

RP-501 Reduced Pressure Backflow Preventer

OPERATIONS, MAINTENANCE AND TROUBLESHOOTING GUIDE



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Features, Applications and Specifications

The RP-501 Reduced Pressure Backflow Preventer consists of:

- Two independent-acting spring-loaded check valves - an inlet and an outlet valve.
- An automatic differential Relief Valve (located in the “zone” between the check valves) .
- Two resilient seated shut off valves – one on the inlet, the other on the outlet.
- Four test cocks.

PRODUCT FEATURES

- Compact, lightweight size makes it easy and quick to install.
- Requires only a Phillips-head screwdriver to disassemble and reassemble – no special tools needed .
- Durable, made of non-corrosive plastic thermal resin material:
 - Withstands the toughest environments.
 - Unlike a brass Backflow Preventer, the RP-501 is less susceptible to vandalism and theft.
 - UV resistant – endures heat and direct sun.
- Low head loss – optimizes energy, saving energy costs.

The RP-501 is approved by the following Standards Authorities:

Approved under :

USA : NSF61 (Drinking water), ASSE 1013, AWWA C511, Approved by the Foundation for Cross Connection Control and Hydraulic Research at the University of Southern California.

Australia : AS4020 (Drinking water), Watermark AS2845.1.

France : ACS.



APPLICATIONS

To protect potable water lines and other installations against backsiphonage and backpressure of contaminated water.

For irrigation system and water handling applications.

SPECIFICATIONS

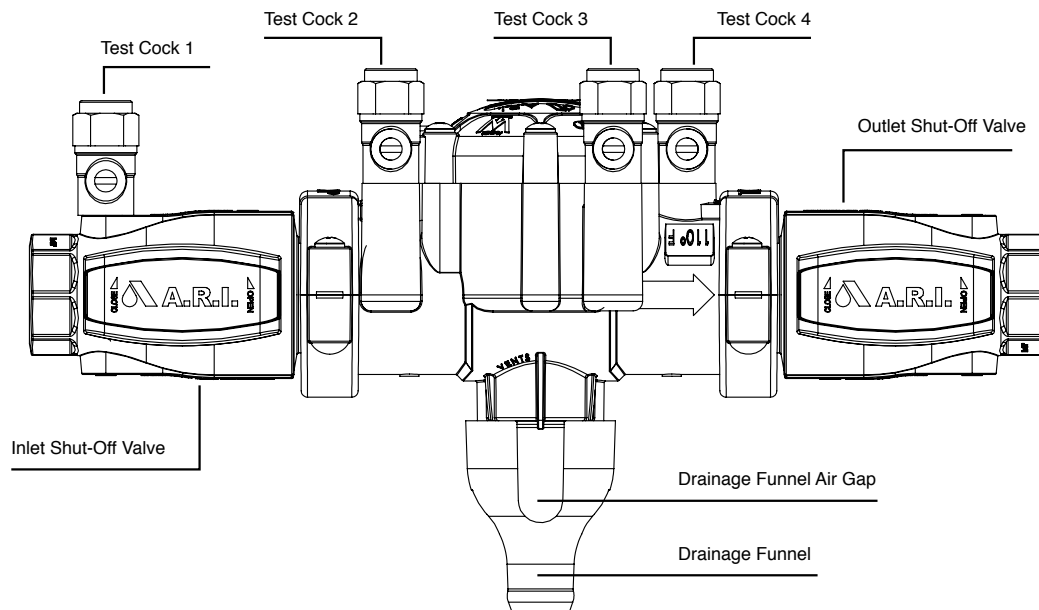
- Operating pressure: up to 150 psi
- Operating temperature: up to 110° F
- Valve sizes: 1/2", 3/4", 1", 1 1/4", 1 1/2", 2"

