Type 1290 Vapor Recovery Regulator

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® vapor recovery valves must be installed, operated and maintained in accordance with federal, state and local codes, rules and regulations, and Emerson Process Management Regulator Technologies, Inc. (Regulator Technologies) instructions.

If a leak develops or if the outlet continually vents gas, service to the unit may be required. Failure to correct trouble could result in a hazardous condition. Only a qualified person must install or service the unit.

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 Type 1290 Vapor Recovery Valve.

Figure 1. *Type 1290 Vapor Recovery Regulator*

Introduction

Scope of the Manual

This manual provides installation, adjustment and maintenance procedures and also parts ordering information for Type 1290 Vapor Recovery regulator complete with a Type 1098-EGR main valve, a Type Y291A or Y291AL pilot and a Type 95H supply pressure regulator. Detailed instructions for installation, adjustment and maintenance of other equipment used with this regulator are found in separate manuals.

Product Description

The Type 1290 vapor recovery regulator is a self-contained, pilot-operated regulator system used for vapor recovery of blanketing gas. When blanketing gas pressure inside the vessel rises due to thermal heating or pump-in operations, the Type 1290 regulator senses an increase in vessel pressure and vents excessive internal tank pressure to a vapor recovery storage tank.

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Specifications

This section lists the specifications for the Type 1290 vapor recovery regulator. Specifications for a given regulator as it originally comes from the factory are stamped on the regulator nameplate located on the actuator, while the pilot control spring range appears on the pilot spring case.

Body Sizes and End Connection Styles[1]

BODY SIZE, NPS / DN	MAIN VALVE END CONNECTION STYLE	
	Cast Iron	WCC Steel or CF8M Stainless Steel
1 or 2 / 25 or 50	NPT, CL125 FF or CL250 RF flanged	NPT, SWE, BWE, CL150 RF, CL300 RF, CL600 RF or PN 16/25/40 flanged
3, 4 or 6 / 80, 100 or 150	CL125 FF or CL250 RF flanged	BWE, CL150 RF, CL300 RF, CL600 RF or PN 16 flanged
8 x 6 or 12 x 6 / 200 x 150 or 300 x 150	- - - -	BWE, CL150 RF, CL300 RF, CL600 RF or PN 25 flanged

Maximum Main Valve Inlet Pressure[2]

See Table 2

Maximum Differential Pressure[2]

35 psi / 2.4 bar

Control Pressure Ranges[2]

See Table 1

Type 95H Supply Pressure Settings

PILOT TYPE	TYPE 1098-EGR MAIN VALVE WITH GREEN SPRING, NPS / DN		SPRING COLOR
	1, 2, 3 or 4 / 25, 50, 80 or 100	6 or 8 x 6 / 150 or 200 x 150	
Y291AL	8 psig / 0.55 bar	13 psig / 0.90 bar	Black
Y291A	8 psig / 0.55 bar	13 psig / 0.90 bar	Orange
	8 psig / 0.55 bar	13 psig / 0.90 bar	Red
	9 psig / 0.62 bar	14 psig / 0.97 bar	Olive Green
	10 psig / 0.69 bar	14 psig / 0.97 bar	Yellow
	11 psig / 0.76 bar	15 psig / 1.0 bar	Light green
	14 psig / 0.97 bar	18 psig / 1.2 bar	Light Blue
	15 psig / 1.0 bar	20 psig / 1.4 bar	Black

Type Y291A or Type Y291AL Pilot Orifice Diameter

3/8-inch / 9.5 mm

Control Line Connection

1/2 NPT

Exhaust Line Connection

3/4 NPT

Supply Pressure and Spring Case Connections

1/4 NPT

Port Diameters and Travels

BODY SIZE, NPS / DN	PORT DIAMETER, Inch / mm	TRAVEL, Inch / mm
1 / 25	1-5/16 / 33	3/4 / 19
2 / 50	2-3/8 / 60	1-1/8 / 29
3 / 80	3-3/8 / 86	1-1/2 / 38
4 / 100	4-3/8 / 111	2 / 51
6 / 150	7-3/16 / 183	2 / 51
8 x 6 / 200 x 150	7-3/16 / 183	2 / 51
12 x 6 / 300 x 150	7-3/16 / 183	2 / 51

Temperature Capabilities[2]

Nitrile (NBR):
-20 to 180°F / -29 to 82°C
Fluorocarbon (FKM):
For Inches w.c. Setpoints:
40 to 300°F / 4 to 149°C
For psig Setpoints:
0 to 300°F / -18 to 149°C
Ethylenepropylene (EPDM):
-20 to 275°F / -29 to 135°C
Perfluoroelastomer (FFKM):
-20 to 300°F / -29 to 149°C

Approximate Weights:

NPS 1 / DN 25: 85 pounds / 39 kg
NPS 2 / DN 50: 100 pounds / 45 kg
NPS 3 / DN 80: 145 pounds / 66 kg
NPS 4 / DN 100: 195 pounds / 88 kg
NPS 6 / DN 150: 380 pounds / 172 kg
NPS 8 x 6 / DN 200 x 150: 740 pounds / 336 kg
NPS 12 x 6 / DN 300 x 150: 1265 pounds / 574 kg

1. End connections for other than U.S. standards can usually be provided. Consult your local Sales Office.
2. Pressure/temperature limits in this Instruction Manual and any applicable standard or code limitation should not be exceeded.

Table 1. *Control Pressure Ranges*

PILOT TYPE	CONTROL PRESSURE RANGES[1]	SPRING COLOR	SPRING PART NUMBER	BUILDUP TO WIDE-OPEN	SPRING WIRE DIAMETER, Inch / mm	SPRING FREE LENGTH, Inch / mm
Y291AL	0.5 to 1.5-inches w.c. / 1 to 4 mbar[2]	Black	1B413627222	0.25-inch w.c. / 0.60 mbar	0.075 / 1.90	2.25 / 57.2
Y291A	1 to 2.5-inch w.c. / 2 to 6 mbar[2][3]	Orange	1B558527052	0.25-inch w.c. / 0.60 mbar	0.072 / 1.83	3.78 / 96.0
	2 to 7-inch w.c. / 5 to 17 mbar[2][4]	Red	1B653827052	0.25-inch w.c. / 0.60 mbar	0.085 / 2.16	3.62 / 92.0
	4 to 14-inch w.c. / 10 to 35 mbar	Olive Green	1B653927022	0.25-inch w.c. / 0.60 mbar	0.105 / 2.67	3.75 / 95.2
	12 to 28-inch w.c. / 30 to 70 mbar	Yellow	1B537027052	0.05 psig / 3.40 mbar	0.114 / 2.90	4.31 / 109
	1.0 to 2.5 psig / 0.07 to 0.17 bar	Light Green	1B537127022	0.10 psig / 6.90 mbar	0.156 / 3.96	4.06 / 103
	2.5 to 4.5 psig / 0.17 to 0.31 bar	Light blue	1B537227022	0.15 psig / 10.0 mbar	0.187 / 4.75	3.94 / 100
	4.5 to 7 psig / 0.31 to 0.48 bar	Black	1B537327052	0.20 psig / 14.0 mbar	0.218 / 5.54	3.98 / 101

1. Spring ranges based on pilot being installed with the spring case pointed down.
2. Do not use Fluorocarbon (FKM) diaphragm with this spring at diaphragm temperatures lower than 60°F / 16°C.
3. When using a Fluorocarbon (FKM) diaphragm, the minimum outlet pressure is 2-inch w.c. / 5 mbar.
4. When using a Fluorocarbon (FKM) diaphragm, the minimum outlet pressure is 2.5-inch w.c. / 6 mbar.

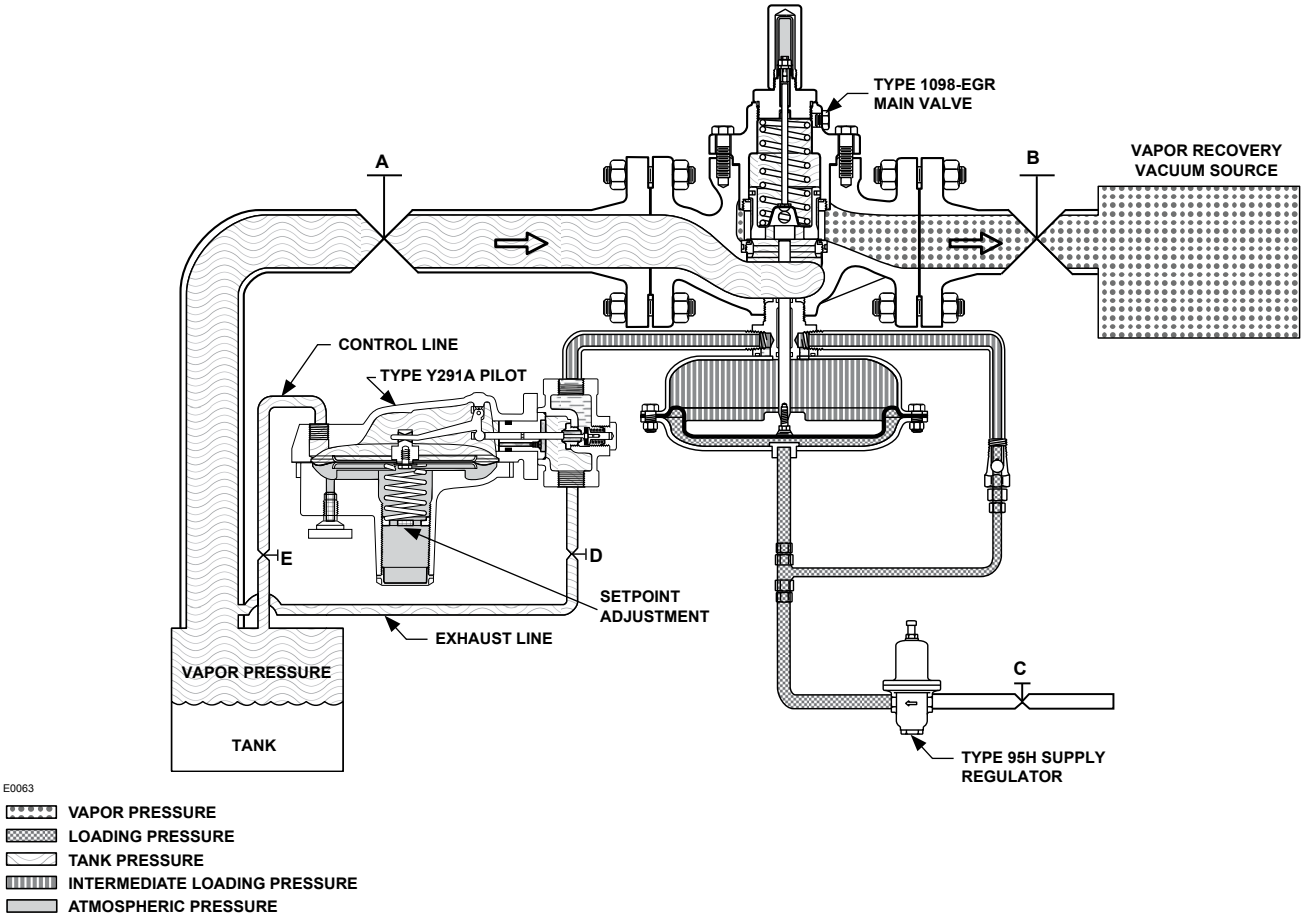

Figure 2. *Operational Schematic*

Table 2. *Maximum Main Valve Inlet Pressures*

PILOT TYPE	MAXIMUM INLET PRESSURES Type 1098-EGR Main Valve with Green Spring										SPRING COLOR
	NPS 1 / DN 25		NPS 2 / DN 50		NPS 3 / DN 80		NPS 4 / DN 100		NPS 6, 8 x 6 or 12 x 6 / DN 150, 200 x 150 or 300 x 150		
	psig	bar	psig	bar	psig	bar	psig	bar	psig	bar	
Y291AL	5.5	0.38	5.0	0.35	4.0	0.28	3.0	0.21	3.5 /	0.24	Black
Y291A	5.5	0.38	5.0	0.35	4.0	0.28	3.0	0.21	3.5	0.24	Orange
	5.5	0.38	5.0	0.35	4.0	0.28	3.0	0.21	3.5	0.24	Red
	6.5	0.45	6.0	0.41	5.0	0.35	4.0	0.28	4.5	0.31	Olive Green
	7.5	0.52	7.0	0.48	6.0	0.41	5.0	0.35	4.5	0.31	Yellow
	8.5	0.59	8.0	0.55	7.0	0.48	6.0	0.41	5.5	0.38	Light Green
	11.5	0.79	11.0	0.76	10.0	0.69	9.0	0.62	8.5	0.59	Light Blue
	12.5	0.86	12.0	0.83	11.0	0.76	10.0	0.69	10.5	0.72	Black

Principle of Operation

The Type 1290 vapor recovery regulator serves as a vessel vapor recovery system. The Type 1290 regulator controls vessel blanketing gas pressure when the vessel is being filled with fluid or when ambient temperature causes the vapor gas to expand. The system monitors the increasing blanket pressure and throttles open to pass excess blanketing gas into a vapor recovery system thus controlling the desired set pressure of the vessel.

