

# OPERATOR'S MANUAL

INCLUDING: OPERATION, INSTALLATION & MAINTENANCE

# 40744X-X

RELEASED: 7-23-86

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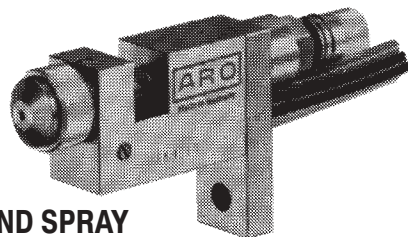
(REV. J)

## COMPACT DISPENSING VALVES (SEE MODELS COVERED BELOW)



**READ THIS MANUAL CAREFULLY BEFORE INSTALLING,  
OPERATING OR SERVICING THIS EQUIPMENT.**

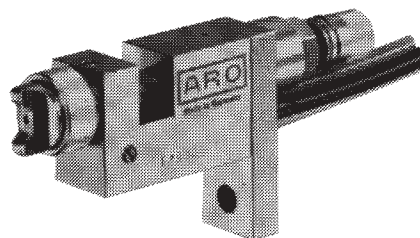
It is the responsibility of the employer to place this information in the hands of the operator. Keep for future reference.



### ROUND SPRAY DIFFUSED PATTERN

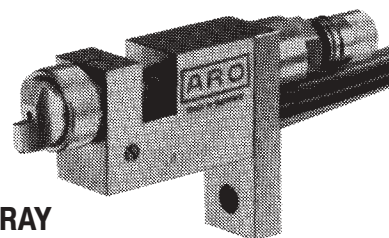
407441-8  
407441-10  
407441-15

407446-8  
407446-15  
(Non-Ratchet Type)



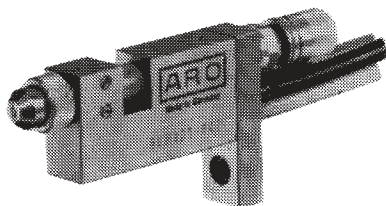
### FLAT SPRAY 90° PATTERN

407442-8  
407442-10  
407442-15



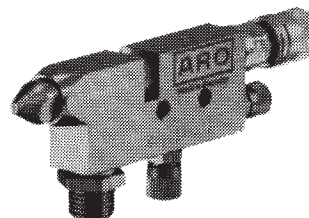
### FLAT SPRAY 45° PATTERN

407442-8-4  
407442-10-4  
407442-15-4



### ROUND SPRAY FOCUSED PATTERN

407443-8  
407443-12  
407443-20



### EXTRUSION VALVE

407444-3  
407444-5  
407444-7

## GENERAL DESCRIPTION

These compact, air-operated, automatic spray valves provide air-atomized application of cold adhesives and other low-viscosity fluids. They are designed to be used with either supply pumps or pressure tanks. The material is sealed from outside air and moisture which protects it from premature curing. The guns work best with fast set, low viscosity adhesives (100 to 2000 centipoise). Their design allows either continuous or intermittent use and reduces the need for daily cleanup.

The compact size of the valve allows them to be installed into machines in confined spaces or in narrow recessed areas.

In combination with pneumatic solenoid valves, they produce a clean and even spray pattern. The high-grade materials and corrosion resistant surfaces permit use under extreme conditions, critical applications and with "problem type" materials.

## CONTROL REQUIREMENTS

### TYPICAL SET-UP SHOWING COMPONENTS REQUIRED TO HAVE TIMED CONTROL OF SPRAY.

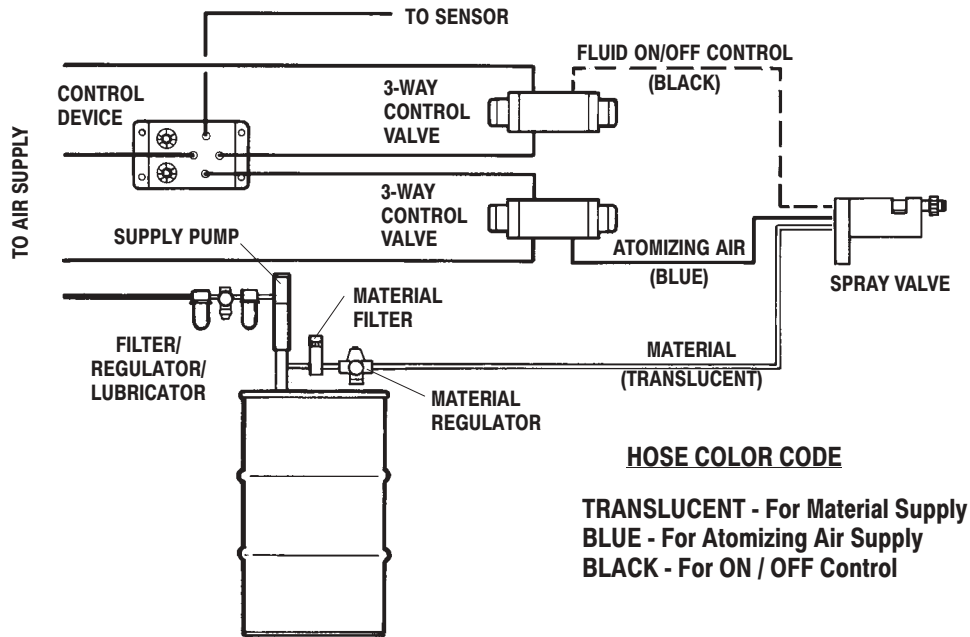


FIGURE 1

The Compact Spray Valves are air open and spring return. They require a 3-way valve to operate. Control hose color codes are as follows: Translucent - for material, Blue - for atomizing air, Black - for on / off control. The air pressure must be regulated by air regulators for both the atomizing and the control function. Separate pressure valves and solenoids for atomizing air and control provide a constant and more exact adhesive pattern and allow for precise adjustment.

