



MACH 1AR and MACH 1ARV HVLP Automatic Air Spray Guns

(with Ratchet Needle Adjustment)



MACH 1AR HVLP AUTOMATIC AIR SPRAY GUN

Ideal for industrial coatings, the MACH 1AR HVLP “High Volume, Low Pressure” Automatic Spray Gun incorporates a stainless steel fluid inlet, fluid nozzle, and fluid needle for spraying a wide variety of conventional and waterborne coatings. It is also pneumatically activated for application with reciprocating, rotary, spindle machines, and in stationary gun set-ups. The MACH 1AR Auto Gun features a ratchet fluid needle valve adjustment where repeatable fluid flows are required. Exceptionally rugged in construction, this gun is built to stand up under hard continuous use. However, like any

other fine precision instrument, it’s 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.

⚠ WARNING

⚠ Servicing the spray gun while pressurized could result in components or material exiting the spray gun at high velocity, possibly resulting in bodily injury or damage to the spray gun. Before removing any components from the spray gun, shut off the air and material pressure.

NOTE

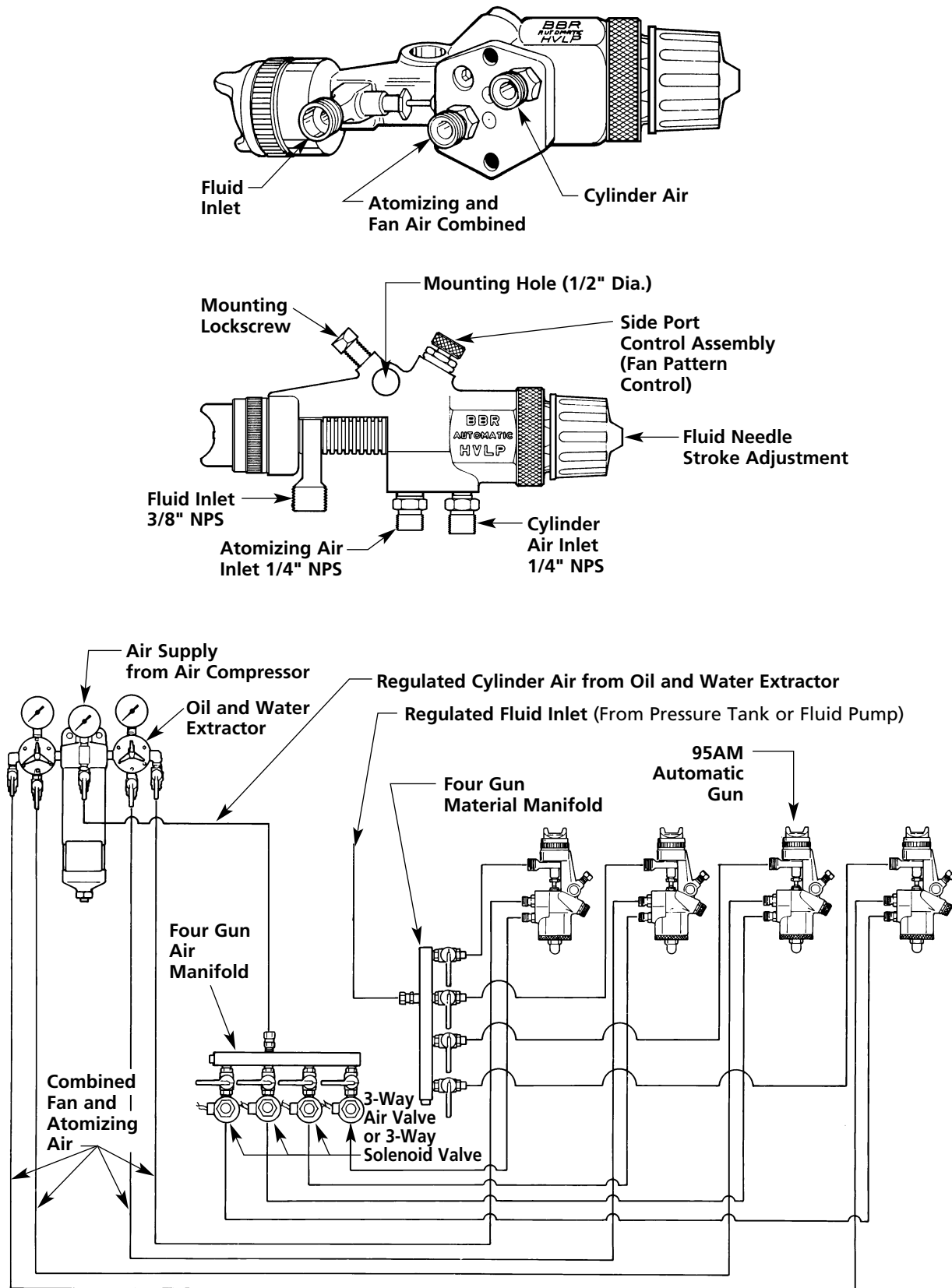
IMPORTANT REGULATORY NOTE regarding the use of this product appears on page 11.

