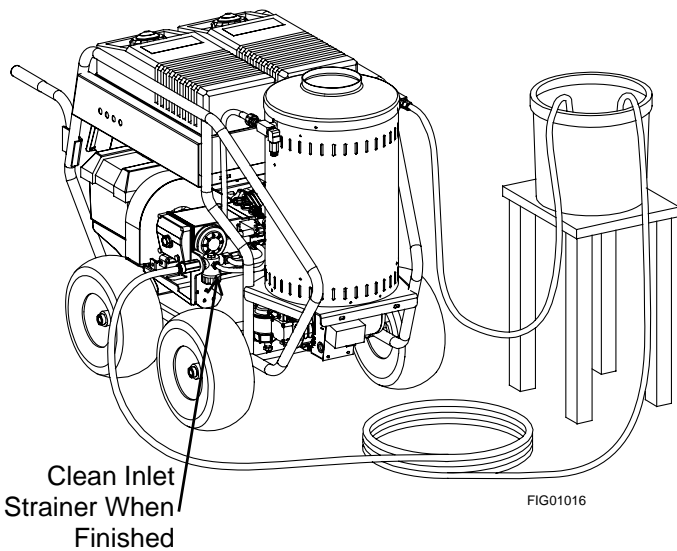
**Non-Detergent Oil (order pump oil Item #4043)



Coil Descaling

In hard water areas, scale build-up within the heating coil will occur. Scale deposits will decrease the water temperature rise and may eventually clog the heating coil.

1. Mix coil cleaner (Part #222210 call 1-800-270-0810 to order) in a 5 gallon bucket and elevate the bucket so it is higher than the unloader.
2. Attach the high pressure hose to the high pressure water outlet on the machine. Do not hook up the spray gun.
3. Place the other end of the high pressure hose in the 5 gallon bucket.
4. Attach a short length of hose to the garden hose inlet on the pump.
5. Prime the pump by filling the hose with water, then place the end of the hose in the bucket.



6. Run the pressure washer in cold mode for 1 to 3 hours recirculating the cleaning solution.

Warning: Do not run the burner.

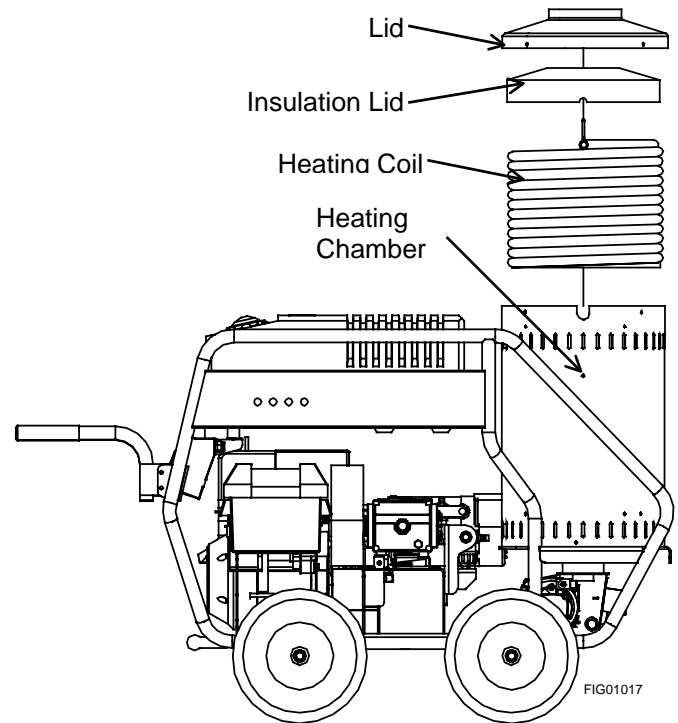
7. Dispose of the cleaning solution where it is not harmful to animals or the environment.
8. Flush with fresh water and clean the inlet strainer when finished.

Coil Desooting

Poor grades of fuel oil or inadequate combustion air will cause heavy soot build-up on the outside surface of the heating coil. These deposits will insulate the coil. This will restrict the air flow through the coil, further aggravating the soot build-up.

