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Pressure Reducing Valve

Operation & Maintenance

for water, heating, air-conditioning, and sanitatary systems

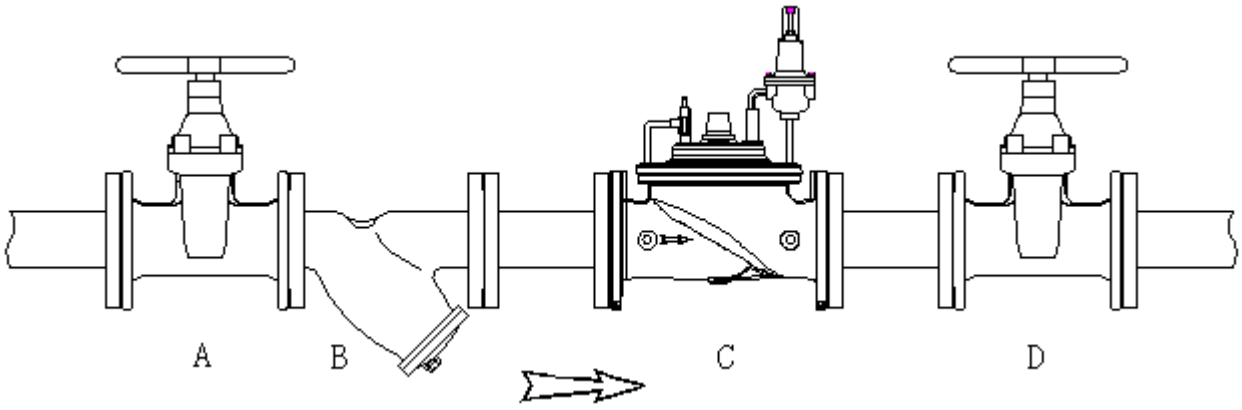


INSTALLATION / OPERATION / MAINTENANCE

HVPRVF Pressure Reducing Valve

Installation

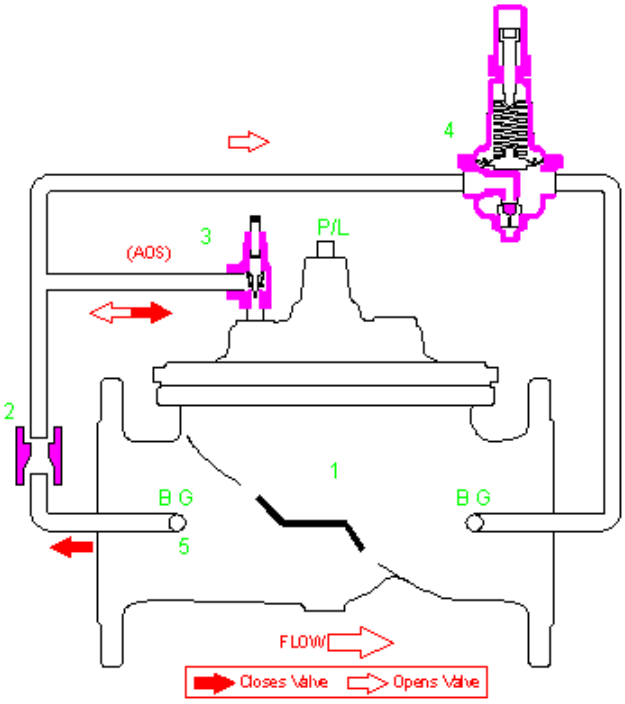
1. Confirm the flow direction of pipe line must meet the arrow of Pressure reducing valve
2. Enough space for adjustments and disassembly.
3. Install the Isolation valves in both inlet and outlet of Pressure reducing valve.
4. Install the Strainer before Pressure reducing valve.
5. It has a better function if the valve is installed horizontally. When valve size is ≧ DN200, the valve has to be installed horizontally.



A. Inlet isolation valve
B. Strainer
C. Pressure reducing valve
D. Outlet isolation valve

Operation

1. Confirm that all ball valves are open (handle parallel to ball valve body).
2. Open fully the upstream isolating valve and partially the downstream isolating valve, to fill-up, in a slow and controlled manner, the distribution system is on the downstream side of the pressure reducing valve.
3. Confirm that the supply pressure and the flow through the system are typical. If necessary, create flow by opening a downstream hydrant.
4. Vent air from the valve's control loop by loosening cover tube fitting at the highest point, allowing all air to bleed off. Retighten the tube fitting.
5. The outlet pressure could be factory set according to the design pressure request, otherwise the default set pressure is 3.0 bar.
6. If the set pressure is either different from the design or the requirements have been changed, unlock the pilots plastic cap and locking nut, slowly turn the pilot adjusting screw Clock-Wise to increase set pressure and Counter -Clock-Wise to decrease it. Allow the main valve to react and the pressure to stabilize
7. After the pressure is stabilized, lock the pilots locking nut, cover the plastic cap and open fully the downstream isolating valve.
8. The Needle valve is used to control close speed of valve. To decrease close speed or to stabilize the valve reaction, turn the needle valve Clockwise.



