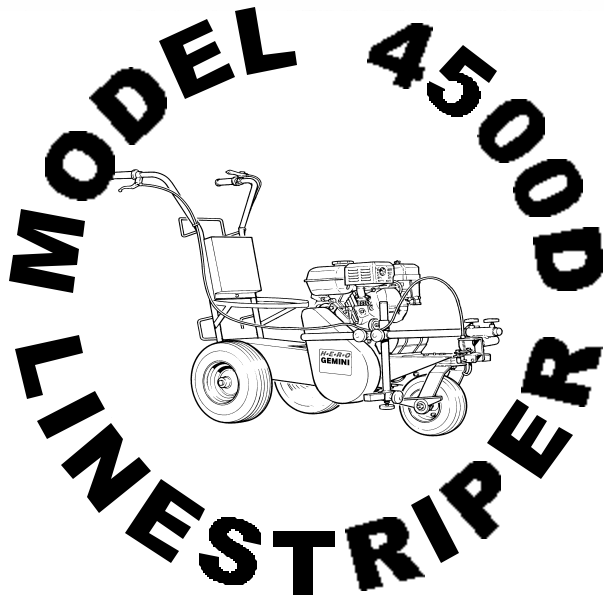


HERO

Industries



Model 4500D
Linestriper

SAFETY, OPERATING AND MAINTENANCE INSTRUCTIONS AND PARTS LIST

WARNING

DO NOT ATTEMPT TO OPERATE THIS MACHINE UNTIL YOU HAVE READ AND UNDERSTOOD ALL SAFETY PRECAUTIONS AND OPERATING INSTRUCTIONS. EQUIPMENT AND CHEMICALS WHEN USED IMPROPERLY CAN BE DANGEROUS.

H.E.R.O. Industries

a division of Middlefield Bancorp Limited

2719 Lake City Way

Burnaby, B.C., V5A 2Z6

Phone: (604) 420-6543 Toll Free 800-494-4376

Fax: (604) 420-8725

E-Mail: sales@hero.ca Website: [//www.hero.ca](http://www.hero.ca)

H.E.R.O. WARRANTY

H.E.R.O. INDUSTRIES LTD., guarantees this airless pump to be free of defects in materials and workmanship to the original owner, for a period of one full year from the date of purchase.

The warranty entitles the owner to parts replacement at no charge. The parts replacement warranty is valid for any necessary replacement, whither caused by material or workmanship defect or simple wear. The hydropulse membrane (part# 4-04-22-4500) is warranted for LIFE. Installation costs for the hydropulse membrane is provided for the first 12 months only. H.E.R.O. Industries Ltd. offers no warranty on the intake ball, outgo ball, drive belt, hoses, gun or accessories, plastic, rubber, other soft goods or motor used in or supplied with the H.E.R.O. sprayer.

Motor, accessories, etc., which are supplied by other manufacturers and are attached to or supplied with the H.E.R.O. airless pump, are warranted only to the extent that these parts are warranted by their respective manufacturers. Warranty claims must be made directly to such manufacturers or their local authorized service depots.

The warranty is only applicable to the original purchaser and the equipment has been properly used, operated and maintained in accordance with all instructions, precautions and warnings contained in this manual. For the purpose of this warranty, damage resulting from accident, abuse, improper cleaning or operation, fire, flood, or Act of God, is not covered.

H.E.R.O.'s liability is limited to replacing parts found to be defective or worn and does not include; transportation costs, damage or other expenses of any kind incurred in connection with the purchase and use of this sprayer.

Repairs claimed under warranty must be performed at an authorized H.E.R.O. Service Center, using only genuine H.E.R.O. parts. Parts necessary under warranty claim will be supplied by your local H.E.R.O. Service Center.

DO NOT return worn parts to factory without authorization.

To qualify for the warranty, the warranty card (attached to this page) supplied with this H.E.R.O. airless pump, must be completed with equipment serial number and signed by the purchaser, and postmarked within ten (10) days of purchase.

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The following symbols will appear through out this manual. Each symbol is used to visually draw your attention to important safety precautions, special operational instructions, as well as warnings and hints. Please take this opportunity to familiarize yourself with their meanings.



WARNING / CAUTION
Pay special attention to instructions



ALWAYS
Procedures or situations to follow.



SERVICE / MAINTENANCE
Service or maintenance instructions.



WARNING / FLAMMABLE
Dangerous situations to avoid, due to possibility of explosion or fires



NEVER / AVOID
Activities or situations to avoid.



MEDICAL EMERGENCY
Important medical advice.



IMPORTANT

NOTE: AS WITH ALL MECHANICAL EQUIPMENT, PROPER OPERATING AND MAINTENANCE PROCEDURES ARE REQUIRED TO KEEP YOUR H.E.R.O. AIRLESS PUMP PERFORMING TO YOUR SATISFACTION. THE FOLLOWING SAFETY, OPERATING AND MAINTENANCE INSTRUCTIONS ARE IMPORTANT.

Read and understand this manual completely, especially with regard to all **safety precautions**. Read and follow instructions on all warning labels on your equipment. Keep the warning labels clean and readable at all times. Order new labels from your local distributor or from H.E.R.O. Industries if needed.

The manufacturer shall not be responsible for any loss, damages, or injury of any kind or nature whatsoever resulting from the use the equipment other than in strict compliance with the instructions, cautions and warnings contained in this operating and instruction manual and as displayed on the face of the equipment.

This system is capable of producing 2400 psi. (spray pressure). To avoid rupture and injury DO NOT operate this pump with components rated less than 3000 psi. working pressure (including but not limited to spray guns, hose and connections).

Before servicing, cleaning or removing of any part, shut off power and relieve pressure.



IMPORTANT



Never place fingers near spray tip of gun. **Never** point gun toward any part of the body, or that of any other person. Material issuing from the spray tip is at high pressure. If fingers, or any part of the body are placed near the tip of the spray gun, it is possible that the spray could break the skin and inject some of the material. If injury does occur, seek the **immediate** attention of a medical doctor. Be prepared to inform the doctor what fluid was injected, if the injury is of an injection nature. **Never** treat the situation as a simple matter. Equipment and chemicals, when used improperly can be dangerous.



IMPORTANT SAFETY PRECAUTIONS



- ☒ **NEVER** place any part of the body in front of the spray tip or aim the gun toward any part of the body.
- ☒ **NEVER** point the gun toward any individual.
- ☒ **NEVER** treat any injury as a simple cut. If injury does occur, seek immediate medical attention. Be prepared to inform the doctor what fluid was injected.
- ☒ **NEVER** allow another person to use the sprayer unless he is thoroughly instructed on its operation and has read all safety precautions in this manual and all safety warning labels attached to unit.
- ☒ **NEVER** use around children.
- ☒ **NEVER** attempt to perform any maintenance or service on any part of the unit spray system without first;
 1. Turn off the engine.
 2. Turn the engine switch to "OFF" position.
 3. Relieving all pressure in the pump by triggering the gun.
 4. Locking gun trigger in "LOCKED" position, with gun locked closed.
- ☒ **NEVER** operate the sprayer without the tip guard complete and in place.
- ☒ **NEVER** spray any material in the vicinity of open flame, pilot lights, electrical outlets or any other source of ignition.
- ☒ **NEVER** spray volatile materials with flash points lower than 140 F (60 C).
- ☒ **NEVER** attempt to stop any leakage in the paint line or at any fitting with your hand or any part of your body. Immediately shut off the unit should leakage occur.
- ☒ **NEVER** allow paint hose to become kinked, or to vibrate against rough or sharp surfaces.
- ☒ **NEVER** operate the unit at pressures higher than the pressure rating of the lowest rated component in the system, or at pressure higher than factory preset.
- ☒ **NEVER** spray in an enclosed area. The spraying area must be well ventilated to safely remove chemical vapors.
- ☒ **NEVER** operate the unit with worn or damaged accessories, or with accessories other than those supplied by H.E.R.O. Industries, unless the accessories have been first specifically approved in writing by H.E.R.O. Industries.
- ☒ **NEVER** allow the unit to be serviced or repaired anywhere other than an authorized H.E.R.O. Service Center, or with other than genuine H.E.R.O. parts or components.
- ☒ **NEVER** leave unit unattended without first shutting off, triggering the gun to relieve all pump pressure, and setting the trigger lock on gun in "LOCKED" position, with gun locked closed.



IMPORTANT SAFETY PRECAUTIONS



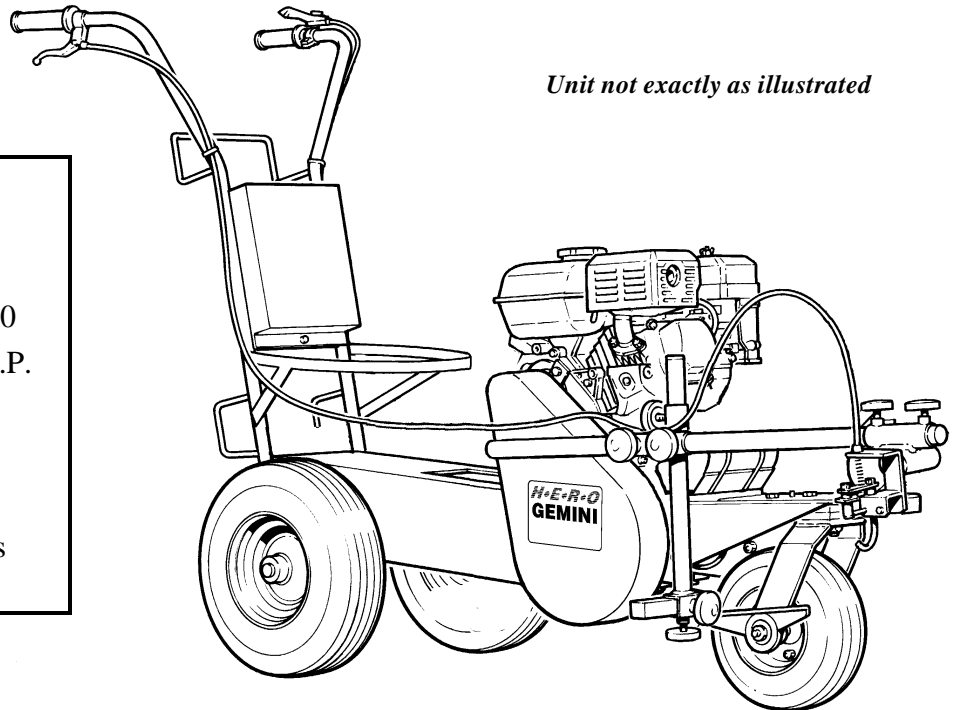
- ☑ **ALWAYS** follow H.E.R.O. recommendations for operation and safety completely.
- ☑ **ALWAYS** set trigger lock on gun in "LOCKED" position when not in use, with gun locked close.
- ☑ **ALWAYS** check connections and fittings for tightness before operating the unit.
- ☑ **ALWAYS** locate the unit in a well ventilated area a minimum of 25 feet from the spray area.
- ☑ **ALWAYS** ground the unit, the paint containers, and the object being sprayed to eliminate static discharge. Ensure that all these objects remain grounded throughout the entire spraying operation.
- ☑ **ALWAYS** use accessories and components approved for at least 3000 psi (working pressure) in the spraying system.
- ☑ **ALWAYS** use accessories and components supplied by H.E.R.O. Industries., or specifically approved in writing by H.E.R.O. Industries on with the unit.
- ☑ **ALWAYS** examine accessories for wear or damage before operating the unit.
- ☑ **ALWAYS** use lowest possible pressure when flushing and cleaning the unit, and hold the gun firmly against a metal container to reduce static discharge possibility.
- ☑ **ALWAYS** wear a face filter mask when operating the unit.
- ☑ **ALWAYS ;**
 1. Turn off the engine.
 2. Turn the engine switch to "OFF" position.
 3. Relieve all pressure in the pump by triggering the gun.
 4. Lock gun trigger in "LOCKED" position, with gun locked closed before attempting to perform any maintenance or service on any part of the unit spray system.
- ☑ **ALWAYS** wear safety glasses when operating the unit.
- ☑ **ALWAYS** ensure fire extinguishing equipment is readily available and properly maintained in the spray area.
- ☑ **ALWAYS** observe good housekeeping and keep the spray area free from obstructions.
- ☑ **ALWAYS** be aware that certain chemicals may react with aluminum, carbide, or other components in the pump system. Read the manufacturer's label on all materials to be sprayed, and follow the manufacturer's recommendations. If in doubt, consult your material supplier to be sure.

H.E.R.O. AIRLESS SPRAY PAINTING

Welcome to the world of H.E.R.O. airless paint spraying. We are sure you will enjoy owning and operating your new H.E.R.O. model 4500D linestriper. The H.E.R.O. 4500D Linestriper is a versatile painting unit that is suitable for both line striping applications and regular airless painting applications.

With H.E.R.O. airless spray equipment you will avoid the inconvenience and mess of overspray. You are spraying paint, not air, and the paint is driven to the painting surface in a clean, fan shaped spray which penetrates all cracks and corners. To attain these results, you must adjust the pressure as low as possible.

We recommend that you become familiar with your H.E.R.O. unit. Discuss with your dealer the useful accessory items he has to offer - various types of tips, extension poles for hard to reach areas, extra hose, etc. Use of accessory items is often the difference between a good job and an excellent one!



Specifications

GPM at Max. Tip	1.0
Maximum PSI	3000
Engine (Honda)	4 H.P.
Tip Range	
1 Gun	.031
2 Gun	.021
Weight	210 Lbs

WARNING

Do not attempt to operate this machine until you have read and understood all safety precautions and operating instructions.

Equipment and chemicals when used improperly can be dangerous.



UNIT SET-UP

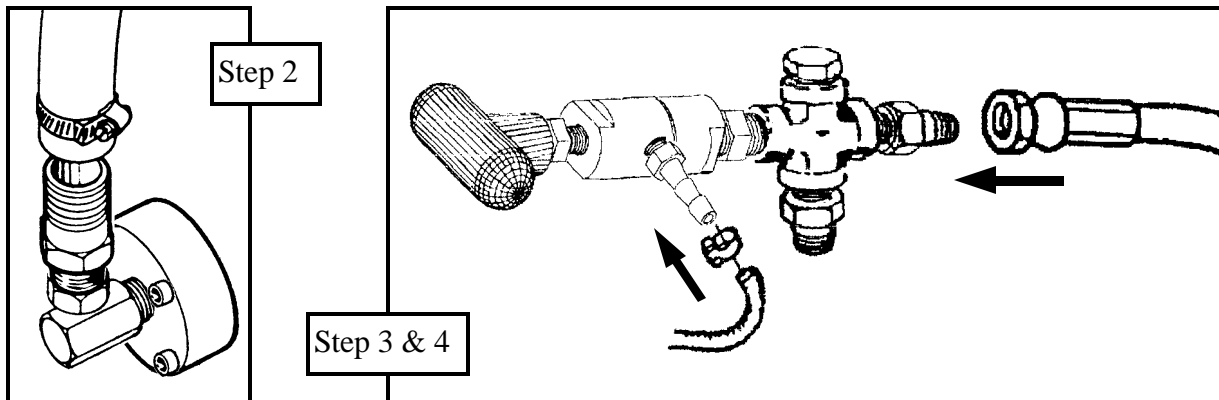
Due to the flexible design of the 4500D, the set up of the unit may take on various approaches, depending on the intended use. We will begin with the basic uncrating and initial unit set-up and then discuss the various set-up options which are available to you for other uses.



Your H.E.R.O. airless sprayer has been full factory tested prior to shipment. However we recommend that the following safety and set-up procedures be followed.

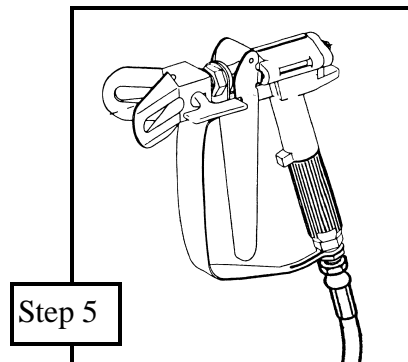
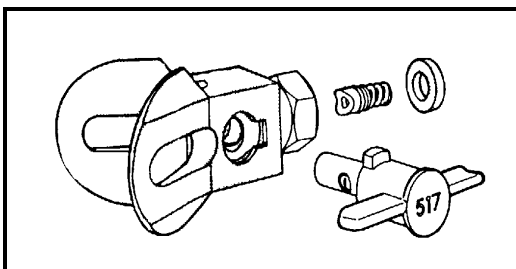


1. Remove unit from shipping carton. Inspect exterior of unit for any signs of freight damage. If any parts are found to be broken or damaged, immediately contact the carrier and arrange for an inspection of the concealed damage. Claims for freight damage **must** be made by the **CONSIGNEE** and not by the shipper. The carrier accepts full responsibility for the safe delivery of merchandise upon pick-up from the shipper.
2. Attach intake siphon assembly (ref # 1) to intake hose barb (ref # 6). Tighten hose clamp (ref # 5) securely.



3. Attach prime hose (ref # 51) to prime valve hose barb (ref #47). Secure with clamp (ref # 52).
4. Attach paint hose to outgo connector (ref # 38).
5. Attach gun to paint hose.

NOTE; Spray tip and tip guard should be attached to gun prior to attaching to hose.