Note

The Type 1290 is used as part of the gas blanketing system to control the outflow of blanketing gas under normal conditions and to collect vessel vapors for the vapor recovery system. It is not an ASME safety relief device. You should provide alternate methods of emergency overpressure protection.

The Type 1290 vapor recovery regulator responds to any changes in the blanket gas pressure and throttles open or close to control the flow of the blanket gas out of the vessel. A vacuum source on the outlet of the regulator is necessary to ensure flow of low-pressure blanket gas out of the vessel and into a vapor recovery system. The higher the vacuum source, the more the flow capacity of the vapor recovery regulator.

The pressure of the blanket gas registers under the diaphragm of the pilot. A Type 95H regulator provides a constant loading pressure source to the Type 1098-EGR main valve actuator. When the pilot is closed, the loading pressure fills both sides of the Type 1098 actuator through a fixed restriction.

The Type 1098-EGR main valve spring keeps the main valve plug tightly shut. When the vessel blanket gas pressure reaches the setting of the pilot spring, the pilot diaphragm moves, opening the pilot valve disk and exhausting some of the Type 1098-EGR's actuator loading pressure through the pilot orifice. This typically happens when the vessel is being filled with liquid.

The small fixed restriction maintains a higher loading pressure on the bottom of the Type 1098 actuator. The pressure differential across the main valve diaphragm moves the diaphragm upward causing the main valve to open which allows the blanket gas to flow out to the vapor recovery system vacuum source, hence controlling the vessel blanket pressure.

When the vessel blanket gas pressure begins to stabilize, the pilot spring throttles and the pilot disk closes. This allows the loading pressure source to fill both sides of the Type 1098 actuator through the fixed restriction. This equalizes the pressure acting on the diaphragm, thus allowing the main valve spring to close the main valve plug.

Installation and Startup

WARNING

Personal injury, equipment damage or leakage due to escaping accumulated gas or bursting of pressure-containing parts may result if this gas blanketing system is overpressured or installed where service conditions could exceed the limits given in the Specifications section and on the appropriate nameplate, 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 Title 49, Part 192, of the U.S. Code of Federal Regulations, by the National Fuel Gas Code Title 54 of the National Fire Codes of the National Fire Protection Association, or by other applicable codes) to prevent service conditions from exceeding those limits.

Additionally, physical damage to the vapor recovery regulator system could result in personal injury and property damage due to escaping accumulated gas. To avoid such injury and damage, install the vapor recovery system in a safe location.

Note

On the Type EGR main valve, normal pressure drop assists shutoff, therefore, leakage may result during any reverse pressure drop condition.

1. Use qualified personnel when installing, operating and maintaining regulators. Before installing, inspect the main valve, pilot and tubing for any shipment damage or foreign material that may have collected during crating and shipment. Make certain that the body interior is clean and the pipelines are free of foreign material. Apply pipe compound only to the external pipe threads with a threaded body, or use suitable line gaskets and good bolting practices with a flanged body.

Note

The Type 1290 vapor recovery regulator should be installed as shown in Figure 1 so that flow through the Type 1098-EGR main valve matches the flow arrow attached to the valve body.

WARNING

A regulator may vent some gas to the atmosphere. In hazardous or flammable gas service, vented gas may accumulate and cause personal injury, death or property damage due to fire or explosion. Vent a regulator in hazardous gas service to a remote, safe location away from air intakes or any hazardous location. The vent line or stack opening must be protected against condensation or clogging.

2. To keep the pilot spring case vent from being plugged or the spring case from collecting moisture, corrosive chemicals or other foreign material, point the vent down or otherwise protect it. For proper operation, the Type Y291A pilot should be installed with the spring case barrel pointed down as shown in Figure 1. However, a Type 1290 with a Type Y291AL pilot must be installed with the pilot spring case barrel pointed up. To remotely vent a Type Y291A or Y291AL, remove the vent (key 26) and install obstruction-free tubing or piping into the 1/4 NPT vent tapping. Provide protection on a remote vent by installing a screened vent cap into the remote end of the vent pipe.
3. Refer to Figure 2. Attach a 1/2 NPT upstream pressure control line to the vessel using a straight run of pipe. Connect the other end of the control line to the Type Y291A or Y291AL pilot. Install a 1/2 NPT exhaust line between the pilot and vessel.
4. Run a supply pressure line (see Figure 2) to the Type 95H regulator inlet (use 3/8-inch / 9.5 mm outer diameter tubing or 1/4-inch / 6.4 mm pipe minimum). Type 95H minimum supply pressure should be 10 psig / 0.69 bar higher than the set pressure of the Type 95H regulator.

Pre-startup Considerations

Before beginning the startup procedures in the next section, make sure the conditions below are followed:

- Block valves isolate the regulator.
- Hand valves are closed.
- Gauges may be installed (if required) in place of pipe plugs (key 52, Figure 11).

Note

For proper operation, the Type 95H supply pressure regulator is factory set to the values in the Specifications section.

Startup and Adjustment (Refer to Figure 2)

1. Open valve ‘C’ to supply the energy source. The Type 95H supply regulator has been preset at the factory according to the control spring in the pilot. If any field changes have been made, reset the Type 95H outlet pressure. See Table 1 for the correct pressure setting.
2. Open valve ‘D’ (if used). This valve must have a large port area and be fully open.
3. Open valve ‘E’ (if used). This valve must be a full ported valve that will not restrict pressure registration.

Note

When opening valve ‘E’ in step 3, the main valve may go wide-open if the vapor pressure is higher than the pilot setpoint.

4. Slowly open valve ‘A’, introducing pressure into the vapor recovery regulator system.
5. Slowly open valve ‘B’. The regulator will go into immediate operation.
6. The control spring in the Type Y291A will be preset at the factory if setpoint was specified. Otherwise, the factory setpoint is approximately mid-range of the spring. The spring range of the pilot is stamped on the cap of the pilot.

   Control spring adjustment may be necessary. To check the setpoint, raise the vessel pressure while observing a pressure gauge (manometer) and the main valve travel indicator to determine whether or not the setpoint is correct. On a Type Y291A, turning the adjusting screw clockwise into the spring case increases the pressure setting. On a Type Y291AL, turning the adjusting screw counterclockwise out of the spring case will increase the pressure setting.

Note

One way to increase the vessel blanketing pressure temporarily is to manually push on the blanketing regulator diaphragm. To push on the diaphragm, remove the spring case closing cap on the blanketing regulator (Type Y690A, Y692, Y693 or Y291A pilot) and use a screwdriver or rod to temporarily push on the diaphragm assembly and raise the outlet pressure of the blanketing regulator. Release the manual force on the diaphragm and the blanketing regulator will return to its original setpoint.

Shutdown

Installation arrangements may vary but in any installation, it is important that the upstream block valve should be closed first and that the upstream valves be opened or closed slowly.

Maintenance

Regulator parts are subject to normal wear and must be inspected and replaced as necessary. The frequency of inspection and replacement of parts depends upon the severity of service conditions or the requirements of local, state and federal regulations. Due to the care Regulator Technologies takes in meeting all manufacturing requirements (heat treating, dimensional tolerances, etc.), use only replacement parts manufactured or furnished by Regulator Technologies.

The stem O-rings on the Type 1098 actuator can be lubricated annually, using the grease fitting (key 28, Figure 7). Line pressure leakage or unexpected grease extrusion from the actuator vent (key 27, Figure 7) during normal operation indicates stem O-ring damage. All O-rings, gaskets and seals should be lubricated with a good grade general-purpose grease and installed gently rather than forced into position. Be certain that the nameplates are updated to indicate accurately any field changes in equipment, materials, service conditions or pressure settings.

WARNING

To avoid personal injury resulting from sudden release of pressure, isolate the pilot or regulator from all pressure and cautiously release trapped pressure from the pilot or regulator before attempting disassembly.

Type EGR Main Valve

Replacing Quick-Change Trim Package

Perform this procedure if replacing the entire trim package (Figure 3). Key numbers for both the complete main valve and its trim package are referenced in Figure 6.

Note

All disassembly, trim change, and reassembly steps in this section may be performed with the regulator in the main line.

1. Remove the cap screws (key 3) on a cast iron or steel body, or remove the stud bolt (key 29, not shown) on a stainless steel body. Pry the body flange (key 2) loose from the valve body (key 1), and lift out the trim package (Figure 3).
2. Perform any required inspection, cleaning or maintenance on the exposed surfaces of the valve body or trim package. Replace the gasket (key 4) or cage O-ring (key 17) as necessary.
3. On a pre-built replacement trim package, check indicator zeroing by unscrewing the indicator protector (key 19) and seeing if the flange of the flange nut (key 22) lines up evenly with the bottom marking on the indicator scale (key 18). If not, remove the indicator scale and separate the flange nut and hex nut (key 8). Hold the indicator scale against the indicator fitting (key 5) with the scale base resting against the shoulder of the fitting, and turn the flange nut until its flange is aligned with the bottom scale marking. Then lock both nuts against each other, and install the indicator scale and protector.
4. Lightly coat the cage seating surfaces of the valve body (key 1) web and the body flange (key 2) seating surfaces of the valve body neck with a good grade of general-purpose grease. Install the trim package, and secure it evenly with the cap screws or stud bolt nuts (key 29, not shown). No particular trim package orientation in the body is required.

Replacing Trim Parts

Perform this procedure if inspecting, cleaning or replacing individual parts in a trim package. Key numbers are referenced in Figure 6. An exploded view of a standard full-capacity trim package only is shown in Figure 4.

Note

Access to the spring (key 9), indicator fitting O-ring (key 21) or travel indicator parts in step 1 can be gained without removing the body flange (key 2).

1. Remove the indicator fitting (key 5) and attached parts. Proceed to step 5 if only performing maintenance on the fitting or attached parts.
2. Remove the cap screws (key 3) on a cast iron or steel body, or remove the stud bolt (key 29, not shown) on a stainless steel body, and pry the body flange (key 2) loose from the valve body (key 1).
3. Use the valve body (key 1) as a holding fixture if desired. Flip the body flange (key 2) over, and anchor it on the valve body as shown in Figure 5, removing the pipe plug (key 31) first.
4. To gain access to the port seal (key 12), upper seal (key 15), or valve plug parts, unscrew the seat ring (key 13) from the cage (key 11) and the cage

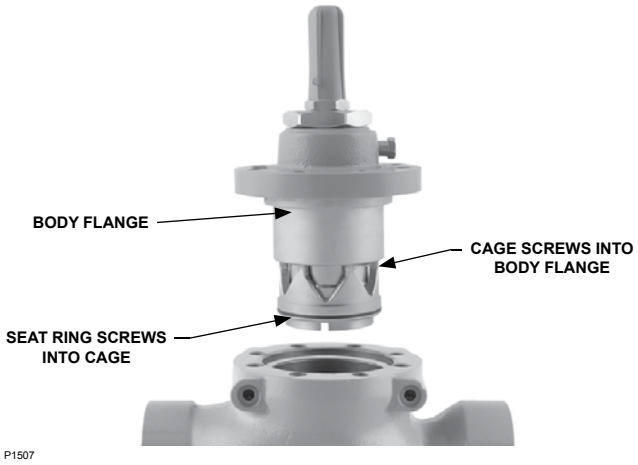

Figure 3. *Trim Package Removal*

from the body flange (key 2). For leverage, insert a wrench handle or similar tool into the seat ring slots (Figure 5) and wrap a strap wrench around a cage, or insert a soft bar through the windows of the cage. Proceed to step 6 if no further maintenance is necessary.

