

## TROUBLESHOOTING INSTRUCTIONS

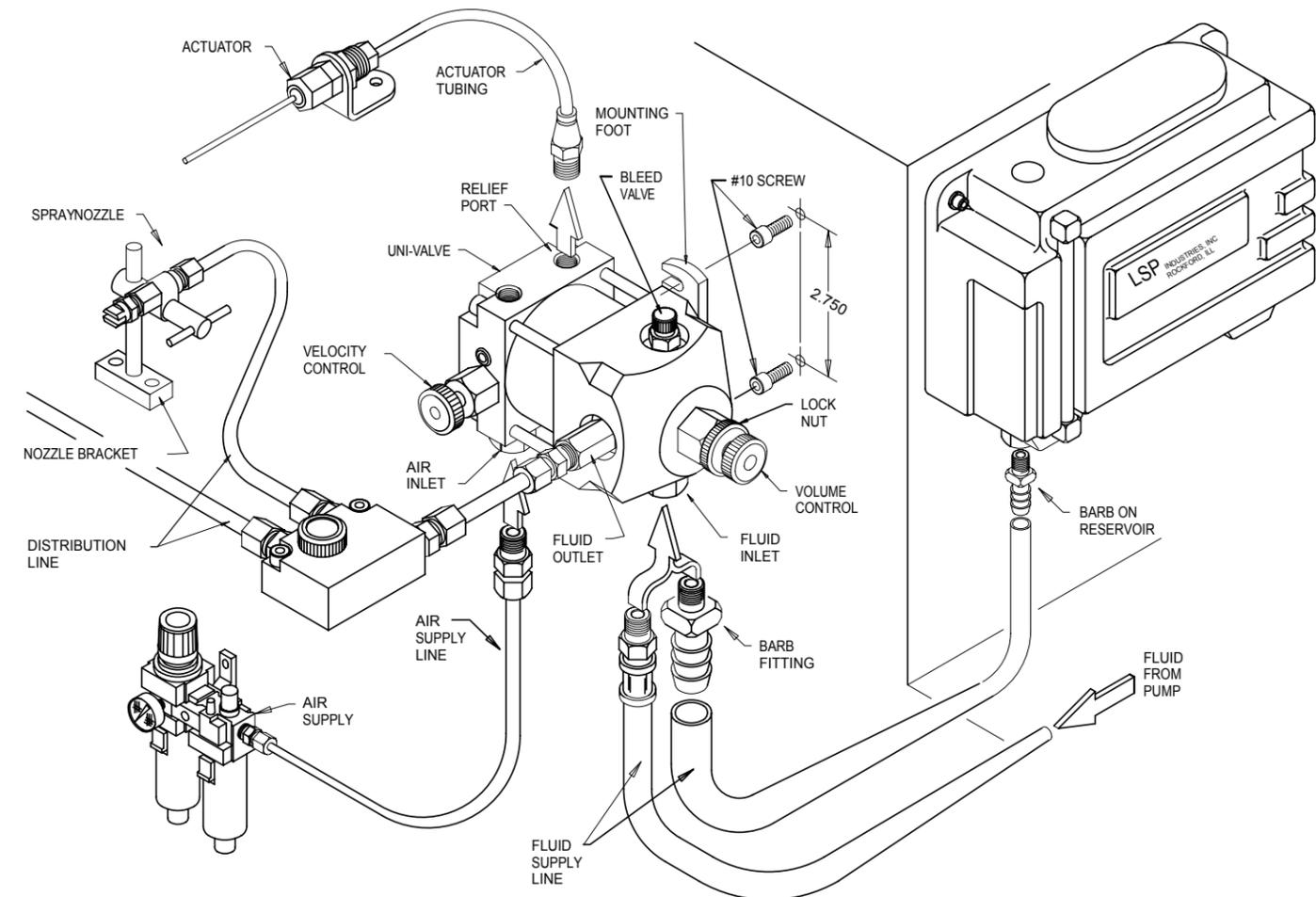
PROBLEMS	SOLUTIONS
I. Fluid will not flow from the Bleed Valve when opened.	<p>A. Insure the <b>BLEED VALVE</b> is open far enough. Unscrew until the Valve stem comes completely out. Inspect the Valve's passage for obstruction.</p> <p>B. Insure that fluid is getting to the <b>MiniSpray</b>. Check below per the method of fluid supply being used.</p> <ol style="list-style-type: none"> <li>If using a <b>RESERVOIR</b> (Gravity Feed) <ol style="list-style-type: none"> <li>Insure the <b>RESERVOIR</b> is full, and the fill-level is above the top of the <b>MiniSpray</b>.</li> <li>If the fluid is very heavy, it may be too viscous to run through the <b>FLUID SUPPLY LINE</b>.</li> </ol> </li> <li>If using a <b>PUMP</b> (Pressure Feed) <ol style="list-style-type: none"> <li>Insure the <b>PUMP</b> is "on" and is pumping at a good pressure.</li> <li>Make sure any valve in the <b>FLUID SUPPLY LINE</b> is open.</li> </ol> </li> </ol> <p>C. Insure the <b>FLUID INLET</b> is not obstructed. See "INSPECTING the MiniSpray". Look for a clogged <b>FLUID INLET</b>.</p>
II. The built-in air valve (UniValve) does not actuate when the Actuator is cycled.	<p>A. Check the operating air pressure. It should be at least 40 P.S.I.</p> <p>B. Ascertain if the problem is with the <b>UniVALVE</b> or <b>ACTUATOR</b> as follows.</p> <ol style="list-style-type: none"> <li>Turn off the <b>AIR SUPPLY</b> and disconnect the Actuator from the <b>MiniSpray</b>. If <b>ACTUATOR TUBING</b> is being used, disconnect it at the <b>ACTUATOR</b> not at the <b>MiniSpray</b>.</li> <li>Turn <b>AIR SUPPLY</b> back on. Air should be escaping where the <b>ACTUATOR</b> was disconnected.</li> <li>Prevent this air escaping by placing your thumb over the vent hole.</li> <li>If the <b>MiniSpray</b> operates when you plug and unplug this hole, the problem is with the <b>ACTUATOR</b>. Continue with the <b>INSTRUCTIONS</b> supplied with that <b>ACTUATOR</b>.</li> <li>If the <b>MiniSpray</b> will not operate by this method, check the <b>UniVALVE</b> as described below.</li> </ol> <p>C. If <b>ACTUATOR TUBING</b> is being used, do the following; else, go on to <b>Step D</b>.</p> <ol style="list-style-type: none"> <li>Insure the <b>TUBE</b> has been installed properly. See the <b>INSTRUCTIONS</b> for the <b>ACTUATOR</b> being used.</li> <li>Inspect the <b>TUBE</b> for leakage (cuts, cracks, bad connections, etc.)</li> <li>Inspect the <b>TUBE</b> for blockage (obstructions, kinks, crimps, etc.)</li> <li>If the <b>ACTUATOR TUBE</b> is longer than four feet, response will be slowed. If too long, the <b>UniVALVE</b> will not operate.</li> </ol> <p>D. Investigate the <b>UniVALVE</b>. See "Inspecting the UniValve" for direction. If simple cleaning and lubrication solves the problem, but it repeats consistently, installing an <b>AIR FILTER/LUBRICATOR</b> would probably cure the problem for good.</p>
