



# Operators Manual

**ACF4-4000  
CFH-3530G**

**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.

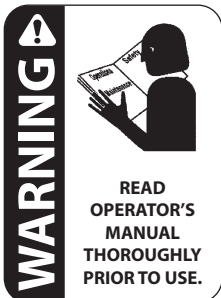
The operator must know how to stop the pressure washer quickly and understand the operation of all controls. Never permit anyone to operate the pressure washer without proper instructions.

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.

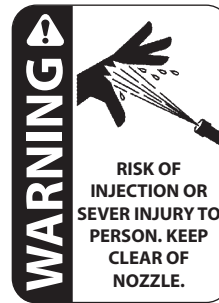
9. To reduce the risk of injury, close supervision is necessary when this pressure washer is used near children. Do not allow children to operate the pressure washer. This pressure washer must be attended during operation.



**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.

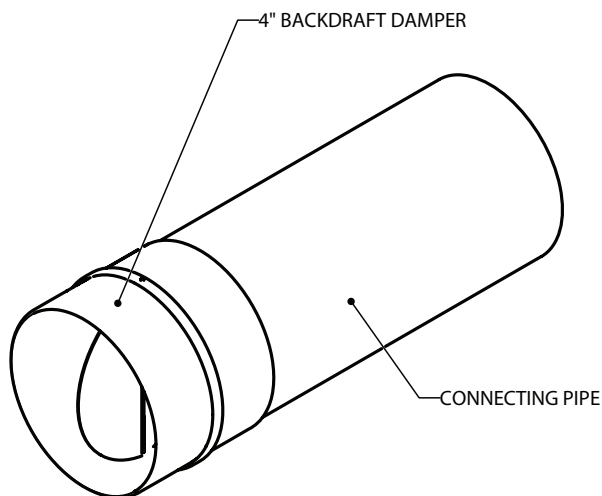
20. Install this pressure washer on non-combustible flooring.

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.



#### CHEMICAL WARNING:

Chemicals used for cleaning are dangerous! Keep all chemicals out of the reach of children and untrained adults.

Proper safety precautions must be taken before handling any chemicals. Read and follow all directions and instructions on the product label before using chemicals. Wear eye protection and rubber gloves when handling or using chemicals. Always have a clean supply of water available to wash off any contact with the skin or eyes. Should any chemical product contact the eyes, immediately flood the eyes with clean water and seek medical attention at once. If skin contact occurs, flood the affected area with plenty of water for 15 minutes. If irritation persists, seek medical attention. If chemicals are swallowed, follow the product label directions and get immediate medical attention. Read the material safety data sheets on all chemicals before using them.



#### DISCHARGE HOSE WARNING:

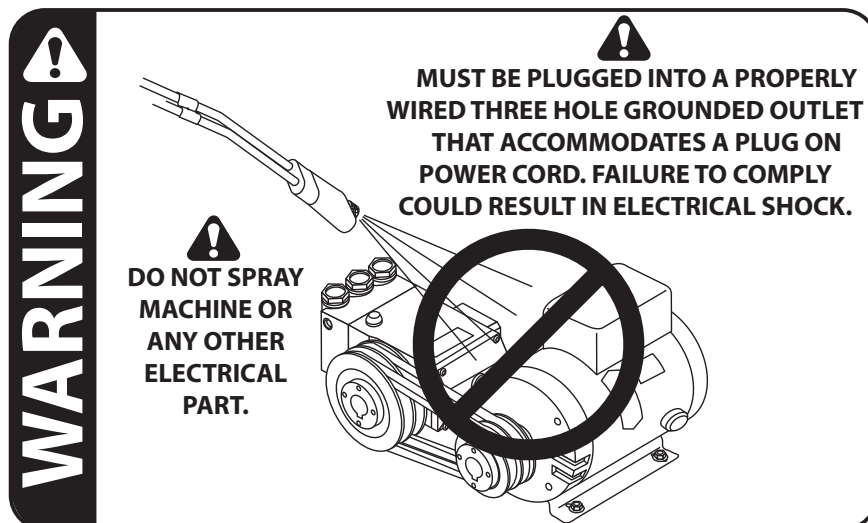
The discharge hose supplied with the machine is designed for use on steam and high-pressure cleaners. Special care, handling, and maintenance are required to provide proper and safe operation. The following guidelines must be followed to ensure safe operation and provide the maximum hose service life.

