

May 2017

# Type EZR Pressure Reducing Regulator

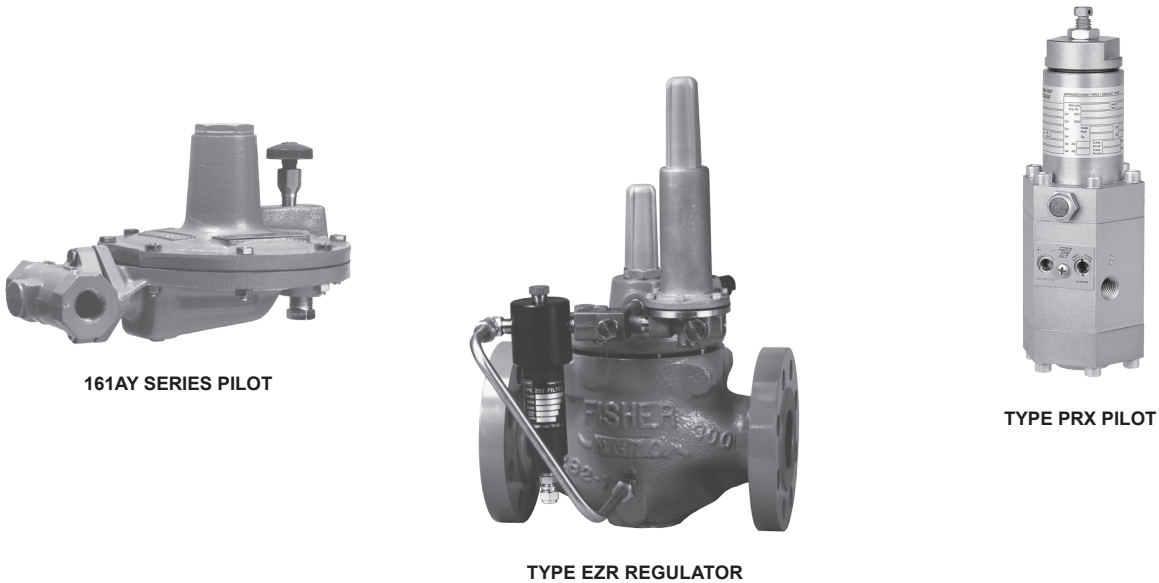


Figure 1. Type EZR Pressure Reducing Regulator



## WARNING

Failure to follow these instructions or to properly install and maintain this equipment could result in an explosion and/or fire 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 Emerson Process Management Regulator Technologies, Inc. (Emerson) 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.

Call a gas service person to service the unit. Only a qualified person must install or service the regulator.

## Introduction

### Scope of the Manual

This instruction manual provides installation, startup, adjustment, maintenance and parts ordering information for Type EZR pressure reducing regulator, Types 112 restrictor, 161AY, 161EB and PRX Series pilot. Any accessories used with this regulator are covered in their respective instruction manuals.

### Product Description

The Type EZR pilot-operated, pressure reducing regulators are used for natural gas, air or other non-corrosive gas applications and include a Type 112 restrictor and a 161EB, 161AY or PRX Series pilot. For applications that have high-pressure drops, using a Type 161AYM or 161EBM monitor pilot will increase the accuracy of the regulator.

# Type EZR

## Specifications

Specifications for the Type EZR regulator are shown below. The control spring range for the pilot is marked on the spring case of 161EB Series pilots and on the nameplate of 161AY and PRX Series pilots. Other information for the main valve appears on the nameplate.

### Main Valve Body Sizes, End Connection Styles and Structural Design Ratings<sup>(1)(2)</sup>

See Table 1

### Maximum Inlet Pressures and Pressure Drops<sup>(1)</sup>

**Main Valve:** See Table 10

**Pilots:** See Table 3

**Restrictor:** 1500 psig / 103 bar

### Outlet (Control) Pressure Ranges

See Table 2

### Main Valve Plug Travel

**NPS 1, 1-1/4 x 1, 2 x 1 /**

**DN 25, 32 x 25, 50 x 25:** 0.37 in. / 9.4 mm

**NPS 2 / DN 50:** 0.68 in. / 17 mm

**NPS 3 / DN 80:** 0.98 in. / 25 mm

**NPS 4 / DN 100:** 1.19 in. / 30 mm

**NPS 6 / DN 150:** 1.5 in. / 38 mm

**NPS 8 / DN 200:** 1.75 in. / 44 mm

### Minimum and Maximum Differential Pressures<sup>(1)</sup>

See Tables 4 and 10

### Proportional Bands

See Table 2

### Temperature Capabilities<sup>(1)</sup>

See Table 8

### Pressure Registration

External

### Options

- Integral Slam-Shut Device
- Pre-piped Pilot Supply and Pilot Bleed
- Travel Indicator
- Inlet Strainer
- Type 252 Pilot Supply Filter
- Trim Package
- Restricted Capacity Trim
- Pilot Diaphragm for Pressure Loading

1. The pressure/temperature limits in this Instruction Manual and any applicable standard or code limitation should not be exceeded.

2. End connections for other than ASME standard can usually be provided, contact your local Sales Office for assistance.

## Pilot Type Descriptions

**Type 161AY**—Low-pressure pilot with an outlet pressure range of 6 in. w.c. to 7 psig / 15 mbar to 0.48 bar. Pilot bleeds (exhausts) downstream through the sense (control) line.

**Type 161AYM**—The monitor version of the Type 161AY pilot. The pilot bleed (exhaust) is isolated from the sense (control) line. This pilot is used in monitoring systems requiring an isolated pilot bleed (exhaust).

**Type 161EB**—High accuracy pilot with an outlet pressure range of 5 to 350 psig / 0.34 to 24.1 bar. Pilot bleeds (exhausts) downstream through the sense (control) line.

**Type 161EBM**—The monitor version of the Type 161EB pilot. The pilot bleed (exhaust) is isolated from the sense (control) line. This pilot is used in monitoring systems requiring an isolated pilot bleed (exhaust).

**Type PRX/120**—Outlet pressure range of 14.5 to 435 psig / 1.00 to 30.0 bar. The Type PRX/120 can be used as the pilot on single-stage pressure reducing regulators or as the monitor pilot or working pilot in wide-open monitor systems. The Type PRX has a double diaphragm which provides increased accuracy

and sensitivity, an integral restrictor adjustment which allows adjustable opening and closing speeds and a damper adjustment which adjusts inlet pressure variability and loading pressure oscillations.

**Type PRX/120-AP**—Outlet pressure range of 435 to 1000 psig / 30.0 to 69.0 bar. The Type PRX/120-AP can be used as the pilot on single-stage pressure reducing regulators, as the monitor pilot or working pilot in wide-open monitor systems or as the working pilot for monitoring and working regulators in the working monitoring systems.

**Type PRX/125**—Identical to the Type PRX/120 except the restriction screw is removed. The Type PRX/125 can only be used as the monitor override pilot on working monitor applications.

**Type PRX/125-AP**—Identical to the Type PRX/120-AP except the restriction screw is removed. The Type PRX/125-AP can only be used as the monitor override pilot on working monitor applications.

### Note

**For applications requiring extremely tight control, using a Type 161AYM or 161EBM monitor pilot will increase the accuracy of the regulator.**

**Table 1. Main Valve Body Sizes, End Connection Styles and Body Ratings**

MAIN VALVE BODY SIZE, NPS / DN	MAIN VALVE BODY MATERIAL	END CONNECTION STYLE <sup>(1)</sup>	STRUCTURAL DESIGN RATING <sup>(2)</sup>
2 x 1, 2, 3, 4 and 6 / 50 x 25, 50, 80, 100 and 150	Cast iron	NPT (NPS 2 x 1 and 2 / DN 50 x 25 and 50 only)	400 psig / 27.6 bar
		CL125 FF	200 psig / 13.8 bar
		CL250 RF	500 psig / 34.5 bar
1, 1-1/4 x 1 <sup>(3)</sup> , 2 x 1, 2, 3, 4, 6 x 4 <sup>(4)</sup> , 8 x 4 <sup>(4)</sup> , 6, 8 x 6 <sup>(4)</sup> and 12 x 6 <sup>(4)</sup> / 25, 32 x 25, 50 x 25, 50, 80, 100, 150 x 100, 200 x 100, 150, 200 x 150 and 300 x 150	WCC Steel	NPT or SWE (NPS 1, 2 x 1 and 2 / DN 25, 50 x 25 and 50 only)	1500 psig / 103 bar
		CL150 RF	290 psig / 20.0 bar
		CL300 RF	750 psig / 51.7 bar
		CL600 RF or BWE	1500 psig / 103 bar
8 / 200	LCC Steel	CL150 RF	290 psig / 20.0 bar
		CL300 RF	750 psig / 51.7 bar
		CL600 RF	1500 psig / 103 bar

1. Ratings and end connections for other than ASME standard can usually be provided. Contact your local Sales Office for assistance.  
2. See Tables 3, 8, 10 and 11 for diaphragm materials and additional pressure ratings.  
3. Available in steel NPT only.  
4. NPS 6 x 4, 8 x 4, 8 x 6, 12 x 6 / DN 150 x 100, 200 x 100, 200 x 150, 300 x 150 Types EZR and 399 bodies are not the same as the EW valve bodies and are not interchangeable.

**Table 2. Outlet (Control) Pressure Ranges, Proportional Bands and Pilot Control Spring Information**

TYPE	OUTLET (CONTROL) PRESSURE RANGE		PROPORTIONAL BAND <sup>(1)(3)</sup>		PILOT CONTROL SPRING INFORMATION					
	psig	bar	psig	bar	Part Number	Color Code	Wire Diameter		Free Length	
							In.	mm	In.	mm
161AY or 161AYM	6 to 15 in. w.c.	15 to 37	1 in. w.c.	3 mbar <sup>(2)</sup>	1B653927022	Olive drab	0.105	2.67	3.75	95.2
	0.5 to 1.2	34 to 83	1 in. w.c.	3 mbar <sup>(2)</sup>	1B537027052	Yellow	0.114	2.90	4.31	109
	1.2 to 2.5	83 mbar to 0.17 bar	0.5	34 mbar <sup>(2)</sup>	1B537127022	Light green	0.156	3.96	4.13	105
	2.5 to 4.5	0.17 to 0.31	0.5	34 mbar <sup>(2)</sup>	1B537227022	Light blue	0.187	4.75	3.94	100
	4.5 to 7	0.31 to 0.48	0.5	34 mbar <sup>(2)</sup>	1B537327052	Black	0.218	5.54	4.13	105
161EB or 161EBM	5 to 15	0.34 to 1.0	0.5	34 mbar <sup>(2)</sup>	17B1260X012	White	0.120	3.05	3.75	95.2
	10 to 40	0.69 to 2.8	0.5	34 mbar <sup>(2)</sup>	17B1262X012	Yellow	0.148	3.76	3.75	95.2
	30 to 75	2.1 to 5.2	0.6	41 mbar <sup>(2)</sup>	17B1259X012	Black	0.187	4.75	4.00	102
	70 to 140	4.8 to 9.7	1.3	90 mbar <sup>(2)</sup>	17B1261X012	Green	0.225	5.71	3.70	94.0
	130 to 200	9.0 to 13.8	1.5	0.10 <sup>(2)</sup>	17B1263X012	Blue	0.262	6.65	3.85	97.8
200 to 350	13.8 to 24.1	3	0.21 <sup>(2)</sup>	17B1264X012	Red	0.294	7.47	4.22	107	
161EB <sup>(4)</sup>	30 to 300	2.1 to 20.7	6	0.41	15A9258X012	Green	0.243	6.17	1.88	47.7
TYPE	OUTLET (CONTROL) PRESSURE RANGE		ACCURACY CLASS (AC) <sup>(1)</sup>		PILOT CONTROL SPRING INFORMATION					
	psig	bar	psig	bar	Part Number	Color Code	Wire Diameter		Free Length	
							In.	mm	In.	mm
PRX/120 PRX/125	14.5 to 26	1.00 to 1.8	2.5%	2.5%	M0255240X12	Yellow	0.110	2.79	2.16	54.9
	23 to 44	1.6 to 3.0	2.5%	2.5%	M0255230X12	Green	0.126	3.20		
	41 to 80	2.8 to 5.5	2.5%	2.5%	M0255180X12	Blue	0.138	3.50		
	73 to 123	5.0 to 8.5	2.5%	2.5%	M0255220X12	Black	0.157	3.99		
	116 to 210	8.0 to 14.5	1%	1%	M0255210X12	Silver	0.177	4.50		
203 to 334	14.0 to 23.0	1%	1%	M0255200X12	Gold	0.197	5.00	2.00	50.8	
319 to 435	22.0 to 30.0	1%	1%	M0255860X12	Aluminum	0.236	5.99	2.00	50.8	
PRX/120-AP PRX/125-AP	435 to 1000	30.0 to 69.0	1%	1%	M0273790X12	Clear	0.335	8.51	3.93	99.8

1. Proportional band and Accuracy Class include outlet pressure drop plus hysteresis (friction), but do not include lockup.  
2. Proportional band was determined with a pressure drop ranging from 50 to 150 psig / 3.5 to 10.3 bar. Approximately double the proportional band if the pressure drop is less than 50 psig / 3.5 bar.  
3. With Type 112 restrictor set on 2. With Type PRX restrictor turn the restrictor screw one turn counterclockwise from fully seated.  
4. Should only be used as the intermediate reduction pilot on the Type EZR worker/monitor systems.

**Table 3. Pilot Pressure Ratings**

TYPE	MAXIMUM INLET PRESSURE		MAXIMUM EMERGENCY OUTLET PRESSURE OR MAXIMUM EMERGENCY SENSE PRESSURE <sup>(1)</sup>		MAXIMUM BLEED (EXHAUST) PRESSURE FOR MONITOR PILOTS	
	psig	bar	psig	bar	psig	bar
161AY	150	10.3	150	10.3	----	
161EB	1500	103	1200	82.7		
161AYM	150	10.3	150	10.3	150	10.3
161EBM	1500	103	1200	82.7	1500	103
PRX Series	1480	102	1480	102	1480	102

1. Maximum pressure to prevent the casings from bursting during abnormal operation (leaking to atmosphere and internal parts damage may occur).

# Type EZR

**Table 4. Main Valve Minimum Differential Pressures<sup>(1)</sup>**

MAIN VALVE BODY SIZE, NPS / DN	MAIN SPRING PART NUMBER AND COLOR CODE	DIAPHRAGM MATERIAL	MINIMUM DIFFERENTIAL, PERCENT OF CAGE CAPACITY											
			FOR 90% CAPACITY						FOR 100% CAPACITY					
			100% Trim		60% Trim		30% Trim		100% Trim		60% Trim		30% Trim	
			psi	bar	psi	bar	psi	bar	psi	bar	psi	bar	psi	bar
1 and 1-1/4 x 1 / 25 and 32 x 25	19B2400X012, Light Blue	17E68 and 17E88	24	1.7	29	2.0	31	2.2	24	1.7	31	2.2	40	2.8
	GE12727X012, Black	17E97	35	2.5	38	2.7	42	2.9	35	2.5	39	2.7	52	3.6
		17E68 and 17E88	30	2.1	35	2.4	39	2.7	30	2.1	36	2.5	52	3.6
	19B2401X012, Black with White Stripe <sup>(3)</sup>	17E88 and 17E97	43	3.0	50	3.4	56	3.9	43	3.0	53	3.7	68	4.7
2 x 1 / 50 x 25	19B2400X012, Light Blue	17E68 and 17E88	24	1.7	29	2.0	31	2.2	24	1.7	31	2.2	40	2.8
	19B2401X012, Black with White Stripe	17E97	43	3.0	50	3.4	56	3.9	43	3.0	53	3.7	68	4.7
		17E68 and 17E88	43	3.0	50	3.4	56	3.9	43	3.0	53	3.7	68	4.7
	GE12501X012, Red Stripe <sup>(3)</sup>	17E97	68	4.7	73	5.0	88	6.1	72	5.0	81	5.6	102	7.0
2 / 50	19B0951X012, Yellow <sup>(2)</sup>	17E68 and 17E88	12	0.83	15	1.0	15	1.0	12	0.83	25	1.7	20	1.4
	18B2126X012, Green	17E97	24	1.7	25	1.7	26	1.8	24	1.7	30	2.1	37	2.6
		17E68 and 17E88	18	1.2	20	1.4	22	1.5	19	1.3	26	1.8	28	1.9
	18B5955X012, Red <sup>(3)(4)</sup> GE05504X012, Purple <sup>(3)(4)</sup>	17E88 and 17E97	29	2.0	29	2.0	31	2.1	31	2.1	35	2.4	43	3.03
3 / 80	T14184T0012, Yellow <sup>(2)</sup>	17E68 and 17E88	16	1.1	19	1.3	24	1.7	23	1.6	23	1.6	29	2.0
	19B0781X012, Light Blue	17E97	23	1.6	23	1.6	23	1.6	23	1.6	23	1.6	25	1.7
		17E68 and 17E88	21	1.5	22	1.5	28	1.9	28	1.9	28	1.9	33	2.3
	19B0782X012, Black <sup>(3)</sup>	17E88 and 17E97	32	2.2	33	2.3	43	3.0	38	2.6	38	2.6	50	3.4
4, 6 x 4 and, 8 x 4 / 100, 150 x 100 and 200 x 100	T14184T0012, Yellow <sup>(2)</sup>	17E68 and 17E88	10	0.69	12	0.83	14	0.97	25	1.7	25	1.7	25	1.7
	18B8501X012, Green	17E97	16	1.1	17	1.2	21	1.5	34	2.3	34	2.3	34	2.3
		17E68 and 17E88	16	1.1	17	1.2	20	1.4	30	2.1	30	2.1	30	2.1
	18B8502X012, Red <sup>(3)</sup>	17E88 and 17E97	21	1.5	24	1.7	26	1.8	40	2.8	40	2.8	40	2.8
6, 8 x 6 and 12 x 6 / 150, 200 x 150 and 300 x 150	19B0364X012, Yellow <sup>(2)</sup>	17E97	10	0.69	11	0.76	14	0.97	12	0.83	16	1.1	16	1.1
		17E88	10	0.69	13	0.90	13	0.90	12	0.83	21	1.5	21	1.5
	19B0366X012, Green	17E97	14	0.97	22	1.5	22	1.5	19	1.3	29	2.0	29	2.0
		17E88	17	1.2	21	1.5	21	1.5	20	1.4	36	2.5	36	2.5
	19B0365X012, Red <sup>(3)</sup>	17E88 and 17E97	23	1.6	29	2.0	29	2.0	30	2.1	41	2.8	41	2.8
8 / 200	GE09393X012, Yellow <sup>(2)</sup>	17E97	16	1.1	----	----	----	----	19	1.3	----	----	----	----
	GE09396X012, Green		20	1.4					23	1.6				
	GE09397X012, Red <sup>(3)</sup>		26	1.8					30	2.1				

1. See Table 1 for structural design ratings, Table 3 for pilot ratings and Table 10 for maximum pressure ratings.  
 2. The white and yellow springs are only recommended for inlet pressures under 100 psig / 6.9 bar.  
 3. The red, black, purple, red stripe and black with white stripe springs are only recommended for applications where the maximum inlet pressure can exceed 500 psig / 34.5 bar.  
 4. 18B5955X012 (Red) is used on constructions with travel indicator while GE05504X012 (Purple) is used on non-travel indicator constructions.

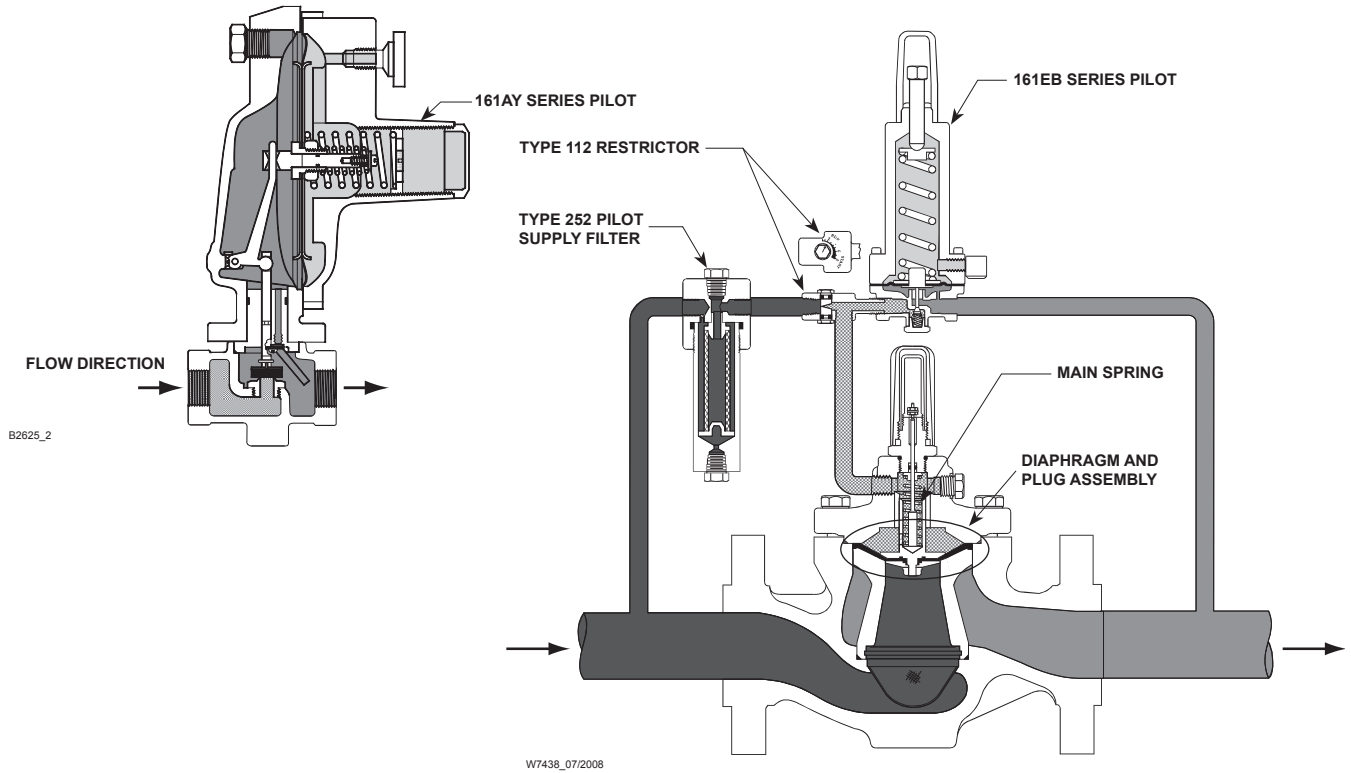
## Principle of Operation

As long as the outlet (control) pressure is above the outlet pressure setting, the pilot valve plug or disk remains closed (Figure 2). Force from the main spring, in addition to inlet pressure bleeding through the Type 112 restrictor (the restrictor is integral in the PRX Series pilots), provides downward loading pressure to keep the main valve diaphragm and plug assembly tightly shutoff.

