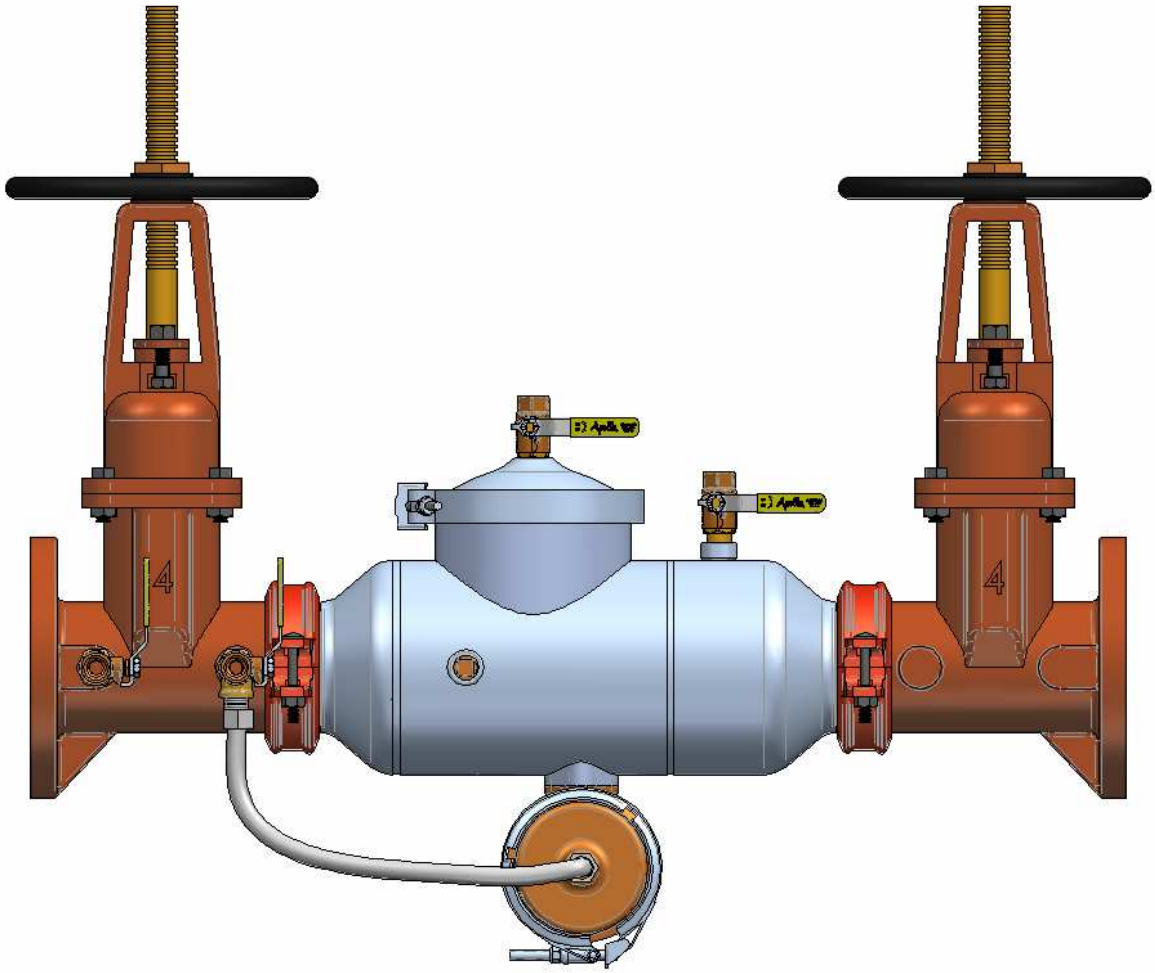
Made In The USA

Model RP 4A
Model RPDA 4A
Model RPDA2 4A

Installation, Operation, and Maintenance Manual



2 ½” – 12”

Reduced Pressure Principle Backflow Preventer
Reduced Pressure Detector Assembly

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Reduced Pressure Principle Backflow Preventer (RP)

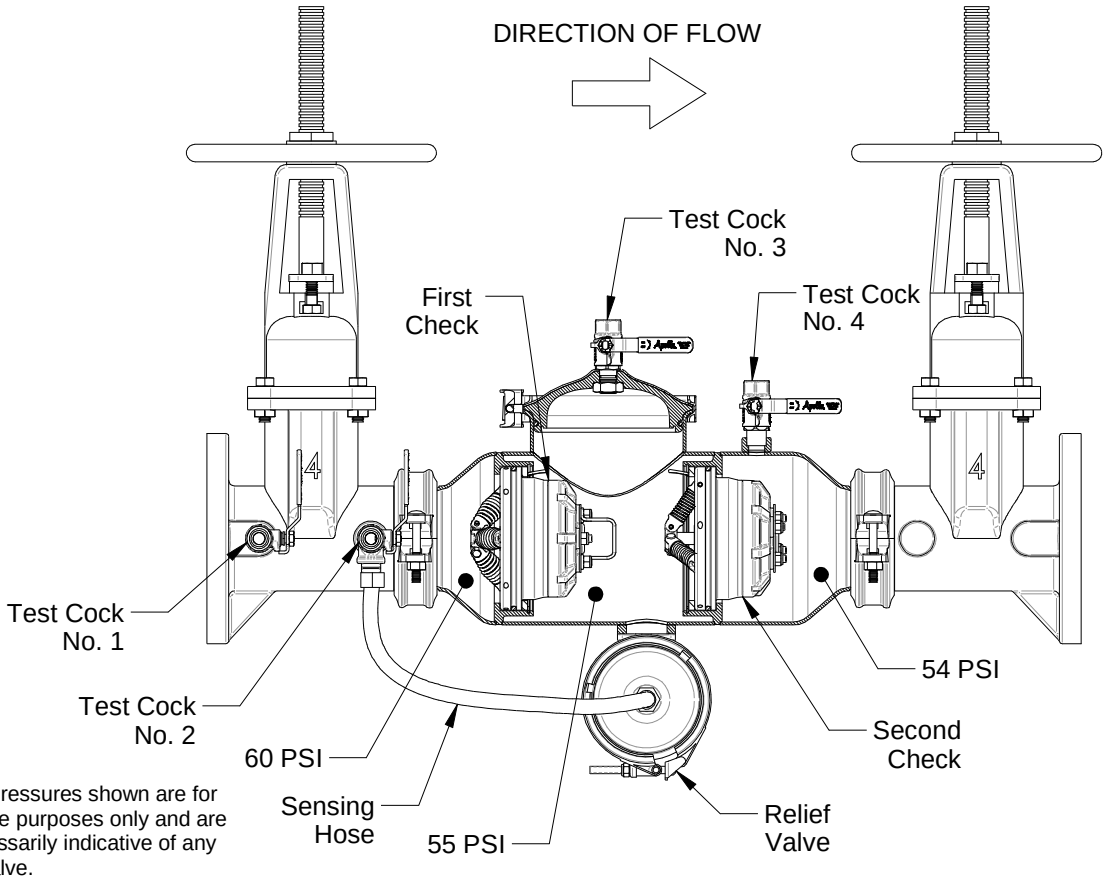
I. DESCRIPTION AND OPERATION

The Reduced Pressure Principle (RP) device consists of two independently-acting, spring-loaded check valves, together with a hydraulically dependent, mechanically independent pressure differential relief valve, located in the zone between the check valves. Two resilient seated shut-off valves and four test cocks complete the assembly.

The first check is designed to maintain a minimum of 5 psi across the check valve. The second check is designed to maintain a minimum of 1 psi across the check 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 2 psi less than the inlet pressure.

II. INSTALLATION

- **A.** The RP must be installed in an accessible location to facilitate periodic field testing and maintenance.
- **B.** The location selected should have adequate drainage for relief valve discharge. 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. A clearance between the lower most portion of the device and flood grade or floor should be provided for ease of maintenance.
- **E.** If shut-off valves are provided separately, they must include tapped bosses for attachment of the sensing hose, the #1 test cock, and the #2 test cock. Contact the factory for installation instructions.
- **F.** After installing the assembly and with downstream (#2) shut-off valve closed, pressurize the device and bleed air through test cock #4. Then open #2 shut-off valve.



NOTE: Pressures shown are for illustrative purposes only and are not necessarily indicative of any actual valve.

Figure 1

III. TROUBLE SHOOTING GUIDE

SYMPTOM	CAUSE	CORRECTIVE ACTION
1. Relief valve continuously discharges during no-flow condition.	a. #1 check valve fouled with debris. b. #2 check valve fouled with debris coupled with a backpressure condition. c. #1 check poppet stem not moving freely in guide (or #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 deposit 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. #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. #2 shut-off valve not closed completely. b. Test equipment improperly installed.	a. Close #2 shut-off valve or inspect for possible through leakage. b. Recheck test procedure.
5. #2 check valve fails to hold backpressure.	a. #2 shut-off valve not closed completely. b. #2 check valve fouled with debris. c. #2 check poppet stem not moving freely in guide.	a. Close #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 #1 check valve is low during field test No. 3 (does not meet 5 PSID minimum).	a. #1 check valve fouled with debris. b. Upstream pressure fluctuations causing inaccurate gauge reading. c. #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.

IV. MAINTENANCE INSTRUCTIONS

2 ½" – 6" Sizes

Open test cocks #2, #3, and #4 to relieve pressure from the device. Both shut-off valves must be closed.

A. Check Removal
Note: If the first check disc needs only to be cleaned, it is not necessary to remove the entire check module from the valve body. See the next section, "Check Maintenance", for disc cleaning instructions.

1. Remove the cover clamp by backing off the reusable locknut until the latch can be disengaged from the T-bolt. Pull the clamp apart and slide away from the valve. See Figure 2.

2. Lift off the cover. A flat screwdriver will aid in lifting the cover out of the body. Screwdriver slots are provided on the perimeter of the cover. The first check must be removed first, and then the second check may be removed.

3. Remove the check-retaining clip by pinching the clip ears together. This will disengage the clip from its groove. Remove clip and check-retaining ring. Pull check module straight out of the body. The check module is sealed in place by an o-ring. See Figure 3.

