

March 2015

Type Y693 Gas Blanketing Regulator

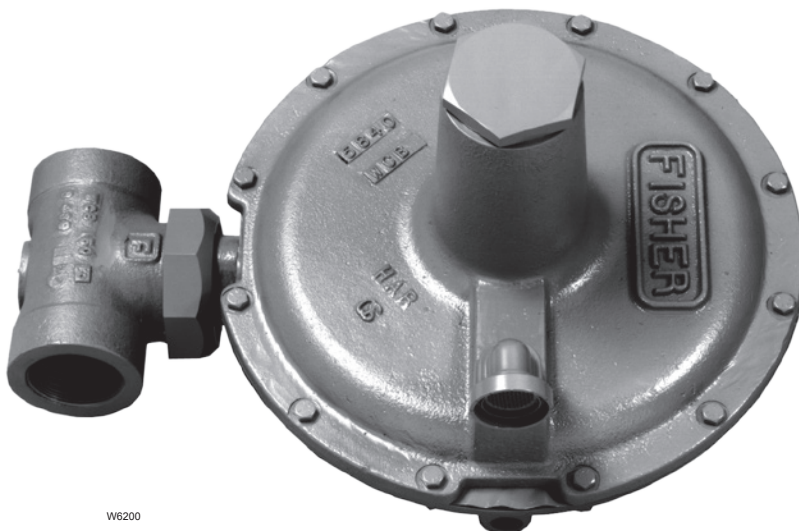


Figure 1. Type Y693 Gas Blanketing Regulator

Introduction

WARNING

Failure to follow these instructions or to properly install and maintain this equipment could result in an explosion, fire and/or chemical contamination causing property damage and personal injury or death.

Fisher® regulators must be installed, operated and maintained in accordance with federal, state and local codes, rules and regulations and manufacturer's instructions.

If the regulator vents gas or a leak develops in the system, service to the unit may be required. Failure to correct trouble could result in a hazardous condition.

Installation, operation and maintenance procedures performed by unqualified personnel may result in improper

adjustment and unsafe operation. Either condition may result in equipment damage or personal injury. Use qualified personnel when installing, operating and maintaining the Type Y693 regulator.

Scope of the Manual

This instruction manual includes installation, startup, maintenance and parts information for the Type Y693 Gas Blanketing Regulator (Figure 1).

Product Description

The Accu-Pressure™ Type Y693 Gas Blanketing Regulator (Figure 1) is a pressure reducing regulator with external registration requiring a downstream control line. It is used for accurate pressure control on pressure blanketing systems. The regulator will help in controlling emissions from the blanketed product and helps in protecting against any contamination to the blanketed product by atmospheric conditions.

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Specifications

The Specifications table lists specifications for the Type Y693 Gas Blanketing Regulator. Specifications for a given regulator as it originally comes from the factory are stamped on the spring case nameplate.

Body Sizes and End Connection Styles⁽¹⁾

NPS 1-1/2 and 2 NPT, ASME CL150 and CL300
RF flanged (Optional) or EN PN 16, 25 and 40
RF flanged (Optional)

Maximum Allowable Inlet Pressure⁽²⁾

150 psig / 10.3 bar or body rating limit

Maximum Outlet (Casing) Pressure⁽²⁾

15 psig / 1.0 bar

Outlet Pressure Ranges⁽²⁾

See Table 1

Maximum Operating Outlet Pressure to Avoid Internal Part Damage⁽²⁾

2 psig / 0.14 bar above outlet pressure setting

Material Temperature Capabilities⁽²⁾

Nitrile (NBR): -20 to 180°F / -29 to 82°C

Fluorocarbon (FKM): 40 to 300°F / 4 to 149°C

Polytetrafluoroethylene (PTFE):

0 to 300°F / -18 to 149°C

Spring Case Connection

Aluminum Version: 3/4 NPT

Steel and Stainless Steel Version: 1/2 NPT

Approximate Weights

Cast Iron with Aluminum: 22 lbs / 10 kg

WCC Steel or CF8M Stainless steel:

57 lbs / 26 kg

WCC Steel with Aluminum 35 lbs / 16 kg

1. Flanged end connections and end connections for other than U.S. standard can usually be provided; consult the local Sales Office.

2. The pressure/temperature limits in this manual, and any applicable standard limitation, should not be exceeded.

Table 1. Outlet (Control) Pressure Ranges

	OUTLET PRESSURE RANGE ⁽¹⁾		COLOR CODE	CONTROL SPRING WIRE DIAMETER		PART NUMBER
	psig	bar		In.	mm	
Light diaphragm plate	0.5 to 2.0 in. w.c.	1 to 5 mbar	Brown	0.109	2.77	1D892527022
	2 to 5 in. w.c.	5 to 12 mbar	Red	0.120	3.05	1D892627022
	5 to 8 in. w.c.	12 to 20 mbar	Black	0.130	3.30	1D892727012
	8 to 18 in. w.c.	20 to 45 mbar	Gray	0.156	3.96	1D893227032
	18 to 32 in. w.c.	45 to 80 mbar	Dark Green	0.182	4.62	1D893327032
Heavy diaphragm plate	1 to 2	69 to 138 mbar	Dark blue	0.225	5.72	1H975827032
	1.5 to 3.3	103 to 228 mbar	Orange	0.250	6.35	1H975927032
	2 to 5	138 mbar to 0.3 bar	Yellow	0.283	7.19	1P615427142
Heavy diaphragm plate with brass closing cap and heavy duty spring adjuster	2 to 5.5	138 mbar to 0.4 bar	Green stripe	0.363	9.22	0Y066427022
	4 to 10	276 mbar to 0.7 bar	Silver	0.406	10.3	1H802427032

1. Outlet pressure ranges are for installations with the spring barrel positioned in any direction. After installation always check/adjust the pressure setting.

The regulator will maintain a positive vessel pressure reducing the possibility of vessel wall collapse. The Type Y693 is available in NPS 1-1/2 and 2 / DN 40 and 50 body sizes.

