

OPERATION and MAINTENANCE MANUAL



**IMPORTANT: TO REDUCE RISK OR INJURY, READ OPERATING
INSTRUCTIONS CAREFULLY BEFORE USING**

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USE ONLY HYDRO MAX CERTIFIED ORIGINAL EQUIPMENT REPLACEMENT PARTS, FAILURE TO DO SO COULD LEAD TO WARRANTY EXCLUSION AND SEVERE BODILY INJURY

THANK YOU: The employees and management of BCE Cleaning Systems LLC thank you for selecting our products. The production and quality assurance team have taken the greatest care in ensuring that your new power washer exceeds the standards set by you, the customer, by Hydro Max engineering and management, and by our safety certification.

YOUR RESPONSIBILITY: This operator's 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. Every person who will operate the equipment must read and follow the safety warning and operating instruction sections of this owner's manual prior to use. You are responsible for operating the product properly and safely. You are also responsible to follow the maintenance schedule on the back page of this manual to keep your warranty active.

FREIGHT DAMAGE: If delivered by a trucking company, please inspect for any concealed freight damage and note this on the paperwork from the trucking company before signing. If you should find damage has occurred during shipping, do not return the damaged items to BCE, but file a claim immediately with the freight carrier involved.

QUESTIONS: Help us provide you with the fastest service. Please locate the enclosed warranty registration card and return it to BCE to register your machine. If problems occur, contact the dealer you bought your machine from, a local authorized Hydro Max service center, or call the Hydro Max factory and ask for technical services.

THERE ARE NO USER SERVICEABLE COMPONENTS ON THIS EQUIPMENT.

GETTING STARTED: If your dealer has not prepared the machine for startup, you may need to connect the hose to the pressure outlet on the washer and connect the other end of the hose that swivels to the trigger gun inlet and tighten. Mobile Wash Skids are engine powered and shipped from the factory with the fuel tanks empty, the battery cables disconnected. Pressure Steamers are electric powered and will require an appropriate electric outlet or disconnect box and an electric plug that is rated for your machine's voltage and amperage and matches to

your electrical socket. Smaller machines are equipped with a ground fault interrupter on the electrical cord, and you will need to press the re set button after it is plugged in. (See Operating Instruction section and enclosed page on Installation Guidelines).

NO-NONSENSE GUARANTEE: Hydro Max Systems, (BCE Cleaning Sys. LLC.) promises to repair Hydro Max power washers if defective in materials or workmanship for one year from the date of original retail purchase including the cost of PARTS, but you must pay transportation costs and travel time.

Items and Conditions Not Covered:

1. Normal wear items such as discharge hose, guns, wands, spray arms, nozzles, quick couplers, O-rings, pump packing, brushes, filters, belts, and tires.
2. Cost of regular maintenance/adjustments or damage from lack of maintenance.
3. Damage due to freezing, abrasive fluids, chemical deterioration, and scale build-up.
4. Damage from fluctuation in electrical or water supply.
5. Any product or part that has been altered, modified, over pressurized, misused, or has been in an accident.
6. Dealer installation or damage from improper installation of the machine or alteration by a dealer or promise of additional warranty from dealer. The factory warranty is not transferable from the dealer to the retail purchaser on used or rented equipment.
7. Labor is not paid if the dealer that serviced your machine is not an authorized service center.
8. Labor is not paid on added accessories such as surface cleaners, hose reels, water recovery and filtration.

WARRANTY PROVIDED BY OTHERS:

Gasoline and diesel engines and some electric motors are warranted by the manufacturer of the component and their warranty is provided through the manufacturer's service centers.

COIL REPLACEMENT: Should the heater coil leak under normal conditions within the first 5 years of service, Hydro Max will repair or replace coil as needed (Pro-rated after 2 years). Failure - From freezing is considered neglect and is therefore excluded. Freight and installation labor is not covered.

GENERAL CONDITIONS: HydroMax's responsibility with respect to claims is limited to making the required repairs or replacements to the original retail user, and no claim of breach of warranty shall be cause for any cancellation or rescission of the contract of sale of any HydroMax product. HydroMax 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. This supersedes any and all previous warranty statements for products purchased after Jan 1, 2011. Hydro Max is not liable for indirect, incidental, or consequential damages including any cost of substitute equipment, loss of revenue, pecuniary expense or loss, or inability to use a HydroMax product. Hydro Max disclaims all implied warranties, including those of merchantability and fitness for use for a particular purpose. Some states do not allow exclusions or limitations on how long an implied warranty lasts, so the above exclusions may not apply to you. It is the buyer's responsibility to ensure the installation and use of Hydro Max products conforms to local codes. Products exported outside the US and Canada are covered solely by the warranty of the local export dealer and this warranty does not apply.

HOW TO OBTAIN WARRANTY SERVICE:

1. List washer model# _____.
List serial# _____.
2. Contact your local service dealer and return the Hydro Max washer or part within the warranty period along with your sales receipt. To locate service, call Hydro Max and ask for technical services or go to: www.bcesystems.com
3. You also have the option to obtain a return goods authorization and ship the questionable part freight prepaid directly to the factory. The part will be evaluated upon receipt. If found defective, Hydro Max will repair or replace part under the conditions of warranty and return it to you.
4. If the defective component is an engine or motor made by another manufacturer, we, or your authorized Hydro Max dealer, can help you obtain warranty service through the specific manufacturer's local authorized service center.
5. If you are unable to resolve the warranty claim, write to BCE Cleaning Systems P.O. Box 1598, Calhoun, Ga. 30701 Attn.: Technical Services. Please enclose a copy of the dated purchase receipt and explain the nature of the defect.

WARNING

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

ELECTRICAL PRECAUTIONS:

1. **Observe all State, Local, and National codes for the installation of your electrically powered washer.**
2. For a grounded product rated 250volts, single phase, or less: This product is provided with a ground fault circuit interrupter built into the power cord plug. (7.5hp single phase excluded; order GFCI separately). 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, grounding provides a path of least resistance for electric current to reduce the risk of electric shock. The 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 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 are not recommended.
6. **NEVER** operate an electrically powered washer after it has tripped a breaker or a ground fault device without knowing 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 the power supply before making any repairs or adjustments.**

- Transformer on burner is 20,000 volts. Disconnect battery cable before servicing burner or engine on 12-volt systems.