Installation

GENERAL INSTALLATION GUIDELINES

- A. Install the RP-501 Backflow Preventer in a location accessible to periodic field testing and maintenance. Mount the RP-501 in a horizontal position with adequate clearance from walls and/or obstructions. A 12" to 33" clearance is needed between the lowest portion of the device and floor.
- B. Adequate drainage is needed for discharge. A Drainage Funnel is provided so the discharge may be piped away (See FIGURE 1).
NOTE: Never place the RP-501 where it may become submerged in standing water.
- C. Before installing the RP-501, thoroughly flush all upstream piping to remove debris.
- D. It is recommended that a "Y" strainer be installed before the inlet of the RP-501 to prevent debris from entering the device.
- E. After installing the assembly, close the Outlet Shut-off Valve, pressurize the RP-501 and release the air through Test Cock 4. Then, open the Outlet Shut-off Valve.

FIGURE 1



RECOMMENDATIONS

- Do not install in areas subject to extended periods of freezing temperatures.
- The product must be protected from excessive pressure increases, caused by thermal expansion or water hammer, which can cause damage to the valve.
- DO NOT USE ANY PIPE DOPE, OIL, GREASE OR SOLVENT ON ANY PARTS unless instructed to do so.
- Parts should fit together freely. Do not force parts to fit.

Operation

During normal flow, the two check valves open to supply water downstream. The Relief Valve is power-activated by upstream pressure and is kept shut by a diaphragm, through the internal control system.

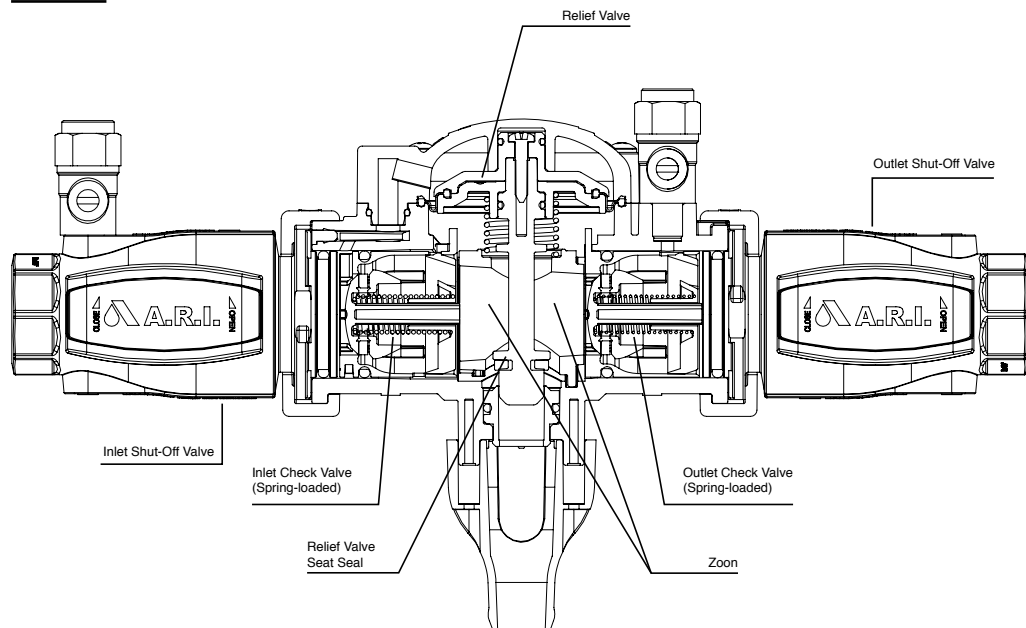
In the zone, the area between the check valves, pressure is maintained at approximately 6.3 psi lower than the water supply pressure. The Outlet Check Valve is spring-loaded to maintain a minimum pressure decrease of 1 psi (see FIGURE 2).

When negative pressure or sub-atmospheric conditions occur, the Inlet Check Valve closes to prevent backflow. If the Outlet Check Valve fails, the pressure between the two check valves rises, opening the Relief Valve and releasing the water to the atmosphere.

