LOCTITE®

EQUIPMENT

Operation Manual

Light Cure Valve
Part Number 98009

VA 15 Diaphragm Valve SS
Part Number 1730181

Cyanoacrylate Adhesive Valve
Part Number 98013

Henkel

Contents

1. Specifications

Dispense Valves 98009, 98013 and VA15

98009 Valve Head: Acetal copolymer
98013 Valve Head: UHMW Polyethylene
VA15 Valve Head: 316 Stainless Steel
Size: 3.090" length x 1.060" diameter (78.5 mm x 26.9 mm)
Free Flow Orifice: 0.100" dia. (2.5 mm)
Inlet Thread: 1/8 NPT Female
Outlet Thread: 1/4-28 UNF

List of Parts Supplied

Valve Assembly
5 ft. air line tubing (attached to valve)
6 ft. product tubing, 1/4" O.D., lined with PTFE
Valve mount screw
Needle kit
Operating manual

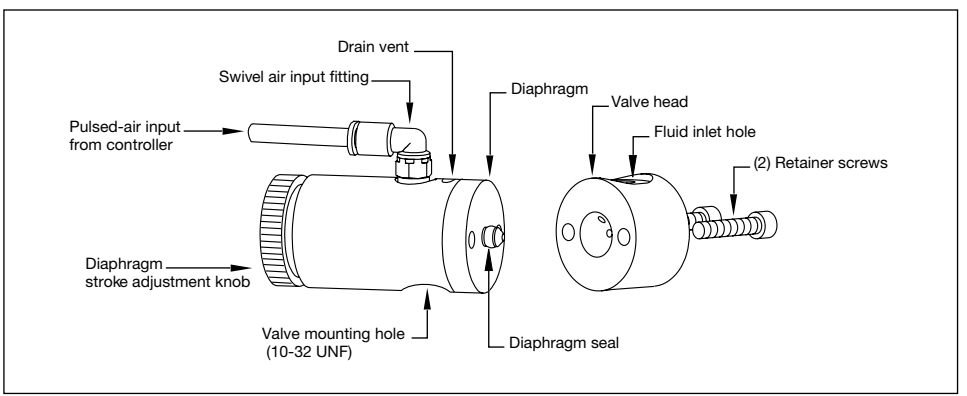
2. Description

All exterior components are indicated in the illustration below. The exploded schematic view is shown on page 10.

Each dispense valve is shipped with the standard luer lock output fitting, a 5-foot air hose with swivel air input fitting and a 1/4" male elbow product input fitting with 6 feet of PTFE-lined tubing.

The diaphragm stroke adjustment is preset at the factory at 1/2 turn open. One full turn of the stroke adjustment is equal to 0.025" (0.6 mm), which is the maximum stroke of the dispense valves.

In the unlikely event of diaphragm rupture, the valve body has a drain vent to ensure that material does not enter the piston assembly.



3. Unpacking and Inspection

Carefully remove the system from its shipping carton, and inspect it for any signs of damage. Any damage should be reported immediately to the carrier. Refer to the list of parts supplied (page 1), and compare to the contents. Report any missing parts promptly to the Loctite® customer service department at 1-800-LOCTITE (562-8483).

4. Theory of Operation

The dispense valves are normally a closed, fail-safe, adjustable opening, diaphragm valve. Input air pressure of 70 to 90 psi (4.8 to 6.2 bar) forces the internal piston to move a pre-adjusted distance, normally 0.025" or less. A connecting rod pulls open the diaphragm seal, permitting the fluid to flow through the diaphragm chamber.

Relieving the input air pressure allows the piston return spring to close the diaphragm, ensuring rapid “fail-safe” shutoff of fluid flow.

The amount of fluid that flows through the valve is determined by: (1) length of time the valve is open, (2) fluid reservoir pressure, (3) output dispensing tip size, (4) diaphragm stroke and (5) fluid viscosity.

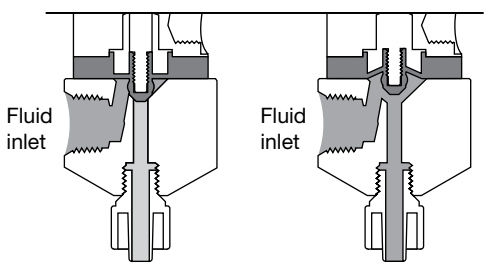
For small deposits of low viscosity fluid, the diaphragm adjustment will be set at a short stroke – but never less than 1/8 turn from closed. The diaphragm stroke adjustment knob is turned counterclockwise to open.

