# WATTS FACTORY REPAIR INFORMATION

*The following pages are excerpts from literature the manufacturers print to help repair their assemblies. This information is provided to assist in repairing their assemblies but should not be considered all the information needed to repair all situations.*

## MODELS FOR WHICH FACTORY REPAIR INFORMATION IS PROVIDED

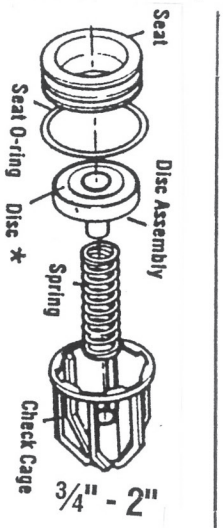


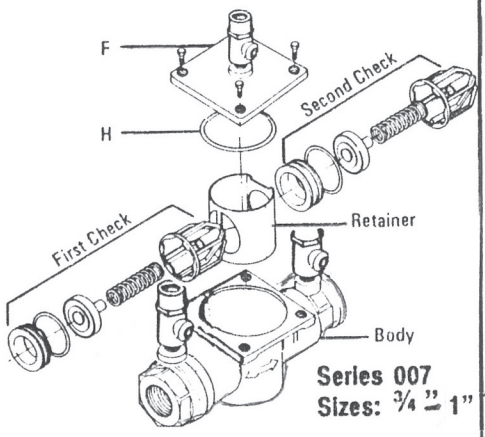
**PAGES 21-97 THROUGH 21-99 HAVE INTENTIONALLY BEEN OMITTED**

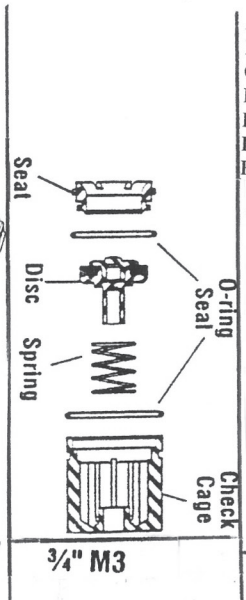
# Series 007 DOUBLE CHECK VALVE ASSEMBLY Sizes: ½" thru 2"

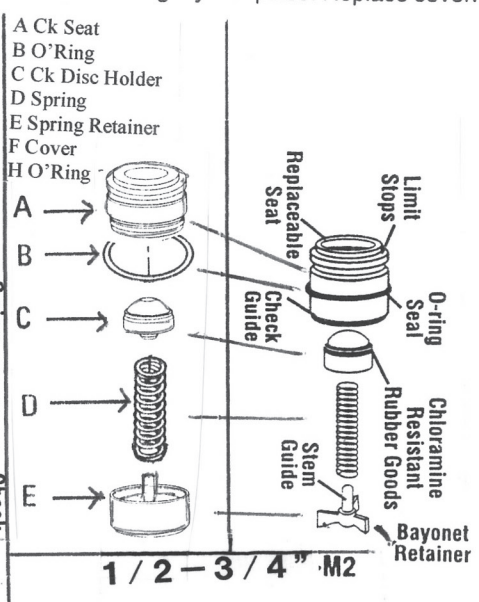
**Servicing the First and Second Check Valves:**

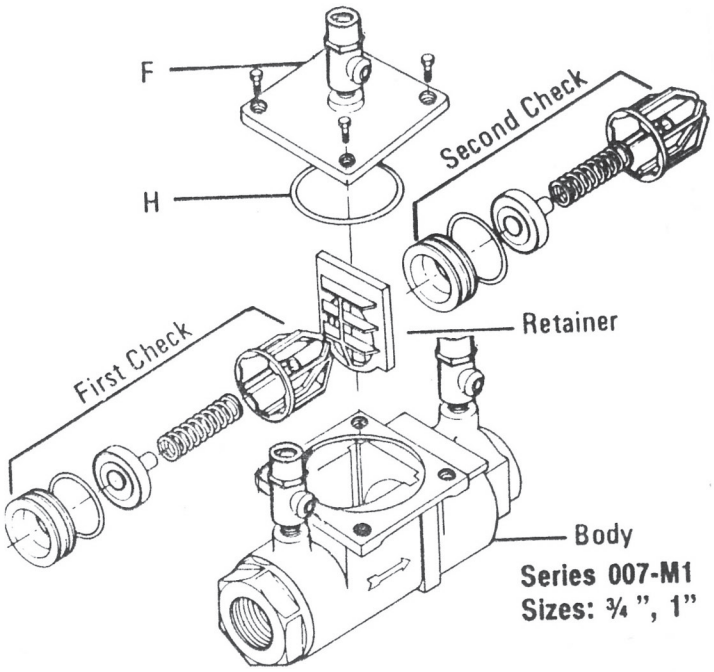
1. After removing the cover, remove the retainer for the body bore. The check valve modules can now be removed from the valve by hand or with a screwdriver. **Note:** For Series 007 sizes ¾"- 2", the seats and sprngs of the first and second check modules are **not** interchangeable. The heavier spring and smaller diameter seat belong with the first check module. Series 007M1 sizes ¾"- 1" and Series 007M2 ¾" have interchangeable seats and springs.
2. The check seats are attached to the cage with a bayonet type locking arrangement. Holding the cage in one hand, push the seat inward and rotate counter-clockwise against the cage, for Series 007M2 pull apart seat and cage. The seat, cage, spring and disc assembly are now individual components.
3. The disc assembly may now be cleaned and re-assembled or, depending on its condition, it may be discarded and replaced with a new assembly from the repair kit. O'rings should be cleaned or replaced as necessary and lightly greased with the FDA approved silicon grease furnished with the service kit.
4. Re-assemble the check valve module in the reverse order. Check modules are installed in the valve body with the seats facing the valve inlet. The modules must be securely in place before the retainer can be replaced. On the ¾"- 1" size, this retainer may have to be tilted slightly into place. Replace cover.

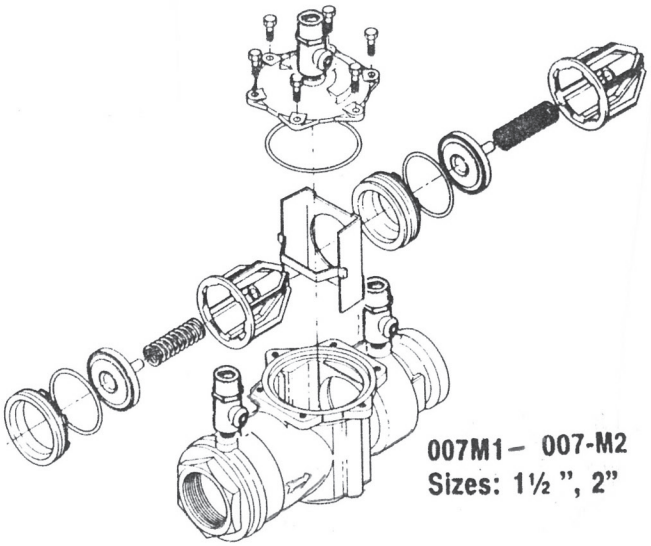


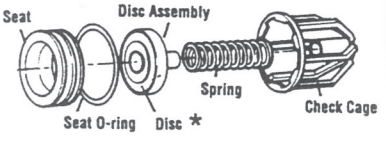




CHECK ASSEMBLY (1" - 2")



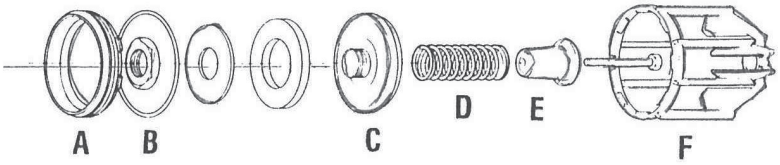
# Series 007 DOUBLE CHECK VALVE ASSEMBLY

## Sizes: 2½'' and 3''

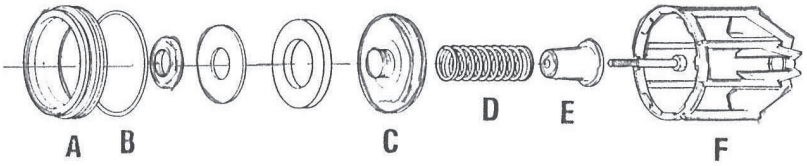
1. Remove cover bolts and cover.
2. Remove the retainer from the body bore. The check valve modules can now be removed from the valve by hand or with a screwdriver. **Note:** The seats and springs of the first and second check modules are **not** interchangeable. The heavier spring and smaller diameter seat belong with the first check module.
3. The check seats are attached to the cage with a bayonet type locking arrangement. Holding the cage in one hand, pusn the seat inward and rotate counter-clockwise against the cage. The seat, spring cage, spring and disc assembly are now individual components.
4. The disc assembly may now be cleaned and re-assembled or, depending on its condition, may be discarded and replaced with a new assembly from the repair kit. ''O'' rings should be cleaned or replaced as necessary and lightly greased with the FDA approved silicon grease furnished with the service kit.
5. Re-assemble the check valve modules. Check modules are installed in the valve body with the seats facing the valve inlet. The modules must be securely in place before the retainer can be replaced. On the ¾'' and 1'' size, this retainer mav have to be tilted slightly into place.

**NOTE: No special tools required to service Series 007 2½''- 3''**

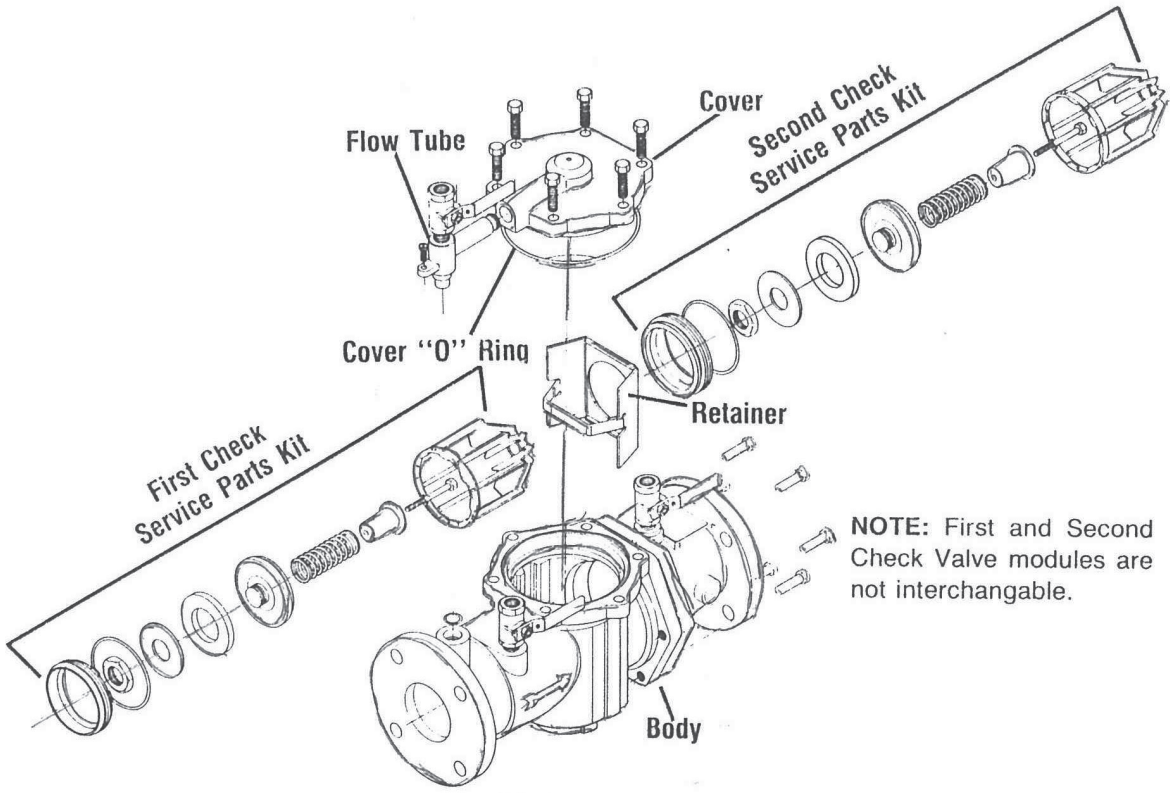
**FIRST CHECK**




**SECOND CHECK**




A Ck Seat
B O'Ring
C Ck Disc Holder
D Spring
E Guide
F Spring Retainer




**NOTE:** First and Second Check Valve modules are not interchangable.

# 4" and 6" 007

## To Clean the Check Seats and Clapper Face

1. Remove the valve access cover.
2. Withdraw the 1st check seat retaining wires (fig. 1). Do not bend.
3. Withdraw the entire 1st check module.
4. Compress the spring assembly and pop the ball-end from its' socket; then remove the entire spring assembly.
5. With the spring load gone, rotate the clapper open then wipe clean any debris from the rubber clapper and the bronze seat sealing surface.
6. Repeat steps (2-5) for the removal and cleaning of the 2nd check seat and clapper.
7. To re-install, reverse the above steps while being sure to orient the check modules so the clapper hinge is on top.

## To Replace Check Seats

1. Remove the valve access cover.
2. Withdraw the 1st check seat retaining wires (fig. 1). Do not bend.
3. Withdraw the entire 1st check module.
4. Compress the spring assembly and pop the ball-end from its' socket, then remove the entire spring assembly.
5. Loosen the two #8 set screws and slide out the two pins that secure the check cage.
6. Everything now easily comes apart so you can replace the check seat - to rebuild, reverse the above steps.

**NOTE:** To replace the 2nd check seat you must first remove the 1st check module.

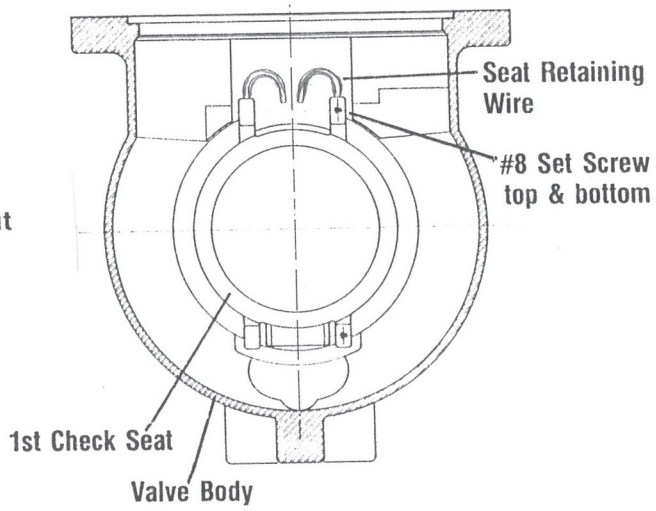
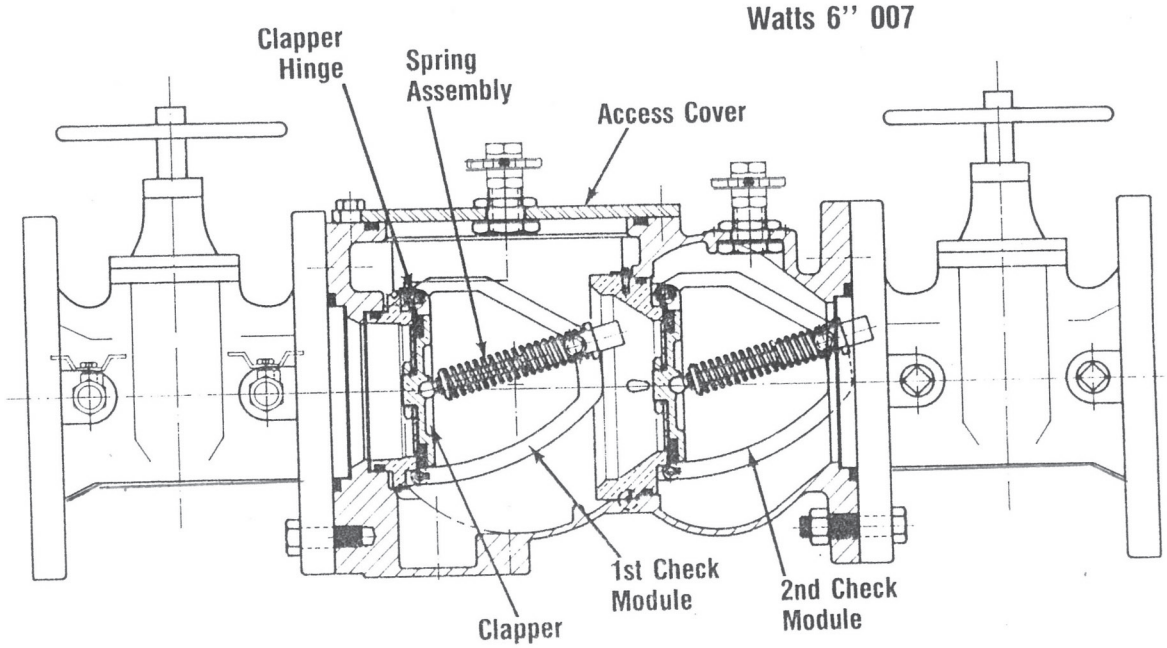
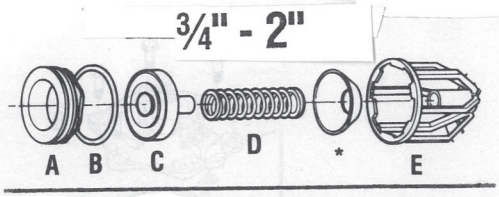
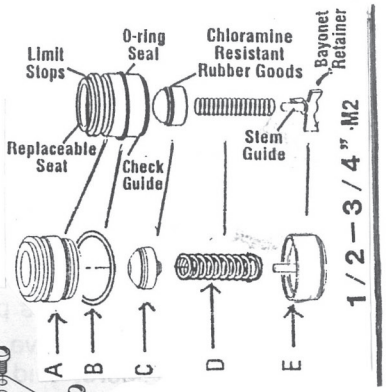



**Figure 1**
**View from the inside of the valve looking out through the 1st check orifice.**



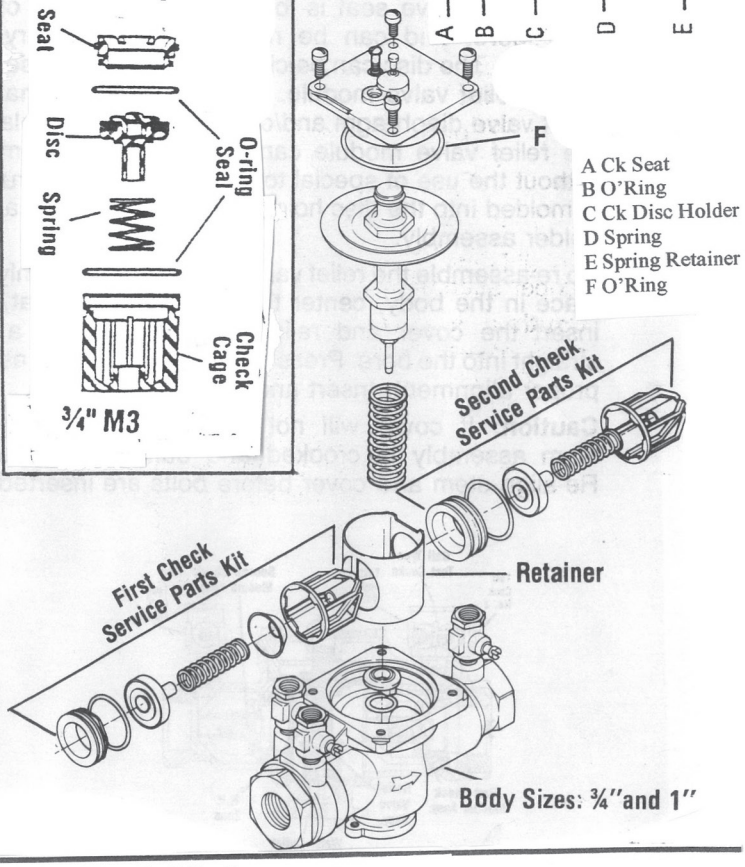
# 009 Sizes: ½" thru 2"




1. Remove the relief valve assembly
2. Remove the retainer from the body bore. The check valve modules can now be removed from the valve by hand or with a screwdriver. **Note:** The seats and springs of the first and second check modules are **not** interchangeable. The heavier spring and/or smaller diameter seat belong with the first check module.
3. The check seats are attached to the cage with a bayonet type locking arrangement. Holding the cage in one hand, push the seat inward and rotate counter-clockwise against the cage. The seat, spring cage, spring and disc assembly are now individual components.
   **Note:** ½" - ¾" M2 modules snap apart
4. The disc assembly may now be cleaned and re-assembled or, depending on its condition, may be discarded and replaced with a new assembly from the repair kit. "O" rings should be cleaned or replaced as necessary and lightly greased with the FDA approved silicon grease furnished with the service kit.
5. Re-assemble the check valve modules. Check modules are installed in the valve body with the seats facing the valve inlet. The modules must be securely in place before the retainer can be replaced. On the ¾" and 1" size, this retainer may have to be tilted slightly into place. Replace relief valve assembly.

