**TROUBLESHOOTING INSTRUCTIONS**

**PROBLEMS**

**SOLUTIONS**

**I. Fluid will not flow from the Bleed Valve when opened.**

A. Insure the **Bleed Valve** is open far enough. Unscrew (clockwise) until the valve stem stops turning.

B. Insure that fluid is getting to the MacroSpray. Check below per the method of fluid supply being used:

1. If using a **Reservoir** (Gravity Feed):
a) Insure the Reservoir is full, and the fill-level is above the top of the MacroSpray.
b) If the fluid is very heavy, it may be too viscous to run through the **Fluid Supply Line**.

2. If using a **Pump** (Pressure Feed):
a) Insure the Pump is "on" and is pumping at a good pressure.
b) Make sure any valve in the **Fluid Supply Line** is open.

C. Insure the **Fluid** inlet is not obstructed.

See "**INSPECTING the MacroSpray**". Look for a clogged **Fluid Inlet**.

**II. The built-in air valve (Univalve) does not actuate when the Actuator is cycled.**

A. Check the operating air pressure. It should be at least 40 P.S.I.

B. Ascertain if the problem is with the **Univalve** or **Actuator** as follows:

1. Turn off the **Air Supply** and disconnect the Actuator from the MacroSpray. If the Actuator tubing is being used, disconnect it from the Actuator and at the MacroSpray.

2. Turn the **Air Supply** back on. Air should be escaping where the Actuator was disconnected.

3. Prevent this air escaping by placing your thumb over the vent hole.

4. If the MacroSpray operates when you plug and unplug this hole, the problem is with the Actuator. Continue with the INSTRUCTIONS supplied with that Actuator.

5. If the MacroSpray will not operate by this method, check the **Univalve** as described below.

C. If the **Actuator** tubing is being used, do the following:

1. Insure the **Tubes** have been installed properly. See the INSTRUCTIONS for the Actuator used.

2. Inspect the **Tubes** for leakage (cuts, cracks, bad connections, etc.)

3. Inspect the **Tubes** for blockage (obstructions, kinks, crimps, etc.)

4. If the **Actuator Tube** is longer than four feet, response will be slowed. If too long, the **Univalve** will not operate.

D. Inspect the **Univalve**. See "**INSPECTING the Univalve**" for direction.

If simple cleaning and lubrication solves the problem, but it repeats consistently, installing an **Air Filter/Lubricator** would probably cure the problem for good.

**III. Fluid does not eject from SprayNozzle when MacroSpray is activated.**

A. Insure fluid is present. Check per **PROBLEM I.** at **Steps B.** and **C.**

B. Insure the **Univalve** is operating. If not, see **PROBLEM II.**

C. The MacroSpray may require priming. See **OPERATING INSTRUCTIONS at Step B.**

**NOTE:** If priming solves the problem, but it re-occurs often, see **PROBLEM V.**

D. Ascertain if the problem is with the **MacroSpray** or **SprayNozzle** as follows:

1. Dis-connect the **Distribution Line** at the MacroSpray's **Fluid Outlet**.

2. Operate the MacroSpray and check the ejection from the **Fluid Outlet**.

3. If an appropriate amount of fluid is forcefully ejected, see "**INSPECTING the SprayNozzle**". Look for an obstruction in the **Distribution Line** or **Spray Nozzle**.

4. If no fluid is ejected, or very little is with little force, see "**INSPECTING the MacroSpray**". Check everything as directed.

**IV. The pattern of the spray ejected from the SprayNozzle is unsatisfactory.**

A. If the SprayNozzle drips during or after ejection. This indicates there is air in the system or "soft" **Distribution Tube** being used. See **OPERATING INSTRUCTIONS at Step H.**

B. If the spray is erratic, off-center, or unevenly dispersed.

See "**INSPECTING the SprayNozzle**", and look for a contaminated **Nozzle Tip**.

C. If the spray is not atomized finely enough:

1. **Fluid** not operating. Check everything as directed.