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

FIRE PRECAUTIONS:

- DO NOT use improper fuels or solvents in this equipment, and only fill with the correct fluids when the unit is in an OFF condition, main power is disconnected, and engine and burner are cool.
- Fill the diesel burner fuel tank with #2 diesel fuel, kerosene, or approved alternate fuel. NEVER use gasoline. Do not confuse gasoline and diesel fuel tanks.
- NEVER operate this equipment in the presence of flammable vapors, dust, gases, or other potentially combustible materials.
- AVOID contact with the exterior of the coil/heat exchanger assembly, mufflers, and exhaust port or stack to prevent burns.
- DO NOT store fuel or other flammable materials near the burner or any other open flame.
- Diesel fired, or gasoline power units are designed for outdoor use and installation only.
- Burner on/off switch must be placed in the OFF position when the pressure washer is not being used. Do not depend on engine run switch to turn the burner off – this may cause a safety hazard.
- Warning: Burner (water heater) should start only when water is sprayed. Stop the system/engine immediately if burner continues to fire when trigger gun is off.

VENTILATION PRECAUTIONS:

- Do not run the engine or burner in an enclosed area. Exhaust gases contain carbon monoxide, an odorless, deadly poison.
- Observe all State, Local, and National codes providing for indoor use or installation of this unit.
- Provide adequate ventilation to prevent engine overheating and inefficient burner combustion (min. 2' air space). Do not restrict normal engine airflow.
- For engine driven units mounted in a van or box truck type vehicles, provide an external engine exhaust line that is larger in diameter than the factory exhaust pipe and vent the exhaust to the outside of the vehicle, but not below the vehicle's interior floor height. Also, insure adequate fresh air circulation within the van for engine cooling purposes to prevent heat build-up and for engine fresh air intake. Clearance of at least 12" is recommended on all sides of the unit. Provide a burner exhaust vent, at least 8" diameter, to the outside through the van roof, or through the side

panel that is at least 10" in diameter, and position this vent to avoid water, dirt and debris collection. No flammable liquids, aerosols, or flammable materials should be stored within 24" of the unit and should not be stored under the unit. During refueling, ALL ignition sources and switches should be OFF and there should be a person with the proper fire extinguisher and training within the vicinity of the unit in case of fire. Units should not be left running unattended or out of site.

SPRAY INJECTION PRECAUTION:

- 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 physicians call your local poison center. Without proper treatment, complications can develop.
- WARNING – Risk of injection or severe injury to persons – Keep clear of nozzle. DO NOT direct discharge stream at people. This machine is to be used by trained operators. Keep operating area clear of all people. 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. CAUTION: Hot discharge fluid – DO NOT touch or direct discharge stream at people. Gun kicks back – Hold with both hands. Stay alert – Watch what you are doing.
- 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 corrosive content.
- Know the detergents you are using. Read and follow the directions on the detergent labels.

PERSONAL HAZARD:

- Shut the unit off and disconnect power before removing belt guards or electrical covers.
- Shut unit off before moving it.
- NEVER lock the trigger on the gun valve in the on position.
- Do not exceed recommended operating pressure or temperature.
- Observe all regulations when towing trailer - mounted units.
- Keep hands clear of belts: Some units equipped with auto-on may start at any time when power is connected.
- Do not operate the product when fatigued or under the influence of alcohol or drugs.

BEFORE START UP: Read all instructions.

1. **CHECK PUMP OIL:** Check pump oil by locating the oil view window. Depending on your pump model, fill to the red dot or to the top of the site glass window.
2. **CHECK FLUID LEVELS:** Check engine oil and coolant levels if unit is so equipped. (See the maintenance schedule on page 9).
3. **CONNECT THE HOSE AND GUN ASSEMBLY.**
4. **CONNECT THE WATER SUPPLY & TURN WATER ON:** Maintain an adequate supply of water using a 3/4" I.D. hose with a pressure between 25 and 60psi. Burner power switches should be off before starting. If tank fed, be sure there is water in the tank and the valve is switched for supply tank feed. Do not run dry.

5. BATTERY INFORMATION:

Batteries are available through your dealer. Depending on the type of battery you purchase, you may have to fill it with electrolyte (available at local auto parts store).

WEAR EYE PROTECTION!

If the opening on your battery box measures 9" by 6", we recommend DEKA Marine Master Battery. Deep cycle batteries are recommended to extend battery life. Always connect the positive battery cable before the negative and coat the battery terminals with corrosion inhibitor to prevent corrosion. Do not reverse polarity.

6. If wheel kit, accessories, or discharge hose are not installed, see your local dealer for instructions & installation.

WARNING

BE SURE TRIGGER ON SPRAY GUN IS OFF AND CHEMICAL VALVE IS CLOSED

WARNING

DO NOT OPERATE MACHINE WITHOUT ADEQUATE WATER SUPPLY

OPERATION:

1. STARTING:

Electric Powered Units:

Connect power supply and ensure that all wiring connections and voltages are of sufficient rating to comply with the equipment's requirements. Turn the pump power switch on. If the unit is equipped with auto-start, keep all power switches off when left unattended. (Unit will only turn on when trigger gun is pulled.)

Gasoline Engine Units:

Turn the engine power switch to the on position, choke if necessary and turn the key to the start position only until engine starts. On units with a rewind starter, pull cord rapidly.

Diesel Engine Units:

Turn the power switch to

heat the glow plugs for a maximum of 30 seconds and release. Turn the

power switch to the start position only until engine starts. (Do not use starter fluids.)

2. PURGE AIR FROM SYSTEM:

Squeeze the trigger on the spray gun until a constant stream of water comes out. (Purging works best with nozzle removed from wand and/or dual wand in the low-pressure mode.)

3. SELECT DESIRED NOZZLE

Connect nozzle securely to spray wand. If equipped, close pressure-adjusting knob on dual wand. Hold gun firmly, squeeze trigger for high-pressure spray. CAUTION – Gun kicks back – hold with both hands.

WARNING – risk of explosion – DO NOT spray flammable liquids.

4. START BURNER:

To create hot water on high pressure washers equipped with heat exchangers, release the trigger on the gun, turn the burner to the "on" position, and 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.

Warning: Cool down burner before shutting off.

5. STEAM:

Insert green 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.

6. BYPASS MODE:

System will go into bypass mode when machine is left running and trigger gun is closed. Bypass mode is when the inlet water coming into the pump recirculates through the unloader across the pump head. If left in bypass too long – more than five minutes – friction created by the movement of the water will begin to heat the water at a rapid rate. If equipped with a THERMAL DUMP VALVE, water exceeding 145°F will cause the valve to open allowing the cool water in. The valve will reset itself when the water temperature comes down to a safe level. If equipped with a bulk water tank, water can be bypassed back through the tank allowing for a larger volume of water to be re-circulated through the pump head thus reducing heat on the pump seals. If equipped with By-pass-cool system, a small portion of the bypass water is routed back through the float tank to keep the pump cool.

Warning: Do not leave in bypass for longer than five minutes to prevent pump from overheating. Shut off unit when not spraying water.