- Never exceed rated machine pressure or temperature.
- Do not route the hose in a manner that will cause sharp bending, kinking, cutting, abrasion, or other exterior damage.
- Do not pull on the hose to move the machine, untangle knots, or use any other excessive pulling stress.
- Do not use the hose if cuts, leaks, abrasions, bulges, or coupling damage is evident.
- Do not use the hose if any reinforcement is exposed.
- Do not attempt field repairs through an unauthorized hydraulic hose repair shop. Special couplings and crimping specifications are required for steam and high-pressure washers discharge hose. Contact a qualified pressure washer service representative for repair of a damaged hose.
- Always examine hose couplings and quick disconnect (if provided) before each operation. If leaking is evident, do not use the hose. Contact a qualified pressure washer service representative.

- Never leave the discharge hose lying on the floor or ground where it could be driven over by vehicles or damaged by falling objects. Always coil and hang the hose immediately after use.
- If there is any doubt about the hose condition, replace the hose immediately.

**OSHA Lockout/Tagout Rule for Alternating Powered Equipment:** To prevent unexpected energizing, start-up, or release of energy that could cause injury to the employees working on the equipment, the following steps must be followed:

1. Turn off equipment.
  2. Dissipate or release all residual energy in the machine.
  3. Shut off the main power by removing the cord or shutting off the electrical disconnect switch.
  4. Secure the power cord near the machine or lock and tag the switch.
  5. Check all previous steps, then try to operate the machine to assure that it will not work.
- These procedures insure that all power to the machine will be under control.



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.

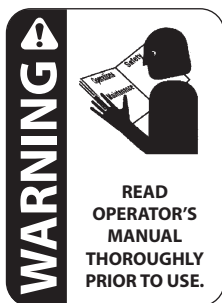
L'opérateur doit savoir comment arrêter rapidement le nettoyeur haute pression et comprendre le fonctionnement et toutes les commandes. Ne permettez jamais à quiconque d'utiliser ce nettoyeur haute pression sans les instructions appropriées.

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.

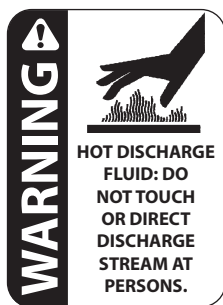


**AVERTISSEMENT:** La pulvérisation à haute pression peut entraîner l'écaillage de la peinture ou générer des particules qui deviendront aérogènes et s'envoleront à des vitesses élevées. Pour éviter des blessures aux yeux, aux mains et aux pieds, il convient de porter des appareils de sécurité.

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.

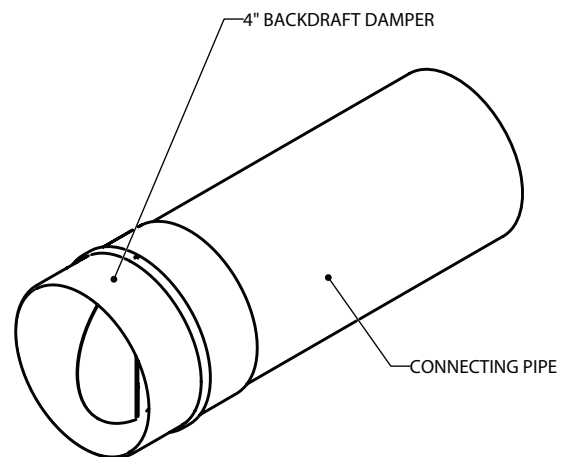
20. Installez ce nettoyeur haute pression sur un sol ininflammable.

