299H Series

English - April 2021

Introduction

This Installation Guide provides instructions for installation, startup and adjustment of 299H Series regulators. 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: 299H Series Instruction Manual, D102684X012. Instructions and parts list for the 67C Series Instrument Supply Regulators are found in Instruction Manual D102601X012. Instructions and parts list for the P590 Series Filters are found in Instruction Manual D101555X012. Instructions and parts list for the Type VSX8 slam-shut are found in Instruction Manual D103127X012.

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*.

PRODUCT SIZE	CATEGORY	FLUID TYPE
1-1/2 NPT	I	1
DN 50 / NPS 2		

Specifications

Available Configurations

Type 299H: Pilot-operated pressure reducing regulator with a pilot integrally mounted to the actuator casing

Type 299HR: A Type 299H with a token internal relief valve to relieve minor overpressure caused by thermal expansion

Type 299HV: Same as the Type 299H with a Type VSX8 slam-shut valve which provides overpressure or overpressure and underpressure protection.

Type 299HVR: Same as the Type 299HV with an internal token relief valve.

Body Size and End Connection Styles

See Table 1

Maximum Operating Inlet Pressure by Orifice Size(1)

6.4 x 9.5 mm / 1/4 x 3/8 in. ..... 12.1 bar / 175 psig
9.5 mm / 3/8 in. ..... 12.1 bar / 175 psig
13 mm / 1/2 in. ..... 12.1 bar / 175 psig
19 mm / 3/4 in. ..... 10.3 bar / 150 psig
22 mm / 7/8 in.(3) ..... 8.6 bar / 125 psig
25 mm / 1 in.(3) ..... 6.9 bar / 100 psig
30 mm / 1-3/16 in.(3) ..... 5.5 bar / 80 psig

Maximum Casing and Emergency Outlet Pressure(1)

4.5 bar / 66 psig

Proof Test Pressure

All Pressure Retaining Components have been proof tested per Directive.

Outlet (Control) Pressure Ranges(1)(2)

See Table 2

Minimum Differential Pressure For Full Stroke

0.10 bar d / 1.5 psid

Maximum Set Pressure for Type 299HV(1)

1.1 bar / 16 psig

Maximum Set Pressure for Slam-shut Device(1)

See Table 2

Minimum and Maximum Slam-Shut Trip Pressure Ranges

Types 299HV and 299HVR: 1.45 bar / 21 psig

Temperature Capabilities(1)(4)

-29 to 66°C / -20 to 150°F

Installation

WARNING

Only qualified personnel shall 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. (Emerson) 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.

1. The pressure/temperature limits in this Installation Guide and any applicable standard or code limitation should not be exceeded.
2. For optimum performance, a pilot supply regulator may be installed in the pilot supply tubing between the main valve and pilot.
3. This orifice size is not available for Types 299HV and 299HVR.
4. Product has passed Emerson testing for lockup, relief start-to-discharge and reseal down to -40°.

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 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.

Type VSX8 Slam-shut Device

Refer to the Instruction Manual for Type VSX8 Slam-shut, document D103127X012, for Adjustment and Maintenance of the Slam-shut.

Type VSX8 Installation Startup

Note

The Type VSX8 slam-shut device can be rotated 360° for easy installation and maintenance.

Equipment installed downstream of Type VSX8 slam shut device can be damaged if the following procedure for resetting the Type VSX8 slam shut device is not followed. This equipment includes the integral Type VSX8 regulator configurations.

Before proceeding with the adjustment of the slam-shut device springs, the operator must ensure upstream and downstream valves are closed and adjusting screws are unscrewed.

With proper installation completed and downstream equipment properly adjusted, perform the following procedure while monitoring the pressure with gauges.

