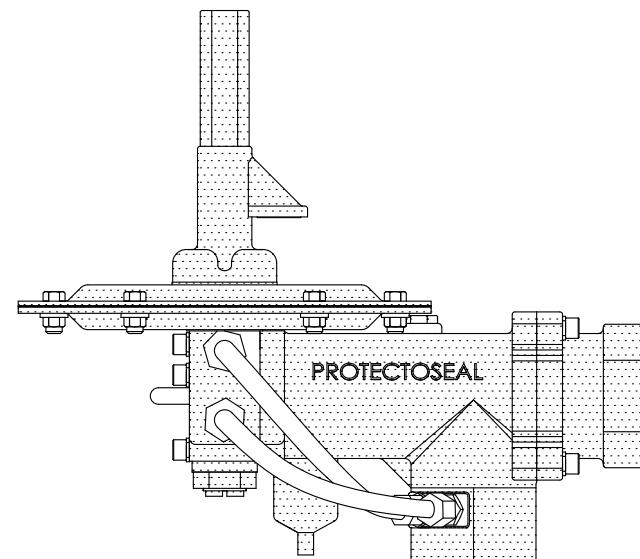


Installation & Maintenance Guide

PROTECTOSEAL SERIES NO. 10 2" Pilot Operating Tank Blanketing Valve



The Protectoseal Series 10, 2" Pilot Operated Tank Blanketing Valve was developed as an effective means of controlling the formation of explosive vapor / air mixtures in storage tanks via gas blanketing. Installation of the device will require additional safety equipment for optimal operating performance. Prior to installation of Protectoseal's 2" Tank Blanketing Valve, each of the following should be considered as an integral part of the system's design:

1. Emergency Venting
2. Pressure and Vacuum Relief Venting
3. Safety Shut-off Valves
4. Supply Gas Filtering

For a comprehensive understanding of the typical tank blanketing installation please refer to the Series 10, 2" Pilot Operated Tank Blanketing Valve Product Specification Sheet or User Manual.

Drawings, specifications and dimensions are subject to change without notice, contact factory for latest information.

SAFETY INFORMATION

Safety Words: A safety related message is identified by a safety alert symbol and a signal word to indicate the level of risk involved with a particular hazard. Per ANSI standard Z535.4-1998 the definitions of the signal words are as follows:



DANGER:

Indicates an imminently hazardous situation which, if not avoided will result in death or serious injury.



WARNING:

Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.



NOTICE:

Indicates a statement of company policy directly or indirectly related to the safety of personnel or protection of property. This signal word should not be associated directly with hazardous situations and shall not be used in place of DANGER, WARNING or CAUTION.

INSTRUCTIONS FOR SAFE OPERATION AND MAINTENANCE

This instruction manual is intended to familiarize the appropriate personnel with the operation, servicing and safety procedures associated with the Series 10, 2" Blanketing Valve. This manual should be kept available to all operating and maintenance personnel.

Make sure that any person installing and/or operating the tank blanketing valve device:

1. Is technically qualified and competent.
2. Has completely read this Installation and Maintenance Guide and understands the dangers associated with improper installation and misuse.
3. Uses proper personal protection equipment (including hearing protection).



1. Improper installation and misuse may be extremely dangerous to nearby personnel and can cause permanent damage to the device and associated tank equipment.

2. In the event of a blanketing valve failure, unrestricted gas flow, reduced gas flow or complete loss of gas flow may result. Without properly sized venting devices and suitable safety shut-off equipment, excessive pressure or vacuum conditions may develop.

For a comprehensive understanding of the typical blanketing installation please refer to the Series 10, Product Spec Sheet or User Manual



1. Do not attempt to adjust the set point or perform maintenance on the device without first isolating the valve from the upstream high pressure gas supply and downstream tank vapors.

2. Verify chemical compatibility with all blanketing valve parts/accessories prior to installation. Process vapors may be exposed to all components during operation. Contact the factory for product data sheets.

3. It is essential that hearing protection be used when in the vicinity of an operational blanketing valve. Sound pressure measurements in excess of 140 dB have been recorded at the outlet.



1. Refer to Fig. 2 (recommended sense line length vs. I.D.) prior to installing the valve. The sense line must be kept open and unobstructed and have an inside diameter 1/2" (12.7 mm) sch. 40 pipe. The line should be located at least five (5) feet from the outlet of the blanketing valve. Long sense line runs will require larger diameters as recommended in Fig. 2. Care must be taken during installation so that liquid and condensation drain away from the blanketing valve housing.

2. SUPPLY GAS MUST BE DRY AND FREE OF PARTICULATES. Liquid in the supply line will cause piston lubrication washout which may lead to premature valve failure. SUPPLY LINE FILTERING IS HIGHLY RECOMMENDED.

PROTECTOSEAL SERIES NO. 10

2" TANK BLANKETING VALVE

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Definition of Terms

Some of the terms used in this manual are defined below:

Conservation Vent: A device which is connected to a storage tank and regulates the pressure therein. Conservation vents may provide pressure relief, vacuum relief, or both. Pallets move in direct response to tank pressure allowing flow out of or into the tank. Pallet movement may be controlled by weight-loading, spring-loading, or a pilot valve.

Deadband: The total pressure difference between the blanketing valve opening pressure (or set point) and resealing pressure. This applies to the main valve; some leakage through the pilot will occur above the main valve reseating pressure

Diaphragm Chamber: The portion of the pilot valve which contains the sense diaphragm.

Dome Pressure: The pressure in the dome volume.

Dome Volume: The chamber between the poppet in the pilot valve and the piston in the main valve.

Emergency Vent: A conservation vent which provides additional pressure relief to accommodate extraordinary conditions such as fire exposure to a tank or full-open failure of a blanketing valve.

Flow Orifice Plate: A circular orifice plate that can be threaded into the inlet body to reduce the blanketing valve's flow capacity.

Inlet Port: The connection to the blanketing valve coming from the gas supply line.

Main Valve: The portion of the blanketing valve through which the supply gas flows into the storage tank.

Orifice: A small diameter passage in the line between the inlet port and the dome volume.

Outlet Port: The connection to the blanketing valve leading to the storage tank.

Pilot Valve: The portion of the blanketing valve which senses the tank pressure and controls the dome pressure.

Piston: The component in the main valve which moves open from a normally seated position to allow flow of blanketing gas through the valve.

Piston Spring: The spring which biases the piston towards the seated position.

Poppet: The component in the pilot valve which can move open from a normally seated position to allow flow through the valve.

Poppet Spring: The spring which biases the poppet towards the seated position.

Purge: A very low flow of supply gas directed past the sense line and/or the outlet in order to keep corrosive vapors away from the blanketing valve.

Sense Chamber: The space below the diaphragm chamber to which the pressure from the sense line is directed. The pressure in the sense chamber controls the opening and closing of the pilot and blanketing valve.

Sense Diaphragm: A thin, non-metallic disc in the diaphragm chamber which flexes in response to changes in tank pressure acting upon it.

Sense Line: A line running from the storage tank to the sense port of the blanketing valve. It feeds tank pressure to the underside of the sense diaphragm.

Sense Port: The connection to the blanketing valve coming from the sense line.

Set Point: The tank pressure (positive or negative) at which the blanketing valve opens.

Soft Goods: The elastomeric components of the blanketing valve including the o-rings, gaskets and diaphragm.

Stop: A bolt connected to the sense diaphragm which contacts the poppet to move it in response to movement of the sense diaphragm.

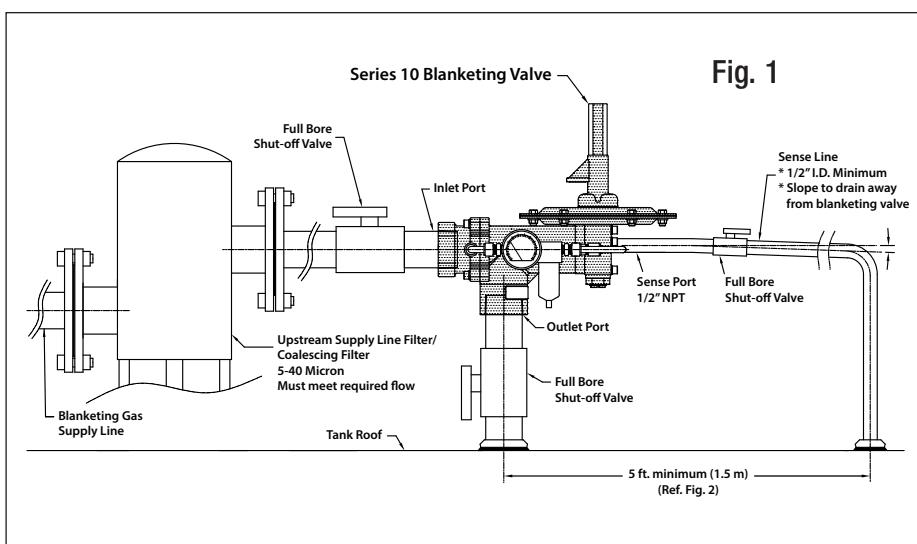
INSTALLATION

Placement

The blanketing valve should be placed on top of the storage tank with its outlet connected via a short run of pipe to the top of the tank. A second, usually smaller, line runs from the sense port of the valve to a separate connection on the tank. A line coming from the blanketing gas supply source connects to the valve inlet. The blanketing valve must be positioned so that the inlet line is horizontal and the outlet line points downward. Installation requires connecting the blanketing valve to three lines as shown below in Fig. 1.

WARNING

WARNING:
Follow your company's safety procedures to avoid injury to personnel or damage to equipment.



All three lines connected to the valve should have full bore shut-off valves so that the unit can be isolated and depressurized for maintenance. The use of pipe unions at each connection will facilitate installation and removal of the blanketing valve. FEP tape should be applied to all pipe thread connections. However, be careful in applying it so that the tape cannot get loose inside and potentially clog the blanketing valve. **DO NOT USE PIPE DOPE.** Further details regarding the three lines follow:

■ **SUPPLY LINE:** The piping leading to the blanketing valve inlet should be the same pipe size as the inlet connection. This line should incorporate a full bore shut-off valve to enable isolation of the valve from the pressure supply during maintenance. The line should also include an in-line filter. The filter flow capacity must be higher than the required flow through the blanketing valve. For most applications, 5-40 micron filter elements are suitable, but for contaminated supply lines and lines with excessive liquid buildup, special coalescing filter systems are highly recommended. Contact factory for more details.

■ **OUTLET LINE:** The piping from the valve outlet should be at least the same size as the outlet connection. This line should also incorporate a full bore-shut-off valve to enable isolation of the blanketing valve from the tank during maintenance. A short, straight pipe run from the valve outlet to the top of the storage tank is recommended. An extended length of pipe from the blanketing valve to the tank could lead to main valve chatter causing premature wear and delayed closing of the valve leading to overpressurization of the tank.

WARNING: Never connect a 45° or 90° elbow to the outlet.

■ **SENSE LINE:** The sense line should also include a full bore valve to enable isolation of the blanketing valve from the tank during maintenance. The horizontal run from the sense port should be angled slightly down away from the valve to ensure that condensate

WARNING

will not drain into the valve. $1\frac{1}{2}$ " sch. 40 pipe or larger is recommended to ensure that there is not a pressure drop from the tank to the valve. This size line is also needed so that the high pressure supply gas which leaks into the sense chamber while the valve is open is able to dissipate into the tank so as not to affect closing of the blanketing valve.

The sense line connection to the tank should be far enough from the outlet line connection to ensure that a static pressure is sensed. On the other hand, the line should not be so long as to lead to any significant pressure drop. Protectoseal recommends extending all sense line runs to at least 5 ft. from the valve outlet. If a longer sense line is necessary, then the size of the tubing or pipe should be increased according to offset pressure drop effects, see Fig. 2.

It is recommended to keep piping as short as possible for optimum valve performance.

