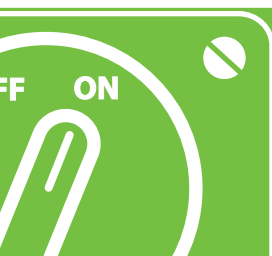


Operation Manual

Manual de operación

WARNING: Do not use the appliance without reading the instruction manual.



Oil Fired Operation
Aceite disparado
Operación

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WARNING: This product can expose you to chemicals including lead, which is known to the State of California to cause cancer and birth defects or other reproductive harm. For more information, go to www.P65Warning.ca.gov

ADVERTENCIA: Este producto puede exponerle a productos químicos incluso el plomo, que es conocido al Estado de California causar cáncer y defectos de nacimiento u otro daño reproductivo.

AVERTISSEMENT : Ce produit peut vous exposer aux produits chimiques en incluant l'avance, qui est connue à l'État de Californie provoquer le cancer et les anomalies congénitales ou d'autre mal reproducteur.



20180730

California Prop 65 Warning

Machine Unpacking, General Safety

Machine Unpacking

All cleaners are carefully inspected and cartoned to protect against shipping damage. If there is damage or missing parts, the transportation company agent should make a notation to that effect on the bill. Refer to the parts list in this manual and advise what parts are missing or damaged. If available, give the invoice number on all order bills. This procedure will enable needed parts to be shipped quickly.



Thank you for choosing our product.

READ ALL Installation, Operation, and Maintenance instructions before operating the machine.

NOTE: Record model number and serial number and date of purchase.



IMPORTANT SAFETY INSTRUCTIONS

The safety alert symbol. This symbol is used to identify safety information about hazards that can result in personal injury.

A signal word (DANGER, WARNING, or CAUTION) is used with the alert symbol to indicate the likelihood and the potential severity of injury. In addition, a hazard symbol may be used to represent the type of hazard

This portion may be the most important in your manual. It is our desire at Steam Way International that you have many years of satisfactory use, with no injuries to the operator, maintenance personnel, customers or onlookers. If the operator uses good safety practices, the likelihood of injuries will be minimal.

 **DANGER**

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

 **WARNING**

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

 **CAUTION**

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

CAUTION

CAUTION, when used without the alert symbol, indicates a situation that could result in damage to the equipment

Read and understand this “OPERATOR’S MANUAL” and “LABELS ON THE MACHINE” before starting.

A - Explosion

B - Fire

C - Electric Shock

D - Toxic Fumes

E - Kickback

F - Hot Surface

G - Flying Objects

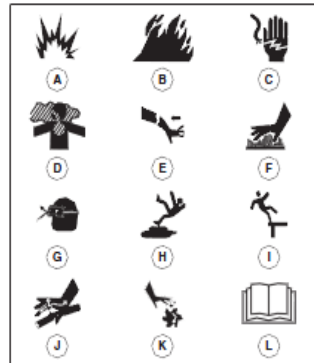
H - Slippery Surface

I - Fall

J - Fluid Injection

K - Moving Parts

L - Read Manual



General Safety



When using this product basic precautions should always be followed, including the following:

1. Read all the instructions before using the product.
2. To reduce the risk of injury, close supervision is necessary when a product is used near children.
3. Know how to stop the product and bleed pressures quickly. Be thoroughly familiar with the controls.
4. Stay alert - watch what you are doing.
5. Do not operate the product when fatigued or under the influence of alcohol or drugs.
6. Keep operating area clear of all persons.
7. Do not overreach or stand on unstable support. keep good footing and balance at all times.
8. Follow the maintenance instructions specified in the manual.
9. This product is provided with a Class A Ground Fault Circuit Interrupter built into the power cord plug. If replacement of the plug or cord is needed, use only identical replacement parts.
10. The operator of this equipment should be thoroughly familiar with its operation and trained in the job to be accomplished.
11. The operator of this equipment should wear protective face shields and other protective clothing as required for safe operations.
12. Do not leave this machine unattended when it is operating.
13. Do not operate the machine if any mechanical failure is noted or suspected.
14. When starting a job, survey the area for possible hazards and correct before proceeding.
15. Keep all protective covers and shields in place. Replace all protective covers and shields after adjustments are made to prevent accidental contact with hazardous parts.
16. If a water or fuel leak is found, **DO NOT OPERATE THE MACHINE**. Shut off and repair.
17. Inspect machine for damaged or worn components and repair or replace to avoid potential hazards. Drive belts, if so equipped, must be inspected and tightened. Do not operate the machine if any mechanical failure is noted or suspected.
18. If chemicals are used in conjunction with this equipment, read and follow the product label directions.
19. Always point the gun assembly in a safe direction away from people and do not direct spray on the cleaner. Always use spray tip or steam impact nozzle specified in the machine specifications.

Electrical Safety

1. GRONDING INSTRUCTIONS

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

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

2. GROUND FAULT CIRCUIT INTERRUPTER PROTECTION

This pressure washer is provided with a Class A ground-fault circuit-interrupter (GFCI) built into the plug of the power-supply cord. This device provides additional protection from the risk of electrical shock. Should replacement of the plug or cord become necessary, use only identical replacement parts that include Class A GFCI protection.