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

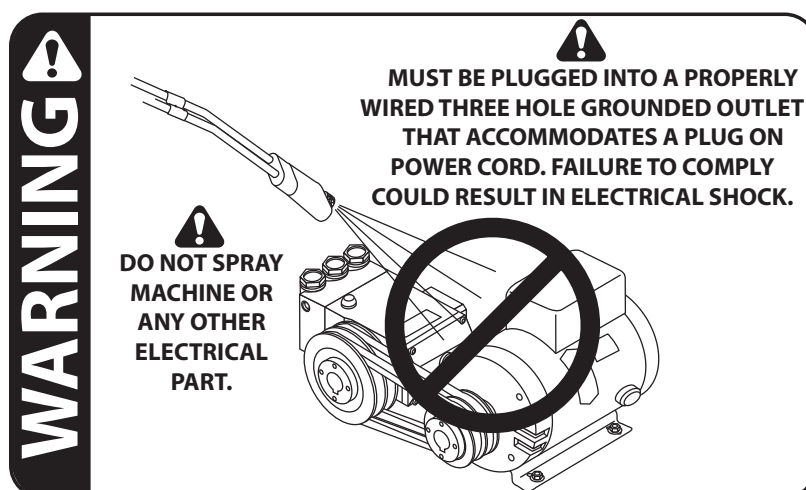
22. Ne mettez jamais la pompe en service si elle est sèche. Ne gardez pas le pistolet pulvérisateur fermé plus de trois minutes sans avoir enclenché l'option « embrayage ».

**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

Depending on the intended use, the oil fired pressure washers are designed specifically for use as stationary units, 4-wheel portable units, or as service vehicle-mounted cleaning systems.

These models are completely self-contained and are ideally suited for a wide variety of applications when commercial electrical power is either not available or not practical.

If the unit is part of a mobile wash set-up, the following precautions should be taken:

- Locate the machine in the vehicle so as to prevent excessive vibration and road shock.
- If mounted on an open trailer, make sure that the unit is adequately protected from wind, weather, and road hazards associated with highway travel in an open vehicle.

Even though the unit may be used as a portable or vehicle mounted unit, whenever the machine is in actual operation it must be positioned as level as possible to prevent the possibility of engine damage due to lack of adequate engine crankcase lubrication and to ensure proper machine operation.

When locating the machine (whether it will be portable or stationary) it is important to position the machine for easy access to all operating controls and an adequate water supply. Consideration must also be given to adequate ventilation and for the best possible access to all machine and engine maintenance or service requirements.

**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.



**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.



This machine is not equipped with a flame or muffler spark arrester. If this machine is to be used in any forest brush, grass, or stubble-covered land, or where sparks may create a fire hazard, the machine must be equipped with a flame and/or spark arrester before being used. Contact your local dealer or authorized service representative for additional information.

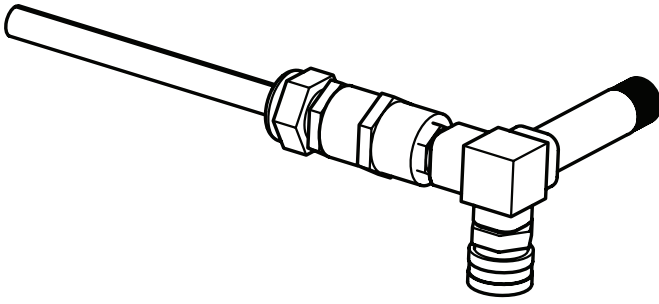
## MACHINE SETUP

Exact machine setup may vary somewhat between machine models, however, the following information will be general guideline. Contact your dealer or authorized service representative if additional information or help is required. Setup steps include:

- General Assembly
- Venting the Power Washer
- Connecting to a Satisfactory Water Supply
- Providing Proper Burner Fuel
- Filling the Gas Tank

### General Assembly

1. Connect the 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.

**CAUTION:** The addition of extra hose, hose reels, down stream chemical injectors, etc., could cause excess back pressure and overload the pump. DO NOT substitute or modify hoses. Contact your dealer or authorized service representative if you have questions.

2. Connect and secure the positive (+) battery cable to the positive (+) battery terminal. The positive cable is identified by the “+” marking on the terminal, the cable coming from the starter, or the red cable.

**IMPORTANT:** Always connect the positive battery cable first.

3. Connect and secure the negative (-) battery cable to the negative (-) battery terminal. The negative cable is identified by the negative “-” marking on the terminal, the cable going to ground, or black cable.



**WARNING:** To prevent personal injury or electrical system damage, connect cables carefully and never reverse polarity when connecting cables. Always wear eye protection when servicing or charging batteries.

### Venting the Power Washer



**WARNING:** Burner and engine exhaust gases contain poisonous carbon monoxide, which can kill. Avoid inhaling fumes and never run the unit in a closed building or confined area without proper venting.