**V. The MacroSpray must be primed frequently to maintain good performance.**

This indicates air is getting into the MacroSpray somehow. The more common causes of this are listed below:

A. If a fluid is being used to supply the fluid, it may be introducing air into the system.

B. The **Fluid Supply Line** may be cracked or punctured, or it's connections may be loose.

C. An **O-Ring Seal** may be bad, allowing air to be drawn into the MacroSpray. See "**INSPECTING the MacroSpray**" and check **O-Rings** (6) for proper seating.

**INSTALLATION INSTRUCTIONS**

A. Installing an Actuator

The MacroSpray requires an Actuator to operate. If you do not have one, see the ACCESSORIES Section for a listing of those available.

The MacroSpray ejects when it's **Relief Port** is vented to atmosphere, and recharges when this **Port** is closed. This is controlled by the **Actuator**. Follow the INSTRUCTIONS supplied with your **Actuator** for details on how it is installed.

B. Installing the MacroSpray

**NOTE:** The MacroSpray should preferably be mounted on a wall or upright (not on a table or bed) and its **Fluid Inlet** port should be pointing downward (as shown in the ILLUSTRATION).

If the MacroSpray is mounted on a level surface, it's performance may be somewhat reduced, especially when dispensing smaller amounts of fluid.
1. Locating the MacroSpray

Consider the following when locating a MacroSpray.

a) Insure that lines to be connected to the MacroSpray will not interfere with other equipment, and will not be caught by or caught against moving parts.
b) Locate MacroSpray as close to SPRAY NOZZLES as practical. Most applicable when airflow is heavy fluid.
c) Locate MacroSpray at a lower level than the SPRAY NOZZLE for easier start-up.
d) Locate MacroSpray as close to the ACTUATOR as practical (must be within four feet). Most applicable when operating at higher cycle rates (faster than 100 cycles per minute).

2. Mounting the MacroSpray

Drill and tap for four 3/8" screws on a 4-1/2/"5.50 X 5.50(50) bolt pattern (see ILLUSTRATION on cover). Mount the MacroSpray with screws screwed into four MOUNTING HOLES.

C. Installing a Fluid Supply

The fluid to be ejected may be supplied by a built-in air valve termed the AIR VALVE.

b) Mount the AIR VALVE on the pressurized Reservoir, or any elbow fittings are used, increase passages to 5/8" or more.

E. Installing the Distribution System.

This System consists of NOZZLE ASSEMBLIES, DISTRIBUTION LINE, and their connections to the MacroSpray.

1. Items required

The items below are required to operate the MacroSpray. They are ordered separately from the supplier and might not be included. If not present, they must be obtained.

a) Nozzle Assembly

Various types of NOZZLE ASSEMBLIES are available. At least one of these items are required. (see ACCESSORIES)

b) Distribution Line

Distribution Line must be 1/4" O.D. For best results use metal tubing (soft copper is easiest to handle).

2. Mounting a Single Assembly

Do as described per type of NOZZLE ASSEMBLY being used.

a) SprayNozzle.

This requires support. If metal DISTRIBUTION LINE is used, in order to be able to use this as support. If this line is flexible, a NOZZLE BRACKET (see ACCESSORIES) or another support will have to be used.

b) FlexTube.

Drill and tap for 1/8-27 pipe thread. Screw the threaded stud of the FlexTube into this hole.

c) MagnaTube.

Simply set the MagnaTube into place where desired.

3. Installing the Signal Line

For best results, try to comply with the following:

a) Keep the amount of LINE used to a minimum. Run LINE as directly as possible. Use as little slack as practical.

b) Use metal LINE where possible. If flexible LINE is required, see if metal LINE can be used up to a point and then continued with flexible LINE.

c) Keep contamination out of the LINES. If cutting creates chips, be sure to flush clean before installation.

d) Make all connections properly. Keep the DISTRIBUTION LINE bottomed in the FITTING when tightening the compression nut to one full turn past hand-tight.

4. Using the On/Off Manifold

ON/OFF MANIFOLDS provide for splitting the DISTRIBUTION LINE and allowing LINES to be turned on/off. For best results, try to comply with the following:

a) If MacroSpray is close to SPRAY NOZZLES, connect MANIFOLD directly to MacroSpray's FLUID OUTLET PORT using a pipe nipple.

b) If MacroSpray is distant to the SPRAY NOZZLES, locate MANIFOLD as close to the SPRAY NOZZLES as practical. Run DISTRIBUTION LINE from the MacroSpray to the MANIFOLD, and then on to the SPRAY NOZZLES.

