November 2009

Types 95LD and 95HD Differential Pressure Regulators


W1894-1

TYPE 95LD


W6195

TYPE 95LD (FLANGED)


W1894-1

TYPE 95HD

Figure 1. *95 Series Differential Pressure Regulators*

WARNING

Failure to follow these instructions or to properly install and maintain this equipment could result in an explosion, fire and/or chemical contamination 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. 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.

Installation, operation, and maintenance procedures performed by unqualified personnel may result in improper adjustment and unsafe operation. Either condition may result in equipment damage or personal injury. Use qualified personnel when installing, operating, and maintaining the Types 95LD and 95HD regulators.

Introduction

Scope of the Manual

This manual provides instructions for the installation, adjustment, maintenance, and parts ordering for 95 Series differential pressure regulators. These regulators usually are shipped separately for line or panel mounting or installed on other equipment. Instructions and parts lists for other equipment are found in separate manuals.

D100257X012

Specifications

Available Configurations

Type 95LD: Low-pressure differential regulator for 2 to 30 psi (0,14 to 2,1 bar) differential pressures

Type 95HD: High-pressure differential regulator for 5 to 150 psi (0,34 to 10,3 bar) differential pressures

Body and Orifice Sizes

Types 95LD, 95HD
NPS 1/4:
1/4-inch (6,4 mm) orifice
NPS 1/2 (DN 15):
3/8-inch (9,5 mm) orifice
NPS 3/4 and 1 (DN 20 and 25):
9/16-inch (14 mm) orifice

Type 95HD
NPS 1-1/2 and 2 (DN 40 and 50):
1-1/16-inch (27 mm) orifice

End Connection Styles
NPT, ASME flanged 14-inch face-to-face
EN flanged; 356 mm face-to-face, CL150 RF, CL300 RF or SWE

Maximum Cold Working Pressures of Body Size and Materials
See Table 1

Differential Pressure Ranges
See Table 2

Shutoff Classification Per ANSI/FCI 70-3-2004
Metal Seats: Class IV
Elastomer Seats: Class VI or better
Polytetrafluoroethylene (PTFE): Class IV

Flow and Sizing Coefficients
See Table 3

Maximum Temperature Ranges of Diaphragm and Seat Materials(1)(2)

MATERIAL	TEMPERATURE RANGE
Nitrile (NBR)	-40° to 180°F (-40° to 82°C)
Neoprene (CR)	-40° to 180°F (-40° to 82°C)
Fluorocarbon (FKM)(3)	0° to 300°F (-18° to 149°C)
Ethylenepropylene (EPDM)	-40° to 275°F (-40° to 135°C)
PTFE	-40° to 400°F (-40° to 204°C)
Stainless Steel (SST)	-40° to 650°F (-40° to 343°C)

Maximum Temperature Ranges of Body Materials(1)(2)

TYPE	BODY AND SPRING CASE MATERIALS	TEMPERATURE RANGE
95LD, 95HD	Cast Iron	-40° to 406°F (-40° to 208°C)
	Steel	-20° to 450°F (-29° to 232°C)
	Stainless Steel	-40° to 450°F (-40° to 232°C)

Pressure Setting Adjustment
Handwheel

Pressure Registration
Internal with outside pressure source for differential pressure or pressure loading

Approximate Weights

Type 95HD
NPS 1/4 body: 4 pounds (2 kg)
NPS 1/2 (DN 15) body:
8 pounds (4 kg)
NPS 3/4 and 1 (DN 20 and 25) bodies:
20 pounds (9 kg)
NPS 1-1/2 and 2 (DN 40 and 50) bodies:
73 pounds (33 kg)

Type 95LD
NPS 1/4 (DN 6) body:
6 pounds (3 kg)
NPS 1/2 (DN 15) body:
12 pounds (5 kg)
NPS 3/4 and 1 (DN 20 and 25) bodies:
32 pounds (15 kg)

1. The pressure/temperature limits in this Instruction Manual, and any applicable standard or code limitation should not be exceeded.
2. Pressures and/or the body end connection may decrease these maximum temperatures.
3. Fluorocarbon (FKM) is limited to 200°F (93°C) hot water.

Product Description

Types 95LD and 95HD are small-size, large-capacity, differential pressure regulators. They are suitable for steam, air, gas, oil, water, and other fluids control. Typical applications include use on testing fixtures, wash tanks, sterilizers, steam tables, fuel lines, and plant air supplies. The differential pressure range of the Type 95LD regulator is from 2 to 30 psi (0,14 to 2,1 bar) (three spring ranges). The Type 95HD differential pressure range is from 5 to 150 psi (0,34 to 10,3 bar) (seven spring ranges).

Specifications

The Specifications section gives some general specifications for the 95 Series differential pressure regulators. The nameplates give detailed information for a particular regulator as it comes from the factory.

Table 1. *Maximum Cold Working Pressures of Body Size and Materials*

TYPE	BODY AND SPRING CASE MATERIALS	DIAPHRAGM AND SEAT MATERIALS	MAXIMUM INLET PRESSURE		MAXIMUM OUTLET PRESSURE(1)	
			Psig	bar	Psig	bar
95LD	Cast iron	Elastomer All-Metal	250 250	17,2 17,2	50 50	3,4 3,4
	Steel or Stainless Steel	Elastomer All-Metal	300 300	20,7 20,7	125 125	8,6 8,6
95HD	Cast iron	Elastomer All-Metal	250 250	17,2 17,2	250 250	17,2 17,2
	Steel or Stainless Steel	Elastomer All-Metal	300 300	20,7 20,7	300 300	20,7 20,7

