



Operators Manual

**ACF1-1000
CFH-3010E**

**Do not use or operate machine until this
manual has been read and fully understood**

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Model Number _____
Serial Number _____
Date of Purchase _____

The model and serial numbers are found on a decal attached to the pressure washer. You should record both the serial number and the date of purchase and keep them in a safe place for future reference.

Thank you for purchasing this hot water pressure washer. We reserve the right to make changes to the pressure washer at any time, without incurring any obligation.

OWNER/USER RESPONSIBILITY

The owner and/or user must have an understanding of the manufacturer's operating instructions and warnings before using this pressure washer. Warning information should be emphasized and understood. If the operator is not fluent in English, the manufacturer's instructions and warnings shall be read to and discussed with the operator in the operator's native language by the purchaser/owner, making sure that the operator comprehends its contents.

The owner and/or user must study, and maintain for future reference, the manufacturer's instructions.

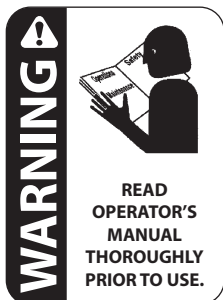
The operator must know how to stop the pressure washer quickly and understand the operation of all controls. Never permit anyone to operate the pressure washer without proper instructions.

This manual should be considered a permanent part of the pressure washer and should remain with it if the pressure washer is resold.

When ordering parts, specify the model and serial number. Use only identical replacement parts.

This pressure washer is to be used only by trained operators.

IMPORTANT SAFETY INFORMATION



WARNING: To reduce the risk of injury, read the operating instructions carefully before using.

1. Read the owner's manual thoroughly. Failure to follow the instructions could cause a malfunction of the machine and in death, serious bodily injury, and/or property damage.
2. Know how to stop the pressure washer and bleed the pressure quickly. Be thoroughly familiar with the controls.

3. Stay alert - watch what you are doing.
4. Do not add fuel while the pressure washer is running.
5. All installations must comply with local codes. Contact your electrician, plumber, utility company, or the selling distributor for specific details.

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.



WARNING: Keep the wand, hose, and water spray away from electric wiring or fatal electric shock may result.

6. To protect the operator from electrical shock, the machine must be electrically grounded. It is the responsibility of the owner to connect this machine to a UL grounded receptacle with the proper voltage and amperage ratings. Do not spray water on or near electrical components. Do not touch the pressure washer with wet hands or while standing in water. Always disconnect the power before servicing.



WARNING: Flammable liquids can create fumes which can ignite, causing property damage or severe injury.

WARNING: Risk of explosion — Operate only where an open flame or torch is permitted.



WARNING: Risk of fire - Do not add fuel when the pressure washer is operating or still hot.

7. Keep the operating area clear of all persons.

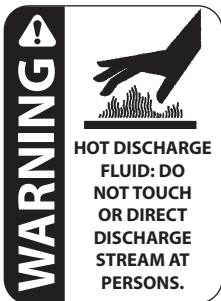


WARNING: High pressure spray can cause paint chips or other particles to become airborne and fly at high speeds. To avoid personal injury, eye, hand, and foot safety devices must be worn.

8. Eye, hand, and foot protection must be worn when using this pressure washer.



WARNING: This pressure washer exceeds 85 db. Appropriate ear protection must be worn.



CAUTION: Hot discharge fluid. Do not touch or direct the discharge stream at anyone.

WARNING: This pressure washer produces hot water and must have insulated components attached to protect the operator.



WARNING: Risk of injury. Hot surfaces can cause burns. Use only the designated gripping areas of the spray gun and wand. Do not place your hands or feet on non-insulated areas of the pressure washer.

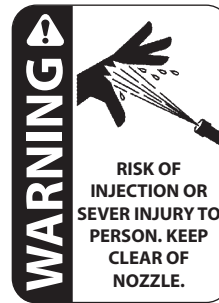
9. To reduce the risk of injury, close supervision is necessary when this pressure washer is used near children. Do not allow children to operate the pressure washer. This pressure washer must be attended during operation.



WARNING: Grip the cleaning wand securely with both hands before starting. Failure to do this could result in injury from a whipping wand.

10. Never make adjustments to the pressure washer while in operation.

11. Be certain all quick coupler fittings are secured before using this pressure washer.



WARNING: The high pressure developed by this pressure washer can cause personal injury or equipment damage. Keep clear of the nozzle. Use caution when operating. Do not direct the discharge stream at people, or severe injury or death could result.



WARNING: Protect the pressure washer from freezing.

12. To keep the pressure washer in the best operating condition, it is important that you protect the pressure washer from freezing. Failure to do this could cause a malfunction of the pressure washer and result in death, serious bodily injury, and/or property damage. Follow the storage instructions specified in this manual.

13. Inlet water must be clean, fresh water, no hotter than 90°F.



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

14. Avoid installing this pressure washer in small areas or near exhaust fans. Adequate oxygen is needed for combustion or dangerous carbon monoxide can result.

15. The manufacturer is not liable for any changes made to our standard pressure washers or any components not purchased from us.

16. The best insurance against an accident is caution and knowledge of the pressure washer.



WARNING: Be extremely careful when using a ladder, scaffolding, or any other relatively unstable location. The cleaning area should have adequate slopes and drainage to reduce the possibility of a fall due to slippery surfaces.

17. Do not overreach or stand on an unstable support. Keep good footing and balance at all times.

18. Do not operate this pressure washer when fatigued or under the influence of alcohol, prescription medications, or drugs.

19. Follow the maintenance instructions specified in the manual.

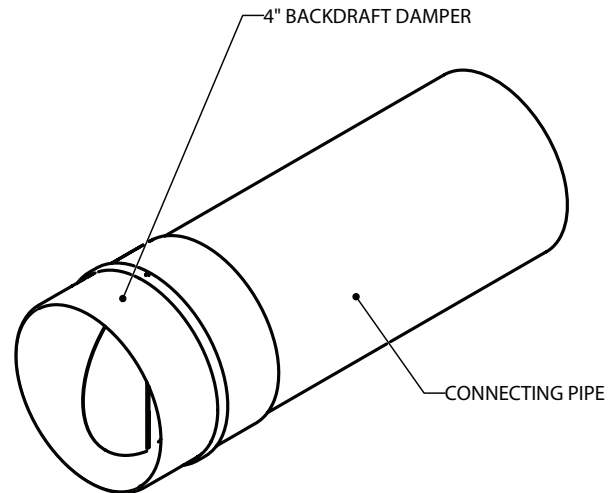
20. Install this pressure washer on non-combustible flooring.

21. Do not allow acids or caustic or abrasive fluids to pass through the pump.

22. Never run the pump dry. Do not leave the spray gun closed longer than three minutes without having the "Clutch" option.

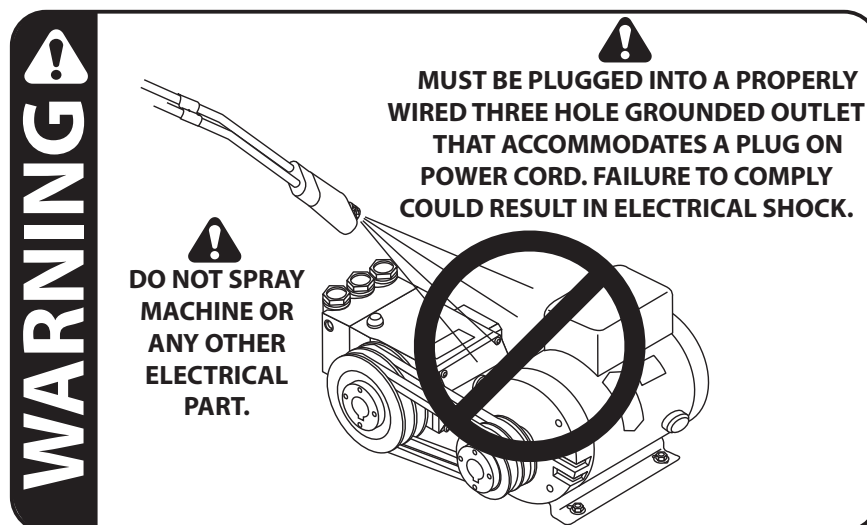
WARNING: If a connection is made to a portable water supply, a back-flow device must be used.

23. Exhaust gases should not be vented into a wall, a ceiling, or a concealed space in a building. A back draft preventer should be installed to prevent drawing cool air through the heat chamber when not in use.



Example of a backdraft preventer (must have flap to stop backdraft)

Follow the maintenance instructions specified in the manual.



Merci d'avoir acheté ce nettoyeur haute pression à l'eau chaude. Nous nous réservons le droit de modifier ce nettoyeur haute pression en tout temps et sans préavis.