7. SET CHEMICAL INJECTION:

If the unit is equipped with inlet chemical injection, place chemical pickup tube in pre-mixed chemical solution and open chemical valve for desired chemical concentration. Rinse and close valve after use, do not use harsh chemicals through the inlet injector system. Drawing air into the chemical tube by leaving the chemical valve open will cause the pump to lose pressure and may cause pump damage.

MAINTAIN PH BETWEEN 5 & 9

If unit is equipped with a downstream chemical injector, connect the chemical injection assembly into the high-pressure discharge hose quick connects. Place the chemical pickup into chemical solution and turn brass collar to adjust concentration. The chemical will inject only when you drop the outlet pressure by opening the valve on the dual wand or changing to a low-pressure nozzle. Soap the surface from the bottom up. Close chemical valve when not in use.

8. If equipped with a (2) gun operation, select "50%" nozzle from panel and insert into coupler on spray gun for full pressure output when using two guns at the same time. Flow can be reduced by selecting flow reduction nozzles only when one operator is using the machine. The maximum temperature is 200°F.

WASHING 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. Backing away from the surface and using the broad spray nozzle works best to perform rinsing and delicate surface washing. In areas where 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 downstream or high pressure depending on the system you have. When using the high-pressure 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 a 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 and let it work in for couple of minutes before rinsing. Do not allow chemicals to dry on the surface.

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

SHUT DOWN

1. Turn the burner switch to the off position.
2. Rinse & close chemical valve.
3. Squeeze the trigger on the spray gun until the water becomes cool.
4. Turn the motor/engine switch off with the appropriate controls. Turn off diesel engine units by pulling the throttle kill lever or key if equipped.
5. Turn off the water supply.
6. Squeeze trigger to release any trapped pressure in discharge hose.
7. Disconnect & store hoses.
8. Antifreeze equipment:

If the equipment is not to be used for an extended period, store it in a heated space or antifreeze the unit. Run the machine until the float tank is nearly empty, fill with a 50% mix of water and antifreeze and run until antifreeze appears at the high-pressure outlet. If the unit is equipped with a blowout valve, it may be blown out with compressed air in addition to using an antifreeze 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.

APPEARANCE:

To maintain the appearance of the power washer, use stainless steel cleaner on the stainless-steel panels.

POWER SYSTEMS:

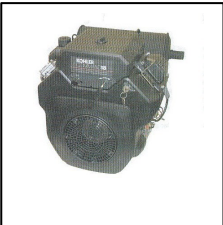


ELECTRIC MOTORS: All single-phase electric motors contain a manual or automatic thermal overload, which will shut down the motor if it overheats. If the overload or starter shuts down the motor, have an electrician or an authorized Hydro Max distributor check for electrical problems. Voltage reading under load should be +/- 10% of name plate voltage on motor. Wait for the motor to cool before re-setting. Depressing the red overload button located on either the motor or the starter can reset the motor. Use thumb pressure – do not force. If equipped with an automatic thermal overload, it will reset itself after the motor has cooled.

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. Three times total system wattage is required.

POWER 1ph SIZE 1ph SIZE 1ph SIZE 1ph SIZE 3ph SIZE 3ph SIZE

A fused disconnect switch of sufficient ampere rating should be installed by an electrician to provide power to the machine. If your unit is equipped with 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.



GASOLINE ENGINE: With the proper care and maintenance, your gasoline engine will give years of trouble-free service. Please follow the Service and Maintenance Guide and the

enclosed engine sheet or contact your local authorized engine dealer for maintenance and repairs.

Use unleaded gasoline with an octane rating of 87 or higher in the engine fuel tank. Consult engine manual for proper oil type and capacity. The engine manufacturer recommends a break-in.

period of 25 hours at which time the engine oil and filter should be replaced. Thereafter, change the oil every 50 hours and the filter every 100 hours (see engine manual). Do not rely on the low oil shutdown (if equipped) as a reminder to add oil. The engine manufacturer will typically not warranty engine damage from lack of oil even if the low oil system fails.

On machines with a 115V generator or a 12V burner, the throttle is preset at the factory (See Generator section). Engines include backfire prevention solenoids.

DIESEL ENGINE: The diesel engine, although it has a higher initial cost, can save money with lower fuel consumption and longer life. Use clean diesel fuel #2 and do not allow the engine to run out of fuel or the system will have to be bled to restart the engine.

Clean the fuel filter periodically with kerosene (See Engine Manual). Use API classification **CC/CD** grade rated oil for diesel engines

in the engine crankcase and change every 50 hours. If the engine is water cooled, use a 50/50 mix of antifreeze/de-ionized water solution, and check daily. Never use more antifreeze than water or damage to the engine could occur from overheating. **Always consult the engine manual provided by the engine manufacturer for the most accurate information.**

POWER TRANSMISSION:

WARNING: Shut off power supply

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 them to slide. Turn the horizontal rail adjusting bolts to tighten belts until they deflect 1/4 " to 1/2" with finger pressure.

DIRECT DRIVE: Pump is bolted directly to the motor/engine. If the pump needs to be removed, do not force off by prying or damage may occur. When reassembling, coat the entire motor shaft with heavy grease, or a generous amount of anti-seize and use "thread locker" or "lock tight" on mounting bolts.

GENERATOR:

Some self-contained hot water units (ACG/ACD Series) are equipped with a 115v, 2000w generator to power the diesel burner. The generator output voltage must be between 110 to 130 Volts, (or between 59 to 63 Hz.), when the unit is under full load. If the generator voltage falls out of this



range, the RPM of the engine will need to be adjusted to proper speed. If the engine cannot maintain the proper RPM, do not use the burner or any power from the generator until the engine is repaired.

An **AUXILIARY OUTLET** is available on some ACG Series machines for running wastewater recovery systems, lights, or other accessories off of the generator. A maximum of 1500 watts of 115v power is available when the burner is on or 2000 watts when it is off. A switch/circuit breaker located on the control panel will need to be reset if the circuit is overloaded. Use of a ground fault interrupter is recommended when plugging in accessories or lights to the auxiliary voltage outlet. To extend generator life, make sure the burner and all auxiliary power is off when the engine is started or stopped. Keep generator dry.

PUMPING SYSTEM:



PUMP: The pump is a positive displacement, oil bath crankcase, and 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 crank case 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 dot with non-detergent 30w pump oil, available at your Hydro Max dealer. If the oil becomes milky in color, moisture enters the crankcase. Change the oil and contact your authorized Hydro Max dealer if the problem persists. Keeping filters clean and checking for air in pump feed lines can prevent cavitation and increase pump life. Do not run 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 the pump dry. Protect from freezing. Do not run a frozen pump until it is completely thawed.



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 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.



