

BE

HOT WATER PRESSURE WASHER



HW3513HAD

User Manual



TABLE OF CONTENTS

Safety

- 6 Safety Rules
- 7 Safety Warnings

Features

- 12 Features

Installation & Preparation

- 13 Attire
- 13 Set-Up
- 14 Engine/Burner Fuel Tank
- 15 Dual Lance Assembly With Adjustable Pressure
- 15 Nozzle Review
- 16 Nozzle Connection
- 16 Water Supply
- 17 Unloader
- 18 Thermal Relief Valve
- 18 Pre-Start Inspection Procedures

Operation

- 19 Priming The Pump
- 19 Start-Up/Cold Water Operation
- 21 Hot Water Operation
- 21 Cleaning with Detergents
- 22 Shutdown

Maintenance

- 23 Specific Maintenance
- 24 Winterizing
- 26 Maintenance Chart

Troubleshooting

- 27 Troubleshooting Chart



TABLE OF CONTENTS

Parts List

30	Specifications
32	Flow Chart
32	EMF System
33	Operation Theory
34	Frame Assembly
36	Engine/Pump Assembly
38	High Pressure Pump
41	Unloader/Manifold Assembly
42	Unloader
43	Pressure Switch
44	Detergent Injector
45	Heat Exchanger/EMF System
47	Boiler Assembly
49	Gun/Wand/Hose Assembly
50	Dual Lance Assembly
51	Fuel Tank
52	Fuel Pump & Fuel Solenoid
53	EMF System
55	Electric Box Assembly
56	Wire Schematic
56	Wire Diagram
57	Statement of Warranty
58	Warranty Exclusions



INTRODUCTION



Attention: Read through the complete manual prior to the initial use of your Pressure Washer

Using the Operator's manual

The operating manual is an important part of your Pressure Washer. It should be read thoroughly before initial use, and referred to often to make sure adequate safety and service concerns are being addressed.

Reading the owner's manual thoroughly will help avoid any personal injury or damage to your pump. By knowing how best to operate this machine you will be better positioned to show others who may also operate the unit.

You can refer back to the manual at any time to help troubleshoot any specific operating functions, so store it with the machine at all times.

PRODUCT IDENTIFICATION

**Record Identification Numbers****Pressure Washer**

If you need to contact an Authorized Dealer or Customer Service line (1-866-850-6662) for information on servicing, always provide the product model and identification numbers.

You will need to locate the model and serial number for the pump and record the information in the places provided below.

Date of Purchase:
Dealer Name:
Dealer Phone:

Product Identification Numbers
Model Number:
Serial Number:




SAFETY

Save these Instructions

SAFETY RULES



This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.

The safety alert symbol () is used with a signal word (DANGER, CAUTION, WARNING), a pictorial and/or a safety message to alert you to hazards.

DANGER indicates a hazard which, if not avoided, will result in death or serious injury.

WARNING indicates a hazard which, if not avoided, could result in death or serious injury.

CAUTION indicates a hazard which, if not avoided, might result in minor or moderate injury.

NOTICE indicates a situation that could result in equipment damage. Follow safety messages to avoid or reduce the risk of injury or death.

Hazard Symbols and Meanings



EXPLOSION



FIRE



HOT SURFACE



MOVING PARTS



FLYING OBJECTS



ELECTRIC SHOCK



TOXIC FUMES



INJECTION

SAFETY


WARNING


Serious injury or death may occur from normal sparks in the multiple ignition sources or engine/burner exhaust.

Injury or death may occur as a result of improper fueling.



Serious injury or death may occur from a ground fire caused by a muffler spark.

Serious injury or death may occur if system safety's are not properly maintained.

- Always operate pressure washer in a well ventilated area free of flammable vapors, combustible dust, gases or other combustible materials.
- Do not store the pressure washer near an open flame or any equipment such as a stove, furnace, water heater, etc., which utilizes a pilot light or sparking device.
- Do not use this pressure washer to spray flammable material!
- Do not smoke while filling burner fuel tank.
- Never fill the fuel tanks while the pressure washer is running or hot. Allow to cool two minutes before refueling.
- Always refuel slowly to avoid the possibility of spilled fuel which may cause a risk of fire.
- Do not refuel indoors or in a poorly ventilated area.
- Engine Fuel Tank: Refuel with gasoline only. Do not use diesel or fuel oil.
- Burner Fuel Tank (Black): When refueling the Burner Fuel Tank, use No. 1 or No. 2 fuel oil/diesel or kerosene. Do not use gasoline.
- Do not operate the unit if diesel fuel is spilled. Wipe the pressure washer clean and move it away from the spill. Avoid creating any ignition until the diesel fuel has evaporated.
- A spark arrester must be added to the muffler of this engine if it is to be used on any forest covered, brush covered or grass covered unimproved land. The arrester must be maintained in effective working order by the operator. In the state of California, the above is required by law. (Section 4442 of the California Public Resources Code.) Other states may have similar laws. Federal laws apply on Federal lands.
- This pressure washer has a Safety Relief device which should never be altered, modified, removed or made inoperative. If the device fails, replace immediately with only genuine manufacturer replacement part.




SAFETY


⚠ WARNING	
	<p>Serious injury or death may occur from inhaling engine/ burner exhaust or dangerous vapors. The engine exhaust from this product contains chemicals known to the State of California to cause cancer, birth defects, or other reproductive harm.</p>
<ul style="list-style-type: none"> ▪ Never operate this pressure washer in an enclosed area. Always make certain there is adequate ventilation (fresh outside air) for breathing and combustion. This will prevent the buildup of dangerous carbon monoxide gases. Beware of poorly ventilated areas, or areas with exhaust fans which can cause poor air exchange. ▪ Follow all safety instructions provided with the materials you are spraying. Use of a respirator may be required when working with some materials. Do not use this pressure washer to dispense hazardous detergents. 	


⚠ WARNING	
	<p>Serious injury or death could occur from high pressure spray penetrating the skin.</p>
<ul style="list-style-type: none"> ▪ Keep clear of nozzle and spray! Never put your hand, fingers or body directly over the spray nozzle. ▪ Do not direct discharge stream at persons or self. ▪ This product is to be used only by trained operators. ▪ Always keep operating area clear of all persons. ▪ Close supervision is necessary when used near children. DO NOT allow children to operate this unit! ▪ SEEK EMERGENCY MEDICAL CARE if the spray appears to have penetrated the skin! DO NOT TREAT AS A SIMPLE CUT!! ▪ High pressure hoses and fuel lines should be inspected daily for signs of wear. If evidence of failure exists, promptly replace all suspect hoses and fuel lines to prevent the possibility of injury from the high pressure spray. If a hose or fitting is leaking, NEVER PLACE YOUR HAND DIRECTLY ON THE LEAK. ▪ NEVER operate the gun with the trigger wired in the open position. To prevent accidental discharge, the trigger gun should be securely locked when not in use. ▪ Before removing the spray nozzle or servicing the unit, ALWAYS shut off the unit and trigger the gun to release trapped pressure. (Even after you shut off the unit, there is high pressure water left in the pump, hose and gun until you release it by triggering the gun.) 	

SAFETY



⚠ WARNING	
	<p>Serious injury or death may occur from contact with electricity.</p>
<ul style="list-style-type: none"> ▪ DO NOT direct spray on or into electrical installations of any kind! This includes electrical outlets, light bulbs, fuse boxes, transformers, the unit itself, etc. ▪ DO NOT allow metal components of the pressure washer to come in contact with live electrical components. 	

⚠ WARNING	
	<p>Serious injury may occur from touching the gasoline engine, muffler or heat exchanger. These areas can remain hot for some time after the pressure washer is shutdown.</p>
<ul style="list-style-type: none"> ▪ Never allow any part of your body to contact the gasoline engine, muffler or heat exchanger. 	

⚠ WARNING	
	<p>Serious injury may occur from a pressure washer malfunction or exploding accessories if incorrect system components, attachments or accessories are used.</p> <p>Serious injury or death may occur if attempting to start the pressure washer when the pumping system is frozen.</p>
<ul style="list-style-type: none"> ▪ Never make adjustments to the factory set pressures. ▪ Never exceed manufacturers maximum allowable pressure rating of attachments. ▪ Do not allow any hoses to make contact with heat exchanger to prevent the possibility of bursting. Avoid dragging the hoses over abrasive surfaces such as cement. ▪ Use only manufacturer recommended repair parts for your pressure washer. ▪ In freezing temperatures, the unit must always be warm enough to ensure there is no ice formation in the pump. Do not start the pressure washer if it has been transported in an open or under heated vehicle without first allowing the pump to thaw. 	



SAFETY

WARNING



Serious injury may occur to the operator from moving parts on the pressure washer.

- Before making any adjustments, be certain the engine is turned off and the ignition cable(s) is removed from the spark plug(s). Turning the machinery over by hand during adjustment or cleaning might start the engine and machinery with it.
- Do not operate the unit without all protective covers in place.

WARNING



Serious injury or death may occur from detergents contacting the skin.

Serious injury can occur from loose debris being propelled at a high speed from the spray gun.

Injury may occur if the operator loses his balance caused by the thrust of water traveling through the spray nozzle.

Injury may occur from the pressure washer.

- **SEEK EMERGENCY MEDICAL CARE** if you are using cleaning agents and the spray appears to have penetrated the skin! **DO NOT TREAT AS A SIMPLE CUT!** Be prepared to tell a physician exactly what kind of detergents you were using by reading the Material Safety Data Sheet (MSDS) provided with your detergent.
- Never use any solvents or highly corrosive detergents or acid type cleaners with this pressure washer.
- Protective equipment such as rubber suits, gloves and respirators are advisable, especially when using cleaning detergents.
- Keep all detergents out of the reach of children!
- **ALWAYS** wear protective goggles when operating the unit to shield the eyes from flying debris and detergents.
- **DO NOT** direct spray toward fragile materials such as glass for shattering could occur.
- Stay alert-watch what you are doing. Do not operate the unit when fatigued or under the influence of alcohol or drugs.
- **NEVER** squeeze the trigger unless securely braced.
- **DO NOT** overreach or stand on unstable support.
- Wet surfaces can be slippery, wear protective foot gear and keep good footing and balance at all times.

SAFETY



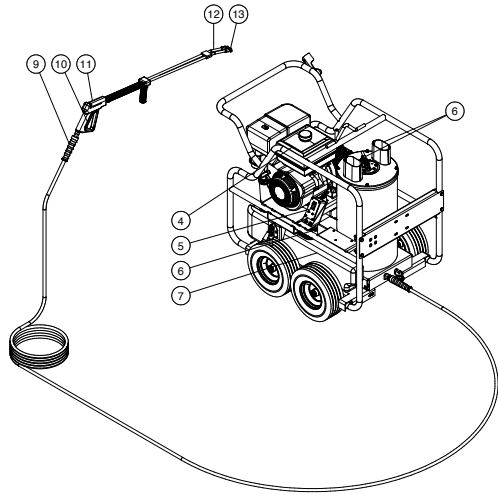
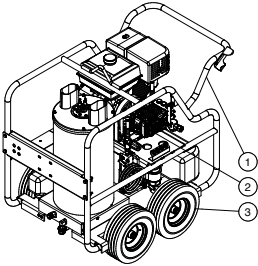
- NEVER trigger the gun while on a ladder or roof.
- ALWAYS hold on firmly to the gun/lance assembly when starting and operating the unit. Failure to do so can cause the lance to fall and whip dangerously.
- Know how to stop the pressure washer and bleed pressures quickly. Be thoroughly familiar with controls.
- DO NOT leave pressurized unit unattended. Shut off the pressure washer and release trapped pressure before leaving.
- DO NOT operate the unit if you see any fuel, oil or water leaks from the machine. DO NOT resume operation until the unit has been inspected and repaired by a qualified service person.
- NEVER run the engine with the governor disconnected or operate at excessive speeds.
- Place unit in a clean, dry, flat area for servicing. Before servicing the unit: turn the unit off, relieve the water pressure from the trigger gun, and allow the unit to cool down. Service in clean, dry, flat area. If applicable, block wheels to prevent unit from moving.
- Do not move the unit by pulling on the hose.

