

Split Body Mechanical Proportional Valve

Installation and Maintenance Manual

**THIS MANUAL MUST BE GIVEN TO THE OPERATIONS MANAGER
AND KEPT ON THE PREMISES.**

Notice

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Contact Technical Support for additional troubleshooting information at 800-323-1799.

DAMAGE CLAIMS / LOST EQUIPMENT

Thoroughly examine all components and units as soon as they are received. If any cartons are damaged or missing, write a complete and detailed description of the damage or shortage on the face of the freight bill. The carrier's agent must verify the inspection and sign the description. Refuse only the damaged product, not the entire shipment.

Veeder-Root must be notified of any damages and/or shortages within 30 days of receipt of the shipment, as stated in our Terms and Conditions.

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1. Contact Veeder-Root Customer Service at 800-873-3313 with the specific part numbers and quantities that were missing or received damaged.
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3. Veeder-Root will file the claim with the carrier and replace the damaged/missing product at no charge to the customer. Customer Service will work with production facility to have the replacement product shipped as soon as possible.

CUSTOMER'S PREFERRED CARRIER

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2. Customer may submit a replacement purchase order. Customer is responsible for all charges and freight associated with replacement order. Customer Service will work with production facility to have the replacement product shipped as soon as possible.
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RETURN SHIPPING

For the parts return procedure, please follow the appropriate instructions in the "General Returned Goods Policy" pages in the "Policies and Literature" section of the Veeder-Root **North American Environmental Products** price list. Veeder-Root will not accept any return product without a Return Goods Authorization (RGA) number clearly printed on the outside of the package.

WARRANTY

Please see page iii.

Warranty

Veeder-Root warrants that this product shall be free from defects in material or workmanship for a period of twenty-four (24) months after installation and twenty-seven (27) months after shipment.

Veeder-Root will repair or replace at our option the product if the product is returned to us transportation charges prepaid by user within the warranty period, and is determined by us to be defective. This warranty will not apply: (1) to any product which has been subject to misuse, abuse, negligence, accident, or drive-offs; (2) to systems that are misapplied or are not installed per Veeder-Root's specifications, or which have been modified, rebuilt or repaired by unauthorized persons; or (3) to damage resulting from acts of God. Repair or replacement of the defective part or component under the terms of this warranty is the **EXCLUSIVE REMEDY**. Veeder-Root is not liable for incidental, consequential, or indirect damages or loss, including, without limitation, personal injury, death, property damage, environmental damages, cost of labor, clean-up, downtime, installation and removal, product damages, loss of product, or loss of revenue or profits. **THE WARRANTY CONTAINED HEREIN IS EXCLUSIVE AND THERE ARE NO OTHER EXPRESS, IMPLIED, OR STATUTORY WARRANTIES. WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE ARE EXPRESSLY EXCLUDED.**

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Introduction

This manual describes how to install the Veeder-Root Split Body Mechanical Proportional Valve to any standard Vacuum Assist hanging hardware assembly.

The Split Body Mechanical Proportional Valve (MPV) is an inverted coaxial configuration to be utilized in a Stage II gasoline liquid and gasoline vapor recovery environment. It contains gasoline fluid flow in the outer coaxial section and allows gasoline vapor return flow through the inner coaxial section. It is installed in the dispenser casting/splitter, followed by an inverted coaxial whip hose or hose, depending on breakaway configuration.

A ring-shaped piston and spring are located in the liquid flow section. As liquid flow rate increases, the piston is displaced and compresses against the return spring a predetermined amount. The ring-shaped piston houses a magnet which then drives a magnetically coupled vapor piston located in the inner-coaxial section.

As the vapor piston assembly is displaced in response to the liquid piston movement, the assembly moves a needle valve tip within an orifice, thereby allowing for an increase in the cross sectional vapor flow area and an increase in the vapor flow volume through the orifice. This displacement relationship with respect to the flow path flow area regulates the Air / Liquid (A/L) ratio of the vapor recovery system. Nominal intended variable vapor flow rate is 20 to 45 liter/minute.