1. Very slowly, open the upstream block valve.
2. On a Type 299HV, the Type VSX8 is shipped in the tripped position and will need to be reset. If the Type VSX8 is OPSO only, it can be reset before starting the regulator. If the Type VSX8 is OPSO/UPSO, the regulator will need to be started and the downstream system pressurized before the Type VSX8 can be reset. See the section for Type VSX8 reset.
3. Use the following procedure to reset the Type VSX8:
   a. To properly reset the Type VSX8 slam shut after it has been tripped to the closed position, a flat-head screwdriver must be inserted into the backside of the reset button.
   b. The screwdriver should be slowly rotated to gradually pull the reset button away from the Type VSX8 device. This slow movement allows for a slow bleed of the pressure across the Type VSX8 slam shut's disk and seat area. The operator should be able to hear the pressure bleeding through the system.
   c. When the pressure has equalized and the air bleeding sound has dissipated, the reset button should be pulled completely away from the Type VSX8 slam shut device by hand until the internal shut-off mechanism has been re-latched.
   d. Once the operator feels the click of the re-latch occurring, the reset button should be pushed completely back into its original position.
4. Slowly open the hand valve (if used) in the control line. The regulator will control downstream pressure at the pilot control spring setting. See the Adjustment section following these numbered steps if changes in the setting are necessary during the start-up procedure.

Table 1. *Body Sizes and End Connection Styles*

BODY SIZE		BODY MATERIAL AND END CONNECTION STYLE		
DN	In.	Cast Iron (For Types 299H and 299HR only)	Ductile Iron	Steel (For Types 299H and 299HR only)
- - - -	1-1/4	NPT	- - - -	- - - -
- - - -	1-1/2	NPT	NPT	NPT
50	2	NPT and CL125 FF(1) flanged	NPT, CL125 FF, CL250 RF flanged and PN 10/16 flanged	NPT and CL150 RF flanged
1. This flange is available with a face-to-face dimension of 191 mm / 7.5 in. or 254 mm / 10 in.				

Table 2. *Outlet Pressure Ranges*

OUTLET (CONTROL) PRESSURE RANGE		TYPE	
mbar	In. w.c.	299H	299HR, 299HV and 299HVR
9 to 15(1)	3.5 to 6(1)	X	X
12 to 22(1)	5 to 9(1)	X	X
17 to 50(1)	7 to 20(1)	X	X
40 to 99(1)	16 to 40(1)	X	X
69 mbar to 0.22 bar	1 to 3.25 psig	X	X
0.19 to 0.41 bar	2.75 to 6 psig	X	X
0.35 to 1.1 bar	5 to 16 psig	X	X
0.97 to 2.4 bar	14 to 35 psig	X	X
2.1 to 4.1 bar	30 to 60 psig	X	X
1. Use a pilot supply regulator if actual inlet pressure varies more than ±1.4 bar / 20 psi and the published accuracy is required.			

5. Slowly open the downstream block valve.
6. Slowly close the bypass valve, if used.
7. Check all connections for leaks.

Note

The Type VSX2 is not interchangeable with the Type VSX8 module. Each slam-shut module requires a mating valve body. Both slam-shut and body can be replaced in the field. See parts list for part numbers.

299H Series Adjustment

Keys are referenced in Figure 2. The only adjustment on a 299H Series regulator is the reduced pressure setting of the pilot control spring (key 32). Remove the closing cap (key 29) and turn the adjusting screw (key 36). Turning the adjusting screw clockwise into the spring case increases the controlled or reduced pressure setting. Turning the screw counterclockwise decreases the reduced pressure setting. Always tighten the locknut (key 35) and replace the closing cap after making adjustments.

Note

It is recommended that the 299H Series regulators use a complete matching casing set that includes an upper case, a lower case and spring case in the old blank configuration or new swirl configuration. However, these parts are interchangeable with each other.

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.

The seal and warning tag contain important safety information, if removed be sure to reattach before startup.

Parts List

299H Series Regulator

Key	Description
1	Lower Casing, Types 299H, 299HV and 299HVR
2	Upper Casing, Type 299HV
3	Closing Cap
4	Spring Seat Delrin® (standard) Steel (High vibration or engine applications - used with key 93)
5	Adjustment Nut
6	Closing Spring
7	Pressure Equalization Spring
8*	Diaphragm
9*	O-ring
10	Diaphragm Post
11	Pusher Post
12	Orifice
13*	Disk
14*	O-ring
15*	O-ring
16	Valve Stem Assembly
17	Valve Body
18	Cap Screw
19	Elbow (3 required for Cast Iron or Steel bodies; 2 required for Ductile Iron Bodies)

*Recommended spare part.
Delrin® is a mark owned by E.I. du Pont de Nemours and Co.