One advantage of separate air supplies is that in conjunction with the use of a timer type control device, one has the ability to turn off the fluid stream and allow the atomizing air to remain on. In this case, the air stream will clean and dry the nozzle and help decrease cleaning and service time. Multiple valves can also be grouped together to achieve a multiple bead pattern.

The spray gun control system should be determined before installation. The basic control systems are metered air and constant air.

Note that the i.d. of the hoses used should be as large as possible and should not be longer than necessary. Control hoses should be as close as practical to equal length to prevent cycle delay problems. If a number of spray valves are installed and an inadequate size hose is used, input air pressure can run too low and inhibit proper functioning of the valves.

The example circuits are shown in figures 2 and 3.

The trigger to either of the two circuits can be most any kind of 3-way valve device. The following views give some examples of various pneumatic triggering methods.

The metered air system operates as follows: when a limit valve triggers the metered air system, the fluid valve and the atomizing air turn "on" and "off" simultaneously. This reduces the air consumption and does not require many parts, although excessive glue-build up on the tip may result if cycled often. Also, the leading and trailing edge of the spray pattern will usually contain large drops. If this type of spray pattern is acceptable and the gun is not cycled often, then this system is recommended.

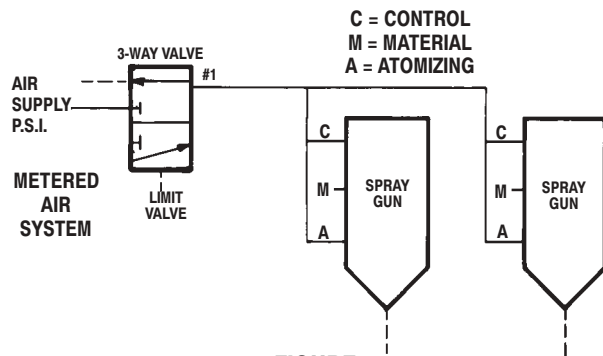


FIGURE 2

For the metered air system, the device (limit valve or 3-way valve) must have a flow rating that can adequately supply enough air to control the number of guns the system is to contain. Most limit valves can control and atomize two guns only. If four guns are used, a larger 3-way valve is necessary.

The constant air system operates as follows: the atomizing air is “on” continuously. The limit valve only cycles the gun. This circuit does not require many parts. Glue build up is reduced because the atomizing air blows off excess glue when the gun is “off”. The spray pattern is uniform from the trailing edge to the leading edge. If a uniform spray pattern is necessary and the gun is “on” for a much greater period of time than the gun is “off”, or if air consumption is not a factor, then this system is recommended.

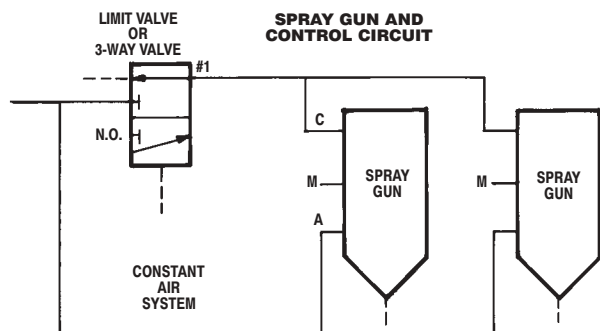


FIGURE 3

#### APPROXIMATE CFM REQUIREMENTS FOR ATOMIZING AIR PER SPRAY VALVE

##### CFM @ P.S.I. (BAR)

5.7	20 (1.4)
6.8	30 (2.1)
7.7	40 (2.8)
8.5	50 (3.4)
9.3	60 (4.1)

#### 407444-XX CONTROLS

The Compact Extrusion Valves are air open and air close and require a 4-way valve to operate.

### SET UP AND ADJUSTMENT

The spray pattern is established by the following adjustments: distance from substrate, substrate speed, atomizing air pressure, material pressure, the gun's stroke length, the glue type and its viscosity and tip orientation.

Adjustment	Primary Effect
Distance from Substrate	Pattern Width
Substrate Speed	Amount of Glue
Atomizing Air Pressure	Drop Size
Fluid Pressure	Amount of Glue, Drop Size
Stroke Length	Amount of Glue and trailing edge of pattern
Glue Type / Viscosity	Amount of Glue, Drop Size
Tip Orientation	Pattern Width

In actual practice, width, substrate speed, glue type and viscosity are determined by the application. The following charts are provided to guide the operator in setting the adjustments.

**Pattern Width:** This is adjusted by the tip orientation and the height from the tip to the substrate. The tip can be rotated 360°. When the “ears” on the tip are parallel with the movement of the substrate, the pattern width is wide. When the “ears” are perpendicular to the substrate's movement, the pattern width is small.

**Drop Size and the Amount of Glue:** These are adjusted by the atomizing pressure, fluid pressure and the stroke length. Viscosity and substrate speed have a large effect on the pattern.

**Guidelines:** 1. Thinner materials (lower viscosities) will generally decrease the drop size and produce a more evenly dispersed spray pattern.

2. Faster substrate speeds generally require slightly higher fluid pressures and slightly longer stroke length adjustment. Slower substrate speeds require lower fluid pressure and shorter stroke lengths.

#### STARTING UP

**CAUTION** Injection injuries can be serious!

**NOTE:** Never make any repairs or service on the system without relieving all pressure in the system. Accidental triggering can lead to fluid injection injury. Be Careful.

Check needle lift-off. From closed position, the needle must be set to open by making 1.5 turns with a 3 mm hex key.

Regulate Control Air Pressure to 55 - 90 p.s.i. (3.8 - 6.2 Bar). Adjust atomizing air pressure to 20 - 25 p.s.i. (1.4 - 1.7 Bar). Adjust atomizing air pressure to produce desired pattern. Atomizing air should open a little bit earlier than the control valve. For nozzle cleaning, the atomizing air must stay longer than the control valve time after spray valve is closed.

