Type 92EZ Pressure Reducing Valve

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Figure 1. *Type 92EZ Pressure Reducing Valve*

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. (Emerson) instructions.

If the regulator vents gas or a leak develops in the system, service to the unit may be required. Failure to correct trouble could result in a hazardous condition.

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 92EZ regulator.

Introduction

Scope of the Manual

This manual provides instructions for installation, startup, maintenance and parts ordering information for the Type 92EZ Valve. Instructions and parts lists for other equipment used with these valves are found in separate manuals. The Type 92EZ is also available with a Type 6492HM or 6492HTM safety override pilot.

Specifications

Specifications are given for the Type 92EZ valve on below. Specifications for a given valve as it originally comes from the factory are stamped on the nameplate.

Available Configuration
Pilot-operated globe-style pressure reducing valve with post guiding and flow-to-close valve plug action.

Body Sizes and End Connection Styles
See Table 1

Body Ratings and Maximum Inlet Pressures(1)
See Table 2

Minimum Differential Pressures Required for Full Stroke(1)
20 psig / 1.4 bar with Stainless steel spring;
10 psig / 0.69 bar with Inconel® spring

Maximum Differential Pressures(1)(2)
Low Pressure Pilot: 150 psig / 10.3 bar
High Pressure/Temperature Pilot: 250 psig / 17.2 bar

Outlet Pressure Ranges(1)
See Table 3

Pressure Registration
External

Maximum Temperature Capabilities(1)
See Table 2

Downstream Control Line Connections
NPS 1 and 1-1/2 / DN 25 and 40: 1/4 NPT
NPS 2 / DN 50: 3/8 NPT

Approximate Weights
See Table 9

Construction Materials

Main Valve

Body: Cast iron, WCC Steel, CF8M Stainless steel
Upper and Lower Casings: WCC Steel
Gaskets (Body and Bushing): Graphite, Copper or Monel®
Integral Seat Cage and Valve Plug: 416 Stainless steel
Diaphragms: 302 Stainless steel
Stem Seal: Graphite/PTFE
Valve Plug Guide Bushing: 17-4PH Stainless steel
Spring: 17-7PH Stainless steel or Inconel®
Pipe Fittings: Steel or Stainless steel

Type 92B Pilot

Body and Spring Case: Cast iron, WCC steel
Diaphragm Plate Assembly: Aluminum, Steel
Diaphragm Gasket: Cast iron: Composition; Steel: Graphite
Diaphragm, Valve Plug, and Valve Spring: Stainless steel
Valve Stem and Orifice: 416 Stainless steel
Bellows and Bellows Retainer: Bronze (standard) or 321 Stainless steel
Spring and Lower Spring Seat: Steel (standard) or Stainless steel
Upper Spring Seat: Aluminum (standard) or Carbon steel
Screen: 304 Stainless steel
Check Valve Assembly: Stainless steel or Copper

Pilot Mounting Parts

Cast Iron Body: Copper tubing and brass fittings
Steel Body: Stainless steel tubing and corrosion resistant steel fittings

1. The pressure/temperature limits in this Instruction Manual or any applicable standard limitation should not be exceeded.
2. A pre-pilot supply regulator option may be used for differential pressures above 250 psid / 17.2 bar d.

Table 1. *Body Sizes and End Connection Styles*

BODY SIZE		END CONNECTION STYLE	
NPS	DN	Cast Iron Body	Steel or Stainless Steel Body
1, 1-1/2 or 2	25, 40 or 50	NPT, CL125 FF or CL250 RF	NPT, CL150 RF, CL300 RF or CL600 RF

Table 2. *Maximum Inlet Pressures, Outlet Pressure and Temperatures*

BODY MATERIAL	END CONNECTION	PILOT TYPE	MAXIMUM INLET PRESSURE		MAXIMUM OPERATING OUTLET PRESSURE		MAXIMUM EMERGENCY OUTLET PRESSURE		MAXIMUM TEMPERATURE		MAXIMUM DIAPHRAGM CASING PRESSURE		MAXIMUM DIFFERENTIAL PRESSURE	
			psig	barg	psig	barg	psig	barg	°F	°C	psig	barg	psig	barg
Cast iron	NPT	Low Pressure	175	12.1	25	1.72	100	6.89	406	208	150	10.3	150	10.3
		High Pressure	250	17.2	150	10.3	250	17.2	406	208	150	10.3	250	17.2
	CL125 FF	Low Pressure	125	8.62	25	1.72	100	6.89	353	178	150	10.3	125	8.62
		High Pressure	125	8.62	120	8.27	250	17.2	353	178	150	10.3	125	8.62
	CL250 RF	Low Pressure	175	12.1	25	1.72	100	6.89	406	208	150	10.3	150	10.3
		High Pressure	250	17.2	150	10.3	250	17.2	406	208	150	10.3	250	17.2
Steel	NPT	Low Pressure	175	12.1	25	1.72	100	6.89	450	232	300	20.7	150	10.3
		High Pressure	550	37.9	250	17.2	300	20.7	450	232	300	20.7	250	17.2
		High Temperature	550	37.9	250	17.2	300	20.7	650	343	300	20.7	250	17.2
	CL150 RF	Low Pressure	175	12.1	25	1.72	100	6.89	450	232	300	20.7	150	10.3
		High Pressure	185	12.8	175	12.1	185	12.8	450	232	300	20.7	185	12.8
		High Temperature	125	8.62	115	7.93	125	8.62	650	343	300	20.7	125	8.62
	CL300 RF	Low Pressure	175	12.1	25	1.72	100	6.89	450	232	300	20.7	150	10.3
		High Pressure	550	37.9	250	17.2	300	20.7	450	232	300	20.7	250	17.2
		High Temperature	550	37.9	250	17.2	300	20.7	650	343	300	20.7	250	17.2
	CL600 RF	High Pressure	550	37.9	250	17.2	300	20.7	450	232	300	20.7	250	17.2
		High Temperature	550	37.9	250	17.2	300	20.7	650	343	300	20.7	250	17.2
Stainless Steel	NPT	Low Pressure	175	12.1	25	1.72	100	6.89	450	232	300	20.7	150	10.3
		High Pressure	550	37.9	250	17.2	300	20.7	450	232	300	20.7	250	17.2
		High Temperature	550	37.9	250	17.2	300	20.7	650	343	300	20.7	250	17.2
	CL150 RF	Low Pressure	175	12.1	25	1.72	100	6.89	450	232	300	20.7	150	10.3
		High Pressure	182	12.5	172	11.9	182	12.5	450	232	300	20.7	182	12.5
		High Temperature	125	8.62	115	7.93	125	8.62	650	343	300	20.7	125	8.62
	CL300 RF	Low Pressure	175	12.1	25	1.72	100	6.89	450	232	300	20.7	150	10.3
		High Pressure	497	34.2	250	17.2	300	20.7	450	232	300	20.7	250	17.2
		High Temperature	440	30.3	250	17.2	300	20.7	650	343	300	20.7	250	17.2
	CL600 RF	High Pressure	550	37.9	250	17.2	300	20.7	450	232	300	20.7	250	17.2
		High Temperature	550	37.9	250	17.2	300	20.7	650	343	300	20.7	250	17.2

Table 3. *Outlet Pressure Ranges*

PILOT TYPE	OUTLET PRESSURE		SPRING WIRE DIAMETER		SPRING FREE LENGTH		PART NUMBER	COLOR CODE
	psig	barg	in.	mm	in.	mm		
Low Pressure	2 to 6	0.14 to 0.41	0.207	5.26	2.50	63.5	1E395627022	Yellow
	5 to 15	0.34 to 1.0	0.234	5.94	2.52	64.0	1D7455T0012	Green
	13 to 25	0.90 to 1.7	0.283	7.19	2.44	62.0	1E395727192	Red
High Pressure	15 to 30	1.0 to 2.1	0.207	5.26	2.50	63.5	1E395627022	Yellow
	25 to 75	1.7 to 5.2	0.234	5.94	2.52	64.0	1D7455T0012	Green
	70 to 150	4.8 to 10.3	0.281	7.14	2.44	62.0	1E395727192	Red
	80 to 250	5.5 to 17.2	0.375	9.53	2.50	63.5	14B9942X022	Unpainted
High Temperature	15 to 100	1.0 to 6.9	0.282	7.16	2.50	63.5	14B9943X012	Unpainted
	80 to 250	5.5 to 17.2	0.375	9.53	2.50	63.5	14B9942X022	Unpainted

Table 4. *Minimum Differential Pressures for Safety Override System*

TYPE	SPRING RANGE		SPRING COLOR	MINIMUM PRESSURE AT WHICH MONITORING PILOT CAN BE SET, psig / bar
	psig	bar		
6492HM	10 to 30	0.69 to 2.1	Yellow	10 / 0.69 over normal downstream pressure
	25 to 75	1.7 to 5.17	Green	10 / 0.69 over normal downstream pressure
	70 to 150	4.8 to 10.3	Red	15 / 1.0 over normal downstream pressure
6492HTM	15 to 100	1.0 to 6.9	Unpainted	10 / 0.69 over normal downstream pressure
	80 to 250	5.5 to 17.2	Unpainted	25 / 1.7 over normal downstream pressure

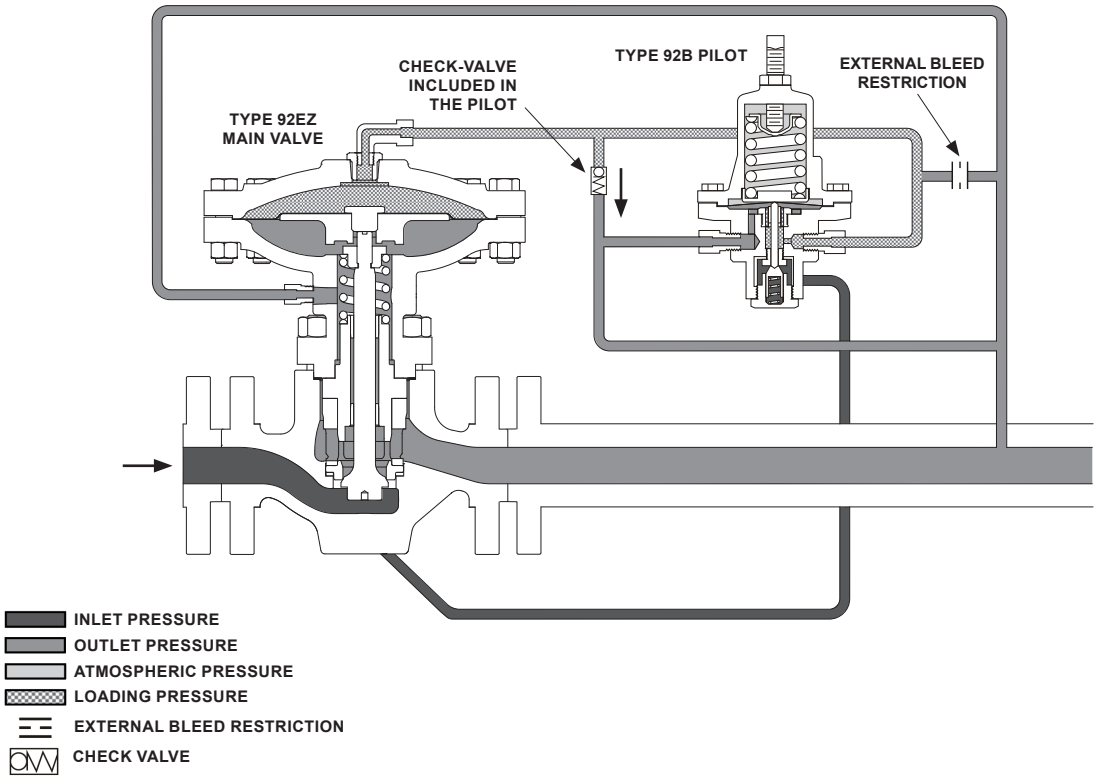


Figure 2. *Type 92EZ Operational Schematic*

Product Description

The Type 92EZ Pressure Reducing Valve is the standard steam valve for industry. It can withstand dirty operating environments while providing accurate and stable pressure control. The Type 92EZ is applied as a main pressure reducing valve in industrial process heating applications such as heat exchangers, evaporators, digesters and reactors. Commercial applications include pressure reducing valves for meter runs found in district energy systems, hot water heat exchangers, absorption chillers and boiler deaerator tanks.

A Type 6492HM safety override pilot is available for the Type 92EZ. The Type 92B pilot is used in a series installation with the Type 6492HM safety override pilot installed on the upstream valve. The Type 6492HM safety override pilot senses pressure downstream of the second valve and prevents pressure from rising above safe operating pressure in the event the downstream valve fails. This system is approved by ASME B31.1-1989, 122.14.2.A and can replace an ASME safety valve when vent piping is not practical and upstream steam pressure does not exceed 400 psig / 27.6 barg. Local codes and standards may require approval by an appropriate authority prior to installation.

WARNING

The Type 92EZ safety override system does not provide positive shutoff in dead end service. It is intended for large distribution systems where steam leakage will condense before steam pressure builds up. Downstream piping and components must be rated for maximum upstream steam pressure for dead end service. Failure to do so could cause personal injury or death.

Principle of Operation

Refer to the operational schematic in Figure 2. Compression of the pilot spring pushes the diaphragm down and holds the pilot valve plug open. Outlet pressure is changed by varying the amount of pilot spring compression.

When steam enters the inlet of the valve, it also enters the pilot supply line and flows through the open pilot valve to the top of the main diaphragm. The force created by this steam pressure on the diaphragm overcomes the force of the main valve spring opening the valve plug and allowing steam to flow downstream.

