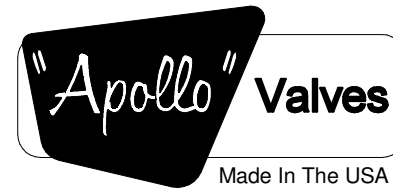


SPECIFICATIONS

Maximum working water pressure: PN 12 (1200 kPa)
 Maximum working water temperature: 60° C
 Hydrostatic test pressure: 1500 kPa
 End connections: In compliance with AS 2129

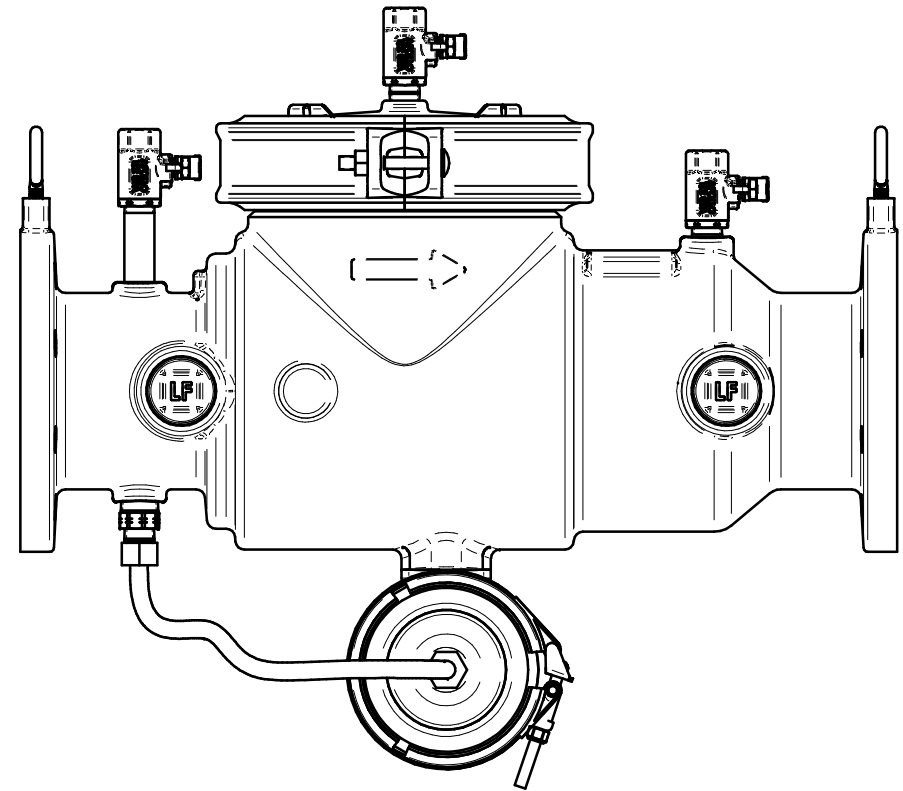
TROUBLESHOOTING GUIDE

SYMPTOM	CAUSE	CORRECTIVE ACTION
1. Relief valve continuously discharges during no-flow condition.	a. No. 1 check valve fouled with debris. b. No. 2 check valve fouled with debris coupled with a backpressure condition. c. No. 1 check poppet stem not moving freely in guide (or No. 2 check poppet during a backpressure condition).	a. Inspect and clean seat disc and seat. b. Inspect and clean seat disc and seat. c. Inspect for debris or deposits on poppet stem or guide.
2. Relief valve discharges continuously during flow and no-flow conditions.	a. Relief valve fouled with debris. b. Damaged diaphragm (allows water to pass through from inlet to zone). c. Sensing passage to inlet side of diaphragm plugged. d. No. 1 check poppet stem not moving freely in poppet guide.	a. Inspect and clean relief valve seat disc and seat. b. Replace diaphragm. c. Inspect and clean passage in cover and body. d. Inspect for debris or deposits on poppet stem or guide.
3. Relief valve discharges intermittently in a "spitting" action during no-flow condition.	a. Pressure fluctuations or water hammer from supply.	a. Eliminate or reduce supply pressure fluctuations.
