

# "Apollo"®



## **INSTALLATION, OPERATION & MAINTENANCE MANUAL**

REDUCED PRESSURE PRINCIPLE (RPZ) 1/4" - 10"

REDUCED PRESSURE DETECTOR ASSEMBLY (RPDA) 3" - 10"

**40-200 Series (1/4" - 10") | 40-200S Series (1/4" - 1") | 40-700 Series (3" - 10")**

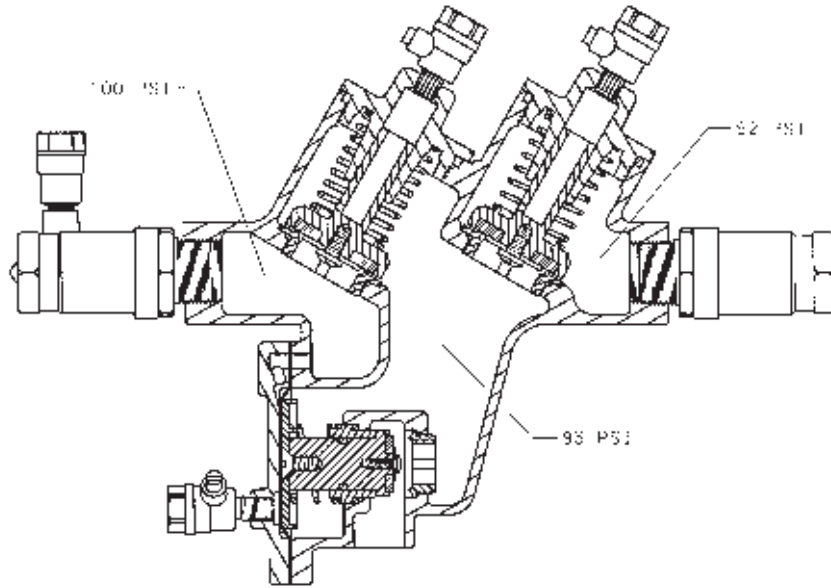
ES1593 IOM BFMM4000 rev.b

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**I. DESCRIPTION AND OPERATION**

The RPZ device consists of two independently acting, spring loaded, poppet type check valves, together with a hydraulically dependent, mechanically independent pressure differential relief valve, located in the zone between the check valves. Two resilient seated shut-off valves and four test cocks complete the assembly. During normal operation, the pressure drop across the first check valve into the "zone" area is approximately 7 PSI. The second check valve is lightly spring loaded to provide a minimum pressure drop of 1 PSI across it. (See Fig. 1) The relief valve operates on a differential pressure. Supply pressure on the upstream side of the first check valve acts against the diaphragm to close the relief valve during normal operation. In the event of back-pressure, the relief valve will open to maintain the pressure in the "zone" at least 2 PSI less than the inlet pressure. The RPDA device consists of a mainline RPZ and a by-pass assembly consisting of an approved RPZ assembly and water meter. Each device is equipped with test cocks for periodic field testing and is normally supplied with inlet and outlet shut-off valves. For information on operation, installation, trouble shooting & testing refer to Installation Instruction Booklet I503600 furnished with each RPDA unit. For maintenance instructions see pages 5 & 6. For parts list see pages 21 - 24.

**FIGURE 1  
NO FLOW CONDITION**



**II. INSTALLATION**

1. The RPZ device must be installed in an accessible location to facilitate periodic field testing and maintenance.
2. The location selected should have adequate drainage for relief valve discharge. Drainage may be piped away, providing an approved air gap device is used (see Fig. 2). The device should never be placed where it may become submerged in standing water.
3. Flush all upstream piping thoroughly to remove foreign matter prior to installing the device.
4. Install the device in a horizontal position with adequate clearance from walls and/or obstructions, for testing and maintenance. A 12" to 30" clearance between the lower most portion of the device and flood grade or floor should be provided.
5. When shut-off valves are supplied separately, they should be installed with a test cock on the upstream side of the inlet shut-off valve. (f) A "Y" strainer can be installed just upstream of the RPZ assembly to eliminate any debris from entering the device and fouling the check and/or relief valve.
6. When installing the assembly, use pipe sealant on external threads only (if applicable).
7. Use wrench grips provided when installing (if applicable).
8. After installing the assembly, and with downstream or #2 shut-off valve closed, pressurize the RPZ device and bleed air through test cock #4. Then open #2 shut-off valve.

NOTE: If water continues to drain from the relief valve, check the Troubleshooting

# INSTALLATION, OPERATION & MAINTENANCE MANUAL

## III. TROUBLESHOOTING

| SYMPTOM  | CAUSE  | CORRECTIVE ACTION   |
|--|--|---|
| Relief valve continuously discharges during no-flow condition.   | <ol style="list-style-type: none"> <li>#1 check valve fouled with debris.</li> <li>#2 check valve fouled with debris coupled with a back-pressure condition.</li> <li>#1 check poppet stem not moving freely in guide (or #2 check poppet during a back-pressure condition.)</li> </ol>  | <ol style="list-style-type: none"> <li>Close #2 shut-off valve or inspect for possible through leakage.</li> <li>Inspect and clean seat disc and seat.</li> <li>Inspect for debris or deposit on poppet stem or guide.</li> </ol>                       |
| Relief valve discharges continuously during flow and no-flow conditions.   | <ol style="list-style-type: none"> <li>Relief valve fouled with debris.</li> <li>Damaged diaphragm (allows water to pass through from inlet to zone).</li> <li>Sensing passage to inlet side of diaphragm plugged. d. #1 check poppet stem not moving freely in poppet guide.</li> </ol> | <ol style="list-style-type: none"> <li>Inspect and clean relief valve seat disc and seat.</li> <li>Replace diaphragm.</li> <li>Inspect and clean passage in cover and body.</li> <li>Inspect for debris or deposits on poppet stem or guide.</li> </ol> |
| Relief valve discharges intermittently in a "spitting" action during no-flow condition.  | <ol style="list-style-type: none"> <li>Pressure fluctuations (water hammer) from supply.</li> </ol>  | <ol style="list-style-type: none"> <li>Eliminate or reduce pressure fluctuations.</li> </ol>  |
| Relief valve does not open during field test No. 1.  | <ol style="list-style-type: none"> <li>#2 shut-off valve not closed completely.</li> <li>Test equipment improperly installed.</li> </ol>   | <ol style="list-style-type: none"> <li>Close #2 shut-off valve or inspect for possible through leakage.</li> <li>Recheck test procedure.</li> </ol>   |
| #2 check valve fails to hold back-pressure.  | <ol style="list-style-type: none"> <li>#2 shut-off valve not closed completely.</li> <li>#2 check valve fouled with debris.</li> <li>#2 check poppet stem not moving freely in guide.</li> </ol>   | <ol style="list-style-type: none"> <li>Close #2 shut-off valve or inspect for possible through leakage.</li> <li>Inspect and clean seat disc and seat.</li> <li>Inspect for debris or deposits on poppet stem or guide.</li> </ol>                      |
| Pressure differential across #1 check valve is low during field test No. 3 (must be a minimum of 3 PSI more than the opening differential pressure of the relief valve as recorded in Test No. 1). | <ol style="list-style-type: none"> <li>#1 check valve fouled with debris.</li> <li>Upstream pressure fluctuations causing inaccurate gauge reading.</li> <li>#1 check poppet stem not moving freely in guide.</li> </ol>   | <ol style="list-style-type: none"> <li>Inspect and clean seat disc and seat.</li> <li>Eliminate pressure fluctuations.</li> <li>Inspect for debris or deposits on poppet stem or guide.</li> </ol>  |

#### IV. MAINTENANCE INSTRUCTIONS - 1/4" - 2"

##### A. DISASSEMBLY — CHECK VALVES

1. Close #2 shut off valve, then close #1 shut-off valve.
2. Bleed pressure from the assembly by opening #2, #3, and #4 test cock.

**CAUTION: Caps are spring loaded and should be removed carefully to avoid personal injury.**

3. Unscrew cap using hex head provided.
4. Remove spring and poppet assembly from the body.

##### B. DISASSEMBLY — CHECK VALVE POPPET

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

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

##### ASSEMBLY — CHECK VALVE POPPET

1. Install new disc in poppet, secure disc with retaining washer and screw.

**NOTE: Due to symmetry of the disc, the old disc may be turned over to obtain an effective seal.**

##### D. ASSEMBLY — CHECK VALVE

1. Install the poppet assembly into the body.
2. Install the spring (heavy spring, larger diameter wire, goes into #1 check valve) onto the poppet.
3. Apply a thin coat of synthetic based lubricant on cap O-Ring.
4. Guide cap over spring and poppet stem and tighten cap.

##### E. RELIEF VALVE DISASSEMBLY

1. Remove cover bolts, cover and diaphragm.
2. Grasp the diaphragm plate and pull the assembly straight out of the body.
3. Holding the relief valve assembly in one hand, remove the screw and retaining washer.
4. Remove the seat disc.
5. Turn the assembly over, keeping the spring compressed by holding down on the diaphragm plate, remove the screw.
6. Remove the diaphragm plate, spring and bushing from the R.V. stem.
7. Remove the O-Ring from the R.V. stem.
8. All parts should be carefully inspected for any damage or excessive wear and thoroughly rinsed in clean water prior to reassembly. Replace worn parts as necessary.

##### F. ASSEMBLY — RELIEF VALVE

1. Apply a thin coat of synthetic base lubricant on O-Rings before installing.
2. Install O-Ring onto R.V. stem.
3. Slide bushing over R.V. stem and position spring onto bushing.
4. Position diaphragm plate and compress spring, install screw into R.V. stem.
5. Turn the assembly over and install seat disc, retaining washer and screw.
6. Install O-Ring onto bushing.
7. Slide complete assembly into the body.
8. Position diaphragm over flange, install cover and tighten bolts evenly.
9. Open #1 shut-off valve & bleed air out of the unit through #2, #3 and #4 test cocks; then open #2 shut-off valve.
10. Test complete assembly to ensure proper operation.

## V. MAINTENANCE INSTRUCTIONS - 2-1/2" - 10"

### A. DISASSEMBLY — CHECK VALVES

1. Close #2 shut off valve, then close #1 shut-off valve.
2. Bleed pressure from the assembly by opening #2, #3, and #4 test cock.
3. Remove cover bolts and cover.

**NOTE:** *The spring load on the cover will be removed when the cover bolts are backed off approximately 3/8".*

4. Remove the complete check assembly straight out of the valve body being careful not to damage the seat ring.
5. The check valve seat is threaded into the body and may be removed at this time if necessary (the seat is bolted into the body on the 10" unit).
6. To remove the seat disc, remove the retaining plate nut (on the 8" & 10" units remove the retaining

**WARNING:**

*The check valve spring is held in compression by the stem nut on top. This nut should not be removed unless the spring requires replacement.*

### B. ASSEMBLY — CHECK VALVES

1. Install seat disc in holder and secure with retaining plate and retaining nut or bolts as applicable.

**NOTE:** *Due to the symmetry of the disc, the old disc may be turned over to obtain an effective seal.*

2. Install the check valve assembly into the body (assemble with the larger diameter spring into the first check valve).
3. Apply a thin coat of synthetic based lubricant on the cover O-Ring and place it into the groove around the lip of the check barrel. Being careful not to disturb O-Ring, install the cover and tighten the bolts evenly.