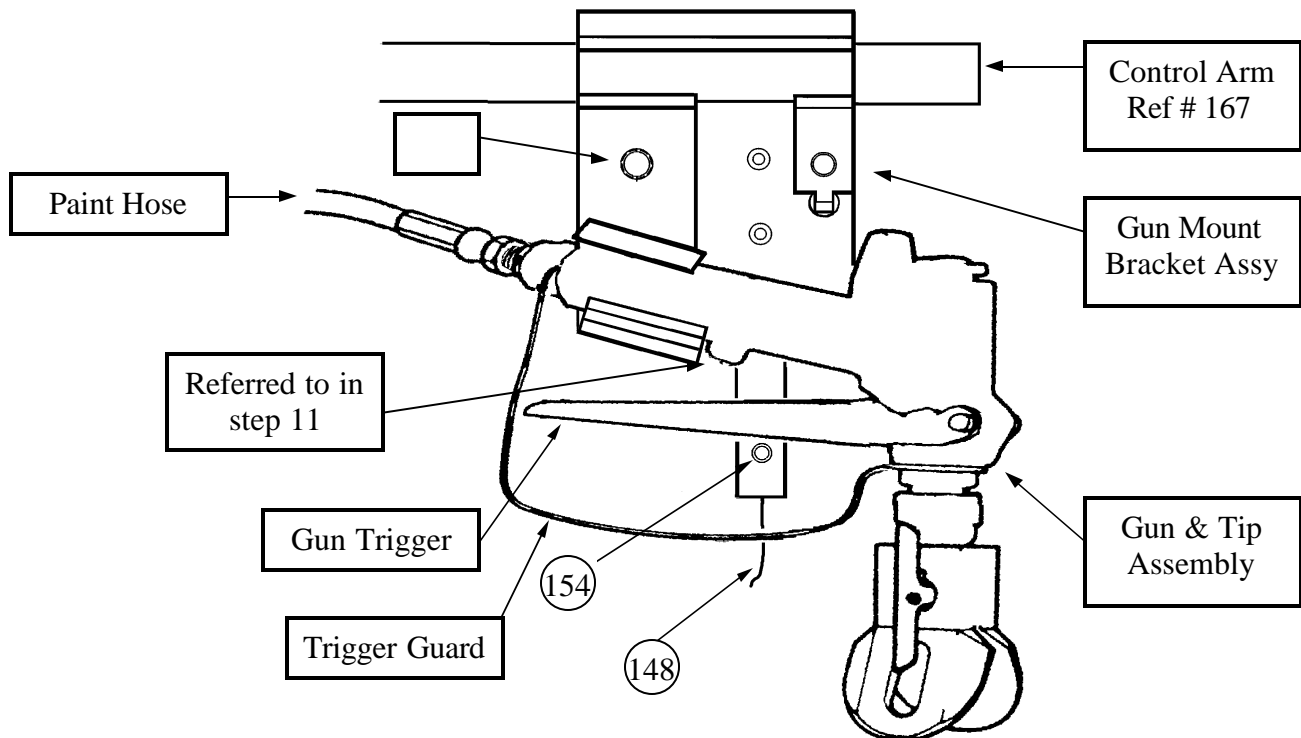


UNIT SET-UP

The 4500D is supplied with one (1) gun mounting bracket, horizontal arm.(ref # 167) and one vertical arm (ref # 168). It may be mounted on either the right or left side of unit, based on your personnel preference. An optional second gun mounting kit (Part # 4-06-440-485) is available for those who wish to spray dual lines, or a combination single strip and curb application. More instructions on pages 13-19.

When operating only one gun, as shipped, a minimum of 50' of 1/4 airless paint hose is required.

6. Coil the majority of the paint hose around the units' hose wrap. Leave sufficient length to reach gun mounting bracket at it's furthest possible reach (6-8 feet).
NOTE: Hose should be coiled loosely to avoid kinks
7. Loosen wing nut (Ref # 164 hidden in this diagram) This will loosen the gun holding tab (Ref # 162) and provide clearance for the gun handle to be inserted.
8. Temporarily remove gun trigger guard from gun swivel. Move to the side to allow gun installation.
9. Turn gun perpendicular to gun mount. Insert gun swivel / hose connection into the gun mount.
10. Rotate gun until parallel with bracket. Ensure trigger activation screw (Ref # 154) is under the trigger.
11. Slide gun handle back until the notch found on the gun body, contacts the mounting bracket.
Tighten wing nut (Ref # 164 hidden in this diagram) to secure gun in bracket.
12. Reposition trigger guard on gun.
13. Check operation of the remote trigger lever (Ref # 148) to ensure smooth operation of gun trigger.
NOTE: The remote trigger activation cable is factory set and should not require additional adjustment. The positioning of the gun/mount/control arm is conditional on the type of line you wish make. Instructions for positioning of the gun for specific purposes is discussed on pages 17 -18.



GETTING READY TO SPRAY



DO NOT attempt to operate this equipment until you have read and understood ALL safety precautions and operating instructions. Equipment and chemicals, when used improperly can be dangerous



BEFORE STARTING YOUR UNIT.....



- ☑ **CHECK** to ensure that the shipping seal has been removed from under the cap on the hydraulic tank. Hydraulic tank should be at least 3/4 full of H.E.R.O. LVO hydraulic fluid.
- ☑ **CHECK** all fittings and connections in the pump system, hose and gun to ensure they are tight. Vibrations during transport could cause items to loosen.
- ☑ **CHECK** to ensure that there is a spray tip in the gun, and that the tip is the correct size for the coating you are to spray. (There are various tips available, for each type of coating or configuration. See " Airless Spray Tip " on pages 21 – 22 , for proper tip selection.
- ☑ **CHECK** to ensure that you have H.E.R.O. strainer bags, H.E.R.O. Wonder Wash, appropriate thinner for the paint, a waste container, and any other accessories you may require for the job.
- ☑ **READ THIS MANUAL THOROUGHLY.**
- ☑ **READ THE HONDA ENGINE MANUAL SUPPLIED WITH THE UNIT. FOLLOW ALL THEIR RECOMMENDED PROCEDURES FOR “START-UP” AND OPERATION**

With all set-up instructions complete you can move on to the start-up and testing of unit operation.

Before doing so, we want to take this chance to encourage you to experiment with your new equipment. If this is your first H.E.R.O. Linestriper, we recommend that water be used as a test material. Take the opportunity to experiment with the equipment and become familiar with the controls and the various gun set-up options (see pages 17 – 18).

Operation of a linestriper requires many new skills and is quite different than that of a regular airless paint sprayer. To be proficient, practice is required.

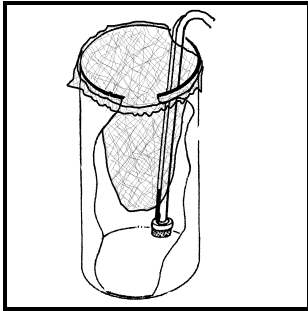
Painting straight lines is not that difficult, as the unit will roll in a straight line with little or no assistance. **NOTE: Like an automobile, wheel alignment is critical. The front swivel caster can be knocked out of alignment, making a straight line extremely difficult.**

Practice your timing, - starting and stopping the spray flow to create dotted lines. Practice your technique for creating circles and curves. These may be your most difficult procedures. Practice all the situations you will encounter. Remember the final outcome of your job effects your reputation. An ineffective or poorly done job, may impact your ability to get repeat or referral business.

Once you are comfortable and feel confident in your abilities and the operation of the unit, it is safe to begin using paint.

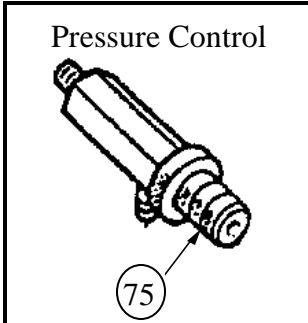
To start the unit and practice with water, follow the instructions on page 10, omitting the change to paint. Good Luck and Good Striping!

GETTING READY TO SPRAY

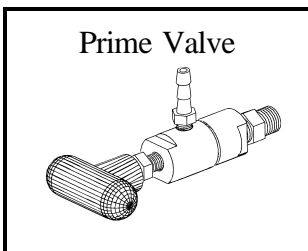


1. Place intake siphon assembly into a clean 5 gallon pail.
2. Install strainer bag (accessory item 5GAL SB) in pail and secure with large rubber band.
NOTE; *Strainer bag must remain 4 inches from the bottom of pail*
3. Trigger gun to release any pressure in the unit. Use extreme caution to ensure that the gun is not directed towards anyone or any object which may be damaged.

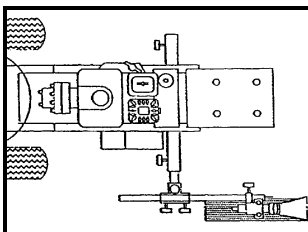
NOTE; *Unit may contain storage solution.*



4. To remove storage solution, add one gallon of thinner, compatible with the type of paint to be used, to the siphon pail.
5. Turn pressure control knob (ref # 75) counter clockwise to lowest pressure setting.
6. Start engine. See Honda owner's manual for correct procedures.
7. Turn prime valve handle (ref # 46) counter clockwise until fully open. Allow thinner to circulate back into the siphon pail for a few minutes. Then turn the prime valve handle clockwise to close the valve (close tightly), and direct the flow to the paint hose and gun. Leave the pressure setting low.
8. Trigger gun into a waste container.
9. Remove rinse / prime fluid and pour paint through strainer bag into siphon pail.



10. Repeat step 7, until paint flows freely.
NOTE; *Never turn prime valve back to "prime" position when the unit is under pressure.*
NOTE: *The thicker paint will require a longer time to complete the initial prime circulation through the prime valve. Leave the valve in the prime position to ensure the complete removal of all air and pre-prime fluid. Several minutes may be required, particularly with thicker viscosity products.*



11. Spray a test pattern. Begin by spraying a test pattern onto old newspaper or other scrap material. Increase the pressure, slowly at first, by turning the pressure control knob clockwise. Continue increasing the pressure until the spray pattern is uniformed from top to bottom, with no heavy areas. Secure pressure control setting, by turning the silver lock ring (ref # 77) counter clockwise until snugly against the face of the pressure control knob. If heavy areas are still visible at maximum pressure setting, thin the paint with the correct thinner, according to the paint manufacturer's recommendations.

Paint Straining



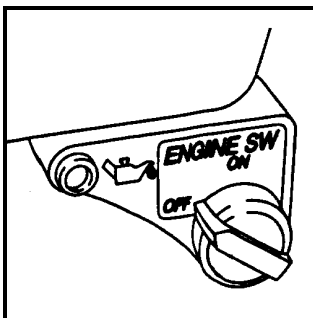
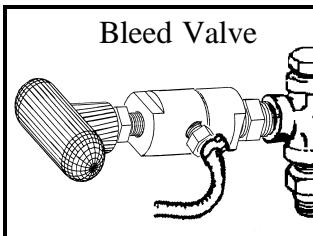
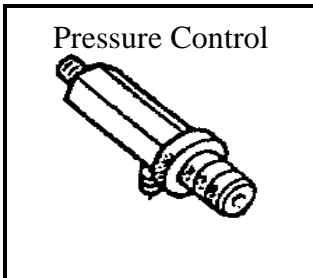
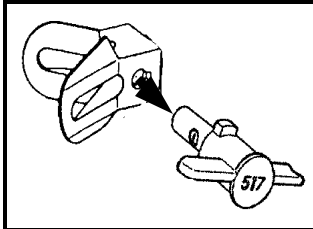
*It is recommended that all products entering the sprayer, be pre-strained to remove any large particles and contaminants, **BEFORE** they are drawn into the sprayer. The strainer bag should remain in place throughout the painting operation. This will prevent foreign matter from falling into the bucket and contaminating the previously strained paint. The gun filter should not be relied upon to do all the paint filtration. Any dirt, grime or other undesirable particles which reach the gun filter have passed through the entire paint pump and have possibly created unnecessary damage and inconvenience. Always strain the paint before siphoning.*



SHUTTING DOWN & PRESSURE RELIEF PROCEDURES



If shutting down for a short period of time, it is sufficient to turn the unit off and trigger the gun to relieve pressure. Then set the safety lock on gun to "locked" position. With the gun locked closed, remove gun from bracket and immerse the gun in a container of the correct thinner for the paint you



1. Complete pressure relief procedures, listed above
2. Remove gun assembly from gun mounting bracket.
3. Remove spray tip and gun filter, from gun.
4. Turn pressure control knob counter clockwise to low pressure setting. Only use sufficient pressure to allow material to move through the sprayer. **DO NOT** operate at or near full pressure.
5. Remove siphon assembly from paint container.
6. Trigger gun, back into paint container, until unit runs dry.
NOTE: Pump and spray hose will continue to contain paint. This paint may be recovered by placing prime hose into paint container and draining the remainder while re-priming with cleaning fluid in step 7 & 9. Switch prime hose from paint pail to waste pail when cleaning fluid emerges.
7. Place siphon assembly in container of correct thinner, for the spray product being used, and prime the pump as shown in step 6, of "Spraying". *See special notes from step 6. Allow thinner to circulate back into the container for a few minutes to flush the prime valve.
8. Close prime valve, turning counter-clockwise.
9. Trigger gun into paint container until thinner comes through. *See special notes from step 6. Release gun trigger when cleaning fluid emerges. Re-direct flow into waste container and continue spraying until thinner runs clear. Heavily soiled thinners may have to be changed to complete cleaning job.
10. Lift siphon assembly out of cleaning fluid and allow pump to run dry.
11. Insert tip into gun. Turn to "Cleaning Position". Repeat procedure using 1-5 gallons of **H.E.R.O. Equipment Wonder Wash** solution. Unit **must not** be stored with water. Only store with a non corrosive material (Paint thinner, solvent).
12. Switch unit "off", turn gas valve off and trigger gun to relieve remaining pressure.
13. Clean and rinse gun handle filter in correct thinner, and return to gun.

SPECIAL STORAGE INSTRUCTIONS

In areas where the sprayer is **NOT** used 12 months of the year, special preparations must be used for winter or off season storage. Because solvents evaporate quickly, they should not be used for long term storage. A petroleum based solution (solvent and oil) should be used as an extended storage material. **DO NOT** store the unit with water in pump. **DO NOT** allow storage solution to freeze in pump. **NOTE: H.E.R.O. Equipment Wonder Wash, available from your H.E.R.O. distributor, will provide the added cleaning benefits of solvent at a much lower cost. Suitable as a short term (1-2 days) storage solution only**



SPECIAL NOTES & INSTRUCTIONS



NEVER LEAVE THE UNIT UNDER PRESSURE WHEN NOT SPRAYING (ENGINE TURNED OFF). RELIEVE PRESSURE BY TRIGGERING GUN. NEVER STORE THE UNIT WITH PAINT OR WATER IN THE PUMP SYSTEM, EVEN OVERNIGHT.

- NEVER attempt to start the engine when the unit is under pressure. Relieve pressure and follow instructions in "Setting up to spray"
- Always follow flushing and cleaning instructions exactly.
- Regularly check the level of H.E.R.O. LVO hydraulic fluid in the hydraulic tank. It should be kept near full, top up as needed with only genuine H.E.R.O. LVO hydraulic fluid.
- Crankshaft eccentric bearing should be greased at regular intervals consistent with hours of use. Use MO-2 grease (i.e. common auto grease) approximately every 10 hours of operation.
- Check drive belt (part # 66/100) tension frequently. The belt will stretch with use, and should be adjusted after 20 hours of operation and again after 50 hours. Periodic checks after 50 hours should be made. Failure of the drive belt is not covered by the equipment warranty, so proper maintenance of the belt is important.
- Regularly check fittings, bolts, nuts and connections for damage. Tighten, adjust or replace as required.
- Check crankshaft alignment often. An out of alignment crankshaft will cause the damage to the eccentric bearing.

GAS ENGINE

- Check the engine oil level daily. Top up only with the manufacturer's recommended oil. Running the engine with insufficient oil can cause serious engine damage.
- Check the engine air cleaner daily. **NEVER** operate without an air cleaner.
- Use only UNLEADED or low leaded gasoline.
- The engine requires regular operation and should not be stored for prolonged periods without operating. Run for a minimum 15 minutes each week while in storage.
- Remove gas before storing.
- Have the engine professionally serviced by an approved service technician on a regular bases as recommended by the manufacturer (Honda).

OPTIONAL GUN MOUNTING CONFIGURATIONS

As mentioned earlier in equipment set-up, there are many options for gun connection or configurations. Choose the option which best suits your needs and follow the instructions provided. Each configuration lists the required items and also list optional items for your consideration. Parts list of components required for each option is provided for easy ordering. All configurations will require additional gun and tip, which are not listed.

NOTE: *When using multiple guns, 50' of 1/4" airless paint hose (Supplied with each unit) must be your primary paint supply line and in use at ALL times. Shorter hose * lengths may be used for the second line only.*

Option – A (2 Gun Set-Up, 1 For Striping & 1 For Stencils or Painting)

Items Required:

- ◆ 114 * (50' x 1/4" Paint Hose) (1 Only)
- ◆ 14A (1/4 x 1/4 connector) (2 Only)
- ◆ 503 (Ball valve) (*1 Only – Optional*)

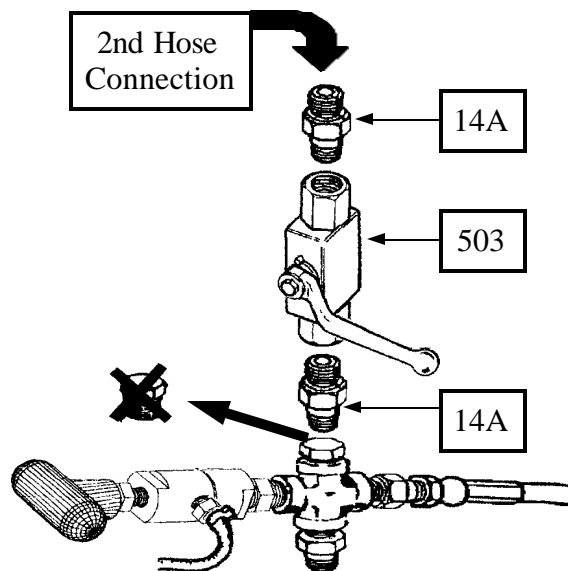
Option A, is for the addition of a second gun to be used for purposes other than striping. The use of an inline ball valve is listed as optional, however we strongly recommend its' use. The valve will allow you to divert paint to the second gun only when required, can be left closed when the second gun is not in use. Reduces paint wastage and saves clean-up time.



