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I & M Mark 128PQC Series

Installation & Maintenance Instructions for the Mark 128PQC Series Control Valves

Warning: Jordan Valve Control Valves must only be used, installed and repaired in accordance with these Installation & Maintenance Instructions. Observe all applicable public and company codes and regulations. In the event of leakage or other malfunction, call a qualified service person; continued operation may cause system failure or a general hazard. Before servicing any valve, disconnect, shut off, or bypass all pressurized fluid. Before disassembling a valve, be sure to release all spring tension.

INSTALLATION

Warning:

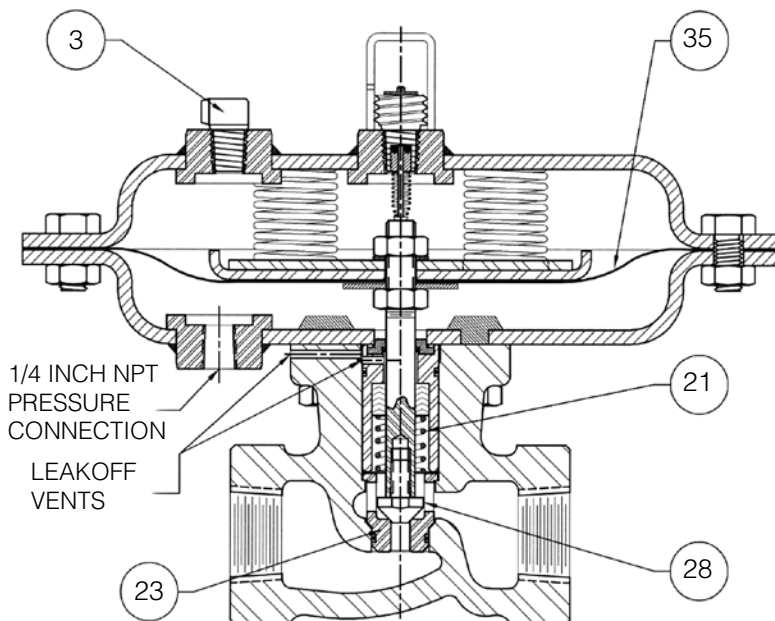
Service conditions must not exceed the limits shown on the valve nameplate, or those outlined in this manual. Consequences could include bursting of pressure-retaining parts and uncontrolled process fluid, resulting in personal injury or property damage. Control valves should also be protected from external damages.

Prior to installing the Mark 128PQC Series Control Valve, perform a complete inspection for damage, and remove any foreign debris. Position the valve for desired flow direction. If angle flow is required, switch the pipe plug to left-hand connection. (Figure 2)

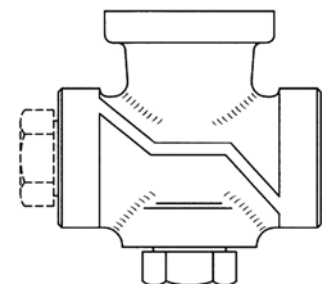
The versatility of this valve allows for installation in any orientation, with the standard method being with the actuator above the body. Standard orientation is best when an angle body or angle configuration has been specified.

When installing the valve into the line, accepted piping practices must be used. A three-valve bypass should be used if continuous operation is required during inspection or maintenance.

For a fail-close control valve, connect the input signal line into the 1/4-inch NPT actuator connection (Figure 1) in the lower diaphragm case assembly. The input signal pressure line should be installed in the upper diaphragm case assembly of a fail-open control valve.



Mark 128PQC Control Valve with Fail-Close Action



Detail of Mark 128PQC Exterior

Figure 1: Mark 128PQC Control Valve Typical Constructions

MAINTENANCE

Warning:

Prior to performing any maintenance, isolate the valve from the process pressure. Vent control input signal pressure. Relieve the process pressure and drain process media from both sides of valve (Figure 5, Key 27). A sudden release of pressure or fluid can cause personal injury or property damage.

Scheduled inspections and maintenance are vital to continued operation of all pressure control valves and systems. Parts are subject to wear and tear, and must be replaced as necessary, depending on the intensity of service conditions. Unless the valve body requires maintenance or replacement, it may remain in the pressure system or on the vessel.

