



OPERATION & MAINTENANCE MANUAL



IMPORTANT: READ BEFORE OPERATING

HIGH PRESSURE WASHERS NATURAL GAS & PROPANE

**HN SERIES
NATURAL GAS HEAT LINK SERIES**

HYDRO TEK SYSTEMS, INC.
10418 Enterprise Drive
Redlands, CA USA 92374
PH(909)799-9222 FAX(909)799-9888
Website: www.hydroteksystems.com
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INTRODUCTION:

The employees and management of HYDRO TEK SYSTEMS, INC. thank you for selecting our products. The production and quality assurance personnel have taken the greatest care in the assembly process to ensure that your new High Pressure Cleaner is of a quality and standard acceptable to both you the customer and us the manufacturer.

This operators manual was compiled for your benefit. By studying and following the safety, installation, operation, maintenance, and troubleshooting information contained within, you can look forward to many years of trouble free service from your equipment.

Upon receipt of the equipment, please inspect for any concealed freight damage. Should you find damage has occurred during shipping, do not return the damaged merchandise to Hydro Tek, but file a claim immediately with the freight carrier involved.

Please locate the enclosed warranty registration card. **Determine Series of your machine (Ultimate Line models include blue labeling and extra operational features. Pro Line models include red labeling and the model numbers end in "H" or "C").** Fill out and return it to activate the warranty on your machine. Also enclosed are installation instructions.

Please note that the owner/user has certain obligations under the terms of the warranty for this equipment, and as such you are encouraged to always have every person who will operate the equipment, read and become familiar with the contents of this owners manual, prior to their using this equipment.

Contact your AUTHORIZED HYDRO TEK DEALER or a trained HYDRO TEK SYSTEMS service engineer if problems occur, or if installation is required.

THERE ARE NO USER SERVICEABLE COMPONENTS ON THIS EQUIPMENT.

ULTIMATE LINE LIMITED WARRANTY

FIVE YEARS PARTS + ONE YEAR LABOR: Cat Pump crankcase, heater coil (wet end/freezing excluded)

THREE YEARS PARTS + ONE YEAR LABOR: Fuel, water tanks, stainless steel panels, frames (finish excluded)

ONE YEAR PARTS + ONE YEAR LABOR: Electrical components and electric motors

90 DAY PARTS, NO LABOR: Accessories, balance of components, and wear items but not limited to unloaders, hoses, wands, guns, nozzles, quick couplers, filters, belts, seals, o-rings and pump packings

PRO LINE PARTS WARRANTY

ONE YEAR LIMITED PARTS WARRANTY- Provided by Hydro Tek on Pro Line machines excluding normal wear items listed below.

THREE YEAR COIL WARRANTY - Three year parts warranty. Labor, freezing & descaling excluded.

FIVE YEAR PUMP WARRANTY- Up to five year limited warranty on crankcase of the pump provided by the respective pump manufacturer.

90 DAY WARRANTY ON OPTIONAL ACCESSORIES

STATEMENT OF WARRANTY:

Hydro Tek Systems, Inc. (Hydro Tek) warranties the Ultimate and Pro Line pressure washers to be free from defects in material and workmanship for the time periods stated above calculated from the date of the original retail purchase. Hydro Tek will make the required repairs, or at Hydro Tek's option, provide replacement components if found to be defective in material or workmanship in the reasonable judgment of Hydro Tek. This warranty only extends to the original retail purchaser, and is subject to the exclusions shown below. Any parts replaced under this warranty will resume the remainder of the parts warranty period.

This Warranty does not apply to and Hydro Tek is not responsible for:

1. Normal wear items such as Unloader Valves, Discharge Hoses, Guns, Wands, Nozzles, Quick Couplers, Brushes, Filters, Belts, Seals, O-rings, and Packings.
2. Labor charges or costs related to the removal of the defective part, field labor charges, transportation to service center and costs to return it to Hydro Tek, or service charges for scheduled maintenance or any adjustments.
3. Damage due to freezing, abrasive fluids, chemical deterioration, and scale build up (finish on frames and metal excluded).
4. Damage from fluctuation in electrical or water supply.
5. Damage resulting from failure to follow manufacturer's maintenance instructions.
6. Damage resulting from misuse, neglect, accidents, modifications, alterations, abuse, or incorrect installation.
7. Products operated outside of specified limits or intended use as specified in the operation manual.
8. Repairs made necessary by the use of parts which are either not obtained from or approved by Hydro Tek.
9. Actions or inactions by any Hydro Tek distributor giving rise to or causing a warranty exclusion or promise of additional warranty.
10. Warranty on engines, motors, and pumps, which are warranted by their respective manufacturers and are serviced through the manufacturer's service centers.

WARNING

THIS EQUIPMENT CAN BE HAZARDOUS TO THE OPERATORS SAFETY AND ONLY AUTHORIZED PERSONNEL WHO HAVE READ AND UNDERSTOOD THE OPERATION MANUAL SHOULD BE PERMITTED TO OPERATE THIS UNIT. NEVER ALLOW CHILDREN TO PLAY ON OR AROUND THIS EQUIPMENT.

LIMITATION OF LIABILITY

Hydro Tek's responsibility with respect to claims is limited in making the required repairs or replacements. Hydro Tek reserves the right to change or improve the design of any of its products or illustrations without assuming any obligation to modify any product previously manufactured.

THERE IS NO OTHER EXPRESSED WARRANTY.