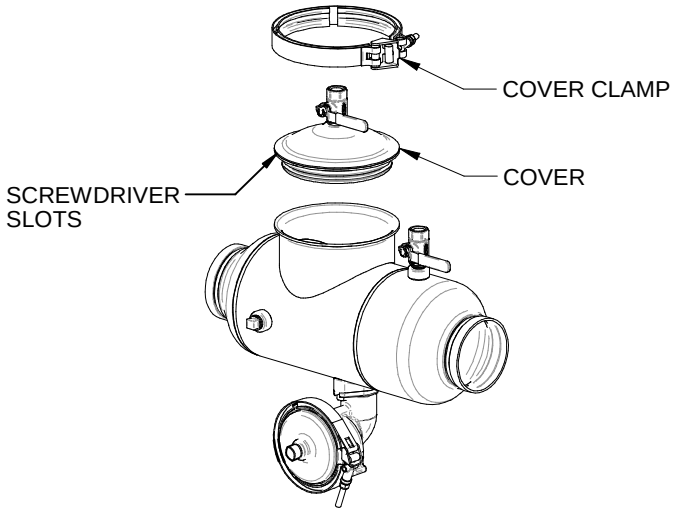


Figure 2

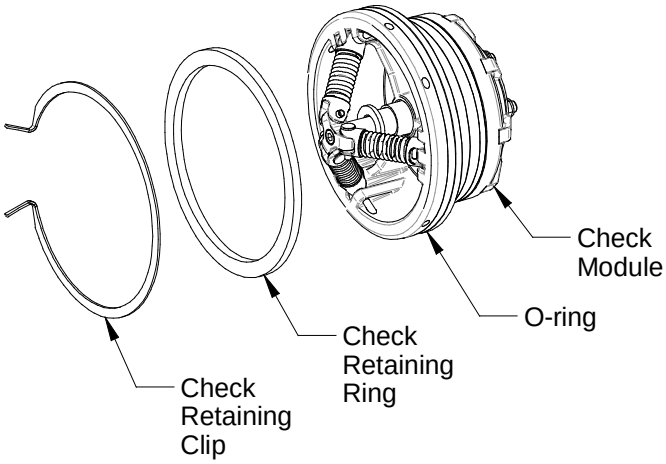


Figure 3

B. Check Maintenance
If only cleaning of the first check is necessary, simply remove the three (3) reusable locknuts for 2 1/2" & 3" valves / four (4) nuts for 4" & 6" valves on the black plastic disc retainer (See Figure 4). *SUGGESTION: Place a rag over the relief valve opening inside the valve body to prevent the locknuts from falling into the relief valve.* Remove the check handle and washer and lift the disc retainer and disc out of the body. Rinse the disc with clean water or replace if necessary. The disc may be flipped over for a temporary repair, but should be replaced if damaged. Replace the disc, disc retainer, washer, handle, and nuts. Do not over tighten locknuts.

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

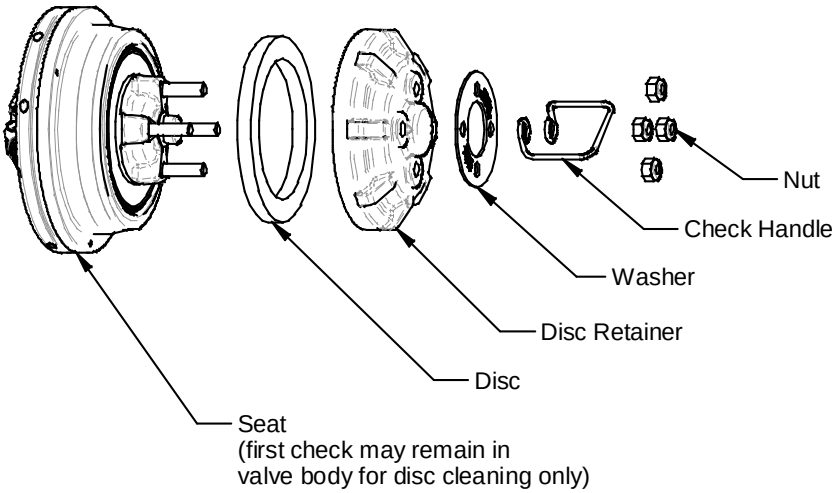


Figure 4

C. Relief Valve Maintenance

1. Unscrew the sensing hose from the nipple (sensing hose is not shown). See Figure 5.
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.
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.

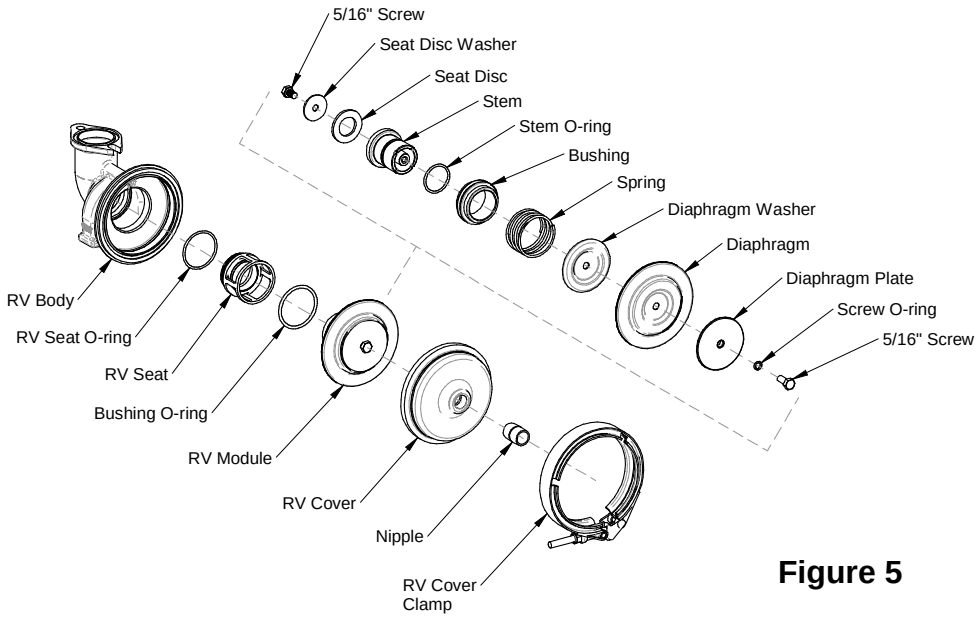
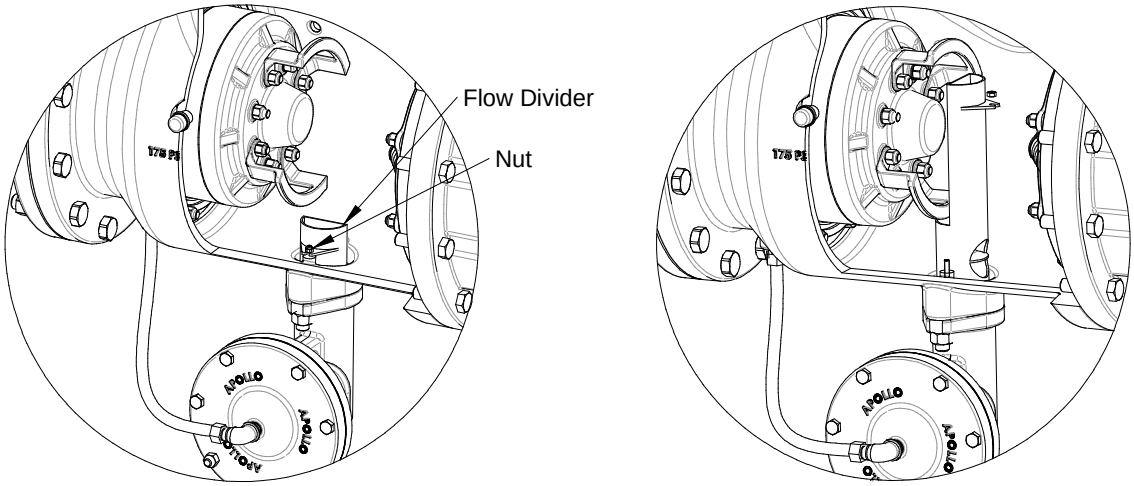


Figure 5

8" – 12" Sizes

Open test cocks #2, #3, and #4 to relieve pressure from the device. Both shut-off valves must be closed.



Note: On 10" & 12" models, the flow divider (FD) must be removed before the checks should be removed. To remove the FD, remove the ¼" nut holding it in place. Then rotate the FD 90° and lift up and out of the valve body. Pay attention to which side of the body the FD is attached. The FD's tab should be oriented on the same side as the cover of the relief valve body. If the relief valve needs to be turned 180°, the FD must also be rotated 180°.

A. Check Removal
Note: If the first check disc needs only to be cleaned, it is not necessary to remove the entire check module from the valve body. See the next section, "Check Maintenance", for disc cleaning instructions.

1. Take off the cover coupling by removing the two bolts and nuts.
2. Lift off the cover. The gasket may remain on the valve body. See Figure 6.
   Note: The 10" & 12" valves are equipped with lifting tabs for cover lifting only. This tab should not be used to lift the entire valve.
3. Remove the six (6) reusable locknuts for 8" valves / eight (8) nuts for 10" & 12" valves on the check seat with a 3/4" socket and ratchet. *SUGGESTION: Place a rag over the relief valve opening inside the valve body to prevent the locknuts from falling into the relief valve.*

4. Slide the entire check module off the body studs and remove from body (see Figure 7).

Either check may be removed without disturbing the other (8” – 12” valves only).

