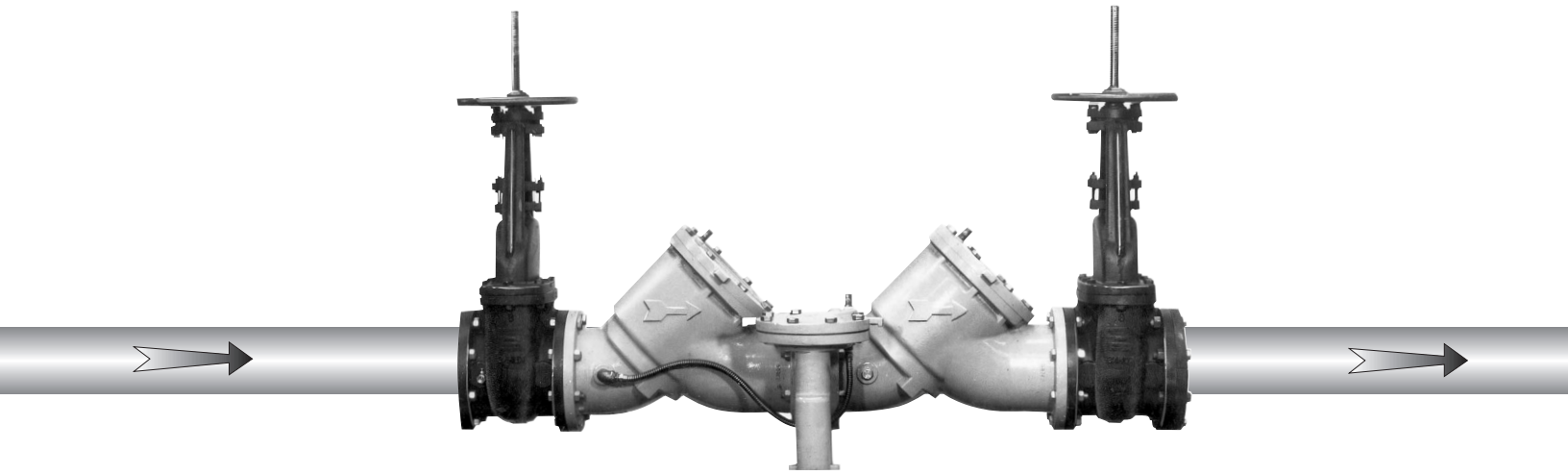
Series 909/909RPDA

Reduced Pressure Zone Assemblies
Reduced Pressure Detector Assemblies

Sizes: 2½" – 10" (65 – 250mm)



Watts 909 OSY shown
Designed for inline servicing

- **Installation**
- **Service**
- **Repair Kits**
- **Maintenance**

For field testing procedure, send for IS-TK-DL, IS-TK-9A, IS-TK-99E and IS-TK-99D.

For other repair kits and service parts, send for PL-RP-BPD.

For technical assistance, contact your local Watts representative on back page.

IMPORTANT: Inquire with governing authorities for local installation requirements.
NOTE: For *Australia* and *New Zealand*, line strainers should be installed between the upstream shutoff valve and the inlet of the backflow preventer.
Its important that this device be tested periodically in compliance with local codes, but at least once per year or more as service conditions warrant. If installed on a fire sprinkler system, all mechanical checks, such as alarm checks and backflow preventers, should be flow tested and inspected internally in accordance with NFPA 13 and NFPA 25.

CALIFORNIA PROPOSITION 65 WARNING

WARNING: This product contains chemicals known to the State of California to cause cancer and birth defects or other reproductive harm.
(California law requires this warning to be given to customers in the State of California.)
For more information: www.watts.com/prop65

WATTS®

Basic Installation Instructions

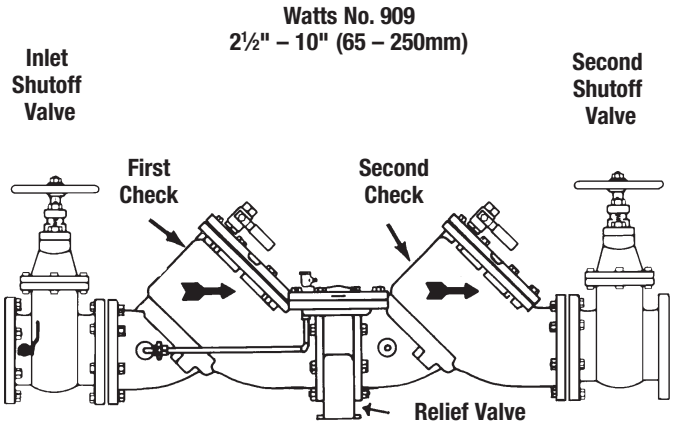
Installation Note:
The flange gasket bolts for the gate valves should be retightened during installation as the bolts may have loosened due to storage and shipping.

