

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 Type 99 Instruction Manual, D100260X012.

PED Category

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](#).

PRODUCT SIZE	PED LIMITATION	CATEGORY
DN 50 / NPS 2	19.0 bar / 275 psig	I

Specifications

Available Configurations

Type 99L - Type 99 with Type 61L pilot which has 5 mbar to 1.4 bar / 2 in. w.c. to 20 psig pressure range.

Type 99LD - Type 99 with Type 61LD pilot which has a narrower proportional band than the standard Type 61L pilot.

Type 99LE - Type 99 with Type 61LE pilot which has a broader proportional band than the standard Type 61L pilot.

Type 99H - Type 99 with Type 61H pilot which has 0.69 to 4.5 bar / 10 to 65 psig pressure range.

Type 99HP - Type 99 with Type 61HP pilot has 2.4 to 6.9 bar / 35 to 100 psig pressure range.

Body Size and End Connection Styles

DN 50 / NPS 2 body with NPT, CL125 FF, CL150 RF, CL250 RF, CL300 RF end connections

Maximum Allowable Inlet Pressure⁽¹⁾

11.0 bar / 160 psig with Type 61LD pilot;
27.6 bar / 400 psig with Type 61L, 61LE or 61H pilot
69.0 bar / 1000 psig with Type 61HP pilot, along with Type 1301F pilot supply regulator and Type H110 relief valve (13 mm / 1/2 in. orifice only)

Outlet (Control) Pressure Ranges⁽¹⁾

See Table 1

Maximum Allowable Pressure Drop⁽¹⁾

See Table 2

Maximum Actuator Pressures⁽¹⁾

Operating: 6.9 bar / 100 psig

Emergency: 7.6 bar / 110 psig

Maximum Pilot Spring Case Pressure for Pressure Loading⁽¹⁾⁽²⁾

Types 61L, 61LD and 61LE: 3.4 bar / 50 psi with special steel closing cap

Types 61H and 61HP: 6.9 bar / 100 psi

Minimum Differential Pressure Required for Full Stroke

See Table 2

Maximum Rated Travel

6.4 mm / 1/4 in.

Temperature Capabilities⁽¹⁾

Nitrile (NBR)/Neoprene (CR)/Nylon (PA):

-29 to 82°C / -20 to 180°F

Fluorocarbon (FKM): -18 to 149°C / 0 to 300°F

Installation



WARNING

Only qualified personnel should install or service a regulator. 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.

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

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

2. For stability or overpressure protection, a pilot supply regulator may be installed in the pilot supply tubing between the main valve and pilot.

Type 99

Table 1. Outlet Control Pressure Ranges

PILOT TYPE	MAXIMUM PILOT SUPPLY PRESSURE		OUTLET (CONTROL) PRESSURE RANGES		PILOT CONTROL SPRING				
	bar	psig	bar	psig	Color Code	Wire Diameter		Free Length	
						mm	In.	mm	In.
61L	27.6	400	5 to 10 mbar ⁽¹⁾ 7 to 30 mbar ⁽¹⁾	2 to 4 in. w.c. ⁽¹⁾ 3 to 12 in. w.c. ⁽¹⁾	Orange	1.83	0.072	96.0	3.78
61LD	11.0	160	0.02 to 0.14 0.07 to 0.35 0.14 to 0.69 0.35 to 1.0 0.69 to 1.4	0.25 to 2 1 to 5 2 to 10 5 to 15 10 to 20	Unpainted	2.03	0.080	76.2	3.00
					Red	2.77	0.109	69.9	2.75
					Yellow	3.61	0.142	69.9	2.75
					Blue	4.37	0.172	73.2	2.88
					Brown	4.75	0.187	77.0	3.03
61LE	27.6	400			Green	5.26	0.207	79.5	3.13
61H	27.6	400	0.69 to 4.5	10 to 65	Green stripe	9.22	0.363	152	6.00
61HP	41.4	600	2.4 to 6.9	35 to 100	Blue	5.08	0.200	42.9	1.69