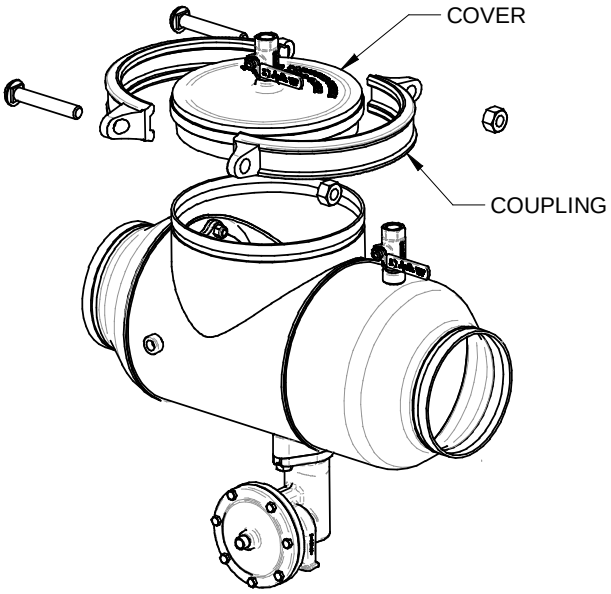


Figure 6

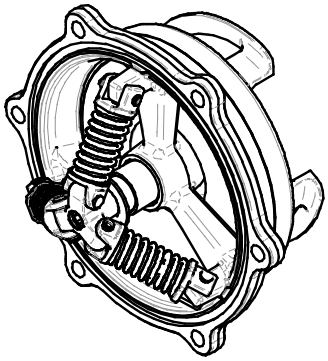


Figure 7

B. Check Maintenance

If only cleaning of the first check is necessary, simply remove the six (6) reusable locknuts for 8" valves / eight (8) nuts for 10” & 12” valves on the black plastic disc retainer (See Figure 8). Remove the check handles and washers and lift the disc retainer and disc out of the body. Rinse the disc with clean water or replace if necessary. The disc may be flipped over for a temporary repair, but should be replaced if damaged. Replace the disc, disc retainer, washer, handle, and nuts. Do not over tighten locknuts.

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

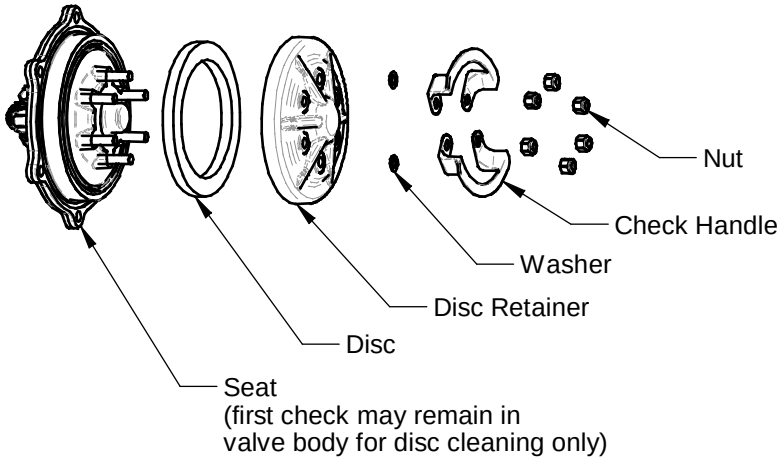


Figure 8

C. Relief Valve Maintenance

Note: See Figure 9.

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 ⅝" bolts securing the RV to the valve body.
3. Remove the RV cover by removing the seven (7) ⅜" bolts.
4. Remove the diaphragm.
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 ¼" 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 ¼" 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.

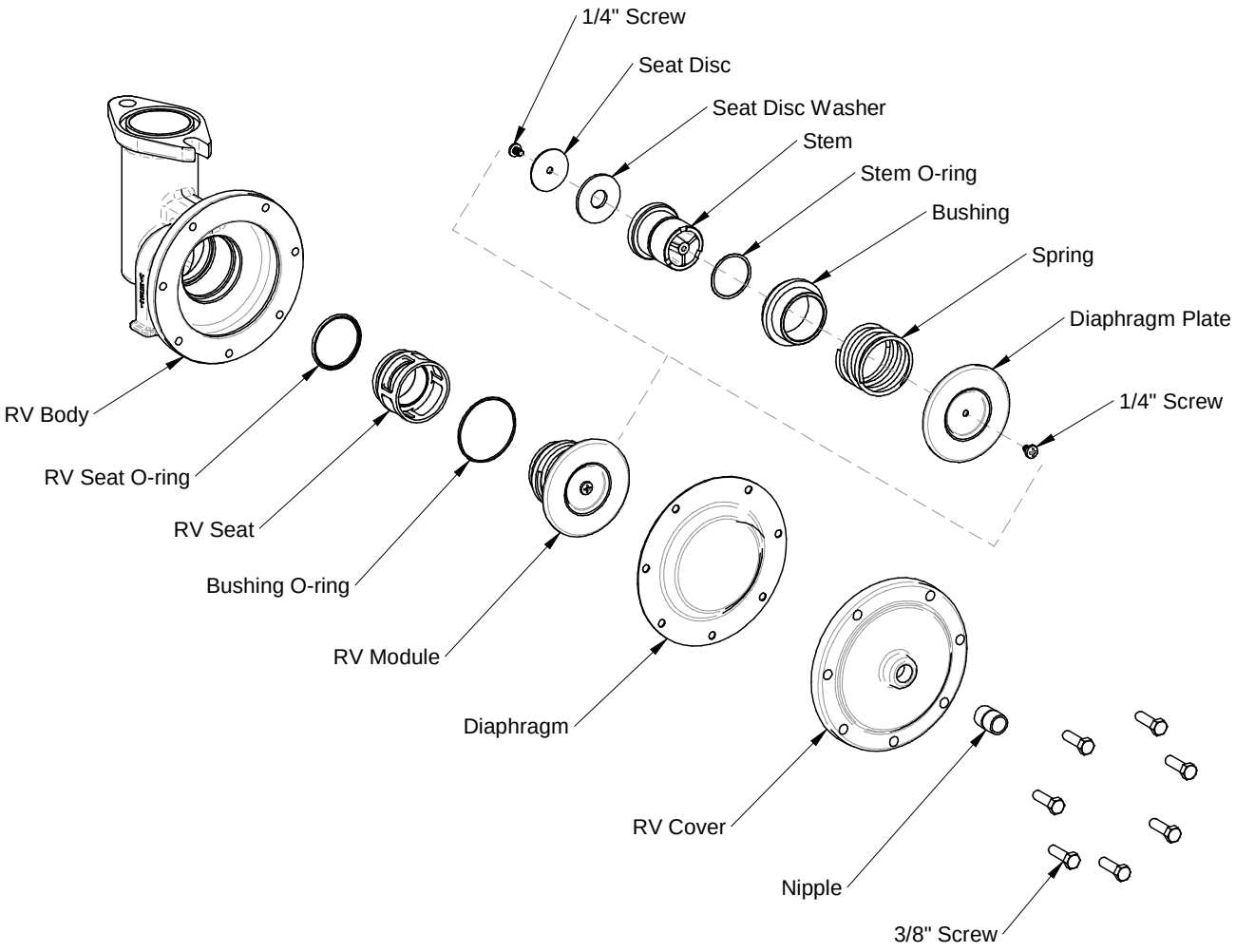

1/4" Screw
Seat Disc
Seat Disc Washer
Stem
Stem O-ring
Bushing
Spring
Diaphragm Plate
1/4" Screw
RV Body
RV Seat O-ring
RV Seat
Bushing O-ring
RV Module
Diaphragm
RV Cover
Nipple
3/8" Screw

Figure 9

V. TESTING PROCEDURES

NOTE: This 3 valve test kit procedure may not be approved in all jurisdictions. Consult your local water purveyor for acceptable test procedures. See Figure 10 for test schematic.

TEST NO. 1

PURPOSE:
To test operation of the pressure differential relief valve.

REQUIREMENT:
The pressure differential relief valve must operate to maintain the zone between the two check valves at a minimum of 2 psi less than the supply pressure.

PROCEDURE:
1. Open test cock (TC) #4 to establish flow through the RP. Flush TCs in the following order taking care not to dump the relief valve. Open and close TC #1. **SLOWLY** open and close TC #2. Open and close TC #3. Close test cock #4. Install appropriate adapters in TCs.
2. Connect the high (left) hose to TC #2. Connect the low (middle) hose to TC #3. Fully open the bypass (right) valve.
3. Slowly open TC #2. Bleed the high side through the bypass hose by opening the high valve. Close the high valve.
4. Slowly open TC #3. Bleed the low side through the bypass hose by opening the low valve. After the pointer on the gage reaches the upper end of the scale, close the bypass and low valves.
5. Close the No. 2 shutoff valve and observe the pressure drop across check valve No. 1. If the pressure drops until the relief valve discharges continuously, check valve No. 1 is leaking and must be cleaned or repaired before continuing.
6. Open the high valve.
7. Open the low valve no more than one-quarter (1/4) turn.
8. Watch the pointer on the gage drop slowly to the opening point of the relief valve and record the reading. If the relief valve does not open, go to step 10.
9. Close the high and low valves on the gage and go to test No. 2.
10. The No. 2 shutoff valve may be leaking. Reopen and close No. 2 shutoff valve to attempt a better shutoff. Repeat steps 6 through 8. If the relief valve does not open, a bypass hose is required (not to be confused with the bypass hose on the gage). Large leaks may require a garden hose.
11. Attach the bypass hose to TC #1. Bleed hose by opening TC #1. Close TC #1.
12. Connect the bypass hose from TC #1 to TC #4.
13. Open TC #1 to pressurize the hose.
14. Slowly open TC #4. Repeat steps 6 through 8. If the relief valve still does open, the leaky No. 2 shutoff valve must be repaired.

TEST NO. 2

PURPOSE:
Is check valve No. 2 tight against back pressure?

NO BYPASS HOSE USED IN TEST 1
1. Bleed gage bypass hose by opening the high and bypass valves. Close the bypass valve.
2. Attach the bypass hose to TC #4. Open TC #4.
3. Loosen the low side hose at TC #3 to re-establish the normal reduced pressure within the "zone". Re-tighten the low hose at TC #3.
4. Open the bypass valve. If the differential pressure stabilizes above the relief valve opening point, check valve No. 2 is recorded as "tight". Proceed to test No. 3. If the reading falls to the relief valve opening point, check valve No. 2 is noted as "leaking" and test No. 3 cannot be completed.

BYPASS HOSE USED IN TEST 1
1. Leave the bypass hose connected between TCs #1 and #4. Leave TCs #1 and #4 open.
2. Open the low and bypass valves allowing the pointer to reach the upper part of the scale.
3. Close the low and bypass valves.

4. If the differential pressure stabilizes above the relief valve opening point, check valve No. 2 is recorded as "tight" (proceed to test No. 3). If the reading falls to the relief valve opening point, check valve No. 2 is recorded as "leaking" and test No. 3 cannot be completed.

