FORM NO. 3318–767 Rev. B

TORO®

HydroJect® Injection System

for HydroJect® Aerators

Model No. 09830

Operator's Manual

IMPORTANT: Read this manual carefully. It contains information about your safety and the safety of others. Also become familiar with the controls and their proper use before you operate the product.

Introduction

We want you to be completely satisfied with your new product, so feel free to contact your local Authorized TORO Distributor for help with service, genuine replacement parts, or other information you may require.

The warning system in this manual identifies potential hazards and has special safety messages that help you and others avoid personal injury, even death. DANGER, WARNING and CAUTION are signal words used to identify the level of hazard. However, regardless of the hazard, be extremely careful.

DANGER signals an extreme hazard that will cause serious injury or death if the recommended precautions are not followed.

WARNING signals a hazard that may cause serious injury or death if the recommended precautions are not followed.

CAUTION signals a hazard that may cause minor or moderate injury if the recommended precautions are not followed.

Two other words are also used to highlight information. “Important” calls attention to special mechanical information and “Note” emphasizes general information worthy of special attention.

The left and right side of the machine is determined by standing behind the machine in the normal operator’s position.

Printed in USA

Contents

Specifications

- **Tank** – The six-quart tank is made of nylon for excellent chemical resistance.
- **Mixing Ratios** – The mixing ratios are variable from 1:100 (1.0%) to 1:500 (0.2%).

  Note: The decal on the injector is just a starting point. Further calibration may be required.
- **Drain Hose** – A drain hose is provided for draining and cleaning the additive tank.
- **Injector** – The HydroJect® Injection System is a water-driven liquid injector designed to inject proportionate amounts of **completely dissolved additives that are recommended and approved**. The Injection System includes a bypass knob to turn the additives on and off as required.

Productivity

Injector Ratio	Application Time – Full Tank Will Last:
1:100 (1%)	38 Minutes
1:128 (0.8%)	48 Minutes
1:200 (0.5%)	75 Minutes
1:500 (0.2%)	190 Minutes

Approved Additives

TORO Product	Ounces per 1000 sq. ft.	Container	TORO Model No.	Product Description
Liquid Wetting Agent	4–8	2 x 2.5 gal.	86–8530	Turf and soil wetting agent. Alters the property of water to increase water infiltration, provide uniform wetting of soil and planting media, and improve water efficiency.

IMPORTANT: Use of unapproved products may be detrimental to the HydroJect® and will void the warranty. See your TORO Distributor for information regarding approved products.

Safety

Safety Instructions

⚠ WARNING

POTENTIAL HAZARD
- **Incorrect injection ratios can produce an unsafe concentration level in the outlet water.**

WHAT CAN HAPPEN
- **Unsafe concentration levels in outlet water caused by incorrect injection ratios can pose a danger to personal health, and can damage equipment.**

HOW TO AVOID THE HAZARD
- **Determine the correct solution injection ratios.**
- **Adjust the injector to obtain the desired solution concentrations in the outlet water.**
- **Ensure that the correct injection ratios are being maintained.**

The HydroJect® Injection System is a water-driven liquid injector designed to inject proportionate amounts of **liquid additives that are recommended and approved**. It is the responsibility of the operator to determine correct solution injection ratios, adjust the Injector to obtain the desired solution concentrations in the outlet water, and ensure that proper injection ratios are being maintained. Incorrect injection ratios can be harmful to personal health, the environment or equipment.

⚠ CAUTION

POTENTIAL HAZARD
- **Chemicals can be hazardous and can cause personal injury.**

WHAT CAN HAPPEN
- **Chemicals which are handled incorrectly can pose a danger to personal health, and can damage equipment.**

HOW TO AVOID THE HAZARD
- **Carefully read the directions printed on the chemical manufacturer's labels before handling chemicals. Instructions on chemical manufacturer's container labels regarding mixing proportions should be read and strictly followed.**
- **Keep chemicals from skin. If chemicals come in contact with body, wash off immediately with clean water and detergent.**
- **Always wear goggles and other protective equipment as recommended by the chemical manufacturer.**

Hazard control and accident prevention are dependent upon the awareness, concern, and proper training of the personnel involved in the operation, transport, maintenance, and storage of the machine. Improper use or maintenance of the machine can result in injury or death. To reduce the potential for injury or death, comply with the following safety instructions.

IMPORTANT: It is the responsibility of the operator to comply with federal, state and local ordinances or regulations pertaining to application.

1. Read and understand the contents of this Operator's Manual, and the Operator's Manual for the HydroJect® 3000 Aerator before operating the machine. Become familiar with all controls and know how to stop quickly. Free replacement manuals are available by sending the complete Model and Serial Number to:

   The TORO Company
   8111 Lyndale Avenue South
   Bloomington, Minnesota 55420

2. Keep all shields and safety devices in place. If a shield, safety device or decal is damaged or missing, repair or replace it before operating the machine. Also tighten any loose nuts, bolts or screws to ensure that the machine is in safe operating condition.

3. Wearing safety glasses, safety shoes, ear protection and a helmet is advisable and required by some local ordinances and insurance regulations. Always wear goggles and other protective equipment as recommended by the chemical manufacturer.

4. Never use additives in the water supply system other than those listed in this manual as recommended and approved.

5. Make sure all hydraulic line connectors are tight, and all hydraulic hoses and lines are in good condition before applying pressure to the system.

6. Make sure all waterline connectors are tight, and all water and additive hoses and lines are in good condition before applying pressure to the system.

7. Before disconnecting or performing any work on the water system, relieve all pressure in the system by stopping the engine and opening the bleed valve. Opening the bleed valve allows any trapped water to escape from the system, and also allows the accumulator piston to move to the bottom of the accumulator cylinder.

