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I & M Mark 968 (1-1/2" - 2")

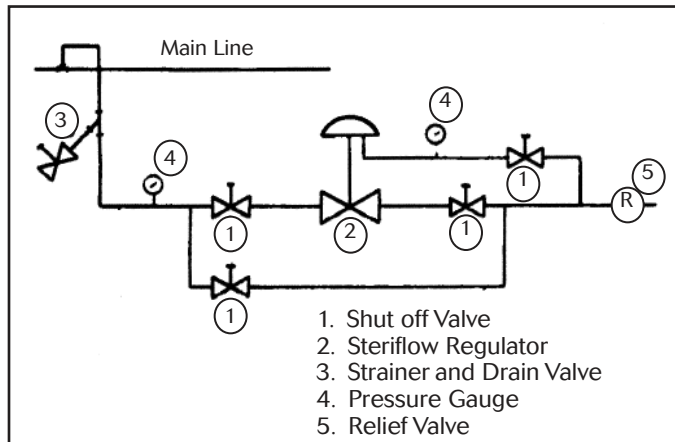
Installation & Maintenance Instructions for the 1-1/2 – 2" Mark 968 Gas Pressure Regulator

Warning: Steriflow Valve Pressure Regulators must only be used, installed and repaired in accordance with these Installation & Maintenance Instructions. Observe all applicable public and company codes and regulations. In the event of leakage or other malfunction, call a qualified service person; continued operation may cause system failure or a general hazard. Before servicing any valve, disconnect, shut off, or bypass all pressurized fluid. Before disassembling a valve, be sure to release all spring tension.

Please read these instructions carefully!

Your Steriflow Valve product will provide you with long, trouble-free service if it is correctly installed and maintained. Spending a few minutes now reading these instructions can save hours of trouble and downtime later. When making repairs, use only genuine Steriflow Valve parts, available for immediate shipment from the factory.

Ideal Installation



- To protect the valve from grit, scale, thread chips and other foreign matter, ALL pipelines and piping components should be blown out and thoroughly cleaned before the installation process begins.
- Shutoff valves, pressure gauges and by-pass piping should be installed as indicated in the Ideal Installation Schematic to provide easier adjustment, operation, and testing.
- A line strainer should be installed on the inlet side of the valve to protect it from grit, scale and other foreign matter. A 0.033 perforated screen is usually suitable for this purpose. Line strainers are available from Steriflow Valve.
- For best control, 3' 0" straight sections of pipe should be installed on either side of the valve.
- For setpoints below 10" WC, the valve should be inverted (top of diaphragm facing floor).
- In preparing threaded pipe connections, care should be exercised to prevent pipe-sealing com-

pound from getting into pipelines. Pipe-sealing compound should be used sparingly, leaving the two end threads clean. Steriflow uses, and recommends, thread sealer Teflon ribbon.

- The flow arrow on the valve body must be pointed in the direction of flow. Ideally, the valve should be installed in the highest horizontal line of piping to provide drainage for inlet and outlet piping, to prevent water hammer, and to obtain faster response.
- If possible, install a relief valve downstream from the valve. Set at 15 psi above the control point of the valve.
- In gas service, expand the outlet piping at least one pipe size if the control pressure (downstream) is 25% of the inlet pressure or less. A standard tapered expander connected to the outlet of the valve is recommended.
- Where surges are severe, a piping accumulator is recommended.

NOTE: Inverted mounting is required for set points below 10" wc.

Control Sensing Line

A control sensing line must be installed from the underside of the diaphragm housing to the vessel as follows:

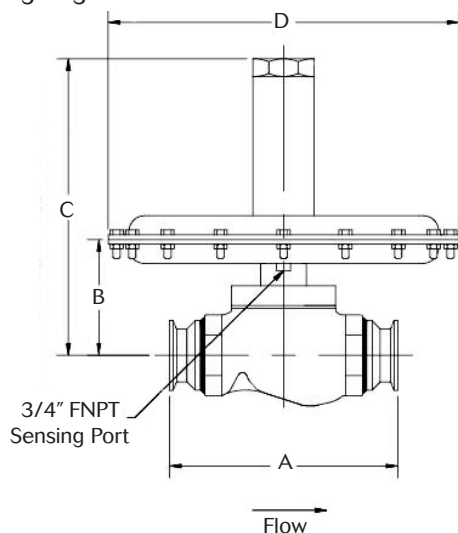
- Connect one end of a 3/4" pipe or tubing to the fitting under the diaphragm.
- Connect the other end to an appropriate fitting on the vessel.
- Note if a Sterile filter is required downstream of the regulator before gas entry into vessel, the Control Sensing line should be attached to the regulator outlet piping at a point upstream from that filter, but downstream of any turbulence caused by any piping restrictions elbows, diaphragm valves, etc. A full port isolation valve must be used in the control sensing line in order to completely isolate the valve from moisture during vessel and filter SIP (regardless of presence of sterile filter or not).

Note that the filter will cause a pressure difference between its inlet, and the vessel pressure. You will

- have to adjust regulator accordingly.
4. DO NOT locate the control sensing line tap in any location where turbulence or abnormal velocities may occur.
 5. The control sensing line should be sloped away from the valve.
 6. Install a pressure gauge to measure pressure in the tank itself, not in the outlet piping or the control line to aid in setting the valve.

Control Sensing Line Piping Recommendation

- Keep the regulator as close to the vessel as possible and as high as possible.
- Minimize the length of the downstream pipe coming from the valve.
- NEVER reduce the pipe size on the valve outlet to the tank. This line must always be as large as the valve size, or one pipe size larger to assure it does not act as a restriction.
- Any downstream isolation valve after the regulator must be a full port type. The isolation valve cannot act as a restriction.
- The sensing line must be a minimum of 3/4" tubing or pipe.
- A sensing line isolation valve is recommended. Again, must be full ported, and must be installed and used if the vessel will be CIP'd, SIP'd or washed in any way.
- Slope the sensing line to the sensing port on the tank.
- Keep the sensing line as short and straight as possible.
- For each 10 feet of control sensing line required, increase the line size by one pipe diameter. (Especially important on the blanket pressures of less than 5 inches of water column).
- If the control sensing line is installed on the vessel (no sterile filter required), it should be as far removed as possible from the downstream pipe outlet going into the vessel.



Start-Up

With the inlet, outlet, and bypass shutoff valves closed, and no pressure in the downstream line:

1. Fully open the control line shut-off valve.
2. Fully open the outlet shut-off valve.
3. Slowly open the inlet shut-off valve.
4. Slowly open the inlet valve just enough to start flow through the valve. Observe the downstream pressure gauge. Increase the downstream pressure slowly by gradually opening the inlet valve.
5. Do not fully open the inlet valve until you are sure that the regulator has control of the system. Usually, the handwheel on the inlet valve will turn freely when this is achieved.
6. To change the controlled pressure, adjust the controlled pressure supplied to the top of the diaphragm.

Trouble Shooting

The first step in troubleshooting a piloted pressure regulator is to classify the action of the controlled pressure into one of the following categories:

- A. Under Pressure: Controlled pressure too low; not enough flow or no flow through valve.
- B. Over Pressure: Valve will not close or controlled pressure increases after valve closes.
- C. Pressure Fluctuates: Controlled pressure rises and falls, will not settle out under low loads.

The next step is to determine what could cause the trouble. The third step is to locate and remedy the cause by the process of elimination. Make no assumptions and check the easy ones first. The guide below lists the controlled pressure action, common causes and procedure for checking each cause.

Controlled pressure action UNDER PRESSURE:

- Valve undersized for application. Check capacity required and valve capacity.
- Line strainer screen clogged. Blow down strainers or visually check that they are clear.
- Incorrect setting on range spring. Vary the setting and check response.
- Main valve diaphragm or balance diaphragm ruptured. See action on valve maintenance.
- Malfunction of other piping components. Check for leaking safety valves, inadvertently opened or closed valves.

Controlled pressure action OVER PRESSURE:

- Incorrect setting on range spring. Vary the setting and check response.
- Main valve seats leaking. Close inlet shut-off valve, allow downstream pressure to bleed off, close out-

let valve and remove loading pressure tubing. Back out adjusting screw on valve until free. Crack open inlet shut-off valve - if the fluid issues from the main valve port, the main valve seats are leaking.

