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 until the VALVE SCREW comes completely out. Inspect the VALVES passage for obstruction. B. Insure that fluid is getting to the **MicroSpray**. Check below per 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 **MicroSpray**. 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 MicroSpray**". 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 **MicroSpray**. (If **ACTUATOR TUBING** is being used, disconnect it at the **ACTUATOR** not at the **MicroSpray**.) 2. Turn **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 **MicroSpray** 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 **MicroSpray** will not operate by this method, check the **ACTUATOR TUBE** and/or **UNIVALVE** described below. C. If **ACTUATOR TUBING** is being used, do the following: Else, go on to **Step D.** 1. Insure the **TUBE** has been installed properly. See the "**INSTRUCTIONS**" for the **ACTUATOR** being used. 2. Inspect the **TUBE** for leakage (cuts, cracks, bad connections, etc.) 3. Inspect the **TUBE** for blockage (obstructions, kinks, crimps, etc.) 4. An **ACTUATOR TUBE** longer than four feet will affect response. If too long, the **UNIVALVE** will not operate. D. Investigate the **UNIVALVE**. See "**INSPECTING the UniValve**" for direction. If simple cleaning and lubrication solves the problem, but if it repeats consistantly, it installing an **AIR FILTER AND AIR LUBRICATOR** would probably cure the problem for good.
III. Fluid does not eject from SprayNozzle when the MicroSpray 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 **VOLUME CONTROL** may be set too far in to allow operation. Open by turning counter-clockwise. D. The **MicroSpray** may require priming. See "**OPERATING INSTRUCTIONS**" at **Step B.** **NOTE:** If priming solves the problem, but it reoccurs often, see **PROBLEM V.** E. Ascertain if the problem is with the **MicroSpray** or **SPRAYNOZZLE** as follows. 1. Disconnect the **DISTRIBUTION LINE** at the **MicroSprays FLUID OUTLET**. 2. Operate the **MicroSpray** 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 MicroSpray**". 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 TUBING** is 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: Indicates not enough power for the weight of fluid being used. Increase air pressure, or use lighter fluid.
V. The MicroSpray must be primed frequently to maintain good performance	This indicates air is getting into the **MicroSpray** somehow. The more common causes of this are listed below. A. If a **PUMP** 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 **MicroSpray**. See "**INSPECTING the MicroSpray**" and check **O-RING(2)**, **(18)**, and **(20)**, and those in **SEAL ASSEMBLY(25).** If these **O-RINGS** are good and the problem still exists, then disassemble the **MicroSpray** and check those in **SEAL ASSEMBLY**(25).