### GENERAL DESCRIPTION

#### Start Up Purging Of the Valve

Turn off air cap with collar ring. Hang the valves over a drain tank. Apply 14 - 30 p.s.i. (1 - 2 Bar) air pressure on pressure tank or pump. Open control valve (2) by hand and purge the system, until the adhesive is clean and flows evenly. Close the control valve. Adhesive is now under pressure up to the nozzle tip. Clean nozzle tip and reassemble air cap and collar ring.

#### IMPORTANT:

During the adjustment procedure, the air cap and nozzle tip may get dirty. Clean the air cap and nozzle tip and make sure that the collar ring or side holes of the air cap are clean. If collar ring and side holes are crusted, the atomizing air jet will be diverted and you will not obtain good results in applying adhesive.

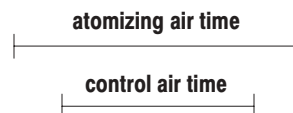
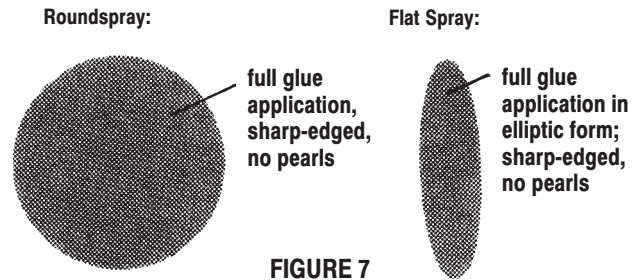
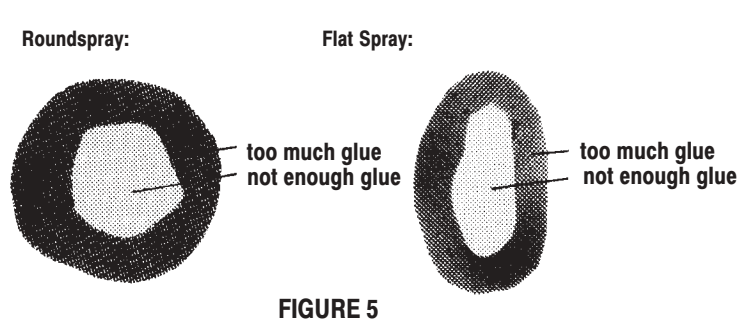


FIGURE 4

Air cap dirty: - Glue rebounds back from substrate. Clean air cap and nozzle, adjust less atomizing air pressure.  
 - Too much glue.  
 Reduce glue pressure on tank or diaphragm pump.

Correct adhesive pattern should look as shown below with: 1. sufficient adhesive quantity. 2. fixed distance between spray valve and substrate. 3. clean adhesive without dirt and particles included. 4. minimum control air pressure of 55 - 90 p.s.i. (3.8 - 6.2 Bar) and 5. correctly adjusted atomizing air pressure.

Application illustration (no motion of substrate):

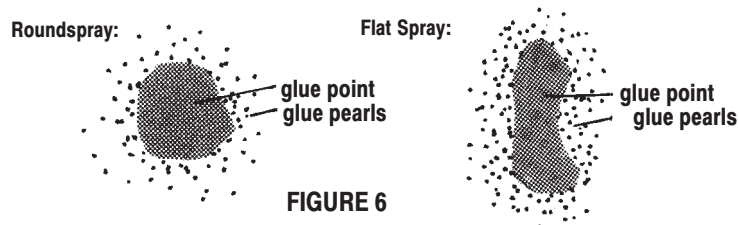


Irregular application:- Insufficient material atomizing and velocity to substrate.  
 Increase atomizing air pressure.  
 Not enough material within spray time.  
 Increase material pressure.

Typical spray patterns that are shown with each valve were achieved using a 700 CPS spray grade quick-tack adhesive. Each individual test was run at the listed test pressures. Results with different materials may vary.

### TEST CONDITIONS

Application illustration (no motion of substrate):



## PRODUCT DATA

### Tip Diameter

407444-3	0.3 mm
407444-5	0.5 mm
407444-7	0.7 mm
40744X-8-X	0.8 mm
40744X-10-X	1.0 mm
407443-12	1.2 mm
40744X-15-X	1.5 mm
407443-20	2.0 mm

**Fluid Inlet (male)** ..... 1/4 N.P.T.

**Atomizing Air Inlet (male)** ..... 1/4 N.P.T.

**Control Air Inlet (male)**

407441-XX, 407442-XX-X, 407443-XX, 407446-XX	1/8 N.P.T.
407444-X	1/4 N.P.T.

### Minimum Control Air Required

407441-XX, 407442-XX-X, 407446-XX	55 p.s.i. (3.8 bar)
407443-XX, 407444-X	90 p.s.i. (6.2 bar)

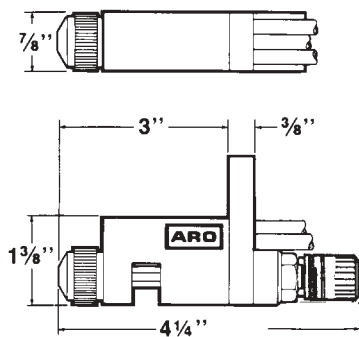
### Maximum Fluid Operating Pressure

407443-XX	90 p.s.i. (6.2 bar)
407441-XX, 407442-XX-X, 407446-XX	180 p.s.i. (12.4 bar)
407444-X	1000 p.s.i. (68.9 bar)

### Recommended Range Atomizing Air Pressure

407441-XX, 407443-XX, 407446-XX	7.3 - 37.5 p.s.i. (0.5 - 2.6 bar)
407442-XX-X	7.5 - 37.5 p.s.i. (0.5 - 2.6 bar)
407444-X	None Required

