

Types 1098-EGR and 1098H-EGR Pressure Reducing Regulators



WARNING

Failure to follow these instructions or to properly install and maintain this equipment could result in an explosion, fire and/or chemical contamination causing property damage and personal injury or death.

Fisher® regulators must be installed, operated, and maintained in accordance with federal, state, and local codes, rules and regulations, and Fisher instructions.

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

Installation, operation, and maintenance procedures performed by unqualified personnel may result in improper adjustment and unsafe operation. Either condition may result in equipment damage or personal injury. Use qualified personnel when installing, operating, and maintaining the Types 1098-EGR and 1098H-EGR pressure reducing regulator.

Introduction

Scope of Manual

This manual describes and provides instructions and parts list for Type 1098-EGR or 1098H-EGR regulator complete with a standard P590 Series filter and either a 6350 Series regulator, a 61 Series pilot, or a Type Y600AM Pilot. The Type 1806 relief valve is also covered when a 61 Series pilot is used. Instructions and parts lists for monitoring pilots and other equipment used with this regulator are found in separate manuals.



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Figure 1. Type 1098-EGR

Description

Types 1098-EGR and 1098H-EGR regulators provide economical and accurate pressure control in a wide variety of applications; natural gas distribution systems; fuel gas supply to industrial boilers, furnaces, ovens, and mixers; and large commercial/industrial establishments such as shopping centers and schools. 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.

Specifications

The Specifications section lists pressure limitations and other specifications for various Types 1098-EGR and 1098H-EGR constructions. Specifications for a given regulator as it originally comes from the factory are stamped on nameplates located on both the



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Specifications

Body Sizes and End Connection Styles

See Table 1

Main Valve Maximum Inlet Pressure⁽¹⁾

400 psig (27,6 bar) or body rating limit whichever is lower

Maximum Pilot Supply Pressure^(1,2)

600 psig (41,4 bar)

Outlet Pressure Ranges

See Table 2

Maximum and Minimum Differential Pressures

See Table 4

Actuator Sizes and Maximum Pressures

See Table 3

Main Valve Flow Characteristic

Linear (standard) or Quick opening

Main Valve Flow Direction

In through the seat ring and out through the cage

Pressure Registration

External

Material Temperature Capabilities⁽²⁾

Nitrile (NBR):

-20° to 180°F (-29° to 82°C)

Fluorocarbon (FKM):

0° to 300°F (-18° to 149°C),

Water is limited to 0° to 180°F (-18° to 82°C)

Ethylene propylene (EPR):

-20° to 275°F (-29° to 135°C)

Options

- NACE Construction
- Boiler Fuel Construction
- Aqueous Service Construction
- Monitor Configuration
- Noise Abatement Trim

1. The pressure/temperature limits in this instruction manual or 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.

Table 1. Body Sizes and End Connection Styles

BODY SIZE, INCHES (DN)	CAST IRON	STEEL OR STAINLESS STEEL
1 or 2 (25 or 50)	NPT, CL125 FF, or CL250 RF	NPT, CL150 RF, CL300 RF, CL600 RF, BWE, SWE, or PN 16/25/40
3, 4, or 6 (80, 100 or 150)	CL125 FF or CL250 RF	CL150 RF, CL300 RF, CL600 RF, BWE, or PN 16/25/40
8 x 6 or 12 x 6 (200 x 150 or 300 x 150)	----	CL150 RF, CL300 RF, CL600 RF, BWE, or PN 16/25/40

Table 2. Outlet Pressure Ranges

PILOT TYPE	OUTLET (CONTROL) PRESSURE RANGES	SPRING COLOR	SPRING PART NUMBER
6351	3 to 20 psig (0,21 to 1,4 bar) 5 to 35 psig (0,34 to 2,4 bar) 35 to 100 psig (2,4 to 6,9 bar)	Green Silver Red	1B986027212 1B788327022 1K748527202
6352	14-inches w.c. to 2 psig (35 mbar to 0,14 bar) 2 to 10 psig (0,14 to 0,69 bar)	Yellow Black	14A9672X012 14A9673X012
6353	3 to 40 psig (0,21 to 2,8 bar) 35 to 125 psig (2,4 to 8,6 bar)	Yellow Red	1E392527022 1K748527202
6354L ⁽¹⁾ 6354M ⁽²⁾ 6354H	85 to 200 psig (5,9 to 13,8 bar) ⁽¹⁾ 175 to 220 psig (12,1 to 15,2 bar) ⁽²⁾ 200 to 300 psig (13,8 to 20,7 bar) ⁽²⁾	Blue Blue Green	1L346127142 1L346127142 15A9258X012
61L 61LD 61LE	0.25 to 2 psig (0,02 to 0,14 bar) 1 to 5 psig (0,07 to 0,34 bar) 2 to 10 psig (0,14 to 0,69 bar) 5 to 15 psig (0,34 to 1,0 bar) 10 to 20 psig (0,69 to 1,4 bar)	Red Yellow Blue Brown Green	1B886327022 1J857827022 1B886427022 1J857927142 1B886527022
61H	10 to 65 psig (0,69 to 4,5 bar)	Green Stripe	0Y066427022
61HP	15 to 45 psig (1,0 to 3,1 bar) 35 to 100 psig (2,4 to 6,9 bar) 100 to 300 psig (6,9 to 20,7 bar)	Yellow Blue Red	1E392527022 1D387227022 1D465127142
Y600AM	4 to 8-inches w.c. (10 to 20 mbar) 7 to 16-inches w.c. (17 to 40 mbar) 15-inches w.c. to 1.2 psig (37 mbar to 0,08 bar) 1.2 to 2.5 psig (0,83 to 0,17 bar) 2.5 to 4.5 psig (0,17 to 0,31 bar) 4.5 to 7 psig (0,31 to 0,48 bar)	Red Olive Drab Yellow Light Green Light Blue Black	1B653827052 1B653927022 1B537027052 1B537127022 1B537227022 1B537327052

1. Without diaphragm limiter.
2. With diaphragm limiter.

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Table 3. Actuator Sizes and Maximum Pressures

ACTUATOR		OUTLET (CONTROL) PRESSURE, PSIG (bar)	EMERGENCY CASING PRESSURE, PSIG (bar)
Type	Size		
1098	30	100 (6,9)	115 (7,9)
	40 (standard)	75 (5,2)	82 (5,7)
	70	50 (3,5)	65 (4,5)
1098H	30	300 (20,7)	400 (27,6)

Table 4. Maximum and Minimum Differential Pressures for Main Valve Selection

BODY SIZE, INCHES (DN)	SPRING PART NUMBER AND COLOR	MAXIMUM ALLOWABLE DIFFERENTIAL PRESSURE, PSIG (bar) ⁽¹⁾	MINIMUM DIFFERENTIAL PRESSURE REQUIRED FOR FULL STROKE, PSIG (bar)		
			Size 30 Actuator	Size 40 Actuator	Size 70 Actuator
1 (25)	14A9687X012 Green	60 (4,1)	3.5 (0,24)	2.5 (0,17)	1 (0,07)
	14A9680X012 Blue	125 (8,6)	5 (0,34)	4 (0,28)	1.5 (0,10)
	14A9679X012 Red	400 (27,6) or body rating limit, whichever is lower	7 (0,48)	5 (0,34)	2.5 (0,17)
2 (50)	14A6768X012 Yellow	20 (1,4)	----	2 (0,14)	1 (0,07)
	14A6626X012 Green	60 (4,1)	4 (0,28)	3 (0,21)	1.5 (0,10)
	14A6627X012 Blue	125 (8,6)	6 (0,41)	5 (0,34)	2 (0,14)
	14A6628X012 Red	400 (27,6) or body rating limit, whichever is lower	11 (0,76)	10 (0,69)	3 (0,21)
3 (80)	14A6771X012 Yellow	20 (1,4)	----	2.5 (0,17)	1 (0,07)
	14A6629X012 Green	60 (4,1)	5 (0,34)	4 (0,28)	2 (0,14)
	14A6630X012 Blue	125 (8,6)	8 (0,55)	6 (0,41)	2.5 (0,17)
	14A6631X012 Red	400 (27,6) or body rating limit, whichever is lower	14 (0,97)	11 (0,76)	4 (0,28)
4 (100)	14A6770X012 Yellow	20 (1,4)	----	3.5 (0,24)	1.3 (0,09)
	14A6632X012 Green	60 (4,1)	10 (0,69)	5 (0,34)	2.5 (0,17)
	14A6633X012 Blue	125 (8,6)	13 (0,90)	8 (0,55)	3 (0,21)
	14A6634X012 Red	400 (27,6) or body rating limit, whichever is lower	22 (1,5)	13 (0,90)	5 (0,34)
6, 8 x 6, and 12 x 6 (150, 200 x 150, and 300 x 150)	15A2253X012 Yellow	20 (1,4)	----	6 (0,41)	2.2 (0,15)
	14A9686X012 Green	60 (4,1)	13 (0,90)	9.5 (0,66)	4 (0,28)
	14A9685X012 Blue	125 (8,6)	19 (1,3)	14 (0,97)	6 (0,41)
	15A2615X012 Red	400 (27,6) or body rating limit, whichever is lower	28 (1,9) ⁽²⁾	19 (1,3)	8 (0,55)

1. Maximum inlet pressure is equal to set pressure plus maximum differential.

2. Requires special 6300 Series pilot construction without integral relief valve and with external Type 1806 40 psid (2,8 bar d) relief valve.

Table 5. Supply Pressure Settings Required for the Type 95H Regulator

BODY SIZE, INCHES (DN)	TYPE EGR SPRING COLOR	SUPPLY PRESSURE, PSIG (bar)					
		Type Y600AM Spring Color					
		Red	Olive Drab	Yellow	Green	Light Blue	Black
1 (25)	Green	6 (0,41)	6 (0,41)	7 (0,48)	8 (0,55)	11 (0,76)	13 (0,90)
	Blue	7 (0,48)	7 (0,48)	8 (0,55)	10 (0,69)	13 (0,90)	14 (0,97)
	Red	8 (0,55)	8 (0,55)	9 (0,62)	11 (0,76)	14 (0,97)	15 (1,0)
2 (50)	Green	6 (0,41)	6 (0,41)	7 (0,48)	9 (0,62)	12 (0,83)	13 (0,90)
	Blue	8 (0,55)	8 (0,55)	9 (0,62)	11 (0,76)	14 (0,97)	15 (1,0)
	Red	13 (0,90)	13 (0,90)	14 (0,97)	16 (1,1)	19 (1,3)	20 (1,4)
3 (80)	Green	7 (0,48)	7 (0,48)	8 (0,55)	10 (0,69)	13 (0,90)	14 (0,97)
	Blue	9 (0,62)	9 (0,62)	10 (0,69)	12 (0,83)	15 (1,0)	16 (1,1)
	Red	14 (0,97)	14 (0,97)	15 (1,0)	17 (1,2)	20 (1,4)	21 (1,5)
4 (100)	Green	8 (0,55)	8 (0,55)	9 (0,62)	11 (0,76)	14 (0,97)	15 (1,0)
	Blue	11 (0,76)	11 (0,76)	12 (0,83)	14 (0,97)	17 (1,2)	18 (1,2)
	Red	16 (1,10)	16 (1,1)	17 (1,2)	19 (1,3)	22 (1,5)	23 (1,6)
6 (150) 8 X 6 (200)	Green	13 (0,90)	13 (0,90)	14 (0,97)	15 (1,0)	18 (1,2)	20 (1,4)
	Blue	17 (1,17)	17 (1,2)	18 (1,2)	20 (1,4)	23 (1,6)	24 (1,6)
	Red	22 (1,5)	22 (1,5)	23 (1,6)	25 (1,8)	28 (1,9)	29 (2,0)

1. The pressures shown in the table are the minimum supply pressures required by the pilot. If the inlet pressure is less than shown, an external pilot supply is necessary.

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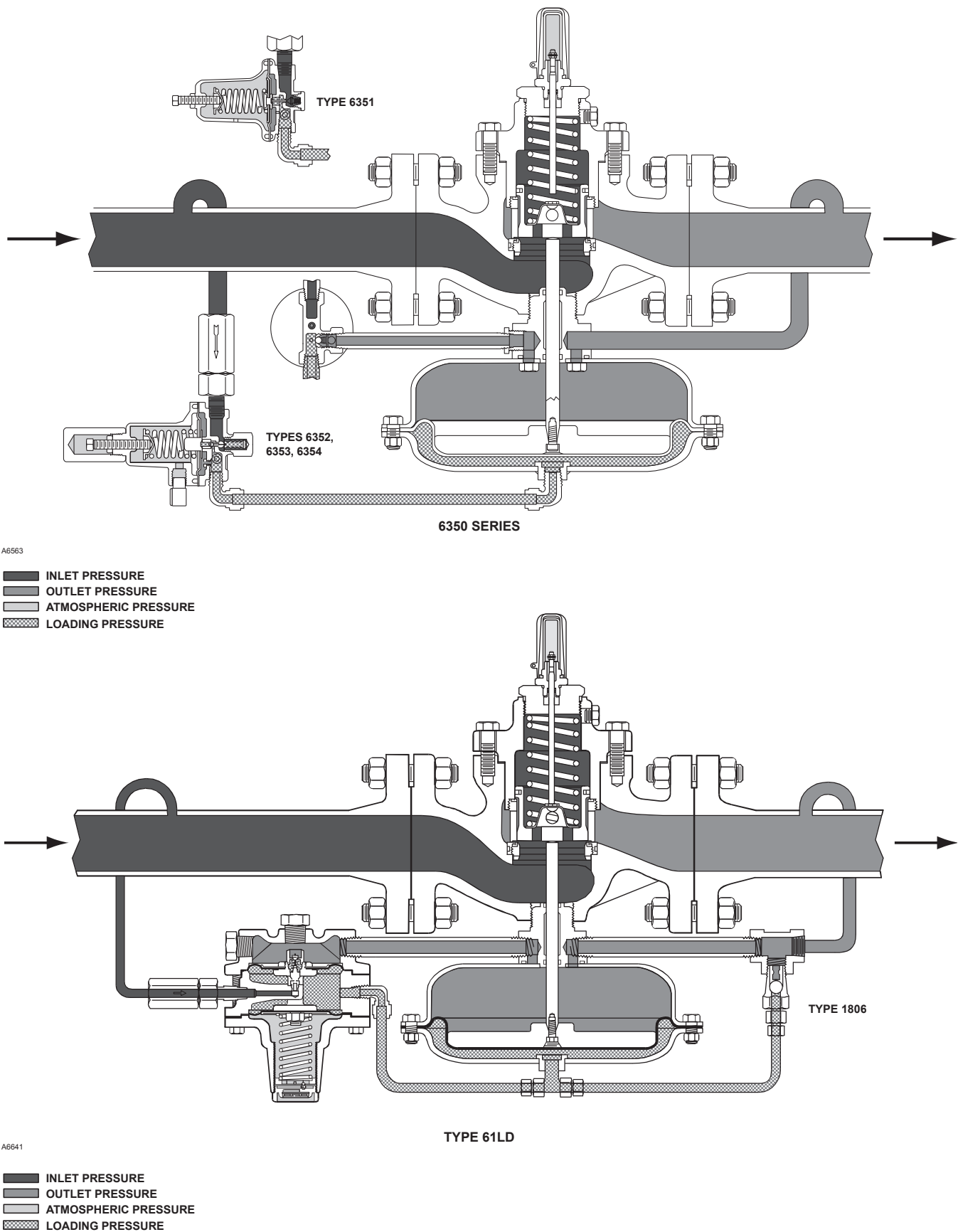
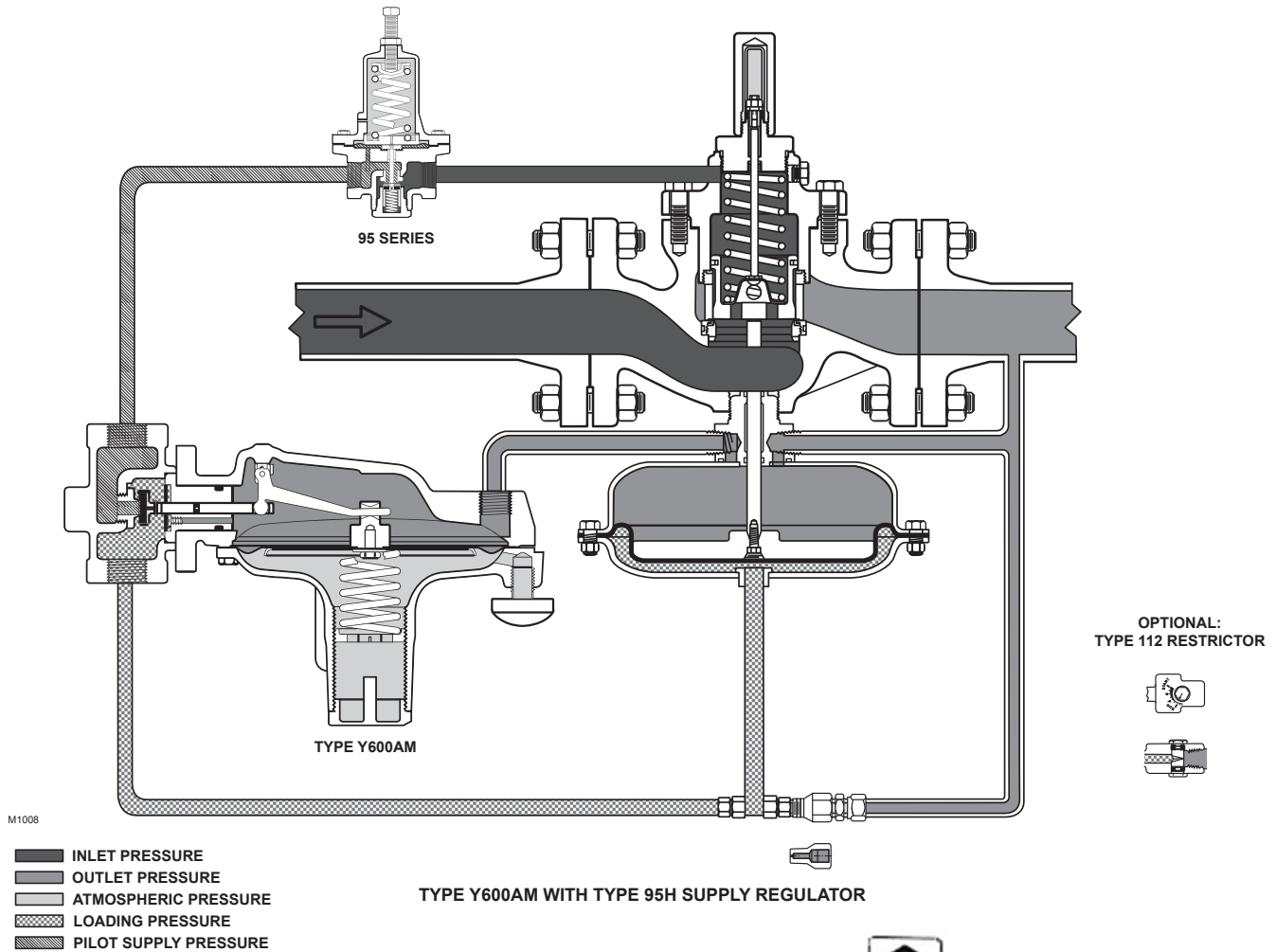
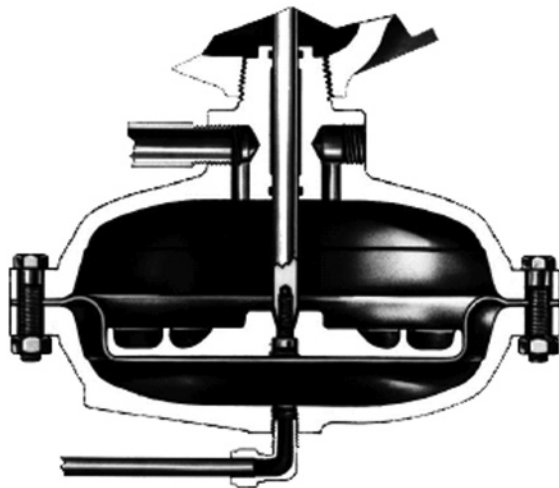


Figure 2. Operational Schematics

Types 1098-EGR and 1098H-EGR

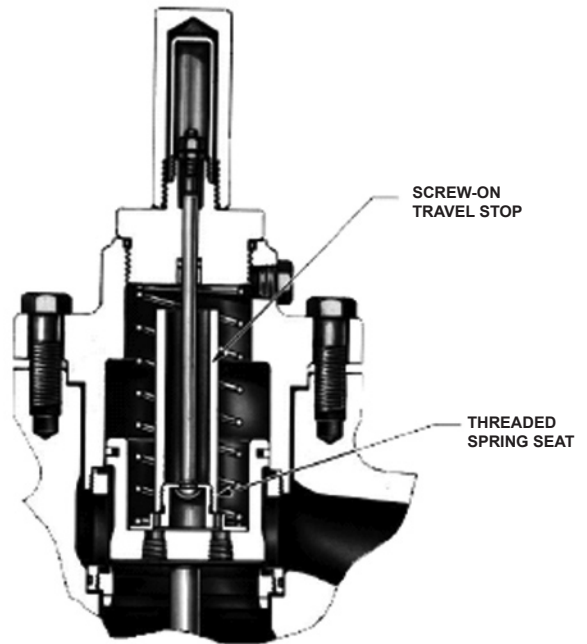


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DETAIL OF TYPE 1098H ACTUATOR



W3161-1"

DETAIL OF OPTIONAL
RESTRICTED CAPACITY CONSTRUCTION

Figure 2. Operational Schematics (continued)

Types 1098-EGR and 1098H-EGR

actuator and main valve body, while the pilot control spring range is displayed on the pilot spring case, and the pilot restriction code is stamped on the pilot body (S = standard gain, L = low gain, and H = high gain).