The external threads of the mechanical proportional valve attach to the dispenser discharge casting (splitter) and the internal threads attach to an inverted coaxial whip hose or hose. The Veeder-Root Split Body MPV is compatible with the M34X1.5 thread size on standard vacuum assist inverted coaxial hoses per EN 13483-2005(E). **Do not attempt to use this Split Body MPV with other style hanging hardware hose assemblies.**

Table 1. Split Body MPV Compatibility

Model	Vapor Pump	RPM	Nozzle
Split Body MPV	VaporTEK	2500 (Constant Dual Speed)	AVRN
	Durr Mx0544	2800 - 3400 (Constant Speed)	

Installation work should only be done by a knowledgeable and experienced individual. If further assistance for technical support is required, please visit www.veeder.com or call (800) 323-1799 to locate a qualified technician.

Certification

Veeder-Root requires that technicians satisfactorily complete the Veeder-Root Vacuum Assist certification course before performing installation, maintenance, servicing, testing or troubleshooting of Veeder-Root Vacuum Assist Hanging Hardware Systems.

Warranty claims may only be submitted by authorized V-R Distributors and Contractors.

Related Manuals

577013-985 AVRN Vacuum Assist Nozzle Installation and Maintenance Manual
577014-013 VaporTEK Installation, Setup and Troubleshooting Manual

Approvals

Safety CNEx 15.2231

Safety Precautions

The following safety symbols may be used throughout this manual to alert you to important safety hazards and precautions.

 <p>EXPLOSIVE Fuels and their vapors are extremely explosive if ignited.</p>	 <p>ELECTRICITY High voltage exists in, and is supplied to, the device. A potential shock hazard exists.</p>	 <p>TURN OFF CELL PHONE Turn off cell phone or other device until fueling is complete and nozzle is returned to cradle.</p>
 <p>TURN ELECTRICAL POWER OFF Live power to a device creates a potential shock hazard. Turn Off electrical power to the device and associated accessories when servicing the unit.</p>	 <p>WARNING Heed the adjacent instructions to avoid damage to equipment, property, environment or personal injury.</p>	 <p>DISCHARGE STATIC ELECTRICITY Failure to discharge static electricity before fueling may ignite gasoline vapors.</p>
 <p>FLAMMABLE Fuels and their vapors are extremely flammable.</p>	 <p>INJURY TO EYES AND SKIN Careless or improper handling of gasoline can result in bodily injury. If in eyes, irrigate with water for at least 15 minutes. On skin wash area thoroughly with clear water. Seek medical advice immediately.</p>	 <p>FILL CONTAINERS ON GROUND DO NOT fill containers in or on the vehicle. Put approved container on ground to fill.</p>
 <p>CLEAN WORK AREA Dispose of fuel soaked materials properly and not into trash barrels that may be used by customers.</p>	 <p>READ ALL RELATED MANUALS Knowledge of all related procedures before you begin work is important. Read and understand all manuals thoroughly. If you do not understand a procedure, ask someone who does.</p>	 <p>DO NOT REENTER VEHICLE WHILE FUELING If you reentered your vehicle while fueling, touch grounded metal on dispenser before touching nozzle.</p>
 <p>APPROVED CONTAINERS Use nonbreakable, clearly marked containers, suitable for collecting and transporting hazardous fuels during service.</p>	 <p>USE SAFETY BARRICADES Unauthorized people or vehicles in the work area are dangerous. Always use safety cones or barricades, safety tape, and your vehicle to block the work area.</p>	 <p>UNATTENDED VEHICLE Do not leave nozzle unattended while dispensing fuel.</p>
 <p>NO POWER TOOLS Sparks from power tools (such as drills) can ignite fuels and their vapors.</p>	 <p>NO VEHICLES Moving vehicles in the area during service can create a potential for personal injury to you or others. Sparks from starting vehicles can ignite fuels and their vapors.</p>	 <p>DO NOT ALLOW CHILDREN TO DISPENSE FUEL Keep kids away from fueling area. Only licensed operators should refuel vehicles.</p>
 <p>LUBRICATE Lubricate o-rings using mineral oil or other suitable lubricant.</p>	 <p>DIRECTION OF FLOW An arrow on a component indicates direction of fuel flow through the device. Install component with arrow pointing in direction of nozzle.</p>	 <p>AVOID BREATHING GASOLINE VAPORS Gasoline inhaled may cause unconsciousness and burns to lips, mouth and lungs. Keep airway open. Seek medical advice immediately.</p>
 <p>NO SMOKING Sparks and embers from burning cigarettes or pipes can ignite fuels and their vapors.</p>	 <p>NO OPEN FLAMES Open flames from matches, lighters, welding torches, etc. can ignite fuels and their vapors.</p>	 <p>DO NOT SWALLOW GASOLINE Gasoline ingested may cause unconsciousness and burns to internal organs. Do not induce vomiting. Keep airway open. Oxygen may be needed at scene. Seek medical advice immediately.</p>

