

***AIR DRIVEN
SHAKER WASHER***

**OPERATORS MANUAL
*DIRECT DRIVE
PRESSURE WASHER***

Once the unit has been removed from the box, immediately write in the serial number of your unit in the space provided below.

SERIAL NUMBER _____

TABLE OF CONTENTS

INTRODUCTION	3
IMPORTANT SAFETY WARNINGS.....	4-7
MOTOR PRECAUTIONS	4
SPRAY PRECAUTIONS.....	5
DETERGENT CLEANING PRECAUTIONS	6
MISCELLANEOUS SAFETY PRECAUTIONS	6
ADJUSTMENT PRECAUTIONS.....	7
FEATURES DRAWING	8
SAFETY DECALS	9
INSTALLATION & PREPARATION	10-13
ATTIRE	10
SETUP	10
NOZZLE REVIEW	11
NOZZLE CONNECTION.....	11
WATER SUPPLY	12
UNLOADER.....	12
THERMAL RELIEF VALVE	12
PRE-START INSPECTION PROCEDURES.....	13
OPERATING INSTRUCTIONS	14-15
PRIMING THE PUMP	14
START-UP.....	14
CLEANING WITH DETERGENTS	15
SHUTDOWN.....	15
STORAGE & MAINTENANCE.....	16-17
SPECIFIC MAINTENANCE	16
WINTERIZING.....	17
TROUBLESHOOTING	18
STATEMENT OF WARRANTY	19
PUMP BREAKDOWN	20-21

⚠WARNING
Warning: This product contains lead, a chemical known to the State of California to cause birth defects or other reproductive harm.
Wash your hands after handling this product.

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

INTRODUCTION

Congratulations on the purchase of your air driven pressure washer! You can be assured your new pressure washer was constructed with the highest level of precision and accuracy. Each component has been rigorously tested by technicians to ensure the quality, endurance and performance of this unit.

This operator's manual was compiled for your benefit. By reading and following the simple safety, installation, operation, maintenance and troubleshooting steps described in this manual, you will receive years of trouble free operation from your pressure washer. The contents of this manual are based on the latest product information available at the time of publication. CSE reserves the right to make changes in price, color, materials, equipment, specifications or models at any time without notice.

! IMPORTANT !

THESE PARAGRAPHS ARE SURROUNDED BY A "SAFETY ALERT BOX". THIS BOX IS USED TO DESIGNATE AND EMPHASIZE SAFETY WARNINGS THAT MUST BE FOLLOWED WHEN OPERATING THIS PRESSURE WASHER. ACCOMPANYING THE SAFETY WARNINGS ARE "SIGNAL WORDS" WHICH DESIGNATE THE DEGREE OR LEVEL OF HAZARD SERIOUSNESS. THE "SIGNAL WORDS" USED IN THIS MANUAL ARE AS FOLLOWS:

DANGER: INDICATES AN IMMINENTLY HAZARDOUS SITUATION WHICH, IF NOT AVOIDED, WILL RESULT IN DEATH OR SERIOUS INJURY.

WARNING: INDICATES A POTENTIALLY HAZARDOUS SITUATION WHICH, IF NOT AVOIDED, COULD RESULT IN DEATH OR SERIOUS INJURY.

CAUTION: INDICATES A POTENTIALLY HAZARDOUS SITUATION WHICH, IF NOT AVOIDED MAY RESULT IN MINOR OR MODERATE INJURY.

THE SYMBOLS BELOW THIS PARAGRAPH ARE "SAFETY ALERT SYMBOLS". THESE SYMBOLS ARE USED TO CALL ATTENTION TO ITEMS OR PROCEDURES THAT COULD BE DANGEROUS TO YOU OR OTHER PERSONS USING THIS EQUIPMENT.



ALWAYS PROVIDE A COPY OF THIS MANUAL TO ANYONE USING THIS EQUIPMENT. READ ALL INSTRUCTIONS BEFORE OPERATING THIS PRESSURE WASHER AND ESPECIALLY POINT OUT THE "SAFETY WARNINGS" TO PREVENT THE POSSIBILITY OF PERSONAL INJURY TO THE OPERATOR.

Your safety and the safety of others is extremely important. We have provided many important safety messages in this manual and on your product. Always read and obey safety messages.



This is the safety alert symbol. This symbol alerts you to hazards that can kill or hurt you and others. The safety alert symbol and the words “DANGER” and “WARNING” will precede all safety messages. These words mean:

DANGER

You **will** be killed or seriously injured if you don't follow instructions.

WARNING

You **can** be killed or seriously injured if you don't follow instructions.

All safety messages will identify the hazard, tell you how to reduce the chance of injury, and tell you what can happen if the safety instructions are not followed.

CODE SYMBOLS



Hazard. Possible consequences: death or severe injuries



Hazardous Situation. Possible consequences: slight or mild injuries



Dangerous Situation. Possible consequences: damage to the drive or the environment



Important instructions on protection against explosion

Improper environment, installation and operation can result in severe personal injury and/or damage to property.

Qualified personnel must perform all work to assemble, install, operate, maintain and repair air motor.

Qualified personnel must follow:

- These instructions and the warning and information labels on the motor.
- All other drive configuration documents, startup instructions and circuit diagrams.
- The system specific legal regulations and requirements.
- The current applicable national and regional specifications regarding explosion protection, safety and accident prevention.



Complete the following checklist prior to starting installation in a hazardous area. All actions must be completed in accordance with Directive 2014/34/EU.

Checklist for installation in hazardous areas:

- _____ Read air motor label to check that motor has been designed for use in a hazardous application:
 - Hazardous zone
 - Hazardous category
 - Equipment group
 - Temperature class
 - Maximum surface temperatures

Example:

Model designation: 1UP-NRV-10

Year manufactured: 2003

II 2GD

Ex h IIC T4 Gb

Ex IIIC T135°C Db

Benton Harbor, MI USA

Telephone: 269.926.6171

* Legend

II: Equipment group II

2: Equipment category 2

G: Gas atmospheres

D: Dust atmospheres

b: EPL b.