04-01-11

INSTALLATION, OPERATION, and TROUBLESHOOTING

with REPLACEMENT PARTS LISTING for MicroSpray Model No. P-010-A

Supercedes the P-010

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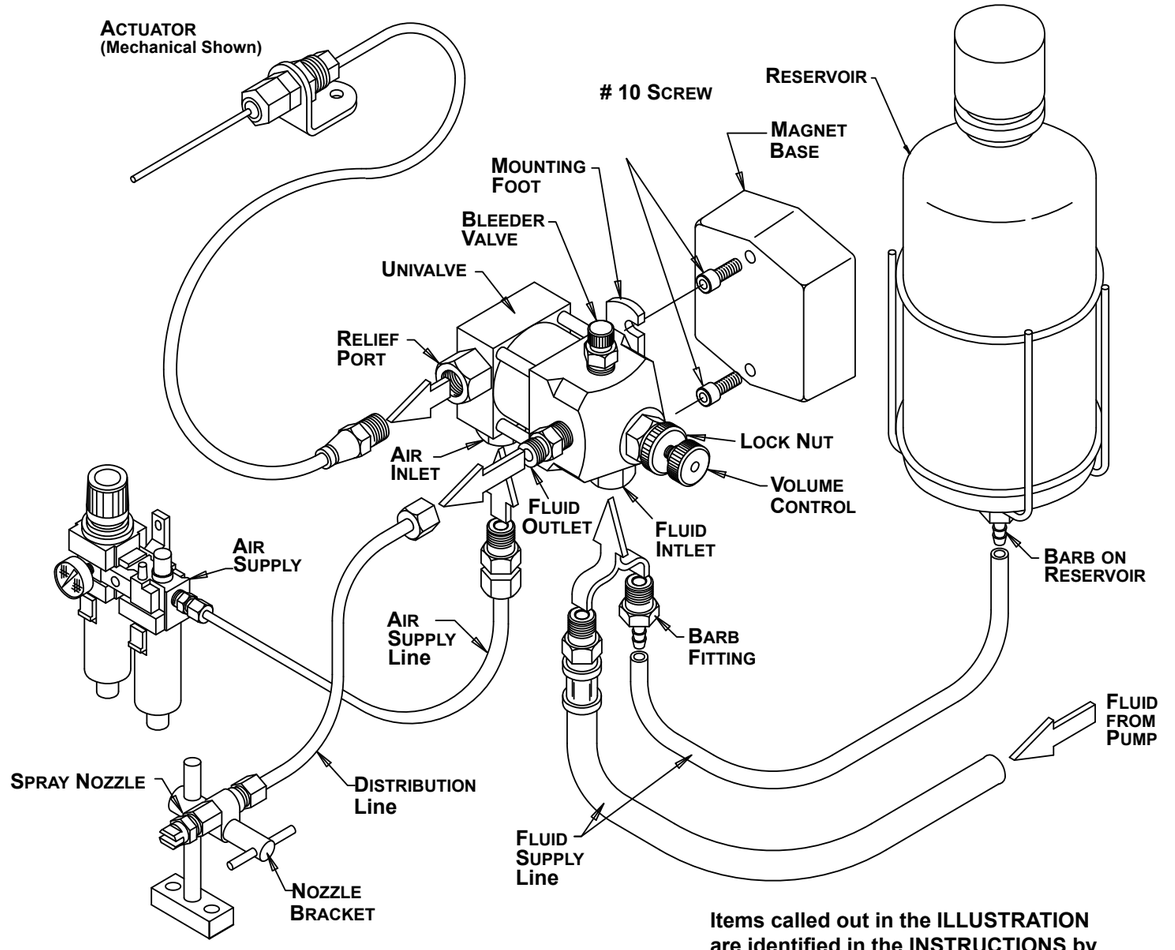


Items called out in the ILLUSTRATION are identified in the INSTRUCTIONS by ALL CAPITAL LETTERS

INSTALLATION INSTRUCTIONS

A. Installing an Actuator

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

The **MicroSpray** 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 MicroSpray

NOTE:

The **MicroSpray** should always be mounted on a wall or upright (never on a table or bed) and it's **FLUID INLET** port must be pointing downward (as shown in the **ILLUSTRATION**).

If the **MicroSpray** is mounted on a level surface, it's performance will be greatly reduced; especially when dispensing smaller amounts of fluid.

1. Locating the MicroSpray
Consider the following when choosing a location at which to place the **MicroSpray**.
a) Insure that the lines to be connected to the **MicroSpray** will not interfere with work, and will not be caught by or rub against moving parts.
b) Locate the **MicroSpray** as close to the **SPRAYNOZZLE** as practical. This is most applicable when dispensing very heavy viscosity fluids.
c) Locate the **MicroSpray** at a lower level than the **SPRAYNOZZLE** for easier start-up.
d) Locate the **MicroSpray** closer to the **ACTUATOR** for fast cycling (must be within four feet). Applicable to operating faster than 300 cycles per minute.

2. Mounting the MicroSpray
a) Drill and tap for two #10 screws at 2" centers. Slide the slots in the **MOUNTING FOOT** of the **MicroSpray** under the heads of these screws and tighten securely.
b) For portability attach the MicroSpray to the magnet , P907 and postion it in a convienent location.