## 407441-XX & 407446-XX



ROUND SPRAY  
DIFFUSED PATTERN

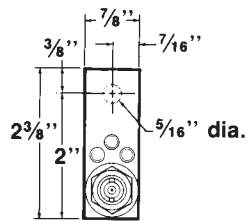
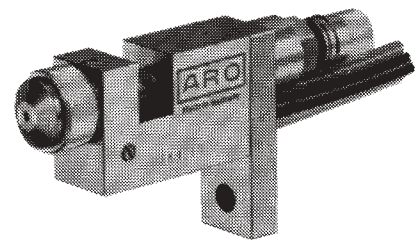
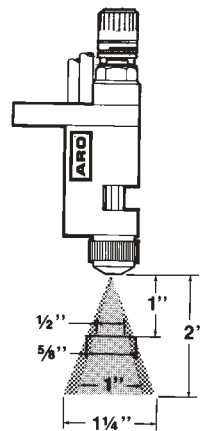
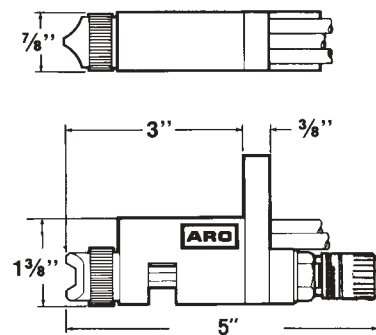


FIGURE 8



MATERIAL PRESSURE	CONTROL AIR	ATOMIZING AIR
P.S.I. (bar)	P.S.I. (bar)	P.S.I. (bar)
15 (1.0)	55 (3.8)	20 (1.4)
30 (2.1)	90 (6.2)	35 (2.4)

## 407442-XX



FLAT SPRAY  
90° PATTERN

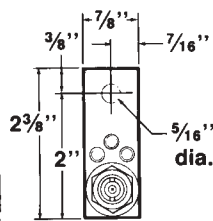
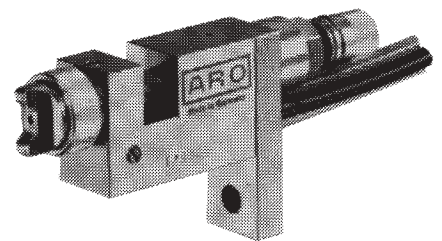
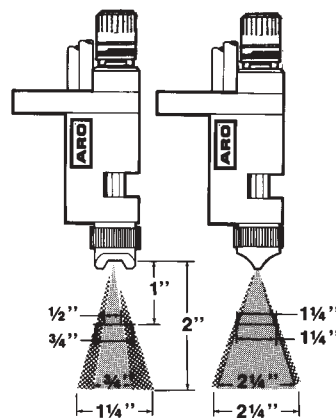
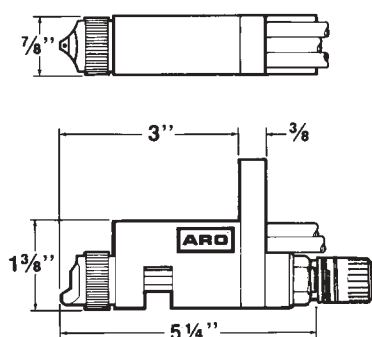


FIGURE 9



## 407442-XX-4



FLAT SPRAY  
45° PATTERN

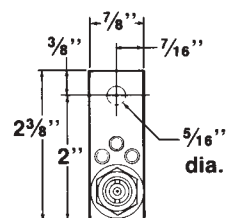
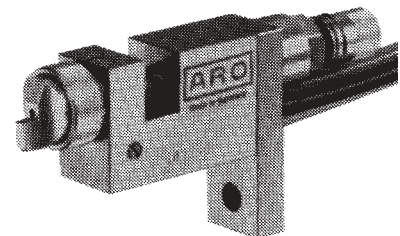
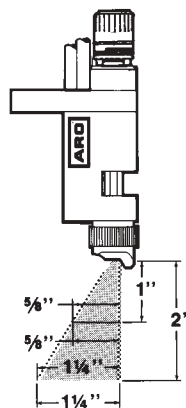
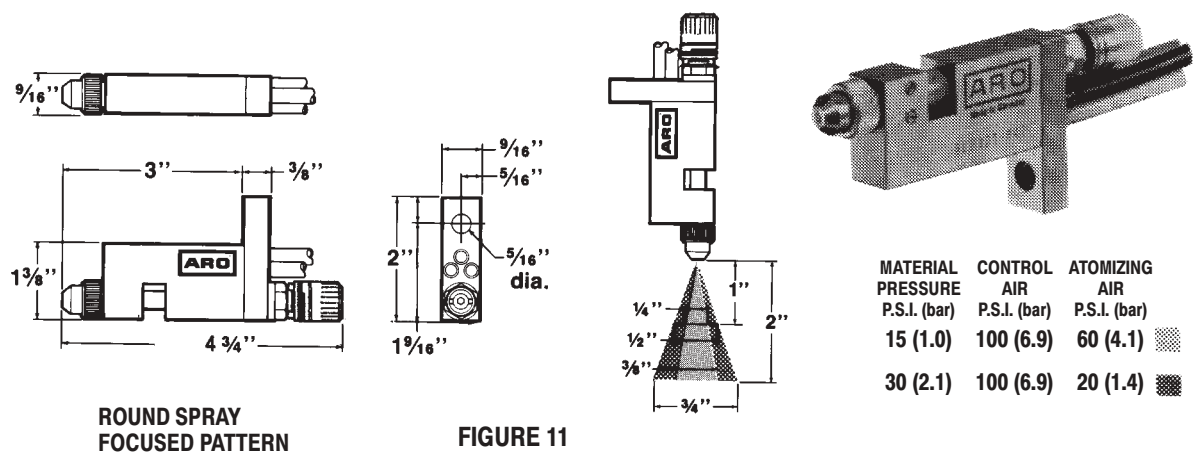