1. The maximum outlet pressure equals the spring case loading pressure plus the maximum spring setting.

Table 2. *Spring Part Numbers for 95 Series Body Sizes and Pressure Ranges*

TYPE	BODY SIZE, NPS (DN)	DIFFERENTIAL PRESSURE RANGE(1)		SPRING WIRE DIAMETER INCHES (mm)	SPRING FREE LENGTH INCHES (mm)	SPRING PART NUMBER	COLOR
		Psig	bar				
95LD	1/4	2 to 6 5 to 15 13 to 30	0,14 to 0,41 0,34 to 1,0 0,90 to 2,1	0.148 (3,76) 0.172 (4,37) 0.207 (5,26)	2.00 (50,8) 2.00 (50,8) 1.94 (49,2)	1E392527022 1E392627012 1E392727142	Yellow Green Red
	1/2 (15)	2 to 6 5 to 15 13 to 30	0,14 to 0,41 0,34 to 1,0 0,90 to 2,1	0.207 (5,26) 0.234 (5,94) 0.281 (7,14)	2.50 (63,5) 2.57 (65,2) 2.44 (62,0)	1E395627022 1D7455T0012 1E395727192	Yellow Green Red
	3/4, 1 (20, 25)	2 to 6 5 to 15 13 to 30	0,14 to 0,41 0,34 to 1,0 0,90 to 2,1	0.306 (7,77) 0.343 (8,71) 0.406 (10,3)	4.00 (102) 4.00 (102) 4.00 (102)	1E398927022 1E399027142 1E399127162	Yellow Green Red
95HD	1/4	15 to 30 25 to 75 70 to 150	1,0 to 2,1 1,7 to 5,2 4,8 to 10,3	0.148 (3,76) 0.172 (4,37) 0.207 (5,26)	2.00 (50,8) 2.00 (50,8) 1.94 (49,2)	1E392527022 1E392627012 1E392727142	Yellow Green Red
	1/2 (15)	15 to 30 25 to 75 70 to 150	1,0 to 2,1 1,7 to 5,2 4,8 to 10,3	0.148 (3,76) 0.172 (4,37) 0.207 (5,26)	2.50 (63,5) 2.57 (65,2) 2.44 (62,0)	1E395627022 1D7455T0012 1E395727192	Yellow Green Red
	3/4, 1 (20, 25)	15 to 30 25 to 75 70 to 150	1,0 to 2,1 1,7 to 5,2 4,8 to 10,3	0.306 (7,77) 0.343 (8,71) 0.406 (10,3)	4.00 (102) 4.00 (102) 4.00 (102)	1E398927022 1E399027142 1E399127162	Yellow Green Red
	1-1/2, 2 (40, 50)	5 to 80 60 to 120 100 to 140 120 to 150	0,34 to 5,5 4,1 to 8,3 6,9 to 9,7 8,3 to 10,3	0.531 (13,5) 0.562 (14,3) 0.593 (15,1) 0.656 (16,7)	6.56 (167) 6.56 (167) 6.50 (165) 6.57 (167)	1E795327082 1E795427082 1E793327082 1P788827082	Light Blue Light Gray Yellow Black

1. For Types 95LD and 95HD regulators, the pressure ranges indicate the differential pressure that can be obtained with the indicated spring. The differential pressure (spring setting) is added to the spring case loading pressure to determine the actual outlet pressure.

Table 3. *Types 95LD and HD Flow and Sizing Coefficients*

BODY SIZE, NPS (DN)	WIDE-OPEN COEFFICIENTS (FOR RELIEF SIZING)			C_1	K_m	IEC SIZING COEFFICIENTS		
	C_v	C_g	C_s			X_T	F_D	F_L
1/4	0.8	28	1.40	35	0.83	0.775	0.58	0.91
1/2 (15)	1.9	67	3.35		0.71		0.58	0.84
3/4, 1 (20, 25)	4.4	156	7.80		0.67		0.44	0.82
1-1/2, 2 (40, 50)	12.5	475	23.75	38	0.83	0.913	0.37	0.91

$K_m = F_L^2$

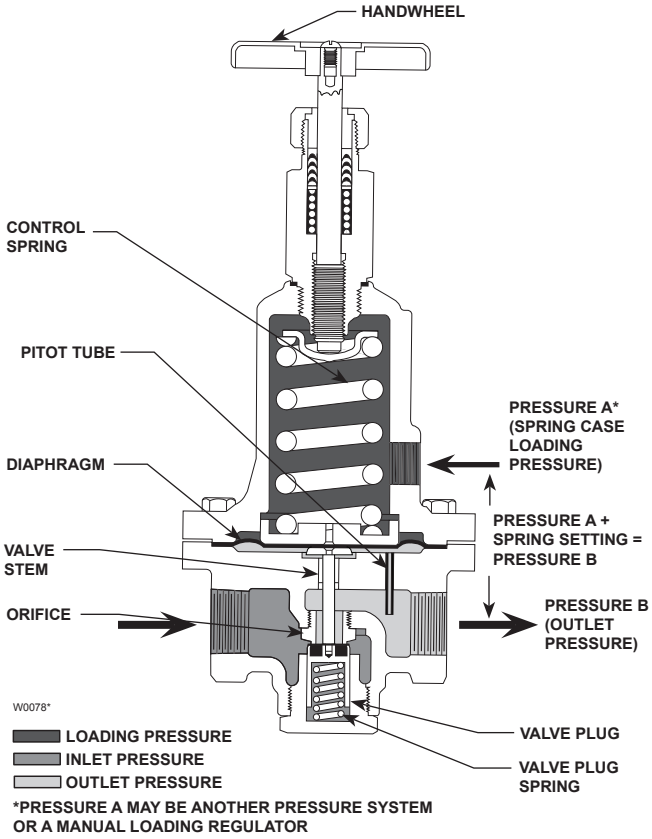

Figure 2. *Type 95HD Operational Schematic (Also Typical of 95LD)*

Principle of Operation

Types 95LD and 95HD regulators maintain a differential pressure between the loading supply pressure and the downstream pressure of the regulator.

Refer to Figure 2. The design of the regulator isolates the diaphragm and pressure response chamber from the main flow stream. The downstream pressure (outlet pressure) is registered under the diaphragm through the pitot tube or registration hole. If the downstream pressure increases, pressure under the diaphragm also increases. This force overcomes the spring compression and loading supply pressure, allowing the stem to rise. The valve plug spring forces the valve plug closer to the orifice. Flow through the regulator is reduced so that downstream pressure returns to the desired differential level. When the downstream pressure decreases, the opposite action takes place. Pressure under the diaphragm decreases. The valve stem pushes the valve plug downward, opening the flow stream and increasing the flow through the regulator. Downstream pressure rises back to the desired differential level.

Installation

Before installing the regulator, be sure the chosen location is adequately protected from damage by vehicles and other external sources. The regulator should be away from building eaves and above probable snow levels. Temperature conditions should not exceed the limits shown in Specifications section.

Unpack the regulator and remove the protective shipping plugs from the end connections of the body and the pressure connection in the spring case. Be sure the body and connecting pipelines are clean. Coat the pipeline threads with a suitable pipe compound. The regulator may be installed in any position as long as the flow is in the direction indicated by the arrow cast on the body.

The design of the regulator isolates the diaphragm and the pressure response chamber from the main flow steam. Outlet pressure registers under the diaphragm through the pitot tube or registration hole. Loading pressure registers on the top of the diaphragm. The loading pressure is connected to the NPT connection in the spring case.

Overpressure Protection

WARNING

Personal injury or system damage may result if this regulator is installed, without appropriate overpressure protection, where service conditions could exceed the limits given in the Specification section and/or regulator nameplate. Regulator installations should be adequately protected from physical damage.

The Types 95LD and 95HD have outlet pressure ratings that are lower than the inlet pressure ratings. Some type of overpressure protection is needed if the actual inlet pressure can exceed the outlet pressure rating. Common methods of overpressure protection include relief valves, monitoring regulators, or series regulation.