The Relief Valve operates on differential pressure. Supply pressure on the upstream side of the Inlet Check Valve acts against the diaphragm to close the Relief Valve during normal operation. In the event of backpressure or backsiphonage, the Relief Valve will open to maintain the pressure in the “zone” at 2 psi less than the inlet pressure.

Note: If water continues to drain from the Relief Valve, check the Troubleshooting section for probable causes and solutions.

FIGURE 2



Testing Procedures

To remain in compliance with local codes it is important to periodically test the RP- 501. (As service conditions warrant, it should be tested at least once per year or more.) Test set-up is illustrated in FIGURE 3 on page 7.

Equipment: USC approved test kit required.

Test No. 1

Purpose: To test operation of the pressure differential Relief Valve.

Requirement: The pressure differential Relief Valve must operate to maintain a minimum pressure of 2 psi less than the supply pressure in the “zone” (the area between the two Check Valves).

Procedure (see FIGURE 3, page 7):

1. To flush debris, release the water through all four Test Cocks.
NOTE: Open Test Cock 2 slowly to avoid accidental dumping of the Relief Valve.
2. Connect the “high” side (gray) hose to check Test Cock 2.
Connect the “low” side (yellow) hose to check Test Cock 3.
3. Open Test Valves 2 and 3.
4. Slowly open Test Cock 3 and release all air from the gauge and hoses through the “vent (red) hose. While Test Cock 3 is open, slowly open Test Cock 2 and release all air again through the “vent” (red) hose.
Close Test Valve 3, and then close Test Valve 2.
5. Close Outlet Shut-off Valve.
6. Slowly open Test Valve 3 until the differential gauge starts to drop.
NOTE: It is important that the differential gauge drops slowly. To do so, maintain Test Valve 3 at this position and observe the differential pressure reading at the moment the first discharge is noted from the Relief Valve.
7. Record this reading as the opening differential pressure of the Relief Valve and close Test Valve 3.

Test No. 2

Purpose: To check Outlet Check Valve for tightness against reverse flow.

Requirement: The Check Valve should not allow through leakage in a direction opposite to normal flow under all conditions of a pressure differential.

Procedure (See FIGUR 3, page7):

1. The Outlet Shut-off Valve should be in the closed position (from Test 1).
2. Loosely attach the “vent” (red) hose to Test Cock 4.
3. Release all air from the “vent” (red) hose by opening Test Valve 2.
4. Close Test Valve 2 and tighten hose connection to Test Cock 4. Then open Test Cock 4.
5. Loosen the “low” side (yellow) hose at Test Cock 3 slightly and re-establish the normal reduced pressure within the zone. Retighten hose.
6. Open Test Valve 2
If the differential pressure remains steady then the Outlet Check Valve is working properly. If the differential pressure drops causing the Relief Valve to open, then Outlet Check Valve should be recorded as “leaking” and Test 3 cannot be completed.

Testing Procedures, cont.

Test No. 3

Purpose: To test the static differential pressure across the Inlet Check Valve.

Requirement: The static differential pressure across Inlet Check Valve must be a minimum of 3 psi more than the opening differential pressure of the Relief Valves as recorded in Test 1.

Procedure (See FIGURE 3):

