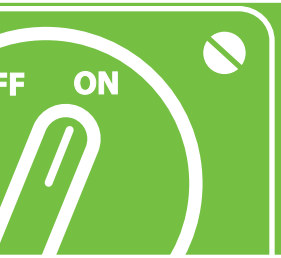
Operation Manual



Electric Driven
Electric Heat

20180817

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.

DANGER

Indicates a hazard which, if not avoided, *will result in death or serious injury.*

WARNING

Indicates a hazard which, if not avoided, *could result in death or serious injury.*

CAUTION

Indicates a hazard which, if not avoided, *might result in minor or moderate injury.*

CAUTION

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

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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.

WARNING:
ADVERTENCIA:
AVERTISSEMENT:

20180730

California Prop 65 Warning

Operation - Safety
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

Electrical Installation
Operating Instructions Pre-Start Up

General Safety

1. Before operating this machine, read and observe all safety, unpacking, and operating instructions. Failure to comply with these instructions could create a hazardous situation.
2. The operator of this equipment should not operate this equipment when fatigued or under influence of alcohol or drugs.
3. The operator of this equipment should be thoroughly familiar with its operation and trained in the job to be accomplished.
4. The operator of this equipment should wear protective face shields and other protective clothing as required for safe operations.
5. Do not leave this machine unattended when it is operating.
6. All installations must conform to all applicable local codes. Contact your electrician, plumber, utility company or seller for details.
7. Follow instructions on how to stop the machine and bleed pressures quickly. Be thoroughly familiar with the controls.
8. Do not operate the machine if any mechanical failure is noted or suspected.
9. When starting a job, survey the area for possible hazards and correct before proceeding.
10. 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.
11. If a water or fuel leak is found, **DO NOT OPERATE THE MACHINE.** Shut off and repair.
12. Inspect machine for damaged or worn components and repair or replace to avoid potential hazards. Do not operate the machine if any mechanical failure is noted or suspected.
13. If chemicals are used in conjunction with this equipment, read and follow the product label directions.
14. Always point the gun assembly in a safe direction away from people and do not direct spray on the cleaner.

Electrical Motor Driven Safety

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.

Mechanical Safety

1. All guards, shields, and covers must be replaced after adjustments are made to prevent accidental contact with hazardous parts.
2. Inspect machine for damaged or worn components and repair or replace to avoid potential hazards. Do not operate the machine if any mechanical failure is noted or suspected. Drive belts if so equipped must be inspected and tightened
3. Always use spray tip or steam impact nozzle specified in the machine specifications.

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: 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.

⚠ WARNING ⚠ ADVERTENCIA

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.

⚠ 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'automne.

⚠ 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: Protect machine from freezing.

ADVERTENCIA: Proteja la máquina contra la congelación.

AVERTISSEMENT: Protéger la machine contre le gel..

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.

⚠ WARNING

⚠ ADVERTENCIA

Machine Installation

Location
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 defendant 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.

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: 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.

⚠ WARNING

⚠ ADVERTENCIA

Pre-Operational Instructions

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.

Quick-Connect Spray Tips

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.

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.

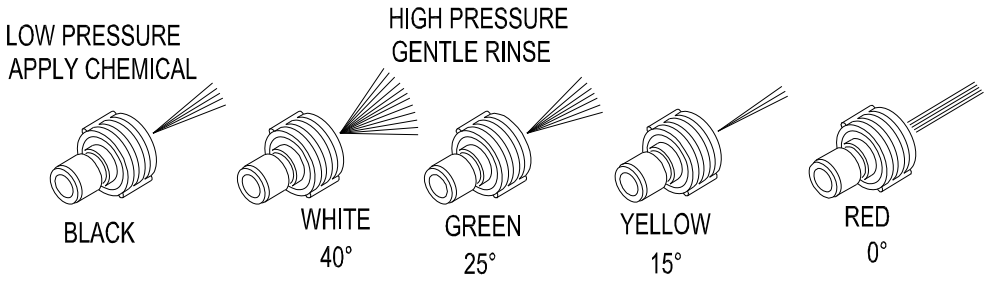
White (40˚) produces a wide-fan spray for general cleaning and rinsing.

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



Start-Up Instructions

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.

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.

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.