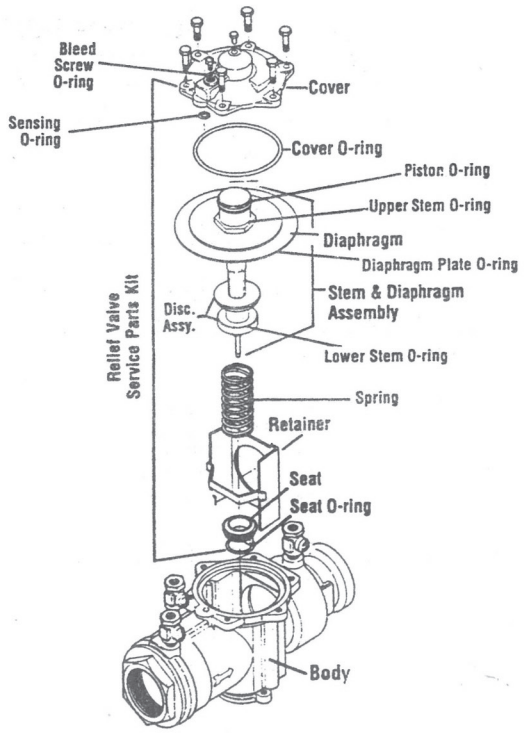



## Servicing the Relief Valve

1. Remove the relief valve cover bolts while holding the cover down.
2. Lift the cover straight off. The stem and diaphragm assembly will normally remain with the cover as it is removed. The relief valve spring will be free inside the body at this point.
3. The relief valve seat is located at the bottom of the body bore, and can be removed, if necessary, for cleaning. The disc can be cleaned without disassembly of the relief valve module. If it is determined that the relief valve diaphragm and/or disc should be replaced, the relief valve module can be readily disassembled without the use of special tools. **Note:** The disc rubber is molded into the disc holder and is supplied as a disc holder assembly.
4. To re-assemble the relief valve, press the seat firmly into place in the body, center the spring on the seat, and insert the cover and relief valve module as a unit straight into the bore. Press down on the cover to assure proper alignment. Insert and tighten bolts.

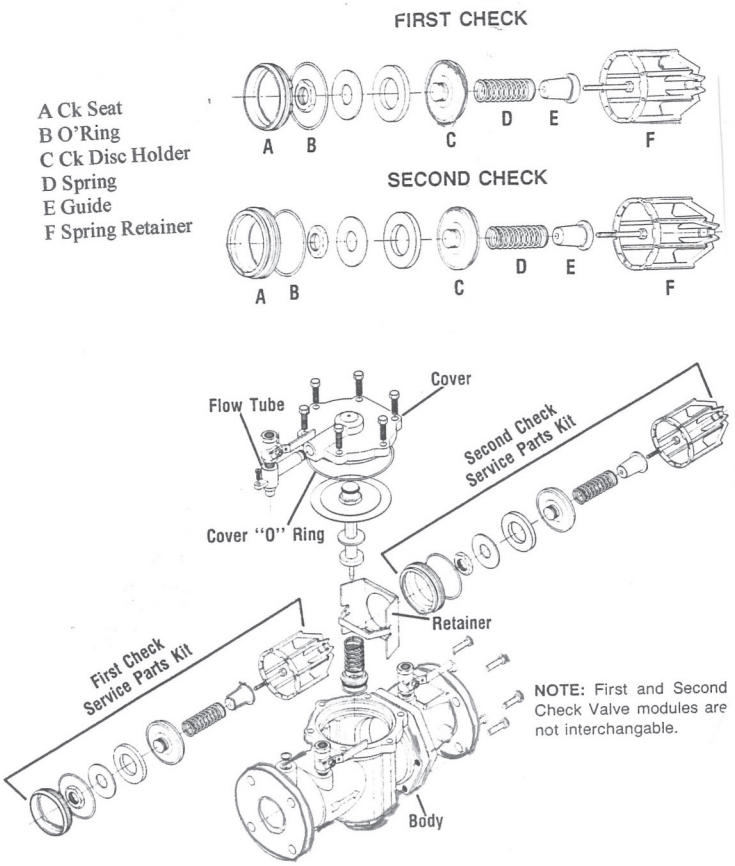
   **Caution:** If cover will not press flat against body, stem assembly is crooked and damage can result. Re-align stem and cover before bolts are inserted.



# 009
## 2 1/2 – 3"

1. Remove the relief valve assembly
2. Remove the retainer from the body bore. The check valve modules can now be removed from the valve by hand or with a screwdriver. **Note:** The seats and springs of the first and second check modules are **not** interchangeable. The heavier spring and smaller diameter seat belong with the first check module.
3. The check seats are attached to the cage with a bayonet type locking arrangement. Holding the cage in one hand, pusn the seat inward and rotate counter-clockwise against the cage. The seat, spring cage, spring and disc assembly are now individual components.
4. The disc assembly may now be cleaned and re-assembled or, depending on its condition, may be discarded and replaced with a new assembly from the repair kit. "O" rings should be cleaned or replaced as necessary and lightly greased with the FDA approved silicon grease furnished with the service kit.
5. Re-assemble the check valve modules. Check modules are installed in the valve body with the seats facing the valve inlet. The modules must be securely in place before the retainer can be replaced. On the ¾" and 1" size, this retainer may have to be tilted slightly into place Replace relief valve assembly.

**NOTE: No special tools required to service Series 009 ½"- 3".**

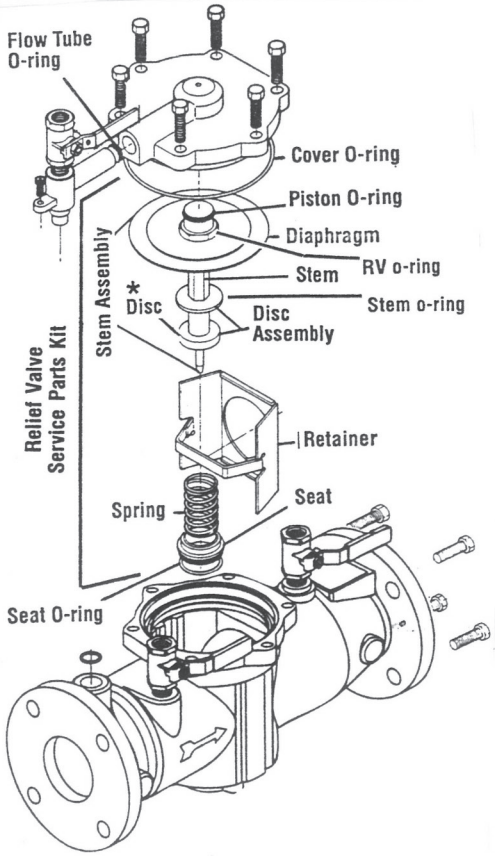



# Servicing the Relief Valve 2½"- 3"

1. Remove the four or six relief valve cover bolts while holding the cover down.
2. Lift the cover straight off. The stem and diaphragm assembly will normally remain with the cover as it is removed. The relief valve spring will be free inside the body at this point.
3. The relief valve seat is located at the bottom of the body bore, and can be removed, if necessary, for cleaning. The disc can be cleaned without disassembly of the relief valve module. If it is determined that the relief valve diaphragm and/or disc should be replaced, the relief valve module can be readily disassembled without the use of special tools. **Note:** The disc rubber is molded into the disc holder and is supplied as a disc holder assembly.
4. To re-assemble the relief valve, press the seat firmly into place in the body, center the spring on the seat, and insert the cover and relief valve module as a unit straight into the bore. Press down on the cover to assure proper alignment. Insert and tighten bolts.

**Caution:** If cover will not press flat against body, stem assembly is crooked and damage can result. Re-align stem and cover before bolts are inserted.

**NOTE: No special tools required to service Series 009 ½"- 3".**

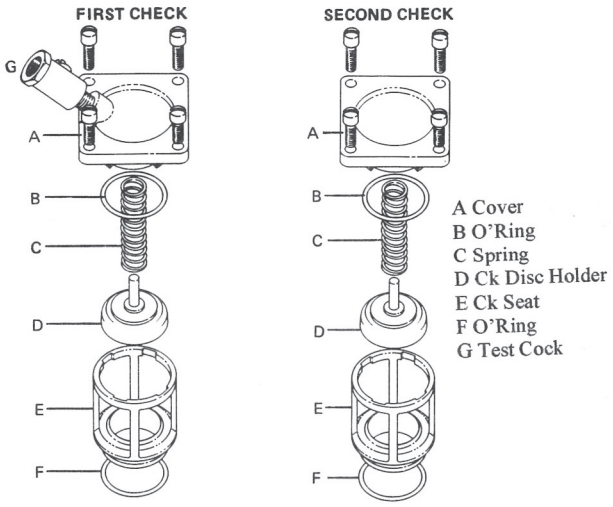


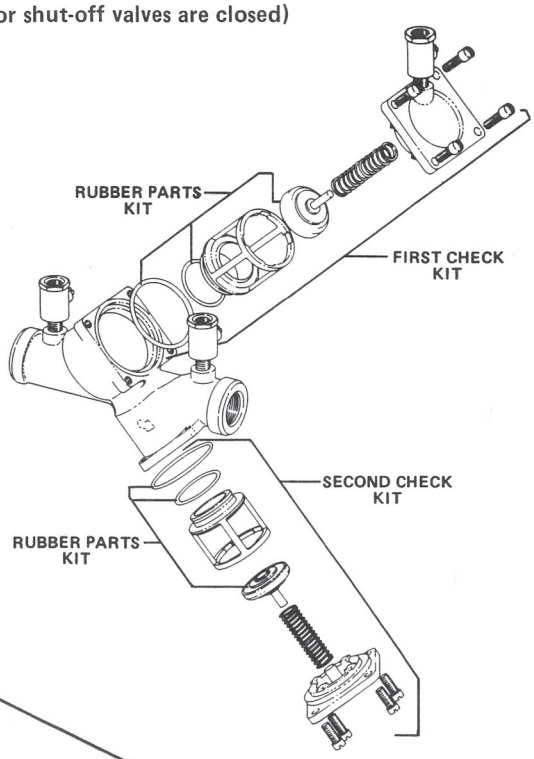
# 709 - 3/4 - 2"

### FIRST and SECOND CHECKS ¾ - 2" Sizes

**1.** After removing the cover screws, the check comes out with the cover. **2.** Holding the check valve module in both hands, rotate the assembly ¼ turn. This will disengage the disc and spring assembly into individual components. The disc assembly may be cleaned or replaced. "O" rings should be cleaned or replaced as necessary and lightly greased with the FDA approved silicon grease. Reassemble the check valve module in the reverse order. **NOTE:** The springs of the first and second check valves are interchangeable.

**(Before servicing be certain water is turned off or shut-off valves are closed)**




# 709 - 773 - 773DCDA 2 1/2- 10"

### FIRST AND SECOND CHECKS 2½"- 10" Sizes

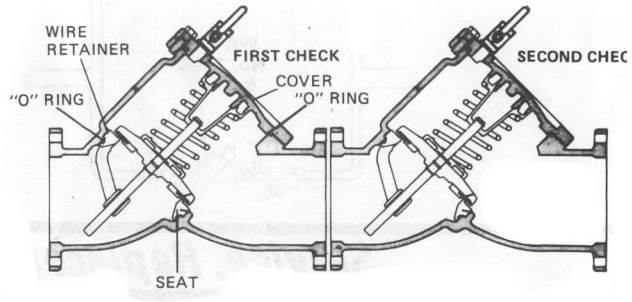
**1.** Remove hatch cover bolts . NOTE: The 709 is designed so that when the bolts are backed off ½" all the spring load is released from the cover and retained by the check module. **CAUTION: Be sure to verify this before removing all the bolts.**

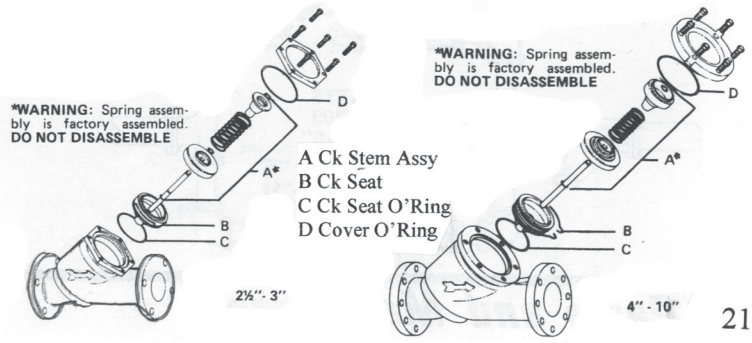
**2.** Lift check valve module straight out taking care not to hit and damage seat ring.

**3.** The seat ring may be removed and replaced by pulling out the two wire retainers. The wire retainers are 10" long. One is drawn out clockwise and the other is drawn out counter-clockwise.

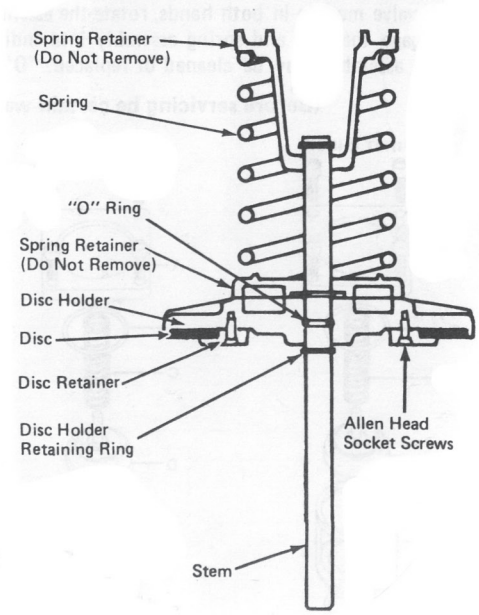
**4.** With the retainer wires removed, the seat ring can be lifted straight up and removed.

**CAUTION:** The check valve disc and spring assembly 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, replace the disc and spring assembly. If the disc holder has been damaged by freezing or severe water hammer, it can be replaced in the field. Remove the disc holder retaining ring and slide the disc holder off the stem. Remove the "O" ring from the stem and replace with a new one. Apply grease to the "O" ring and slide the new disc holder into place. Re-install the retaining ring. NOTE: the disc holder should not be removed when servicing only the disc, remove allen head screws holding the disc retaining plate and replace disc.




### DISC and SPRING ASSEMBLY



# Series 770 – 772

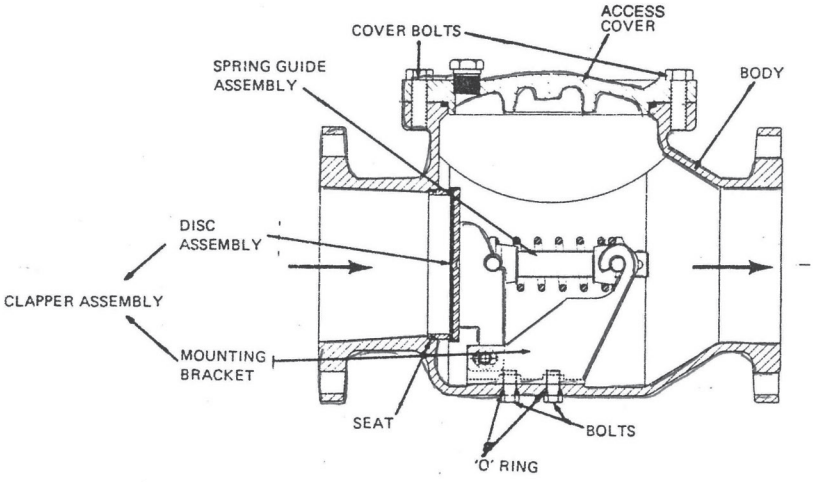
### Spring Guide Assembly Removal Instructions

1. The 772 features a captured spring in a center stem guided assembly. The spring guide assembly must be removed to clean the seat disc. As with any spring loaded mechanism, keep fingers away from pinch points. The spring guide assembly has a heavy spring pre-load and could cause injury. It is not neccessary to disassemble the spring guide assembly.
2. Remove the access cover.
3. Apply leverage between the spring guide assembly and the disc assembly as shown in Fig. 1.
4. Compress the spring guide assembly slightly so it will pop free from the notches on the disc assembly and rest as shown in Fig. 2.
5. Completely remove the spring guide assembly by unhooking the two outlet end ears from the mounting bracket.

### Disc Assembly Removal Instructions

1. Remove the access cover.
2. Remove the spring guide assembly.
3. Unfasten the two bolts on the bottom of the body opposite the access cover.
4. Reach in through the access opening and remove the entire clapper assembly. Opening the clapper assembly. and laying it flat on a table (refer to Fig. 3).
5. With an allen wrench, remove the set-screw which secures the spacer to the retainer pin on the clapper assembly.
6. Slide out the retainer pin to separate the disc assy from the mounting bracket.