Replaces
Part Sheet
2672

Part
Sheet
2672R

Binks MACH 1AR HVLP AUTOMATIC SPRAY GUN

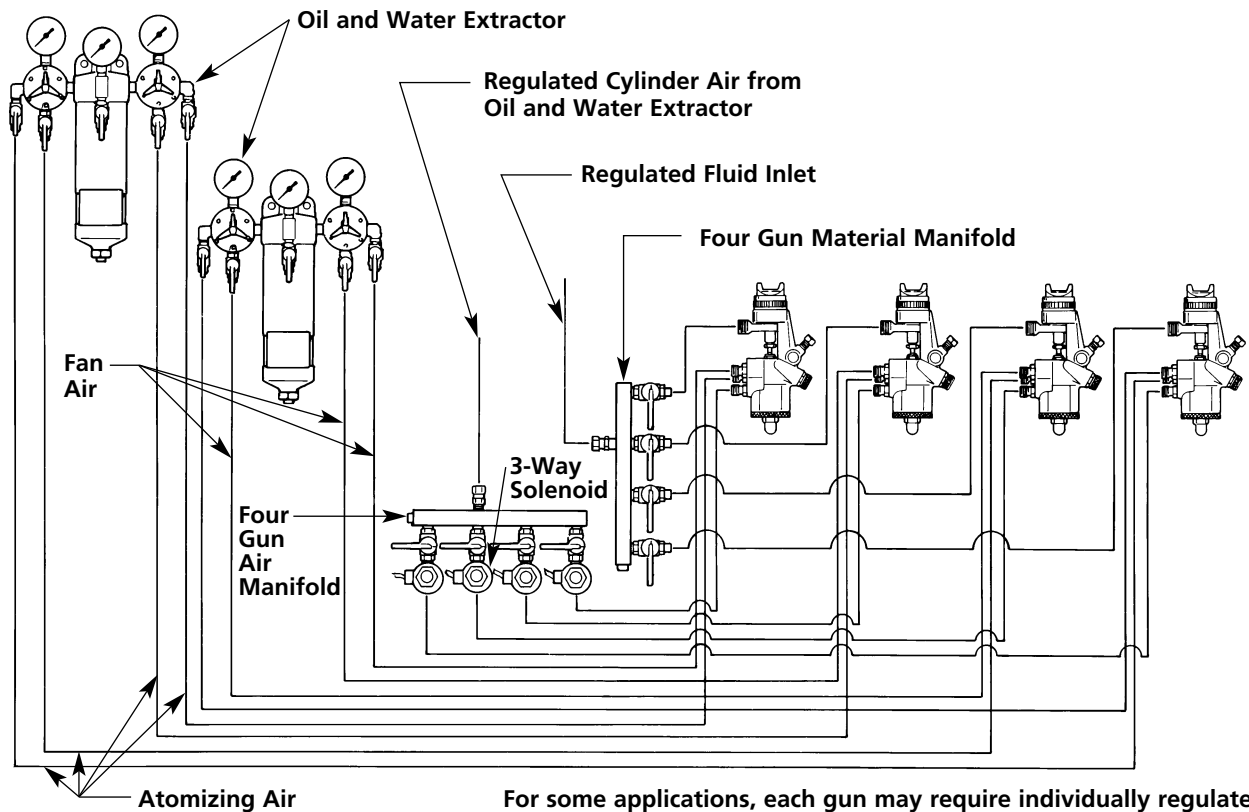
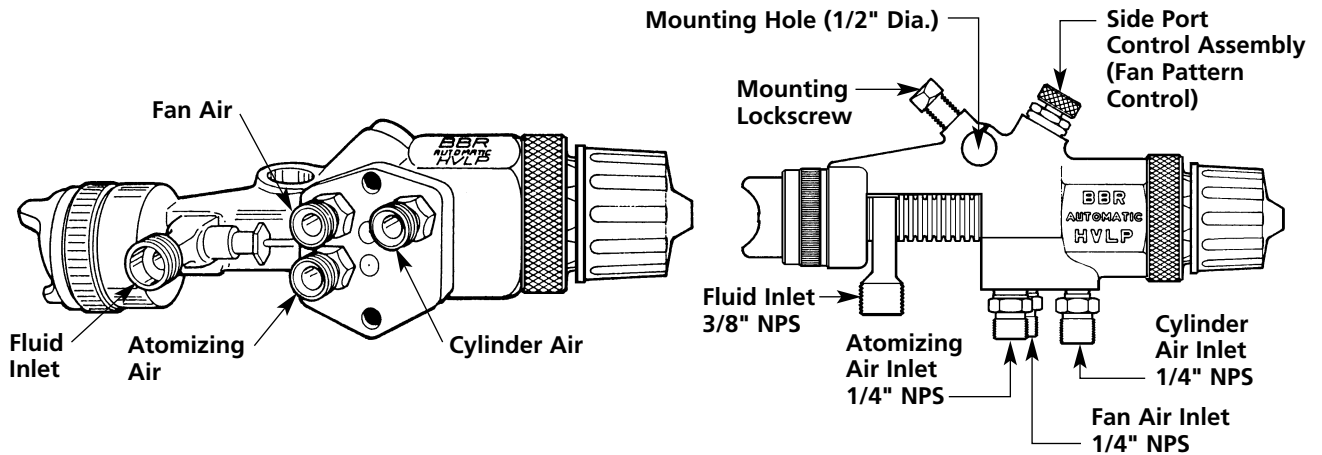
Typical Arrangement Diagram and Hook-Up for Combined Fan and Atomizing Air