SET – UP



1. Remove plug (ref # 36) from outgo cross fitting (ref # 35).
2. Pre-assemble ball valve and connectors as shown.
NOTE: *Operation of inline ball valve can be changed to suit your personal preference. For easiest reference, the handle should be in a parallel position, in relationship to the valve body , when open. The handle will be at right angle to the body, when closed (illustration shown as closed).*
3. Attach paint hose in location indicated in diagram.



OPTIONAL GUN MOUNTING CONFIGURATIONS

Option – B (2 Gun Set-Up, Both For Stripping)

Items Required:

- ◆ 114 * (50' x 1/4" Paint Hose) (1 Only)
- ◆ 14A (1/4 x 1/4 connector) (2 Only)
- ◆ 503 (Ball valve) (**1 Only – Optional**)
- ◆ 4-06-440-485 (Kit, Extra Gun Mounting) (1 Only)
 - ◆ Gun Post
 - ◆ Post / Extension Arm Bracket Assembly
 - ◆ Gun Extension Arm Assembly
 - ◆ Gun Bracket Assembly
 - ◆ Gun Trigger Lever and Cable.

Option B, lists the items required when adding a second gun for stripping purposes (dual lines). The extra gun mounting kit contains all items required to operate a second stripping gun. The use of an inline ball valve is listed as optional, however we strongly recommend its' use. The valve will allow you to divert paint to the second gun only when required, can be left closed when the second gun is not in use. Reduces paint wastage and saves clean-up time.

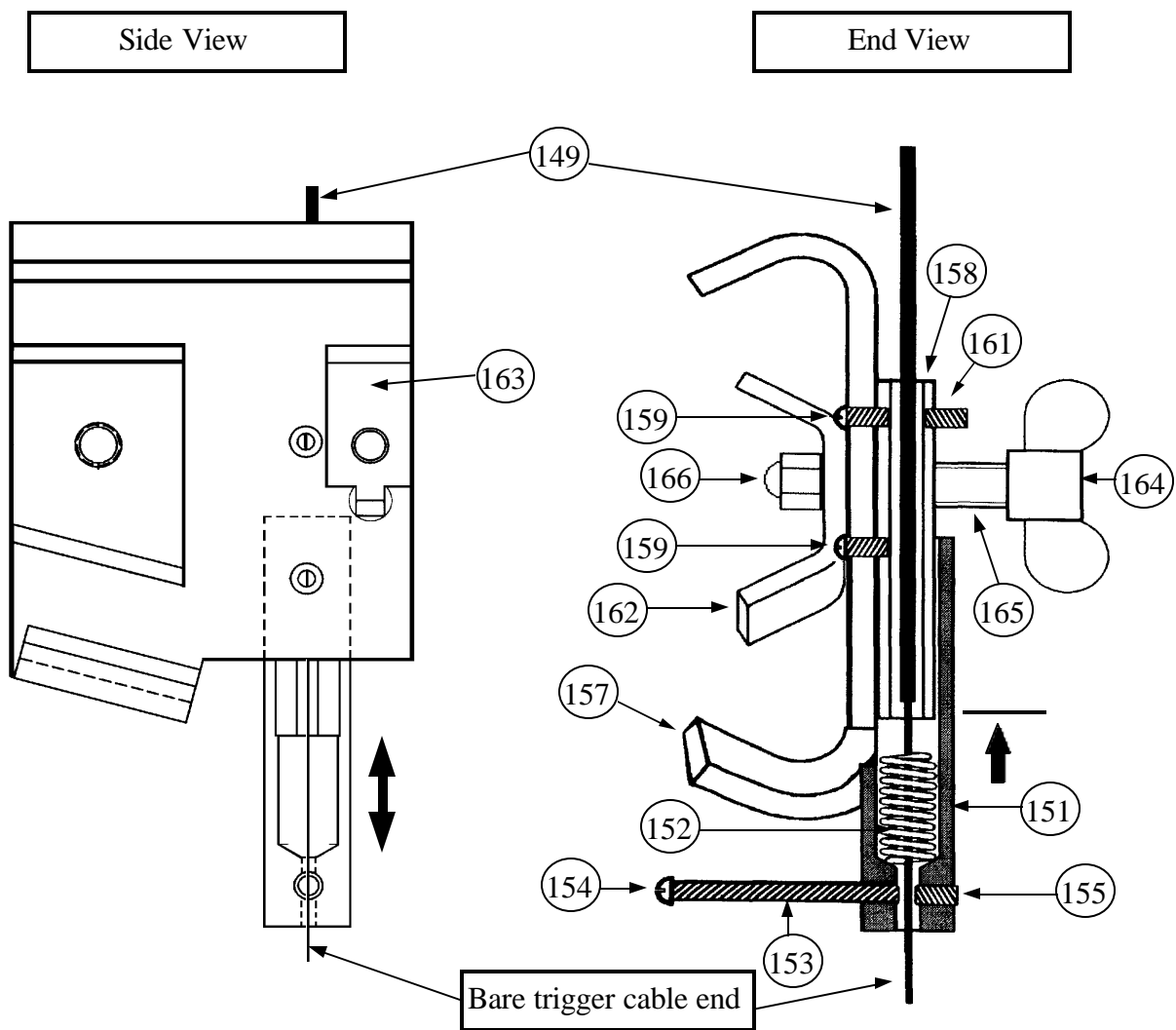
In most cases the Extra Gun Mounting Kit will be purchased for spraying dual lines, curb tops and sides simultaneously or to create extra wide lines. For this reason the extra gun mount is placed next to the existing gun mount.

1. Make hose and inline valve connections as shown on previous page (Option A).
2. Attach trigger lever to the unit's left side handle (refer to existing lever for assistance). Relocation of caster release switch may be required for optimum convenience. Keep the caster switch within easy reach for activation while stripping curves or circles.
3. Slide the cross bar (ref # 141) out by 6" - 8" inches, to allow space for adding the second vertical gun support. Re-secure cross bar. (Cross bar located in front of belt guard and travels under unit)
4. Slide gun post (ref # 168) onto cross bar, leaving 3" - 4" inches between the two gun posts.
5. Slide post / extension arm bracket assembly (ref # 169) onto gun post. Position at same height as existing bracket. Secure with adjustment knobs.
6. Slide extension arm (ref # 167) into post / extension arm bracket assembly. Keep at equal length as existing arm. Secure with adjustment knobs.
7. Attach gun mounting bracket assembly (ref # 156) to extension arm. Keep at equal length as existing bracket. Secure with wing nuts.
8. Secure gun trigger cable cover to cable with masking tape to avoid separation. Secure at exposed cable end.
9. Connect cable to lever. Feed cable down cart handle, (securing with cable ties or tape, not provided). Select a convenient route under frame and over to gun trigger bracket. Be sure to avoid placing near any moving parts.
10. Loosen set screws (ref # 155 & 161) to ensure cable can feed through.
11. Remove trigger actuator assembly (ref # 150)
12. Remove tape from cable and cover. Feed cable assembly into trigger guide (ref # 158) until 3-4 inches of bare cable is protruding through the bottom. Cable cover should remain fully within cable holder tube (Approximately 1/2" inside the bottom of tube).

OPTIONAL GUN MOUNTING CONFIGURATIONS

Set – Up Continued

13. Tighten setscrew (ref # 161) only until cable is stable and will not move. **DO NOT** over tighten the screw so as to crush the cable cover.
14. Feed the bare cable into the actuator (ref # 151), ensuring the cable passes through the spring (ref # 152). Feed actuator up over trigger guide (ref # 158).
15. Raise actuator assembly (ref # 150) up until the internal spring (ref # 152) touches the trigger guide tube (ref # 158). Slight spring compression should be felt.
16. Tighten actuator setscrew (ref # 155) firmly against cable.
17. Install gun. See steps 7 – 14 on page 8.
18. Make any fine tuning adjustments to the cable length to ensure full and complete operation of gun trigger.



LINE STRIPING SUGGESTIONS

To ensure a sharp, crisp line, always use newer condition spray tips. Spray tips are available specifically designed for the purpose of line striping. However, our experience has shown that most standard spray tips will provide excellent results, without the need to use the specialized striping tips. Let your standards of excellence be your guide.

The painted line width can be adjusted by changing the spray tip, or by raising or lower the gun/tip in relationship to the spray surface (ground). For example: A tip which has a 4" spray pattern when 6" from the surface (ground) will increase in width (while loosing its crisp edge) when raised to a height greater than 6 inches.

Coverage (Paint thickness) can be adjusted by changing the tip's orifice size or by adjusting the speed at which the unit is moved. To increase coverage, either use a larger orifice tip or move the unit more slowly. To decrease coverage, use a smaller orifice tip or move more quickly. Your experience will help you determine which orifice size is best for you and the product you are using.

When selecting tips, take into account;

- Product viscosity (consult product manufacturer and product label for tip recommendations)
- Your own personal cadence or walking speed. (If you like to walk slowly, do not allow the spray application to over whelm you. If you walk quickly, ensure the tip orifice is providing sufficient flow to create the desired coverage)
- Desired application thickness.



CAUTION: *Always engage the gun's trigger locking mechanism, before adjusting the gun position or changing tips. Failure to do so could result in serious injury, as the gun may be triggered accidentally or unpredictably.*

The 4500D framework for gun location is fully adjustable to allow the gun or guns to be positioned in any location as required by the specific line striping application or personal preference.

When factory shipped, the gun trigger is located on the right handle, while the caster release trigger is located on the left. The gun mount and extension arm have been placed on the right hand side of the unit. These items may be switched to the opposite sides if desired (lefties etc.). When operating in extremely close quarters, it may be required to move the gun controls from the right side to the left side regardless of your personal preference. All these options are available to you.

One of the important features of the 4500D is the single, pivoting or swiveling front caster (ref # 133). The unit has been factory tested to ensure the unit will track in a straight line with virtually not assistance required. Shipping, handling and daily use may throw the caster out of alignment. When this occurs a great deal of control will be required to keep the unit on a straight line. Re-alignment of the front caster will be needed to correct this. To utilize the front caster, activate the release switch (ref # 133) on the left handle as you begin to enter the arc or curved pattern. Keep the switch activated through the entire curved pattern and release as you exit the pattern.

Proper gun placement is required to ensure the rear wheels do not roll over the freshly painted line. See instructions to follow.

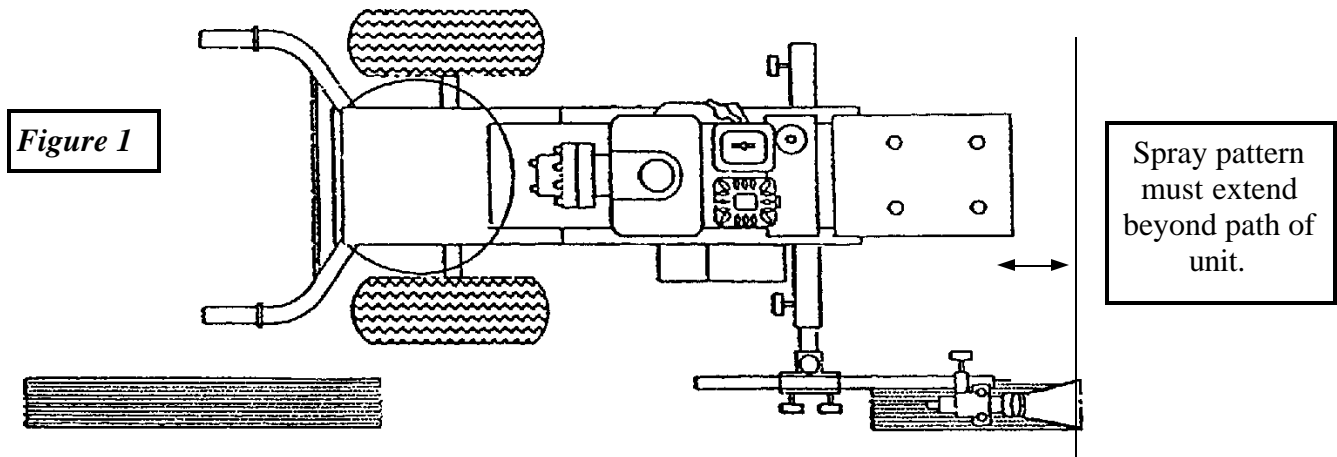
LINE STRIPING SUGGESTIONS

The following diagrams and instructions outline the various ways in which the 4500D can be configured and used. These are meant as a guide to assist you in becoming familiar with the unit.

GUN POSITION AND SET-UP

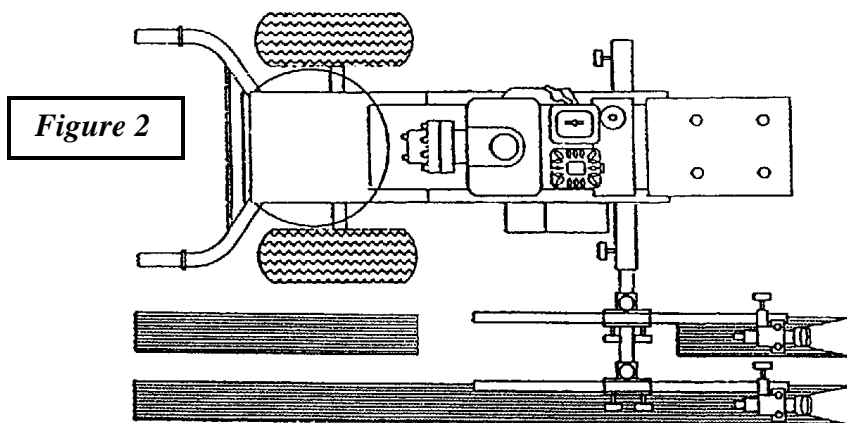
STRAIGHT LINES – *Figure 1*, shown below, is the configuration which is most commonly used in parking lot layouts. In this configuration, the gun is extended to the front of the unit, making it possible to approach a curb at 90° and paint flush to the curb. Gun control arm and mount may be placed on either the right or left side of the unit, based on personal preference or to work around obstacles in your path.

NOTE: *This set-up is not suitable for circles or curves. With the gun in this position, the rear wheels will run over freshly painted curves or circles.*



DUAL STRAIGHT LINES – *Figure 2*, shown below, is a duplication of *figure 1*, using two guns for a dual line. This configuration can be used any where a dual line is needed. Individual gun activation controls allow for dual single or broken lines. Used primarily for roadway lines. Placing the guns close together will allow the combination of spray patterns when an extra wide single line is needed.

NOTE: *Optional second gun controller kit (4-06-440-485) and mounting connectors required. See page 13 for specifications.*

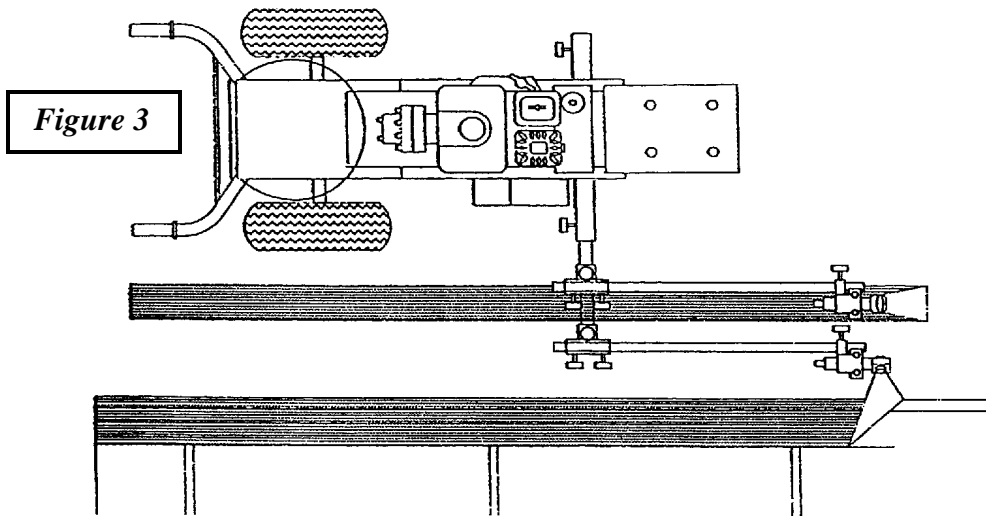


LINE STRIPING SUGGESTIONS

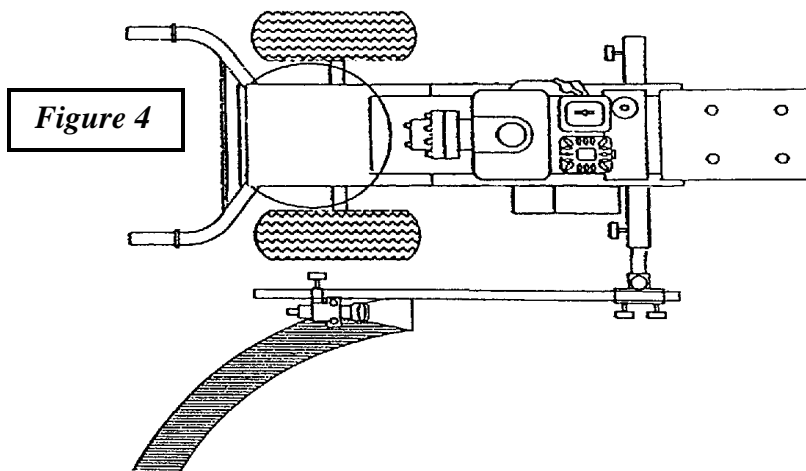
GUN POSITION AND SET-UP

DUAL STRAIGHT LINES, CURBS – *Figure 3*, shown below, is a duplication of the set-up used in *figure 2* (using two guns for a dual line). By simply adjusting the angle of the gun bracket, on the control arm, it is possible to spray both the top and sides of curbs. Guns can be positioned at different heights or angles as required to gain the correct angle to the spray surface.

