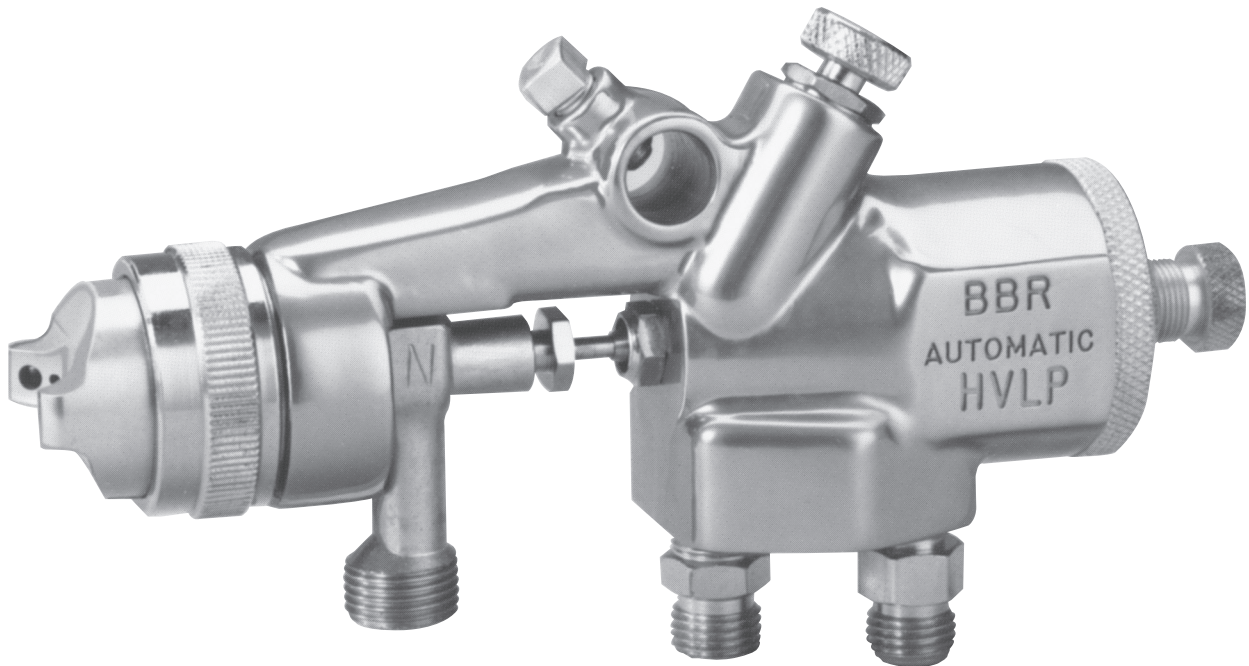




## MACH 1A HVLP (MACH 1AV HVLP) AUTOMATIC AIRSPRAY GUN

6203-XXXX-X MACH 1A  
5203-XXXX-X MACH 1AV



Your new Binks MACH 1A HVLP Automatic Spray Gun is exceptionally rugged in construction, and is built to stand up under hard, continuous use. However, like any other fine precision instrument, its most efficient operation depends on a knowledge of its construction, operation and maintenance. Properly handled and cared for, it will produce beautiful, uniform finishing results long after other spray guns have worn out.

The automatic MACH 1A HVLP gun is a conventional style airspray gun with special nozzles and modifications that allow it to operate at high transfer efficiencies in compliance with the “California South Coast Air Quality Management District” regulations as a “high volume, low pressure” airspray gun.

High pressure, low volume airflow is converted to high volume, low pressure within the gun body. Special air and fluid nozzles enable the gun to atomize fluid at low air pressures and velocities, creating the “soft spray” effect for high transfer efficiencies.

### **⚠ CAUTION**

Before removing any components from spray gun, shut off air and material pressure.

### **NOTE**

IMPORTANT REGULATORY NOTE regarding the use of this product appears on page 10.

In this part sheet, the words **WARNING**, **CAUTION** and **NOTE** are used to emphasize important safety information as follows:

## **WARNING**

Hazards or unsafe practices which could result in severe personal injury, death or substantial property damage.

## **CAUTION**

Hazards or unsafe practices which could result in minor personal injury, product or property damage.

## **NOTE**

Important installation, operation or maintenance information.

## **WARNING**

### Read the following warnings before using this equipment.



#### READ THE MANUAL

Before operating finishing equipment, read and understand all safety, operation and maintenance information provided in the operation manual.



#### OPERATOR TRAINING

All personnel must be trained before operating finishing equipment.



#### EQUIPMENT MISUSE HAZARD

Equipment misuse can cause the equipment to rupture, malfunction, or start unexpectedly and result in serious injury.



#### LOCK OUT / TAG-OUT

Failure to de-energize, disconnect, lock out and tag-out all power sources before performing equipment maintenance could cause serious injury or death.



#### AUTOMATIC EQUIPMENT

Automatic equipment may start suddenly without warning.



#### PRESSURE RELIEF PROCEDURE

Always follow the pressure relief procedure in the equipment instruction manual.



#### KEEP EQUIPMENT GUARDS IN PLACE

Do not operate the equipment if the safety devices have been removed.



#### KNOW WHERE AND HOW TO SHUT OFF THE EQUIPMENT IN CASE OF AN EMERGENCY



#### WEAR SAFETY GLASSES

Failure to wear safety glasses with side shields could result in serious eye injury or blindness.



#### INSPECT THE EQUIPMENT DAILY

Inspect the equipment for worn or broken parts on a daily basis. Do not operate the equipment if you are uncertain about its condition.



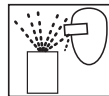
#### NEVER MODIFY THE EQUIPMENT

Do not modify the equipment unless the manufacturer provides written approval.



#### NOISE HAZARD

You may be injured by loud noise. Hearing protection may be required when using this equipment.



#### PROJECTILE HAZARD

You may be injured by venting liquids or gases that are released under pressure, or flying debris.