### C. DISASSEMBLY — RELIEF VALVE

1. Remove cover bolts, cover and diaphragm.

**NOTE:** *On the 8" & 10" units the diaphragm is an integral part of the relief valve assembly.*

2. Grasp the diaphragm plate and pull the assembly straight out of the body.
3. Holding the relief valve assembly in one hand, remove the screw and retaining washer.
4. Remove the seat disc.
5. Turn the assembly over, keeping the spring compressed by holding down on the diaphragm plate, remove the screw/bolt.
6. Remove the diaphragm plate(s), spring and bushing from the R.V. stem.
7. Remove the O-Ring from the R.V. stem.
8. All parts should be carefully inspected for any damage or excessive wear and thoroughly rinsed in clean water prior to reassembly. Replace worn parts as necessary.

### D. ASSEMBLY — RELIEF VALVE

1. Apply a thin coat of synthetic base lubricant on O-Rings before installing.
2. Install O-Ring onto R.V. stem.
3. Slide bushing over R.V. stem and position spring onto bushing.
4. Position diaphragm plate(s) and compress spring, install screw into R.V. stem.
5. Turn the assembly over and install seat disc, retaining washer and screw.
6. Install O-Ring onto bushing.
7. Slide complete assembly into the body testing for freedom of movement.
8. Position diaphragm over flange ensuring that the hole in the diaphragm for the sensing passage is in the correct position, install cover and tighten bolts evenly.
9. Open #1 shut-off valve & bleed air out of the unit through #2, #3 and #4 test cocks; then open #2 shut-off valve.
10. Test complete assembly to ensure proper operation.

## VI. TESTING PROCEDURES

**IT'S IMPORTANT THAT THE RPZ BE TESTED PERIODICALLY IN COMPLIANCE WITH LOCAL CODES, BUT AT LEAST ONCE A YEAR OR MORE, AS SERVICE CONDITIONS WARRANT.**

### EQUIPMENT REQUIRED

Reduced pressure backflow preventer test kit 40-200-TKU, or 40-200-TK5U.

### TEST NO. 1:

**NOTE: Test set-up is illustrated in Figure 3.**

*Procedure 1 for use with 40-200-TKU Test Kit only. See procedure 2 for 40-200-TK5U.*

**PURPOSE: TO TEST OPERATION OF THE PRESSURE DIFFERENTIAL RELIEF VALVE.**

### REQUIREMENT:

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

### PROCEDURE:

1. Bleed water through all four test cocks to flush any foreign material.

**NOTE: Open test cock #2 very slowly to avoid accidental dumping of the relief valve.**

2. Connect the "high" side hose to test cock #2.

3. Connect the "low" side hose to test cock #3.

4. Open valves #1, #2, and #3.

5. Slowly open test cock #3 and bleed all air from gauge and hoses through the "vent" hose. With test cock #3 maintained in the open position, slowly open test cock #2 and bleed all air again through the "vent" hose. Close valve #3. Then close valve #2.

6. Close #2 shut-off valve.

7. Slowly open valve #3 until the differential gauge needle starts to drop.

**NOTE: It is important that the differential gauge needle drops slowly. Maintain #3 at this position and observe the differential pressure reading at the moment the first discharge is noted from the relief valve.**

8. Record this reading as the opening differential pressure of the relief valve and close valve #3.

### TEST NO. 2:

**PURPOSE: TO TEST CHECK VALVE #2 FOR TIGHTNESS AGAINST REVERSE FLOW.**

### REQUIREMENT:

The check valve shall permit no through leakage in a direction reverse to normal flow under all conditions of a pressure differential.

### PROCEDURE:

1. Maintain the #2 shut-off valve in the closed position (from Test No. 1).

2. Loosely attach the "vent" hose to test cock #4.

3. Bleed all air from the "vent" hose by opening valve #2.

1. Close valve #2 and tighten hose connection to test cock #4. Then open test cock #4.

1. Loosen the "low" side hose at test cock #3 slightly and re-establish the normal reduced pressure within the zone. Then retighten hose.

1. Open valve #2. If the differential pressure remains steady then check valve #2 is reported as "OK". If the differential pressure falls until the relief valve opens then check valve #2 is recorded as "leaking" and Test No. 3 cannot be completed.

### TEST NO. 3:

**PURPOSE: TO TEST THE STATIC DIFFERENTIAL PRESSURE ACROSS CHECK VALVE #1.**

### REQUIREMENT:

The static differential pressure across check valve #1 must be a minimum of 3 PSI more than the opening differential pressure of the relief valve as recorded in Test No. 1.

### PROCEDURE:

1. With the testing equipment installed as stated in Test No. 2, the static differential pressure across check valve #1 will be indicated on the gauge and should be recorded as such.

**NOTE: Gauge needle should be steady and not falling.**

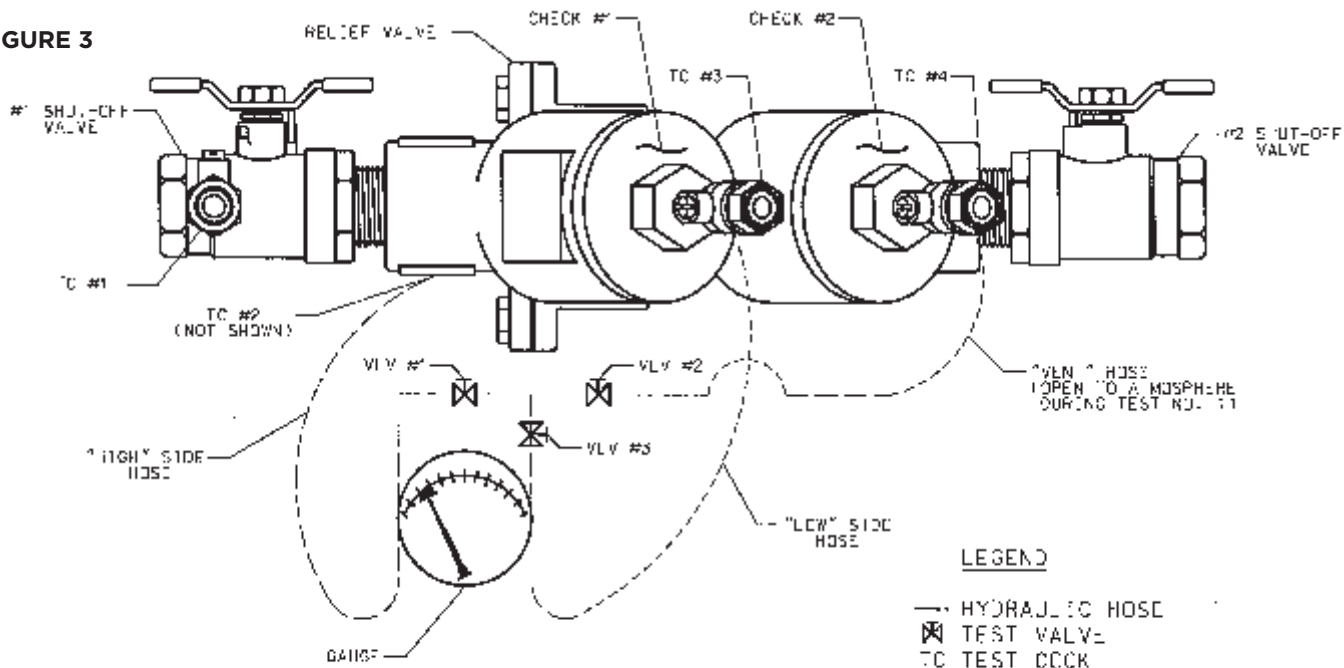
### RESTORE OPERATION:

2. Close all test cocks, open all needle-valves, open #2 shut-off valve and carefully remove all test equipment.

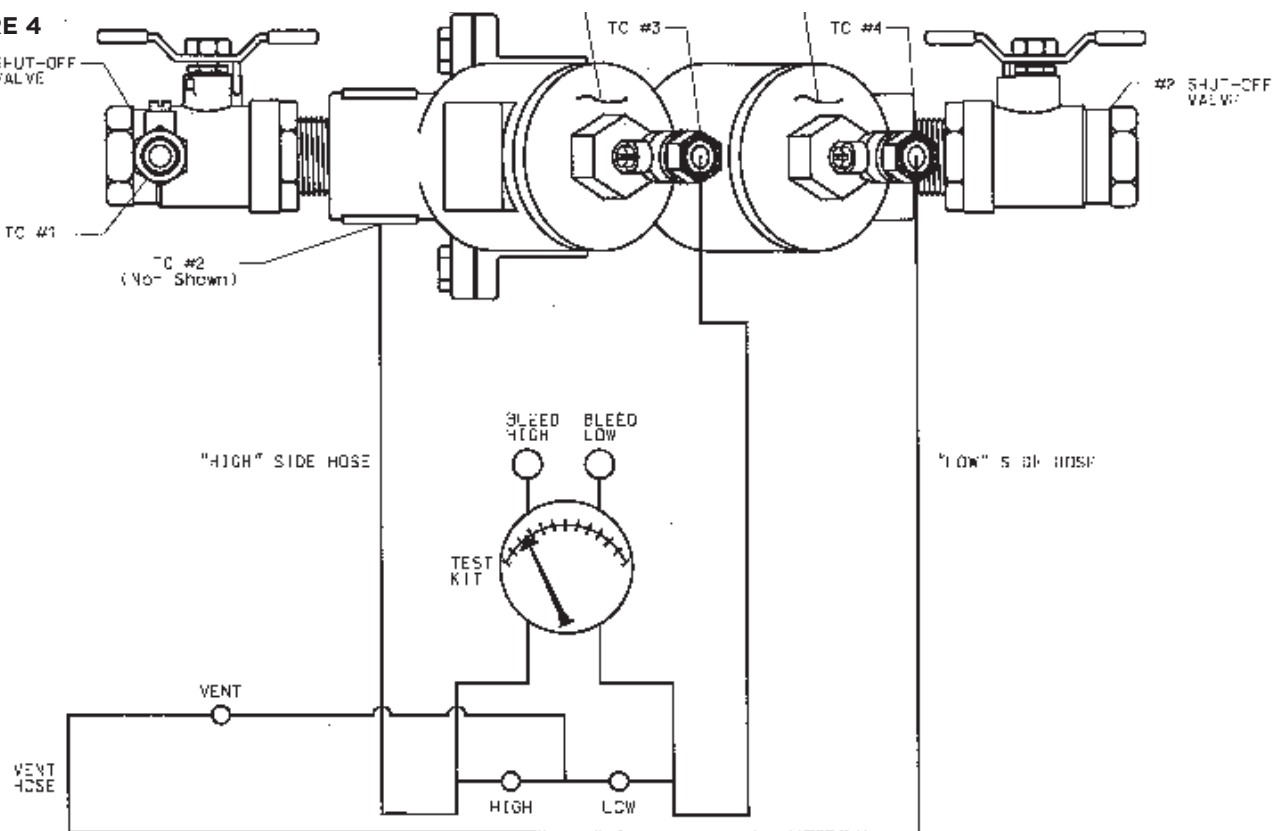
**NOTE: Refer to Troubleshooting Guide in section III to resolve any problems incurred during field testing.**

## VI. TESTING PROCEDURES

**FIGURE 3**



**FIGURE 4**





## VI. TESTING PROCEDURES

### PROCEDURE 2

TEST PROCEDURE USING 40-200-TK5 or 40-200-TKRC TEST KIT

**NOTE: IT IS THE TESTER'S RESPONSIBILITY TO DETERMINE IF THIS PROCEDURE IS ACCEPTED BY LOCAL AUTHORITIES.**

#### TEST SET UP

1. Obtain permission to shut off the water supply.
2. Determine the direction of flow.
3. Identify and install appropriate adapters in all 4 test cocks.
4. All test kit valves are closed.

