

LSR Series Direct-Operated Regulators

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WARNING

Failure to follow these instructions or to properly install and maintain this equipment could result in an explosion, fire 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 qualified service person to service the unit. Installation, operation and maintenance procedures performed by unqualified person may result in improper adjustment and unsafe operation. Either condition may result in equipment damage or personal injury. Only a qualified person shall install or service the regulator.



Figure 1. LSR Series Regulator

Outside North America Only

Introduction

Scope of the Manual

This manual provides specifications, installation, adjustment, maintenance instructions and parts ordering information for the LSR Series Regulators.

Only personnel qualified through training or experience should install, operate and maintain this regulator. If there are any questions concerning these instructions, contact your local Emerson Impact Partner Office before proceeding.

Specifications

The Specifications section lists the specifications for the LSR Series Direct-Operated Regulators. Factory specification is stamped on the nameplate fastened on the regulator at the factory.

Actuator Sizes

475 mm Actuator: Low pressure construction for outlet pressure range of 17.2 to 138 mbar / 0.25 to 2 psig. Maximum operating inlet pressure of 6.2 bar / 90 psig. Outlet pressure range of 138 to 340 mbar / 2 to 5 psig has a maximum operating inlet up to 8.6 bar / 125 psig. The maximum emergency inlet pressure rating is 19.7 bar / 285 psig at 38°C / 100°F⁽¹⁾.

350 mm Actuator: Medium pressure construction for outlet pressure range of 0.3 to 0.69 bar / 4.35 to 10 psig. Maximum operating inlet pressure of 8.61 bar / 125 psig. Medium Pressure for outlet range of 0.69 to 1.5 bar / 10 to 21.75 psig has a maximum operating inlet up to 19.7 bar / 285 psig. The maximum emergency inlet pressure rating is 19.7 bar / 285 psig at 38°C / 100°F⁽¹⁾.

255 mm Actuator: High pressure construction for outlet pressure range of 1.38 to 4.14 bar / 20 to 60 psig. The maximum operating inlet pressure is 19.7 bar / 285 psig with a maximum emergency inlet pressure of 19.7 bar / 285 psig at 38°C / 100°F⁽¹⁾.

Body Sizes and End Connection Styles

See Table 3

Outlet Pressure Ranges⁽¹⁾

See Table 4

Pressure Ratings⁽¹⁾

See Table 4

Maximum Outlet Pressure⁽¹⁾

See Table 5

Certifications

DVGW (EN334, EN14382)
Pressure Equipment Directive (PED)
Up to 25% Hydrogen Blend (Pending 100%)
Hydrogen Construction Available⁽³⁾

Turndown Ratio:

1000:1

Pressure Registration

External; downstream control line is required

Temperature Capabilities⁽¹⁾⁽²⁾

-29 to 66°C / -20 to 150°F
-20 to 60°C / -4 to 140°F for PED (DN 40 / 1.5 in. body size only)

Temperature Capabilities⁽¹⁾⁽²⁾ (continued)

-20 to 66°C / -4 to 150°F for PED
Lockup and Function Tested to -40°C / -40°F

Control Line Connection

Without Slam-Shut: 1/2 NPT (internal); connection will be positioned directly over body outlet (standard position) or 90 degrees right or left of standard position if specified.

With Slam-Shut: 1/2 NPT (internal) connection right or left directly over slam-shut. Can be selected or changed after shipment.

VSX8 Series Slam-Shut Controller:

1/4 NPT connection

Vent Connection

3/4 NPT (internal) vent assembly.

Approximate Weight

Body

1.5x1.5: 11.7 kg / 25.8 lbs

1.5x3: 14.5 kg / 31.9 lbs

2x2: 13.5 kg / 30.4 lbs

2x2 NPT: 10.9 kg / 24 lbs

2x4: 17.55 kg / 38.7 lbs

3x3: 48 kg / 105 lbs

3x6: 59 kg / 130 lbs

Slam-Shut Device: 7.45 kg / 16.4 lbs

475 mm Actuator:

39 kg / 86 lbs (Eye nuts included)

350 mm Actuator:

27.7 kg / 61.1 lbs (Eye nuts included)

255 mm Actuator:

20.35 kg / 44.9 lbs (Eye nuts included)

Construction Materials

Body: Gray iron (DN 50 / 2.0 in. body size only), Ductile iron and WCC Steel

Bonnet (top/bottom flanges): Carbon steel (LF2)

Case: 1.4308 Stainless steel

Stem: S17400 H1075, SA479 S20910 (for DN 40 / 1.5 in. body size Hydrogen application only)

Orifice: 304 Stainless steel

Disk: Nitrile (NBR) Inside Steel Retainer

Actuator: S355ML Structural steel

Elastomers: Nitrile (NBR)

Diaphragm: Nylon-reinforced Nitrile (NBR)

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

2. The lock up and function were tested to -40°C / -40°F. Flow performance was tested at ambient temperature.

3. Contact your Emerson Impact Partner or the local Emerson sales office for more information.

PED Categories and Fluid Group

A single LSR Regulator without Slam-shut cannot be used as a safety accessory according Pressure Equipment Directive (PED) 2014/68/EU to protect downstream pressure equipment.

According to EN 14382, only in integral strength type and Class A configuration (when both over and under pressure protections are set up), the possible built-in safety shut-off device can be classified like a safety accessory according to Pressure Equipment Directive (PED) 2014/68/EU.

Table 1. LSR Series Regulators PED Category

PRODUCT SIZE	CATEGORY	FLUID GROUP
1.5 and 2	I	1
All sizes with slam shut	IV	

The minimum PS between slam shut device valve and slam-shut controller shall be the PS of the safety accessory to comply the provisions of EN 14382 about integral strength type.

Table 2. Available Configurations

TYPE NUMBER						OPTION
L	S					
						BODY SIZE
	2					DN 50 x 50, 50 x 100 / 2 x 2, 2 x 4 in. or DN 40 x 40, 40 x 80 / 1.5 x 1.5, 1.5 x 3 in.
	3					DN 80 x 80, 80 x 150 / 3 x 3, 3 x 6 in.
						OUTLET PRESSURE CONSTRUCTION
	0					Low Pressure Applications (Outlet Pressure: 17 to 340 mbar / 0.25 to 5 psig)
	2					Medium Pressure Applications (Outlet Pressure: 0.1 to 1.53 bar / 1.5 to 22.4 psig)
	5					High Pressure Applications (Outlet Pressure: 0.57 to 4.4 bar / 8.4 to 60 psig)
						OVERPRESSURE PROTECTION
	0					Without Overpressure Protection Module
	4					With Slam-shut Module ⁽¹⁾
1. Reference Instruction Manual D103127X012 for VSX8 Series safety slam-shut module.						

Table 3. Body Sizes and End Connection Styles

BODY SIZE		END CONNECTION STYLE	
DN	In.	Ductile Iron Body	WCC Steel Body
40 x 40	1.5 x 1.5	CL150 RF or PN 16	CL150 RF or PN 16
40 x 80	1.5 x 3	CL150 RF or PN 16	CL150 RF or PN 16
50 x 50	2 x 2	CL150 RF or PN 16	NPT, CL150 RF or PN 16
50 x 100	2 x 4	CL150 RF or PN 16	NPT, CL150 RF or PN 16
80 x 80	3 x 3	CL150 RF or PN 16	PN 16, CL150 RF or CL300 RF
80 x 150	3 x 6	CL150 RF or PN 16	CL150 RF or PN 16

Table 4. LSR Series Outlet Pressure Ranges and Control Spring Information⁽¹⁾

ACTUATOR DIAMETER SIZE mm	TYPE	OUTLET PRESSURE RANGE		CONTROL SPRING			
		bar	psig	Part Number	Wire Diameter		Color
					mm	in.	
475	LS200 and LS204	0.017 to 0.022	0.25 to 0.32	ERAA07279A0	5.0	0.19	Light Blue
		0.02 to 0.05	0.30 to 0.70	ERAA07575A0	7.0	0.25	Yellow
		0.04 to 0.09	0.60 to 1.28	ERAA07577A0	7.0	0.25	Brown
		0.08 to 0.15	1.10 to 2.24	ERAA07585A0	8.0	0.31	Dark Grey
		0.14 to 0.35	2.00 to 5.00	ERAA07589A0	10.5	0.41	Pink
350	LS220 and LS224	0.03 to 0.09	0.49 to 1.34	ERAA07575A0	7.0	0.25	Yellow
		0.06 to 0.17	0.84 to 2.44	ERAA07577A0	7.0	0.25	Brown
		0.14 to 0.3	2 to 4.35	ERAA07586A0	8.0	0.31	Light Green
		0.3 to 0.35	4.35 to 5.1	ERAA07586A0	8.0	0.31	Light Green
	LS220 and LS224 LS320 and LS324	0.3 to 0.73	4.35 to 10.6	ERAA07589A0	10.0	0.41	Pink
		0.33 to 1.08	4.8 to 15.7	ERAA07592A0	11.0	0.44	Dark Blue
		0.57 to 1.5	8.3 to 21.75	ERAA07283A0	13.0	0.5	Orange
		1.38 to 2.09	20.0 to 30.3	ERAA07589A0	10.5	0.41	Pink
255	LS250 and LS254 LS350 and LS354	1.38 to 3.09	20.0 to 44.8	ERAA07592A0	11.0	0.44	Dark Blue
		1.72 to 4.14	25.0 to 60	ERAA07283A0	13.0	0.50	Orange

1. DN 40 and 50 / 1.5 and 2 in. LS200 Series

Table 5. Maximum Inlet and Outlet Pressure

PRESSURE		475 MM ACTUATOR		350 MM ACTUATOR		255 MM ACTUATOR	
		barg	psig	barg	psig	barg	psig
Maximum Operating Inlet Pressure	17 to 138 mbarg / 0.25 to 2 psig maximum outlet pressure	6.2	90	8.6	125	19.7	285
	138 to 345 mbarg / 2 to 5 psig maximum outlet pressure	8.6	125				
	<0.69 barg / 10 psig maximum outlet pressure	N/A	N/A				
	>0.69 barg / 10 psig maximum outlet pressure	N/A	N/A	19.7	285		
Maximum Emergency Inlet Pressure		19.7	285				
Maximum Operating Outlet Pressure ⁽¹⁾		0.34	5.0	1.5	22	4.1	60
Maximum Outlet Pressure Over Outlet Pressure		0.8	11.6	2.0	29	5.8	84
Maximum Emergency Outlet (Casing) Pressure		5.6 ⁽²⁾	66.0 ⁽²⁾	7.9 ⁽³⁾	115 ⁽³⁾	10.3	150

1. With highest spring range available only.

2. 35 psi / 2.41 bar per PED.

3. 50 psi / 3.45 bar per PED.

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Table 6. LSR Series Wide Open Flow Coefficients

Type	Size DN / in.	FLOW COEFFICIENTS		
		C _g	C _i	C _v
Without Slam-shut	40 x 40 / 1.5 x 1.5	1349	30	46
	40 x 80 / 1.5 x 3	1842	30	61
With Slam-shut	40 x 40 / 1.5 x 1.5	1312	30	44
	40 x 80 / 1.5 x 3	1821	31	59
Without Slam-shut	50 x 50 / 2 x 2	2083	33	72
	50 x 100 / 2 x 4	2461	29	74
With Slam-shut	50 x 50 / 2 x 2	2001	28	71
	50 x 100 / 2 x 4	2304	34	67
Without Slam-shut	80 x 80 / 3 x 3	4260	24	189
	80 x 150 / 3 x 6	4290	21	216
With Slam-shut	80 x 80 / 3 x 3	4240	28	160
	80 x 150 / 3 x 6	4280	26	175

Note: Multiply restricted trim % value by the C_g for the restricted C_g value.

