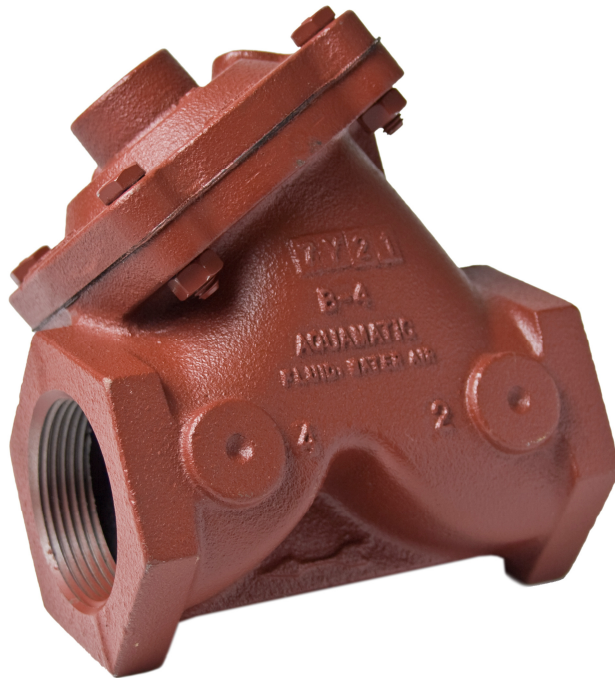




AQMATIC
Valves & Controls

OPERATION AND MAINTENANCE MANUAL



V42 METAL BODY DIAPHRAGM VALVES

SERIES V42B – V42L

3/4 Inch – 6 Inch

INTRODUCTION

AquaMatic® diaphragm valves are designed for application on water, compressed air, and other fluids. Valve bodies and caps are Cast Iron with stainless steel shaft, Nitrile (Buna N) seals and discs. The diaphragm is Nitrile (Buna N) elastomer reinforced with fabric.

Main advantages of AquaMatic valves are:

- Low pressure drop resulting in higher flow due to Y-pattern design
- Upper and lower diaphragm chambers separated from line media
- Large diaphragm area compared to the seat area; 1.2 ratio of diaphragm area to seat area provides drip tight closing
- Low initial costs and ease of maintenance
- All internal parts are replaceable without removing valves from the service line

Diaphragm valves are available with the 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	NA
SAO	X	NA	-	NA	X	X
SAC	X	X	NA	-	NA	NA
LS	X	X	X	NA	-	NA
PI	X	NA	X	NA	NA	-

X = CAN BE COMBINED

NA = NOT AVAILABLE

* Spring Assist Option not available on Series 429, 6” valves.

** Limit Stop, Position Indicator and Spring Assist Closed options can **not** be combined.

NORMALLY OPEN

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

NORMALLY CLOSED

Line pressure applied to the upper diaphragm chamber through hole in the valve shaft closes 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 that could attack the diaphragm.

SPRING ASSIST OPEN

A spring installed under the diaphragm forces the valve into a 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

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

LIMIT STOP

An adjustable bolt installed in the cap will limit the stroke of the valve. This feature can be used to close the valve in case of emergency and also control how far the valve will open. This feature can be used to control the flow rate; however, the flow rate will change with pressure fluctuations.

POSITION INDICATOR

An indicator rod attached to the valve shaft shows open or closed position of valve. This feature is a visual indication only. This feature is available with Normally Open and Spring Assist Open option only.