III. Fluid does not eject from SprayNozzle when the MiniSpray is activated.	<p>A. Insure fluid is present. Check per <b>PROBLEM I.</b> at <b>Steps B.</b> and <b>C.</b></p> <p>B. Insure the <b>UniVALVE</b> is operating. if not, see <b>PROBLEM II.</b></p> <p>C. The <b>VOLUME CONTROL</b> may be set too far in to allow operation. Open by turning counterclockwise.</p> <p>D. The <b>MiniSpray</b> may require priming. See <b>OPERATING INSTRUCTIONS</b> at <b>Step B.</b></p> <p><b>NOTE:</b> If priming solves the problem, but it reoccurs often, see <b>PROBLEM V.</b></p> <p>E. Ascertain if the problem is with the <b>MiniSpray</b> or <b>SPRAYNOZZLE</b> as follows.</p> <ol style="list-style-type: none"> <li>Disconnect the <b>DISTRIBUTION LINE</b> at the <b>MiniSpray's FLUID OUTLET</b>.</li> <li>Operate the <b>MiniSpray</b> and check the ejection from the <b>FLUID OUTLET</b>.</li> <li>If an appropriate amount of fluid is forcefully ejected, see "INSPECTING the SprayNozzle". Look for an obstruction in the <b>DISTRIBUTION LINE</b> or <b>SPRAY NOZZLE</b>.</li> <li>If no fluid is ejected, or very little is with little force, see "INSPECTING the MiniSpray". Check everything as directed.</li> </ol>
IV. The pattern of the spray ejected from the SprayNozzle is unsatisfactory.	<p>A. If the <b>SPRAYNOZZLE</b> drips during or after ejection: This indicates there is air in the system or "soft" <b>DISTRIBUTION TUBING</b> is being used. See <b>OPERATING INSTRUCTIONS</b> at <b>Step H.</b></p> <p>B. If the spray is erratic, off-center, or unevenly dispersed: See "INSPECTING the SprayNozzle" and look for a contaminated <b>NOZZLE TIP</b>.</p> <p>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.</p>
V. The MiniSpray must be primed frequently to maintain good performance	<p>This indicates air is getting into the <b>MiniSpray</b> somehow. The more common causes of this are listed below.</p> <p>A. If a <b>PUMP</b> is being used to supply the fluid, it may be introducing air into the system.</p> <p>B. The <b>FLUID SUPPLY LINE</b> may be cracked or punctured, or its connections may be loose.</p> <p>C. An O-Ring Seal may be bad, allowing air to be drawn into the <b>MiniSpray</b>. See "INSPECTING the MiniSpray" and check <b>O-RINGS(2), (10), and (14)</b>. If these <b>O-RINGS</b> are good and the problem still exists, then disassemble the <b>MiniSpray</b> and check those in <b>SEAL ASSEMBLY(19)</b>.</p>