#### TEST NO. 1

PURPOSE: DOES THE DIFFERENTIAL PRESSURE RELIEF VALVE OPERATE TO MAINTAIN THE "ZONE" BETWEEN THE TWO CHECK VALVES AT LEAST 2 PSI LESS THAN THE SUPPLY PRESSURE.

1. Open test cock 4 to establish flow through the RP. "Blow out" test cocks 1, 2 & 3.

**Note: Open test cock 2 slowly to avoid accidental dumping of the relief valve. Close test cock 4.**

2. Connect the red hose between test cock 2 and the high side (back, middle) connection on the test kit.
3. Connect the green hose between test cock 3 and the low side (back, right) connection on the test kit.
4. Slowly open test cock 3. Bleed the low side by opening the bleed low (top, right) valve.
5. Slowly open test cock 2. Bleed the high side by opening the bleed high (top, left) valve. Close the bleed high (top, left) valve.
6. After the gauge reaches full scale, close the bleed low (top, right) valve.
7. Close the No. 2 shutoff valve and observe the pressure drop across Check Valve 1. Should the pressure drop until the relief valve discharges continuously, check valve 1 is leaking and must be repaired before continuing.
8. Open the high (bottom, middle, red) valve.
9. Open the low (bottom, right, green) valve no more than one quarter (1/4) turn.
10. Watch the gauge drop slowly to the relief valve opening point - record the reading. (If the differential pressure does not drop to the relief valve opening point, close the high and low valves and go to step 12).
11. Close the high and low valves and go to test No. 2.
12. No. 2 shutoff valve may be leaking. Reopen and close No. 2 shutoff valve to attempt a better shutoff. Repeat steps 7 through 10. If the relief valve does not open, a by-pass hose is required. (Large leaks may require a garden hose).
13. Attach a hose (not supplied with Test Kit) to test cock 1. Bleed hose by opening test cock 1. Close test cock 1.
14. Connect the hose from test cock 1 to test cock 4.
15. Open test cock 1 to pressurize the hose.
16. Slowly open test cock 4. Repeat steps 8 through 10. If the relief valve does not open, the leaky No. 2 shutoff valve must be repaired.

#### TEST NO. 2

PURPOSE: IS CHECK VALVE 2 PRESSURE TIGHT AGAINST BACK PRESSURE.

#### NO BYPASS HOSE USED IN TEST 1.

1. Connect the black hose to vent (back, left) connection on the test kit.
2. Bleed vent hose by opening the high (bottom, middle, red) and vent (bottom, left, black) valves. Close the vent valve.
3. Attach the vent hose to test cock 4.
4. Open test cock 4.
5. Open the bleed low (top, right) valve allowing the gauge to reach full scale. Close the bleed low valve.
6. Open the vent (bottom, left, black) valve.
7. If the differential pressure stabilizes above the relief valve opening point check valve 2 is recorded as "tight". (Proceed to test No. 3). If the reading falls to the relief valve opening point, check valve 2 is recorded as "leaking" and Test No. 3 cannot be completed.

#### BYPASS HOSE USED IN TEST 1.

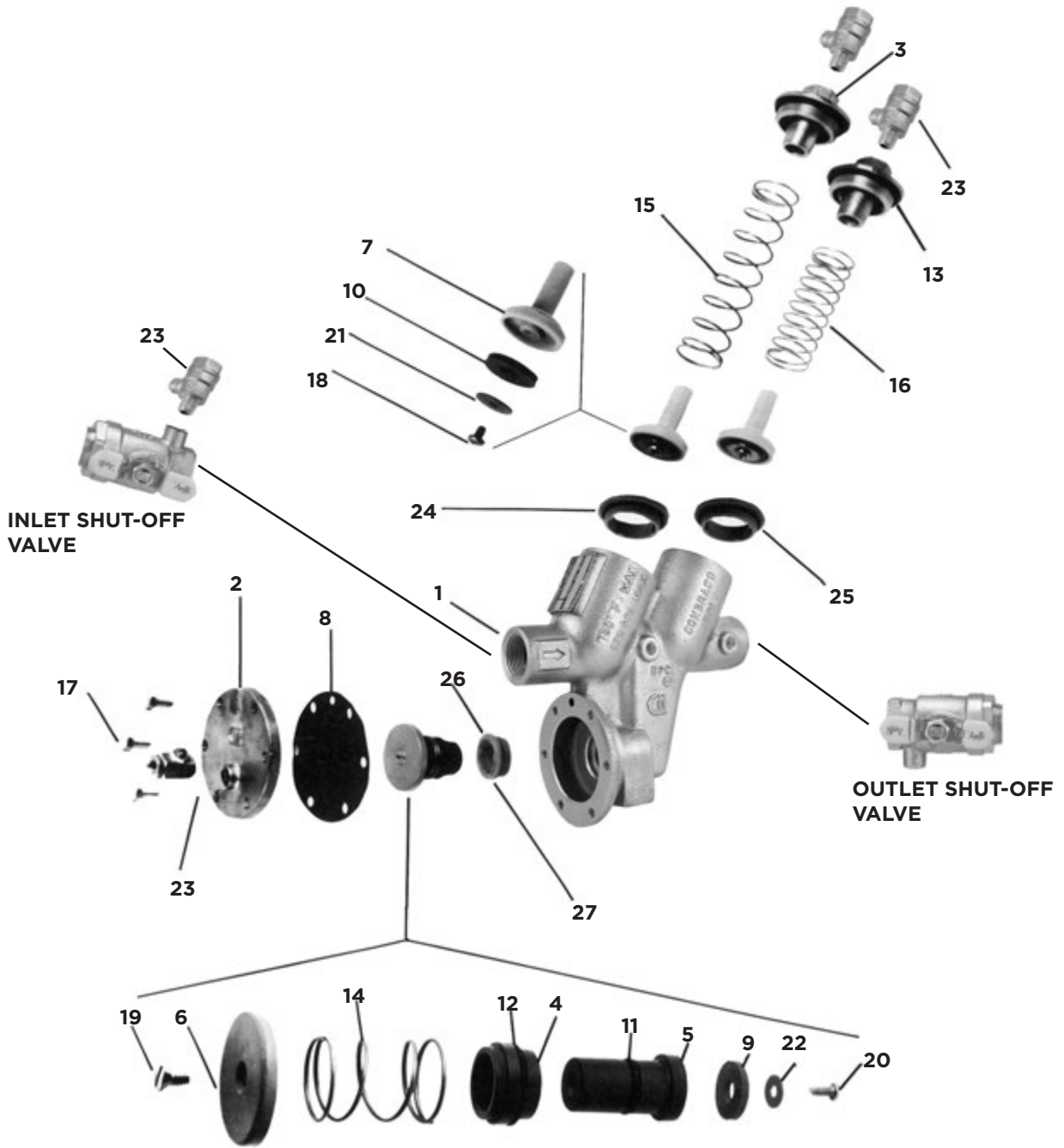
1. Leave the bypass hose connected between test cocks 1 and 4.
2. Leave test cocks 1 and 4 open.
3. Open the bleed low (top, right) valve allowing the gauge to reach full scale. Close the bleed low valve.
4. If the differential pressure stabilizes above the relief valve opening point, check valve 2 is recorded as "tight". (Proceed to Test No. 3). If the reading falls to the relief valve opening point, check valve 2 is recorded as "leaking" and Test No. 3 cannot be completed.

#### TEST NO. 3

IS THE STATIC PRESSURE DROP ACROSS CHECK VALVE 1 MAINTAINED AT LEAST 3 PSI ABOVE THE RELIEF VALVE OPENING POINT.

1. Open the bleed low (top, right) valve allowing the gauge to reach full scale. Close the bleed low valve.
2. Allow the gauge reading to stabilize. Record this reading as the static pressure drops across check valve 1.
3. Close all test cocks. Open the No. 2 shutoff valve.
4. Remove all test equipment. Drain test kit

**PART NUMBER DIAGRAM - 1/4" - 2" BRONZE**



**INLET AND OUTLET SHUT-OFF VALVES**  
40-20X-TX

| SIZE                                    | 1/4"    | 3/8"    | 1/2"    | 3/4"    | 1"      | 1-1/4"   | 1-1/2"   | 2"       |
|---|---------|---------|---------|---------|---------|----------|----------|----------|
| Inlet Shut-Off Valve (pictured)         | 7B80101 | 7B80201 | 7B80301 | 7B80401 | 7B80501 | 7B80699A | 7B80799A | 7B80899A |
| Inlet Shut-Off Valve w/Union            |         |         | 7B30301 | 7B30401 | 7B30501 | 7B30699A | 7B30799A | 7B30899A |
| Outlet Shut-Off Valve (pictured)        | 7B80131 | 7B80231 | 7B80331 | 7B80431 | 7B80531 | 7B80699B | 7B80799B | 7B80899B |
| Outlet Shut-Off Valve w/Union           |         |         | 7B30331 | 7B30431 | 7B30531 | 7B30699B | 7B30799B | 7B30899B |
| Replacement Handles for Shut-Off Valves | W858800 | W858800 | W858800 | W858800 | W859100 | W891500  | W891600  | W891600  |