## CHECK VALVES 4", 6", 8" and 10"



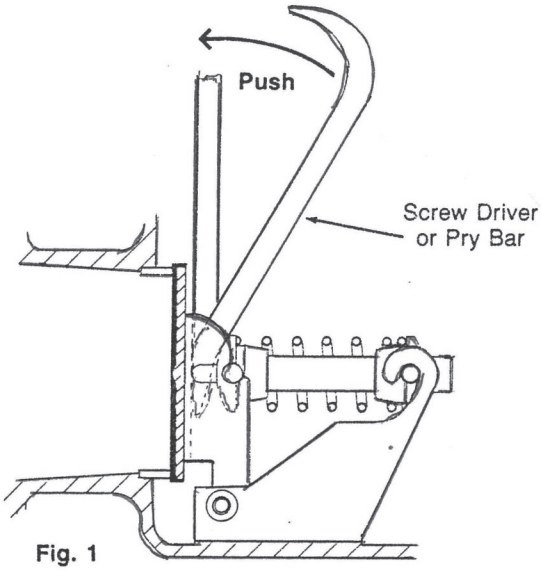




Fig. 1

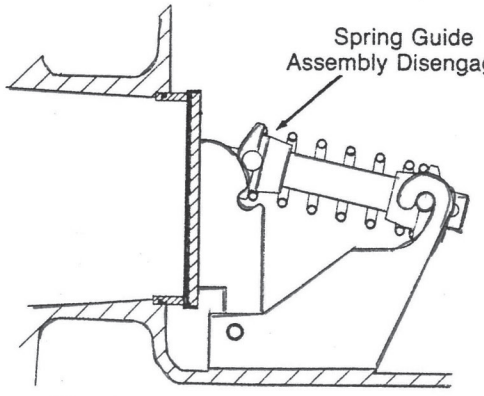



Fig. 2

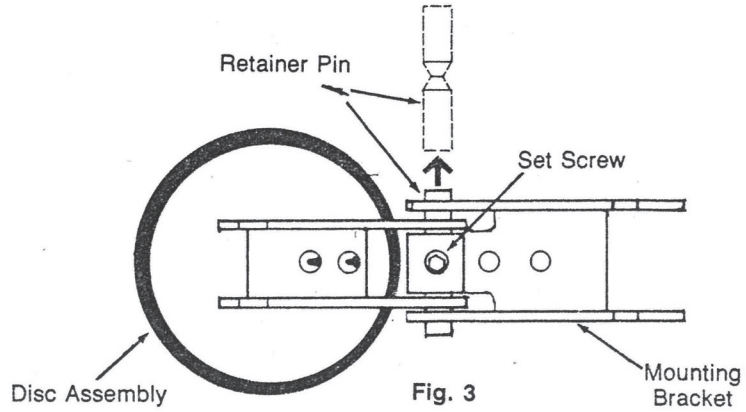
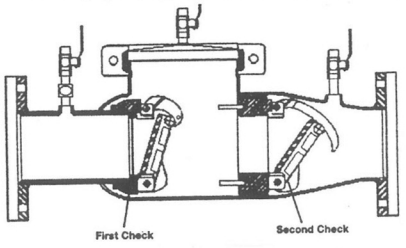



Fig. 3
Top View

**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 coupler and cover plate from 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 Arm as a handle to unscrew. If Check can not be loosened by hand, insert a long screwdriver between valve body and Check **(see figure 3)**. Slowly apply pressure against the Check until loosened. Finish unscrewing by hand. Unscrew #2 Check (turn counter clock-wise) by placing a long screwdriver between lugs and applying pressure to loosen #2 Check. Finish unscrewing by hand.
3. To clean #1 Check, (6' and 8" only) locate the Check Arm open ing stud on the oulet flange of the valve assembly. Slide the Check Arm over the stud with the check threads facing down ward **(figure 1)**. Tighten 1/4" nut on stud to secure Check bar. Slowly pull the assembly outward to open check allowing exposure of the seat and clapper contact area for cleaning. To clean #2 Check, lift Check Arm and hold in open position. Raise clapper so that the end of the Check Arm rests between roller and clapper **(figure 2)**. Thoroughly clean the seat area and clapper sealing surfaces of both Checks. Inspect seats, clapper sealing surfaces, Check Arms, and O-rings for damage. If not damaged gently close the clapper. If damaged, install a new Check assembly and/or O-ring.
4. Before reinstallation of Checks thoroughly clean o-ring groove and lubricate o-ring w/FDA approved lubricant. Insert and thread #2 Check first and then #1 Check. #2 Check should be tightened by inserting a long screwdriver between lugs to tighten firmly. Do not over tighten. Tighten #1 Check firmly by hand only. Replace cover plate, clean groove coupler gasket and groove, replace groove coupler.



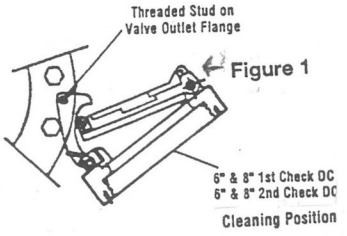




Figure 1

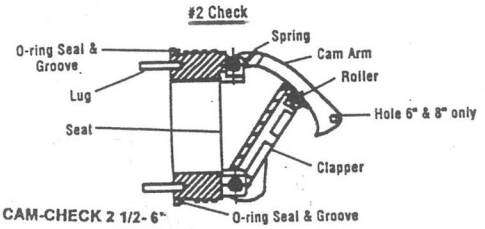
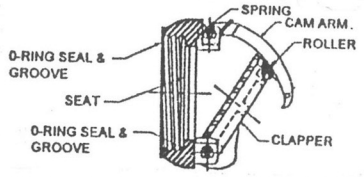



Figure 2



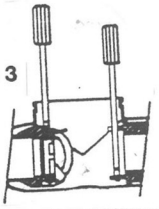
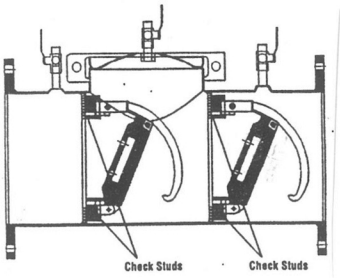
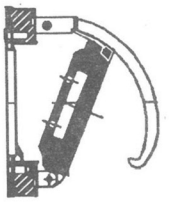



Figure 3



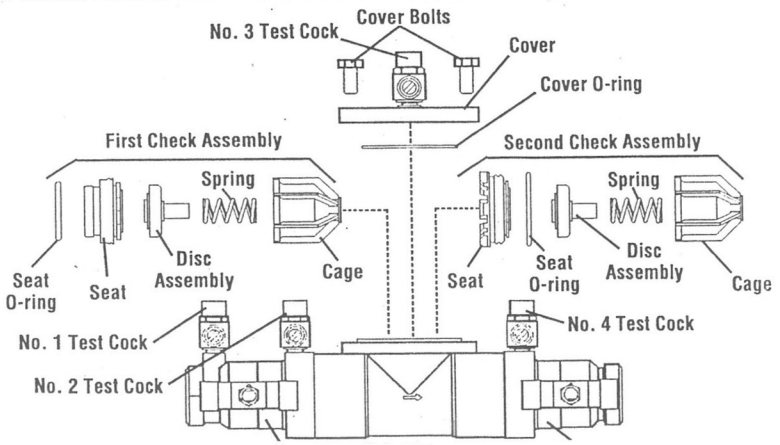



# 775 1/2 - 2"

**Servicing the First and Second Check Valves:**

1. Close shutoff valves and open test cocks No. 2, 3 and 4 to relief pressure from the body of the valve. Loosen cover bolts and remove cover. The check valve modules can now be removed from the valve by hand or with a screwdriver. Note: The first and second check assemblies are not interchangeable and the first check assembly must be removed prior to removing the second check assembly.
2. The check seats are attached to the cage with a bayonet type locking arrangement. Holding the cage in one hand, push the seat inward and rotate counterclockwise against the cage. The seat, cage, spring and disc assembly are now individual components.
3. The disc assembly may now be cleaned and reassembled or, depending on its condition, it may be replaced with a new assembly from a repair kit. Seat O-rings should be inspected and replaced as necessary.
4. Reassemble the check module in the reverse order. Install the check modules into the valve body hand-tight. Replace the cover.

**(Before servicing be certain water is turned off or shut-off valves are closed)**



Sizes ¾", 1", 1¼", 1½", 2"

# Series 900 REDUCED PRESSURE PRINCIPLE BACKFLOW PREVENTERS

*DISASSEMBLY OF NO. 900*

1. Remove the No. 900 head from the line (union nuts and adapters remain in the line).
2. Remove inlet adapter bolts, maintaining pressure by hand on adapter to overcome spring preload within the device. (Figure A) NOTE: Use longer jacking bolts to maintain pressure on adapter while removing short bolts.

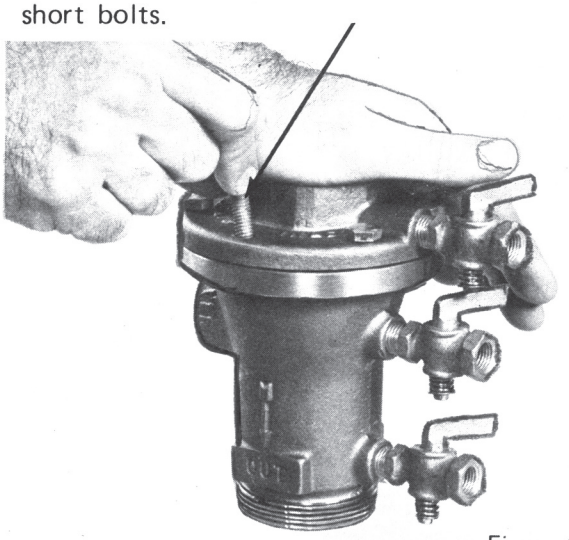



Figure A

3. Remove inlet adapter and adapter gasket. Lift out first check valve piston assembly and spring. Figure B.
4. The relief valve seat in Series 900 is replaceable although cleaning can be performed without removing from valve.

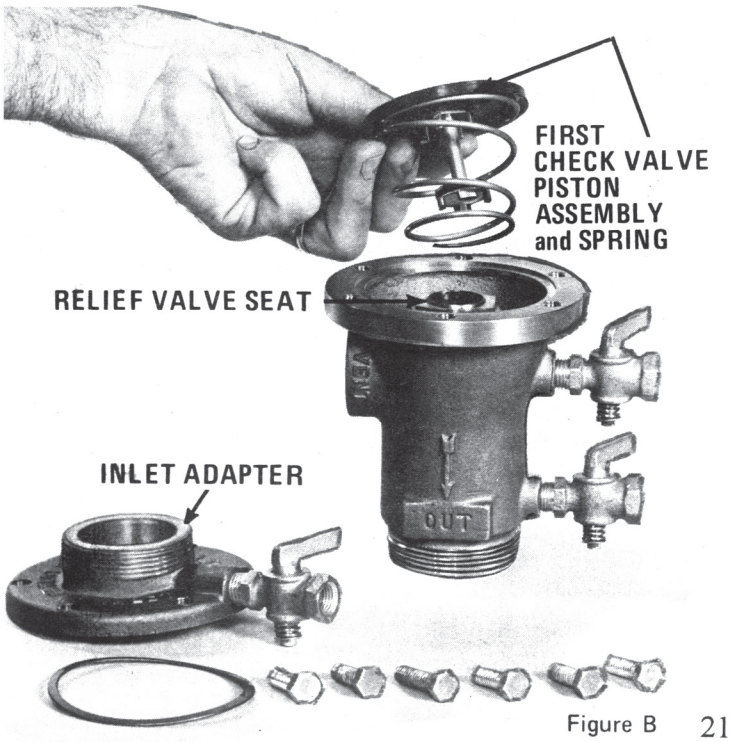



Figure B

5. Remove relief valve spring. Figure C.

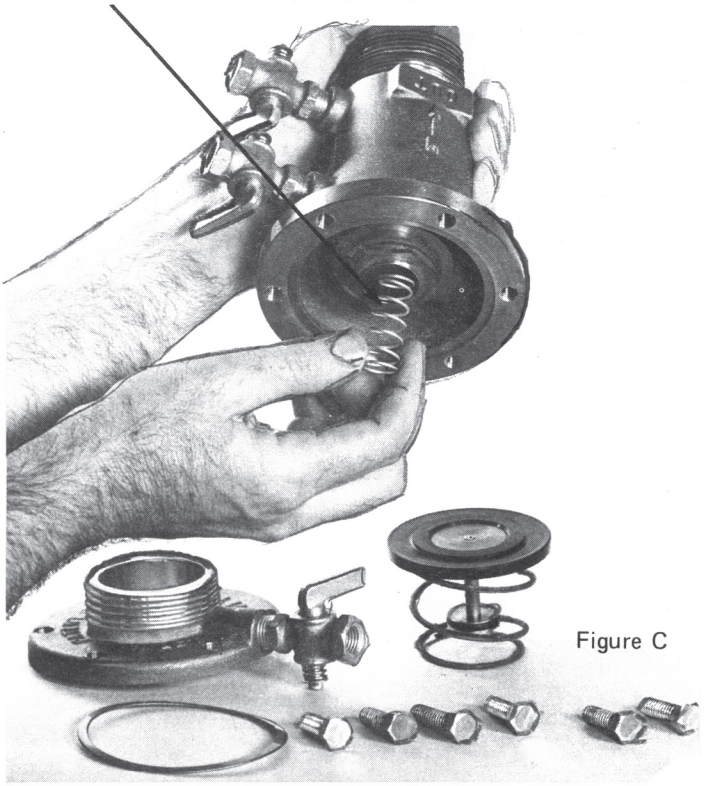


Figure C

6. Insert nutdriver through inlet end to engage head of stem. From outlet end, loosen and remove jam nut with second nutdriver. Remove second check valve assembly from outlet end of valve. (Figure D) Remove the stem and second check valve spring from inlet end of valve. (Reference Figure E)

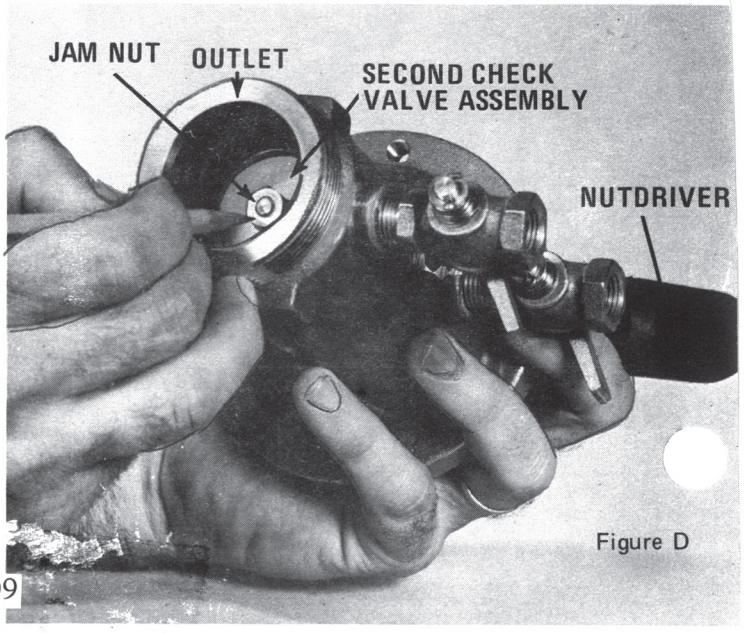



Figure D

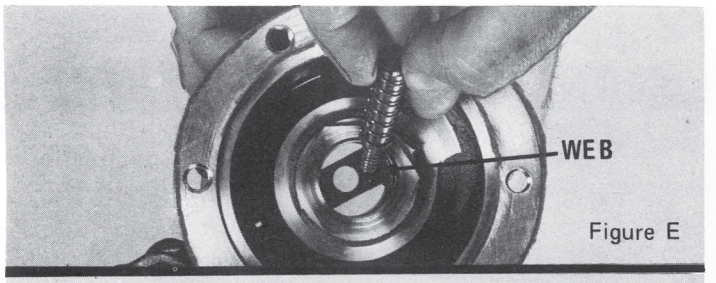


Figure E

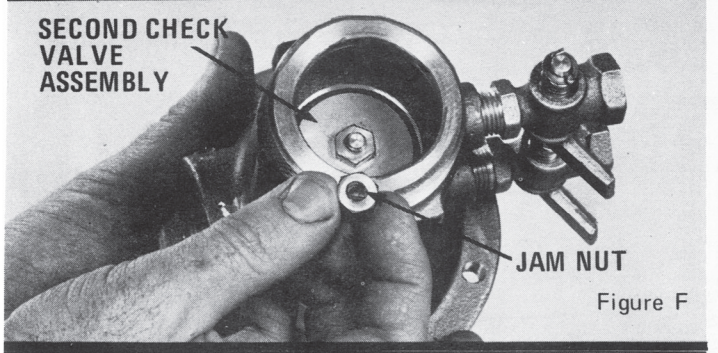


Figure F

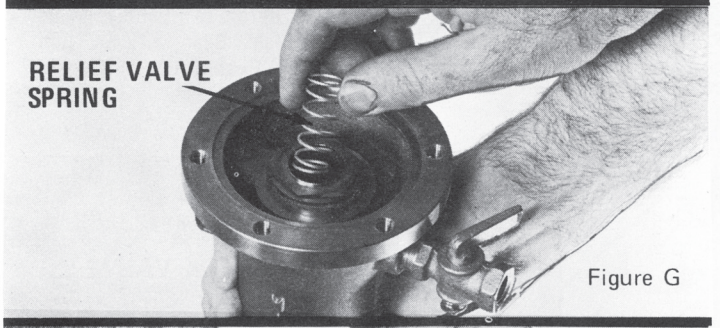


Figure G

Figure H

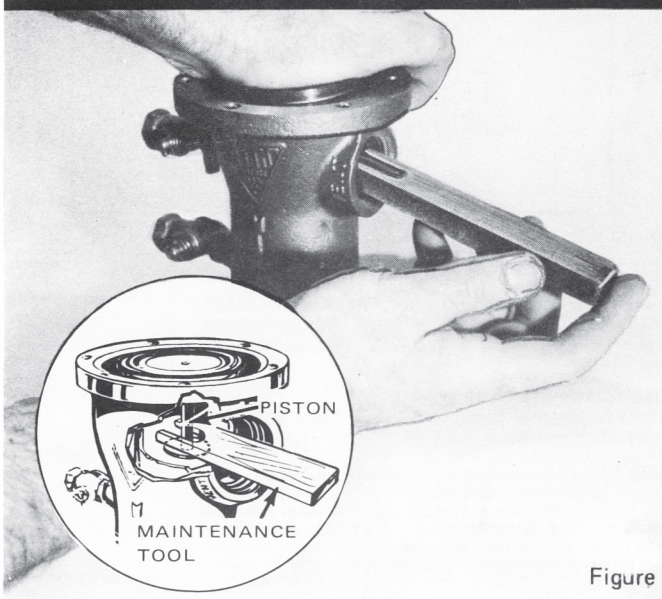
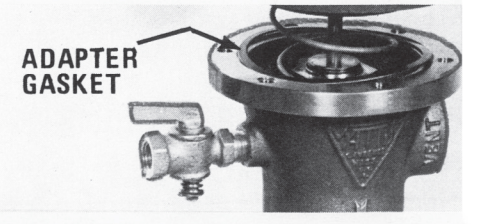


Figure I

*REASSEMBLY OF NO. 900*

1. Place second check valve spring over stem and insert in web, from inlet side of valve, as shown. Figure E.
2. From inlet side, push down stem to overcome spring pressure. From outlet side, insert second check valve assembly and thread on stem. Insert nutdriver through inlet end and engage head of stem. Tighten check valve assembly nut securely. Thread on jam nut and tighten securely. Figure F.
3. Screw in relief valve seat to tapping (if seat was removed).
4. From inlet end of valve, insert small end of relief valve spring over the stem. Figure G.
5. Install small end of first check valve spring over relief valve seat, (Ref. Figure B). Insert check valve piston assembly into the valve pressing the piston through the seating orifice. Figure H. If above is inserted properly, the second check valve spring will be located under the disc guide. (It is important that this middle spring be seated evenly; see No. 7). Also, these parts must be greased. See note on Page 4.
6. While holding down check valve assembly, insert maintenance tool (furnished with each device) into the outlet so that it engages the piston. This serves to overcome spring preload and simplify assembly. Figure I.
7. Insert adapter gasket and place adapter on top of check valve assembly centering stem rivet in inlet and lining up bolt holes by eye. Figure J.
8. Insert and tighten long jacking bolts furnished and insert and tighten other bolts. Figure J. Press thumb through inlet against check valve assembly and remove maintenance tool.
9. Replace the No. 900 head in the line; tighten union nuts.