RESPONSABILITÉ DU PROPRIÉTAIRE OU UTILISATEUR :

Le propriétaire ou utilisateur doit avoir bien compris les instructions de fonctionnement du fabricant et les avertissements avant l'utilisation de ce nettoyeur haute pression. Les avertissements doivent être notés et bien compris. Si l'opérateur n'a pas une bonne compréhension de l'anglais, les instructions du fabricant doivent être lues et expliquées à l'utilisateur dans la langue d'origine par l'acheteur ou propriétaire, en s'assurant qu'il comprend bien ces instructions.

Le propriétaire ou l'utilisateur doit étudier et conserver pour toute référence ultérieure les instructions du fabricant.

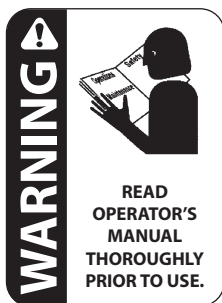
L'opérateur doit savoir comment arrêter rapidement le nettoyeur haute pression et comprendre le fonctionnement et toutes les commandes. Ne permettez jamais à quiconque d'utiliser ce nettoyeur haute pression sans les instructions appropriées.

Ce manuel doit être considéré comme faisant partie intégrante du nettoyeur haute pression et doit être joint au nettoyeur si ce dernier est revendu.

Lors de la commande de pièces détachées, spécifiez le numéro de série et le modèle. Lors de l'entretien, utilisez exclusivement des pièces de rechange identiques.

Ce nettoyeur haute pression ne doit être utilisé que par des opérateurs formés au préalable.

INSTRUCTIONS DE SÉCURITÉ IMPORTANTES



AVERTISSEMENT: Pour réduire le risque de blessures lisez avec attention les instructions de fonctionnement :

1. Le manuel du propriétaire doit être lu entièrement avant toute utilisation. Si les instructions ne sont pas appliquées, il peut en résulter un fonctionnement

défectueux de la machine, et des blessures graves, ainsi que des dégâts matériels.

2. Il convient de savoir comment procéder pour arrêter le nettoyeur haute pression et purger la pression rapidement. Il convient de bien connaître

toutes les commandes.

3. Il convient d'être alerte et de bien faire attention à la procédure.

4. Ne remplacez pas le réservoir GPL pendant le fonctionnement du nettoyeur haute pression.

5. Toutes les installations doivent être en conformité avec les normes locales. Contactez un électricien, un plombier la société de services publics ou le revendeur pour tous détails spécifiques.

DANGER: Une connexion incorrecte du connecteur de mise à la masse de l'équipement peut être source de choc électrique. Vérifiez avec un technicien qualifié en cas de doute sur la mise à la masse correcte de la prise secteur utilisée.



AVERTISSEMENT: Conservez le tube, le tuyau et le pulvérisateur à l'écart du câblage électrique, car un choc électrique mortel peut se produire.

6. Pour protéger l'opérateur des chocs électriques, la machine doit être mise à la masse.

Il incombe au propriétaire de connecter cette machine à une prise secteur mise à la masse ayant une tension et un ampérage adaptés. Ne pulvérisez pas d'eau près de composants électriques. Ne touchez pas le nettoyeur haute pression avec les mains mouillées ou quand vous êtes dans l'eau. Deconnectez toujours l'alimentation avant l'entretien de l'appareil



AVERTISSEMENT: Les liquides inflammables peuvent créer des fumées qui peuvent s'enflammer, et être responsable de dégâts matériels ou des blessures graves.

AVERTISSEMENT: Risque d'explosion — Ne l'utilisez que dans des endroits où une flamme nue ou une torche est autorisée.



AVERTISSEMENT: Risque d'incendie — Ne changez pas de réservoir pendant le fonctionnement du nettoyeur ou s'il est encore chaud.

AVERTISSEMENT : Utilisez uniquement du carburant à gaz.

7. Veillez à ce qu'il n'y ait personne dans la zone de nettoyage.

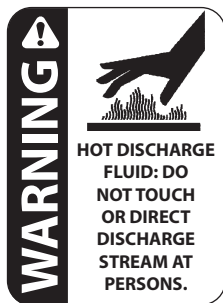


AVERTISSEMENT: La pulvérisation à haute pression peut entraîner l'écaillage de la peinture ou générer des particules qui deviendront aérogènes et s'envoleront à des vitesses élevées. Pour éviter des blessures aux yeux, aux mains et aux pieds, il convient de porter des appareils de sécurité.

8. Les protections pour les yeux, les mains et les pieds doivent être portées pendant l'utilisation de ce nettoyeur haute pression.



AVERTISSEMENT: Le bruit émis par ce nettoyeur haute pression est supérieur à 85 dB. Une protection appropriée de l'ouïe est nécessaire.



ATTENTION: Liquide chaud déchargé. Ne touchez pas le flux de décharge et ne le dirigez pas vers d'autres personnes.

AVERTISSEMENT: Ce nettoyeur haute pression produit de l'eau chaude et les composants isolés doivent être installés pour protéger l'opérateur.



AVERTISSEMENT: Risque de blessures. Les surfaces chaudes peuvent être source de brûlures. N'utilisez que les zones de prise du pulvérisateur et du tube. Ne placez pas les mains ou les pieds sur des zones non isolées du nettoyeur haute pression.

9. Pour réduire le risque de blessures, une supervision étroite est nécessaire lorsqu'il est utilisé à proximité de jeunes enfants. N'autorisez pas les enfants à utiliser ce nettoyeur haute pression. Le nettoyeur haute pression doit être sous surveillance pendant son utilisation.



AVERTISSEMENT: Agrippez le tube de nettoyage à l'aide des deux mains avant de commencer. Sinon le tube de nettoyage peut être source de blessures.

10. Ne réglez jamais le nettoyeur haute pression pendant qu'il est utilisé.

11. Vérifiez que tous les raccords rapides sont bien fixés avant d'utiliser ce nettoyeur haute pression.



AVERTISSEMENT: La haute pression créée par ce nettoyeur peut être source de blessures graves ou de dégâts matériels. Restez à l'écart de la buse. Faites attention pendant son utilisation. Ne dirigez pas le jet vers des personnes, car cela pourrait être source de blessures graves voire mortelles.



AVERTISSEMENT : Protégez le nettoyeur haute pression du gel.

12. Pour que ce nettoyeur haute pression soit toujours dans des conditions optimales de fonctionnement, il est important

de le protéger du gel. Si ce n'est pas le cas, cela sera source de mauvais fonctionnement du nettoyeur, de blessures graves, voire mortelles ou de dégâts matériels. Suivez les instructions de rangement spécifiées dans ce manuel.

13. L'admission d'eau doit être nettoyée avec de l'eau propre à une température qui ne doit pas dépasser 90 °F.



AVERTISSEMENT: Risque d'asphyxie. Utilisez ce nettoyeur haute pression uniquement dans des endroits bien ventilés.

14. Évitez d'installer ce nettoyeur dans des endroits confinés ou près de ventilateurs. Une quantité d'oxygène adéquate est nécessaire pour la combustion, sinon du monoxyde de carbone dangereux peut se produire.

15. Le fabricant ne peut être tenu responsable de modifications effectuées sur ses nettoyeurs haute pression standards ou de l'utilisation de composants qui n'ont pas été acquis chez lui.

16. La meilleure garantie contre un accident consiste à s'entourer de précautions lors de l'utilisation de ce nettoyeur haute pression.



AVERTISSEMENT: Faites extrêmement attention quand vous utilisez une échelle ou des échafaudages ou d'autres éléments relativement instables. La zone de nettoyage doit avoir des pentes adéquates pour le drainage, afin de réduire la possibilité de chute sur des surfaces glissantes.

17. Ne cherchez pas à atteindre des objets hors de portée ni ne montez sur un support instable. Gardez toujours une position stable et ne perdez jamais l'équilibre.

18. N'utilisez pas ce nettoyeur haute pression si vous êtes fatigué ou sous l'influence de l'alcool ou de médicaments ou de stupéfiants.

19. Observez les instructions d'entretien dans le manuel.

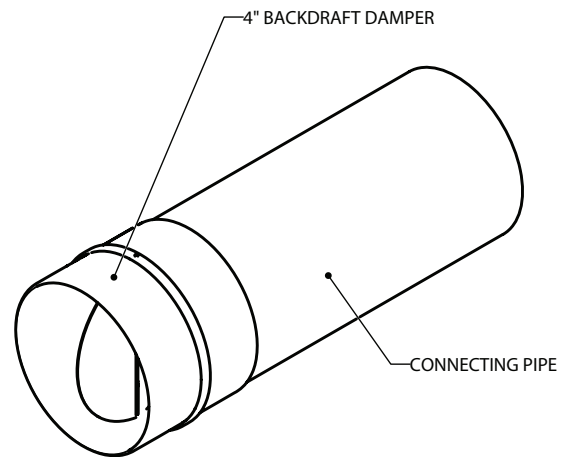
20. Installez ce nettoyeur haute pression sur un sol ininflammable.