3. EXTENSION CORDS

Use only 3-wire extension cords that have 3-prong grounding-type plugs and 3-pole cord connectors that accept the plug from the product. Use only extension cords that are intended for outdoor use. These extension cords are identified by a marking "Acceptable for use with outdoor appliances; store indoors while not in use." Use only extension cords having an electrical rating not less than the rating of the product. Do not use damaged extension cords. Examine extension cord before using and replace if damaged. Do not abuse extension cord and do not yank on any cord to disconnect. Keep cord away from heat and sharp edges. Always disconnect the extension cord from the receptacle before disconnecting the product from the extension cord.

4. WARNING - To reduce the risk of electrocution, keep all connections dry and off the ground. Do not touch plug with wet hands.

5. Fuses or circuit breakers should be compatible with machine requirements.

6. Do not plug in or unplug machine with wet hands.

7. All wiring and electrical connections should comply with the National Electrical Code (NEC) and with local codes and practices.

8. High voltage may be present within this machine. Servicing should only be performed by properly trained personnel.

Fuel Burning Safety

Fuel Burning Safety

1. Use only fuel as specified in the specifications. The use of incorrect fuel may result in fire or explosion and severe injury to the operator.
2. Do not refuel machine while it is running or hot. Allow it to cool sufficiently to prevent ignition of any spilled fuel. Clean up any spilled fuel before resuming operation.
3. Fuel burning equipment must have proper ventilation for cooling, combustion air, and exhausting of combustion products.
4. Running engine gives off carbon monoxide, an odorless, colorless, poison gas. Breathing carbon monoxide can cause nausea, fainting or death. Some chemicals or detergents may be harmful if inhaled or ingested, causing severe nausea, fainting, or poisoning.
5. During normal operation of this machine, HOT discharges and surfaces may be produced.
6. Always shut down machine before refueling.
7. Do not overfill the fuel tank. If any spillage occurs, clean up immediately and/or neutralize the spill before attempting to operate the machine.
8. Do not start the burner unless a full flow of water is coming from the wand. Air leaks or insufficient water to the machine means less than full flow of water through the coil. This could cause hose failure and burns to the operator.

SAVE THESE SAFETY INSTRUCTIONS

WARNING: RISK OF INJECTION OR SEVERE INJURY. KEEP CLEAR OF NOZZLE. DO NOT DIRECT DISCHARGE STREAM AT PERSONS. THIS EQUIPMENT IS TO BE USED ONLY BY TRAINED OPERATORS.

ADVERTENCIA: RIESGO DE INYECCIÓN O LESIONES GRAVES. MANTÉNGASE ALEJADO DE LA BOQUILLA. NO DIRIJA EL FLUJO DE DESCARGA HACIA PERSONAS. SOLO OPERADORES ADECUADAMENTE CAPACITADOS DEBEN USAR ESTE EQUIPO.

AVERTISSEMENT: RISQUE D'INJECTION OU DE GRAVES BLESSURES. RESTER À L'ÉCART DE LA BUSE. NE PAS diriger la décharge flux DE PERSONNES. CET ÉQUIPEMENT NE DOIT ÊTRE UTILISÉ QUE PAR UNE FORMATION

WARNING



ADVERTENCIA

WARNING: Risk of eye injury. Spray can splash back or propel objects.

ADVERTENCIA: El agua rociada puede salpicar o propulsar objetos.

AVERTISSEMENT: Risque de blessure d'oeil. Le spray peut faire des éclaboussures en arrière ou propulser des objets.



WARNING



ADVERTENCIA

WARNING: Kickback from spray gun can cause you to fall.

ADVERTENCIA: El uso de la hidrolavadora puede crear charcos y superficies resbaladizas.

AVERTISSEMENT: Rebondit de pistolet de pulvérisation peut vous causer d'automme.

WARNING



ADVERTENCIA

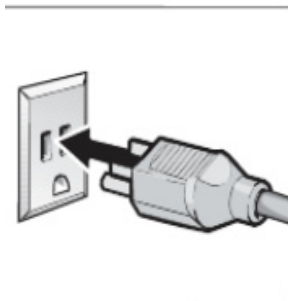
Preparing Your Washer

Prepaing Your Washer

Preparing Your Washer

Electrical

1. This machine must be electrically grounded. Failure to have the machine grounded may result in the operator being electrically shocked and even death.
2. Fuses or circuit breakers should be compatible with machine requirements.
3. If an extension cord must be used to operate this machine, it should be as short as possible. The extension cord must be properly sized and fitted with a grounding type plug and receptacle.
4. Do not plug-in or un-plug machine with wet hands.
5. Keep power cords and connections (connectors) out of water.
6. All wiring and electrical connections should comply with the National Electrical Code (NEC) and with local codes and practices.
7. High voltage may be present within this machine. Servicing should only be performed by properly trained personnel.



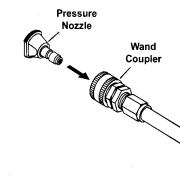
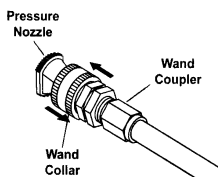
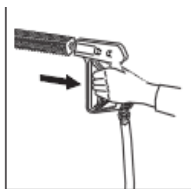
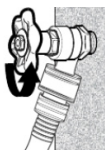


Connect Discharge Hose to Gun Assembly

1. Apply pipe tape or sealant to threads on gun.
2. Attach discharge hose to gun using two open-end wrenches. Tighten hose fitting enough to prevent leaks.

