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RF2+



Obey local or municipal regulations for product recycling and disposal.

ABOUT THIS MANUAL

ITS PURPOSE

The purpose of this manual is to help you get the most value from your Binks IntelliFlow™ system. It can help you to determine how to install, operate, maintain, and repair your equipment. It provides information and procedures for routine maintenance and servicing and offers diagnostic and repair procedures to follow when trouble occurs.

ITS CONTENTS

This manual is divided into Chapters, each of which is divided into consecutively numbered Sections.

Chapters will contain text, images, tables, or a combination of them.

Pages with images will have paragraphs and sentences with callout numbers that refer to their respective images, steps, and parts.

Procedures, once described in the text, are not normally repeated. When it is necessary to refer to another Chapter or Section, the reference will be given as Chapter and Section number. Cross references given without the use of the word "Chapter" apply to Sections or paragraphs in the current Chapter.

Chapter 02 Table of Contents.

Chapter 03 Safety: Safety, hazard, and warning rules.

Chapter 04 Product Overview: Introduction to the equipment component and technical specifications.

Chapter 05 Servicing: Weeping MVR service overview.

Chapter 06 Maintenance: Disassembly, inspection, and assembly procedures, and parts.

Chapter 07 Manual Change Summary: The revisions and changes made to this manual.

Chapter 08. Warranty: Your equipment's warranty.

WHO SHOULD USE THIS GUIDE

This guide is intended for users with different levels of knowledge and experience with this system:

Installers: The person(s) who will locate and install this equipment.

Users: The person(s) who will learn how to operate this equipment.

Servicers: The person(s) who will service and maintain this equipment.

This guide assumes all persons who will install, use, operate, and service this equipment have some knowledge of the product and its operating system.

MANUAL DISCLAIMER

All current and applicable certifications shown in this manual confirm Binks' adherence to the strict standards met to obtain the required regulatory compliances.

This manual was prepared with the most accurate information current at the time of publishing. Binks does not accept responsibility for errors in, or omissions from, the information contained herein.

Please get in touch with your distributor or Binks Customer Service for additional service information and assistance.

MVR RELATED MANUALS & PUBLICATIONS

Part Number	Description
77-3152-1	RF2 Installation Manual
77-3165-1	RF2+ Installation Manual
LN-9225-00	Weepless MVR

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03 SAFETY

03.1 SAFETY PRECAUTIONS

Before the operation, maintenance, or servicing of this Binks system; fully read and understand all technical and safety literature for your product. This manual contains information that is important for you to know and understand.

This information relates to USER SAFETY and the PREVENTION OF EQUIPMENT PROBLEMS.

To help you understand this information, we use recognizable ANSI Z535 and ISO warning boxes and symbols throughout this manual. Please obey these safety sections.

⚠ DANGER

DANGER! Indicates a hazardous situation that, if not avoided, will result in death or severe injury.

⚠ WARNING

WARNING! Indicates a hazardous situation that, if not avoided, could result in death or severe injury.

⚠ CAUTION

Caution! Indicates a hazardous situation that, if not avoided, could result in minor or moderate injury, or equipment damage.

NOTICE

Notice: Indicates information considered important but not hazard related.

SAFETY

Safety: Indicates a type of safety instruction, or a separate panel on a safety placard, where specific safety-related instructions or procedures are described.

Careful study and continued use of this manual will provide a better understanding of the equipment functions and procedures.

This understanding will result in improved operation, efficiency, and longer, trouble-free service with faster and easier troubleshooting. If you need the necessary safety literature for your specific system, contact your local Binks representative or Binks directly.

NOTICE

This manual lists standard specifications and service procedures. Differences can occur between this literature and your equipment.

Differences in local or municipal codes, manufacturer or plant requirements, material delivery requirements, and more can make variations unpreventable. To find these differences, compare this manual to your system installation drawings and other applicable Binks equipment manuals.

⚠ WARNING

The user **MUST** read and be familiar with the Safety Section in this manual and the safety literature therein identified.

Only trained personnel can operate this equipment.

All personnel who operate, clean, or maintain this equipment **MUST** fully read and understand this manual! To operate and service the equipment, follow all **WARNINGS** and safety requirements.

The user must be aware of and adhere to **ALL** local building and fire codes and ordinances, as well as NFPA 33 AND EN 16985 SAFETY STANDARDS, LATEST EDITION, or applicable country safety standards, before the installation, operation, or servicing of this equipment.

⚠ WARNING

The hazards shown on the pages that follow can occur during the normal use of this Binks equipment, but not all listed hazards will be applicable to your product model or equipment.

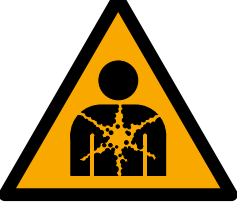
Repairs may only be performed by personnel authorized by Binks.

AREAS Indicate possible hazard occurrences	HAZARDS Indicate possible hazards	SAFEGUARDS Prevention of possible hazards
Spray Areas  	Fire Hazards Improper or unsatisfactory operation and maintenance procedures will cause a fire hazard. If the safety interlocks are disabled during operation, protection against accidental arcing is shut off and can cause a fire or explosion. Frequent Power Supply or Controller shutdown identifies a problem in the system. For this occurrence, a correction will be necessary	Fire extinguishing equipment must be present in the spray area. Periodically run a test to make sure the equipment stays usable. Keep spray areas clean to prevent the build-up of combustible residues. Do not smoke in the spray area. The high voltage supplied to the atomizer must be turned off before the equipment is cleaned, flushed or maintained. Spray booth ventilation must be kept at the rates as set by NFPA-33, OSHA, country, local, and municipal codes. If flammable or combustible solvents are used to clean the equipment, ventilate the area. Prevent electrostatic arcing. Maintain spark-safe work distance between the parts that get coated and the applicator. A span of one inch for every 10KV of the output voltage is necessary. Do an equipment test only in areas free of combustible material. The test may necessitate the high voltage to be on, but only as instructed. Non-factory replacement parts or unauthorized equipment modifications can cause a fire or injury. Non-factory replacement parts or unauthorized equipment modifications can cause a fire or injury. The key switch bypass is used only during setup operation. Do no production work with disabled safety interlocks. Set up and operate the paint procedure and equipment under NFPA-33, NEC, OSHA, local, municipal, country, and European Health and Safety Norms.

AREAS Indicate possible hazard occurrences	HAZARDS Indicate possible hazards	SAFEGUARDS Prevention of possible hazards
Spray Areas  	Explosion Hazard Improper or unsatisfactory operation and maintenance procedures will cause a fire or explosion hazard. If the safety interlocks are disabled during operation, protection against accidental arcing is shut off and can cause a fire or explosion. Frequent Power Supply or Controller shutdown identifies a problem in the system. For this occurrence, a correction will be necessary.	Prevent electrostatic arcing. Maintain spark-safe work distance between the parts that get coated and the applicator. A span of one inch for every 10KV of output voltage is necessary. Unless specifically approved for use in hazardous locations, put all electrical equipment outside of Class I or II, Division 1 or 2 hazardous areas in accordance with NFPA-33, or outside of Zone 2 or Zone 22 in accordance with EN standards. If equipped, set the current overload sensitivity as described in the related section of the equipment manual. If incorrectly set, the current overload sensitivity for protection against accidental arcing is turned off and can cause a fire or explosion. Frequent power supply shutdown indicates a problem in the system, which requires correction. Always turn off the control panel power before the system is flushed, cleaned, or servicing the spray system equipment. Make sure no objects are within the spark-safe work distance before the high voltage is turned on. The control panel must interlock with the ventilation system and conveyor in accordance with NFPA-33, EN 50176. Fire extinguishing equipment must be present in the spray area. Periodically run a test to make sure the equipment stays usable. Do an equipment test only in areas free of combustible material.
General Use and Maintenance 	Improper or unsatisfactory operation and maintenance procedures will cause a fire hazard. Personnel must be correctly trained in the operation and maintenance of this equipment.	Train all personnel in accordance with the requirements of NFPA-33, EN 60079-0. Before equipment operation, personnel must read and understand these instructions and safety precautions. Obey appropriate local, municipal, state, and national codes governing ventilation, fire protection, operation maintenance, and housekeeping. Reference OSHA, NFPA-33, EN Norms, and your insurance company requirements.

AREAS Indicate possible hazard occurrences	HAZARDS Indicate possible hazards	SAFEGUARDS Prevention of possible hazards
Spray Area High Voltage Equipment    	Electrical Discharge This equipment contains a high voltage device that can cause an electrostatic induction on ungrounded objects. This electrical charge is capable of igniting coating materials. Insufficient ground will cause a spark hazard. A spark can ignite many coating materials and cause a fire or explosion.	Operators in the spray area and the parts to be sprayed must be sufficiently grounded. All conductive objects inside the spray area must be grounded. Hold the parts that get sprayed on conveyors or hangers that are correctly grounded. The resistance between the parts and the earth-ground must not be more than 1 MΩ. Refer to: NFPA-33. Before the equipment is operated, ground all operators. They cannot wear rubber-soled insulated shoes. Wear ground straps on wrists or legs for sufficient ground contact. Operators must not wear or carry ungrounded metal objects. When used, operators must make complete contact with the applicator handle and electrostatic gun. Use conductive gloves or gloves with the palm section cut out. Operators must wear grounded footwear. NOTE: REFER TO NFPA-33 OR SPECIFIC COUNTRY SAFETY CODES FOR GUIDANCE TO CORRECTLY GROUND THE OPERATOR. Except for objects needed for the high-voltage process, all electrically conductive objects in the spray area are to be grounded. Supply a grounded conductive floor in the spray area. Except for objects needed for the high-voltage process, all electrically conductive objects in the spray area are to be grounded. Supply a grounded conductive floor in the spray area. Always turn off the applicator voltage before the system is flushed, cleaned, or when servicing the spray system equipment. Unless specifically approved for use in hazardous locations, put all electrical equipment outside of Class I or II, Division 1 or 2 hazardous areas in accordance with NFPA-33, or outside of Zone 2 or Zone 22 in accordance with EN standards. Do not install an applicator into a fluid system if the solvent supply is ungrounded. Do not touch an energized applicator electrode.