TYPICAL NORMALLY OPEN DIAPHRAGM VALVE

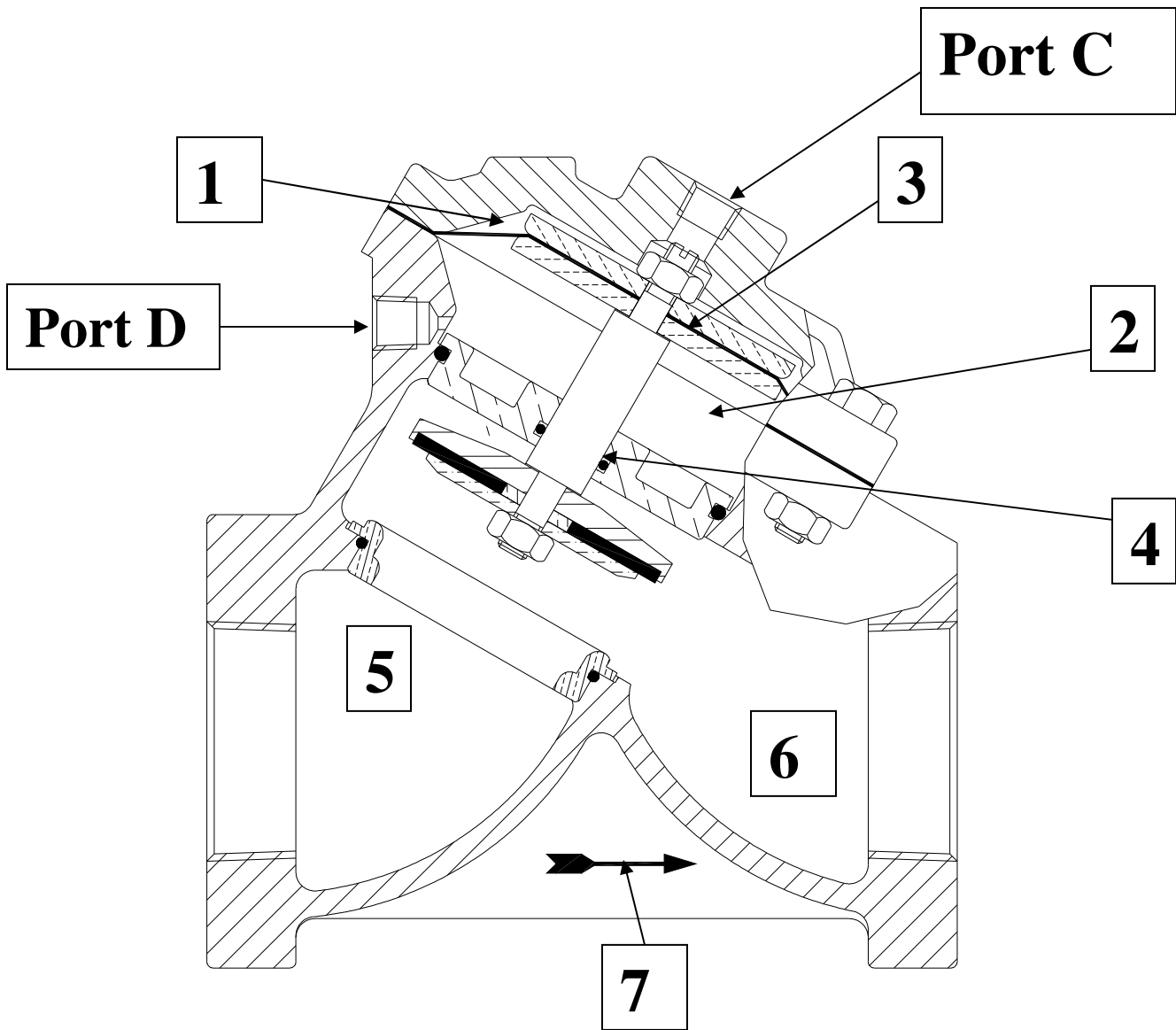


Fig. 1

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

INSTALLATION

- Observe all local 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 media flow.
- Valve can be installed in a vertical pipe or horizontal pipeline. If installed in horizontal pipeline, the valve cap can be either facing up or down due to the unique design feature of the valve.
- Control pressure (equal to or greater than line pressure) should be connected to valve cap on normally open valves (Port C, Fig. 1) and vent port (Port D, Fig. 1) should be left open. **DO NOT** plug vent port.
- Control pressure (equal to or greater than line pressure) should be connected to the (port D, Fig. 1) on normally closed valves. **DO NOT** remove the pipe plug installed on Port C, Fig. 1.