21. Ne laissez pas d'acides ou de fluides abrasifs ou caustiques pénétrer par la pompe.

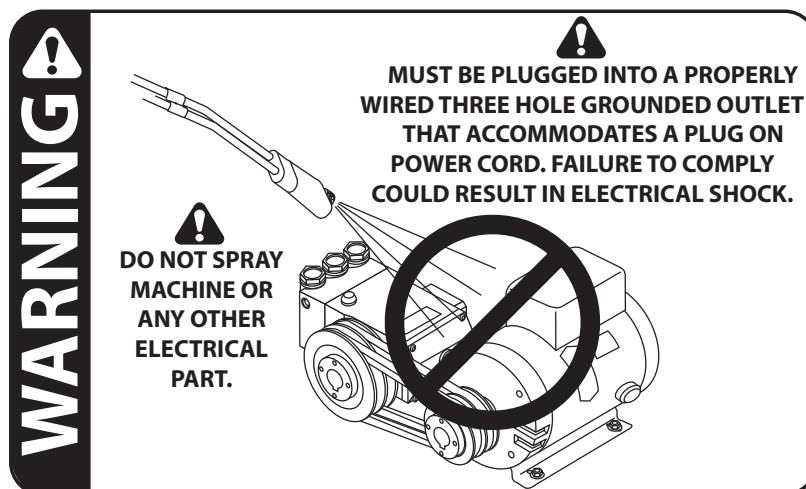
22. Ne mettez jamais la pompe en service si elle est sèche. Ne gardez pas le pistolet pulvérisateur fermé plus de trois minutes sans avoir enclenché l'option « embrayage ».

AVERTISSEMENT : En cas de connexion à une alimentation en eau portable, un dispositif anti-retour doit être utilisé.

23. Les gaz d'échappement ne doivent pas être orientés vers un mur, un plafond ou un espace confiné dans un bâtiment. Un dispositif anti-refoulement d'air doit être installé pour éviter l'aspiration d'air frais dans la chambre de combustion en cas de non utilisation.



Exemple de dispositif anti-refoulement d'air (le clapet doit être installé pour empêcher le refoulement) Observez les instructions d'entretien dans le manuel.



SETUP

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INSPECTION and IDENTIFICATION

Machine Delivery Inspection

Examine the shipping crate and machine carefully for any hidden damage during shipping. Claims for damage or shortage should be filed with the contract carrier (trucking company) that delivered the equipment. Remove all loose parts and strapping attached to the machine for shipping purposes.

Machine Identification

The machine model number, serial number, and specifications are stamped on a plate permanently attached to the right rear side of the machine main frame.

Record the information from this plate for any future reference.

Model:			
Output:	Gpm:	Psi:	
Fuel:			
Elec.:	PH:	Volts:	Amps:
Serial No.:			

LOCATION

The machine is portable and designed to be used at or near the work area under complete control of the operator. Position the machine for easy access to all controls, power, and water supply. Use an additional hose if greater washing distance is needed rather than moving the machine towards the work area.

IMPORTANT: In the event that the machine must be located out of sight of the operator, special equipment and/ or controls may be required to provide proper operation and assure operator safety. Contact your dealer or qualified service representative before installing or using the machine from a remote location.



CAUTION: Even though the machine may be portable, it must always be positioned on a solid level area with drainage to avoid the possibility of the machine tipping over and to avoid falls from slippery surfaces. Avoid areas where water may accumulate.

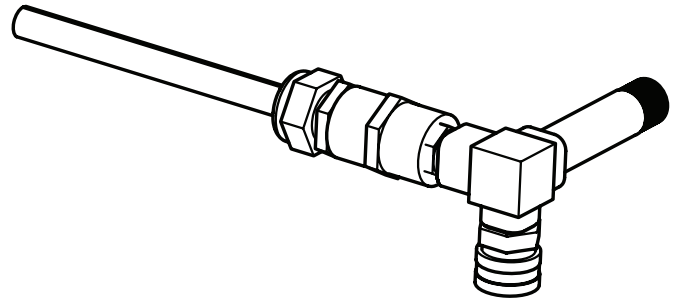


DO NOT locate the machine in small confined areas without any ventilation. Without adequate oxygen, incomplete combustion and/or carbon monoxide will result. Always protect the machine from freezing.

MACHINE SETUP

How to set up the machine: General Assembly

1. Remove the brackets and hardware from the box and locate where they go on the unit. Use the bolts and nuts to attach the hose hanger, the GFCI cord hanger, and gun storage hanger to the frame.
2. Connect the 3/8" x 40' or 3/8" x 50' high pressure discharge hose to the coil outlet quick coupler.



NOTE: Do not attach the wash gun to the hose at this time.

Fueling your machine

3. On oil fired machines, use good, clean No. 1 or No. 2 home heating oils, kerosene, or diesel fuel, free from water.

Diesel fuel may be used, however it contains additives for high compression diesel engines that may soot up the combustion chamber and may require more frequent coil cleaning to maintain efficient performance. Use No. 1 fuel in cold temperatures.



WARNING: Do not use or mix gasoline or alcohol with fuel. This mixture could cause an explosion.

4. Provide the machine with proper stacking for exhaust of flue gasses if used in an enclosed area. Comply with all state and/or local codes regarding ventilation.

IMPORTANT: If the machine is to be used inside, and you are putting a chimney on it, be sure the chimney is at least the same size as the stack on the machine.

A poor draft will cause the unit to soot and not operate efficiently. When installing the chimney, the machine should be positioned in such a manner as to use the straightest possible stack. Stacking should be made by a licensed technician and conform to all local and state codes.

- Never reduce the diameter of the stack.
- Prevent cold down drafts from freezing the coil when not in use.
- Oil fired machines need a single acting draft control.

Connecting the Water Supply

5. Connect the machine to a cold water supply tap at least 1.5 times the gallons per minute (gpm) output of the machine.

NOTE: Use at least a 5/8 inch ID supply hose if operated within 50 feet of water supply. Use 3/4 inch ID hose if over 50 feet.

IMPORTANT: If the water supply exceeds eight grains of hardness, install a water softener in the supply line to extend coil life and maintain machine efficiency.

Making the Electrical Connectings

6. Make sure that all machine switches are turned off, then connect the machine to the correct electrical supply.



Machines are equipped with UL listed power cords with a ground prong. Power cords must be plugged into a mating ground receptacle in accordance with the National Electrical Code and applicable local codes and ordinances.

- Do not modify the cord or plug.
- Do not allow an extension cord connection to fall or lay in water.
- Do not pull the cable to unplug.
- DO NOT use an adapter.

IMPORTANT: Electrical power for the machine must be supplied from a properly grounded mating receptacle and an adequately fused disconnect. Where a properly grounded receptacle is not available, it is the responsibility of the owner to provide one, or have one installed. It may be necessary to refuse the circuit to allow for motor in rush current. See your local electrician or power company. All single phase machines are equipped with an integral ground fault circuit interrupter (GFCI)

molded into the power cord. Do not modify or remove the (GFCI) plug.

If an extension cord is needed it is recommended that the cord have a (GFCI) or be connected to a (GFCI) protected circuit.

On all 115 volt machines, use a UL listed 12/3 extension cord only. Do not exceed 50 feet in length.

230 Volt, 3-Phase Machines: Electrical supply for 230 volt, 3-Phase machine models must be connected directly to the electrical service entrance control panel supplied on the machine. Electrical supply for these machines must be made by a licensed electrician and must conform to all National, State, and local codes and ordinances regarding 230 volt, 3-Phase electrical requirements.

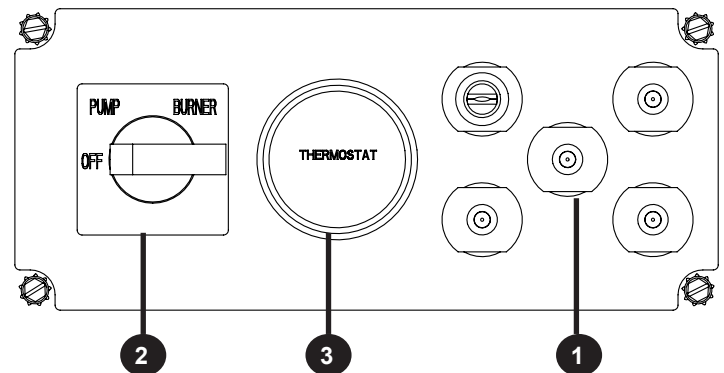
IMPORTANT: Do not attempt to operate this machine on less than 90% of rated system voltage (over-heating, poor performance, or component damage could occur). Contact a qualified electrical technician or your power company to check for proper system voltage.