The maximum pressures that should not be exceeded are stamped on the nameplate and are also shown in the Specifications section and Table 1.

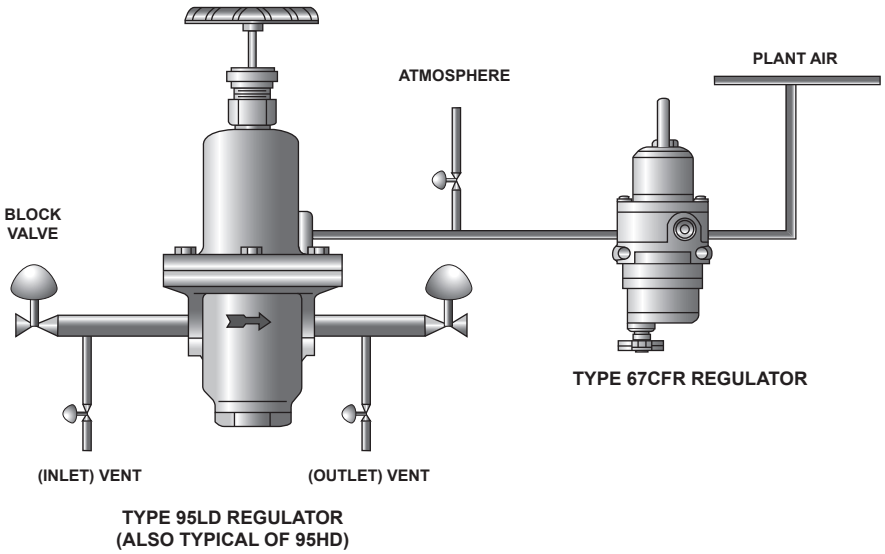

Figure 3. *Installation Schematic*

Startup

Note

The Specifications section and Table 1 show the maximum inlet and the differential pressures for specific constructions. Use pressure gauges to monitor inlet pressure, outlet pressure, and any intermediate pressure during startup.

1. Check that proper installation is completed and downstream equipment has been properly adjusted.
2. Make sure all block and vent valves are closed.
3. Back out the adjusting screw by turning the handwheel counterclockwise continuously.
4. Slowly open the valves in the following order:
   a. Loading supply and control line valve(s), if used
   b. Inlet block valve
   c. Outlet block valve
5. Set the regulator to the desired outlet (control) pressure according to the Adjustment procedure.

Adjustment

Key numbers are referenced in Figures 4 and 5.

The factory setting of the regulator can be varied within the pressure range stamped on the nameplate. To change the outlet pressure, turn the handwheel (key 38) clockwise to increase outlet pressure, or counterclockwise to decrease it. Monitor the outlet pressure with a test gauge during the adjustment.

All regulator springs can be backed off to provide zero outlet. Recommended outlet pressure ranges available, maximum inlet pressures and temperatures, and color codes of the respective springs are shown in Tables 1 and 2.

Shutdown

1. Isolate the regulator from the system.
2. Close the upstream block valve to the regulator inlet.
3. Close the downstream block valve to the regulator outlet.
4. Vent the downstream pressure by slowly opening the vent valve to vent downstream pressure.
5. Vent loading pressure slowly to release pressure in the spring case.
6. Vent inlet pressure slowly (through the vent valve) to release all remaining pressure in the regulator.

Maintenance

WARNING

To avoid personal injury and equipment damage, isolate the regulator from all pressures, including loading pressure. Cautiously release all pressure from the regulator before attempting disassembly.

Due to normal wear and damage that may occur from external sources, the regulator should be inspected periodically. Parts such as the O-rings, gaskets, diaphragm, and packing should be replaced as necessary. The frequency of inspection and replacement depends upon the severity of service conditions or the requirements of state and federal laws.

Suitable lubricants are shown in the assembly drawings. Apply the lubricants as the regulator is being reassembled.

Refer to Figure 4 or 5 while disassembling the regulator. The regulator does not have to be taken out of the pipeline to be disassembled. Relieve the spring compression by turning the handwheel (key 38) counterclockwise.

Replacement or Maintenance of Orifice and Valve Plug

If it appears that the valve does not shut off tightly, the orifice and valve plug may be worn or damaged. Proceed as follows to check them.

1. Unscrew the valve plug guide (key 5) from the body (key 1). The valve plug spring (key 10) and the valve plug (key 4) will normally come out of the body along with the valve plug guide.
2. Remove the orifice (key 3). Examine the orifice and valve plug seating surfaces for damage.

Note

If the damage to elastomer or metal seating surfaces is severe, replace the orifice and valve plug with new parts. However, by following the lapping procedure below, it is possible to repair metal seating surfaces if they are only slightly worn or scratched.

3. Lapping procedure:
   a. Place a small amount of 500-grit silicon carbide or aluminum oxide lapping compound on a flat surface such as a piece of heavy plate glass.
   b. Take the valve plug or orifice and move it in a “Figure 8” motion on the lapping compound. Do not allow the part to tip or rock since this would round the corners.
   c. Repeat step b for each part, this time using an 800-grit or 1000-grit silicon carbide or aluminum oxide lapping compound.
   d. Wash away all traces of the lapping compound. To help prevent scratching the seating surfaces, a light coat of oil may be applied before returning the valve plug and orifice to the body.
4. Return the orifice, valve plug, valve plug spring, and valve plug guide to the body.

Replacement of Packing

Leakage around the adjusting screw may indicate worn packing material. Follow the instructions below to replace the packing rings.

1. Take out the machine screw (key 41) and lift off the washer (key 44) and handwheel (key 38).
2. Unscrew the packing box (key 32). Unscrew the packing nut (key 35) and the packing follower (key 34) off of the adjusting screw (key 33).
3. Unscrew and pull the adjusting screw out through the bottom of the packing box.
4. Pull out the old packing (key 36) and replace it with three new packing rings. Replace the packing box gasket (key 37).
5. Reassemble the stuffing box unit by returning the adjusting screw to the inside of the packing box. Slip the packing follower onto the adjusting screw and into the packing box. Screw on the packing nut.
6. Put the packing box back onto the spring case. Set the handwheel and washer on the adjusting screw and screw in the machine screw.

