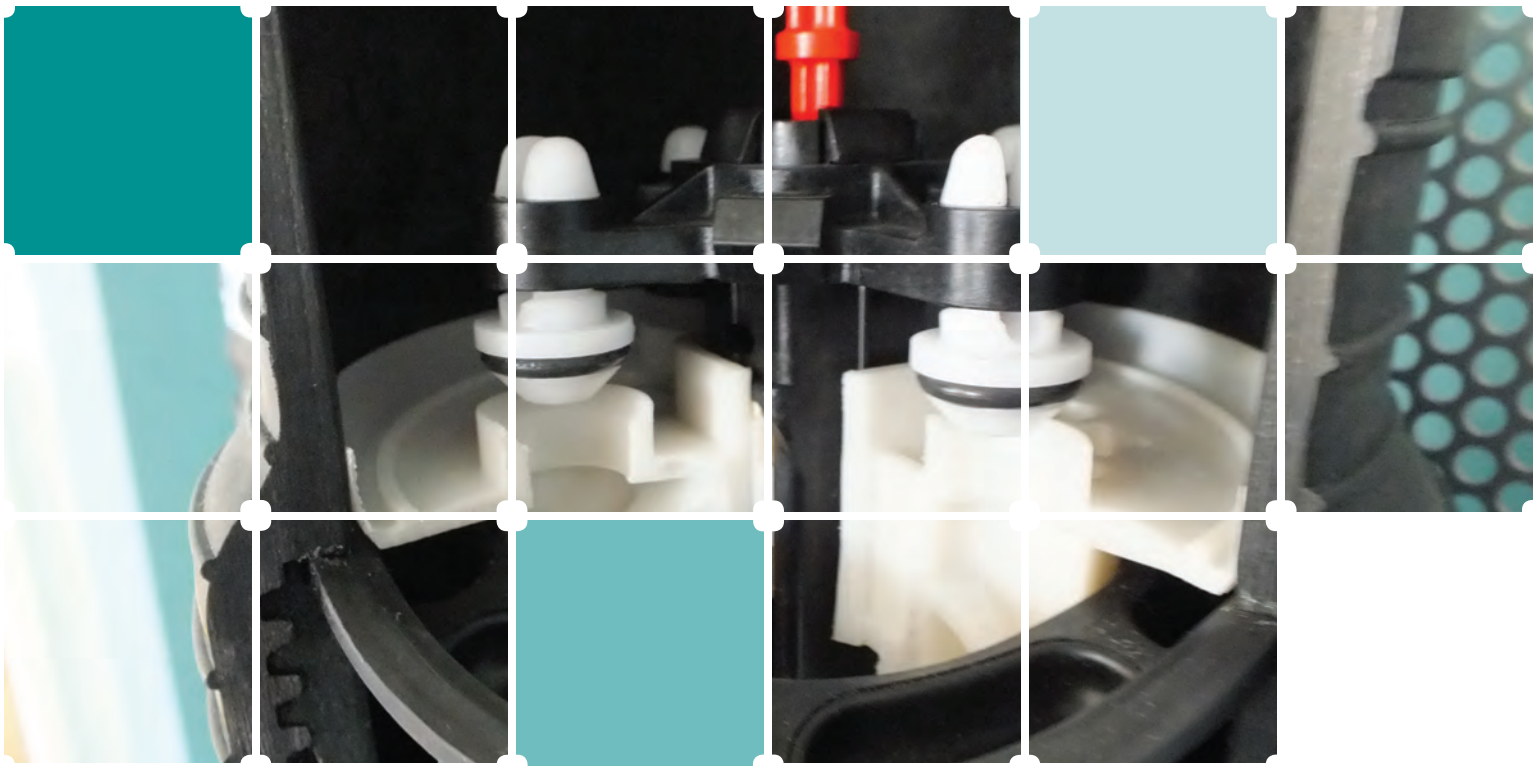
Hydro systems
A DOVER COMPANY

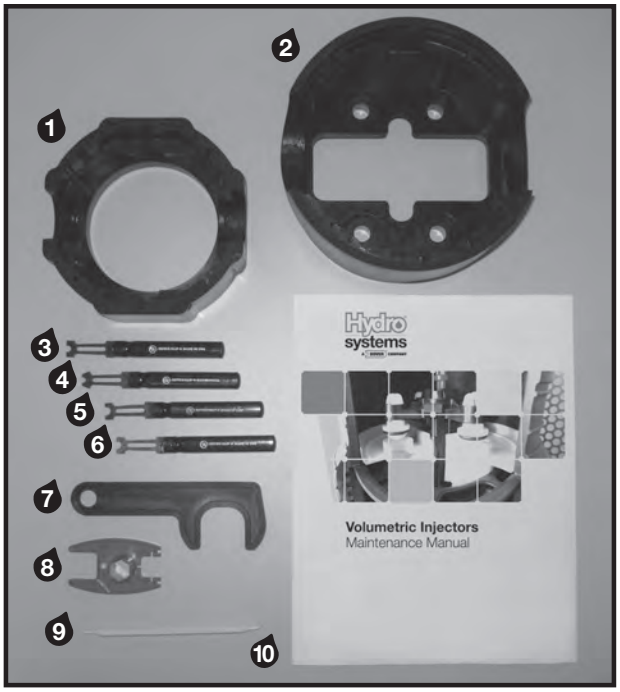


Volumetric Injectors
Maintenance Manual

Available Now

Repair kit

1. 10096731–Insert, Volumetric Fixture
2. 10096730–Base, Volumetric Fixture
3. 10095184–Attacher Tool, Chemilizer, A-330
4. 10095185–Removal Tool, Chemilizer, A-310
5. 10096926–C-Clip, Attacher, MiniDos & SuperDos, A-080
6. 10096927–C-Clip, Remover, MiniDos & SuperDos, A-110
7. 195950–MiniDos Lower End Wrench
8. 193021–6-in-1 Wrench
9. 10096928–Tool, O-ring Puller
10. 10097064–Manual, Volumetric Repair



Bonus Feature!

Find a detailed and easy to remove Routine Maintenance for Volumetric Injectors inserted into this manual.

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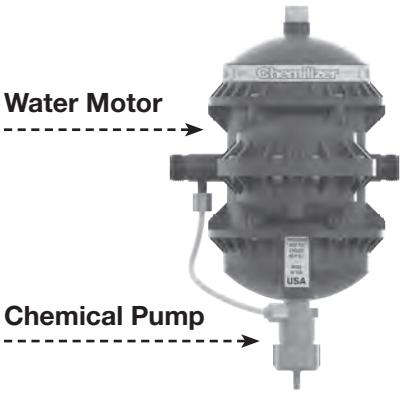
If left outdoors fluid can freeze inside the injector causing permanent damage. → Allow the fluid inside the injector to thaw before troubleshooting to minimize potential damage.

Always shut off the water and depressurize the injector before doing any repair work on unit.



First, determine if the problem is with the water motor or the chemical pump. → When the water motor is working properly, you will hear a “clicking” sound. (Depending on water flow, the unit may only click once every 2-3 minutes. Be patient.)

IS IT “CLICKING”?

YES → **Problem is in White Chemical Pump**

NO → **Problem is in Blue Water Motor**

Most service issues are with the chemical pump and most of those can be resolved with our inexpensive pump rebuild kit. See the parts catalog in this manual for part numbers.

Sometimes during installation of the pump, the user forgets to fully extend the pump stem prior to inserting it into the motor. If this is the case, merely remove the pump, pull the pump stem out all the way and re-insert in motor.

Also, make sure the cap is tight on the pump. Hand tight is enough. You can overtighten the cap. Do not use pliers or a wrench to tighten the cap.

If the Injector does not click or no water flows through the injector:

1. Check water flow (GPM) and line pressure to the injector and installation.
2. Check tension bands for wear. If wear has occurred change the tension bands.
3. Change motor piston.

If the Injector is clicking, but is not pulling chemical:

1. Unscrew the pump (quarter turn) and inspect the sleeve, o-ring and check disk for wear.
2. Change the pump out.

If the Injector is not working on low flow:

1. Take the top off of the injector and check the actuating and pivot arms for wear.
2. Change the actuating arm, pivot arm and tension bands.

If the Injector is leaking:

1. Take off the top or bottom of the injector and inspect the seal.
2. Change seal if wear has occurred.

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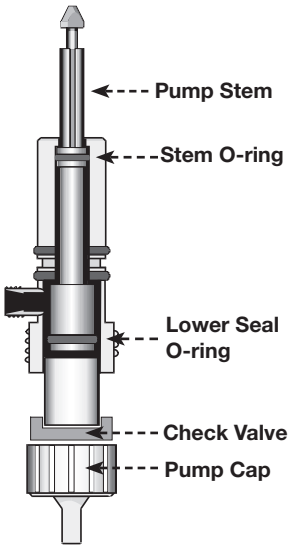
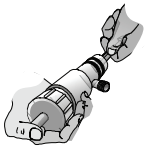
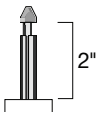
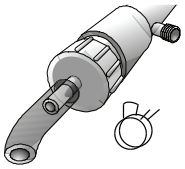
Chemilizer Troubleshooting - Chemical Pump - Fixed & Adjustable

NOTE: A general rule of thumb is: If the water motor is clicking - the problem is usually in the chemical pump.

Fixed Pump

Problem	Cause	Solution
Motor clicks, but chemical does not draw up into the tube 	Pump cap not tight	If pump cap is not tight enough the check valve will not seal properly. Tighten the pump cap.  **To hand check the pump cap** place thumb over bottom nib and pull stem out. If there's no suction tighten the bottom cap and try again. If there's still no suction remove cap.
	Suction hose filter clogged	Clean or replace filter. Always use clean water for mixing stock solution. Keep filter off bottom of solution tank where debris settles.
	Worn or damaged parts on the inside causing pump to lose vacuum.	Clean or replace check valve. Replace stem assembly. Rebuild with pump rebuild kit.  **To hand check worn or damaged parts** with pump cap and check valve removed, place thumb over bottom of pump body and pull stem out. If there's good suction replace the check valve. If no there's no suction, worn parts need to be replaced.
	Pump not engaged to piston clip in water motor.	Remove pump and check for broken or worn pump stem at arrowhead.   Pull stem to up position and reinstall.
	Piston clip broken on inside of water motor.	If pump is still not pumping there is a possibility that the clip is broken. This is a very rare occurrence.
Medication is drawn up the suction hose, but then falls back down	Vacuum leak	• Clean or replace check valve. • Tighten bottom cap: If not tight it can cause a leak. • If suction hose it not fitting tightly on the bottom cap, it can cause a leak. • Cut off end of the hose and re-attach. • Check hose for holes. 

Adjustable Pump

Problem	Cause	Solution
Motor clicks, but chemical is not drawn up into the suction hose.	Large o-ring on lower seal is worn or damaged.	Replace pump stem.
	Pump stem is not engaged into the piston clip in water motor.	Remove pump, check for a broken or worn pump stem at tip. Pump stem must be pulled out completely (approx. 2.5") before being inserted into the bottom of the water motor.
	Piston clip may be broken or worn on the inside of the water motor.	This is an extremely rare occurrence, but if the pump stem was not pulled out when initially installed this could cause excessive wear of the piston clip. The water motor must be sent to an authorized repair center or Hydro Systems for repair.
Chemical solution is drawn up in the suction hose, but then falls back down.	Vacuum leak	• Check valve may need cleaning or replacing. • Check suction hose to ensure a tight fit with tube nut in place. • Prime pump by hand and verify that chemical solution stays up in the suction hose.

NOTE: This guide is intended to help you find problems. Hydro Systems suggests a total rebuild kit to eliminate problems that may have been missed or cause the customer future problems.

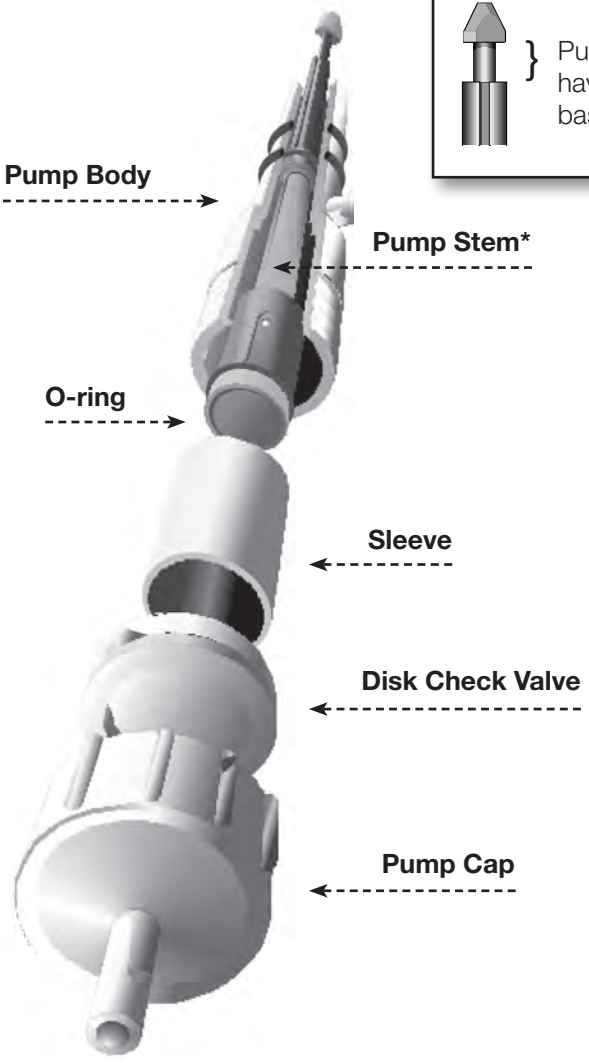
NOTE: The adjustable chemical pump will NOT work properly if the pump cap is not tight enough.

