Type 92C Steam Regulator

WARNING

Fisher® regulators must be installed, operated, and maintained in accordance with federal, state, and local codes, rules and regulations, and Emerson Process Management Regulator Technologies, Inc. instructions.

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 92C regulator.

Introduction

Scope of the Manual

This instruction manual provides installation, maintenance, and parts ordering information for the Type 92C steam self-powered control valve and the Type 6392 pilot. Both the pilot-operated and the pressure-loaded constructions are covered. The Type 92C is also available with a Type 6492HM or 6492HTM safety override pilot. The pressure-loading device and accessories used with this valve are covered in other manuals.

Description

The Type 92C steam regulator is a gray cast iron, steel, or stainless steel pressure-reducing regulator for steam or hot air service. This regulator is available with a Type 6392 pilot for use as a pilot-operated regulator (Figure 1) or without a pilot for use as a pressure-loaded regulator. The pilot-operated version uses inlet pressure as the operating medium; no separate air supply is required. The pressure-loaded version is used where remote adjustment of the regulator pressure setting is required; a 67 or

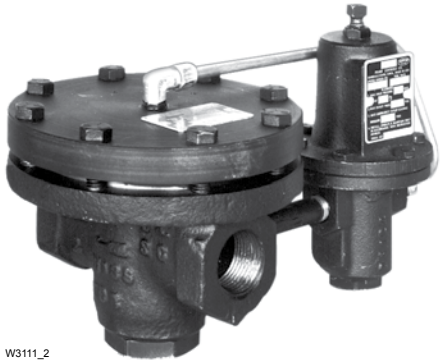

Figure 1. *Type 92C Pilot-Operated Regulator*

1301 Series regulator or 670 Series panel-mounted regulator may be used as the loading regulator.

A Type 6492HM (or 6492HTM) safety override pilot is also available for the Type 92C. The Type 6392 pilot is used in a series installation with the Type 6492HM (or 6492HTM) safety override pilot installed on the upstream valve. The Type 6492HM (or 6492HTM) 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 pressure does not exceed 400 psig / 27.6 bar. Local codes and standards may require approval by an appropriate authority prior to installation.

WARNING

The Type 92C 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.

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Specifications

This section lists the specifications for Type 92C regulator. Additional specifications for an individual regulator are found on the regulator body and pilot nameplates.

Body Sizes and End Connection Styles

SIZE	BODY MATERIAL	
	Gray Cast Iron	Steel or CF8M Stainless Steel
NPS 1/2, 3/4, or 1 / DN 15, 20, or 25	NPT	NPT, CL150 RF, CL300 RF, or PN 16/25/40

Maximum Allowable Inlet and Pilot Supply Pressures*

Gray Cast Iron Construction: 250 psig / 17.2 bar

Steel and Stainless Steel Construction: 300 psig / 20.7 bar

Regulator Pressure Drops*

Minimum: 15 psi / 1.0 bar

Maximum Operating: 150 psi / 10.3 bar for outlet pressure settings equal to or below 50 psig / 3.4 bar; 200 psi / 13.8 bar for outlet pressure settings above 50 psig / 3.5 bar

Maximum Emergency
Gray Cast Iron construction: 250 psi / 17.2 bar
Steel and Stainless Steel construction: 300 psi / 20.7 bar

Outlet Control Ranges

See Table 1

Maximum Outlet Pressures*

Maximum Operating Outlet Pressure: 150 psig / 10.3 bar

Maximum Emergency Outlet (Casing) Pressure
Gray Cast Iron construction: 250 psig / 17.2 bar
Steel and Stainless Steel construction: 300 psig / 20.7 bar

Loading Pressure for Pressure-Loaded Regulator*

See Figure 2 to determine loading pressure. Maximum allowable loading pressure is 250 psig / 17.2 bar for gray cast iron construction and 300 psig / 20.7 bar for steel or stainless steel construction; the maximum allowable diaphragm differential pressure of 150 psi / 10.3 bar for gray cast iron, steel, and stainless steel constructions must not be exceeded.

Orifice Sizes

NPS 1/2 / DN 15 Main Valve: 9/16 inch / 14 mm

NPS 3/4 and 1 / DN 20 and 25 Main Valves: 3/4 inch / 19 mm is **standard**; 9/16 inch / 14 mm is optional

Maximum Material Temperature Capabilities(1)

Gray Cast Iron Construction: 406°F / 208°C

Steel and Stainless Steel Construction: 500°F / 260°C

Optional High-Temperature Steel or Stainless Steel Body: 650°F / 343°C

Pressure Registration

With Pilot: External

Without Pilot: Internal

Downstream Control Line Connection

1/4 NPT (internal) in pilot body (downstream control line not required for pressure-loaded regulator)

Loading Pressure Connection

1/4 NPT (internal) in main valve diaphragm flange (this connection is factory-piped to the pilot on pilot-operated regulator)

Pilot Spring Case Vent

3/32-inch / 2.4 mm drilled hole

Approximate Weights

Gray Cast Iron, Steel, or Stainless Steel Body with Pilot: 20 pounds / 9.1 kg

Gray Cast Iron, Steel, or Stainless Steel Body without Pilot: 16 pounds / 7.3 kg

1. Pressure/temperature limits in this Instruction Manual and any applicable code limitations must not be exceeded.

Note

To determine required loading pressure, add the diaphragm differential pressure to the desired outlet pressure setting.

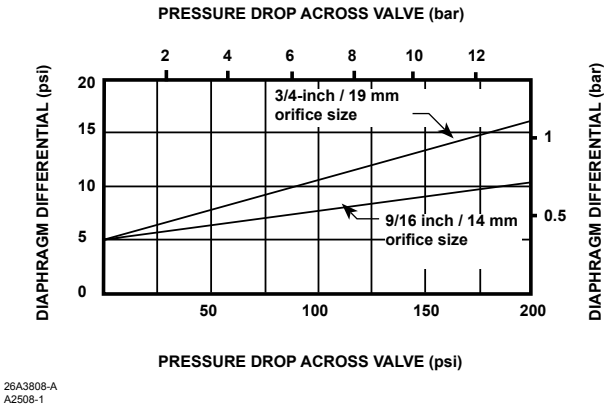


Figure 2. *Diaphragm Differential Pressure for Pressure-Loaded Regulator*

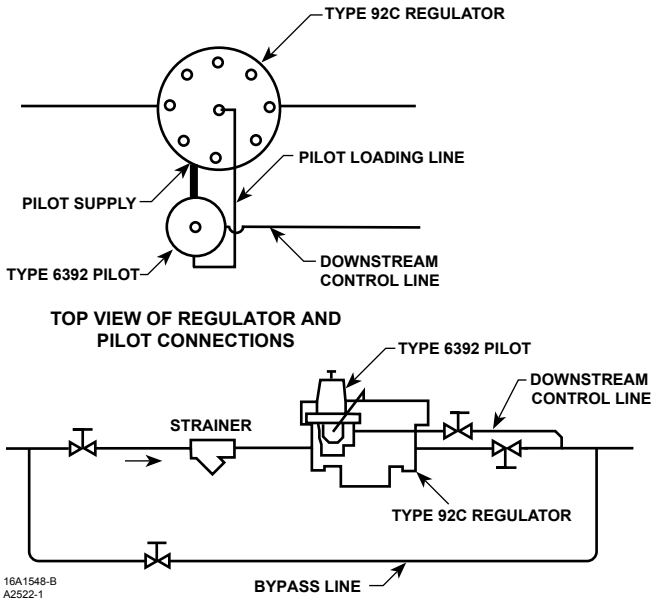


Figure 3. *Typical Pilot-Operated Type 92C Regulator Installation*

Table 1. *Safety Pilot Outlet (Control) Pressure Ranges*

TYPE	SPRING RANGE		SPRING COLOR	MINIMUM PRESSURE AT WHICH MONITORING PILOT CAN BE SET
	psig	bar		
6492HM	10 to 30	0.69 to 2.1	Yellow	5 psig / 0.34 bar over normal distribution pressure
	25 to 75	1.7 to 5.2	Green	10 psig / 0.69 bar over normal distribution pressure
	70 to 150	4.8 to 10.3	Red	
6492HTM	80 to 250	5.4 to 17.2	Unpainted	
	15 to 100	1.0 to 6.9		