Connect Spray Tip to Wand

1. Before installing spray tip, attach machine to water source and the run machine with wand pointed in safe direction until steady flow come from the end of wand shut down machine and install nozzle.
2. Choose desired spray tip, pull back nozzle extension collar, insert spray tip and release collar. Tug on spray tip to make sure it is securely in place.



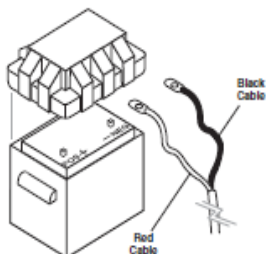
Battery Installation (if so equipped)

WARNING: Batteries generate explosive gases during normal battery operation. DO NOT expose the battery to flame or sparks as these gases may ignite.

WARNING: Battery fluid is highly acidic. If battery fluid contacts skin or clothing, wash immediately with soap and water. If battery fluid enters eye, immediately flood eye with running cold water for at least 15 minutes and get immediate medical attention.

Install battery (battery not included) in battery box as shown.

To reduce the possibilities of sparking attach the battery cables in the following order. First attach the positive battery cable (red) to the positive "+" terminal of the battery. Next, attach the negative battery cable (black) to the negative "-" terminal of the battery. To disconnect the battery, remove the cables in the opposite order as installed.



Electric Driven Installation

Electric Driven Intallation

INSTALLATION

Location

All installations must conform to all applicable local codes. Contact your electrician, plumber, utility company or seller for details.

This machine should be installed by only qualified technicians. The machine should be set upon a level surface where it will not be affected by strong winds, rain, snow, extreme heat, and freezing temperatures. Install the machine considering locations for chemical pick-up, fuel connections, electrical connections, water hook-up, venting, and maintenance.

Electrical Driven Installation

Electrical

Connect machine to an electrically grounded circuit that is fused or circuit-breaker-protected. The circuit must match that which is specified in the ELECTRICAL section under MODEL SPECIFICATION.

Extension Cord

The use of an extension cord that has undersize wire compared to the amp draw of your machine will adversely limit the starting load carrying abilities of the motor and machine's performance. Use only extension cords that are intended for outdoor use. These extension cords are identified by a marking "Acceptable for use with outdoor appliances; store indoors while not in use." Use only extension cords having an electrical rating not less than the rating of the product. Do not use damaged extension cords. Use an extension cord in good repair free of frays or cracks in the outer covering. Do not abuse extension cord and do not yank on any cord to disconnect. Keep cord away from heat and sharp edges. Always disconnect the extension cord from the receptacle before disconnecting the product from the extension cord.

| Copper Wire Size Minimum AWG | Machine AMP Draw* 3 Conductor Wires | Machine AMP Draw* 2 Conductor Wires |
|---|--|--|
| 16 | 10 | 13 |
| 15 | -- | -- |
| 14 | 15 | 18 |
| 12 | 20 | 25 |
| 10 | 25 | 30 |
| 8 | 35 | 40 |
| 6 | 45 | 55 |
| 4 | 60 | 70 |
| 2 | 80 | 95 |

Based on Ambient Temperature of 86°F (30°C)

Based on no more than 100 feet

* Use AMP Draw indicated the same or higher than your machine output.

EXAMPLE: Machine AMP Draw 51, use 55 (2 Conductor): The thermostat type of cord shall be C, PD, E, EO, EN, S, So, SRD, SJ, SJO, SV, SVO, SP.

The thermo set plastic types shall be ET, ETT, ETLB, ETP, ST, STO, SRDT, SJT, SJTO, SVT, SVTO, and SPT.

Water Supply

This machine must have a water supply meeting or exceeding the maximum discharge volume specified in the PERFORMANCE section, and a minimum water inlet pressure of 10 PSI/ 0.68 BAR.

Barrier

We recommend a barrier be installed between the machine and wash area to prevent moisture from coming in direct contact with electrical controls, motors and transformers. This will increase the machine's life and lessen electrical problems.

Water Temperature Variation

On machines not equipped with a temperature control device, the temperature of the discharged water is dependant on the incoming water temperature. Some minor adjustment to the fuel input may be required if the incoming water is significantly different than 50°F.

Water Conditions

Local water conditions affect the pressure washer components adversely more than any other element. In areas where troublesome conditions may exist with like equipment (such as water heaters), we recommend the use of a water softener.

Freezing

This machine must be protected from freezing according to storage section of MACHINE MAINTENANCE.

WARNING: Protect machine from freezing.



ADVERTENCIA: Proteja la máquina contra la congelación.

AVERTISSEMENT: Protéger la machine contre le gel..



Chemicals

Mix chemicals per the chemical manufacturer's printed directions. Follow all mixing, handling, application, and disposal instructions. Wear gloves, boots, goggles, and protective clothing appropriate for the chemical being used.

WARNING: Risk of electrocution. Contact with power source can cause electric shock or burn.

ADVERTENCIA: Riesgo de electrocución. Contacto con la fuente de alimentación puede causar la sacudida eléctrica o la quemadura.

AVERTISSEMENT: Risque d'électrocution. Contactez avec la source de pouvoir peut provoquer le décharge électrique ou brûler.



Engine Driven Installation

Engine Driven Installation

Engine Driven Installation

WARNING: This machine emits carbon monoxide, and deadly gas, and must be vented if used in an enclosed area. Improper venting can cause poor combustion, delayed ignition, down drafts, and the possibility of freezing the coil. Contact your distributor or local heating and air conditioning dealer for proper materials. Local codes must be observed.