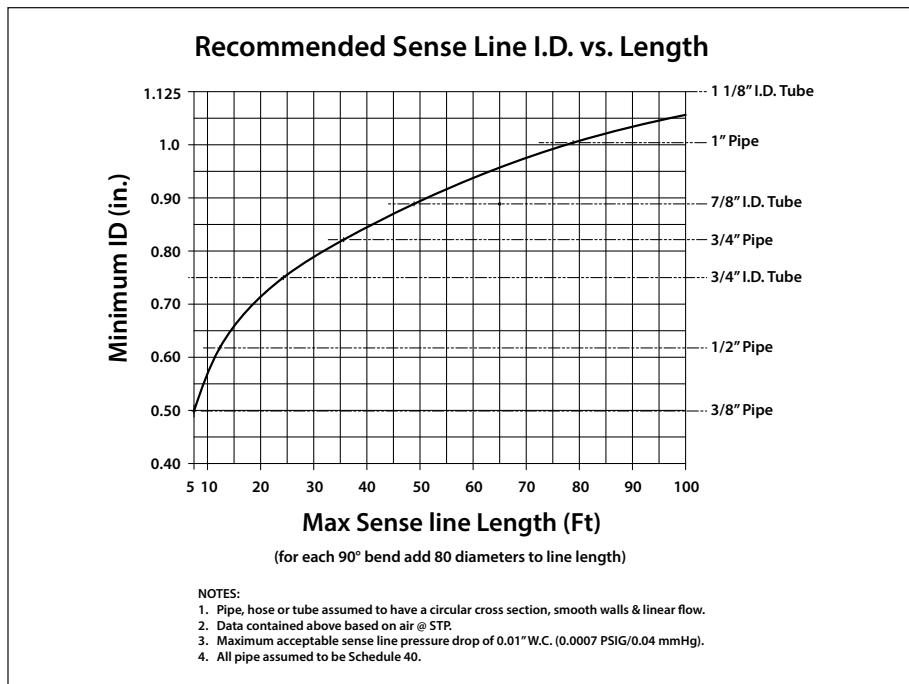


Fig. 2
Recommended Minimum Sense Line I.D. Based on Length

Start-Up

WARNING:

A pressure / vacuum relieving device large enough to vent excess pressure and also be an emergency vacuum relief device should be installed to avoid damage to the tank.

Do not exceed the maximum inlet pressure stated on the nameplate; also maintain the minimum pressure.

The blanketing valve is tested and set to the customer specified set point (as listed on the label) prior to shipment. Further adjustment in the field should not be required. After installation is complete, follow the steps below in order to put the blanketing valve into service:

1. Open the shut-off valve in the sense line between the blanketing valve and the tank.
2. Open the shut-off valve in the outlet line between the blanketing valve and the tank.
3. Check the blanketing gas supply line pressure to see that it corresponds to the pressure or pressure range listed on the label of the blanketing valve. If not, the supply pressure regulator should be adjusted accordingly. The ideal range in which the valve will operate is 40 to 130 PSIG.
4. Slowly open the shut-off valve in the blanketing gas supply line. Pressurizing the blanketing valve slowly pre-loads the valve so that it will not initially pop open.

If the tank pressure is above the blanketing valve set point, then the blanketing valve should seal immediately. Otherwise the valve will open and flow until the tank pressure rises above the set point. If the blanketing valve does not reseal at all, consult "Troubleshooting" on page 28.

Shut-Down

The blanketing valve must be depressurized when removing it from operation. Follow the steps below for system shut-down:

1. Close the shut-off valve in the blanketing gas supply line.
2. Close the shut-off valve in the sense line.
3. Pressure between the supply line shut-off and the seals inside the blanketing valve must be bled off. If the set point pressure is above atmospheric pressure, then the safest way to do this is to break the seal at the sense port of the blanketing valve. This will allow the pressure in the sense chamber to drop which will open the blanketing valve and bleed off the internal pressure into the tank. If the blanketing valve has a setting below atmospheric pressure, then a different method must be used. In addition to cracking the sense line, a connection between the supply line shut-off valve and the blanketing valve inlet port must be cracked to allow the high pressure gas to bleed out. The connection should be cracked slowly so that the high pressure gas bleeds, not bursts, out.
4. Close the shut-off valve in the outlet line.
5. Remove the supply line to the blanketing valve carefully in case there is still trapped pressure in the line.

MAINTENANCE**Purpose & Frequency**

Periodic maintenance checks are recommended to ensure that the blanketing valve is in good operating condition. The blanketing valve should be periodically actuated and all sliding surfaces and seals properly lubricated to ensure smoothness and good operation. Debris in the valve, damaged seals or lubrication wash-out are the most likely causes of operating problems. The frequency of routine maintenance necessary for the blanketing valve will depend on the severity of the operating conditions. The valve should be checked within a month of installation and then as determined appropriate after that. At minimum, the valve should be checked bi-annually.

Leakage Check

Before performing any disassembly, it is a good idea to check for external leakage. This can be done by spraying or brushing soap around mating connections and bolts. If no leakage is detected around the #18 gasket or the #21 gasket (See Fig. 4), then it should not be necessary to disassemble the diaphragm case while performing routine maintenance.

Disassembly & Inspection

The following instructions are for maintenance of the standard components of the blanketing valve. Refer to the section entitled "Accessory Equipment" for instructions regarding optional accessories. Also, the diagrams in this section show a unit with standard FNPT inlet and outlet connections. Except where noted, these instructions apply also to units with other inlet and outlet connections.

Protectoseal O-rings and gaskets are available from Protectoseal. See Table 6 on page 14 for soft goods kits which can be ordered.



WARNING: The blanketing valve must be completely depressurized before any disassembly is performed. Refer to your company's procedures for handling toxic or hazardous materials. See the "shut-down" instructions above.

■ DIAPHRAGM CASE

Remove the eight (8), #15 bolts, #20 nuts, and #4 lock washers. Carefully pull up the upper case assembly. Reach under the case to hold the #7 set spring in position while pulling the case up so that the spring and the #6 upper anchor do not fall over. The diaphragm assembly, see Fig. 4, and the #18 gasket can now be removed and checked. If there is any corrosion or damage to the gasket, it must be replaced.

Looking at the diaphragm assembly, the two (2), #13 plates should be clamped flat against the #14 diaphragm, and the diaphragm should be free of cracks, cuts or holes. See Fig. 5 for disassembly of the diaphragm assembly. Unthread the #11 stop (machined hex screw) from the #8 lower anchor. Note: This connection may be very tight due to thread adhesive being applied during assembly. The diaphragm and the #10 gasket should be free of cracks, cuts or holes. To remove the #19 lower case, remove the four (4), #9 hex screws. This exposes the #21 gasket which can then be inspected for corrosion or damage. (See Fig. 4)

■ PILOT VALVE (See Figs. 4, 6 & 7)

Position the blanketing valve so that the inlet points downward. Remove the four (4), #33 cap screws. Slowly lift up and remove the pilot body. Set aside the #36 main valve including (Fig. 7) the #38 piston assembly and #39 O-rings.

Refer to Fig. 6. Before removing the #32 lower plug assembly, identify the marks on the nut of the lower plug assembly and the bottom of the pilot body. These marks, which should be lined up with each other, identify the proper position of the lower plug. This position is set at the factory for optimal performance of the blanketing valve. If the marks are not easy to see, then additional marks to identify the position during reassembly (with felt tip pen or otherwise) should be made on the nut and the pilot body before unscrewing the lower plug. Unscrew and remove the #32 lower plug assembly. When this is removed, the #27 poppet and attached parts will come out with it. Be careful not to damage the fine thread on the lower plug after removal.

Grasping the lower plug assembly in one hand and the poppet in the other, firmly tug on the poppet to pull it out of the lower plug assembly. Be certain to do this in a slow, controlled manner so that the #28 poppet spring does not fly out and get lost. If the #19 lower case has been removed, then the #23 upper plug can also be removed. The best way to do this is to slowly insert a phillips-head screwdriver up into the bottom of the small hole in the upper plug and tap on it to push the plug out. Be very careful not to damage the inside bottom of the upper plug where the #22 O-ring seats. The O-rings can now be inspected for wear or corrosion.

■ MAIN VALVE (See Figs 7 & 8)

The #34 O-ring which is between the main body and the pilot body may be inspected for corrosion or damage. Slide the #38 piston assembly out of the #36 main body. Inspect the #38a piston rear (Fig. 8) for scratches or signs of marring. Inspect the #39 and #41 O-rings for wear or corrosion. Remove the #44 hex screw to disassemble the piston assembly. Be careful not to damage the outside of the piston.

It may be possible to inspect the #45 (Fig. 7) flow orifice plate while still assembled inside the inlet cap, #46. This can be removed and replaced without disassembling the blanketing valve. Contact your Sales Representative and request Part No. 10-T1A for the necessary tool.

If no leakage between the main body and the inlet cap was detected during the leakage test, then it will not be necessary to remove the inlet cap (See Fig. 4 & 7). If it is desired to remove the inlet cap, first remove the #51 and #53 bypass tubes by loosening the #47 and #50 tube fittings. Then remove the four (4), #43 cap screws and pull the inlet cap out from the main body. The #35 O-ring may then be inspected for corrosion or damage. If leakage was detected at any connections in the external filter line (going through the #40 filter), then these components should be removed for inspection and reapplication of FEP tape on the tapered threads. Refer to page 16 for instructions on cleaning the filter.

Reassembly

When reassembling the blanketing valve, be sure to replace any worn or damaged O-rings and gaskets.

WARNING

WARNING: Do not overtighten threaded connections.

■ MAIN VALVE (See Fig. 4, 7 & 8)

If the inlet cap has been removed, then replace the #35 O-ring, insert the inlet cap into the #36 main body, and secure it with the four (4), #43 hex screws and #56 lock washers. Tighten the cap screws to 96 in-lbs. of torque.

Reassemble any connections which were loosened in the external filter line. Apply FEP tape to any tapered thread connection. Reconnect the #51 and #53 inlet and outlet bypass tubes by tightening the #47 and #50 tube fittings. **WARNING:** It is critical that the #51 tube cutout is located in the center of the #46 inlet cap and perpendicular to the flow.

WARNING

Before reassembling the #38a piston rear (see Fig. 8), the (2) #39 O-rings should be liberally lubricated. Recommended lubricant is DuPont Krytox GPL206 (do not use for oxygen service). Reassemble the #40 retainer. Before assembling the #44 hex screw to the piston rear, Protectoseal recommends cleaning the threads and applying Loctite* primer #7649 and Loctite* thread locker #277 to where the hex screw engages the #38a piston rear internal threads. Insert the #44 hex screw with #9 lock washer and tighten to 60 in-lbs. of torque. Verify that all piston components are concentric before tightening to the final torque rating of 150 in-lbs. Push the piston assembly back into the main body. The piston should move freely in and out of the bore but should not drop through freely. If it does drop through, the wrong size (too small) O-rings must have been put into the grooves. Verify that the piston assembly is free to move in the main body bore by sliding it back and forth. The piston will fit snug in the bore but should not have to be more than hand forced past any point.

*Loctite not to be used for oxygen service.

■ PILOT VALVE (See Fig. 6, 7 & 4))

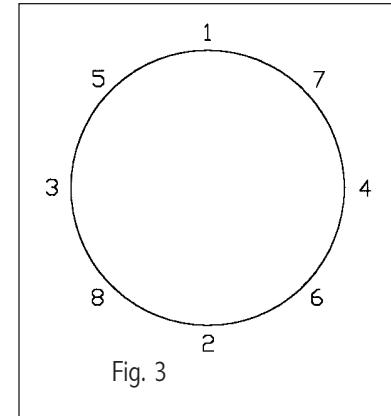
Before reassembling the pilot valve, the #25 and #26 O-rings should be lubricated. Reinsert all six (6) O-rings. It is also recommended that a conservative amount of anti-seize compound be applied to the threads of the lower plug before threading it back into the pilot body. Hold the poppet upside down, insert the #28 poppet spring in the groove in the end, and insert the #29 spring pin into the spring. Slide the #32 lower plug assembly over the spring pin, spring, and poppet, and pop it into place. The poppet should move easily up and down inside the lower plug, being pushed up by the poppet spring. Push the #23 upper plug back into the #30 pilot body if it has been removed (see Fig 7). The orientation of the cross holes in the upper plug is not important. Slowly, being careful not to damage the end of the stem on the poppet or the seat at the end of the piston, insert the #34 O-ring into the groove in the main body. Carefully position the pilot body over the main body so that the piston spring fits into the groove in the pilot body. Slowly push the pilot body toward the main body so that the hub of the pilot body slides inside the #34 O-ring. **WARNING - BE VERY CAREFUL NOT TO CUT OR DAMAGE THE O-RING!** While holding the pilot body in place, insert the four (4), #33 cap screws with #56 lock washers and

WARNING

■ DIAPHRAGM CASE (See Fig. 4)

With the assembly of bodies upright, place the #21 gasket on top of the pilot body. Place the #19 lower case over the gasket and secure it with four (4), #15 hex screws and #4 lock washers, tightening to 96 in-lbs. If the diaphragm assembly has been disassembled, then reassemble it as shown in Fig. 5. Apply thread adhesive to the thread connection and tighten until lock washer and plates are compressed.

Place the diaphragm assembly over the lower case, then place the #18 gasket over the diaphragm and line up the bolt holes. Place the #7 set spring over the #8 lower anchor of the diaphragm assembly and insert the #6 upper anchor in the top of the spring. While holding the spring upright with one hand, slide the #17 upper case assembly until it rests on top of the diaphragm. Line up the bolt holes, insert the eight (8), hex screws, lock washers, and nuts and tighten to 96 in-lbs. Tighten the hex screws in the order as shown in Fig. 3.