This supersedes any and all previous warranty statements for products purchased after June 1, 2001. Hydro Tek is not liable for indirect, incidental or consequential damages including but not limited to: The cost of substitute equipment, loss of revenue, pecuniary expense or loss, or any damages whatsoever arising out of the use or inability to use a Hydro Tek product. Hydro Tek disclaims all implied warranties, including those of merchantability and fitness for use or a particular purpose. It is the buyer's responsibility to ensure installation and use of Hydro Tek products conforms to local codes.

Proof of purchase date required to obtain warranty.

ELECTRICAL PRECAUTIONS:

1. Observe all State, Local, and National codes for the installation of your electrically powered washer.

WARNING

FIRE OR EXPLOSION HAZARD CAN CAUSE SEVERE INJURY OR DEATH AND PROPERTY DAMAGE

Product Is Provided With A Ground Fault Circuit Interrupter Built Into The Power Cord Plug. If Replacement Of The Plug Or Cord Is Needed, Use Only Identical Replacement Parts.

3. GROUNDING INSTRUCTIONS:

Cord Connected, Grounded Products:

This product must be grounded. If it should malfunction or breakdown, grounding provides a path of least resistance for electric current to reduce the risk of electric shock. This product is equipped with a cord having an equipment-grounding conductor. The plug must be plugged into an appropriate outlet that is properly installed and grounded in accordance with all local codes and ordinances.

Danger - Improper connection of the equipment-grounding conductor can result in a risk of electrocution. Check with a qualified electrician or service personnel if you are in doubt as to whether the outlet is properly grounded. Do not modify the plug provided with the product, do not cut off the ground pin - if it will not fit the outlet, have a proper outlet installed by a qualified electrician. Do not use any type of adaptor with this product.

4. To comply with the national electric code, this pressure washer should only be connected to a receptacle that is protected by a ground fault circuit interrupter (GFCI).
5. EXTENSION CORDS:
Use of extension cords is not recommended.
6. NEVER operate an electrically powered washer after it has tripped a breaker or a ground fault device without having the reason for the trip determined by an authorized service engineer or competent electrician.
7. Use only in a dry area. Do not handle electrical cords and plugs when they are wet, when your hands are wet, or when standing in water.

Do not spray high pressure water on to the machine.

8. Disconnect power supply before making any repairs or adjustments.
9. Unit must be grounded. A grounding lug is provided on the machine.

FIRE PRECAUTIONS:

1. Propane bottle equipped units must have the bottle removed from the unit and placed 10 feet away before start-up.
2. NEVER operate this equipment in the presence of flammable vapors, dust, gases, or other potentially combustible materials.
3. AVOID contact with the exterior of the coil/heat exchanger assembly and exhaust stack to prevent burns.
4. DO NOT store fuel or other flammable materials near the burner or any other open flame.
5. To avoid burns NEVER stand over burner exhaust outlet. Burner may start at any time once power is turned on.
6. Do not touch burner exhaust port, mufflers, or wands/hoses as contact may cause burns. Use designated gripping areas.
7. Burner on/off switch must be placed in the OFF position when the pressure washer is not being used.

VENTILATION PRECAUTIONS:

1. DO NOT run burner in an enclosed area. Exhaust gases contain carbon monoxide, an odorless deadly poison.
2. Observe all State, Local, and National codes providing for indoor use or installation of this unit.
3. If natural gas or propane odor is present, and/or unit does not light, turn off all controls, close gas cock and call your gas company for service.
4. Know the detergents you are using. Read and follow the directions on the detergent labels.



WARNING: Natural Gas Units

FIRE OR EXPLOSION HAZARD CAN CAUSE PROPERTY DAMAGE, SEVERE INJURY, OR DEATH

1. Do not force the gas control knob. Use only your hand to turn the gas control knob. Never use any tools.
2. If the gas control knob will not operate by hand, the gas control should be replaced by a qualified service technician.
3. Check for gas leaks with rich soap water solution any time work is done on a gas control, including all piping.

PERSONAL HAZARD:

1. DO NOT remove belt guards or electrical covers while motor is operating or when the power is connected.
2. DO NOT move engine powered machinery while the engine is operating.
2. DO NOT lock the trigger on the gun valve in the on position.
3. DO NOT exceed recommended operating pressure or temperature.
4. KEEP HANDS CLEAR OF BELTS AND MOVING PARTS.
5. Do not operate the product when fatigued or under the influence of alcohol or drugs.

⚠️ SPRAY INJECTION PRECAUTION:

1. Fluid from high pressure spray or leaks can penetrate the skin and cause serious injury. If any fluid appears to penetrate the skin get emergency medical help at once. DO NOT treat as a simple cut. Tell the physician exactly what fluid was injected. For treatment instructions have the physician call your local poison center. Without proper treatment, complications can develop.
2. **WARNING** - Risk of injection or severe injury to persons - Keep clear of nozzle. DO NOT direct discharge stream at persons. This machine is to be used by trained operators. Keep operating area clear of all persons.
CAUTION: Hot discharge fluid - DO NOT touch or direct discharge stream at persons. Gun kicks back - Hold with both hands. Stay alert - Watch what you are doing.
3. Always wear protective eye goggles when operating the equipment. Additional protective items such as a rubber suit and boots, gloves, and respirators are advisable, particularly
2. NEVER point the spray gun at yourself or other persons. Do not lock the trigger in the "ON" position. Use only 48" long wands on machines producing over 3000 psi. Also, only use straight wands or wands with a bend of 10° or less.
3. NEVER put your hands or fingers over the spray tip or over leaks which may occur on the discharge hose or other components.
4. Always wear protective eye goggles when operating the equipment. Additional protective items such as a rubber suit, gloves, and respirators are advisable, particularly when using cleaning detergents with a corrosive content.
5. Know the detergents you are using. Read and follow the directions on the detergent labels.