KNOW THE MACHINE CONTROLS AND INSTRUMENTS BEFORE STARTING OR OPERATING THE MACHINE TO ASSURE SAFE OPERATION.

Control Panel Operation

Depending on your machine model, standard units are equipped with a single rotary type control switch for pump and burner operation.



#	Item	Description
1	Wash Jets	Quick-couple spray nozzle storage
2	Rotary Switch	Pump/Burner/OFF switch
3	Adjustable Temperature Control	Dial to set desired outlet temperature

INITIAL MACHINE STARTUP

1. On Oil Fired Machines: Fill the fuel supply tank with clean No. 1 or No. 2 home heating oil, kerosene, or diesel fuel free from water. Replace the fuel cap securely.

IMPORTANT: Always keep the fuel cap securely in place to prevent water and contamination from entering the fuel system.

NOTE: No. 2 diesel fuel may vary in BTU (heat content). Contact a service person if excessive heating or thermostat cycling occurs.



WARNING: DO NOT overfill the fuel tank! If spillage occurs, DO NOT light the burner before cleaning up any spilled fuel. If necessary, move the machine away from the spill area before lighting the burner.



WARNING: ALWAYS shut down the machine and refuel in a safe place away from open fires or sparks. DO NOT smoke while refueling.



WARNING: DO NOT use waste oil. DO NOT use or mix gasoline or alcohol with fuel. This mixture can cause an explosion resulting in serious personal injury or death.

2. Turn on the water supply valve to allow the float tank to fill.

IMPORTANT: If the water supply exceeds 8 grains of hardness, install a water softener in the supply line to extend the life and maintain machine efficiency.

3. Make sure that the machine control switch(es) are in the “OFF” position. Connect the machine to the proper electrical supply.

4. Turn the machine rotary switch to the “PUMP” position (do not start the burner) and direct the water flow into a container or floor drain. Allow water to pump through the machine for 3 to 5 minutes to flush out any contamination that may be in the system from the supply line or the manufacturing and shipping process. Check for any leaks and general machine operation during this time.



CAUTION: ALWAYS start the pump before igniting the burner. Never operate the machine without water flowing through it.

IMPORTANT: After initial installation, coil de-scaling, or after a long period of non-use, run the unit with the gun or nozzle removed to flush out any dirt, rust, or loose scale which could plug the nozzle.

5. Turn the rotary switch to the “OFF” position, then disconnect the electrical power supply.

6. Apply thread sealant to the first few threads of the high pressure discharge hose. Connect the wash gun or wand securely to the discharge hose. The machine is now ready to be put to work. (See

OPERATING INSTRUCTIONS

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OPERATING INSTRUCTIONS



WARNING: Always wear full eye protection (preferably a face shield), protective clothing, rubber gloves, and boots when operating the machine to protect yourself from burns caused by high pressure spray and detergents, fluid injection, or debris dislodged by the high pressure spray.



WARNING: Never attempt to clean or wash down the machine using its own spray gun. The machine is water protected, but not water proof. Washing down the machine will increase the hazard of electrical shock and/or damage the machine.



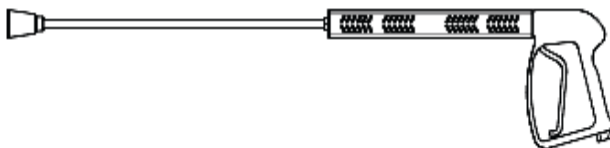
WARNING: Do not operate the machine outside in the rain or during thunder storms.

General Information

Depending on your machine model, some machines in this series are designed for steam cleaning only while other models are designed for high pressure cleaning, or “combination” high pressure or steam cleaning. Models designed for steam cleaning only will have a straight through gun (wand) with a high impact steam tip.

High pressure or “combination” high pressure/steam models feature gun control and selectable stainless steel wand tips.

HIGH PRESSURE GUN



HIGH PRESSURE / STEAM

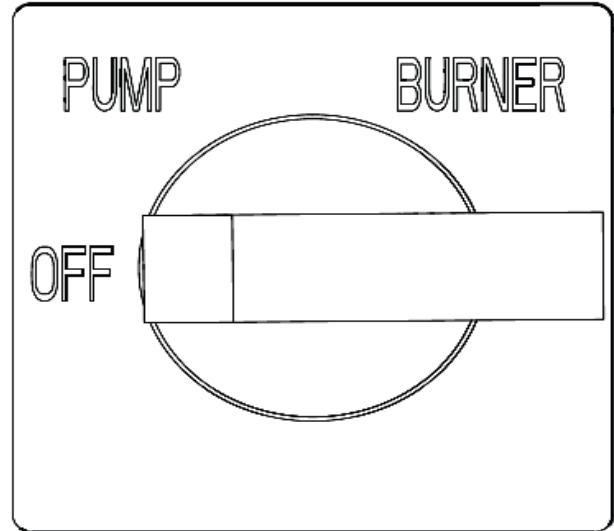


All models are equipped with adjustable temperature control.

Starting the Cleaner

To start your hot water pressure cleaner:

1. Make sure that the rotary switch is in the “OFF” position before connecting the machine to an electrical supply.



2. Connect the supply hose to the water supply and allow the float tank to fill.

3. On fuel oil fired machines, insert the detergent suction tube into a remote detergent solution container.



CAUTION: Read and follow the directions supplied by the chemical manufacturer regarding detergent usage and safety precautions.

4. If so equipped, adjust the temperature control setting for the intended cleaning mode (steam or high pressure). Set the control to 200° F for nozzles used for high pressure, hot water cleaning. Set the control to 300° F for steam cleaning.



WARNING: Never exceed 210° F maximum setting for high pressure, hot water cleaning. Exceeding the 210° F maximum setting could cause a potentially hazardous situation.

NOTE: The burner cycles on and off as required to maintain the 200° F operating temperature for high pressure, hot water cleaning. When in the steam mode, the burner runs steadily to produce steam at 300° F. If the burner does cycle, it indicates a flow problem. Contact your servicing dealer to check for proper flow and/or pressure.

Steam cleaning with full combination models

1. If steam cleaning with the full combination models, select and install the quick-coupled steam tip on the wand. DO NOT use high pressure tips for steam cleaning with these models!
2. Adjust the temperature control to the 300° position.



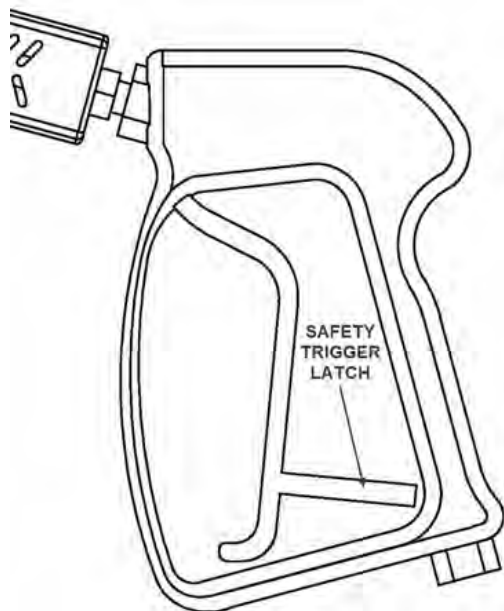
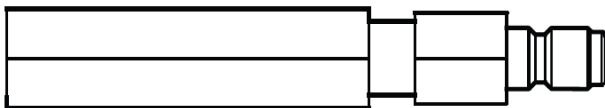
CAUTION: When using the machine as a high pressure washer make sure to change the temperature control to 200° and switch to the high pressure tips.

Steam cleaning with adjustable combination models

1. If steam cleaning with the adjustable combination models, select and install the straight thru steam gun with steam nozzle attached. DO NOT use a high pressure gun or tips for steam cleaning.



WARNING: The high pressure gun control gun is equipped with a built-in trigger safety latch. Fold the latch in the fully outward (down) position to guard against accidental trigger release and potential dangerous high pressure spray wand or hose whip when the machine is in operation. The machine should always be shutdown and system pressure relieved before changing tips or performing any other service.



WARNING: To prevent bodily injury, Trigger Gun equipped machines are provided with a safety shut off type gun. Always maintain a firm grip on the trigger gun with the wand and nozzle pointed in a safe direction. The trigger gun action of the gun releases system pressure very quickly in a recoil effect. The operator must be familiar with the operation or be trained to anticipate the recoil in order to maintain safe control of the gun, wand, and high pressure steam.