Series 909

Sizes: 2½" – 10" (65 – 250mm) 909

High Capacity Relief Series:
Location and Installation Considerations

1. Backflow preventers must be installed in high-visibility locations in order to allow for immediate notice of telltale discharge or other malfunction. This location should also facilitate testing and servicing, and protect against freezing and vandalism.
2. Installing a backflow preventer in a pit or vault is not recommended. However, if this becomes necessary, Watts highly recommends that a licensed journeyman tradesperson, who is recognized by the authority having jurisdiction, be consulted to ensure that all local codes and required safety provisions are met. An air gap below the relief port must be maintained so as to avoid flooding and submersion of the assembly, which may lead to a cross connection. *Please refer to Figure No. 1 for further information.
3. A strainer should be installed ahead of the backflow preventer to protect all internal components from unnecessary fouling.
   Caution: Do not install a strainer ahead of the backflow preventer on seldom-used, emergency water lines (i.e. fire sprinkler lines). The strainer mesh could potentially become clogged with debris present in the water and cause water blockage during an emergency.
4. Normal discharge and nuisance spitting are accommodated by the use of a Watts air gap fitting and a fabricated indirect waste line. Floor drains of the same size MUST be provided in case of excessive discharge. *Please refer to Figure No. 1 and Figure No. 2 for further information.
5. When a 909 Series backflow preventer is installed for dead-end service applications. (i.e. boiler feed lines, cooling tower makeup or other equipment with periodic flow requirements), discharge from the relief vent may occur due to water supply pressure fluctuation during static no-flow conditions. A check valve may be required ahead of the backflow preventer. *Please see "Troubleshooting", Page 7, prior to installation.



6. The relief valve module on 2½" – 10" (65 – 250mm) 909 Series assemblies may be turned to discharge to the opposite side. To do so, unbolt the relief valve and turn the relief valve discharge port to the opposite side. Mount the high pressure hose on the opposite. This should be done by a licensed journeyman tradesperson, who is recognized by the authority having jurisdiction and only when space is critical for testing or repair.
7. ASSEMBLY: If the backflow preventer is disassembled during installation, it MUST be reassembled in its proper order. The gate valve with the test cock is to be mounted on the inlet side of the backflow preventer. The test cock must be on the inlet side of the wedge. Please see above. Failure to reassemble correctly will result in possible water damage due to excessive discharge from the relief port/vent and possible malfunction of the backflow preventer.
8. Installation procedures must comply with all state and local codes and must be completed by a licensed journeyman tradesperson who is recognized by the authority having jurisdiction. Please see Page 3 for specific installation procedures.
9. Prior to installation, thoroughly flush all pipe lines to remove any foreign matter.
10. START UP at Initial Installation and After Servicing: The downstream shutoff should be closed. Slowly open upstream shutoff and allow the backflow preventer to fill slowly. Bleed air at each test cock. When backflow preventer is filled, slowly open the downstream shutoff and fill the water supply system. This is necessary to avoid dislodging O-rings or causing damage to internal components.
11. TEST: The 909 Series backflow preventer may be tested by a certified tester at the time of installation in order to ascertain that the assembly is in full working order and may be relied upon to protect the safe drinking water as per applicable standard.

Figure 1 Series 909 RELIEF VALVE DISCHARGE RATES

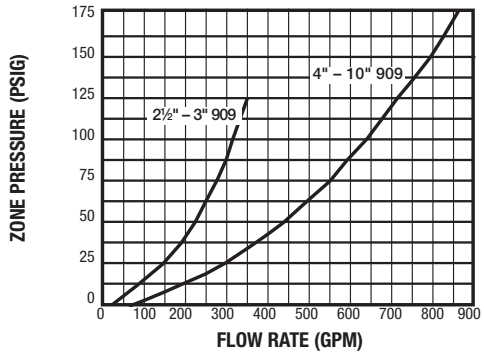


Figure 2

VALVE SIZE		TYPICAL FLOW RATES AS SIZED BY FLOOR DRAIN MANUFACTURERS	DRAIN SIZE	
in.	*mm*		*in.*	*mm*
2½"	65	55 gpm	2	50
3"	80	112 gpm	3	65
4"	100	170 gpm	4	100
6", 8", 10"	150,200,250	350 gpm	5	125

Basic Installation Instructions Series 909

Sizes: 2½" – 10" (65 – 250mm)

Installation

A. Series 909 should be installed in a horizontal and upright position. This positions the relief valve below the first check valve, enabling the zone to drain through the relief valve outlet. The shutoff valve with the test cock is to be mounted on the inlet side of the backflow preventer. The test cock is on the inlet side of the shutoff valve.

