

Model 110 & 210 Spray Valves

User Guide



About Dymax

Light-curable adhesives. Systems for light curing, fluid dispensing, and fluid packaging.

Dymax manufactures industrial adhesives, light-curable adhesives, epoxy resins, cyanoacrylates, and activator-cured adhesives. We also manufacture a complete line of manual fluid dispensing systems, automatic dispensing systems, and light-curing systems. Light-curing systems include LED light sources, spot, flood, and conveyor systems designed for compatibility and high performance with Dymax adhesives. Dymax adhesives and light-curing systems optimize the speed of automated assembly, allow for 100% in-line inspection, and increase throughput. System designs enable stand-alone configuration or integration into your existing assembly line.

Please note that most dispensing and curing system applications are unique. Dymax does not warrant the fitness of the product for the intended application. Any warranty applicable to the product, its application, and use is strictly limited to that contained in the Dymax standard Conditions of Sale. Dymax recommends that any intended application be evaluated and tested by the user to ensure that desired performance criteria are satisfied. Dymax is willing to assist users in their performance testing and evaluation. Data sheets are available for valve controllers or pressure pots upon request.

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Introduction

This guide describes how to use the Dymax Model 110 standard-flow spray valve (PN T16396) or the Model 210 high-flow spray valve (PN T17287). Sections in this guide describe how to assemble, use, and maintain these spray valves safely and efficiently.

Intended Audience

Dymax prepared this user guide for experienced process engineers, maintenance technicians, and manufacturing personnel. If you are new to pneumatically operated fluid spray equipment and do not understand the instructions, contact the Dymax technical support team to answer your questions before using the equipment.

Where to Get Help

Customer Support and Applications Engineering teams are available by phone and email in Germany, Monday through Friday, from 8:00 a.m. to 5:00 p.m. Central European Time. You can also email Dymax Europe GmbH at info_de@dymax.com. Please see the back cover for worldwide contact information. For more information about this product, visit dymax.com.

Additional resources are available to ensure a trouble-free experience with our products:

- Detailed product information on www.dymax.com
- Dymax adhesive Product Data Sheets (PDS) on our website
- Material Safety Data Sheets (SDS) provided with shipments of Dymax adhesives

Safety



WARNING! *If you use this fluid dispensing equipment without first reading and understanding the information in this guide, personal injury can result from the uncontrolled release of high-pressure gas, injection injury, or exposure to chemicals. To reduce the risk of injury, read and understand this guide before assembling and using Dymax fluid dispensing equipment.*

General Safety Considerations

All users of Dymax fluid dispensing equipment should read and understand this user guide before assembling and using the equipment.

To learn about the safe handling and use of dispensing fluids, obtain and read the MSDS for each fluid before using the fluid. Dymax includes an MSDS with each adhesive sold. MSDS for Dymax products can also be requested through the Dymax website.

Specific Safety Considerations

Using Safe Operating Pressures

Pressurizing the components in the dispensing system beyond the maximum recommended pressure can result in the rupturing of components and serious personal injury. To minimize the risk of rupturing components and injury, do not exceed the maximum operating pressure of the components in your fluid dispensing system (see system specifications on page 18).

Preventing Injection Injury

Discharging fluids or compressed air with a dispensing tip against your skin can cause very serious injection injury. To minimize the risk of injection injury, do not place the dispensing tip in contact with your skin.

Product Overview

Description of the Dymax Spray Valves

The Dymax Model 110 and 210 Spray Valves are low pressure, low volume, front-closing stainless steel valves. These valves use air pressure to atomize fluids and transfer them to a substrate. The valves can be used in a wide variety of coating applications, applying any number of low-to-high viscosity fluids.

The Model 110 is a standard-flow spray valve and should be used with materials that have a viscosity less than 10,000 cP.

The Model 210 is a high-flow spray valve and should be used with materials that have a viscosity greater than 10,000 cP.