TEST NO. 3

PURPOSE:
Is the static pressure drop across check valve No. 1 maintained at least 3 psi above the relief valve opening point?

NO BYPASS HOSE USED IN TESTS 1 AND 2
1. Close the high and bypass valves. Close TC #4 and disconnect gage bypass hose.
2. Open the low and bypass valves allowing the pointer to reach the upper end of the scale. Close the low and bypass valves.
3. Allow the gage reading to stabilize. Record this reading as the static pressure drop across check valve No. 1.

BYPASS HOSE USED IN TESTS 1 AND 2
1. Open the low and bypass valves allowing the pointer to reach the upper end of the scale. Close the low and bypass valves.
1. Allow the gage reading to stabilize. Record this reading as the static pressure drop across check valve No. 1.

TESTING PROCEDURE FOR SINGLE CHECK ON RPDA TYPE 2 BYPASS:

Note: The first check of the mainline valve is <u>also</u> the first check of the bypass assembly and the test results for the first mainline check should be recorded as the first check of the bypass assembly. If the local water authority requires a second test for the first check, perform the test again and record the results. The second check is the single check on the bypass line. (See page 14 for test cock locations.)

1. Flush water through the bypass line test cocks to eliminate foreign material.
2. To test the bypass single check, connect the “high” side hose to the first test cock on the bypass line (upstream of single check valve). Hold the “low” side hose level with the gauge.
3. Close the inlet shut-off valve on the mainline and bypass line. The single check valve must hold at least 1.0 psid.

WRAP UP: CLOSE ALL TEST COCKS. OPEN NO. 2 SHUT-OFF VALVE. DRAIN GAGE.

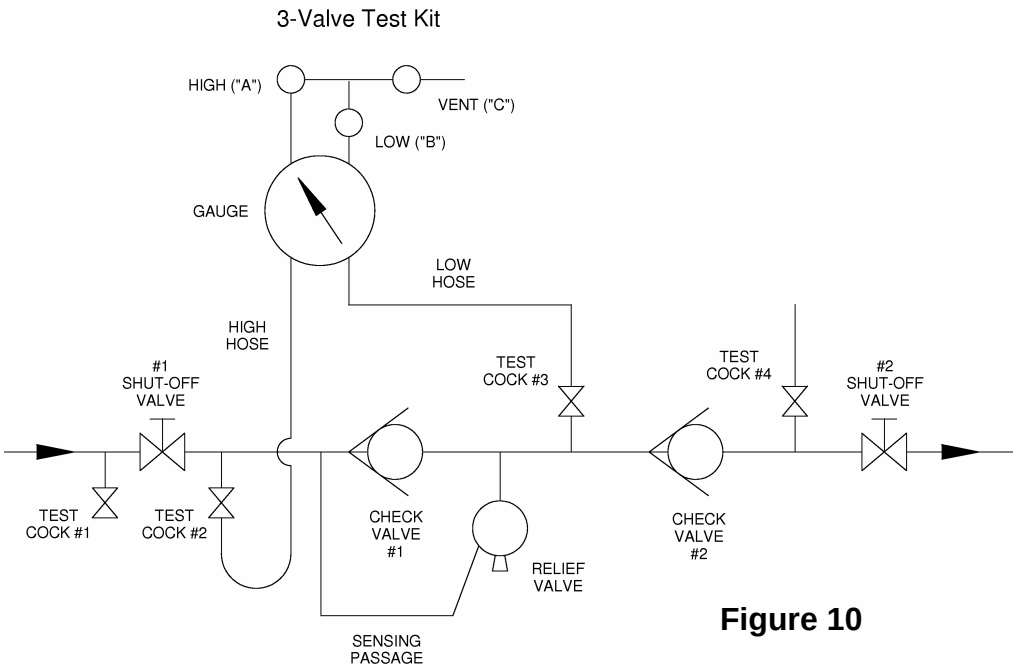


Figure 10

Reduced Pressure Detector Assembly (RPDA)

VI. DESCRIPTION AND OPERATION

The Reduced Pressure Detector Assembly (RPDA Type 1) contains a mainline RP incorporating two independently acting, spring-loaded check valves with a diaphragm-actuated spring-loaded relief valve located between the checks and a bypass line consisting of an approved RP assembly and a water meter. The RPDA Type 2 contains a mainline RP and a bypass line consisting of a single check valve and a water meter (A Type 2 bypass utilizes the first check of the mainline as the first check of the bypass and the single check on the bypass as the second check). Each device is equipped with test cocks for periodic field testing and is normally supplied with inlet and outlet shut-off valves. NOTE: UL and FM installations must include indicating type shut-off valves.

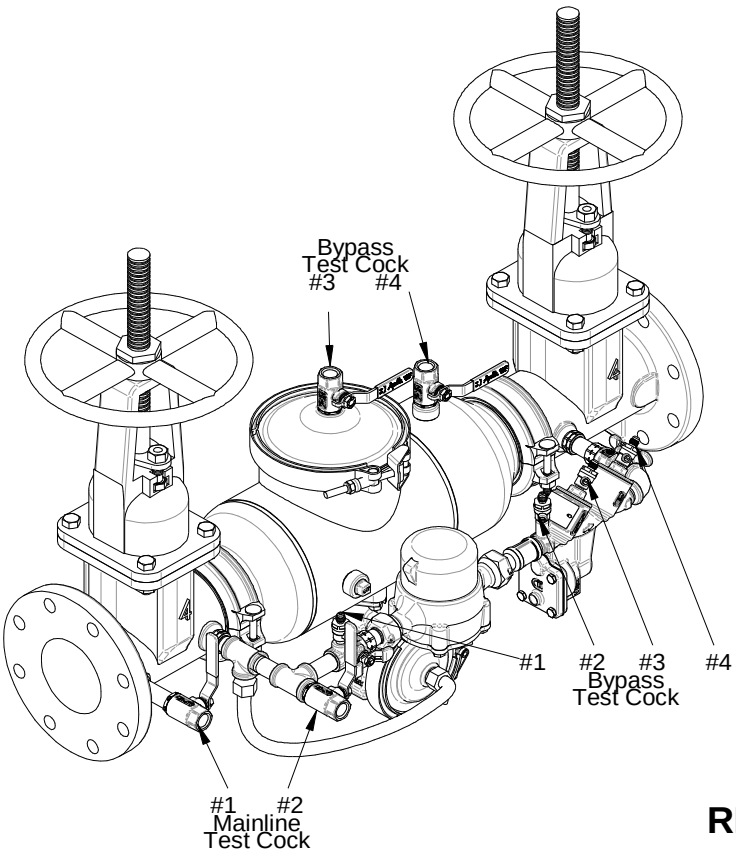
During no flow conditions, the mainline and bypass check valves will remain closed. If there is a low flow demand (up to a minimum of 2 gpm) of water downstream, the flow is routed through the water meter to monitor such consumption. If the downstream pressure increases above the supply pressure or there is a reduction in the inlet pressure, the mainline and bypass check valves will close to prevent backflow.

VII. INSTALLATION

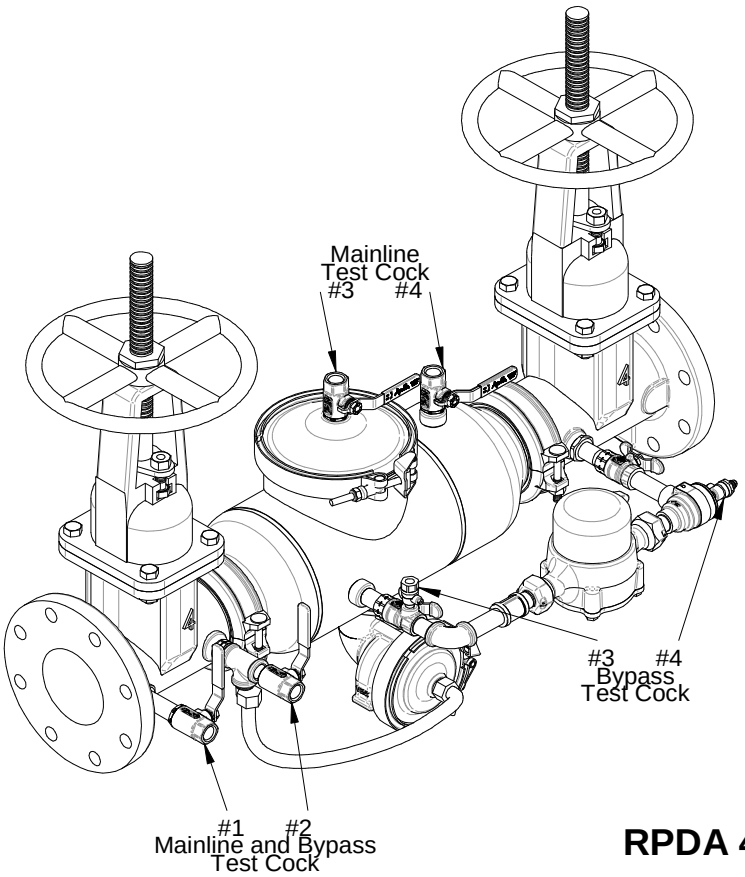
A. The RPDA must be installed in an accessible location to facilitate periodic field testing and maintenance.
B. Flush all upstream piping thoroughly to remove foreign matter prior to installing the device.
C. The device must be installed in the horizontal position. A clearance of 12” to 30” between the lower most portion of the device and flood grade or floor should be provided for ease of maintenance
D. If shut-off valves are provided separately, they must include tapped bosses for attachment of the sensing hose, bypass piping, the #1 test cock, and the #2 test cock. Contact the factory for installation instructions.
E. After installing the assembly and with downstream (#2) shut-off valve closed, pressurize the device and bleed air through test cock #4. Then open #2 shut-off valve.

OTHER INSTALLATION TIPS

- The installation location should have adequate drainage for relief valve discharge. The device should never be placed where it may be submerged in standing water. Do not install in areas subject to freezing without using a properly designed enclosure.
- As in any piping system, provisions should be made to minimize water hammer and pressure rise due to thermal expansion, as these conditions can create damaging and dangerously high internal pressures.
- A “Y” strainer can be installed just upstream of the RP assembly to eliminate any debris from entering the device and fouling the check and/or relief valve. **Note**: Strainers are normally not allowed on fire protection systems. Check with local authorities.

