

VM Series Pneumatic Diaphragm Valves

Submittal Data Sheet



Job or Customer:

Engineer:

Contractor:

Submitted by: Date

Approved by: Date

Order No: Date

Specification:

< STANDARDS >



- ASTM D1784
- ASTM D4101-86
- ASTM D3222
- ASTM D1785
- ASTM F441
- ASTM D2466
- ASTM D2467
- ASTM F439

IPEX VM Series Diaphragm Valves are the ideal solution for modulating flow and controlling dirty or contaminated fluids in a variety of applications. The weir-style design allows for precise throttling while the compact design allows for installation in any orientation. This pneumatically actuated version provides automatic control with an extensive range of options and accessories. The modular nature of this valve results in many material, body style, and diaphragm options. VM Series Diaphragm Valves are part of our complete systems of pipe, valves, and fittings, engineered and manufactured to our strict quality, performance, and dimensional standards.



ISO 3609
ISO 10931

VALVE AVAILABILITY

Body Material:	PVC, CPVC, PP, PVDF
Size Range:	3" through 4"
Pressure:	150 psi (1/2" to 2"), 90 psi (2-1/2" to 4")
Diaphragm:	EPDM, FPM or PTFE (EPDM backed)
Control Style:	Pneumatically Actuated
End Connections:	Spigot, True Union (Socket), Flanged (ANSI 150)



ANSI B16.5

VM Series Pneumatic Diaphragm Valves

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Valve Selection

Valve Size (inches)	Body Material	Diaphragm Material	IPEX Part Number						Pressure Rating @ 73°F
			Normally Open & Air to Air			Normally Closed			
			Spigot	True Union	ANSI Flanged	Spigot	True Union	ANSI Flanged	
3	PVC	EPDM	054417		054462	054651		054696	150 psi
		FPM	054426		054471	054660		054705	
		PTFE	054435		054480	054669		054714	
	CPVC	EPDM	054489		054534	054723		054768	
		FPM	054498		054543	054732		054778	
		PTFE	054507	n/a	054552	054741	n/a	054787	
4	PVC	EPDM	054418		054463	054652		054697	
		FPM	054427		054472	054661		054706	
		PTFE	054436		054481	054670		054715	
	CPVC	EPDM	054490		054535	054724		054769	
		FPM	054499		054544	054733		054779	
		PTFE	054508		054553	054742		054788	

Body Material:

- PVC
- CPVC

Size (inches):

- 3
- 4

Diaphragm:

- EPDM
- FPM
- PTFE

Control Style:

- Pneumatic (Normally Open & Air to Air)
- Pneumatic (Normally Closed)

End Connections:

- Spigot
- True Union (Socket)
- Flanged (ANSI 150)

IPEX Part Number:

VM Series Pneumatic Diaphragm Valves

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Valve Selection

Valve Size (mm)	Body Material	Diaphragm Material	IPEX Part Number				Pressure Rating @ 73°F
			Normally Open & Air to Air		Normally Closed		
			Spigot	True Union	Spigot	True Union	
90	PP	EPDM	054561		054796		
		FPM	054570		054805		
		PTFE	054579		054814		
	PVDF	EPDM	054606		054843		
		FPM	054615		054852		
		PTFE	054624	n/a	054861	n/a	
110	PP	EPDM	054562		054797	150 psi	
		FPM	054571		054806		
		PTFE	054580		054815		
	PVDF	EPDM	054607		054844		
		FPM	054616		054853		
		PTFE	054625		054862		

Body Material:

- PP
- PVDF

Size (inches):

- 90mm
- 110mm

Diaphragm:

- EPDM
- FPM
- PTFE

Control Style:

- Pneumatic (Normally Open & Air to Air)
- Pneumatic (Normally Closed)

End Connections:

- Spigot
- True Union (Socket)

IPEX Part Number:

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Options and Accessories



Electrical Position Indicator
1 Switch Mechanical, Accessory B

Style	Dimension (in)	IPEX Part Number
CM / NC	1/2	054952
VM / NC	1/2 - 1	054953
VM / NC	1-1/4 - 1-1/2	054954
VM / NC	2	054955
VM / NC	2-1/2 - 4	054956
* VM Manual	1/2 - 1	054962
* VM Manual	1-1/4 - 1-1/2	054963
* VM Manual	2	054964
* VM Manual	2-1/2 - 3	054965
* VM Manual	4	054966

* Special machining needed for the valve bonnet and compressor.