- If the machine is to be used as a stationary unit and located in a closed building or other confined area, provide the machine with proper stacking for exhaust of burner flue gases and engine exhausts.

- OR -

- If the machine is used inside an enclosed van-type vehicle, provisions must be made to vent all combustion exhaust outside the vehicle. All engine cooling air must be supplied by controlled means, such as dedicated vent openings, powered fans, or properly located vehicle doors. DO NOT allow unit heat to recycle within the vehicle or serious overheating of the engine will occur.

Comply with all state and local codes regarding ventilation requirements.

**IMPORTANT:** Be sure the chimney (stack) is at least the same size as the burner stack on the machine. A poor draft will cause the unit to soot and not operate efficiently and an accumulation of carbon monoxide could result. Avoid long stack runs, more than two 90° elbows, and short stack heights.

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 to a Satisfactory Water Supply

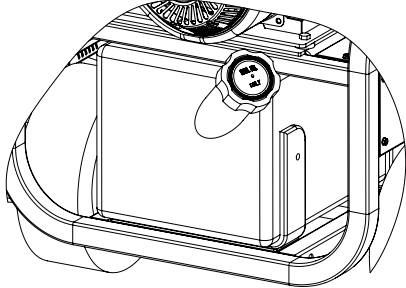
Adequate, clean water is essential for the reliable operation of your pressure washer.

- Each machine has a standard female hose barb connection where the water supply hose connects. Connect it to a cold water supply tap at least 1.5 times the gallons per minute (gpm) output of the machine. Tap pressure must be 20 to 60 psi. If wide variations in water pressure are experienced, a pressure regulator should be installed in the supply line.

**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. Use perfectly clean water. You can install a strainer (100 mesh rating) on the supply line if needed.

## Providing the Proper Burner Fuel

**IMPORTANT:** The burner heats the water and uses home heating oil, kerosene, or diesel fuel. The engine runs the pump that provides the pressure, and uses gasoline. **DO NOT** put burner fuel in the gas tank, or gasoline in the burner fuel tank.



- Remove the burner fuel supply tank fill cap, then carefully fill the tank with good, clean No.1 or No.2 home heating oil, kerosene, or diesel fuel. Be careful not to overfill the tank and cause fuel spillage. Replace the fuel cap securely.

**IMPORTANT:** Always keep the fuel supply fill cap securely in place to prevent water and contaminants from entering the fuel system. Always use clean fuel and clean fuel handling equipment.



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



**DO NOT** overfill the fuel tank. If fuel spillage occurs,

**DO NOT** light the burner or start the engine before cleaning up and neutralizing any spilled fuel. To ignore this warning may result in a fire or explosion.



**ALWAYS** shut down the machine and let the engine cool before refueling. Refuel in a safe place away from open fires or sparks. **DO NOT** smoke while refueling.



The burner fuel supply tank is colored black and is plastic. The gasoline supply is located on the engine. **ALWAYS** use the correct fuel in each tank.

## Filling the Gas Tank

- Fill the gasoline supply tank with clean, fresh regular grade unleaded gasoline with a pump sticker octane rating of 87 or higher. Unleaded gas is recommended because it leaves less combustion chamber deposits. Regular grade leaded gasoline may also be used,

**IMPORTANT:** Use **ONLY** regular gasoline (unleaded or leaded) in the gas tank. Do not add oil to the gasoline. Do not use diesel fuel or burner oil. Do not overfill the gas tank. Leave room for the gas to expand.



**WARNING:** Gasoline is extremely flammable and its vapors can explode if ignited. Store gasoline only in approved containers, in unoccupied buildings, away from sparks or flames. **DO NOT** add gasoline to the fuel tank while the engine is hot or running, or start the engine near spilled gasoline.

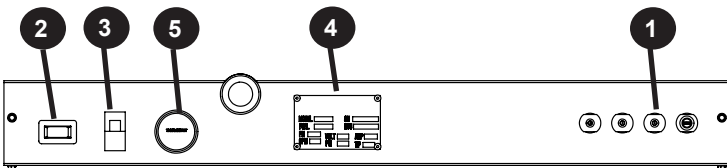


**KNOW THE MACHINE CONTROLS AND INSTRUMENTS BEFORE STARTING OR OPERATING THE MACHINE TO ASSURE SAFE OPERATION.**

### Control Panel and Monitor Light Operation

Depending on your machine model and optional equipment, the control panel may vary somewhat. Use the following information applicable to your machine model before starting or operating your machine.

