OPERATION AND MAINTENANCE MANUAL

K53 METAL BODY DIAPHRAGM VALVES

SERIES K531 – K537

1 Inch – 3 Inch

INTRODUCTION

AquaMatic diaphragm valves are designed for application on water and other fluids. Valve body & cap are glass filled thermo plastic, with Noryl and PVC plastic internals parts, EPDM seals and discs. The formed diaphragm is a Nitrile (Buna N) elastomer reinforced with Polyamide fabric.

The main advantages of the AquaMatic K530 valves are:

- Low pressure drop resulting in higher flow due to Y-pattern design
- Upper and lower diaphragm chambers separated from line media
- Larger diaphragm area compared to the seat area, ratio of diaphragm area to seat area is 1.2, provides drip tight closing
- Low initial costs and ease of maintenance
- All internal parts are replaceable without removing valves out of the service line
- Two Dynamic O- Rings prevents intermixing of line fluid with control media
- Female socket weld union end connectors
- No exposed metal parts

The diaphragm valves are available with following options.

- Normally Open Pressure to Close (NO)
- Normally Closed, Pressure to Open (NC)
- Spring Assist Open (SAO)
- Spring Assist Closed (SAC)
- Limit Stop (LS)
- Position Indicator. (PI)

COMBINING OPTIONS.

OPTIONS	NO	NC	SAO	SAC	LS	PI*
NO	-	NA	X	X	X	X
NC	NA	-	NA	X	X	X
SAO	X	NA	-	NA	X	X
SAC	X	X	NA	-	X	X
LS	X	X	X	X	-	X
PI	X	X	X	X	X	-

X = CAN BE COMBINED. NA = NOT AVAILABLE.

*Position Indicator Option is supplied with Limit Stop options

NORMALLY OPEN

Line pressure under the seat opens the valve. Control pressure applied to the upper diaphragm chamber closes the valve.

NORMALLY CLOSED

External tubing from Inlet side of the valve applies pressure to the upper diaphragm chamber to close the valve. Control pressure applied to the lower diaphragm chamber equalizes the pressure on the diaphragm and line pressure under the seat opens the valve.
Normally closed valves **are not recommended** for use in media containing suspended particles and/or chemicals, which could attack the diaphragm.

SPRING ASSIST OPEN

Spring installed under the diaphragm forces the valve fully open position in absence of any line or control pressure. Control pressure applied to the upper diaphragm chamber closes the valve.

SPRING ASSIST CLOSE

Spring installed above the diaphragm forces the valve to close position in absence of any line or control pressure. Control pressure applied to the lower diaphragm chamber opens the valve.
Depending upon size of the valve, 3-5 PSI (0.2 to 0.34 bars) on the inlet side of the valve will start to open the valve.

LIMIT STOP

An adjustable bolt installed in the cap of the valve will limits valve stroke. This feature can be used to close the valve in case of emergency and also valve stroke and hence the flow rate, however the **flow rate will change** with change in inlet pressure.

POSITION INDICATOR

An indicator rod attached to the valve shaft shows if the valve is open or closed. This feature is a visual indication only. This feature is available in combination with limit stop and spring assist open options only.