WARNING: This product can expose you to chemicals including lead, which is known to the State of California to cause cancer and birth defects or other reproductive harm. For more information, go to www.P65Warnings.ca.gov. Wash hands after handling.



FEATURES

Features



1. Convenient Push/Pull Handle
2. Beltguard
3. Flat Free Wheels
4. Gasoline Engine Tank
5. Burner On/Off Switch
6. Air Shutter Adjusting Arm
7. Burner Fuel Tank
8. Heat Exchanger Exhaust
9. High Pressure Hose
10. Trigger Safety Lock
11. Trigger Gun
12. Dual Lance
13. Quick Connect Nozzle



INSTALLATION & PREPARATION

Installation & Preparation

ATTIRE

Proper attire is essential to your safety. It is advised to utilize whatever means necessary to protect eyes, ears, and skin. Additional safety attire (such as respiratory mask) may be required when using detergent cleaning agents with this washer.

SET-UP

1. This unit should only be placed on a level surface to ensure proper lubrication for the water pump while operating. NEVER spray water directly on the unit.
2. Do not use unit in an area:
 - a. with insufficient ventilation.
 - b. where there is evidence of oil or fuel leaks.
 - c. where flammable gas vapors may be present.This unit has multiple ignition sources that could cause an explosion or fire.
3. Do not allow the unit to be exposed to rain, snow or freezing temperatures. If any part of the unit becomes frozen, excessive pressure may build up in the unit which could cause it to burst resulting in possible serious injury to the operator or bystanders.
4. Be certain to block the wheels to prevent the unit from moving while operating.
5. Pump oil level should be checked before each use. Make certain the oil is on the "Full" mark on the dipstick or in the center of the oil sight glass. If the level appears to be low, fill with SAE30W non-detergent pump oil.

DANGER



DO NOT PLACE UNIT IN AN AREA WHERE FLAMMABLE GAS VAPORS MAY BE PRESENT. A SPARK COULD CAUSE AN EXPLOSION OR FIRE! DO NOT STORE/OPERATE UNIT IN FREEZING ENVIRONMENTS!



INSTALLATION & PREPARATION

WARNING



DO NOT OPERATE IN AN ENCLOSED AREA. USE THIS PRODUCT ONLY IN WELL VENTILATED AREAS!
THE EXHAUST CONTAINS CARBON MONOXIDE, A POISONOUS, ODORLESS AND INVISIBLE GAS. BREATHING THIS GAS CAN CAUSE SERIOUS INJURY, ILLNESS & POSSIBLE DEATH.

ENGINE/BURNER FUEL TANK

DANGER



DO NOT SMOKE WHILE FUELING!
DO NOT FILL THE FUEL TANK WHILE UNIT IS RUNNING OR HOT. ALLOW UNIT TO COOL FOR TWO MINUTES BEFORE RE-FUELING.
DO NOT FILL FUEL TANK TO POINT OF OVERFLOWING. ALLOW APPROXIMATELY 1/4" OF TANK SPACE FOR FUEL EXPANSION.
ALWAYS STORE FUEL AWAY FROM THE WASHER WHILE THE UNIT IS RUNNING OR HOT.

1. Review "Risk of Explosion or Fire" Warnings pg. 7, before fueling.
2. Locate the Safety Decals on your unit and heed their warnings.
3. Gasoline Engines: A minimum of 85 octane fuel is recommended for use with this unit. **DO NOT MIX OIL WITH GASOLINE.**
Burner Fuel: Use No. 1 or No 2 fuel oil/diesel or kerosene.
4. Purchase gasoline fuel in quantities that may be used within 30 days. Use of clean, fresh lead-free gasoline is recommended. Leaded gasoline may be used if lead-free is unavailable. **DO NOT** use gasoline containing methanol or alcohol.
5. Check the engine oil level before starting the engine. (See Engine manual.)
6. Fill fuel tanks according to accompanying manufacturer's instruction manual.
7. Refer to the Engine Manual supplied with this unit for proper engine adjustment procedures.
8. Review the engine manual accompanying this pressure washer for correct engine start-up and maintenance procedures.

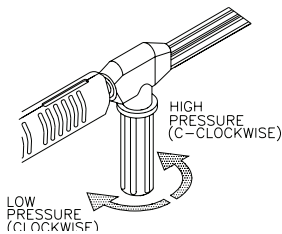


INSTALLATION & PREPARATION

DUAL LANCE ASSEMBLY WITH ADJUSTABLE PRESSURE

This unit features a dual lance assembly with adjustable pressure which allows the user to select a high or low pressure spray. Simply rotate the adjustable grip on the dual lance to achieve the desired pressure selection.

1. Selection of high pressure can be achieved by turning the adjustable grip on the Dual Lance assembly counterclockwise.
2. Selection of low pressure can be achieved by turning the adjustable grip on the Dual Lance clockwise.



NOZZLE REVIEW

Various nozzles may be quick-connected into the end of the wand to change the spray pattern or use the detergent feature. When using Quick Connects (Q.C.), be certain the connection is securely locked. If not, the high pressure water may shoot the nozzle from the wand, causing severe injury or serious damage. To determine spray fan, refer to the actual number stamped on the nozzle. The first two digits indicate the spray fan in degrees, i.e.; 00=0°, 15=15°, 40=40°.

1. The 0° nozzle (RED): This is a blasting nozzle. It delivers a very concentrated stream of water. Be cautious when using the straight narrow stream. It is not recommended for use on painted or wood surfaces, or items attached with adhesive backings. Uses: Removing weeds from sidewalk cracks, stubborn stains from concrete, masonry, aluminum and steel, caked mud from equipment, and cleaning lawn mower undersides.
2. The 15° nozzle (YELLOW): This is a chiseling nozzle. The spray should be directed at a 45° angle to the surface and used like a scraper to remove paint, grease and dirt. Uses: Surface preparation (removing mildew stains and paint chips).
3. The 40° nozzle (WHITE): This is a wash nozzle. This wide spray pattern disperses the water pressure over a large area and is recommended for moderate washing. Uses: Washing aluminum siding, cleaning windows, washing vehicles, spraying sidewalks, driveways, and patios.

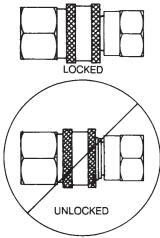


INSTALLATION & PREPARATION

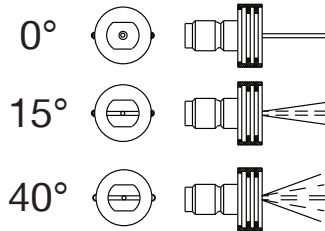
⚠ WARNING

NEVER LOOK DIRECTLY AT THE NOZZLE ORIFICE UNLESS IT IS DISCONNECTED FROM THE GUN/WAND ASSEMBLY!

CONNECTION OF Q.C. NOZZLES

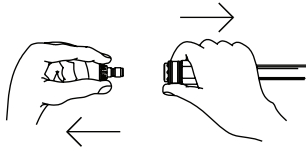


QUICK-CONNECT (Q.C.)



NOZZLE CONNECTION

1. Be certain the trigger gun is locked in the "OFF" position.
2. The nozzle assembly should be disconnected from the gun/wand assembly at this by retracting the locking ring on the quick-connect fitting to remove the nozzle.



WATER SUPPLY

1. Select a water supply hose which is a quality grade of garden hose measuring at least 3/4" ID and no longer than 50 feet.
2. Check the water inlet strainer to ensure it is clean and free of any obstructions. As a strainer becomes obstructed, it restricts proper flow of water to the pump. This can result in cavitations which will prematurely cause failure of pump packings.
 - a. Using a screwdriver, remove the screen from the water inlet.
 - b. Clean or replace if necessary.
3. Connect the hoses.
 - a. Connect one end of the water supply hose to the water inlet of the unit.
 - b. Connect the other end of the hose to your pressurized water supply.



INSTALLATION & PREPARATION

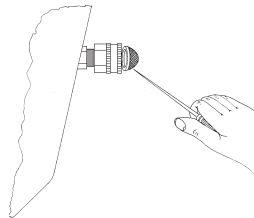
- Do not use a non-pressurized water supply (i.e. from a pond or well) with this unit.
- When connecting the water inlet to the water supply mains, local regulations of your water company must be observed. In some areas, the unit must not be connected directly to the public drinking water supply. This is to ensure there is no feedback of detergents into the water supply. (Direct connection is permitted if a back flow preventer is installed. Check with local authorities for approval.)
- If there is a high mineral content in your water, it is highly recommended that a water softener and an additional water strainer be added to the water inlet to help prevent the possibility of excessive scale buildup inside the heat exchanger coil. Clean both strainers before starting your pressure washer.

WARNING

THE TRIGGER GUN SHOULD ALWAYS BE LOCKED IN THE OFF POSITION WHEN NOT IN USE!

4. Follow the incoming water requirements listed below:
 - a. Water pressure must be a minimum of 20 pounds per square Inch (PSI) and a maximum of 125 PSI. (A typical outdoor faucet will generally supply this PSI if turned completely "ON".)
 - b. Incoming GPM must be approximately one gallon more than the outgoing GPM stated on the pressure washer nameplate. (You can check GPM by timing how long it takes to fill a 5 gallon container.)
 - c. Incoming water temperature must not exceed 125°F. Excessive pump damage may result if the water temperature exceeds this acceptable level.
5. Never allow the unit to operate without the incoming water line attached and the water supply is completely turned on.

WATER INLET STRAINER



UNLOADER

The unloader has been preset at the factory.



INSTALLATION & PREPARATION

THERMAL RELIEF VALVE

To ensure the water temperature does not exceed acceptable levels, never allow the pressure washer to operate in the bypass mode (with the unit running and the trigger closed) for more than three minutes.

A “thermal relief valve” has been added to this unit to protect the pump. It may begin to open and release water if the water temperature in the pump has exceeded 140° F. This will allow fresh, cool water to enter the system.

PRE-START INSPECTION PROCEDURES

Before starting the unit, perform the following procedures:

1. Check the oil level in the pump and engine.
2. Inspect the water inlet strainer. Clean or replace if necessary. See “Water Supply”, #2, pg. 16.
3. Check all hose connections to ensure they are securely tightened. See “Water Supply”, #3, pg. 16.
4. Inspect for system water leaks, oil leaks and fuel leaks. If a fuel leak is found, DO NOT START UNIT! See “Risk of Explosion or Fire”, pg. 7. Be sure that all damaged parts are replaced and that the mechanical problems are corrected prior to operation of the unit. If you require service, contact Customer Service.
5. Inspect high pressure hoses for kinking, cuts and leaks. If a cut or leak is found, DO NOT USE HOSE! Replace hose before starting unit. See “Risk of Injection” pg. 8. Be sure that all damaged parts are replaced and that the mechanical problems are corrected prior to operation of the unit. If you require service, contact Customer Service.

OPERATION

**Operating Instructions****PRIMING THE PUMP**

It is essential to prime the pump and flush the unit each time the water supply has been disconnected from the unit OR whenever the unit has set for any period of time. This unit has a steel coil which, after setting, will cause the water remaining in the coil from the previous usage to turn brown or black. This contaminated water must be flushed from the system before start-up. This procedure should be performed without the high pressure hose, gun and nozzle assembly installed.