Reinstallation & System Check

Follow the installation and start-up instructions on page 2 to reinstall the blanketing valve after maintenance. After reinstalling the blanketing valve, a soap test should be performed again. If leakage is detected, then the point of leakage should be noted, and the valve should be disassembled as appropriate to identify the gasket or O-ring past which the leak is occurring.

If the blanketing valve flows continuously and does not seal after start-up, then the system should be shut down so that the problem can be identified. See the section "Troubleshooting" on page 28 for possible problem sources. Any time that a blanketing valve is disassembled and reassembled, its operation should be monitored for a period afterward.

Set Point Adjustment w/o a Field Test Kit

Protectoseal Series 10 2" blanketing valves may be provided with a field test kit which facilitates checking and, if necessary, adjusting the set point. See "Field Test Accessories" on page 21 for more information. Instructions below provide a method of checking the set point for a blanketing valve which is not equipped with a field test kit. To add field test accessories to your unit contact the factory.

■ REQUIRED EQUIPMENT

1. High pressure / high flow air (or nitrogen) supply source with pressure gauge
2. Low pressure air supply source with manometer or pressure gauge
3. Collector tank (optional)
4. Clamping device to hold the blanketing valve
5. Wrenches
6. Screwdriver
7. Ear protection

■ TEST PROCEDURE (See Fig. 9)



WARNING

1. Clamp the blanketing valve securely so that the outlet is open to blow into an area where it will not cause any harm. **WARNING:** A high pressure surge of air will exit the outlet port of the blanketing valve when the valve opens. It is advisable to connect a piece of pipe to the outlet to direct the flow away from the person conducting the testing.
2. Connect a line from a high pressure / high flow air supply source to the blanketing gas supply source, if possible. The recommended inlet supply range is 40 PSIG to 130 PSIG.
3. Connect a low pressure supply line to the $\frac{1}{2}$ " NPT sense port. This line must be connected to a manometer or pressure gauge for pressure monitoring. Ideally, to obtain a more static pressure supply, this line should come from a collector tank and the pressure reading should be taken from the collector tank.
4. Unscrew and remove the #1 cap from the blanketing valve.
5. Check that the manometer or gauge is zeroed.
6. Set the low pressure supply as follows:

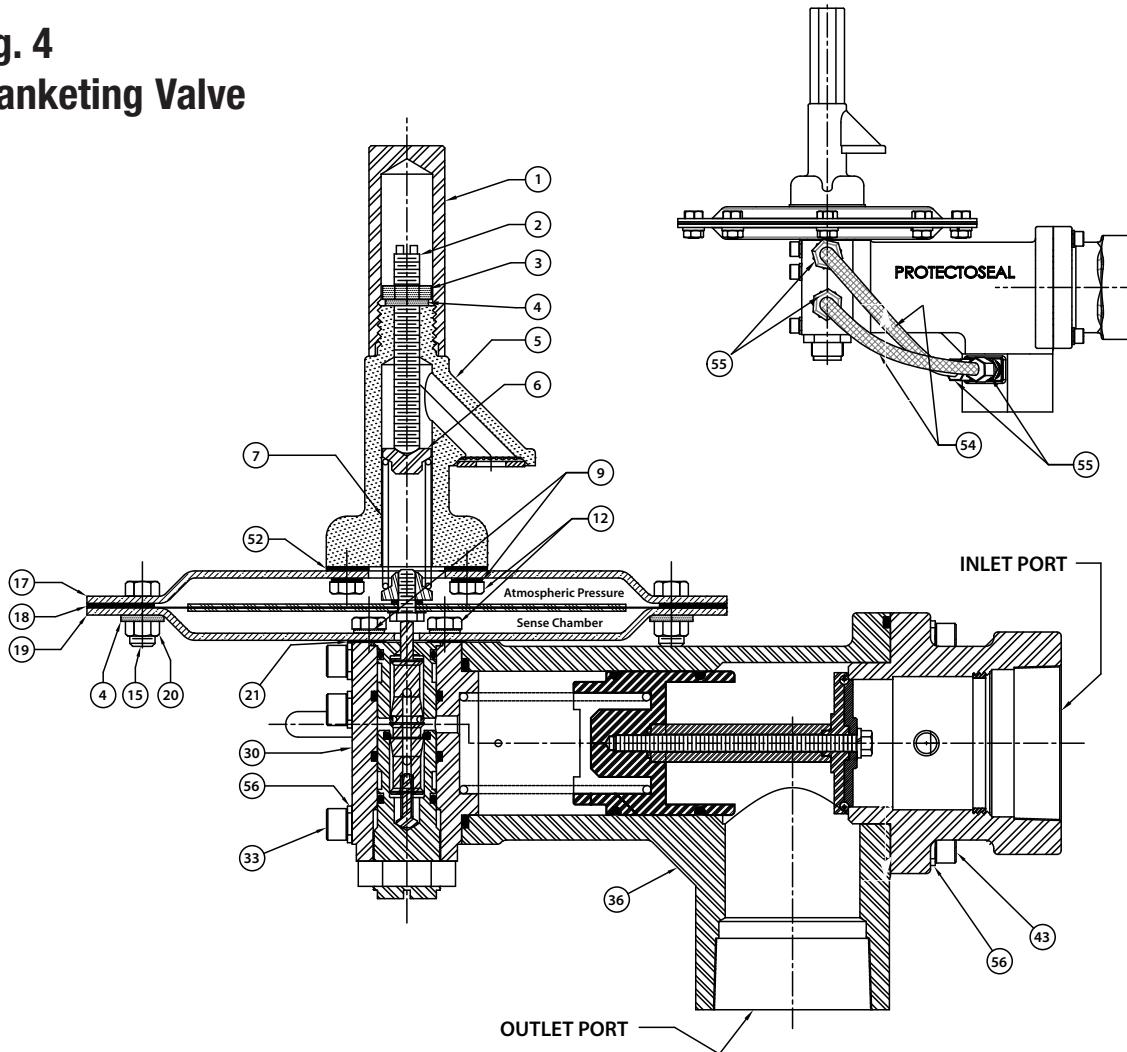
Set Point Range (inches W.C.)	Low Pressure Supply (inches W.C.)
-0.5 to 30.0	6 above set point
Above 30.0	2 above set point



WARNING

7. Pressurize the low pressure supply line connected to the sense port.
8. **WARNING:** Put on ear protection, the flow out of the valve can be extremely loud.
9. Pressurize the high pressure supply line connected to the inlet port.
10. If the blanketing valve does not seal initially, loosen the #3 jam nut and unscrew the #2 set screw until it seals completely.
11. Opening pressure adjustment: Cycle the pressure to the sense port up and down to determine the opening point of the blanketing valve. The tank pressure should be lowered slowly (at approximately 0.1" W.C. per second for low settings). Adjust the set screw so that the main valve opens at the desired set point. Please note the following:
 - a) The set point of the Series 10 Blanketing Valve is specified as the pressure at which the main valve opens.
 - b) The opening of the blanketing valve can be heard, and the opening of the main valve should be distinguished from the opening of the pilot valve. The pilot valve will begin to leak at a pressure just above that at which the main valve will open abruptly. The quick opening of the main valve is usually very loud, although the degree of loudness will depend upon the inlet pressure and the flow capacity (as determined by the size of the flow orifice, if any).
 - c) The main valve reseals above the pressure at which it opens, and the pilot reseals above where the main valve reseals.
12. After the desired opening pressure has been attained, secure the position of the set screw by tightening the jam nut until the lockwasher is flat.
13. If the opening pressure has been adjusted to a pressure different than that of the set point specified on the blanketing valve label, then the blanketing valve should be marked permanently to identify the new set point.
14. Shut off the inlet pressure, then relieve test tank pressure. Wait for the main valve to pop open and relieve pressure.
15. Disconnect all the test lines.
16. Screw the cap onto the spring guide and tighten it securely. Be careful not to move the spring guide.
17. Follow the blanketing valve installation and start-up instructions to install the blanketing valve into the system.

Fig. 4
Blanketing Valve

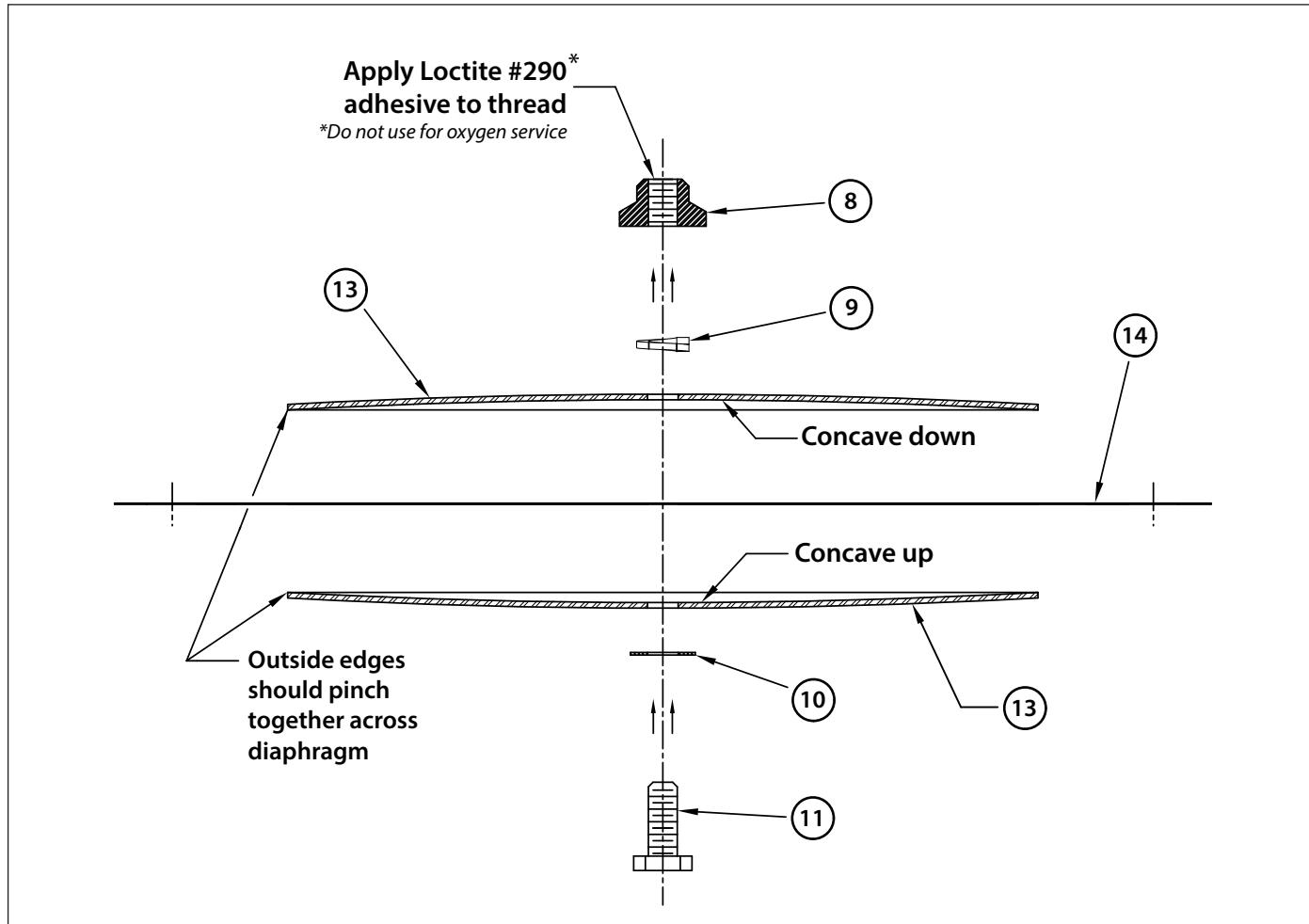


No.	Qty.	Description	Part No.	No.	Qty.	Description	Part No.
1	1	Cap	-	19	1	Lower Diaphragm Case	-
2	1	Set Screw	-	20	8	Jam Nut (3/8-16UN)	4329180000SS
3	1	Jam Nut (3/8-24UN)	4329170000SS	21	1	Gasket	20-18D-*
4	9	Lock Washer (\varnothing 3/8)	4289060000SS	30	1	Pilot Body (Fig. 6)	-
5	1	Spring Guide Assembly	-	33	4	Cap Screw (5/16-18UN)	4169157220SS
6	1	Upper Anchor	-	36	1	Main Body (Fig. 7)	--
7	1	Setting Spring	20-11(**)-66	43	4	Cap Screw (5/16-18UN)	4169143210SS
9	8	Lock Washer (\varnothing 1/4")	4289040000SS	52	1	Gasket	20-18E-101
12	8	Hex Screw (1/4-20UN)	4119141610SS	54	2	Exhaust Hose	10-240BR-69
15	8	Hex Screw (3/8-16UN)	4119182010SS	55	4	Tube Fitting	20-F22-69
17	1	Upper Diaphragm Case	-	56	8	Lock Washer (\varnothing 5/16)	4289050000SS
18	1	Diaphragm Case Gasket	20-18C-*				