TROUBLE SHOOTING

Problem	Possible Cause	Solution
1. Normally open valve not closing	<ul style="list-style-type: none"> a. Insufficient control pressure b. Valve disc damaged c. Vent port plugged or clogged 	<ul style="list-style-type: none"> a. Check the control pressure source b. Disassemble valve and replace disc c. Remove plug from vent port or clean vent port
2. Normally closed valve not closing	<ul style="list-style-type: none"> a. Insufficient line pressure or low flow b. Orifice in the shaft plugged or clogged 	<ul style="list-style-type: none"> a. Add spring assist closed option to create back pressure b. Remove restriction from the orifice in the shaft
3. Leak through vent port	<ul style="list-style-type: none"> a. Dynamic O-ring damaged b. Damaged diaphragm c. Shaft guide O-ring damaged 	<ul style="list-style-type: none"> a. Replace dynamic O-ring b. Replace diaphragm c. Replace shaft guide O-ring
4. Occurrence of water hammer	<ul style="list-style-type: none"> a. Valve closes too fast b. Excessive control pressure 	<ul style="list-style-type: none"> a. Reduce closing speed by installing a needle valve in control line b. Reduce control pressure. Control pressure should be within 5% of line pressure

	c. Valve installed backwards	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 and 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 or 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

TOOLS AND REPAIR PARTS KITS

Valve Series	Seat Removal Tool	Shaft Guide Removal Tool	Diaphragm and Seal Kit	Int. Parts Kit "NO" Valves	Int. Parts Kit "NC" Valves
421	1074161	1074124	1070068	1070118	1070129
424	1074247	1074227	1070069	1070119	1070130
425	1074411	1" HEX*	1070070	1070120	1070131
426	1074411	1 ¼" HEX*	1070071	1070121	1070132
427	NA	1 ¼" HEX*	1070072	1070122	1070133
428	NA	1 ½" HEX*	1070073	1070123	1070134
429	NOTE 1	NOTE 1	1070074	1074653	1074654

NOTE 1 - Center plate with O-ring retainer and seat are installed with 5/16" - 18 hex bolts.