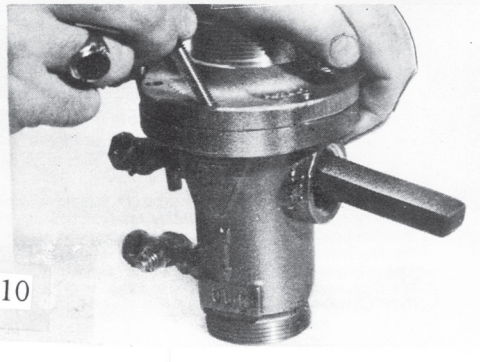
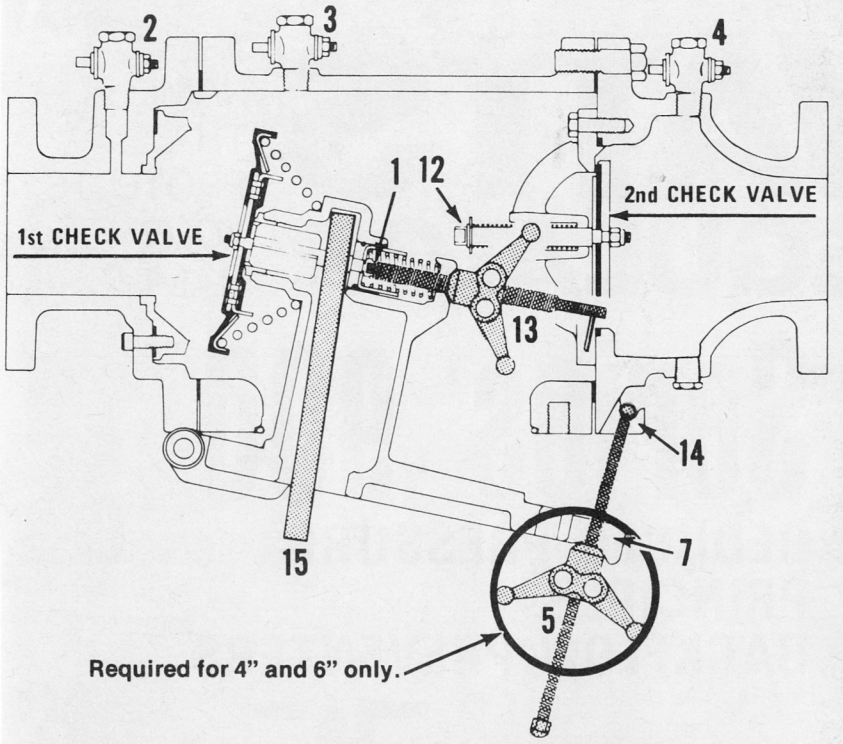
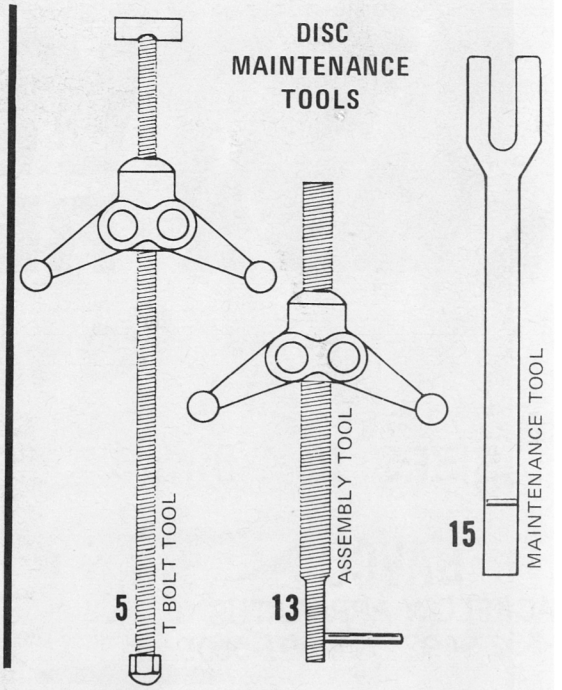



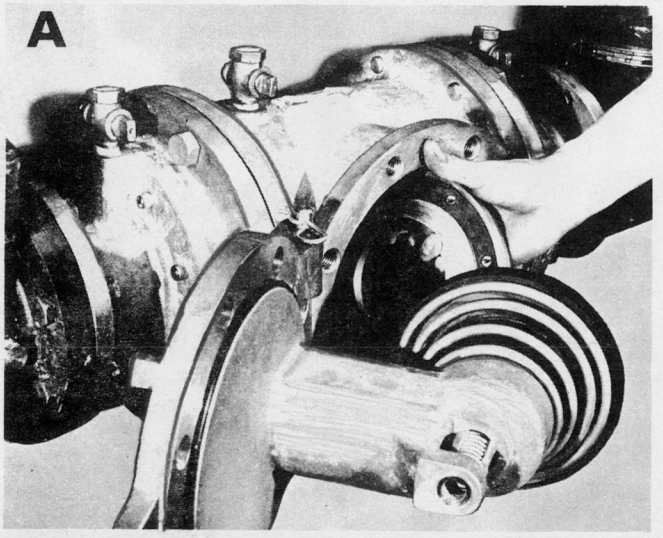
Figure J

SIZES: 2½" thru 6"

# SERVICE REPLACEMENT PARTS and MAINTENANCE Series 900




## FIRST CHECK VALVE QUICK CLEANING OPERATION:

A. Insert maintenance tool (15) into the vent port until the mark on the handle is flush with vent port surface.

B. Close both inlet and outlet gate valves.

C. Open three test cocks (2, 3 and 4) located between the gate valves. The test cock which is immediately upstream of the first check valve (2) must be left open when the access door is swung open to equalize pressure. When this test cock is opened, the relief valve will tend to open, but will be captivated in a partially open position by the maintenance tool.

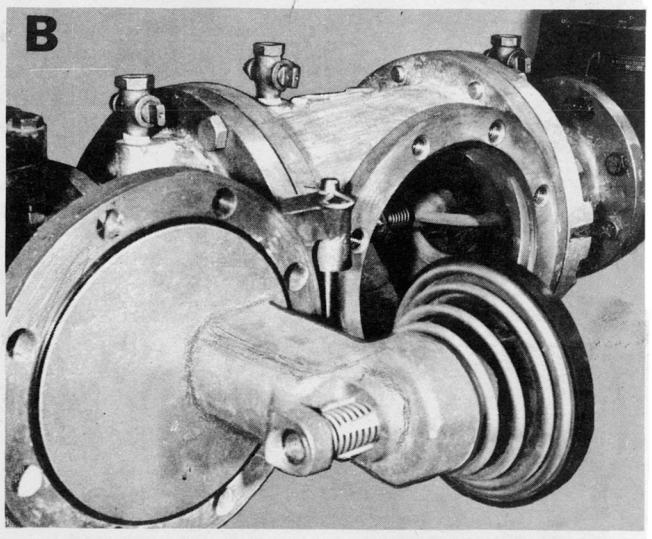
D. Remove eight hexagonal bolts from the access door.

E. Swing the door to an open position collecting water spillage in a suitable receptacle.

F. Inspect 1st check valve seats and discs for damage or deterioration, after wiping with a clean cloth.

G. If damage or deterioration to either seat is evident, remove the eight socket head screws and remove seat and gasket from valve. See photo (A).

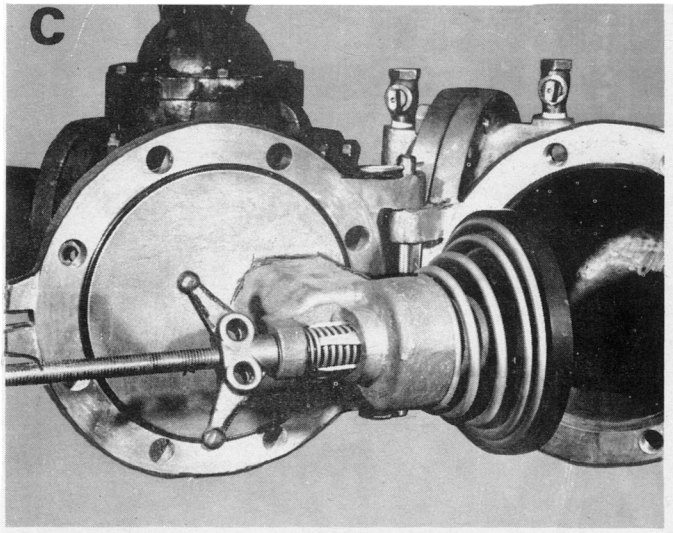
H. Reverse above procedure for reassembly. Note lubricate seat gasket with "O" ring grease.




## REMOVAL OF FIRST CHECK VALVE ASSEMBLY:

I. Insert assembly tool (13) into the hole in the end of the relief valve casting and screw threaded rod onto the end of the check valve assembly (1) hand tight. Lubricate rod for easier turning.

J. Tighten the wing nut of the assembly tool only until the maintenance tool (15) can just be removed from the relief valve vent port. (Approximately a half turn.) See photos (C and D).

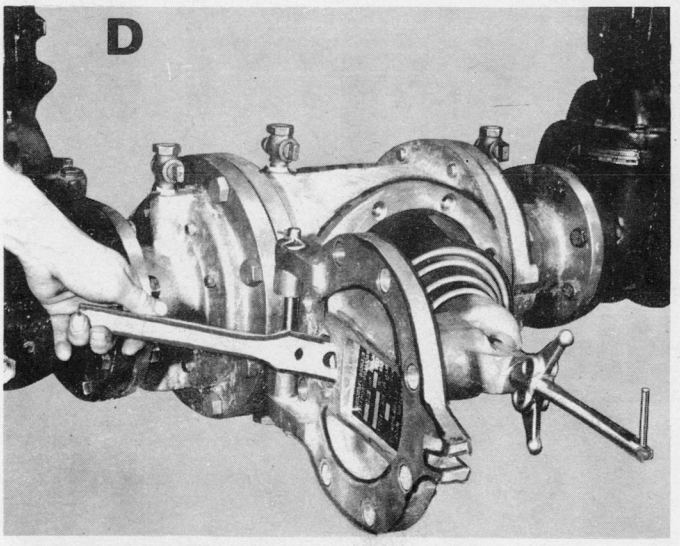



**CAUTION:** DO NOT OVER-TIGHTEN THE WING NUT AS THIS MAY DAMAGE THE RELIEF VALVE DISC.

**K.** Remove maintenance tool (15). Loosen wing nut while restraining rod from turning, allowing springs to completely decompress. When wing nut spins loosely, threaded rod can be unscrewed from device permitting removal of 1st check valve assembly.

**L.** After replacing parts of the check valve assembly, reverse procedure to reassemble parts taking note of the "Caution" regarding over-tightening of the wing nut. Tighten the wing nut only until maintenance tool (15) can just be inserted to the mark on the handle of the tool.

**M.** Insert maintenance tool (15), photo (D). Loosen wing nut and remove assembly tool (13) from device.

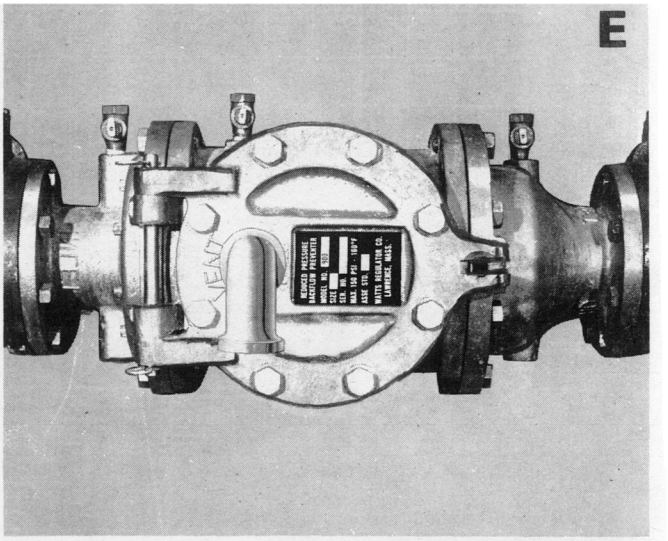



## DISMANTLING OF SECOND CHECK VALVE:

**N.** Depress valve stem of second check valve assembly (12) and hold in an open position. Collect any water spillage.

**O.** Reach in through the door and wipe both seat and disc of the second check assembly while depressing (holding). Allow valve to close. **Caution:** Keep fingers clear of closing.

**P.** If second check valve is damaged or deteriorated, remove six bolts from the flange of the second check valve module and remove the module.

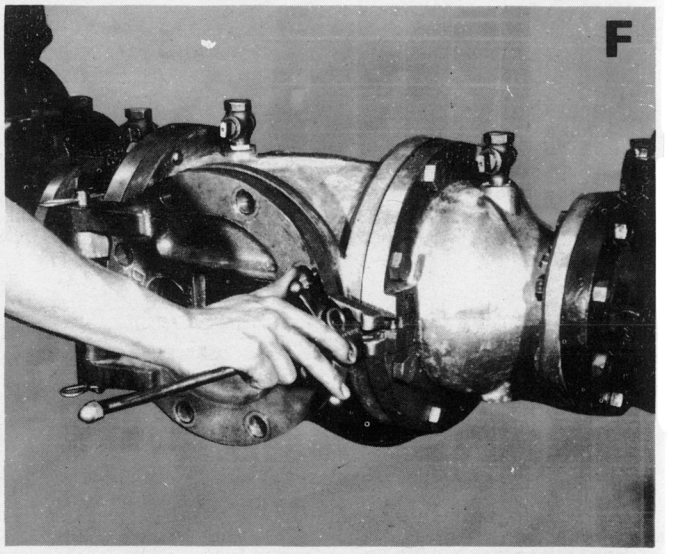



**Q.** After disassembly and cleaning, reassemble the check valve module in the position shown in photo (B).

**R.** Inspect access door "O" ring seal to be sure it is in its proper position and close the door. Reassemble with eight hexagonal bolts.

**S.** Close all petcocks and open gate valves.

**T.** Remove maintenance tool (15) after restoring water pressure, photo (E).




## OPENING OF ACCESS DOOR WHEN MAINTENANCE TOOL CANNOT BE FULLY INSERTED INTO VENT PORT BECAUSE RELIEF VALVE IS OPEN:

**U.** Insert T bolt (5) into cavity of outlet casting (14) and through the ear of relief valve casting (7).

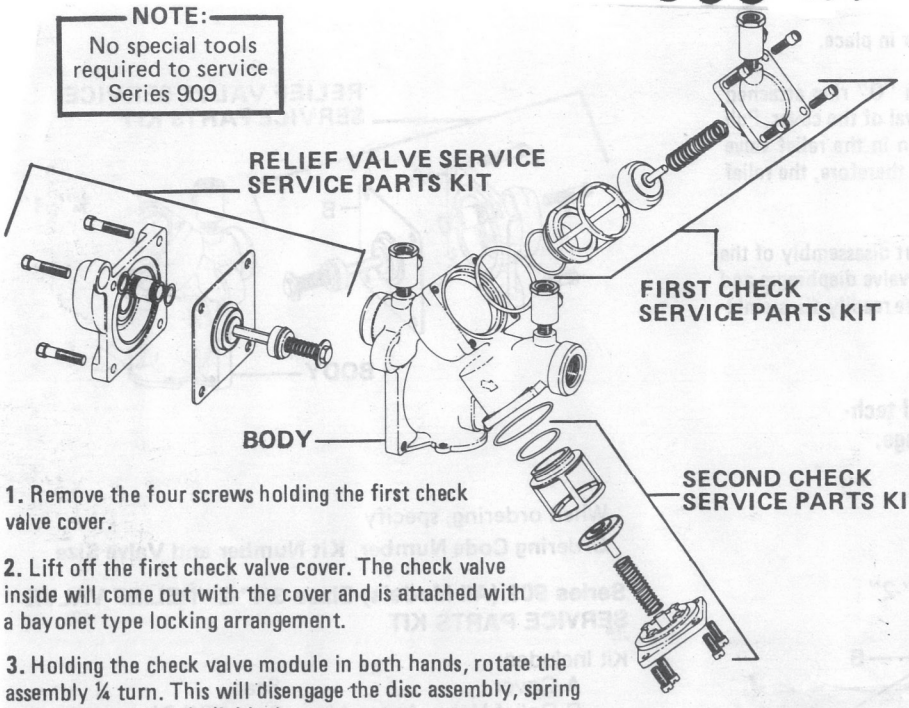
**V.** Tighten wing nut hand tight.

**W.** Remove eight hexagonal hatch bolts. *There is now a spring load transmitted to the T bolt assembly (5) from the first check spring.*

**X.** Slowly back off the wing nut allowing the door to open to the point where the first check and relief valve springs have decompressed enough so the door can be freely opened and the T bolt assembly (5) can be removed.

# 909 3/4–2"

**NOTE:**
No special tools required to service Series 909



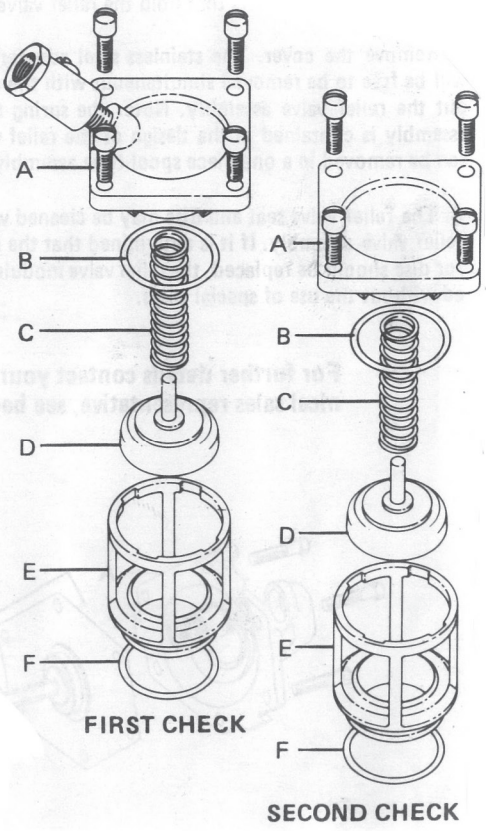

**1.** Remove the four screws holding the first check valve cover.

**2.** Lift off the first check valve cover. The check valve inside will come out with the cover and is attached with a bayonet type locking arrangement.