Chemilizer Troubleshooting - Chemical Pump

Chemilizer manufactures two basic types of chemical pumps: ❶ **General Purpose** ❷ **Vinegar**

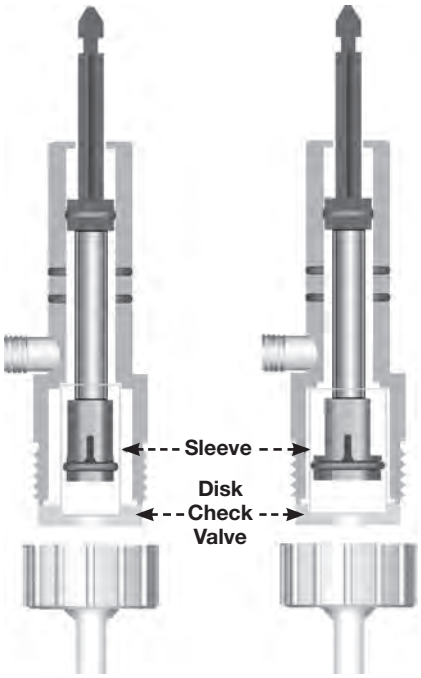
The two types of pumps are available in the following five ratios: 1:128, 1:100, 2:128, 2:100 and 1:250. In addition to these five the **General Purpose** pump is available in 1:500 ratio. The **General Purpose** pump comes with black or brown viton o-rings and the **Vinegar** pump comes with orange silicone o-rings.

Pump Body: The pump body is the same for all pump types and ratios.



*Pump stems on **General Purpose** pumps have viton o-rings and **Vinegar** pumps have silicone o-rings.

} Pump stems for different ratios have different lengths from the base of the tip to the shaft.



1:128, 1:100, 1:250 and 1:500 pump stems have a smaller lower seal & sleeve. The disk check valve has a thicker wall to accommodate the sleeve.

2:128 & 2:100 pump stems have a larger lower seal & sleeve. The disk check valve has a thinner wall to accommodate the sleeve.

- The chemical pump is made of chemical resistant materials to withstand most chemical attacks.
- The chemical pump twists in and out of the water motor for easy maintenance.
- No tools are required for assembly or disassembly.

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Chemilizer Troubleshooting - Chemical Pump Parts Inspection

Pump O-rings:

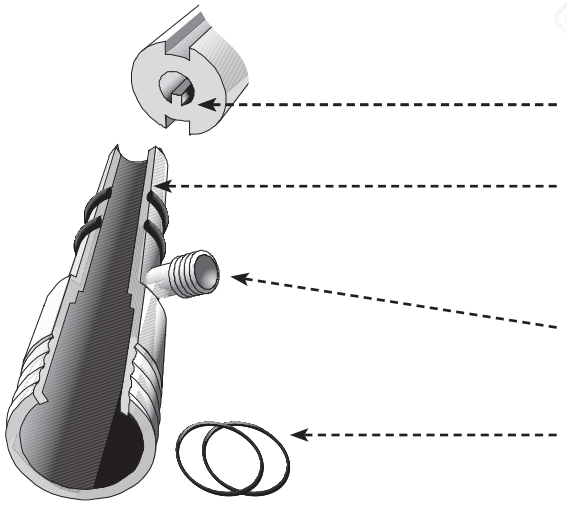
- Pump stems for chlorine/medication pumps have viton o-rings.
- Viton o-rings are brown or occasionally black.
- Pump stems for **Vinegar** pumps have silicone o-rings.
- Silicone o-rings are orange.
- **General Purpose** pump bodies have viton o-rings.

New o-rings have round sides ---------->

Damaged o-rings have nicks or scratches ->

Worn o-rings have flattened sides ------->

Using the wrong o-ring will cause premature wear.



Pump Body:

- Check key on top of body for excessive wear. If key way wears off, the pump will not lock into the water motor.
- Check inside of body for wear marks by holding the body up to a light and look down the barrel. The side wall should be smooth. Wear marks are caused by grit on the o-ring riding up and down the barrel.
- Check the threads for defects such as cross-threading or nicks. Defective threads could cause the bottom cap not to seal properly.
- Worn or damaged o-rings on the pump body can cause water to leak from the water motor.

Ceramic Sleeve:

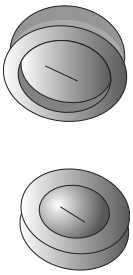
- Check the ceramic sleeve for cracks or chips. Most damage to ceramic sleeves is caused by dropping the sleeve.
- Check the inside for scratches caused by grit riding up and down on the o-ring.
- Scratches can cause vacuum loss, or damage to new o-rings.

Pump Stem:

- Arrowheads that are broken at the base of the stem have most likely been dropped.
- If o-rings are damaged or worn, they can let water leak past from the water motor. This can cause the motor not to operate at lower flows.
- This o-ring provides the vacuum for pulling up and pushing out the chemical being injected.

Check Valve:

Inspect the check valve for worn or torn slit that may cause it not to seal. The check valve slit can fuse itself together if it has been on a shelf for a long time before being sold. This can be fixed by pinching the two sides together.



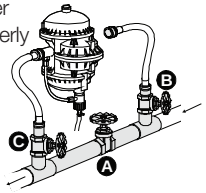
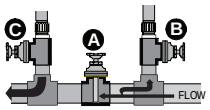
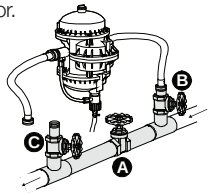
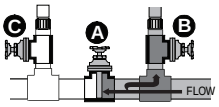
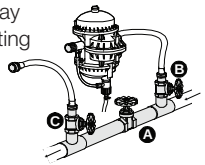
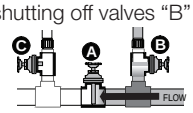
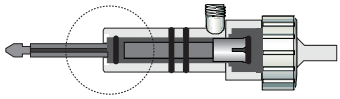
Bottom Cap:

- Check bottom cap for damaged threads and stress cracks.
- Most damage to bottom caps is due to dropping which breaks the nib.

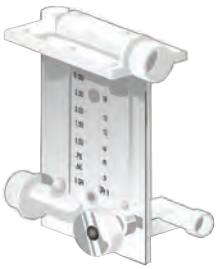
Chemilizer Troubleshooting - Water Motor & Injection Control Panel

NOTE: A general rule of thumb is: If the water motor is clicking - the problem is usually in the chemical pump. For problems with the chemical pump refer to guide on the next page. For problems that are in the water motor follow this guide.

Water Motor

Problem	Cause	Solution
Water motor does not click **or** **Water motor clicks a few times, then stops**	No water flow to the water motor. Water flow improperly attached. 	• Make sure gate valve “A” is closed, and valves “B” and “C” are open. • Make sure water is entering motor on inlet side and not outlet side.  **To determine if water is flowing** to the motor, shut water off, disconnect hose from valve “B” and open valve “B”. If no water comes out there is a problem with the installation. (Valve “A” is closed during this test.)
	No water flow through the water motor. 	 First, determine that water is flowing in main water line. Then, you need to determine if water is flowing through the motor. Shut off water, release pressure, disconnect hose from valve “C” and restart water. If no water comes out of the hose, there is a problem in the water motor. (Valve “A” is closed during this test.)
	Defective chemical pump.	**Change the chemical pump.** A chemical pump that has become frozen in place due to chemical crystals or clogged due to lack of maintenance can cause motor to stop.
	Damage to inside parts – possibly broken tension rings or excessive wear on parts.	Remove top cap and check for broken or worn parts. Repair or rebuild as necessary.
Water Motor works on high flow, but stops on low flow	Valve “A” may not be shutting off all the water. 	If the by-pass valve “A” is not fully closed, or if it does not close properly, water will leak by. On low flows this could starve the water motor. Test by shutting off valves “B” & “C” and relieving pressure on unit by opening air vent. Disconnect hose on outlet side of motor. Open valve “C”. If there is water flowing from hose, valve “A” needs to be replaced. 
	Defective chemical pump may have worn o-ring on stem.	Change or rebuild the chemical pump. Replacement with pump rebuild kit is recommended, but replacing pump stem is an option. 

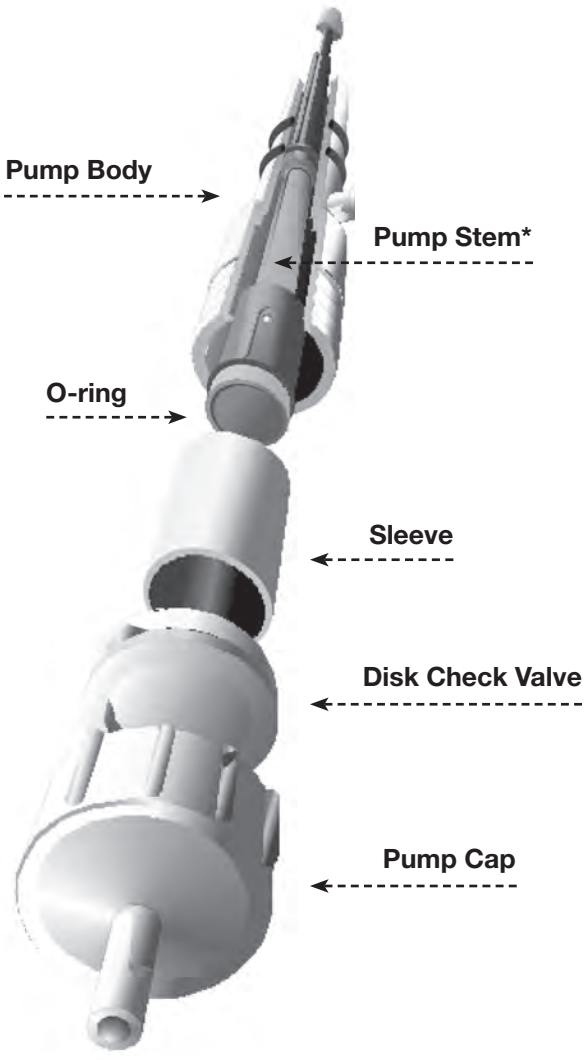
Injection Control Panel

Problem	Cause	Solution
Low volume float is sitting motionless at the bottom of the Injection Control Panel when water is flowing	The Low Volume Adjustment Valve may be clogged from debris.	1. Turn off pump or other water source. 2. Remove the Low Volume Adjustment Valve control knob from the injection Control Panel by unscrewing it. 3. Turn pump/water source on for 5-10 seconds. Water will spurt from the open needle valve, clearing the debris. 4. Turn off the pump/water source and replace the needle valve. * Repeat these steps when initially setting the injection level. 

Chemilizer Troubleshooting - Chemical Pump - Fixed

Chemical Pump - Fixed		
Problem	**Cause**	**Solution**
Chemical pump is not pulling chemical	Damaged or broken ceramic sleeve	• Remove the pump from the injector. Unscrew the bottom cap and replace ceramic sleeve with a new sleeve and o-rings.
	Excessive o-ring wear	• Remove the pump from the injector. Unscrew the bottom cap and replace with new o-rings.
	Broken stem	• Remove the pump from the injector. Unscrew the bottom cap and replace with a new stem.
	Defective check valve	• Remove the pump from the injector. Unscrew the bottom cap and replace with a new check valve.
Chemical pump is back filling the stock tank	Defective check valve	• Remove the pump from the injector. Unscrew the bottom cap and replace with a new check valve.

Pump Body: The pump body is the same for all pump types and ratios.



*Pump stems on **General Purpose** pumps have viton o-rings and **Vinegar** pumps have silicone o-rings.

Make sure the pick up and remote injection tubes have a tight seal and are not sucking air.

Chemilizer Repair - Injector Disassembly, Repair & Reassembly

Tools & Supplies You Will Need:

1. One Phillips-head screw driver
2. One 3/8" combination open-end/box-end wrench
3. One pair needle nose pliers
4. One set of “C” clip tools (*available for purchase* from Hydro Systems Company)
    a. Removal
    b. Replacement
5. One repair stand (*supplied to dealer* by Hydro Systems Company)
6. Silicone lubricant

Repair Stand

Your Work Space Should Be:

1. An area large enough to lay out the disassembled parts.
2. An area with running water to test the rebuilt unit.

Note: Before starting on the CP33, remove any hoses attached to the Injection Control Panel; remove the two Phillips-head screws that attach the Injection Control Panel to the water motor and then remove the Injection Control Panel. Set it aside where it will not get damaged.

I. Section One – Disassembling the Top Cap

A. With injector upright in the repair stand, remove all Phillips-head screws from the top cap, but leave the screws in the screw holes. This will aid you in realigning the cap to the main body when you reassemble the injector.

B. Gently remove the top cap by holding the injector firmly in the repair stand with one hand, while grasping and lifting on the mounting brackets on the rear with the other. This will cause the top cap to separate from the main body, exposing the internal parts of the upper section.

C. You should now see:
    1. The upper portion of the inlet and outlet valves and actuator tee
    2. The pivot arm assembly held in place by “C” clips
    3. The actuator arm assembly held in place by “C” clips
    4. The tension bands (2)
    5. The top by-pass assembly
    6. The top of the diaphragm assembly
    7. The large top cap o-ring

Chemilizer placed in Repair Stand

D. To repair the upper section:
    1. Remove tension bands (be sure there are two bands).
    2. With your “C” clip removal tool, remove the “C” clips from one side of the pivot arm assembly.
    3. With your “C” clip removal tool, remove the “C” clips from one side of the actuator arm assembly.
    4. Remove the pivot pins, then the actuator arm assembly and pivot arm assembly.
    5. Remove the top by-pass assembly.

Note: To disassemble the main body you must remove the main body Phillips-head screw.

II. Section Two – Disassembling the Bottom Cap

A. To gain access to the lower half of the injector you must remove the bottom cap.
    1. Place the injector in the repair stand with the top of the unit pointed down, with the top cap removed.
    2. Remove all the Phillips-head screws from the bottom cap, but leave the screws in the screw holes. This will aid you in realigning the cap to the main body when you reassemble the injector.
    3. Grasp the injector firmly and lift the bottom cap from the rear holding on to the mounting bracket.

II. Section Two – Disassembling the Bottom Cap (continued)

B. With the bottom cap removed you are looking at:
   1. The lower part of the I/O valve assembly
   2. The lower part of the diaphragm assembly including the pump retaining clip
   3. The large o-ring for the bottom cap

Note: To disassemble the main body assembly you must first remove the o-ring on the bottom of the outlet valve and unscrew the main body Phillips-head screw.