8. Perform only those maintenance instructions described in this manual. If major repairs are ever needed or assistance is desired, contact an Authorized TORO Distributor. To ensure optimum performance and safety, always purchase genuine TORO replacement parts and accessories to keep the TORO all TORO. NEVER USE "WILL–FIT" REPLACEMENT PARTS AND ACCESSORIES MADE BY OTHER MANUFACTURERS. Look for the TORO logo to ensure genuineness. Using unapproved replacement parts and accessories could void the warranty of The TORO Company.

Safety and Instruction Decals

Safety decals and instructions are easily visible to the operator and are located near any area of potential danger. Replace any decal that is damaged or lost.

See the HydroJect® 3000 Aerator Operator's Manual for the Safety and Instruction Decals

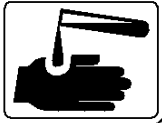
ON CHEMICAL TANK (Part No. 93−1695)

APPLICATION RATE

OUNCES PER 1000 SQ. FT.
(3.0 INCH HOLE SPACING)

TANK CONCEN-TRATION (PERCENT)	INJECTOR RATIO			
	1:100 (1%)	1:128 (.8%)	1:200 (.5%)	1:500 (.2%)
10	2.1	1.7	1.1	.4
20	4.2	3.3	2.1	.8
30	6.4	5.0	3.2	1.3
40	8.5	6.6	4.2	1.7
50	10.6	8.3	5.3	2.1
60	12.7	9.9	6.4	2.5
70	14.8	11.6	7.4	3.0
80	17.0	13.2	8.5	3.4
90	19.1	14.9	9.5	3.8
100	21.2	16.6	10.6	4.2

WARNING



CHEMICALS CAN BE HAZARDOUS

TO REDUCE THE RISK OF ENVIRONMENTAL DAMAGE AND PERSONAL INJURY:

- SELECT THE CORRECT CHEMICAL FOR THE APPLICATION.
- HANDLE AND APPLY CHEMICALS AS INSTRUCTED BY THE CHEMICAL MANUFACTURER'S LABELS. ALWAYS WEAR PROTECTIVE CLOTHING AND MASK.

IMPORTANT:

SEE OPERATOR'S MANUAL.
USE ONLY COMPLETELY DISSOLVED CHEMICALS THAT ARE RECOMMENDED & APPROVED BY TORO.

93-1695

Installation

Loose Parts

Note: Use the chart below to identify parts used for assembly.

DESCRIPTION	QTY.	USE
Locknut, 3/8”-16	3	Fasten the injection unit to the machine frame
Hex Head Screw, 3/8”-16 x 1-1/2” (38 mm)	3	
Hole Location Template	1	
Hose Clamp, 1/4”–5/8” (6–16 mm)	4	Plumb the injection unit to the HydroJect® 3000
Hose, 3/8” (9.5 mm) I.D. x 68” (173 cm) long	1	
Hose, 3/8” (9.5 mm) I.D. x 10” (25 cm) long	1	
Fitting	1	
Hose Clamp	6	
Nylon Tubing, 3/16” (4.8 mm) I.D. x 30” (76 cm) long	1	
Hose, 3/4” (19 mm) I.D. x 15-1/2” (39 cm) long	1	
Hose, 1/4” (6 mm) I.D. x 12” (30 cm) long	1	
Hose, 1/4” (6 mm) I.D. x 2” (51 mm) long	1	
Hose, 3/4” (19 mm) I.D. x 50” (127 cm) long	1	
Tee Fitting, 3/8” (9.5 mm) hose x 3/4” (19 mm) hose	1	
Fitting, 3/4” FPT x 3/4” (19 mm) hose	1	
Pipe Sealant	1	
Elbow Fitting	2	
Interlock Pin	2	
O–ring Seal	2	
Operator’s Manual	1	Read before operating
Parts Catalog	1	Ordering parts

Installing the Injection System to a HydroJect® 3000

IMPORTANT: The HydroJect® 3000 Aerator MUST be equipped with a regulator and pre-filter. If not, you must purchase and install these kits before you install the Injection System. (Contact your Authorized TORO Distributor.)

