LOCTITE®

# EQ VA40 CA Volumetric Valve

## 2333708

**Operating Manual**


Henkel

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# 1 Please Observe the Following

## 1.1 Emphasized Sections

⚠ **Warning!**

Refers to safety regulations and requires safety measures that protect the operator or other persons from injury or danger to life.

**! Caution!**

Emphasizes what must be done or avoided so that the unit or other property is not damaged.

☞ **Notice:**

A notice gives recommendations for better handling of the unit during operation or adjustment as well as for service activities.

## 1.2 For Your Safety

⚠ For safe and successful operation of the unit, read these instructions completely. If the instructions are not observed, the manufacturer can assume no responsibility.

⚠ Do not expose the connecting plastic lines to heat, oil, or sharp edges.

⚠ Make sure the unit stands stable and secure.

⚠ Use only original equipment replacement parts.

⚠ Always disconnect the power supply before servicing the unit.

⚠ Always disconnect the pneumatic supply before servicing the unit.

⚠ Observe general safety regulations for the handling of chemicals such as Loctite®® adhesives and sealants. Observe the manufacturer's instructions as stated in the Safety Data Sheet.

☞ While under warranty, the unit may be repaired only by an authorized Loctite® service representative.

## 1.3 Unpacking and Inspection

Carefully unpack the Loctite®® EQ VA40 CA Volumetric Valve and examine the items contained in the carton. Inspect the unit for any damage that might have occurred in transit. If such damage has occurred, notify the carrier immediately. Claims for damage must be made by the consignee to the carrier and should be reported to the manufacturer.

## 1.4 Items supplied

- Loctite® EQ VA40 CA Volumetric Valve 2333708
- Equipment Manual
- PTFE lined tubing, 6.4mm OD, 2 meters long
- Air Line 4mm OD, blue, 2 meters
- Air Line 4mm OD, yellow, 2 meters
- Needle Sample Kit

## 1.5 Features

- Volumetric displacement
- Dosing range, 1.5 – 6 microliters
- Long Life Seal Design > 1 Million Cycles
- Compact size, 1.5” square x 7.0” long {38 mm square x 178 mm long]
- Stackable at 38mm (1.5 “)
- Cycle rate, 120 /minute
- Adhesive compatibility, Cyanoacrylate [CA]
- Fluid body material: 316 stainless steel
- Quick priming check valve
- Fitting – ¼” tube x 1/16 NPT, 316 stainless steel

## 1.6 Usage

The Loctite® EQ VA40 CA Volumetric Valve is a positive displacement metering valve which dispenses a precise **drop** of adhesive with each cycle. Positive displacement is not influenced by variations in pressure, time, temperature or adhesive viscosity therefore making it a better choice for drop applications. The Loctite® EQ VA40 CA Volumetric Valve is specifically designed to dispense low to medium viscosity Loctite® Cyanoacrylate Adhesives.

## 2 Description

The Loctite® EQ VA40 CA Volumetric Valve is a positive displacement metering valve which dispenses a precise **drop** of adhesive with each cycle. The EQ VA40 is designed with a flooded chamber and a single check valve that allows for quick priming and minimizes the need for re-priming. The check valve is a patent pending design which improves the speed and reliability of priming. The Loctite® EQ VA40 is specifically designed to dispense drops of Loctite® Cyanoacrylate Adhesive with precise dosing in the range of 1.5 to 6.0 microliters.

The Loctite® EQ VA40 CA Volumetric Valve dimensions are 38mm [1.5”] square and an overall length of 17.8 cm [7.0”]. This compact dispense valve is stackable at 19mm centers. The fluid body is made of 316 stainless steel and the actuator is anodized aluminum. The actuator is a double acting cylinder with an aluminum piston for long life. The Loctite® EQ VA40 CA Volumetric Valve is capable of dispense rates up to 2 cycles per second.