Replacement of Diaphragm

When the regulator does not respond to differential pressure changes or the loading pressure seems to leak to the downstream piping, the diaphragm could be worn out or ruptured. Inspect the diaphragm as follows:

1. Remove the cap screws (key 16) from the diaphragm casing. Lift the entire spring case (key 2) off of the body.
2. Take the upper spring seat (key 9), regulator spring (key 11) and the lower spring seat (key 8, Type 95HD) out of the lower spring case. In

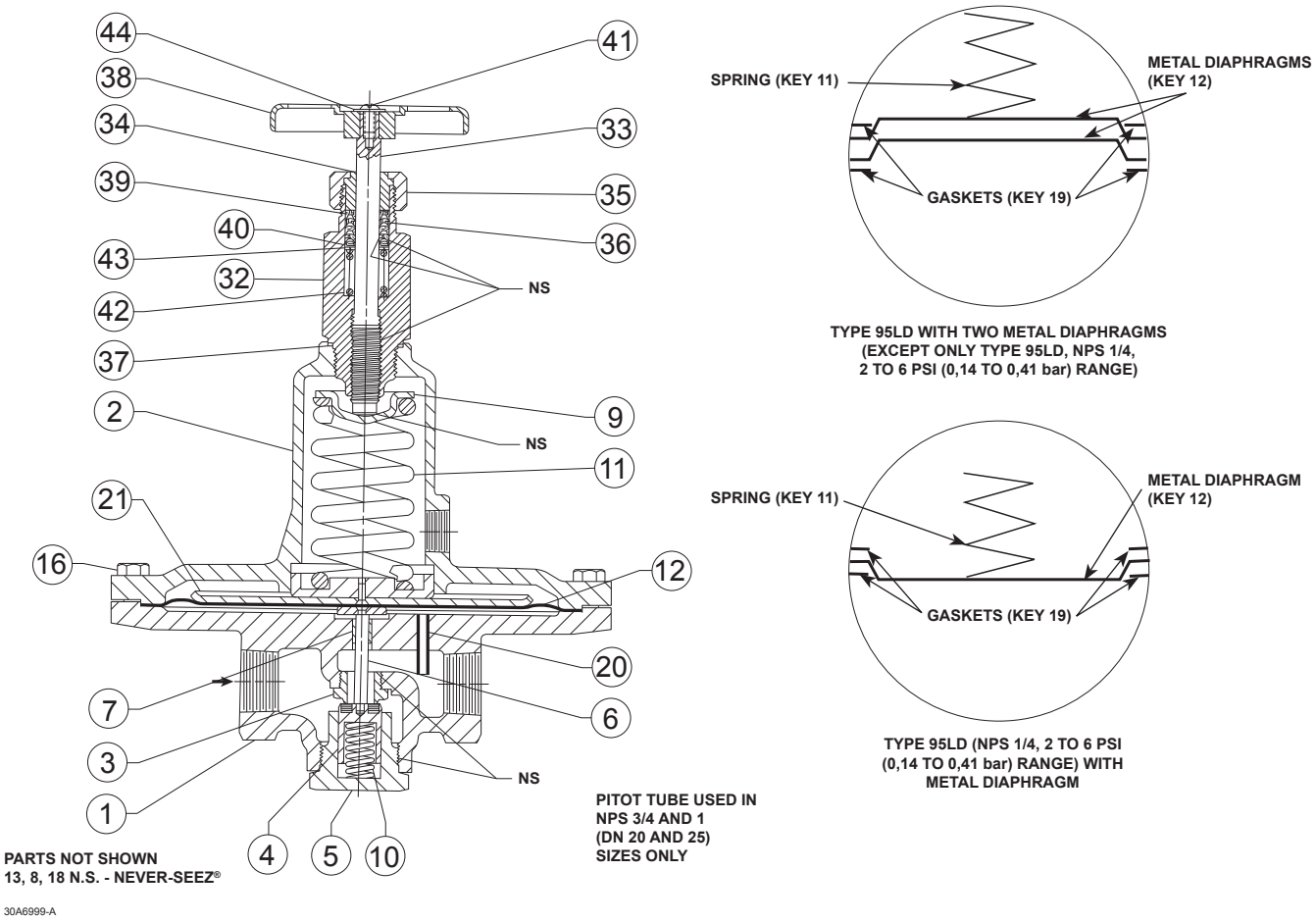

Figure 4. *Type 95LD Regulator Assembly*

Type 95LD, the lower spring seat and diaphragm plate (key 21) are threaded together and can be removed as one unit.

3. If the unit has metal diaphragms,

   a. Find the pusher post (key 30) and place on a surface with the larger flat surface down and the thread stem up (metal diaphragm pusher post has a recessed diameter in the bottom surface). Then, find one smaller composition gasket (key 47) and fit it over the threaded end of the pusher post. Find and take one of the diaphragm heads and slip it over the threaded end of the pusher post with the chamfered side of the diaphragm head toward the gasket. Take a second gasket and place it over the threaded end of the pusher post on top of the diaphragm head.

   b. Replace one of the two large diaphragm gaskets (key 19) on the surface of the body that will support the diaphragms. There will be two diaphragms used per regulator, except for Type 95LD, NPS 1/4 with 2 to 6 psi (0,14 to 0,41 bar) outlet setting which uses only one metal diaphragm (the metal diaphragm is in between two diaphragm gaskets). Another diaphragm gasket will be placed on top of the second metal diaphragm. The raised surfaces of the metal diaphragms should be placed in the unit so that they are facing toward the assembler (toward the spring) except only when one metal diaphragm is being used then the raised surface should be facing down (towards the body). See Figures 4 and 5 as references.

4. Set the diaphragm plate, lower spring seat, spring, and upper spring seat back onto the diaphragm.

5. Place the spring case on the body. Tighten the cap screws finger tight only.

6. To ensure proper slack in the diaphragm, apply some spring force to the diaphragm by turning the handwheel clockwise.

7. Finish tightening the cap screws.

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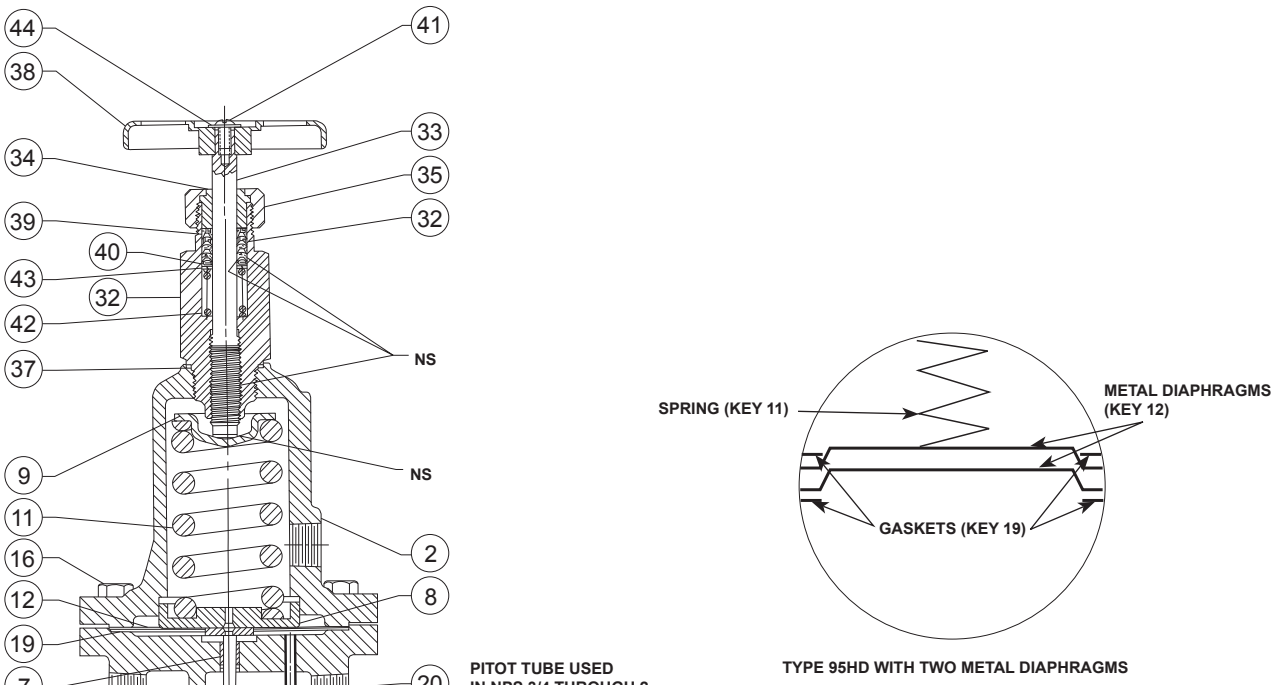

