



COMMERCIAL SERIES

ALL ELECTRIC PRESSURE WASHER

OPERATORS MANUAL



X-HW3075EW3GEN **Operator Manual**

BEPOWEREQUIPMENT .COM



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ATTENTION: Read through the complete manual prior to the initial use of your pressure washer.

Using the Operator's Manual

Thank you for purchasing our hot water pressure washer! This operating manual is an important part of the unit. It should be read thoroughly before initial use, and referred to often to make sure adequate safety and service concerns are being addressed.

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

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

Record Identification Numbers

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

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

| |
|--------------------------|
| Date of Purchase: |
| Dealer Name: |
| Dealer Phone: |

| PRODUCT IDENTIFICATION NUMBERS | |
|---------------------------------------|--|
| Model Number: | |
| Serial Number: | |

PRODUCT SPECIFICATIONS









| Model | PSI | GPM | PUMP | KW | HP | Voltage | AMP | UNIT DIMENSIONS | SHIPPING DIMENSIONS |
|----------------|------|-----|----------------|----|-----|---------|------|-------------------|---------------------|
| X-HW3075EW3GEN | 3000 | 4 | General TS1511 | 72 | 7.5 | 575 | 80.3 | 32" x 26.75" x 52 | 36" x 30" x 56" |



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

| | |
|----------------|---|
| DANGER | This indicates a hazard which, if not avoided, will result in serious injury or death. |
| WARNING | This indicates a hazard which, if not avoided, will result in a severe injury or property damage. |
| CAUTION | This indicates a hazard which, if not avoided, might result in a minor or moderate injury. |
| NOTICE | This indicates a situation that could result in equipment damage or damage to other property. Ensure all safety messages are observed and adhered to. |

Hazard Symbols and Meanings

| | | | |
|---|---|---|---|
|  |  |  |  |
| EXPLOSION | FIRE | HOT SURFACE | MOVING PARTS |
|  |  |  |  |
| FLYING OBJECTS | ELECTRIC SHOCK | TOXIC FUMES | INJECTION |

DANGER

- Always operate the pressure washer in a well-ventilated area free of flammable vapors, combustible dust, gases, or other combustible materials.
- Do not store the pressure washer near an open flame or any equipment such as a stove, furnace, water heater, etc., which utilizes a pilot light or sparking device.
- Do not use this pressure washer to spray flammable material.
- Do not smoke while filling burner fuel tank.
- Never fill the fuel tanks while the pressure washer is running or hot. Allow unit to cool for two minutes.
- Always refuel slowly to avoid the possibility of spilled fuel which may cause a risk of fire.
- Always leave room for fuel to expand in the gas tank. Do not overfill.
- Engine Fuel Tank: If using a Gasoline Engine, refuel with gasoline only. Do not use diesel or kerosene.
- Burner Fuel Tank (Black): When refueling the Burner Fuel Tank, use No. 1 or No. 2 fuel oil/diesel or kerosene. Do not use gasoline.
- Do not operate the unit if gasoline or diesel fuel is spilled. Wipe the pressure washer clean and move it away from the spill. Avoid creating any ignition until the gasoline or diesel fuel has evaporated.
- When the battery is being activated, hydrogen and oxygen gases in the battery are extremely explosive. Keep open sparks and flames away from the battery at all times, especially when charging.
- Be certain to disconnect the battery ground terminal before servicing. When disconnecting the cable from the battery, start with the negative terminal. When connecting them, start with the positive cable.
- When charging the battery, remove the battery vent plugs.
- Use only a voltmeter or hydrometer to check a battery charge.
- DO NOT jump start the battery unless both batteries are of equal voltage and amperage.

IMPORTANT SAFETY WARNINGS



WARNING



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

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

- A spark arrester must be added to the muffler of this engine when using on land covered with any flammable agricultural crop (hay and grain), and if they are used in or near brush or forested areas. The arrester must be maintained in effective working order by the operator of the equipment. In the state of California, the above is required by law. (Section 4442 and 4443 of the California Public Resources Code.) Other states/provinces may have similar laws. Federal laws apply on Federal lands.
- This pressure washer has a Safety Relief Valve . This should never be altered, modified, removed or made inoperative. If the device fails, replace immediately with genuine manufacturer replacement part.

WARNING



Serious injury or death may occur from inhaling engine/burner exhaust or dangerous vapors. The engine exhaust from this product contains chemicals known to the State of California to cause cancer, birth defects, or other reproductive harm.

- Never operate this pressure washer in an enclosed area. Always ensure there is adequate ventilation (fresh outside air) for breathing and combustion. This will prevent the buildup of dangerous carbon monoxide gases. Beware of poorly ventilated areas, or areas with exhaust fans which can cause poor air exchange. This unit should only be used outdoors to ensure ventilation is never an issue.
- Follow all safety instructions provided with the materials you are spraying. Use of a respirator may be required when working with some materials. Do not use this pressure washer to dispense hazardous detergents.

WARNING



Serious injury or death could occur from high pressure spray penetrating the skin.

- Keep clear of nozzle and spray! Never put your hand, fingers or body directly over the spray nozzle.
- Do not direct discharge stream at self, other persons, or pets.
- This product is to be used only by trained operators.
- Always keep operating area clear of other people.
- Do not allow children to operate this unit or be in the vicinity while you operate it.
- Seek emergency medical care if spray seems to have penetrated the skin. Do not treat as a simple cut!
- High pressure hoses and fuel lines should be inspected daily for signs of wear. If evidence of failure exists, promptly replace all suspect hoses and fuel lines to prevent the possibility of injury from the high pressure spray. If a hose or fitting is leaking, do not place your hand on the leak.
- Never operate the gun with the trigger held in the open position. To prevent accidental discharge, the trigger gun should be securely locked when not in use.
- Before removing the spray nozzle or servicing the unit, always shut the unit off and pull the trigger of the gun to release trapped pressure (even after you shut off the unit, there is high pressure water left in the pump, hose and gun until you release it by pulling the trigger the gun).

WARNING



Serious injury or death may occur from contact with electricity.

- Do not direct spray on or into electrical installations of any kind! This includes electrical outlets, light bulbs, fuse boxes, transformers, and the unit itself.
- Do not allow metal components of the pressure washer to come in contact with live electrical components.

WARNING



Serious injury may occur from touching the gasoline engine, muffler, or heat exchanger. These areas can remain hot for some time after the pressure washer is shutdown.

- Never allow any part of your body to contact the gasoline engine, muffler, or heat exchanger.

WARNING



Serious injury may occur from a pressure washer malfunction or exploding accessories if incorrect system components, attachments, or accessories are used.

Serious injury or death may occur if attempting to start the pressure washer when the pumping system is frozen.

- Never make adjustments to the factory set pressures.
- Never exceed manufacturers maximum allowable pressure rating of attachments.
- Do not allow any hoses to make contact with heat exchanger to prevent the possibility of bursting. Avoid dragging the hoses over abrasive surfaces such as cement.
- Use only manufacturer recommended repair parts for your pressure washer.
- In freezing temperatures, the unit must always be warm enough to ensure there is no ice formation in the pump. Do not start the pressure washer if it has been transported in an open or under heated vehicle without first allowing the pump to thaw.

WARNING



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

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

WARNING



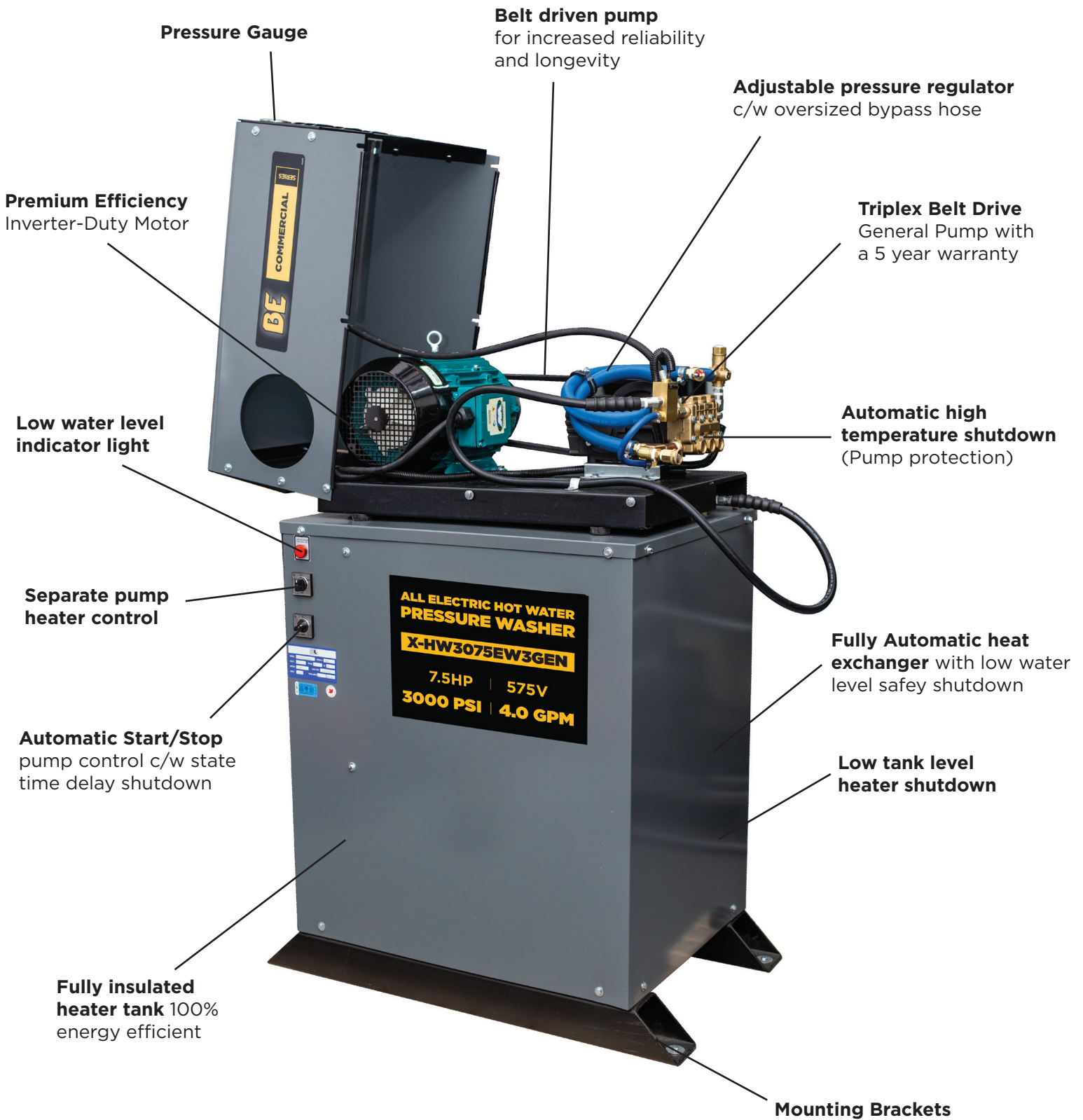
Serious injury or death may occur from detergents contacting the skin.

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

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

- Never use any solvents or highly corrosive detergents or acid type cleaners with this pressure washer.
- Protective equipment such as rubber gloves and respirators are advisable, especially when using cleaning detergents.
- Keep all detergents out of the reach of children!
- Always wear protective goggles when operating the unit to shield the eyes from flying debris and detergents.
- Do not direct spray toward fragile materials such as glass.
- Stay alert: watch what you are doing. Do not operate the unit when fatigued or under the influence of alcohol or drugs.
- Never squeeze the trigger unless securely braced.
- Do not overreach or stand on unstable support.
- Wet surfaces can be slippery. Wear protective foot gear and keep good footing/balance at all times.
- Never pull the trigger of the gun while on a ladder, roof, or other unstable surface.
- Always hold on firmly to the gun/lance assembly when starting and operating the unit. Failure to do so can cause the lance to fall and whip dangerously.
- Do not leave pressurized unit unattended. Shut off the pressure washer and release trapped pressure before leaving.
- Do not operate the unit if you see any fuel, oil, or water leaking from the machine. DO NOT resume operation until the unit has been inspected and repaired by a qualified technician.
- Do not transport the unit by pulling on hoses or cords.

GETTING TO KNOW YOUR WASHER





BEFORE STARTING THE UNIT

GENERAL LOCATION

Select a location that offers a solid, level surface capable of supporting the system. A clean, dry, heated equipment room with drainage is ideal. Proximity to the water supply, electrical supply and cleaning areas are also important. Security, lighting and easy access for service should also be considered.

Installation should be done by a licensed plumber. Local codes may require the use of a backflow preventer on the inlet supply line. If a backflow preventer is in place, an SRA (surge relief assembly) option may be required. When the trigger gun is released there is a pressure spike between the unit and the backflow preventer that may cause issues with the hoses on the supply side of the system.

WARNING

This system must be protected from freezing at all times. Do not install the equipment in areas where it may be exposed to temperatures below 0°C (32°F).

PORTABLE SYSTEMS / WHEEL KITS

Before using portable systems or systems with optional wheel kits (PCA and HD-PCA options), be sure that the machine is on a level surface and cannot move when in use. Larger portable systems and wheel kits include locking swivel casters that should be in the locked position prior to beginning any cleaning operation.