1. Turn on the water supply.
2. Low pressure water will begin flowing from the water outlet. This allows the unit to prime and purge any air from the system. The unit is primed when water flow is uninterrupted by air.
3. Once the system is flushed, turn off the water supply and connect the high pressure discharge hose/gun to the water outlet of the unit.
4. Turn on the water supply.

⚠ CAUTION

BE CERTAIN THE HOSE, GUN & LANCE ASSY. ARE NOT CONNECTED TO THE UNIT WHILE PRIMING THE PUMP. PRIMING ALLOWS MINERAL DEPOSITS TO BE RELEASED FROM THE SYSTEM WHICH WOULD OBSTRUCT OR DAMAGE THE GUN AND NOZZLE ASSEMBLY RESULTING IN COSTLY REPAIRS.

START-UP/COLD WATER OPERATION**⚠ WARNING**

KEEP CLEAR OF NOZZLE! NEVER PLACE HAND OR FINGERS IN FRONT OF NOZZLE!
DO NOT DIRECT DISCHARGE STREAM AT PEOPLE OR PETS!

⚠ CAUTION

DO NOT ALLOW SPRAY PATTERN TO REMAIN ON A FIXED AREA FOR AN EXTENDED PERIOD OF TIME. POSSIBLE DAMAGE MAY OCCUR TO THE AREA.



OPERATION

1. Refer to the "Safety Precautions" pgs. 7-11 before starting the unit.
2. Locate the Safety Decals on your unit and heed their warnings.
3. Ensure that the switch is in the "OFF" position.
4. Perform the following engine start-up procedures.
 - a. Point the trigger gun in a safe direction, disengage the safety lock on the gun and squeeze the trigger.
 - b. Brace yourself for kickback from the high pressure created by the pump once the engine has started.
 - c. Hold the trigger gun open while starting the engine according to the manufacturer's instructions in the engine manual accompanying this unit.
5. Once the unit has started, perform the following procedures with the gun open:
 - a. Inspect for system water leaks, oil leaks and fuel leaks. If a fuel leak is found, **TURN UNIT OFF IMMEDIATELY!** See "Risk of Explosion or Fire", pg. 7. Be sure that all damaged parts are replaced and that the mechanical problems are corrected prior to operation of the unit. If you require service, contact Customer Service.
 - b. Inspect high pressure hoses for kinking, cuts and leaks. If a cut or leak is found, **DO NOT TOUCH HOSE AT LEAK!!! TURN UNIT OFF IMMEDIATELY!** Replace hose before starting the unit. See "Risk of Injection or Severe Cutting Injury" pg. 8. Be sure that all damaged parts are replaced and that the mechanical problems are corrected prior to operation of the unit. If you require service, contact Customer Service.
6. Trigger the gun several times and try adjusting the water pressure by rotating the grip on the lance. **NEVER** place hand or fingers in front of the nozzle or look directly into the nozzle! High pressure water creates a risk of severe injury!
7. Do not allow unit to operate in bypass mode (with trigger closed) for more than three minutes without triggering the gun. Failure to follow this simple rule can cause premature failure of pump packings, resulting in costly pump repair.
8. Your pressure washer can deliver high pressure spray and a variety of spray patterns using cold water. If you wish to use the Hot Water, Steam application or Cleaning with Detergents, for the correct procedures.

OPERATION

**HOT WATER OPERATION****▲ WARNING**

THE WATER TEMPERATURE COULD BECOME VERY HOT DURING HOT WATER OPERATION. BE CAUTIOUS WHEN ADJUSTING PRESSURE OR CONTROLLING THE TRIGGER GUN/ LANCE ASSEMBLY.

1. Follow the steps outlined for "START-UP/COLD WATER OPERATION".
2. Move the Burner Switch to the ON position. On initial start-up, water will begin turning hot in approximately 20 seconds and will reach maximum temperature in approximately 2-1/2 minutes, provided the trigger remains squeezed. The burner will stop firing when the trigger is released.

At this point, the unit is operating as a hot water pressure washer. Be extremely cautious when adjusting the pressure and controlling the trigger gun/ lance assembly to avoid the possibility of burns.

While spraying, it is normal for the burner to fire intermittently. The high limit switch will cause combustion to cease when the temperature of the discharged water exceeds the temperature setting of the switch. Combustion will begin again when the water temperature drops below the minimum setting .

CLEANING WITH DETERGENTS UNDER LOW PRESSURE

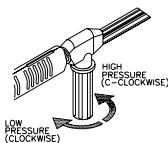
This feature is designed for use with mild detergents only. Since the cleaning solution travels through the heat exchanger coil, DO NOT use corrosives as they will cause extensive damage as well as pose a considerable safety hazard.

This injection system is designed to apply detergents under low pressure only. It will not allow detergent solutions to be introduced into the system unless the adjustable nozzle is set in the low pressure mode.



OPERATION

1. Prepare detergent solution according to label directions. Never pump acids, alkaline, abrasive fluids or solvents through the unit.
2. Adjust the amount of detergent desired by locating the adjustment knob at the end of the clear vinyl hose. Turn the knob completely counterclockwise to set at maximum siphon rate.
3. Fully immerse the detergent strainer into the detergent solution.
4. With the trigger gun locked in the "OFF" position, securely quick-connect the detergent spray nozzle (#65 40° BLACK) into the end of the wand.
5. To apply solution; unlock the trigger gun and squeeze the trigger. In a few moments a detergent/water mixture will exit the nozzle. Start spraying the lower portion of the surface being cleaned and move up, using long overlapping strokes. Applying from the bottom up helps avoid streaking. Allow to soak briefly. (Avoid working on hot surfaces or in direct sunlight to minimize the chances of the detergent drying, which may result in damaging painted surfaces.) Be certain to rinse a small section at a time.
6. To rinse; lock the trigger gun in the "OFF" position, securely quick-connect the desired high pressure nozzle into the end of the wand. Unlock the trigger gun and spray. It will take about 30 seconds to purge all detergent from the line. For best rinsing results, start at the top and work down.
7. Siphon a gallon of water through the low pressure detergent injection system after each use. This prevents the possibility of corrosion or detergent residue causing mechanical problems during the next use.



SHUTDOWN

1. Move the Burner Switch to the OFF position.
2. Squeeze the trigger and discharge the water for a period of three minutes to cool the heat exchanger and high pressure hose. (Insufficient cool down period of the high pressure hose will cause excessive wear and eventual rupturing of the hose.)
3. **DO NOT** close the choke to stop the engine. Backfire or engine damage may occur. Turn the engine "OFF" as directed in the engine manual.
4. Close the engine fuel shut-off valve.
5. Turn the water supply "OFF".
6. Pointing the gun in a safe direction, trigger the gun momentarily to relieve trapped pressure.
7. Disconnect and drain the nozzle assembly, gun, wand and hoses.
8. Store complete assembly in a non-freezing environment.

MAINTENANCE

**Storage & Maintenance Instructions****SPECIFIC MAINTENANCE**

ENGINE: The engine instructions that accompany your unit detail specific procedures for maintenance of the engine. Following the engine manufacturer's recommendations will extend engine work life.

PUMP: Change the pump oil after the first 50 hours of operation. After initial change, every 3 months or 250 hour intervals are recommended. If oil appears dirty or milky, changes may be required in greater frequency. Use pump oil SAE30W non-detergent and fill only to the center of the oil sight glass. DO NOT overfill.

QUICK COUPLERS: There is an o-ring seal inside the female quick coupler. This o-ring will deteriorate or, if the unit is allowed to pump without the high pressure hose or nozzle attached, the o-ring may be blown out occasionally. Simply insert a replacement o-ring to correct the leak. (Additional o-rings can be purchased from your dealer.)

NOZZLE: Water flow through the spray nozzle will erode the orifice, making it larger, resulting in a pressure loss. Nozzles should be replaced whenever pressure is less than 85% of the maximum. The frequency of replacement will depend upon such variables as mineral content in the water and number of hours the nozzle is used.

BURNER AIR ADJUSTMENT: The air shutter has been factory preset for proper operation between sea level and 2000 feet elevation at standard conditions (60°F ambient water and air temperatures). To assure maximum combustion efficiency at colder temperatures and higher altitudes, it will be necessary to adjust the air supply to the combustion chamber. A smoke spot test is recommended during any air shutter adjustment. This will aid in maximizing the burner efficiency and avoid the inefficient operation and excessive sooting of the combustion chamber.

1. The machine must be running and the burner on.
2. Take a smoke spot test to determine if more or less air is required for proper combustion.
 - a. If the test is greater than a #3 smoke, turn the shutter arm counterclockwise to increase the air flow into the combustion chamber.
 - b. If the test is yellowish in color, turn the shutter arm clockwise to decrease the air flow into the combustion chamber.
3. Hold onto the air shutter adjusting arm and loosen the locking nut. Move the shutter in 1/8" increments and retighten the locking nut after each 1/8" movement.
4. Trigger the gun on and off slowly to make sure there is proper ignition. Slight or no puffing on the ignition, and a smoke spot test of 0-3 is good.



MAINTENANCE

5. Repeat steps 2 and 3 until step 4 is attained.

LEAKS: Promptly eliminate any leaks found in the pumping system by removing suspect parts, applying thread sealant to the threads and reinstalling.

If using Teflon tape, be certain no tape gets inside any plumbing to prevent the possibility of a plugged spray nozzle.

WINTERIZING

1. For storage and transportation purposes in subfreezing ambient temperatures, it will be necessary to winterize this unit. This unit must be protected to the lowest incurred temperature for the following reasons:
 - a. If any part of the pumping system becomes frozen; excessive pressure may build up in the unit which could cause the unit to burst resulting in possible serious injury to the operator or bystanders.
 - b. The pumping system in this unit may be permanently damaged if frozen. **FREEZE DAMAGE IS NOT COVERED BY WARRANTY.**

If you must store your unit in an area where the temperature may fall below 32°F, you can protect your unit by following the procedure outlined below.

1. Gather the following items:
 - a. Two 5 gallon containers.
 - b. One gallon of antifreeze. (Use an environmentally safe antifreeze.)
 - c. Water supply.
 - d. Three foot hose, 1/2-3/4 I.D. with a 3/4 inch male garden hose fitting.
2. Procedure:
 - a. To start winterizing, unit must be run according to the "Start-up Cold Water Operation".
 - b. After running, shut off the unit and water supply.
 - c. Relieve system pressure by pointing the trigger gun in a safe direction and squeezing the trigger until water flow ceases to exit the Lance Assy.
 - d. Lock the trigger gun in the OFF position and adjust the Lance to the low pressure mode.
 - e. Remove the water supply hose from the unit and attach the 3 foot hose securely to the inlet connection.
 - f. Shut off the detergent injector (if applicable).
 - g. Fill one 5 gallon container with water.

MAINTENANCE



- h. Holding the 3 foot hose in an upright position, completely fill the hose with water. Then plug the open end of the hose with your thumb or finger. Place the plugged end into the 5 gallon container of water.
- i. Start the unit. Trigger the gun several times until all the air is worked out of the system (unit is primed).
- j. With the trigger gun held open, siphon enough water out of the 5 gallon container until there is just enough water left to mix with the antifreeze.
- k. Point the trigger gun into the empty container. (Be certain to wear safety attire for protection from splashing.)
- l. Trigger the gun until the antifreeze begins to exit the trigger gun. Release the trigger for 3 seconds, then trigger the gun for 3 seconds. Continue cycling the trigger gun several times until all the antifreeze mixture is siphoned from the container.
- m. Stop the unit.
- n. Detach the 3 foot hose from the unit and drain any excess antifreeze back into the 5 gallon container storage & maintenance
- o. Disconnect the hose and trigger gun from the unit and drain any excess antifreeze back into the 5 gallon container.
- p. Drain hose, trigger gun and lance assembly and store with the unit in a safe non-freezing area.
- q. Store antifreeze solution for next use or dispose of according to state EPA laws.