## INSTALLATION, OPERATION, and TROUBLESHOOTING

### WITH REPLACEMENT PARTS LISTING FOR MINISPRAY MODEL No. P-040-A SUPERCEDES THE P-040



P.O.Box 5303, Rockford, IL • 61125  
 5060-27th Ave, Rockford, IL • 61109  
 Tel: 815-226-8090 • Fax: 815-226-9250  
 E-mail: sales@lspind.com



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

## INSTALLATION INSTRUCTIONS

### A. Installing an Actuator

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

The **MiniSpray** 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 MiniSpray

#### NOTE:

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

## INSTALLATION (continued)

### 1. Locating the MiniSpray

Consider the following when choosing a location for a MiniSpray.

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

### 2. Mounting the MiniSpray

Drill and tap for two #10 screws at 2-5/8" (2.625) centers. Slide the slots in the **Mounting Foot** of the **MiniSpray** under the heads of these screws and tighten securely. (See **ILLUSTRATION** on cover).

### C. Installing a Fluid Supply

The fluid to be ejected may be supplied by **RESERVOIR** or **PUMP**. Do as described below per the method being used.

#### 1. Using a Reservoir (Gravity Feed)

1-1/2 and 5 Gallon **RESERVOIRS** are available (see **ACCESSORIES**). Both install in similar fashion. All items required for installation are supplied with the **RESERVOIR**.

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

- Locate the **RESERVOIR** higher than the **MiniSpray** and as close to it as practical. Insure the **FLUID SUPPLY LINE** will be out of harms way when installed.
- Mount the **RESERVOIR** using the mounting holes provided.
- Attach a **BARB FITTING** into the **FLUID INLET** of the **MiniSpray**. Also into the outlet port in the bottom of the **RESERVOIR**.
- 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.

- 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 **MiniSpray** and out the **SPRAYNOZZLE**. Lower pressures are recommended for ease of handling.
- The **FLUID SUPPLY LINE** and all fittings used with it, should have at least a 3/16" passage.
- Connect this **LINE** at the **PUMP**, and then to the **FLUID INLET** of the **MiniSpray**. 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 **MiniSpray** operates on compressed air which is controlled by a built-in air valve termed the "**UNI VALVE**".

#### 1. Air Pressure

The **MiniSpray** 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 1/4" passage. If this **LINE** is over ten feet long, or any elbow fittings are used, increase passages to 5/16" or more. A valve or disconnect on this **LINE** can be useful, but it must have 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 the **AIR SUPPLY LINE** to the **AIR SUPPLY**. Connect the other end of this **LINE** to the **AIR INLET** of the **MiniSpray**. Using thread sealant will help prevent loss of air.

### E. Installing the Distribution System.

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

#### 1. Items required

The items below are required to operate the **MiniSpray**. They are ordered separate from the **MiniSpray** 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).

If this **LINE** must be flexible, **L.S.P. HyPressure Tubing** is the **only non-metal tubing allowed for use**. Any other tubing is found to be too "soft" for good performance and may burst.

##### c) Line Fittings

Standard 1/4" compression fittings should be used when making any connections required while running **DISTRIBUTION LINE**.

### 2. Mounting a Nozzle Assembly

Do as described below per the type **NOZZLE ASSEMBLY** being used.

#### a) SprayNozzle.

This type **NOZZLE** requires support. If metal **DISTRIBUTION LINE** is used, it may be stable enough to be used as this support.

If this **LINE** is flexible, a **NOZZLEBRACKET** (see **ACCESSORIES**) or similar 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 Distribution Line.

For best results, try to comply with the following.

- Keep the amount of **LINE** used to a minimum. Run **LINE** as directly as possible. Use as little slack as practical.
- 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**.
- Keep contamination out of the **LINEs**. If cutting creates chips, be sure to flush clean before installation.
- Make all connections properly. Keep the **DISTRIBUTION LINE** bottomed in the **FITTING** while tightening the compression nut to one full turn past hand-tight.

### 4. Using the On/Off Manifold

The **ON/OFF MANIFOLD** provides for splitting the **DISTRIBUTION LINE** and allows each leg to be turned on/off. For best results, try to comply with the following, as well as suggestions at Step 3 above.

- If **MiniSpray** is close to **SPRAYNOZZLES**, connect **MANIFOLD** directly to **MiniSpray's FLUID OUTLET PORT** using a pipe nipple. Run **DISTRIBUTION LINE** to **SPRAYNOZZLES** from the **MANIFOLD**.
- If **MiniSpray** is distant to the **SPRAYNOZZLES**, locate **MANIFOLD** as close to the **SPRAYNOZZLES** as practical. Run **DISTRIBUTION LINE** from the **MiniSpray** to the **MANIFOLD**, and then on to the **SPRAYNOZZLES**.