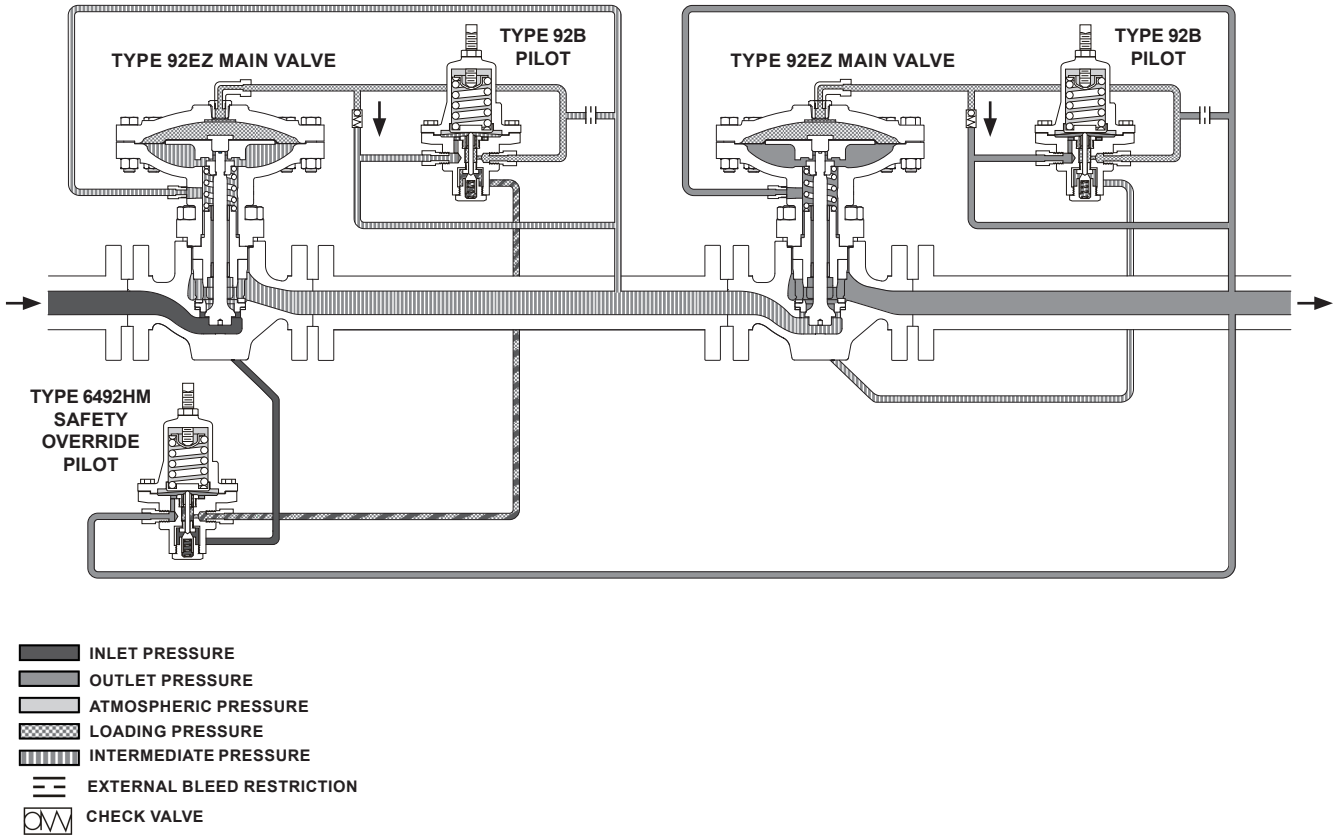


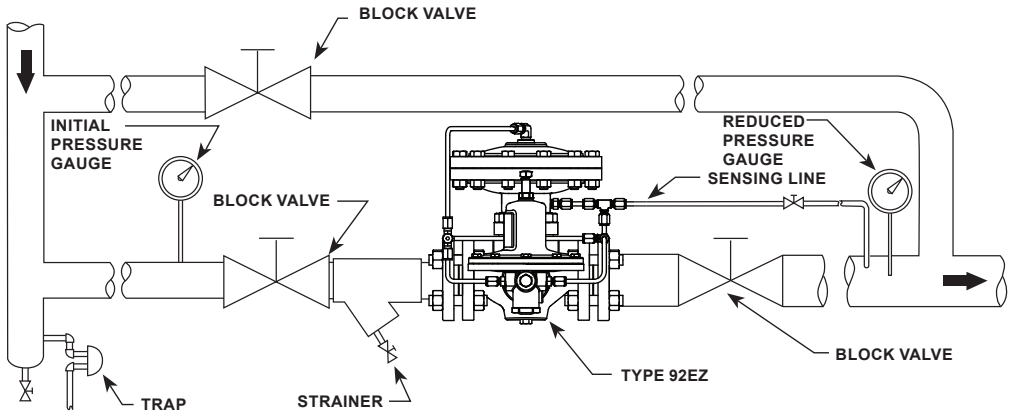
Figure 3. *Safety Override System Schematic*

Downstream pressure registers under the main diaphragm through the control line and tends to balance the diaphragm. Steam from the downstream system also registers under the pilot diaphragm through line. Pressure forces the diaphragm upward, permitting the pilot valve plug to move toward the closed position. Flow of steam to the top of the main diaphragm is thereby reduced and the pressure on main diaphragm drops due to the bleed through the orifice. The main valve moves toward the closed position, allowing only enough steam flow to satisfy downstream requirements.

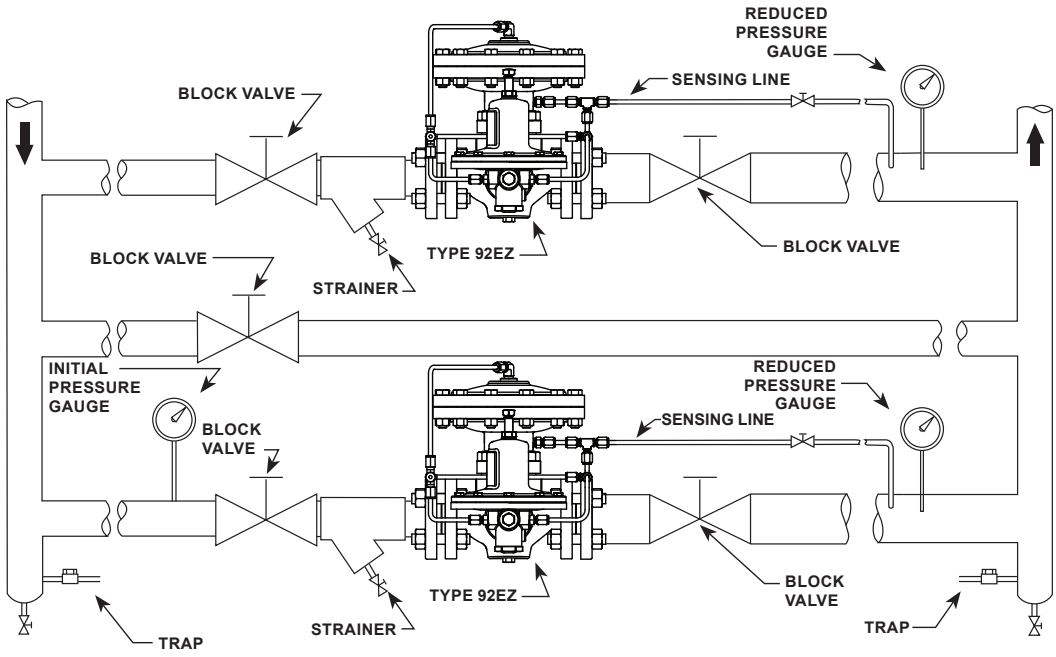
When steam demand increases, the downstream pressure decreases below the setting of the pilot spring. The pilot opens to increase the pressure on the main diaphragm. The main valve opens to increase the flow downstream. Conversely, if the steam demand decreases, the downstream pressure increases and the pilot reacts to decrease the pressure on top of the main diaphragm. The main valve throttles toward the closed position and the steam flow decreases.

Thus, through the combination of pilot and main valve operation, control of the downstream steam pressure is maintained.

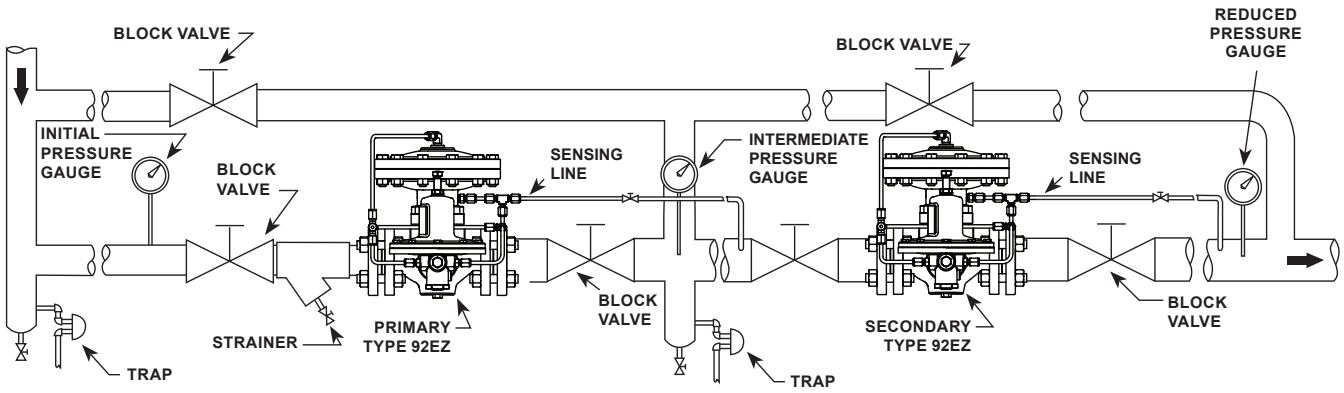
A check valve is included in the pilot to limit differential pressure on the main valve diaphragm. In the event of a large decrease in downstream pressure, the check valve opens to relieve diaphragm loading pressure to the downstream system. The check valve cartridge assembly has a factory setting to limit differential pressure across the diaphragm to approximately 40 psid / 2.8 bard. If diaphragm differential pressure exceeds 40 psid / 2.8 bard, the check valve opens to relieve diaphragm loading pressure into the downstream system, thereby preventing a high differential across the diaphragm which might otherwise cause diaphragm damage. The check valve closes and normal operation resumes when the differential pressure across the diaphragm is reduced to the proper level.



TYPE 92EZ SINGLE-STAGE INSTALLATION



TYPE 92EZ SINGLE-STAGE PARALLEL INSTALLATION



TYPE 92EZ TWO-STAGE INSTALLATION

Figure 4. *Type 92EZ Typical Installations*

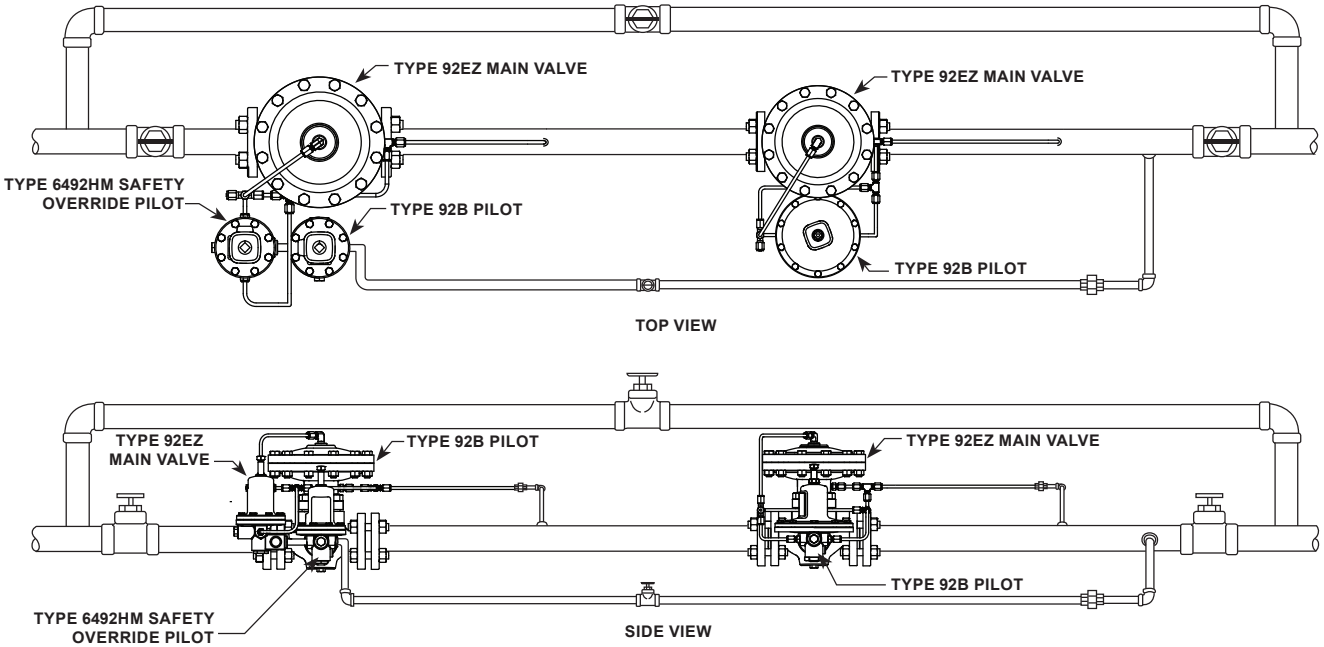


Figure 5. *Safety Override System Installation*

Type 6492HM Safety Override System

Refer to Figure 3. Once placed in operation, the upstream Type 92B (B) pilot senses the intermediate pressure between both valves, and the Type 6492HM (A) pilot senses downstream pressure of the second valve. As demand for flow increases, intermediate pressure will fall causing the Type 92B pilot to open. As the Type 92B pilot opens, loading pressure to the main valve increases, opening the main valve.

The Type 6492HM (A) safety override pilot remains open because its setpoint is above the setpoint of the downstream valve. In the unlikely event that the downstream valve fails open, downstream pressure will rise above the downstream valve's setpoint. This pressure is sensed by the Type 6492HM (A) safety override pilot. As downstream pressure increases the Type 6492HM (A) safety override pilot closes, reducing loading pressure to the upstream main valve, which positions the main valve to maintain desired downstream override pressure.

In the event that the upstream valve fails, the downstream valve will prevent downstream pressure from rising above safe operating levels.

