

ORVR Hanging Hardware System

Troubleshooting Manual

WARNINGS AND INSTRUCTIONS

IMPORTANT SAFETY INFORMATION

This section introduces the hazards and safety precautions associated with installing, inspecting, maintaining or servicing this product. Before performing any task on this product, read this safety information and the applicable sections in this manual, where additional hazards and safety precautions for your task will be found. Fire, explosion, electrical shock or pressure release could occur and cause death or serious injury, if these safe service procedures are not followed.

PRELIMINARY PRECAUTIONS

You are working in a potentially dangerous environment of flammable fuels, vapors, and high voltage or pressures. Only trained or authorized individuals knowledgeable in the related procedures should install, inspect, maintain or service this equipment.

Read the Manual

Read, understand and follow this manual, the related manuals described on page 1, and any other labels or related materials supplied with this equipment. If you do not understand a procedure, call (800) 323-1719 to locate a qualified technician. It is imperative to your safety and the safety of others to understand the procedures before beginning work. **Make sure your employees and any service contractors read and follow the instructions.**

Follow the Regulations

Applicable information is available in National Fire Protection Association (NFPA) 30A; *Code for Motor Field Dispensing Facilities and Repair Garages*, NFPA 70; *National Electrical Code* (NEC), Occupational Safety and Hazard Association (OSHA) regulations and federal, state, and local codes. All these regulations must be followed. Failure to install, inspect, maintain or service this equipment in accordance with these codes, regulations and standards may lead to legal citations with penalties or affect the safe use and operation of the equipment.

Prevent Explosions and Fires

Fuels and their vapors will explode or burn, if ignited. Spilled or leaking fuels cause vapors. Even filling customer tanks will cause potentially dangerous vapors in the vicinity of the dispenser or island.

Working Alone

It is highly recommended that someone who is capable of rendering first aid be present during servicing. Familiarize yourself with Cardiopulmonary Resuscitation (CPR) methods, if you work with or around high voltages. This information is available from the American Red Cross. Always advise the station personnel about where you will be working, and caution them not to activate power while you are working on the equipment. Use the OSHA Lockout/Tagout procedures. If you are not familiar with this requirement, refer to OSHA documentation.

Working With Electricity Safely

Ensure that you use safe and established practices in working with electrical devices. Poorly wired devices may cause a fire, explosion or electrical shock. Ensure that grounding connections are properly made. Ensure that you do not pinch wires when replacing covers. Follow OSHA Lockout/Tagout requirements. Station employees and service contractors need to understand and comply with this program completely to ensure safety while the equipment is down. Before you start work, know the location of the Emergency Power Cutoff Switch (the E-STOP). This switch cuts off power to all fueling equipment and submerged turbine pumps and is to be used in the event of an emergency. 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.

Hazardous Materials

Some materials may present a health hazard if not handled correctly. Ensure that you clean hands after handling equipment. Do not place any equipment in the mouth.

WARNING! FAILURE TO COMPLY WITH THE FOLLOWING WARNINGS AND SAFETY PRECAUTIONS COULD RESULT IN PROPERTY DAMAGE, INJURY OR DEATH.

FIRE HAZARD! Do **NOT** use **power tools** (Class I Division I and Class I Division II) during the installation or maintenance of equipment. Sparking could ignite fuel or vapors, resulting in fire.

CHEMICAL EXPOSURE HAZARD! Wear appropriate **safety equipment** during installation or maintenance of equipment. Avoid exposure to fuel and vapors.

FUEL SPILL! Do **NOT** install unlisted ads/billboards, and do **NOT** install any other unlisted after-market device on any automatic nozzle. Doing so may change the sensitivity of the shut-off mechanism, which may cause the nozzle not to shut off, resulting in a fuel spill. Please see sensitivity test in Underwriters Laboratory Specification UL842.

REQUIREMENTS FOR USE

- The ORVR Hose and Nozzle are designed for use only at facilities dispensing motor fuels.
- Application of hoses and nozzles must be consistent with NFPA Code 30A, OSHA regulations, and federal, state and local fire codes, and other applicable local regulations.
- Injury or damage may result from splash-back or spillage if the nozzle is operated in excess of the applicable regulatory high-flow rates.
- The selection of any Veeder-Root product must be based upon physical specifications and limitations and the product's compatibility with the materials to be handled. Veeder-Root makes no warranty of fitness for a particular purpose. See Warranty below.
- All Veeder-Root products should be used in accordance with applicable federal, state and local laws, ordinances and regulations.

