

March 2024

# Fisher™ Type 133HP to LS200 Series Regulator Transition Management Guide



Figure 1. Typical LS200 Series

## Background

The Fisher LS200 Series is designed to provide precise, reliable pressure regulation for a wide range of applications. It features a robust design that ensures a steady supply of pressure, regardless of changes to inlet pressure or flow rate. The LS200 Series is also easy to install and maintain, with minimal disruption to existing processes.

The new Fisher LS200 Series pressure reducing natural gas regulator is a balance trim design like the Type 133HP. The LS200 Series offers a number of improvements and upgrades compared to the Type 133HP. The LS200 Series meets or exceeds the Type 133HP in pressure rating, flow, accuracy, ease of maintenance and materials of construction. These improvements have resulted in a marked improvement over the legacy Type 133HP.

Table 1. New and Legacy Products Description

| NEW PRODUCT  | DESCRIPTION       | LEGACY PRODUCT |
|--------------|-------------------|----------------|
| LS200 Series | Pressure Reducing | Type 133HP     |

## Purpose

The purpose of this document is to ease the transition of the user from the Type 133HP to the new LS200 Series. The transition can be most easily understood through the following categories:

1. **Fit** – Is the installation of this product different?
2. **Form** – Are there any physical changes?
3. **Function** – How is the product different in its operation and performance?

# LS200 Series

**Table 2. New and Legacy Products Configuration Description**

| NEW PRODUCT TYPE   | DESCRIPTION   | LEGACY PRODUCT TYPE |
|--|---|---------------------|
| <b>LS200 Series: Pressure Reducing Natural Gas Regulator</b> |   |                     |
| Type LS200   | Direct-operated low pressure regulator for 0.25 to 5 psig / 0.017 to 0.35 bar outlet pressures                            | Type 133HP          |
| Type LS204*  | Direct-operated low pressure regulator for 0.25 to 5 psig / 0.017 to 0.35 bar outlet pressures with integrated Slam-shut  | ----                |
| Type LS220   | Direct-operated low pressure regulator for 4.35 to 21.75 psig / 0.3 to 1.5 bar outlet pressures                           | Type 133HP          |
| Type LS224*  | Direct-operated low pressure regulator for 4.35 to 21.75 psig / 0.3 to 1.5 bar outlet pressures with integrated Slam-shut | ----                |
| Type LS250   | Direct-operated high pressure regulator for 20 to 60 psig / 1.38 to 4.14 bar outlet pressures                             | Type 133HP          |
| Type LS254*  | Direct-operated low pressure regulator for 20 to 60 psig / 1.38 to 4.14 bar outlet pressures with integrated Slam-shut    | ----                |

**Table 3. Physical Design Comparison**

| CATEGORY                                | LS200 SERIES                      | TYPE 133HP                       |
|---|-----------------------------------|----------------------------------|
| Body Size                               | 2 in. / DN 50                     | 2 in. / DN 50                    |
| End Connection                          | NPT, CL125 FF, CL150 RF and PN 16 | NPT and CL150 RF                 |
| Face-to-Face Dimension (Flanged Bodies) | 10 in. / 254 mm                   | 10 in. / 254 mm                  |
| Pressure Registration                   | External                          | External                         |
| Vent Connection                         | 1/2 NPT or Drilled Untapped Hole  | 1/2 NPT or Drilled Untapped Hole |