Control Panel (for reference only - the control panel in your unit may be somewhat different)



#	Item	Description
1	Wash Jets	Quick-couple spray nozzle storage
2	Hour Meter	The hour meter is activated whenever the pump control switch is turned on, indicating the actual service hours the pump has been operated. Use the hour meter reading for all hourly routine maintenance requirements
3	Rocker Switch	Burner on and off switch
4	Specification Tag	Pressure washer information
5	Adjustable Temperature Control	Dial to set desired outlet temperature

## INITIAL MACHINE STARTUP

After the machine has been properly set up, fueled, and prepared for use, perform the following initial start up procedures before using the machine for cleaning.

**NOTE:** Some machines may have permanent anti-freeze in the system to protect them from freezing during the shipping and storage process. It is important to flush out this solution before using the machine (see Step 7 below).

**IMPORTANT:** At this point, only the high-pressure discharge is connected to the machine. You do not connect the wash gun or wand until Step 9 below.

**IMPORTANT:** Refer to the engine manufacturer's operator manual, included with the machine, for prestarting information and checklist. Refer to this manual for all required engine operation maintenance and service information for the engine.

### To initially start up the machine:

1. Turn on the water supply valve to allow the float tank to fill.
2. Open the burner fuel supply valve at the filter head.
3. Turn on the engine fuel supply valve, located on the gasoline tank outlet.
4. Pull the engine choke out.
5. Turn the key switch fully clockwise to crank the engine, then release the key switch to the "RUN" position as soon as the engine starts.
6. Push the engine choke in.

**NOTE:** If the engine fails to start, or will not run properly on the first start-up, refer to the engine operation manual supplied with the machine for minor adjustments.

7. When the engine starts, the unit will immediately begin to pump water. Direct the water flow into a container or floor drain. Allow water to pump through the machine for three to five minutes in order to flush out any anti-freeze or other contamination that may be in the system from the water supply line or the manufacturing or shipping process. Check for any leaks and observe general machine operation during this time. Do not start the burner yet.

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



8. Turn the key switch to the center position to shut down the engine and pump. Turn off the fuel valve.
9. Apply thread sealant (Loctite red) 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 “Starting the Cleaner” on page 2-2).

# OPERATING INSTRUCTIONS

OPERATING INSTRUCTIONS	2-2
PRESSURE CLEANING TIPS	2-4
SHUTTING DOWN AFTER USE	2-4



## 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**

All models are equipped with adjustable temperature control, gun control, and selectable stainless steel wand tips.

**Starting the Cleaner****To start your hot water pressure cleaner:**

1. Make sure that the machine controls are in the “off” position.
2. Connect the supply hose to the water supply and allow the float tank to fill.  
**IMPORTANT:** Never let the pump run without a water supply or serious damage will result.
3. Turn on the water supply valve.
4. Turn on the engine and burner fuel supply valves.
5. 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.

**NOTE:** An adjustable temperature control is installed in the coil outlet to control the output temperature. It is preset for a specific temperature and when that temperature is reached, the switch shuts down the burner to maintain that temperature.

6. Select and install a high-pressure quick-coupled tip on the wand. Turn the tip nozzle in the quick-coupler for the desired spray pattern (vertical or horizontal).

**NOTE:** Some machines are supplied with two or more high-pressure spray tips. Tips are generally selected according to pump output and degree of spray pattern (0°, 15°, 25°, 40°) for the intended use. The operating pressure is determined by the spray tip. ALWAYS use the correct tip. Overpressure could result from an incorrect tip. Contact your dealer or service representative if tips are required for special applications.

7. Use the key switch to start the engine and pump as described in the “INITIAL MACHINE STARTUP” section on page 1-5.



If the machine is equipped with four wheel portability, it must be positioned on a level surface. ALWAYS chock one wheel (front and back) on each side of the machine to prevent machine movement.

**NOTE:** Because the engine is loaded as soon as start-up occurs, if cold starting is difficult on gun-controlled models, remove the spray tip and release the gun trigger to reduce the engine load. When the engine has warmed somewhat, shut it down and reinstall the spray tip, then restart the engine in the normal manner.