**PARTS LIST - 1/4" - 2" BRONZE**

| ITEM NO | DESCRIPTION      | QUANTITY   | PART NO          |                 |                    |
|---------|------------------|------------|------------------|-----------------|--------------------|
|         |                  |            | 1/4", 3/8", 1/2" | 3/4" & 1"       | 1-1/4", 1-1/2", 2" |
| 1       | Body             | 1          | Consult Factory  | Consult Factory | Consult Factory    |
| 2       | RV Cover         | 1          | F301705          | F298205         | F298505            |
| 3       | Cap              | 2          | F323105          | F310805         | F311505            |
| 4       | RV Bushing       | 1          | I450715          | I424015         | I425715            |
| 5       | RV Stem          | 1          | G329600          | G321200         | G321300            |
| 6       | Diaphragm Plate  | 1          | E222200          | D250600         | D251600            |
| 7       | Poppet           | 2          | K340900          | K336200         | K336700            |
| 8       | RV Diaphragm     | 1          | D263200          | D250500         | D251500            |
| 9       | RV Seat Disc     | 1          | D263100          | D282900         | D251400            |
| 10      | Check Seat Disc  | 2          | D263000          | D250300         | D250800            |
| 11      | Stem O-Ring      | 1          | D262800          | D250200         | D251300            |
| 12      | Bushing O-Ring   | 1          | D262900          | D250100         | D251200            |
| 13      | Check Cap O-Ring | 2          | D204600          | D250000         | D251000            |
| 14      | RV Spring        | 1          | A179500          | A169800         | A170200            |
| 15      | 1st Check Spring | 1          | A179700          | A169900         | A170300            |
| 16      | 2nd Check Spring | 1          | A179400          | A170000         | A170100            |
| 17      | Hex Head Bolt    | 6(*4)(**7) | B179300          | B175100         | B175400            |
| 18      | Screw            | 2          | B183700          | B175000         | B175000            |
| 19      | Screw            | 1          | B174900          | B174900         | B175300            |
| 20      | Screw            | 1          | B183700          | B174800         | B175300            |
| 21      | Retaining Washer | 2          | E222300          | D249900         | D250900            |
| 22      | Retaining Washer | 1          | E222400          | D249800         | D249900            |
| 23      | Test Cock        | 4          | 7829001          | 7829001         | 7829101            |
| 24      | Check Seat       | 2          | L515200          | L486400         | L486600            |
| 25      | Check O-Ring     | 2          | D308600          | D227400         | D256500            |
| 26      | RV Seat          | 1          | L515300          | L486300         | L486700            |
| 27      | RV O-Ring        | 1          | D308700          | D216800         | D227400            |

\*1/4", 3/8" & 1/2" SIZES ONLY

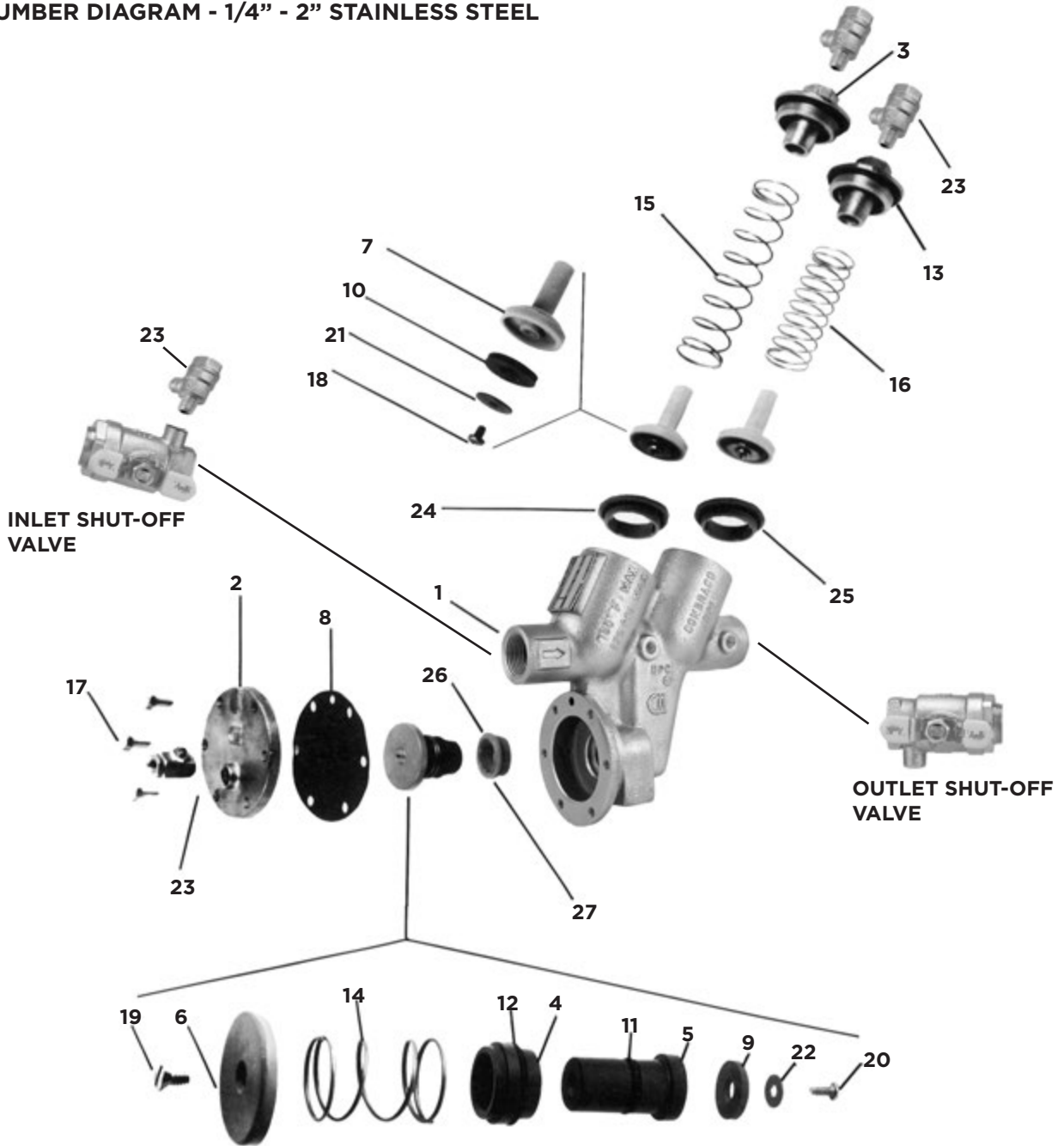
\*\*1-1/4", 1-1/2" & 2" SIZES ONLY

**REPAIR KITS\*\*\***

| KIT                     | PARTS INCLUDED   | PART NO          |           |                    |
|-------------------------|--|------------------|-----------|--------------------|
|                         |  | 1/4", 3/8", 1/2" | 3/4" & 1" | 1-1/4", 1-1/2", 2" |
| Major Repair Kit        | 4, 5, 6, 7 (2), 8, 9, 10 (2), 11, 12, 13 (2), 14, 18 (2), 19, 20, 21 (2), 22, 24 (2), 25 (2), 26, 27 | 40003A1          | 40004A1   | 40007A1            |
| Check Valve Repair Kit  | 7, 10, 13, 18, 21, 24, 25  | 40007A2          | 40007A2   | 40007A2            |
| Relief Valve Repair Kit | 4, 5, 6, 8, 9, 11, 12, 14, 19, 20, 22, 26, 27  | 40003A3          | 40004A3   | 40007A3            |
| Rubber Repair Kit       | 8, 9, 10 (2), 11, 12, 13 (2), 25 (2), 27   | 40003A4          | 40004A4   | 40007A4            |
| Replaceable Seat Kit    | 24 (2), 25 (2), 26, 27   | 40003A7          | 40004A7   | 40007A7            |
| Air Gap Drain           | -  | 40200XA          | 40200X1   | 40200X1            |
| Seat Removal Tool       | -  | 40000SRT         | 40000SRT  | 40000SRT           |

\*\*\* For repair kits without replaceable seat components, replace part number suffix designation "A" with "O". Example: Major Repair Kit part number 40004O1

**PART NUMBER DIAGRAM - 1/4" - 2" STAINLESS STEEL**



**INLET AND OUTLET SHUT-OFF VALVES**  
40-20X-T2S

| SIZE                                    | 1/4"    | 3/8"    | 1/2"    | 3/4"    | 1"      |
|---|---------|---------|---------|---------|---------|
| Inlet Shut-Off Valve                    | 7H80101 | 7H80201 | 7H80301 | 7H80401 | 7H80501 |
| Outlet Shut-Off Valve                   | 7H80131 | 7H80231 | 7H80331 | 7H80431 | 7H80531 |
| Replacement Handles for Shut-Off Valves | W858800 | W858800 | W858800 | W858800 | H269300 |

**PARTS LIST - 1/4" - 2" STAINLESS STEEL**

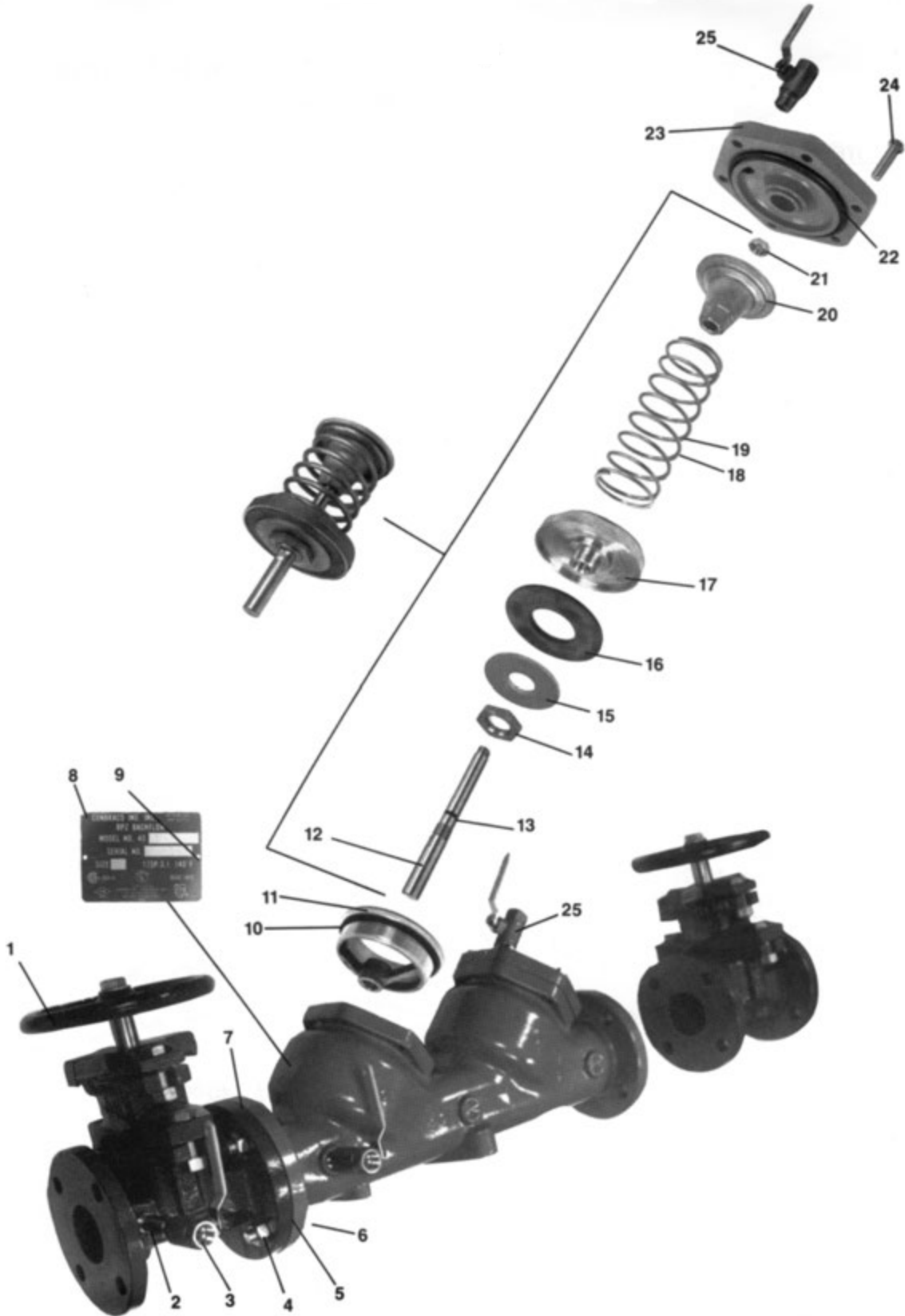
| ITEM NO | DESCRIPTION      | QUANTITY   | PART NO          |                 |
|---------|------------------|------------|------------------|-----------------|
|         |                  |            | 1/4", 3/8", 1/2" | 3/4" & 1"       |
| 1       | Body             | 1          | Consult Factory  | Consult Factory |
| 2       | RV Cover         | 1          | F305605          | F304805         |
| 3       | Cap              | 2          | F323205          | F323305         |
| 4       | RV Bushing       | 1          | I514915          | I510515         |
| 5       | RV Stem          | 1          | G329600          | G321200         |
| 6       | Diaphragm Plate  | 1          | E222200          | D250600         |
| 7       | Poppet           | 2          | K340900          | K336200         |
| 8       | RV Diaphragm     | 1          | D308800          | D304700         |
| 9       | RV Seat Disc     | 1          | D263100          | D282900         |
| 10      | Check Seat Disc  | 2          | D263000          | D250300         |
| 11      | Stem O-Ring      | 1          | D308400          | D305100         |
| 12      | Bushing O-Ring   | 1          | D308500          | D304400         |
| 13      | Check Cap O-Ring | 2          | D308300          | D305200         |
| 14      | RV Spring        | 1          | A179500          | A169800         |
| 15      | 1st Check Spring | 1          | A179700          | A169900         |
| 16      | 2nd Check Spring | 1          | A179400          | A170000         |
| 17      | Hex Head Bolt    | 6(*4)(**7) | B179300          | B175100         |
| 18      | Screw            | 2          | B183700          | B174800         |
| 19      | Screw            | 1          | B174900          | B174900         |
| 20      | Screw            | 1          | B183700          | B175000         |
| 21      | Retaining Washer | 2          | E222300          | D249900         |
| 22      | Retaining Washer | 1          | E222400          | D249800         |
| 23      | Test Cock        | 4          | 7893001          | 7893001         |
| 24      | Check Seat       | 2          | L515200          | L486400         |
| 25      | Check O-Ring     | 2          | D308600          | D304600         |
| 26      | RV Seat          | 1          | L515300          | L486300         |
| 27      | RV O-Ring        | 1          | D308700          | D304500         |
|         | O-Ring Lubricant | 1          | I901600          | I901600         |