Water Supply

The correct water supply is important to the life of your pressure washer. Sediment, scale or other debris, air, and insufficient water volume or high temperature can all cause expensive damage and premature failure of the system. Your pressure washer will require a clean, constant, cold water supply equal to or greater than the rated discharge volume of the system as specified at the front of this manual. Changes in volume and pressure can have a direct impact on one another and may cause system interruption or failure. Select a water supply that will be uninterrupted by other water consuming devices. A minimum supply pressure of 30 PSI should be maintained with the system operating at full discharge flow. Consult the factory if the water supply pressure exceeds 70 PSI. If warm or hot water is to be used, the inlet requirements may change. Consult the manufacturer for details. A shut off valve should be fitted on the water supply, prior to the system inlet, for ease of service to the system. Do not use black iron pipe on the water supply. Rust and scale can develop and can contaminate and damage the pressure wash system.

New Water Supply Pipe

Before connecting the pressure washer to a new water supply pipe, the piping must be flushed thoroughly to remove any filings or debris that may be present due to soldering or threading processes.

Testing the Water Supply

If the volume of a water supply is questionable, a simple test may be conducted. Using an empty container of equal volume to the discharge rate of the pressure washer (GPM), place the discharge end of the water supply hose into the container and fill for one minute. A larger volume container with a mark indicating the pre-measured level of the discharge volume of the pump may also be used. If the container cannot be filled in the one-minute period, an alternate supply will have to be considered.

Tank Feeding

With the high speed of most of today's positive displacement (high pressure) pumps, a proper water supply is critical to the life expectancy of the pump. While many pump manufacturers will show a negative pressure value (NSPH) in their pump specifications, the preference is to provide a pressurized feed. Consult your dealer or the factory if your application requires the system to be supplied from a water supply tank or similar supply.

Natural Water Sources

Unless this system has been factory modified to accept such, it is not recommended that the system be fed from water sources such as ponds, streams, rivers, lakes etc. Never use natural sources of water where laws prohibit its use. Always protect our waterways from water that has been used in your cleaning processes.

Filters / Screens

Your pressure wash system was supplied with a conical inlet screen/washer installed in the garden hose connection provided. This screen should be checked periodically and any dirt or debris removed. When replacing the screen/washer, the convex (raised portion) of the screen should face the water supply.

Optional Screens

Your system may be supplied with an optional canister type filter or "Y" strainer for added protection and ease of servicing. This screen should also be checked and cleaned periodically. When replacing the canister bowl, ensure that the gasket provides a leak tight seal. When a filter or strainer is used it should be adequately sized to prevent any restriction of flow to the pump. If a feed tank is to be used, the strainer should be placed on the supply line to the tank and the tank should include protection from contaminants or debris falling into it. The recommended screen size for most applications is 80 mesh.

Water Supply Connection Hoses

A short, flexible water hose must be installed between the water supply and the pump inlet connection. Contact your dealer or the factory for details on pre-assembled connection hoses. Never use pipe or rigid material to connect the machine to the water supply. Select a high quality non-collapsing type hose with an inside diameter (ID) one size larger than the pump's inlet port. Avoid using long lengths of hose. All supply lines and hoses must be airtight and leak free. Do not allow the hose to kink or otherwise restrict the flow of water to the pump. Unless sealed by a gasket or O-ring,

Teflon® tape or suitable compound must be used on all threaded plumbing connections to provide a leak tight connection.

SRA Option

When the water supply line incorporates a back-flow preventer, anti siphon valve, check valve or a pressure reduction valve, or if the system is capable of displacing 5 GPM (19 lpm) or more, the optional SRA assembly should be installed. (See diagram

A) As the flow of water stops in a system when the trigger gun closes, a momentary surge in pressure may occur on the inlet side of the highpressure pump. Devices on the supply lines, such as the ones mentioned above, will not allow this pressure to dissipate

which may result in damage to inlet and bypass components. The SRA will absorb this energy, preventing such damage. The surge tank pressure and relief valve have been preset at the factory and further adjustment should not be required. If relief valve adjustment must be made, the setting should be 25 to 30 PSIG (1.4 to 2 bar) above the water supply pressure. The discharge port of the relief valve may be connected to a drain by piping or a reinforced hose with a minimum temperature rating of 250°F (120°C). Terminate the piping or hose at least 6 inches (150 mm) from the drain so that visual reference to discharge may be made. All routing of any discharge lines must be in a downward direction only and must be of the same diameter as the port of the valve. To avoid risk of personal injury, install the discharge line as described above prior to any adjustment of the valve. The surge tank has been precharged with compressed air to 40 PSIG (2.8 bar). Periodic checking of the pressure is suggested.

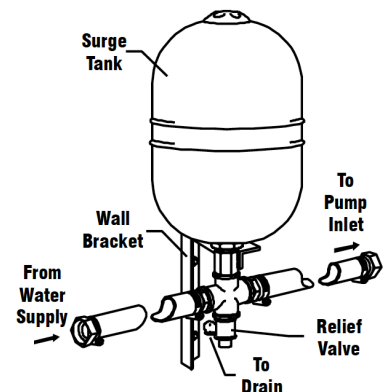


Diagram A.



CONNECTING TO WATER SUPPLY

Use of Hot Water

Use of a hot water supply is not recommended for this system. Positive displacement pumps, or high-pressure pumps as they are commonly referred to, are typically designed for a cold water feed or supply. While the pump specification may reflect an elevated maximum allowable temperature, conditions must be ideal for the protection of the pump. Premature pump seal and valve failure are common problems associated with systems fed with hot water. When hot water is required for a cleaning operation, a heater capable of high pressures should be incorporated into the system, downstream of the pump. Contact your dealer or the factory for details on heaters or complete hot water high-pressure wash systems.

Thermal Protection

A thermal protection device has been included in this system to protect the pump from the damaging effects of overheating due to potential excessive bypass conditions or hot water being fed to the system. These devices are intended to be a safety feature to protect the pump only and are not meant to provide a control over inlet temperature. If the system does not include automatic start/stop motor control, a thermal relief device will discharge the heated water to atmosphere when the pump inlet reaches approximately 60°C (140°F). As cool water is allowed to enter the system and replace this heated water, the valve will close when safe temperatures are restored. If the system does include automatic start / stop motor control, a thermal shutdown device will interrupt the motor control circuit when the pump inlet reaches approximately 60°C (140°F). The system will be inoperable until the

pump is cooled. When shutdown occurs, open the trigger gun to allow cool water to enter the pump. Reduce the incoming water temperature if necessary. The thermal shutdown valve will automatically reset and the control circuit restored.

LWPP (*Option)

Your system may include an optional Low Water Pressure Protection circuit, which links a pressure switch located on the inlet plumbing side of the system to the electrical controls, that is designed to protect the pump from damage due to insufficient water supply. If the water source is unstable or cannot meet the volumetric demand of the pump(s), a drop in the supply line pressure will result. The pressure switch contacts will open, stalling the system and illuminating a “FAULT-RESET” push button. When this occurs, check and repair the cause of the low pressure. After safe operating pressures are restored, press and release the “FAULT-RESET” button. The light should go out and the system will now be ready to operate.

LWLI (*Option)

Low water level indicator light. Red light indicates when heater tank water levels are below level switch. Refill heater water tank to normal operating level.

HSTD (*Option)

High temperature shut down. Thermo probe on the pump inlet automatically shuts system down if the inlet water temperatures exceed 145°F. Inlet water temperature must be restored to normal operating levels (cold water) in order for the system to return to automatic operation.

WARNING

Do not adjust or override the pressure switch or jam the reset button in an attempt to prevent system stalling. Severe system damage will result.

NOTE: The LWPP circuit will have to be reset after any interruption in the power supply to the machine.

ELECTRICAL SUPPLY

Your system may include an optional Low Water Pressure Protection circuit, which links a pressure

switch located on the inlet plumbing side of the system to the electrical

WARNING

All electrical work is to be performed by qualified and licensed personnel only. The installation must comply with all local codes and laws applying to this type of device. This machine must be electrically grounded. Improper electrical installation may result in risk of death, personal injury or damage to the system.

Electrical Connection

The serial plate located on the machine identifies the correct voltage, phase and amperage requirements for the pressure wash system. Prior to connecting the system, a voltage reading of the supply should be taken to confirm that it matches the machine's motor plate data. In addition, confirm that the amperage demand can also be met. Be sure all wiring is secure and does not interfere with or come in contact with any moving parts. Protect all wiring from potential impact and contact with sharp edges. Use an appropriate watertight wire, cable, and box connector or strain relief when making electrical connections. A fused disconnect clearly identified as "PRESSURE WASHER" and allowing easy access for servicing and emergency shutdown should be located as close to the machine or receptacle as conveniently possible. Location of the disconnect must comply with all local electrical codes.

Stationary Systems

A terminal block labeled L1, L2 and L3 (3 phase machines) or L1 and L2 (1 phase machines) and a ground lug have been provided in the control panel to connect the machine to the power supply. A lug has also been provided for connecting the ground wire from the supply.

Portable Systems

A power cord pre-wired to the motor or control box has been supplied but does not include a connection plug. (120-volt machines excluded) A receptacle will have to be provided in any location where the machine is to be used and mating plug will have to

be installed onto the power cord. Select and use only mating connections that are CSA or UL approved or equivalent and rated for the voltage and amperage of the machine. Twist lock type connectors or similar lockable type connectors are suggested.

Motor Connection (Stationary Systems)

A power cord, pre-wired to the pump motor, has been provided and will be connected to the corresponding terminals on the motor overload (3 phase machines) or motor starter (1 phase machines) in the control panel. The ground wire from the motor will also be connected to the ground lug in the panel.

Power and Extension Cords

If an extension cord must be used with your pressure wash system, be sure to select the proper type and gauge of wire. This machine must be electrically grounded - Use only grounding type cords. Extension cords approved for outdoor use usually include a water resistant, insulating shell making them suitable for the environment surrounding a pressure washer, whether it is used indoors or outdoors. Longer lengths of cord of a smaller size may lead to increased line resistance, which will have adverse and damaging effects on the system's electrical components. Use an extension cord with a wire size at least one size heavier than the power cord of the machine (i.e. A machine supplied with a 14 gauge wire will require a minimum 12 gauge cord). With most applications, the addition of extra high-pressure hose is safer and more convenient than longer power cords.



HIGH PRESSURE CONNECTION

Control Circuit Connection (Automatic Start / Stop)

Control circuit connections for the pump package components, including the flow switch and thermal pump protector, have been provided. These wires are

identified and numbered and are to be connected to the corresponding terminals on the control panel. A step-down transformer in the control panel that is connected to the main supply provides power to the control circuit.

HIGH PRESSURE CONNECTION

The high-pressure hose / gun assembly may be connected directly to the machine or may be connected to a piping distribution system for remote operation. The high-pressure hose assembly will include a swivel type quick coupler and a mating

fitting will be located on the pump system high-pressure outlet (systems above 4000 PSI excluded). Hand tighten the swivel connector only. If a leak is detected, inspect the oring on the coupler and replace if needed. Occasional application of white lithium grease will extend the life of the o-ring.

WARNING

Only mating halves of quick couplers pressure rated to match the system should be used to make high-pressure connections. Mixing of various couplers may result in system damage or personal injury.

Distribution Piping Connection

When using any distribution-piping network, be sure that the installation conforms to all local plumbing codes. Anchor the piping securely to a suitable solid surface. A properly installed high-pressure system and distribution pipe network should not vibrate or "rattle". Use of insulated pipe clamps will reduce potential noise associated with vibrating pipes. If excessive vibration does occur, contact the installing contractor, your dealer or the factory. Connect the high-pressure outlet of the system to the distribution-piping network via a high-pressure flexible hose (optional). This hose must have the same inside diameter (or greater) as the outlet connection of the system. A shut off

valve installed on the main discharge line from the system is recommended and will make servicing the equipment easier. Arrange the discharge plumbing with ease of future servicing in mind. Use only high quality pipe and fittings capable of handling the systems maximum pressure. Schedule 80 pipe is generally considered acceptable for operating pressures up to 3000 PSI. Galvanized steel pipe will deter corrosion and scaling which can lead to component clogging and failure. Do not use black pipe or fittings, as they will corrode. Teflon® tape or suitable compound must be used on all threaded plumbing connections to provide a leak tight connection.

| TOTAL MAXIMUM FLOW AT ANY GIVEN POINT | SUGGESTED LINE SIZE |
|---------------------------------------|---------------------|
| 45-60 USGPM | 1 1/2" |
| 25-45 USGPM | 1 1/4" |
| 15-25 USGPM | 1" |
| 10-15 USGPM | 3/4" |
| 3-10 USGPM | 1/2" |

The line size may be reduced as the volume drops throughout the distribution system

Terminate the distribution piping at each cleaning area or "drop" with a high quality 1/2" ball valve, (stainless steel is suggested), rated for the system maximum pressure. Quick connects, one half mounted on the ball valve and the mating half attached to the high pressure wash hose assembly, will make moving the wash hose assembly an easy task. Do not use "shut-off" or "valved" type connectors as they can lock up at high pressure and make connecting impossible. Use only "open" type connectors. See the OPTIONS section of this manual or contact your dealer or the factory for details on optional CLS cleaning stations.