To ensure consistent dispensing, the fluid reservoir pressure and the timed pulse must be constant. Reservoir air pressure is determined by the viscosity of the fluid and the amount of fluid to be dispensed.

The dispense valves can be operated in any position without affecting flow. Vibration normally has no effect on performance. The valves can be moved in and out of dispense positions at high cycle speeds (such as a reciprocating device installed on a production line) without affecting dispensing performance.

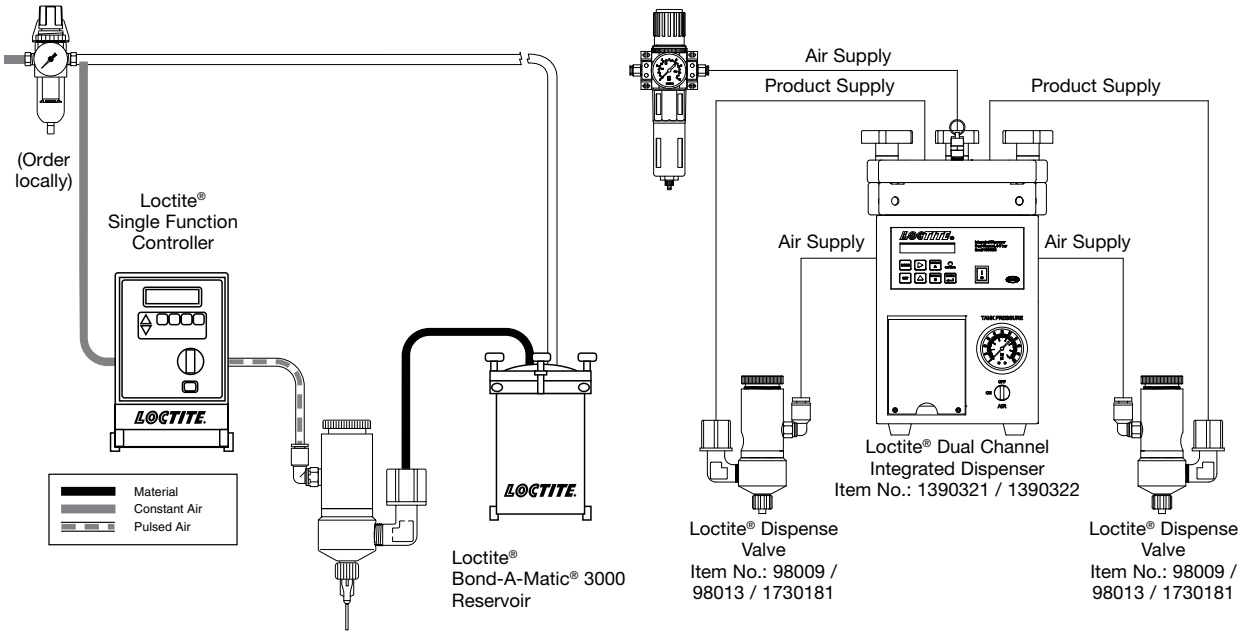
The unique design of the dispense valves provides extremely high cycle rates at unusually close operating tolerances.

98009 LC, 98013 CA & 1730181 VA15



5. Typical System Setup

Plant air must be properly filtered and dry. If not, specify a 5-micron filter regulator.



6. Setup Instructions

Connect the fluid reservoir feed tube **2** to the fluid inlet fitting **1**.

Connect the control air line **3** to the valve controller or other pneumatic switch that is used to control the ON time of the valve.