NOTE: *Optional second gun controller kit (4-06-440-485) and mounting connectors required. See page 13 for specifications.*



CURVES, CIRCLES or TURNS – *Figure 4*, shown below, outlines a configuration which is suitable when a combination of straight and sharp curves or turns are to be painted. Placement of the gun next to the rear wheels is required to ensure these wheels do not pass over freshly painted lines.



PARKING LOT LAYOUT

To follow is a guide to the layout or calculation of the available parking stall in a given area. Local and state laws may dictate the minimum stall size. Be sure to check with your local governing body for appropriate standards.

Angle Of Parking	Direction Of Parking	Width Of Stall	Depth of Stall Perpendicular to Stall	Width Of Aisle	Unit Parking Depth	Width of Stall Parallel To Aisle	Number of Stall In Distance*	Area ** Per Car Sq. Ft.
30	Drive –	8'	15.9'	11'	42.8'	16	L-3.6 – 16	356
45	Drive - In	8'	18.4'	12'	48.8	11.3	L-7.1 – 11.3	305
60	Drive - In	8'	19.6'	19'	58.2	9.3	L-6.7 – 9.3	325
90	Drive - In	8'	18'	28-32'	64-68	8	L – 8	283
90	Back – In	8'	18'	22'	58	8	L – 8	242
30	Drive - In	8.6'	16.4'	10'	42.8	17	L-2.8 – 17	428
45	Drive - In	8.6'	18.7'	11'	48.4	12	L-6.7 – 12	346
60	Drive - In	8.6'	19.8'	18'	57.6	9.8	L-6.6 – 9.8	320
90	Drive - In	8.6'	18'	24-29'	61-65	8.5	L-8.5	296
90	Back – In	8.6'	18'	21'	57	8.5	L-8.5	259
30	Drive - In	9'	16.8'	9'	42.6	18	L-2.5 – 12.7	426
45	Drive - In	9'	19.1'	11'	49.2	12.7	L-6.4 – 12.7	352
60	Drive - In	9'	20'	17'	57	10.4	L-6.4 – 12.7	352
90	Drive - In	9'	18'	23-37'	59-63	9	L – 9	286
90	Drive - In	9'	18'	20'	56	9	L – 9	255

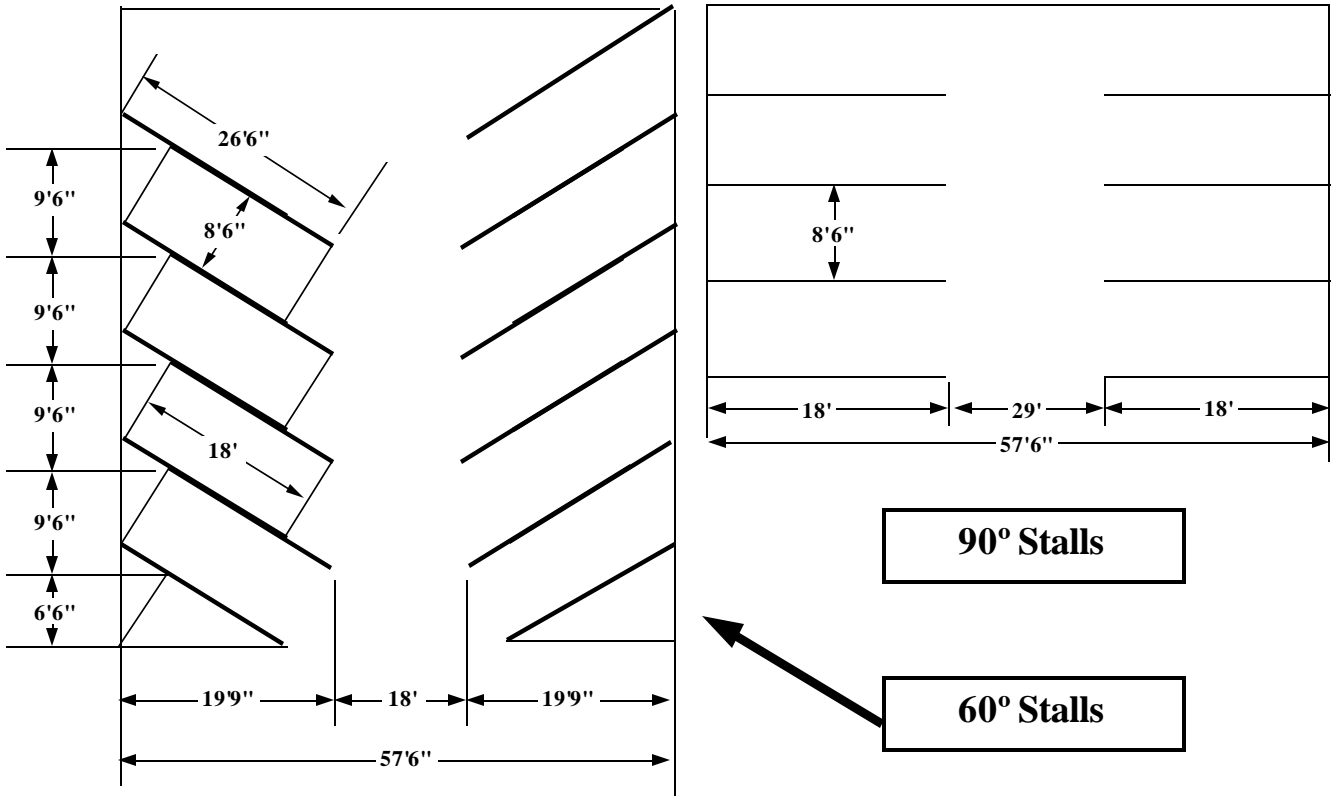
* To calculate the number of stalls:

(Aisle length (L)) - minus (Starting space) ÷ divided by (Width of stall parallel to aisle).

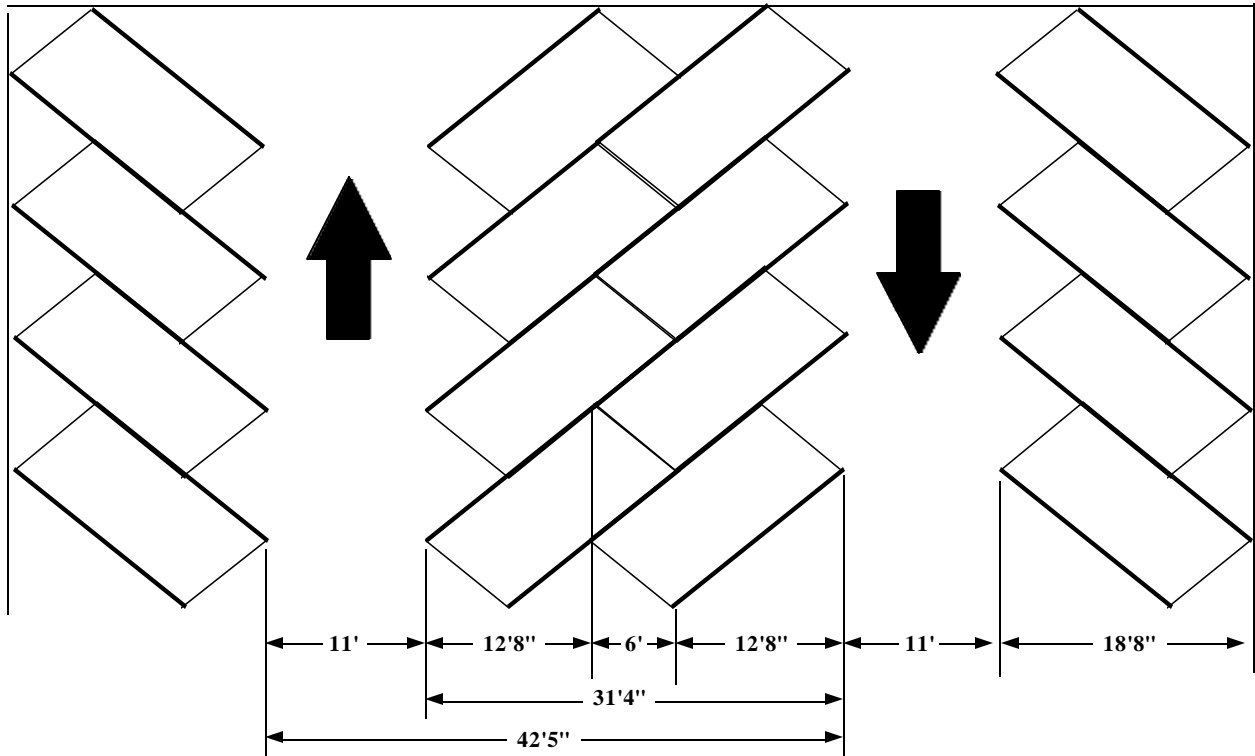
For example: For a 45° **“Drive – In”** plan, with 8' 6" wide stalls and an aisle length of 100', the number of stalls would be 100' minus 6.7' divided by 12 = 7.78 stalls on each side. (You would require 90'8" for 7 stalls).

** Based on the number of whole spaces in an aisle 100' long. A 100' aisle, 48.4' wide has an area of 4840 square feet for each stall provided.

PARKING LOT LAYOUT



45° Stalls



SPRAY TIP SELECTION

Although the 4500D has been designed with line striping as it's primary function, it can also function as a regular airless paint sprayer.

Airless spray tips are a key component to the successful operation of an airless system. They define the spray pattern, control the flow and ultimately tell the pump how hard it must work. A proper understanding of airless tip is critical to the success or failure of any airless application and can help you avoid many of the profit thieves you face daily.

Airless Spray Tip Characteristics – It is important to remember that the orifice size, in conjunction with the fan width size determines the spray characteristics of the tip.

EXAMPLES: The larger the orifice with the same fan width, the greater the volume of paint applied to the same area.

Fan Width	10"	10"	10"
Orifice Size	.013	.015	.017
Tip Number	513	515	517
	Least Volume	More Volume	Most Volume

Conversely, the larger the fan width with the same orifice means the same amount of material is being applied over a greater area. The result is less volume of paint per square inch.

Fan Width	8"	10"	16"
Orifice Size	.017	.017	.017
Tip Number	413	515	617
	Least Volume	More Volume	Most Volume

WHAT CAUSES TIP WEAR ? - The velocity with which material moves through the orifice will cause wear due to abrasion. This wear will effect the flow rate (increases) and the quality of the spray pattern. Many factors will affect the wear of the tip.

- A. The viscosity and quality of the material being sprayed.
- B. The amount of pressure being used.
- C. Cleaning the equipment with the tip still in the spray gun.
- D. Wrong filter mesh size for material being used.

HOW TO DETECT TIP WEAR – The easiest way to detect tip wear is by the pattern. The pattern width (Fan) will narrow and lose its feathered edge as the tip wears. When the pump can no longer keep up with the tip size “tails” will occur from the pressure drop.

HOW TO IMPROVE TIP LIFE – These procedures can improve tip life.

- A. Always use filters in your airless gun and pump
- B. Use the minimum amount of pressure to achieve proper atomization.
- C. Remove spray tip before cleaning equipment.
- D. Strain all paint.

WHY SPEND SO MUCH TIME ON TIP INFORMATION ? - The largest percentage of pump complaints can be traced back to blown tips or the wrong size tip used for the material being sprayed.

SPRAY TIP SELECTION

AIRLESS TIP'S FLOW RATE (GALLONS PER MINUTE)

Orifice Size In Inches	GPM Flow Rate	Orifice Size In Inches	GPM Flow Rate
.007	.05	.018	.35
.009	.08	.019	.40
.011	.12	.021	.47
.013	.18	.023	.57
.015	.23	.026	.72
.017	.30	.031	1.1

AIRLESS TIP RECOMMENDATIONS

COATINGS	COATING VISCOSITY	FILTER MESH	ORIFICE SIZE *
Varnishes	Light Body	100 – 150	.009, .011
Lacquer Finishes (clear)			.009, .011
Sanding Sealers			.009, .011
Shellac (clear)			.009, .011
Transparent Stain			.011, .013
Water Sealers (clear)			.011, .013
Solid Stains	Medium Body	60 – 100	.013, .015
Exterior House Paint			.013, .017
Interior Wall Paint			.015, .017
Interior & Exterior Primers			.017, .019
Commercial Grade Architectural Coatings:			
Interior Wall Paints	Heavy Body	30 – 60	.017, .019
Interior Wall Primers			.017, .019
Dry Fall (Quick Dry)			.019, .023
One Coat, Primer-Finish Paints			.019, .023
Elastomerics	Extra Heavy		.021 – .031
Pigmented Water Proofer's			.021 – .027
Block Filler			.025 – .031

* Fan width between 8 and 12 inches.

UNDERSTANDING THE PUMP OPERATION

Hydraulic Energy Regulated Output (H.E.R.O.) is more than just our name, it is the bases for the operation of the pump. It is the regulation or control, of hydraulic energy, which allows the equipment to build and then deliver or have an output of pressure. Once you have a basic understanding of the operation of the equipment and the effect created in one area and how it will effect operation in another area, you will be better able to diagnose and make repairs.

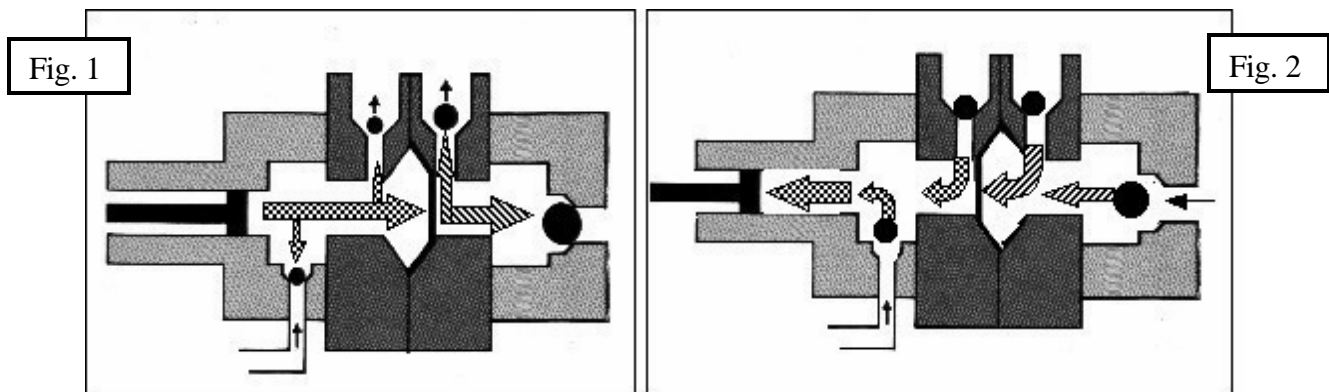
All H.E.R.O. hydropulse membrane pumps are made up of two (2) distinct pumps. The first, and most important pump is the hydraulic pump. The hydraulic system is made up of two valves, the hydraulic intake valve (ref # 66) and the hydraulic outgo valve, known as the hydraulic pressure control valve (ref # 74). The second pump is known as the paint or material pump. The paint system is made up of two basic valves, the paint intake valve assembly (ref # 11-18), paint outgo valve, (ref # 26). A third valve, known as a bleed valve (ref # 37) is used during the priming procedure, (see "setting up to spray"). For correct operation, all five valves must be in good working condition. For this manual we will refer to the two systems as "hydraulic" and "paint".

At the center of these two pumps is the hydropulse membrane. The hydropulse membrane is a flexible nylon disc which transfers the energy (pressure) created by the hydraulic pump, to create energy (pressure) in the paint pump. The function of the hydropulse membrane is to create a barrier between the hydraulic oil and the spray material and transfer the energy created.

To fully understand and trouble shoot a H.E.R.O. pump, always keep in mind that "for every action, there is an opposite or corresponding re-action". For every action of the hydraulic intake valve (ref # 66), there is an opposite re-action of the hydraulic outgo valve (ref # 74). At the same time there are corresponding re-actions taking place within the paint pump. This means that as the hydraulic intake valve is opening, so is the corresponding paint intake valve, and while the hydraulic outgo valve is closing, so is the corresponding paint outgo valve. The operation and function of each valve is discussed at the end of this section.

For correct operation to begin, the hydraulic system must be fully primed and all air must be removed (see "**purging**" page 28). Operation begins with piston in the backward position (fig. 2). At this point the hydraulic intake is open, while the hydraulic outgo valve is closed. The corresponding paint valves are in similar positions.

As the piston moves forward, it pushes hydraulic oil forward. This movement of oil causes the hydraulic intake valve to close and the hydropulse membrane to move forward (fig. # 1). The hydraulic outgo valve will remain closed until sufficient pressure is created to cause it to open. While the hydraulic valves are operating a corresponding re-action is taking place in the paint valves. The forward movement of the hydropulse membrane pushes the paint, causing the paint intake valve, (ref # 11-18) to close. The trapped paint requires a means of release, so it forces the outgo valve, (ref # 26), to open and paint flows to the gun.



UNDERSTANDING THE PUMP OPERATION

The backward movement of the piston, creates a vacuum in the hydraulic system. This causes the hydraulic outgo valve to close and the hydraulic intake valve to open (fig. 1). Opening of the hydraulic intake valve allows a new supply of hydraulic oil to enter the system, replacing the oil which was used on the forward stroke. Once again a corresponding re-action is taking place in the paint pump. The hydropulse membrane is being pulled backward by the hydropulse membrane spring, (ref # 56). The backward hydropulse membrane movement causes a vacuum in the paint pump. This vacuum causes the intake valve to open, allowing a new supply of paint to enter. The corresponding paint outgo valve is drawn closed by the vacuum created by the hydropulse membrane.