It is recommended to install some type of warning system, such as a sentinel relief valve, to warn the operator that a valve has failed in the system. This will prevent prolonged operation with one valve, which could cause valve trim wear and noise associated with operation at high differential pressures.

Installation

WARNING

Regulators should be installed, operated and maintained in accordance with federal, state and local codes, rules and regulations and Emerson instructions. If the regulator vents steam or a leak develops in the system, it indicates that service is required.

Failure to take the regulator out of service immediately may create a hazardous condition.

Call a service man in case of trouble. Only a qualified person must install or service the regulator.

CAUTION

Be sure to install Type 92B pilot above the pipeline with the adjusting screw pointing up and the control line sloped at a downward pitch to the main line to ensure proper condensate drainage.

The maximum inlet and outlet pressures for which this Type 92EZ has been manufactured should not be exceeded. These pressures are stamped on the nameplates attached to the main valve and pilot.

The following points should be kept in mind when installing this pressure reducing valve. See Figure 4 for a schematic drawing of a typical installation.

1. Inspect the Type 92EZ for any shipment damage. Remove any foreign materials that may have collected in the valve during shipment.
2. Blow down the pipeline as required.
3. Install a strainer ahead of the Type 92EZ to protect the internal parts of the valve.
4. Install an upstream block valve ahead of the Type 92EZ and a downstream block valve, if required, so that the valve can be isolated and serviced. If continuous operation is necessary during maintenance or inspection, install bypass piping and valve around the Type 92EZ.
5. This Type 92EZ is intended to be installed with the diaphragm case above the pipeline so that condensate will not collect in the case.
6. Install the Type 92EZ in the pipeline so that the flow will be in the direction indicated by the arrow cast on the body. Follow normal piping procedures when installing the screwed or flanged control valve.
7. Install the external control line as follows:
   a. Connect one end of the control line to the Type 92EZ body tapping. This tapping is 1/4 NPT for NPS 1 and 1-1/2 / DN 25 and 40 bodies, 3/8 NPT for NPS 2 / DN 50 body and 1/2 NPT for NPS 3 and 4 / DN 80 and 100 bodies.

      Note

      The control line should be as large as the tapped hole in the Type 92EZ.

   b. The other end of the control line is connected to the downstream system. Place the tapped hole for this connection in a straight run of pipe 3 to 5 ft. / 0.91 to 1.52 m from the control valve when the valve body is the same size as the pipeline. If the valve body is smaller than the pipeline and requires swage nipples, place the tapped hole at a distance from the swage connection equal to 10 times the pipe diameter.
   c. Do not locate the control line tap in an elbow, swage or other changes in configuration of the pipeline where turbulence or abnormal velocities may occur.
   d. Do not locate the control line tap in a vessel (such as a deaerator) located immediately downstream of the control valve. Locate the tap in the pipeline leading to the vessel.
   e. Slope the control line away from the Type 92EZ so that condensate can drain back into the pipeline.
   f. Install a shutoff valve (not a needle valve) in the control line.
   g. Install a pressure gauge in the control line or near the outlet of the Type 92EZ to aid in setting the outlet pressure.

Startup and Adjustment

WARNING

Failure to remove accumulated condensate may result in severe condensation induced water hammer which can result in personal injury or death.

Prior to Valve Startup

New Installations

Blow down inlet steam piping to remove any debris such as weld beads by opening the drain valve of the inlet strainer to the control valve. Close the isolation valve and disassemble strainer to remove accumulate debris. Repeat as necessary until strainer basket is free of debris.

Old Installations

Open all upstream and downstream drain valves at drip legs and strainers to drain condensate that may have accumulated during the shutdown period. Crack the inlet isolation valve to the pressure reducing stations to flush any residual condensate. Close the drain valves once the drain is free of condensate.

Pilot Adjustment

Loosen hex nut on screw before adjustment. To adjust the downstream reduced pressure setting, turn the set screw clockwise into the spring case to increase the downstream pressure setting. Turn it counterclockwise out of the spring case to decrease the setting. Tighten it once adjustment is made.

Pre-Pilot Adjustment

If a Type MR95H pre-pilot supply is provided on the pilot supply mounting line, its pressure setting must be adjusted to a certain value above the outlet pressure setting of the Type 92EZ valve. If using a standard 17-4 main valve spring, set it at 30 psig / 2.1 barg above the downstream setting. If using an Inconel® low differential main valve spring, set it at 20 psig / 1.4 barg above the downstream setting.

Type 92EZ (Figures 4, 9 and 10)

To put the valve into operation after installation or after disassembly for inspection or repairs, proceed as follows:

1. Relieve all spring compression on the pilot spring by loosening hex nut (key 7) and turning set screw (key 6) counterclockwise (out of the spring case).
2. Open the upstream block valve.
3. Open the downstream block valve slowly.
4. Close the bypass valve.
5. Slowly turn the set screw of the pilot clockwise into the spring case until the downstream pressure reaches the required setting. Tighten hex nut on the set screw.

Safety Override System (Figure 3)

Use the following procedure to put the system into operation:

1. Remove all pilot control spring compression from the Type 6492HM safety override pilot by turning the adjusting screw out of the spring case (counterclockwise).
2. Adjust the Type 92B upstream working pilot's and Type 92B downstream working pilot's adjusting screws into the spring case (clockwise) to their maximum adjustment.
3. Slowly open the upstream block valve to introduce inlet pressure to the system.
4. Open the downstream block valve and control line block valves, if used.

Note

Some flow is needed to make pressure settings accurate.

5. If a bypass is used, slowly close the bypass line block valve.
6. Adjust the Type 6492HM safety override pilot to the desired downstream override pressure. The safety override pilot's setpoint must be higher than the downstream working pilot's setpoint by the amounts listed in Table 4.

Note

The normal pressure and maximum override pressure should be set at or below the safe working pressure of the equipment and piping system downstream. (Reference applicable codes and/or standards for maximum allowable or safe working pressures for equipment and piping systems served.)

7. Adjust the Type 92B downstream working pilot to the desired normal downstream control pressure.
8. Adjust the Type 92B upstream working pilot to the desired intermediate control pressure (typically 50% of inlet pressure).
9. Readjust the Type 92B downstream working pilot to the desired normal downstream control pressure, if necessary.
10. Tighten the lock nuts on all pilots to lock the adjusting screws in position.

Shutdown

To take the regulator out of operation:

1. If a bypass line is used, slowly open the bypass line block valve while monitoring the downstream pressure.
2. Close the control line shutoff valve.
3. Close the downstream block valve.
4. Close the upstream block valve.
5. If a pressure-loaded or on-off pilot is used, close the needle valve to the pilot.
6. Vent the regulator and control line to release any trapped pressure.

Troubleshooting

Operating difficulties may be experienced with this valve as a result of improper installation, improper valve sizing, damage to internal parts, trim wear or an accumulation of dirt, boiler compound or other foreign materials on internal parts.

Failure to Close

To determine which valve leaks, follow these steps.

1. Close inlet block valve, depressurize system and close outlet block valve.
2. Remove pilot loading port (top of cross pipe) to exhaust loading pressure to atmosphere.
3. Crack inlet block valve. Steam will exhaust from loading port.
4. Release compression on adjusting spring to see if pilot closes tight (per ANSI Class IV).
5. Open and close several times to wash seat. Pilot closing tight means main valve disk is held open by foreign matter or restrictor is clogged. Steam may wash the obstruction from the seat if the valve is made wide open. This can be accomplished, even at light loads, if the control point is beyond the outlet block valve.
6. Reassemble loading port tubing and place regulator in operation.
7. Slowly open inlet block valve, then outlet block valve.

See Table 8 below for detailed troubleshooting diagnostics of various failure modes and recommended maintenance steps.

Instability

Check to see that the valve is not oversized or that proper control line practices are implemented. A cycling Type 92EZ might possibly control the downstream pressure within acceptable limits but the life of the diaphragms, guide bushings, seat ring and valve plug could be greatly reduced.

If cycling occurs as a result of oversizing or other causes, it can frequently be minimized by reducing the gain of the Type 92EZ. This can be accomplished by installing a pre-pilot supply regulator (Type MR95H) in the Type 92B pilot supply line. Adjust the pre-pilot supply regulator to reduce pilot supply pressure to 30 psig / 2.1 barg above the outlet pressure setting of the Type 92B Pilot. This arrangement can minimize cycling and still provide adequate pilot supply pressure to ensure full opening of the main valve plug, if required.

See Table 10 below for detailed troubleshooting diagnostics for instability mitigation and proper control line practices.

Maintenance

CAUTION

Before disassembling or removing the valve from the line, isolate it from the pressure source and relieve all internal pressure.

Due to normal wear, parts must be periodically inspected and replaced if necessary. The frequency of inspection depends on the severity of the service.

Removing and Reinstalling Tubing

Type 92EZ (Figure 14)

1. Use an adjustable wrench to loosen and remove tubing connections in the following order:
   a. Sense line connector nut located on sense pipe tee (key 32).
   b. Connector (key 29) located on lower actuator casing.
   c. Connector (key 29) located at outlet connection of pilot.
   d. Connector (key 29) located at loading connection of pilot.
   e. Elbow connector (key 30) located on top of upper casing.
2. Place the tubing manifold on the side.
3. (Optional): Remove cross pipe (key 33) and inspect external restrictor (key 34) for clogging by sludge/debris. If clogged, consider installing filter and steam trap upstream. Reinstall once cleaned / replaced.
4. (Optional): Dismount pilot by unscrewing it from pipe nipple adaptor (key 35). If pre-pilot is installed, disconnect the Type 92B Pilot first, then the Type MR95H Pre-Pilot.
5. To remount pilot, start by screwing pilot inlet connection into mounting nipple. If pre-pilot is required, install the Type MR95H Pre-Pilot first, then the Type 92B Pilot.

Note

Use new plumber's tape when reconnecting pilot nipple to mitigate leakage.

6. Reinstall tubing manifold and use an adjustable wrench to tighten connections in reverse order from step 1.

Note

Ensure proper control line installation practices are used: sloped lines, no smaller than control line port, 6 to 10 pipe diameters downstream from nearest source of turbulence such as elbows, pipe swages, meters or block valves.

Replacing Trim Assembly / Drop-In Trim Kit™

Type 92EZ Main Valve (Figure 8)

WARNING

Use proper lifting technique or equipment to avoid injury.

CAUTION

Avoid forceful pulling to prevent injury or damage to components.

Note

The regulator may remain in the pipeline during maintenance procedures unless the main valve body is replaced or removed for repairs.

7. After removing tubing per step 1 above, use a wrench to unscrew lower casing heavy hex nuts (key 3) connecting lower casing (key 4) to valve body (key 1). Mark the outer edge of the valve body and lower diaphragm casing to aid reassembly alignment.
8. Lift actuator assembly (keys 4, 5, 6, 7) from valve body and cap screws (key 2). Body gasket (key 14) may be stuck to the underside of the lower casing (key 4). See Table 9 below for actuator assembly weights.
9. Remove trim assembly. Inspect parts for excessive wear or damage.

Note

If plug is seized, trim assembly may require gentle shaking for removal.

10. Lubricate and reinstall gaskets (keys 9, 14). Reinsert trim assembly or insert new Drop-In Trim Kit™ into valve body. Ensure trim assembly is evenly seated on gaskets.

Note

Whenever a gasket seal is disturbed by removing or shifting gasketed parts, a new gasket should be installed upon reassembly. This is necessary to ensure a good gasket seal.

11. Lubricate cap screws (key 2). Insert actuator assembly (keys 4, 5, 6, 7) through cap screws and screw heavy hex nuts (key 3) to secure it to valve body (key 1). See Table 5 below for lower casing heavy hex nut torque values.

Trim Maintenance (Seat Ring and Other Parts)

Type 92EZ Main Valve (Figure 8)

WARNING

Spring under tension. Unscrewing upper spring seat too quickly may cause spring to release forcefully upwards and cause injury.

For quicker in-line maintenance, use the Drop-In Trim Kit™ instead of replacing individual parts.

12. After removing trim assembly in step 9 above, clamp bottom of valve plug (key 8) and use a wrench to unscrew and remove upper spring seat (key 18). Remove main spring (key 17).
13. Remove valve plug (key 8) by pulling it through bottom of trim assembly.

Note

If valve plug is stuck, secure trim assembly and gently tap the topside of the valve plug with a rubber mallet.

14. Remove integral seat cage (key 10). Inspect seat ring for excessive wear or damage, replace as needed.
15. Remove bushing holder (key 15) and bushings (key 16) to access retaining ring (key 12) and stem seal (key 13). Remove or replace if necessary.

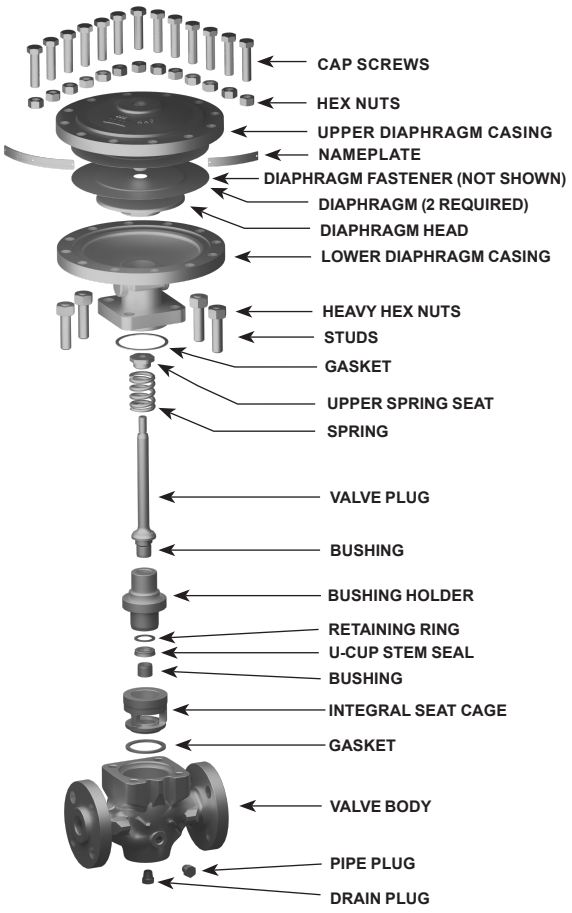


Figure 6. *Type 92EZ Main Valve Exploded View*

Note

High-temperature constructions do not have stem seal and retaining ring.