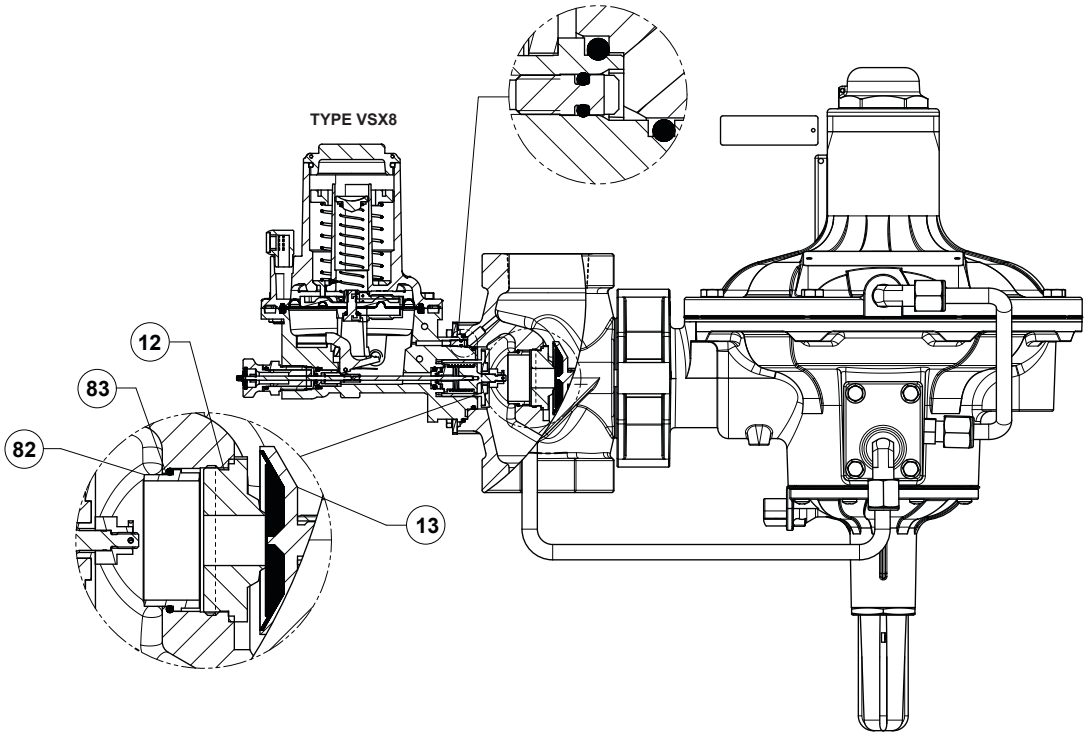
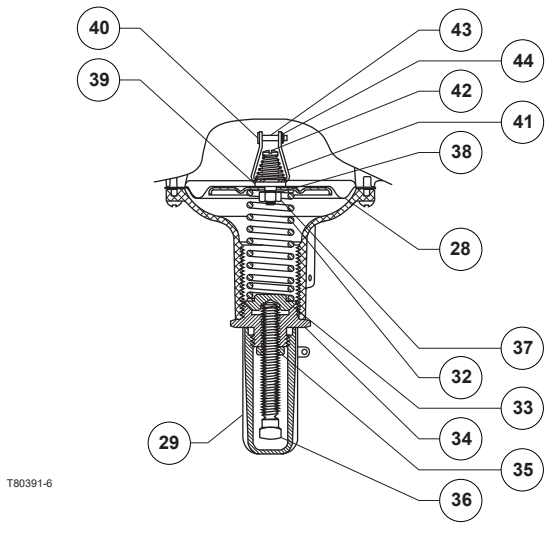