Principle of Operation

The pilot-operated Types 1098-EGR and 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 Type 1098-EGR regulator operation schematic is shown in Figure 2.

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 providing additional loading pressure to the actuator diaphragm. This loading pressure forces the actuator stem forward, opening the main valve plug via a bump connection. The upward motion of the plug allows gas to flow through the cage into 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, 61 Series, or Y600AM pilots) or bellows (Types 6352 through 6354M pilots) close the pilot valve plug (unbalanced in the Type 6351 or 61 Series pilots but balanced in the Types 6352 through 6354M pilot). Excess loading pressure on the actuator diaphragm escapes downstream through the bleed hole (Type 6351 pilot), bleed orifice (61 Series pilot), restriction (Types 6352 through 6354M pilots) or fixed restrictor (Type Y600AM pilot).

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

To protect the Type 1098 or 1098H actuator diaphragm from excessive differential pressure, the 6300 Series pilots have a relief valve that allows loading pressure to bleed downstream at approximately 25 psig (1,7 bar) differential across the actuator diaphragm. An external relief valve (Type 1806) is required when differential is higher than 25 psid (1,7 bar d) or when using the 61 or Y600A Series pilots.

40 PSI (2,8 bar) Relief Valve

A mounting assembly for a 40 psi (2,8 bar) differential relief valve is available for the Type 1098-EGR. The standard 25 psi (1,7 bar) differential relief valve construction is integrally mounted between the loading and downstream pressures in the 6351 through 6354 Series regulating pilots. Both differential relief valves protect the main regulator diaphragm from damage that may occur from too high differential between the loading pressure and downstream pressure.

The 40 psi (2,8 bar) differential relief valve construction is designed specifically for the red main valve spring selection in the 6-inch (DN 150) Type 1098-EGR-6354 with the size 30 actuator. This construction uses the Type 1806H relief valve (with a setting of 40 psi (2,8 bar)) to relieve excess loading pressure and does not interfere with the normal operation of the regulator.

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 the Specifications section and on the appropriate nameplate, or where conditions exceed any ratings of the adjacent piping or piping connections. To avoid such injury or damage, provide pressure-relieving or pressure-limiting devices to prevent service conditions from exceeding those limits.

Additionally, physical damage to the regulator may result 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 (Figure 3)

Installations

A Type 1098-EGR or 1098H-EGR regulator bleeds no gas to the atmosphere, making it suitable for installation in pits or other enclosed locations without

Types 1098-EGR and 1098H-EGR

elaborate venting systems. This regulator can also be installed in pits subject to flooding by venting the pilot spring case above the expected flood level so that the pilot diaphragm is exposed to atmospheric pressure.

Note

**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 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, 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 build-up on all machined guiding and sealing surfaces inside the body and at the bonnet flange/body joint.

Note

**Install so that flow through the main
valve matches the flow arrow attached to
the valve body.**

2. Install a three-valve bypass around the regulator if continuous operation is necessary during maintenance or inspection. 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. To remotely vent the standard pilot, remove the vent and install obstruction-free tubing or piping into the 1/4-inch NPT vent tapping. 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 (9,5 mm) outer diameter or larger pilot supply line from the upstream pipeline to the filter inlet as shown in Figure 3. 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. Do not make the tap near any elbow, swage, or nipple that might cause turbulence. Connect the other end of the control line to the bonnet connection. Install a hand valve in the control line to shutoff the control pressure when the bypass is in use.
6. If a quick acting solenoid is to be installed downstream of the regulator, the regulator and solenoid should be located as far apart as practical. This maximizes the gas piping volume between the regulator and solenoid and improves the regulator response to quick changing flow rates.
7. Consult the appropriate instruction manual for installation of an optional Type 662 pneumatic or electric remote control drive unit. For optional remote pneumatic loading of a 6350 or 61 Series 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:

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

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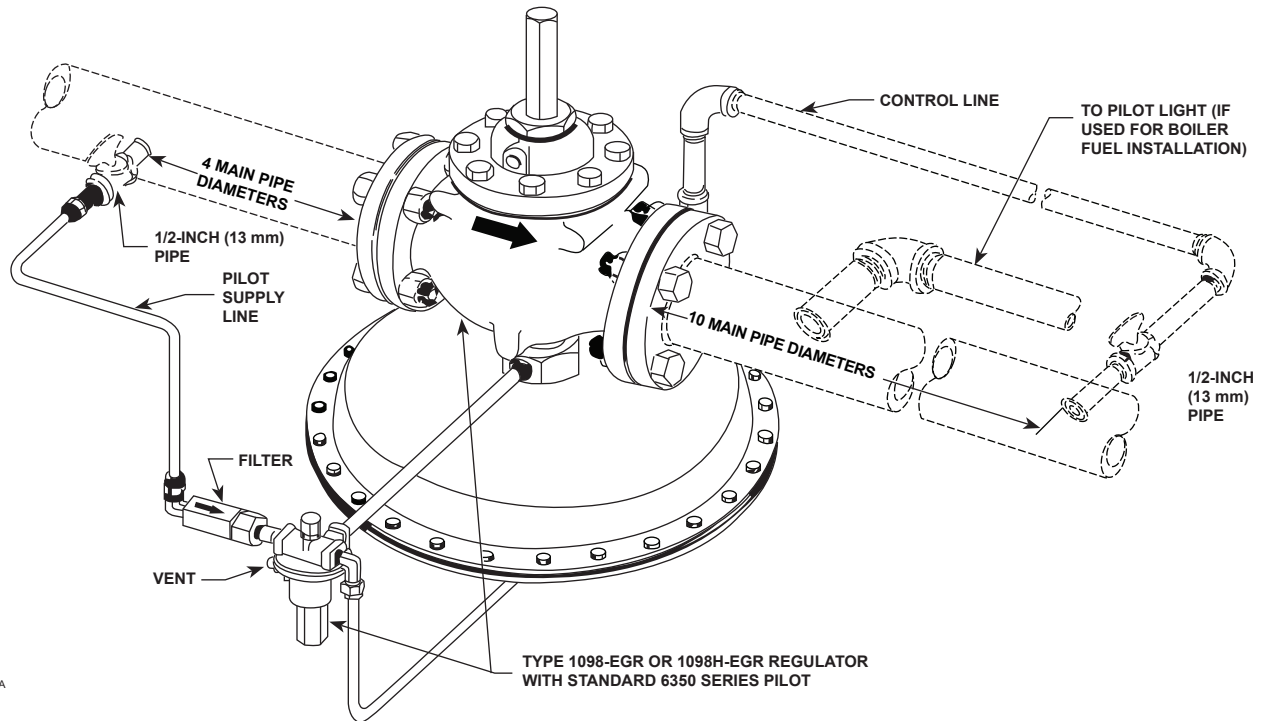


Figure 3. Standard Single-Pilot Installation



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 and turn the adjusting screw. Then tighten the locknut to maintain the adjustment position. On a standard Types 6352 through 6354M pilot, a closing cap must be removed before adjustment and replaced afterward.

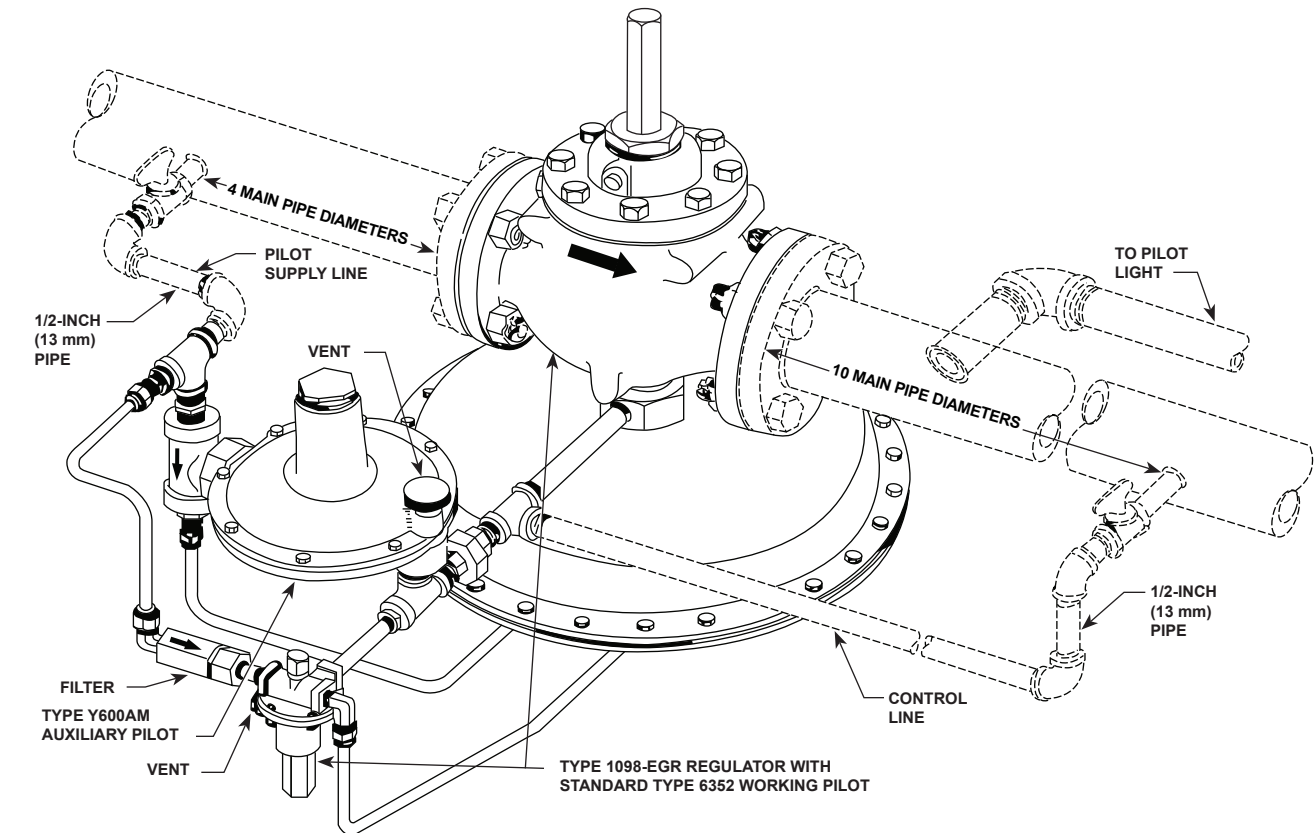


WARNING

To avoid possible personal injury from a pressure-loaded 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 61 Series or Type Y600AM pilots: remove the closing cap and turn the adjusting screw. Any adjustments made should set the controlled pressure within the appropriate spring range shown in the Table 2.

Types 1098-EGR and 1098H-EGR



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Figure 4. Typical Dual-Pilot Boiler Fuel Installation

Startup

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

Dual-Pilot Boiler Fuel Control

Applications

Boiler Fuel Pressure Control

To enhance proper operation and adequate response to negative pressure shock condition in low differential pressure boiler fuel control applications, use the Type 1098-EGR boiler fuel configuration:

- Type 1098-EGR with Type 6352 pilot
- Size 70 Actuator
- Quick Opening Cage
- Yellow Main Spring
- Type Y600AM or 627M Auxiliary Pilot mounted in parallel with the Type 6352 pilot

To provide faster response, two pilots mounted in parallel sense downstream pressure. To provide faster response, two pilots mounted in parallel sense the downstream pressure. The Type 6352 pilot is the primary controlling pilot and the Type Y600AM or 627M auxiliary pilot stands by until it senses a negative pressure shock condition. The auxiliary pilot opens, allowing additional flow into the actuator, increasing the stroking speed and providing faster response. See Figure 5 for schematic. The quick opening cage allows maximum capacity at shorter travels to decrease stroking time in opening and closing directions. The service conditions should not exceed 20 psig (1,4 bar) maximum inlet pressure and 10 psid (0,69 bar d) maximum differential pressure.

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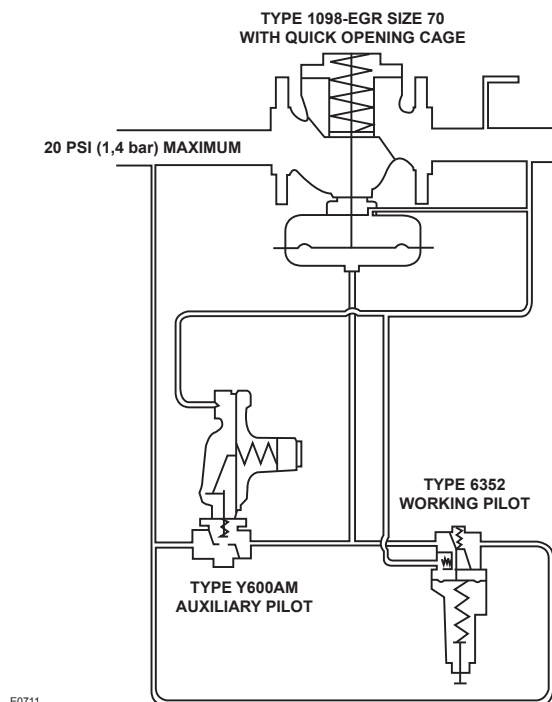


Figure 5. Boiler Fuel Configuration

Supply the boiler pilot light gas with the Type 1098-EGR. The pilot light gas supply line should branch off the main fuel line downstream of the Type 1098-EGR and include a separate regulator to control the final pilot light gas pressure, if required (see Figure 5). This allows the Type 1098-EGR to have its main valve plug just off the seat waiting for the sudden negative shock created when the boiler solenoid valve is opened to light the boiler to the low fire load. This installation practice significantly increases the stroking speed of the Type 1098-EGR. See Figure 5 for schematic.

Note

Modulating solenoid load valves provide a definite time delay in moving from one position to the other, effectively preventing sudden pressure changes in the system. Alternately, a snap-acting solenoid valve can be furnished with a characterized valve plug that, by allowing maximum capacity to be reached at a greater proportion of total travel, slows the action slightly. This action does not control shock as effectively as modulating solenoid valves.

Installation

1. Perform the Standard Single-Pilot Regulator Installation section through step 3, making sure that the regulator is installed with the actuator below the main valve as shown in Figure 4.
2. Run a 1/2-inch (13 mm) 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 regulator in the pilot supply line, and provide vent valves so that pressure can be properly isolated and relieved from the regulator.
3. Attach a 1/2-inch NPT downstream pressure control line ten pipe diameters downstream of the regulator in a straight run of pipe. Do not make the tap near any elbow, swage, or nipple, which might cause turbulence.

Table 6. Auxiliary Pilot Selection (Fast Stroke Dual Pilot)

SIZE	CONSTRUCTION	ORIFICE	SPRING RANGES	SPRING NUMBER	SPRING COLOR	MINIMUM PRESSURE AT WHICH AUXILIARY PILOT CAN BE SET
3/4-inch (19 mm)	Type Y600AM	1/2-inch (13 mm)	4 to 8-inches w.c. (10 to 20 mbar)	1B653827052	Red	1-inch w.c. (2 mbar) Under working pilot setpoint
			7 to 16-inches w.c. (17 to 40 mbar)	1B653927022	Olive Drab	
			15-inches w.c. to 1.2 psi (37 mbar to 0,08 bar)	1B537027052	Yellow	
	Type Y600AM	1/2-inch (13 mm)	1.2 to 2.5 psi (0,08 to 0,17 bar)	1B537127022	Light Green	0.2 psig (0,01 bar) Under working pilot setpoint
			2.5 to 4.5 psi (0,17 to 0,31 bar)	1B537227022	Light Blue	
			4.5 to 7 psi (0,31 to 0,48 bar)	1B537327052	Black	
	Type 627M	1/2-inch (13 mm)	5 to 10 psi (0,35 to 0,69 bar)	10B3076X012	Yellow	0.3 psig (0,02 bar) Under working pilot setpoint

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Connect the other end of the control line to the 1/4-inch NPT connection in the control pipe tee as shown in Figure 4. Install a hand valve in the control line to shutoff 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.

- 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 or 61 Series pilot, make the loading piping connections to the 1/4-inch NPT vent connection.

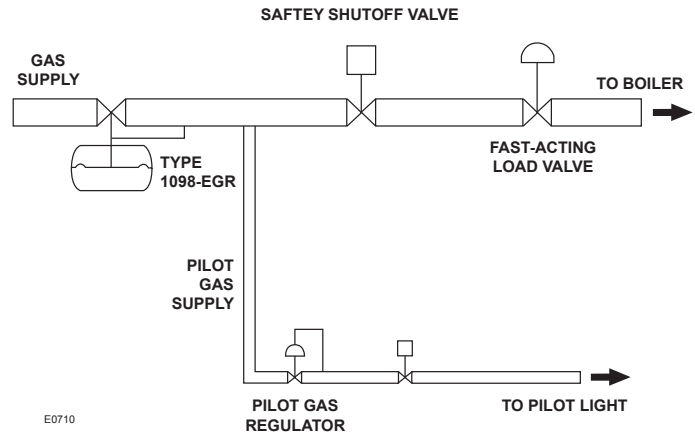


Figure 6. Boiler Fuel Configuration Installation Guide

Startup

- Slowly open the pilot supply line hand valve.
- Slowly open the upstream block valve and partially open the downstream block valve for minimum flow.
- 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 w.c. (27 mbar) for the working pilot and 10-inches w.c. (25 mbar) for the standby pilot, begin by reducing the working pilot setting far enough below 10-inches w.c. (25 mbar) for the working pilot to shutoff. Then set the standby pilot for an outlet pressure of 10-inches w.c. (25 mbar). Finally, set the working pilot for an outlet pressure of 11-inches w.c. (27 mbar).

Table 6 shows how close the standby pilot can be set to the working pilot setting.

- Completely open the downstream block valve.
- Slowly close the bypass valve, if any.

Working Monitor (Figure 7)

Installation

- For both working monitor regulator and working regulator, perform the Standard Single-Pilot Regulator Installation section through step 6.
- Connect another downstream pressure control line and hand valve (Figure 7) to the monitoring pilot according to the monitoring pilot instruction manual. Attach a 1/2-inch NPT 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.