C. Installing a Fluid Supply
The fluid to be ejected may be supplied by **RESERVOIR** or **PUMP**. See the appropriate set of instructions below for the method you will be using.

1. Using a Reservoir (Gravity Feed)
A **ONEQUART RESERVOIR** is ILLUSTRATED. 1-1/2 Gallon is available (see ACCESSORIES). Both install in similar fashion. Items required are supplied with the **RESERVOIR**. Use thread sealant when making any of the following connections, ***they must be air tight***.
a) Locate the **RESERVOIR** higher than the **MicroSpray** and as close to it as practical. Insure the **FLUID SUPPLY LINE** will be out of harms way when installed.
b) Mount the **RESERVOIR** using the mounting holes provided.
c) Attach a **BARB FITTING** into the **FLUID INLET** of the **MicroSpray**. Also (if not already present) into outlet port in the bottom of the **RESERVOIR**.
d) Push one end of the **FLUID SUPPLY LINE** onto the **BARB** under the **RESERVOIR**. Route the other end of this **LINE** to the **FLUID INLET** and cut off any excess (***not too much!!***). Push this end onto the **BARB FITTING** in the **FLUID INLET**.

2. Using a Pump (Pressure Feed)
PUMPS as described below 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 (approx. 150 P.S.I.) fluid will be forced through the **MicroSpray** and out the **SPRAYNOZZLE**. Lower pressures are recommended for ease of handling.
b) The **FLUID SUPPLY LINE** and all fittings used with it, should have at least a 1/8" passage.
c) Connect this **LINE** at the **PUMP**, and then to the **FLUID INLET** of the **MicroSpray**. 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***.

D. Installing the Air Supply
The **MicroSpray** operates on compressed air controlled by a built-in air valve termed the **"UNIVALVE"**.

1. Air Pressure
The **MicroSpray** will operate at any pressure from 40 to 120 P.S.I. Less than 40 P.S.I. 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.

2. Air Supply Line
This **AIR SUPPLY LINE** and all the fittings used with it, ***must have*** at least 3/16" passage. If this **LINE** is over ten feet long, or any elbow fittings are used, increase passages to 1/4" or more. A valve or disconnect on this **LINE** can be useful, but it ***must have*** the proper passage.

3. Air Handling Equipment
Using an **AIR FILTER/REGULATOR/LUBRICATOR** is strongly recommended. The **FILTER** and **LUBRICATOR** for more care-free service and longer life. The **REGULATOR** for air conservation and controlling performance.

4. Connecting the Air Supply Line
Connect one end of **AIR SUPPLY LINE** to the **AIR SUPPLY**. Connect other end to the **AIR INLET** of the **MicroSpray**. Using thread sealant will help prevent loss of air.

E. Installing the Distribution System
The Distribution System consists of the **DISTRIBUTION LINE**, **SPRAYNOZZLES**, and their connections with the **MicroSpray**. This System is very important to good performance. Try to comply with the following as closely as possible.

1. Distribution Line
DISTRIBUTION LINE must be 3/16" O.D. It should be cut as short as practical, be clean on the inside, and be made of the proper material. Use the copper tubing supplied with the **MicroSpray** if at all possible.
If this **LINE** must be flexible, **L.S.P.** can supply a semi-rigid, **HyPressure Tubing** (see ACCESSORIES). ***This is the only non-metal tubing allowed to be used.*** Any other tubing is found to be too "soft" for good performance and may burst.

2. SprayNozzle
The **SPRAYNOZZLE** which is supplied will give a wide, fan shaped spray pattern. A **DROPNOZZLE** is also available for dispensing a stream or drop (see ACCESSORIES).
The **SPRAYNOZZLE** must be supported. If metal **DISTRIBUTION LINE** is used, it may be stable enough to be used for this support. If this **LINE** is flexible, a support similar to the **NOZZLEBRACKET** shown (see ACCESSORIES) will have to be made or aquired.