Table 2. *Outlet Pressure Ranges*

SPRING USAGE	OUTLET PRESSURE RANGE		SPRING PART NUMBER AND COLOR	SPRING WIRE DIAMETER		SPRING FREE LENGTH	
	psig	bar		Inches	mm	Inches	mm
Standard use up to 500°F / 260°C	5 to 70	0.34 to 4.8	1E392627012, Green	0.170	4.32	2.00	50.8
	20 to 150	1.4 to 10.3	1E392727142, Red	0.207	5.26	1.94	49.0
High-pressure and/or High temperature over 500°F / 250°C	15 to 100	1.0 to 6.9	14B9941X012, Unpainted	0.192	4.88	1.96	49.8
	80 to 200	5.5 to 17.2	14B9940X012, Unpainted	0.282	7.16		

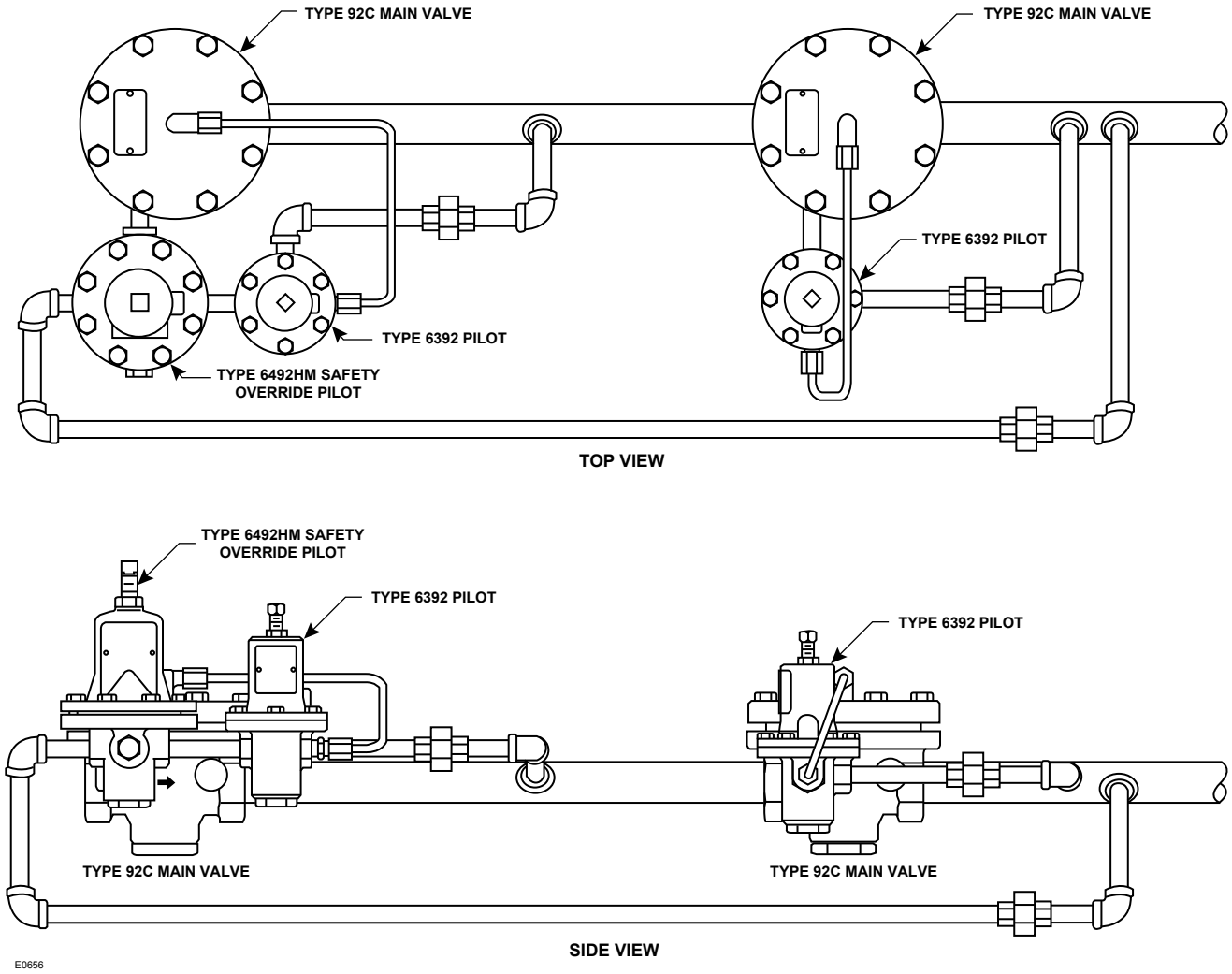
Table 3. *Flow Coefficients*[1]

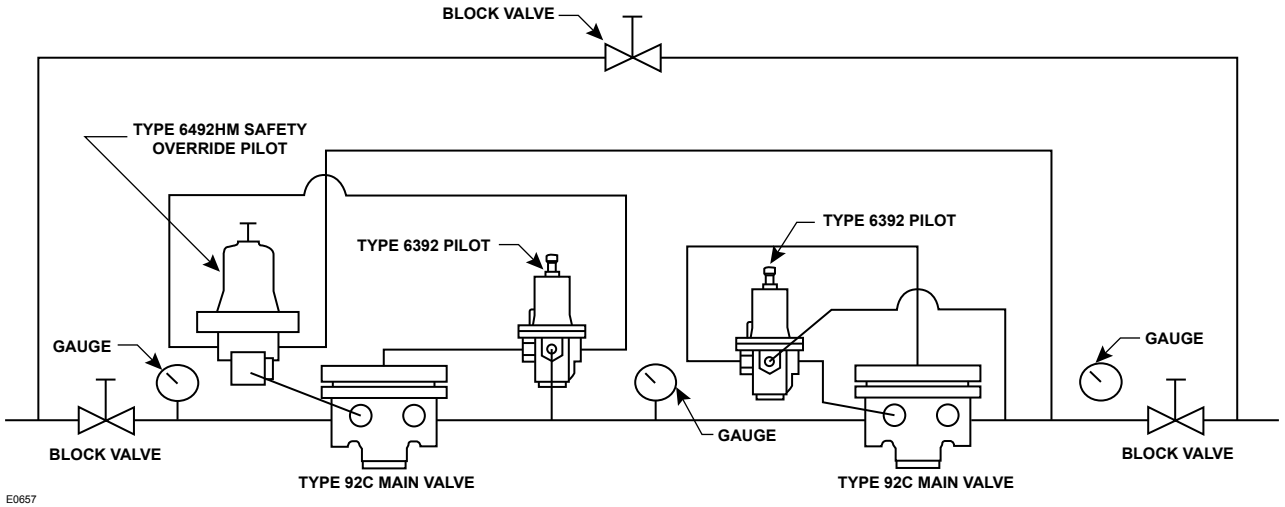
ORIFICE SIZE		WIDE-OPEN FOR RELIEF SIZING			C_1	K_m
Inches	mm	C_g	C_s	C_v		
9/16	14	170	8.5	5	34	0.67
3/4	19	240	12	7.1		

1. $C_v = C_s \times 20 \div C_1$

Table 4. *IEC Sizing Coefficients*

BODY SIZE		ORIFICE SIZE					
		9/16 inch / 14 mm			3/4 inch / 19 mm		
NPS	DN	X_T	F_D	F_L	X_T	F_D	F_L
1/2	15	0.73	0.38	0.82	- - - -	- - - -	- - - -
3/4 or 1	20 or 25		0.44		0.73	0.38	0.82





TYPICAL TYPE 92C WITH TYPE 6492HM OR 6492HTM SAFETY OVERRIDE PILOT INSTALLATION

Figure 3. *Typical Pilot-Operated Type 92C Regulator Installations (continued)*

Principle of Operation

Pilot-Operated Regulator

Refer to Figure 5. Pilot supply pressure is piped from the inlet side of the main valve to the pilot inlet connection. Downstream pressure registers under the main valve diaphragm through the pitot tube and under the pilot diaphragm through the downstream control line.

When downstream pressure decreases to a value below the setting of the pilot regulator spring, the pilot spring forces the pilot valve plug open, increasing the loading pressure on the top of the main valve diaphragm. The increased loading pressure on top of the main valve diaphragm and decreased downstream pressure under the main valve diaphragm force the main valve diaphragm and stem downward. This opens the main valve plug, and increases flow to the downstream system, thus restoring downstream pressure to the setting of the pilot regulator spring.