**Table 4. Pressure Comparison**

| PRESSURE   |   | TYPE LS200          |                    | TYPE LS220         |                    | TYPE LS250 |      | TYPE 133HP |      |
|--|---|---------------------|--------------------|--------------------|--------------------|------------|------|------------|------|
|  |   | psig                | bar                | psig               | bar                | psig       | bar  | psig       | bar  |
| Maximum Operating Inlet Pressure                 | <5 psig / 345 mbar maximum outlet pressure  | 90.0                | 6.2                | 125                | 8.6                | 300        | 20.7 | 150        | 10.3 |
|  | =5 psig / 345 mbar maximum outlet pressure  | 125                 | 8.6                |                    |                    |            |      |            |      |
|  | <10 psig / 0.69 bar maximum outlet pressure | N/A                 | N/A                | 300                | 20.7               |            |      |            |      |
|  | >10 psig / 0.69 bar maximum outlet pressure |                     |                    |                    |                    |            |      |            |      |
| Maximum Emergency Inlet Pressure                 |   | 300                 | 20.7               |                    |                    |            |      |            |      |
| Maximum Operating Outlet Pressure <sup>(1)</sup> |   | 5.0                 | 0.34               | 22                 | 1.5                | 60         | 4.1  | 60         | 4.1  |
| Maximum Outlet Pressure Over Outlet Pressure     |   | 11.6                | 0.8                | 29                 | 2.0                | 84         | 5.8  | 100        | 6.9  |
| Maximum Emergency Outlet (Casing) Pressure       |   | 66.0 <sup>(2)</sup> | 5.6 <sup>(2)</sup> | 115 <sup>(3)</sup> | 7.9 <sup>(3)</sup> | 150        | 10.3 | 150        | 10.3 |

1. With highest spring range available only.  
2. 35 psi / 2.41 bar per PED.  
3. 50 psi / 3.45 bar per PED.

**Table 5. Sizing Coefficients**

| TRIM USED         | LS200 SERIES       |                          |                | TYPE 133HP     |                          |                |
|-------------------|--------------------|--------------------------|----------------|----------------|--------------------------|----------------|
|                   | Maximum Travel     | Wide Open C <sub>g</sub> | C <sub>1</sub> | Maximum Travel | Wide Open C <sub>g</sub> | C <sub>1</sub> |
| No Restriction    | 100%               | 2083                     | 29             | 100%           | 1800                     | 35             |
| Restricted Travel | 78% <sup>(1)</sup> | 1625                     | 26             | 60%            | 1150                     | 31.8           |
|                   | 60%                | 1249.8                   | 24.5           | 40%            | 760                      | 29.1           |
|                   | 40%                | 650                      | 22             | 25%            | 490                      | 28.2           |

1. 78% trim designed for retrofit Type 133HP applications without needing to up-size existing relief valve.

**Table 6. Detailed Comparison of LS200 Series (New Product) and Type 133HP (Legacy Product) Pressure Reducing Regulators**