** Suffix 'A' through 'D', spring dependent on setting - see Product Spec Sheet.

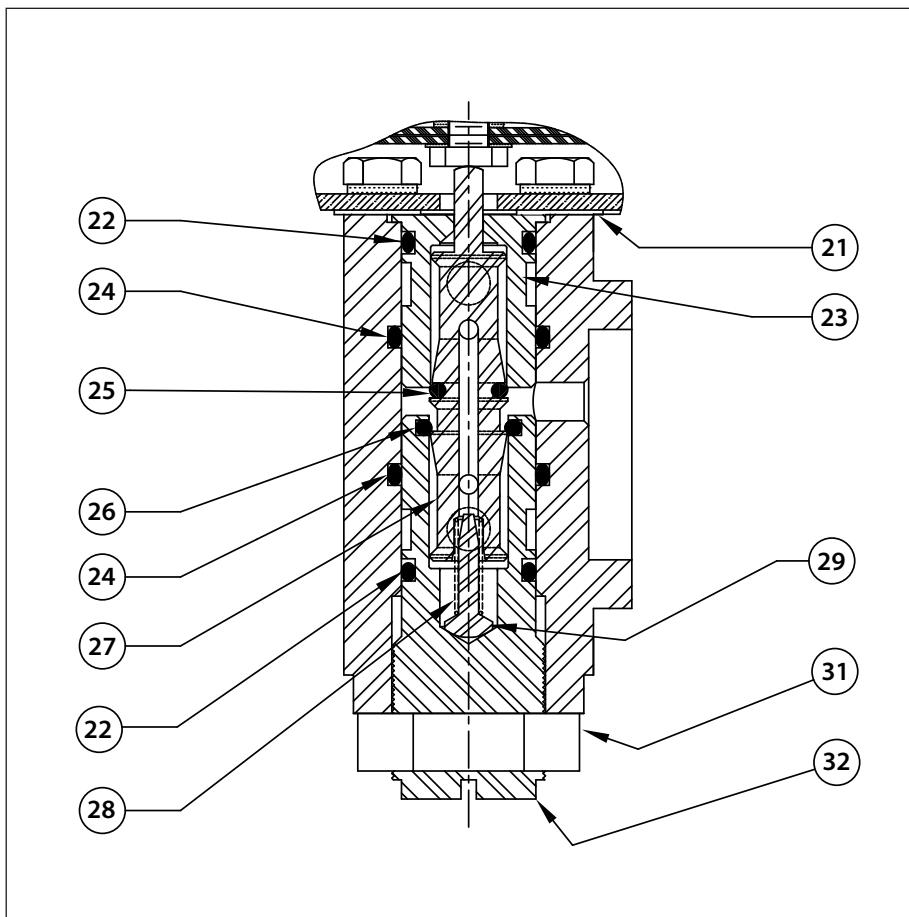
* Suffix for the material code, see Table on page 14.

Fig. 5
Diaphragm Assembly



No.	Qty.	Description	Part No.
8	1	Lower Anchor	-
9	1	Lock Washer (1/4" Dia.)	4289040000SS
10	1	Gasket (FEP)	20-18B-107
11	1	Stop	-
13	2	Plate	-
14	1	Case Diaphragm (FEP)	20-18A-107

Fig. 6
Pilot Valve Assembly
(Item #30)

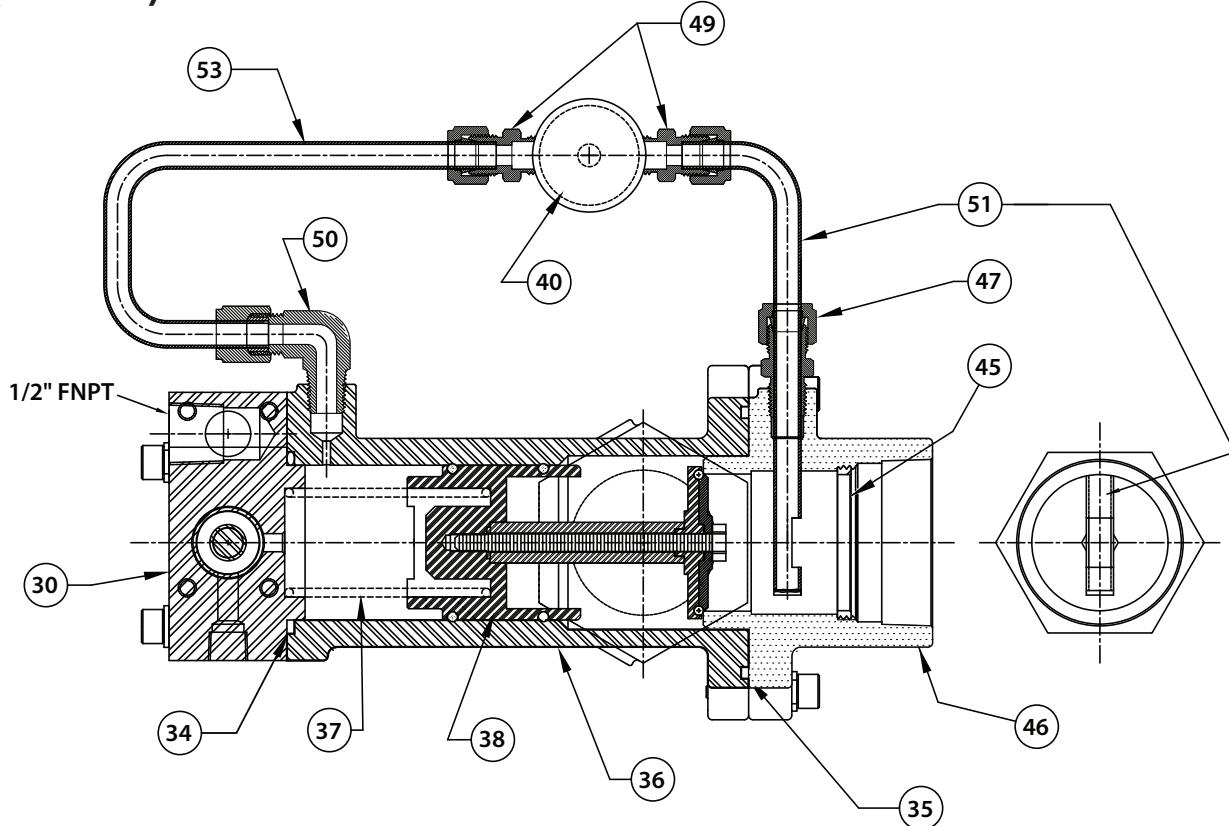


No.	Qty.	Description	Part No.
21	1	Gasket	20-18D-*
22	2	O-Ring	20-R115-*
23	1	Upper Plug	†
24	2	O-Ring	20-R118-*
25	1	O-Ring	20-R109-*
26	1	O-Ring	20-R112-*
27	1	Poppet	†
28	1	Poppet Spring	-
29	1	Spring Pin	-
30	1	Pilot Body	†
31	1	Lock Nut	-
32	1	Lower Plug	†

* Suffix for the material code, see Table 5 on Page 14.

† These parts must be replaced as a set.

**Fig. 7
Main Valve Assembly
(Item #36)**

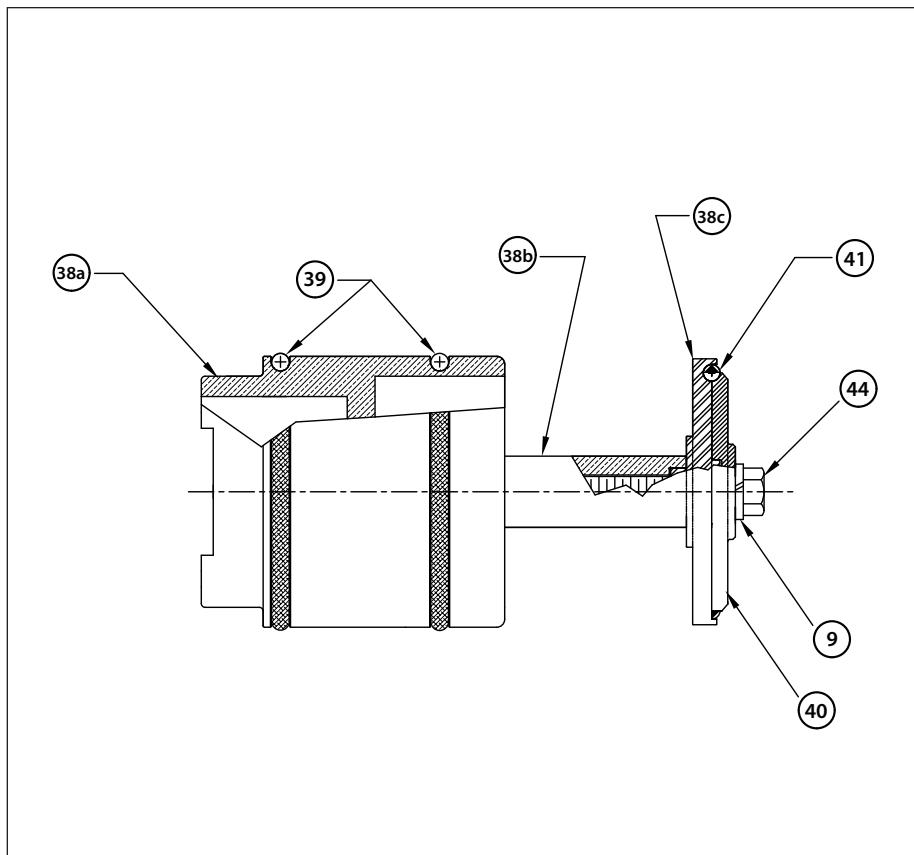


No.	Qty.	Description	Part No.
30	1	Pilot Body	-
34	1	O-Ring	10-R228-*
35	1	O-Ring	10-R238-*
36	1	Main Body	-
37	1	Piston Spring	-
38	1	Piston Assembly	-
40	1	Bypass Filter	-
45	1	Orifice Place	10-236[**]-69
46	1	Inlet Body	-
47	1	Bypass Inlet Fitting	-
49	2	Filter Fitting	20-F22-69
50	1	90° Elbow Fitting	20-F32-69
51	1	Bypass Inlet Tube	-
53	1	Bypass Outlet Tube	-

** Suffix 'A' through 'D' dependent on Flow Reduction % - See Product Spec Sheet.

* Suffix for the material code, see Table 5 on page 14.

Fig 8
Piston Assembly
(Item #40)



No.	Qty.	Description	Part No.
9	1	Lock Washer	-
38a†	1	Piston Rear	-
38b	1	Piston Stem	-
38c	1	Piston Front	-
39	2	Piston O-Ring	10-R225-*
40	1	Retainer	-
41	1	Main Seal O-Ring	10-R224-*
44†	1	Piston Hex Screw	-

* Suffix for the material code, see Table on Page 14.

† Apply Loctite primer #7649 and #Loctite thread locker #277 to mating threads prior to assembly. Do not use Loctite for oxygen service.

**Table 5
O-Ring & Gasket Codes &
Suffixes**

Model No. Code*	Material	Part No. Suffix (†)
A	Buna-N	-101
B	Neoprene	-100
C	Viton®	-118
D	EPDM	-136
E	Kalrez®**	-140
F	Chemraz®**	-138

* Digit #7 of part number.