⚠️ PERSONAL HAZARD:

1. DO NOT remove belt guards or electrical covers while engine is operating or when the power is connected.
2. DO NOT lock the trigger on the gun valve in the on position.
3. DO NOT exceed recommended operating pressure or temperature.
4. **KEEP HANDS CLEAR of Belts:** Some units equipped with auto on may start at any time when power is connected.

BEFORE START UP:**HN SERIES**

1. **CHECK OIL AND FLUID LEVELS:** Check pump oil by locating the oil view window and fill to the red dot.
2. **INSTALL LEGS TO BASE.** Legs are required for safe pilot operation and reduce risk of fire. The HN Legs include forklift fork clearance slots to allow leg installation after the HN is removed from the pallet. To reduce risk of serious injury, always block load mechanism in place before working:



3. **CONNECT HOSE AND GUN ASSEMBLY**
4. **CONNECT THE WATER SUPPLY & TURN WATER ON:** Maintain an adequate supply of water using a ¾" I.D. steel pipe with a pressure between 25 and 60 PSI. Burner power switches should be off before starting. Do not run dry for longer than one minute.
5. **NATURAL GAS/PROPANE GAS:** Connect gas supply using appropriate shut off cock and recommended gas plumbing procedures, including the use of a soap or leak detection solution on all fittings. (Contact your gas supplier). Note that a Draft Diverter is not included as a standard feature with the machine. Draft diverters are required on HN models for better heating efficiency and improved pilot ignition when cycling gun. Gas regulator, gas and water supply lines are not included with the machine.

OPERATION:

1. **STARTING:**



- Connect power supply and ensure that all wiring connections and voltages are of sufficient rating to comply with the equipments requirements. Turn pump power switch on. Press "Reset" button to start motor if equipped with a Wash Station Remote.
2. **CONNECT SPRAY NOZZLE:** Connect Nozzle securely to spray wand and/or close pressure adjusting knob on dual wand, hold gun firmly, squeeze trigger for high pressure spray.
 3. **START BURNER:** Turn burner switch on. Unit is equipped with an automatic lighting pilot with a 90 second lockout. If burner does not light within 90 seconds turn burner switch off then on again to start ignition sequence over. Turn the thermostat to the desired temperature. Squeeze the trigger on the spray gun and the burner will begin heating the water. It will stop firing whenever the water spray is off or if the temperature setting is exceeded.
 4. **STEAM:** Insert steam nozzle and turn thermostat to 250° steam setting. The steam nozzle is sized for approximately 25% less water volume than the hot water mode.
 5. **WASH STATION REMOTE:** Install station on the wall at a convenient wash site. ("R" models only) Control switches in the Wash Station Remote will over-ride and operate the HN Pump, Burner, and Soap Valve functions. Soap (Chemical) Valve at machine must be preset before soap switch at remote is activated. **WARNING:** Do not leave soap switch in the "ON" position when soap is depleted. Pressure drop will occur due to air intake and harm system components. Remote systems have an Auto off feature with an adjustable timer that can be set to your preference.

HN SERIES OPERATING CONDITIONS


Heat rise will vary depending on inlet water temperature and environmental conditions. Natural gas burners are preset from the factory for an inlet water temperature of 60-70 degree F and approximately 4" of water column natural gas pressure on the **outlet** of the gas valve for a 140 degree F heat rise. If the water inlet temperature is 20 degree F colder than the factory setting the heat rise will be approximately 6% less. Adjustments can be made to the gas valve outlet pressure by a qualified gas technician to increase the outlet gas pressure to 5" water column with the use of a manometer to gain higher heat rise and compensate for colder water inlet conditions if they persist year round.

Inlet gas pressure when measured while the burner is on with a manometer placed right before the gas valve, needs to be between 6 and 7" of water column natural gas pressure and properly sized gas supply piping is required to achieve full factory rated heat rise. (See "INSTALLATION GUIDELINES" include with this manual)

HL SERIES OPERATION

1. Connect power cord/GFCI to power supply.
2. Select spray nozzle, connect to spray wand and lock back collar on quick connect.
3. Connect water supply garden hose (Minimum 35 PSI required) turn water on.
4. Move L.P. tank off unit and away 10 feet. Open valve.
5. Turn pump switch on and pull trigger: Turn switch to burner position and adjust thermostat for hot water cleaning.
6. For soap application: insert black soap nozzle in wand & pull trigger to start soap flow.
7. To shut off unit, turn off burner/pilot switch. Close the propane tank valve, pull trigger on gun until water is cool.

SHUT OFF BOTH SWITCHES WHEN UNATTENDED OR WHEN REFUELING. UNIT MAY START AT ANY TIME.

 **Warning:** Cool down burner before shutting off pump when in the steam or heating mode.

WASHING OPERATION & TECHNIQUES

When washing always start from the bottom up, and do the final rinse from the top down. This will keep the water from streaking the surfaces that are being cleaned. When applying chemicals, it is also best to start from the bottom and work up.

In areas where there is no grease or oil present, and the dirt is loose, cold water will be sufficient. When it comes to grease, oil, and hard to clean dirt, hot water and/or chemicals can make the job easier, and speed up the cleaning process. For applications that require even more heat and where water use/runoff must be minimized, switch to the steam mode (if equipped) and adjust the thermostat for up to 250° steam.