\*3/4", 1" SIZES ONLY

**REPAIR KITS**

| KIT                     | PARTS INCLUDED   | PART NO          |           |
|-------------------------|--|------------------|-----------|
|                         |  | 1/4", 3/8", 1/2" | 3/4" & 1" |
| Major Repair Kit        | 4, 5, 6, 7 (2), 8, 9, 10 (2), 11, 12, 13 (2), 14, 18 (2), 19, 20, 21 (2), 22, 24 (2), 25 (2), 26, 27 | 40003A1S         | 40004A1S  |
| Check Valve Repair Kit  | 7, 10, 13, 18, 21, 24, 25  | 40003A2S         | 40004A2S  |
| Relief Valve Repair Kit | 4, 5, 6, 8, 9, 11, 12, 14, 19, 20, 22, 26, 27  | 40003A3S         | 40004A3S  |
| Rubber Repair Kit       | 8, 9, 10 (2), 11, 12, 13 (2), 25 (2), 27   | 40003A4S         | 40004A4S  |
| Replaceable Seat Kit    | 24 (2), 25 (2), 26, 27   | 40003A7S         | 40004A7S  |
| Air Gap Drain           | -  | 40200XA          | 40200X1   |
| Seat Removal Tool       | -  | 40000SRT         | 40000SRT  |

**PART NUMBER DIAGRAM - 2-1/2", 3", 4", 6" RPZ**

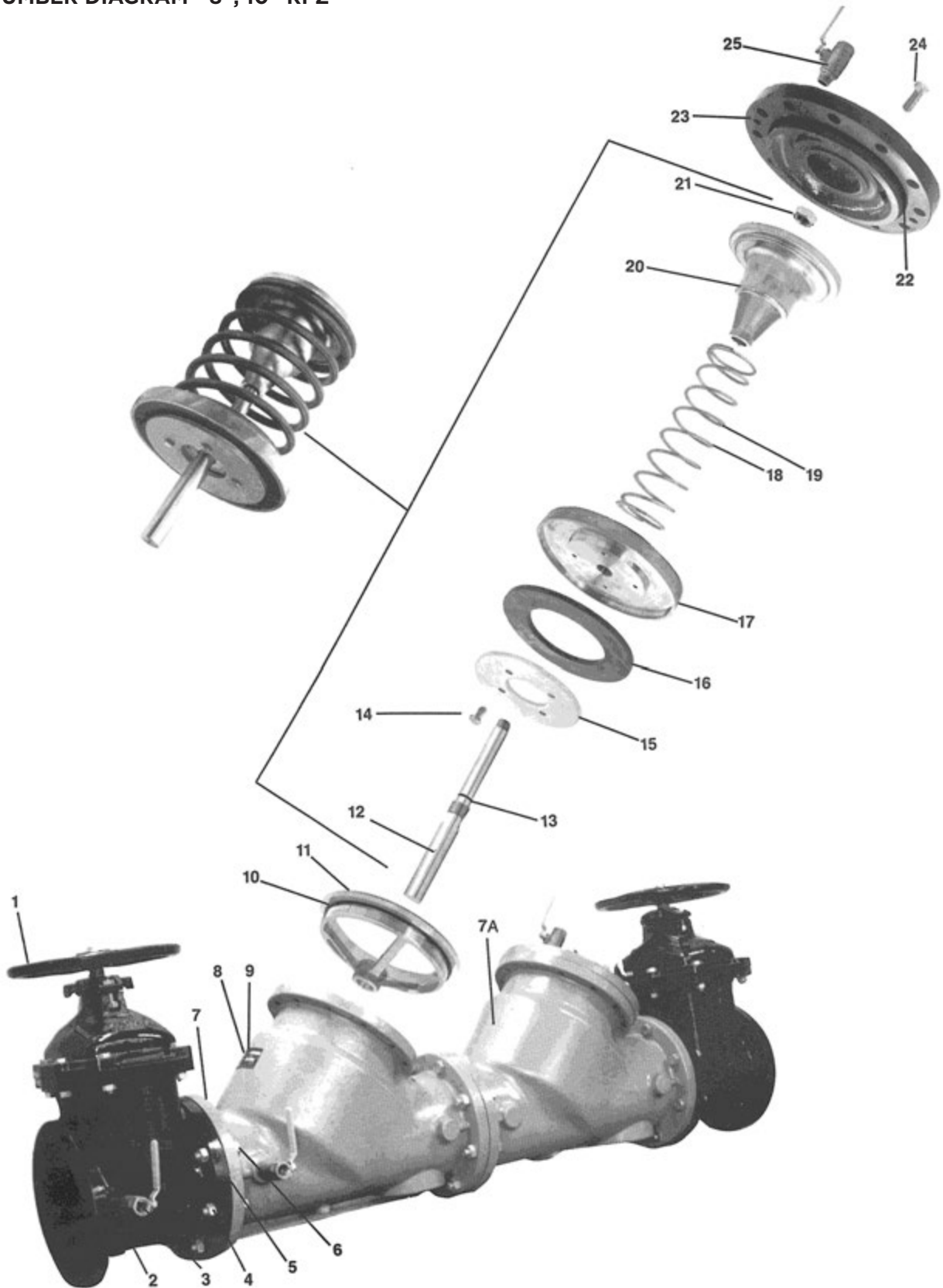


**PARTS LIST - 2-1/2", 3", 4", 6" RPZ**

| ITEM NO | DESCRIPTION           | QUANTITY | PART NO |          |         |         |
|---------|-----------------------|----------|---------|----------|---------|---------|
|         |                       |          | 2-1/2"  | 3"       | 4"      | 6"      |
| 1       | Shut-Off Valve (OS&Y) | 2        | W678900 | W679000  | W682400 | W682500 |
| 1       | Shut-Off Valve (NRS)  | 2        | W678500 | W678600  | W674300 | W674400 |
| 2       | Brass Nipple          | 1        | K340600 | K340600  | K340600 | K341240 |
| 3       | Test Cock             | 1        | 7010301 | 7010301  | 7010301 | 7010401 |
| 4       | Flange Nut            | *        | C169100 | C169100  | C169100 | C175900 |
| 5       | Ring Gasket           | 2        | D258300 | D258400  | D258200 | D257900 |
| 6       | Flange Bolt           | *        | B180400 | B180400  | B182800 | B182900 |
| 7       | Body                  | 1        | Q452919 | Q453219  | Q453819 |         |
| 8       | Nameplate             | 1        | I440600 | I440600  | I440600 |         |
| 9       | Drive Screw           | 2        | I261300 | I261300  | I261300 | I261300 |
| 10      | C.V. Seat O-Ring      | 2        | D256700 | D256700  | D257300 | D257600 |
| 11      | C.V. Seat             | 2        | L463705 | L463705  | L464005 | L464405 |
| 12      | C.V. Stem             | 2        | G323906 | G323906  | G324206 | G324600 |
| 13      | C.V. Stem O-Ring      | 2        | D256100 | D256100  | D256100 | D257600 |
| 14      | Retainer Nut          | 2        | C175600 | C175600  | C175600 | C176000 |
| 15      | Retainer Washer       | 2        | E219900 | E219900  | E220400 | E220500 |
| 16      | C.V. Seat Disc        | 2        | D256000 | D256000  | D257200 | D257500 |
| 17      | Seat Disc Holder      | 2        | F300005 | F300005  | F300105 | F300205 |
| 18      | 1st Check Spring      | 1        | A174000 | A174000  | A174300 | A174500 |
| 19      | 2nd Check Spring      | 1        | A174100 | A-174100 | A174400 | A174600 |
| 20      | Spring Retainer       | 2        | E219805 | E219805  | E220205 | E220305 |
| 21      | Jam Nut               | 2        | C158905 | C158905  | C158905 | C170600 |
| 22      | Cap O-Ring            | 2        | D256600 | D256600  | D257400 | D257700 |
| 23      | C.V. Cap              | 2        | Q453019 | Q453019  | Q453319 | Q453719 |
| 24      | Cap Bolt              | 12       | B179700 | B179700  | B180100 | B180000 |
| 25      | Test Cock             | 3        | 7080301 | 7080301  | 7080301 | 7080401 |

