ANDERSON GREENWOOD

Before installation these instructions must be fully read and understood.

1.1 General

The Anderson Greenwood Series 800 valve is designed for modulating action. The main valve will open at nameplate set, but only an amount proportional to the relieving capacity required. As process pressure increases, the valve will open more and be in full lift at 110% of set.

The main valve uses the principle of pressurizing the larger area of a differential area piston with line pressure to hold the piston closed up to set pressure. At set pressure, the pilot relieves, depressurizing the volume on the larger area side of the piston. Line pressure acting on the smaller area side causes it to lift, permitting discharge from the main valve. As capacity relief of the system is satisfied, system pressure will begin to decrease. When it does, the pilot will actuate and direct system pressure to the larger area side of the main valve piston to close it.

The pilot is the non-flowing type. With the main valve open and relieving at steady pressure, no process gas or fluid flows through the pilot. When process pressure changes, the pilot actuates to change the lift of the main valve seat disk. During these actuations a small amount of gas or fluid flows through the pilot and is discharged at the pilot outlet.

The set pressure range is 1481 psig to 7500 psig.

1.2 Installation

Either or both inlet and outlet may be standard ANSI flanges or ANSI pipe threaded connections and are to be installed in accordance with accepted piping practices.When remote pressure pick-up is used the pilot supply tube is connected to a remote location rather than to the inlet neck of the valve. A block valve in the remote pilot supply line is not recommended. If one is used it must be opened before pressurizing the main valve.

NOTE: Remote pressure pick-up piping must have the equivalent flow area of 3/8" tubing for lengths up to 100 feet. For lengths greater than this, consult factory.

1.3 Start-Up

There must be pressure at the valve inlet or at the pilot inlet/sense port for valves with remote sense to establish a differential force across the piston and "load" it in the closed position. Pressure must pass through the pilot and exert force on the top of the piston. On normal plant start-up the valve will close itself as pressure increases.

Block valves are often used under safety valves to isolate them when maintenance is required. When putting the safety valve in service be sure the block valve is fully opened. If the block valve is opened after system start-up, the safety valve may briefly vent before the volume on the larger area side of the piston gets pressurized to close the main valve seat disk.

1.4 Maintenance

Anderson Greenwood recommended main valve and pilot maintenance procedures including pilot set pressure adjustment and valve assembly testing are described in the following paragraphs. Following these procedures in a regular pressure relief valve maintenance program appropriate for the specific operating conditions will ensure satisfactory valve performance and provide optimum service life.

Should the pressure/media requirements of a pilot operated pressure relief valve be outside the capabilities of the repair facility, contact Anderson Greenwood for specific instructions before starting any maintenance activity.

This manual is provided as a general guide for the maintenance of the safety valves described herein. It does not include procedures covering all valve configurations and variations manufactured by Anderson Greenwood. The user is advised to contact Anderson Greenwood or one of our authorized representatives for assistance with valve configurations and variations not covered in this manual.

tyco / Flow Control

Total Flow Control Solutions™

Engineering Doc. #05.9040.271 Rev. G

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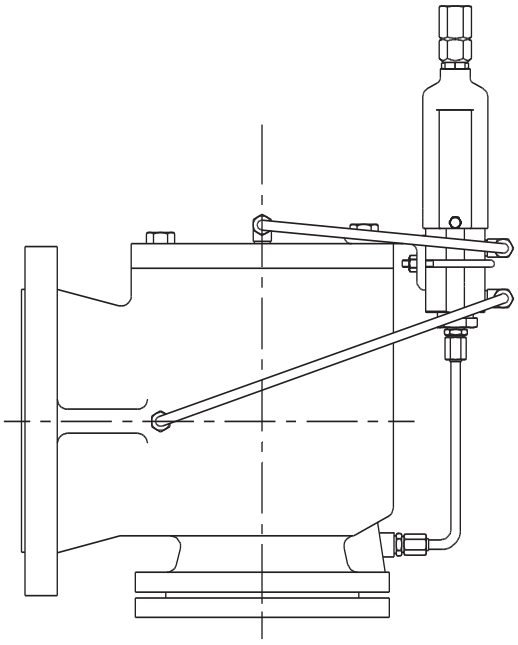


2.0 Main valve maintenance

2.1 Disassembly

Before beginning disassembly, bleed off any pressure trapped in the main valve or pilot.

Refer to Figure 1 for parts description and location.

Remove the cap (Item 17) from the body (Item 1). Remove the liner seal (Item 6), liner (Item 5) and piston (Item 10). Remove the soft goods from the piston. If the piston is equipped with a wedge ring (Item 23), clean and retain it for use during assembly. The dipper tube (Item 4) is swaged in place and no attempt should be made to remove it. The nozzle (Item 3) should not be removed unless it is damaged or the nozzle seal (Item 2) is leaking. Refer to Figure 1 for parts description and location.

NOTE: Do not remove lock pin and lift stop adjusting bolt (Items 12 and 11) on valves so equipped unless nozzle is removed. This bolt controls the piston lift and the valve's relieving capacity. If either or both the nozzle and lift bolt were removed, then lift must be reset following the procedure of paragraph 2.3.3.

2.1.1 Nozzle and nozzle seal disassembly

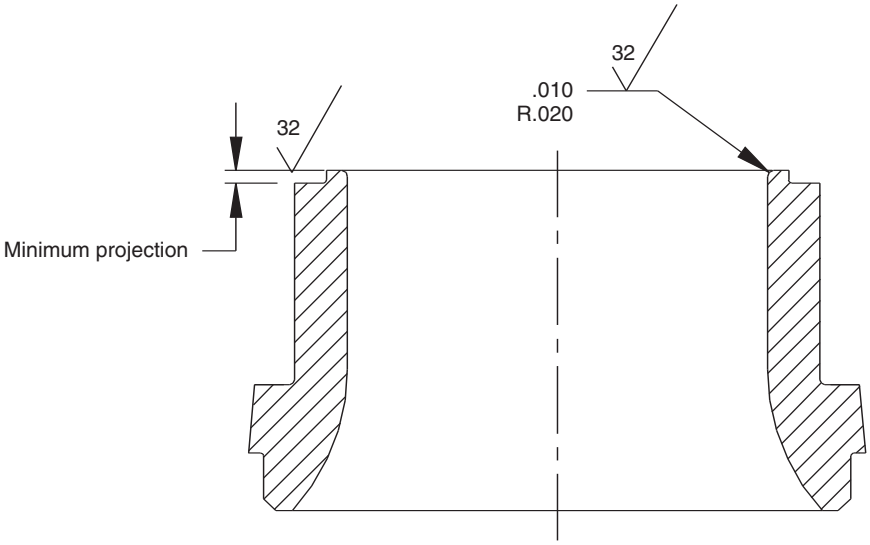
Refer to Figure 2 for parts description and location.

1. Remove lock pin and lift adjusting bolt from piston, if applicable.
2. Place liner in body and piston, without seat or seat retainer, into liner and on top of nozzle.
3. Place appropriate spacer (see Table I) on top of piston and then the cap over the spacer.
4. Thread the appropriate number of cap bolts (see Table I) into threaded holes on top of body. If two bolts are used, they should be 180° apart. When using four bolts, they should be 90° apart. Always use the shortest cap bolts supplied with the valve unless all cap bolts are required. For example, the 1" Type 40/50 is equipped with two 1.50" long bolts and two 1.88" long bolts but only the two 1.50" long bolts should be used. However, the 2" Type 40/50 is equipped with two 1.25" long bolts and two 1.62" long bolts and all four bolts are required for nozzle installation.
5. Tighten cap bolts evenly to the torque listed in Table I to compress nozzle seal.
6. Use a punch or bar with a light hammer and tap on the nozzle retainer teeth to loosen the nozzle retainer. Unthread nozzle retainer approximately 1/2 turn.
7. Loosen cap bolts to remove load from nozzle. Remove components from main valve.

2.2 Main valve nozzle rework

Should the main valve nozzle seating face become nicked or scratched such that the main valve seat does not seal, the imperfections can be removed by polishing the seating face with 400 grit sandpaper. If necessary, the nozzle may be removed from the body and the nozzle seating face (only the seating face) may be remachined and/or polished using 400 grit sandpaper on a flat surface plate. The resurfaced nozzle must be within the limiting dimensions shown in the Table and Figure below. If the resurfaced seating face standoff is less than the minimum projection height listed, the nozzle must be replaced.