1. Type 61LD pilot only.

Table 2. Maximum Allowable Pressure Drop and Minimum Differential Pressures

MAXIMUM ALLOWABLE PRESSURE DROP		MAIN VALVE SPRING				MINIMUM DIFFERENTIAL PRESSURE FOR FULL STROKE		DISK MATERIAL	MAXIMUM ORIFICE SIZE ⁽¹⁾⁽⁵⁾	
bar	psig	Wire Diameter		Free Length		bar	psig		mm	In.
		mm	In.	mm	In.					
1.7	25	3.76	0.148	152	6	0.05	0.75	Nitrile (NBR), Fluorocarbon (FKM)	29	1-1/8
3.4	50	3.96	0.156	181	7.13	0.10	1.5	Neoprene (CR), Fluorocarbon (FKM)	29	1-1/8
10.3	150	4.75	0.187	168	6.63	0.21	3	Nitrile (NBR), Neoprene (CR), Fluorocarbon (FKM)	29	1-1/8
12.1 ⁽²⁾	175 ⁽²⁾	4.75	0.187	168	6.63	0.21	3	Nitrile (NBR), Neoprene (CR), Fluorocarbon (FKM)	22	7/8
17.2	250	4.75	0.187	168	6.63	0.21	3	Nitrile (NBR), Neoprene (CR), Fluorocarbon (FKM)	22	7/8
20.7	300	7.22	0.281	152	6	0.69	10	Nylon (PA)	29 ⁽³⁾	1-1/8 ⁽³⁾
27.6	400	7.22	0.281	152	6	0.69	10	Nylon (PA)	22	7/8
69.0	1000	7.22	0.281	152	6	0.69	10	Nylon (PA)	13 ⁽⁴⁾	1/2 ⁽⁴⁾

1. Can use all orifice sizes up to maximum size listed.

2. CL125 FF flanged body only.

3. 29 mm / 1-1/8 in. is the only orifice available for 20.7 bar / 300 psig maximum inlet pressure regulator.

4. 13 mm / 1/2 in. is the only orifice available for 69.0 bar / 1000 psig maximum inlet pressure regulator.

5. O-ring seat construction is only available for 22 and 29 mm / 7/8 and 1-1/8 in. orifice sizes.

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 set at the factory for the setpoint specified on the order or at the midpoint of the spring range. The allowable spring range is stamped on the nameplate. If a pressure setting other than specified is desired, be sure to change the pressure setting by following the Adjustment section. With proper installation completed and relief valves properly adjusted, slowly open the upstream and downstream shutoff valves (if applicable).

Adjustment

To change the outlet pressure, remove the closing cap or loosen the locknut and turn the adjusting screw clockwise to increase 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

Actuator and Main Body Assembly

Key	Description
1	Spring Case
2	Main Spring Seat
3	Main Spring
4	Diaphragm Rod
5	Diaphragm Rod Guide Assembly
6	Collar
7*	Pusher Post Gasket
8	Pusher Post Assembly
9	Lever
10	Diaphragm Plate
11*	Diaphragm
12	Cap Screw
13	Hex Nut
14	Union Nut
15	Body Snap Ring
16*	Body Gasket
17	Valve Body
18	Disk Holder
18*	Disk Holder Assembly for 69.0 bar / 1000 psig Maximum Inlet Regulator
19*	Disk
19*	O-ring
20*	Orifice
21*	Retainer
22	Cap Screw
25	Cotter Pin
26	Valve Carrier
27	Lever Pin
28	Retaining Ring for Brass trim
29	Lower Casing
32	Nameplate
56	Upper Casing
57*	Spring Case Gasket
58	Cap Screw
64*	O-ring (for use only with O-ring steam seal)
73	Pipe plug
75	Standard P590 Series Filter Assembly
152	Drive Screw
157	Adaptor
159	Nameplate (for use only with O-ring stem seal and extra high-pressure pilot)

Type 61HP (Extra High-Pressure Pilot)

Key	Description	Key	Description
23	Elbow	68	Spring Seat
24	Pilot Supply Tubing	82	Hex nut
30*	Diaphragm	92	Pipe Tee
31	Yoke Leg	113	Pipe Nipple
34	Connector	116	Yoke Cap
35	Cap Screw	117*	Inlet Valve Plug
36	Elbow	118	Relief Valve Cap
37	Lower Yoke Cap	119	Relief Valve Body
38	Inlet Orifice	120	Spring Seat
39	Pilot Body	121	Spring Seat Washer
40*	Diaphragm	122	Pipe Bushing
41	Diaphragm Plate	123	Cap Screw
43	Control Spring	124	Valve Spring
44	Spring Case	125	Flange Adaptor
45	Adjusting Screw	126*	Gasket
47	Cap Screw	128	Diaphragm Nut
49	Relief Valve Spring	129	Valve Spring Seat
50*	Relief Valve Plug	130	Machine Screw
52*	Bleed Orifice	131	Pipe Plug (not shown)
53	Loading Tubing	150*	Diaphragm Insert
55	Pipe Nipple	151	Pilot Nameplate
57	Adaptor	152	Drive Screw
60	Pipe plug (not shown)	153*	Seal Washer