Proper winterizing is based on the recommended manufacturer's instructions listed on the "Protection Chart" shown on the back label of most antifreeze containers.

3. OPTIONAL PROCEDURE:

- a. Shut the unit and water supply off.
- b. Relieve system pressure by pointing the trigger gun in a safe direction and squeezing the trigger until water flow ceases to exit the nozzle.
- c. Disconnect and drain the hose, trigger gun and lance assembly.
- d. Remove the coil drain plug from the heat exchanger inlet.
- e. Start the unit and allow it to run until all the water exits the unit. Once the water has stopped flowing from the unit, turn off.

When using this procedure, use caution as ice chips can form from drops of water which could cause the unit to burst if starting before completely thawed.



MAINTENANCE

MAINTENANCE CHART

PROCEDURE	DAILY	3 MONTHS	6 MONTHS	9 MONTHS	12 MONTHS
Check engine oil level	X				
Change engine oil*****		X	X	X	X
Check water pump oil level	X				
Change water pump oil **		X	X	X	X
Oil leak inspection	X				
Fuel leak inspection	X				
Water leak inspection	X				
Hose inspection	X				
Water inlet filter inspection	X				
Inspect belt		X	X	X	X
Replace high pressure nozzle***		X	X	X	X
Replace fuel filter		X	X	X	X
Inspect fuel pump filter*					X
Replace fuel nozzle*					X
Check burner air adjustment		X	X	X	X
Check burner electrodes*					X
Test water pressure*		X	X	X	X
Test fuel pressure*		X	X	X	X
Test water temperature*		X	X	X	X
Descale coil****					X

* Must be performed by an authorized service technician.

** The pump oil must be changed after the first 50 hours of operation and every 250 hours or 3 months, whichever comes first.

*** High pressure nozzle should be replaced whenever pressure is less than 85%.

**** Scale build-up will vary with mineral content in the water and amount of usage. Descaling can range from weekly to yearly maintenance.

***** The engine oil must be changed after the first 8 hours of operation and every 50 hours or 3 months, whichever comes first.



TROUBLESHOOTING

Troubleshooting

TROUBLESHOOTING CHART

SYMPTOM	PROBABLE CAUSE	REMEDY
Engine will not start	Various engine problems	Refer to the Engine Manual accompanying your unit.
	Unit components are frozen.	Allow to thaw. If any part of the unit becomes frozen; excessive pressure may build up in the unit which could cause the unit to burst resulting in possible serious injury to the operator or bystanders.
No discharge at nozzle when trigger mechanism is squeezed.	Inadequate water supply.	Ensure hose is 3/4" diameter and incoming water supply is turned on.
Low or fluctuating pressure.	Kink in water inlet hose.	Remove kink.
	Kink in high pressure discharge hose.	Replace kinked high pressure hose.
	Water inlet screen obstructed.	Remove screen, clean or replace.
	Pump sucking air. (Prime eliminated)	Tighten all water intake connections Eliminate leaks in intake line.
	Collar on adjustable nozzle is not in the high pressure mode.	Turn Collar clockwise to move to high pressure
	Obstructed or worn spray nozzle.	Remove, clean or replace.
	Damaged or obstructed valve assy. on pump.	Remove, clean or replace.
	Pump packings worn.	Replace packings.
	Unloader/Bypass valve not operating correctly.	Repair or replace.
Water is leaking from Thermal Relief Valve.	Water temperature is too high.	Do not allow unit to operate in bypass mode (with the trigger gun closed) for more than three minutes.
	Defective valve.	Replace.
Oil appears milky or foamy.	Water in oil.	Change pump oil. Fill to proper level.
Oil leaking from unit.	Worn seals or o-rings.	Contact Customer Service.



TROUBLESHOOTING

SYMPTOM	PROBABLE CAUSE	REMEDY
Detergent will not siphon into Low Pressure Detergent mode.	Detergent strainer is not completely submerged in detergent solution.	Check, submerge if necessary.
	Detergent strainer obstructed.	Inspect, clean or replace.
	Detergent hose cut, obstructed or kinked.	Inspect, clean or replace.
	Detergent adjusting knob turned to closed position.	Open adjusting knob. Refer to "Cleaning with Detergents".
	Too many high pressure hose extensions attached to the water outlet.	Use one extension maximum.
	Nozzle assembly is plugged.	Clean or replace.
	Ball & Spring in Venturi stuck.	Remove, clean or replace.
Water flows back into detergent container.	Ball & Spring in Venturi reversed, missing or corroded.	Remove, clean or replace.
Water flows from the nozzle when the trigger gun is locked in the "OFF" position	Trigger gun is malfunctioning.	Repair or replace.
Water is leaking under heat exchanger coil.	Safety Relief device is relieving caused by an unloader or pressure switch malfunction.	1. Detect and correct unloader or pressure switch problem. 2. Replace safety relief device. NEVER run unit without safety relief device. Doing so can cause an explosion!
Burner will not ignite	Switch is not in "Burner" position.	Check switch position.
	Out of fuel.	Refuel.
	Trigger gun is closed.	Open trigger gun for pressure.
	EMF Drive belt loose or broken.	Replace.
	Flexible coupler broken.	Replace.
	Dirty or clogged fuel filter	Replace.
	Fuel pump sucking air.	Tighten all fuel intake connections. Eliminate leaks in intake line.
	Fuel pump inoperative.	Check pressure, replace if needed.
	Dirty or clogged fuel nozzle.	Replace.



TROUBLESHOOTING

SYMPTOM	PROBABLE CAUSE	REMEDY
Burner will not ignite	Ignition module	Consult your Customer Service
	Ignition electrodes damaged or worn.	With unit running and trigger gun closed, look through burner sight glass to ensure there is sparking across electrodes.
	No voltage	Consult your Customer Service.
	Pressure switch override.	Pressure should be over 250 PSI/18 Bar to allow burner to come on.
	High limit switch override.	Unit will automatically reignite when cool.
	Improper burner air adjustment.	Adjust as explained on page 26.
	Fuel solenoid valve failure.	Replace.
Burner runs erratically.	Water in the fuel oil.	Drain fuel filter/water separator. Drain fuel tank, and replace with clean fuel.
	Dirty fuel filter	Replace.
	Dirty fuel nozzle.	Replace.
	Improper air adjustment setting.	Adjust as explained on page 26.
	Fuel pump malfunctioning.	Replace.
Burner runs, but will not heat.	Poor or improper fuel supply.	Check fuel to ensure it is correct. Drain tank and replace filter if necessary and refill with proper fuel.
	Low fuel pump pressure.	Check fuel pump pressure, adjust or replace if needed.
	Dirty fuel nozzle.	Replace.
	Improper air adjustment setting.	Adjust as explained on page 26.
	Scale build up in heat exchanger coil.	Consult your Customer Service.
Burner discharges white smoke.	Low on fuel.	Refuel. If white smoke persists, consult Customer Service.
	Excessive air supply.	Adjust as explained on page 26.
Burner discharges black smoke.	Insufficient air supply.	Adjust as explained on page 26.



PARTS LIST

Parts List

SPECIFICATIONS

MODEL NUMBER	HW3513HAD
Operating Pressure (PSI/Bar)	3500 / 241 (+/- 5%)
Water Volume (GPM/lpm)	3.27 / 12.38 (+/- 5%)
Outlet Water Temperature (F/C)	140°F/78°C (+/- 20°F) rise above inlet ambient (210°F/ 99°C maximum)
Engine:	Honda
Model	GX390
Engine Type	Four Stroke, Overhead Cam, Single Cylinder
Oil Type	SAE10W-30
Oil Capacity (oz./liter)	37 / 1.1
Low Oil Protection	Oil Alert
Fuel Type	Unleaded Gasoline 86 Octane Minimum
Fuel Capacity (Qt./liter)	1.6/6.0
Starting	Recoil Rope
Max No Load RPM	3600 (+/- 100)
High Pressure Pump:	Direct Driven, Oil Bath, Triplex Piston
Oil Type	SAE30W Non-Detergent
Oil Capacity (oz./liter)	15.0 / 0.44
Plungers	Ceramic
Manifold	Forged Brass
Valves	Stainless Steel
Unloader	Preset
Inlet Water Strainer	Easy opening for inspection and cleaning of Stainless Steel Screen
Heat Dump Valve	Relieves heated water during unloader bypass stage
Detergent Injector:	Adjustable Low Pressure downstream from pump
Burner Fuel System	
Fuel Type	No. 1 or No. 2 Fuel Oil, Diesel or Kerosene
Fuel Capacity (gal./liters)	5.5 / 21
Fuel Filter	Inline Filter
Fuel Pump	Two Line, Single Stage
Fuel Pressure (PSI/BAR)	145 / 10
Fuel Nozzle	1.75 60° B Delavan

PARTS LIST



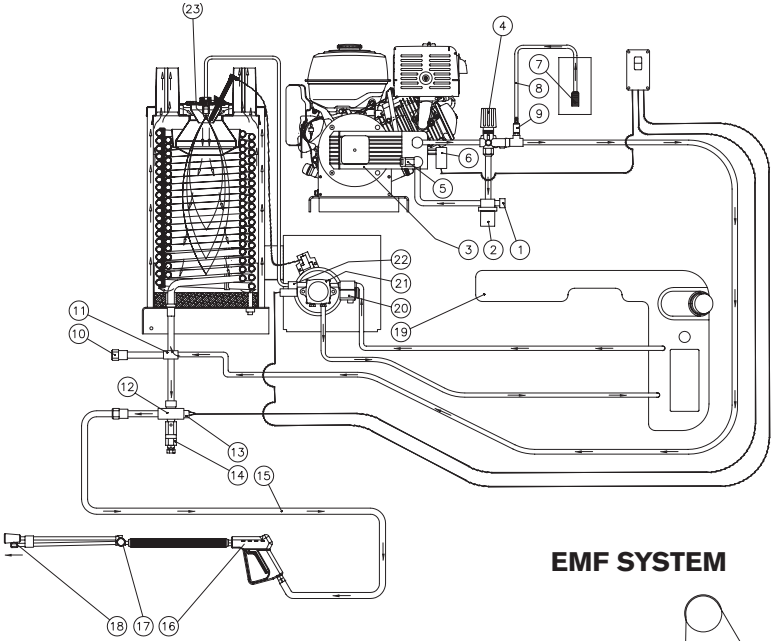
SPECIFICATIONS CONT.