#### PINCH POINT HAZARD

Moving parts can crush and cut. Pinch points are basically any areas where there are moving parts.



#### STATIC CHARGE

Fluid may develop a static charge that must be dissipated through proper grounding of the equipment, objects to be sprayed and all other electrically conductive objects in the dispensing area. Improper grounding or sparks can cause a hazardous condition and result in fire, explosion or electric shock and other serious injury.



#### WEAR RESPIRATOR

Toxic fumes can cause serious injury or death if inhaled. Wear a respirator as recommended by the fluid and solvent manufacturer's Safety Data Sheet.



#### TOXIC FLUID & FUMES

Hazardous fluid or toxic fumes can cause serious injury or death if splashed in the eyes or on the skin, inhaled, injected or swallowed. LEARN and KNOW the specific hazards of the fluids you are using.



#### FIRE AND EXPLOSION HAZARD

Improper equipment grounding, poor ventilation, open flame or sparks can cause a hazardous condition and result in fire or explosion and serious injury.



#### MEDICAL ALERT

Any injury caused by high pressure liquid can be serious. If you are injured or even suspect an injury:

- Go to an emergency room immediately.
- Tell the doctor you suspect an injection injury.
- Show the doctor this medical information or the medical alert card provided with your airless spray equipment.
- Tell the doctor what kind of fluid you were spraying or dispensing.



#### GET IMMEDIATE MEDICAL ATTENTION

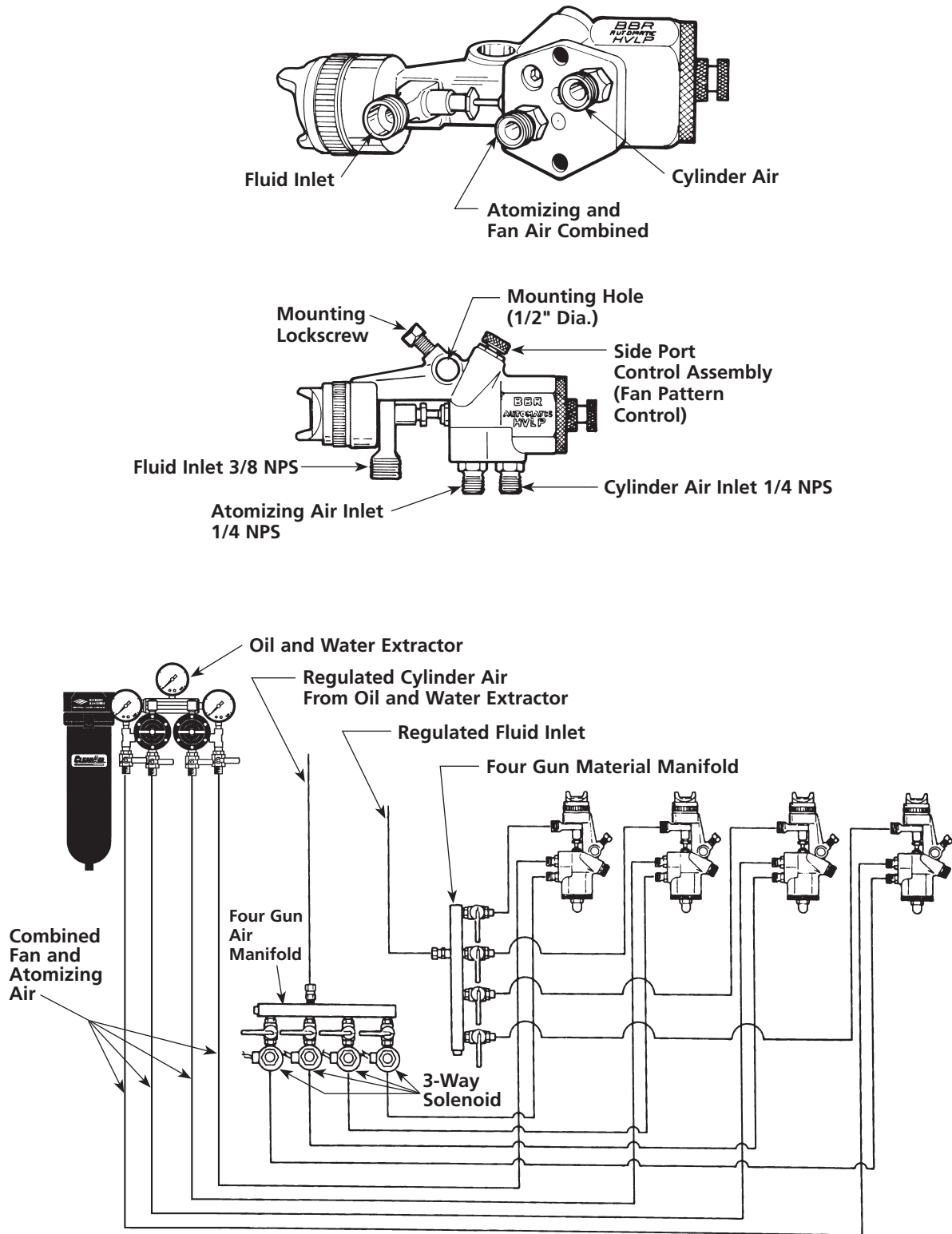
To prevent contact with the fluid, please note the following:

- Never point the gun/valve at anyone or any part of the body.
- Never put hand or fingers over the spray tip.
- Never attempt to stop or deflect fluid leaks with your hand, body, glove or rag.
- Always have the tip guard on the spray gun before spraying.
- Always ensure that the gun trigger safety operates before spraying.