OPERATING PRECAUTIONS

Post the warning signs required by the current edition of NFPA 30-A, Section 9.2.5.4 in a conspicuous location. We recommend that you post the following warnings in a conspicuous location visible to those using the equipment. Contact authorities having local jurisdiction for additional required warnings.



- **TURN OFF** your engine before refueling, and **DO NOT RESTART** your engine until fueling is completed.
- **DISCHARGE YOUR STATIC ELECTRICITY** before fueling by touching with your bare hand grounded metal on your car or on dispenser away from nozzle
 - Failure to discharge static electricity could cause a spark which could ignite fuel vapors.
 - **DO NOT** reenter your vehicle during fueling, because this could recharge your body with static electricity. If you must re-enter your vehicle, be sure to discharge your static electricity again before you touch the nozzle.
- **NO SMOKING.** Extinguish all open flames and pilot lights, such as on RV appliances.
- **TURN OFF** cell phones and other electronic devices to avoid distractions while fueling.

- **DO NOT** leave nozzle unattended. Nozzle performance and the automatic shut-off are influenced by many factors. **STOP THE PUMP IMMEDIATELY** if the nozzle does not shut off after refueling.
- **WARNING! DO NOT REMOVE NOZZLE FROM FUEL PIPE IF FIRE STARTS.** Move back from dispenser and inform the attendant. Use the emergency shut-off button to stop the pump if the attendant is not available at the site.
- **DO NOT ALLOW CHILDREN** to pump gasoline. The equipment should be used only by persons of legal driving age.
- **GASOLINE CAN BE HARMFUL OR FATAL IF SWALLOWED.** Long-term exposure may cause cancer. Keep eyes and skin away from liquid gasoline and gasoline vapors. Avoid prolonged breathing of gasoline vapors.
- **USE ONLY APPROVED PORTABLE CONTAINERS.** Dispense gasoline into approved portable containers placed on the ground. **NEVER FILL PORTABLE CONTAINERS IN OR ON THE VEHICLE.** If you do, static electricity generated in dispensing fuel can create a spark that ignites fuel vapors causing a fire.
 - **WHILE FILLING AN APPROVED PORTABLE CONTAINER,** manually hold the trigger on the nozzle for a low flow rate, and **DO NOT** engage the nozzle's hold-open clip in high position.
 - **KEEP THE NOZZLE TOUCHING THE PORTABLE CONTAINER WHEN FILLING THE PORTABLE CONTAINER** to discharge any static electricity generated in filling the container. If you do not do so, static electricity generated in dispensing fuel can create a spark that ignites fuel vapors causing a fire.

Notice

Veeder-Root makes no warranty of any kind with regard to this publication, including, but not limited to, the implied warranties of merchantability and fitness for a particular purpose.

Veeder-Root shall not be liable for errors contained herein or for incidental or consequential damages in connection with the furnishing, performance, or use of this publication.

Veeder-Root reserves the right to change system options or features, or the information contained in this publication.

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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'S PREFERRED CARRIER

1. Contact VR Customer Service at 800-873-3313 with the specific part numbers and quantities that were missing or received damaged.
2. Fax signed Bill of Lading (BOL) to VR Customer Service at 800-234-5350.
3. VR 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

1. It is the customer's responsibility to file a claim with their carrier.
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.
3. If "lost" equipment is delivered at a later date and is not needed, VR will allow a Return to Stock without a restocking fee.
4. VR will NOT be responsible for any compensation when a customer chooses their own carrier.

RETURN SHIPPING

For the parts return procedure, please follow the appropriate instructions in the "General Returned Goods Policy" and "Parts Return" pages in the "Policies and Literature" section of the Veeder-Root **North American Environmental Products** price list.

WARRANTY

Please see page v.