Installation



WARNING

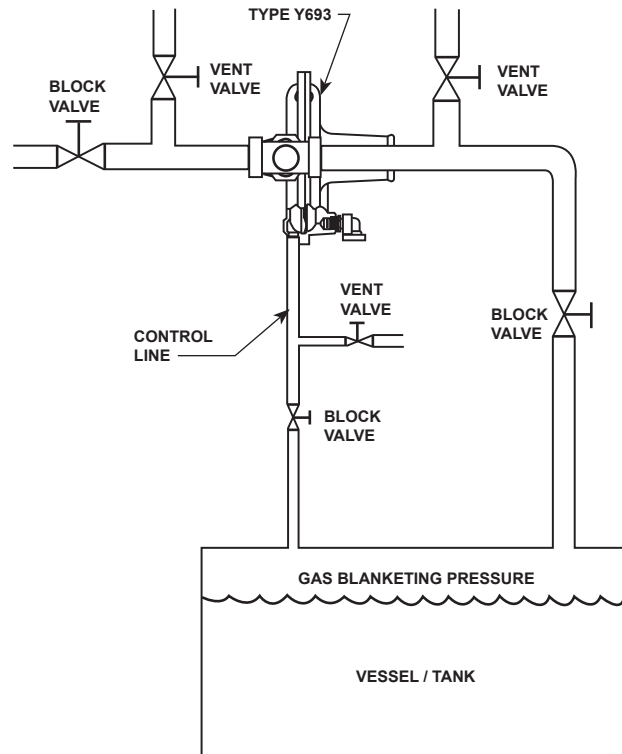
Personal injury, equipment damage or leakage due to escaping accumulated gas or bursting of pressure-containing parts may result if the gas blanketing regulator is overpressured or is installed where service conditions could exceed the limits given in Specifications or where conditions exceed any ratings of the adjacent piping or piping connections. To avoid such injury or

damage, provide pressure-relieving or pressure-limiting devices (as required by Title 49, Part 192, of the U.S. Code of Federal Regulations, by the National Fuel Gas Code Title 54 of the National Fire Codes of the National Fire Protection Association or by other applicable codes) to prevent service conditions from exceeding those limits. A regulator should be inspected immediately for damage after any overpressure condition.

Additionally, physical damage to the gas blanketing regulator could result in personal injury and property damage due to escaping accumulated gas. To avoid such injury and damage, install the gas blanketing regulator in a safe and well ventilated location.

Key numbers referenced in this section are shown in Figures 3, 4 and 5.

1. Use qualified personnel when installing, operating and maintaining the regulator. Before installing, inspect the regulator for any shipment damage or foreign material that may have collected during crating and shipment. Make certain the body interior is clean and the pipelines are free of foreign material. Apply pipe compound only to the male pipe threads.
2. The regulator may be installed in any position as long as the flow through the body is in the direction indicated by the flow arrow attached to the body. Install the regulator as close as possible to the blanketed vessel using a straight run of pipe the same size or larger as the regulator body. Position the body (key 28) and/or diaphragm spring case (key 23) so it will not collect moisture or debris into the screened vent (as shown in Figure 2). If the regulator requires repositioning, refer to the body area maintenance procedures and/or the diaphragm and spring case area maintenance procedures in the Maintenance section to reposition the screened vent for the application. If a block valve is required, install a full flow valve between the regulator and the blanketed vessel.
3. Attach a downstream pressure control line to the female connection in the lower spring case. The female pressure connection is a 1/2 NPT in the steel or stainless steel lower spring case and a 3/4 NPT for the aluminum lower spring case. Connect the other end of the control line to the vessel. To allow for self-drainage, install the control line at an angle so that any liquid material will drain away from the regulator. See Figures 4 and 5 for the location of the external control line connection.



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Figure 2. Typical Type Y693 Installation

4. For proper regulator operation, a spring case vent (key 56) is required to allow atmospheric pressure to register on the diaphragm. The spring case vent must be kept open and positioned in such a manner to prevent the spring case from collecting moisture, corrosive chemicals or other foreign material. To allow maximum flexibility in installing the regulator, the vent assembly is supplied separately in a bag. Install the vent assembly in the 3/4 NPT vent tapping and position the vent pointed down as shown in Figure 2. Depending on the orientation of the regulator, the elbow (key 75) supplied with the vent may not be required to position the vent pointed down.
5. To remotely vent the regulator, remove the vent and install obstruction-free tubing or piping into the 3/4 NPT vent tapping. Provide protection on a remote vent by installing a screened vent cap into the remote end of the vent pipe.
6. If continuous operation of the system is required during inspection or maintenance, install a parallel regulator with a three-valve bypass around the regulator.



WARNING

If the regulator vents some gas or a leak develops in the system, it indicates that service is required. Failure to take the regulator out of service immediately may create a hazardous condition. In hazardous or flammable gas service, vented gas may accumulate and cause personal injury, death or property damage due to fire or explosion. Vent a regulator in hazardous gas service to a remote, safe location away from air intakes or any hazardous location. The vent line or stack opening must be protected against condensation or clogging.

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Startup and Adjustment



WARNING

To avoid personal injury, property damage or equipment damage caused by bursting of pressure containing parts or explosion of accumulated gas, never adjust the control spring to produce an outlet pressure higher than the upper limit of the outlet pressure range or that particular spring (see Table 1). If the desired outlet pressure is not within the range of the control spring, install a spring of the proper range according to the Diaphragm and Spring Case Area section of the maintenance procedure.

With installation completed, the regulator can be placed in operation by slowly opening the upstream and downstream block valves, if used, while using gauges to monitor pressure. The regulator takes control when downstream pressure is established.

The regulator has been adjusted at the factory to provide approximately the reduced pressure requested. To ensure the correct pressure setting always use a pressure gauge to verify the outlet pressure setting. The range of allowable pressure settings is stamped on the spring casing nameplate. If a pressure setting beyond the stamped range is required, install a spring with the desired range by following the procedures for changing the spring and diaphragm in the Maintenance section. To adjust the pressure setting, perform the following steps (key numbers are referenced in Figures 3, 4 and 5):

1. Remove the closing cap (key 3, if required).
2. Turn the adjusting screw (key 2) either clockwise to increase outlet pressure or counterclockwise to decrease outlet pressure. The regulator will go into immediate operation. To ensure correct operation always use a pressure gauge to monitor the blanket pressure when making adjustments.
3. Replace the closing cap (key 3, if required).

Shutdown

First, close the nearest upstream shutoff valve and then, close the nearest downstream shutoff valve and the block valve on the control line (refer to Figure 2). Next, open the vent valve between the regulator and the downstream shutoff valve nearest to it. Then, open the upstream vent valve and the vent valve in the control line. All pressure between these shutoff valves is released through the open vent valves, since a gas

blanketing regulator remains open in response to the decreasing downstream pressure. If vent valves are not installed, safely bleed off both inlet and outlet pressures, and check that the regulator contains no pressure.