Max. surface temp. 275°F/135°C

Ambient range (Ta) +1°C to +40°C (34°F/104°F)

- _____ Check the site environment for potentially explosive oils, acids, gases, vapors or radiation

- _____ Check the ambient temperature of the site and the ability to maintain proper ambient temperature.

Ambient range:

Non-hazardous conditions: 34°F/1°C to 250°F/121°C

Hazardous conditions: 34°F/1°C to 104°F/40°C

- _____ Check the site to make sure that the air motor will be adequately ventilated and that there is no external heat input (e.g. couplings). The cooling air may not exceed 104°F/40°C.

- _____ Check that products to be driven by the air motor meet ATEX approval.

- _____ Check that the air motor is not damaged.

INSTALLATION

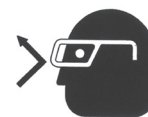
Correct installation is your responsibility. Make sure you have the proper installation conditions.



WARNING



Injury Hazard



Install proper guards around output shaft as needed.

Air stream from product may contain solid or liquid materials that can result in eye or skin damage.

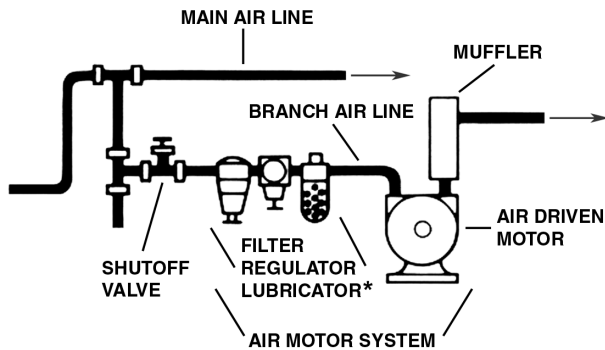
Wear eye protection when installing this product.

Failure to follow these instructions can result in serious injury or property damage.

Mounting

This product can be installed in any orientation. Mount the motor to a solid metal base plate that is mounted to a stable, rigid operating surface. Use shock mounts to reduce noise and vibration. Install a pressure regulator or simple shut-off valve to control motor.

Connection



Check the direction of the motor airflow. A single rotation motor will operate properly only in one direction. Single rotation motors require a sound absorber to be connected to the air port. Remove the plastic shipping plugs from the ports. Save plugs for future use during shutdown.

Install a 5-micron filter in the air line before the connection to the motor. Next install an air pressure regulator to control motor speed and torque.

For lubricated operation: Air motors with an “LL” or “NLP” designation in the model number can operate with or without lubrication. For optimal service and life, lubrication is recommended.

An automatic air line lubricator should be installed in the air line as close as possible and no more than 18 inches (1/2 meter) from the air motor. Install the lubricator level with or above the air motor so that the oil mist will blow directly into or fall down into the motor.

Fill the oil reservoir to the proper level with Gast #AD220 or SAE 10W high detergent or non-detergent motor oil. For food processing applications, use an FDA-approved, food-grade lubricant. Adjust lubricator to feed 1 drop of oil for every 50 CFM of air while the unit is running, or 1 drop of oil per continuous minute of run time. Do Not overfeed oil or exhaust air may become contaminated.

Clean the compressed air connection with low pressure air to remove any dirt from the line before connecting to the ports.

Use the proper sized fasteners. For the most efficient output and control of speed, use air lines that are the same size as the motor inlet port if the connection is less than 7 feet (2 meters). For longer connections, use the next pipe size larger than the motor intake port. Connect lines to motor in the proper direction.

A reversible motor will work equally well in both directions. Connect a 4-way valve with piping to both air ports of motor to make reversing possible. Connect the sound absorber on the exhaust air port or valve connection.

Do not add any thrust to the end or side of the shaft when making connections.



Do not use a hammer on the shaft or connections.



Lubricating the drive shaft will make assembly easier. Use a puller for removal of pulleys, couplings and pinions on the motor shaft. Check that the tension on the belt pulley matches the manufacturer's specifications. Do not exceed the maximum radial and axial forces on the shaft. If the motor shaft is connected to the part to be driven without a coupling, check that the radial offset and axial force effect will not cause problems.



Use only belts with < 109 electrical leakage resistance to prevent static electrical problems. Ground the motor.

Accessories

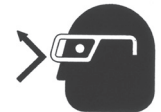
A muffler is shipped with the air motor (except 16AM) but is not installed. Consult your Gast Distributor/Representative for additional filter recommendations. Install a moisture trap and 5 micron filter in the air line ahead of motor.

Air consumption data at various speeds and pressures are available from your Gast Distributor/Representative or the factory.

OPERATION



WARNING



Injury Hazard

Air stream from product may contain solid or liquid material that can result in eye or skin damage.

Do Not use combustible gases to drive this motor.

Wear hearing protection. Sound level from motor may exceed 85 db(A).

Failure to follow these instructions can result in eye injury or other serious injury.

Check all connections before starting motor. It is your responsibility to operate this product at recommended speeds, loads and room ambient temperatures. Do not run the motor at high speeds with no load. This will result in excessive internal heat that may cause motor damage.

The starting torque is less than the running torque. The starting torque will vary depending upon the position of the vanes when stopped in relation to the air intake port.

Use a pressure regulator and/or simple shut-off valve to regulate the motor's speed and torque. This will provide the required power and will conserve air. Open the air supply valve to the motor. Set the pressure or flow rate to the required speed or torque. Adjust the lubricator to feed one drop of oil for every 50-75 CFM (1.5-2 M³ per minute) of air moving through motor. Check the oil level daily. The gear reducer does not need lubrication.