Valve Size and Type	Min. Nozzle Projection Height (in)
1/1.5x2 Type 843/853 (D, E and F Orifice)	.045
1.5x2/3 Type 843/853 (G and H Orifice)	.040
2” Type 843/853	.035
3” Type 843/853	.035
4” Type 843/853	.035
6” Type 843/853	.035
8” Type 843/853	.035
1.5” Type 863	.035
2” Type 863	.035
3” Type 863	.035
4” Type 863	.030
6” Type 863	.030
8x88 Type 863	.030
8x10 Type 863	.030



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2.3 Assembly

2.3.1 Nozzle and nozzle seal installation

Refer to Figure 2 for parts description and location.

1. Place nozzle seal and nozzle in body.
2. Place nozzle retainer over nozzle and thread into body until it stops on nozzle shoulder. Do not lubricate nozzle retainer threads or mating body threads.
3. Repeat steps 2 through 5 of disassembly procedure to compress nozzle seal. Thread nozzle retainer into body as seal is compressed to keep nozzle retainer from binding against piston.
4. Use a punch or bar with a light hammer and tap on the nozzle retainer teeth to snug the nozzle retainer threads.
5. Loosen cap bolts to remove load fro m spacer.
6. Remove spacer from valve.

Table I

Valve Size and Type	Spacer P/N	Cap Bolt Thread	# Cap Bolts To Use	Cap Bolt Torque (ft-lb)
1/1.5x2 Type 843/853 (D, E and F Orifice)	06.5612.001	.500-20 UNF	2	31
1.5x2/3 Type 843/853 (G and H Orifice)	06.5612.002	.500-20 UNF	2	41
1.5x2/3 Type 843/853 (G and H Orifice)	06.5612.002	.625-18 UNF	2	51
2” Type 843/853	06.5612.004	.500-20 UNF	4	27
2” Type 843/853	06.5612.004	.625-18 UNF	4	34
3” Type 843/853	06.5612.006	.500-20 UNF	4	35
3” Type 843/853	06.5612.006	.625-18 UNF	4	44
4” Type 843/853	06.5612.008	.750-16 UNF	4	130
4” Type 843/853	06.5612.008	.875-14 UNF	4	151
6” Type 843/853	06.5612.009	.750-16 UNF	2	82
6” Type 843/853	06.5612.009	.875-14 UNF	2	95
8” Type 843/853	06.5612.010	.875-14 UNF	4	123
8” Type 843/853	06.5612.010	1.000-14 UNS	4	140
1.5” Type 863	06.5612.004	.500-20 UNF	2	19
2” Type 863	06.5612.006	.500-20 UNF	2	31
2” Type 863	06.5612.006	.625-18 UNF	2	39
3” Type 863	06.5612.008	.750-16 UNF	2	113
4” Type 863	06.5612.011	.625-18 UNF	2	63
6” Type 863	06.5612.012	.750-16 UNF	2	88
8x88 Type 863	06.5612.013	.875-14 UNF	4	119
8x10 Type 863	06.5612.014	1.125-12 UNF	10	89

2.3.2 Soft goods and main valve reassembly

Refer to Figure 1 for parts description and location.

2.3.3 Type XX3 piston and seat

Clean and apply a light coating of Dow Corning No. 33 or equivalent silicone lubricant on all threads. Install new seat and reassemble seat retainer and seat retainer screw or screws.

NOTE: Over tightening of seat retainer screw or screws can distort or damage the seat and cause leakage. Retainer screw or screws should be installed until assembly is snug. Then tighten an additional 1/4 to 1/2 turn to secure assembly.

On 1" thru 4" Type 43/53 and 1.5" thru 3" Type 63 valves, if either or both the nozzle and lift bolt were removed, then lift needs to be set. If lift setting gages are available, use lift setting procedure 06.3349 (gas service) or 06.3350 (liquid service); otherwise use procedure 05.2284.

For gas service valves, install new piston seal with new back-up ring in upper groove. The back-up ring is assembled below the O-ring, see Detail A. For liquid service valves, install new piston seal along with original wedge ring in lower groove. The wedge ring is assembled below the O-ring, see Detail A. For gas service, lubricate upper portion of liner I.D., piston seal, and back-up ring with Dow Corning No. 33 or equivalent. For liquid service, lubricate the same area with Desco 600 or equivalent. Use lubricant sparingly. Insert liner and piston into body and install new liner seal.

Install the cap making sure it is seated squarely into body. Install cap bolts hand tight then tighten an additional 1/4 to 1/2 turn uniformly so as not to "cock" the cap. Such a condition may result in leakage at the liner seal or cause the piston and liner to bind.

Notes

(1) Field replaceable only if required.

(2) Recommended spare parts for repair.

(3) Used only for liquid service.

(4) Not used on 6", 8" Type 443/453 and 4" and larger Type 463.

Refer to Section 7.1 for soft goods repair kit part numbers.

Item	Description
1	Body
2	Nozzle Seal(1)
3	Nozzle(1)
4	Dipper Tube
5	Liner
6	Liner Seal(2)
7	Seat(2)
8	Seat Retainer
9	Seat Retainer Screw
10	Piston
11	Lift Adjusting Bolt(4)
12	Lock Pin(4)
13	Piston Seal(2)
14	Back-up Ring(2)
15	Nozzle Retainer
16	Dome Spring
17	Cap
18	Cap Bolt
21	Supply Tube
22	Tube Connector
23	Wedge Ring(3)