WARNING: Contact with muffler area can result in serious burns.

Exhaust heat/gases can ignite combustibles, structures or damage fuel tank causing a fire.

ADVERTENCIA: Contacto con el área de silenciador puede causar quemaduras serias.

El calor/gases de gases de combustión puede encender combustibles, estructuras o dañar el depósito de combustible que causa un fuego.

AVERTISSEMENT: Contact avec la région de silencieux peut s'ensuivre dans sérieux brûle.

La chaleur/gaz épuisée peut enflammer des combustibles, des structures ou nuire au réservoir à carburant provoquant un feu.



WARNING: Starter and other rotating parts can entangle hands, hair, clothing, or accessories.

ADVERTENCIA: El arrancador y otras piezas que rotan pueden enredar las manos, el pelo, la ropa, o los accesorios.

AVERTISSEMENT: Le démarreur et d'autres parties tournantes peuvent embrouiller des mains, des cheveux, des vêtements, ou des accessoires.



WARNING: Risk of asphyxiation. Use this product only in a well-ventilated area.

ADVERTENCIA: Riesgo de asfixia. Este producto únicamente debe usarse en una zona bien ventilada.

AVERTISSEMENT: Risque d'asphyxie. Utilisez ce produit seulement dans une région bien aérée.



WARNING: Fuel and its vapors are extremely flammable and explosive.

ADVERTENCIA: El combustible y sus vapores son muy inflamables y explosivos.

AVERTISSEMENT: Le combustible et ses vapeurs sont extrêmement inflammables et explosifs.



Pre-Operational Instructions

PRE-OPERATIONAL INSTRUCTIONS

FUEL TANK:

Fill the fuel tank (if so equipped) with Use only fuel as specified in fuel specifications.

PRE START-UP

1. The first time the machine is operated, after repairs have been made, or if the machine has set for a period of time (30 days or more) follow the following procedures.
 - A. Check the tension of the belt (if so equipped) per instructions in **MACHINE MAINTENANCE**.
 - B. Flush the machine per instructions in **MACHINE MAINTENANCE**.
 - C. Install float tank drain plug (if so equipped).
 - D. Open float tank ball valve (if so equipped).

CAUTION: *Always use the factory supplied wash hose with your machine. Do not substitute other hoses as a potential safety problem may develop.*

CAUTION: *If machine has been exposed to sub-freezing temperatures, it must be thoroughly warmed to above freezing before operating. Failure to warm machine can cause damage to the pump packings and other components.*

MAINTENANCE Refer to the **MACHINE MAINTENANCE SCHEDULE** for any maintenance to be performed before operation of this machine.

WATER SUPPLY: This machine must have a water supply meeting or exceeding the maximum discharge volume specified in the **PERFORMANCE** section, and a minimum water inlet pressure of 10 PSI / 0.68 BAR.

- ◆ **LIME:** Water containing large amounts of lime, calcium or other similar materials can produce a coating on the inside of the spray tip, impact nozzle and coil pipe.
- ◆ **FLOAT TANK:** Check the float tank (if so equipped) to assure it is full and the float valve shuts off securely.
- ◆ **FLOAT TANK BALL VALVE:** Check the position of the ball valve on the outlet side of the float tank (if so equipped) that it is in the open position.
- ◆ **CHEMICAL:** Use factory recommended chemicals for best cleaning action and for extended pump life. Follow instructions on chemical container.

WARNING: Use of pressure washer can create puddles and slippery surfaces.

ADVERTENCIA: El uso de la hidrolavadora puede crear charcos y superficies resbaladizas.

AVERTISSEMENT: L'utilisation de nettoyeur sous pression peut créer les mares et les surfaces glissantes.



Pre-Start Up Engine Driven

PRE START UP ENGINE DRIVEN

- ◆ **FUEL QUANTITY:** Make sure the fuel supply is sufficient to complete the job. See the **SPECIFICATIONS** for the fuel tank capacity.
- ◆ **FUEL FILTER:** Inspect fuel filter for evidence of water contaminants.

Quick-Connect Spray Tips

These tips have fixed spray patterns that are more consistent than those produced by an adjustable nozzle. Each tip is color-coded for easy identification.

Black has a larger hole for low-pressure soap application.

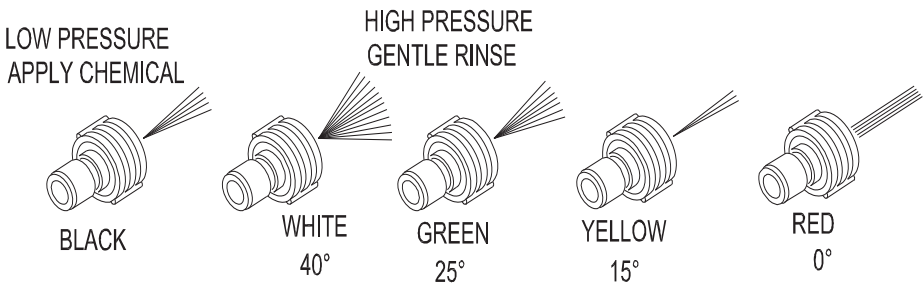
White (40°) produces a wide-fan spray for general cleaning and rinsing.

Green (25°) provides a narrower-fan spray for tough stains in general cleaning applications.

Yellow (15°) maintains a tight-fan spray with intense cleaning power for heavy-duty cleaning and paint preparation.