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

Binks MACH 1AR HVLP AUTOMATIC SPRAY GUN

Typical Arrangement Diagram and Hook-Up for Separate Fan and Atomizing Air
(See Page 4 for Internal Modifications to Gun)



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

GENERAL NOTES:

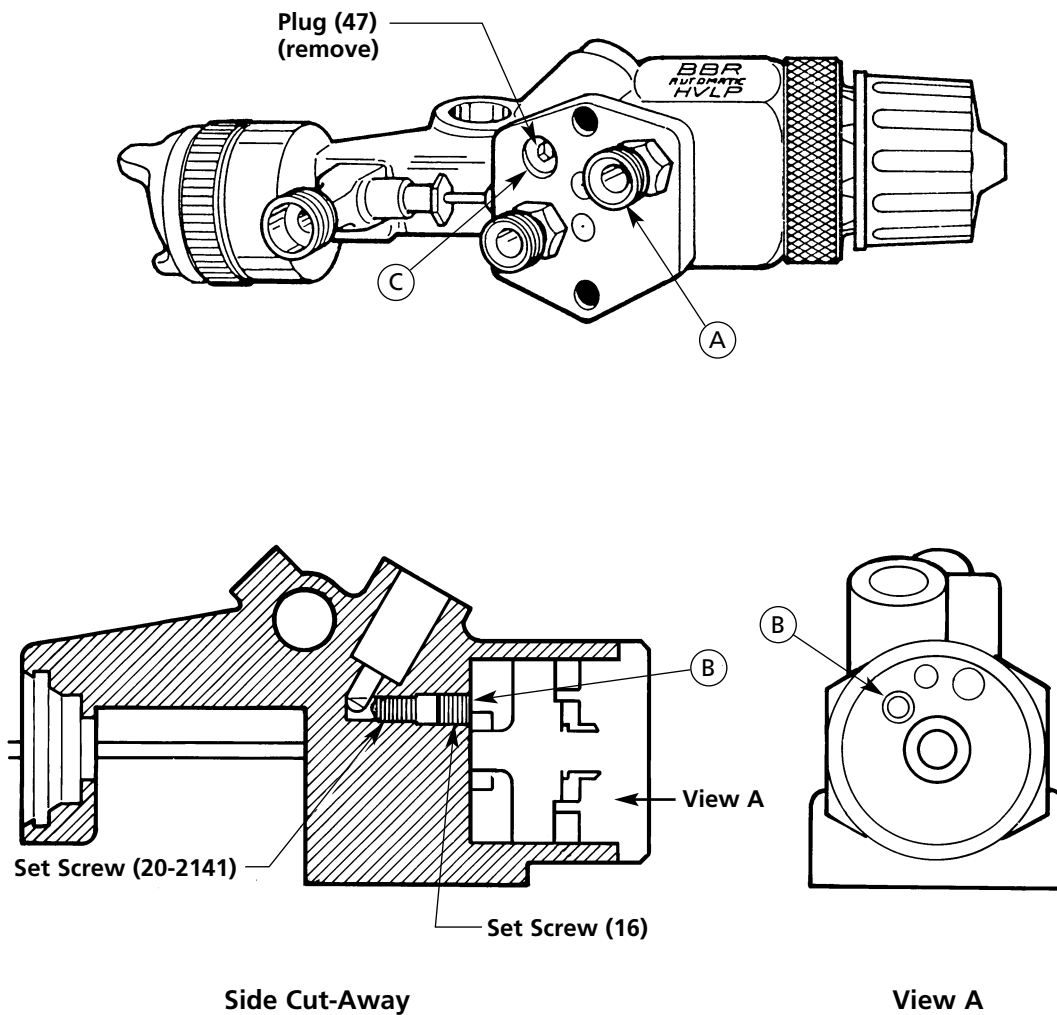
1. Have at least 55-60 psi air pressure for cylinder's operating air.
2. To reduce overspray and obtain maximum efficiency, always spray with lowest possible air pressure that produces an acceptable spray pattern. Fluid pressure should be less than air pressure in most applications.
3. The air line from 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 AND ATOMIZING AIR

1. Unscrew ratchet housing assembly (28) and remove material needle and attached parts (22, 23, 24, 25) (See assembly drawing, page 6).
2. Remove piston assembly (18) by injecting low pressure air cylinder air port (A).
3. With 5/32" Allen wrench, remove plug (16) from hole (B) on inside of cylinder.
4. Insert set screw (20-2141) into position as shown in side cut-away. (Set screw is packaged loose.)
5. Re-install plug (16).
6. Re-install piston (18), 2 springs (26, 27), material needle (22), and ratchet housing assembly (28). (See assembly drawing, page 6).
7. Remove plug (47) from the fan air port (C).
8. Install fitting (36) into port (C). (Fitting is packaged loose.)