Replacing Packing and Trim

Follow these procedures when replacing the entire packing and trim assembly or individually replacing packing and trim parts. Unless otherwise indicated, key numbers in this section reference Table 2 for parts listings for replacement packing and trim assembly, Figure 2 for packing and trim assembly key numbers and Figure 4 control valve assembly key numbers.

1. Detach the control valve from all pressure, and release pressure from valve body and actuator. Ensure the valve is completely closed.
2. Remove the four nuts (Key 32) from the screws of the lower diaphragm casing. After disconnecting the input signal tubing, remove the actuator from the valve body, along with attached trim parts.

Table 1: Maximum Allowable Shutoff Pressure Drops

Seating	Actuator Action	Flowing Pressure Drop Tends To:	Port Diameter		Cadmium Coloured Main Spring 14A8831X012				Red Main Spring 14A9077X012			
			In	mm	At 20 Psig (1.4 bar) Operating Signal Pressure (2 Springs Req'd)		At 35 Psig (2.4 bar) Operating Signal Pressure (4 Springs Req'd)		At 20 Psig (1.4 bar) Operating Signal Pressure (2 Springs Req'd)		At 35 Psig (2.4 bar) Operating Signal Pressure (4 Springs Req'd)	
					Psi	Bar	Psi	Bar	Psi	Bar	Psi	Bar
Metal (All Types)	Fail Close	Open Valve	1/4	6.4	1510	104	3370	232	3880	233	3600	248
			3/8	9.5	520	36	1340	92	1340	92	3120	215
			1/2	12.7	220	15	690	47	700	48	1720	118
			3/4	19.1	30	2.1	240	16	240	16	710	49
		Close Valve	1/4	6.4	940	65	1860	128	1370	94	2920	201
			3/8	9.5	1130	78	2450	169	1540	106	3300	227
	1/2		12.7	1330	92	2920	201	1710	118	3600	248	
	3/4		19.1	2030	140	3600	248	2320	160	3600	248	
	Fail Open	Close Valve	1/4	6.4	170	12	350	24	---	---	---	---
			3/8	9.5	530	36	610	42	---	---	---	---
			1/2	12.7	540	37	1150	79	---	---	---	---
			3/4	19.1	1400	96	2910	200	---	---	---	---
Soft	Fail Close	Open Valve	1/4	6.4	1000	69	1000	69	1000	69	1000	69
			3/8	9.5	710	49	1000	69	1000	69	1000	69
			1/2	12.7	400	28	830	57	830	57	1000	69
			3/4**	19.1**	160	11	350	24	360	25	790	54
		Close Valve	1/4	6.4	940	65	1000	69	1000	69	1000	69
			3/8	9.5	1000	69	1000	69	1000	69	1000	69
			1/2	12.7	1000	69	1000	69	1000	69	1000	69
			3/4**	19.1**	1000	69	1000	69	1000	69	1000	69
	Fail Open	Close valve	1/4	6.4	560	39	660	45	---	---	---	---
			3/8	9.5	480	33	960	66	---	---	---	---
			1/2	12.7	540	37	1000	69	---	---	---	---
			3/4***	19.1**	1000	69	1000	69	---	---	---	---

Replacing Packing and Trim continued,

3. Accessible areas should be cleaned at this stage, and all necessary maintenance performed. The actuator and attached trim parts can be turned over and held by the valve body.
4. To separate trim and access packing parts or seal O-rings, first loosen and remove the valve plug (Key 25) and remove the packing box washer (Key 27).
5. Remove the packing box (Key 28), O-ring retainer (Key 18), stem O-ring (Key 19) and diaphragm casing O-ring (Key 31) off the stem.
6. Install replacement parts as necessary.
 - 6.1. If a complete packing and trim assembly is being installed, remove the assembly from the tube (Key 37), keeping the web sleeve (Key 39) on the assembly so the parts remain in place. Roll the sleeve back as necessary during installation.
 - 6.2. Continue pushing the assembly onto the stem until the valve plug and cage are pushed away from the packing box washer or wiper ring. Roll the web sleeve back into place just past the packing box.
 - 6.3. If installing nitrile/cotton packing, the packing rings may be lubricated with silicon based product.
7. Slide the packing box onto the stem until the packing box, the O-ring (Key 19) and the O-ring retainer (Key 18) and the diaphragm casing O-ring (Key 31) are sealed against the diaphragm casing.
 - 7.1. Ensuring proper positioning of the O-rings will prevent them from being cut when other parts are compressed against them.
 - 7.2. Advance the packing spring washer (Key 29), packing spring (Key 21), second packing spring washer, wiper ring and packing box washer (Key 27, if included in the assembly) down onto the stem.
8. For installation of the packing and trim assembly, it is necessary to remove the sleeve, cage puller (Key 40) and cage (Key 23) from the valve plug depending on individual valve configuration.