AREAS Indicate possible hazard occurrences	HAZARDS Indicate possible hazards	SAFEGUARDS Prevention of possible hazards
Spray Areas 	Toxic Fluid or Fumes Toxic fluids or fumes can cause severe injury or death if splashed in the eyes or on the skin, or if inhaled or swallowed.	Read the Safety Data Sheet (SDS) for instructions to know and understand how to handle the specific hazards of the fluids used, and the effects of long-term exposure. During the spray, clean, or servicing of equipment, or when in the work area, keep the work area fully ventilated. Always wear personal protective equipment (PPE) when in the work area or during equipment operation. Refer to the Personal Protective Equipment warnings in this manual. Store hazardous fluid in approved containers and refer to local, municipal, state, and national codes governing the disposal of hazardous fluids.
Spray Area and Equipment Use 	High-pressure fluid sprayed from the gun, hose fittings, or ruptured/damaged components can pierce the skin. While this injury can appear as cut skin, this is a severe injury that can result in the amputation of the affected area.	Do not point or operate the spray gun at the body part of a person. Do not put your hand or fingers over the gun fluid nozzle or fittings in the hose or Proportioner. Do not try to stop or deflect leaks with your hand, glove, body, or shop rag. Do not “blowback” fluid, as the equipment is not an air spray system. Relieve pressure in the supply hoses, Proportioner, and QuickHeat™ hose before the equipment is inspected, cleaned, or serviced. Use the lowest possible pressure to recirculate, purge, or troubleshoot the equipment. Examine the hoses, couplings, and fittings every day. Service or immediately replace parts that leak, are worn, or are damaged. Replace high-pressure hose sections. They cannot be recoupled or serviced.

AREAS Indicate possible hazard occurrences	HAZARDS Indicate possible hazards	SAFEGUARDS Prevention of possible hazards
Equipment and Fluids 	Skin and Clothing Burns Equipment surfaces and fluids can become very hot during operation.	Do not touch hot fluid or equipment during operation. Do not let clothing touch the equipment during operation or immediately after the equipment is stopped. Let the equipment fully cool before the examination or servicing of the component.
Pressurized Aluminum Parts    	The use of certain solvents and chemicals can cause equipment damage and severe personal injury.	Do not use 1,1,1-trichloroethane, methylene chloride or other halogenated hydrocarbon solvents or fluids that contain such solvents. These solvents can cause a severe chemical reaction and equipment rupture that results in equipment and property damage, serious bodily injury, or death.

AREAS Indicate possible hazard occurrences	HAZARDS Indicate possible hazards	SAFEGUARDS Prevention of possible hazards
Spray Areas 	Do Not Touch The effect of paint flow rates and formulations on the quality of atomization can cause the turbines to rotate at high speeds.	Do not use a rag or gloved hand against the bell edge to stop or slow down a bell during rotation. Do not try to clean the bell edge during rotation.

⚠ CAUTION

Only operate the equipment after you have read this section.

03.2 ADDITIONAL SAFETY INFORMATION

The IntelliFlow has an emergency stop (E-Stop) pushbutton on the main operator panel. During an emergency, all operations for the IntelliFlow will halt when the E-Stop is engaged. The operator must disengage the E-Stop and reset the system to recover from this state.

Observe all local or municipal safety measures and wear approved protective equipment when servicing this equipment. Clean all spilled chemicals and materials and do all work in a clean and organized environment to prevent personal injury and equipment damage.

⚠ DANGER

To prevent injury or electrocution while the system is under power, do not contact, disconnect, or manipulate electrical connections or devices. The main disconnect on the right side of the controller can be locked out. Follow the proper Lockout–Tagout (LOTO) procedures for internal controller electrical work.

Only qualified electrical personnel can perform the work if diagnosis and troubleshooting are not possible during working conditions.

⚠ WARNING

To prevent possible chemical spillage when personnel are not on site, air and fluid supplies for the equipment must be disabled when the equipment idles for an extended period, such as an end-of-day shutdown.

NOTICE

During the initial commission of the equipment and at periodic times throughout equipment life, visually examine all fluid fittings for leaks.

Periodically, it is necessary to visually examine all pieces of this equipment for signs of noticeable degradation due to chemicals or other conditions in the equipment's environment.

SAFETY

Obey local or municipal regulations that require installed fire suppression for equipment operation.

If the operation of this equipment, sensors, switches, or other ancillary equipment occurs in the presence of flammable gases and vapors, connect this equipment through intrinsic-safe or Zener barriers. Classify them as a "simple apparatus" or approve them for use in these areas.

04 PRODUCT OVERVIEW

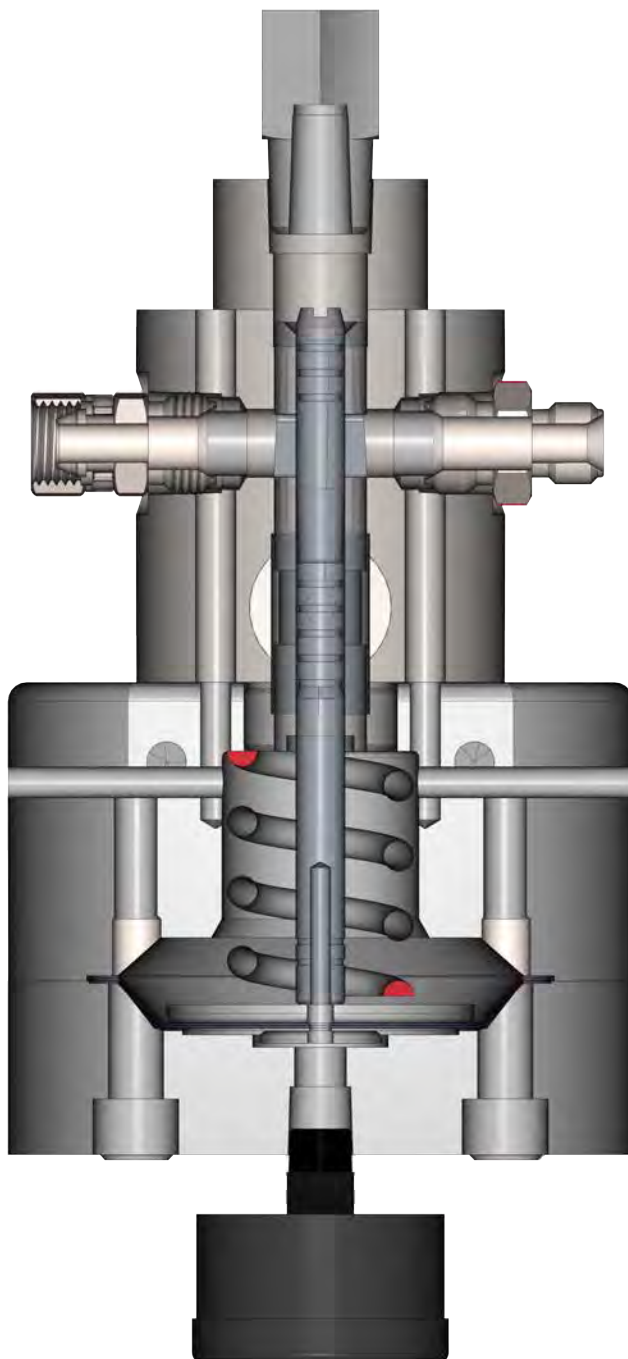
04.1 WEEPING MVR INTRODUCTION

The material regulator valve (MVR) (TR-SSMM-147, 148, 225) is an air-operated valve that slides. It has a tapered needle and specially designed fluid ports to permit precise regulation and rapid response to air command signals. The entire range of MVR operation is maintained with these characteristics.

The MVR is controlled via an air pressure signal generated from the electronic proportional pressure regulator.

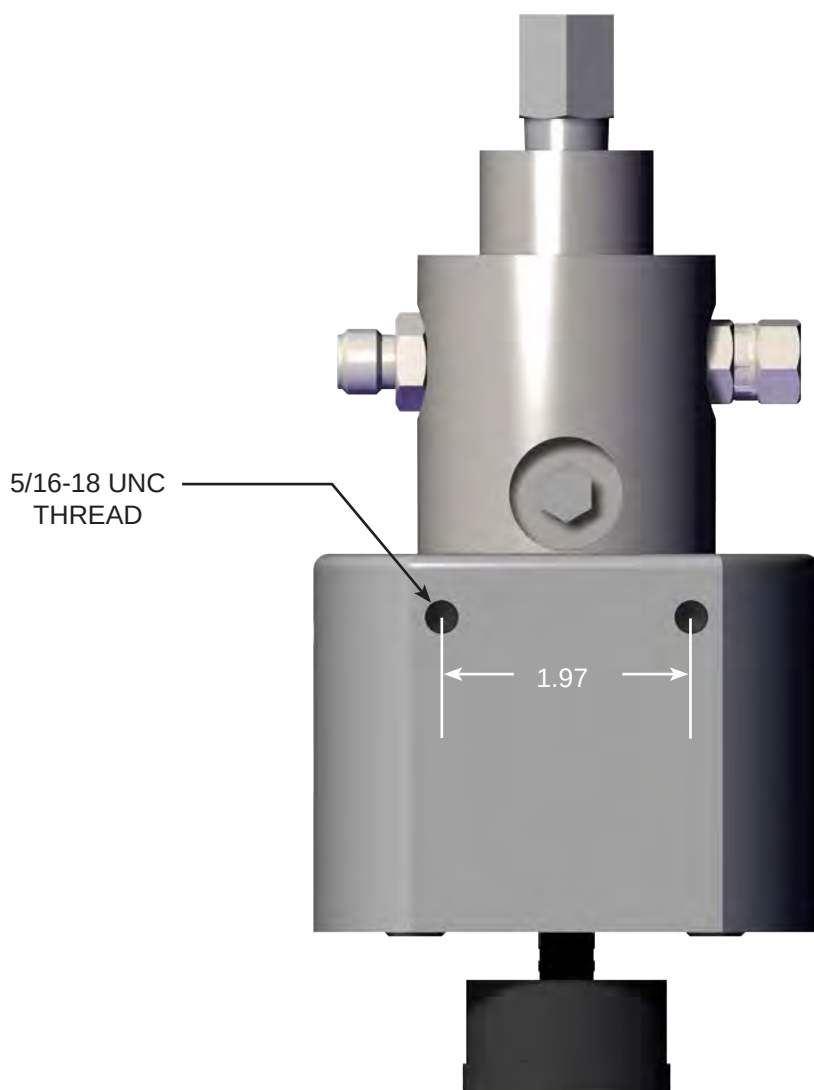
Air pressure against a solvent-resistant diaphragm moves the needle up and down across the fluid ports.

The tapered area on the needle and the fluid port configuration let fluid flow through the MVR proportional to the air pressure control signal. An increase in air pressure results in an increase in fluid flow through the MVR.