All hot water machines are equipped with a **SAFETY 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 DISC TECHNOLOGY: This additional safety feature functions to protect the coil from the heating system and high system spikes of pressure. If this component ruptures, you should take the machine in to an authorized HydroMax 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 light vacuum, not to exceed negative 3psi, which draws up the chemical into the inlet manifold of the pump, mixes it with water, and sprays it out of the nozzle under high pressure.

Open the chemical valve only when the pickup tube is submerged in a solution or air will enter the pump causing the pump to lose pressure and 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 5-9 PH. Consult Hydro Max 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, by installing black soap nozzle or opening spray wand valve if equipped. 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 label.

WATER SUPPLY: An adequate water supply to the pump must be always maintained. 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. Do not restrict inlet water supply. 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 ¾" 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.

Bulk tank water supply: Large capacity water supply tanks can be used with most units if water is not readily available at the washing site. Belt driven; low speed pumps (less than 1750 RPM) can be drawn from a tank if you ensure that the vacuum does not exceed negative 3psi. An 80 mesh, 200 -micron strainer and a 1" I.D. or larger suction hose must be used to maintain a clean and adequate water supply. Larger flow (8-10gpm) machines require 1" feed and filtration. Be sure that the water supply is free from air or damage to the pump may result. Periodically you should clean out the strainer and water supply tank to remove debris that may accumulate on the bottom. If a water supply tank and a float tank are both utilized, a special three-way valve can be used to switch between tanks.

USING DE-IONIZED OR SOFTENED WATER IN YOUR POWER WASHER: Do not use de-ionized 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.

The inside of the coil assembly can become covered with soot if the burner is out of adjustment or if it is fired by diesel fuel. This can be cleaned by removing both end caps on the coil enclosure and brushing or spraying off debris, or by adding a soot removal agent to the diesel fuel. Both a diesel fuel pressure gauge and smoke test device is required for proper burner adjustment, and must be performed by a qualified technician. 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. To remove buildup in the coil, use a scale remover. Perform this descaling 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 the thermostat to 250° F.

PRESSURE/FLOW SWITCH: The burner is equipped with either a pressure switch or a 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 machine and have it serviced.

DIAGNOSTIC LIGHT: The burner diagnostic light on the rocker switch (if equipped) can help in determining problems with the burner. The red light indicates that power is going to the fuel solenoid valve. The burner should be firing and heating the water whenever the red light is on. When the trigger on the spray gun is released or if the temperature set point is exceeded, the red light will go off and the burner will stop firing.



DIESEL FIRED BURNER: The diesel-fired burner is a forced draft pressure-atomizing burner. Diesel fuel is sprayed out of an atomizing nozzle, mixed with air, and ignited by a high voltage spark. The flame is directed towards the coils of pipe, which in turn, heats the water flowing through it. Use clean #2 DIESEL FUEL for the burner or substitute #1 diesel, light fuel oil, or Kerosene if diesel is not available.

AIR BAND adjustments may need to be made to compensate for higher elevations, or if more than a trace of smoke is observed in the burner exhaust. The **ELECTRODES** may need to be cleaned and adjusted periodically. These adjustments have to be made precisely and should be performed only by qualified personnel. Set between #1 & #2 on the smoke gauge.



The **FUEL PUMP** is a self-priming, low volume pump which is propelled by the burner motor. The fuel pump pressure is typically set at 130 PSI but can be turned as high as 140 PSI during the winter when the incoming water temperature is lower. Before adjusting the fuel pressure, connect a fuel pressure gauge and an outlet water temperature gauge, turn the pump and burner on, and turn the fuel pressure screw clockwise until the desired water temperature is obtained. Be sure not to exceed the recommended specifications of the machine.

The **FUEL FILTER** will need to be replaced often if the diesel fuel quality is poor. A fuel filter with a water separator is recommended if the fuel quality is consistently poor.

The **FUEL SOLENOID** is an electric fuel valve that shuts off the fuel whenever the trigger on the spray gun is released or if the set temperature on the heat switch is exceeded.

The **IGNITION TRANSFORMER** provides a high voltage spark that travels down the electrodes to ignite the diesel fuel. Disconnect all power before servicing.

The 12V burner operates from the battery on the DC/DCD Series. The engine has a 20 to 25 amp charging system that keeps the battery charged which runs the burner. The burner motor and transformer stop

when the trigger gun is released and is controlled through a high amperage contactor. To help keep the battery fully charged, and for safely cooling down the burner, turn off the burner during the last minute of rinsing. When leaving the machine unattended, shut off the burner and engine switch. Replace 12 VDC battery regularly (2 year maximum interval) on 12V burner systems to help ensure consistent performance.

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 4200psi. Additional hose lengths can be added with quick twist 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 Max hot water machines require a special 250° rated hose to operate in steam mode. If the hose is not replaced when worn or if it is not replaced by a Hydro Max original equipment hose, it may burst and serious injury and burns could result.



QUICK COUPLERS: The swivel connectors on the high-pressure hose and quick couplers on the spray nozzle make it easy to change nozzles or hoses. When connecting hoses or nozzles, be certain that the collar on the quick couplers snap into the locked position to prevent them from becoming loose. 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 it if it becomes worn. Twist couplers are also used on most 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 any gun in the on position for any reason. Never point spray at a person or any part of the body.

SPRAY WAND: Wands are available in 24" to 79" 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 in which your machine was designed. The orifice, or hole, of the nozzle will enlarge with wear. For optimum performance, replace the spray nozzle to maintain the full output pressure of your machine. The nozzle installed on 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 into 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 four different spray angles: 0°, 15°, 25°, 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° red nozzle with care because it can damage the surface you are spraying with its high impact and long reaching spray.

The 15° yellow nozzle sprays out a flat stream at a 15° width. It gives you less impact power than the above 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 25° green nozzle is wider than the 15° and is most referred to as the “steam nozzle”.

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

The 40° nozzle spreads the water stream over a wide area to give you less impact for delicate surfaces.

OPTIONAL ACCESSORIES:

WET SANDBLASTER: The wet sandblaster is a system that introduces sand (or other media such as baking soda) into the water stream for abrasive blasting. It is especially effective for graffiti or paint removal. Performance of the 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 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 the best results through the sandblaster. Use 16 to 20 grit (course) sand for rust or concrete. Use 30 grit (fine) for fine metal surfaces or wood. Do not use wet sand or mix different grits of sand. A sand hopper is available for convenient sand storage. An air valve is available for adjusting feed rate on the hopper and should be fully open when using fine media such as baking soda. Always use safety goggles and protective clothing when operating the wet sandblaster.



TURBO NOZZLE: (please note temperature limits below) The turbo nozzle multiplies the power of your machine by rotating the spray jet and making the water impact a surface harder to give better cleaning results.

