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Fisher Controls

Instruction Manual

Type 1098-EGR & 1098H-EGR Pilot-Operated Regulators

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Contents

TYPE 1098-EGR-6352 REGULATOR

TYPE 1098H-EGR-6354L REGULATOR

Figure 1. Typical Regulator Constructions

D100339 X012

Introduction

Scope of Manual

This manual describes and provides instructions and parts list for a Type 1098-EGR or 1098H-EGR regulator (figure 1) complete with standard P590 Series filter and either a 6350 Series regulator or a Type 61LD pilot. The Type 1806 relief valve also is covered when a Type 61LD pilot is used. However, instructions and parts lists for monitoring pilots and other equipment used with this regulator are found in separate manuals.

Product Description

Type 1098-EGR and 1098H-EGR regulators provide economical, accurate pressure control in a wide variety of applications such as gas distribution systems, heat-treating furnaces, and boiler plants. They are also used in plant air service and in liquid service where a slow stroking time (approximately 30 to 90 seconds) is desired on both opening and closing the main valve. The Type 1098-EGR regulator is used with a Type 6351, 6352, 6353 or the 61 series pilot. The Type 1098H-EGR regulator is used with a Type 6351, 6352, 6353, 6354H, 6354L, or 6354M pilot.

Specifications

Table 1 lists specifications for various Type 1098-EGR and 1098H-EGR constructions. Specifications for a given regulator as it originally comes from the factory are stamped on nameplates (figure 2) located on the actuator and main valve body, while the pilot control spring range appears on the pilot spring case and the pilot restriction code is stamped on the pilot body.

Table 1. Specifications

BODY SIZES AND END CONNECTION STYLES

Body Size, Inch	Material	End Connection Style	Rating(1)
1, 2	Cast iron	NPT screwed	Class 250B
	WCB steel	NPT screwed, butt-welding, or socketwelding	Class 600
2, 3, 4, 6, 8 x 6	Cast iron	Flat-face flanged	Class 125B
		Raised-face flanged	Class 250B
	WCB steel	Raised-face flanged	Class 150, 300, or 600
		Buttwelding	Class 600

MAXIMUM MAIN VALVE INLET PRESSURE(1): 400 psig (28 bar) or body rating limit, whichever is lower, except 20 psig (1.4 bar) for boiler fuel installations as shown in table 2

MAXIMUM PILOT SUPPLY PRESSURE(1, 2): 600 psig (41 bar)

PILOT RESTRICTION(3)

TYPE NUMBER	GAIN	RESTRICTION		
		Used	Color Code	Letter Code
6351	Standard	No	None	None
6352 through 6354M	Standard	Yes	Green	S
	Low for liquid service and/or broader proportional bands	No	None	L
	High for narrower proportional bands	Yes	Red	H

OUTLET (CONTROL) PRESSURE RANGES(4)

Type 6351 Pilot: **J** 3 to 20 psig (0.21 to 1.4 bar) with green spring **J** 5 to 35 psig (0.34 to 2.4 bar) with cadmium spring or **J** 35 to 100 psig (2.4 to 6.9 bar) with red spring

Type 6352 Pilot: **J** 2 inch wc to 2 psig (5 to 140 mbar) with yellow spring or **J** 2 to 10 psig (140 to 690 mbar) with black spring

Type 6353 Pilot: **J** 3 to 40 psig (0.21 to 2.8 bar) with yellow spring or **J** 35 to 125 psig (2.4 to 8.6 bar) with red spring

Type 6354L Pilot: 85 to 200 psig (5.9 to 14 bar) with blue spring and no diaphragm limiter

Type 6354M Pilot: 175 to 220 psig (12 to 15 bar) with blue spring and diaphragm limiter

Type 6354H Pilot: 200 to 300 psig (14 to 21 bar) with green spring and diaphragm limiter

Type 61LD Pilot: **J** 0.25 to 2 psig (0.017-0.138 bar) with red spring **J** 1 to 5 psig (0.069-0.34 bar) with yellow spring **J** 2 to 10 psig (0.138-0.69 bar) with blue spring **J** 5 to 15 psig (0.34-1.02 bar) with brown spring **J** 10 to 20 psig (0.69-1.4 bar) with green spring

MAXIMUM AND MINIMUM DIFFERENTIAL PRESSURES: See table 2

Table 1. Specifications (Continued)

ACTUATOR SIZES AND MAXIMUM ACTUATOR PRESSURES(1)

ACTUATOR SIZE		OUTLET (CONTROL) PRESSURE		EMERGENCY CASING PRESSURE	
		Psig	Bar	Psig	Bar
Type 1098	30	100	6.9	115	7.9
	40	75	5.2	82	5.7
	70	50	3.4	65	4.5
Type 1098H	30	300	21	400	28

MAIN VALVE FLOW CHARACTERISTIC **J** Linear (standard) or **J** quick-opening

MAIN VALVE FLOW DIRECTION In through seat ring and out through cage

MATERIAL TEMPERATURE CAPABILITIES(1) **Standard Elastomers: -**20 to 150_F (-29 to 66_C)
High-Temperature Elastomers: 0 to 300_F (-18 to 149_C), except 0 to 180_F (-18 to 82_C) for water service

PORT DIAMETERS AND TRAVELS

BODY SIZE INCH	PORT DIAMETER		TRAVEL				
			Standard		Restricted Capacity		
	Inch	mm	Inch	mm	Percentage of Flow Capacity	Inch	mm
1	1-5/16	33.3	3/4	19	- - -	- - -	
2	2-3/8	60.3	1-1/8	29	30	3/8	10
					70	5/8	16
3	3-3/8	85.7	1-1/2	38	40	7/8	22
4	4-3/8	111.1	2	51	40	1	25
6 & 8 X 6	7-3/16	182.6					

APPROXIMATE WEIGHTS (WITH STANDARD SINGLE-PILOT CONSTRUCTION)

ACTUATOR SIZE		BODY SIZE, INCH				
		1	2	3	4	6
					Lb	
Type 1098	30	55	75	115	165	350
	40	65	85	125	175	360
	70	140	160	200	250	435
Type 1098H	30	80	100	140	190	375
					Kg	
Type 1098	30	25	34	52	75	159
	40	29	39	57	79	163
	70	64	73	91	113	197
Type 1098H	30	36	45	64	86	170

1. The pressure/temperature limits in this manual, and any applicable standard limitation should not be exceeded.
2. For stability or overpressure protection, a reducing regulator may be installed upstream of the pilot according to the installation section.
3. Restriction part numbers are given in the parts list.
4. Pilot control spring part numbers are given in the parts list.

Installation and Startup

WARNING

Personal injury, equipment damage, or leakage due to escaping accumulated gas or bursting of pressure-containing parts may result if this regulator is overpressured or is installed where service conditions could exceed the limits given in tables 1 and 2 and on the appropriate nameplate, or where conditions exceed any ratings of the adjacent piping or piping connections. To avoid such injury or damage, provide pressure-relieving or pressure-limiting devices (as required by Title 49, Part 192, of the U.S. Code of Federal Regulations, by the National Fuel Gas Code Title 54 of the National Fire Codes of the National Fire Protection Association, or by other applicable codes) to prevent service conditions from exceeding those limits.

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

Standard Single-Pilot Regulator

Installations

A Type 1098-EGR or 1098H-EGR regulator bleeds no gas to atmosphere, making it suitable for installation in pits and other enclosed locations without elaborate venting systems. This regulator also can be installed in pits subject to flooding, by installing a special antiflood breather vent or by venting the pilot spring case above the expected flood level so that the pilot diaphragm can be referenced to atmospheric pressure.

Note

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

1. Use qualified personnel when installing, operating, and maintaining regulators. Before installing, inspect the main valve, pilot, and tubing for any shipment damage or foreign material that may have collected during crating and shipment. Make certain the body interior is clean and the pipelines are free of foreign material. Apply pipe compound

Table 2. Maximum and Minimum Differential Pressures for Main Valve Spring Selection

CONSTRUCTION			Low-differential boiler fuel installation Type 1098-EGR requiring quick-opening cage and limited to 20 psig (1.4 bar) max inlet pressure	All Other Constructions		
MAXIMUM ALLOWABLE DIFFERENTIAL PRESSURE			**20 psig (1.4 bar)**	**60 psi (4.1 bar)**	**125 psi (8.6 bar)**	**400 psig (28 bar) or body rating limit, whichever is lower**
MINIMUM DIFFERENTIAL PRESSURE REQUIRED FOR FULL STROKE	**1 Inch Body**	**Size 40 Actuator**	**Not available**	**2.5 psi (0.17 bar)**	**4 psi (0.28 bar)**	**5 psi (0.34 bar)**
		Size 30 Actuator	**Not available**	**3.5 psi (0.24 bar)**	**5 psi (0.34 bar)**	**7 psi (0.48 bar)**
		Size 70 Actuator	**1.0 psi (0.069 bar)**	**1 psi (0.069 bar)**	**1.5 psi (0.10 bar)**	**2.5 psi (0.17 bar)**
	2 Inch Body	**Size 40 Actuator**	**Not available**	**3 psi (0.21 bar)**	**5 psi (0.34 bar)**	**10 psi (0.69 bar)**
		Size 30 Actuator	**Not available**	**4 psi (0.28 bar)**	**6 psi (0.42 bar)**	**11 psi (0.76 bar)**
		Size 70 Actuator	**1.0 psi (0.069 bar)**	**1.5 psi (0.10 bar)**	**2 psi (0.14 bar)**	**3 psi (0.21 bar)**
	3 Inch Body	**Size 40 Actuator**	**Not available**	**4 psi (0.28 bar)**	**6 psi (0.41 bar)**	**11 psi (0.76 bar)**
		Size 30 Actuator	**Not available**	**5 psi (0.34 bar)**	**8 psi (0.55 bar)**	**14 psi (0.97 bar)**
		Size 70 Actuator	**1.0 psi (0.069 bar)**	**2 psi (0.14 bar)**	**2.5 psi (0.17 bar)**	**4 psi (0.28 bar)**
	4 Inch Body	**Size 40 Actuator**	**Not available**	**5 psi (0.34 bar)**	**8 psi (0.55 bar)**	**13 psi (0.90 bar)**
		Size 30 Actuator	**Not available**	**10 psi (0.69 bar)**	**13 psi (0.90 bar)**	**22 psi (1.5 bar)**
		Size 70 Actuator	**1.3 psi (0.090 bar)**	**2.5 psi (0.17 bar)**	**3 psi (0.21 bar)**	**5 psi (0.34 bar)**
	6, 8 x 6 Inch Body	**Size 40 Actuator**	**Not available**	**9.5 psi (0.66 bar)**	**14 psi (0.97 bar)**	**19 psi (1.3 bar)**
		Size 30 Actuator	**Not available**	**13 psi (0.90 bar)**	**19 psi (1.3 bar)**	**28 psi (1.9 bar)(1)**
		Size 70 Actuator	**2.2 psi (0.15 bar)**	**4 psi (0.28 bar)**	**6 psi (0.42 bar)**	**8 psi (0.55 bar)**
MAIN VALVE SPRING COLOR CODE (2)			**Yellow, except green for 1 inch body**	**Green**	**Blue**	**Red**

1. Requires special 6350 Series pilot construction with Type 1806H relief valve.
2. Spring part numbers are given in the parts list.

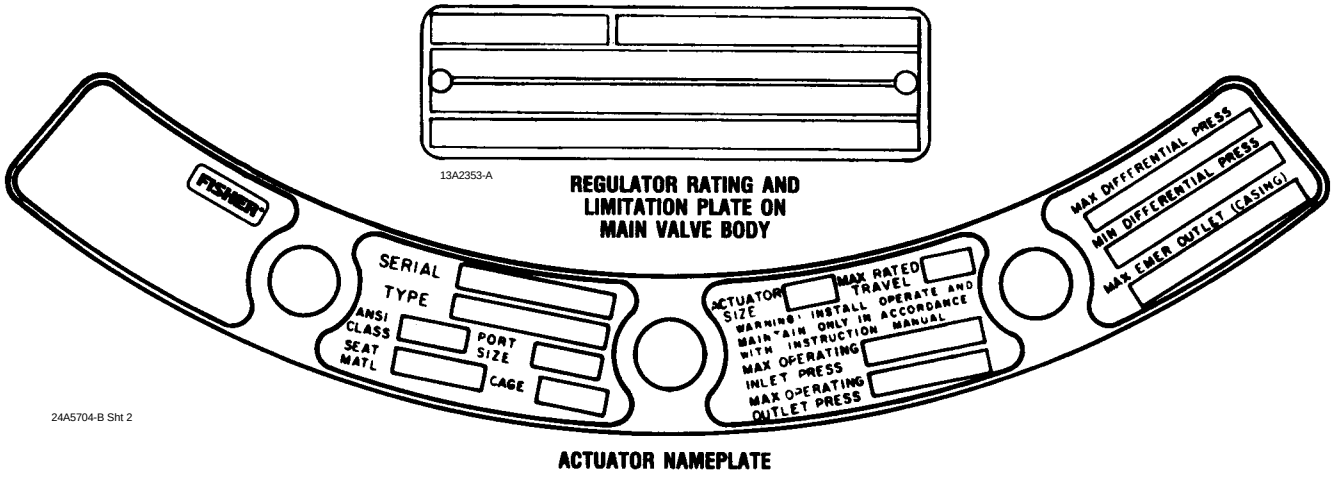


Figure 2. Regulator Nameplates

only to the male pipe threads with a screwed body, or use suitable line gaskets and good bolting practices with a flanged body.

With a weld end body, be sure to remove the trim package, including the gasket (key 4, figure 11), according to the Maintenance section before welding the body into the line. Do not install the trim package until any post-weld heat treatment is completed. If heat treating, prevent scale buildup on all machined guiding and sealing surfaces inside the body and at the bonnet flange/body joint.

Note

All Type 1098-EGR and 1098H-EGR regulators should be installed so that flow through the main valve matches the flow arrow attached to the valve body.

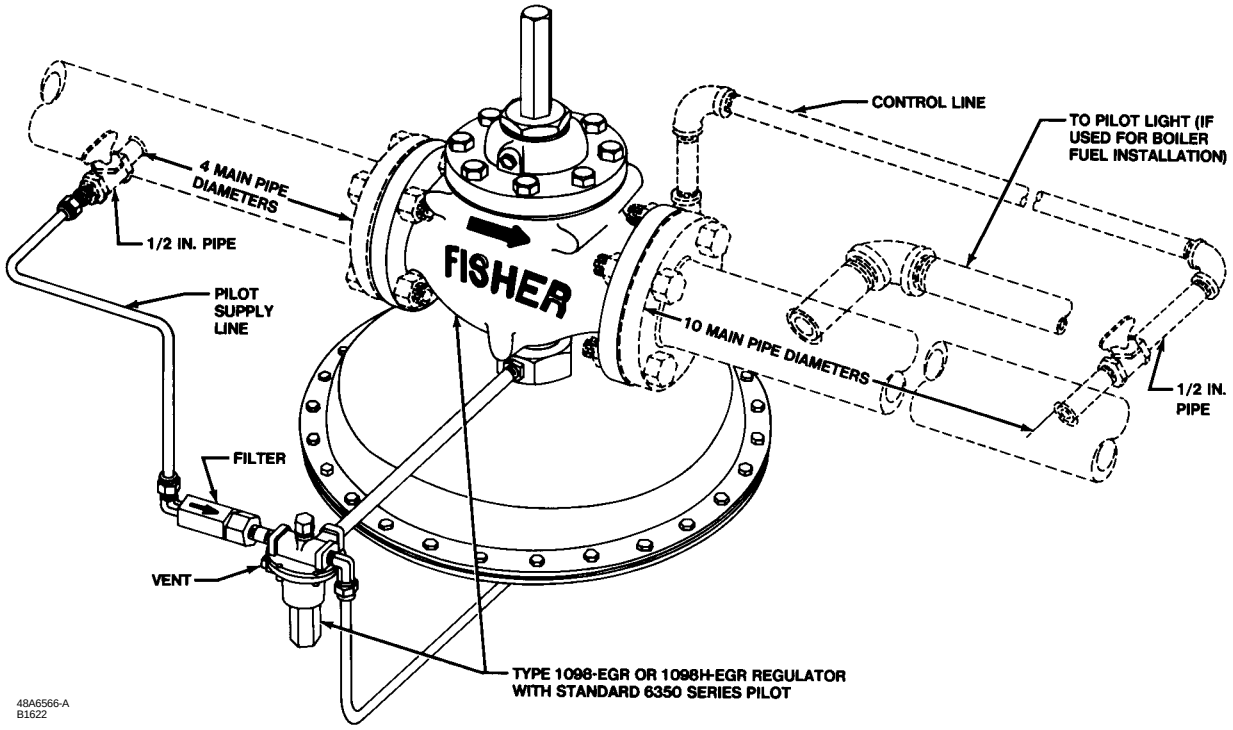


Figure 3. Standard Single-Pilot Installation

2. Install a three-valve bypass around the regulator if continuous operation is necessary during maintenance or inspection.

The standard pilot mounting position is shown in figure 1, the pilot may be field-changed to the opposite-side mounting position by swapping the pilot pipe nipple to the opposite bonnet tapping.

WARNING

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

3. To keep the pilot spring case vent from being plugged or the spring case from collecting moisture, corrosive chemicals, or other foreign material, point the vent down or otherwise protect it. Vent orientation may be changed by removing the spring case and remounting it on the pilot body or on a standard Type 6352 through 6354M pilot, by twisting the vent (key 35, figure 13, or key 13, figure 14) in the spring case. To remotely vent a standard Type 6352 through 6354M pilot, remove the vent and install obstruction-free tubing or piping into the 1/4-inch NPT vent tapping. The Type 61LD pilot is vented by installing the vent piping in place of the pipe plug (key 22, figure 18). Then remove the closing cap assembly (key 5, figure 18) in order to remove the machine screw from inside the closing cap and tightly install it in the vent hole in the center of the closing cap. Provide protection on a remote vent by installing a screened vent cap into the remote end of the vent pipe.

4. Run a 3/8-inch outer diameter or larger pilot supply line from the upstream pipeline to the filter inlet as shown in figure 3, bushing the line down to fit the 1/4-inch NPT filter connection. Do not make the upstream pipeline connection in a turbulent area, such as near a nipple, swage, or elbow. If the maximum pilot inlet pressure could exceed the pilot rating, install a separate reducing regulator in the pilot supply line. Install a hand valve in the pilot supply line, and provide vent valves to properly isolate and relieve the pressure from the regulator.

5. Attach a 1/2-inch NPT downstream pressure control line downstream of the regulator in a straight run of pipe as shown in figure 3. Connect the other end of the control line to the bonnet connection. Do not make the tap near any elbow, swage, or nipple that might cause turbulence. Install a hand valve in the control line to shut off the control pressure when the bypass is in use.

6. If a quick acting solenoid is to be installed downstream of a regulator, the regulator and solenoid should be located as far apart as practical. This will maximize the gas piping volume between the regulator and solenoid and improve the regulator response to quick changing flow rates.