## INSPECTING the UniValve

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

### A. Disassemble UniValve as follows.

- Unscrew **PIPE PLUG(31)** from **VALVE HOUSING(27)**.
- Remove **RETAINER RING(20)** from **VALVE HOUSING(27)** (use a small screw driver and pry ring from groove). See page 5.
- Remove **VALVE PLUG(37)** and **VALVE SPOOL(35)** by inserting a rod (3/16" or smaller) into the hole from which **PIPE PLUG(31)** was removed and pushing these parts out of **VALVE HOUSING(27)**.

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

- Do not remove an **O-RING** from its 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(34)** to fit in its groove very loosely. The reason: it is a special, low friction configuration.

## ACCESSORIES

The items listed below are made available to help with the application of the MiniSpray.

### A. Actuators

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

#### 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 continuously while air is applied. 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 described below.

#### 4. Count Down Actuator — Model No: E310

Actuates 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 after triggering.

#### 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 continuously at a set cycle rate. Can be set for remote control so that actuation stops when machine does.

#### 7. Electronic Actuator — Model No: E300

Is a combination of the Counter and Pulsator described above. Counts from 1 to 99. Pulsation time and duration have separate adjustments. Either or both features are selectable. Includes time delay to control the moment of actuation.

### C. The Velocity Control.

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

- Unscrew **VELOCITY CONTROL(30)** from **VALVE HOUSING(27)** to check **O-RING(28)** and **BACKUP RING(29)**.
- Repair or replace as required and reassemble in reverse order.

### D. Reassemble the UniValve as follows.

- Clean the bore in **VALVE HOUSING(27)** as well as is practical.
- Apply a coat of light machine oil to all parts.
- Insert **VALVE SPOOL(35)** into **VALVE HOUSING(27)** making sure **O-RING(34)** is not pinched (give this **O-RING** special attention because of its loose fit). Install **VALVE PLUG(37)** and retain with **RETAINER RING(20)**. Install **PIPE PLUG(31)** and torque to 60-80 in.lbs.

### E. Reconnect the Air Supply and Actuator, and test operation.

### B. Nozzle Assemblies

**NOZZLE ASSEMBLIES** are available in various types and spray patterns. A simple description of each type is given below, followed by a chart of Catalog Numbers for each type and spray pattern.

#### 1. SprayNozzles — Model No's P20x

Consist of a Nozzle Tip and a Check to prevent after dripping.

#### 2. FlexTube — Model No's 21x

Consist of a **SprayNozzle** (above) attached to a **Sta-Put Flex-Tube**.

#### 3. MagnaTube — Model No's P22x

Consist of a **FlexTube** (above) mounted on a magnetic base.

Nozzle Tip	SprayNozzle	FlexTube	MagnaTube
110° Fan Spray	P-201	P-201	P-201
80° Fan Spray	P-202	P-202	P-202
65° Fan Spray	P-203	P-203	P-203
25° Fan Spray	P-205	P-205	P-205
55° Cone Spray	P-207	P-207	P-207
Rt. Angle Spray	P-209	P-209	P-209

### C. HyPressure Tubing — Model No: P940

Supplied for use as flexible **DISTRIBUTION LINE**. This is the only flexible tubing we have found capable of giving satisfactory performance. Has 1/4" O.D. which adapts to **NOZZLEASSEMBLIES**.

### 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°. Mounts on the **MagnaBase** for yet more convenience.

### E. MagnaBases

Holds **ACCESSORIES** for easy positioning and adjustments.

#### . MagnaBase — Model No: P905

Holds with a force of 100 pounds on bare metal.

### F. Fluid Reservoirs

For use as containers for supplying the lubricant to be dispensed.

#### 1. 1-1/2 Gallon Reservoir — Model No: P312

Consists of 1-1/2 Gallon container with sight-glass, snap-on lid, filtered outlet, and mounting hardware.