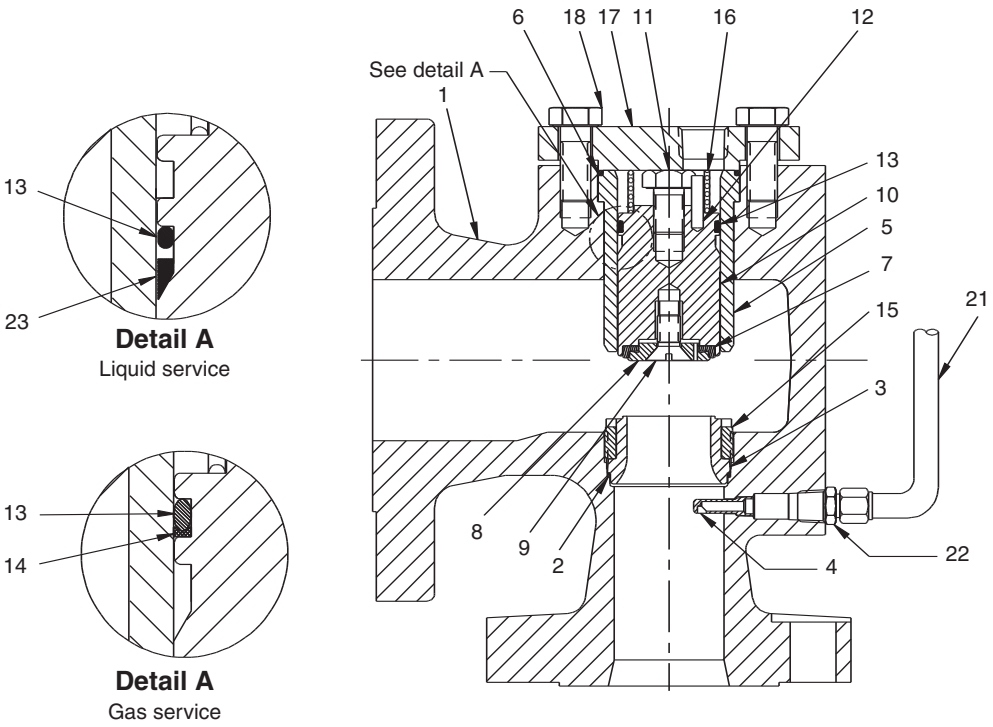


Figure 1
Main Valve

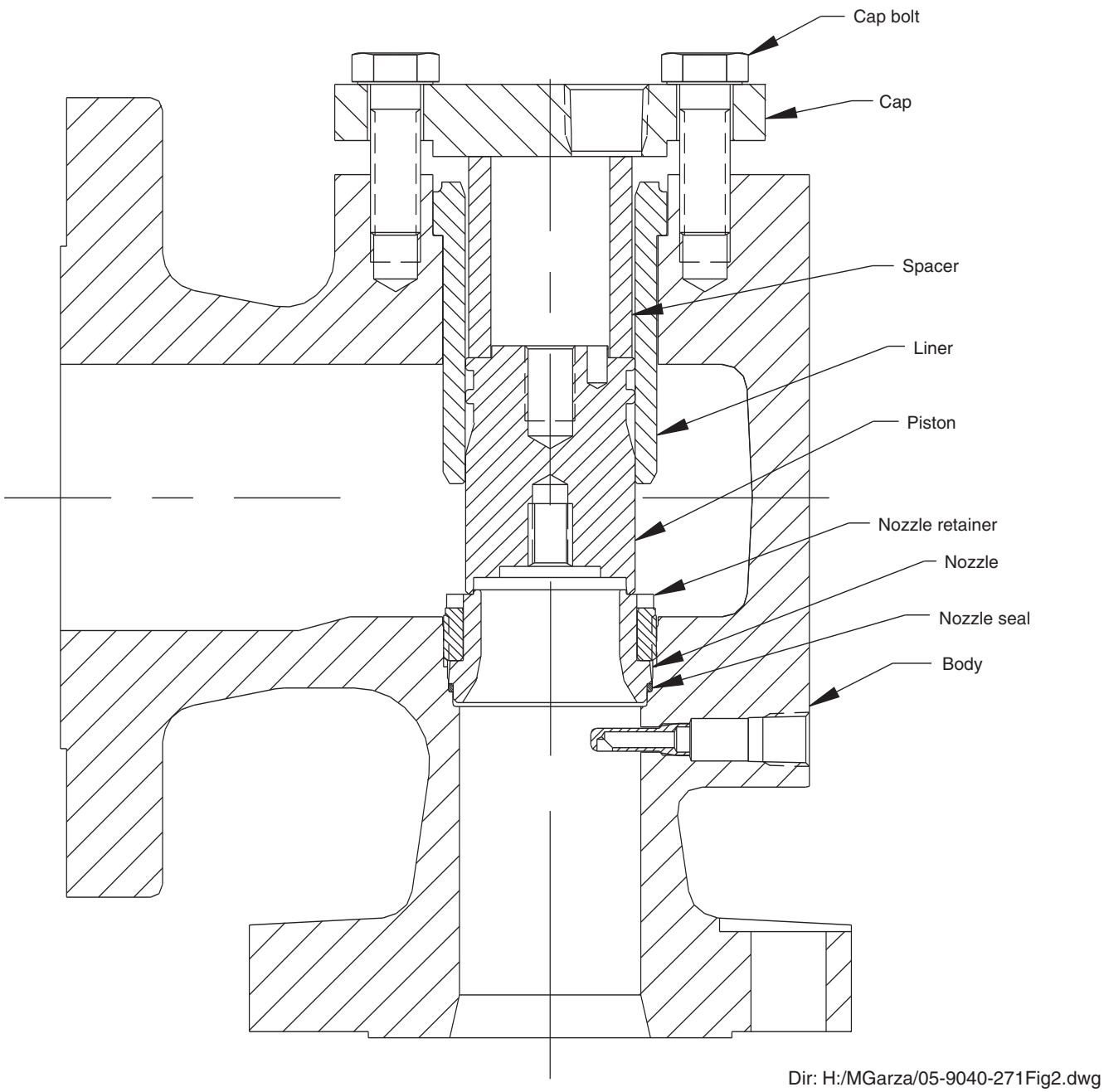


Figure 2

3.0 Pilot maintenance, 1481 to 7500 psig pressure range

Refer to Figures 3, 4, and 5.

Arrange all parts in an orderly sequence on a flat work surface during disassembly. This will facilitate assembly and help ensure that the correct parts are assembled in the proper sequence.

3.1 Disassembly

Before beginning disassembly, bleed off any pressure trapped in the main valve or pilot.

3.1.1 Standard pilot – gas or liquid

NOTE: If the pilot is equipped with a lift lever, the lift lever handle assembly (310) must be unscrewed and removed from the cap (280) before continuing with disassembly. To do this, hold the lift lever handle in the position shown in Figure 3, unscrew the lift assembly bushing from the cap, and remove the handle assembly.

Clamp pilot assembly in vise with Spring Bonnet (50) up. Remove the Cap (460), for pilot with lift lever remove jam nut (Item 350) and lift lever nut (340), loosen the Locknut (290), and turn the Pressure Adjustment Screw (270) counterclockwise to remove the spring tension. Remove the Bonnet Lock Bolt (60) and unscrew the Spring Bonnet from the Body (10). The Spring (160) and Spring Washers (170) will be loose in the bonnet. Use a 1/4" wrench on the flats to hold the upper end of the Feedback Piston (100) and remove the Hex Nut (260) and Lockwasher (180). Turn body upside down while holding a hand under the top to catch the Sense Piston (110). Remove the Inlet Bushing (20). Remove any dirt or debris in the Screen Assembly in the Inlet Bushing. Turn body right side up over the bench to catch parts. Push the Feedback Piston down until all the internals come out the bottom. The Piston Seal Backup Ring (120), Sense Seal (190), Feedback Spacer (130), and Feedback Seal (200) will remain in the top of the body and must be removed. If a tool is used, take care not to damage the body seal bore. The Outlet Nozzle Seal (230) may stay in the lower bore of the Body and must be removed. Pull the Outlet Nozzle (30) off the bottom of the internal assembly and remove the Spool Seal (210). Examine the seating surface of the Outlet Nozzle for nicks or scratches. Small irregularities may be removed by lightly lapping the Outlet Nozzle's top face.

Clamp the internal assembly in the vise upside down and remove the Inlet Nozzle (40) by inserting an approximately 3/16" diameter pin punch in the hole and using it as a wrench. The spool assembly will come out with the Inlet Nozzle, leaving the Spool Spring (150) free. Clamp the Spool Nut (90) in the vise upside down and unscrew the Inner Spool (70). Disassemble the Inlet Nozzle, Outer Spool (80), and Inner Spool and remove all seals. Examine the Inlet Nozzle the same as the Outlet Nozzle.

3.1.2 Pilot accessories

For pilot with a field test assembly, Figure 5, remove the field test backflow preventer from the pilot body. Unscrew the bushing from the backflow preventer body and remove the spring and shuttle. Remove the field test indicator, Figure 5, from the main valve dome port. Unscrew the bushing from the indicator body and remove the plunger and spring.

For pilot equipped with a main valve backflow check valve, Figure 5, remove the backflow preventer from main valve dome port or from the field test indicator. Unscrew the bushing from the backflow preventer body and remove the spring and shuttle. Remove the pilot exhaust backflow check valve from the pilot exhaust port. Unscrew the fitting from the backflow check valve body and remove the flow washer and ball.

Remove and discard all old seats, seals and O-rings before beginning assembly.

3.2 Assembly

3.2.1 Standard pilot – gas or liquid service

Assembly is done in reverse order of disassembly. Lightly lubricate all O-rings, all sliding surfaces, screw threads and spring washer pivot points with Dow Corning No. 33 Silicone grease or equivalent. Do not lubricate the seats. For pilot with lift lever, do not install lift lever handle assembly (Item 310) until final pilot adjustment is completed, see paragraph 4.5.

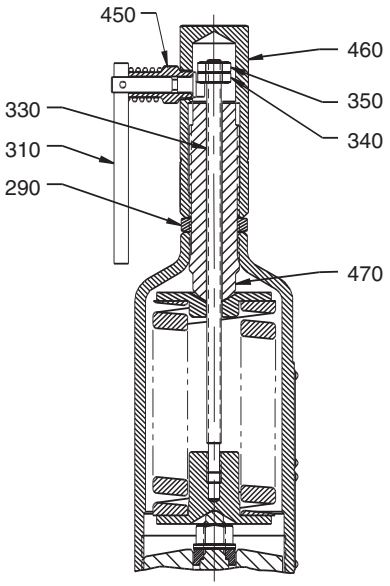
3.2.2 Pilot accessories

Assembly is done in reverse order of disassembly.