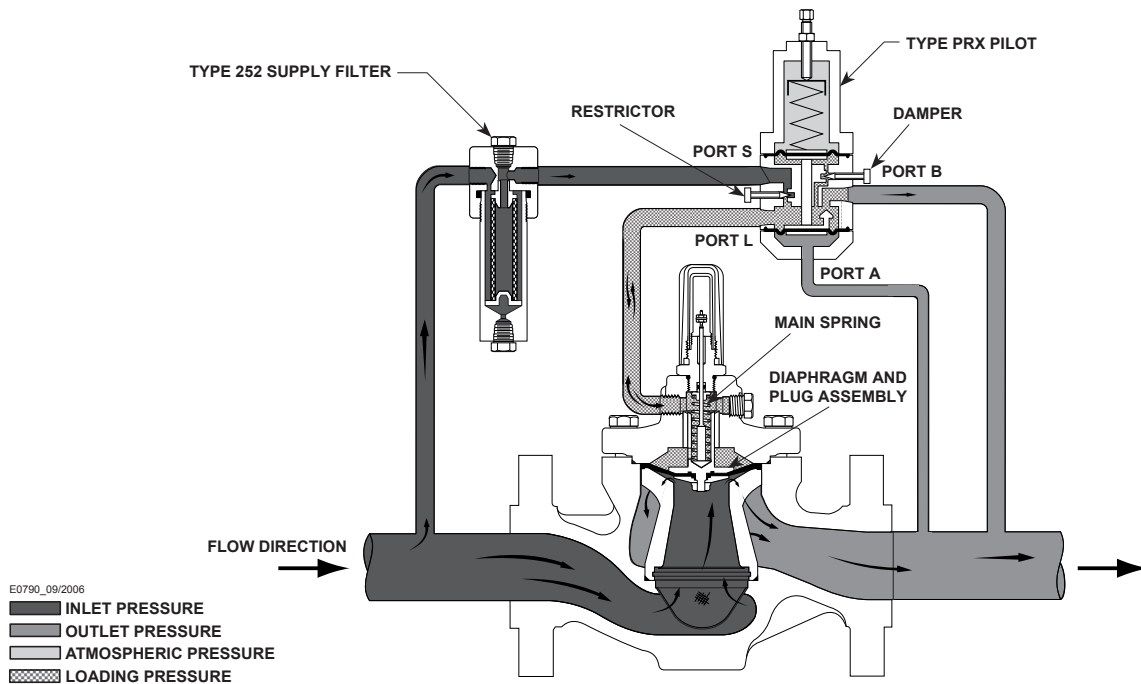
When the outlet pressure decreases below the pilot outlet pressure setting, the pilot plug or disk assembly opens. Loading pressure bleeds downstream through the pilot faster than it can be replaced through the Type 112 restrictor. This reduces loading pressure on

top of the main valve diaphragm and plug assembly. The force imbalance on the diaphragm allows the inlet pressure to overcome the loading pressure and main spring force and open the Type EZR diaphragm and plug assembly.

As the outlet pressure rises toward the outlet pressure setting, it compresses the pilot diaphragm against the pilot control spring and allows the pilot valve plug or disk close. Loading pressure begins building on the Type EZR diaphragm and plug assembly. The loading pressure, along with force from the main spring, pushes the diaphragm and plug assembly onto the tapered-edged seat, producing tight shutoff.



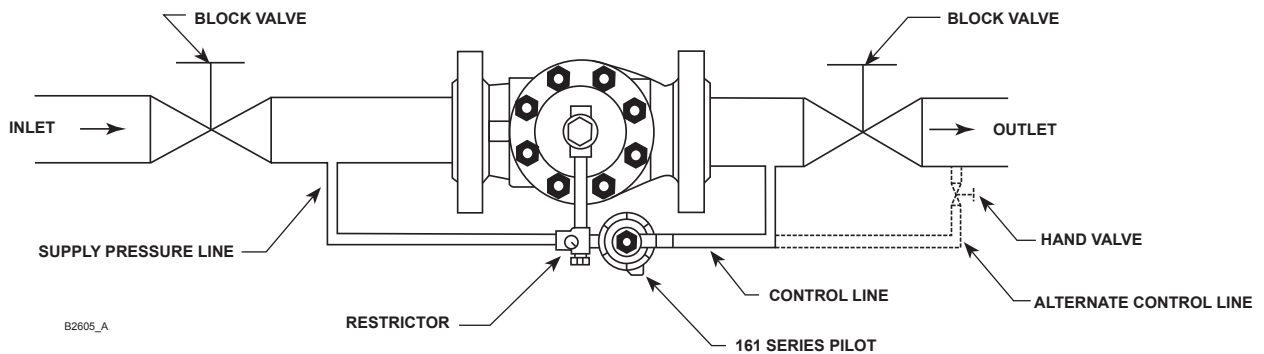
TYPE EZR WITH TYPES 161EB PILOT, 112 RESTRICTOR AND 252 FILTER



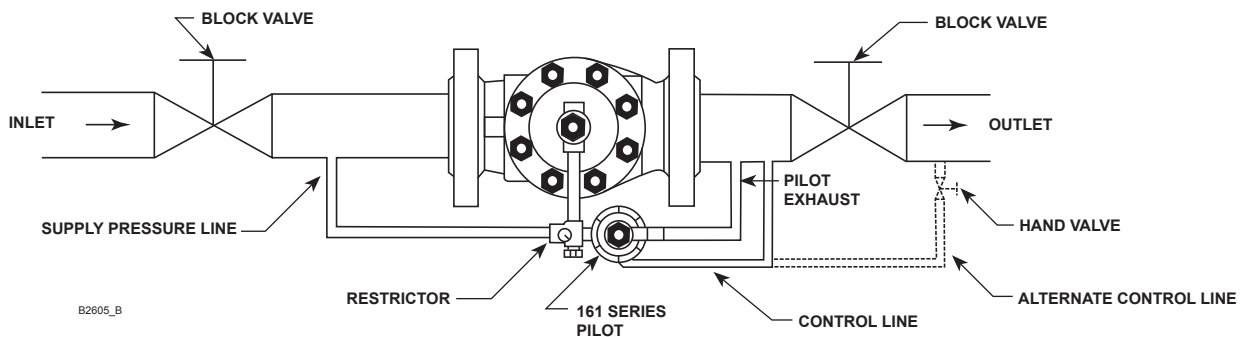
TYPE EZR WITH PRX SERIES PILOT AND TYPE 252 FILTER

Figure 2. Type EZR Operational Schematic

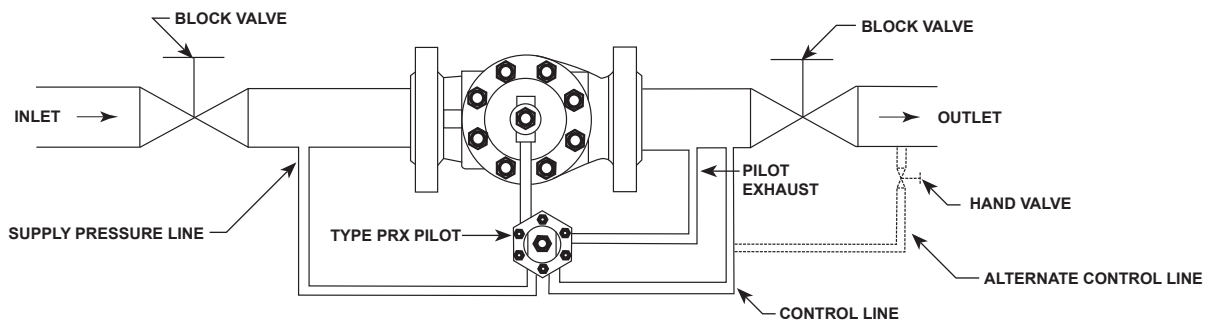
# Type EZR



161 SERIES SINGLE PILOT INSTALLATION WITH PILOT EXHAUST INTO CONTROL LINE



161 SERIES SINGLE PILOT INSTALLATION WITH SEPARATE PILOT EXHAUST LINE



TYPE PRX SINGLE-PILOT INSTALLATION WITH SEPARATE PILOT EXHAUST LINE

Figure 3. Typical Type EZR Single Installation Schematics

## Type EZR Installation



### WARNING

Personal injury, equipment damage or leakage due to escaping gas or bursting of pressure-containing parts may result if this regulator is overpressured or is installed where service conditions could exceed the limits given in Specifications section on page 2 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 the appropriate code, regulation or standard) to prevent service conditions from exceeding limits.

Additionally, physical damage to the regulator could break the pilot off the main valve, causing personal injury and property damage due to escaping gas. To avoid such injury and damage, install the regulator in a safe location.

## All Installations

The robust design of the Type EZR allows this regulator to be installed indoors or outdoors. When installed outdoors, the Type EZR does not require protective housing. This regulator is designed to withstand the elements. The powder paint coating protects against minor impacts, abrasions and corrosion.

When installed indoors, no remote venting is required except on the pilot spring case. This regulator can also be installed in a pit that is subject to flooding by venting the pilot spring case above the maximum possible flood level so the pilot setting can be referenced at atmospheric pressure.

1. Only personnel qualified through training and experience should install, operate and maintain a regulator. Before installation, make sure that there is no damage to or debris in the regulator. Also, make sure that all tubing and piping are clean and unobstructed.

### Note

**The Type EZR optional inlet strainer is intended to prevent occasional large particles from entering the main valve. If the gas contains continuous particles, upstream filtration is recommended. When using an inlet strainer (key 23), do not use the shim (key 23) and vice versa.**

2. Type EZR regulator may be installed in any orientation, as long as flow through the regulator matches the direction of the arrow on the main valve body. However, for easier maintenance, install the regulator with the bonnet up.

### CAUTION

**When installing a Type EZR trim package in an existing E-body, make sure flow is up through the center of the cage and down through the cage slots. In some cases, correct flow path is achieved by removing the body from the line and turning it around. If this is done, change the flow arrow to indicate the correct direction. Damage may result if flow is not in the correct direction. After assembly, check the regulator for shutoff and leakage to atmosphere.**

**Types EZR/399 restricted trim bodies (NPS 6 x 4, 8 x 4, 8 x 6 and 12 x 6 / DN 150 x 100, 200 x 100, 200 x 150 and**

**300 x 150) are different than EW valve bodies and are not interchangeable. Install trims only in correct restricted trim bodies.**

3. The standard pilot mounting position is as shown in Figure 1. Other mounting positions are available.
4. Apply a good grade of pipe compound to the external pipeline threads for a threaded body or use suitable line gaskets for a flanged body. When installing butt weld end connections, remove trim before welding and make sure to use approved welding practices. Use approved piping procedures when installing the regulator.

### CAUTION

**A regulator may vent some gas to the atmosphere. In hazardous or flammable gas service, vented gas may accumulate and cause personal injury, death or property damage due to fire or explosion.**

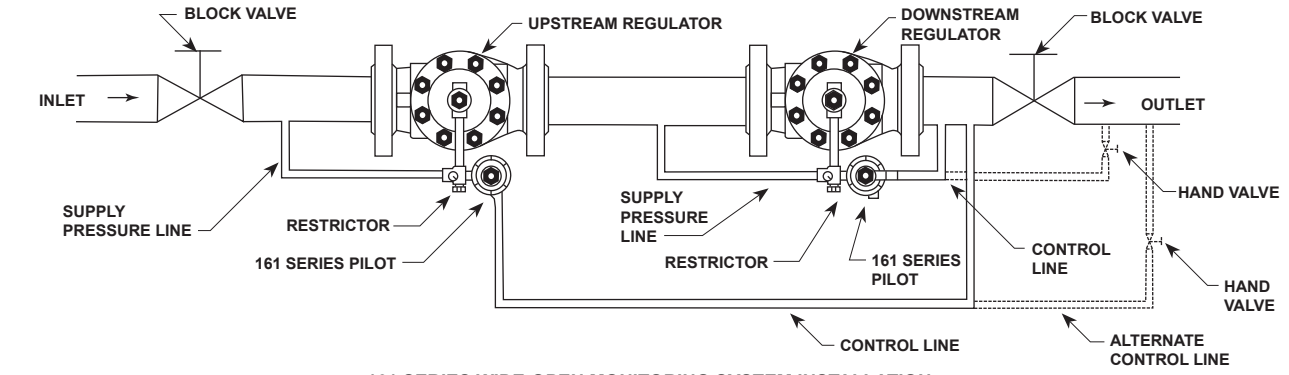
**Vent a regulator in hazardous gas service to a remote, safe location away from air intakes or any hazardous location. Protect the vent line or stack opening against condensation or clogging.**

5. A clogged pilot spring case vent may cause the regulator to function improperly. To prevent plugging (and to keep the spring case from collecting moisture, corrosive chemicals or other foreign material) point the vent down, orient it to the lowest possible point on the spring case or otherwise protect it. Inspect the vent regularly to make sure it has not been plugged. To remotely vent a spring case, remove the vent and install obstruction-free tubing or piping into the 1/4 NPT vent tapping. Provide protection on a remote vent by installing a screened vent cap onto the remote end of the vent pipe. The 161AY Series pilot has a vent restriction (key 55, Figure 20) to enhance low flow stability. Do not remove this restriction.

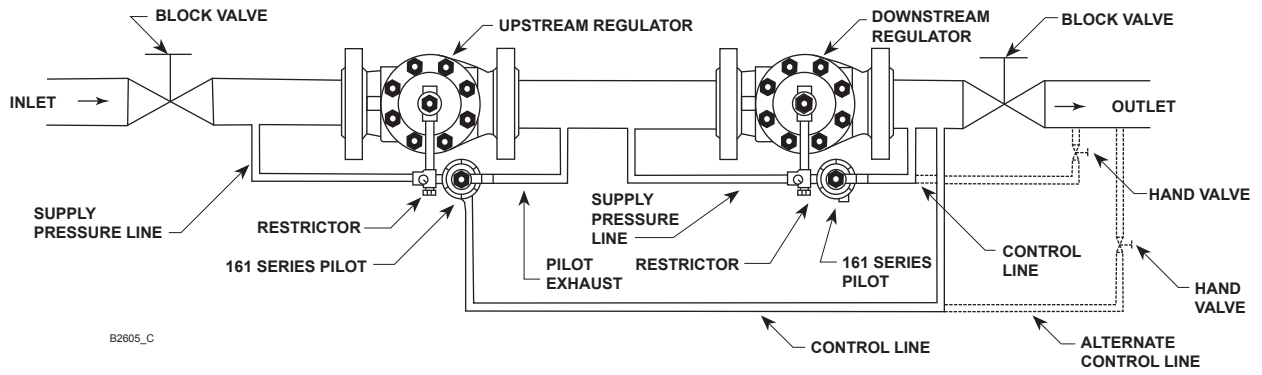
### WARNING

**To avoid freeze-up because of pressure drop and moisture in the gas, use antifreeze practices, such as heating the supply gas or adding a de-icing agent to the supply gas.**

# Type EZR

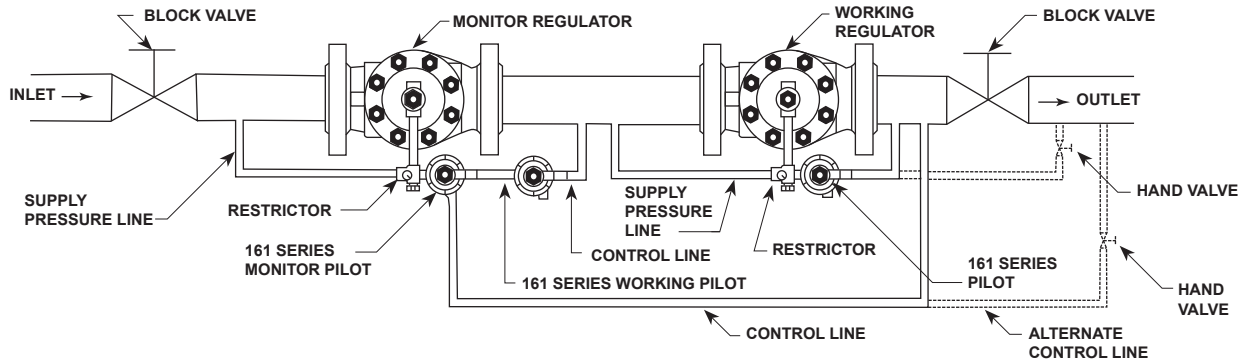


161 SERIES WIDE-OPEN MONITORING SYSTEM INSTALLATION



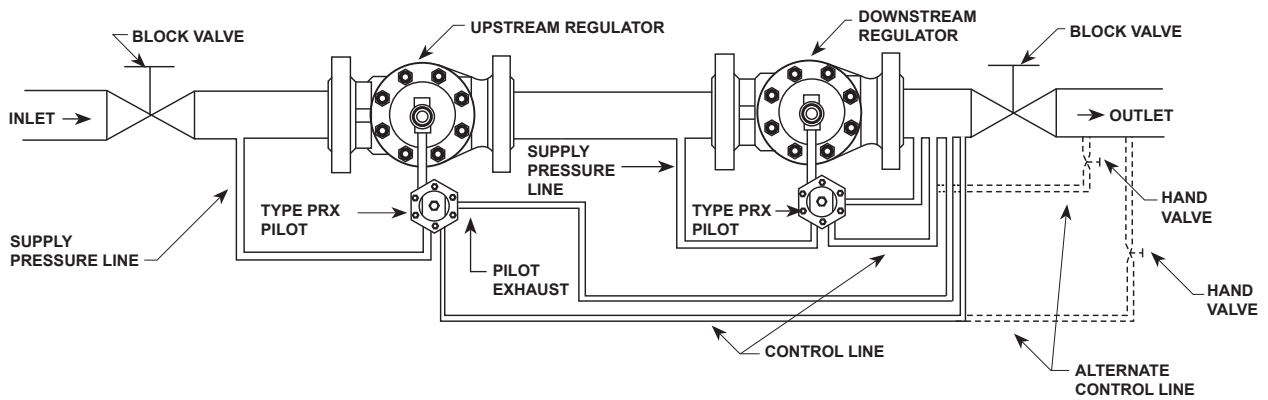
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161 SERIES WIDE-OPEN MONITORING SYSTEM INSTALLATION WITH PILOT EXHAUST TO INTERMEDIATE PRESSURE



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161 SERIES WORKING MONITORING SYSTEM INSTALLATION



TYPE PRX WIDE-OPEN MONITORING SYSTEM INSTALLATION

Figure 4. Typical Type EZR Monitoring System Installation Schematics



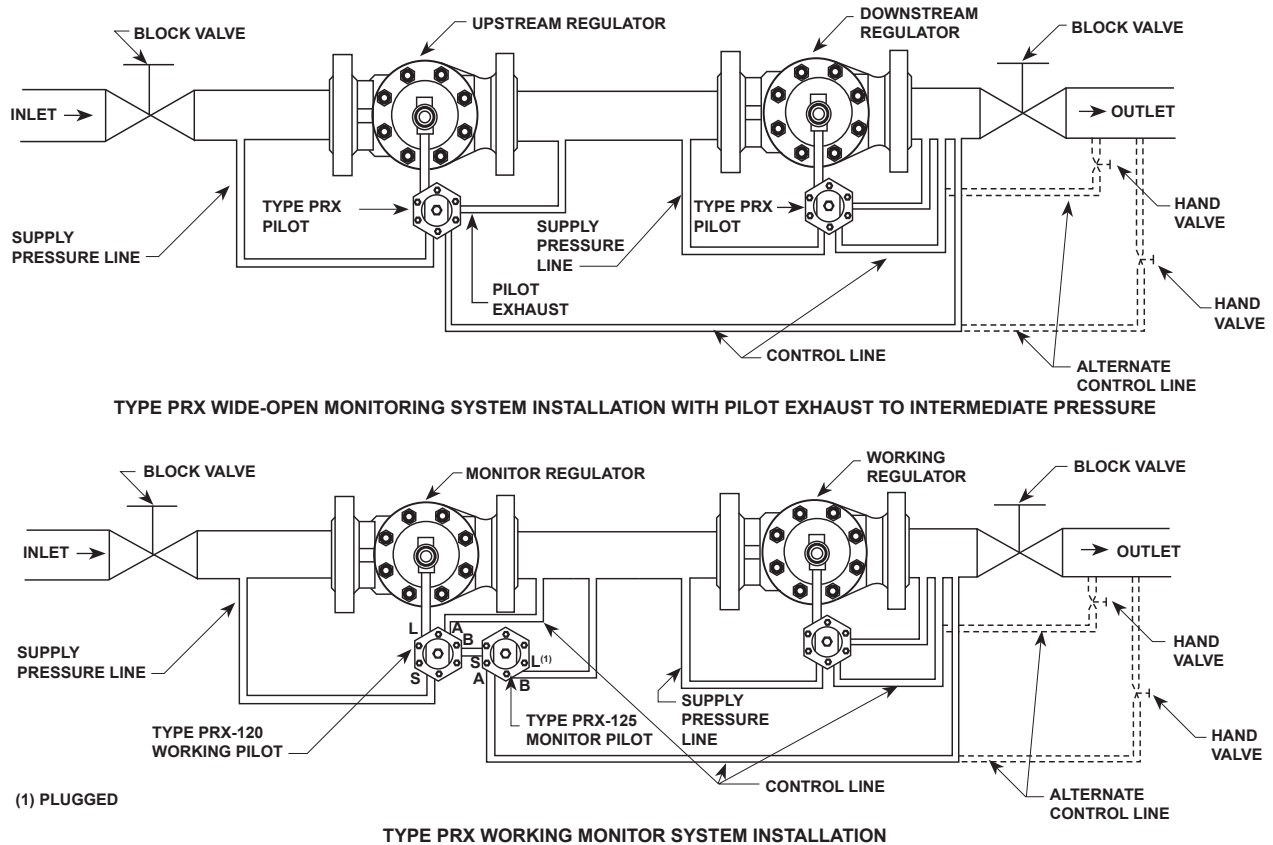


Figure 4. Typical Type EZR Monitoring System Installation Schematics (continued)

6. As shown in Figure 3, run a supply pressure line from the upstream pipeline to the restrictor inlet (use 3/8 NPT outer diameter tubing or larger). Install a Type 252 pilot supply filter upstream of the restrictor, if needed, to keep the supply source from clogging the restrictor or pilot. Inspect and clean this filter regularly to make sure it has not been plugged.
7. Install a downstream pressure control line (as shown in the appropriate view of Figure 3) to the pilot control line connection. Connect the other end of the control line at a minimum of 8 to 10 pipe diameters downstream of the regulator in a straight run of pipe. Do not place a control line connection in a turbulent area, such as in or directly downstream of a swage or elbow. Significant restrictions in the control line can prevent proper pressure registration. When using a hand valve, it should be a full flow valve, such as a full port ball valve. With a Type 161EBM or 161AYM pilot or a PRX Series pilot, run a downstream exhaust bleed line to the downstream bleed line connection in the pilot body assembly.
8. Good piping practices usually require swaging up to larger downstream piping to obtain reasonable downstream fluid velocity.

## Wide-Open Monitor Installations

1. Follow the procedures in the All Installations section and then continue with step 2 of this section.
2. Pilot supply for the downstream monitoring regulator must be obtained between the two regulators as shown in Figure 4. For sizing purposes, add the minimum differential pressure for each regulator together to establish the required pressure drop across the station.
3. In a wide-open Type EZR monitoring system, system lockup will be that of the worker regulator on both an upstream monitor when the upstream pilot exhaust is piped to the intermediate pressure and a downstream monitor with upstream pilot exhaust piped to either intermediate pressure or outlet pressure. With these configurations, the diaphragm of the monitor regulator will change position with every load change. On an upstream monitor with the upstream pilot exhaust piped to downstream, lockup will occur at the monitor's setpoint and the diaphragm of the monitor regulator will be fully open during normal conditions.