Pilot (Low or High-Pressure Pilots) and Tubing Parts

Key	Description
23	Elbow
24	Pilot Supply Tubing, Disk or O-ring Main Valve Seat
30*	Upper Relay Diaphragm
31	Upper Relay Diaphragm Plate
33	O-ring seal
34	Connector
37	Yoke
38	Relay Orifice
39	Relay Valve Body
40*	Lower Relay Diaphragm
41	Lower Relay Diaphragm Plate
42	Spring Seat
43	Control Spring
44	Spring Case
45	Adjusting Screw
46	Closing Cap
47	Cap Screw
48*	Relay Disk Assembly
49	Bleed Valve Spring
50	Bleed Valve
51	Diaphragm Nut
52*	Bleed Orifice
53	Loading Tubing
54	Connector
55	Pipe Nipple
59	Pipe Plug (not shown)
60	Type Y602-1 Vent Assembly, low pressure pilot only
68	Spring Seat
69	Pilot Nameplate
71*	Closing Cap Gasket
72	Type Y602-1 Vent Assembly (for use only with standard high-pressure pilot spring case)
78	Handwheel (for use only with handwheel-style low-pressure pilot)
79	Machine Screw (for use only with handwheel-style low-pressure pilot)
80	Lockwasher
81*	O-ring (for use only with O-ring sealed handwheel assembly) low-pressure pilot
82	Hex nut
114*	Gasket (for use only with high-pressure pilot with spring case 1H232619012)
115	Adaptor (for use only with high-pressure pilot with spring case 1H232619012)
132	Pilot Cover (used only with complete replacement pilot assembly for field conversion)
154	Drive Screw (for use only with low-pressure pilot)

Standard P590 Series Filter Assembly

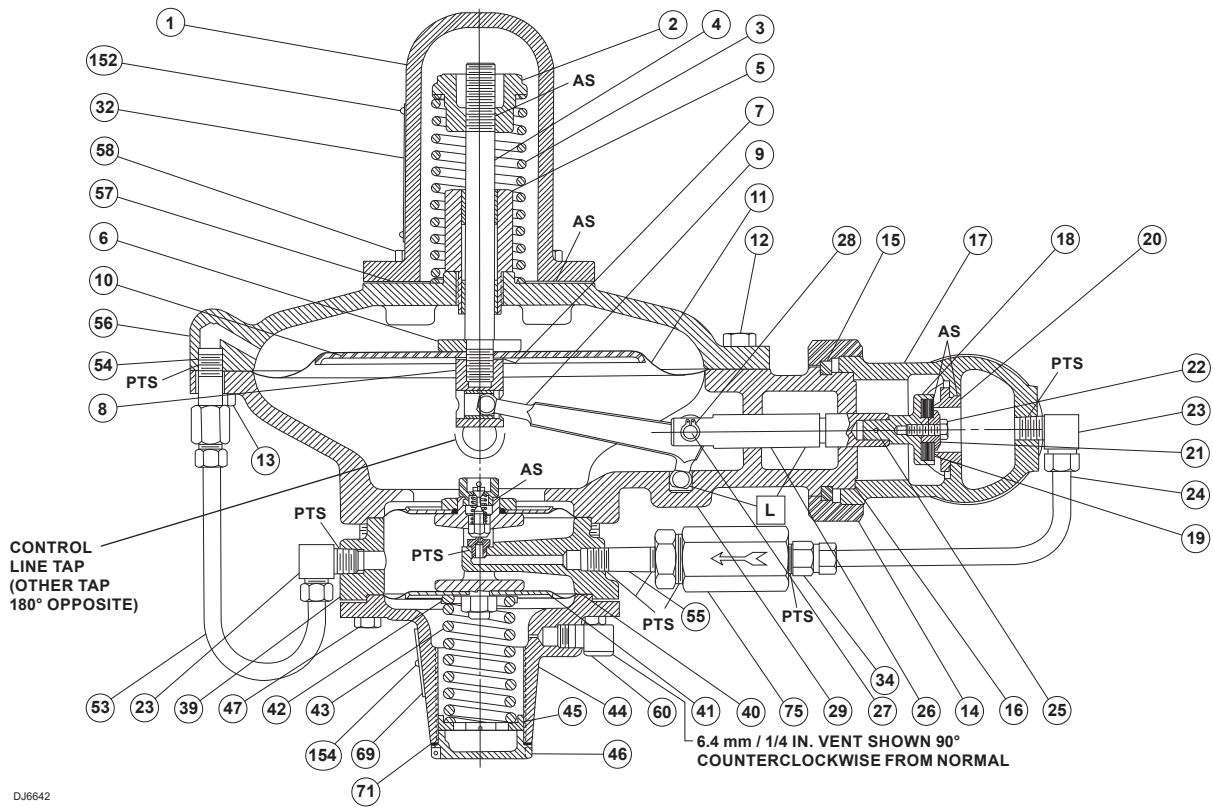
Key	Description
1	Filter Body
2*	Filter Element
3	Filter Head
4	Machine Screw
5	Washer
6*	Spring Washer
7*	Gasket