04.2 WEEPING MVR ASSEMBLY SPECIFICATIONS

Pressures	Ratings
Maximum Air Pressure	100 psi (6.9 bar)
Maximum Fluid Pressure	3000 psi (206.85 bar)
Flow Rate (Dependent upon material viscosity and needle used)	Part Number
Number 2 Needle – Low Flow	TR-SSMM-149
Number 3 Needle – Medium Flow	TR-SSMM-150
Number 4 Needle – High Flow	TR-SSMM-226
Ports	Thread Sizes
Top and Side Ports	1/8-27 NPT (F)
Fluid Inlet and Outlet Ports	3/8 BSP
Bottom Weep Port	3/8-18 NPT (F)
Mounting Holes	5/16-18 at 1.97 inches



05 SERVICING

05.1 COMMON ISSUES

ISSUE	SOLUTION	NOTE
Particulates and residue in the MVR can plug the fluid ports and cause sluggish valve operation.	Use a 100-mesh (149 micron) filter for proper filtration.	If the system is repeatedly disassembled and cleaned for the removal of solids and residue, examine the entire fluid supply system.
Fluid backup, known as reverse flow, can cause reacted or catalyzed material to enter the MVR. The machine will detect reverse flow and shut down.	Clean or immediately flush the MVR to prevent fluid set-up.	If the equipment needs to be cleaned repeatedly, examine the check valves and adjust the REV FLOW system parameter accordingly.
Kinks or tight bends in the control air line will restrict airflow to the MVR.	Periodically examine the condition of exposed tubing and check the fitting connection at the MVR.	
Excessive buildup will cause the valve to operate improperly.	Examine the leakage weep port for any signs of coagulated material.	The buildup also indicates a needed valve needle and body replacement.

05.2 PREVENTATIVE MAINTENANCE

05.2.1 DAILY ROUTINE

1. Examine the leakage weep ports for fluid leakage
Repair the MVR if leakage is evident.
2. Examine the fluid fittings for leakage.
Repair the fittings if leakage is evident.
3. Examine the exposed fluid and air tubing for kinks, tight bends, leaks, and other defects.

05.2.2 WEEKLY ROUTINE

Flush all materials and fluids from the system.

05.2.3 2500 OPERATION HOURS ROUTINE

Rebuild the valve:

1. Examine the fluid section and fluid needle.
2. Replace the fluid section and fluid needle if excessive leakage is evident.
3. Replace the air diaphragms.
4. Replace the compression spring.
5. Replace the seal SSG-8125 PTFE O-ring.

05.3 MAINTENANCE AND SERVICING BEST PRACTICES

1. Work from a clean, dry bench.
2. Always install new O-rings, gaskets, and diaphragms when the MVR is disassembled for service.
3. Use only lint-free wipes or cloths for cleaning.
4. Refer to the model number of the MVR when ordering replacement parts.

05.4 PRELIMINARY REPAIR PROCEDURES

Before the removal of the MVR for servicing or repair, do the following:

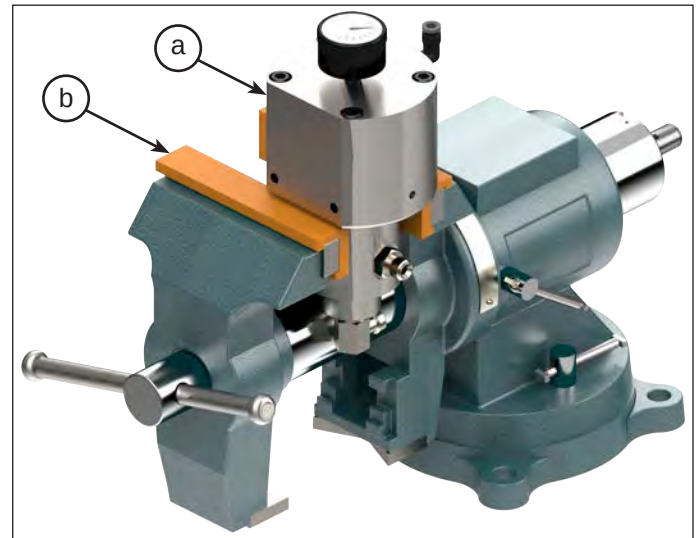
1. Flush the MVR with the system purge.
2. Remove all pressure from the affected fluid line.
3. If equipped, close the shut-off valves on either side of the MVR.
4. Clean the exterior of the MVR before fitting removal.
5. Disconnect the control air line from the MVR.
Cap the exposed hose end to prevent system contamination.
6. Remove the MVR from the fluid line.
7. If the fluid lines remain open during servicing, cap them to prevent system contamination.

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06 MAINTENANCE

06.1 DISASSEMBLY

1. Put the MVR (a) in a bench vise (not included). Use padded jaws (b) to protect the MVR valve housing from damage.

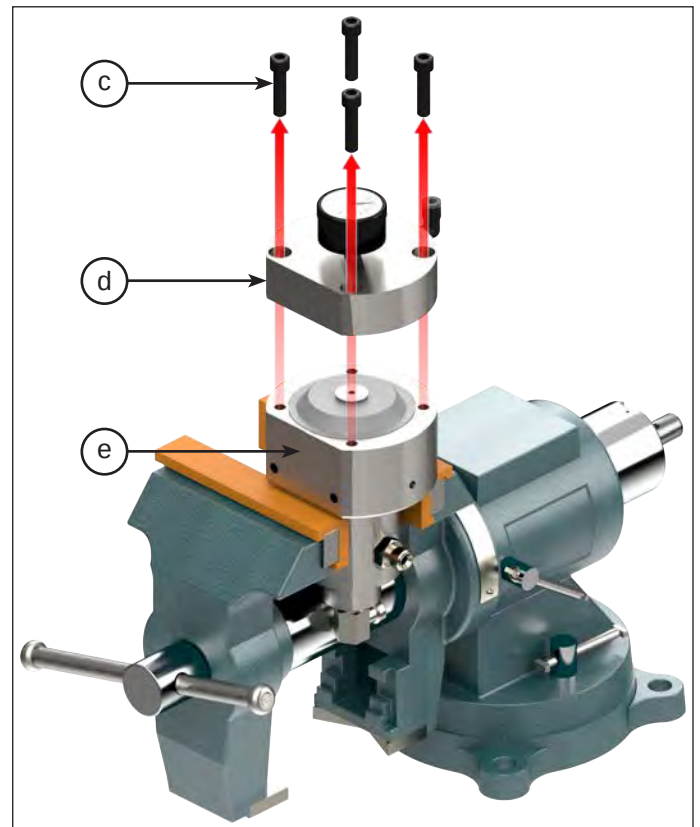


2. Loosen the top four MVR upper housing bolts (c) evenly in an alternating pattern.

NOTICE

When the bolts are loosened, the internal spring load will force the MVR housing halves to separate. It will be necessary to keep equal tension on the housing bolts to avoid damage to the MVR's internal components.

3. Lift the MVR upper housing (d) from the lower housing assembly (e).



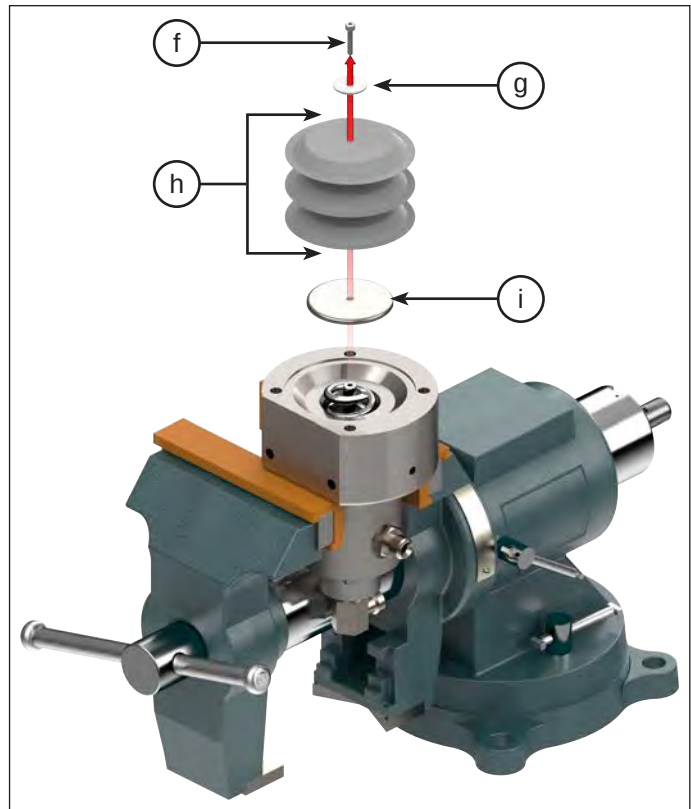
CAUTION

The MVR upper housing mating face is a precision machined surface. Replace the upper housing if it is marred, scratched, or gouged. Carefully move the upper housing onto a clean, lint-free surface.

4. Remove the M4 x 20 millimeter screw (f) and upper diaphragm support (g).
5. Remove the air diaphragms (h).
6. Remove the bottom diaphragm support (i).

NOTICE

Set the upper and lower diaphragm supports on a clean, lint-free surface.



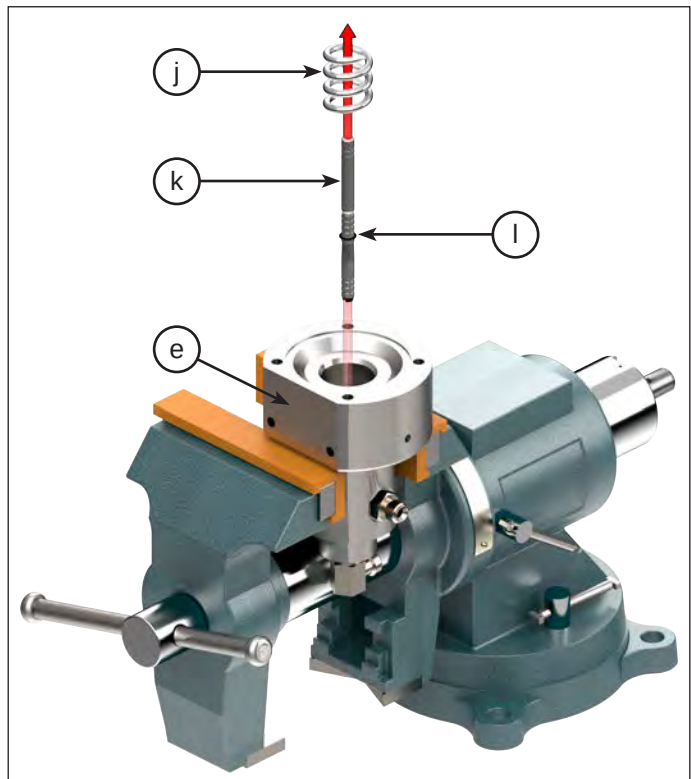
7. Remove the diaphragm spring (j) from the bore of the lower housing (e).
8. Remove the needle (k) from the lower housing internal needle guide (not shown).
9. Remove and discard the needle O-ring seal (l). The O-ring will not be reused.

NOTICE

The O-ring might not come out with the needle. If it does not, it will be pressed out during Step 18.