# Type EZR

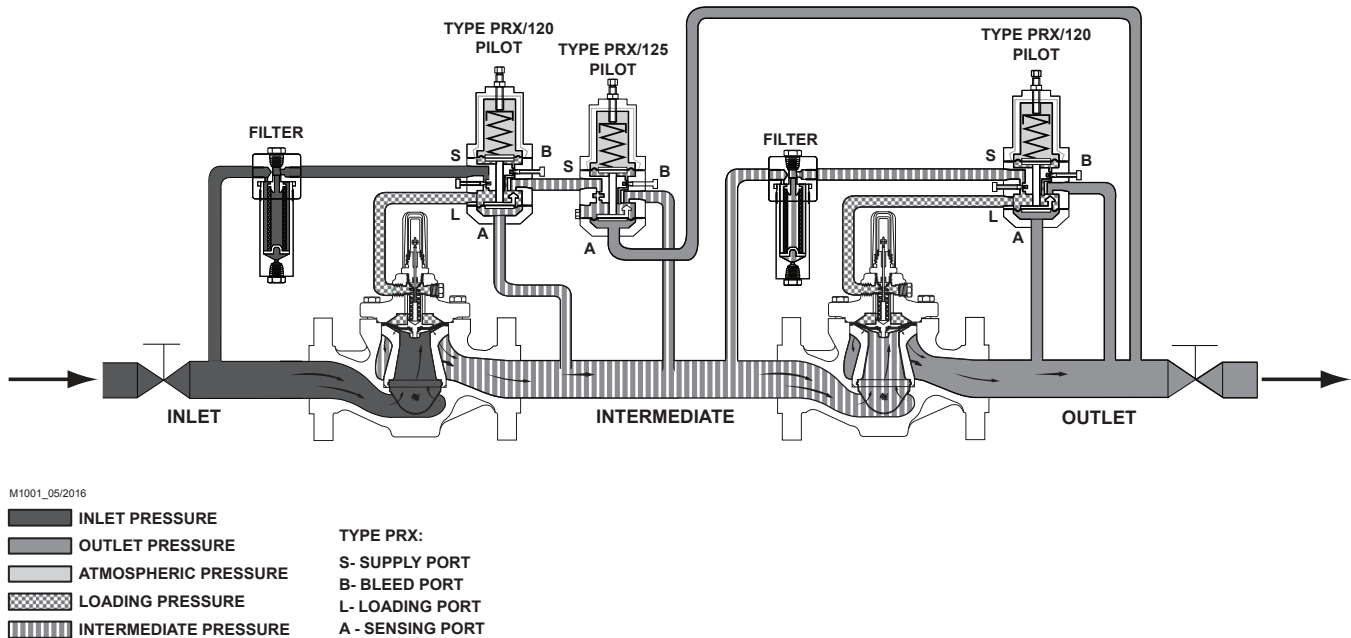


Figure 5. Type EZR-PRX-PRX Working Monitor Schematic

## Working Monitor Installations

On working monitor installations, the working monitor regulator is always upstream and acts as a first-stage regulator through the working pilot during normal operation. This arrangement allows the working monitor's performance to be observed at all times. Then, should the second-stage regulator fail open, the working monitor regulator assumes the entire pressure reduction function of the system through the monitoring pilot.

Use the following procedure when installing a working monitor system.

1. Follow the procedures in the All Installations section and then continue with step 2 of this section.
2. Pilot supply pressure for the downstream Type EZR regulator must be made directly upstream of the Type EZR using intermediate pressure.
3. Table 9 gives the spread between normal distribution pressure and the minimum pressure at which the monitor pilot can be set to take over if the working regulator fails open.
4. Table 4 shows the minimum differential pressure requirements across an individual regulator.

Because this application uses a first-stage and second-stage pressure reduction, add the minimum differential pressure for each regulator together to establish the required pressure drop across the station. Do not exceed maximum pilot ratings given in Table 3.

### For Type PRX Working Monitor

As shown in Figure 5, run a supply pressure line (use 3/8 NPT outer diameter tubing or larger) from the upstream pipeline to the inlet (Port S) of the upstream Type PRX-120 pilot. Install a Type 252 pilot supply filter upstream of the pilot, if needed, to keep the supply source from clogging the restrictor in the pilot. Inspect and clean this filter regularly to make sure it has not been plugged.

Connect the loading port (Port L) of the upstream Type PRX-120 pilot to the bonnet of the upstream Type EZR regulator. Connect the "B" port of the upstream Type PRX-120 pilot to the "S" port of the upstream Type PRX-125 pilot. Connect the "A" port (located on the underside of the pilot) of the upstream Type PRX-120 pilot to the intermediate pressure between the first and second Type EZR regulators as shown in Figure 5.

The "L" port of the upstream Type PRX-125 pilot is plugged. Connect the "B" port of upstream Type PRX-125 pilot to the intermediate pressure

between the first and second Type EZR regulators. Connect the “A” port of upstream Type PRX-125 pilot downstream of both regulators.

The pilot supply pressure connection for the downstream Type EZR regulator must be directly upstream of the Type EZR using intermediate pressure and connected to the “S” port of the downstream Type PRX-120. Install a Type 252 pilot supply filter upstream of the pilot, if needed, to keep the supply source from clogging the restrictor in the pilot. Inspect and clean this filter regularly to make sure it has not been plugged. Connect the loading port (Port L) of the downstream Type PRX-120 pilot to the bonnet of the downstream Type EZR regulator. Connect the “A” and “B” ports of the downstream Type PRX-120 pilot to downstream pressure.

## Startup and Adjustment

### Note

**Table 10 shows the maximum inlet and differential pressures for specific constructions. Use pressure gauges to monitor inlet pressure, outlet pressure and any intermediate pressure during startup.**

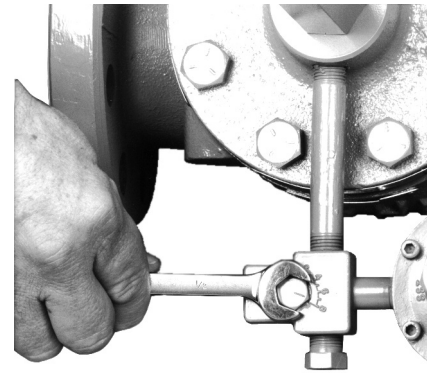


### CAUTION

**To prevent damage to the Type PRX pilot during startup, the sense and bleed lines of the Type PRX should be located on the same side of the downstream block valve. Keep sense and bleed lines separate.**

## Startup for Both Single-Regulator and Monitoring Installations

1. Make sure all block and vent valves are closed.
2. Back out the pilot adjusting screw(s).
3. For easy initial startup, set the restrictor to the “8” position. For future startups, the restrictor can be left in the desired run position.
4. **SLOWLY OPEN** the valves in the following order:
  - a. Pilot supply and control line valve(s), if used
  - b. Inlet block valve
  - c. Outlet block valve
5. For a 161 Series pilot with Type 112 restrictor, turn the restrictor(s) to position “2” or to the desired run position. For a PRX Series pilot, turn the restrictor screw 1 turn counterclockwise from fully seated (turn restrictor fully clockwise then



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**Figure 6. Restrictor Adjustment**

1 turn counterclockwise) and the damper screw fully counterclockwise.

6. **For a single regulator**, set the pilot to the desired outlet (control) pressure according to the pilot adjustment procedure.

### For a wide-open downstream monitor

**installation**, adjust the upstream working pilot until intermediate pressure is higher than the desired setpoint of the monitor pilot. Adjust the downstream monitoring pilot to the desired monitoring takeover pressure. Reduce the upstream pilot to the normal outlet pressure setting.

### For a wide-open upstream monitor installation,

adjust the downstream working pilot to a setpoint higher than the setpoint of the monitor pilot. Adjust the upstream monitoring pilot to the desired monitor takeover pressure. Reduce the downstream pilot setting to normal outlet pressure setting.

**For a working monitor installation**, turn out the adjusting screw of the downstream pilot, removing spring tension. Adjust the upstream working pilot to the desired intermediate pressure setting. Turn out the adjusting screw of the upstream monitor pilot, removing spring tension. Turn in the adjusting screw of the downstream pilot. Adjust the upstream monitor pilot to the desired setpoint taking into account the guidelines shown in Table 9. Establish final desired downstream pressure by adjusting the downstream pilot.

## Pilot Adjustment

**For 161 Series pilots**, remove the pilot closing cap (key 16, Figure 19 or key 22, Figure 20) and, on 161EB Series only, loosen the locknut (key 12, Figure 19). Turn the adjusting screw (key 11, Figure 19 or key 35, Figure 20) into the spring case (key 2, Figure 19 or key 3, Figure 20) to increase the downstream pressure. Turn the adjusting screw out of the spring case to decrease the downstream pressure.

# Type EZR

**Table 5. 161EB Series Pilot Adjustment Recommendations**

PILOT TYPE	RECOMMENDED TYPE 112 RESTRICTOR SETTINGS FOR LOW FLOW OPERATION	TYPE 112 RESTRICTOR SETTINGS TO AVOID AT LOW FLOW
161EB Series Pilots	Restrictor Setting of "5" or greater	Avoid restrictor setting of "2" or less if continuous flows are expected to be less than 5% of maximum capacity

Note: Higher Type 112 restrictor settings will increase proportional band. Adjustment of the Type 112 restrictor will also cause a shift in setpoint. Setpoint should be checked and adjusted following restrictor setting adjustment.

**Table 6. Type 161AY/161AYM Pilot Adjustment Recommendations**

PILOT TYPE	RECOMMENDED TYPE 112 RESTRICTOR SETTINGS FOR LOW FLOW OPERATION	RECOMMENDED ORIFICE SIZE(S) FOR LOW FLOW OPERATION	TYPE 112 RESTRICTOR SETTINGS AND ORIFICE SIZES TO AVOID AT LOW FLOW
161AY Series Pilots	Restrictor Setting of "5" or greater	3/32 or 1/8 in. / 2.38 or 3.18 mm (3/32 in. / 2.38 mm is standard)	Avoid restrictor setting of "2" or less if continuous flows are expected to be less than 5% of maximum capacity

Note: Higher Type 112 restrictor settings will increase proportional band. Adjustment of the Type 112 restrictor will also cause a shift in setpoint. Setpoint should be checked and adjusted following restrictor setting adjustment.

**Table 7. Type PRX Pilot Adjustment Recommendations**

PILOT TYPE	RECOMMENDED TYPE PRX RESTRICTOR AND DAMPER SCREW SETTINGS FOR LOW FLOW OPERATION	TYPE PRX RESTRICTOR AND DAMPER SCREW SETTINGS TO AVOID AT LOW FLOW
PRX/120 and PRX/120-AP Series	<p><b>Restrictor Screw</b></p> <ul style="list-style-type: none"> <li>- 1 turn out (counterclockwise) from fully seated for most low flows</li> <li>- 2-1/2 turns out (for flows less than 5% of maximum)</li> </ul> <p><b>Damper Screw</b></p> <ul style="list-style-type: none"> <li>- Fully out (counterclockwise) from seated for most low flows</li> <li>- One turn out (for flows less than 5% of maximum)</li> </ul>	<p><b>Restrictor Screw</b></p> <ul style="list-style-type: none"> <li>- Fully seated (clockwise) or full out (counterclockwise)</li> </ul> <p><b>Damper Screw</b></p> <ul style="list-style-type: none"> <li>- Full in (clockwise)</li> </ul>

Note: Counterclockwise adjustment of the Type PRX restrictor screw will increase proportional band. Adjustment of the restrictor screw will also cause a shift in setpoint. Setpoint should be checked and adjusted following restrictor screw adjustment.

**For PRX Series pilots (Figure 26),** loosen locknut (key 2) and turn the adjusting screw into the spring case to increase (or out of the spring case to decrease) the downstream pressure. When the required downstream pressure is maintained for several minutes, tighten the locknut to lock the adjusting screw in position and replace the pilot closing cap.

The Restrictor and Damper screws on the PRX Series pilot control the regulator's proportional band (droop) and speed of response. Table 7 includes the appropriate settings for low flow operation. For additional tuning follow the steps outlined below:

1. Start with the restrictor screw 1 turn counterclockwise from fully seated (turn restrictor fully clockwise then 1 turn counterclockwise) and the damper screw fully counterclockwise.
2. Turn damper screw clockwise until desired performance is achieved. This reduces the flow path of the damper. If the damper becomes fully seated (no longer able to turn clockwise) and the desired performance has not been achieved, return the damper screw to the fully counterclockwise position.

**WARNING**

**The damper screw should not be left in the fully seated position, as it will lock the regulator in last position which could cause incorrect pressure regulation.**

3. Turn the restrictor screw an additional turn counterclockwise from fully seated. This increases the flow path of the restrictor. If additional tuning is required, repeat step 2. Follow this method until desired performance is achieved.

## Type 112 Restrictor Adjustment

The Type 112 restrictor controls the regulator's proportional band (droop) and speed of response. The restrictor can be used to fine tune the regulator for maximum performance by decreasing the restrictor setting for tighter control (increased opening speed, decreased closing speed); or increasing the restrictor setting for maximum stability (decreased opening speed, increased closing speed). A lower setting also provides a narrower proportional band for better accuracy. The "8" position has the largest flow, is most stable and easiest for startup, however, using the "8" position

**Table 8. Diaphragm Material Selection Information**

	17E68 NITRILE (NBR)	17E97 <sup>(1)</sup> NITRILE (NBR)	17E88 FLUOROCARBON (FKM)
Gas Temperature (for lower temperatures contact your local Sales Office)	-20 to 150°F / -29 to 66°C	0 to 150°F / -18 to 66°C	0 to 260°F / -18 to 127°C <sup>(2)</sup>
General Applications	Best for cold temperatures.	Best for high pressure conditions, i.e. transmission service or high pressure industrial service. It is also the best for abrasive or erosive service applications.	Best for natural gas having aromatic hydrocarbons. It is also the best for high temperature applications.
Heavy Particle Erosion	Fair	Excellent	Good
Natural Gas With:			
Up to 3% aromatic hydrocarbon content <sup>(3)</sup>	Good	Excellent	Excellent
3 to 15% aromatic hydrocarbon content <sup>(3)</sup>	Poor	Good	
15 to 50% aromatic hydrocarbon content <sup>(3)</sup>	Not recommended	Poor	
Up to 3% H <sub>2</sub> S (hydrogen sulfide or sour gas)	Good	Good	Good
Up to 3% ketone	Fair	Fair	Fair
Up to 10% alcohol	Good	Good	
Up to 3% synthetic lube	Fair	Fair	Good

1. The NPS 6 / DN 150, 17E97 diaphragm will perform in gas temperatures as low as -20°F / -29°C.  
2. For differential pressures above 400 psig / 27.6 bar diaphragm temperature is limited to 150°F / 66°C.  
3. The aromatic hydrocarbon content is based on percent volume.

**Table 9. Type EZR Working Monitor Performance**

MONITORING PILOT			MINIMUM PRESSURE OVER NORMAL DISTRIBUTION PRESSURE AT WHICH MONITOR PILOT CAN BE SET WITH A RESTRICTOR SETTING OF 2		
Construction	Outlet (Control) Pressure Range		Spring Part Number		
Type 161AY or 161AYM	6 to 15 in. w.c.	15 to 37 mbar	1B653927022	1 in. w.c.	2 mbar <sup>(1)</sup>
	0.5 to 1.2 psig	34 to 83 mbar	1B537027052	1 in. w.c.	2 mbar <sup>(1)</sup>
	1.2 to 2.5 psig	83 mbar to 0.17 bar	1B537127022	0.5 psig	34 mbar <sup>(1)</sup>
	2.5 to 4.5 psig	0.17 to 0.31 bar	1B537227022	0.5 psig	34 mbar <sup>(1)</sup>
	4.5 to 7 psig	0.31 to 0.48 bar	1B537327052	0.5 psig	34 mbar <sup>(1)</sup>
Type 161EBM	5 to 15 psig	0.34 to 1.0 bar	17B1260X012	0.5 psig	34 mbar <sup>(1)</sup>
	10 to 40 psig	0.69 to 2.8 bar	17B1262X012	0.5 psig	34 mbar <sup>(1)</sup>
	30 to 75 psig	2.1 to 5.2 bar	17B1259X012	0.6 psig	41 mbar <sup>(1)</sup>
	70 to 140 psig	4.8 to 9.7 bar	17B1261X012	1.3 psig	90 mbar <sup>(1)</sup>
	130 to 200 psig	9.0 to 13.8 bar	17B1263X012	1.5 psig	0.10 bar <sup>(1)</sup>
	200 to 350 psig	13.8 to 24.1 bar	17B1264X012	3 psig	0.21 bar <sup>(1)</sup>

1. Monitor pilot minimum setpoint was determined with a pressure drop ranging from 50 to 150 psig / 3.5 to 10.3 bar. Approximately double the minimum monitor pilot setpoint.

is not necessary. The “0” setting has the smallest (minimum) flow passage; at no point of rotation will the Type 112 restrictor be completely shut off. After initial adjustment, the restrictor does not need to be adjusted for maintenance or startup.

## Low Flow Application Considerations

For stable, low flow operation, other considerations besides pilot settings should also be addressed. Installation of an oversized regulator may make low flow operation difficult. When possible, a smaller-sized Type EZR should be installed. Reduced capacity trim reduces relief valve requirements by decreasing the maximum possible flow through the regulator but does not improve low flow performance. During design of a

regulator installation, the downstream piping volume should be maximized. Control lines should not be located in or near piping sections that may experience turbulent flow, such as elbows or swages. Larger diameter control lines are also recommended in low flow conditions. The larger control lines are less restrictive and will reduce pilot exhaust bleed backpressure to the pilot that may cause instability. Separate sense and exhaust lines may also help at low flow conditions. This feature is provided on the PRX Series, Types 161EBM and 161AYM pilots. Control line taps should be located in straight pipe; several pipeline diameters (8 to 10 of largest piping on outlet) downstream of the regulator. These guidelines have been used to improve station stability at low flow.

# Type EZR

**Table 10. Main Valve Maximum Pressure Ratings, Diaphragm Selection Information and Main Spring Selection<sup>(1)</sup>**

BODY SIZE NPS / DN	DIAPHRAGM MATERIAL	MAXIMUM OPERATING INLET PRESSURE <sup>(4)</sup>		MAXIMUM OPERATING DIFFERENTIAL PRESSURE <sup>(4)</sup>		MAXIMUM EMERGENCY INLET AND DIFFERENTIAL PRESSURE		MAIN SPRING COLOR CODE	DIAPHRAGM DESIGNATION
		psig	bar	psid	bar d	psid	bar d		
1 and 1-1/4 x 1 / 25 and 32 x 25	17E68 Nitrile (NBR) Low temperature	100	6.9	100	6.9	100	6.9	Light Blue	
		460	31.7	400	27.6	460	31.7	Black	
	17E97 Nitrile (NBR) High pressure and/or erosion resistance	500	34.5	500	34.5	1050	72.4	Black	
		1050	72.4	800	55.2	1050	72.4	Black with White Stripe <sup>(2)</sup>	
	17E88 Fluorocarbon (FKM) High aromatic hydrocarbon content resistance	100	6.9	100	6.9	100	6.9	Light Blue	
		500	34.5	500	34.5 <sup>(3)</sup>	750	51.7	Black	
750	51.7	500	34.5 <sup>(3)</sup>	750	51.7	Black with White Stripe <sup>(2)</sup>			
2 x 1 / 50 x 25	17E68 Nitrile (NBR) Low temperature	100	6.9	100	6.9	100	6.9	Light Blue	
		360	24.8	300	20.7	360	24.8	Black with White Stripe	
	17E97 Nitrile (NBR) High pressure and/or erosion resistance	500	34.5	500	34.5	500	34.5	Black with White Stripe	
		1050	72.4	800	55.2	1050	72.4	Red Stripe <sup>(2)</sup>	
	17E88 Fluorocarbon (FKM) High aromatic hydrocarbon content resistance	100	6.9	100	6.9	100	6.9	Light Blue	
		750	51.7	500	34.5 <sup>(3)</sup>	750	51.7	Black with White Stripe	
2 / 50	17E68 Nitrile (NBR) Low temperature	100	6.9	100	6.9	100	6.9	Yellow	
		460	31.7	400	27.6	460	31.7	Green	
	17E97 Nitrile (NBR) High pressure and/or erosion resistance	500	34.5	500	34.5	1050	72.4	Green	
		1050	72.4	800	55.2	1050	72.4	Red <sup>(2)</sup> or Purple <sup>(2)</sup>	
	17E88 Fluorocarbon (FKM) High aromatic hydrocarbon content resistance	100	6.9	100	6.9	100	6.9	Yellow	
		500	34.5	500	34.5 <sup>(3)</sup>	750	51.7	Green	
750	51.7	500	34.5 <sup>(3)</sup>	750	51.7	Red <sup>(2)</sup> or Purple <sup>(2)</sup>			
3 / 80	17E68 Nitrile (NBR) Low temperature	100	6.9	100	6.9	100	6.9	Yellow	
		360	24.8	300	20.7	500	34.5	Light Blue	
	17E97 Nitrile (NBR) High pressure and/or erosion resistance	500	34.5	500	34.5	1050	72.4	Light Blue	
		1050	72.4	800	55.2	1050	72.4	Black <sup>(2)</sup>	
	17E88 Fluorocarbon (FKM) High aromatic hydrocarbon content resistance	100	6.9	100	6.9	100	6.9	Yellow	
		500	34.5	500	34.5 <sup>(3)</sup>	750	51.7	Light Blue	
750	51.7	500	34.5 <sup>(3)</sup>	750	51.7	Black <sup>(2)</sup>			
4, 6 x 4 and 8 x 4 / 100, 150 x 100 and 200 x 100	17E68 Nitrile (NBR) Low temperature	100	6.9	100	6.9	100	6.9	Yellow	
		360	24.8	300	20.7	500	34.5	Green	
	17E97 Nitrile (NBR) High pressure and/or erosion resistance	500	34.5	500	34.5	1050	72.4	Green	
		1050	72.4	800	55.2	1050	72.4	Red <sup>(2)</sup>	
	17E88 Fluorocarbon (FKM) High aromatic hydrocarbon content resistance	100	6.9	100	6.9	100	6.9	Yellow	
		500	34.5	500	34.5 <sup>(3)</sup>	750	51.7	Green	
750	51.7	500	34.5 <sup>(3)</sup>	750	51.7	Red <sup>(2)</sup>			
6, 8 x 6 and 12 x 6 / 150, 200 x 150 and 300 x 150	17E97 Nitrile (NBR) High pressure and/or erosion resistance	100	6.9	100	6.9	100	6.9	Yellow	
		500	34.5	500	34.5	1050	72.4	Green	
		1050	72.4	800	55.2	1050	72.4	Red <sup>(2)</sup>	
	17E88 Fluorocarbon (FKM) High aromatic hydrocarbon content resistance	100	6.9	100	6.9	100	6.9	Yellow	
		500	34.5	500	34.5 <sup>(3)</sup>	750	51.7	Green	
		750	51.7	500	34.5 <sup>(3)</sup>	750	51.7	Red <sup>(2)</sup>	
8 / 200	17E97 Nitrile (NBR) High pressure and/or erosion resistance	100	6.9	100	6.9	100	6.9	Yellow	
		500	34.5	500	34.5	1050	72.4	Green	
		1050	72.4	800	55.2	1050	72.4	Red <sup>(2)</sup>	

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1. See Table 1 for main valve structural design ratings and Table 3 for pilot ratings.