4. Relief valve does not open during test No. 1.	a. No. 2 shut-off valve not closed completely. b. Test equipment improperly installed.	a. Close No. 2 shut-off valve or inspect for possible through leakage. b. Recheck test procedure.
5. No. 2 check valve fails to hold backpressure.	a. No. 2 shut-off valve not closed completely. b. No. 2 check valve fouled with debris. c. No. 2 check poppet stem not moving freely in guide.	a. Close No. 2 shut-off valve or inspect for possible through leakage. b. Inspect and clean seat disc and seat. c. Inspect for debris or deposits on poppet stem or guide.
6. Pressure differential across No. 1 check valve is low during field test No. 3 (does not meet 35 kPa minimum).	a. No. 1 check valve fouled with debris. b. Upstream pressure fluctuations causing inaccurate gauge reading. c. No. 1 check poppet stem not moving freely in guide.	a. Inspect and clean seat disc and seat. b. Eliminate pressure fluctuations. c. Inspect for debris or deposits on poppet stem or guide.



Manufactured by Conbraco Industries, Inc.

INSTALLATION, OPERATION, AND MAINTENANCE INSTRUCTIONS



DN 65 - DN 250 Model RPAULF4A Model RPLF4AI Reduced Pressure Principle Backflow Preventer

SAVE THESE
INSTRUCTIONS

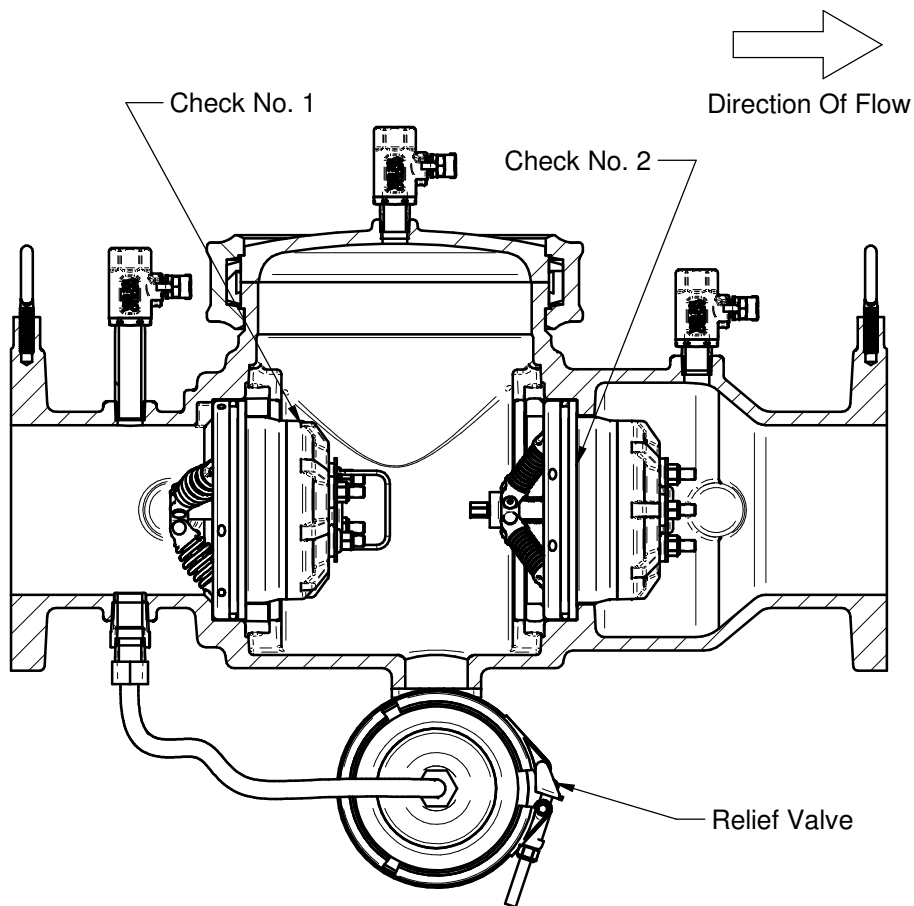
Conbraco Industries, Inc. P.O. Box 247
 Matthews, North Carolina 28106 USA
 Phone (704) 841-6000
 Fax (704) 841-6020
 www.apollovalves.com