## 3 Specifications

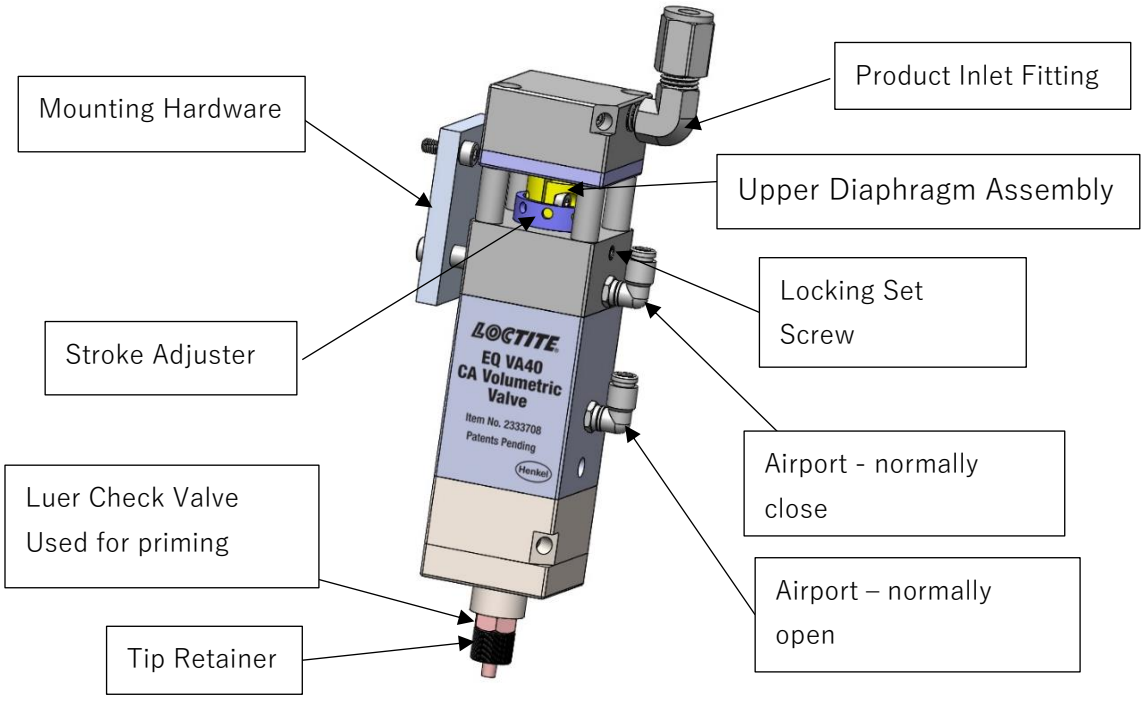
| | |
|---|---|
| Dimensions (L x Width) | 17.2 cm [6.8”] long X 3.8 cm [1.5”] SQ |
| Total weight: lbs. (Kg) | 0.82Kg |
| Viscosity Range: | 1 to 10000cP |
| Operating Air pressure: | 4 to 7 bars [60 -100 Psi] |
| Operating Product pressure: | 2 to 5 bars [30 to 70 Psi] |
| Fluid Body | 316 Stainless Steel |
| Seal | PTFE Diaphragms |
| Displacement Pin | TiN coated |
| Fluid Inlet Thread | 1/16 NPT |
| Threaded Hole-Mounting | M4 x 0.7mm |
| Center to Center Spacing | 38mm (1.5“) |

# 4 Installation

The Loctite® EQ VA40 CA Volumetric Valve requires a four-way pneumatic solenoid valve to actuate the cylinder section. The pneumatic valve must be operated with clean dry air at 4 to 7 bars of pressure. The 4-way pneumatic solenoid valve has a normally open port and a normally closed port. Use the supplied 4 mm OD tubing to connect the air ports to the EQ VA40 Volumetric Valve.

The adhesive is supplied from a pressure reservoir 6.4mm tube x 1/16 NPT fitting located on the top of the Loctite® EQ VA40 CA Volumetric Valve. Use the supplied 6.4 mm OD tubing, insert the tube into the compression fitting and tighten. Secure the tubing to the reservoir with a compression fitting which allows the tubing to pass through the fitting into the adhesive container.

Supply clean, dry, regulated air to the reservoir and set the pressure at 2 bars [30 psi]. For best results use dry nitrogen if available. The reservoir pressure setting is to ensure adhesive product will flow into the Loctite® EQ VA40 CA Volumetric Valve at a rate which allows the EQ VA40 to operate at 120 cycles per minute.