Table 7. Pressure Ranges and Body Pressure-Temperature Ratings with PED Certification

TYPE	OUTLET RANGE		BODY MATERIAL	END CONNECTION	TEMPERATURE RANGE		MAXIMUM OPERATING INLET		MAXIMUM BODY PRESSURE RATING	
	bar	psig			°C	°F	bar	psig	bar	psig
LS200 and LS204	0.017 to 0.138	0.25 to 2	Ductile iron	PN 16	-20 to 38	-4 to 100	8.6	125	16	232
					-20 to 60	-4 to 140			17.2	249
				CL150 RF	-20 to 60	-4 to 140			16.7	242
			Steel	PN 16	-20 to 38	-4 to 100			16	232
				CL150 RF	-20 to 60	-4 to 100			19.7	285
					-20 to 60	-4 to 140			18.7	271
					-20 to 60	-4 to 140			19.7	285
				NPT ⁽¹⁾	-20 to 38	-4 to 100			18.7	271
	0.137 to 0.344	2 to 5	Ductile iron	PN 16	-20 to 38	-4 to 100	8.6	125	16	232
					-20 to 60	-4 to 140			17.2	249
				CL150 RF	-20 to 38	-4 to 100			16.7	242
			Steel	PN 16	-20 to 38	-4 to 100			16	232
				CL150 RF	-20 to 60	-4 to 140			19.7	285
					-20 to 60	-4 to 100			18.7	271
					-20 to 60	-4 to 140			19.7	285
				NPT ⁽¹⁾	-20 to 38	-4 to 100			18.7	271
LS220 and LS224	0.02 to 0.69	0.34 to 10	Ductile iron	PN 16	-20 to 38	-4 to 100	8.6	125	16	232
					-20 to 60	-4 to 140			17.2	249
				CL150 RF	-20 to 38	-4 to 100			16.7	242
			Steel	PN 16	-20 to 38	-4 to 100			16	232
				CL150 RF	-20 to 60	-4 to 100			19.7	285
					-20 to 60	-4 to 140			18.7	271
					-20 to 60	-4 to 100			19.7	285
				NPT ⁽¹⁾	-20 to 38	-4 to 100			18.7	271
LS220 and LS224 LS320 and LS324	0.69 to 1.5	10 to 21.7	Ductile iron	PN 16	-20 to 38	-4 to 100	16	232	16	232
					-20 to 60	-4 to 140	17.2	249	17.2	249
				CL150 RF	-20 to 38	-4 to 100	16.7	242	16.7	242
			Steel	PN 16	-20 to 38	-4 to 100	16	232	16	232
				CL150 RF	-20 to 60	-4 to 100	19.7	285	19.7	285
					-20 to 60	-4 to 140	18.7	271	18.7	271
					-20 to 60	-4 to 100	19.7	285	19.7	285
				NPT ⁽¹⁾	-20 to 38	-4 to 100	18.7	271	18.7	271
LS250 and LS254 LS350 and LS354	1.37 to 4.13	20 to 60	Ductile iron	PN 16	-20 to 38	-4 to 100	16	232	16	232
					-20 to 60	-4 to 140	17.2	249	17.2	249
				CL150 RF	-20 to 38	-4 to 100	16.7	242	16.7	242
			Steel	PN 16	-20 to 38	-4 to 100	16	232	16	232
				CL150 RF	-20 to 60	-4 to 100	19.7	285	19.7	285
					-20 to 60	-4 to 140	18.7	271	18.7	271
					-20 to 60	-4 to 100	19.7	285	19.7	285
				NPT ⁽¹⁾	-20 to 38	-4 to 100	18.7	271	18.7	271

1. DN 50 / 2 in. body size only

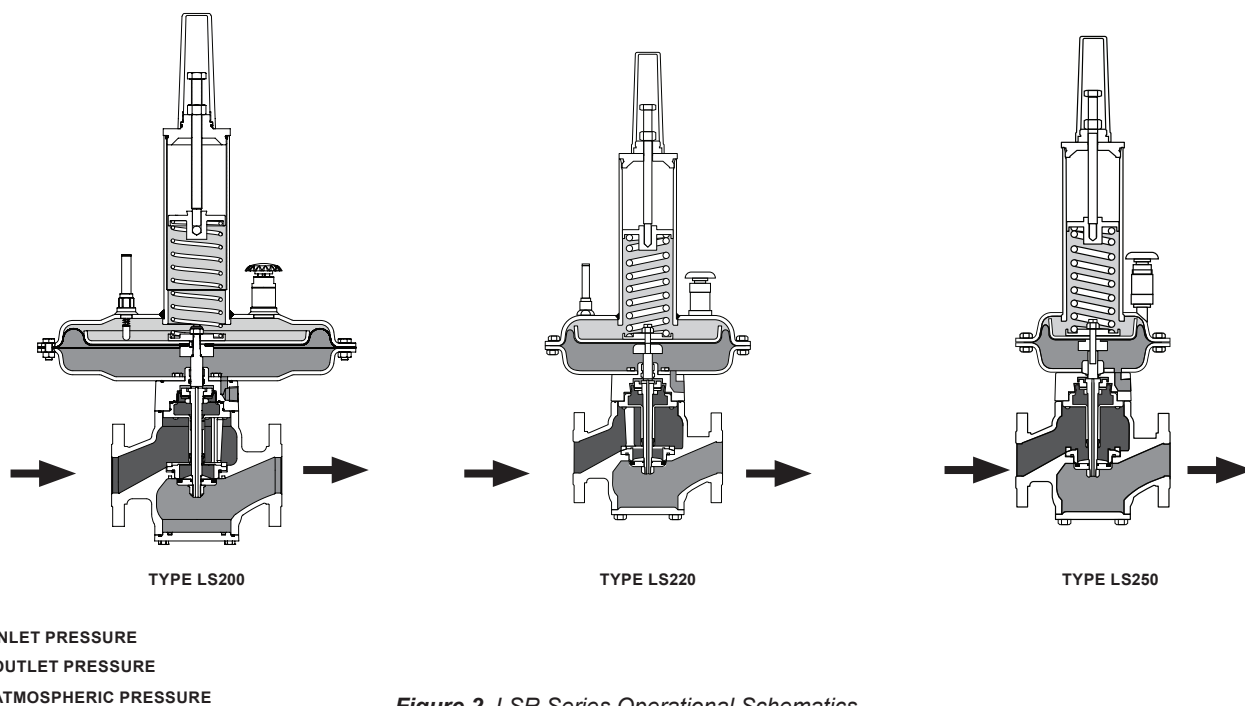


Figure 2. LSR Series Operational Schematics

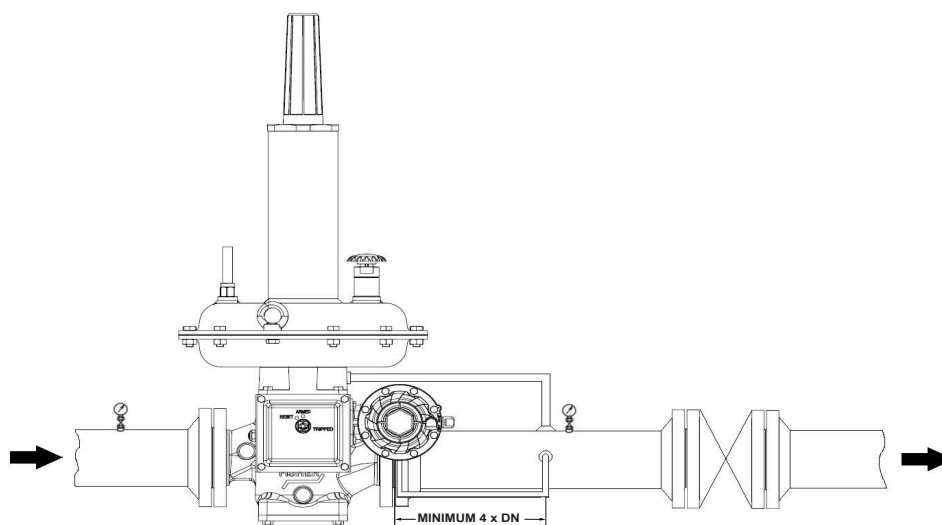


Figure 3a. LSR Series Installation Schematic

Downstream equipment, protected by possible built-in safety shut-off device (in its Class A and integral strength configuration) of this product, shall have technical features such as to be category per table below according to Pressure Equipment Directive (PED) 2014/68/EU.

The regulator and built-in pressure accessories (e.g. slam-shut controller Type VSX8) installed in all the available sizes of LSR Series Regulators, conform to Pressure Equipment Directive (PED) 2014/68/EU Article 4 Section 3 and were designed and manufactured in accordance with Sound Engineering Practice (SEP).

Per Article 4 Section 3, these “SEP” products must not bear the CE marking.

Product Description

The LSR Series Direct-Operated Gas Regulators, shown in Figure 1 are primarily designed for industrial and commercial applications supplying gas to furnaces, burners and other appliances. The LSR Series Balancing System enables the regulator to provide accurate control gas pressure for maximum combustion efficiency despite varying inlet pressure conditions. The single port construction provides bubble-tight shutoff.

This product has been designed to be used with fuel gases of 1st and 2nd family according to EN 437 and with other nonaggressive and nonfuel gases. For any other gases, other than natural gas, please contact your local sales agent.

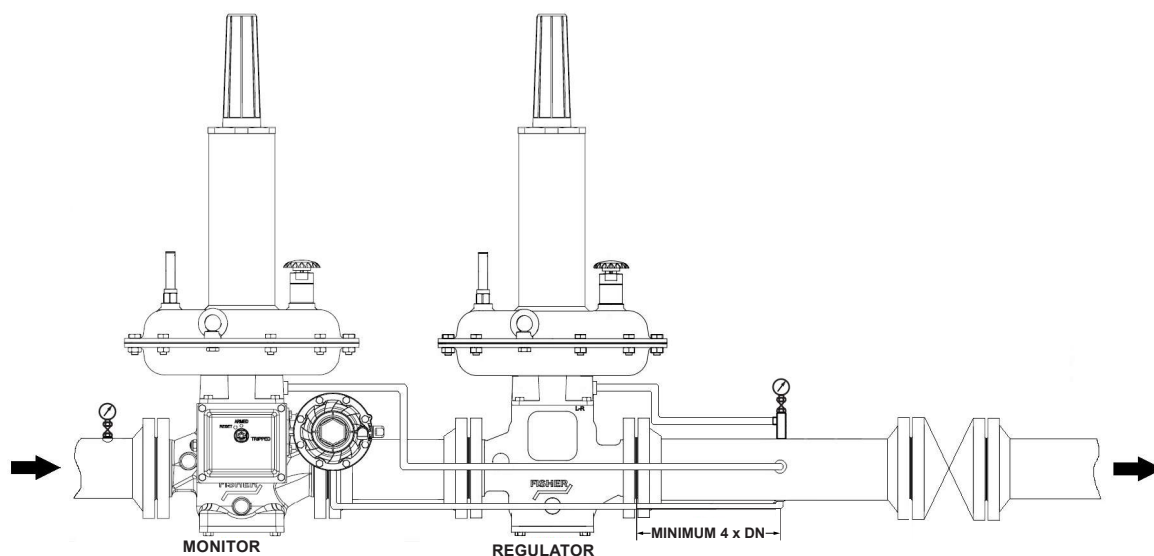


Figure 3b. LSR Series Monitor Configuration Installation Schematic

The standard gas pressure devices (regulators and safety shut-off devices) are those used in the assemblies dealt with into EN 12186 and EN 12279 and their use has to be under the provisions into ENs 12186 and 12279.