Figure 5. *Type 95HD Regulator Assembly*

Parts Ordering

When corresponding with your local Sales Office about this equipment, always reference the equipment serial number or FS number that can be found on the nameplate.

When ordering replacement parts, reference the key number of each needed part as found in the following parts list. Separate kits containing all recommended spare parts are available.

Parts List

Key	Description	Part Number
	Parts Kit (Included are keys 3, 4, 10, 12, and 19 (for All Metal Trim only)	
	Type 95HD	
	For Brass and Neoprene (CR) (CR) Trim	
	NPS 1/4 body	R95HX000012
	NPS 1/2 (DN 15) body	R95HX000022
	NPS 3/4 and 1 (DN 20 and 25) bodies	R95HX000032
	For 416 Stainless Steel and Neoprene (CR) (CR) Trim	
	NPS 1/4 body	R95HX000102
	NPS 1/2 (DN 15) body	R95HX000112
	NPS 3/4 and 1 (DN 20 and 25) bodies	R95HX000122
	NPS 1-1/2 and 2 (DN 40 and 50) bodies	R95HX000042
	For All Metal Trim	
	NPS 1/4 body	R95HX000332
	NPS 1/2 (DN 15) body	R95HX000342
	NPS 3/4 and 1 (DN 20 and 25) bodies	R95HX000352
	NPS 1-1/2 and 2 (DN 40 and 50) bodies	R95HX000362
	Extra parts for NPS 1-1/2 and 2 (DN 40 and 50) bodies include keys 45, 47, 51 and 52	
	Parts Kit (Included are keys 3, 4, 10, 12, and 19 (for All Metal Trim only) (continued)	
	Type 95LD	
	For Brass and Neoprene (CR) (CR) Trim	
	NPS 1/4 body	R95LX000012
	NPS 1/2 (DN 15) body	R95LX000022
	NPS 3/4 and 1 (DN 20 and 25) bodies	R95LX000032
	For 416 Stainless Steel and Neoprene (CR) (CR) Trim	
	NPS 1/4 body	R95LX000102
	NPS 1/2 (DN 15) body	R95LX000112
	NPS 3/4 and 1 (DN 20 and 25) bodies	R95LX000122
	For All Metal Trim	
	NPS 1/4 body	R95LX000252
	NPS 1/2 (DN 15) body	R95LX000262
	NPS 3/4 and 1 (DN 20 and 25) bodies	R95LX000272
1	Body	See following Table
2	Spring Case	
	Type 95HD	
	Steel	
	NPS 1/4 body	2L443222012
	NPS 1/2 (DN 15) body	2L324122012
	NPS 3/4 and 1 (DN 20 and 25) bodies	3E408822012
	NPS 1-1/2 and 2 (DN 40 and 50) bodies	31A9804X022
	Stainless Steel	
	NPS 1/4 body	2L443233092
	NPS 1/2 (DN 15) body	2L3241X0012
	NPS 3/4 and 1 (DN 20 and 25) bodies	3E4088X00A2
	NPS 1-1/2 and 2 (DN 40 and 50) bodies	31A9804X042
	Type 95LD	
	Steel	
	NPS 1/4 body	2L443422012
	NPS 1/2 (DN 15) body	3L324222012
	NPS 3/4 and 1 (DN 20 and 25) bodies	4F432322012

Key	Description	Part Number
2	Spring Case (continued)	
	Type 95LD (continued)	
	Stainless Steel	
	NPS 1/4 body	2L4434X0012
	NPS 1/2 (DN 15) body	3L3242X0012
	NPS 3/4 and 1 (DN 20 and 25) bodies	4F4323X0022
3*	Orifice	
	Metal-to-metal seat	
	NPS 1/4 body	
	416 Stainless steel	1E391646172
	316 Stainless steel	1E391635072
	NPS 1/2 (DN 15) body	
	416 Stainless steel	1E395046172
	316 Stainless steel	1E395035072
	NPS 3/4 and 1 (DN 20 and 25) bodies	
	416 Stainless steel	1E398046172
	316 Stainless steel	1E398035072
	NPS 1-1/2 and 2 (DN 40 and 50) bodies (Type 95HD only)	
	304 Stainless Steel	2P787035042
	316 Stainless Steel	2P787035072
	416 Stainless Steel	2P787046172
	Brass	2P787046172
	Elastomer Seat	
	NPS 1/4 body	
	Brass	1E393214012
	316 Stainless steel	1E393235072
	416 Stainless steel	1E393235132
	NPS 1/2 (DN 15) body	
	Brass	1E396214012
	416 Stainless steel	1E396235132
	NACE, 316 Stainless steel	1E396235072
	NPS 3/4 and 1 (DN 20 and 25) bodies	
	Brass	1E399514012
	416 Stainless steel	1E399535132
	NACE, 316 Stainless steel	1E399535072
	NPS 1-1/2 and 2 (DN 40 and 50) bodies (Type 95HD only)	
	Brass	1P7860X0092
	416 Stainless Steel	1P786035132
	NACE, 316 Stainless Steel	1P7860X00A2
4*	Valve Plug	
	Metal-to-metal seat, 416 Stainless steel	
	NPS 1/4 body	
	416 Stainless steel	1E391746172
	316 Stainless steel	1E391735162
	NPS 1/2 (DN 15) body	
	416 Stainless steel	1E395146172
	316 Stainless steel	1E395135072
	NPS 3/4 and 1 (DN 20 and 25) bodies	
	416 Stainless steel	1E398146172
	316 Stainless steel	1E398135072
	NPS 1-1/2 and 2 (DN 40 and 50) bodies (Type 95HD only)	
	416 Stainless steel	1U403746172
	304 Stainless steel	1U403735042
	316 Stainless steel	1U4037X0012
	Brass	1U403746172
	Elastomer Seat	
	NPS 1/4 body	
	Brass/Neoprene (CR)	1E3933000C2
	416 Stainless steel/Neoprene (CR)	1E3933000E2
	316 Stainless steel/Neoprene (CR)	1E3933X0012
	416 Stainless steel/PTFE	1E3933000A2
	316 Stainless steel/PTFE	1E3933X0022
	Brass/PTFE	1E3933X0032
	Brass/Fluorocarbon (FKM)	1E3933X0082
	416 Stainless steel/Fluorocarbon (FKM)	1E3933X0102
	316 Stainless steel/Fluorocarbon (FKM)	1E3933X0092
	316 Stainless steel/Perfluoroelastomer (FFKM)	1E3933X0242
	NPS 1/2 (DN 15) body	
	Brass/Neoprene (CR)	1E3963000A2
	416 Stainless steel/Neoprene (CR)	1E3963000B2
	316 Stainless steel/Neoprene (CR)	1E3963X0012
	Brass/PTFE	1E3963X0022
	416 Stainless steel/PTFE	1E3963000D2
	316 Stainless steel/PTFE	1E3963X00B2
	Brass/Fluorocarbon (FKM)	1E3963X0072
	416 Stainless steel/Fluorocarbon (FKM)	1E3963X0092
	416 Stainless steel/Ethylenepropylene (EPDM)	1E3963X0182