Most coils will never require desooting. However, to desoot a coil...

1. Wear protective clothing, goggles, and gloves.
2. Disconnect high pressure hose on inlet side of coil and thermostat on outlet side of coil.
3. Remove the lid and insulation lid from the heating chamber and hoist the coil out. Be careful, the coil weighs 125 lbs.

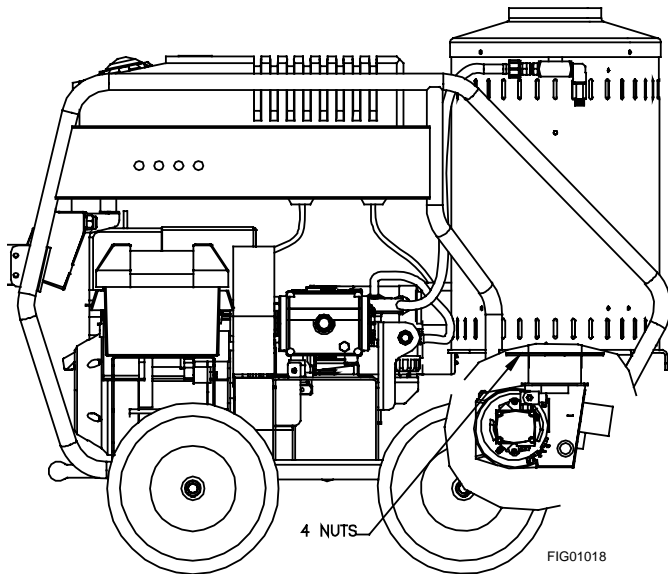


4. Clean the coil.
5. Reassemble the coil to the machine. Make sure the white insulation remains in place.
6. Reattach high pressure hose and thermostat, and make sure all fittings are tight before using the machine.

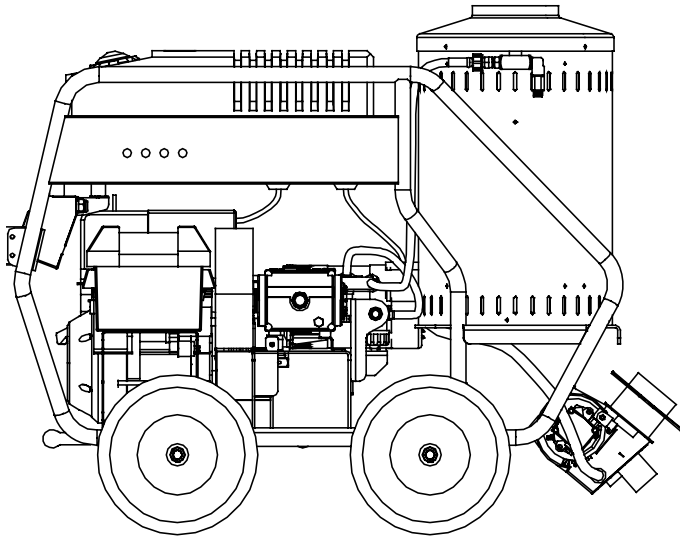
Electrodes

On a yearly basis the electrodes should be inspected and any necessary adjustments made.

1. Remove the 4 nuts that attach the burner to the heating chamber. You do not have to disconnect the fuel lines or the electric cords.