Red (0°) creates a concentrated pinpoint water jet for stubborn stains on concrete, masonry, or steel, and for stripping paint.

* Not all machines come equipped with all Quick-Connect Spray tips



WARNING: The high pressure stream of water that this equipment produces can cut through skin and its underlying tissues, leading to serious injury and possible amputation.

ADVERTENCIA: El chorro de agua a alta presión que este equipo produce, puede atravesar la piel y los tejidos subcutáneos, provocando lesiones de gravedad que podrían dar lugar a la amputación de un miembro.

La pistola rociadora contiene agua a alta presión incluso con el motor parado y el agua desconectada, que puede causar la herida.

AVERTISSEMENT: Le ruisseau de haute pression d'eau que cet équipement produit peut couper par la peau et ses tissus sous-tendants, en causant la blessure sérieuse et l'amputation possible.



Start Up Motor & Engine Driven

WARNING: Kickback from spray gun can cause you to fall.

ADVERTENCIA: El uso de la hidrolavadora puede crear charcos y superficies resbaladizas.

AVERTISSEMENT: Rebondit de pistolet de pulvérisation peut vous causer d'automne.



START-UP

1. **Electric Motor Driven Machines** - With the gun assembly in hand (on trigger gun models hold the trigger gun valve in **OPEN** position) and with a good flow of water turn the switch to the 'on' position.
2. **Engine Driven Machines** - With the gun assembly in hand (on trigger gun models hold the trigger gun valve in **OPEN** position) and with a good flow of start the engine per engine owner's manual.

CAUTION: Do not operate with the trigger gun valve closed for more than 3 minutes or water pump damage may occur.

CAUTION: A good flow of water must be flowing from the end of a gun for 30 seconds, before proceeding. Lack of water can cause damage to the water pump and like components.

To clean:

Start on the lower portion of the area to be cleaned and work up using long, even, overlapping strokes.

Dirt is generally removed easily if grease and/or oil are not present; however, if grease and/or oil are present, hot water and chemical will accelerate in the cleaning process.

To apply chemical:

Use factory recommended chemicals for best cleaning action and for extended pump life. Contact your dealer for chemicals available. Follow instructions on the chemical container.

Mix chemicals per label instructions. Use necessary safety precautions.

Insert chemical screen into chemical container.

WARNING: Chemical Burn Hazard. Chemicals could cause burns resulting in death or serious injury, and/or property damage.

ADVERTENCIA: Riesgo de Quemadura Químico. Los productos químicos podrían causar quemaduras que causan la herida de muerte o seria, y/o el daño a la propiedad.

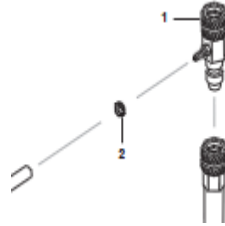
AVERTISSEMENT: Le Produit chimique Brûle le Hasard. Les produits chimiques pourraient provoquer brûle la conséquence dans la blessure mortelle ou sérieuse, et-ou le dommage de propriété.



Upstream Chemical Injection – Through Pump or Float Tank

When injecting chemicals “upstream” what you are doing is introducing chemicals to the water flow as it enters the actual pump inlet and requires a float tank. The popularity of this type of chemical injection is due to the fact that this allows chemicals to be applied at full pressure a major advantage for productivity.

CAUTION: You cannot draw chemical through the pump such as an abrasive product as an aluminum brightener. It will cause a non-warrantable premature pump failure.



Downstream Chemical Injection – On End of Gun

Injector assembly connected to the discharge gun wand quick coupler. This effectively eliminates the major risks of exposing the inner workings of a pump to harsh chemicals. When chemical is desired, the system must be switched over to the **low pressure nozzle** to draw chemical.

Chemical Injection Operation

A. Engage the trigger safety latch on the spray wand. Pull back the Quick-Connect collar on the end of the wand and remove the tip. Now insert “black” tip into the fitting, and release the collar. You can draw chemical only with the “black” low pressure nozzle. Tug on spray tip to make sure the connection is secure. Rotate to desired spray angle. For most effective cleaning, keep spray tip from 8 to 24 inches away from the cleaning surface.

B. Insert chemical screen into chemical container.

C. Turn the burner switch to the “off” position. There will be air in the chemical line. Air heats very quickly and needs to be eliminated before the burner can be turned on. Open the metering valve counter clockwise with the trigger gun open allowing the chemical to come up the chemical line. Chemical should begin moving up the chemical line. Once the chemical line is completely full, trigger the gun on and off numerous times to break any possible air locks. Turn burner system switch to “on” position.

D. If the gun assembly is equipped with variable or multiple nozzle assembly, adjust to low pressure.

E. If the gun assembly is equipped with a dual lance wand open the valve.

Do not allow the detergent to dry on the surface (prevents streaking).

If the gun assembly is equipped with variable or multiple nozzle assembly, adjust as desired.

To Rinse:

If the machine is equipped with a panel mounted metering valve, close the chemical metering valve (if so equipped).

NOTE: It is advisable to dip the chemical screen in a container of clean water and open the valve 1 minute to clean the valve of any remaining residue.

If the gun assembly is equipped with variable or multiple nozzle assembly, open and close to clean nozzle of any remaining residue.