#### 2. 5 Gallon Reservoir — Model No: P315

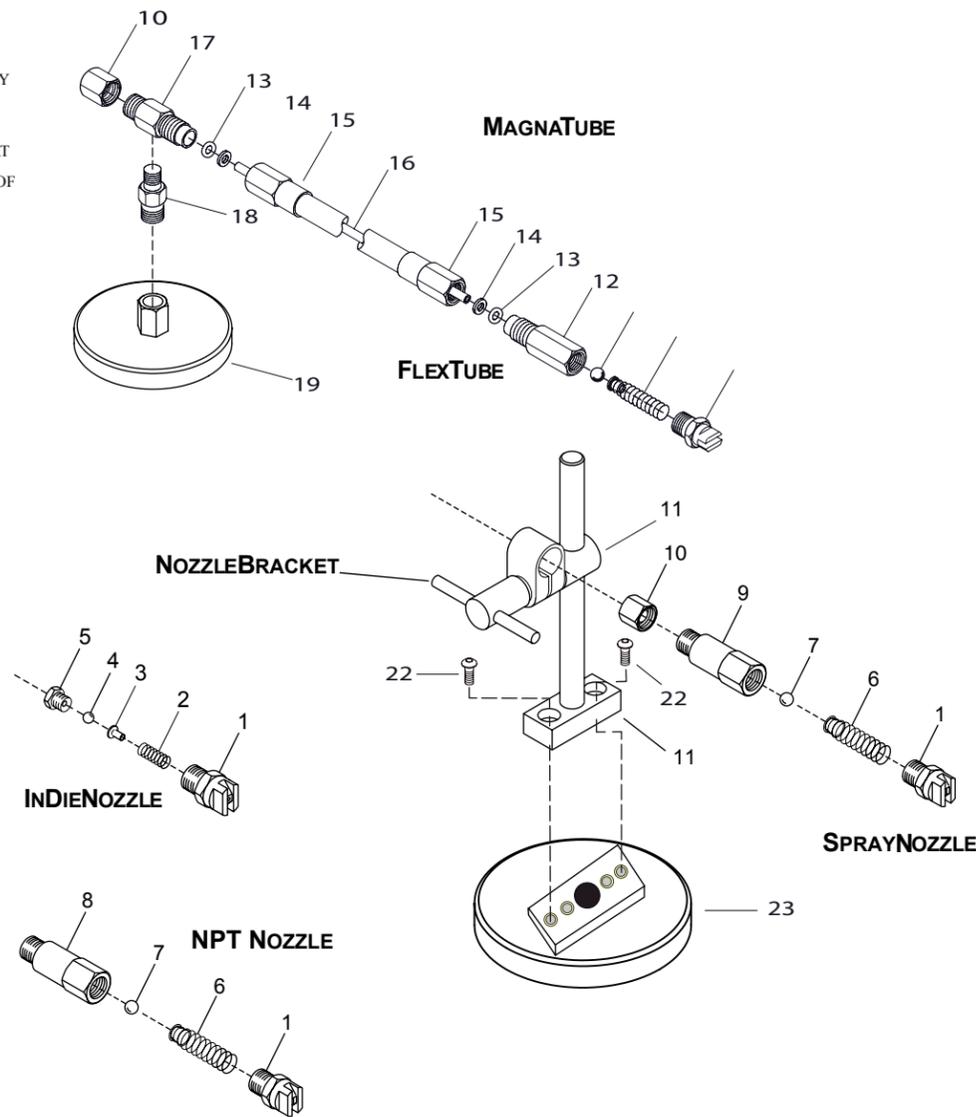
Same as above except with 5 Gallon capacity.

## PARTS LIST "E"

USE THE APPROPRIATE FIGURE AT THE RIGHT TO IDENTIFY THE PART BY IT'S KEY NO.

USING THE KEY NO. AND TABLE BELOW, FIND THE PART NUMBER, NO. OF PIECES USED, AND THE DESCRIPTION OF THE PART NEEDED.

KEY PART NO. NUMBER	NO. PCS	DESCRIPTION -OR- PART NAME
NOZ-101	1	NOZZLE, 110° FAN:
NOZ-102	1	NOZZLE, 80° FAN:
1 NOZ-103	1	NOZZLE, 65° FAN:
NOZ-104	1	NOZZLE, 25° FAN:
NOZ-105	1	NOZZLE, 55° ROUND:
NOZ-106	1	NOZZLE, SIDE FAN:
2 SPG-005	1	SPRING,CHECK:
3 EYE-001	1	EYELET,CHECK
4 BAL-021	1	BALL,CHECK:
5 SET-019	1	SEAT,CHECK:
6 280-SPG-01	1	SPRING ASSEMBLY:
7 BAL-022	1	BALL,CHECK:
8 HSG-050	1	HOUSING,CHECK
9 HSG-020	1	HOUSING,CHECK
10 FIT-017	1	FITTING,NUT:
11 290-BRK-02	1	BRACKET ASSY:
12 HSG-036	1	HOUSING,CHECK:
13 RGO-006	2	O-RING,SEAL:
14 RGB-006	2	RING,BACKUP:
15 281-TUB-01	1	FLEXTUBE ASSY:
16 TUB-011	1	TUBE,COPPER:
17 ADP-041	1	ADAPTER,MOUNTING:
18 BRK-014	1	BRACKET,MOUNTING
19 282-BAS-07	1	MAGNETIC BASE
22 SCR022	1	SCREW, BUTTON Hd: 10X32-.875
23 290BAS05	1	MAGNETIC BASE



## Inspecting the Distribution System

Refer to PARTS LIST "E" for Key No's shown in parenthesis.

### A. The DISTRIBUTION LINE

This LINE is very important to good performance. Check that it is of the proper type. See **INSTALLATION INSTRUCTIONS** at Step "D".

If this LINE is metal, check for kinks or crimping that may have closed it off. If it is flexible LINE, check it for cuts or cracks.