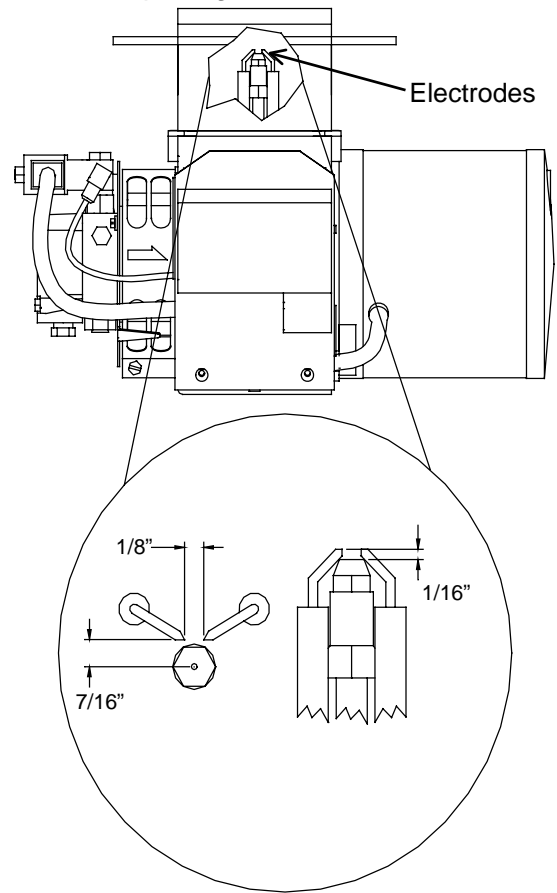


2. Pull the burner out from underneath the heat exchanger.



3. Clean off carbon deposits which may have accumulated on the tips of the electrodes.

4. Reset the spacing as shown below.



Moving and Handling Instructions

Maneuvering Your Pressure Washer

- 1.) Use the handles to move the pressure washer.
- 2.) To turn, lift slightly on the handles and pivot the pressure washer on its front wheels.
- 3.) To engage brakes, pull brake arms out, rotate them down and use them as chocks.

Lifting Your Pressure Washer

- 1.) To reduce risk of injury, it is recommended to use a hoist to lift this pressure washer.
- 2.) Lift from lifting points.

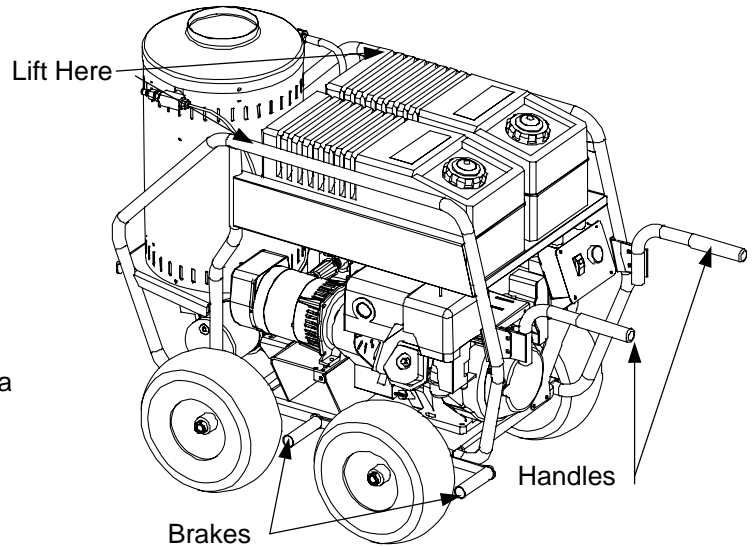


FIG01024

Long Term Storage

During cold weather, store the pressure washer indoors and move it outdoors before starting the engine. Follow these instructions to prevent the pump from freezing during storage.

Storage:

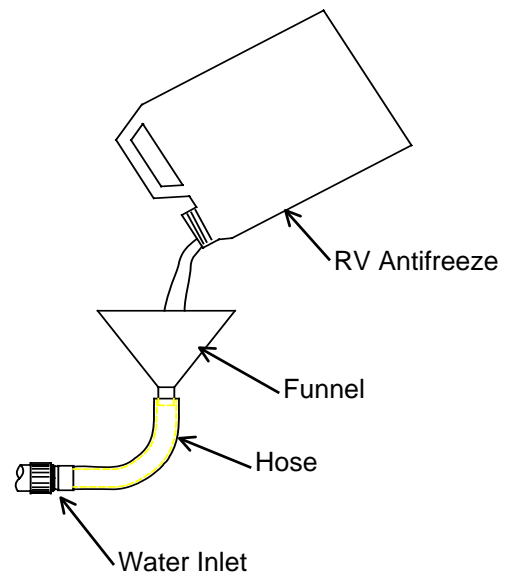
Before you store the pressure washer, make sure you do the following:

- 1.) If adding stabilizer, run pressure washer with high pressure hose for five minutes.
- 2.) Disconnect the battery and store it indoors.
- 3.) Disconnect high pressure and garden hose.