Warranty

For Veeder-Root ORVR compliance hanging hardware components, the following warranty applies:

We warrant that this product shall be free from defects in material and workmanship for a period of fifteen (15) months from the date of invoice thereof. We 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.**

IMPORTANT SAFETY INFORMATION	ii
PRELIMINARY PRECAUTIONS	ii
REQUIREMENTS FOR USE.....	ii
OPERATING PRECAUTIONS	iii
Warranty	v
Introduction	
Certification	1
Related Manuals	1
Safety Precautions	2
System Components	3
Troubleshooting	
Safety Precautions	6
Premature Nozzle Shut Off	6
Premature / Nuisance Shutoff Troubleshooting Procedure	6
Procedure.....	7
Results.....	7
Nozzle Does Not Shut Off or Splash Back Occurs	8
Leaks Out of the Spout	9
Leaks at Nozzle Inlet	9
Leaks Other Than from Spout	9
Nozzle Fails Pressure Decay Testing	10
Nozzle Fails Air-to-liquid Ratio Testing	10
Nozzle Lever Hard to Open	10

Figures

Figure 1.	Complete V-R ORVR Hanging Hardware Assembly	3
Figure 2.	ORVR Sensor and Nozzle	4
Figure 3.	A/L Adapter/ORVR Nozzle Test Setup	7

Introduction

This manual describes how to troubleshoot the Veeder-Root ORVR Hanging Hardware System.

The Veeder-Root ORVR Primary and Whip hoses are inverted coaxial vapor recovery hoses in which the outer hose delivers the fuel to the nozzle and the inner hose returns the vapors collected. The Veeder-Root nozzle and hose components use a special hose thread size (1-1/4 - 18) that is NOT compatible with the M34 thread size on standard inverted coaxial hoses.

The ORVR primary hose assembly contains a mechanical sensor which allows for proper vapor collection on traditional non-ORVR vehicles, but limits air ingestion when fueling ORVR vehicles.

The fuel section of the ORVR nozzle uses an automatic shutoff sensing port near the end of the spout. When the level of fuel reaches this sensing port, the nozzle automatically shuts off. A two position hold open latch is located beneath the lever to control the flow. The vapor collection section of the ORVR nozzle has a valve to prevent loss of vapor when the nozzle is not being used.

The no pressure/no flow device causes the ORVR nozzle to shut off whenever the dispenser shuts off fuel flow. This feature meets the NFPA Code 30A requirement regarding self-service nozzles with a hold-open latch.

This 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) 323-1719 to locate a qualified technician.

Certification

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


















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

Related Manuals

577013-887	ORVR Primary Hose, Breakaway and Whip Hose Installation and Maintenance Manual
577013-888	ORVR Nozzle Installation and Maintenance Manual

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 of the ORVR hose assembly indicates direction of 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>

System Components

Figure 1 illustrates the complete Veeder-Root ORVR hanging hardware assembly:

1. Vacuum Assist Whip Hose
2. Vacuum Assist Safety Breakaway
3. Primary Hose Assembly with ORVR Sensor (nozzle end)
4. ORVR Nozzle