III. Section Three – Disassembling the Main Body

1. With the injector in the repair stand and the top and the bottom caps removed, remove all remaining Phillips-head screws.
   1. Note: Do not forget to remove the two Phillips-head screws inside the main body; one from the top and one from the bottom.
   2. Note: You must remove the o-ring on the bottom of the outlet valve before you can separate the two halves.
2. Remove the actuator tee – first spread the inlet and outlet valves until they unsnap from the actuator tee to allow for easy removal.
3. With all the screws removed, grip the two halves and pull them apart - **DO NOT PRY THEM APART WITH A SCREWDRIVER.**
4. With the main body separated (into the top main body and bottom main body) you should see:
   a. Diaphragm assembly
   b. Two center Phillips-head screw o-rings
   c. Lower section of the I/O valves
5. Repairing the main body consists of the following:
   a. Replacing the diaphragm assembly
   b. Replacing the I/O valve assembly including the I/O actuator tee
   c. Replacing the two small Phillips-head screw o-rings

IV. Section Four - Reassembling the Main Body

1. Place the bottom main body into the repair stand, with the unit facing you. The saucer shaped portion identifies the front of the bottom main body.
2. Take the diaphragm assembly and slide the white piston guide into the guide slot on the bottom main body.
   a. The long portion of the white piston guide should point up with the screw heads facing the bottom of the unit.
   b. The 45 degree notch at the top of the white piston guide should face to the back of the unit (towards the valves).
3. Take the inlet valve (with the "+" on top of it) and place it into the inlet tee.
4. Replace the o-rings in the indented area where the Phillips-head screw goes through the inside of the main body. Use silicone sealant to ensure the o-rings stay in place.
   a. The indented area is in the rear of each half of the main body.
   b. The Phillips-head screws hold the two halves together from the inside.
5. Now re-attach the two halves of the main body.
   a. Take the top main body and place it over the bottom main body.
6. Place saucer shaped portion facing you with pivot holes facing up.
7. Work the inlet valve up through the top main body.
   a. Align the top main body with the inlet/outlet tees and the white piston guide on the diaphragm assembly.
   b. Push the top main body straight down until the two halves lock together.
   c. Use the Phillips-head screws in the holes around the side of the two halves to attach the top main body and bottom main body. Then tighten with the hex head nuts to secure the two parts.

IV. Section Four - Reassembling the Main Body (continued)

7. Work the inlet valve up through the top main body (Continued - See steps a-c on previous page).
   d. Place the Phillips-head screws into the holes provided for them on the insides of the top main body and bottom main body to further secure them.
   e. Work the diaphragm assembly up and down several times making sure it moves freely.
   f. Replace the two screws in the back of the unit that anchor the inlet/outlet tees in place.

V. Section Five - Reassembling the Top Cap

1. Flip the injector over in the repair stand so that the top of the water motor is facing up and the front of the unit (saucer shape main body) is facing you. You should be looking at the pivot holes and the top part of the diaphragm assembly.
2. Drop the outlet valve through the hole for the outlet valve (left side of unit) and then snap the outlet valve onto the actuator tee.
3. Snap inlet valve onto actuator tee.
4. Slide the actuator arm assembly through window of actuator tee – one arm on each side of the actuator tee.
5. Insert the top by-pass assembly into the guide slot with the pivot pin slots aligned with the pivot pin holes in the top main body; the by-pass boot should be over the diaphragm assembly.
6. Insert a pivot pin through the pivot pin hole at the rear of unit just in front of the actuator tee and through the pivot pin slot in the actuator arm assembly. Secure with “C” clip using the “C” clip replacement tool.
7. Replace the pivot arm assembly with the tension pins under the top by-pass assembly, and its arms on either side of the molded posts and diaphragm assembly.
8. Insert the pivot pins in:
   a. The slot at the top of the diaphragm assembly.
   b. The pivot hole directly behind diaphragm assembly.
9. Secure the pivot arm assembly with “C” clips using the “C” clip replacement tool.
10. Place tension bands over tension pins.
11. Check the operation of the I/O valves and the diaphragm assembly before replacing the top cap.
    a. Check by alternately pushing down on the top of the diaphragm assembly and then pushing down on the pivot arm assembly where the tension pin is located.
    b. You should get a hard snapping action.
    c. Repeat this action several times to ensure proper operation.
12. Place the top cap o-ring in the groove around the perimeter of the top main body.
13. Set the top cap in place, lining up the screw holes with those in the top main body; with your hands on the top cap, lean your weight onto it. You should hear a pop as the top cap is anchored in place.
14. Place hex nuts onto Phillips-head screws and tighten.

VI. Section Six - Reassembling the Bottom Cap

1. Turn the unit upside down in the repair stand so that the bottom of unit is facing up.
2. Replace the o-ring on the bottom of outlet valve.
3. Place the large o-ring seal on the seat of the bottom main body.
4. Set the bottom cap in place, lining up the screw holes in the cap with those in the main body. With both of your hands on the cap, press down, leaning your weight onto the bottom cap to anchor it onto the main body.
   a. You should hear a pop as the bottom cap locks into place.
   b. Replace all of the hex nuts and tighten to secure.

Note: On the CP33, re-attach the Injection Control Panel on the front of the injector with the two Phillips-head screws.

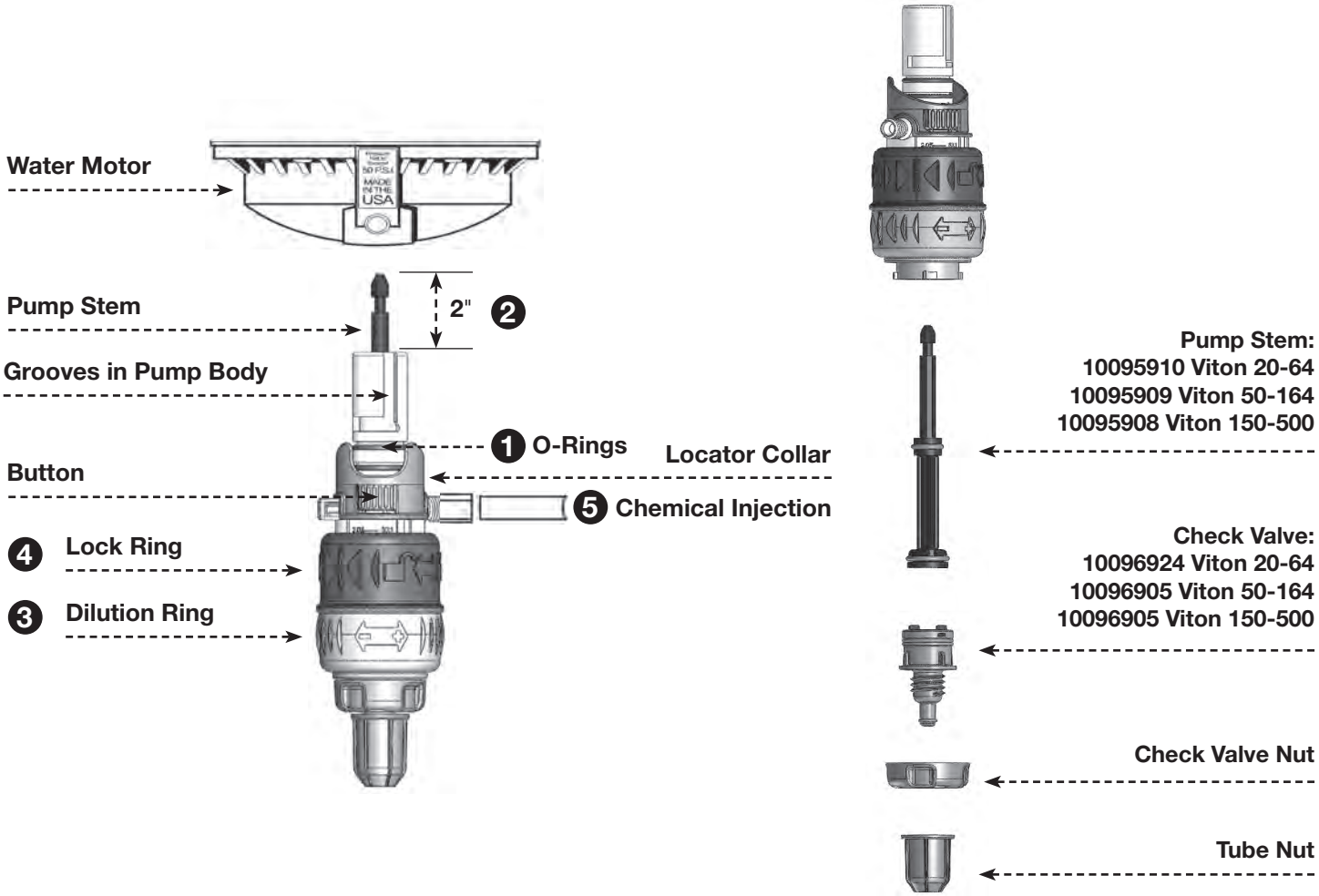
Be sure to water test the injector before returning to the customer. Hydro Systems Company recommends that you test at a low flow (1 gph) and low (10) and high (50) pressure.

Chemilizer Repair - Chemical Pump - Adjustable

1. Lubricate the o-rings on the pump housing with silicone lubricant before the pump is installed into the motor. A light coating of lubricant is all that is required.
2. Make sure the pump stem is pulled all the way out (about 2"). Push the pump up into the water motor. Pins inside the water motor will engage with the grooves in the pump body. Turn the pump 1/4 turn clockwise. The slot in the locator collar will mate with the square projection on the water motor.

NOTE: Depressing the buttons on each side of the locator lock will allow the locator collar to rotate 180º to allow installation with chemical injection on the right side. If the slot in the locator collar does not mate with the water motor, depress the buttons and rotate the locator collar until the groove mates with the water motor.

3. Rotating the dilution ring changes the dilution ratio. Rotate the dilution ring either direction until the correct dilution is set.
4. Rotate the lock ring clockwise to lock the dilution setting. Rotating the lock ring counter-clockwise allows the dilution to be changed.
5. After installing pump into bottom of water motor - loosen Jaco nut on pump and insert hose into fitting. Then, re-tighten Jaco nut.



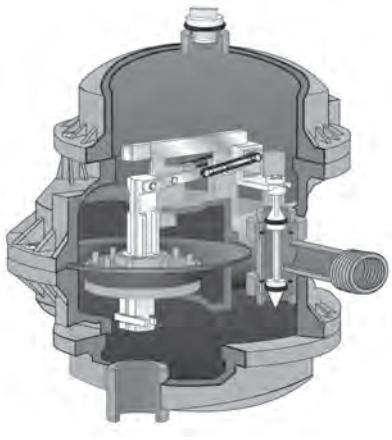
Hydro systems
A DOVER COMPANY

Chemilizer Parts - Water Motor

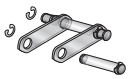
The body parts for Chemilizer injectors are made of reinforced plastic. With minimum care and maintenance, they will provide years of service.

Since there is little wear caused by interior moving parts, Chemilizer injectors can be rebuilt using original body parts.

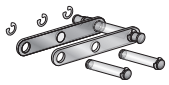
The o-rings are primarily used to seal the parts together and eliminate leaking. Whenever the injectors are taken apart, the o-rings should be replaced. Special care should always be taken when replacing o-rings. If the o-rings do not seal properly there will be leaks.