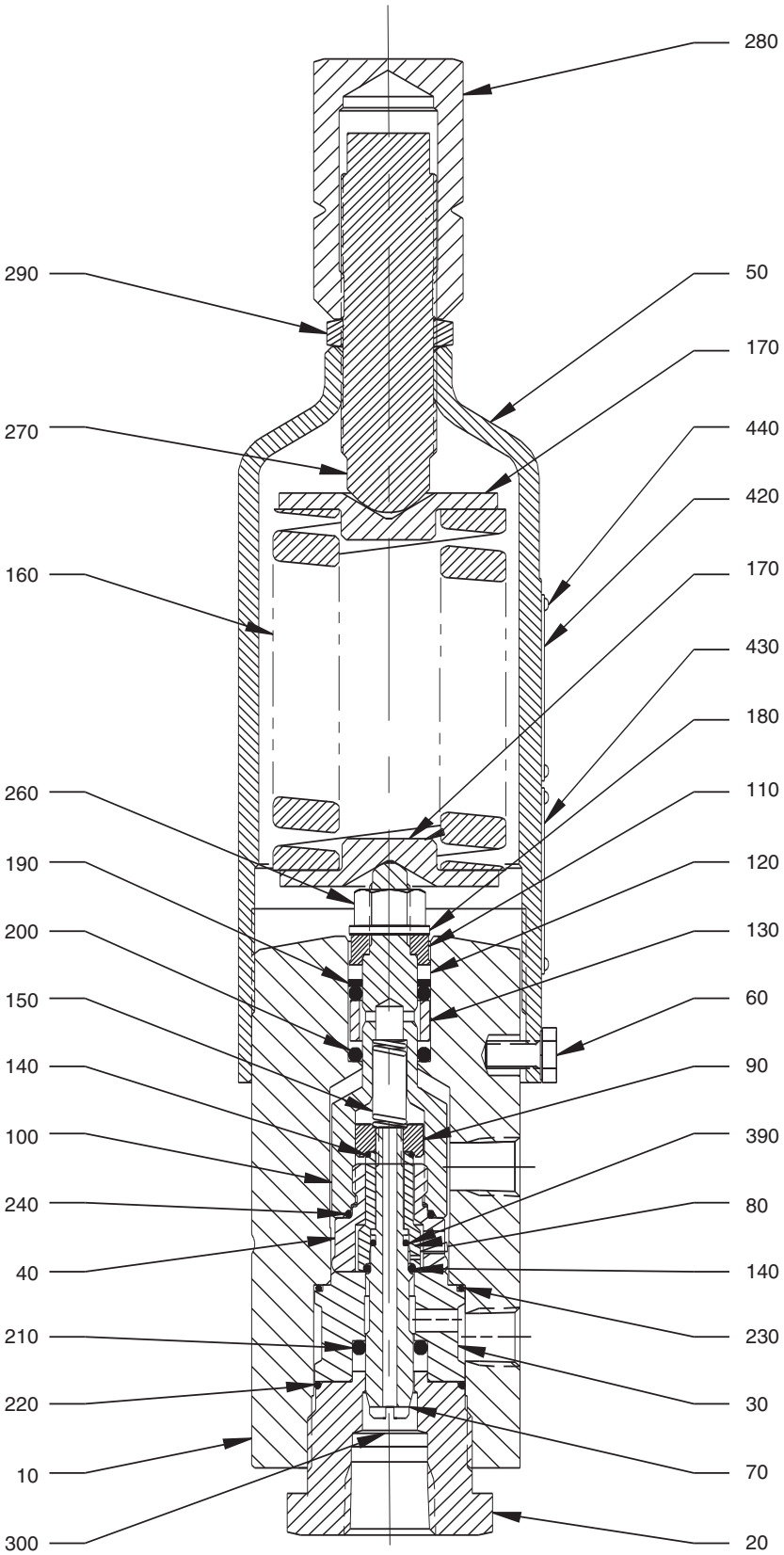
For pilot with a field test assembly, lightly lubricate the indicator bushing threads and all seals with Dow Corning No. 33 Silicone grease or equivalent. Lightly lubricate the field test backflow preventer bushing threads and all seals with Dow Corning No. 33 Silicone grease or equivalent. When reinstalling the field test backflow preventer on the pilot, orient it so that the bushing end is connected to the supply tube (process) side.

For pilot with a main valve backflow preventer and pilot exhaust backflow check valve, lightly lubricate the backflow preventer bushing threads, the check valve fitting threads, and all seals with Dow Corning No. 33 Silicone grease or equivalent. When reinstalling the backflow preventer in the main valve dome port or on the field test indicator, orient it so that the bushing end is connected to the pilot (process) side.

Item	Description
10	Body
20	Bushing-Inlet
30	Nozzle-Outlet
40	Nozzle-Inlet
50	Bonnet
60	Bolt-Bonnet Lock
70	Spool-Inner
80	Spool-Outer
90	Nut-Spool
100	Piston-Feedback
110	Piston-Sense
120	Ring-Piston Seal Backup
130	Spacer-Feedback
140	Seat
150	Spring-Spool
160	Set Spring
170	Washer-Spring
180	Washer-Lock
190	Seal-Sense HP
200	Seal-Feedback HP
210	Seal-Spool HP
220	Seal-Inlet Bushing
230	Seal-Outlet Nozzle
240	Seal-Inlet Nozzle
260	Nut-Hex
270	Screw-Pressure Set
280	Cap-Standard
290	Nut-Lock
300	Screen Assembly
310	Lift Lever Handle Assembly
330	Rod-Lift Lever
340	Nut-Jam Lower
350	Nut-Jam Upper
390	Seal-Inner Spool LP and HP
420	Nameplate-Pilot
430	Nameplate-POSRV (Patent)
440	Screw-Drive
450	Bushing-Handle Assembly
460	Cap-Lift Lever
470	Screw-Pressure Set



Lift lever assembly



Standard assembly
Figure 3

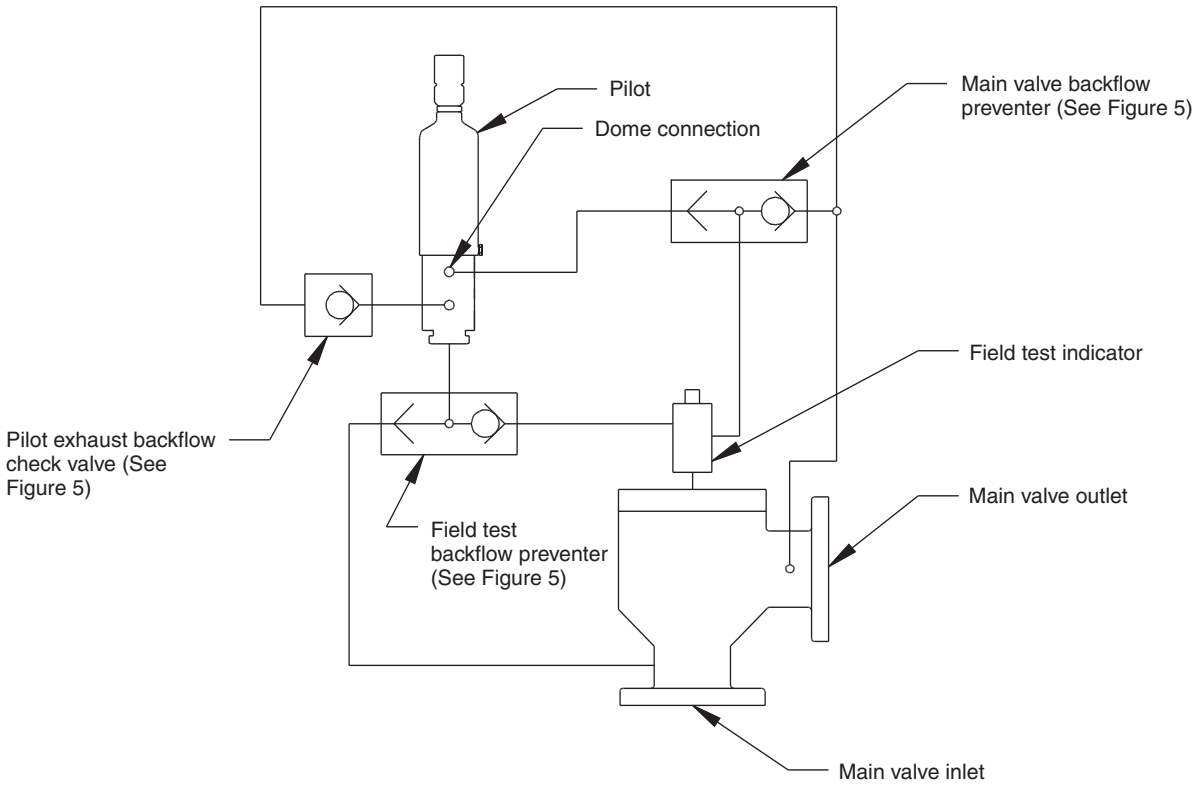
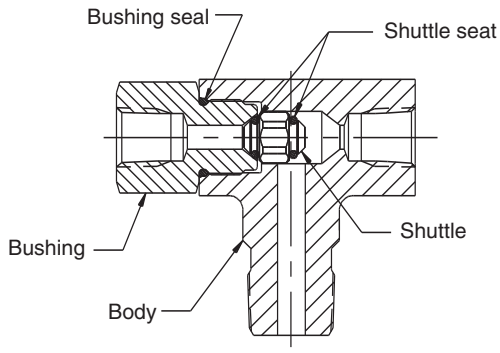
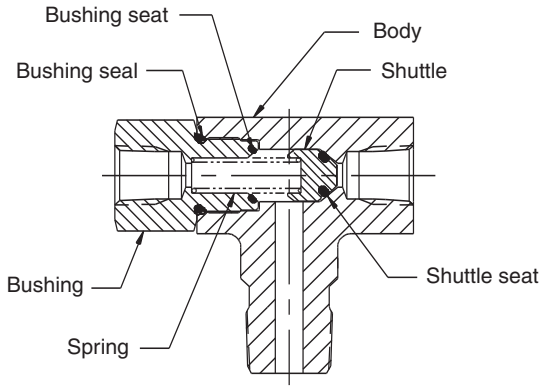