5. To replace the body flange (key 2) or gain access to the spring (key 9), indicator stem (key 10), stem O-ring (key 7), spring seat (key 28) or E-ring (key 23), remove the indicator protector (key 19) and indicator scale (key 18). Since some compression is left in the spring, carefully remove the flanged nut (key 22) and hex nut (key 8). Insert a screwdriver through the press-fit retainer (key 6) to remove the stem O-ring without removing the retainer. If necessary, unclip the E-ring from the indicator stem.
6. As required, replace and lightly lubricate the body flange gasket (key 4), cage O-ring (key 17), seat ring port seal (key 12) and the cage upper seal (key 15). Install the dry port and upper seals in their retaining slots with the grooved side facing out. After the dry seals are installed into their retaining slots, lightly lubricate the exposed portion of the seals and apply a light coat of lubricant to the cage and seat ring threads. Also lubricate any other surfaces as necessary for ease of installation. No further main valve maintenance is necessary if only the indicator fitting and attached parts were removed.
7. Use the valve body as a holding fixture during this step as shown in Figure 5. Insert the valve plug (key 16) into the body flange (key 2). Then loosely screw the cage (key 11) into the body flange and slowly work the upper seal (key 15) by untightening and tightening the cage. This will allow the upper seal to be properly seated. Securely tighten the cage using a strap wrench wrapped around the cage. Loosely screw the seat ring (key 13) into the cage and slowly work the port seal (key 12) by

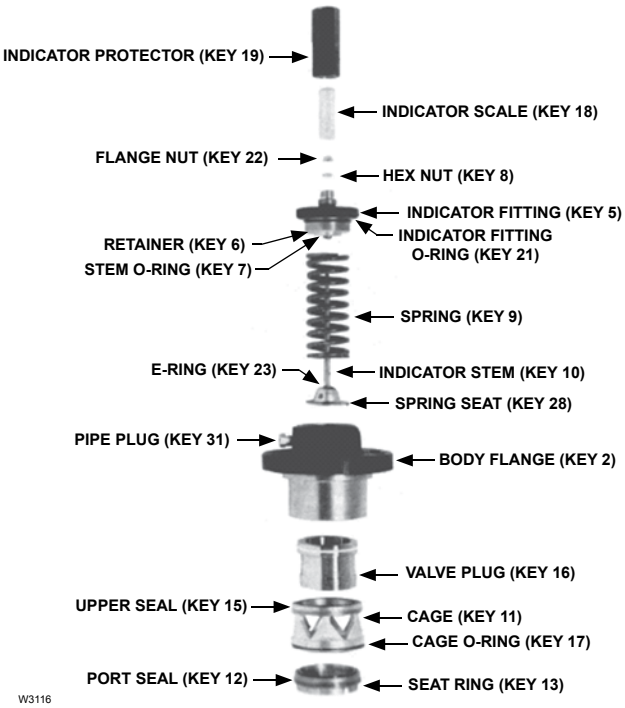

Figure 4. *Exploded View of Full-Capacity Trim Package Assembly*

untightening and tightening the seat ring. This will allow the port seal to be properly seated. After the port seal is seated, use a wrench or similar tool (see Figure 5) to tighten the seat ring, then back off the seat ring about 1/8-inch / 3.2 mm.

8. Remove the upside-down body flange (key 2) if it was anchored on the body (key 1). Lightly coat the cage (key 11) seating surfaces of the valve body web and the body flange seating surfaces of the valve body neck with a good grade of general-purpose grease. Install the body flange on the body, and secure it evenly with the cap screws (key 3) or stud bolt nuts (key 3). Install the pipe plug (key 31) in the side tapping of the flange for proper operation.
9. Make sure that the flange (key 2) and stem O-ring (key 7) and the retainer (key 6) are installed in the indicator fitting (key 5). Orient the spring seat (key 28) as shown in Figure 6, and attach it with the E-ring (key 23) to the slotted end of the indicator stem (key 10) then install the spring (key 9).
10. Be careful not to cut the stem O-ring (key 7) with the stem threads, install the indicator fitting (key 5) down over the indicator stem (key 10) until resting on the spring (key 9). Install the hex nut (key 8) and then the flanged indicator nut (key 22) on the indicator stem, pushing on the fitting if necessary to provide sufficient stem thread exposure. To maintain clearance for indicator part installation, draw up the spring seat (key 28) by turning the hex nut down on the stem until the threads bottom.

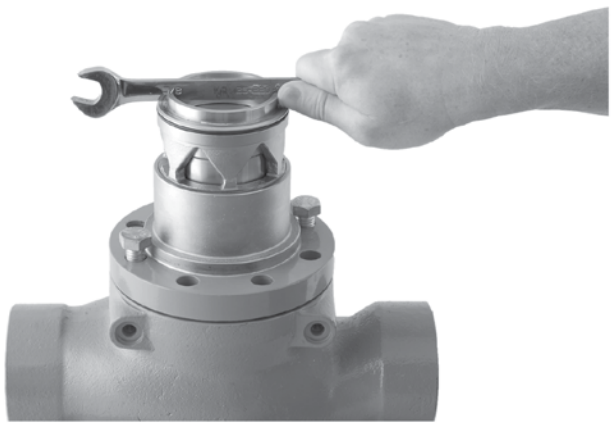

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Figure 5. *Seat Ring/Cage Removal or Installation Using Body as Holding Fixture*

11. Install the indicator fitting (key 5) with attached parts into the body flange (key 2). Back the hex nut (key 8) off until the spring (key 9) completely closes the valve plug (key 16) against the port (key 12) and upper seals (key 15), as indicated by stem threads showing between this nut and the fitting. Hold the indicator scale (key 18) against the fitting with the scale base resting against the shoulder of the fitting, and turn the flange nut (key 22) until its flange is aligned with the bottom scale marking. Then lock both nuts against each other, and install the indicator scale and protector (key 19).

Y291A Series Pilots

Body Area

This procedure is for gaining access to the disk assembly, orifice and body O-ring. All pressure must be released from the regulator, before the following steps can be performed. Key numbers are referenced in Figures 8 and 9.

1. To inspect and replace the disk assembly (key 13) or orifice (key 5), remove the back body cap (key 43).
2. Remove the disk assembly (key 13) from the disk spacer (key 44) if it is necessary to replace the disk assembly.
3. To inspect and replace the orifice (key 5) or throat seal O-ring (key 31), remove the cap screws (key 2) and separate the diaphragm casing (key 4) from the body (key 1).
4. Remove and inspect the body seal O-ring (key 11) and back-up ring (key 49). Replace if necessary.
5. Inspect and replace the orifice (key 5) if necessary. Lubricate the threads of the replacement orifice with a good grade of light grease. Install with 29 to 37 foot-pounds / 39 to 50 N•m of torque.
6. Inspect and replace the throat seal O-ring (key 31) and the machine screw (key 33).
7. Install the back-up ring (key 49) in the body (key 1). Next, install the body seal O-ring (key 11) into the body. See the expanded view of the body area in Figure 8 or 9.

Note

In the following step, be sure to install the spring case barrel pointed down as shown in Figure 1.

8. Replace the diaphragm casing (key 4) on the body (key 1) and secure with the cap screws (key 2).
9. Secure the disk assembly (key 13) to the disk spacer (key 44). Place the back disk spring (key 41) and back body seal O-ring (key 42) on the back body cap (key 43).
10. Use a good quality thread sealer when replacing the body cap assembly.

Diaphragm and Spring Case Area

For a Type Y291A Pilot

This procedure is for gaining access to the control spring, diaphragm, and lever assembly stem. All pressure must be released from the diaphragm case assembly before the following steps can be performed. Key numbers are referenced in Figure 8.

To Change the Control Spring:

1. Remove the closing cap (key 22), and turn the adjusting screw (key 35) counterclockwise until all compression is removed from the spring (key 6).
2. Remove the adjusting screw (key 35) and change the control spring (key 6) to match the desired spring range.
3. Replace the adjusting screw (key 35).
4. Install a replacement closing cap gasket (key 25), if necessary, and reinstall the closing cap (key 22).
5. If the spring range was changed, be sure to change the stamped spring range on the spring case nameplate.

To Disassemble and Reassemble Diaphragm Parts:

This procedure is for gaining access to the control spring, diaphragm, valve stem and stem O-ring. All pressure must be released from the diaphragm casing before these steps can be performed.

1. Remove the closing cap (key 22) and the adjusting screw (key 35).
2. Remove the hex nuts (key 23, not shown) and cap screws (key 24), lift off the spring case assembly (key 3) and remove the control spring (key 6).
3. Remove the diaphragm (key 10) plus attached parts by tilting them so that the pusher post (key 8) slips off the lever assembly (key 16). To separate the diaphragm from the attached parts, unscrew the diaphragm plate cap screw (key 38) from the pusher post. If the only further maintenance is to replace the diaphragm parts, skip to step 7.
4. To replace the lever assembly (key 16), remove the machine screws (key 17). To replace the stem (key 14), perform Body Area Maintenance procedure steps 1 and 3, and pull the stem out of the guide insert (key 18).
5. Install the stem (key 14) into the guide insert (key 18) and perform Body Area Maintenance procedure steps 6 through 10 as necessary.
6. Install the lever assembly (key 16) into the stem (key 14) and secure the lever assembly with the machine screws (key 17).
7. Install the lower head gasket (key 45), heavy diaphragm head (key 50), diaphragm (key 10), diaphragm head (key 7) and washer (key 36) on the pusher post (key 8), and secure with cap screw (key 38) using 30 to 45 inch-pounds / 3 to 5 N•m of torque.
8. Install the pusher post (key 8) plus attached diaphragm parts onto the lever assembly (key 16).
9. Install the spring case (key 3) on the diaphragm casing (key 4) so the vent assembly (key 26) is properly oriented, and secure it with the cap screws (key 24) and hex nuts (key 23, not shown) fingertight only.
10. Install the control spring (key 6) and the adjusting screw (key 35) in the spring case (key 3). Turn the adjusting screw clockwise until there is enough control spring force to provide proper slack to the diaphragm (key 10). Using a crisscross pattern, finish tightening the cap screws (key 24) and hex nuts (key 23, not shown) to 18 to 21 foot-pounds / 24 to 28 N•m of torque. To adjust the outlet pressure to the desired setting, refer to the Startup and Adjustment section.
11. Install a replacement closing cap gasket (key 25) if necessary, and then install the closing cap (key 22).

For a Type Y291AL

This procedure is for gaining access to the control spring, diaphragm assembly and valve stem. All pressure must be released from the diaphragm case assembly before these steps can be performed. Key numbers are referenced in Figure 9.