16. Reassemble trim parts in reverse-order: stem seal (key 13), retaining ring (key 12), bushing holder (key 15), bushings (key 16), integral seat cage (key 10), main spring (key 17). Apply high temperature thread sealant to upper spring seat (key 18) and screw it in to valve plug threading. Continue from step 10 above to reinsert trim assembly. See Table 5 below for upper spring seat torque values.

Note

Main spring can be put back in either orientation.

Diaphragm Maintenance

Type 92EZ Main Valve (Figure 8)

WARNING

Do not use your hands to secure diaphragm head while screwing diaphragm fastener as this may cause potential injury.

Misaligning diaphragms will cause improper sealing.

If tubing has not been removed yet, disconnect loading tubing (key 26) by loosening elbow connector (key 30) and top connector of pipe cross (key 33).

17. Unscrew actuator bolting (keys 6, 7) and separate upper casing (key 5) from lower casing (key 4) to access diaphragm assembly. Mark the outer edge of the lower casing and upper casing to aid reassembly alignment.
18. Secure diaphragm head (key 19) and use a wrench to unscrew diaphragm fastener (key 21) to access diaphragms (key 20).
19. Remove and replace diaphragms (key 20). Insert and align new diaphragms (2 required) over opening in diaphragm head (key 19).
20. Secure diaphragm head (key 19). Apply high temperature thread sealant to diaphragm fastener (key 21) and screw it through diaphragms to put together diaphragm assembly. See Table 5 below for diaphragm fastener torque values.
21. Replace diaphragm assembly in lower casing. Align it so that diaphragms are completely level with top surface of lower casing.
22. Apply thin layer of anti-seize lubricant onto sealing surfaces of upper casing (key 5) and lower casing (key 4). Lubricate cap screws (key 6) and screw hex nuts (key 7) to secure actuator casing. See Table 5 below for diaphragm casing cap screw/ hex nut torque values.

Pilot Maintenance (Orifice, Valve Plug and Strainer)

Type 92B Pilot (Figures 9 and 10)

CAUTION

The check valve assembly should not be disassembled in the field, because its setting is made at the factory and will be lost by disassembling. Doing this will void product warranty.

For quick in-line maintenance, these steps can be easily performed without removing the Pilot from the Main Valve.

23. Unscrew valve plug guide (key 2). Valve plug (key 4), valve plug spring (key 3) and strainer screen (key 77) will come out with valve plug guide. Inspect and clean or replace as required.
24. Unscrew orifice (key 5) from body (key 1) and replace if necessary. Apply high temperature thread sealant to orifice threads before screwing orifice into body. See Table 6 below for orifice (key 5) torque value.
25. Apply high temperature thread sealant to threads of valve plug guide (key 2) before screwing into body (key 1). See Table 6 below for valve guide (key 2) torque value.
26. To inspect check valve, unscrew pipe plug (key 74) and use a screwdriver to carefully remove check valve assembly (key 75). If check valve is clogged or damaged, replace the entire check valve assembly. After reinstalled, screw in the pipe plug. See Table 6 below for check valve assembly (key 75) and pipe plug (key 74) torque values.

Pilot Maintenance (Diaphragm and Spring)

Type 92B Pilot (Figures 9 and 10)

⚠ WARNING

Failure to relieve spring tension before removing spring case will cause spring to release forcefully upwards and cause injury.

Although diaphragm or spring replacement can be performed in-line, it may be easier to perform maintenance by removing the Pilot from the Main Valve.

27. Use an adjustable wrench to loosen hex nut (key 16) and relieve spring compression by turning the set screw (key 15) counterclockwise.
28. Remove casing cap screws (key 17). Remove spring case (key 14) to access upper spring seat (key 13), spring (key 12), lower spring seat (key 11), diaphragms (key 10) and diaphragm gasket (key 18). Inspect and replace as needed.

Note

For low-pressure pilots (Figure 9), the lower spring seat and the diaphragm plate are both part of the diaphragm plate assembly (key 24) and are pinned together.

29. After lubricating, insert diaphragm gasket (key 18) and two diaphragms (key 10) in body (key 1) with raised preformed centers towards spring case (key 14).
30. Stack lower spring seat (key 11), spring (key 12), and upper spring seat (key 13) on top of diaphragms (key 12).
31. Replace spring case. Lubricate and install casing cap screws (key 17). Ensure pilot vent cap is clean. See Table 6 below for casing cap screw (key 17) torque value.

Pilot Maintenance (Bellows and Stem)

Type 92B Pilot (Figures 9 and 10)

Although bellows or stem replacement can be performed in-line, it may be easier to perform maintenance by removing the Pilot from the Main Valve.

32. After removing diaphragm parts in step 26 above, unscrew bellows retainer (key 8) from body (key 1). Take out bellows (key 9) and valve stem (key 7). Inspect, clean, and replace as needed. Reinsert valve stem in body (smallest diameter first).
33. Place bellows (key 9) in body (key 1) on top of valve stem (key 7). Apply high temperature thread sealant to threads of bellows retainer (key 8). Install bellows retainer to secure bellows in place. Continue from step 31 above to complete pilot reassembly. See Table 6 below for bellows retainer (key 8) torque value.

Pre-Pilot Supply Maintenance

Types MR95H and MR95HT (Figure 11)

1. Unscrew the valve plug guide (key 5) from the body (key 1) to access the orifice (key 3) and valve plug (key 4).
2. Coat threads with sealant went reinstalling valve plug guide to ensure an adequate metal-to-metal seal.
3. To access diaphragm assembly, carefully remove all spring tension from adjusting screw (by turning counter-clockwise) before removing spring case and bolting.

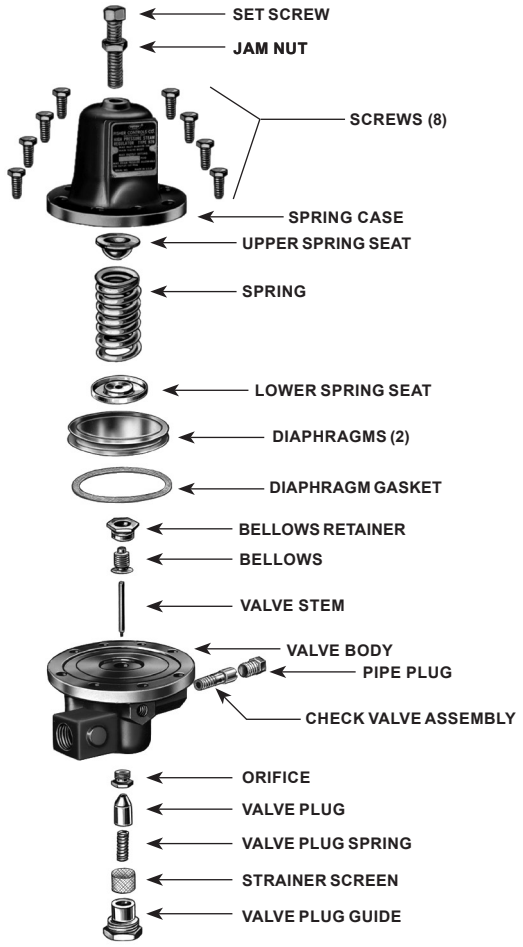


Figure 7. *Type 92B High Pressure Pilot Exploded View*

Safety Override Pilot

Types 6492HM and 6492HTM (Figure 12)

These procedures are to be performed if inspecting, cleaning or replacing any pilot parts or of cycling, erratic control or too high or too low an outlet (control) pressure is noted. Perform only those procedures in this section required to correct the problem. Key numbers are referenced in Figure 12.

Note

Before performing any maintenance, loosen the hex nut (key 16), if used, and turn the set screw (key 15) counterclockwise until all compression is removed from the control spring (key 12). Remove the pilot from the pipe nipple and connectors.

1. Unscrew the valve guide (key 2). Remove the screen (key 77), inner valve (key 4), valve spring (key 3) and stem (key 7). Unscrew the orifice (key 5). Examine the orifice and plug seating surfaces for damage.
2. Clean and replace parts as necessary. Apply high temperature sealant to the orifice threads. Thread the seat ring into place and tighten using 19 to 25 ft-lbs / 26 to 34 N•m of torque.
3. Handle the parts carefully, and place the valve spring (key 3) in the valve guide (key 2). Slide the inner valve (key 4) over the spring and into the valve guide. Place the screen (key 77) onto the valve guide. Place the stem (key 7) in the center hole of the valve guide. Apply sealant to the valve guide threads, and screw the guide plus attached parts into the body (key 1).
4. Remove the pipe plug (key 74). Then remove the pipe plug (key 94). Clean and replace the pipe plugs as necessary.
5. Apply high temperature sealant to the threads of the pipe plug (key 94) and install into the body (key 1).
6. Apply high temperature sealant to the threads of the pipe plug (key 74). Install into the body (key 1).
7. Remove the cap screws (key 17), spring case (key 14), control spring (key 12) and upper spring seat (key 13) from the body (key 1).
8. Remove the lower spring seat (key 11), diaphragms (key 10) and diaphragm gasket (key 18) from the body. Inspect and clean the diaphragm gasket. Replace if necessary.
9. Unscrew the bellows retainer (key 8) and remove the bellows (key 9). Replace worn parts as necessary. Apply high temperature sealant to the bellow retainer threads. Install the bellows and bellows retainer. Tighten the bellows retainer using 19 to 25 ft-lbs / 26 to 34 N•m of torque.
10. Install the diaphragm gasket. Install both diaphragms with their raised performed centers facing toward the spring case.
11. Lubricate the upper spring seat and the exposed threads of the adjusting screw. Install the lower spring seat (key 11), control spring (key 12), upper spring seat (key 13) and spring case (key 14). Insert and tighten the cap screws (key 17) in a crisscross bolting pattern using 12 to 18 ft-lbs / 16 to 24 N•m of torque.

Table 5. *Type 92EZ Main Valve Torque Values*

BODY SIZE		DIAPHRAGM FASTENER (KEY 21)		UPPER SPRING SEAT (KEY 18)		DIAPHRAGM CASING CAP SCREW/HEX NUT (KEY 6/7)		LOWER CASING HEAVY HEX NUT (KEY 3)	
NPS	DN	ft-lbs	N•m	ft-lbs	N•m	ft-lbs	N•m	ft-lbs	N•m
1	25	23 to 29	31 to 39	40 to 50	54 to 68	50 to 70	68 to 95	75 to 95	102 to 129
1-1/2	40	38 to 46	52 to 62	40 to 50	54 to 68	80 to 100	108 to 136	55 to 70	75 to 95
2	50	38 to 46	52 to 62	115 to 125	156 to 170	95 to 110	129 to 149	55 to 70	75 to 95

Table 6. *Type 92B Pilot Torque Values*

VALVE GUIDE (KEY 2)		ORIFICE (KEY 5)		BELLOWS RETAINER (KEY 8)		CHECK VALVE ASSEMBLY (KEY 75)		PIPE PLUG (KEY 74)		CAP SCREW (KEY 17)	
ft-lbs	N•m	ft-lbs	N•m	ft-lbs	N•m	ft-lbs	N•m	ft-lbs	N•m	ft-lbs	N•m
42 to 58	57 to 78.6	19 to 25	25.8 to 34	19 to 25	25.8 to 34	5 to 15	7 to 20.3	19 to 25	25.8 to 34	12 to 18	16.3 to 24.4

Table 7. *Types MR95H and MR95HT Pre-pilot Supply Torque Values*

BODY SIZE		SPRING CASE BOLT		ORIFICE		PLUG GUIDE	
NPS	DN	ft-lbs	N•m	ft-lbs	N•m	ft-lbs	N•m
1/4	- - - -	6 to 8	8 to 11	6 to 8	8 to 11	50 to 58	68 to 79

Table 8. *Types 6492HM and 6492HTM Safety Override Pilot Torque Values*

BODY SIZE		SPRING CASE BOLT		SEAT RING		PIPE PLUG		BELLOWS RETAINER	
NPS	DN	ft-lbs	N•m	ft-lbs	N•m	ft-lbs	N•m	ft-lbs	N•m
1/4	- - - -	12 to 18	16 to 24	19 to 25	26 to 34	5 to 15	7 to 20	19 to 25	26 to 34

Table 9. *Approximate Weights*

BODY SIZE, NPS / DN	ACTUATOR ASSEMBLY		CAST IRON				STEEL			
			Threaded Body (HP Pilot / LP Pilot)		Flanged Body (HP Pilot / LP Pilot)		Threaded Body (HP Pilot / LP Pilot)		Flanged Body[1] (HP Pilot / LP Pilot)	
	lb	kg	lb	kg	lb	kg	lb	kg	lb	kg
1 / 25	31	14	59 / 64	27 / 29	- - - -	- - - -	70 / 75	32 / 34	87 / 92	39 / 42
1-1/2 / 40	43	20	77 / 82	35 / 37	81 / 86	37 / 39	94 / 99	43 / 45	107 / 112	49 / 51
2 / 50	57	26	114 / 119	52 / 54	119 / 124	54 / 56	126 / 131	57 / 59	141 / 146	64 / 66