If additional pressure accessories (e.g. slam shut controller) are needed, it is recommended to use Emerson products.

Emerson will not be responsible for any possible inefficiency due to installation of non-Emerson production additional pressure accessories (e.g. slam-shut controller).

An external downstream control line is required for the operation of the regulator. A restriction collar is available to reduce the flow capacity of the regulator.

path where gas velocity tends to lower the pressure. The higher pressure near the disk is registered on the top of the balancing diaphragm through the space between the stem and the cage.

This pressure registered on the top of the balancing diaphragm aids downward disk travel and compensates for spring and diaphragm effect. This improves regulator rangeability and performance.

Installation



WARNING

Personal injury, property damage, equipment damage or leakage due to escaping gas or bursting of pressure-containing parts may result if this regulator is overpressured or 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 cause personal injury or property damage due to escaping gas. To avoid such injury or damage, install the regulator in a safe location.

Wear proper PPE for working on the regulator. Use proper lifting technique when working on the regulator.

Before installing the LSR Series Regulator, inspect it for shipping damage and ensure that the body and orifice are clean. Blow out the pipeline to remove pipe scale and other foreign material.

Principle of Operation

Refer to the operational schematics in Figure 3. The LSR Series downstream pressure is registered under the diaphragm via the external control line and is used as the operating medium. Increased demand lowers the downstream pressure and allows the spring to move the diaphragm and stem assembly down, opening the valve disk and supplying more gas to the downstream system.

Decreased demand increases the downstream pressure and moves the diaphragm and stem assembly up, closing the valve disk and decreasing the gas supply to the downstream system.

Boosting System

The LSR Series incorporates a balancing diaphragm and a boosting system. When the regulator is locked up, inlet pressure is registered on the top of the disk and on the bottom of the balancing diaphragm through space between the stem and cage. Also, downstream pressure is registered on the bottom of the disk and on the top of the balancing diaphragm through a passage in the stem.

When the trim is open, gas flows from the inlet over the edge of the disk to the outlet. Under the disk, there is little gas flow. The gas pressure is higher than it is in the flow

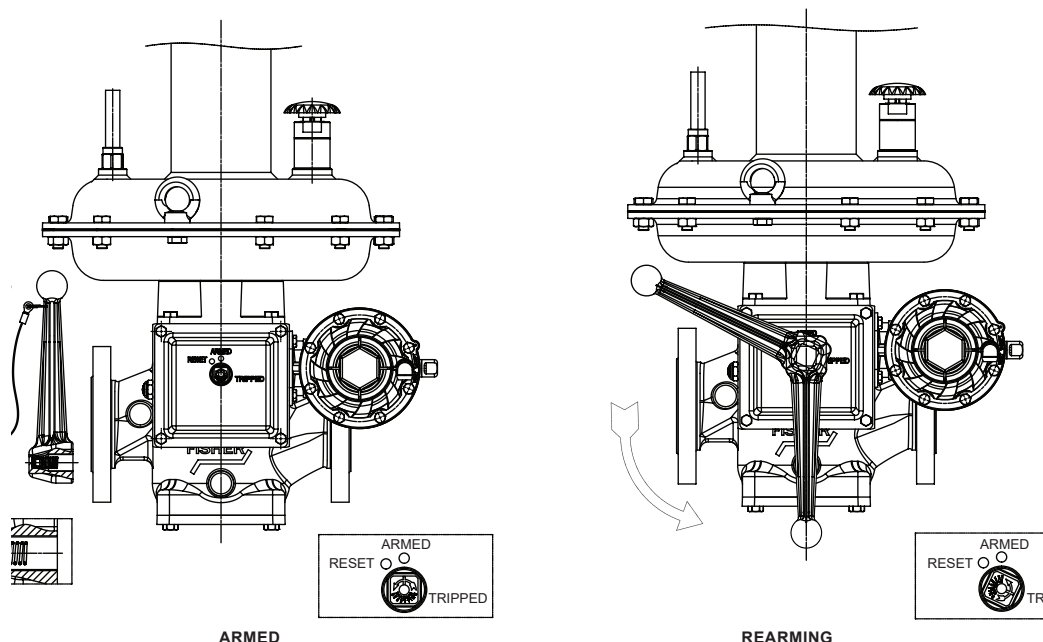


Figure 4. Rearming Process

The regulator may be installed in any position as long as the flow through the body is the same as indicated by the flow direction arrow on the body and the vent opening is unobstructed and protected from the rain, ice and other foreign material.

If the regulator has threaded end connections, coat external threads with pipe compound. For flanged end connections, tighten the flange bolts evenly.

Parallel run with LSR Series is recommended to ensure continued operation during maintenance windows.

The regulator must be protected from damage by vehicles and other outside sources.

Overpressure Protection

The LSR Series Regulator has an outlet pressure rating lower than the inlet pressure rating. Some type of overpressure protection is needed if the actual inlet pressure exceeds the outlet pressure rating.

Maximum operating inlet pressure for the LSR Series Regulators is given in Table 4. All models must be protected against inlet pressure above their listed maximum.

Regulator operation below these emergency pressure limitations does not preclude the possibility of damage from external sources or from debris in the gas line.

The regulator should be inspected for damage after any overpressure condition.

Reset Procedure

See Figure 4 for the rearming process. The rearm tool is included with all LSR Series units with slam-shut option. If the tool is not readily available, a 17 mm wrench can be used to rearm. Do not leave the lever or wrench after rearming.

Rotate counterclockwise until the lever is pointed down. Continue rotating past this point to rearm. The lever should point to the Reset Point on the cover. The lever should no longer rotate back to the tripped position.

Downstream Control Line



WARNING

Downstream control line is required for proper operation of these regulators.

An external downstream control line must be installed before putting the LSR Series Regulators in operation. Without the control line, the regulator will remain wide open. The downstream control line should be a pipe or tubing of at least 12.7 mm / 1/2 in. diameter; connect it to the downstream pipe line at least 4 to 10 pipe diameters from the regulator and in a straight section of pipe.

The external downstream control line connection on the LSR Series Regulator is 1/4 NPT.

Vent

The LSR Series vent uses a dampening assembly to improve performance. The damper is connected to the spring case with 1/2 NPT connection. It is screened to prevent insects or foreign material from entering.

If a vent to the atmosphere is required for indoor installations, remove the damper assembly and pipe the vent to the outside.

The vent pipe should be as short as possible with minimum number of bends or elbows. The pipe should also have the largest practical diameter. Install a weather and bug resistant vent assembly on the outside end of the vent pipe.

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For indoor installation that have been piped to the outside and for outdoor installations, the vent opening must be positioned so that water, ice and other foreign material cannot enter the spring case. Use care not to place the vent opening below downspouts, eaves, doors, windows or air intakes. The vent opening should be checked periodically to be sure that the opening has not been plugged with foreign material. On some installations it may be necessary to provide additional protection from the elements.

Startup



WARNING

If the downstream system is already pressurized by another regulator or by a manual bypass, then extra precautions must be taken when placing the LSR Series in service.

The outlet of the regulator must never be subjected to pressure higher than the inlet pressure or the balancing diaphragm may be damaged. Also, the control line pressure must never exceed the set point dictated by the spring setting by more than what is published in Table 5 or the valve seat or diaphragm plates can be damaged.

The procedure used in putting the regulator in service must be planned accordingly. Pressure gauges should always be used to monitor downstream and control line pressures during startup.

If the downstream system is not pressurized by another regulator or by manual bypass, use the following procedure:

1. Check to see that all appliances are turned off.
2. Slowly open the upstream shutoff valve.
3. Slowly open the downstream shutoff valve.
4. Check all connections for leaks.
5. Make final control spring adjustments according to the adjustment procedures.

Adjustment



WARNING

To avoid personal injury, property damage or equipment damage caused by bursting of pressure containing parts or explosion of accumulated gas, never adjust the control spring to maintain a control pressure higher than the upper limit of the control pressure range for that particular spring. If the desired control pressure is not within the range of the spring, install a spring of the proper range according to the Diaphragm and Spring Case Area section of the maintenance procedure.

To increase the pressure setting, remove the closing cap (key 6, Figures 6, 7 and 8) and turn the adjusting screw (key 10) clockwise; to lower the setting, turn the adjusting screw counterclockwise.

A pressure gauge should always be used when adjustments are being made. Do not adjust the spring to produce an outlet pressure setting above the limit stamped on the nameplate, located on the casing. If the required pressure setting is not within the range of the spring in use, substitute with the correct spring or a different actuator might be needed, refer to Table 4 for spring ranges and actuator sizes. When changing the spring, also change the nameplate, located on the casing flange, to indicate the outlet pressure range.

Shutdown

Isolate the regulator from the pressure system and release pressure from the outlet and the control line. Inlet pressure will then automatically be released as the regulator opens up in response to the lowered pressure on the diaphragm. If the unit or station has a slam-shut, ensure the slam-shut has not isolated pressure upstream or downstream before beginning maintenance.

Maintenance

This section includes instructions for disassembly and replacement of parts. All key numbers refer to Figures 6, 7 and 8, except where indicated. Reference Torque Values Table 8 for specific values of each key number.



WARNING

To avoid personal injury, property damage or equipment damage caused by sudden release of pressure or explosion of accumulated gas, do not attempt any maintenance or disassembly without first isolating the regulator from system pressure and relieving all internal pressure from the regulator.

Regulators that have been disassembled for repair must be tested for proper operation before being returned to service. Only parts manufactured by Emerson should be used for repairing Fisher™ regulators. Restart gas utilization equipment according to normal startup procedures.

To avoid personal injury due to the sudden uncontrolled movement of parts, do not loosen the diaphragm casing cap screws (key 17 and 19) when the control spring (key 13) has spring force applied to it. Release the spring compression as described in step 2 of Actuator Maintenance and Balance Diaphragm Replacement.

Wear proper PPE for working on the regulator. Use proper lifting technique when working on the regulator.