In either case, check all connections to insure they are air tight.

### B. The NOZZLE TIP

**NOTE:** Whenever a Nozzle Tip (#1) is removed, the Check Ball (#4, #7) should be replaced. In time, the Ball takes a "set" and will not seat properly once disturbed.

1. Unscrew the Nozzle Tip (#1). Caution, this Tip is spring loaded.
2. Inspect the Check Spring (#2, #6). Replace if broken or deformed.
3. Clean the Nozzle Tip (#1) and blow dry. Inspect by looking through it. If you do not see a tiny, uniformly shaped hole, there is a clog.

Tips on unclogging a Nozzle Tip:

...Try to dislodge it with a high pressure stream directed backward to the normal flow through the Nozzle.

...If you must use a tool, use one as "soft" as possible (plastic, fiber)

...Apply no more pressure than necessary. The Tip is easily damaged.

Some clogs are impossible to get out without harming the Tip. Keep a spare Nozzle Tip handy for such cases.

4. At re-assembly, clean the Nozzle Tip of all residue and apply thread sealant. Torque to 80-120 in.lbs.

### C. The FLEXTUBE \ MAGNATUBE

A FlexTube or MagnaTube may be clogged or leaking. These problems are handled differently as described below.

#### 1. Checking for a clogged FlexTube.

First do Step "B" above. Do no more dis-assembly. Check for the clog by running a wire or blowing through the Copper Tube (#16).

#### 2. Repairing a leaking FlexTube.

- a. Unscrew the Check Housing (#12) from the FlexTube (#15).

**NOTE:** Removing the Nozzle Tip (#1) is not necessary.

- b. Unscrew the FlexTube (#15) from the Mounting Adapter (#17).
- c. Remove the two small "O"Rings(#13) and Backup Rings(#14). See if they are dirty, cut, or deformed. Clean or replace as needed.
- d. Check the surfaces where these "O"Rings seal. If scratched or marred, have smoothed or replace the part.
- e. 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 or the other needs replacing. If it is necessary, be careful to not mar the soft Copper Tube which is easily scratched.

## OPERATING INSTRUCTIONS

### A. Supply the Fluid to be Sprayed

Do as described below per the method you are using to supply fluid to the MiniSpray.

#### 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 MiniSpray.

#### 2. If Using a Pump (Pressure Feed)

Insure there is fluid for the PUMP. Activate the PUMP. Open the FLUID SUPPLY LINE to the MiniSpray (open valve, connect disconnect, etc.)

### B. Prime the MiniSpray

#### 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 MiniSpray.

### D. Set the Controls

Fully open the VOLUME CONTROL and VELOCITY CONTROL by turning their knobs counter-clockwise until they stop. If an AIR REGULATOR is present, set it for maximum air pressure.

### E. Operate the MiniSpray

Operate the ACTUATOR to cycle the MiniSpray. 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 MiniSpray 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. Using 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 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 MiniSpray.

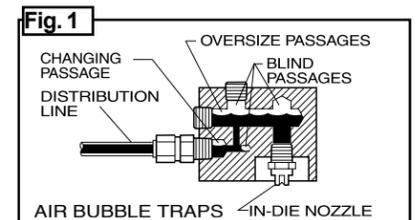
If a RESERVOIR is left to run dry, or a PUMP leaks and pumps air, or the FLUID SUPPLY LINE becomes punctured or is cracked, etc.... are a few ways in which air might be introduced into the System from external sources.

#### 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.

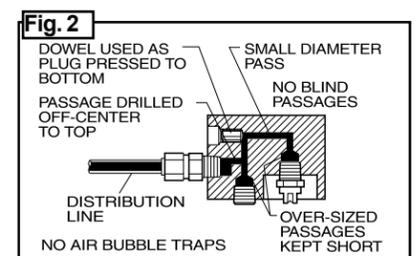
#### Example #1:

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:

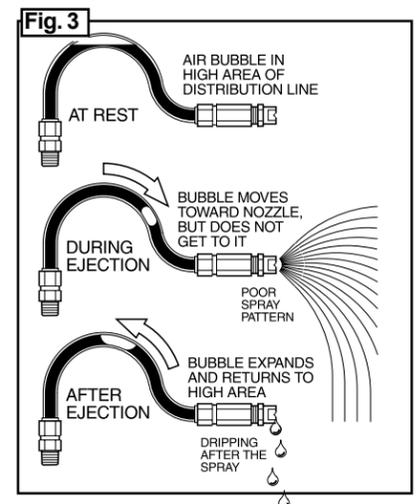
We recommend that you contact L.S.P. if you plan to fabricate a portion of the System.

#### 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 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 NOZZLE to be expelled.