1. Remove the fuel tank from the HydroJect® 3000 Aerator (Fig. 1).

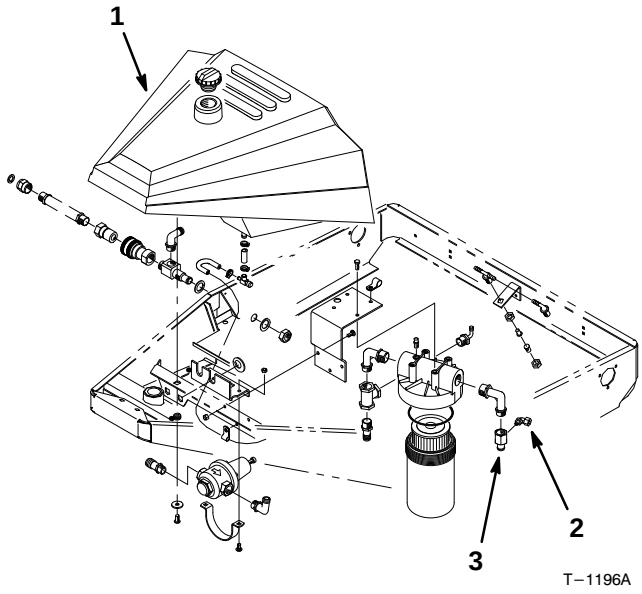


Figure 1

1. Fuel Tank
2. 90-degree Black Plastic Elbow Fitting
3. Brass Adapter Fitting

2. Remove the hose between the water filter and the water pump (Fig. 2).

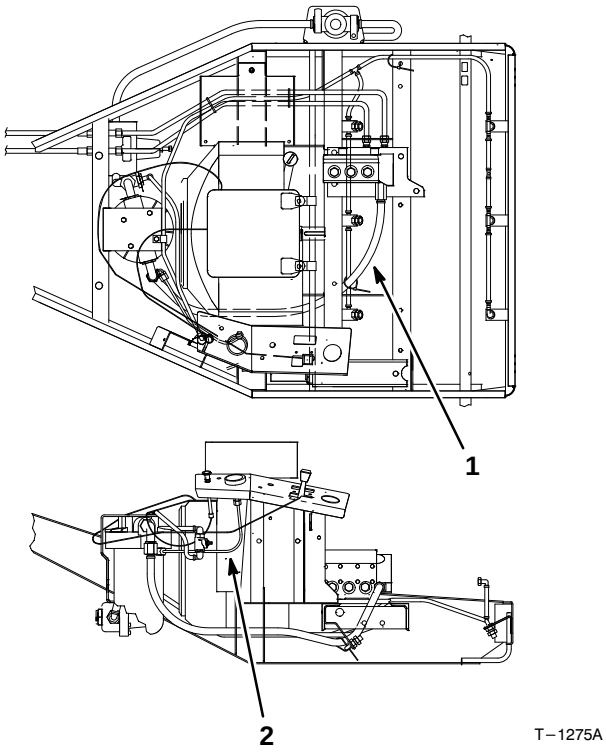


Figure 2

1. Hose (between water filter and pump)
2. Black Pressure Gauge Hose

3. Remove the black pressure gauge hose from the 90-degree black plastic elbow fitting (Figs. 1 and 2).

4. Remove the 90-degree black plastic elbow fitting from the brass adapter fitting and discard (Fig. 1).

5. Remove the brass adapter fitting from the outlet side of the filter and discard (Fig. 1).

6. Disconnect the valve assembly hose and tube retainer from the brass barbed fitting (Fig 3).

7. Remove the barbed fitting from the straight brass barbed fitting on the inlet side of the pump (Fig 3).

8. Remove the straight brass barbed fitting from the inlet side of the pump (Fig 3).

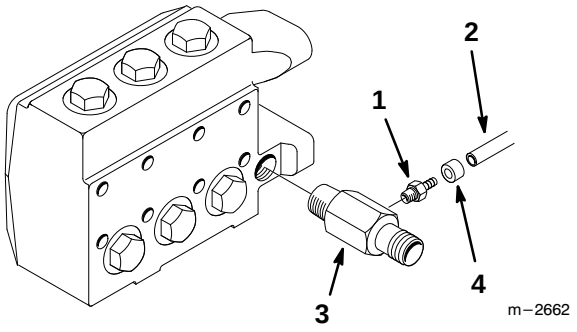


Figure 3

1. Barbed Fitting
2. Valve Assembly Hose
3. Straight Brass Barbed Fitting
4. Tube Retainer

9. Install the new plastic pressure gauge fitting, and the barbed fitting removed in step 8 above into the new stainless steel fitting using pipe sealant (Fig. 5).

10. Install the stainless steel fitting into the inlet side of the pump using pipe sealant (Fig. 4).

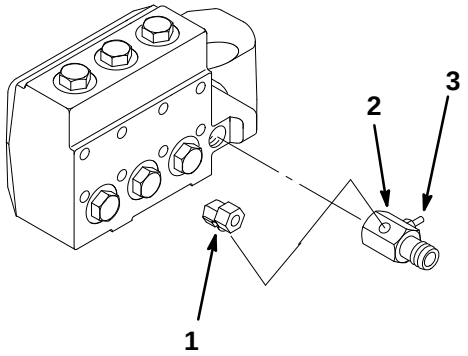


Figure 4

1. Plastic Pressure Gauge Fitting (new)
2. Stainless Steel Fitting (new)
3. Barbed Fitting

11. Install a O–ring seals, elbow fittings and interlock pins to bottom of liquid injector (Fig. 5).

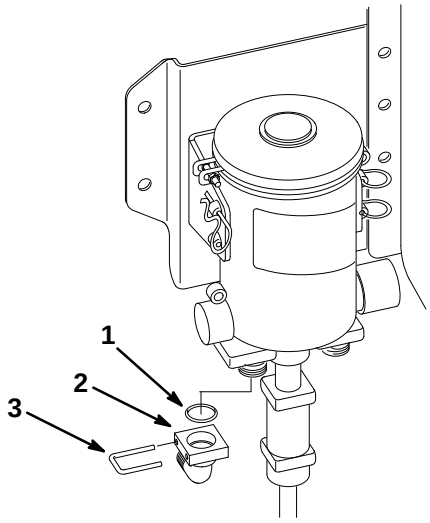


Figure 5

1. O–ring Seal
2. Elbow Fitting
3. Interlock Pin

12. Tape the paper hole template (included with the kit) onto the right-hand rear side of the machine frame to locate the support bracket mounting holes (Fig. 6).

13. Center-punch and drill the three 13/32” (10.5 mm) diameter mounting holes (Fig. 6). Use caution not to damage the wiring.

14. Mount the support bracket and attached assembly to the side of the machine using the three (3) 3/8”-16 x 1-1/2” (38 mm) hex head bolts and locknuts (Fig. 6).

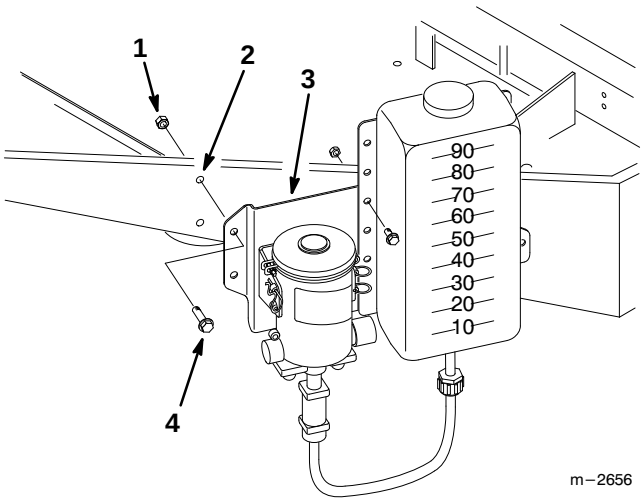


Figure 6

1. 3/8” Locknut (3)
2. 13/32” (10.5 mm) Diameter Hole (3)
3. Support Bracket
4. 3/8”-16 x 1-1/2” (38 mm) Hex Head Bolt (3)