Microswitches (NEMA 4X)
2 Switches Electromechanical, Accessory C

Style	Dimension (in)	IPEX Part Number
VM / NC	1/2 - 1-1/2	054967
VM / NC	2 - 4	054968
VM / NO	1/2 - 4	054969



Microswitches (NEMA 4X)
2 Switches Inductive, Accessory Cl

Style	Dimension (in)	IPEX Part Number
VM / NC	1/2 - 1-1/2	054970
VM / NC	2 - 4	054971
VM / NO	1/2 - 4	054972



Microswitches (NEMA 4X)
2 Switches Electromechanical, Accessory D

Style	Dimension (in)	IPEX Part Number
VM / NC	1/2 - 1	054973
VM / NC	1-1/4 - 1-1/2	054974
VM / NC	2	054975
VM / NO	1/2 - 1	054976
VM / NO	1-1/4 - 1-1/2	054977
VM / NO	2	054978
CM / NC - NO	1/2	054979



Microswitches (NEMA 4X)
2 Switches Inductive, Accessory DI

Style	Dimension (in)	IPEX Part Number
VM / NC	1/2 - 1	054980
VM / NC	1-1/4 - 1-1/2	054981
VM / NC	2	054982
VM / NO	1/2 - 1	054983
VM / NO	1-1/4 - 1-1/2	054984
VM / NO	2	054985
CM / NC - NO	1/2	054986



PS Pilot Valve - Direct Mount

Direct mount solenoid pilot valve for VM and CM series valves

Style	Dimension (in)	Seal Material	IPEX Part Number
VM Series	1/4	Viton®	053074
CM Series	1/8	Viton®	053075

Standard voltage is 110 VAC. Other voltages available upon request.

PS Pilot Valve - Gang or Remote Mount

Gang mount solenoid pilot valve for VM and CM series valves

Style	Dimension (in)	Seal Material	IPEX Part Number
Gang Mount	1/4	Viton®	053076

Standard voltage is 110 VAC. Other voltages available upon request.



Stroke Limiter - Accessory F

Style	Dimension (in)	IPEX Part Number
VM / NC	1/2 - 1-1/2	054991
VM / NC	2	054992
* VM / NC	2-1/2 - 4	054993
VM / NO - DA	1-1/2 - 2	054994
VM / NO - DA	2-1/2 - 4	054995
CM / NC	1/2	054996

Protection cap included for VM.

* Actuator must have the metal cap.



Position Indicator - Accessory G

Style	Dimension (in)	IPEX Part Number
VM / NC - NO - DA	1/2 - 2	054997
VM / NC - NO - DA	2-1/2 - 4	054998

Protection cap included, see assembly instructions.



Stroke Limiter w/ Position Indicator - Accessory H

Style	Dimension (in)	IPEX Part Number
VM / NC	1/2 - 1	054999
VM / NC	1-1/4 - 1-1/2	053063
VM / NC	2	053064
* VM / NC	2-1/2 - 4	053065
VM / NO - DA	1/2 - 2	053066
VM / NO - DA	2-1/2 - 4	053067
CM / NC	1/2	053068

Protection cap included for VM.

* Actuator must have the metal cap.



Stroke Limiter w/ Position Indicator
and Manual Override - Accessory I

Style	Dimension (in)	IPEX Part Number
VM / NC	1/2 - 1	053069
VM / NC	1-1/4 - 1-1/2	053070
VM / NC	2	053071
VM / NO - DA	1/2 - 1	053072
VM / NO - DA	1-1/4 - 2	053073

Protection cap included.

PS Pilot Valve - Direct Mount

Direct mount solenoid pilot valve for VM and CM series valves

Style	Dimension (in)	Seal Material	IPEX Part Number
VM Series	1/4	Viton®	053074
CM Series	1/8	Viton®	053075

Standard voltage is 110 VAC. Other voltages available upon request.