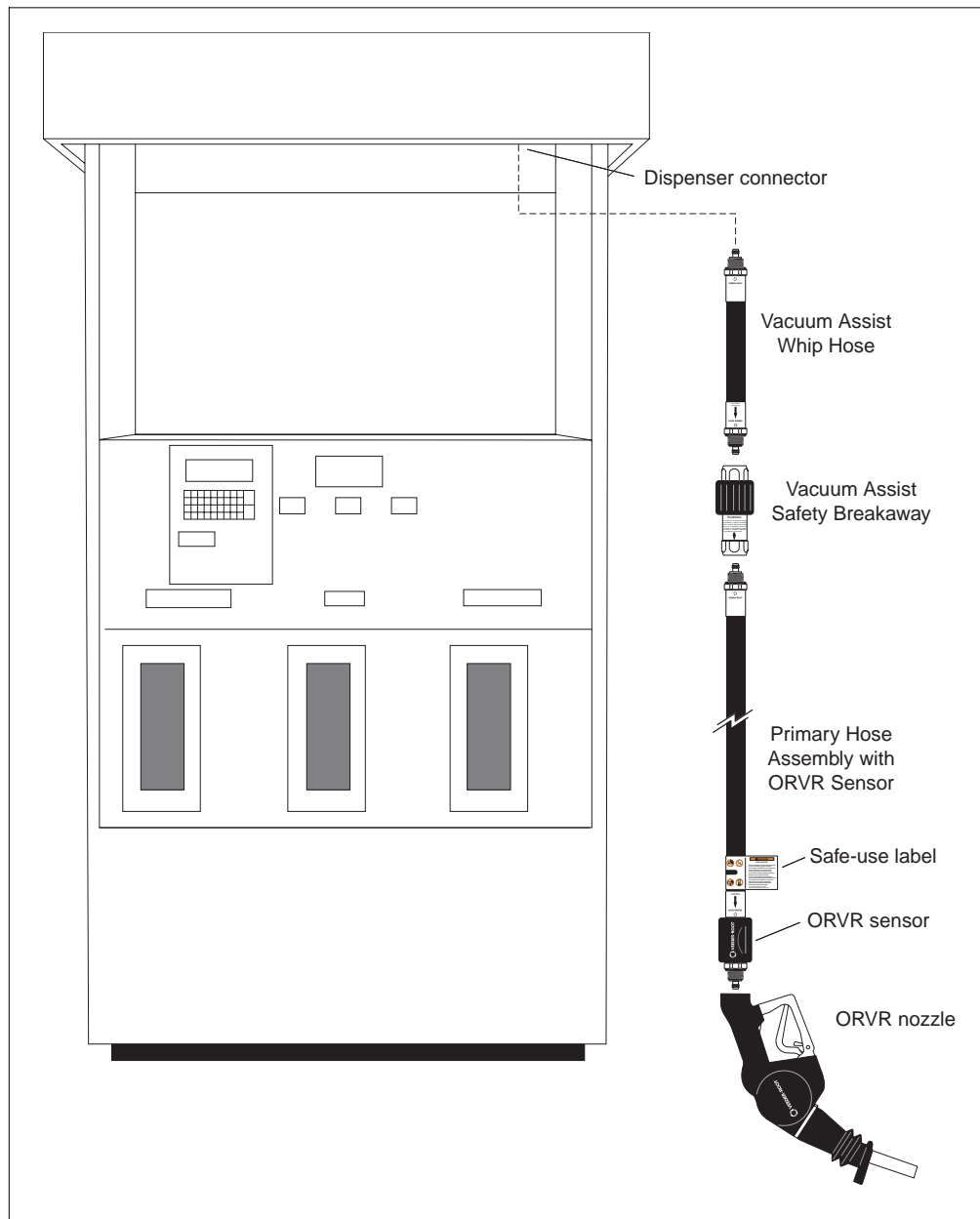


Figure 1. Complete V-R ORVR Hanging Hardware Assembly

Figure 2 illustrates additional nozzle features.