**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 changing tips or if the machine is left unattended for any reason when the machine is in operation. The machine should always be shutdown and system pressure relieved before changing tips or performing any other service.

8. After the pump has developed constant pressure, turn on the burner switch for hot water cleaning. The burner will be ignited and will heat the water to the selected temperature.



**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 “TROUBLE SHOOTING” chapter of this manual or contact your dealer or service technician.

9. 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.



**WARNING:** Do not operate the machine outdoors in the rain.



**WARNING:** Do not clean or wash down the machine with its own spray. The machine is water protected, but not water proof. Operating or cleaning the machine in this manner will increase the hazard of electrical shock and/or damage to the machine.

## PRESSURE CLEANING TIPS



**WARNING:** On gun control models, to minimize the possibility of machine overloading or relief valve actuation, DO NOT let the unit run for more than three minutes with the gun in the closed position.

### High Pressure Cleaning

High impact steam cleaning is generally used on heavier materials or equipment that have very heavy accumulations of tars, grease, oils, and so on, that are more easily removed 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 most effective cleaning.

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 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

The wash nozzle supplied with the machine will provide optimum hot water cleaning for most universal-type cleaning requirements, if used properly.

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 will provide the most effective cleaning impact and avoid 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 until all the soap is flushed from the machine. (Run water only through the machine.)
2. Turn the burner switch off and leave the pump switch on. Let the unit discharge cold water until the heating coil assembly has cooled down for 3 to 5 minutes.
3. Turn the pump switch off and trigger the gun to relieve system pressure.  
**NOTE:** Make sure that the soap valve is completely closed.
4. Shutoff and/or disconnect the inlet hose and wrap up the wand and discharge hose for safe storage.

# SPECIFICATIONS

SPECIFICATIONS

3-2



**SPECIFICATIONS**

**Hot Water Pressure Cleaner**

<b>MODEL</b>	<b>CFH-3530G</b>
Flow Output (GPM)	3.5
Pressure Ratings (PSI)	3000
Output Temperature	160°
Heat Rise Degrees Farenheit	105°
Cleaning Comparison Index (1)	18,107
Engine	Vanguard
Engine Horsepower	10
Engine/Pump Drive	Direct
Engine Fuel	Gas
Engine Fuel Capacity (U.S. Gal.)	1
Engine Start	Recoil
<b>Oil Fired Burner System</b>	
Operating Fuel	Oil
Input BTUs	210,000
Fuel Consumption (GPH)	4
Burner Fuel Capacity	7.4
Burner Voltage	12V
Stack Size	7"
Discharge Hose	3/8" x 50'
<b>Dimensions</b>	
Length	36 1/2"
Width	25"
Height	42"
Weight (approximate) (lbs)	372

(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

WINTERIZING AND STORAGE 4-5







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

**IMPORTANT:** Read and follow the engine manufacturer's instructions regarding the operation and maintenance of the engine.

#### Weekly

- Check the pressure hose for wear or damage.
- Check and/or clean fuel filters as required. (This will depend on the quality of fuel used.)
- Perform the required 25 or 50 hour engine maintenance (See the engine manufacturer's operation manual).

#### Monthly

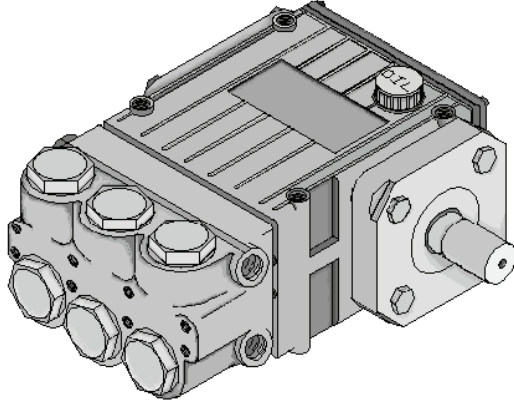
- Inspect the burner and engine exhaust ventilation system.
- Check the belt pulley set screws for tightness.
- Check the quick-coupler for leakage.
- Check the pump drive belt condition and tension.
- Check the condition and tension of all drive belts.
- Perform required engine maintenance (see the engine manufacturer's operation manual).
- Change the pump oil (see Pump Lubrication).
- Check the generator output voltage .
- Check the battery electrolyte level.
- Check the condition of the engine and pump mount plate rubber isolators.