9. Fix the valve plug onto the stem, rotating the plug until the shoulder makes snug contact with the stem. No further tightening is necessary.
10. To replace the cage or access the cage O-ring (Key 22), remove the cage from the body (Key 26) using the cage puller or a wire hook. Replacement parts can be installed as necessary.
11. Attach the actuator and trim to the valve body (Key 26), paying special attention to the cage O-ring to prevent damage. Thread the four nuts (Key 32) to the lower diaphragm casing assembly screws. Nuts must be tightened to 15-foot-pounds (20N•m).
12. Reconnect the input signal tubing to the actuator connection of the appropriate diaphragm casing.

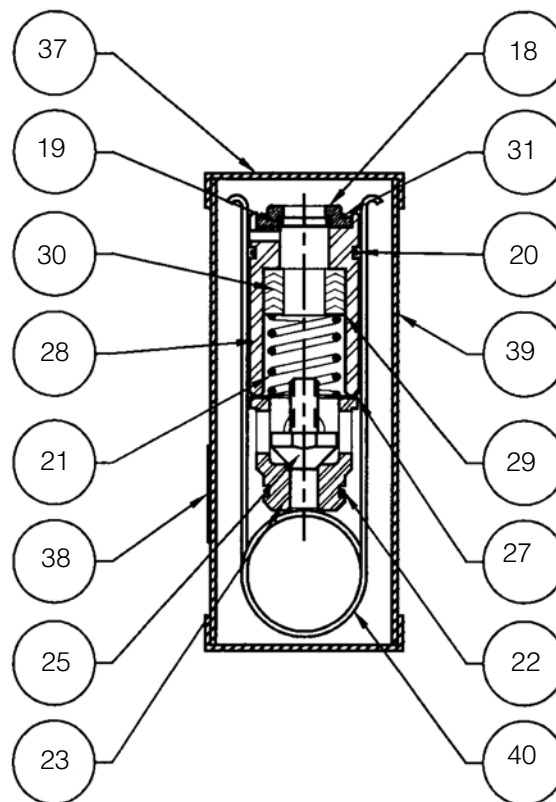


Figure 2: Replacement Packing and Trim Assemblies for Metal Seated Constructions

Changing Main Spring Range

Unless otherwise indicated, refer to Table 2 for parts listings for replacement packing and trim assembly, Figure 2 for packing and trim assembly key numbers and Figure 4 for control valve assembly key numbers.

1. Isolate off the control valve from all pressure, and release pressure from valve body and actuator.
2. Release pressure and drain the process media from both sides of the valve body. Ensure the valve is completely closed.
3. If necessary, disconnect the input signal tubing; remove the diaphragm casing nuts (Key 15), cap screws (Key 14) and upper diaphragm casing (Key 1).
4. For fail-close action applications, install main springs (Key 12), using quantities and descriptions as outlined in Table 2.

Note: It is important to avoid loosening the stem-nut (Key 15), as this may prevent the valve from shutting off or from fully opening at full pressure, and resulting in the need for complete disassembly of the control valve to properly install the stem and diaphragm.