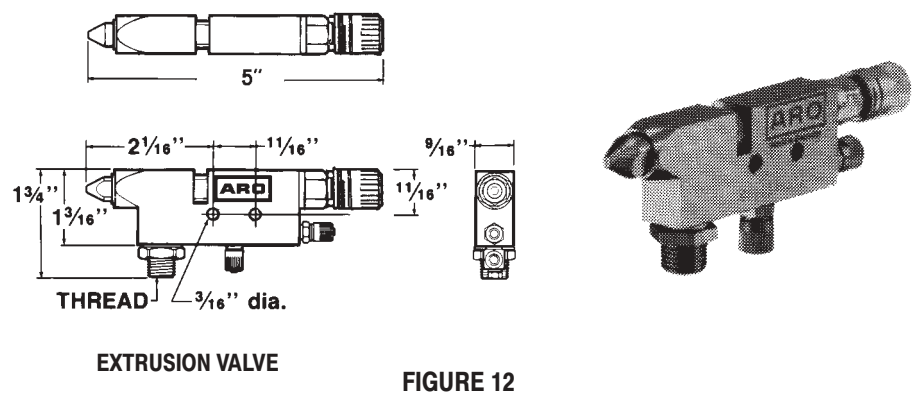
FIGURE 10



407443-XX



407444-XX



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## REPAIR AND MAINTENANCE

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**Before starting maintenance or repair work, ensure that all air-operated tools are disconnected from the air supply.**

**⚠ WARNING** Danger caused by combustible and noxious spraying material. Safety instructions on fluid can and material data of fluid manufacturer must definitely be observed.

**⚠ WARNING** Before opening the spray valve, it has to be disconnected from the air and fluid supply. Otherwise ejected elements can cause danger.

These spray valves are high precision tools. Always keep clean and observe minimum instructions to maintain a long and useful life of valve. We recommend lubricating moveable parts regularly, and greasing threads, especially the nozzle threads, when replacing or cleaning the nozzle. It is recommended to use clean and filtered application fluid only. Also, atomizing air should be clean. Control air should be slightly oiled.

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### CLEANING

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To clean valve, spray solvent until pure solvent leaves nozzle. Do not submerge entire valve in solvent. At longer working interruptions, it is advisable to clean air cap and nozzle by putting these parts only into solvent. If necessary, use a soft brush. Moving parts and threads should always be greased slightly.

The spray valve should be cleaned using appropriate thinner.

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### TROUBLE SHOOTING

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- If drops form on the (9) retainer, the (5) packing set is worn out. To exchange gaskets, remove needle (see "Changing the Nozzle Set"). Then unscrew (9) retainer and change (5) packing set. Re-assemble in reverse order. The (10 and 15) "O" rings are to be renewed if uncontrolled air blow is noticeable.
- If drops form on the (2) nozzle, either needle or nozzle is worn and should be replaced. Or needle is not closing properly because of particle residues within nozzle.
- If there is an uneven and not steady spray jet: Make sure that (2) nozzle is screwed in tight. Other reason could also be dirt residue within air cap (see "Cleaning").

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### CHANGING THE NOZZLE SET

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A nozzle set includes (11) needle assembly, (2) nozzle and (1) air cap. If nozzle size is to be changed, always change all three parts. Change the complete set also when only one of the parts is defective. Before starting maintenance or repair work, ensure that all air-operated tools are disconnected from the air supply.

- Remove (18) ratchet assembly or (29) lock assembly.
- Remove (17) mounting and (26, 27 and 28) hoses.
- Pull out (16) needle spring.
- Pull out (11) needle assembly.
- Remove (1) air cap and unscrew (2) nozzle.

Before unscrewing nozzle, please observe that needle never is under spring pressure.

RE-ASSEMBLE IN REVERSE ORDER.

Please observe hose connection.

(13) Needle nuts must be counter-screwed in such a position where "pre-air" and "purging-air" works.

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### CHANGING GASKETS

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**IMPORTANT!** Do not use metallic aid to remove and insert gaskets and gasket seats! Gaskets and gasket seats can be damaged.

Before starting maintenance or repair work, ensure that all air-operated tools are disconnected from the air supply.

- Remove (18) ratchet assembly or (29) lock assembly.
- Remove (17) mounting and (26, 27 and 28) hoses.
- Pull out (16) needle spring.
- Pull out (11) needle assembly.
- Unscrew (9) retainer.

Pull out gaskets. New gaskets should be greased slightly. (10) "O" ring is to be placed into the (9) retainer. (7) "O" ring is to be placed into the seat of (4) valve body. Insert (6) shaped gasket into the center of (7) "O" ring. The (6) shaped gasket is not symmetrical. The somewhat wider opening must be positioned to point to the front of spray valve, i.e., after assembling retainer in direction "nozzle". When inserting "O" rings and gaskets, do not use any sharp or pointed metallic implements. The gasket is a very precise and sensitive component and is not able to stand impacts. Grease slightly the (9) retainer and (10) "O" ring sub-assembly and assemble into the (4) valve body. RE-ASSEMBLE IN REVERSE ORDER.