D. Connecting the Air Supply Line

- Unscrew PIPE PLUG(42) from VALVE HOUSING(32).
- Remove RETAINER RING(39) from VALVE HOUSING(32) (use a small screwdriver and force it from machine). See page 5.
- Remove VALVE PLUG(38) and VALVE STOPPL(36) by inserting a rod (3/16" or smaller) into the hole from which PIPE PLUG(42) was removed. Using thread sealant prevent loss of air.
- Inspect the Spool, Cylinder, and their O-Rings.
- Do not remove an O-Rings from it's groove unless found bad. If bad, do not scratch the groove while prying it out.
- Check parts for contamination. If dirty/gummy, clean thoroughly.
- Check parts (including the O-RINGS on them) for cuts, marring, breakage, or deformation.

NOTE: It is natural for O-RING(35) to fit in it's groove very closely. The reason being that it is a special, low friction configuration.

3. Air Handling Equipment

Using an AIR FILTER/REGULATOR/LUBRICATOR is strongly recommended. The FILTER and LUBRICATOR for more care-free service. Use the LUBRICATOR for air conservation and controlling performance.

Connecting the Air Supply Line

Connect one end of the AIR SUPPLY LINE to the AIR SUPPLY. Connect other end of LINE to the AIR INLET of the MacroSpray.

Installing the System.

This System consists of NOZZLE ASSEMBLIES, DISTRIBUTION LINE, and their connections to the MacroSpray.

1. Items required

The items below are required to operate the MacroSpray. They are ordered separately from the supplier and might not be included. If not present, they must be obtained.

b) Attach a BAR TUBE FITTING in the FLUID INLET of the MacroSpray. Insert into the outlet of the DISTRIBUTION system.

d) Push one end of the FLUID SUPPLY LINE onto the BAR TUBE under the ROUTE. Route the other end of this LINE to the FLUID INLET and cut off excess (not too much!). Push this end onto the BAR TUBE in the FLUID INLET.

2. Using a Pump (Pressure Feed)

PUMPS as described are available from L.S.P. Contact us or our representative if interested.

a) Pump pressures from 40 to 100 P.S.I. may be used. At higher pressures, use adjustable 50 P.S.I. fluid will be forced through the MacroSpray and out the SPRAY NOZZLE.

b) The FLUID SUPPLY LINE: All fittings used with it should have at least a 3/8" passage.

c) Connect this LINE at the PUMP and then to the FLUID INLET of the MacroSpray. A valve or disconnect on this LINE can be useful, but it must have proper passage.

Use thread sealant when making any of the above connections, they must be air tight.

3. Air Pressure

The MacroSpray will operate at any pressure from 40 to 120 P.S.I. (inclusive). In most cases, may be used if performance is acceptable; more than 80 P.S.I. is usually a waste of air; and more than 120 P.S.I. may reduce unit life.

4. Air Supply Line

This AIR SUPPLY LINE and all the fittings used with it, must have at least 1/2" passage. If this LINE is over ten feet long, or any elbow fittings are used, increases passages to 5/8" or more. A valve or disconnect on this LINE can be useful, but it must have proper passage.

A. Dis-assemble UniValve as follows.

- Unscrew PIPE PLUG(42) from VALVE HOUSING(32).
- Remove RETAINER RING(39) from VALVE HOUSING(32) (use a small screwdriver and force it from machine). See page 5.
- Remove VALVE PLUG(38) and VALVE STOPPL(36) by inserting a rod (3/16" or smaller) into the hole from which PIPE PLUG(42) was removed. Using thread sealant prevent loss of air.
- Inspect the Spool, Cylinder, and their O-Rings.
- Do not remove an O-Rings from it’s groove unless found bad. If bad, do not scratch the groove while prying it out.
- Check parts for contamination. If dirty/gummy, clean thoroughly.
- Check parts (including the O-RINGS on them) for cuts, marring, breakage, or deformation.

NOTE: It is natural for O-RING(35) to fit in it’s groove very closely. The reason being that it is a special, low friction configuration.