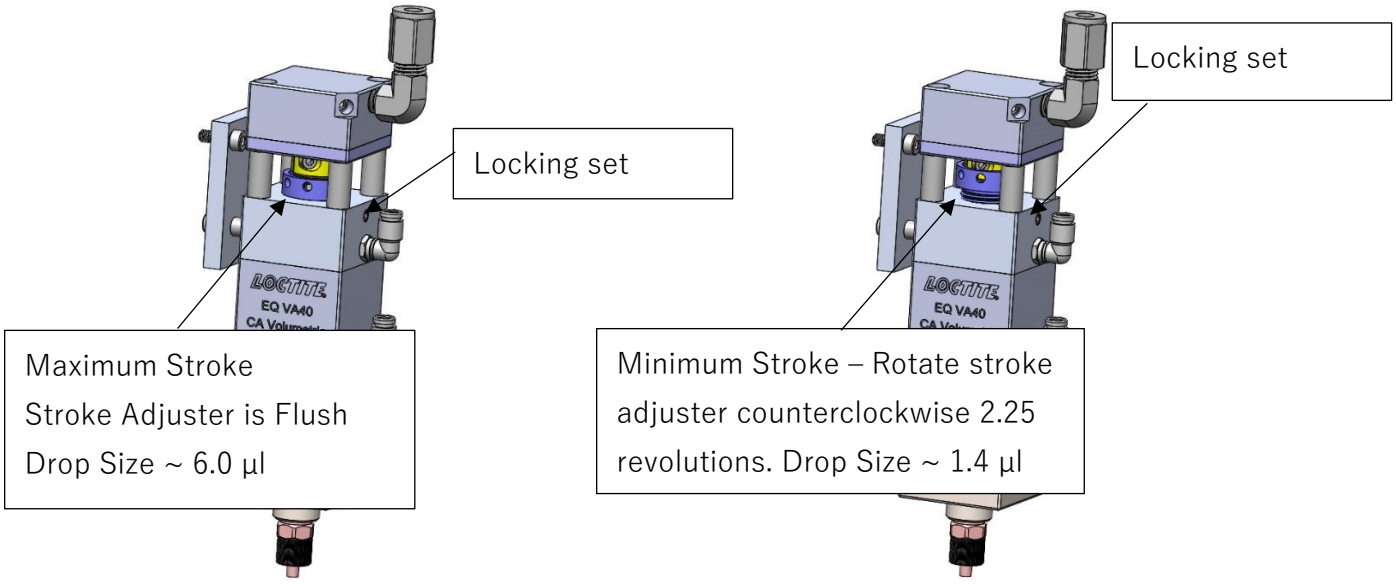



**Loctite® EQ VA40 CA Volumetric Valve – Annotated Drawing**

# 5 Operation

- The Loctite® EQ VA40 CA Volumetric Valve is ready to dispense - control lines are installed; pressure reservoir is loaded with adhesive and a feed line is attached to the product inlet fitting. The pneumatic pressure to the controller is set at 4 bars and the reservoir pressure is set at 2 bars. The system is now ready to setup for drop dispensing:

1. A dispense tip is inserted onto the Luer Check Valve and secured with the Tip Retainer Nut.
2. To prime the Loctite® EQ VA40 CA Volumetric Valve rotate the Luer Check Valve counterclockwise 2 1/4 rotations. When a steady flow of bubble free adhesive is observed rotate the Luer Check Valve clockwise and tighten. Cycle the Loctite® EQ VA40 CA Volumetric Valve 5 to 10 actuations and repeat priming. This action will dislodge air under the diaphragm seals.
3. The drop size is determined by the length of the stroke which the displacement rod travels into the displacement chamber. The drop decreases as the stroke is shortened. The stroke is set by loosening the locking set screws and rotating the stroke adjuster counterclockwise to decrease the stroke.



4. The Loctite® EQ VA40 CA Volumetric Valve is ready to dispense. Set actuation rate at greater than or equal to 0.2 seconds.
5. Cycle the Loctite® EQ VA40 CA Volumetric Valve 5 -10 times and then measure drop size. Adjust stroke to suit.

# 6 Application Hints

The Loctite® EQ VA40 is specifically designed to dispense drops of Loctite® Cyanoacrylate Adhesive. This adhesive is moisture sensitive. Clean dry air must be used to pressurize adhesive but for best results dry nitrogen is recommended.

☞Shutdown – Always keep the Loctite® EQ VA40 CA Volumetric Valve full of adhesive. At the end of the day depressurize the reservoir. The dispense needle will cure and seal the system. Always install a new dispense tip after all extended shutdown periods.