Standard Configuration

1. Main valve
2. Restriction
3. Needle valve
4. Pressure reducing Pilot
5. Strainer

Optional Configuration

B. Ball valve
G. Pressure gauge
P. Position Indicator
L. Limit switch

Maintenance

1.if any problem comes from the malfunction, the main valve leaks or over setting pressure at outlet , then check 2 system one is main valve system and the other is pilot system (including control tube and pilot valve). Analysis and solve problem follow the trouble shooting below.
2. Check the control system whether the tubing is leaking, if it leaks, replace the tubes or tighten all the connection tubes and fix it.

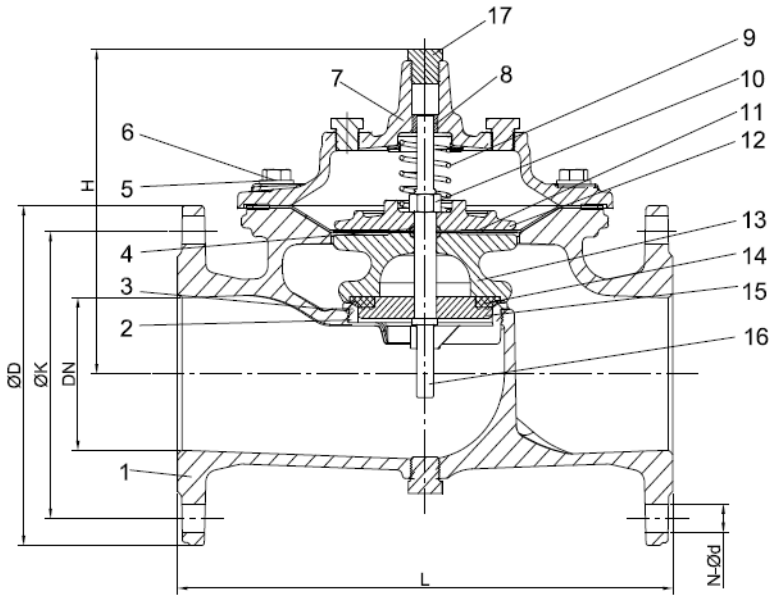
Inspection or maintenance can be accomplished without removing the valve from the line. Repair kits with new diaphragm and disc or spare parts (small size) are recommended to be on hand before work begins.
WARNING: Maintenance personnel can be injured and equipment damaged if disassembly is attempted with pressure in the valve.

Table1 Main valve trouble shooting

SYMPTOM	NO.	PROBABLE CAUSE	SOLUTION
Main valve fails to open	1	No pressure at valve inlet	Check inlet pressure
	2	Main valve diaphragm assembly inoperative	Disassemble, clean stem, replace detective parts
	3	Pilot not opening: No spring compression	Tighten adjusting screw
	4	Ball valve in pilot system closed	Open it
	5	Spring guide not in place	Assemble properly
	6	Pilot yoke dragged	Assemble properly
Main valve fails to close	1	Foreign matter between disc and seat, worn disc. Scale on stem or worn diaphragm,	Disassemble main valve, remove matter, clean parts and replace defective parts
	2	Needle valve closed	Open it properly
	2	Pilot remain open: Spring compressed, Mechanical obstruction,	Disassemble and remove obstruction
	3	Worn disc	Disassemble and replace
	4	Yoke dragged	Assemble properly
	5	Worn Diaphragm	Disassemble and replace
Fails to regulate	1	Air in main valve cover and/or tubing	Loosen top cover plug or fittings and bleed air
	2	Pilot yoke dragged on inlet nozzle,	Assemble properly
	3	Pilot spring not in correct range to control	Change spring
	4	Needle valve closed	Open it properly

Main valve

Main valve material list



NO.	Part Name	Material
1	Body	Ductile Iron
2	Seat	Stainless Steel
3	O-Ring	Rubber
4	O-Ring	Rubber
5	Bolt	Stainless Steel
6	Washer	Stainless Steel
7	Bonnet	Ductile Iron
8	Bush	Brass
9	Spring	Stainless Steel
10	Nut	Stainless Steel
11	Diaphragm	Rubber+Nylon
12	Fixing holder	Ductile Iron
13	Disc Holder	Ductile Iron
14	Seal	Rubber
15	Seat Retainer	Stainless Steel
16	Stem	Stainless Steel
17	Plug	Stainless Steel

Inspection or maintenance can be accomplished without removing the valve from the line. Repair kits with new diaphragm and disc or trim parts (small size) are recommended to be on hand before work begins.