Operate the motor for approximately 2 hours at the maximum desired load. Measure the surface temperature of the motor on the casting opposite the pipe ports. The maximum surface temperature listed on the motor is for normal environmental and installation conditions. For most air motors, the maximum surface temperature should not exceed 275°F/135°C. Do not continue to operate the motor if the measured surface temperature exceeds temperature listed on the motor. If your measured temperature does exceed listed value, consult with your Gast Distributor/Representative for a recommendation.

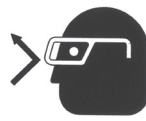
MAINTENANCE



WARNING



Injury Hazard



Disconnect air supply and vent all air lines.

Wear eye protection when flushing this product.

Air stream from product may contain solid or liquid material that can result in eye or skin damage.

Flush this product in a well ventilated area.

Do Not use kerosene or other combustible solvents to flush this product.

Failure to follow these instructions can result in eye injury or other serious injury.

It is your responsibility to regularly inspect and make necessary repairs to this product in order to maintain proper operation.

For Lubricated Operation

Use Gast #AD220 or a detergent SAE #10 automotive engine oil for lubricating. Lubricating is necessary to prevent rust on all moving parts. Excessive moisture in air line may cause rust or ice to form in the muffler when air expands as it passes through the motor. Install a moisture separator in the air line and an after cooler between compressor and air receiver to help prevent moisture problems.

Manual Lubrication

Shut the air motor down and oil after every 8 hours of operation. Add 10-20 drops of oil to the air motor intake port.

Automatic Lubrication

Adjust inline oiler to feed 1 drop of oil per minute for high speed or continuous duty usage. Do not overfeed oil or exhaust air may become contaminated. Check intake and exhaust filters after first 500 hours of operation. Clean filters and determine how frequently filters should be checked during future operation. This one procedure will help assure the motor's performance and service life.

Flushing

Flushing this product to remove excessive dirt, foreign particles, moisture or oil that occurs in the operating environment will help to maintain proper vane performance. Flush the motor if it is operating slowly or inefficiently.

Use only Gast #AH255B Flushing Solvent. DO NOT use kerosene or ANY other combustible solvents to flush this product.

1. Disconnect air line and muffler.
2. Add flushing solvent directly into motor. If using liquid solvent, pour several tablespoons directly into the intake port. If using Gast #AH255B, spray solvent for 5-10 seconds into intake port.
3. Rotate the shaft by hand in both directions for a few minutes.
4. You must wear eye protection for this step. Cover exhaust with a cloth and reconnect the air line.
5. Restart the motor at a low pressure of approximately 10 psi/ 0.7 bar until there is no trace of solvent in the exhaust air.
6. Listen for changes in the sound of the motor. If motor sounds smooth, you are finished. If motor does not sound like it is running smoothly, installing a service kit will be required (See "Service Kit Installation").


Check that all external accessories such as relief valves or gauges are attached and are not damaged before operating product.

Cleaning the sound absorber.

1. Remove the sound absorber (for non-lubricated operation, inspect muffler every 90 days. To avoid excessive clogging of muffler element, change frequently).
2. Clean the felt filter.
3. **You must wear eye protection for this step.** For lubricated operation, add 3-4 drops of oil.
4. Check the air compressor.
5. Listen for changes in the sound of the motor. If motor sounds smooth, you are finished. If motor does not sound like it running smoothly, installing a service kit will be required (See "Service Kit Installation").

Shutdown.

It is your responsibility to follow proper shutdown procedures to prevent product damage.

1. Turn off air intake supply.
2. Disconnect air supply and vent all air lines.
3. Disconnect air lines.
4. Remove air motor from connecting machinery.
5. Remove the muffler.
6.   **Wear eye protection. Keep away from air stream.** Use clean, dry air to remove condensation from the inlet port of the motor.
7. For lubricated operation, add a small amount of oil into the intake port. Rotate shaft by hand several times to distribute oil.
8. Plug or cap each port.
9. Coat output shaft with oil or grease.
10. Store motor in a dry environment.



Disposal (Please note current regulations) Parts of the air motor or air powered gear motor, shafts, cast iron or aluminum castings, gear wheels as well as rolling contact bearings may be recycled as scrap metal.

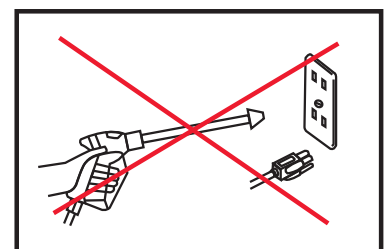
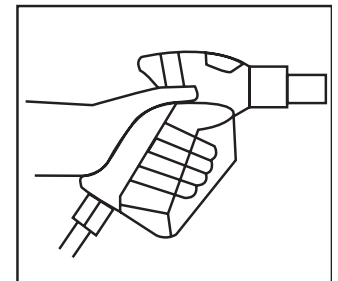
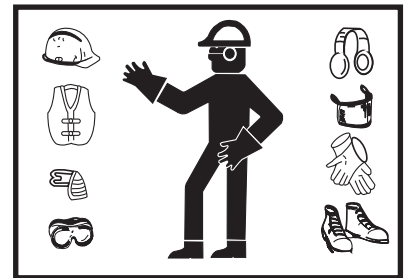
IMPORTANT SAFETY WARNINGS

SPRAY PRECAUTIONS:



DANGER: RISK OF INJECTION OR SEVERE CUTTING INJURY! KEEP CLEAR OF NOZZLE! DO NOT DIRECT DISCHARGE STREAM AT PERSONS OR PETS! ONLY TRAINED OPERATORS SHOULD USE THIS PRODUCT. WHEN OPERATING THIS UNIT, BASIC PRECAUTIONS SHOULD ALWAYS BE OBSERVED INCLUDING THE FOLLOWING:

1. KEEP AWAY FROM THE SPRAY:
 - a. Because of the high pressure and velocity of the spray, fluids can penetrate the skin, causing serious injury.
 - b. Never point the gun at yourself or anyone else. Never put your hand, fingers or body directly over the spray nozzle. Always keep operating area clear of all persons. Use extreme caution when operating near children.
 - c. If an accident does occur and the spray appears to have penetrated the skin, SEEK EMERGENCY MEDICAL CARE. DO NOT TREAT AS A SIMPLE CUT. If you are using cleaning agents, be prepared to tell a physician exactly what kind.
2. ALWAYS wear protective goggles when operating the unit to shield the eyes from flying debris and detergents. Other protective equipment such as rubber suits, gloves and respirators are advisable, especially when using cleaning detergents. Use extreme caution when operating near children.
3. Stay alert-watch what you are doing. Do not operate the unit when fatigued or under the influence of alcohol or drugs.
4. NEVER squeeze the trigger unless securely braced. The thrust from the water traveling through the nozzle may be powerful enough to cause the operator to lose balance if unprepared. DO NOT overreach or stand on unstable support. Wet surfaces can be slippery, wear protective foot gear and keep good footing and balance at all times. NEVER trigger the gun while on a ladder or roof.
5. Caution should be used when directing spray toward fragile materials such as glass. Shattering could result in serious injury.
6. ALWAYS hold on firmly to the gun/wand assembly when starting and operating the unit. Failure to do so can cause the wand to fall and whip dangerously. NEVER operate the gun with the trigger wired in the open position. To prevent accidental discharge, the trigger gun should be securely locked when not in use.
7. DO NOT direct spray on or into electrical installations of any kind! This includes electrical outlets, light bulbs, fuse boxes, transformers, etc. Severe electrical shock may occur.
8. Even after you shut off the unit, there is high pressure water left in the pump, hose and gun until you release it by triggering the gun. Before removing the spray nozzle or servicing the unit, ALWAYS shut off the unit and trigger the gun to release trapped pressure.



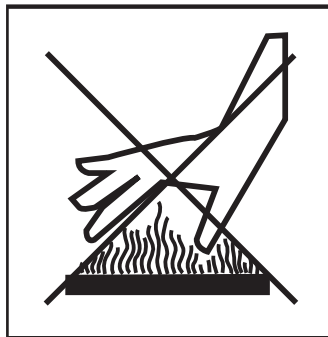
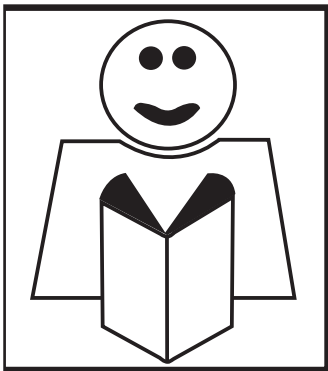
IMPORTANT SAFETY WARNINGS

DETERGENT CLEANING PRECAUTIONS:

1. DO NOT use solvents or highly corrosive detergents or acid type cleaners with this pressure washer.
2. KNOW YOUR DETERGENTS! Be prepared to tell a physician exactly what you are using in the event of an emergency. Read the Material Safety Data Sheet (MSDS) provided with your detergent and all detergent labels. Follow all appropriate instructions regarding preparation use, safety and transportation. Keep ALL detergents out of the reach of children.
3. DO NOT use this pressure washer to dispense hazardous detergents.
4. DO NOT alter the detergent injection feature in any manner not prescribed in this manual. Use only genuine replacement parts for necessary repairs.

MISCELLANEOUS SAFETY PRECAUTIONS:

1. NEVER ALLOW CHILDREN OR ADOLESCENTS TO OPERATE THIS UNIT!
2. Read and follow all handling, operations, maintenance and safety instructions listed in this manual and provide such information to ANYONE who will be operating this unit.
3. In freezing temperatures, the unit must always be warm enough to ensure there is no ice formation in the pump. DO NOT start this unit if it has been transported in an open or underheated vehicle without first allowing the pump to thaw.
4. When connecting the water inlet to the water supply mains, local regulations of your water company must be observed. In some areas the unit must not be connected directly to the public drinking water supply. This is to ensure that there is no feedback of the detergents into the water supply. (Direct connection is permitted if a back flow preventer is installed.)
5. DO NOT allow any part of your body or the high pressure hose to make contact with the muffler. Avoid dragging the hose over an abrasive surface such as cement. This causes wear and eventual rupturing.
6. High pressure hoses should be inspected daily for signs of wear. If evidence of failure exists, promptly replace all suspect hoses to prevent the possibility of injury from the high pressure spray. If a hose or fitting is leaking, NEVER place your hand directly on the leak.
7. DO NOT operate the unit without all protective covers in place.
8. NEVER run the unit with the governor disconnected or operate at excessive speeds.
9. To reduce the risk of injury, maintain a safe distance for persons while operating this unit. Close supervision is necessary when operating the unit near children.
10. DO NOT leave pressurized unit unattended. Shut off the unit and release trapped pressure before leaving.
11. DO NOT move the unit by pulling on the hose.



IMPORTANT SAFETY WARNINGS

ADJUSTMENT PRECAUTIONS:

1. NEVER alter or modify the equipment, be sure any accessory items and system components being used will withstand the pressure developed. Use ONLY genuine parts for repair of your pressure washer. Failure to do so can cause hazardous operating conditions and will void warranty.
2. NEVER make adjustments to the machinery while it is connected to a compressor without first removing the connected air lines. Turning the machinery over by hand during adjustment or cleaning might start the motor and machinery with it, causing serious injury to the operator.
3. Know how to stop the pressure washer and bleed pressures quickly. Be thoroughly familiar with controls.
4. Before servicing the unit; turn the unit off, relieve the water pressure, and allow the unit to cool down. Do not make repairs while unit is running. Service in a clean, dry, flat area. Block the wheels to prevent the unit from moving.
5. Follow the maintenance instructions specified in this manual.



! SAVE THESE INSTRUCTIONS !