Winter Storage:

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

- 1.) Follow the storage instructions listed above.
- 2.) Disconnect spark plug cable. Make sure the engine start switch is OFF, and the fuel valve is OFF.
- 3.) Attach the garden hose with funnel to the pump inlet (see illustration).
- 4.) Pour RV antifreeze into the funnel, then turn the engine over until antifreeze comes out the pump outlet.
- 5.) Drain all water from the high pressure hose. Depress trigger on gun and drain all water out of gun/lance.



Troubleshooting Guide

Engine Will Not Start

Causes	Solutions
Low Oil Shutdown	Fill engine with the adequate amount of oil.
Cold Engine	Choke engine to start.
No Fuel	Add gas to engine, make sure fuel shutoff valve is open.
Dead Battery	Recharge/Replace battery.
Spark plug wire not attached	Attach spark plug wire to spark plug.

Pressure Washer Runs But Burner Doesn't Fire

Causes	Solutions
Heat switch turned OFF	Turn heat switch ON.
Thermostat set too low or off	Set thermostat to desired temp.
Fuel tank empty	Fill fuel tank with kerosene, diesel, or fuel oil.
Defective Burner	Call Customer Service.

Pressure Washer Runs But No Pressure

Causes	Solutions
Partially clogged or damaged nozzle	Clean or replace nozzle.
Low water flow	Make sure the water supply is more than 4 gpm.

Pressure Washer Surges Or Cycles While In Bypass

Causes	Solutions
Leak between unloader and gun.	Check all connections between unloader and gun for leaks. Tighten loose components and replace damaged components.
Gun leaking internally	Replace spray gun.

Smoke From Heat Exchanger

Causes	Solutions
Engine not at full throttle	Throttle engine all the way up.
Air band not adjusted properly	Adjust the air band until the burner burns cleanly. See <i>Installation Instructions</i>
Poor quality fuel	Use kerosene for the cleanest burn.

Water Not Heating Sufficiently

Causes	Solutions
Scale build-up in coil	See <i>Coil Descaling</i> under <i>Maintenance Instructions</i> .
Coil is full of soot	See <i>Coil Desooting</i> under <i>Maintenance Instructions</i> .

Poor Or No Detergent Supply

Causes	Solutions
Soap control knob set too low.	Adjust soap control knob.
Inadequate detergent supply	Refill detergent container. Make sure chemical strainer is fully submerged.
High pressure hose too long	Use less hose. Move machine closer to the work.
Chemical strainer or injector clogged	Clean the strainer and injector. Always start with a clean detergent container. Run clean water through the injector after each use.

Any Questions, Comments, Problems or Parts Orders

In the United States
NorthStar Customer Service

Call 1-800-270-0810
 Hours: Monday - Friday 7:00 AM to 5:30 PM
 Saturday 7:30 AM-11:30 AM Central Time

In the United Kingdom
 Call 02392639752

Northern Tool and Equipment Co. (UK) Ltd.
 Unit 2, Keel Close,
 Portsmouth, Hants PO3 5QD, England