**IT IS THE RESPONSIBILITY OF THE EMPLOYER TO PROVIDE THIS INFORMATION TO THE OPERATOR OF THE EQUIPMENT. FOR FURTHER SAFETY INFORMATION REGARDING THIS EQUIPMENT, SEE THE GENERAL EQUIPMENT SAFETY BOOKLET (77-5300).**

## Binks MACH 1A HVLP AUTOMATIC SPRAY GUN

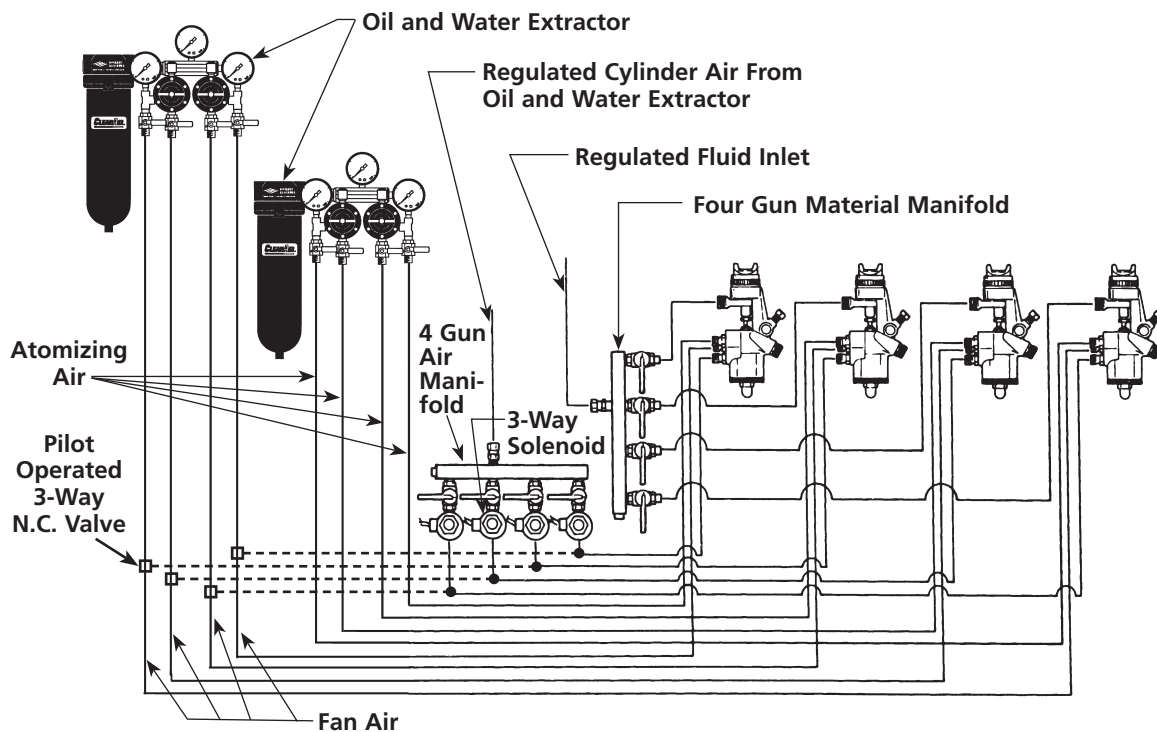
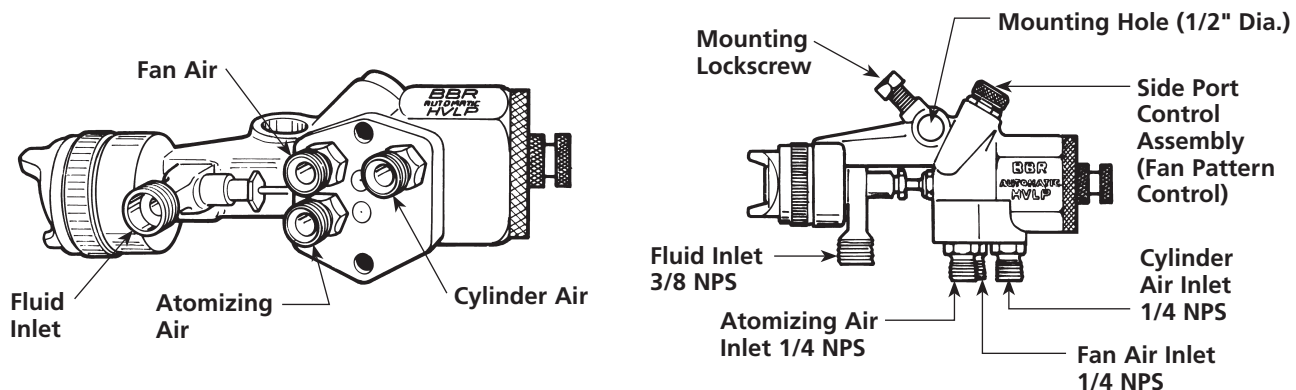
Typical Arrangement Diagram and Hook-up for Combined Fan and Atomizing Air



For some applications each gun may require individually regulated fluid and air inlet lines.

## Binks MACH 1A HVLP AUTOMATIC SPRAY GUN

Typical Arrangement Diagram and Hook-up for Separate Fan and Atomizing Air  
(See Page 5 for Internal Modifications to Gun)



For some applications each gun may require individually regulated fluid and air inlet lines.

(SEE PAGE 11 FOR PNEUMATIC SCHEMATIC)

### GENERAL NOTES

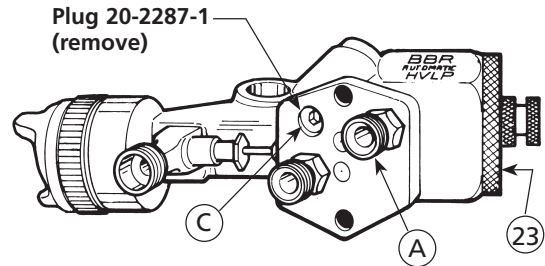
1. Have at least 55-60 P.S.I. air pressure for cylinder's operating air.
2. To reduce overspray and obtain maximum efficiency, always spray with lowest possible air pressure that produces an acceptable spray pattern. Fluid pressure should be less than air pressure in most applications.
3. The air line from gun to 3-way valve should be as short as possible for rapid operation.
4. All air used in the gun should be dirt and moisture free. (This is accomplished by using an oil and water extractor).
5. Shut off all fluid and air lines to gun if gun is to stand idle for any length of time. (This is to prevent "build-up" or accumulation of minute leaks in the system from turning on the gun.)