**3.** Holding the check valve module in both hands, rotate the assembly ¼ turn. This will disengage the disc assembly, spring and seat cover into individual components.

**4.** The disc assembly may be cleaned and reassembled, or depending upon its condition, it may be discarded and replaced and replaced with a new assembly from the service kit . "O" rings should be cleaned or replaced as necessary and lightly greased with the FDA approved silicon grease which is also furnished with the service kit.

**5.** Reassemble the check valve module in the reverse order. Service is identical for both the first and second check valves.



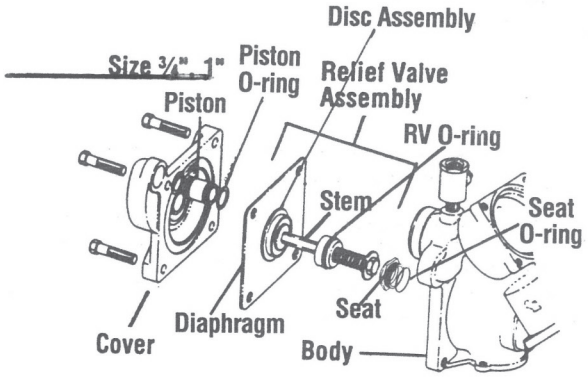

A Cover
B Cover O'Ring
C Spring
D Ck Disc Holder
E Ck Seat
F Ck Seat O'Ring

# *Servicing the Relief Valve ¾ - 2"*

**1.** Remove the four bolts that hold the relief valve cover in place.

**2.** Remove the cover. The stainless steel adapter, with "O" ring attached will be free to be removed simultaneous with the removal of the cover. Pull out the relief valve assembly. Note: the spring tension in the relief valve assembly is contained in the design of the relief valve; therefore, the relief can be removed in a one-piece spool-type assembly.

**3.** The relief valve seat and disc may be cleaned without disassembly of the relief valve assembly. If it is determined that the relief valve diaphragm and /or disc should be replaced, the relief valve module can be readily disassembled without the use of special tools.




**TO PREVENT SHAFT DAMAGE ASSEMBLE AS SHOWN.**
CAUTION: If cover will not press against body, assembly is crooked and tightening bolts will bend shaft. **Do not force the cover into place as damage may result from misalignment.**

To assemble the Relief Valve Assembly have a screwdriver ready.
Depress the Relief Valve Assembly, carefully guiding it against the two pound spring load. When properly aligned, the pistonis in the cylinder bore. Insert the screwdriver as shown.
The Relief Valve Assembly is held encapsulated by the screwdriver. You should now have both hands free to bolt down the cover. Insert and snug two bolts 180° apart to hold the cover. Finish iserting the remaining bolts and snug up evenly and alternating until secure. Remove the screwdriver.

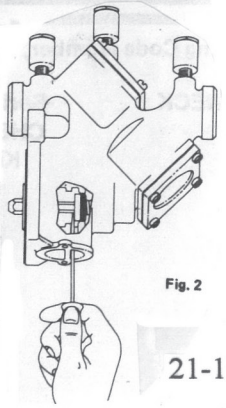
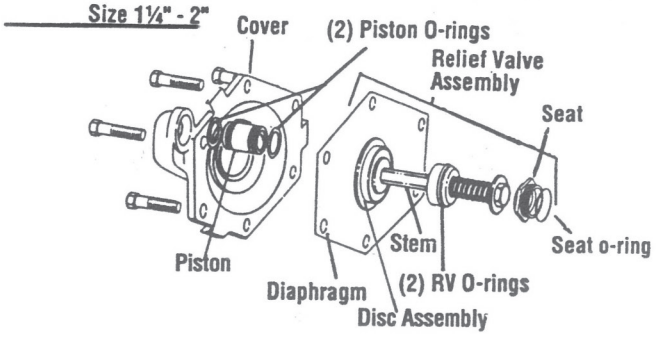


Fig. 2



# Series 909 Sizes 2½''- 10''

**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.**

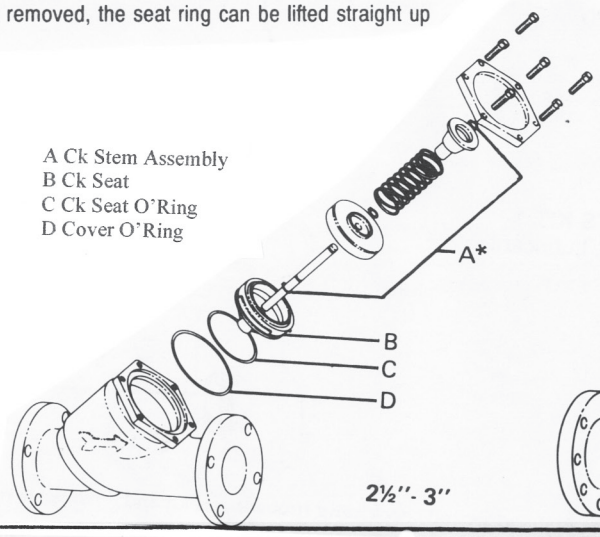
**2.** Lift the check valve module straight out taking care not to hit and damage the seat ring.

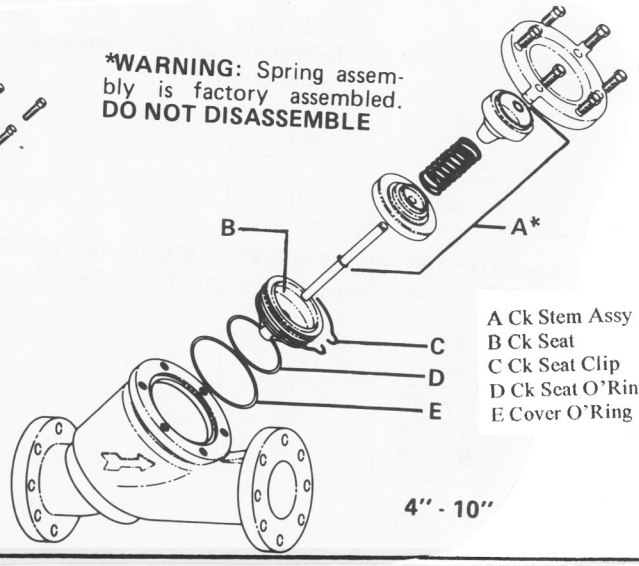
**3.** The seat ring may be removed and replaced by pulling out the two wire retainers on sizes 4"- 10" while on sizes 2½ "- 3", one quarter-turn twist removes seat. The wire retainers are 10" long. One is drawn out clockwise and the other is drawn out counter clockwise.

**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" simply remove the retaining nut or for sizes 6"- 10" remove the allen head socket screws. Reverse this procedure to install the new disc.



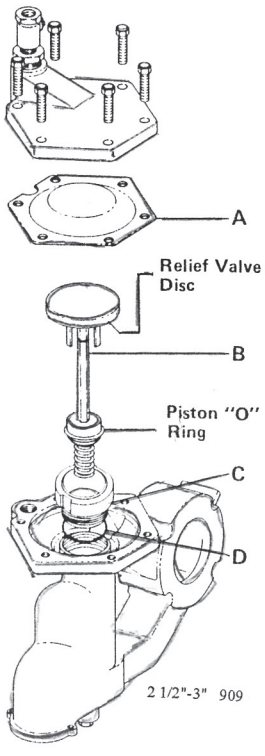

**1.** Remove the relief valve cover bolts. Note the 909 is designed so that when the bolts are backed off ½" all the relief valve spring load is retained by the bottom plug spring module. **CAUTION:** Be sure to verify this before removing all the bolts.

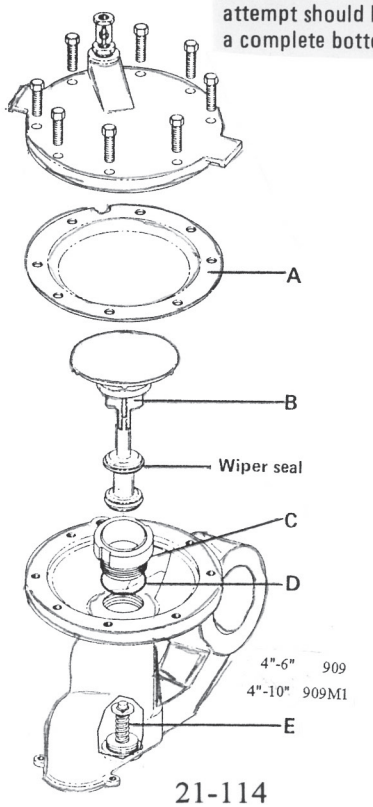
**2.** Remove the cover and diaphragm (A). The relief valve piston assembly (B) can be lifted straight up and out.

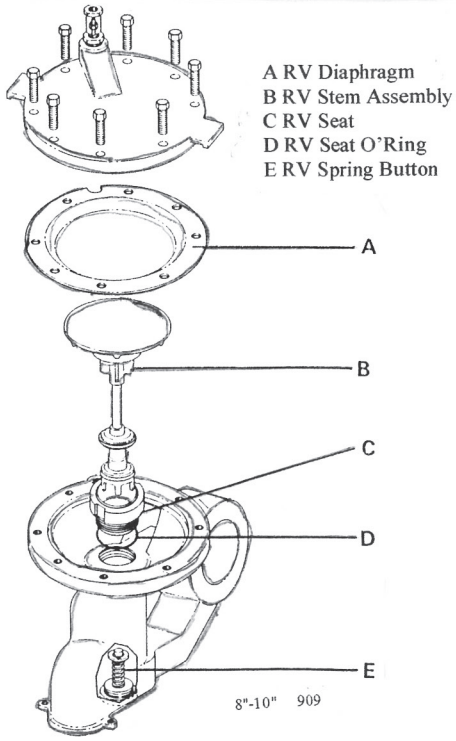
**3.** Replace the wiper seal and piston "O" ring and apply grease to the "O" ring.

**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 spring assembly (E). 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.



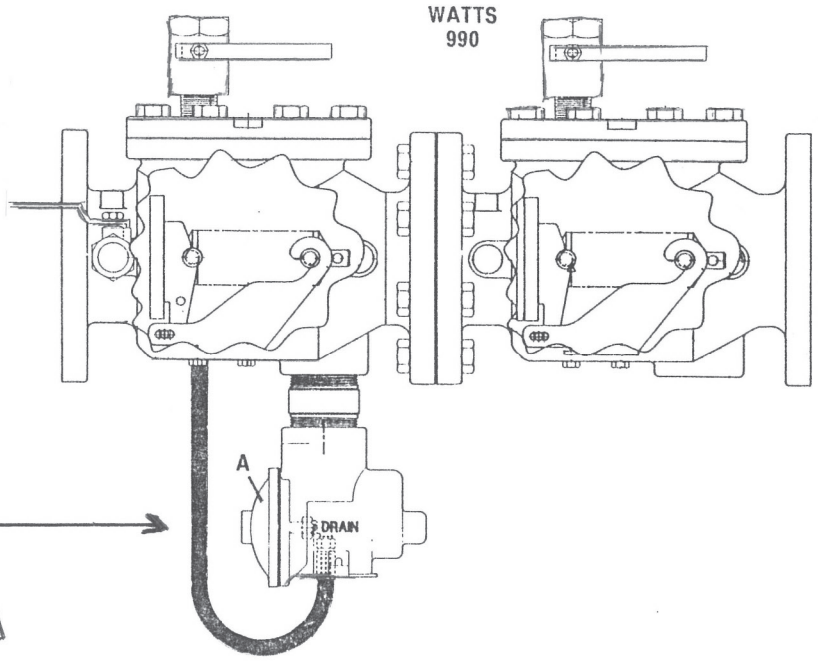



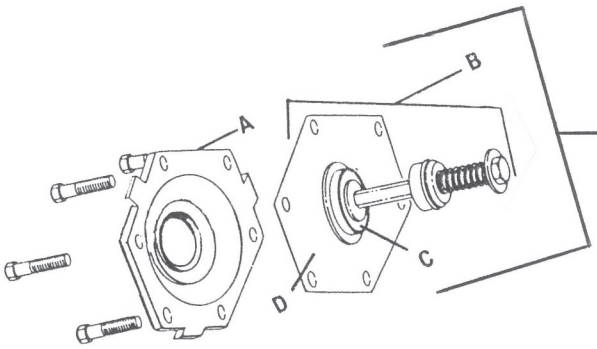



# Series 990 - 992

## To Service the Relief Valve:

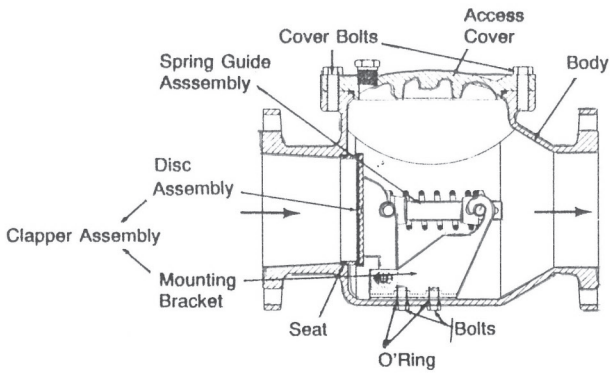
1. Remove sensing hose. Check for debris.
2. Remove cover (A).
3. Remove diaphragm and stem assembly (B). Check seat disc (C) for debris and diaphragm (D) for cuts or tears. Repair or replace as necessary.
4. Lubricate only sealing O'Rings with Dow Corning FS 1292. **Do not** lubricate seat disc or diaphragm.
5. Reassemble and test.




A Cover B RVStem Assy C RV Disc D RV Diaphragm

## CHECK VALVES



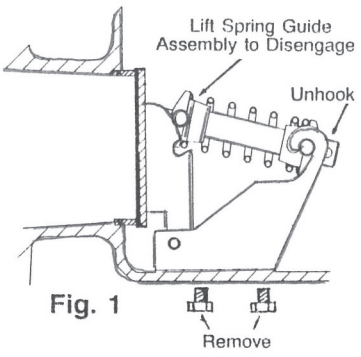




Fig. 1

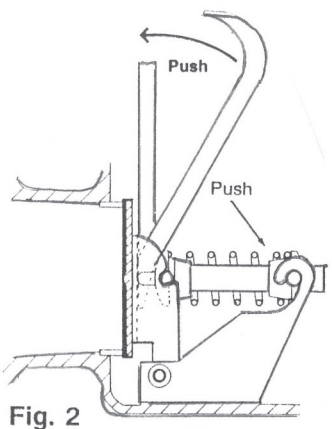



Fig. 2

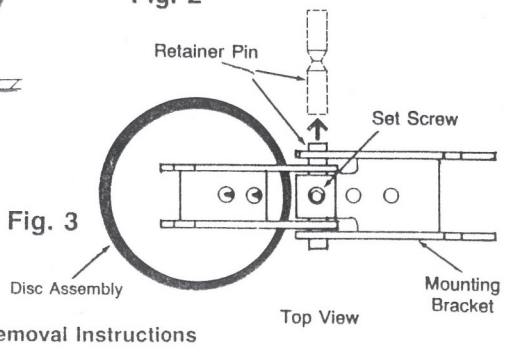



Fig. 3

### Spring Guide Assembly Removal Instructions

1. Remove the access cover.
2. The 990 features a captured spring in a center stem guided assembly. The spring guide assembly must be removed to clean the seat disc. To remove the spring assembly from the mounting bracket remove the two bolts on the bottom of the body opposite the access cover. This will allow the spring module to be removed from the notches on the mounting bracket. (Fig. 1) As with any spring loaded mechanism, keep fingers away from pinch points. The spring guide assembly has a heavy spring pre-load and could cause injury. It is not necessary to diassemble the spring guide assembly.

### To Replace

1. Bolt the mounting bracket back in place after lubricating the bolt O'Rings.
2. Position the back of the spring guide into the rear hook of the mounting bracket.
3. Apply leverage between the spring guide assembly and the disc assembly as shown in Fig. 2. Compress spring assembly slightly and push down to position the spring assembly in the front notches.

### Disc Assembly Removal Instructions

1. Remove the access cover.
2. Unfasten the two bolts on the bottom of the body opposite the access cover.
3. Remove the spring guide assembly.
4. Reach in through the access opening and remove the entire clapper assembly, opening the clapper assembly and laying it flat on a table. (Refer to Fig. 3)
5. With an allen wrench, remove the set-screw swhich secures the spacer to the retainer pin on the clapper assembly.
6. Slide out the retainer pin to separate the disc assembly from the mounting bracket. **Important:** Each check repair kit fits (1) one check module.

# 993/993RPDA

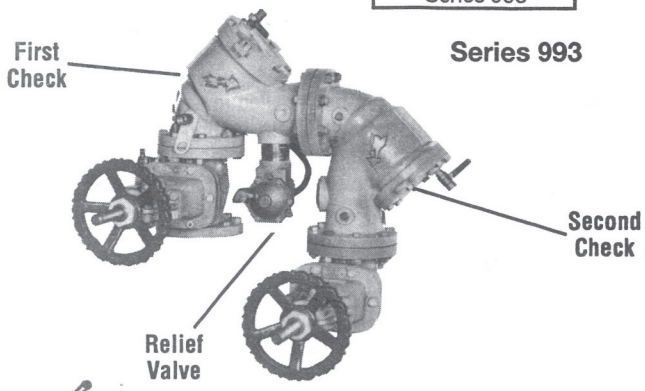
## Servicing First and Second Checks

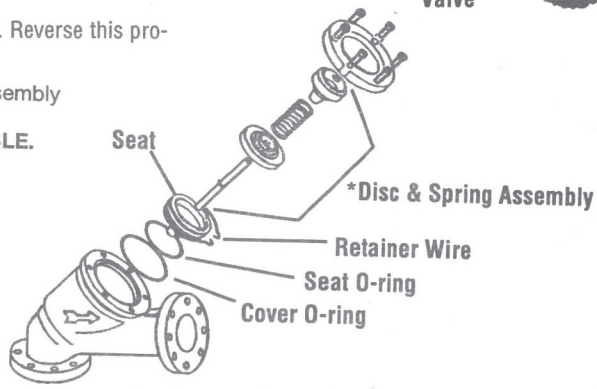
1. Remove the hatch cover bolts. **NOTE:** The 993 is designed so that when the bolts are backed off ½", all the spring load is released from the cover and retained by the check module. **CAUTION: Be sure to verify this before removing all the bolts.**
2. Lift the check valve module straight out taking care not to hit and damage the seating.
3. The seat ring may be removed and replaced by pulling out the two wire retainers. 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 spiring 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, simply remove the retaining nut. Reverse this procedure to install the new disc.