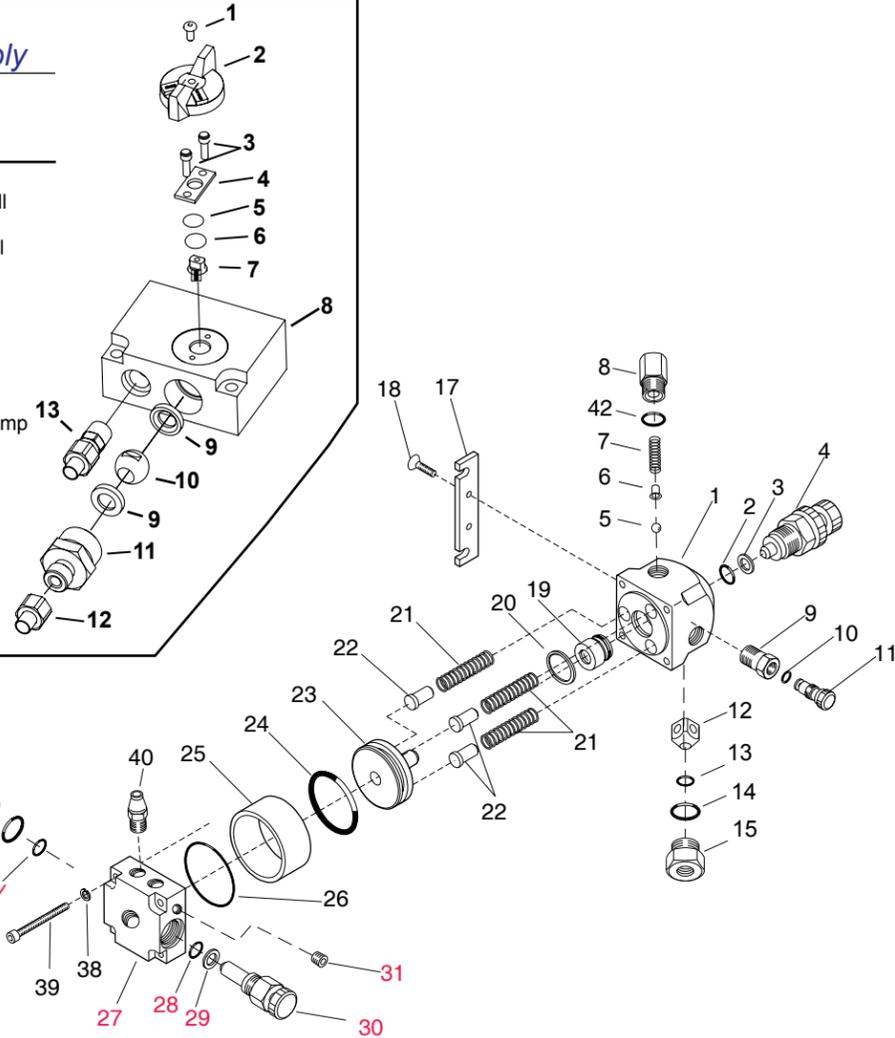
# REPLACEMENT PARTS LISTING

## PART LIST "B"

### 290-MAN-09 Manifold Assembly

(reference Figure #2)

Key No.	Part No.	No. Pcs	Description -or- Part Name
1	SCR-060	1	SCREW, Button Head
2	MLD-051	1	MOLDING, Knob: small
3	SCR-086	2	SCREW, Cap: soc hd.
4	PLT-071	1	PLATE, Retainer: small
5	RGB-032	1	RING, Backup: solid
6	RGO-057	1	RING, "O": seal.
7	STM-002	1	STEM, Valve: on/off.
8	HSG-226	1	HOUSING, Valve.
9	SET-036	2	SEAT, Valve: on/off
10	BAL-052	1	BALL, Valve: on/off.
11	OUT-014	1	OUTLET, Valve: 1/4 comp
12	FIT-017	1	CAP, 1/4 comp.
13	FIT-021	1	FITTING, Adapter



KEY NO.	PART NUMBER	QTY USED	DESCRIPTION OF PART
1	BRL-032	1	BARREL
2	RGO-032	1**	O-RING, SEAL
3	RGB-005	1**	RING, BACKUP
4	220-SCR-01	1	VALVE, VOLUME ADJUST
5	BAL-022	1**	BALL, CHECK, 1/4"
6	EYE-004	1**	EYELET, SPRING
7	SPG-023	1**	SPRING, CHECK 1/4"
8	OUT-044	1	OUTLET, FLUID
9	SET-004	1	SEAT, BLEEDER
10	RGO-028	1	O-RING, SEAL
11	SCR-203	1	SCREW, BLEEDER VALVE
12	CHK-009	1**	CHECK, INLET
13	RGO-008	1**	O-RING, SEAL
14	RGO-034	1**	O-RING, SEAL
15	INL-022	1	INLET, FLUID
17	PLT-048	1	PLATE, MOUNTING
18	SCR-019	2	SCREW, FLAT HEAD
19	220-SLV-01	1**	SEAL ASSEMBLY, RAM
20	RGR-024	2**	RING, RETAINER
21	SPG-030	3**	SPRING, RETURN