PS Pilot Valve - Gang or Remote Mount

Gang mount solenoid pilot valve for VM and CM series valves

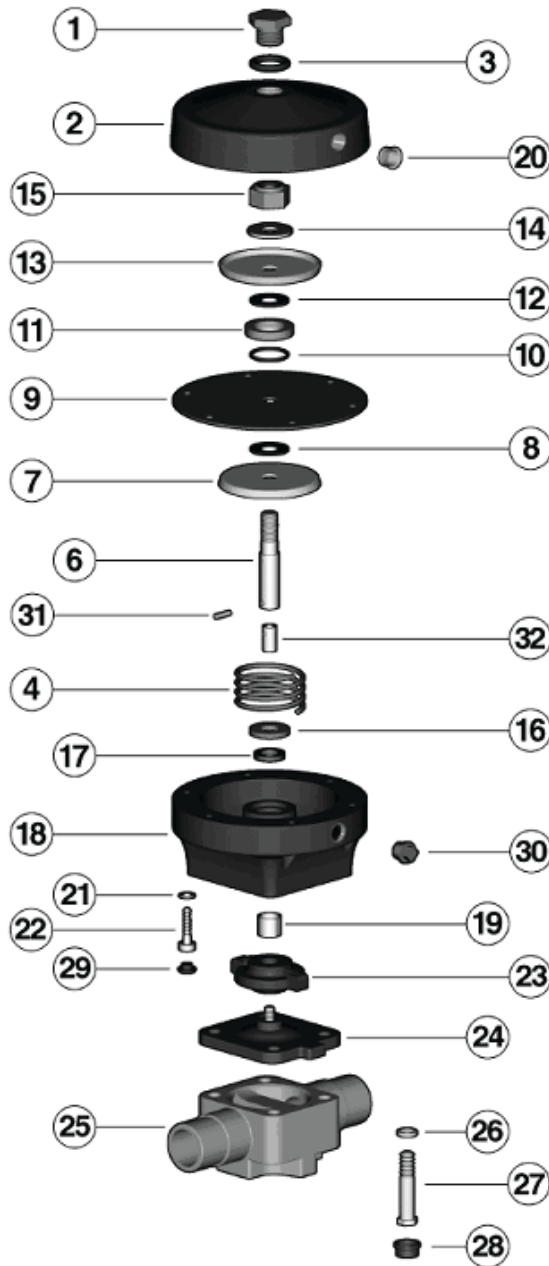
Style	Dimension (in)	Seal Material	IPEX Part Number
Gang Mount	1/4	Viton®	053076

Standard voltage is 110 VAC. Other voltages available upon request.

VM Series Pneumatic Diaphragm Valves

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Components



Normally Open & Air to Air

#	Component	Material	Qty
1	threaded plug	AL	1
2	actuator – upper part	GRPP	1
3	o-ring	NBR	1
4	spring	carbon steel	1
6	spindle	stainless steel	1
7	press diaphragm-plate	zinc plated steel	1
8	washer	NBR	1
9	control diaphragm	CR	1
10	o-ring (sizes 1-1/4" to 2")	NBR	1
11	spacer ring (sizes 1-1/4" to 2")	zinc plated steel	1
12	washer	NBR	1
13	press diaphragm-plate	zinc plated steel	1
14	washer	zinc plated steel	1
15	locknut	zinc plated steel	1
16	security washer	brass	1
17	quad-ring	NBR	1
18	actuator – lower part	GRPP	1
19	spindle bearing	metal – PTFE	1
20	plug	PE	1
21	washer	zinc plated steel	6
22	cylindrical screw	zinc plated steel	6
23	compressor	PBT	1
24	sealing diaphragm	EPDM / Viton® / PTFE	1
25	valve body	PVC / CPVC / PP / PVDF	1
26	washer	zinc plated steel ¹	4
27	hex bolt	zinc plated steel ¹	4
28	protective cap	PE	4
29	protective cap	PP	6
30	threaded plug	brass	1
31	pin (sizes 1/2" to 2")	SS	1
32	coupling	SS	1

* Spare parts available.