MODEL NUMBER	HW3513HAD
Fuel Consumption (GPH/LPH)	2.1 GPH Continuous Burning
Electro Magnetic Firing (EMF) System:	Belt Driven (Patent #5,954,494)
Ignition	Transistorized Magneto
Control Voltage	12 Volt DC
Blower	Forced Air
Heat Exchanger:	Vertical, Top fired, Dual Spiral Coil
BTU Input	294,000
Efficiency	86% with #2 Fuel Oil/ Diesel
Smoke Density	0-3 per ASTM D2156
Controls:	
On/Off Switch	Industrial grade rocker switch
Pressure Switch	Shuts off burner fuel supply upon trigger release
High Limit Switch	Shuts off burner fuel supply when outlet water temp. exceeds 210°F / 99°C
Fuel Solenoid:	12 Volt
Safety Relief:	Relieves excess system pressure
Unit Net Weight (Lbs/Kg)	428 / 194
Unit Shipping Weight (Lbs/Kg)	551 / 250
Unit Net Dimensions (In/Cm)	49.25Lx 31Wx 40H/125.1L x 78.7W x 101.6H
Unit Shipping Dimensions (In/Cm)	57.25L x 35W x 54.75 H/145.4L x 88.9W x 139.1H

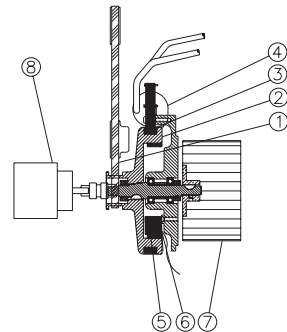
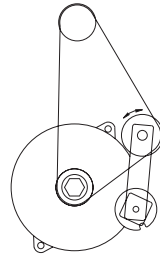


PARTS LIST

FLOW CHART



EMF SYSTEM



PARTS LIST

**GENERAL THEORY OF OPERATION**

WATER FLOW: Connect a pressurized water source to the INLET GARDEN HOSE CONNECTION (1) and turn on the water supply.

The water then travels into the TRIPLEX HIGH PRESSURE PUMP (2) which has an UNLOADER (6) that bypasses the water when the trigger gun is closed. To protect the pump from heated water during this bypass stage, a HEAT DUMP VALVE (5) will open at 140°F/60°C allowing the heated water to escape. The Heat Dump Valve automatically resets when the water cools. The PRESSURE SWITCH (7) controls the fuel supply to the burner.

From there, the water will flow into the HEAT EXCHANGER INLET (10) where it is heated when the burner is on. As the water exits the HEAT EXCHANGER OUTLET (11), it enters a safety system which protects the operator from danger. The safety system contains a HIGH TEMPERATURE LIMIT SWITCH (12) which senses the water temperature and shuts off the fuel supply to the burner if it gets too hot. If the unloader fails to bypass the water or the burner remains on when the trigger gun is closed, the SAFETY RELIEF (13) will relieve and allow water to exit safely.

The heated water then flows through the HIGH PRESSURE HOSE (14) and to the TRIGGER GUN ASSEMBLY (15) which allows the operator to control the water spray. When the trigger gun is open, the water flows through the LANCE (16) and exits the NOZZLE (17).

FUEL FLOW: The Fuel Pump draws fuel from the FUEL TANK (18) through a replaceable FUEL FILTER (4) and into the FUEL PUMP (3). Fuel exits the fuel pump, into a FUEL SOLENOID VALVE (8) which controls fuel flow to the FUEL NOZZLE (9) where it ignites and burns in the heat exchanger.

EMF SYSTEM: The patented Electro Magnetic Firing (EMF) System is an integrated system which gives all the requirements for combustion.

The BELT (1) from the power source turns the HUB (2) which has two EXTERIOR MAGNETS (3) attached. As these magnets spin past the IGNITION MODULE (4), a magnetic flux is created from which the ignition module produces a high voltage. This voltage arcs across the electrodes giving the spark that is needed for ignition.

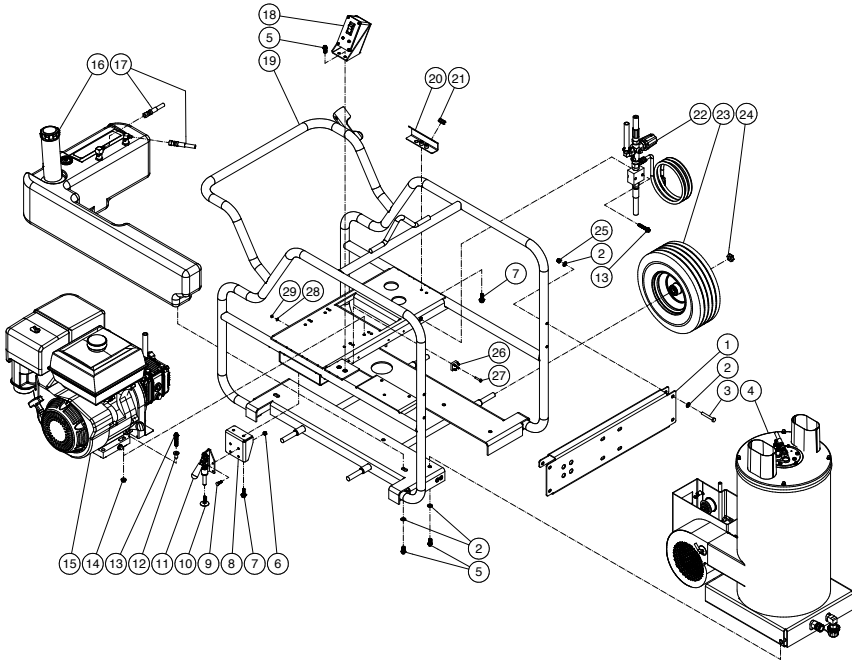
This hub has an INTERNALLY MOUNTED MAGNET (5) which spins past a STATOR (6) that produces the voltage that controls the fuel supply to the heat exchanger. In addition to this, the hub also spins the BLOWER FAN (7) that forces the air into and through the heat exchanger.

The FUEL PUMP (8) is also connected to the hub by means of a flexible coupler.



PARTS LIST

FRAME ASSEMBLY



PARTS LIST



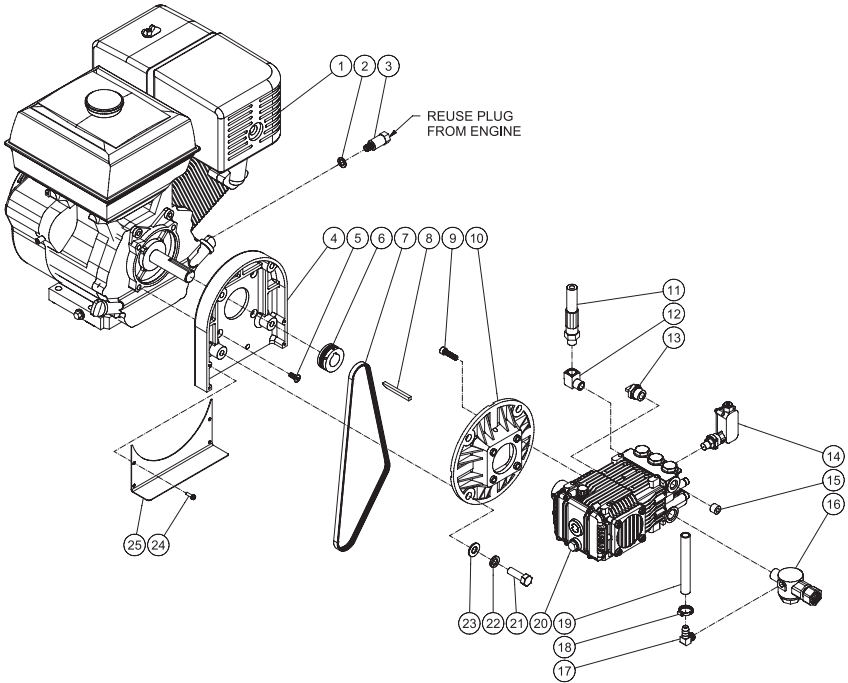
FRAME ASSEMBLY SPECS

ITEM	DESCRIPTION	PART #	QTY
1	Hose Reel Mounting Bracket	20-1395A42	1
2	Washer	28-0003	15
3	Bolt	27-0072	4
4	Heat Exchanger / Emf Assy	N/A	1
5	Bolt	27-9524	9
6	Locknut	30-0155	2
7	Bolt	27-1201	4
8	Brake Bracket	20-1393A01	1
9	Bolt	27-0015	2
10	Bolt	27-9550	1
11	Push/Pull Toggle Clamp	33-0400	1
12	Engine Shim	33-0169	4
13	Bolt	27-9529	6
14	Nut	30-3023	4
15	Engine/Pump Assembly	N/A	1
16	Fuel Tank Assembly	850-0193	1
17	Fuel Hose	15-0147	2
18	Electric Box Assembly	N/A	1
19	Frame	5-0342A42	1
20	Nozzle Holder	20-1198A01	1
21	Grommet	33-0001	4
22	Unloader/ Manifold Assembly	N/A	1
23	Wheel	14-0006	4
24	Locknut	30-0117	4
25	Locknut	30-0157	4
26	Bridge Rectifier	32-1114	1
27	Bolt	27-8807	1
28	Star Washer	28-1009	1
29	Nut	30-6001	1



PARTS LIST

ENGINE/PUMP ASSEMBLY



PARTS LIST



ENGINE/PUMP ASSEMBLY

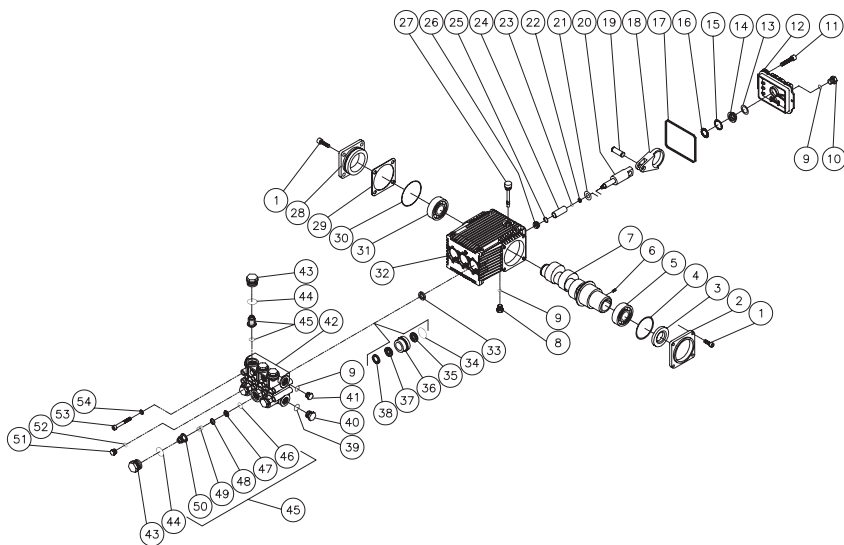
ITEM	DESCRIPTION	PART #	QTY
1	Engine - Honda GX390 Recoil	1-0205	1
2	Washer	28-0605	1
3	Oil Drain	24-0143	1
4	Adapter Flange	38-0049	1
5	Bolt	27-0418	4
6	Sheave	10-0077	1
7	Belt	11-0037	1
8	Key	43-0088	1
9	Bolt	27-8434	4
10	Adapter Plate	38-0051	1
11	High Pressure Hose	15-0194	1
12	Elbow	23-0034	1
13	Relief Valve	22-0005	1
14	Pressure Switch	22-0171	1
15	Plug	23-0244	1
16	Filter - Water	19-0096	1
17	Elbow	23-0119	1
18	Hose Clamp	42-0011	1
19	Hose* (Two Feet Required)	15-0007	1
20	Pump	3-0194	1
21	Bolt	27-0218	4
22	Lockwasher	29-0010	4
23	Washer	28-0006	4
24	Bolt	27-9526	4
25	Beltguard	20-0384A01	1