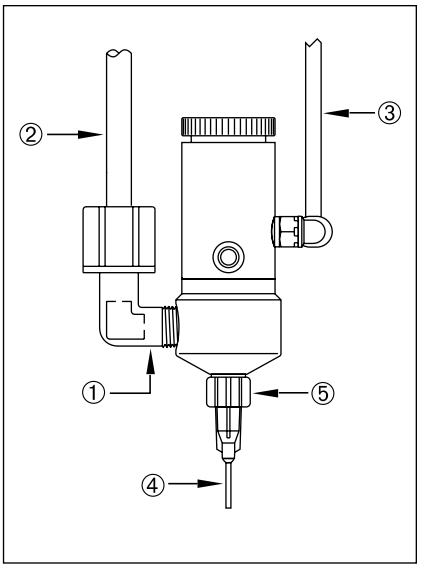
Connect an appropriate size dispensing tip **4** to the output tip adapter **5**. Use small diameter tips, 20 to 25 gauge, for low viscosity fluids. Use larger tips, 14 to 20 gauge, for more viscous fluids.

Using a Loctite® Reservoir and Controller or a Loctite® Dual Channel Integrated Controller, set up and connect the valve and the fluid reservoir as shown on page 5. Load fluid reservoir, per Reservoir Operating Manual instructions.

CAUTION: Always treat a pressurized reservoir with respect, and check air gauge to ensure pressure is at zero before opening.

To ensure that all pressure is bled off, all Loctite® reservoirs have a pressure relief valve that should be activated before opening the tank.

After filling, check to be certain the reservoir is sealed.



6. Setup Instructions (continued)

NOTE: Do not overtighten the diaphragm or open the stroke adjustment knob (counterclockwise) more than two full turns. Turning out more than two full turns does not increase the flow capacity, and will reduce the closure spring tension. This situation could permit pressurized liquid to force open the diaphragm seal, resulting in continuous liquid flow.

Before proceeding, check the following:

1. Be sure all the connections are tight.
2. Set the reservoir pressure. For low viscosity fluids, start with a pressure of approximately 5 psi (0.3 bar). For higher viscosity, start at 10 to 20 psi (0.7 to 1.4 bar). Increase or decrease as necessary.

   If solvents or other watery fluids are to be dispensed in very small amounts, specify a 0 to 15 psi (0 to 1.0 bar) precision regulator to control the reservoir pressure.
3. Set the diaphragm stroke. Start with no more than 1/2 turn open. The dispense valves are shipped with the stroke adjustment set at 1/2 turn open.
4. Set the valve control air pressure at a minimum of 70 psi (4.8 bar). Refer to the Controller Operating Manual.
5. Actuate the valve long enough to fill the valve, start liquid flow and purge air from the dispensing tip. If a small tip is used, it may need to be removed from the valve during purging. Then fill the tip hub with fluid and install on the tip adapter so it is free of air.
6. Before setting the controller time, adjust the valve stroke control and reservoir pressure to provide proper flow from the tip. Excessive flow can cause bubbles. Use only enough reservoir pressure to achieve the proper flow. Avoid setups with tight stroke setting and high reservoir pressures.
7. Test the dispensed amount with a nominal time setting. If more or less fluid is required, increase or decrease the open time or reservoir air pressure.

Questions regarding installation, operation, or safety should be addressed to Henkel technical support by calling 1-800-LOCTITE (562-8483).

7. Troubleshooting

Problem	Possible Cause	Correction
No liquid flow.	If valve operating pressure is too low, the valve will not open.	Increase air pressure to 70 psi (4.8 bar) minimum.
	The reservoir pressure may not be high enough.	Increase pressure.
	The dispensing tip may be clogged.	Replace tip.
	The stroke adjustment may be closed.	If closed, open counterclockwise 1/2 turn.
	Material may have set up in the valve head.	Clean the valve head.
Fluid drools after the valve closes, eventually stopping.	This is caused by air trapped in the outlet section of the valve chamber, or the material has entrapped air. The air will expand after the valve closes, causing extrusion until the air reaches atmospheric pressure.	Purge the valve by dispensing at a steady flow until clear. If a small tip is being used, it may be necessary to remove the tip while purging to obtain sufficient flow to carry the air down through the tip adapter. Check to be certain the outlet fitting, tip adapter and tip are tight.
Liquid drips at a steady rate after the valve closes.	A steady drip can be caused by excessive reservoir pressure.	Check to be sure the reservoir pressure is not above 70 psi (4.8 bar).
	If the stroke adjustment knob is turned out more than two full turns, the closure spring tension will be reduced, allowing normal reservoir pressure to force the diaphragm open.	Check to be sure the stroke adjustment knob is less than two turns out.