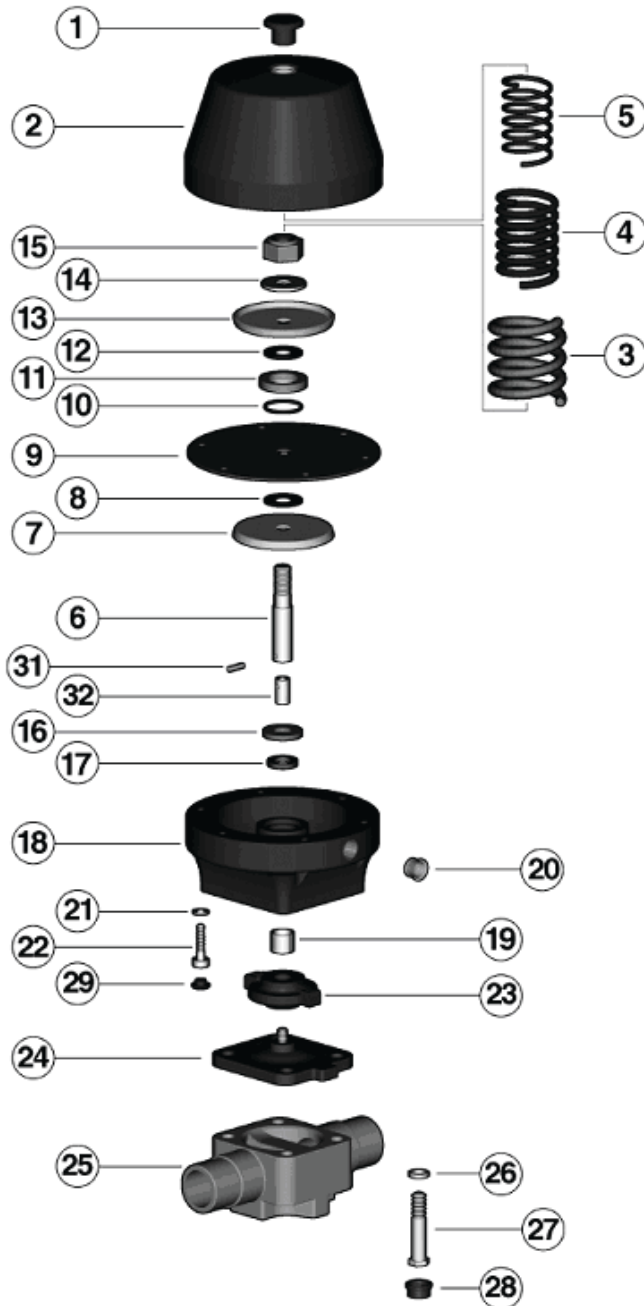
Items 1 through 7 are supplied as an assembly.

Contact IPEX for availability of spare components for True Union and Flanged style valves.

¹ Stainless steel for PVDF valves.

VM Series Pneumatic Diaphragm Valves

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Normally Closed

#	Component	Material	Qty
1	plug	PP	1
2	actuator – upper part	GRPP	1
3	spring	carbon steel	1
4	spring	carbon steel	1
5	spring	carbon steel	1
6	spindle	stainless steel	1
7	press diaphragm-plate	zinc plated steel	1
8	washer	NBR	1
9	control diaphragm	CR	1
10	o-ring (sizes 1-1/4" to 2")	NBR	1
11	spacer ring (sizes 1-1/4" to 2")	zinc plated steel	1
12	washer	NBR	1
13	press diaphragm-plate	zinc plated steel	1
14	washer	zinc plated steel	1
15	locknut	zinc plated steel	1
16	security washer	brass	1
17	quad-ring	NBR	1
18	actuator – lower part	GRPP	1
19	spindle bearing	metal – PTFE	1
20	plug	PE	1
21	washer	zinc plated steel	6
22	cylindrical screw	zinc plated steel	6
23	compressor	PBT	1
24	sealing diaphragm	EPDM / Viton® / PTFE	1
25	valve body	PVC / CPVC / PP / PVDF	1
26	washer	zinc plated steel ¹	4
27	hex bolt	zinc plated steel ¹	4
28	protective cap	PE	4
29	protective cap	PP	6
31	pin (sizes 1/2" to 2")	SS	1
32	coupling	SS	1

* Spare parts available.

Items 1 through 7 are supplied as an assembly.

Contact IPEX for availability of spare components or True Union and Flanged style valves.

¹ Stainless steel for PVDF valves.