B. Actuators

Any Actuator described below may be used to operate the MacroSpray. They include all the necessary fittings, tubing, brackets, etc. required to adapt to the MacroSpray.

- Mechanical Actuator — Model No: P901

Used for actuating the manual actuation. Operates by having a probe deflected in any center. This may be done by hand or by using a moving machine member.

- Electronic Actuator — Model No: P908

Used for electrical actuation. Operates when supplied with a 110/240v H.S.I. Other voltages are available.

- Timer Actuator — Model No: P-202

Used to actuate repeatedly at a set cycle rate. Air Operated. Actuates continuously while air is supplied. Cycle set by screwdriver in a recessed slot.

C. The Velocity Control

This part and it’s seals seem little or no use. Do not remove part unless damaged or it is leaking air. If so, do as follows.

1. Unscrew EXCUTORY CONTROLLER(41) from VALVE HOUSING(32) to check O-RING(31) and BACKUP O-RING(40).
2. Repair or replace as required and re-assemble in reverse order.

D. Re-assemble the UniValve as follows.

1. Clean the bore in VALVE HOUSING(32) as well as practical.
2. Apply a coat of light machine oil to all parts.
3. Mount VALVE STOPPL(36) to VALVE HOUSING(32) making sure O-RING(35) is not pinched (give this O-RING special attention because of it’s loose fit). Install VALVE PLUG(38) and retain with RETAINER RING(39).
4. Install Pipe PLUG(42) and torque to 60-80 in-lbs.

4. Using the On/Off Manifold

- Unscrew the On/Off Manifold from the DISTRIBUTION LINE and allowing LINES to be turned on/off. For best results, try to comply with the following:

a) If MacroSpray is close to SPRAY NOZZLES, connect MANIFOLD directly to MacroSpray’s FLUID OUTLET PORT using a pipe nipple.

b) If MacroSpray is distant to the SPRAY NOZZLES, locate MANIFOLD as close to the SPRAY NOZZLES as practical. Run DISTRIBUTION LINE from the MacroSpray to the MANIFOLD, and then on to the SPRAY NOZZLES.

E. Re-connect the Air Supply and Actuator, and test operation.

The items listed below are made available to help with the application of the MacroSpray.
A. The
Whenever a Nozzle Tip (#1) is removed, the Check Ball (#4, #7)
NOTE:
13 rgo-006 2 o-ring,seal:
14 rgb-006 2 ring,bacKUp:
23 207bas05 1 magnetic base
22 scr022 1 screw, bUtton hd: 10X24-.875
12 hsg-036 1 hoUsing,checK:
7 bal-022 1 ball,checK:
6 280-spg-01 1 spring assembly:
4 bal-021 1 ball,checK:

No. NumbER P cS - oR- PART NAmE

PARTS LIST “E”

USE the APPROPRIATE FIGURE AT THE RIGHT TO IDENTIFY the PART BY its KEY No.

USING the KEY No. AND table beloW, FIND the PART NUMBER, No. OF PIECES USED, AND the DESCRIPTION of THE PART SELECTED.

KEY No. PART NUMBER DESCRIPTION
NOZ-101 1 NOZZLE, 10" FAN
NOZ-102 1 NOZZLE, 6" FAN
NOZ-103 1 NOZZLE, 6" FAN
NOZ-104 1 NOZZLE, 29" FAN
NOZ-105 1 NOZZLE, 5", ROUND
NOZ-106 1 NOZZLE, SIDE FAN

1 SPG-005 1 SPRING,CHecK:
2 EYE-001 1 EYELET,CHecK:
3 BAL-021 1 BALL,CHecK:
4 SET-019 1 SEAT,CHecK:
5 206-SPO-01 1 SPRING ASSEMBLY:
6 BAL-022 1 BALL,CHecK:
7 HSG-090 1 HOUSING,CHecK:
8 HSG-020 1 HOUSING,CHecK:
9 FIT-017 1 FITTING,NO:
10 296-BRK-22 1 BRACKET ASSY:
11 296-BRK-12 1 BRACKET ASSY:
12 296-BRK-06 1 BRACKET ASSY:
13 RGB-006 2 O-RING,SEAL:
14 RGB-006 2 RING,BacKUp:
15 296-TUB-41 1 FLUX TUBE,ASSY:
16 TUB-011 1 TUBE,FLUX:
17 ADP-041 1 ADAPTER,MAStEr:
18 BRK-014 1 BRACKET,MAStEr:
19 296-TUB-81 1 MAGNETIC TUBE:
22 SCR022 1 SCREW, BUTTON HD: 10X24-.875
23 207bas05 1 MAGNETIC BASE

Inspecting the Distribution System
Refer to PARTS LIST “E” for Key No. shown in parenthesis.