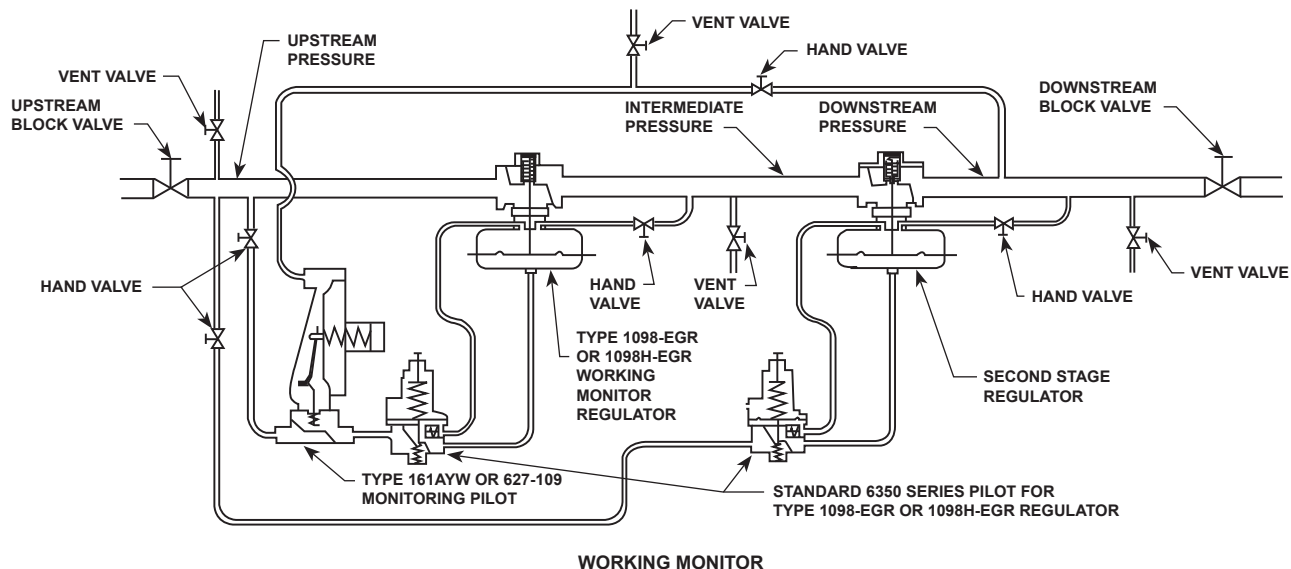
For two typical monitoring pilots, Table 7 gives the spread between normal distribution pressure and the minimum pressure at which the working monitor regulator can be set to take over if the working regulator fails to open.

Startup

Table 7. Working Monitor Performance

Construction	MONITORING PILOT INFORMATION		MINIMUM PRESSURE AT WHICH WORKING MONITOR REGULATOR CAN BE SET
	Spring Range	Spring Part Number	
Type 161AYW and 150 psig (10,3 bar) maximum allowable pilot inlet	3 to 12-inches w.c. (7 to 30 mbar)	1B653927022	3-inches w.c. (7 mbar) over normal distribution pressure
	11 to 25-inches w.c. (27 to 62 mbar)	1B537027052	
	0.9 to 2.5 psi (0,06 to 0,17 bar)	1B537127022	0.5 psig (0,03 bar) over normal distribution pressure
	2.5 to 4.5 psi (0,17 to 0,31 bar)	1B537227022	
Type 627-109 and 150 psig (10,3 bar) maximum allowable pilot inlet for cast iron body or 750 psig (51,7 bar) maximum allowable pilot inlet for malleable iron or steel body	4.5 to 7.0 psi (0,31 to 0,48 bar)	1B537327052	
	5 to 20 psig (0,34 to 1,38 bar)	10B3076X012	
	15 to 40 psig (1,0 to 2,8 bar)	10B3077X012	3.0 psig (0,21 bar) over normal distribution pressure
	35 to 80 psig (2,4 to 5,5 bar)	10B3078X012	
	70 to 150 psig (4,8 to 10,3 bar)	10B3079X012	5.0 psig (0,34 bar) over normal distribution pressure
	130 to 200 psig (9,0 to 13,8 bar)	10B3079X012	

Types 1098-EGR and 1098H-EGR



26A4298-A
A2118-2

Figure 7. Typical Working Monitor Installation

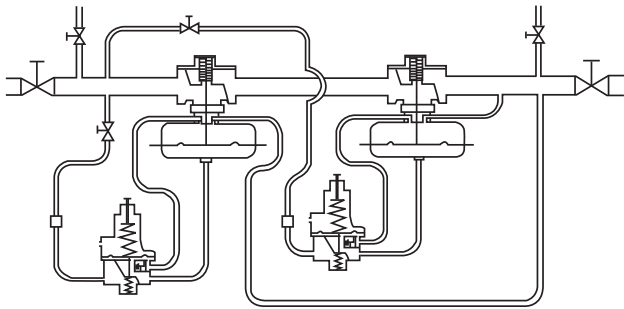
On a working monitor installation (Figure 7), be sure that the second-stage working regulator is set to operate at a pressure lower than the Type 1098-EGR or 1098H-EGR working monitor regulator. To do this, increase the setting of the monitoring pilot until the working pilot is in control of the intermediate 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 7. The steps followed to set the monitoring pilot may vary with each piping situation; however, the basic method remains the same. The following sub steps a and b may be used as examples for setting the monitoring pilot:

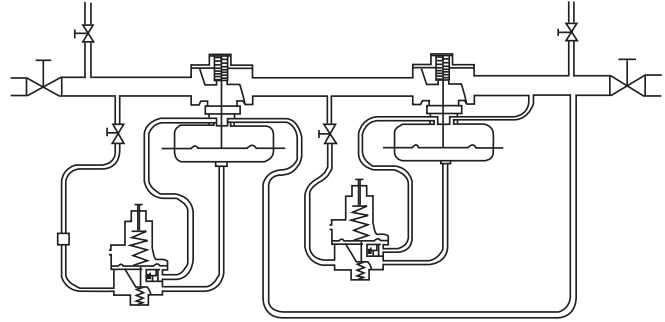
- a. Increase the outlet pressure setting of the second-stage working regulator until the monitoring pilot takes control of the downstream pressure. Adjust the monitoring pilot setting until the desired emergency downstream pressure is achieved. Then, readjust the second-stage working regulator to establish the desired downstream pressure.
- b. Install special piping (not shown in Figure 7) 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.

Types 1098-EGR and 1098H-EGR



16A4296-A

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



16A4297-A

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

□ PILOT SUPPLY REGULATOR

Figure 8. Typical Wide-Open Monitor Installations

5. Slowly open the downstream block valve.
6. Slowly close the bypass valve, if any.



NOTICE

Adjustment Recommendations for Monitor Applications

Low amplitude/high frequency monitor trim oscillations can occur if the monitor regulator pressure setting is adjusted too closely to the working regulator pressure setting and/or if the monitor pilot supply regulator pressure setting is adjusted too closely to the monitor regulator pressure setting. The monitor pressure setting should be adjusted so it is at minimum 2 times the pilot proportional band pressure above the working regulator pressure setting. The monitor pilot supply pressure setting should be adjusted so it is at minimum 5 psig (0,34 bar) plus the monitor minimum differential pressure above the working regulator pressure setting. These adjustments must be made such that other governing pressure limits, such as casing ratings, pilot maximum differential pressures, or regulatory limits, are not exceeded.

Wide-Open Monitor (Figure 8)

Installation

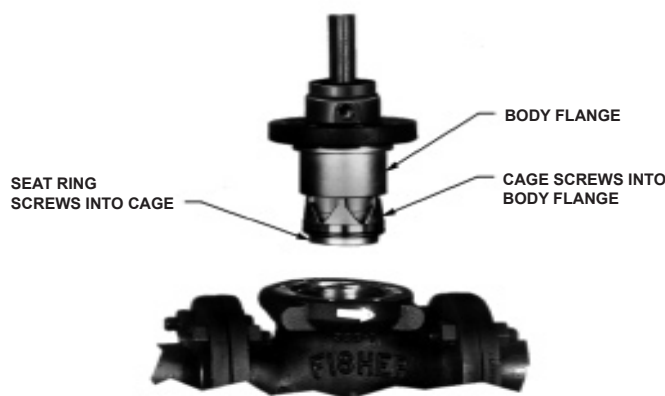
1. For both the wide-open monitoring regulator and the working regulator, perform the Standard Single-Pilot Regulator Installation section through step 6.
2. Connect the control line of the wide-open monitoring regulator (Figure 8) to downstream piping near the working regulator control line connection. 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.

Startup

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

1. Slowly open the pilot supply line hand valve.
2. Slowly open the upstream block valve and partially open the downstream block valve for minimum flow.

Types 1098-EGR and 1098H-EGR



W3012-1*

Figure 9. Trim Package Removal

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 8) 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.

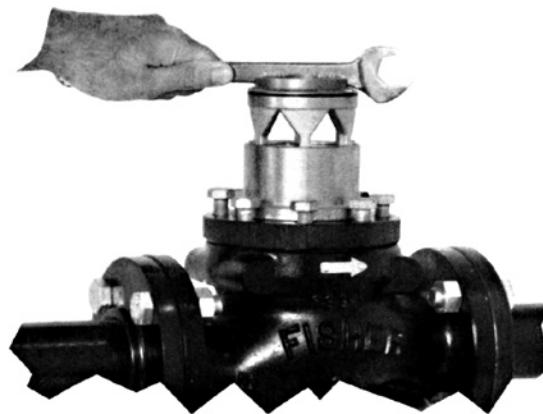


Figure 10. Seat Ring/Cage Removal or Installation Using Body as Holding Fixture

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 upstream pipeline vent valve. Allow 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.

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 14). Stem O-rings can be checked

Types 1098-EGR and 1098H-EGR

for damage during normal operation by line pressure leakage or unexpected grease extrusion from the actuator vent (key 27, Figure 14). 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.

Design Type EGR Main Valve

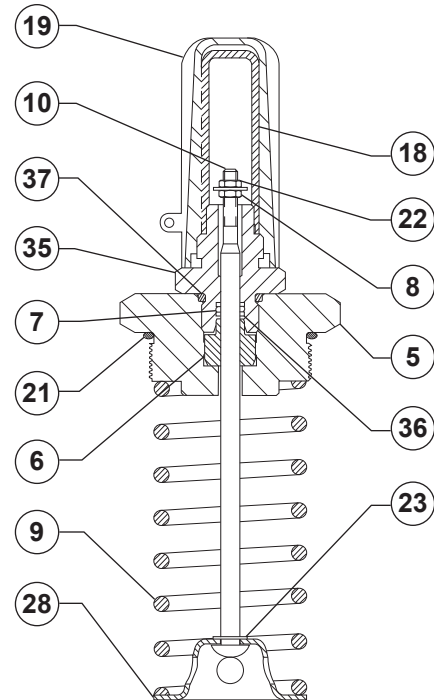
Replacing Quick-Change Trim Package

Perform this procedure if the entire trim package is replaced. Key numbers for both the complete main valve and its trim package are referenced in Figures 12 and 13. 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 disconnection pilot supply or control lines.

1. Remove the cap screws (key 3) with a cast iron body or remove the hex nuts (key 29, not shown) with a steel body. Pry the body flange (key 2) 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



10C1212

Figure 11. Types 1098-EGR and 1098H-EGR Travel Indicator Assembly

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 surface 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.

Types 1098-EGR and 1098H-EGR

Replacing Travel Indicator Assembly

The Types 1098-EGR and 1098H-EGR travel indicator assemblies now incorporate a redesigned O-ring retainer (key 6), Polytetrafluoroethylene (PTFE) backup 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.

Type EGR Cap Screw (key 3) Torque, FOOT-POUNDS (N•m)

SIZE, INCHES (DN)	TORQUE, FOOT-POUNDS (N•m)
1 (25)	75 to 95 (102 to 129)
2 (50)	55 to 70 (75 to 95)
3 (80)	100 to 130 (136 to 176)
4 (100)	160 to 210 (217 to 285)
6, 8 x 6, 12 x 6 (150, 200 x 150, 300 x 150)	375 to 425 (509 to 577)

1. Remove the travel indicator assembly by removing lower indicator fitting (key 5) from the 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.

Replacing Trim Parts

Perform this procedure when inspecting, cleaning, or replacing individual trim package parts. Key numbers are referenced in Figures 12 and 13.

Note

Access to the spring (key 9), flange O-ring, 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) on a cast iron body or remove the hex nuts (key 29, not shown) on 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 part, 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™ 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 fold over 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

Types 1098-EGR and 1098H-EGR

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. Apply a thin coating of lubricant to seals for protection during assembly. 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 (DN 25) body, which does not use it, the pipe plug (key 31) must be installed in the side tapping of the flange for proper operation.
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 12, and attach it with the E-ring to the slotted end of the indicator stem. Install the travel stop (if 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 15): 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.

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 16 and mounting key numbers in Figure 25, 26, 27, or 29.

Note

The body assembly (key 1) may remain on the pipe nipple (key 23, Figure 25, or key 39, Figure 29) unless the entire pilot is replaced. The optional bonnet (key 2) for a Type 662 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 662 mounting), and turn the adjusting 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. Ensure the registration and bleed holes in the pilot body are free of debris. After assembly, make sure of the proper control spring setting according to the Startup section and remark the spring case if necessary.

Types 1098-EGR and 1098H-EGR

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

Types 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 17. Mounting key numbers are referenced in Figure 25 for single-pilot constructions and in Figures 27 and 29 for dual-pilot constructions.

Note

The body (key 1) may remain on the pipe nipple (key 23, Figure 25 or key 39, Figure 29) 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 remark 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.
- ## 61 Series 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 Figures 18 and 19 and mounting part and relief valve key numbers in Figure 26.
1. Remove the pilot from the pipe nipple (key 24) 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 bottom cover (key 3).
 4. To inspect the two diaphragms (keys 14 and 15) thoroughly, remove the diaphragm nut (key 11), hex nut (key 19), and the upper and lower relay heads (keys 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.

Types 1098-EGR and 1098H-EGR

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 relay 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 relay 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, disconnect the relief tubing at the connector fitting 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 Y600AM Pilot

Body Area

This procedure is for gaining access to the disk assembly, orifice, body O-ring, and pitot tube if used. All pressure must be released from the diaphragm casing, and the disk assembly must be open, before these steps can be performed.

1. Remove the cap screws (key 2) and separate the diaphragm casing (key 4) from the body (key 1).
2. Remove and inspect the body seal O-ring (key 11) and the backup ring (key 48). See Figure 22.
3. Inspect and replace the orifice (key 5) if necessary. Protect the orifice seating surface during disassembly and assembly. Lubricate the

threads of the replacement orifice with a good grade of light grease and install with 29 to 37 foot-pounds (39 to 50 N•m) of torque.

4. To replace the disk assembly (key 13), remove the cotter pin (key 15). If not necessary, skip to step 7.
5. To replace the pitot tube (key 32, Figures 21) on the Type Y600A, remove the machine screws (key 33), install the new pitot tube, and secure with the machine screws. Position the pitot tube so that it points into the outlet of the body (key 1) by rotating the guide insert (key 18).
6. Install the disk assembly (key 13) and secure it with the cotter pin (key 15).
7. Place backup ring (key 48) into the body (key 1). Then place the body seal O-ring (key 11) into the body. See Figure 21.
8. Place the diaphragm casing (key 4) on the body (key 1). Secure the diaphragm casing to the body with the cap screws (key 2) using 7 to 9 foot-pounds (9 to 12 N•m).

Diaphragm and Spring Case Area

This procedure is for gaining access to the spring, diaphragm, lever assembly stem, and Type Y600AM stem O-ring. All pressure must be released from the diaphragm casing before performing these steps.

1. Remove the closing cap (key 22), and turn the adjusting screw (key 35) counterclockwise to remove the compression from the spring (key 6).
2. If the only maintenance is to change the control spring, take out the control spring and replace with the desired spring. Turn the adjusting screw (key 35) clockwise to compress the spring to the desired outlet pressure setting. Skip to step 11.
3. If further maintenance to the internal diaphragm casing parts is required, remove the hex nuts (key 23, not shown) and cap screws (key 24). Remove the diaphragm (key 10) plus attached parts by tilting them so that the pusher post (key 8) slips off the lever assembly (key 16). To separate the diaphragm from the attached parts, unscrew the cap screw (key 38, Figures 21 and 22) from the pusher post (key 8). If the only maintenance needed is to replace the diaphragm parts, skip to step 7.
4. To replace the lever assembly (key 16), remove the machine screws (key 17). To replace the stem (key 14) or stem O-ring (key 30, Figures 21 and 22), also perform Body Area Maintenance

Types 1098-EGR and 1098H-EGR

procedure steps 1 and 4, and pull the stem (key 14) out of the diaphragm casing (key 4). Grease the replacement stem O-ring (key 30, Figures 21 and 22) with a good grade of lubricant and install it on the stem (key 14).

5. Install the stem (key 14) into the diaphragm casing (key 4) and perform Body Area Maintenance procedure steps 6 through 8 as necessary.
6. Install the lever assembly (key 16) into the stem (key 14) and secure the lever assembly with the machine screws (key 17).
7. Hold the pusher post (key 8) and place diaphragm assembly parts on the pusher post in the following order: diaphragm (key 10), diaphragm head (key 7), lower spring seat (key 50), and washer (key 36), and secure with diaphragm cap screw (key 38) using 7 to 9 foot-pounds (9 to 12 N•m) of torque.
8. Install the pusher post (key 8) and attached parts onto the lever (key 16).
9. Install the control spring (key 6) and spring case (key 3) on the diaphragm casing (key 4) so that the vent assembly (key 26) is correctly oriented, and secure them with the cap screws (key 24) and hex nuts (key 23) to finger tightness only.
10. Turn the adjusting screw (key 35) clockwise until there is enough control spring (key 6) force to provide proper slack to the diaphragm (key 10). Using a crisscross pattern, finish tightening the cap screws (key 24) and hex nuts to 5 to 6 foot-pounds (6,8 to 8,1 N•m) of torque. Finish turning the adjusting screw to the desired outlet pressure setting.
11. Install the closing cap (key 22).
2. Inspect the seating surface of the valve plug, being sure that the composition surface (or polished steel surface) of the valve plug is not damaged. Replace if damaged.
3. Inspect the seating edge of the orifice (key 3). If damaged, unscrew the orifice from the body and replace it with a new part. If no further maintenance is required, reassemble the regulator in the reverse of the above steps. When installing the valve plug guide (key 5) coat the threads and sealing surface with sealant to ensure an adequate metal-to-metal seal.
4. To inspect the diaphragm (key 12) or other internal parts, loosen the locknut (key 17) and turn the adjusting screw (key 15) to remove all spring compression.
5. Remove the diaphragm case cap screws (key 16) and lift off the spring case (key 2). Remove the upper spring seat (key 9) and regulator spring (key 11). Remove the lower spring seat (key 8).
6. Remove the diaphragm (key 12) and examine for damage. Replace if damaged.
7. With diaphragm removed, check to be sure the pressure registration hole is completely open and free of all obstructions.
8. Reassemble in reverse order of the previous steps. Lubricate the upper spring seat (key 9) and the exposed threads of the adjusting screw (key 15). Before tightening cap screws (key 16) be sure to install the adjusting screw, if completely removed, and turn it down to obtain diaphragm slack. This allows proper positioning of the diaphragm to permit full travel of the valve plug (key 4). Complete reassembly procedures and temporarily install a gauge in place of the pipe plug (key 52). Turn the adjusting screw to produce the desired outlet pressure values shown in Table 2. Tighten the locknut to maintain the desired setting.

Type 95H Supply Pressure Regulator

This section includes instructions for disassembly and assembly of replacement parts. All key numbers refer to Figure 24.