Figure 1. *Type 299HV with Type VSX8 Assembly*

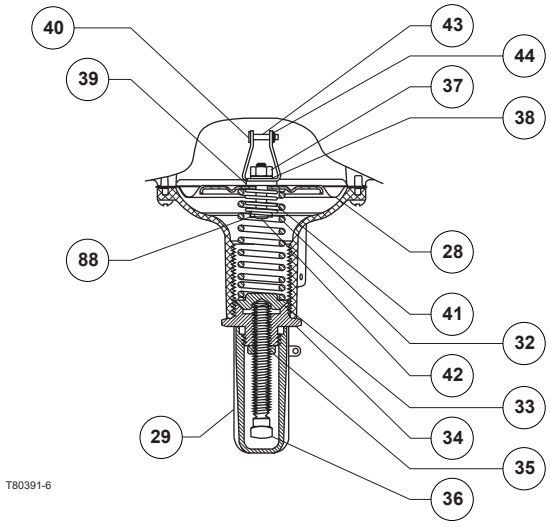
Key	Description
20	Connector
21	Pilot Supply Tubing (Without Filter)
22	Loading Tubing
23	Cap Screw
24	Machine Screw
25	Lever Pin
26	Lever
27	Vent Hood (Type Y602-12 Vent Assembly)
28	Diaphragm Assembly
29	Closing Cap
30	Machine Screw
31	Spring Case
32	Control Spring
33	Spring Seat
34	Bonnet
35	Locknut
36	Adjusting Screw
37	Hex Nut
38	Washer
39	Diaphragm Post
40	Pusher Post
41	Overtravel Spring
42	Machine Screw
43	Rivet, Flat head
44	Retaining Ring
45	Check Valve Assembly
46	Machine Screw
47	Inlet Fitting
48	Stem Assembly
49*	O-ring
50	Pilot Orifice
51	Inlet Screen
52*	Pilot Disk Assembly
53*	O-ring

Key	Description
54*	O-ring
56	Screw (2 required for External Registration; 1 required for Dual Registration)
57	Lever
58	Pipe Plug
59	Pipe Plug, Internal Registration only
61	O-ring (2 required for External Registration; 1 required for Dual Registration)
62	Drive Screw
63	Nameplate
68*	Wire Seal
69	Warning Tag
70	Bleed Restriction
72	Filter Assembly
78	Pilot Supply Tubing, Long (for constructions with filter or pilot supply option)
79	Pilot Supply Tubing, Short (for constructions with filter or pilot supply option)
80	Pad
81	Diaphragm Head
82	Insert (For Types 299HV and 299HVR only, see Figure 1)
83	O-ring (For Types 299HV and 299HVR only, see Figure 1)
84	Plate (For Types 299H and 299HR only)
85	O-ring (For Types 299H and 299HR only)
86	O-ring (For Types 299H and 299HR only)
87	Set Screw (For Types 299H and 299HR only)
88	Spring Seat (For Type 299HR only)
89	Label (For Types 299H and 299HR only)
92	Tee
93	Spring Seat Washer (high vibration and engine applications - used with key 4)
94	Plastic Plugs

*Recommended spare part.



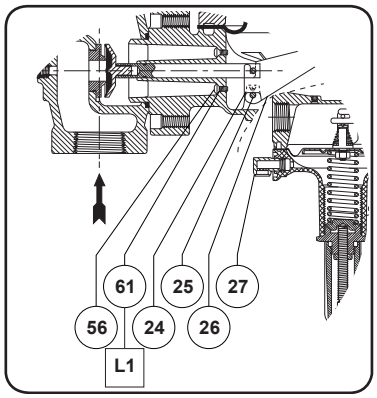
TYPE 299H PILOT WITHOUT RELIEF VALVE



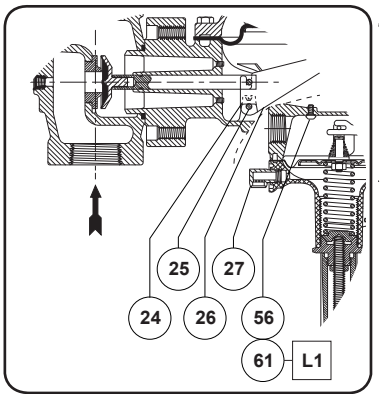
TYPE 299HR PILOT WITH TOKEN RELIEF VALVE

☐ APPLY ANTI-SEIZE COMPOUND (L2) / ADHESIVE (A)

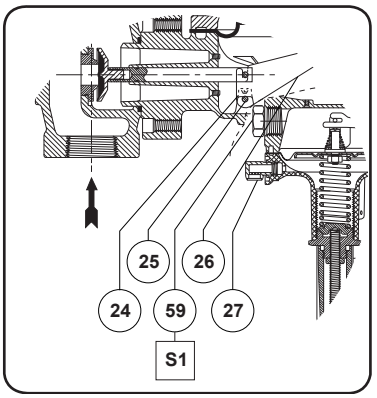
Figure 2. *299H Series Pilot Assemblies*



EXTERNAL REGISTRATION



DUAL REGISTRATION



INTERNAL REGISTRATION

☐ APPLY MULTI-PURPOSE LUBRICANT (L1) / MULTI-PURPOSE POLYTETRAFLUOROETHYLENE (PTFE) THREAD SEALANT (S1)