5. For fail-open applications, unfasten the lock nut (Key 16), remove the flat washer (Key 33), diaphragm (Key 35), diaphragm plate (Key 34), spring plate (Key 2), and main springs (Key 12).
6. Refer to Table 1 and install main springs as indicated.
7. Reassemble the removed parts (Keys 2, 34, 35, 33, and 16). The locknut (Key 16) must be tightened to 12 foot-pounds (16 N•m).
8. Attach the upper diaphragm casing using the cap screws, and casing nuts, tightening in an even crisscross pattern to avoid crushing the diaphragm. Tighten to 15 foot-pounds (20 N•m).
9. Reconnect the input signal tubing to the actuator connection of the appropriate diaphragm casing.

Reversing Action or Replacing Actuator Parts

Unless otherwise indicated, refer to Table 2 for parts listings for replacement packing and trim assembly, Figure 2 for packing and trim assembly key numbers and Figure 4 for control valve assembly key numbers.

1. Isolate the control valve from all pressure, and release pressure from valve body and actuator and ensure the valve is completely closed.
2. Remove the input signal tubing, diaphragm casing nuts (Key 15), cap screws (Key 14) and upper diaphragm casing (Key 1).
3. Remove the following:
 - 3.1. Main springs (Key 12)
 - 3.2. Stem nut (Key 15)
 - 3.3. Locknut (Key 16) and lock washer (Key 4)
 - 3.4. Spring plate (Key 2)
 - 3.5. Diaphragm plate (Key 34) and diaphragm (Key 35)
 - 3.6. Flat washer (Key 33)
4. Unscrew the four nuts (Key 32) from the screws of the lower diaphragm casing. After disconnecting the input signal tubing, remove the actuator from the valve body along with attached trim parts.
5. Remove the following:
 - 5.1. Valve plug (Key 25)
 - 5.2. Packing box washer (Key 27)
 - 5.3. Slide the packing box (Key 28), O-ring retainer (Key 18), stem O-ring (Key 19) and the diaphragm casing O-ring (Key 31) off the stem.
6. Replace the valve stem, bottom stem nut or lock nut (Key 15 or 16) as required.
7. Refer to Figure 3 and ensure that the lower shoulder of the bottom stem nut (Key 15) (for fail-open assembly) or locknut (Key 16) (for fail-close assembly) is the proper distance from the plug end of the stem.

**Reversing Action or Replacing Actuator Parts
cont'd**

8. Perform the following assembly sequences as necessary to achieve the required control valve action:
 - 8.1. Fail-close action: install the following parts: flat washer (Key 33), diaphragm (Key 35), diaphragm plate (Key 34), spring plate (Key 2), lock washer (Key 4) and stem nut (Key 15). Tighten stem nut to 12 foot-pounds (16 N•m).
 - 8.2. Fail-open action, install the following parts: lock washer (Key 4), spring plate, diaphragm plate, diaphragm, flat washer (Key 33) and locknut (Key 16). Tighten the lock nut to 12-foot-pounds (16 N•m).
9. With fail-open application, place the main springs (Key 12) into the lower diaphragm casing, ensuring that the lower ends of the springs rest over the weld stud heads of the lower diaphragm casing.
10. Following steps 6 through 10 of the “Replacing Packing and Trim” section, install packing and trim parts to secure the stem.
11. When reversing action from previous direction, move the vent (Key 3) to the 1/4-inch NPT actuator connection of the lower diaphragm casing (for fail-open action) or upper diaphragm casing (for fail-close action).
12. For fail-close application, place the main springs so that they rest in the spring plate holes and will not touch the upper diaphragm casing vent boss.
13. Mount the upper diaphragm casing, capscrews, and casing nuts, tightening in an even crisscross pattern to avoid crushing the diaphragm. Tighten to 15 foot-pounds (20 N•m).
14. Replace the actuator and attached trim parts into the valve body (Key 26) with nuts (Key 15) to the lower diaphragm casing integral assembly screws. Tighten nuts to 15 foot-pounds (20 N•m).
15. Reconnect the input signal tubing to the actuator connection of the appropriate diaphragm casing.

PARTS ORDERING

Mark 128-PQC valves have individual serial numbers, found on the valve nameplate. Please refer to that number when ordering parts or contacting your Jordan Valve Sales Representative. Individual parts numbers are listed as follows. Please include these numbers when ordering replacement parts.