2. The red, black, purple, red stripe and black with white stripe springs are only recommended for applications where the maximum inlet pressure can exceed 500 psig / 34.5 bar.

3. For differential pressures above 400 psid / 27.6 bar d diaphragm temperatures are limited to 150°F / 66°C.

4. These are recommendations that provide the best regulator performance for a typical application. Please contact your local Sales Office for further information if a deviation from the standard recommendations is required.

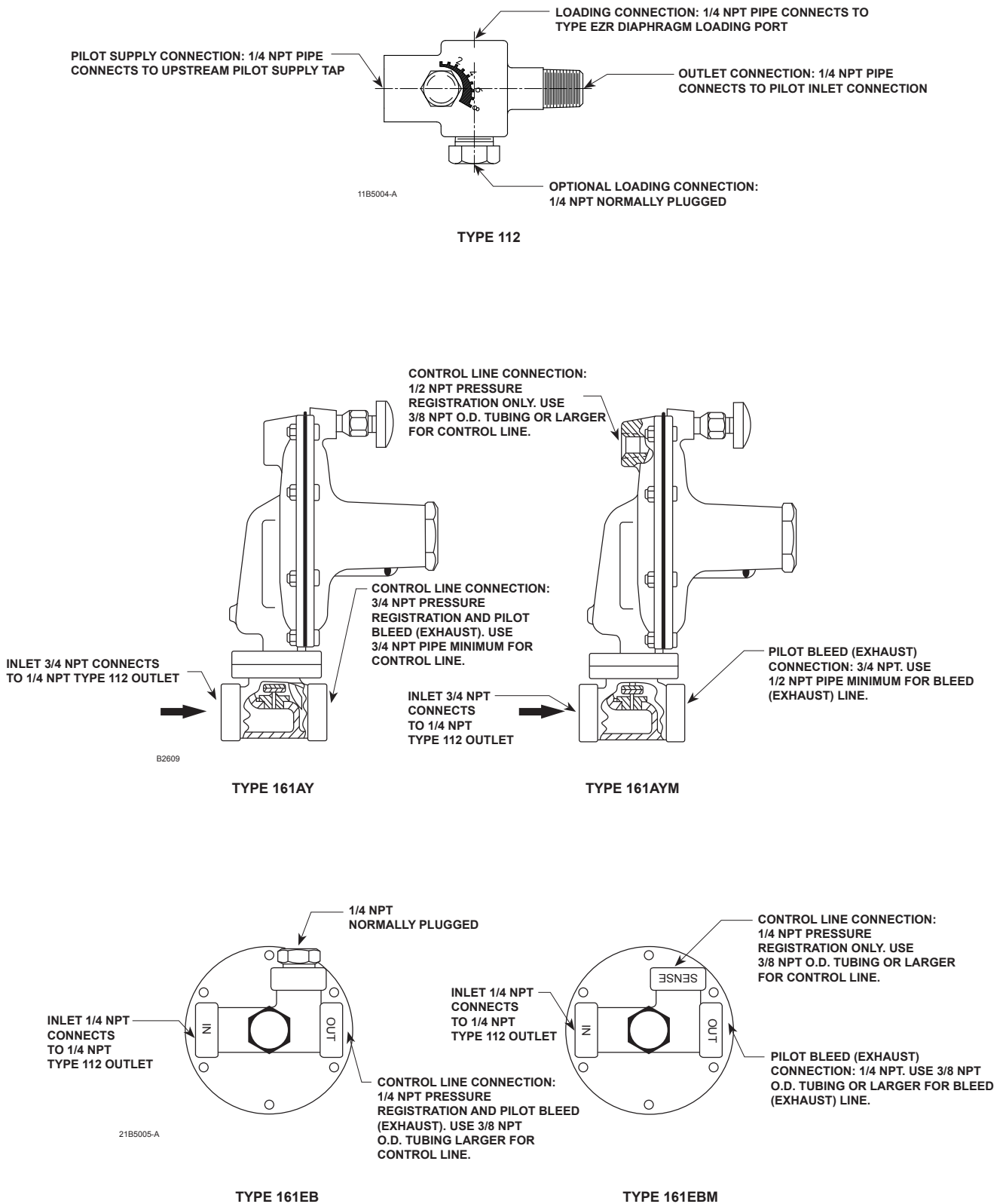


Figure 7. Pilot Port Function and Connection Sizes

# Type EZR

## Shutdown for Both Single-Regulator and Monitoring Installations



### WARNING

If pilot supply pressure is shut down first, the downstream system may be subjected to full inlet pressure.

1. If the pilot setting must be disturbed, be sure to keep some tension on the spring. This will prevent trapping inlet pressure during blow down.
2. Close the valves shown in Figure 3 or 4, in the following order:
  - a. Inlet block valve
  - b. Outlet block valve
  - c. Control line valve(s), if used
3. Open the vent valves to depressurize the system.

## Maintenance

Regulator parts are subject to normal wear and must be inspected periodically and replaced as necessary. Due to the care Emerson takes in meeting all manufacturing requirements (heat treating, dimensional tolerances, etc.), use only replacement parts manufactured or furnished by Emerson. Also, when lubrication is required, use a good quality lubricant and sparingly coat the recommended part. The frequency of inspection and parts replacement depends upon the severity of service conditions, applicable codes and government regulations and company inspection procedures. Table 12 lists various regulator problems and possible solutions for them.

## Type EZR Main Valve Trim Parts

Instructions are given for complete disassembly and assembly. The main valve body may remain in the pipeline during maintenance procedures. Key numbers are referenced in Figures 14 through 18.



### CAUTION

Avoid personal injury or damage to property from sudden release of pressure or uncontrolled gas or other process fluid. Before starting to disassemble, carefully release all pressures according to the Shutdown procedure. Use gauges to monitor inlet and outlet pressures while releasing these pressures.

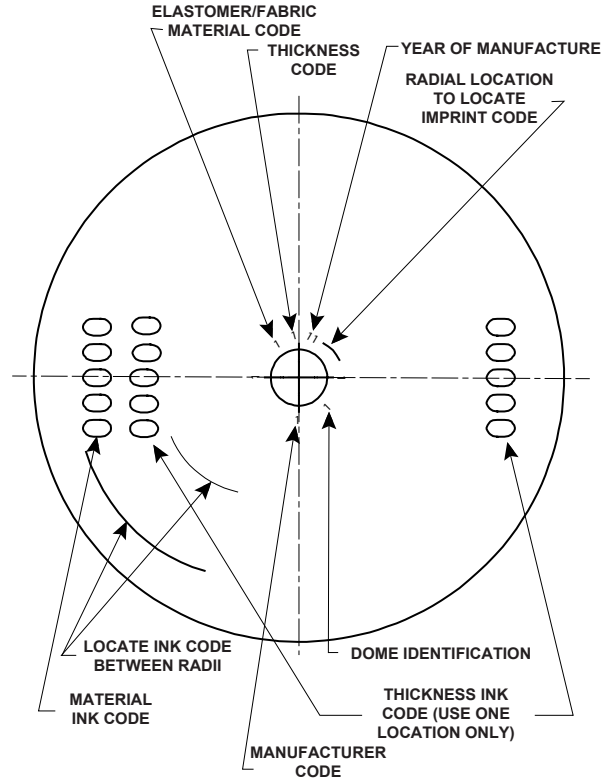


Figure 8. Diaphragm Markings

Table 11. Diaphragm Imprint Codes

STYLE		MATERIAL		DIAPHRAGM MATERIAL
Imprint	Ink Mark	Imprint	Ink Mark	
2	130	2	17E68	17E68 - Nitrile (NBR) (low temperature)
		4	17E88	17E88 - Fluorocarbon (FKM) (high aromatic hydrocarbon content resistance)
		5	17E97	17E97 - Nitrile (NBR) (high pressure and/or erosion resistance)

## Converting a Fisher™ E-Body to Type EZR

Remove all trim parts from the main valve and clean the body interior. Then follow procedure in Assembly section to convert a Fisher E-body to a Type EZR.



### CAUTION

When installing a Type EZR trim package make sure flow is up through the center of the cage and down through the cage slots. In some cases, correct flow path is achieved by removing the body from the line and turning it around. If this is done, change the flow arrow to indicate the correct direction. Damage may result



**Table 12. Troubleshooting Guide**

PROBLEM	POSSIBLE SOLUTION
Outlet pressure suddenly rises above setpoint and approaches inlet pressure	<ul style="list-style-type: none"> <li>• If travel indicator is in UP position, check restrictor and pilot supply filter for plugging</li> <li>• If travel indicator is in DOWN position, check main valve for debris or diaphragm damage</li> </ul>
Outlet pressure normal at low flow but falls below setpoint at high flow	<ul style="list-style-type: none"> <li>• Check main valve inlet strainer for plugging</li> <li>• Check inlet pressure at high flow condition</li> <li>• Check sizing calculations to be sure main valve body is large enough for load</li> <li>• Check for undersized or restricted control line (use the minimum size given in step 6 of All Installations of the Type EZR Installation section).</li> <li>• Adjust restrictor to a lower setting</li> </ul>
Outlet pressure cycles	<ul style="list-style-type: none"> <li>• Adjust restrictor to a higher setting</li> <li>• Check control line placement. Make sure it is not located in a turbulent area.</li> <li>• Make sure there is not a restriction in the control line, such as a needle valve.</li> </ul>
Gas escapes from pilot spring case	<ul style="list-style-type: none"> <li>• Replace pilot diaphragm assembly</li> </ul>
Gas escapes from travel indicator	<ul style="list-style-type: none"> <li>• Replace indicator stem O-ring, if indicator is not desired, convert to a non-travel indicator assembly</li> </ul>
Regulator unexpectedly closes or falls below setpoint	<ul style="list-style-type: none"> <li>• Check pilot for ice. Moisture in the gas can cause ice to form and build up in the pilot, blocking the flow. Heating the regulator or adding a de-icing agent will reduce the possibility of icing.</li> </ul>
Outlet pressure approaches inlet pressure when no flow is desired	<ul style="list-style-type: none"> <li>• Check main valve O-rings for damage or improper installation</li> <li>• Check cage and diaphragm surfaces for erosion or trapped debris</li> <li>• Check pilot valve plug and seat for seating surface damage or debris</li> <li>• Check pilot for ice</li> </ul>
Regulator will not open	<ul style="list-style-type: none"> <li>• Check for clogged control line</li> <li>• Make sure control line is installed and open</li> <li>• Check for damage to the main valve diaphragm</li> <li>• On new installations, make sure the control line and pilot supply are properly connected</li> </ul>
Regulator will not close	<ul style="list-style-type: none"> <li>• Make sure the pilot supply is properly connected</li> <li>• Check restrictor for clogging</li> <li>• Check the main valve diaphragm for damage</li> <li>• Check for a broken control line</li> </ul>
High lock-up pressure with slow shutdown	<ul style="list-style-type: none"> <li>• Check for debris on main valve or pilot seat</li> </ul>
High lock-up pressure with fast shutdown	<ul style="list-style-type: none"> <li>• Adjust restrictor to a higher setting</li> </ul>
Note: If you were unable to solve your problem using this troubleshooting guide, contact your local Sales Office.	

**if flow is not in the correct direction. After assembly, check the regulator for shutoff and leakage to atmosphere.**

## Disassembly

### Disassembly of Type EZR

1. Shutdown, isolate and depressurize the main valve and pilot.
2. Remove travel indicator assembly or travel indicator plug assembly using the Travel Indicator Assembly Maintenance section.
3. Remove the cap screws (key 3). Lift up and remove the bonnet (key 2) from the body (key 1).

#### Note

**For the NPS 8 / DN 200 body, the lifting flange (key 143) is capable of supporting the full weight of the regulator assembly and can be utilized to lift bonnet if required.**

4. Remove the diaphragm and plug assembly (key 9) and bonnet O-ring (key 28). For NPS 2 x 1 / DN 50 x 25 sizes, use a screwdriver to remove the upper adaptor (key 131).

5. Pull out the cage (key 7), O-ring (key 8) and inlet strainer or strainer shim (key 23) (if no strainer). For NPS 2 x 1 / DN 50 x 25 sizes, remove the lower adaptor (key 132).
6. Clean parts and replace if necessary. To change the O-ring (key 121) on a 6 in. / 152 mm cage with attached restrictor plate (key 71), remove cap screws (key 126).

## Assembly

1. Install the inlet strainer or shim (key 23) into the body (key 1).

#### Note

**When installing in a vertical orientation, apply lubricant to the bottom of the inlet strainer or strainer shim (key 23) to help hold parts in place while installing cage.**

2. Lightly lubricate and install the cage O-ring (key 8).
3. Apply lubricant lightly to all O-rings or the mating part before installing them.
4. Install the cage (key 7) and lightly lubricate and install the bonnet O-ring (key 28).

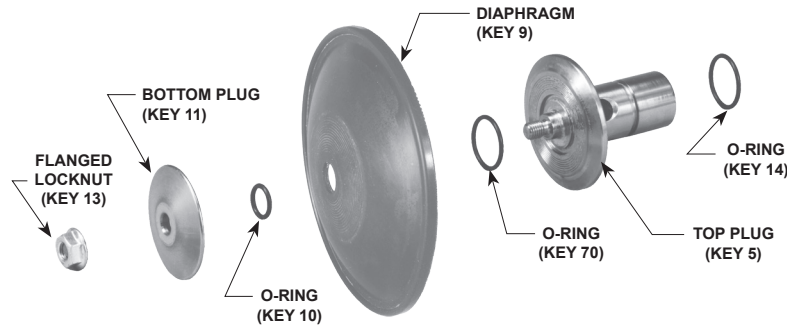


Figure 9. Diaphragm and Plug Assembly Components

To assemble a 6 in. / 152 mm cage with attached restrictor plate (key 71), lightly lubricate the O-ring (key 121) and place it on the restrictor plate. Secure the cage to the restrictor plate with the cap screws (key 126), using a torque of 10 to 12 ft-lbs / 14 to 16 N•m.

For NPS 2 x 1 / DN 50 x 25 sizes, the lower adaptor (key 132) must be assembled on the cage before placing in the body. Lightly lubricate the lower adaptor O-rings (keys 121 and 67) and place the lower adaptor on a flat surface. Then press the cage down into the lower adaptor.

5. Lubricate the top and bottom of the outer edge (bead area) of the diaphragm and place diaphragm and plug assembly (key 9) on the cage (key 7) making sure the bead is in the cage groove. Lubricate the top plug (key 5) recess. For NPS 2 x 1 / DN 50 x 25 sizes, the upper adaptor (key 131) must be placed on the cage before the bonnet (key 2). Lightly lubricate the upper adaptor O-ring (key 133) and then press the upper adaptor onto the cage.
6. Prior to installing the travel indicator or travel indicator plug, install the bonnet (key 2) in proper orientation.

## CAUTION

**Make sure to use a Type EZR bonnet. The Type EZR bonnet is NOT interchangeable with other Fisher™ E-body bonnets. Installing an improper bonnet can result in stem assembly breakage and unit failure. The bonnet can be identified by the Type EZR markings on the top.**

7. Lubricate cap screws (key 3) and secure the bonnet (key 2), using an even crisscross pattern. It may be necessary to push down on bonnet to start cap screws. Tighten cap screws to proper torque (see Table 13).

8. Lightly lubricate the travel indicator assembly threads and install the indicator fitting (key 19) into the bonnet (key 2, Figure 14), tighten to the proper torque (see Table 13).

## Diaphragm and Plug Assembly Maintenance

The diaphragm and plug assembly can be replaced as a single unit (a diaphragm cartridge) or individual components within the assembly can be replaced. When replacing individual components, inspect each component for damage and wear and replace parts as needed. Key numbers for the following assembly and disassembly procedure are referenced in Figures 9 and 14.

1. Place a screwdriver or similar tool through the hole in the top plug (key 5).
2. Remove the flanged locknut (key 13) from the bottom plug (key 11). This loosens the entire assembly.

### Note

**On NPS 1, 1-1/4 x 1 and 2 x 1 / DN 25, 32 x 25 and 50 x 25 bodies, remove the socket head screw (key 129) and lock washer (key 130) from the bottom plug.**

3. Remove the bottom plug (key 11) and the bottom plug O-ring (key 10).
4. Remove the diaphragm (key 9).
5. Remove the top plug O-rings (keys 14 and 70).
6. Check all components for damage or wear and replace as necessary.
7. When reassembling, be sure to lubricate all O-rings before installing.
8. Hold the top plug (key 5). Place the parts on the top plug in the following order:

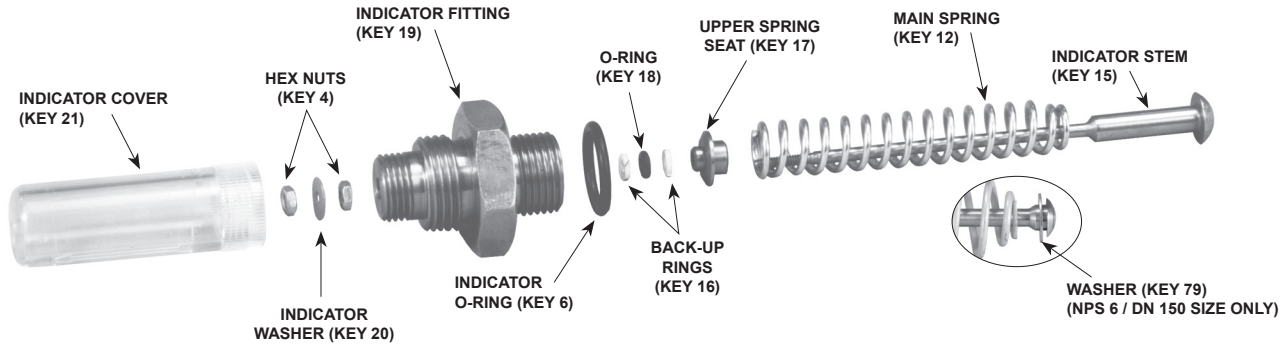


Figure 10. Travel Indicator Parts

Table 13. Torque Values

BODY SIZE, NPS / DN	TORQUE, Ft-lbs / N·m			
	Cap Screw	Flange Locknut	Indicator Fitting	Indicator Plug
1 or 1-1/4 x 1 / 25 or 32 x 25	75 to 95 / 102 to 129	4 to 6 / 5.4 to 8.1	90 to 160 / 122 to 217	90 to 160 / 122 to 217
2 x 1 or 2 / 50 x 25 or 50	55 to 70 / 75 to 95	6 to 8 / 8.1 to 11	90 to 160 / 122 to 217	90 to 160 / 122 to 217
3 / 80	100 to 130 / 136 to 176	19 to 25 / 26 to 34	200 to 300 / 271 to 407	200 to 300 / 271 to 407
4, 6 x 4 or 8 x 4 / 100, 150 x 100 or 200 x 100	160 to 210 / 217 to 285	19 to 25 / 26 to 34	200 to 300 / 271 to 407	200 to 300 / 271 to 407
6, 8 x 6 or 12 x 6 / 150, 200 x 150 or 300 x 150	275 to 300 / 373 to 407	50 to 100 / 68 to 136	300 to 425 / 407 to 577	300 to 425 / 407 to 577
8 / 200	400 to 450 / 542 to 610	90 to 110 / 122 to 149	300 to 425 / 407 to 577	300 to 425 / 407 to 577

- O-ring (key 14)
- O-ring (key 70)
- Diaphragm (key 9)
- O-ring (key 10)
- Bottom Plug (key 11)
- Flanged Locknut (key 13)

9. Reassemble in the reverse order. Tighten flange locknut (key 13) to proper torque (see Table 13).

## Travel Indicator Assembly Maintenance

Travel indicator assembly key numbers are referenced in Figures 10, 14 and 18. The indicator assembly can be removed and installed without removing the bonnet (key 2) from the body (key 1). Travel indicator maintenance is performed for two reasons:

- When damaged or worn parts need replacing.
- When travel indicator is removed and replaced with a travel indicator plug assembly.



### WARNING

**Avoid personal injury or damage to property from sudden release of pressure or uncontrolled gas or**

**other process fluid. Before starting to disassemble, carefully release all pressures according to the shutdown procedure. Use gauges to monitor inlet, loading and outlet pressures while releasing these pressures.**

- Remove the indicator protector (key 22, Figure 14) and indicator cover (key 21).
- Remove the first hex nut (key 4) and the indicator washer (key 20).
- Unscrew the second hex nut (key 4) on the top of the indicator stem (key 15). Do not remove.
- Use a wrench to remove indicator fitting (key 19).
- Lift out travel indicator assembly. If replacing travel indicator with travel indicator plug, skip to step 9.
- Compress the main spring (key 12). Remove the second hex nut (key 4). Parts will separate easily when the hex nut is removed.
- Slide the indicator stem (key 15) out of the indicator fitting (key 19). The main spring (key 12) and upper spring seat (key 17) will be free.
- If necessary, use the indicator stem (key 15) to pry the back-up rings (key 16) and O-ring (key 18) out of the indicator fitting (key 19).

# Type EZR

9. Check the indicator fitting O-ring (key 6). Lubricate and replace if necessary.
10. To replace travel indicator parts, lubricate all O-rings, back-up rings and threads. To reassemble, hold the indicator stem (key 15) and place the parts on the stem in the following order (see Figure 10).
  - Washer (key 79 for NPS 6 / DN 150 size only)
  - Main Spring (key 12), small end first
  - Upper Spring Seat (key 17), make sure to place the large end toward the spring
  - First Back-up Ring (key 16)
  - O-ring (key 18)
  - Second Back-up Ring (key 16)
  - Indicator Fitting (key 19), the back-up rings (key 16) and O-ring (key 18) should slide into the indicator fitting and the small end of the upper spring seat (key 17) should slide into the indicator fitting.
  - First Hex Nut (key 4)
  - Indicator Washer (key 20)
  - Second Hex Nut (key 4)
11. Install the indicator fitting (key 19) into the bonnet (key 2, Figure 14), tighten to the proper torque (see Table 13).

To set the travel indicator, hold the indicator cover (key 21) next to the indicator fitting (key 19). Screw the hex nuts (key 4) and the indicator washer (key 20) down on the indicator stem (key 15) until the washer is even with the lowest marking on the indicator cover. Lightly lubricate the indicator cover threads and install. Replace the indicator protector (key 22).

**To replace the travel indicator with the non-travel indicator option**, place the main spring (key 12) into the bonnet. Install the indicator plug (key 19) and tighten to proper torque (see Table 13).