\*2-1/2" & 3" QTY = 8 / 4" QTY = 16 / 6" QTY = 24

**PART NUMBER DIAGRAM - 8", 10" RPZ**





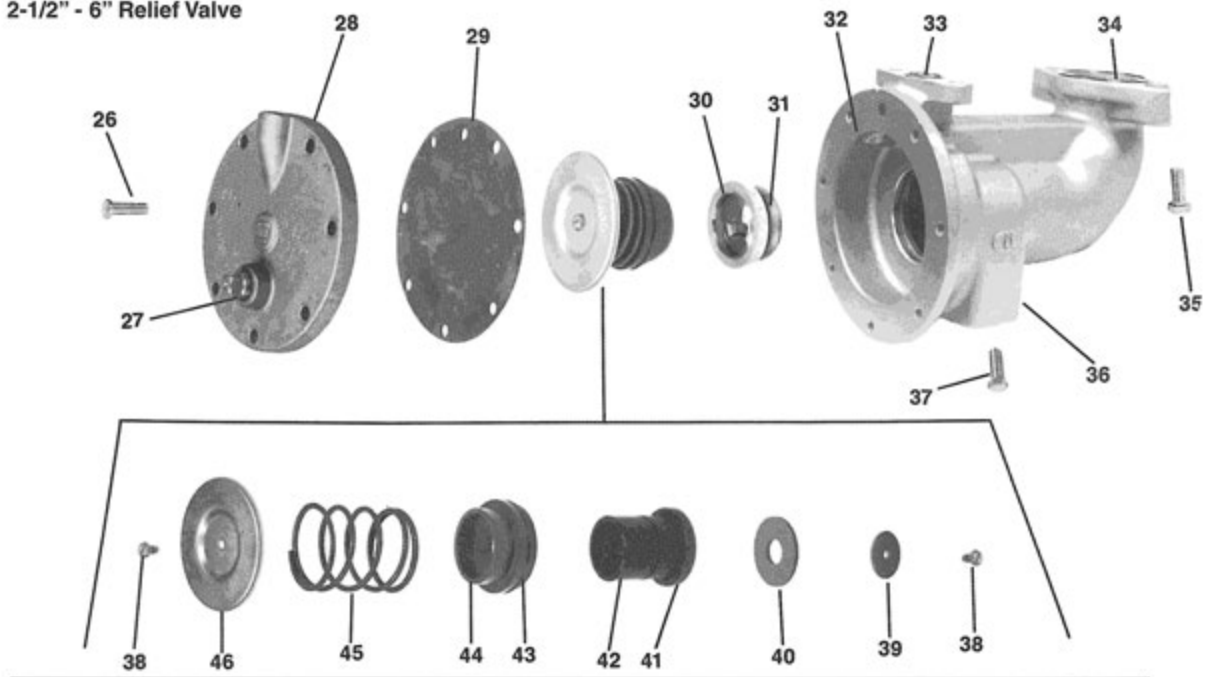
**PARTS LIST - 8", 10" RPZ**

| ITEM NO | DESCRIPTION           | QUANTITY | PART NO  |          |
|---------|-----------------------|----------|----------|----------|
|         |                       |          | 8"       | 10"      |
| 1       | Shut-Off Valve (OS&Y) | 2        | W682600  | W685900  |
| 1       | Shut-Off Valve (NRS)  | 2        | W682700  | W685800  |
| 2       | Brass Nipple          | 1        | K341200  | K341200  |
| 3       | Test Cock             | 1        | 7010401  | 7010401  |
| 4       | Flange Nut            | *        | C175900  | C179300  |
| 5       | Ring Gasket           | 3        | D259000  | D265300  |
| 6       | Flange Bolt           | **       | B185700  | B185800  |
| 6A      | Stud                  | 2        | N/A      | B203600  |
| 7       | Body                  | 1        | Q454319  | Q457219  |
| 7A      | Body                  | 1        | Q459319  | Q459519  |
| 8       | Nameplate             | 1        | I440600  | I440600  |
| 9       | Drive Screw           | 2        | I261300  | I261300  |
| 10      | C.V. Seat O-Ring      | 2        | D258900  | D258800  |
| 11      | C.V. Seat             | 2        | L465305  | L475905  |
| 12      | C.V. Stem             | 2        | G327300  | G330500  |
| 13      | C.V. Stem O-Ring      | 2        | D258700  | D258700  |
| 14      | Retainer Nut/Bolt     | ***      | C175400  | C175400  |
| 15      | Retainer Washer       | 2        | E220800  | E222900  |
| 16      | C.V. Seat Disc        | 2        | D258600  | D264900  |
| 17      | Seat Disc Holder      | 2        | F300805  | F301905  |
| 18      | 1st Check Spring      | 1        | A174700  | A177800  |
| 19      | 2nd Check Spring      | 1        | A174800  | A177900  |
| 20      | Spring Retainer       | 2        | E220705  | E222805  |
| 21      | Jam Nut               | 2        | *C176305 | *C176305 |
| 22      | Cap O-Ring            | 2        | D258800  | D265100  |
| 23      | C.V. Cap              | 2        | Q454519  | Q457419  |
| 24      | Cap Bolt              | ****     | B169000  | B188100  |
| 25      | Test Cock             | 3        | 7080401  | 7080401  |
|         | Seat Bolt             | 12       | N/A      | B184900  |

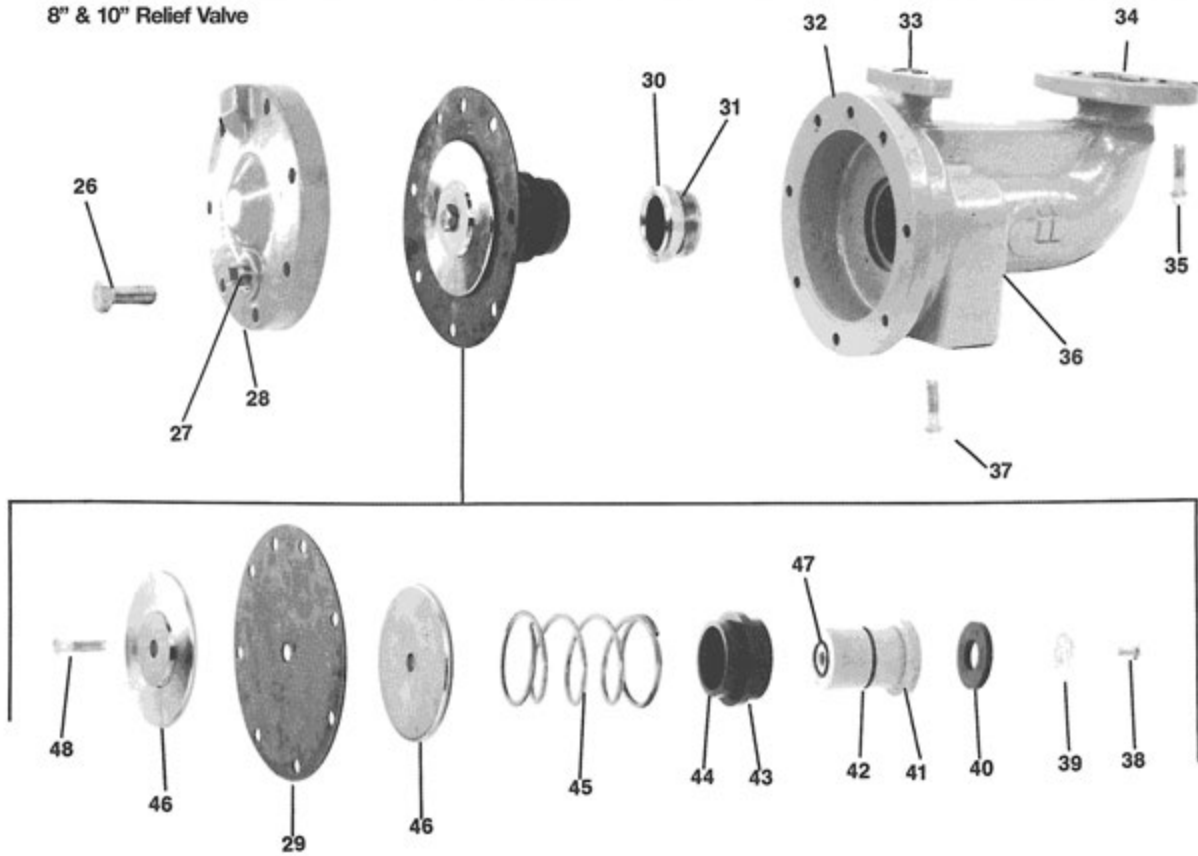
\*8" QUANTITY = 24 / 10" QUANTITY = 38  
 \*\*8" QTY = QUANTITY / 10" QUANTITY = 34  
 \*\*\*8" & 10" QUANTITY = 8  
 \*\*\*\*8" & 10" QUANTITY = 24

## PART NUMBER DIAGRAM - 2-1/2" - 6" RELIEF VALVES

2-1/2" - 6" Relief Valve



8" & 10" Relief Valve



**PARTS LIST - 2-1/2" - 6" RELIEF VALVES**

| ITEM NO | DESCRIPTION                 | 2-1/2" - 6" |         | 8" - 10" |          |
|---------|-----------------------------|-------------|---------|----------|----------|
|         |                             | QUANTITY    | PART NO | QUANTITY | PART NO  |
| 26      | Relief Valve Cover Bolt     | 7           | B179600 | 7        | B170300  |
| 27      | 1/2 NPT Plug                | 1           | K300800 | N/A      | N/A      |
| 27      | 3/4 NPT Plug                | N/A         | N/A     | 1        | K301000  |
| 28      | Relief Valve Cover          | 1           | Q453105 | 1        | Q454219  |
| 29      | Relief Valve Diaphragm      | 1           | D256400 | 1        | D259100  |
| 30      | Relief Valve Seat Ring      | 1           | L463805 | 1        | L465105  |
| 31      | Relief Valve Seat Ring      | 1           | D256800 | 1        | D2593-00 |
| 32      | Relief Valve Body           | 1           | Q453505 | 1        | Q454119  |
| 33      | Small Relief Valve O-Ring   | 1           | D257000 | 1        | D218600  |
| 34      | Large Relief Valve O-Ring   | 1           | D257100 | 1        | D230400  |
| 35      | Relief Valve Flange Bolt    | 2           | B180000 | 4        | B166900  |
| 36      | 1/4 NPT Plug                | 1           | K301900 | 1        | K301900  |
| 37      | Relief Valve Flange Bolt    | 2           | B179200 | 2        | B166900  |
| 38      | Pan Head Screw              | 2           | B175300 | 1        | B185600  |
| 39      | Relief Valve Seat Washer    | 1           | E220000 | 1        | E221000  |
| 40      | Relief Valve Seat Disc      | 1           | D256300 | 1        | D259500  |
| 41      | Relief Valve Stem           | 1           | G324000 | 1        | G327405  |
| 42      | Relief Valve Stem O-Ring    | 1           | D256500 | 1        | D259400  |
| 43      | Relief Valve Bushing O-Ring | 1           | D256200 | 1        | D259200  |
| 44      | Relief Valve Bushing        | 1           | L463915 | 1        | L465215  |
| 45      | Relief Valve Spring         | 1           | A174200 | 1        | A174900  |
| 46      | Diaphragm Plate             | 1           | E220100 | 2        | E220905  |
| 47      | Stem Face O-Ring            | N/A         | N/A     | 1        | D210600  |
| 48      | Diaphragm Bolt              | N/A         | N/A     | 1        | B180000  |