Principle of Operation

The Type Y693 Gas Blanketing Regulator reduces a higher-pressure gas to maintain a positive low pressure of blanket gas over a stored liquid (see Figure 2). Also when the vessel (or tank) is suddenly cooled, causing vapors to contract, the regulator replaces the volume of contracting vapors with a volume of blanketing gas to prevent the internal vessel pressure from decreasing. In both cases, a positive vessel pressure prevents outside air from entering the vessel and reduces the possibility of atmospheric pressure collapsing the vessel.

Gas blanketing regulators respond to a slight decrease in internal vessel pressure (caused by pump out or atmospheric cooling) by throttling open to increase the flow rate of gas into the vessel. When the vessel's liquid level has been lowered to the desired point and the vapor pressure reestablished, the regulator throttles closed.

When the liquid level drops and vessel pressure decreases below the setting of the control spring, the spring force on the diaphragm opens the disk assembly to supply the required flow of gas to the vessel. When vessel pressure has been satisfied, outlet pressure tends to increase slightly, acting on the diaphragm. When the outlet pressure exceeds the control spring setting, the diaphragm moves to close the disk assembly.

Maintenance

Regulator parts are subject to normal wear and must be inspected and replaced as necessary. The frequency of inspection and replacement of parts depends upon the severity of service conditions or the requirements of local, state and federal regulations. Due to the care Emerson™ takes in meeting all manufacturing requirements (heat treating, dimensional tolerances, etc.), use only replacement parts manufactured or furnished by Fisher®.



WARNING

To avoid personal injury, property damage or equipment damage caused by sudden release of pressure, isolate the regulator from all pressure and cautiously release trapped pressure from the regulator before attempting disassembly.

Body Area Maintenance Procedures

For the Aluminum lower casing version only:

Key numbers are referenced in Figure 4.

This procedure is for gaining access to the disk assembly, orifice and body O-ring. All pressure must be released from the regulator, before these steps can be performed.

1. Remove the cap screws (key 18) that hold the lower casing assembly (key 9) to the body (key 28). Separate the lower casing from the body.
2. Inspect and replace the orifice (key 27) if necessary. Lubricate the threads of the replacement orifice with a good grade of pipe thread sealant. Install the orifice with 75 to 100 ft-lbs / 102 to 136 N•m of torque.
3. Inspect the disk (key 99) for nicks, cuts and other damage. Unscrew the machine screw (key 12) and replace the disk with a new part if necessary. Install the new disk, disk washer and machine screw (keys 99, 98 and 12) and tighten to a torque of 1 to 2 ft-lbs / 1 to 3 N•m.
4. Inspect the bias spring (key 85) and disk holder (key 25). Unscrew the disk holder (key 25) from the valve stem (key 13) and replace the bias spring with a new part, if necessary. Lubricate the disk holder threads and carefully tighten to 5 to 7 ft-lbs / 7 to 9 N•m.
5. Inspect the body O-ring (key 16) for damage and/or wear and replace if necessary.
6. Install the lower casing assembly (key 9) to the body (key 28) with cap screws (key 18). Uniformly tighten the two cap screws to a torque of 45 to 50 ft-lbs / 61 to 68 N•m.

For the Steel or Stainless Steel Lower Casing Version Only:

Key numbers are referenced in Figure 5.

This procedure is for gaining access to the disk assembly, orifice, body gasket and split ring. All pressure must be released from the regulator, before these steps can be performed.

1. Unscrew the union nut (key 19) from the body (key 28) and remove the lower casing assembly (key 20) and split ring (key 17).
2. Inspect and replace the orifice (key 27) if necessary. Lubricate the threads of the replacement orifice with a good grade of pipe thread sealant. Install the orifice with 75 to 100 ft-lbs / 102 to 136 N•m of torque.

3. Inspect the disk (key 99) for nicks, cuts and other damage. Unscrew the machine screw (key 12) and replace the disk with a new part if necessary. Install the new disk, disk washer and machine screw (keys 99, 98 and 12), and hand tighten to a torque of 1 to 2 ft-lbs / 1 to 3 N•m.
4. Inspect the bias spring (key 85) and disk holder (key 25). Unscrew the disk holder (key 25) from the valve stem (key 13) and replace the bias spring with a new part, if necessary. Lubricate the disk holder threads and carefully tighten to no more than 5 to 7 ft-lbs / 7 to 9 N•m.
5. If necessary, install a replacement body gasket (key 16) into the body (key 28).
6. Slide the union nut (key 19) as far as it will go onto the lower casing assembly (key 20). Install both halves of the split ring (key 17) into the slots of the lower casing assembly (key 20) and secure them by sliding the union nut down on the split ring.
7. Install the lower casing assembly (key 20) with the attached split ring (key 17) and union nut (key 19) to the body (key 28).
8. Tighten the union nut (key 19) until the lower casing assembly (key 20) is secure on the body (key 28).

Diaphragm and Spring Case Area

This procedure is for gaining access to the spring, diaphragm and lever assembly stem. All pressure must be released from the diaphragm case assembly before these steps can be performed. Key numbers are referenced in Figures 3, 4 and 5.

To Change the Control Spring:

1. Remove the closing cap (key 3, if required), and turn the adjusting screw (key 2) counterclockwise until all compression is removed from the control spring (key 1).
2. Remove the adjusting screw (key 2) and upper spring seat (key 4 or 44). Change the control spring to match the desired spring range.
3. Replace the upper spring seat and install the adjusting screw (key 2).
4. Install a replacement closing cap gasket (key 35), if necessary, and reinstall the closing cap (key 3, if required).
5. If the spring range was changed, be sure to change the stamped spring range on the nameplate.

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To Disassemble and Reassemble Diaphragm Parts:

For the Aluminum lower casing version only:

Key numbers are referenced in Figures 3 and 4.