Table 2: Replacement Packing and Trim Assembly Part Numbers

Port Diameter		TFE Ring Packing and Heat-Treated 440C SST Valve Plug and Cage	TFE V-Ring Packing, Nitronic 50 SST Valve Plug and Cage, and Inconel X750 Packing Spring
In	mm	Mark 128PQC 17-7PH SST Packing Spring	Mark 128 PQC
1/4	6.5	15A2611X012	15A2611X042
3/8	9.5	15A2611X022	15A2611X052
1/2	12.7	15A2611X032	15A2611X062

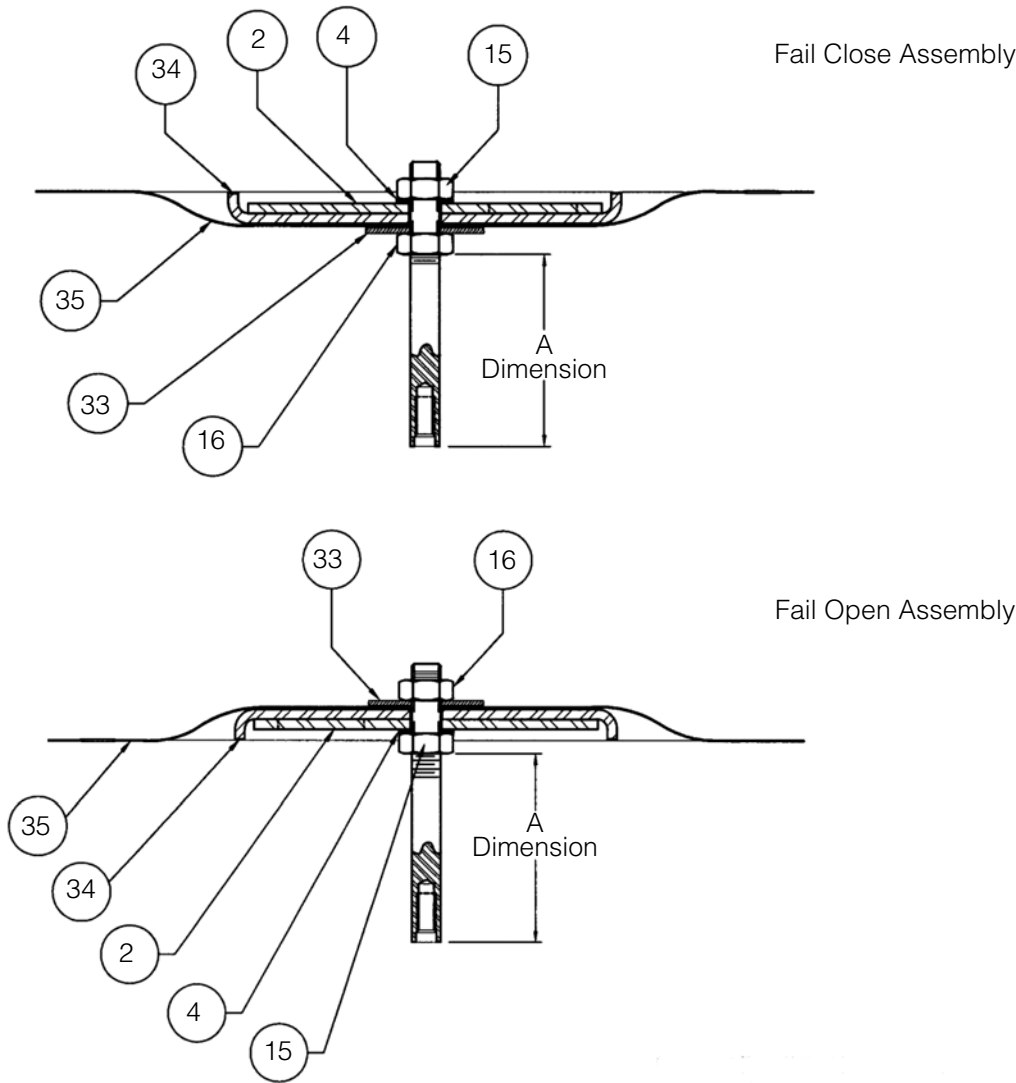
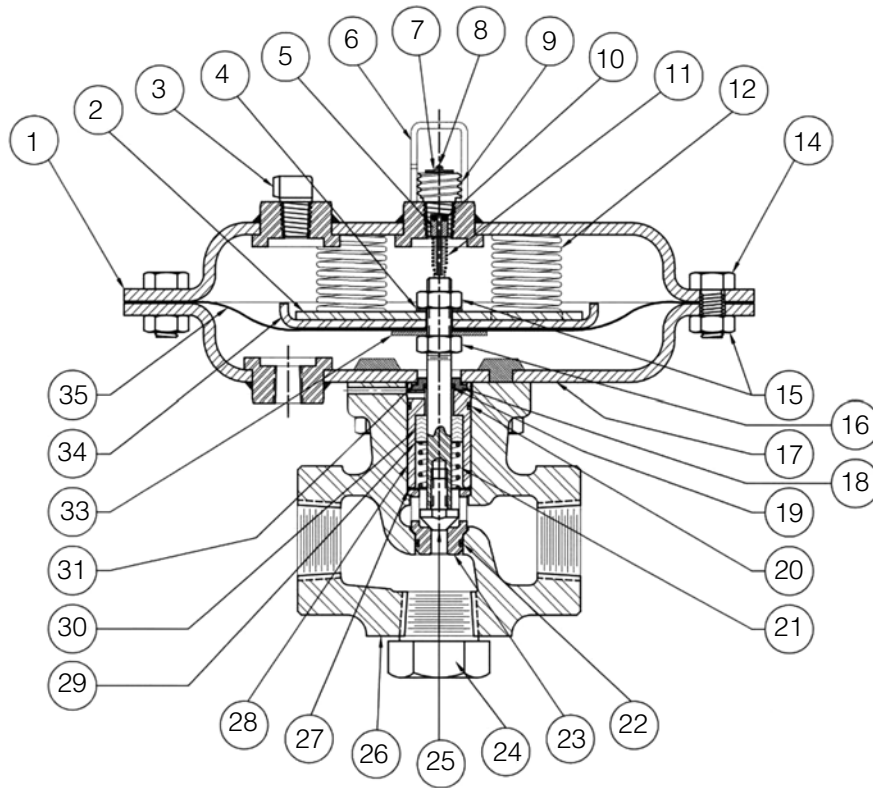