157294F

Parts Breakdown

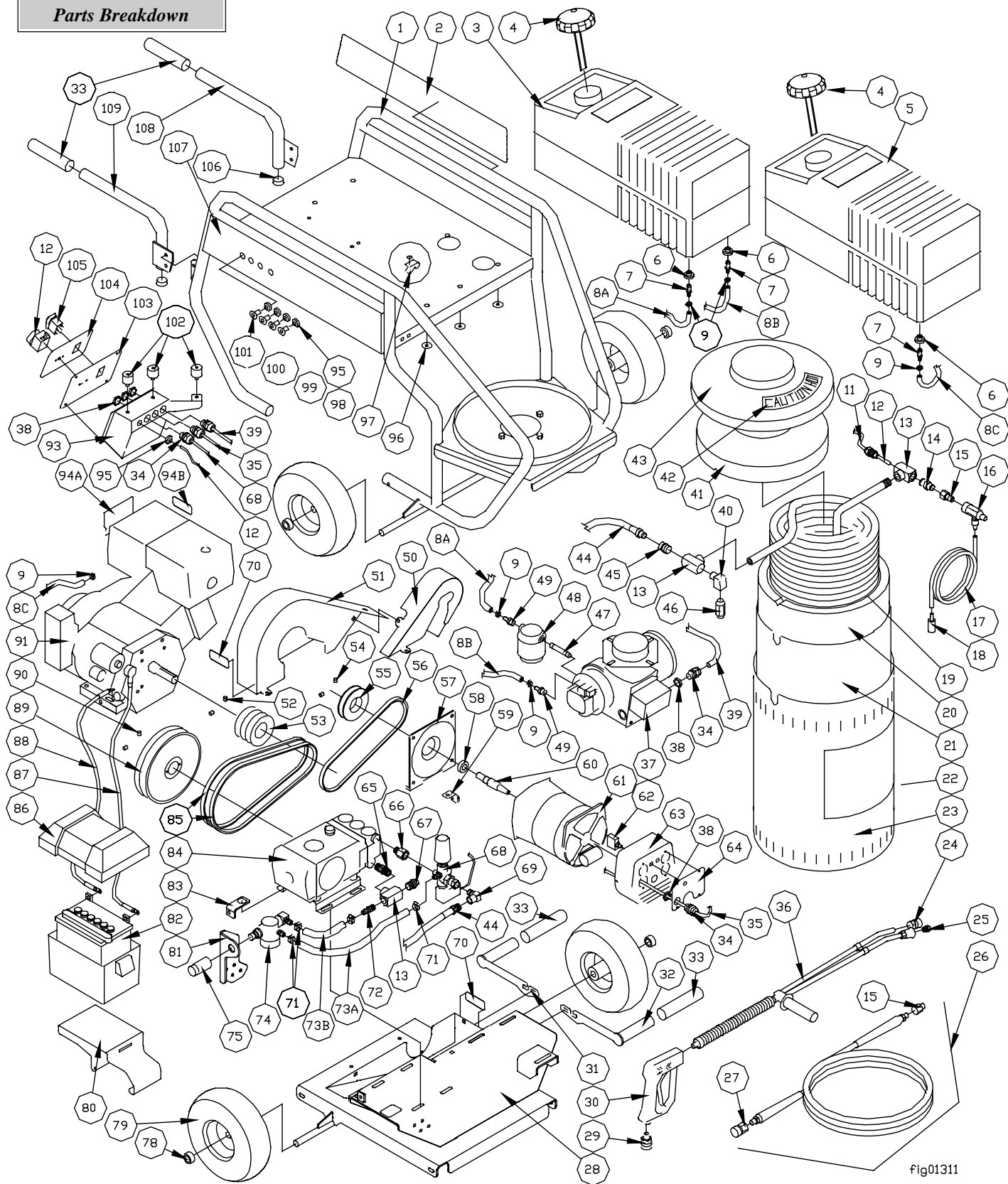


fig01311

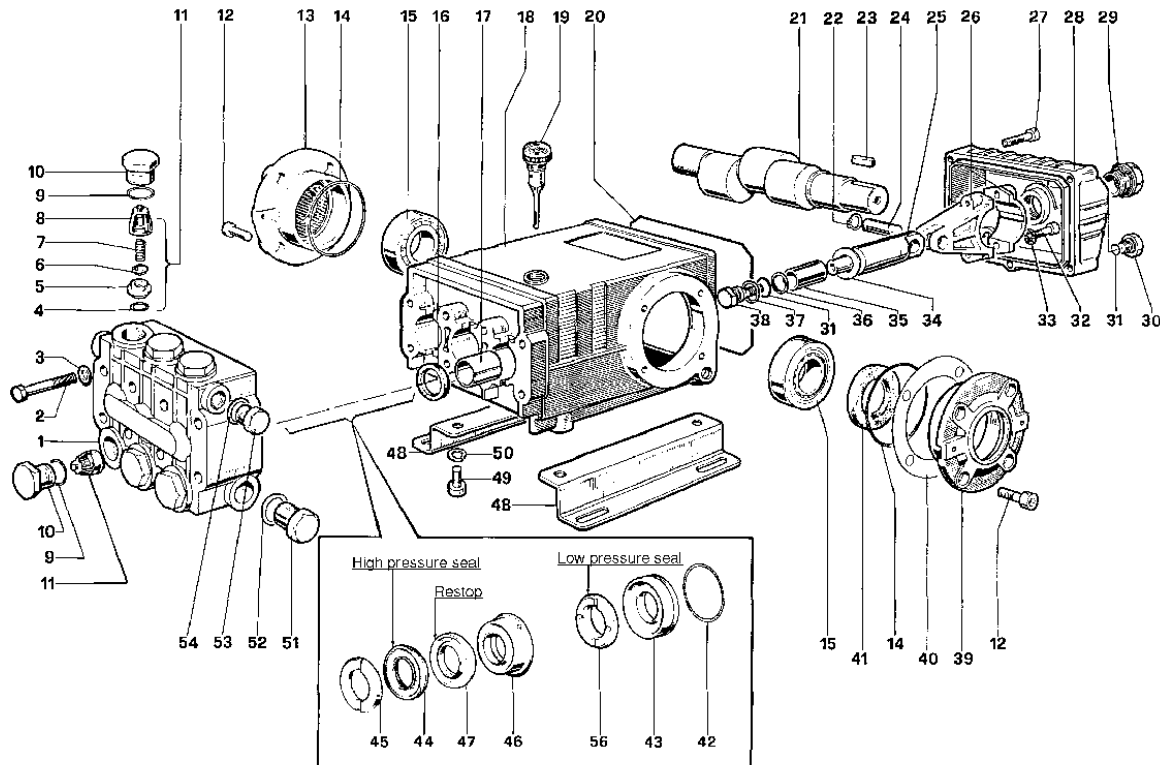
ITEM	PART#	DESCRIPTION	QTY
1	35251	Roll Cage	1
2	35192	Instruction Decal	1
3	308304	Fuel Tank	1
4	33322	Fuel/Gas Cap	2
5	308303	Gas Tank	1
6	306401	Fuel Valve Grommet	4
7	31976	Connector	3
8A	4054	1/4" Fuel Line Hose	30"
8B	4054	1/4" Fuel Line Hose	32"
8C	4054	1/4" Fuel Line Hose	28"
9	171410	1/4" Hose Clamp	7
10	306402	Needle Valve	1
11	30501	1/4" Split Loom	48"
12	305422	Thermostat	1
13	305208	1/2" Tee, Plated Steel	3
14	5002	Nipple, 1/2" MPT X 3/8" MPT	1
15	313109	Quick Couple Nipple, 3/8" FPT	2
16	31935	Chemical Injector, Quick Connect	1
17	33488	1/2" Braided Chemical Hose	48"
18	2212	Chemical Strainer	1
19	33573	Heating Coil	1
20	33387	Ceramic Insulation Can	1
21	33574	Inner Wrap	1
22	305248	Label, Industrial Hot Water PW	1
23	36180	Stainless Steel Wrap	1
24	2234	Quick Coupler, 1/4" FPT	1
25	30507	Chemical Nozzle, 1/4" MPT	1