1. Remove the downstream external control line. Remove the closing cap (key 3), and turn the adjusting screw (key 2) counterclockwise to remove the adjusting screw (key 2). Remove the upper spring seat (key 4 or 44) and the control spring (key 1).
2. Remove the hex nuts (key 22), cap screws (key 21) and spring case (key 23).
3. Remove the diaphragm assembly (key 5) plus attached parts by tilting them so that the pusher post (key 8) slips off the lever assembly (key 49). To separate the diaphragm (key 5) from the attached parts, unscrew the spring holder cap screw (key 30) from the pusher post (key 8).
4. Inspect the pusher post and replace if required.
5. To replace the lever assembly (key 49), remove the machine screws (key 11), cotter pin (key 14) and clevis pin (key 10). To replace the valve stem (key 13), unscrew the cap screws (key 18) from the body (key 28) and remove the lower casing assembly (key 9). Pull the valve stem (key 13) out of the lower casing assembly (key 9).
6. To inspect the body bushing (key 97), remove the bushing snap ring (key 74) and carefully remove the body bushing from the lower casing assembly (key 9).
7. During the assembly procedure, use lubricants on parts as indicated in Figure 4 and replace parts as required.
8. Install the body bushing O-ring (key 64) on the body bushing (key 97). A wiper retaining ring (key 63) is required to hold the wiper (key 66) in place while the bushing is installed into the lower casing assembly (key 9). Ensure that the wiper is properly oriented with the wiper lip pointing inward toward the diaphragm. Install the bushing snap ring (key 74) to hold the body bushing in place.
9. Apply a moderate coating of lubricant to the valve stem (key 13). Install the stem O-ring (key 15) and the two back-up rings (key 69, one on each side of the O-ring) onto the valve stem (key 13).
10. Install the valve stem (key 13) from the body side of the bushing, this is to ensure that the O-ring groove does not damage the wiper.
11. Install the lever assembly (key 49) into the stem (key 13) and insert the clevis pin (key 10) and cotter pin (key 14). Secure the lever assembly (key 49) with the machine screws (key 11). Carefully tighten the machine screws to a torque of 7 to 9 ft-lbs / 9 to 12 N•m.
12. Install the diaphragm and plate assembly (key 5, pattern side up) on the pusher post. Then install the lower spring seat (key 4).
13. Lubricate the diaphragm cap screw threads (key 30) and insert the cap screw to secure the diaphragm parts to the pusher post (key 8). Carefully tighten to a torque of 7 to 9 ft-lbs / 9 to 12 N•m.
14. Install the assembled parts in the lower casing (key 9). Make sure that the lever (key 49) fits in the pusher post (key 8) and that the holes in the diaphragm align with the holes in the lower casing.
15. Install the spring case (key 23) on the lower casing assembly (key 9) so that the vent assembly (key 56) is correctly oriented, and secure with the cap screws (key 21) and hex nuts (key 22) finger tight only.
16. Insert the control spring (key 1) into the spring case (key 23), followed by the upper spring seat (key 4 or 44) and the adjusting screw (key 2).
17. Turn the adjusting screw (key 2) clockwise until there is enough control spring (key 1) force to provide proper slack to the diaphragm (key 5). Using a crisscross pattern, finish tightening the cap screws (key 21) and hex nuts (key 22) to 18 to 21 ft-lbs / 24 to 28 N•m of torque. To adjust the outlet pressure to the desired setting, refer to the Startup and Adjustment section.
18. Install a replacement closing cap gasket (key 35) if necessary, and then install the closing cap (key 3, if required).
19. Connect the downstream control line and refer to the Startup section before putting the regulator back in operation.

For the Steel or Stainless Steel lower casing version only:

Key numbers are referenced in Figures 3 and 5.

1. Remove the downstream external control line. Remove the closing cap (key 3, if required), and turn the adjusting screw (key 2) counterclockwise to remove the adjusting screw (key 2). Remove the upper spring seat (key 4 or 44) and the control spring (key 1).

2. Remove the hex nuts (key 22), cap screws (key 21) and spring case (key 23).
3. Remove the diaphragm assembly (key 5) plus attached parts by tilting them so that the pusher post (key 8) slips off the lever assembly (key 9). To separate the diaphragm (key 5) from the attached parts, unscrew the spring holder cap screw (key 30) from the pusher post (key 8).
4. Inspect the pusher post and replace if required.
5. Inspect the lower spring seat (key 4), lower diaphragm head (key 6) and the lower diaphragm head gasket (key 7) and replace if necessary.
6. To replace the lever assembly (key 9), remove the machine screws (key 11). To replace the valve stem (key 13), unscrew the union nut (key 19) from the body (key 28) and remove the lower casing assembly (key 20) and split ring (key 17). Pull the valve stem (key 13) out of the lower casing assembly (key 20).
7. To inspect the body bushing (key 97), remove the bushing snap ring (key 74) and carefully remove the body bushing from the lower casing assembly (key 20).
8. During the assembly procedure, use lubricants indicated parts (Figure 5) and replace parts as required.
9. Install the body bushing O-ring (key 64) on the body bushing (key 97). To install the wiper (key 66), place a small swab of lubricant into the body bushing to hold the wiper in place while the bushing is installed into the lower casing assembly (key 20). Ensure that the wiper is properly oriented with the wiper lip pointing inward toward the diaphragm. Install the bushing snap ring (key 74) to hold the body bushing in place.
10. Apply a moderate coating of lubricant to the valve stem (key 13). Install the stem O-ring (key 15) and the two back-up rings (key 69, one on each side of the O-ring) onto the valve stem (key 13).
11. Install the valve stem (key 13) from the body side of the bushing, this is to ensure that the O-ring groove does not damage the wiper.
12. Install the lever assembly (key 9) into the stem (key 13) and secure the lever assembly (key 9) with the machine screws (key 11). Carefully tighten the machine screws to a torque of 2 to 3 ft-lbs / 3 to 4 N•m.
13. Always use a new lower diaphragm plate gasket (key 31). Install the parts on the pusher post in the order listed below:
 - Lower diaphragm plate gasket (key 7)
 - Lower diaphragm plate (key 6)
 - Diaphragm and plate assembly (key 5) pattern side up
 - Lower spring seat (key 4)
14. Lubricate the diaphragm cap screw threads (key 30) and insert the cap screw to secure the diaphragm parts to the pusher post (key 8). Carefully tighten to a torque of 7 to 9 ft-lbs / 9 to 12 N•m.
15. Install the assembled parts in the lower casing (key 20). Make sure that the lever (key 9) fits in the pusher post (key 8) and that the holes in the diaphragm align with the holes in the lower casing.
16. Install the spring case (key 23) on the lower casing assembly (key 20) so that the vent assembly (key 56) is correctly oriented, and secure with the cap screws (key 21) and hex nuts (key 22) finger tight only.
17. Insert the control spring (key 1) into the spring case (key 23), followed by the upper spring seat (key 4 or 44) and adjusting screw (key 2).
18. Turn the adjusting screw (key 2) clockwise until there is enough control spring (key 1) force to provide proper slack to the diaphragm (key 5). Using a crisscross pattern, finish tightening the cap screws (key 21) and hex nuts (key 22) to 18 to 21 ft-lbs / 24 to 28 N•m of torque. To adjust the outlet pressure to the desired setting, refer to the Startup and Adjustment section.
19. Install a replacement closing cap gasket (key 35) if necessary, and then install the closing cap (key 3).
20. Connect the downstream control line and refer to the Startup section before putting the regulator back in operation.