When downstream pressure increases it registers under the pilot diaphragm and overcomes the force of the pilot spring. This allows the pilot valve spring to close the pilot valve plug and causes excess loading pressure to bleed to the downstream system through the pilot bleed hole. At the same time, increased downstream pressure registers under the main valve diaphragm. The decreased loading pressure on top of the main valve diaphragm and increased downstream pressure under the main valve diaphragm force the main valve diaphragm upward. This allows the main valve plug spring to close the main valve plug, reducing flow to the downstream system.

Pressure-Loaded Regulator

Refer to Figure 7. With a pressure-loaded regulator, a remote, adjustable loading regulator provides loading pressure to the top of the main valve diaphragm. Downstream pressure registers under the main valve diaphragm through the pitot tube.

When downstream pressure decreases, it registers under the diaphragm and allows the stem and plug to move downward, thereby opening the valve to increase downstream pressure.

When downstream pressure increases, it registers under the diaphragm and forces the stem and plug to move upward. The upward force of the spring causes the valve to close, which decreases flow to the downstream system thus decreasing downstream pressure. In hot air service, supply air above the diaphragm becomes compressed and is vented to the atmosphere. If a steam supply is used, the steam is vented downstream.

Safety Override Pilot Principle of Operation

Refer to Figure 6. Once placed in operation, the upstream Type 6392 pilot senses the intermediate pressure between both valves, and the Type 6492HM (or 6492HTM) pilot senses downstream pressure of the second valve. As demand for flow increases, intermediate pressure will fall causing the Type 6392 pilot to open. As the Type 6392 pilot valve opens, loading pressure to the main valve increases, opening the main valve.

The Type 6492HM (or 6492HTM) 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 (or 6492HTM) safety override pilot. As downstream pressure increases the safety override pilot closes, reducing loading pressure to the main valve, which positions the main valve to maintain downstream pressure as specified per ASME Boiler and Pressure Vessel Code, section VIII.

In the event that the upstream valve fails, the downstream regulator 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.

When operating in most steam systems, valve setpoints should be in strict accordance to ASME Boiler and Pressure Vessel Code, section VIII. The Type 6492HM (or 6492HTM) safety override pilot should be set at 10 psig / 0.69 bar or 10% above maximum downstream operating pressure of the second valve, whichever pressure is greater. For example, most HVAC systems operate at 15 psig / 1.0 bar, so the safety override pilot should be set no higher than 25 psig / 1.7 bar.

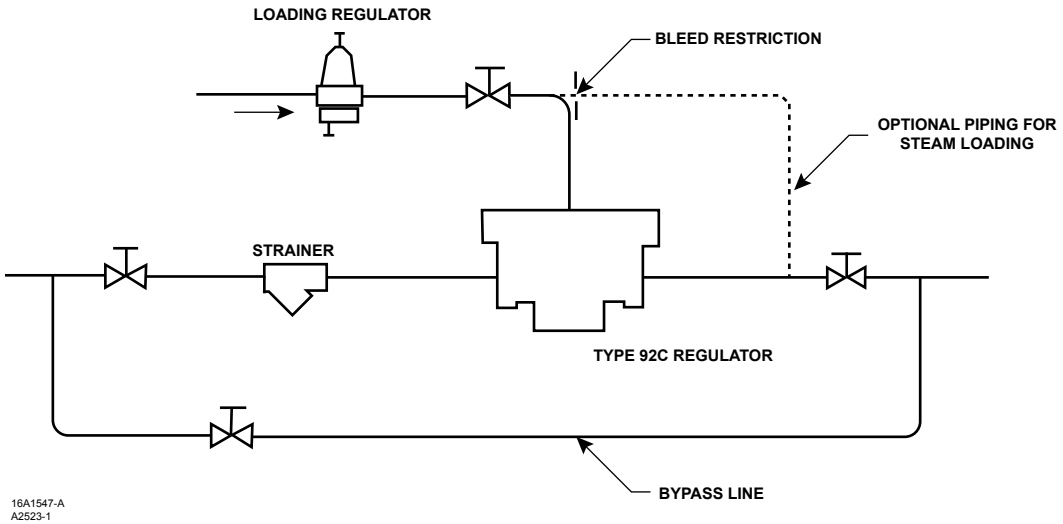


Figure 4. *Typical Pressure-Loaded Type 92C Regulator Installation*

Installation

WARNING

Personal injury, equipment damage, or leakage due to escaping steam or bursting of pressure-containing parts may result if this regulator is overpressured or is installed where service conditions could exceed the limits given in Specifications section on page 2 and on the appropriate nameplate, or where conditions exceed any ratings of the downstream piping or piping connections. To avoid such injury or damage, provide pressure-relieving or pressure-limiting devices to prevent service conditions from exceeding those limits. Type 92C regulators and their installations should be checked for compliance with all applicable codes such as the ANSI B31.1-1977 Power Piping standard and the ASME Boiler and Pressure Vessel code.

Use a qualified personnel when installing, operating, and maintaining a Type 92C regulator. Make sure that there is no damage to or foreign material in the regulator and that all tubing and piping are clean and unobstructed. Install the regulator so that flow direction matches the arrow marked on the regulator body. Some typical Type 92C regulator installations are shown in Figures 3 and 4.

The Type 92C regulator may be installed in any orientation. However, the regulator should not be installed in a tall vertical pipeline where condensate could collect and create a pressure head affecting regulator performance.

Apply steam-compatible pipe compound to the external pipeline threads. Then, using acceptable piping procedures, install the regulator into the pipeline.

If continuous operation of the system is required during inspection and maintenance, install a three-valve bypass around the regulator. If the flowing medium contains solids, install a proper size strainer upstream of the regulator.

Pilot-Operated Regulator

The Type 6392 pilot has three 1/4 NPT connections located in the pilot body. For proper operation of a pilot-operated regulator, the pilot supply and the regulator loading connections should be installed parallel to the flow direction arrow marked on the pilot body as shown in Figure 10, and the downstream control line should be installed in the pilot body connection as shown in Figures 3 and 10. If a pilot-operated regulator is ordered, the pilot supply and the regulator loading connections will be made at the factory.

Note

Pilot is shown here above the main valve body for illustration purposes only. See Figures 1 and 10 for actual pilot position and appearance of pilot-supply line and loading-pressure tubing.