KEY PART NO.	NUMBER	QTY USED	DESCRIPTION OF PART
22	GID-013	3	GUIDE, SPRING
23	220-PIS-01	1	PISTON & RAM
24	RGO-073	1**	O-RING, SEAL
25	CYL-042	1	CYLINDER, AIR
26	RGO-072	1**	O-RING, SEAL
27	220-HAI-01	1	VALVE HOUSING
28	RGO-010	1**	O-RING, SEAL
29	RGB-019	1**	RING, BACKUP
30	220-SCR-02	1	VELOCITY ADJUST
31	FIT-022	1	PLUG, PIPE
32	RGO-057	1**	O-RING, SEAL
33	RGO-050	1**	O-RING, SEAL
34	RGO-014	1**	O-RING, SEAL
35	SPL-027	1	VALVE, SPOOL
36	RGO-035	1**	O-RING SEAL
37	PLG-022	1	PLUG, VALVE
38	WAS-001	4	WASHER, LOCK
39	SCR-090	4	SCREW, TIE ROD
40	FIT-020	1	FITTING, TUBE
41	RGR-024	1	RING, RETAINING
42	RGO-014	1	O-RING, SEAL

ITEMS IN RED SHOW ALL PARTS FOR A COMPLETE AIRVALVE  
220VAL01 1 AIR VALVE, COMPLETE

NOTE: Items marked (\*\*) are available in a Repair Kit under the Part No. 220-ACY-01

# INSPECTING the MiniSpray

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

## A. Inlet Check Valve

The function of the INLET CHECK VALVE is to allow fluid from the FLUID SUPPLY LINE to enter the MiniSpray, and not to allow it 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 O-RING 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 INLET(15) is cut or broken.
6. Replace parts found to be bad. Clean parts. Reassemble in reverse order. Make sure CHECK(12) is oriented correctly and moves freely in it's hole. Torque FLUID INLET(15) to 85-100 in.lbs.

## B. Outlet Check Valve

The function of the OUTLET CHECK VALVE is to allow the fluid in the MiniSpray out into the DISTRIBUTION LINE, and not to allow it back in again.

1. Disconnect the DISTRIBUTION LINE from the MiniSpray.
2. Remove FLUID OUTLET(8) from BARREL(1). Caution: 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. 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 MiniSpray.

1. See Step A. above, check O-RING(14) as directed at Line 5.
2. See Step B. above, check BAL(05) as directed at Line 4.
3. Remove BLEEDER SCREW(11) from the BLEEDER SEAT(9). Check if O-RING(10) is cut or broken. Replace if bad.
4. Remove VOLUME ADJUST(4) from 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(19) as directed at Line 8.

## D. Disassembly of the MiniSpray

If the MiniSpray must be taken apart, do as follows.

1. Remove four TIE ROD SCREWS(39) holding VALVE HOUSING(27) to BARREL(1). This should allow dis-assembly, 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 an O-RING from it's groove unless found bad. If bad, do not scratch the groove while prying it out.
3. Remove VALVE HOUSING(27). Check O-RING(26).
4. Remove AIR CYLINDER(25). Check the outside for dents and dings. Check the inside diameter for scoring.
5. Remove PISTON & RAM(23). Check O-RING(24). Check finish of RAM (small diameter rod) for scoring and nicks. Check the PISTON (larger diameter) for deformation.
6. Remove three RETURN SPRINGS(21). Check each for deformation and breakage. Inspect the holes which locate these SPRINGS in BARREL(1) and in PISTON & RAM(23) for excessive wear or elongation.
7. Remove RETAINER RING(20) (use a small screwdriver and place the tip under the exposed end and uncoil the ring, layer by layer until removed from the groove). Check RETAINER RING for breakage or deformation.
8. Remove SEAL ASSEMBLY(19). Check the O-RINGS on the inside and outside of this part for cuts, nicks, or excessive wear. If any O-RING is bad, replace the entire SEAL ASSEMBLY(19).

## E. Reassembly of the MiniSpray

When putting the MiniSpray together again, do as follows

1. If reusing SEAL ASSEMBLY(19), clean it thoroughly. A new SEAL ASSEMBLY(19) comes with O-RINGS installed and ready for use. Insert into BARREL(1), and retain with RETAINER RING(20). Make sure RETAINER RING fully seats into it's groove all the way around.



2. Insert three RETURN SPRINGS(21) into BARREL(1). Put a SPRING GUIDE(22) into each.
3. Apply a light coat of oil or grease to RAM and O-RING(24) on PISTON & RAM(23).
4. Install PISTON & RAM(23) such that the SPRING GUIDES(22) nest in the holes in the PISTON, and the RAM aligns with, and slides into the SEAL ASSEMBLY(19).
5. Install AIR CYLINDER(25) over the PISTON & RAM(23), making sure O-RING(24) is not pinched.
6. Install VALVE HOUSING(27) onto AIR CYLINDER(25), making sure O-RING(26) is not pinched.
7. Attach VALVE HOUSING(27) to BARREL(1) using four TIE ROD SCREWS(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.