| CATEGORY  | LS200 SERIES (NEW PRODUCT)                 |                     | TYPE 133HP (LEGACY PRODUCT)                       |                     |
|---|--|---------------------|---|---------------------|
| End Connection Style  | NPT  |                     | NPT   |                     |
|   | CL125 FF, CL150 RF                         |                     | CL125 FF, CL150 RF                                |                     |
|   | PN 16                                      |                     | ----  |                     |
| Body Material   | Gray cast iron, Ductile iron and WCC Steel |                     | Gray cast iron and WCC Steel                      |                     |
| Actuator Material   | S355ML Structural steel                    |                     | Gray Cast Iron Spring Case and Steel Lower Casing |                     |
| Diaphragm Material  | Nylon-reinforced Nitrile (NBR)             |                     | Neoprene (CR)                                     |                     |
| Disk/Seat Material  | Nitrile (NBR) Inside Steel Retainer        |                     | Aluminum Disk Holder and Nitrile (NBR)            |                     |
| Orifice Material  | 304 Stainless steel                        |                     | Aluminum  |                     |
| Trim and Stem Material  | S17400 Stainless steel H1075               |                     | Aluminum  |                     |
| Body and Orifice Size   | <b>Body Size</b>                           | <b>Orifice Size</b> | <b>Body Size</b>                                  | <b>Orifice Size</b> |
|   | 2 in.                                      | 2.02 in. / 51.3 mm  | 2 in.   | 1.90 in. / 48.26 mm |
|   | 2 x 4 in.                                  | 2.02 in. / 51.3 mm  | Not Applicable                                    |                     |
| Control Pressure Range  | <b>TYPE LS200 LOW PRESSURE ACTUATOR</b>    |                     | <b>TYPE 133HP</b>                                 |                     |
|   | 0.25 to 0.32 psig / 0.017 to 0.022 bar     |                     | ----  |                     |
|   | 0.30 to 0.70 psig / 0.02 to 0.05 bar       |                     | ----  |                     |
|   | 0.60 to 1.28 psig / 0.04 to 0.09 bar       |                     | ----  |                     |
|   | 1.10 to 2.24 psig / 0.08 to 0.15 bar       |                     | ----  |                     |
|   | 2 to 5 psig / 0.14 to 0.35 bar             |                     | ----  |                     |
|   | <b>TYPE LS220 MEDIUM PRESSURE ACTUATOR</b> |                     | <b>TYPE 133HP</b>                                 |                     |
|   | 4.35 to 5.1 psig / 0.3 to 0.35 bar         |                     | 2 to 5 psig / 0.14 to 0.34 bar                    |                     |
|   | 4.35 to 10.6 psig / 0.3 to 0.73 bar        |                     | 4.5 to 10 psig / 0.31 to 0.69 bar                 |                     |
|   | 4.8 to 15.7 psig / 0.33 to 1.08 bar        |                     | 6 to 20 psig / 0.41 to 1.4 bar                    |                     |
|   | 8.3 to 21.8 psig / 0.57 to 1.5 bar         |                     |   |                     |
|   | <b>TYPE LS250 HIGH PRESSURE ACTUATOR</b>   |                     | <b>TYPE 133HP</b>                                 |                     |
|   | 20 to 30 psig / 1.38 to 2.09 bar           |                     | 16 to 30 psig / 1.1 to 2.1 bar                    |                     |
|   | 20 to 45 psig / 1.38 to 3.09 bar           |                     | 26 to 40 psig / 1.8 to 2.8 bar                    |                     |
|   | 25 to 60 psig / 1.72 to 4.14 bar           |                     | 36 to 50 psig / 2.5 to 3.4 bar                    |                     |
| 45 to 60 psig / 3.1 to 4.1 bar                                      |  |                     |   |                     |
| Temperature Range   | -40 to 150°F / -40 to 66°C                 |                     | -20 to 150°F / -29 to 66°C                        |                     |
| Hydrogen Readiness  | 25% Blend Ready                            |                     | Not Available                                     |                     |
|   | 100% Hydrogen in Development               |                     | Not Available                                     |                     |
| <b>APPROXIMATE WEIGHT</b>   |  |                     |   |                     |
| Type LS220  | 91.5 lbs / 41.2 kg                         |                     | Not Applicable                                    |                     |
| Type LS250  | 75.3 lbs / 33.9 kg                         |                     | 62.5 lbs / 28 kg                                  |                     |
| 2x4 Body Weight Adder   | 8.3 lbs / 4 kg                             |                     | Not Applicable                                    |                     |
| Slam-shut Weight Adder  | 16.4 lbs / 7.5 kg                          |                     | Not Applicable                                    |                     |
| "Published Flow Capacity (60 psi inlet and 5 psi outlet 20% droop)" | 179,000 SCFH / 5075 Nm <sup>3</sup> /h     |                     | 84,700 SCFH / 2270 Nm <sup>3</sup> /h             |                     |
| Dimensions  | <b>SEE FIGURE 4 AND TABLE 7</b>            |                     |   |                     |
| Options   | Travel Indicator                           |                     | None  |                     |
|   | Integrated slam-shut                       |                     |   |                     |
|   | Sealed adjusting screw                     |                     |   |                     |
|   | Field Convertible Slam-shut                |                     |   |                     |

Note: Shaded cells indicate differences between the new and legacy product.