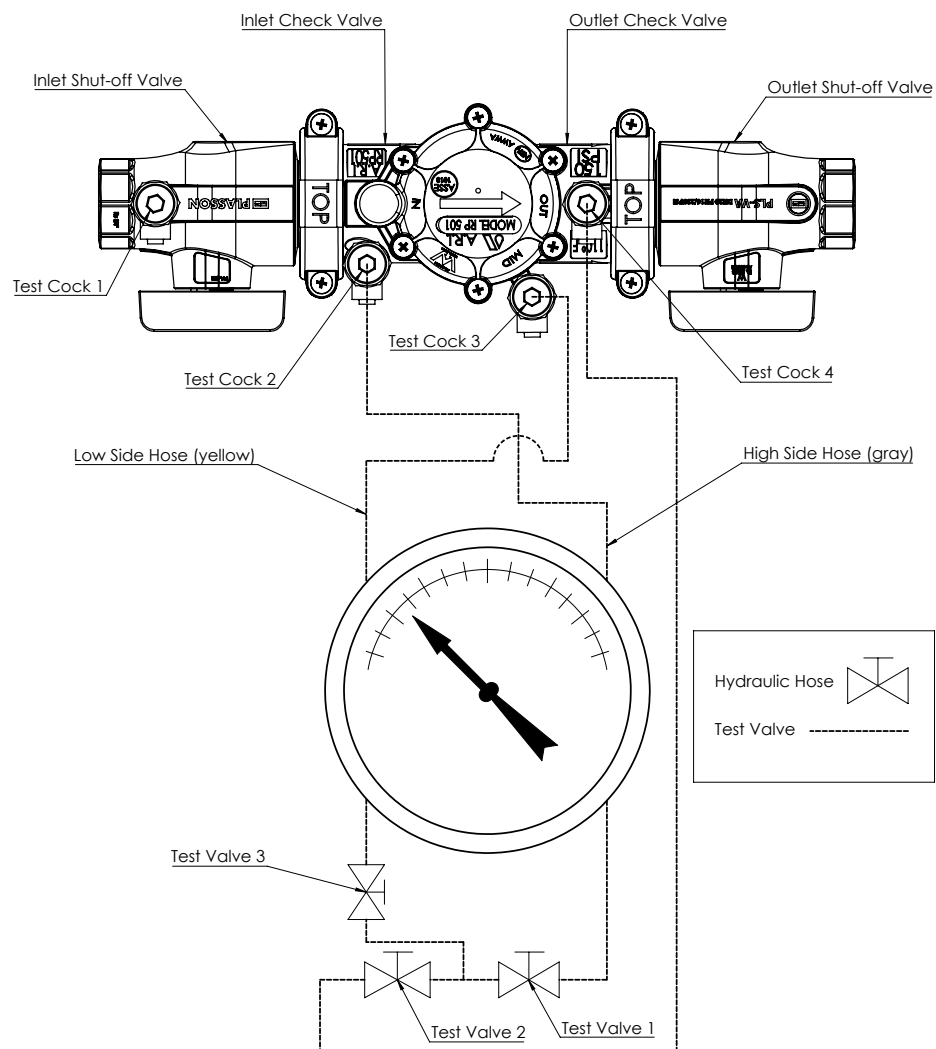
With the testing equipment installed as stated in Test 2, the static differential pressure across the Inlet Check Valve will be indicated on the gauge and should be recorded as such.

NOTE: The gauge should be steady and not falling.

Restore Operation (See FIGURE 3): Close all Test Cocks, open all Test Valves, open the Outlet Shut-off Valve and carefully remove all test equipment.

NOTE: Refer to Troubleshooting Guide to resolve any problems incurred during field-testing.

FIGURE 3



Maintenance

How to Disassemble the RP-501 (See FIGURE 4)

1. Close the Outlet Shut-off Valve (11), then close Inlet Shut-off Valve (10).
2. Release pressure from the assembly by opening Test Cocks 2, 3 and 4 (8).

CAUTION: The cover is spring-loaded and should be removed carefully to avoid personal injury.

3. Use a Phillips-head screwdriver to remove the Relief Valve cover screws (1.1) while holding the cover (1) down.
4. Lift the cover (1) straight up.
5. Remove the Relief Valve Assembly (2).
6. Remove the Relief Valve Spring (3).
7. Remove the Retainer (4).
8. Remove the Inlet and Outlet Check Valves (5) (6).

NOTE: Clean all the parts that have been removed. Then reassemble, or depending on their condition, discard and replace with new replacement parts. O-rings should be cleaned or replaced as necessary and lightly greased with NSF 61-approved silicone-based grease.

How to Assemble the RP-501 (See FIGURE 4)

1. Securely install the Inlet and Outlet Check Valves (6) (7).
2. Install the Retainer (5).
3. Place the Relief Valve Spring (4) in position.
4. Install the Relief Valve Assembly (3).
5. Put on the cover (1), hold it down and tighten the screws (1.1).