After a clear flow of water is noted from the end of the wand, Engage the trigger safety latch on the spray wand. Pull back the Quick-Connect collar on the end of the wand and remove the tip. Now insert high pressure tip into the fitting, and release the collar. Start from the top, working downward using long, overlapping strokes

NOTE: Machines with PRESSURE SWITCHES, because of lower pressures may lose heat during chemical application.

Motor & Engine Driven Shut Down

Shut Down

1. **Electric Motor Driven Machines** - With the gun assembly in hand (on trigger gun models hold the trigger gun valve in open position) the switch to the 'off' position.
2. **Engine Driven Machines** - With the gun assembly in hand (on trigger gun models hold the trigger gun valve in open position) and with a good flow of start the Engine.
1. If freezing conditions may exist, refer to STORAGE in MACHINE MAINTENANCE.

Combination Option Operating Instructions

Combination Option Operating Instructions

NOTE: In process of making steam, the water flow through the coil has to be decreased. The amount of water is determined by the pressure and water temperature of your location.

If the incoming water temperature is as high as 70°F, the amount of water going through the coil has to decrease very little.

If the incoming water temperature is as low as 40°F, the amount of water going through the coil has to be decreased.


The water temperature is relative to the season variation and should be taken in consideration when operating steam.


The 2 systems used to create steam they are the high volume and low volume system. The high volume system uses a regulating valve and the low volume uses a metering valve.


WARNING: The discharge reaching over 300°F can cause **SERIOUS BODILY INJURY** to you and anyone coming in contact with it.

La décharge atteignant par-dessus 300° F peut causer **LA BLESSURE PHYSIQUE SERIEUSE** à vous et n'importe qui entrant le contact avec cela.

La expulsión de que es más de 300°F puedo hacer un lesión de grave a Usted o alguien quien usar esto equipo.

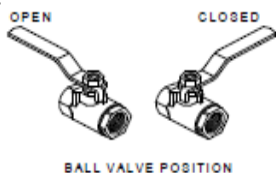
 **WARNING:** RISK OF INJECTION OR SEVERE INJURY. KEEP CLEAR OF NOZZLE. DO NOT DIRECT DISCHARGE STREAM AT PERSONS. THIS EQUIPMENT IS TO BE USED ONLY BY TRAINED OPERATORS.

 **AVERTISSEMENT:** RISQUE D'INJECTION ET DE BLESSURES GRAVES. SE TENIR À L'ÉCART DU JET. NE PAS DIRIGER LE JET DE SORTIE VERS D'AUTRES PERSONNES. CONFIER L'UTILISATION LE JET DE SORTIE VERS D'AUTRES PERSONNES. CONFIER L'UTILISATION DE CE MATÉRIEL À UN OPÉRATEUR QUALIFIÉ.

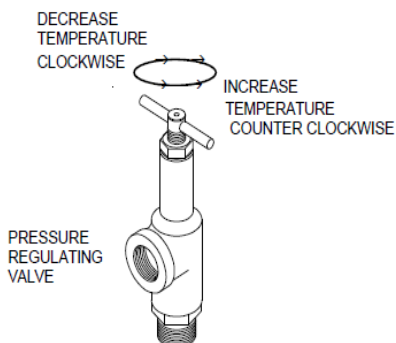
 **ADVERTENCIA:** RIESGO DE LA INYECCIÓN O SEVERO LESIÓN. CLARO DE LA SUBSISTENCIA DEL INYECTOR. NO DIRIJA LA CORRIENTE DE LA DESCARGA EN LAS PERSONAS. ESTO EL EQUIPO DEBE SER UTILIZADO SOLAMENTE LOS OPERADORES ENTRENADOS.

Pre Start - Up High Volume Combi

1. Set temperature control at 300°F / 150°C MAXIMUM.
2. Open the water bypass ball or metering valve (if so equipped) on the coil inlet assembly.



3. Turn the tee on the regulating valve (if so equipped) clockwise to DECREASE the temperature and counter clockwise to INCREASE the temperature.

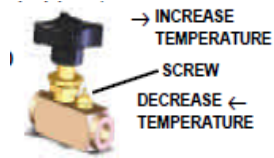
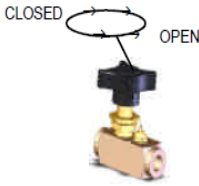


Pre Start - Up Low Volume Combi

TEMPERATURE REGULATING:

Regulate the temperature indicated on the thermometer to 300°F by adjusting the regulating valve.

1. Set temperature control at 300°F / 150°C MAXIMUM.
2. Completely open the water bypass metering valve (if so equipped) handle turning it counter clockwise found on the pump or unloader assembly.
3. With a small common screw driver turn the screw on the metering valve (if so equipped) counter clockwise to **DECREASE** the temperature and clockwise to **INCREASE** the temperature.



Start Up

1. Install the open gun assembly.
2. With the gun assembly in hand (on trigger gun models hold the trigger gun valve in open position) and with a good flow of water, start the engine.

CAUTION: A good flow of water must be flowing from the end of a gun for 30 seconds, before proceeding. Lack of water can cause damage to the water pump and like components.

CAUTION: On a machine equipped with a trigger gun valve, if the trigger gun valve remains in the close position for more than 3 minutes, water pump damage may occur.

3. Turn the switch to the “burner” position

CAUTION: Do not run the machine with the burner switch in the on position when the fuel tank is empty or with tank valves closed. This will cause damage to the fuel pump and void warranty.

CAUTION: Do not operate with the trigger gun valve closed for more than 3 minutes or water pump damage may occur.