1. Steel flanged body weights are averaged between weights of CL150 RF, CL300 RF and CL600 RF units.

Table 10. *Pilot-Operated Steam Regulator Troubleshooting Diagnostic Matrix*

SYMPTOM	PROBLEM	CAUSE	MAINTENANCE STEP	SOLUTION	RECOMMENDATIONS
Fail to Close (Downstream pressure not shutting off per ANSI Class IV)	Main Valve leak through seat and plug	Debris caught between seat ring/orifice and plug	9 or 13	Blow off debris with compressed air Clean, lap and reinstall if not damaged	Ensure pilot strainer has no damage Install filter or strainer upstream Upgrade material for higher temperature
	Pilot leak through orifice and plug		23		
	Main Valve plug seized open	Condensate buildup resulting in sludge/ scale accumulation and hydraulic locking	9 or 13	Clean, lap and reinstall if not damaged	Install steam trap upstream
	Pilot plug seized open		32		
	Pilot diaphragm ruptured (steam exhausting from spring case)	Failure to remove condensate resulting in erosion and flashing	27	Replace pilot diaphragm	Ensure proper control line placement(1) Install steam trap upstream of pilot
	Pilot bellows damaged		32	Replace pilot bellows	
	Control line disconnected	Control line break, improper start-up	6	Reinstall control line	
	Clogged external restrictor	Debris caught in pipe cross from steam flow	1	Clean and reinstall restrictor	Ensure pilot strainer has no damage
Fail to Open (Downstream pressure well under setpoint)	Main Valve diaphragm ruptured (steam exhausting from actuator)	Condensate buildup resulting in erosion and flashing / Used for batch processes or applications with high cycles	17	Replace if damaged	Install steam trap upstream Check for instability Upgrade to piston-style design
	Main Valve plug seized close	Failure to remove condensate resulting in sludge or scale accumulation and hydraulic locking	9 or 13	Clean, lap, and reinstall if not damaged Replace if damaged	Install filter/strainer upstream Install steam trap upstream
	Pilot plug seized close		23		
	Pilot strainer clogged				
	Restrictor Damaged	Erosion from debris	1		
	Flow demand not met at setpoint	Valve undersized / Lighter control spring available	27	Increase inlet pressure / Replace with lighter control spring	Use low differential Inconel® main spring Validate capacity with Bulletin
Instability or Cycling (vibration, hunting)	Improper control line placement	Turbulent sensing region	6	Reinstall control line	Ensure proper control line placement(1)
	Sluggish or slow response	Control line smaller than control line port / Pilot strainer clogged	6 / 23	Reinstall control line / Clean and reinstall pilot strainer	Ensure proper control line placement(1) / Install filter or strainer upstream
	Large pressure swings at opening and closing	Insufficient piping volume	4	Install pre-pilot supply to raise maximum differential pressure rating	Increase piping volume between downstream isolation valve/ safety device
	Cavitation / Flashing	High differential pressure	4	Install pre-pilot supply to raise maximum differential pressure rating	Lower differential pressure Use tandem safety installation
	Pilot Vent plugged	Clogged by rain or foreign object	31	Clean and reinstall	Ensure pilot vent pointed downwards

1. The control line should be located in a straight run of pipe, no smaller than the control line port of the pilot, sloped to drain condensate and at least 6 pipe diameters downstream from any areas of turbulence such as elbows, pipe swages, meters or block valves. Turbulence near the sensing port of the regulator leads to rapid fluctuations in sensed inlet pressure, leading to instability.

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Parts Ordering

Each Type 92EZ valve is assigned an FS or serial number. It can be found stamped on the nameplate attached to the spring case of the pilot.

Refer to the FS or serial number and the complete part number when ordering spare parts or requesting technical advice from your local Sales Office.

Parts List

Type 92EZ Main Valve (Figure 8)

Key	Description	Part Number
	Drop-In Trim Kits	
	Cast Iron (406°F / 208°C) or Steel (450°F / 232°C)	
	NPS 1 / DN 25	R92EZX200A0
	NPS 1-1/2 / DN 40	R92EZX200A1
	NPS 2 / DN 50	R92EZX200A2
	Steel (650°F / 343°C)	
	NPS 1 / DN 25	R92EZX200A3
	NPS 1-1/2 / DN 40	R92EZX200A4
	NPS 2 / DN 50	R92EZX200A5
	Stainless Steel (450°F / 232°C)	
	NPS 1 / DN 25	R92EZX200A6
	NPS 1-1/2 / DN 40	R92EZX200A7
	NPS 2 / DN 50	R92EZX200A8
	Stainless Steel (650°F / 343°C)	
	NPS 1 / DN 25	R92EZX200A9
	NPS 1-1/2 / DN 40	R92EZX200B0
	NPS 2 / DN 50	R92EZX200B1
	Gasket Kits	
	Cast Iron (406°F / 208°C) or Steel (450°F / 232°C)	
	NPS 1 / DN 25	R92EZX100A0
	NPS 1-1/2 / DN 40	R92EZX100A1
	NPS 2 / DN 50	R92EZX100A2
	Steel (650°F / 343°C)	
	NPS 1 / DN 25	R92EZX100A3
	NPS 1-1/2 / DN 40	R92EZX100A4
	NPS 2 / DN 50	R92EZX100A5
	Stainless Steel (450°F / 232°C)	
	NPS 1 / DN 25	R92EZX100A6
	NPS 1-1/2 / DN 40	R92EZX100A7
	NPS 2 / DN 50	R92EZX100A8
	Stainless Steel (650°F / 343°C)	
	NPS 1 / DN 25	R92EZX100A9
	NPS 1-1/2 / DN 40	R92EZX100B0
	NPS 2 / DN 50	R92EZX100B1
	Repair Kits	
	Cast Iron (406°F / 208°C) or Steel (450°F / 232°C)	
	NPS 1 / DN 25	R92EZX000A0
	NPS 1-1/2 / DN 40	R92EZX000A1
	NPS 2 / DN 50	R92EZX000A2
	Steel (650°F / 343°C)	
	NPS 1 / DN 25	R92EZX000A3
	NPS 1-1/2 / DN 40	R92EZX000A4
	NPS 2 / DN 50	R92EZX000A5
	Stainless Steel (450°F / 232°C)	
	NPS 1 / DN 25	R92EZX000A6
	NPS 1-1/2 / DN 40	R92EZX000A7
	NPS 2 / DN 50	R92EZX000A8
	Stainless Steel (650°F / 343°C)	
	NPS 1 / DN 25	R92EZX000A9
	NPS 1-1/2 / DN 40	R92EZX000B0
	NPS 2 / DN 50	R92EZX000B1

*Recommended spare part.

Key	Description	Part Number
1	Body	
	Cast Iron	
	NPT	
	1 NPT	ERAA59015A0
	1-1/2 NPT	ERAA59718A0
	2 NPT	ERAA59023A0
	CL125 FF	
	NPS 1 / DN 25	ERAA59016A0
	NPS 1-1/2 / DN 40	ERAA59719A0
	NPS 2 / DN 50	ERAA59024A0
	CL250 RF	
	NPS 1 / DN 25	ERAA59017A0
	NPS 1-1/2 / DN 40	ERAA59720A0
	NPS 2 / DN 50	ERAA59025A0
	Steel	
	NPT	
	1 NPT	ERAA59018A0
	1-1/2 NPT	ERAA59721A0
	2 NPT	ERAA59026A0
	CL150 RF	
	NPS 1 / DN 25	ERAA59019A0
	NPS 1-1/2 / DN 40	ERAA59722A0
	NPS 2 / DN 50	ERAA59027A0
	CL300 RF	
	NPS 1 / DN 25	ERAA59020A0
	NPS 1-1/2 / DN 40	ERAA59723A0
	NPS 2 / DN 50	ERAA59028A0
	CL600 RF	
	NPS 1 / DN 25	ERAA59021A0
	NPS 1-1/2 / DN 40	ERAA59724A0
	NPS 2 / DN 50	ERAA59029A0
	Stainless Steel	
	NPT	
	1 NPT	ERAA59018A1
	1-1/2 NPT	ERAA59721A1
	2 NPT	ERAA59026A1
	CL150 RF	
	NPS 1 / DN 25	ERAA59019A1
	NPS 1-1/2 / DN 40	ERAA59722A1
	NPS 2 / DN 50	ERAA59027A1
	CL300 RF	
	NPS 1 / DN 25	ERAA59020A1
	NPS 1-1/2 / DN 40	ERAA59723A1
	NPS 2 / DN 50	ERAA59028A1
	CL600 RF	
	NPS 1 / DN 25	ERAA59021A1
	NPS 1-1/2 / DN 40	ERAA59724A1
	NPS 2 / DN 50	ERAA59029A1
2	Stud	
	Cast Iron/Steel	
	NPS 1 / DN 25 (4 required)	1R2848X0752
	NPS 1-1/2 and 2 / DN 40 and 50 (8 required)	1K2429X0782
	Stainless Steel	
	NPS 1 / DN 25 (4 required)	1R284835222
	NPS 1-1/2 and 2 / DN 40 and 50 (8 required)	1K242935222
3	Hex Nut, Heavy	
	Cast Iron/Steel	
	NPS 1 / DN 25 (4 required)	1C3306X0832
	NPS 1-1/2 and 2 / DN 40 and 50 (8 required)	1A3772X0892
	Stainless Steel	
	NPS 1 / DN 25 (4 required)	1C330635252
	NPS 1-1/2 and 2 / DN 40 and 50 (8 required)	1A3772X0012
4	Lower Diaphragm Casing	
	NPS 1 / DN 25	ERAA58372A0
	NPS 1-1/2 / DN 40	ERAA59033A0
	NPS 2 / DN 50	ERAA59035A0
5	Upper Diaphragm Casing	
	NPS 1 / DN 25	39B4682X012
	NPS 1-1/2 / DN 40	39B4700X012
	NPS 2 / DN 50	39B4681X012
6	Cap Screw (12 required)	
	NPS 1 / DN 25	1A4130X0032
	NPS 1-1/2 and 2 / DN 40 and 50	1A4175X0032

Type 92EZ Main Valve (Figure 8) (continued)

Key	Description	Part Number
7	Hex Nut (12 required)	
	NPS 1 / DN 25	1A413224122
	NPS 1-1/2 and 2 / DN 40 and 50	1A417624122
8*	Valve Plug	
	NPS 1 / DN 25	ERAA57539A0
	NPS 1-1/2 / DN 40	ERAA58306A0
	NPS 2 / DN 50	ERAA58889A0
9*	Gasket (1 required)	
	NPS 1 / DN 25	16A7845X012
	NPS 1-1/2 / DN 40	16A7907X012
	NPS 2 / DN 50	16A7876X012
10*	Integral Seat Cage	
	NPS 1 / DN 25	ERAA62196A0
	NPS 1-1/2 / DN 40	ERAA62197A0
	NPS 2 / DN 50	ERAA62198A0
12*	Retaining Ring	
	NPS 1 and 1-1/2 / DN 25 and 40	ERAA59135A0
	NPS 2 / DN 50	ERAA60122A0
13*	Stem Seal (U-cup)	
	NPS 1 and 1-1/2 / DN 25 and 40	ERAA59132A0
	NPS 2 / DN 50	ERAA59269A0
14*	Gasket	
	NPS 1 / DN 25	14A6785X022
	NPS 1-1/2 / DN 40	14A3384X022
	NPS 2 / DN 50	14A5685X022
15*	Bushing Holder	
	NPS 1 / DN 25	ERAA57445A0
	NPS 1-1/2 / DN 40	ERAA58312A0
	NPS 2 / DN 50	ERAA58893A0
16*	Bushing (2 required)	
	NPS 1 and 1-1/2 / DN 25 and 40	ERAA59189A0
	NPS 2 / DN 50	ERAA59153A0
17*	Spring	
	NPS 1 / DN 25	1R151337052
	NPS 1-1/2 / DN 40	1R151437052
	NPS 2 / DN 50	1R151537052
18	Upper Spring Seat	
	NPS 1 / DN 25	ERAA57542A0
	NPS 1-1/2 / DN 40	ERAA58403A0
	NPS 2 / DN 50	ERAA58332A0
19	Diaphragm Head	
	NPS 1 / DN 25	19B4685X012
	NPS 1-1/2 / DN 40	19B5514X012
	NPS 2 / DN 50	29B0453X012
20*	Diaphragm (2 required)	
	NPS 1 / DN 25	1F251436012
	NPS 1-1/2 / DN 40	1F301236012
	NPS 2 / DN 50	1F250336012
21	Diaphragm Fastener	
	NPS 1 / DN 25	ERAA58525A0
	NPS 1-1/2 and 2 / DN 40 and 50	ERAA58998A0
22	Pipe Plug (2 required)	
	Cast Iron and Steel	1A767524662
	Stainless Steel	1A7675X0742
23	Drive Screw	
	Cast Iron (7 required)	1A368228982
	Steel or Stainless Steel (5 required)	1A368228982
24	Nameplate	- - - - - - - - - -
25	Warning Label (Cast Iron body only)	1F137018992

Type 92B Pilot (Figures 9 and 10)

Key	Description	Part Number
	Parts Kits (includes keys: 4, 5, 7, 8, 9, 10, 18 and 77)	
	Low-pressure Pilot (Cast iron and Steel)	R92BLPX0012
	High-pressure Pilot (Cast iron and Steel)	R92BHPX0012
1	Pilot Valve Body	
	Cast Iron	
	Low pressure	32A0404X012
	High pressure	22A0403X012
	Ductile Iron	
	Low pressure	32A0404X022
	High pressure	22A0403X022
	Steel	
	Low pressure	32A0404X052
	High pressure/High temperature	22A0403X052
	Stainless Steel	
	Low pressure	32A0404X062
	High pressure/High temperature	22A0403X072
2	Valve Guide	
	Cast Iron, Ductile Iron or Steel, 416 Stainless Steel	1E391835132
	Stainless Steel, 316 Stainless Steel	1E391835072
3	Valve Spring, 302 Stainless Steel	1E392437022
4*	Valve Plug	
	Cast Iron, Ductile Iron or Steel, 416 Stainless Steel	1F967446172
	Stainless Steel, 316 Stainless Steel	1F9674X0012
5*	Orifice	
	Cast Iron, Ductile Iron or Steel, 416 Stainless Steel	1H564446172
	Stainless Steel, 316 Stainless Steel	1H5644X0012
7	Valve Stem	
	Cast Iron, Ductile Iron or Steel, 416 Stainless Steel	1F967835132
	Stainless Steel, 316 Stainless Steel	1F9678X0012
8	Bellows Retainer	
	Cast Iron, Ductile Iron or Steel, Brass	1F971214012
	Stainless Steel, 316 Stainless Steel	1F9712X0012
9	Bellows	
	Cast Iron, Ductile Iron or Steel, Bronze	1F971318992
	High Temperature Steel Pilot and Stainless Steel, 321 Stainless Steel	1F9713X0012
10*	Diaphragm, 302 Stainless Steel (2 required)	
	Low pressure	ERCA00490A0
	High pressure/High temperature	ERCA00459A0
11	Lower Spring Seat, Aluminum	
	High pressure	1J9140X0032
	High temperature	14B9948X012
12	Spring, Plated Steel	
	Low-pressure pilot	
	2 to 6 psig / 0.14 to 0.41 bar	1E395627022
	5 to 15 psig / 0.34 to 1.0 bar	1D7455T0012
	13 to 25 psig / 0.90 to 1.7 bar	1E395727192
	High-pressure pilot	
	15 to 30 psig / 1.0 to 2.1 bar	1E395627022
	25 to 75 psig / 1.7 to 5.2 bar	1D7455T0012
	70 to 150 psig / 4.8 to 10.3 bar	1E395727192
	High temperature pilot	
	15 to 100 psig / 1.0 to 6.9 bar	14B9943X012
	80 to 250 psig / 5.5 to 17.2 bar	14B9942X022
13	Upper Spring Seat, Plated Steel	
	Low/High pressure	1D667125072
	High temperature	14B9951X012
14	Spring Case	
	Cast Iron or Ductile Iron, Cast Iron	
	Low pressure	3J496319012
	High pressure	2J496219012
	Steel, WCC Steel	
	Low pressure	3L416122012
	High pressure	2L416322012
	Stainless Steel, 316 Stainless Steel	
	Low pressure	3L4161X0022
	High pressure	2L416333092

*Recommended spare part.