## TO CHANGE FROM COMBINED FAN AND ATOMIZING AIR TO SEPARATE FAN (BLEEDS AIR) AND ATOMIZING AIR

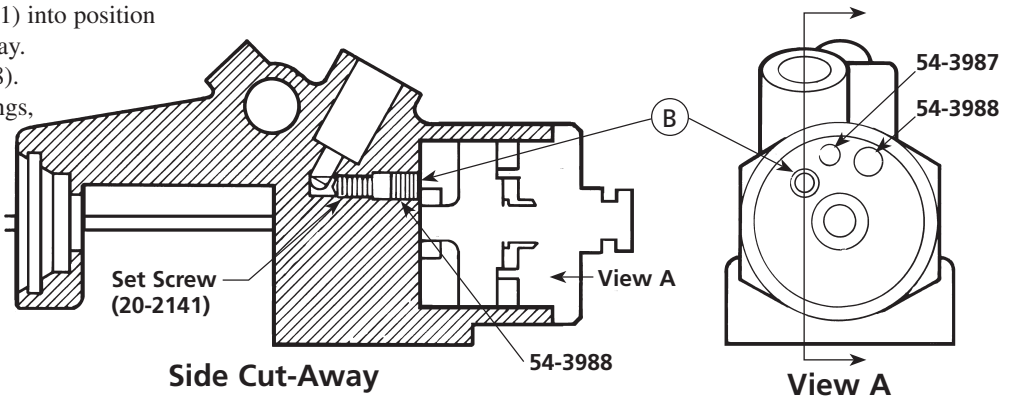
1. Unscrew end cap (27) and remove material needle valve (21, 22, 23, 24) (See parts drawing, page 6).
2. Remove piston (19) by injecting low pressure air into cylinder air port (A).

### ⚠ WARNING

Use of excessive pressure will cause piston to exit gun body at high velocity, possibly resulting in damage to the components or personal injury. Point back of the gun in a safe direction and do not use excessive pressure to remove the piston.



3. With 5/32" hex key, remove plug (54-3988) from hole (B) on inside of cylinder.
4. Insert set screw (20-2141) into position as shown in side cut-away.
5. Re-install plug (54-3988).
6. Re-install piston, 2 springs, material needle valve and end cap (27). (See assembly drawing, page 6).
7. Remove plug 20-2287-1 from the fan air port (C).
8. Install fitting 71-28 into port (C).



## SETUP FOR SPRAYING

### CONNECTING GUN TO MATERIAL HOSE

Gun should be connected by a suitable length of 3/8" diameter material hose fitted with a connector with a 3/8" NPS(f) nut at gun end. 1/4" diameter hose is recommended for use with low viscosity materials. (Fluid hoses of different composition are available for special fluids.)

### CONNECTING GUN TO AIR HOSE

Gun should be connected by a suitable length of 5/16" diameter air hose fitted with a connector with a 1/4" NPS(f) nut at gun end.

## OPERATING THE MACH 1 HVLP AUTOMATIC SPRAY GUN

### CONTROLLING THE MATERIAL FLOW

When fed from a pressure supply, an increase in the material pressure will increase the rate of flow. Correct fluid nozzle size ensures correct material flow rate. If necessary, fluid flow can also be adjusted by adjusting the amount of needle travel. This is done by loosening lock nut (28) and adjusting control knob (29) until the correct needle travel is achieved.

### ADJUSTING AIR AND FLUID TIMING

A 1/16" gap between the air piston (19) and needle body (23) should be maintained (see figure 1). This will create needle motion that will allow adequate air flow before the fluid starts flowing. The gap may be adjusted by partially removing the material needle valve (21, 22, 23, 24), screwing the needle (21) either in or out of the needle body (23) and locking it back into the gun while being sure to check the clearance between the air valve piston (19) and the needle body (23).

### ADJUSTING THE SPRAY PATTERN

The width of the spray pattern is controlled by the side port control assembly (7) on page 6. Turning this control clockwise until it is closed will give a round spray; turning it counterclockwise will widen the spray into a fan shape. The fan spray can be turned anywhere through 360° by positioning the air cap (2) relative to the gun. To effect this: loosen retainer ring; position nozzle, then, re-tighten retainer ring.