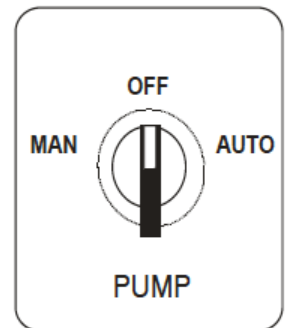
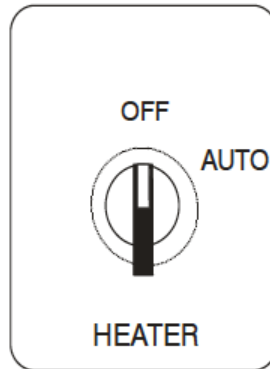
STARTING THE PRESSURE WASHER

Before Starting the Pressure Washer

- Be sure that the inlet and discharge hoses are attached and that all connections are secure.
- Check that the water supply is turned on and there are no leaks in the system.
- Open the trigger gun to ensure that the pump is flooded with water and that all air is purged from the system.
- Check the chemical container level and be sure that the pick up tube is submerged.
- Check the pump oil for proper level and condition. (See Lubrication, Trouble Shooting)
- Check that all control switches are in the OFF position and then connect the machine to the power supply.

Accumulators / Surge Arrestors

An optional high-pressure accumulator, also called a surge arrestor, may be installed on the discharge side of the high-pressure pump. The purpose of this device is to minimize the minute pulses created as the water moves through the pump. These pulses are a normal characteristic of positive displacement pumps. Addition of the accumulator will result in reduced noise, vibration and system wear. The accumulator has been pre-charged at the factory and adjustment should not be required.



WARNING

High-pressure sprays can generate considerable force on the spray wand and cause a whipping effect. Always grip the spray wand and gun handle firmly when operating the pressure washer. Never tie or otherwise lock the gun trigger open.

On / Off (Manual) Motor Control

If your system does not include an automatic motor control circuit, an ON / OFF switch will be located on the electrical control box. With the trigger gun closed, turn the control switch to ON. Open the trigger gun and begin cleaning. Avoid allowing the pump to run with the trigger gun closed for extended periods, as severe pump damage will

occur. Water forced past the regulator / unloader will develop heat when in continuous bypass mode. Various pump and system designs as well as water conditions make determining the length of time this takes nearly impossible, but overheating of the pump will generally occur within a few minutes. Save your system, turn it off when not in use.



STARTING THE PRESSURE WASHER

Automatic Start / Stop Motor Control

Your system may include an automatic pump motor control circuit. This allows remote starting and stopping of the machine, eliminating the need for the operator to return to the machine each time it is turned on or off. In addition, the potential for pump damage due to excessive bypassing is reduced.

To start the machine, turn the control switch to AUTO (A) and simply squeeze the trigger gun. The

resulting flow is detected by a flow switch, which signals the system to start. To stop the machine, release the gun and the system will stop after a brief time delay (approximately 8 seconds). The system will remain available for use until the control switch is turned to the off position or until the main power is disconnected. It is important that the system remain free of any leaks to prevent the automatic controls from cycling unnecessarily.

WARNING

The system will react to movement of water passed the flow switch and may start unexpectedly. Remove all power from the system when working on or near moving parts of the equipment. When machine is unattended, turn the control switch to the OFF position and depress the trigger gun to remove any residual system pressure.

Automatic Start / Stop Motor Control

Your system may include an automatic pump motor control circuit. This allows remote starting and stopping of the machine, eliminating the need for the operator to return to the machine each time it is turned on or off. In addition, the potential for pump damage due to excessive bypassing is reduced.

To start the machine, turn the control switch to AUTO (A) and simply squeeze the trigger gun. The resulting flow is detected by a flow switch, which signals the system to start. To stop the machine, release the gun and the system will stop after a brief time delay (approximately 8 seconds). The system will remain available for use until the control switch is turned to the off position or until the main power is disconnected. It is important that the system remain free of any leaks to prevent the automatic controls from cycling unnecessarily.

RPBSS (*Option)

Remote Push Button Start Stop. This box allows you to set up a remote control in different room(s) where required, to use pressure washer, this allows you to start and stop the unit remotely with this basic switch box. This control box also includes a emergency stop button.

Manual Override (Automatic Systems Only)

A manual (Hand) position has been provided on the pump control switch on the electrical box or panel cover. If a switch with only OFF / AUTO positions is provided, an independent override switch may be located inside the control box and will be labeled as such. This position is intended for overriding the automatic controls, should it be necessary to do so when servicing the system. This position should not be used for normal operation as system damage may result.

SYSTEM PRESSURE ADJUSTMENT

This system has been designed and built to specific maximum output volumes and pressures as listed at the front of this manual. While individual components may indicate higher capacities for volume and pressure, it is extremely important that the system operating pressure as specified not be exceeded. The system's maximum pressure has been pre-set at the factory. Adjustment of the pressure regulator / unloader valve may result in system damage. Loss of system pressure can generally be attributed to other causes. Do not adjust the regulator / unloader valve in an attempt to restore lost pressure. If the pressure must be adjusted, a high quality liquid filled pressure gauge should be installed on the discharge port of the pump upstream of the pressure regulator / unloader valve. With the trigger gun(s) open, adjust the regulator / unloader slowly to the desired pressure. Contact your dealer or the factory for optional high quality pressure gauges. See additional information regarding pressure in the nozzle and maintenance sections.

HIGH-PRESSURE NOZZLES

The correct nozzle orifice size (nozzle number) and condition of the nozzle is crucial to the performance of any high-pressure wash system. The pressure is developed only when a restriction, in this case the nozzle, is used to control the flow of fluid, causing a back pressure effect. The pump itself does not create pressure, but rather has been designed to tolerate pressure to specific limits. Selecting a nozzle too small or too large in size, or using damaged or obstructed nozzles may result in poor system performance and possible system damage and failure. The correct nozzle number has been provided at the front of this manual. Keep this information on hand for future reference or consider stocking replacement nozzles. To prolong nozzle life, avoid striking the nozzle against hard surfaces when handling the spray gun / wand assembly.

LUBRICATION

Pump Lubrication

All lubricating fluids have been provided for this system prior to shipment from the factory, however as a precaution, levels should be checked before beginning operation. The pump will be equipped with an oil dipstick on the top of the crankcase and / or may have a sight glass on the rear of the crankcase. The oil should be filled to the level indicated on the oil dipstick or to the red or orange dot on the centre of the sight glass. Use only SAE 20 or 30 non-detergent type oil or as outlined in the specifications at the front of this manual. Special pump oils are available that are specifically formulated for high-pressure pumps and may be recommended for warranty purposes. When using this specially formulated oil, the oil change frequency may be extended to 500 hours. Contact your dealer for details. Some larger capacity pumps may have seal lubricating ports or oilers. The lubricating ports will be located on the top of the pump crankcase at the front edge close to the manifold. Under normal use, three (3) drops of oil per month is sufficient in each port. Under heavier use an additional one or two (1 or 2) drops may be added. For pumps equipped with oilers, the drip rate was pre-set at the factory and further adjustment should not be necessary. An oiler manual will be attached to this manual for reference. Care should be exercised to avoid damage to the sight glass. The same oil type as used in the crankcase may be used for the seal lubricating ports or oilers. Some pump systems include gear reduction boxes that allow pumps and engines / motors of different speeds to be combined without the use of belts and pulleys. These gear reducers will have specific lubrication requirements. Unless noted otherwise at the front of this manual, a high quality 80-90W gear lube is acceptable.

Changing The Pump Oil

It is recommended that the original oil be changed after an initial fifty (50) hour run-in period. Subsequent oil changes should be performed every three hundred (300) hours of operation or three (3) months, which ever occurs first. The oil drain plug is typically located on the rear of the crankcase at the bottom

Pump Rotation

Some pumps must rotate in one direction to provide proper lubrication to the crankcase components. The preferred direction is the crankshaft turning from the top of the crankcase toward the manifold (head). See diagram B. If the pump rotation is incorrect, interchange any two of the numbered leads at the motor connection point. See Motor Connection

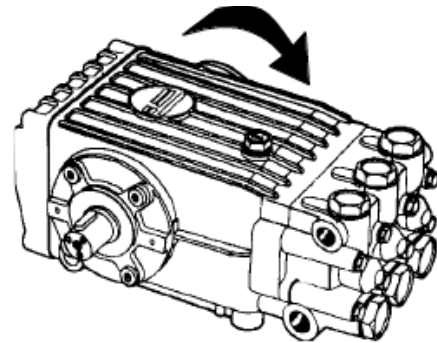


Diagram B.

WARNING

Unless it has been factory modified to accept such, use of highly corrosive cleaning agents is not recommended for your pressure washer. Damage to the system may result.

CHEMICAL (SOAP) APPLICATION

Your pressure wash system may include a chemical injection system for applying water-soluble cleaning agents through the pressure washer. There are two basic types of chemical injection systems in high-pressure washing. Both utilize a venturi principle to draw the chemical into the water that is moved through the pump. Upstream chemical injection involves mixing the detergent with the water prior to entering the high pressure pump, resulting in a high pressure water / soap mixture. Downstream chemical injection mixes the detergent with the water after the pump at low pressure. Both can offer advantages, depending on the type of cleaning to be performed. Your distributor or the factory can assist in determining the best method for your needs. Care should always be taken to ensure that the chemical container is maintained with ample solution, that the pick up end of the chemical tube be submerged at all times and that the chemical be free of dirt and debris. If powdered soap is to be used with the pressure washer, it must be completely dissolved in water prior to use. It is recommended that the injection system be rinsed after each use by placing the chemical pick up tube in a small container of warm water and activating the injection system for a few moments. Avoid lengthy chemical pick up tubes or hoses, as the ability to draw chemical will be diminished. See CS1 Chemical Station in the Options

Accessories section for information on chemical injection during multiple simultaneous cleaning operations. Before using any soaps or chemicals, review the manufacturer's instructions for use. Varying chemical and soap products are available for pressure washing, but most methods of applying chemical remain similar. Most chemicals require dwell time (time to work) to react on the material that is to be removed from the surface being cleaned. Generally, dwell times of five to ten minutes are common. Applying chemical to a wetted surface beginning at the bottom and working upward will aid in avoiding chemical streaking of the object being cleaned. Rinsing is best performed from the top downward.

Activating and Deactivating Upstream Chemical

To activate the upstream chemical system, open the 1/4 turn ball valve located on the pump frame. (See diagram C.) The chemical may take a few moments to enter and make its way through the system. Conversely, when the chemical valve is turned off, it will take a few moments for the chemical to clear from the system.

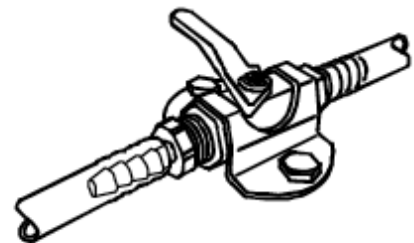


Diagram C.

WARNING

Regular checks of the chemical supply tank will be required. Always be sure that the tank is at an ample level and that the pick up end of the chemical tube is submerged in the chemical at all times. Damage to the system may result if air is allowed to enter the system via the chemical tube.

Activating and Deactivating Downstream Chemical

Several methods of activating a downstream chemical injection system are available. In each

case, a pressure drop is created across the injector to allow the chemical to be drawn into the water stream. Avoid using long lengths of high-pressure hose where possible as the capabilities of the injector may be affected. Your system may include

one of the following devices for chemical application.

Dual Wand

Dual wands or lances are typically supplied with either a side handle or a top mounted chemical control knob. When the knob or handle is turned, water flow is diverted to the high-pressure nozzle only (high pressure or rinse mode) or to both the high-pressure nozzle and a soap nozzle on the secondary tube of the wand (low pressure injection mode). Care must be taken to protect the valve assembly from impact. Do not drop the wand and trigger gun.

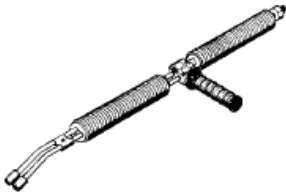


Diagram D.

Adjustable Nozzle Assembly

Typically constructed with an impact resistant, thermal plastic housing, these nozzle assemblies are fastened at the end of a single tube lance. Holding the wand firmly and pulling the nozzle housing back toward or pushing away from the trigger gun will switch the nozzle between high and low pressure modes. Additionally, the spray angle of the water may be adjusted by twisting the housing to the side.

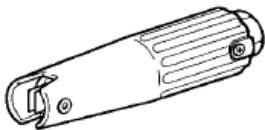


Diagram E.

Shower Head Nozzle

A high-pressure nozzle fastened into the centre port of the nozzle holder provides the high-pressure rinse mode. By turning the thermal plastic housing cover, the water is directed to multiple orifices around the high-pressure nozzle activating the chemical injector.

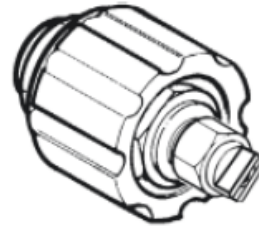


Diagram F.

Dual Nozzle Holder

As the name suggests, a dual nozzle holder will include two nozzles, one typically a brass nozzle with a relatively large orifice for chemical application and the other a hardened stainless steel nozzle for high-pressure rinse mode. A free moving valve inside the holder body is used to block the port of the nozzle that is not required and is held in place by the water flow when the gun is open. As the valve is free moving and will fall with gravity, smooth handling of the gun will have to be practiced. To select either nozzle, close the trigger gun and rotate the gun / wand assembly until the desired nozzle is vertically above the other. Squeeze and hold the trigger gun open. Without releasing the gun trigger, rotate the gun / wand assembly back to a comfortable grip position and continue cleaning.