7. Consult the appropriate instruction manual for installation of an optional pneumatic or electric remote control drive unit. For optional remote pneumatic loading of a 6350 Series or 61LD pilot, make the loading piping connections to the 1/4-inch NPT vent connection.

Prestartup Considerations

Before beginning the startup procedures in this section, make sure the following conditions are in effect:

- **D** Block valves isolate the regulator.
- **D** Vent valves are closed.
- **D** Hand valves are closed.

CAUTION

Introduce pilot supply pressure into the regulator before introducing any downstream pressure, or internal damage may occur due to reverse pressurization of the pilot and main valve components.

Always use pressure gauges to monitor downstream pressure during startup. Procedures used in putting this regulator into operation must be planned accordingly if the downstream system is pressurized by another regulator or by a manual bypass.

Note

For proper operation, pilot supply pressure must exceed control pressure by the minimum amount specified on the actuator nameplate as minimum differential pressure.

The only adjustment necessary on a Type 1098-EGR or 1098H-EGR regulator is the pressure setting of the pilot control spring. Turning the adjusting screw clockwise into the spring case increases the spring compression and pressure setting. Turning the adjusting screw counterclockwise decreases the spring compression and pressure setting.

Pilot Adjustment

To adjust standard 6350 Series pilots: loosen the locknut (key 11, figure 13, or key 10, figure 14), and turn the adjusting screw (key 10, figure 13, or key 9, figure 14). Then tighten the locknut to maintain the adjustment position. On a standard Type 6352 through 6354M pilot, a closing cap (key 28, figure 14) must be removed before adjustment and replaced afterward.

WARNING

To avoid possible personal injury from a pressure-loaded Type 61LD pilot, carefully vent the spring case before removing the closing cap. Otherwise, trapped loading pressure could forcefully eject the freed closing cap.

To adjust the Type 61LD pilot: remove the closing cap (key 5, figure 18) and turn the adjusting screw (key 6, figure 18). Any adjustments made should set the controlled pressure within the appropriate spring range shown in the Specifications table.

Startup

1. Slowly open the hand valve in the pilot supply line.
2. Slowly open the upstream block valve, and partially open the downstream block valve for minimum flow.
3. Slowly open the hand valve in the control line.
4. Adjust the pilot setting if necessary.
5. Completely open the downstream block valve.
6. Slowly close the bypass valve, if any.

Dual-Pilot Boiler Fuel Control Regulator

Installation

1. Perform the Standard Single-Pilot Regulator Installation section through step 3, making sure that the regulator is installed in a horizontal pipeline with the actuator below the main valve as shown in figure 4.

2. Run a 1/2-inch outer diameter or larger pilot supply line from the upstream pipeline to the 1/2-inch NPT supply connection in the pipe tee as shown in figure 4. Do not make the connection in a turbulent area, such as near a nipple, swage, or elbow. If the maximum pilot inlet pressure could exceed the pilot rating, install a separate reducing regulator in the pilot line. Install a hand valve in the pilot supply line, and provide vent valves so that pressure can be properly isolated and relieved from the regulator.

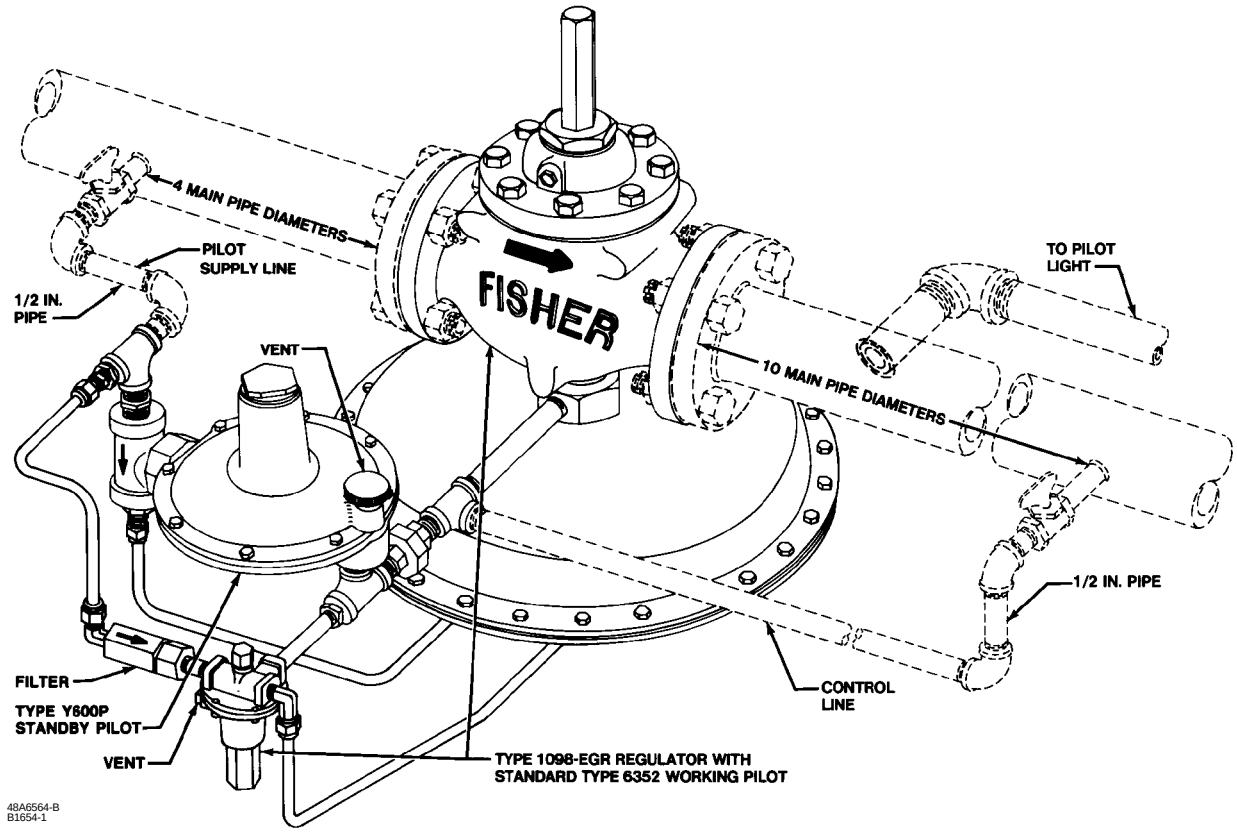


Figure 4. Typical Dual-Pilot Boiler Fuel Installation

3. Attach a 1/2-inch NPT downstream pressure control line ten pipe diameters downstream of the regulator in a straight run of pipe. Connect the other end of the control line to the 1/4-inch NPT connection in the control line pipe tee as shown in figure 4. Do not make the tap near any elbow, swage, or nipple which might cause turbulence. Install a hand valve in the control line to shut off the control pressure when the bypass is in use. Also use the hand valve to dampen out pulsations which may cause instability or cycling of the regulator.

4. Consult the appropriate instruction manual for installation of an optional pneumatic or electric remote control drive unit. For optional remote pneumatic loading of a 6350 Series or Type 61LD pilot, make the loading piping connections to the 1/4-inch NPT vent connection.

Prestart Considerations

Before beginning the startup procedures in this section, make sure the following conditions are in effect:

- **D** Block valves isolate the regulator.
- **D** Vent valves are closed.
- **D** Hand valves are closed.

CAUTION

Introduce pilot supply pressure into the regulator before introducing any downstream pressure, or internal damage may occur due to reverse pressurization of the pilot and main valve components.

Always use pressure gauges to monitor downstream pressure during startup. Procedures used in putting this regulator into operation must be planned accordingly if the downstream system is pressurized by another regulator or by a manual bypass.

Note

For proper operation, pilot supply pressure must exceed control pressure by the minimum amount specified on the actuator nameplate as minimum differential pressure.

The only adjustment necessary on a Type 1098-EGR or 1098H-EGR regulator is the pressure setting of the pilot control spring. Turning the adjusting screw clockwise into

the spring case increases the spring compression and pressure setting. Turning the adjusting screw counterclockwise decreases the spring compression and pressure setting.

Pilot Adjustment

To adjust standard 6350 Series pilots: loosen the locknut (key 11, figure 13, or key 10, figure 14), and turn the adjusting screw (key 10, figure 13, or key 9, figure 14). Then tighten the locknut to maintain the adjustment position. On a standard Type 6352 through 6354M pilot, a closing cap (key 28, figure 14) must be removed before adjustment and replaced afterward.

WARNING

To avoid possible personal injury from a pressure-loaded Type 61LD pilot, carefully vent the spring case before removing the closing cap. Otherwise, trapped loading pressure could forcefully eject the freed closing cap.

To adjust the Type 61LD pilot: remove the closing cap (key 5, figure 18) and turn the adjusting screw (key 6, figure 18). Any adjustments made should set the controlled pressure within the appropriate spring range shown in the Specifications table.

Startup

1. Slowly open the hand valve in the pilot supply line.

2. Slowly open the upstream block valve, and partially open the downstream block valve for minimum flow.

3. Slowly open the hand valve in the control line and make sure that the standby pilot is set far enough below the working pilot so that the standby pilot remains closed during normal operation. For example, with final desired settings of 11 inches wc (27 mbar) for the working pilot and 10 inches wc (25 mbar) for the standby pilot, begin by reducing the working pilot setting far enough below 10 inches wc (25 mbar) for the working pilot to shut off. Then set the standby pilot for an outlet pressure of 10 inches wc (25 mbar). Finally, set the working pilot for an outlet pressure of 11 inches wc (27 mbar).

Table 3 shows how close the standby pilot can be set to the working pilot setting.

4. Completely open the downstream block valve.

5. Slowly close the bypass valve, if any.

Working Monitor

Installation

1. For both the working monitor regulator and the working regulator, perform the Standard Single-Pilot Regulator Installation section through step 6.

2. Connect another downstream pressure control line and hand valve (figure 5) to the monitoring pilot according to the monitoring pilot instruction manual. Attach a 1/2-inch NPT intermediate pressure control line and hand valve from the intermediate pressure pipeline to the working monitor regulator. Pipe supply pressure between the monitoring pilot and the working monitor regulator according to the monitoring pilot manual.

For two typical monitoring pilots, table 4 gives the spread between normal distribution pressure and the minimum pressure at which the working monitor regulator can be set to take over if the working regulator fails open.

Prestartup Considerations

Before beginning the startup procedures in this section, make sure the following conditions are in effect:

- **D** Block valves isolate the regulator.
- **D** Vent valves are closed.
- **D** Hand valves are closed.

CAUTION

Introduce pilot supply pressure into the regulator before introducing any downstream pressure, or internal damage may occur due to reverse pressurization of the pilot and main valve components.

Always use pressure gauges to monitor downstream pressure during startup. Procedures used in putting this regulator into operation must be planned accordingly if the downstream system is pressurized by another regulator or by a manual bypass.

Note

For proper operation, pilot supply pressure must exceed control pressure by the minimum amount specified on the actuator nameplate as minimum differential pressure.

Table 3. Standby Pilots for Boiler Fuel Control Applications

STANDBY PILOT INFORMATION			MINIMUM PRESSURE AT WHICH STANDBY PILOT CAN BE SET
Construction	**Spring Range**	**Spring Part Number**	
Type Y600P with 3/8 inch (9.5 mm) port diameter and 150 psig (10 bar) maximum allowable pilot inlet	3 to 8 inch wc (8 to 20 mbar)(1) 5 to 15 inch wc (12 to 38 mbar)(1) 11 to 28 inch wc (27 to 68 mbar)(1)	1B6358 27052(1) 1B6539 27022(1) 1B5370 27052(1)	1 inch wc (2.5 mbar) under working pilot set point
	1 to 2-1/2 psig (0.069 to 0.17 bar)(2) 2-1/4 to 4-1/2 psig (0.16 to 0.31 bar)(2) 4-1/2 to 7 psig (0.31 to 0.48 bar)(2)	1B5371 27022(2) 1B5372 27022(2) 1B5373 27052(2)	0.2 psig (14 mbar) under working pilot set point
Type 621-107 with 3/8 inch (9.5 mm) port diameter and 150 psig (10 bar) maximum allowable pilot inlet for cast iron body or 750 psig (52 bar) maximum allowable pilot inlet for malleable iron or steel body	5 to 10 psig (0.34 to 0.69 bar)	1D8923 27022	0.3 psig (21 mbar) under working pilot set point

1. With standard diaphragm plate.
2. With heavy diaphragm plate.

Table 4. Working Monitor Performance

MONITORING PILOT INFORMATION			MINIMUM PRESSURE AT WHICH WORKING MONITOR REGULATOR CAN BE SET
Construction	**Spring Range**	**Spring Part Number**	
Type Y600M with 1/8 inch (3.2 mm) port diameter and 150 psig (10 bar) maximum allowable pilot inlet	5 to 15 inch wc (12 to 38 mbar) 11 to 28 inch wc (27 to 68 mbar)	1B6539 27022 1B5370 27052	3 inch wc (7 mbar) over normal distribution pressure
	1 to 2-1/2 psig (0.069 to 0.17 bar) 2-1/4 to 4-1/2 psig (0.16 to 0.31 bar) 4-1/2 to 7 psig (0.31 to 0.48 bar)	1B5371 27022 1B5372 27022 1B5373 27052	0.5 psig (0.034 bar) over normal distribution pressure
Type 621-109 with 1/8 inch (3.2 mm) port diameter and 150 psig (10 bar) maximum allowable pilot inlet for cast iron body or 750 psig (52 bar) maximum allowable pilot inlet for malleable iron or steel body	5 to 15 psig (0.34 to 1.0 bar) 10 to 25 psig (1.0 to 1.7 bar) 20 to 35 psig (1.4 to 2.4 bar) 25 to 60 psig (1.7 to 4.1 bar)	1D8923 27022 1D7515 27022 1D6659 27022 1D7555 27142	30 psig (0.21 bar) over normal distribution pressure
	40 to 80 psig (2.8 to 5.5 bar) 80 to 150 psig (5.5 to 10 bar) 130 to 200 psig (9.0 to 14 bar)	1E5436 27142 1P9013 27142(1) 1P9013 27142(2)	5.0 psig (0.34 bar) over normal distribution pressure

1. With large diaphragm plate.
2. With small diaphragm plate.

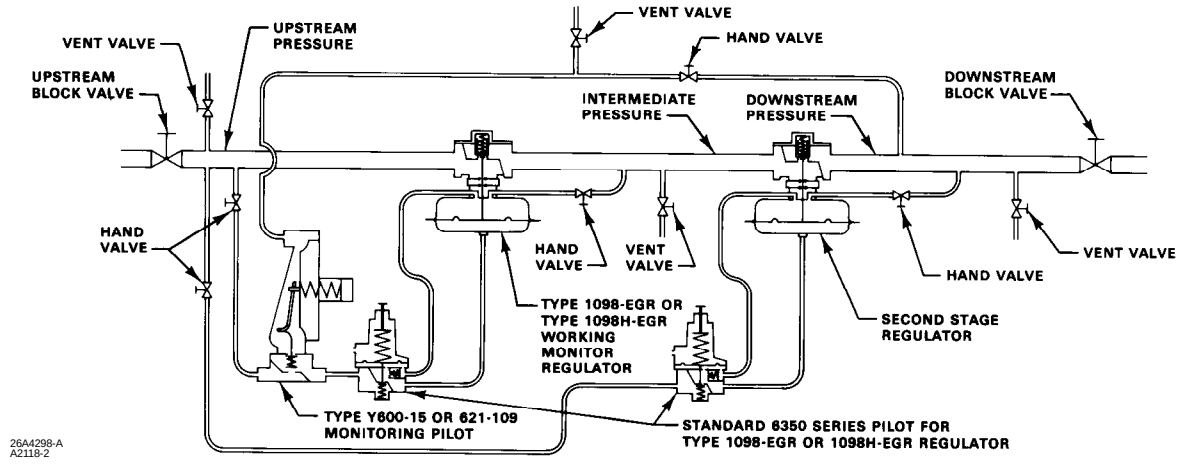


Figure 5. Typical Working Monitor Installation

The only adjustment necessary on a Type 1098-EGR or 1098H-EGR regulator is the pressure setting of the pilot control spring. Turning the adjusting screw clockwise into the spring case increases the spring compression and pressure setting. Turning the adjusting screw counterclockwise decreases the spring compression and pressure setting.

Pilot Adjustment

To adjust all standard 6350 Series pilots: loosen the locknut (key 11, figure 13, or key 10, figure 14), and turn the adjusting screw (key 10, figure 13, or key 9, figure 14). Then tighten the locknut to maintain the adjustment position. On a standard Type 6352 through 6354M pilot, a closing cap (key 28, figure 14) must be removed before adjustment and replaced afterward.

WARNING

To avoid possible personal injury from a pressure-loaded Type 61LD pilot, carefully vent the spring case before removing the closing cap. Otherwise, trapped loading pressure could forcefully eject the freed closing cap.

To adjust the Type 61LD pilot: remove the closing cap (key 5, figure 18) and turn the adjusting screw (key 6, figure 18). Any adjustments made should set the controlled pressure within the appropriate spring range shown in the Specifications table.

Startup

On a working monitor installation (figure 5), be sure that the second-stage working regulator is set to operate at a pressure lower than the Type 1098-EGR or 1098H-EGR working monitor regulator. To do this, increase the setting of the monitoring pilot until the working pilot is in control of the intermediate pressure and the second-stage working regulator is in control of the downstream pressure. If this is not done, the monitoring pilot tries to take control of the downstream pressure.

1. Slowly open the upstream block valve and the hand valves in both pilot supply lines. This energizes both pilots so that their setpoints can be adjusted. Partially open the downstream block valve for minimum flow.

2. To enable intermediate pressure adjustment with the working monitor regulator, slowly open the hand valve in the intermediate pressure control line.

3. To enable downstream pressure adjustment with the second-stage working regulator, slowly open the hand valve in the control line to this regulator.

4. Adjust the setting of the monitoring pilot to establish the desired emergency downstream pressure, which is to be maintained in the event of open failure of the second-stage working regulator. The emergency downstream pressure should exceed the desired downstream pressure by at least the amount listed in table 4. The steps followed to set the monitoring pilot may vary with each piping situation; however, the basic method remains the same. The following substeps a and b may be used as examples for setting the monitoring pilot:

a. Increase the outlet pressure setting of the second-stage working regulator until the monitoring pilot takes control of the downstream pressure. Adjust the monitoring pilot setting until the desired emergency downstream pressure is achieved. Then readjust the second-stage working regulator to establish the desired downstream pressure.

b. Install special piping (not shown in figure 5) so that the monitoring pilot senses the intermediate pressure. The intermediate pressure then appears to the monitoring pilot as if it were increased downstream pressure, and the monitoring pilot controls and reduces the intermediate pressure. Adjust the monitoring pilot setting until the desired emergency downstream pressure is achieved at the intermediate pressure stage. Then slowly close the special piping, and open up the monitoring downstream control line for normal service.