7. Troubleshooting (continued)

Problem	Possible Cause	Correction
(Continued from previous page)	If the reservoir pressure and stroke adjustment are within limits, a steady drip indicates failure of the diaphragm to close fully due to particle buildup or wear.	Remove the valve head, clean and inspect sealing surfaces on the diaphragm and valve head. Replace worn parts.
Fluid leaks out between valve head and diaphragm.	Fluid leaking out between the valve head and diaphragm indicates the annular sealing ridge on the valve head is damaged, or the valve head is distorted due to excessive torque on the retaining screws.	In either case, replace the valve head.
Liquid flows out of the drain hole.	Liquid flowing out of the drain hole indicates a ruptured diaphragm.	Replace the diaphragm in accordance with maintenance instructions on page 11.
Valve responds slowly when opening and closing.	Valve response is related to control air line length and size. The valves are supplied with 5 feet of 3/32" ID tubing attached. Any additional length or size change will affect response time.	Check to be sure that the length and size have not been changed.
Inconsistent deposits.	Inconsistent deposits can result if the air pressure controlling the valve and/or supplying the reservoir is fluctuating, or if the valve operating pressure is less than 70 psi (4.8 bar).	Check to be sure that the air pressures are constant and the valve operating pressure is 70 psi (4.8 bar).
	The time the valve is open must be constant.	Check to be sure the valve controller is providing a consistent output.

Questions regarding installation, operation, or safety should be addressed to Henkel technical support by calling 1-800-LOCTITE (562-8483).

8. Maintenance and Cleaning

Normally, purging with appropriate flush material or solvent after use is sufficient for cleaning. Some materials, however, may cause a buildup on the valve head and diaphragm, which will require a periodic, thorough cleaning by removing the valve head. Note that valve head removal is accomplished without demounting the valve.

To Remove the Valve Head

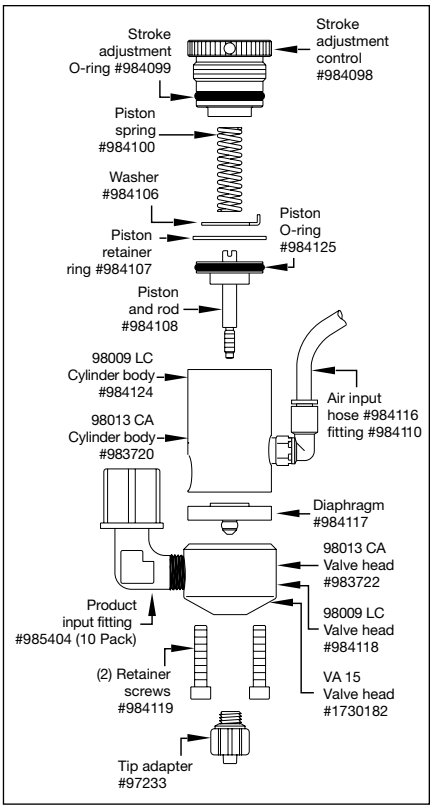
Remove the two retainer screws. It is not always necessary to remove the fittings from the valve head for cleaning. If the fittings must be removed, be careful: solidified material on the fitting thread could cause the valve head thread to strip out.

NOTE: Avoid using sharp probes for cleaning. Any nicks or scratches on the diaphragm or the sealing side of the valve head may cause improper valve action, and require replacement of diaphragm and head.

To Reinstall Valve Head

Align valve head holes with diaphragm and cylinder body holes, and reinsert retainer screws. Tighten in accordance with the Torque Specifications Chart on the next page.

If the diaphragm holes do not line up with the tapped holes in the air cylinder body, proceed with steps 5 through 7 (To Change Diaphragm) on the next page.



Valve Components

8. Maintenance and Cleaning (continued)

Tools needed:
Snap ring pliers
1/8" flat tip screwdriver
7/64" hex wrench
6" adjustable wrench