VM Series Pneumatic Diaphragm Valves

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Installation Procedures

1. The valve may be installed in any position or direction.
2. Please refer to the appropriate connection style sub-section:
 - a. For spigot style, solvent cement each pipe onto the ends of the valve body. Ensure that excess solvent does not run into the body of the valve.
 - b. For true union style, remove the union nuts and slide them onto the pipe.
 - i. For socket style, solvent cement the end connectors onto the pipe ends. For correct joining procedure, please refer to the section entitled, "Joining Methods - Solvent Cementing" in the IPEX Industrial Technical Manual Series, "Volume I: Vinyl Process Piping Systems". **Ensure that excess solvent does not run into the body of the valve. Be sure to allow sufficient cure time before continuing with the valve installation.**
 - ii. For threaded style, thread the end connectors onto the pipe ends. For correct joining procedure, please refer to the section entitled, "Joining Methods - Threading" in the IPEX Industrial Technical Manual Series, "Volume I: Vinyl Process Piping Systems".
 - iii. Ensure that the socket o-rings are properly fitted in their grooves then carefully place the valve in the system between the two end connections.
 - iv. Tighten both union nuts. Hand tightening is typically sufficient to maintain a seal for the maximum working pressure. **Over-tightening may damage the threads on the valve body and/or the union nut, and may even cause the union nut to crack.**
 - c. For flanged style, join both flanges to the pipe flanges. For correct joining procedure, please refer to the section entitled, "Joining Methods - Flanging" in the IPEX Industrial Technical Manual Series, "Volume I: Vinyl Process Piping Systems".
3. Anchoring is strongly recommended due to the weight of the actuator. The valve can be fixed to the supporting structure using the mounting holes on the bottom of the valve body.
4. Connect any accessories then a suitable air supply and pilot system to the actuator. Be sure to check that both the working and control pressure are in accordance with the specifications.

Disassembly

1. If removing the valve from an operating system, isolate the valve from the rest of the line. **Be sure to depressurize and drain the valve and isolated branch. Depressurize and disconnect the pneumatic control line before continuing with disassembly.**
2. Detach the valve from the support structure by disassembling the threaded connections on the bottom of the valve body (25).
3. Please refer to the appropriate connection style sub-section:
 - a. For spigot style, cut the pipe on either side of the valve and remove from the line.
 - b. For true union connections, loosen both union nuts and drop the valve out of the line. If retaining the socket o-rings, take care that they are not lost when removing the valve from the line.
 - c. For flanged style, loosen each bolt holding the valve to the pipe flanges. Please refer to the section entitled, "Joining Methods - Flanging" in the IPEX Industrial Technical Manual Series, "Volume I: Vinyl Process Piping Systems" for a recommended bolt tightening pattern diagram. Follow the same pattern when disassembling the flanged joints then carefully remove the valve from the line.
4. Remove the protective caps (28), then loosen and remove the bolts (27) and washers (26) from the bottom of the valve body.
5. The valve components can now be checked for problems and/or replaced.

Note: For safety reasons, it is not recommended to attempt to disassemble the actuator. However if necessary, proceed as follows:
6. Using a spring release (or press) to maintain pressure on the internal springs, remove the protective caps (29) then carefully loosen and remove the bolts (22) and washers (21).
7. Back off the pressure on the spring release (or press) to separate the upper (2) and lower (18) parts of the actuator and remove the springs (4 for Normally Open, 3-5 for Normally Closed).
8. Loosen and remove the locknut (15) to disassemble the diaphragm control components (7 through 14).
9. Remove the spindle (6, 31, and 32) - compressor (23) - diaphragm (24) assembly, taking care not to damage the quad-ring (17).
10. Loosen and remove both the diaphragm and compressor.

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Assembly

Note: Before assembling the valve components, it is advisable to lubricate the o-rings with a water soluble lubricant. **Be sure to consult the "IPEX Chemical Resistance Guide" and/or other trusted resources to determine specific lubricant-rubber compatibilities.**

1. Assemble the compressor (23) with the diaphragm (24) and thread onto the spindle (6, 31, and 32).
2. Insert the spindle into the lower part (18) of the actuator, ensuring proper placement of the quad-ring (17).
3. For Normally Open actuators, reposition the spring (4) in the lower part of the actuator.
4. Properly assemble the diaphragm control components (7-14) on the spindle and fasten in place using the locknut (15).
5. Carefully line up the holes of the control diaphragm (9) with the proper holes of the lower part of the actuator.
6. For Normally Closed actuators, reposition the springs (3-5) on the press-diaphragm plate (13).
7. Properly position the upper part (2) of the actuator on the lower portion, then clamp in place using a spring release tool or press. Insert and tighten all bolts (22) and washers (21) then replace all protective caps (29).
8. Sufficiently tighten the diaphragm (24) then back off slightly until the bolt holes line up.
9. Position the assembled actuator on the valve body (25) while ensuring that the sealing surfaces properly line up. Insert and tighten all bolts (27) and washers (26) then replace all protective caps (28).

Testing and Operating

The purpose of system testing is to assess the quality of all joints and fittings to ensure that they will withstand the design working pressure, plus a safety margin, without loss of pressure or fluid. Typically, the system will be tested and assessed in sub-sections as this allows for improved isolation and remediation of potential problems. With this in mind, the testing of a specific installed valve is achieved while carrying out a test of the overall system.