⚠ CAUTION

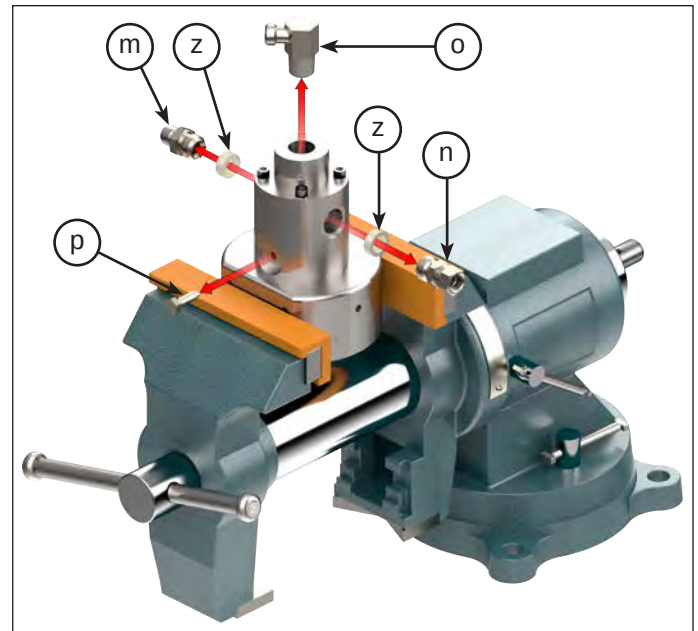
Discard used O-ring seals. O-ring seals cannot be reused but must always be replaced with new ones during MVR needle replacement or servicing.



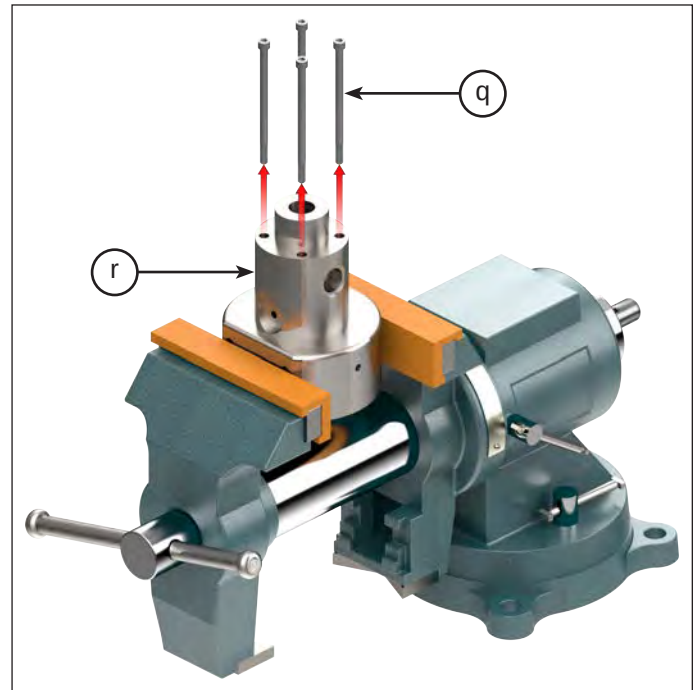
10. Flip the assembly and re-tighten the vise.
11. Remove fittings (m, n, and o).
12. Remove the MVR washers (z)
13. Remove the bushing alignment screw (p).

NOTICE

Set the fittings on a clean, lint-free surface.



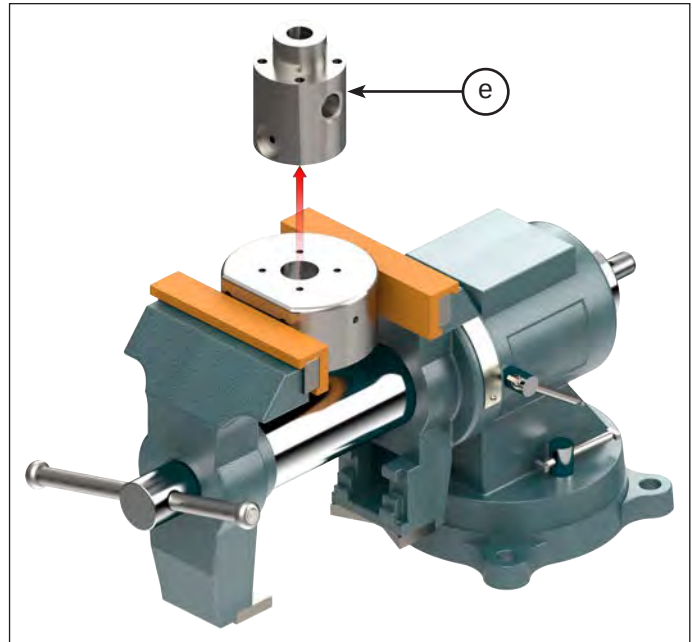
14. Remove the four screws (q) from the fluid housing (r).



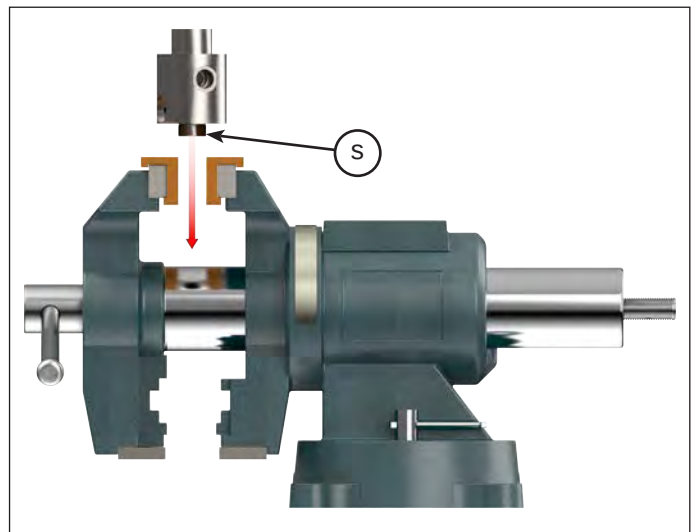
15. Remove the fluid housing (e) from the lower housing.
16. Remove the lower housing from the vise.

⚠ CAUTION

The MVR lower housing mating faces are precision-machined surfaces and will need to be replaced if marred, scratched, or gouged. The housing must be handled with care and be put on a clean, lint-free surface.



17. Put the fluid housing into the vise with padded jaws (shown) or bearing press (not shown) with the small end (s) face-down.

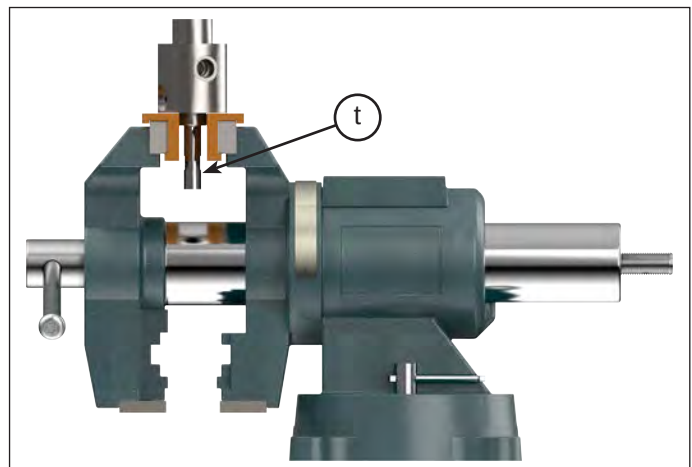


18. Use a suitable tool to drive or press out the needle bushing (t) from the valve housing.

The O-ring will drop onto the work surface if it did not come out when the needle was removed.

⚠ CAUTION

Discard used O-ring seals. O-ring seals cannot be reused but must always be replaced with new ones during MVR needle replacement or servicing.

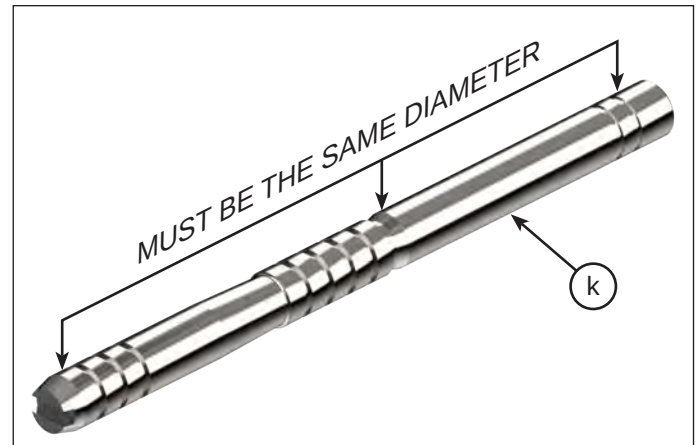


06.2 INSPECTION

Use an applicable solvent and clean the remaining material from all MVR parts.

Examine all following parts for wear and damage:

1. The needle (k) must measure the same diameter at the ends and center.
Replace the needle and bushing as a set if the needle does not measure the same at the three locations or if the needle is scored, scratched, or damaged.
2. Examine the needle for straightness along its length.
Replace it if it is not straight.

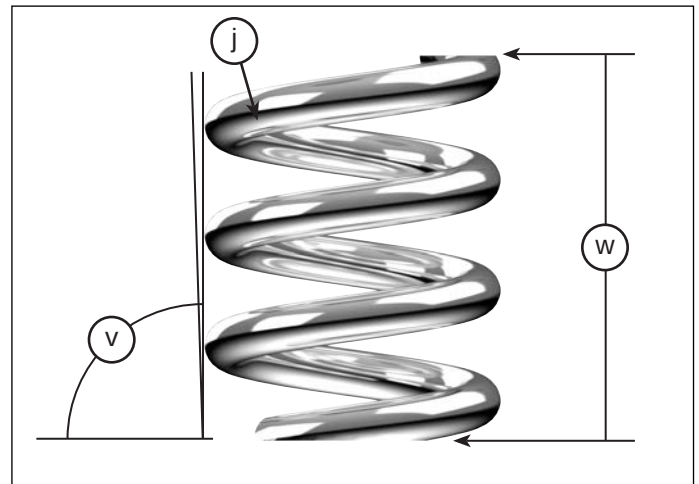


3. The needle bushing interior (u) must not be scored or scratched.

Replace the bushing and needle as a set if the bushing is scored, scratched, or damaged.

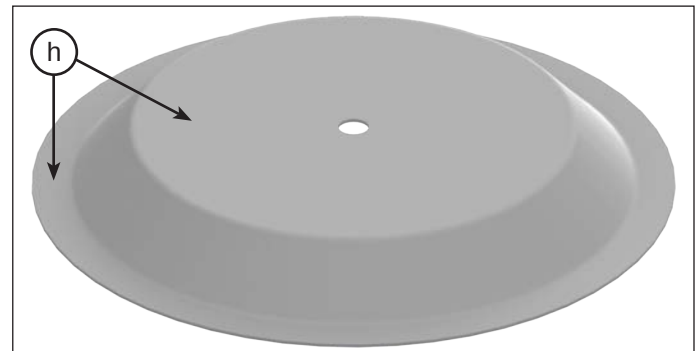


4. The diaphragm spring (j) must be straight. Replace the spring if it is more than 1 degree out of vertical center (v) from side to side or if the spring free length (w) is less than 1.5 inches.