5. Slowly open the downstream block valve.

6. Slowly close the bypass valve, if any.

Wide-Open Monitor

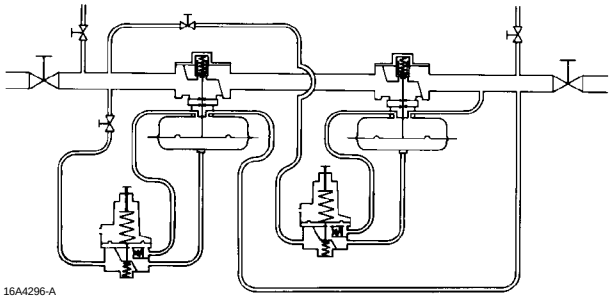
Installation

1. For both the wide-open monitoring regulator and the working regulator, perform the Standard Single-Pilot Regulator Installation section through step 6.

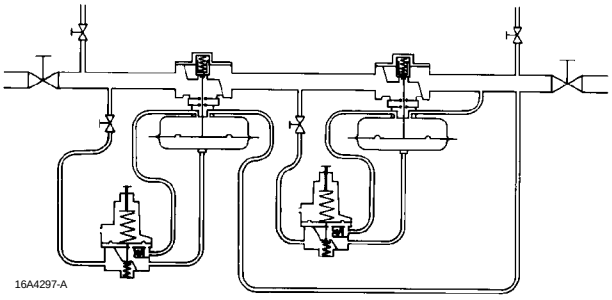
2. Connect the control line of a wide-open monitoring regulator (figure 6) to downstream piping near the working regulator control line connection. During normal operation the wide-open monitoring regulator stands wide open with the pressure reduction being taken across the working regulator. Only in case of working regulator failure does the wide-open monitoring regulator take control at its slightly higher setting.

Prestartup Considerations

Before beginning the startup procedures in this section, make sure the following conditions are in effect:



FLEXIBLE WIDE-OPEN MONITOR ARRANGEMENT THAT PERMITS WIDE-OPEN MONITOR TO BE EITHER UPSTREAM OR DOWNSTREAM



MINIMUM PIPING WIDE-OPEN MONITOR ARRANGEMENT THAT REQUIRES WIDE-OPEN MONITOR ALWAYS TO BE UPSTREAM

Figure 6. Typical Wide-Open Monitor Installations

D Block valves isolate the regulator.

D Vent valves are closed.

D Hand valves are closed.

CAUTION

Introduce pilot supply pressure into the regulator before introducing any downstream pressure, or internal damage may occur due to reverse pressurization of the pilot and main valve components.

Always use pressure gauges to monitor downstream pressure during startup. Procedures used in putting this regulator into operation must be planned accordingly if the downstream system is pressurized by another regulator or by a manual bypass.

Note

For proper operation, pilot supply pressure must exceed control pressure by the minimum amount specified on the actuator nameplate as minimum differential pressure.

The only adjustment necessary on a Type 1098-EGR or 1098H-EGR regulator is the pressure setting of the pilot control spring. Turning the adjusting screw clockwise into the spring case increases the spring compression and pressure setting. Turning the adjusting screw counterclockwise decreases the spring compression and pressure setting.

Pilot Adjustment

To adjust all standard 6350 Series pilots: loosen the locknut (key 11, figure 13, or key 10, figure 14), and turn the adjusting screw (key 10, figure 13, or key 9, figure 14). Then tighten the locknut to maintain the adjustment position. On a standard Type 6352 through 6354M pilot, a closing cap (key 28, figure 14) must be removed before adjustment and replaced afterward.

WARNING

To avoid possible personal injury from a pressure-loaded Type 61LD pilot, carefully vent the spring case before removing the closing cap. Otherwise, trapped loading pressure could forcefully eject the freed closing cap.

To adjust the Type 61LD pilot: remove the closing cap (key 5, figure 18) and turn the adjusting screw (key 6, figure 18). Any adjustments made should set the controlled pressure within the appropriate spring range shown in the Specifications table.

Startup

Repeat this procedure in turn for each regulator in the installation.

1. Slowly open the hand valve in the pilot supply line.

2. Slowly open the upstream block valve, and partially open the downstream block valve for minimum flow.

3. Slowly open the hand valve in the control line and adjust the pilot setting if necessary. Set the monitoring regulator at a slightly higher control pressure than the working regulator.

4. Completely open the downstream block valve.

5. Slowly close the bypass valve, if any.

Shutdown

Installation arrangements vary, but in any installation it is important that the valves be opened or closed slowly and that the outlet pressure be vented before venting inlet pressure to prevent damage caused by reverse pressurization of the pilot or main valve. The following steps apply to the typical installation as indicated.

Single-Pilot, Dual-Pilot Regulator or Wide-Open Monitor

As well as applying to a single-pilot regulator (figure 3), the steps in this procedure also are valid for a dual-pilot regulator (figure 4) or a wide-open monitoring installation (figure 6) and just need to be repeated for each regulator in such an installation.

1. Slowly close the downstream block valve. If the control line is downstream of the block valve, also close the hand valve in the control line.

2. Slowly close the upstream block valve and the hand valve in the pilot supply line.

3. Slowly open the vent valve in the downstream pipeline. If the control line is downstream of the block valve, also open the vent valve in the control line. Permit all pressure to bleed out.

4. Slowly open the vent valve in the upstream pipeline. Permit all pressure to bleed out of both the piping and the pilot.

Working Monitor

1. Slowly close the downstream block valve and the hand valve in the downstream pressure control line.

2. Slowly close the upstream block valve and the hand valves in both pilot supply lines.

3. Slowly open all vent valves and permit all pressures to bleed out of the piping and regulators.

Principle of Operation

The pilot-operated Type 1098-EGR and Type 1098H-EGR regulators both use inlet pressure as the operating medium, which is reduced through pilot operation to load the actuator diaphragm. Outlet or downstream pressure opposes loading pressure in the actuator and also opposes the pilot control spring. The operation of each regulator is the same, and the Type 1098-EGR regulator operation schematic is shown in figure 7.

In operation, assume that outlet pressure is below the pilot control setting. Control spring force on the pilot diaphragm thus opens the pilot valve plug (Type 6351 pilot) or relay orifice (Type 61LD pilot), providing additional loading pressure to the actuator diaphragm. This diaphragm loading pressure opens the main valve plug, supplying the required gas to the downstream system.

When downstream demand has been satisfied, outlet pressure tends to increase, acting on the pilot and actuator diaphragms. This pressure exceeds the pilot control spring setting, moving the pilot diaphragm away and letting the valve plug spring (Type 6351 or Type 61LD pilots) or bellows (Type 6352 through 6354M pilot) close the pilot valve plug (unbalanced in the Type 6351 or Type 61LD pilots but balanced in the Type 6352 through 6354M pilot). Excess loading pressure on the actuator diaphragm escapes downstream through the bleed hole (Type 6351 pilot), bleed orifice (Type 61LD pilot), or restriction (Type 6352 through 6354M pilot).

Reduced actuator loading pressure permits the main valve to close. The combination of main valve spring force and valve plug unbalance provides positive shutoff of the valve plug against the port and upper seals.

To protect the Type 1098 or 1098H actuator diaphragm from excessive differential pressure, all 6300 series and 61LD pilots have a relief valve that allows loading pressure to bleed downstream at approximately 25 psi (1.7 bar) differential across the actuator diaphragm.

A dual-pilot regulator (figure 7) also operates similarly to a single-pilot regulator. In addition, the large ports of the standby pilot open to quickly supply additional loading pressure to the Type 1098 diaphragm. This extra loading pressure strokes the main valve quickly in order to satisfy rapid load changes in the boiler system.

A working monitor system (figure 5) reduces pressure and throttles while the working monitor regulator is in operation. If the working regulator fails open, the working monitor regulator takes over the entire pressure reduction function. The working monitor concept allows observation of the performance of the first-stage regulator at all times.

As long as the second-stage working regulator maintains normal downstream pressure, the monitoring pilot stays wide open. This permits inlet pressure to go straight through to the working monitor pilot for reduction to actuator loading pressure.

Downstream pressure is piped back to the monitoring pilot. As long as the downstream pressure is less than the monitoring pilot setting, the working pilot controls the actuator to maintain intermediate pressure. If the second-stage working regulator fails open, the downstream pressure increases to the setting of the monitoring pilot (slightly higher than the original downstream pressure). The monitoring pilot takes control and the working monitor pilot throttles down the loading pressure to

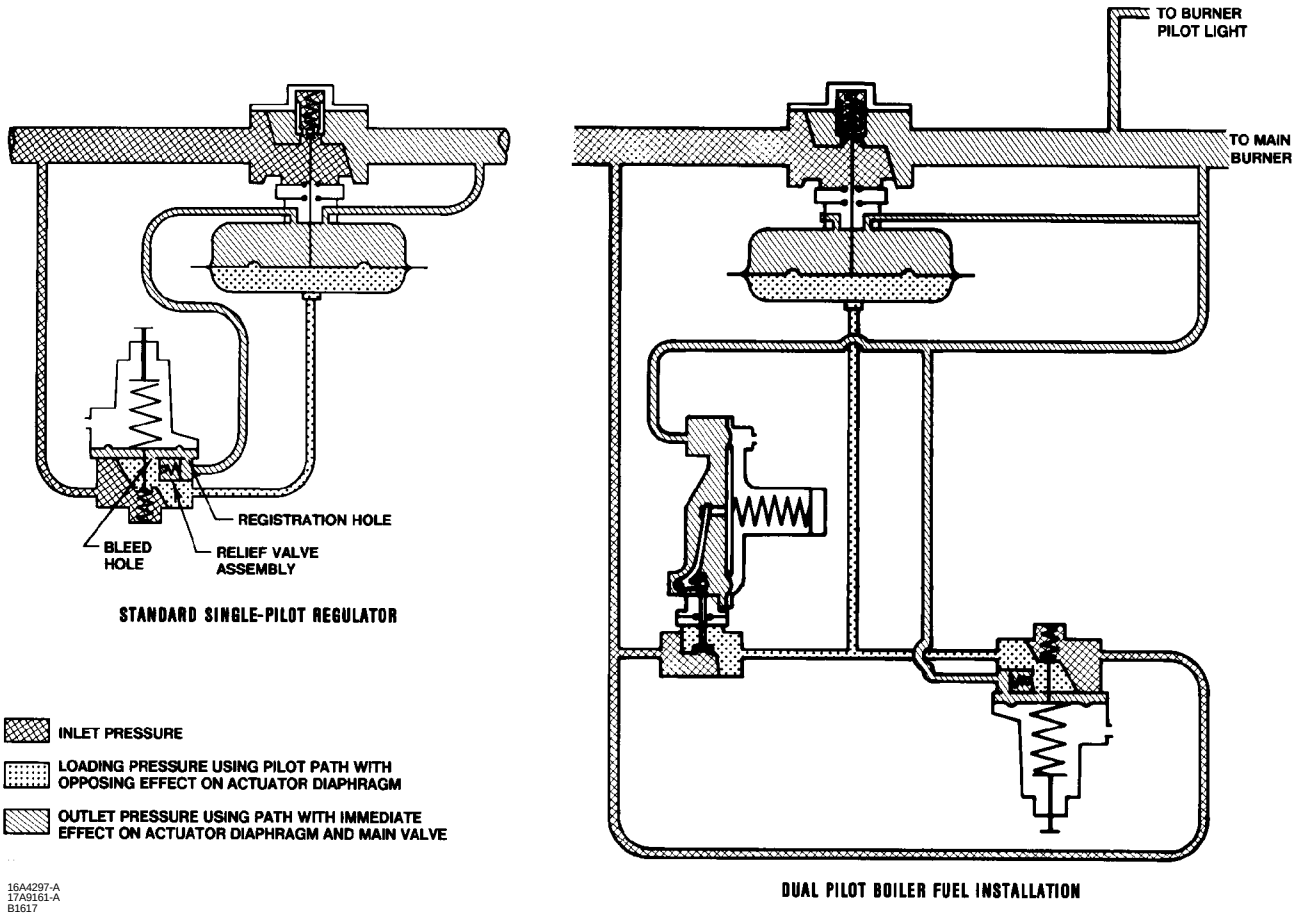


Figure 7. Principle of Operation Schematics

the working monitor regulator actuator. This actuator will move the valve plug and control the downstream pressure at the emergency level. Thus, downstream equipment is protected against a major overpressure condition without disrupting service or venting gas to the atmosphere.

Maintenance

Regulator parts are subject to normal wear and must be inspected and replaced as necessary. The frequency of inspection and replacement of parts depends upon the severity of service conditions or the requirements of local, state, and federal regulations. Due to the care Fisher takes in meeting all manufacturing requirements (heat treating, dimensional tolerances, etc.), use only replacement parts manufactured or furnished by Fisher. The stem O-rings on the Type 1098 or 1098H actuator can be lubricated annually, using the grease fitting (key 28, figure 20). Stem O-rings can be checked for damage during normal operation by line pressure leakage or unexpected grease extrusion from the actuator vent (key 27, figure 20). All O-rings, gaskets, and seals should be lubricated with a good grade of general-purpose grease and installed gently rather than forced into position. Be certain that the nameplates are updated to accurately indicate any field changes in equipment, materials, service conditions, or pressure settings.

WARNING

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

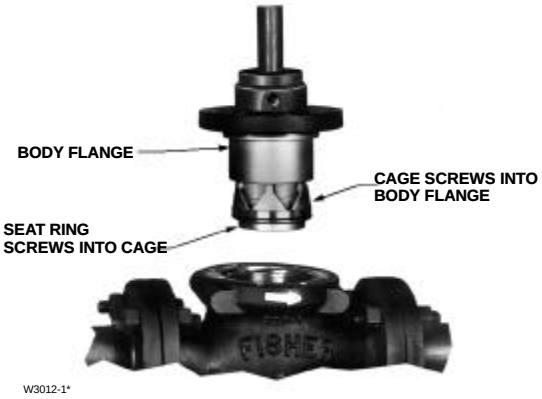


Figure 8. Trim Package Removal

Figure 9. Exploded View of Full-Capacity Trim Package Assembly

Design EGR Main Valve

Replacing Quick-Change Trim Package

Perform this procedure if the entire trim package (figure 8) is replaced. Key numbers for both the complete main valve and its trim package are referenced in figure 11. Some replacement trim package assembly numbers are listed in a table in the parts list.

Note

All disassembly, trim change, and reassembly steps in this section may be performed with the regulator in the main line and without disconnecting pilot supply or control lines.

1. Remove the cap screws (key 3) with a cast iron body, or remove the stud bolt nuts (key 29, not shown) with a steel body. Pry the body flange (key 2) loose from the valve body (key 1), and lift out the trim package.

2. Perform any required inspection, cleaning, or maintenance on the exposed surfaces of the valve body or trim package. Replace the gasket (key 4) or cage O-ring (key 17) as necessary.

3. On a pre-built replacement trim package, check indicator zeroing by unscrewing the indicator protector (key 19) and seeing if the flange of the indicator nut (key 22) lines up evenly with the bottom marking on the indicator scale (key 18). If not, remove the indicator scale and separate the indicator nut and hex nut (key 8). Hold the indicator scale against the indicator fitting (key 5) with the scale base resting against the shoulder of the fitting, and turn the indicator nut until its flange is aligned with the bottom scale marking. Then lock both nuts against each other, and install the indicator scale and protector.

4. Coat the cage seating surfaces of the valve body web and the body flange seating surfaces of the valve body neck with a good grade of general-purpose grease. Install the trim package, and secure it evenly with the cap screws or stud bolt nuts. No particular trim package orientation in the body is required.

Replacing Trim Parts

Perform this procedure if inspecting, cleaning, or replacing individual parts in a trim package. Key numbers are referenced in figure 11. An exploded view of a standard full-capacity trim package only is shown in figure 9.

Note

Access to the spring (key 9), flange O-ring (key 21), travel indicator parts, or optional travel stop (key 32) in step 1 can be gained without removing the body flange (key 2).

1. Remove the indicator fitting (key 5) and attached parts. Proceed to step 5 if only maintenance on the fitting or attached parts is performed.

2. Remove the cap screws (key 3) with a cast iron body, or remove the stud bolt nuts (key 29, not shown) with a steel body, and pry the body flange loose from the valve body (key 1).

3. Use the valve body as a holding fixture if desired. Flip the body flange over, and anchor it on the valve body as shown in figure 10, removing the pipe plug (key 31) first if necessary.

4. To gain access to the port seal (key 12), upper seal (key 15), or valve plug parts, unscrew the seat ring (key 13) from the cage (key 11) and the cage from the body flange. For leverage, a wrench handle or similar tool may be inserted into the seat ring slots (figure 10) and a strap wrench may be wrapped around a standard or a Whisper Trim**R** cage, or a soft bar may be inserted through the windows of a standard cage. To remove the piston ring (key 14) and/or plug O-ring (key 20), remove the valve plug (key 16) from the body flange, insert a screwdriver into the precut foldover area of the piston ring, and unfold the piston ring. Proceed to step 6 if no further maintenance is necessary.

5. To replace the body flange or gain access to the spring, indicator stem (key 10), stem O-ring (key 7), spring seat (key 28), E-ring (key 23), or optional travel stop, remove the indicator protector (key 19) and indicator scale (key 18). Since some compression is left in the spring, carefully remove the flanged nut (key 22) and hex nut (key 8). A screwdriver may be inserted through the press-fit bushing (key 6) to remove the stem O-ring without removing the bushing. If necessary, unscrew the travel stop (if used), and unclip the E-ring from the indicator stem.

6. Replace and lubricate parts such as the gasket (key 4) and cage O-ring (key 17) as necessary, making sure that if the port and upper seals were removed they are installed in their retaining slots with the grooved sides facing out. Also lubricate any other surfaces as necessary for ease of installation. No further main valve maintenance is necessary if just the indicator fitting and attached parts were removed.

7. Install the plug O-ring (key 20) and piston ring (key 14) onto the valve plug. Insert the valve plug into the body flange, install the cage plus upper seal and O-ring into the body flange, and then install the seat ring plus port seal into the cage. Use the valve body as a holding fixture during this step as shown in figure 10, and insert a wrench handle or similar tool into the seat ring slots for leverage when tightening the seat ring and cage.

8. Remove the upside-down body flange if it was anchored on the body. Coat the cage seating surfaces of the valve body web and the body flange seating surfaces of the valve body neck with a good grade of general-purpose grease. Install the body flange on the body, and secure it evenly with the cap screws or stud bolt nuts. Except on the 1-inch body, which does not use it, the pipe plug (key 31) must be installed in the side tapping of the flange for proper operation.

Figure 10. Seat Ring/Cage Removal or Installation Using Body as Holding Fixture

9. Make sure that the flange and stem O-rings and the bushings are installed in the indicator fitting. Orient the spring seat as shown in figure 11, and attach it with the E-ring to the slotted end of the indicator stem. Install a travel stop (if it is used) on the spring seat, and then install the spring.