B. The 909 should always be installed in an accessible location to facilitate testing and servicing. Check the state and local codes to insure that the backflow preventer is installed in compliance, such as the proper height above the ground.

C. Water discharge from the relief valve should be vented in accordance with code requirements. The relief valve should never be solidly piped into a drainage ditch, sewer or sump. The discharge should be funneled through a Watts air gap fitting piped to a floor drain.

D. Watts recommends a strainer be installed ahead of Watts 909 Series assemblies to protect the discs from unnecessary fouling.

E. Backflow preventers should never be placed in pits unless absolutely necessary and then only when and as approved by local codes. Consult your local or state plumbing or health inspector. Watts recommends installation indoors or above ground in an insulated enclosure.

Start Up

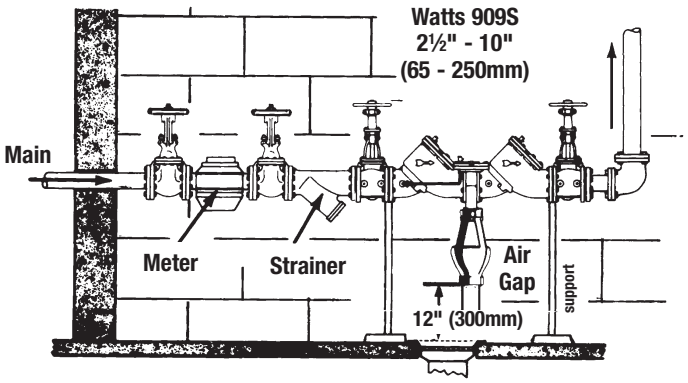
F. The downstream shutoff should be closed. Open upstream slowly, fill the valve and bleed the air through Test cock 2, 3 and 4. When valve is filled, open the downstream shutoff slowly and fill the water supply system. This is necessary to avoid water hammer or shock damage.

G. The installation of a Watts air gap with the drain line terminating above a floor drain will handle any normal discharge or nuisance spitting through the relief valve. However, floor drain size may need to be designed to prevent water damage caused by a catastrophic failure condition. Do not reduce the size of the drain line from the air gap fitting.

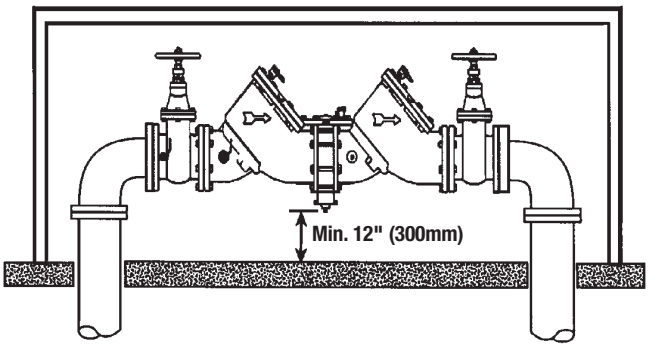
H. Two or more smaller size valves can be piped in parallel (when approved) to serve a larger supply pipe main. This type of installation is employed where increased capacity is needed beyond that provided by a single valve and permits testing or servicing of an individual valve without shutting down the complete line.

The number of assemblies used in parallel should be determined by the engineer's judgement based on the operating conditions of a specific installation.

Indoors



Above Ground



Now available, WattsBox Insulated Enclosures, for more information, send for ES-WB.

Parallel

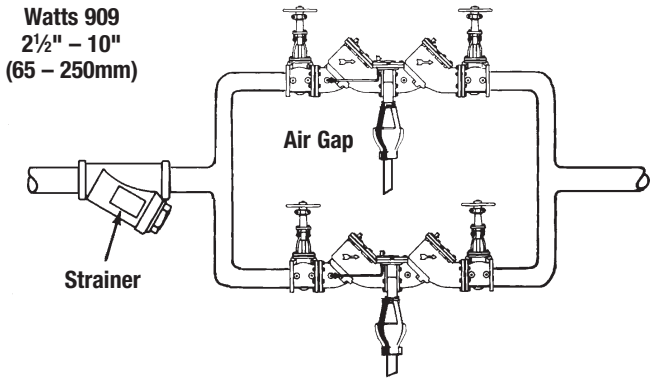


TABLE ONE - CAPACITY REQUIRED FOR SYSTEM

50 gpm	100 gpm	150 gpm	200 gpm	250 gpm	350 gpm	450 gpm	640 gpm	1000 gpm	2000 gpm	3000 gpm	5000 gpm
Two ¾" Devices	Two 1" Devices	Two 1¼" Devices	Two 1½" Devices	Two 1½" Devices	Two 2" Devices	Two 2½" Devices	Two 3" Devices	Two 4" Devices	Two 6" Devices	Two 8" Devices	Two 10" Devices

Table shows total capacity provided with dual valve installations of various sizes.