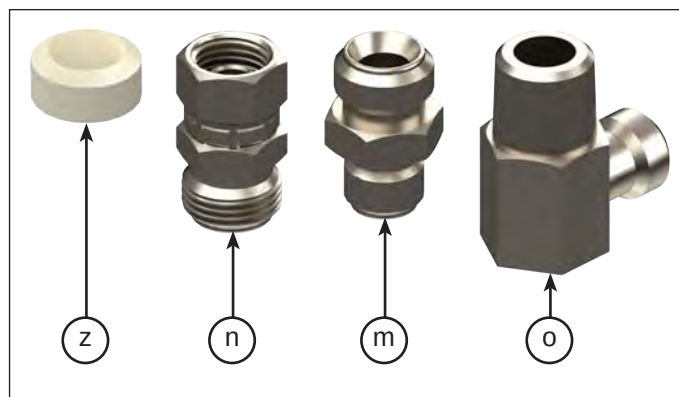


5. Replace the diaphragms (h) if fluid leaks into the air pressure chamber.

Inspect the diaphragms for wear and damage, including tears, rips, and cracks. Replace the diaphragms as a set if damaged.



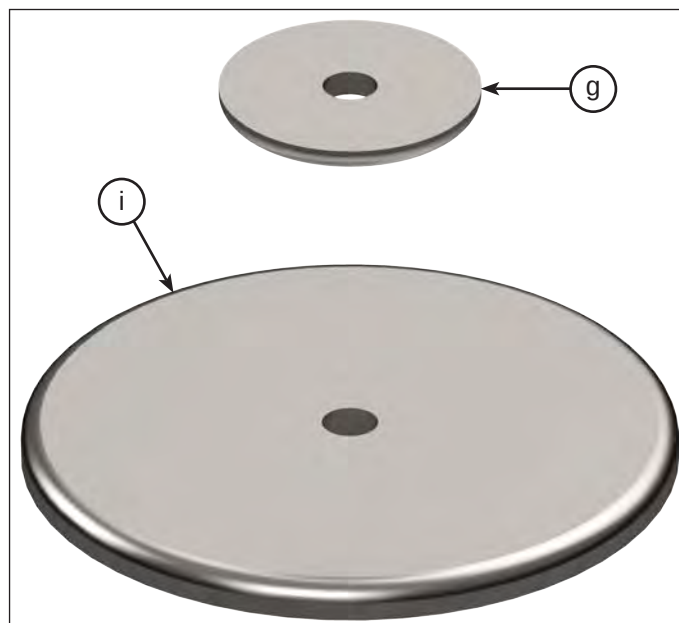
6. Replace the MVR washers (z) if they are worn, scratched, or damaged.
7. Replace fittings (m, n, o) if they leak, are worn, damaged, or have thread damage.



8. Examine the edges of the upper (g) and lower (i) diaphragm supports for raised and sharp nicks that can damage the diaphragms.

NOTICE

Minor nicks can be filed, but if they cannot be smoothed, the support must be replaced.



06.3 ASSEMBLY

06.3.1 NEEDLE PREASSEMBLY

1. Assemble the upper diaphragm support washer (g), onto the screw (f).

NOTICE

The radius side and edges (x) of the upper diaphragm support washer faces away from the bottom of the screw when correctly assembled.

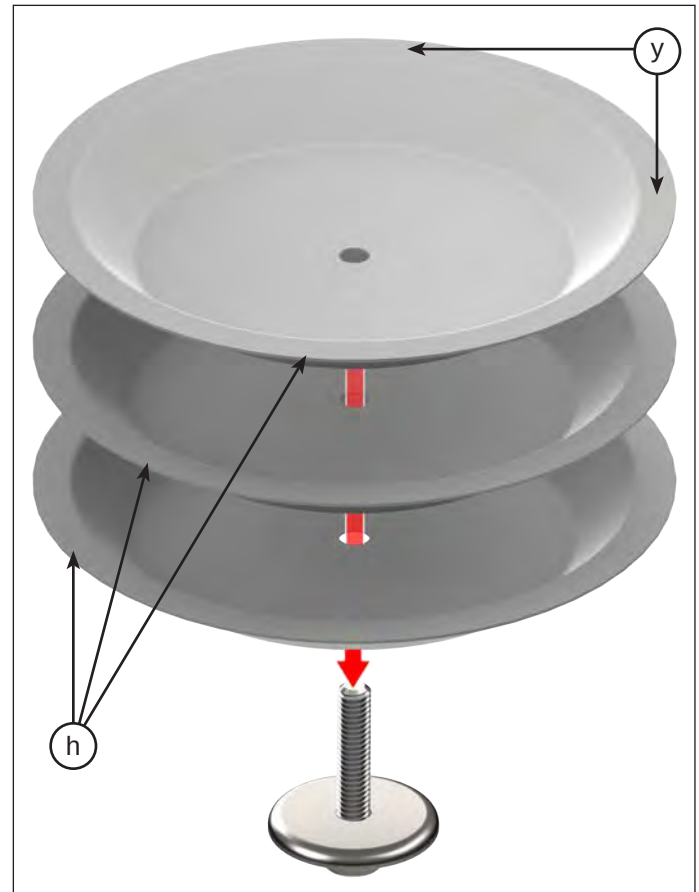
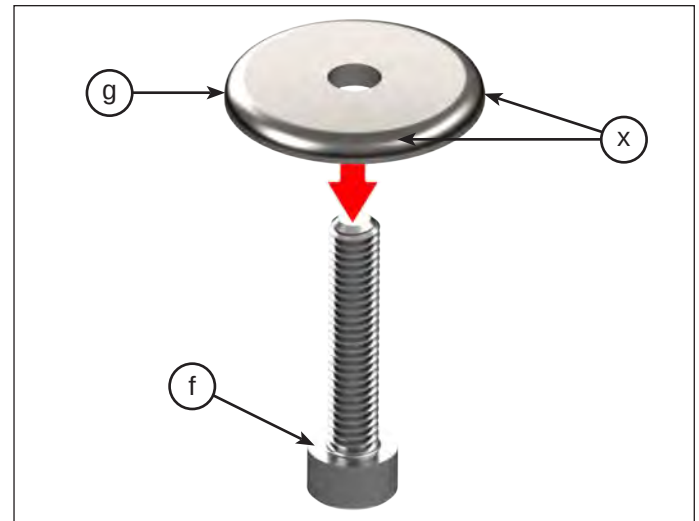
NOTICE

While not required, it is recommended that the diaphragms be replaced each time the MVR housing is opened, serviced, or rebuilt.

2. Assemble the diaphragms (h), onto the screw and upper diaphragm support washer.

NOTICE

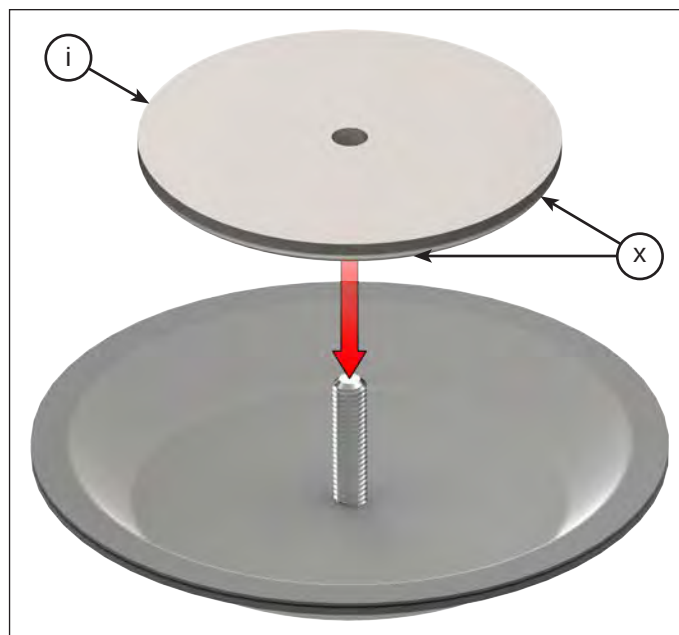
The orientation of the diaphragm seats (y) must point away from the upper support washer.



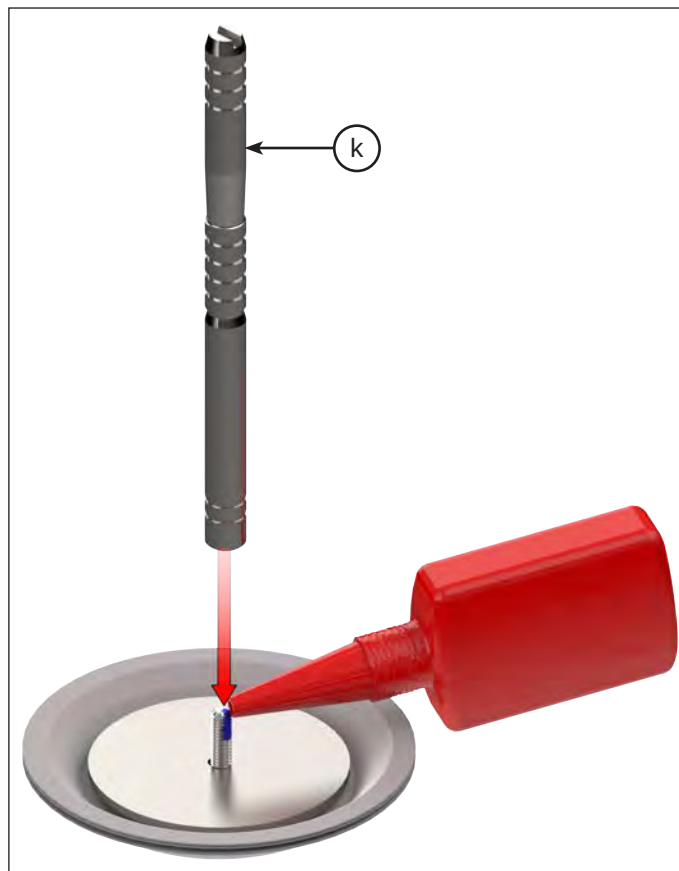
- Put the lower diaphragm support washer (i) on top of the diaphragms.

NOTICE

The radius side and edges (x) of the lower diaphragm support washer faces toward from the diaphragms when correctly assembled.



- Apply a small quantity of blue Loctite 243 (not included) onto the screw threads.
- Turn the needle (k) onto the screw.



6. Tighten the screw (f) and diaphragm assembly onto the needle.

NOTICE

When the needle is tightened, it can be held in place with a padded vise or pliers, or a large screwdriver in the slot at the bottom of the needle.