10. Being careful not to cut the stem O-ring with the stem threads, install the indicator fitting down over the indicator stem until resting on the spring. Install the hex nut and then the flanged indicator nut on the indicator stem, pushing on the fitting if necessary to provide sufficient stem thread exposure. To maintain clearance for indicator part installation, draw up the spring seat by turning the hex nut down on the stem until the threads bottom.

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

P590 Series Filter

Perform this procedure to clean or replace filter parts in a standard Type P593-1 or P594-1 filter assembly. Remove the following as shown in figure 12: filter body (key 1), machine screw (key 4), gasket (key 7), two flat washers (key 5), and filter element (key 2).

Upon reassembly, one of the flat washers must go between the filter element and filter head (key 3) and the other must go between the filter element and gasket. Use a good grade of pipe thread sealant on the filter head pipe threads as shown by L.S. in figure 12.

Type 6351 Pilot

Perform this procedure if changing the control spring for one of a different range, or if inspecting, cleaning, or replacing any other pilot parts. Pilot key numbers are referenced in figure 13 and mounting key numbers in figure 15, 16, or 17.

Note

The body assembly (key 1) may remain on the pipe nipple (key 23, figure 15, or key 39, figure 16) unless the entire pilot is replaced. The optional spring case (key 2) for a Type 661 electric remote control drive unit may remain installed during maintenance.

1. To gain access to the diaphragm assembly (key 7), control spring (key 9), or spring seat (key 8), loosen the locknut (key 11, not used with Type 661 mounting), and turn the adjustment screw (key 10) out until compression is removed from the spring. Remove the machine screws (key 12), and separate the body assembly from the spring case.

2. Inspect the removed parts, and replace as necessary. Make sure the registration and bleed holes in the pilot body are free from debris. After assembly, make sure of the proper control spring setting according to the Startup section, and re-mark the spring case if necessary.

3. To replace the valve plug (key 4), remove the body plug (key 3) and body plug gasket (key 23). Be careful to keep the valve plug spring (key 6) and valve plug spring seat (key 5) from falling out and possibly getting lost while removing the valve plug. Inspect the removed parts, and replace as necessary. Make sure the valve plug seating surfaces are free from debris.

Type 6352 Through 6354M Pilots

Perform this procedure if changing the control spring for one of a different range, or if inspecting, cleaning, or replacing any other pilot parts. Pilot part key numbers are referenced in figure 14. Mounting key numbers are referenced in figure 15 for single-pilot constructions and in figure 16 or 17 for dual-pilot constructions.

Note

The body (key 1) may remain on the pipe nipple (key 23, figure 15 or key 39, figure 16) unless the entire pilot is replaced.

1. To gain access to the diaphragm assembly (key 5), diaphragm limiter (key 23) if used, control spring (key 6), restriction (key 22), stem guide (key 8), or spring seat (key 7), remove the closing cap (key 11), loosen the locknut (key 10), and turn the adjusting screw (key 9) counterclockwise until compression is removed from the spring. Remove the machine screws (key 14), and separate the body from the spring case (key 2).

2. Inspect the removed parts, and replace as necessary. Make sure the restriction and the registration hole in the body are free from debris. After assembly, make sure of the proper control spring setting according to the Startup section, and re-mark the spring case if necessary.

3. To replace the valve plug (key 4) or bellows O-ring (key 17), remove the body plug (key 3) and body plug gasket (key 12). Be careful to keep the bellows assembly (key 16) from falling out and possibly getting lost while removing the valve plug. Inspect the removed parts, and replace as necessary. Make sure the valve plug seating surfaces are free from debris.

Type 61LD Pilot and Type 1806 Relief Valve

Perform this procedure if changing the control spring for one of a different range, or if inspecting, cleaning, or replacing relief valve or any other pilot parts. Pilot part key numbers are referenced in figure 18 and mounting part and relief valve key numbers in figure 19.

1. Remove the pilot from the pipe nipple (key 14) unless just the control spring is to be changed.

2. To gain access to the control spring or other internal parts, remove the closing cap assembly (key 5) and relieve control spring (key 7) compression by turning the adjusting screw (key 6) counterclockwise. Change the control spring and install the adjusting screw and closing cap assembly if no other maintenance will be performed. Make sure of the proper control spring setting according to the Installation and Startup section, and restamp the nameplate if necessary.

3. For any other internal maintenance, relieve control spring compression according to step 2. Then remove the cap screw (key 20) and separate the pilot into three sections; spring case (key 1), body (key 2), and diaphragm case (key 3).

4. To inspect the two diaphragm (keys 14 and 15) thoroughly, remove the diaphragm nut (key 11), hex nut (key 19), and the upper and lower diaphragm plates (key 16 and 17). The projecting prong in the body may be used as the restraining member to keep the yoke from turning while removing the nuts. Also inspect the O-ring (key 12), and replace any parts as necessary.

5. Take the yoke (key 4) and attached parts out of the body to examine the disk holder assembly (key 9). Remove the relay orifice (key 8) to check for clogging and replace if necessary.

6. To replace the disk holder assembly, first unscrew the bleed orifice (key 10). Remove it and the associated parts. Then unscrew the disk holder assembly from the bleed valve (key 26) to gain access to the relay spring (key 13). Clean or replace any parts as necessary before reassembling.

7. Upon reassembly, pay particular attention to the following assembly suggestions.

a. Before replacing the diaphragm case or spring case, be sure the yoke assembly is positioned so that it will not bind or rub on the prong in the relay body.

b. Avoid wrinkling the diaphragms when replacing the diaphragm case and spring case.

c. Replace the diaphragm case, carefully working the upper diaphragm (key 14) into the recess in the diaphragm case. If the diaphragm case rocks with respect to the pilot body, the diaphragm is probably wrinkled.

d. Replace the spring case, using care to smooth the lower diaphragm (key 15) evenly into the recess in the pilot body.

e. Install the eight cap screws, tightening them down evenly in a crisscross pattern to avoid crushing the diaphragm. Recommended final torque on these cap screws in 10 to 12 foot pounds (14 to 16 N$m).

8. After assembly, make sure of the proper control spring setting according to the Installation and Startup section, and restamp the nameplate (key 27) if necessary.

9. To gain access to the Type 1806 relief valve (key 17), disconnect the relief tubing at the connector fitting (key 21) and unscrew the relief valve. Make sure the spring closes the ball, or replace the relief valve if necessary. Install the relief valve back in the pipe tee (key 16) and reconnect the relief tubing (key 18) and connector fitting.

Type 1098 and 1098H Actuator and Pilot Mounting Parts

Perform this procedure if changing the actuator or inspecting, cleaning, or replacing actuator and/or pilot mounting parts. Actuator part key numbers are referenced in figure 20, and mounting part key numbers in figure 15, 16, or 17 unless otherwise indicated.

1. The actuator and pilot(s) may be removed and replaced as a unit by disconnecting the control line and pilot supply line.

2. Access to all internal parts except the stem O-rings (key 6) may be gained without removing the bonnet (key 3) or upper diaphragm case (key 2) from the main valve or the pilot(s) from the bonnet pipe nipple (key 23, figure 15, or keys 37 and 39, figure 16). Disconnect the loading tubing (key 24, figure 15, 16, or 17) from the actuator elbow fitting (key 25, figure 15, or key 41, figure 16), and with a Type 61LD pilot also disconnect the relief tubing (key 18, figure 19) from the fitting tee.

3. Remove the cap screws (key 10), nuts (key 11), lower diaphragm case (key 1), diaphragm (key 7), and diaphragm plate (key 8). To separate the stem (key 12) from the diaphragm plate (key 8), remove the stem cap screw (key 9).

4. **To remove the Type 1098 case O-ring (key 5),** unscrew the four case cap screws (key 4), remove the upper diaphragm case (key 2), and remove the case O-ring.

To remove the Type 1098 and Type 1098H stem O-rings (key 6), remove the pilot(s) and pipe nipple(s) if necessary. Unscrew either the Type 1098 bonnet (key 3) or the Type 1098H upper diaphragm case (key 2), and remove the O-rings.

5. Lubricate both stem O-rings (key 6) with grease, and install them in either the Type 1098 bonnet (key 3) or in the Type 1098H upper diaphragm case (key 2).

For the Type 1098H actuator, thread the upper diaphragm casing into the main valve body.

For the Type 1098 actuator, lubricate the case O-ring (key 5), and install it in the bonnet (key 3). Line up the holes in the upper diaphragm casing and the bonnet; insert and tighten the four case cap screws to secure the parts together. Thread the bonnet into the main valve body.

6. Secure the diaphragm plate to the stem with the stem cap screw (key 9). Lay the entire diaphragm, diaphragm plate, and stem assembly into the lower diaphragm case so the diaphragm convolution laps up over the diaphragm plate according to figure 20. Then install the stem slowly up

into the bonnet to prevent stem or O-ring damage, and secure the lower diaphragm case to the upper diaphragm case with the cap screws and nuts. Tighten the cap screws and nuts evenly in a crisscross pattern to avoid crushing the diaphragm.

7. Grease the stem O-rings through the grease fitting (key 28) until excess grease starts coming out the vent (key 27).

8. Install the pipe nipple(s) and pilot(s) if they were removed during maintenance. Connect the actuator loading tubing if it was disconnected.

Parts Ordering

Each Type 1098-EGR or 1098H-EGR regulator is assigned a serial number or F.S. number which can be found on the nameplates (figure 2). Refer to this number when contacting your Fisher sales office or sales representative for assistance, or when ordering replacement parts.

When ordering a replacement part, be sure to include the complete 11-character part number from the following parts list. Some commonly used trim packages can be ordered according to the 11-character assembly number given in the parts list.

Parts List

Note

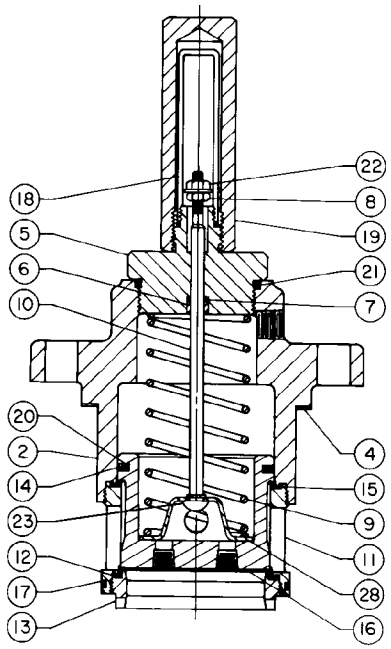
Except where indicated, sizes shown are valve body sizes.

Design EGR Main Valve (figure 11)

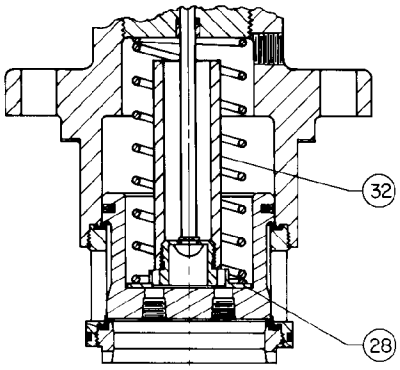
Key	Description	Part Number
	Parts kit (included are: gasket, key 4; stem O-ring, key 7; port seal, key 12; piston ring, key 14; upper seal, key 15; cage O-ring, key 17; plug O-ring, key 20; and indicator fitting O-ring, key 21)	
	2-inch	R63EG X00022
	3-inch	R63EG X00032
	4-inch	R63EG X00042
	6-inch	R63EG X00062
	Parts kit, Quick Change Trim Assembly (included are: body flange, key 2; linear cage, key 11; spring, key 9; valve plug, key 16; seat ring, key 13; travel indicator, key 10; and standard elastomers)	
	60 Psi (4.1 bar) spring color green	
	Cast Iron Body Flange	
	1-inch	25A3170 X012
	2-inch	25A3170 X102
	3-inch	25A3170 X152
	4-inch	25A3170 X222
	6-inch	25A3170 X272
	Steel Body Flange	
	1-inch	25A3170 X422
	2-inch	25A3170 X452
	3-inch	25A3170 X372
	4-inch	25A3170 X482
	6-inch	25A3170 X512
	125 Psi (8.6 bar) spring color blue	
	Cast Iron Body Flange	
	1-inch	25A3170 X032
	2-inch	25A3170 X082
	3-inch	25A3170 X142
	4-inch	25A3170 X192
	6-inch	25A3170 X282
	Steel Body Flange	
	1-inch	25A3170 X432
	2-inch	25A3170 X382
	3-inch	25A3170 X462
	4-inch	25A3170 X492
	6-inch	25A3170 X342
	400 Psi (28 bar) spring color red	
	Cast Iron Body Flange	
	1-inch	25A3170 X052
	2-inch	25A3170 X112
	3-inch	25A3170 X172
	4-inch	25A3170 X242
	6-inch	25A3170 X312
	Steel Body Flange	
	1-inch	25A3170 X442
	2-inch	25A3170 X332
	3-inch	25A3170 X472
	4-inch	25A3170 X502
	6-inch	25A3170 X522

Key	Description	Part Number
1	Valve Body	
	Cast Iron	
	NPT screwed	
	1 inch	34A6351 X012
	2 inch	34A6763 X012
	Class 125B FF	
	1 inch	34A6353 X012
	2 inch	34A5694 X012
	3 inch	34A5695 X012
	4 inch	34A5703 X012
	6 & 8 x 6 inch	34A6999 X012
	Class 250B RF	
	1 inch	34A6354 X012
	2 inch	34A5672 X012
	3 inch	34A5657 X012
	4 inch	34A5642 X012
	6 & 8 x 6 inch	34A7000 X012
	WCB steel, heat-treated	
	NPT screwed	
	1 inch	34A6352 X012
	2 inch	34A6764 X012
	2 inch (NACE)(1)	34A6764 X022
	Class 150 RF	
	1 inch	34A6355 X012
	1 inch (NACE)	34A6355 X042
	2 inch	34A6765 X012
	2 inch (NACE)	34A6765 X022
	3 inch	34A6773 X012
	3 inch (NACE)	34A6773 X032
	4 inch	34A6776 X012
	4 inch (NACE)	34A6776 X032
	6 inch	34A6998 X012
	6 inch (NACE)	34A6998 X032
	8 x 6 inch	38A4214 X012
	8 x 6 inch (NACE)	38A4214 X022
	Class 300 RF	
	1 inch	34A6754 X012
	2 inch	34A6766 X012
	2 inch (NACE)	34A6766 X032
	3 inch	34A6774 X012
	3 inch (NACE)	34A6774 X022
	4 inch	34A6777 X012
	4 inch (NACE)	34A6777 X032
	6 inch	34A6993 X012
	6 inch (NACE)	34A6993 X022
	8 x 6 inch	38A5825 X012
	8 x 6 inch (NACE)	38A5825 X032
	Class 600 RF	
	1 inch	34A6755 X012
	2 inch	34A6767 X012
	2 inch (NACE)	34A6767 X032
	3 inch	34A6775 X012
	3 inch (NACE)	34A6775 X022
	4 inch	34A6778 X012
	4 inch (NACE)	34A6778 X022

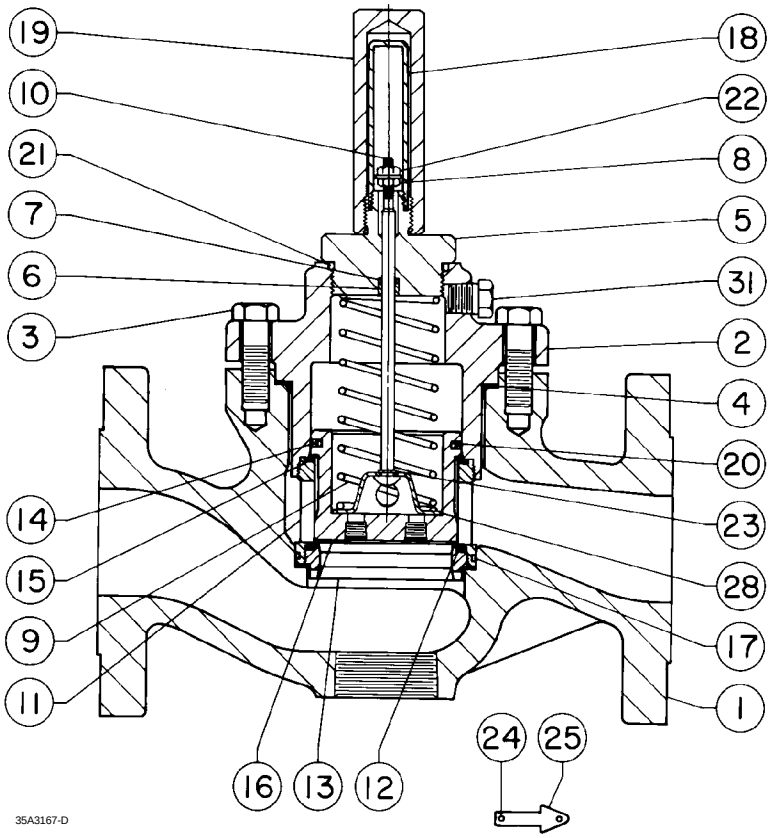
1. National Association of Corrosion Engineers (NACE) standard MR-01-75.



QUICK-CHANGE TRIM PACKAGE ASSEMBLY



DETAIL OF OPTIONAL RESTRICTED-CAPACITY CONSTRUCTION



COMPLETE CAST IRON FULL-CAPACITY MAIN VALVE ASSEMBLY

Figure 11. Design EGR Main Valve

Key	Description	Part Number
1	Valve Body (Continued)	
	Class 600 RF	
	6 inch	34A6997 X012
	6 inch (NACE)	34A6997 X022
	8 x 6 inch	39A7068 X012
	8 x 6 inch (NACE)	39A7068 X022
	Socket weld	
	1 inch	36A3941 X012
	2 inch	36A3945 X012
	Schedule 40 butt weld	
	1 inch	36A3942 X012
	2 inch	36A3944 X012
	3 inch	36A3947 X012
	4 inch	36A3949 X012
	6 & 8 x 6 inch	36A3952 X012
	Schedule 80 butt weld	
	1 inch	36A3943 X012
	2 inch	36A3946 X012
	3 inch	36A3948 X012
	4 inch	36A3950 X012
	6 & 8 x 6 inch	36A3951 X012

Key	Description	Part Number
2	Body Flange	
	Cast iron, ENC(2)	
	1 inch	24A6761 X012
	2 inch	25A3168 X012
	3 inch	24A9034 X012
	4 inch	25A2309 X012
	6 & 8 x 6 inch	34A8172 X012
	WCB steel, ENC, heat-treated	
	1 inch	24A6779 X012
	1 inch (NACE)	24A6779 X032
	2 inch	25A2254 X012
	2 inch (NACE)	25A2254 X022
	3 inch	25A2300 X012
	3 inch (NACE)	25A2300 X022
	4 inch	24A9032 X012
	4 inch (NACE)	24A9032 X022
	6 & 8 x 6 inch	34A7152 X012
	6 & 8 x 6 inch (NACE)	34A7152 X022

*Recommended spare part.
2. Part included in trim package assembly can be ordered according to the parts kit trim package.