# 7 Troubleshooting

| Problem | Possible Cause | Correction |
|---|---|---|
| No liquid flow | • If pneumatic valve operating pressure is to low, the valve will not shift.<br>• The reservoir pressure may not be high enough<br>• Displacement rod may be in forward position<br>• The dispense tip may be clogged.<br>• Stroke Adjuster maybe out of range | • Increase air pressure to 60 psi (4 bar) minimum<br>• Increase pressure to 30 psi (2 bar)<br>• Check air lines to ensure that the normally open airport is energized<br>• Replace tip<br>• Ensure stroke adjuster is with 2.25 revolutions of adjustment. (section 5-3) |

| | | |
|---|---|---|
| Fluid drools after the volumetric valve is cycled, eventually stopping. | • This is caused by air coming from the reservoir into the fluid body and pumped out into the Luer check valve. The air will expand after the check valve closes, causing product to extrude out the dispense tip until the air reaches atmospheric pressure. | • Prime the Loctite® EQ VA40 CA Volumetric Valve by rotating the Luer Check Valve counterclockwise 2 1/4 rotations. When a steady flow of adhesive is observed rotate the Luer Check Valve clockwise and tighten. |
| Liquid drips at a steady rate after the valve closes. | • A steady drip can be caused by excessive reservoir pressure.<br>• The Luer Check Valve is not closing fully due to particle build up on the ball and seat. | • Check reservoir pressure to ensure it is not above 70 psi (4.8 bar)<br>• Remove the Luer check valve body, inspect sealing surfaces and ball surface. Clean or replace ball if contaminated with particulate. |
| Liquid flows out of the drain hole | • Fluid leaking out of the drain hole indicates a seal failure. | • Replace seal in accordance with maintenance instructions |
| Difficulty adjusting the stroke | • The locking set screw is screw in place.<br>• Airlines on actuator are in wrong position. | • Loosen set screw to adjust stroke.<br>• Reverse airlines – bottom airport is normally open, air flowing at start up. (section 4) |

# 8 Care and Maintenance

The Loctite® EQ VA40 CA Volumetric Valve is designed to provide continuous dispensing service without any special maintenance. The Loctite® EQ VA40 CA Volumetric Valve is a robust design that will delivery over one million cycles with

minimal maintenance. Adhesive and or small particles may build up on the sealing surfaces within the Luer check valve. Most of the time these small particles can be flushed out by priming the system. If priming does not flush the cured adhesive out of the valve it will be necessary to disassembly the Lure Check Valve and clean the parts with Loctite® Flushing Solvent 12121 or replace parts with Loctite® EQ VA40 Seal Kit, IDH# 2389012.