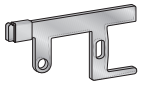
Tension Bands



Actuator Arm Assembly

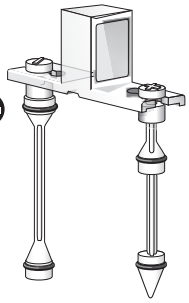


Pivot Arm Assembly



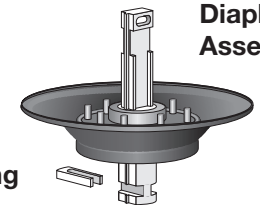
Top By-Pass Assembly

Actuator Tee



Outlet Valve ⊖ ⊕ **Inlet Valve**

Inlet Valve/Outlet Valve Assembly

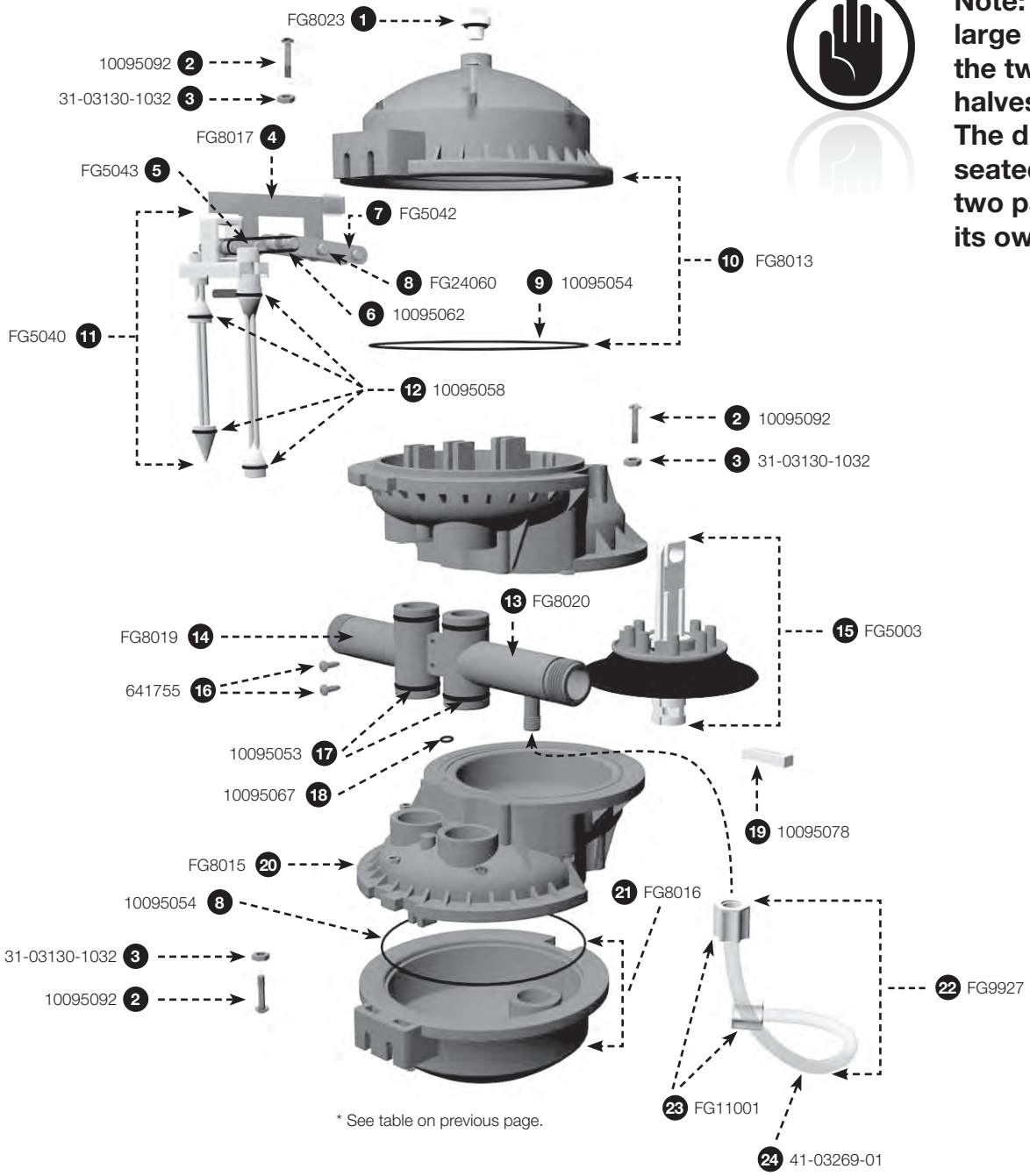


Diaphragm Assembly

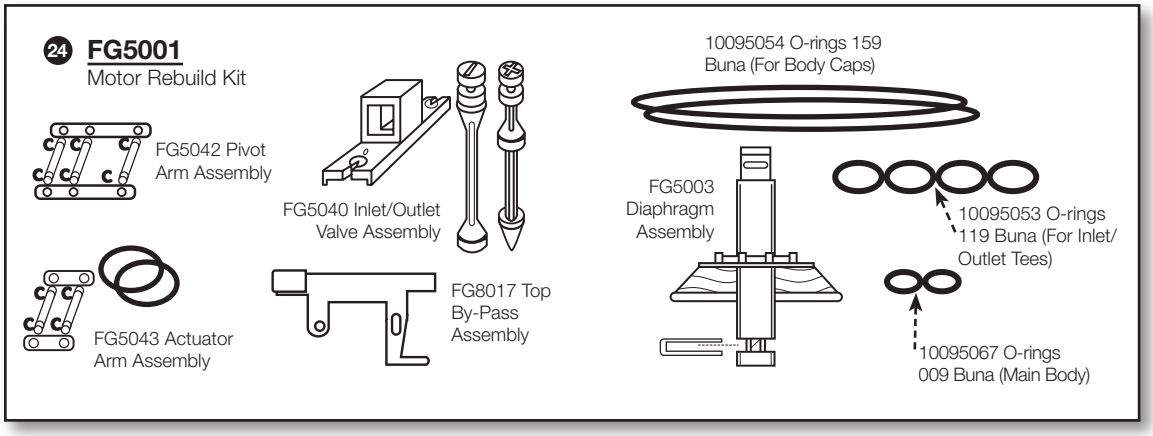
Pump Retaining Clip

Manual Reference	Part #	Description
Chemilizer Body		
1	FG8023	Twist Air Vent Assembly
2	10095092	Screw 10-32 S.S.
3	31-03130-1032	Nut 10-32 S.S.
4	FG8017	Top By-pass Assembly
5	FG5043	Actuator Arm Assembly
6	10095062	Tension Bands
7	FG5042	Pivot Arm Assembly
8	FG24060	Retaining Clip
9	10095054	O-rings 159 Buna
10	FG8013	Top Cap Assembly
11	FG5040	Inlet/Outlet Valve Assembly
12	10095058	Inlet/Outlet O-rings
13	FG8020	Outlet Tee Assembly
14	FG8019	Inlet Tee Assembly
15	FG5003	Diaphragm Assembly
16	641755	Screw 8×1/2
17	10095053	O-rings 159 Buna
18	10095067	O-rings 009 Buna
19	10095078	Piston Clip
20	FG8015	Main Bottom Body Assembly
21	FG8016	Bottom Body Assembly
22	FG9927	Hose Chemical Assembly
23	FG11001	Jaco Nut 1/4
24	41-03265-01	PE Tube 3/16×1/4×1/16 Chemical

* See diagram on next page.



Note: There is no large o-ring sealing the two center body halves together. The diaphragm is seated between these two parts and forms its own seal.



Chemilizer Parts - Chemical Pump - Fixed

Fixed Chemical Pumps		
FG9209-V	1:128 Pump Viton Assembly	
FG9210-V	1:100 Pump Viton Assembly	
FG9211-V	2:100 Pump Viton Assembly	
FG9220-V	2:128 Pump Viton Assembly	
FG9222-V	1:250 Pump Viton Assembly	
FG9225-V	1:500 Pump Viton Assembly	
FG9309	1:128 Pump Silicone Assembly	
FG9310	1:100 Pump Silicone Assembly	
FG9311	2:100 Pump Silicone Assembly	
FG9320	2:128 Pump Silicone Assembly	
FG9322	1:250 Pump Silicone Assembly	

Fixed Chemical Pump Stems		
FG9009	1:128 Pump Stem Viton	
FG9010	1:100 Pump Stem Viton	
FG9011	2:100 Pump Stem Viton	
FG9020	2:128 Pump Stem Viton	
FG9022	1:250 Pump Stem Viton	
FG9025	1:500 Pump Stem Viton	
FG9109	1:128 Pump Stem Silicone	
FG9110	1:100 Pump Stem Silicone	
FG9111	2:100 Pump Stem Silicone	
FG9120	2:128 Pump Stem Silicone	
FG9122	1:250 Pump Stem Silicone	

Pump Rebuild Kits		
FG9409-V	1:128 Pump Rebuild Viton Kit	
FG9410-V	1:100 Pump Rebuild Viton Kit	
FG9411-V	2:100 Pump Rebuild Viton Kit	
FG9420-V	2:128 Pump Rebuild Viton Kit	
FG9422-V	1:250 Pump Rebuild Viton Kit	
FG9425-V	1:500 Pump Rebuild Viton Kit	
FG9509	1:128 Pump Rebuild Silicone Kit	
FG9510	1:100 Pump Rebuild Silicone Kit	
FG9511	2:100 Pump Rebuild Silicone Kit	
FG9520	2:128 Pump Rebuild Silicone Kit	
FG9522	1:250 Pump Rebuild Silicone Kit	

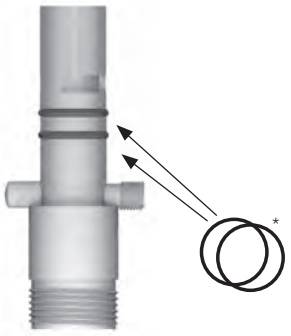
Note: All pump rebuild kits come with stem, check valve and housing o-rings.

O-ring Kits		
FG9910	1% Viton Repair Kit	
FG9911	1% Silicone Repair Kit	
FG9912	2% Viton Repair Kit	
FG9913	2% Silicone Repair Kit	
FG15104	Check Valve 2% - Silicone	
FG15504	Check Valve 2% - Viton	
FG15204	Check Valve 1% - Silicone	
FG15404	Check Valve 1% - Viton	

Note: All o-ring kits come with 3 upper and 3 lower o-rings and a check valve.

Fixed Pump Housing		
FG9936	1% Silicone Pump Cap Assembly*	
FG9936-V	1% Viton Pump Cap Assembly*	
FG9937	2% Silicone Pump Cap Assembly*	
FG9937-V	2% Viton Pump Cap Assembly*	
003921	Filter PVC Assembly	
10095071	Sleeve 1%	
10095072	Sleeve 2%	

***** Includes check valve

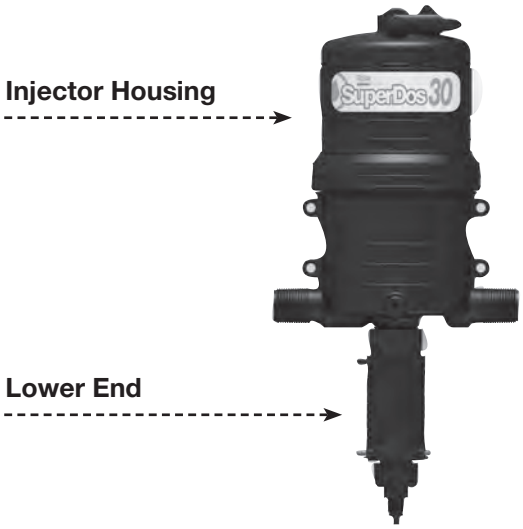
Fixed Pump Housing		
10095065*	**Pump Housing O-rings** 117 Viton Pump Housing *Fits 1% or 2% Pumps* • 1%=1:100, 1:128, 1:250 & 1:500 ratios • 2%=2:100 & 2:128 ratios	

* Universal o-rings

If left outdoors fluid can freeze inside the injector causing permanent damage.

Allow the fluid inside the injector to thaw before troubleshooting to minimize potential damage.

Always shut off the water and depressurize the injector before doing any repair work on unit.



First, determine if the problem is with the injector housing or the lower end.

IS IT "CLICKING"?

YES → **Problem is in Lower End**

NO → **Problem is in Injector Housing**

<u>If the Injector does not click, or no water flows through the unit:</u>

1. Check water flow (GPM) and line pressure to the injector and installation.
2. Check to see if the arrow on the front of the unit is in the same direction of the flow.
3. Check motor piston assembly. If wear or damage has occurred replace the motor piston assembly.

<u>If the Injector is clicking, but is not pulling chemical:</u>

1. Replace the dosing piston in the lower end and check the inner cylinder for wear.
2. Replace the inner cylinder if wear has occurred.

<u>If the unit leaks from upper or lower housing:</u>

1. Replace the upper or lower housing body.
2. Replace the mixing chamber gasket.

<u>If the injector leaks from top part of lower end:</u>

1. Unscrew the lower end from the lower housing and check the gasket for wear.
2. Replace entire lower end.

<u>If the Injector leaks from bottom part of lower end:</u>

1. Unscrew the check valve and check for unwanted debris.
2. Replace check valve, o-rings and inner cylinder below the dosing adjustment sleeve.

Hydro systems A DOVER COMPANY

SuperDos & MiniDos Troubleshooting - General

New Install - always pressure up slowly		
Problem	**Cause**	**Solution**
No clicking sound	Fluid not flowing through unit	• Are the red plugs at the inlet, outlet and suction tube fitting openings removed? • Is the unit installed backward? The arrow on the unit must point in the direction of the fluid flow. • Has the new injector been stored for an extended period? If so, submerge the injector in room temperature water for 24 hours so that the working parts can reabsorb fluid and swell back to the proper size. • If still not clicking, do not open the upper body. Call Hydro Systems customer service at 800.543.7184.
	Fluid flowing through unit	• Fluid rate is below or exceeds rated service flow of injector. • If below the rated service flow then increase flow rate. If above, reduce flow rate. • Operating pressure exceeds maximum limit. Install a pressure reducer valve. • On/off lever in off position. Place the on/off lever switch to the on position. • By-pass valve not closed. Check and set valve to the off position.

Injector in Operation or After Scheduled Maintenance		
Problem	**Cause**	**Solution**
No clicking sound	Main piston assembly #9 worn	Replace #9 main piston assembly. Clean fluid filter.
	Cover #1 or main body #40 worn or scored	Replace and install or clean fluid filter.
	On/off lever in off position	Place the On/Off lever switch to the ON position.
	By-pass valve not closed	Set Valve to the closed position.
	Dirty or plugged inlet filter	Ensure mesh size is correct for proper filtration. Clean filter.
	#17 Worn or not seated properly	Re-seat #17 or replace.
Clicking sound, no suction of solution	Suction tube #25 (#60 - 20%) or suction tube fitting #11 cracked, loose, leaking or clogged suction tube filter	Check for proper fit, replace and/or clean as necessary.
	Dosage piston #44 worn or installed incorrectly, inner cylinder #37 (#68 - 1% & #7 - 20%) worn	Replace. Ensure during maintenance replacement that #44 dosage piston was installed correctly flared-end up.
	O-ring retainer #82 (#15 - 10% & 20%) installed incorrectly	Install correctly.
	O-ring seat #14 or dosage piston #44 damaged or worn	Replace. On 0.4% models replace #51 shaft assembly.
	Check valve #13 (#60 - 20%) leaking	Clean & replace as necessary.
Clicking sound, under injecting	#44 dosage piston worn	Replace, on 0.4% models replace #51 Shaft Assembly.
	#37 (#7 - 20%) inner cylinder worn	Replace.
	Unit operates at high-flow and not at low-flow	Replace #17 o-ring.
	Main piston assembly #9 worn	Replace #9 main piston assembly. Clean fluid filter.
	Cover #1 or main body #40 worn or scored	Replace and install or clean fluid filter.
Fluid re-filling solution tank	Suction tube #25 (#60 - 20%) or suction tube fitting #11 cracked, loose, leaking or clogged suction tube filter	Check seat area on suction tube fitting #11. Check valve and seal must fit loose in the suction tube fitting. Check seal and inside fitting for debris.
	Dosage piston #44 worn or installed incorrectly, inner cylinder #37 (#68 - 1% & #7 - 20%) worn	Replace with new check valve assembly.
	O-ring retainer #82 (#15 - 10% & 20%) installed incorrectly	Replace.