INSTALLATION & PREPARATION

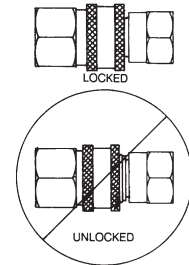
NOZZLE REVIEW:

Various nozzles may be quick-connected into the end of the wand to change the spray pattern or use the detergent feature. When using Quick Connects (Q.C.), be certain the connection is securely locked. If not, the high pressure water may shoot the nozzle from the wand, causing severe injury or serious damage. To determine spray fan, refer to the actual number stamped on the nozzle. The first two digits indicate the spray fan in degrees, i.e.; 15=15°, 25=25°, 65=detergent/low pressure.

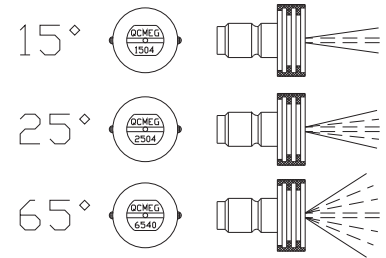
1. The 15° nozzle (YELLOW): This is a chiseling nozzle. The spray should be directed at a 45° angle to the surface and used like a scraper to remove paint, grease and dirt. Uses: Surface preparation (removing mildew stains and paint chips).
2. The 25° nozzle (GREEN): This is a flushing nozzle. This pattern is best suited for flushing dirt, mud, and grime. Uses: Wet sweeping leaves from walks, curbs and driveways, cleaning stable floors, washing swimming pool bottoms, degreasing engines.
3. The 65° nozzle (BLACK): This is a low pressure detergent application nozzle. This broad spray pattern distributes solution over vast areas under low pressure. Uses: Detergent application, misting or rinsing.

**WARNING RISK OF INJECTION
CAUSING SEVERE INJURY!**
**NEVER LOOK DIRECTLY AT THE
NOZZLE ORIFICE UNLESS IT IS
DISCONNECTED FROM THE
GUN/WAND ASSEMBLY!**

CONNECTION OF Q.C. NOZZLES



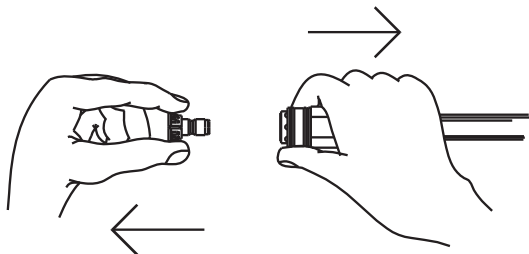
QUICK-CONNECT (Q.C.)



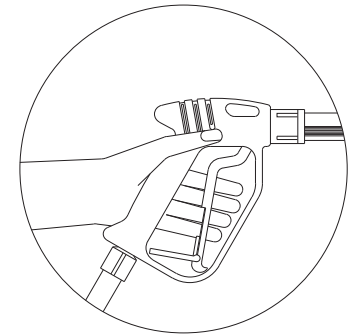
NOZZLE CONNECTION:

1. Be certain the trigger gun is locked in the “OFF” position. See WARNING, right.
2. The nozzle assembly should be disconnected from the gun/wand assembly at this time by retracting the locking ring on the quick-connect fitting to remove the nozzle.

QUICK-CONNECT FITTING

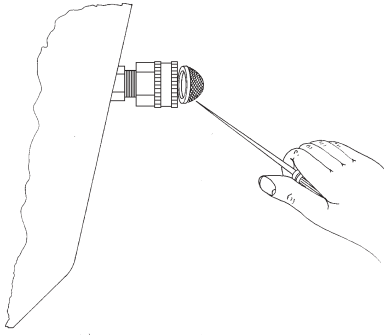


**WARNING RISK OF SEVERE
INJURY!**
**THE TRIGGER GUN SHOULD
ALWAYS BE LOCKED IN THE
OFF POSITION WHEN NOT IN
USE!**



INSTALLATION & PREPARATION

CHECK WATER INLET STRAINER



WATER SUPPLY:

1. Select a water supply hose which is a quality grade of garden hose measuring at least 3/4" ID and no longer than 50 feet.
2. Check the water inlet strainer to ensure it is clean and free of any obstructions. Periodic cleaning of the water strainer will help prevent pump problems. As a strainer becomes obstructed, it restricts proper flow of water to the pump. This can result in cavitations which will cause premature failure of pump packings.
 - a. Using a screw driver, remove the screen from the water inlet.
 - b. Clean or replace if necessary.

3. Connect the hoses.

- a. Connect one end of the water supply hose to the water inlet of the unit.
- b. Connect the other end of the hose to your pressurized water supply.

NOTE: Do not use a non-pressurized water supply (i.e. from a pond or well) with this unit.

- c. Connect the high pressure discharge hose to the water outlet of the unit.
- d. Securely connect the other end of the hose to the gun assembly. (A wrench may be required on some models.)
- e. Connect the wand assembly to the gun/hose assembly.

4. Follow the incoming water requirements listed below:

- a. Water pressure must be a minimum of 25 pounds per square inch (PSI) and a maximum of 100 PSI. (A typical outdoor faucet will generally supply this PSI if turned completely "ON".)
- b. Incoming GPM must be approximately one gallon more than the outgoing GPM stated on the pressure washer nameplate. (You can check GPM by timing how long it takes to fill a 5 gallon container.)
- c. Incoming water temperature must not exceed 125°F. Excessive pump damage may result if the water temperature exceeds this acceptable level.

5. Never allow the unit to operate without the incoming water line attached and the water supply completely turned on.



CAUTION RISK OF UNIT DAMAGE!

DO NOT OVERTIGHTEN THE UNLOADER. BREAKAGE COULD RESULT IN IMMEDIATE LOSS OF WATER PRESSURE AND COSTLY REPAIRS.

UNLOADER:

FACTORY PRESET:

The unloader valve on your machine is factory preset and should only be adjusted by a trained service technician. DO NOT adjust the pressure on your own!