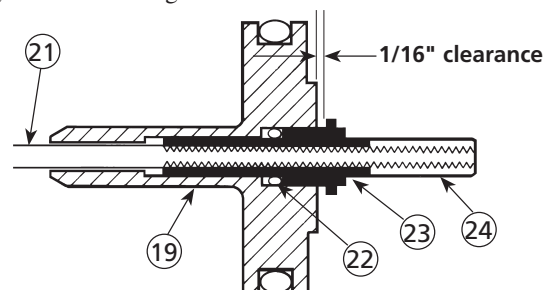
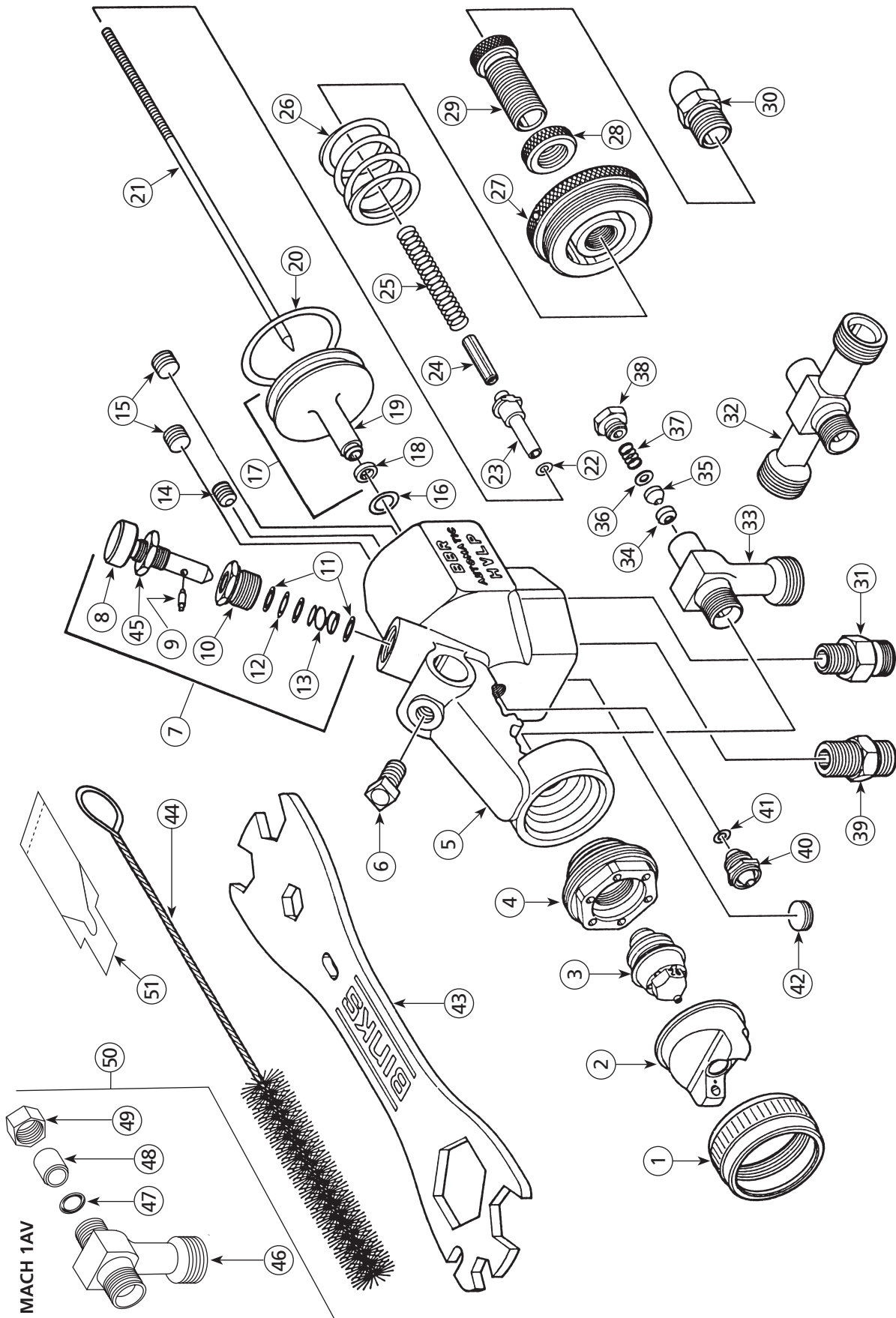


Figure 1



Optional fluid needle cover (30) is for installations that need to be tamper-proof.  
Needle cover allows gun to be fully opened when triggered.

## PARTS LIST

(When ordering, please specify Part No.)

ITEM NO.	PART NO.	DESCRIPTION	QTY.	ITEM NO.	PART NO.	DESCRIPTION	QTY.
1	54-3531	RETAINING RING.....	1	28	54-3732	LOCK NUT.....	1
2	*	AIR NOZZLE.....	1	29	54-3731	CONTROL KNOB.....	1
3	*	FLUID NOZZLE.....	1	30	54-3715**	FLUID NEEDLE COVER.....	1
4	54-3543	HEAD INSERT.....	1	31	71-28	DOUBLE MALE NIPPLE 1/8 NPT x 1/4 NPS.....	2
5	—	MACH 1A GUN BODY ASSEMBLY.....	1	32	54-3741	FLUID INLET, RECIRCULATING (Optional).....	1
6	20-1359-1	SQ. BOLT 5/16-18 x 3/4 Long.....	1	33	54-3533	FLUID INLET (Stainless Steel).....	1
7	54-3720	SIDE PORT CONTROL ASSEMBLY.....	1	34	54-4264 ●▲	GLAND ADAPTER.....	1
8	54-3721	CONTROL SPINDLE.....	1	35	54-4265 ●▲	NEEDLE SEAL.....	1
9	31-258	RETAINING PIN.....	1	36	54-4266 ●▲	SEAL BACKUP.....	1
10	31-256	STUFFING BOX.....	1	37	54-4267 ●▲	SPRING.....	1
11	31-259	INNER WASHER.....	3	38	54-4263 ●▲	PACKING NUT.....	1
12	20-3620-5 ▲	O-RING.....	1	39	57-13-1	DOUBLE MALE NIPPLE 1/4 NPT x 1/4 NPS.....	1
13	31-241	CONTROL SPRING.....	1	40	54-3716	AIR VALVE GLAND ASSEMBLY.....	1
14	54-3987 △	SET SCREW, 1/4-28.....	1	41	20-3859-5 ▲	O-RING Air Valve Gland.....	1
15	54-3988 △	PLUG 1/16-20 NPT.....	2	42	54-3986 △	PLUG 1/8-27 NPT.....	1
16	20-5286 ▲	O-RING.....	1	43	54-3918	WRENCH (Not Included).....	1
17	54-3706	PISTON ASSEMBLY.....	1	44	82-469	GUN BRUSH.....	1
18	54-3729 ◆	SEAL.....	1	45	—	JAM NUT.....	1
19	54-3722 ◆	PISTON.....	1	46	■	FLUID INLET.....	1
20	20-4511 ▲	O-RING.....	1	47	20-2227-5 ■▲	O-RING.....	1
21	47-478	NEEDLE (Stainless Steel).....	1	48	54-4531 ■▲	SPACER.....	1
22	20-3515-5 ▲	O-RING (Needle Assembly).....	1	49	54-4542 ■	NUT ASSEMBLY.....	1
23	54-3713	NEEDLE BODY.....	1	50	54-4540 ■	FLUID INLET ASSEMBLY.....	1
24	54-3709	NEEDLE LOCKING NUT.....	1	51	■	GUNNERS MATE.....	1
25	54-3719	SPRING (Needle Return).....	1		54-4270	NEEDLE BOOT (Not Shown).....	1
26	54-3707	SPRING (Piston Return).....	1				
	54-1876	OPTIONAL H.D. SPRING (Piston Return) ...	1				
27	54-3708	END CAP.....	1				

\* See Air and Fluid Nozzle Chart on page 8.