1. Unscrew the valve plug guide (key 5) from the body (key 1). The valve plug spring (key 10) and the valve plug (key 4) will normally come out of the body along with the valve plug guide.

Types 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

Types 1098-EGR and 1098H-EGR

numbers are referenced in Figure 14, and mounting part numbers in Figure 28, 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, 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 25, or keys 37 and 39, Figure 29). Disconnect the loading tubing (key 24, Figure 25, 27, or 29) from the actuator elbow fitting (key 25, Figure 25, or key 41, Figure 29), and with a Type 61LD pilot also disconnect the relief tubing (key 18, Figure 26) 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 Types 1098 and 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).

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 4). 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 14. 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 zerk fitting (key 28) until excess grease emerges from 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 FS number which can be found on the nameplates. Refer to this number when contacting your local Sales Office for assistance, or when ordering replacement parts.

When ordering a replacement part, be sure to 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 kits listed in the Parts List.

Parts List

Note

Except where indicated, sizes shown are valve body sizes.

Types 1098-EGR and 1098H-EGR

Type EGR Main Valve (Figures 12 and 13)

Key	Description	Part Number	Key	Description	Part Number
				400 Psi (27,6 bar) spring color red	
				Cast Iron Body Flange	
				1-inch (DN 25)	25A3170X052
				2-inch (DN 50)	25A3170X112
				3-inch (DN 80)	25A3170X172
				4-inch (DN 100)	25A3170X242
				6-inch (DN 150)	25A3170X312
				Steel Body Flange	
				1-inch (DN 25)	25A3170X442
				2-inch (DN 50)	25A3170X332
				3-inch (DN 80)	25A3170X472
				4-inch (DN 100)	25A3170X502
				6-inch (DN 150)	25A3170X522
				8 x 6-inch (DN 200 x 150)	25A3170X552
				Parts kit, Quick Change Travel Indicator Kit	
				(included are: keys 10, 6, 35, 5, 8, 7, 36, 2 required;	
				keys 21, 18, 22, 23, 37, 19, 28, 9)	
				60 Psi (4,1 bar) spring color green	
				1-inch (DN 25)	10C1212X042
				2-inch (DN 50)	10C1212X012
				3-inch (DN 80)	10C1212X022
				4-inch (DN 100)	10C1212X032
				6-inch (DN 150)	10C1212X052
				125 Psi (8,6 bar) spring color blue	
				1-inch (DN 25)	10C1212X092
				2-inch (DN 50)	10C1212X062
				3-inch (DN 80)	10C1212X072
				4-inch (DN 100)	10C1212X082
				6-inch (DN 150)	10C1212X102
				400 Psi (27,6 bar) spring color red	
				1-inch (DN 25)	10C1212X142
				2-inch (DN 50)	10C1212X112
				3-inch (DN 80)	10C1212X122
				4-inch (DN 100)	10C1212X132
				6-inch (DN 150)	10C1212X152
			1	Valve Bodies	See following table
			2	Body Flange	
				Cast iron, ENC ⁽²⁾	
				2-inch (DN 50)	25A3168X012
				3-inch (DN 80)	24A9034X012
				4-inch (DN 100)	25A2309X012
				6, 8 x 6, and 12 x 6-inch	
				(DN 150, 200 x 150, and 300 x 150)	34A8172X012
				WCC steel, ENC, heat-treated	
				1-inch (DN 25)	24A6779X012
				2-inch (DN 50)	25A2254X012
				3-inch (DN 80)	25A2300X112
				4-inch (DN 100)	24A9032X012
				6, 8 x 6, and 12 x 6-inch	
				(DN 150, 200 x 150, and 300 x 150)	34A7152X012
				Stainless steel	
				1-inch (DN 25) (NACE)	24A6779X062
				2-inch (DN 50) (NACE)	25A2254X082
				3-inch (DN 80) (NACE)	25A2300X122
				4-inch (DN 100) (NACE)	24A9032X042
				6, 8 x 6, and 12 x 6-inch (NACE)	
				(DN 150, 200 x 150, and 300 x 150)	34A7152X052
			3	Cap Screw, plated steel (use with cast iron body)	
				1-inch (DN 25) (4 required)	1R281124052
				2-inch (DN 50) (8 required)	1A453324052
				3-inch (DN 80) (8 required)	1A454124052
				4-inch (DN 100) (8 required)	1A485724052
				6, 8 x 6, and 12 x 6-inch	
				(DN 150, 200 x 150, and 300 x 150) (12 required)	1U513124052
	Elastomer Trim Parts kit (included are: keys 4, 7, 12, 14, 15, 17, 20, 21, 36, and 37)				
	Nitrile (NBR)				
	1-inch (DN 25)	R63EGX00112			
	2-inch (DN 50)	R63EGX00122			
	3-inch (DN 80)	R63EGX00132			
	4-inch (DN 100)	R63EGX00142			
	6-inch (DN 150)	R63EGX00162			
	Fluorocarbon (FKM)				
	1-inch (DN 25)	R63EGXFK112			
	2-inch (DN 50)	R63EGXFK122			
	3-inch (DN 80)	R63EGXFK132			
	4-inch (DN 100)	R63EGXFK142			
	6-inch (DN 150)	R63EGXFK162			
	Ethylene propylene (EPDM)				
	1-inch (DN 25)	R63EGXEP112			
	2-inch (DN 50)	R63EGXEP122			
	3-inch (DN 80)	R63EGXEP132			
	4-inch (DN 100)	R63EGXEP142			
	6-inch (DN 150)	R63EGXEP162			
	Actuator Parts kit keys (5, 6, 7, 56, and 57)				
	Size 30				
	Nitrile (NBR)	R1098X00302			
	Fluorocarbon (FKM)	R1098X00502			
	Size 40				
	Nitrile (NBR)	R1098X00402			
	Fluorocarbon (FKM)	R1098X00602			
	Size 70				
	Nitrile (NBR)	R1098X00702			
	Quick Change Trim Kit (see Figure 13 for included keys)				
	60 Psi (4,1 bar) spring color green				
	Cast Iron Body Flange				
	1-inch (DN 25)	25A3170X012			
	2-inch (DN 50)	25A3170X102			
	3-inch (DN 80)	25A3170X152			
	4-inch (DN 100)	25A3170X222			
	6-inch (DN 150)	25A3170X272			
	Steel Body Flange				
	1-inch (DN 25)	25A3170X422			
	2-inch (DN 50)	25A3170X452			
	3-inch (DN 80)	25A3170X372			
	4-inch (DN 100)	25A3170X482			
	6-inch (DN 150)	25A3170X512			
	8 x 6-inch (DN 200 x 150)	25A3170X532			
	125 Psi (8,6 bar) spring color blue				
	Cast Iron Body Flange				
	1-inch (DN 25)	25A3170X032			
	2-inch (DN 50)	25A3170X082			
	3-inch (DN 80)	25A3170X142			
	4-inch (DN 100)	25A3170X192			
	6-inch (DN 150)	25A3170X282			
	Steel Body Flange				
	1-inch (DN 25)	25A3170X432			
	2-inch (DN 50)	25A3170X382			
	3-inch (DN 80)	25A3170X462			
	4-inch (DN 100)	25A3170X492			
	6-inch (DN 150)	25A3170X342			
	8 x 6-inch (DN 200 x 150)	25A3170X542			

*Recommended spare part.

1. NACE International Standard MR0175.

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

Types 1098-EGR and 1098H-EGR

Key 1 Type EGR Valve Bodies

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

Key 1 Type EGR Valve Bodies (continued)

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

Types 1098-EGR and 1098H-EGR

Type EGR Main Valve (Figures 12 and 13) (continued)

Key	Description	Part Number	Key	Description	Part Number
3	Stud Bolt, steel (use with stainless steel body) (not shown)		10 ⁽²⁾	Travel Indicator Stem (continued)	
	1-inch (DN 25) (4 required)	1R284835222		316 stainless steel (NACE)	
	2-inch (DN 50) (8 required)	1K242935222		1-inch (DN 25) (NACE)	T14311T0022
	3-inch (DN 80) (8 required)	1A378135222		2-inch (DN 50) (NACE)	T14275T0022
	4-inch (DN 100) (8 required)	1R369035222		3-inch (DN 80) (NACE)	T14312T0022
	6, 8 x 6, and 12 x 6-inch			4-inch (DN 100) (NACE)	T14313T0022
	(DN 150, 200 x 150, and 300 x 150) (12 required)	1A365635222		6, 8 x 6, and 12 x 6-inch	
4 ⁽²⁾	Gasket, composition		11	Cage	
	1-inch (DN 25)	14A6785X012		Linear, CF8M Stainless steel (NACE)	
	2-inch (DN 50)	14A5685X012		1-inch (DN 25)	34B4136X012
	3-inch (DN 80)	14A5665X012		2-inch (DN 50)	34B5838X012
	4-inch (DN 100)	14A5650X012		3-inch (DN 80)	34B5839X012
	6, 8 x 6, and 12 x 6-inch			4-inch (DN 100)	34B5840X012
	(DN 150, 200 x 150, and 300 x 150)	14A6984X012		6, 8 x 6, and 12 x 6-inch	
5 ⁽²⁾	Travel Indicator Fitting, plated steel			(DN 150, 200 x 150, and 300 x 150)	34B5841X012
	1-inch (DN 25)	T21117T0012		Whisper Trim™	
	1-inch (DN 25) (NACE)	T21117T0022		416 stainless steel	
	2, 3, and 4-inch (DN 50, 80, and 100)	T21107T0012		1-inch (DN 25)	24A2043X012
	2, 3, and 4-inch (DN 50, 80, and 100) (NACE)	T21107T0022		2-inch (DN 50)	24A5707X012
	6 and 8 x 6-inch (DN 150 and 200 x 150)	T21120T0012		3-inch (DN 80)	24A5708X012
	6, 8 x 6, and 12 x 6-inch			4-inch (DN 100)	24A5709X012
	(DN 150, 200 x 150, and 300 x 150) (NACE)	T21120T0012		6, 8 x 6, and 12 x 6-inch	
6 ⁽²⁾	O-ring Retainer			(DN 150, 200 x 150, and 300 x 150)	24A8174X012
	416 stainless steel (NACE)	T14276T0012		316 stainless steel	
7*	Travel Indicator Stem O-ring			1-inch (DN 25)	24A2043X022
	Nitrile ⁽²⁾ (NBR)	1E472706992		2-inch (DN 50)	24A5707X022
	Fluorocarbon (FKM)	1N430406382		3-inch (DN 80)	24A5708X042
	Ethylene propylene (EPDM)	1D6875X0092		4-inch (DN 100)	24A5709X022
8 ⁽²⁾	Travel Indicator Hex Nut, plated steel	1A662228992		6, 8 x 6, and 12 x 6-inch	
9 ⁽²⁾	Spring, steel	See following table		(DN 150, 200 x 150, and 300 x 150)	24A8174X022
10 ⁽²⁾	Travel Indicator Stem			Quick Opening, cast iron, ENC	
	Stainless steel			1-inch (DN 25)	37A7211X012
	1-inch (DN 25)	T14311T0012		2-inch (DN 50)	37A7212X012
	2-inch (DN 50)	T14275T0012		3-inch (DN 80)	37A7213X012
	3-inch (DN 80)	T14312T0012		4-inch (DN 100)	37A7214X012
	4-inch (DN 100)	T14313T0012		6, 8 x 6, and 12 x 6-inch	
	6, 8 x 6, and 12 x 6-inch			(DN 150, 200 x 150, and 300 x 150)	37A7215X022
	(DN 150, 200 x 150, and 300 x 150)	T14314T0012			

Key 9 Spring

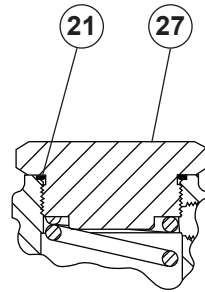
BODY SIZE	SPRING							
	Standard (Steel)				NACE (Inconel®)			
	20 psi (1,4 bar) Yellow	60 psi (4,1 bar) Green	125 psi (8,6 bar) Blue	400 psi (27,6 bar) Red	20 psi (1,4 bar) Yellow	60 psi (4,1 bar) Green	125 psi (8,6 bar) Blue	400 psi (27,6 bar) Red
1-inch (DN 25)	----	14A9687X012	14A9680X012	14A9679X012	----	----	10B1882X012	----
2-inch (DN 50)	14A6768X012	14A6626X012	14A6627X012	14A6628X012	----	16A5501X012	16A5995X012	16A5499X012
3-inch (DN 80)	14A6771X012	14A6629X012	14A6630X012	14A6631X012	----	16A5503X012	16A5996X012	16A5500X012
4-inch (DN 100)	14A6770X012	14A6632X012	14A6633X012	14A6634X012	----	16A5506X012	16A5997X012	16A5998X012
6 and 8 x 6-inch (DN 150 and 200 x 150)	15A2253X012	14A9686X012	14A9685X012	15A2615X012	----	16A5510X012	16A5999X012	16A6000X012

*Recommended spare part.

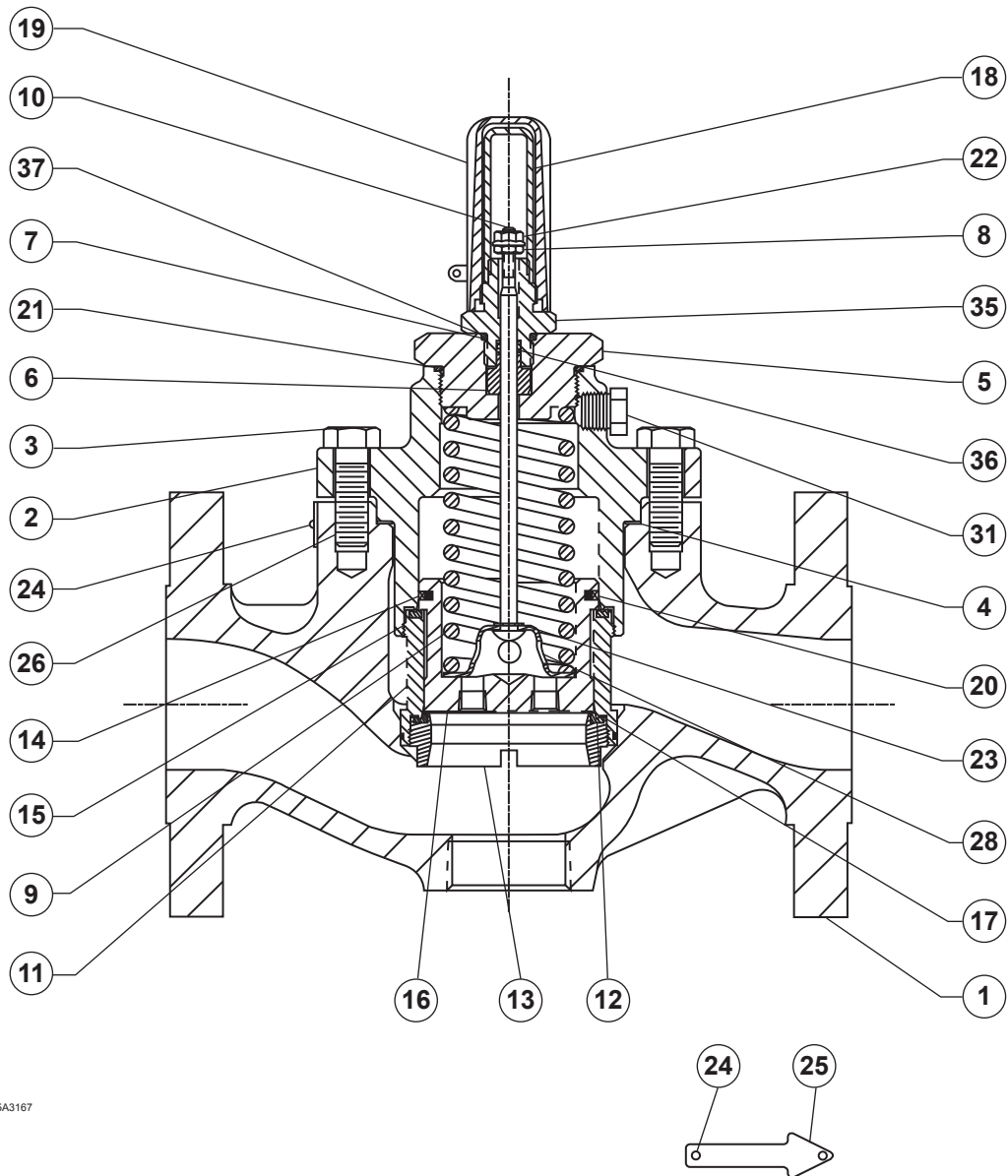
1. NACE International Standard MR0175.

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

Types 1098-EGR and 1098H-EGR



INDICATOR PLUG ASSEMBLY



35A3167

COMPLETE CAST IRON
FULL-CAPACITY MAIN VALVE ASSEMBLY

Figure 12. Type EGR Main Valve Construction

Types 1098-EGR and 1098H-EGR

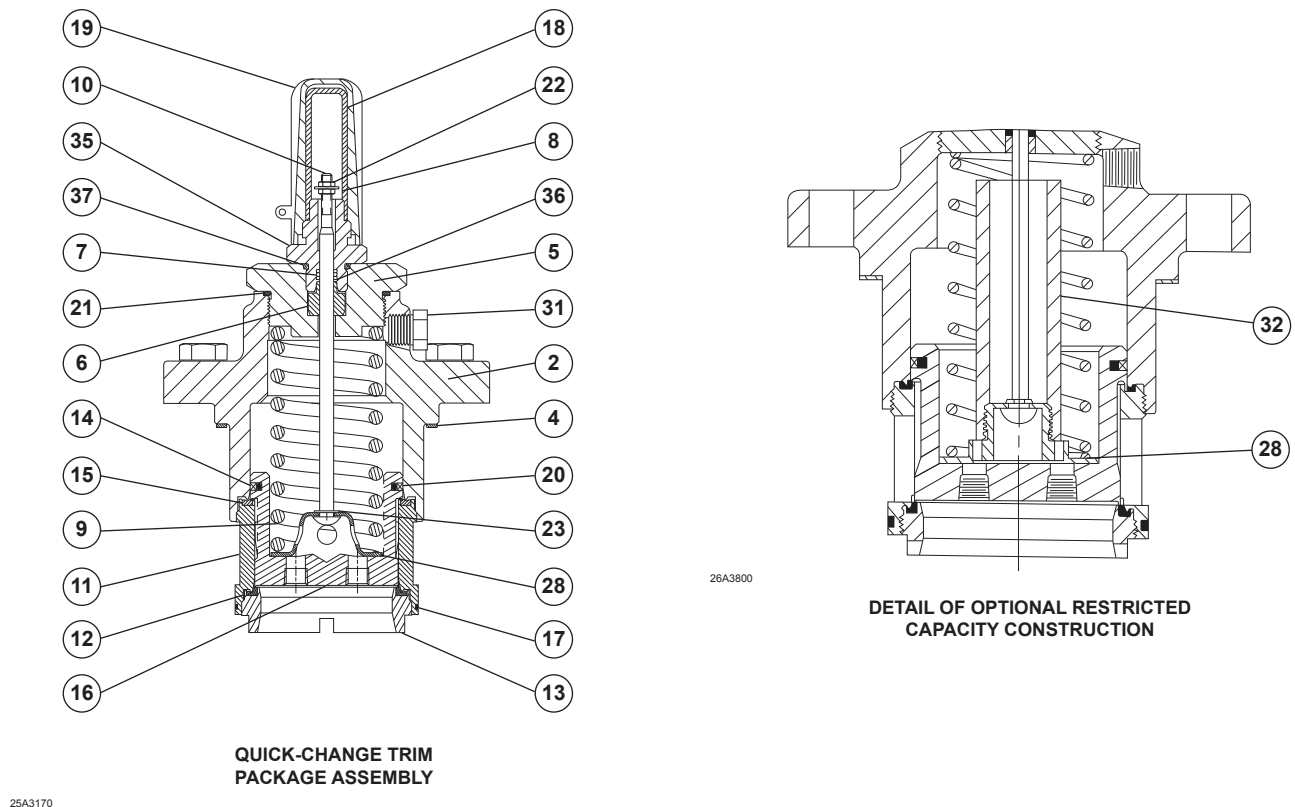


Figure 13. Type EGR Main Valve Internal Constructions

Type EGR Main Valve (Figures 12 and 13) (continued)

Key	Description	Part Number	Key	Description	Part Number
12*	Port Seal		13*(2)	Seat Ring	
	Nitrile ⁽²⁾ (NBR) standard			416 stainless steel	
	1-inch (DN 25)	14A6788X012		1-inch (DN 25), 1-5/16-inch (33 mm) port	24A6781X012
	2-inch (DN 50)	24A5673X012		2-inch (DN 50), 2-3/8-inch (60 mm) port	24A5670X012
	3-inch (DN 80)	24A5658X012		3-inch (DN 80), 3-3/8-inch (86 mm) port	24A5655X012
	4-inch (DN 100)	24A5643X012		4-inch (DN 100), 4-3/8-inch (111 mm) port	24A5640X012
	6, 8 x 6, and 12 x 6-inch (DN 150, 200 x 150, and 300 x 150)	14A8175X012		6-inch (DN 150), 7-3/16-inch (183 mm) port	24A6989X012
	Fluorocarbon (FKM)			8 x 6-inch (DN 200 x 150), 7-3/16-inch (183 mm) port	38A4216X012
	1-inch (DN 25)	14A8186X012		316 stainless steel (NACE)	
	2-inch (DN 50)	25A7412X012		1-inch (DN 25), 1-5/16-inch (33 mm) port (NACE)	24A6781X022
	3-inch (DN 80)	25A7375X012		2-inch (DN 50), 2-3/8-inch (60 mm) port (NACE)	24A5670X022
	4-inch (DN 100)	25A7469X012		3-inch (DN 80), 3-3/8-inch (86 mm) port (NACE)	24A5655X022
	6, 8 x 6, and 12 x 6-inch (DN 150, 200 x 150, and 300 x 150)	14A6996X012		4-inch (DN 100), 4-3/8-inch (111 mm) port (NACE)	24A5640X022
	Ethylene propylene (EPDM)			6-inch (DN 150), 7-3/16-inch (183 mm) port (NACE)	24A6989X022
	1-inch (DN 25)	14A6788X022		8 x 6-inch (DN 200 x 150), 7-3/16-inch (183 mm) port (NACE)	38A4216X022
	2-inch (DN 50)	24A5673X062			
	3-inch (DN 80)	24A5658X062			
	4-inch (DN 100)	24A5643X052			
	6, 8 x 6, and 12 x 6-inch (DN 150, 200 x 150, and 300 x 150)	14A8175X022			

*Recommended spare part.