26	32276	50' High Pressure Hose Assembly	1
27	313108	Coupler, 3/8" FPT	1
28	35252	Base	1
29	313107	Coupler, 3/8" MPT	1
30	2227	Gun, 4000 psi	1
31	35288	Rear Brake	1
32	35287	Front Brake	1
33	30747	Handle/Brake Grip	4
34	22502	Strain Relief	5
35	36404	Power Cord	1
36	305234	Dual Lance Wand	1
37	36400	Burner, 120V	1
38	305267	Strain Relief Nut, 1/2" NPT	5
39	36403	Burner Cord	1
40	5027	Elbow, 1/2" MPT X 1/2" FPT	1
41	33388	Ceramic Insulation Lid	1
42	305410	Label, Caution Hot	1
43	35331	Lid, Heat Exchanger	1
44	37549	36" High Pressure Hose	1
45	30048	Reducer, 1/2" MPT X 3/8" FPT	1
46	305298	1/2" Pop-Off Valve, 3600 psi	1
47	305239	1/4" NPT Nipple, 3" Long	1
48	32308	Fuel Filter/Water Separator	1
49	5011	1/4" Hose Barb X 1/4" MPT	2
50	35254	Generator Belt Guard	1
51	35253	Pump Belt Guard	1
52	37868	Set Screw (5/16-18)	2
53	37746	Engine Sheave, Three Groove	1
54	37851	Set Screw (1/4-20)	2
55	37747	Generator Sheave, One Groove	1