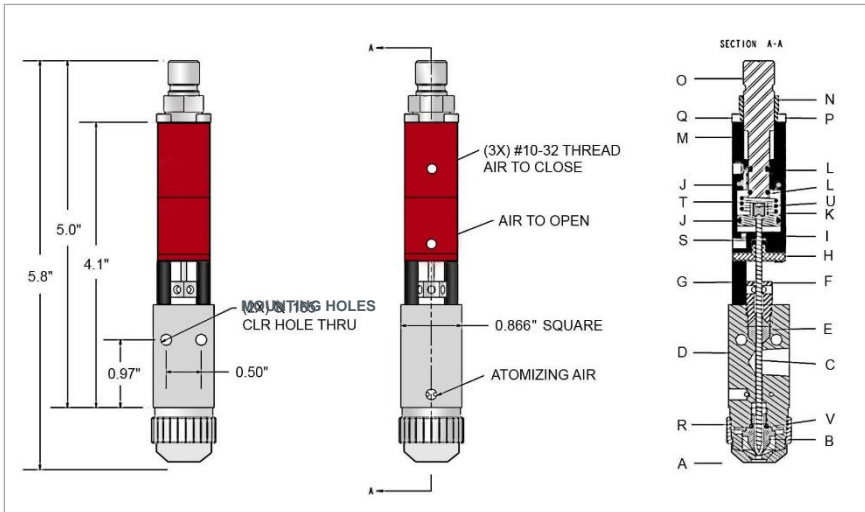
Component Overview

The valve is comprised of two major sections, the air section (red anodized portion) and the fluid section (stainless steel portion). The air section of the valve is constructed of an aluminum body. It contains a simple piston/cylinder combination used to open and close the valve. This section also houses the stroke-adjustment bolt, which is located in the upper air body. The stroke-adjustment bolt controls how far the piston and needle assembly can retract thus regulating the rate of fluid flow.

The second section of the valve, the fluid section, is constructed of stainless steel. It contains a needle and seat combination, which is located at the end of the Valve inside the atomizing air cap. Fluid flows through the seat orifice as the needle retracts out of the seat. The fluid stops as the needle moves back into the Seat. When the needle is retracted, atomizing air is applied to spray all of the fluid from the air cap. The stroke adjustment bolt located on the air section of the valve regulates the distance that the needle can retract out of the seat. This controls the orifice size and the rate of fluid flow. A precision air regulator is used to control a precise amount of atomizing air. Fluids can include but are not limited to solvents, conformal coatings, grease, etc.

Wetted parts on the spray valve include: 303, 304 stainless steel, Teflon®, and Kalrez®

Figure 1.
Model 110 & 210 Component Diagram



Item	Description	Item	Description
A	Air Cap, Round (Flat)	M	Upper Air Body
B*	Seat	N	Lock Nut
C	Needle	O	Stroke Adjuster
D*	Fluid Section	P	Machine Screw
E	Packing	Q	Machine Screw
F	Packing Nut	R	Collar Ring
G	Standoff	S	O-Ring
H	End Cap	T	Spring
I	Lower Air Body	U	Set Screw
J	O-Ring	V*	O-Ring
K	Piston	W	Seat Wrench (Not Shown)
L	O-Ring		

*These parts are not interchangeable between the standard-flow and high-flow valves

Special Features and Benefits

Feature	Benefit
Stainless Steel Construction	Compatible with a greater number of fluids
Interchangeable flat or round spray nozzle	Spray range of 0.25" (6.35 mm) to greater than 2" (50.8 mm)
Lightweight with low trigger resistance	Ergonomic design allows for hours of effortless spraying
Easy adjustment of material flow and spray atomization	Greater dispensing accuracy with less material waste

Assembly and Setup

Unpacking and Inspecting Your Shipment

When your spray valve arrives, inspect the boxes for damage and notify the shipper of box damage immediately.

Open each box and check for equipment damage. If parts are damaged, notify the shipper and submit a claim for the damaged parts. Contact Dymax so that new parts can be shipped to you immediately.