“Turbo Laser” type nozzles cannot be used with water over 190° for the life of the turbo nozzle will be greatly decreased and the warranty voided. The “Rotomax” type nozzle can be used up to 170°. Turn off burner or reduce temperature setting before using. Simply remove the regular spray nozzle, replace it with the turbo nozzle and squeeze the trigger on the spray gun. Do not point the turbo nozzle upward when starting.

EXTENSION HOSES: connecting additional hose lengths by means of twist couplers can extend the length of your high-pressure discharge hose. Hose

extensions generally come in 50' and 100' lengths. Specify the maximum pressure and temperature of your machine when ordering. Low-pressure inlet garden hoses are available in 50' and 100' lengths. Premium quality, 200psi rated hoses are recommended.



HOSE REELS: Hose reels are available for convenient and quick storage of both discharge and inlet hoses. Different hose reels options are available for trailer mounting, machine mounting, or as base mount options. To

keep the hose from unreeling, lock the drum in place and secure the gun or the end of the hose or it may drag on the road. The low-pressure hose should be of sufficient quality that it will not flatten out when reeled up, or water supply to the machine will be cut off.

If the reel swivel begins to leak, replace or connect the hose directly to the machine until the leak is repaired. Hose reel swivels with lubrication are pre-lubricated at the factory. Additional lubrication intervals depend on application and frequency of use. However, a minimum for re-lubrication at 40 hours is recommended. Standard Moly-Lith grease is recommended. Do not over grease. Using a hand held grease gun, dispense one pump of grease into the grease fitting. Depress the ball bearing at the end of the grease fitting to allow the grease and air to escape. **WARNING:** Replace discharge hose with original equipment hose rated for 250°F.

The Surface Cleaner can be used with hot water up to 250° on most models for extra stubborn grease or grime, eliminated the need for soap pretreatment in most applications. Rated to be used with a pressure washer up to 4000psi and up to 10gpm. See your dealer for proper nozzle size configurations to match your pressure washer.

WASTEWATER CONTAINMENT AND RECOVERY:

Hydro Max manufactures a line of Vacuum, a product line of mobile wastewater recovery accessories. Starting with containment



berms to divert wash water away from storm drains and toward a vacuum pickup device. The vacuum system

can be used to simply pickup and transfer the water to a bulk tank or filter the water for washing reuse or sanitary sewer disposal.

Vacuum system choices are either fully portable (on wheels) or truck or trailer mount systems. Dispose of collected wastewater properly: Permits can be obtained to dump wastewater into a sanitary sewer system if properly treated and tested. It is illegal to allow wash water to run into storm drains.



Surface cleaner - connects to a pressure washer and uses a spray bar rotating at a high speed within 1" of the ground. It will clean concrete more consistently than an operator with a spray wand, with less fatigue, and 10-20 times faster. Simply move the twister over the surface and watch a clean path appear behind the unit.

Trailer Packages



TRAILERS: Hydro Max trailers are designed to match your Hydro Max washer and increase productivity. Several trailer and tank skid configurations are available. The trailer electrical connection comes with a 7 pole round receptacle. Because of the vast array of different connectors, you may need to have one installed by your dealer or purchase it at a local auto parts store and install it yourself. Electric brake trailers require an electric brake controller installed in the tow vehicle.

Be sure that the trailer you order conforms to your State Department of Transportation regulations, including but not limited to braking and lighting requirements. If water is being transported on the highway, trailer brakes are recommended. Adjust brake drums as required.

Before taking the trailer on the road, be certain that the hitch on your tow vehicle is rated for the full trailer weight and of the proper height so that the trailer remains **level when hitched**, or wheel damage could result. The trailer tongue weight on the tow vehicle hitch should never be under 8% of the total trailer (loaded) weight. Insufficient tongue weight can result in “fishtailing” and loss of control of the trailer AND tow vehicle.

TIRE PRESSURE			
15" tires	15" tires	16" tires	16" tires
50 psi	35 psi	50 psi	50 psi

Before each use: Check air pressure in tires. Check all bolts including the lug nuts for tightness and condition periodically. Double check safety chain and wire harness before departing. Check latch on coupler and adjust if required to fit your trailer ball properly. **Never tow without properly adjusted rear view mirrors, brake actuators, or lights.**

Grease wheel bearings as required.

TRAILER MAINTENANCE SCHEDULE				
ITEM	FUNCTION REQUIRED	3 MTH. OR 3000 MILES	6 MTH. OR 6,000 MILES	12 MTH. OR 12,000 MILES
Brakes	Test that they are operational	Before every use		
Brake Adjustment	Adjust to proper operating clearance	X		
Brake Magnets	Inspect for wear and current draw		X	
Brake Linings	Inspect for wear and contamination			X
Brake Controller	Check for correct amperage, modulation		X	
Brake Cylinders	Check for leaks / sticking			X
Brake lines	Inspect for cracks leaks or kinks			X
Trailer Brake Wiring	Inspect for bare spots, fray, etc.			X
Breakaway Systems	Check battery charge and switch operation	Before every use		
Hub/Drum	Check for abnormal wear or scoring			X
Wheel Bearings & Cups	Inspect for corrosion or wear: clean & repack			X
Seals	Inspect for leakage; replace if removed			X
Springs	Inspect for wear / loss or arch			X
Suspension Parts / Ball Hitch	Inspect for bending loose fasteners/ wear; Lubricate		X	
Hangers	Inspect welds			X
Wheel Nuts & Bolts	Tighten to specified Torque value (Lug = 70-90 ft lbs)		X	
Wheels	Inspect for cracks, dents or distortion	X		
Tire Inflation Pressure	Inflate to tire manufacturer's specs.	Before every use		
Tire Condition	Inspect for cuts, wear, bulging, etc.	X		



Tank Skids: Hydro Max tank skids are designed for Hydro Max hot and cold-water pressure washers. They are compact and designed to give the same performance as a trailer package. All the main components of the trailer package are included.

Tank skids are designed to operate the same as operating a trailer package. Water is stored in the tank and the by-pass line is also returned to the tank. Each unit includes a garden hose reel (water supply to the tank) and a pressure reel (high pressure water from the pressure washer).

The compact design allows the unit to be transported in a standard bed truck, small trailer, etc. The tank skid can be installed on a trailer and be converted into a standard trailer package.

Operation: As stated, the unit operates like a trailer package.

1. Add water to the water tank (using garden hose reel).
 - a. Tank has a float valve installed to prevent over-filling.
2. Connect gun to pressure hose.
3. Check water filter daily. (Clean as needed)
4. Open tank valve. (open when straight/closed when perpendicular)
5. Start engine (choke as needed- non EFI engines).
6. Run at $\frac{3}{4}$ briefly to allow engine to warm.
7. Always start engine with trigger pulled and no nozzle installed. Run at low pressure to keep load from cold engine.
8. After engine is warmed- go to full throttle.
9. Let off trigger gun- install nozzle.
10. Turn on burner and set desired temp on thermostat. (Hot water versions)
11. Operate normally. When finished, let off trigger and throttle down to $\frac{1}{2}$ and cool engine.