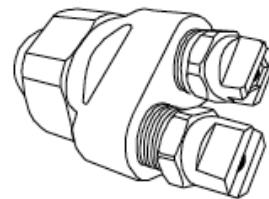


Diagram G.

Chemical Rate Adjustment (Downstream Injection)

To adjust the amount of chemical being injected, turn the adjustment knob located on the injector. With the knob in the full in (closest to the body of the injector), no chemical will be allowed into the water stream. Turning the knob out (away from the body of the injector) will allow more chemical into the water stream. Most injectors will allow a chemical to water mixture rate of up to 20%.

Chemical Rate Adjustment (Upstream Injection)

If your system includes an upstream chemical injection system, the injector was preset at the factory. However, field adjustment may be required to compensate for water supply conditions using the following steps. Extreme caution must be used to avoid starving the pump for water.

1. With the high-pressure pump running and the trigger gun(s) and chemical ball valve open, turn the bypass screw full counter clockwise (see diagram H). Do not use excessive force on the screw.

2. Slowly turn the screw clockwise until the chemical begins to move through the pick up hose. Do not adjust the bypass screw any further. Over-adjustment will starve the pump and may cause damage.
3. Adjust the fine metering screw until the desired amount of chemical is achieved.

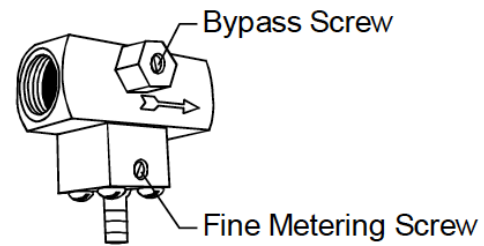


Diagram H.



OPTIONAL ACCESSORIES

OPTIONAL ACCESSORIES

Pressure Gauge

If added as a factory installed option, a glycerin filled pressure gauge will be connected directly to or as close to the manifold of the high-pressure pump as possible. The gauge will be capable of measuring pressures higher than that of the system, usually twice the system maximum. Do not adjust the pressure in an attempt to reach the gauge maximum. On systems that utilize a pressure regulator, slight pressure spikes or increase may occur when the trigger gun is released (by-pass mode). Systems that incorporate pressure regulating unloader valves will exhibit a near zero pressure at the gauge while bypassing. Should the gauge needle vibrate heavily during operation, regardless of the pressure regulating device, replacement may be necessary. Refer to the TROUBLESHOOTING section of this manual for additional information that may be helpful in determining causes for pressure loss.

CLS Cleaning Stations

On centralized high-pressure wash systems, a CLS installed at the termination point of the high-pressure piping in each cleaning area allows the hose, gun and wand assembly to be easily attached or detached without the aid of tools or needing to completely shutdown the system. A mating connection is provided for the easy addition or relocation of the CS1 chemical station option. (See below)

CS1 Chemical Station

Multi-user systems, where two or more cleaning operations are being performed simultaneously, may require the addition of chemical or different chemicals at the various locations. To accomplish this, the area(s) requiring chemical can be fitted with a CS1 chemical station. By simply opening or closing the CS1 flow valve, the selection of chemical or rinse mode may be made by that operator without affecting the operations taking place elsewhere.

When selected, cleaning in chemical mode will reduce the pressure at that drop by approximately 35%. A supply of chemical will have to be provided at the CS1. Mating quick connects matching the CLS and the high-pressure hose are provided on the CS1. Should adjustment to the CS1 be necessary, use the following procedure.

1. Turn the fine metering screw full clockwise (see diagram H) and then five (5) complete turns counterclockwise. This provides the injector with maximized available chemical that can be regulated in the final step.
2. Turn the bypass screw full clockwise (see diagram H) and then five (5) complete turns counterclockwise. Do not use excessive force on the screw.
3. Select chemical mode at the CS1 flow valve. (Close ball valve)
4. Start the system and turn the bypass screw clockwise slowly until the chemical begins to move through the pick up hose. Do not adjust the bypass screw any further.
5. With the trigger gun open, adjust the fine metering screw until the desired amount of chemical is achieved.

Hose Reels

A high-pressure hose reel may be used with your high-pressure wash system to store the high-pressure hose when not in use. Manual (hand crank), spring rewind and electric rewind models are available and often feature added accessories to maximize efficiency. An optional flexible connection (high pressure jumper hose) must be installed between the high-pressure water supply and the inlet of any hose reel. Hose reels are sized to store a maximum length of hose of a specific diameter as well as having maximum pressure and temperature ratings. Do not exceed the manufacturer's hose capacities or performance specifications.

⚠ WARNING

Before spooling the high-pressure hose onto the reel for the first time, flood and pressurize the hose. Failure to do so may result in damage to the hose reel and will render the warranty void. Always keep your hands, loose clothing and other objects well clear of the moving parts of the hose reel when rewinding hose.

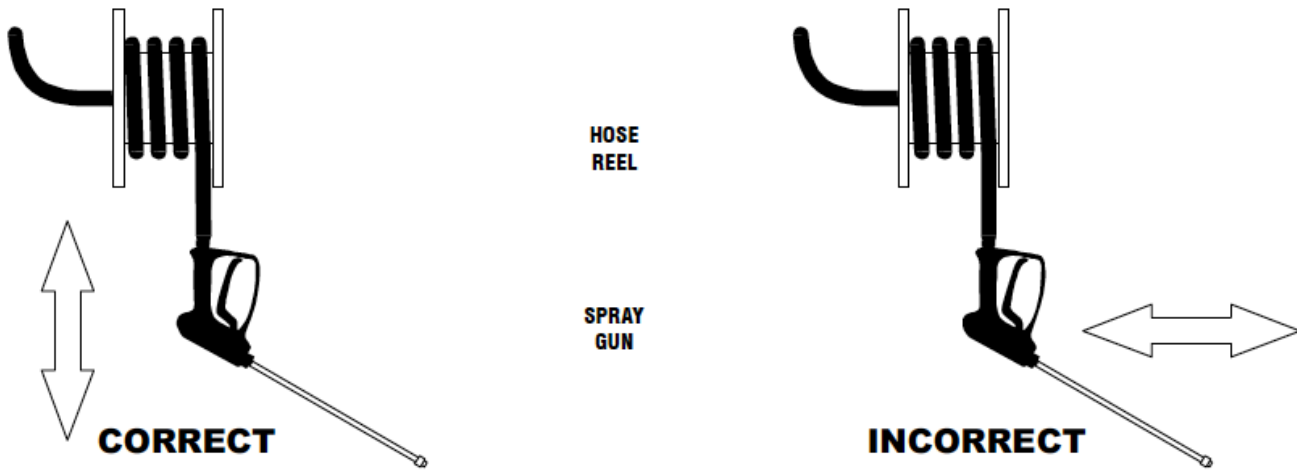


Figure 1

Manual Rewind Reels

When un-spooling hose from a manual rewind hose reel, pull the hose slowly and at a right angle to the drum. (See figure 1 above) When spooling the hose back on to the hose reel, keep light tension on the hose to prevent it from becoming tangled. Using gloves or a clean cloth lightly wrapped around the hose as a wiper, guide the hose by hand to remove dirt and other contaminants from the outer shell. Inspect the swivel of the reel and the hose on a regular basis for signs of wear and leakage.

Spring Rewind Reels

A spring rewind hose reel uses the action of the rotating drum to "load" tension on a spring. That is, as you remove the hose windings from the reel, tension is applied to the spring in an increasing manner. Therefore, the more hose removed from

the drum, the harder you have to pull to remove it. Conversely, as you allow the reel to rewind, it will start rewinding with more energy than it will have when it completes the rewinding cycle.

Un-Spooling Hose

Maintaining a tight grip on the hose and from a position reasonably close to the reel, pull the hose at a right angle to the drum. (See figure 1 above) A clicking noise can be heard as the ratchet mechanism passes the lock at each half revolution of the drum. Allow the hose to slowly retract after the second or third click to lock the ratchet mechanism. Repeat this procedure until the desired amount of hose has been removed from the drum. For easier rewind operation, always allow at least one wrap of hose to remain on the drum.

⚠ WARNING

Attempting to remove or rewind hose from distances away from the reel and at angles other than perpendicular to the drum will prove to be difficult and may pose a safety hazard. Always grip the hose firmly when un-spooling or spooling. Do not allow the hose to rewind freely. Be sure that your feet and legs will not become entangled in the hose as it rewinds. The hose must have an unobstructed path to the reel during the rewind action.



OPTIONAL ACCESSORIES

Rewinding Hose

From a position in close proximity to the reel, grip the hose tightly and pull slowly on the hose until the clicking of the ratchet stops. Maintaining a tight grip on the hose, allow it to slowly retract. Do not allow the hose to rewind freely. Using gloves or a clean cloth lightly wrapped around the hose as a wiper, guide the hose by hand to remove dirt and other contaminants from the outer shell. Inspect the swivel of the reel and the hose on a regular basis for signs of wear and leakage.

Power (Electric) Rewind Reels

Use of power rewind hose reels requires some operator knowledge and understanding of how the reel functions. In addition, safety concerns must also be understood. When a power rewind reel is provided with this high pressure wash system, the hose reel's

Original Equipment Manufacturer's (OEM) user's guide will be attached to this manual for reference.

ETM (Hour Meter *Option)

The ETM option allows simple monitoring of the system's use and takes the guesswork out of determining when routine service is required. The display indicates total accumulated time with the last digit indicating the final hour in 1/10th increments.

CWBB (*Option)

Designed as an energy saving feature for high volume, multi-gun hot water systems, the CWBB option allows maximized flow of cold water for the removal of heavy soils and other problems where higher volumes of water are required. A dedicated high volume hose, trigger gun and wand assembly, as well as a shut off valve, are provided for this purpose. With the bulk of the soil removed, detailed cleaning with hot water at a lesser volume is made easier. Depending on the maximum output volume of the system, use of the CWBB gun may impact the performance of all guns supported from the same system.

Rotating Nozzles

Tougher cleaning operations may require a

concentrated spray to maximize the impact of the water delivered by the pressure washer. However, on large areas requiring cleaning, achieving this with a fixed pattern nozzle (0° pattern) can be time consuming. To resolve both of these issues, a rotating nozzle can be quick connected to the end of the high-pressure wand. Rotating nozzles use the flow of the water moving past them to spin a 0° orifice within a housing, creating a high impact, oscillating spray which allows the coverage of a larger surface area in less time than a fixed nozzle. Various designs are available, but the most popular is one that incorporates a ceramic nozzle and seat. While typically more reliable and easier to service, the ceramic materials in this design may also be more sensitive to operating conditions. Impacts, extreme temperatures and rapid temperature changes as well as suspended solids in the water can all quickly shorten the nozzle life expectancy. When using a rotating nozzle, point the wand in a downward position before triggering the gun. This will allow the ceramic orifice to make contact with the seat as opposed to avoid having a hard impact when the flow begins. Avoid dropping or otherwise impacting the nozzle assembly, especially on the orifice or outlet surface. When used with hot water, try to minimize the output temperature and avoid sudden changes of temperature, both when switching from cold to hot and hot to cold. Optional high-pressure in-line screens are available that can protect the nozzle from the abrasive effects of solid matter contained in the water passing through it. Generally, a 100 to 200 mesh screen can provide the best protection. As with all screens and filters, it is important that periodic checking and cleaning be performed. As with all high-pressure sprays, care should be taken not to damage the surface being cleaned. Start the cleaning operation with the nozzle away from the surface and slowly move toward it to avoid damage.

Sandblast Heads

When high-pressure water alone is not sufficient for the removal of unwanted surface coatings, an optional wet sandblast attachment is available for most systems that permits the induction of an abrasive material. The advantages of using a wet

sand blast attachment over conventional air driven blasting methods include less noise, the absence of dust, static electricity generation and potentially damaging heat build up on the surface being cleaned.

In a manner similar to a chemical injector, the abrasive is drawn into the high-pressure water stream and discharged through a tungsten carbide guide in a uniform cone pattern. Using quick connects, one half installed on the wand and the mating half installed on both the standard high-pressure nozzle and the inlet of the sandblast head will allow easy interchanging without tools and

PROTECTING THE SYSTEM FROM FREEZING

If the equipment will be used or stored in areas where it will be exposed to temperatures below 0° Celsius (32° Fahrenheit) for any period of time, precautions must be taken to prevent damage due to freezing. Draining the system does not offer adequate protection. Use of a high quality plumbing antifreeze or automotive windshield washer antifreeze is recommended. Glycol based antifreeze may be used, but be sure to follow the manufacturer's directions for correct mixture and for proper disposal after use. The following method may be used to protect the system when not in use.