15. Remove the old pressure gauge hose from the pressure gauge (Fig. 7).

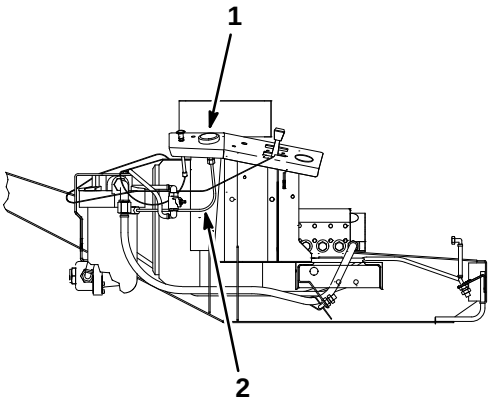


Figure 7

1. Pressure Gauge
2. Pressure Gauge Hose (old)

16. Install the new pressure gauge hose (.312”/8 mm O.D. black nylon) from the pressure gauge to the new plastic pressure gauge fitting on the pump. Cut the hose to length as required (Figs. 7 and 8).

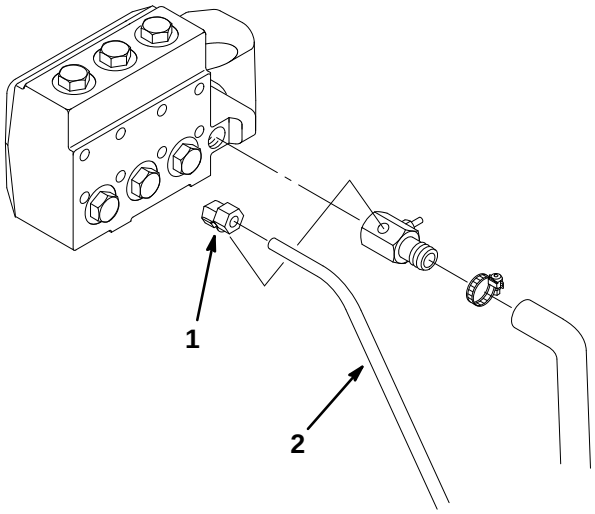


Figure 8

1. Plastic Pressure Gauge Fitting (new)
2. Pressure Gauge Hose (new)

17. Install new blue 3/4” (19 mm) hose from the filter to the inlet side of the liquid injector. Cut the hose to length as required (Fig. 9).

18. Install new blue 3/4” (19 mm) hose from the liquid injector outlet to the inlet side of the water pump. Cut the hose to length as required (Fig. 9).

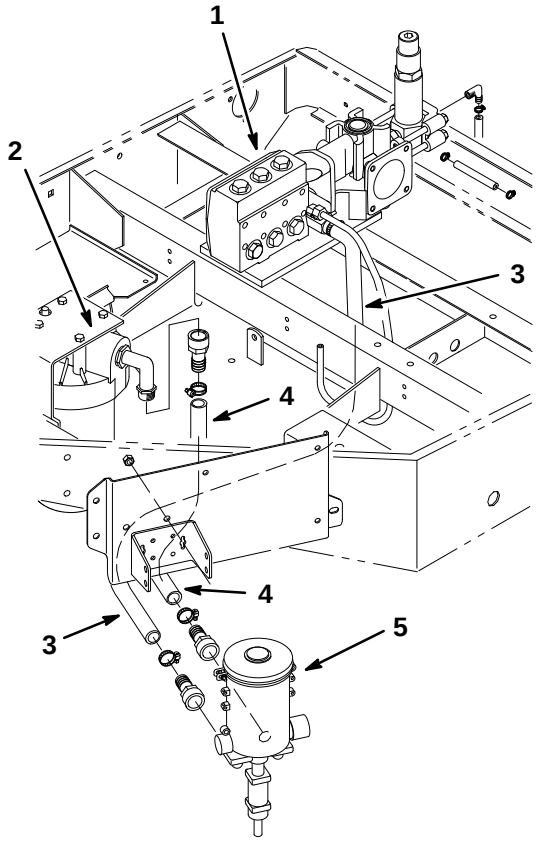


Figure 9

1. Water Pump
2. Filter
3. Blue 3/4” (19 mm) Hose (from Injector outlet to Pump inlet)
4. Blue 3/4” (19 mm) Hose (from Filter outlet to Injector inlet)
5. Liquid Injector