Shut Down Instructions

Shut Down

1. Turn the burner switch off (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 pump switch to “off.”
3. Turn off the water supply.
4. Shut off electrical supply.
5. If freezing conditions may exist, refer to STORAGE in MACHINE MAINTENANCE.

Machine Steam Combination Operation

NOTE: In process of making steam, the water flow through the heater manifold 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 heater manifold has to decrease very little.
If the incoming water temperature is as low as 40°F, the amount of water going through the water manifold has to be decreased.
The water temperature is relative to the season variation and should be taken in consideration when operating steam.

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 àvous et n’importe qui entrant le contact avec cela.

La expulsión de que es más de300°F puedo hacer un lesión de grave a Usted o alguien quien usar esto equipo.

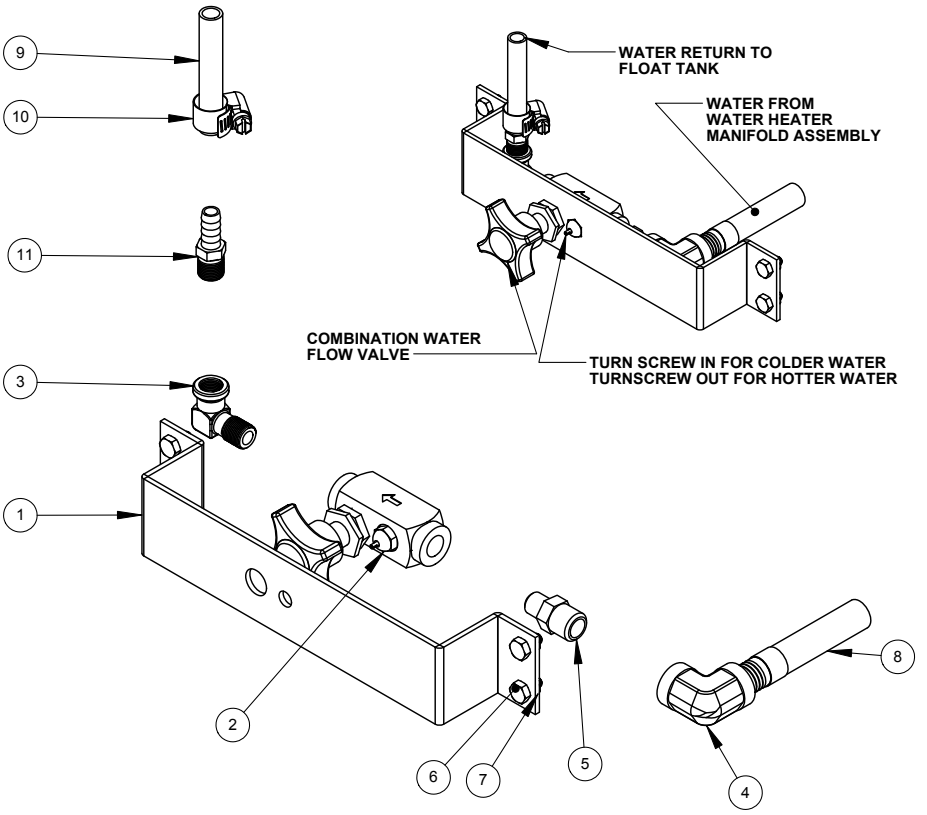
***WARNING:** RISK OF INJECTION OR SEVERE INJURY. KEEP CLEAR OF NOZZLE. DO NOT DIRECT DISCHARGE STREAM AT PERSONS. THIS EQUIPMENT ISTO BE USED ONLY BY TRAINED OPERATORS.*

***AVERTISSEMENT:** RISQUE D’INJECTION ET DE BLESSURES GRAVES. SE TENIR À L’ÉCART DU JET. NE PAS DIRIGER LE JET DE SOTIE VERS D’AUTRES PERSONNES CONFIER L’UTILISATION LE JET DE SOTIE 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 OPERADORESENTRENADOS.*

Combi Start-Up Instructions

1. Change discharge gun to open steam gun assembly.
2. Set temperature control on control box at 300°F / 150°C MAXIMUM.
3. Open the water metering valve by turning knob counter clockwise on the combi manifold assembly.
4. Turn the valve on the regulating valve clockwise to INCREASE the temperature and counter clockwise to DECREASE the temperature.