Parts Ordering

When contacting your local Sales Office about this regulator, include the type number and all other pertinent information stamped on the nameplate.

Type Y693

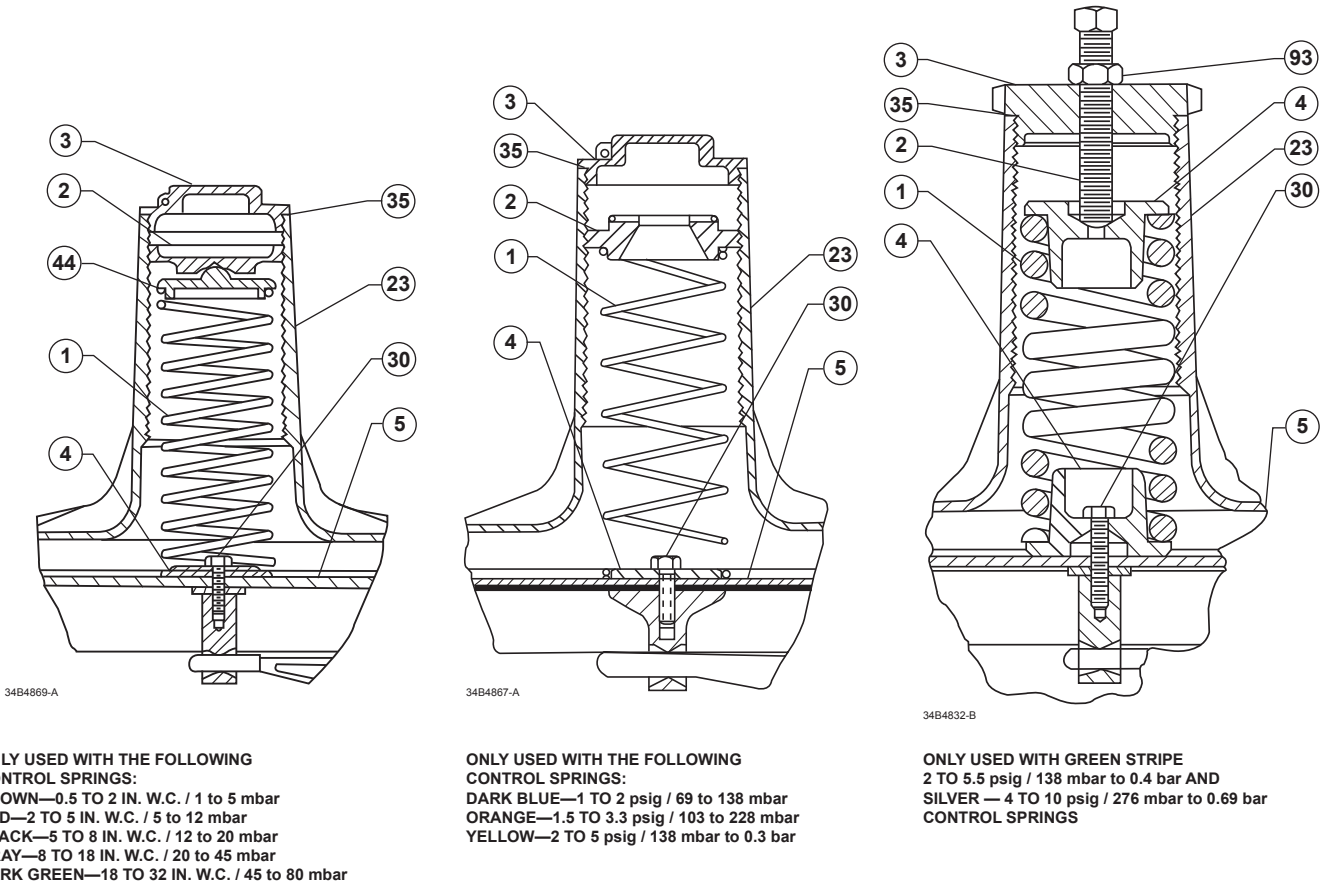


Figure 3. Type Y693 Adjusting Screw/Control Spring Combinations

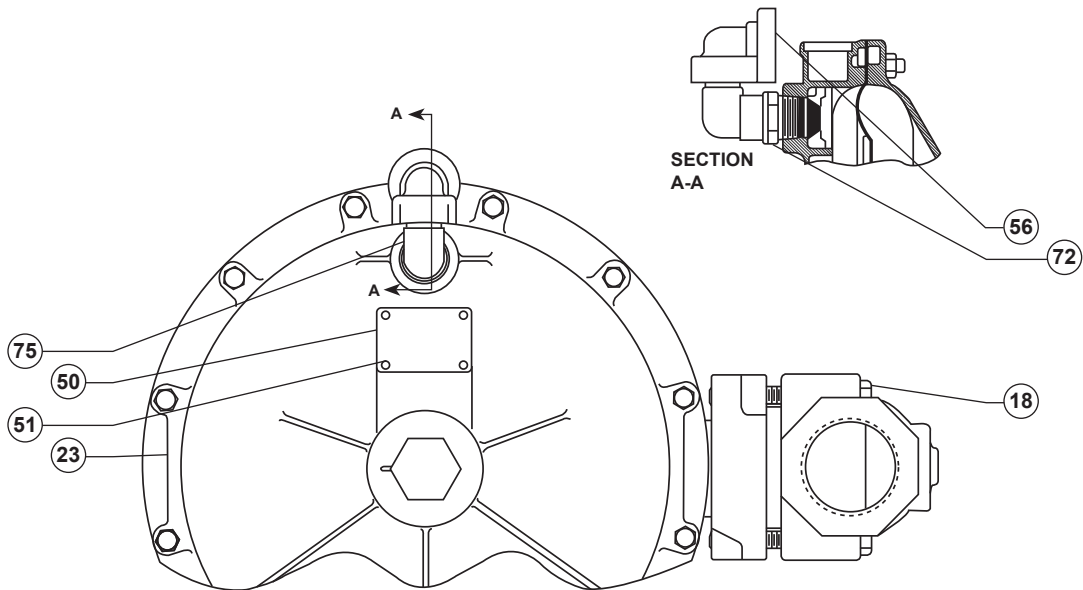
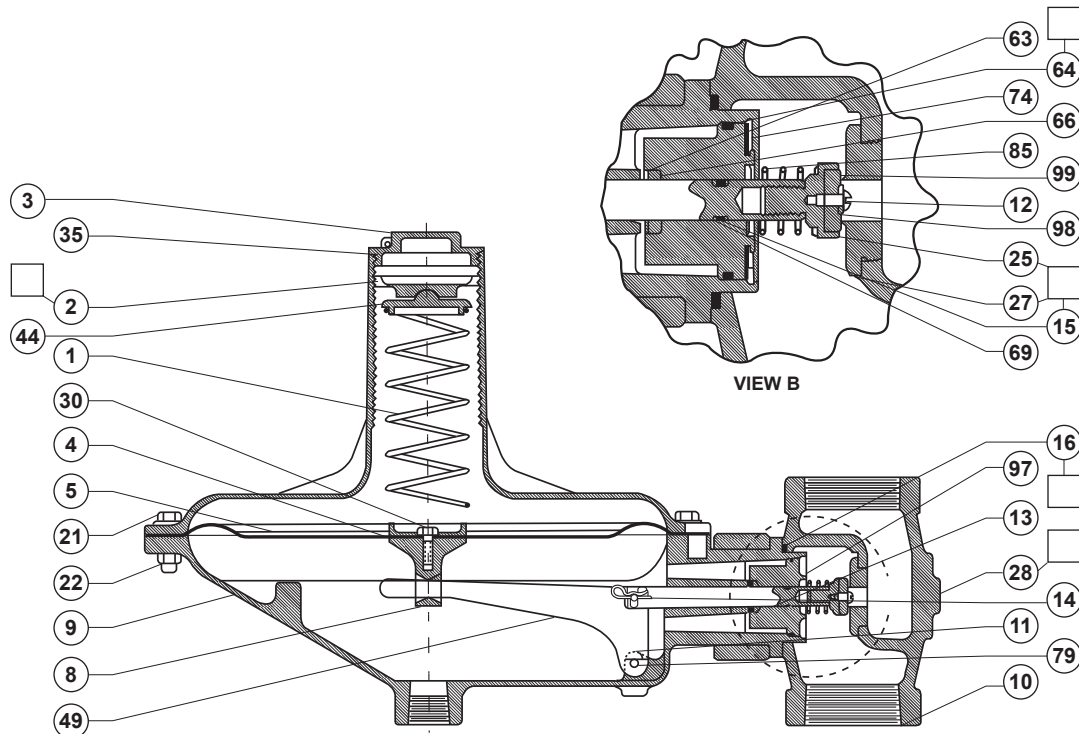


Figure 4. Type Y693 Regulator, Aluminum Lower Casing Version



□ APPLY LUBRICANT

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Figure 4. Type Y693 Regulator, Aluminum Lower Casing Version (continued)

Parts List

In this parts list, parts marked NACE are intended for corrosion-resistant service as detailed in the National Association of Corrosion Engineers (NACE) standard MR0-175-90.

Type Y693 Regulator (Figures 3, 4 and 5)

Aluminum lower casing version (Figures 3 and 4)

Key	Description	Part Number
1	Control Spring, Plated steel	See Table 1
2	Adjusting Screw	
	0.5 to 32 in. w.c. / 1 to 80 mbar spring	1A5896X0022
	1 to 5 psig / 69 mbar to 0.3 bar spring	1L928608012
	2 to 5.5 psig / 138 mbar to 0.4 bar spring	1A500528982
	4 to 10 psig / 276 mbar to 0.7 bar spring	1A500528982
3	Closing Cap	
	0.5 to 32 in. w.c. / 1 to 80 mbar spring	1A589544022
	1 to 5 psig / 69 mbar to 0.3 bar spring	1A589544022
	2 to 5.5 psig / 138 mbar to 0.4 bar spring	1H798714012
	4 to 10 psig / 276 mbar to 0.7 bar spring	1H798714012
4	Lower Control Spring Seat, Plated steel	
	0.5 to 32 in. w.c. / 1 to 80 mbar spring	14B4240X012