ITEM	PART#	DESCRIPTION	QTY
56	35745	Generator V-Belt, A25	1
57	31717	Bearing Mount Plate	1
58	306403	Stub Shaft Bearing	1
59	35255	Belt Tension Plate, Generator	1
60	31716	Stub Shaft	1
61	31681	Generator Head	1
62	33403	5A Thermal Circuit Breaker	1
63	31177	End Cover	1
64	35728	Receptacle Cover	1
65	50HPN8	1/2" NPT Nipple	1
66	30320	3/8" MPT X 3/8" FPT Adapter	1
67	2239	Thermal Relief Valve	1
68	34962	Unloader w/ Pressure Switch	1
69	2295	Elbow, 3/8" MPT X 3/8" FPT	1
70	35189	Rotating Machinery Decal	1
71	2263	Hose Clamp, 5/16" X 7/8"	4
72	2294	1/2" Hose Barb X 1/2" MPT	1
73A	2264	1/2" Low Pressure Hose	21"
73B	2264	1/2" Low Pressure Hose	12"
74	32916	Inlet Filter	1
75	32656	Garden Hose Mount	1
78	305200	Wheel Retainer	4
79	36801	Wheel and Tire	4
80	35737	Battery Mount Riser	1
81	35727	Inlet Filter Mount	1
82	1670	Battery	1
83	34942	Belt Tension Plate, Pump	1
84	35207	Pump	1
85	36402	Pump V-Belt, BX40	2
86	4048	Battery Box	1
87	316526	Positive Battery Cable	1
88	316527	Negative Battery Cable	1
89	37738	Pump Sheave, Two Groove	1
90	37868	Set Screw (5/16-18)	2
91	601092	Engine	1
93	35741	Control Box	1
94A	35743	Warning Decal	1
94B	35743	Hot Muffler Decal	1
95	35198	Grommet	5
96	30754	Leather Washer	12
97	17153	Fuel Line Hose Clamp	1
98	253095	Nozzle, 40° QC, #4.5	1
99	253094	Nozzle, 25° QC, #4.5	1
100	253093	Nozzle, 15° QC, #4.5	1
101	253092	Nozzle, 0° QC, #4.5	1
102	305587	Isomount	3
103	35740	Control Box Front	1
104	35742	Control Panel Decal	1
105	305180	Switch, Single Pole	1
106	30748	Tube Cap	2
107	35191	Nozzle Decal	1
108	34946	Left Handle	1
109	34945	Right Handle	1