1. Remove the closing cap (key 22) and slowly turn the adjusting nut (key 20) counterclockwise removing all compression from the control spring (key 6). Remove the adjusting nut and the upper spring seat (key 19). If the only further maintenance is to change the control spring, skip to step 11.
2. Remove the hex nuts (key 23, not shown) and cap screws (key 24), lift off the spring case assembly (key 3) and remove the control spring (key 6).
3. Remove the diaphragm (key 10) plus attached parts by tilting them so that the pusher post (key 8) slips off the lever assembly (key 16). To separate the diaphragm casing (key 4) from the attached parts, unscrew the diaphragm head hex nut (key 21) from the pusher post. If the only further maintenance is to replace the diaphragm parts or change the control spring (key 6), skip to step 7.
4. To replace the lever assembly (key 16), remove the machine screws (key 17). To replace the stem (key 14) perform Body Area Maintenance procedure steps 1 and 4, and pull the stem out of the diaphragm casing (key 4).
5. Install the stem (key 14) into the diaphragm casing (key 4) and perform Body Area Maintenance procedure steps 6 through 10 as necessary.
6. Install the lever assembly (key 16) into the lever stem and secure the lever assembly with the machine screws (key 17).
7. Install the diaphragm head gasket (key 45), lower diaphragm head (key 7), diaphragm (key 10) and upper diaphragm head (key 7) on the pusher post (key 8). Coat the top surface of the pusher post with a good grade of adhesive gasket sealer and secure with the diaphragm hex nut (key 21) with 80 to 110 inch-pounds / 9 to 12 N•m of torque.
8. Install the pusher post (key 8) plus attached diaphragm parts onto the lever assembly (key 16).
9. Install the spring case assembly (key 3) and control spring (key 6) on the diaphragm casing (key 4) so

the vent assembly (key 26) is correctly oriented, and secure them with the cap screws (key 24) and hex nuts (key 23, not shown) fingertight only.

10. Turn the adjusting nut (key 20) clockwise until there is enough control spring (key 6) force to provide proper slack to the diaphragm (key 10). Using a crisscross pattern, finish tightening the cap screws (key 24) and hex nuts (key 23, not shown) to 16 to 20 foot-pounds / 22 to 27 N•m of torque. Then finish turning the adjusting nut to the desired outlet pressure setting.
11. Install a replacement closing cap gasket (key 25) if necessary, and then install the closing cap (key 22).
12. Reinstall the Type Y291AL on the Type 1290 with the Type Y291AL spring case barrel pointed up.

Type 95H Supply Pressure Regulator

This section includes instructions for disassembly and replacement of parts for the Type 95 supply regulator. Key numbers are referenced in Figure 10.

WARNING

Before disassembling the regulator, isolate it from the pressure system and release all pressure from the regulator.

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. Inspect the seating surface of the valve plug (key 4), being sure that the composition surface of the valve plug is not damaged. Replace if damaged.
3. Inspect the seating edge of the orifice (key 3). If damage is noted, unscrew the orifice from the body and replace it with a new part. If no further maintenance is required, reassemble the regulator in the reverse of the above steps. When installing the valve plug guide (key 5) coat the threads and sealing surface with sealant to ensure an adequate metal-to-metal seal.
4. If diaphragm (key 12) damage is suspected, or to inspect the diaphragm or other internal parts, loosen the jam nut (key 17) and turn the adjusting screw (key 15) to remove all spring compression.
5. Remove the diaphragm case cap screws (key 16) and lift off the spring case (key 2). Remove the upper spring seat (key 9) and regulator spring (key 11). Remove the lower spring seat (key 8).
6. Remove the diaphragm (key 12) and examine for damage. Replace if damage is noted.
7. With diaphragm (key 12) removed, check to be sure the pressure registration hole is completely open and free from all obstructions.
8. Reassemble in the reverse of the above procedures. Lubricate the upper spring seat (key 9) and the exposed threads of the adjusting screw (key 15). Before tightening cap screw (key 16) be sure to install the adjusting screw, if completely removed, and turn it down so that diaphragm slack is obtained. This allows proper positioning of the diaphragm (key 12) to permit full travel of the valve plug (key 4). Complete reassembly procedures and turn the adjusting screw to produce the desired outlet pressure values shown in the Type 95H set pressure specifications. Tighten the jam nut (key 17) to maintain the desired setting.

Type 1098 Actuator and Mounting Parts

Perform this procedure if changing, inspecting, cleaning or replacing the actuator and/or the pilot mounting parts. Key numbers are referenced in Figures 7 and 11.

1. The actuator and pilot may be removed and replaced as a unit by disconnecting the Type 1098 loading pressure line.
2. Access to all internal parts except the stem O-rings, bearings and wiper ring (keys 6, 56 and 57, respectively, Figure 7) may be gained without removing the bonnet (key 3) or upper diaphragm case (key 2) from the main valve. Disconnect the pipe nipple (key 39, Figure 11) from the lower diaphragm case (key 1, Figure 7).
3. Remove the cap screws (key 10), nuts (key 11), lower diaphragm case (key 1), diaphragm (key 7), and diaphragm plate (key 8). To separate the stem (key 12) from the diaphragm plate, remove the stem cap screw (key 9).
4. To remove the case O-ring (key 5), unscrew the four case cap screws (key 4), remove the upper diaphragm case (key 2), and remove the case O-ring.

   To remove the stem O-rings, bearings and wiper ring (keys 6, 56 and 57, respectively), remove the loading and control lines. Unscrew the bonnet (key 3) and remove the O-rings.
5. Lubricate both stem O-rings (key 6) and wiper ring (key 57), and install them with the stem bearings (key 56) in bonnet (key 3). Lubricate the case O-ring (key 5), and install it in the bonnet. Line up the holes

in the upper diaphragm casing (key 2) and the bonnet; insert and tighten the four case cap screws (key 4) to 24 to 30 foot-pounds / 33 to 41 N•m of torque. Thread the bonnet into the main valve body (key 1, Figure 6).

6. Secure the diaphragm plate (key 8) to the stem (key 12) with the stem cap screw (key 9). Lay the diaphragm (key 7), diaphragm plate and stem assembly into the lower diaphragm case (key 2) so the diaphragm convolution laps up over the diaphragm plate according to Figure 7. Install the stem slowly up into the bonnet (key 3) to prevent stem or O-ring damage, and secure the lower diaphragm case to the upper diaphragm case (key 1) with the cap screws and nuts. Tighten the cap screws (key 4) and nuts using a crisscross pattern with 24 to 30 foot-pounds / 33 to 41 N•m of torque.
7. Grease the stem O-rings (key 6) through the grease fitting (key 28) until excess grease starts coming out the vent assembly (key 27). Install the pipe nipple and line tubing if they were removed during maintenance.

Parts Ordering

Each Type 1290 vapor recovery regulator is assigned a serial number which can be found on the nameplate on the main valve actuator. Refer to this number when contacting your local Sales Office for assistance, or when ordering replacement parts. When ordering a replacement part, be sure to reference the key number of each needed part and include the complete 11-character part number from the following parts list.

Separate kits containing all recommended spare parts are available for both the main valve and pilot.

Parts marked NACE can be used for sour gas service as detailed in the NACE International standard MR0175. Parts referenced in the parts list can be found in Figures 6 through 10.

Parts List

Design Type EGR Main Valve (Figure 6)

Key	Description	Part Number
	Parts Kit, Nitrile (NBR) Elastomers (Included are keys 4, 7, 12, 15, 17, 21, 36 and 37)	
	NPS 1 / DN 25	R63EGX00112
	NPS 2 / DN 50	R63EGX00122
	NPS 3 / DN 80	R63EGX00132
	NPS 4 / DN 100	R63EGX00142
	NPS 6, 8 x 6 and 12 x 6 / DN 150, 200 x 150 and 300 x 150	R63EGX00162
1	Body	See Table 3
2	Body Flange	
	Cast iron, ENC	
	NPS 2 / DN 50	25A3168X012
	NPS 3 / DN 80	24A9034X012
	NPS 4 / DN 100	25A2309X012
	NPS 6, 8 x 6 and 12 x 6 / DN 150, 200 x 150 and 300 x 150	34A8172X012
	WCC Steel, ENC, Heat-treated	
	NPS 1 / DN 25	24A6779X012
	NPS 2 / DN 50	25A2254X012
	NPS 3 / DN 80	25A2300X012
	NPS 4 / DN 100	24A9032X012
	NPS 6, 8 x 6 and 12 x 6 / DN 150, 200 x 150 and 300 x 150	34A7152X012
	CF8M Stainless steel, ENC (NACE)	
	NPS 1 / DN 25	24A6779X062
	NPS 2 / DN 50	25A2254X082
	NPS 3 / DN 80	25A2300X122
	NPS 4 / DN 100	24A9032X042
	NPS 6, 8 x 6 and 12 x 6 / DN 150, 200 x 150 and 300 x 150	34A7152X052
3	Cap Screw, Zinc-plated steel (cast iron and steel bodies)	
	NPS 1 / DN 25 (4 required)	1R281124052
	NPS 2 / DN 50 (8 required)	1A453324052
	NPS 3 / DN 80 (8 required)	1A454124052
	NPS 4 / DN 100 (8 required)	1A485724052
	NPS 6, 8 x 6 and 12 x 6 / DN 150, 200 x 150 and 300 x 150 (12 required)	1U513124052
3	Stud Bolt, Stainless steel, (stainless steel body, not shown)	
	NPS 1 / DN 25 (4 required)	1R284835222
	NPS 2 / DN 50 (8 required)	1K242935222
	NPS 3 / DN 80 (8 required)	1A378135222
	NPS 4 / DN 100 (8 required)	1R369035222
	NPS 6, 8 x 6 and 12 x 6 / DN 150, 200 x 150 and 300 x 150 (12 required)	1A365635222
4*	Gasket, Composition	
	NPS 1 / DN 25	14A6785X012
	NPS 2 / DN 50	14A5685X012
	NPS 3 / DN 80	14A5665X012
	NPS 4 / DN 100	14A5650X012
	NPS 6, 8 x 6 and 12 x 6 / DN 150, 200 x 150 and 300 x 150	14A6984X012
5	Indicator Fitting, Plated steel (not for stainless steel body)	
	NPS 1 / DN 25	T21117T0012
	NPS 1 / DN 25 (NACE)	T21117T0022
	NPS 2, 3 and 4 / DN 50, 80 and 100	T21107T0012
	NPS 2, 3 and 4 / DN 50, 80 and 100 (NACE)	T21107T0022
	NPS 6, 8 x 6 and 12 x 6 / DN 150, 200 x 150 and 300 x 150	T21120T0012
	NPS 6, 8 x 6 and 12 x 6 / DN 150, 200 x 150 and 300 x 150 (NACE)	T21120T0012
6	O-ring Retainer	
	416 Stainless steel (NACE)	T14276T0012
7*	Travel Indicator Stem O-ring	
	Nitrile (NBR)	1E472706992
	Fluorocarbon (FKM)	1N430406382
	Perfluoroelastomer (FFKM)	1D6875X0082
8	Hex Nut, Plated steel	1A662228992
9	Spring	
	Steel	
	60 psi / 4.1 bar maximum drop, Green	
	NPS 1 / DN 25	14A9687X012
	NPS 2 / DN 50	14A6626X012
	NPS 3 / DN 80	14A6629X012
	NPS 4 / DN 100	14A6632X012
	NPS 6, 8 x 6 and 12 x 6 / DN 150, 200 x 150 and 300 x 150	14A9686X012

*Recommended spare part.