WARNING: Maintenance personnel can be injured and equipment damaged if disassembly is attempted with pressure in the valve.

Main valve Disassembly

1. Close upstream and downstream isolation valves and release the internal valve pressure before disassembly the main valve.
2. Loosen tube fittings in the pilot system to remove pressure from valve body and cover chamber. After pressure has been released from the valve, remove the pilots and tubing. Mark or take picture of position of tubing and pilots for easy re-assembly.
3. Remove Bonnet bolts and remove Bonnet. Pull Bonnet straight up to keep from damaging the integral seat bearing and stem.
4. Remove the trim parts from the valve body. With smaller valves this can be accomplished by hand by pulling straight up on top of the stem. On large valves, an eye bolt of proper size can be installed on top of the stem and the trim parts can be then lifted with some tooling on spot. Take care not to damage the stem and diaphragm.
5. The next item to remove is the stem nut. Examine the stem threads above the nut for signs of mineral deposits or corrosion. If the threads are not clean, use a wire brush to remove as much of the residue as possible. Attach a good fitting wrench to the nut and give it a sharp “rap” rather than a steady pull. Usually several blows are sufficient to loosen the nut for further removal. On the smaller valves, just change a new trim parts
6. After the stem nut has been removed, the trim parts breaks down into its component parts. Removal of the seal from the disc holder can be a problem if the valve has been in service for a long time. Using two screwdrivers inserted along the outside edge of the disc usually will accomplish its removal.
7. The only part left in the valve body is the seat which ordinarily does not require removal. Carefully cleaning and polishing of inside and outside surfaces with sandpaper.

Reassembly

1. Reassembly is the reverse of the disassembly procedure. When the trim parts has been tightened to a point where the diaphragm cannot be twisted, the seal should be compressed very slightly by the disc guide. Excessive compression should be avoided.
2. MAKE SURE THE STEM NUT IS VERY TIGHT. Attach a good fitting wrench to the nut and give it a sharp “rap” rather than a steady pull. Usually several blows are sufficient to tighten the stem nut for final tightening. Failure to do so could allow the diaphragm to pull loose and tear when subjected to pressure.
3. Carefully install the trim parts. Take care not to damage the stem and diaphragm.
4. Put spring in place and replace Bonnet. Make sure diaphragm is smooth under the Bonnet.
5. Tighten Bonnet bolts firmly.
6. Test Valve before re-installing pilot valve system. Due to the weight of the trim parts this

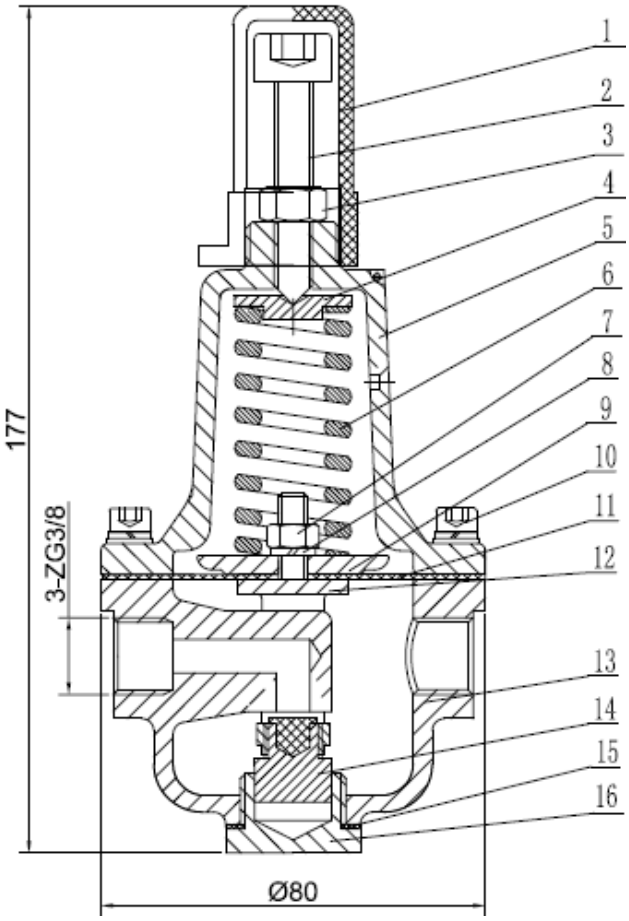
procedure is not possible on valves DN200 and larger. on these valves, the same determination can be made by carefully introducing a low pressure into the valve body with the Bonnet vented. Looking in Bonnet center hole see the trim parts lift easily without hesitation, and then settle back easily when the pressure is removed.
2. To check the valve for drip-tight closure, a line should be connected from the inlet to the Bonnet, and pressure applied at the inlet of the valve. If properly assembled, the valve should hold tight with a low pressure.
3. With the line connected from the inlet to the Bonnet, apply full working pressure to the inlet. Check all around the Bonnet for any leaks. Re-tighten Bonnet nuts if necessary to stop leaks from the diaphragm side.
4. Remove pressure, then re-install the pilot system and tubing exactly as it was prior to removal. Bleed air from all high points.