Key	Description	Part Number
3	Cap Screw, zn pl steel (use w/cast iron body)	
	1 inch (4 req'd)	1R2811 24052
	2 inch (8 req'd)	1A4533 24052
	3 inch (8 req'd)	1A4541 24052
	4 inch (8 req'd)	1A4857 24052
	6 & 8 x 6 inch (12 req'd)	1U5131 24052
3	Stud Bolt, steel (use w/steel body) (not shown)	
	1 inch (4 req'd)	1R2848 31012
	2 inch (8 req'd)	1K2429 31012
	3 inch (8 req'd)	1A3781 31012
	4 inch (8 req'd)	1R3690 31012
	6 & 8 x 6 inch (12 req'd)	1A3656 31012
4*(2)	Gasket, composition	
	1 inch	14A6785 X012
	2 inch	14A5685 X012
	3 inch	14A5665 X012
	4 inch	14A5650 X012
	6 & 8 x 6 inch	14A6984 X012
5(2)	Indicator Fitting, pl steel	
	1 inch	14A6758 X012
	1 inch (NACE)	14A6758 X022
	2, 3, & 4 inch	14A9689 X012
	2, 3, & 4 inch (NACE)	14A9689 X042
	6 & 8 x 6 inch	24A8183 X012
	6 & 8 x 6 inch (NACE)	24A8183 X022
6(2)	Bushing	
	416 stainless steel	14A5677 X012
	410 stainless steel (NACE)	14A5677 X022
7*	Stem O-Ring	
	Nitrile(2)	1D6875 06992
	Fluoroelastomer	1N4304 06382
8(2)	Hex Nut, pl steel	1A6622 28992
9(2)	Spring, steel	
	20 psi (1.4 bar) maximum drop yellow	
	2 inch	14A6768 X012
	3 inch	14A6771 X012
	4 inch	14A6770 X012
	6 & 8 x 6 inch	15A2253 X012
	60 psi (4.1 bar) maximum drop green	
	1 inch	14A9687 X012
	2 inch	14A6626 X012
	2 inch (NACE)	16A5501 X012
	3 inch	14A6629 X012
	3 inch (NACE)	16A5503 X012
	4 inch	14A6632 X012
	4 inch (NACE)	16A5506 X012
	6 & 8 x 6 inch	14A9686 X012
	6 & 8 x 6 inch (NACE)	16A5510 X012
	125 psi (8.6 bar) maximum drop blue	
	1 inch	14A9680 X012
	1 inch (NACE)	10B1882 X012
	2 inch	14A6627 X012
	2 inch (NACE)	16A5995 X012
	3 inch	14A6630 X012
	3 inch (NACE)	16A5996 X012
	4 inch	14A6633 X012
	4 inch (NACE)	16A5997 X012
	6 & 8 x 6 inch	14A9685 X012
	6 & 8 x 6 inch (NACE)	16A5999 X012
	400 psi (28 bar) maximum drop red	
	1 inch	14A9679 X012
	2 inch	14A6628 X012
	2 inch (NACE)	16A5499 X012
	3 inch	14A6631 X012
	3 inch (NACE)	16A5500 X012
	4 inch	14A6634 X012
	4 inch (NACE)	16A5998 X012
	6 & 8 x 6 inch	15A2615 X012
	6 & 8 x 6 inch (NACE)	16A6000 X012
10(2)	Indicator Stem	
	Stainless steel	
	1 inch	14A6756 X012
	2 inch	14A6994 X012
	3 inch	14A6995 X012
	4 inch	14A8179 X012
	6 & 8 x 6 inch	14A6986 X012
10(2)	Indicator Stem (Continued)	
	316 stainless steel (NACE)	
	1 inch (NACE)	14A6756 X022
	2 inch (NACE)	14A6994 X022
	3 inch (NACE)	14A6995 X022
	4 inch (NACE)	14A8179 X022
	6 & 8 x 6 inch (NACE)	14A6986 X022
11	Cage	
	Linear	
	Cast iron, ENC(2)	
	1 inch	24A6783 X012
	2 inch	24A5669 X012
	3 inch	24A5654 X012
	4 inch	24A5639 X012
	6 & 8 x 6 inch	24A6990 X012
	WCB steel, ENC, heat-treated	
	1 inch	24A6783 X022
	1 inch (NACE)	24A6783 X032
	2 inch	24A5669 X022
	2 inch (NACE)	24A5669 X032
	3 inch	24A5654 X022
	3 inch (NACE)	24A5654 X042
	4 inch	24A5639 X022
	4 inch (NACE)	24A5639 X032
	6 inch	24A6990 X022
	6 & 8 x 6 inch (NACE)	24A6990 X032
	Whisper Trim	
	416 stainless steel	
	1 inch	24A2043 X012
	2 inch	24A5707 X012
	3 inch	24A5708 X012
	4 inch	24A5709 X012
	6 & 8 x 6 inch	24A8174 X012
	316 stainless steel (NACE)	
	2 inch (NACE)	24A5707 X022
	3 inch (NACE)	24A5708 X032
	4 inch (NACE)	24A5709 X022
	6 & 8 x 6 inch (NACE)	24A8174 X022
	Quick Opening, cast iron, ENC	
	1 inch	37A7211 X012
	2 inch	37A7212 X012
	3 inch	37A7213 X012
	4 inch	37A7214 X012
	6 & 8 x 6 inch	37A7215 X012
12*	Port Seal	
	Nitrile(2) standard	
	1 inch	14A6788 X012
	2 inch	24A5673 X012
	3 inch	24A5658 X012
	4 inch	24A5643 X012
	6 & 8 x 6 inch	14A8175 X012
	Fluoroelastomer	
	1 inch	14A8186 X012
	2 inch	25A7412 X012
	3 inch	25A7375 X012
	4 inch	25A7469 X012
	6 & 8 x 6 inch	14A6996 X012
13*(2)	Seat Ring	
	416 stainless steel	
	1 inch, 1-5/16 inch (33 mm) port	24A6781 X012
	2 inch, 2-3/8 inch (60 mm) port	24A5670 X012
	3 inch, 3-3/8 inch (86 mm) port	24A5655 X012
	4 inch, 4-3/8 inch (111 mm) port	24A5640 X012
	6 inch, 7-3/16 inch (183 mm) port	24A6989 X012
	8 x 6 inch 7-3/16 inch (183 mm) port	38A4216 X012
	316 stainless steel (NACE)	
	1 inch, 1-5/16 inch (33 mm) port (NACE)	24A6781 X022
	2 inch, 2-3/8 inch (60 mm) port (NACE)	24A5670 X022
	3 inch, 3-3/8 inch (86 mm) port (NACE)	24A5655 X022
	4 inch, 4-3/8 inch (111 mm) port (NACE)	24A5640 X022
	6 inch, 7-3/16 inch (183 mm) port (NACE)	24A6989 X022
	8 x 6 inch 7-3/16 inch (183 mm) port (NACE)	38A4216 X022
14*(2)	Piston Ring	
	1 inch, TFE (clear)	14A6786 X012
	2 inch, TFE (clear)	14A5675 X012
	3 inch, TFE (clear)	14A5660 X012
	4 inch, TFE (clear)	14A5645 X012
	6 & 8 x 6 inch, glass-filled TFE (yellow)	14A6985 X022

*Recommended spare part

2. Part included in trim package assembly which can be ordered according to the parts kit trim package.

Key	Description	Part Number
15*	Upper Seal	
	Nitrile(2) (standard)	
	1 inch	14A6789 X012
	2 inch	24A5674 X012
	3 inch	24A5659 X012
	4 inch	24A5644 X012
	6 & 8 x 6 inch	14A8176 X012
	Fluoroelastomer	
	1 inch	14A8187 X012
	2 inch	25A7413 X012
	3 inch	25A7376 X012
	4 inch	25A7468 X012
	6 & 8 x 6 inch	14A8185 X012
16*(2)	Valve Plug, heat-treated	
	416 stainless steel	
	1 inch	14A6780 X012
	2 inch	24A6772 X012
	3 inch	24A9421 X012
	4 inch	24A8182 X012
	6 & 8 x 6 inch	24A6992 X012
	316 stainless steel (NACE)	
	1 inch (NACE)	14A6780 X022
	2 inch (NACE)	24A6772 X032
	3 inch (NACE)	24A9421 X022
	4 inch (NACE)	24A8182 X022
	6 & 8 x 6 inch (NACE)	24A6992 X022
17*	Cage O-Ring	
	Nitrile(2) (standard)	
	1 inch	10A7777 X012
	2 inch	10A7779 X012
	3 inch	14A5688 X012
	4 inch	10A3481 X012
	6 & 8 x 6 inch	18A2556 X022
	Fluoroelastomer	
	1 inch	10A7778 X012
	2 inch	10A7779 X022
	3 inch	10A3441 X012
	4 inch	10A3483 X012
	6 & 8 x 6 inch	18A2556 X032
18	Indicator Scale, plastic	
	1 inch(2)	14A6759 X012
	2 inch(2)	14A5678 X012
	3 inch(2)	14A5662 X012
	4 inch	
	w/2 inch (51 mm) travel(2)	14A5647 X012
	w/1-1/2 inch (38 mm) travel	14A5662 X012
	6 & 8 x 6 inch(2)	14A5647 X012
19	Indicator Protector	
	Zn pl steel	
	1 & 2 inch(2)	14A8180 X012
	3, 6 & 8 x 6 inch(2)	14A6769 X012
	4 inch(2) w/2 inch (51 mm) travel	14A6769 X012
	Pl steel	
	4 inch w/1-1/2 inch (38 mm) travel	14A5664 X012
20*	Plug O-Ring	
	Nitrile(2) (standard)	
	1 inch	14A6981 X012
	2 inch	14A5686 X012
	3 inch	1V3269 06562
	4 inch	14A5688 X012
	6 & 8 x 6 inch	1K8793 06992
	Fluoroelastomer	
	1 inch	14A8188 X012
	2 inch	14A5686 X022
	3 inch	1V3269 X0042
	4 inch	10A3441 X012
	6 & 8 x 6 inch	1V5476 06382
21*	Indicator Fitting O-Ring	
	Nitrile(2)	
	1 inch	10A8931 X012
	2, 3, & 4 inch	10A3800 X012
	6 & 8 x 6 inch	1F2629 06992
	Fluoroelastomer	
	1 inch	10A0811 X012
	2, 3, & 4 inch	1R7276 06382
	6 & 8 x 6 inch	1P4877 06382
22(2)	Flange Nut, pl steel	14A5693 X012
23(2)	E-Ring	
	stainless steel	14A8181 X012
	1577 steel, heat treated (NACE)	14A8181 X022
24	Drive Screw, stainless steel (4 req'd)	1A3682 28982
25	Flow Arrow, stainless steel	1V1059 38982
26	Body Rating Plate, stainless steel (not shown)	13A2353 X012
28	Spring Seat	
	Full capacity trim(2)	
	zinc plated steel	
	1 inch	14A6982 X012
	2, 3, & 4 inch	15A2206 X012
	6 & 8 x 6 inch	14A8177 X012
	Heat-treated wrought steel (NACE)	
	1 inch (NACE)	14A6982 X022
	2 inch, 3 inch, 4 inch (NACE)	15A2206 X022
	6 & 8 x 6 inch (NACE)	14A8177 X022
	Restricted capacity trim, heat-treated,	
	416 stainless steel	
	2, 3, & 4 inch	14A9678 X012
	6 inch	14A9688 X012
	2, 3, & 4 inch (NACE)	14A9678 X012
	6 & 8 x 6 inch (NACE)	14A9688 X012
29	Hex Nut Steel (use w/steel body)	
	(not shown)	
	1 inch (4 req'd)	1C3306 24072
	2 inch (8 req'd)	1A3772 24072
	3 inch (8 req'd)	1A3760 24072
	4 inch (8 req'd)	1A3520 24072
	6 & 8 x 6 inch (12 req'd)	1A4409 24072
31(2)	Pipe Plug	
	zinc plated steel	1A7675 24662
	steel (NACE)	
	2, 3, or 4 inch (NACE)	1A7675 24012
	6 or 8 x 6 inch (NACE)	1B5731 X0012
32	Travel Stop, galvanized zn pl steel (not used w/full capacity trim)	
	2 inch	
	30% capacity	14A9677 X012
	70% capacity	14A9676 X012
	3 inch,	
	40% capacity	14A9671 X012
	4 inch,	
	40% capacity	14A9670 X012
	6 inch,	
	40% capacity	14A9682 X012
33	NACE Tag (not shown) (NACE)	
	18-8 stainless steel (NACE)	19A6034 X012
34	Tag Wire (not shown) (NACE)	
	304 stainless steel (NACE)	1U7581 X0022

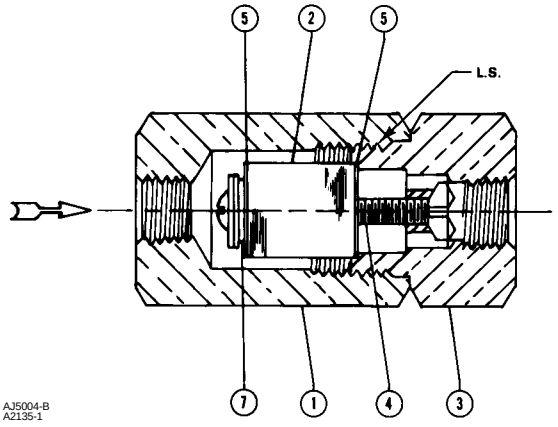
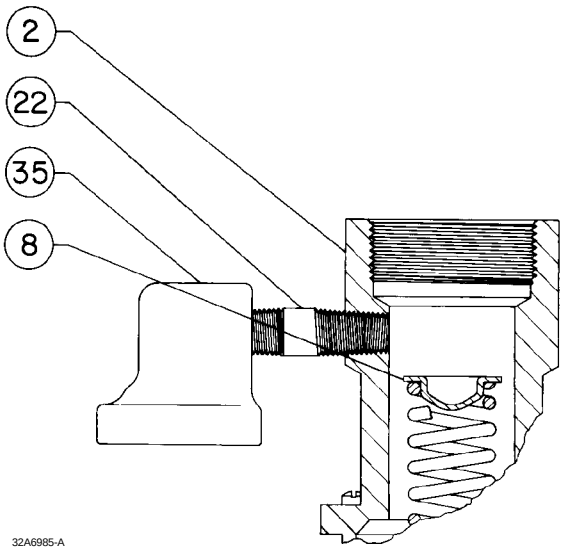
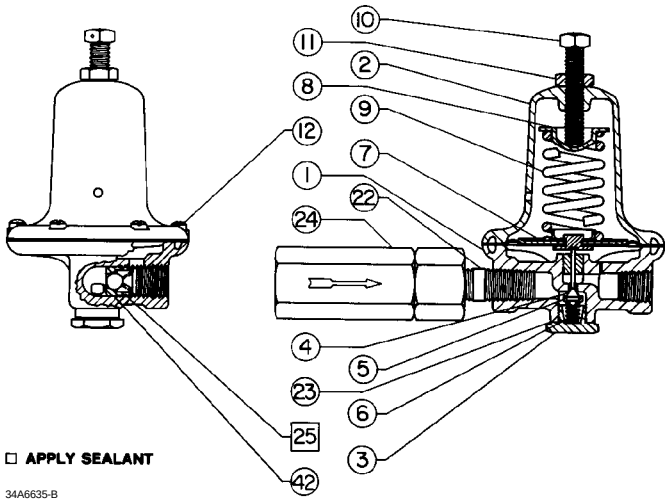


Figure 12. Standard P590 Series Filter Assembly

*Recommended spare part
2. Part included in trim package assembly which can be ordered according to the parts kit trim package.