3. Connections
Standard 3/16" compression fittings are built-in the **FLUID OUTLET** and the **SPRAYNOZZLE**. When making these connections keep **DISTRIBUTION LINE** bottomed in the fitting while tightening the **COMPRESSION NUT** to one full turn past hand-tight.

ACCESSORIES

Items listed below are available to help with the application of the MicroSpray.

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

1. Mechanical Actuator -- Model No: P901
Used for manual or mechanical actuation. Operates by having a probe deflected off-center in any direction. This may be done by hand or by using a moving machine member.

2. Electrical Actuator -- Model No: P912
Used for electrical actuation. Operates when supplied with a 110Vac 60Hz signal. Other voltages are available.

3. Air Timer Actuator -- Model No: P908
Used to actuate repeatedly at a set cycle rate. Air Operated. Actuates continously while air is app lied. Cycle rate set by screwdriver in a recessed slot.

Electronic Actuators
These Actuators are rugged, Solid-State Electronic devices. They all activate by magnetic pick-up or limit switch. The features of each are descibed below.

4. Count Down Actuator -- Model No:E310
ctuates after being triggered a given number of times. Count is settable from 1 to 99. Includes a time delay for controlling the moment of actuation.

5. Pulsating Actuator -- Model No: E305
Actuates a set number of times when triggered. Time between actuations is adjustable, allowing the pulses to be spread over a given period of time. Includes a time delay for controlling the start of pulsation after triggering.

6. Timer Actuator -- Model No: E315
Actuates continously at a set cycle rate. Can be set for remote control so that actuation stops when machine does.

7. PresSpray Controller -- Model No: E3 00
Is a combination of the Counter and Pulsator described above. Counts from 1 to 9. Pulsation time and duration have separate adjustments. Either or both features are selectable. Includes time delay to control the moment of actuation.

B. Nozzles
Same as the **SPRAYNOZZLE** supplied with the **MicroSpray**, except with other dispersion angles or types. Directly replaces the **SPRAYNOZZLE**.

1. 110° Fan Spray -- Model No: P230
2. 95° Fan Spray -- Model No: P232 (included w/ Unit)
3. 80° Fan Spray -- Model No: P233
4. 65° Fan Spray -- Model No: P234
5. 25° Fan Spray -- Model No: P235
6. Drop Nozzle -- Model No: P236 (no dispersion)

NOTE:
Spray angles are re ry performance. Has 3/16" O.D. which adapts to **MicroSpray** fittings.

D. NozzleBracket -- Model No: P925
Used to support the **SPRAYNOZZLE**. Gives complete control for aiming the **SPRAYNOZZLE**. Moves up/down 5", tilts 180°, and rotates 360°. Can be mounted on a MagnaBase for still more convenience.

E. MagnaBase--Model No: P907
Holds the **NOZZLEBRACKET, ACTUATORS, TRIPBRACKETS,** and other ACCESSORIES. Allows easy positioning and adjustments.

MagnaBase -- Model No: P907
Holds with a force of 100 pounds on bare metal. Holds one quart reservoir.

F. Fluid Reservoirs
For use as containers for supplying the lubricant to be dispensed by the **MicroSpray**.

1. OneQuart Reservoir -- Model No: P301
Consists of a bottle with one-quart capacity along with a fluid filter, supply tubing, and a wire bracket for mounting.

2. OneQuart Reservoir w/ magnet -- Model No: P305
Same as above, but includes a built-in high-strength magnetic base for easy placement and removal.

3. 1-1/2 Gallon Reservoir -- Model No: P306
Consists of a 1-1/2 gallon container with built-in mounting tabs. Includes a sight-glass, fluid filter, and snap-on lid.

INSPECTING the UniValve

See REPLACEMENT PARTS for Key No's shown in parenthesis.

A. Disassemble UniValve as follows.

1. Unscrew **VALVE CYLINDER(37)** from **VALVE HOUSING(33)**.
2. Remove **VALVE SPOOL(36)** by inserting a rod (3/16" or smaller) into the hole from the opposite end to push the **VALVE SPOOL** out.
4. Do not remove **O-RINGs** from grooves unless found to be defective. If replacment is necessary, do not scratch the groove surfaces while prying out the Seal.