#### Annually

- Tune up the fuel burner (this should be done by a qualified Service Technician, please consult your local AaLadin Distributor).
- Replace worn wash gun nozzle and quick couplers.
- Change the pump oil. (see Pump Lubrication)
- Check the detergent pick-up hose for damage or plugging.
- Replace all filter elements.
- Run a back pressure test to determine the amount of scale formation in the heating coil. (see an authorized Service representative.)
- Perform all required engine maintenance (see the engine manufacturer's operation manual).
- Check and clean the battery cables and terminals.
- Check the generator brushes for wear and replace as necessary.

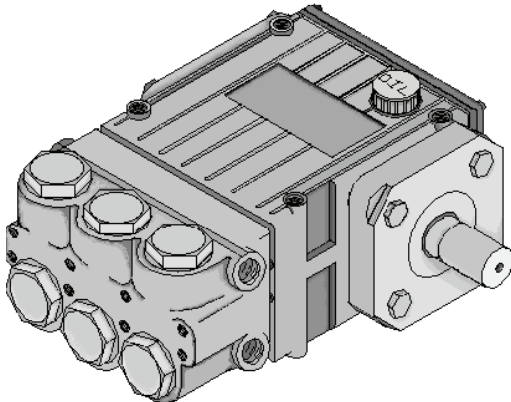
### Pump Lubrication Requirements

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.



### Checking Pump Oil Level

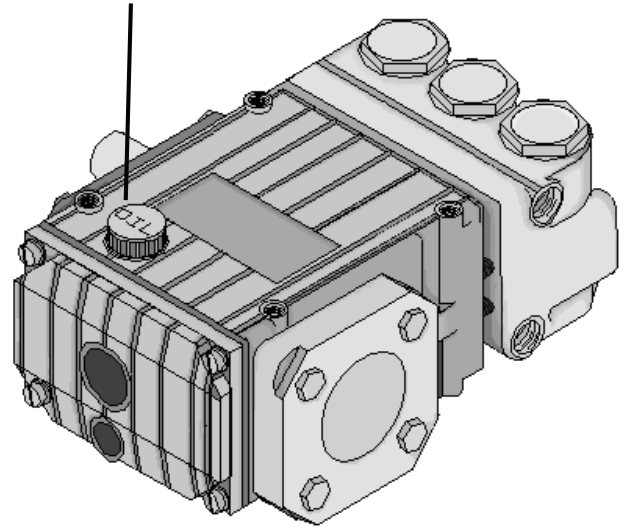
Loosen and remove the check/fill plug to check the oil level. The dipstick is notched on the stem. The top of the notch is the “full” mark and the bottom is the “add” mark. Replace the dipstick securely after checking the oil level.



### 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.

Fill plug/dipstick



### Battery Service

Check the electrolyte level in each cell at least once a month (more often in severe service). Remove the cover plates carefully and add water before the top of the separators are exposed. Use distilled water in your battery.



**WARNING:** Battery acid causes severe burns. Batteries contain sulfuric acid. Avoid contact with skin, eyes, or clothing. Wear eye protection. Always keep out of reach of children.

#### ANTIDOTE:

- External - flush with water.
- Internal - Drink large quantities of water or milk. Follow with milk of magnesia, beaten egg, or vegetable oil. Call physician immediately.
- Eyes - Flush with water for 15 minutes and get prompt medical attention.

Keep the battery clean by periodically wiping it off with a damp cloth. Keep the cable connections clean and tight. To remove corrosion, wash the terminals with a solution of one part baking soda and four parts water. When you are through, rinse all parts and surfaces thoroughly with clean water.

**IMPORTANT:** If battery cables are removed for service or battery replacement, always disconnect the negative (-) ground cable first, then the positive (+) cable. When reconnecting the cables, always connect the positive cable first so that no arcing can occur if the wrench accidentally contacts both the terminal and the frame.

**WARNING:** To prevent personal injury or electrical system damage, connect cables carefully and never reverse polarity when connecting cables. Always wear eye protection when servicing or charging batteries.

## Charging the Battery

If the battery power is not sufficient to crank the engine, you must charge it.