Test Procedure for Reduced Pressure Zone Backflow Preventers

The following Test Procedure is one of several that is recognized throughout the United States for verification of the functioning of backflow preventers.

The following procedure is not a specific recommendation. The Watts series of test kits are capable of performing any of the recognized backflow test procedures.

A. Open TC #4 and flush test cocks Nos. 1, 2, and 3 on BF assembly, then close TC #4.

B. Turn tester on (before connecting hoses). Tester must read all zeros. Close VA and VB.

Test No. 1 - Relief Valve

1. Install high side hose between TC #2 and tester connection A.
2. Install low side hose between TC #3 and tester connection B.
3. Open VB then TC #3. Now open VA then TC #2 slowly. Close VA then VB.
4. Close #2 shutoff valve.
5. Observe the apparent first check valve differential pressure (A - B).
6. Install bypass hose between VA and VB. Open VB and bleed air by loosening hose connection at VA. Tighten hose connection and close VB.

Push - Print Head (wait) then Push - Start Test

7. Open VA, then slowly open VB (no more than ¼ turn). When relief valve drips, push the "hold" button for 2 seconds. Record reading (must be 2 psid or more).

Push - Stop Test

8. Close VA and VB.

Test No. 2 - Test No. 2 Check Valve

9. Install bypass hose between VA and TC #4. Open VA, then bleed air by loosening hose connection at TC #4. Tighten hose connection. Close VA.

Push - Start Test

10. Open VB to reestablish pressure within the "zone". Close VB.
11. Open VA then TC #4. If relief valve does not drip, record second check valve as "closed tight".

Test No. 3 - Test No. 1 Check Valve

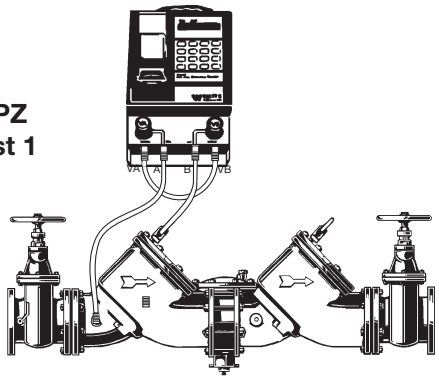
12. Open VB to reestablish first check valve differential pressure. Close VB. Record pressure differential.

Stop Test (Push Stop Test twice)

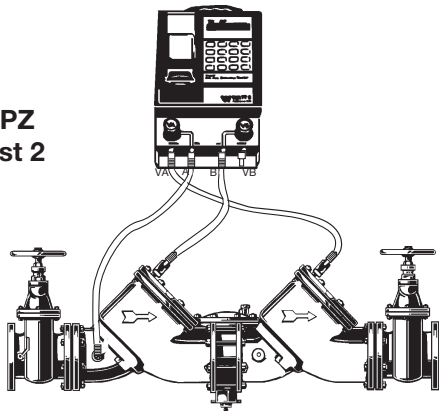
13. Close test cocks and remove tester, return assembly to normal operating condition.

Watts TK-DP

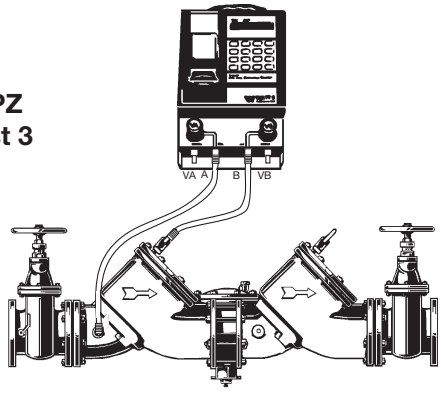
RPZ Test 1



RPZ Test 2



RPZ Test 3

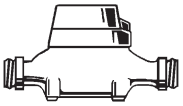


For complete testing information, send for IS-TK-9A or IS-TK-DP/DL.

Replacement Water Meters for 2½" - 10" Series 909RPDA, 990RPDA and 992RPDA.