Table 8. Torque Requirement for Regulator Maintenance

KEY	PART NUMBER	DESCRIPTION	SIZE	TORQUE	
				N•m	Ft-lb
15	ERAA51785A0	Hex locknut	20 mm / 3/4 in. Socket	35	25.8
31	ERAA07626A0	Hex	30 mm / 1-1/4 in. Wrench	30	22.1
54	ERAA12336A0	Hex locknut/Nylon	20 mm / 3/4 in. Socket	39	28
34	ERAA12017A0	Torx screw - Orifice, Cage and Int Flange ⁽¹⁾	T20 Torx	3.2	2.4
21	ERAA07751A0	Travel Indicator	21 mm / 13/16 in. Socket	12	8.9
21A	ERAA54252A0				
39	ERAA11283A0				
21E	ERSA02798A0	Bushing Travel Indicator	21 mm / 13/16 in. Socket	5.0	3.7
58D	M0236660X12	Hex	3/4 NPT	18	13.3
58H	M0236670X12	Damper Connector	3/4 NPT	5.0	3.7
17	M5009027X12	255 and 350 mm actuator - Hex cap screw	17 mm / 11/16 in. Socket	24	17.7
22	ERAA12023A0	Hex cap screw	13 mm / 1/2 in. Socket	22	16.2

1. Use Loctite® Threadlocker Blue compound when installing Key 34 Torx Screws.

Table 9. Torque Requirement for Slam-Shut Maintenance

KEY	PART NUMBER	DESCRIPTION	SIZE	TORQUE	
				N•m	Ft-lb
202	GE38176X012	Hex cap screw, VSX4 half flange	10 mm / 13/32 in. Socket	15.4	11.4
202	GE38176X012	Hex cap screw, SSD cover plate	10 mm / 13/32 in. Socket	11	8.2
228	M5011006X12	Hex socket cap screw	4 mm / 5/32 in. Hex Key	5.5	4.1
224	M5011019X12	Hex cap screw	5 mm / 3/16 in. Hex Key	10.5	7.7
216	ERAA49756A0	Hex socket set screw	2.5 mm Hex Key	3.1	2.3

Disk or Pad Maintenance

[Click here for the 3-Minute Disk Change on the New Fisher™ LSR Series Pressure Regulator Video](#)

1. Isolate the regulator and bleed downstream pressure to atmosphere.
2. Remove bolts (key 22) and diaphragm plate (key 30).
3. Unscrew locknut (key 54) with 19 mm socket and remove the disk (key 43) and O-ring (key 42). No need to remove the actuator or hold the stem during maintenance. Inspect the disk for damage and replace if needed. Replace O-ring and locknut from the kit.
4. Reassemble in reverse order. Replace disk (key 43) and tighten locknut (key 54). Install the bottom flange (key 44) with O-ring (key 32) and 4 bolts (key 22).
5. During reassembly, check all O-rings (key 32) to be certain they are in good condition; replace if necessary. Lubricate the O-ring with elastomer sealant and lubricant. Apply anti-seize compound liberally to the adjusting screw threads (key 10), as indicated in Figures 6 to 8.

Note

If screen flow streamer (key 63) is included, ensure to check and clean it. Operation with the screen flow streamer causes performance drop.

Readjustment is required if regulator is installed upside down or horizontal.

Actuator Maintenance (Figures 6 to 8)

[Click here for the Full Rebuild of the New Fisher™ LSR Series Pressure Regulator Video](#)



CAUTION

Ensure to take extra care during aligning of bolt holes as threads of bolts will damage the diaphragm.

Do not damage the orifice sealing edge when removing from the body or reinstalling in the body. The result could be loss of sealing tightness during lockup.

1. Isolate the regulator and bleed downstream pressure to atmosphere.
2. Remove closing cap (key 6), rotate the adjusting screw (key 10) counterclockwise until there is no compression on the control spring (key 13).
3. Remove cap screws (key 17) from the actuator (key 2).
4. Lift the spring case (key 2) and set aside. Remove the control spring (key 13) and spring seat (key 12).
5. Unscrew locknut (key 15), remove the lower spring seat (key 14). Then remove diaphragm plate (key 5).
6. Diaphragm (key 4) should now be loose and can be replaced.
7. Align bolt holes before tightening down locknut (key 15).

8. Set diaphragm (key 4), diaphragm head (key 5) and spring seat (key 14). Align bolts (key 17), lift stem (key 37) and allow full assembly to settle which aligns the balance diaphragm (key 28) and main diaphragm. Once aligned with bolts, tighten down locknut (key 15) to 30 N•m / 25.1 ft-lb. Do not overtighten.
9. During reassembly, ensure that all O-rings (keys 24, 25, 33, 48, 47 and 57) are in good condition; replace if necessary. Lubricate with elastomer sealant and lubricant. Apply anti-seize compound liberally to the adjusting screw threads (key 10), as indicated in Figures 6 to 8.

Balance Diaphragm Replacement

[Click here for the Full Rebuild of the New Fisher™ LSR Series Pressure Regulator Video](#)



WARNING

Do not remove cover (key 222) before manually tripping the slam-shut.



CAUTION

Ensure to take extra care during aligning of bolt holes as threads of bolts will damage the diaphragm.

Do not damage the orifice sealing edge when removing from the body or reinstalling in the body. The result could be loss of sealing tightness during lockup.

1. Isolate the regulator and bleed downstream pressure to atmosphere. Once pressure upstream and downstream have bled to 0, manually trip the slam-shut to release the spring energy in the trim.
2. Remove closing cap (key 6), rotate the adjusting screw (key 10) counterclockwise until there is no compression on the control spring (key 13).
3. If slam-shut is included, remove the slam-shut mechanism from the body. Remove 4 bolts (key 202) then pull the cover (key 222) from the box and pull entire slam-shut off the body. Ensure to take care of the O-ring seal between the body to avoid damage. Set aside to protect the cam and sealing surface. Apply lubricant to the slam-shut device lever 2 (key 212).
4. Remove cap screws (key 17) from the actuator (key 2).
5. Lift the spring case (key 2) and set aside. Remove the control spring (key 13) and spring seat (key 12).
6. Unscrew locknut (key 15), remove the lower spring seat (key 14). Then remove diaphragm plate (key 5).
7. Diaphragm (key 4) should now be loose and can be replaced.
8. Remove the 4 intermediary flange screws (key 22) and lift actuator assembly and trim out of the body (key 1).

9. Carefully place the lower casing edge (key 3) on a surface protecting the sealing area.
10. Remove locknut (key 54) on the disk assembly (key 43) and remove disk.

Note

Use a marker or grease pen to mark the cage orientation to the intermediary flange. If the cage is not installed in the same position, flow performance could be reduced.

11. Remove screws (key 34) then remove the orifice (key 38) and cage (key 35) from the intermediary flange (key 26).
12. Remove locknut (key 31) using a 30 mm key and hold the stem (key 37) in place by the hex feature using a 16 mm key.
13. Remove the balance diaphragm plate (key 30).
14. Remove and replace balance diaphragm (key 28). Lightly grease the outside and inside of the balance diaphragm before reassembly.
15. Reassemble the locknut (key 31) using a 30 mm key and hold the stem (key 37) in place by the hex feature using a 16 mm key at 30 N•m / 25.1 ft-lb torque.
16. Insert stem (key 37) into cage (key 35), make sure that balance diaphragm (key 28) is mounted correctly on intermediary flange (key 26) inner groove.
17. Mount the cage (key 35) on balance diaphragm (key 28) on indicated position, make sure the stem hex feature engages with the one on the cage (upper diameter edge should enter below intermediary flange top diameter).
18. Assemble screws (key 34) to fix the cage (key 35) and orifice (key 38) from the intermediary flange (key 26). Make sure the gap between cage and intermediary flange is equal on outside circle diameter. Use Loctite® Threadlocker blue compound on key 34 screws. Loctite® prevents vibration loosening.
19. Put the trim back into body (key 1) and assemble the 4 intermediary flange screws (key 22).
20. Ensure that the serrated washer (key 29) and O-ring (key 57) are in right position.
21. Assemble main diaphragm (key 4), replace with a new one if necessary.
22. Reassemble in reverse order parts above main diaphragm (key 4).
23. During reassembly, ensure that all O-rings (keys 24, 25, 33, 48, 47 and 57) are in good condition; replace if necessary. Lubricate with elastomer sealant and lubricant. Apply anti-seize compound liberally to the adjusting screw threads (key 10), as indicated in Figures 6 to 8.

Note

If screen flow streamer (key 63) is included, ensure to check and clean it. Operation with the screen flow streamer causes performance drop.

Replacing Orifice or Seat

[Click here for the Orifice Replacement Maintenance on Fisher™ LSR Series Pressure Regulator Video](#)



WARNING

Do not remove cover (key 222) before manually tripping the slam-shut.



CAUTION

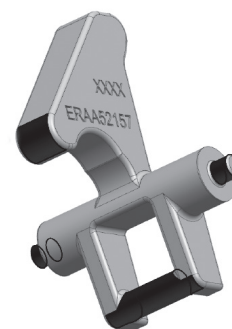
Do not damage the orifice sealing edge when removing from the body or reinstalling in the body. The result could be loss of sealing tightness during lockup.

1. Isolate the regulator and bleed downstream pressure to atmosphere. Once pressure upstream and downstream have bled to 0, manually trip the slam-shut to release the spring energy in the trim.
2. Remove closing cap (key 6), rotate the adjusting screw (key 10) counterclockwise until there is no compression on the control spring (key 13).
3. If slam-shut is included, remove the slam-shut mechanism from the body. Remove 4 bolts (key 202) then pull the cover (key 222) from the box and pull entire slam-shut off the body. Careful of the O-ring seal between the body to avoid damage. Set aside protecting the cam and sealing surface.
4. Remove the 4 bonnet screws (key 22) and lift actuator assembly and trim out of the body (key 1).
5. Carefully place the actuator on a surface protecting the travel indicator (key 21) and the vent assembly.
6. Remove locknut (key 54) on the disk assembly (key 43) and remove disk.
7. Remove the two torx screws (key 34) to remove the orifice (key 38) from the cage (key 35). Keep the cage connected to the bonnet (key 26). If unit has a slam-shut option, inspect the slam-shut disk (key 204) for damage or cuts.
8. Change out the orifice (key 38) with new part and reassemble.
9. During reassembly, ensure that all O-rings (keys 32, 40 and 42) are in good condition; replace if necessary. Lubricate the O-ring with elastomer sealant and lubricant. Apply anti-seize compound liberally to the adjusting screw threads (key 10), as indicated in Figures 6 to 8. Use Loctite® Threadlocker blue compound on key 34 screws. Loctite® prevents vibration loosening. Apply lubricant to the slam-shut device lever 2 (key 212).

Note

If screen flow streamer (key 63) is included, ensure to check and clean it. Operation with the screen flow streamer causes performance drop.

Readjustment is required if regulator is installed upside down or horizontal.



lubricated areas

LUBRICATED AREAS

Figure 5. Slam-shut Lever 2 Lubricated Areas

Parts Ordering

When corresponding with your local Sales Office about this regulator, include the type number, serial number and other information stamped on the nameplate.

When ordering replacement parts, reference the key number of each needed part and specify the eleven character part number as found in the following parts list.

Parts List

LSR Series Regulator

Key	Description	Part Number
	Spare Parts Kit	See Repair Kit Table
1	Body	See Key 1 Table
2	Upper Casing, Steel	
	DN 40 475 mm Actuator	ERAA58248A0
	DN 40 350 mm Actuator	ERAA58247A0
	DN 40 255 mm Actuator	ERAA58245A0
	Types LS200 and LS204	ERAA09247A0
	Types LS220, LS224, LS320 and LS324	ERAA10668A0
	Types LS250, LS254, LS350 and LS354	ERAA10667A0
3	Lower Casing, Steel	
	DN 40 475 mm Actuator	ERAA58219A0
	DN 40 350 mm Actuator	ERAA58218A0
	DN 40 255 mm Actuator	ERAA58217A0
	Types LS200 and LS204	ERAA09225A0
	Types LS220, LS224, LS320 and LS324	ERAA09262A0
	Types LS250, LS254, LS350 and LS354	ERAA09273A0
4*	Diaphragm, Nitrile (NBR)	
	DN 40 475 mm Actuator	ERAA07483A0
	DN 40 350 mm Actuator	ERAA07476A0
	DN 40 255 mm Actuator	ERAA07454A0
	Types LS200 and LS204	ERAA07483A0
	Types LS220, LS224, LS320 and LS324	ERAA07476A0
	Types LS250, LS254, LS350 and LS354	ERAA07454A0
5	Diaphragm Head, Steel	
	DN 40 475 mm Actuator	ERAA10664A0
	DN 40 350 mm Actuator	ERAA10663A0
	DN 40 255 mm Actuator	ERAA10662A0
	Types LS200 and LS204	ERAA10664A0
	Types LS220 and LS224	ERAA10663A0
	Types LS250 and LS254	ERAA10662A0
	Types LS320 and LS324	ERAA57625A0
	Types LS350 and LS354	ERAA57626A0
6	Protective Cap, Nylon	ERAA50712A0

- continued -

*Recommended Spare Part.