⚠ CAUTION

The needle has a precision machined surface. The needle will need to be replaced if it is nicked, marred, or damaged during the reassembly procedure.

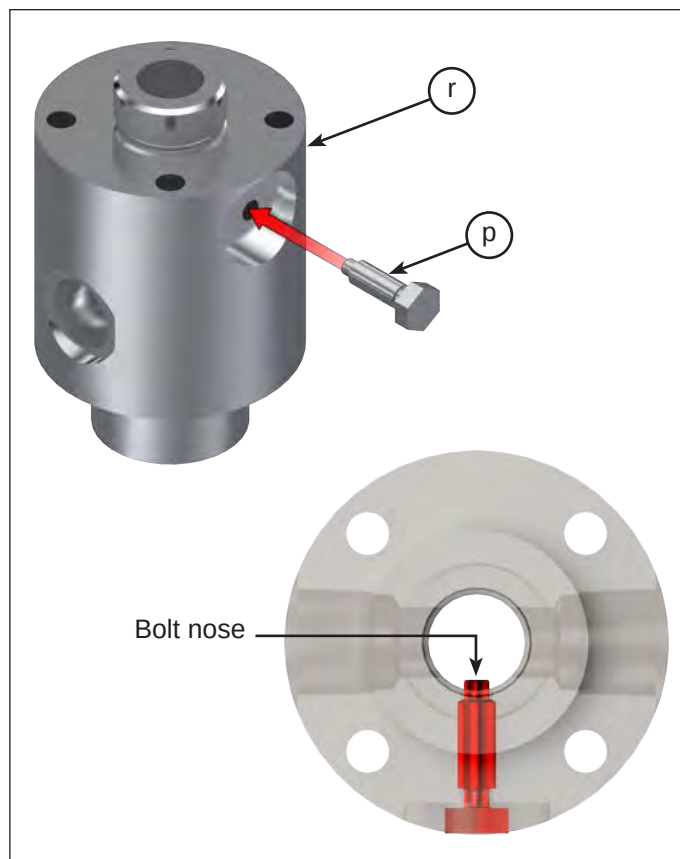


06.3.2 FLUID HOUSING ASSEMBLY

1. Put the bushing alignment screw (p) loosely into the fluid housing (r) with its nose slightly into the bushing bore.

CAUTION

The bolt must not be turned into the fluid housing all the way. It must be left loose to provide needed alignment of the needle bushing when it is pressed into place.

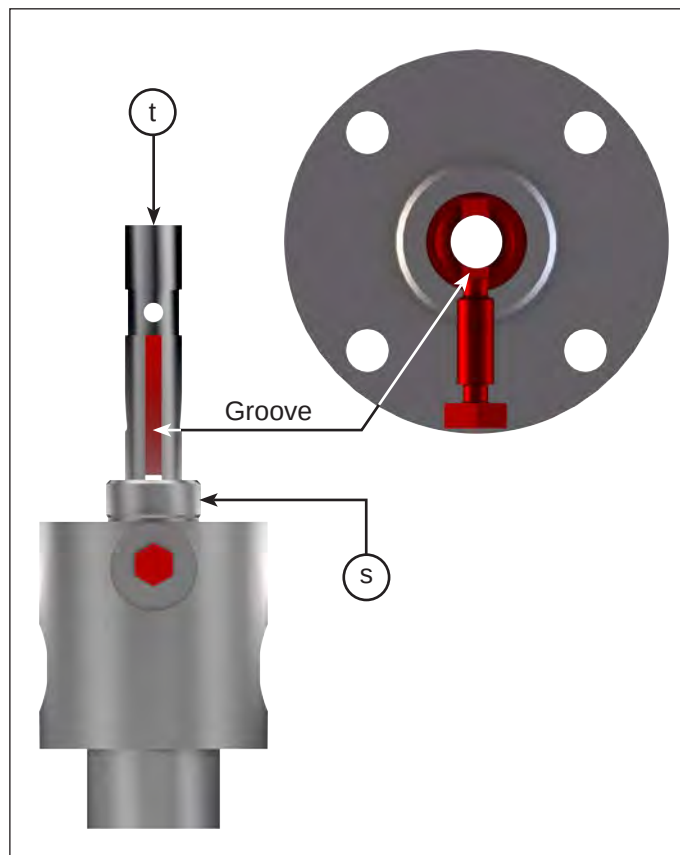


2. Apply a thin layer of petroleum jelly (not included) to the inner bore of the fluid housing.
3. Apply a thin layer of petroleum jelly (not included) to the outer surface of the needle bushing (t).
4. Put the needle bushing into the small end (s) of the fluid housing.

NOTICE

The groove on the needle bushing (marked in red) aligns with the alignment bolt.

The screwdriver slot on the bottom of the bushing faces down into the fluid housing bore.



5. Put the fluid housing and needle bushing into an arbor press (not included).
6. Press the needle bushing until fully seated into the fluid housing.

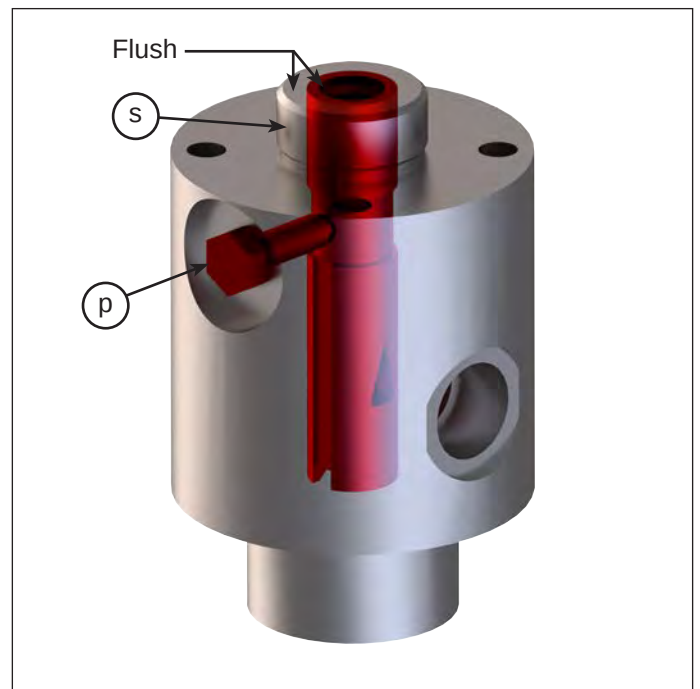


7. Examine the small end (s) of the fluid housing where the needle bushing was pressed. Make sure the needle bushing is flush with the fluid housing surface.

NOTICE

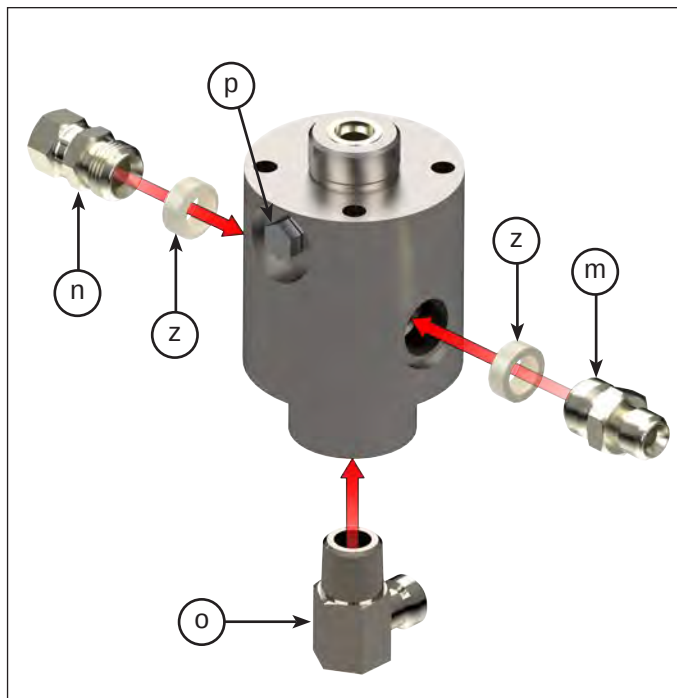
The top of the needle bushing will be flush with the fluid housing when correctly seated.

8. Tighten the bushing alignment screw (p).

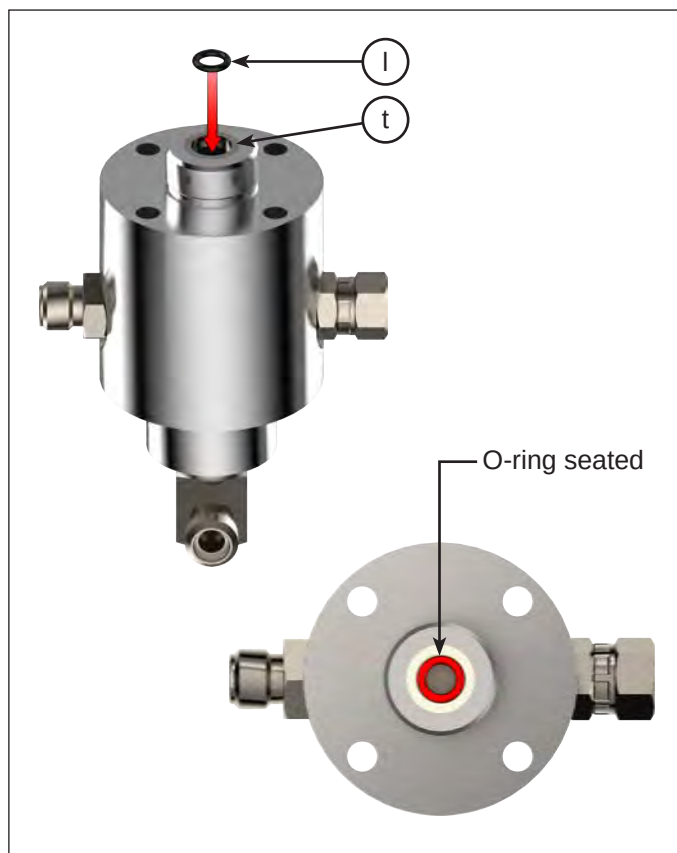


06.3.3 MVR ASSEMBLY

1. Put the MVR washers (z) into the fluid housing left and right fitting bores.
2. Apply Teflon tape (not included) to the fitting threads (m, n, and o).
3. Turn the fittings into the fluid housing.
 - i. Make sure fitting (n) is put into the fluid housing on the left of the bushing alignment screw (p).
 - ii. Make sure fitting (m) is put into the fluid housing on the right of the bushing alignment screw (p).
 - iii. Make sure the fitting (o) elbow faces 180 degrees away from the bushing alignment screw (p).