ORDERING CODE	VALVE SERIES	SIZE	DESCRIPTION
0835561	909RPDA/990RPDA/992RPDA	2½" – 10"	D709BA203-GPM-B (registers in gallons)
1203010	909RPDA/990RPDA/992RPDA	2½" – 10"	D709BB203-CFM-B (registers in cubic feet)
CFM AND GPM Outside Reader Kit			
0899022	909RPDA/990RPDA/992RPDA	2½" – 10"	ROM DC/RP CFM-B
0899023	909RPDA/990RPDA/992RPDA	2½" – 10"	ROM DC/RP GPM-B

Water Meter



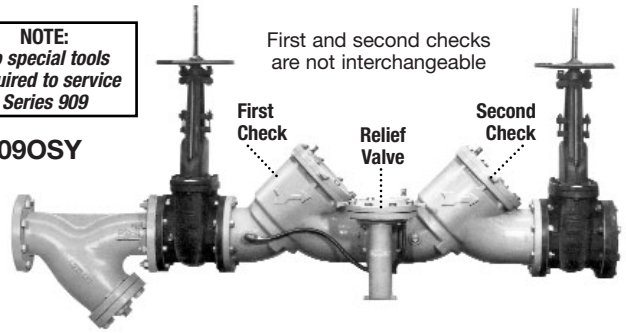
Outside Reader

Servicing First and Second Checks

Sizes: 2½" – 10" (65-250mm)

NOTE:
No special tools required to service Series 909

909OSY

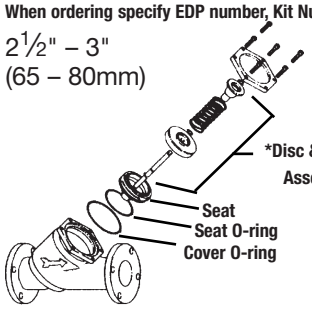


909 Repair Kits 2½" – 10" (65 – 250mm)

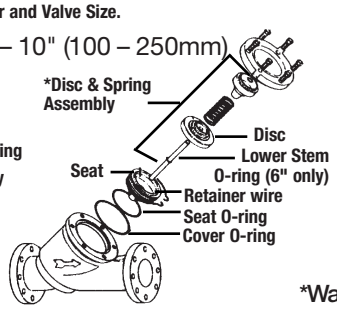
ORDERING CODE	KIT NO.	SIZE in.	SIZE mm
First Check Kits:			
0887210	RK 909 CK1	2½ – 3	65-80
0887212	RK 909 CK1	4	100
0887213	RK 909 CK1	6	150
0887214	RK 909 CK1	8	200
0887215	RK 909 CK1	10	250
Second Check Kits:			
0887211	RK 909 CK2	2½ – 3	65-80
0887216	RK 909 CK2	4	100
0887217	RK 909 CK2	6	150
0887218	RK 909 CK2	8	200
0887219	RK 909 CK2	10	250
Kits include: Disc & Spring assembly, Cover O-ring and lubricant.			
First Check Rubber Parts Kits:			
0887220	RK 909 RC1	2½ – 3	65-80
0887221	RK 909 RC1	4	100
0887223	RK 909 RC1	6	150
0887224	RK 909 RC1	8	200
0887225	RK 909 RC1	10	250
Second Check Rubber Parts Kits:			
0887226	RK 909 RC2	2½ – 3	65-80
0887227	RK 909 RC2	4	100
0887228	RK 909 RC2	6	150
0887229	RK 909 RC2	8	200
0887230	RK 909 RC2	10	250
Kits include: Lower Stem O-ring (6" only), Check disc, Cover O-ring, and lubricant.			
Seat Kits for Checks:			
0887730	RK 909 S	2½ – 3	65-80
0887731	RK 909 S	4	100
0887732	RK 909 S	6	150
0887733	RK 909 S	8	200
0887734	RK 909 S	10	250
Kits include: Seat, Seat O-ring, Cover O-ring, Retainer wire and lubricant.			
Total Rubber Parts Kits:			
0887750	RK 909 RT	2½ – 3	65-80
0887751	RK 909 RT	4	100
0887752	RK 909 RT	6	150
0887753	RK 909 RT	8	200
0887754	RK 909 RT	10	250
0887761	RK 909M1 RT	8	200
0887762	RK 909M1 RT	10	250
Kits include: Lower Stem O-ring (6" only), Check disc, Cover O-ring, Sleeve O-ring, Piston O-ring, RV disc assembly, Diaphragm, Piston seal and Lubricant.			

When ordering specify EDP number, Kit Number and Valve Size.