LSR Series

LSR Series Regulator (continued)

Key	Description	Part Number
7	Bonnet, External Adjusting Steel	ERAA50689A0
10	Adjusting Screw, Steel	ERAA07799A0
11	Ball, Stainless steel	M4500530X12
12	Upper Spring Seat, Steel	ERAA50770A0
13	Spring, Steel	
	475 mm Actuator	
	0.25 to 0.32 psig / 0.017 to 0.022 bar, Light Blue	ERAA07279A0
	0.30 to 0.70 psig / 0.02 to 0.05 bar, Yellow	ERAA07575A0
	0.60 to 1.28 psig / 0.04 to 0.09 bar, Brown	ERAA07277A0
	1.10 to 2.24 psig / 0.08 to 0.15 bar, Dark Grey	ERAA07285A0
	2.0 to 5.0 psig / 0.14 to 0.35 bar, Pink	ERAA07589A0
	350 mm Actuator	
	0.34 to 0.58 psig / 0.02 to 0.04 bar, Light Blue	ERAA07279A0
	0.59 to 1.34 psig / 0.04 to 0.09 bar, Yellow	ERAA07575A0
	0.84 to 2.44 psig / 0.06 to 0.17 bar, Brown	ERAA07277A0
	4.35 to 5.1 psig / 0.27 to 0.35 bar, Light Green	ERAA07586A0
	4.35 to 10.6 psig / 0.3 to 0.73 bar, Pink	ERAA07589A0
	4.8 to 15.7 psig / 0.33 to 1.08 bar, Dark Blue	ERAA07592A0
	8.3 to 21.75 psig / 0.57 to 1.5 bar, Orange	ERAA07283A0
	255 mm Actuator	
	20 to 30.3 psig / 1.38 to 2.09 bar, Pink	ERAA07589A0
	20 to 44.8 psig / 1.38 to 3.09 bar, Dark Blue	ERAA07592A0
	25 to 60 psig / 1.72 to 4.14 bar, Orange	ERAA07283A0
14	Lower Spring Seat, Steel	
	LS200 Series	ERAA50696A0
	LS300 Series	ERAA56200A0
15*	Locknut, Steel	
	LS200 Series	ERAA51785A0
	LS300 Series	ERAA56185A0
16	Nameplate	-----
17	Bolt, Steel	ERAA53025A0
18	Eyenuit Nut, Steel (2 required)	M5043007X12
19	Nut, Steel	ERAA12217A0
20*	O-ring, Nitrile (NBR)	ERAA42931A2
21*	Travel Indicator Assembly, Brass	
	Types LS200/LS220 and LS204/LS224	ERAA14511A1
	Types LS250 and LS254	ERAA14798A1
	Types LS320 and LS324	ERAA59194A0
	Types LS350 and LS354	ERAA59206A0
21A	Fitting	ERAA54252A0
21B	Stem, Stainless steel	
	LS200 Series	ERAA07781A0
	LS300 Series	ERAA59191A0
21C*	O-ring, Nitrile (NBR)	ERAA12026A0
21D	O-ring, Nitrile (NBR)	1H2926X0032
21E	Bushing Indicator, Brass	ERSA02798A0
21F	Cover Assembly, Polymer	M0210910X12
21G	Nameplate, Polymer	-----
21H	End Piece, Brass	
	Types LS200/LS220 and LS204/LS224	ERAA07793A0
	Types LS250 and LS254	ERAA51739A0
	Types LS320 and LS324	ERAA59194A0
	Types LS350 and LS354	ERAA59193A0
21J	Spring, Brass (2 required)	ERAA51766A0
21K	Pointer, Brass	M0229000X12
22	Screw, Steel (4 required)	ERAA12023A0
23*	Backup Ring (2 required)	
	LS200 Series	ERAA12012A0
	LS300 Series	ERAA56144A0

LSR Series Regulator (continued)

Key	Description	Part Number
24*	O-ring, Nitrile (NBR)	
	LS200 Series	ERAA12013A0
	LS300 Series	ERAA56145A0
25*	O-ring, Nitrile (NBR)	ERAA12008A0
26	Intermediate Flange, Nitrile (NBR)	
	Types LS200/LS220 and LS204/LS224	ERAA10701A0
	Types LS250 and LS254	ERAA52058A0
	Types LS320/LS350 and LS324/LS354	ERAA58626A0
27	Balance Diaphragm Head, Nitrile (NBR)	
	LS200 Series	ERAA51970A0
	LS300 Series	ERAA55957A0
28*	Balance Diaphragm, Nitrile (NBR)	
	LS200 Series	ERAA07724A0
	LS300 Series	ERAA56118A0
29	Serrated Washer, Steel	
	LS200 Series	ERAA51778A0
	LS300 Series	ERAA57486A0
30	Balance Diaphragm Plate, Steel	
	LS200 Series	ERAA51960A0
	LS300 Series	ERAA55959A0
31	Retaining Nut, Steel	
	LS200 Series	ERAA07626A0
	LS300 Series	ERAA56210A0
32*	O-ring, Nitrile (NBR) (2 required)	
	LS200 Series	ERAA52798A0
	LS300 Series	ERAA56239A0
33*	O-ring, Nitrile	ERAA51959A0
34	Screw, Steel (6 required)	ERAA52386A0
35	Cage, Stainless steel	
	LS200 Series	ERAA10702A0
	LS300 Series	ERAA55554A0
36*	Stem Bushing	
	LS200 Series	ERAA49971A0
	LS300 Series	ERAA56143A0
37	Stem, Stainless steel	
	LS200 Series	ERAA50684A0
	LS300 Series	ERAA56162A0
38*	Orifice, Stainless steel	
	LS200 Series	ERAA13221A0
	LS300 Series	ERAA60918A0
39	Hole Plug, Brass	ERAA11283A0
40*	Gasket, Nitrile (NBR)	
	LS200 Series	ERAA12018A0
	LS300 Series	ERAA56109A0
41	Pad Retainer, Steel	
	100% capacity, Types LS200 and LS204	ERAA07530A0
	100% capacity, Types LS220 and LS224	ERAA51481A0
	100% capacity, Types LS250 and LS254	ERAA52946A0
	100% capacity, LS300 Series	ERAA55949A0
	78% capacity, LS200 Series	ERAA53097A0
	60% capacity, Type LS1050	ERAA55710A0
	60% capacity, LS200 Series	ERAA51820A0
	40% capacity, Type LS1050	ERAA55711A0
	40% capacity, LS200 Series	ERAA52867A0
42*	O-ring, Nitrile (NBR)	
	LS200 Series	1F2613X0012
	LS300 Series	ERAA56175A0

Outside North America Only

*Recommended Spare Part.

LSR Series Regulator (continued)

Key	Description	Part Number
43*	Pad Assembly, Steel and Nitrile (NBR) Types LS200 and LS204 Types LS220/LS250 and LS224/LS254 Single sided Double sided Types LS320/LS350 and LS324/LS354	ERAA54695A0 ERAA07637A1 ERAA12823A1 ERAA55950A0
44	Bottom Flange, Steel LS200 Series LS300 Series	ERAA07518A0 ERAA55960A0
45	Nut, Steel	ERAA53059A0
46	Sealing Washer, Nitrile (NBR)	11A9681X012
47*	O-ring LS200 Series LS300 Series	GE18400X022 ERAA52798A0
48	Plug	1A369235072
53	Lock Pin, Stainless steel	ERAA51580A0
54*	Locknut, Steel LS200 Series LS300 Series	ERAA12336A0 ERAA56185A0
56*	Stem Guide, Nylon	ERAA50073A0
57*	O-ring, Nitrile (NBR)	1F113906992
58*	Damper Assembly	M8090197X12
59	Protective Cap	ERAA54279A0
60	Screw Adjusting, Internal	GE26108X012
61	Bonnet, Internal Adjusting	ERAA55665A0
62	Washer	GE47292X012
63	Screen Flow Streamer	ERAA50117A0

Slam Shut Device

Key	Description	Part Number
26*	Gland Sleeve, Brass	ERAA52345A0
30*	Protective Cap, Brass	ERAA52346A0
110*	Shutter, Steel	ERAA09134A0
199	Type VSX8 Assembly	See Type VSX8 Instruction Manual
200	Blanking Plug, Aluminum	GE31255X012
201	Half Ring Flange, Steel	GF01942X012
202	Screw, Steel	GE38176X012
203*	O-ring, Nitrile (NBR)	GF03443X012
204*	Pad Assembly, Steel or Nitrile (NBR)	M0236560X32
205	Spring Holder, Brass	ERAA49374A0
206*	Anti friction Ring, Bronze filled Polytetrafluoroethylene (PTFE)	M0236980X12
207*	O-ring, Nitrile (NBR)	FA400519X12
208	Main Spring, Steel	ERAA09265A0
209*	Snap Ring	M4500515X12
210	Spring, Steel	ERAA53299A0
211	Mechanism Box, Ductile iron	ERAA46519A0
212	Lever 2	ERAA52158A0
213	Latching Pin, Stainless steel	ERAA46552A0
214	Lever 1, Cast steel	ERAA46523A0
215	Shaft, Stainless steel	ERAA46550A0
216*	Threaded Pin, Steel	ERAA49756A0

Slam Shut Device (continued)

Key	Description	Part Number
217	Bushing, Brass	ERAA50286A0
218*	O-ring, Nitrile (NBR)	ERAA49833A0
219*	Baseplate Bushing, Polymer	ERAA50072A0
220	Cam, Stainless steel	ERAA49540A0
221*	O-ring, Nitrile (NBR)	M6010013X12
222	Lid, Ductile iron	ERAA51898A0
223*	Gasket, Nitrile (NBR)	ERAA51913A0
224	Screw, Steel	M5011019X12
225	Base Plate, Steel	ERAA50038A0
226	Torsion Spring, Steel	ERAA46779A0
227*	O-ring, Nitrile (NBR)	ERAA50661A0
228	Screw, Steel	M5011006X12
229*	Gasket, Nitrile (NBR)	ERAA51439A0
230	Reloading Nameplate, Aluminum	ERAA53509A0
231	Drive screw, Stainless steel	M4500027X12
232	Wrench , Aluminum	M0193731X12
233	Silencer, Brass	M4500367X12