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

**First and second checks are not interchangeable**

**NOTE:** No special tools required to service Series 993

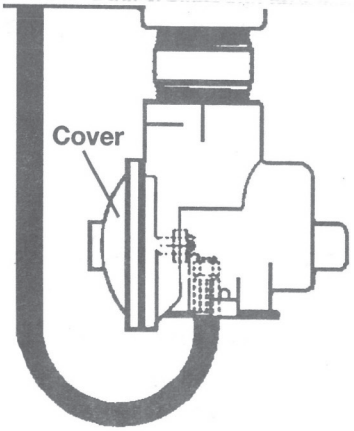


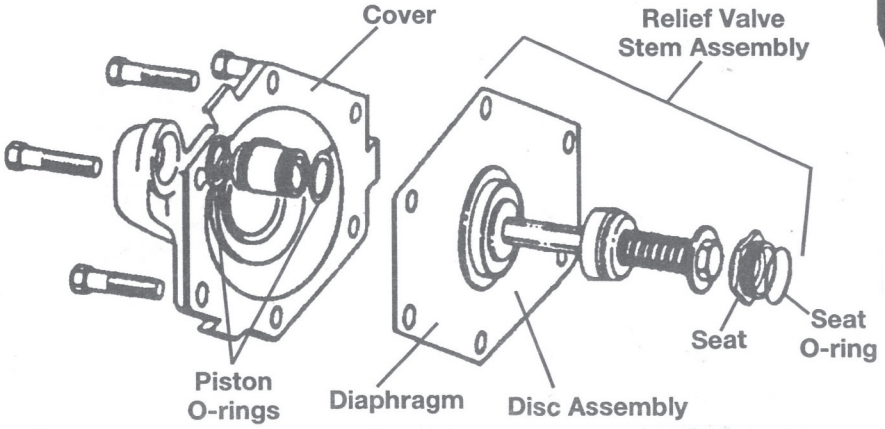




## Servicing the Relief Valve

### To Service the Relief Valve:

1. Remove sensing hose. Check for debris.
2. Remove cover.
3. Remove diaphragm and stem assembly. Check seat disc for debris and diaphragm for cuts or tears. Repair or replace as necessary.
4. Lubricate only sealing O-rings with Dow Corning FS 1292. **Do not** lubricate seat disc or diaphragm.
5. Reassemble and test.



# 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

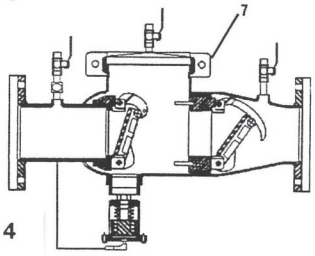



Figure 2

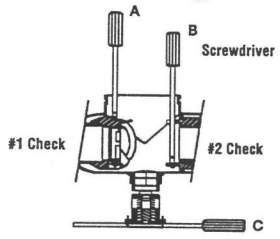



Figure 3

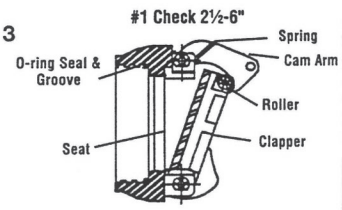



Figure 4

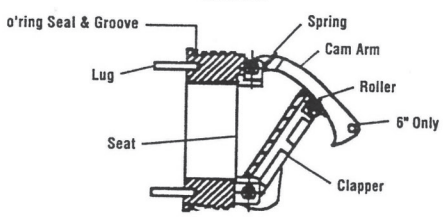



Figure 5A Cam Bar Open Pin

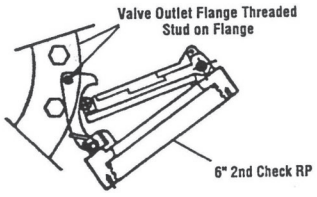



Figure 5B


# 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

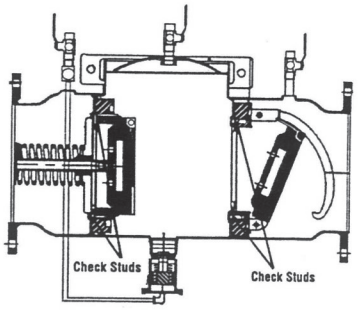



Figure 2

#1 Cam-Check RP

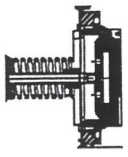


Figure 3

#2 Cam-Check DC & RP

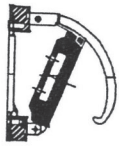
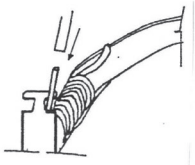


Figure 4



# Servicing the First Check 8" & 10"

***Use extreme caution when servicing the first check!***

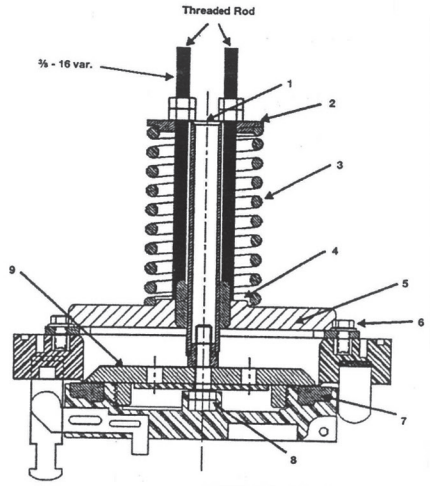
**To inspect the seat and clean the seat and clapper washer:**

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

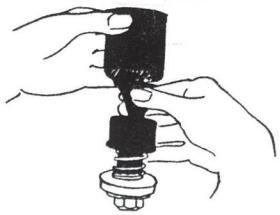
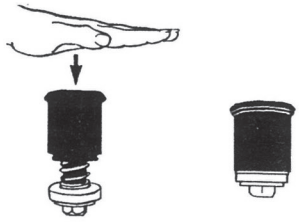
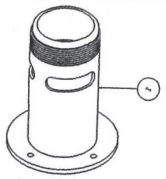
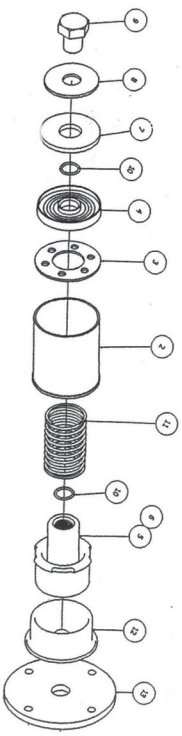


Figure 8

Figure 9







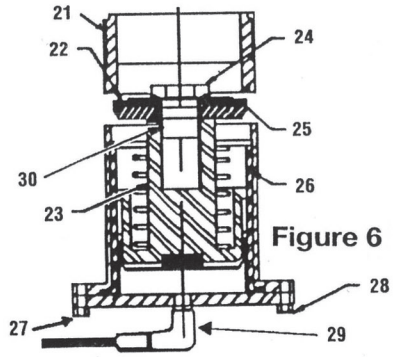


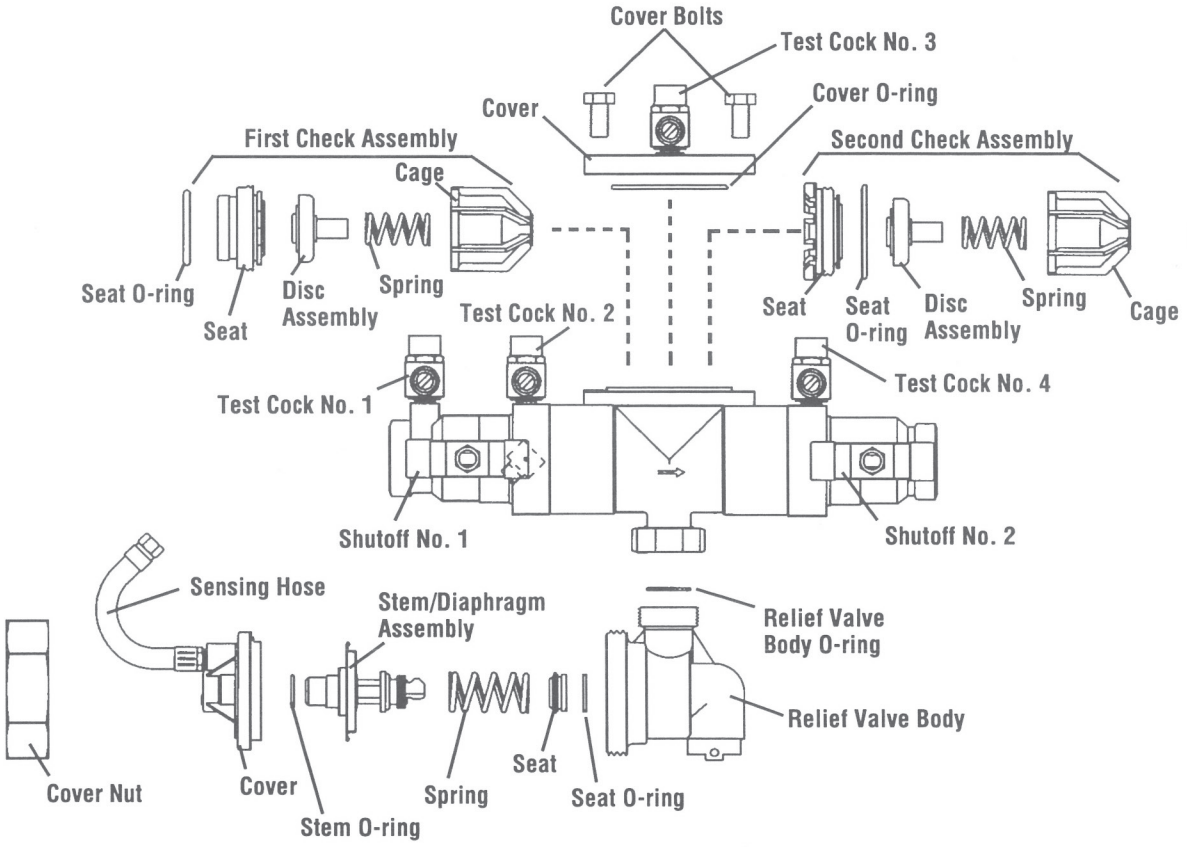

Figure 6

| 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 |

## Servicing the First and Second Check Valves ½", ¾", and 1"

1. Close shutoff valves and open test cocks No. 2, 3 and 4 to relieve pressure from the body of the valve. Loosen cover bolts and remove cover. The check valve modules can now be removed from the valve by hand or with a screwdriver. Note: The first and second check assemblies are not interchangeable and the first check assembly must be removed prior to removing the second check assembly.
2. The check seats are attached to the cage with a bayonet type locking arrangement. Holding the cage in one hand, push the seat inward and rotate counterclockwise against the cage. The seat, cage, spring and disc assembly are now individual components. If the cage disengages prematurely, simply use the cage as a tool to screw the check valve seat from the valve body.
3. The disc assembly may now be cleaned and reassembled or, depending on its condition, it may be replaced with a new assembly from a repair kit. Seat o-ring should be inspected and replaced as necessary.
4. Reassemble the check module in the reverse order. Install the check modules into the valve body hand-tight. Replace the cover.




## Servicing the Relief Valve ½", ¾", and 1"

1. Remove the relief valve cover nut by turning the nut counterclockwise
2. Remove the relief valve cover, stem/diaphragm assembly, and relief valve spring.
3. Inspect the relief valve diaphragm for wear and replace as needed.
4. The relief valve seat is located inside of the body and can be removed, if necessary, for cleaning/inspection. The seat is pressed into the body cavity and can be removed by inserting a finger in the center of the seat and pulling outwards. Inspect seat for nicks and replace as needed.
5. Inspect the disc rubber and clean or replace if required. The disc can be removed by screwing the white washer counterclockwise.
6. To reassemble the relief valve, press the seat firmly into place in the body, snap the spring onto the relief valve stem, center the spring on the seat, and insert the cover and stem/diaphragm assembly as a unit, into the body bore. The locating pin in the relief valve cover should be aligned with the corresponding locating notch in the top of the relief valve body.
7. Install relief valve cover nut and tighten.

# Series 995/995RPDA

**Reduced Pressure Zone Backflow Preventer/ Reduced Pressure Detector Assemblies**

**Sizes: 3" - 6"**

## Servicing First and Second Checks

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

1. Slowly open all ball valves to relieve air and water pressure. After pressure is relieved, loosen bolts on groove coupler and remove groove coupler and cover plate from valve body.
2. Remove #1 Check Assembly. Do not use Check Arm as a handle to unscrew the Check. Insert lid bolts in 1st check seat ring (see fig. 1), insert a long screwdriver or pry bar between lid bolts. Gently apply pressure against the bolts and turn seat assembly counter clockwise moving bolts hole to hole to maintain turning leverage (two additional bolts will eliminate need to move lid bolts from hole to hole). Finish unscrewing by hand and remove through top access port. Unscrew #2 Check (turn counter-clock wise) by placing a long screwdriver across lid bolts inserted in holes located in the 2nd check seat ring, similar in method used to remove 1st check and applying pressure to loosen #2 Check. Finish unscrewing by hand.
3. To clean Check, locate the Check Arm opening stud on the out let flange of the valve assembly. Slide the Arm over the stud with the check threads facing downward **(fig. 2)**. Tighten 1/4" nut on stud to secure cam bar. Slowly pull the assembly out ward to open check allowing exposure of the seat and clapper contact area for cleaning. The assembly may be locked open by aligning the holes in the cam bar and hinge arms and inserting a rod (fig. 4).

### Check Disassembly

Please use caution when disassembling check. The check is a spring-loaded mechanical device.

**Figure 3**

Press down on the check assembly to unload the cambar from hinge arms and roller. Then place a thin rod or screwdriver into a maintenance hole in one hinge arm.

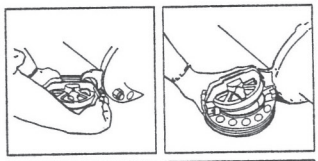


**Figure 4**

Using your free hand, swing the clapper assembly away from the seat. Align (A) lockout holes.

**Figure 5**

Remove 1 c-clip from the center pivot pin. Withdraw the center pivot pin from the clapper and the hinge arms. Remove the clapper assembly from the check assembly module. **Note: You may replace this item as an assembly or you may replace only the disc.**

**Figure 6**

Disassemble the clapper by removing 4 screws, disc retainer and the clapper disc. Disc may be flipped if sealing surface is damaged.

**Figure 1**

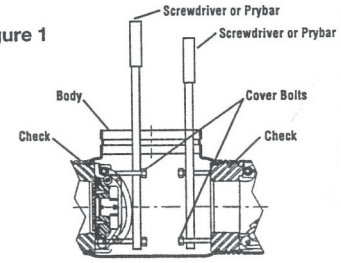
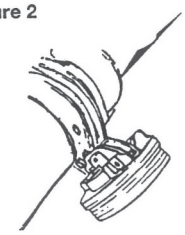
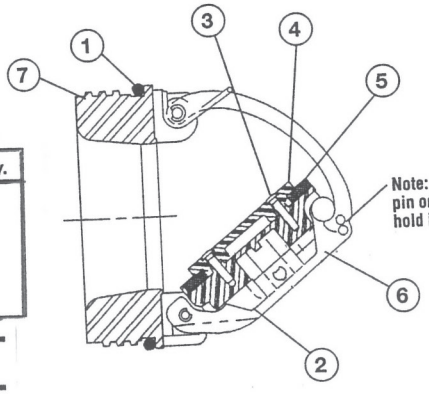



**Figure 2**



3", 4" & 6" RP 1st Check Assmbly

**Before reinstallation of check assembly, thoroughly clean O-ring groove and lubricate O-ring with F.D.A. approved lubricant.**




**Note: Align holes and insert pin or small screwdriver to hold in open position.**

| Item | Part Description | Qty. |
|---|---|---|
| 1. | 1st Cam-Check O-ring (removable) | 1 |
| 2. | Clapper Assembly (removable) | 1 |
| 3. | Clapper Retaining Plate Screws (removable) | 4 |
| 4. | Clapper Retainer Plate (removable) | 1 |
| 5. | Clapper Disc (removable) | 1 |
| 6. | Pivot Arm Pin (removable) 2 c-clips | 1 |
| 7. | 2nd Cam-Check O-ring (removable) | 1 |

## Servicing the Relief Valve

**RELIEF VALVE SERVICE INSTRUCTIONS**

1. Prior to beginning any maintenance work, shut down the water supply to the unit and relieve any residual pressure in the valve by opening Test Cock (TC) #4.
2. The relief valve is an integral part of the lid assembly and may be serviced when the lid assembly is removed from the body of the valve.
3. The relief valve may be disconnected from the sensing line hose if desired to enable easier access to all parts of the assembly.

**REPLACING THE SEALING DISC**

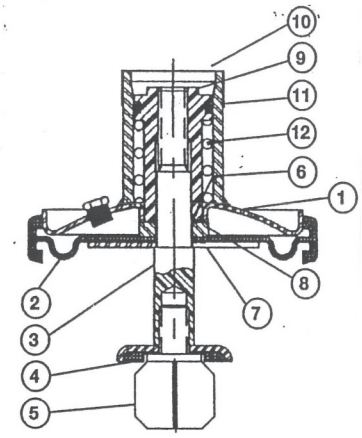
1. Remove relief valve assembly from body.
2. Unscrew Seal Cup Lock Nut from the underside of the body
3. Remove Seal Cup and Gasket thru the body access port.
4. Install NEW Seal Cup and gasket in reverse order.
5. Reinstall Lock Nut. DO NOT CROSS THREAD.

**COMPLETE DISASSEMBLY OF THE RELIEF VALVE**

1. Remove Sensing line from "T" junction at TC #2.
2. Remove Relief Valve Assembly from body.
3. Where available, clamp the RV assembly at the center section of the shaft on to the jaws of a vise and tighten sufficiently to prevent turning during disassembly.
4. Unscrew the seat from the shaft by turning counter clockwise.
5. Remove lower spacer (**Note:** Chamber side should be down).
6. Remove dust cap.
7. Remove retaining nut (**Note:** Apply light downward pressure to prevent spring from POPPING off the spring guide and retaining washer).
8. Lift off the cover. All internal parts will be pulled off the shaft at the same time.
9. Remove Spacer (Note direction of chamber)
10. Remove the diaphragm (Note direction of roll/convalute for reinstallation)
11. Remove diaphragm support.
12. Remove shaft O-ring.
13. Remove Upper spacer (Note chamber side should be on the top)

**RV STYLE:**

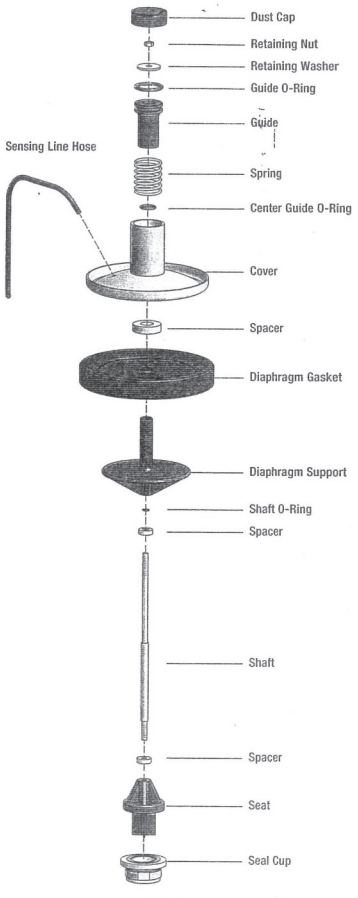
After removing Dust Cap, inspect Retainer Nut
OLD STYLE: HEX molded in guide - Parts no longer available.
NEW STYLE: ⅜" Nylock HEX nut - Parts shown stainless.