2½" – 3"
(65 – 80mm)



4" – 10" (100 – 250mm)



1. Remove the hatch cover bolts. NOTE: The 909 is designed so that when the bolts are backed off ½", all the spring load is released from the cover and retained by the check module. CAUTION: Be sure to verify this before removing all the bolts.
2. Lift the check valve module straight out taking care not to hit and damage the seating.
3. The seat ring may be removed and replaced by pulling out the two wire retainers on sizes 4" – 10" (100 – 250) while on sizes 2½" – 3" (65 – 80mm), one quarter turn twist removes seat. The wire retainers are 10" long. One is drawn out clockwise and the other is drawn out counterclockwise.
4. With the retainer wires removed, the seat ring can be lifted straight up and removed.
5. **CAUTION:** The check valve spring is in compression. The spring load is captured by the two spring retainers and the stem. The spring retainers are not to be removed for servicing. If there is a need to replace the spring, spring retainer or stem, an assembled module must be obtained from the factory. These modules are not interchangeable, be sure to replace the first check with a first check module and the second check with a second check module.
6. To replace the disc on sizes 2½" – 4" (65 – 100mm) simply remove the retaining nut or for sizes 6" – 10" (150 – 250mm) remove the allen head socket screws. Reverse this procedure to install the new disc.

909RPDA Repair Kits 2½" – 10" (65 – 250mm)

ORDERING CODE	KIT NO.	SIZE in.	SIZE mm
First Check Kits:			
0887239	RK 909RPDA CK1	2½ – 3	65-80
0887240	RK 909RPDA CK1	4	100
0887241	RK 909RPDA CK1	6	150
0887242	RK 909RPDA CK1	8	200
0887243	RK 909RPDA CK1	10	250
Second Check Kits:			
0887244	RK 909RPDA CK2	2½ – 3	65-80
0887245	RK 909RPDA CK2	4	100
0887246	RK 909RPDA CK2	6	150
0887247	RK 909RPDA CK2	8	200
0887248	RK 909RPDA CK2	10	250
Kits include: Disc & Spring assembly, Cover O-ring and lubricant.			
First Check Rubber Parts Kits:			
0887249	RK 909RPDA RC1	2½ – 3	65-80
0887250	RK 909RPDA RC1	4	100
0887251	RK 909RPDA RC1	6	150
0887252	RK 909RPDA RC1	8	200
0887253	RK 909RPDA RC1	10	250
Second Check Rubber Parts Kits:			
0887254	RK 909RPDA RC2	2½ – 3	65-80
0887255	RK 909RPDA RC2	4	100
0887256	RK 909RPDA RC2	6	150
0887257	RK 909RPDA RC2	8	200
0887258	RK 909RPDA RC2	10	250
Kits include: Lower Stem O-ring (6" only), Check disc, Cover O-ring, and lubricant.			
Seat Kits for Checks:			
0887735	RK 909RPDA S	2½ – 3	65-80
0887736	RK 909RPDA S	4	100
0887737	RK 909RPDA S	6	150
0887738	RK 909RPDA S	8	200
0887739	RK 909RPDA S	10	250
Kits include: Seat, Seat O-ring, Cover O-ring, Retainer wire and lubricant.			
Total Rubber Parts Kits:			
0887756	RK 909RPDA RT	2½ – 3	65-80
0887757	RK 909RPDA RT	4	100
0887758	RK 909RPDA RT	6	150
0887759	RK 909RPDA RT	8	200
0887760	RK 909RPDA RT	10	250
0887764	RK 909RPDAM1 RT	8	200
0887765	RK 909RPDAM1 RT	10	250
Kits include: Lower Stem O-ring (6" only), Check disc, Cover O-ring, Sleeve O-ring, Piston O-ring, RV disc assembly, Diaphragm, Piston seal and Lubricant.			

For further details contact your technical sales representative, see back page.

*Warning: Spring assembly is factory assembled. DO NOT DISASSEMBLE

Servicing the Relief Valve

Sizes: 2½" – 10" (65-250mm)

1. Remove the relief valve cover bolts. Note the 909 is designed so that when the bolts are backed off ½" all the relief valve spring load is retained by the bottom plug spring module.
   CAUTION: Be sure to verify this before removing all the bolts.
2. Remove the cover and diaphragm. The relief valve piston assembly can be lifted straight up and out.
3. Replace the wiper seal and piston O-ring and apply grease to the O-ring.
4. To replace the relief valve disc, hold the upper guide fin and unscrew the diaphragm pressure plate. It may be necessary to lightly tap the cast webs and the pressure plate to loosen. Replace with a new disc holder assembly and O-ring. Note: the disc rubber is molded into the disc holder and is supplied as a disc holder assembly.
5. Removal of the bottom plug and spring assembly. During normal field service there is no need to remove the bottom plug spring assembly other than inspection. It can be removed by simply unscrewing with a large pipe wrench.