C. The FlexTube: a. FlexTube or MagnaTube may be clogged or leaking. These
problems are handled differently as described below. b. Checking for a clogged FlexTube.
1. First do Step “B” above. Do no more dis-assembly. Check for the clog by running a wire or blowing through the Copper Tube. c. Repairing a leaking FlexTube.
2. Unscrew the Check Housing (#12) from the FlexTube (#15).
NOTE: Removing the Nozzle Tip (#1) is not necessary.
3. Unscrew the FlexTube (#15) from the Mounting Adapter (#17).
4. Remove the two small “O” Rings (#13) and Backup Rings (#14).
NOTE: If they are dirty, old, or deformed, clean or replace as needed.
5. Check the surfaces of the “O” Rings seal. If scratched or marred, have smoothed or replace the part.
6. Re-assemble in reverse order, and torque parts to 60-80 in-lbs.

D. If the Copper Tube (#16) from FlexTube (#15) unless one of the other procedure. If it is necessary, be careful not to mar the soft Copper Tube which is easily scratched.

C. The FlexTube: a. FlexTube or MagnaTube may be clogged or leaking. These
problems are handled differently as described below. b. Checking for a clogged FlexTube.
1. First do Step “B” above. Do no more dis-assembly. Check for the clog by running a wire or blowing through the Copper Tube.
2. Repairing a leaking FlexTube.
3. Unscrew the Check Housing (#12) from the FlexTube (#15).
4. Unscrew the FlexTube (#15) from the Mounting Adapter (#17).
5. Remove the two small “O” Rings (#13) and Backup Rings (#14).
NOTE: If they are dirty, old, or deformed, clean or replace as needed.
6. Check the surfaces of the “O” Rings seal. If scratched or marred, have smoothed or replace the part.
7. Re-assemble in reverse order, and torque parts to 60-80 in-lbs.

NOTE: Do not remove the Copper Tube (#16) from FlexTube (#15) unless one of the other procedure. If it is necessary, be careful not to mar the soft Copper Tube which is easily scratched.

A. Supply the Fluid to be Sprayed
Do as described below per the method you are using to supply fluid to the MacroSpray.

1. If Using a Reservoir
Fill the Reservoir with the fluid to be sprayed. The fill level must be above the top of the MacroSpray.

2. If Using a Pump
Ensure there is fluid for the Pump. Activate the Pump. Open the Fluid Supply Line to the MacroSpray (open valve, connect disconnected, etc.)

B. Prime the MacroSpray
1. If Using a Reservoir
Open the BLEED VALVE by turning it’s knob counter-clockwise. Keep the BLEED VALVE open until fluid flows from the hole in it’s side. When this fluid is void of air bubbles, close the BLEED VALVE and tighten securely.
2. If Using a Pump
Do as above, but be aware the fluid is under pressure. This can get messy if not done cautiously. It is best to place a towel over the area.

C. Supply the Operating Air
Connect or turn on the Air Supply to the MacroSpray.

D. Set the Controls
Fully open the VOLUME CONTROL and VELOCIT y CONTROL by turning their knobs counter-clockwise until they stop. If an AIR REGULATOR is present, see for maximum air pressure.

E. Operate the MacroSpray
Operate the ACTUATOR to cycle the MacroSpray. Continue this cycling until fluid is ejected at the SprayNozzle. If this does not eventually happen, return to Step B, and prime again.

F. Purge all Trapped Air
Initial sprays are normally of poor quality and drip. This is due to air in the system. Continued cycling should drive this air out, with eventual sprays becoming normal. Once set, secure this position.