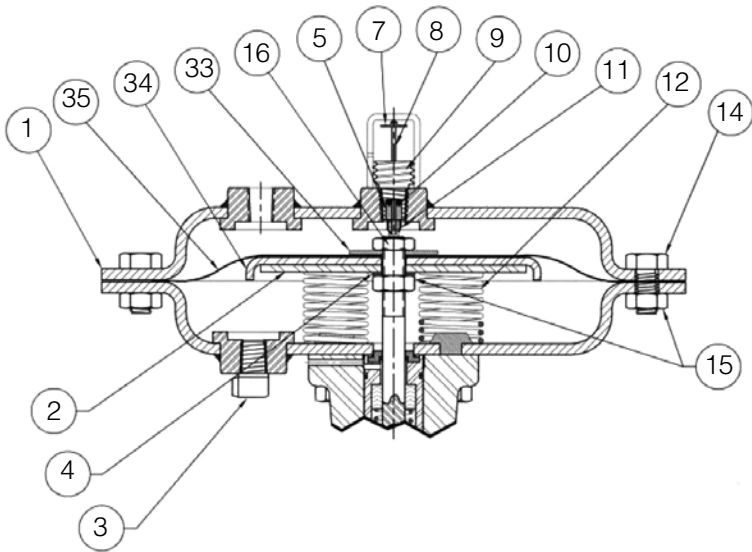
Figure 3: Stem and Diaphragm Assembly Dimensions

Valve Design	Dimension A			
	Fail-Open		Fail-Close	
	In.	mm	In.	mm
Mark 128PQC	2.72	69.1	2.46	62.5

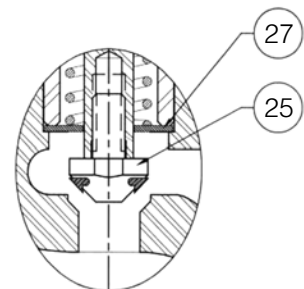
MARK 128PQC SERIES CONTROL VALVE



Mark 128PQC Control Valve: Fail-Closed with Cage-Style Metal Seat and Single TFE-V-Ring Packing