Hydro systems
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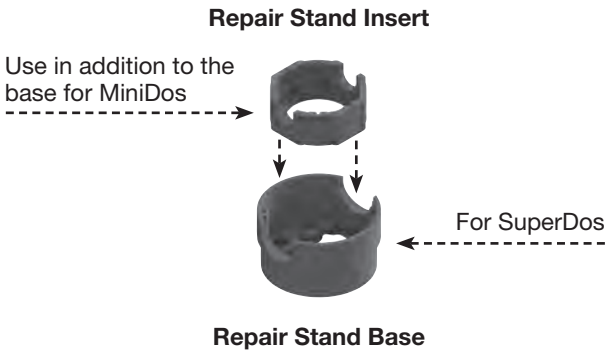
SuperDos & MiniDos Repair -
Disassembly of SuperDos & MiniDos Lower End & Injector Motor

Tools You Will Need:

1. Channel-lock wrench
2. Needle nose pliers
3. Black plastic wrench
4. Red plastic 6-way wrench
5. 7/16 wrench
6. 1/4 inch nut driver
7. O-ring removal tool
8. Housing wrenches
9. Flat-head screwdriver
10. Phillips-head screwdriver
11. Water line
12. Drain
13. Work bench
14. One repair stand (*supplied to dealer* by Hydro Systems Company)



Your Work Space Should Be:

1. An area large enough to lay out the disassembled parts.
2. An area with running water to test the rebuilt unit.

I. Section One – Lower End - assumed to have unit in an upright, hard mounted position

Step 1: Check Valve Assembly (*Instructions do not include the MicroDos, MiniDos 0.4% HAC or the SuperDos 45)*

1. Unscrew the first nut at the bottom of the lower end.
2. Remove nipple from the nut.
3. Remove the o-ring from the nipple.
4. Take needle nose pliers and twist the two tabs that stick up counter-clockwise (should feel it snap).
5. Remove twist lock and check valve poppet with spring.
6. Remove spring from poppet hooks located on the cross-hair of the poppet.

Step 2: Cylinder Assembly (*Does not include MicroDos, MiniDos 20% or SuperDos 10%)*

1. Remove metal u-pin from lower end (and black u-pin for SuperDos).
2. Take adjustment sleeve and turn to the right until the inner cylinder is more exposed, and easier to grasp.
3. Grab inner cylinder and pull down and out of the unit.

A. For MiniDos

1. Use the channel-lock wrench to unscrew the outer cylinder. There are flat areas on the inner cylinder where the wrench fits.
2. Unscrew the outer cylinder from the unit.
3. To remove the adjustment sleeve, rotate the sleeve clockwise (if viewing from the bottom).

B. For SuperDos

1. Unscrew the outer cylinder from the lower body.
2. Screw the adjustment sleeve up to the top of the outer cylinder.
3. Take the o-ring removal tool and remove the o-ring from the outer cylinder.
4. Unscrew the adjustment sleeve back down to remove it.

Step 3: Dosing Shaft Assembly *(Does not include MicroDos, MiniDos 20% or SuperDos 10%)*

A. For Two-part Shafts (MiniDos 1, 2.5% and SuperDos 0.3%)

1. Quarter-turn the lower shaft assembly, and pull down to remove.
2. Quarter-turn the upper shaft, and pull down.
3. Remove gasket (MiniDos only), white spacer and #17 o-ring.

B. For Single-part Shafts

1. Quarter-turn the shaft, and pull down.
2. Remove gasket (MiniDos only), spacer and #17 o-ring from either shaft or housing.
3. Take needle nose pliers to pinch the dosing piston locks.
4. Pull off dosing piston while the dosing piston locks are suppressed.

II. Section Two – Motor

The motor is very fragile:
Use caution!

1. Flip injector upside-down and place top of injector into the repair stand.
2. Firmly grab the inlet and outlet on the lower body and turn counter-clockwise. Unscrew until injector comes apart.
3. Flip injector back over and replace into the repair stand.
4. Remove the top cap (with the motor still attached).
5. Remove the one-way mixing chamber gasket from either the lower body or the motor.
6. Take the cotter ring and remove it from the on/off switch pin.
7. Remove the on/off shaft pin.
8. Grasp the motor and quickly pull out the motor.

SuperDos in Stand

MiniDos in Stand

SuperDos & MiniDos Repair -
Reassembly of SuperDos & MiniDos Injector Motor & Lower End

Tools & Supplies You Will Need:

1. Channel-lock wrench
2. Needle nose pliers
3. 7/16 Wrench
4. 1/4" nut driver
5. O-ring removal tool
6. Housing wrenches
7. Flat-head screwdriver
8. Phillips-head screwdriver
9. Water line
10. Drain
11. Work bench
12. Silicone lubricant
13. Rubber mallet

I. Section One – Motor Installation:

The motor is very fragile:
Use caution!

1. Grab the red or black by-pass shaft with the o-ring attached.
2. Place by-pass shaft in top of motor and cycle motor to down position.
3. Take a rubber mallet and tap by-pass shaft into motor with caution.
4. Cycle motor up and down to ensure it is functioning properly.
5. Put some silicone lubricant on the by-pass shaft o-ring.
6. Cycle by-pass shaft into up position.
7. Carefully fish the by-pass shaft into upper housing top bore.
8. Once the by-pass shaft is centered, tilt the motor piston so that one edge of the flange is inserted into the upper housing.
9. Rotate motor while slowly pushing it into the upper housing.

The flange is very fragile:
Use caution!

10. Once the motor is all the way in the upper housing, press on the bottom of the motor (on the shaft socket-lock).
11. Press on the bottom of the motor and the upper part of the upper housing until you feel it “pop” into place (takes quite a bit of force).
12. Rotate the on/off switch on the upper housing until the holes line up for the pin.
13. Insert the pin through the slot in the top.
14. Put cotter ring on to hold the pin in place.
15. Grasp the motor and cycle it to the down position. Be careful not to damage the upper flange of the motor!

A. For MiniDos

1. Put silicone lubricant on the mixing chamber gasket (on the flat side).
2. Place the mixing chamber gasket into the lower housing, making sure that the duck bills are facing down, and are not being pinched by the support structure of the lower body.
3. Slowly insert the motor at a tilt, making sure not to damage the flange. Once the flange is all the way into the cylinder of the lower body, the upper housing can be pushed down to meet the lower housing.

I. Section One – Motor Installation: (continued)

B. For SuperDos

1. Put silicone lubricant on the mixing chamber gasket (on the flat side inner and outer rim).
2. Place the mixing chamber gasket around the lower part of the motor, with the gasket duck bills facing away from the upper housing.
3. Grasp the motor by the lower part of the piston and tilt the motor to insert one flange edge at a time, making sure not to damage the flange.
4. Once the flange is all the way into the cylinder of the lower body, the upper housing can be pushed down to meet the lower housing.
5. First, using only hand force, screw the upper housing on to the lower housing (be careful not to cross-thread).
6. Use the proper wrench to tighten the upper housing unit the mold seams on the upper and lower housing match up.

II. Section Two – Lower End Assembly:

Step 1: Dosing Shaft Assembly

A. For Two-part Shafts:

1. Place #17 o-ring on top shaft.
2. Insert top shaft into unit under the lower body.
3. Turn the shaft a 1/4 turn to lock it in place.
4. Place the white spacer (MiniDos) and gasket parts on the shaft (hold them in place).
5. Insert the lower shaft into the bottom part of upper shaft (make sure there is a dosing piston on the shaft).
6. While holding the upper shaft (so it does not rotate), 1/4 turn the lower shaft to lock it into place.
7. Check both the upper and lower shafts to ensure that they are locked in.
8. Keep holding the spacer and gasket in place as you install the lower end cylinders (next step).

B. For One-part Shafts:

1. Install an o-ring at the base of the shaft along with the dosing piston.
2. Place the white gasket loosely on the shaft along with the spacer(s) and the #17 o-ring.
3. Insert shaft into lower body and 1/4 turn to lock it into place.
4. Ensure that the shaft is locked in.

Step 2: Lower End Cylinder Assembly

A. For MiniDos:

1. Take the outer cylinder and put on the white o-ring in the groove (larger diameter side).
2. Insert outer cylinder (smaller diameter side) into the adjustment sleeve (at the bottom of the numbers).
3. Screw adjustment sleeve on to the outer cylinder until the 4 flat slots are visible.
4. Take the inner cylinder and make sure that the o-rings have silicone lubricant on them.
5. Insert inner cylinder into bottom of the cylinder assembly.
6. Line up the inner cylinder slot with the adjustment sleeve holes.
7. Install the metal u-pin into the holes.
8. Prepare to install the cylinder into the lower body.
9. Make sure there is a white gasket to seal the outer cylinder to the lower body.
10. First, hand tighten the lower end cylinder assembly.
11. Then, use the channel-lock wrench to finish tightening the lower end cylinder assembly.

Hydro systems
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SuperDos & MiniDos Repair -
Reassembly of SuperDos & MiniDos Lower End & Injector Motor

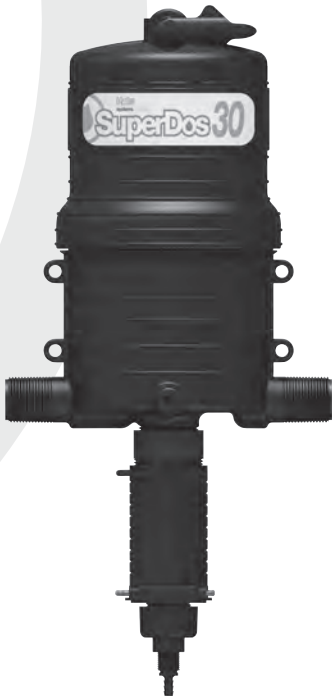
II. Section Two – Lower End Assembly: (continued)

B. For SuperDos:

1. Insert the outer cylinder (bottom of numbers) into the top of the adjustment sleeve (where a + and – can be seen).
2. Screw on the adjustment sleeve until there is a visible groove sticking out of the bottom of the adjustment sleeve.
3. Install the outer cylinder o-ring in the groove, followed by silicone lubricant.
4. Take inner cylinder and put lubricant on the o-ring at the top (side without threads).
5. Insert the top of the inner cylinder into the outer cylinder all the way.
6. While grasping the outer cylinder at the very top, rotate adjustment sleeve until the inner cylinder is matched up with the adjustment sleeve.
7. Then, rotate the adjustment sleeve until the holes line up with the slots.
8. Insert the metal u-pin into the two holes.
9. Prepare to attach the lower end cylinder assembly to the lower body.
10. Make sure there is a white gasket and the white spacer is installed on the shaft assembly.
11. Screw on the outer cylinder on the lower housing and hand-tighten.
12. Install the plastic u-pin in the upper slots in the adjustment sleeve.

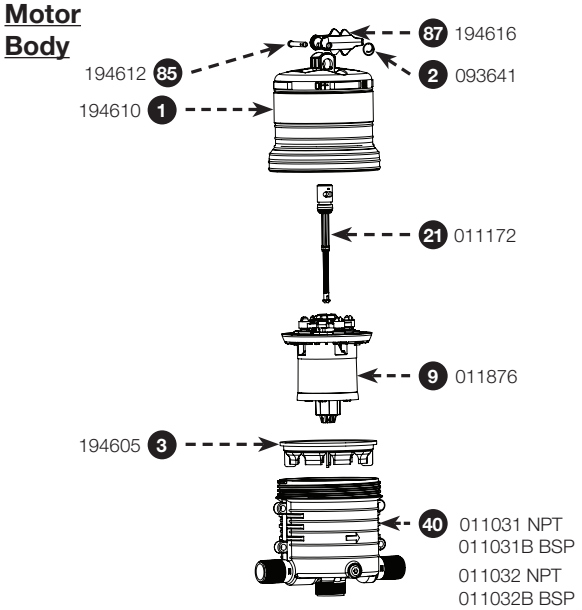
Step 3: Check Valve Assembly

1. Take check valve poppet and install the spring on the upper (flat) portion of the poppet.
2. There are two little hooks where the spring sits into on the cross-hair.
3. Insert the poppet and spring assembly into the wide part of the nipple, spring side up.
4. Take the twist-lock part and insert it into the nipple with the two tabs in the up position.
5. Using either your fingers or a pair of needle nose pliers, twist the two tabs on the twist lock in a clockwise direction until they pop into place.
6. Install the o-ring on the outer rim of the nipple.
7. Insert nipple and o-ring assembly (point first) into the wide rim side of the check valve nut.
8. Screw on the check valve assembly to the lower end cylinder assembly.
9. Hand tighten the nut.



Manual Reference	Part #	Description
SuperDos 15, 20, 30, 45		
1	194610	Upper Body
2	193641	Cotter Ring
3	194605	Mixing Chamber Gasket
9	011876	Piston Assembly
21	011172	Shaft Assembly
40	011031	Lower Body NPT 1"
	011031B	Lower Body BSP 1"
40	011032	Lower Body NPT 1-1/4"
	011032B	Lower Body BSP 1-1/4"
85	194612	Upper Shaft Pin
87	194616	On/Off Handle

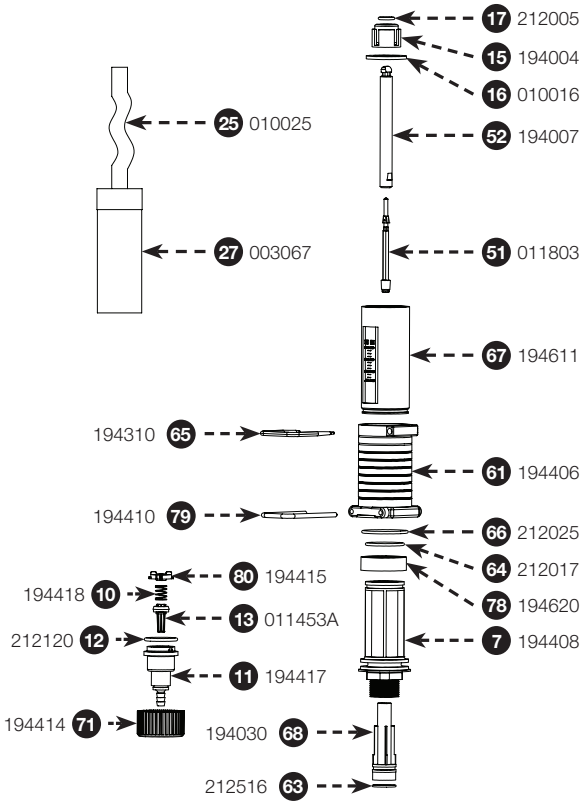
Motor Body



Manual Reference	Part #	Description
Lower End 0.3%		
7	194408	Cylinder, Inner
10	194418H	Spring
11	194417	Fitting, Suction Tube, 1/4"
12	212120*	O-ring
13	011453A	Check Poppet
15	194004	Seal Retainer, O-ring
16	010016*	Lower End Gasket
17	212005*	O-ring
25	010025	Suction Tube, 1/4"×5"
27	003067	Foot Valve 1/4" ID
51	011803*	Lower Shaft Assembly
52	194007	Upper Shaft
61	194406P	Ratio Adjustment Sleeve
63	212516*	O-ring, Outer Cylinder (#68)
64	212017*	O-ring, Inner Cylinder, Lower End
65	194310D	Interlock Pin
66	212025*	O-ring, Outer Cylinder, Lower End
67	194611	Cylinder, Outer
68	194030	Cylinder, Inner for #7
71	194414	Nut, Suction Tube Fitting
78	194620	Lower End Stop
79	194410SS	Retainer Clip, Bottom
80	194415	Twistlock