B. Inspect Spool, Cylinder, and their O-Rings.

1. Check these parts for contamination. If very dirty/gummy, this is probably the problem. Clean parts thoroughly.
2. Insure these parts (including Seals) are not broken, cut, marred, or deformed.
3. Inspect the large diameter of the **SPOOL(36)** and the inside diameter of the **CYLINDER(37)** for wear or scoring. Slip them together to check fit. The fit should be very close, but must not show any interference or sticking.
4. Replace any part not passing above inspections.

C. Reassemble the UniValve as follows.

1. Clean the bore in **HOUSING(33)** as well as is practical.
2. Apply a coat of light machine oil to all parts.
3. Slide **SPOOL(36)** and **CYLINDER(37)** together, then screw **CYLINDER(37)** into **HOUSING(33)**. Torque to 60-75 inch-lbs.

D. Reconnect the Air Supply and test operation.

INSPECTING the SprayNozzle

See REPLACEMENT PARTS for Key No's shown in parenthesis.

A. The Distribution Line

1. Check this **LINE** for kinks or crimps, or other deformation that may have closed it off.
2. Check this **LINE** and it's Fittings for leakage. They must be air tight.

B. The SprayNozzle

1. Unscrew **NOZZLE TIP(16)** from **NOZZLE HOUSING(11)**.
2. Unscrew **NOZZLE SEAT(12)** from **NOZZLE TIP(16)**. Caution: **SEAT** is spring loaded.
3. Inspect **NOZZLE SPRING(15)**, replace if broken or deformed.
4. Inspect **CHECK BALL(13)**, replace if cut, pitted, or deformed.
5. Clean the **NOZZLE TIP**, and blow dry. Inspect the tiny hole through the end of this **TIP** for obstruction or clogging.

Tips on unclogging a NOZZLE TIP.

... Dislodge the clog with a high pressure stream directed backward to the normal flow through the **NOZZLE**.

... If using a tool is necessary, use one as “soft” as possible (plastic, fiber). Apply no more pressure than necessary. The **NOZZLE TIP** is easily damaged.

Some clogs are impossible to get out without harming the **NOZZLE TIP**. Keep a spare handy for such cases.

6. Reassemble in reverse order. Use sealant on the threads between **NOZZLE TIP(16)** and **NOZZLE HOUSING(11)**. Torque to 80-100 in-lbs.

OPERATING INSTRUCTIONS

A. Supply the Fluid to be Sprayed

Do as described below per the method being used to supply fluid to the **MicroSpray**.

1. If using a Reservoir (Gravity Feed)
Fill the **RESERVOIR** with the fluid to be sprayed. The fill level must be above the top of the **MicroSpray**.

2. If using a Pump (Pressure Feed)
Insure there is fluid for the **PUMP**. Activate the **PUMP**. Open the **FLUID SUPPLY LINE** to the **MicroSpray** (open valve, connect disconnect, etc.)

B. Prime the MicroSpray

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 **MicroSpray**.

D. Set the Controls

Fully open the **VOLUME CONTROL** by turning it’s knob counter-clockwise until it stops. If an **AIR REGULATOR** is present, set it for maximum pressure.

E. Operate the MicroSpray

Operate the **ACTUATOR** to cycle the **MicroSpray**. 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 the spray changing to a fine burst with no drip at all. If this does not eventually happen, continue at **Step H.** below.

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 **MicroSpray** begins to malfunction; then increase the pressure 10 to 15 P.S.I. above that point. This insures sufficient power at economical air consumption.

H. Poor Spray Quality

If poor spray quality presists, 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 more details 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 be sucked 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 **MicroSpray**. If a **RESERVOIR** is left to run dry, or a **PUMP** leaks 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 without the potential problems of the one above it.

NOTE: We reccommend you contact **L.S.P.** before attempting to frabricate portions of the system.