Type 92B Pilot (Figures 9 and 10) (continued)

Key	Description	Part Number
15	Set Screw, Plated Steel	1D995448702
16	Hex Nut, Plated Steel	1A353724122
17	Cap Screw	
	Cast Iron, Ductile Iron and Steel, Plated Steel	
	Low pressure (10 required)	1A381624052
	High pressure (8 required)	1A381624052
	High temperature (8 required)	1A3816X0242
	Stainless Steel, Stainless Steel	
	Low pressure (10 required)	1A3816X0152
	High pressure (8 required)	1A3816X0152
	High temperature (8 required)	1A381635222
18*	Diaphragm Gasket	
	Cast Iron, Ductile Iron, Steel and Stainless Steel Body, Graphite	
	Low pressure	1E3970X0012
	High pressure/High Temperature	ERCA00485A1
19	Drive Screw (2 required)	1A368228982
20	Nameplate	- - - - - - - - - -
22	Pipe Nipple	
	Cast Iron, Ductile Iron and Steel, Plated Steel	
	Low pressure	1B825226012
	High pressure/High temperature	1A473526012
	Stainless Steel, 316 Stainless Steel	
	Low pressure	1B8252X0012
	High pressure/High temperature	1A4735X0012
24	Diaphragm Plate Assembly	
	Low pressure only	1E3967X0012
34	Machine Screw	ERAA01670A0
74	Pipe Plug	
	Cast Iron, Ductile Iron and Steel, Plated Steel	0Z020128992
	Stainless Steel, 316 Stainless Steel	0Z020135072
75	Check Valve Assembly	
	Cast Iron, Ductile Iron and Steel Pilot Body	12A0405X012
	Stainless Steel Pilot Body	12A0405X022
77	Screen	16A1512X012

Type 92EZ Main Valve Tubings and Fittings (Figure 14)

Key	Description	Part Number
26	Loading Tubing	- - - - - - - - - -
27	Pipe Bushing (2 required)	- - - - - - - - - -
28	Control Tubing	- - - - - - - - - -
29	Male Connector (3 required)	- - - - - - - - - -
30	Elbow	- - - - - - - - - -
31	Cap End	- - - - - - - - - -
32	Tee (2 required)	- - - - - - - - - -
33	Cross	- - - - - - - - - -
34	Bleed Restriction	- - - - - - - - - -
35	Adaptor	- - - - - - - - - -

*Recommended spare part.

Types 6492HM and 6492HTM Pilots (Figure 12)

Key	Description	Part Number
1	Pilot Valve Body	
	Steel	22A0403X052
	Stainless Steel	22A0403X072
2	Valve Guide	
	Steel	1E391835132
	Stainless Steel	1E391835072
3	Valve Spring	1E392437022
4	Inner Valve	
	Steel	1F967446172
	Stainless Steel	1F9674X0012
5	Orifice	
	Steel	1H564446172
	Stainless Steel	1H5644X0012
7	Valve Stem	
	Steel	1F967835132
	Stainless Steel	1F9678X0012
8	Bellows Retainer	
	Steel	1F971214012
	Stainless Steel	1F9712X0012
9	Bellows	
	Steel	1F971318992
	Stainless Steel	1F9713X0012
10	Diaphragm (2 required)	ERCA00459A0
11	Lower Spring Seat	
	Type 6492HM	1J9140X0032
	Type 6492HTM	- - - - - - - - - -
	Steel	1J9140X0022
	Stainless Steel	14B9948X012
12	Spring	
	Type 6492HM	
	10 to 30 psig / 0.69 to 2.07 bar	1E395627022
	25 to 75 psig / 1.72 to 5.17 bar	1D7455T0012
	70 to 150 psig / 4.83 to 10.3 bar	1E395727192
	Type 6492HTM	
	15 to 100 psig / 1.03 to 6.9 bar	14B9943X012
	80 to 250 psig / 5.52 to 17.2 bar	14B9942X022
13	Upper Spring Seat	
	Type 6492HM	1D667125072
	Type 6492HTM	14B9951X012
14	Spring Case	
	Steel	
	with standard adjusting screw	2L416322012
	with sealed adjusting screw	2L442022012
	Stainless Steel	
	with standard adjusting screw	2L416333092
	with sealed adjusting screw	2L4420X0012
15	Set Screw	
	Standard	1D995448702
	Handwheel	1J496428982
16	Hex Nut	1A353724122
17	Cap Screw (8 required)	
	Type 6492HM	
	Steel	1A381624052
	Stainless Steel	1A3816X0152
	Type 6492HTM	
	Steel	1A3816X0242
	Stainless Steel	1A3816X0152
18	Diaphragm Gasket	
	Type 6492HM	ERCA00485A0
	Type 6492HTM	ERCA00485A1
19	Drive Screw (4 required)	1A368228982
20	Nameplate	- - - - - - - - - -
34	Machine Screw for use with Handwheel	ERAA01670A0
38	Handwheel	1J496144012
39	Lock Washer for use with Handwheel	ERAA01671A0
74	Pipe Plug	
	Steel	0Z020128992
	Stainless Steel	0Z020135072

Types 6492HM and 6492HTM Pilots (Figure 12) (continued)

Key	Description	Part Number
77	Screen	16A1512X012
78	Reducing Bushing	
	Steel	1C379026232
	Stainless Steel	1C3790X0012
87	Sealed Adjusting Screw Sealing Washer	1V205699012
94	Pipe Plug	1E823135042
95	Warning Label (Figure 13)	19B0429X0A2

Type 6492HM Pilot Mounting Parts (Figure 16)

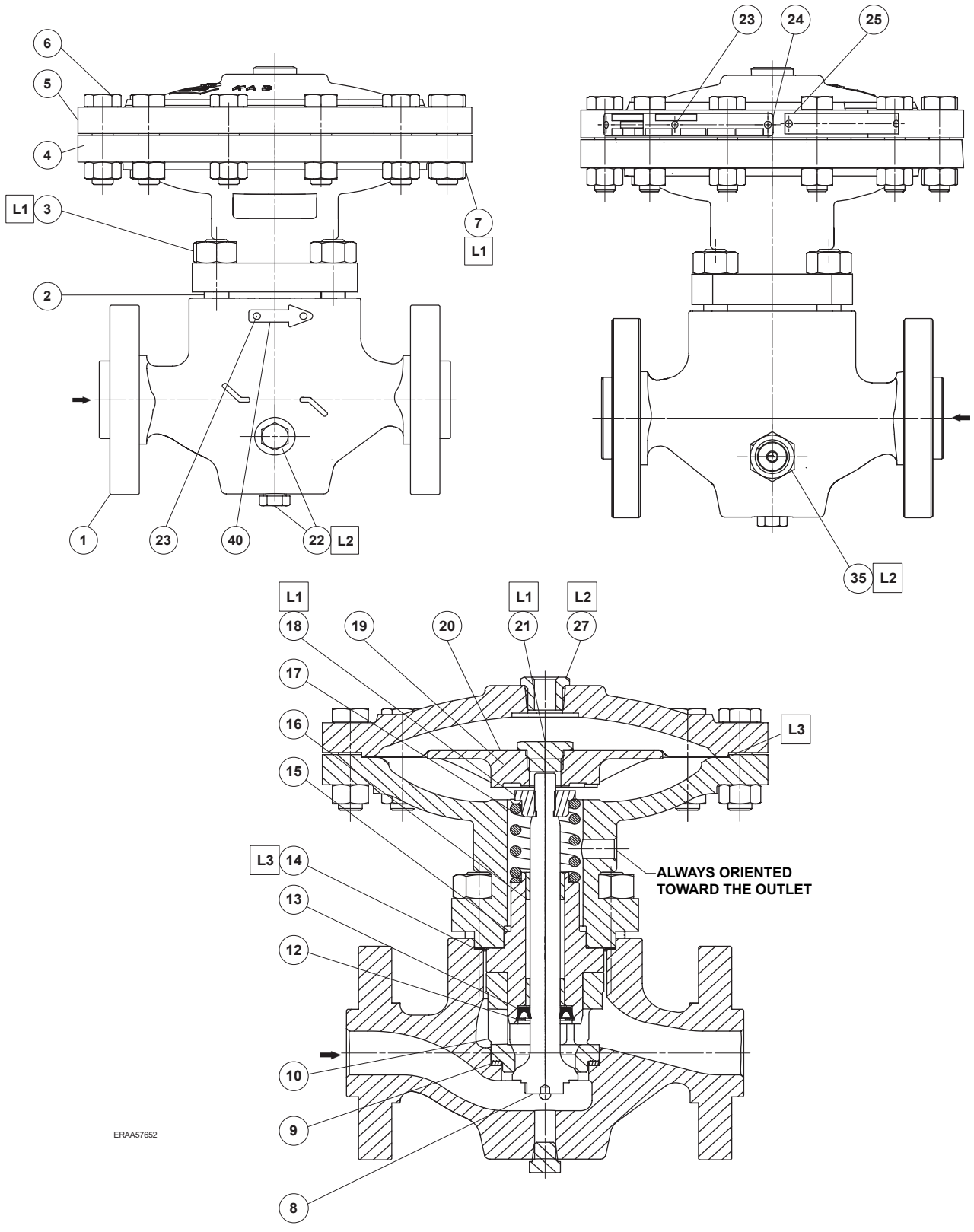
Key	Description	Part Number
65	Loading Tubing	- - - - - - - - - -
66	Pipe Bushing	
	Steel	- - - - - - - - - -
	Stainless Steel	- - - - - - - - - -

Types MR95H and MR95HT Pilots (Figure 11)

Key	Description	Part Number
1	Body	GF04858X022
2	Spring Case	ERCA02872A0
3	Orifice	GF04856X022
4	Valve Plug	ERCA00360A0
5	Valve Plug Guide	GF05490X072
6	Stem Assembly	ERCA00638A0
7	Stem Guide Bushing	ERCA03695A0
8	Lower Spring Seat	
	Type MR95H	1E392309012
	Type MR95HT	ERCA00453A0
9	Upper Spring Seat	
	Type MR95H	ERCA00383A0
	Type MR95HT	14B9950X012
11	Spring	
	Type MR95H	
	15 to 30 psig / 1.0 to 2.1 bar	1E392527022
	25 to 75 psig / 1.7 to 5.2 bar	ERAA01888A0
	70 to 150 psig / 4.8 to 10.3 bar	ERAA01889A0
	Type MR95HT	
	15 to 100 psig / 1.0 to 6.9 bar	ERCA04292A0
	80 to 300 psig / 5.5 to 20.7 bar	ERCA04291A0
12	Diaphragm (2 required)	ERCA00647A0
13	Nameplate	- - - - - - - - - -
15	Adjusting Screw	GF05533X012
16	Cap Screw (6 required)	
	Type MR95H	ERCA04149A0
	Type MR95HT	ERCA04149A2
17	Jam Nut	ERCA00652A0
19	Diaphragm Gasket	1E3931X0012
20	Pitot Tube	ERCA04393A1
26	Inner Valve Spring	
	Type MR95H	ERCA04280A0
	Type MR95HT	ERCA04281A0
63	Bottom Plug Seal	ERCA02976A0

Type MR95H Pilot Mounting Parts (Figure 15)

Key	Description	Part Number
22	Pipe Plug	- - - - - - - - - -
26	Loading Tubing	- - - - - - - - - -
27	Pipe Bushing (M 1/2 x F 1/4)	- - - - - - - - - -
28	Control Tubing	- - - - - - - - - -
29	Male Connector (3 required)	- - - - - - - - - -
30	Elbow	- - - - - - - - - -
31	Cap End	- - - - - - - - - -
32	Tee (2 required)	- - - - - - - - - -
33	Cross	- - - - - - - - - -
34	Bleed Restriction (0.04 in.)	- - - - - - - - - -
35	Adaptor (M 1/4 x F 1/2)	- - - - - - - - - -
36	Pipe Nipple	- - - - - - - - - -
37	Elbow (F 1/4 x F 1/4)	- - - - - - - - - -
38	Pipe Nipple	- - - - - - - - - -