CAUTION:

RP-501 ½", ¾", 1" -

Secure the screws with a recommended torque of 1.84 pound force feet (2.5 Nm).

RP-501 1 ¼", 1 ½", 2" -

Secure the screws with a recommended torque of 6.64 pound force feet (9 Nm).

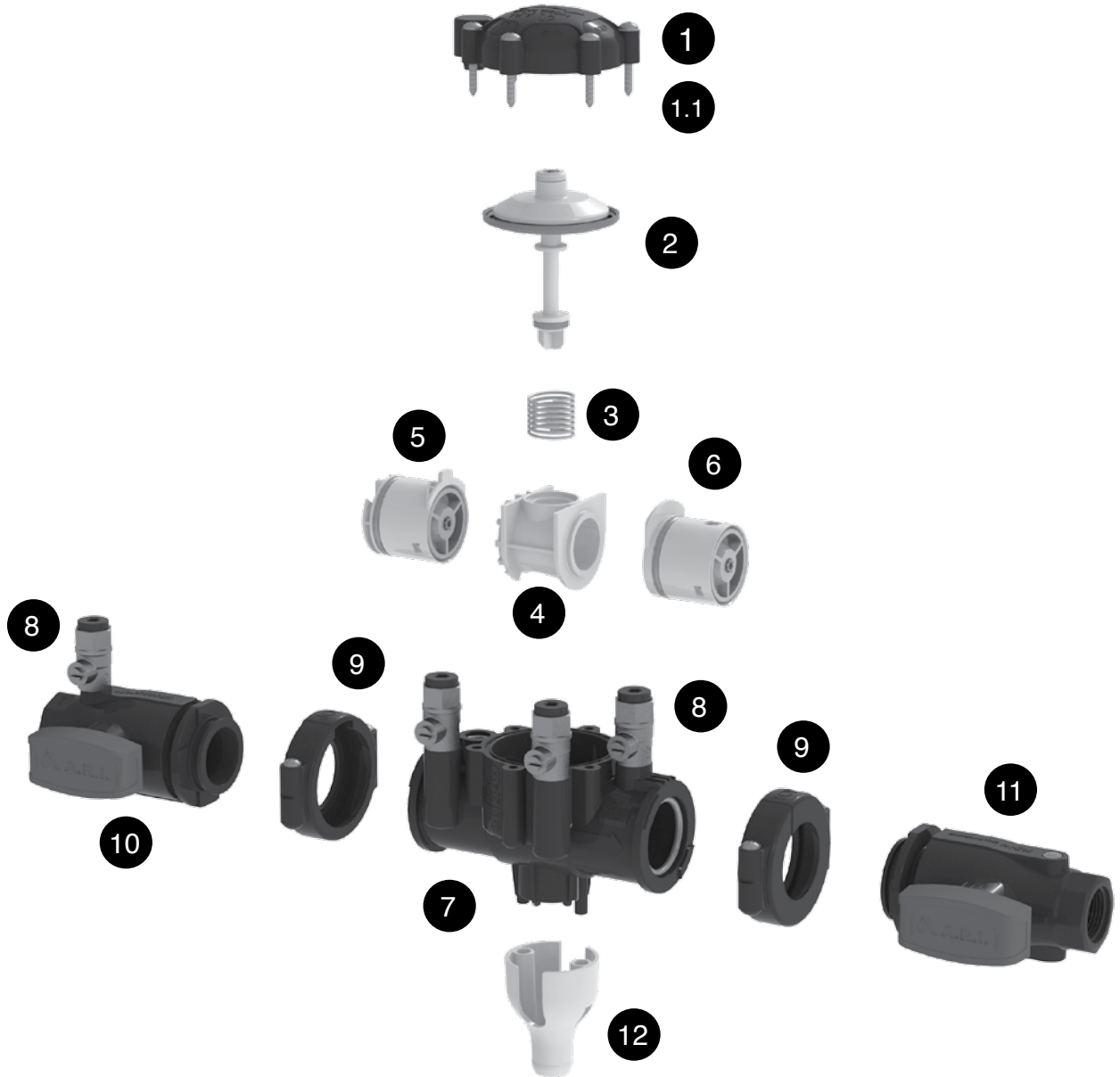
Part List

No. Part

1. Cover Assembly
- 1.1 Cover Screws
2. Relief Valve Assembly
3. Relief Valve Spring
4. Retainer
5. Inlet Check Valve Assembly
6. Outlet Check Valve Assembly
7. Body Assembly
8. Test Cocks (#1, #2, #3, #4)
9. Clamp Assembly
10. Inlet Shut-off Valve
11. Outlet Shut-off Valve
12. Drainage Funnel

Maintenance

FIGURE 4



Troubleshooting Guide

(See FIGURE 4)

SYMPTOM	CAUSE	SOLUTION
Relief Valve continuously discharges during no-flow settings..	A. Inlet Check Valve (5) is fouled with debris.	A. Inspect and clean the seat and seal.
	B. Outlet Check Valve (6) is fouled with debris coupled with a backpressure condition.	B. Inspect and clean the seat and seal.
Relief Valve continuously discharges during flow and no-flow settings.	A. Relief Valve fouled with debris.	A. Clean Relief Valve Assembly (2).
	B. Damaged diaphragm (allows water to pass through, from inlet to zone).	B. Replace the Relief Valve Assembly (2).
	C. The passage to inlet side of diaphragm plugged.	C. Inspect and clean the passage in the Cover (1) and the Body (2).
Relief Valve does not open during field test no.1	A. Outlet Shut-off Valve (11) is not closed completely.	A. Close Outlet Shut-off Valve (11) or inspect for possible through leakage.
	B. Test equipment improperly installed.	B. Recheck test procedure.