1. NACE International Standard MR0175.

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

Types 1098-EGR and 1098H-EGR

Type EGR Main Valve (Figures 12 and 13) (continued)

Key	Description	Part Number	Key	Description	Part Number
14*(2)	Piston Ring		17*	Cage O-ring (continued)	
	1-inch (DN 25), PTFE (clear)	14A6786X012		Ethlenepropylene (EPDM)	
	2-inch (DN 50), PTFE (clear)	14A5675X012		1-inch (DN 25)	10A7777X022
	3-inch (DN 80), PTFE (clear)	14A5660X012		2-inch (DN 50)	10A7779X052
	4-inch (DN 100), PTFE (clear)	14A5645X012		3-inch (DN 80)	14A5688X082
	6, 8 x 6, and 12 x 6-inch (DN 150, 200 x 150, and 300 x 150), glass-filled			4-inch (DN 100)	10A3481X052
	PTFE (yellow)	14A6985X022		6, 8 x 6, and 12 x 6-inch (DN 150, 200 x 150, and 300 x 150)	18A2556X072
15*	Upper Seal		18	Travel Indicator Scale, plastic	
	Nitrile ⁽²⁾ (NBR) (standard)			1-inch ⁽²⁾ (DN 25)	14A6759X012
	1-inch (DN 25)	14A6789X012		2-inch ⁽²⁾ (DN 50)	14A5678X012
	2-inch (DN 50)	24A5674X012		3-inch ⁽²⁾ (DN 80)	14A5662X012
	3-inch (DN 80)	24A5659X012		4-inch (DN 100)	
	4-inch (DN 100)	24A5644X012		with 2-inches (51 mm) travel ⁽²⁾	14A5647X012
	6, 8 x 6, and 12 x 6-inch (DN 150, 200 x 150, and 300 x 150)	14A8176X012		with 1-1/2-inch (38 mm) travel	14A5662X012
	Fluorocarbon (FKM)			6, 8 x 6, and 12 x 6-inch ⁽²⁾ (DN 150, 200 x 150, and 300 x 150)	14A5647X012
	1-inch (DN 25)	14A8187X012	19	Travel Indicator Protector, plated steel	
	2-inch (DN 50)	25A7413X012		1 and 2-inch ⁽²⁾ (DN 25 and 50)	24B1301X012
	3-inch (DN 80)	25A7376X012		3, 4, 6, and 8 x 6-inch ⁽²⁾ (DN 80, 100, 150, and 200 x 150)	14A6769X012
	4-inch (DN 100)	25A7468X012	20*	Plug O-ring	
	6, 8 x 6, and 12 x 6-inch (DN 150, 200 x 150, and 300 x 150)	14A8185X012		Nitrile ⁽²⁾ (NBR) (standard)	
	Ethlenepropylene (EPDM)			1-inch (DN 25)	14A6981X012
	1-inch (DN 25)	14A6789X022		2-inch (DN 50)	14A5686X012
	2-inch (DN 50)	24A5674X062		3-inch (DN 80)	1V326906562
	3-inch (DN 80)	24A5659X062		4-inch (DN 100)	14A5688X012
	4-inch (DN 100)	24A5644X052		6, 8 x 6, and 12 x 6-inch (DN 150, 200 x 150, and 300 x 150)	1K879306992
	6, 8 x 6, and 12 x 6-inch (DN 150, 200 x 150, and 300 x 150)	14A8176X022	20*	Plug O-ring	
16*(2)	Valve Plug			Fluorocarbon (FKM)	
	416 stainless steel			1-inch (DN 25)	14A8188X012
	1-inch (DN 25)	14A6780X012		2-inch (DN 50)	14A5686X022
	2-inch (DN 50)	24A6772X012		3-inch (DN 80)	1V3269X0042
	3-inch (DN 80)	24A9421X012		4-inch (DN 100)	14A5688X022
	4-inch (DN 100)	24A8182X012		6, 8 x 6, and 12 x 6-inch (DN 150, 200 x 150, and 300 x 150)	1V547606382
	6, 8 x 6, and 12 x 6-inch (DN 150, 200 x 150, and 300 x 150)	24A6992X012		Ethlenepropylene (EPDM)	
	316 stainless steel (NACE)			1-inch (DN 25)	14A6981X032
	1-inch (DN 25)	14A6780X022		2-inch (DN 50)	14A5686X052
	2-inch (DN 50)	24A6772X032		3-inch (DN 80)	1V3269X0062
	3-inch (DN 80)	24A9421X022		4-inch (DN 100)	14A5688X082
	4-inch (DN 100)	24A8182X022		6, 8 x 6, and 12 x 6-inch (DN 150, 200 x 150, and 300 x 150)	1K8793X0012
	6, 8 x 6, and 12 x 6-inch (DN 150, 200 x 150, and 300 x 150)	24A6992X022	21*	Travel Indicator Fitting or Indicator Plug O-ring	
17*	Cage O-ring			Nitrile ⁽²⁾ (NBR)	
	Nitrile ⁽²⁾ (NBR) (standard)			1-inch (DN 25)	10A8931X012
	1-inch (DN 25)	10A7777X012		2, 3, and 4-inch (DN 50, 80, and 100)	10A3800X012
	2-inch (DN 50)	10A7779X012		6, 8 x 6, and 12 x 6-inch (DN 150, 200 x 150, and 300 x 150)	1F262906992
	3-inch (DN 80)	14A5688X012		Fluorocarbon (FKM)	
	4-inch (DN 100)	10A3481X012		1-inch (DN 25)	10A0811X012
	6, 8 x 6, and 12 x 6-inch (DN 150, 200 x 150, and 300 x 150)	18A2556X022		2, 3, and 4-inch (DN 50, 80, and 100)	1R727606382
	Fluorocarbon (FKM)			6, 8 x 6, and 12 x 6-inch (DN 150, 200 x 150, and 300 x 150)	1F2629X0012
	1-inch (DN 25)	10A7778X012		Ethlenepropylene (EPDM)	
	2-inch (DN 50)	10A7779X022		1-inch (DN 25)	10A8931X022
	3-inch (DN 80)	14A5688X022		2, 3, and 4-inch (DN 50, 80, and 100)	10A3800X042
	4-inch (DN 100)	10A3483X012		6, 8 x 6, and 12 x 6-inch (DN 150, 200 x 150, and 300 x 150)	1F2629X0032
	6, 8 x 6, and 12 x 6-inch (DN 150, 200 x 150, and 300 x 150)	18A2556X032	22 ⁽²⁾	Travel Indicator Flange Nut, plated steel	14A5693X012
			23 ⁽²⁾	E-Ring	
				Stainless steel	14A8181X012
				1577 steel, heat treated (NACE)	14A8181X022
			24	Drive Screw, stainless steel (4 required)	1A368228982
			25	Flow Arrow, stainless steel	1V105938982
			26	Body Rating Plate, stainless steel (not shown)	-----

*Recommended spare part.

1. NACE International Standard MR0175.

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

Types 1098-EGR and 1098H-EGR

Type EGR Main Valve (Figures 12 and 13) (continued)

Key	Description	Part Number
27	Indicator Plug Steel 1-inch (DN 25) 2-inch (DN 50) 3-inch (DN 80) 4-inch (DN 100) Stainless Steel 1-inch (DN 25) 2-inch (DN 50) 3-inch (DN 80) 4-inch (DN 100) 6, 8 x 6, and 12 x 6-inch (DN 150, 200 x 150, and 300 x 150)	14A6983X012 14A9684X012 14A9684X012 14A9684X012 14A6983X022 14A9684X032 14A9684X032 14A9684X032 14A8178X032
28	Spring Seat Full capacity trim ⁽²⁾ Plated steel 1-inch (DN 25) 2, 3, and 4-inch (DN 50, 80, and 100) 6 and 8 x 6-inch (DN 150 and 200 x 150) Heat-treated wrought steel (NACE) 1-inch (DN 25) (NACE) 2, 3, and 4-inch (DN 50, 80, and 100) (NACE) 6, 8 x 6, and 12 x 6-inch (DN 150, 200 x 150, and 300 x 150) (NACE) Full capacity trim ⁽²⁾ Restricted capacity trim, heat-treated, 416 stainless steel 2, 3, and 4-inch (DN 50, 80, and 100) 6-inch (DN 150)	14A6982X012 15A2206X012 14A8177X012 14A6982X022 15A2206X022 14A8177X022 14A9678X012 14A9688X012
29	Hex Nut Steel (use with stainless steel body) (not shown) 1-inch (DN 25) (4 required) 2-inch (DN 50) (8 required) 3-inch (DN 80) (8 required) 4-inch (DN 100) (8 required) 6, 8 x 6, and 12 x 6-inch (DN 150, 200 x 150, and 300 x 150) (12 required)	1C330635252 1A377235252 1A376035252 1A352035252 1A440935252
31 ⁽²⁾	Pipe Plug Plated steel, for all sizes Steel (NACE), for 2, 3, or 4-inch (DN 50, 80, or 100) (NACE) Stainless steel, for 6, 8 x 6, and 12 x 6-inch (DN 150, 200 x 150, and 300 x 150) (NACE)	1A767524662 1A767524012 1E8231X0012
32	Travel Stop, galvanized plated steel (not used with full capacity trim) 2-inch (DN 50) 30% capacity 70% capacity 3-inch (DN 80), 40% capacity 4-inch (DN 100), 40% capacity 6-inch (DN 150), 40% capacity	14A9677X012 14A9676X012 14A9671X012 14A9670X012 14A9682X012
33	NACE Tag (not shown) (NACE)	19A6034X012
34	Tag Wire (not shown) (NACE)	1U7581X0022
35	Fitting All sizes All sizes (NACE)	T21104T0012 T21104T0022
36*	Backup Ring (2 Required) All sizes	1K786806992
37*	O-ring Nitrile (NBR) Fluorocarbon (FKM) Ethylene propylene (EPDM)	18B3438X012 1N430306382 1N4303X0012

Types 1098 and 1098H Actuators (Figure 14)

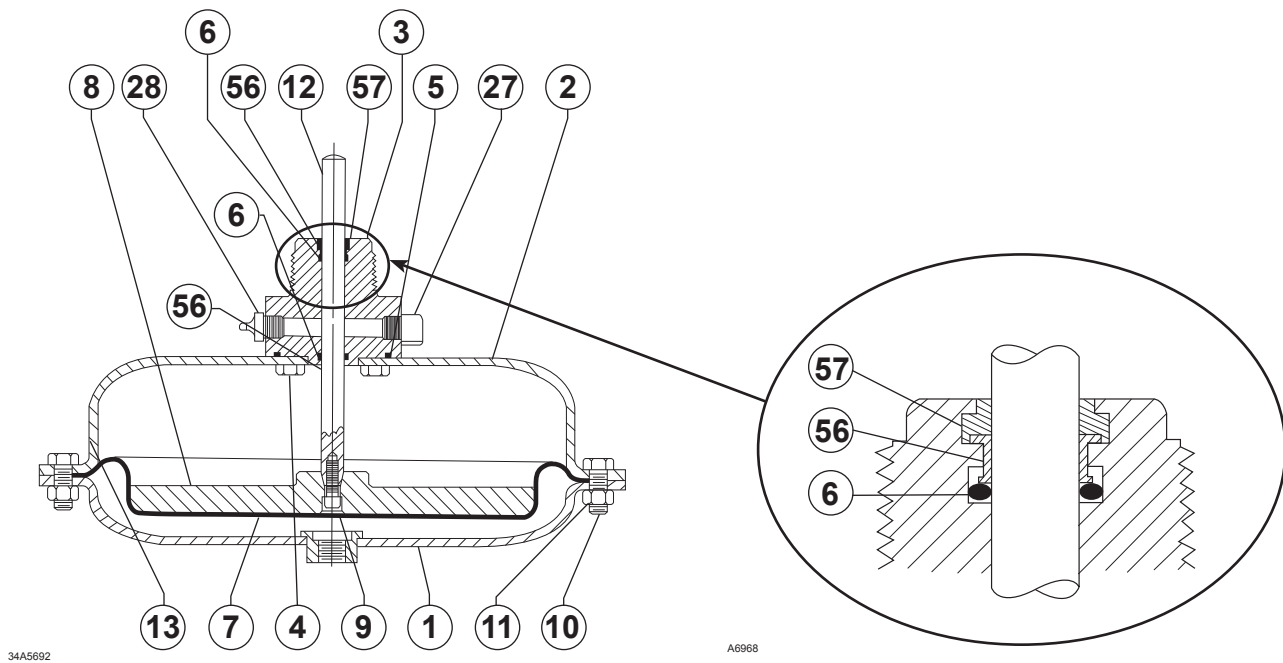
Key	Description	Part Number
1	Lower Casing Size 30 Type 1098 Steel Steel (NACE) Type 1098H Steel Stainless steel (NACE)	2E8007X00B2 2E8007X0042 36A8537X012 36A8537X032
	Size 40 Type 1098 Steel Steel (NACE) Stainless steel (NACE)	24A7155X012 24A7155X072 24A7155X052
	Size 70 Type 1098 Steel Steel (NACE)	2N1266X00B2 2N1266X0072
2	Upper Casing Size 30 Type 1098 Steel Steel (NACE) Type 1098H Steel Stainless steel (NACE)	25A7340X012 25A7340X032 36A8535X012 36A8535X052
	Size 40 Type 1098 Steel Steel (NACE) Stainless steel (NACE)	24A5680X012 24A5680X062 24A5680X042
	Size 70 Type 1098 Steel (NACE)	25A2607X032
3	Bonnet Steel Stainless Steel (NACE)	33B0301X012 33B0301X052
4	Cap Screw Sizes 30 and 40 (4 required) Steel Steel (NACE) Size 70 (4 required) Steel Steel (NACE)	1D529824052 1D529838992 1A368424052 1A368435072
5	Casing O-ring Nitrile (NBR) Fluorocarbon (FKM) Ethylene propylene (EPDM)	1F358106992 1F3581X0022 1F3581X0052
6	Stem O-ring (2 required) Nitrile (NBR) Fluorocarbon (FKM) Ethylene propylene (EPDM)	1C782206992 1K756106382 1C7822X0052
7	Diaphragm Type 1098 Nitrile (NBR) Size 30 Size 40 Size 70 Fluorocarbon (FKM) Size 30 Size 40 Size 70 Ethylene propylene (EPDM) Size 30 Size 40 Size 70	2E791902202 27B9744X012 2N126902202 2E7919X0052 27B9744X022 2N1269X0032 2E7919X0062 27B9744X032 2N1269X0042

*Recommended spare part.

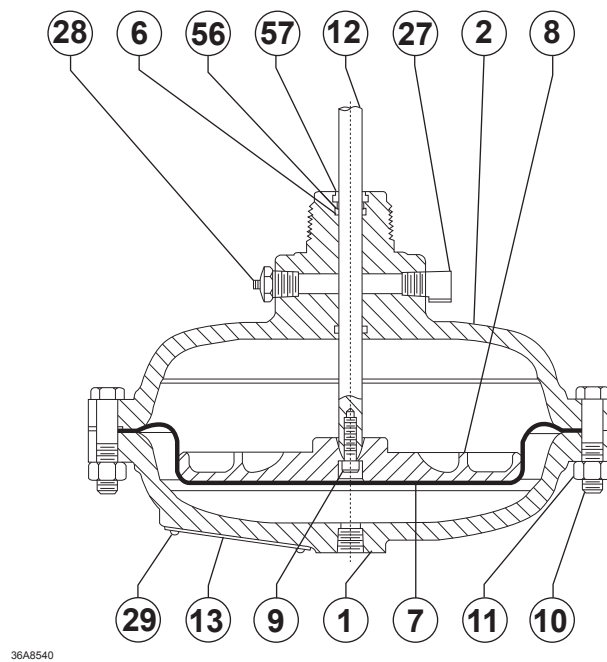
1. NACE International Standard MR0175.