4. Apply a small quantity of petroleum jelly (not included) to the new O-ring (l).
5. Put the O-ring into the needle bushing (t) pressed into the small end of the fluid housing. Make sure the O-ring is pushed down until fully seated.

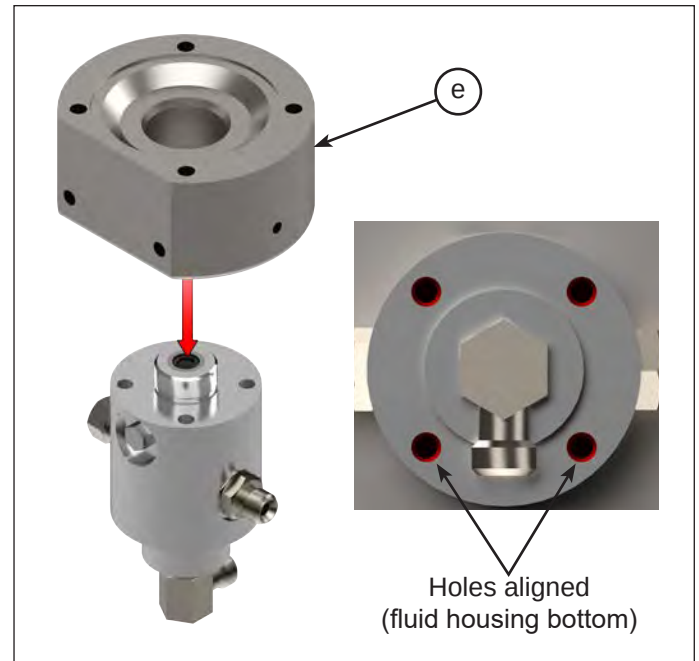


6. Put the lower housing (e) onto the small end of the fluid housing. The flat mounting side of the lower housing aligns with the bushing alignment screw in the fluid housing.

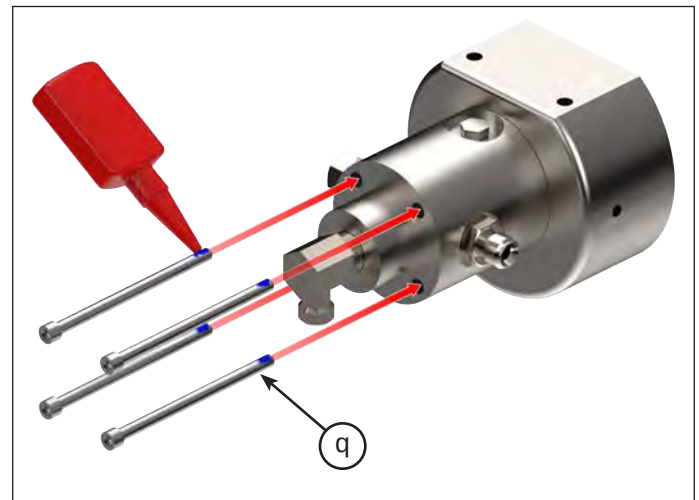
⚠ CAUTION

The fluid housing must remain upright to prevent the pinch damage of the O-ring.

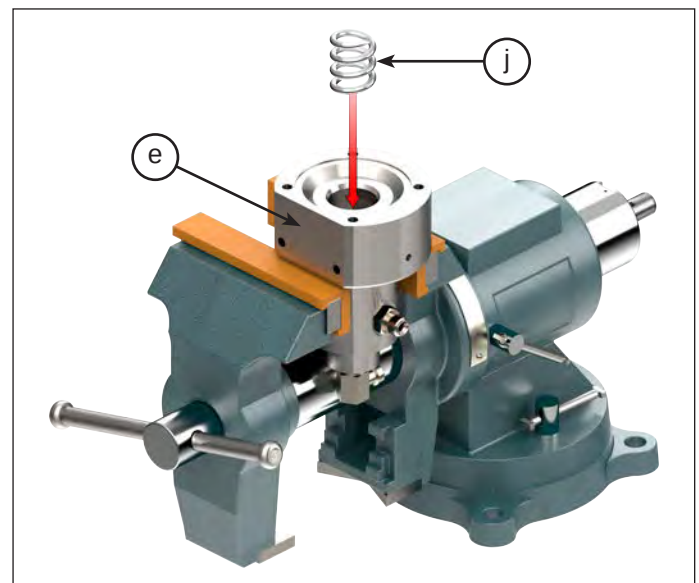
7. Make sure the drilled holes in the lower housing align with the tapped holes in the fluid housing.



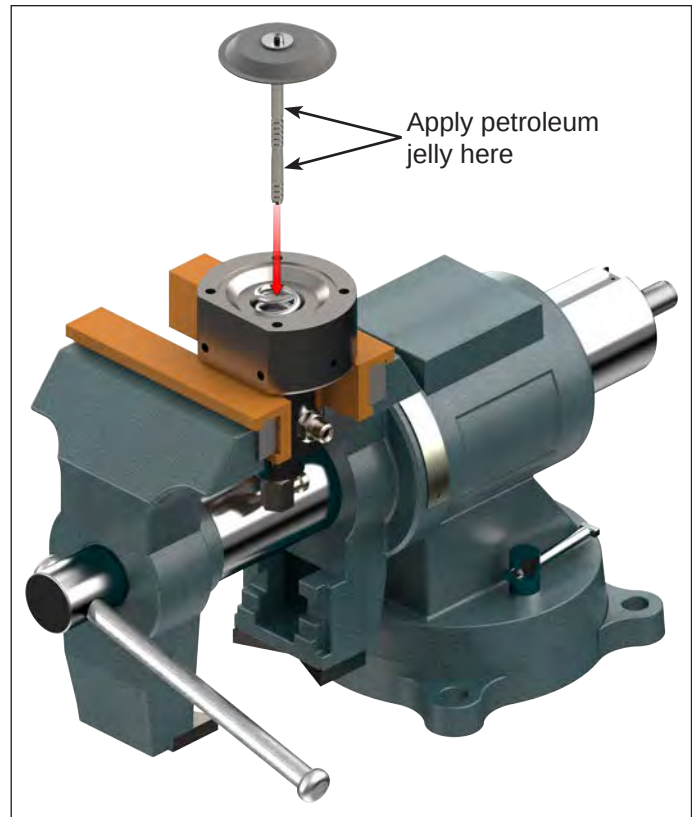
8. Apply a small quantity of blue Loctite 243 (not included) onto the screw threads (q).
9. Put the screws into the fluid housing and tighten it to the lower housing.



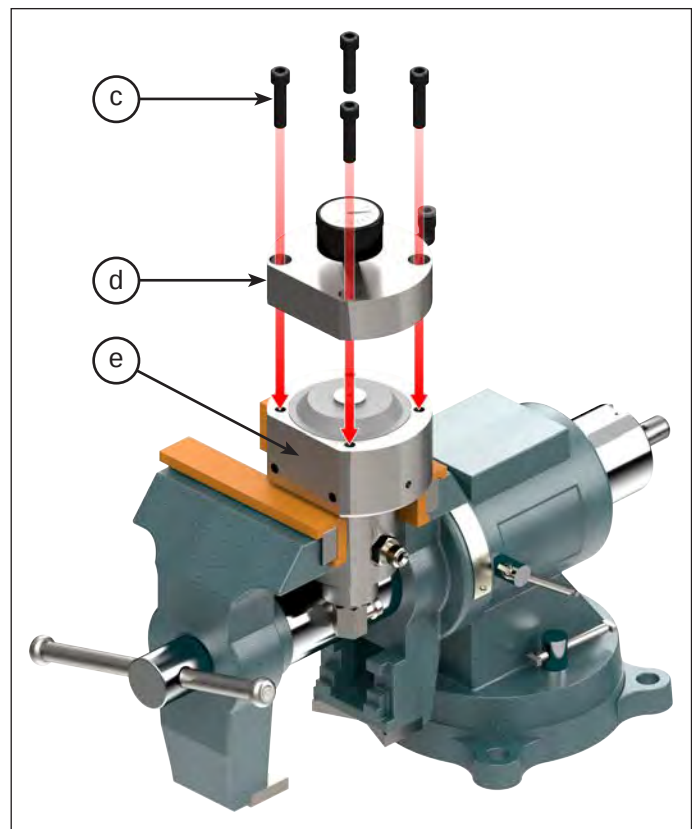
10. Put the assembled lower MVR in a bench vise (not included). Use padded jaws to protect the MVR valve housing from damage.
11. Put the diaphragm spring (j) into the bore of the lower housing (e).



12. Apply a small quantity of petroleum jelly (not included) onto the outside diameter of needle.
13. Align the needle and diaphragm assembly into the needle bushing in the fluid housing assembly.
14. Carefully slide the needle into the bushing until the lower diaphragm support rests onto the top of the spring.



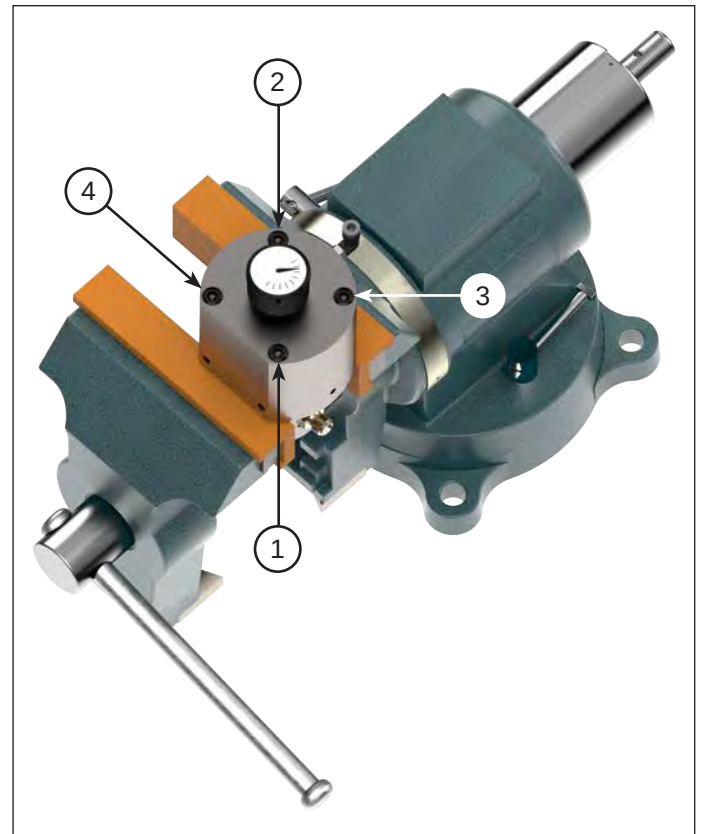
15. Lightly put the MVR upper housing (d) down onto the lower housing assembly (e). The flat surfaces of the upper and lower housings must be on the same side.
16. Put the screws (c) into the counter bores of the upper housing, then turn them in enough to hold them in position.



