



# INSTRUCTION MANUAL



## ROLLER PUMPS

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## WARNINGS

### BELT AND SHAFT GUARD MUST BE INSTALLED



The belt, pulleys, and PTO couplers on these pumps are external moving components which present a danger to the operator and personnel in the area if not properly guarded and operated. Prior to using any belt driven pump, ensure the belt and shaft guards are installed and functioning properly. While operating the pump, keep all articles (hands, fingers, clothing, hair, etc.) away all moving parts and pinch points.

### AVOID HIGH PRESSURE FLUIDS



Escaping fluid under pressure may penetrate the skin causing serious injury. Avoid the hazard by relieving pressure before disconnecting hydraulic lines. Tighten all connections before applying pressure and inspect hoses regularly for wear or damage. If an accident occurs, see a doctor immediately. Any fluid injected into the skin must be surgically removed within a few hours or gangrene may result.

### HANDLE CHEMICAL PRODUCTS SAFELY

Direct exposure to hazardous chemicals may cause serious injury. Potentially hazardous chemicals used with Ace pumps are hydraulic fluid, fertilizer, and chemicals. A Safety Data Sheet (SDS) provides specific details on chemical products: physical and health hazards, safety procedures, and emergency response techniques. Check the SDS before starting any job using a hazardous chemical.

## PLUMBING DIAGRAM

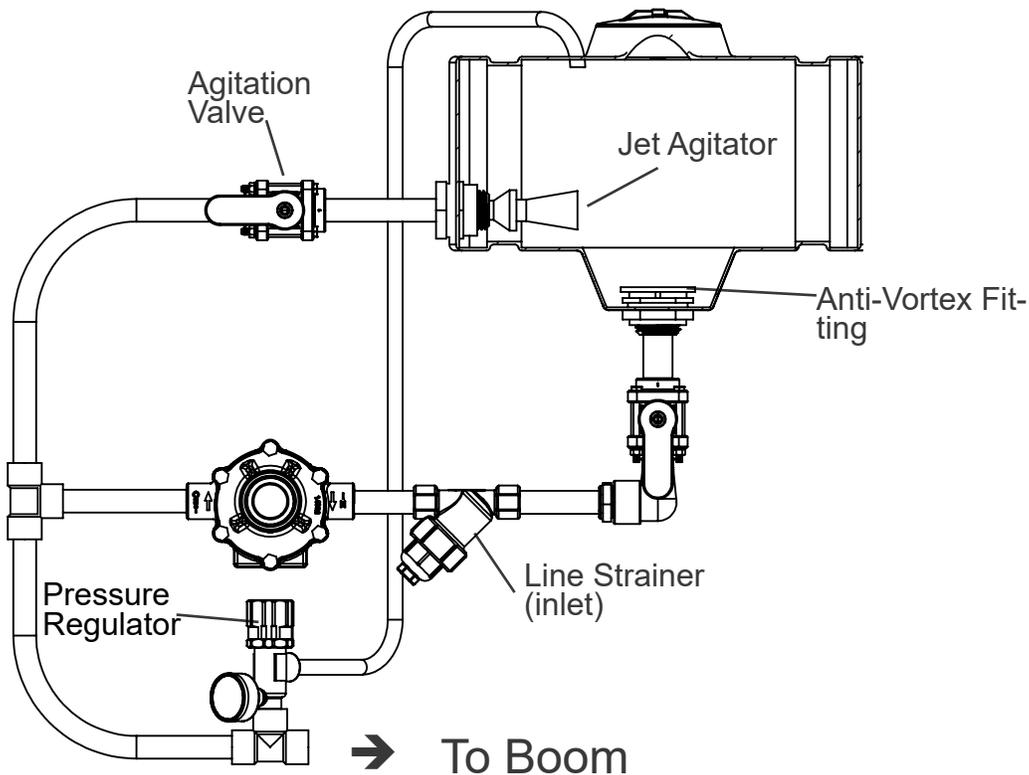


Figure 1

## SPRAYER PLUMBING SUGGESTIONS

The primary goal when plumbing a sprayer pump is to route liquid from the pump to the spray boom with minimum restriction. Minimizing restrictions is necessary for achieving the pump's maximum rated capacity. 1) Hoses should be the same size as the pump's ports. 2) Install a pressure relief valve on the discharge side of the pump with a bypass line back to tank to relieve pressure in shutoff conditions. 3) Avoid unnecessary restrictions in lines such as elbows, fittings, valves, and all extraneous curves and bends 4) Use spray control valves and a flowmeter that are the same size as the discharge port to prevent flow restriction. Following these guidelines is necessary for delivering the highest flow to the boom.