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

Types 1098-EGR and 1098H-EGR



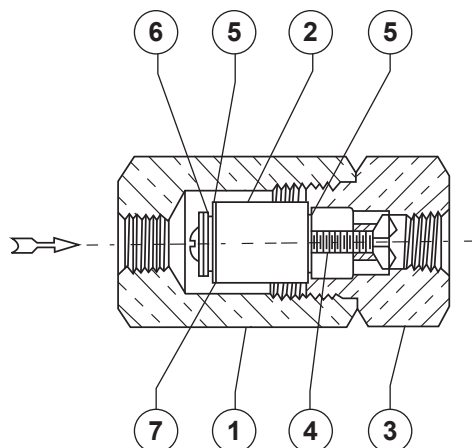
TYPE 1098



TYPE 1098H

Figure 14. Types 1098 and 1098H Actuator Assemblies

Types 1098-EGR and 1098H-EGR



A7008

Figure 15. Standard P590 Series Filter Assembly

Types 1098 and 1098H Actuators (Figure 14) (continued)

Key	Description	Part Number	Key	Description	Part Number
7	Diaphragm (continued)		11	Hex Nut	
	Type 1098H			Type 1098	
	Nitrile (NBR)	2E791902202		Size 30 (12 required)	
	Fluorocarbon (FKM)	2E7919X0052		Steel	1A346524122
	Ethylene propylene (EPDM)	2E7919X0062		Stainless steel (NACE)	1A337435252
8	Diaphragm Plate			Size 40 (16 required)	1A346524122
	Size 30			Size 70 (28 required)	1A346524122
	Steel	15A7339X012		Type 1098H	
	Stainless steel (NACE)	GE08313X012		Steel	1A340324122
	Size 40			Stainless steel (NACE)	1A337435252
	Steel	14A5682X012	12	Stem, stainless steel	
	Stainless steel (NACE)	GE08466X012		1-inch (DN 25) body size	14A6757X012
	Size 70			1-inch (DN 25) body size (NACE)	14A6757X022
	Steel	15A2606X012		2-inch (DN 50) body size	14A5683X012
	Steel (NACE)	19A7319X012		2-inch (DN 50) body size (NACE)	14A5683X022
9	Cap Screw			3-inch (DN 80) body size	14A5663X012
	Sizes 30 and 40			3-inch (DN 80) body size (NACE)	14A5663X022
	Steel	1L545428982		4-inch (DN 100) body size	14A5648X012
	Stainless steel (NACE)	1L545438992		4-inch (DN 100) body size (NACE)	14A5648X022
	Size 70			6-inch (DN 150) body size	14A6987X012
	Steel	11B1768X012		6-inch (DN 150) body size (NACE)	14A6987X022
	Steel (NACE)	11B1768X022		8 x 6-inch (DN 200 x 150) body size	18A4217X012
10	Cap Screw			8 x 6-inch (DN 200 x 150) body size (NACE)	18A4217X022
	Sizes 30 (12 required) and 40 (16 required)		13	Nameplate (not shown)	-----
	Steel	1E760324052	27	Vent Insert	Type Y602X1-A12
	Stainless steel (NACE)	1A915524052	28	Zerk Fitting, steel	1L847828992
	Size 70 (28 required)		54	NACE Tag, 18-8 stainless steel (not shown)	19A6034X012
	Steel	11B1768X012	55	Tag Wire, 303 stainless steel (not shown)	1U7581X0022
	Steel (NACE)	11B1768X022	56	Bearing (2 required)	
				Nitrile (NBR) Diaphragm	17A7112X012
				Fluorocarbon (FKM) and	
				Ethylene propylene (EPDM) Diaphragms	17A7112X022
			57	Wiper	15A6002XN12

*Recommended spare part.

1. NACE International Standard MR0175.

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

Types 1098-EGR and 1098H-EGR

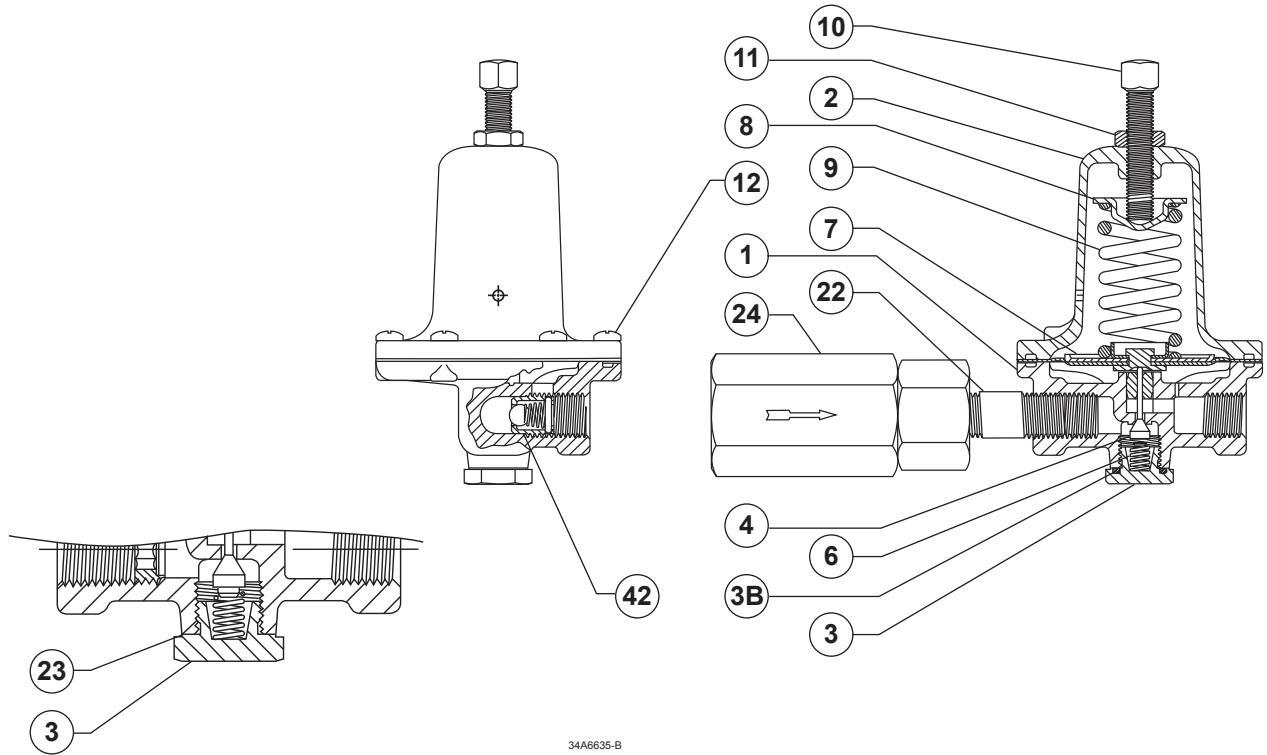


Figure 16. Type 6351 Pilot Assembly

Standard P590 Series Filter (Figure 15)

Key	Description	Part Number
1	Filter Body Type P594-1, brass Type P593-1, aluminum (NACE)	1E312414012 1E312409012
2*	Filter Element, cellulose (NACE)	1E312606992
3	Filter Head Type P594-1, brass Type P593-1, aluminum (NACE)	1E312514012 1E312509012
4	Machine Screw Type P594-1, brass Type P593-1, aluminum (NACE)	1J500218992 1J500209012
5	Washer (2 required) Type P594-1, brass Type P593-1, aluminum (NACE)	1J500018992 1J500010062
6	Spring Washer, plated steel	1H885128982
7*	Gasket, composition	1F826804022
11	NACE Tag, 18-8 stainless steel (not shown)	19A6034X012
12	Tag Wire, 304 stainless steel (not shown)	1U7581X0022

Type 6351 Pilot (Figure 16)

Key	Description	Part Number
	Parts Kit (includes keys 3, 4, 6, 7 and for the P590 Series filter, keys 2 and 7)	R6351X00012
1	Body Assembly Aluminum with brass bushing Aluminum with stainless steel bushing (NACE) Stainless steel with stainless steel bushing	1B7971X0092 1B7971X0342 1B7971X0122
2	Bonnet Aluminum with closing cap	25A6220X012
3	Body Plug Assembly (includes body plug and O-ring) Aluminum body plug with Nitrile (NBR) O-ring with Fluorocarbon (FKM) O-ring Stainless steel body plug with Nitrile (NBR) O-ring with Fluorocarbon (FKM) O-ring	18B6542X022 18B6542X042 18B6542X052 18B6542X062
4	Inner Valve Assembly Nitrile (NBR) with brass stem Nitrile (NBR) with stainless steel stem Nitrile (NBR) with stainless steel stem (NACE) Fluorocarbon (FKM) with stainless steel stem Fluorocarbon (FKM) with brass stem	20B9389X012 20B9389X022 20B9389X022 20B9389X042 29B9389X032
6	Valve Spring For brass and stainless steel stems For stainless steel stem (NACE)	1B797937022 19A2860X012

Types 1098-EGR and 1098H-EGR

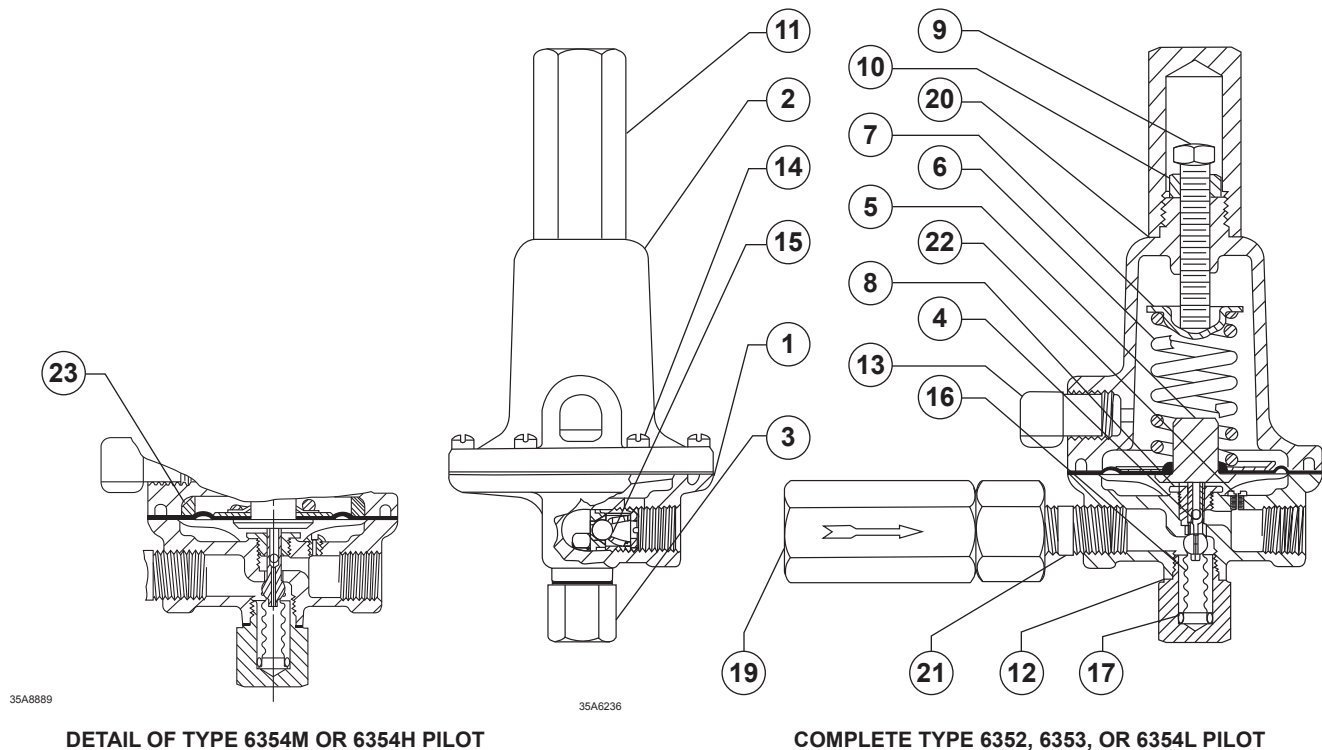
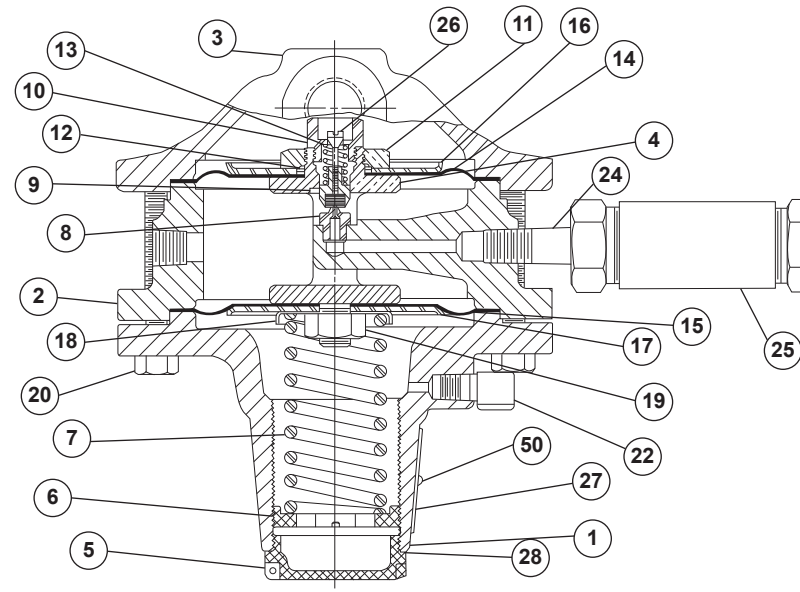


Figure 17. Types 6352 through 6354H Pilot Assemblies

Type 6351 Pilot (Figure 16) (continued)

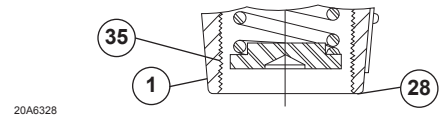
Key	Description	Part Number	Key	Description	Part Number
7*	Diaphragm Assembly (includes plated steel diaphragm plate) Nitrile (NBR) diaphragm and aluminum pusher post Nitrile (NBR) diaphragm and stainless steel pusher post Fluorocarbon (FKM) diaphragm and aluminum pusher post	1B7980000B2 1B7980X00A2 1B7980000C2	28	Closing Cap Aluminum bonnet (plastic cap)	23B9152X012
8	Upper Spring Seat	1B798525062	35	Vent Assembly	Type Y602X1-A12
9	Control Spring, plated steel 2 to 20 psig (0,14 to 1,4 bar) range 3 to 20 psig (0,21 to 1,4 bar) range, green 5 to 35 psig (0,35 to 2,4 bar) range, silver 35 to 100 psig (2,4 to 6,9 bar) range, red	1B788327022 1B986027212 1B788327022 1K748527202	42	Relief Valve Assembly Aluminum/302 stainless steel (NACE) All other assemblies	16A5929X042 16A5929X022
10	Adjusting Screw Aluminum bonnet	10B7192X012	43	Closing Cap Gasket Types S301D and S301F NPT TAP	15A6218X012
11	Locknut, plated steel (not used with Type 662) Aluminum bonnets	1A946324122	Types 6352, 6353, 6354L, 6354M, and 6354H Pilots (Figure 17)		
12	Machine Screw, steel (6 required)	T13305T0012	Key	Description	Part Number
13	Hex Lock Plate, aluminum	10B2695X012		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)	
14	Threaded Lock Plate, aluminum	10B2696X012		Type 6352	R6352X00012
22	Pipe Nipple, Standard and Corrosive service, Galvanized plated steel (use with P590 Series)	1C488226232		Type 6353	R6353X00012
	Steel (NACE)	1C4882X0032		Type 6354	R6354X00012
24	P590 Series Filter (parts listed under separate heading) Type P594-1, brass (standard) Type P593-1, aluminum	AJ5004000A2 AJ5004T0012	1	Pilot Body Aluminum Aluminum with 50 psig (3,4 bar) Type 1806H relief Stainless steel Stainless steel with 50 psig (3,4 bar)	35A6228X012 17A8075X012 39A5971X012

Types 1098-EGR and 1098H-EGR



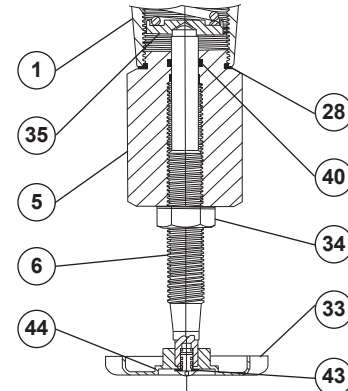
20A6326

TYPES 61L, 61LD, AND 61LE PILOT



20A6328

**DETAIL OF CAPPED
ADJUSTING SCREW OPTION**



30A6327

DETAIL HANDWHEEL OPTION

Figure 18. Types 61L, 61LD, and 61LE Pilot Assemblies

Types 6352, 6353, 6354L, 6354M, and 6354H Pilots (Figure 17) (continued)

Key	Description	Part Number	Key	Description	Part Number
2	Spring Case Aluminum Stainless steel	25A6220X012 28A9277X012	6	Control Spring (continued) Type 6353 3 to 40 psig (0,21 to 2,8 bar) 35 to 125 psig (2,4 to 8,6 bar) DVGW 10 to 40 psig (0,69 to 2,8 bar) DVGW 40 to 58 psig (2,8 to 4,0 bar)	1E392527022 1K748527202 1E392527022 1K748527022
2	Regulator Bonnet (for Type 6353)	24B6641X022	6	Type 6354L 85 to 200 psig (5,9 to 13,8 bar)	1L346127142
3	Body Plug Aluminum 316 stainless steel	15A6221X012 15A6221X042	6	Type 6354M 175 to 220 psig (12,1 to 15,2 bar)	1L346127142
4	Valve Plug and Stem Assembly Nitrile (NBR) disk with stainless steel stem (standard) Nitrile (NBR) disk with 316 stainless steel stem (NACE) Fluorocarbon (FKM) with stainless steel stem (for use in oxygen service) Fluorocarbon (FKM) disk with 316 stainless steel stem (NACE)	15A6207X012 15A6207X052 15A6207X042 15A6207X112	6	Type 6354H 200 to 300 psig (13,8 to 20,7 bar)	15A9258X012
5	Diaphragm Assembly Type 6352, Nitrile (NBR) Type 6353, Nitrile (NBR) Type 6353, Fluorocarbon (FKM) Type 6353, Fluorocarbon (FKM) (for use in oxygen service) Type 6354, Neoprene (CR) Type 6354, Fluorocarbon (FKM) Type 6352 (NACE), Nitrile (NBR) Type 6353 (NACE), Nitrile (NBR) Type 6353 (NACE), Fluorocarbon (FKM) Type 6354 (NACE), Neoprene (CR) Type 6354 (NACE), Fluorocarbon (FKM)	15A6216X012 15A6216X022 15A6216X092 15A6216X162 15A6216X032 15A6216X152 15A6216X552 15A6216X542 15A6216X562 15A6216X572 15A6216X582	7	Spring Seat Type 6352 or 6353 Type 6354L, 6354M, or 6354H	1B798525062 1K155828982
6	Control Spring Type 6352 14-inches w.c. to 2 psig (35 mbar to 0,14 bar) 2 to 10 psig (0,14 to 0,69 bar), black DVGW 4 to 10 psig (0,28 to 0,69 bar)	14A9672X012 14A9673X012 14A9673X012	8	Stem Guide 416 stainless steel (standard) 410 stainless steel (NACE)	15A6222X012 15A6222X022
			9	Adjusting Screw Type 6352 Type 6353 Type 6354 For use with Type 662	10B3692X012 10B7192X012 10B6190X012 18B3500X052
			10	Locknut Type 6352 Type 6353 or 6354	1C724018992 1A946324122
			11	Closing Cap Aluminum Stainless steel	23B9152X012 1H2369X0032
			12	Body Plug Gasket / O-ring For aluminum and brass bodies, composition For stainless steel body, Nitrile (NBR) For stainless steel body, Fluorocarbon (FKM)	1C495704022 1F113906992 1N463906382
			13	Vent Assembly	Type Y602X1-A12
			14	Machine Screw (6 required) Aluminum and brass Stainless steel	10B6189X022 1V4360X0022