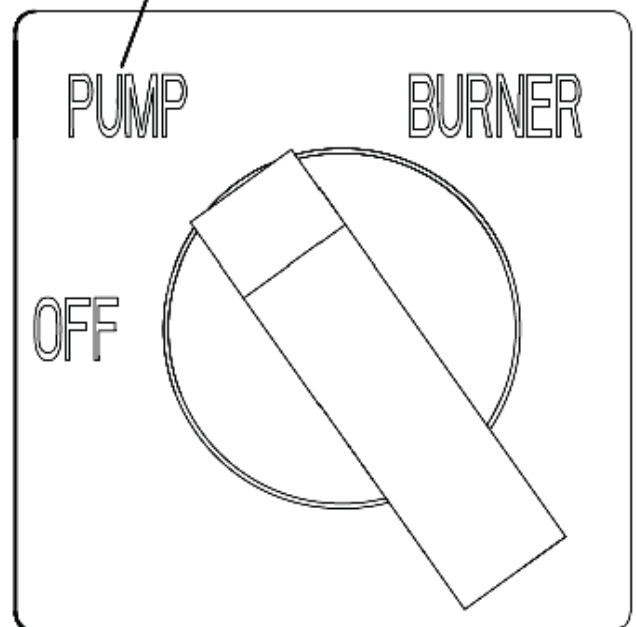
Cold or hot water high pressure cleaning

1. If cold or hot water high pressure cleaning, select and install a high pressure quick-coupled tip on the wand. Turn the nozzle in the quick-coupler for the desired spray pattern (vertical or horizontal).

NOTE: See “Cleaning Tips” section for additional information on tip selection and usage.

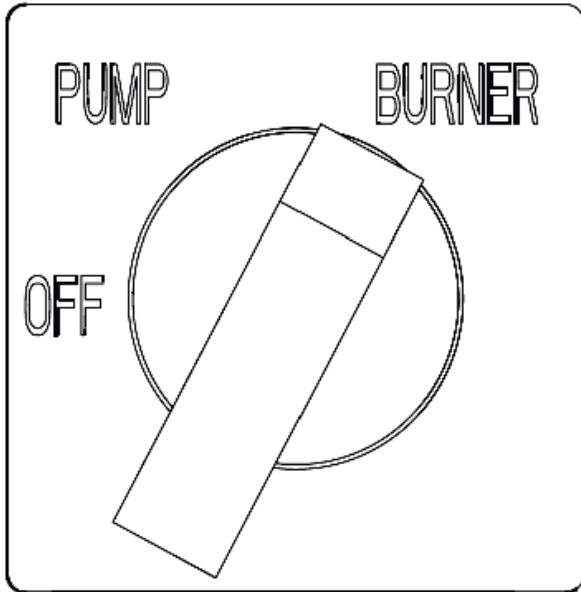
2. Turn the machine control switch to the “PUMP” position. Allow the pump to develop constant operating pressure. Hold the gun and lance firmly, with both hands, before triggering the gun (gun control units).

Always start the pump first



3. If steam or hot high pressure cleaning is desired, after cold water spray has developed constant operating pressure, turn the control to the “BURNER” position. The burner ignites and heats the water to the selected temperature setting.

Always develop a constant operating pressure before switching to the burner position.



NOTE: This is only for changing from cold to steam or hot high pressure cleaning. To change from hot high pressure to steam or from steam to hot high pressure, see “Changing Operating Mode (combination models)” on page 2-5.



WARNING: DO NOT allow the burner to operate without igniting! If the burner fails to ignite, shut the machine down immediately and check for accumulation of oil or gas before proceeding. See the Troubleshooting section of this manual or contact your dealer or service technician.

NOTE: See additional instructions for machines equipped with steam or hot high pressure option bypass systems

To start the “soap” mode, (detergent solution spray). The Down Stream Chemical Injector with which this machine is equipped should be used to regulate the “soap” to the desired application rate.

NOTE: DO NOT allow the container to become empty. Air will be drawn into the machine causing cavitation and/or damage the pump.

NOTE: DO NOT allow the container to become empty. Air will be drawn into machine causing cavitation and/or damage the pump.

IMPORTANT: Do not allow the machine to go into a “dry” steam condition. This can be recognized by the absence of any liquid at the nozzle and a “blue” colored vapor. Shut down the burner immediately and allow the machine to cool down as described in the “Shutting Down After Use” section. Serious damage could result to the hose and heating section of the machine if not corrected. Inspect for any damage and consult the Troubleshooting section or contact your dealer or service technician if this problem should occur.

Changing Operating Mode (combination models)

To change the operating mode (high pressure to steam, or steam to high pressure) after the machine is in operation, shut down the burner and let the machine cool down, as described in "Shutting Down After Use". Shut down the machine and change to the correct tip and temperature setting for the intended operating mode as previously instructed.



CAUTION: On gun control models, to minimize the possibility of machine over-loading, overheating, or relief valve actuation, DO NOT let the unit run for more than five minutes with the gun in the closed position.

To change operating mode on an adjustable combi bypass system:

Observe the following operating information (in addition to that already provided in "Starting and Using the Cleaner") for models equipped with optional bypass system.

1. Install the steam gun as previously outlined.
2. Open the bypass system "Shut-off" valve.
3. Turn the temperature control to the 300° F setting.
4. Turn on the pump and ignite the burner after water is flowing freely.
5. If the temperature does not maintain 300°, make the following adjustments. While observing the outlet temperature gauge, slowly turn the bypass regulating valve open (counterclockwise) until the outlet temperature stabilizes at 300° F. Allow the temperature to stabilize after each adjustment. Adjust the bypass valve as required to maintain 300° F. Turn the valve clockwise to lower the temperature, counterclockwise to raise the temperature.

NOTE: After proper bypass flow has been established, the regulating valve may be left in that position except for minor adjustments to maintain temperature. The bypass "shut-off" valve isolates the steam system during the high pressure cleaning mode.

6. Turn off the burner and allow it to cool down as instructed in "Shutting Down After Use".
7. Turn off the pump.
8. Turn the temperature control to 200° F.

9. Install the high pressure gun.
10. Close the bypass system shutoff valve.
11. Follow the start up procedure as previously instructed.

PRESSURE CLEANING TIPS

Steam Cleaning

High impact steam cleaning is generally used on heavier materials or equipment that have very heavy accumulations of tars, grease, oils, etc. that are removed easier with the high temperatures associated with steam pressure. High impact steam cleaning should be performed from the top to the bottom with the wand held about six inches away for the best cleaning effect on heavier materials. Care must be taken if steam cleaning is used on light gauge material such as panels and painted surfaces to prevent material warpage and/or paint removal and severe streaking.

High Pressure Cleaning

The wash gun nozzle supplied with the machine provides optimum cold or hot water cleaning for most universal type cleaning requirements if used properly.

NOTE: Some machine models are supplied with two or more nozzles. Contact your dealer or service representative if nozzles are required for special applications. Nozzles are generally selected by degree of spray pattern (0°, 15°, 25°, or 40°) for an intended use.

High Pressure Nozzle Usage

Zero degree (0°) nozzles are generally used for high impact, spot type cleaning of small confined or remote areas on heavier materials that are difficult to reach. These nozzles should not be used on light or thin gauge materials or painted surfaces such as panels or on areas where material warpage could be a problem.

Fifteen degree (15°) nozzles are generally used for severe general purpose type cleaning operations and are most effective when held 6 to 12 inches from the cleaning surface on medium to heavy gauge materials.

Twenty five degree (25°) nozzles are generally used in less severe cleaning operations where a wider spray pattern with less impact is desirable and to speed up the cleaning process.

Forty degree (40°) nozzles are generally used when minimum impact is desired for light materials, painted surfaces, and large surface areas where warpage may be a problem due to the higher impact of smaller nozzle sizes. This nozzle is also ideal for applying hot wax.

Cleaning Tips

For the best results, the gun should always be used with long slow deliberate strokes, 6-12 inches away from the surface, in much the same manner as using a paint sprayer. This provides the most effective cleaning impact and avoids streaks or skips in the cleaning process. "Waving" the gun aimlessly across the surface wastes expensive detergent and prolongs the cleaning process.

If the machine is used to apply hot wax after the cleaning and rinsing process, the gun should be held farther from the surface to get a "misting" effect when applying the wax. For best results, follow the directions supplied by the manufacturer for applying hot wax.

Most cleaning agents are more effective if the surface is rinsed first to loosen the dirt. With many cleaning needs, the use of hot water, instead of cold water, greatly increases the cleaning effect of most detergents.

Detergents should be applied from the bottom to the top to avoid streaks, allowed to set for a moment or two to react with the dirt, then rinsed from the top down to avoid streaks or skips. Never use more detergent than is necessary to clean the surface. Always follow the directions supplied by the manufacturer on the container regarding detergent use, particularly regarding painted and/or aluminum surfaces.

SHUTTING DOWN AFTER USE

To shut down after use:

1. Close the "soap" valve completely. Finish cleaning in the "Rinse" mode. (Run water only through the machine.)
2. Turn the rotary switch to the pump position. Let the unit discharge cold water until the heating coil assembly has cooled down for 3 to 5 minutes.
3. Turn the rotary switch to off and trigger the gun to relieve system pressure.

NOTE: Make sure that the soap valve is completely closed.