⚠ WARNING

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



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 ATOMIZING AIR

Gun should be connected by a suitable length of 5/16" or 3/8" diameter air hose fitted with a connector and a 1/4" NPS(f) nut at gun end.

CONNECTING GUN TO CYLINDER AIR

Gun should be connected by a suitable length of 3/16" I.D. or 1/8" I.D. air hose of shortest length possible with 1/4" NPS(f) connector.

OPERATING THE MACH 1AR 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 adjusting the ratchet housing cap (35) until the correct needle travel is achieved.

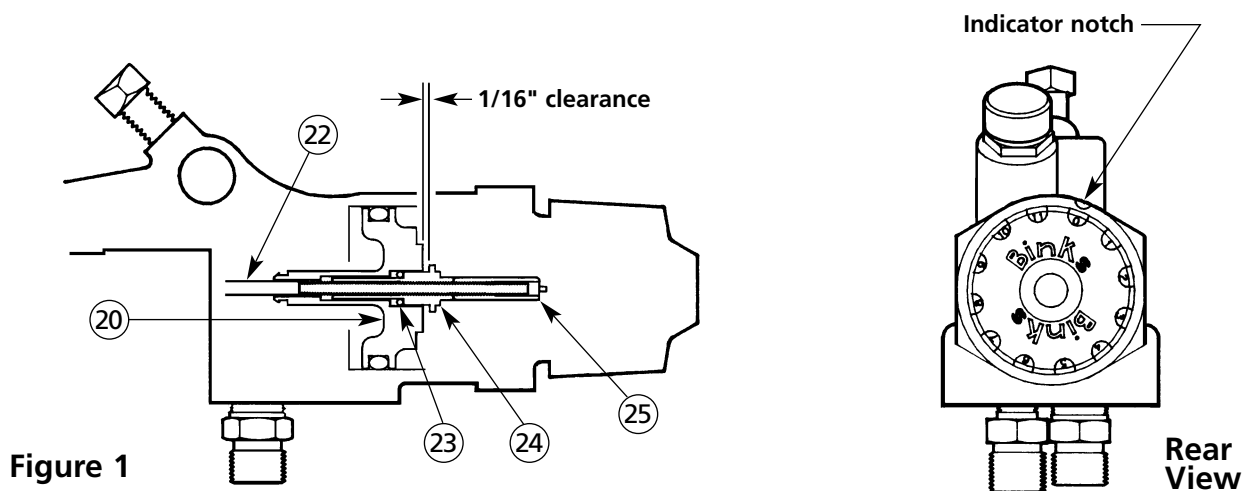
ADJUSTING AIR AND FLUID TIMING

A 1/16" gap between the air piston assembly (18) and needle body (24) 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 (22), screwing it either in or out of the needle body (24) and locking it back into the gun while being sure to check the clearance between the air valve piston (18) and the needle body (24).

ADJUSTING THE SPRAY PATTERN

The width of the spray pattern is controlled by the side port control assembly (7). (See 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 nozzle (2) relative to the gun. To effect this: loosen retaining ring (1); position nozzle (2) then retighten retaining ring.