19. Reconnect the valve assembly hose and tube retainer to the barbed fitting on the inlet side of the pump (Fig. 10).

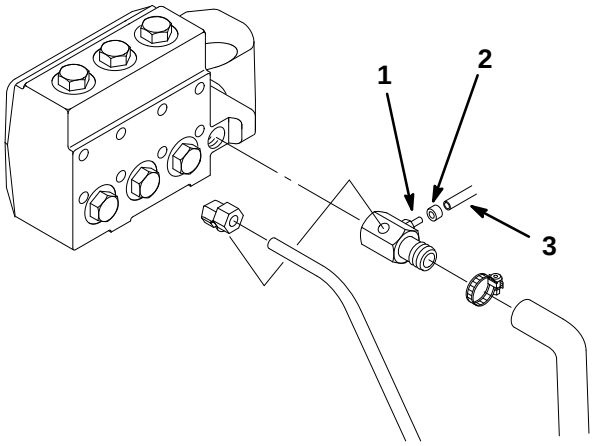


Figure 10

1. Barbed Fitting
2. Tube Retainer
3. Valve Assembly Hose

20. Plumb the optional regulator overflow to the inlet side of the pump as follows:

A. Remove the hose that runs from the regulator to the tee fitting (Fig. 11).

B. Remove the tee fitting and the two hoses between the spray wash nozzles (Fig. 11).

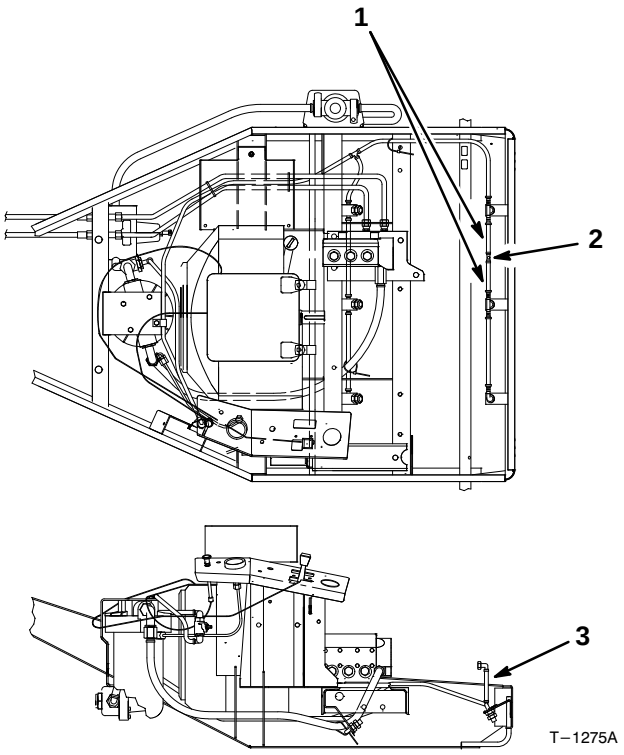


Figure 11

1. Hoses (between nozzles and tee fitting)
2. Tee Fitting
3. Hose (from regulator to tee fitting)

C. Install new blue 3/8” (9.5 mm) hose between the spray wash nozzles (Fig. 12).

D. Install new blue 3/8” (9.5 mm) hose to the regulator. Route the hose around the left-hand side of the machine, then through the machine frame to behind the engine (Fig. 12).

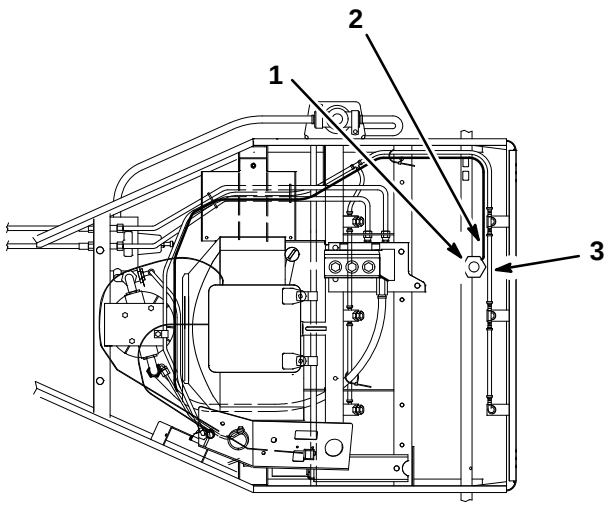


Figure 12

1. Regulator
2. Blue 3/8” (9.5 mm) Hose (from Regulator to tee fitting behind engine)
3. Blue 3/8” (9.5 mm) Hose (between spray wash nozzles)

E. Locate the blue 3/4” (19 mm) hose that runs from the injector outlet to the pump inlet. Cut the hose just behind the engine (Fig. 13).

F. Install the tee fitting included with the kit in the blue 3/4” (19 mm) hose (Fig. 13).

G. Install the blue 3/8” (9.5 mm) hose from the regulator to the tee fitting (Fig. 13).

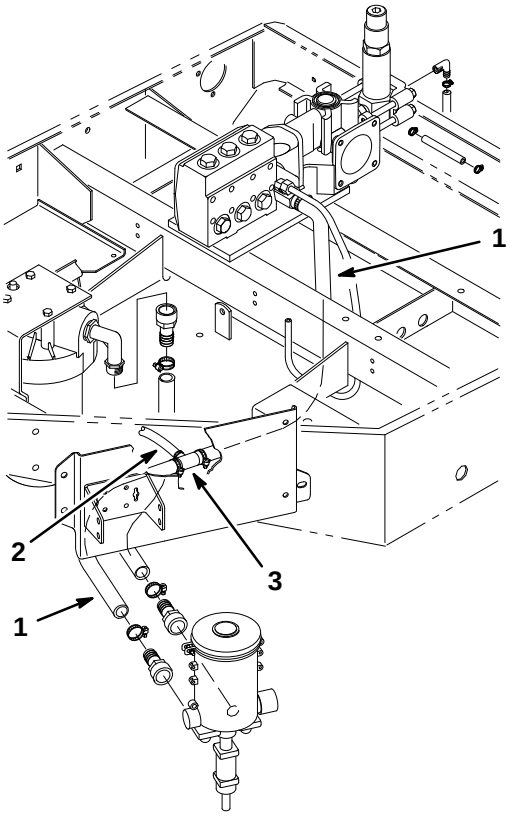


Figure 13

1. Blue 3/4” (19 mm) Hose (from Injector outlet to Pump inlet)
2. Blue 3/8” (9.5 mm) Hose (from Regulator)
3. Tee Fitting

21. Reinstall the fuel tank.

Operation

Operating Precautions

The HydroJect® Injection System is a water-driven liquid injector designed to inject proportionate amounts of **liquid additives that are recommended and approved**.