Check that the parts included in your order match those listed below. If parts are missing, contact your local Dymax representative or Dymax Customer Support to resolve the problem.

Parts Included

- Spray valve (round cap)
- Spray valve user guide

System Interconnect

Air

The valve is a normally closed spray valve. It requires a 2-position, 4-way air solenoid valve to actuate the air section. The valve should be operated with clean, dry air between 60-100 psi. Two #10-32 threaded air ports are located on the air section of the valve. The air port located furthest from the midsection of the valve is the air line to close the valve. The air port located closest to the mid-section of the valve is the air line to open the valve. Quick-connect air fittings are typically supplied with the spray valve to fit 5/32" tubing.

Atomizing air is connected to the valve through the #10-32 threaded port located on the fluid section (D). The atomizing air should be connected so that it turns on only when the valve is cycled to the open position. There are two configurations that can be used to connect the atomizing air.

The first configuration uses a single solenoid with one output. This configuration can be seen in Figure 2. The single solenoid in this configuration is used to simultaneously open the valve and pressurize the atomizing air regulator.

The second configuration, which can be seen in Figure 3, uses a dual solenoid to allow independent control of the atomizing air.

Fluid

The spray valve requires a material reservoir or pressure tank to draw material from. The material reservoir should be connected to the valve via the 3/8" OD push-to-connect fitting already installed on the stainless-steel fluid section (D) of the valve.

Figure 2.
Single Solenoid Setup Configuration

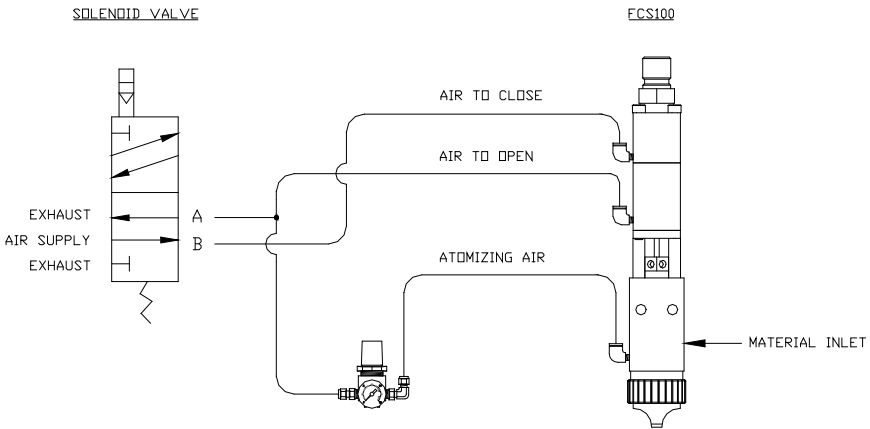
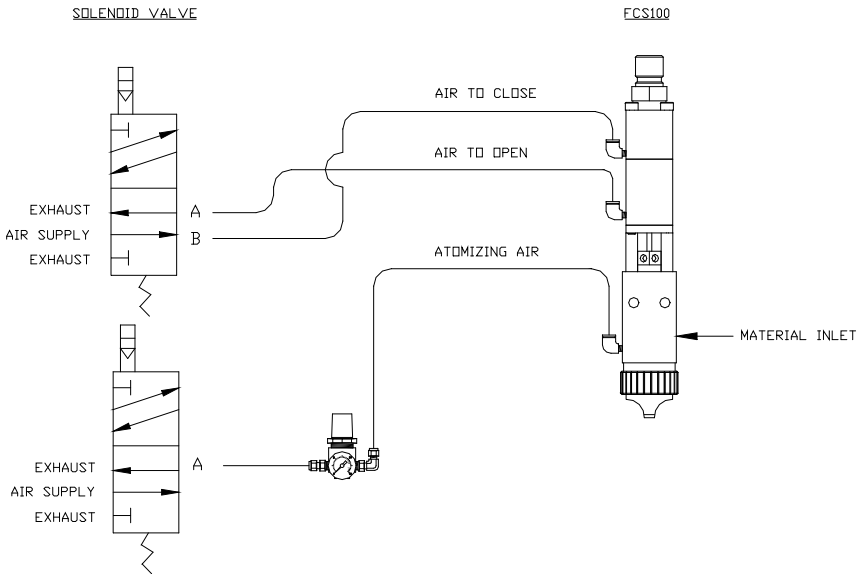


Figure 3.
Dual Solenoid Setup Configuration



Operating the Dispensing Valve

Setup and Operation

Refer to Figure 1 for part reference designation.