- By-pass shut-off leaking. During period of leakage close outlet shut-off valve, observe downstream pressure gauge.

Controlled Pressure Fluctuates:

- Valve oversized. Check capacity required and valve capacity.

Maintenance

Caution: Ensure that the valve is de-pressurized before loosening any fittings or joints. The following steps are recommended before performing any maintenance on the valve:

1. Allow pressure to bleed off through the downstream piping. Do not attempt to reverse the flow through the valve by bleeding pressure from the upstream from the upstream side of the valve.
2. When the pressure gauges indicate that all pressure has been removed from the system, close the outlet shut-off valve and the valve may be serviced.

Note: Refer to the drawing at the end of this document for description and proper orientation of parts.

Vessel Cleaning or Sanitation

Note: If the vessel is cleaned, CIP'd or SIP'd it is critical that the regulator downstream Isolation valve, and the control sensing line isolation valve be closed prior to any of those cleaning practices. Follow the guidelines under "Maintenance" prior to closing these valves.

Main Valve

All operations can be performed with the valve in the line.

Replacing the Main and Balance Diaphragms

1. Remove the closing cap (1).
2. Thread the adjusting screw (2) out of the spring tube.
3. If the set range is in psi, remove the upper spring guide (not shown).
4. Remove range spring (3).
5. Remove the actuator flange bolts (8) and nuts (9).
6. Remove the upper case (5).
7. Insert special tool (Part Number 15522) into the

inlet of the valve and engage the hole in the lower stem (23).

8. Loosen the diaphragm bolt (17).
9. Remove the spring guide (4), diaphragm plate (6), main diaphragm (7), seal washer (30), and the thread seal washer (31). Discard the main diaphragm.
10. Remove the ring nut (11), the lower diaphragm case (10), and stem bushing (13), and o-ring (12). Jordan recommends that the stem bushing and o-ring be discarded and replaced with new parts when this maintenance is performed.
11. Loosen hex bolts (26) and lockwashers (27). Remove the bonnet (14), two o-rings (24), and the bonnet plate (15). Jordan recommends that these o-rings be discarded and replaced with new parts when this maintenance is performed.
12. Using the adjusting tool in the inlet of the valve, remove the upper stem (29) with tool number 70080-111.
13. Remove the balance diaphragm plate (28), balance diaphragm (25), and the thread seal washer (31). Discard the balance diaphragm.
14. Using new replacement parts, reverse the above procedure to reassemble. Lubricate o-rings prior to installation with a suitable elastomer lubricant.* Save the special tools provided with the repair kit for future use.

Plug & Seat Replacement

1. Perform all steps in the section on replacing main and balance diaphragms.
2. Use seat removal tool (Part Number 15533-110) to remove the seat (22), and the lower stem, plug and seat (17,18,19,20,23).
3. Remove the seat o-ring (21). Steriflow recommends that this o-ring be discarded and replaced with a new one when this maintenance is performed.
4. Install the new lower stem (17,18,19,20,23), plug and seat assembly into the body.
5. Lubricate the new seat o-ring (21) prior to installation with a suitable elastomer lubricant.* Install the o-ring (21) over the threads and on to the seat (22).
6. Install the seat (22) over the lower stem (23). Carefully thread it into the body (16).
7. Use the seat removal tool to tighten the seat. Do not over tighten! Compressing the seat o-ring into the body bore is all that is required to produce a seal.
8. Proceed to stem 14 in the section on replacing main and balance diaphragms.

* On pharma and food/beverage applications, make sure the elastomer lubricant used is suitable for the end user's application (i.e. FDA or NSF approved).