* Must specify material

Lower End 0.3%

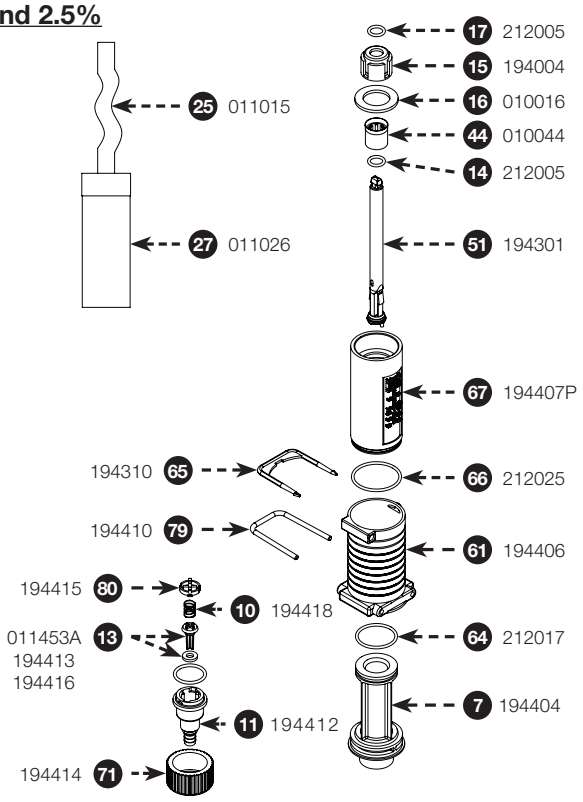


SuperDos & MiniDos Parts -
SuperDos Lower End Repair Parts - 0.3%, 0.4%, 2.5% & 5%

Manual Reference	Part #	Description
Lower End 2.5%		
7	194404P	Cylinder, Inner
10	194418H	Spring
11	194412	Fitting, Suction Tube, 3/8"
12	212120*	O-ring
13	011453A	Check Poppet
14	212005*	O-ring
15	194004	Seal Retainer, O-ring
16	010016*	Lower End Gasket
17	212005*	O-ring
25	011015	Suction Tube, 3/8"x5'
27	011026	Filter, for Suction Tube
44	010044P	Dosage Piston
51	194301F	Shaft
61	194406P	Ratio Adjustment Sleeve
64	212017*	O-ring, Inner Cylinder, Lower End
65	194310D	Interlock Pin
66	212025*	O-ring, Outer Cylinder, Lower End
67	194407P	Cylinder, Outer
71	194414	Nut, Suction Tube Fitting
79	194410SS	Retainer Clip, Bottom
80	194415	Twistlock

* Must specify material

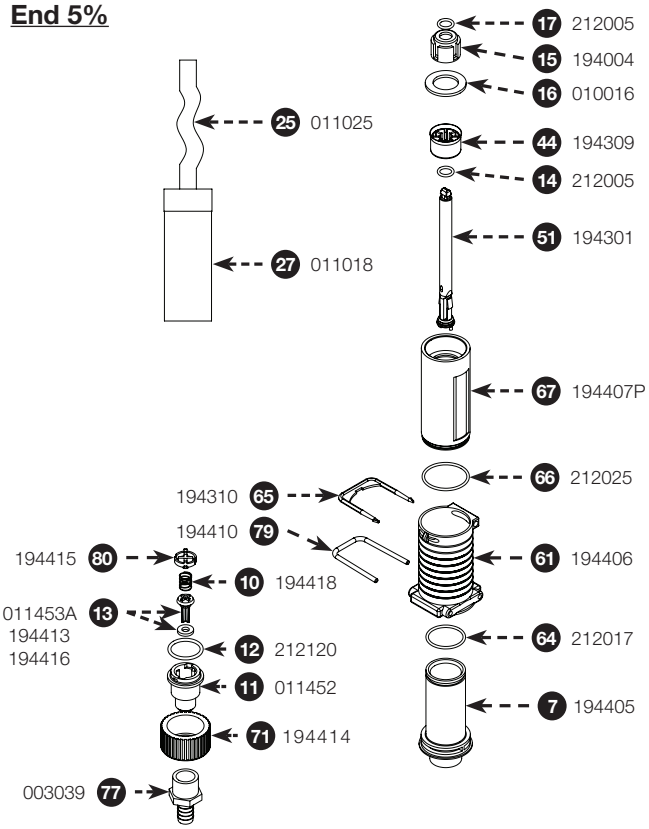
Lower End 2.5%



Manual Reference	Part #	Description
Lower End 5%		
7	194405P	Cylinder, Inner
10	194418H	Spring
11	011452	Fitting, Suction Tube, 1/2"
12	212120*	O-ring
13	011453A	Check Poppet
14	212005*	O-ring
15	194004	Seal Retainer, O-ring
16	010016*	Lower End Gasket
17	212005*	O-ring
25	011025	Suction Tube, 1/2"x5'
27	011018	Filter, for Suction Tube, 1/2" ID
44	194309	Dosage Piston
51	194301F	Shaft
61	194406P	Ratio Adjustment Sleeve
64	212017*	O-ring, Inner Cylinder, Lower End
65	194310D	Pin, Upper Interlock
66	212025*	O-ring, Outer Cylinder, Lower End
67	011918P	Cylinder, Outer
71	194414	Nut, Suction Tube Fitting
77	003039	Hose Barb 1/2"×3/8"
79	094410SS	Retainer Clip, Bottom
80	194415	Twistlock

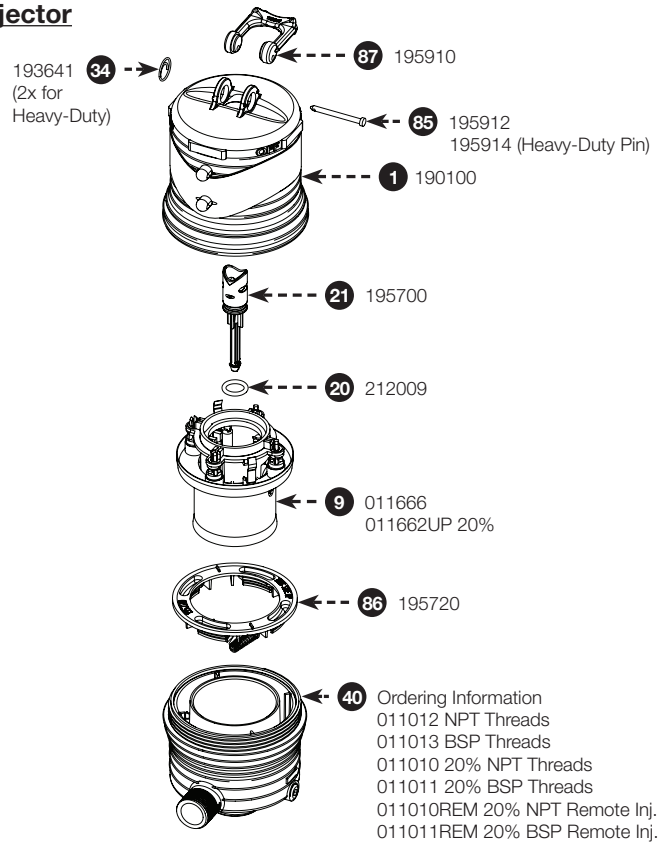
* Must specify material

Lower End 5%



Manual Reference	Part #	Description
Injector Repair Parts		
1	190100	Upper Body
9	011666 011662UP 20%	Motor Piston
20	212009	O-ring
21	195700	Bypass Shaft
34	093641	Cotter Ring
40	011012 011013 011010 011011 011010REM 011011REM	NPT Lower Body BSP Lower Body 20% NPT 20% BSP 20% NPT Remote Inj. 20% BSP Remote Inj.
85	195912 195914 (Heavy-Duty Pin)	Upper Shaft Pin
86	195720	Mixing Chamber Gasket
87	195910	On/Off Handle

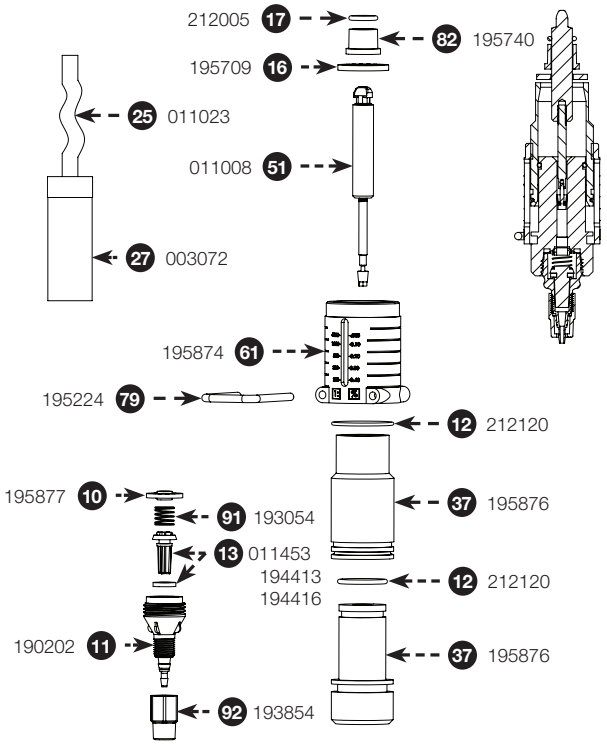
Injector



Manual Reference	Part #	Description
Lower End Injector & Wear Parts Kits 0.4%		
7	190031	Outer Cylinder
10	195877	0.4% Spring
11	190202	Suction Tube Fitting, 1/8"
12	212120*	O-ring
13	011453A	Check Poppet with washer
16	195709	Gasket
17	212005*	O-ring
25	011023	Suction Tube 1/8" x 3'
27	003072	Filter For Suction Tube 1/8"
37	195876	0.4% Inner Cylinder
51	011008	0.4% Shaft Assembly
60	212517W	O-ring
61	195874	0.4% Ratio Adjuster
79	195224	Interlock Pin
82	195740	Shaft Seal Spacer
91	193054	Seal, Check Valve
92	193854	Hose Nut 1/8"

* Must specify material

Lower End Assembly

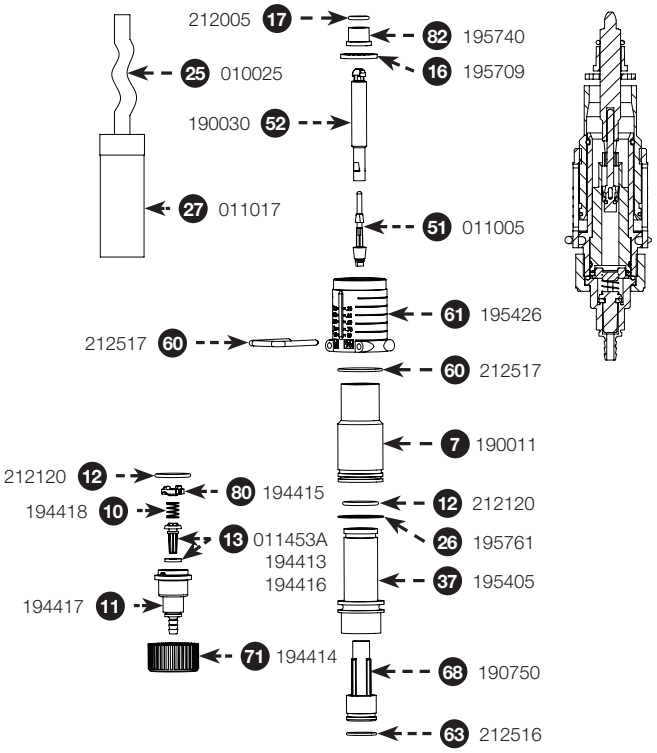


SuperDos & MiniDos Parts -
MiniDos Lower End Injector & Wear Parts Kits 1% & 2.5%

Manual Reference	Part #	Description
Lower End Injector & Wear Parts Kits 1%		
7	190011	Cylinder, Outer
10	194418H	Spring
11	194417	Suction Tube Fitting
12	212120*	O-ring
13	011453A	Check Poppet with Washer
16	195709	Gasket
17	212005*	O-ring
25	010025*	Suction Tube 1/4" x 5'
26	195761	Anti-Lock Gasket
27	011017	Filter For Suction Tube, 1/4" ID
37	195405	Inner Cylinder
51	011005	Lower Shaft Assembly
52	190030	Shaft, Upper
60	212517W	O-ring
61	195426	Ratio Adjuster
63	212516*	O-ring, Inner Cylinder
68	1950750	Inner Cylinder for #37
71	194414	Nut, Suction Tube Fitting
79	195224	Interlock Pin
80	194415	Twistlock
82	195740	Shaft Seal Spacer