## 161EB Series Pilots (Figure 19)

### Note

**This procedure covers all 161EB Series pilots. Types 161EB and 161EBM rated for outlet pressure settings over 200 psig / 13.8 bar require a diaphragm limiter. Types 161EB and 161EBM pilots rated for outlet pressure settings under 200 psig / 13.8 bar do not require a diaphragm limiter.**

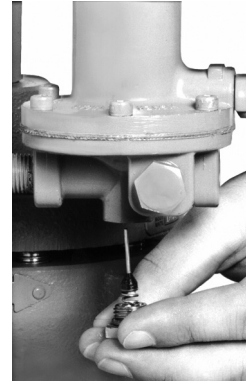


Figure 11. 161EB Series Pilot Trim Removal/Installation

### Trim Parts

1. As shown in Figure 11, remove the body plug (key 3) to let the plug spring (key 6) and valve plug (key 4) drop freely from the body.
2. Inspect the removed parts and body plug O-ring (key 15), replace as necessary and make sure the plug seating surfaces are free from debris.
3. Sparingly apply lubricant to the body plug O-ring (key 15) and the threads of the body plug (key 3). Install the body plug O-ring over the body plug.
4. Stack the plug spring (key 6) and valve plug (key 4) on the body plug (key 3). Install the body plug with stacked parts into the body (key 1).

### Diaphragm Parts

1. Remove the closing cap (key 16), loosen the locknut (key 12) and back out the adjusting screw (key 11) until compression is removed from the control spring (key 9).
2. Remove the machine screws (key 13, not shown) and separate the spring case (key 2) from the body (key 1). Remove the control spring seat (key 8), the control spring (key 9). If used, remove the diaphragm limiter (key 10). Replace if necessary.
3. Remove the diaphragm assembly (key 7) and inspect the diaphragm.
4. On Type 161EBM pilots, inspect the stem guide seal assembly (key 19) and, if damaged, replace the complete assembly. Inspect the outer O-ring (key 22) and replace if necessary.
5. Install the diaphragm assembly (key 7) and push down on it to see if the valve plug (key 4) strokes smoothly and approximately 1/16 in. / 1.6 mm.
6. Stack the control spring (key 9), control spring seat (key 8) and diaphragm limiter (key 10) (if used) on

the diaphragm assembly (key 7). If used, make sure the diaphragm limiter is installed beveled side up on Types 161EB and 161EBM pilots with 200 to 350 psig / 13.8 to 24.1 bar outlet pressure range. Lightly apply lubricant to the control spring seat.

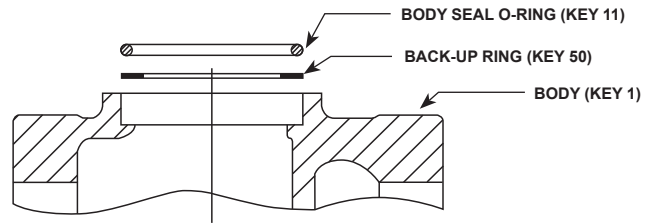
7. Install the spring case (key 2) on the body (key 1) with the vent (key 18) properly oriented. Make sure the vent is not directly over inlet or outlet piping due to possible icing. Install the machine screws (key 13, not shown), using a crisscross pattern, torque them to 5 to 7 ft-lbs / 6.8 to 9.5 N•m for stainless steel bodies and 2 to 3 ft-lbs / 2.7 to 4.1 N•m for aluminum bodies. Lubricate the adjusting screw threads.
8. When maintenance is complete, refer to the Startup and Adjustment section to put the regulator back into operation and adjust the pressure setting. Tighten the locknut (key 12), replace the closing cap gasket (key 17) if necessary and install the closing cap (key 16).

## 161AY Series Pilots (Figure 20)

### Body Area

Use this procedure to gain access to the disk assembly, orifice and body O-ring. All pressure must be released from the diaphragm casing and the disk assembly must be open, before these steps can be performed.

1. Remove the cap screws (key 2) and separate the diaphragm casing (key 4) from the body (key 1).
2. Remove body seal O-ring (key 11) and the back-up ring (key 50). Inspect the body seal O-ring and replace if necessary.
3. Inspect and replace the orifice (key 5) if necessary. Lubricate the threads of the replacement orifice with a good grade of light grease and install with 29 to 37 ft-lbs / 39 to 50 N•m of torque.
4. Remove the cotter pin (key 15) if it is necessary to replace the disk assembly (key 13) or the throat seal O-ring (key 31) of a Type 161AYM.
5. For a Type 161AYM, inspect the throat seal O-ring (key 31) and remove the machine screw (key 33). Replace O-ring if necessary.
6. Install the disk assembly (key 13) and secure it with the cotter pin (key 15).
7. Place back-up ring (key 50) into the body (key 1) then place the body seal O-ring (key 11) into the body.
8. Place the diaphragm casing (key 4) on the body (key 1). Secure the diaphragm casing to the body with the cap screws (key 2).



**Figure 12.** Expanded View of the Body Area  
Showing the O-ring and Back-up Ring Placement

### Diaphragm and Spring Case Area

Use this procedure to change the control spring and to inspect, clean or replace parts in the spring case and diaphragm assembly.

#### To Change the Control Spring:

1. Remove the closing cap (key 22) and turn the adjusting screw (key 35) counterclockwise until all compression is removed from the control spring (key 6).
2. Change the control spring (key 6) to match the desired spring range.
3. Replace the adjusting screw (key 35).
4. Install the replacement closing cap gasket (key 25) if necessary and reinstall the closing cap (key 22).
5. If the spring was changed, be sure to change the stamped spring range on the nameplate.

#### To Disassemble and Reassemble Diaphragm Parts

1. Remove the closing cap (key 22) and turn adjusting screw (key 35) counterclockwise to remove adjusting screw, baffle plate (key 56) and control spring (key 6).
2. Remove the spring case hex nuts (key 23, not shown), cap screws (key 24) and spring case (key 3).
3. Remove the diaphragm (key 10) and attached parts by tilting them so that the pusher post (key 8) slips off the lever assembly (key 16). To separate the diaphragm (key 10) from the attached parts, unscrew the machine screw (key 38) from the pusher post (key 8).
4. Inspect the pusher post (key 8) and the body seal O-ring (key 11), replace if required.
5. Remove hex nut (key 21) to separate the diaphragm (key 10) and attached parts.
6. To replace the lever assembly (key 16), remove the machine screws (key 17). To replace the stem (key 14) or access the stem seal O-ring (key 30) also perform Body Area Maintenance

procedure steps 1 and 4 and pull the stem out of the diaphragm casing (key 4).

7. Install the stem (key 14) into the guide insert (key 18) and perform Body Area Maintenance procedure steps 6 through 8 as necessary.
8. Install the lever assembly (key 16) into the stem (key 14) and secure the lever assembly with the machine screws (key 17).
9. Install the parts on the pusher post in the order listed below:
  - Pusher Post (key 8)
  - Pusher Post Connector (key 40)
  - Connector Seal O-ring (key 49)
  - Diaphragm Head (key 7)
  - Diaphragm (key 10), pattern side up
  - Diaphragm Head (key 7)
  - Hex Nut (key 21) — Tighten the hex nut 9 to 11 ft-lbs / 12 to 15 N•m to secure parts to the pusher post connector (key 40)
  - Overpressure Spring (key 39)
  - Spring Holder (key 37)
  - Machine Screw (key 38)
10. Insert and tighten the machine screw (key 38) with a torque of 1 to 3 ft-lbs / 1.4 to 4.1 N•m to secure the diaphragm parts to the pusher post (key 8).
11. Install the assembled parts in the diaphragm casing (key 4). Make sure the lever (key 16) fits in the pusher post (key 8) and that the holes in the diaphragm (key 10) align with the holes in the diaphragm casing.
12. Place the spring case (key 3) on the diaphragm casing (key 4) so the vent assembly (key 26) is oriented correctly and secure with the cap screws (key 24) and hex nuts (key 23, not shown), fingertight only.
13. Insert the control spring (key 6) into the spring case (key 3), followed by the baffle plate (key 56) and adjusting screw (key 35).
14. Turn the adjusting screw (key 35) clockwise until there is enough spring (key 6) force to provide proper slack to the diaphragm (key 10). Using a crisscross pattern, tighten the cap screws (key 24) and hex nuts (key 23, not shown) to 14 to 17 ft-lbs / 19 to 23 N•m of torque. To adjust the outlet pressure to the desired setting, refer to Startup and Adjustment section.
15. Install a replacement closing cap gasket (key 25) if necessary and then install the closing cap (key 22).

## PRX Series Maintenance



### CAUTION

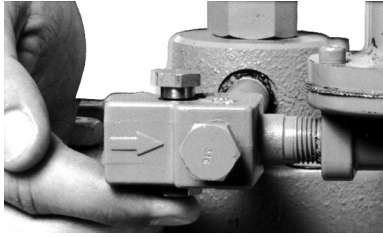
**Always remove spring compression before performing maintenance on this unit. To remove spring compression, loosen locknut (key 2, Figure 26) and back out adjusting screw (key 1) until compression is removed from the spring (key 7).**

### Lower Case Maintenance

1. Remove pressure from the pilot.
2. Remove machine screws (key 10) from lower cover (key 21) and the separate lower cover from the body (key 16).
3. Use a wrench to hold the stem (key 23) and loosen the stem nut (key 20). Remove the stem nut and washer (key 11).
4. Remove the upper diaphragm plate (key 13), diaphragm (key 14), pad holder (key 22) and O-ring (key 18). Inspect parts for damage or wear and replace if necessary.
5. Remove orifice (key 19) and O-ring (key 17). Inspect the parts for damage or wear and replace if necessary. Lightly lubricate the O-ring and place in the body (key 16). Install the orifice.
6. Set the pad holder (key 22) in the body (key 16).
7. Lightly lubricate the rims of the diaphragm (key 14) and place it on top of the pad holder (key 22). Set the upper diaphragm plate (key 13) on the diaphragm.
8. Lightly lubricate the O-ring (key 18) and place it in the lower cover (key 21).
9. Place the washer (key 11) and stem nut (key 20) on the stem (key 23) and tighten. If also performing Upper Case Maintenance, skip to step 2 of the Upper Case Maintenance section.
10. Insert machine screws (key 10) in the lower cover (key 21) and tighten uniformly to ensure proper seal.

### Upper Case Maintenance

1. Remove pressure from the pilot.
2. Loosen locknut (key 2) and back out adjusting screw (key 1) until compression is removed from the spring (key 7). Remove cap (key 3).
3. Lift the upper spring seat (key 6), spring (key 7) and O-ring (key 4) out of the upper cover (key 8). Inspect O-ring and replace if necessary.



**Figure 13.** Pushing Groove Valve Up With Retainer

4. Remove machine screws (key 10) from lower cover (key 21) and the separate lower cover from the body (key 16), unless removed during lower diaphragm maintenance. Use a wrench to hold stem (key 23) securely while removing the upper diaphragm nut (key 26).
5. Remove remaining loose components: washer (key 11), upper diaphragm plate (key 13), diaphragm (key 14), lower diaphragm plate (key 15) and O-rings (keys 18 and 25). Inspect diaphragm and O-rings for damage or wear and replace if necessary.
6. Lightly lubricate the O-ring (key 25). Place O-ring over the stem (key 23) and press it down into the body (key 16).
7. Set the lower diaphragm plate (key 15) into the body (key 16).
8. Lightly lubricate the rims of the diaphragm (key 14) and place it in the body (key 16) on top of the lower diaphragm plate (key 15).
9. Set the upper diaphragm plate (key 13) on top of the diaphragm (key 14).
10. Place washer (key 11) and upper diaphragm nut (key 26) on the stem (key 23) and tighten using a wrench to hold the stem.
11. Set the upper spring seat (key 6).

### **Damper and Restrictor Maintenance**

1. Remove screw (key 31, Figure 26) and plate (key 29).
2. Remove ring nuts (key 30).
3. Remove damper adjusting screw (key 27). Remove and inspect O-ring (key 28) for damage or wear and replace if necessary. Lightly lubricate O-ring before placing on the adjusting screw. Insert damper adjusting screw into the body (key 16) and tighten. Insert ring nut (key 30) and tighten. Back out damper adjusting screw until it stops.

4. Remove restrictor adjusting screw with hole (key 32). Remove and inspect O-ring (key 28) for damage or wear and replace if necessary. Lightly lubricate O-ring before placing on the adjusting screw. Insert restrictor adjusting screw into the body (key 16) and completely tighten. Insert ring nut (key 30) and completely tighten. Back out restrictor adjusting screw 1/2 turn.

### **Note**

**When using a Type PRX/120 pilot with a Type PRX/125 pilot as a monitor, use the following settings:**

- **Restrictor - completely tighten and then back out three full turns.**
- **Damper - back out until it stops.**

5. Install plate (key 29) and screw (key 31).

### **Type 112 Restrictor**

Perform this procedure only if O-rings are leaking. Key numbers are referenced in Figure 21.

1. Unscrew the groove valve (key 22) and retainer (key 23) just enough to loosen them, but do not completely separate.
2. As shown in Figure 13, push on the retainer (key 23) to push the groove valve (key 22) out of the body (key 21), then complete disassembly.
3. Replace the groove valve O-rings (key 24) if necessary, being sure to lightly apply lubricant to the replacement O-rings before installing them in the groove valve and retainer.
4. Install the groove valve (key 22) into the same side of the body where the scale appears. Install the retainer into the opposite side of the body and tighten until both are secure.
5. When all maintenance is complete, refer to the Startup and Adjustment section to put the regulator back into operation.

### **Parts Ordering**

When corresponding with your local Sales Office about this equipment, reference the equipment serial number found on a nameplate attached to the bonnet. When ordering replacement parts, reference the key number of each needed part as found in the following parts list. Separate kits containing all recommended spare parts are available.

# Type EZR

**Table 14. Type EZR Main Valve Body Part Numbers (key 1, Figure 14)**

BODY SIZE, NPS / DN	BODY MATERIAL	END CONNECTION STYLE	BODY STYLE	
			Standard (Included Tapped Inlet)	Tapped Inlet and Tapped Outlet
1 / 25	WCC Steel	NPT	GE11581X012	GE32046X012
		SWE	GE11440X012	-----
		CL150 RF	GE11583X012	14B5623X032
		CL300 RF	GE11607X012	14B5623X042
		CL600 RF	GE11608X012	14B5623X052
		SCH 40 BWE	GE11610X012	14B5623X122
1-1/4 x 1 / 32 x 25	WCC Steel	NPT	GE11582X012	-----
2 x 1, 2 / 50 x 25, 50	Cast iron	NPT	GE10583X012	ERSA04807A0
		CL125 FF	GE10585X012	14B5834X012
		CL250 RF	GE10587X012	14B5834X152
	WCC Steel	NPT	GE10588X012	GG00315X012
		SWE	GE10682X012	GG04880X012
		CL150 RF	GE10676X012	14B5834X032
		CL300 RF	GE10678X012	14B5834X042
		CL600 RF	GE10679X012	14B5834X052
SCH 40 BWE	GE10680X012	14B5834X072		
SCH 80 BWE	GE10681X012	-----		
3 / 80	Cast iron	CL125 FF	GE10689X012	GG05163X012
		CL250 RF	GE10698X012	14B5835X112
	WCC Steel	CL150 RF	GE10699X012	14B5835X032
		CL300 RF	GE10700X012	14B5835X042
		CL600 RF	GE10701X012	14B5835X052
		SCH 40 BWE	GE10702X012	14B5835X102
		SCH 80 BWE	GE10703X012	-----
PN 25/40	GE13594X012			
4 / 100	Cast iron	CL125 FF	GE10707X012	GG06484X012
		CL250 RF	GE10822X012	14B5836X112
	WCC Steel	CL150 RF	GE10835X012	14B5836X032
		CL300 RF	GE10839X012	14B5836X042
		CL600 RF	GE10842X012	14B5836X052
		SCH 40 BWE	GE10843X012	14B5836X092
SCH 80 BWE	GE10844X012	-----		
6 x 4 / 150 x 100	WCC Steel	CL150 RF	GE11772X012	-----
		CL300 RF	GE16359X012	39B3356X012
		CL600 RF	GE17626X012	
		SCH 40 BWE	GE16448X012	-----
		SCH 80 BWE	GE16561X012	
8 x 4 / 200 x 100	WCC Steel	CL150 RF	GE17629X012	
		CL300 RF	GE17630X012	
		CL600 RF	GE17631X012	-----
		SCH 40 BWE	GE17627X012	
		SCH 80 BWE	GE17628X012	
6 / 150	Cast iron	CL125 FF	GE11444X012	ERSA03400A0
		CL250 RF	GE11445X012	-----
	WCC Steel	CL150 RF	GE11447X012	24B5837X032
		CL300 RF	GE11449X012	24B5837X042
		CL600 RF	GE11451X012	24B5837X052
		SCH 40 BWE	GE11452X012	24B5837X072
		SCH 80 BWE	GE11453X012	-----

- continued -



## Parts List

### Type EZR Main Valve (Figures 14 to 18)

#### Note

**On an NPS 1-1/4 x 1, 2 x 1, 6 x 4, 8 x 4, 8 x 6 or 12 x 6 / DN 32 x 25, 50 x 25, 150 x 100, 200 x 100, 200 x 150 or 300 x 150 body, the first digit indicates the end connection size and the second digit indicates the trim size. Order parts according to trim size unless otherwise indicated.**

Key	Description	Part Number
	Parts Kits	
	Diaphragm and O-rings (Included are keys 6, 8, 9, 10, 13, 14, 18, 28 and 70) (continued)	
	NPS 6, 8 x 6 and 12 x 6 / DN 150, 200 x 150 and 300 x 150	
	17E97 Nitrile (NBR)	REZRX000S62
	17E88 Fluorocarbon (FKM)	19B2837X042
	NPS 8 / DN 200	
	17E97 Nitrile (NBR)	REZRX000S82
1	Valve Body	See Table 14
2	Bonnet Assembly, Steel	
	NPS 1 and 1-1/4 x 1 / DN 25 and 32 x 25 bodies	39B2403X022
	NPS 2 x 1 and 2 / DN 50 x 25 and 50 bodies	38B2122X022
	NPS 3 / DN 80 body	38B5963X022
	NPS 4, 6 x 4 and 8 x 4 / DN 100, 150 x 100 and 200 x 100 bodies	38B2133X022
	NPS 6, 8 x 6 and 12 x 6 / DN 150, 200 x 150 and 300 x 150 bodies	49B0355X022
	NPS 8 / DN 200 body	GE18697X022
3	Cap Screw, Zinc-Plated Steel	
	NPS 1 and 1-1/4 x 1 / DN 25 and 32 x 25 bodies (4 required)	1R281124052
	NPS 2 x 1 or 2 / DN 50 x 25 or 50 body (8 required)	1A453324052
	NPS 3 / DN 80 body (8 required)	1A454124052
	NPS 4, 6 x 4 and 8 x 4 / DN 100, 150 x 100 and 200 x 100 bodies (8 required)	1A440224052
	NPS 6, 8 x 6 and 12 x 6 / DN 150, 200 x 150 and 300 x 150 bodies (12 required)	1U513124052
4	Hex Nut (2 required)	
	NPS 1, 1-1/4 x 1, 2 x 1 and 2 / DN 25, 32 x 25 50 x 25 and 50 body, Zinc-plated carbon steel	1H322228982
	NPS 3, 4, 6 x 4, 8 x 4, 6, 8 x 6 and 12 x 6 / DN 80, 100, 150 x 100, 200 x 100, 150, 200 x 150 and 300 x 150 body, Stainless steel	1L286338992
	NPS 8 / DN 200 body, Zinc-plated carbon steel	1A573528982
5	Top Plug, Stainless steel	
	NPS 1, 1-1/4 x 1 and 2 x 1 / DN 25, 32 x 25 and 50 x 25 bodies	29B2404X012
	NPS 2 / DN 50 body	28B2130X012
	NPS 3 / DN 80 body	28B8511X012
	NPS 4, 6 x 4 and 8 x 4 / DN 100, 150 x 100 and 200 x 100 bodies	28B5964X012
	NPS 6, 8 x 6 and 12 x 6 / DN 150, 200 x 150 and 300 x 150 bodies	39B0370X012
	NPS 8 / DN 200 body	39B5071X012
6*	O-ring	
	NPS 1, 1-1/4 x 1, 2 x 1 and 2 / DN 25, 32 x 25, 50 x 25 and 50 bodies	
	Nitrile (NBR)	18B3438X012
	Fluorocarbon (FKM)	1N430306382
	NPS 3 / DN 80 body	
	Nitrile (NBR)	10A8931X012
	Fluorocarbon (FKM)	10A8931X052
	NPS 4, 6 x 4 and 8 x 4 / DN 100, 150 x 100 and 200 x 100 bodies	
	Nitrile (NBR)	10A8931X012
	Fluorocarbon (FKM)	10A8931X052
	NPS 6, 8 x 6, 12 x 6 and 8 / DN 150, 200 x 150, 300 x 150 and 200 bodies	
	Nitrile (NBR)	10A3800X012
	Fluorocarbon (FKM)	1R727606382
7	Cage, Stainless steel	
	NPS 1, 1-1/4 x 1 and 2 x 1 / DN 25, 32 x 25 and 50 x 25 bodies	39B2413X012
	NPS 2 / DN 50 body	37B9748X012
	NPS 3 / DN 80 body	48B5961X012
	NPS 4 / DN 100 body	48B2135X012
	NPS 6 x 4 / DN 150 x 100 body	29B1881X012
	NPS 8 x 4 / DN 200 x 100 body	29B1883X012
	NPS 6, 8 x 6 and 12 x 6 / DN 150, 200 x 150 and 300 x 150 bodies	49B0353X012
	NPS 8 / DN 200 body	59B5955X012