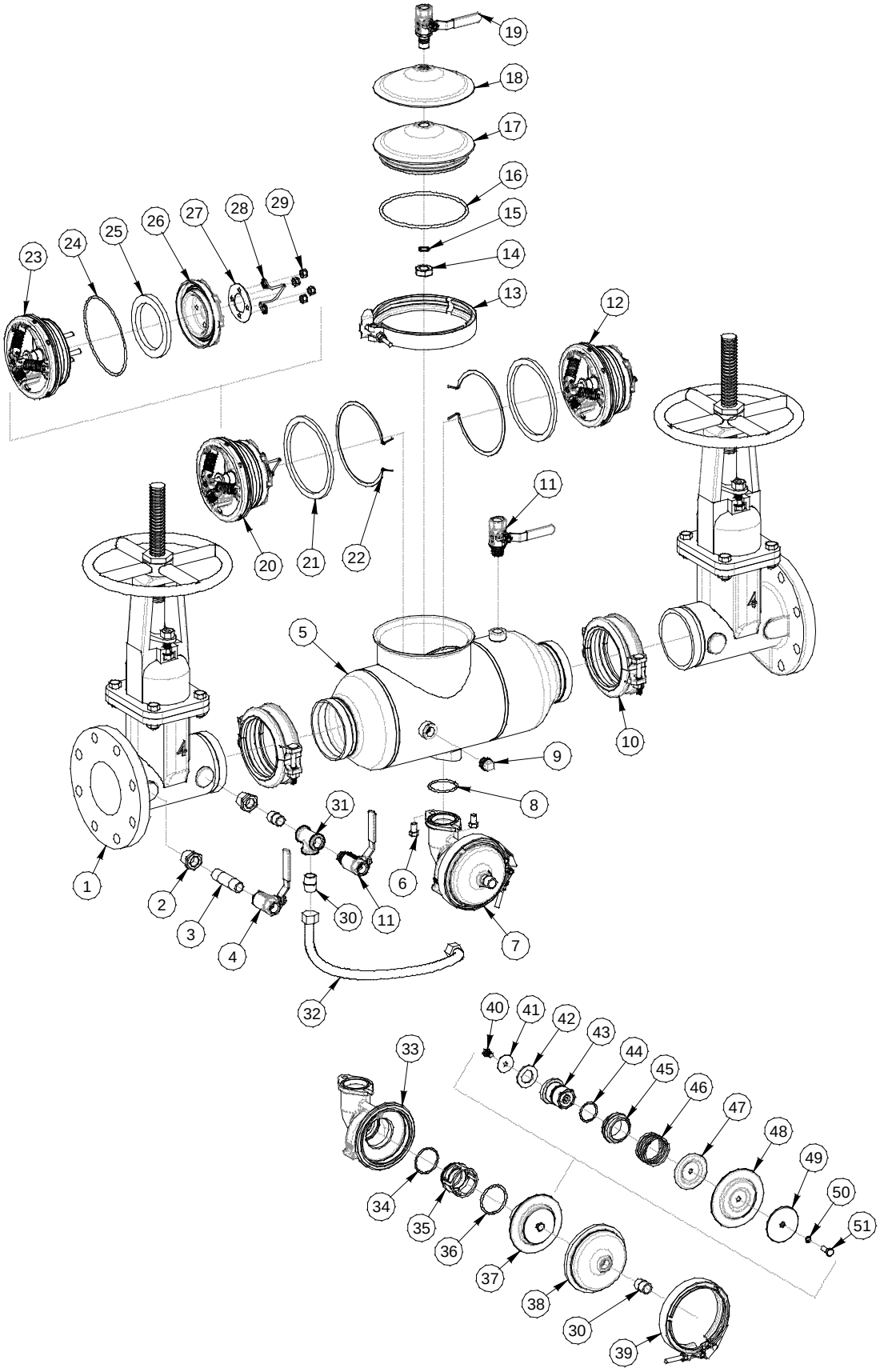


RPDA 4A Type 1



RPDA 4A Type 2

VIII. PARTS LIST 2 ½” – 6”



RP4A / RPDA 4A (Mainline) / RPDA2 4A (Mainline) Parts List

Item #	Description	Qty.	Part Number			
			2 1/2"	3"	4"	6"
1	Shut-off Valve	2	See Pages 25 & 26			
2	Reducer Bushing	2	K-3503-00			n/a
3	Nipple	(QTY)	K-3406-00 (1)			K-3412-00 (2)
4	Test Cock, FxF	2	70-103-10			70-104-10
5	Valve Body	2	Consult Factory			
6	Screw, 3/8-16 x .63	2	B-1921-00			
7	Relief Valve Sub-Assy	1	W-9184-05			
8	O-ring, RV Port	1	D-4866-00			
9	Plug, 1/2" NPT	1	K-3008-00			
10	Coupling	2	W-5237-00	W-5238-00	W-5239-00	W-5240-00
11	Test Cock, MxF	1	70-803-10			70-804-10
12	Second Check Module	1	W-9290-05		W-9186-05	W-9222-05
13	Cover Clamp	1	W-9293-00		W-9183-00	W-9221-00
14	Retaining Nut	1	C-2635-00			C-1756-00
15	O-ring, Test Cock	1	D-4892-00			D-3904-00
16	O-ring, Cover	1	D-4976-00		D-4870-00	D-5001-00
17	Cover, Inner	1	F-3900-00		F-3864-00	F-3865-00
18	Cover, Outer	1	E-2903-00		E-2865-00	E-2866-00
19	Test Cock, Cover	1	78-220-10			78-221-10
20	RP First Check Module	1	W-9289-05		W-9187-05	W-9220-05
21	Check Retaining Ring	2	E-2960-00		E-2868-00	E-2869-00
22	Check Retaining Clip	2	L-8063-00		L-7996-00	L-8037-00
23	Seat/Spring Sub-Assy	1	W-9715-05		W-9717-05	W-9719-05
24	Check Seat O-ring	1	D-4975-00		D-4869-00	D-5000-00
25	Disc	1	D-4958-00		D-4862-00	D-4890-00
26	Disc Retainer	1	L-7800-00		F-3862-00	F-3863-00
27	Washer	(QTY)	E-2905-00 (1)		E-2920-00 (1)	E-2878-00 (4)
28	Handle (1st Chk Only)	1	H-3814-00		H-3792-00	H-3793-00
29	Locknut	(QTY)	C-1900-00 (3)		C-2052-00 (4)	C-2053-00 (4)
30	Nipple	(QTY)	K-3460-00 (2)			K-3460-00 (1)
31	Tee	1	K-3571-00			K-4552-00
32	Sensing Hose	1	W-9271-00			
33	RV Body	1	Q-6921-05			
34	Seat O-ring	1	D-4867-00			
35	Seat Cage	1	L-7995-00			
36	Bushing O-ring	1	D-4883-00			
37	RV Module	1	W-9185-05			
38	RV Cover	1	Q-6922-05			
39	RV Clamp	1	W-9182-00			
40	Screw, 5/16-18 x .50	1	B-1715-00			
41	RV Washer	1	E-2863-00			
42	Disc	1	D-4863-00			
43	Stem	1	G-4803-00			
44	Stem O-ring	1	D-4744-00			
45	Bushing	1	I-9014-00			
46	RV Spring	1	A-2500-00			
47	Diaphragm Washer	1	E-2864-00			
48	Diaphragm	1	D-4861-00			
49	Diaphragm Plate	1	E-2867-00			
50	Dia. Plate O-ring	1	D-4865-00			
51	Screw, 5/16-18 x .75	1	B-1751-00			

REPAIR KITS
2 ½" – 6"

Check Rubber Only Kit (One kit repairs one check)		Size		
		2-1/2" & 3"	**4"**	**6"**
ITEM #	Repair Kit Model Number	**RK4A3CMR**	**RK4A4CMR**	**RK4A6CMR**
	Ordering Code	4A-000-01	4A-00A-01	4A-00C-01
not shown	Lubricant	I-9016-00		
25	Disc	D-4958-00	D-4862-00	D-4890-00
24	Check O-ring	D-4975-00	D-4869-00	D-5000-00
8	Relief Valve Port O-ring	D-4866-00		
16	Cover O-ring	D-4976-00	D-4870-00	D-5001-00
15	Test Cock O-ring	D-4892-00		D-3904-00