Valve Head Torque Specification

98009 LC
Acetal (Black):
12 lb.-in.
(1.58 N-m)

98013 CA Valve
UHMW (White)
7 lb.-in.
(0.79 N-M)

1730181 VA 15 Valve
316 Stainless Steel
10 lb.-in.
(1.13 N-M)

To Change Diaphragm

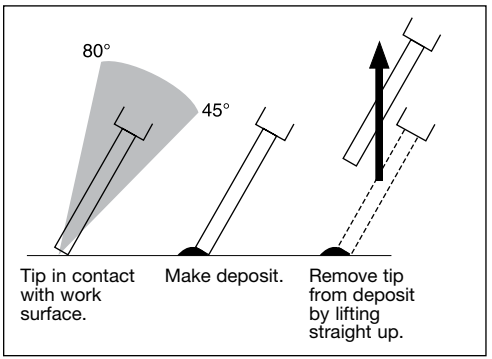
1. Back out stroke control knob two turns counterclockwise from the closed position.
2. Remove valve head.
3. Unscrew diaphragm (counterclockwise) and remove it from the diaphragm piston rod.
4. Carefully thread on the new diaphragm. Be sure that the internal thread on the diaphragm is not stripped or cross-threaded.
5. Tighten with medium pressure (fingers only) until diaphragm bottoms against shoulder on piston rod. At this point, do not overtighten or loosen the diaphragm to align the diaphragm and air cylinder holes.
6. To align the holes of the diaphragm with the appropriate holes in the air cylinder body, insert a small flat tip screwdriver through the hole in the stroke control knob and engage the piston rod slot. Then, as viewed from the stroke control knob end, turn the screwdriver clockwise to rotate the rod, piston and diaphragm assembly until the appropriate holes are lined up.
7. Reinstall valve head (tighten screws in accordance with the Torque Specifications Chart to the left), turn stroke control knob clockwise until closed, then reopen to approximate required stroke.

To Change or Lubricate Piston O-ring

1. Remove the valve head and diaphragm.
2. Remove the stroke control knob and spring by turning control knob counterclockwise until free.
3. Using snap ring pliers, remove the piston retainer ring and anti-torque washer.
4. Remove the piston.
5. Lubricate O-ring, piston shaft and air cylinder wall with silicone grease Loctite® part #997569.
6. Reinstall piston, retainer ring and anti-torque washer.
7. Reinstall spring and stroke control knob. Turn knob in no more than two complete turns before the diaphram and valve head are installed.
8. Reinstall diaphragm and valve head, following steps 4 to 7 of “To Change Diaphragm,” above.

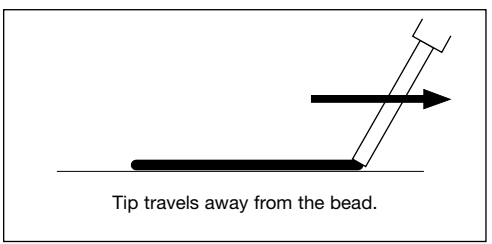
9. Applications

The dispense valves provide productive solutions to many types of applications. The following will help you utilize the valves most effectively.



Correct method to dispense dots. Bring valve to part, or part to valve tip, at the angle shown. Cycle valve. Withdraw tip as indicated. This technique ensures consistent dot deposit. Very low viscosity materials may tend to flow up the outside of the tip. Application at the angle shown prevents this.

Microdeposits. For critically small deposits, care must be exercised in reservoir pressurization, diaphragm stroke opening and tip size. **For very low viscosity material, the tip must contact the work surface prior to the dispensing cycle to ensure fluid transfer.**



Applying beads. Bring the tip in contact with the part or close enough to ensure fluid transfer. If the bead is to be applied in one direction only, position the valve at a 45° angle as shown. If the installation requires X-Y motion, position the valve perpendicular to the work surface with the gap determined by thickness of the bead.

Multiple valves – one controller. CAUTION: Valve timing is the primary control of deposit size. When several valves are manifolded from one controller, deposit size adjustment must be made using a secondary control such as reservoir pressure or stroke control. This adds more setup time, and these settings may end up in undesirable ranges, causing inconsistent output. When consistency is critical, we recommend using one valve controller per valve.

9. Applications (continued)

Rack mounting valves. For filling, it is often expedient to mount several valves so multiple filling can be done simultaneously. This can result in significantly increased production speeds, while retaining precise fill control.

Reservoirs. Standard Loctite® reservoirs include 0.5 and 2 liter pressure tanks. Standard fittings are available to connect these reservoirs to the valve.