## Dispense Valves Flushing & Cleaning Procedure

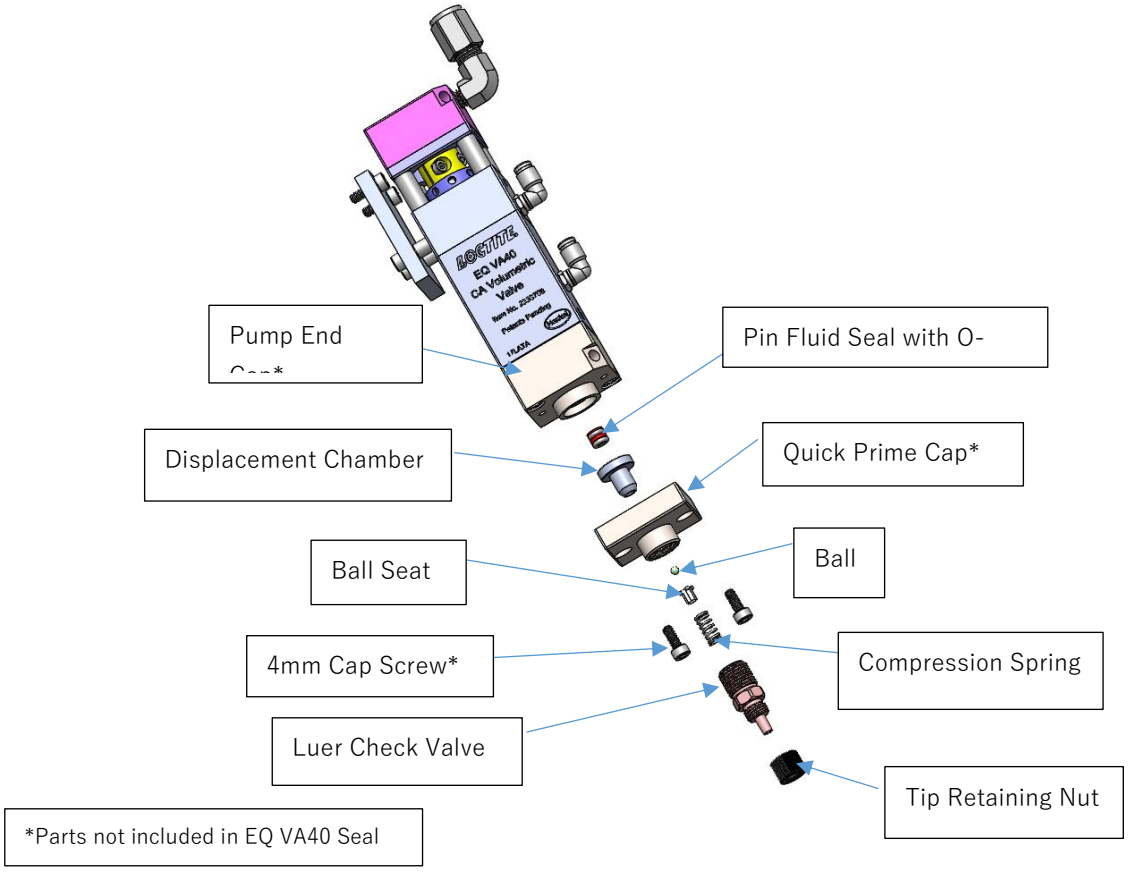
If the dispensing system (reservoir, dispense valve, etc.) will not be used for one or more weeks, it is recommended that the feed line and dispense valve be flushed clean with the proper solvent. This procedure will describe the process.

1. Turn off the reservoir pressure and verify that pressure has been exhausted from the reservoir.
2. Remove the reservoir lid and remove the adhesive container.
3. Replace it with a container of Equipment Flushing Solvent (item # 12121).
4. Replace the reservoir lid and tighten all wing nuts so the lid is secure.
5. Adjust the air pressure regulator to 5 psi.
6. Place a beaker or similar container under the dispense valve.
7. Rotate the Luer Check Valve counterclockwise 2 ¼ rotations and allow the Equipment Flushing Solvent to flow into the container.
8. Note: this may take a few moments (or minutes) depending upon the viscosity of the adhesive in the feed line.
9. While the solvent is flowing, be sure to cycle the volumetric valve to simulate an “agitation” effect.
10. Continue this process of opening and closing the valve every 5 seconds for a total of two (2) minutes or until the solvent is clear.
11. Once you are satisfied that all adhesive has been removed from the feed line and dispense valve, shut off the air and remove the flushing solvent.
12. Re-install the reservoir lid and adjust the pressure regulator to approx. 70 % of its maximum value.
13. Allow air to continually flow out of the dispense valve.
14. CAUTION: the vapors from the flushing solvent will be emitted. If an exhaust hood or fume filtration system is available, it should be used.

15. Continue to dispense air for approx. 1 minute or until all solvent has been removed from the feed lines.
16. While the air is being forced thru the feed lines, lightly tap the feed line leading from the reservoir to the dispense valve.
17. Once you are confident that all the remaining solvent has been purged from the feed line and valve, the process is complete.
18. Rotate the Luer Check Valve clockwise until tight.