DESCRIPTION

The Apollo Reduced Pressure Principle Backflow Preventer is designed to control cross-connections between potable water lines and substances that are health hazards or non-health hazards. The device consists of two independently acting, spring loaded check valves with a diaphragm actuated, spring-loaded relief valve located between the checks. The device is equipped with three test cocks.

OPERATION

The first check is designed to maintain a minimum of 35 kPa across the valve. The second check is designed to maintain a minimum of 7 kPa across the valve during normal operation. The relief valve operates on a differential pressure. Supply pressure on the upstream side of the first check valve acts against the diaphragm to close the relief valve during normal operation. In the event of back-pressure, the relief valve will open to maintain the pressure in the "zone" at least 14 kPa less than the inlet pressure.



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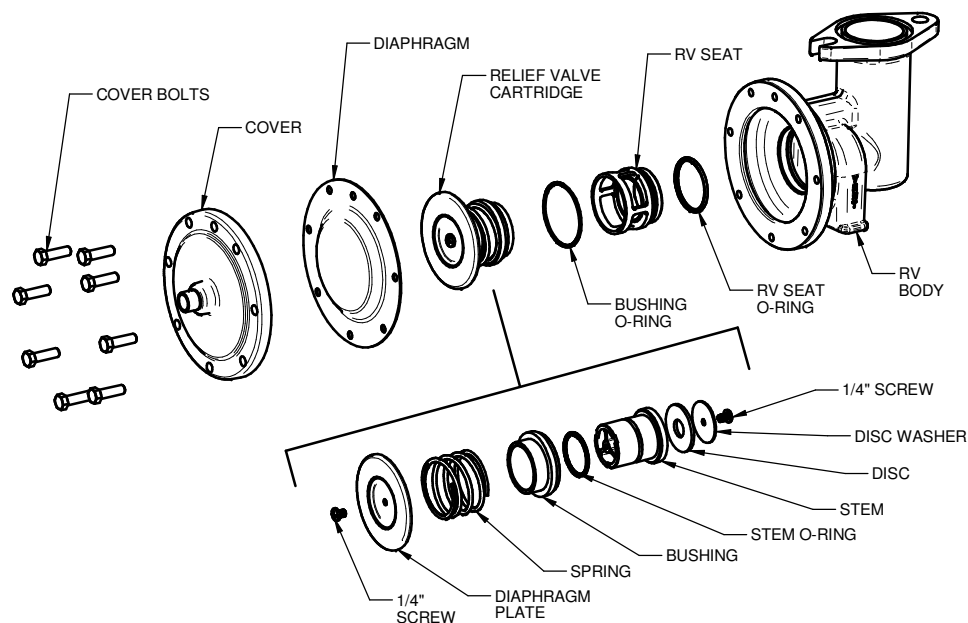
5. Remove the RV cartridge by grasping the diaphragm plate and pulling straight out. A bushing o-ring may remain in the body. Ensure this o-ring is not damaged.
6. Inspect the RV seat disc for debris or damage. To clean or replace the RV seat disc, remove the 1/4" screw on the seat disc washer. The RV disc may be flipped over for a temporary repair, but should be replaced if damaged.
7. Replace the seat disc, seat disc washer, and 1/4" screw.
8. Insert the RV module into the valve body.
9. Replace diaphragm, cover, and bolts.
10. Inspect sensing hose and replace if damaged.
11. Reinstall sensing hose to RV cover nipple.