Travel Indicator Assembly

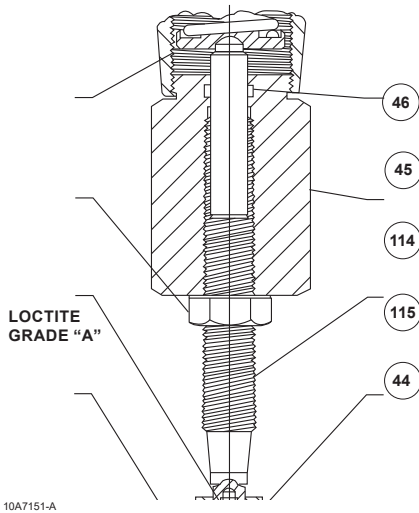
Key	Description
1	Spring Case
101	Indicator Stem Adaptor
102	Indicator Cap
103	Indicator Stem
104	Disk Nut
105	Machine Screw Nut
106	Retainer
107*	Indicator Window
108*	Gasket
109	Indicator Cover
110	Machine Screw
111*	O-ring
112	Indicator Scale

*Recommended Spare Part

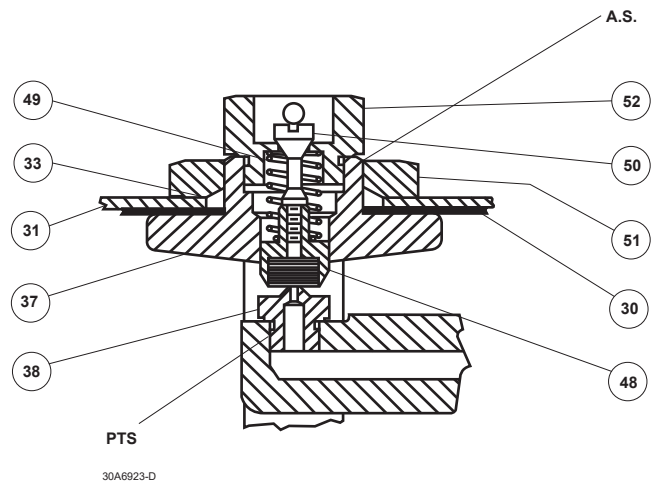
Type 99



COMPLETE REGULATOR SHOWING TYPE 61L PILOT AND DISK SEAT



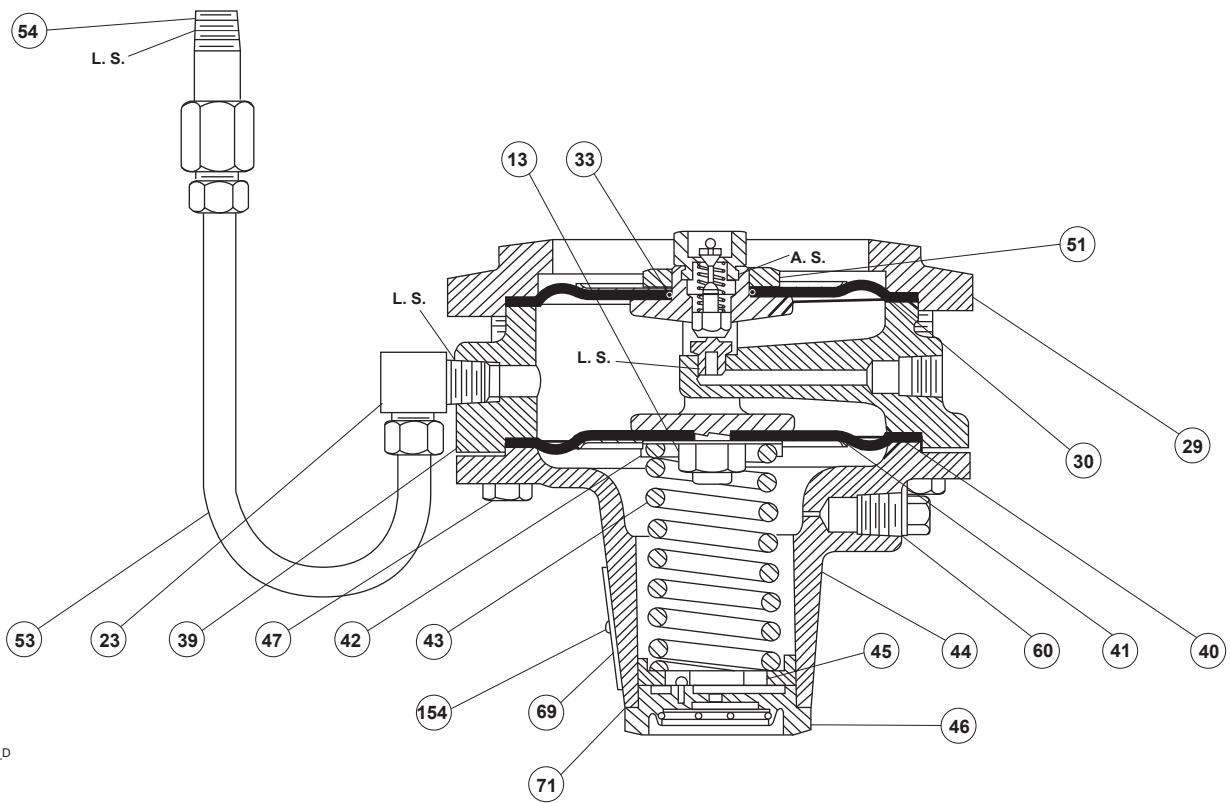
CLOSING CAP ACCESSORY FOR HIGH PRESSURE PILOT