1. Disconnect the power supply to the machine and turn off all control switches (Turn off engine on gas powered machines)
2. Turn off the water supply.
3. Relieve any trapped pressure in the system by squeezing the trigger gun but leave high pressure hose(s) attached to the discharge.
4. Remove supply hose.
5. Fill a clean container of sufficient size to supply the machine with enough antifreeze solution for approximately two minutes operation (i.e. 8 gallons for a 4 GPM system).
6. Connect a short hose to the inlet of the system and submerge the open end in the antifreeze close to the bottom of the container.
7. Restore power to the machine and turn control switch to MANUAL position. (Start engine on gas powered machines)

sealant. To maintain proper flow of abrasive to the sandblast head, always keep the abrasive material dry. To maintain the free flow of abrasive, the pick up tube, or probe as it may be referred to, requires air to be available where the sand enters. Tube designs generally include provisions for air movement and it is important that these airways remain unclogged. Insert the pick up tube in a vertical position in the sand or abrasive with the top above the surface. Periodic repositioning as the abrasive is consumed may be required. While many abrasive materials are available, those used in conventional sandblasting methods are strongly suggested.

8. Open and hold trigger gun until antifreeze is discharged from nozzle. (Most antifreeze compounds will foam slightly when discharged from system). Discharged antifreeze may be directed back into container for reuse or proper disposal.
9. Close the trigger gun momentarily to force solution through by-pass loop.
10. Repeat step 1, 3 and 4 If desired, compressed air may be connected to the inlet connection of the system to force the remaining antifreeze solution from the system, however air pressure should be regulated to no more than 80 PSI.



MAINTENANCE

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

* Must be performed by an authorized service technician.

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

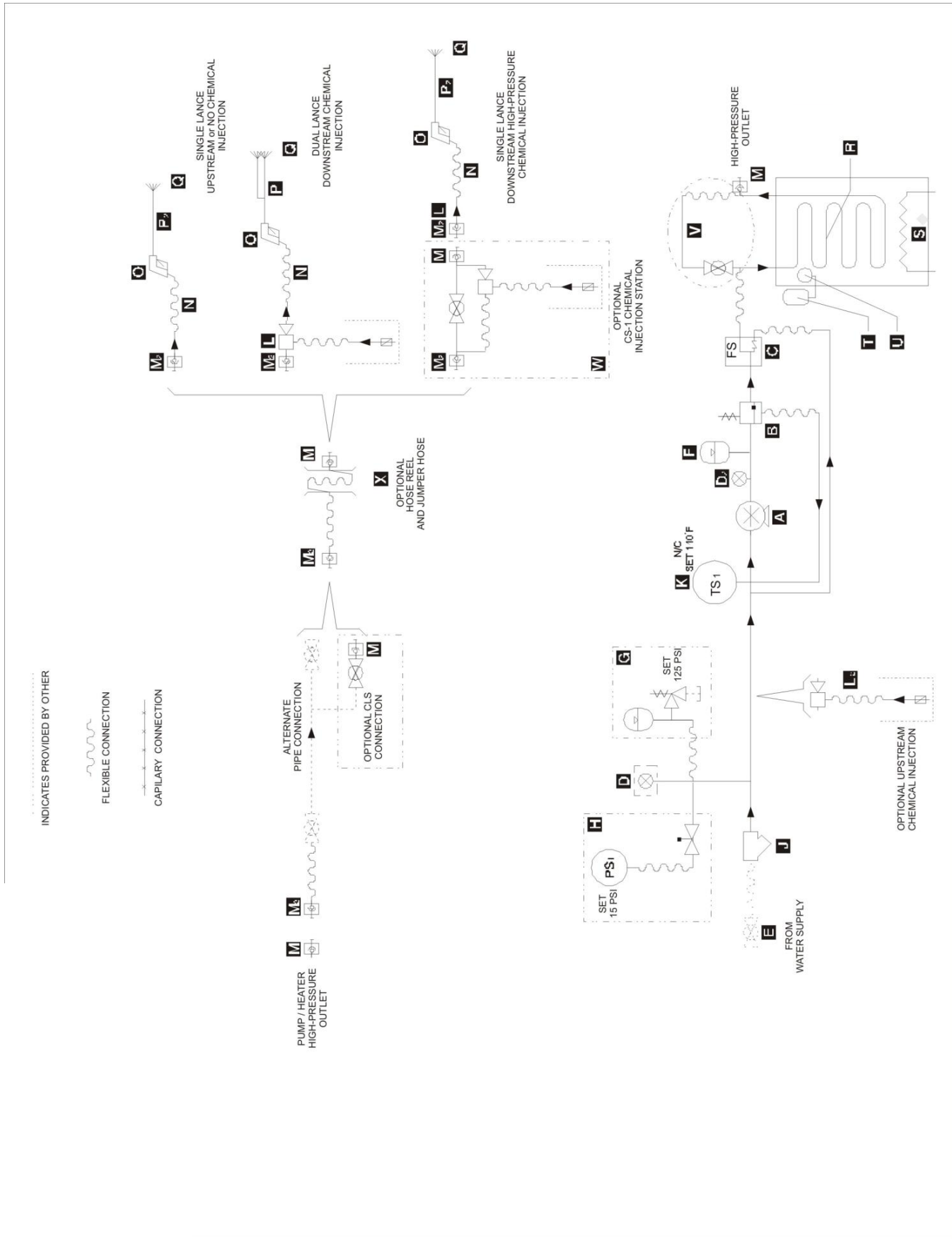
*** High pressure nozzle should be replaced whenever pressure drops to less than 85%.

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

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

NOTE: FAILURE TO MAINTAIN YOUR PRESSURE WASHER/EQUIPMENT, INCLUDING REGULAR MAINTENANCE OF PUMP AND SYSTEM COMPONENTS, WILL VOID MANUFACTURER'S WARRANTY.

WIRING DIAGRAM





WIRING DIAGRAM LEGEND

| ITEM | DESCRIPTION | DETAIL | PSC OPTION | PART NO. | QTY |
|-----------|--------------------------------|--|------------|----------|-----|
| A | High-pressure Pump | See attached data sheet | | | 1 |
| B | Pressure Regulator / Unloader | See attached data sheet | | | 1 |
| B2 | Safety Relief Valve | See attached data sheet (IF USED) | | | N/A |
| C | Flow Switch | See attached data sheet | | | 1 |
| D | Pressure Gauge | Liquid Filled / 0 - 100 PSI | | | 1 |
| D2 | Pressure Gauge | Liquid Filled / 0 - 4000 PSI | PG | | 1 |
| E | Ball Valve, Inlet | 200# WOG, Brass | PG | | 1 |
| E2 | Ball Valve, Discharge | 6000# WOG, Stainless steel | | | 1 |
| F | Accumulator (Surge Arrestor) | Pulsation Dampener(IF USED) | SA | | N/A |
| G | Surge Relief Assembly | Inlet Water | SRA | | N/A |
| H | Pressure Switch Assembly | Low Inlet Water Supply Pressure Protection Set Pressure: 8 PSI(IF USED) | LWPP | | N/A |
| J | Strainer | 80 mesh, Stainless steel (IF USED) | | | 1 |
| K | Thermal Protector | Normally closed, opens @ 140°F, self reset non-adjustable | | | 1 |
| L | Chemical Injector (downstream) | See attached data sheet(IF USED) | | | 1 |
| L2 | Chemical Injector (upstream) | See attached data sheet(IF USED) | | | 1 |
| M | Quick Connect Set | M22 Male / Brass (IF USED) | | | 1 |
| M2 | Quick Connect Set | M22 Female / Brass with plastic grip(IF USED) | | | 1 |
| N | High-pressure Hose | 3/8" x 50' / 3000# W.P. / (1) swivel end (1) rigid end | 6PW-50FT | | 1 |
| O | High-pressure Gun | See attached data sheet | | | 1 |
| P | Wand / Lance | Dual, variable pressure, 36" Single, 36" | | | 1 |
| P2 | Wand / Lance | Dual, variable pressure, 36" Single, 36" | | | 1 |
| Q | Nozzle, High-pressure | See information on PREFACE sheet | | | 1 |
| R | Heater Coil Assembly | 3/4", 80A53 carbon steel pipe | | | 1 |
| S | Heater Elements | | | | 9 |
| T3 | Heater Thermostat | | | | 1/1 |
| U | | | | | N/A |
| V | Cold Water By-pass Assembly | | CWBE | | N/A |
| W | CS-1 Assembly | Downstream High-pressure Chemical Injection(IF USED) | | | N/A |
| X | Hose Reel Assembly | | | | N/A |
| Y | Modulating Gas Valve | | | | N/A |
| Z | QS2 Feature | Quick Start Assembly for centralized systems | QS2 | | N/A |

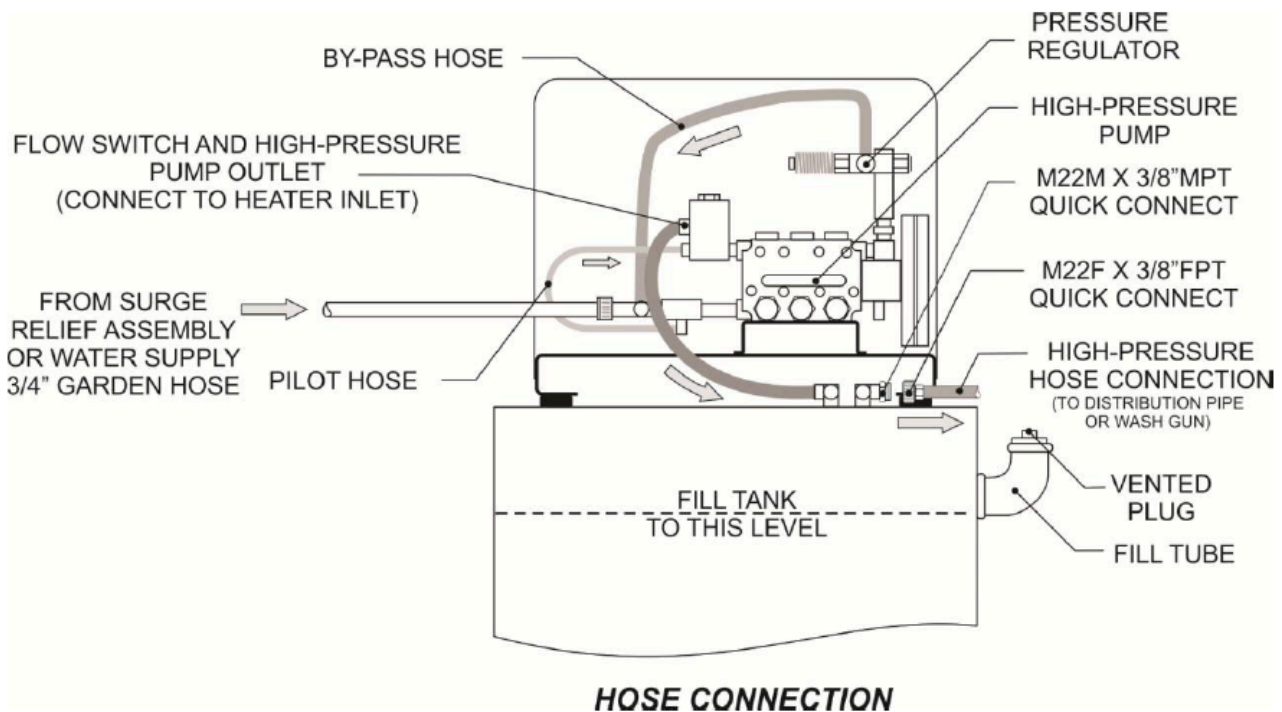
PUMPING SYSTEM

Functional Description

High pressure water pumping systems in all our models are based on the same principals. An electric motor is sized for the correct load, voltage, and environment. This is connected to the pump by belts. Water enters the positive displacement (P.D.) pump and pumped out to the hose and gun assembly. The operating pressure is maintained by the regulator. This regulator also allows water flow from the pump to be recirculated (known as the bypass) back into the inlet when the gun is closed. A thermo safety shutdown monitors the bypass water temperature to protect the pump and components from extreme heat. Before operating and as regular maintenance, check the pump oil level. (Refer to maint. section.)

Inlet Water Hook Up

CAUTION! Determine that the water supply source and supply line is of adequate size to provide sufficient water to match the pump discharge rate with a residual line pressure of at least 10 PSI at the pump. If water supply exceeds 80 PSI consult the factory. Severe pump damage may occur if these conditions are not met. Provide clean water to the water inlet connection via a water hose supply line. The supply line requires a minimum 3/4" male garden hose connection. The inlet hook up is located near the pump head and is supplied with a screen filter. It is recommended a water softener be installed if excessive hard water



Discharge Water Connection

A high pressure hook up hose approximately 4 feet long is supplied with the system. This connects the

discharge of the pump to the heat exchanger. The pump discharge fitting is located near the head of the pump. This is downstream of the flow switch.



HEAT EXCHANGER

HEAT EXCHANGER

The design feature of our Heat Exchanger allows high pressure cold water to be heated in an unpressurized tank. Cold water entering the heat exchanger passes through a coil submerged in heated water. Electrical controls for the exchanger and pumping package are mounted on the outside of the tank. The protective outer wrap and front panel enclose the controls.

After filling the water tank to the level indicated in Fig.4, turn the heat exchanger switch to the "ON" position. Once the heater has reached the set temperature, water may drip through a small hole in the 90 deg. to prevent pressure from building up which can naturally occur when water is heated to high temperature.