Key	Description	Part Number
4*	Valve Plug (continued)	
	Elastomer Seat (continued)	
	NPS 1/2 (DN 15) body (continued)	
	316 Stainless steel/Perfluoroelastomer (FFKM)	1E3963X0192
	Brass/Nitrile (NBR)	1E3963X00A2
	NPS 3/4 and 1 (DN 20 and 25) bodies	
	Brass/Neoprene (CR)	1E3996000A2
	416 Stainless steel/Neoprene (CR)	1E3996000B2
	316 Stainless steel/Neoprene (CR)	1E3996X0012
	Brass/PTFE	1E3996X0022
	416 Stainless steel/PTFE	1E3996000E2
	316 Stainless steel/PTFE	1E3996000D2
	Brass/Fluorocarbon (FKM)	1E3996X0072
	416 Stainless steel/Fluorocarbon (FKM)	1E3996X0092
	316 Stainless steel/Perfluoroelastomer (FFKM)	1E3996X0342
	NPS 1-1/2 and 2 (DN 40 and 50) bodies	
	416 Stainless steel/Nitrile (NBR)	1U4039000A2
	Brass/Neoprene (CR)	1U4039X0052
	316 Stainless steel/Neoprene (CR)	1U4039X0082
	316 Stainless steel/PTFE	1U4039X00B2
	416 Stainless steel/Fluorocarbon (FKM)	1U4039X00A2
	NACE, 316 Stainless steel/Fluorocarbon (FKM)	1U4039X0182
	316 Stainless steel/Perfluoroelastomer (FFKM)	1U4039X0182
5	Valve Plug Guide	
	Metal-to-metal seat, 416 Stainless steel	
	NPS 1/4 body	
	Brass	1E391814012
	416 Stainless steel	1E391835132
	316 Stainless steel	1E391835072
	NPS 1/2 (DN 15) body	
	Brass	1E395214012
	416 Stainless steel	1E395235132
	316 Stainless steel	1E395235072
	NPS 3/4 and 1 (DN 20 and 25) bodies	
	Brass	1E398214012
	416 Stainless steel	1E398235132
	316 Stainless steel	1E398235072
	NPS 1-1/2 and 2 (DN 40 and 50) bodies	
	Brass	19B9067X022
	416 Stainless steel	19B9067X012
	316 Stainless steel	19B9067X102
	304 Stainless steel	19B9067X092
	Elastomer Seat	
	NPS 1/4 body	
	Brass	1E391814012
	416 Stainless steel	1E391835132
	316 Stainless steel	1E391835072
	NPS 1/2 (DN 15) body	
	Brass	1E395214012
	416 Stainless steel	1E395235132
	NACE, 316 Stainless steel	1E395235072
	NPS 3/4 and 1 (DN 20 and 25) bodies	
	Brass	1E398214012
	416 Stainless steel	1E398235132
	NACE, 316 Stainless steel	1E398235072
	NPS 1-1/2 and 2 (DN 40 and 50) bodies	
	416 Stainless steel	19B9067X012
	304 Stainless steel	19B9067X092
	316 Stainless steel	19B9067X102
	Brass	19B9067X022
6	Stem Assembly	
	Metal-to-metal seat	
	NPS 1/4 body	
	416 Stainless steel	1F2113000A2
	316 Stainless steel	1F2113000C2
	NPS 1/2 (DN 15) body	
	416 Stainless steel	1F2114000A2
	316 Stainless steel	1F2114000C2
	NPS 3/4 and 1 (DN 20 and 25)	
	416 Stainless steel	1F2115000A2
	316 Stainless steel	1F2115000C2
	NPS 1-1/2 and 2 (DN 40 and 50)	
	416 Stainless steel	1P785335232
	316 Stainless steel	1P7853X00A2
	304 Stainless steel	1P785335042
	Brass	1P785335232
	Elastomer seat	
	NPS 1/4	
	416 Stainless steel	1F2113000A2
	316 Stainless steel	1F2113000C2

*Recommended spare part.