LSR Series

LSR Series Repair Kit

SPARE PART KITS	ACTUATOR TYPE (SIZE)	KEY	KIT PART NUMBER	
			DN 40 and 50 / 1-1/2 and 2 in.	DN 80 / 3 in.
Pad Repair Kit	All (single side)	32, 42, 43, 54	RLS2PAD10A0	RLS3PAD10A0
	All (double side)	32, 42, 43, 54	RLS2PAD20A0	RLS3PAD20A0
Orifice Kit	All	32, 38, 40, 42, 54	RLS2ORFC0A0	RLS3ORFC0A0
	All with SSD	32, 38, 40, 42, 54, 203, 206, 207, 223	RLS24ORF0A0	RLS34ORFCA0
Balance Port Kit	All	15, 20, 23, 24, 28, 32, 33, 42, 47, 54, 57	RLS2BALN0A0	RLS3BALN0A0
	All with SSD	15, 20, 23, 24, 28, 32, 33, 42, 47, 54, 57, 203, 223	RLS2XBALNA0	RLS3XBALNA0
Actuator Kit	475 mm	4, 15, 20, 21C, 33, 57	RLS200ACTA0	RLS300ACTA0
	350 mm	4, 15, 20, 21C, 33, 57	RLS220ACTA0	RLS320ACTA0
	255 mm	4, 15, 20, 21C, 33, 57	RLS250ACTA0	RLS350ACTA0
Full Rebuild Kit	475 mm	4, 15, 20, 21C, 23, 24, 25, 28, 32, 33, 36, 38, 40, 42, 43, 47, 54, 56, 57	RLS200REBA0	RLS300REBA0
	350 mm	4, 15, 20, 21C, 23, 24, 25, 28, 32, 33, 36, 38, 40, 42, 43, 47, 54, 56, 57	RLS220REBA0	RLS320REBA0
	255 mm	4, 15, 20, 21C, 23, 24, 25, 28, 32, 33, 36, 38, 40, 42, 43, 47, 54, 56, 57	RLS250REBA0	RLS350REBA0
	475 mm with slam shut device	4, 15, 20, 21C, 23, 24, 25, 28, 32, 33, 36, 38, 40, 42, 43, 47, 54, 56, 57	RLS204REBA0	RLS304REBA0
	350 mm with slam shut device	4, 15, 20, 21C, 23, 24, 25, 28, 32, 33, 36, 38, 40, 42, 43, 47, 54, 56, 57, 203, 204, 206, 207, 209, 216, 218, 219, 221, 223, 227, 229, 21C	RLS224REBA0	RLS324REBA0
	255 mm with slam shut device	4, 15, 20, 21C, 23, 24, 25, 28, 32, 33, 36, 38, 40, 42, 43, 47, 54, 56, 57, 203, 204, 206, 207, 209, 216, 218, 219, 221, 223, 227, 229, 21C	RLS254REBA0	RLS354REBA0
Travel Indicator	350 mm	21	RLS220TVLA0	RLS320TVLA0
	255 mm	21	RLS250TVLA0	RLS350TVLA0
Vent	All	58	RLS20VENTA0	RLS30VENTA0
Slam Shut Device VSX8	All	203	RLS20VSX8A0	RLS30VSX8A0

Outside North America Only

Key 1, Body Materials and Part Numbers

BODY SIZE	BODY MATERIAL	END CONNECTION STYLE	SLAM-SHUT POSITION	PART NUMBER
1.5 x 1.5	Ductile iron	CL150 RF	L-R	ERAA57769A0
			R-L	ERAA57767A0
			W/O	ERAA57755A0
			L-R & R-L	ERAA56744A0
		PN 16	L-R	ERAA57770A0
			R-L	ERAA57768A0
			L-R & R-L	ERAA56745A0
			W/O	ERAA57757A0
	WCC	CL150 RF	L-R	ERAA57680A0
			R-L	ERAA57679A0
			L-R & R-L	ERAA55891A0
			W/O	ERAA57678A0
		PN 16	L-R	ERAA57707A0
			R-L	ERAA57705A0
			L-R & R-L	ERAA56267A0
			L-R	ERAA57799A0
1.5 x 3	Ductile iron	CL150 RF	R-L	ERAA57786A0
			L-R & R-L	ERAA56854A0
			W/O	ERAA57758A0
		PN 16	L-R	ERAA57800A0
			R-L	ERAA57782A0
			L-R & R-L	ERAA56855A0
			W/O	ERAA57759A0
	WCC	CL150 RF	L-R	ERAA57727A0
			R-L	ERAA57713A0
			L-R & R-L	ERAA56375A0
			W/O	ERAA57709A0
		PN 16	L-R	ERAA57735A0
			R-L	ERAA57734A0
			L-R & R-L	ERAA56383A0
			R-L	ERAA52444A0
2x2	Ductile iron	CL150 RF	R-L	ERAA52446A0
			W/O SSD	ERAA52448A0
			L-R and R-L	ERAA09111A0
		PN 16	L-R	ERAA52432A0
			R-L	ERAA52445A0
			L-R and R-L	ERAA09124A0
			W/O SSD	ERAA52447A0
	WCC	CL150 RF	L-R	ERAA52451A0
			R-L	ERAA52452A0
			L-R and R-L	ERAA07381A0
			W/O SSD	ERAA08618A0
		PN 16	L-R	ERAA52449A0
			R-L	ERAA52450A0
			L-R and R-L	ERAA07419A0
		NPT	L-R	ERAA52453A0
			R-L	ERAA52473A0
			L-R and R-L	ERAA12504A0
			W/O SSD	ERAA08366A0
2x4	Ductile iron	CL150 RF	W/O SSD	ERAA09046A0
			W/O SSD	ERAA09096A0
		PN 16	L-R	ERAA52476A0
			R-L	ERAA52478A0
			L-R and R-L	ERAA09149A0
			W/O SSD	ERAA52492A0
	WCC	CL150 RF	L-R	ERAA52475A0
			R-L	ERAA52477A0
			L-R and R-L	ERAA09157A0
			W/O SSD	ERAA52489A0
		PN 16	L-R	ERAA52480A0
			R-L	ERAA52484A0
			L-R and R-L	ERAA08233A0
			W/O SSD	ERAA08630A0
	Cast iron	CL125 FF	L-R	ERAA52479A0
			R-L	ERAA52481A0
			L-R and R-L	ERAA08234A0
			W/O SSD	ERAA09121A0

Outside North America Only

LSR Series

Key 1, Body Materials and Part Numbers (continued)

BODY SIZE	BODY MATERIAL	END CONNECTION STYLE	SLAM-SHUT POSITION	PART NUMBER
3 x 3	Ductile iron	CL150 RF	L-R	ERAA58115A0
			R-L	ERAA58114A0
			L-R & R-L	ERAA57717A0
			W/O	ERAA58116A0
		PN 16	L-R	ERAA58125A0
			R-L	ERAA58124A0
			L-R & R-L	ERAA57718A0
			W/O	ERAA58126A0
	WCC	CL150 RF	L-R	ERAA58067A0
			R-L	ERAA58066A0
			L-R & R-L	ERAA56547A0
			W/O	ERAA58068A0
		CL300 RF	L-R	ERAA58112A0
			R-L	ERAA58111A0
			L-R & R-L	ERAA57761A0
			W/O	ERAA57760A0
		PN 16	L-R	ERAA58087A0
			R-L	ERAA58081A0
			L-R & R-L	ERAA56548A0
			W/O	ERAA58093A0
3 x 6	Ductile iron	CL150 RF	L-R	ERAA58396A0
			R-L	ERAA58395A0
			L-R & R-L	ERAA57981A0
			W/O	ERAA58397A0
		PN 16	L-R	ERAA58401A0
			R-L	ERAA58400A0
			L-R & R-L	ERAA57982A0
			W/O	ERAA58402A0
	WCC	CL150 RF	L-R	ERAA58387A0
			R-L	ERAA58373A0
			L-R & R-L	ERAA57732A0
			W/O	ERAA58388A0
		PN 16	L-R	ERAA58390A0
			R-L	ERAA58389A0
			L-R & R-L	ERAA57733A0
			W/O	ERAA58391A0

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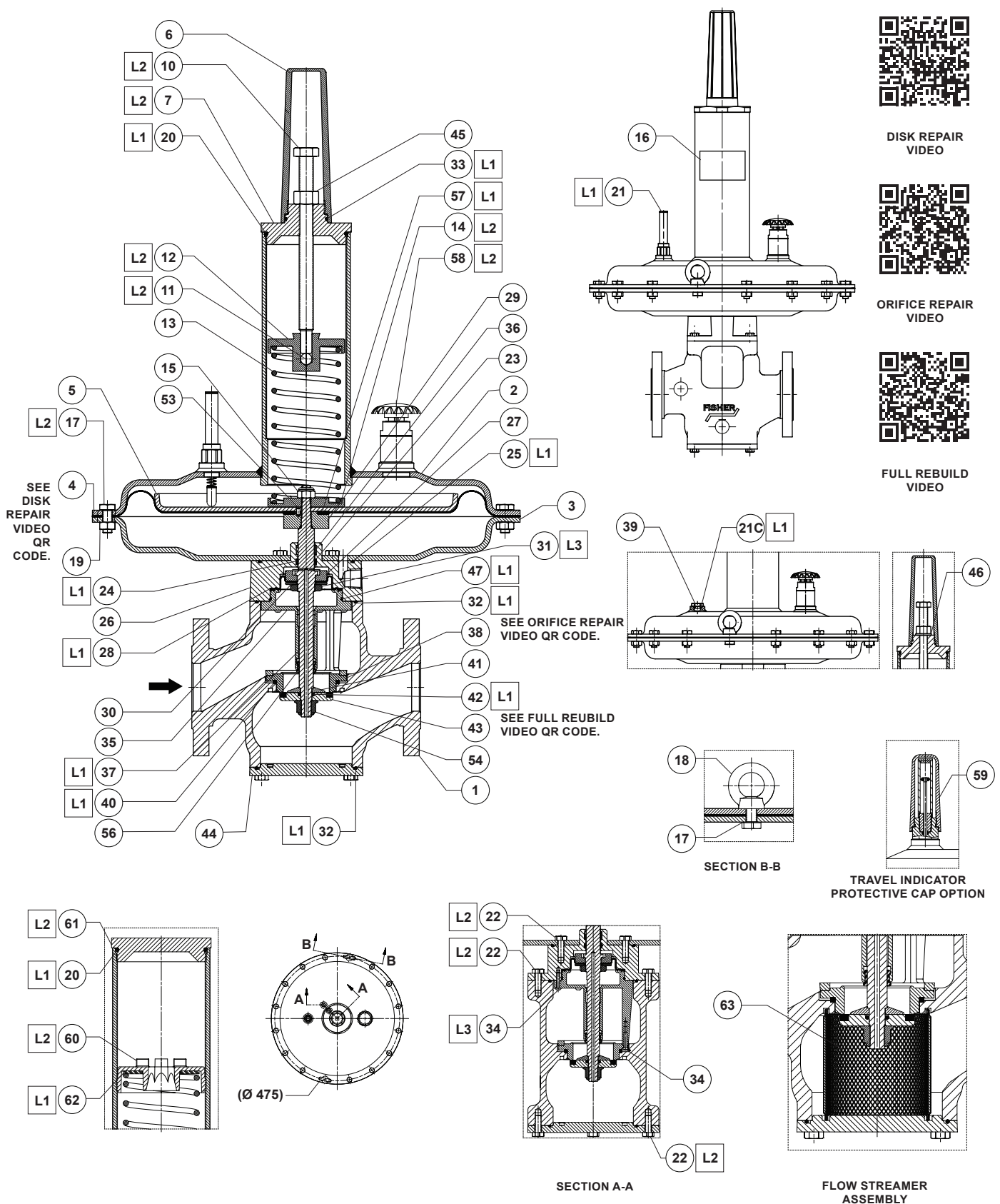