PILOT RELAY ASSEMBLY

- APPLY SEALANT (S) / LUBRICANT (L)
- A.S. – APPLY ANTI-SEIZE COMPOUND
- PTS – APPLY PIPE THREAD SEALANT

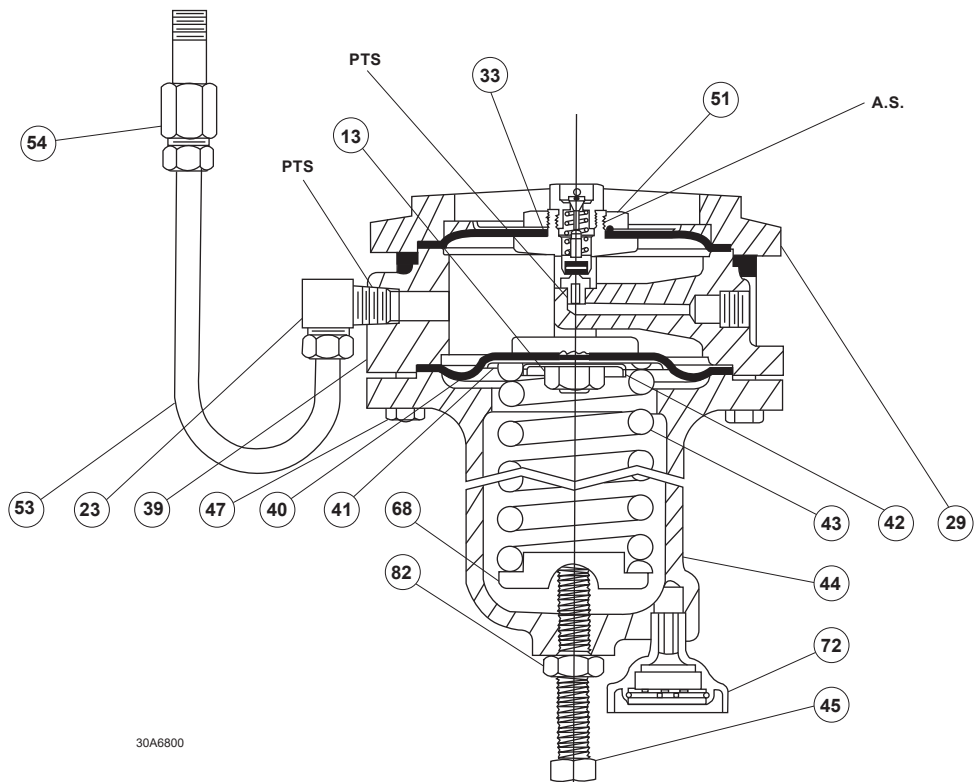
Figure 1. Type 99 Regulator with Type 61L (Low) or 61H (High-Pressure) Pilot