Key	Description	Part Number
6	Stem Assembly (continued)	
	Elastomer seat (continued)	
	NPS 1/2 (DN 15) body	
	416 Stainless steel	1F2114000A2
	316 Stainless steel	1F2114000C2
	NPS 3/4 and 1 (DN 20 and 25)	
	416 Stainless steel	1F2115000A2
	316 Stainless steel	1F2115000C2
	NPS 1-1/2 and 2 (DN 40 and 50)	
	416 Stainless steel	1P785335232
	316 Stainless steel	1P7853X00A2
7*	Stem Guide Bushing	
	Metal-to-metal seat	
	NPS 1/4 body	
	416 Stainless steel	1E392235132
	316 Stainless steel	1E392235072
	NPS 1/2 (DN 15) body	
	416 Stainless steel	1E392235132
	316 Stainless steel	1E392235072
	NPS 3/4 and 1 (DN 20 and 25)	
	416 Stainless steel	1E398535132
	316 Stainless steel	1E398535072
	NPS 1-1/2 and 2 (DN 40 and 50)	
	416 Stainless steel	1P785435132
	316 Stainless steel	1P7854X00A2
	304 Stainless steel	1P785435042
	Brass	1P785435132
	Elastomer seat	
	NPS 1/4	
	416 Stainless steel	1E392235132
	316 Stainless steel	1E392235072
	NPS 1/2 (DN 15) body	
	416 Stainless steel	1E392235132
	316 Stainless steel	1E392235072
	NPS 3/4 and 1 (DN 20 and 25)	
	416 Stainless steel	1E398535132
	316 Stainless steel	1E398535072
	NPS 1-1/2 and 2 (DN 40 and 50)	
	416 Stainless steel	1P785435132
	316 Stainless steel	1P7854X00A2
8	Lower Spring Seat	
	Type 95HD only	
	NPS 1/4 body	
	Aluminum	1E392309012
	NPS 1/2 (DN 15) body	
	Aluminum	1E395408012
	NPS 3/4 and 1 (DN 20 and 25) bodies	
	Aluminum	1E398608012
	NPS 1-1/2 and 2 (DN 40 and 50) bodies	
	Carbon Steel Plate	1P787724152
9	Upper Spring Seat, Carbon steel	
	NPS 1/4 body	1B798525062
	NPS 1/2 (DN 15) body	1D667125072
	NPS 3/4 and 1 (DN 20 and 25) bodies	1E398725072
	NPS 1-1/2 and 2 (DN 40 and 50) bodies, Type 95HD only	1P787624092
10	Valve Plug Spring, Stainless steel	
	NPS 1/4 body	1E392437022
	NPS 1/2 (DN 15) body	1E395537022
	NPS 3/4 and 1 (DN 20 and 25) bodies	1E398837022
	NPS 1-1/2 and 2 (DN 40 and 50) bodies, Type 95HD only	1P785837012
11	Regulator Spring	
	Steel	See following Table

Key	Description	Part Number
12*	Diaphragm	See following Table
16	Cap Screw, Steel plate	
	Type 95HD	
	NPS 1/4 body (6 required)	
	Cast Iron body	1A407824052
	Steel/Stainless steel body	1A391724052
	NPS 1/2 (DN 15) body (8 required)	1A381624052
	NPS 3/4 and 1 (DN 20 and 25) bodies (8 required)	
	Cast Iron body	1A336924052
	Steel/Stainless steel body	1A341824052
	NPS 1-1/2 and 2 (DN 40 and 50) bodies (8 required)	
	Steel	1K568428982
	Stainless steel	1K5684X0032
	Type 95LD	
	NPS 1/4 body (10 required)	
	Steel	1A407824052
	Stainless steel	1A4078X0102
	NPS 1/2 (DN 15) body (10 required)	
	Steel	1A381624052
	Stainless steel	1A3816X0152
	NPS 3/4 and 1 (DN 20 and 25) bodies (12 required)	
	Steel	1A336924052
	Stainless steel	1A3369X0112
18	Drive Screw, (2 required)	
	(Not shown)	1A368228982
19*	Diaphragm Gasket, composition (2 required)	
	Use with 302 Stainless steel diaphragms only	
	Type 95HD	
	NPS 1/4 body	1E393104022
	NPS 1/2 (DN 15) body	1E396104022
	NPS 3/4 and 1 (DN 20 and 25) bodies	1E399304022
	NPS 1-1/2 and 2 (DN 40 and 50) bodies	1P787904022
	Type 95LD	
	NPS 1/4 body	1E394004022
	NPS 1/2 (DN 15) body	1E397004022
	NPS 3/4 and 1 (DN 20 and 25) bodies	1E390404022
20	Pitot Tube	
	NPS 3/4 and 1 (DN 20 and 25) bodies	
	Copper	1E399417012
	NACE, 316 Stainless steel	1E399438092
	304 Stainless steel	1E399438072
	NPS 1-1/2 and 2 (DN 40 and 50) bodies	
	304 Stainless steel	1P785638072
	316 Stainless steel	1P7856X0012
	Brass	1P7856X0032
21	Diaphragm Head Assembly, aluminum/steel	
	Type 95LD only	
	NPS 1/4 body	1E3936X0012
	NPS 1/2 (DN 15) body	1E3967X0012
	NPS 3/4 and 1 (DN 20 and 25) bodies	1E3907X0012
30	Pusher Post, Type 95HD only	
	Metal-to-metal seat	
	416 Stainless steel	1P785135132
	304 Stainless steel	1P785135042
	316 Stainless steel	1P7851X0012
	Elastomer seat	
	416 Stainless steel	1P784935132
	316 Stainless steel	1P7849X00A2
31	Locknut, Zinc-plated steel, Type 95HD only	1P788724122
32	Packing Box, steel	
	NPS 1/4 body	1L449624092
	NPS 1/2 through 1 (DN 15 through 25) bodies	1L324024092
	NPS 1-1/2 and 2 (DN 40 and 50) bodies	11A9809X022

*Recommended spare part.

Key 1 Regulator Body, ASME CL150 RF and CL300 RF Flanges

BODY SIZE, NPS (DN)	TYPE 95LD BODY MATERIAL				TYPE 95HD BODY MATERIAL			
	Steel		Stainless Steel		Steel		Stainless Steel	
	CL150 RF	CL300 RF	CL150 RF	CL300 RF	CL150 RF	CL300 RF	CL150 RF	CL300 RF
1/2 (15)	2V5673X0022	20A4569X012	2V5673X0012	20A4569X022	16A6787X012	12B5376X012	16A6787X022	12B5376X022
3/4 (20)	2V4262X0012	20A3088X012	2V4262X0022	20A3088X032	2V9941X0012	20A4013X012	2V9941X0032	20A4013X022
1 (25)	2V3546X00A2	2U7969X0022	2V3546X0012	2U7969X0092	2V3879X00A2	2V3944X0012	2V3879X0012	2V3944X0042
1-1/2 (40)	- - - -	- - - -	- - - -	- - - -	1V4939X0012	2V3881X0012	1V4939X0032	2V3881X0062
2 (50)	- - - -	- - - -	- - - -	- - - -	2V5703X0012	20A1091X012	2V5703X0032	20A1091X022

Key 1 Regulator Body, NPT

BODY SIZE, NPS	TYPE 95LD			TYPE 95HD		
	Cast Iron	Steel	316 SST	Cast Iron	Steel	316 SST
1/4	1E391119012	1J127722012	1J127733092	1E391019012	1J127322012	1J127333092
1/2	2E394519012	2L908022012	2L908033092	1E394319012	2L907722012	2L907733092
3/4	2E397419012	2E863722012	2E863733092	2E397219012	2E408422012	2E408433092
1	2E397519012	2E863822012	2E863833092	2E397319012	2E408522012	2E408533092
1-1/2	- - - -	- - - -	- - - -	3P784319012	3P784322012	3P784333092
2	- - - -	- - - -	- - - -	3P784219012	3P784222012	3P784233092