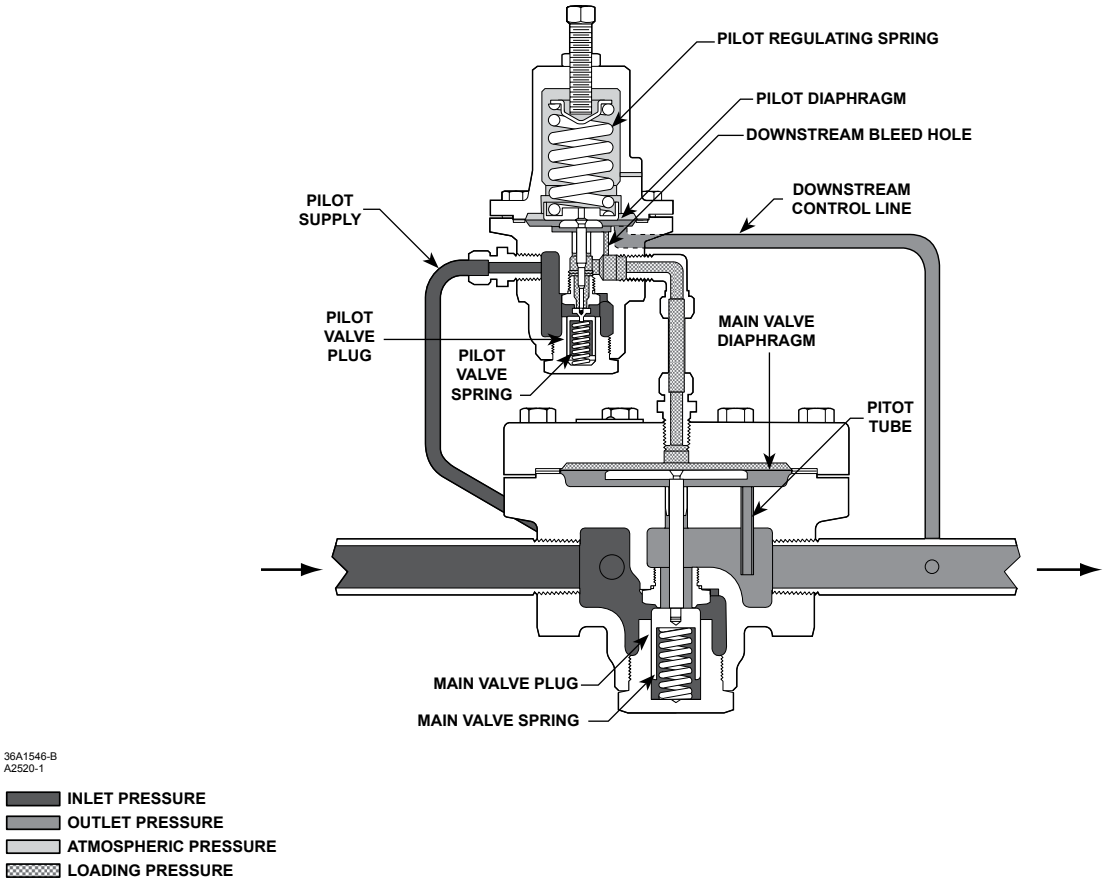


Figure 5. *Operational Schematic of Pilot-Operated Type 92C Regulator*

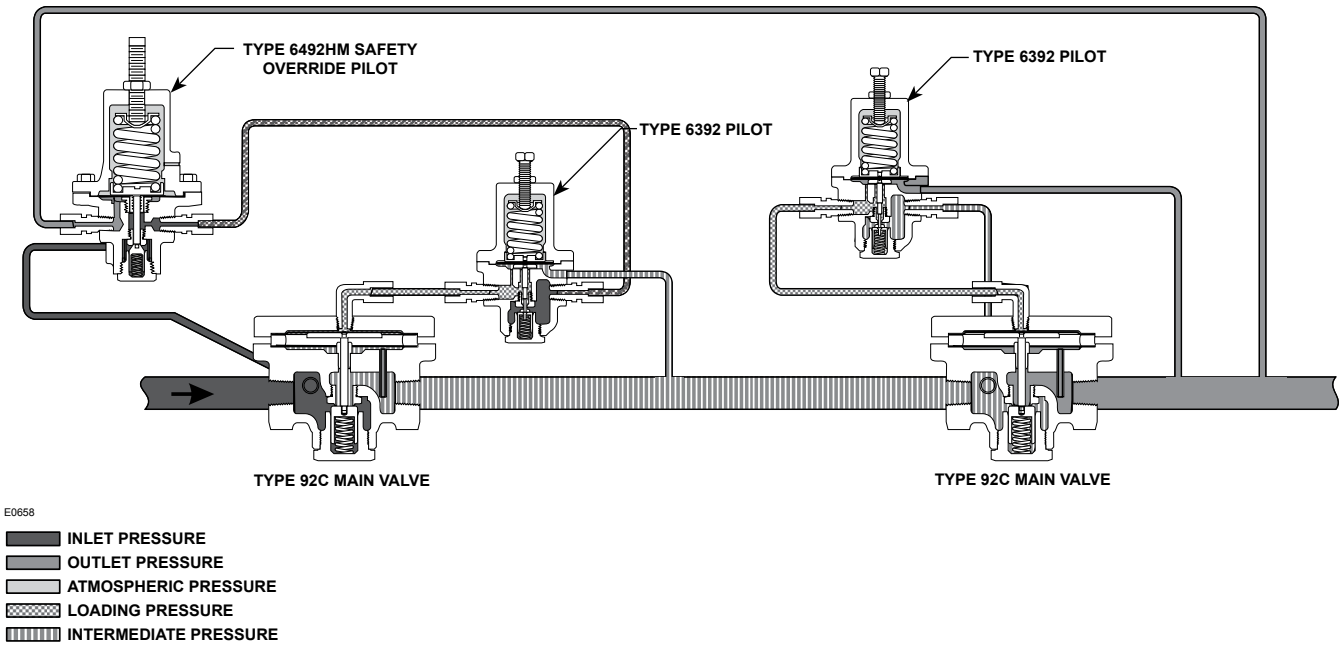


Figure 6. *Type 92C with Type 6492HM Safety Override Pilot Operational Schematic*

Note

Since a clogged vent may cause improper regulator functioning, install and maintain the Type 92C regulator so that the Type 6392 pilot spring case vent remains clear and unobstructed.

To install a pilot-operated regulator:

1. Connect a downstream control line of at least 1/4-inch / 6.4 mm diameter pipe bushed down to the 1/4 NPT control line connection in the pilot body.
2. For both body-sized and swaged pipelines, locate the pipeline control line connection in a section of straight pipe at least 10 pipe diameters away from the regulator or swage.
3. Do not locate the pipeline control line connection in an elbow, swage, or other area where turbulence or abnormal velocities may occur.
4. If the pilot is mounted with the control line in a position other than horizontal, make sure the control line is sloped away from the pilot so that condensate can drain into the pipeline.
5. Install a shutoff valve (not a needle valve) in the control line to completely isolate the pilot during maintenance.
6. Install a pressure gauge in the control line or near the regulator to aid in setting the outlet pressure.

   Each pilot-operated regulator is factory-set for the pressure setting specified on the order. If no setting is specified, the unit is factory-set at 30 psig / 2.1 bar. In all cases, check the spring setting to make sure it is correct for the application.

Pressure-Loaded Regulators

To install a pressure-loaded regulator:

1. Install a shutoff valve in the pressure-loading piping or tubing.
2. Connect the piping or tubing to the 1/4 NPT connection in the diaphragm flange (key 2, Figure 8).

If the loading regulator used with the pressure-loaded regulator does not provide internal relief, an atmospheric bleed (e.g., no. 60 drill size) is required if the loading supply is air, or a downstream bleed line is required if the loading supply is steam. This installation is shown in Figure 4.

The pressure setting of a pressure-loaded regulator is adjusted and determined by the pressure-loading device. In all cases, check the pressure setting to make sure it is correct for the application.

Startup

The maximum inlet pressure for a specific construction is stamped on the main valve nameplate. Use pressure gauges to monitor upstream and downstream pressures during startup.

To put the regulator into operation:

1. Open the control line shutoff valve.
2. For a pilot-operated regulator, open the downstream block valve.

For a pressure-loaded regulator, open the shutoff valve in the pressure-loading piping or tubing.

3. Slowly open the upstream block valve.
4. If a bypass line is used, slowly close the bypass line block valve.
5. To adjust the downstream pressure, follow the appropriate procedure:
   a. **For a pilot-operated regulator,** loosen the jam nut (key 15, Figure 9). Turn the adjusting screw (key 16, Figure 9) into the spring case to increase the downstream pressure. Turn the adjusting screw out of the spring case to decrease the downstream pressure. When the required downstream pressure is maintained for several minutes, tighten the jam nut to lock the adjusting screw in position.
   b. **For a pressure-loaded regulator,** refer to the Instruction Manual of the pressure-loading device for downstream pressure adjustment procedures.

Safety Override Pilot Startup and Adjustment

1. Loosen adjusting screws of the Type 6492HM (or 6492HTM) safety override pilot and Type 6392 intermediate pilot on the upstream valve until there is no spring load. The screws should turn freely by hand.
2. Loosen the adjusting screw of the Type 6392 pilot on the downstream valve until there is no spring load.
3. Tighten the Type 6492HM (or 6492HTM) safety override pilot of the upstream valve all the way in to its highest spring setting.