30A6923_D

A.S. - APPLY ANTI-SEIZE COMPOUND
L.S. - APPLY LEAD SEAL COMPOUND

LOW-PRESSURE PILOT PARTS



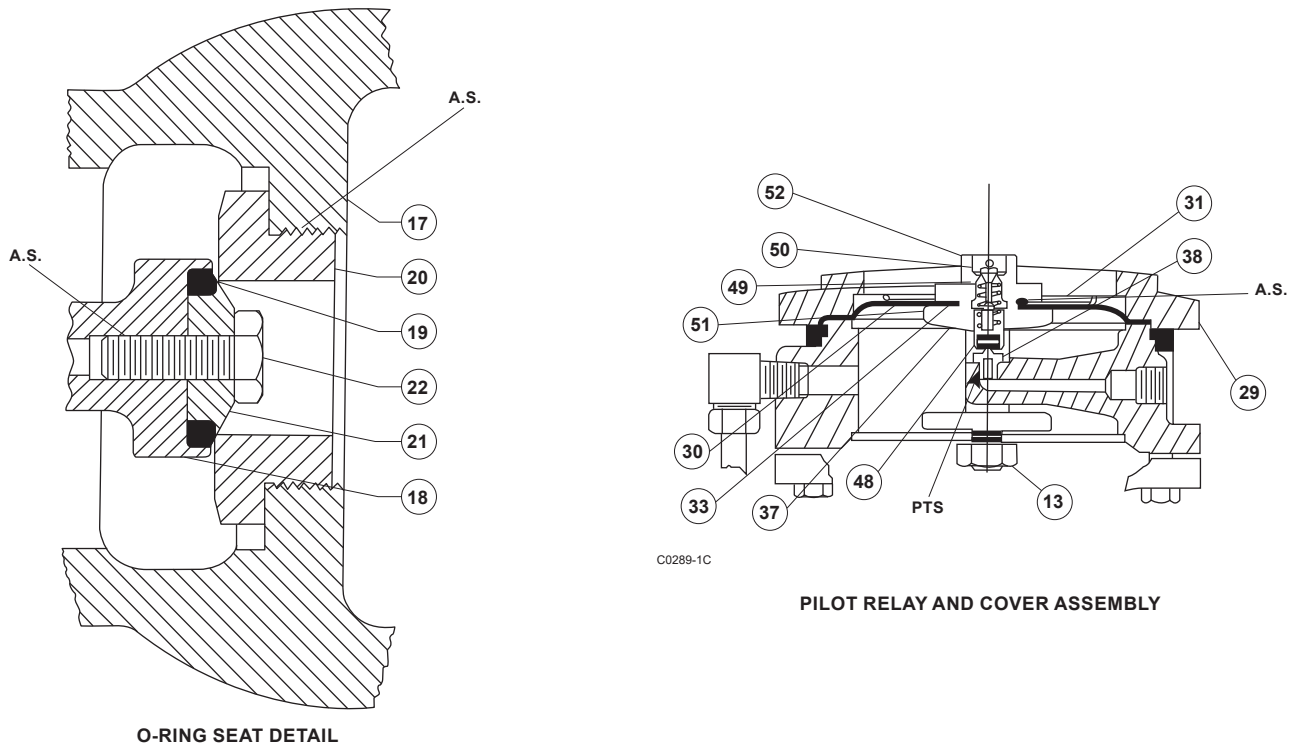
30A6800

HIGH-PRESSURE PILOT PARTS

A.S. - APPLY ANTI-SEIZE COMPOUND
PTS - APPLY PIPE THREAD SEALANT

Figure 1. Type 99 Regulator with Type 61L (Low) or 61H (High-Pressure) Pilot (continued)

Type 99



A.S. - APPLY ANTI-SEIZE COMPOUND
 PTS - APPLY PIPE THREAD SEALANT

Figure 1. Type 99 Regulator with Type 61L (Low) or 61H (High-Pressure) Pilot (continued)