\*\* Optional fluid needle cover is for installations that need to be tamper-proof.  
Needle cover allows gun to be fully opened when triggered.

▲ Part of Repair Kit 54-3980.

◆ Part of item 17. Also available separately.

● Part of Self-Adjusting Packing Kit (54-4261) without needle.

△ Part of gun body assembly, item 5. ■ For MACH 1AV.

## ACCESSORIES

**54-4270** Flexible Needle Cover

**54-1876** Heavy Duty Piston Spring

## NOZZLE AND NEEDLE SELECTIONS

### HVLP Air Nozzles

**92P** = For general industrial and automotive finish applications.  
**95P** = Standard pressure nozzle for fine finish spraying.  
**95AP** = Extra fine atomization nozzle for standard finish materials.  
**97P** = Wide fan nozzle for fine finish of high solid coatings.

**97AP** = Extra fine atomization nozzle for high solids/metallics.  
**905P** = Same as 95P but for use w/900 series fluid nozzle.  
**100P** = Tulip Pattern shape for high quality atomization of low to medium viscosity material.

#### HVLP AIR NOZZLES

##### 95P, 97P, 95AS, 95AP, 97AP, 905P ■

GUN INLET PSI	NOZZLE AIR FLOW SCFM	NOZZLE ATOMIZING PSI
20	11.0	3
30	15.7	5
38	17.5	7
45	19.6	9
50	22.5	10

##### HVLP AIR NOZZLE 93P ■

GUN INLET PSI	NOZZLE AIR FLOW SCFM	NOZZLE ATOMIZING PSI
8.0	5.5	3
11.5	7.0	5
14.5	8.0	7
17.0	9.5	9
18.0	10.0	10

##### HVLP AIR NOZZLE 90P ■

GUN INLET PSI	NOZZLE AIR FLOW SCFM	NOZZLE ATOMIZING PSI
5	4.0	3
7	4.5	5
10	5.0	7
12	5.5	9
15	6.0	10

##### HVLP AIR NOZZLE 94P ■

GUN INLET PSI	NOZZLE AIR FLOW SCFM	NOZZLE ATOMIZING PSI
14	7.0	3
21	9.0	5
27	11.0	7
30	12.0	9
33	13.0	10

##### HVLP AIR NOZZLE 92P ■

GUN INLET PSI	NOZZLE AIR FLOW SCFM	NOZZLE ATOMIZING PSI
6.0	4.5	3
8.5	6.0	5
11.0	6.8	7
13.5	7.5	9
15.0	8.0	10

##### HVLP AIR NOZZLE 100P ■

GUN INLET PSI	NOZZLE AIR FLOW SCFM	NOZZLE ATOMIZING PSI
3.0	3.2	2
6.1	4.8	4
9.0	6.0	6
11.6	6.9	8
14.3	8.0	10

■ **NOTE:** Regulator pressures are based on 25' of 5/16" diameter hose in good condition without Quick-Disconnects or other restrictive fittings. Use the air nozzle test gauge accessory to confirm the atomizing/regulator pressure relationship for your actual air supply set-up. These recommendations are for "typical" or "average" fluids, and are intended to serve as a starting point. Adjust as necessary for your specific application.

## FLUID NOZZLES

### STANDARD NOZZLES

MATERIAL	FLUID NOZZLE NO.	APPLICABLE AIR NOZZLES	COMPATIBLE FLUID NEEDLE†
<b>ULTRA LIGHT:</b> Reduced Flow.	89 (.020" Dia.) 89A (.025" Dia.)	90P, 92P	47-478
<b>VERY LIGHT:</b> Reduced Flow.	90 (.030" Dia.)	93P, 94P	47-478
<b>LIGHT:</b> less than 15 to 20 seconds in a ZAHN 2 Cup, e.g., stains, varnishes, thin lacquers, automotive refinishing materials.	91 (.040" Dia.)	95P, 97P	47-478
	92 (.046" Dia.)	95AP*	47-478
<b>MEDIUM:</b> 20 to 60 seconds in a ZAHN 2 Cup, e.g., general industrial coatings	94 (.055" Dia.) 95 (.059" Dia.)	97AP*	47-478
	97 (.070" Dia.)	100P	47-478

\*"Blue Max" fine finish nozzles.



## NOZZLE AND NEEDLE SELECTIONS

### HVLP Air Nozzles

#### SPECIAL PURPOSE NOZZLES

TYPICAL APPLICATION	FLUID NOZZLE NO.	APPLICABLE AIR NOZZLES	COMPATIBLE FLUID NEEDLE
<b>VERY HEAVY MATERIALS:</b> Block Filler, Texture Coatings, Fire Retardants, Road Marking Paint, Bitumastics, Adhesives, Cellular Plastics, Underbody and Vitreous Coatings, Special Applications	94VT (.052")▲ 1.3 mm	94P, 97P, 100P	54-3966
	905 (.089") 2.3 mm	905P	47-478†
	905VT (.088")▲ 2.3 mm		54-3968
	906 (.100") 2.5 mm		47-478†
<b>FEATHERING</b> For applications requiring more gradual valve opening for fluid flow control with trigger	92F (.046") 1.2 mm	94P, 97P	54-4034
	94F (.055") 1.4 mm	95AP, 97AP	54-4036
	97F (.070") 1.7 mm	100P	54-4039

† Stainless steel, standard. Optional nylon tipped stainless steel (47-472).