	1 to 5 psig / 69 mbar to 0.34 bar spring	14B4240X012
	2 to 5.5 psig / 138 mbar to 0.4 bar spring	1A500528982
	4 to 10 psig / 276 mbar to 0.7 bar spring	1A500528982
5*	Diaphragm Assembly	
	0.5 to 32 in. w.c. / 1 to 80 mbar springs	
	Nitrile (NBR)	14B3350X012
	Fluorocarbon (FKM)	14B3350X022
	1 to 10 psig / 69 mbar to 0.7 bar springs	
	Nitrile (NBR)	14B3350X032
	Fluorocarbon (FKM)	14B3350X042

Key	Description	Part Number
8	Pusher Post, Stainless steel	1L143311992
9	Lower Casing Assembly, Aluminum	1H9751X0022
10*	Clevis Pin, Plated steel	14B2155X012
11	Machine Screw, Stainless steel (2 required)	1B420428982
12	Machine Screw, Stainless steel	1A8664X00A2
13	Stem, Stainless steel	24B1765X012
14*	Cotter Pin, Stainless steel	1A866537022
15*	Stem O-ring	
	Nitrile (NBR)	1E216306992
	Fluorocarbon (FKM)	1L949306382
16*	Body Gasket	
	Nitrile (NBR)	T12587T0012
	Fluorocarbon (FKM)	T12587T0022
18	Cap Screw, Plated steel (2 required)	1H974724052
21	Diaphragm Case Cap Screw, Plated steel (12 required)	1B136324052
22	Hex Nut, Zinc-plated steel (12 required)	1A309324122
23	Spring Case, Aluminum	AE6180X0012
25*	Disk Holder, Stainless steel	24B1952X012
27	Orifice, Stainless steel, 1/2 in. / 13 mm	1A928835032
28	Body	
	Cast Iron	
	NPT	
	NPS 1-1/2	14B3192X012
	NPS 2	14B3192X022
	Flanged	
	CL125 FF	
	NPS 2 / DN 50	14B3193X012
	CL250 RF	
	NPS 2 / DN 50	14B3193X022
	WCC Steel	
	NPT	
	NPS 1-1/2	14B3192X032
	NPS 2	14B3192X042
	Flanged	
	CL150 RF	
	NPS 1-1/2 / DN 40	14B4053X012
	NPS 2 / DN 50	14B4053X022