* Must specify material

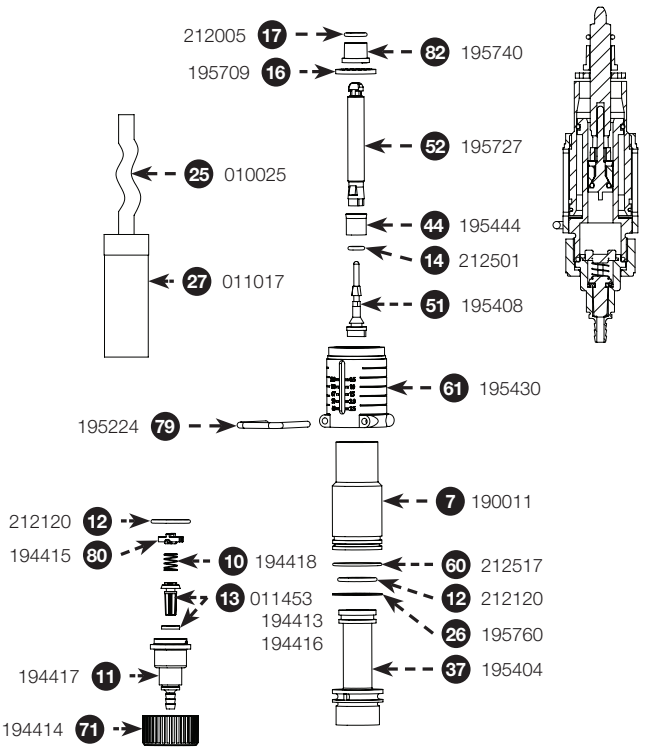
Lower End Assembly



Manual Reference	Part #	Description
Lower End Injector & Wear Parts Kits 2.5%		
7	190011	Cylinder, Outer
10	194418H	Spring
11	194417	Suction Tube Fitting
12	212120*	O-ring
13	011453A	Check Poppet with washer
14	212501*	O-ring
16	195709	Gasket
17	212005*	O-ring
25	010025	Suction Tube, 1/4"x5'
26	195760	Anti-Lock Gasket
27	011017	Filter For Suction Tube, 1/4" ID
37	195404	Inner Cylinder
44	195444P	Dosage Piston
51	195408	Shaft, Lower
52	195727	Shaft, Upper
60	212517W	O-ring
61	195430	Ratio Adjuster
71	194414	Nut, Suction Tube Fitting
79	195224	Interlock Pin
80	194415	Twistlock
82	195740	Shaft Seal Spacer

* Must specify material

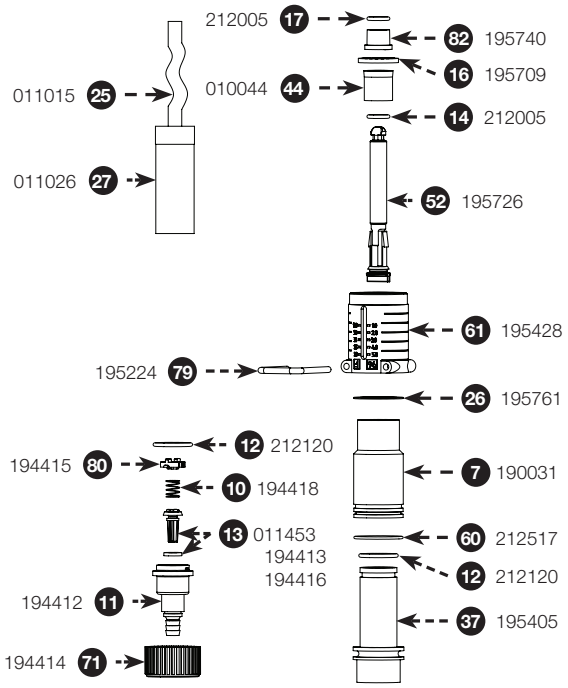
Lower End Assembly



Manual Reference	Part #	Description
Lower End Injector & Wear Parts Kits 5%		
7	190031	Cylinder, Outer
10	194418H	Spring
11	194412	Fitting, Suction Tube, 3/8"
12	212120*	O-ring
13	011453A	Check Poppet with Washer
14	212005*	O-ring
16	195709	Gasket
17	212005*	O-ring
25	011015	Suction Tube, 3/8" x 5'
26	195761	Anti-Lock Gasket
27	011026	Filter for Suction Tube, 3/8" ID
37	095405	Inner Cylinder
44	010044P	Dosage Piston
52	195726	Shaft
60	212517W	O-ring
61	195428	Ratio Adjuster
71	194414	Nut, Suction Tube Fitting
79	195224	Interlock Pin
80	194415	Twistlock
82	195740	Shaft Seal Spacer

* Must specify material

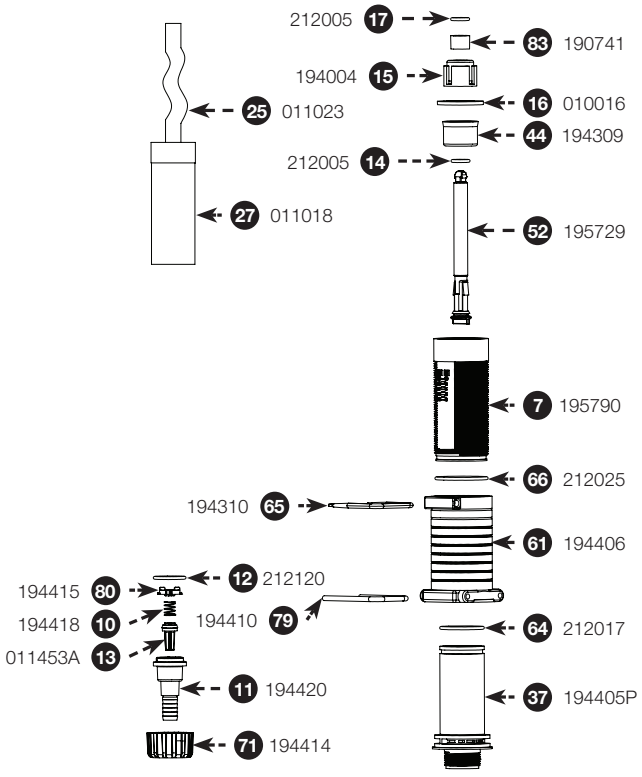
Lower End Assembly



Manual Reference	Part #	Description
Lower End Injector & Wear Parts Kits 10%		
7	195790	Cylinder, Outer
10	194418H	Spring
11	194420	Suction Tube Fitting
12	212120*	O-ring
13	011453A	Check Poppet with washer
14	212005*	O-ring
15	194004	Seal Retainer, O-ring
16	010016S	Gasket
17	212005*	O-ring
25	011025	Suction Tube, 1/2" x 5'
27	011018	Filter for Suction Tube, 1/2" ID
37	194405P	Inner Cylinder
44	194309	Dosage Piston
52	195729	Shaft
61	194406P	Ratio Adjustment Sleeve
64	212017*	O-ring, Outer Cylinder, Lower End
65	194310D	Interlock Pin
66	212025*	O-ring, Outer Cylinder, Lower End
71	194414	Nut, Suction Tube Fitting
79	194410SS	Retainer Clip Bottom
80	194415	Twistlock
83	190741	Shaft Seal Spacer

* Must specify material

Lower End Assembly

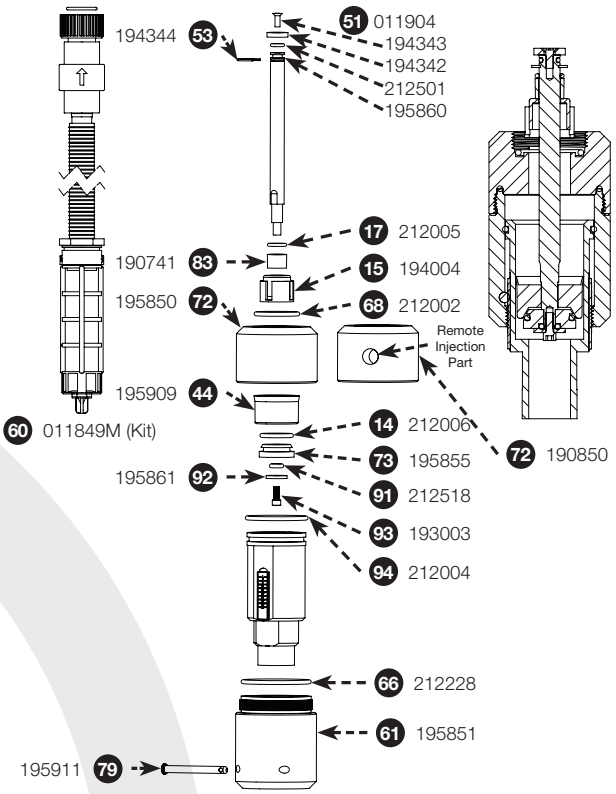


SuperDos & MiniDos Parts -
MiniDos Lower End Injector & Wear Parts Kits 20%

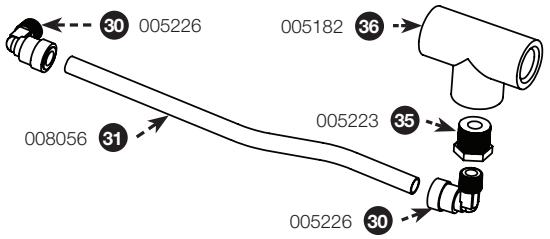
Manual Reference	Part #	Description
Lower End Injector & Wear Parts Kits 20%		
7	011913P	Inner Cylinder
14	212006*	O-ring
15	194004	Seal Retainer O-ring (Retainer Quad Ring)
17	212005*	O-ring
44	195909	Dosage Piston
51	011904	Shaft Assembly
53	194344	Klipring
60	011849M*	Hose Kit
61	195851	Outer Cylinder
66	212228*	O-ring
68	212002*	O-ring
72	195850	Adapter
72	190850	Remote Adapter
73	195855	Dosage Piston Guide
79	195911	Ratio Locking Pin
83	190741	Shaft Seal Spacer
91	212518*	O-ring
92	195861	Shaft Cap
93	193003	Capscrew 10-32×1/2" Ss Hex Head
94	212004*	O-ring

* Must specify material

Lower End Assembly



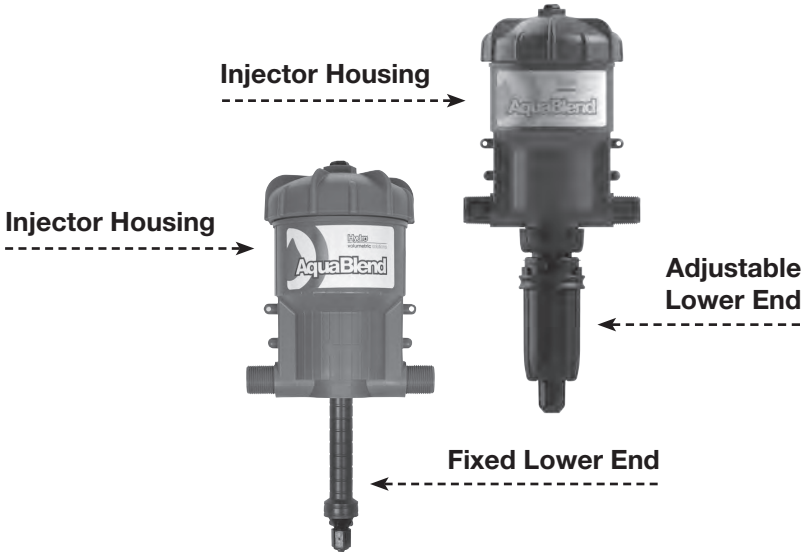
Remote Injection Kit (#012706)



If left outdoors fluid can freeze inside the injector causing permanent damage.

Allow the fluid inside the injector to thaw before troubleshooting to minimize potential damage.

Always shut off the water and depressurize the injector before doing any repair work on unit.



First, determine if the problem is with the injector housing or the lower end.

IS IT "CLICKING"?

YES → **Problem is in Lower End**

NO → **Problem is in Injector Housing**

<u>If the Injector does not click, or no water flows through the unit:</u>

1. Check water flow (GPM) and line pressure to the injector and installation.
2. Check motor piston assembly. If wear or damage has occurred replace the motor piston assembly.

<u>If the Injector is clicking, but is not pulling chemical:</u>

1. Replace the dosing piston in the lower end and check the inner cylinder for wear.
2. Replace the inner cylinder if wear has occurred.

<u>If the unit leaks from upper or lower housing:</u>

1. Replace the upper or lower housing body.
2. Replace the mixing chamber gasket.

<u>If the injector leaks from top part of lower end:</u>

1. Unscrew the lower end from the lower housing and check the gasket for wear.
2. Replace entire lower end.

<u>If the Injector leaks from bottom part of lower end:</u>

1. Unscrew the check valve and check for unwanted debris.
2. Replace check valve, o-rings and inner cylinder below the dosing adjustment sleeve.

Hydro systems
A DOVER COMPANY

AquaBlend Troubleshooting - General

New Install - always pressure up slowly		
Problem	**Cause**	**Solution**
No clicking sound	Fluid not flowing through unit	• Are the red plugs at the inlet, outlet and suction tube fitting openings removed? • Is the unit installed backward? The arrow on the unit must point in the direction of the fluid flow. • Has the new injector been stored for an extended period? If so, submerge the injector in room temperature water for 24 hours so that the working parts can reabsorb fluid and swell back to the proper size. • If still not clicking, do not open the upper body. Call Hydro Systems customer service at 800.543.7184.
	Fluid flowing through unit	• Fluid rate is below or exceeds rated service flow of injector. • Ensure all air is out of the unit by pressing the bleeder button in until water comes out. • If below, increase flow rate. If above, reduce flow rate. • Operating pressure exceeds maximum limit. Install a pressure reducer valve.

Injector in Operation or After Scheduled Maintenance		
Problem	**Cause**	**Solution**
No clicking sound	Air trapped in unit	Release trapped air by pressing the bleeder button in until water comes out.
	By-pass valve not open	Set valve to the closed position.
	Broken Springs	Replace springs, clean fluid filter.
	Dirty or plugged inlet filter	Ensure mesh size is correct for proper filtration. Clean filter.
	Main Piston Assembly #18 worn	Replace #18 Main Piston Assembly. Clean fluid filter.
	Main body #9 worn or scored	Replace body & piston.
Clicking sound, no suction of solution	Cracked or loose suction hose	Check for proper fit and/or replace.
	Dosage piston/gasket #44 worn or installed incorrectly	Replace. Ensure during maintenance replacement that #44 dosage piston/gasket was installed correctly. Piston needs to be flared-end up.
	O-ring seat #14 or dosage piston / gasket #44 damaged or worn	Replace.
	Suction tube #25 or suction tube fitting #11 cracked, leaking or clogged suction tube filter	Replace and/or clean as necessary.
	Check valve #13 leaking	Clean and/or replace as necessary.
Clicking Sound. Under Injecting or Unit operates at high-flow and not at low flow	#44 dosage piston/gasket worn	Replace.
	#7 inner cylinder worn	Replace inner cylinder and piston/gasket.
	Broken springs	Replace springs, clean fluid filter.
	Main Piston Assembly #18 worn	Replace # 18 Main Piston Assembly. Clean fluid filter.
	Main body #9 worn or scored	Replace body & piston.
Fluid Re-filling Solution Tank	Check valve #13 leaking or dirty	Check seat area on suction tube fitting #11. Check valve and seal must fit loose in the suction tube fitting. Check seal and inside fitting for debris.
	Washer seal on #13 is swollen or chemical attack	Replace with new check valve assembly.