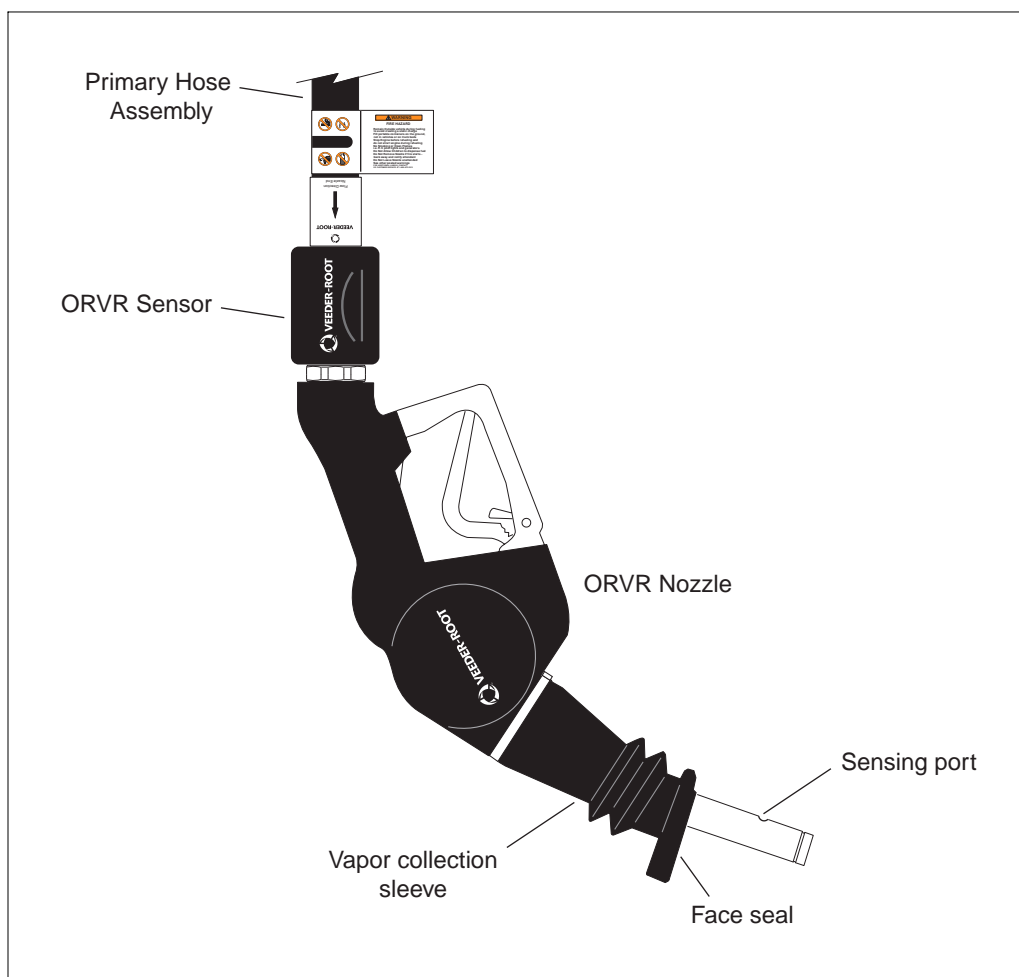


Figure 2. ORVR Sensor and Nozzle

Troubleshooting

Every Veeder-Root ORVR nozzle is tested and is guaranteed to be in proper working condition when shipped. Its continued proper operation is dependent upon reasonable care in handling. Nozzles should not be dragged or thrown on the ground or paved surfaces. The automatic shutoff elements are subject to damage by such handling, which can result in the nozzle failing to shut off properly.

Table 1. Nozzle Troubleshooting QuickHelp

If Nozzle:	Possible Causes	Solution
Keeps Shutting Off	Full vehicle fuel tank	Do not top off.
	Splash back	Reduce fuel rate by fuelling at low clip. Reposition or rotate the nozzle.
	Vehicle type	Reduce fuel rate by fuelling at low clip. Reposition or rotate the nozzle.
	No pressure, No flow	Verify that the dispenser is authorized.
	Spout may be bent or damaged	Replace nozzle.
	Fuel in vapor side	Verify vapor pump is operating. (Also see steps below in the 'Has Fuel in Vapor Side' section).
	Sensing port may contain debris or foreign material	Clean the sensing port or replace nozzle, if required.
	ORVR Valve malfunction	Replace primary hose assembly.
Does Not Shut Off	Flow too low (less than required 3 gpm min.)	Check GPM flow rate, e.g., filters may be clogged.
	Nozzle may not be in fill pipe correctly	Reposition nozzle in fill pipe, if problem persists then flow fuel into an approved container. If nozzle doesn't shut off, replace nozzle.
	Foreign material in venturi poppet area or fuel valve assembly	Replace nozzle.
Leaks at Spout Area	Loose Spout nut	Remove vapor collection sleeve and tighten spout nut. Replace nozzle if leak does not stop.
Leaks at Inlet Area	Damaged O-rings	Check hose connection and O-rings.
Leaks at Lever Guard or Stem	Worn seals	Replace nozzle.
Does Not Dispense Fuel or Very Low Flow Rate	Dispenser may not be ON	Turn ON dispenser.
	Low pressure (<20 psi)	Check dispenser pressure. Check dispenser or pump.
	Clogged fuel filters	Replace dispenser filters.
Fails Pressure Decay Test	Leaking vapor valve	Replace nozzle if leak is greater than 3 cubic inches per minute (49cc per minute).
Has Fuel in Vapor Side	Damaged inner hose or hose o-rings	Check for meter creep. Check o-rings on inner hose.
	Topping off tanks during fueling	Remove nozzle from primary hose assembly. Completely drain hose assembly and nozzle into an approved container.