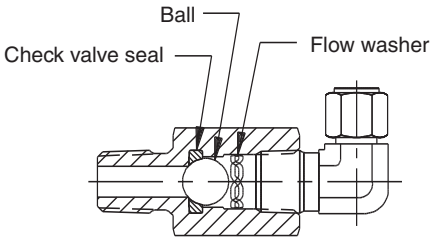
Figure 4



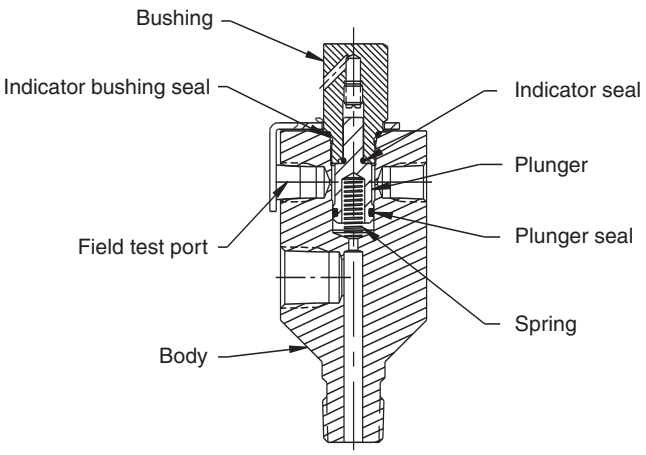
Backflow preventer
(Standard prior to September 2002)



Backflow preventer with bias spring
(Standard beginning in September 2002)



Pilot exhaust backflow check valve



Field test indicator assembly (style B)

Figure 5

4.0 Pilot set pressure adjustment

4.1 Definitions

Set Pressure is defined as the supply pressure at which the dome pressure is 70% of the supply pressure. This corresponds to the initial audible discharge of gas or first steady stream of liquid from the main valves.

Crack Pressure is defined as the supply pressure at which gas flow begins at the pilot exhaust.

Reseat Pressure is defined as the supply pressure at which the dome pressure increases to 75% of supply pressure. The dome pressure will continue to increase until the supply pressure decreases to 95% of set.

4.2 Set pressure, standard pilot

4.2.1 Gas service pilot

To adjust the set pressure, a test set-up similar to that shown in Figure 6 should be used. The test media should be air. The adjustment screw should be turned IN most of the way. Increase the supply pressure to nameplate setting and slowly back out the adjustment screw until flow through the pilot exhaust begins. Continue to slowly back out the adjustment screw until dome pressure is 70% of the supply pressure and the supply pressure meets the required set pressure tolerance of paragraph 4.5. After adjustment is completed, securely tighten the jam nut.

To determine reseat pressure, shut off the air supply and use the accumulator vent valve to slowly reduce the supply pressure until the dome pressure is 75% of supply pressure.

Close the shut-off valve and slowly open the bleed valve. When the dome pressure gauge reading is zero, the pilot may be removed from the test set-up.

4.2.2 Liquid service pilot

NOTE: For liquid service pilots, set pressure must be verified on liquid. An initial set pressure adjustment may be made with air as the supply pressure media using a test set-up similar to that shown in Figure 6 and following the procedure described in paragraph 4.2.1 above. This initial set pressure will be approximately $1\frac{1}{2}$% lower than the set pressure observed when the pilot is tested on liquid.

To adjust the set pressure, a test set-up similar to that shown in Figure 7 should be used. The test media should be water. Some air volume must be maintained above the water surface in the accumulator.

Increase the air supply pressure to nameplate setting and slowly back out the adjustment screw until water flow through the pilot exhaust begins. Continue to slowly back out the adjustment screw until dome pressure is 70% of the supply pressure and the supply pressure meets the required set pressure tolerance of paragraph 4.5.

To determine reseat pressure, shut off the air supply and use the accumulator vent valve to slowly reduce supply pressure until the dome pressure is 75% of supply pressure.

Close the shut-off valve in the water line to the pilot inlet port and slowly open the bleed valve. When the dome pressure gauge reading is zero, the pilot may be removed from the test set-up.

The optional indicator assembly shown in Figure 7 may be used for set pressure above 70 psig. If an indicator assembly is used, slowly increase the supply pressure until the indicator pin pulls into the indicator assembly and is approximately flush with the end of the indicator body. The pressure when the pin pulls in is the set pressure. Loosen the jam nut, adjust the adjustment screw, and retighten the jam nut as required to meet the set pressure tolerance of paragraph 4.5.

Shut off the air supply and use the accumulator vent valve to slowly bleed down supply pressure until the indicator pin “pops” out of the indicator assembly (full extension of the pin is approximately $\frac{7}{16}$”). The pressure when the pin “pops” out is the reseat pressure.

Close the shut-off valve in the water line to the pilot inlet port and slowly open the bleed valve. When the dome pressure gauge reading is zero, the pilot may be removed from the test set-up.

4.3 Range of adjustment

All pilots can be adjusted ± 5% beyond the nameplate setting. If a set pressure change is made that requires a new spring, consult Factory for information contained in spring chart.

4.4 Performance requirements

Set Pressure (psig)	Tolerance As % of Set	Crack Pressure As % of Set	Reseat Pressure
1481 to 6170 Inclusive	± 3%	Min 96%	96 to 100

4.5 Lift lever handle assembly installation

For pilot equipped with a lift lever, install the lift lever handle assembly (Item 310) after completing the final pilot adjustment.

Screw the lift lever nut (Item 340) on the threaded portion of the lift lever rod (Item 330) until the lower face of the lift lever nut is approximately 2.32" above the top of the lock nut (Item 290). Use the jam nut (Item 350) to lightly lock the lift lever nut in place. Screw the cap on the set pressure adjustment screw (Item 470) until it is hand tight against the lock nut. The lower face of the lift lever nut should be even with the center of the threaded hole in the cap. If the lift lever nut is not positioned correctly, remove the cap and adjust the nuts as required, and reinstall the cap.

With the lift lever handle held in the position shown in Figure 3, install the handle assembly by screwing the handle assembly bushing into the cap. The cam surface of the lift lever handle assembly must contact the lower face of the lift lever nut between 15° and 45° of clockwise or counterclockwise rotation of the handle past its null or centered position. Resistance of the handle indicates contact has occurred. If resistance occurs at less than 15°, the lift lever nut must be positioned higher. If resistance first occurs at more than 45°, the nut must be positioned lower on the lift lever rod.

If necessary, remove the handle assembly from the cap following the procedure of paragraph 3.1 and repeat this assembly procedure in order to correctly position the lift lever nut and jam nut on the threaded portion of the lift lever rod. When correctly positioned lock the lift lever nut with the jam nut, install and securely tighten the cap, install the handle assembly, and securely tighten the handle assembly bushing.