If it is necessary to disassemble the RV module and/or remove the RV seat:

1. Remove the RV module as described above.
2. Remove the 1/4" screw on the diaphragm plate. Use caution as this will disengage the spring.
3. Remove the 1/4" screw on the seat disc washer.
4. Inspect all components for damage, paying particular attention to the diaphragm, seat disc, o-rings, and stem. If any of these components are worn or damaged, they should be replaced.
5. Lubricate the stem, stem o-ring, and RV seat o-ring with DOW 111 or equivalent lubricant. Reassemble RV cartridge.
6. Remove the RV seat by grasping the cage and pulling straight out. A flat screwdriver may be necessary to aid in removal.
7. Inspect the seat and seat o-ring for damage. If damaged, they should be replaced.
8. Insert the seat into the RV body. Ensure that it is fully seated.
9. Ensure the bushing o-ring is positioned in the RV body, then insert the assembled RV cartridge into the valve body.
10. Replace diaphragm, cover, and bolts.
11. Inspect sensing hose and replace if damaged.
12. Reinstall sensing hose to RV cover nipple.

5. Lubricate the stem, stem o-ring, and RV seat o-ring with Apollo supplied lubricant, Dow 111 or equal.
6. Reassemble RV module.
7. Remove the RV seat by grasping the cage and pulling straight out. A flat screwdriver may aid in removal.
8. Inspect the seat and seat o-ring for damage. If damaged, they should be replaced.
9. Insert the seat into the RV body. Ensure that it is fully seated.
10. Lubricate the bushing o-ring with Apollo supplied lubricant, Dow 111 or equal and insert the assembled RV module into the valve body. Ensure the diaphragm bead is seated properly before installing the RV cover.
11. Replace the cover and clamp.
12. Inspect the sensing hose and replace if damaged.
13. Reinstall the sensing hose to the nipple.

RELIEF VALVE MAINTENANCE, DN 200 and DN 250



1. Unscrew the sensing hose from the relief valve (RV) cover nipple (sensing hose is not shown).
2. The RV can be serviced while still attached to the valve or it can be removed (rarely needed). To remove the RV, unscrew the two 5/8" bolts securing the RV to the valve body.
3. Remove the RV cover by removing the eight (8) 3/8" bolts.
4. Remove the diaphragm.

It is common for occasional spillage from the relief valve port to occur during pressure fluctuations or check valve fouling. Therefore, this device must be installed in an area where spillage is not objectionable and can be adequately drained. If a drain line to contain relief valve discharge is used, a mechanical air gap must be provided between the drain and this RP. Apollo offers an Air Gap Drain kit for easy attachment to this device.

INSTALLATION

ALL MODEL RPAULF4A INSTALLATIONS SHALL COMPLY WITH AS/NZS 3500.1

- A. The RP must be installed in an accessible location to facilitate periodic field testing and maintenance and not subject to freezing. The relief valve outlet should always have free ventilation to the atmosphere and be located not less than 300 mm above the surrounding surface.
- B. The location selected should have adequate drainage for relief valve discharge not subject to ponding. The device should never be placed where it may be submerged in standing water.
- C. Flush all upstream piping thoroughly to remove foreign matter prior to installing the device.
- D. The device should be installed in the horizontal position.
- E. Upstream and downstream resilient seated shutoff valves are required to be installed and a line strainer is required except as provided by AS/NZS 3500.1. After installing the assembly and with downstream or #2 shut-off valve closed, pressurize the device and bleed air through test cock #3. Then open #2 shut-off valve.

TESTING PROCEDURES

NOTE: Consult AS 2845.3 for detailed procedures. The steps below summarize the valve testing.