## PUMP MOUNTING

In order to prevent injury or damage to property, all Ace roller pumps should be properly mounted to a solid base where there is not danger of the pump falling or breaking loose. All Ace roller pumps come with mounting holes, which allow bolts to be put into the pump so it can be secured to a sturdy base. When mounting your Ace roller pump, be sure to use bolts and nuts which are compatible with any chemicals that may come into contact with them as well as choosing the correct grade of bolt based on the pump weight and any expected loads. The following are basic guidelines for proper pump mounting: 1) The pump should be mounted below the tanks to allow gravity to naturally fill the pump with liquid. 2) If the pump must be located above the liquid level, a foot valve should be installed to maintain the pump's prime.

**WARNING:** Belts, pulleys, flexible shaft couplers, and PTO couplers are external moving components. Ensure proper guarding is installed when operating the pump.

# PUMP MOUNTING CONSIDERATIONS

## Pump Rotation

Direction of rotation is always determined WHEN FACING THE SHAFT. This rule applies to both the pump and motor shafts. Ace Roller Pumps are available in either standard counter-clockwise (CCW) for tractor PTO applications or (-R) clockwise (CW) rotation for direct coupling to gas engines.

When direct coupling shafts, always MATCH THE OPPOSITE ROTATION pump with the shaft. See Figure 2 to determine rotation of various drive sources and pump. A gasoline engine with CCW rotation will direct couple to a RP-600-R or RP-800-R pump with CW rotation. When mounting a pump with a belt and pulleys; either pump rotation can be used to match the drive shaft rotation and the desired direction of the pump see Figure 3 and Figure 4.

The rotation of several common power sources are: Gasoline engine and electric motor shafts rotate counterclockwise; a tractor PTO shaft rotates in a clockwise direction; the front tractor engine crankshaft rotates in a counterclockwise direction.

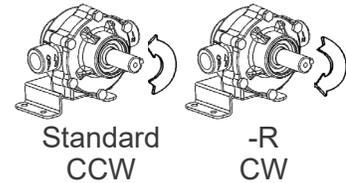
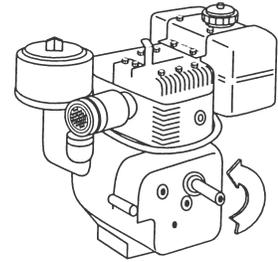
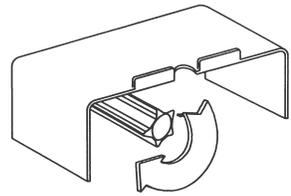
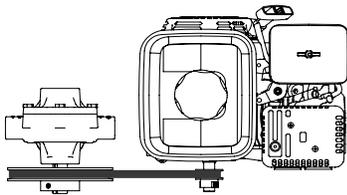
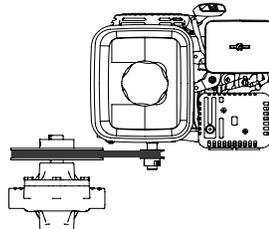


Figure 2



Use: RP-600 or RP-800  
Figure 3



Use: RP-600-R or RP-800-R  
Figure 4

## Pulley Ratio

Belt and pulley drive systems are typically used to reduce pump speed. Use the formula below to determine proper pulley sizes.

$$\frac{\text{ENGINE RPM}}{\text{PUMP RPM}} = \frac{\text{PUMP PULLEY DIA}}{\text{ENGINE PULLEY DIA}}$$

Example: Use a 3,800 RPM gas engine to drive a pump at 1,000 rpm.