12. **If operating hot water unit-** turn off burner and continue to spray water until water cools.
13. Release all pressure before disconnecting hose.
14. Roll hose onto reels and lock reel with travel lock pins.
15. **Note: Protect from freezing**

Protect from freezing: It is extremely important to protect any pressure washer from freezing temperatures. Immediate and permanent damage can occur when water is allowed to freeze inside the unit and supply lines. If unit will be exposed to freezing temperatures, it must be protected. Two easy methods are: **Blow the water out of the unit** or **run a non-freezing liquid** through the unit. Drain the water tank using the drain valve or drain plug installed near the tank valve.

Method #1: Push air through the lines to remove the water.

1. Drain the tank and close tank valve.
2. Connect an air valve to the secondary supply line (if installed) or the $\frac{3}{4}$ " tee with drain plug. (in place of the plug)
3. Remove trigger gun so pressure line is open.
4. Connect airline at low pressure.
5. Allow air to push the water out of the unit.
6. When water stops- remove air. Wait a couple of minutes and re-connect air.
7. Continue with air until all water is removed.

Method #2: Run a non-freezing liquid through the unit.

1. Drain tank and close tank valve.
2. Use secondary feed line (if installed) or connect a feed line to the $\frac{3}{4}$ " tee. (In place of drain plug).
3. Connect trigger gun. No nozzle installed.
4. Use secondary feed line to pull from a container with the Non-freezing liquid.
5. Start unit at low speed and run until liquid is spraying from Trigger gun.

Method #2-Continued:

6. Note: Use a colored liquid to make it easy to see when it has fully passed through the unit.
7. Once liquid is completely through the unit and hoses, let off trigger to allow small amount of the liquid through the unloader and by-pass line.
8. Turn off engine.
9. Connect nozzle and release pressure from lines.



Typical line connection for method #2

Troubleshooting: Trouble shooting in this section relates to the tank skid only. Not the pressure washer.

The most common problem with tank skids or trailers would be the connection between the unit and the water tank. The connected water supply line must be air-tight so that the unit can generate the needed suction to pull the water from the tank. If a unit is unused or has had the water removed from the system, the unit can be "air-locked". Installing a secondary feed line with a water hose connection (if not installed) is the best method to solve this problem. Connect a garden hose to the unit using the secondary feed line. Close the tank valve. Remove the trigger gun and force water through the system. Start the unit at a slow speed and allow the pump to prime completely. Connect the trigger gun with nozzle. Spray the water and cycle the trigger gun to allow any air in the systems to go through the by-pass line. Add water to the tank and switch to normal operation.

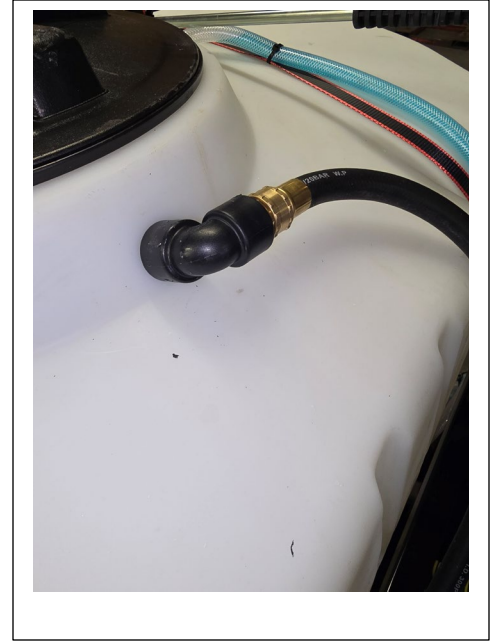
Note: Any leaks noticed while under garden hose pressure must be fixed. While the unit is pulling from the tank, the line must be completely "air-tight".



Tank valve plumbing w/ secondary feed line installed. Tank valve shown in the open position. Secondary line should be closed for normal operation.



Chemical injector- connected to swivel of the hose reel. Injects the chemical while flowing at low pressure.



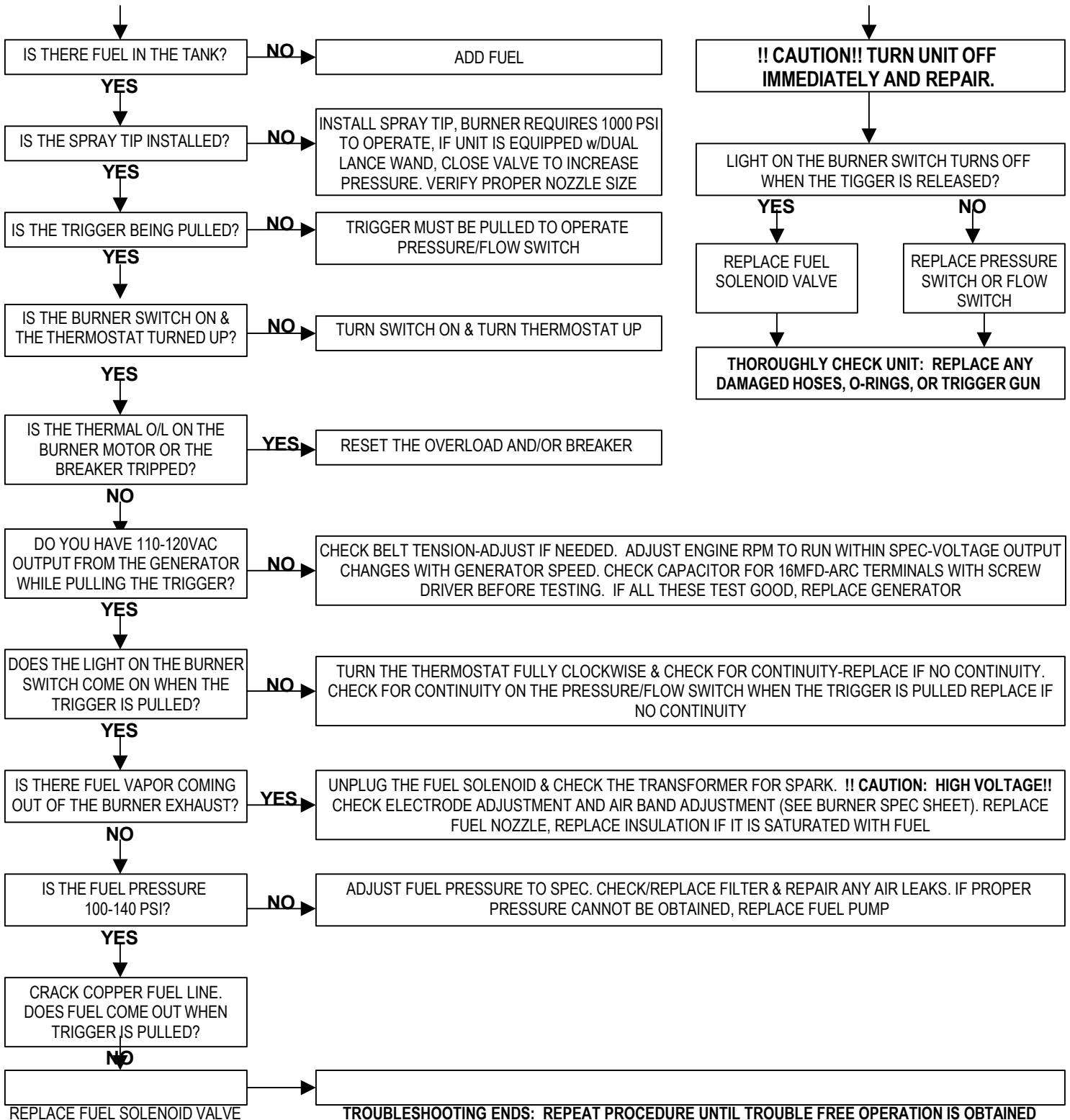
Black line is water fill line- connected to garden hose reel. Floate valve connected inside tank. Clear line is the by-pass line (returns water to the tank while trigger is not pulled).