Type 1290

Key	Description	Part Number
9	Spring (continued)	
	Steel (continued)	
	125 psi / 8.6 bar maximum drop, Blue	
	NPS 1 / DN 25	14A9680X012
	NPS 2 / DN 50	14A6627X012
	NPS 3 / DN 80	14A6630X012
	NPS 4 / DN 100	14A6633X012
	NPS 6, 8 x 6 and 12 x 6 / DN 150, 200 x 150 and 300 x 150	14A9685X012
	400 psi / 27.6 bar maximum drop, Red	
	NPS 1 / DN 25	14A9679X012
	NPS 2 / DN 50	14A6628X012
	NPS 3 / DN 80	14A6631X012
	NPS 4 / DN 100	14A6634X012
	NPS 6, 8 x 6 and 12 x 6 / DN 150, 200 x 150 and 300 x 150	15A2615X012
	Inconel® X750 (NACE)	
	60 psi / 4.1 bar maximum drop, Green	
	NPS 1 / DN 25	11B6769X012
	NPS 2 / DN 50	16A5501X012
	NPS 3 / DN 80	16A5503X012
	NPS 4 / DN 100	16A5506X012
	NPS 6, 8 x 6 and 12 x 6 / DN 150, 200 x 150 and 300 x 150	16A5510X012
	125 psi / 8.6 bar maximum drop, Blue	
	NPS 1 / DN 25	12B8326X012
	NPS 2 / DN 50	16A5995X012
	NPS 3 / DN 80	16A5996X012
	NPS 4 / DN 100	16A5997X012
	NPS 6, 8 x 6 and 12 x 6 / DN 150, 200 x 150 and 300 x 150	16A5999X012
	400 psi / 27.6 bar maximum drop, Red	
	NPS 1 / DN 25	10B1882X012
	NPS 2 / DN 50	16A5499X012
	NPS 3 / DN 80	16A5500X012
	NPS 4 / DN 100	16A5998X012
	NPS 6, 8 x 6 and 12 x 6 / DN 150, 200 x 150 and 300 x 150	16A6000X012
10	Indicator Stem	
	Stainless steel	
	NPS 1 / DN 25	T14311T0012
	NPS 2 / DN 50	T14275T0012
	NPS 3 / DN 80	T14312T0012
	NPS 4 / DN 100	T14313T0012
	NPS 6, 8 x 6 and 12 x 6 / DN 150, 200 x 150 and 300 x 150	T14314T0012
	316 Stainless steel (NACE)	
	NPS 1 / DN 25	T14311T0022
	NPS 2 / DN 50	T14275T0022
	NPS 3 / DN 80	T14312T0022
	NPS 4 / DN 100	T14313T0022
	NPS 6, 8 x 6 and 12 x 6 / DN 150, 200 x 150 and 300 x 150	T14314T0022
11	Cage	
	Linear, CF8M Stainless steel (NACE)	
	NPS 1 / DN 25	34B4136X012
	NPS 2 / DN 50	34B5838X012
	NPS 3 / DN 80	34B5839X012
	NPS 4 / DN 100	34B5840X012
	NPS 6, 8 x 6 and 12 x 6 / DN 150, 200 x 150 and 300 x 150	34B5841X012
	Quick Opening, Cast iron, ENC	
	NPS 1 / DN 25	37A7211X012
	NPS 2 / DN 50	37A7212X012
	NPS 3 / DN 80	37A7213X012
	NPS 4 / DN 100	37A7214X012
	Quick Opening, Steel	
	NPS 6, 8 x 6 and 12 x 6 / DN 150, 200 x 150 and 300 x 150	37A7215X022

Key	Description	Part Number
11	Cage (continued)	
	Whisper™ Trim	
	416 Stainless steel	
	NPS 1 / DN 25	24A2043X012
	NPS 2 / DN 50	24A5707X012
	NPS 3 / DN 80	24A5708X012
	NPS 4 / DN 100	24A5709X012
	NPS 6, 8 x 6 and 12 x 6 / DN 150, 200 x 150 and 300 x 150	24A8174X012
	316 Stainless steel	
	NPS 1 / DN 25	24A2043X022
	NPS 2 / DN 50	24A5707X022
	NPS 3 / DN 80	24A5708X042
	NPS 4 / DN 100	24A5709X022
	NPS 6, 8 x 6 and 12 x 6 / DN 150, 200 x 150 and 300 x 150	24A8174X022
12*	Port Seal	
	Nitrile (NBR) **(standard)**	
	NPS 1 / DN 25	14A6788X012
	NPS 2 / DN 50	24A5673X012
	NPS 3 / DN 80	24A5658X012
	NPS 4 / DN 100	24A5643X012
	NPS 6, 8 x 6 and 12 x 6 / DN 150, 200 x 150 and 300 x 150	14A8175X012
	Fluorocarbon (FKM)	
	NPS 1 / DN 25	14A8186X012
	NPS 2 / DN 50	25A7412X012
	NPS 3 / DN 80	25A7375X012
	NPS 4 / DN 100	25A7469X012
	NPS 6, 8 x 6 and 12 x 6 / DN 150, 200 x 150 and 300 x 150	14A6996X012
	Ethylenepropylene (EPDM)	
	NPS 1 / DN 25	14A6788X022
	NPS 2 / DN 50	24A5673X062
	NPS 3 / DN 80	24A5658X062
	NPS 4 / DN 100	24A5643X052
	NPS 6, 8 x 6 and 12 x 6 / DN 150, 200 x 150 and 300 x 150	14A8175X022
	Perfluoroelastomer (FFKM)	
	NPS 1 / DN 25	14A6788X042
	NPS 2 / DN 50	24A5673X082
	NPS 3 / DN 80	24A5658X052
	NPS 4 / DN 100	24A5643X032
	NPS 6, 8 x 6 and 12 x 6 / DN 150, 200 x 150 and 300 x 150	14A8175X042
13*	Seat Ring	
	416 Stainless steel	
	NPS 1 / DN 25, 1-5/16-inch / 33 mm orifice	24A6781X012
	NPS 2 / DN 50, 2-3/8-inch / 60 mm orifice	24A5670X012
	NPS 3 / DN 80, 3-3/8-inch / 86 mm orifice	24A5655X012
	NPS 4 / DN 100, 4-3/8-inch / 111 mm orifice	24A5640X012
	NPS 6 / DN 150, 7-3/16-inch / 183 mm orifice	24A6989X012
	NPS 8 x 6 and 12 x 6 / DN 200 x 150 and 300 x 150, 7-3/16-inch / 183 mm port	38A4216X012
	316 Stainless steel (NACE)	
	NPS 1 / DN 25, 1-5/16-inch / 33 mm orifice	24A6781X022
	NPS 2 / DN 50, 2-3/8-inch / 60 mm orifice	24A5670X022
	NPS 3 / DN 80, 3-3/8-inch / 86 mm orifice	24A5655X022
	NPS 4 / DN 100, 4-3/8-inch / 111 mm orifice	24A5640X022
	NPS 6 / DN 150, 7-3/16-inch / 183 mm orifice	24A6989X022
	NPS 8 x 6 and 12 x 6 / DN 200 x 150 and 300 x 150, 7-3/16-inch / 183 mm port	38A4216X022
15*	Upper Seal	
	Nitrile (NBR) **(standard)**	
	NPS 1 / DN 25	14A6789X012
	NPS 2 / DN 50	24A5674X012
	NPS 3 / DN 80	24A5659X012
	NPS 4 / DN 100	24A5644X012
	NPS 6, 8 x 6 and 12 x 6 / DN 150, 200 x 150 and 300 x 150	14A8176X012

*Recommended spare part.
Inconel® is a mark owned by Special Metals Corporation.

Table 3. *Key 1 Type EGR Body Part Numbers*

BODY MATERIAL	END CONNECTION STYLE	NPS 1 / DN 25	NPS 2 / DN 50
Cast Iron	NPT	34B7611X012	38A8845X012
	CL125 FF	34B8630X012	38A8847X012
	CL250 RF	37B5950X012	38A8846X012
WCC Steel	NPT	37B5946X012	38A8848X012
	CL150 RF	37B5947X012	38A8853X012
	CL300 RF	37B5948X012	38A8849X012
	CL600 RF	37B5949X012	38A8844X012
	SWE	GE05951X012	GE05958X012
	SCH 40 BWE	GE05953X012	GE05957X012
	SCH 80 BWE	GE05954X012	GE05959X012
	PN 16/25/40	GE05956X012	GE05960X012
CF8M Stainless steel/NACE	NPT	37B5946X032	38A8848X032
	CL150 RF	37B5947X032	38A8853X072
	CL300 RF	37B5948X032	38A8849X032
	CL600 RF	37B5949X032	38A8844X032
	SWE	GE05951X022	GE05958X022
	SCH 40 BWE	GE05953X022	GE05957X022
	SCH 80 BWE	GE05954X022	GE05959X022
	PN 16/25/40	GE05956X022	GE05960X022
NACE WCC Steel	NPT	- - - - - - - - - - -	38A8848X022
	CL150 RF	37B5947X022	38A8853X052
	CL300 RF	37B5948X022	38A8849X022
	CL600 RF	37B5949X022	38A8844X022

Table 3. *Key 1 Type EGR Body Part Numbers (continued)*

BODY MATERIAL	END CONNECTION STYLE	NPS 3 / DN 80	NPS 4 / DN 100	NPS 6 / DN 150	NPS 8 x 6 / DN 200 x 150
Cast Iron	CL125 FF	38A8851X012	38A8865X012	38A8875X012	- - - - - - - - - - -
	CL250 RF	38A8850X012	38A8854X012	38A7110X012	- - - - - - - - - - -
WCC Steel	CL150 RF	38A8872X012	38A8867X012	38A7115X012	GE05973X012
	CL300 RF	38A8871X012	38A8869X012	38A8873X012	GE05974X012
	CL600 RF	38A8852X012	38A8866X012	38A8874X012	GE05975X012
	SCH 40 BWE	GE05962X012	GE05967X012	GE05971X012	- - - - - - - - - - -
	SCH 80 BWE	GE05963X012	GE05968X012	GE05970X012	- - - - - - - - - - -
	PN 16/25	GE05965X012	GE05969X012	GE05972X012	GE05977X012
CF8M Stainless steel/NACE	CL150 RF	38A8872X052	38A8867X042	38A7115X032	- - - - - - - - - - -
	CL300 RF	38A8871X052	38A8869X032	38A8873X032	- - - - - - - - - - -
	CL600 RF	38A8852X042	38A8866X032	38A8874X032	- - - - - - - - - - -
	SCH 40 BWE	GE05962X022	GE05967X022	GE05971X022	GE05976X022
	SCH 80 BWE	GE05963X022	GE05968X022	GE05970X022	- - - - - - - - - - -
	PN 16	GE05965X022	GE05969X022	GE05972X022	- - - - - - - - - - -
NACE WCC Steel	CL150 RF	38A8872X062	38A8867X032	38A7115X022	GE05973X022
	CL300 RF	38A8871X042	38A8869X022	38A8873X022	GE05974X022
	CL600 RF	38A8852X032	38A8866X022	38A8874X022	GE05975X022

Key	Description	Part Number
15*	Upper Seal (continued)	
	Fluorocarbon (FKM)	
	NPS 1 / DN 25	14A8187X012
	NPS 2 / DN 50	25A7413X012
	NPS 3 / DN 80	25A7376X012
	NPS 4 / DN 100	25A7468X012
	NPS 6, 8 x 6 and 12 x 6 / DN 150, 200 x 150 and 300 x 150	14A8185X012
	Perfluoroelastomer (FFKM)	
	NPS 1 / DN 25	14A6789X042
	NPS 2 / DN 50	24A5674X082
	NPS 3 / DN 80	24A5659X052
	NPS 4 / DN 100	24A5644X032
	NPS 6, 8 x 6 and 12 x 6 / DN 150, 200 x 150 and 300 x 150	14A8176X042
	Ethylenepropylene (EPDM)	
	NPS 1 / DN 25	14A6789X022
	NPS 2 / DN 50	24A5674X062
	NPS 3 / DN 80	24A5659X062
	NPS 4 / DN 100	24A5644X052
	NPS 6, 8 x 6 and 12 x 6 / DN 150, 200 x 150 and 300 x 150	14A8176X022

Key	Description	Part Number
16*	Valve Plug	
	416 Stainless steel	
	NPS 1 / DN 25	14A6780X012
	NPS 2 / DN 50	24A6772X012
	NPS 3 / DN 80	24A9421X012
	NPS 4 / DN 100	24A8182X012
	NPS 6, 8 x 6 and 12 x 6 / DN 150, 200 x 150 and 300 x 150	24A6992X012
	316 Stainless steel (NACE)	
	NPS 1 / DN 25	14A6780X022
	NPS 2 / DN 50	24A6772X032
	NPS 3 / DN 80	24A9421X022
	NPS 4 / DN 100	24A8182X022
	NPS 6, 8 x 6 and 12 x 6 / DN 150, 200 x 150 and 300 x 150	24A6992X022
17*	Cage O-ring	
	Nitrile (NBR) **(standard)**	
	NPS 1 / DN 25	10A7777X012
	NPS 2 / DN 50	10A7779X012
	NPS 3 / DN 80	14A5688X012
	NPS 4 / DN 100	10A3481X012
	NPS 6, 8 x 6 and 12 x 6 / DN 150, 200 x 150 and 300 x 150	18A2556X022

*Recommended spare part.

