

English - August 2018

Introduction

This installation guide provides instructions for installation, startup and adjustment. To receive a copy of the Instruction Manual, contact your local Sales Office or view a copy at www.fisher.com. For further information refer to: 161 Series Instruction Manual, D103232X012.

PED/PE(S)R Categories

This product may be used as a safety accessory with pressure equipment in the following categories. It may also be used outside of these Directives using Sound Engineering Practice (SEP) per table below. For information on the current PED/PE(S)R revision, see Bulletin: [D103053X012](#).

TYPE	PRODUCT SIZE	CATEGORY
161EB	NPS 1/4	SEP
161AY	DN 15 / NPS 1/2	

Specifications

Outlet (Control) Pressure Ranges

See Table 1

Proportional Bands

See Table 1

Maximum Inlet Pressures⁽¹⁾

161, 161M, 161EB, 161EBH, 161EBM or 161EBHM:

103 bar / 1500 psig

161AY, 161AYM or 161AYW: 10.3 bar / 150 psig

Pilot Flow Coefficients

See Table 2

Options

Type 252 Pilot supply filter

Pilot Sping Case Vent

1/4 NPT (internal)

Installation



WARNING

Only qualified personnel shall install or service a relief valve/backpressure regulator. Relief valves and backpressure regulators should be installed, operated and maintained in accordance with international and applicable codes and regulations and Emerson Process Management Regulator Technologies, Inc. instructions.

If the regulator vents fluid or a leak develops in the system, it indicates that service is required. Failure to take the regulator out of service immediately may create a hazardous condition.

Personal injury, equipment damage, or leakage due to escaping fluid 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 the Specifications section, 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 result in personal injury and property damage due to escaping fluid. To avoid such injury and damage, install the regulator in a safe location.

Table 1. Outlet (Control) Pressure Ranges and Proportional Bands

PILOT TYPE	OUTLET (CONTROL) PRESSURE RANGE		PROPORTIONAL BAND ⁽¹⁾⁽²⁾⁽³⁾	
	bar	psig	bar	psig
161 or 161M	0.34 to 1.03	5 to 15	0.14	2
	0.69 to 8.62	10 to 125	0.14	2
	8.3 to 20.7	120 to 300	0.41	6
161AY, 161AYM or 161AYW	15 to 37 mbar ⁽⁴⁾	6 to 15 in. w.c. ⁽⁴⁾	2 mbar	1 in. w.c
	0.03 to 0.08 ⁽⁵⁾	0.5 to 1.2 ⁽⁶⁾	2 mbar	1 in. w.c
	0.08 to 0.17 ⁽⁶⁾	1.2 to 2.5 ⁽⁶⁾	0.03	0.5
	0.17 to 0.31	2.5 to 4.5	0.03	0.5
161EB or 161EBM	0.31 to 0.48	4.5 to 7	0.03	0.5
	0.34 to 1.03	5 to 15	0.03	0.5
	0.69 to 2.76	10 to 40	0.03	0.5
	2.07 to 5.17	30 to 75	0.04	0.6
	4.83 to 9.65	70 to 140	0.09	1.3
161EBH or 161EBHM	8.96 to 13.8	130 to 200	0.10	1.5
	13.8 to 24.1	200 to 350	0.21	3
	17.2 to 31.0	250 to 450	0.24 ⁽⁷⁾	3.5 ⁽⁷⁾
	27.6 to 48.2	400 to 700	0.48 ⁽⁷⁾	7 ⁽⁷⁾

1. Proportional band includes outlet pressure drop plus hysteresis (friction), but does not include lockup.

2. Proportional band was determined with a pressure drop ranging from 3.4 to 10.3 bar / 50 to 150 psig. Approximately double the proportional band if the pressure drop is less than 3.4 bar / 50 psig.

3. With Type 112 restrictor set on 2.

4. The spring ranges for the Type 161AYW is 7.5 to 30 mbar / 3 to 12 in. w.c.

5. The spring ranges for the Type 161AYW is 27 to 62 mbar / 11 to 25 in. w.c.

6. The spring ranges for the Type 161AYW is 0.06 to 0.17 bar / 0.9 to 2.5 psig.

7. Proportional band was determined with a pressure drop ranging from 6.9 to 20.7 bar / 100 to 300 psig. Approximately double the proportional band if the pressure drop is less than 6.9 bar / 100 psi.