Figure 3. *299H Series Registration Assemblies*

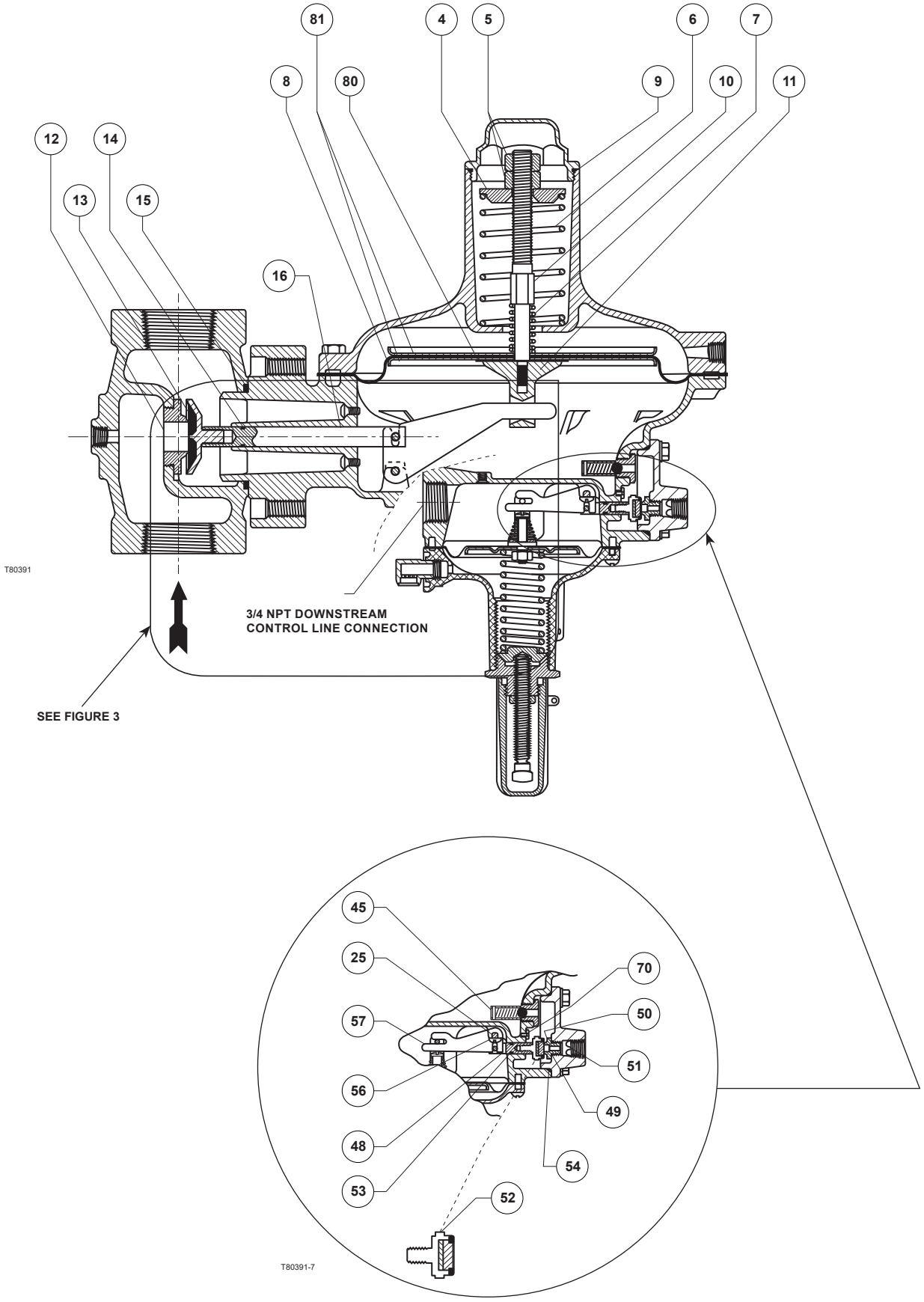
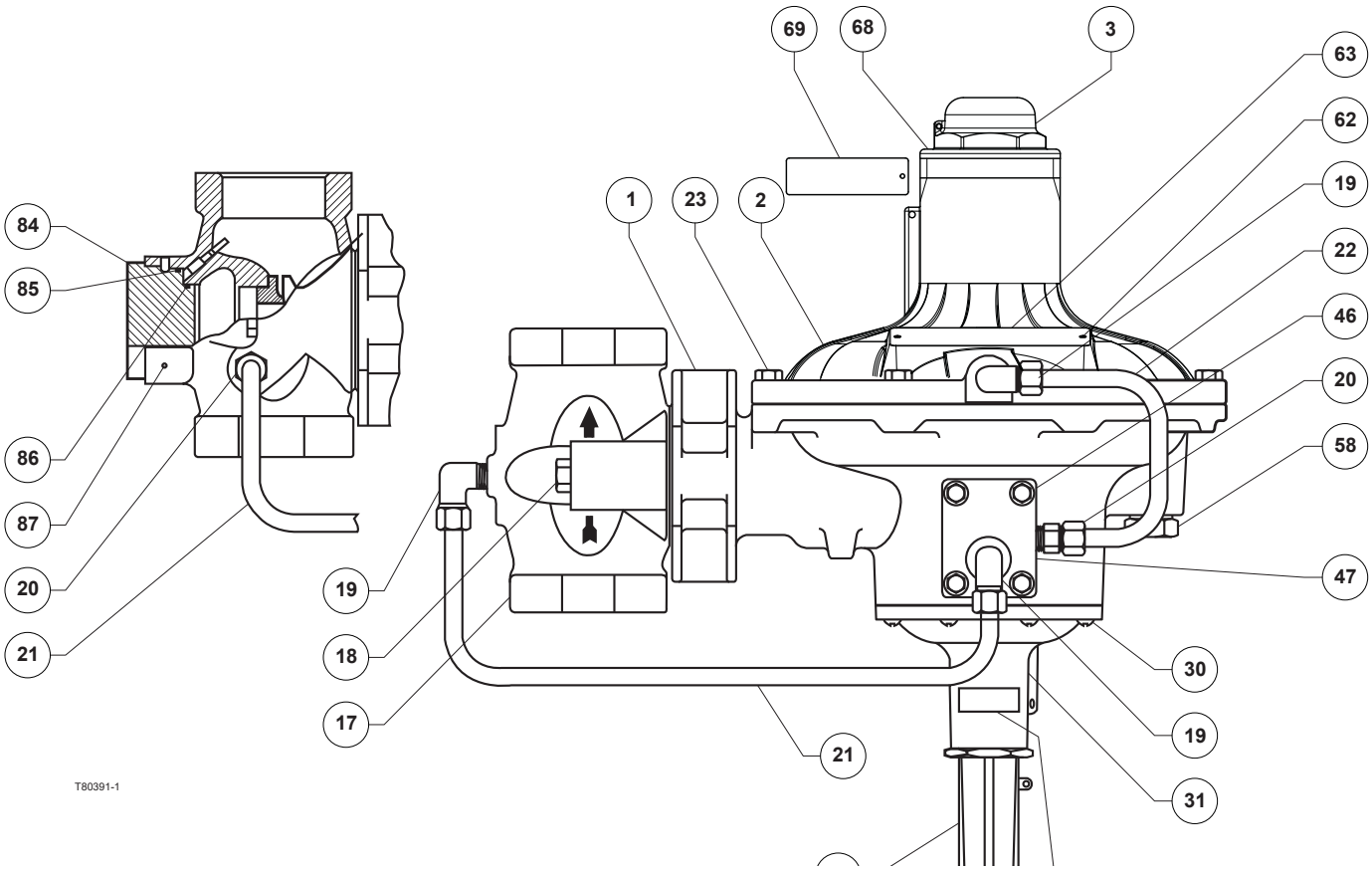


Figure 4. *299H Series Interior Assembly*



☐ APPLY ANTI-SEIZE COMPOUND (L2) / MULTI-PURPOSE (PTFE) THREAD SEALANT (S1)

Figure 5. *299H Series Exterior Assembly*

Webadmin.Regulators@emerson.com
Fisher.com
Facebook.com/EmersonAutomationSolutions
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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

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

The distinctive swirl pattern cast into every actuator casing uniquely identifies the regulator as part of the Fisher™ brand Commercial Service Regulator family and assures you of the highest-quality engineering, performance, and support traditionally associated with Fisher™ and Tartarini™ regulators. Visit www.fishercommercialservice.com to access interactive applications.

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