*MUST ORDER IN ONE FOOT LENGTHS



PARTS LIST

HIGH PRESSURE PUMP



ITEM	DESCRIPTION	PART #	QTY
1	Bolt	27-8884	8
2	Shaft Cover	46-0713	1
3	Oil Seal (see kit 70-0337)	26-0194	1
4	O-Ring (see kit 70-0337)	25-0397	1
5	Bearing	48-0062	1
6	Set Screw	27-8886	1
7	Crankshaft (after serial #28511)	46-0959	1
-	Crankshaft (before serial #28511)	46-0734	1
8	Plug	39-0102	1
9	O-Ring	25-0325	3
10	Plug	39-0086	1
11	Bolt	27-8885	6
12	Crankcase Cover	46-0719	1
13	O-Ring	25-0370	1
14	Oil Sight Glass	46-0670	1
15	Reflector	46-0824	1
16	Retainer	46-0671	1
17	O-Ring (see kit 70-0337)	25-0398	1

PARTS LIST



ITEM	DESCRIPTION	PART #	QTY
18	Connecting Rod (after serial #28511)	46-0922	3
-	Connecting Rod (before serial #28511)	46-0697	3
19	Piston Pin	46-0698	3
20	Plunger Rod	46-0699	3
21	Slinger Washer (see kit 70-0352)	46-0700	3
22	Back-up Ring (see kit 70-0352)	25-0404	3
23	O-Ring (see kit 70-0352)	25-0382	3
24	Piston (see kit 70-0352)	46-0701	3
25	Washer (see kit 70-0352)	26-0191	3
26	Nut	30-6020	3
27	Oil Dipstick	39-0090	1
28	Bearing Cap	46-0703	1
29	Shim - 0.1mm (qty. varies 1-3)	46-0704	-
-	Shim - 0.2mm (qty. varies 1-3)	46-0705	-
30	O-Ring (see kit 70-0337)	25-0380	1
31	Bearing (after serial #28511)	48-0072	1
-	Bearing (before serial #28511)	48-0061	1
32	Crankcase	46-0811	1
33	Oil Seal (see kit 70-0337)	46-0931	3
34	O-Ring (see kit 70-0177)	25-0384	3
35	Low Pressure Seal (see kit 70-0177)	46-0707	3
36	Packing Retainer	46-0708	3
37	V-Packing (see kit 70-0177)	46-0709	3
38	Supporter Ring (see kit 70-0178)	46-0710	3
39	O-Ring	25-0372	1
40	Plug	39-0088	1
41	Plug	39-0086	1
42	Manifold	46-0711	1
43	Valve Cap	39-0095	6
44	O-Ring	25-0160	6
45	Single Valve Assembly (inc. 46-50)	70-0179	1
46	O-Ring (see kit 70-0179)	25-0386	6
47	Valve Seat (see kit 70-0179)	N/A Sep.	6
48	Valve Plate (see kit 70-0179)	N/A Sep.	6



PARTS LIST

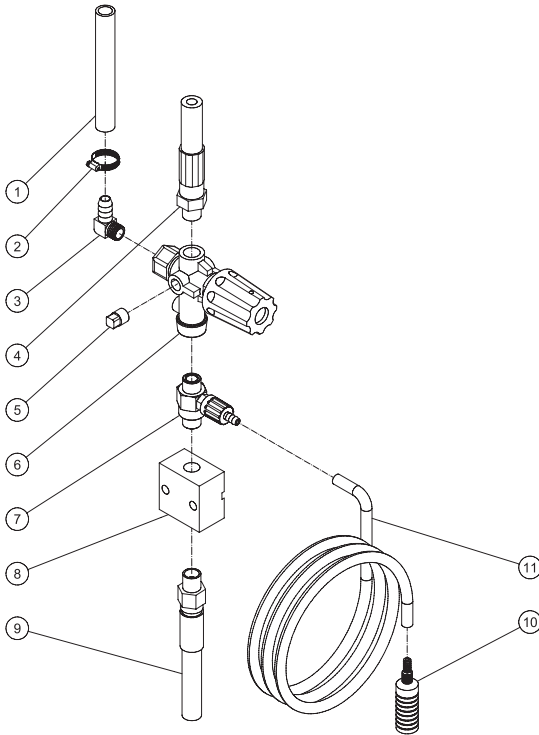
ITEM	DESCRIPTION	PART #	QTY
49	Valve Spring (see kit 70-0179)	N/A Sep.	6
50	Valve Cage (see kit 70-0179)	N/A Sep.	6
51	Plug	39-0096	2
52	O-Ring	25-0387	2
53	Bolt	27-8440	8
54	Lockwasher	29-0154	8

REPLACEMENT KITS

KIT #	DESCRIPTION	ITEMS	# OF ASSEMBLIES	# OF CYLINDERS
70-0177	Kit - High Pressure Seals	34, 35, 37	3	3
70-0178	Kit - Support Rings	38	3	3
70-0179	Kit - Valve Kit	46-50	6	3
70-0337	Kit - Oil Seals Kit	3, 4, 17, 30, 33	1, 1, 1, 1, 3	3
70-0352	Kit - Piston Kit	21-26	3	3

PARTS LIST

UNLOADER/MANIFOLD ASSEMBLY



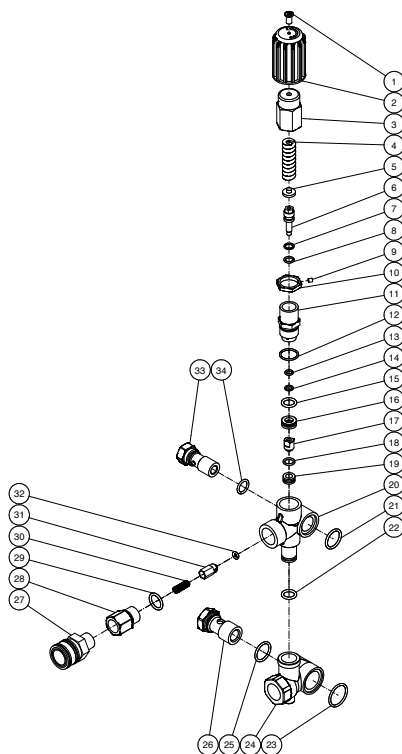
REF. #	DESCRIPTION	PART #	QTY
1	Hose* (two feet required)	15-0007	1
2	Hose Clamp	42-0011	1
3	Elbow	23-0119	1
4	High Pressure Hose	15-0194	1
5	Plug	23-0238	1
6	Unloader	850-0252	1
7	Chemical Injector	50-0052	1
8	Manifold Block	51-0025	1
9	HP Hose	15-0202	1
10	Strainer	19-0050	1
11	Chemical Hose* (six feet required)	15-0021	1
*MUST ORDER IN ONE FOOT LENGTHS)			



PARTS LIST

UNLOADER

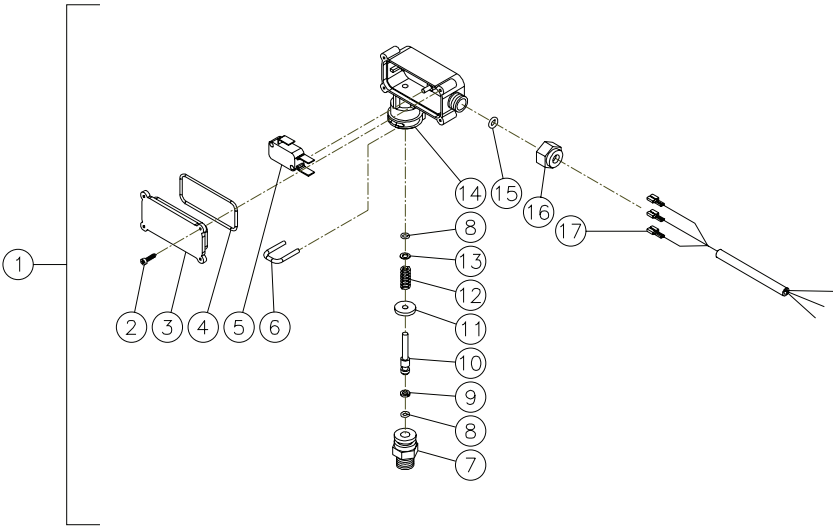
ITEM	DESCRIPTION	PART #	QTY
1	Screw	27-2772	1
2	Knob	7-0250	1
3	Knob	N/A	1
4	Spring	N/A	1
5	Spring Seat	N/A	1
6	Valve Rod	N/A	1
7	Support Ring	N/A	1
8	O-Ring	25-0651	1
9	Set Screw	8-0479	1
10	Jam Nut	N/A	1
11	Unloader Body	N/A	1
12	O-Ring	25-0652	1
13	O-Ring	25-0163	1
14	Support Ring	N/A	1
15	O-Ring	25-0655	1
16	ByPass Jet Unloader	N/A	1
17	Bullet	N/A	1
18	O-Ring	25-0656	1
19	Valve Seat	N/A	1
20	Valve Housing	N/A	1
21	O-Ring	25-0664	1
22	O-Ring	25-0684	1
23	O-Ring	25-0654	1
24	By Pass Housing	N/A	1
25	O-Ring	25-0602	1
26	Inlet Banjo Bolt	8-0595	1
27	Quick Connect Socket	17-0007	1
28	Outlet Connector	46-1389	1
29	O-Ring	25-0386	1
30	Spring	N/A	1
31	Checking Valve	N/A	1
32	O-Ring	25-0653	1
33	Outlet Banjo Bolt	8-0594	1
34	O-Ring	25-0169	1



KIT #	DESCRIPTION	# OF ASSEMBLIES
70-0500	Non-return valves (items 30-23)	1
70-0647	Unloader rebuild (items 1-19)	1

PARTS LIST

PRESSURE SWITCH

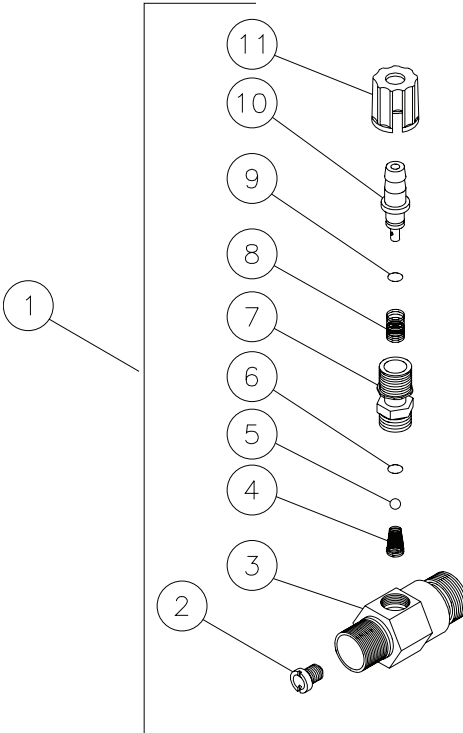


REF. #	DESCRIPTION	PART #	QTY
1	Pressure Switch	22-0243	1
2	Screw	N/A	4
3	Cover	N/A	1
4	O-Ring (See 70-0306)	N/A Sep.	1
5	Micro Switch	N/A	1
6	Retainer Clip	N/A	1
7	Body	N/A	1
8	O-Ring (See 70-0306)	N/A Sep.	2
9	Back-Up Ring (See 70-0306)	N/A Sep.	1
10	Piston	N/A	1
11	Washer	N/A	1
12	Spring	49-0145	1
13	Washer	N/A	1
14	Plastic Housing	N/A	1
15	O-Ring (See 70-0306)	N/A Sep.	1
16	Nut	N/A	1
17	Wire Assembly	N/A	1
	O-Ring Repair Kit (inc. 4, 8-9, 15)	70-0306	