1. Plumb the valve as outlined in the set-up procedures.
2. Regulate the air pressure operating the valve between 60-100 psi.
3. Making sure that the valve is not aimed toward anyone, cycle the valve several times. When the valve is cycling, the Piston (K) can be heard hitting the Stroke Adjuster (O), and the Needle (C) can be seen going up and down in the center.
4. Adjust the atomizing Air Pressure Regulator between 1-2 psi. Air should be felt flowing from the end of the valve when the valve cycles open.

NOTE: If the valve is not cycling properly, refer to the Troubleshooting Section of this manual.

5. When the Fluid Delivery System is connected to the valve, pressurize the material to be dispensed.
6. Once again, cycle the valve open to purge. Fluid should begin to spray from the tip of the Air Cap (A).
7. Continue cycling the valve until all air is removed from the Fluid Line and a steady spray pattern of material can be seen.
8. Adjust the atomizing air pressure to achieve proper spray of material. This pressure will vary due to the viscosity of the fluid.
9. Check the Fluid Connection and Packing Nut (F) for leaks. If the valve is leaking, refer to the Troubleshooting Section of this manual.
10. Turn the Stroke Adjuster (O) until the desired flow rate is achieved. Turning the Stroke Adjuster (O) clockwise will decrease the material flow rate and counter-clockwise will increase the material flow rate. If the Stroke Adjuster (O) is turned all the way down, it will stop fluid flow entirely.
11. Once the stroke adjustment setting is determined, use an adjustable wrench to tighten the Lock Nut (N) up against the Upper Air Body (M).

NOTE: Refer to the Troubleshooting Section for any problems.

Maintenance and Cleaning

General Valve Maintenance

Lubricate the Packing (E) on the valve every 200 hours by placing a few drops of mineral oil or other light oil inside the Packing Nut (F).

The Packing Nut (F) will require occasional tightening as wear occurs in order to prevent leaks through the Packing (E).

Routing Cleaning and Disassembly

Cleaning and rebuilding the valve will be required from time-to-time. A spare parts kit is available with all the normal wear parts included. Refer to Figure 1 for part reference designation.

1. Begin disassembly by removing air and fluid pressure from the valve.
2. Remove all pneumatic tubing and fluid delivery fittings, hoses, etc. from the valve.
3. Loosen the Packing Nut (F) by using the tip of a 3/32" Allen key.
4. Remove the two Machine Screws (Q) located on the same corners as the Standoffs (G) with a 3/32" Allen key.

NOTE: During removal, the valve's Spring (T) will force the air section away from the fluid section.

5. Pull the Air Section (M, I) away from the Fluid Section (D).
6. Clean off the tip of the stainless steel Needle (C).
7. Unthread and remove the Packing Nut (F) and Packing (E) from the fluid section (D) of the valve.
8. Using soft tip pliers unthread and remove the two Standoffs (G) from the fluid section (D).
9. Unthread and remove the Collar Ring (R) followed by the Air Cap (A).
10. Using a seat wrench, unthread and remove the Seat (B) and the 007 Kalrez® O-Ring (V).

NOTE: The teeth of the seat wrench are tapered so the wrench will only fit on one side.

11. Clean all of the wetted parts thoroughly with an appropriate solvent.
12. On the Air Section (A), remove the final two Machine Screws (P) that thread into the End Cap (H) by using a standard 3/32" Allen key.

NOTE: During removal, the Spring (T) will force the Air Section apart.

