Watts Series 994/994RPDA 2 ½" – 6"

REMOVING CHECK ASSEMBLIES (Before servicing be sure shutoff valves are closed)

1. Slowly open all ball valves to relieve air and water pressure. Loosen bolts on groove coupler and remove groove couple and cover platefrom valve body.
2. Remove #1 Check Assembly by using your hands to unscrew (turn counter-clockwise) Check and remove through top access port. Do not use Check Arm as a handle to unscrew. If Check cannot be loosened by hand, insert a long screwdriver between valve body and Check **(see figure 2)**. Gently apply pressure against the Check until loosened. Finish unscrewing by hand. Unscrew #2 Check (turncounter-clockwise) by placing along screwdriver across lugs and applying pressure to loosen #2 Check. Finish unscrewing by hand.
3. To clean #1 Check (6" only), locate the Check Arm opening stud on the outlet flange of the valve assembly. Slide the Check Arm over the stud with the check threads facing down ward **(figure 5A)**. Tighten 1/4" nut on stud to secure cam bar.
4. Slowly pull the assem-bly outward to open check allowing exposure of the seat clapper area for cleaning. To clean #2 Check, lift Cam Arm and hold in open position. Raise clapper so that the end of the Check Arm rests between roller and clapper **(figure 5B)**. Thoroughly clean the seat area and clapper sealing surfaces of both Checks. Inspect seats, clapper sealing surfaces, Check Arms, and O-rings for dam-age, nicks, and debris. If not damaged, gently close the clapper. If dam-aged, install a new Check as-sembly and/or O-ring.
4. Before reinstallation of Checks, thoroughly clean O-ring groove and lubricate O-ring with FDA approved lubricant. Insert and thread #2 Check first and then #1 Check. #2 Check should be tight-ened by inserting a long screwdriver between lugs to tighten firmly **(see figure 2)**. Do not over tighten. Tighten #1 Check firmly by hand only. Replace cover plate, clean groove coupler gasket and groove. Replace groove coupler. Repressurize and bleed air from all test cocks.

Figure 1

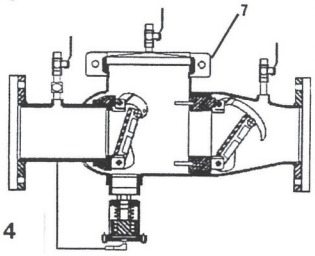


Figure 2

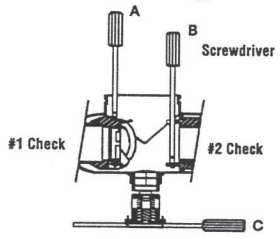


Figure 3

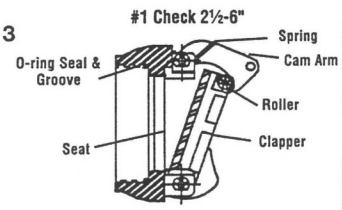


Figure 4

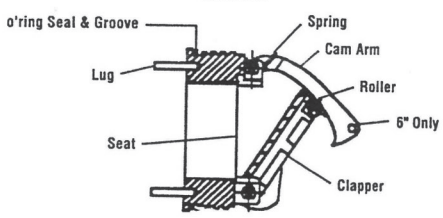


Figure 5A Cam Bar Open Pin

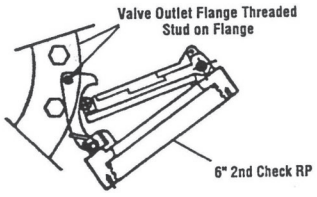


Figure 5B

Watts Series 994/994RPDA (8" and 10")

REMOVING CHECK ASSEMBLIES *(Before servicing be certain shut off valves are closed)*

1. Slowly open all ball valves to relieve air and water pressure. Loosen bolts on groove coupler and remove groove couple and cover plate from valve body.
2. **#1CHECK**

   Using a 9/16" socket wrench or nut driver, remove the four nuts from the #1 check studs **(see fig. 1)**. Using two hands, place them at 12 o'clock and 6 o'clock, wiggle the check assembly free. Remove through access port with back of clapper first with spring end down. Pull check assembly out of main body. Inspect seats and clapper sealing surfaces.

   #2 CHECK

   After loosening bolts with a 9/16" socket, remove bolts completly. Using the centerline access bar, spin the check assembly from the 9 o'clock position to the 12 o'clock position, then (without letting go of the access bar) push the cam assembly slightly downstream so that the clap-per is now parallel to the valve body. Now bring the check assembly through the check retaining wall. Leave the check assembly parallel to the valve body. Pull the check as sembly through the access port.
3. Using a 3/8" nut driver or a piece of small diameter pipe, place on the check arm torsion spring and move away from and move away from and around the torsion spring retaining bracket so as to relieve the torsion spring tension. This will allow the check arm to move freely, enabling you to inspect the clapper face and check seat. Thoroughly clean the seat area and clapper sealing surfaces, check arms, and o-rings for damage, nicks, and debris. If damaged, install a new check assembly and or O-ring.
4. Before reinstallation of check assembly, thoroughly clean O-ring groove and lubricate O-ring with F.D.A. approved lubricant.