These operations are repeated at a rate of 750 times a minute. These continuously repeated actions draw paint into the pump, pressurize it, and then deliver it to the gun. The failure, of any one valve, to operate correctly will effect the overall equipment performance. Each of the five valves mentioned earlier, have an important function and will effect the overall performance of the unit if not performing correctly.

HYDRAULIC INTAKE VALVE (REF # 66, PART # 4-30)

The hydraulic intake valve, is a small vacuum valve which controls the hydraulic oil entering the hydraulic pump/cylinder area. Once the oil has past through the valve it is prevented from returning. The valve is commonly called a "one way check valve". Valve failure will result in the hydraulic pump being unable to build pressure, and the hydropulse membrane will stop moving. Spray pressure will cease.

HYDRAULIC OUTGO VALVE (REF # 74, PART # 4-27C)

The hydraulic outgo valve, better known as the "pressure control valve", is used to control the units operating pressure. The valve is fully adjustable from 0 psi. to 3000 psi. By turning the pressure control valve knob (ref # 75) clockwise the pressure is increased. The hydraulic pump continues to build at all times and must have a means of releasing this pressure. Pressure applied to the P.C. ball, (ref # 88) will keep it lodged in the P.C. seat (ref # 87) until the internal hydraulic oil pressure is sufficient to cause it to open. The point at which the oil is released is equal to the level set by the control knob. As components within the pressure control valve wear, the valve loses its ability to maintain or reach the required pressures (see "low static pressure").

PAINT INTAKE VALVE ASSEMBLY (REF# 11-18)

The paint intake valve is made up of eleven items, endcap (ref # 11), washer (ref # 12), seat (ref # 13) intake ball (ref # 14), spring (ref # 15), o-ring (ref # 16), ball guide (ref # 17), and ball stop (ref # 18). The intake valve controls the incoming flow of spray materials and is responsible for keeping them from returning to the source. The ball must be able to create a complete seal on the seat, otherwise pressure will be lost. A worn intake valve will permit correct static pressure, but supply lower spray pressure. A worn intake ball will become smaller in diameter and lose its ability to seal at the seat. A worn seat will develop a large step in the area where contact with the ball is made. This can cause the intake ball to distort in shape making the ball egg shaped. If the valve assembly becomes warm to the touch, this may be a sign of a loose or worn seat caused by wear or improper compression caused by a worn intake washer (ref # 12). The intake washer (ref # 12), acts as a compression washer insuring the seat (ref # 13) remains pressed into the endcap (ref # 11). The seat must remain firmly pressed into the endcap at all times, through the correct assembly of parts listed, and the correct bolt torque. Replace the intake washer (ref # 12) each time the endcap is removed. See page 32 for details.

UNDERSTANDING THE PUMP OPERATION

PAINT OUTGO VALVE (REF # 26, PART # 4-611C)

The paint outgo valve monitors and controls the flow of spray materials as it leaves the sprayer. It also works together with the paint intake valve, to build paint pressure as specified by the setting made by the hydraulic outgo valve (pressure control valve). A worn outgo valve will result in pulsation in the spray material and cause the paint hose to jump and vibrate vigorously.

BLEED VALVE (REF # 36, PART # 4-606)

The bleed valve is used at the beginning and end of the spray operation (see "setting up to spray"). The function of the bleed valve is to assist in removing air from the paint pump when beginning to spray. It is necessary to remove all air from the paint pump so that the spray material can replace it. The pump will function without the bleed valve, however, the initial priming procedure would require considerably longer to complete. During the priming procedure the hydropulse membrane is exposed to its greatest amount of stress. Use of the bleed valve and a lightweight thinner, which is compatible with the intended spray material, will reduce hydropulse membrane stress and reduce priming time. The bleed valve will also allow you to remove any unused paint left in the pump and hose at the completion of a job. When the bleed valve is open the material is pumped through the paint intake and outgo and back to the source by way of the bleed valve. When closed, no material should be escaping from the bleed valve return hose (ref # 51). If material escapes through the bleed valve return hose, when the valve is closed, spray pressure at the gun will be reduced.



The solution to almost all problems can usually be found in the paint side valves. However, before performing any repair or looking further, the following are things which can cause an apparent sprayer failure, without any mechanical problem. ALWAYS check these items before proceeding.



1. Circuit breaker open or fuse blown.
2. Engine fuel line closed.
3. Engine switch set to "OFF".
4. Spark plug wire loose or disconnected.
5. Pressure control knob loose or missing
6. Spray tip plugged.
7. Spray tip worn out.
8. Gun handle filter plugged.
9. Paint hose plugged.
10. Loose fitting or hole in siphon hose.
11. Intake siphon hose plugged.
12. Siphon screen missing or plugged.
13. Sprayer under pressure when restarting.
14. Strainer bag plugging siphon screen.

UNLESS YOU ARE KNOWLEDGEABLE ABOUT THE REPAIR OF HIGH PRESSURE EQUIPMENT, DO NOT ATTEMPT TO REPAIR AN AIRLESS SPRAYER YOURSELF. ALWAYS FOLLOW ALL SAFETY PRECAUTIONS.

TROUBLESHOOTING

PRESSURE TEST

To verify the operation of an airless sprayer, use of pressure gauge is required. A pressure gauge (min. 3000 psi) installed at the gun, using a new .021 tip, and not less than 50 feet of H.E.R.O. airless spray hose is needed. If you do not have access to these items, your local H.E.R.O. authorized service center will be able to perform this test. Your model 4500D is manufactured to perform at;

2650 psi -- Static pressure, with lock ring (ref # 77) on pressure control valve (ref # 74).

1950 psi -- Pressure drop, when gun trigger is squeezed.

2250 psi -- Spraying pressure, after recovery time.

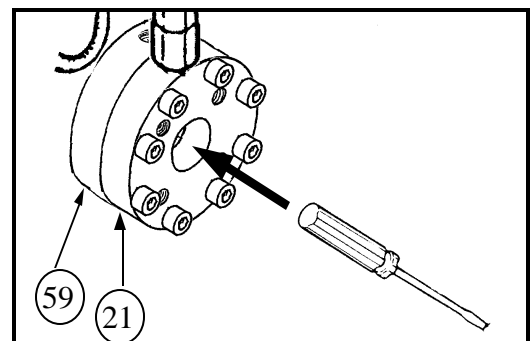
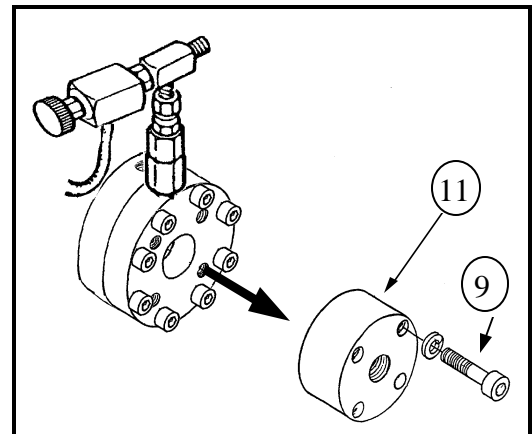
If your unit is unable to perform to the above pressure levels consult the troubleshooting guide for the required repair procedure.

HYDRAPULSE MEMBRANE TEST

If your unit is disabled and you are unable to perform a pressure test, use the following procedures for determining the area to repair. This test will divide the two halves of the equipment (hydraulic from paint) and make identification of your solution easier to obtain. This test is commonly referred to as the "Hydrapulse membrane Test"

The solution to almost all problems can be found in the paint side valves, due to the increased wear from contact with the abrasive paint/spray materials. Intake valve (ref # 11-18), Outgo valve (ref #26), and Bleed valve (ref # 36) make up the three paint valves. Refer to pages where exploded views of these valves are shown. To eliminate the hydraulic side of the pump (piston side of hydrapulse membrane) as a source of problems;

1. Remove the intake valve end cap (ref # 11) by removing the four cap screws (ref # 9). The intake valve assembly, (ref # 11-18), will generally come off as an entire assembly, requiring no further dismantling. If the ball guide (ref # 17) and ball stop (ref # 18), remain in the paint head, they can be pried free with a screwdriver.
2. Start unit.
3. Increase the pressure by turning the pressure control knob (ref # 75) clockwise to full pressure.
4. Put pressure on the center of the exposed hydrapulse membrane with the handle of a screwdriver or other blunt object.
5. **NOTE:** The hydrapulse membrane is located between the paint head (ref # 21) and the hydraulic head (ref # 59)
6. If you are **UNABLE** to stop or alter the hydrapulse membrane's movement, then the hydraulic side is operating properly. The problem is located in the "Paint" pump. See troubleshooting guide for additional information.



TROUBLESHOOTING

SITUATION

POSSIBLE CAUSE (REMEDY)

GASOLINE ENGINE WON'T START/RUN

1. Pump under pressure. (reduce pressure setting by turning pressure control knob counter-clockwise, trigger gun to relieve pressure).
2. Fuel line valve closed. (open fuel line valve. See Honda owners manual).
3. Engine switch in "OFF" position. (turn the engine switch to "ON" position).
4. Engine out of gasoline. (allow engine to cool, before adding appropriate levels of unleaded gas).
5. Engine is oil contaminated. Unit and engine must remain vertical or oil from the crankcase can enter the carburetor, air filter etc. (see an authorized Honda service center).

GASOLINE ENGINE STALLS/QUITS

1. See "GASOLINE ENGINE Won't Start/Run
2. Drive belt is loose. (tighten drive belts by evenly turning belt tension bolts on either side of engine clockwise. Check tension frequently. Loose belts generally emit loud squealing noises).
3. Unit primes, builds pressure, but pump "seizes" or "stops" when gun is triggered. (loose belts, tighten).
4. Engine requires tune-up. (see an authorized Honda service center).

TOTAL LOSS OF PRESSURE, HYDRAPULSE MEMBRANE MOVEMENT CANNOT BE STOPPED OR ALTERED. (SEE "HYDRAPULSE MEMBRANE TEST")

1. Paint too thick. (thin paint according to manufacturer's recommendations).
2. Intake ball (ref # 14) worn or jammed opened/closed. (remove intake endcap (ref # 11) and ball guide (ref # 17). Inspect intake ball, (ref # 14), to ensure it is free, round, and has no nicks or cuts. Inspect ball guide for excessive "bashing out" on the internal walls. Excessive wear causes the ball to become "lost" and unable to locate the seating surface. Inspect for foreign material jamming ball. Replace parts as needed).
3. Intake seat loose/bypassing. (remove intake endcap, (ref # 11) and ball guide, (ref # 17). Remove seat (ref # 13), inspect inlet washer (ref # 12) for excessive compression. Inspect for any sign of material bypass between intake seat and endcap cavity. **NOTE;** The proper alignment of intake parts, condition of intake washer (ref # 12), combined with the correct bolt torque are critical to the correct function of the intake valve. Replace the intake washer (ref # 12), each time the endcap is removed. See page 32 for more details.
4. Outgo valve ball (ref # 30) worn or jammed. (remove outgo valve, (ref # 26). Invert valve and unthread outgo valve upper, (ref # 31), from outgo lower, (ref # 27). Remove crush washer, (ref # 28), outgo seat, (ref # 29), outgo ball, (ref # 30), from outgo upper tunnel. Inspect outgo ball to ensure that it is round and free of nicks or cuts. Inspect for foreign material jamming ball. Inspect ball and cage for wear. Replace parts as needed).
5. Outgo valve (ref # 26) incorrectly assembled. (disassemble and reassemble outgo valve, closely following detailed instructions on page 33).

TROUBLESHOOTING

SITUATION

POSSIBLE CAUSE (REMEDY)

TOTAL LOSS OF PRESSURE, HYDRAPULSE MEMBRANE HAS NO MOVEMENT OR MOVEMENT CAN BE STOPPED. (SEE "HYDRAPULSE MEMBRANE TEST")

1. Hydraulic intake valve (ref # 66) defective. (remove hydraulic feed line, (ref # 67), from hydraulic intake valve. Plug hydraulic feed line so hydraulic fluid does not drain. Remove hydraulic intake valve from elbow, (ref # 62). Check hydraulic intake valve to ensure that it flows in one way only, into the cylinder. Replace if necessary. **NOTE;** Item cannot be repaired).
2. Air lock created on hydraulic side of pump. (air entering hydraulic side due to loose hydraulic feed line fittings, (ref # 67), punctured hydraulic feed line, poor seal at hydraulic intake valve, (ref # 66), or elbow, (ref # 62). Tighten hydraulic feed line, test for leaks, or apply Teflon tape or pipe sealant on fittings. Purge air as per detailed instructions below).
3. Pressure control valve ball (ref # 88) worn out/jammed. (remove hydraulic return line, (ref # 73), from pressure control valve fitting, (ref # 82). Remove pressure control valve, (ref # 74), from elbow, (ref # 62). Disassemble pressure control valve, by removing valve seat, (ref # 87), from body, (ref # 83). Inspect for and remove foreign material. Inspect ball for wear. Install pressure control repair kit, (ref # 89), if necessary).
4. Piston rod (ref # 94) disconnected from piston (ref # 92). (reconnect piston rod following detailed instructions on page 37 – 38).

NO PRESSURE, BLUE HYDRAULIC FLUID IN PAINT

1. Hydrapulse membrane broken. (replace with complete hydrapulse membrane, (ref # 54). Closely follow detailed instructions on page 36. **NOTE;** If, and only if, paint has contaminated the hydraulic side of the pump, the entire hydraulic system must be cleaned and flushed. Make sure to remove and clean the hydraulic tank screen, (ref # 70), during this process. Refill only with genuine H.E.R.O. LVO hydraulic fluid. **NOTE;** *If lacquer has contaminated the hydraulic system, the piston seal, (ref # 91), must be changed in addition to flushing the system. Closely follow detailed instructions on page 37 – 38).*

HYDRAULIC SIDE OF PUMP HAS BEEN REPAIRED AND REASSEMBLED, HYDRAPULSE MEMBRANE NOT MOVING "PURGING"

1. Air lock created on hydraulic side of pump. (when the hydraulic side of the pump is working there is no air in it. During repairs it is possible that air has been trapped in the hydraulic system. It must be removed or the pump will not work. To purge the air from the hydraulic system; remove the pressure control knob, (ref # 75), from the valve. Gently pull the P.C. stem, (ref # 82), out. It will pull out about 1/8". Remove the vented hydraulic cap, (ref # 72), from the hydraulic tank, (ref # 69), and install accessory pressure cap, item 4-45-3. With a bicycle pump, apply a few pounds of air pressure to the hydraulic tank. This will force the oil through the hydraulic system and push out any of the trapped air. Wait a few minutes. Remove pressure cap and replace with vented cap. Restart the unit and install pressure control knob.

NOTE: *Unit may be running during purging procedure to speed up the procedure. If a pressure cap is unavailable, simply running the equipment for approximately 5-10 minutes with the P.C. stem pulled out, will purge the system).*



TROUBLESHOOTING

SITUATION

POSSIBLE CAUSE (REMEDY)

PUDDLE OF OIL APPEARING UNDER SPRAYER DURING OPERATION

1. Hydraulic fitting loose/cracked or hydraulic lines are punctured. (examine all hydraulic lines and fittings for cracks, breaks or looseness. Replace or tighten as required).
2. Piston seals (ref # 91) worn. (remove and replace piston seals, following closely the detailed instructions on page 37 – 38).

CORRECT STATIC PRESSURE, BUT REDUCED SPRAYING PRESSURE

(Check with pressure gauge, see page 26 for details).

1. Spray tip worn out/too large. (replace with new, correct sized spray tip. Tip must not exceed a newer condition .031 tip (for 1 gun) or .021 tip (for 2 guns)).
2. Paint hose incorrect. (replace hose with genuine H.E.R.O. airless spray hose (min. 50 feet). Steel braided hoses must not be used).
3. Intake valve seat (ref # 13) worn. (replace intake seat closely following detailed instructions on page 32).
4. Intake ball (ref # 14) worn. (replace intake balls when signs of wear, deformation, nicks or cuts are evident. An out of round ball is the sign of a worn intake seat, (ref # 13), and both items should be replaced).
5. Outgo seat (ref # 29) worn. (replace seat).
6. Outgo ball (ref # 30) worn/damaged. (replace outgo ball).
7. Bleed valve (ref # 37) bypassing. (start sprayer. With bleed valve closed tightly, handle, (ref # 46), turned clockwise fully, check prime valve return hose, (ref # 51), for material bypass. Repair bleed valve using, (ref # 50), if material is bypassing.

LOW STATIC PRESSURE, LOW SPRAY PRESSURE

(Check with pressure gauge, see page 26 for details).

1. Pressure control valve stem screw (ref # 80) loose. (remove pressure control knob, (ref # 75), and inspect screw for looseness. Screw should be secured to stem, (ref # 80), with Loc-Tite. If the screw turns independent of the stem than it must be re-secured. Secure unit so it will not move. Install pressure gauge and .021 spray tip. Obtain a piece of wood, to use as a pusher or purchase a pressure control adjustment tool, 27C-15. Remove pressure control screw and put some Loc-Tite 609 on threads. Turn the screw into the stem a few turns and push it in to its maximum and read pressure. Turn the screw in or out until 3000 psi static pressure is obtained. If you obtain a pressure which higher than 3000 psi, trigger gun to release some pressure and continue adjusting screw until correct pressure is obtained. Let Loc-Tite set up.
2. Pressure control ball (ref # 88) and/or seat (ref # 87) worn. (remove entire pressure control valve, (ref # 74), from sprayer. Remove valve seat, ball, retainer, (ref # 86), and spring, (ref # 85), from valve. Replace with pressure control repair kit, (ref # 89). Hold valve body vertical while placing in spring, followed by retainer. Retainer should be below the valve body (approx. 3/8") when positioned correctly. Center ball on retainer, turn valve seat into body until finger tight, using pipe dope or Teflon tape to seal. Fully tighten using wrench.