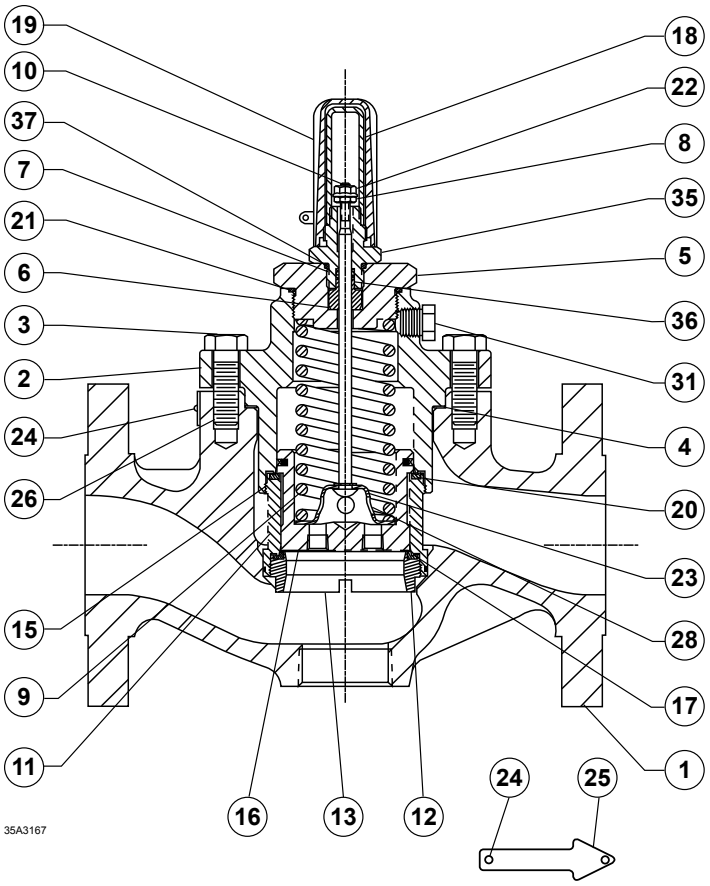


Figure 6. *Type EGR Main Valve*

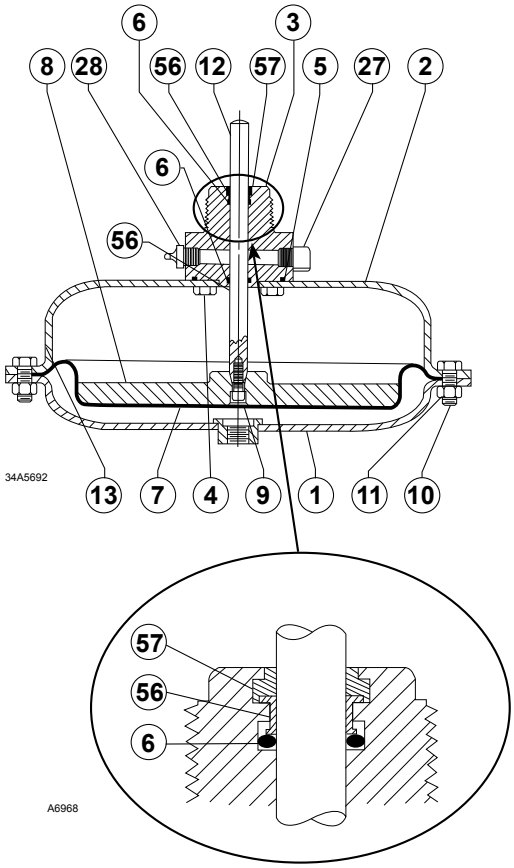


Figure 7. *Type 1098 Actuator*

Key	Description	Part Number
17*	Cage O-ring (continued)	
	Fluorocarbon (FKM)	
	NPS 1 / DN 25	10A7778X012
	NPS 2 / DN 50	10A7779X022
	NPS 3 / DN 80	14A5688X022
	NPS 4 / DN 100	10A3483X012
	NPS 6, 8 x 6 and 12 x 6 / DN 150, 200 x 150 and 300 x 150	18A2556X032
	Perfluoroelastomer (FFKM)	
	NPS 1 / DN 25	10A7777X032
	NPS 2 / DN 50	10A7779X132
	NPS 3 / DN 80	14A5688X112
	NPS 4 / DN 100	10A3481X032
	NPS 6, 8 x 6 and 12 x 6 / DN 150, 200 x 150 and 300 x 150	18A2556X092
	Ethylenepropylene (EPDM)	
	NPS 1 / DN 25	10A7777X022
	NPS 2 / DN 50	10A7779X052
	NPS 3 / DN 80	14A5688X082
	NPS 4 / DN 100	10A3481X052
	NPS 6, 8 x 6 and 12 x 6 / DN 150, 200 x 150 and 300 x 150	18A2556X072
18	Indicator Scale, Plastic	
	NPS 1 / DN 25	14A6759X012
	NPS 2 / DN 50	14A5678X012
	NPS 3 / DN 80	14A5662X012
	NPS 4 / DN 100	
	with 2-inch / 51 mm travel	14A5647X012
	with 1-1/2-inch / 38 mm travel	14A5662X012

Key	Description	Part Number
18	Indicator Scale, Plastic (continued)	
	NPS 6, 8 x 6 and 12 x 6 / DN 150, 200 x 150 and 300 x 150	14A5647X012
19	Travel Indicator Protector, Plated steel	
	NPS 1 and 2 / DN 25 and 50	24B1301X012
	NPS 3, 4, 6, 8 x 6 and 12 x 6 / DN 80, 100, 150, 200 x 150 and 300 x 150	14A6769X012
21*	Indicator Fitting O-ring	
	Nitrile (NBR), **(standard)**	
	NPS 1 / DN 25	10A8931X012
	NPS 2, 3 and 4 / DN 50, 80 and 100	10A3800X012
	NPS 6, 8 x 6 and 12 x 6 / DN 150, 200 x 150 and 300 x 150	1F262906992
	Fluorocarbon (FKM)	
	NPS 1 / DN 25	10A0811X012
	NPS 2, 3 and 4 / DN 50, 80 and 100	1R727606382
	NPS 6, 8 x 6 and 12 x 6 / DN 150, 200 x 150 and 300 x 150	1F2629X0012
	Perfluoroelastomer (FFKM)	
	NPS 1 / DN 25	10A8931X032
	NPS 2, 3 and 4 / DN 50, 80 and 100	10A3800X062
	NPS 6, 8 x 6 and 12 x 6 / DN 150, 200 x 150 and 300 x 150	1F2629X0042
	Ethylenepropylene (EPDM)	
	NPS 1 / DN 25	10A8931X022
	NPS 2, 3 and 4 / DN 50, 80 and 100	10A3800X042
	NPS 6, 8 x 6 and 12 x 6 / DN 150, 200 x 150 and 300 x 150	1F2629X0032
22	Flange Nut, Plated steel	14A5693X012

*Recommended spare part.

Key	Description	Part Number
23	E-Ring	
	Stainless steel	14A8181X012
	1577 Steel, Heat treated (NACE)	14A8181X022
24	Drive Screw, Stainless steel (2 required)	1A368228982
25	Flow Arrow, Stainless steel	- - - - - - - - - -
27	Indicator Plug	
	Steel	
	NPS 1 / DN 25	14A6983X012
	NPS 2 / DN 50	14A9684X012
	NPS 3 / DN 80	14A9684X012
	NPS 4 / DN 100	14A9684X012
	Stainless steel	
	NPS 1 / DN 25	14A6983X022
	NPS 2 / DN 50	14A9684X032
	NPS 3 / DN 80	14A9684X032
	NPS 4 / DN 100	14A9684X032
	NPS 6, 8 x 6 and 12 x 6 / DN 150, 200 x 150 and 300 x 150	14A8178X032
28	Spring Seat, Full capacity trim	
	Zinc-plated steel	
	NPS 1 / DN 25	14A6982X012
	NPS 2, 3 and 4 / DN 50, 80 and 100	15A2206X012
	NPS 6, 8 x 6 and 12 x 6 / DN 150, 200 x 150 and 300 x 150	14A8177X012
	Heat-treated wrought steel (NACE)	
	NPS 1 / DN 25	14A6982X022
	NPS 2, 3 and 4 / DN 50, 80 and 100	15A2206X022
	NPS 6, 8 x 6 and 12 x 6 / DN 150, 200 x 150 and 300 x 150	14A8177X022
29	Hex Nut, Steel (stainless steel body, not shown)	
	NPS 1 / DN 25 (4 required)	1C330635252
	NPS 2 / DN 50 (8 required)	1A377235252
	NPS 3 / DN 80 (8 required)	1A376035252
	NPS 4 / DN 100 (8 required)	1A352035252
	NPS 6, 8 x 6 and 12 x 6 / DN 150, 200 x 150 and 300 x 150 (12 required)	1A440935252
31	Pipe Plug	
	Steel	1A767524662
	Stainless steel	1A767535072
32	Travel Stop (not available on NPS 1 / DN 25 body),	
	Zinc-plated steel	
	NPS 2 / DN 50	
	30% Flow Capacity	14A9677X012
	70% Flow Capacity	14A9676X012
	NPS 3 / DN 80, 40% Flow Capacity	14A9671X012
	NPS 4 / DN 100, 40% Flow Capacity	14A9670X012
	NPS 6 / DN 150, 40% Flow Capacity	14A9682X012
33	NACE Tag, Stainless steel (not shown) (except NPS 1)	- - - - - - - - - -
34	Tag Wire, Stainless steel (not shown) (except NPS 1)	- - - - - - - - - -
35	Indicator Fitting	
	416 Stainless steel	T21104T0012
	316 Stainless steel (NACE)	T21104T0022
36	Back-up Ring (2 required)	1K786806992
37	Travel Indicator O-ring	
	Nitrile (NBR) **(standard)**	18B3438X012
	Fluorocarbon (FKM)	1N430306382
	Perfluoroelastomer (FFKM)	1N4303X0032
	Ethylenepropylene (EPDM)	1N4303X0012
38	Pipe Plug	
	Zinc-plated steel	1A767524662
	316 Stainless steel (NACE)	1A767535072

Type 1098 Actuator, Size 40 (Figure 7)

Key	Description	Part Number
	Parts kit (Included are keys 5, 6, 7, 56 and 57), Size 40, Nitrile (NBR)	R1098X00402
1	Lower Diaphragm Case	
	Steel	24A7155X012
	Steel (NACE)	24A7155X072
	Stainless steel (NACE)	24A7155X052
2	Upper Diaphragm Case	
	Zinc-plated steel	24A5680X012
	Steel (NACE)	24A5680X062
	Stainless steel (NACE)	24A5680X042
3	Bonnet	
	Steel	33B0301X012
	Stainless steel	33B0301X052
4	Cap Screws (4 required)	
	Zinc-plated steel	1D529824052
	B8M Zinc-plated steel (NACE)	1D529838992
5*	Case O-ring	
	Nitrile (NBR)	1F358106992
	Fluorocarbon (FKM)	1F3581X0022
	Ethylenepropylene (EPDM)	1F3581X0052
6*	Stem O-ring (2 required)	
	Nitrile (NBR)	1C782206992
	Fluorocarbon (FKM)	1K756106382
	Ethylenepropylene (EPDM)	1C7822X0052
7*	Diaphragm	
	Nitrile (NBR)	27B9744X012
	Fluorocarbon (FKM)	27B9744X022
	Ethylenepropylene (EPDM)	27B9744X032
8	Diaphragm Plate	
	Cast iron	14A5682X012
	316 Stainless steel (NACE)	GE08466X012
9	Stem Cap Screw	
	Plated steel	1L545428982
	Grade 8 black steel (NACE)	1L545438992
	Stainless steel	1L545438992
10	Cap Screw (16 required)	
	Zinc-plated steel	1E760324052
	Stainless steel	1E7603X0072
11	Hex Nut (16 required)	
	Zinc-plated steel	1A346524122
	18-8 Stainless steel	1A3465X0032
12	Stem	
	17-4PH Stainless steel	
	NPS 1 / DN 25	14A6757X012
	NPS 2 / DN 50	14A5683X012
	NPS 3 / DN 80	14A5663X012
	NPS 4 / DN 100	14A5648X012
	NPS 6 / DN 150	14A6987X012
	316 Stainless steel (NACE)	
	NPS 1 / DN 25	14A6757X022
	NPS 2 / DN 50	14A5683X022
	NPS 3 / DN 80	14A5663X022
	NPS 4 / DN 100	14A5648X022
	NPS 6 / DN 150	14A6987X022
	NPS 8 x 6 / DN 200 x 150	18A4217X022
13	Nameplate, Stainless steel	- - - - - - - - - -
27	Type Y602-12 Vent Assembly	27A5516X012
28	Grease Fitting, Steel	1L847828992
56	Bearing (2 required)	
	Nylon (PA)	17A7112X012
	Nyliner	17A7112X022
57	Wiper Ring	15A6002XN12