**NOTE: the operator must wear Safety glasses and proper gloves while this procedure is being performed.**

## Rebuilding the Loctite EQ VA40 CA Volumetric Valve



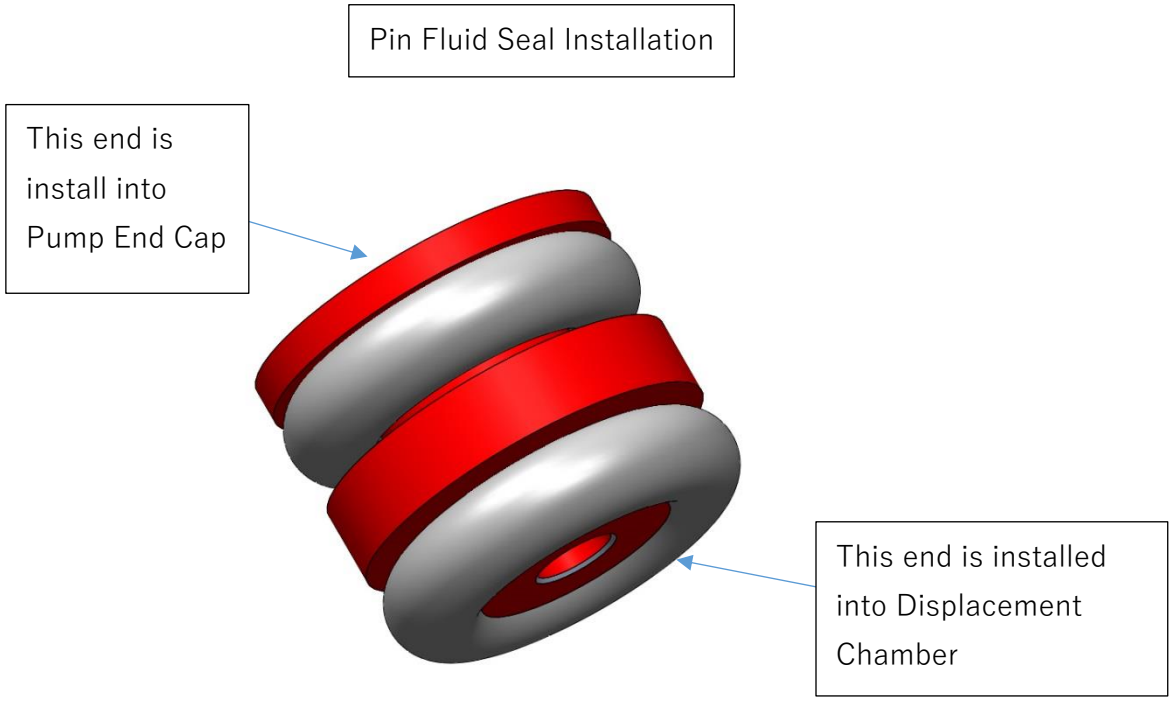
The Loctite® EQ VA40 Seal Kit, IDH# 2389012, contains all replacement part needed to rebuild the EQ VA40 CA Volumetric Valve.

**Disassemble Procedure**

1. Start by following the Dispense Valves Flushing & Cleaning Procedure as stated above.
2. Disconnect feed line and air lines.
3. Unscrew the Luer Check Valve.
4. Remove the Ball, Compression Spring and Ball Seat.
5. Remove the 4mm cap screws.
6. Remove Quick Prime Cap.
7. Pull out the Displacement Chamber.
8. Pull out the Pin Fluid Seal.
9. Ensure that mating surfaces of the Pump End Cap and the Quick Prime Cap are clean and free of cured adhesive.

**Assembly Procedure**

1. Install Pin Fluid Seal into Pump End Cap.




2. Install Displacement Chamber into Pump End Cap
3. Install Quick Prime Cap using the 4mm cap screws.
4. Install Ball Seat into Compression Spring.
5. Place the Ball Seat and Compression Spring assembly into the Luer Check Valve housing.
6. Carefully place Ball onto Ball Seat and Compression Spring assembly. Ensure that the Ball is nested in the Ball Seat.
7. Install Luer Check Valve by screwing into the Quick Prime Cap. A 12mm wrench is needed because of the tight fit between the hole in the Luer Check Valve and the stem of the Displacement Chamber.
8. The EQ VA40 CA Volumetric Valve is rebuilt.

**Testing the EQ VA40 CA Volumetric Valve**

1. Install EQ VA40 CA Volumetric Valve to reservoir and controller.
   ☞ **Notice:** Always use new feedline after a rebuild.
2. Ensure the reservoir is empty. Secure reservoir lid and pressurize to 30 PSI.