**REPAIR KITS**

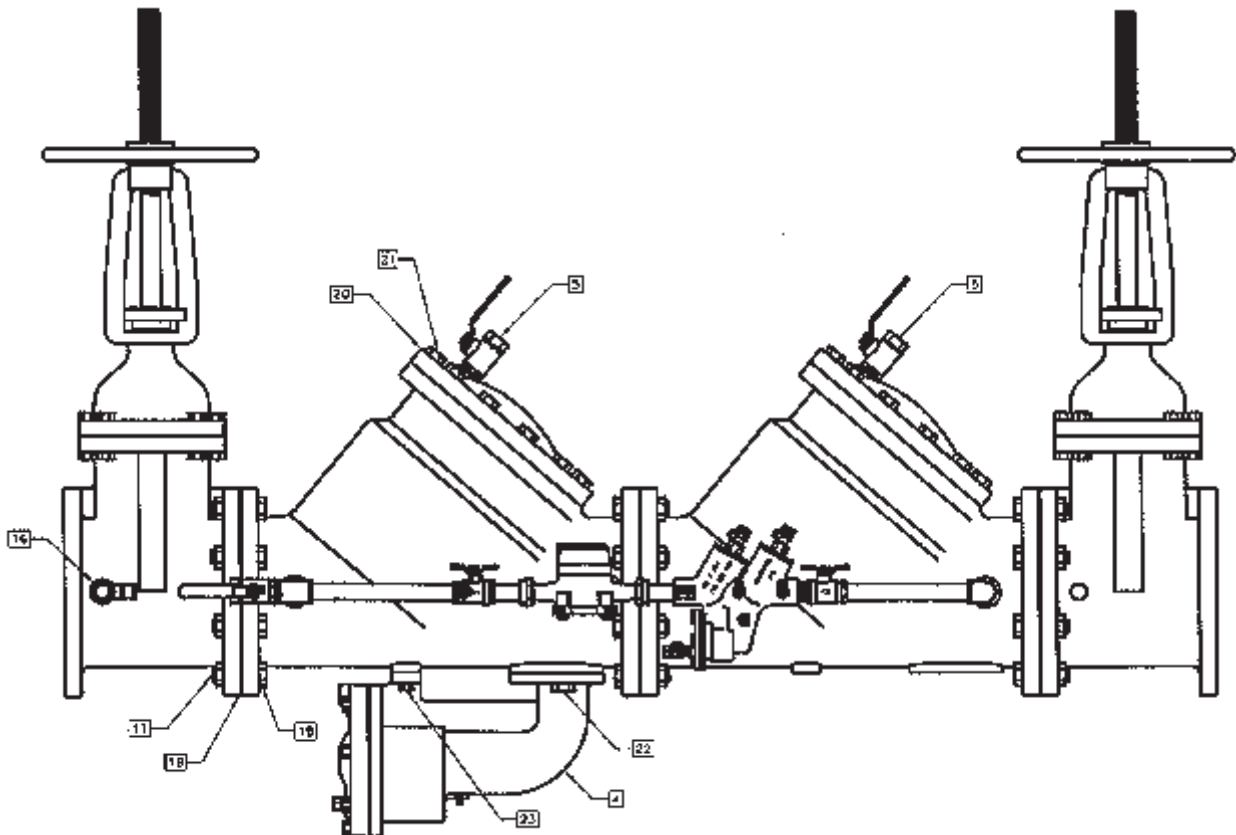
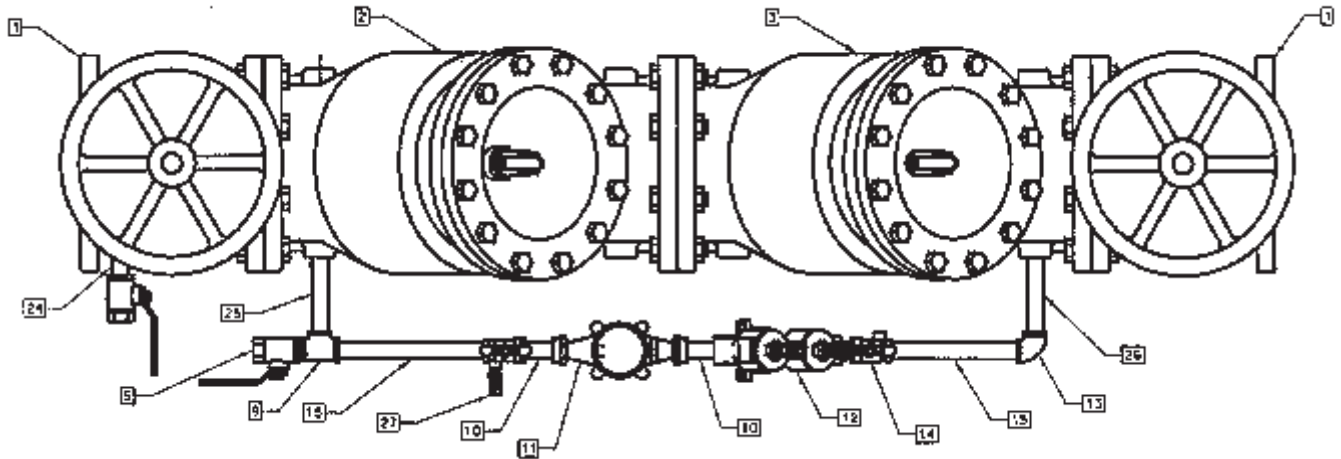
| KIT                                      | PARTS INCLUDED  | PART NO    |         |         |         |         |
|--|---|------------|---------|---------|---------|---------|
|  |   | 2-1/2", 3" | 4"      | 6"      | 8"      | 10"     |
| 1st Check Valve Repair Kit               | 12, 13, 14, 15, 16, 17, 18, 20, 21, 22                            | 4000901    | 4000A01 | 4000C01 | 4000E01 | 4000G01 |
| 2nd Check Valve Repair Kit               | 12, 13, 14, 15, 16, 17, 19, 20, 21, 22                            | 4000902    | 4000A02 | 4000C02 | 4000E02 | 4000G02 |
| Seat Repair Kit                          | 10, 11, 22  | 4000903    | 4000A03 | 4000C03 | 4000E03 | 4000G03 |
| Check Rubber Repair Kit (2 of each part) | 10, 13, 16, 22  | 4000904    | 4000A04 | 4000C04 | 4000E04 | 4000G04 |
| Relief Valve Repair Kit                  | 29, 30, 31, 33, 34, 38, 39, 40, 41, 42, 43, 44, 45, 46, (47, 48)* | 4000905    | 4000A05 | 4000C05 | 4000E05 | 4000G05 |
| Air Gap Drain                            | 29, 31, 33, 34, 40, 42, 43, (47)*                                 | 4000906    | 4000A06 | 4000C06 | 4000E06 | 4000G06 |

\*8" & 10" Only

## PART NUMBER DIAGRAM - 3" - 4" RPDA

### NOTES

- USE P/N W-7062-00 FOR METER IN CUBIC FEET REGISTER.
- USE P/N W-7094-00 FOR METER IN GALLONS REGISTER.
- N/S - NOT SHOWN



### RPDA BYPASS ASSEMBLY KITS

- 3" RPDA w/meter in cubic feet 40700BPC
- 3" RPDA w/meter in gallons 40700BPE
- 4" RPDA w/meter in cubic feet 4070ABPC
- 4"RPDA w/meter in gallons 4070ABPE

**PARTS LIST - 3" - 4" RPDA**

| ITEM NO | DESCRIPTION                      | QUANTITY | PART NO |         |
|---------|----------------------------------|----------|---------|---------|
|         |                                  |          | 3"      | 4"      |
| 1       | Gate Valve (OS&Y)                | 2        | W679000 | W682400 |
| 2       | RPDA Body                        | 1        | Q493419 | Q480719 |
| 3       | Relief Valve Assembly            | 1        | W672905 | W672905 |
| 4       | Test Cock                        | 3        | 7080301 | 7080301 |
| N/S     | 1st Check Poppet Assembly        | 1        | W671705 | W673005 |
| N/S     | 2nd Check Poppet Assembly        | 1        | W728905 | W710005 |
| 7       | Bypass Shut-Off Valve            | 1        | 7B10401 | 7B10401 |
| 8       | Tee, Reducing                    | 1        | K350600 | K350600 |
| 9       | Coupling, Water Meter            | 2        | K350500 | K350500 |
| 10      | Water Meter in Cubic Feet        | 1        | W706200 | W706200 |
| 10      | Water Meter in Gallons           | 1        | W709400 | W709400 |
| 11      | 3/4" RPZ                         | 1        | W739005 | W739005 |
| 12      | Elbow, Street                    | *        | K350200 | K350200 |
| 13      | By-Pass Shut-Off Valve           | 1        | 7B10431 | 7B10431 |
| 14      | Nipple, Close                    | 4        | K337000 | K337000 |
| 15      | Test Cock                        | 1        | 7010301 | 7010301 |
| N/S     | Flange Nut                       | **       | C143800 | C143800 |
| 17      | Flange Gasket                    | 2        | D258400 | D258200 |
| 18      | Flange Bolt                      | **       | B180400 | B182800 |
| 19      | Cap                              | 2        | Q453019 | Q453319 |
| 20      | Cap Bolt                         | 12       | B179700 | B180100 |
| 21      | Relief Valve Flange Bolt (Large) | 2        | B180000 | B180000 |
| 22      | Relief Valve Flange Bolt (Small) | 2        | B179200 | B179200 |
| 23      | Nipple                           | 1        | K340600 | K340600 |
| 24      | Test Cock                        | 1        | 7825701 | 7825701 |
| N/S     | Nipple, 3/4" x 4-1/2" (Large)    | 1        | K360500 | N/A     |
| N/S     | Elbow, 3/4" - 90°                | 1        | K350100 | N/A     |
| N/S     | Cap O-Ring                       | 2        | D256600 | D257400 |
| N/S     | Seat O-Ring                      | 2        | D256700 | D257300 |
| N/S     | Relief Valve O-Ring (Small)      | 1        | D257000 | D257000 |
| N/S     | Relief Valve O-Ring (Large)      | 1        | D257100 | D257100 |
| N/S     | Nameplate                        | 1        | I499100 | I499100 |
| N/S     | Nameplate Tack                   | 2        | I529400 | I529400 |
| N/S     | Instruction Booklet              | 1        | I503600 | I503600 |
| N/S     | Check Valve Seat                 | 2        | L463705 | L464005 |