Key 1 Regulator Body, Socket Weld

BODY SIZE, NPS (DN)	TYPE 95LD BODY MATERIAL		TYPE 95HD BODY MATERIAL	
	Steel	Stainless Steel	Steel	Stainless Steel
1/2 (15)	2P518522012	2P5185X0012	2N693922012	2N6939X0012
3/4 (20)	2K632722012	2K632733092	2H852022012	2H8520X00A2
1 (25)	2H160622012	2H1606X00A2	2F485522012	2F4855X0012
1-1/2 (40)	- - - -	- - - -	3V388022012	3V388033092
2 (50)	- - - -	- - - -	3V279622012	3V2796X0012

Key 11 Regulator Spring

BODY SIZE, NPS (DN)	TYPE 95LD RANGE, PSI (bar)	TYPE 95HD RANGE, PSI (bar)	COLOR CODE	PART NUMBER
1/4	2 to 6 (0,14 to 0,41) 5 to 15 (0,34 to 1,0) 13 to 30 (0,90 to 2,1)	15 to 30 (1,0 to 2,1) 25 to 75 (1,7 to 5,2) 70 to 150 (4,8 to 10,3)	Yellow Green Red	1E392527022 1E392627012 1E392727142
1/2 (15)	2 to 6 (0,14 to 0,41) 5 to 15 (0,34 to 1,0) 13 to 30 (0,90 to 2,1)	15 to 30 (1,0 to 2,0) 25 to 75 (1,7 to 5,2) 70 to 150 (4,8 to 10,3)	Yellow Green Red	1E395627022 1D7455T0012 1E395727192
3/4 and 1 (20 and 25)	2 to 6 (0,14 to 0,41) 5 to 15 (0,34 to 1,0) 13 to 30 (0,90 to 2,1)	15 to 30 (1,0 to 2,1) 25 to 75 (1,7 to 5,2) 70 to 150 (4,8 to 10,3)	Yellow Green Red	1E398927022 1E399027142 1E399127162
1-1/2 and 2 (40 and 50)	- - - - - - - - - - - - - - - -	5 to 80 (0,34 to 5,5) 60 to 120 (4,1 to 8,3) 100 to 140 (6,9 to 9,7) 120 to 150 (8,3 to 10,3)	Light Blue Light Gray Yellow Black	1E795327082 1E795427082 1E793327082 1P788827082

Key 12 Diaphragm*

BODY SIZE, NPS (DN)	NEOPRENE (CR)	302 SST (2 REQUIRED)	FLOUROCARBON (FKM) (2 REQUIRED)
Type 95HD			
1/4	1E393502112	1E392836012	1E393502402(2)
1/2 (15)	1E396602112	1E395836012	1E396602402
3/4 and 1 (20 and 25)	1E399902112	1E399236012	1E399902402
1-1/2 and 2 (40 and 50)	1P788102192	1P787836012	11A1347X012
Type 95LD			
1/4	1E394102112	1E393936012(1)	1E394102402(2)
1/2 (15)	1E397102112	1E396936012	1E397102402
3/4 and 1 (20 and 25)	1E390302112	1E390536012	1E390302332
1-1/2 and 2 (40 and 50)	- - - -	- - - -	- - - -

1. Only one metal diaphragm is needed for Type 95LD, NPS 1/4 with 2 to 6 psi (0,14 to 0,41 bar) outlet range.
2. Only one Fluorocarbon (FKM) diaphragm is needed for Types 95LD/HD, NPS 1/4.

*Recommended spare part.

Key	Description	Part Number
33	Adjusting Screw, Stainless steel	
	NPS 1/4 body	1L449535232
	NPS 1/2 (DN 15) body	1L449735232
	NPS 3/4 and 1 (DN 20 and 25) bodies	1L324435232
	NPS 1-1/2 and 2 (DN 40 and 50) bodies	21A9808X012
34	Packing Follower	
	NPS 1/4 body	
	Stainless steel	1K885035072
	NPS 1/2 through 2 (DN 15 through 50) bodies	
	Steel	1K884924092
35	Packing Box Nut	
	Zinc-plated steel	0P077624102
36*	Packing, PTFE (3 required)	
	NPS 1/4 body	1C752601012
	NPS 1/2 through 2 (DN 15 through 50) bodies	1H784301012
37*	Packing Box Gasket, Steel	
	NPS 1/4 body	1B487099202
	NPS 1/2 through 2 (DN 15 through 50) bodies	1N499199202
38	Handwheel	
	NPS 1/4 body	1L217544992
	NPS 1/2 through 1 (DN 15 through 25) bodies	1L369644992
	NPS 1-1/2 and 2 (DN 40 and 50) bodies	1J410819042
39*	Female Adaptor, PTFE	
	NPS 1/4 body	1F124401012
	NPS 1/2 through 2 (DN 15 through 50) bodies	1H784401012
40*	Male Adaptor, PTFE	
	NPS 1/4 body	1F124801012
	NPS 1/2 through 2 (DN 15 through 50) bodies	1H784201012
41	Machine Screw, Steel plate	
	NPS 1/4 body	1A340828992
	NPS 1/2 through 1 (DN 15 through 25) bodies	16A5763X012
	NPS 1-1/2 and 2 (DN 40 and 50) bodies	1A680324122
42	Packing Spring, 316 Stainless steel	1F125437012
43	Washer, 316 Stainless steel	
	NPS 1/4 body	1F125236042
	NPS 1/2 through 2 (DN 15 through 50) bodies	1H981836042
44	Washer, Steel	
	NPS 1/4 body	1A329128982
	NPS 1/2 through 1 (DN 15 through 25) bodies	1A352332992
	NPS 1-1/2 and 2 (DN 40 and 50) bodies	1E794128992

Type 95HD Only (Parts not shown)

Key	Description	Part Number
45*	O-Ring	
	Nitrile (NBR) (NBR) (2 required)	
	With Neoprene (CR) (CR) diaphragm only	1C782206992
	Flourocarbon (FKM) (2 required)	
	With Fluorocarbon (FKM) (FKM) diaphragm only	1K756106382
47*	Diaphragm Gasket, Composition (2 required)	
	With 302 Stainless steel diaphragm only	1P788004022
48	Diaphragm Head (2 required)	
	Steel	1P788225012
	316 Stainless steel	1P788235072
49	Lockwasher, Steel	1A487828992
50	Packing Follower	
	416 Stainless steel	1P785535232
	304 Stainless steel	1P785535042
	316 Stainless steel	1P7855X00A2
51*	O-Ring, PTFE	1P785906242
52	Spring, 316 Stainless steel	1P785737012
54	Inner Valve Base	
	416 Stainless steel	1U404046172
	304 Stainless steel	1U404035042
	316 Stainless steel	1U4040X00A2
	Brass	1U4040X0012

*Recommended spare part.

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