4. To CLEAN:

A. Start on the lower portion of the area to be cleaned and work up using long, even, overlapping strokes.

B. Dirt is generally removed easily if grease and/or oil is not present. However if grease and/or oil are present, hot water and chemical will accelerate in the cleaning process.

5. TO APPLY CHEMICAL:

CHEMICAL: Use factory recommended chemicals for best cleaning action and for extended pump life. Contact your dealer for chemicals available. Follow instructions on chemical container.

Note : If the valve is open without the chemical line in a source the water pump will draw air causing the system not to pressure up.

Mix chemicals per label instructions. Use necessary safety precautions.

CAUTION: You cannot draw an abrasive product such as an aluminum brightener. It will cause a non-warrantable premature pump failure.

When chemical is desired, the system must be switched over to the low pressure nozzle to draw chemical.

A. Insert chemical screen into chemical container.

B. If your system is hot water turn the burner switch to the off position.

There will be air in the soap line. Air heats very quickly and needs to be eliminated before the burner can be turned on. Open, counter clockwise the soap metering valve to up the chemical line. Once the chemical line is completely full trigger control gun. Soap should begin moving up the chemical line. Once the chemical line is completely full trigger, the gun on and off numerous times to break any possible air locks. Turn burner system switch to "on" position if equipped.

C. Adjust metering valve or injector. Install your injector tip.

D. If the gun assembly is equipped with variable or multiple nozzle assembly, adjust to low pressure'

To Rinse: (For cold water rinse, turn the burner switch off.)

A. If the machine is equipped with a panel mounted metering valve, close the chemical metering valve.

NOTE: It is advisable to dip the chemical screen in a container of clean water and open the valve 1 minute to clean the valve of any remaining residue.

B. If the gun and wand is equipped with variable or multiple nozzle assembly, open and close to clean nozzle of any remaining residue.

C. After a clear flow of water is noted from the end of the wand, start from the top, working downward using long, overlapping strokes.

Shut Down

1. Turn the burner switch to the “off” position. (If not already done so in the cold water rinse.)
2. After cool, clear water is coming from the end of the wand, turn the engine to the “off” position.

HIGH VOLUME COMBI:

- A. *Close the water bypass ball valve (if so equipped) on the coil inlet assembly.*

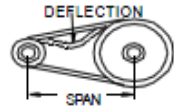
LOW VOLUME COMBI:

- A. Completely Close the water bypass metering valve (if so equipped) handle turning it clockwise found on the unloader or pump assembly.
3. Turn off the water supply.
4. If freezing conditions may exist, refer to STORAGE in the section of MACHINE MAINTENANCE.
5. Replace stack cover (if so equipped)

Machine Maintenance

Machine Maintenance

MACHINE MAINTENANCE



Belt Tension (if so equipped)

1. Deflection for each inch of span between pulley centers with a 6-pound force applied in the middle of the span.

EXAMPLE: A 6-pound force applied at the middle of an 8 inch span should produce a deflection of 8/64 inch or 1/8 inch.

2. Belts can be tightened or loosened by loosening the nuts holding the pump assembly to the motor mount. Then tighten or loosen the j-bolt on the motor mount. Retighten the pump assembly after the desired tension is reached.

SPRAY TIP MAINTENANCE

1. Remove the spray tip from the gun assembly.
2. Blow out debris with compressed air from the outside in. Any debris remaining in the inlet side of the nozzle should be cleaned out. If lime or chemical scale is present in the inlet side, the nozzle may be soaked in descaling solution or replaced. If the tip is worn, replace with one specified in the machine specifications.
3. Before replacing spray tip flush the machine per "FLUSHING".
4. Reinstall Spray tip to gun assembly.

Flushing

1. Connect machine to an electrically grounded circuit that is fuse or circuit breaker protected.
2. Turn on the water supply.
3. Check the float tank (if so equipped) to assure it is full and the float valve shuts off securely.
4. Check the position of the ball valve (if so equipped) on outlet line of the float tank assuring it is in the open position.
5. Remove spray tip from gun assembly.
6. With the gun assembly in hand (on trigger gun models hold the trigger gun valve in open position) and with a good flow of water turn switch to the "ON" position or start the engine.

STORAGE

1. Rinse the chemical line by inserting the screen into a container of clear water and open the metering valve 1 minute to clean it of any remaining residue. Be sure the chemical metering valve is closed when finished.
2. Check the position of the ball valve (if so equipped) on the outlet of the float tank assuring it is in the closed position.
3. Attach an air chuck to the air valve stem on the pump assembly. With the trigger gun in the open position, apply air until a mixture of air and very little water is coming from the gun wand.
4. Remove the air chuck.
5. Fill a 1-gallon container with Ethylene Glycol type antifreeze. Minimum should be a mixture of ½ antifreeze and ½ water strength before each use, as the antifreeze will dilute with use.
6. FLOAT TANK EQUIPPED: Pour the anti-freeze solution into the float tank.
7. WITHOUT FLOAT TANK: Install a 2 2-ft. Garden hose to the water inlet. Insert the other end into a container of antifreeze solution.
8. **Electric Motor Driven Machines** - Turn on the switch to the "ON" position.
9. **Engine Driven Machines** - Start the engine per engine owner's manual.
10. **Electric Motor Driven Machines** - Turn off the switch just prior to running out of antifreeze mixture.
11. **Electric Motor Driven Machines** - Shut off the engine just prior to running out of antifreeze mixture Disconnect electrical supply.
12. Place machine in a dry place protected from weather condition.