\*Recommended Spare Part

# Type EZR

Key	Description	Part Number	Key	Description	Part Number
8*	Cage O-ring (not required for NPS 2 x 1 or 8 x 6 / DN 50 x 25 or 200 x 150) bodies		12	Main Spring	
	NPS 1 / DN 25 body			NPS 1, 1-1/4 x 1 and 2 x 1 / DN 25, 32 x 25 and 50 x 25 bodies	
	Nitrile (NBR)	14A5713X012		White	19B2399X012
	Fluorocarbon (FKM)	13A2351X012		Black	GE12727X012
	NPS 2 / DN 50 body			Red Stripe (NPS 2 x 1 / DN 50 x 25 body only)	GE12501X012
	Nitrile (NBR)	10B4428X012		Light Blue	19B2400X012
	Fluorocarbon (FKM)	10B4428X022		Black with White Stripe	19B2401X012
	NPS 3 / DN 80 body			NPS 2 / DN 50 body	
	Nitrile (NBR)	10B4366X012		Yellow	19B0951X012
	Fluorocarbon (FKM)	10B4366X022		Green	18B2126X012
	NPS 4, 6 x 4 and 8 x 4 / DN 100, 150 x 100 and 200 x 100 bodies			Red for use with travel indicator	18B5955X012
	Nitrile (NBR)	10B4373X012		Purple for use with non-travel indicator	GE05504X012
	Fluorocarbon (FKM)	10B4373X022		NPS 3 / DN 80 body	
	NPS 6, 8 x 6 and 12 x 6 / DN 150, 200 x 150 and 300 x 150 bodies			Yellow	T14184T0012
	Nitrile (NBR)	1H862306992		Light Blue	19B0781X012
	Fluorocarbon (FKM)	1H8623X0022		Black	19B0782X012
	NPS 8 / DN 200 body			NPS 4, 6 x 4 and 8 x 4 / DN 100, 150 x 100 and 200 x 100 bodies	
	Nitrile (NBR)	1V9229X0042		Yellow	T14184T0012
	Fluorocarbon (FKM)	1V9229X0022		Green	18B8501X012
				Red	18B8502X012
9*	Diaphragm			NPS 6, 8 x 6 and 12 x 6 / DN 150, 200 x 150 and 300 x 150 bodies	
	NPS 1, 1-1/4 x 1 and 2 x 1 / DN 25, 32 x 25 and 50 x 25 bodies			Yellow	19B0364X012
	17E97 Nitrile (NBR), high pressure	GE11960X012		Green	19B0366X012
	17E88 Fluorocarbon (FKM)	39B2397X022		Red	19B0365X012
	17E68 Nitrile (NBR), low pressure	30C1009X012		NPS 8 / DN 200 body	
	NPS 2 / DN 50 body			Yellow	GE09393X012
	17E68 Nitrile (NBR), low temperature	29B1909X012		Green	GE09396X012
	17E97 Nitrile (NBR), high pressure	28B2123X052		Red	GE09397X012
	17E88 Fluorocarbon (FKM)	29B2715X012	13	Flanged Locknut, Steel	
	NPS 3 / DN 80 body			NPS 2 / DN 50 body	18B2139X012
	17E68 Nitrile (NBR), low temperature	38B9886X012		NPS 3, 4, 6 x 4 and 8 x 4 / DN 80, 100, 150 x 100 and 200 x 100 bodies	15A7591X012
	17E97 Nitrile (NBR), high pressure	39B2726X012		NPS 6, 8 x 6, 12 x 6 / DN 150, 200 x 150 and 300 x 150 bodies	19B0361X012
	17E88 Fluorocarbon (FKM)	38B8512X022		NPS 8 / DN 200 body	10C1267X012
	NPS 4, 6 x 4 and 8 x 4 / DN 100, 150 x 100 and 200 x 100 bodies				
	17E68 Nitrile (NBR), low temperature	38B8509X012	14*	Top Plug O-ring	
	17E97 Nitrile (NBR), high pressure	39B3996X012		NPS 1, 1-1/4 x 1, 2 x 1 and 2 / DN 25, 32 x 25, 50 x 25 and 50 bodies	
	17E88 Fluorocarbon (FKM)	39B1154X012		Nitrile (NBR)	13A1584X052
	NPS 6, 8 x 6 and 12 x 6 / DN 150, 200 x 150 and 300 x 150 bodies			Fluorocarbon (FKM)	13A1584X022
	17E97 Nitrile (NBR)	49B0357X012		NPS 3, 4, 6 x 4 and 8 x 4 / DN 80, 100, 150 x 100 and 200 x 100 bodies	
	17E88 Fluorocarbon (FKM)	40C1035X012		Nitrile (NBR)	10A3803X062
	NPS 8 / DN 200 body			Fluorocarbon (FKM)	10A3803X032
	17E97 Nitrile (NBR)	40C1888X012		NPS 6, 8 x 6, 12 x 6 and 8 / DN 150, 200 x 150, 300 x 150 and 200 bodies	
10*	O-ring			Nitrile (NBR)	T12050X0012
	NPS 1, 1-1/4 x 1, 2 x 1 and 2 / DN 25, 32 x 25, 50 x 25 and 50 bodies			Fluorocarbon (FKM)	T12050X0022
	Nitrile (NBR)	1E216306992	15	Stem, Stainless steel	
	Fluorocarbon (FKM)	1L949306382		NPS 1, 1-1/4 x 1 and 2 x 1 / DN 25, 32 x 25 and 50 x 25 bodies	T14185T0012
	NPS 3, 4, 6 x 4 and 8 x 4 / DN 80, 100, 150 x 100 and 200 x 100 bodies			NPS 2 / DN 50 body with travel indicator	T14185T0012
	Nitrile (NBR)	1J4888X0052		NPS 3, 4, 6 x 4 and 8 x 4 / DN 80, 100, 150 x 100 and 200 x 100 bodies	T21074T0012
	Fluorocarbon (FKM)	1J4888X0032		NPS 6, 8 x 6 and 12 x 6 / DN 150, 200 x 150 and 300 x 150 bodies	29B0366X012
	NPS 6, 8 x 6 and 12 x 6 / DN 150, 200 x 150 and 300 x 150 bodies			NPS 8 / DN 200 body	29B5076X012
	Nitrile (NBR)	11A8741X052			
	Fluorocarbon (FKM)	11A8741X012	16	Back-up Ring (2 required)	
	NPS 8 / DN 200 body			NPS 1, 1-1/4 x 1, 2 x 1 and 2 / DN 25, 32 x 25, 50 x 25 and 50 bodies	1N659106242
	Nitrile (NBR)	1F4636X0032		NPS 3, 4, 6 x 4, 8 x 4, 6, 8 x 6 and 12 x 6 / DN 80, 100, 150 x 100, 200 x 100, 150, 200 x 150 and 300 x 150 bodies	1J418806992
	Fluorocarbon (FKM)	1N571406382		NPS 8 / DN 200 body	1K786806992
11	Bottom Plug, Stainless steel		17	Upper Spring Seat	
	NPS 1, 1-1/4 x 1 and 2 x 1 / DN 25, 32 x 25 and 50 x 25 bodies	19B2407X012		NPS 1, 1-1/4 x 1 and 2 x 1 / DN 25, 32 x 25 and 50 x 25 bodies	18B2129X012
	NPS 2 / DN 50 body	18B2127X012		NPS 2 / DN 50 body with travel Indicator	18B2129X012
	NPS 3 / DN 80 body	18B8513X012		NPS 3, 4, 6 x 4 and 8 x 4 / DN 80, 100, 150 x 100 and 200 x 100 bodies	18B5968X012
	NPS 4, 6 x 4 and 8 x 4 / DN 100, 150 x 100 and 200 x 100 bodies				
	Nitrile (NBR)	18B5966X012			
	Fluorocarbon (FKM)	29B0763X012			
	NPS 6, 8 x 6 and 12 x 6 / DN 150, 200 x 150 and 300 x 150 bodies	29B0763X012			
	Nitrile (NBR)	29B5958X012			
	Fluorocarbon (FKM)	29B5958X012			

\*Recommended Spare Part

Key	Description	Part Number	Key	Description	Part Number
17	Upper Spring Seat (continued) NPS 6, 8 x 6 and 12 x 6 / DN 150, 200 x 150 and 300 x 150 bodies	29B0764X012 20C1357X012	25	Flow Arrow, Stainless steel	-----
18*	O-ring NPS 1, 1-1/4 x 1, 2 x 1 and 2 / DN 25, 32 x 25, 50 x 25 and 50 bodies Nitrile (NBR) Fluorocarbon (FKM) NPS 3, 4, 6 x 4, 8 x 4, 6, 8 x 6 and 12 x 6 / DN 80, 100, 150 x 100, 200 x 100, 150, 200 x 150 and 300 x 150 bodies Nitrile (NBR) Fluorocarbon (FKM) NPS 8 / DN 200 body Nitrile (NBR) Fluorocarbon (FKM)	1H2926X0032 1H2926X0022 1D191706992 1N423906382 1E472706992 1N430406382	26	Drive Screw, Stainless steel For NPS 1 and 1-1/4 x 1 / DN 25 and 32 x 25 (4 required) For NPS 2 x 1, 2, 3, 4, 6, 6 x 4 and 8 x 4, / DN 50 x 25, 50, 80, 100, 150, 150 x 100 and 200 x 100 (5 required) For NPS 8 / DN 200 (6 required)	1A368228982
19	Indicator Fitting, Stainless steel NPS 1, 1-1/4 x 1, 2 x 1 and 2 / DN 25, 32 x 25, 50 x 25 and 50 bodies NPS 3, 4, 6 x 4 and 8 x 4 / DN 80, 100, 150 x 100 and 200 x 100 bodies NPS 6, 8 x 6, 12 x 6 / DN 150, 200 x 150 and 300 x 150 bodies NPS 8 / DN 200 body	28B2128X012 28B5969X012 39B0358X012 30C1356X012	28*	O-ring NPS 1 and 1-1/4 x 1 / DN 25 and 32 x 25 bodies Nitrile (NBR) Fluorocarbon (FKM) NPS 2 x 1 and 2 / DN 50 x 25 and 50 bodies Nitrile (NBR) Fluorocarbon (FKM) NPS 3 / DN 80 body Nitrile (NBR) Fluorocarbon (FKM) NPS 4, 6 x 4 and 8 x 4 / DN 100, 150 x 100 and 200 x 100 bodies Nitrile (NBR) Fluorocarbon (FKM) NPS 6, 8 x 6 and 12 x 6 / DN 150, 200 x 150 and 300 x 150 bodies Nitrile (NBR) Fluorocarbon (FKM) NPS 8 / DN 200 body Nitrile (NBR) Fluorocarbon (FKM)	19B2838X012 19B2838X022 18B2124X012 18B2124X022 18B8514X012 18B8514X022 18B2140X012 18B2140X022 19B0359X012 10A3591X012 1P5585X0022 1P5585X0032
19	Indicator Plug, Stainless steel NPS 1, 1-1/4 x 1 and 2 x 1 / DN 25, 32 x 25 and 50 x 25 bodies NPS 2 / DN 50 body NPS 3, 4, 6 x 4 and 8 x 4 / DN 80, 100, 150 x 100 and 200 x 100 bodies NPS 6, 8, 8 x 6 and 12 x 6 / DN 150, 200, 200 x 150 and 300 x 150 bodies	19B2409X012 GE17585X012 28B5970X012 39B0767X012	47	Hex Nut, SA194-2H (NPS 8 / DN 200 body only) (8 required)	1A4452X0612
20	Indicator Washer NPS 1, 1-1/4 x 1, 2 x 1 and 2 / DN 25, 32 x 25, 50 x 25 and 50 bodies NPS 3, 4, 6 x 4, 8 x 4, 6, 8 x 6 and 12 x 6 / DN 80, 100, 150 x 100, 200 x 100, 150, 200 x 150 and 300 x 150 bodies NPS 8 / DN 200 body	18B2138X012 18B8503X012 20C2461X012	63	Pilot Supply Pipe Plug, Steel (2 required)	1A767524662
21	Indicator Cover, Plastic NPS 1, 1-1/4 x 1, 2 x 1 and 2 / DN 25, 32 x 25, 50 x 25 and 50 bodies NPS 3, 4, 6 x 4 and 8 x 4 / DN 80, 100, 150 x 100 and 200 x 100 bodies NPS 6, 8, 8 x 6 and 12 x 6 / DN 150, 200, 200 x 150 and 300 x 150 bodies	T14188T0012 19B2270X012 19B4691X012	64	Bonnet Pipe Plug, Steel For NPS 1, 1-1/4 x 1, 2 x 1, 2, 3, 4, 6, 8 x 6, 12 x 6, 6 X 4 and 8 X 4 / DN 25, 32 x 25, 50 x 25, 50, 80, 100, 150, 200 x 150, 300 x 150, 150 x 100 and 200 x 100 For NPS 8 / DN 200	1A767524662 1A369224492
22	Indicator Protector, Plastic NPS 1, 1-1/4 x 1, 2 x 1 and 2 / DN 25, 32 x 25, 50 x 25 and 50 bodies NPS 3, 4, 6 x 4, 8 x 4, 6, 8, 8 x 6 and 12 x 6 / DN 80, 100, 150 x 100, 200 x 100, 150, 200, 200 x 150 and 300 x 150 bodies	24B1301X012 29B2269X012	66	O-ring (NPS 8 x 6 / DN 200 x 150 body only) Nitrile (NBR) Fluorocarbon (FKM)	18A2556X022 18A2556X032
23	Inlet Strainer, Stainless steel NPS 1 and 1-1/4 x 1 / DN 25 and 32 x 25 bodies NPS 2 x 1 and 2 / DN 50 x 25 and 50 bodies NPS 3 / DN 80 body NPS 4, 6 x 4 and 8 x 4 / DN 100, 150 x 100 and 200 x 100 bodies NPS 6, 8 x 6 and 12 x 6 / DN 150, 200 x 150 and 300 x 150 bodies NPS 8 / DN 200 body	20B8004X012 10B4409X012 20B4367X012 20B4374X012 20B7853X012 29B5966X012	67	O-ring NPS 2 x 1 / DN 50 x 25 body Nitrile (NBR) Fluorocarbon (FKM) NPS 8 x 6 / DN 200 x 150 body Nitrile (NBR) Fluorocarbon (FKM)	10B4428X012 10B4428X022 1V335006562 1V3350X0012
23	Strainer Replacement Shim, Stainless steel NPS 1 and 1-1/4 x 1 / DN 25 and 32 x 25 bodies NPS 2 x 1 and 2 / DN 50 x 25 and 50 bodies NPS 3 / DN 80 body NPS 4, 6 x 4 and 8 x 4 / DN 100, 150 x 100 and 200 x 100 bodies NPS 6, 8 x 6 and 12 x 6 / DN 150, 200 x 150 and 300 x 150 bodies NPS 8 / DN 200 body	13B8061X012 13B8062X012 13B8063X012 13B8064X012 13B8065X012 39B5967X012	70*	O-ring NPS 1, 1-1/4 x 1, 2 x 1 and 2 / DN 25, 32 x 25, 50 x 25 and 50 bodies Nitrile (NBR) Fluorocarbon (FKM) NPS 3, 4, 6 x 4 and 8 x 4 / DN 80, 100, 150 x 100 and 200 x 100 bodies Nitrile (NBR) Fluorocarbon (FKM) NPS 6, 8 x 6, 2 x 6 and 8 / DN 150, 200 x 150, 300 x 150 and 200 body Nitrile (NBR) Fluorocarbon (FKM)	13A1584X052 13A1584X022 10A3803X062 10A3803X032 T12050X0012 T12050X0022
24	Nameplate	-----	71	Restrictor Plate, Stainless steel NPS 1, 1-1/4 x 1 and 2 x 1 / DN 25, 32 x 25 and 50 x 25 bodies For 60% Capacity Trim For 30% Capacity Trim NPS 2 / DN 50 body For 60% Capacity Trim For 30% Capacity Trim NPS 3 / DN 80 body For 60% Capacity Trim For 30% Capacity Trim	19B2835X012 19B2836X012 18B2144X012 18B2145X012 28B8516X012 28B8517X012

\*Recommended Spare Part

# Type EZR

Key	Description	Part Number	Key	Description	Part Number
71	Restrictor Plate, Stainless steel (continued) NPS 4, 6 x 4 and 8 x 4 / DN 100, 150 x 100 and 200 x 100 bodies For 60% Capacity Trim For 30% Capacity Trim NPS 6 / DN 150 body For 100% Capacity Trim For 60% Capacity Trim For 30% Capacity Trim NPS 8 x 6 / DN 200 x 150 body For 100% Capacity Trim For 60% Capacity Trim For 30% Capacity Trim NPS 12 x 6 / DN 300 x 150 body For 100% Capacity Trim For 60% Capacity Trim For 30% Capacity Trim	28B8504X012 28B8505X012 49B0367X012 49B0368X012 49B0369X012 49B0768X012 49B0776X012 49B0775X012 49B0769X012 49B2396X012 49B0777X012		Type 161EBM Parts Kit, Nitrile (NBR) (included are keys 4, 6, 7, 15, 17, 19 and 22) 5 to 200 psig / 0.34 to 13.8 bar 200 to 350 psig / 13.8 to 24.1 bar	R161MX00012 R161MX00022
72	E-Ring, for Restricted Trim, Steel NPS 1, 1-1/4 x 1 and 2 x 1 / DN 25, 32 x 25 and 50 x 25 bodies NPS 2 / DN 50 body NPS 3 / DN 80 body NPS 4, 6 x 4 and 8 x 4 / DN 100, 150 x 100 and 200 x 100 bodies	19B2411X012 16A7882X012 18B8518X012 18B8506X012	1	Body Assembly, CF8M Stainless steel Types 161EB Types 161EBM	1B7971X0252 30B8715X012
79	Washer (NPS 6, 8 x 6 and 12 x 6 / DN 150, 200 x 150 and 300 x 150 bodies), Stainless steel	19B0362X012	2	Spring Case, Stainless steel	27B9722X012
121	O-ring NPS 2 x 1 / DN 50 x 25 body Nitrile (NBR) Fluorocarbon (FKM) NPS 6, 8 x 6 and 12 x 6 / DN 150, 200 x 150 and 300 x 150 bodies Nitrile (NBR) Fluorocarbon (FKM)	T12587T0012 T12587T0022 1D269206992 1D2692X0022	3	Body Plug, Stainless steel	1B7975X0052
126	Cap Screw, Steel (4 required) NPS 6 / DN 150 body NPS 8 x 6 / DN 200 x 150 body NPS 12 x 6 / DN 300 x 150 body	1L7325X0042 1V6816X0012 19B3650X022	4*	Valve Plug, Nitrile (NBR) with stainless steel stem Fluorocarbon (FKM) with stainless steel stem	20B9389X052 20B9389X062
129	Socket Head Screw, Stainless steel For NPS 1, 1-1/4 x 1 and 2 x 1 / DN 25, 32 x 25 and 50 x 25 only	1D6170X0012	6	Plug Spring, Stainless steel	1E701337022
130	Lock Washer, Stainless steel For NPS 1, 1-1/4 x 1 and 2 x 1 / DN 25, 32 x 25 and 50 x 25 only	1A329128982	7*	Diaphragm Assembly, Diaphragm with Stainless steel diaphragm plate	See Table 15
131	Upper Adaptor (NPS 2 x 1 / DN 50 x 25 body only)	29B5963X012	8	Control Spring Seat, Plated steel	See Table 15
132	Lower Adaptor (NPS 2 x 1 / DN 50 x 25 body only)	19B5964X012	9	Control Spring, Zinc-plated steel	See Table 15
133*	O-ring NPS 2 x 1 / DN 50 x 25 body only Nitrile (NBR) Fluorocarbon (FKM) NPS 8 / DN 200 body only	1F262906992 1F2629X0012 1N3330X0032	10	Diaphragm Limiter, Stainless steel	See Table 15
136	Stud, Steel (NPS 8 / DN 200 body only) (8 required)	11A5189X282	11	Adjusting Screw, Plated steel	See Table 15
137	Lower Spring Seat, Stainless steel NPS 8 / DN 200 body only	GE09140X012	12	Locknut, Zinc-plated steel	1D667728982
140	Bushing, Carbon Steel NPS 6, 8 x 6 and 12 x 6, 8 / DN 150, 200 x 150 and 300 x 150, 200 bodies	1C379026232	13	Machine Screw, Plated steel (6 required) Types 161EB and 161EBM	1V4360X0022
143	Lifting Flange NPS 8 / DN 200 body only	30C1724X012	14	Pipe Plug Type 161EB	1A767535072
144	Yoke Locknut NPS 8 / DN 200 body only	1E832723062	15	Body Plug O-ring, Nitrile (NBR)	1F113906992
			16	Closing Cap Nylon (PA) Metal, for pressure loading Types 161EB and 161EBM only	24B1301X012 17B1406X012
			17*	Closing Cap Gasket, Pressure loading for metal closing cap Types 161EB and 161EBM only	1C659804022
			18	Type Y602-12 Vent Assembly, Plastic	27A5516X012
			19*	Stem Guide Seal Assembly Type 161EBM Stainless steel seal and seal retainer with Nitrile (NBR) O-ring	10B8711X012
			22	O-ring (Type 161EBM)	10A0904X012
			38	Lower Spring Seat	18B1248X012

## 161EB Series Pilots (Figure 19)

Key	Description	Part Number
	Type 161EB Parts Kit, Nitrile (NBR) (included are keys 4, 6, 7 and 15) 5 to 200 psig / 0.34 to 13.8 bar 200 to 350 psig / 13.8 to 24.1 bar	R161X000012 R161X000022

## Type 161AY or 161AYM Pilot (Figure 20)

Key	Description	Part Number
	Parts Kit (included are keys 10, 11, 12, 13, 15, 25, 30, 31, 33, 45, 48 and 49)	RY690AX0012
1	Body, Cast iron	1E987119012
2	Cap Screw (2 required)	1C856228992
3	Spring Case Assembly, Ductile iron	13B0109X042
4	Lower Casing, Ductile iron Type 161AY Type 161AYM	17B5352X012 47B3063X012
5	Orifice, 303 Stainless steel 3/32 in. / 2.4 mm 1/4 in. / 6.4 mm 1/8 in. / 3.2 mm	0R044135032 0B042035032 1A936735032
6	Control Spring 6 to 15 in. w.c. / 15 to 37 mbar 0.5 to 1.2 psig / 34 to 83 mbar 1.2 to 2.5 psig / 83 mbar to 0.17 bar 2.5 to 4.5 psig / 0.17 to 0.31 bar 4.5 to 7 psig / 0.31 to 0.48 bar	1B653927022 1B537027052 1B537127022 1B537227022 1B537327052
7	Diaphragm Head (2 required)	17B9723X032
8	Pusher Post	27B5354X012
10	Diaphragm Nitrile (NBR) Fluorocarbon (FKM)	37B9720X012 23B0101X052
11	Body Seal Nitrile (NBR) Fluorocarbon (FKM)	1H993806992 1H9938X0012

\*Recommended Spare Part

Key	Description	Part Number
12	Insert Seal Nitrile (NBR) Fluorocarbon (FKM)	1B885506992 1B8855X0012
13	Disk Assembly Nitrile (NBR) Fluorocarbon (FKM)	1C4248X0202 1C4248X0052
14	Stem	17B3423X012
15	Cotter Pin	1A866537022
16	Lever Assembly	1B5375000B2
17	Machine Screws (2 required)	19A7151X022
18	Guide Insert	27B4028X022
21	Hex Nut	1A354024122
22	Closing Cap Plastic ( <b>standard</b> ) Steel	T13524T0062 1E422724092
23	Hex Nut (8 required)	1A352724122
24	Cap Screw (8 required)	1A352524052
25	Closing Cap Gasket	1P753306992
26	Vent Assembly Spring Case Down (Type Y602-1) Spring Case Up (Type Y602-11) Spring Case Sideways (Type Y602-12)	Type Y602X1-A1 Type Y602X1-A11 Type Y602X1-A12
27	Pipe Plug, Type 161AY only	1A369224492
30	Stem Seal O-ring, Type 161AYM only Nitrile (NBR) Fluorocarbon (FKM)	1H2926G0012 1H2926X0022
31	Throat Seal, Type 161AYM only Nitrile (NBR) Fluorocarbon (FKM)	1D682506992 1D6825X0012
33	Machine Screw, Type 161AYM only	18A0703X022
35	Adjusting Screw	1B537944012
37	Spring Holder	1R982025072
38	Machine Screw	10B6189X022
39	Overpressure Spring	1B541327022
40	Pusher Post Connector	27B7982X012
46	Nameplate	-----
47	Drive Screw (2 required)	1A368228982
48	Post Seal Nitrile (NBR) Fluorocarbon (FKM)	1D687506992 1N430406382
49	Connector Seal Nitrile (NBR) Fluorocarbon (FKM)	13A1584X012 13A1584X022
50	Back-up Ring	18B3446X012
55	Restriction	1D483514012
56	Baffle Plate	11B4292X012