Commonly a 1.75" pulley is used on the engine. The Pump Pulley Diameter can be determined from the formula above:

$$\frac{3,800 \text{ RPM}}{1,000 \text{ RPM}} = \frac{\text{PUMP PULLEY DIA}}{1.75" (4.4 \text{ CM})}$$

Solving this equation for Pump Pulley Diameter yields:

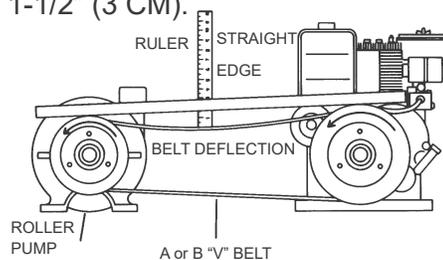
$$\frac{3,800 \text{ RPM} \times 1.75" (4.4 \text{ CM})}{1,000 \text{ RPM}} = 6.65" (16.9 \text{ CM})$$

Round the result to the nearest pulley size. For this example the recommended Pump Pulley Diameter is 6.75" (17.1 CM).

## Belt Alignment and Tension

Proper belt alignment and belt tension will prevent premature bearing failure in the engine and/ or pump. Use a straight edge held to the faces of the pulleys to check alignment. To provide proper belt tension, lay the straight edge on the tops of both pulleys as shown below. Use a mild force to deflect the belt as shown. Use a ruler to measure the amount of deflection. Proper tension will allow 1/2" (1 CM) of deflection for each 12" (30 CM) of distance between the pulleys.

For example: If the distance between the pulleys is 3' (90 CM), the deflection should be 1-1/2" (3 CM).



## A) Tractor PTO Installation

The preferred method for mounting is to use a torque bar kit (RP-TBK) with chains to provide support for the pump.

1. Attach the torque bar to the pump with the long side of the bar on the inlet side of the pump for mounting.
2. Mount the pump and torque bar to the PTO shaft using an Ace Pump PTO coupler. (BAC-10RP6-QC or BAC-10-RP8-QC)
3. Attach the torque chain going up to the tractor frame with the bar in horizontal position.
4. Attach the tensioning chain going up to the tractor frame while applying tension to the spring. Avoid aggressive angles which may put unnecessary side loading on the pump shaft or bearings.

**WARNING:** Do not attach torque bar to movable linkages. Personnel should never be within 3 meters (9 ft) of the pump while in operation

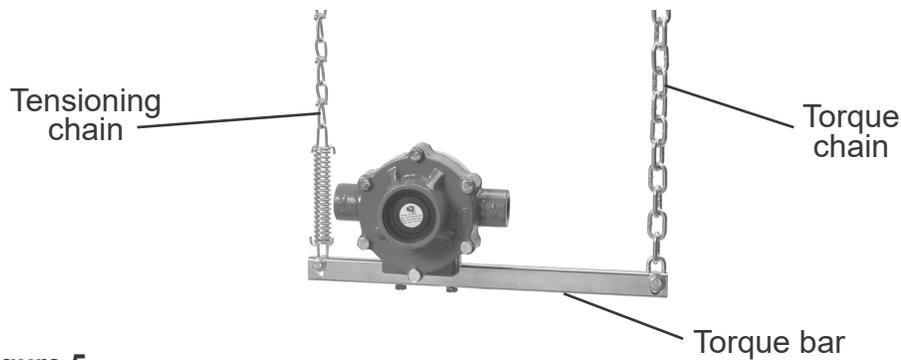


Figure 5

## B) Direct Drive - Flexible Coupling Installation

When direct driving Ace Roller Pumps with flexible couplings, make sure drive speed (RPM) is within the maximum rated speed (RPM) of your pump: see performance tables. Also verify shaft rotation between the pump and drive are correct: see pump rotation guidance on the previous page.

1. Assemble roller pump base plate to roller pump.  
(RP-BP6 is used with RP-600 or RP-BP8 is used with RP-800)
2. Mount base plate/pump assembly into position on engine/pump base.
3. Install coupling according to manufacturer's specifications.
4. Align pump and drive shafts and tighten the pump mounting bolts.

**ATTENTION:** No end thrust should be applied to pump when coupling is connected. A flexible coupling is recommended to allow for some minor shaft misalignment.