**Parts Table**

| Item | Part Description |
|---|---|
| 1. | Cover |
| 2. | Diaphragm/Gasket |
| 3. | Shaft |
| 4. | Sealing Disc |
| 5. | Guide, Lower |
| 6. | O-ring |
| 7. | Support Disc |
| 8. | Disc, Diaphragm Stop |
| 9. | Guide, Upper |
| 10. | Cover, Dust |
| 11. | O-ring, Upper |
| 12. | Spring |

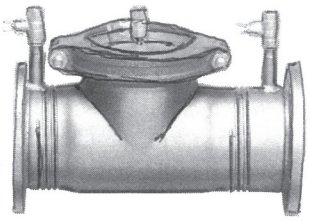
**Old Style**




**New Style**

# Series 775/775DCDA

**Double Check Backflow Preventer**
**Double Check Detector Assemblies**
**Sizes: 3" - 8"**



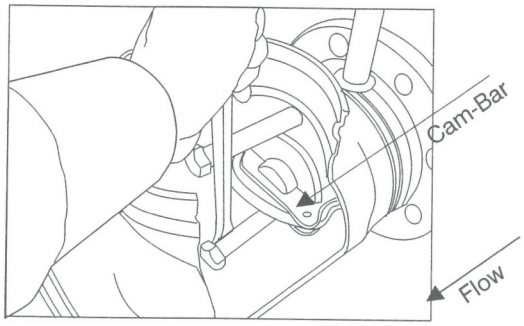
## REMOVING CAM-CHECKS

Place yourself so that the water flow through the valve is left to right.

**1. Shut down** water system by closing two gate valves and lock out system if possible. Slowly open ball valves to relieve internal pressure. After pressure is relieved, loosen bolts on groove coupler and remove groove coupler and cover plate from valve body.

**2. Unscrew** (counter clockwise as viewed through the port facing the check) the #1 Cam-Check. Insert the two grooved coupler bolts into the holes in the face of the seat. Be sure that the pins or bolts are installed with one on each side of the cam bar as shown. Insert a long screwdriver or pry bar between opposing pins and loosen the check (counter clockwise) until it comes free to turn by hand. Finish unscrewing the Cam-Check by hand using the support ears for the clapper and cam bar to turn the check. (See fig #1A)

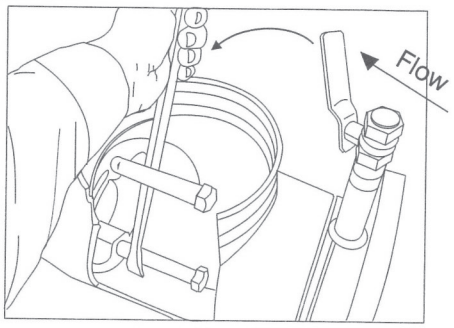
Figure #1A




**3. Lift** the Check straight up and out of the port access hole.

**4. Using** a pry bar across opposing pins in the #2 Cam-Check, loosen the #2 Cam-Check until it can be unscrewed by hand. Finish unscrewing the check by hand until it is free from the threads and spins out of the bore. (See fig. #1B). Remove #2 Cam-Check.

Figure #1B




**5. Lift** the Check straight up and out of the port access hole.

## CAM-CHECK DISASSEMBLY

**Please use caution when disassembling cam-check.**

**FIGURE 7**

Using a thin rod or screwdriver, lift the cambar up so that the clapper is free to swing upwards away from the seat.

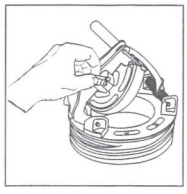


**FIGURE 8**

Using your free hand, swing the clapper open until the roller is almost to the free end of the cambar. Align the maintenance lockout holes in the cambar and the hinge arms.
Secure the check assembly in the maintenance position by inserting a rod or thin screwdriver through the lock-out holes.

**FIGURE 9**

Remove 1 c-clip from the center pivot pin. Withdraw the center pivot pin from the clapper and the hinge arms. Remove the clapper assembly from the check assembly module. Remove the retainer screws. **Note: You may replace this item as an assembly or you may continue and replace only the sealing disc.**

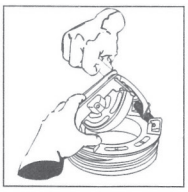
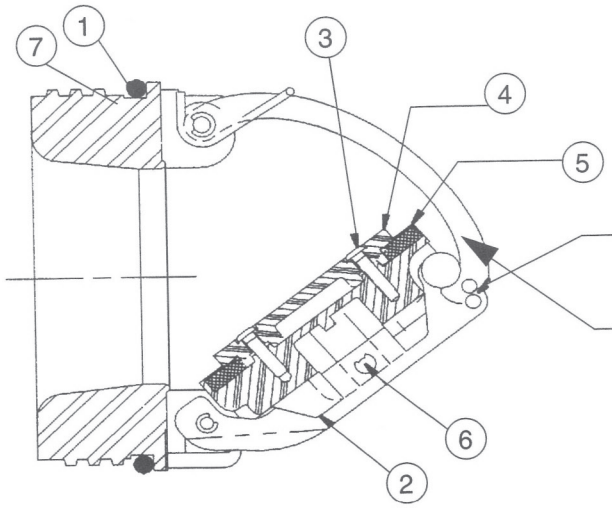


**FIGURE 10**

Disassemble the clapper by removing 4 screws, clapper retainer plate and the clapper disc. Disc may be reversed if sealing surface is damaged.

Before reinstallation of check assembly, thoroughly clean O-ring groove and lubricate O-ring with F.D.A. approved lubricant.




Note: Align holes and insert pin or small screwdriver to hold in open position.

**Cam bar**

# Series 775/775DCDA

## Double Check Backflow Preventer
## Double Check Detector Assemblies
## Sizes: 3" - 8"

| Item # | Part Description |
|---|---|
| 1. | 1st Cam-Check O-ring (removable) |
| 2. | Clapper Assembly (removable) |
| 3. | Clapper Retaining Plate Screws (removable) |
| 4. | Clapper Retainer Plate (removable) |
| 5. | Clapper Disc (removable) |
| 6. | Pivot Arm Pin (removable) 2 c-clips |
| 7. | 2nd Cam Check O-ring (removable) |

## INSTALLING CAM CHECKS

Prior to installing the Cam-Checks, ensure that all threads are clean and free of debris, grit, or other particles. Thoroughly clean O-rings grooves and lubricate O-rings with an FDA approved Lubricant.

### A) First Install the #2 Cam-Check:

**1. Insert** the #2 Cam-Check through the cover port with the clapper facing down. Align the threads of the #2 Cam-Check with the threads in the body and start to thread the Check in by hand.

**2. Tighten** the #2 Cam-Check. Insert grooved coupler bolts into the holes in the rear face of the seat . Insert a long screw driver or pry bar between opposing pins and tighten the check (clockwise as viewed through the port facing the check) until it comes to a solid stop. Then back the check out about 15 degrees or from the 1:00 to the 12:00 position. (See Fig #1C)

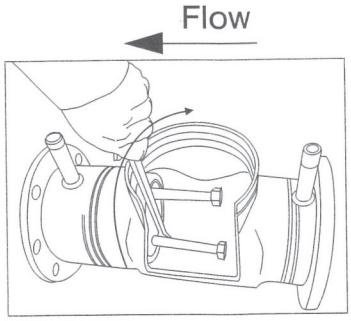



Figure #1C

### B) Then Install the #1 Cam-Check:

**1. Insert** the #1 Cam-Check through the cover port with the clapper facing down. Align the threads of the #1 Cam-Check with the threads in the body and start to thread the Check in by hand - using the ears which extend from the seat ring to turn the check assembly. **DO NOT** use the clapper or the cam bar to turn the check assembly.

**2. Tighten** the #1 Cam-Check. Insert grooved coupler bolts into the holes in the face of the seat (or use the bolts from the lid groove coupler). Be sure that the pins or bolts are installed with one on each side of the cam bar. Insert a long screw driver or pry bar between opposing pins and tighten the check (clockwise as viewed through the port facing the check) until it comes to a solid stop. Then back the check out about 15 degrees or from the 1:00 position to the 12:00 position. (See Fig #1D)

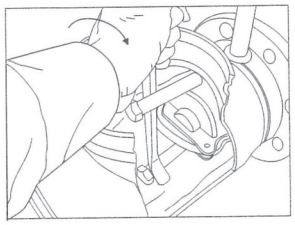



Figure #1D

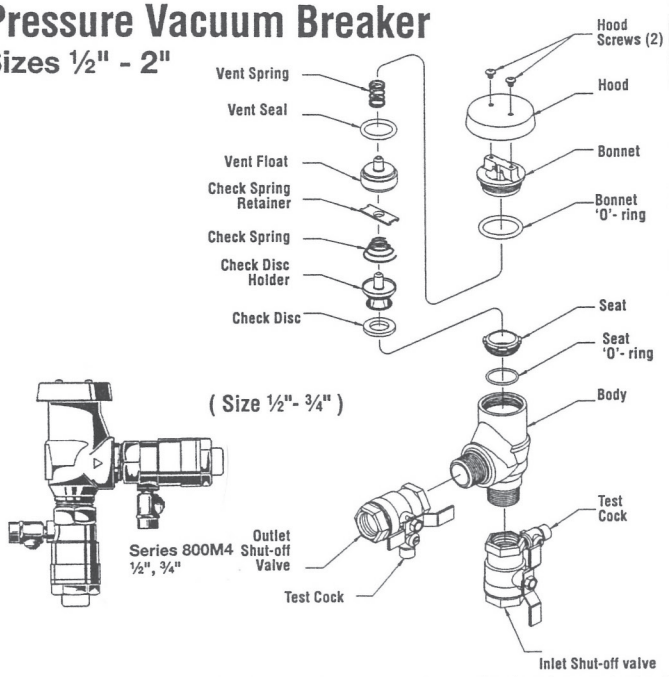
**START UP:** After re-installation of the cover plate and groove coupler - the downstream shut off valve should be closed. Open upstream gate slowly, fill the valve and bleed the air through Test cocks 2, 3 and 4. When valve is filled, open the downstream shut off slowly. Failure to bleed air from assembly may cause water hammer or shock damage to the water system.

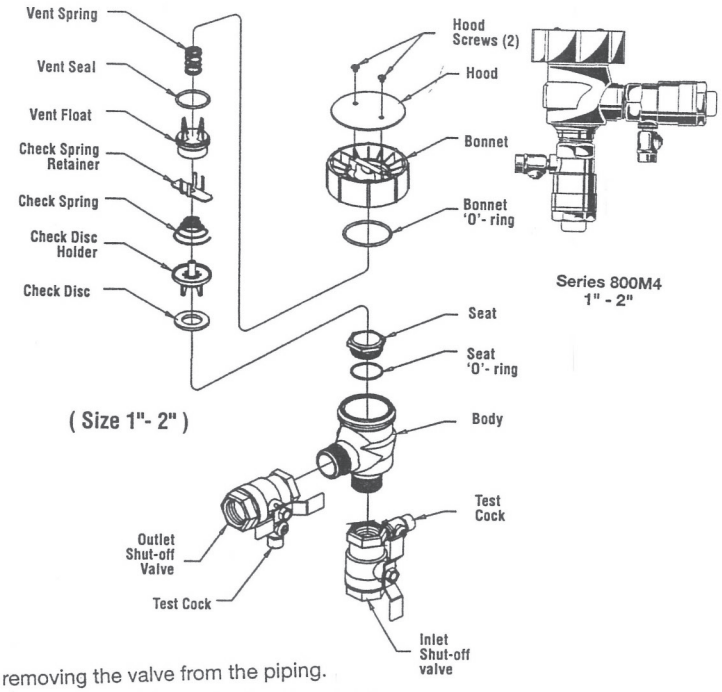
**NOTE:** Ames assemblies require minimum maintenance. All assemblies must be retested once maintenance has been performed. ***Before servicing be certain shut off valves are closed.***

# Series 800M4/800M4FR

## Pressure Vacuum Breaker

### Sizes ½" - 2"




Internal parts can be removed, repaired or inspected without removing the valve from the piping.

**Disassembly**

1. Shut off the supply pressure and drain the valve.
2. Remove the two hood screws and the hood.
3. Place a wrench on the parallel flats of bonnet and stem assembly. Turn counter clockwise and remove.
4. Remove the vent assembly.
5. Press down on the spring retainer and disengage it from the retaining lugs. Then turn 90° and remove.
6. Remove the spring retainer and spring. Note that the large diameter of the spring is down on the guide assembly.
7. Remove the check disc holder and guide assembly.
8. Disassemble the check disc holder assembly.

**Reassembly**

Reassemble in the reverse order utilizing the new parts from the repair kit.

---

# Series 008

## Anti-Siphon, Anti-Spill Vacuum Breaker

### Sizes ⅜" - 1"

Internal parts can be removed, repaired or inspected without removing the valve from the piping.

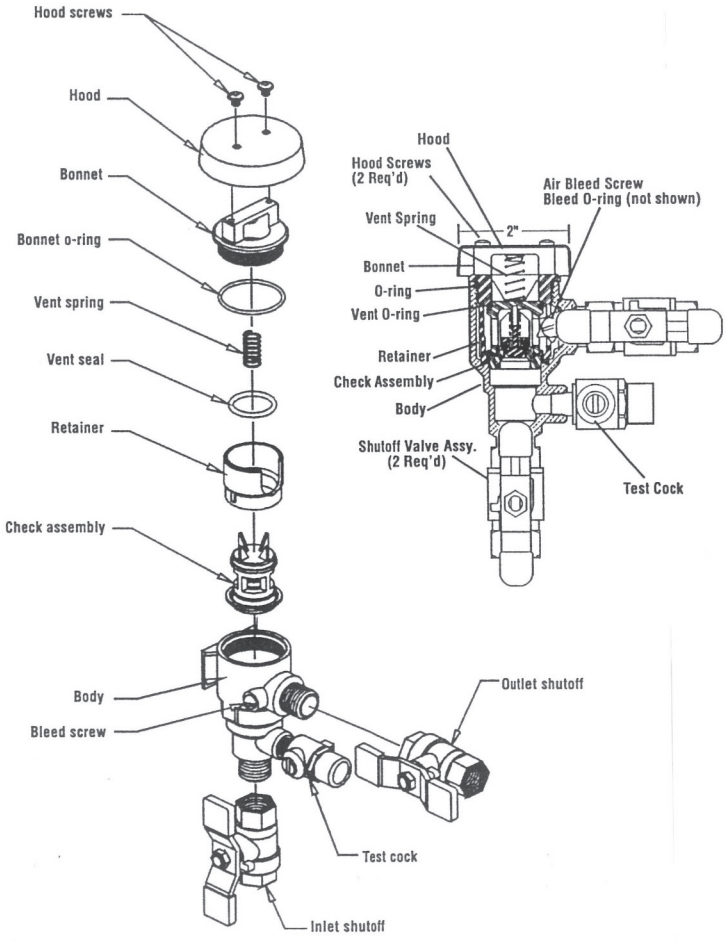
**Disassembly:**

1. Shut off supply pressure and drain valve.
2. Remove the two hood screws, remove hood.
3. Unscrew the bonnet by turning counterclockwise.
4. Lift retainer and check assembly from valve body. To assist with removal a small flow can be applied by "cracking" the inlet valve slightly. Alternately the test cock may be opened to break any suction caused by lifting internal assembly. Be sure to close test cock before pressurizing valve.

**Reassembly:**

Install new retainer module assembly into valve body by aligning "U" shaped cutout in retainer with the valve outlet. The top of retainer must drop just below threads in the valve body. Reassemble remaining parts in reverse order.

***Caution:***
***Spillage may occur if diaphragm is ruptured. Care must be taken not to damage parts during assembly.***



# Series 719 Sizes: ½" – 2" (15 – 50mm) Service and Maintenance

## Double Check Valve Assemblies

### Servicing the First and Second Check Valves

**NOTE:** Before servicing be certain water is turned off or shut-off valves are closed

1. Close shut off valves up and downstream of the valve.
2. Using an appropriate sized wrench, loosen the check valve cover. Unscrew the check valve cover and lift off.
3. Remove spring.
4. Lift out disc holder assembly from body of valve.
5. To reverse the seat disc, unscrew disc screw and disassemble disc washer and disc rubber from disc holder assembly. Reverse rubber so opposite face is showing. Assemble disc screw through disc washer and rubber and screw into disc holder.
6. To replace seat module, pull out of body by gripping at reinforcement ring. Replace seat module with new component by placing into body seat bore. Tightening cover will engage seat properly.
7. Insert disc holder assembly back into seat module.
8. Replace spring insuring that it seats properly on disc holder.
9. Place cover onto spring with internal guide on cover positioned inside end coil.
10. Screw cover onto valve body.
11. Tighten cover wrench tight.
10. Open shut off valves.

---

# Series 919

## Reduced Pressure Zone Assemblies

# Servicing First & Second Check Valves ¼" – 2"

**NOTES:** 1. No special tools are required to service the Series 919 ¼" - 2".
2. Before servicing, make sure the water is turned off or shut-off valves are closed.

1. Close shut-off valves up and downstream of the valve.
2. Using an appropriate sized wrench, loosen the check valve cover. Unscrew the check valve cover and lift it off.
3. Remove the spring.
4. Lift out the disc holder assembly from the body of the valve.
5. To reverse the seat disc, unscrew the disc screw and disassemble the disc washer and disc rubber from the disc holder assembly. Reverse the disc rubber so the opposite face is showing.
6. Assemble the disc screw through the disc washer and disc rubber, and screw it into the disc holder.
7. To replace the seat module, pull the seat module out of the body by gripping at the reinforcement ring. Replace the seat module with the new seat by placing it into the body seat bore.

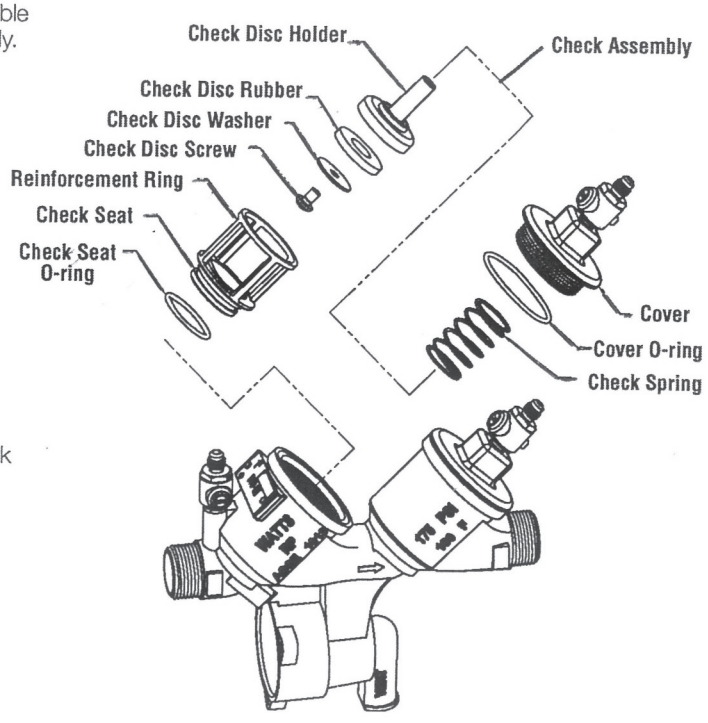
**NOTE:** When you tighten the cover in step 12, the cover will engage the seat module properly.