Troubleshooting

Troubleshooting

| Trouble | Possible Cause | Remedy |
|--------------------------------|--|--|
| Poor cleaning action | Hard water. | Connect machine to water softener. |
| | Low pressure. | See "low operating pressure." |
| | Little or no chemical being drawn. | See "machine will not draw chemical." |
| | Improper chemical. | Obtain proper chemical. |
| | Improper chemical mixture. | Mix chemicals per the label. Follow all mixing, handling, application, and disposal instructions. |
| | Low discharge pressure. | See "low operating pressure." |
| Machine will not draw chemical | No chemical solution. | Replenish supply. |
| | Metering valve not open. | Turn metering valve knob to open. |
| | Chemical line strainer clogged. Air leak in chemical line. | Remove screen and clean |
| | Metering Valve clogged. | Tighten all fittings and hoses for the chemical line. |
| | Restrictor orifice too large or missing. | Disassemble and clean. Install proper size orifice. |
| Low operating pressure | Insufficient water supply. | The water supply must meet or exceed the maximum discharge volume specified in the PERFORMANCE section, and minimum water inlet pressure specified in the GENERAL section of the MODEL SPECIFICATIONS section. |
| | Incoming water hose too small. | Use larger water supply hose. |
| | Water supply hose too long. | Use shorter water supply hose. |
| | Belt slippage. | Tighten belt per instructions in MACHINE MAINTENANCE insert. |
| | Worn belt. | Replace belt per CLEANER EXPLODED VIEW. |
| | Spray tip worn or wrong size. | Replace with spray tip specified in the GENERAL section of MODEL SPECIFICATIONS. |
| | Dirty or worn check valves in water pump | See PUMP TROUBLESHOOTING. |
| | Water supply hose kinked. | Straighten hose |
| | Inlet filter screen clogged | Clean water filter screen or hose inlet screen. |
| | Motor runs slow. | See "Pump engine starts slow or overheats and stops." |
| | Air leak in inlet plumbing. | Tighten all fittings. |
| Defective water pump. | See PUMP TROUBLESHOOTING. | |

Machine Troubleshooting Continued

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| | Leaking discharge hose. | If a water leak is found, DO NOT OPERATE THE MACHINE. Disconnect the power and replace hose. |
| | Chemical metering valve open and sucking air. | Re-supply chemical, place soap screen in water, or shut off metering valve. |
| | Defective unloader valve. | Repair or replace unloader valve. |
| | Inlet ball valve not fully open (if so equipped) | Open inlet ball valve completely (handle parallel w/ valve body). |
| Excessive, unusual noise | Defective pump. | See PUMP TROUBLESHOOTING. |
| | Defective motor. | Call service technician or take engine to repair/warranty station. |
| | Pulleys rubbing. | Adjust shields or pulley(s) |
| | Misalignment of pump & motor | Realign pump and engine. |
| Belts slipping | Belts too loose. | Tighten belt per instructions on MACHINE MAINTENANCE. |
| | Excessive back pressure. | See "Excessive back pressure" below. |
| | Defective water pump. | See PUMP SERVICE. |
| Excessive back pressure | Spray tip built up with lime. | Remove and clean, or replace spray tip with tip specified in the GENERAL section of MODEL SPECIFICATIONS. Flush machine per FLUSHING in MACHINE MAINTENANCE. |
| | Water pump turning too fast. | See MODEL SPECIFICATIONS. |
| | Coil built up with lime | De-lime coil. |
| | Relief valve defective. | Remove and replace. |
| Pump motor will not start (motor does not hum) | No power. | Use a different outlet, check fuses in main disconnect switch. Replace fuse if blown. |
| | Defective motor starter or ON/OFF switch. | Call service technician. |
| | Defective motor. | Call service technician, or take motor to Repair/Warranty station. |
| Pump motor will not start (motor hums) | Pump frozen. | Machine must be thoroughly warmed to above freezing. |
| | Defective motor. | Call service technician or take motor to Repair/Warranty station. |
| | Defective water pump. | See PUMP SERVICE. |
| | Excessive back pressure. | See "Excessive back pressure" above. |
| Pump motor starts slow or overheats and stops | Low voltage | See "Low voltage" below. |

Machine Troubleshooting Continued

| | | |
|-------------------------------------|--|--|
| | Excessive back pressure. | See "Excessive back pressure" above. |
| | Defective motor. | Call service technician, or take motor to Repair/Warranty station. |
| Pump motor stops and will not start | Motor starter "kicked out" (if so equipped) or thermal overload tripped. | Turn motor starter off to reset, then turn on, or push thermal overload reset button on motor. |
| | Excessive back pressure. | See "Excessive back pressure" above. |
| | Defective motor. | Call service technician, or take motor to Repair/Warranty station. |
| Low voltage | Incoming voltage incorrect. | Have a qualified technician check the motor terminal voltage. Correct voltage is in MODEL SPECIFICATIONS. |
| | Not large enough extension cord. | Use an extension cord with amperes of watts rating as high as or higher than that of the MODEL SPECIFICATIONS. |
| | Too long extension cord. | Shorten extension cord. |
| Machine shocks operator | Machine improperly grounded. | STOP operating machine. Call service technician. |
| | Outlet not grounded | Have properly wired outlet installed. |