13. Separate the Upper Air Body (M) from the Lower Air Body (I) and remove the Spring (T).
14. Slide the End Cap (H) off the Needle (C).
15. Holding the Lower Air Body (I) in one hand, grab the Needle (C) and push the Needle and Piston (K) assembly out of the Lower Air Body (I).
16. Remove the 004 Buna O-Ring (S) from the Lower Air Body (I).
17. Hold the Piston (K) with an adjustable wrench and use a 5/64" Allen key to unthread and remove the Set Screw (U).
18. Remove the Needle (C) and the 014 Buna O-Ring (J) from the Piston (K).
19. Remove the 014 Buna O-Ring (J) from the Upper Air Body (M) and the 008 Buna O-Ring (L) from the Stroke Adjuster (O).
20. Unthread the Stroke Adjuster (O) from the Upper Air Body (M) and remove the 008 Buna O-Ring (L).
21. Replace all worn components with new components.

Assembly Instructions

Refer to Figure 1 for part reference designation.

General

- All O-Rings must be lubricated with a small amount of silicone grease.
- A small amount of removable thread locker should be applied to the Set Screw (U) and the male threads of the Standoffs (G).
- Assemble the air section (M,I) and fluid section (D) separately prior to connecting the assemblies.

Air Section

1. Assemble the Stroke Adjuster (O) and Lock Nut (N) with the hex head toward the knurled end of the bolt.
2. Mount one 008 Buna O-Ring (L) on the inside groove of the Stroke adjuster (O).
3. Assemble the Stroke Adjuster (O) assembly into the Upper Air Body (M).
4. Mount one 014 Buna O-Ring (J) on the end of the Upper Air Body (M) and the other 008 Buna O-Ring (L) on the end groove of the Stroke Adjuster (O).
5. Back out the Stroke Adjuster (O) by turning it counter-clockwise to the end of its travel.
6. Drop the Needle (C) into the Piston (K) and assemble with the Set Screw (U) using an adjustable wrench and 5/64" Allen key to tighten.
7. Mount the 014 Buna O-Ring (J) onto the Piston (K).
8. Apply a small amount of silicone grease to the inside of the Lower Air Body (I) then drop in the Piston (K) and Needle (C) assembly.
9. Mount the 004 Buna O-Ring (S) on the end of the Needle (C) and slide it down into the groove in the end of the Lower Air Body (I).
10. Slide the End Cap (H) onto the Needle (C) up to the Lower Air Body (I), place the Spring (T) on top of the Piston (K), and assemble the two air bodies using two Machine Screws (P) tightening with a 3/32" Allen key.

NOTE: Be sure the air holes are lined up on the same face and will align with the air hole on the Fluid Section (D).

Fluid Section

1. Screw the Standoffs (G) into the Fluid Section (D) using soft tip pliers to tighten.
2. Drop the Packing (E) into the Fluid Section (D), and screw in the Packing Nut (F) but leave finger tight until assembled with the Air Section (M, I).
3. Mount the 007 Kalrez® O-Ring (V) on the Seat (B) and thread the Seat (B) into the Fluid Section (D). Tighten using the seat wrench.
4. Place the Air Cap (A) onto the Fluid Section (D) over the Seat (B) and secure it by threading the Collar Ring (R) in place.

Assemble Sections

1. Back out the Stroke Adjuster (O) by turning it counter-clockwise until the end of its travel.
2. Apply a small amount of silicone grease to the end of the Needle (C) then insert it into the Packing Nut (F) and slide the two sections together.
3. Align the air holes of the Air Section (M, I) on the same face as the atomizing air hole of the Fluid Section (D) then connect the sections using the two Machine Screws (Q), tightening them down evenly using a 3/32" Allen key.
4. Using the tip of a 3/32" Allen key, tighten the Packing Nut (F).