Types 1098-EGR and 1098H-EGR

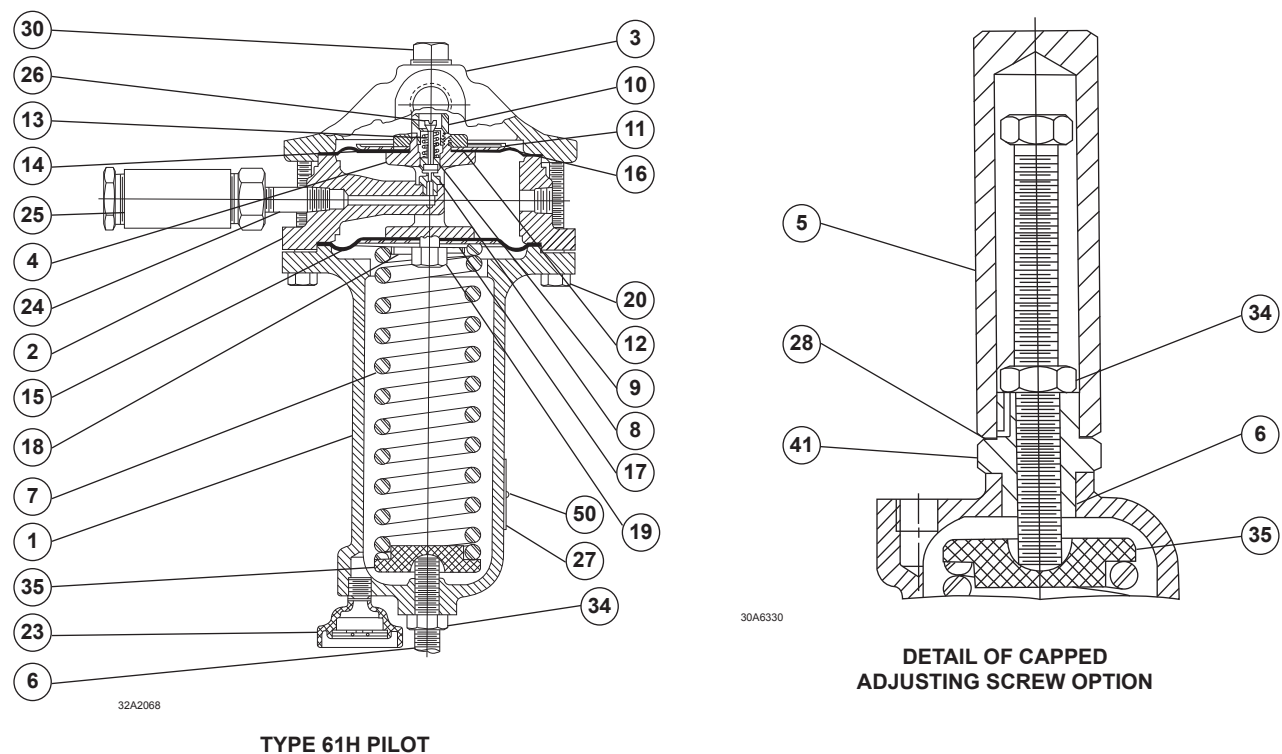


Figure 19. Type 61H Pilot Assembly

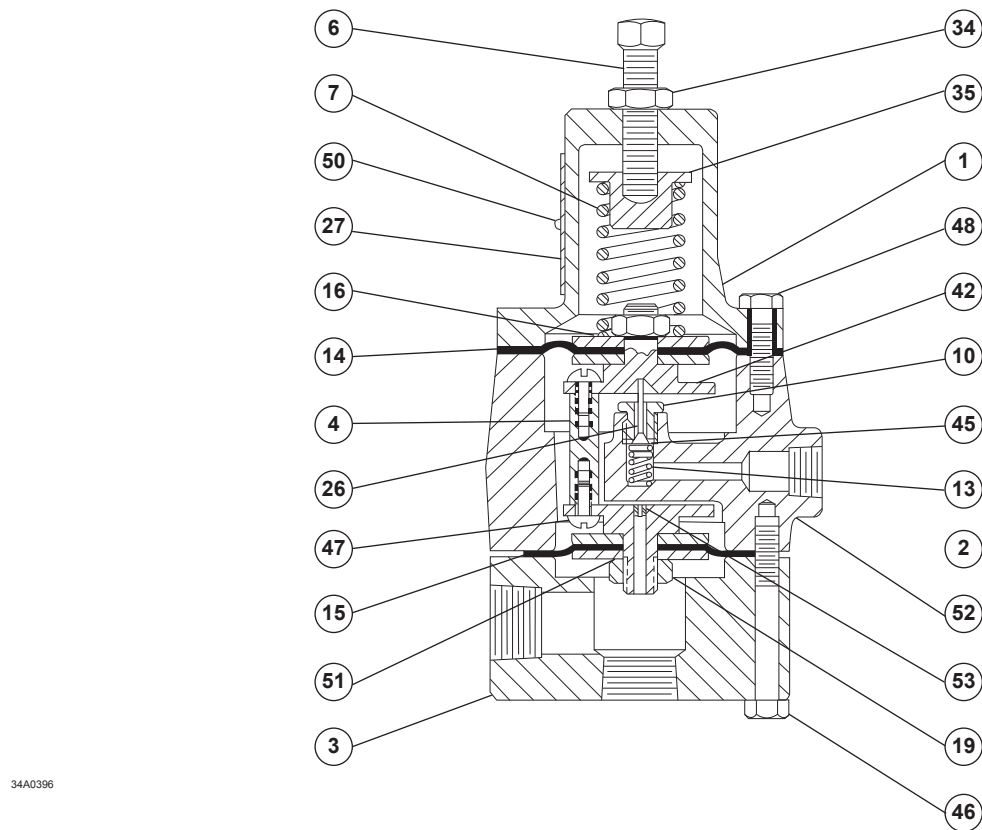


Figure 20. Type 61HP Pilot Assembly

Types 1098-EGR and 1098H-EGR

Types 6352, 6353, 6354L, 6354M, and 6354H Pilots (Figure 17) (continued)

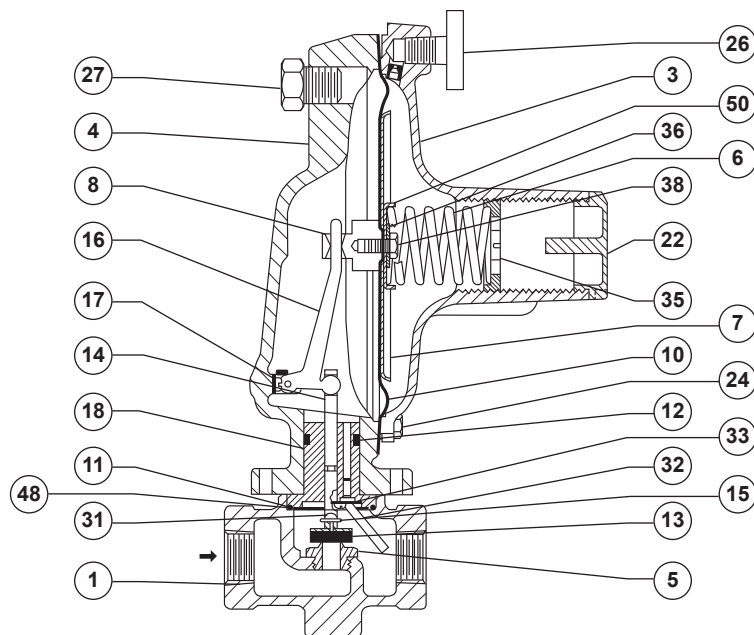
Key	Description	Part Number
15	Relief Valve Assembly 25 psig (1,7 bar) 25 psig (1,7 bar) (NACE) 25 psig (1,7 bar) (for oxygen service) 25 psig (1,7 bar) (stainless steel)	16A5929X052 16A5929X042 16A5929X032 16A5929X072
16	Bellows Assembly Standard for all except in oxygen service For use in oxygen service	15A6202X032 15A6202X022
17	O-ring Standard for all except in oxygen service For use in oxygen service, Fluorocarbon (FKM)	1D682506992 1D6825X0012
19	Filter P590 Series (standard) P590 Series for corrosive service P590 Series for NACE service	Type P590X1-A2 Type P590X1-A1 Type P590X1-A6
20	Closing Cap Gasket	15A6218X012
21	Pipe Nipple For standard and corrosive service For NACE service For corrosive NACE service	1C488226232 1C4882X0032 1C488238982
22	Restriction Standard High	17A2030X012 17A2029X012
23	Diaphragm Limiter Aluminum Brass Stainless steel	15A9259X012 19A8674X012 10B4407X012
26	NACE Tag	19A6034X012
27	Tag Wire	1U7581X0022
28	Packing Bonnet	1L449635072
29	Packing Nut	0P077624102
30	Handwheel	1L217544992
31	Washer	1A329128982
32	Screw	1E985428982
33	Packing Spring	1F125437012
34	Packing Box Gasket	1B487099202
35	Packing Follower	1K885035072
36	Male Adaptor	1F124801012
37	Female Adaptor	1F124401012
38	Packing Washer	1F125236042
39	Packing Ring (3 required)	1C752601012
40	Adjusting Screw	21B5621X012

61 Series Pilots (Figures 18, 19, and 20)

Key	Description	Part Number
1	Relay Spring Case Types 61L, 61LD, and 61LE Type 61H Standard adjusting screw Capped adjusting screw or Type 662 Type 61HP Standard adjusting screw	1B983919012 1B984119012 1H232619012 2P969419012
2	Relay Valve Body Types 61L, 61LD, 61LE, and 61H Type 61HP	2J581919012 33A9845X012
3	Bottom Cover Types 61L, 61LD, 61LE, and 61H Type 61HP	2C518619012 13A9843X012

Key	Description	Part Number
4	Relay Yoke Types 61L, 61LD, 61LE, and 61H Type 61HP (2 required)	1D662544012 13A9838X012
5	Closing Cap Assembly Types 61L, 61LD, and 61LE For all except pilots with handwheel adjusting screw and pressure loaded pilots Pressure loaded corrosive trim Standard trim with handwheel adjusting screw Type 61H Pressure loaded/capped adjusting screw	T11069X0012 1E422724092 1R759314012 1H236514012
6	Adjusting Screw Types 61L, 61LD, and 61LE For all except handwheel adjusting screw For use with handwheel adjusting screw Type 61H Standard For 10 to 35 psig (0,69 to 2,4 bar) range For 10 to 50 psig (0,69 to 3,5 bar) range For 10 to 65 psig (0,69 to 4,5 bar) range Pressure loaded/capped adjusting screw Type 662 mounting Type 61HP Standard	1B537944012 1R759414012 1A500528982 1B212028982 1A279128982 1J881524102 18B3500X072 1C216032992
7	Control Spring Types 61L, 61LD, and 61LE 0,25 to 2 psig (0,02 to 0,14 bar) 1 to 5 psig (0,07 to 0,35 bar) 2 to 10 psig (0,14 to 0,69 bar) 5 to 15 psig (0,34 to 1,0 bar) 10 to 20 psig (0,69 to 1,4 bar) Type 61H 10 to 65 psig (0,69 to 4,5 bar) Type 61HP 15 to 45 psig (1,0 to 3,1 bar) 35 to 100 psig (2,4 to 6,9 bar) 100 to 300 psig (6,9 to 20,7 bar)	1B886327022 1J857827022 1B886427022 1J857927142 1B886527022 0Y066427022 1E392527022 1D387227022 1D465127142
8	Relay Orifice Standard applications Fast close and open, or open only Special orifice, fast open only application	1C520135032 1D373735032 1E874235132
9	Disk Holder Assembly Standard trim Corrosive trim Oxygen service and pressure loaded corrosive trim	1B8868000A2 1B8868000B2 1N3638000A2
10	Bleed Orifice Types 61L, 61LD, and 61LE Standard bleed Capped bleed Type 61H Type 61HP	1B887335032 1D777135032 1B887335032 1D318135032
11	Diaphragm Nut Standard trim Corrosive trim	1B989514012 1B989535072
12	O-ring Seal Standard and corrosive trim Oxygen service and pressure loaded corrosive trim	1B885506992 1B8855X0012
13	Relay Spring Types 61L and 61LE Type 61LD Type 61H Up to 300 psig (20,7 bar) inlet pressure 300 to 400 psig (20,7 to 27,6 bar) inlet pressure Type 61HP	1C911537022 1E643637022 1C911537022 1N859137022 18797937022

Types 1098-EGR and 1098H-EGR



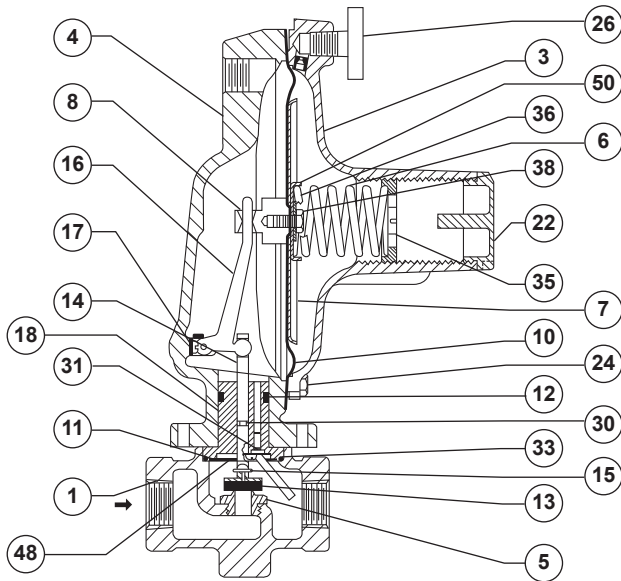
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Figure 21. Type Y600A Regulator Assembly

61 Series Pilots (Figures 18, 19, and 20) (continued)

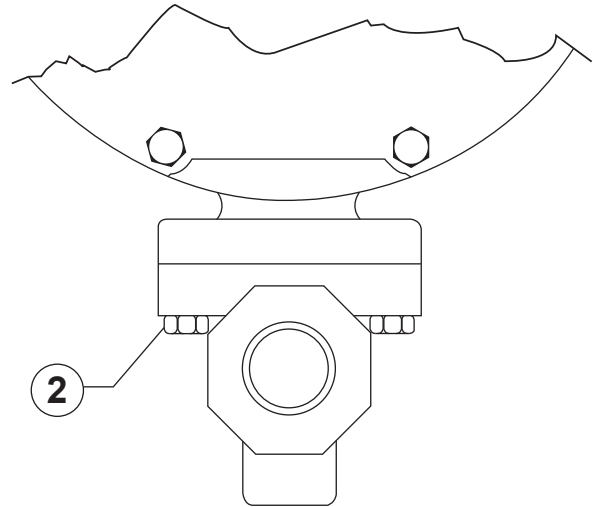
Key	Description	Part Number	Key	Description	Part Number
			18	Spring Seat Types 61L, 61LD, and 61LE Type 61H	1B886225072 1D558525072
14	Upper Relay Diaphragm Types 61L, 61LD, 61LE, and 61H Standard and corrosive trim Oxygen service and pressure loaded corrosive trim Type 61HP Standard Oxygen service	1B885202052 1N162802332 13A9841X022 13A9841X012	19	Hex Nut Types 61L, 61LD, 61LE, and 61H Type 61HP (2 required)	1A340324122 1A346524122
15	Lower Relay Diaphragm Types 61L, 61LD, and 61LE Standard and corrosive trim Oxygen service and pressure loaded corrosive trim Type 61H Standard and corrosive trim Oxygen service and pressure loaded corrosive trim Type 61HP Standard Oxygen service	1B886002052 1N536102332 1B894202192 1N162702302 13A9840X012 13A9840X022	20	Cap Screw (8 required)	1B989624052
			23	Pipe Plug or Vent Assembly Pipe Plug for Types 61L, 61LD, and 61LE Vent Assembly for Type 61H	1A649528982 Type Y602-1 1C488226232
16	Upper Relay Head Types 61L and 61LD Type 61LE Type 61H Type 61HP (4 required)	1B989325072 1D558425072 1D558425072 13A9839X012	24	Pipe Nipple	
17	Lower Relay Head Types 61L and 61LD Type 61LE Type 61H	1B989425072 1B989425072 1D558325072	25	Filter Assembly Standard trim Corrosive trim	Type P594-1 Type P593-1
			26	Bleed Valve Types 61L, 61LE, 61H Type 61LD Type 61HP Standard Trim Oxygen Service	1D986735132 1H951635132 1D5604000B2 1N3798000C2
			27	Nameplate	-----
			28	Gasket Types 61L, 61LD, and 61LE Type 61H	1P753306992 1B487099202
			30	Pipe Plug	1A369224492
			33	Handwheel	1J496144012
			34	Hex Nut	1A351124122
			35	Spring Seat Types 61L, 61LD, and 61LE Type 61H Type 61H Type 61HP	1J618124092 1D558525072 16A9812X012 10A3963X012

Types 1098-EGR and 1098H-EGR



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Figure 22. Type Y600AM Regulator Assembly



A7144

Figure 23. Diaphragm Casing Cap Screw Location

61 Series Pilots (Figures 18, 19, and 20) (continued)

Key	Description	Part Number
40	O-ring	1D541506992
41	Adaptor	1J881624092
42	Yoke Cap	13A9836X012
43	Lockwasher	1A352332992
44	Machine Screw	16A5763X012
45	Valve Spring Seat	1L251135072
46	Cap Screw (6 required)	15A0690X012
47	Machine Screw (4 required)	1A866935032
48	Cap Screw (6 required)	1P327028982
50	Drive Screw (2 required)	1A368228982
51	Diaphragm Insert (2 required)	
	Standard	13A9842X012
	Oxygen service	13A9842X022
52	Lower Yoke Cap	13A9837X012
53	Bleed Plug	1V211514012
54	Vent Assembly	Type Y602-1

Types Y600A and Y600AM Parts List (Figures 21 through 23)

Key	Description	Part Number
	Parts Kit (keys 10, 11, 12, 13, 15, 30, and 31) Types Y600A and Y600AM	RY600AX0012
1	Body, Cast Iron 3/4 x 3/4-Inch (DN 20 x 20)	1E987119012

Key	Description	Part Number
2	Cap Screw (2 required), Plated steel	1C856228992
3	Spring Case Assembly, Cast iron	1B6365X0342
4	Diaphragm Casing, Cast iron	47B2271X012
5	Orifice, Aluminum 1/4-Inch (6,4 mm)	0B042009012
6	Spring, Plated steel	
	4 to 8-inches w.c. (10 to 20 mbar)	1B653827052
	7 to 16-Inches w.c. (17 to 40 mbar)	1B653927022
	15-Inches w.c. to 1.2 psig (37 mbar to 0,08 bar)	1B537027052
	1.2 to 2.5 psig (0,08 to 0,17 bar)	1B537127022
	2.5 to 4.5 psig (0,17 to 0,31 bar)	1B537227022
	4.5 to 7 psig (0,31 to 0,52 bar)	1B537327052
7	Diaphragm Head 304 Stainless steel	17B9723X032
8	Pusher Post Aluminum	17B9734X032
10*	Diaphragm, Nitrile (NBR)	17B9726X012
11*	Body Seal O-ring, Nitrile (NBR)	1H993806992
12*	Insert Seal O-ring, Nitrile (NBR)	1B885506992
13*	Disk Assembly, Aluminum Disk Holder with Nitrile (NBR) disk	1C4248X0212
14	Stem, Stainless steel	17B3423X012
15*	Cotter Pin, Stainless steel	1A866537022
16	Lever Assembly, Plated steel	1B5375X0082
17	Machine Screw (2 required), Stainless steel	19A7151X022
18	Guide Insert, Delrin	27B4028X012
22	Closing Cap	T11069X0012
23	Hex Nut, not shown (8 required), Plated steel	1E985324142
24	Cap Screw (8 required) Plated steel	T1070824912
26	Type Y602 Vent Assembly	
	Spring case up (standard)	Type Y602-11
	Spring case down	Type Y602-1
27	Pipe Plug, Plated steel (Type Y600A only)	1A369224492
30*	Stem O-ring (Type Y600AM only), Nitrile (NBR)	1H292606992
31*	Throat Seal O-ring (Type Y600AM only), Nitrile (NBR)	1D682506992

*Recommended spare part.