Installation

Readying Dispenser for Split Body MPV Installation

Before installing the Split Body MPV you must:

1. **Turn off electricity, tag and lockout the electrical power to the dispenser. Open the panel/cover to the base of the dispenser and close the dispenser's shear valves.**

Lockout/Tagout covers servicing and maintenance of machines and equipment in which the unexpected energization or start-up of the machine(s) or equipment or release of stored energy could cause injury to employees or personnel. Subpart S of 29 CFR Part 1910 – Electrical Hazards, 29 CFR Part 1910.333 contains specific Lockout/Tagout provision for electrical hazards.

WARNING! Electricity must be turned off to the dispenser and shear valves closed prior to service to avoid personal injury, damage to equipment, property, or the environment!

Total Electrical Shut-Off For Unit Where the Split Body MPV Is To Be Installed!

The first and most important information you must know is how to stop all fuel flow to the pump/dispenser. Locate the switch or circuit breakers that shut off all power to all fueling equipment and submerged turbine pumps (STPs) affecting the fuel dispenser on which you are installing the Split Body MPV.

⚠ WARNING



The buttons on the console at the cashier's station **WILL NOT** shut off electrical power to the pump/dispenser. This means that even if you press a button on the console labeled **EMERGENCY STOP, ALL STOP, PUMP STOP, or something similar**, fuel may continue to flow uncontrolled.

IN AN EMERGENCY, you must use the **TOTAL ELECTRICAL SHUT-OFF** for all of the fueling equipment, dispensing devices, and submerged turbine pumps (STPs) at the site, either by using the **Emergency Power Cutoff Switch (the E-STOP)** or the circuit breakers for all the fueling equipment, dispensing devices and submerged turbine pumps and not the console's buttons.

Total Electrical Shut-Off Before Access!

Installing a Split Body MPV requires total electrical shut off of the fuel dispenser and the STP's affecting that dispenser. Understand the function and location of this switch or circuit breaker before inspecting, installing, maintaining, or servicing Veeder-Root equipment.

2. **Evacuating, Barricading and Shutting Off.** Any procedure that requires access to the pump/dispenser requires the following actions:



- An evacuation of all unauthorized persons and vehicles from the work area
 - Use of safety tape, cones or barricades at the affected unit(s)
 - A total electrical shut-off of the affected unit(s)
3. Open the panel/cover to the base of the dispenser and close the dispenser's shear valves.

- Before replacing or servicing dispensing components, such as the Split Body MPV, nozzle, hose, whip or safety breakaway, relieve the system pressure. (NFPA 30A 6.3.6) (2003 Revision)



- If necessary, drain any product from the hanging hardware into an approved container.

Installation

WARNING! If this is a new facility installation, the fueling point must be flushed into an approved container before installing the nozzle or Split Body MPV. Using the nozzle or Split Body MPV when flushing the system could result in foreign material becoming lodged in the nozzle or Split Body MPV and cause it to improperly perform.

- Turn off the electricity, tag and lockout the electrical power switch to the dispenser. Open the panel/cover to the base of the dispenser and close the dispenser's safety valves.

WARNING! Electricity must be turned off to the dispenser and safety valves closed prior to service to avoid personal injury or damage to equipment, property, or environment!

- The Veeder Root Split Body MPV is for vapor recovery applications and has M34x1.5 threads and O-ring seals.
- Verify that the correct MPV model is being used to meet the A/L ratio allowed by the local government regulation.
- Before installing the Split Body MPV inspect all of the threads of the fittings in the dispenser discharge casting (splitter), the MPV, the hose or whiphose, breakaway and the nozzle. Replace or repair if necessary.

WARNING! Do not use pipe dope, thread sealant or PTFE tape on the threads!

- Inspect and lubricate all of the O-rings on the Split Body MPV and the hose using mineral oil or other suitable lubricant (see Figure 1).