For general washing use a broad pattern spray nozzle such as the 40 degree nozzle. Rinsing and delicate surface washing is best performed by backing away from the surface and using the broad spray nozzle. In areas where the cleaning is more difficult and in smaller areas such as cracks and holes use the narrow spray nozzles, 0 or 15 degree.

Chemicals can be applied in a couple of different ways. One way is with a hand spray pump. The other is with the chemical system on the equipment; either down stream or high pressure depending on the system you have. When using the high pressure (pump inlet) chemical system do not use any caustic chemical as this may cause damage to the pump. For very harsh chemicals it is best to use the hand sprayer. First wet the surface and wash off heavy debris. Test the surface to be sure the chemical won't harm it. Then apply the chemical & let work for a couple of minutes for them to take affect before rinsing. Do not allow chemicals to dry on the surface.

When rinsing off the chemicals always start from the top down. When finished using the chemical be sure to rinse out the chemical line and valve with fresh water to prevent clogging.

SHUT DOWN:

1. Turn Burner switch to the off position.
2. Rinse and close Chemical Valve. Turn off Chemical Solenoid Switch if equipped.
3. Squeeze the trigger on the Spray Gun until the water becomes cool..
4. TURN MOTOR SWITCH OFF with the appropriate controls.
5. Turn off water supply.
6. Squeeze trigger to release any trapped pressure in discharge hose.
7. Turn gas valve off when not in use for an extended period.
8. DISCONNECT & STORE HOSES.
9. WINTERIZE: If not used in the winter, store in heated space or antifreeze the unit. Run the machine until the float tank is near empty, fill with a 50% mix of water and anti-freeze and run until antifreeze appears at the high pressure outlet. If unit is equipped with a blowout valve, it may be blown out with compressed air in addition to using anti-freeze solution. On direct feed units (no float tank), use a 5' garden hose to draw the antifreeze mix from a bucket or blow out the unit with compressed air until only air and no water comes out of the discharge.

POWER SYSTEM:

ELECTRIC MOTORS: All electric motors contain a manual or automatic thermal overload which will shut down the motor if it overheats. If the overload or starter shuts down the motor, have an electrician or an authorized Hydro Tek distributor check for electrical problems. The motor can be reset by depressing the red overload button located on either the motor or the starter, (as shown above). The automatic overload will reset itself after the motor has cooled.



HORSE POWER	115V 1PH WIRE SIZE	208V 1PH WIRE SIZE	208V 3PH WIRE SIZE	230V 1PH WIRE SIZE	230V 3PH WIRE SIZE	460V 3PH WIRE SIZE
1.5	15A 12/3	N/A	N/A	10A 14	N/A	N/A
2	20A 12/3	N/A	N/A	12A 14	N/A	N/A
5	N/A 26A 10/3	N/A	N/A	24A 10/3	N/A	N/A
6.5 / 6	N/A	N/A	N/A	27A 10/3	22A 12/4	13A 14/4
7.5	N/A	N/A	N/A	35A #8	N/A	N/A
10	N/A	50A #8	32A #8	48A #8	30A #10	16A #12
15	N/A	N/A	40A #8	N/A	38A #8	20A #12

Never spray water on the unit, or damage to the electric motor(s) may occur. Consult the factory if running an electric machine from a generator. A dedicated breaker of sufficient ampere rating should be installed by an electrician. Refer to the chart above for electrical requirements: some models are 208 Volt compatible. Check with your local Distributor for more information. The 24 Volt AC Burner control Transformer is wired for 230 Volts AC input. Rewire the transformer for 208 Volt AC if input voltage is changed to 208 Volt AC. If your unit is equipped with a ground fault interrupter, it will have to be reset whenever it is plugged in or if a ground fault interruption occurs. Test regularly for proper operation.

POWER TRANSMISSION:

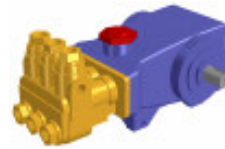
DIRECT DRIVE: Pump is bolted directly to the motor/engine. If pump needs to be removed, do not force off by prying or damage could occur. When reassembling, coat the entire motor shaft with heavy grease, or a generous amount of anti-seize.

BELT DRIVE: Check belt condition, alignment and tension periodically. Replace belts when they show signs of wear or cracking. Tighten belts by loosening the mounting bolts on the pump and generator to permit rail adjustment. Belts should deflect 1/4" - 1/2" with 2 pounds of force.



PUMPING SYSTEM:

PUMP: The pump is a positive displacement, oil bath crankcase, triplex plunger type. It contains 3 plungers which move forward and backward in a cylinder to propel water past 3 inlet valves and 3 discharge valves into a high pressure manifold.



The crankcase oil window should be checked for oil level and clarity and the pump for oil or water leaks before each use. The sight window is located at the rear (opposite the head) of the pump and should be filled to the middle with Pump Oil, available at your Hydro Tek dealer. If the oil becomes milky in color, moisture is entering the crankcase. Change the oil and contact your authorized Hydro Tek dealer if the problem persists.

To increase pump life, prevent cavitation (air bubbles), overheating, and dirty water. Cavitation can be prevented by keeping filters clean and checking for air in pump feed lines. Do not run the pump in the bypass mode (pump running with the trigger gun off), for a period of more than 5 minutes or the pump will begin to overheat (maximum water temperature is 145°F). Do not run pump dry. Protect from freezing. Do not run a frozen pump. Wait until it is thawed out to run.