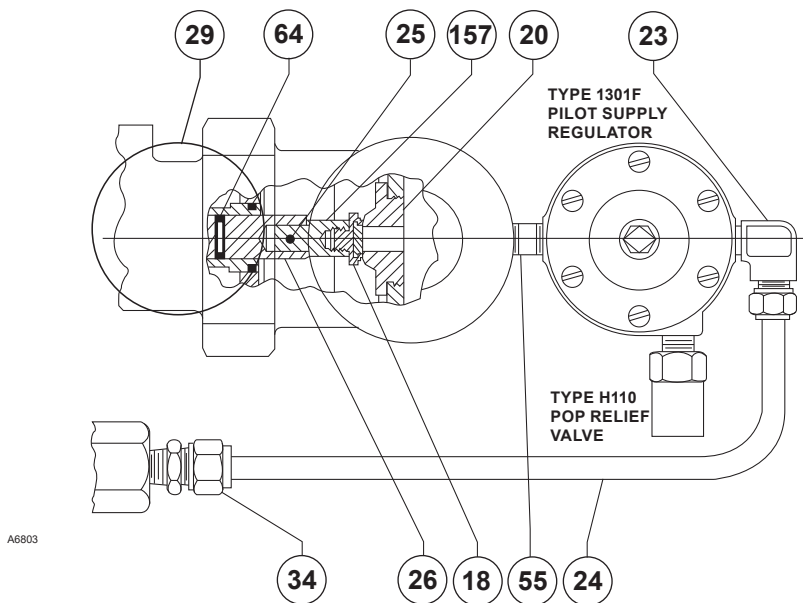
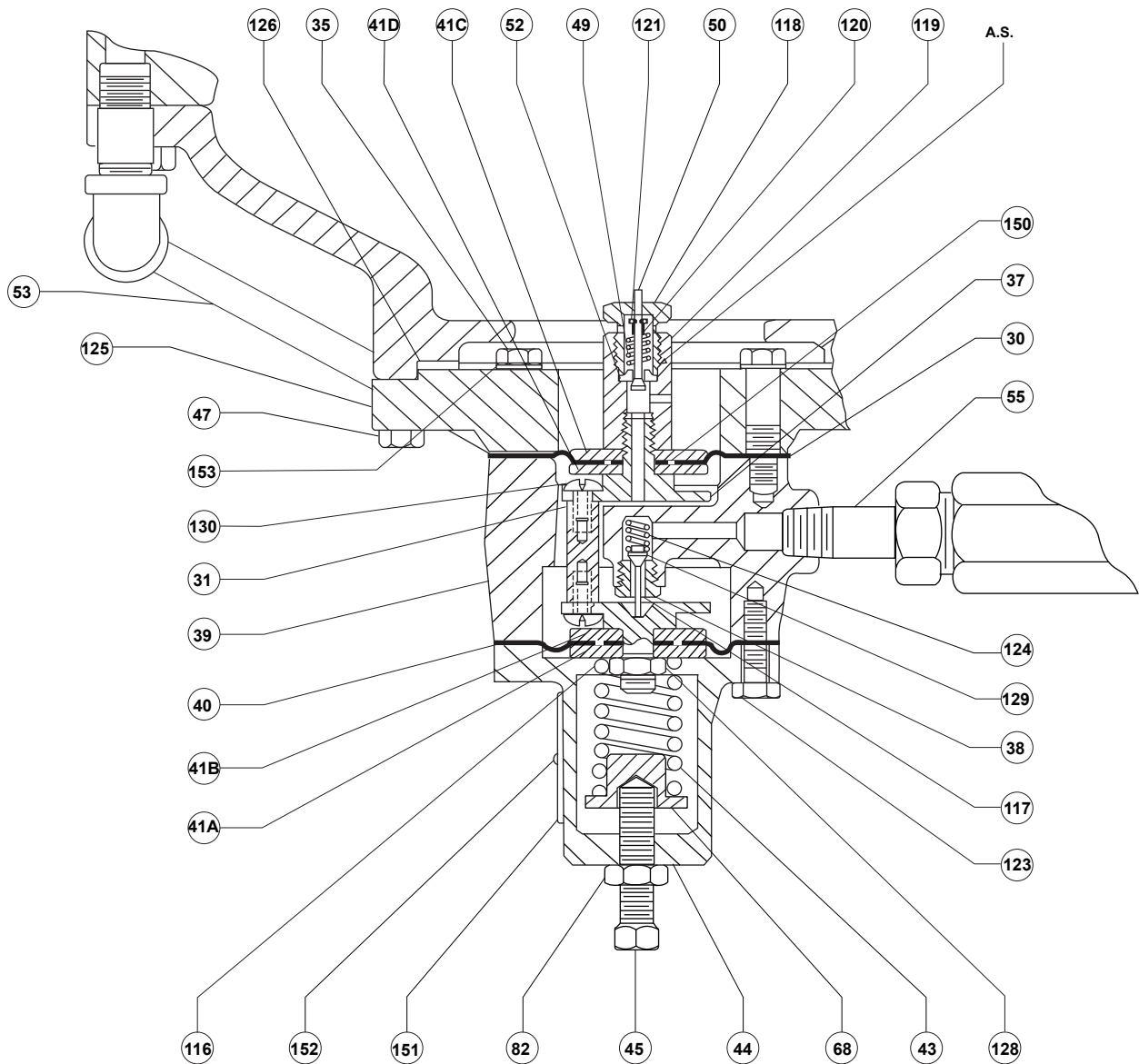


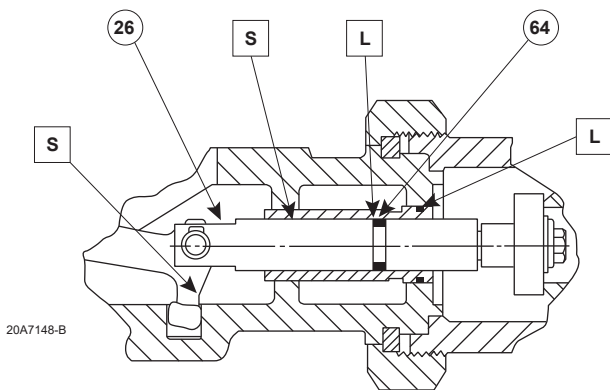
Figure 2. 69.0 bar / 1000 psig Maximum Inlet Regulator Partial Detail