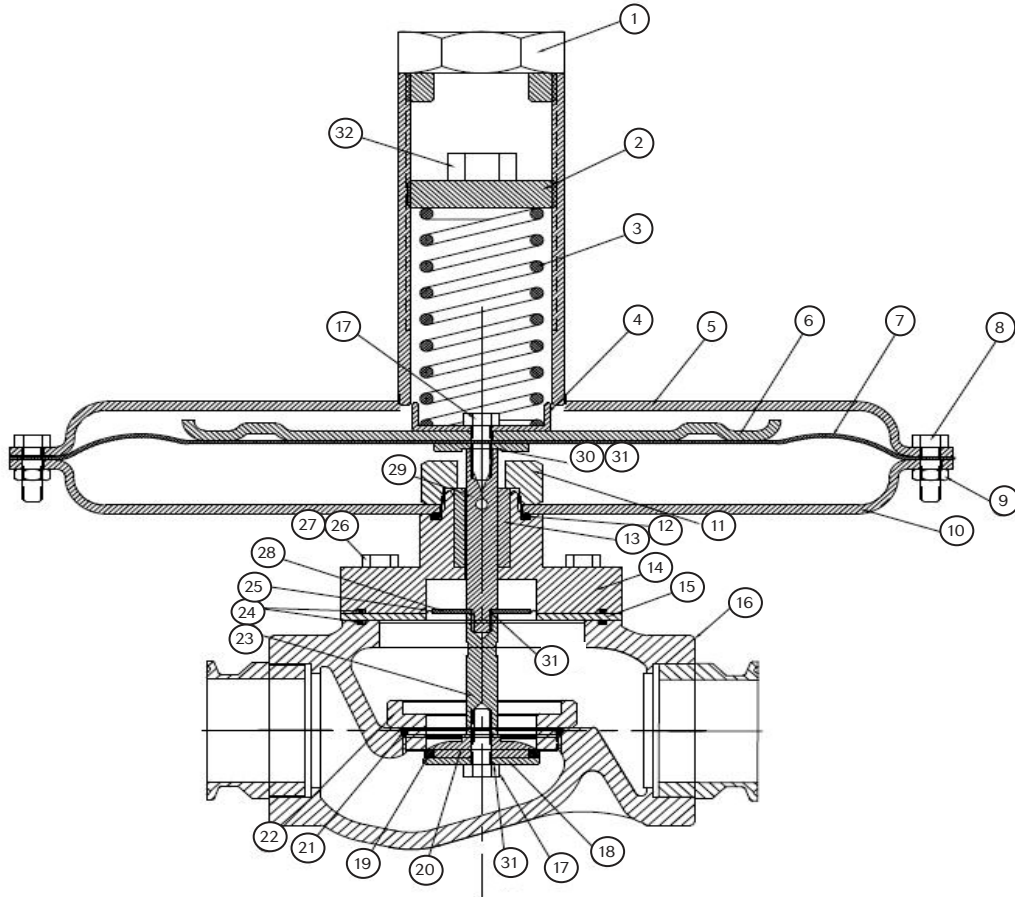
Ordering Spare Parts

Use only genuine Steriflow Valve parts to keep your valve in good working order. So that we can supply the parts, which were designed for your valve, we must know exactly which product you are using. The only guarantee to getting the correct replacement parts is to provide your Steriflow Representative with the valve serial number.

This number is located on the valve identification tag. If the serial number is not available, the parts needed for your valve might be determined using the following information: Model Number; Valve Body Size; Plug Material and Seat Size; Spring Range or Set Point; Trim Material; Part Name - Number and Quantity (see parts list chart).

NOTE: Without a valve serial number, any parts ordered incorrectly are subject to a minimum 25% restocking charge when returned.

Illustration and Parts List



Item	Description	Qty.	Item	Description	Qty.
1	Closing Cap	1	**17	HHCS	2
2	Adjusting Screw	1	**18	Seat Plate	1
3	Range Spring	1	**19	Soft Seat	1
4	Spring Guide	1	**20	Plug Face	1
5	Actuator Case (Upper)	1	*21	O-Ring	1
6	Main Diaphragm Plate	1	*22	Seat	1
7	Main Diaphragm	1	**23	Lower Stem	1
8	Hex Bolt	22	*24	Bonnet Plate O-Ring	2
9	Hex Nut	22	*25	Balance Diaphragm	1
10	Actuator Case (Lower)	1	26	HHCS	4
11	Ring Nut	1	27	Lockwasher (not shown)	4
*12	O-Ring	1	28	Balance Diaphragm Plate	1
*13	Stem Bushing	1	29	Upper Stem	1
14	Bonnet	1	30	Seal Washer, Large	1
15	Bonnet Plate	1	31	Seal Washer (not shown)	3
16	Body	1	32	Adjusting Bolt	1
*	Recommended Spare Parts		**	Furnished as an assembly in repair kits.	