Inlet Check Valve (5) does not hold backpressure.	A. Outlet Shut-off Valve (11) is not closed completely.	A. Close Shut-off Valve (11) or inspect for possible through leakage.
	B. Outlet Check Valve (6) is fouled with debris.	B. Inspect and clean the seat and seal.
Pressure differential is low across the Inlet Check Valve (5) during Field Test 3 (Does not meet 3 PSID minimum).	A. Check Valve (6) is fouled with debris.	A. Inspect and clean the seat and seal.
	B. Upstream pressure fluctuations causing inaccurate gauge reading.	B. Eliminate pressure fluctuation.

Replacement Parts List

PART	SIZES ½", ¾", 1"		SIZES 1¼", 1½", 2"	
	CATALOG NO.	QNT	CATALOG NO.	QNT
1. Cover Assembly	0466-0501-KIT	1	0465-0502-KIT	1
2. Relief Valve Assembly	0466-9601	1	0466-9602	1
3. Relief Valve Spring	0266-7696	1	0266-769602S2	1
4. Retainer	0266-3101	1	0266-3102AN	1
5. Inlet Check Valve Assembly	0466-0276-IN	1	0465-027602-IN	1
6. Outlet Check Valve Assembly	0466-0276-OUT	1	0466-027602-OUT	1
7. Clamp Assembly	0466-99-KIT	2	0466-9902-KIT	2
8. Inlet Shut Off Valve				
1/2" NPT 1¼" NPT	0466-734815NTNR-20	1	0466-734813NTNR-20	1
3/4" NPT 1½" NPT	0466-734834NTNR-20	1	0466-734815NTNR-20	1
1" NPT 2" NPT	0466-734801NTNR-20	1	0466-734802NTNR-20	1
9. Outlet Shut Off Valve				
1/2" NPT 1¼" NPT	0466-734850NTNR	1	0466-734813NTNR	1
3/4" NPT 1½" NPT	0466-734834NTNR	1	0466-734815NTNR	1
1" NPT 2" NPT	0466-734801NTNR	1	0466-734802NTNR	1
10. Drainage Funnel	0266-5101	1	0266-5102AN	1



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