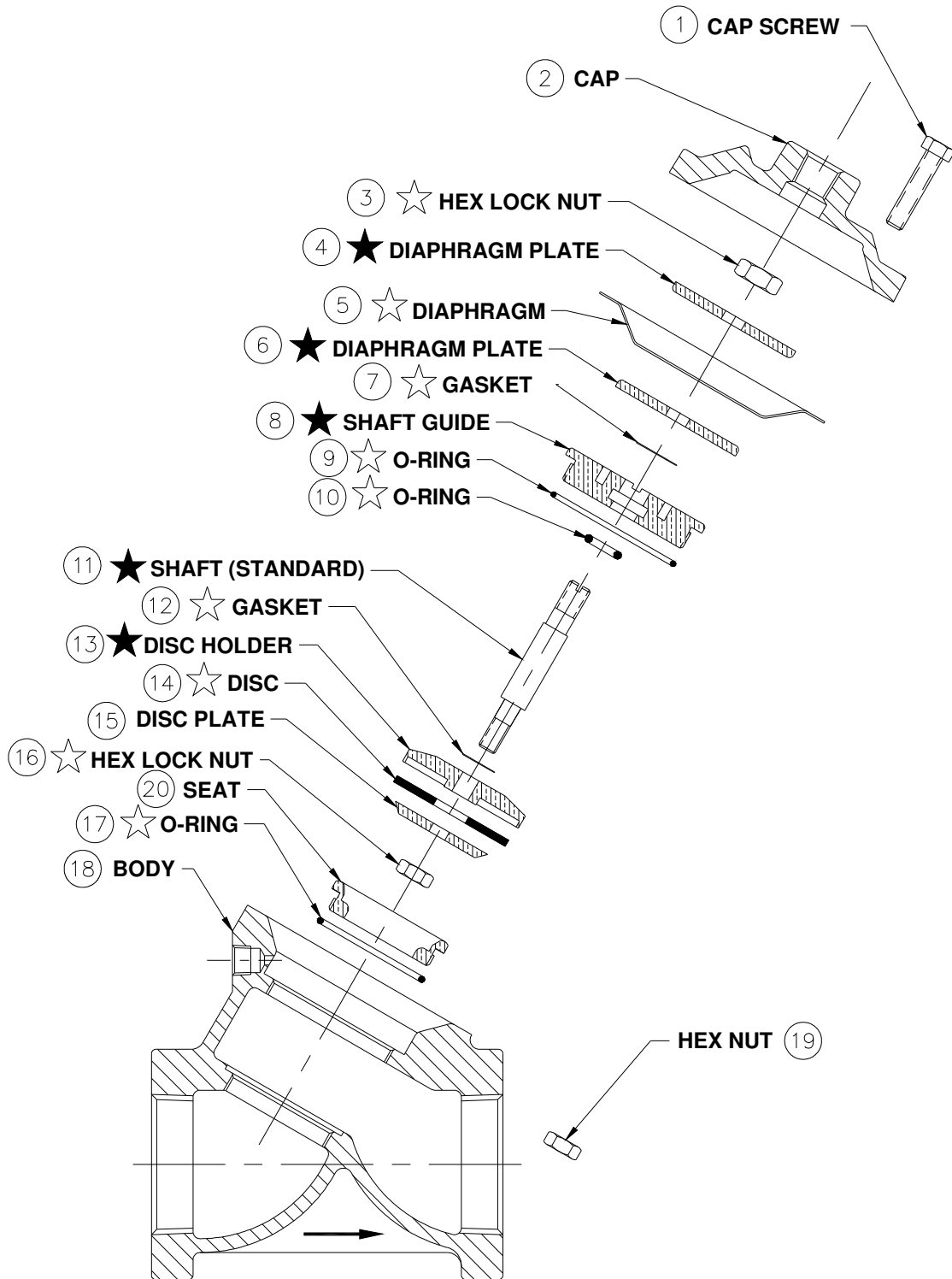
* - Use deep socket wrench for removal of shaft guide.

NA - Not available.

☆ Parts Included in Diaphragm & Seal Kits.

★ Parts Included in Internal Parts Kit.

EXPLODED VIEW – NORMALLY OPEN VALVE



NORMALLY OPEN (STANDARD)

DISSASSEMBLY PROCEDURE

1. Turn off line media supply to the valve.
2. Remove control pressure line.
3. Remove valve cap (tem No. 2) from body (item No. 18), by removing cap screws (item No. 1) and nuts (item No. 19).
Remove spring if valve has spring assist closed option.*
4. Slide out the position indicator rod if valve has position indicator option.*
5. Use a blunt screwdriver to hold the shaft (item No. 11) and remove the hex locknut (item No. 3).
6. Remove diaphragm plates (item Nos. 4 & 6), diaphragm (item No. 5) and (item No. 7).
7. Remove spring and centering plate if valve has spring assist open option.*
8. Remove shaft guide (item No. 8) and O-ring (item No. 9) by turning it **counter clockwise**.
9. Remove O-Ring (item No. 10) from shaft guide (item No. 8). Use blunt object to remove the O-Ring.
10. Lift out shaft/disc assembly.
11. Remove bottom hex locknut (item No. 16) and disassemble disc plate (item No. 15), disc (item No. 14), disc holder (item No. 13) and gasket (item No. 12).
12. Remove valve seat (item No. 20) with O-ring (item No. 17), by turning it **counter clockwise**.

* Options not shown in the drawing.

REASSEMBLY PROCEDURE

1. Replace damaged parts.
2. Lubricate all O-rings with Silicon lubricant provided with repair parts kit.
3. Apply Loctite provided with repair kit to the upper and lower threads of the shaft.
4. Reverse the disassembly procedure described above.
5. Reconnect control pressure line and turn on the line media supply.