Table 1. Nozzle Troubleshooting QuickHelp

If Nozzle:	Possible Causes	Solution
Fails A/L Testing	Restriction in nozzle vapor path or faulty vapor valve	Replace nozzle.
	ORVR hose sensor activated during test	Test with proper A/L Measurement adapter.
	Vacuum pump out of calibration	Recalibrate Vacuum Pump.

Safety Precautions

Before beginning any of the following troubleshooting procedures you should observe all safety precautions shown below. Read the meaning of these safety symbols on page 2 of this manual.



Premature Nozzle Shut Off

- The flow rate of the nozzle may be above the maximum allowed. United States regulations require flow rates not to exceed 10 gpm (37.8 lpm). A high flow rate may cause the sensing port to be prematurely covered with liquid (see Figure 2 on page 4).

Solution: Flow rate should be lowered by using flow restrictors, lowering STP pressure or using a programmable flow rate feature on the fuel dispenser.

- The flow rate may be higher than the fill pipe angle allows.

Solution: Reduce the flow rate by fueling with the hold-open clip in the lower position.

Some fuel pipe designs prohibit proper retention of the nozzle. In such cases, the nozzle must be hand-held to prevent premature shut offs and/or the nozzle falling out of the fill pipe.

- The nozzle may be improperly inserted into the fill pipe.
- The nozzle's sensing port (see Figure 2 on page 4) may contain debris or foreign material.

Solution: Adjust the nozzle as needed to improve the flow path.

Solution: Check for, and remove, debris from the sensing port.

- Spout may be bent or damaged.

Solution: Replace nozzle.

- The ORVR sensor in nozzle end of the Primary hose may be malfunctioning.

Solution: Replace Primary hose assembly.

Premature / Nuisance Shutoff Troubleshooting Procedure

Follow this procedure to identify if problem is caused by nozzle or ORVR valve in hose. This procedure WILL:

- Show whether or not the auto shut-off mechanism is prematurely engaging or the ORVR valve is operating properly.
- Show if the blocking poppet is stuck in the non-blocking position.

- Show that the diaphragm and blocking poppet are operating as desired.

PROCEDURE

1. Place nozzle A/L adapter so that the lip seal passes or excludes the automatic shutoff sensing port and fully compresses the nozzle vapor collection sleeve (see Figure 3).