G. Make Adjustments
1. Aim the SprayNozzle Position the SprayNozzle so that it’s spray is giving the desired coverage.
2. Reduce the Amount of Fluid used.
Adjust the VOLUME CONTROL until the desired amount of fluid is being dispensed. Once set, secure this control in place with the LOCK NUT.

3. Reduce the Operating Air Pressure.
If an AIR REGULATOR is present, reduce pressure until spray quality begins to deteriorate or the MacroSpray begins to malfunction. Then increase the pressure 10 to 15 P.S.I. above that point. This insures sufficient power at economical air consumption.

4. Adjust the Velocity Control
The VELOCITY CONTROL adjusts the speed of ejection. With very light fluids or high air pressures, the spray might be so violent and atomized so fine that it “bounces off” causing “fogging”. Adjust the VELOCITY CONTROL to tune out this problem.

H. Poor Spray Quality
If poor spray quality persists, see the following for descriptions of the most common causes.

1. Incorrect Distribution Line being used.
If the Distribution Line being used is of improper material, or is too long in length, it may be too “soft”. Meaning that the line expands too much during ejection, absorbing some of the force required for a good spray. After ejection, it contracts again, to squeeze out an after-drip. For additional information see INSTALLATION INSTRUCTIONS at Step E.

2. Air is Drawn into the System.
During operation the system sees a vacuum. Connections which are not air tight may allow air to suck in. Use thread sealant on all fittings and piping, and make all tube connections properly and tight.

3. Air is Introduced into the System.
The problem need not necessarily be at the MacroSpray. If a Reservoir is left to run dry, or a Pump Seals and pumps air, or the Fluid Supply Line becomes punctured or is cracked, etc... are a few ways in which air might be introduced into the System from external sources.

4. Air is Trapped in the System.
The following examples show how “pockets” can trap air in the System. They do not show every possible situation, but give an idea of what to look for.

Example #1:
If a portion of the system has been fabricated, configurations such as those shown in Fig #1 can trap air in the system.
Fig. 2 shows the same system which shows the potential problems of the one above it.

NOTE: We recommend that you contact L.S.P. If you plan to fabricate a por-
tion of the System.

Example #2
A high area in the Di-
tribution Line can keep an air bubble from being ejected. See Fig #3.

To cure the problem, try cycling at a fast rate and at full volume to drive the bubble up to the SprayNozzle. If that doesn’t work, raise the NOZZLE (or lower the Line) so that the bubble will run up to the SprayNozzle to be expelled.
INSPECTING the MacroSpray

A. Inlet Check Valve
The function of the INLET CHECK VALVE is to allow fluid from the FLUID SUPPLY LINE to enter the MacroSpray, and not allow it to back out again.
1. Remove the FLUID INLET(15) from the BARREL(1).
2. Clean FLUID INLET(15) and check small O-RING(13) inside. Do not remove this unless it is cut or broken. If bad, do not scratch the groove while prying it out.
3. Check the passages in FLUID INLET(15) and BARREL(1) for obstruction.
4. Remove CHECK(12), and see if it is cut, pitted, or deformed.
5. Check if O-RING(14) on FLUID OUTLET(9) is cut or broken.
6. Replace parts found to be bad. Clean all parts. Re-assemble in reverse order. Make sure CHECK(12) is oriented correctly and moves freely in it’s hole. Torque FLUID INLET(15) to 150-200 in.lbs.

B. Outlet Check Valve
The function of the OUTLET CHECK VALVE is to allow the fluid in the MacroSpray out into the DISTRIBUTION LINE, and not to allow it back into the MacroSpray.
1. Disconnect the DISTRIBUTION LINE from the MacroSpray.
2. Remove FLUID OUTLET(9) from BARREL(1).

Caution: this fitting is spring loaded...be prepared.
3. Check if CHECK SPRING(5) is broken or deformed.
4. Check if CHECK BALL(5) is cut, pitted, or deformed.
5. Check if O-RING(8) on FLUID OUTLET(9) is cut or broken.
6. Replace any parts found bad. Clean all parts. Re-assemble in reverse order. Torque FLUID OUTLET(9) to 100-150 in.lbs.