** On units with Kalrez® or Chemraz® seals & gaskets the diaphragm case gasket will be Buna-N.

**Table 6
Soft Goods Kits**

Kit Part No.	Contents
10-SGK1-†	All O-rings, Gaskets & Diaphragms
10-SGK2-†	All O-rings

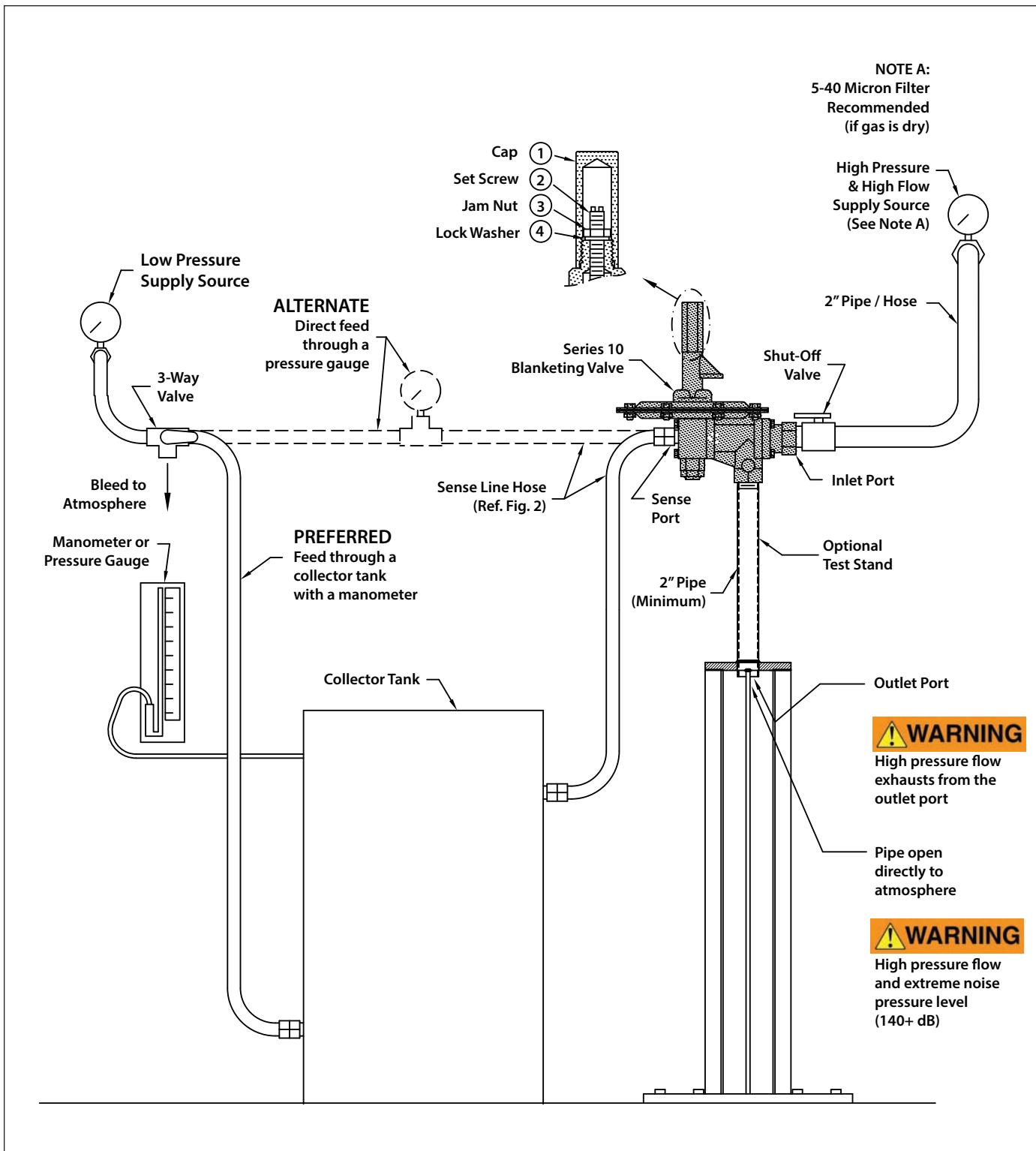
† Suffix for the material code, see Table 5.

**Table 7
O-Ring Sizes**

No.	Part No.	Cross Section Dia.	I.D.
25	20-R109-*	.103	0.299
26	20-R112-*	.103	0.487
22	20-R115-*	.103	0.674
24	20-R118-*	.103	0.862
41	10-R224-*	.139	1.734
39	10-R225-*	.139	1.859
34	10-R228-*	.139	2.234
35	10-R238-*	.139	3.484

* Suffix for the material code, see Table 5.

Fig. 9 Recommended Test Set-Up



ACCESSORIES

Filter

■ FUNCTION

The inlet line filter, with a 20 micron element, serves to keep any unwanted particles out of the pilot valve and dome volume. This filter serves as back up in case contamination enters the supply line through or after the supply line filter. **THIS FILTER IS NOT A SUBSTITUTE FOR A SUPPLY LINE FILTER.**

■ MAINTENANCE

Condensate may be drained from the bowl of the in-line filter (see Fig. 10) by turning the draincock (serrated knob on the bottom of the bowl) clockwise from bottom. Note: The serrated knob may be covered by a protective rubber cap which slips off. Draining can be done while the system is pressurized, however caution must be taken to catch the fluid which may shoot out due to the high pressure inside of the filter (the pressure inside the filter will equal the blanketing gas supply pressure). **WARNING: DO NOT unscrew the bowl of the filter while system is pressurized.** After the system has been depressurized, the filter can be cleaned as follows:

1. Unscrew the bowl of the filter and clean the bowl (use household soap only or other compatible cleaner).
2. Unscrew the filter element. Check the element for excessive blockage or visible holes. Replacement filter elements are available if needed.
3. Reassemble the element and the bowl. Make sure that the bowl is screwed all the way so that the top presses against the rubber seal in the body. Also make sure that the drain at the bottom of the bowl is closed (screwed all the way counter-clockwise from

WARNING

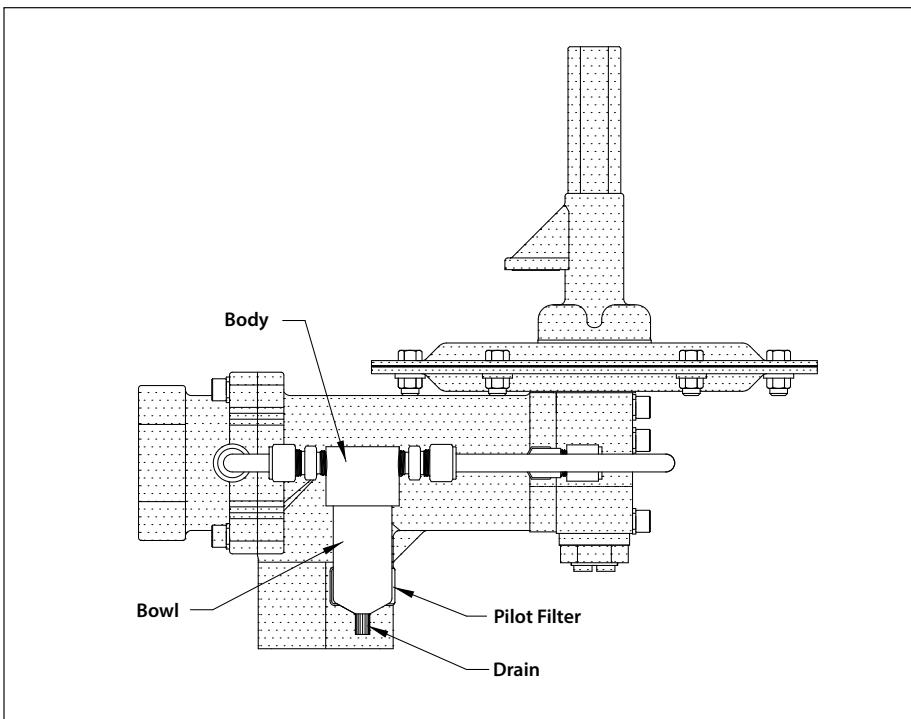


Fig. 10
Pilot Filter

Check Valve

■ FUNCTION

The check valve, which goes in the external filter line between the inlet gas supply and the pilot valve, prevents tank pressure from being drawn out of the tank through the blanketing valve in the event that pressure in the blanketing gas supply line should drop to zero or vacuum. It is in between the inlet cap and the pilot filter and allows flow in only one direction - from the inlet to the filter (and on to the pilot valve). See Fig. 11.

■ MAINTENANCE

The check valve should not normally require maintenance. When the blanketing valve has been depressurized, the check valve may be removed and checked. A small arrow on the body of the check valve shows the direction of flow. If pressure is supplied to the inlet, flow should come through the outlet. If pressure is supplied at the outlet, no flow should pass through the check valve. If the check valve is found to be defective, it must be replaced.

When installing the check valve, be certain that it is positioned with the arrow pointing away from the inlet (in the direction of flow shown in Fig. 11).

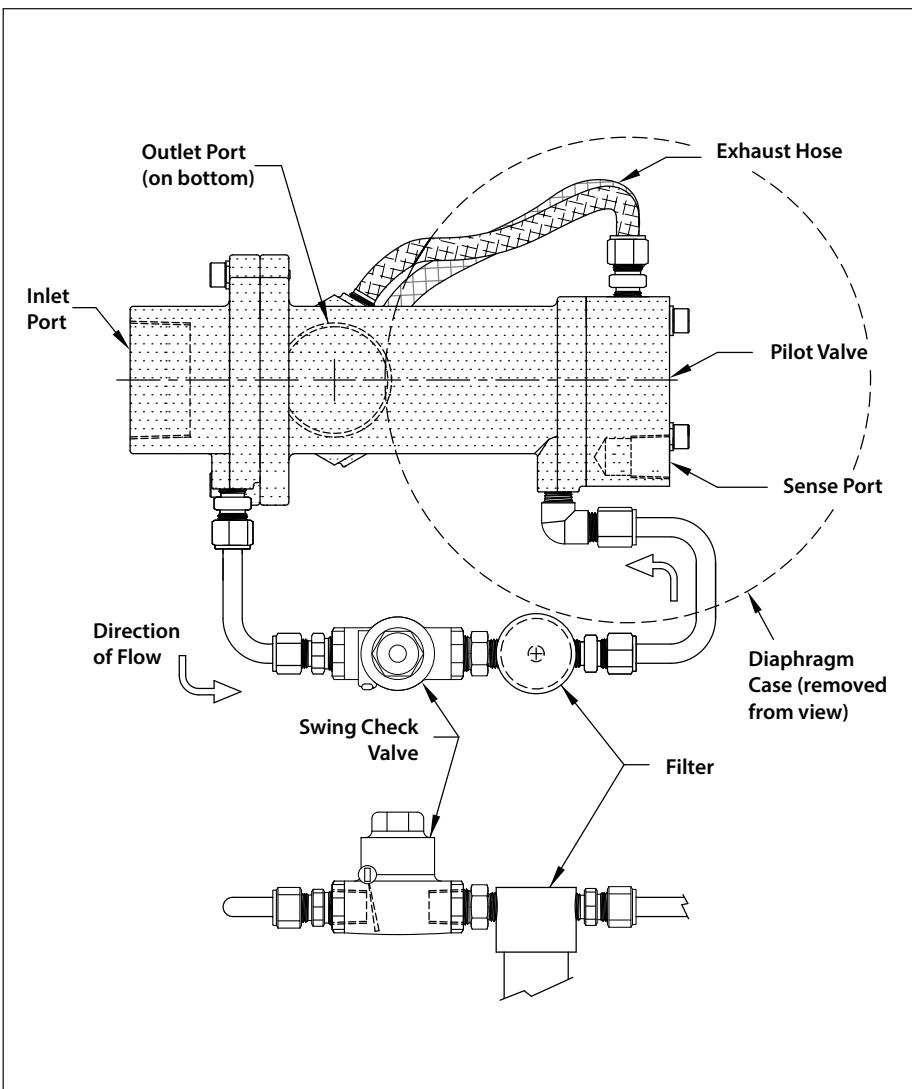


Fig. 11
Check Valve Location

Pressure Gauges

■ FUNCTION

Optional pressure gauges may be included which enable system pressure monitoring. The supply line pressure gauge will show the blanketing gas supply pressure at the inlet and inside of the blanketing valve. The sense line pressure gauge will show the tank pressure being sensed by the blanketing valve through the sense line.

■ MAINTENANCE

When the blanketing valve has been completely depressurized, gauges may be removed for calibration checks. Replacement gauges can be ordered if necessary. The sense line gauge supplied by Protectoseal has a working pressure of up to 15 psig and so should not be damaged by fluctuations in tank pressure. Damage to the supply pressure gauge may indicate that the blanketing gas supply system was overpressurized at some point. Excessive supply pressure can cause blanketing valve failure and should be immediately investigated.