1. Notify the customer water will be off; inspect device for leaks, verify the make, model, and serial number.
2. Flush test cocks in order (3-1-2), without opening the relief valve, then install fittings.
3. Close valves "A", "B", & "C" on test kit and close the #2 shut-off valve.
4. Connect the high side hose to test cock #1, and low hose to test cock #2.
5. Slowly open test cock #2, then open vent "C" valve and low "B" valve. This will bleed air from low side of gauge. Slowly open test cock #1, then open high "A" valve. This will bleed air from high side of gauge. Close valve "A", then valve "B", then valve "C".
6. Observe this apparent differential pressure for check valve #1; this value must be at least 35 kPa or greater.

TEST NO. 1

Purpose: To test check valve #2 against back pressure.

1. Connect the vent "C" hose to test cock #3.
2. Slowly open the high "A" and vent "C" valves and keep the low "B" closed.
3. Open test cock #3.
4. Gauge reading may decrease slightly due to disc compression. If pressure differential continues to decrease until the vent opens, report check valve #2 as leaking.

TEST NO. 2

Purpose: To test shut-off valve #2 for tightness.

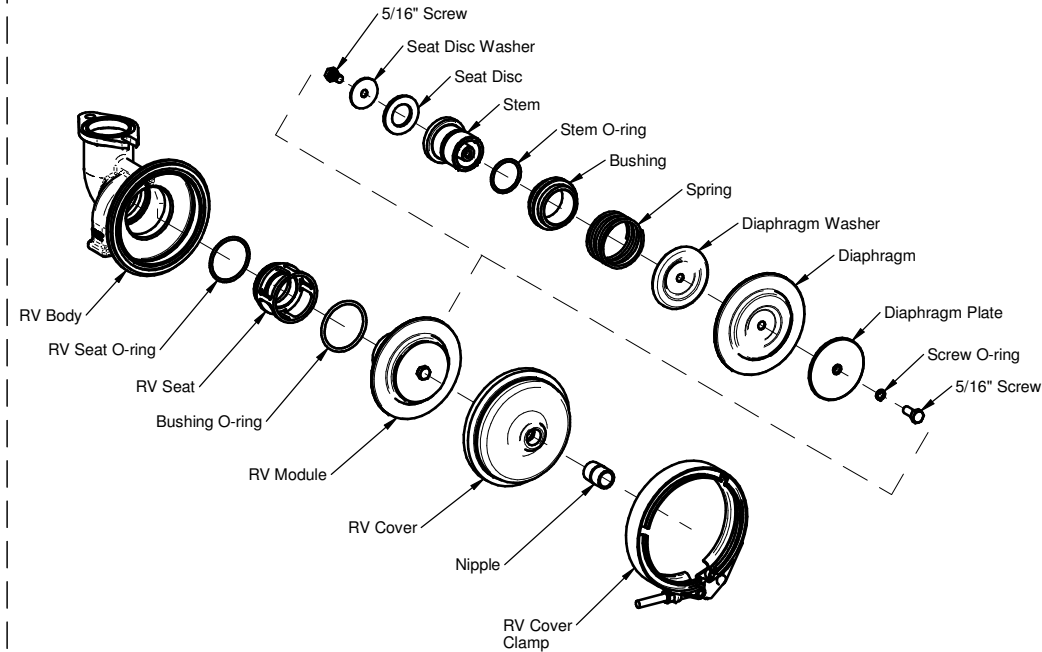
1. After passing test No. 1, continue to test No. 2 by closing test cock #1.
2. The indicated pressure differential will decrease slightly. If pressure differential continues to decrease (approaching zero) report the No. 2 shut-off valve as leaking.

TEST NO. 3

Purpose: To test check valve #1 for tightness.

1. Close high "A" valve and open test cock #1.
2. Close test cock #3.
3. Open low valve "B", this will bleed air from low side of gauge, then closing valve "B" restores the system to a normal static condition.
4. Observe the pressure differential gauge; this value must be at least 35 kPa or greater. Record this value for check valve #1 on the backflow test report form.