Test Procedure after Valve Assembly

There are a few simple tests which can be made in the field to make sure the valve has been assembled properly. Do these before installing pilot system and returning valve to service.
1. Check the trim parts for freedom of movement after all pressure is removed from the valve. Insert fabricated tool into threaded hole in top of valve stem, and lift the trim parts manually. Note any roughness, sticking or grabbing. The trim parts should move smoothly throughout entire valve stroke. The tool is fabricated from rod that is threaded on one end to fit valve stem and has a “T” Bar handle of some kind on the other end for easy gripping.
Place marks on this trim parts lifting tool when the valve is closed and when manually positioned open. The distance between the two marks should be approximately the stem travel (which is about 0.25XDN+5mm). If the stroke is different, there is a good reason to believe something is mechanically restricting the stroke of the valve. The Bonnet must be removed, the obstruction located and removed. Due to the weight of the trim parts this procedure is not possible on valves DN200 and larger. on these valves, the same determination can be made by carefully introducing a low pressure into the valve body with the Bonnet vented. Looking in Bonnet center hole see the trim parts lift easily without hesitation, and then settle back easily when the pressure is removed.
2. To check the valve for drip-tight closure, a line should be connected from the inlet to the Bonnet, and pressure applied at the inlet of the valve. If properly assembled, the valve should hold tight with a low pressure
3. With the line connected from the inlet to the Bonnet, apply full working pressure to the inlet. Check all around the Bonnet for any leaks. Re-tighten Bonnet nuts if necessary to stop leaks past the diaphragm.
4. Remove pressure, then re-install the pilot system and tubing exactly as it was prior to removal. Bleed air from all high points.

Pressure reducing pilot trouble shooting

Pressure reducing pilot material list



NO.	Part Name	Material
1	Cap	Plastic
2	Adjusting Screw	Stainless Steel
3	Jam Nut	Stainless Steel
4	Spring guide	Stainless Steel
5	Bonnet	Stainless Steel
6	Spring	Cr-VA
7	Nut	Stainless Steel
8	Washer	Stainless Steel
9	Fixing Holder	Stainless Steel
10	Screw	Stainless Steel
11	Diaphragm	Rubber+Nylon
12	Yoke	Stainless Steel
13	Body	Stainless Steel
14	Disc	Stainless Steel+Rubber
15	O-Ring	Rubber
16	Plug	Stainless Steel

Pilot Trouble Shooting

SYMPTOM	PROBABLE CAUSE	REMEDY
Fails to open when deliver pressure lowers	No spring compression	Tighten adjusting screw
	Damaged spring	Disassemble and replace
	Spring guide is not in position	Assemble properly
	Yoke dragging on inlet nozzle	Disassemble and reassemble properly
Fails to close when delivery pressure rises	Spring compressed solid	Back off adjusting screw
	Mechanical obstruction	Disassemble and reassemble properly
	Worn disc	Disassemble remove and replace disc retainer assembly
	Yoke dragging on inlet nozzle	Disassemble and reassemble properly
Leakage from cover vent hole	Damaged diaphragm	Disassemble and replace
	Loose diaphragm nut	Remove cover and tighten nut

MAINTENANCE

Disassembly

To disassemble follow the sequence of the item numbers assigned to parts in the sectional illustration.

1. Unscrew 1#cap, 2#adjusting screw;
2. Unscrew 10# bolts and remove 5#bonnet;
3. Remove 4#Spring guide and 6#spring;
4. Turn out 16# plug;
5. Turn out 14# disc with straight screwdriver; and check the rubber, if not in good quality, change a new one.
6. Turn out 7#nut, and remove 9# fix holder and 11# diaphragm, and check the diaphragm, if not in good quality ,change a new one.
7. Take the 12#yoke from body;

Reassembly

Reassembly is the reverse of disassembly. Caution: must be taken to avoid having the yoke drag on the inlet nozzle of the body

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