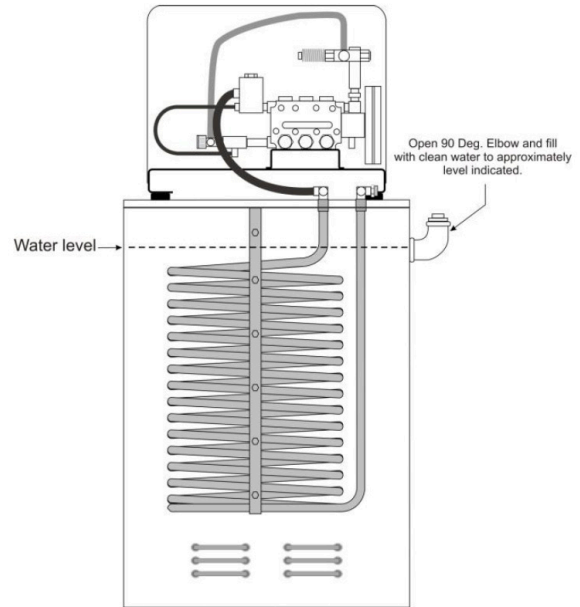


Figure 4
Electric Heat Exchanger Flow

High Pressure Water From Pump To Heat Exchanger Inlet Connection

A high pressure hook up hose is supplied with the unit. This hose connects the pumping unit to the inlet of the heat exchanger. The inlet and outlet connections are located on the top of the heat exchanger, marked inlet and outlet.

Hot Water Discharge Connection

A standard system includes a high pressure hose connected to a gun and wand. Connect the high pressure hose and gun assembly to the outlet fitting on the heat exchanger. Hand tighten the black plastic covered quick disconnects.

Depending upon the application, a variety of discharge hook ups are available. Single gun direct, multiple direct, or multiple remote locations with optional soap/foaming stations are just a few. Consult your distributing representative for application assistance.

Automatic Heat Controls

Automatic heat controls include tank water

temperature and tank low water shut-off. Other components mounted on the panel are motor fusing, motor contactor, motor overload, automatic timer, heating element contactor, control transformer, and terminal strips.

The tank water thermostat and tank low water shut-off are wired in series with the heating element contactor coil. The thermostat maintains tank water temperature at approximately 180 degrees F (82 degrees C). A level switch in the tank will open if the water level should drop to a point where operation of the unit is affected. This will not allow heating of the tank water.

Electrical Hook Up

Electrical service for the system is run to the terminal strip on the electrical panel labeled L1, L2, and L3. This unit must be properly grounded to prevent electrical shock. A fused disconnect is to be provided in accordance with local codes. Refer to the ID plate for voltage and total connected load.

WARNING

DISCONNECT MAIN POWER WHEN NOT IN USE OR UNSUPERVISED. TURN OFF ALL SWITCHES WHEN NOT IN USE.

STARTUP AND ADJUSTMENT PROCEDURES

Installation

Install the Electrically Heated System in accordance with pumping package and heat exchanger

directions. See pump and heat exchanger directions. This equipment should be installed and serviced by qualified personnel.

WARNING

THIS HEAT EXCHANGER SHOULD BE USED WITH A REGULATOR ONLY. DO NOT USE UNLOADER WITH THE CHECK VALVE. NO CHECK VALVE SHOULD BE PRESENT BETWEEN THE PUMP AND HEAT EXCHANGER. DUE TO THE DESIGN OF THE HEAT EXCHANGER, WATER IN THE COIL MUST BE ALLOWED TO EXPAND. IF WATER IS TRAPPED IN THE COIL IT CAN INCREASE THE PRESSURE IN THE COIL AND LEAD TO A COIL FAILURE.

Turning Power On

Do not turn power on until the heat exchanger is filled with water as severe damage may occur if water is not above the heater elements. To fill heat exchanger, remove 1 1/4" pipe plug from the elbow fill pipe located on the heat exchanger. Insert water hose and fill. Heater tank will require approximately 70 gallons (265 liters) of water on initial fill. After the water level has reached the fill elbow the power may now be turned on. It will take 15 to 20 minutes for the heat exchanger to reach operating temperature. WATER WILL EXIT THE FILL PIPE WHILE THE HEATER TEMPERATURE IS RISING. This

is due to the heat expansion of the cold water just added. This will stop after the heater has reached its operating temperature. Replace and hand tighten the 1 1/4" fill pipe plug. After initial heating of the tank leave the main power on to the equipment. This will ensure hot cleaning solution instantly on pump start up.

Turning Water On

Turn the inlet water supply on after the pumping package has been installed. See pumping package section for details.

CAUTION

Before pumping package is started for the first time, or after maintenance has been performed on any supply or discharge water lines, all air must be purged from the system. Failure to do so may result in system damage.

System Operation

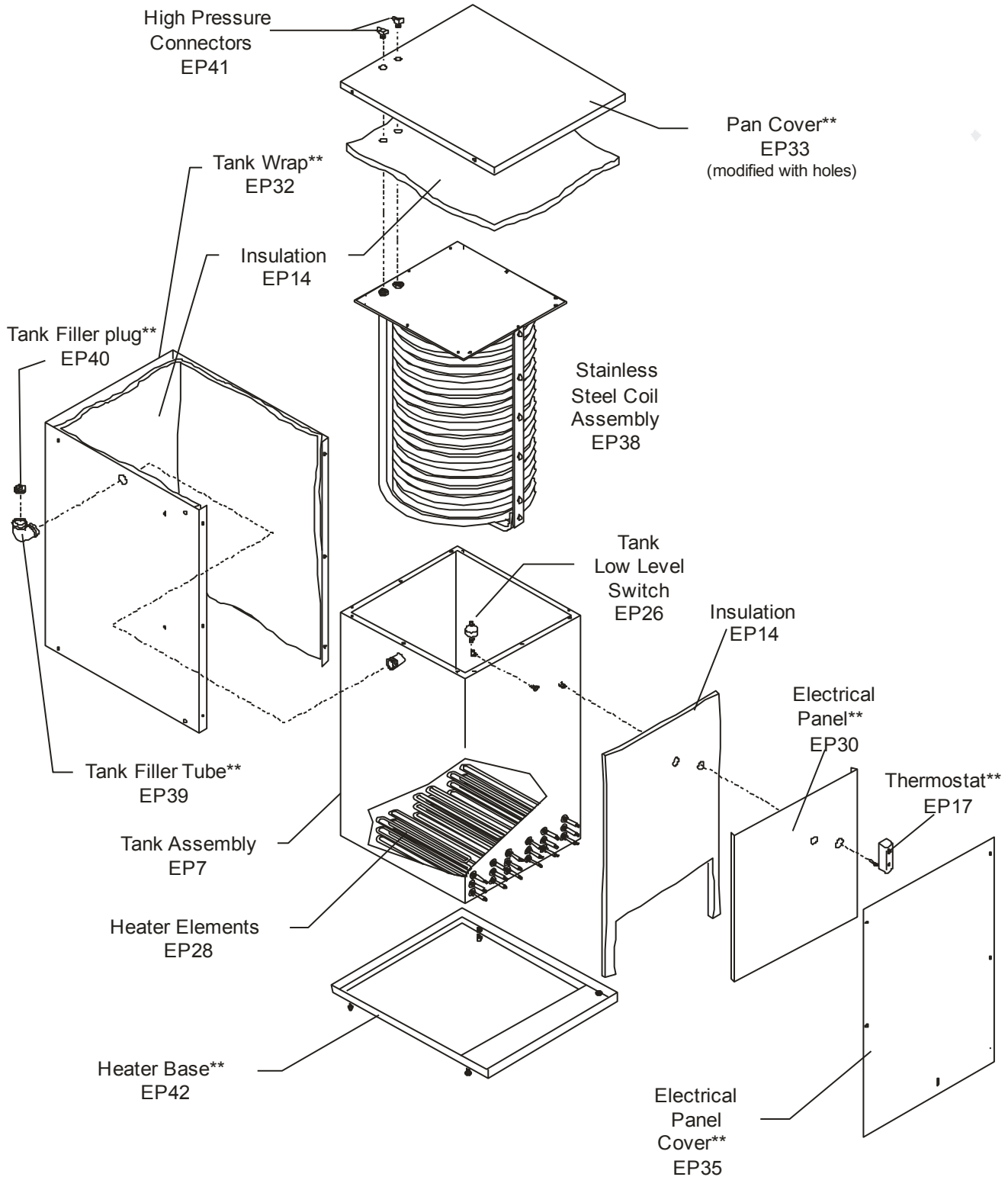
Caution: Pressure cleaning gun must be HELD ONTO SECURELY when the pump is turned on as serious personal injury may be inflicted if spray wand is allowed to move freely. High pressure spray can cause SERIOUS BODILY HARM - HANDLE WITH CARE - NEVER POINT SPRAY AT ANY PART OF THE BODY. Proper protective equipment should be worn if corrosive chemicals are used. With pumping unit off pull the gun trigger to ensure that the water is running through the nozzle. Check the supply line

to ensure there are no kinks in the hose. Release the gun trigger. Place the operators switch located on the heat exchanger in the "A" automatic position. You are now ready to clean.

Pressure Regulation

This unit has been adjusted at the factory and preset at the designed specifications. DO NOT RE-ADJUST IN AN ATTEMPT TO INCREASE PUMP PRESSURE. This will only increase the regulating pressure which will cause internal pump damage or motor overload.

72 kW Heat Exchanger



**Not included in rebuild kit

Drawing 1

ELECTRICAL PANEL ASSEMBLY DIAGRAM LEGEND



| ITEM | DESCRIPTION | DETAIL | PART NO. | QTY |
|------|-------------------------|-------------------------------------|---------------|------|
| EP1 | Terminal Strip | Control circuit | 202324 | 1 |
| EP2 | Timer | Solid state 8 sec delay off | 400441 | 1 |
| EP3 | Din Bar | Motor contactor mounting | 202567 | 3.5" |
| EP4 | Motor over-load | see table p. 33 | | 1 |
| EP5 | Dual coil | 1/2 in 4000 PSI 316 SS | *400574 | 1 |
| EP6 | Ground lug | 70 AMP | 201009 | 1 |
| EP7 | Single heater tank | see table p. 33 | | 1 |
| EP8 | Insulation Kit | Insulation double (sq ft) | *203204 | 40 |
| EP9 | Terminal block | see table p. 33 | | 1 |
| EP10 | Fuse holder | see table p. 33 | | 1 |
| EP11 | Fuse | see table p. 34 | | 3 |
| EP12 | Contactor element | see table p. 34 | | |
| EP13 | Dual heater tank | see table p. 34 | | 1 |
| EP14 | Insulation Kit | Insulation single (sq ft) | *202529 | 32 |
| EP15 | Contactor motor | see table p. 34 | | 1 |
| EP16 | Auxiliary contact | 1 n/o 1n/c/10amp | 401463 | 1 |
| EP17 | Thermostat | 100-240 degree F/n/c | 403060/403061 | 1 |
| EP18 | Relay element contactor | 30 amp SPST 24vac | 202519 | 1 |
| EP19 | Fuse holder | Control circuit | 202088 | 1 |
| EP20 | Fuse | Control circuit 2am slow-blow | 202315 | 1 |
| EP21 | Transformer | see table p. 35 | | 1 |
| EP22 | Switch | Control circuit manual/off/auto | 402279 | 1 |
| EP23 | Fuse Holder | Transformer primary | 400002 | 1 |
| EP24 | Fuse | Transformer primary .5am time delay | 401056 | 2 |
| EP25 | Flow Switch | System primary activation | 240036 | 1 |
| EP26 | Level Switch | Tank safety n/o | 200412 | 1 |
| EP27 | Thermo Probe | Pump safety 140* | 400646 | 1 |
| EP28 | Heater element | see table p. 35 | | |
| EP29 | Motor | see table p. 35 | | |
| EP30 | Electric panel | 8B Heater elect. Panel comp. | *100076BLCK | 1 |
| EP31 | Wrap | 8A-2 dual heater wrap (Black) | 500027 | 1 |
| EP32 | Wrap | 8A- heater wrap (Black) | 500028 | 1 |



ELECTRICAL PANEL ASSEMBLY DIAGRAM LEGEND

| ITEM | DESCRIPTION | DETAIL | PART NO. | QTY |
|------|-----------------------|-------------------------------|-------------|------|
| EP33 | Top Cover | 12B exchanger (black) | 400104 | 1 |
| EP34 | Dual heater top cover | 12B-2 dual heater (black) | *100650BLCK | 1 |
| EP35 | Electric panel cover | 8C panel cover (black single) | 400098 | 1 |
| EP36 | Electric panel cover | 8C-2 panel cover (black dual) | *100077BLCK | 1 |
| EP37 | E-stop switch | Emergency stop switch | *500036 | 1 |
| EP38 | Single coil | SS coil 1991 & up | *401022 | 1 |
| EP39 | 1-1/4" fill elbow | GP100-20 | 300516 | 1 |
| EP40 | 1-1/4" elbow plug | GP109-20 | 300528 | 1 |
| EP41 | 3/8" street elbow | S1015-C | S1015-C | 2 |
| EP42 | Single heater base | 1A single heater base | *202764BLCK | 2 |
| EP43 | Dual heater base | 1A-2 dual heater base | *100275BLCK | 1 |
| EP44 | Pressure switch | Inlet pressure low (lwpp) | 200900 | 1 |
| EP45 | Red heater light | Red Heater Light (lwli) | 401837 | 1 |
| EP46 | Relay | Relay (lwpp, lwli.pco) | 201182 | 1 |
| EP47 | Switch | Control heater off/on | 402302 | 1 |
| EP48 | Relay base | Relay Base (lwpp, lwli.pco) | 401342 | 1 |
| EP49 | Yellow push button | Lwpp (illum) | 401938 | 1 |
| EP50 | Hour meter | 24vac hour meter | 400280 | 1 |
| EP | Pump cover | Under 10hp motor | *100068BLCK | 1 |
| EP | Pump cover | Over 10hp motor | *100947BLCK | 1 |
| EP | Permafilm | FP46025 Permafilm | 800015 | 450g |