Figure 1

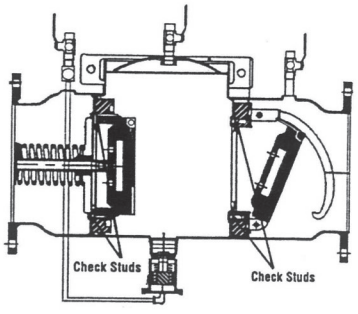


Figure 2

#1 Cam-Check RP

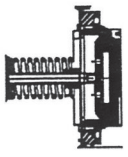


Figure 3

#2 Cam-Check DC & RP

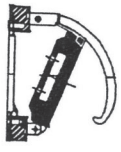
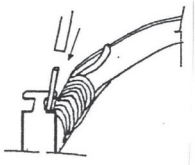


Figure 4



Servicing the First Check 8" & 10"

Use extreme caution when servicing the first check!

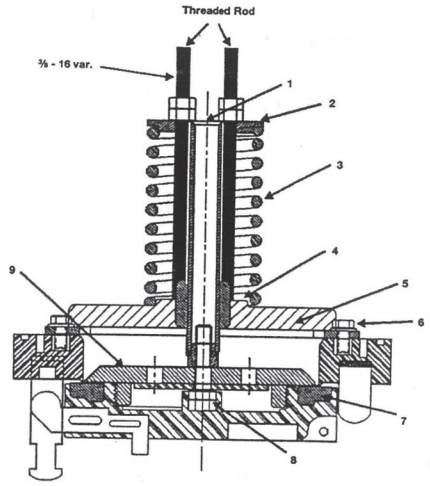
To inspect the seat and clean the seat and clapper washer:

1. After removing the first check from the backflow valve body, place on a flat surface with the coil spring facing up.
2. In order to gain access to the seat and clapper rubber ring, you must compress the spring (#3) that surrounds the clapper shaft (#1). To do so, you must place the ⅜" threaded rod through two holes of the spring retaining plate #2.
3. After placing the ⅜" all-thread rod through the spring retaining plate, Screw the threaded rod into the holes (#4) at the base of spider (#5 next to shaft). Be sure to use two nuts on the threaded rod to tighten them into the holes. The depth of the threaded holes should be approximately ½". This operation will require you to use two pieces of threaded rod (see drawing below).
4. Compressing the spring. To do so you need to loosen the top ⅜" nut and back it off without unthreading the threaded rod from the spider. Place a box end wrench or crescent wrench on the ⅜" nut closest to the spring retaining plate and tighten. Tighten both threaded and nut evenly; put a few turns on one threaded rod nut and a few turns on the other.
5. During compression, the clapper will slowly move up, away from the seat. To examine the seat, continue spring compression until the clap-per has moved approximately 1" from the seat. This will allow debris to be removed and or the seat to be examined.
6. To unload the spring compression, loosen the all-thread and then double nut the all-thread and unscrew the rod from the spider and shaft base.

To disassemble the first check, you will need the following:

- Two pieces of ⅜" threaded rod (approximately 14" long)
- Adjustable crescent wrench
- Pipe wrench or channel lock pliers

1. Shaft
2. Spring retaining plate
3. Spring
4. ⅜" threaded hole (maintenance)
5. Spider
6. Spider retaining bolt
7. Seat ring
8. Clapper to shaft bolt
9. Seat ring retainer



Servicing the Relief Valve 2 ½"-10"

1. The relief valve may be serviced while on or off the backflow preventer valve.
2. **NOTE: DO NOT USE A PIPE WRENCH TO REMOVE THE RELIEF VALVE ASSEMBLY FROM THE BACKFLOW PREVENTER.**
3. Shut down water system.

RELIEF VALVE DISASSEMBLY

1. Disconnect the relief valve hose from the elbow in the bottom flange cover at the swivel hose connection. Do not remove the elbow.
2. If the valve is to be removed from the backflow preventer for service, place a screw driver blade or flat bar across the edges of two of the hex head screws in the bottom flange cover and turn counter-clockwise to loosen the relief valve assembly. (See Figure 2 page 4)
3. Remove the four bottom bolts from the bottom of the relief valve assembly with a 5/16" socket or open-end wrench. Remove the bottom flange cover.
4. Remove the piston assembly & sleeve from the relief valve body by placing your index fingers through the slots in the side of the body and pressing down on the top of the disc retainer in the top of the piston assembly. (See Figure 7.)
5. Pull the piston assembly free of the body by grasping the sleeve and pulling down.
6. Grip the sleeve and the piston assembly by the head of the hex head bolt. Pull up on the sleeve to extend the diaphragm. Slide the sleeve (item #26) completely off of the diaphragm and inspect the diaphragm for tears, holes or excessive wrinkles. If the diaphragm is damaged, order a new piston/diaphragm assembly.