Fig. 1

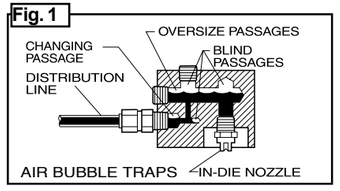
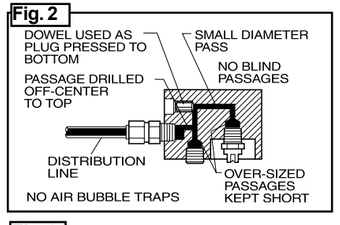


Fig. 2

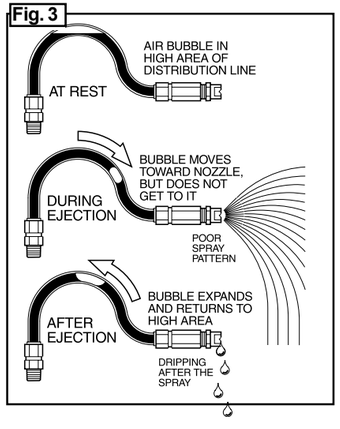


Example #2
A high area in the **DISTRIBUTION LINE** can keep an air bubble from being ejected. See **Fig #3**.

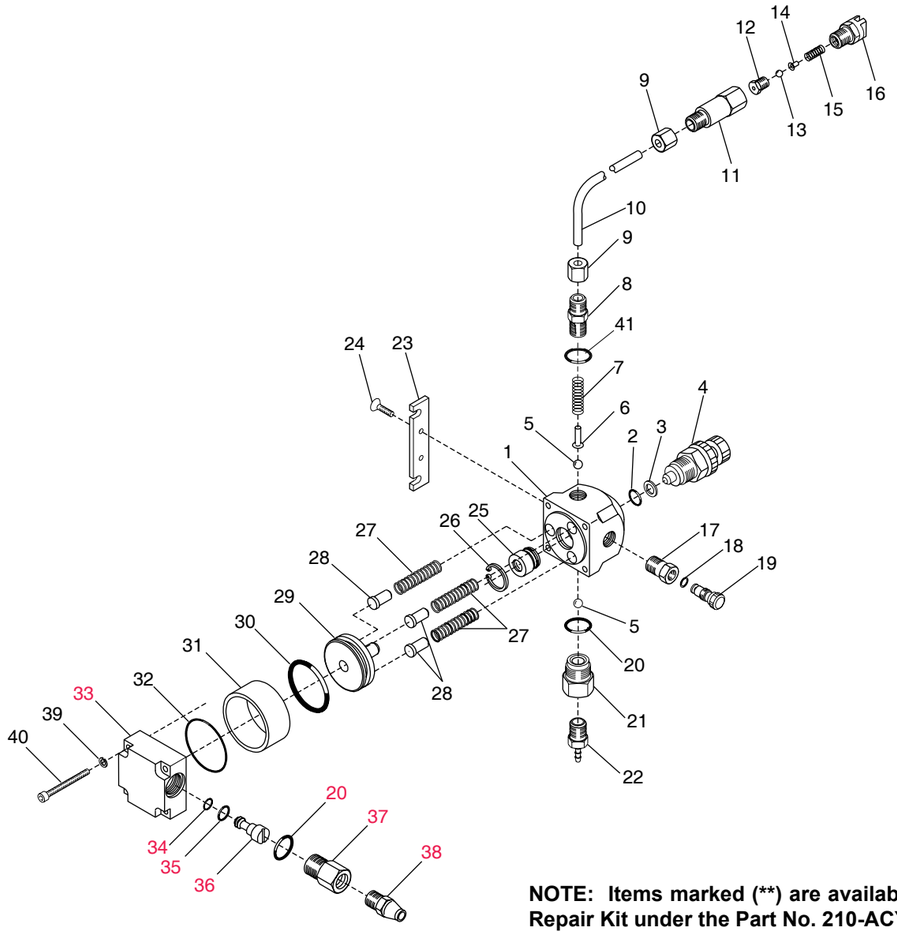
To cure the problem, try cycling very fast at full volume to drive bubble to the **SPRAYNOZZLE**.