PARTS LIST

DETERGENT INJECTOR

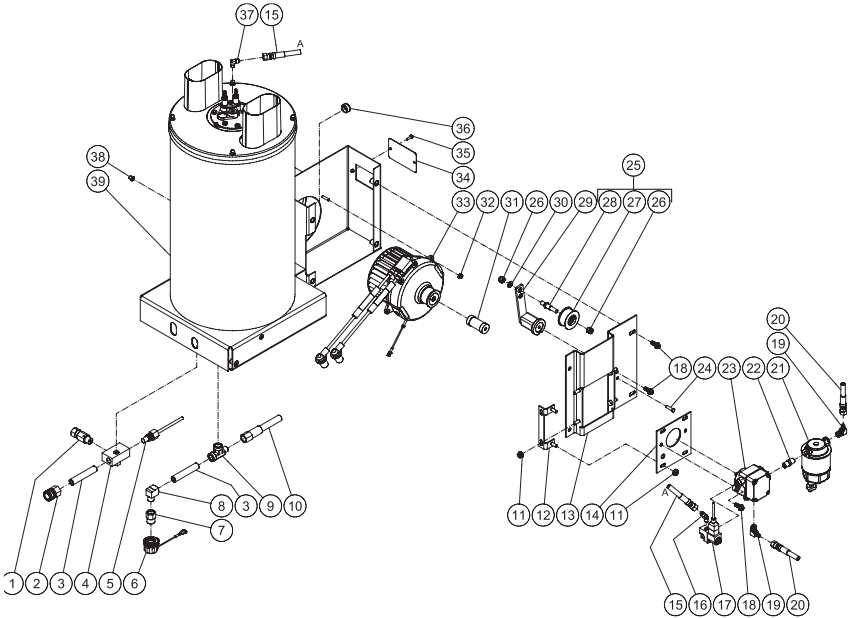


ITEM	DESCRIPTION	PART #	QTY
1	Detergent Injector (inc. 2-11)	50-0052	1
2	Orifice (2.1mm)	50-0057	1
3	Injector Body	N/A	1
4	Spring (see 852-0056)	N/A Sep.	1
5	Ball (see 852-0056)	N/A Sep.	1
6	O-Ring (see 852-0056)	N/A Sep.	1
7	Piston Retainer	50-0156	1
8	Spring	49-0056	1
9	O-Ring (see 852-0056)	N/A Sep.	1
10	Adjustable Shutter Barb	50-0157	1
11	Adjustment Knob	50-0158	1
	Injector Repair Kit (inc. 4-6, 8)	852-0056	1

PARTS LIST



HEAT EXCHANGER/EMF SYSTEM



ITEM	DESCRIPTION	PART #	QTY
1	Pressure Relief Valve	22-0273	1
2	QC Socket	17-0004	1
3	Pipe Nipple	24-*0165	2
4	Outlet Connector	24-0138	1
5	HI Limit Switch	32-0798	1
6	Drain Plug Assembly	850-0218	1
7	Adapter	23-0279	1
8	Elbow	23-0034	1
9	Street Tee	23-0058	1
10	HP Hose	15-0202	1
11	Nut	30-3023	8
12	Bracket	20-0360A01	2
13	Fuel Pump Bracket	20-0381A01	1
14	Fuel Pump Plate	20-0363A01	1



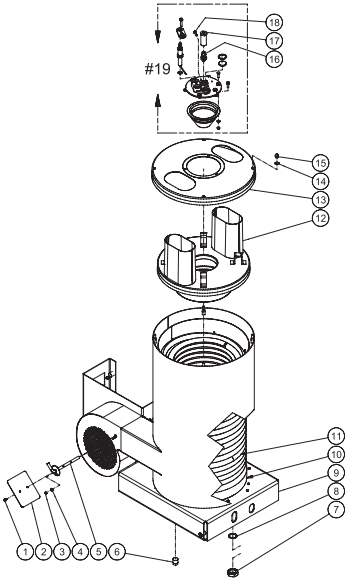
PARTS LIST

ITEM	DESCRIPTION	PART #	QTY
15	HP Fuel Hose	15-0165	1
16	Elbow	23-0288	1
17	Fuel Solenoid	44-0100	1
18	Bolt	27-9524	7
19	Elbow	23-0237	2
20	Fuel Hose	15-0147	2
21	Fuel Filter/Water Separator	19-0070	1
22	Nipple	24-0145	1
23	Fuel Pump	3-0020	1
24	Idler Pin	33-0211	1
25	Tensioner Sheave Shaft Assembly	850-0166	1
26	Locknut	30-0159	2
27	Sheave Assembly	850-0177	1
28	Idler Shaft	33-0212	1
29	Tensioner	10-0071	1
30	Washer	28-0003	1
31	Coupling	33-0225	1
32	Nut	30-3022	2
33	EMF Assembly	850-0403	1
34	Access Panel	20-0386A01	1
35	Bolt	27-09526	2
36	Electrical Bushing	32-0427	2
37	Elbow	23-0287	1
38	Electrical Bushing	32-0426	1
39	Heat Exchanger Assembly	N/A	1

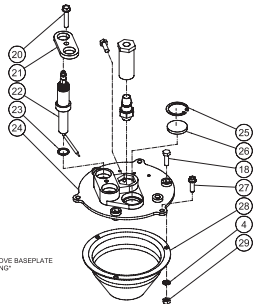


PARTS LIST

BOILER ASSEMBLY

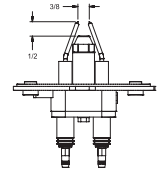
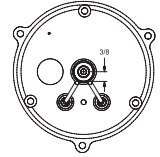


LOCATED ABOVE BASEPLATE ON COIL FITTING



ITEM #19

ELECTRODE GAP SETTINGS





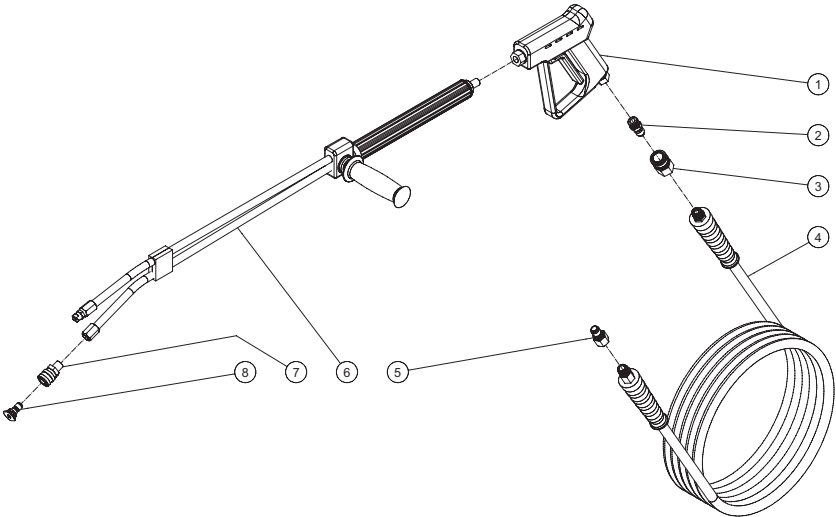
PARTS LIST

ITEM	DESCRIPTION	PART #	QTY
1	Bolt	27-8879	2
2	Air Diverter	20-0378A01	1
3	Nut	30-0137	1
4	Star Washer	28-1009	4
5	Air Diverter Stem	20-0377A01	1
6	Plug	24-0034	1
7	Nut	30-0121	2
8	Washer	28-0521	2
9	Outer Wrap	20-0376A42	1
10	Insulation	33-0250	1
11	Heat Exchanger Coil	66-0011	1
12	Inner Pan Assembly	20-0372	1
13	Top Pan	20-0371A01	1
14	Lockwasher	28-1028	4
15	Acorn Nut	30-6002	4
16	Fuel Nozzle	18-0308	1
17	Fuel Nozzle Holder	23-0292	1
18	Bolt	27-8878	4
19	Electrode Assembly Kit (inc. 4, 18, 20-29)	850-0351	1
20	Bolt	27-8807	1
21	Electrode Bracket	20-1094A01	1
22	Electrode	32-0987	2
23	Washer	28-0523	2
24	Electrode Plate	38-0065	1
25	Snap Ring	33-0254	1
26	Sight Glass	33-0252	1
27	Bolt	27-9526	3
28	Cone	20-0373	1
29	Nut	30-6001	3



PARTS LIST

GUN/WAND/HOSE ASSEMBLY

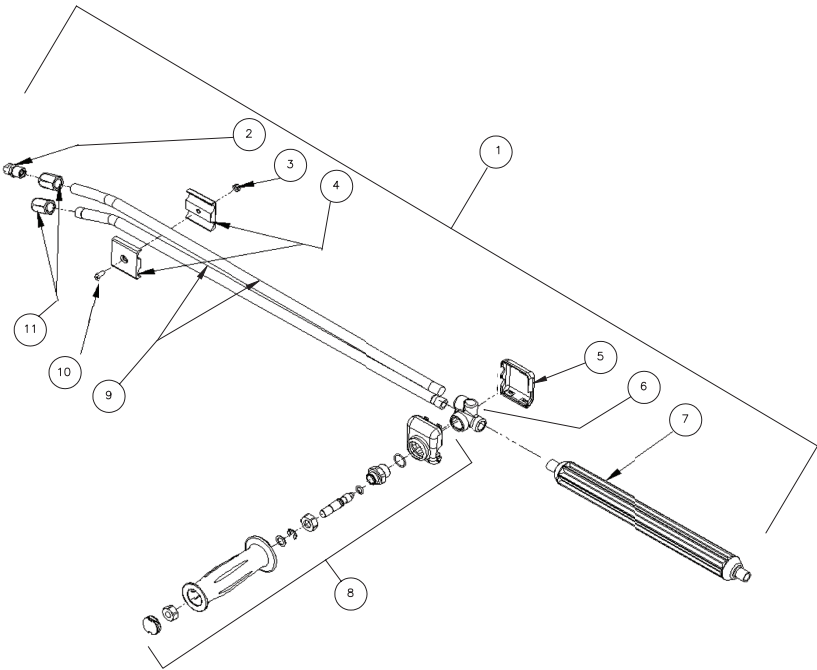


ITEM	DESCRIPTION	PART #	QTY
1	Gun	16-0001	1
2	Quick Connect	17-0005	1
3	QC Socket	17-0004	1
4	Hose	15-0166	1
5	Quick Connect	17-0006	1
6	Duel Lance	16-0417	1
7	QC Socket	17-0028	1
8	Nozzle 00035	18-0392	1
-	Nozzle 15035	18-0393	1
-	Nozzle 40035	18-0396	1



PARTS LIST

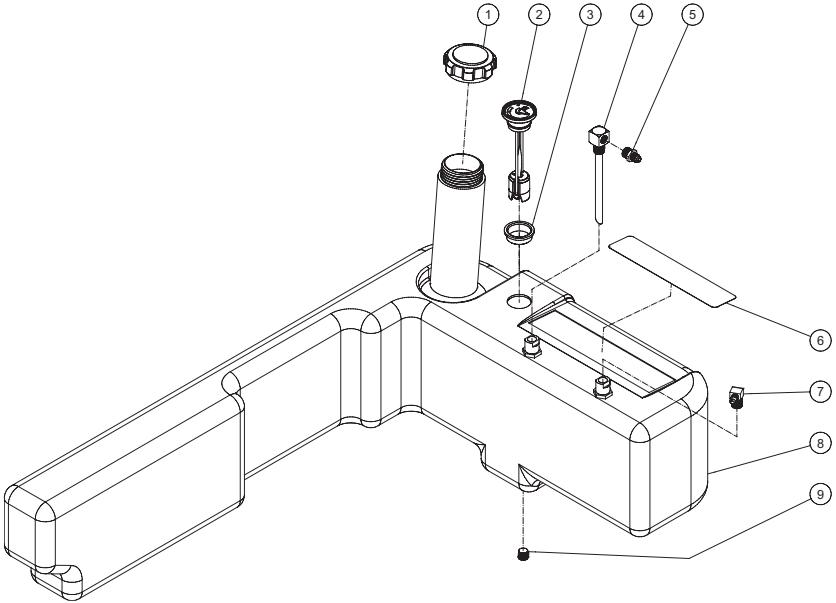
DUAL LANCE ASSEMBLY



ITEM	DESCRIPTION	PART #	QTY
1	Dual Lance Assembly - 36" (inc. 2-11)	16-0417	1
2	Detergent Nozzle	18-0110	1
3	Nut	30-6001	1
4	Clamp	16-0420	2
5	Lower Valve Cover (see 16-0416)	N/A Sep.	1
6	Housing (see 16-0416)	N/A Sep.	1
7	Lance	16-0419	1
8	Handle Repair Kit	70-0419	1
9	Lance (see 16-0416)	N/A Sep.	2
10	Screw	27-8196	1
11	Nozzle Adapter	24-0280	2