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

161 Series

Table 2. Pilot Flow Coefficients

161AY SERIES				161EB SERIES			
Orifice Size	C _g	C _v	C _i	Orifice Size	C _g	C _v	C _i
2.4 mm / 3/32 in.	6.9	0.20	35	3.18 mm / 1/8 in.	8.5	0.28	30.4
3.2 mm / 1/8 in.	12.3	0.35	35				
6.4 mm / 1/4 in.	50	1.43	35				

Clean out all pipelines before installation of the regulator and check to be sure the regulator has not been damaged or has collected foreign material during shipping. For NPT bodies, apply pipe compound to the external pipe threads. For flanged bodies, use suitable line gaskets and approved piping and bolting practices. Install the regulator in any position desired, unless otherwise specified, but be sure flow through the body is in the direction indicated by the arrow on the body.

Note

It is important that the regulator be installed so that the vent hole in the spring case is unobstructed at all times. For outdoor installations, the regulator should be located away from vehicular traffic and positioned so that water, ice and other foreign materials cannot enter the spring case through the vent. Avoid placing the regulator beneath eaves or downspouts and be sure it is above the probable snow level.

Overpressure Protection

The recommended pressure limitations are stamped on the regulator nameplate. Some type of overpressure protection is needed if the actual inlet pressure exceeds the maximum operating outlet pressure rating. Overpressure protection should also be provided if the regulator inlet pressure is greater than the safe working pressure of the downstream equipment.

Regulator operation below the maximum pressure limitations does not preclude the possibility of damage from external sources or debris in the line. The regulator should be inspected for damage after any overpressure condition.

Startup

The regulator is factory set at approximately the midpoint of the spring range or the pressure requested, so an initial adjustment may be required to give the desired results. With proper installation completed and relief valves properly adjusted, slowly open the upstream and downstream shutoff valves.

Adjustment

To change the outlet pressure, remove the closing cap or loosen the locknut and turn the adjusting screw clockwise to increase outlet pressure or counterclockwise to decrease pressure. Monitor the outlet pressure with a test gauge during the adjustment. Replace the closing cap or tighten the locknut to maintain the desired setting.

Taking Out of Service (Shutdown)



WARNING

To avoid personal injury resulting from sudden release of pressure, isolate the regulator from all pressure before attempting disassembly.

Parts List

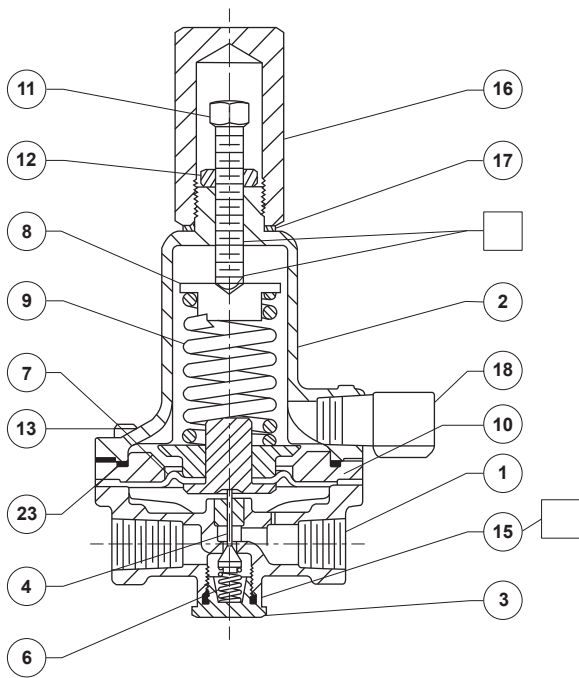
161 and 161EB Series Pilots (Figures 1 through 3)

Key	Description
1	Body Assembly
2	Spring Case
3	Body Plug
4*	Valve Plug
6	Plug Spring
7*	Diaphragm Assembly
8	Upper Spring Seat
9	Control Spring
10	Diaphragm Limiter
11	Adjusting Screw
12	Locknut
13	Machine Screw (6 required)
14	Pipe Plug
15	Body Plug O-ring
16	Closing Cap
17*	Closing Cap Gasket
18	Type Y602-12 Vent Assembly
19*	Stem Guide Seal Assembly, Types 161M, 161EBM and 161EBHM
22	O-ring, Types 161M, 161EBM and 161EBHM
23	O-ring, Types 161, 161M and 161EBHM
26	Gauge, Type 161EB
38	Lower Spring Seat, Types 161EB and 161EBM

Types 161AY, 161AYM and 161AYW Pilots (Figure 4)