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

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

Figure 8. *Type 92EZ Main Valve Assembly*

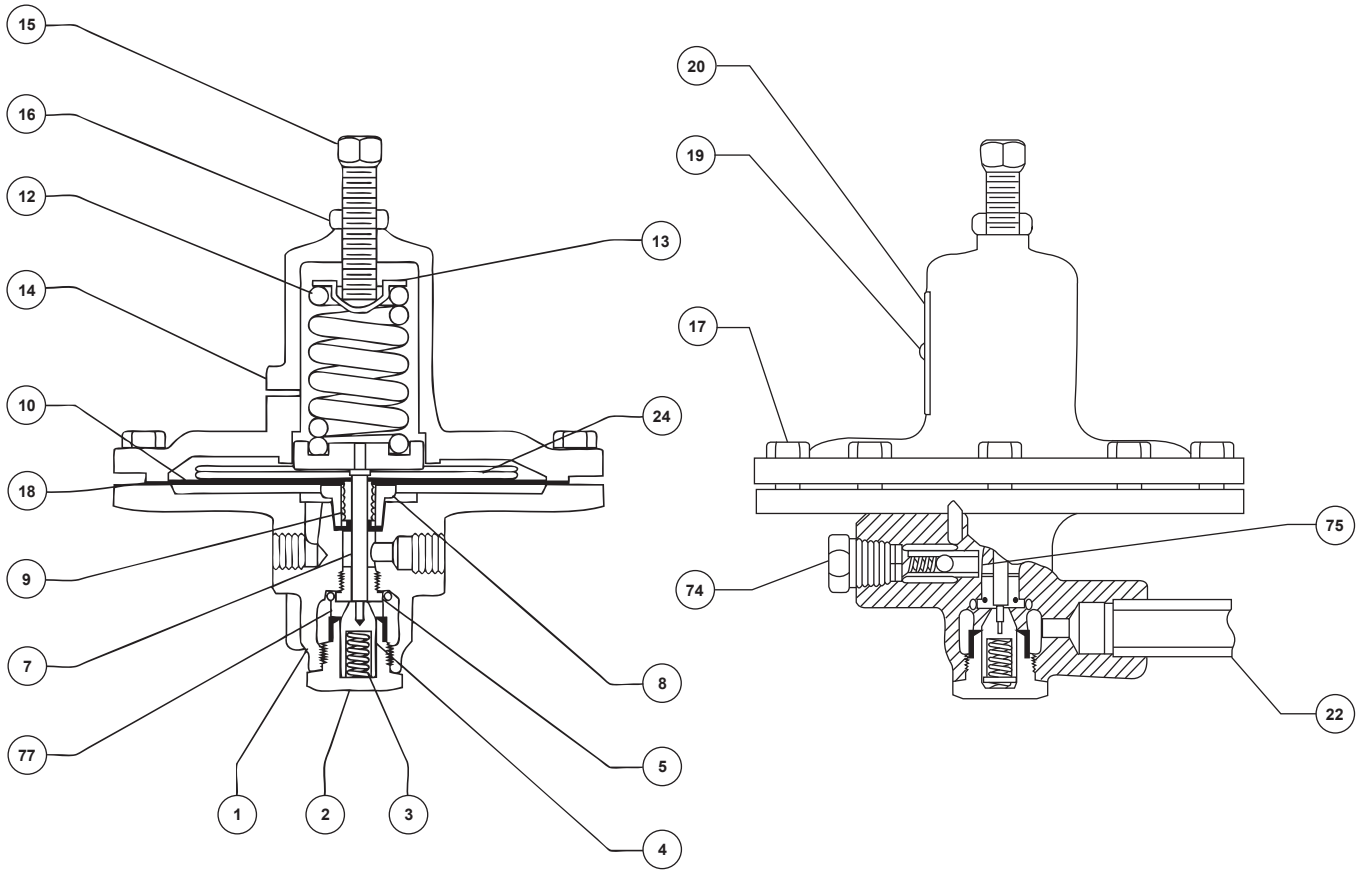


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Figure 9. *Type 92B Low-Pressure Pilot Assembly*

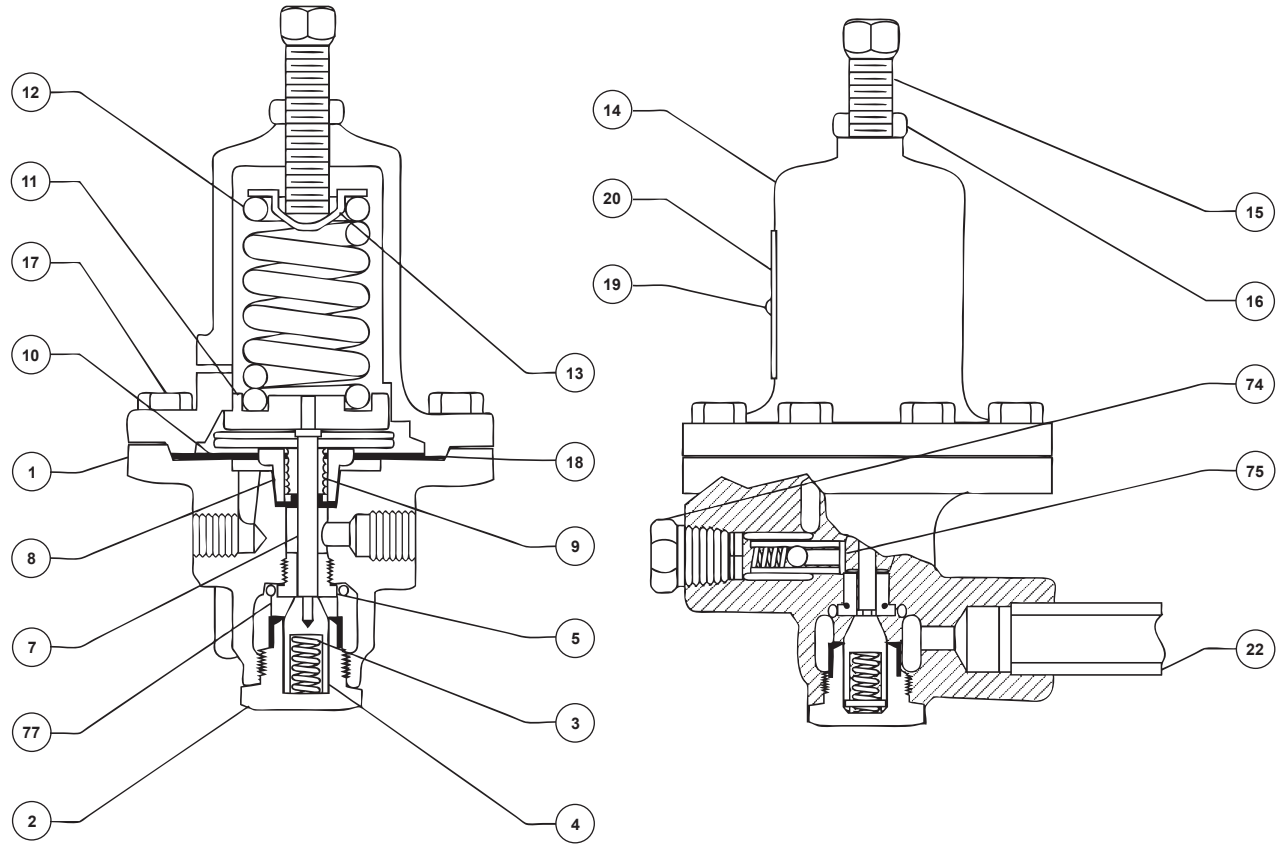

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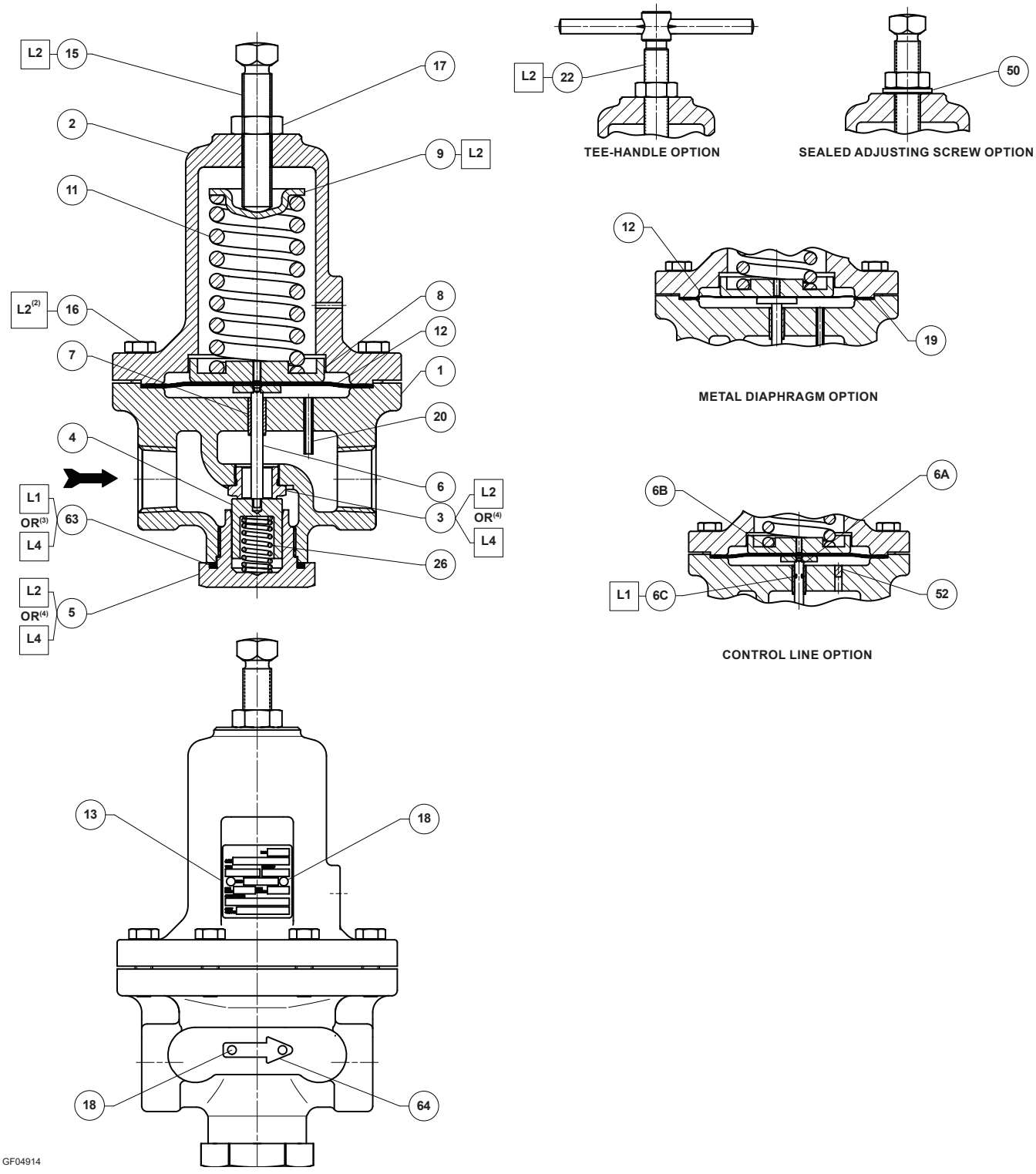
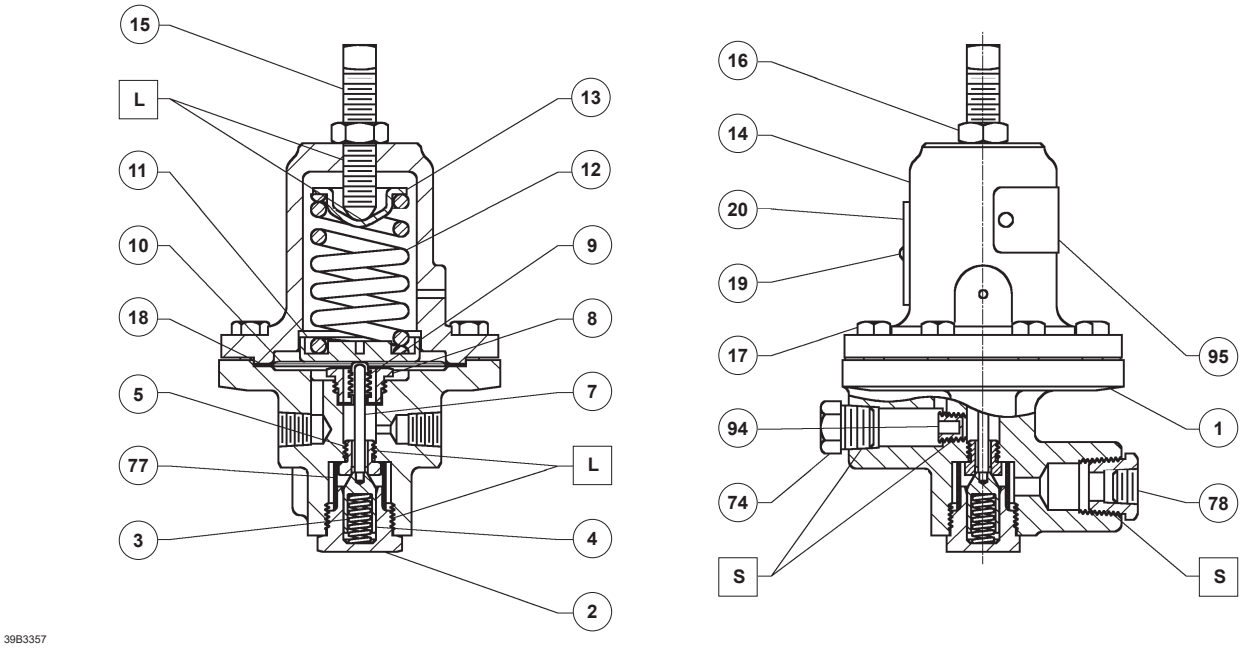
Figure 10. *Type 92B High-Pressure Pilot Assembly*



☐ **APPLY LUBRICANT OR SEALANT(1):**
L1 = GENERAL PURPOSE PTFE OR LITHIUM GREASE
L2 = ANTI-SEIZE COMPOUND
L4 = GRAPHITE SEALANT

1. Lubricants and sealant must be selected such that they meet the temperature requirements.
2. Apply L2 (anti-seize compound) on key 16 for stainless steel bolts.
3. Apply L4 (graphite sealant) instead of L1 (general purpose PTFE or lithium grease) on key 63 for graphite ring.
4. Apply L4 (graphite sealant) instead of L2 (anti-seize compound) on keys 3 and 5 for Type MR95HT.