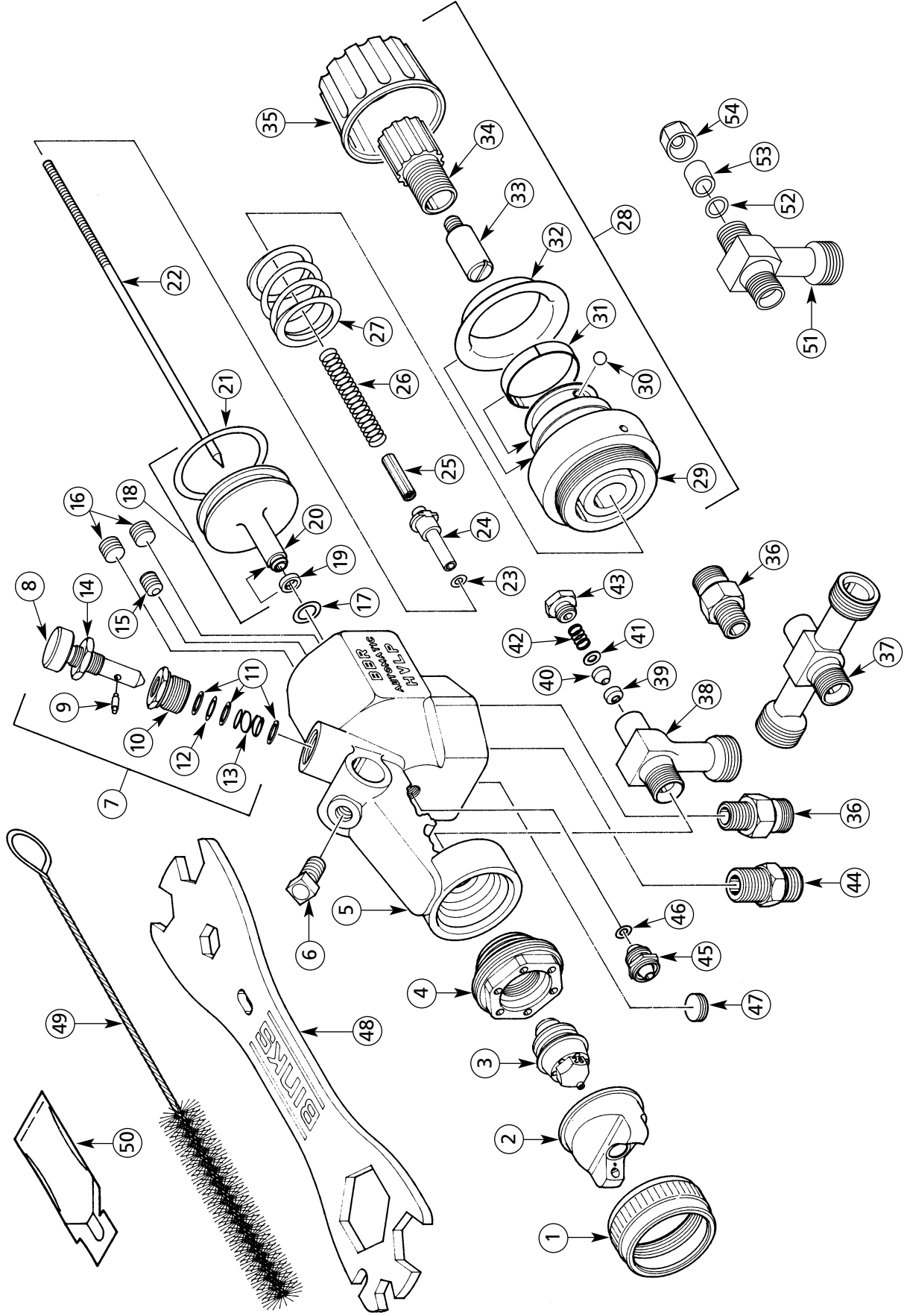


NOTE: All No's. in parenthesis refer to Item No's. in Assembly Drawing on Page 6.

RATCHET ADJUSTMENT

1. First, note the number on the indicator notch (see REAR VIEW above).
2. Remove ratchet housing assembly (28) and 2 springs (26 & 27). Make sure needle body (24) is set with a 1/16" clearance as shown in Figure 1. (To set 1/16" clearance, see "ADJUSTING AIR AND FLUID TIMING" above).
3. Remove screw (33) from inside the center of the ratchet housing (29) and pull off cap (35).
4. Reset cap back onto ratchet housing assembly (28) aligning the zero on the cap to the indicator notch as shown in the REAR VIEW above.
5. Tighten screw (33) and reassemble springs and ratchet housing assembly to gun. The needle should now be closed and in the zero position.

Binks MACH 1AR HVLV AUTOMATIC SPRAY GUN
 Typical Arrangement Diagram and Hook-Up for Combined Fan and Atomizing Air



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	29	54-3584	RATCHET HOUSING	1
2	*	AIR NOZZLE.....	1	30	20-2183	BALL	2
3	*	FLUID NOZZLE.....	1	31	54-1878	SPRING	1
4	54-3543	HEAD INSERT	1	32	54-1870	INDICATOR.....	1
5	54-3975	MACH 1AR GUN BODY ASS'Y.	1	33	54-3583	SCREW	1
6	20-1359	SQ. BOLT 5/16-18 x 3/4 LG.....	1	34	54-1879	RATCHET	1
7	54-3720	SIDE PORT CONTROL ASSEMBLY.	1	35	54-1984	CAP	1
8	54-3721	CONTROL SPINDLE	1	36	71-28	DOUBLE MALE NIPPLE 1/8 NPT x 1/4 NPS.....	2
9	31-258	RETAINING PIN	1	37	54-3741	FLUID INLET Recirculating (Optional)	1
10	31-256	STUFFING BOX	1	38	54-3533	FLUID INLET (Stainless Steel)	1
11	31-259	INNER WASHER	3	39	●	GLAND ADAPTER	1
12	20-3620▲	O-RING	1	40	●	NEEDLE SEAL	1
13	31-241	CONTROL SPRING	1	41	●	SEAL BACKUP	1
14	54-4269	JAM NUT	1	42	●	SPRING	1
15	20-5589□	PLUG.....	1	43	●	PACKING NUT	1
16	20-5692□	PLUG 1/16-27 NPT	2	44	57-13	DOUBLE MALE NIPPLE 1/4 NPT x 1/4 NPS.....	1
17	20-5286▲	O-RING	1	45	54-3716	AIR VALVE GLAND ASSEMBLY..	1
18	54-3706	PISTON ASSEMBLY	1	46	20-3859▲	O-RING Air Valve Gland.....	1
19	54-3729■	SEAL	1	47	20-2287	PLUG 1/8-27 NPT.....	1
20	54-3722■	PISTON	1	48	54-3918	WRENCH	1
21	20-4511▲	O-RING	2	49	82-469	GUN BRUSH	1
22	47-478	NEEDLE (Stainless Steel)	1	50	59-3871	GUNNERS MATE	1
23	20-3515▲	O-RING (Needle Assembly)	1	51	54-4541†	FLUID INLET MACHINING.....	1
24	54-3713	NEEDLE BODY.....	1	52	20-2227▲†	O-RING (2-006 BUNA-N).....	1
25	54-3709	NEEDLE LOCKING NUT	1	53	54-4531▲†	O-RING PACKING SPACER.....	1
26	54-1697	SPRING Needle Return	1	54	54-4542†	NUT ASSEMBLY	1
27	54-1876	SPRING Piston Return.....	1				
28	54-3582	RATCHET HOUSING ASSEMBLY...	1				