Figure 6. Type LSR Assembly

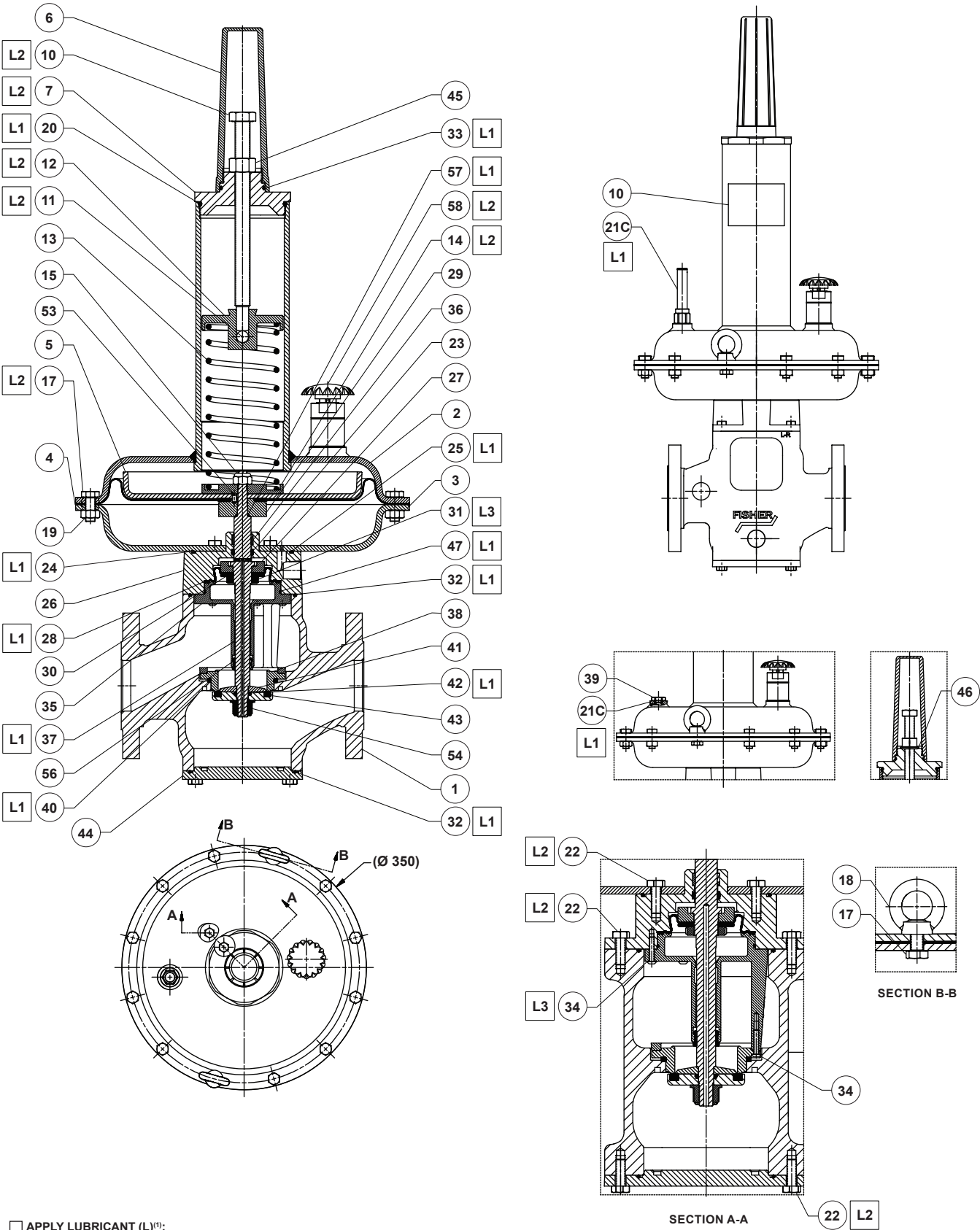


Figure 7. Type LS220 Assembly

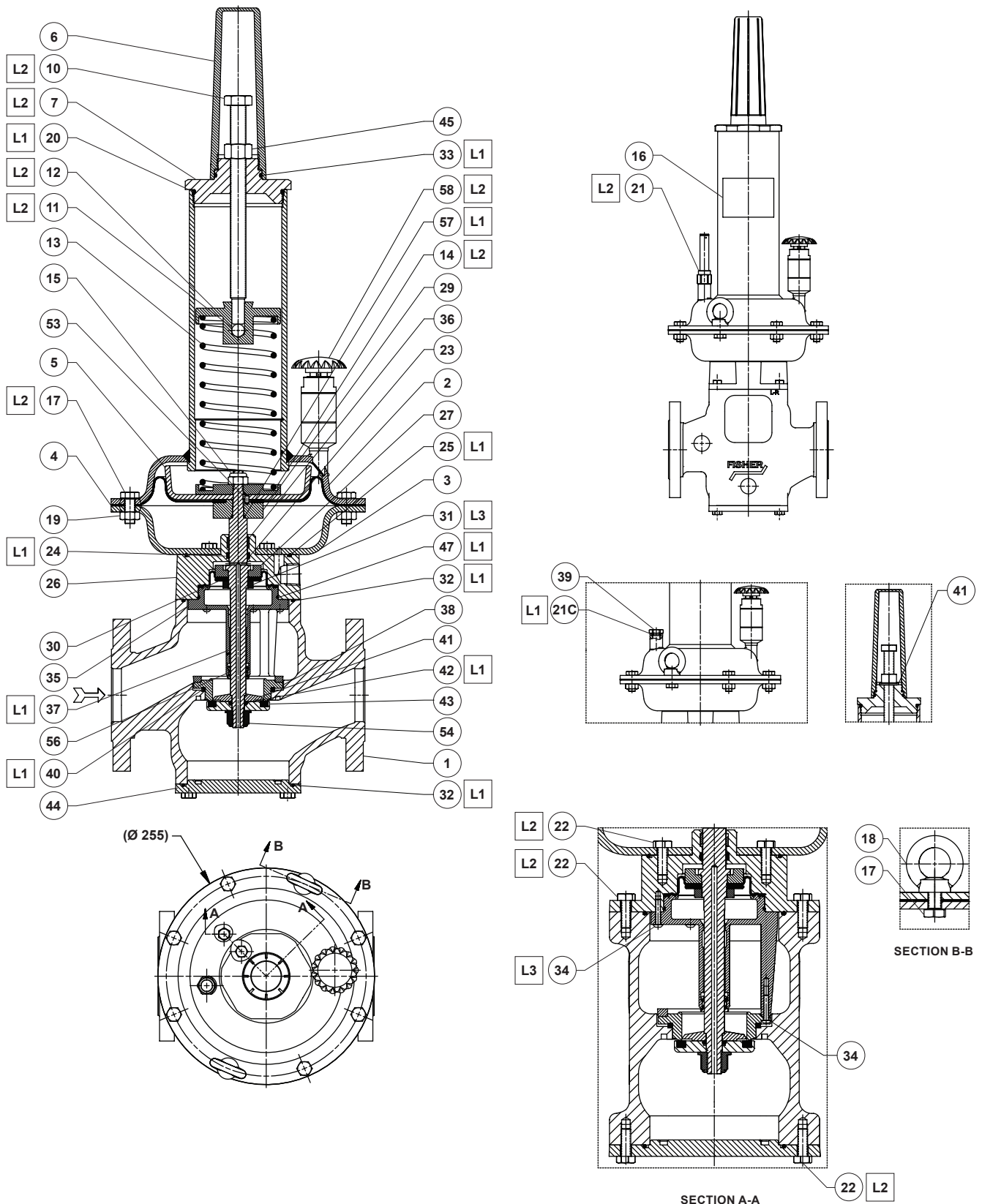


Figure 8. Type LS250 Assembly

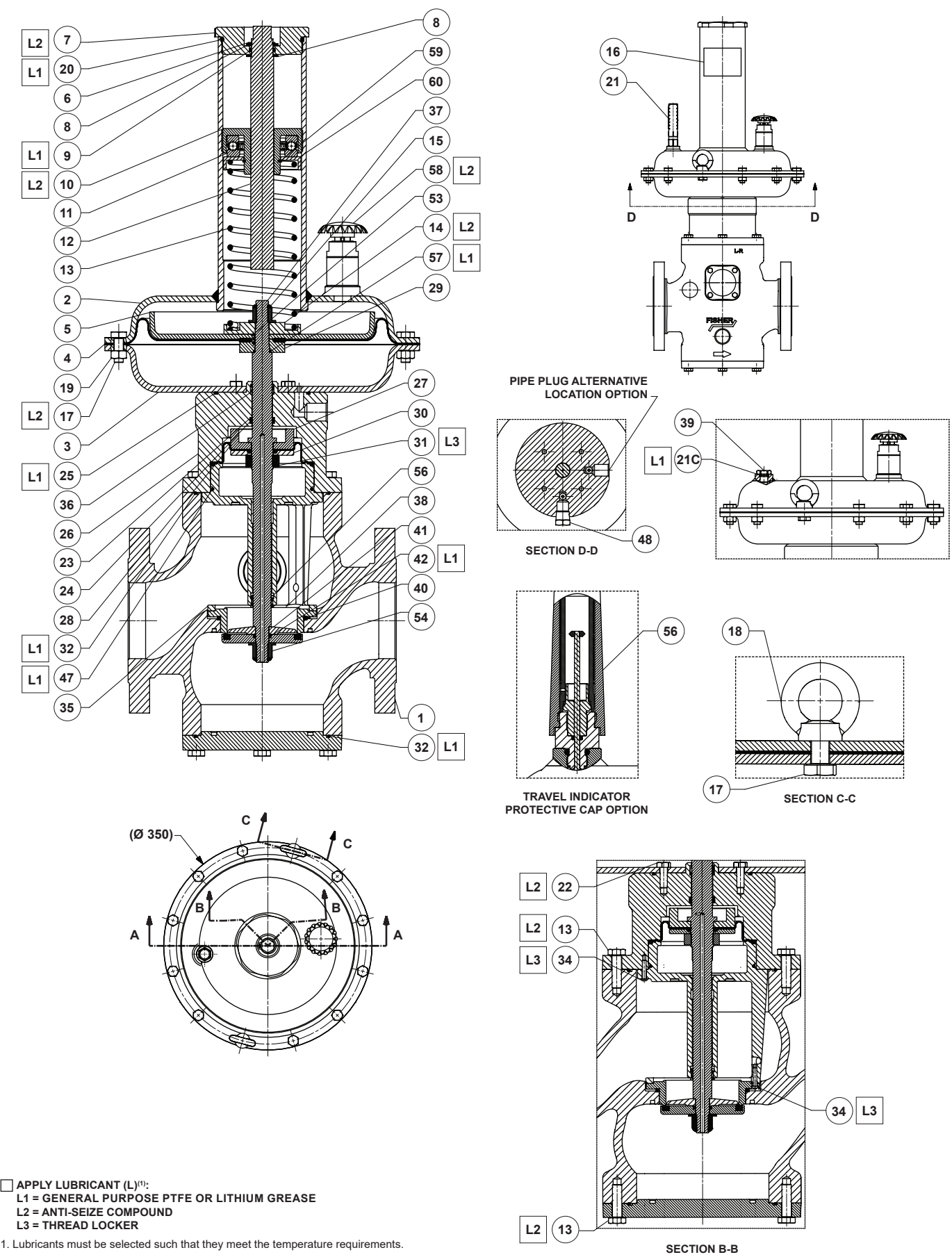


Figure 9. Type LS320 Assembly

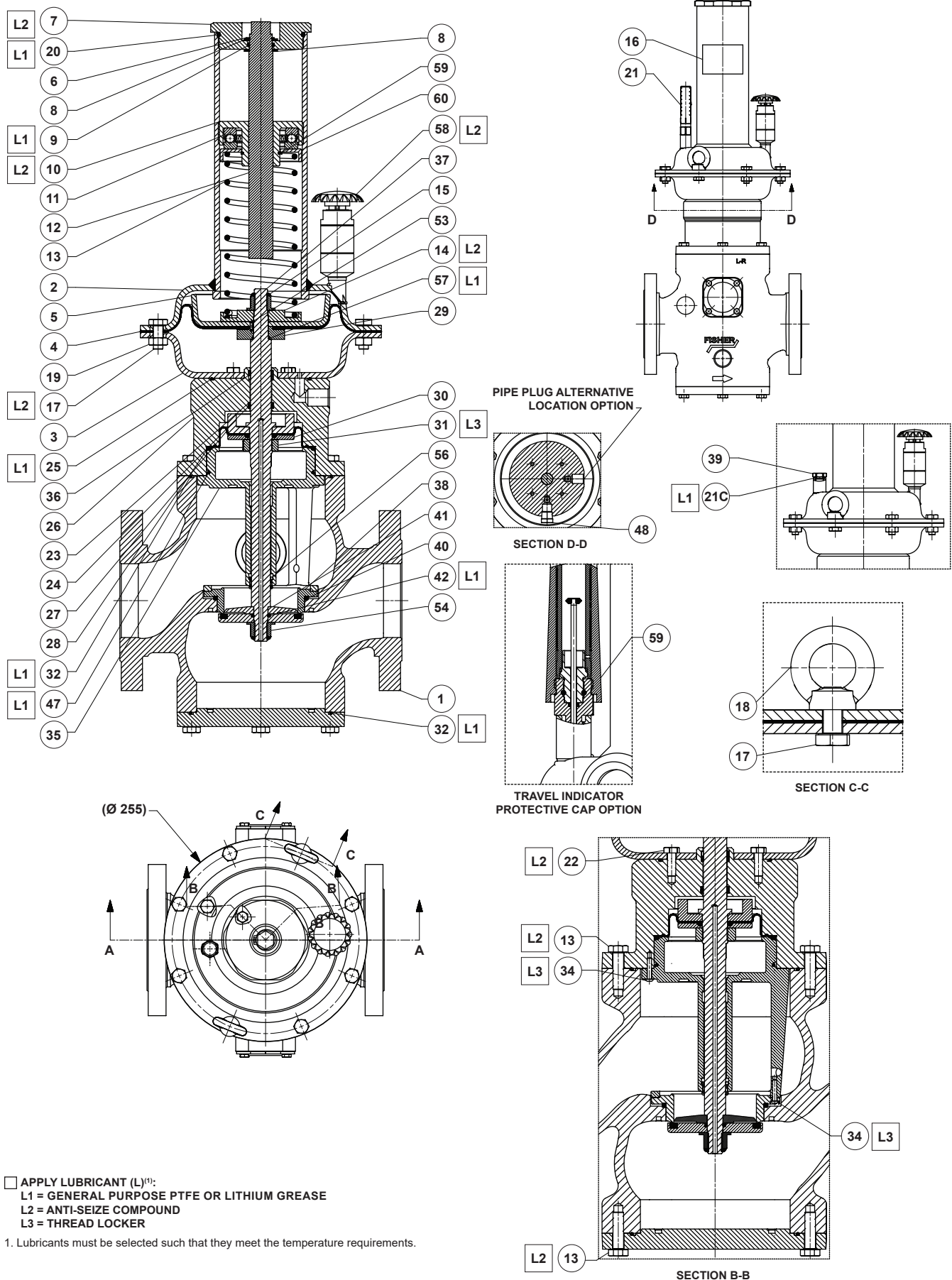
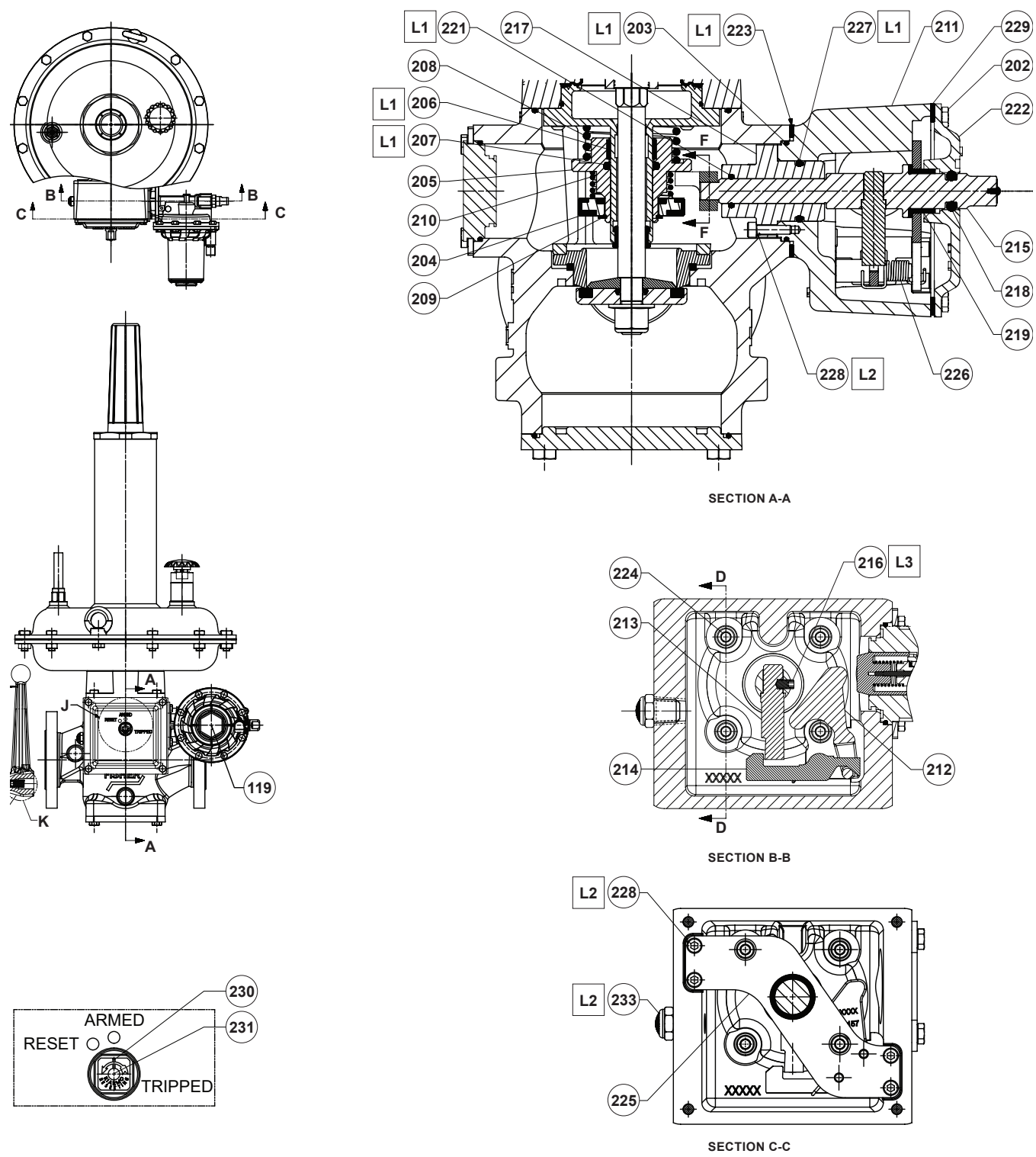


Figure 10. Type LS350 Assembly

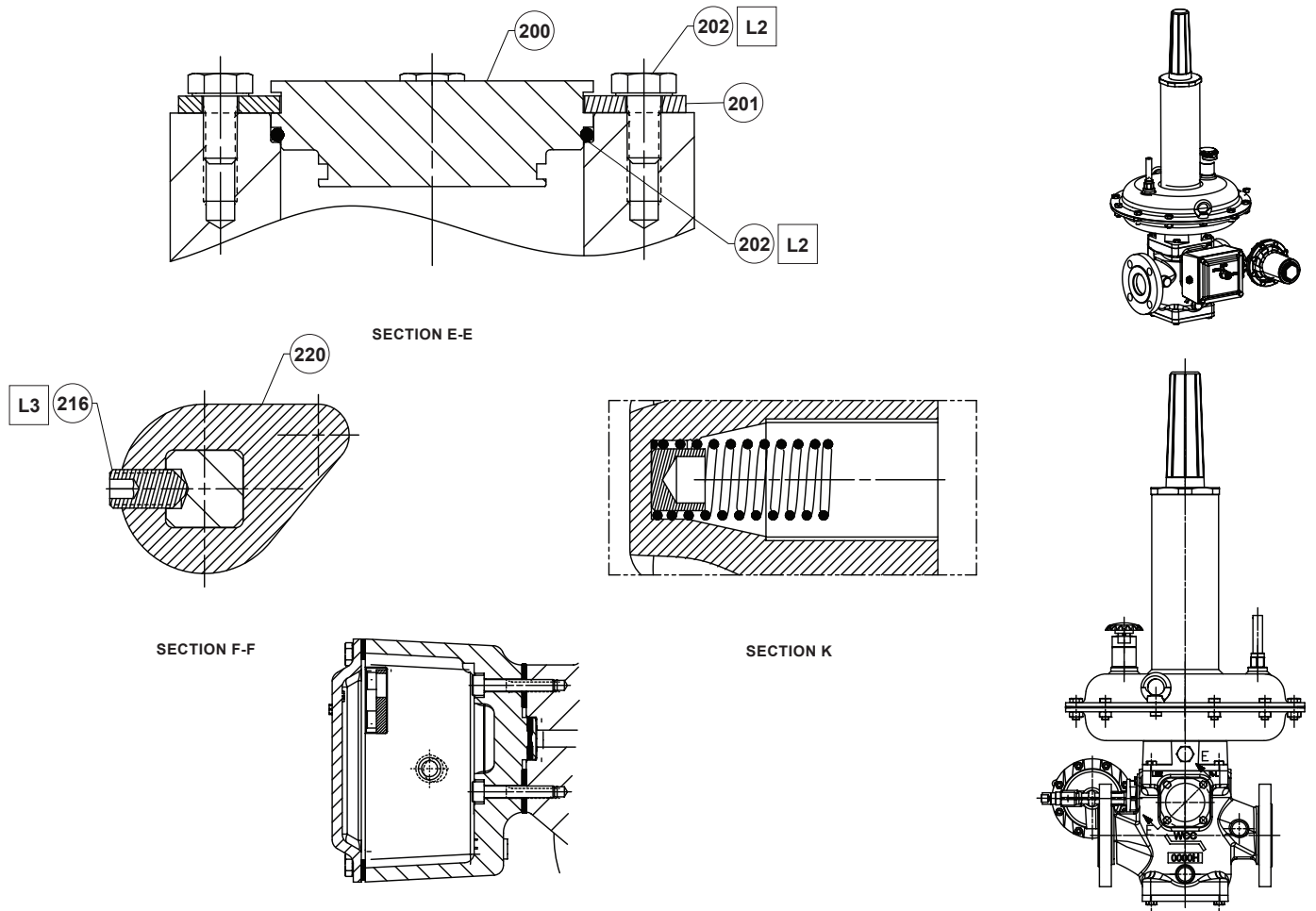


□ APPLY LUBRICANT (L)⁽¹⁾:
L1 = GENERAL PURPOSE PTFE OR LITHIUM GREASE
L2 = ANTI-SEIZE COMPOUND
L3 = THREAD LOCKER

1. Lubricants must be selected such that they meet the temperature requirements.

Figure 11. LSR Series Slam-Shut Device Assembly

Outside North America Only



□ APPLY LUBRICANT (L)⁽¹⁾:
 L2 = ANTI-SEIZE COMPOUND
 L3 = THREAD LOCKER

1. Lubricants must be selected such that they meet the temperature requirements.

Figure 11. LSR Series Slam-Shut Device Assembly (continued)

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