AquaBlend Repair - Disassembly of Lower End & Injector Motor

Tools & Supplies You Will Need:

1. Channel-lock wrench
2. Needle nose pliers
3. O-ring removal tool
4. Housing wrenches
5. 6-in-1 Wrench
6. Phillips-head screwdriver
7. Water line
8. Drain
9. Work bench
10. One repair stand (*supplied to dealer* by Hydro Systems Company)
11. Silicone lubricant

Repair Stand

Your Work Space Should Be:

1. An area large enough to lay out the disassembled parts.
2. An area with running water to test the rebuilt unit.

I. Section One – Lower End - ***(assumed to have unit in an upright, hard mounted position)***

Step 1: Check Valve Assembly

1. Unscrew the first nut at the bottom of the lower end.
2. Remove nipple from the nut.
3. Remove the o-ring from the nipple.
4. Take needle nose pliers and twist the two tabs that stick up counter-clockwise (should feel it snap).
5. Remove twist lock and check valve poppet with spring.
6. Remove spring from poppet hooks located on the cross-hair of the poppet.

Step 2: Cylinder Assembly

1. Remove metal u-pin and black u-pin from lower end.
2. Take adjustment sleeve and turn to the right until the inner cylinder is more exposed, and easier to grasp.
3. Grab inner cylinder and pull down and out of the unit.
4. Unscrew the outer cylinder from the lower body.
5. Screw the adjustment sleeve up to the top of the outer cylinder.
6. Take the o-ring removal tool and remove the o-ring from the outer cylinder.
7. Unscrew the adjustment sleeve back down to remove it.

Step 3: Dosing Shaft Assembly

1. Quarter-turn the lower shaft assembly, and pull down to remove.
2. Quarter-turn the upper shaft, and pull down.
3. Remove gasket.

AquaBlend in Stand

II. Section Two – Motor

The motor is fragile:
Use caution!

1. Place AquaBlend in repair stand upside-down and rotate counter-clockwise to loosen cap.
2. Remove the AquaBlend from repair stand.
3. Proceed to unscrew the top lid from the main housing.
4. Take out the motor from the main housing.

AquaBlend Repair -Reassembly of Injector Motor & Lower End

Tools & Supplies You Will Need:

1. Channel-lock wrench
2. Needle nose pliers
3. O-ring removal tool
4. Housing wrenches
5. Phillips-head screwdriver
6. Water line
7. Drain
8. Work bench
9. Silicone lubricant

I. Section One – Motor Installation - ***(assumed to have unit in an upright, hard mounted position)***

The motor is fragile:
Use caution!

1. Place motor into main housing, with the wider part of the motor in the up position.
2. Make sure the top cap has a large o-ring installed along the rim.
3. Place the top cap onto the upper housing and screw it on.
4. Tighten firmly with two hands.

II. Section Two – Lower End Assembly

Step 1: Dosing Shaft Assembly

1. Place white gasket on top shaft.
2. Insert top shaft all the way into unit under the main housing.
3. Turn the shaft a quarter-turn to lock it in place.
4. Insert the lower shaft into the bottom part of upper shaft (make sure there is a dosing gasket on the shaft).
5. While holding the upper shaft (so it does not rotate), quarter turn the lower shaft to lock it into place.
6. Check both the upper and lower shafts to ensure that they are locked in.

Step 2: Lower End Cylinder Assembly

1. Insert the outer cylinder (bottom of numbers) into the top of the adjustment sleeve (where a + and – can be seen).
2. Screw on the adjustment sleeve until there is a visible groove sticking out of the bottom of the adjustment sleeve.
3. Install the outer cylinder o-ring in the groove, followed by silicone lubricant.
4. Take inner cylinder and put lubricant on the o-ring at the top (side without threads).
5. Insert the top of the inner cylinder into the outer cylinder all the way.
6. While grasping the outer cylinder at the very top, rotate adjustment sleeve until the inner cylinder is matched up with the adjustment sleeve.
7. Then, rotate the adjustment sleeve until the u-pin holes line up with the slots.
8. Insert the metal u-pin into the two holes.
9. Prepare to attach the lower end cylinder assembly to the lower body.
10. Make sure there is a white gasket installed in the outer cylinder.
11. Screw on the outer cylinder on the lower housing and hand-tighten.
12. Install the plastic u-pin in the upper slots in the adjustment sleeve.

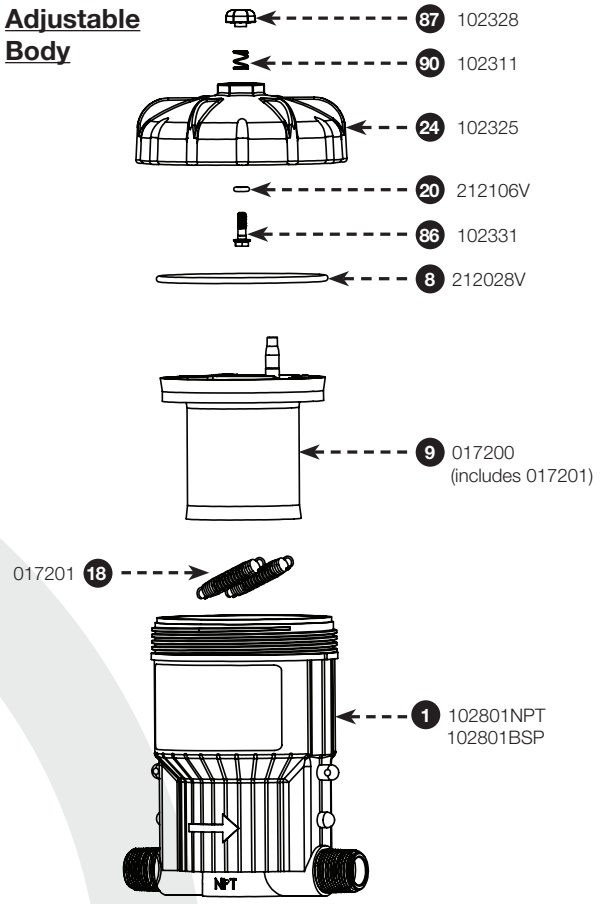
Step 3: Check Valve Assembly

1. Take check valve poppet and install the spring on the upper (flat) portion of the poppet.
2. There are two little hooks where the spring sits into on the cross-hair.
3. Insert the poppet and spring assembly into the wide part of the nipple, spring side up.
4. Take the twist-lock part and insert it into the nipple with the two tabs in the up position.
5. Using either your fingers or a pair of needle nose pliers, twist the two tabs on the twist lock in a clockwise direction until they pop into place. Install the o-ring on the outer rim of the nipple.
6. Insert nipple and o-ring assembly (point first) into the wide rim side of the check valve nut.
7. Screw on the check valve assembly to the lower end cylinder assembly.
8. Hand tighten the nut.

AquaBlend Parts -
Injector & Adjustable Lower End Repair Parts - 2% & 5%

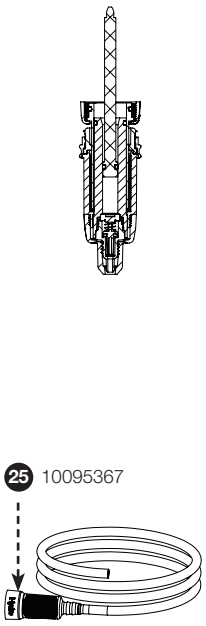
Manual Reference	Part #	Description
AquaBlend Adjustable Body		
1	102801NPT, 102801BSP	Body, NPT & BSP AquaBlend Adjustable
8	212028V	O-ring
9	017200	Replacement Motor Piston
18	017201	Replacement Motor Springs
20	212106V	O-ring
24	102325	Lid
86	102331	Vent Screw
87	102328	Vent Cap
90	102311	Vent Spring

Adjustable Body



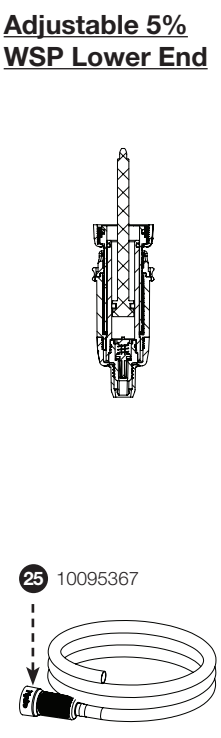
Manual Reference	Part #	Description
Adjustable 2% WSP Lower End		
7	190868	Lower End .78%
10	194418H	Spring
11	190201	Suction Tube Fitting
12	193054	Gasket
13	011453A	Check Poppet
25	10095367	Pick-up Tube Assembly
44	102004V	Dosage Gasket
51	102036	Shaft
64	212029Vz	O-ring
66	212030V	O-ring
68	102031	Inner Cylinder
71	102026	Bottom Nut
80	194415	Twistlock
91	10095920	Hose Nut

Adjustable 2% WSP Lower End



Manual Reference	Part #	Description
Adjustable 5% WSP Lower End		
7	102035	5% Adjustable Assembly
10	194418H	Spring
11	10097177	Check Valve Body, 3/8"
12	212516V	O-ring
13	011453A	Check Poppet
25	10095356	Pick-up Tube Assembly
44	194022V	Dosage Gasket
51	102037	Shaft
64	212029V	O-ring
66	212030V	O-ring
68	102024	Inner Cylinder
71	102026	Bottom Nut
80	194415	Twistlock
91	10095924	Hose Nut

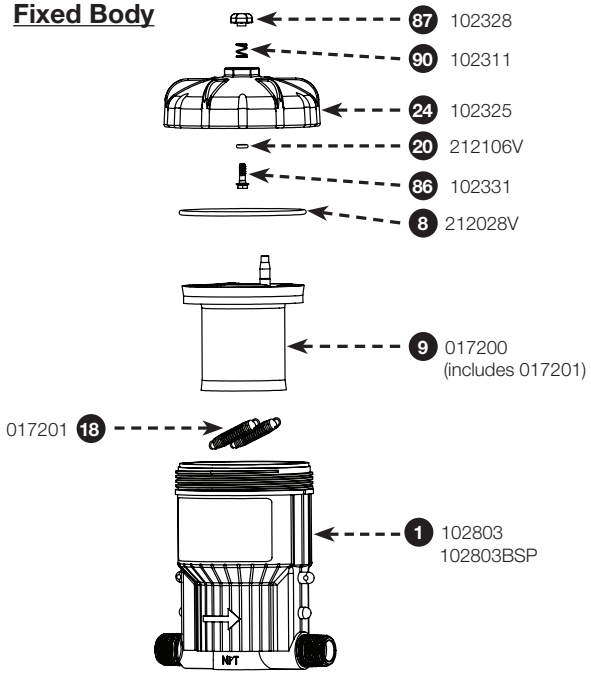
Adjustable 5% WSP Lower End



AquaBlend Parts -
Injector & Fixed Lower End Repair Parts - .78% & 1%

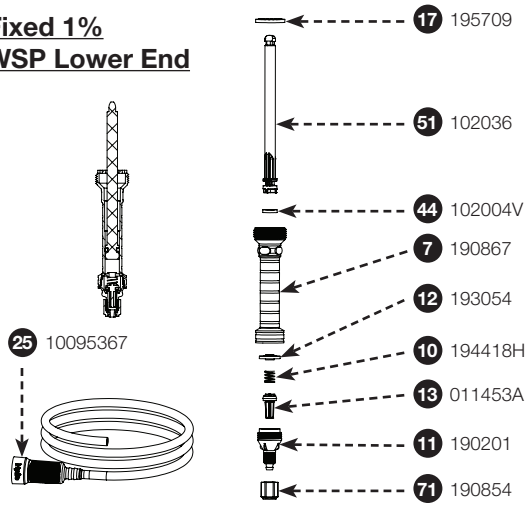
Manual Reference	Part #	Description
AquaBlend Fixed Body		
1	102803, 102803BSP	Body, NPT & BSP AquaBlend Fixed
8	212028V	O-ring
9	017200 (includes 017201)	Replacement Motor Piston
18	017201	Replacement Motor Springs
20	212106V	O-ring
24	102325	Lid
86	102331	Vent Screw
87	102328	Vent Cap
90	102311	Vent Spring

Fixed Body



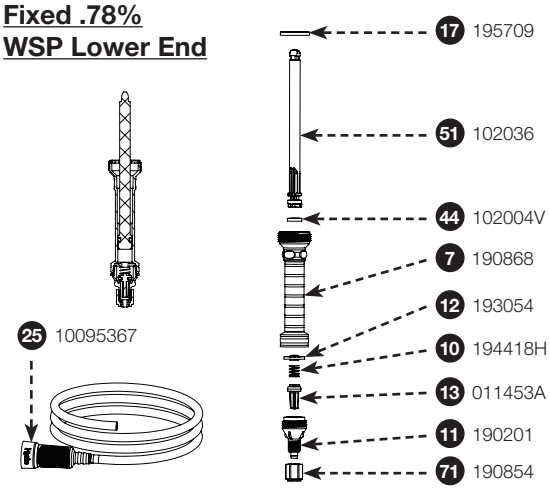
Manual Reference	Part #	Description
Fixed .78% WSP Lower End		
7	190868	Lower End .78%
10	194418H	Spring
11	190201	Suction Tube Fitting
12	193054	Gasket
13	011453A	Check Poppet
17	195709	Gasket
25	10095367	Pick-up Tube Assembly
44	102004V	Dosage Gasket
51	102036	Shaft
71	190854	Hose Nut

Fixed 1%
WSP Lower End



Manual Reference	Part #	Description
Fixed 1% WSP Lower End		
7	190867	Lower End 1%
10	194418H	Spring
11	190201	Suction Tube Fitting
12	193054	Gasket
13	011453A	Check Poppet
17	195709	Gasket
25	10095367	Pick-up Tube Assembly
44	102004V	Dosage Gasket
51	102036	Shaft
71	190854	Hose Nut

Fixed .78%
WSP Lower End



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