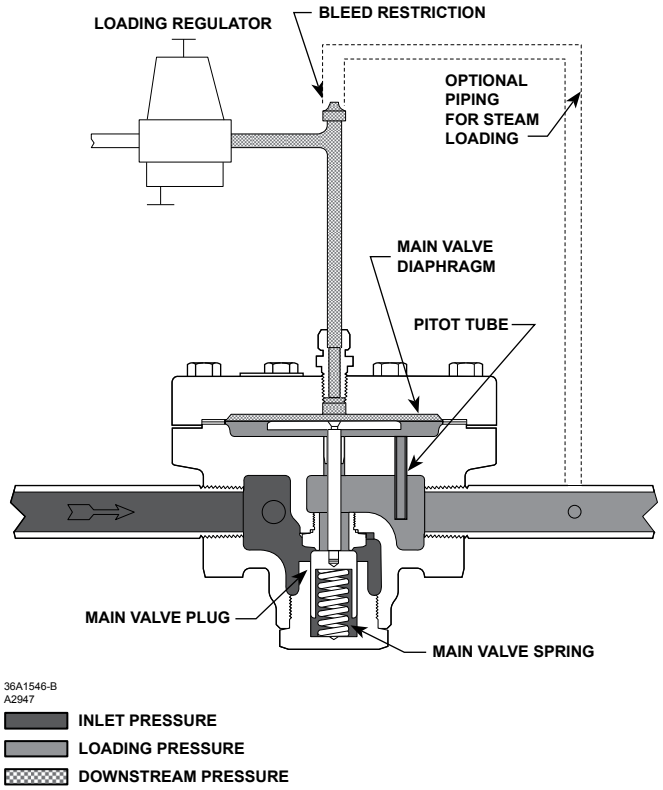


Figure 7. *Operational Schematic of Pressure-Loaded Type 92C Regulator*

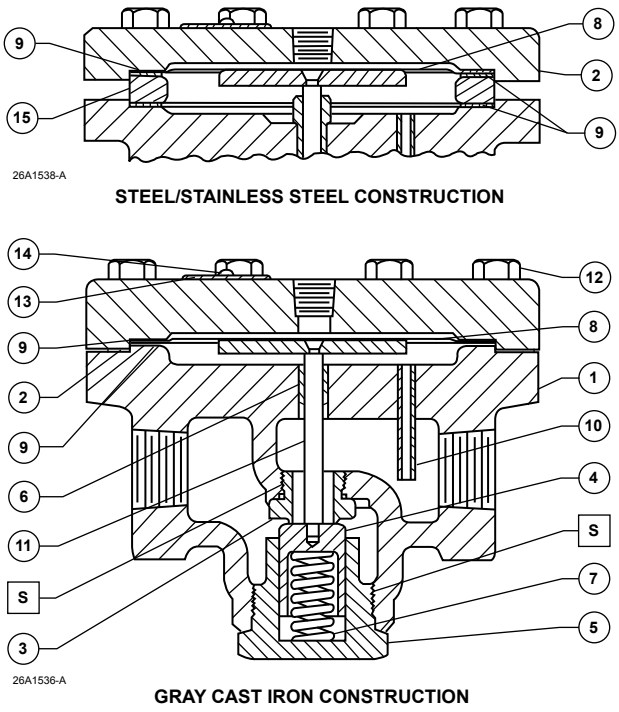


Figure 8. *Type 92C Steam Regulator Assembly*

4. Tighten the Type 6392 pilot of the upstream valve all the way in to its highest spring setting.
5. Tighten the Type 6392 pilot of the downstream valve to the desired downstream pressure.
6.* Loosen the Type 6392 intermediate pilot on the upstream valve to the desired intermediate pressure (normally 50% of inlet pressure).
7. Loosen the Type 6492HM (or 6492HTM) safety override pilot of the upstream valve until there is no spring load.
8. Tighten the Type 6392 pilot of the downstream valve all the way in to its highest spring setting.
9. Tighten the Type 6492HM (or 6492HTM) safety override pilot of the upstream valve to desired pressure as specified per ASME Boiler and Pressure Vessel Code, section VIII.
10.* Loosen the Type 6392 pilot of the downstream valve to the desired downstream pressure setpoint.

*Fisher® recommends establishing setpoint by tightening the adjusting screw.

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 upstream block valve.
3. **For a pilot-operated regulator,** close the downstream block valve.

   For a pressure-loaded regulator, close the shutoff valve in the pressure-loading piping or tubing.
4. Close the control line shutoff valve.
5. Vent the regulator, the control line, and the pilot supply line to release any trapped pressure.

Maintenance

Regulator parts are subject to normal wear and must be inspected periodically and replaced as necessary. The frequency of inspection and replacement depends upon the severity of service conditions and upon applicable Federal, state, and local codes and regulations.

WARNING

Avoid personal injury or property damage from sudden release of pressure or uncontrolled steam or other process fluid. Before starting disassembly:

- **Isolate the regulator from the process,**
- **Release process pressure, and**
- **Vent the pilot supply and main valve loading pressures.**

This section contains separate procedures for regulator and pilot maintenance.

Type 92C Regulator

Perform these procedures when replacing diaphragm, the stem assembly, the valve plug, or the orifice. Refer to the correct section for the required instructions. Key numbers refer to Figure 8 unless otherwise indicated.

The regulator may remain in the pipeline during maintenance procedures unless the valve body is to be replaced or removed for repairs. For pilot-operated regulators, the pilot may remain on the pipe nipple (key 23, Figure 10) unless the pilot body (key 1, Figure 9) is to be removed or the entire pilot replaced as a unit.

Replacing Diaphragm and Stem Assembly

1. **For the pilot-operated regulator,** unscrew the elbow and connector (keys 25 and 24, Figure 10) so that the loading tubing (key 22, Figure 10) can be removed.

   For the pressure-loaded regulator, unscrew the loading tubing (customer supplied) from the 1/4 NPT connection in the regulator diaphragm flange (key 2).

2. Remove the cap screws (key 12) and the diaphragm flange (key 2).

   Lift out the upper diaphragm gasket (key 9), the diaphragms (key 8), the lower diaphragm gasket, and for Steel/Stainless Steel constructions, the diaphragm ring (key 15), and another diaphragm gasket (key 9).

3. Lift out the stem assembly (key 11) consisting of the pusher plate and the stem. Check that the pitot tube (key 10) is clear and free of obstructions. Clean the parts. Check for wear, scratches, nicks and other damage, and replace parts as necessary.

4. Install the stem assembly (key 11) in the stem guide bushing (key 6). Place one diaphragm gasket (key 9) in the regulator body (key 1).

   For Steel/Stainless Steel constructions, place the diaphragm ring (key 15) and another diaphragm gasket (key 9) on top of the first gasket.

   For all constructions, place the two molded diaphragms (key 8) with the raised circle up, another diaphragm gasket, and the diaphragm flange (key 2) on the body. Insert and tighten the cap screws (key 12).

5. **For the pilot-operated regulator,** reconnect the elbow, the loading tubing, and the connector (keys 25, 22, and 24, Figure 10).

   For the pressure-loaded regulator, reconnect the pressure-loading tubing.

6. When maintenance is completed, refer to the Startup section to put the regulator back in operation and to adjust the pressure setting.

Replacing Valve Plug and Orifice

1. Remove the valve plug guide (key 5).
2. Remove the valve plug (key 4) and the valve plug spring (key 7). Inspect the valve plug seating surface for nicks or scratches. Replace as necessary.
3. Unscrew the orifice (key 3), and inspect the seating surface for nicks and scratches. Replace if necessary.
4. Clean the valve plug guide, the valve plug, the valve plug spring, and the orifice (keys 5, 4, 7, and 3, respectively).
5. Coat the orifice threads with Never-Seez* or equivalent lubricant. Then, being careful not to damage the seating surface, thread the orifice (key 3) into the regulator body (key 1).
6. Place the valve plug spring (key 7) into the valve plug guide (key 5). Then slide the valve plug (key 4) over the spring and into the valve plug guide.
7. Apply Lok-Cease 20/20† sealant or equivalent to the valve plug guide threads, and screw the valve plug guide (key 5) with attached parts into the regulator body (key 1), applying 130 to 160 foot-pounds / 176 to 217 N•m of torque.