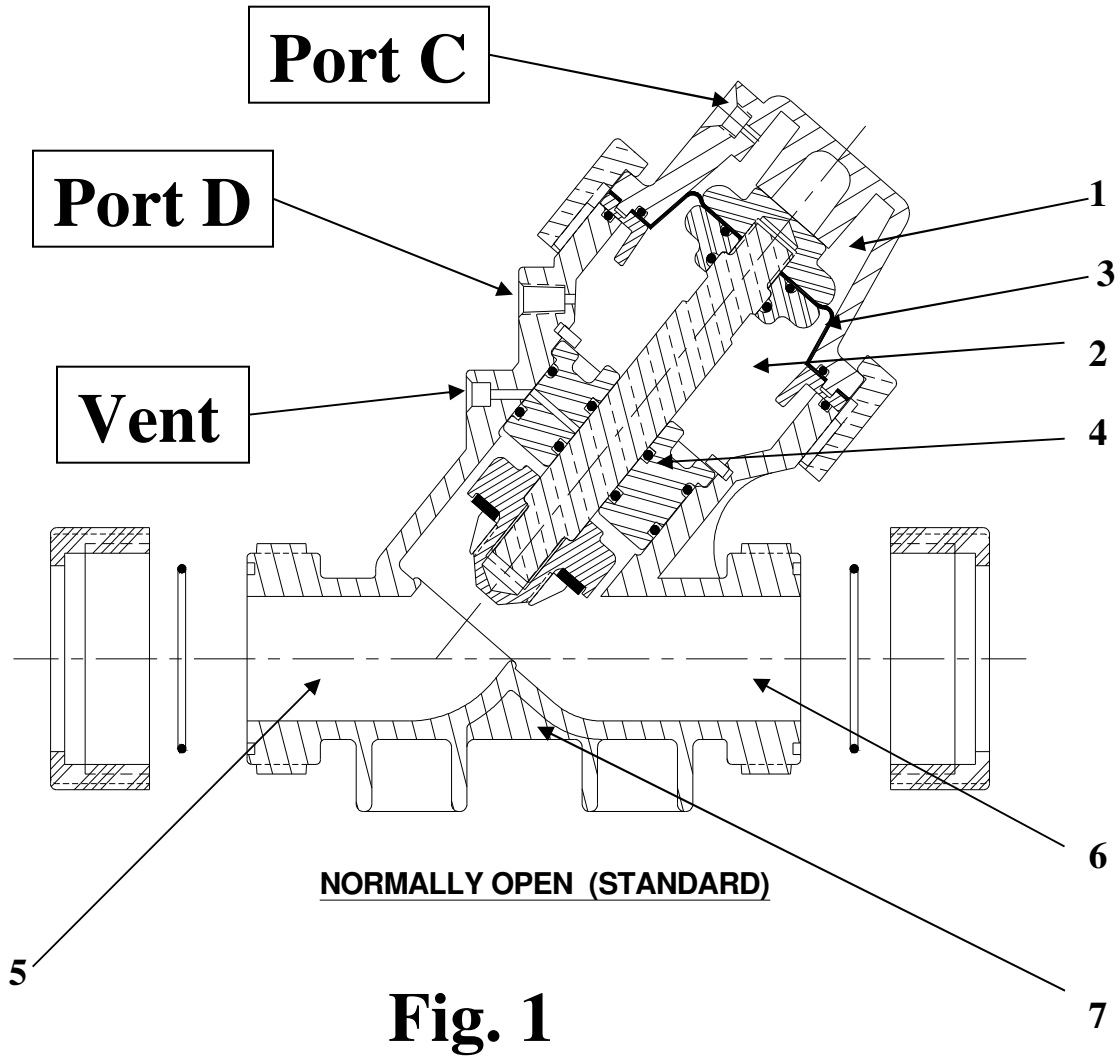


Fig. 1

1. **Upper diaphragm chamber**
2. **Lower diaphragm chamber**
3. **Diaphragm**
4. **Dynamic "O" ring (2)**
5. **Inlet chamber (upstream chamber, Influent chamber)**
6. **Outlet chamber (downstream chamber, effluent chamber)**
7. **Direction of flow arrow**

INSTALLATION

- Observe all city and municipal plumbing codes when installing the valve.
- Follow good plumbing procedures.
- Use approved and appropriate pipe sealant on all threaded joints.
- Install valve, with flow arrow (marked on valve body) pointing toward the direction of fluid flow.
- Valve can be installed in a vertical pipe or horizontal pipeline with valve cap pointing upward or downward.
- Control pressure (equal to line pressure) should be connected to valve cap (Port C, Fig. 1) on normally open valves and vent port should be left open. **DO NOT** plug vent port.
- Control pressure (equal to or slightly greater than line pressure) should be connected to (Port D, Fig.1) on normally closed valves.
- Control pressure can be either air or water. If air is used, it should be oil free to avoid damage to the valve body and diaphragm materials.
- **DO NOT** use metal tubing fittings.