4. Unplug the power supply, shutoff and/or disconnect the inlet hose, and wrap up the wand, discharge hose, and power cord for safe storage.

SPECIFICATIONS

SPECIFICATIONS

3-2



SPECIFICATIONS

Hot Water Pressure Cleaner

MODEL	CFH-3010E
Flow Output (GPM)	3
Pressure Ratings (PSI)	1000
Output Temperature	160°
Heat Rise Degrees Farenheit	105°
Cleaning Comparison Index (1)	8,960
Oil Fired Burner System	
Operating Fuel	Oil
Input BTUs	245,000
Fuel Consumption (GPH)	4
Burner Fuel Capacity	7.4
Burner Voltage	120V
Stack Size	7"
Discharge Hose	3/8" x 50'
Dimensions	
Length	42 1/4"
Width	26 1/4"
Height	44 1/4"
Weight (approximate) (lbs)	336

(1) Cleaning Comparison Index - This index is used in the comparison of pressure washing equipment by taking into account the cleaning effects of water pressure, flow, and temperature on cleaning time. The higher the Cleaning Comparison Index number, the faster the equipment cleans.

MAINTENANCE

ROUTINE MAINTENANCE

4-2





A Properly Maintained Machine is a Safe Machine

It is the operator's responsibility to make daily inspections of the machine for anything that could cause a potential service, fire, or safety problem.

ROUTINE MAINTENANCE

Service & Maintenance Schedule

Preventative maintenance is the easiest and least expensive type of maintenance. The life of any machine depends on the care that it is given. Regular inspections of the machine's systems and critical components are the key to preventative maintenance. To prevent machine down time and prolong the life of your unit, follow these simple routines.

Daily

- Check cold water supply before starting.
- Check and maintain good clean quality fuel.
- Check detergent supply.
- Check wash nozzle for clogging or damage.
- Check pump oil level.
- Check for leaks.

Weekly

- Check pressure hose for wear or damage
- Check and/or clean fuel filter as required. (This depends on the quality of fuel used.)

Monthly

- Check power cord(s) for damage.
- Check machine electrical ground wire condition.
- Check belt pulley set screws for tightness.
- Check quick coupler for leakage.
- Check pump drive belt condition and tension.
- Check tire pressure.

Annualy

- Tune up fuel burner.
- Replace worn wash gun nozzle and quick couplers.
- Change pump oil. (See Pump Lubrication)
- Check detergent pick-up hose for damage or plugging.
- Replace fuel filter element.
- Run a back pressure test to determine the amount of scale formation in the heating coil. (See an authorized Service representative.)

Winterizing and Storage

To protect the machine from severe damage resulting from water freezing inside the pump, heating coil, or other components, or from corrosion resulting from long periods of inactivity or storage, use the following procedure:

To winterize and store your pressure washer:

1. Disconnect the water supply line and drain the float tank of all water.
2. After draining the float tank, pre-mix a 50-50 solution of permanent anti-freeze and water in a five gallon container. Fill the float tank with this solution.

IMPORTANT: Do not use anti-leak type anti-freeze.

3. Place the detergent suction tube into the float tank. Open the metering valve at least one full turn.
4. Hold the wash gun trigger open. Turn on the pump, wait a few seconds, then release the trigger. Open the trigger again after a few seconds and release. Cycle the wash gun trigger on and off four times, then hold the gun open until the anti-freeze appears at the nozzle tip. Turn off the pump. The machine is now winterized and prepared for storage.

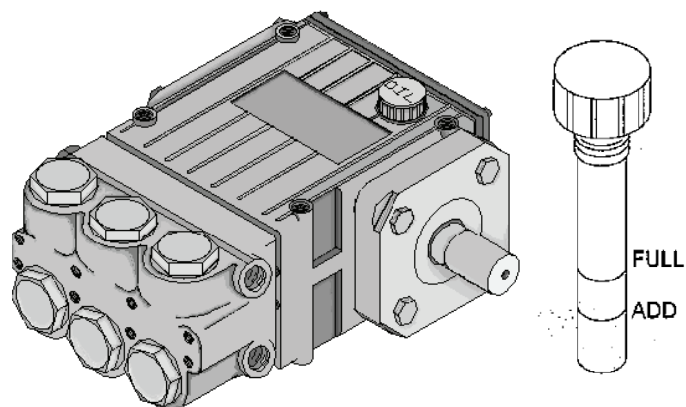
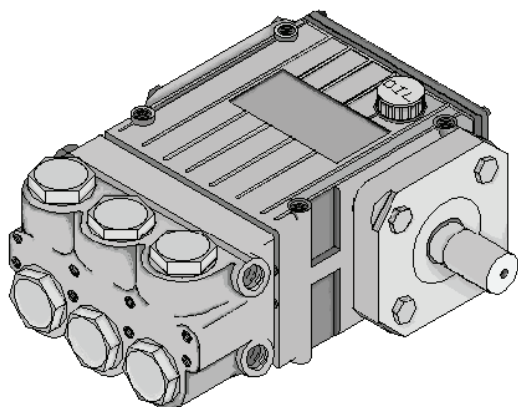
IMPORTANT: Be sure to keep the float tank filled with anti-freeze during this procedure.

5. When preparing to operate the washer after winterizing for storage, remove the gun from the pressure hose, reconnect the water supply and have an anti-freeze container ready. Turn the pump on, direct the flow of the solution back into its container for reuse. Take care not to dilute with water through the washer. Reinstall the gun to the pressure hose.

NOTE: If kept relatively undiluted, anti-freeze may be reused again and again.

Pump Lubrication Requirements

The pump is pre-lubed from the factory. After the first 50 hours of operation, change the crankcase oil. Change oil every three months or 500 hours (whichever occurs first) thereafter. Use SAE 30W non-detergent motor oil.



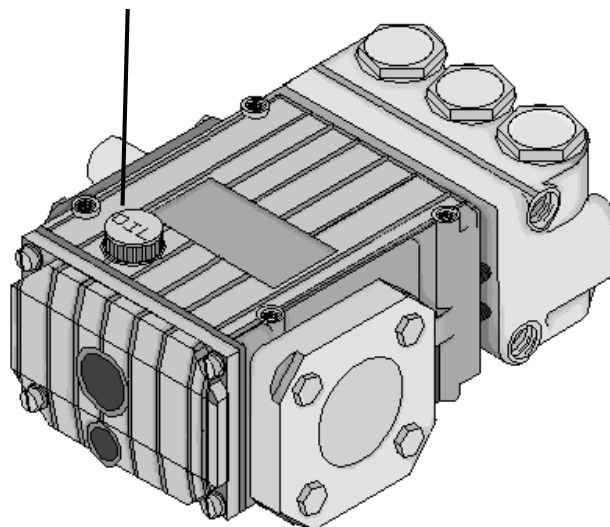
Changing Pump Oil

The oil may be drained by removing the plug located at the rear of the pump crankcase. The crankcase may also be drained by removing the fill plug and using a suction gun with a flexible tube to suction the oil out. After draining, fill the crankcase with the specified oil to the full level. Do not overfill.

Checking Pump Oil Level

Loosen and remove the check/fill plug to check the oil level. The dipstick is notched on the stem. The top of the notch is the “full” mark and the bottom is the “add” mark. Replace the dipstick securely after checking the oil level.

Fill plug/dipstick

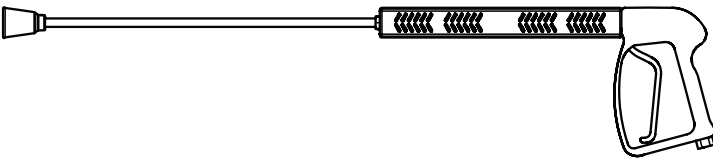


Pressure Hose

Inspect the hose for damage and/or wear. Replace the hose if it is damaged in any way.

- Avoid extending the hose across high traffic areas and never leave the hose where it can be run over by vehicles of any type.
- Never pull on the hose to move the machine or place undue stress on the hose.
- Never pull the hose around a sharp corner or force it into a small loop. The wire braid has a minimum bend radius of five inches.
- Wrap up the hose as soon as you finish and store it in a safe location.

Trigger Gun and Wand Assembly



- Inspect the trigger gun for damage or wear and check for complete trigger shut off daily. The gun must be able to completely shut off flow in the event of accidental or operational trigger release. Repair or replace if defective.
- Inspect the wand and couplings for wear, damage, or leaks daily. Replace a damaged wand, DO NOT attempt repairs!!

Heating Coil Maintenance

With any heating coil, deposits from the water and chemicals can settle on the inner wall of the steel pipe. These “scale” deposits restrict flow through the coil and may eventually plug the coil completely.

In hard water areas, this condition can occur in less than a month’s time unless the user has installed a water softener.