RELIEF VALVE REASSEMBLY

1. Thoroughly clean all inside surfaces of the relief valve body.
2. Inspect the relief valve body seat surface located at the top edge of the three discharge slots near the top of the body by rubbing the end of the index finger around the entire seat surface; access the seat surface through the slots or the bottom of the body. The seat must be free of nicks. If nicks are discovered, remove the body & install a new relief valve assembly.
3. Position the diaphragm on the piston assembly so that it is facing up as shown in Figure 8.
4. Now fold the top (ribbed) edge of the diaphragm inward, grasp the sleeve with the **ribbed edge up** and slide the sleeve down over the piston assembly as shown in Figure 8.
5. While still holding the sleeve, slide it up over the diaphragm and, using your thumb & index finger, position the bead of the diaphragm so that it wraps over the outside of the rib on the top of the sleeve so that the sleeve is held by the diaphragm. Now place the piston assembly on a flat, firm surface with diaphragm facing up as shown in Figure 9.
6. Cup your hand slightly to form an air trap and force the sleeve down over the piston assembly with a rapid slap (hard) on the open end of the diaphragm with your cupped hand. The trapped air in the diaphragm will force the diaphragm between the inside of the sleeve and the outside of the piston. Ensure that the diaphragm is fully seated. **If diaphragm is wrinkled, repeat previous step.**
7. Slide the piston assembly and sleeve into the relief valve body with the hex head bolt entering the flanged end of the body first. Slide the piston assembly in until the diaphragm lip is smoothly seated in the machined groove in the flanged end of the body. By running your index finger around the outside of the diaphragm bead, you will ensure it is seated smoothly
8. Position the bottom flange cover on the bottom of the relief valve body and secure by hand tightening the four bottom bolts.
9. Now tighten the four bottom bolts to approximately 15 ft.-lbs. with a 5/16" socket or open-end wrench.
10. Reattach the relief valve hose to the elbow in the bottom flange cover.

Figure 7

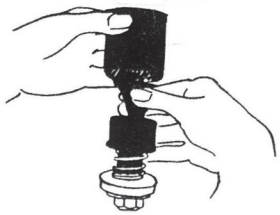
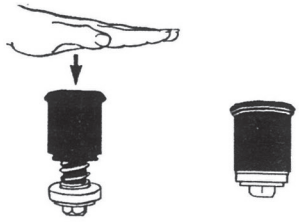
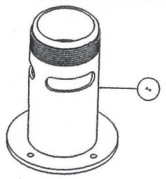
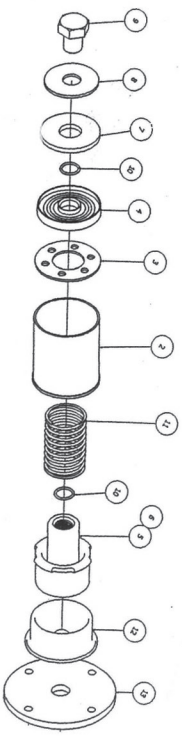


Figure 8

Figure 9







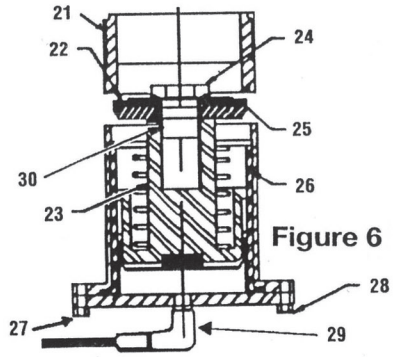


Figure 6

Item #	Part Description
21	Relief Valve Body
22	Rubber Shut-Off Disc
23	Piston Diaphragm Assembly
24	Hex Head Bolt
25	Disc Retainer
26	Sleeve
27	Bottom Bolt
28	Bottom Flange (w st. elbow)
29	Bottom St. Ell
30	O-ring disc

PARTS LIST	
ITEM	DESCRIPTION
1	RV BODY
2	SLEEVE, SS RV MACHINED
3	STOP, SPRING
4	CLIP, RV SS
5	PISTON, RV SS
6	THREAD INSERT, 5/8-11 SS
7	DISC, RV SHUT-OFF
8	RETAINER DISC, WASHER, SS
9	*HCS, 5/8-18 UNC X 3/4, SS
10	O-RING, 2-015
11	SPRING COMPRESSION, SS RV
12	DIAPHRAM, SS RV
13	*LANGE, SS RV
14	*HCS, 1/4-20 X 5/8, SS
15	ELBOW, STREET, 3/8 NPT, SS
16	*OSE ASSEMBLY, SS RV 27" L