# LS200 Series

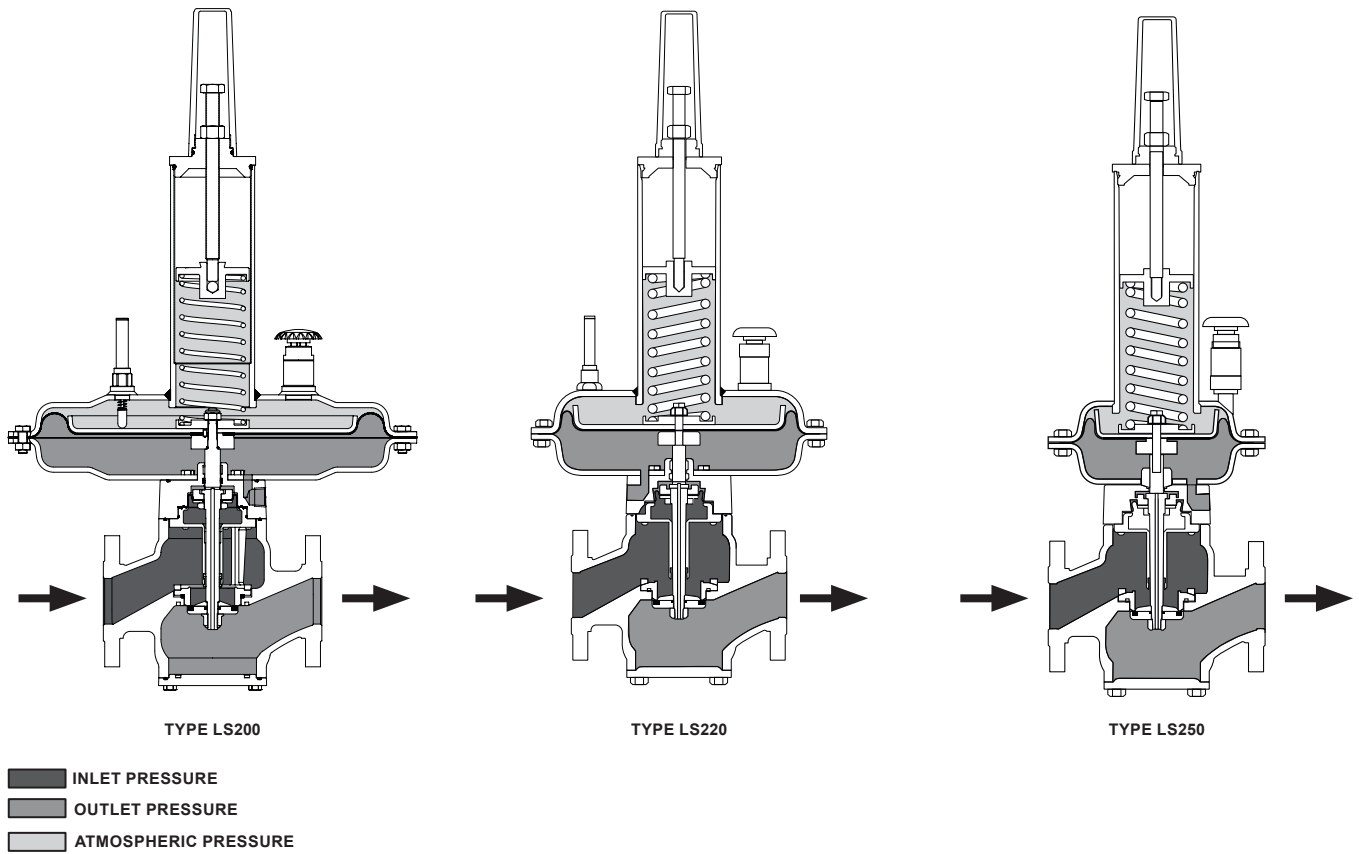


Figure 2. LS200 Series Operational Schematics

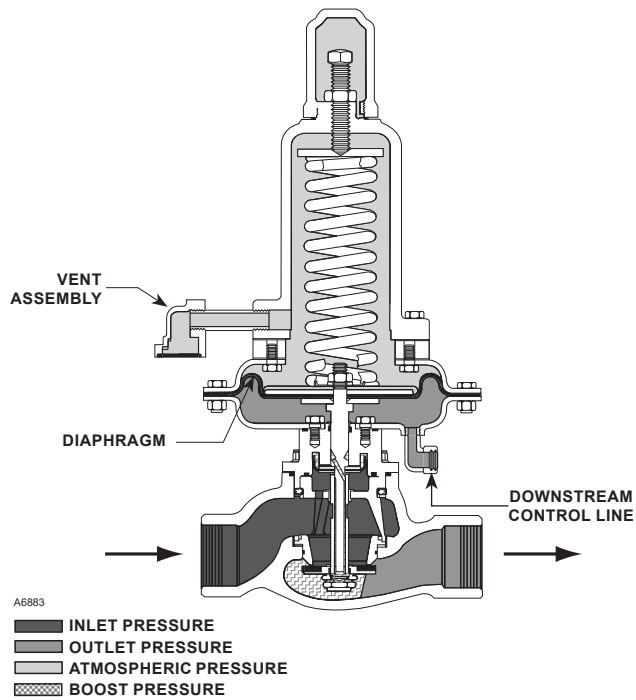


Figure 3. Type 133HP Operational Schematic

The following is a discussion covering each of these three elements.

## Fit

See Table 3. The new and legacy products have the same body sizes and end connections. Expanded outlet option, 4 in. outlet flange allows less pipe above the ground or save space in a vault by removing a pipe swage downstream. Face-to-face dimensions of flanged connections are the same. The LS200 Series is 9.66 in. / 245 mm taller than the Type 133HP. (Internal adjusting screw is in development to reduce the height difference to 4 in. / 101 mm)

## Form

The new LS200 Series offers the same configuration options as the legacy Type 133HP. New body material and end connection size are available with the same face-to-face dimension of 10 in. / 254 mm. The LS200 Series trim materials are upgraded to 304 Series stainless steel for increased durability compared to Type 133HP aluminum trim. The actuator for the high pressure Type LS250 1/4 in. / 6.35 mm wider than the Type 133HP. The height differences are shown in Table 7. The new LS200 Series is 8 in. / 203 mm taller than the Type 133HP. This is to make room for taller springs allowing more travel and therefore flow. The springs were designed around common set points for optimal performance. No parts were reused from the Type 133HP to develop the LS200 Series. The LS200 Series utilizes external control line for pressure registration, same as the Type 133HP.

## Function

See Tables 4 to 6 for comparing the features of the LS200 Series to the legacy Type 133HP. The LS200 Series utilizes the same balance trim design principles as the Type 133HP with larger orifice, keeping the basic function the same. This increases the flow performance and capacity.

The LS200 Series offers a higher operating inlet pressure allowing it to operate in more conditions than the Type 133HP. The LS200 Series also offers shorter maintenance times with a new to the market, hex stem design allowing for bottom entry repairs. The LS200 Series keeps the same four bolt access to all the trim like the Type 133HP. The disk can be changed in five minutes compared to more than thirty minutes for Type 133HP.

Go to the LS200 Series webpage on Emerson.com or Emerson's YouTube page for the maintenance videos to see the new procedure. The LS200 Series also offers a travel indicator, expanded outlet and integrated slam-shut that were not previously available on the Type 133HP.

## Conclusion

The release of the LS200 Series is a new direct in the natural gas distribution technology available. It increases the level of safety available for gas use while offering zero emission overpressure protection options. The increase flow and improved materials make the LS200 Series more versatile than the Type 133HP while improving on ease of maintenance. Please refer to the LS200 Series Bulletin and web page for the complete list of features and additional information.