407442-XX-4  
ONLY

407441-XX  
407442-XX  
407442-XX-4  
407446-XX

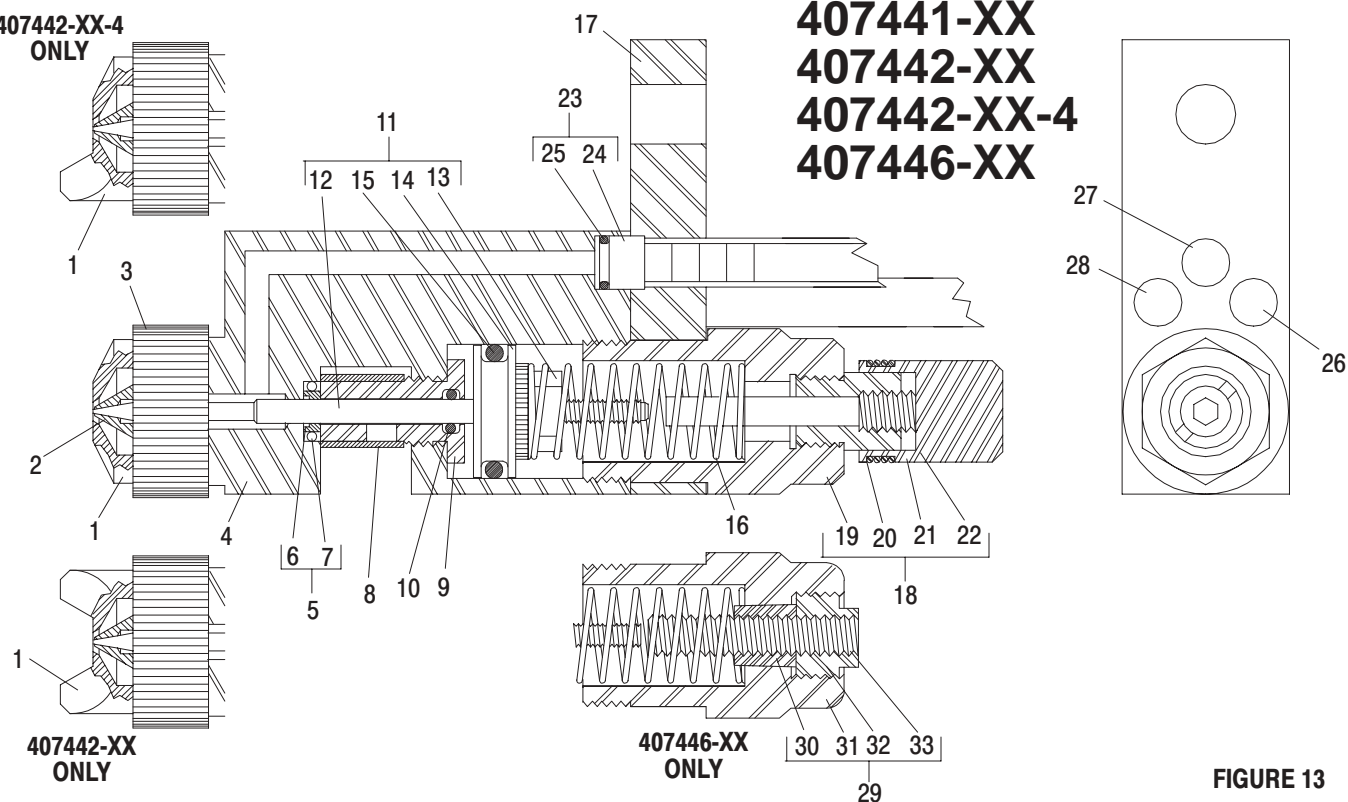


FIGURE 13

Item	Description (size in inches)	Qty	Part No.
1	<b>Air Cap</b> (models 407441-8 & 407446-8)	(1)	98669
	(model 407441-10)	(1)	98670
	(model 407441-15, 407446-15)	(1)	98671
	(model 407442-8)	(1)	98672
	(model 407442-10)	(1)	98673
	(model 407442-15)	(1)	98674
	(model 407442-8-4)	(1)	98675
	(model 407442-10-4)	(1)	98676
	(model 407442-15-4)	(1)	98677
2	<b>Nozzle</b> (models 40744X-8 & 407442-8-4)	(1)	98678
	(models 40744X-10 & 407442-10-4)	(1)	98679
	(models 40744X-15 & 407442-15-4)	(1)	98680
3	<b>Collar Ring</b>	(1)	98681
4	<b>Gun Body</b> (models 407441-XX & 407446-XX)	(1)	98556
	(models 407442-XX & 407442-XX-4)	(1)	98550
5	<b>Packing Set</b> (includes items 6 & 7)	(1)	81772
✓ 6	<b>Shaped Gasket</b>	(1)	98682
✓ 7	<b>"O" Ring</b>	(1)	98683
8	<b>Plastic Protection Cover</b>	(1)	
9	<b>Retainer</b>	(1)	98624-1
✓ 10	<b>"O" Ring</b>	(1)	98684
11	<b>Needle Assembly</b> (includes items 12 thru 15)		
	(models 40744X-8 & 407442-8-4)	(1)	81769
	(models 40744X-10 & 407442-10-4)	(1)	81770
	(models 40744X-15 & 407442-15-4)	(1)	81771
12	<b>Needle</b>	(1)	
13	<b>Needle Nut</b>	(1)	
14	<b>Piston</b>	(1)	

Item	Description (size in inches)	Qty	Part No.
✓ 15	<b>"O" Ring</b>	(1)	98685
16	<b>Needle Spring</b>	(1)	98686
17	<b>Mounting</b>	(1)	98558
18	<b>Ratchet Assembly</b> (models 407441- & 407442- )	(1)	81800-1
	(includes 19 thru 22)		
19	<b>Lock</b>	(1)	
20	<b>Ring</b>	(1)	
21	<b>Adjusting Nut Assembly</b>	(1)	
22	<b>Pin</b>	(2)	
23	<b>Hose Socket Assembly</b> (includes 24 & 25)	(3)	81773
24	<b>Hose Socket</b>	(3)	
✓ 25	<b>"O" Ring</b>	(3)	98687
□ 26	<b>Hose, Black (Control Air)</b> (1 meter long)	(1)	98688-XXX
□ 27	<b>Hose, Translucent (Fluid)</b> (1 meter long)	(1)	98689-XXX
□ 28	<b>Hose, Blue (Atomizing Air)</b> (1 meter long)	(1)	98690-XXX
29	<b>Lock Assembly</b> (407446-XX)(includes 30 thru 34)	(1)	81788
30	<b>Locking Sleeve</b>	(1)	98611
31	<b>Lock</b>	(1)	98610
32	<b>Bolt</b>	(1)	98609
33	<b>Screw</b>	(1)	98608
34	<b>Mounting for R 1/4"</b> (not shown)	(1)	98693
35	<b>Nipple (1/8" x 1/4")</b> (not shown)	(1)	98694
36	<b>1/8" Fitting</b> (not shown)	(1)	98691
37	<b>1/4" Fitting</b> (not shown)	(2)	98692
38	<b>Plug Socket Assembly</b> (not shown)	(1)	81774
✓	<b>Parts included in Repair Kit</b>		637143-1

□ Customer must specify length in feet.