PARTS LIST

FUEL TANK

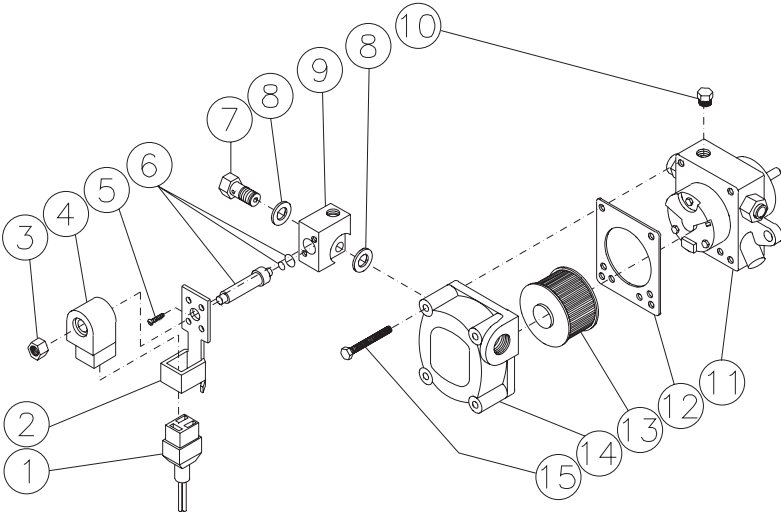


ITEM	DESCRIPTION	PART #	QTY
1	Fuel Cap	12-0033	1
2	Fuel Gauge	22-0475	1
3	Fuel Gauge Grommet	33-0255	1
4	Fuel Pick Up	33-0270	1
5	Nipple	23-0247	1
6	Decal-CAUTION: Risk of Fire (see 71-0010)	N/A	1
7	Elbow	23-0237	1
8	Fuel Tank	12-0052	1
9	Plug	23-0296	1



PARTS LIST

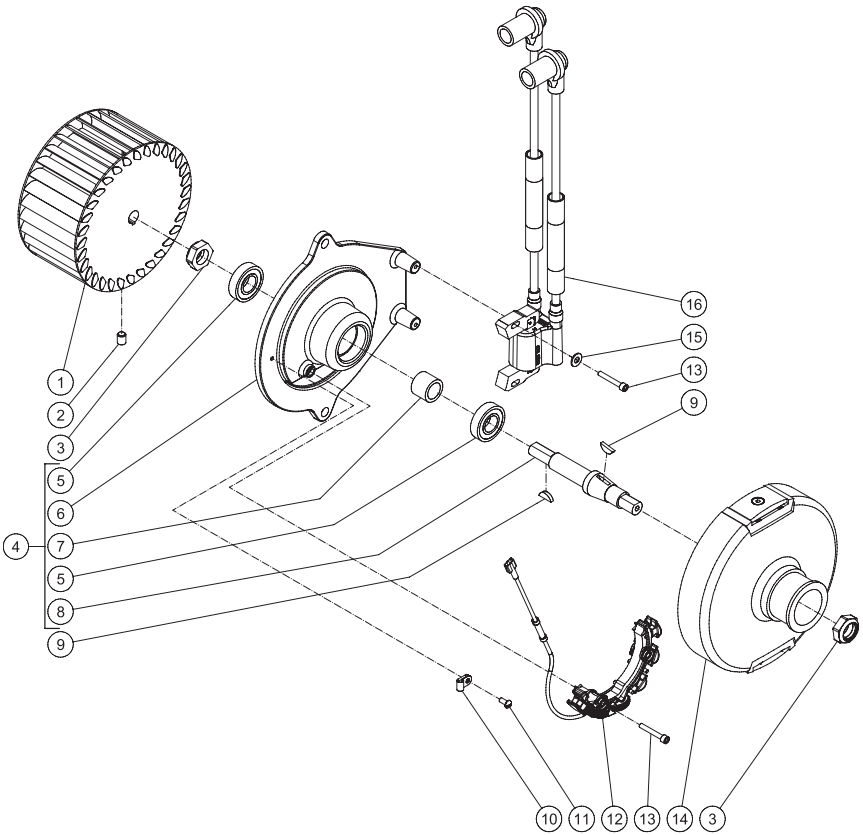
FUEL PUMP & FUEL SOLENOID



ITEM	DESCRIPTION	PART #	QTY
1	Cord-Din Connector	32-0443	1
2	Base Plate	46-1014	1
3	Nut	46-1016	1
4	Solenoid Coil - 12 Volt	46-1015	1
5	Screw	N/A	2
6	Piston	46-1012	1
7	Bolt	46-1009	1
8	Washer	26-0150	2
9	Solenoid Body	N/A	1
10	Plug	24-0082	1
11	Fuel Pump Body	N/A	1
12	Cover Gasket	26-0109	1
13	Fuel Oil Strainer	19-0034	1
14	Fuel Pump Cover	46-1005	1
15	Fuel Pump Cover Screw	46-1006	4

PARTS LIST

EMF SYSTEM



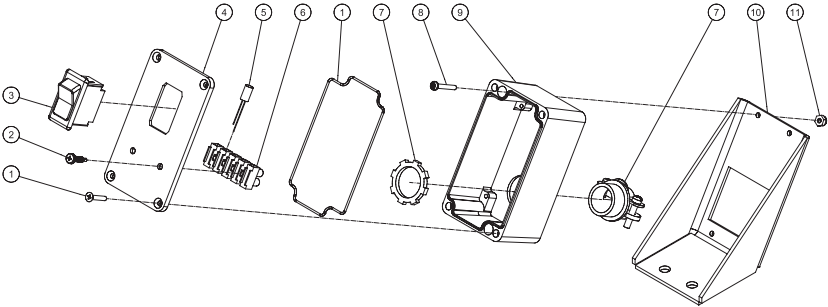


PARTS LIST

ITEM	DESCRIPTION	PART #	QTY
-	EMF Assembly	850-0403	1
1	Blower Fan	44-0099	1
2	Set Screw	N/A	1
3	Locknut	30-0177	2
4	Blower Flange Assembly	850-0402	1
5	Sealed Bearing	48-0041	2
6	Blower Flange	38-0066	1
7	Spacer	33-0206	1
8	Blower Shaft	20-0347	1
9	Woodruff Key	43-0080	2
10	Clamp	32-0403	1
11	Screw	27-2070	1
12	Stator Assembly	850-0401	1
13	Bolt	27-0740	4
14	Hub	38-0041	1
15	Washer	28-0001	2
16	Ignition Assembly	850-0413	1

PARTS LIST

ELECTRIC BOX ASSEMBLY

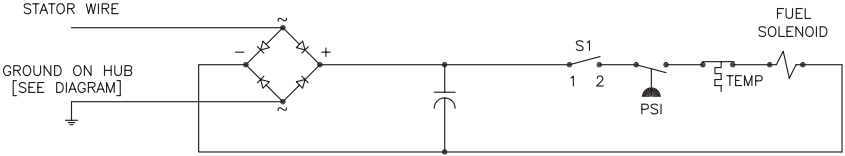


ITEM	DESCRIPTION	PART #	QTY
1	Electric Box Hardware Kit	70-0169	1
2	Screw	27-3350	2
3	Rocker Switch	32-0422	1
4	Electric Box Lid	32-0430A01	1
5	Capacitor	32-1113	1
6	Terminal Strip	32-0394	1
7	Connector	32-0085	1
8	Bolt	27-8497	2
9	Electric Box	32-0429A01	1
10	Electric Box Bracket	20-0380A01	1
11	Locknut	30-0152	2

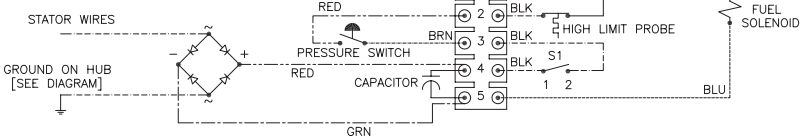
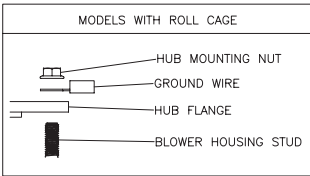


PARTS LIST

WIRING SCHEMATIC



WIRING DIAGRAM



WARRANTY

**STATEMENT OF WARRANTY**

The manufacturer warrants all parts, (except those referred to below), of your new pressure washer to be free from defects in materials and workmanship during the following periods:

- For Lifetime against freezing and cracking:
 - Pump Manifold
 - For Seven (7) Years from the date of original purchase:
 - High Pressure Pump
 - For Three (3) Years from the date of original purchase:
 - Heat Exchanger Coil
 - For Two (2) Years from the date of original purchase:
 - Frame
 - Guard or Shields
 - For One (1) Year from the date of original purchase:
 - Adjustable Thermostat
 - Selector switch
 - Overload
 - For Six (6) months from the date of original purchase:
 - Ignition Transformer
 - For Ninety (90) days from the date of original purchase:
 - Unloader Valve
 - Fuel solenoid
 - Fuel Pump
 - Safety Relief Valve
 - For Thirty (30) days from the date of original purchase:
 - High Pressure Hose
 - Strainers / Filters
- Plumbing
 - Pulleys
 - GFCI Cord
 - Starter Contactor
 - Burner Motor
 - Electrodes
 - High Limit thermostat
 - Pressure Switch
 - Trigger Gun
 - Wand

Defective parts not subject to normal wear and tear will be repaired or replaced at our option during the warranty period. In any event, reimbursement is limited to the purchase price paid.



WARRANTY

WARRANTY EXCLUSIONS

1. The motor is covered under separate warranty by its respective manufacturer and is subject to the terms set forth therein.
2. Normal wear parts:

Pump Packings	Spray Nozzles
Pump Valves	Detergent Valves
Fuel Filters	Quick Couplers/screw connects
O-rings	Belts
3. This warranty does not cover parts damaged due to normal wear, misapplication, misuse, operation at other than recommended speeds, pressures or temperature. Parts damaged or worn because of the use of caustic liquids or by operation in abrasive or corrosive environments or under conditions causing pump cavitation are not warranted. Failure to follow recommended operating and maintenance procedures also voids warranty.
4. The use of other than Genuine Repair Parts will void warranty. Parts returned, prepaid to our factory or to an Authorized Service Center will be inspected and replaced free of charge if found to be defective and subject to warranty. There are no warranties which extend beyond the description of the face hereof. Under no circumstances shall the manufacturer bear any responsibility for loss of use of the unit, loss of time or rental, inconvenience, commercial loss or consequential damages.



AAA Rent-All at 225-291-1356 for assistance ordering parts*



BE

THE POWER YOU NEED.

If you need assistance with the assembly or
operation of your Pressure Washer please call

1-866-850-6662