## 161EB Series Mounting Parts

### Standard Configuration

Key	Description	Part Number
29	Pipe Nipple, Plated steel NPS 1 and 1-1/4 / DN 25 and 32 body NPS 2 and 3 / DN 50 and 80 body NPS 4 / DN 100 body NPS 6, 6 x 4 and 8 x 4 / DN 150, 150 x 100 and 200 x 100 bodies NPS 8 x 6 and 12 x 6 / DN 200 x 150 and 300 x 150 bodies NPS 8 / DN 200 body	1N584226232 1U264426232 1U5728X0012 1C210026232 1C215726012 1C215726012
38	Pipe Nipple, Plated steel	1D239726232

## Type 112 Restrictor (Figure 21)

Key	Description	Part Number
14	Pipe Plug, Stainless steel	1A767535072
21	Body, Stainless steel	20B4429X012
22	Groove Valve, Stainless steel	20B4403X012

\*Recommended Spare Part

Key	Description	Part Number
23	Retainer, Stainless steel	10B4402X012
24*	Groove Valve O-ring (2 required), Fluorocarbon (FKM)	1C8538X0052

## 161AY Series Mounting Parts (Figure 22)

### For Regulator Pilot

Key	Description	Part Number
4	Nut, SA194 (2 required)	1C3306X0832
29	Pipe Nipple, Plated Steel NPS 1 and 1-1/4 x 1 / DN 25 and 32 x 25 bodies NPS 2 x 1, 2 and 3 / DN 50 x 25, 50 and 80 bodies NPS 4, 6 x 4 and 8 x 4 / DN 100, 150 x 100 and 200 x 100 bodies NPS 6, 8 x 6 and 12 x 6 / DN 150, 200 x 150 and 300 x 150 bodies NPS 8 / DN 200 body	1N584226232 1N624026232 1U5728X0012 1C210026232 1C215726012
45	Bushing, Plated Steel	1A3424X00A2
46	Washer, (2 required)	1D716228982
47	Nut (2 required)	1E944024112
48	U-Bolt	11B3469X012
49	Mounting Bracket NPS 1 and 1-1/4 x 1 / DN 25 and 32 x 25 bodies NPS 2 x 1 and 2 / DN 50 x 25 and 50 bodies NPS 3 / DN 80 body NPS 4 / DN 100 body NPS 6, 8 x 6 and 12 x 6 / DN 150, 200 x 150 and 300 x 150 bodies NPS 8 / DN 200 body	37B4475X012 31B3466X012 31B3467X012 ----- ----- -----
73	Stud, Zinc-plated steel (2 required)	-----

### For Working Monitor Set

Key	Description	Part Number
4	Nut, SA194 (2 required)	1C3306X0832
29	Pipe Nipple, Plated Steel NPS 1 and 1-1/4 x 1 / DN 25 and 32 x 25 bodies NPS 2 x 1, 2 and 3 / DN 50 x 25, 50 and 80 bodies NPS 4, 6 x 4 and 8 x 4 / DN 100, 150 x 100 and 200 x 100 bodies NPS 6, 8 x 6 and 12 x 6 / DN 150, 200 x 150 and 300 x 150 bodies NPS 8 / DN 200 body	1N584226232 1N624026232 1U5728X0012 1C210026232 1C215726012
38	Pipe Nipple, Plated Steel	1D239726232
45	Bushing Plated Steel (2 required)	1A3424X00A2
46	Washer (2 required)	1D716228982
47	Nut, (2 required)	1E944024112
48	U-Bolt	11B3469X012
49	Mounting Bracket NPS 1 and 1-1/4 x 1 / DN 25 and 32 x 25 bodies NPS 2 x 1 and 2 / DN 50 x 25 and 50 bodies NPS 3 / DN 80 body NPS 4, 6 x 4 and 8 x 4 / DN 100, 150 x 100 and 200 x 100 bodies NPS 6, 8 x 6 and 12 x 6 / DN 150, 200 x 150 and 300 x 150 bodies NPS 8 / DN 200 body	37B4475X012 31B3466X012 31B3467X012 31B3468X012 31B4920X012 GE13864X012
50	Cap screw (2 required) NPS 2 x 1, 2, 3, 4, 6 x 4, 8 x 4, 6, 8 x 6, 12 x 6 / DN 50 x 25, 50, 80, 100, 150 x 100 and 200 x 100, 150, 200 x 150, 300 x 150 bodies	1A344424052
73	Stud, Zinc-plated steel (2 required)	1H2597X0012

# Type EZR

## PRX Series Mounting Parts (Figure 22)

Key	Description	Part Number
63	Nipple, Pipe, Hex NPS 1, 1-1/4, 2x 1, 2, 3, 4, 6 x 4 and 8 x 4 / DN 25, 32, 50 x 25, 50, 80, 100, 150 x 100 and 200 x 100 bodies	GE13860X012
64	Nipple NPS 6, 8 x 6, 12 x 6, 8 / DN 150, 200 x 150, 300 x 150, 200 bodies	1C782526012
65	Coupling NPS 6, 8 x 6, 12 x 6, 8 / DN 150, 200 x 150, 300 x 150, 200 bodies	1H724028992
66	Bushing NPS 6, 8 x 6, 12 x 6, 8 / DN 150, 200 x 150, 300 x 150, 200 bodies	1C379026232
67	Nipple, Pipe, NPT, NPS 6, 8 x 6, 12 x 6, 8 / DN 150, 200 x 150, 300 x 150, 200 bodies	1C488226232
68	Elbow, FNPT, Pipe, All sizes	-----
69	Adaptor, NPS 4, 6 x 4 and 8 x 4 / DN 100, 150 x 100 and 200 x 100 bodies only	GE19749X012

## Pounds to Pounds (161EB Series Pilots) Monitor System Mounting Parts (Figure 23)

Key	Description	Part Number
29	Pipe Nipple, Plated steel NPS 1 and 1-1/4 / DN 25 and 32 bodies	-----
	NPS 2 / DN 50 body	-----
	NPS 3 / DN 80 body	-----
	NPS 4 / DN 100 body	-----
	NPS 6 / DN 150 body	-----
	NPS 8 x 6 and 12 x 6 / DN 200 x 150 and 300 x 150 bodies	-----
	NPS 8 / DN 200 body	-----
38	Pipe Nipple, Plated steel	-----

## Pounds to Inches (161AY/161EB Series Pilots) Monitor System Mounting Parts (Figure 24)

Key	Description	Part Number
38	Pipe Nipple, Galvanized Steel	-----
45	Bushing, Plated Steel (2 required)	-----
138	Pipe Nipple, Galvanized Steel	-----
139	Coupling, Steel	-----
140	Bushing, Plated Steel	-----
141	Pipe Nipple, Galvanized Steel	-----

## Pre-piped Pilot Supply (Figure 25)

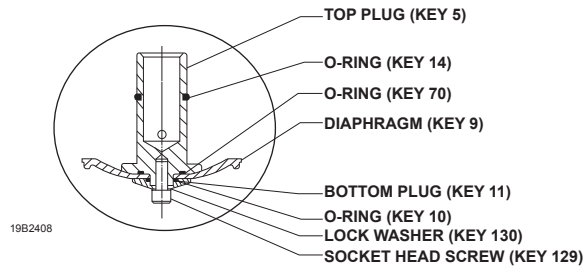
Key	Description	Part Number
59	Pipe Nipple, for use without Type 252 filter NPS 1 / DN 25 body	-----
	NPS 2, 3 and 4 / DN 50, 80 and 100 bodies	-----
	NPS 6, 8 x 6 and 12 x 6 / DN 150, 200 x 150 and 300 x 150 bodies	-----
60	Elbow, for use without Type 252 filter	-----
61	Tubing Connector, for use without Type 252 filter (1 required with Type 252, 2 required without Type 252)	-----
	Steel	-----
	Stainless Steel	-----

Key	Description	Part Number
62	Tubing, Stainless steel	-----
68	External Elbow, for use with Type 252 filter Steel	-----
	Stainless Steel	-----
81	Nipple, for mounting Type 252 filter NPS 1, 2, 3 and 4 / DN 25, 50, 80 and 100 bodies	-----
	NPS 6, 8 x 6 and 12 x 6 / DN 150, 200 x 150 and 300 x 150 bodies	-----
	NPS 8 / DN 200 body	-----

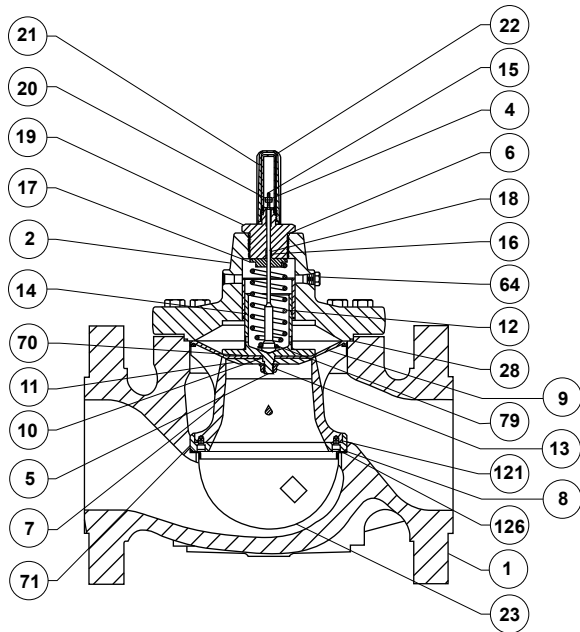
## PRX Series Pilots (Figure 26)

Key	Description	Part Number
	Parts Kits	
	Elastomer Parts Kits (includes keys: 4, 5, 14, 17, 18, 25 and 28)	
	Types PRX/120, PRX/120-AP, PRX/125 and PRX/125-AP	
	Nitrile (NBR)	RPRX00X0N12
	Fluorocarbon (FKM)	RPRX00X0F12
1	Adjusting Screw	M0253340X12
2	Locknut	M5036008X12
3	Cap	M0253350X12
4*	Upper Cover O-ring	See Parts Kits
5*	O-ring	See Parts Kits
6	Upper Spring Seat	M0253360X12
7	Spring	See Table 2
8	Upper Cover	M0298540X12
9	Lower Spring Seat	M0253380X12
10	Machine Screw	M5011018X12
11	Washer (14 required)	M5055001X12
12	Filter	M4500367X12
13	Upper Diaphragm Plate (2 required)	M0253390X12
14*	Diaphragm	See Parts Kits
15	Lower Diaphragm Plate	M0253410X12
16	Body	M0253310X12
17*	Orifice O-ring	See Parts Kits
18*	Lower Cover O-ring	See Parts Kits
19	Orifice	M0253440X12
20	Nut	M5002004X12
21	Lower Cover	M0298600X12
22*	Pad Holder	
	Polyurethane (PU)	M0253400X12
	Fluorocarbon (FKM)	M0279950X12
23	Stem	M0253430X12
24	Nameplate	-----
25*	Stem O-ring	See Parts Kits
26	Upper Diaphragm Nut	M5028005X12
27	Damper Adjusting Screw with Hole	M0253480X12
28*	Restrictor/Damper O-ring	See Parts Kits
29	Plate	GD25440X012
29	Damper/Restrictor Plate	
	Types PRX/120 and PRX/120-AP	M0254400X12
	Types PRX/125 and PRX/125-AP	M0257930X12
30	Ring Nut (2 required)	M0253490X12
31	Nameplate Screw	M5061001X12
32	Restrictor Adjusting Screw with Hole	M0253480X12
33	Plug (Types PRX/125 and PRX/125-AP Only)	M0257920X12
34	Plug (Types PRX/125 and PRX/125-AP Only)	M4500328X12
35	Spring Barrel Extension for AP	M0274100X12

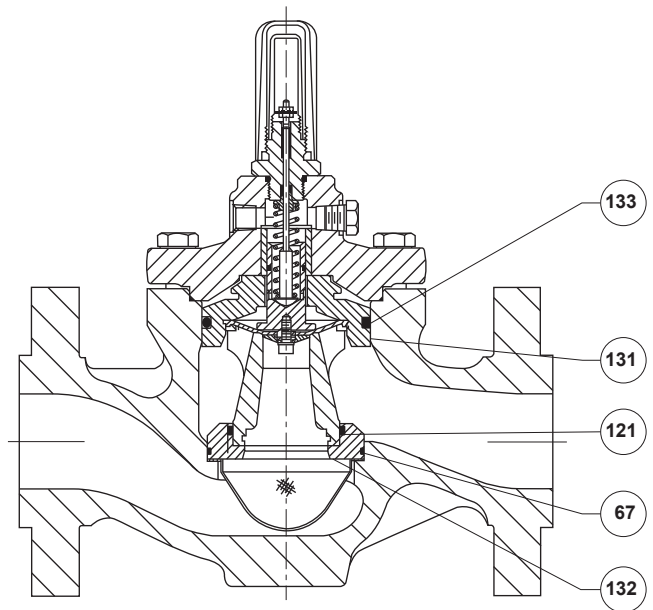
\*Recommended Spare Part



NPS 1, 1-1/4 x 1 AND 2 x 1 / DN 25, 32 x 25 AND 50 x 25  
DIAPHRAGM ASSEMBLY

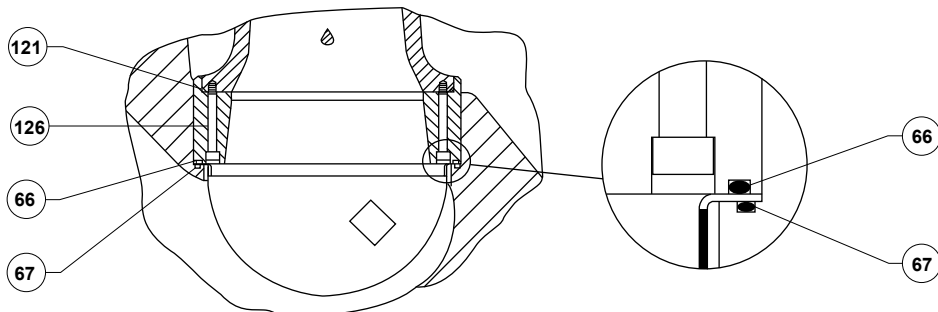


MAIN VALVE ASSEMBLY FOR NPS 6, 8 x 6 AND 12 x 6 /  
DN 150, 200 x 150 AND 300 x 150 BODY SIZES



49B5067

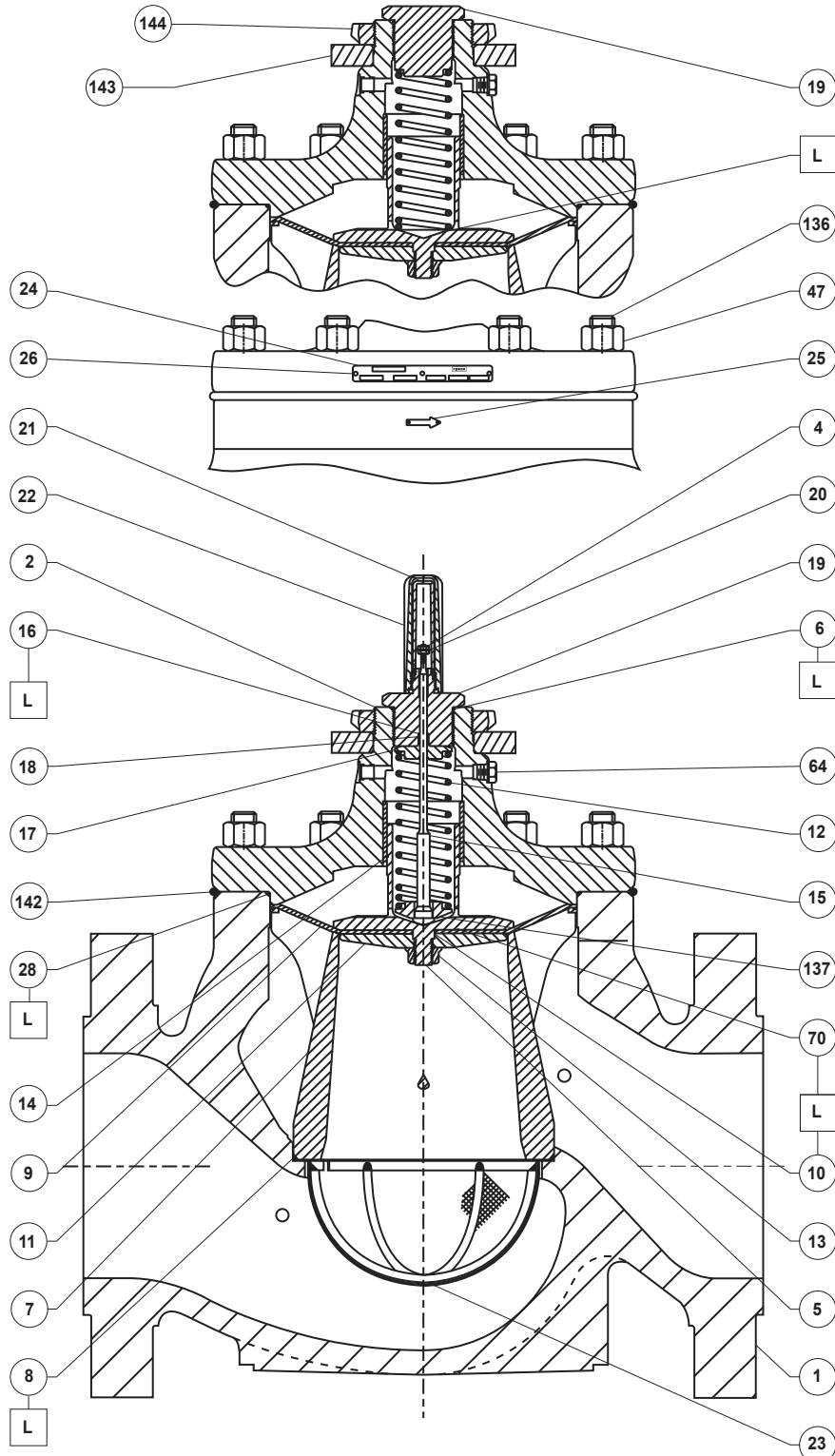
NPS 2 x 1 / DN 50 x 25 MAIN VALVE ASSEMBLY



NPS 8 x 6 / DN 200 x 150 RESTRICTOR PLATE O-RING PLACEMENT

Figure 14. Type EZR Main Valve

# Type EZR



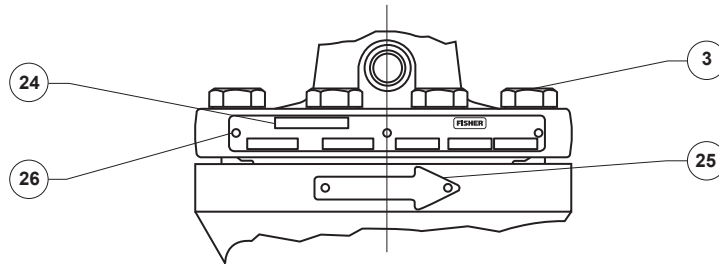
40C3570-C

□ APPLY LUBRICANT (L)  
PARTS NOT SHOWN: 63

MAIN VALVE ASSEMBLY FOR NPS 8 / DN 200 BODY

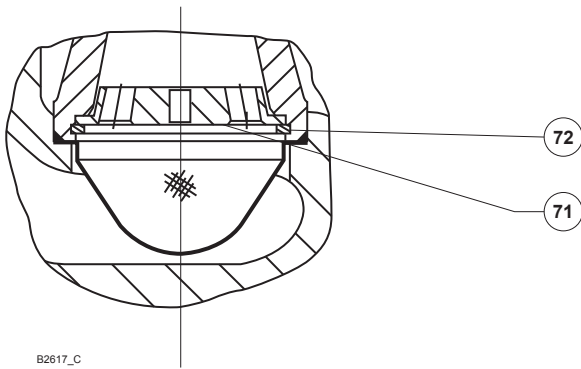
Figure 14. Type EZR Main Valve (continued)





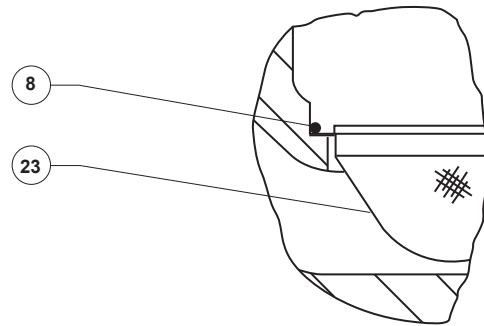
B2617\_A2

**Figure 15. Type EZR Nameplate and Flow Arrow**



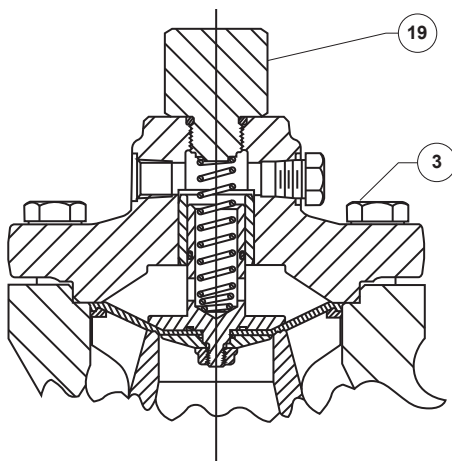
B2617\_C

**Figure 16. Type EZR Restricted Trim**



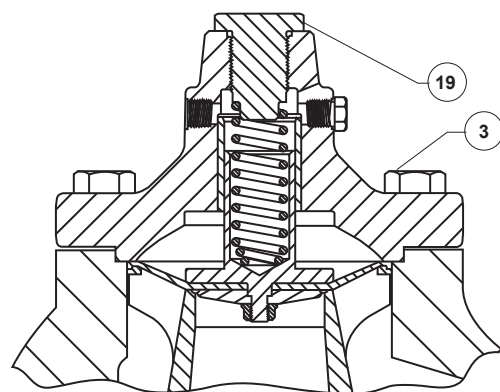
B2617\_D

**Figure 17. Type EZR Cage O-ring Placement**



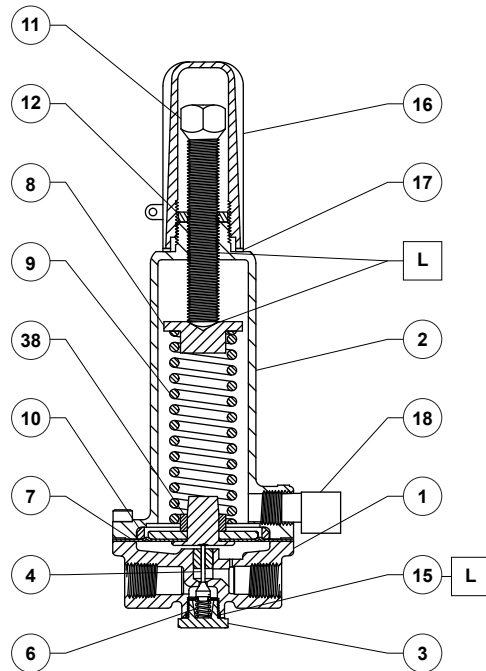
B2617\_E

NPS 1, 1-1/4 x 1, 2 x 1, 2, 3 AND 4 /  
DN 25, 32 x 25, 50 x 25, 50, 80 AND 100 BODY SIZES

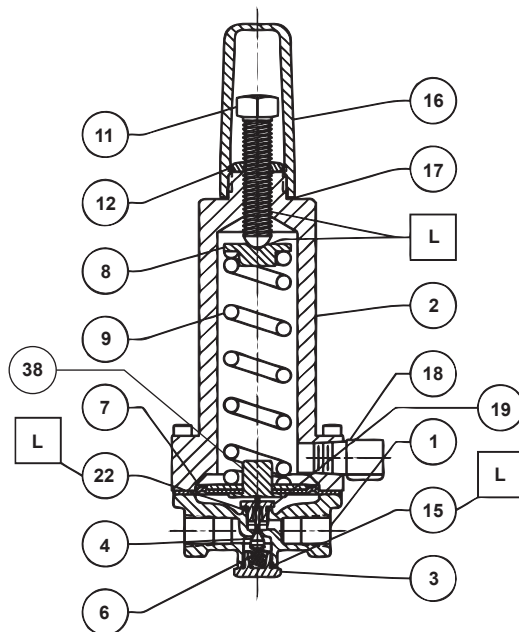


NPS 6 x 4, 8 x 4, 6, 8 x 6, 12 x 6 /  
DN 150 x 100, 200 x 100, 150, 200 x 150, 300 x 150 BODY SIZES