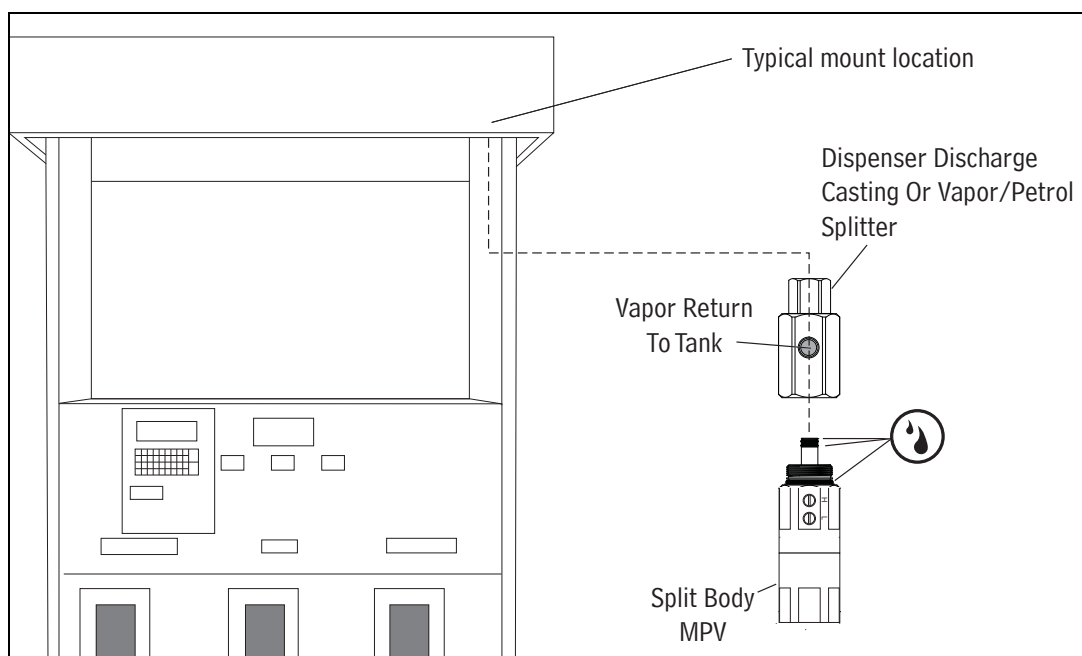


Figure 1. Installing Split Body MPV Into Dispenser's Discharge Casting

6. Orient the MPV and the Male M34 thread on the MPV into the dispenser discharge casting (splitter) and hand tighten.
7. Verify that the adjustment screws on the side of the MPV are accessible. If so, continue to Step 8. If not, remove the MPV and install a clocking ring - this will rotate the location of the adjustment screws 180 degrees when installed. Slide the clocking ring over the large O-ring on the MPV. Be sure to seat the clocking ring on the shelf on the MPV (see Figure 2).
8. Using a torque wrench having an open-end attachment as shown in the left image of Figure 3, tighten the top half of the MPV to 50 foot-pounds (68 N•m). Do not use channel-lock or other pliers.
9. Inspect and lubricate all of the O-rings on the hose. Attach the hose or whip hose end to the female M34 thread in the lower half of the MPV and tighten it to 50 foot-pounds (68 N•m) as shown in right image of Figure 3.

CAUTION! Position the wrenches as shown prior to tightening.