TROUBLESHOOTING

SITUATION

POSSIBLE CAUSE (REMEDY)

FLUID BEING SPRAYED OUT OF TIP PULSATES, SPRAY HOSE LIES QUIET WHEN GUN TRIGGER CLOSED

1. Spray tip worn out or too large. (replace with new tip of correct size. Tip must not exceed a single good condition .031 tip or 2 x .021 tips).
2. Paint hose incorrect type. (replace with genuine top quality H.E.R.O. airless spray hose. Steel braided hose is not recommended).
3. Too short a length of hose. (minimum 50' of airless spray hose is required. Replace or add hose until a minimum of 50' is being used).

FLUID BEING SPRAYED OUT OF TIP PULSATES, SPRAY HOSE CONTINUES TO MOVE VIGOROUSLY WHEN GUN TRIGGER CLOSED

1. Outgo valve (ref # 26) assembled incorrectly. (remove the outgo valve and reassemble closely following the instructions on page 34).
2. Outgo valve ball (ref # 30) worn out or jammed. (inspect outgo ball to ensure that it is round and free of nicks or cuts. Inspect for foreign material jamming ball. Inspect seat and cage for wear. Replace parts as required).

PUMP SPRAYS WATER OR SOLVENT AT CORRECT PRESSURES, BUT WILL NOT SPRAY PAINT (Check with pressure gauge, see page 26)

1. Air leak in paint intake siphon assembly. (check all fittings and hose clamps in intake assembly for tightness).
2. Air leak in paint intake. (check for cracked or broken intake fittings. Swivel connector, (ref # 8), or hose barb, (ref # 7), may be damaged due to over tightening. Look for small black hairline fractures. Replace damaged parts).
3. Partial blockage in paint intake siphon hose, (ref # 5). (clean and remove any blockages from intake siphon hose. Check to insure strainer bag is not clogging intake siphon hose).

SPRAYER DOES NOT PRIME WITH PAINT

1. Heavy bodied paint, pump dry. (refer to " Operating Instructions" and follow priming instructions using the correct thinner for the paint you are to use).

SPRAYER DOES NOT PRIME WITH CORRECT THINNER

1. Pump completely dry .(pump may experience difficulty in priming when it is completely dry. First invert siphon tube and pour thinner into siphon tube, to help prime dry pump).
2. Intake siphon assembly (ref # 1) has loose/damaged fittings, loose clamps, or damaged hose. (check all fittings, hose clamps, for tightness, siphon hose for damage or holes. Replace or tighten as required).
3. Intake valve ball (ref # 14) stuck. (remove intake endcap, (ref # 11), and free ball and reassemble).
4. Outgo valve ball (ref # 30) stuck. (remove outgo valve, (ref # 26). Unthread outgo valve upper body, (ref # 31), from outgo body lower ,(ref # 27). Remove outgo seat ,(ref # 29), from upper body. Free ball and reassemble following detailed instructions on page 33).

TROUBLESHOOTING

SITUATION

POSSIBLE CAUSE (REMEDY)

SPRAY MATERIAL LEAKS AT BLEED VALVE STEM

1. Bleed valve stem packings (ref # 41 or 42) defective. (replace damaged packings following detailed instructions on page 34.

SPRAY MATERIAL LEAKS OUT BLEED VALVE HOSE WITH VALVE CLOSED

1. Bleed valve not closed tightly. (tighten valve handle, (ref # 46) further)
2. Bleed valve worn. (install bleed valve repair kit, (ref # 42). See page 34 for detailed instructions.)

SPRAY PATTERN IS SPOTTY OR UNEVEN

1. Pressure is too low. (increase pressure slowly until problem is corrected).
2. Spray material too thick. (thin as recommended by material manufacturer).
3. Plugged siphon screen, siphon tube, gun filter or a combination. (inspect and clean or replace as required).
4. Plugged tip. (remove and clean tip).
5. Pump malfunctioning or unsuitable for the material. (refer to other areas of troubleshooting guide and check material requirements vs 4500D output abilities).

SPRAY PATTERN LEAVES LINES OR FINGERS

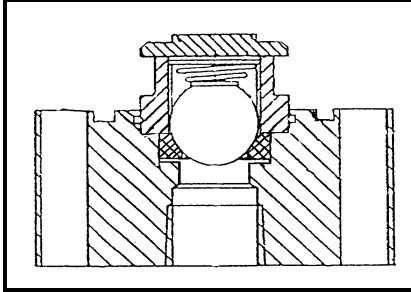
1. Pressure too low. (increase pressure slowly until problem is corrected).
2. Worn tip. (replace tip).
3. Tip too small for spray material. (change to larger tip or increase pressure. See material manufacturers recommendations).

EXCESSIVE OVERSPRAY OR FOGGING

1. Pressure too high. (reduce pressure as required).
2. Material too thin. (follow material manufacturers recommendations re-thinning).
3. Tip too large. (reduce tip size).
4. Too windy. (wait for wind to let up).

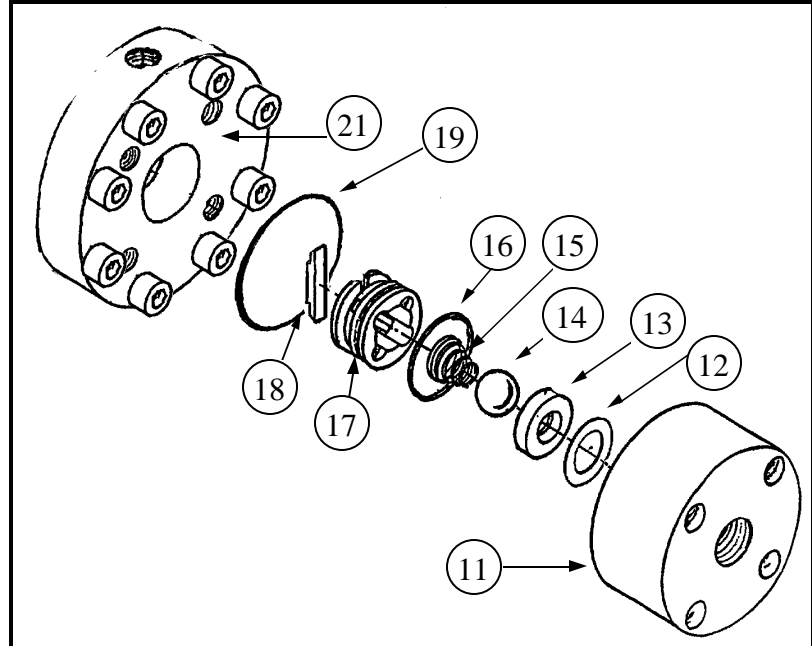


REPAIR OF INTAKE VALVE



Tools or Supplies Required

- ◆ Vise
- ◆ 3/8 Allan wrench
- ◆ Large open end wrench
- ◆ Torque Wrench
- ◆ Cleaning solvents

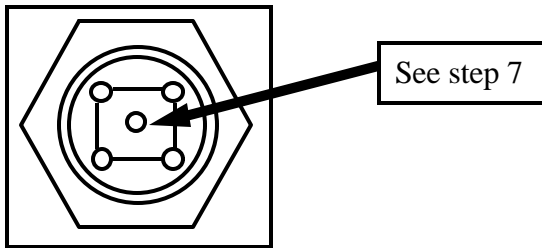


1. Remove the four bolts (ref # 9) and pull intake endcap (ref # 11), from the pump. The endcap should separate from the material head (ref # 21), with the ball guide (ref # 17) attached. If the ball guide remains in the material head, pry out with a screw driver.
2. Clamp endcap in vise with the ball guide facing up.
3. Pry off the ball guide and remove intake ball (ref # 14) and spring (ref # 15).
4. Remove seat from endcap.
NOTE; The seat is not secured with any Loc-Tite, however dried paint may cause difficulty in removing seat.
5. Remove the crush washer (ref # 12).
6. Thoroughly clean and inspect all parts. Replace any worn or damaged parts.
7. Place clean endcap in vise with o-ring (ref # 19) groove facing up.
8. Assembly of parts is the reverse of removal; washer (ref # 12), seat (ref # 13), and ball (ref # 14).
NOTE; A new compression washer should be used each time the endcap is removed
9. If the ball guide (ref # 17) and ball stop (ref # 18) were separated during removal, re-assemble the two.
NOTE; The step on the ball stop must face outwards (Towards hydropulse membrane).
10. Place the spring (ref # 15) into the ball guide so the smaller end of the spring will contact the ball.
11. Assemble the ball guide, with spring, onto the endcap over the already installed ball and seat. Push down on the ball guide so that the ball guide o-ring (ref # 16) locks the assembly together.
12. Place o-ring (ref # 19) in the groove on the face of the endcap.
13. Install the entire endcap assembly onto the material head with the four bolts (ref # 9). Torque bolts, using a crisscross pattern, to 20 ft. lbs. Repeat torquing procedure using 30 ft. lbs.

NOTE: Effective March 1997, and beginning with serial number 120285, the current "B" style Hydropulse "Intake" assembly is used. The changes effect the Endcap (ref # 11), Crush Washer (ref # 12), Ball Guide (ref # 17), Ball Stop (ref # 18), and the Material Head (ref # 21). The most significant change is to the endcap. Gone is the o-ring, formerly located under the intake seat. The endcap is machined flush and a new crush washer is now placed in before the seat (crush washer is placed under the seat). The seat will be held in place through the compression of parts during assembly.



REPAIR OF OUTGO VALVE



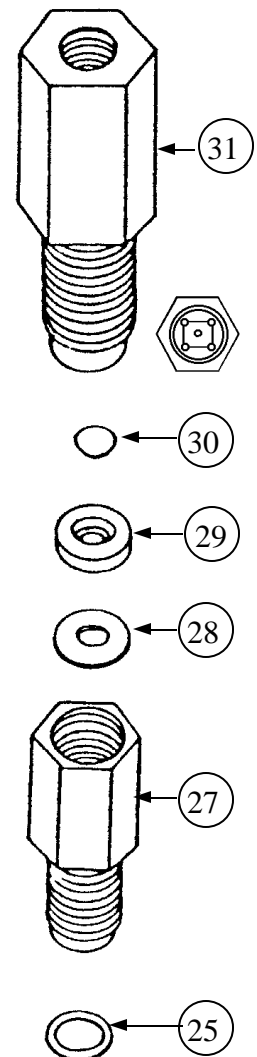
Tools or Supplies Required

- ◆ Vise
- ◆ 11/16" Open end wrench
- ◆ 1" Open end wrench
- ◆ 5/8" Open end wrench
- ◆ Teflon Tape or pipe sealant.

1. Open prime valve, (ref # 36) in order to release pressure from the material side of pump.
2. Remove pressure control knob, (ref # 75) and pull P.C. stem, (ref # 78) out to internal stop, thereby releasing hydraulic pressure.
3. Disconnect outgo cross, (ref # 35) from outgo swivel, (ref # 32) on the outgo valve.
4. Remove outgo valve from machine by turning counter clockwise.
5. Invert valve and secure upper part of valve, (ref # 31) in vise.
6. Remove lower half of valve, (ref # 27).
7. Remove crush washer, (ref # 28), seat, (ref # 29), and ball, (ref # 30). Clean and inspect all parts for wear. Replace any worn parts.

NOTE: *Check the condition of the internal passage ways of the outgo upper (ref # 31). A total of five holes allow the paint to pass through the upper. The center hole will become enlarged over time and cause the ball to travel a greater distance than originally intended. This can cause a reduction in the response time of the valve and lead to pulsation in the spray hose and spray pattern.*

8. Apply Teflon tape to threads of outgo upper body.
9. Invert outgo upper and drop ball in.
10. Install seat, beveled side down to ball. Seat should fit snugly into outgo body. Press on seat to ensure it will compress until it is flush with outgo body.
11. Place crush washer on seat. Replace crush washer if badly crushed.
12. Thread outgo lower onto outgo upper until finger tight. Tighten 1/2 turn with wrench. Teflon tape or pipe sealant should be used.
13. Attach repaired valve to machine, installing a new crush washer, (ref # 25) following steps 3-4 in reverse order.

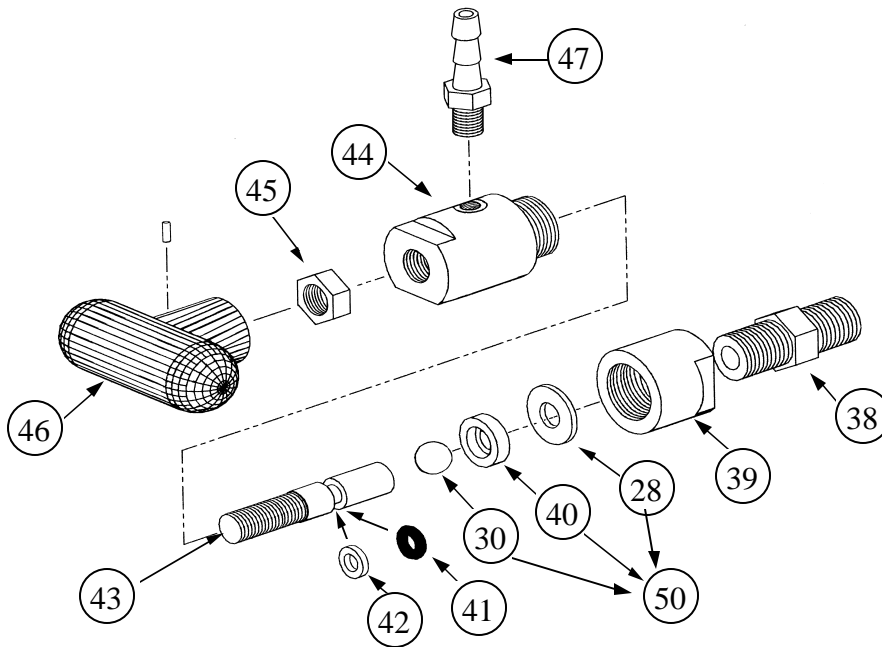


SPECIAL NOTES:

- ☑ To check the ball for wear, place against a new seat and check sealing edge against a bright light.
- ☑ A used seat may be checked in a similar manner using a new ball. Replace used part if light pass at sealing edge.



REPAIR OF BLEED VALVE



Tools or Supplies Required

- ◆ Vise
- ◆ 9/16 Open end wrench
- ◆ 3/4 Open end wrench
- ◆ 5/8 Open end wrench
- ◆ Teflon Tape or pipe sealant, optional *
- ◆ Loctite, optional **

Bleed Valve Repair Kit Installation

1. Open bleed valve (ref # 37), turning handle counter-clockwise to release pressure from material side of pump.
2. Remove bleed valve return hose, (ref # 51) from bleed valve return fitting, (ref # 47).
3. Place wrench on bleed valve connector, (ref # 38). Turn counter-clockwise to remove valve from outgo cross, (ref # 35).
4. Secure valve vertically in vise, clamping vise jaws on the flats of valve nut (ref # 39). See picture above.
5. Use wrench to remove valve housing (ref # 44) from nut, (ref # 39).
6. Remove ball, (ref # 30), seat, (ref # 40) and crush washer, (ref # 28).
7. Install new crush washer and seat, (ensuring the beveled surface of seat is facing out) into the bleed valve nut (ref # 39). Place new ball into bevel of seat.
8. Re-install valve housing (* Use of Teflon Tape or pipe sealant is optional). Tighten 1/4 turn past finger tight. If leakage occurs at this junction point during operation, tighten 1/4 turn more or until leakage stops.

To install new valve stem, or valve stem seals, (ref # 41 or 42), continue at step 9 .

9. Complete steps 1 to 5 from above.
10. Place valve housing in vise.
11. Use 1/2" wrench to loosen jam nut (ref # 45), and remove handle.
12. Remove jam nut from valve stem (ref # 43), and unthread valve stem down through housing.
13. Remove existing o-ring and washer (ref # 41 & 42) from stem. Replace with new parts, ensuring they are installed in the correct order on stem. Refer to diagram.
14. Thread stem back into housing until all threads are used. Thread jam nut on to valve stem.
15. Re-assembly valve. Refer to steps 6 to 8 from instructions above.
16. Thread handle onto valve stem. Allow stem to thread down onto ball (internally). Tighten handle firmly.
17. Hold handle while tightening jam nut (Ref # 45) tightly against handle. (** Use of Loctite is optional)

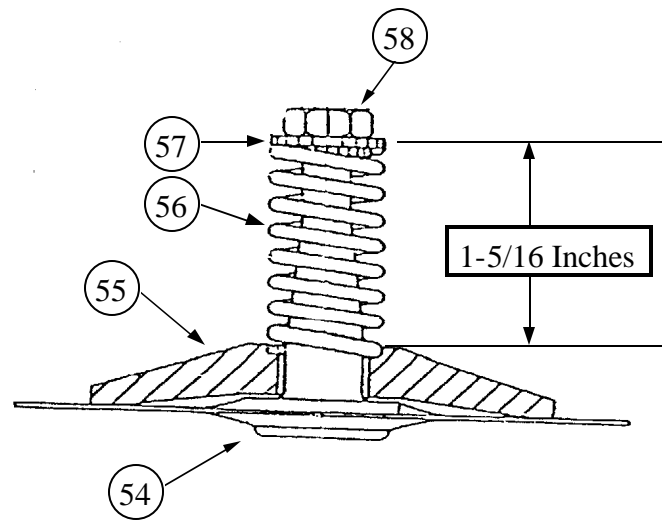


HYDRAPULSE MEMBRANE REPLACEMENT



Tools or Supplies Required

- ◆ 3/8 Allan wrench
- ◆ 1/2" Open end wrench
- ◆ Torque Wrench
- ◆ 4-45-3 Pressure cap.
- ◆ Ruler
- ◆ H.E.R.O. hydraulic oil
- ◆ Drip / collection tray
- ◆ Rags



Removal

1. Remove the eight bolts (ref # 20) securing the material head (ref # 21) to the hydraulic head (ref # 59).
2. Remove the material head and replace material head cushion (ref # 22) with the new cushion provided.
3. Place a container under pump to catch hydraulic oil.
4. Gently pull hydropulse membrane to separate it from the hydraulic head.
5. Remove the nut (ref # 58) on the hydropulse membrane stem in order to separate the hydropulse membrane from the hydraulic plastic horn (ref # 55), hydropulse membrane spring (ref # 56), and spring locator (ref # 57).
6. Clean all parts.