▲ Carbide Tip – used on MACH 1AV gun.

## MAINTENANCE

### LUBRICATION

Monthly: Remove piston assembly (17) and lubricate the air cylinder chamber and needle valve spring with a coating of petroleum jelly. Also, lubricate side port control assembly (7) with oil. Binks Gunners Mate (56-429) is recommended.

#### ▲ CAUTION

**Never use lubricants containing silicone since these lubricants can cause finish defects.**

### REMOVAL OF PISTON

First unscrew the end cap (27), remove the springs (25 & 26) and pull out the entire material needle valve (21, 22, 23, 24). Remove piston by applying a few pounds of air pressure to the cylinder air inlet. Air pressure will cause the piston to pop out.

#### ▲ WARNING

**Use of excessive pressure will cause piston to exit gun body at high velocity, possibly resulting in damage to the components or personal injury. Point back of the gun in a safe direction and do not use excessive pressure to remove the piston.**

### TO REPLACE NEEDLE SEAL AND GLAND ADAPTER IN FLUID INLET

Remove end cap (27), springs (25 & 26) and assembled material needle valve consisting of (21, 22, 23, 24). Proceed to the front of the gun and remove retaining ring (1), air nozzle (2) and fluid nozzle (3). Then, using wrench (43), unscrew head insert (4) and remove fluid inlet (33). Unscrew packing nut (38) and remove spring (37) and seal backup (36). Using a No. 10 x 1-1/4" coarse thread wood screw (Binks Part No. 20-6536) or small sheet metal screw, remove the needle seal (35) and gland adapter (34).

Replace gland adapter (34) and needle seal (35). Re-insert seal backup (36), spring (37) and screw on packing nut (38) a couple of turns so it fits loosely by hand. Reassemble fluid inlet (33) to gun body (5) with head insert (4). Tighten head insert using wrench (43). Reassemble fluid nozzle (3), air cap (2) and retaining ring (1). Re-insert material needle valve (21, 22, 23, 24), springs (25 & 26) and screw on end cap (27). Finally, tighten packing nut (38) until it bottoms out on fluid inlet (33).

## CLEANING

In certain states it is now against the law to spray solvents containing Volatile Organic Compounds (VOC) into the atmosphere when cleaning a spray gun.

In order to comply with these new air quality laws Binks recommends one of the following two methods to clean your spray finishing equipment:

1. Spray solvent through the gun into a closed system. An enclosed unit, or spray gun cleaning station, condenses solvent vapors back into liquid form which prevents escape of VOC into the atmosphere.
2. Place spray gun in a washer type container. This system must totally enclose the spray gun, cups, nozzles, and other parts during washing, rinsing, and draining cycles. This type of unit must be able to flush solvent through the gun without releasing any VOC vapors into the atmosphere.

Additionally, open containers for storage or disposal of solvent, or solvent-containing cloth or paper, used for surface preparation and clean-up may not be used. Containers shall be non absorbent.

### CLEANING

To clean the gun, flush the fluid lines with solvent and blow air through the lines to make sure all the air passages are dry.

#### ▲ CAUTION

**Never completely submerge the gun in solvent as this will dissolve the lubricating oil and dry out the seals.**

## TROUBLE SHOOTING

### FAULTY SPRAY

A faulty spray may be caused by improper cleaning, dried materials around the fluid nozzle tip or in the air cap. Soak these parts in thinners that will soften the dried material and remove with a brush or cloth. If either the air cap (2) or fluid nozzle (3) are damaged, these parts must be replaced before perfect spray can be obtained.

#### **CAUTION**

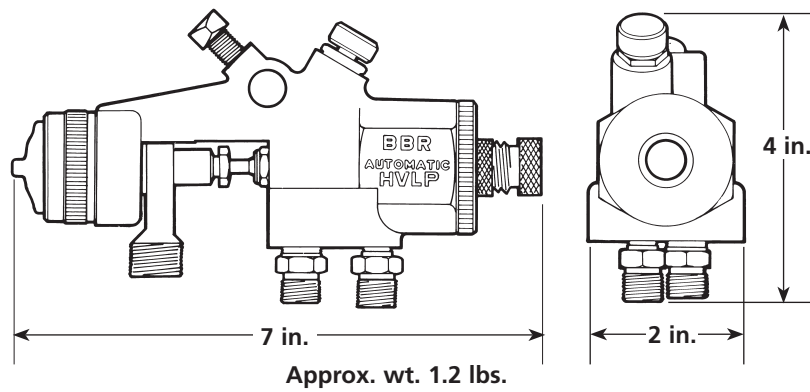
Never use metal instruments to clean the air or fluid nozzles, these parts are carefully machined and any damage to them will cause faulty spray.

### INTERMITTENT SPRAY

If the spray flutters, it is caused by one of the following faults:

1. Insufficient material available. Check supply and replenish if necessary.
2. Loose fluid nozzle (3). Tighten but without using undue force (100-120 in. lbs. torque).
3. Leakage at material needle valve packing (40). Tighten or replace air valve gland assembly.
4. Fluid connection insufficiently tight or dirt on cone faces of connection. Correct as necessary.
5. Leaking cylinder air and/or inadequate pressure.
6. Inadequate fluid pressure.

## GUN DIMENSIONS



#### **CAUTION**

Do not exceed 70 psi gun inlet pressure. Use air nozzle test gauge assembly to determine and verify exact nozzle operating air pressure.