* See Air and Fluid Nozzle Chart.

▲ Part of Repair Kit 54-3980.

□ Part of Gun Body Assembly, (5).

■ Part of Piston Assembly (18). Also available separately.

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

† Replaces Items 38-43 on vitreous setup.

NOZZLE AND NEEDLE SELECTIONS

HVLP AIR NOZZLES

MODELS 95P, 97P, 905P, 907P, 95AP, 97AP, 905AP, 907AP

GUN INLET PRESSURE PSI	NOZZLE ATOMIZING AIR FLOW SCFM	APPROX. NOZZLE ATOMIZING PRESSURE PSI
20	10	2.5
35	15	6.0
50	20	10.0

95P = Standard pressure nozzle for fine finish spraying.

97P = Wide fan nozzle for fine finish of high solid coatings.

905P = Same as 95P but for use with 900 Series fluid nozzle.

907P = Same as 97P but for use with 900 Series nozzles.

95AP = Extra fine atomization nozzle for standard finish materials.

97AP = Extra fina atomization nozzle for high solids/metallics.

905AP = Same as 95AP but for 900 Series fluid nozzles.

907AP = Same as 97AP but for 900 Series fluid nozzles.

LVLP AIR NOZZLES

LVLP AIR NOZZLE 90P

NOZZLE ATOMIZING PSI	NOZZLE AIRFLOW SCFM	GUN INLET PSI
3	4.0	5
5	4.5	7
7	5.0	10
9	5.5	12
10	6.0	13

LVLP AIR NOZZLES 91P, 92P

NOZZLE ATOMIZING PSI	NOZZLE AIRFLOW SCFM	GUN INLET PSI	FAN CONTROL REGULATOR PSI
3	4.5	6.0	9
5	6.0	8.0	10
7	6.8	11.0	14
9	7.5	13.5	18
10	8.0	15.0	19

LVLP AIR NOZZLE 93P

NOZZLE ATOMIZING PSI	NOZZLE AIRFLOW SCFM	GUN INLET PSI	FAN CONTROL REGULATOR PSI
3	5.5	8.0	10.0
5	7.0	11.5	14.0
7	8.0	14.5	18.0
9	9.5	17.0	22.5
10	10.0	18.0	24.0

90P = Low volume for special purpose applications (for use with 1-1/2 hp compressors with limitations of 6 cfm or less).

91P = Low volume nozzle for adhesive and special purpose.

92P = Low volume nozzle for general purpose specialty coatings.

93P = Low volume nozzle for fine automotive finish applications.

FLUID NOZZLES

STANDARD NOZZLES

MATERIAL	FLUID NOZZLE NO.	APPLICABLE AIR NOZZLE	COMPATIBLE FLUID NEEDLE
VERY LIGHT / Reduced Flow	90F (.030" Dia.) 0.8 mm	90P, 91P, 92P, 93P	54-4032
LIGHT: less than 15 to 20 seconds in a Zahn 2 Cup, e.g., stains, varnishes, thin lacquers, automotive refinishing fluids.	91F (.040" Dia.) 1.0 mm 92F (.046" Dia.) 1.2 mm	95P, 97P	54-4033 54-4034
MEDIUM: 20 to 60 seconds in a ZAHN 2 Cup, e.g., general industrial coatings.	94F (.055" Dia.) 1.4 mm	95AP, 97AP*	54-4036
HEAVY: greater than 60 seconds in a Zahn 2 Cup.	97F (.070" Dia.) 1.7 mm		54-4039

*"Blue Max" fine finish nozzles.