If that doesn't work, raise the **NOZZLE** (or lower the **LINE**) so that the bubble will run up to the **NOZZLE** to be expelled.

Fig. 3



REPLACEMENT PARTS LISTING



NOTE: Items marked (**) are available in a Repair Kit under the Part No. 210-ACY-01

Key No:	Part Number	Qty. Used	Description of Part
1	BRL-027	1	Barrel
2	RGO-050	1 **	O-Ring Seal
3	RGB-016	1 **	Backup Ring
4	210-SCR-01	1	Volume adjust
5	BAL-022	2 **	Check Ball, 1/4"
6	EYE-004	1 **	Ball Seat, 1/4"
7	SPG-023	1 **	Check Spring, 1/4"
8	OUT-045	1	Fluid Outlet
9	FIT-018	2	Compression N T
10	TUB-063	1	Distribution Line
11	HSG-073	1	Nozzle Housing
12	SET-019	1	Nozzle Seat
13	BAL-021	1	Check Ball, 3/16"
14	EYE-001	1	Ball Seat, 3/16"
15	SPG-005	1	Check Spring, 3/16"
16	NOZ-107	1	Nozzle Tip
17	SET-004	1	Bleeder Seat
18	RGO-028	1 **	O-Ring Seal
19	SCR-203	1	Bleeder Screw
20	RGO-034	2 **	O-Ring Seal

Key No.	Part Number	Qty. Used	Description of Part
21	INL-021	1	Fluid Inlet
22	FIT-067	1	Barb Fitting
23	PLT-047	1	Mounting Foot
24	SCR-019	2	Flat Head Screw
25	210-SLV-01	1 **	Seal Assembly
26	RGR-032	1 **	Retainer Ring
27	SPG-029	3 **	Return Spring
28	GID-012	3	Spring Guide
29	210-PIS-01	1	Piston & Ram
30	RGO-071	1 **	O-Ring Seal
31	CYL-040	1	Air Cylinder
32	RGO-033	1 **	O-Ring Seal
33	210-HAI-01	1	Valve Housing
34	RGO-005	1 **	Backup Ring
35	RGO-009	1 **	O-Ring Seal
36	SPL-026	1	Valve Spool
37	CYL-039	1	Valve Cylinder
38	FIT-020	1	Tube Fitting
39	WAS-008	4	Lock Washer
40	SCR-056	4	Tie-Rod Screw
41	RGO-020	1	O-Ring Seal

INSPECTING the MicroSpray

A. Inlet Check Valve

The function of the **Inlet Check Valve** is to allow fluid from the **Fluid Supply Line** to enter the **MicroSpray**, and not to allow it back out again.

1. Remove the **Fluid Inlet(21)** from the **Barrel(1)**. Make sure **Check Ball(5)** is not lost in the process.
2. Check the passage in **Fluid Inlet(21)** for obstruction.
3. Check the passage in **Barrel(1)** (small off-center hole) for obstruction.
4. Check if **Check Ball(5)** is cut, pitted, or deformed.
5. Check if **O-Ring(20)** on **Fluid Inlet(21)** is cut or broken.
6. Replace parts found to be bad. Clean parts. Re-assemble in reverse order. Make sure **Check Ball(5)** is not crushed. Torque **Fluid Inlet(21)** to 85-100 in.lbs.

B. Outlet Check Valve

The function of the **Outlet Check Valve** is to allow the fluid in the **MicroSpray** out to the **Distribution Line**, and not to allow it back in again.