Troubleshooting

Table 1.
Troubleshooting Chart for the Dymax Spray Valve

Problem	Possible Cause	Corrective Action
Valve does not cycle	Air pressure to air section too low	Increase air pressure to 60-100 psi
	Packing Nut (F) is too tight	Loosen Packing Nut (F) until valve just begins to cycle, retighten
	Stroke Adjuster (O) is bottomed out	Back out Stroke Adjuster (O) by turning it counter-clockwise
	Material is cured in the valve	Disassemble and clean valve
	Valve was assembled without lubricating the O-ring seals	Disassemble valve, lubricate seals and re-assemble
Material leaks from valve tip	Needle (C) and/or Seat (B) are worn	Replace parts as necessary
	Seat (B) is not tightened enough against Fluid Section (D)	Use seat wrench to tighten Seat (B) onto Fluid Section (D)
Valve leaks from mid-section	Packing Nut (F) is loose	Tighten Packing Nut (F) until snug
	Packing (E) is worn	Replace Packing (E)
Valve does not spray anything	Fluid pressure is too low	Increase fluid pressure
	Material cured in Fluid Section (D)	Disassemble valve and clean
Air bubbles in fluid	Valve not properly purged	Flip valve upside down and cycle until air bubbles are removed
	Problem with fluid delivery system	Diagnose and repair
	Atomizing air pressure set too high	Reduce atomizing air pressure

Table 1 Continued

Problem	Possible Cause	Corrective Action
Spray rate too fast	Stroke Adjuster (O) set out too far	Turn Stroke Adjuster (O) clockwise toward the zero mark
Spray rate too slow	Stroke Adjuster (O) set too close to the zero mark	Turn Stroke Adjuster (O) counter- clockwise
Poor spray pattern	Cured material at tip of Needle (C) and Seat (B)	Remove air cap and clean tip
	Cured material in Air Cap (A)	Remove air cap and clean
	Incorrect atomizing air pressure	Adjust atomizing air pressure
	Damaged Needle (C) and or Seat (B)	Replace parts as necessary

Spare Parts and Accessories

Options/Accessories

Item	Part Number
Nozzles	
Flat Spray Nozzle	T15697
Parts Kits	
Model 110 (Standard-Flow Valve) Spare Parts Kit includes seat, seat wrench, needle, Teflon packing, and Buna and Kalrez o-rings	T15696
Model 210 (High-Flow Valve) Spare Parts Kit includes seat, seat wrench, needle, Teflon packing, and Buna and Kalrez o-rings	T17288
Stands	
Front Closing Stand with Drip Cup	T15454

Specifications

Property	Specification
Part Numbers	<p>T16396 Model 110 standard-flow spray valve with round cap</p> <p>T17287 Model 210 high-flow spray valve with round cap</p>
Valve Type	Normally closed, needle spray valve
Construction Material	Body - Aluminum & Stainless Steel Wetted Parts - 303 & 304 Stainless Steel, Teflon®, Kalrez®
Operating Air Pressure	60-100 psi [4.14 - 6.89 bar]
Maximum Inlet Fluid Pressure	2,500 psi [172.37 bar]
Viscosity Range	<p>Model 110 1 – 10,000 cP</p> <p>Model 210 > 10,000 cP</p>
Spray Pattern Width	<p>Flat 0.75" - 2+" [1.91 cm - 5.08+ cm]</p> <p>Round 0.25" - 2" [0.64 cm - 5.08 cm]</p>
Maximum Tubing Size	Supplied with 0.375" (0.95 cm) OD tubing
Activation	Single or dual-solenoid valve
Dimensions (W x D x H)	0.87" x 0.87" x 5.80" [2.2 cm x 2.2 cm x 14.7 cm]
Weight	9 oz [0.26 kg]
Unit Warranty	1 year from purchase date



Warranty

From date of purchase, Dymax Corporation offers a one-year warranty against defects in material and workmanship on all system components with proof of purchase and purchase date. Unauthorized repair, modification, or improper use of equipment may void your warranty benefits. The use of aftermarket replacement parts not supplied or approved by Dymax Corporation will void any effective warranties and may result in damage to the equipment.

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