Key	Description
1	Body
2	Cap Screw (2 required)
3	Spring Case Assembly
4	Lower Casing
5	Orifice
6	Control Spring
7	Diaphragm Head
8	Pusher Post
10*	Diaphragm
11*	Body Seal
12*	Insert Seal
13*	Disk Assembly
14	Stem
15*	Cotter Pin (Types 161AY and 161AYM only)
16	Lever Assembly
17	Machine Screws (2 required)
18	Guide Insert
21	Hex Nut
22	Closing Cap
23	Hex Nut (8 required)
24	Cap Screw (8 required)
25	Closing Cap Gasket, for steel closing cap
26	Vent Assembly
30*	Stem Seal O-ring (Type 161AYM only)
31*	Throat Seal (Type 161AYM only)
33*	Machine Screw (Type 161AYM only)
35	Adjusting Screw
37	Spring Holder
38	Machine Screw
39	Overpressure Spring
40	Pusher Post Connector
46	Nameplate
47	Drive Screw (2 required)
48*	Post Seal

*Recommended Spare Part

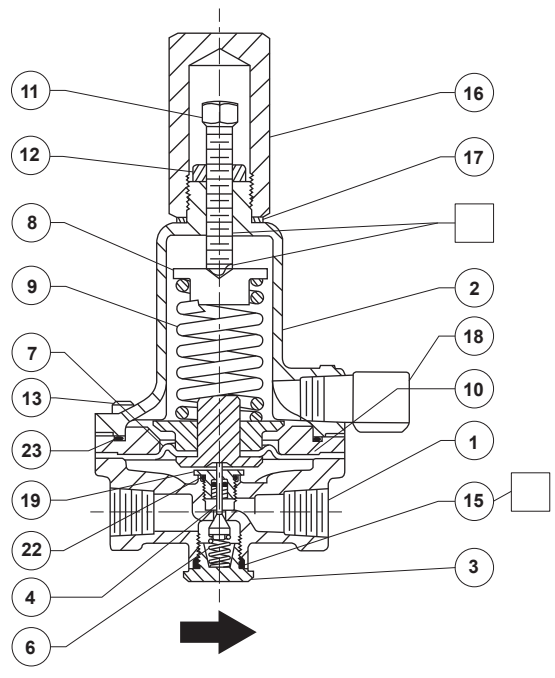


TYPE 161

32B0707

□ APPLY LUBRICANT
PARTS NOT SHOWN: KEY 14

Figure 1. Type 161 Monitor Pilot Assembly

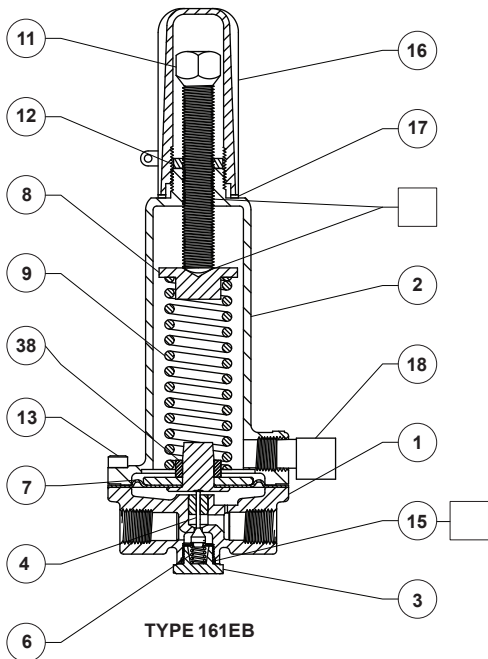


TYPE 161M

32B0708_D

□ APPLY LUBRICANT

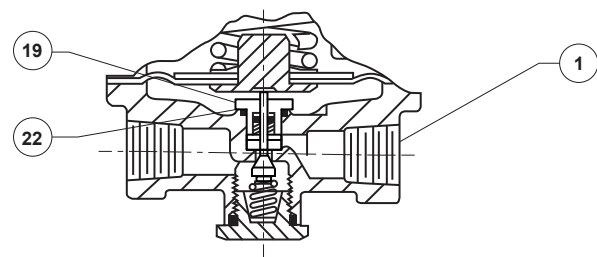
Figure 2. Type 161M Monitor Pilot Assembly



TYPE 161EB

37B1208

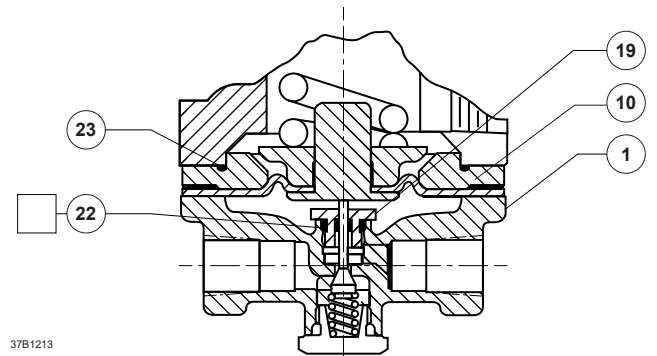
□ APPLY LUBRICANT
PARTS NOT SHOWN: KEYS 10, 14 AND 26