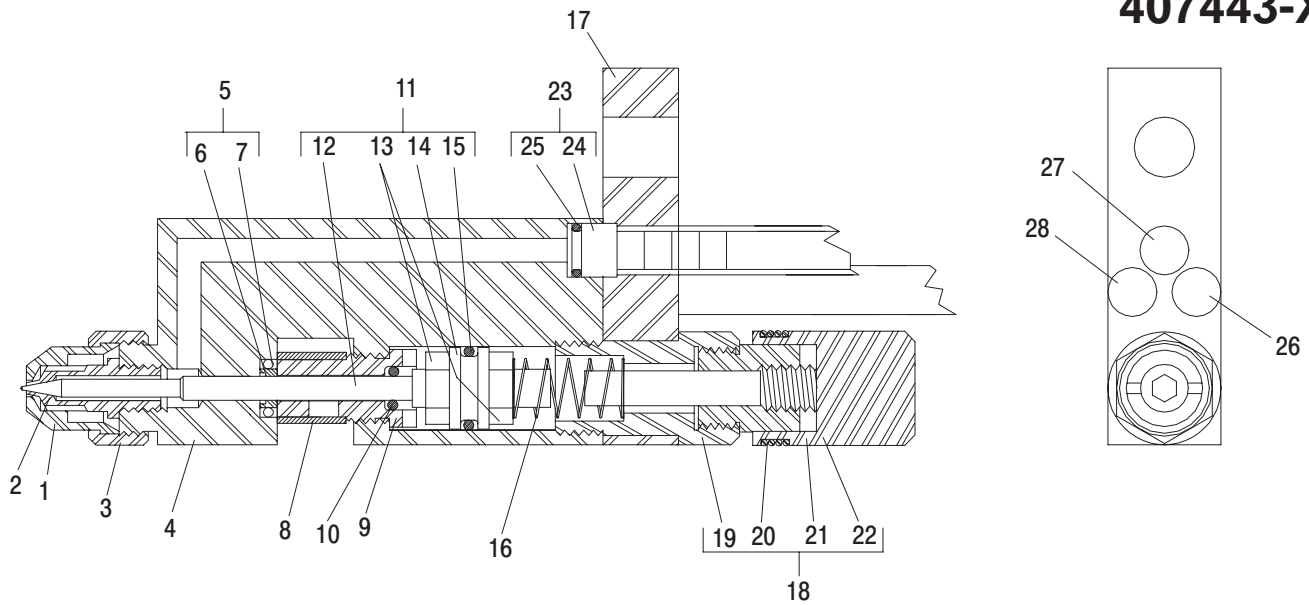
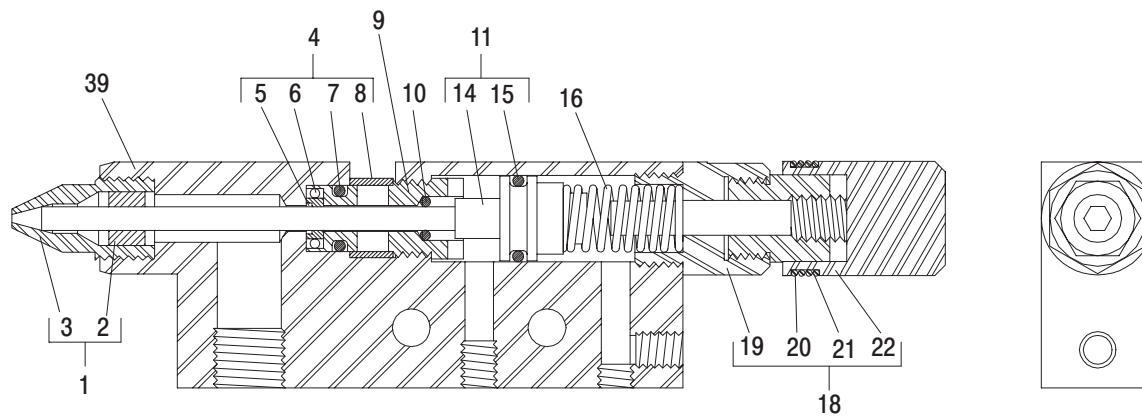


FIGURE 14

Item	Description (size in inches)	Qty	Part No.	Item	Description (size in inches)	Qty	Part No.
1	Air Cap (model 407443-8)	(1)	98695	✓ 15	"O" Ring	(1)	98705
	(model 407443-12)	(1)	98696	16	Needle Spring	(1)	98706
	(model 407443-20)	(1)	98697	17	Mounting	(1)	98713
2	Nozzle (model 407443-8)	(1)	98698	18	Ratchet Assembly (includes 19 thru 22)	(1)	81801-1
	(model 407443-12)	(1)	98699	19	Lock	(1)	
	(model 407443-20)	(1)	98700	20	Ring	(1)	
3	Collar Ring	(1)	98701	21	Adjusting Nut	(1)	
4	Gun Body	(1)	98552	22	Pin	(2)	
5	Packing Set (includes items 6 & 7)	(1)	81778	23	Hose Socket Assembly (includes 24 & 25)	(3)	81779
✓ 6	Shaped Gasket	(1)	98702	24	Hose Socket	(3)	98707
✓ 7	"O" Ring	(1)	98703	✓ 25	"O" Ring	(3)	98708
8	Plastic Protection Cover	(1)		□ 26	Hose, Black (Control Air) (1 meter long)	(1)	98688-XXX
9	Retainer	(1)	98557	□ 27	Hose, Translucent (Fluid) (1 meter long)	(1)	98689-XXX
✓ 10	"O" Ring	(1)	98704	□ 28	Hose, Blue (Atomizing Air) (1 meter long)	(1)	98690-XXX
11	Needle Assembly (includes items 12 thru 15)			35	Nipple (1/8" x 1/4") (not shown)	(1)	98694
	(model 407443-8)	(1)	81775	36	1/8" Fitting (not shown)	(1)	98691
	(model 407443-12)	(1)	81776	37	1/4" Fitting (not shown)	(2)	98692
	(model 407443-20)	(1)	81777	38	Plug Socket Assembly (not shown)	(1)	81780
12	Needle	(1)		✓	Parts included in Repair Kit		637143-2
13	Needle Nut	(2)					
14	Piston	(1)					

□ Customer must specify length in feet.