PROBLEM	PROBABLE CAUSE (The most recurring probable cause is listed first)	REMEDY (Repairs should only be made by a qualified technician)
Power System: Gasoline or Diesel Engine Driven		
Engine will not start or crank over	Battery dead. Dirty battery connection. Battery cables disconnected. Engine, pump, or gearbox is seized. Key-switch, solenoid, and starter on engine defective	Charge or replace battery, add electrolyte if battery is new. Clean connections / Carefully check polarity. Connect or replace damaged cables. Replace or repair seized part. Repair or replace.
Engine will not start but will crank over	Engine power switch is off or defective. Low oil shut down is activated. Low water switch engaged or defective (not on all models). Low on fuel. Fuel filter is clogged. Engine flooded or starved.	Check engine power switch. Add oil to engine, check more frequently. Add water to bulk tank feeding pressure washer. Fill with appropriate fuel, bleed injector pump on diesel engine. Replace or clean fuel filter Choke only as required.
Engine bogs down under load whenever spray gun is triggered	Engine needs to be repaired or replaced. Operating in high elevation. Carbon deposits on cylinder head	See engine manual or engine dealer. Lower the pressure on the unit and check for correct engine speed (RPM). Remove head and wire brush deposits.
Power System: Electric Motor Driven		
Electric motor does not start	No electric power. Thermal overload in the motor or starter has tripped. Power switch inoperative. Electric motor or wiring failure. No water to inlet.	Check cord, plug, socket, and breaker. 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 the power switch. Replace or repair motor and/or wiring. Connect water supply.
Machine will not auto-start (if equipped with ETS or ITS)	Must have adequate water supply. Scale build-up in coil. Check filter screen & inlet pressure. Inlet flow switch defective / jammed with debris.	25 PSI minimum. De-scale 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		
Trigger gun leaks or will not shut off	Debris in gun valve assembly.	Clean valve assembly or replace gun.
Pump runs but has low spray pressure	Water turned off. Nozzle is plugged or sized incorrectly. Inlet chemical injection valve is open without the end of the pickup tube inserted into detergent. Coil on hot water machines is obstructed. Priming of pump after run dry.	Turn water on. Clean or replace with proper size. Close soap valve or submerge detergent pickup tube into solution. Clean obstruction or scale deposits from coil with coil cleaner. Crack open fitting on high-pressure outlet of pump.
Pump runs but has low spray pressure	Nozzle not installed. Dual wand valve is open. Leaky discharge hose or quick coupler. Water sprays out around nozzle. Inlet strainer clogged. Worn or wrong size nozzle. Belt slippage. Unloader valve worn or improperly adjusted. Air leak in inlet plumbing. EZ start valve is leaking.	Install nozzle. Close dual wand valve and install high-pressure nozzle. Replace hose, quick coupler, or o-ring in the quick coupler. Clean and check more frequently. Replace with nozzle of proper size. Tighten or replace with correct belt Install pressure gauge on pump head to adjust pressure. Check valve seat on unloader. Reseal fittings and inspect inlet hoses for air leaks. Remove hose to check for internal leaks.
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 pump. Leaking High Pressure seals Leaking Low Pressure seals	Remove hose to check for internal leaks. Increase water supply flow. Clean out or replace worn valves. Check fittings and hose for airtight 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	Broken or worn bearing or connecting rod in crankcase	Replace pump or bearing.
Oil leaking from pump	Loose drain plug or damaged seal	Locate point of oil leakage and replace damaged o-ring/seal.

PROBLEM	PROBABLE CAUSE (The most recurring probable cause is listed first)	REMEDY (Repairs should only be made by a qualified technician)
Inlet injection will not siphon chemical	Check valve in 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. 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. Inspect hose, replace as required. Check screen on strainer pickup tube. Disassemble, clean or replace. Use with cold water (150° Maximum)
Pressure relief relieving water	Un-loader 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 over-pressurizing and system spikes.	Take in for system check.
Battery		
Battery keeps losing voltage (For 12v systems)	Battery voltage low. RPM too low. Engine charging system faulty. Electrodes misadjusted. Fuel pump pressure too high. Air band too far open. Burner amp draw too high.	Have battery checked and load test, charge if low and replace if necessary. Allow water to cool 2 minutes before shutting off engine. Engine RPM should be 3600 RPM with no load. Check engine charging system – must have 16 amp output. Adjust electrodes to maximum 1/8" gap. Fuel pump pressure should be approximately 100 to 110 PSI. Adjust for proper burn. Check amp draw of burner motor – should be 11 amp or less. Check amp draw of transformer – should be 4.8 or less.
Water Temperature		
Discharge water temperature exceeds recommended operating temperature	Burner input too high for conditions. Water flow restricted. High temperature limit switch faulty or set too high.	Decrease fuel pump pressure and/or fuel nozzle size. Clean or replace nozzle of proper size. De-scale coil and clear obstructions. Replace or reset temperature limit switch.
Discharge water temperature not reaching maximum operating temperature	Burner input too low for conditions.	Increase fuel pump pressure and/or fuel nozzle size.
Burner System – Diesel Fired		
Refer to Burner Troubleshooting Chart on following pages		

BURNER TROUBLESHOOTING ACG/ACD Series - 120V AC

**BURNER DOES
"NOT" COME ON**



**BURNER DOES
"NOT" TURN OFF**

!! CAUTION!! TURN UNIT OFF IMMEDIATELY AND REPAIR.