## C) Belt/ Pulley Drive Installation

1. Install pulleys onto pump and engine shafts. Mount pump next to engine, see Page 3 for proper orientation.
2. Use a straight edge to ensure pulleys are properly aligned.
3. Tension belts to manufacturers specifications or use alternate method on Page 3.

**WARNING:** Over tensioned belts may result in premature bearing failure and under tensioned belts may cause pump performance issues or excessive belt wear.

## MATERIAL RECOMMENDATION

The following table common applications and which Ace roller pump series is recommended for the best pump performance and life.

Spraying Application	Ace "C" Series (Cast Iron)	Ace "PL" Series (Corrosion Resistant)
Weed and Brush control - Non-glyphosate	✓	
Weed control - Glyphosate		✓
Insect and Pest control	✓	
Fertilizers		✓
Fumigants		✓
Fungicides		✓
Liquids with abrasive particles in suspension		✓
Water wash or transfer	✓	
Acids are Not Recommended	x	x

**WARNING:** Never pump flammable or combustible materials with Ace roller pumps. This includes any type of fuel, oil, or similar material.

Only water based materials should be used in Ace Roller Pumps.

Pump life will be longer when pumping materials that have lubricating properties and no abrasives.

## OPERATING INSTRUCTIONS

### Before Startup

Ensure PTO shaft guarding is firmly in place and no rotating components are exposed.

Check all plumbing connections to make sure they are tight.

Ensure all hoses are properly positioned and are not damaged in any way.

Ensure there is fluid in the supply tank and line. Do not run dry.

### Priming the Pump

Mount the pump below the liquid level of the tank if possible.

Check line strainer and remove any debris or clogs found.

For initial setup and test of your system, start with clean water instead of chemicals, to confirm the system and plumbing connections are sealed.

Ensure discharge of pump is open so liquid can completely fill the pump and allow any air to escape.

## Startup and Operation

Ensure all unnecessary personnel are clear of the area.

Start power source. If possible slowly increase the speed (RPM) until desired pressure or flow is reached.

**DO NOT** exceed the pumps's maximum pressure, speed (RPM), or flow rating. Failure to restrict the pump below maximum rating may result in leaks and premature failure.

## Shutdown

Slowly decrease speed (RPM) until the pump comes to a stop then close all valves in the system.

If pump will not be used for several hours, it should be cleaned by flushing out the unused chemical and blow air through the pump to prevent corrosion.

## TROUBLESHOOTING

Symptom	Possible Cause	Corrective Action
Pump will not prime	Leak in suction line	Check plumbing for leaks and correct
	Blockage in suction line	Inspect suction for obstructions such as debris or loose inner liner and remove from the line
	Pump turning wrong direction	Correct the rotation of the pump
	Suction hose sucked to tank	Cut a "V" notch in the end of suction hose
	Roller stuck in pump	Disassemble pump and inspect rollers
	Pump seals leak air	Replace seals
Loss of pressure	Clogged suction strainer	Check strainer and clean regularly
	Kinked, blocked or collapsed suction hose	Inspect suction hose and repair as needed
	Air leak in suction plumbing	Inspect suction plumbing for leaks, use thread sealant and retighten all connections
	Relief valve setting too low or weak spring	Check relief valve and correct setting or replace spring
	Faulty gauge	Replace gauge
	Pump seals leak air	Replace seals
	Nozzle orifices worn	Replace nozzles
Pump worn	Repair/ replace pump (see repair instructions)	
Pump is locked	Corrosion (rust), scale, residue or build up	Repair/ replace pump (see repair instructions)
	Solid object lodged in pump	Disassemble pump and remove blockage