* Trademark of Never-Seez Corp.
† Trademark of Certified Laboratories

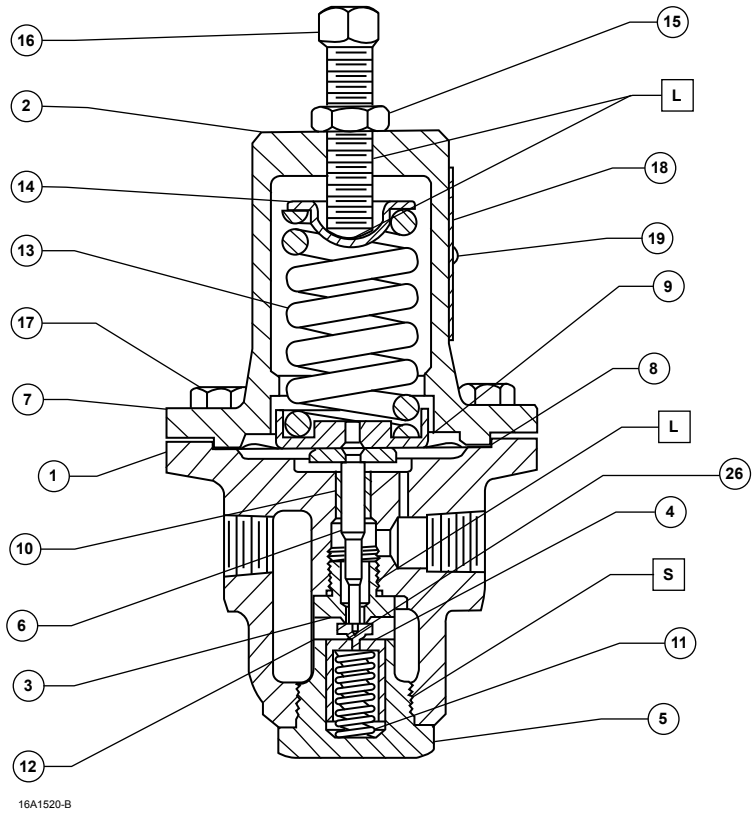


Figure 9. *Type 6392 Pilot Assembly*

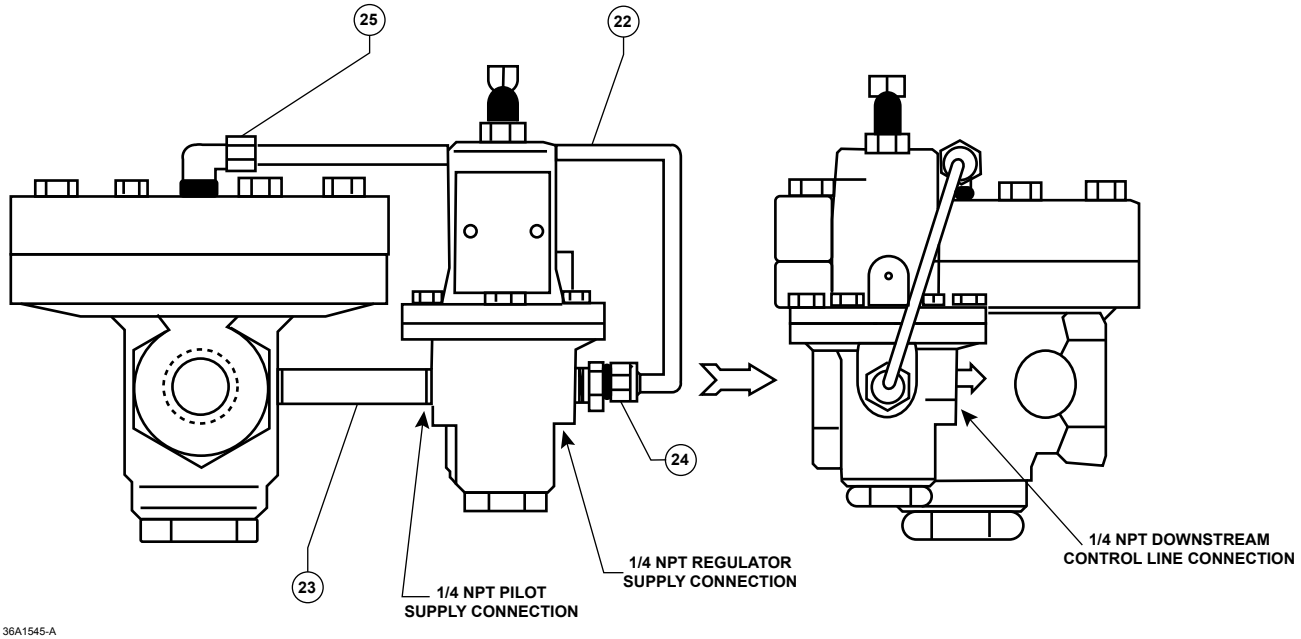


Figure 10. *Type 6392 Pilot Mounting Parts*

8. When maintenance is completed, refer to the Startup section to put the regulator back in operation and to adjust the pressure setting.

Type 6392 Pilot

Perform this procedure if inspecting, cleaning, or replacing any pilot parts. Key numbers refer to Figure 9 unless otherwise specified.

All pilot maintenance may be performed with the pilot body (key 1) attached to the pipe nipple and connector (keys 23 and 24, Figure 10) unless the pilot body must be removed or the pilot is to be replaced as a unit.

1. Loosen the jam nut (key 15), and turn the adjusting screw (key 16) counterclockwise until all compression is removed from the control spring (key 13). Remove the loading tubing from the pilot outlet connection. Remove the cap screws (key 17), spring case (key 2), control spring (key 13), and upper spring seat (key 14) from the body.
2. Remove the lower spring seat (key 9), the diaphragm (key 7), and the diaphragm gasket (key 8) from the body. Lift out the stem assembly (key 6) consisting of the stem and the pusher plate. Clean the 1/16-inch / 1.6 mm diameter pilot bleed hole. Clean and replace parts as necessary, and assemble the stem assembly, the gasket, the diaphragm, and the spring seat in the order shown in Figure 9.
3. Install the control spring (key 13), the lubricated upper spring seat (key 14), and the spring case (key 2). Insert and tighten the cap screws (key 17). Lubricate the adjusting screw (key 16) with Never-Seez* or equivalent lubricant, and thread it into the spring case.
4. Unscrew the valve plug guide (key 5). Remove the strainer screen (key 12), the valve plug (key 4), the valve plug cap (key 26), and the valve plug spring (key 11). Unscrew the orifice (key 3). Clean and replace parts as necessary. Apply Never-Seez* or equivalent lubricant to the orifice threads, and screw the orifice into place.
5. Place the valve plug spring (key 11) into the valve plug guide (key 5). Insert the valve plug cap (key 26) into the valve plug (key 4), and then slide both parts over the spring and into the valve plug guide. Place the strainer screen (key 12) onto the valve plug guide. Apply Lok-Cease 20/20† sealant or equivalent (key 21) to the valve plug guide threads, and screw the valve plug guide with the attached parts into the pilot body (key 1).
6. When maintenance is completed, refer to the Startup section to put the regulator back into operation, and adjust the pressure setting.

Types 6492HM and 6492HTM Safety Override Pilots

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 refer to Figure 11.

Note

Before performing any maintenance, loosen the hex nut (key 16), if used, and turn the adjusting screw (key 15) or handwheel (key 31) counterclockwise until all compression is removed from the control spring (key 12). Remove the pilot spring from the pipe nipple and connectors (keys 82 and 83, Figure 12).

1. Unscrew the plug guide (key 2). Remove the screen (key 77), inner valve (key 4), plug 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 sealant to the orifice threads. Thread the orifice into place and tighten using 19 to 25 foot-pounds / 26 to 34 N•m of torque.
3. Handle parts carefully, and place the plug spring (key 3) in the plug guide (key 2). Slide the inner valve (key 4) over the spring and into the plug guide. Place the screen (key 77) onto the plug guide. Place the stem (key 7) in the center hole of the plug guide. Apply sealant to the plug 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 sealant to the threads of the pipe plug (key 94) and install.