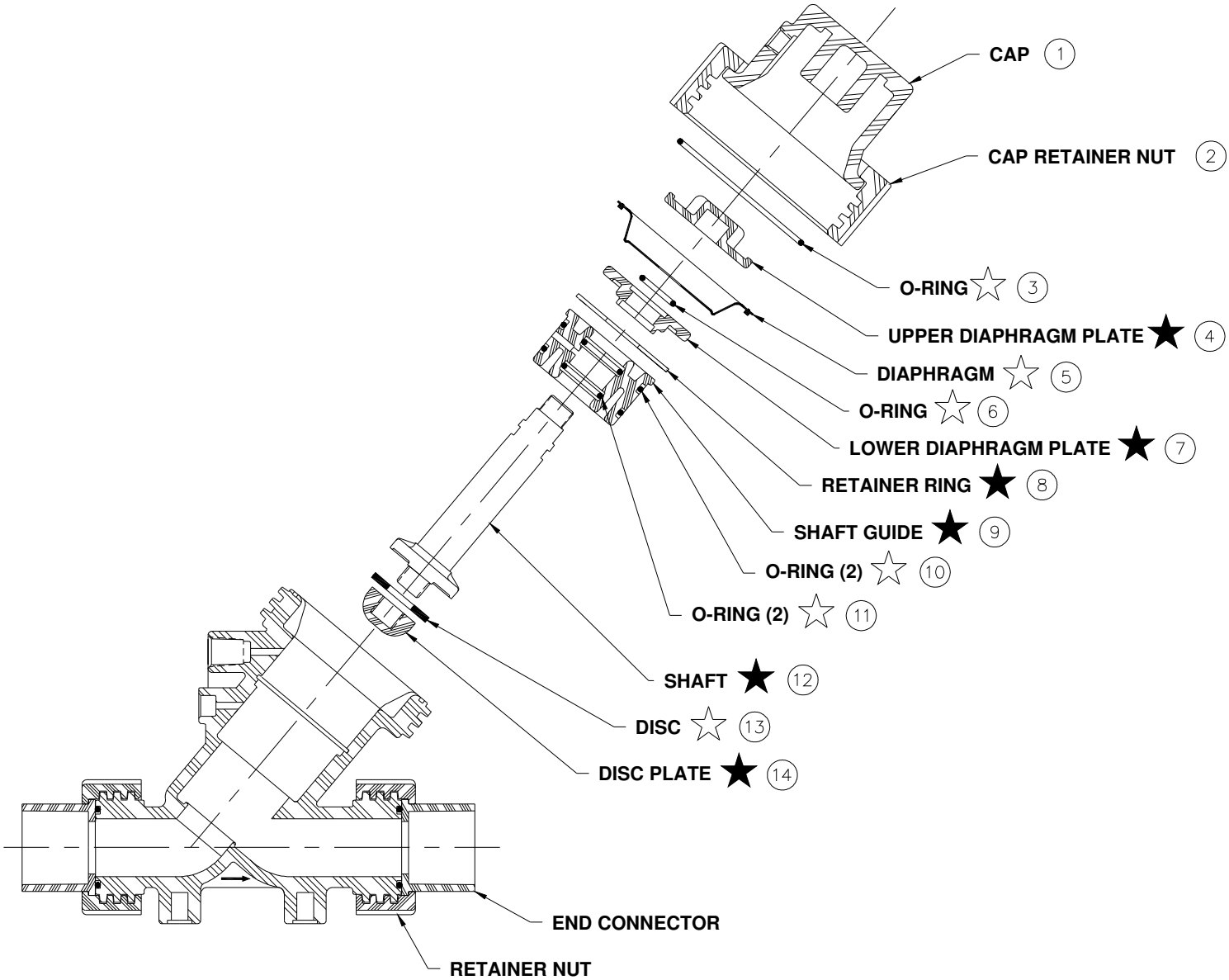
TROUBLE SHOOTING

Problem	Possible Cause	Solution
1. Normally open valve, not closing	a. Insufficient control pressure. b. Valve disc damaged. c. Vent port plugged or clogged.	a. Check the control pressure source. b. Disassemble valve and replace disc. c. Remove plug from vent port or clean vent port.
2. Normally close valve not closing	a. Insufficient line pressure or low flow. b. Orifice in the shaft plugged or clogged.	a. Add spring assist closed option to create backpressure. b. Remove restriction from the orifice in the shaft.
3. Leak through vent port.	a. Dynamic ”O” rings damaged. b. Damaged diaphragm c. Shaft guide “O” rings damaged.	a. Replace dynamic “O” rings. b. Replace diaphragm. c. Replace shaft guide “O” rings.
4. Occurrence of water hammer.	a. Valve closes too fast. b. Excessive control pressure.	a. Reduce closing speed by installing a needle valve in control line. b. Reduce control pressure. Control pressure should

	c. Valve installed backwards.	be within 5% of line pressure. c. Make sure media flow is in the direction of flow arrow on the valve body.
5. Valve operation sluggish.	a. Control pressure not vented. b. Dynamic "O" ring swollen.	a. Make sure that control pressure is exhausted. b. Check "O" ring and if swollen, check chemical compatibility.
6. Normally open valve does not open fully.	a. Control pressure not exhausted. b. Drain line Restricted.	a. Make sure the control pressure is exhausted. b. Check & remove drain line restriction.
7. Normally close valve does not open fully.	a. Insufficient control pressure. b. Restriction in control pressure line.	a. Control pressure should be equal to greater than line pressure. b. Check for restriction and remove restriction.