The symptoms of a scaled coil are slow heating, inadequate heat rise, loss of nozzle pressure, and a continuous overload of the motor.

If any of these symptoms are evident, a coil back pressure check should be performed to determine the extent of the plugging. Contact a dealer or authorized service representative for this service.

NOTE: Commercial chemicals may be available for use in cleaning the coil. If used, follow the directions provided on the container or by your chemical supplier. If chemicals are used, be sure they are compatible with the pressure hose and pump.

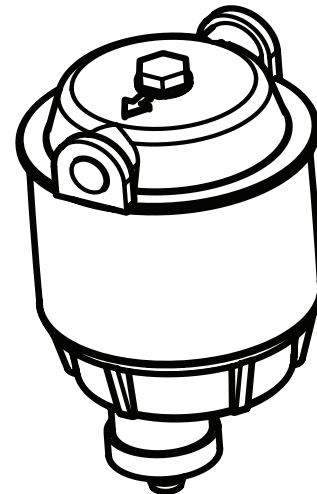
Removing Soot From The Coil

Inefficiency in oil burner operation, due to poor quality fuel or insufficient air for proper combustion, will result in the accumulation of soot on the heating coil. These deposits cause poor heating efficiency and further restrict air flow.

To minimize the possibility of soot buildup, use good quality fuel and keep the burner air properly adjusted. Periodically use a commercial anti-soot fuel additive with your normal fuel supply. Follow the directions supplied with the product for use.

An extremely sooted coil may require that the coil be removed and washed down with a suitable cleaning agent and high pressure spray. Contact a dealer or authorized service representative for this service.

Burner Fuel Filter / Water Separator Filter



Machines equipped with a combination fuel filter/ water separator (this type of fuel filter has a water drain valve on the bottom) should have the collected water drained off weekly or more often. (The frequency of draining is determined by fuel quality, storage, and handling.) Fuel filter change is generally recommended every 100 service hours or six months whichever occurs first. However, if fuel quality is good and proper fuel storage and handling is adhered to, filter life may be extended.

The inline filter on ED/ES Series machines is disposable.

Water level should never exceed the top level of the plastic sediment bowl. To drain the bowl, turn the valve located on the bottom of the bowl until clear fuel appears at the valve.



WARNING: DO NOT smoke or allow flame or sparks in the area when changing fuel filters. Clean up and neutralize any spilled fuel before igniting the burner or starting the engine. To ignore this warning may cause a fire or explosion resulting in severe bodily injury or death.

Changing the Filter

To change the filter:

1. Turn off the fuel supply valve and drain the filter into a catch pan.
2. Loosen and remove the plastic spin-on fuel sediment bowl from the filter element.
3. Remove the filter using a filter wrench.
4. Lubricate the new filter element seal ring with fuel or light oil. Install the filter element until the seal contacts the base and tighten by hand 1/4 to 1/2 additional turn.
5. Lubricate the bowl o-ring seal with fuel or light oil. Install the bowl until the seal contacts the filter element and tighten by hand 1/4 to 1/2 additional turn.
6. Turn on the fuel supply valve.

TROUBLESHOOTING





WARNING: Before attempting any repairs or maintenance, be sure the machine is shut off and disconnected from electrical supply.

Troubleshooting is an organized study of the problem and a planned method or procedure for investigation and correction of the difficulty. The following troubleshooting guide includes some of the problems that you may encounter during the service life of the machine.

The troubleshooting guide does not give all the answers for correction of problems listed, but is meant to stimulate a train of thought and indicate a work procedure directed toward the source of the trouble.

THINK BEFORE ACTING

Study the problem thoroughly and ask yourself these questions:

1. What are the warning signs preceding the trouble?
2. What previous repair and maintenance work has been done?
3. Has a similar problem occurred before?
4. If the machine still runs, is it safe to continue operation to make further checks?

DO THE EASIEST THINGS FIRST

Most problems are simple and easily corrected. For example, a “Burner will not light” complaint may be caused by no fuel supply or dirty filter.

Always check the easiest and obvious things first. Following this simple rule saves time and trouble.

FIND AND CORRECT THE BASIC CAUSE OF THE TROUBLE

After a mechanical failure has been corrected, be sure to locate and correct the cause of the problem so that the same failure will not be repeated. A complaint of “failed fuel pump” may be corrected by replacing the faulty pump, but something caused the pump to fail. The cause may be debris or more often water in the fuel.

The following pages list some of the problems, causes and probable fixes the operator can study to become aware of what might cause the problem should it arise. If the hints in this manual do not correct a problem, contact a dealer or authorized service representative.

DO NOT attempt repairs you do not understand.

OIL BURNER MALFUNCTION

PROBLEM	POSSIBLE CAUSE	SOLUTION
Burner motor does not operate	<ol style="list-style-type: none"> 1. Overload protection tripped 2. No power reaching burner 3. Motor bearings "Frozen" 4. Fuel pump "Frozen" 5. Defective burner motor 	<ol style="list-style-type: none"> 1. Allow motor to cool. Push reset button 2. Check the power cord, circuit breaker, switched, internal wiring, and wiring terminals. Re-establish power by replacing bad switch, etc. 3. Free motor shaft and lubricate. Replace motor if necessary 4. Replace fuel pump - Keep water out of fuel supply 5. Replace or repair motor
Burner motor runs but no ignition	<ol style="list-style-type: none"> 1. No fuel 2. Weak or defective ignition transformer- weak spark or no spark 3. Electrodes out of proper adjustment - no spark 4. Poor fuel atomization 5. Inadequate fuel pressure - low pump setting or air leak in the fuel pump suction plumbing 6. Very cold weather causes jelling of heavier fuel oils 7. Excessive combustion air 	<ol style="list-style-type: none"> 1. Replenish fuel supply 2. Replace transformer 3. Readjust electrodes. Replace electrode assembly if damaged or if ceramic insulation is cracked. (See Dealer) 4. Check for loose or fouled fuel nozzle, dirty, or clogged fuel filter, or fuel pump screen. Clean or replace fouled components (See Dealer) 5. Contact service person (See Dealer) 6. Switch to lighter oil, kerosene, or No. 1 heating oil 7. Close air band until burner ignites, then readjust for cleanest burn, and tighten (See Dealer)
Burner motor runs but no fuel at burner nozzle or no fuel atomization	<ol style="list-style-type: none"> 1. No fuel 2. Clogged fuel nozzle 3. Clogged fuel filter 4. Restricted fuel line 5. Air leak in fuel suction line 6. Clogged or inoperative fuel solenoid 	<ol style="list-style-type: none"> 1. Replenish fuel supply 2. Clean or replace nozzle 3. Clean or adjust filter 4. Locate and eliminate restriction 5. Locate and eliminate air leak 6. Clean or replace if faulty 7. (Items 1-6 See Dealer)
Burner starts but flame blows away	<ol style="list-style-type: none"> 1. Excessive combustion air 2. Poor fuel atomization 	<ol style="list-style-type: none"> 1. Close air band until burner will stay lit, then adjust for cleanest burn and tighten 2. Check for loose or clogged nozzle, dirty filter, or low fuel pump pressure. Correct as needed 3. (Items 1-2 See Dealer)
Burner motor stops after a few minutes of operation	<ol style="list-style-type: none"> 1. Low line voltage causing overload to trip 2. Defective burner motor 	<ol style="list-style-type: none"> 1. Use heavier supply wiring, a larger circuit, or eliminate other loads on circuit 2. Repair or replace motor
Poor burn, smokey burn or foul, pungent odor	<ol style="list-style-type: none"> 1. Insufficient combustion air 2. Fuel nozzle partially clogged, fouled, loose or worn 3. Low fuel pressure, poor fuel atomization 4. Air leak in fuel pump suction plumbing (inlet side), sometimes indicated by bubbles in fuel return hose. 5. Very cold weather causes jelling of heavier oils 6. Damaged combustion chamber 7. Poor or no fuel shut off in fuel pump causing accumulation of unburned fuel 	<ol style="list-style-type: none"> 1. Open air adjustment band until burn improves 2. Clean, tighten, or replace fuel nozzle as needed 3. Contact service person 4. Locate and eliminate air leak. Check all fittings, hoses, filters, and pump filter cover 5. Switch to lighter oil, kerosene, or No. 1 heating oil 6. Remove burner from heating coil to check for damage to combustion basket, if damaged, order new chamber 7. Replace fuel pump, check combustion chamber, replace if necessary, check fuel solenoid, replace if faulty 8. (Items 1-7 See Dealer)

PROBLEM	POSSIBLE CAUSE	SOLUTION
Low temperature output	<ol style="list-style-type: none"> 1. Partially clogged fuel nozzle 2. Significant scale deposits in heating coil 3. Significant soot deposits on heating coil 4. Low fuel pressure 5. Very low tap water supply temperatures 	<ol style="list-style-type: none"> 1. Clean or replace fuel nozzle 2. Conduct back pressure test to determine extent of scaling (see ROUTINE MAINTENANCE on page 4-2 in this manual). Contact your dealer for assistance. 3. De-soot the coil as instructed in Heating Coil Maintenance on page 4-5 4. Contact service person 5. (Items 1-4 See Dealer)
Excessive temperature output	<ol style="list-style-type: none"> 1. Very high tap water supply temperatures 2. Fuel pressure too high 3. Oversized fuel nozzle 	<ol style="list-style-type: none"> 1. Contact service person 2. Consult dealer for correct fuel nozzle
Fuel filter clogs often	<ol style="list-style-type: none"> 1. Very dirty fuel 	<ol style="list-style-type: none"> 1. Use clean fuel, clean storage tanks, clean filler cans, and clean funnel
Fuel pump “freezes” or locks up	<ol style="list-style-type: none"> 1. Water in fuel supply causes corrosion in fuel pump 	<ol style="list-style-type: none"> 1. Use cleaner fuel supply, change filter more often, and eliminate water from fuel storage tank.
Frequent failure of ignition transformer	<ol style="list-style-type: none"> 1. Too much exposure to moisture, rain, wash spray, etc 	<ol style="list-style-type: none"> 1. Avoid leaving washer out in wet weather, keep wash spray away from machine.