* Trademark of Never-Seez Corp.
† Trademark of Certified Laboratories

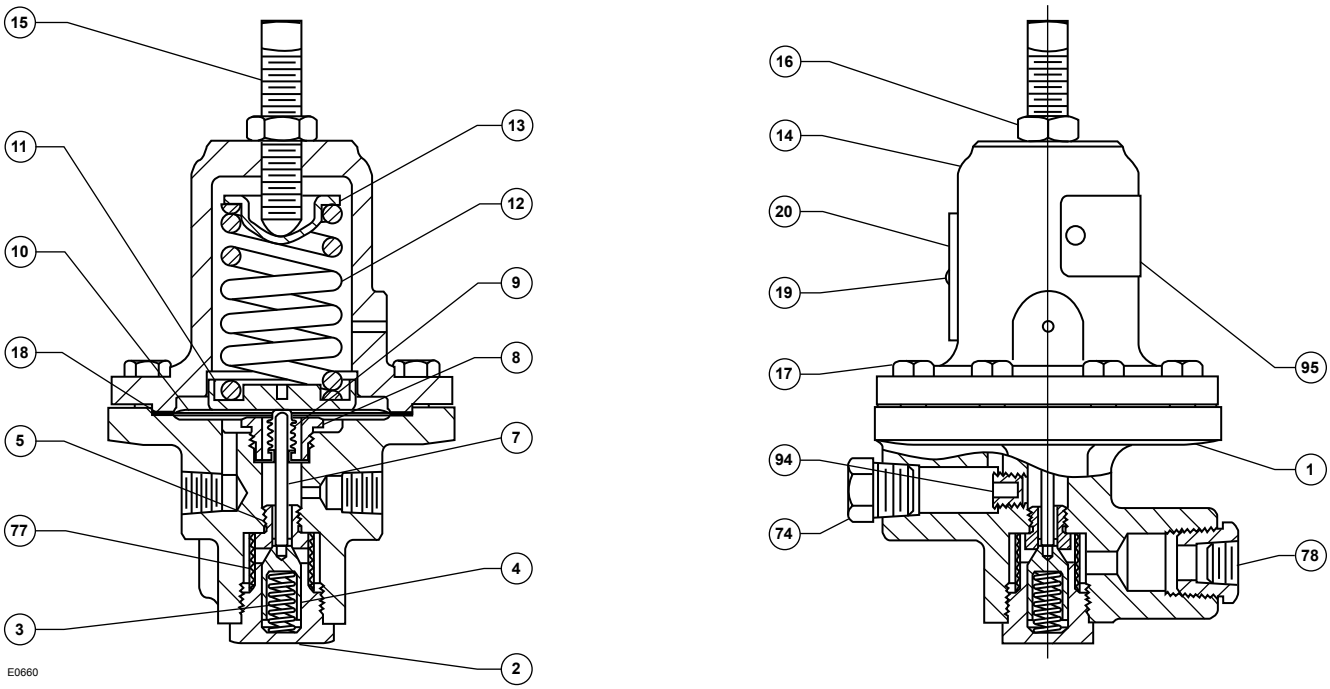


Figure 11. *Type 6492HM or 6492HTM Safety Override Pilot Assembly*

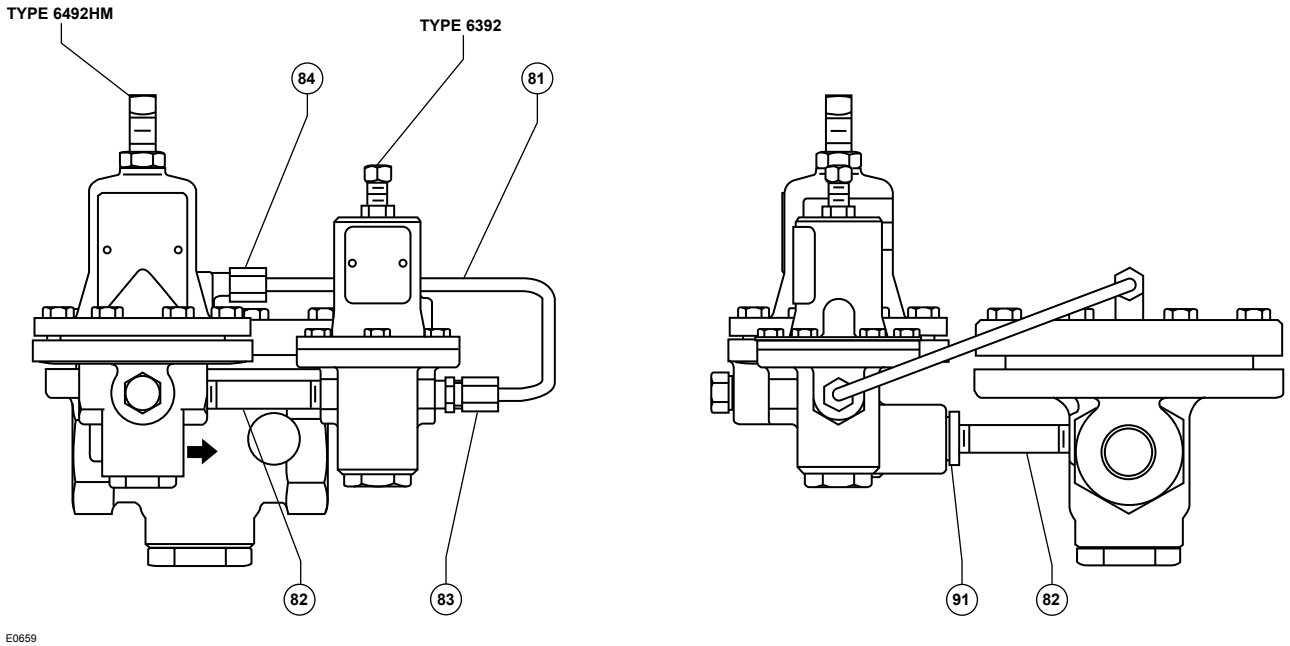


Figure 12. *Type 92C with Safety Override Pilot Assembly*

6. Apply sealant to the threads of the pipe plug (key 74). Thread the pipe plug into place and tighten using 5 to 15 foot-pounds / 6.8 to 20 N•m of torque.
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, and replace if necessary.
9. Unscrew the bellows retainer (key 8) and remove the bellows (key 9). Replace worn parts as necessary, and install the bellows and bellows retainer. Tighten the bellows retainer using 19 to 25 foot-pounds / 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 foot-pounds / 16 to 24 N•m of torque.

Parts Ordering

When corresponding with your local Sales Office about this equipment, always specify the equipment serial number as found on the regulator nameplate.

When ordering replacement parts, specify the complete 11-character part number of each needed part as found in the following parts list.

Parts List

Regulator

Key	Description	Part Number
1	Regulator Body Assembly with Bushing (See key 6 for bushing)	
	Gray Cast Iron	
	NPS 1/2 / DN 15	36A1539X012
	NPS 3/4 / DN 20	36A1540X012
	NPS 1 / DN 25	36A1541X012
	Steel	
	1/2 NPT	36A1542X012
	3/4 NPT	36A1543X012
	1 NPT	36A1544X012
1	Regulator Body Assembly with Bushing (continued)	
	Steel (continued)	
	CL150 RF	
	NPS 1/2 / DN 15	14B3428X012
	NPS 3/4 / DN 20	14B3428X022
	NPS 1 / DN 25	19A5459X012
	CL300 RF	
	NPS 1/2 / DN 15	14B3428X032
	NPS 3/4 / DN 20	14B3428X042
	NPS 1 / DN 25	14B0037X012
	PN 16/25/40 RF	
	NPS 1/2 / DN 15	14B3428X052
	NPS 3/4 / DN 20	14B3428X062
	NPS 1 / DN 25	14B3428X072
	Stainless Steel	
	1/2 NPT	36A1542X022
	3/4 NPT	36A1543X032
	1 NPT	36A1544X022
	CL150 RF	
	NPS 1/2 / DN 15	14B3428X082
	NPS 3/4 / DN 20	14B3428X092
	NPS 1 / DN 25	19A5459X022
	CL300 RF	
	NPS 1/2 / DN 15	14B3428X102
	NPS 3/4 / DN 20	14B3428X112
	NPS 1 / DN 25	14B0037X022
	PN 16/25/40 RF	
	NPS 1/2 / DN 15	14B3428X122
	NPS 3/4 / DN 20	14B3428X132
	NPS 1 / DN 25	14B3428X142
2	Diaphragm Flange	
	Gray Cast Iron	26A1533X012
	Steel	26A1534X012
	Stainless Steel	26A1534X022
3	Orifice	
	For 1/2 and 3/4 NPT body, 9/16 inch / 14 mm, 416 Stainless Steel	16A1529X012
	For 1 NPT body 3/4 NPT / 19 mm, 416 Stainless Steel	16A1529X012
	For 3/4 and 1 NPT body, 9/16 inch / 14 mm, Ethylenepropylene (EPDM), 410/416 Stainless Steel	1E399535132
4	Valve Plug, heat-treated, 416 Stainless Steel	1E398146172
5	Valve Plug Guide	
	Brass (for Gray Cast Iron body)	1E398214012
	416 Stainless Steel (for Steel/Stainless Steel body)	1E398235132
6	Stem Guide Bushing, heat-treated	
	416 Stainless Steel (included in key 1)	
	For Gray Cast Iron body	1E398535132
	For Steel/Stainless Steel body	16A1530X012
7	Valve Plug Spring, Stainless Steel	1E398837022
8*	Diaphragm, Stainless Steel (2 required)	1E399236012
9*	Diaphragm Gasket	
	(2 required for Gray Cast Iron body; 3 required for Steel/Stainless Steel body with Ethylenepropylene (EPDM) seat)	16A1526X012
	Steel/Stainless Steel body with metal seat, 3 required	1E3993X0012
	Steel/Stainless Steel body with metal seat (High temperature), 3 required	16A1526X022
10	Pitot Tube	
	For Gray Cast Iron body, Copper	
	NPT	16A1525X012
	For Steel body, Copper	
	NPT	1E399417012
	CL150 RF	16A1525X012
	CL300 RF and PN 16/25/40	1E399417012