UNLOADER AND PRESSURE RELIEF VALVE: The unloader valve is preset at the factory to govern the proper output pressure of your machine. It will release the pressure of the pump output back into the inlet if the trigger on the spray gun is released. NEVER increase the set pressure on the unloader to exceed the specifications for your machine. The unloader should be adjusted only by qualified personnel.



PRESSURE RELIEF VALVE. In the unlikely event that your unloader fails, or if the burner overheats and builds excessive pressure, the pressure relief valve will vent the pressure into the atmosphere. If this occurs, turn off the machine and have it checked by an authorized dealer. The pressure relief valve will automatically reset itself.



BURST DISK TECHNOLOGY: This additional safety feature functions to protect the coil and other components from overpressurizing from the heating system and high system spikes of pressure. If this component ruptures, you should take the machine in to an authorized Hydro Tek dealer. Do not plug off and continue to run.



CHEMICAL INJECTION SYSTEM:

With an inlet chemical injection system the chemicals are introduced at the inlet of the pump and controlled with a chemical metering valve. The pump is fed by a float tank to create a slight vacuum which draws up the chemical into the inlet manifold of the pump, mixes it with the water, and sprays it out of the nozzle under high pressure.

Open the chemical valve only when the pickup tube is submersed in a solution or air will enter the pump and you will lose pressure and the pump will run rough.

Do not use highly corrosive detergents or acid type cleaners, and be sure to rinse and close the chemical valve after each use or the chemical line and check valve may become obstructed. Chemicals should be between 5-9PH. Consult Hydro Tek for chemical compatibility. Chemical abuse is not covered under warranty.

An optional **DOWNSTREAM INJECTOR** is available if harsh chemicals need to be applied. The downstream injector will apply chemicals only at low pressure. If equipped standard with downstream injection, adjust concentration level by turning brass collar on the injector, or the knob on pump or control panel. Read and follow all safety instructions on the detergent bottle.



WATER SUPPLY: An adequate water supply must be maintained to the pump at all times. If the inlet flow is too low or if there is air in the water supply, the pump will run rough, pulsate and lose pressure. Maximum inlet water temperature is 145°F. If the pump is run dry, it can quickly overheat.

The water is filtered by a garden hose adapter screen. Clean and replace as required or install a large capacity strainer to insure a clean supply of water.

DIRECT WATER FEED: Maintain an inlet water pressure between 25 PSI and 60 PSI using a 3/4" I.D. hose. Install a back flow preventer on your supply hose if State or Local ordinances require it. Install a water regulator if your water pressure exceeds 60 PSI.

FLOAT TANK WATER FEED: A float tank is usually used to regulate the incoming water supply to the pump and introduce chemicals into the inlet of the pump. The float tank and filter (located inside the tank) should be flushed out if debris accumulates in the bottom. If the float tank overflows or runs out of water, adjust or replace the float valve inside the tank and check the inlet water feed pressure.



WATER TREATMENT: The inlet water can be deionized for spot free rinse or softened to make detergent clean more effectively. Do not use deionized water through the coil on a hot water machine or coil corrosion will result. Water softeners, however, will reduce coil scale deposits and should be installed if your water is especially hard

HEATING SYSTEM:

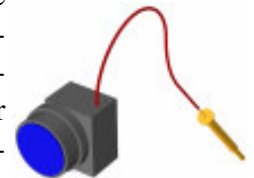
COIL/HEAT EXCHANGER SYSTEM: The heat exchanger contains a continuous coil of pipe which forms a cold water jacket around the outside of the heating area. It is double wrapped with ceramic blanket insulation and a stainless steel cover.



When the water is heated, scale (calcium) will begin to form on the inside of the coil pipe depending upon the hardness of the water in your area. The coil can be **DESCALED** by using a scale remover (Part# CB105) available at your authorized Hydro Tek dealer. It is necessary to perform this service only when a noticeable pressure drop is detected across the coil. Follow directions to avoid damage. Wear safety glasses.



TEMPERATURE SWITCH: The burner is equipped with a high temperature limit switch which will shut off the burner when the water temperature becomes too hot. Hot water machines are equipped with an adjustable thermostat so that the operator can control the outlet water temperature. The burner will automatically cycle on and off to maintain the desired temperature.



STEAM INSTRUCTIONS: If your unit is steam - capable, install the green steam nozzle, turn thermostat to 250° F.

PRESSURE/FLOW: The burner is equipped with either a pressure switch or flow switch to control the burner. When the trigger on the spray gun is squeezed, water begins to move through the coil and pressurize. The flow/pressure switch turns the burner on and begins to heat the water. Whenever the water spray stops or if the water is shut off, the burner will shut off.

⚠️WARNING: Burner should fire only when the trigger is squeezed and spraying water, if it comes on at any other time, shut off the machine and have it serviced.

NATURAL GAS/PROPANE GAS BURNER: The gas burner uses a vertical coil with a natural draft aspirating type burner. It has electronic ignition for an auto lighting burner pilot with a 90 second lockout for safety. If the burner does not light within 90 seconds turn the burner switch off and on again to start the ignition sequence over. The vertical coil can be connected to an exhaust flue, and must have a draft diverter mounted at a maximum 30" above the unit. Exhaust flue must never run horizontal, check your local code for exhaust flue size requirements. **Do not store any wood, pallets, hoses, or any other flammable material under or near the burner area.**

NG Pipe Chart: For 450,000 BTU	
Length	Pipe Size
0-50 FT.	1 1/4"
51-150 FT.	1 1/2"
151-200 FT.	2"

⚠️WARNING
WHEN PERFORMING ANY TESTS ON THE IGNITION SYSTEM, DO NOT TOUCH IGNITION ROD. THE IGNITION CIRCUIT GENERATES OVER 10,000 VOLTS AND ELECTRICAL SHOCK CAN RESULT

IGNITION SENSOR / ROD: After extended ignition arcing, insulating deposits may form on the ignition rod, reducing the arc intensity. Also, because of the high heat zone beneath the burner, premature failure of the rubber insulation covering on the ignition wire may cause arcing to a ground before reaching the pilot ignition rod.