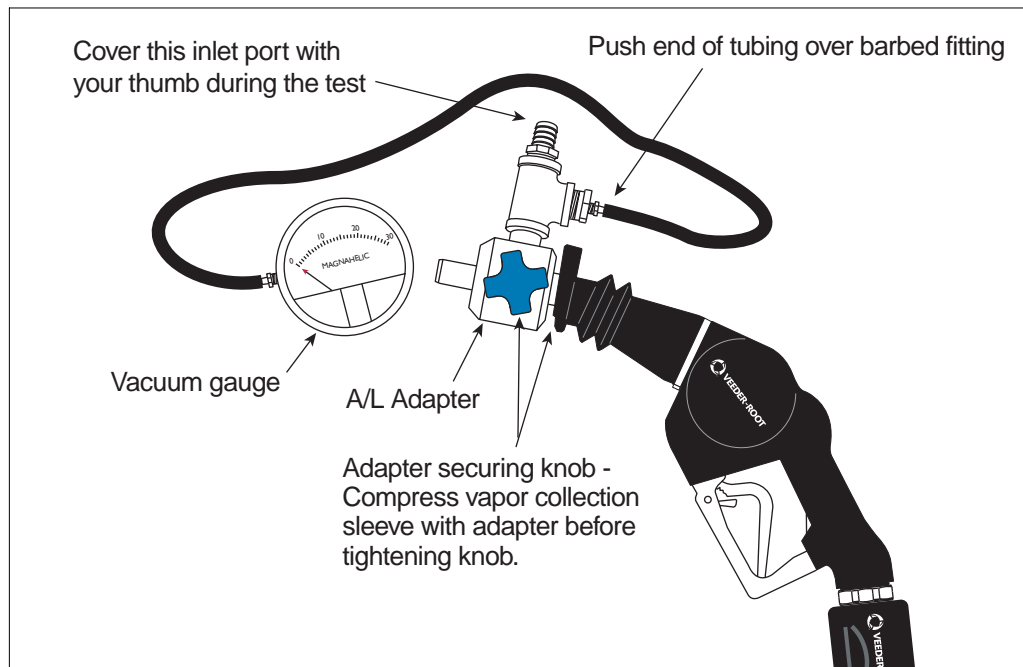


Figure 3. A/L Adapter/ORVR Nozzle Test Setup

2. Attach vacuum gage to the hose barb fitting on the nozzle A/L adapter.
3. Initialize the dispenser and begin dispensing fuel into an approved container. Dispense fuel at the highest flow rate possible (use high hold-open clip setting).
4. Monitor the vacuum gage during the fueling operation.
5. Cover open pipe tee inlet port with your thumb to block air flow through it once fuel flow has begun.



RESULTS

Nozzle shuts off.

Conclusion: Since the nozzle A/L adapter excludes the automatic shutoff sensing port, the problem resides solely with the nozzle.

Action: Replace the existing nozzle with a new nozzle.

Nozzle does not shutoff and a continuously high vacuum reading is noted on the vacuum gage.

Conclusion: ORVR valve is not moving from open position to blocking position.

Action: Replace the existing primary hose and ORVR valve with a new primary hose and ORVR valve.

Nozzle does not shutoff. The vacuum level rises to 5 inches WC and then drops to 0 inches WC. The vacuum level reaches 5 inches WC more quickly at 10 gpm than at 5 gpm.

Conclusion: The nozzle and ORVR valve are both operating properly. The nuisance shutoff must have been caused by the vehicle fill pipe design.

Action: Place the nozzle and primary hose back into normal service.

Nozzle Does Not Shut Off or Splash Back Occurs

- The flow rate of the nozzle may be below the minimum rate for reliable automatic shut off. The minimum flow rate of the nozzle is 3 gpm (11.3 lpm).

Solution: Improve flow rate. Change dispenser filter, if needed. System may be in slow-flow prepay mode. System may be in slow-flow mode from mechanical leak detector. Call for service.

- The nozzle may not be properly placed in the fill pipe.

Solution: Make sure the nozzle is properly inserted in fill pipe. Liquid must cover the sensing port on the underside of the spout for the nozzle to automatically shut off. (see Figure 2 on page 4).

- The flow rate of the nozzle may be above the maximum allowed for reliable automatic shut off.

Solution: United States regulation requires flow rates to be 10 gpm (37.8 lpm) or less for gasoline-based fuel.

- Due to the design of the vehicle fill pipe, splash-back may occur that can be mistaken for a failure of the nozzle automatic shutoff mechanism.

Solution: Reduce the flow rate by fueling at a lower hold-open clip position. This will allow the shut-off mechanism to operate properly and eliminate splash-back.

- Spout and sensing port may be damaged.

Solution: Replace the nozzle.

Leaks Out of the Spout

- With the dispenser authorized and the nozzle lever closed, liquid leaks out of the spout and does not stop. There may be debris or foreign objects in the fuel valve.

Solution: Replace nozzle.

- With the dispenser authorized and the nozzle lever closed, liquid leaks out of the spout and does not stop. There may be damage to the seat of the fuel valve due to excessive pressure build-up in the dispenser.

Solution: Replace nozzle and verify that dispenser is relieving pressure properly.

- With the dispenser authorized and the nozzle lever closed, liquid leaks out of the spout and slowly stops. There may be a foreign object in the venturi poppet. Also, if the dispenser is not authorized and the nozzle lever is closed with the spout tilted downward, liquid leaking out of the spout and slowly stopping may also be the result of a foreign object in the venturi poppet.

Solution: In either case, clean debris from the Venturi poppet by removing the spout assembly.