8. Valve Chatters.	a. Control pressure line not vented. b. Limit stop adjustment limits opening of the valve.	a. Check and make sure control pressure line is vented. b. Adjust limit stop to allow valve to open further.

REPAIR PART KITS

Valve Series	Valve Size	Diaphragm & EP Seals Kit	Diaphragm & FKM Seals Kit	Diaphragm & Butyl Seals Kit	Internal Parts Kit
531	1 Inch	1070318	1070334	1070326	1070342
534	1 ½ nch	1070319	3003017	1070327	1070343
535	2 Inch	1070320	1082191	NA	1070344
537	3 Inch	1070321	1070337	NA	1070345



NORMALLY OPEN (STANADARD)

☆ Parts Included in Diaphragm & Seal Kit.

★ Parts Included in Internal Parts Kit.

DISASSEMBLY PROCEDURE

1. Turn off water supply and control pressure to the valve.
2. Disassemble valve cap item No. 1 using strap wrench P/N. 1073557.
3. Remove O-Ring item No. 3 from top of the diaphragm.
4. While holding the shaft, unscrew upper diaphragm plate item No. 4 by turning it counter clockwise.
5. Remove diaphragm item No. 5, O-Ring item No. 6 and lower diaphragm plate item No. 7.
6. Remove retaining ring item No. 8.
7. Pull out the shaft assembly and shaft guide item No. 9.
8. Remove O-Rings item No. 10 and item No. 11.
9. Remove shaft guide from the shaft assembly.
10. Disassemble disc plate item No. 14 and disc item No. 13 from the shaft.

REASSEMBLY PROCEDURE.

1. Lubricate all O- Rings with silicon based lubricant. DO NOT use any lubricants containing petroleum based products.
2. Reverse disassembly procedure described above.
3. Reconnect control pressure line and turn on the water supply.

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