### To charge the battery:

1. Connect the positive (+) battery charger lead to the positive (+) battery terminal.
2. Connect the negative (-) battery charger lead to a good ground on the frame, away from the battery.
3. Set the battery charger to the 12 volt setting at a rate of 20 amperes.



**WARNING:** Shut off the battery charger before disconnecting the battery terminals. While the battery is charging, hydrogen gas is given off through the vents. When

hydrogen gas is mixed with air, the mixture is highly explosive and will explode in the presence of a spark or small flame. This could cause severe personal injury. NEVER smoke or allow flame or sparks near the area where batteries are being charged. ALWAYS wear eye protection when servicing or charging batteries.

4. Unplug the battery charger.
5. Disconnect the positive (+) cable.
6. Disconnect the negative (-) cable.



**CAUTION:** Jump (boost) starting the motor with another battery is not recommended. Use of a larger battery for boost starting

could cause severe damage to the motor.

## Engine and Pump Mounting

Once a month, inspect the engine and pump mount rubber isolator mounts and the mounting plate to the main frame. Use a pry bar to lift upwards on the mount plate for all four corners to be sure the rubber mounts have not separated (broken). Replace any rubber mounts that are broken or have lost their resiliency.

## 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 5 inches.
- Wrap up the hose as soon as you finish and store it in a safe location.

## Burner Fuel Filter/Water Separator Filter

Machines equipped with a combination fuel filter/water separator should have the collected water drained off weekly or more often, if necessary (the frequency will be determined by fuel quality, storage, and handling). Fuel filter change is generally recommended every 100 service hours or six months, whichever comes first. However, if fuel quality is good and fuel is properly stored and handled, filter life may be extended. Water level should never exceed the top of the plastic sediment bowl. To drain the bowl, put a container under the bowl, push upwards (against spring pressure) on the drain valve, located on the bottom of the bowl, until clear fuel appears at the valve. Dispose of the dirty fuel in a safe manner.



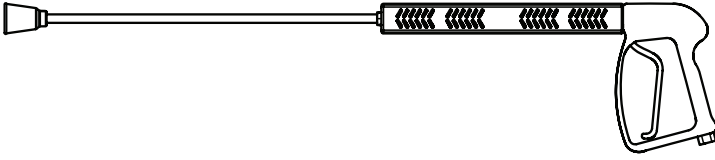
**WARNING:** DO NOT smoke or allow flame or sparks in the area when changing fuel filters. Clean up and neutralize any spilled fuel before igniting the burner or starting

the engine. To ignore this warning may cause a fire or explosion, resulting in severe bodily injury or death.

### To change the filter:

1. Turn off the fuel supply valve and drain the filter into a can.
2. Loosen and remove the plastic spin-on fuel sediment bowl from the filter element.
3. Using a 1/2" wrench, loosen the center bolt in the filter head enough to remove the spin-on filter element by hand.
4. Lubricate the new filter element seal ring with diesel fuel or light oil, then install the filter element by hand until the seal ring contacts the base. Tighten an additional 1/4 to 1/2 turn while holding the center bolt from turning.
5. Lubricate the bowl o-ring seal with fuel or light oil, then install the bowl until the seal contacts the filter element. Tighten by hand an additional 1/4 to 1/2 turn.
6. Turn on the fuel supply.

### 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!

### Cleaning Coils

With certain water conditions, mineral deposits can accumulate rapidly inside the coil pipes. This accumulation is increased by the extreme heat build-up in the coil. The best prevention for coil build-up is to use high quality cleaning detergents. In areas where water is an extreme problem, periodically use AaLadin Coil Cleaner (Part No. 27-163030) to clean the coil.

**IMPORTANT:** It is necessary to run soap through the pressure washer at least once per week to inhibit rusting of the coil. This aids in preventing premature scale buildup and possible damage to the coil, hoses, guns and tips. If you do not run soaps once per week the coil warranty can be voided.

### 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.

## 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. Start the engine.

5. 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.

6. 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.



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



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

## PUMP MALFUNCTION AND PRESSURE DELIVERY PROBLEMS (CRANKCASE TYPE PUMP)

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

## DETERGENT SYSTEM MALFUNCTION

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



# 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](http://www.P65Warnings.ca.gov)