INSTALLATION & PREPARATION

THERMAL RELIEF VALVE:

To ensure the water temperature does not exceed acceptable levels, never allow the pressure washer to operate in the bypass mode (with the unit running and the trigger gun closed) for more than three minutes.

A “thermal relief valve” has been added to this unit to protect the pump. It may begin to open and release water if the water temperature in the pump has exceeded 140°F. This will allow fresh, cool water to enter the system.

PRE-START INSPECTION PROCEDURES:

Before starting the unit, perform the following procedures:

1. Check the oil level in the pump and motor.
 2. Inspect the water inlet strainer. Clean or replace if necessary. See “Water Supply”.
 3. Check all hose connections to ensure they are securely tightened. See “Water Supply”.
 4. Inspect for system fuel leaks. If a fuel leak is found, DO NOT START UNIT! See “Fire & Ventilation Precautions”. Be sure that all damaged parts are replaced and that the mechanical problems are corrected prior to operation of the unit. If you require service, contact Customer Service.
 5. Inspect high pressure hoses for kinking, cuts and leaks. If a cut or leak is found, DO NOT USE HOSE! Replace hose before starting unit. See “Miscellaneous Safety Precautions”. Be sure that all damaged parts are replaced and that the mechanical problems are corrected prior to operation of the unit. If you require service, contact Customer Service.
-



THE FOLLOWING PAGES CONTAIN OPERATING AND MAINTENANCE INSTRUCTIONS.

DO NOT ATTEMPT TO OPERATE THIS PRESSUREWASHER UNTIL YOU HAVE READ AND UNDERSTOOD ALL SAFETY PRECAUTIONS AND INSTRUCTIONS LISTED IN THIS MANUAL.

INCORRECT OPERATION OF THIS UNIT CAN CAUSE SERIOUS INJURY!!

DO NOT ALTER OR MODIFY THIS EQUIPMENT IN ANY MANNER!

OPERATING INSTRUCTIONS



CAUTION RISK OF UNIT DAMAGE.

BE CERTAIN THE NOZZLE IS NOT CONNECTED TO THE UNIT WHILE PRIMING THE PUMP. PRIMING ALLOWS MINERAL DEPOSITS TO BE RELEASED FROM THE SYSTEM WHICH WOULD OBSTRUCT OR DAMAGE THE NOZZLE ASSEMBLY RESULTING IN COSTLY REPAIRS.

PRIMING THE PUMP:

1. It is essential to prime the pump on initial start-up and each time the water supply is disconnected from the unit after initial use.
2. Lay the high pressure hose out to remove any loops. Water flow will constrict the hose, creating tight loops if the hose is not straight.
3. Securely connect the gun assembly to the high pressure hose.
NOTE: The nozzle assembly should NOT be connected to the gun assembly at this time. See "Nozzle Connection".
3. With the trigger gun locked in the "OFF" position, turn the water supply completely on. Pointing the gun in a safe direction, unlock the trigger gun and squeeze the trigger.
4. Low pressure water will begin flowing from the hose/gun assembly. This allows the unit to prime and purge any air from the system. The unit is primed when water flow is uninterrupted by air.
5. Once the unit is primed, release the trigger and lock the gun in the "OFF" position. Securely connect the nozzle assembly. (See "Nozzle Connection").



DANGER RISK OF INJECTION CAUSING SEVERE INJURY!

**-KEEP CLEAR OF NOZZLE!
NEVER PLACE HAND OR FINGERS IN FRONT OF NOZZLE!
-DO NOT DIRECT DISCHARGE STREAM AT PEOPLE OR PETS!
-BE CERTAIN THE NOZZLE IS SECURELY CONNECTED TO THE WAND TO PREVENT ACCIDENTAL DISCHARGE!**

START-UP:

1. Refer to the "Safety Precautions" before starting the unit.
2. Locate the Safety Decals on your unit and heed their warnings.
3. With the gun locked in the "OFF" position, point the trigger gun away from yourself or anyone else. Ensure the water supply is completely turned on.
4. Disengage the safety lock-off on the gun and squeeze the trigger. Low pressure water will begin flowing from the nozzle.
5. BE CERTAIN the trigger gun remains in an open position while starting the engine. Brace yourself as the gun will kickback from the high pressure created by the pump once the motor has started.
6. Steady the unit during start-up. Slowly apply air flow to the motor, not to exceed 100 psi / 7 bar.
7. Once the motor has started, perform the following procedures with the gun open:
 - a. Inspect for system oil leaks and fuel leaks. If an oil leak is found, **TURN UNIT OFF IMMEDIATELY!** See "Fire & Ventilation Precautions". Be sure that all damaged parts are replaced and that the mechanical problems are corrected prior to operation of the unit. If you require service, contact Customer Service.
 - b. Inspect high pressure hoses for kinking, cuts and leaks. If a cut or leak is found, **DO NOT TOUCH HOSE AT LEAK!!! TURN UNIT OFF IMMEDIATELY!** Replace hose before restarting the unit. See "Miscellaneous Safety Precautions". Be sure that all damaged parts are replaced and that the mechanical problems are corrected prior to operation of the unit. If you require service, contact Customer Service.
8. Trigger the gun several times. Be certain to **LOCK** the trigger gun in the "OFF" position whenever changing the quick connect nozzles. **NEVER** look directly into the nozzle! High pressure water creates a risk of severe injury!
9. Do not allow unit to operate in bypass mode (with trigger closed) for more than three minutes without triggering the gun. Failure to follow this simple rule can cause premature failure of pump packing seals, resulting in costly pump repair.
10. Because your pressure washer delivers a high pressure spray and a variety of spray patterns, there are many cleaning jobs that can be done without the use of detergents. If a cleaning agent is required, see "Cleaning With Detergents" for the correct procedures.



CAUTION RISK OF DAMAGE.