10. Attach the other hose end to the nozzle and tighten it to 50 foot-pounds (68 N•m).

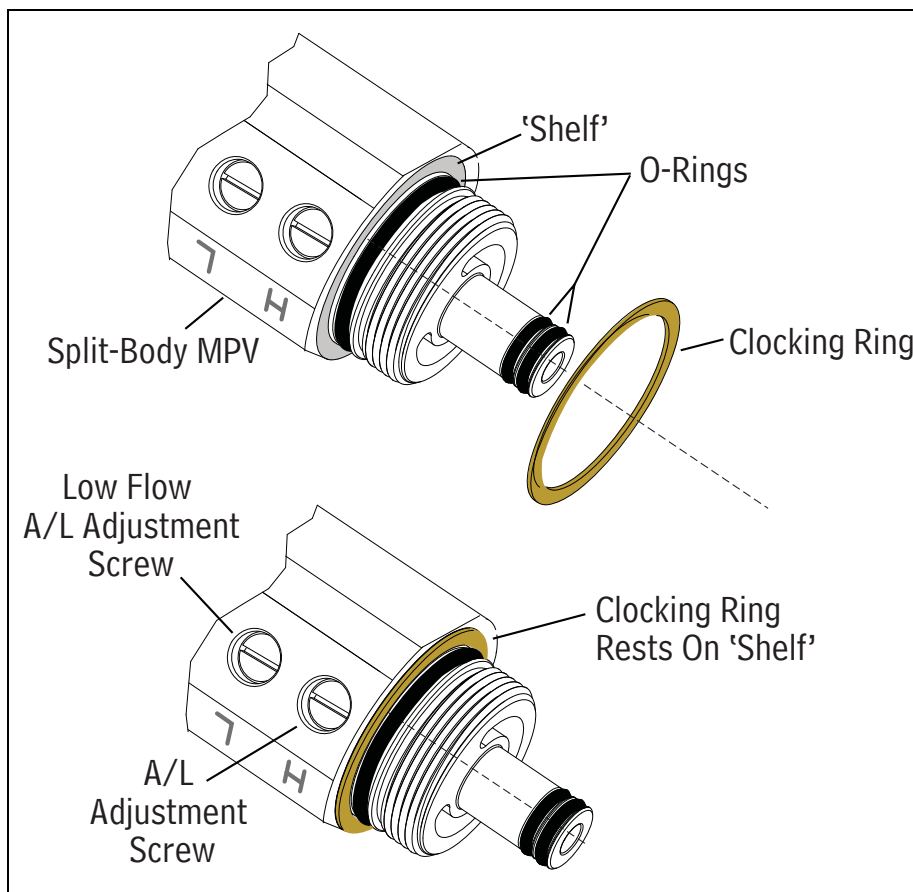


Figure 2. Installing Optional Clocking Ring

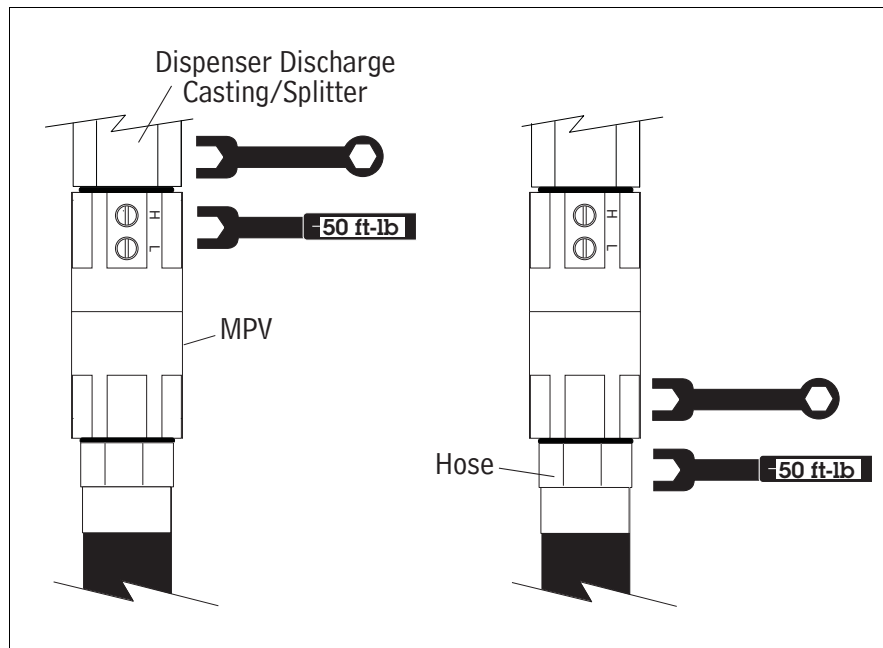


Figure 3. Installing Hose Into Split Body MPV

Checking For Leaks

1. Check the electrical resistance between the dispenser outlet casting (splitter) and the nozzle to confirm continuity of the hanging hardware components.
2. Pressurize the system after restoring electricity and resetting of the safety valves. Inspect along the hose length for liquid leaks.



WARNING! The approved container must be on the ground or earthed and the nozzle must be in contact with container to discharge any static electricity.

3. Pump minimum of one gallon (4 liters) of fuel into the container to purge the air out of the system, and then inspect along the hose length for liquid leaks.
4. Verify the nozzle shut-off action by dispensing fuel into an approved container to assure proper automatic operation.