DETAIL OF SPRING CASE AND VENT FOR TYPE 661 MOUNTING

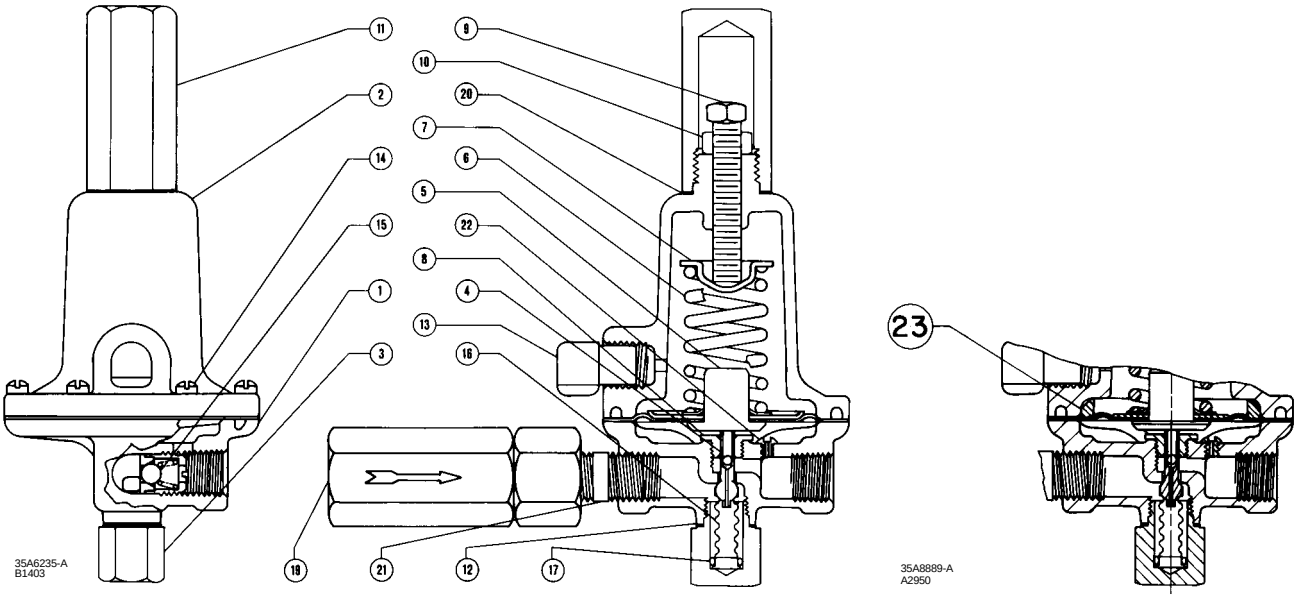


COMPLETE PILOT SHOWING STANDARD SPRING CASE CONSTRUCTION

Figure 13. Type 6351 Pilot Assembly

Key	Description	Part Number
	Standard P590 Series Filter (figure 12)	
1	Filter Body	
	Type P594-1, brass	1E3124 14012
	Type P593-1,	
	aluminum	1E3124 09012
	aluminum (NACE)	1E3124 09012
2*	Filter Element,	
	cellulose	1E3126 06992
	cellulose (NACE)	1E3126 06992
3	Filter Head	
	Type P594-1, brass	1E3125 14012
	Type P593-1,	
	aluminum	1E3125 09012
	aluminum (NACE)	1E3125 09012
4	Machine Screw	
	Type P594-1, brass	1J5002 18992
	Type P593-1,	
	aluminum	1J5002 09012
	aluminum (NACE)	1J5002 09012
5	Washer (2 req'd)	
	Type P594-1, brass	1J5000 18992
	Type P593-1,	
	aluminum	1J5000 10062
	aluminum (NACE)	1J5000 10062
7*	Gasket, composition	1F8268 04022
11	NACE Tag (Type P593-1 only) (NACE)	
	18-8 stainless steel (not shown)	19A6034 X012
12	Tag Wire (Type P593-1 only) (NACE)	
	303 stainless steel (NACE)	1U7581 X0022
	Type 6351 Pilot (figure 13)	
	Parts kit (included are: valve plug, key 4; valve spring, key 6; diaphragm assembly, key 7; body plug gasket, key 23 and for the P590 Series Filter, filter element, key 2; and gasket, key 7)	R6351 X00012
1	Body Assembly	
	Aluminum w/brass bushing	1B7971 X0092
	Aluminum w/315 stainles steel bushing (NACE)	1B7971 X0232
	Brass w/brass bushing	1B7971 X0112
	316 stainless steel w/303 stainless steel bushing	1B7971 X0122
2	Spring Case, aluminum	
	w/untapped vent (standard)	2B7974 08012
	w/1/4 inch NPT tapped vent (for use w/Type 661 mtg)	13A0166 X012
3	Body Plug	
	Aluminum	1B7975 09032
	Brass	1B7975 14012
	316 Stainless steel	1B7975 35072
	Stainless steel (NACE)	1B7975 09032
4*	Valve Plug	
	Nitrile w/brass stem	1D5604 000A2
	Nitrile w/stainless steel stem	1D5604 000B2
	Fluoroelastomer w/brass stem	1N3798 71662
	Fluoroelastomer w/stainless steel stem	1N3798 000C2
4	Inner Valve, 304 stainless steel/nitrile (NACE)	1D5604 000B2
5	Valve Plug Spring Seat	
	Aluminum (use w/brass stem)	1E5322 11032
	316 stainless steel (use w/stainless steel stem)	1L2511 35072
	316 stainless steel (NACE)	1L2511 35072
6	Valve Plug Spring,	
	stainless steel	1B7979 37022
	heat-treated alloy 600 (UNS N07750)	19A2860 X012
7*	Diaphragm Assembly (includes zn pl steel diaphragm plate)	
	Nitrile w/aluminum pusher post	1B7980 000B2
	Fluoroelastomer w/aluminum pusher post	1B7980 000C2
	Nitrile w/stainless steel post	1B7980 X00A2
	Nitrile diaphragm w/stainless steel pusher post & diaphragm plate (NACE)	1B7980 X0112
8	Upper Spring Seat, zn pl steel	1B7985 25062
9	Control Spring, Cd pl steel	
	3 to 20 psig (0.21 to 1.4 bar) range, green	1B9860 27212
	5 to 35 psig (0.34 to 2.4 bar) range,cadmium	1B7883 27022
	35 to 100 psig (2.4 to 6.9 bar) range, red	1K7485 27202
10	Adjusting Screw, pl steel (not used w/Type 661 mtg)	10A2099 X012
11	Locknut, zn pl steel (not used w/Type 661 mtg)	1A9463 24122
12	Machine Screw, pl steel (6 req'd)	1B7839 28982
22	Body Inlet Pipe Nipple,	
	galvanized zn pl steel (use w/P590 Series filter)	1C4882 26232
	steel (NACE)	1C4882 X0032
22	Spring Case Vent Pipe Nipple,	
	galvanized zn pl steel (use w/Type 661 mtg)	1C6789 26232
23*	Body Plug Gasket, composition	1C4957 04022
24	P590 Series Filter (parts listed under separate heading)	
	Type P594-1, brass & cellulose (standard)	AJ5004 000A2
	Type P593-1, aluminum & cellulose	AJ5004 T0012
25	Sealant Loctite N. 516 (one pint can, not supplied)	1M1137 X0012
35	Type Y602-13 Vent Assembly, zinc	
	w/stainless steel screen (use w/Type 661 mtg)	17A6572 X042
42	Relief Valve Assembly Aluminum/stainless steel	
	25 psi (1.7 bar differential)	16A5929 X022
42	Aluminum/302 stainless steel (NACE)	
	25 psi (1.7 bar differential)	16A5929 X042

*Recommended spare part



COMPLETE TYPE 6352, 6353, OR 6354L PILOT

DETAIL OF TYPE 6354H OR 6354M PILOT

Figure 14. Type 6352 Through 6354M Pilot Assemblies

Key	Description	Part Number
	Type 6352 Through 6354M Pilot (figure 14)	
	Parts kit (included are: valve plug, key 4; diaphragm assembly, key 5; body plug gasket, key 12; bellows O-ring, key 17; closing cap gasket, key 20; and for the P590 Series Filter, filter element, key 2; and gasket, key 7)	
	Type 6352	R6352 X00012
	Type 6353	R6353 X00012
	Type 6354	R6354 X00012
1	Body	
	Aluminum	35A6228 X012
	Brass	35A6224 X012
	Steel	35A6226 X012
	316 stainless steel	39A5971 X012
	Aluminum (NACE)	35A6228 X012
	316 stainless steel (NACE)	39A5971 X012
2	Spring Case	
	Aluminum	
	Use w/closing cap	25A6220 X012
	Use w/o closing cap	15A1581 X012
	Use w/Type 661 mtg	26A6790 X012
	Brass	25A6790 X012
	Steel	25A6223 X012
	316 Stainless steel	28A9277 X012
	Aluminum (NACE)	25A6220 X012
	316 stainless steel (NACE)	28A9277 X012
3	Body Plug	
	Aluminum	15A6221 X012
	Brass	15A6221 X022
	Steel	15A6221 X032
	316 stainless steel	15A6221 X042
	Aluminum (NACE)	15A6221 X012
	316 stainless steel (NACE)	15A6221 X042
4*	Valve Plug & Stem Assembly,	
	nitrile disk w/stainless steel stem	15A6207 X012
	316 stainless steel stem (NACE)	15A6207 X052
5*	Diaphragm Assembly	
	Type 6352 w/natural rubber diaphragm	15A6216 X012
	Fluoroelastomer diaphragm (NACE)	15A6216 X132
	Type 6353 w/nitrile diaphragm	15A6216 X022
	Type 6354L, 6354M, or 6354H w/neoprene diaphragm	15A6216 X032

Key	Description	Part Number
6	Control Spring	
	Zn pl steel	
	Type 6352	
	2 inch wc to 2 psig (5 to 140 mbar), yellow	14A9672 X012
	Type 6352	
	2 to 10 psig (0.14 to 0.69 bar), black	14A9673 X012
	2 inch wc to 2 psig (5 to 140 mbar), yellow (NACE)	14A9672 X012
	2 inch wc to 2 psig (5 to 140 mbar), black (NACE)	14A9673 X012
	Type 6353	
	3 to 40 psig (0.21 to 2.8 bar), yellow	1E3925 27022
	35 to 125 psig (2.4 to 6.9 bar), red	1K7485 27202
	Type 6354L	
	85 to 200 psig (5.9 to 14 bar), blue	1L3461 27142
	Type 6354M	
	175 to 220 psig (12 to 15 bar), blue	1L3461 27142
	17-4PH stainless steel	
	Type 6354H	
	200 to 300 psig (14 to 21 bar), green	15A9258 X012
7	Spring Seat	
	Zn pl steel (for Types 6352 & 6353)	1B7985 25062
	Pl steel (for Type 6354L, 6354M, or 6354H)	1K1558 28982
8	Stem Guide	
	416 stainless steel, heat-treated	15A6222 X012
	410 stainless steel (NACE)	15A6222 X022
9	Adjusting Screw	
	Zn pl steel (for Types 6352 & 6353)	1H3050 28982
	Pl steel (for aluminum spring case w/closing cap & Type 6354L, 6354M, or 6354H)	1B7986 28982
10	Locknut, zn pl steel	1A9463 24122
11	Closing Cap	
	Aluminum	1H2369 X0012
	Brass	1H2369 14012
	Steel	1H2369 X0022
	316 stainless steel	1H2369 X0032
12*	Body Plug Gasket	
	Composition	1C4957 04022
	Composition (NACE)	1C4957 04022
13	Type Y602-12 Vent Assembly, plastic w/stainless steel screen	27A5516 X012
14	Machine Screw (6 req'd)	
	Steel	1H4217 28992
	Pl steel	
	For aluminum spring case w/o closing cap	1H2676 28982
	For Type 661 mtg	1E9752 28982

*Recommended spare part

Key	Description	Part Number
15	Relief Valve Assembly	
	Aluminum/stainless steel	
	25 psi (1.7 bar) differential	16A5929 X052
	Aluminum/302 stainless	
	steel for 25 psi (1.7 bar) differential (NACE)	16A5929 X042
16	Bellows Assembly, stainless steel/ nickel	15A6202 X012
17*	Bellows O-Ring, nitrile	1D6825 06992
19	P590 Series filter (parts listed under separate heading)	
	Type P594-1, brass & cellulose (standard)	AJ5004 000A2
	Type 593-1, aluminum & cellulose	AJ5004 T0012
20*	Closing Cap Gasket, composition	15A6218 X012
21	Pipe Nipple	
	Galvanized zn pl steel	1C4882 26232
	Noncorrosive, NACE steel (NACE)	1C4882 X0032
	Corrosive, 316 stainless steel (NACE)	1C4882 X0042
22	Restriction, pl steel (not used for low-gain construction)	
	Standard gain (indicated by S stamped on pilot body), No. 51 drill size or 0.067 inch (1.7 mm) diameter, green	17A2030 X012
	High gain for narrower proportional bands (indicated by H stamped on pilot body), No. 57 drill size or 0.043 inch (1.09 mm) diameter, red	17A2029 X012
22	Restriction, NACE construction 316 stainless steel (not used for low-gain construction) Standard gain (indicated by S stamped on pilot body), No. 51 drill size or 0.067 inch (1.7 mm) diameter, green color code	17A2030 X022
	High gain for narrower proportional bands (indicated by H stamped on pilot body), No. 57 drill size or 0.043 inch (1.09 mm) diameter, red color code	17A2029 X022
23	Diaphragm Limiter, aluminum (for Types 6354H or 6354M)	15A9259 X012
26	NACE Tag (Type 6352 only), NACE 18-8 stainless steel not shown)	19A6034 X012
27	Tag Wire (Type 6352 only), NACE 303 stainless steel (not shown)	1U7581 X0022

Type 61LD Pilot (figure 18)

	Parts kit (included are: relay orifice, key 8; disk holder assembly, key 9; bleed orifice, key 10; O-ring, key 12 relay spring, key 13; upper relay diaphragm, key 14; lower relay diaphragm, key 15; bleed valve, key 26; and closing cap gasket, key 28)	R61LD X00012
1	Spring Case, cast iron	1B9839 19012
2	Body, cast iron	2J5819 19012
3	Diaphragm Case, Cast iron	2C5186 19012
4	Yoke	
	Zinc	1D6625 44012
	Cast iron	1B9840 19012
5	Closing Cap Assembly (includes keys 5a, 5b, 5c and 5d)	AD5586 000A2
5A	Screen, stainless steel (not used with Type 661 mtg)	1B6335 38392
5B	Snap Ring, stainless steel (not used with Type 661 mtg)	1B6336 38992
5C	Machine Screw, steel (not used with Type 661 mtg)	1D5589 28992
5D	Closing Cap, zinc (not used with Type 661 mtg)	2D3715 44012
6	Adjusting Screw, zinc (not used with Type 661 mtg)	1B5379 44012
7	Control Spring, steel pl	
	1/4-2 psig (0.017-0.138 bar) range, red spring	1B8863 27022
	1-5 psig (0.069-0.34 bar) range, yellow spring	1J8578 27022
	2-10 psig (0.138-0.69 bar) range, blue spring	1B8864 27022
	5-15 psig (0.34-1.02 bar) range, brown spring	1J8579 27142
	10-20 psig (0.69-1.4 bar) range, green spring	1B8865 27022
8	Relay Orifice, stainless steel	1C5201 35032
9	Disk Holder Assembly	
	Brass/nitrile (standard)	1B8868 000A2
	Stainless steel/nitrile (corrosive)	1B8868 000B2
10	Bleed Orifice, stainless steel	1B8873 35032
11	Diaphragm Nut	
	Brass	1B9895 14012
	Stainless Steel	1B9895 35072
12*	O-ring, nitrile	1B8855 06992
13	Relay Spring, 302 stainless steel	1E6436 37022
14*	Upper Diaphragm, Nitrile	1B8852 02052
15*	Lower Diaphragm, Nitrile	1B8860 02052
16	Upper Diaphragm Plate, Steel	1B9893 25072
17	Lower Diaphragm Plate, Steel	1B9894 25072
18	Spring Seat, steel, cd pl	1B8862 25072
19	Hex Nut, steel, cd pl	1A3403 24122
20	Cap Screw, steel, (8 req'd)	1B9896 24052
22	Pipe Plug, steel (not used with Type 661 mtg)	1A6495 28992
23	Vent Screen, alloy 400 (used only with Type 661 mtg)	0L0783 43062
24	Pipe Nipple, steel zinc pl	1C4882 26232
25	P590 Series filter (parts listed under separate heading)	
	Type P594-1, brass & cellulose (standard)	AJ5004 000A2
	Type 593-1, aluminum & cellulose	AJ5004 T0012
26	Bleed Valve, 416 stainless steel	1H9516 35132
27	Nameplate, aluminum	14A1711 X012
28*	Gasket, neoprene	1P7533 06992
30	Pipe Plug, cast iron (2 req'd)	1A3619 19012
35	Spring Seat, steel (used only with Type 661 mtg)	1J4284 24092
50	Drive Screw, steel, pl (2 req'd)	1E9530 28982

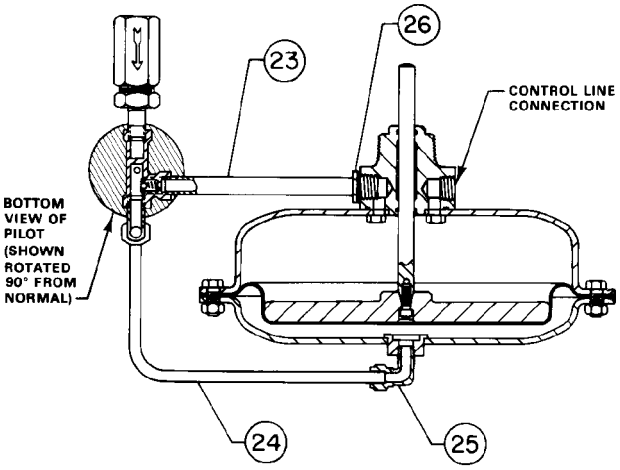


Figure 15. Single-Pilot Mounting Parts

Standard Single-Pilot Mounting Parts (figures 15 & 19)

Note

Key numbers 14 through 22 are only for mounting a Type 61LD pilot.

14	Pipe Nipple, galvanized zn pl steel	1F7315 26012
15	Pipe Nipple, galvanized zn pl steel	1F7302 26012
16	Pipe Tee, Malleable iron	1A4736 21992
17	Type 1806 Relief Valve, SST ball and spring	
	Brass body and spring seat	AF5001 X00A2
	Aluminum body and spring seat	AF5001 X0012
	Stainless steel body and spring seat	AF5001 X0022
18	Relief Tubing	
	Copper	14A9457 X012
	Aluminum	14A9457 X032
	Steel	14A9457 X022
	Stainless steel	14A9457 X042