CAUTION: The spring as retained on the bottom plug is highly loaded. NO attempt should be made in the field to remove the spring. For replacement, a complete bottom plug assembly must be obtained from the factory.

For further details contact your technical sales representative, see back page.

909 Repair Kits 2½" – 10" (65 – 250mm)

ORDERING CODE	KIT NO.	SIZE	
Relief Valve Rubber Parts		in.	mm
0887231	RK 909 RV	2½ – 3	65-80
0887232	RK 909 RV	4 – 6	100-150
0887233	RK 909 RV	8 – 10	200-250
0887234	*RK 909M1 RV	4 – 10	100-250

Kits include: Sleeve o-ring, Seat o-ring, Piston o-ring, Stem o-ring, RV disc assembly, Diaphragm, Piston seal, Bottom plug o-ring and lubricant

Relief Valve Total			
0887235	RK 909 VT	2½ – 3	65-80
0887236	RK 909 VT	4 – 6	100-150
0887237	RK 909 VT	8 – 10	200-250
0887238	*RK 909M1 VT	4 – 10	100-250

Kits include: Adapter o-ring, Diaphragm, Disc & piston assembly, Seat, Seat o-ring and lubricant. (4" – 10" M1 includes bottom plug & spring assembly.)

Cover Kits			
0887740	RK 909 C	2½ – 3	65-80
0887741	RK 909 C	4	100
0887742	RK 909 C	6	150
0887743	RK 909 C	8	200
0887744	RK 909 C	10	250

Kits include: Cover, Cover o-ring and lubricant.

909RPDA Repair Kits 2½" – 10" (65 – 250mm)

Relief Valve Rubber Parts			
0887263	RK 909RPDA RV	2½ – 3	65-80
0887264	RK 909RPDA RV	4 – 6	100-150
0887265	RK 909RPDA RV	8 – 10	200-250
0887266	*RK 909RPDAM1 RV	4 – 10	100-250

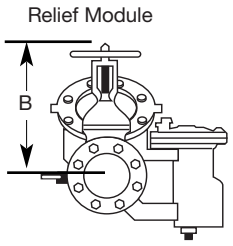
Kits include: Sleeve o-ring, Seat o-ring, Piston o-ring, Stem o-ring, RV disc assembly, Diaphragm, Piston seal, Bottom plug o-ring and lubricant

Relief Valve Total			
0887259	RK 909RPDA VT	2½ – 3	65-80
0887260	RK 909RPDA VT	4 – 6	100-150
0887261	RK 909RPDA VT	8 – 10	200-250
0887262	*RK 909RPDAM1 VT	4 – 10	100-250

Kits include: Adapter o-ring, Diaphragm, Disc & piston assembly, Seat, Seat o-ring and lubricant. (4" – 10"M1 includes bottom plug & spring assembly.)

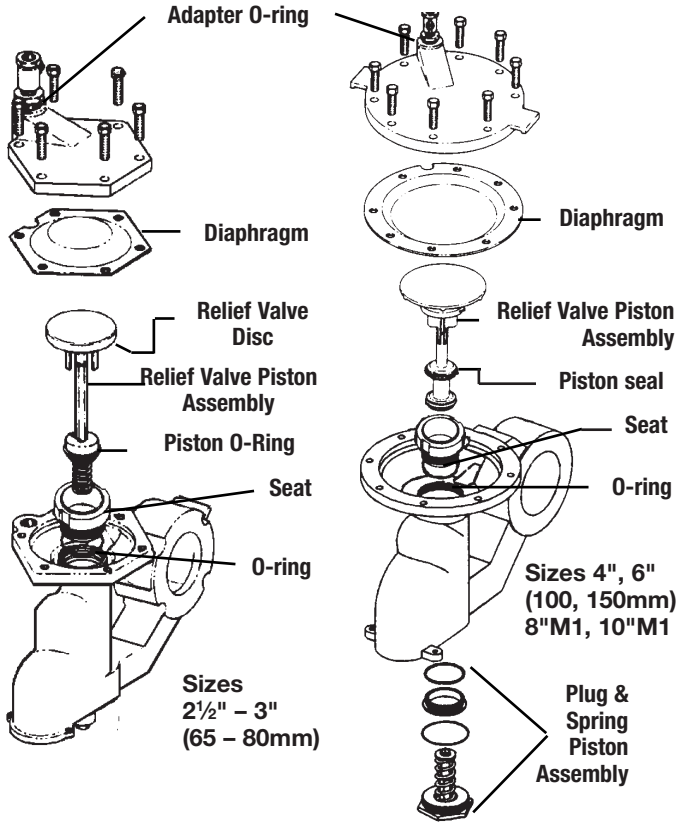
Cover Kits			
0887745	RK 909RPDA C	2½ – 3	65-80
0887746	RK 909RPDA C	4	100
0887747	RK 909RPDA C	6	150
0887748	RK 909RPDA C	8	200
0887749	RK 909RPDA C	10	250