Calibration

1. Verify that the correct mechanical proportional valve model is being used to meet the A/L ratio allowed by the local government regulation.
2. Verify that the vapor recovery system is using approved components as allowed by the local government regulation and/or as outlined in Table 1.
3. Refer to the Dispenser and Vapor Recovery Pump Operation Manuals for proper operation of the vapor recovery pump. See manual 577014-013 for VaporTEK installation.
4. Configure the fueling point desired for calibration per the Nozzle Setup for Wet A/L (Air-to-Liquid Ratio) Testing as described in "AVRN Vacuum Assist Nozzle Manual – 577013-985."

5. Conduct the Wet A/L Test at high clip and low clip. Record the A/L result.
6. If the A/L ratio is within the range allowed by the local governmental regulation, no further adjustments are necessary.
7. Achieve the A/L target on the low clip setting prior to calibrating the high clip position. The low flow A/L adjustment screw impacts the A/L at high clip. The low flow adjustment screw is completely closed and the high flow adjustment screw is completely open as manufactured.
8. If the A/L ratio at **low clip** is below the limit, turn the **Low Flow A/L Adjustment Screw** counterclockwise using a flat blade screwdriver to open the vapor flow path as shown in Figure 4. The adjustment screw is prohibited from protruding beyond the surface of the MPV body. **Do not remove the screw or damage will occur.** Repeat the Wet A/L Test to determine if the adjustments achieved the desired A/L ratio.
9. If the A/L ratio at **low clip** exceeds the limit, turn the **Low Flow A/L Adjustment Screw** clockwise using the flat blade screwdriver to close the vapor flow path as shown in Figure 4. Rerun the Wet A/L Test to determine if the adjustments achieved the desired A/L ratio.
10. Repeat Steps 6 and 7 until the proper A/L ratio is achieved at low clip.
11. If the A/L ratio at **high clip** exceeds the limit, turn the **High Flow A/L Adjustment Screw** clockwise using the flat blade screwdriver to close the vapor flow path as shown in Figure 4. Rerun the Wet A/L Test to determine if the adjustments achieved the desired A/L ratio.
12. If the A/L ratio at **high clip** is below the limit, turn the **High Flow A/L Adjustment Screw** counterclockwise using the flat blade screwdriver to open the vapor flow path as shown in Figure 4. The adjustment screw is prohibited from protruding beyond the surface of the MPV body. **Do not remove the screw or damage will occur.** Rerun the Wet A/L Test to determine if the adjustments achieved the desired A/L ratio.
13. Repeat Steps 9 and 10 until the proper A/L ratio is achieved at high clip.
14. Rerun the wet A/L test to verify that the adjustments achieved the desired A/L rated at both low and high clip positions.

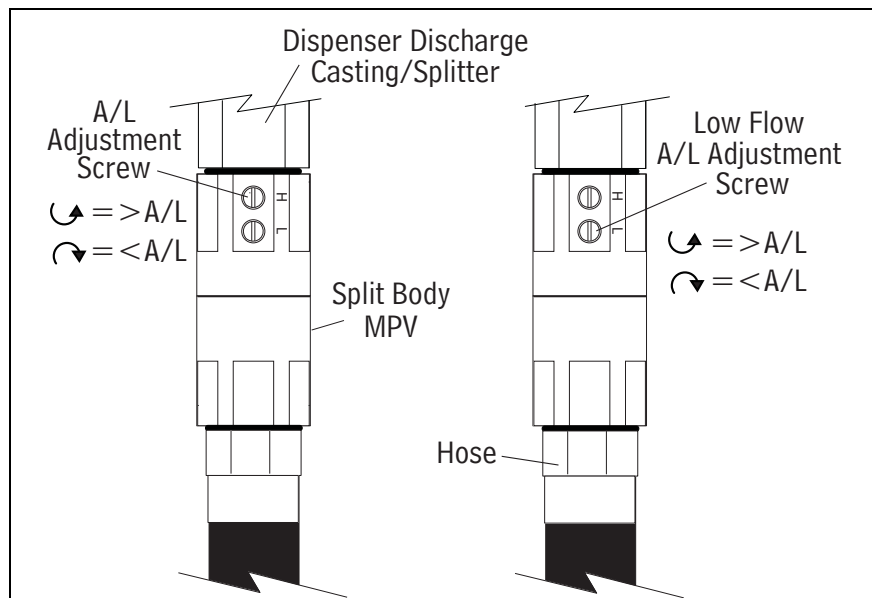


Figure 4. A/L Adjustments On The Split Body MPV

Maintenance

Inspect the Split Body MPV regularly for damage, loose connections or leaks. Due to abuse, misuse, changing gasoline formulas, variation in maintenance practices, environmental conditions and/or conditions beyond the manufacturer's control, dispensing equipment may need replacement. Inspections and proper maintenance procedures should be followed by the station manager to determine if replacement is required. Mechanical Proportional Valves should be replaced when damaged. If O-rings are damaged or missing, replace using a Veeder Root O-ring Kit (P/N 900306-201).