RELIEF VALVE (RV) MAINTENANCE, DN 65 - DN 150



1. Unscrew the sensing hose from the nipple (sensing hose is not shown).
2. The RV can be serviced while still attached to the valve or it can be removed (rarely needed).
3. Remove the clamp by backing off the nut until the latch can be disengaged from the T-bolt. Pull the clamp apart and slide away from the RV.
4. Remove the RV cover.
5. Remove the RV module by grasping the diaphragm plate and pulling straight out.
6. Inspect the RV seat disc for debris or damage. To clean or replace the RV seat disc, remove the 5/16" screw on the seat disc washer. The RV disc may be flipped over for a temporary repair, but should be replaced if damaged. Replace the seat disc, seat disc washer, and 5/16" screw.
7. Lubricate the bushing o-ring with Apollo supplied lubricant, Dow 111 or equal, and insert the RV module into the valve body. The RV diaphragm has a rubber bead that fits into a groove in the RV body. Ensure the diaphragm bead is seated properly in the RV body before installing the RV cover.

If it is necessary to disassemble the RV module and/or remove the RV seat:

1. Remove the RV module as described above.
2. Remove the 5/16" screw on the diaphragm plate. Use caution as this will disengage the spring.
3. Remove the 5/16" screw on the seat disc washer.
4. Inspect all components for damage, paying particular attention to the diaphragm, seat disc, o-rings, and stem. If any of these components are worn or damaged, they should be replaced.

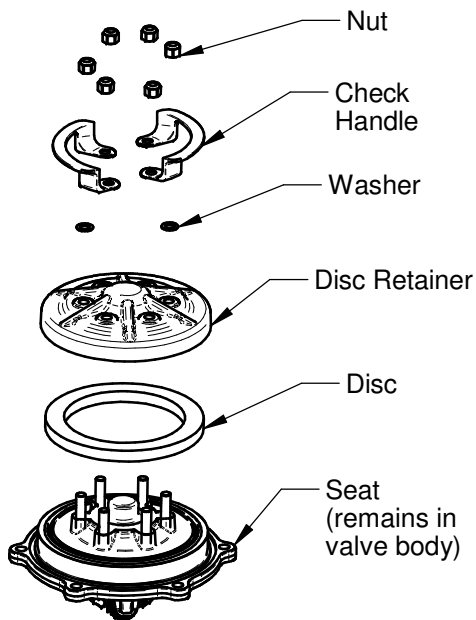
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Check Removal, DN 200 and DN 250

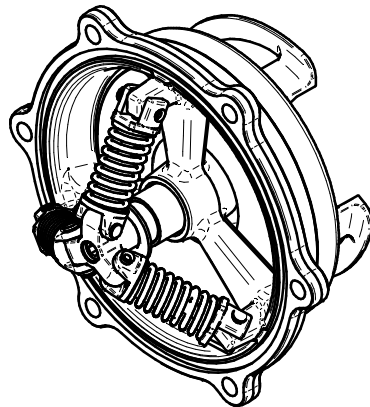
If removing the entire check module is necessary, remove the reusable locknuts on the check seat with a 3/4" socket and ratchet. Lift the entire check module from the body using lifting handles. When replacing the check module, ensure the o-ring is positioned properly in its groove. Lubrication may aid in o-ring retention.

If only cleaning of the disc is necessary, remove only the locknuts on the black plastic disc retainer. The seat will remain in the body. Remove the locknuts, handles, and nuts and lift the disc retainer out of the body. The disc may then be cleaned or replaced as needed. Replace parts in reverse order. Do not overtighten the locknuts.

CHECK VALVE ASSEMBLY (Shown as removed from the valve body for disc cleaning only)



CHECK VALVE ASSEMBLY (Shown as a complete assembly removed from the valve body)



NOTE: The springs are factory installed and should not be removed or adjusted. Serious injury could occur if springs are disassembled.