*Recommended spare part

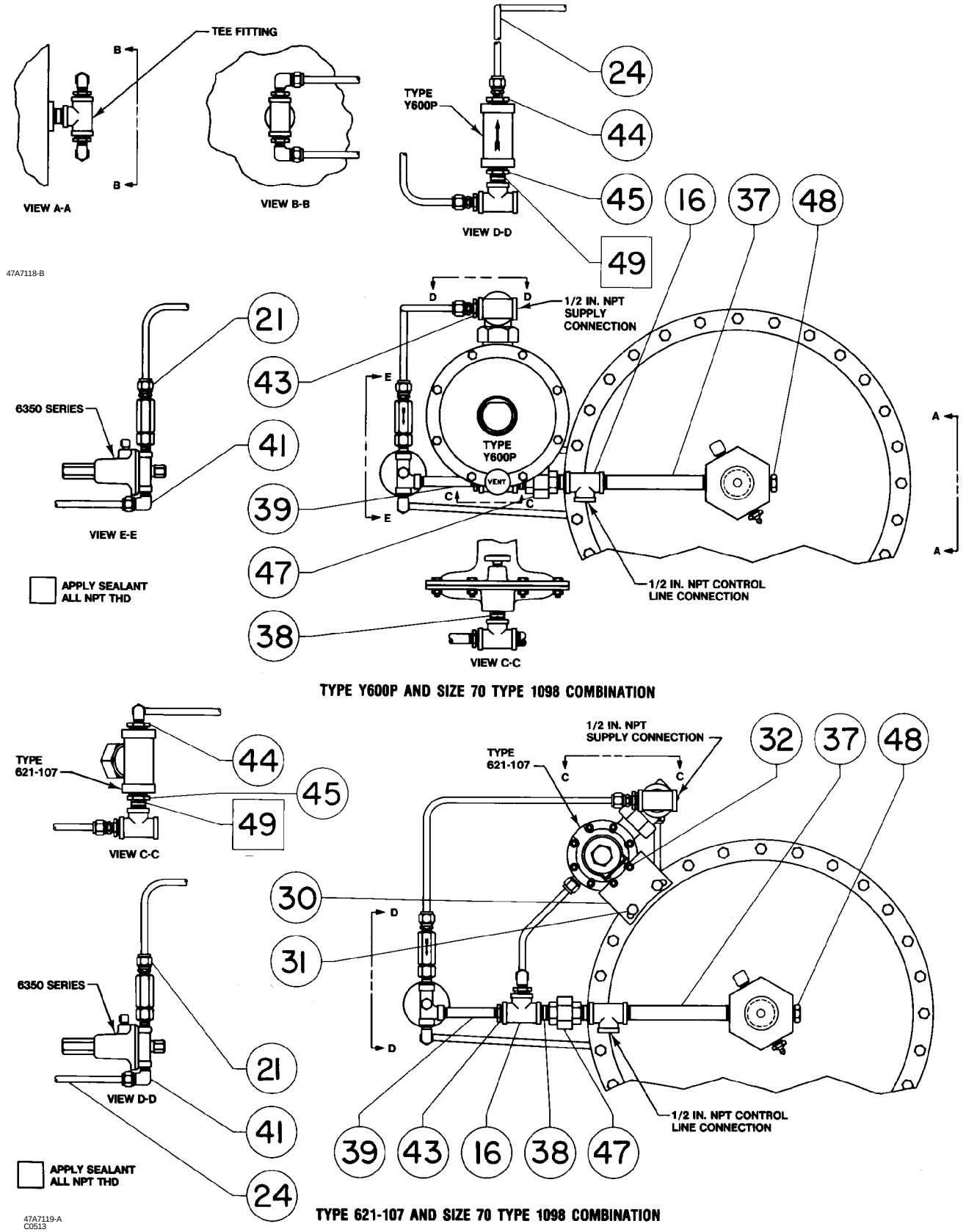


Figure 16. Dual-Pilot Mounting Parts for Boiler Fuel Installations

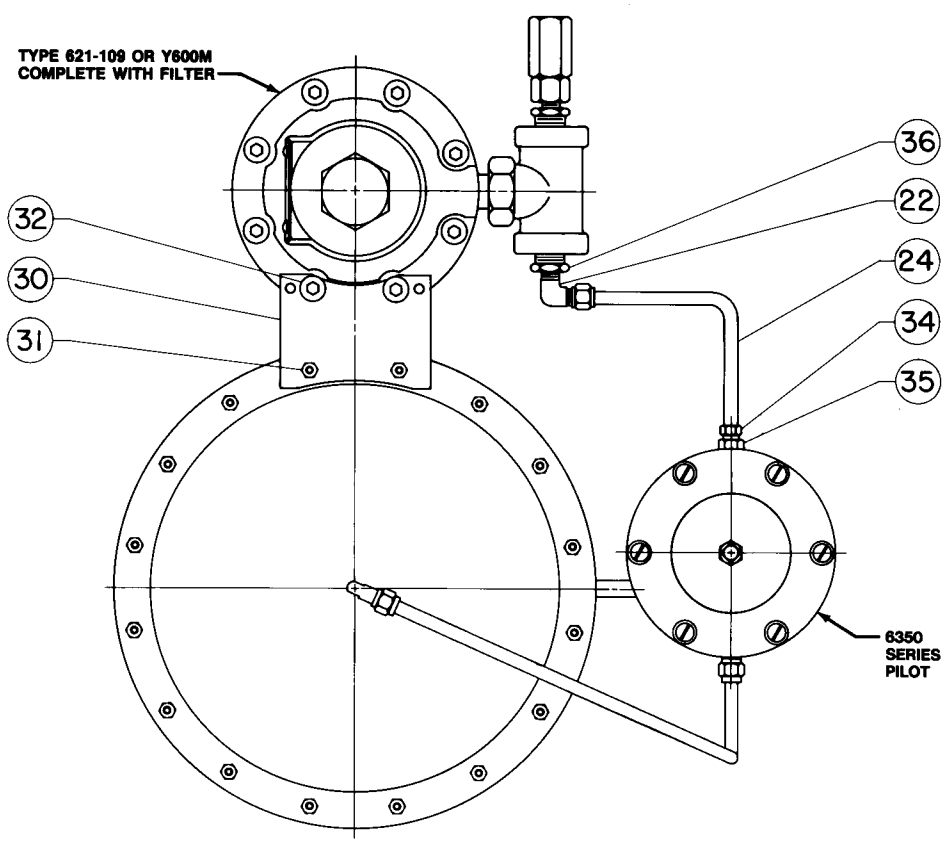


Figure 17. Dual-Mounting Parts for Working Monitor Regulator

Key	Description	Part Number
19	Tee Fitting	
	Brass	14A9056 X012
	Steel	14A9056 X032
	Stainless steel	14A9056 X042
20	Loading Tubing	
	Copper	24A9459 X012
	Aluminum	24A9459 X032
	Steel	24A9459 X022
	Stainless steel	24A9459 X042
21	Connector Fitting	
	Brass	1H8682 18992
	Aluminum	1J9886 11992
	Steel	1J1395 28992
	Stainless steel	1L9272 38992
22	Elbow Fitting	
	Brass	1L2497 18992
	Aluminum	1K5654 11992
	Steel	1J1396 28992
	Stainless steel	1N6856 38992
23	Pipe Nipple, galvanized zn pl steel	
	Size 30 or 40 actuator	1C2100 26232
	Size 70 actuator	19A7858 X012
	Pipe Nipple, NACE construction	
	Size 30 or 40 actuator	
	Aluminum	1C2100 X0022
	316 stainless steel	1C2100 X0012
	Size 70 actuator	
	Aluminum	19A7858 X022
	316 stainless steel	19A7858 X032
24	Loading Tubing	
	Steel (standard)	
	Size 30 or 40 actuator	14A9458 X022
	Size 70 actuator	050021 2401W
	Stainless steel	
	Size 30 or 40 actuator	14A9458 X042
	Size 70 actuator	050198 3807W

Key	Description	Part Number
24	Loading Tube (Continued)	
	Copper	
	Size 30 or 40 actuator	14A9458 X012
	Size 70 actuator	050021 1701W
	Aluminum	
	Size 30 or 40 actuator	14A9458 X032
	Size 70 actuator	050021 1107W
	NACE construction	
	Size 30 or 40 actuator	
	Aluminum	14A9458 X032
	304 stainless steel	14A9458 X042
	Size 70 actuator (specify main valve type number and body size)	
	Aluminum	050021 1107W
	304 stainless steel	050198 3807W
25	Elbow Fitting (2 req'd)	
	Pl steel (standard)	15A6002 X472
	Stainless steel	15A6002 X612
	Brass	15A6002 X162
	Aluminum	15A6002 X402
	Aluminum (NACE)	15A6002 X402
	316 stainless steel (NACE)	15A6002 XC72
26	Pipe Bushing	
	Malleable iron	1B2928 21992
	Steel (NACE)	1B2928 X0032

Boiler Fuel Installation Dual-Pilot Mounting Parts (figure 16)

16	Pipe Tee, galvanized malleable iron (4 req'd)	1A4736 21992
21	Tubing Connector, pl steel (3 req'd)	15A6002 X462
24	Tubing, steel	050021 2401W
30	Mounting Bracket, steel (for Type 621-107)	1H3504 X0012
31	Cap Screw, zn pl steel (2 req'd) (for Type 621-107)	1A5828 24052
32	Cap Screw, zn pl steel (2 req'd) (for Type 621-107)	1K7646 24052

Key	Description	Part Number
37	Pipe Nipple, galvanized zn pl steel	1F7315 26012
38	Pipe Nipple, galvanized zn pl steel (5 req'd for Type Y600P; 4 req'd for Type 621-107)	1K2015 26022
39	Pipe Nipple, galvanized zn pl steel	1C5599 26232
41	Tubing Elbow pl steel (3 req'd for Type Y600P; 5 req'd for Type 621-107)	15A6002 X472
43	Pipe Bushing, pl steel (4 req'd)	1C3790 26232
44	Pipe Bushing, steel	1A3424 28992
45	Pipe Bushing, galvanized zn pl steel	1K2895 28992
47	Female Union, malleable iron	1B5405 21992
48	Pipe Plug, steel	1A3692 24492
49	Led-Plate(3) No. 250 Sealant, 5 lb (2.3 kg) can (not furnished w/regulator)	1M5240 06992

Working Monitor Dual-Pilot Mounting Parts (figure 17)

22	Tubing Elbow, pl steel	15A6002 X472
24	Tubing, steel	050021 2401W
30	Mounting Bracket, steel	1H3504 X0012
31	Cap Screw, zn pl steel (2 req'd)	1A5828 24052
32	Cap Screw, zn pl steel (2 req'd)	1K7646 24052
34	Flared Nut, zn pl steel	1D6921 24272
35	Tubing Connector, brass	1D6922 14012
36	Pipe Bushing, steel (2 req'd)	1A3424 28992

Type 1098 and 1098H Actuators (figure 20)

	Parts kit (included are: casing O-ring, key 5; stem O-ring, key 6; and diaphragm, key 7)	
	Size 30	R1098 X00302
	Size 40 (standard)	R1098 X00402
	Size 70	R1098 X00702
1	Lower Diaphragm Case	
	Type 1098	
	Size 30, zn pl steel	2E8007 28992
	Size 40, steel	24A7155 X012
	Size 70, zn pl steel	2N1266 28992
	Type 1098H	
	Size 30, WCB steel	36A8537 X012
	NACE Construction	
	Type 1098	
	Size 30, heat-treated zinc plated steel (NACE)	2E8007 X0022
	Size 40, NACE steel	24A7155 X032
	Size 70, NACE steel	2N1266 X0022
	Type 1098H (size 30 only), heat-treated WCB steel (NACE)	36A8537 X022
2	Upper Diaphragm Case	
	Type 1098	
	Size 30	
	Steel	25A7340 X012
	Wrought steel (NACE)	25A7340 X022
	Size 40	
	zinc plated steel	24A5680 X012
	Wrought steel (NACE)	24A5680 X022
	Size 70	
	zinc plated steel	25A2607 X012
	Wrought steel (NACE)	25A2607 X022
	Type 1098H	
	Size 30	
	WCB steel	36A8535 X012
	Heat-treated WCB steel (NACE)	36A8535 X022
3	Bonnet (for Type 1098 only)	
	Steel	24A5681 X012
	Wrought steel (NACE)	24A5681 X022
4	Cap Screw (for Type 1098 only)	
	Zinc plated steel	1D5287 24952
	B7M zinc plated steel (NACE)	1D5298 X0012
5*	Casing O-Ring	
	Nitrile (not req'd for Type 1098H)	1F9141 06992
	Fluoroelastomer	1F9141 X0012
6*	Stem O-Ring (2 req'd)	
	Nitrile	1C7822 06992
	Fluoroelastomer	1K7561 06382
7*	Diaphragm, nitrile	
	Size 30	2E7919 02202
	Size 40	2E6700 02202
	Size 70	2N1269 02202
8	Diaphragm Plate	
	Cast iron	
	Size 30	15A7339 X012
	Size 40	14A5682 X012
	Size 70	15A2606 X012
	Heat-treated WCB steel (NACE)	
	Type 1098	
	Size 30	19A7317 X012
	Size 40	19A7318 X012
	Size 70	19A7319 X012
	Type 1098H (size 30 only)	19A7317 X012
9	Stem Cap Screw	
	Plated steel	
	Size 30 or 40	1L5454 28982
	Size 70	11B1768 X012
	Grade 8 black steel (NACE)	
	Type 1098 (NACE)	
	Size 30 or 40 (NACE)	1L5454 X0012
	Size 70 (NACE)	11B1768 X022
	Type 1098H (size 30 only) (NACE)	1L5454 X0012
10	Cap Screw, zn pl steel	
	Type 1098	
	Size 30 (12 req'd)	1E7603 24052
	Size 40 (16 req'd)	1E7603 24052
	Size 70 (28 req'd)	1A5828 24052
	Type 1098H	
	Size 30 (12 req'd)	1A9155 24052
11	Hex Nut, zn pl steel	
	Type 1098	
	Size 30 (12 req'd)	1A3465 24122
	Size 40 (16 req'd)	1A3465 24122
	Size 70 (28 req'd)	1A3465 24122
	Type 1098H	
	Size 30 (12 req'd)	1A3403 24122
12	Stem	
	17-4PH stainless steel	
	1 inch	14A6757 X012
	2 inch	14A5683 X012
	3 inch	14A5663 X012
	4 inch	14A5648 X012
	6 inch	14A6987 X012
	8 x 6 inch	18A4217 X012
	316 stainless steel (NACE)	
	1 inch main valve body (NACE)	14A6757 X022
	2 inch main valve body (NACE)	14A5683 X022
	3 inch main valve body (NACE)	14A5663 X022
	4 inch main valve body (NACE)	14A5648 X022
	6 inch main valve body (NACE)	14A6987 X022
	8 x 6 inch main valve body (NACE)	18A4217 X022
13	Nameplate, stainless steel (not shown)	
	Size 30	25A8373 X012
	Size 40	24A5704 X012
	Size 70	25A8374 X012
26	NACE Tag, 18-8 stainless steel (not shown)	19A6034 X012
27	Type Y602-12 Vent Assembly	27A5516 X012
27	Tag Wire, 303 stainless steel (not shown) (NACE)	1U7581 X0022
28	Grease Fitting, steel	1L8478 28992

*Recommended spare part
3. Trademark of Armite Laboratories.

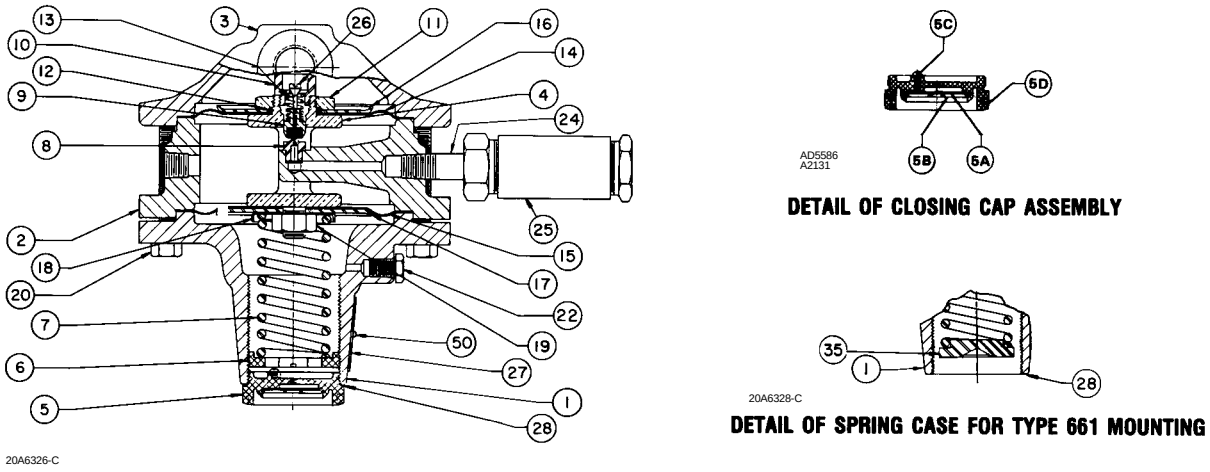


Figure 18. Type 61LD Pilot Assembly

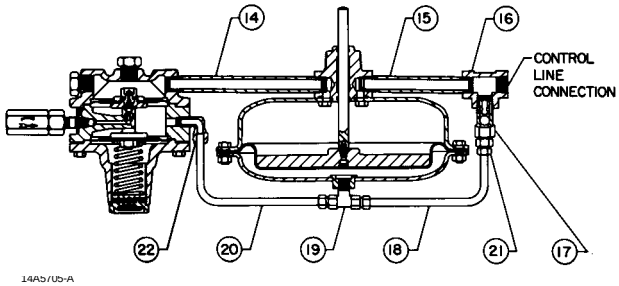


Figure 19. Type 61LD Pilot and Type1806 Relief Valve Mounting

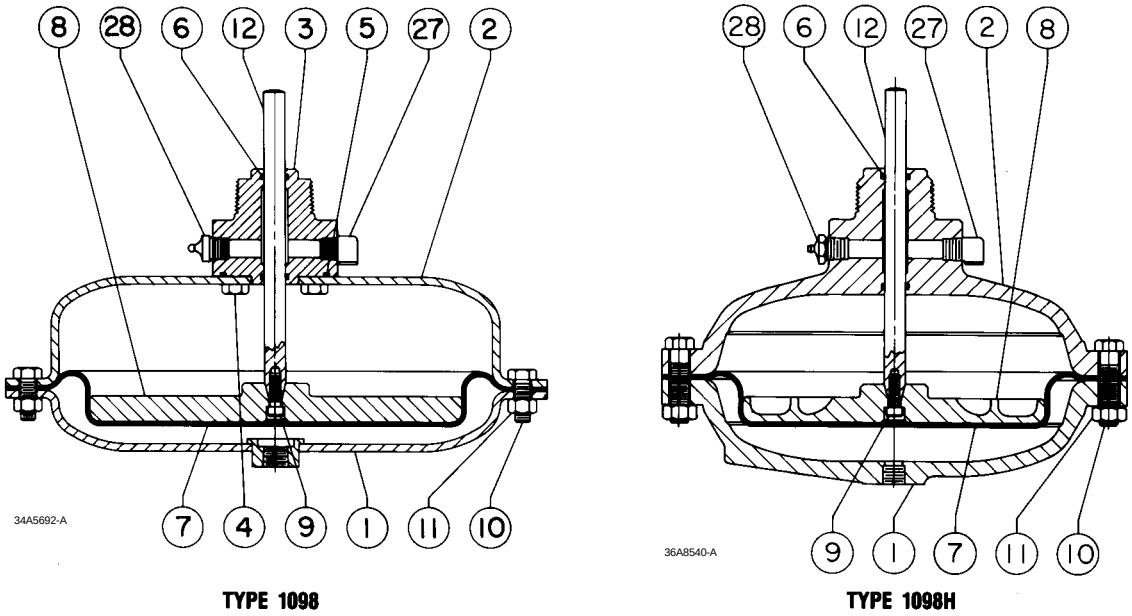


Figure 20. Type 1098 and 1098H Actuator Assemblies

Fisher Controls

For information, contact Fisher Controls:
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Cernay 68700 France
Sao Paulo 05424 Brazil
Singapore 0512

May 1997

Errata Sheet
for

Type 1098-EGR & 1098H-EGR Pilot-Operated Regulators,
Form 5084, May 1987

This errata sheet covers updated information on the Type 1098-EGR Pilot Operated Regulators. Each bullet on this errata sheet refers to the Type 1098 and 1098H Actuator and Pilot Mounting Parts section on page 17 and figure 20 on page 28 of the Type 1098-EGR & 1098H-EGR Pilot-Operated Regulators instruction manual Form 5084.

The Type 1098 bonnet has been redesigned to incorporate a wiper ring, bearings and larger casing O-ring. This redesign effects all body sizes and actuator sizes (size 30, 40, 70 and 30H) for the Type 1098.

When doing maintenance on the Type 1098 original bonnet design and the bonnet redesign, the repair kits R1098X00302, R1098X00402 and R1098X00702 will include all the necessary parts to repair both designs. When repairing the original design, key numbers 56 (bearings) and 57 (wiper ring) will not be needed (refer to figure 20).

- Replace the steps in the section Type 1098 and 1098H Actuator and Pilot Mounting Parts on page 17 with the following steps.

2. Access to all internal parts except the stem O-rings, bearings and wiper (keys 6, 56, 57) may be gained without removing the bonnet (key 3) or upper diaphragm case (key 2) from the main valve or the pilot(s) from the bonnet pipe nipple (key 23, figure 15, or keys 37 and 39, figure 16). Disconnect the loading tubing (key 24, figure 15, 16, or 17) from the actuator elbow fitting (key 25, figure 15, or key 41, figure 16), and with a Type 61LD pilot also disconnect the relief tubing (key 18, figure 19) from the fitting tee.

Second paragraph of step 4.

To remove the Type 1098 and Type 1098H stem O-rings (key 6), remove the pilot(s) and pipe nipple(s) if necessary. Unscrew either the Type 1098 bonnet (key 3) or the Type 1098H upper diaphragm case (key 2), and remove the wiper ring, bearings and O-rings.