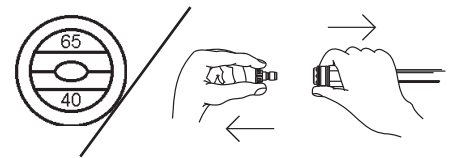
DO NOT ALLOW SPRAY PATTERN TO REMAIN ON A FIXED AREA FOR AN EXTENDED PERIOD OF TIME. POSSIBLE DAMAGE MAY OCCUR TO THE AREA.

OPERATING INSTRUCTIONS

CLEANING WITH DETERGENTS:

1. Refer to “Detergent Cleaning Precautions” pg. 6 before working with detergents. Be certain to wear protective safety attire as stated.
2. Prepare detergent solution according to label directions. Never pump acids, alkaline, abrasive fluids or solvents through the unit.
3. Some units are equipped with adjustable detergent knobs. Locate the clear vinyl hose which leads to the pump head.
 - a. If your injector is equipped with an adjustment knob on the pump head, you may adjust the amount of detergent desired by turning the knob completely counterclockwise to set at the maximum siphon rate.
 - b. If your injector is not equipped with an adjustment knob, the detergent ratio is preset and cannot be adjusted.
4. Immerse the detergent strainer into the detergent solution to allow detergent to siphon.
5. With the trigger gun locked in the “OFF” position, securely quick-connect the detergent spray nozzle (BLACK) into the end of the wand.
6. *NOTE: This injection system is designed to apply detergents under low pressure only. It will not allow detergent solutions to be introduced into the system unless the nozzle assembly is in the low pressure detergent mode.*
6. To apply solution; unlock the trigger gun and squeeze the trigger. In a few moments a detergent/water mixture will exit the low pressure nozzle. Start spraying the lower portion of the surface being cleaned and move up, using long overlapping strokes. Applying from the bottom up helps avoid streaking. Allow to soak briefly. DO NOT allow detergent solution to dry on the surface. (Avoid working on hot surfaces or in direct sunlight to minimize the chances of the detergent drying, which may result in damaging painted surfaces.) Be certain to rinse a small section at a time.
7. To rinse; lock the trigger gun in the “OFF” position, securely quick-connect the desired high pressure nozzle into the end of the wand. Unlock the trigger gun and spray. It will take about 30 seconds to purge all detergent from the line. For best rinsing results, start at the top and work down.
8. Siphon a gallon of water through the low pressure detergent injection system after each use. This prevents the possibility of corrosion or detergent residue causing mechanical problems during the next use.

QUICK CONNECT DETERGENT



SHUTDOWN:

1. Turn air supply “OFF”.
2. Turn the water supply “OFF”.
3. Pointing the gun in a safe direction, trigger gun momentarily to relieve any trapped pressure.
4. Once pressure is relieved, disconnect the nozzle assembly.
5. Disconnect and drain gun, wand and hoses.
6. Wipe unit clean and store with gun, wand and hoses in a safe, non-freezing area.

STORAGE & MAINTENANCE

MOTOR: Add 3-4 drops of lubrication into the intake port. rotate the shaft several times to distribute oil evenly. Plug or cap intake and discharge ports. Store in a dry environment to reduce the risk of damage. Following the motor manufacturer's recommendations will extend motor work life.

PUMP: The pump oil must be changed after the first 25 hours of operation. Once the initial oil change has been completed, it is recommended the oil be changed every 3 months or 250 hour intervals. If oil appears dirty or milky, changes may be required at a greater frequency. Add pump oil and fill only to the center of the sight glass (Refer to the parts listing for the correct pump oil). **DO NOT OVERFILL!**

NOZZLES: Water flow through the spray nozzle will erode the orifice, making it larger, resulting in a pressure loss. Nozzles should be replaced whenever pressure is less than 85% of the maximum. The frequency of replacement will depend upon such variables as mineral content in the water and number of hours the nozzle is used.

QUICK COUPLERS: There is an o-ring seal inside the female quick coupler. This o-ring will deteriorate or, if the unit is allowed to pump without the high pressure hose or nozzle attached, the o-ring may be blown out occasionally. Simply insert a replacement o-ring to correct the leak. (Additional o-rings can be purchased from your dealer.)

AIR MOTOR TROUBLESHOOTING GUIDE

Problem					Reason and Remedy for Problem
Low Torque	Low Speed	Won't Run	Runs Hot	Runs Well Then Slows Down	
●	●	●			Dirt or foreign material present. Inspect and flush.
●	●	●			Internal rust. Inspect and flush.
●	●				Low air pressure. Increase pressure.
	●				Air line too small. Install larger line(s).
	●			●	Restricted exhaust. Inspect and repair.
●	●	●		●	Motor is jammed. Have motor serviced.
	●			●	Air source inadequate. Inspect and repair.
	●			●	Air source too far from motor. Reconfigure setup.

STORAGE & MAINTENANCE

WINTERIZING:

For storage and transportation purposes in subfreezing ambient temperatures, it will be necessary to winterize this unit. This unit must be protected to the lowest incurred temperature for the following reasons:

1. If any part of the pumping system becomes frozen; excessive pressure may build up in the unit which could cause the unit to burst resulting in possible serious injury to the operator or bystanders.
2. The pumping system in this unit may be permanently damaged if frozen. **FREEZE DAMAGE IS NOT COVERED BY WARRANTY.**

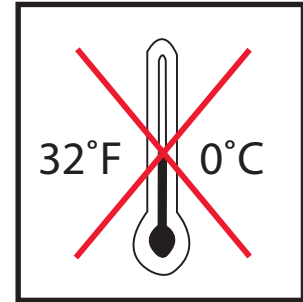
If you must store your unit in an area where the temperature may fall below 32°F, you can protect your unit by following the procedure outlined below.