54A1905

A.S. – APPLY ANTI-SEIZE COMPOUND

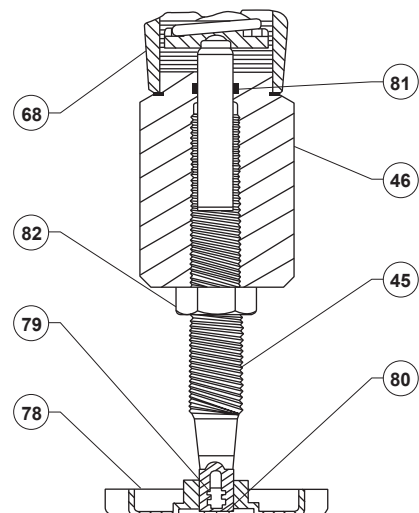
Figure 3. Type 61HP (Extra High Pressure) Pilot



20A7148-B

□ APPLY SEALANT (S) / LUBRICANT (L)

Figure 4. O-ring Stem Seal Assembly



10A7145

Figure 5. O-ring Sealed Handwheel

Type 99

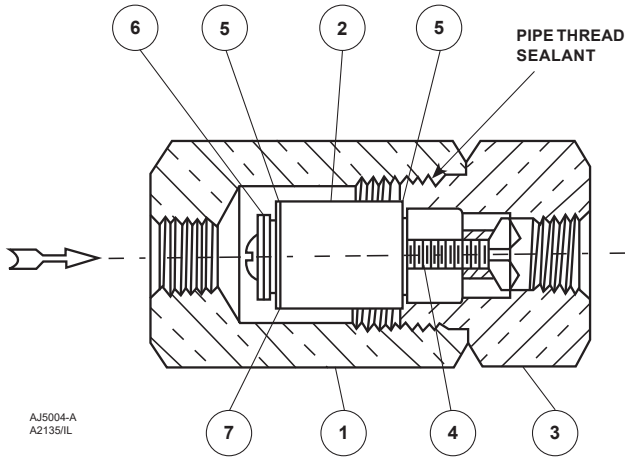


Figure 6. Standard P590 Series Filter Assembly

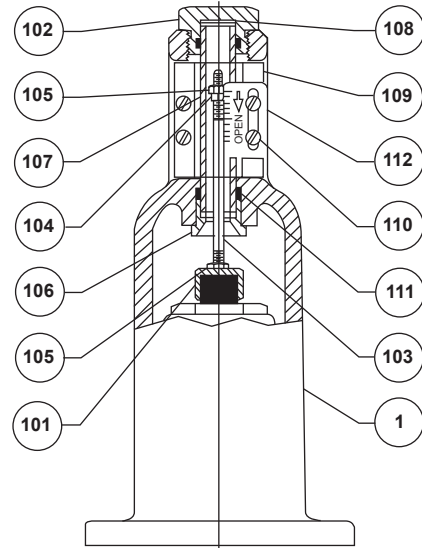


Figure 7. Travel Indicator Assembly

✉ Webadmin.Regulators@emerson.com

Facebook.com/EmersonAutomationSolutions

🔍 Fisher.com

LinkedIn.com/company/emerson-automation-solutions

Twitter.com/emr_automation

Emerson Automation Solutions

Americas

McKinney, Texas 75070 USA
T +1 800 558 5853
+1 972 548 3574

Asia Pacific

Singapore 128461, Singapore
T +65 6777 8211

Europe

Bologna 40013, Italy
T +39 051 419 0611

Middle East and Africa

Dubai, United Arab Emirates
T +971 4 811 8100

D100260X014 © 2002, 2018 Emerson Process Management Regulator Technologies, Inc. All rights reserved. 12/18.
The Emerson logo is a trademark and service mark of Emerson Electric Co. All other marks are the property of their prospective owners. Fisher™ is a mark owned by Fisher Controls International LLC, a business of Emerson Automation Solutions.

The contents of this publication are presented for informational purposes only, and while every effort has been made to ensure their accuracy, they are not to be construed as warranties or guarantees, express or implied, regarding the products or services described herein or their use or applicability. All sales are governed by our terms and conditions, which are available upon request. We reserve the right to modify or improve the designs or specifications of such products at any time without notice.

Emerson Process Management Regulator Technologies, Inc does not assume responsibility for the selection, use or maintenance of any product. Responsibility for proper selection, use and maintenance of any Emerson Process Management Regulator Technologies, Inc. product remains solely with the purchaser.



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