Assembly

1. Place hydraulic plastic horn over the new hydropulse membrane.
2. Position the spring in the bore of the plastic horn.
3. Install the spring locator over the hydropulse membrane stem and into the spring.
4. Thread the jam nut onto the stem. Tighten the jam nut until a measurement of 1-5/16" is obtained. The measurement is taken from the top of the hydraulic horn (ref # 55) to the top of the spring locator (ref # 57). See diagram above.
5. Check the assembly. The spring must be positioned in the bore of the plastic horn on one end and over the shoulder of the spring locator on the other end.
6. Place the hydropulse membrane assembly back into the hydraulic head.
7. Re-install the material head with the eight bolts. Torque to 30 ft. lbs.
8. Refill hydraulic oil tank and "**PURGE**" system following instructions on page 28.
9. Prime the pump with solvent or water and bring the pump up to full pressure (approximately 2500 psi.). Run the pump on standby (not triggering gun) for about 20 minutes, to "break-in" new membrane.
10. Installation is now complete and the pump is ready for use.

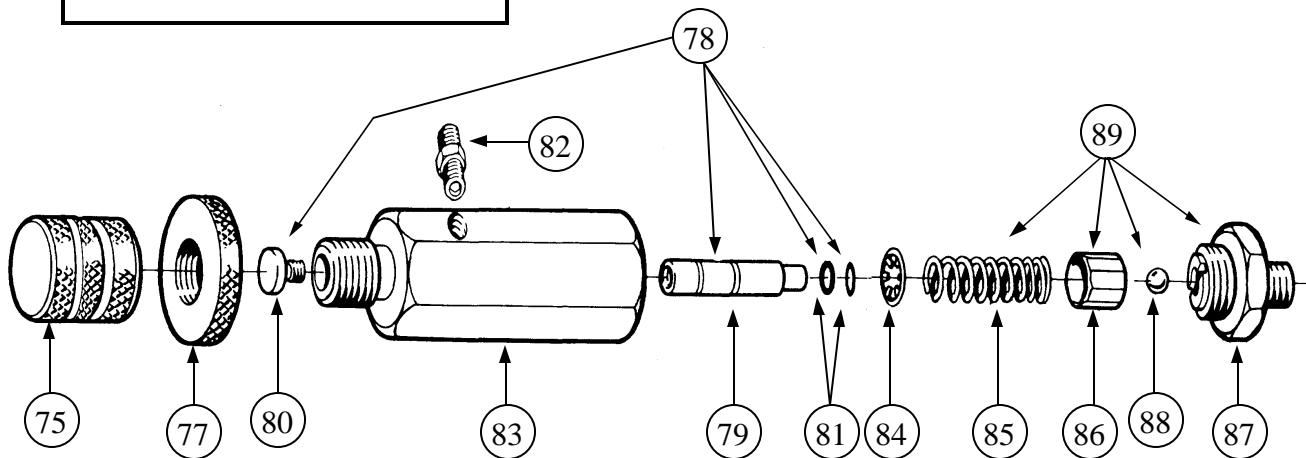


REPAIR OF PRESSURE CONTROL VALVE



Tools or Supplies Required

- ◆ Vice
- ◆ 7/16" Open end wrench
- ◆ 1" Open end wrench
- ◆ 11/16" Open end wrench
- ◆ H.E.R.O. hydraulic oil
- ◆ 4-45-3 Pressure cap
- ◆ Teflon Tape or pipe sealant, optional *



REMOVAL & INSTALLATION OF REPAIR KIT

1. Remove pressure control knob, (ref # 75) and pull P.C. stem, (ref # 78) out to the internal stop (1/16" to 1/8") thereby releasing hydraulic pressure.
2. Remove hydraulic return line, (ref # 73) from P.C. fitting, (ref # 78).
3. Place 11/16" wrench on P.C. seat, (ref # 87). Turn counter-clockwise to remove complete valve.
4. Place complete valve in vise and remove seat from body, (ref # 83).
5. Remove ball, (ref # 88), retainer, (ref # 86), and spring, (ref # 85) from body. Inspect ball for nicks or cuts and replace if damaged. Inspect seat at sealing edge, for signs of wear. A good condition seat will have a very small beveled at the sealing edge. The larger the bevel the more wear has taken place. Inspect retainer for wear. The retainer has a small locating hole in it. The hole should be flush or slightly beveled. The greater the wear on the ball, seat, and retainer the poorer the static pressure will be. Replace parts individually, or use repair kit, (ref # 89).
6. Hold P.C. body vertical. Place spring into body, place retainer onto spring. Ensure retainer fits completely over spring. Retainer should rest below end of body by approximately 1/4" to 3/8". Place ball onto retainer, ensuring ball is located on center hole.
7. Thread on seat, using care not to dislodge the ball from its position on the retainer. Tighten firmly.
8. Apply pipe dope or Teflon tape to exterior threads of seat. Install into elbow. Tighten to prevent leaks and return to original position.
9. Reattach hydraulic line.
10. See "**PURGING**" instructions on page 28.

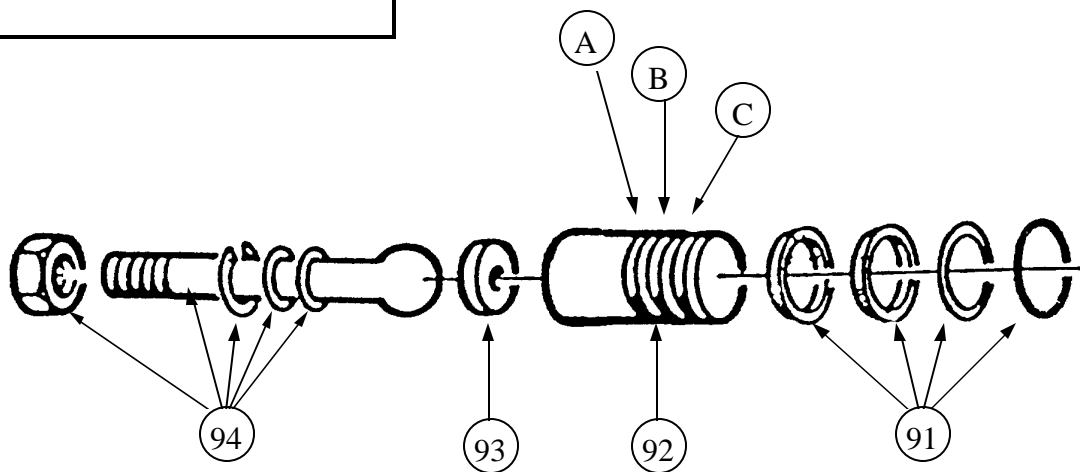


REPAIR OF PISTON



Tools or Supplies Required

- ◆ Vise
- ◆ 9/16 Open end wrench
- ◆ 1/2 Socket
- ◆ Circlip pliers.
- ◆ Grease
- ◆ Golf tee
- ◆ Pick or dental tool.
- ◆ Torque Wrench
- ◆ H.E.R.O. hydraulic oil.
- ◆ 4-45-3 Pressure cap.



1. Remove hydraulic feed line, (ref # 67) from hydraulic intake valve, (ref # 66) and also remove hydraulic return line, (ref # 73) from the pressure control valve, (ref # 74). Plug lines to minimize oil loss. (Hint; golf tees work well for this)
2. Remove the bolts, (ref # 118) passing through the side frames, (ref # 115,116), into the crossblock, (ref # 63).
3. Place a drain tray under cylinder area.
4. Grasp the pump assembly, and pull away from the piston. Stop when piston pulls free, to allow the hydraulic oil to drain into pan. Completely remove pump assembly from between side frames.
5. If only replacing piston seals, (ref # 91) continue at step 15.
6. Remove the piston, (ref # 90) from eccentric bearing, (ref # 100). Move to clean work bench for repairs.
7. Remove piston circlip, using circlip pliers. Remove piston from rod.
NOTE: Use extreme caution not to damage circlip or the internal circlip groove of piston.
NOTE: Piston rod circlip, washer, o-ring, and nut are not available individually. Parts are available with the purchase of piston rod, (ref # 94) only.
NOTE: The circlip will have one sharp edge and one smooth edge. The smooth edge should be towards the washer. If reversed, the rod will continually pull out of the piston.
8. Remove bronze piston rod seat, (ref # 93) from piston, (ref # 92).



REPAIR OF PISTON



9. Examine all parts for wear or damage. Replace as required.
10. Fill the center cavity of piston rod seat until flush with grease. Slide seat into piston with concave side (filled with grease) facing out.
11. Lightly grease the ball end of piston rod. Push piston rod into piston until ball end of rod contacts seat.
12. Slide o-ring and steel washer down rod and into piston. Slide circlip down into piston and snap into the internal circlip groove of piston using circlip pliers.
NOTE: Circlip must fully expand into groove of piston. Circlip has fully expanded when there is 13/64" space between circlip eyelets.
NOTE: If you experience difficulty installing circlip, remove a small quantity of grease. When installed correctly, rod should move slowly and without any free play.
13. If piston seals, (ref # 91) are required, they may be installed now or after piston has been re-attached.
14. Thread rod into eccentric bearing holder, (ref # 102) until nut is flush with eccentric bearing. Tighten snugly.
NOTE: Piston rod nut must remain fully threaded onto rod, if during installation, the nut begins to loosen from rod, re-tighten to rod. Place vise grips on rod to assist in tightening piston rod into eccentric.
15. Remove and discard old piston seals.
16. Piston seal kits, (ref # 91) contain a total of four pieces (1 o-ring, 1 flat washer, 2 cup washers). Take note of their installation sequence by referring to drawing. The piston has three machined grooves, which have been marked on the drawing as A, B, & C.
17. Place flat washer (one side has a contoured face) into groove "C", then place o-ring in front of flat washer, so that it fits into the contoured face of the flat washer.
18. Place one cup washer into groove "B", with open face of cup washer facing the end of piston. (towards hydraulic oil when installed)
19. Place second cup washer into groove "A".
NOTE: Always work from the front of the piston back so that you are always moving the cup washers over filled grooves. This avoids damage that can occur to the cup washers if they have to be dug out of one groove and moved to another. Avoid over stretching.
NOTE: A small, dental like tool, may be used to assist in moving cup washers.
20. Apply grease to seals before installing in cylinder, (ref # 61).
21. Slide pump assembly into side frames and guide piston into cylinder.
NOTE: Use care not to push the piston too far into cylinder. If piston rings slide in too far they will pass through cylinder into the hydraulic cavity. Complete dismantling of piston will be required to remove. The piston can not be pulled back if the seals have gone through cylinder.
22. Reattach crossblock bolts, as removed in step 2. Torque bolts to 30 foot pounds.
23. Reconnect hydraulic lines, as removed in step 1.
24. Add new hydraulic oil to hydraulic tank, using only genuine H.E.R.O. LVO hydraulic oil.
25. Once the repairs have been completed, the hydraulic oil will require purging to remove the trapped air. See "**PURGING**" instructions on page 28.

ACCESSORY ITEMS

1/4x1/4	Hose to Hose Connector
114	Paint Hose, 50' x 1/4"
3-Whipend	Whipend, 3' x 3/16"
10-55-011-2	ASM Gun, Model 400, 2 Finger Trigger, c/w 1710 Zip Tip
10-55-011-4	ASM Gun, Model 400, 4 Finger Trigger, c/w 1710 Zip Tip
10-55-300-2	ASM Gun, Model 300, 2 Finger Trigger, c/w 1710 Zip Tip
10-55-300-4	ASM Gun, Model 300, 4 Finger Trigger, c/w 1710 Zip Tip
5GAL SB-25	Strainer Bags, 5 Gallon, 25 per Carton
4-649	Wonder Wash, 1.5 ounce, 48 per Carton
4-655	Wonder Wash, 5 ounce, 25 per Carton
4-660	Wonder Wash, 5 lbs. Bulk
4-662	Wonder Coat, 1 Liter Bottle
4-664	Wonder Coat, 12 x 4-662 Carton
661	Spray Trigger, for use with 4-662
4-666	Wonder Coat, 4 Liter Bottle (Refill)
4-LVO-1	Hydraulic Oil (LVO), 1 Liter Bottle
4-LV0-4	Hydraulic Oil (LVO), 4 Liter Bottle
4-67/19	Pressure Gauge, c/w Mounting Tee
4-45-3	Pressure Cap
10-QRP-3	Quick Reach Extension Pole, 3 Feet
10-QRP-5	Quick Reach Extension Pole, 5 Feet
10-QRP-8	Quick Reach Extension Pole, 8 Feet
BB-010	"Bucket Buster" Plastic Pail Opener

PARTS LIST

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INTAKE PARTS

REF	PART #	DESCRIPTION	QTY
1	4-667-59	SIPHON ASSEMBLY COMPLETE, (Ref# 2-6, 51-53)	ASSY
2	187A	SCREEN, Siphon, Coarse	1
3	689A	TUBE, Siphon, Metal, 5 Gal., 1"	1
4	4-7184B	HOSE, Siphon, 30"L x 1" ID	1
5	1/75-3	CLAMP	2
6	667-27-AP	BARB, Hose to Elbow, 1"	1
7	667-26-AP	ELBOW, 1"	1
8	4-02-22-2500B	HYDRAPULSE PUMP ASSEMBLY (Ref # 9-22, 54-60)	ASSY
9	HW1087	CAPSCREW, SKT HD, 3/8 NC x 2", Gr. 8	4
10	3-2	WASHER, 3/8" Hi Collar Lock	4
11	4-02-22-2502B	ENDCAP, Hydrapulse, Gold NEW, after serial # 120285	1
12	02-22-2009B	WASHER, Crush NEW, after serial # 120285	1
13	6	SEAT, 3/4" Tungsten Carbide	1
14	17S	BALL, 3/4", Corrosion Resistant	1
15	02-22-2005	SPRING	1
16	02-22-2006	O-RING, Urethane	1
17	02-22-2002B	BALL GUIDE NEW, after serial # 120285	1
18	02-22-2001B	BALL STOP NEW, after serial # 120285	1
19	5V	O-RING, Viton	1
20	3	CAPSCREW, SKT HD, 5/16 x 1-3/4"	8
21	4-02-22-2501B	HEAD, Material, Hydrapulse, Gold NEW, after serial # 120285	1
22	02-22-2004	CUSHION, Material Head	1
23	4-6658B	REPAIR KIT (Ref# 12, 14-15, 19) NEW, after serial # 120285	KIT
24	4-6659B	OVERHAUL KIT (Ref# 12-19) NEW, after serial # 120285	KIT

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OUTGO PARTS

REF	PART #	DESCRIPTION	QTY
25	7C	WASHER, Copper Crush	1
26	4-611C	OUTGO VALVE COMPLETE, (Ref# 27-32)	ASSY
27	11A-1	LOWER, Valve Body	1
28	11A-3CP	WASHER, Copper Crush	1
29	11A-45	SEAT, 3/8, Tungsten Carbide	1
30	11A-5S	BALL, Steel, 3/8	1
31	11B-2	UPPER, Valve Body, for use with steel ball	1
32	20	SWIVEL	1
33	4-6656	REPAIR KIT (Ref# 25, 28, 30)	KIT
34	4-6657	OVERHAUL KIT (Ref# 25, 28-31)	KIT
35	03-440-100	CROSS, 4 x Female	1
36	13A	PLUG	1
37	4-606	BLEED VALVE COMPLETE (Ref# 38-49)	ASSY
38	14A	CONNECTOR, 1/4 x 1/4	2
39	606-2	NUT, Bleed Valve	1
40	11A-4	SEAT, 3/8, Tungsten Carbide	1
41	606-8	O-RING, Bleed Valve, Stem	1
42	606-15	WASHER, Back – Up	1
43	606-10	STEM, Bleed Valve	1
44	606-1	HOUSING, Bleed Valve	1
45	HW4053	JAM NUT, 3/8 NC	1
46	4-606-9	HANDLE, T, Complete with pin	1
47	603-6	BARB, Hose	1
48	603-12	DECAL, Bleed Valve “Close Tightly After Prime”	1
49	606-12	LABEL, Bleed Valve “Max WPR 4000 PSI”	1
50	4-606RK	REPAIR KIT, Bleed Valve (Ref# 28, 30, 40)	KIT
51	4-185B	HOSE, P.V. Return Line	1
52	196	CLAMP	1
53	188	TIES	2