**WARNING:** Disconnect all power sources before attempting any service.

# REPAIR INSTRUCTIONS

## DISASSEMBLY:

1. Remove PTO adapter from pump shaft.
2. Use a file to remove any burrs from pump shaft.
3. Orient shaft keyway at 12 o'clock as shown in Figure 6.
4. Use a small screwdriver to pry dust caps from cover and body.
5. Remove cover cap screws.
6. Support pump at ports as shown in Figure 7. Place pump on fixture with cover down and center shaft under press. Press pump apart as in Figure 8. Shaft and rotor will remain with cover.
7. Remove and discard rollers and cover O-ring seal.
8. Remove rotor/shaft assembly from cover assembly:
  - a) Place the cover in press support fixture with rotor down as shown in Figure 9.
  - b) Use a deep well socket (smaller than pump shaft) or bolt from pump to press shaft out of cover bearing.
9. Flip cover and use a 1" shaft (8 roller) or 21/32" shaft (6 roller) to slowly press bearing out of cover. Repeat procedure to remove bearing from pump housing.
10. Punch seals out of cover and housing with screw driver and mallet as in Figure 10. Discard seals.

## ASSEMBLY:

1. Carefully place seal in the cover centered with the crimped side down (see Figure 11). Press seal to bottom of cavity using a socket or dowel a little smaller than 1-1/8" (6 roller) or 1-1/4" (8 roller) to press evenly on seal diameter.
2. Put bearing in position in cover. Press until it stops using a socket or dowel that is a little smaller than 1-3/8" (6 roller) and 2" (8 roller) see Figure 12.

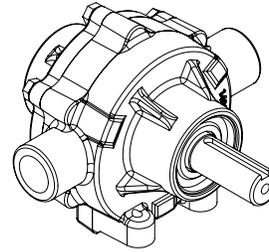


Figure 6

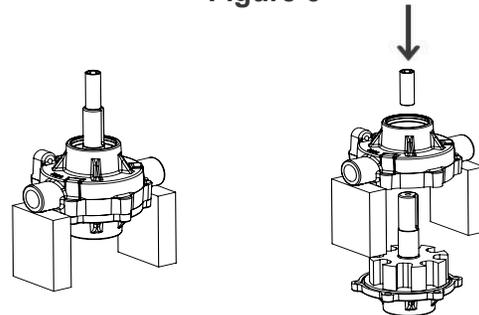


Figure 7

Figure 8

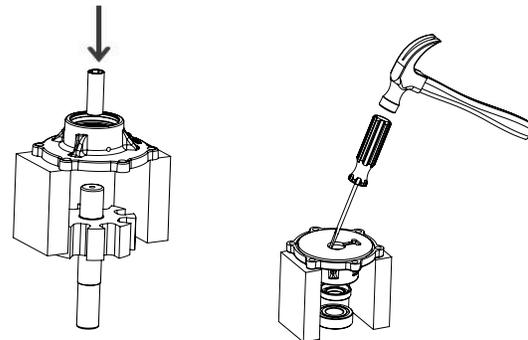
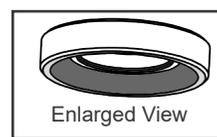


Figure 9

Figure 10



Seal spring  
side facing  
cover

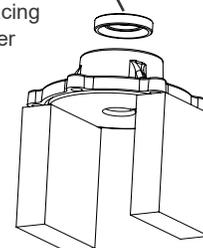


Figure 11

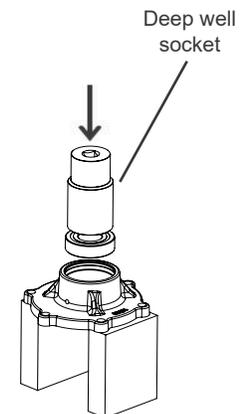
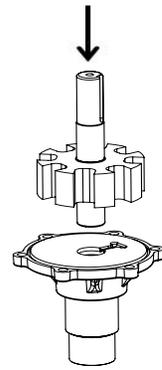


Figure 12

3. Repeat Steps 1 and 2 with housing.
4. Seat O-ring in groove (Figure 13).  
**Note:** The O-ring may need to be stretched to ensure it stays in place. A light coating of grease may also help hold it in place during assembly.
5. Install shaft/rotor assembly by carefully pushing short end of shaft/rotor assembly through shaft seal into cover. Place in arbor press with drive end of shaft pointed up as shown in Figure 14. Use same socket as used in step 2 to support outer race of bearing. Press shaft/ rotor assembly into cover assembly until it stops.