*Recommended spare part

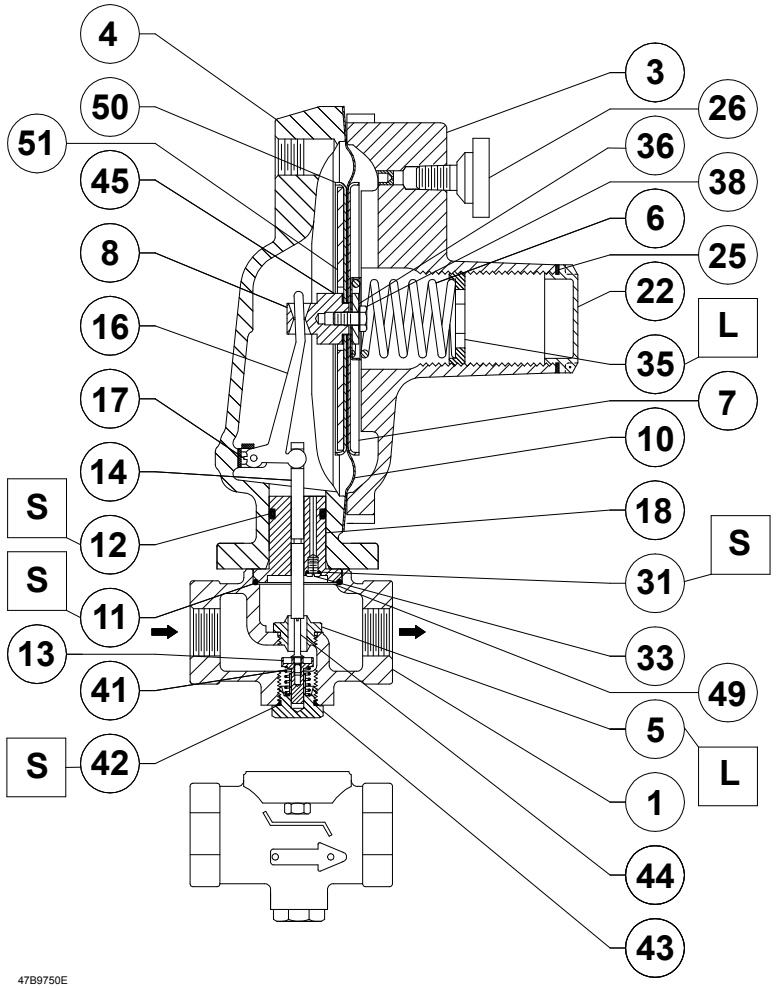
Types Y291A and Y291AL (Figures 8 and 9)

Key	Description	Part Number
	Parts Kits (Included are keys 10, 11, 12, 13, 31, 33, 45 and 49) for other than sour gas corrosion resistance applications	RY600X00032
1	Body, 3/4 NPT	
	Ductile iron	27B8628X012
	Stainless steel	27B1892X012
2	Cap Screw (2 required)	
	Ductile iron	1C856228992
	Stainless steel	18B3456X012
3	Spring Case Assembly	
	Type Y291A	
	Ductile iron	13B0109X042
	Stainless steel	13B0109X032
	Type Y291AL	
	Ductile iron	17B8946X012
	Stainless steel	17B8946X022
4	Lower Diaphragm Casing	
	Ductile iron	47B3063X012
	Stainless steel	47B3064X012
5	Orifice, 3/8-inch / 9.5 mm	
	303 Stainless steel	0L083135032
	316 Stainless steel (NACE)	0L0831X0012
6	Spring	
	Type Y291AL	
	0.5 to 1.5-inch w.c. / 1 to 4 mbar, Black	1B413627222
	Type Y291A	
	1 to 2.5-inch w.c. / 2 to 6 mbar, Orange	1B558527052
	2 to 7-inch w.c. / 5 to 17 mbar, Red	1B653827052
	4 to 14-inch w.c. / 10 to 35 mbar, Olive Green	1B653927022
	12 to 28-inch w.c. / 30 to 70 mbar, Yellow	1B537027052
	1.0 to 2.5 psig / 0.69 to 0.17 bar, Light Green	1B537127022
	2.5 to 4.5 psig / 0.17 to 0.31 bar, Light Blue	1B537227022
	4.5 to 7 psig / 0.31 to 0.48 bar, Black	1B537327052
7	Diaphragm Head (2 required for Type Y291AL)	17B9723X032
8	Pusher Post	
	Type Y291AL	17B9742X012
	Type Y291A	18B3465X012
10*	Diaphragm	
	Nitrile (NBR)	37B9720X012
	Fluorocarbon (FKM)	23B0101X052
	Nitrile (NBR) with Polytetrafluoroethylene (PTFE) protector	34B4375X012
11*	Body Seal O-ring	
	Nitrile (NBR)	1H993806992
	Fluorocarbon (FKM)	1H9938X0012
	Perfluoroelastomer (FFKM)	1H9938X0042
	Ethylenepropylene (EPDM)	1H9938X0022
12*	Insert Seal O-ring	
	Nitrile (NBR)	1B885506992
	Fluorocarbon (FKM)	1B8855X0012
	Perfluoroelastomer (FFKM)	1B8855X0062
	Ethylenepropylene (EPDM)	1B8855X0022
13*	Disk Assembly, Stainless steel disk holder with	
	Nitrile (NBR) Disk	1E9848X0042
	Fluorocarbon (FKM) Disk	1E9848X0032
	Perfluoroelastomer (FFKM) Disk	1E9848X0052
	Ethylenepropylene (EPDM) Disk	1E9848X0062
14	Stem, 316 Stainless steel	17B5278X012
16	Lever Assembly, 302 Stainless steel	1B5375000B2
17	Machine Screw (2 required), 18-8 Stainless steel	19A7151X022
18	Guide Insert, 316 Stainless steel	27B4028X022
19	Upper Spring Seat, Type Y291AL only	1A201824092
20	Adjusting Nut, Type Y291AL only	17B9740X012
21	Hex Nut, Type Y291AL only	1A345724122
22	Closing Cap	
	Type Y291AL, Zinc	1B541644012
	Type Y291A	
	Plastic	T11069X0012
	Steel	1E422724092
	Stainless steel	1E422735072
23	Hex Nut (8 required)	
	Ductile iron	1A352724122
	Stainless steel	1E9440X0352
24	Cap Screw (8 required)	
	Ductile iron	1A352524052
	Stainless steel	18B3455X012
25	Closing Cap Gasket, Neoprene (CR)	1P753306992
26	Vent Assembly	
	Spring Case Up (Type Y602-11)	17A5515X012
	Spring Case Down (Type Y602-1)	17A6570X012
31*	Throat Seal O-ring	
	Nitrile (NBR)	1D682506992
	Fluorocarbon (FKM)	1D6825X0012
	Perfluoroelastomer (FFKM)	1D6825X0032
	Ethylenepropylene (EPDM)	1D6825X0042
33	Machine Screw, 18-8 Stainless steel	18A0703X022
35	Adjusting Screw, Type Y291A only	1B537944012
36	Washer, Steel	18B3440X012
38	Cap Screw, Type Y291A only	1B290524052
41	Back Disk Spring	
	Type Y291AL	
	303 Stainless steel	18B0911X012
	316 Stainless steel (NACE)	18B3466X012
	Type Y291A	
	303 Stainless steel	1E984637022
	316 Stainless steel (NACE)	18B0255X012
42*	Back Body Seal O-ring	
	Nitrile (NBR)	13A1584X012
	Fluorocarbon (FKM)	13A1584X022
	Perfluoroelastomer (FFKM)	13A1584X032
	Ethylenepropylene (EPDM)	13A1584X042
43	Back Body Cap, 316 Stainless steel	1F2737X0012
44	Disk Spacer, 316 Stainless steel	1E9861X0012
45*	Lower Head Gasket, Composition	18B3450X012
46	Nameplate	- - - - - - - - - -
47	Drive Screw (2 required)	1A368228982
49	Back-up Ring, 302 Stainless steel	18B3446X012
50	Heavy Diaphragm Head Assembly (Type Y291A only)	18B3464X012

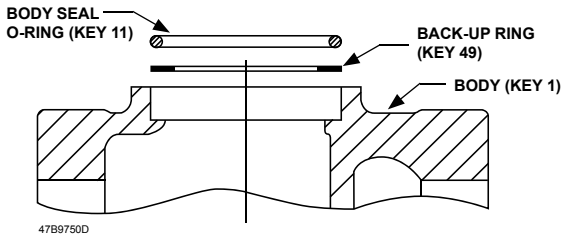
*Recommended spare part.

Type 95H Regulator (Figure 10)

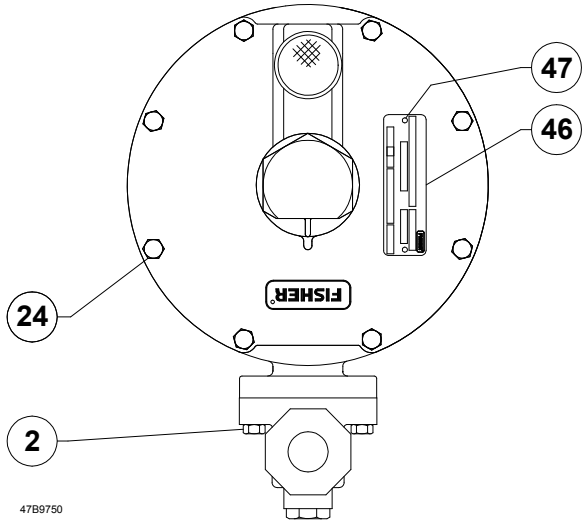
Key	Description	Part Number
	Parts Kit (Included are keys 3, 4, 10 and 12)	R95HX000102
1	Regulator Body, 1/4 NPT	
	Cast iron	1E391019012
	Steel	1J127322012
	Stainless steel	1J127333092
2	Spring Case	
	Cast iron	2E391219012
	Steel	2J127522012
	Stainless steel	2J1275X0012
3*	Orifice	
	416 Stainless steel	1E393235132
	316 Stainless steel (NACE)	1E393235072
4*	Valve Plug	
	416 Stainless steel with	
	Neoprene (CR)	1E3933000E2
	Fluorocarbon (FKM)	1E3933X0102
	316 Stainless steel with Neoprene (CR) (NACE)	1E3933X0012
5	Valve Plug Guide	
	416 Stainless steel	1E391835132
	316 Stainless steel	1E391835072
6	Stem Assembly	
	Stainless steel	1F2113000A2
	316 Stainless steel (NACE)	1F2113000C2
7*	Stem Guide Bushing	
	416 Stainless steel	1E392235132
	316 Stainless steel (NACE)	1E392235072