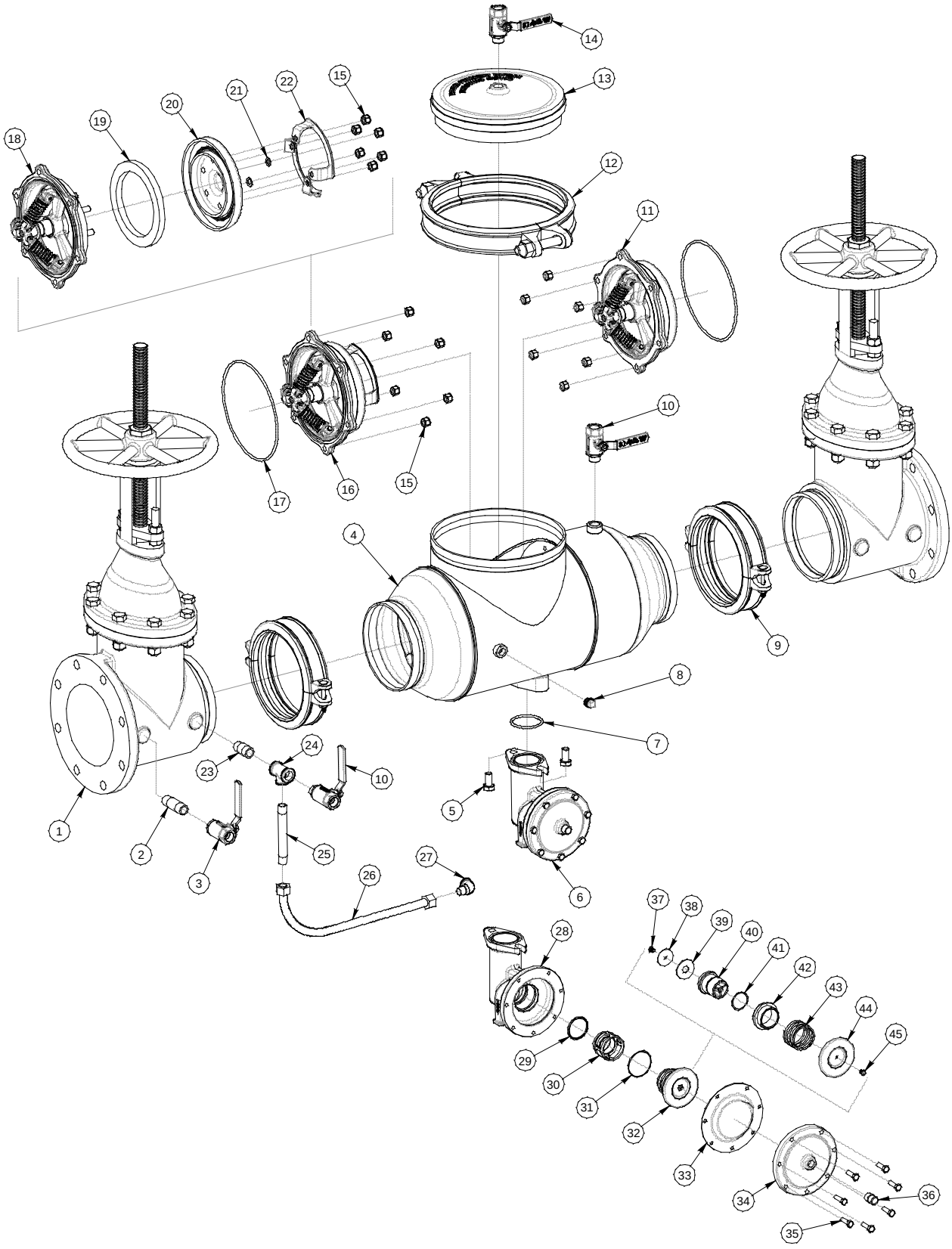
RP First Check Complete Kit (One kit repairs one check)		Size		
		2-1/2" & 3"	**4"**	**6"**
ITEM #	Repair Kit Model Number	**RK4A3RPCM**	**RK4A4RPCM**	**RK4A6RPCM**
	Ordering Code	4A-000-03	4A-00A-03	4A-00C-03
not shown	Lubricant	I-9016-00		
20	1st Check Module S-Assy	W-9289-05	W-9187-05	W-9220-05
24	Check O-ring	D-4975-00	D-4869-00	D-5000-00
16	Cover O-ring	D-4976-00	D-4870-00	D-5001-00

RP Second Check Complete Kit (One kit repairs one check)		Size		
		2-1/2" & 3"	**4"**	**6"**
ITEM #	Repair Kit Model Number	**RK4A3CMSC**	**RK4A4CMSC**	**RK4A6CMSC**
	Ordering Code	4A-000-02	4A-00A-02	4A-00C-02
not shown	Lubricant	I-9016-00		
12	2nd Check Module S-Assy	W-9290-05	W-9186-05	W-9222-05
24	Check O-ring	D-4975-00	D-4869-00	D-5000-00
16	Cover O-ring	D-4976-00	D-4870-00	D-5001-00

RP Relief Valve Rubber Kit		
ITEM #	Repair Kit Model Number	**RK4A6RVR**
	Ordering Code	4A-00C-04
not shown	Lubricant	I-9016-00
34	RV Seat O-ring	D-4867-00
36	Bushing O-ring	D-4883-00
42	RV Seat Disc	D-4863-00
44	Stem O-ring	D-4744-00
48	Diaphragm	D-4861-00
50	Diaphragm Plate O-ring	D-4865-00
8	Relief Valve Port O-ring	D-4866-00

RP Relief Valve Complete Kit		
ITEM #	Repair Kit Model Number	**RK4A6RVC**
	Ordering Code	4A-00C-05
not shown	Lubricant	I-9016-00
34	RV Seat O-ring	D-4867-00
35	Seat Cage	L-7995-00
36	Bushing O-ring	D-4883-00
37	RV Module	W-9185-05
8	Relief Valve Port O-ring	D-4866-00

IX. PARTS LIST 8” – 12”



RP4A / RPDA 4A (Mainline) / RPDA2 4A (Mainline) Parts List

Item #	Description	Qty.	Part Number		
			8"	10"	12"
1	Shut-off Valve	2	See Page 25 & 26		
2	Nipple	2	K-3412-00		
3	Test Cock, FxF	2	70-104-10		
4	Valve Body	2	Consult Factory		
5	Nut	2	N/A	CX-02736	
	Screw	2	B-2348-00	N/A	
6	Relief Valve Sub-Assy	1	W-9348-05	W-9515-05	
7	O-ring, RV Port	1	D-4963-00	D-2304-00	
8	Plug, 1/2" NPT	1	K-3008-00	N/A	N/A
9	Coupling	2	W-5241-00	W-5242-00	N/A
	Bolt Pack	2	N/A	N/A	40-00H-BP
10	Test Cock	1	70-804-10	70-104-10	
11	Second Check Module	1	W-9338-05	W-9346-05	
12	Cover Clamp	1	W-9243-00	W-9355-00	
13	Cover	1	E-2898-05	Q-7064-19	
14	Test Cock, Cover	1	70-804-10	70-104-10	70-104-10
15	Locknut, 1/2-13	(QTY)	C-2638-00 (24)	C-2638-00 (32)	
16	RP First Check Module	1	W-9339-05	W-9347-05	
17	Check O-ring	1	D-4935-00	D-4997-00	
18	Seat/Spring Sub-Assy	1	W-9721-05	W-9723-05	
19	Disc	1	D-4934-00	D-4960-00	
20	Disc Retainer	1	F-3899-00	F-3903-00	
21	Washer	(QTY)	E-2897-00 (2)		
22	Handle	2	H-3828-00	H-3813-00	
23	Nipple	1	K-3772-00	N/A	
24	Tee	1	K-4552-00	N/A	
25	Nipple	1	K-3981-00	N/A	
26	Sensing Hose	1	W-9271-00		
27	Street Elbow	1	K-3570-00		
28	RV Body	1	Q-6991-05	Q-7099-05	
29	RV Seat O-ring	1	D-4883-00	D-3506-00	
30	RV Seat	1	L-8047-00	L-8169-00	
31	Bushing O-ring	1	D-2565-00	D-4858-00	
32	RV Module	1	W-9438-05	W-9514-05	
33	Diaphragm	1	D-2564-00	D-2591-00	
34	RV Cover	1	Q-6993-05	Q-7100-05	
35	Screw	(Qty)	B-1796-00 (7)	B-1703-00 (5)	
36	Nipple	1	K-3460-00		
37	Screw	1	B-1753-00	B-1796-00	
38	Washer	1	E-2200-00	E-2210-00	
39	RV Disc	1	D-2563-00	D-2595-00	
40	RV Stem	1	G-3240-00	G-4858-00	
41	RV Stem O-ring	1	D-5033-00	D-2594-00	
42	Bushing	1	I-9062-15	I-9163-15	
43	Spring	1	A-1742-00	A-1749-00	
44	Diaphragm Plate	(Qty)	E-2201-00 (1)	E-2209-05 (2)	
45	Screw	1	N/A	B-1800-00	

REPAIR KITS
8” – 12”

Check Rubber Only Kit (One kit repairs one check)		Size	
		8"	**10" & 12"**
ITEM #	Repair Kit Model Number	**RK4A8CMR**	**RK4A12INCMR**
	Ordering Code	4A-00E-01	4A-00H-01
not shown	Lubricant	I-9016-00	
19	Disc	D-4934-00	D-4960-00
17	Check O-ring	D-4935-00	D-4997-00
7	Relief Valve Port O-ring	D-4963-00	D-2304-00

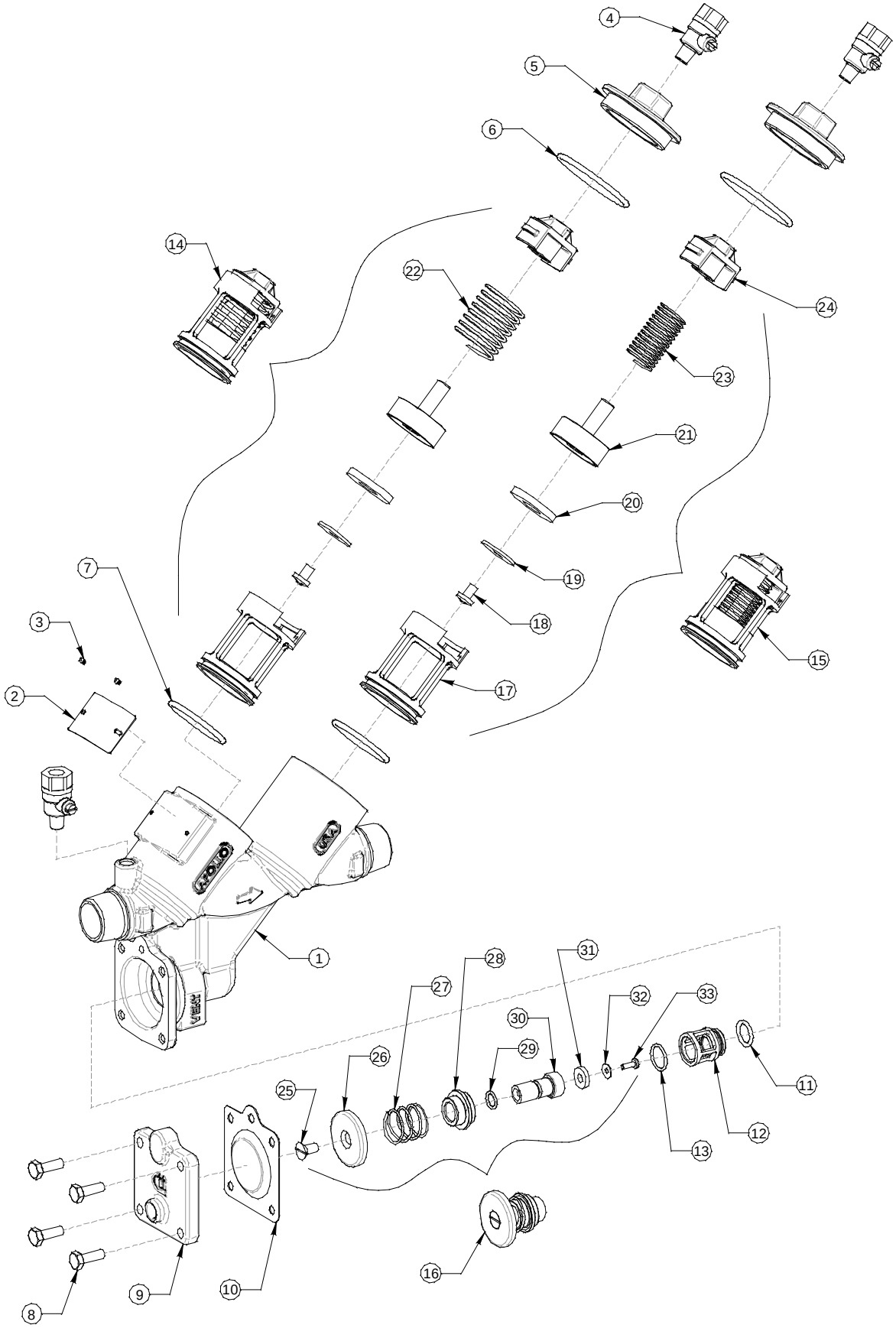
RP First Check Complete Kit (One kit repairs one check)		Size	
		8"	**10" & 12"**
ITEM #	Repair Kit Model Number	**RK4A8RPCM**	**RK4A12INRPCM**
	Ordering Code	4A-00E-03	4A-00H-03
not shown	Lubricant	I-9016-00	
16	1st Check Module S-Assy	W-9339-05	W-9347-05
17	Check O-ring	D-4935-00	D-4997-00