# LS200 Series

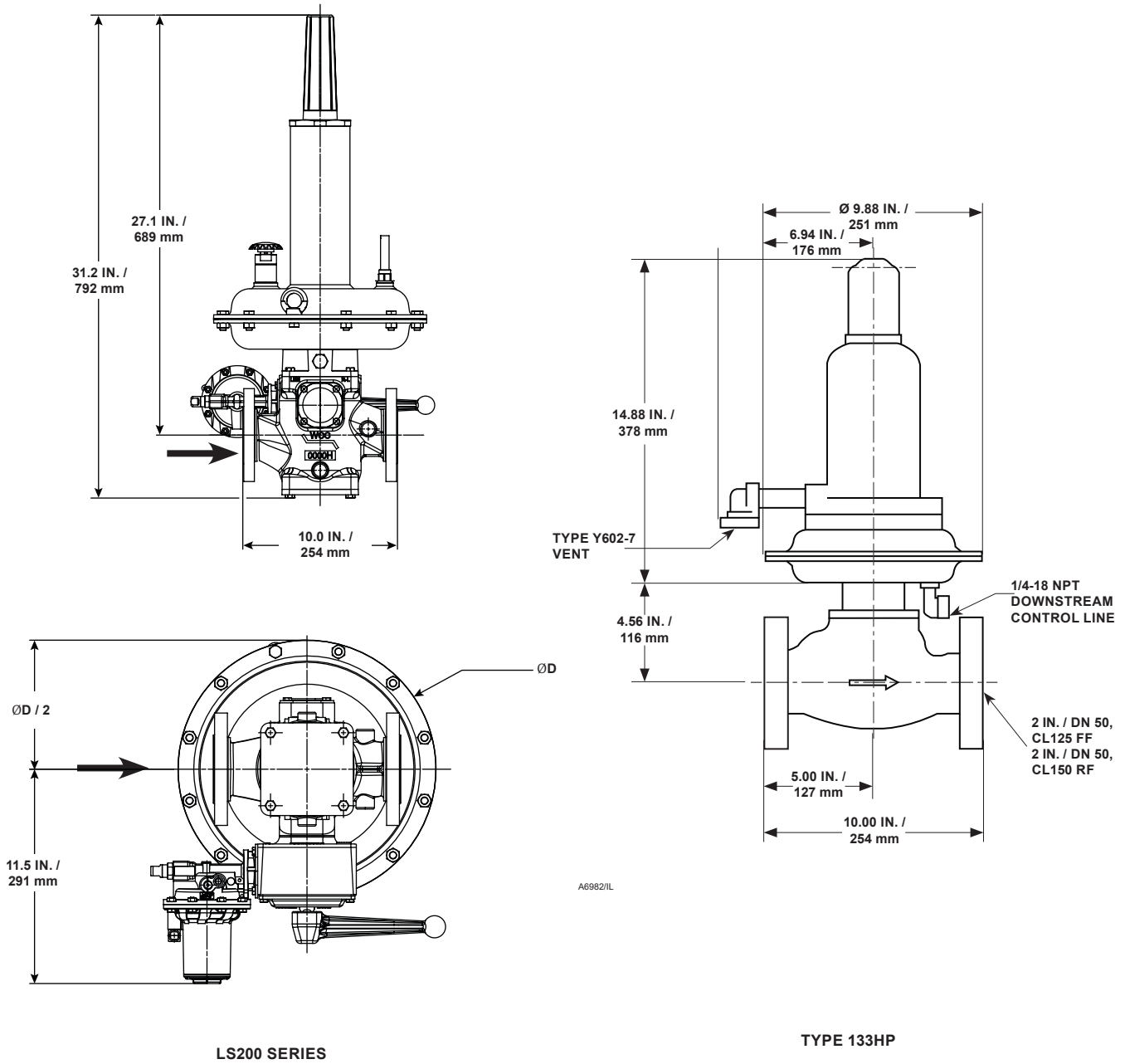


Figure 4. Dimensions

Table 7. Dimension Comparison

| DIMENSION                               | TYPE LS200 |     | TYPE LS220 |     | TYPE LS250 |     | TYPE 133HP |      |
|---|------------|-----|------------|-----|------------|-----|------------|------|
|   | In.        | mm  | In.        | mm  | In.        | mm  | In.        | mm   |
| Middle of Pipe to Top of Closing Cap    | 23.1       | 587 | 27.1       | 689 | 27.1       | 689 | 19.5       | 495  |
| Face to Face                            | 10         | 254 | 10         | 254 | 10         | 254 | 10         | 254  |
| Face to Face / 2                        | 5          | 127 | 5          | 127 | 5          | 127 | 5          | 127  |
| Actuator Diameter                       | 18.7       | 475 | 13.8       | 350 | 10         | 255 | 9.88       | 251  |
| Middle of Pipe to Slam-shut Closing Cap | 11.5       | 292 | 11.5       | 292 | 11.5       | 292 | ----       | ---- |