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 handle turning it counter clockwise found on the combi manifold assembly.
3. With a small common screw driver turn the screw on the metering valve in to ***DECREASE*** the temperature and out to ***INCREASE*** the temperature.

1. Install the open gun assembly.
2. With the gun assembly in hand turn cam switch to on.

   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.
3. Turn the switch to the “heat” 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 an 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.

Combi Shut Down Instructions

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.

A. Close the water bypass valve on the combi manifold assembly.

3. Turn off the water supply.

4. If freezing conditions may exist, refer to STORAGE in the section of MACHINE MAINTENANCE.

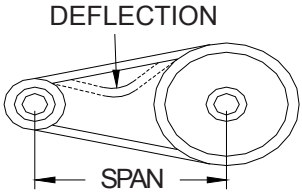
MACHINE MAINTENANCE

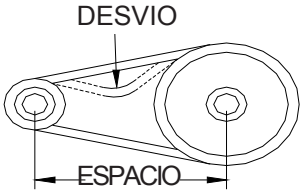
Belt Tension (if so equipped)

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.

Heater Manifold Back Pressure Check

A regular maintenance schedule for descaling of your heating manifold is essential to ensure its longevity.

The frequency of descaling depends upon the amount of use and the condition of the water.

Heater Manifold Check Instructions

1. Remove discharge hose from machine.

2. Inspect inside of hose for build-up of any material. If 1/16" build-up of material exists, descaling should be performed.

A separate descaling pump is recommended so scale and other chemicals will not come in contact with your water pump and causes premature wear.

NOTE: Contact your local dealer for descaling of your machine.

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. Turn on the switch to the "ON" position.
9. Turn off the switch just prior to running out of antifreeze mixture.
10. Shut off the engine just prior to running out of antifreeze mixture Disconnect electrical supply.
11. Place machine in a dry place protected from weather condition.

Machine Maintenance Schedule

MOTOR DRIVEN ELECTRIC FIRED CLEANERS	daily	Each HR 1st 8 HRS	AFTER 1ST 50 HRS	EVERY 50 HRS	EVRERY 100 HRS	EVERY 500 HRS	YEARLY
Oil Bath Water Pump:							
Oil Level- check and add as needed per PUMP SERVICE insert	•						
Oil Change- drain and refill per PUMP SERVICE insert CAUTION: Used oil must be disposed into an environmentally safe container and brought to an oil recycling center			•			•	
Oil Contamination- milky color indicates water	•						
Hoses:							
Blistering, loose covering	•						
Abrasion of cover exposing reinforcement	•						
Cuts exposing reinforcement	•						
Belts:							
Cracks or fraying	•						
Belt tension- For correct belt tension, see MACHINE MAINTENANCE insert	•						
Filter-Water:							
Check water inlet hose screen for debris		•		•			
Check float tank screen for debris	•						
Leaks:							
Check for water and build up of scale at pipe connections	•						
Fuel:							
Adequate fuel supply	•						
Filter-Fuel:							
If contaminants are present see FUEL FILTER insert	•						
Remove and replace fuel filter.						•	
Screen-Fuel Pump:							
Check fuel pump screen for debris. See OIL BURNER MAINTENANCE insert					•		
Burner Nozzle:							
Replace nozzle as specified in BURNER section of MODEL SPECIFICATIONS or BURNER ASSEMBLY insert							•
Guards and Shields:							
Check that all guards and shields are in place and secure							•
Pump Motor with Grease Fittings:							

Remove drain plug. Use 1 or 2 full strokes of Shell “DOBLIUM RB”, Chevron “SR! No.2” or Texaco “PREMIUM RB”. Operate for 20 minutes and replace drain plug				•		
Heating Manifold						
Lime deposit test.			•			
Freezing Temperatures						
Freezing temperatures break heating manifolds and water pumps. See STORAGE in the MACHINE MAINTENANCE section for cold weather instructions.				•		

Machine 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

	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 odes 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 or 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.
Heater Does not activate	Insufficient water flow.	Check for sufficient water flow
	Water temperature too high.	Check water temperature to make sure it is not above 150° F limit.
	Pressure switches inoperable.	Check for switch operation across terminals, adjust or replace.