⚠ WARNING

POTENTIAL HAZARD

- **Incorrect injection ratios can produce an unsafe concentration level in the outlet water.**

WHAT CAN HAPPEN

- **Unsafe concentration levels in outlet water caused by incorrect injection ratios can pose a danger to personal health, and can damage equipment.**

HOW TO AVOID THE HAZARD

- **Determine the correct solution injection ratios.**
- **Adjust the injector to obtain the desired solution concentrations in the outlet water.**
- **Ensure that the correct injection ratios are being maintained.**

Machine Controls

- **Bypass Knob**: Rotate the bypass knob clockwise to enable the injection system. Rotate the bypass knob counterclockwise to bypass the injection system and aerate only (Fig. 14).
- **Ratio Adjuster**: Adjusts the mixing ratio to 1:500 (0.2%), 1:200 (0.5%), 1:128 (0.8%) or 1:100 (1%) (Fig. 14). To adjust the ratio, remove the anti-rotation lock pin, rotate the ratio adjuster to the desired ratio, then reinstall the lock pin. (Refer to step 7 on page 14 for details.)

  Note: The decal on the injector is just a starting point. Further calibration may be required.

- **Drain Hose Connector**: Used to drain and clean the tank. To drain the tank, unscrew and remove the connector (Fig. 14).

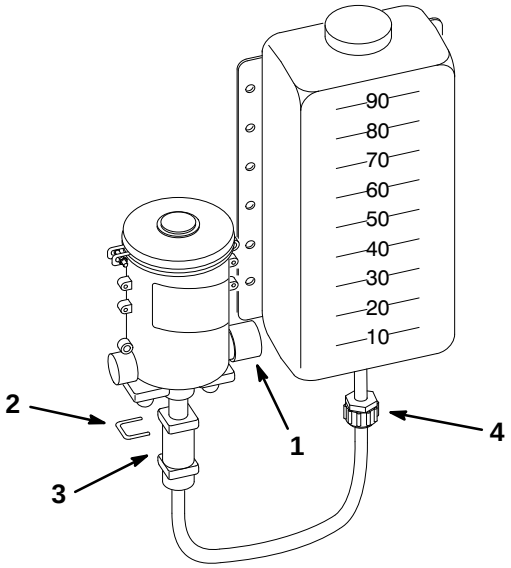


Figure 14

1. Bypass Knob
2. Anti-rotation Lock Pin
3. Ratio Adjuster
4. Drain Hose Connector

Operating Procedure

1. Connect the hose adaptor to a garden hose, then connect the adaptor to the quick coupler on the side of the machine.

2. Turn on the water supply and check the water pressure. The water pressure must be at least 30 psi. If the system pressure is not 30 psi, check to make sure:

- The hose is not kinked or obstructed.
- The water supply is turned all the way on.
- The water filter is not plugged.

3. Reach underneath the fuel tank and press the bleed button down until all air is purged from the filter, and water comes out of the opening.

4. Close the bypass knob on the side of the injection unit (Fig. 15).

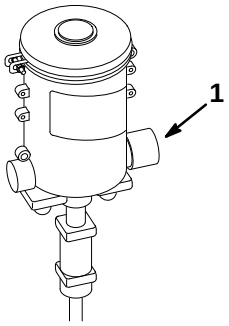


Figure 15

1. Bypass Knob

5. Reach underneath the hood and open the bleed valve on the main valve at the rear of the machine. Bleed the system until a steady flow of water comes from the outlet, then close the valve.

⚠ CAUTION

POTENTIAL HAZARD

- **Chemicals can be hazardous and can cause personal injury.**

WHAT CAN HAPPEN

- **Chemicals which are handled incorrectly can pose a danger to personal health, and can damage equipment.**

HOW TO AVOID THE HAZARD

- **Carefully read the directions printed on the chemical manufacturer's labels before handling chemicals. Instructions on chemical manufacturer's container labels regarding mixing proportions should be read and strictly followed.**
- **Keep chemicals from skin. If chemicals come in contact with body, wash off immediately with clean water and detergent.**
- **Always wear goggles and other protective equipment as recommended by the chemical manufacturer.**

6. Carefully add the additives to the chemical tank, then fill the tank with fresh filtered water for the desired concentration. Refer to Application Rate on page 15.

7. Adjust the mixing ratio as follows: (Refer to the Application Rate and Calibration sections.)

A. Remove the anti-rotation lock pin (Fig. 16).

B. Rotate the ratio adjuster sleeve up or down until the top of the sleeve aligns with the line under the desired mixing ratio (Fig. 16).

C. Align the holes in the ratio adjuster sleeve with the flats on the cylinder, then reinstall the anti-rotation lock pin (Fig. 16).

IMPORTANT: Don't force the ratio adjuster sleeve above the maximum setting of 1% (1:100) or below the minimum setting of 0.2% (1:500) (Fig. 16).

Note: Settings in the gray zone (below 0.5% or 1:200) will cause the pump to take longer to prime. For faster priming, set the mixing ratio to the maximum setting (1% or 1:100). After the pump is primed, reset the mixing ratio to the desired setting.

The ratio adjuster sleeve can be moved with water flowing, while the injector is under water pressure or when the bypass knob is in the bypass position (Fig. 16).

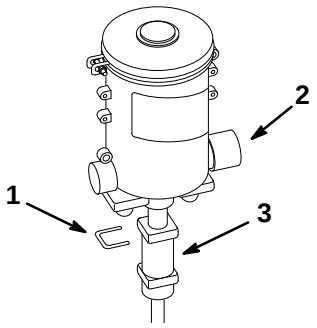


Figure 16

1. Anti-rotation Lock Pin
2. Bypass Knob
3. Ratio Adjuster Sleeve

8. Start the engine. Move the throttle to the Fast position and disengage the parking brake.

9. Aerate normally.

10. When you're finished injecting, add one (1) quart or more of fresh filtered water to the chemical tank. Operate the HydroJect® 3000 Aerator and injection system until the fresh water is gone.

11. Rinse the chemical tank with fresh filtered water.

IMPORTANT: Additives allowed to remain in an inactive injector can dry out and foul or damage the lower end at the next start-up.