**Table 8. Repair Kits**

| SPARE PART KITS       | ACTUATOR TYPE (SIZE)                 | KEY   | KIT PART NUMBER | 133HP KIT PART NUMBER |
|-----------------------|--------------------------------------|---|-----------------|-----------------------|
| Pad Repair Kit        | LS200 (single Side)                  | 32, 42, 43, 54  | RLS200PADA0     | 10A3058X012           |
|                       | LS200 (double Side) <sup>(1)</sup>   | 32, 42, 43, 54  | RLS202PADA0     | N/A                   |
|                       | LS220/LS250 (single side)            | 32, 42, 43, 54  | RLS2PAD10A0     | 10A3058X012           |
|                       | LS220/LS250 (double side)            | 32, 42, 43, 54  | RLS2PAD20A0     | N/A                   |
| Orifice Kit           | All                                  | 32, 38, 40, 42, 54  | RLS2ORFC0A0     | 20A3046X012           |
|                       | All with SSD                         | 32, 38, 40, 42, 54, 203, 206, 207, 223  | RLS24ORF0A0     |                       |
| Balance Port Kit      | LS200                                | 15, 20, 23, 24, 28, 32, 33, 42, 47, 54, 57  | RLS200BALA0     | N/A                   |
|                       | LS204                                | 15, 20, 23, 24, 28, 32, 33, 42, 47, 54, 57, 203, 223  | RLS204BALA0     |                       |
|                       | LS220/LS250                          | 15, 20, 23, 24, 28, 32, 33, 42, 47, 54, 57  | RLS2BALN0A0     |                       |
|                       | LS224/LS254                          | 15, 20, 23, 24, 28, 32, 33, 42, 47, 54, 57, 203, 223  | RLS2XBALNA0     |                       |
| Actuator Kit          | LS200 (475 mm)                       | 4, 15, 20, 21C, 33, 57  | RLS200ACTA0     | 32B3520X012           |
|                       | LS220 (350 mm)                       | 4, 15, 20, 21C, 33, 57  | RLS220ACTA0     |                       |
|                       | LS250 (255 mm)                       | 4, 15, 20, 21C, 33, 57  | RLS250ACTA0     |                       |
| Full Rebuild Kit      | LS200 (475 mm)                       | 4, 15, 20, 21C, 23, 24, 25, 28, 32, 33, 36, 38, 40, 42, 43, 47, 54, 56, 57  | RLS200REBA0     | N/A                   |
|                       | LS220 (350 mm)                       | 4, 15, 20, 21C, 23, 24, 25, 28, 32, 33, 36, 38, 40, 42, 43, 47, 54, 56, 57  | RLS220REBA0     | 18B3520X012           |
|                       | LS250 (255 mm)                       | 4, 15, 20, 21C, 23, 24, 25, 28, 32, 33, 36, 38, 40, 42, 43, 47, 54, 56, 57  | RLS250REBA0     | 18B3520X012           |
|                       | LS204 (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, 203, 204, 206, 207, 209, 216, 218, 219, 221, 223, 227, 229, 21C | RLS204REBA0     | N/A                   |
|                       | LS224 (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     |                       |
|                       | LS254 (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     |                       |
| Travel Indicator      | LS200 and LS220                      | 21  | RLS220TVLA0     |                       |
|                       | LS250 (255 mm)                       | 21  | RLS250TVLA0     |                       |
| Vent                  | LS200                                | 58  | RLS200VENT0     |                       |
|                       | LS220 and LS250                      | 58  | RLS20VENTA0     |                       |
| Slam Shut Device VSX8 | All                                  | 203   | RLS20VSX8A0     |                       |

1. Not yet available

# LS200 Series

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