C. Inspecting for Air Leaks
The following gives reference to the most common causes for air leaking into the MacroSpray.
1. Disconnect the FLUID SUPPLY LINE from the MacroSpray.
2. Remove four Retum SPRING(S)(21) from the FLUID SUPPLY LINE, if not remove this fitting is spring loaded...be prepared.
3. Check if either O-RING(8) or O-RING(10) is cut, broken, or worn. Replace if so.
4. Remove VOLUME ADJUST(4) from end of BARREL(1).
5. Check if O-RING(2) is cut or broken. Replace if bad.
6. Check the rod through the middle of VOLUME ADJUST(4) for contamination, scoring, or deformation. Clean, repair, or replace as necessary.

6. See Step D. below, check SEAL ASSEMBLY(16) as directed at Line 5.

D. dis-assembly of the MacroSpray
If the MacroSpray must be taken apart, do as follows.
1. Disconnect the DISTRIBUTION LINE from the MacroSpray.
2. Remove four Retum SPRING(S)(21) from the FLUID SUPPLY LINE to FRONT PLATE(18). When doing this, the parts may be pushed apart from pressure supplied by RETURN SPRINGS(21); if not, they are stuck together. If stuck, gently tap them apart.

Caution: these parts are loaded and may fly apart when loosened...be prepared.
3. Remove, clean, and inspect each part as instructed below. Do not remove or replace the Fitting Assembly(16), and not to replace in reverse order. Torque VOLUME ADJUST(4) to 150-200 in.lbs.
4. Remove BACK PLATE(27). Check SEAL(26). This Ring acts as a gasket, not an O-Ring. Check for tears and cuts. If the seal assembly is screwed into the barrel. If doing a rebuild a rectangular steel blank is included with the Repair Kit. This with a crescent wrench can be used as the screw driver to remove the Seal Assembly. If not using an Assembly Repair Kit we suggest you make your own simple blank to act as a screw driver.

5. Check the inside diameter for scoring (small diameter rod) for scoring and nicks. Check the Rod through the middle of vOLUME ADJUST(4) for contamination, scoring, or deformation. Clean, repair, or replace as necessary.
6. See Step D. above, check O-RING(8) as directed at Line 5.
7. Remove the BLEEDER VALVE(11). Check if either O-RING(8) or O-RING(10) is cut, broken, or worn. Replace if so.

8. Remove VOLUME ADJUST(4) from end of BARREL(1). Check if O-RING(2) is cut or broken. Replace if bad.
9. Check the rod through the middle of VOLUME ADJUST(4) for contamination, scoring, or deformation. Clean, repair, or replace as necessary.

D. Re-assembly of the MacroSpray
When putting the MacroSpray together again, do as follows:
1. If re-using SEAL ASSEMBLY(16), clean it thoroughly. A new SEAL ASSEMBLY comes with O-RINGS installed and ready for use. It is always recommended that a Loctite type sealant be applied to the seal prior to inserting into barrel. Screw into BARREL(1) using the blank as a screw driver, in the Assembly Repair Kit or a blank made at your shop.

2. Insert four RETURN SPRING(S)(21) into BARREL(1). Put a Spring GUIDE(22) in between RETURN SPRING(S)(21) and SEAL ASSEMBLY(16).
3. Apply a light coat of oil or grease to RAM and O-RING(S)(24) on PISTON & RAM(23).

NOTE: When following, you will be fighting the spring pressure from the RETURN SPRINGS. The assembly order given below may be altered to compensate if desired.
4. Install GUIDE(22) such that the SPRING GUIDE(22) nest in the holes in the PISTON, and the RAM aligns with, and slides into the SEAL ASSEMBLY(16).
5. Install AIR CYLINDER(25) over the PISTON & RAM(23), making sure O-RING(24) is not pinched.
6. Install FRONT PLATE(27) onto AIR CYLINDER(25), making sure SEAL(26) in it’s groove and not to replace in reverse order. Torque VOLUME ADJUST(4) to 150-200 in.lbs.
7. Attach BACK PLATE(27) to FRONT PLATE(18) using four TI ROD SCREWS(28) and HEX NUT(S)(30) with LOCK WASHER(S)(29).

Tighten screws and nuts evenly (one turn to each at a time) so that the parts are drawn together squarely. Torque Screws to 80-100 in.lbs.

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