5. Lubricate both stem O-rings (key 6), and wiper ring (key 57) and install them with the stem bearings (key 56) in either the Type 1098 bonnet (key 3) or in the Type 1098H upper diaphragm case (key 2).

- Add the diagram on the following page to figure 20 on page 28 of the instruction manual.

For information, contact Fisher Controls:
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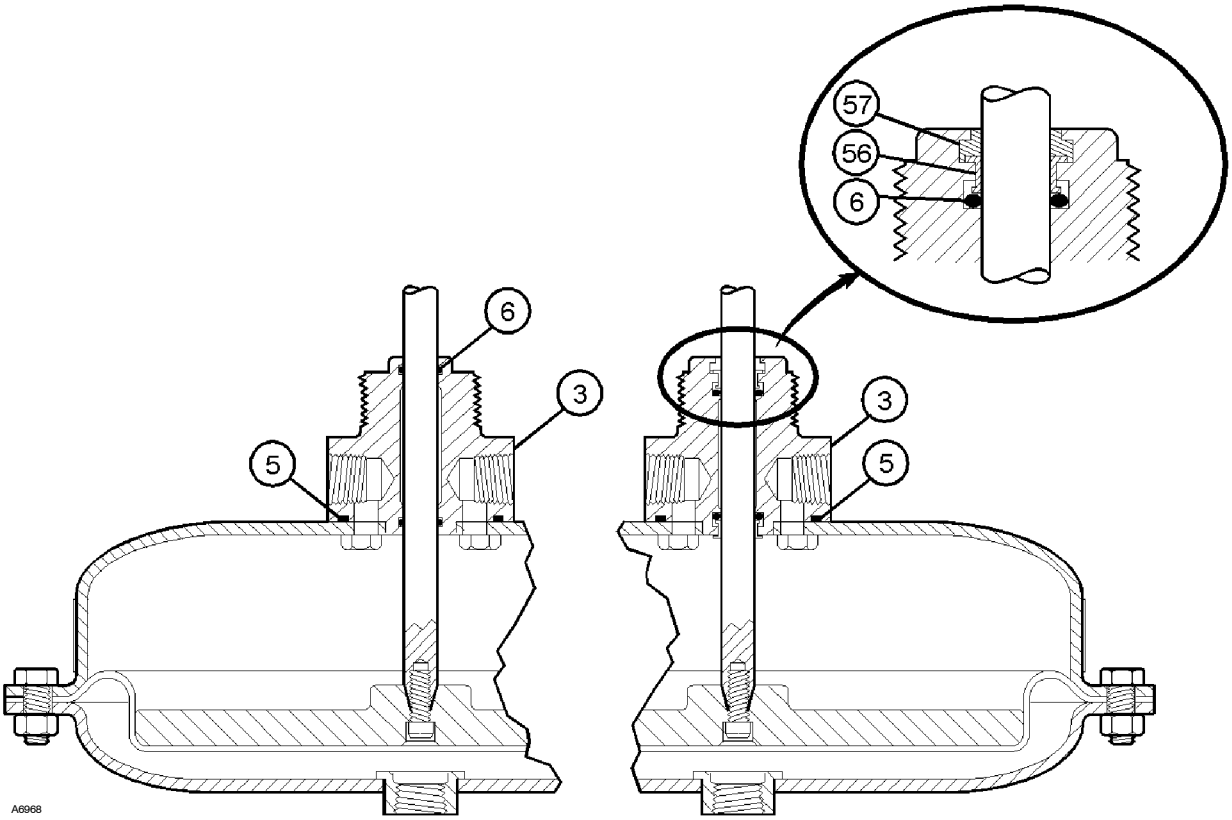

TYPE 1098 ORIGINAL DESIGN

Key	Description	Part Number
3	Bonnet, Steel	24A5681X012
5	Casing O-ring, Nitrile	1F914106992
6	Stem O-ring (2 req d)	
	Nitrile	1C782206992
	Fluoroelastomer	1K756106382

TYPE 1098 REDESIGN

Key	Description	Part Number
3	Bonnet, Steel	33B0301X012
5	Casing O-ring, Nitrile	1F358106992
6	Stem O-ring (2 req d)	
	Nitrile	1C782206992
	Fluoroelastomer	1K756106382
56	Bearing, Nylon (2 req d)	17A7112X012
57	Wiper Ring	15A6002XN12

Figure 20. Type 1098 and 1098H Actuator Assemblies

August 1999

Errata Sheet
for

Types 1098-EGR & 1098H-EGR Pilot-Operated Regulators
Form 5084, May 1987

The body plug on the Type 6351 pilot has been redesigned. The body plug gasket and body plug previously used on the Type 6351 pilot have been replaced with a new body plug assembly. The body plug assembly includes the body plug and the body plug O-ring. Replace or add the following information on the Types 1098-EGR & 1098H-EGR Instruction Manual, form 5084.

- **Replace step 3 of the Type 6351 Pilot section on page 16 with the following:**

3. To replace the valve plug (key 4), remove body plug (key 3 or 3A) to let the plug spring (key 6) and plug/stem assembly (key 4) drop freely from the body (key 1). Inspect the removed parts, replace if neccessary. Make sure the plug seating surfaces are free from debris. Inspect body plug O-ring (key 3B), replace if necessary. Type 6351 pilots manufactured before May 1999 need to have the body plug gasket (key 23) and the body plug (key 3) replaced with a new body plug assembly (key 3), which includes the body plug (key 3A) and the body plug O-ring (key 3B). Install the body plug O-ring (key 3B) over the body plug (key 3A). Stack the plug spring (key 6) and the plug/stem assembly on the body plug assembly (key 3), and install the body plug assembly with stacked parts into the body (key 1).

- **Replace the following Parts List information beginning on page 21 with the information below:**

Type 6351 Pilot (figure 13)

Key	Description	Part Number
	Parts Kit (includes keys 3, 4, 6, 7, and P590 Series filter, key 2)	R6351X00012
3	Body Plug Assembly (includes body plug and O-ring)	
	Aluminum body plug	
	with nitrile O-ring	18B6542X022
	with fluoroelastomer O-ring	18B6542X042
	Stainless steel body plug	
	with nitrile O-ring	18B6542X052
	with fluoroelastomer O-ring	18B6542X062

- **Delete the following Parts List information on page 22:**

Key	Description	Part Number
23*	Body Plug Gasket, composite	1C495704022

For information, contact Fisher Controls:
Marshalltown, Iowa 50158 USA
28320 Gallardon, France
Sao Paulo 05424 Brazil
Singapore 128461

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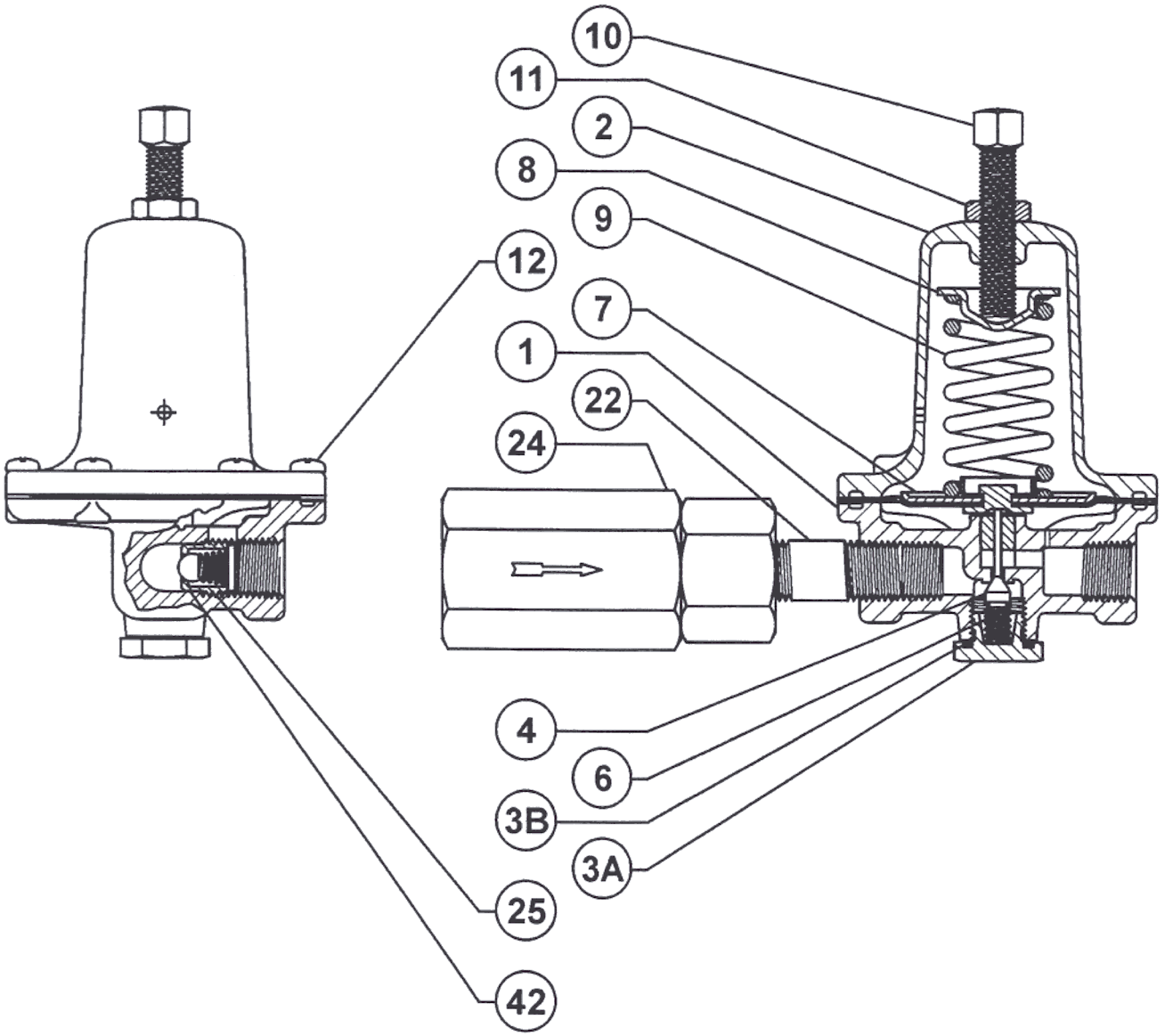
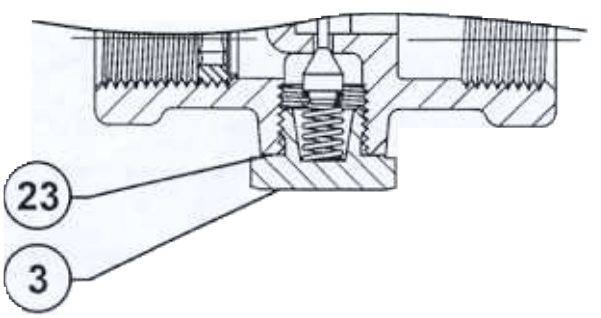
- **Replace the Type 6351 Interior Assembly in figure 13 on page 22 with the figure below:**



NEW TYPE 67 OR 67R ASSEMBLY DRAWING
SHOWING NEW BODY PLUG AND BODY PLUG GASKET



OLD TYPE 67 OR 67R ASSEMBLY DRAWING
SHOWING OLD BODY PLUG AND BODY PLUG GASKET

July 2002

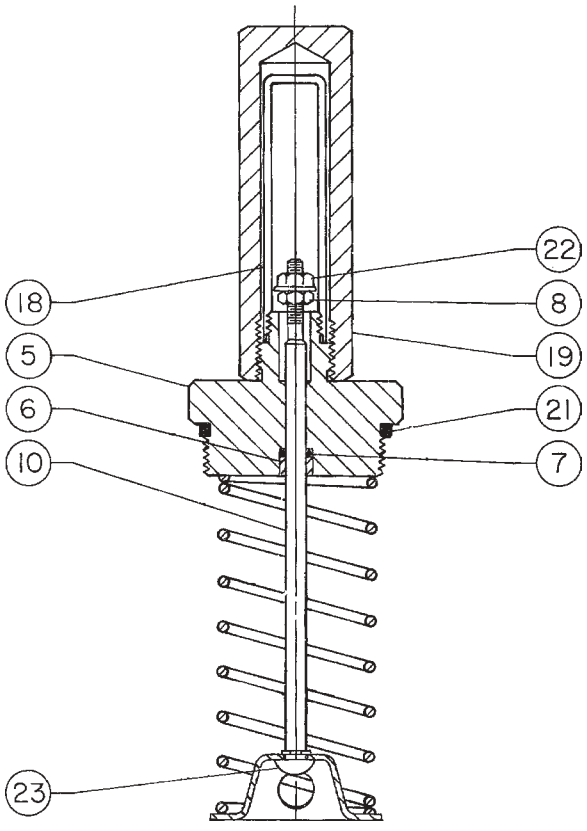
Errata Sheet
for

Type 1098-EGR and 1098H-EGR Pilot-Operated Regulators
Form 5084, May 1987

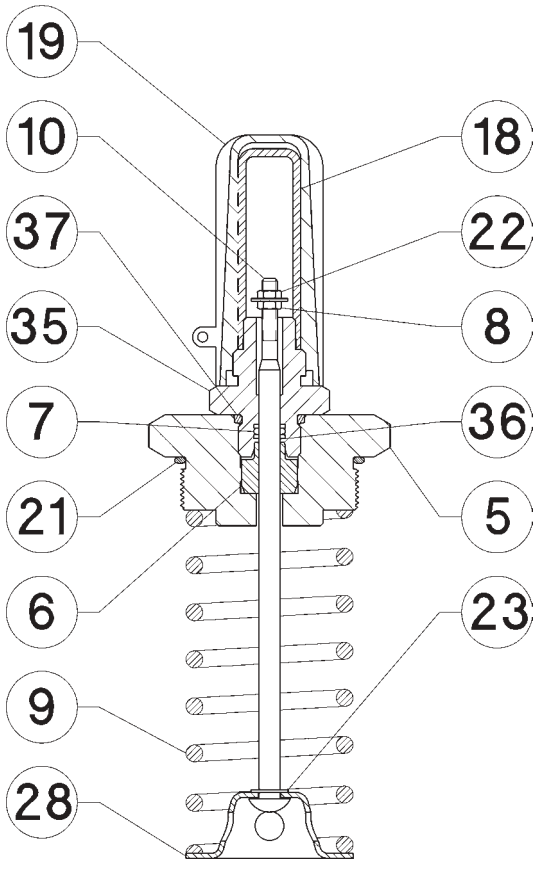
This errata sheet covers the redesign of the Type 1098-EGR and 1098H-EGR travel indicator assemblies. This redesign has been incorporated into all body sizes, regardless of actuator size. The Type 1098-EGR and 1098H-EGR travel indicator assemblies now incorporate a redesigned O-ring retainer (key 6), TFE back-up rings (key 36), and an additional indicator fitting (key 35).

When performing maintenance on the original Type 1098-EGR or 1098H-EGR body flange, travel indicator replacement is recommended. The redesigned travel indicator assembly is incorporated into all Quick-Change Trim kits (e.g. 25A3170X012) and on the Travel Indicator Kits (see table by size). The elastomer repair kits contain the components for the redesigned travel indicator assembly.

See the drawings below for old versus new design.



TYPE 1098 ORIGINAL DESIGN (PRIOR TO SPRING 2002)



TYPE 1098 REDESIGN (10C1212 KIT)

Type 1098-EGR and 1098H-EGR Travel Indicator Assemblies

- Insert the following steps after “Replacing Quick-Change Trim Package” section on page 14.

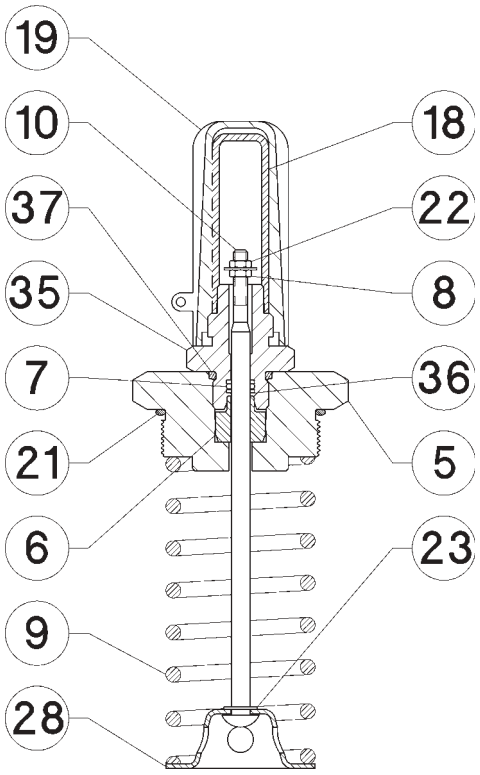
Replacing Travel Indicator Assembly

1. Remove the travel indicator assembly by removing lower indicator fitting (key 5) from body flange (key 2).
2. Coat the threads of the lower indicator fitting (key 5) with a good grade of general-purpose grease.
3. Install travel indicator assembly (10C1212), torque to 40 inch-pounds.
4. Check indicator zeroing by unscrewing the indicator protector (key 19) and seeing if the flange of the indicator nut (key 22) lines up evenly with the bottom marking on the indicator scale (key 18). If not, remove the indicator scale and separate the indicator nut and hex nut (key 8). Hold the indicator scale against the indicator fitting (key 5) with the scale base resting against the shoulder of the fitting, and turn the indicator nut until its flange is aligned with the bottom scale marking. Then lock both nuts against each other, and install the indicator scale and protector.

- Insert the following parts kit list after “Quick Change Trim Assembly” on page 18

Key	Description	Part Number
	Parts kit, QuickChange Travel Indicator Kit (included are: indicator stem, key 10;O-ring retainer, key 6; indicator fitting, key 35; lower indicator fitting, key 5; mach hex nut, key 8; nitrile O-ring, key 7; back-up scarf ring, key 36, 2 required; nitrile o-ring, key 21; indicator cover, key 18; flange nut, key 22; E-ring, key 23; nitrile O-ring, key 37; adjusting screw cap, key 19; spring seat, key 28; spring, key 9)	
	Note: Indicator zeroing of key 8, 12 and 18 may be needed. See Step 4 above.	
	60 Psi (4,1 bar) spring color green	
	1-inch	10C1212X042
	2-inch	10C1212X012
	3-inch	10C1212X022
	4-inch	10C1212X032
	6-inch	10C1212X052
	125 Psi (8.6 bar) spring color blue	
	1-inch	10C1212X092
	2-inch	10C1212X062
	3-inch	10C1212X072
	4-inch	10C1212X082
	6-inch	10C1212X102
	400 Psi (28 bar) spring color red	
	1-inch	10C1212X142
	2-inch	10C1212X112
	3-inch	10C1212X122
	4-inch	10C1212X132
	6-inch	10C1212X152

- Insert “1098 Redesign” into figure 11, page 19.



Travel Indicator Assembly

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