CAUTION: To avoid damaging any of the lift lever components, do not rotate the lift lever handle past that position where the cam surface of the handle assembly first contacts the lower face of the lift lever nut.

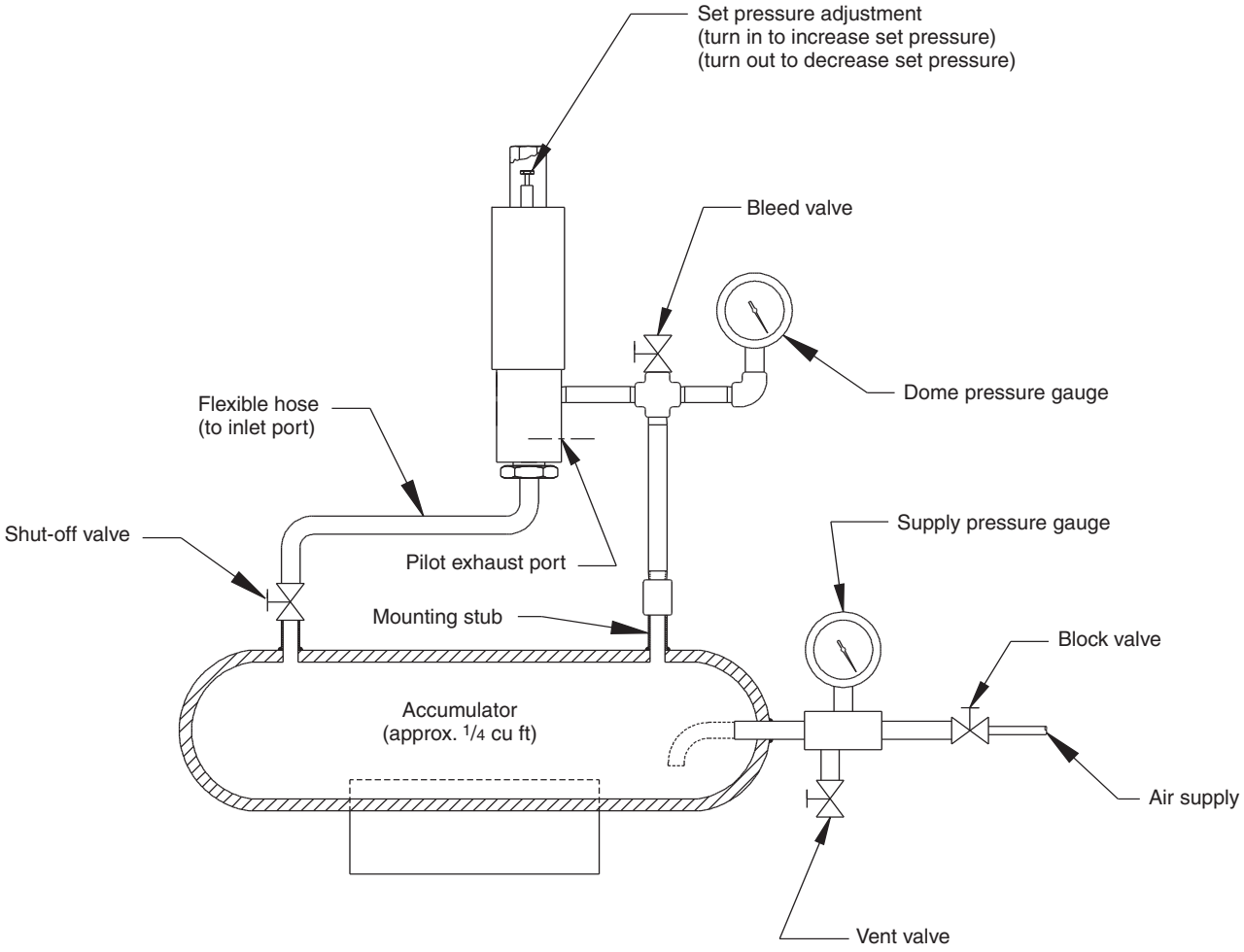


Figure 6
Pilot adjustment test set-up

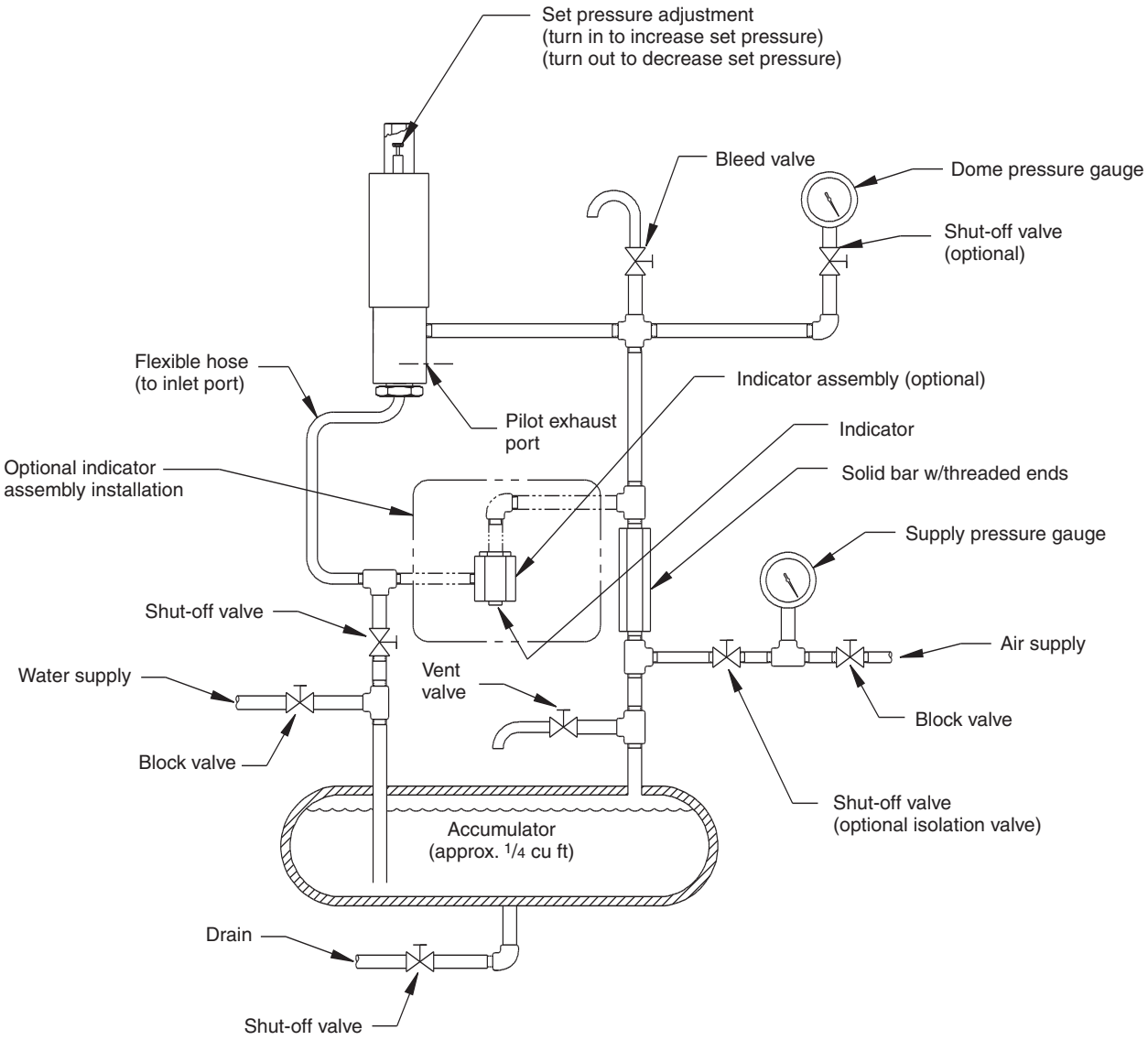


Figure 7

5.0 Valve assembly testing

5.1 General

The complete valve assembly should be tested for internal and external leakage and to verify set pressure using a test set-up similar to that shown in Figure 8, 9 or 10. The test media should be air.

CAUTION: Do not test liquid service valves using water or other liquid test media. Liquid service valves should be tested using air as the test media in accordance with the procedures described below. Testing fully assembled liquid service valves using air ensures that no water or other liquid will remain in the main valve dome after final valve testing.