Leaks at Nozzle Inlet

- The o-ring on the swivel nut/end fitting of the primary hose may be worn or cut.

Solution: Check and replace swivel nut o-ring (Figure 2 on page 4).

- Nozzle may not be properly attached to the hose.

Solution: Check the nozzle for proper attachment to the hose. Verify that neither Teflon tape nor pipe sealant was used.



WARNING! DO NOT use pipe sealant, plastic or Teflon tape on vapor recovery hanging hardware.

Leaks Other Than from Spout



- With the dispenser authorized, the nozzle lever closed and with the spout tilted downward, liquid leaks out of the vapor boot assembly (through the vapor collection sleeve & face seal) and stops. Liquid may have been ingested into the vapor path of the nozzle and/or the hose. This is caused by topping off tanks during fueling. System is working properly.

Solution: Vapor path may be cleared by draining the hose and nozzle into an approved container.

- With the dispenser authorized, the nozzle lever closed and with the spout tilted downward, liquid leaks out of the vapor boot assembly (through the vapor collection sleeve & face seal) and does not stop. Liquid may have crossed over into the vapor path. O-rings may be cut or worn. It is also possible to have a slow accumulating sale indicated on the main display of the dispenser with the nozzle lever closed (this is called meter creep).

Solution: Check and replace the two small o-rings on both vapor line connectors of the primary hose and whip hose. (NOTE: this problem would also be indicated by meter creep).

- With the dispenser authorized and the nozzle lever closed, leaks from under the hand insulator. There may be internal damage to one of several components.

Solution: Replace nozzle.

- With the dispenser authorized and the nozzle lever closed, leaks from around the spout nut. Liquid may have been ingested into the vapor path, flooding out the vapor port above the spout nut.

Solution: This is caused by topping off tanks during fueling. System is working properly. Vapor path may be cleared by draining the hose and nozzle.

- With the dispenser authorized and the vehicle being fueled, nozzle leaks from the lever guard or stem. The seals may be worn.

Solution: Replace nozzle.

Nozzle Fails Pressure Decay Testing

- Leak indicated at spout tip. Vapor valve may be faulty.
Solution: Replace nozzle.

Nozzle Fails Air-to-liquid Ratio Testing

Note: Please refer to the ORVR Nozzle - Installation and Maintenance Manual (P/N 577013-888) for proper A/L testing procedures.

- Fueling point fails high. Vapor flow rates are too high.
Solution: Follow the system manufacturer's instructions for adjusting vapor flow rates downward.
- Fueling point fails low. Vapor flow rates are too low.
Solution: Follow the system manufacturer's instructions for adjusting vapor flow rates upward.
- Fueling point fails low. If there is a pattern of low A/L's for a specific fueling point, the ORVR sensor may be malfunctioning.
Solution: Replace Primary hose assembly.
- Fueling point fails low. If there is a pattern of low A/L's for a dispenser or dispenser side, the system's vacuum pump may not be operating properly.
Solution: Follow the system manufacturer's instructions for diagnosing and correcting problem.
- Fueling point fails low. Leaking at spout tip indicated. The A/L adapter seals may be damaged.
Solution: Replace A/L adapter seals.
- Fueling point fails low. Leaking between seal bead on A/L adapter and face seal on nozzle.
Solution: Make sure the face seal on the nozzle is in the proper orientation. Make sure the A/L adapter seal bead and nozzle face seal are both clean. Make sure there are no nicks or cuts on the A/L adapter seal bead or the nozzle face seal. If you find damage on either component, the damaged component will need to be replaced.
- Fueling point fails low. Spout may be out of round causing the A/L adapter not to seal properly on spout.
Solution: Replace Spout.
- Fueling point fails low. The nozzle shut-off port may be covered with the A/L adapter.
Solution: Adjust the A/L adapter and re-test.
- Fueling point fails low. There may be liquid in the vapor path of either the hose or underground piping.
Solution: Perform liquid blockage test and clear vapor path.
- Fueling point fails low. The vapor valve may be faulty.
Solution: Replace nozzle.

Nozzle Lever Hard to Open

- Fueling point static pressure may be above the maximum allowable of 50 psi (344.74 kPa).
Solution: Verify dispensing system is relieving pressure.