I Series 47 S – 20 mm x 12 mm

GENERAL PUMP

A member of the Interpump Group



PARTS LIST

ITEM PART NO.	DESCRIPTION	KIT NO.	QTY.	ITEM PART NO.	DESCRIPTION	KIT NO.	QTY.	ITEM PART NO.	DESCRIPTION	KIT NO.	QTY.
1. 47120841	Manifold		1	19. 98210600	Oil Dip Stick		1	37. 96728000	Washer	6	3
47120941	Manifold, Nickel-Plated (TS2011-N)			20. 90392200	O-Ring, Cover		1	38. 47219566	Screw, Plunger	6	3
2. 99320600	Screw, M8 x 70		8	21. 47021835	Crankshaft		1	39. 47150022	Cover, Crankcase		1
3. 96702000	Washer, M8.4		8	22. 90055700	Ring, Snap		6	40. 97567800	Shim		2
4. 90384100	O-Ring, .674 x .103		1	23. 91499000	Key		1	41. 90164800	Seal, Oil	3	1
5. 36200366	Seat, Valve		6	24. 97738000	Pin, Wrist		3	42. 90361600	O-Ring, 1.364 x .070	10, 28	3
6. 36200176	Plate, Valve		1	25. 47050554	Guide, Plunger		3	43. 47080570	Retainer, Packing	10, 28	3
7. 94737800	Spring		1	26. 47030001	Rod, Connecting		3	44. 90270500	Packing	28, 69	3
8. 36200251	Guide, Valve		1	27. 98191200	Screw, M6 x 30		5	45. 47100051	Ring, Head, M20	7, 28	3
9. 90384700	O-Ring, .797 x .103	4, 5	6	99183700	Screw, M6 x 14 (TS1011)		5	46. 47216970	Inter med. Ring	28, 71	3
10. 98222000	Cap	4	6	28. 47160122	Cover, Crankcase		1	47. 90270400	Restop Ring	28, 69, 71	3
98222200	Cap, Ni-Plated (TS2011-N)			47160022	Cover, Crankcase (TS1011)			48. 47200074	Pump Feet		2
11. 36703201	Valve Assembly		1	29. 97596800	Oil Indicator		1	49. 99364400	Screw, M10 x 18		4
12. 99303900	Screw, M8 x 16		8	30. 98204100	Cap		1	50. 96710600	Washer, M10.2		4
13. 47150122	Cover, Crankcase		1	31. 90358500	O-Ring, .426 x .070	6	4	51. 98217800	Cap		1
14. 90391300	O-Ring, 2.675 x .103		2	32. 99309900	Screw, M8 x 35		6	52. 96751400	Washer, M21.5		1
15. 640047	Bearing, Roller		2	33. 96701400	Washer, M8.4		6	53. 98210000	Cap		1
16. 90162500	Seal, Oil	2	3	34. 96728600	Washer, M14		6	54. 96738000	Washer, M17.5		1
17. 90912600	Bushing		3	35. 47040409	Plunger, (20 mm)		3	56. 90271000	Seal, Low Press, 20mm 28,69		3
18. 47010522	Crankcase		1	36. 90506700	Ring, Back-up		6				

REPAIR KITS

KIT NO.	1	2	3	4	5	6	7	10	28	69	71
ITEM NOS INCLUDED IN KIT	4, 5, 6, 7, 8 (11)	16	41	9, 10	9, 10	31, 34, 36, 37, 38	45	42, 43	42, 43, 44, 45, 46, 47, 56	44, 47, 56	46, 47
NUMBER OF ASSEMBLIES IN KIT	6	3	2	6	6	3	6	3	1	3	3
NUMBER OF CYLINDERS KIT WILL SERVICE	3	3	-	3	3	3	3	3	1	3	3

TORQUE SPECS*

Position	Ft.-lbs.
2	22.1
10	73.7
12	14.7
27	7.3
29	13.2
30	14.7
32	14.7
38	14.7
49	29.4
51	29.4
53	29.4

*Decrease torque by 20% if threads are lubricated.

GENERAL PUMP

1174 NORTHLAND DRIVE • MENDOTA HEIGHTS, MN 55120

300246 Re v. D
3-01



PHONE: (651)454-6500 • FAX: (651)454-4524 • e-mail: sales@gpcompanies.com • www.generalpump.com

ELECTRICAL DIAGRAM