5.2 Low pressure leakage check

NOTE: For valve with Iso-Dome pilot, apply regulator supply pressure equal to a minimum of 200 psi greater than 92% of set pressure.

5.2.1 Valve for gas service

Slowly increase the supply pressure to 30% of set pressure. Check for main valve nozzle, seat, and piston seal leakage at the main valve outlet. To help in seating the valve seat and piston seal, the valve may be actuated several times. No leakage shall occur in 15 seconds.

5.2.2 Valve for liquid service

Slowly increase supply pressure to 30% of set pressure. Check for main valve nozzle, seat, and piston seal leakage at the main valve outlet. To help in seating the valve seat and piston seal, the valve may be actuated several times. No leakage shall occur in 15 seconds. If leakage is detected at the valve outlet, note the leakage in bubbles observed in 15 seconds and remove the leakage test device from the outlet flange. With the same supply pressure applied to the valve inlet, use a bubble test leak detector to measure leakage through the pilot exhaust. Low pressure leakage performance is acceptable if the leakage at the main valve outlet is equal to the pilot exhaust leakage and this leakage value does not exceed 15 bubbles in 15 seconds.

5.3 High pressure leakage check

NOTE: For valve with Iso-Dome pilot, apply regulator supply pressure equal to a minimum of 200 psi greater than 92% of set pressure.

5.3.1 Valve for gas service

Apply supply pressure to the inlet equal to 90% of the set pressure. Check for leakage at the main valve outlet. Using a suitable gas and air leak detector solution, check for leakage at the cap seal and other pressure connections. No leakage shall occur at the valve outlet and no visible leakage shall be detected at the cap seal or other pressure connections in one minute.

5.3.2 Valve for liquid service

Apply supply pressure to the inlet equal to 90% of the set pressure. Check for leakage at the main valve outlet. Using a suitable gas and air leak detector solution, check for leakage at the cap seal and other pressure connections. No leakage shall occur at the valve outlet and no visible leakage shall be detected at the cap seal or other pressure connections in one minute. If leakage is detected at the valve outlet, note the leakage in bubbles observed in one minute and remove the leakage test device from the outlet flange. With the same supply pressure applied to the valve inlet use a bubble test leak detector to measure leakage through the pilot exhaust. High pressure leakage performance is acceptable if the leakage at the main valve outlet is equal to the pilot exhaust leakage and this leakage value does not exceed 60 bubbles in one minute.

Where superimposed back pressure is specified, the downstream or exhaust connections which are exposed to the back pressure shall be tested at 1.5 times the specified back pressure and all mechanical connections so pressurized will be checked for leaks. No visible leakage shall occur in one minute using a suitable gas and air leak detector solution.

5.4 Main valve function check

CAUTION: This test must be performed at a slow rate of pressure increase to ensure that the main valve does not go into full lift. The pressure applied to the inlet is not to exceed 105% of nameplate set pressure.

After completing the high pressure leakage check of paragraph 5.3, verify main valve opening as follows. Remove the leakage test device from the outlet flange. Slowly increase the inlet pressure above 90% of set pressure. Continue increasing inlet pressure until an audible discharge at the valve outlet verifies main valve opening.