An onsite pressure test procedure is outlined in the IPEX Industrial Technical Manual Series, "Volume I: Vinyl Process Piping Systems" under the section entitled, "Testing". The use of this procedure should be sufficient to assess the quality of a valve installation. **In any test or operating condition, it is important to never exceed the pressure rating of the lowest rated appurtenance in the system.**

Important points:

- Never test thermoplastic piping systems with compressed air or other gases including air-over-water boosters.
- When testing, do not exceed the rated maximum operating pressure of the valve.
- Avoid the rapid closure of valves to eliminate the possibility of water hammer which may cause damage to the pipeline or the valve.
- **An unnecessarily high control pressure may shorten the life of the actuator. Pressure reducers are recommended.**
- **Slow cycle times will contribute to a longer actuator life.**

Please contact IPEX customer service and technical support with regard to any concern not addressed in this data sheet or the technical manual.

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Valve Maintenance

Disassembly

1. If removing the valve from an operating system, isolate the valve from the rest of the line. Be sure to depressurize and drain the valve and isolated branch. Depressurize and disconnect the pneumatic control line before continuing with disassembly.
2. Detach the valve from the support structure by disassembling the threaded connections on the bottom of the valve body (25).
3. Please refer to the appropriate connection style sub-section:
 - a. For spigot style, cut the pipe on either side of the valve and remove from the line.
 - b. For true union connections, loosen both union nuts and drop the valve out of the line. If retaining the socket o-rings, take care that they are not lost when removing the valve from the line.
 - c. For flanged style, loosen each bolt holding the valve to the pipe flanges. Please refer to the section entitled, "Joining Methods - Flanging" in the IPEX Industrial Technical Manual Series, "Volume I: Vinyl Process Piping Systems" for a recommended bolt tightening pattern diagram. Follow the same pattern when disassembling the flanged joints then carefully remove the valve from the line.
4. Remove the protective caps (28), then loosen and remove the bolts (27) and washers (26) from the bottom of the valve body.
5. The valve components can now be checked for problems and/or replaced.

Note: For safety reasons, it is not recommended to attempt to disassemble the actuator. However if necessary, proceed as follows:

6. Using a spring release (or press) to maintain pressure on the internal springs, remove the protective caps (29) then carefully loosen and remove the bolts (22) and washers (21).
7. Back off the pressure on the spring release (or press) to separate the upper (2) and lower (18) parts of the actuator and remove the springs (4 for Normally Open, 3-5 for Normally Closed).
8. Loosen and remove the locknut (15) to disassemble the diaphragm control components (7 through 14).
9. Remove the spindle (6, 31, and 32) – compressor (23) – diaphragm (24) assembly, taking care not to damage the quad-ring (17).
10. Loosen and remove both the diaphragm and compressor.

Assembly

Note: Before assembling the valve components, it is advisable to lubricate the o-rings with a water soluble lubricant. Be sure to consult the "IPEX Chemical Resistance Guide" and/or other trusted resources to determine specific lubricant-rubber compatibilities.

1. Assemble the compressor (23) with the diaphragm (24) and thread onto the spindle (6, 31, and 32).
2. Insert the spindle into the lower part (18) of the actuator, ensuring proper placement of the quad-ring (17).
3. For Normally Open actuators, reposition the spring (4) in the lower part of the actuator.
4. Properly assemble the diaphragm control components (7-14) on the spindle and fasten in place using the locknut (15).
5. Carefully line up the holes of the control diaphragm (9) with the proper holes of the lower part of the actuator.
6. For Normally Closed actuators, reposition the springs (3-5) on the press-diaphragm plate (13).
7. Properly position the upper part (2) of the actuator on the lower portion, then clamp in place using a spring release tool or press. Insert and tighten all bolts (22) and washers (21) then replace all protective caps (29).
8. Sufficiently tighten the diaphragm (24) then back off slightly until the bolt holes line up.
9. Position the assembled actuator on the valve body (25) while ensuring that the sealing surfaces properly line up. Insert and tighten all bolts (27) and washers (26) then replace all protective caps (28).

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Markets served by IPEX group products are:

- Electrical systems
- Telecommunications and utility piping systems
- Industrial process piping systems
- Municipal pressure and gravity piping systems
- Plumbing and mechanical piping systems
- Electrofusion systems for gas and water
- Industrial, plumbing and electrical cements
- Irrigation systems
- PVC, CPVC, PP, PVDF, PE, ABS, and PEX pipe and fittings

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