The Split Body MPV is designed and constructed to give lasting service if properly handled and maintained. After long term service on site, the valve shall be cleaned inside the chamber/orifice. The two parts of the Split Body MPV are joined with Loctite 242, and can only be disconnected by applying a torque of over 70 N•m to the joint. Once apart, check and clean inside of the fuel path and vapor path and remove any traces of Loctite residue. Apply fresh Loctite 242 onto the interface thread of the two parts, then reassemble and torque to 68 N•m. If for any reason it should need attention, contact your V-R distributor for proper disposition.



WARNING! Unauthorized rebuilding or modifying of the Split Body MPV voids ALL approvals and warranties. Veeder-Root products must be used in compliance with applicable federal, state and local laws and regulations.

Replacement Parts

Only the O-rings/clocking rings are replaceable items. If the MPV is non-conforming, the entire assembly must be replaced.

900306-201 Vacuum Assist O-Ring Kit

339045-001 Clocking Rings

Troubleshooting

Problem	Possible Cause	Action
Leaks at external thread area of Split Body MPV.	Damaged o-rings on Split Body MPV.	Replace o-rings as necessary using kit P/N 900306-201.
	Defective discharge casting or vapor/fuel splitter.	Replace discharge casting or vapor/fuel splitter.
Leaks at internal thread area of Split Body MPV.	Damaged o-rings on mating component.	Replace o-rings as necessary using kit P/N 900306-201.
	Defective Split Body MPV.	Replace Split Body MPV.
System fails A/L testing. (Determine component responsible for failure and refer to that component installation and operation manual.)	Split Body MPV installed in incorrect location.	Refer to manual for install location.
	Split Body MPV installed incorrectly.	Refer to this manual for installation orientation.
	Incorrect test method used.	Follow test method per local regulation.
	Debris blocking the inlet vapor collection holes on the nozzle.	Remove debris or replace nozzle spout.
	Restriction in nozzle vapor path or faulty vapor valve.	Replace nozzle.
	Vacuum pump out of calibration for variable speed type.	Recalibrate vacuum pump.
	Vacuum pump unable to generate sufficient vacuum level.	Replace vacuum pump.
	A/L adapter o-rings block the vapor collection holes on the nozzle spout.	Reposition A/L adapter to unblock vapor collection holes.
	Nozzle spout out-of-round causing A/L adapter not to seal properly on the spout.	Lubricate o-rings in A/L adapter.
		Replace nozzle spout.
	Nozzle spout tip leaking which may indicate damaged or worn spout o-rings.	Replace nozzle spout.
	Restriction in Split Body MPV.	Remove restriction or replace Split Body MPV.
	Petrol flow fails to move Split Body MPV vapor needle.	Replace Split Body MPV.
	Petrol in vapor path caused by excessive top-offs.	Drain blockage and minimize top-offs.
Petrol in vapor path caused by faulty component.	Replace component causing petrol to enter the vapor path.	
Debris blocking the inlet vapor and liquid lines in the Split Body MPV.	Remove the debris after disassembling the MPV as discussed in the Maintenance section of this manual.	
Split Body MPV fails A/L testing at low clip.	Petrol flow rate below the minimum operating range of the product.	Increase petrol flow rate above 5 gpm (19 lpm) when tested at low nozzle clip.
	Low flow adjustment screw not set at the proper position.	Turn low flow A/L adjustment screw counterclockwise to increase A/L ratio or clockwise to decrease A/L ratio.
Split Body MPV fails A/L testing at high clip.	Petrol flow rate above the maximum operating range of the product.	Decrease petrol flow rate below 10.5 gpm (40 lpm) when tested at high nozzle clip.
	High flow adjustment screw not set at the proper position.	Turn high flow A/L adjustment screw counterclockwise to increase A/L ratio or clockwise to decrease A/L ratio.