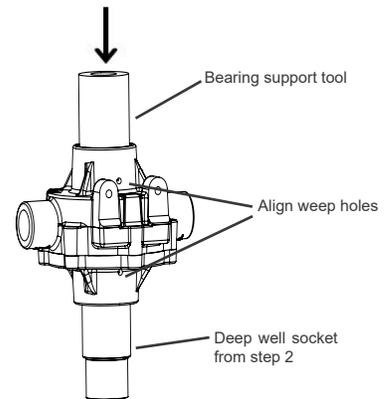


**Figure 13**



**Figure 14**

6. Install each new roller into each rotor slot.
7. Place housing (containing bearing and seal from step 3) onto pump shaft. Align the weep holes of housing and cover as shown in Figure 15.
8. Place bearing assembly tool over shaft and press housing until it stops against cover (see Figure 15).
9. Install pump cover to housing bolts and tighten.
10. If pump will not rotate when turned using a crescent wrench, place a short brass rod (or hardwood dowel) against shaft end (at cover end of the pump). Center rod on shaft (not on bearing). Tap lightly with a hammer. Try turning again.
11. If this fails to center rotor allowing the pump to turn freely, tap other end of the shaft, protecting it as above. Repeat steps 10 and 11 until pump turns freely by hand with a wrench.



**Figure 15**

## MAINTENANCE AND STORAGE

Ace pumps are equipped with factory lubricated bearings and require no further lubrication. If danger of freezing exists, drain the pump by removing suction and discharge hoses and blow air through the pump to remove any liquid that may remain. Neutralize chemicals and flush pump after each use to prevent corrosion.

Pump storage:

1. Flush out pump with clean water.
2. Fill pump with oil or recreational vehicle antifreeze to protect from corrosion and freezing.
3. Insert plugs to retain fluid and prevent rusting.

## STANDARD WARRANTY

Ace pumps and valves are guaranteed against defects in material and workmanship for a period of one year from date of installation. Products or parts found to be defective upon inspection at the factory will be repaired or replaced at our discretion.

Ace Pump Corporation shall not be held liable for damages caused by abuse or misuse of the product or parts. No claim for labor in repairing or replacing such products will be allowed nor will loss of time or inconvenience be considered warranty obligations.

**IMPORTANT:** Pumps or valves returned for warranty consideration which are tested and found to perform within specifications are subject to an inspection charge.

### PLEASE NOTE EXCEPTIONS

1. All seals are covered against defects in materials or workmanship. Seal failures resulting from application related conditions are not covered. Most seal failures are due to application conditions such as: (1) abrasive solution scratching the polished seal faces; (2) chemical attack on elastomer or glue; (3) thermal shock from running pump dry or improper priming; (4) failure to flush chemical from pump after use.
2. Gasoline engines are covered by the engine manufacturer's warranty. Engines submitted for warranty consideration should be returned to the nearest authorized engine repair station. **DO NOT RETURN ENGINE TO ACE PUMP CORPORATION.** If unable to locate nearest engine repair station, consult Ace for referral.
3. On Ace belt driven centrifugal pumps, belt alignment is not to be considered as covered by warranty. Misalignment can occur in transit and is easily corrected at point of installation.
4. Repair requests under the above categories will not be considered warranty, and current repair and transportation charges will apply.

### PROCEDURE

To return a pump, valve, or part for warranty consideration, please call Ace Pump and request a Returned Goods Authorization (RGA) number (800-843-2293). Please request one RGA number for each pump or valve. Provide the part number of the item being returned along with the reason for return. Be specific when describing the nature of the defect. Include this information in the box along with a customer contact name, phone number, and return address. Ship pump prepaid freight. Package pump in original packaging or similar to prevent damage in shipment. Warranty determinations will be made after the product has been received and inspected.

This warranty is in lieu of all other warranties, express or implied, and Ace Pump Corporation does not authorize any other person to assume for it any obligation or liability in connection with the sale of said pumps, valves, or any parts thereof.

**WARNING:** Pumps returned to Ace must be free of chemical hazard. Chemicals must be neutralized and thoroughly rinsed. Pumps with indications of active chemical will not be considered for repair or warranty.