Fail-Open Actuator Detail



Mark 128PQC Cageless Soft-Seat Detail

Figure 4: Typical Mark 128PQC Series Control Valve Assembly

PARTS LIST

Key	Description				Part Number	
1	Upper Diaphragm Casing, Steel				24A8816X012	
2	Spring Plate, Zinc Plated Steel				14A8819X012	
3	Vent Assembly				1C8937000A2	
4	Washer, Steel				1A742328992	
5	Indicator Bushing, 316 SST				13A2323X012	
6	Indicator Cover, Plastic				15A1580X012	
7	Travel Indicator Disc Nut, Plastic				1F730506992	
8	Machine Screw, SST				14A8818X012	
9	Indicator Fitting SST				15A0726X012	
10	O-Ring, Nitrile				1H292606992	
11	Spring, 302 SST				16A0431X012	
12	Main Spring, Cadmium Plated Steel				See Table 2	
13	Nameplate, Aluminum				24A7156X012	
14	Cap Screw, Plated Steel (2 req'd)				1E760324052	
15	Hex Nut, Cadmium Plated Steel (17 req'd)				1A346524122	
16	Locknut, Plated Steel				15A7591X012	
17	Lower Diaphragm Casing, Steel				24A8810X012	
18	O-Ring Retainer, Polyethylene	Mark 128PQC		14A9053X012		
19	O-Ring, Nitrile	Mark 128PQC		1P420706992		
20	O-Ring, Viton	Mark 128PQC		1U841806382		
21	Spring	Mark 128PQC	Inconel X750	15A1809X012		
22	O-Ring, Nitrile	Mark 128PQC		11A8741X012		
23	Cage	316 SST	Mark 128PQC	1/4" (6.4 mm)	14A8823X022	
				3/8" (9.5 mm)	14A8805X022	
				1/2" (12.7 mm)	14A7157X022	
		Austenitic SST w/ Tungsten Carbide Seating Surface	Mark 128PQC	1/4" (6.4 mm)	15A6800X012	
				3/8" (9.5 mm)	15A6801X012	
24	Pipe Plug, Steel				1A794728992	
25	Valve Plug	Metal Seat	Mark 128 PQC 1" Body	1/4" (6.4 mm) and 3/8" (9.5 mm) port	316 SST 15A6804X012	
				1/2" (12.7 mm) port	316 SST 14A6618X012	
		Composition Seat, Austenitic SST/polyethylene	Mark 128 PQC 1" Body	1/4" (6.4 mm) through 1/2" (12.7 mm) port		15A3199X012
				3/4" port		15A3197X012
	Valve Plug Stem, 316 SST		1" Body, Mark 128PQC		14A8806X012	
26	Valve Body, WCB Steel		1" NPT, Mark 128PQC		24A8802X012	
27	Packing Box Washer, SST			1/2" (12.7 mm) or smaller port	14A6617X012	
				3/4" (19.1 mm) port	14A8807X012	
28	Packing Box, SST		Mark 128PQC		14A8809X012	
29	Washer, SST (2 req'd)		Mark 128PQC		14A8808X012	

PARTS LIST CONT.

Key	Description			Part Number	
30	Packing Set, TFE	Mark 128PQC	Complete Set	14A8812X012	
			Individual Parts	Male Adaptor	1J227206242
				V-Ring (4 req'd)	1J255206992
				Female Adaptor	1J233201012
				Wiper Ring	1R2516X0012
31	O-Ring, Nitrile			13A1584X012	
33	Washer, Cadmium Plated Steel			14A9770X012	
34	Diaphragm Plate, Zinc Plated Steel			14A8814X012	
35	Diaphragm, Neoprene w/nitrile insert			14A8813X012	
37	Paper Tube			---	
38	Paper Label			---	
39	Protective Sleeve-Web			---	
40	Cage Puller			15A2525X012	

Keys 5, 7, 8, 9, 10, 11

Complete Assembly	35A1588X0A2
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