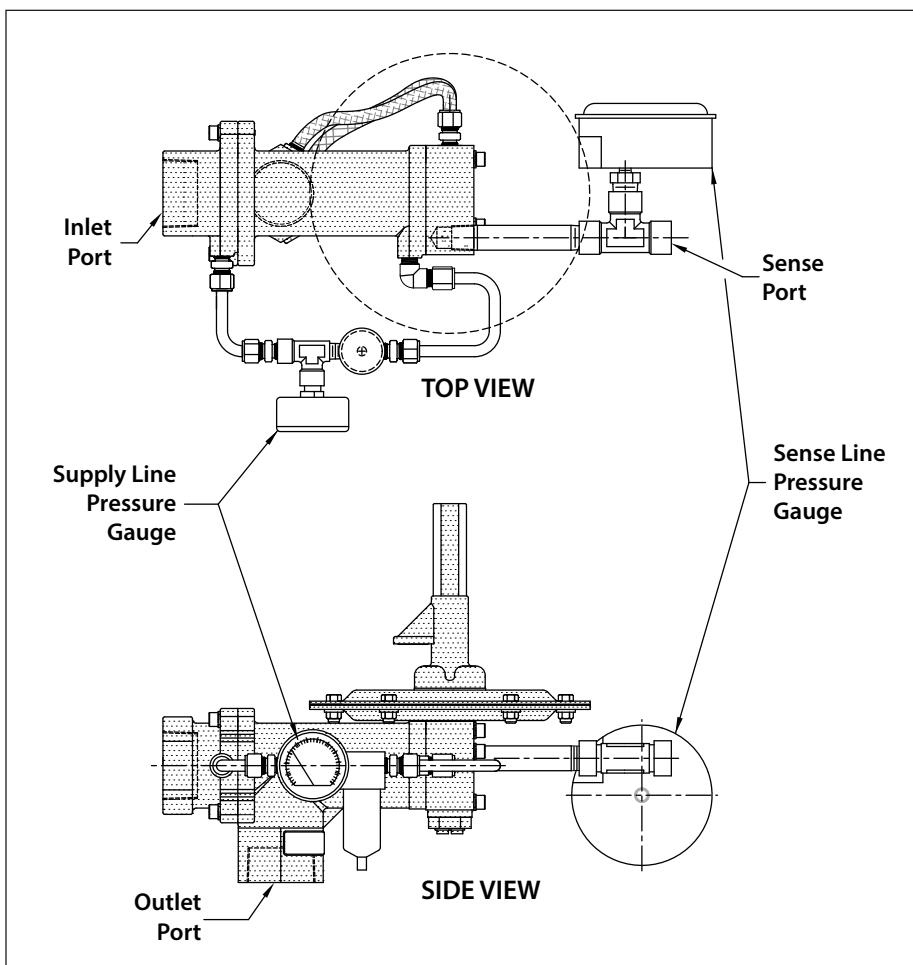


Fig. 12
Pressure Gauges

Integral Purge Accessories

■ FUNCTION

The integral purge is used to create a small flow of blanketing gas at the blanketing valve outlet and/or the sense line connection in order to keep vapors from the material stored in the tank from corroding the blanketing valve. Due to the blanketing valve's stainless steel 316 construction, the availability of chemically resistant soft goods, and the high concentration of blanketing gas present in the blanketing valve, the integral purge should not be necessary except in very severe service conditions. Both the blanketing valve

outlet, and to a much lesser extent, the sense line will be purged with blanketing gas any time that the blanketing valve opens. The integral purge, however, flows continuously and also lessens the existence of standing vapors from the stored material when the blanketing valve is closed.

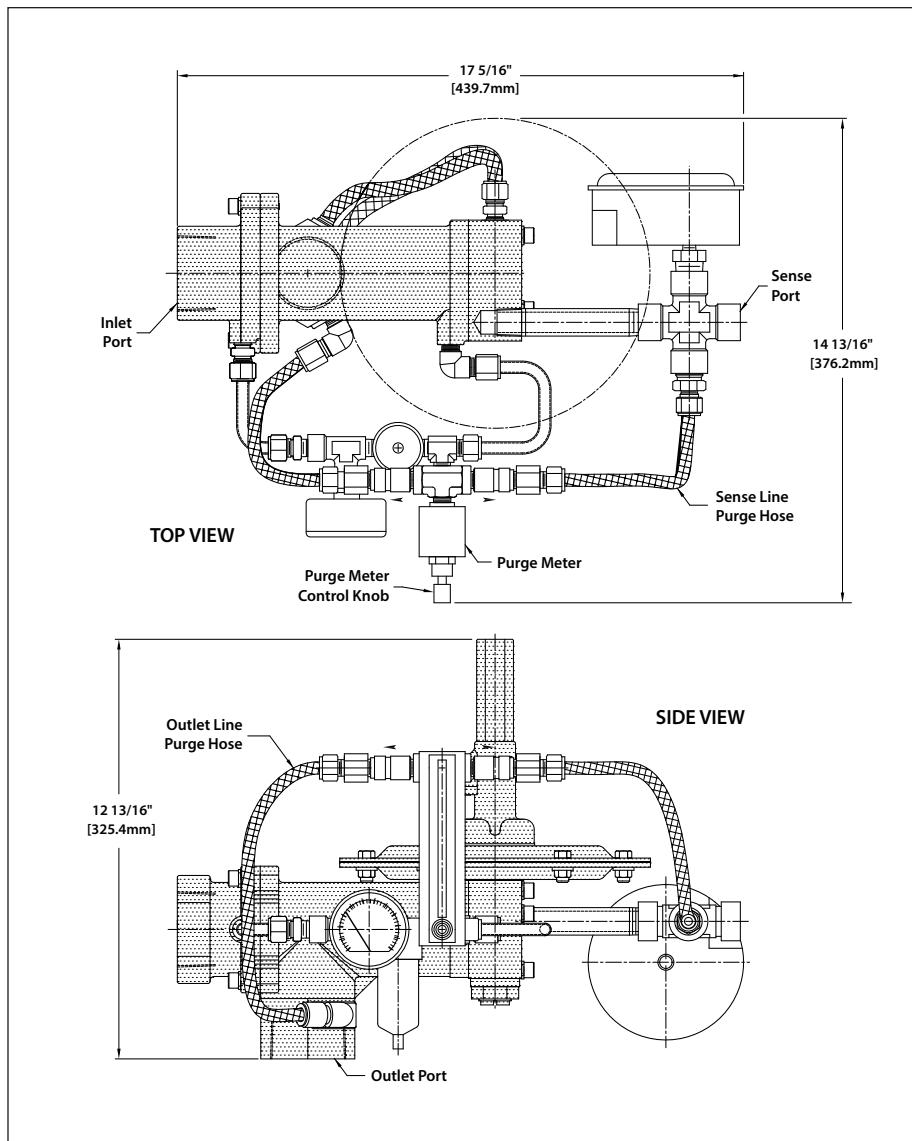


Fig. 13
Integral Purge System with Outlet & Sense Line Purges

■ OPERATION

The integral purge system uses the blanketing gas supply to create a trickle of flow at the outlet port and/or sense port. The purge meter (See Fig. 13) is used to control the flow going to either of these locations. A recommended flow through the meter is 0.5 SCFH. Flows higher than about 1.0 SCFH past the sense port are not recommended because they can create an artificially high pressure at the sense port leading to the valve opening at a tank pressure lower than the set point. If only the outlet purge is connected, flows between 0.80 and 1.00 SCFH are recommended. Do not set purge meter higher than 1.0 SCFH.

The purge meter has a percent scale. The flow indicated will depend on the blanketing gas supply pressure, the molecular weight of the blanketing gas, and (to a lesser degree) the operating temperature. See the tables below to determine the flows through the purge meter:

Scale Reading for a Desired Flow:

$$\text{Scale Reading \%} = (\text{Desired Flow SCFH}) \times 125 \times F1 \times F2 \times F3$$

Flow Indicated at a Scale Reading:

$$\text{Flow SCFH} = (\text{Scale Reading \%}) / (125 \times F1 \times F2 \times F3)$$

Table 8
Supply Pressure Factor (F1)

SUPPLY PRESSURE (PSIG)	F1
40	0.518
50	0.477
60	0.444
70	0.417
80	0.394
90	0.375
100	0.358
110	0.343
120	0.330
130	0.319

Table 9
Molecular Weight Factor (F2)

GAS	F2
Carbon Dioxide	1.00
Helium	1.238
Natural Gas	0.775
Nitrogen	0.982

Table 10
Temperature Factor (F3)

Temp. (°F)	Temp. (°C)	F3
0	-18	0.932
20	-7	0.952
40	4	0.971
60	16	0.991
70	21	1.000
80	27	1.009
100	38	1.028
120	49	1.046

■ MAINTENANCE

The integral purge accessories should not normally require maintenance. When the blanketing valve has been removed for maintenance, the purge meter or purge system can be checked for blockage by attaching a pressure line to the inlet of the purge meter (the bottom connection) and checking for flow at the outlet(s).

Since the blanketing gas should be clean, the purge meter should not usually require cleaning. However, if it is necessary to do so, follow these steps:

1. Squeeze the clear plastic shield to unsnap it from the retainer.
2. Remove the glass tube by pushing it up (against the compression spring) and pulling it out.

3. Use tweezers to pull the float stop out from the top of the tube and then carefully tilt the tube to remove the float. Handle the float with care to avoid nicking or scratching it.
4. Clean the tube and float with mild detergent and water or with a suitable solvent. Use a soft cloth or tube brush to clean the meter tube. Do not expose the tube or float to extreme temperature changes.
5. The shield may be cleaned with detergent and water or with kerosine. If kerosine is used, follow up cleaning with detergent and water.
6. Reassemble in the reverse order of disassembly.

Units which have an outlet line purge will include one or more check valves which prevent back flow from the outlet when the blanketing valve opens. The blanketing valve will not function without these check valves. If it is desired to inspect these check valves, refer to the paragraph on check valve maintenance. Be certain to note the direction of the arrows on the check valves before removing them so that they will be reinstalled properly (the arrows should point away from the purge meter as shown in Fig. 13.).

Field Test Accessories

(Field test accessories contain steel components; please contact factory for additional information.)

■ FUNCTION

The field test accessories make it possible to check the opening pressure of the valve in the field. Through a series of valves and a regulator, the blanketing gas supply is regulated down and directed into the sense chamber of the blanketing valve. A vacuum pump is also used in the low pressure / vacuum set point version in order to lower the pressure sufficiently. By lowering and raising this regulated pressure, the opening and closing point of the blanketing valve can be determined. Both the supply pressure gauge and the sense pressure gauge are included with the field test accessories.

Optional additional accessory is a shut off valve for the sense line. The sense line shut-off valve is used to isolate the sense chamber while conducting a field test. It provides easy accessibility if the valve is field tested while connected to the tank. It also provides a quick means of sealing off the sense port if the valve is removed from the tank for testing.

■ SET-UP

If the unit has been removed from the system:

1. Seal off the sense port by closing the sense line shut-off valve or inserting a pipe plug.
2. Position the outlet of the valve so that the high pressure flow can exhaust safely. The blanketing valve should be held securely by clamping, bolting, or other means.
3. **WARNING:** The flow out of the valve can be extremely dangerous and loud. Be sure to direct any vapors away from non-secured infrastructure and people. The use of personal protective equipment, including ear protection is highly recommended.
4. Connect a line from a pressure source to the valve inlet. The minimum restriction in this line should be a 1" pipe size diameter. The pressure source must be of sufficient capacity to open the blanketing valve fully, otherwise the valve will not operate consistently. Where possible, the inlet supply pressure should be equivalent to the blanketing gas supply pressure.
5. **WARNING:** Do not close off or restrict the outlet flow. This may lead to inaccurate opening and closing as well as piston chatter.

If the unit is still connected in the system:

1. Shut-off the blanketing gas supply to the inlet port.
2. Isolate the sense port from the tank by closing the sense line shut-off valve.





3. If the unit is still connected to the tank, you must leave the outlet line open and exhaust the blanketing valve into the tank. **WARNING:** Exhausting into the tank while running a field test may cause the tank's pressure relief vents to open.
4. It is recommended that a supply line shut-off valve be located close enough to the valve for the operator to easily control the blanketing gas.

Notes regarding the set point and valve operation:

1. The set point of the Protectoseal Series 10 Blanketing Valve is specified as the pressure at which the main valve opens.
2. The opening of the main valve should be audibly distinguished from the opening of the pilot valve. The pilot valve will begin to leak at a pressure just above that at which the main valve will open abruptly. The quick opening of the main valve is usually very loud and dangerous if proper precautions are not taken although the degree of which will depend upon the inlet pressure and the flow capacity.
3. The main valve reseals above the pressure at which it opens, and the pilot reseals above where the main valve reseals.

■ TESTING - HIGHER PRESSURE SET POINT KIT

If the unit has set point range B, C, D or E (as indicated by digit 6 of the model number) (2.1 to 69.2 inches W.C.) then this section applies. If the unit has a set point range of A or F, then proceed to the next section entitled "Testing - Low Pressure or Vacuum Set Point".