SPECIAL PURPOSE NOZZLES

TYPICAL APPLICATION	FLUID NOZZLE NO.	APPLICABLE AIR NOZZLE	COMPATIBLE FLUID NEEDLE
VERY HEAVY MATERIALS:	94VT (.052")▲ 1.3mm	95P, 97P	54-3966
Block Fillers	901VT (.066")▲ 1.6 mm	905P, 907P	54-3967
Texture Coatings	903F (.079") 2.0 mm		54-4055●
Fire Retardants	905F (.089") 2.3 mm		54-4057●
Road Marking Paint	905VT (.088")▲ 2.3 mm		54-3968
Bitumastics	906F (1.00") 2.5 mm		54-4058●
Adhesives	909F (.111") 2.8 mm		54-4061●
Cellular Plastisols	909VT (.112")▲ 2.9 mm		54-3969
Underbody & Vitreous Coatings Special Applications			

● Stainless steel, standard. Optional nylon-tipped stainless steel, 47-472 available. ▲ Carbide Tip.

SPRAY GUN MAINTENANCE

LUBRICATION

Monthly: Remove piston assembly (18) and lubricate the air cylinder chamber and needle valve spring with a coating of Gunners Mate. Also, lubricate side port control assembly (7) with oil.

▲ CAUTION
Never use lubricants containing silicone since these lubricants can cause finish defects. Binks Gunners Mate (54-3871) is recommended.

REMOVAL OF PISTON

To remove the piston, first unscrew the ratchet housing assembly (28), remove 2 springs (26 & 27) and pull out the material needle and attached ports (22, 23, 24, 25). Remove the piston by applying a few pounds of air pressure to the cylinder air inlet. This air pressure will cause the piston to pop out.

▲ WARNING
Use of excessive pressure will cause the piston to exit the gun body at high velocity, possibly resulting in personal injury or damage to gun. When removing the piston, point gun in a safe direction and do not use excessive pressure.

TO REPLACE NEEDLE SEAL AND GLAND ADAPTER IN FLUID INLET

Remove ratchet housing assembly (28), springs (26 & 27) and material needle and attached parts consisting of (22, 23, 24, 25). Proceed to the front of the gun and remove retaining ring (1), air nozzle (2) and fluid nozzle (3). Then, using wrench (48), unscrew head insert (4) and remove fluid inlet (37 or 38). Unscrew packing nut (43) and remove spring (42) and seal backup (41). 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 (40) and gland adapter (39). Replace gland adapter (39) and needle seal (40). Re-insert seal backup (41), spring (42) and screw on packing nut (43) a couple of turns so it fits loosely by hand. Reassemble fluid inlet (38) to gun body (5) with head insert (4). Tighten head insert using wrench (48). Reassemble fluid nozzle (3), air nozzle (2) and retaining ring (1). Re-insert material needle and attached parts (22, 23, 24, 25), springs (26 & 27) and screw on ratchet housing assembly (28). Finally, tighten packing nut (43) until it bottoms out on fluid inlet (37 or 38).

SPRAY GUN CLEANING INSTRUCTIONS

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 two following methods to clean your spray finishing equipment:

1. Use an enclosed clean-up station or enclosure which will condense and collect VOC vapors to prevent their atmospheric release.
2. Use a washer unit. Your gun washer should completely enclose the spray gun, filter, nozzles and other parts during wash, rinse and drain cycles to prevent the release of VOC vapors into the atmosphere.

To further protect the environment, avoid storing solvents or solvent-soaked wipes, such as those used for surface preparation and clean-up, in open or absorbent containers.

To clean the gun, flush the fluid lines with solvent and blow air through the air 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.

TROUBLESHOOTING

FAULTY SPRAY

A faulty spray may be caused by improper cleaning, dried materials around the fluid nozzle tip or in the air nozzle. Soak these parts in thinners that will soften the dried material and remove with a brush or cloth.

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.

If either the air nozzle (2) or fluid nozzle (3) are damaged, these parts must be replaced before perfect spray can be obtained.

FAULTY SPRAY

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

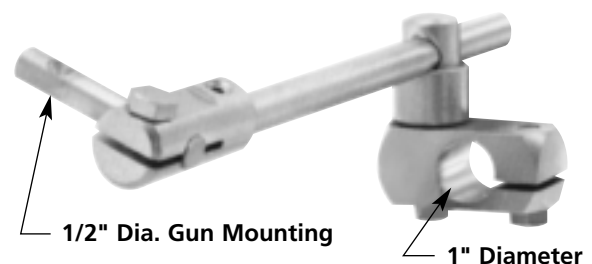
1. Insufficient material available. Check supply and replenish if necessary.
2. Loosen fluid nozzle (3). Tighten but without using undue force (100-120 in. lbs. torque).
3. Leakage at gland adapter (39) and needle seal (40). Tighten packing nut (43) if loose, and replace gland adapter and needle seal if necessary.
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.