1. Gather the following items:
 - a. Two 5 gallon containers.
 - b. One gallon of antifreeze. (CSE recommends an environmentally safe antifreeze.)
 - c. Water supply.
 - d. Three foot hose, 1/2-3/4 I.D. with a 3/4 inch male garden hose fitting.
2. Procedure:
 - a. To start winterizing, unit must be run and primed according to the "Start-up Procedures" listed on page 14.
 - b. After running and priming, shut off the unit and water supply.
 - c. Relieve system pressure by pointing the trigger gun in a safe direction and squeezing the trigger until water flow ceases to exit the nozzle.
 - d. Lock the trigger gun in an OFF position and remove the nozzle.
 - e. In one 5 gallon container, mix the antifreeze and water according to manufacturer's recommendations for the temperature to which you are winterizing.

NOTE: Proper winterizing is based on the recommended manufacturer's instructions listed on the "Protection Chart" shown on the back label of most antifreeze containers.

- f. Remove the water supply hose from the unit and attach the 3 foot hose securely to the inlet connection. Submerge the other end into the antifreeze solution.
 - g. Shut off the detergent injector if applicable.
 - h. Point the wand into the empty container and start the unit.
 - i. Trigger the gun until the antifreeze begins to exit the wand. Release the trigger for 3 seconds, then trigger the gun for 3 seconds. Continue cycling the gun several times until all the antifreeze mixture is siphoned from the container.
 - j. Stop the unit.
 - k. Detach the 3 foot hose from the unit and drain any excess antifreeze back into the 5 gallon container.
 - l. Disconnect the hose/gun/wand assembly from the unit and drain any excess antifreeze back into the 5 gallon container.
 - m. Store the hose, gun and wand with the unit in a safe, non-freezing area.
 - n. Store antifreeze solution for next use or dispose of according to state EPA laws.
3. Optional Procedure:
 - a. Shut the unit and water supply off.
 - b. Relieve system pressure by pointing the trigger gun in a safe direction and squeezing the trigger until water flow ceases to exit the nozzle.
 - c. Disconnect and drain the hose, gun and wand.
 - d. Start the unit and allow it to run until all the water exits the unit. Once the water has stopped flowing from the unit, turn the unit off.

NOTE: When using this procedure, caution should be used as ice chips can form from drops of water which could cause the unit to burst if starting before completely thawed.



PUMP TROUBLESHOOTING

SYMPTOM	PROBABLE CAUSE	REMEDY
No discharge at nozzle when trigger mechanism is squeezed.	Inadequate water supply.	Ensure hose is 3/4" diameter and incoming water supply is turned on.
Low or fluctuating pressure.	Kink in water inlet hose. Kink in high pressure discharge hose. Water inlet screen obstructed. Pump sucking air. (Prime eliminated) Eliminate leaks in intake line. Not in high pressure mode. Obstructed or worn spray nozzle. Damaged or obstructed valve assy.	Remove kink. Replace hose. Remove screen, clean or replace. Tighten all water intake connections Insert a high pressure nozzle. Remove, clean or replace. Remove, inspect, clean or replace on pump.
	Pump packings worn. Bypass valve not operating correctly.	Replace packings. Repair or replace.
Water is leaking from the "Heat Dump Valve"	Water temperature is too high. Defective valve.	Do not allow the unit to operate in the bypass mode (with trigger gun closed) for more than 3 minutes. Replace.
Oil appears milky or foamy.	Water in oil.	Change pump oil. Fill to proper level.
Oil leaking from unit.	DO NOT USE!!!!	Contact CSE Customer Service.
Detergent will not siphon into Low Pressure Detergent mode.	Detergent strainer is not completely submerged in detergent solution. Detergent strainer obstructed. Detergent hose cut, obstructed or kinked. Detergent adjusting knob on pump turned to closed position. (If applicable.) Not in low pressure mode. Nozzle assembly is plugged. Too many high pressure hose extensions attached to the water outlet. Ball & Spring in Venturi stuck.	Check, submerge if necessary. Inspect, clean or replace. Inspect, clean or replace. Open adjusting knob. Refer to "Cleaning with Detergents" pg. 15 Insert BLACK nozzle. Clean or replace. Use one extension maximum. Remove, clean or replace.
Water flows back into detergent container.	Ball & Spring in Venturi reversed, missing or corroded.	Remove, clean or replace.
Water flows from the nozzle when the trigger gun is locked in the "OFF" position.	Gun is malfunctioning.	Repair or replace.

STATEMENT OF WARRANTY

The manufacturer of this washer offers the original owner a one (1) year limited warranty. The manufacturer guarantees the air driven cold water pressure washer to be free from defects in materials and/or workmanship. Any defective parts not subject to normal wear and tear will be repaired or replaced at the manufacturers option during the warranty period. All warranties will begin from the original date of purchase.

ONE (1) YEAR PARTS WARRANTY

Thirty (30) day warranty on high pressure hose, strainer filter, trigger gun and wand and all other accessories.

WARRANTY DOES NOT COVER:

Normal wear parts: pump packing, pump valves, unloader, detergent valves, o-rings, or spray nozzles.

Parts damaged due to misuse or operation at other than recommended speeds, pressures, temperatures or improper installation.

Parts damage due to misuse or worn because of low temperatures, the use of caustic liquids or by operation in abrasive or corrosive environments or under conditions causing pump cavitation.

IMPORTANT:

This unit was designed to be operated in a medium duty application only. The use of this washer in any other application will void warranty. Failure to follow the recommended operating and maintenance procedures or failure to use genuine parts also voids the warranty.

GENERAL INFORMATION:

The motor warranty will be handled through the motor factory. The consumer will be responsible to prepay freight if warranty is to be considered. Parts returned prepaid to our factory or to an Authorized Service Center will be inspected and replaced free of charge if found to be defective and subject to this warranty. There are no warranties which extend beyond the description on the face hereof. Under no circumstances shall the manufacturer bear responsibility for loss of the unit, loss of time, inconvenience, consequential damages, pickup or delivery charges.

3400 RPM