EP 4 Relay, Motor Over-Load

Motor Voltage

| | 208/3 Phase | 230/3 phase | 460 - 480/3 Phase | 575 – 600/3Phase |
|-----|-------------|-------------|-------------------|------------------|
| 3 | 400483 | 401360 | 401467 | 401468 |
| 5 | 401465 | 401466 | 401359 | 401359 |
| 7.5 | 401337 | | 400483 / 400483 | 401360 / 403899 |
| 10 | 401283 | | 401466 | 400483 |
| 15 | 401481 | | 401471 / 403905 | 401465 |
| 20 | --- | | 401337 | 401337 |
| 25 | | | 401283 | |
| 40 | | | 402832 | |

Table 1

EP 7 Single Heater Tank

Heater Voltage

| | 208/3 Phase | 230/3 Phase | 460 - 480/3 Phase | 575 – 600/3Phase |
|--------|-------------|-------------|-------------------|------------------|
| 24 kW | | | *400105 | |
| 48 kW | | | *400106 | |
| 72 kW | | | *400107 | |
| 99 kW | | | *400107 | |
| 115 kW | | | *400107 | |

Table 2

EP 9 Terminal Block

Supply Voltage

| | 208/3 Phase - 230/3 Phase | 460 - 480/3 Phase | 575 – 600/3Phase |
|--------|---------------------------|-------------------|------------------|
| 24 kW | 202871 175 amp | | 202862 115 amp |
| 48 kW | 402058 380 amp | | 202862 115 amp |
| 72 kW | ----- | | 202871 175 amp |
| 99 kW | ----- | | 402058 380 amp |
| 115 kW | ----- | | 402058 380 amp |

Table 3

EP 10 Fuse Holder

Motor Voltage

| | 208/3 Phase | 230/3 phase | 460 - 480/3 Phase | 575 – 600/3Phase |
|-----|---------------------------|-------------|-------------------------|-------------------------|
| 3 | 200941 30 amp LH 25030-3C | | 202295 30 amp H60030-3C | |
| 5 | 200941 30 amp LH 25030-3C | | | |
| 7.5 | 400890 60 amp H 250600-3C | | | 202295 30 amp H60030-3C |
| 10 | 400890 60 amp H 250600-3C | | | |
| 15 | 400890 60 amp H 250600-3C | | 400896 60AMP LH60060-3C | |
| 20 | | | | |
| 25 | | | | |

Table 4



ELECTRICAL PANEL ASSEMBLY

EP 11 Fuse, Motor Circuit

Motor Voltage

| | 208/3 Phase | 230/3 phase | 460 - 480/3 Phase | 575 – 600/3Phase |
|-----|-----------------------|-------------|-----------------------|-----------------------|
| 3 | 202715 20 amp FLNR 20 | | 202721 10 amp NLS 10 | 202721 10 amp NLS 10 |
| 5 | 202719 25 amp FLNR 25 | | 202438 15 amp FLSR 15 | 202438 15 amp FLSR 15 |
| 7.5 | 400893 35 amp FLNR 35 | | 202438 15 amp FLSR 15 | 202438 15 amp FLSR 15 |
| 10 | 400899 45 amp FLNR 45 | | 200977 20 amp FLSR 20 | 202438 15 amp FLSR 15 |
| 15 | 401031 60 amp FLNR 60 | | 201812 30 amp FLSR 30 | 202904 25 amp FLSR 25 |
| 20 | --- | | 200529 40 amp FLSR 40 | 201812 30 amp FLSR 30 |

Motor
Horse
Power

Table 5

EP 13 Dual Heater Tank

Heater Voltage

| | 208/3 Phase | 230/3 Phase | 460 - 480/3 Phase | 575 – 600/3Phase |
|-------|-------------|-------------|-------------------|------------------|
| 24 kW | | | *401797 | |
| 48 kW | | | *401050 | |
| 72 kW | | | *400698 | |
| 99 kW | | | *400698 | |
| | | | *400698 | |

Heater
Input

Table 6

EP 12 Contactor Element

Supply Voltage

| | 208/3 Phase | 230/3 Phase | 460 - 480 60hz 3 Phase | 575 – 600/3Phase |
|--------|----------------|----------------|------------------------|------------------|
| 24 kW | 400375 | 400375 | 400375 | 400375 |
| 48 kW | 400456 (2.Qty) | 400889 (2.Qty) | 400375 | 402963 |
| 72 kW | ----- | ----- | 200682 | 402958 |
| 99 kW | ----- | ----- | 401622 | |
| 115 kW | ----- | ----- | 401622 | |
| 144 kW | ----- | ----- | 200682 (2.Qty) | 400793 (2.Qty) |

Heater Input

Table 7

EP 15 Contactor, Motor

Motor Voltage

| | 208/3 Phase | 230/3 Phase | 460 - 480/3 Phase | 575 – 600/3Phase |
|-----|-------------|-------------|-------------------|------------------|
| 3 | 400506 | | 400506 | 400506 |
| 5 | 401448 | | 400506 | 400506 / 403898 |
| 7.5 | 401462 | | 400506 / 403898 | 400506 / 403898 |
| 10 | 401533 | | 401448 / 403898 | 400506 / 403898 |
| 15 | 401563 | | 401462 | 401448 |
| 20 | 401563 | | 401533 | 401462 |
| 25 | | | 401533 | 401533 |
| 40 | | | 401563 | 401533 |

Motor
Horse
Power

Table 8



EP 21 Transformer

Supply Voltage

| Transformer va | 208/3 Phase | 230/3 Phase | 460 - 480/3 Phase | 575 – 600/3Phase |
|-------------------|-------------|-----------------|-------------------|------------------|
| | 50 | | 400325 PH50MLI | |
| 100 | | 402523 PH100MLI | | 400545 PH100AR |
| 150 | | PH150MLI | | PH150AR |
| 200 | | PH200MLI | | PH200AR |
| 250 | | PH250MLI | | PH250AR |

Table 9

EP 28 Element

Supply Voltage

| Heater Input | 208/3 Phase | 230/3 Phase | 460 - 480/3 Phase | 575 – 600/3Phase |
|-----------------|----------------|-----------------|-------------------|------------------|
| | 24 kW | 200410 (3. qty) | 200410 (3. qty) | 200409 (3 qty) |
| 48 kW | 200410 (6.qty) | 200410 (6.qty) | 200409 (6 qty) | 200408 (6 qty) |
| 72 kW | ----- | ----- | 200409 (9 qty) | 200408 (9 qty) |
| 99 kW | ----- | ----- | 401149 (9 qty) | 401316 (9 qty) |
| 144 kW | ----- | ----- | 402290 (6 qty) | 401755 (6 qty) |

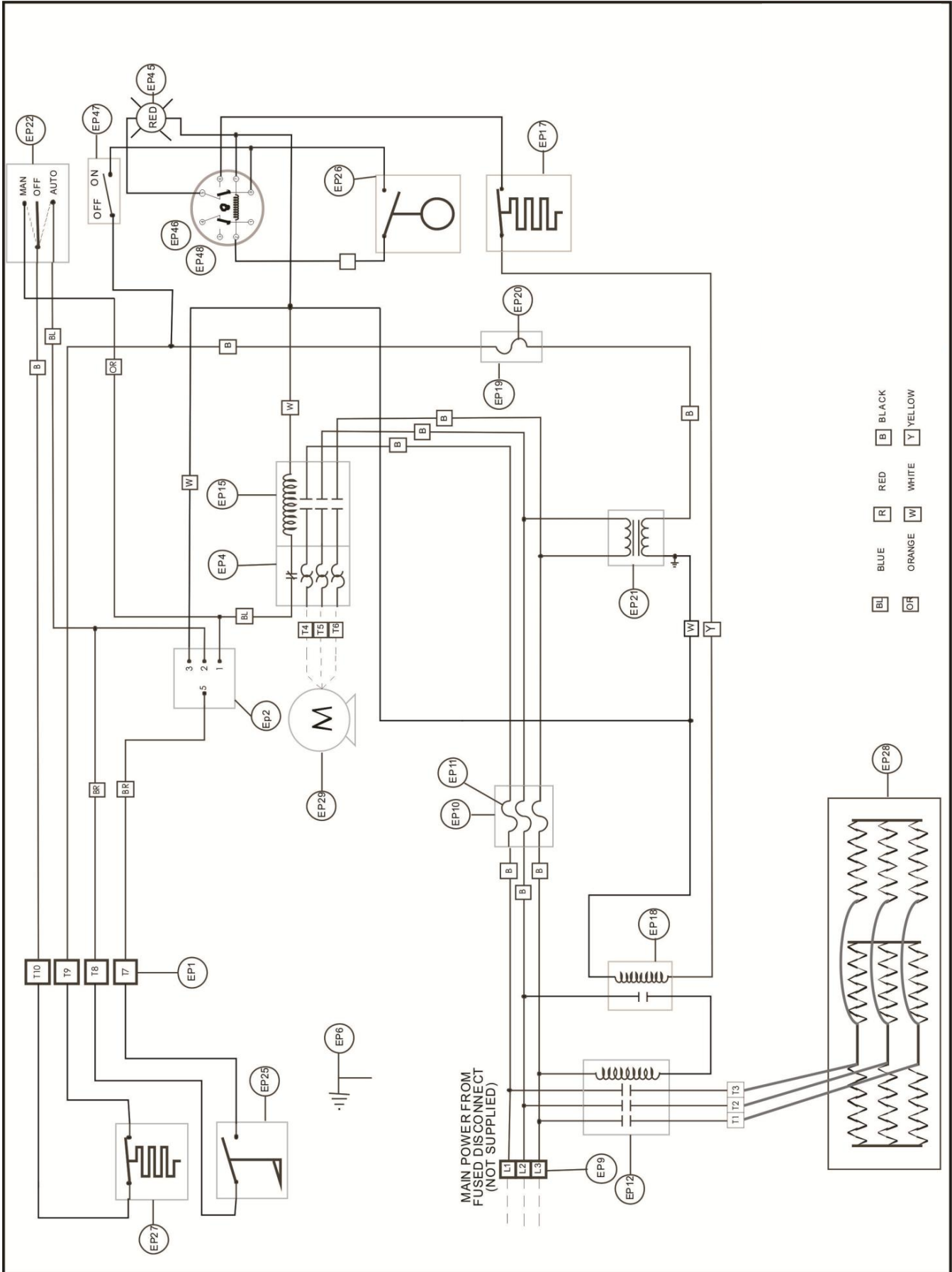
Table 10

EP 29 Motor

Motor Voltage

| Motor Horse Power | 208/3 Phase | 230/3 phase | 460 - 480/3 Phase | 575 – 600/3Phase |
|-------------------------|-------------|-------------|-------------------|------------------|
| | 3 | 201202 | 202684 | 202684 |
| 5 | 201211 | 202685 | 202685 | 201212 |
| 7.5 | 201220 | 202686 | 202686 / 202686 | 201221 |
| 10 | 201228 | 202687 | 202687 | 201229 |
| 15 | 400431 | 400618 | 400618 | 400860 |
| 20 | ----- | 401684 | 401684 | 401253 |
| 25 | | 209217 | 209217 | |
| 40 | | 400457 | 400457 | |

Table 11



GENERAL PUMP

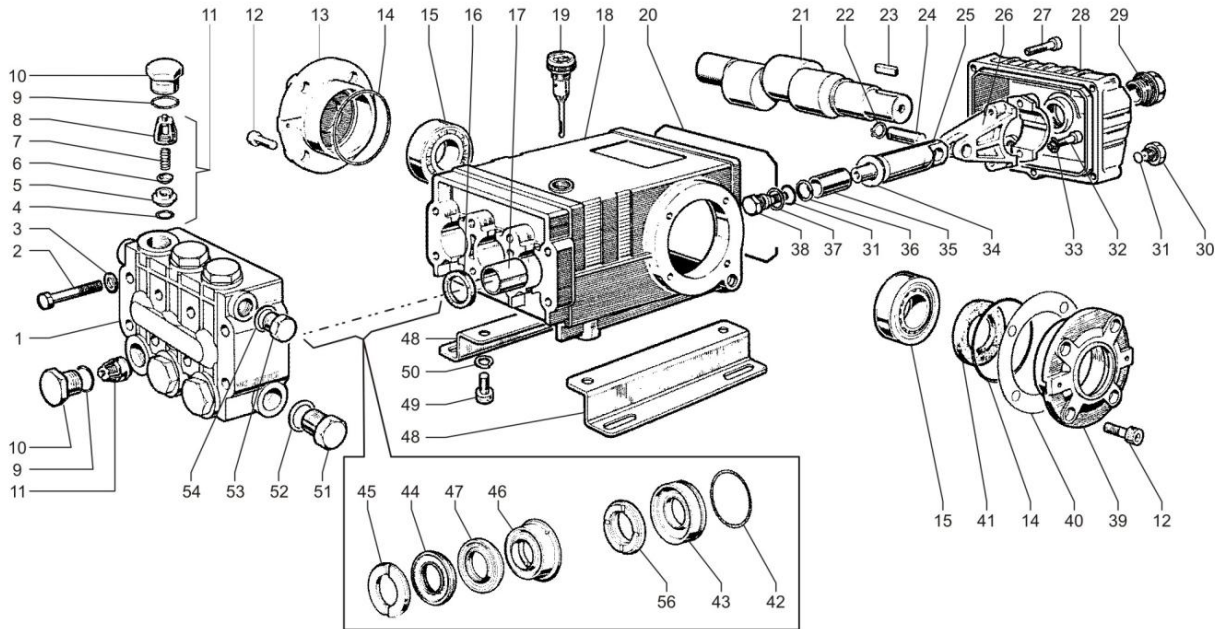
MODEL TS1511 (200136)