Application Rate

1. Adjust the HydroJect® 3000 Aerator to a three-inch (3") hole spacing. Refer to the Maintenance section in the HydroJect® 3000 Aerator Operator's Manual.

2. Determine how many ounces of additive per 1000 square feet you want to apply.

3. Refer to the Application Rate table on the following page to determine the ratio adjuster setting and tank mixture concentration (in percent) needed to apply the desired number of ounces of additive per 1000 square feet. Use 100 percent concentration whenever possible to reduce additive handling and mixing.

4. Set the ratio adjuster to 1:100 (1.0%), 1:128 (0.8%), 1:200 (0.5%) or 1:500 (0.2%) as required.

5. Add the required number of ounces of additive to the chemical tank, then fill the tank with fresh filtered water as required to the very top of the neck, then stir.

Note: The decal on the injector is just a starting point. Further calibration may be required. See the Calibration section.

Example

Say you want to apply an additive at an approximate rate of five (5) ounces per 1000 square feet.

1. Refer to the 3.00" Hole Spacing table shown below. The table shows that to apply additive at a rate of five ounces per 1000 square feet, the ratio adjuster should be set to 1:128 and the tank mixture concentration should be 30 percent.

2. Set the ratio adjuster to 1:128.

3. Carefully add the additive to the chemical tank until it reaches the 30 (percent) line.

4. Fill the tank with fresh filtered water, then stir.

5. Aerate normally.

Application Rate Ounces of Additive per 1000 square feet (3.0-inch hole spacing)				
Tank Concentration (percent)	Injector Ratio			
	1:100 (1%)	1:128 (0.8%)	1:200 (0.5%)	1:500 (0.2%)
10	2.1	1.7	1.1	0.4
20	4.2	3.3	2.1	0.8
30	6.4	5.0	3.2	1.3
40	8.5	6.6	4.2	1.7
50	10.6	8.3	5.3	2.1
60	12.7	9.9	6.4	2.5
70	14.8	11.6	7.4	3.0
80	17.0	13.2	8.5	3.4
90	19.1	14.9	9.5	3.8
100	21.2	16.6	10.6	4.2

To get the application rate for hole spacings other than three inches, multiply the three-inch rate by the multiplier shown in the table below.

Hole Spacing	Multiplier
1.5”	2.00
3”	1.00
4.5”	0.66
6”	0.50

For instance, when using a 4.5-inch hole spacing for the above example, multiply the 5.0 ounce per 1000 square feet rate by 0.66. This will calculate to an application rate of 3.3 ounces of additive per 1000 square feet at the 4.5-inch hole spacing.

Calibration

1. Determine the application rate.

2. Start the HydroJect® and aerate to ensure the injector is primed.

3. Drain about 20 ounces out of the chemical tank into a separate container.

4. Mark the level on the chemical tank.

5. Measure out 100 feet on some test turf.

6. Calculate the amount of tank mixture used to get a given application rate using the following formula:

Ounces of Tank Mixture =

$$\frac{\text{Ounces of Additive per 1000 ft.}^2 \times \text{Path Length} \times \text{Path Width}}{1000 \times \frac{\text{Tank Concentration}}{100}}$$

The path width = 2.75 feet.

The path length = 100 feet.

7. Aerate the 100-foot length normally.

8. Record the volume necessary to refill the chemical tank to the marked level.

9. Adjust the ratio adjuster on the injector and repeat steps 7 and 8 above until the desired number of ounces of tank mixture is used.

Example

Say you want to apply an additive at an approximate rate of five (5) ounces per 1000 square feet.

1. Refer to the 3.00” Hole Spacing table shown below. The table shows that to apply additive at a rate of five ounces per 1000 square feet, the ratio adjuster should be set to 1:128 (0.8%) and the tank mixture concentration should be 30 percent.

2. Set the ratio adjuster to 1:128 (0.8%).

3. Carefully add the additive to the chemical tank until it reaches the 30 (percent) line.

4. Fill the tank with fresh filtered water, then stir.

5. Drain 20 ounces from the chemical tank and save.

6. Mark the level on the chemical tank.

7. Measure out 100 feet on some test turf.

Application Rate

Ounces of Additive per 1000 square feet (3.0-inch hole spacing)

Tank Concentration (percent)	Injector Ratio			
	1:100 (1%)	1:128 (0.8%)	1:200 (0.5%)	1:500 (0.2%)
10	2.1	1.7	1.1	0.4
20	4.2	3.3	2.1	0.8
30	6.4	5.0	3.2	1.3
40	8.5	6.6	4.2	1.7
50	10.6	8.3	5.3	2.1
60	12.7	9.9	6.4	2.5
70	14.8	11.6	7.4	3.0
80	17.0	13.2	8.5	3.4
90	19.1	14.9	9.5	3.8
100	21.2	16.6	10.6	4.2

8. Calculate the amount of tank mixture used to get a given application rate using the formula:

$$\frac{\text{Ounces of Additive per 1000 ft.}^2 \times \text{Path Length} \times \text{Path Width}}{1000 \times \frac{\text{Tank Concentration}}{100}}$$

or, as in this example,

$$\frac{5 \text{ ounces per 1000 ft.}^2 \times 2.75 \text{ ft.} \times 100 \text{ ft.}}{1000 \times \frac{30}{100}} = 4.58 \text{ oz.}$$

The amount of tank mixture used for the 100-foot length should be approximately 4.6 ounces.

9. Aerate the 100-foot length normally.

10. Determine the amount required to refill the chemical tank to the marked line (marked in step 6 on the preceding page).

11. Adjust the ratio adjuster if required and repeat the calibration procedure from step 9 above until the amount of tank mixture used to aerate the 100-foot length equals 4.6 ounces.