TEST NO. 4

Purpose: To test operation of the Differential Pressure Relief Valve.

The Pressure Differential Relief Valve must operate to maintain the "zone" between the two check valves at least 14 kPa less than supply pressure.

1. Close vent "C" valve.
2. Open the high "A" valve.
3. Slowly open the low "B" valve no more than one turn.
4. Hold the valve at this position and observe the gauge reading at the first moment the first discharge is noted from the relief valve.
5. Record this as the opening differential pressure of the relief valve on the test report form.

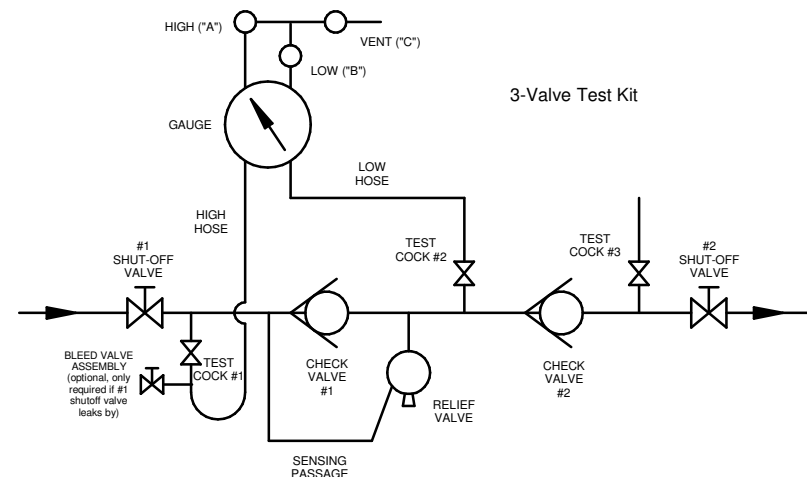
TEST NO. 5

Purpose: To do a differential pressure test on check valve #2.

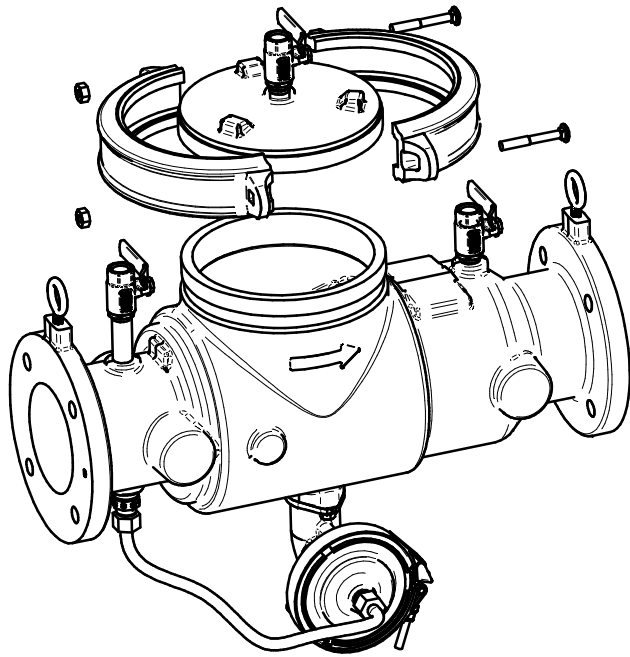
1. After completing test No. 4, close test cock #1, then close test cock #2.
2. Close valves "A", "B", and "C" on test kit.
3. Move low hose "B" to test cock #3, then move high hose "A" to test cock #2.
4. Slowly open test cock #3, then open vent "C" valve and low "B" valve. This will bleed air from low side of gauge.
5. Slowly open test cock #2, then open high "A" valve. This will bleed air from high side of gauge.
6. Close valve "A", then "B", then "C".
7. Observe the pressure differential gauge, this value must be at least 7 kPa or greater.
8. Record this value for check valve #2 on the backflow test report form.