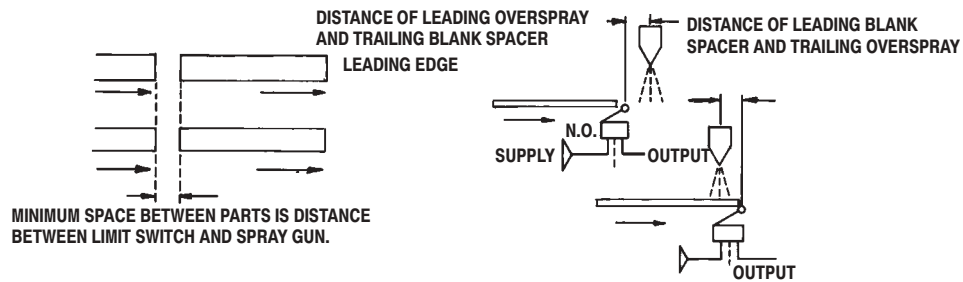


**FIGURE 15**

Item	Description (size in inches)	Qty	Part No.	Item	Description (size in inches)	Qty	Part No.
<b>1</b>	<b>Fluid Nozzle</b> (includes items 2 & 3)			<b>11</b>	<b>Needle Assembly</b> (includes items 14 & 15)		
	(model 407444-3)	(1)	81785		(model 407444-3)	(1)	81781
	(model 407444-5)	(1)	81786		(model 407444-5)	(1)	81782
	(model 407444-7)	(1)	81787		(model 407444-7)	(1)	81783
<b>2</b>	<b>Packing</b>	(1)		<b>14</b>	<b>Piston</b>	(1)	
<b>3</b>	<b>Tip</b>	(1)		✓ <b>15</b>	<b>"O" Ring</b>	(1)	98711
<b>4</b>	<b>Packing Set</b> (includes items 5 thru 8)	(1)	81784	<b>16</b>	<b>Spring</b>	(1)	98706
✓ <b>5</b>	<b>Shaped Gasket</b>	(1)	98702	<b>18</b>	<b>Ratchet Assembly</b> (includes 19 thru 22)	(1)	81799-1
✓ <b>6</b>	<b>"O" Ring</b>	(1)	98703	<b>19</b>	<b>Lock</b>	(1)	
✓ <b>7</b>	<b>"O" Ring</b>	(1)	98709	<b>20</b>	<b>Ring</b>	(1)	
<b>8</b>	<b>Plastic Sleeve</b>	(1)	98710	<b>21</b>	<b>Adjustment Nut Assembly</b>	(1)	
<b>9</b>	<b>Retainer</b>	(1)	98555	<b>22</b>	<b>Pin</b>	(1)	
✓ <b>10</b>	<b>"O" Ring</b>	(1)	98704	<b>39</b>	<b>Body</b>	(1)	98554
				✓	<b>Parts included in Repair Kit</b>		637143-3

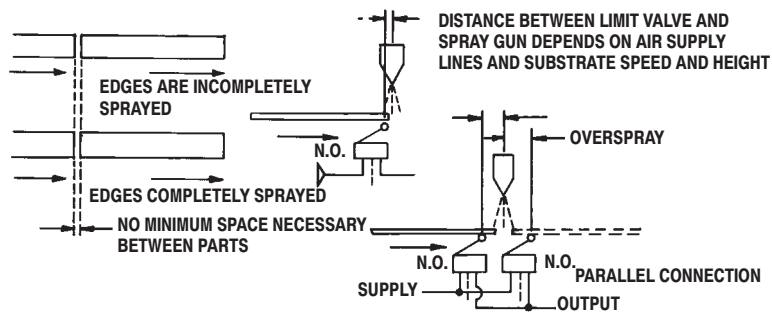
# **VALVE AND CONTROL PLACEMENT EXAMPLES (FOR PACKAGING APPLICATIONS)**

## **OVERSPRAY (ONE END ONLY)**



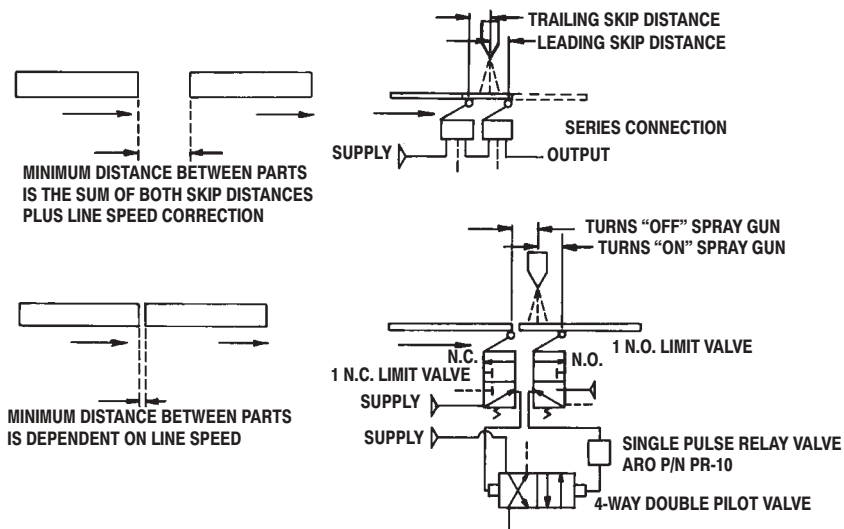
**FIGURE 16**

## **OVERSPRAY (BOTH ENDS)**



**FIGURE 17**

## **SKIP-GLUE-SKIP**



**FIGURE 18**