Temperature. Because the diaphragm and valve head are machined from thermoplastic material, some slight changes can occur when the valve is heated beyond the ambient temperature, resulting in inconsistent deposits. The valves operate between 50°F (10°C) and 90°F (32°C). Care should be taken to keep the valve from hot spots, or if there is a gradient temperature change exceeding 15°F (-9°C), the output should be checked and adjusted, if necessary, to compensate for the temperature change.

Diaphragm displacement. The design of the valves require a minute displacement of the fluid when the valve closes. The displaced volume is related to the opening stroke of the diaphragm. A very small opening creates a very small displacement. For critically small deposits, a careful balance of diaphragm stroke and reservoir pressure is required, particularly as the fluid viscosity increases.

Testing has also shown that reservoir pressure is critical to dispensing consistent volumes. As the reservoir empties, the regulator must sense the pressure drop and introduce air to maintain the desired pressure. Avoid using low pressure settings on a high pressure regulator. If operating below 10 psi (0.7 bar), use a regulator with a 0 to 15 psi (0 to 1.0 bar) operating range.

10. Dispensing Specific Liquids

Low Viscosity Fluids

For dispensing dots, use a 0 to 15 psi (0 to 1.0 bar) precision air regulator set at 2 to 5 psi (0.1 to 0.3 bar). Set the valve stroke control at 1/4 to 1/2 turn open and use a 20 to 25 gauge dispensing tip. Make the final deposit size adjustment using the valve open time.

High Viscosity Fluids

The dispense valves are primarily designed for low to medium viscosity fluids. Because of the design parameters, high viscosity materials can be dispensed if only very small dots are required, or if low flow volume is acceptable. Maximum reservoir pressure is 70 psi (4.8 bar).

11. Spare Parts/Accessories

Part Number	Description
97221	16 Gal. Free Flow Taper Tip Kit, Grey
97222	18 Gal. Free Flow Taper Tip Kit, Green
97223	20 Gal. Free Flow Taper Tip Kit, Pink
97224	22 Gal. Free Flow Taper Tip Kit, Blue
97225	15 Gal. General Purpose Precision Tip Kit, S.S. Tip, Amber
97226	18 Gal. General Purpose Precision Tip Kit, S.S. Tip, Green
97227	20 Gal. General Purpose Precision Tip Kit, S.S. Tip, Pink
97228	25 Gal. General Purpose Precision Tip Kit, S.S. Tip, Red
97229	15 Gal. Flexible Polypropylene Tip Kit, Grey Tube
97230	18 Gal. Flexible Polypropylene Tip Kit, Pink Tube
97231	20 Gal. Flexible Polypropylene Tip Kit, Yellow Tube
97232	25 Gal. Flexible Polypropylene Tip Kit, Red Tube
97233	Luer-Lok Fitting & Adapter Kit
97238	25 Gal. Stainless Steel with PTFE Liner, Plastic Hub Kit
97248	Barrel Tip Cap Kit
97972	Tubing, PTFE Lined, 1/4" O.D., 10 meters long
984684	Rebuild Kit for 98009, includes diaphragm and head
984685	Rebuild Kit for 98013, includes diaphragm and head
985281	Valve Mounting Bracket
985404	Product Input Fitting (10 pack)
1730182	VA 15 Diaphragm Valve SS Head

Also refer to valve components on page 10.

12. Warranty

Henkel expressly warrants that all products referred to in this Instruction Manual under 98009 Light Cure Valve, 98013 Cyanoacrylate Adhesive Valve, and 1730181 VA 15 Diaphragm Valve SS (hereafter called “Products”) shall be free from defects in materials and workmanship. Liability for Henkel shall be limited, at its option, to replacing those Products which are shown to be defective either in materials or workmanship or to credit to the purchaser the amount of the purchase price thereof (plus freight and insurance charges paid therefor by the user). The purchaser’s sole and exclusive remedy for breach of warranty shall be such replacement or credit.

A claim of defect in materials or workmanship in any Products shall be allowed only when it is submitted to Henkel in writing within one month after discovery of the defect or after the time the defect should have reasonably have been discovered and in any event, within twelve months after the delivery of the Products to the purchaser. No such claim shall be allowed in respect of Products which have been neglected or improperly stored, transported, handled, installed, connected, operated, used or maintained or in the event of unauthorized modification of the Products including; where products, parts or attachments for use in connection with the Products are available from Henkel, the use of products, parts or attachments which are not manufactured by Henkel.

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