END OF TESTING

Make sure all test cocks are closed. Remove hoses and fittings. Slowly open shut-off valve #2 to restore water supply to the customer.



CHECK VALVE MAINTENANCE



Make sure there is no pressure on the device by opening all test cocks. Both shut-off valves must be closed.

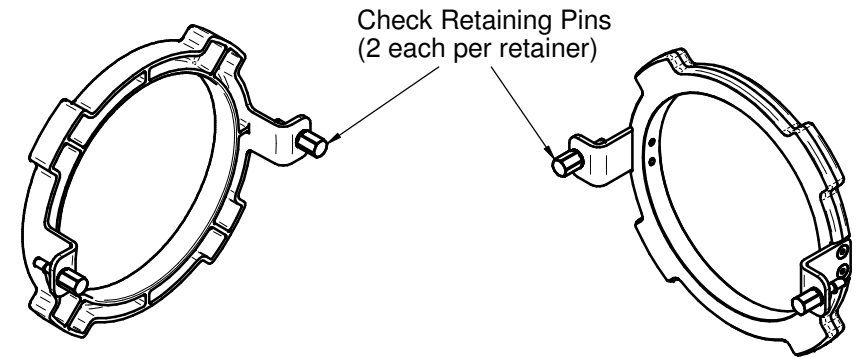
1. Remove the cover's groove connection coupling by removing the bolts and nuts. Slide away the coupling clamps and remove the rubber gasket.
2. Lift off the cover.

If only cleaning of the first check is necessary, simply remove the nuts on the black plastic disc retainer. Remove the check handle(s) and washer(s) and lift the disc retainer and disc out of the body. Clean the disc or replace if necessary. The disc may be flipped over for a temporary repair. Replace the disc, disc retainer, washer, handle(s), and nuts.

Check Removal, DN 65 - DN 150

If removing the entire check module is necessary, remove the check retainers by unscrewing the retaining pins with a 3/8" wrench (the pins are retained and will not fall out). When the pins are loose, rotate the check retainer to align the tabs with the slots in the valve body. Then remove the retainer. The first check retainer is plastic. The second check retainer is stainless steel. They are not interchangeable. Lift the entire check module from the body and clean as needed. Replace parts in reverse order. Securely tighten retainer pins.

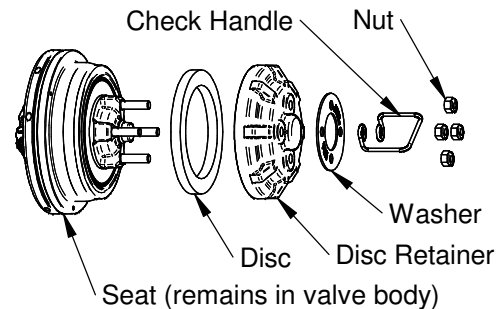
NOTE: Once installed, the retainer may rotate a few degrees in either direction. This is normal. The retainer pins once installed will prevent the retainer from disengaging its groove.



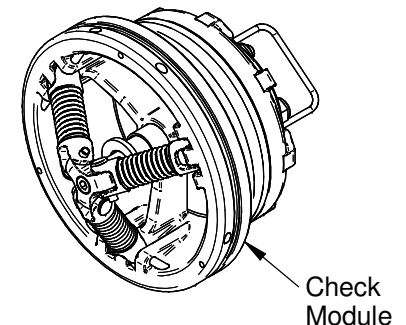
FIRST CHECK RETAINER

SECOND CHECK RETAINER

CHECK VALVE ASSEMBLY
(Shown as removed from the valve body for disc cleaning only)



CHECK VALVE ASSEMBLY
(Shown as a complete assembly removed from the valve body)



NOTE: The springs are factory installed and should not be removed or adjusted. Serious injury could occur if springs are disassembled.