3. Check for air leaks at Luer Check Valve taper tip. If air is leaking the Ball is not properly seated. Remove Luer Check Valve and repeat step 6 and 7 of Assembly Procedure.
4. Actuate controller to cycle EQ VA40 CA Volumetric Valve. Ensure that the Upper Diaphragm Assembly is moving and in the up position when the cycle is complete.
5. Check for air leaks at Luer Check Valve tapered end.
6. Rotate Luer Check Valve 2 ¼ rotations. Air should pass freely. Tighten Luer Check Valve. Check for air leaks. If air is not leaking you are ready to fill reservoir with adhesive.

# 9 Accessories and Spare Parts

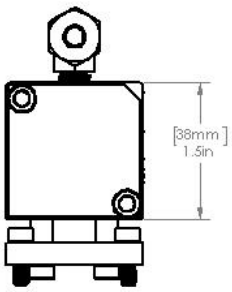
**Optional Accessories and System Components (sold separately):**

- Loctite®® Dual Channel Integrated Semi-Automatic Control Dispenser: PN 1390321
- Loctite®® Bond-A-Matic 3000 Reservoirs, 0 to 100 psi: PN 982723, 982727
- 97102 Semi-Automatic Controller (IDH # 135550)
- 97106 2 L Reservoir (IDH # 135555)

**Recommended Spare Parts / Accessories**

- Loctite® EQ VA40 Seal Kit IDH# 2389012

## 10 Diagram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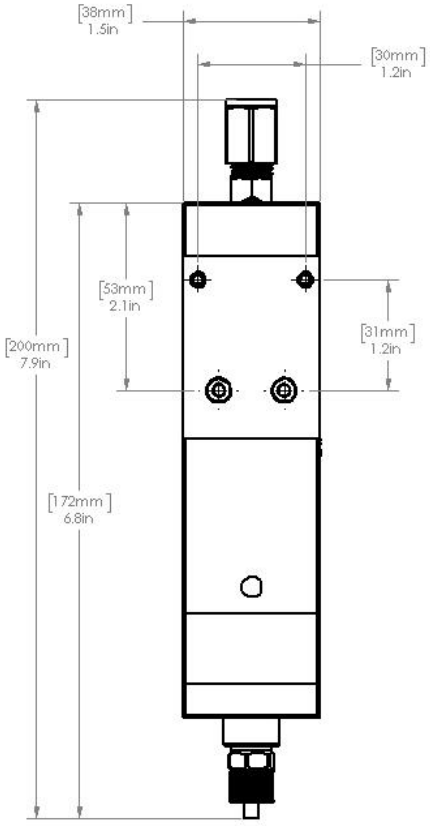
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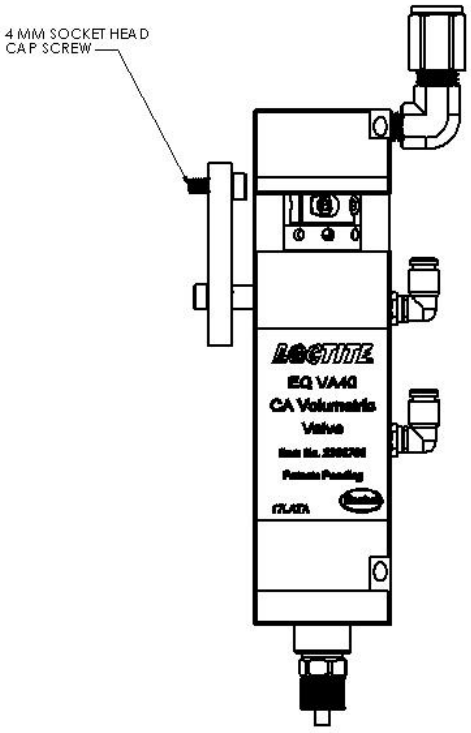
4 MM SOCKET HEAD
CAP SCREW
LOCTITE
EQ VA40
CA Volumetric
Valve

# 11 Warranty

Henkel expressly warrants that all products referred to in this Instruction Manual for (IDH # 2333708 Loctite®® EQ VA 40 CA Volumetric Valve) (hereafter called “Products”) shall be free from defects in materials and workmanship. Liability for Henkel shall be limited, as its option, to replacing those Products which are shown to be defective in either materials or workmanship or to credit 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 in writing within one month after discovery of the defect or after the time the defect should reasonably have been discovered and in any event, within (12) months after the delivery of the Products to the purchaser. This warranty does not apply to perishable items, such as dispense tips, seals, o-rings, etc. 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. 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, no claim shall be allowed.

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