*Recommended Spare Parts

Type Y693

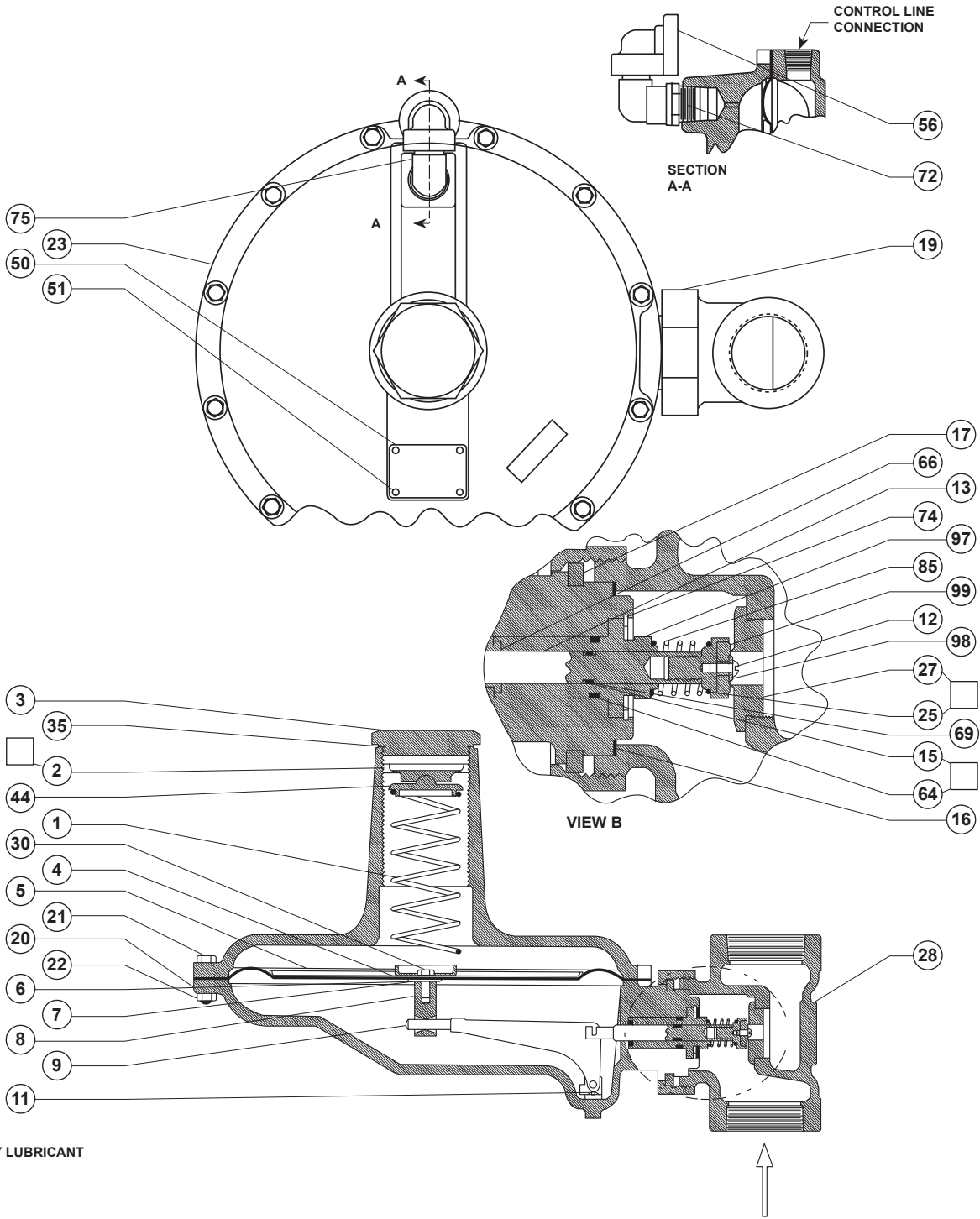


Figure 5. Type Y693 Regulator, Steel or Stainless Steel Lower Casing Version

Key	Description	Part Number	Key	Description	Part Number
28	Body (continued)		7*	Diaphragm Plate Gasket, Composition	1A348704022
	CL300 RF		8	Pusher Post	
	NPS 1-1/2 / DN 40	14B4053X032		Stainless steel	0Y096435072
	NPS 2 / DN 50	14B4053X042		Stainless steel (NACE)	0Y096435072
	EN PN 16, 25 and 40 RF Flanged		9	Lever Assembly	
	NPS 1-1/2 / DN 40	14B4053X052		Stainless steel	1E3409X0052
	NPS 2 / DN 50	14B4053X062		Stainless steel (NACE)	1E3409X0052
30	Cap Screw		11	Machine Screw, Stainless steel (2 required)	1A866935032
	0.5 to 32 in. w.c. / 1 to 80 mbar spring	1A667824052	12	Machine Screw, Stainless steel	1A8664X00A2
	1 to 5 psig / 69 mbar to 0.3 bar spring	1B720924052	13	Stem	
	2 to 5.5 psig / 138 mbar to 0.4 bar spring	1E4539X0012		Stainless steel	24B1975X012
	4 to 10 psig / 276 mbar to 0.7 bar spring	1E4539X0012		Stainless steel (NACE)	24B1975X012
35*	Closing Cap Gasket, Neoprene (CR)	1N446206992	15*	Stem O-ring	
44	Spring Seat	0Y095644012		Nitrile (NBR)	1P4207X0072
49	Lever Assembly, Stainless steel	1H974028992		Fluorocarbon (FKM)	1L949306382
50	Nameplate	-----		Perfluoroelastomer (FFKM)	1P4207X0082
51	Drive Screw	-----	16*	Body Gasket, Composition	1A348004032
56	Vent Assembly Type Y602-8, Plastic	17A6573X022	17	Snap Ring, Steel	0Y095828982
63	Wiper Retaining Ring	14B2153X012	19	Union Nut	
64*	Bushing O-ring			WCC Steel	0Z017624092
	Nitrile (NBR)	1L142906992		Stainless Steel	0Z0176X0012
	Fluorocarbon (FKM)	1P1676X0032		WCC Steel (NACE)	0Z017624092
66*	PTFE Wiper	14B1553X012	20	Lower Casing Assembly	
69*	PTFE Back-up ring (2 required)	14B2150X012		WCC steel	34B1452X012
72	Reducing Nipple, Plastic	14B3323X012		Stainless steel	34B1452X022
74	Bushing Snap Ring, Stainless steel	1L142838992	21	Diaphragm Case Cap Screw, Plated steel	
75	Elbow, Plastic	14B3191X012		(12 required)	1B136324052
79	Pin, Stainless steel	1H972935032	22	Hex Nut, Zinc-plated steel (12 required)	1A309324122
80	Lubricant	-----	23	Spring Case	
85	Bias Spring, Stainless steel	14B2154X012		Aluminum	AE6180X0012
93	Hex Nut, Zinc-plated steel			WCC steel	34B2157X012
	2 to 5.5 psig / 138 mbar to 0.4 bar spring	1A352424122		Stainless steel	34B2157X022
	4 to 10 psig / 276 mbar to 0.7 bar spring	1A352424122	25*	Disk Holder	
97	Body Bushing, Aluminum	24B1454X012		Stainless steel	24B1952X012
98	Disk Washer, Stainless steel	14B1954X012		Stainless steel (NACE)	24B1952X022
99*	Disk		27	Orifice	
	Nitrile (NBR)	14B1953X032		Stainless Steel, 1/2 in. / 13 mm	0L040135032
	Fluorocarbon (FKM)	14B1953X022		Stainless steel (NACE), 1/2 in. / 13 mm	0L0401X0012