RP Second Check Complete Kit (One kit repairs one check)		Size	
		8"	**10" & 12"**
ITEM #	Repair Kit Model Number	**RK4A8CMSC**	**RK4A12INCMSC**
	Ordering Code	4A-00E-02	4A-00H-02
not shown	Lubricant	I-9016-00	
11	2nd Check Module S-Assy	W-9338-05	W-9346-05
17	Check O-ring	D-4935-00	D-4997-00

RP Relief Valve Rubber Kit		Size	
		8"	**10" & 12"**
ITEM #	Repair Kit Model Number	**RK4A8RVR**	**RK4A12INRVR**
	Ordering Code	4A-00E-04	4A-00H-04
not shown	Lubricant	I-9016-00	
29	RV Seat O-ring	D-4883-00	D-3506-00
31	Bushing O-ring	D-2565-00	D-4858-00
33	Diaphragm	D-2564-00	D-2591-00
39	RV Seat Disc	D-2563-00	D-2595-00
41	Stem O-ring	D-5033-00	D-2594-00
not shown	Dia. Plate O-ring	N/A	D-2512-00
7	Relief Valve Port O-ring	D-4963-00	D-2304-00

RP Relief Valve Complete Kit		Size	
		8"	**10" & 12"**
ITEM #	Repair Kit Model Number	**RK4A8RVC**	**RK4A12INRVC**
	Ordering Code	4A-00E-05	4A-00H-05
not shown	Lubricant	I-9016-00	
33	Diaphragm	D-2564-00	D-2591-00
29	RV Seat O-ring	D-4883-00	D-3506-00
30	RV Seat Cage	L-8047-00	L-8169-00
31	Bushing O-ring	D-2565-00	D-4858-00
32	RV Module	W-9438-05	W-9514-05
7	Relief Valve Port O-ring	D-4963-00	D-2304-00

X. PARTS LIST – BYPASS RP (TYPE 1)



Bypass RP Parts List

ITEM #	DESCRIPTION	PART #	QTY
1	Body	Q-6890-05	1
2	Nameplate	I-9025-00	1
3	Nameplate Tack	I-2614-00	2
4	Test Cock	78-290-01	4
5	Cap	F-3846-05	2
6	Cap O-Ring	D-4881-00	2
7	Check Module O-Ring	D-4880-00	2
8	RV Cover Bolts	B-1793-00 (4)	(QTY)
9	RV Cover	F-3890-05	1
10	RV Diaphragm	D-2632-00	1
11	RV Seat O-Ring	D-4892-00	1
12	RV Seat	L-7894-00	1
13	RV Bushing Face O-Ring	D-4893-00	1
14	1st Check Module S-Assy (see table below)	W-9207-05	1
15	2nd Check Module S-Assy (see table below)	W-9075-05	1
16	RV Module S-Assy (see table below)	W-9223-05	1

Bypass RP Check Module Parts List

ITEM #	DESCRIPTION	PART #	QTY
17	Check Seat	L-7815-00	1
18	Screw	B-3279-00	1
19	Disc Retaining Washer	E-2372-00	1
20	Seat Disc	D-4771-00	1
21	Poppet	K-4491-00	1
22	Spring, First Check	A-2514-00	1
23	Spring, Second Check	A-2505-00	1
24	Spring Retainer	L-7814-00	1

Relief Valve Module Subassembly Parts List

ITEM #	DESCRIPTION	PART #	QTY
25	RV Diaphragm Plate Screw	B-1749-00	1
26	RV Diaphragm Plate	E-2222-00	1
27	RV Spring	A-2542-00	1
28	RV Bushing	I-8976-00	1
29	RV Stem O-Ring	D-4891-00	1
30	RV Stem	G-4791-00	1
31	RV Seat Disc	D-4833-00	1
32	RV Seat Disc Washer	NONE	1
33	RV Seat Disc Screw	B-3254-00	1

Bypass RP Repair Kits

4A-003-01: Check Rubber Repair Kit: Includes items 6, 7, and 20 (1 ea.)
4A-003-03: RP First Check Repair Kit: Includes items 6, 7, and 14 (1 ea.)
4A-003-02: RP Second Check Repair Kit: Includes items 6, 7, and 15 (1 ea.)
4A-005-04: RP Relief Valve Rubber Kit: Includes items 10, 11, 13, 29, and 31 (1 ea.)
4A-005-05: RP Relief Valve Complete Kit: Includes items 10, 11, 12, 13, and 16 (1 ea.)
4A-005-09: RP Complete Rubber Kit: Includes items 6, 7, and 20 (2 ea.), 10, 11, 13, 29, and 31 (1 ea.)

XI. MAINTENANCE INSTRUCTIONS – BYPASS RP (TYPE 1)

A. Disassembly – Check Valve Module

1. Close #2 bypass line shut-off valve, then close #1 bypass line shut-off valve.
2. Bleed pressure from the assembly by opening all test cocks on bypass RP.
3. Unscrew cap using hex head provided.
4. Push down and turn the spring retainer 90° to re move. Remove the spring. Remove the poppet from the check seat.
5. Normally, the check seat need not be removed. If removal is required, rock it back and forth while pulling outward.

B. Disassembly – Check Valve Poppet

CAUTION: Do not use pliers or other tools, which may damage or scratch the plastic stem.

1. Holding the poppet assembly in one hand, remove screw and retaining washer.
2. Remove the seat disc.
3. All parts should be carefully inspected for any damage or excessive wear and thoroughly rinsed in clean water prior to reassembly. Replace worn parts as necessary.

C. Assembly – Check Valve Poppet

1. Install new or cleaned disc in poppet and secure with washer and screw.

D. Assembly – Check Valve Module

1. If the check seat was removed, install the new o-ring and lubricate with Apollo supplied lubricant, Dow 111, or equal. Line up the seat with the bore and push it firmly into place.
2. Place and center the poppet assembly in the check seat.
3. Install the spring onto the poppet.
4. Install the spring retainer onto the spring by pushing down into the grooves of the check seat and turning 90°. Ensure spring retainer pops up about ⅛" and locks into the lugs. **CAUTION: Ensure the spring retainer orientation matches that in the parts list drawing or the device's flow will be significantly restricted (i.e. – do not install the spring retainer upside down).**
5. Apply a thin coat of Apollo supplied lubricant, Dow 111 or equal, on cap o-ring.
6. Install cap.

E. Disassembly – Relief Valve

1. Remove cover bolts, cover, and diaphragm.
2. Grasp the diaphragm plate and pull the assembly straight out of the body.
3. Holding the relief valve assembly in one hand and remove the screw.
4. Remove the seat disc.

Note: Items 5 through 7 are not normally required.

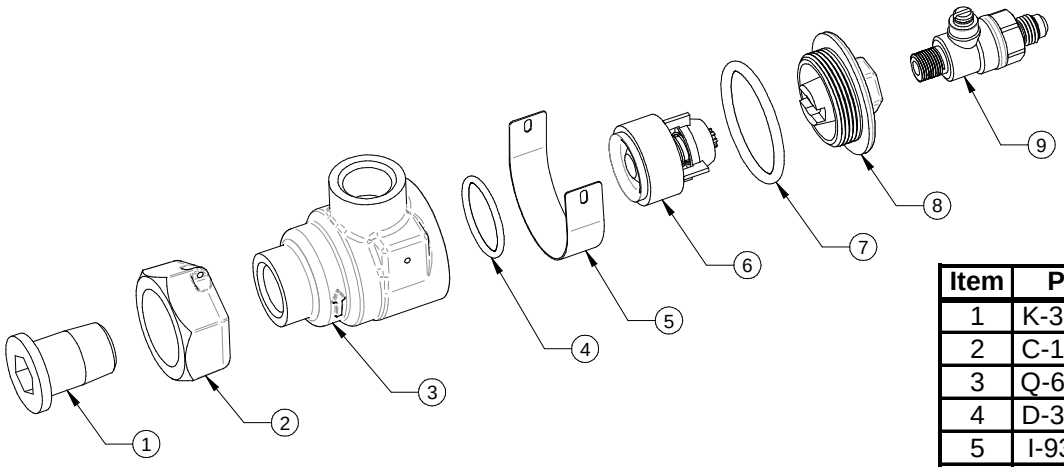
5. Turn the assembly over, keeping the spring compressed by holding down on the diaphragm plate, remove the screw
6. Remove the diaphragm plate, spring, and bushing from the RV stem. Note the orientation of the bushing with respect to the spring.
7. Remove the o-ring from the RV stem.
8. Normally, the RV seat need not be removed. If removal is required, rock it back and forth while pulling outward.
9. All parts should be carefully inspected for any damage or excessive wear and thoroughly rinsed in clean water prior to reassembly. Replace worn parts as necessary.