Specifications

| | Standard | Common | Metric |
|----------------------------|----------------------|-------------|--------------------|
| Maximum Flow | 4.0 GPM | | 15.1 LPM |
| Maximum Discharge Pressure | 3500 PSI | | 241 BAR |
| RPM | | 1450 RPM | |
| Bore | .787 in. | | 20 mm |
| Stroke | .472 in. | | 12 mm |
| Crankcase Capacity | 40.6 oz | | 1.2 l |
| Maximum Fluid Temperature | 160 °F | | 70 °C |
| Inlet Port (2) | | 1/2 In. | |
| Discharge Port (2) | | 3/8 In. | |
| Shaft Diameter | | 24 mm SOLID | |
| Weight | 32 LB. | | 14.5 kg |
| Dimensions | 12.3 x 9.2 x 6.9 IN. | | 311 x 234 x 175 mm |



Parts List



| Item | Part No. | Description | Qty. | Item | Part No. | Description | Qty. | Item | Part No. | Description | Qty. | Item | Part No. | Description | Qty. |
|------|------------|----------------|------|------|------------|-----------------|------|------|------------|---------------|------|------|------------|--------------------|------|
| 1 | 47.1208.41 | Manifold | 1 | 15 | 91.8375.00 | Bearing | 2 | 29 | 97.5968.00 | Oil Gauge | 1 | 43 | 47.0805.70 | Packing Retainer | 3 |
| 2 | 99.3206.00 | Screw | 8 | 16 | 90.1625.00 | Oil Seal | 3 | 30 | 98.2041.00 | Drain Plug | 1 | 44 | 90.2705.00 | High Pressure Seal | 3 |
| 3 | 96.7020.00 | Washer | 8 | 17 | 90.9126.00 | Bushing | 3 | 31 | 90.3585.00 | O-ring | 4 | 45 | 47.1000.51 | Head Ring | 3 |
| 4 | 90.3841.00 | O-ring | 6 | 18 | 47.0104.22 | Crankcase | 1 | 32 | 99.3099.00 | Screw | 6 | 46 | 47.2169.70 | Intermediate Ring | 3 |
| 5 | 36.2003.66 | Valve Seat | 6 | 19 | 98.2106.00 | Oil Dipstick | 1 | 33 | 96.7014.00 | Washer | 6 | 47 | 90.2704.00 | RESTOP Ring | 3 |
| 6 | 36.2001.76 | Valve | 6 | 20 | 90.3922.00 | O-ring | 1 | 34 | 96.7286.00 | Washer | 3 | 48 | 47.2000.74 | Mounting Rail | 2 |
| 7 | 94.7376.00 | Spring | 6 | 21 | 47.0218.35 | Crankshaft | 1 | 35 | 47.0404.09 | Piston | 3 | 49 | 99.3644.00 | Screw | 4 |
| 8 | 36.2002.51 | Valve Retainer | 6 | 22 | 90.0557.00 | Circlip | 6 | 36 | 90.5067.00 | Back-up Ring | 3 | 50 | 96.7106.00 | Washer | 4 |
| 9 | 90.3847.00 | O-ring | 6 | 23 | 91.4890.00 | Key | 1 | 37 | 96.7280.00 | Gasket | 3 | 51 | 98.2176.00 | Plug | 1 |
| 10 | 98.2220.00 | Cap | 6 | 24 | 97.7380.00 | Wrist Pin | 3 | 38 | 47.2195.66 | Piston Bolt | 3 | 52 | 96.7514.00 | Washer | 1 |
| 11 | 36.7032.01 | Valve Assembly | 6 | 25 | 47.0504.54 | Piston Guide | 3 | 39 | 47.1500.22 | Bearing Cover | 1 | 53 | 98.2100.00 | Plug | 1 |
| 12 | 99.3039.00 | Screw | 8 | 26 | 47.0300.01 | Connecting Rod | 3 | 40 | 97.5678.00 | Gasket | 2 | 54 | 96.7380.00 | Washer | 1 |
| 13 | 47.1501.22 | Bearing Cover | 1 | 27 | 99.1912.00 | Screw | 5 | 41 | 90.1648.00 | Bearing Seal | 1 | 55 | 90.2710.00 | Low Pressure Seal | 3 |
| 14 | 90.3913.00 | O-ring | 2 | 28 | 47.1601.22 | Crankcase Cover | 1 | 42 | 90.3616.00 | O-ring | 3 | | | | |

Repair Kits

| Kit 1 | | Kit 2 | | Kit 3 | | Kit 4 | | Kit 6 | | Kit 7 | | Kit 69 | | Kit 71 | | Kit 10 | | Kit 28 | |
|--------|--------|--------|------|--------|------|--------|------|--------|------|--------|------|--------|------|--------|------|--------|------|--------|-------|
| Item # | Qty. | Item # | Qty. | Item # | Qty. | Item # | Qty. | Item # | Qty. | Item # | Qty. | Item # | Qty. | Item # | Qty. | Item # | Qty. | Item # | Qty. |
| 4 | 6 | | | | | | | 31 | 3 | | | 44 | 3 | 46 | 3 | 42 | 3 | 42,43 | |
| 5 | 6 | | | | | 9 | 6 | 34 | 3 | | | 47 | 3 | 47 | 3 | 44,45 | | | 1 ea. |
| 6 | (11) 6 | 16 | 3 | 41 | 2 | 10 | 6 | 36 | 3 | 45 | 6 | 56 | 3 | | | 46,47 | | | |
| 7 | 6 | | | | | | | 37 | 3 | | | | | | | | | | |
| 8 | 6 | | | | | | | 38 | 3 | | | | | | | | | | |

| Item # | Fl./lbs. |
|--------|----------|
| 2 | 22.1 |
| 10 | 73.7 |
| 12 | 14.7 |
| 27 | 7.3 |
| 32 | 14.7 |
| 38 | 14.7 |



TROUBLESHOOTING

| Symptom | Possible Cause | Solution |
|---|--|---|
| System will not start. Control switch in AUTO position. | <ul style="list-style-type: none"> Main power not applied Water supply not turned on Insufficient water pressure and/or volume | <ul style="list-style-type: none"> Apply power Turn on water supply Check supply (see WATER SUPPLY section) |
| System starts but runs rough. | <ul style="list-style-type: none"> Insufficient water pressure and/or volume Clogged inlet screen/filter Damaged plunger | <ul style="list-style-type: none"> Check supply (see WATER SUPPLY section) Check condition/ Clean or replace required. Check for cracks or break |
| Low Pressure. | <ul style="list-style-type: none"> Worn nozzle Belt slippage Air leak in inlet Unloader valve stuck. Partially plugged or improperly adjusted valve seats worn. Inlet suction strainer clogged or improperly sized. Worn packing. Abrasive in pumped fluid or severe cavitation cause by inadequate water. Worn or dirty inlet and/or discharge valve assemblies. Leaky discharge hose | <ul style="list-style-type: none"> Replace nozzle with one of proper size. Tighten or replace, use correct belt Disassemble plumbing Clean, adjust unloader valve, or check for worn and dirty valve seat. Clean, use adequately sized filter, Check more frequently. Clean or install proper inlet filter. Check for adequate inlet water pressure. Clean and/or replace valve assemblies. Replace/repair discharge hose |
| Pump runs extremely rough. | <ul style="list-style-type: none"> Restricted inlet or air entering the inlet plumbing. | <ul style="list-style-type: none"> Check that the inlet plumbing is of proper size. Check for airtight seal. Purge air from the system. |
| Water leakage from manifold. | <ul style="list-style-type: none"> Worn packaging | <ul style="list-style-type: none"> Install new packing |
| Oil leak between crankcase and manifold. | <ul style="list-style-type: none"> Worn crankcase piston rod seals. O-rings on plunger retainer worn. | <ul style="list-style-type: none"> Replace crankcase piston seals. Replace o-rings. |
| Oil leaking in the area of crankshaft. | <ul style="list-style-type: none"> Worn crankshaft seal or damaged and/or improperly installed oil seal o-ring. | <ul style="list-style-type: none"> Remove oil seal retainer and replace damaged and/or improperly installed oil seal o-ring |
| | <ul style="list-style-type: none"> Bad bearing | <ul style="list-style-type: none"> Replace crankshaft bearing(s) |
| Excessive play in the end of the crankshaft pulley. | <ul style="list-style-type: none"> Worn main bearing(s) from excessive tension on drive belt. | <ul style="list-style-type: none"> Replace bearing(s) and/or belts. |
| Water in crankcase. | <ul style="list-style-type: none"> May be caused by humid air condensing inside the crankcase | <ul style="list-style-type: none"> Change oil/ Use any high-grade automotive 30 weight non-detergent oil |
| | <ul style="list-style-type: none"> Worn packing and/or piston rod sleeve, plunger retainer o-rings worn. | <ul style="list-style-type: none"> Replace packing Replace o-rings |
| Oil leaking from underside of crankcase. | <ul style="list-style-type: none"> Worn crankcase piston rod seals. | <ul style="list-style-type: none"> Replace seals |
| Oil leaking at the rear portion of the crankcase. | <ul style="list-style-type: none"> Damaged crankcase, rear cover or o-ring, drain plug o-ring, or sight glass o-ring | <ul style="list-style-type: none"> Replace damaged parts or o-rings |
| Loud knocking noise in pump. | <ul style="list-style-type: none"> Pulley loose on crankshaft | <ul style="list-style-type: none"> Check pulley, key, alignment, and tighten setscrew |
| | <ul style="list-style-type: none"> Broken or worn bearing. Broken or worn connecting rod. | <ul style="list-style-type: none"> Replace bearing. Replace connecting rod. |
| Frequent or premature failure of the packing. | <ul style="list-style-type: none"> Scored, damaged or worn plunger. Over pressure to inlet manifold. | <ul style="list-style-type: none"> Replace plungers. Reduce inlet pressure. |
| | <ul style="list-style-type: none"> Abrasive material in the fluid being pumped. | <ul style="list-style-type: none"> Install proper filtration on inlet plumbing. |
| Pulsation. | <ul style="list-style-type: none"> Excessive pressure and/or temperature of fluid being pump | <ul style="list-style-type: none"> Check pressures and/or temperature. Reduce to acceptable level. |
| | <ul style="list-style-type: none"> Unloader/regulator set at too high of pressure. | <ul style="list-style-type: none"> Reduce pressure. |
| | <ul style="list-style-type: none"> Running pump dry. | <ul style="list-style-type: none"> Do not run pump without water. |
| | <ul style="list-style-type: none"> Faulty pulsation dampener. | <ul style="list-style-type: none"> Check pre-charge, if low, re-charge it or install a new one. |

ALL BE PRESSURE WASHERS COME WITH A COMPREHENSIVE WARRANTY ON PRIMARY PARTS SUCH AS ENGINES, PUMPS, AND PRODUCTS.

BE Power Equipment warrants that each new product will be free of any manufacturer defects in workmanship frames. See below for details specific to your BE product for the set warranty period of the product. Warranty applies to the original purchaser of the product and cannot be transferred.

This warranty does not cover normal wear items, including but not limited to: seals, packings, valves, o-rings, spark plugs etc. Warranty does not include normal maintenance like oil changes, filters or valve adjustments. Nor does it include misuse of product. Warranty approval is at the sole discretion of BE Power Equipment.

In no event shall BE Power Equipment be liable for any indirect, incidental, or consequential damages from the sale or use of the product. This disclaimer applies both during and after the term of this warranty. BE Power Equipment disclaims liability for any implied warranties, including implied warranties of merchantability and fitness for a specific purpose, after the applicable term of this warranty.

Frame: lifetime

Motor:

WEG Motors - 18 month for manufacturer defects

Pumps: Triplex - 5 year**

Coil: (Hot Water Pressure Washer) - 3 Years

Burner: (Hot Water Pressure Washer) - 3 Years

Accessories: (ex- hose reels, hose, gun, wand, tip, injector, couplers, unloaders, wheels etc.) 90 Days

BE



IF YOU NEED ASSISTANCE WITH THE ASSEMBLY OR
OPERATION OF YOUR PRESSURE WASHER, PLEASE CALL
1-866-850-6662
OR VISIT OUR WEBSITE:

BEPOWEREQUIPMENT

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