TYPE 161EBM

37B2946_B

37B1213



TYPE 161EBHM

Figure 3. 161EB Series Monitor Pilot Assemblies

Key	Description
49*	Connector Seal
50	Backup Ring
51	Washer (Type 161AYW only)
52	Spring (Type 161AYW only)
53*	O-ring (Type 161AYW only)

Key	Description
54*	Groove Pin (Type 161AYW only)
55	Restriction (Types 161AY and 161AYM only)
56	Baffle Plate (Types 161AY and 161AYM only)
57*	Bleed Assembly (Type 161AYW only)

*Recommended Spare Part

161 Series

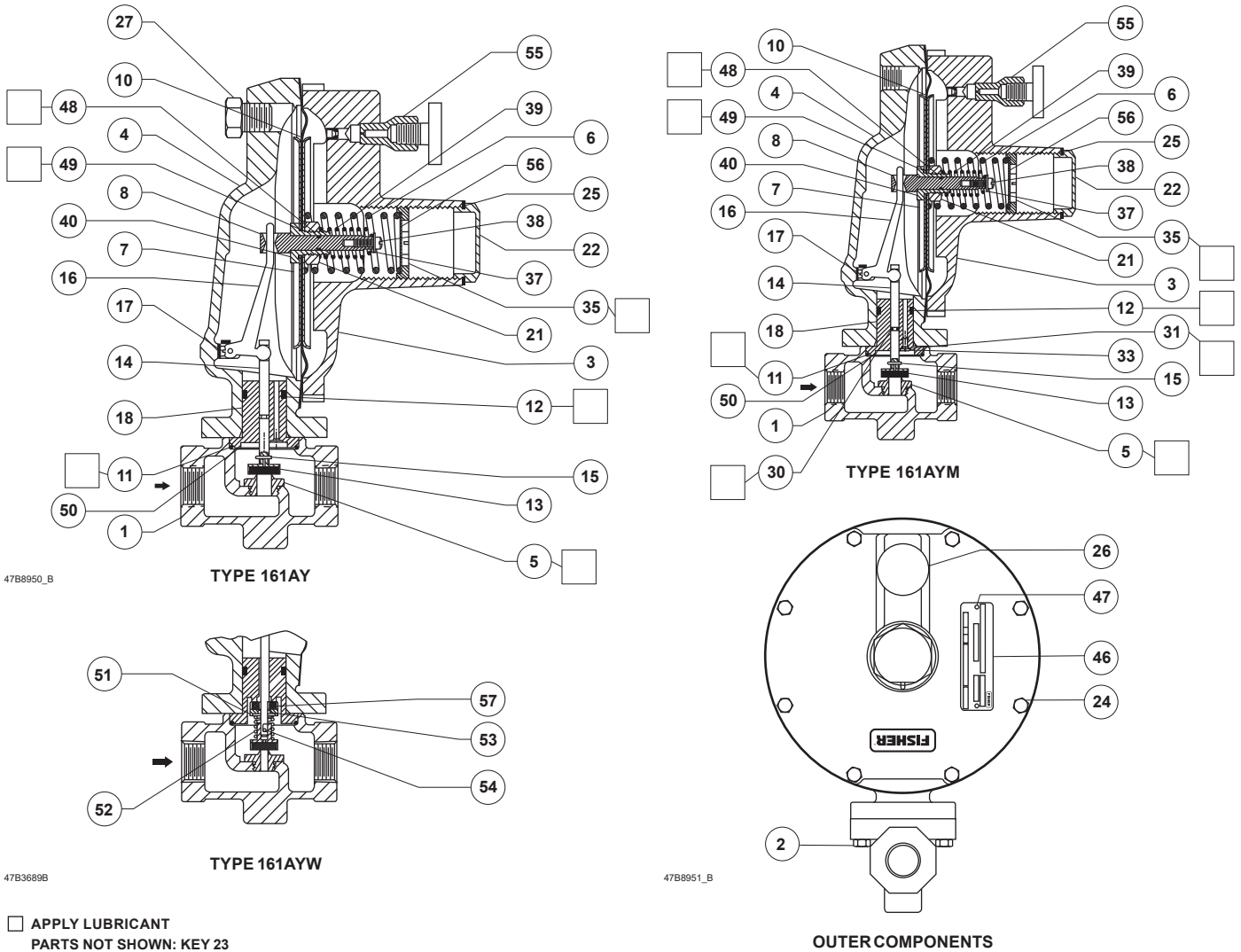


Figure 4. 161AY Series Monitor Pilot Assembly

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For further information on the current PED/PE(S)R revision see Bulletin: [D103053X012](#) or scan the QR code.

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