TYPE Y291A PILOT INTERIOR ASSEMBLY



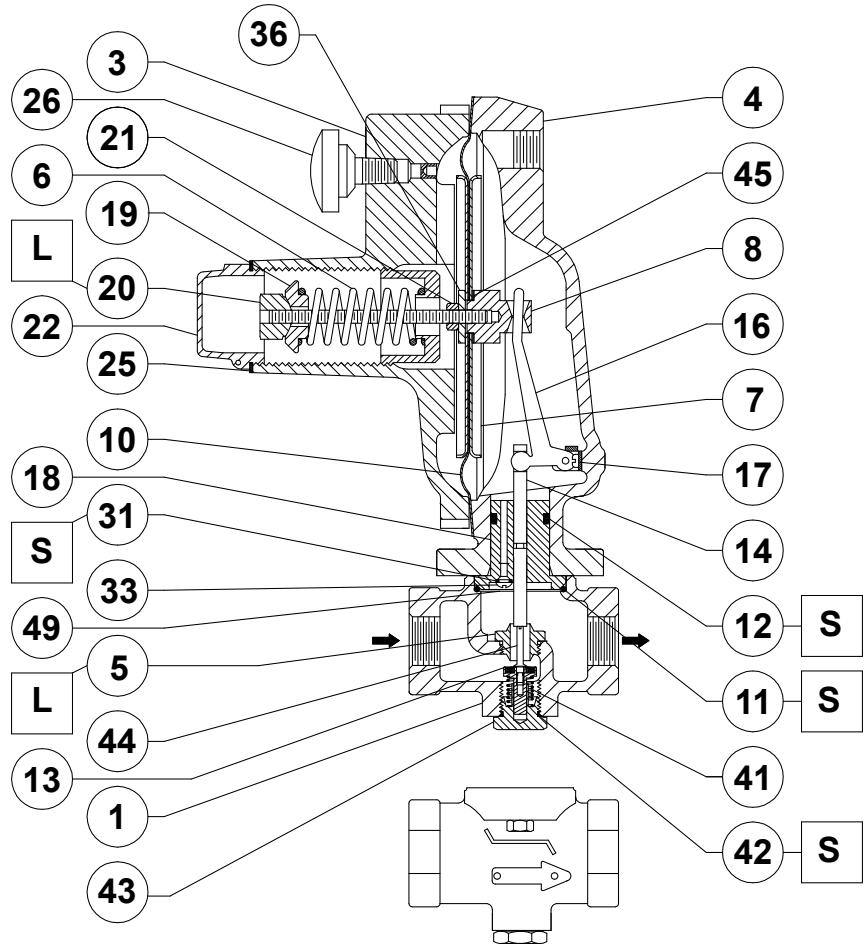
EXPANDED VIEW OF THE BODY AREA SHOWING THE O-RING AND BACK-UP RING PLACEMENT



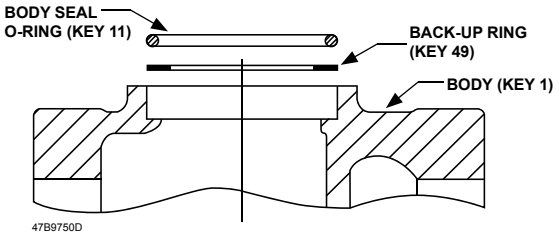
TYPE Y291A PILOT EXTERIOR ASSEMBLY

☐ APPLY SEALANT (S) / ANTI-SEIZE COMPOUND (L)

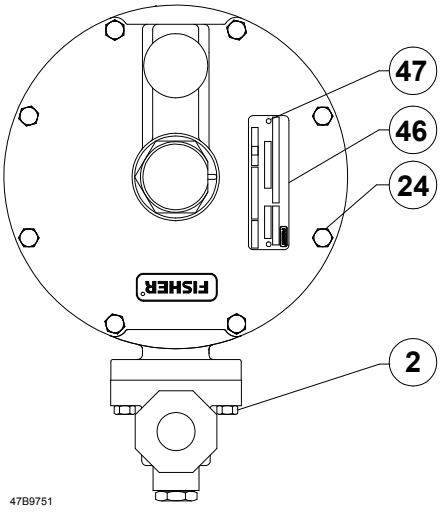
Figure 8. *Type Y291A Pilot Assembly*



TYPE Y291AL PILOT INTERIOR ASSEMBLY



EXPANDED VIEW OF THE BODY AREA SHOWING THE O-RING AND BACK-UP RING PLACEMENT



TYPE Y291AL PILOT EXTERIOR ASSEMBLY

☐ **APPLY SEALANT (S) / ANTI-SEIZE COMPOUND (L)**

Figure 9. *Type Y291AL Pilot Assembly*

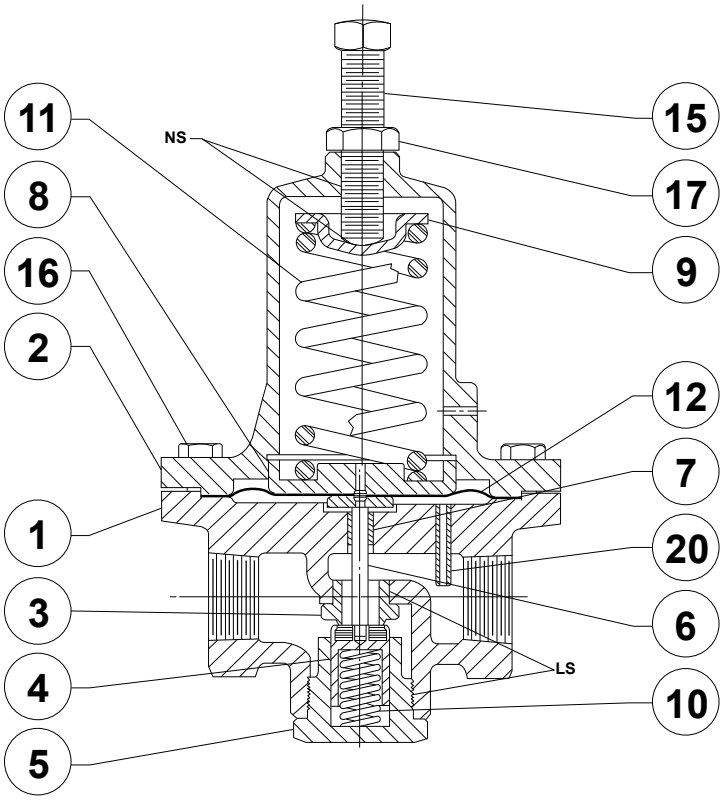


Figure 10. *Type 95H Assembly*

Key	Description	Part Number
8	Lower Spring Seat	
	Aluminum	1E392309012
	Stainless steel (NACE)	1E392335022
9	Upper Spring Seat	
	Steel	1B798525062
	Stainless steel (NACE)	1B798535022
10	Valve Plug Spring	
	Stainless steel	1E392437022
	NACE, Inconel®	19A2862X012
11	Regulator Spring, Steel	1E392527022
12*	Diaphragm	
	Neoprene (CR)	1E393502112
	Fluorocarbon (FKM)	1E393502402
13	Nameplate, Aluminum	- - - - - - - - - -
15	Adjusting Screw, Steel	1E639928992
16	Cap Screw (6 required)	
	Steel	1A407824052
	Stainless steel (NACE)	1A391724052
17	Jam Nut, Steel	1A352224122
18	Drive Screw, Stainless steel (2 required)	1A368228982

Mounting Parts (Figure 11)

Key	Description	Part Number
16	Pipe Tee	
	Zinc-plated steel Galvanized Iron	- - - - - - - - - -
	Stainless steel	- - - - - - - - - -
24	Tubing	
	Steel	- - - - - - - - - -
	Stainless steel	- - - - - - - - - -
30	Mounting Bracket, Stainless steel	- - - - - - - - - -
31	Cap Screw, Stainless steel (2 required)	- - - - - - - - - -
32	Cap Screw, Stainless steel (2 required)	- - - - - - - - - -
35	Tubing Connector, (4 required)	
	Steel	- - - - - - - - - -
	Stainless steel	- - - - - - - - - -
36	Pipe Bushing	
	Steel	- - - - - - - - - -
	Stainless steel	- - - - - - - - - -
39	Pipe Nipple, (3 required)	
	Zinc-plated steel	- - - - - - - - - -
	Stainless steel	- - - - - - - - - -
43	Pipe Bushing, (2 required)	
	Steel	- - - - - - - - - -
	Stainless steel	- - - - - - - - - -
50	Pipe Cross	
	Steel	- - - - - - - - - -
	Stainless steel	- - - - - - - - - -
51	Bleed Orifice, Stainless steel	- - - - - - - - - -
52	Pipe Plug, (2 required)	
	Steel	- - - - - - - - - -
	Stainless steel	- - - - - - - - - -

*Recommended spare part.

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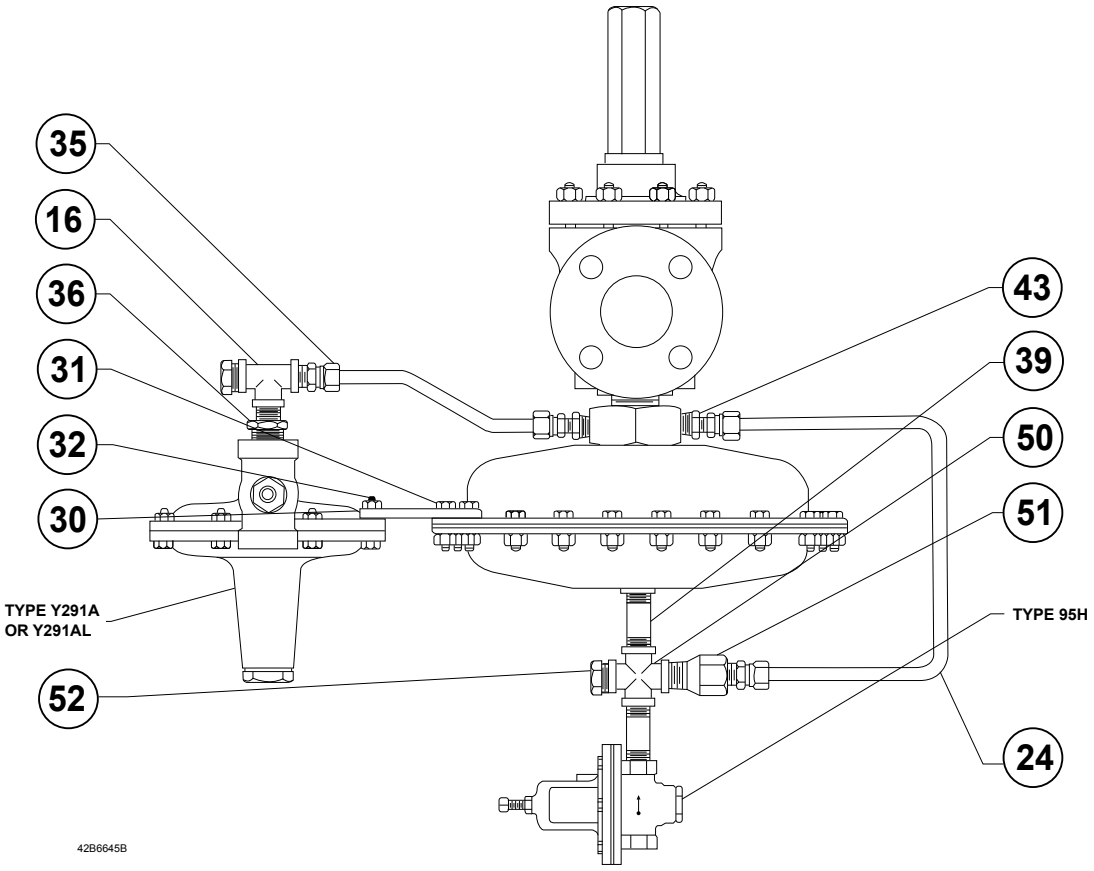

Figure 11. *Type 1290 Mounting Parts*

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