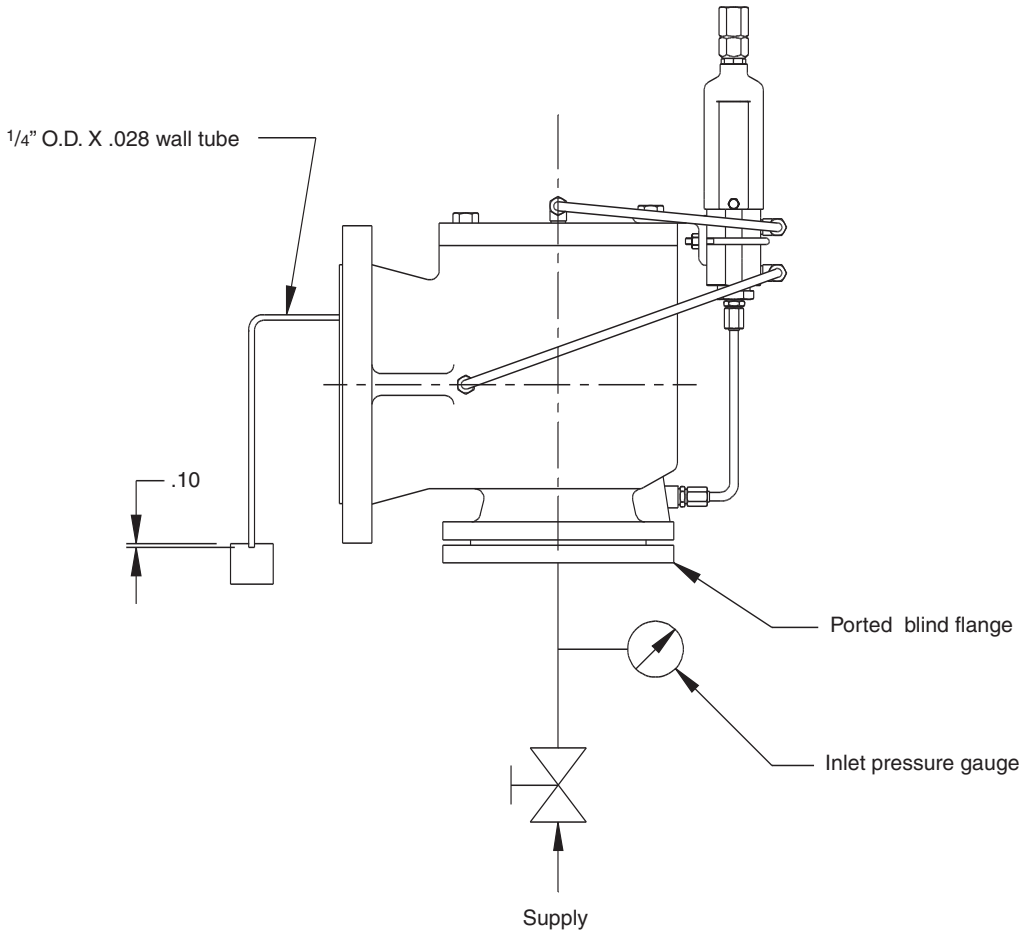


Figure 8
Test set-up for valve with standard pilot

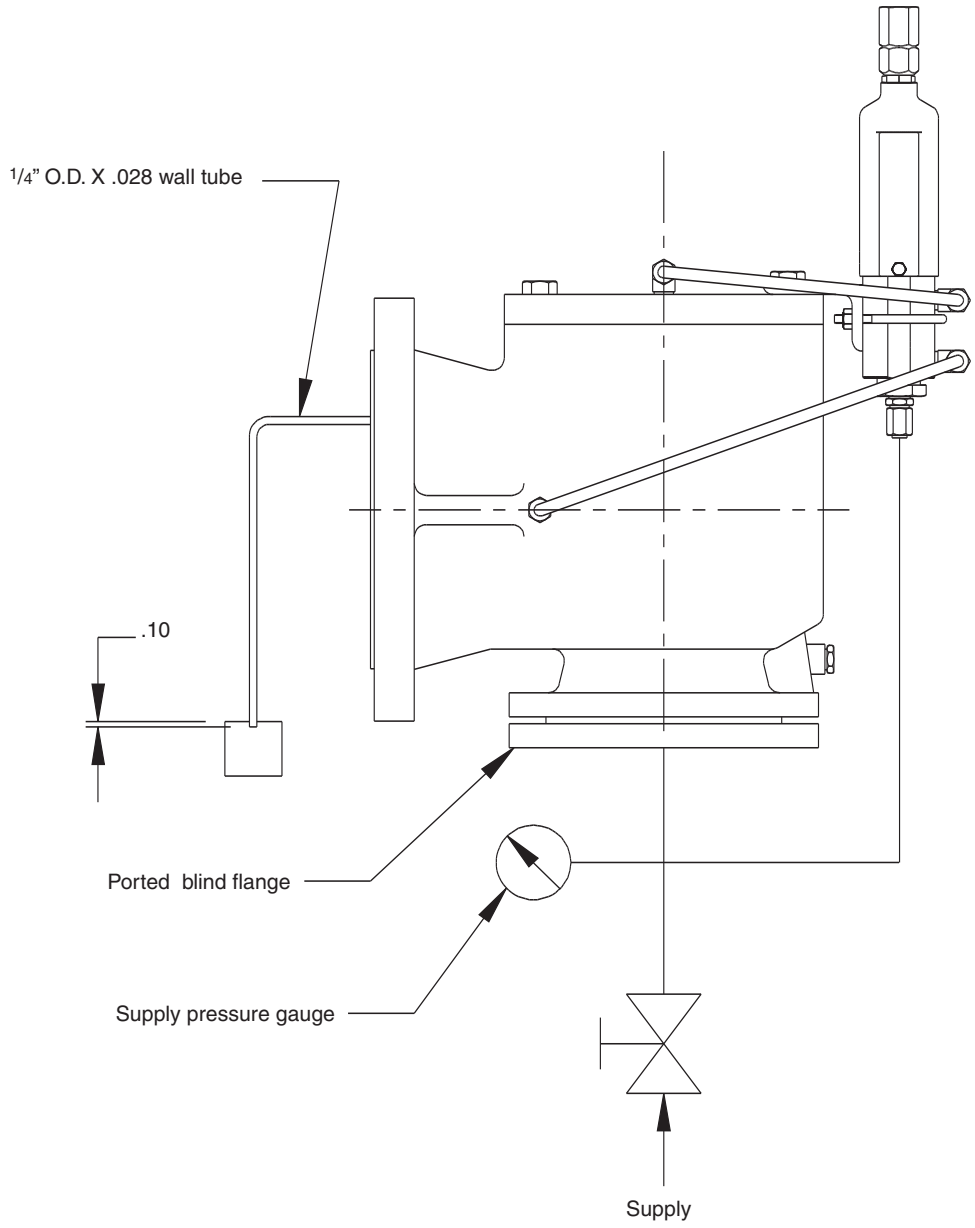


Figure 9
Test set-up for valve with standard pilot

6.0 Pilot set pressure field test procedure

6.1 General

The set pressure of valves equipped with field test accessory can be checked with the valve installed, in service, using a test set up similar to that shown in Figure 10. This procedure accurately checks the set pressure. For slow rates of test gas pressure increase, this procedure will also check the reseat pressure.

The main valve will not open if the process pressure is less than set- pressure. If the main must be opened, slowly increase the test gas pressure until the main valve opens. To close the main valve, close block valve “A” on the test gas bottle and open vent valve “C”.

6.2 Procedure

A. Remove plug from field test fitting and connect flex hose from test gas bottle.

B. Close vent valve “C” on gas bottle, open block valve “A” to slowly pressurize pilot and observe test pressure gage. Set pressure is reached when the pressure gage shows a rapid reduction in pressure. Close valve “A” then open slowly to recycle the pilot enough to be certain of the set pressure.

C. To remove set up, close block valve “A”, open vent valve “C”, remove flexible hose from field test fitting and install plug on field test fitting.

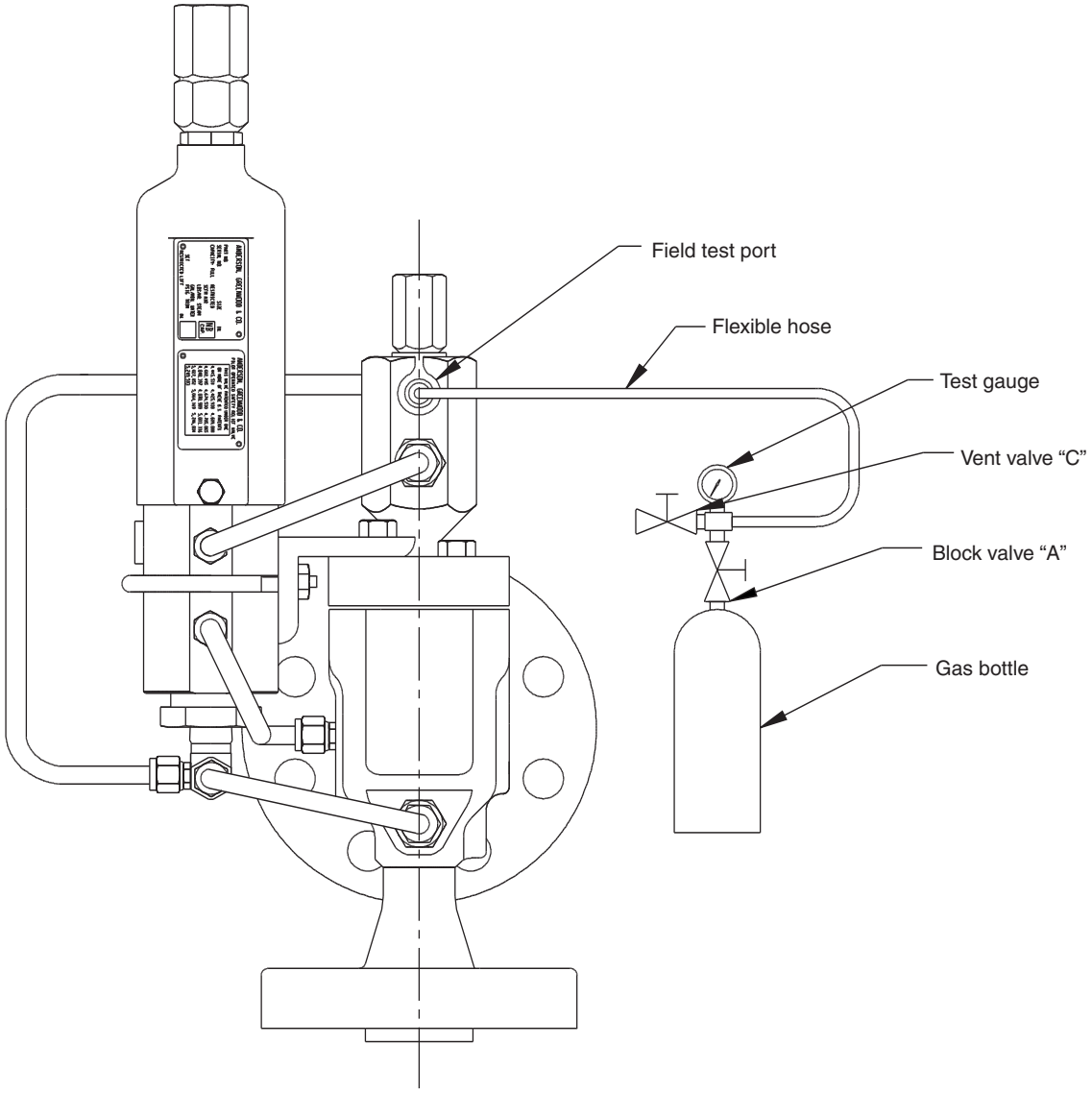


Figure 10
Field test indicator

7.0 Soft goods repair kits

The kits listed below are available from stock. Each kit contain all the seals and seats to repair a main valve or pilot, including lubricants. Pilot kits also contain all the seals and seats for field test and backflow accessories. To order soft goods kits specify the base number and select the last three digits from the following tables. To ensure the correct soft goods kit is ordered, specify the valve model and serial number.

7.1 Main valve – kit base number: 06.3365.XXX

Type 843/853

Material	1 x 2 1 1/2 x 2	1 1/2 x 3*	2 x 3	3 x 4	4 x 6	6 x 8	8 x 10
Urethane and BUNA-N Seats, BUNA-N Seals	001	002	003	004	005	006	007
Urethane and Viton® Seats, Viton® Seals	012	013	014	015	016	017	018
Urethane and EPR Seats, EPR Seals	141	142	143	144	145	146	147

*Also 1 1/2 x 2 threaded “G” and “H” orifice

TYPE 863

Material	1 1/2 x 2	2 x 3 2 x 3 x 3	3 x 4 3 x 4 x 4	4 x 6 4 x 6 x 6	6 x 8 6 x 8 x 8	8 x 8 x 8	8 X 10 8 x 10 x 10
Urethane and BUNA-N Seats, UNA-N Seals	003	004	005	008	009	010	011
Urethane and Viton® Seats, Viton® Seals	014	015	016	019	020	021	022
Urethane and EPR Seats, EPR Seals	143	144	145	148	149	150	151

Viton® is a registered trademark of DuPont Dow Elastomers

7.2 Pilot - kit base number: 06.2869.XXX

Material	1481-6170 psig
BUNA-N	.001
Viton®	.002
EPR	.003

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