Figure 11. *Types MR95H and MR9HT, Pre-Pilot Assembly*



APPLY LUBRICANT (L) OR SEALANT (S)

Figure 12. *Type 6492HM Safety Override Pilot Assembly*

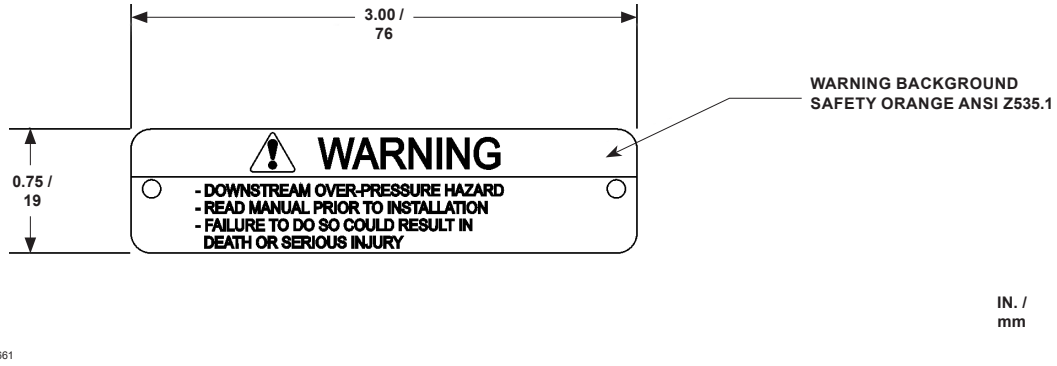
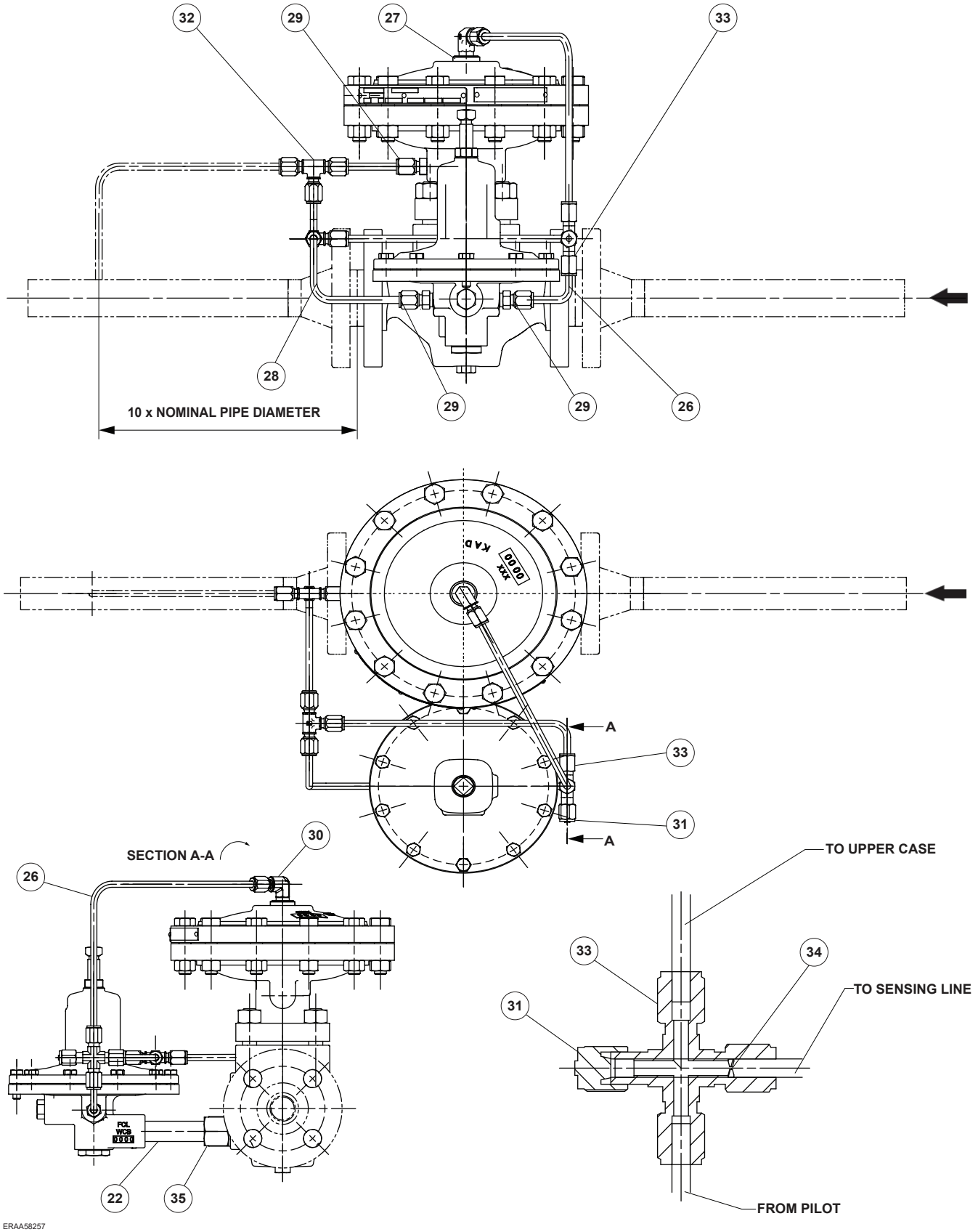
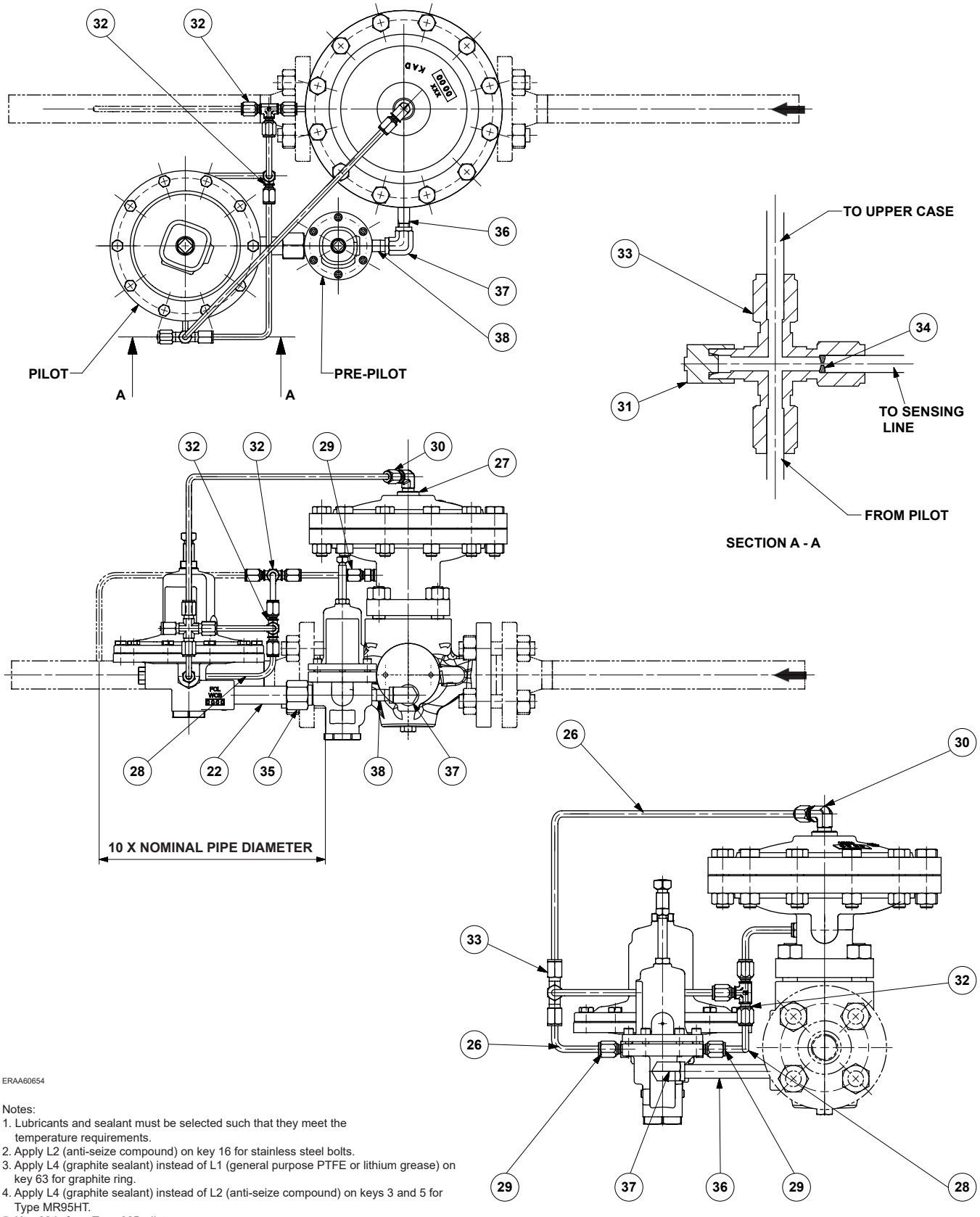


Figure 13. *Safety Override Pilot Warning Label (key 95)*



Note: Key 21 is from Type 92B pilot.

Figure 14. *Pilot Mounting Assembly (Low Pressure Pilot Shown)*



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Notes:
1. Lubricants and sealant must be selected such that they meet the temperature requirements.
2. Apply L2 (anti-seize compound) on key 16 for stainless steel bolts.
3. Apply L4 (graphite sealant) instead of L1 (general purpose PTFE or lithium grease) on key 63 for graphite ring.
4. Apply L4 (graphite sealant) instead of L2 (anti-seize compound) on keys 3 and 5 for Type MR95HT.
5. Key 22 is from Type 92B pilot.

Figure 15. *Pre-Pilot Supply Mounting Assembly*

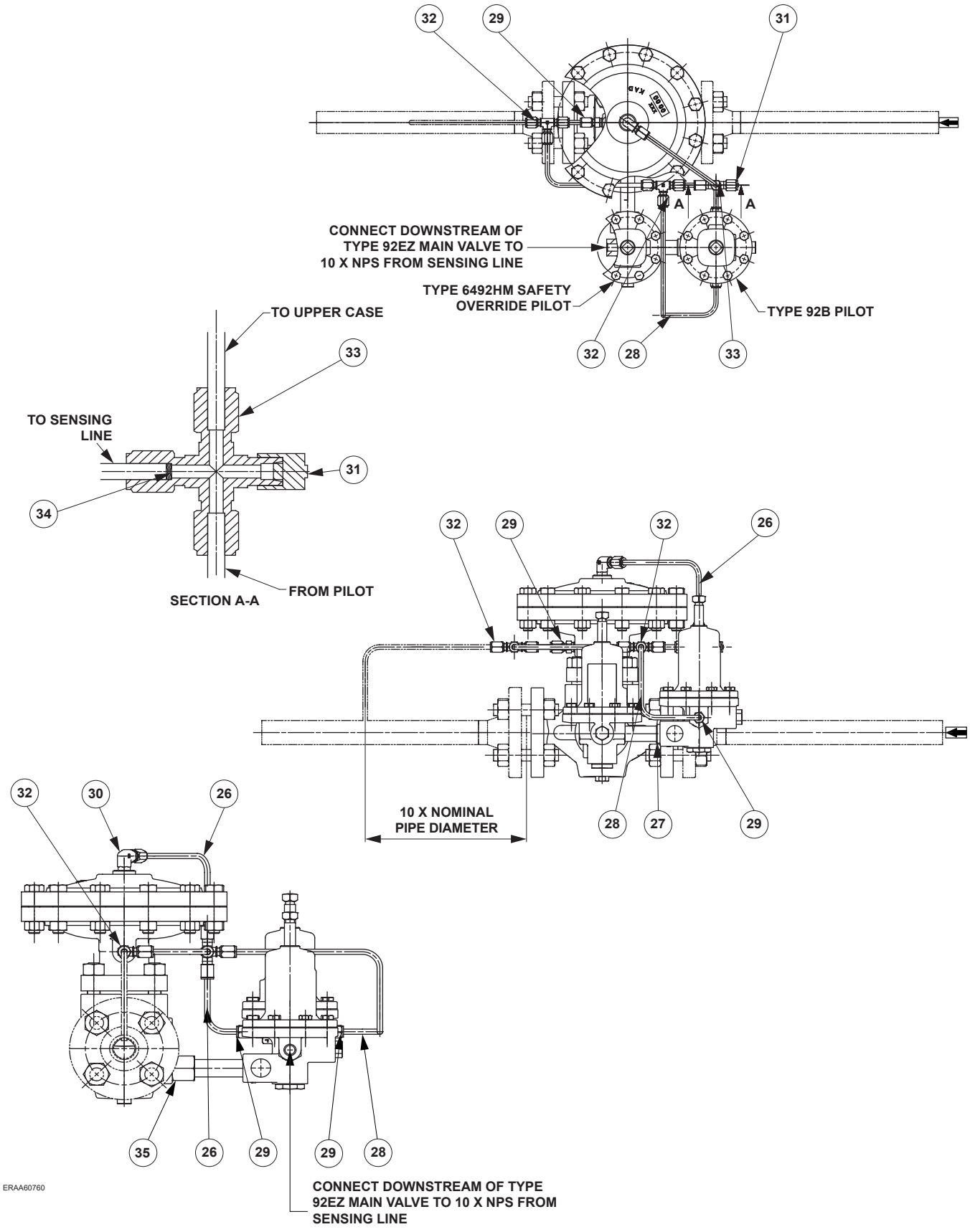

Figure 16. *Safety Override Pilot Mounting Assembly (High Pressure Pilot Shown)*

Webadmin.Regulators@emerson.com
Fisher.com
Facebook.com/EmersonAutomationSolutions
LinkedIn.com/emerson-final-control
X.com/EMR_automation

Emerson

Americas
McKinney, Texas 75069 USA
T +1 800 558 5853
+1 972 548 3574

Asia Pacific
Singapore 128461, Singapore
T +65 6777 8211

Europe
Bologna 40013, Italy
T +39 051 419 0611

Middle East and Africa
Dubai, United Arab Emirates
T +971 4 811 8100

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