17. Tighten the screws in a crisscross sequence pattern in a minimum of two steps.

NOTICE

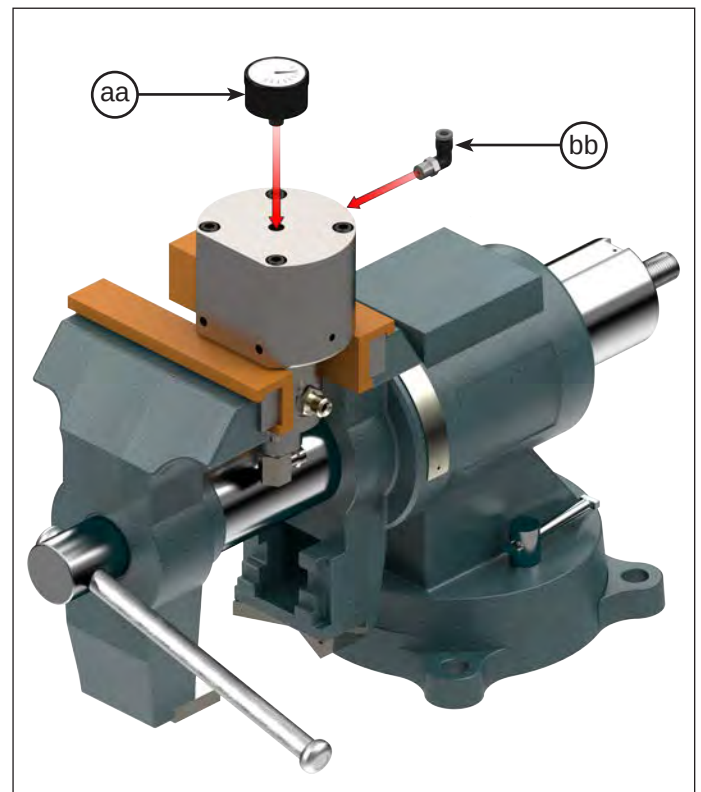
While the bolts are turned, the internal spring load will keep force against the MVR housing halves. It will be necessary to keep equal tension on the housing bolts to avoid damage to the MVR's internal components.



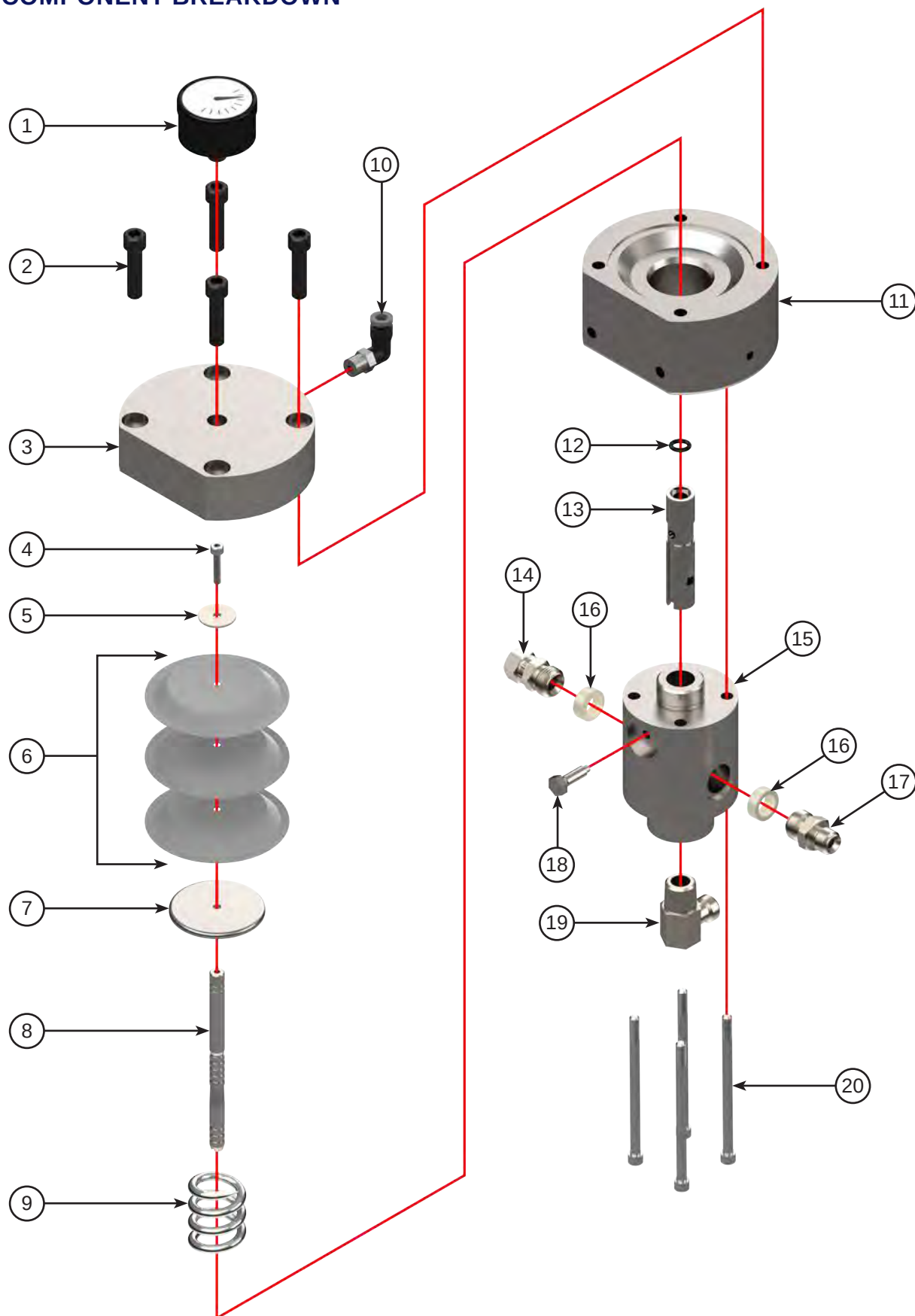
18. If previously removed, examine the pressure gauge (aa) and elbow fitting (bb).

If the gauge or threads are damaged, they must be replaced.

19. Apply Teflon tape (not included) to the threads, and attach the elbow and gauge to the upper housing.



06.4 COMPONENT BREAKDOWN



06.5 WEEPING MVR ASSEMBLY

Number	Part Number	Description	Quantity	Notes
1	GA-338	Pressure Regulator, 0-160 psi	1	Apply Teflon tape (not included)
2	TR-SSF-100	Screw, Socket Head Cap, M8 X 40	4	
3	A10508-00	Upper Housing (After 12/03)	1	
	TR-SSHC-151	Upper Housing (Prior to 12/03)	1	
4	TR-SSF-031	Screw, Socket Head Cap, M4 X 20	1	Apply Blue Loctite 243 (not included)
5	TR-SSF-506	Upper Diaphragm Support Washer	1	
6	TR-SSMM-151	Air Diaphragm	3	
7	TR-SSF-504	Lower Diaphragm Support Washer	1	
8	See Table "A"	Needle	1	Apply petroleum jelly (not included)
9	78783-00	Diaphragm Spring	1	
10	20-7024	Elbow, 1/8 inch NPT (M) x 1/4 inch ODT	1	Apply Teflon tape (not included)
11	A10509-00	Lower Housing (After 12/03)	1	
	TR-SSHC-150	Lower Housing (Prior to 12/03)	1	
12	SSG-8125	O-Ring, Polytetrafluoroethylene	1	Apply petroleum jelly (not included)
13	TR-SSHC-153-1	Needle Bushing	1	Apply petroleum jelly (not included)
14	4SN-6B	Fitting, 02 Weeping MVR (TR-SSMM-147)	1	
	4SN-6B	Fitting, 03 Weeping MVR (TR-SSMM-148)	1	
	4SN-6B	Fitting, 04 Weeping MVR (TR-SSMM-225)	1	
15	TR-SSHC-149	Fluid Housing	1	
16	TR-100952	MVR Washer	2	
17	4-6B	Fitting, 02 Weeping MVR (TR-SSMM-147)	1	
	4-6B	Fitting, 03 Weeping MVR (TR-SSMM-148)	1	
	4-6B	Fitting, 04 Weeping MVR (TR-SSMM-225)	1	
18	TR-SSF-508	Bushing Alignment Screw	1	
19	6T-4-90	Elbow, 3/8 inch NPT (M) x 1/4 inch NPS (M)	1	
20	TR-SSF-509	Screw, Socket Head Cap, M6 X 75	4	Apply Blue Loctite 243 (not included)

06.6 TABLE A-WEEPING MVR FLUID NEEDLES

MVR Assembly Part Number	Description	Needle Part Number
TR-SSMM-147	Number 2 Needle	TR-SSMM-149
TR-SSMM-148	Number 3 Needle	TR-SSMM-150
TR-SSMM-225	Number 4 Needle	TR-SSMM-226

06.7 RECOMMENDED SPARE PARTS

Part Number	Description	Quantity
TR-SSMM-151	Air Diaphragm, MVR Assembly	3
78783-00	Compression Spring, Diaphragm, MVR	1
SSG-8125	O-ring, Polytetrafluoroethylene	1

06.8 MVR MOUNTING ASSEMBLY

Part Number	Description	Quantity	Notes
310-2802	MVR Mounting Bracket	1	
20-7019	Flat Washer, 5/16 inch, 18-8	2	
20-7020	Lock Washer, 5/16 inch, 18-8	2	
20-7021	Hex Head Cap Screw, 5/16 inch-18, 1/2 inch LG	2	

06.9 WEEPING MVR FLUID NEEDLES

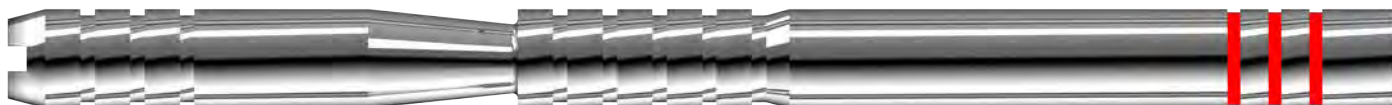
NOTICE

To determine the correct size and replacement MVR fluid needle, refer to the image shown below.

The needles have grooves at the top. The number of grooves (highlighted in red for this example) correlates to the dash number of the parent part number.



TR-SSMM-149 / Low Flow Fluid Needle (MVR Number TR-SSMM-147)



TR-SSMM-150 / Medium Flow Fluid Needle (MVR Number TR-SSMM-148)



TR-SSMM-226 / High Flow Fluid Needle (MVR Number TR-SSMM-225)

MANUAL CHANGE SUMMARY

Date	Description	Version
04/2013	Initial release	R1
03/2024	Revised manual and added new information and images	R2.0
05/2025	Updated manual to latest binks standards	R3.0

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