**Figure 18. Type EZR Travel Indicator Plug Option**



TYPE 161EB PILOT



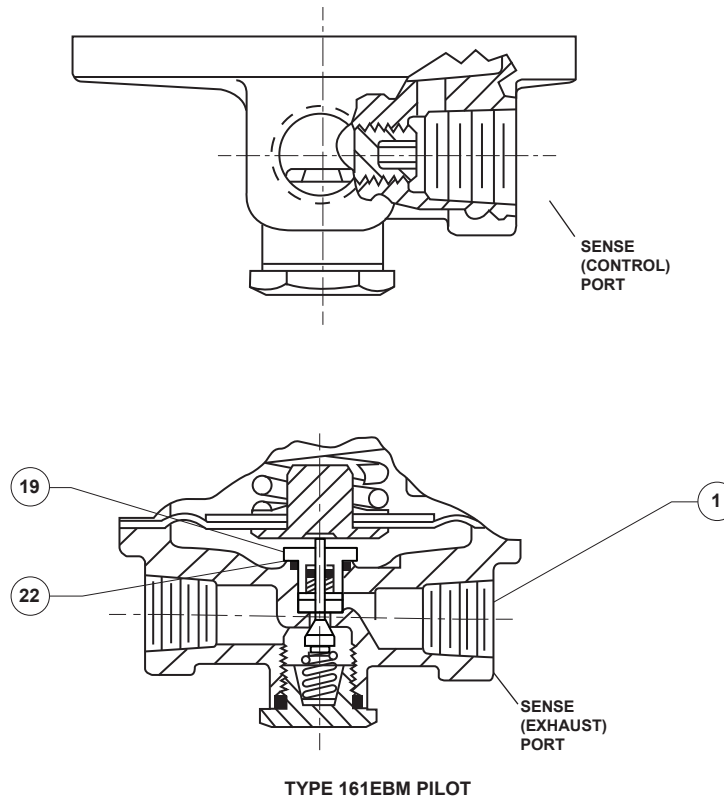
37B1193

TYPE 161EBM PILOT

37B1199

□ APPLY LUBRICANT (L)

Figure 19. 161EB Series Pilots



31B5012-A

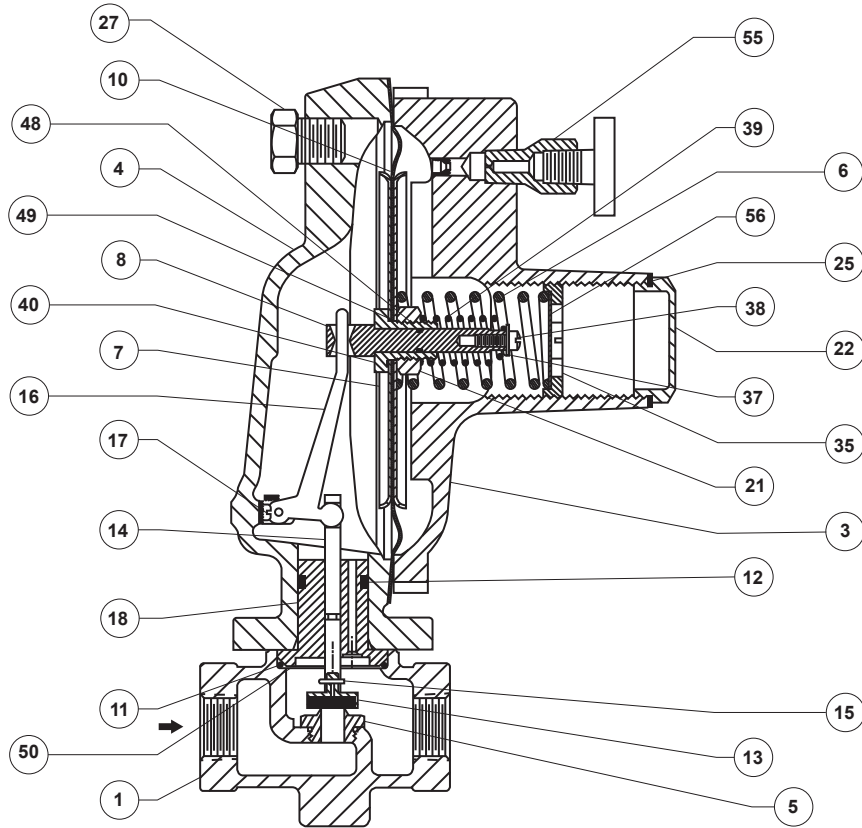
Figure 19. 161EB Series Pilots (continued)

Table 15. 161EB Series Pilot Part Numbers (keys 7, 8, 9, 10 and 11, Figure 19)

KEY	PART NAME	OUTLET (CONTROL) PRESSURE RANGE AND SPRING COLOR CODE							
		Type 161EB or 161EBM							Type 161EB <sup>(3)</sup>
		5 to 15 psig / 0.34 to 1.0 bar White	10 to 40 psig / 0.69 to 2.8 bar Yellow	30 to 75 psig / 2.1 to 5.2 bar Black	70 to 140 psig / 4.8 to 9.7 bar Green	130 to 200 psig / 9.0 to 13.8 bar Blue	200 to 350 psig / 13.8 to 24.1 bar Red	30 to 300 psig / 2.1 to 20.7 bar Green	
7	Diaphragm Assembly, Nitrile (NBR)	17B9055X022 <sup>(1)</sup>	17B9055X022 <sup>(1)</sup>	17B9055X022 <sup>(1)</sup>	17B9055X022 <sup>(1)</sup>	17B9055X022 <sup>(1)</sup>	17B9055X032 <sup>(2)</sup>	17B9055X032 <sup>(2)</sup>	
	Diaphragm Assembly, Fluorocarbon (FKM)	17B9055X062 <sup>(1)</sup>	17B9055X062 <sup>(1)</sup>	17B9055X062 <sup>(1)</sup>	17B9055X062 <sup>(1)</sup>	17B9055X062 <sup>(1)</sup>	17B9055X052 <sup>(2)</sup>	17B9055X052 <sup>(2)</sup>	
8	Spring Seat	17B0515X012	17B0515X012	17B0515X012	17B0515X012	17B0515X012	17B0515X012	19B9059X012	
9	Spring	17B1260X012	17B1262X012	17B1259X012	17B1261X012	17B1263X012	17B1264X012	15A9258X012	
10	Diaphragm Limiter	-----	-----	-----	-----	-----	10B4407X012	10B4407X012	
11	Adjusting Screw	10B3081X012	10B3081X012	10B3081X012	10B3081X012	10B3081X012	10B3080X012	17B1227X012	

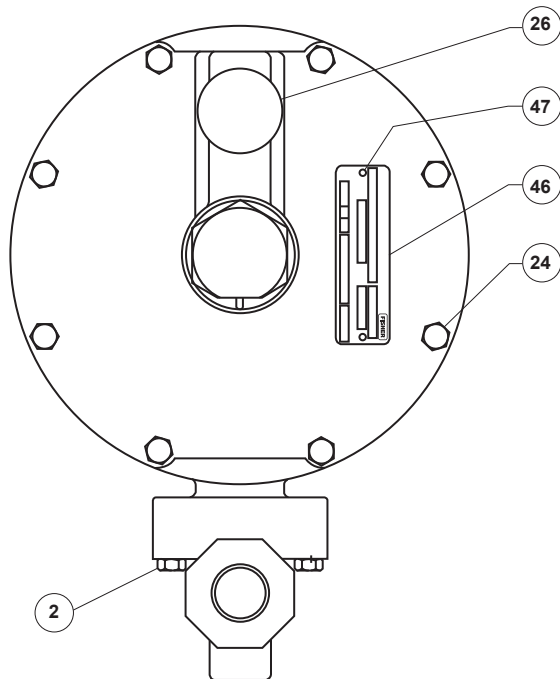
1. Standard assembly for stainless steel construction; 1/32 in. / 0.8 mm thick diaphragm and 1-3/4 in. / 45 mm diaphragm plate diameter.  
 2. Standard assembly for stainless steel construction; 1/32 in. / 0.8 mm thick diaphragm and 1-1/2 in. / 38 mm diaphragm plate diameter.  
 3. Should only be used as the intermediate reduction pilot on the Type EZR worker/monitor systems.

# Type EZR

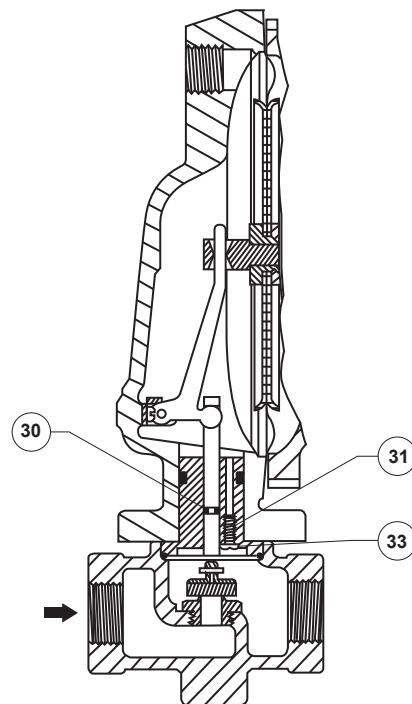


B2631

TYPE 161AY



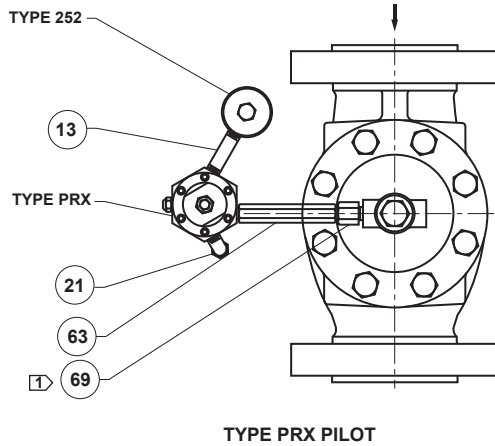
B2632



B2631

TYPE 161AYM

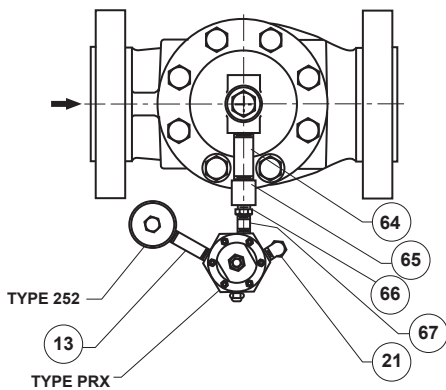
Figure 20. Types 161AY and 161AYM Pilots



40C1205

NOTE:  
 ① NPS 4 / DN 100 BODY ONLY

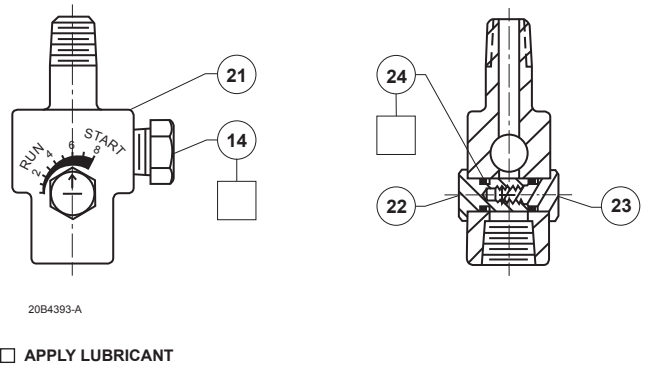
MOUNTING FOR NPS 1 THROUGH 4 /  
 DN 25 THROUGH 100 TYPE EZR REGULATOR



GE18431

TYPE PRX PILOT

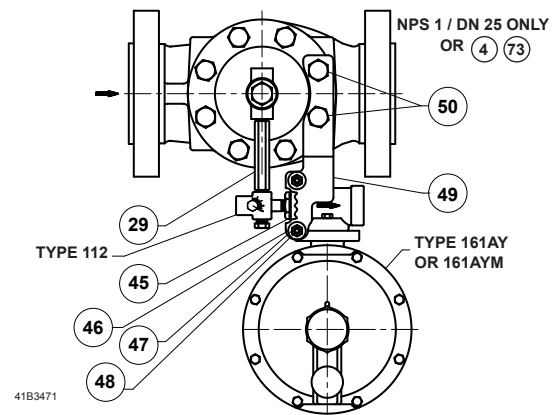
MOUNTING FOR NPS 6 AND 8 / DN 150 AND 200  
 TYPE EZR REGULATOR



20B4393-A

□ APPLY LUBRICANT

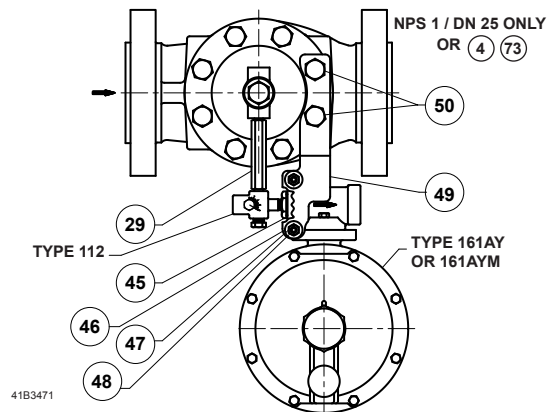
Figure 21. Type 112 Restrictor



41B3471

TYPE 161AY PILOT

MOUNTING FOR NPS 1 THROUGH 6 /  
 DN 25 THROUGH 150 TYPE EZR REGULATOR



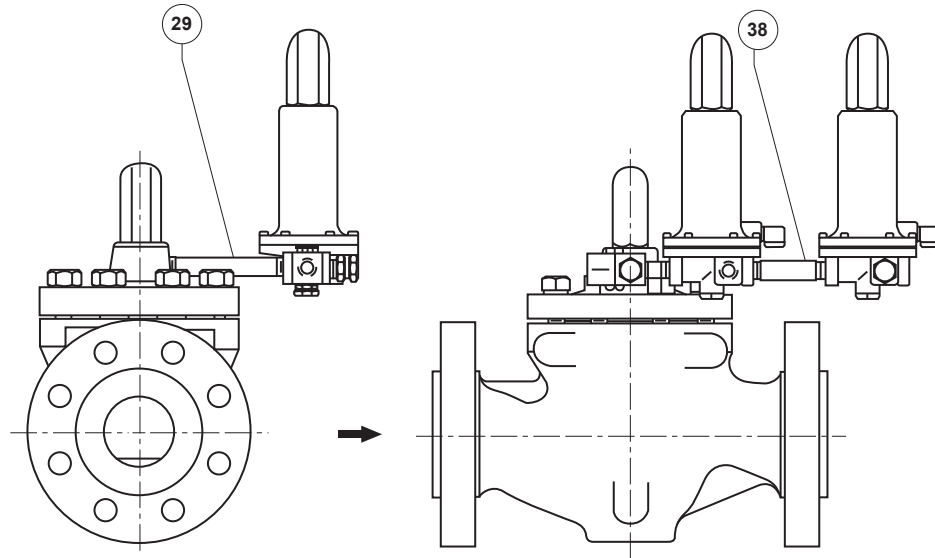
41B3471

TYPE 161AY PILOT

MOUNTING FOR NPS 8 / DN 200  
 TYPE EZR REGULATOR

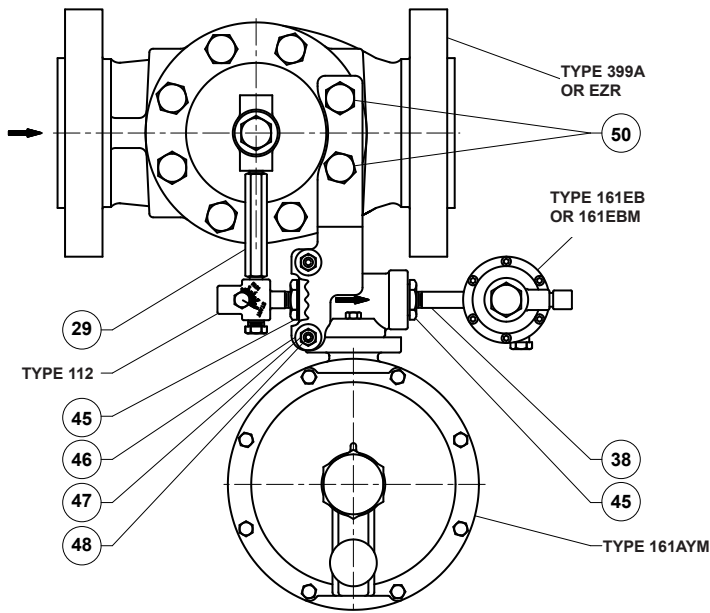
Figure 22. Types PRX and 161AY Pilot Mounting Parts

# Type EZR



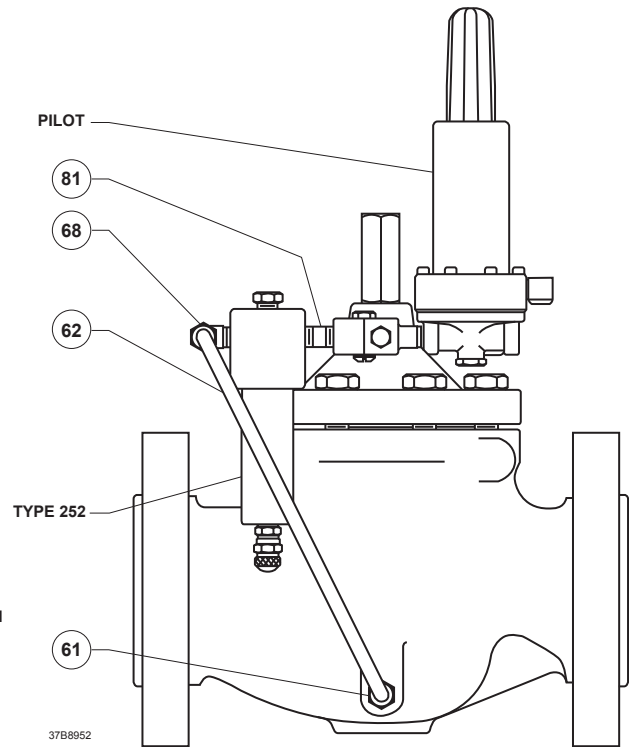
B2612

**Figure 23.** Pounds to Pounds (161EB Series Pilots) Working Monitor Mounting Parts



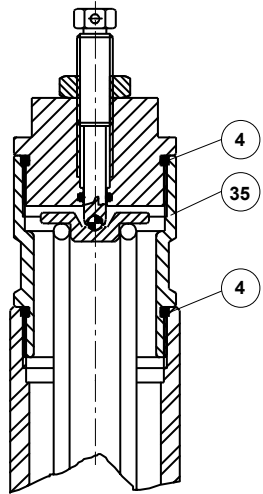
41B5009

**Figure 24.** Pounds to Inches (161AY/161EB Series Pilots) Monitor System Mounting Parts

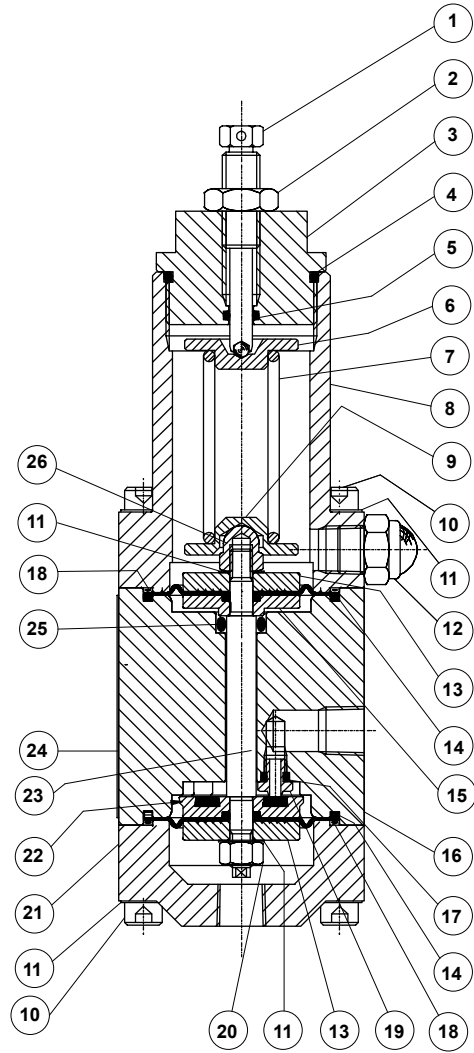


37B8952

**Figure 25.** Pre-piped Type EZR with Type 161EB Pilot, Type 112 Restrictor and Type 252 Pilot Supply Filter

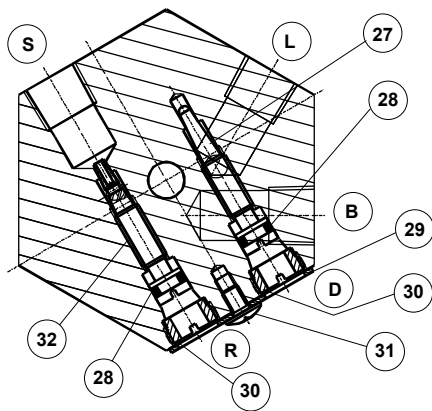


TYPE PRX/120-AP OR PRX/125-AP

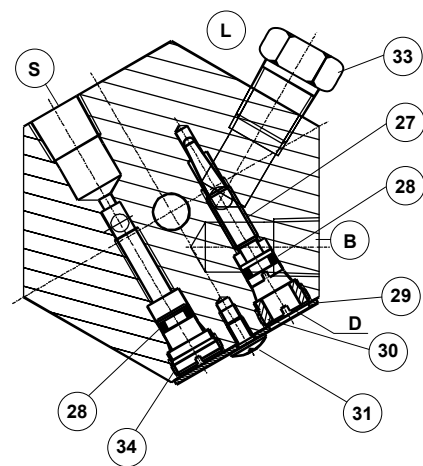


TYPE PRX/120 OR PRX/125

S - SUPPLY PORT  
 B - BLEED PORT  
 L - LOADING PORT  
 A - SENSING PORT  
 D - DAMPER  
 R - RESTRICTOR



TYPE PRX/120 OR PRX/120-AP




TYPE PRX/125 OR PRX/125-AP

Figure 26. PRX Series Pilot Assembly

 [Webadmin.Regulators@emerson.com](mailto:Webadmin.Regulators@emerson.com)

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