Follow these steps to determine the opening and resealing points (See Fig. 14):

1. Connect the test kit as shown at connection #1 and connection #2 (if it is not already attached). If the blanketing valve includes the integral purge option, the purge meter should be shut before using the field test unit.
2. Pull up the handle on the regulator to unlock it and turn the handle all the way counter-clockwise. This minimizes the outlet pressure of the regulator so that the regulator pressure gauge will not be damaged when inlet pressure is applied.
3. Turn the knobs on the needle valve and the bleed valve clockwise to close them.
4. Open shut-off valve #2 (at the hose end of the test kit).
5. **WARNING:** The flow out of the valve can be extremely dangerous and loud. Be sure to direct any vapors away from non-secured infrastructure and people. The use of personal protective equipment, including ear protection is highly recommended.
6. Pressurize the inlet to the blanketing valve.
7. Slowly open shut-off valve #1 (at the inlet of the test kit).
8. Turn the handle on the regulator clockwise to increase the outlet pressure until the regulator gauge reads approximately 10 PSIG.
9. Slowly open the needle valve to pressurize the sense line. Bring the pressure up above the set point (as indicated by the sense line pressure gauge).
10. Lower the sensed pressure by adjusting the knobs on the bleed valve, the needle valve and the regulator.
11. Note: If the blanketing valve has been removed from the system, then pressure in the sense chamber will bleed to atmosphere through the outlet port. Thus, there will not be a tight system and some gas must be continually bled in through the test kit in order to maintain the pressure at the sense port.
12. Cycle the sensed pressure up and down to determine the opening pressures. If the blanketing valve is not opening at the set point, see the section entitled "Set Point Adjustment" on page 7.
13. If other problems are experienced, refer to the troubleshooting guide. Double check your set-up and test procedures before attempting to adjust the set point or fix any other problems.

If other problems are experienced, refer to the troubleshooting section. Double check your set-up and test procedure before attempting to adjust the set point or fix any other problems.

■ TESTING - LOW PRESSURE OR VACUUM SET POINT TEST KIT

If the unit has set point range A or F (-0.5 to 2.0 inches W.C.), then this section applies. Follow these steps to determine the blanketing valve's opening and resealing points (See Fig. 15).

1. Pull up the handle on the regulator to unlock it and turn the handle all the way counter-clockwise. This minimizes the outlet pressure of the regulator so that the regulator pressure gauge or the sense line gauge will not be damaged when inlet pressure is applied.
2. Turn the knob on the stem valve clockwise to close it.
3. Open shut-off valve #2 (at the hose end of the test kit).
4. **WARNING:** The flow out of the valve can be extremely dangerous and loud. Be sure to direct any vapors away from non-secured infrastructure and people. The use of personal protective equipment, including ear protection, is advised.
5. Pressurize the inlet to the blanketing valve.
6. Slowly open shut-off valve #1 (at the inlet of the test kit).
7. Turn the handle on the regulator clockwise to increase the outlet pressure until the regulator gauge reads 13 to 14 PSIG. **(NOTE:** Do not pressurize above 15 PSIG. Doing so could damage the sense line pressure gauge which is rated at 15 PSIG maximum.)
8. Lower the sensed pressure by turning the knob to open the stem valve. **NOTE:** Due to the small volume of the field test kit which controls the sense pressure, the blanketing valve may chatter near the set point.
9. Cycle the sensed pressure up and down to determine the opening pressures.
10. If the blanketing valve is not opening at the set point, refer to the section entitled "Set Point Adjustment" on page 7.



If other problems are experienced, refer to the troubleshooting section. Double check your set-up and test procedure before attempting to adjust the set point or fix any other problems.

■ ADJUSTING THE SET POINT (See Fig. 4)

1. Remove the #1 cap.
2. While securing the #2 set screw with a screwdriver, loosen the #3 jam nut.
3. Screw the set screw clockwise to make the unit open at a higher (or less negative) pressure or screw it counter-clockwise to make it open at a lower (or more negative) pressure.
4. Check the opening point using the field test kit as instructed above.
5. Iterate until the desired opening point is achieved.
6. Secure the position of the set screw with the jam nut and lock washer.
7. Thread on and tighten the cap.
8. Mark the new set point on blanketing valve label.

■ AFTER TESTING

To depressurize the blanketing valve and test kit, shut off the inlet supply while the valve is flowing. Check that the pressure indicated on the sense line gauge is zero. Close shut-off valve #1 and shut-off valve #2. Disconnect the test kit at connection #1 and connection #2, if desired.

If the unit has been removed from the system:

1. Open the sense line shut-off valve or remove the pipe plug from the sense port.
2. Disconnect the line from the pressure source.
3. Follow the installation and start-up instructions on page 2 to reinstall the blanketing valve.

If the unit is connected to the system:

1. Open the sense line shut-off valve.
2. Turn the handle on the 3-way valve back to its original position to open the path from the blanketing valve outlet to the tank and shut-off the auxiliary port.
3. Open the inlet supply shut-off valve.

Open and reset the purge meter if that option is included with the blanketing valve per procedure noted on page 20.

■ MAINTENANCE

If any of the components of the field test kit do not function properly, consult the factory for assistance in ordering replacement parts.

The following Figs. will appear on the next pages:

Fig. 14

Higher Pressure Set Point (2.1 to 69.2 inches W.C.) Field Test Kit
With Outlet Line 3-Way Valve & Sense Line Shut-Off Valve

Fig. 15

Low Pressure or Vacuum Set Point (-0.5 to 2.0 inches W.C.) Field Test Kit
Without Outlet Line 3-Way Valve or Sense Line Shut-Off Valve

Fig. 16

Combination of all Available Accessories

Fig. 14
Higher Pressure Set Point
Field Test Kit

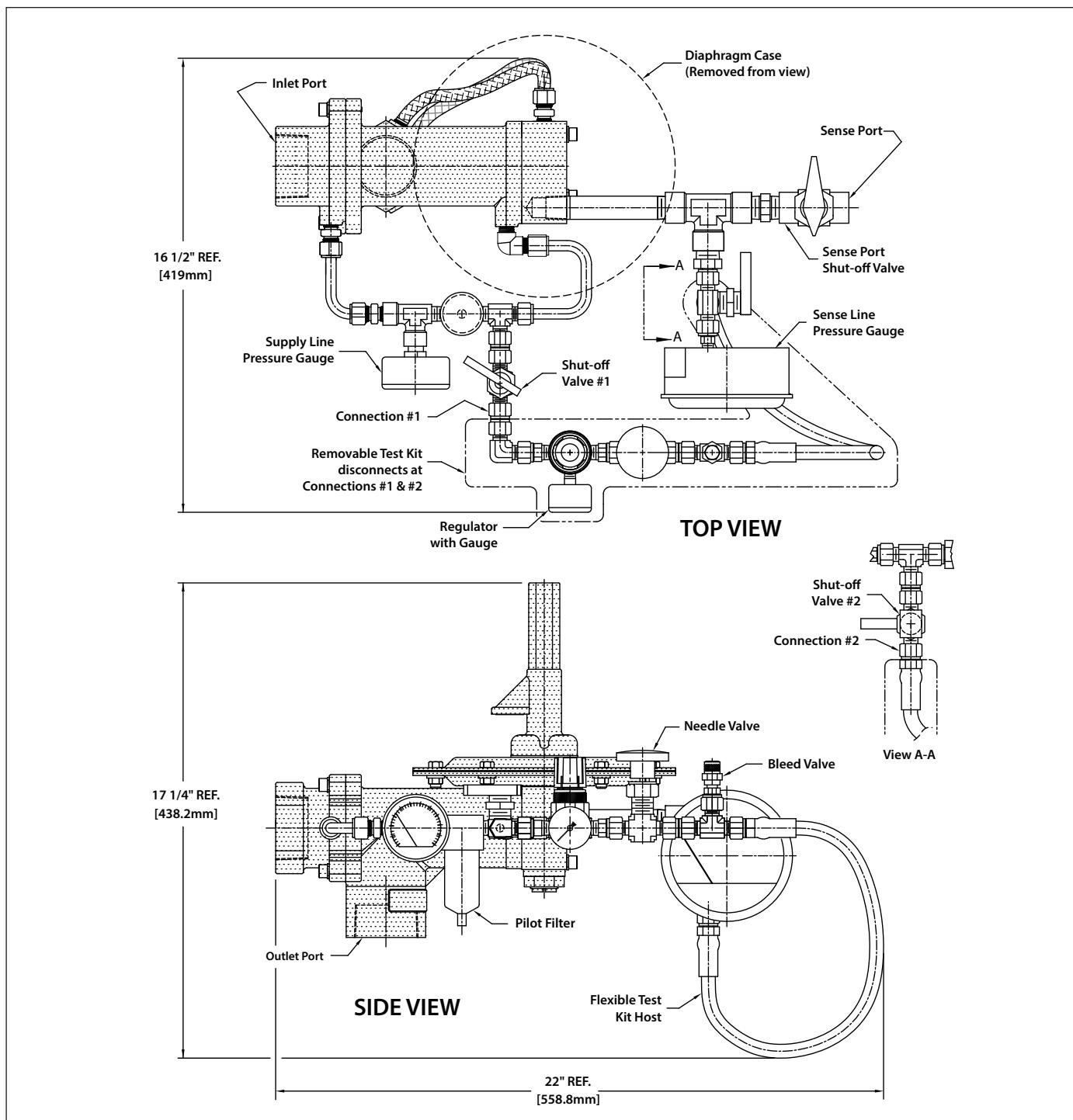


Fig. 14

Higher Pressure Set Point (2.1 to 69.2 inches W.C.) Field Test Kit
 With Outlet Line 3-Way Valve & Sense Line Shut-off Valve