*Recommended spare part

Key	Description	Part Number
10	Pitot Tube (continued)	
	For Stainless Steel body, 304 Stainless Steel	
	NPT	1E399438072
	CL150 RF	16A1525X022
	CL300 RF and PN 16/25/40	1E399438072
11	Stem Assembly, 416 Stainless Steel	16A1524X012
12	Cap Screw, Zinc-plated steel (8 required)	
	For Gray Cast Iron body	1A914524052
	For Steel/Stainless Steel body	1A782024052
14	Drive Screw, Stainless Steel (2 required)	1A368228982
15	Diaphragm Ring	
	For Steel body, Steel	16A1531X012
	For Stainless Steel body, Stainless Steel	16A1531X022

Type 6392 Pilot (See Figure 10)

Key	Description	Part Number
1	Pilot Body	
	Gray Cast Iron	26A1518X012
	Steel	26A1517X012
	Stainless Steel	26A1517X022
2	Spring Case	
	Gray Cast Iron	2E391219012
	Steel	2J127522012
	Stainless Steel	2J1275X0012
3	Orifice, heat-treated	
	416 Stainless Steel	16A1511X012
4	Valve Plug, heat-treated	
	416 Stainless Steel	16A1516X012
5	Valve Plug Guide	
	Brass (for Gray Cast Iron pilot)	1E391814012
	Heat-treated, 416 Stainless Steel	
	(For Steel pilot)	1E391835132
	For Gray Cast Iron and Steel pilot,	
	Heat-treated, 416 Stainless Steel	1E391835132
	For Stainless Steel pilot	1E391835072
6	Stem Assembly, 416 Stainless Steel	
	For Stainless Steel seat	16A1515X012
	For Ethylenepropylene (EPDM) seat	16A1515X022
7	Diaphragm, Stainless Steel (2 required)	1E392836012
8*	Diaphragm Gasket	
	Elastomer seat	1E393104022
	Stainless Steel seat, Graphite	1E3931X0012
9	Lower Spring Seat, Aluminum	1E392309012
10	Stem Guide Bushing, 416 Stainless Steel	1E392235132
11	Valve Plug Spring, Stainless Steel	1E392437022
12	Strainer Screen, Stainless Steel	16A1512X012
13	Control Spring,	
	Standard springs, 416 Stainless Steel	
	5 to 70 psig / 0.34 to 4.8 bar, Green	1E392627012
	20 to 150 psig / 1.4 to 10.3 bar, Red	1E392727142
	Spring for use over 500°F / 260°C,	
	17-7 PH Stainless Steel	
	15 to 100 psig / 1.0 to 6.9 bar	14B9941X012
	20 to 25 psig / 1.4 to 1.7 bar	14B9940X012
14	Upper Spring Seat, Zinc-plated steel	1B798525062
15	Jam Nut, Plate steel	1A352224122
16	Adjusting Screw, Plated steel	1E639928992
17	Cap Screw, Zinc-plated steel (6 required)	
	For Gray Cast Iron body	1A407824052
	For Steel/Stainless Steel body	1A391724052
26	Valve Plug Cap, heat-treated	
	416 Stainless Steel	16A1549X012

*Recommended spare part

Type 6392 Pilot Mounting Parts

Key	Description	Part Number
22	Loading Tubing	
	Copper	16A1527X012
	Stainless Steel	16A1527X022
23	Pipe Nipple, Steel	1N584226232
24	Connector	
	Brass	15A6002X212
	Stainless Steel	15A6002X642
25	Elbow	
	Brass	15A6002X172
	Stainless Steel	15A6002X632

Types 6492HM and 6492HTM Safety Override Pilots (See Figure 12)

Key	Description	Part Number
1	Pilot Valve Body	
	WCC Steel	22A0403X052
	CF8M Stainless Steel	22A0403X072
2	Valve Guide, Stainless Steel	
	Steel body, 416 Stainless Steel	1E391835132
	Stainless Steel body, 316 Stainless Steel	1E391835072
3	Valve Spring, 302 Stainless Steel	1E392437022
4	Inner Valve	
	Steel body, 416 Stainless Steel	1F967446172
	Stainless Steel body, 316 Stainless Steel	1F9674X0012
5	Orifice	
	Steel body, 416 Stainless Steel	1H564446172
	Stainless steel body, 316 Stainless Steel	1H5644X0012
7	Valve Stem	
	Steel body, 410/416 Stainless Steel	1F967835132
	Stainless Steel body, 316 Stainless Steel	1F9678X0012
8	Bellows Retainer	
	Steel body, Brass	1F971214012
	Stainless Steel body, 316 Stainless Steel	1F9712X0012
9	Bellows	
	Steel body, Brass	1F971318992
	Stainless Steel body, 321 Stainless Steel	1F9713X0012
10	Diaphragm, 302 Stainless Steel (2 required)	1E395836012
11	Lower Spring seat	
	Type 6492HM, Aluminum	1E395408012
	Type 6492HTM	
	Steel	1E3954X0052
	Stainless Steel	14B9948X012
12	Spring	
	Type 6492HM, Steel	
	10 to 30 psig / 0.69 to 2.2 bar	1E395627022
	25 to 75 psig / 1.7 to 5.2 bar	1D7455T0012
	70 to 150 psig / 4.8 to 10.3 bar	1E395727192
	Type 6492HTM, Stainless Steel	
	15 to 100 psig / 1.0 to 6.9 bar	14B9943X012
	80 to 250 psig / 5.5 to 17.2 bar	14B9942X012
13	Upper Spring seat, Steel	
	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	Adjusting Screw, Steel	
	Standard	1D995448702
	Handwheel	1J496428982
16	Hex Nut, Zinc-plated steel	1A353724122

Types 6492HM and 6492HTM Safety Override Pilots (See Figure 12) (continued)

Key	Description	Part Number
17	Cap Screw (8 required)	
	Type 6492HM	
	Steel	1A381624052
	Stainless Steel	1A3816X0152
	Type 6492HTM	
	Steel	1A3816X0132
	Stainless Steel	1A3816X0152
18	Diaphragm Gasket	
	Type 6492HM, Composition	1E396104022
	Type 6492HTM, Graphite	1E3961X0012
34	Machine Screw for use with handwheel, Steel	16A5763X012
38	Handwheel, Zinc	1J496144012
39	Lock Washer for use with handwheel, Steel	1A352332992
74	Pipe Plug	
	Steel	0Z020128992
	Stainless Steel	0Z020135072
77	Screen, 304 Stainless Steel	16A1512X012
78	Reducing Bushing	
	Steel	1C379026232
	Stainless Steel	1C3790X0012
87	Sealed Adjusting Screw Sealing Washer	1V205699012
94	Pipe Plug, Stainless Steel	1E823135042
95	Warning Label	19B0429X0A2

Type 6492HM Pilot Mounting Parts

Key	Description	Part Number
81	Tubing	0500103809W
82	Pipe Nipple (2 required)	
	Steel	1C559926232
	Stainless Steel	1C5599X0012
83	Connector	
	Steel	15A6002XY72
	Stainless Steel	15A6002X642
84	Elbow	
	Steel	15A6002XY52
	Stainless Steel	15A6002X632

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