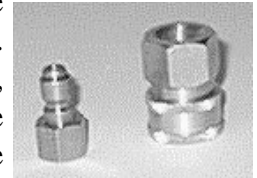
PRESSURE DELIVERY SYSTEM:

DISCHARGE HOSE: Use only a wire braid hose rated for the output pressure and temperature of the machine. Single wire braid hoses are generally rated from 2500 to 3000 PSI and double wire braid from 4000 to 4500 PSI. Additional hose lengths can be added with quick couplers with a minimal loss in pressure of about .5 PSI per foot. Inspect hoses for wear and replace if necessary. Avoid kinking or running over the hose to extend the hose life.



⚠️WARNING: Hydro Tek hot water machines require special 250° Rated hose to operate in the steam mode. If the hose is not replaced when worn or if it is not replaced by a Hydro Tek original equipment hose, it may burst and serious injury and burns could result.

QUICK COUPLERS: The quick couplers on the high pressure hose and spray nozzle make it easy to change nozzles or hoses. When connecting hoses or nozzles, be certain that the collar on the quick coupler snaps back to the locked position or the nozzle or hose may come loose when pressure is applied to it. If the quick connect begins to leak, replace the O-ring (specify Viton or EDPM material) located in the female socket coupler. Grease the coupler periodically to make it work smoothly. Replace if it becomes worn. Twist couplers are used on the wands so they can be interchanged.



TRIGGER GUNS: The trigger gun is merely a valve that turns water spray on and off. If it begins to leak or fails to shut off, replace or repair the valve assembly. Never lock the gun in the on position or point it at any person or any part of the body. Machines that spray steam only are equipped with an open gun that does not shut off the water spray.



SPRAY WAND: Wands are available in 2 to 6 foot lengths for various cleaning applications. If the unit is equipped with a dual wand you can adjust the pressure by turning the knob on the valve to divert part of the water through the low pressure nozzle.

NOZZLES: The spray nozzle is a precisely machined orifice made of hardened stainless steel. The orifice size is matched to the output of your machine to attain the proper flow and pressure that your machine was designed for. The orifice or hole of the nozzle will begin to get larger as the nozzle becomes worn. For optimum performance, replace the spray nozzle to maintain the full output pressure of your machine. The nozzle installed in your machine from the factory is designed to allow only about 90% of the water being pumped to discharge out of the nozzle. The remaining 10% is bypassed back into the inlet water supply by the unloader/regulator valve. If an incorrect nozzle size is used the maximum flow and pressure of the machine cannot be achieved and the pressure unloader valve can wear prematurely. When replacing the nozzle match to one size under the flow and pressure output of the pump.



The nozzle is usually connected to the wand with a quick coupler. Be sure the collar on the quick coupler snaps back to the locked position, or the nozzle could be lost when the trigger on the spray gun is squeezed. Never connect the spray nozzle directly to the trigger gun without a wand or injury could result. Never place hands or fingers over the nozzle tip.

The nozzles generally come in three different spray angles, 0°, 15°, and 40°. The different spray angles of a given size of nozzle do not change the output pressure of the machine, just the impact force and surface coverage of the water spray. The 0° nozzle sprays a straight stream which impacts the surface very hard but does not cover a very wide area. Use the 0° nozzle with care because it can damage the surface you are spraying with its high impact and long reaching spray.

The 15° nozzle sprays out a flat stream at a 15° width. It gives you less impact power but covers a wider area with one pass of the spray wand. As you back away the spraying nozzle from the surface, the spray impact will decrease.

The 40° nozzle spreads the water stream over an even wider area to give you less impact for delicate surfaces.

Some machines come with one 15° nozzle which covers most cleaning applications. Additional nozzles can be added and fitted with quick couplers so that the nozzles can be interchanged for various applications.

The steam nozzle sprays less water than the other high pressure nozzles, so the water is discharged at a higher temperature. (Up to 250° F).

ACCESSORIES:**WET SANDBLASTER**

The wet sandblaster is a system that introduces sand into the water stream for abrasive blasting. It is especially effective for graffiti or paint removal. Performance of the sand unit is directly related to the output of your high pressure washer. The sand is mixed with the water at the sand head in a tungsten carbide nozzle.

A vacuum is created in the sand nozzle which draws a sand and air mixture up the sand hose. If the sand becomes wet or the sand nozzle becomes plugged the vacuum will be lost and the sand will quit flowing. The sand probe can be poked directly into a bag or bucket of sand to draw it up the sand hose. Do not cover the air intake port on the top of the sand probe or the sand flow will be disrupted. Uncoil the sand hose completely before use to improve the sand flow and replace the sand hose when it becomes worn. The carbide sand mixing nozzle can be unscrewed and replaced when worn.

Use bagged silica sand for best results through the sandblaster. Use 16 to 20 grit (course) sand for rust or concrete. Use 30 grit (fine) sand for fine metal surfaces or wood. Do not use wet sand or mix different grits of sand. A sand pot is available for convenient sand storage.

Always use safety goggles and protective clothing when operating the wet sandblaster.