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HYDRAULIC PARTS

REF	PART #	DESCRIPTION	QTY
54	4-04-22-4500	HYDRAPULSE MEMBRANE (Includes Ref# 22 & 58)	KIT
55	04-22-4001	HORN, Plastic	1
56	04-22-4005	SPRING	1
57	04-22-4004	LOCATOR	1
58	HW4032	NUT, 5/15NC Hex Ny-Lock	1
59	4-04-22-4501	HEAD, Hydrapulse, Gold	1
60	5	O-RING	1
61	24/150	CYLINDER, 1",	1
62	25-2	ELBOW	3
63	35B	CROSSBLOCK, Steel	1
64	36	CAPSCREW, HX. HD., 5/16NC x 3", Gr. 5	6
65	HW5050P	WASHER, 5/16" SAE	6
66	4-30	VACUUM VALVE	1
67	4-31GB	FEED LINE, LVO, C/W Fittings, GAS HP Only, Includes ref# 68	1
68	31-1B	ORIFICE, Metering Orifice, GAS HP Only	1
69	4-45A	TANK, Complete With Fittings, (ref# 70-72)	ASSY
70	4-45-1	SCREEN, Tank	1
71	45-4	ELBOW, Return	1
72	4-45-2	LID, Vented, Hydraulic Tank	1
73	4-28G	RETURN LINE, LVO, C/W Fittings	1
74	4-27C	PRESSURE CONTROL VALVE, Complete (Ref# 75-88)	ASSY
75	4-27C-7	KNOB, P.C., Includes Ref# 76	ASSY
76	HW2010	SETSCREW, SKT. HD. 5/16 NC x 5/16"	1
77	27C-6	LOCK NUT, Aluminum, P.C.	1
78	4-27C-10	STEM ASSEMBLY (Ref# 79-81)	ASSY
79	27C-10A	STEM, P.C.	1
80	27C-10B	SCREW, Stem, P.C.	1
81	27C-12	O-RING, P.C.	2
82	4-27C-11	FITTING, Oil Return, P.C.	1
83	27C-8	BODY, P.C.	1

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HYDRAULIC PARTS

REF	PART #	DESCRIPTION	QTY
84	27C-9	CIRCLIP, P.C.	1
85	27C-5	SPRING, P.C.	1
86	27C-4	RETAINER, P.C.	1
87	27C-3	SEAT, 38-40RC, P.C.	1
88	27C-2	BALL, Steel	1
89	4-27CRK	REPAIR KIT, Ref# 85-88	KIT
90	4-38A/150	PISTON & ROD ASSEMBLY, 1" (Ref# 91-94)	ASSY
91	4-37A/150	SEAL SET, Piston, 1"	1
92	4-38A/150-1	PISTON, Only, W/O Seals, 1"	1
93	38A-3	SEAT, Piston, Bronze	1
94	4-38A-2	ROD, Piston, C/W Nut, Washer, O-Ring, Circlip **Nut, Washer, O-Ring & Circlip NOT Sold Individually**	1

DRIVE PARTS

95	42	BEARING, Crankshaft Side	2
96	HW1090P	CAPSCREW, HX HD, 7/16NC x 1 1/4	4
97	HW5070P	WASHER, Lock, 7/16	4
98	HW4060P	NUT, HX. HD, 7/16	4
99	46	KEEPER PLATE	2
100	4-39	ECCENTRIC BEARING & HOLDER, (Ref# 101,102)	ASSY
101	39-2	BEARING, Eccentric, Outer	1
102	4-39-3	Holder, Eccentric, C/W Zerk	1
103	4-41	CRANKSHAFT, Includes Ref# 104	ASSY
104	39-1	RACE, Eccentric, Inner	1
105	HW1044P	CAPSCREW, 1/4NC x 2", GR. 5, PLTD	1
106	HW5040P	WASHER, 1/4 Regular Lock	1
107	HW4020P	NUT, 1/4, HEX	1
108	4-49	KEYSTOCK, 3/16 SQ x 1.5"	2
109	4-05-140-352	SHEAVE, Pump, C/W Set Screws (2) (Includes ref# 110)	1
110	HW2020	SET SCREW, SKT. HD., 5/16 NC x 7/16	2

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DRIVE PARTS

REF	PART #	DESCRIPTION	QTY
111	66/100	BELT	2
112	4-05-140-351	SHEAVE, Motor, C/W Set Screws (2) (Includes ref# 110)	1
113	4-05-140-350	ENGINE, Honda, 4 HP **NOT AS SHOWN**	1
114	HW1072P	CAPSCREW, HX HD, 5/16NC x 1 1/4"	4
115	HW5050P	WASHER, Flat, 5/16	4

CHASSIS PARTS

116	4-06-140-452	FRAME, Left Side	1
117	4-06-140-451	FRAME, Right Side	1
118	4-57	SPACER, Bearing, 6 1/2" x 4"	2
119	HW1060P	CAPSCREW, HX HD, 5/16NC x 3/4	6
120	HW5051P	WASHER, Flat, 5/16	6
121	45B	BRACKET, For Hydraulic Tank	1
122	45D	PAD, For Hydraulic Tank NOT SHOWN	1
123	45C	STRAP, For Hydraulic Tank	2
124	HW1010P	CAPSCREW, HX HD, 1/4NC x 1/2"	2
125	4-06-140-455	BRACKET, Motor Mount (Includes ref# 126, 127)	1
126	HW1200F	CAPSCREW, HX HD, 3/8" x 1 3/4"	2
127	HW4053	NUT, Hex Jam, 3/8NC	2
128	4-06-440-481	CHART, Linestriper, Rear	1
129	06-440-412	GRIP, Handle	2
130	06-99-0002	WHEEL, 12" Pneumatic	2
131	67/17	PIN, Cotter	2
132	4-06-440-452	MOUNT, Caster, Front	1
133	4-06-440-468	CASTER, Pneumatic 8" Wheel	1
134	06-440-411	LEVER, Control For Swivel Caster	1
135	06-440-419	CABLE, For Swivel Caster	1
136	4-06-440-459	COVER, Cable, For Caster Control Lever	1
137	06-440-422	CAP, Cable Cover	1
138	06-440-421	FERRULE, Cable End	1
139	4-06-440-482	MOUNT, Cross Bar, Front	1
140	06-440-415	KNOB, Adjustment, 2"	2

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CHASSIS PARTS

REF	PART #	DESCRIPTION	QTY
141	4-06-440-455	BAR, Gun Cross	1
142	06-440-417	PLUG, Square Tubing	2
143	4-06-140-454	BELTGUARD	1
144	HW1059P	CAPSCREW, 5/16NF x 3/4	1
145	4-06-440-458	CLIP, Stencil	1
146	4-06-440-461	CHAIN, Grounding	1
147	06-440-410	LEVER, Gun Control	1
148	06-440-433	CABLE, For Gun Control Lever	1
149	4-06-440-478	COVER, Cable, For Gun Control Lever	1
150	4-06-440-476	ASSEMBLY, ACTUATOR, For Gun Bracket (ref # 151-155)	ASSY
151	06-440-437	ACTUATOR	1
152	4-06-440-470	SPRING	1
153	4-06-440-475	SLEEVE, Plastic	1
154	HW3053P	SCREW, Machine 10-32 x 2", RD HD Slot	1
155	HW2081	SETCREW, 10-32 x 1/2, Cup Point	1
156	4-06-440-477	ASSEMBLY, GUN BRACKET, Less Actuator, (ref # 157-	ASSY
157	4-06-440-472	FRAME, Gun Bracket	1
158	4-06-440-471	GUIDE, Trigger	1
159	HW3039P	SCREW, Machine, 10-32 x 3/8, RD HD	2
160	HW5010P	WASHER, 3/16 Shakeproof	2
161	HW2051	SETSCREW, SKT HD, 1/4NC x 5/16 Cup Point	1
162	4-06-440-473	CLAMP, Large	1
163	4-06-440-474	CLAMP, Small	1
164	06-440-435	SCREW, Gun Mount, Wing Style	2
165	06-440-442	SPACER, 3/4"	1
166	HW4054	NUT, Cap, 3/8NC	1
167	4-06-440-483	GUN ARM	1
168	06-440-416	PLUG, Round Tubing	3
169	4-06-440-464	CLAMP, Gun Post / Gun Arm	1
170	4-06-440-454	POST, Gun	1
171	4-06-440-485	KIT, GUN MOUNT, FOR ADDITIONAL SPRAY GUN (Includes ref # 147 – 170, 138, 140)	KIT

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DECALS

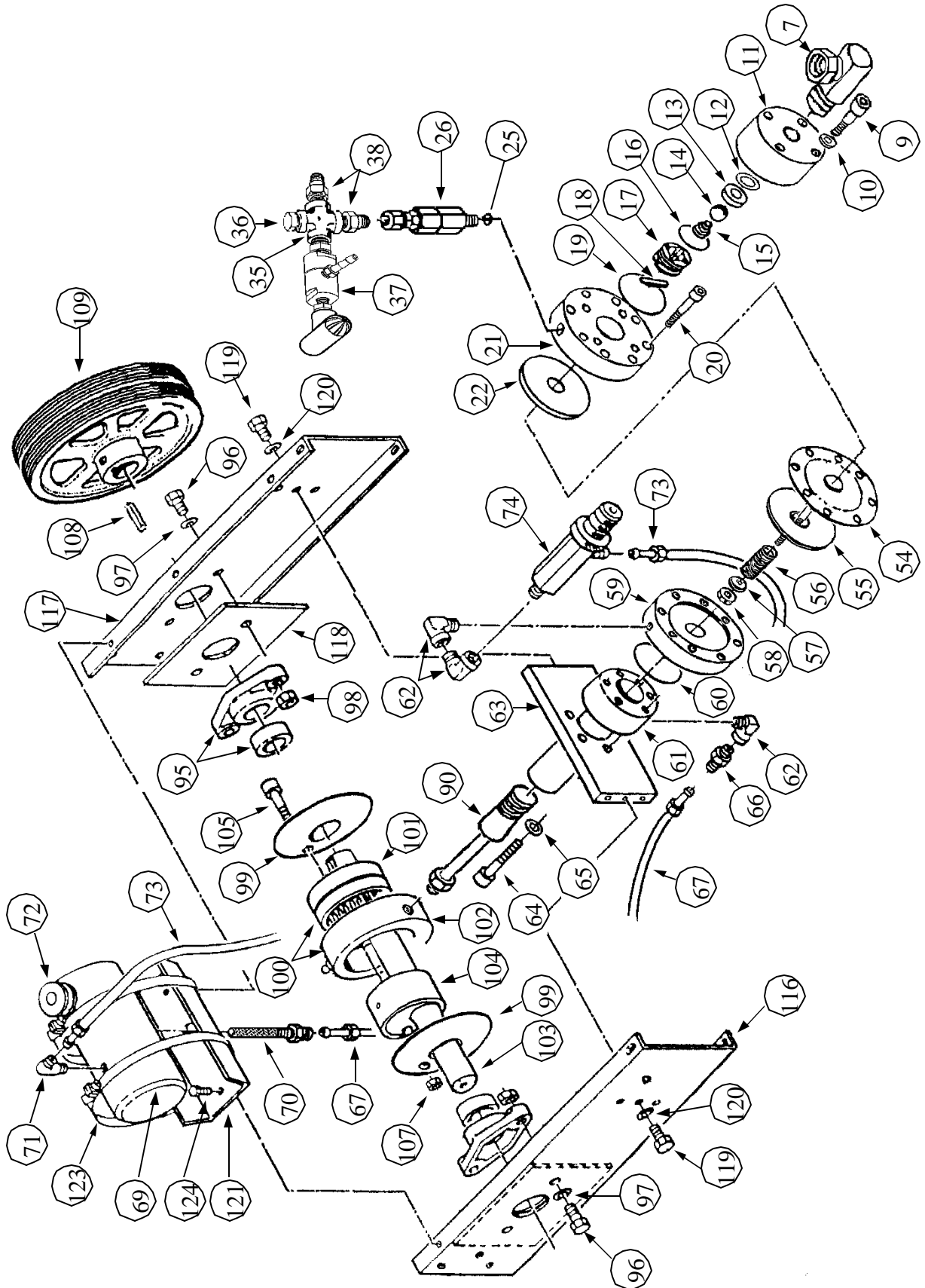
REF	PART #	DESCRIPTION	QTY
172	97B	“Quality By Design”	1
173	92	“ Release Pressure ”, Belt Guard	1
174	91	“H.E.R.O.” Small, Engine	1
175	DEC-4500D	4500D Linestriper	1

HARDWARE

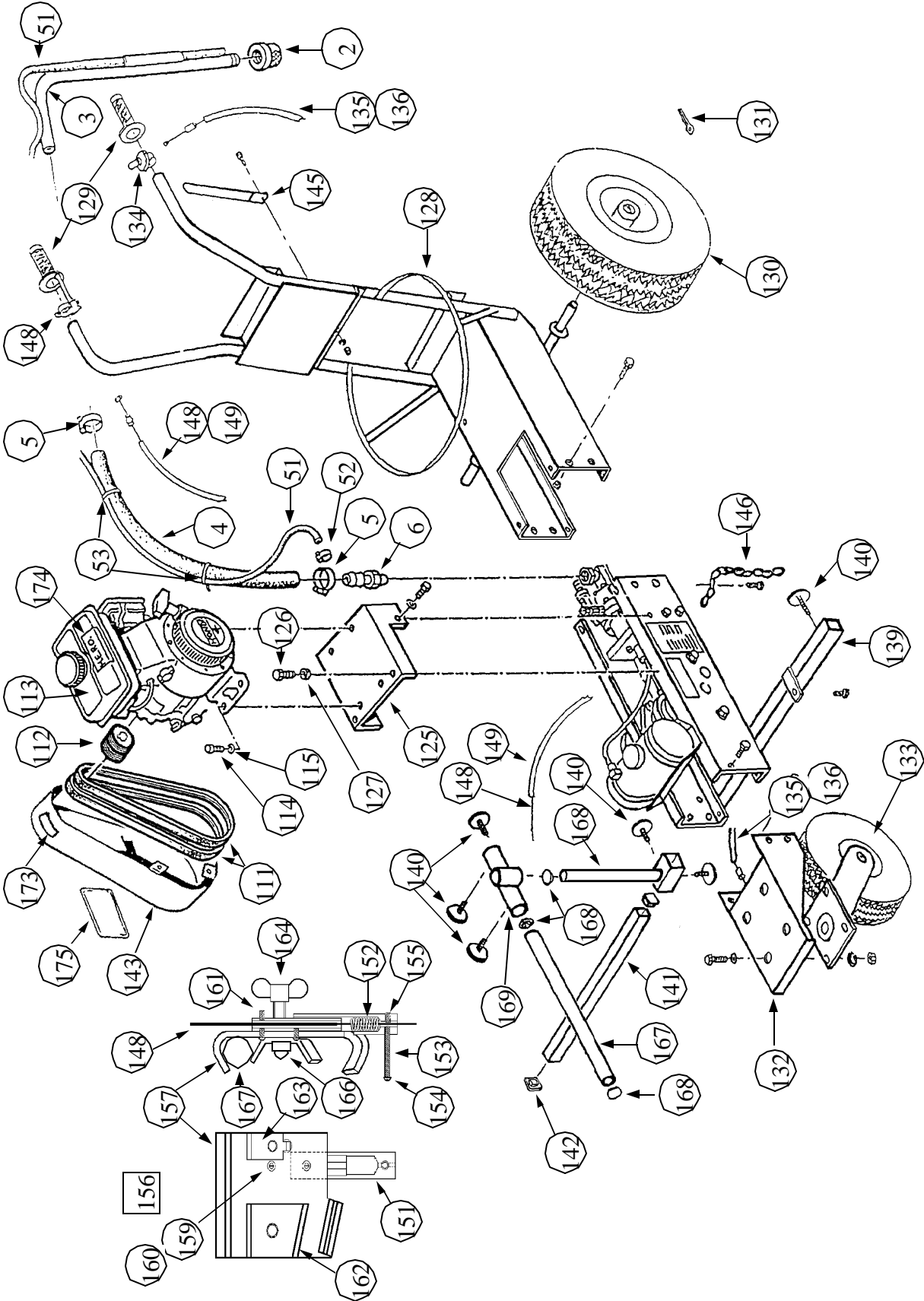
Not all hardware has been listed with reference numbers, due to schematic over crowding or relative insignificance. The following is a list of all additional hardware used on the 4500D.

HW1030	Capscrew, HX HD, 1/4NC x 1 1/4, Plated, Gr. 5	1
HW1010P	Capscrew, HX HD, 1/4NC x 1/2, Plated, Gr. 5	7
HW1020P	Capscrew, HX HD, 1/4NC x 3/4, Plated, Gr. 5	3
HW1050P	Capscrew, HX HD, 5/16NC x 1/2, Plated, Gr. 5	5
HW1059P	Capscrew, HHCS, 5/16NF x 3/4. Plated, Gr. 5	1
HW1060P	Capscrew, HX HD, 5/16NC x 3/4, Plated, Gr. 5	8
HW1065P	Capscrew, HX HD, 5/16NC x 1, Plated, Gr. 5	2
HW1080P	Capscrew, HX HD, 5/16NC x 1 3/4, Plated, Gr. 5	4
HW1090P	Capscrew, HX HD, 7/16NC x 1 1/4, Plated, Gr. 5	8
HW1300P	Capscrew, HHCS, 3/4NF x 5. Plated, Gr. 8	2
HW4020P	Nut, Hex, 1/4NC, Plated	6
HW4022	Nut, Hex, 1/4NC Nylon Insert Lock, Plated	1
HW4030P	Nut, Hex, 5/16NC, Plated	10
HW4060P	Nut, Hex, 7/16NC, Plated	8
HW4100P	Nut, Hex, 3/4NF, Plated	2
HW5030P	Washer, 1/4 SAE, Plated	8
HW5040P	Washer, 1/4 Regular Lock, Plated	6
HW5050P	Washer, 5/16 SAE, Plated	16
HW5051P	Washer, 5/16 SAE, Gr. 8.8, Fedalloy	6
HW5060P	Washer, 5/16 Regular Lock, Plated	7
HW5070P	Washer, 7/16 SAE, Plated	12
HW5073P	Washer, 7/16 Regular Lock, Plated	4
HW5107P	Washer, 3/4 SAE Fedalloy, Plated	2
HW6093	Bolt, Cable Anchor	1

PUMP & FRAME COMPONENTS



EXTERNAL COMPONENTS





PURCHASED FROM:

NAME: _____

ADDRESS: _____

CITY: _____ STATE: _____

PHONE: _____

SERIAL NUMBER: _____

DATE OF PURCHASE: _____