8. Insert the disc holder assembly back into the seat module.
9. Replace the spring ensuring that it seats properly on the disc holder.

**WARNING**

The first check valve has a heavy weight spring. The second check valve has a lighter weight spring. When reassembling the check valves, make sure you install the correct spring into the correct check valve.

10. Place the cover onto the spring with the internal guide on the cover positioned inside the end coil.
11. Screw the cover onto the valve body.
12. Tighten the cover using the appropriate sized wrench.
13. Service the second check valve using steps 2 through 12.
14. Slowly open shut off valves.



# Series 919

## Reduced Pressure Zone Assemblies

# Servicing the Relief Valve ¼" – 2"

**NOTES:** 1. No special tools are required to service the series 919 ¼" - 2".
2. Before servicing, make sure the water is turned off or shut-off valves are closed.

The following procedures provide information for replacing the diaphragm, the relief valve disc, and the relief valve seat. It is recommended that you visually inspect these parts to determine if a replacement or a cleaning is required.

### Disassembling the Relief Valve

1. Remove the relief valve cover bolts while holding the cover down.
2. Turn the cover counterclockwise for ¼ turn, and lift it straight off while still applying pressure to the cover with your hand.

**WARNING**

Make sure you apply pressure to the cover as you lift it straight off. Due to the release of pressure when removing the cover, the relief valve spring may eject quickly.

3. Remove the relief valve assembly (includes cover O-ring, stem and diaphragm assembly).
4. Remove the relief valve spring.
5. Remove the pressed in relief valve seat and seat O-ring.

### Replacing the Diaphragm

6. Using a wrench, loosen the diaphragm assembly by turning the hex bolt counterclockwise.
7. Remove the diaphragm and replace with a new diaphragm if required, or clean the existing diaphragm.
8. Using a wrench, reassemble the diaphragm assembly by turning the hex bolt clockwise to tighten.

### Replacing the Relief Valve Disc and Seat

9. Using a phillips screwdriver, remove the screw in the relief valve disc and replace the disc if required, or clean the existing disc.
10. Place the screw back into the relief valve disc and tighten.
11. Replace the relief valve seat with a new seat if required, or clean the existing seat.

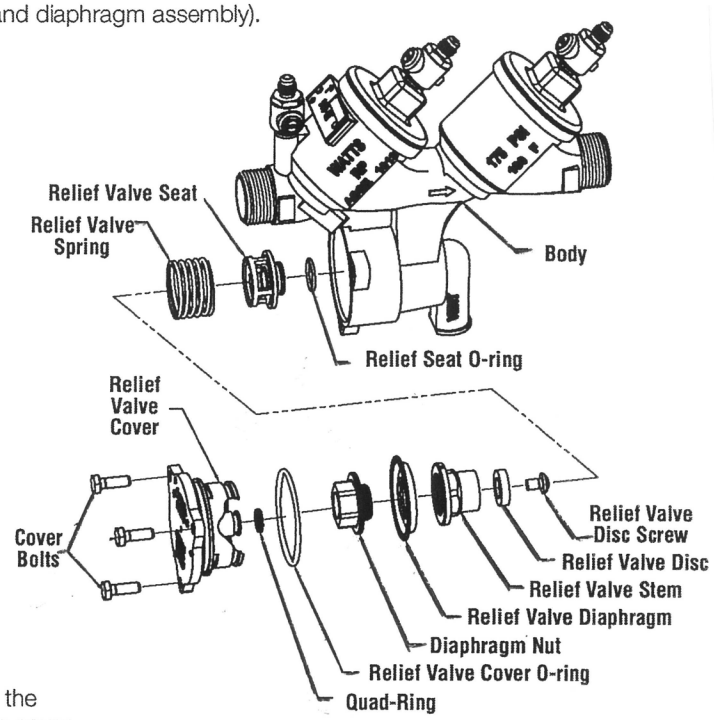
### Reassembling the Relief Valve

12. Place the relief valve seat back into the chamber bore.
13. Slide the diaphragm assembly into the relief valve seat.
14. Place the spring on to the diaphragm assembly.
15. Place the cover O-ring on the diaphragm assembly.
16. Line up the grooves on the relief valve cover with the grooves in the relief valve body, and turn the cover clockwise ¼ turn to seat the cover.
17. Using a wrench, place the bolts back into the cover and tighten.

**CAUTION**

If the cover does not lie flat against the relief valve body, the diaphragm assembly is not installed properly and damage can result. Remove the bolts and cover, realign the diaphragm assembly, and place the cover back on the relief valve body.

18. Open the shutoff valves.



# Model 757 / 757A / 757 DCDA / 757A DCDA

**Sizes 2 ½ - 10"**

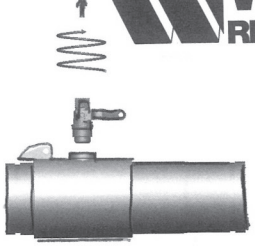


Figure A

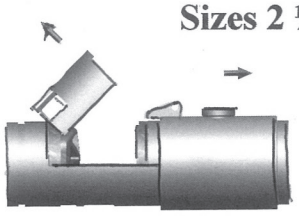


Figure B

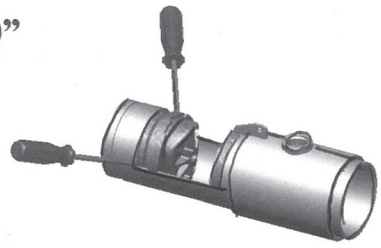


Figure C

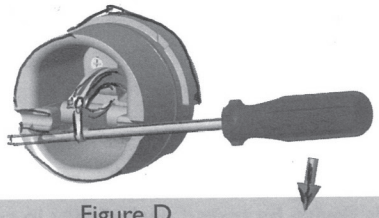


Figure D

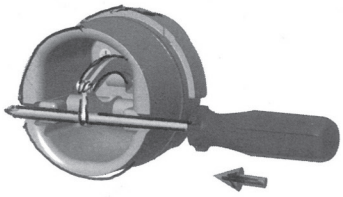


Figure E

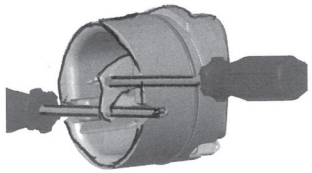


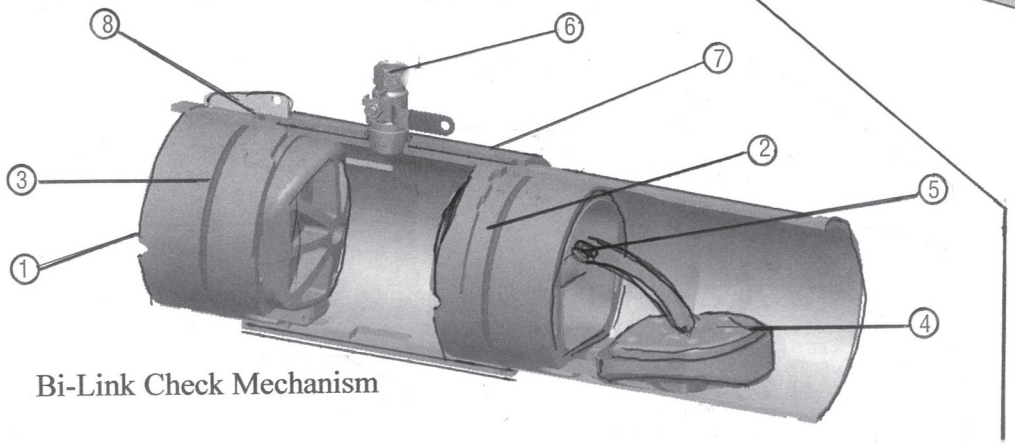
Figure F

## Maintenance Instructions

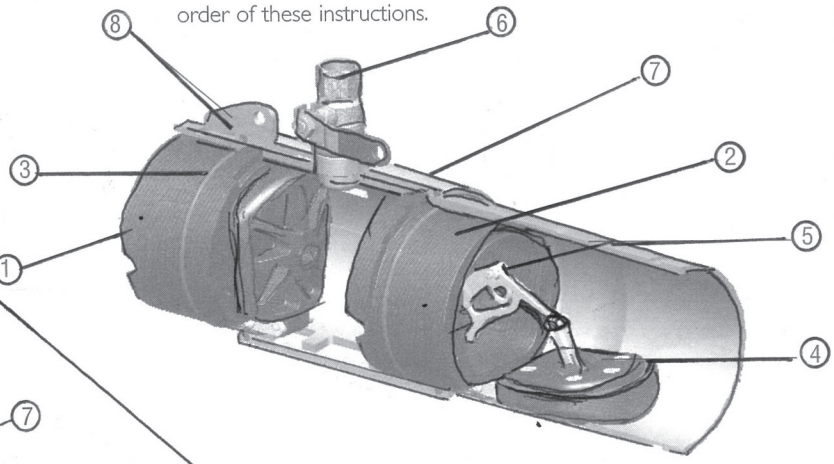
**Prior to servicing any Watts valve, it is mandatory to shut down water system by closing both the inlet and outlet shut-off valves. After shutoff valves are closed, open test cock #2, #3 and #4 to relieve pressure within the backflow assembly.**

1. After #3 test cock has been opened to relieve pressure, remove #3 test cock from housing. (Figure A)
2. Slowly slide the cover sleeve to the downstream side of the housing. (Figure B)
3. Remove the stainless steel check retainer from the housing. (Figure B)
4. Remove the #1 check module (Figure C) by inserting two flat blade screwdrivers into the slots on either side of the check module and gently pry to check module toward the open zone.
5. Remove #2 check module with the same instructions as in #5 above.
6. To clean or inspect either check module, insert a #3 screwdriver through the downstream side of the check module as shown in Figure D and E. When the screwdriver is in place, remove the E-clip (Figure F) and pin connecting the structural members and the check clapper will open with no tension.
7. Thoroughly clean the seating area. The sealing disk may be removed, if necessary, by removing the screws connecting the keeper plate to the clapper. The sealing disc may be reversed and reinstalled if the elastomer is cut or damaged.
8. Wash check module and O-ring and inspect for any damage. If damaged, reinstall new parts.
9. After thorough cleaning, lubricate O-ring w/FDA approved lubricant, replace pin and E-clip in structural members, remove screw driver and reinstall check modules and assemble housing in reverse order of these instructions.

1. 1st Ck Module
2. 2nd Ck Module
3. O'Ring
4. Ck Disc
5. E Clip
6. Closure Sleeve Test Cock
7. Closure Sleeve
8. O'Ring



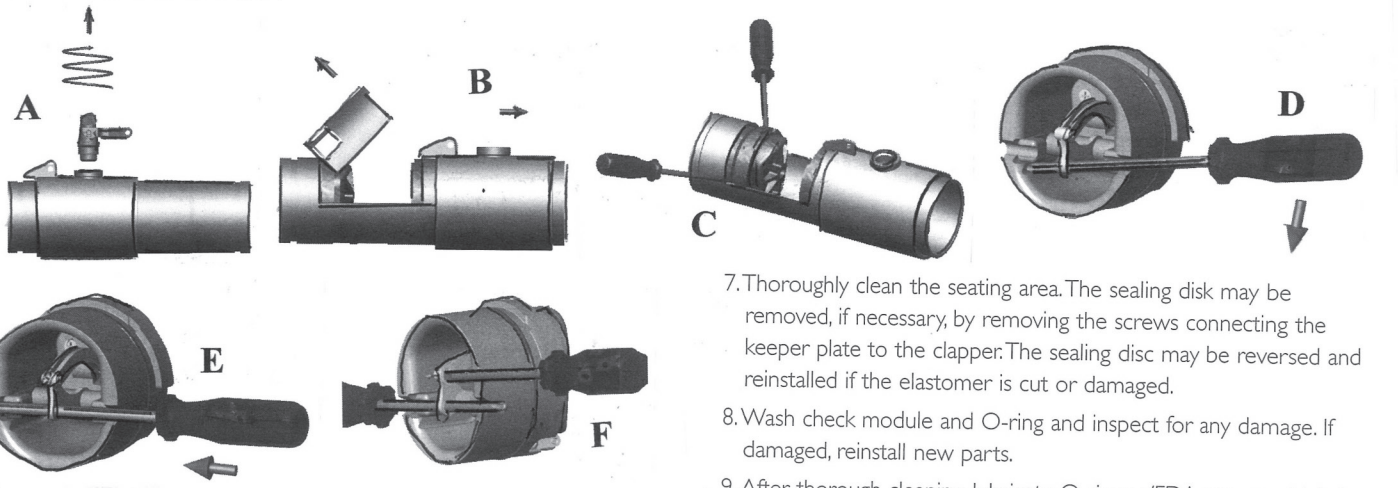

Bi-Link Check Mechanism




Tri-Link Check Mechanism

1. 1st Ck Module
2. 2nd Ck Module
3. O'Ring
4. Ck Disc
5. E Clip
6. Closure Sleeve Test Cock
7. Closure Sleeve
8. O'Ring

# Model 957 / 957 RPDA Sizes 2 ½ - 10"




## Maintenance Instructions

**Prior to servicing any Watts valve, it is mandatory to shut down water system by closing both the inlet and outlet shut-off valves. After shutoff valves are closed, open test cock #2, #3 and #4 to relieve pressure within the backflow assembly.**

1. After #3 test cock has been opened to relieve pressure, remove #3 test cock from housing. (Figure A)
2. Slowly slide the cover sleeve to the downstream side of the housing. (Figure B)
3. Remove the stainless steel check retainer from the housing. (Figure B)
4. Remove the #1 check module (Figure C) by inserting two flat blade screwdrivers into the slots on either side of the check module and gently pry to check module toward the open zone.
5. Remove #2 check module with the same instructions as in #5 above.
6. To clean or inspect either check module, insert a #3 screwdriver through the downstream side of the check module as shown in Figure D and E. When the screwdriver is in place, remove the E-clip (Figure F) and pin connecting the structural members and the check clapper will open with no tension.
7. Thoroughly clean the seating area. The sealing disk may be removed, if necessary, by removing the screws connecting the keeper plate to the clapper. The sealing disc may be reversed and reinstalled if the elastomer is cut or damaged.
8. Wash check module and O-ring and inspect for any damage. If damaged, reinstall new parts.
9. After thorough cleaning, lubricate O-ring w/FDA approved lubricant, replace pin and E-clip in structural members, remove screw driver and reinstall check modules and assemble housing in reverse order of these instructions.

## Servicing Relief Valve

**Prior to servicing the relief valve, it is mandatory to shut down water system by closing both the inlet and outlet shutoff valves and relieving pressure within the assembly by opening the #2, #3 and #4 test cocks.**

1. Disconnect the hose from the bottom cover plate to the relief valve.
2. An O-ring seals the relief valve body to the main housing. It is not necessary to tighten the connection beyond firm hand tightening. The relief valve should be able to be removed by hand untightening. Unscew the relief valve from the housing.
3. Remove the cover plate of the relief valve by removing the four connecting screws.
4. Remove the rubber diaphragm from the relief valve. Be aware of how the diaphragm is configured so that it can be reinstalled in the same manner. The hard rubber tab in the diaphragm fits into a similar socket in the head of the piston. (Figure 1)
5. Hold the relief valve in both hands with the threaded end up and both thumbs on the head of the piston. Push up on the piston until the piston shaft with the attached E-clip is exposed. Remove the E-clip (Figure 2)
6. Remove the piston and spring from the relief valve housing and thoroughly clean all parts including the diaphragm. Inspect all rubber parts for damage and if damaged, replace them with new parts.
7. Reassemble the relief valve in the reverse order that it was disassembled.

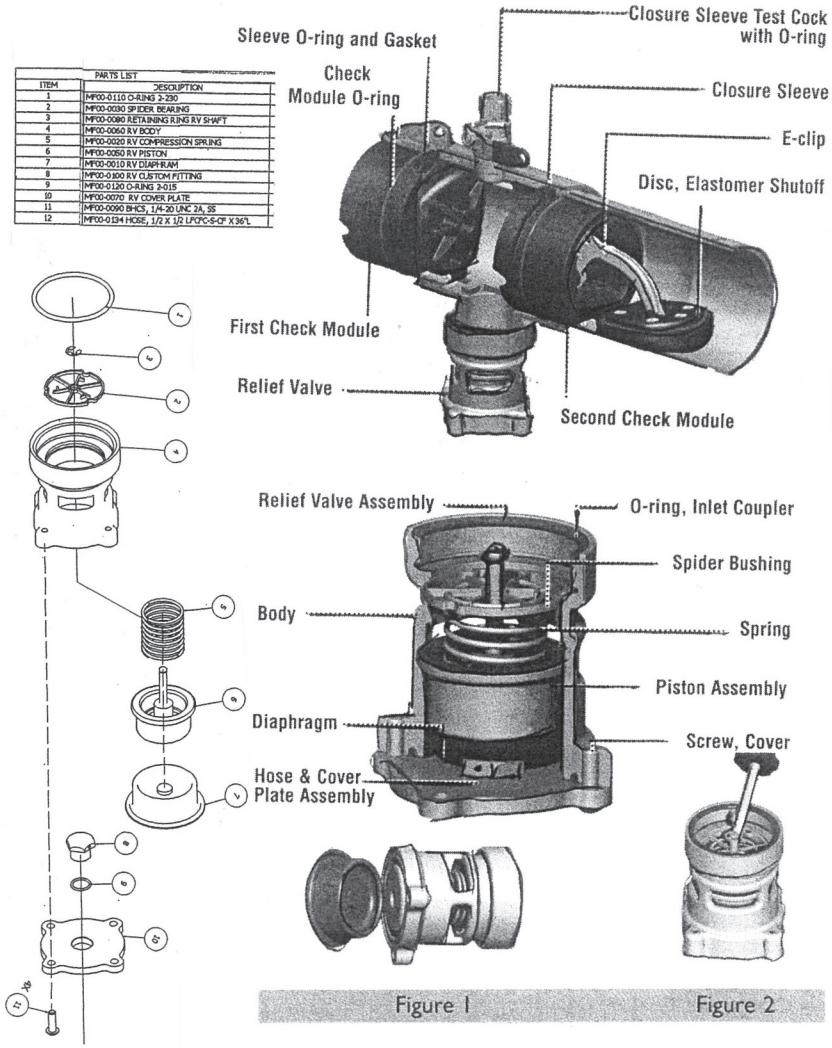



Figure 1 Figure 2