TURBONOZZLE

The turbo nozzle multiplies the power of your machine by rotating the spray jet and making the water impact the surface harder to give better cleaning results. Simply replace the spray nozzle with the turbo nozzle and squeeze the trigger on the spray gun with the burner off for high pressure spray. "Turbo Laser" type nozzles cannot be used with water over 190° or life of the turbo nozzle will be greatly decreased and the warranty voided. The "Roto-max" type nozzle can be used up to 170° F.

HOSES AND HOSE REELS

The high pressure discharge hose can be extended by connecting additional hose lengths by means of twist couplers. Hose extensions generally come in 50 and 100 foot lengths. Specify maximum pressure and temperature of your machine when ordering. Pressure loss for additional hose length is minimal.



⚠ WARNING: If your unit is equipped with 250° steam option, only use 250° rated hose.

Low pressure inlet garden hose is available in 50 and 100 foot lengths. Premium quality, 200 PSI rated hose is recommended to be used and is available at your local dealer.

Hose reels are available for convenient and quick storage of both discharge and inlet hoses. If the reel begins to leak, replace the seal kit in the swivel, or connect the hose directly to the machine until the leak is repaired.

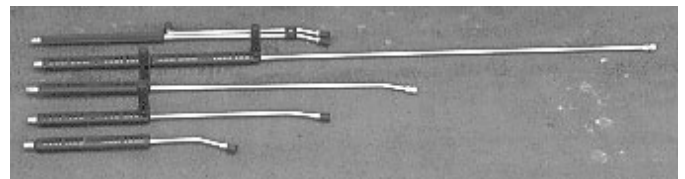


The high pressure hose (200' maximum) should be completely unreeled before use or it can contract on the drum and cause damage to the hose reel. The low pressure hose (200' max) should be of sufficient quality that it will not flatten out when reeled up, or the supply of water to the machine will be cut off.

SPRAY WANDS

Spray wands are available in different lengths and with variable pressure adjustment. The dual wand has a low pressure and high pressure nozzle. When the dual wand is installed on the machine, the output pressure can be lowered simply by turning the valve on the dual wand to divert water into the low pressure nozzle. This lowers the pressure (PSI) but has little or no effect on the discharge flow (GPM) or outlet water temperature on hot water machines.

The short wands are ideal for washing in confined areas such as a car lot. The longer wands help to clean areas that



could not normally be reached.

A downstream chemical injector is available if harsh chemicals need to be applied and water supply tanks are available for remote cleaning sites (see page 9).

⚠ WARNING: Wands under 48" in length should not be used with machines producing over 3000 psi.

PROBLEM	PROBABLE CAUSE*	REMEDY
Power System: Electric Motor Driven		
Electric motor does not start.	No electric power. Thermal overload in the motor/or starter has been tripped. Power switch inoperative. Electric motor or wiring failure.	Check cord, plug, socket, and breaker. Check Voltage Reset manual overload by depressing the thermal switch on the outside of the motor or starter after the motor has cooled. CAUTION! Automatic overload will restart the motor automatically when it has cooled. Check power switch. Replace or repair motor and/or wiring.
Machine will not Auto-Start (if equipped)	Must have adequate water supply. Coil scale build up. Check filter screen & inlet pressure. Inlet Flowswitch damaged or jammed with debris	25 PSI minimum. Descale coil for better water flow. Remove spray nozzle and pull trigger to check auto-start function. Check mechanical function & electrical signal to relay.
Pumping System		
Pump runs but has low spray pressure.	Nozzle not installed. Dual wand valve is open. Leaky discharge hose or quick coupler. Chemical Valve open Inlet strainer clogged. Worn, plugged or wrong size nozzle. Belt slippage. Unloader valve worn or improperly adjusted. Air leak in inlet plumbing.	Install Nozzle. Dual wand valve must be closed and high pressure nozzle installed. Replace hose, quick coupler, or o-ring in the quick coupler. Close Valve Clean and check more frequently. Replace nozzle of proper size. Tighten or replace with correct belt. Install pressure gauge on pump head to adjust pressure. Check valve seat on Unloader.
Pump runs but there is erratic, fluctuating pressure.	Inadequate incoming water supply. Stuck inlet or discharge valves. Restricted inlet or air entering the inlet plumbing on the pump. Leaking H.P. seals. Leaking L.P. seals.	Reseal fittings and inspect inlet hoses for air leaks. Increase water supply flow. Clean out or replace worn valves. Check fittings and hose for air tight seal, clean inlet strainer screen. Replace seals. Pressure feed the pump and replace L.P. seals if water leaks from the pump head.
Excessive crankshaft play or loud, knocking noise in pump. Oil leaking from pump.	Broken or worn bearing or connecting rod in crankcase. Loose drain plug or damaged seal.	Replace pump or bearing. Locate point of oil leakage and replace damaged O-ring or seal.
Inlet injection will not siphon chemical.	Check valve in the strainer clogged. Chemical valve not open or clogged. Strainer not submerged in solution. Detergent hose cut or Kinked.	Clean or replace. Rinse after each use. Open Chemical valve or clean. Submerge strainer and replenish chemical. Inspect hose, replace as necessary.
Water is emitted from the chemical pickup tube.	Check Valve malfunctioning.	Repair or replace check valve.
Downstream injector will not siphon chemical.	Brass knob on injector is closed. Unit not in low pressure mode. Soap solution too thick. Detergent hose cut or Kinked Strainer plugged or not submerged. Internal injector parts corroded or stuck. Outlet water temperature too high.	Open by turning counter clockwise. Open dual wand or install low pressure tip. Dilute or use different soap. Inspect hose, replace as required. Check screen on strainer pickup tube. Disassemble, clean or replace. Use with cold water (150 Degrees F. Max.) If installed on discharge side of coil.
Pressure relief relieving water.	Unloader failure/ Coil overheating/ excessive pressure	Turn machine off, wait a few minutes and restart. If problem continues take in for repair.
Burst Disk Relieving water	Excessive overpressurization and system spikes	Take it in for system check

* The most recurring probable cause is listed first. Repairs should be made only by a qualified technician.