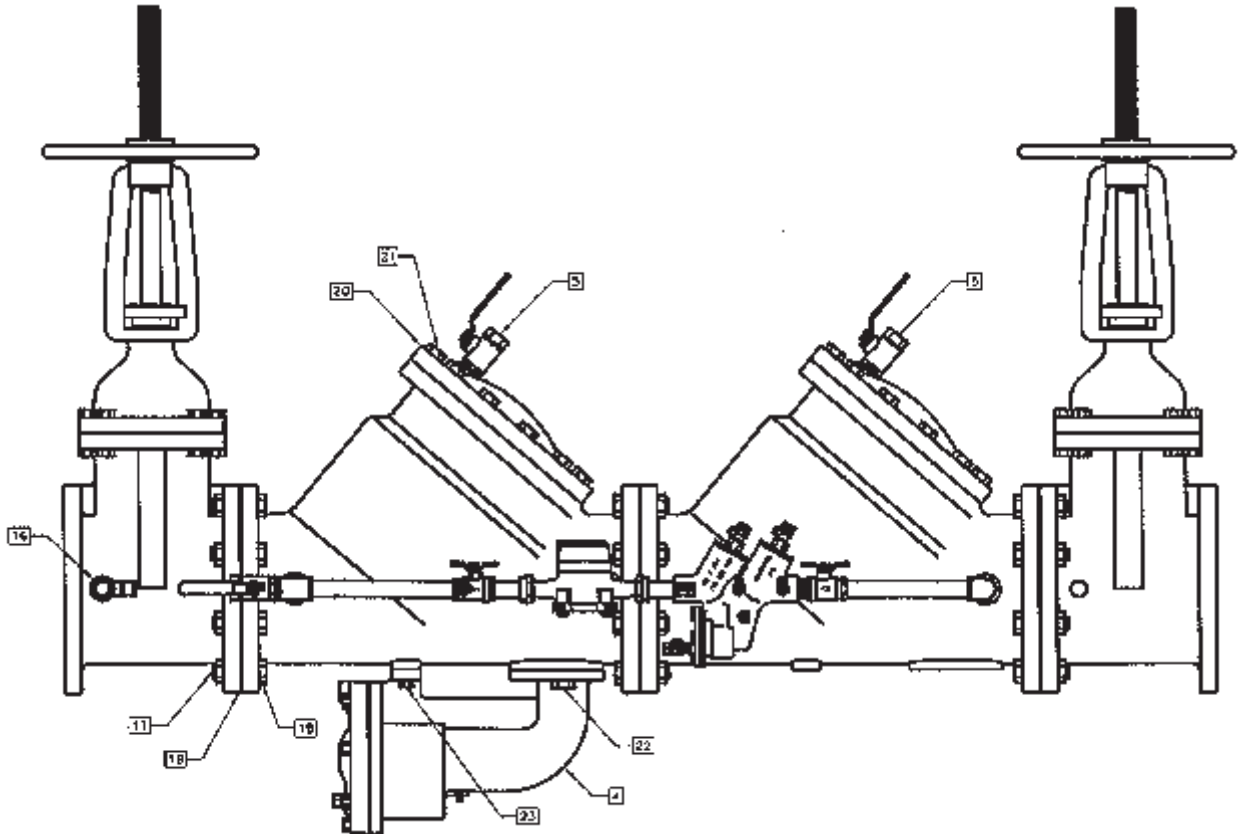
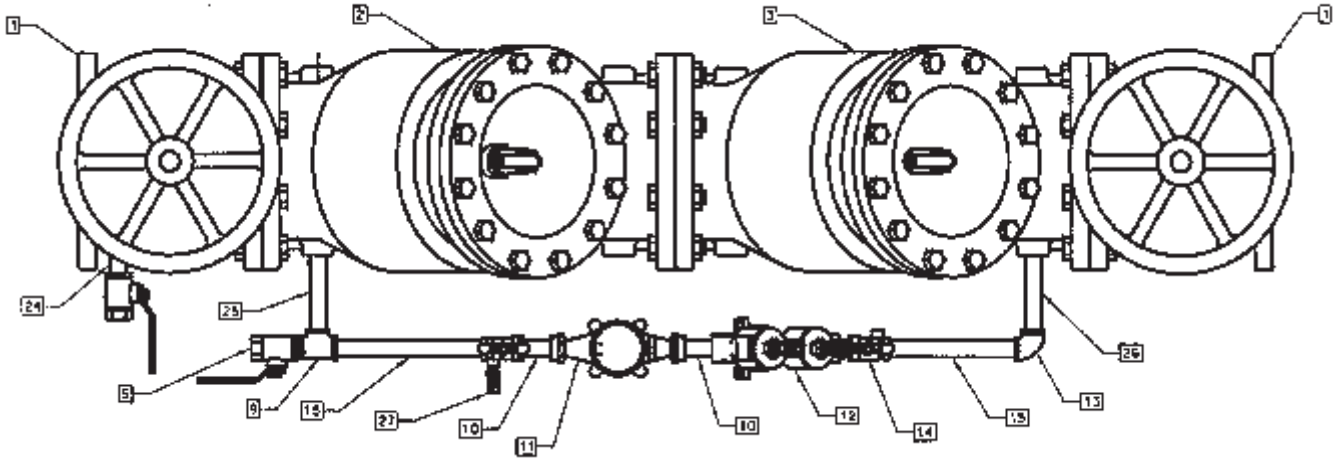
\* 3" QTY = 3 / 4" QTY = 1

\*\* 3" QTY = 8 / 4" QTY = 16

## PART NUMBER DIAGRAM - 6" - 10" RPDA

### NOTES

- USE P/N W-7062-00 FOR METER IN CUBIC FEET REGISTER.
- USE P/N W-7094-00 FOR METER IN GALLONS REGISTER.
- N/S - NOT SHOWN



### RPDA BYPASS ASSEMBLY KITS

- 6" RPDA w/meter in cubic feet      4070CBPC
- 6" RPDA w/meter in gallons          4070CBPE
- 8" RPDA w/meter in cubic feet      4070EBPC
- 8"RPDA w/meter in gallons          4070EBPE
- 10" RPDA w/meter in cubic feet     4070GBPC
- 10"RPDA w/meter in gallons         4070GBPE

**PARTS LIST - 6" - 10" RPDA**

| ITEM NO | DESCRIPTION                      | QUANTITY | PART NO |         |         |
|---------|----------------------------------|----------|---------|---------|---------|
|         |                                  |          | 6"      | 8"      | 10"     |
| 1       | Gate Valve (OS&Y)                | 2        | W682500 | W682600 | W685900 |
| 2       | Body (1st Check)                 | 1        | Q453819 | Q454319 | Q457219 |
| 3       | Body (2nd Check)                 | 1        | Q459119 | Q459319 | Q459519 |
| 4       | Relief Valve Assembly            | 1        | W672905 | W674805 | W674805 |
| 5       | Test Cock                        | 3        | 7080401 | 7080401 | 7080401 |
| N/S     | 1st Check Poppet Assembly        | 1        | W674105 | W674505 | W685605 |
| N/S     | 2nd Check Poppet Assembly        | 1        | W720605 | W720705 | W724905 |
| 8       | By-Pass Shut-Off Valve           | 1        | 7B10401 | 7B10401 | 7B10401 |
| 9       | Tee, 3/4" NPT                    | 1        | K351100 | K351100 | K351100 |
| 10      | Coupling, Water Meter            | 2        | K350500 | K350500 | K350500 |
| 11      | Water Meter in Cubic Feet        | 1        | W706200 | W706200 | W706200 |
| 11      | Water Meter in Gallons           | 1        | W709400 | W709400 | W709400 |
| 12      | 3/4" RPZ                         | 1        | W739005 | W739005 | W739005 |
| 13      | Elbow, 3/4" NPT                  | 1        | K350100 | K350100 | K350100 |
| 14      | By-Pass Shut-Off Valve           | 1        | 7B80431 | 7B80431 | 7B80431 |
| 15      | Nipple, 3/4" NPT                 | 2        | K350900 | K352700 | K356000 |
| 16      | Test Cock                        | 1        | 7010401 | 7010401 | 7010401 |
| 17      | Flange Nut                       | *        | C175900 | C175900 | C179300 |
| 18      | Flange Gasket                    | 3        | D257900 | D259000 | D265300 |
| 19      | Flange Bolt                      | **       | B182900 | B185700 | B185800 |
| 20      | Cap                              | 2        | Q453719 | Q454519 | Q457419 |
| 21      | Cap Bolt                         | ***      | B180000 | B169000 | B188100 |
| 22      | Relief Valve Flange Bolt (Large) | ****     | B180000 | B166900 | B166900 |
| 23      | Relief Valve Flange Bolt (Small) | 2        | B179200 | B166900 | B166900 |
| 24      | Nipple, 3/4" NPT                 | 1        | K341200 | K341200 |         |
| 25      | Nipple, 3/4" x 5-1/2" (Large)    | 1        | K350900 | K350900 | K350900 |
| 26      | Nipple, 3/4" NPT                 | 1        | K350900 | K350900 | K355900 |
| 27      | Test Cock                        | 1        | 7825701 | 7825701 | 7825701 |
| N/S     | Elbow, 3/4" - 90°                | 1        | K350100 | K350100 | K350100 |
| N/S     | Cap O-Ring                       | 2        | D257700 | D258800 | D265100 |
| N/S     | Seat O-Ring                      | 2        | D257600 | D258900 | D258800 |
| N/S     | Relief Valve O-Ring (Small)      | 1        | D257000 | D218600 |         |
| N/S     | Relief Valve O-Ring (Large.)     | 1        | D257100 | D230400 |         |
| N/S     | Nameplate                        | 1        | I499100 | I499100 | I499100 |
| N/S     | Nameplate Tack                   | 2        | I529400 | I529400 | I529400 |
| N/S     | Instruction Booklet              | 1        | I503600 | I503600 | I503600 |
| N/S     | Check Valve Seat                 | 2        | L464405 | L465305 | L475905 |
| N/S     | Stud                             | 2        | N/A     | N/A     | B203600 |
| N/S     | Seat Bolt                        | 12       | N/A     | N/A     | B184900 |

\* 6" & 8" QTY = 24 / 10" QTY = 38  
 \*\* 6" & 8" QTY = 24 / 10" QTY = 34  
 \*\*\* 6" QTY = 12 / 8" & 10" QTY = 24  
 \*\*\*\* 6" QTY = 2 / 8" & 10" QTY = 4

## TEST KITS

### DESCRIPTION

Backflow Preventer Test Kits are compact, lightweight and portable testing devices. They come equipped with a gauge, hoses and all required adapter fittings. Also included is a flexible or adjustable strap for hanging the gauge, laminated test procedures and a molded plastic carrying case with foam inserts.

### DIFFERENTIAL PRESSURE GAUGE TEST KIT

#### 40-200-TKU

This is a three valve test kit used for testing all DCV, RPZ, PVB & SVB backflow preventers.

The gauge is a differential pressure type with a dual scale of 0-15 psid/0-100kPa differential pressure range with a  $\pm 2\%$  accuracy (full scale).

### DIFFERENTIAL PRESSURE GAUGE TEST KIT

#### 40-200-TK5U

This five valve kit is used for testing all DCV, RPZ, PVB & SVB backflow preventers.

The five valve test kit is similar to the three valve kit except it has an additional two valves that make it possible to bleed lines without disconnecting hoses.

| MODEL       | APPLICATION             | WT./100 (LB) |
|-------------|-------------------------|--------------|
| 40-200-TKU  | ALL DCV, RPZ, PVB & SVB | 780          |
| 40-200-TK5U | ALL DCV, RPZ, PVB & SVB | 650          |

#### 40-200-TKU



#### 40-200-TK5U





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