Maintenance

Service Interval Chart

Service Operation	After Each Use	Storage Service
Rinse Injector	X	
Clean Chemical Tank	X	
Clean Lower End with Soapy Water		X

⚠ CAUTION

POTENTIAL HAZARD

- **Chemicals can be hazardous and can cause personal injury.**

WHAT CAN HAPPEN

- **Chemicals which are handled incorrectly can pose a danger to personal health, and can damage equipment.**

HOW TO AVOID THE HAZARD

- **Carefully read the directions printed on the chemical manufacturer's labels before handling chemicals. Instructions on chemical manufacturer's container labels regarding mixing proportions should be read and strictly followed.**
- **Keep chemicals from skin. If chemicals come in contact with body, wash off immediately with clean water and detergent.**
- **Always wear goggles and other protective equipment as recommended by the chemical manufacturer.**

The injection system has been designed and built to pump liquid solutions with a minimum of maintenance. However, some solutions may leave deposits, residue or precipitates which may require attention to ensure maximum dependable service.

The degree to which these contaminants accumulate depends on the nature of the solutions being pumped and that of the water supply.

By performing the following maintenance procedures, your injection system will be ready to serve your needs reliably and accurately.

Rinsing the Injector

Rinse the injector after each use as follows:

1. Add one (1) quart or more of fresh filtered water to the chemical tank.

2. Operate the HydroJect® 3000 and injection system until the fresh water is gone.

   IMPORTANT: Additives allowed to remain in an inactive injector can dry out and foul or damage the lower end at the next start-up.

Cleaning the Lower End with Soapy Water

1. Remove the interlock pins and disassemble the plunger and cylinder assemblies (Fig. 17).
2. Clean the plunger O-ring seat area in the cylinder with warm soapy water (Fig. 17).
3. Place the plunger assembly in warm soapy water until the assembly tip and spring operate freely (Fig. 17).

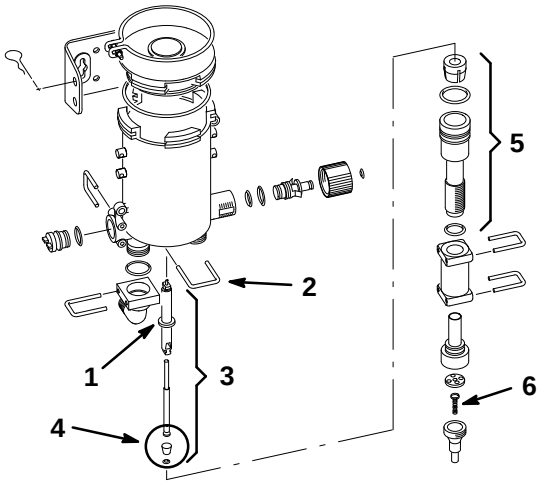


Figure 17

1. O-ring Seat Area
2. Interlock Pin (4)
3. Plunger Assembly
4. Assembly Tip
5. Cylinder Assembly
6. Spring

Cleaning the Chemical Tank

⚠ CAUTION

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- **Always wear goggles and other protective equipment as recommended by the chemical manufacturer.**

IMPORTANT: Keep the chemical tank covered to prevent dirt or other airborne debris from entering the tank

1. Remove the drain hose connector from the bottom of the chemical tank (Fig. 18).
2. Flush the tank with fresh filtered water.
3. Replace the drain hose connector on the bottom of the chemical tank (Fig. 18).

Note: To help keep the chemical tank clean:

- Rinse the tank thoroughly and often.
- Mix additive solutions daily.
- Don't mix solutions together that may react and form a precipitate.
- Use fresh filtered water when filling the tank.

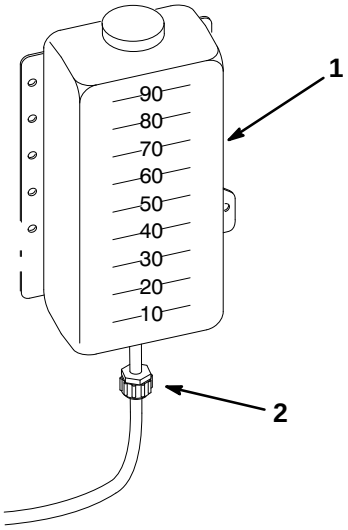

Figure 18

1. Chemical Tank
2. Drain Hose Connector

Storage

1. Rinse the lower end with fresh soapy water.

2. Remove the injector from the HydroJect® as follows:

A. Remove the drain hose connector from the bottom of the chemical tank (Fig. 18).

B. Disconnect the water hoses from the injector.

C. Remove the hairpin cotters and remove the injector from the support bracket (Fig. 19).

3. Rotate the injector until all water is drained.

4. Remove the interlock pins and disassemble the plunger and cylinder assemblies (Fig. 19).

5. Clean the plunger and cylinder assemblies (Fig. 19).

6. Reassemble the plunger and cylinder assemblies (Fig. 19).

7. Reinstall the injector to the HydroJect®.

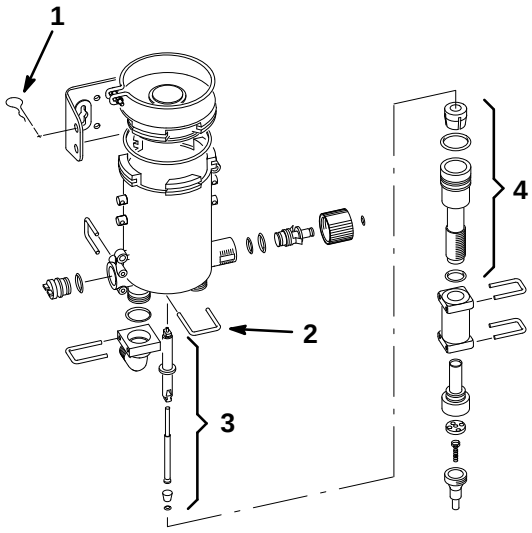

Figure 19

1. Hairpin Cotter (2)
2. Interlock Pin (4)
3. Plunger Assembly
4. Cylinder Assembly


TORO®