LIGHT ON THE BURNER SWITCH TURNS OFF WHEN THE TRIGGER IS RELEASED?

YES
REPLACE FUEL SOLENOID VALVE

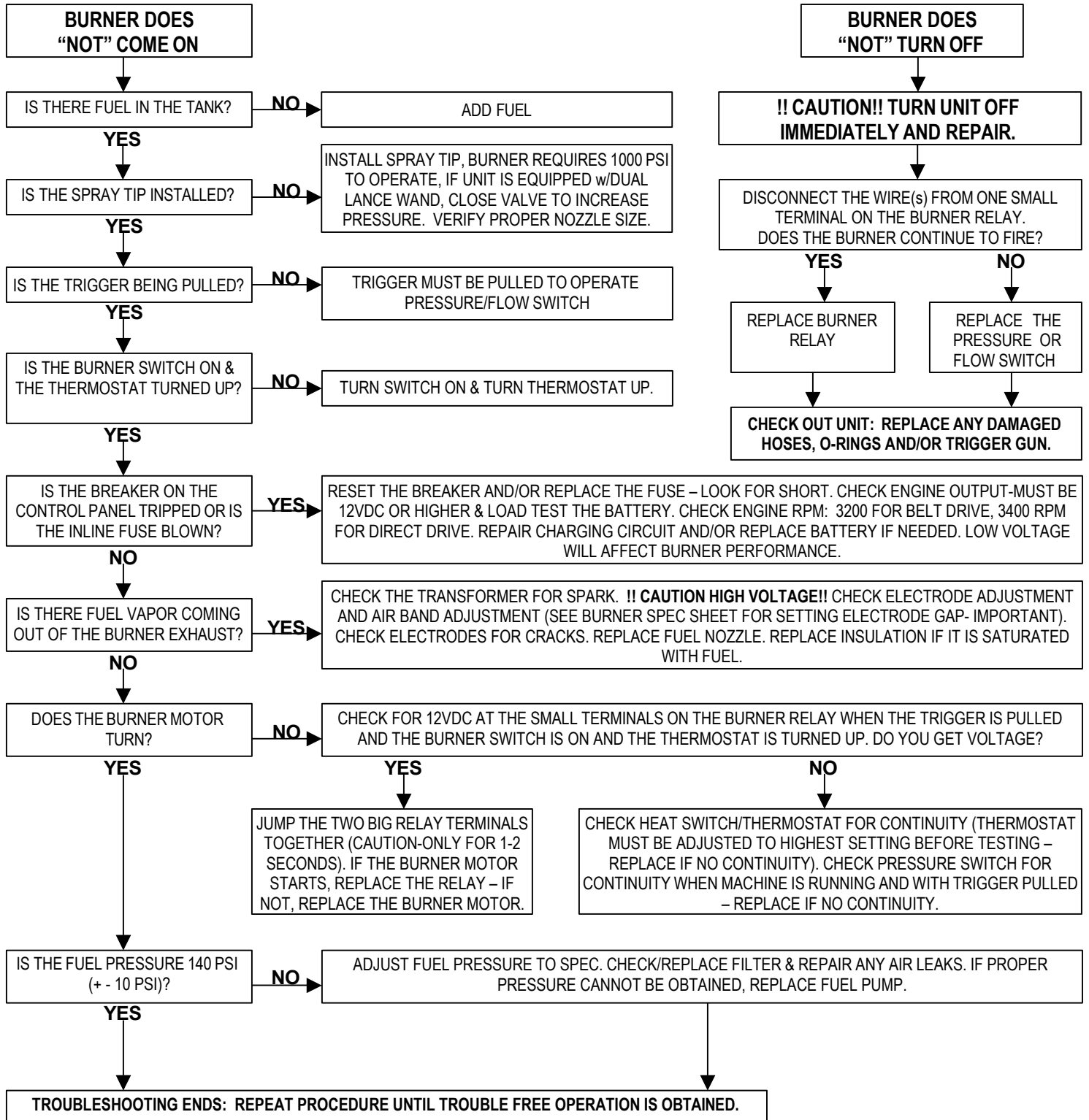
NO
REPLACE PRESSURE SWITCH OR FLOW SWITCH

THOROUGHLY CHECK UNIT: REPLACE ANY DAMAGED HOSES, O-RINGS, OR TRIGGER GUN

REPLACE FUEL SOLENOID VALVE

TROUBLESHOOTING ENDS: REPEAT PROCEDURE UNTIL TROUBLE FREE OPERATION IS OBTAINED

BURNER TROUBLESHOOTING DC/DCD Series – 12V DC



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 Max 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**

Engine Oil	Inspect Daily	
	Change	After first 8 hours then every 50 hours especially in high ambient temperatures
	Filter	Every 100 hours
Air Cleaner	Inspect	Every 50 hours
	Clean	Every 3 months
Diesel Engine Coolant	Check daily (maximum 50% antifreeze)	
Battery Level	Check monthly 12V DC Burner Systems: Replace battery every 2 years	
Engine Fuel Filter	500 hours or 6 months	
Spark Plug Maintenance	500 hours or 6 months	
Clean Fuel Tank(s)	Annually	
Replace Fuel Lines	Annually	
Pump Oil	Inspect Daily	
	Change	After first 25 hours, then every 6 months or 500 hours
	Axial pumps come filled with synthetic oil, which does not require changing	
Clean/Replace Burner Filter	Monthly (More often if fuel quality is poor)	
Remove Burner Soot	Annually	
Burner Adjustment/Cleaning	Annually	
De-scale Coil	Annually (More often if required)	
Replace Spray Nozzle	Every 6 months	
Replace Quick Connects	Annually	
Clean Water Screen/Filter	Weekly	
Clean Float/Supply Tank	Every 6 months	
Replace HP Hose	Annually	
Belts	Tighten	Every 6 months
	Inspect/Replace	Annually
Trailer Tires/Bearings	Monthly (Check tires for condition, tighten lug nuts, grease & check bearings)	

MAINTENANCE INFORMATION

DESCRIPTION	OIL TYPE	CAPACITY
Gas Engine	10w 30 motor oil **	.63 to 3 qt.
Diesel Engine	10w 30 API cc/cd	3.25 qt.
Pump, Cat	Cat Hydraulic, non-detergent 10w 40 ISO 68	11 – 42 oz.
Pump, AR	Non-detergent SAE 30w	10 – 41 oz.
Pump, General	General, non-detergent SAE 30w	11 – 42 oz.

** Check the engine manufacturer's service guide for additional maintenance items and specific high ambient temperature oil selection.