F. Assembly – Relief Valve

1. Apply a thin coat of Apollo supplied lubricant of Dow 111 or equal on o-rings before installing.
2. Install o-ring on RV seat. Line up the seat with the bore and push firmly into place.
3. If the RV stem has been disassembled, install o-ring onto RV stem.

4. Slide bushing over RV stem and position spring onto bushing. Note the correct position of the bushing from step #6 in disassembly instructions. (Spring must fit over the smaller shoulder of the bushing upon reassembly.)
5. Position diaphragm plate and compress spring, install screw into RV stem.
6. Turn the assembly over and install seat disc and screw.
7. Install o-ring onto bushing.
8. Slide complete assembly into the body.
9. Position diaphragm over flange, install cover, and tighten bolts evenly.
10. Open #1 shut-off valve and bleed air out of the unit through #2, #3, and #4 test cocks; then open #2 shut-off valve.
11. Test complete assembly to ensure proper operation.

XII. PARTS LIST – BYPASS SINGLE CHECK (TYPE 2)



Item	Part #	Description	Qty
1	K-3960-06	Tailpiece	1
2	C-1844-05	Union Nut	1
3	Q-6783-05	Body	1
4	D-3885-00	Check O-ring	1
5	I-9341-00	Nameplate	1
6	F-3228-00	Check Valve	1
7	D-3589-00	Cap O-ring	1
8	F-3818-05	Cap	1
9	78-292-01	Test Cock	1

4A-003-12: Check Repair Kit: Includes items 4, 6, and 7 (1 each)
4A-003-13: Check Complete Kit: Includes items 1 – 9 (1 each)

XIII. MAINTENANCE INSTRUCTIONS – BYPASS SINGLE CHECK (TYPE 2)

A. Disassembly – Check Valve Module

1. Close #2 bypass line shut-off valve, then close #1 bypass line shut-off valve.
2. Bleed pressure from the assembly by opening the upstream test cock (located on the bypass line #1 shut-off valve) and the downstream test cock (located on the check valve cap).
3. Unscrew cap using hex head provided.
4. Pull check module straight out of body. Needle-nose pliers will aid in removing check valve. Check o-ring may remain in valve body. NOTE: Check valve modules are not user serviceable. In the event of check failure, replacement modules are sold individually. However, debris caught in the check may be rinsed out.

B. Assembly – Check Valve Module

1. Install new or cleaned check valve module into body (ensure check o-ring is in place).
2. Apply a thin coat of Apollo supplied lubricant, DOW 111 or equal, on cap o-ring.
3. Install cap.

XIV. BYPASS LINE KITS

SIZE	METER OPTION	TYPE I BYPASS KIT PART NO.	TYPE II BYPASS KIT PART NO.
2 1/2"	GALLONS PER MIN	4A-709-BPE	4A-729-BPE
	CUBIC FT PER MIN	4A-709-BPC	4A-729-BPC
	NO METER	4A-709-BPG	4A-729-BPG
3"	GALLONS PER MIN	4A-700-BPE	4A-720-BPE
	CUBIC FT PER MIN	4A-700-BPC	4A-720-BPC
	NO METER	4A-700-BPG	4A-720-BPG
4"	GALLONS PER MIN	4A-70A-BPE	4A-72A-BPE
	CUBIC FT PER MIN	4A-70A-BPC	4A-72A-BPC
	NO METER	4A-70A-BPG	4A-72A-BPG
6"	GALLONS PER MIN	4A-70C-BPE	4A-72C-BPE
	CUBIC FT PER MIN	4A-70C-BPC	4A-72C-BPC
	NO METER	4A-70C-BPG	4A-72C-BPG
8"	GALLONS PER MIN	4A-70E-BPE	4A-72E-BPE
	CUBIC FT PER MIN	4A-70E-BPC	4A-72E-BPC
	NO METER	4A-70E-BPG	4A-72E-BPG
10"	GALLONS PER MIN	4A-70G-BPE	4A-72G-BPE
	CUBIC FT PER MIN	4A-70G-BPC	4A-72G-BPC
	NO METER	4A-70G-BPG	4A-72G-BPG
12"	GALLONS PER MIN	4A-70H-BPE	4A-72H-BPE
	CUBIC FT PER MIN	4A-70H-BPC	4A-72H-BPC
	NO METER	4A-70H-BPG	4A-72H-BPG

XV. SHUT-OFF VALVE PART NUMBERS

Shut-off Valve Options -- 2 1/2"			
Assembly Description (Inlet x Outlet)	**Inlet**	**Outlet**	**Suffix**
FLG NRS X FLG NRS	W-5310-00	W-5310-00	-02
FLG OS&Y X FLG OS&Y	W-4733-00	W-4733-00	-03
FLG OS&Y X MONIT. BFLY	W-4733-00	W-5244-00	-04
FLG OS&Y X GRV OS&Y	W-4733-00	W-5282-00	-07
GRV OS&Y X GRV OS&Y	W-5282-00	W-5282-00	-08
MONITORED BFLY X MONITORED BFLY	W-5244-00	W-5244-00	-09
GRV NRS X GRV NRS	W-9369-00	W-9369-00	-011
FLG NRS X GRV NRS	W-5310-00	W-9369-00	-012

Shut-off Valve Options -- 3"			
Assembly Description (Inlet x Outlet)	**Inlet**	**Outlet**	**Suffix**
FLG NRS X FLG NRS	W-5311-00	W-5311-00	-02
FLG OS&Y X FLG OS&Y	W-4734-00	W-4734-00	-03
FLG OS&Y X MONIT. BFLY	W-4734-00	W-5245-00	-04
FLG OS&Y X FLG PI	W-4734-00	W-5311-00	-06
FLG OS&Y X GRV OS&Y	W-4734-00	W-5283-00	-07
GRV OS&Y X GRV OS&Y	W-5283-00	W-5283-00	-08
MONITORED BFLY X MONITORED BFLY	W-5245-00	W-5245-00	-09
FLG OS&Y X GRV PI	W-4734-00	W-9370-00	-010
GRV NRS X GRV NRS	W-9370-00	W-9370-00	-011
FLG NRS X GRV NRS	W-5311-00	W-9370-00	-012

Shut-off Valve Options -- 4"			
Assembly Description (Inlet x Outlet)	**Inlet**	**Outlet**	**Suffix**
FLG NRS X FLG NRS	W-5312-00	W-5312-00	-02
FLG OS&Y X FLG OS&Y	W-4735-00	W-4735-00	-03
FLG OS&Y X MONIT. BFLY	W-4735-00	W-5246-00	-04
FLG OS&Y X FLG PI	W-4735-00	W-5312-00	-06
FLG OS&Y X GRV OS&Y	W-4735-00	W-5284-00	-07
GRV OS&Y X GRV OS&Y	W-5284-00	W-5284-00	-08
MONITORED BFLY X MONITORED BFLY	W-5246-00	W-5246-00	-09
FLG OS&Y X GRV PI	W-9126-00	W-9371-00	-010
GRV NRS X GRV NRS	W-9371-00	W-9371-00	-011
FLG NRS X GRV NRS	W-5312-00	W-9371-00	-012

Shut-off Valve Options -- 6"			
Assembly Description (Inlet x Outlet)	**Inlet**	**Outlet**	**Suffix**
FLG NRS X FLG NRS	W-5313-00	W-5313-00	-02
FLG OS&Y X FLG OS&Y	W-4736-00	W-4736-00	-03
FLG OS&Y X MONIT. BFLY	W-4736-00	W-5247-00	-04
FLG OS&Y X FLG PI	W-4736-00	W-5313-00	-06
FLG OS&Y X GRV OS&Y	W-4736-00	W-5285-00	-07
GRV OS&Y X GRV OS&Y	W-5285-00	W-5285-00	-08
MONITORED BFLY X MONITORED BFLY	W-5247-00	W-5247-00	-09
FLG OS&Y X GRV PI	W-4736-00	W-9372-00	-010
GRV NRS X GRV NRS	W-9372-00	W-9372-00	-011
FLG NRS X GRV NRS	W-5313-00	W-9372-00	-012

Shut-off Valve Options -- 8"			
Assembly Description (Inlet x Outlet)	**Inlet**	**Outlet**	**Suffix**
FLG NRS X FLG NRS	W-5314-00	W-5314-00	-02
FLG OS&Y X FLG OS&Y	W-4737-00	W-4737-00	-03
FLG OS&Y X MONIT. BFLY	W-4737-00	W-5248-00	-04
FLG OS&Y X FLG PI	W-4737-00	W-5314-00	-06
FLG OS&Y X GRV OS&Y	W-4737-00	W-5286-00	-07
GRV OS&Y X GRV OS&Y	W-5286-00	W-5286-00	-08
MONITORED BFLY X MONITORED BFLY	W-5248-00	W-5248-00	-09
FLG OS&Y X GRV PI	W-4737-00	W-9373-00	-010
GRV NRS X GRV NRS	W-9373-00	W-9373-00	-011
FLG NRS X GRV NRS	W-5314-00	W-9373-00	-012

Shut-off Valve Options -- 10"			
Assembly Description (Inlet x Outlet)	**Inlet**	**Outlet**	**Suffix**
FLG NRS X FLG NRS	W-5315-00	W-5315-00	-02
FLG OS&Y X FLG OS&Y	W-4738-00	W-4738-00	-03
FLG OS&Y X MONIT. BFLY	W-4738-00	W-5249-00	-04
FLG OS&Y X FLG PI	W-4738-00	W-5315-00	-06
FLG OS&Y X GRV OS&Y	W-4738-00	W-5321-00	-07
GRV OS&Y X GRV OS&Y	W-5321-00	W-5321-00	-08
MONITORED BFLY X MONITORED BFLY	W-5249-00	W-5249-00	-09

Shut-off Valve Options -- 12"			
Assembly Description (Inlet x Outlet)	**Inlet**	**Outlet**	**Suffix**
FLG NRS X FLG NRS	W-9529-00	W-9529-00	-02
FLG OS&Y X FLG OS&Y	W-9528-00	W-9528-00	-03