1. Disconnect the **Distribution Line** from the **Micro-Spray**.
2. Remove **Fluid Outlet(8)** from **Barrel(1)**. Be careful, this fitting is spring loaded.
3. Check if **Check Spring(7)** is broken or deformed.
4. Check if **Check Ball(5)** is cut, pitted, or deformed.
5. Check the threads on **Fluid Outlet(8)**, and in the hole of **Barrel(1)**. These pipe threads must seal, check if nicked, deformed, or stripped.
6. Replace any parts found bad. Clean parts. Re-assemble in reverse order. Use sealant on threads. Torque **Fluid Outlet(8)** to 85-100 in.lbs.

C. Inspecting for Air Leaks

The following gives reference to the most common causes for air leaking into the **MicroSpray**.

1. See **Step A.** above, check **O-RING** as directed at **Line 5**.
2. See **Step B.** above, inspect threads as directed at **Line 5**.
3. Remove **Bleeder Screw(19)** from the **Bleeder Seat(17)**. Check if **O-Ring(18)** is cut or broken. Replace if bad.
4. Remove **Volume Adjust(4)** from the end of **Barrel(1)**. Check if **O-Ring(2)** is cut or broken. Replace if bad.
5. 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(25)** as directed at **Line 8**.

D. Disassembly of the MicroSpray

If the **MicroSpray** must be taken apart, do as follows.

1. Remove the four **Tie Rod Screws(40)** which hold **Valve Housing(33)** to **Barrel(1)**. This should allow disassembly, but the parts may be stuck together. If stuck, try gently tapping them apart. If necessary, remove the **Volume Adjust(4)** from the opposite end of **Barrel(1)**; this will allow access for pushing the assembly apart from that end.
2. Remove, clean, and inspect each part as instructed below. Do not remove **O-Rings** from grooves unless they are bad. If replacment is necessary, be careful not to scratch the groove surfaces while prying out the Seal.
3. Remove **Valve Housing(33)**. Check **O-Ring(32)**.
4. Remove **Air Cylinder(31)**. Check the outside for dents and dings. Check the inside diameter for scoring.
5. Remove **Piston & Ram(29)**. Check **O-Ring(30)**. Check finish of **Ram** (small diameter rod) for scoring and nicks. Check the **Piston** (larger diameter) for deformation.
6. Remove three **Return Springs(27)**. Check each for deformation and breakage. Inspect the holes which locate these **Springs** in **Barrel(1)** and in **Piston & Ram(29)** for excessive wear or elongation.
7. Remove Retainer Ring(26) (use a small screwdriver and place the tip under the exposed end and uncoil the ring, layer by layer until removed from the grove). Check this **Ring** for breakage or deformation.
8. Remove **Seal Assembly(25)**. Check the **O-Rings** on the inside and outside of this part. If any are cut, nicked, or badly worn, replace the entire **Seal Assembly(25).**

E. Reassembly of the MicroSpray

When putting the **MicroSpray** together again, do as follows.

1. If reusing **Seal Assembly(25)**, clean it throughly (a new **Seal Assembly** comes ready to install). Insert **Seal Assembly(25)** into **Barrel(1)**, and retain with **Retainer Ring(26)**. Make sure **Retainer Ring** fully seats into it's groove all the way around.

2. Insert three **Return Springs(27)** into **Barrel(1)**. Put a **Spring Guide(28)** into each.
3. Apply a light coat of oil (or grease) to the **Ram** and **O-Ring** on **Piston & Ram(29)**.
4. Install **Piston & Ram(29)** so that **Spring Guides(28)** nest in the holes in the **Piston**, and that the **Ram** aligns with, and slides into **Seal Assembly(25)**.
5. Install **Air Cylinder(31)** over the **Piston & Ram(29)**, making sure **O-Ring(30)** is not pinched.
6. Install **Valve Housing(33)** onto **Air Cylinder(31)**, making sure **O-Ring(32)** is not pinched.
7. Attach **Valve Housing(33)** to **Barrel(1)** using four **Tie Rod Screws(40)** with **Lock Washers(39)**. Screw the **Screws** in evenly (a couple turns to each at a time) so that the parts are drawn together squarely. Torque **Screws** to 50-70 in.lbs.