PUMP MALFUNCTION AND PRESSURE DELIVERY PROBLEMS (CRANKCASE TYPE PUMP)

PROBLEM	POSSIBLE CAUSE	SOLUTION
Low Pressure	<ol style="list-style-type: none"> 1. Worn or oversized spray nozzle 2. Clogged water and/or detergent inlet strainer 3. Out of detergent - pump sucking air through detergent line 4. Air leak in inlet plumbing 5. Belt slipping 6. Dirt or foreign particle in the valve assembly 7. Worn or damaged inlet or discharge valve 	<ol style="list-style-type: none"> 1. Replace worn nozzle 2. Clean or replace fouled strainers 3. Restore detergent supply or close detergent shut off valve 4. Locate air leak. Reseal connection or replace damaged part 5. Tighten or replace if damaged 6. Remove any dirt or particles 7. Replace worn valves
Rough operation with loss of pressure	<ol style="list-style-type: none"> 1. Restricted inlet plumbing or air leak in inlet plumbing 2. Damaged pump parts 	<ol style="list-style-type: none"> 1. Ensure adequate water supply and supply hose. Repair inlet fittings 2. Replace any damaged pump parts. Clean out any foreign particles
Water leakage - intake manifold or crankcase	<ol style="list-style-type: none"> 1. Worn manifold seals or condensation inside crankcase 	<ol style="list-style-type: none"> 1. Replace seals. Change oil at regular intervals
Loud knocking, noisy operation	<ol style="list-style-type: none"> 1. Inadequate water supply to pump creating “vacuum knock” 2. Loose pulley 3. Worn or broken bearing(s) 	<ol style="list-style-type: none"> 1. Check for restricted inlet and adequate tap water supply 2. Check key and tighten set screw 3. Replace bearing(s) as needed
Oil leaks	<ol style="list-style-type: none"> 1. Worn crankcase seals, crankcase cover seal, or drain plug seal 	<ol style="list-style-type: none"> 1. Replace seals
Excessive pump shaft play	<ol style="list-style-type: none"> 1. Worn and loose bearings 	<ol style="list-style-type: none"> 1. Replace bearings. Check bearing seals, spacers, and retainers, replacing any worn parts
Irregular spray pattern	<ol style="list-style-type: none"> 1. Worn or partially clogged spray nozzle 	<ol style="list-style-type: none"> 1. Clean or replace nozzle

ELECTRICAL MALFUNCTION

PROBLEM	POSSIBLE CAUSE	SOLUTION
Washer electrically dead	<ol style="list-style-type: none"> 1. No power to the machine 2. A defective power cord 3. A defective main on/off switch 4. Faulty or loose wiring 5. The GFCI Tripped 	<ol style="list-style-type: none"> 1. Check the circuit breaker. Check for a defective electrical outlet 2. Repair or replace the bad cord 3. Test the switch(es) and replace if defective 4. Check the switch and motor wiring for solid connections 5. DANGER - DO NOT OPERATE. A fault exists. Contact an electrician or the power company
Power supply circuit breaker trips often and will not stay "on"	<ol style="list-style-type: none"> 1. A short circuit in the washer or elsewhere on the circuit 2. An undersized circuit is being used, or too much total load on the circuit 3. The supply voltage is low 4. An undersized extension cord causing under-voltage to the washer 5. A faulty circuit breaker 	<ol style="list-style-type: none"> 1. Check the washer (and other loads on the same circuit) for faulty wiring, a loose wire, etc. 2. Put the washer on a larger circuit or remove other loads from the existing circuit. 3. 120V units require a minimum of 108V. 220V units require 208V. Check the line voltage and connect the washer to an adequate voltage supply. 4. Contact an electrician or supplier for the proper size and length. 5. Replace the breaker
Thermal overload protector in main pump motor trips often	<ol style="list-style-type: none"> 1. A partially or totally clogged spray nozzle is overburdening the motor 2. You are using an undersized spray nozzle 	<ol style="list-style-type: none"> 1. Remove and clean out the nozzle. Make sure the strainers on the water inlet swivel and chemical suction tube are present and in good, clean condition. 2. Make sure the nozzle size is correct, as indicated in the "Parts" section.
Thermal overload protector trips often in either or both motors (pump and burner)	<ol style="list-style-type: none"> 1. The supply voltage is low 2. The extension cord is too small 	<ol style="list-style-type: none"> 1. Check the line voltage to make sure that the correct voltage is present. (Check with the power company or an electrician.) 2. Replace the cord with the proper size
Electrical shock from cabinet or spray wand	<ol style="list-style-type: none"> 1. An electrical leakage exists and the washer is not properly grounded. 	<ol style="list-style-type: none"> 1. DANGER - Do not use! Find the problem or contact a qualified electrician. The washer must be completely grounded at all times! This means a solid ground connection inside the cabinet and strict use of properly grounded extension cords and receptacles
GFCI Tripping, DANGER an electrical fault exists, - DO NOT attempt to operate the unit without finding and correcting the fault	<p>NEVER use a two-conductor extension cord. NEVER remove the grounding pin on the washer's power cord. Make sure any repairs done to the extension cord were done properly and that the proper connections were made.</p>	<ol style="list-style-type: none"> 1. (Call your dealer or an electrician.)
Flame failure relay trips	<ol style="list-style-type: none"> 1. Lack of fuel 2. Dirty CAD cell 3. Low voltage 4. Loose wiring 	<ol style="list-style-type: none"> 1. Check the fuel supply and systems for blockages 2. Clean and replace 3. Check the line voltage. Ensure the proper voltage 4. Check the wiring

DETERGENT SYSTEM MALFUNCTION

PROBLEM	POSSIBLE CAUSE	SOLUTION
Washer fails to draw detergent	<ol style="list-style-type: none"> 1. Suction tube not below liquid surface 2. Clogged or damaged suction strainer 3. Clogged metering valve 	<ol style="list-style-type: none"> 1. Completely submerge suction tube and strainer in detergent solution 2. Clean or replace strainer 3. Clean or replace metering valve
Detergent solution too weak	<ol style="list-style-type: none"> 1. Clogged detergent strainer or metering valve 2. Air leak in detergent suction tube or inlet plumbing 	<ol style="list-style-type: none"> 1. Clean or replace 2. Find air leak and tighten or replace parts as necessary
Detergent solution too concentrated	<ol style="list-style-type: none"> 1. Original detergent product too concentrated 	<ol style="list-style-type: none"> 1. Dilute product 2:1 and recalibrate the metering valve suction
Detergent appearing in the rinse cycle	<ol style="list-style-type: none"> 1. Detergent control valve open 2. Leaking (defective) detergent control valve 	<ol style="list-style-type: none"> 1. Close valve completely 2. Replace with new control valve
Solution of detergent concentrate during shut down	<ol style="list-style-type: none"> 1. Detergent at lower level than water supply plumbing and natural siphon drains water into detergent container. 	<ol style="list-style-type: none"> 1. Shut off detergent control valve and/or water valve when shutting down
Detergent siphons out during shutdown	<ol style="list-style-type: none"> 1. Washer is shut down, detergent valve left open and gun is laid on ground (below the level of the detergent container) creating a natural siphon of detergent supply. 2. Valve defective 	<ol style="list-style-type: none"> 1. Close detergent valve when shut down. Store hose properly instead of leaving on ground. 2. Replace valve

LEGAL NOTICES





California Proposition 65 Warning

WARNING: This product contains chemicals known to the State of California to cause cancer, and birth defects or other reproductive harm.

For more information: www.P65Warnings.ca.gov