PROBLEM

PROBABLE CAUSE*

REMEDY

Heating/Burner System-Natural Gas or LP Fired

WARNING Disconnect MV Wire At Gas Valve Before Trouble Shooting.

Pilot will not light, burner will not fire.	<p>Burner switch not on. Trigger not pulled. Thermostat not turned up. Poor Ground Gas valve turned off. No voltage to valve.</p> <p>Pilot orifice plugged. Defective ignition module. Defective vacuum switch. Defective pressure switch. Defective transformer. Defective flow switch. Defective thermostat. Faulty rocker switch. Ignitor not working.</p>	<p>Turn switch on / press reset switch. Pull trigger. Burner should fire <u>only</u> when trigger is pulled. Adjust Thermostat up. Check & clean ground connections Turn gas valve on</p> <p>Check for 24 VAC between pilot valve (PV) and PV/MV. Valve will operate between 20.5 and 28.5 VAC. Remove orifice & clean. Check for 24 VAC incoming @ 24v & 24v ground. (If you dedect voltage to module, but not through module, replace). Check for 24v output. If no voltage, replace. Replace. Replace. Replace. Replace. Test for spark. Test for continuity between ignition wire and ground. WARNING: High voltage ignitor can cause electrical shock.</p>
Pilot lights, but burner will not fire.	<p>Check for 24 VAC between main valve (MV) and PV/MV when trigger pulled & unit on. Failure to complete circuit to main valve Damaged or loose pilot assembly Insufficient or excessive gas pressure Check for continuity between ignition module ground and pilot assembly ground.</p>	<p>If no VAC @ valve, replace module. If you get voltage, replace valve.</p> <p>Check for controls continuity to main valve (thermostat, pressure switch, flow switch) Check for loose ignition wires Refer to installation guidelines (consult with qualified gas technician) Assure good ground.</p>
Burner fires, but goes out.	<p>Faulty ignition module. Excess draft. Gas leak ahead of valve.</p>	<p>Replace module. Protect from windy conditions / install draft diverter. Turn gas off. Call gas supplier.</p>
NG or LP odor is present. WARNING: Check all NG connections with soap solution before operation.	<p>Lockout not working. Valve stuck. Faulty thermostat.</p>	<p>Replace module. Turn main gas valve off. Replace valve. Replace.</p>
Discharge water temperature too high.	<p>Water restriction. Incoming gas pressure to high. Worn spray nozzle.</p>	<p>Clean or replace spray nozzle, descale coil, remove obstructions. Lower gas pressure. Replace spray nozzle with proper size.</p>
Discharge water temperature not reaching maximum operating temperature.	<p>Gas pressure too low. Draft under burner manifold.</p>	<p>Increase gas pressure or install additional jets Prevent down draft with installation of down draft diverter. Prevent side draft with nonflammable barrier.</p>
Burner continues to fire even when water is not being sprayed.	<p>Faulty burner control circuit . Main gas valve stuck open.</p>	<p>Turn machine off immediatly, Replace flow, vacuum, pressure, or temperature switches. Turn gas off - replace main gas valve.</p>
Valve has had water sprayed on it. Has been submerged in water and does not work.	<p>Flood or accidental spraying.</p>	<p><u>Replace valve:</u> Do not attempt to repair or clean out.</p>
Ignition module has been subjected to water or moisture.	<p>Flood or accidental spraying.</p>	<p><u>Replace module:</u> Do not attempt to repair.</p>

PREVENTATIVE MAINTENANCE:

While your pressure washer has been produced with quality materials and craftsmanship, you as the owner have certain responsibilities for the correct care of the equipment. Attention to regular preventative maintenance procedures will assist in preserving the performance of your equipment. Contact your Hydro Tek dealer for maintenance. A small investment in

preventative maintenance will add many hours to the life of your pressure washer. Perform maintenance more often under severe conditions. Do not spray high pressure water onto the machine. **Not all maintenance items apply to all machines.**

MAINTENANCE SCHEDULE

Pump Oil	Inspect	Daily
	Change	After first 50 hours, then every 3-5 months or 500 hours
		Axial pumps come filled with synthetic oil which does not require changing.
Burner Adjustment/Cleaning		Annually
Remove Burner Soot		Annually
Descale Coil		Annually (more Often If Required)
Replace Spray Nozzle		6 months
Replace Quick Connects		Annually
Clean Water Screen/Filter		Weekly
Clean Float/Supply Tank		Every 6 months
Replace HP Hose		Annually
Belts	Tighten	6 months (more often if required)
	Check/Replace	Annually
Motor	Clean	Annually

MAINTENANCE INFORMATION

DESCRIPTION	OIL TYPE	CAPACITY
Pump, General	Non detergent SAE 30w	34-41oz
Pump, AR	Non Detergent SAE 30w	10-41oz (axial pumps; no change req.)
Pump, Cat	Cat Hydraulic, non-detergent 10w-40 ISO 68	11-25oz