Fig. 15
Low Pressure Field
Test Kit

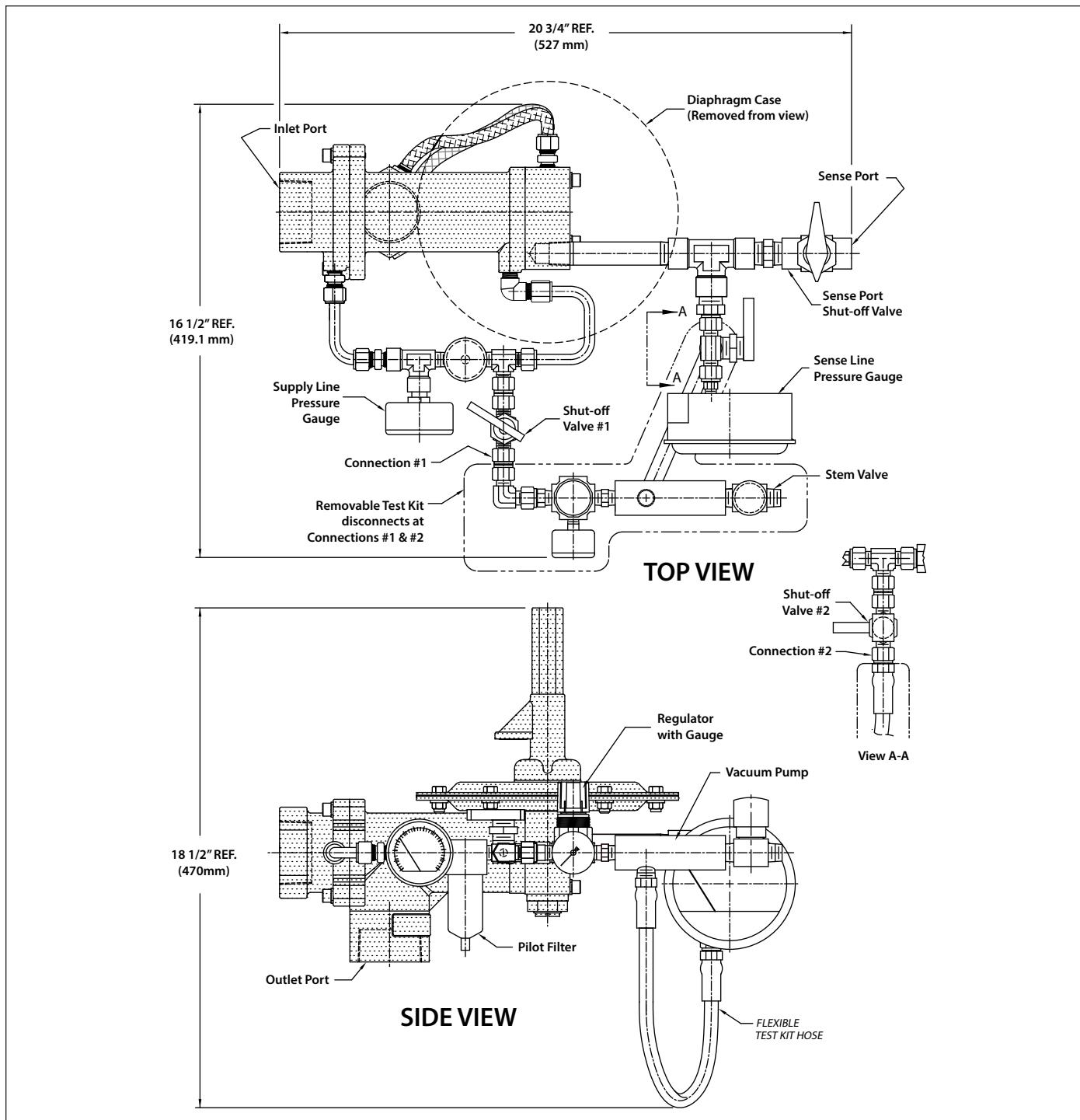
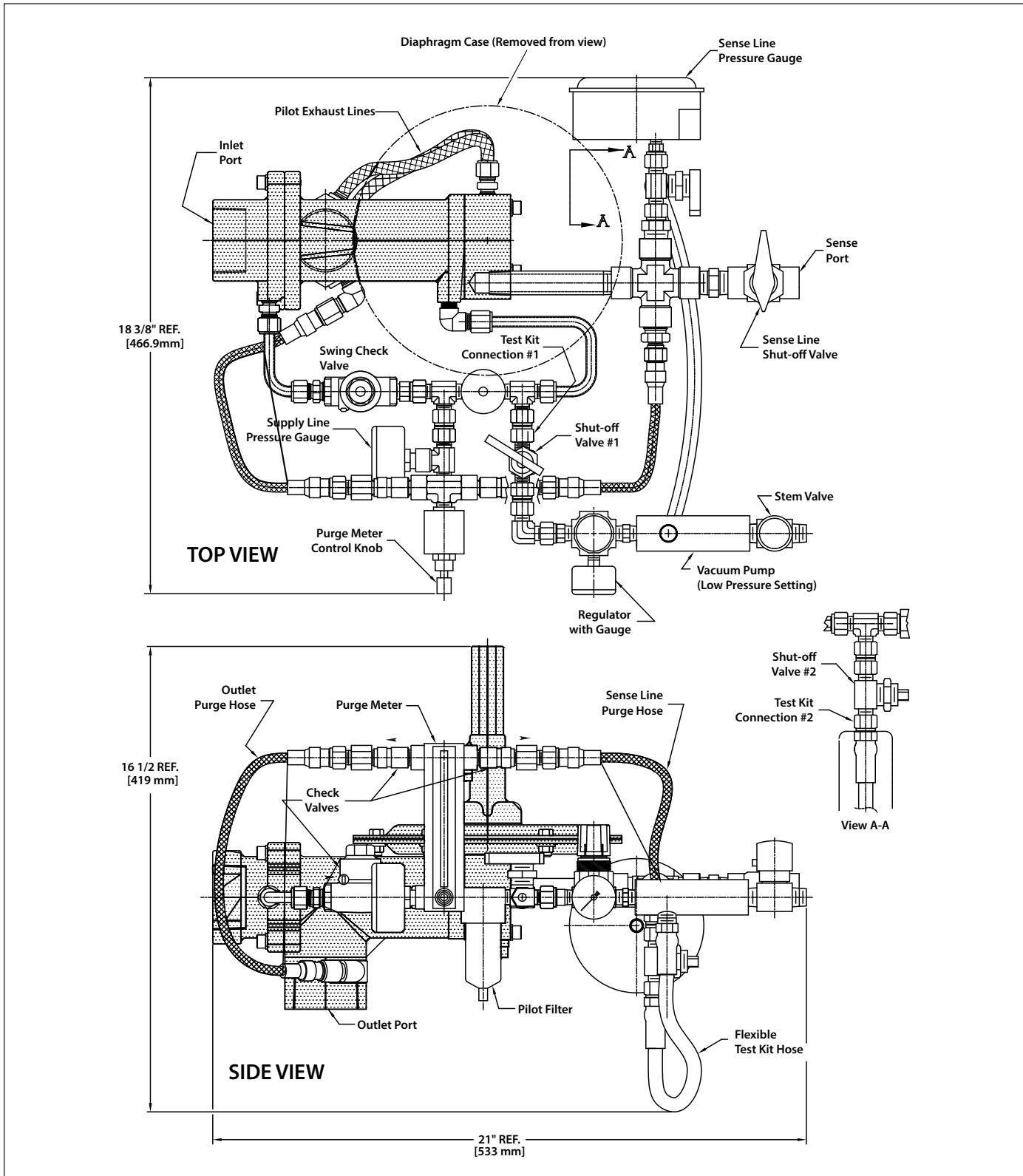


Fig. 15
Low Pressure or Vacuum Set Point (-0.5 to 2.0 inches W.C.) Field Test Kit
Without Outlet Line 3-Way Valve or Sense Line Shut-off Valve

Fig. 16 Combination of All Available Accessories

NOTE: Field Test Kit include steel components. Contact Protectoseal for additional information.



Troubleshooting

Possible problems which could be encountered with a blanketing valve are listed below. Possible sources of the problems along with suggestions for investigating the problems are also included. Refer to the maintenance instructions for directions on disassembly and reassembly of the blanketing valve and accessories. Refer to Figure 2 through 8 as necessary. **NOTE:** ** Refers to optional equipment which may not be included with your unit

WARNING

WARNING: Always depressurize the blanketing valve before disassembling.

■ PROBLEM 1 : The blanketing valve does not open at all.

- 1.1. The blanketing gas supply is empty or shut down or the shut-off valve in the supply line is closed.
 - ✓ Inspect the blanketing gas supply source and supply line.
- 1.2. The shut-off valve in the outlet line is closed.
 - ✓ Open the shut-off valve.
- 1.3. The sense line shut-off valve is closed or the sense line is blocked.
 - ✓ Inspect the sense line.
- 1.4. The set point is too low.
 - ✓ Has the #2 set screw been adjusted? If the set screw has been backed out then the opening pressure will have been lowered, possibly below atmospheric pressure.
 - ✓ The set point may be checked. See either the sections regarding "Set Point Adjustment" on page 7 or consult the factory for assistance.
- 1.5. The diaphragm assembly or the poppet is stuck. Take off the #17 upper case assembly and inspect.
 - ✓ Is the #14 diaphragm assembly intact?
 - ✓ Was the #7 set spring jammed when you took off the case?
 - ✓ Does the #27 poppet move down and spring back up when you press down on the stem protruding into the lower case? If not, disassemble the pilot valve and check the O-rings, the pin and the spring pin.
- 1.6. The piston is jammed shut. Remove the pilot body and inspect the main body.
 - ✓ Does the #38 piston assembly move freely through the bore.
 - ✓ Check for debris in the bore.
 - ✓ Inspect the #39 and #41 O-rings.
 - ✓ Was the #37 piston spring jammed when you removed the pilot body?
 - ✓ Check for marks or raised surfaces on the piston or in the bore. If found, the main valve and/or piston may require replacement.
 - ✓ Does the #38a piston appear to be adequately lubricated?

■ PROBLEM 2: The blanketing valve flows full open without resealing.

- 2.1. There is a leak in the sense line or in the tank.
 - ✓ Isolate the blanketing valve from the tank, pressurize the tank, and check to see if it holds pressure.
- 2.2. There is a leak from the sense chamber.
 - ✓ Leak test the diaphragm case around the perimeter and around the bolts.
 - ✓ Leak test around the #21 gasket between the lower case and the pilot body.
 - ✓ Check for a hole in the sense diaphragm.
 - ✓ Check the #18 gasket in the diaphragm assembly.
- 2.3. There is a leak in the external filter line.
 - ✓ Leak test all fittings.
- 2.4. The external filter line bypass inlet tube is incorrectly installed.
 - ✓ Verify the rectangular opening is perpendicular to the inlet flow and centered in the inlet housing (see Fig. 7).
- 2.5. The set point is too high. If the set point of the blanketing valve is above that of the pressure relief devices, then neither the blanketing valve or the pressure relief devices will close.

- ✓ Compare the specified set points for the blanketing valve and the pressure relief devices. The blanketing valve set point should be at least 2.0 inches W.C. below that of the pressure relief devices.
- ✓ The set point may be checked. See either the section regarding "Set Point Adjustment" on page 7 or consult the factory for assistance.
- 2.6. The piston is stuck open.
 - ✓ See #6 in preceding problem.
 - ✓ Check for debris at the piston seat (where the #41 O-rings seats).
- 2.7. The diaphragm assembly or the poppet is stuck.
 - ✓ See 1.5.
- 2.8. An O-ring has been blown out or damaged.
 - ✓ Disassemble and inspect.
- 2.9. The blanketing valve was not reassembled properly after maintenance.
 - ✓ Check to see if an O-ring is missing or if the wrong size O-ring was used for the #39 O-ring. Use Table 7 on page 14 to check O-ring sizes.
 - ✓ Take apart the pilot valve and check to see that the #28 poppet spring and the #29 spring pin are in place.
 - ✓ ** Verify that the check valve installed in the proper direction. See the section regarding "Integral Purge Accessories".
 - ✓ ** Verify that the shut-off valves for the field test kit are closed. See the section regarding "Field Test Accessories".
 - ✓ ** Verify that the purge meter flow is not set above 1.0 SCFH.
- 2.10. The volume of gas or supply pressure has dropped below the minimum recommended values.
 - ✓ Verify status of supply gas.

■ PROBLEM 3: The blanketing valve leaks continuously.

- 3.1. Debris is holding the poppet or piston open.
 - ✓ Take the unit apart, check for debris, clean and reassemble.
- 3.2. An O-ring has been blown out or damaged.
 - ✓ Disassemble and inspect.
- 3.3. The piston is not properly reseated.
 - ✓ Check for debris at the piston seat (where the #41 O-ring seats).
 - ✓ Verify that the piston stem and front pieces are not loose and concentric to the piston rear (see Fig. 8).
 - ✓ See 1.6
- 3.4. There is a leak in the external filter line.
 - ✓ Leak test all fittings.
- 3.5. There is a leak from the sense chamber.
 - ✓ See 2.2
- 3.6. The diaphragm assembly is stuck or prevented from moving all the way back up.
 - ✓ See 1.5

■ PROBLEM 4: The blanketing valve opens above or below the set point.

- 4.1. There is a leak in the sense line.
 - ✓ Leak test connections in the sense line.
- 4.2. There is a leak from the sense chamber.
 - ✓ See 2.2.
- 4.3. The set point is incorrect.
 - ✓ The set point may be checked. Refer to sections regarding "Set Point Adjustment" on page 7 or consult the factory for assistance.

■ PROBLEM 5: The pressure vent or other pressure relief device opens before the blanketing valve closes.

- 5.1. The set point of the two devices are too close to each other
 - ✓ See 2.4.
- 5.2. The blanketing valve is opening above its set specified set point.
 - ✓ Has the #2 set screw been adjusted? If the set screw has been screwed in then the opening pressure will have been raised.
 - ✓ The set point may be checked. Refer to sections regarding "Set Point"
- 5.3. The pressure relief device is opening below its specified set point.
 - ✓ Check the opening pressure of the pressure relief device.
- 5.4. The blanketing valve is closing too far above its set point. This would indicate that the pilot valve is not functioning properly.
 - ✓ Check that the #32 lower plug assembly is screwed in all the way with the mark on the nut lining up with the mark on the pilot body.
 - ✓ Check for debris in the pilot valve.
 - ✓ Inspect the O-rings in the pilot valve.
 - ✓ Possibly the pilot valve was not reassembled properly after maintenance.
- 5.5. The blanketing valve flow capacity is too high for the system.
 - ✓ Refer to the "User Guide" for assistance in determining flow capacity sizing.

■ PROBLEM 6: The vacuum vent or other vacuum relief device opens.

- 6.1. The blanketing valve set point is below (more negative than) the vacuum vent set point.
 - ✓ Check the labels of the blanketing valve and the vacuum relief device to identify the set points. The set point of one of the units may have to be changed.
- 6.2. The blanketing valve is opening below its set point.
 - ✓ See 1.4.
- 6.3. The vacuum vent is opening above its set point.
 - ✓ Check the opening pressure of the vacuum relief device.
- 6.4. The blanketing valve flow capacity is not high enough for the system.
 - ✓ Refer to the "User Guide" for assistance in determining flow capacity sizing.

■ PROBLEM 7: The blanketing valve cycles, repeatedly opening and closing.

- 7.1. The blanketing valve flow capacity is too high for the system.
 - ✓ Refer to the User's Guide for assistance in determining flow capacity sizing.
- 7.2. **The check valve in the line between the outlet and the purge meter is not sealing.
 - ✓ Refer to the section on "Integral Purge Accessories" on page 18 for procedures on investigating the operation of the check valve. Replace the check valve if it is found defective.
- 7.3. The pressure relief vent is set too close to the blanketing valve set point.
 - ✓ Check set points, one may need to be changed.
- 7.4. The outlet size of the blanketing valve is too small for the system.
 - ✓ Contact factory for additional help.
- 7.5. The sense line is located too close to the blanketing valve outlet.
 - ✓ Adjust location of sense line (see Fig. 2).

NOTE: ** Refers to optional equipment which may not be included with your unit.



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