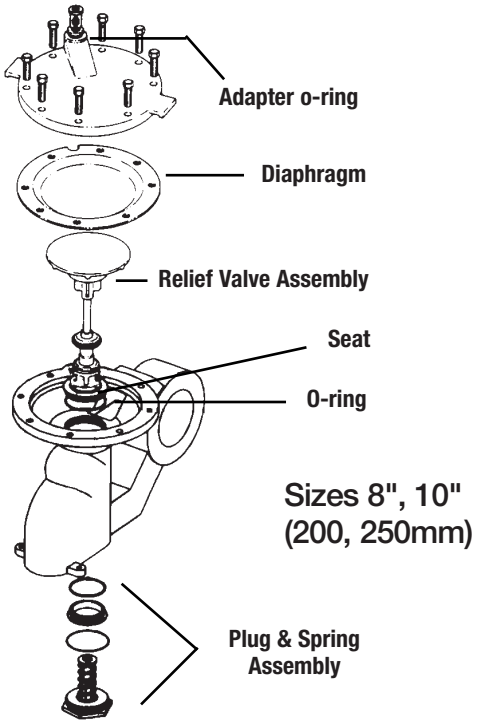
Kits include: Cover, Cover o-ring and lubricant.
*M1 = Cast iron relief valve.



Clearance Required for Servicing

in.	mm	A	B
2½ – 3	65-80	10"	11"
4	100	15"	14"
6	150	15"	16"
8	200	23"	21"
10	250	25"	21"





Troubleshooting Guide - Backflow Preventers

Problem	Cause	Solution
A. Valve spits periodically from the vent		
	A.1 Fluctuating supply pressure.	**A.1** Install a soft seated check valve immediately upstream of the device.
	A.2 Fluctuating downstream pressure	**A.2** Install a soft seated check valve downstream of the device close as possible to the shutoff valve.
B. Valve drips continually from the vent		
	B.1 Fouled first check	**B.1** Flush valve. If flushing does not resolve problem, disassemble valve and clean or replace the first check.
	B.2 Damage or fouled relief valve seat.	**B.2** Clean or replace the relief valve seat.
	B.3 Relief valve piston O-ring not free to move due to pipe scale, dirt or build up of mineral deposits.	**B.3** Clean, grease or replace the piston O-ring.
	B.4 Excessive back pressure, freezing, or water hammer has distorted the second check.	**B.4** Eliminate source of excessive backpressure or water hammer in the system downstream of the device. Use Watts No. 15 to eliminate water hammer. Replace defective second check assembly. In case of freezing; thaw, disassemble and inspect internal components. Replace as necessary.
	B.5 Electrolysis or relief valve seat or first check seats.	**B.5** Replace relief valve seat or inlet cover. Electrically ground the piping system and/ or electrically isolate the device with plastic pipe immediately upstream and downstream of the device.
	B.6 Valve improperly reassembled.	**B.6** If valve is disassembled during installation, caution must be exercised to install check springs in their proper location.
C. Valve exhibits high pressure drop.		
	C.1 Fouled strainer.	**C.1** Clean strainer element or replace.
	C.2 Valve too small for flows encountered.	**C.2** Install proper size device based upon flow requirements.
D. No water flows downstream of valve.		
	D. Valve installed backwards.	**D.** Install valve in accordance with flow direction arrow.
E. Valve does not test properly		
	E.1 Follow manufacturer's test procedure	**E.1, E.2** Clean or replace gate valve with full port ball valves or resilient wedge shutoff valves.
	E.2 Leaky downstream gate valve.	
F. Valve quickly and repeatedly fouls following servicing.		
	F. Debris in pipe line is too fine to be trapped by strainer.	**F.** Install finer mesh strainer element in the strainer.
G. Winterization of backflow preventers.		**G.** Electric heat-tape wrap closely together around valve body. Build a small shelter around the valve with a large light bulb installed and left on at all times. If supply line is not used during the winter, removal of the complete body is the best. This would create an air gap to eliminate any possible backflow.

For additional information, visit our web site at: www.watts.com

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