Steel and Stainless Steel Lower Casing Version (Figures 3 and 5)

Key	Description	Part Number	Key	Description	Part Number
1	Control Spring, Plated steel	See Table 1		Body	
2	Adjusting Screw			WCC Steel	
	0.5 to 32 in. w.c. / 1 to 80 mbar spring	1A5896X0022		NPT	
	1 to 5 psig / 69 mbar to 0.3 bar spring	1L928608012		NPS 1-1/2	14B3194X012
	2 to 5.5 psig / 0.14 to 0.38 bar spring	1A500528982		NPS 2	14B3194X022
	4 to 10 psig / 0.28 to 0.69 bar spring	1A500528982		Flanged	
3	Closing Cap			CL150 RF	
	0.5 to 32 in. w.c. / 1 to 80 mbar spring			NPS 1-1/2 / DN 40	14B3195X012
	Aluminum	1A589544022		NPS 2 / DN 50	14B3195X022
	Steel	1J880124092		CL300 RF	
	Stainless Steel	1J8801X0022		NPS 1-1/2 / DN 40	14B3195X032
	2 to 5.5 psig / 138 mbar to 0.4 bar spring, Brass	1H798714012		NPS 2 / DN 50	14B3195X042
	4 to 10 psig / 0.28 to 0.69 bar spring, Brass	1H798714012		EN PN 16, 25 and 40 RF	
4	Lower Control Spring Seat, Plated steel			NPS 1-1/2 / DN 40	14B3195X092
	0.5 to 32 in. w.c. / 1 to 80 mbar spring	14B4240X012		NPS 2 / DN 50	14B3195X102
	1 to 5 psig / 69 mbar to 0.3 bar spring	14B4240X012		Stainless steel	
	2 to 5.5 psig / 0.14 to 0.38 bar spring (2 required)	1H7974X0012		NPT	
	4 to 10 psig / 0.28 to 0.69 bar spring (2 required)	1H7974X0012		NPS 1-1/2	14B3194X032
5*	Diaphragm Assembly			NPS 2	14B3194X042
	0.5 to 32 in. w.c. / 1 to 80 mbar spring			Flanged	
	Nitrile (NBR)	1N9721X0012		CL150 RF	
	Fluorocarbon (FKM)	1N9721X0022		NPS 1-1/2 / DN 40	14B3195X052
	1 to 10 psig / 69 mbar to 0.7 bar springs			NPS 2 / DN 50	14B3195X062
	Nitrile (NBR)	1N9722X0012		CL300 RF	
	Fluorocarbon (FKM)	1N9722X0022		NPS 1-1/2 / DN 40	14B3195X072
6	Lower Diaphragm Plate			NPS 2 / DN 50	14B3195X082
	Stainless steel	0V003935032		EN Class PN 16, 25 and 40 RF Flanged	
	Stainless steel (NACE)	0V0039X0022		NPS 1-1/2 / DN 40	14B3195X112
				NPS 2 / DN 50	14B3195X122
				WCC Steel (NACE)	
				NPT	
				NPS 1-1/2	14B3194X052
				NPS 2	14B3194X062

*Recommended Spare Parts

Type Y693

Key	Description	Part Number	Key	Description	Part Number
30	Cap Screw, Plated steel 0.5 to 32 in. w.c. / 1 to 80 mbar springs 1 to 5 psig / 69 mbar to 0.3 bar springs 2 to 5.5 psig / 138 mbar to 0.4 bar spring 4 to 10 psig / 276 mbar to 0.7 bar spring	1A667824052 1B720924052 1E4539X0012 1E4539X0012 1N446206992	75	Elbow, Plastic	14B3191X012
35*	Closing Cap Gasket, Neoprene (CR)	0Y095644012	80	Lubricant	-----
44	Spring Seat, Aluminum	-----	85	Bias Spring Stainless steel	14B2154X012
50	Nameplate	-----		Stainless steel (NACE)	14B3540X012
51	Drive Screw	-----	93	Hex Nut, Plated steel	
56	Vent Assembly Type Y602-8, Plastic	17A6573X022		2 to 5.5 psig / 138 mbar to 0.4 bar spring 4 to 10 psig / 276 mbar to 0.7 bar spring	1A352424122 1A352424122
64*	Bushing O-ring Stainless steel trim Nitrile (NBR) Fluorocarbon(FKM) Perfluorocarbon (FFKM) Stainless steel trim (NACE) Neoprene (CR) Fluorocarbon (FKM) Perfluoroelastomer (FFKM)	1C782106992 1C7821X0072 1C7821X0052 1C7821X0042 1C7821X0072 1C7821X0052	97	Body Bushing Stainless steel Stainless steel (NACE)	24B1455X012 24B1455X022
66*	PTFE Wiper	14B1553X012	98	Disk Washer, Stainless steel	14B1954X012
69*	PTFE Back-up ring (2 required)	14B2150X012	99*	Disk Stainless steel trim Nitrile (NBR) Fluorocarbon (FKM) Perfluoroelastomer (FFKM) Stainless steel trim (NACE) Neoprene (CR) Fluorocarbon (FKM) Perfluoroelastomer (FFKM)	14B1953X032 14B1953X022 14B1953X052 14B1953X042 14B1953X022 14B1953X052
72	Reducing Nipple, Plastic	14B3323X012			
74	Bushing Snap Ring Stainless steel Stainless steel (NACE)	14B1764X012 14B1764X022			

*Recommended Spare Parts

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