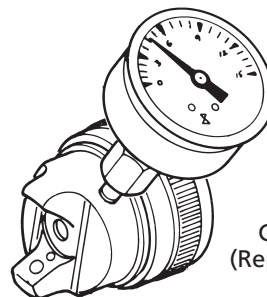
#### IMPORTANT REGULATORY NOTE

Some regulatory agencies prohibit the operation of HVLP spray guns above 10 PSI nozzle atomizing pressure. Users subject to this type of regulation should not exceed 10 PSI (50 PSI gun inlet pressure). It is recommended that the air nozzle test gauge assembly (at right) be used to confirm actual nozzle operating pressure.

It may also be a requirement of some regulatory agencies that users have this gauge nozzle available on site to verify that the gun is being operated within the limits of applicable rules.

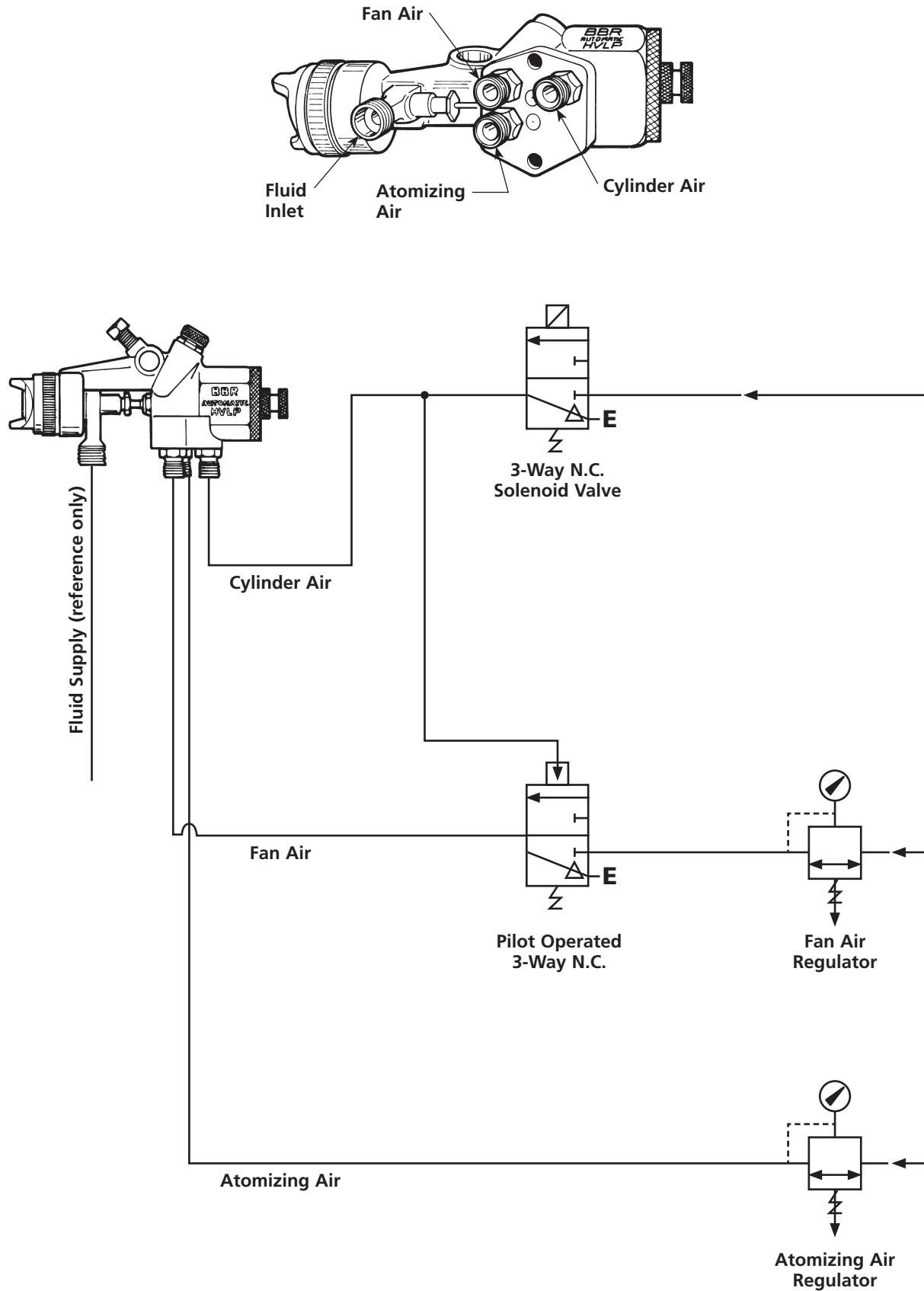
### AIR NOZZLE TEST GAUGE ASSEMBLY

- 54-3935 for 95P, 97P, 95AP, and 97AP Nozzles.
- 54-4345 for 90P Air Nozzle.
- 54-4356 for 93P Air Nozzle.
- 54-3902 for 91P and 92P Air Nozzles.
- 54-4066 for 94P Air Nozzle.
- 54-5650 for 100P Air Nozzle.



Part No.  
59-299  
Gauge Only  
(Replacement)

TYPICAL MACH 1A HOOK-UP WHEN FAN AND ATOMIZING AIR ARE SEPARATED



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## WARRANTY POLICY

This product is covered by Carlisle Fluid Technologies' materials and workmanship limited warranty. The use of any parts or accessories, from a source other than Carlisle Fluid Technologies, will void all warranties. Failure to reasonably follow any maintenance guidance provided may invalidate any warranty.

For specific warranty information please contact Carlisle Fluid Technologies.

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For technical assistance or to locate an authorized distributor, contact one of our international sales and customer support locations.

<b>Region</b>	<b>Industrial / Automotive</b>	<b>Automotive Refinishing</b>
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Europe, Africa, Middle East, India	Tel: +44 (0)1202 571 111 Fax: +44 (0)1202 573 488	
China	Tel: +8621-3373 0108 Fax: +8621-3373 0308	
Japan	Tel: +81 45 785 6421 Fax: +81 45 785 6517	
Australia	Tel: +61 (0) 2 8525 7555 Fax: +61 (0) 2 8525 7575	

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