ACCESSORIES (Optional)

MOUNTING BRACKETS

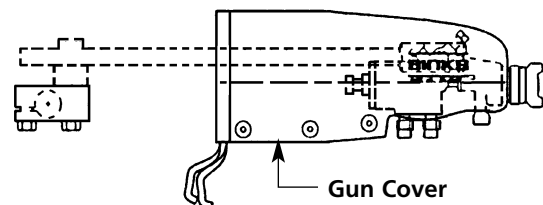
Use for automatic guns. Adjustable to any position. 18" bracket arm. One inch diameter bracket clamp hole for attachment to facility hardware.

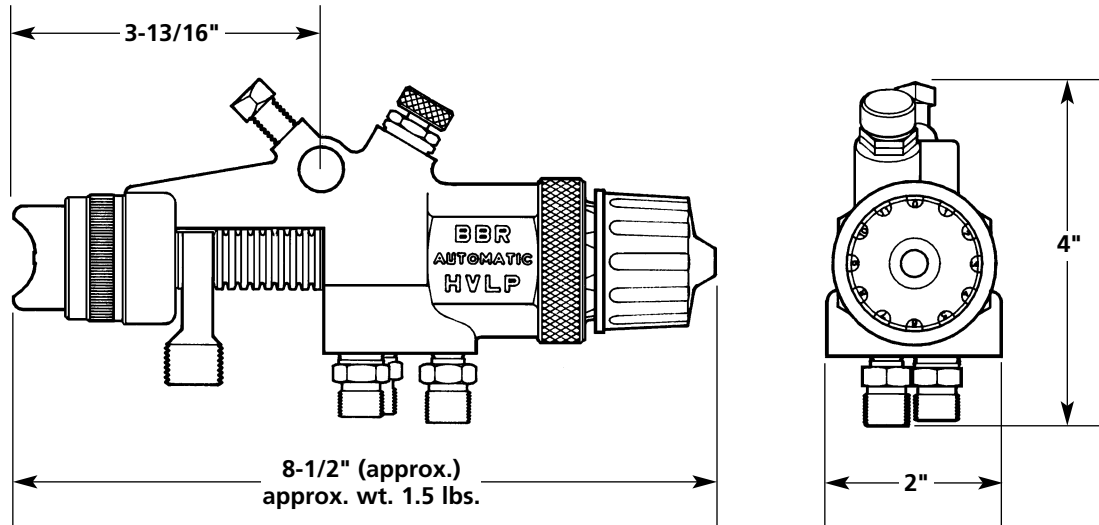
- 54-380** Steel Bracket for automatic guns. Shipping. wt. 5 lbs.
- 54-551** Aluminum bracket for automatic guns on reciprocators. Shipping. wt. 3 lbs. Part Sheet 1185.
- 149-1815** Automatic Robot Mount for Fanuc Robotics S-10.
- 149-1816** Automatic Robot Mount for Fanuc Robotics S-12.
- 149-1817** Automatic Robot Mount for Fanuc Robotics P-100.
- 149-1818** Automatic Robot Mount for Fanuc Robotics P-155.



GUN COVER ASSEMBLY

54-3691 Use over the MACH 1AR & MACH 1A Automatic Spray Guns to protect them from overspray. Drawing at right shows gun cover with 95A Automatic Spray Gun. (Package of 20 covers).





AIR NOZZLE TEST GAUGE ASSEMBLY

54-3935 for 95P, 97P, 95AP, and 97AP Nozzles.

54-3908 for 900 Series Nozzles.

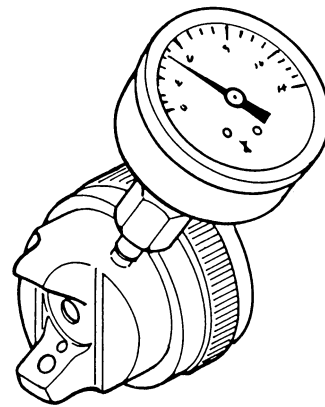
54-4078 for Siphon Series Nozzles.

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.



Part No.
59-299
Gauge Only
(Replacement)

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 the gun inlet pressure indicated on the aircap and/or in these instructions. See Air Pressure Recommendations, Pages 8 and 9 and General Spray Instructions, Page 5. It is recommended that the nozzle test gauge shown above, be used to confirm actual nozzle operating pressure.

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

NOTES

Sales and Service Through a Nationwide Network of Industrial Distributors.

Customer Service in USA / 1-800-992-4657
Technical Support in USA / 1-888-992-4657



195 Internationale Blvd.
Glendale Heights, IL 60139

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2672R-1 Revisions: Updated graphic standards, reset all type; (P6) added Fluid Inlet Machining (51), O-Ring (52), O-Ring Packing Spacer (53), and Nut Assembly (54) to diagram and to Parts List Page 7; (P7) added footnote: †Replaces Items 38-43 on vitreous set-up; (P11) added Air Nozzle Test Gauge Assembly Part Nos. 54-3935, 54-3908, 54-4078, 54-4345, 54-4356, 54-3902, and 54-4066.

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