Types 1098-EGR and 1098H-EGR

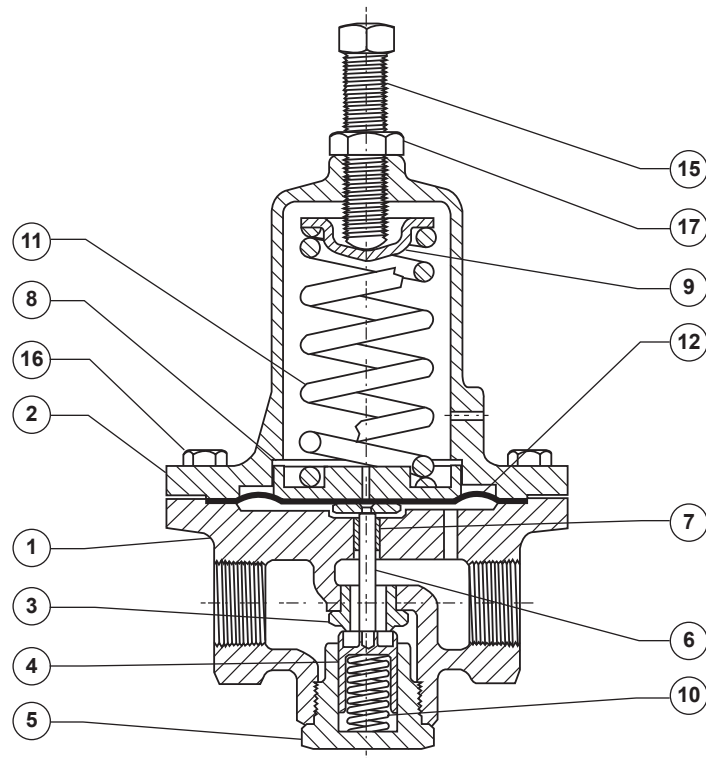


Figure 24. Type 95H Supply Pressure Regulator

Types Y600A and Y600AM Parts List (Figures 21 through 23) (continued)

Key	Description	Part Number	Key	Description	Part Number
32	Pitot Tube, 304 Stainless steel	17B4479X012	3*	Orifice	
33	Machine Screw, Stainless steel			416 Stainless steel	1E393235132
	Type Y600AM (1 required)	18A0703X022	4*	Valve Plug	
	Type Y600A (4 required)	19A7151X022		416 Stainless steel	
35	Adjusting Screw, Zinc	1B537944012		Nitrile (NBR)	1E3933000E2
36	Washer	18B3440X012	5	Valve Plug Guide	
38	Diaphragm Cap Screw, Plated steel	1B290524052		416 Stainless steel	1E391835132
48	Backup Ring, Stainless steel	18B3446X012	6	Stem Assembly	
50	Lower Spring Seat, Plated steel	1B636325062		Stainless steel	1F2113000A2
			7*	Stem Guide Bushing	
				Stainless steel	1E392235132
			8	Lower Spring Seat	
				Aluminum (standard)	1E392309012
			9	Upper Spring Seat	
				Steel	1B798525062
			10	Valve Plug Spring	
				Stainless steel	1E392437022
			11	Spring	
				Steel, yellow	1E392527022
			12*	Diaphragm	
				Neoprene (CR)	1E393502112
			13	Nameplate	-----
			15	Adjusting Screw, steel	1E639928992
			16	Cap Screw (6 required)	
				Steel	1A407824052
			17	Locknut, steel	1A352224122

Type 95H Regulator (Figure 24)

Key	Description	Part Number	Key	Description	Part Number
	Parts Kit (Included are keys 3, 4, 10, and 12) for composition, Trim 3A, 1/4-inch body	R95HX000102			
1	Body, 1/4-inch NPT				
	Cast iron	1E391019012			
2	Spring Case				
	Cast iron	2E391219012			

*Recommended spare part.

Types 1098-EGR and 1098H-EGR

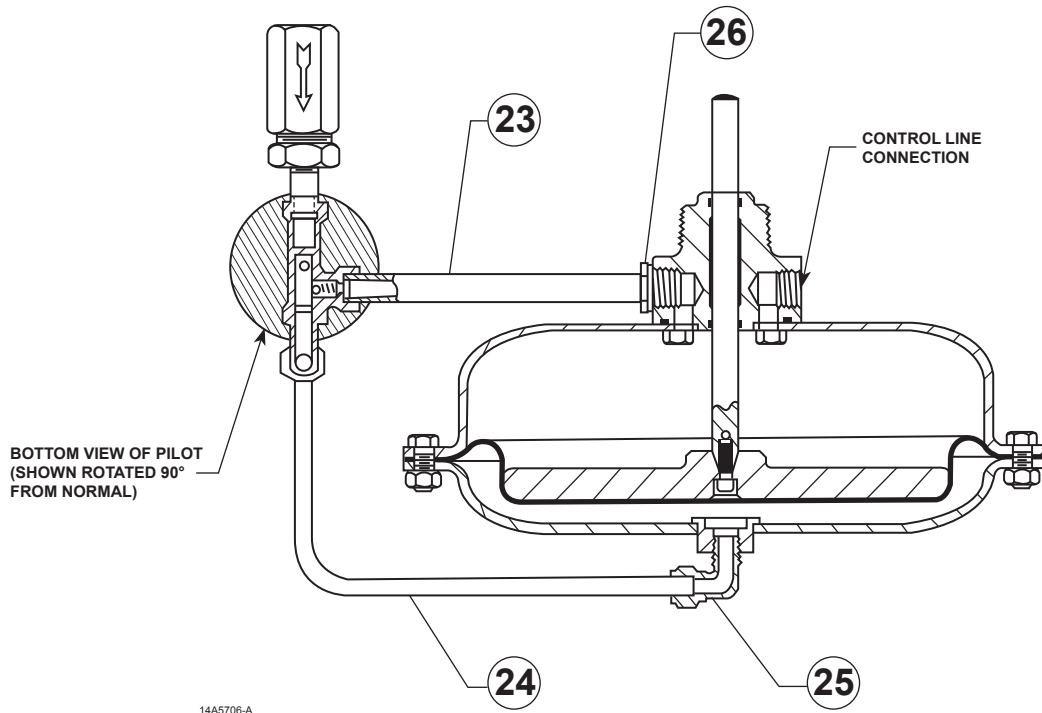


Figure 25. Single-Pilot Mounting Assembly

Mounting Parts

6350 Series Mounting Parts (Figure 25)

Key	Description	Part Number	Key	Description	Part Number
16	Pipe Tee for use with 50 psig (3,4 bar) relief	1C597547362	25	Tube Fitting Elbow (2 required for standard and 3 required for use with 50 psig (3,4 bar) relief mounting)	
21	Tube Fitting Connector for use with 50 psig (3,4 bar) relief, steel	15A6002XW22		Actuator Sizes 30 and 40	
23	Pipe Nipple			Brass	15A6002X162
	Type 1098			Aluminum (NACE)	15A6002X402
	Actuator Sizes 30 and 40			Steel	15A6002XW32
	Plated steel	1C210026232		Stainless steel (NACE)	15A6002X612
	Stainless steel (NACE)	1C2100X0012		Actuator Size 70	
	For use with 50 psig (3,5 bar) relief	1C782526012		Brass	15A6002X162
	Actuator Size 70			Steel	15A6002XW32
	Plated steel	19A7858X012		Stainless steel (NACE)	15A6002X612
	Stainless steel (NACE)	19A7858X032	26	Pipe Bushing	
	Type 1098H			Steel (NACE)	1C379026232
	Steel	1C488226232		Stainless steel (NACE)	1C3790X0012
	Stainless steel	1C488238982	51	Pipe Nipple, for use with 50 psig (3,5 bar) relief (2 required) (not shown)	1C488226232
24	Tubing		52	Pipe Tee, for use with 50 psig (3,5 bar) relief (not shown)	1A473621992
	Actuator Sizes 30 and 40				
	Copper	14A9458X012			
	Stainless steel (NACE)	14A9458X052			
	Actuator Size 70				
	Copper	0500211701W			
	Stainless steel (NACE)	0500213809W			

Types 1098-EGR and 1098H-EGR

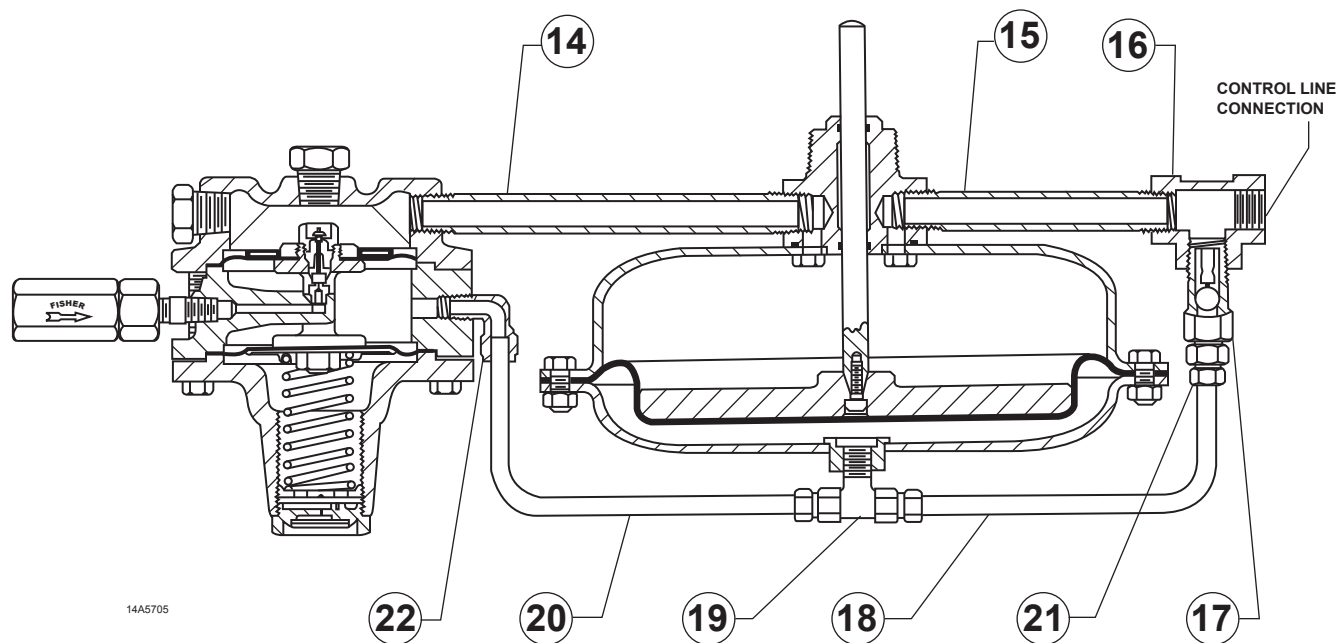
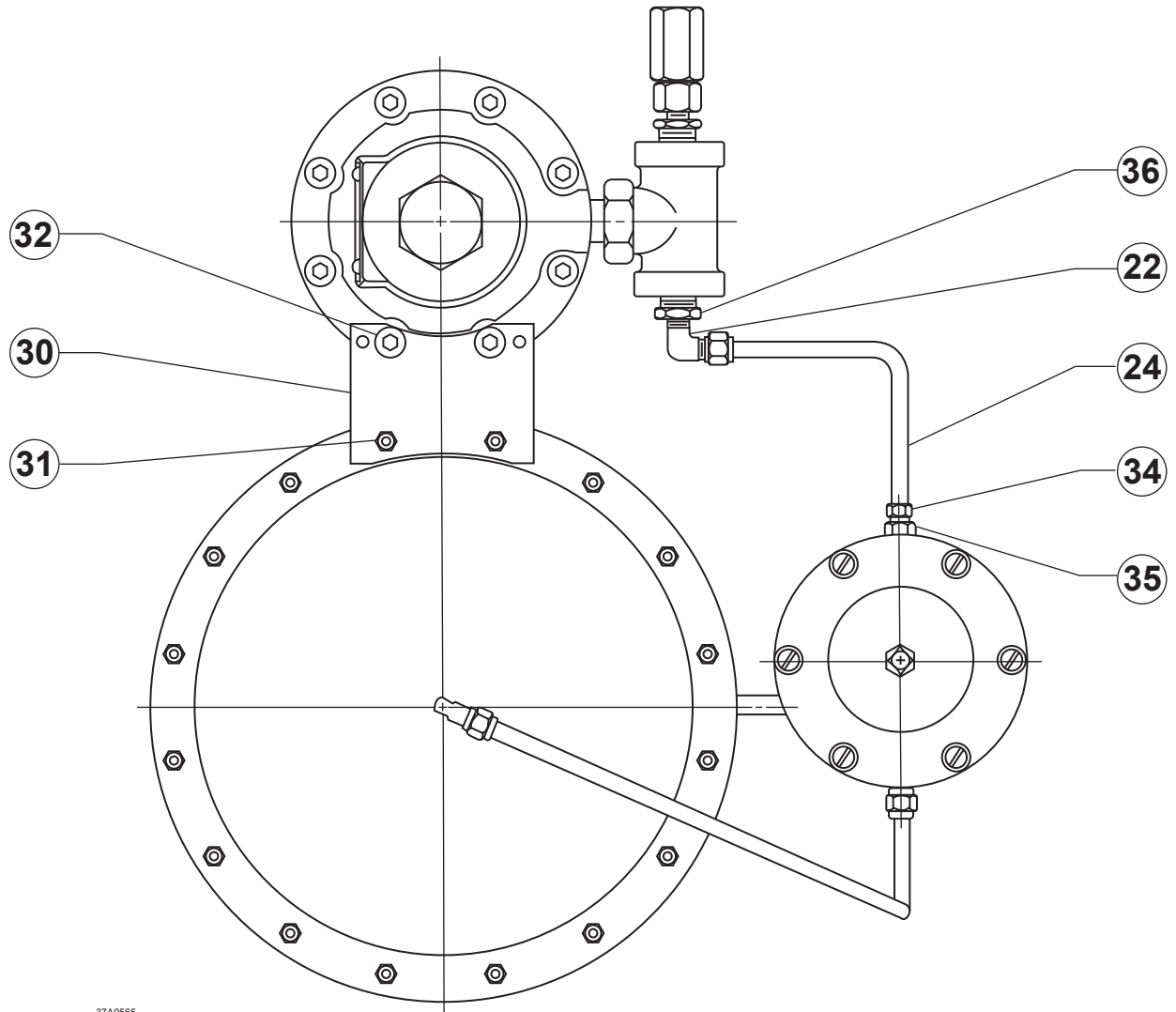


Figure 26. 61 Series Pilot and Type 1806 Relief Valve Mounting

Mounting Parts (continued)

61 Series Mounting Parts (Figure 26)

Key	Description	Part Number	Key	Description	Part Number
14	Pipe Nipple		21	Tube Fitting Connector	
	For standard 61 Series mounting			Brass	15A6002X202
	Actuator Sizes 30 and 40	1F731526012		Steel	15A6002XW22
	Actuator Size 70	15A1810X012	Stainless steel	15A6002X602	
	Negative shock service		22	Tube Fitting Elbow	
	Actuator Sizes 30 and 40	1C782526012		Brass	15A6002X162
Actuator Size 70	1F731526012	Steel		15A6002XW32	
15	Pipe Nipple			Stainless steel	15A6002X612
	Actuator Sizes 30 and 40	1F730226012	26	Pipe Bushing for size 70 actuator only	1C379026232
	Actuator Size 70	15A2610X012		39	Pipe Nipple for negative shock service only
16	Pipe Tee	1A473621992	53	Pipe Elbow for negative shock service only	1B952821992
18	Relief Tubing		Auxiliary Pilot Mounting Parts		
	Actuator Sizes 30 and 40				
	Copper	14A9457X012	Key	Description	Part Number
	Stainless steel	14A9457X052			
	Actuator Size 70				
	Copper	15A2608X012			
	Stainless steel	15A2608X052	22	Tube Elbow	15A6002XW32
19	Tube Fitting Tee		24	Tubing	0500213809W
	Brass	14A9056X012	30	Mounting Bracket	1H3504X0012
	Steel	15A6002XW42	31	Cap Screw (2 required)	1A582824052
	Stainless steel	15A6002X842	32	Cap Screw (2 required)	
20	Loading Tubing			For Type 627-109	1P327028982
	For standard 61 Series mounting			For Type 161AYW	1A553424052
	Actuator Sizes 30 and 40		34	Flared Nut (1 required for use with	
	Copper	24A9459X012		Type 6352 pilot and 2 required with	
	Stainless steel	24A9459X052		Type 61H Pilot)	1D692124272
		Negative shock service	0500213809W	35	Tube Connector (1 required for use with



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Figure 27. Working Monitor Assembly

Types 1098-EGR and 1098H-EGR

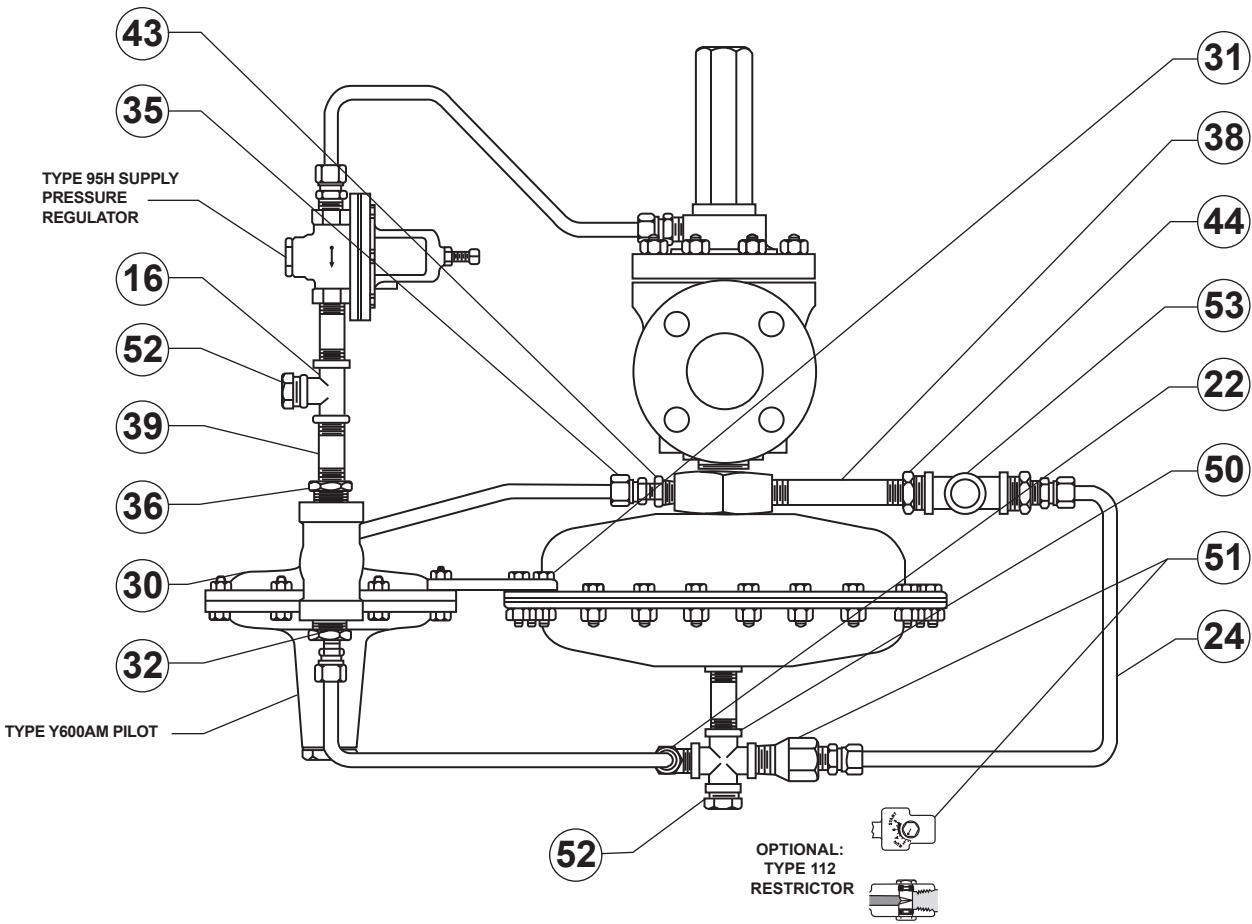


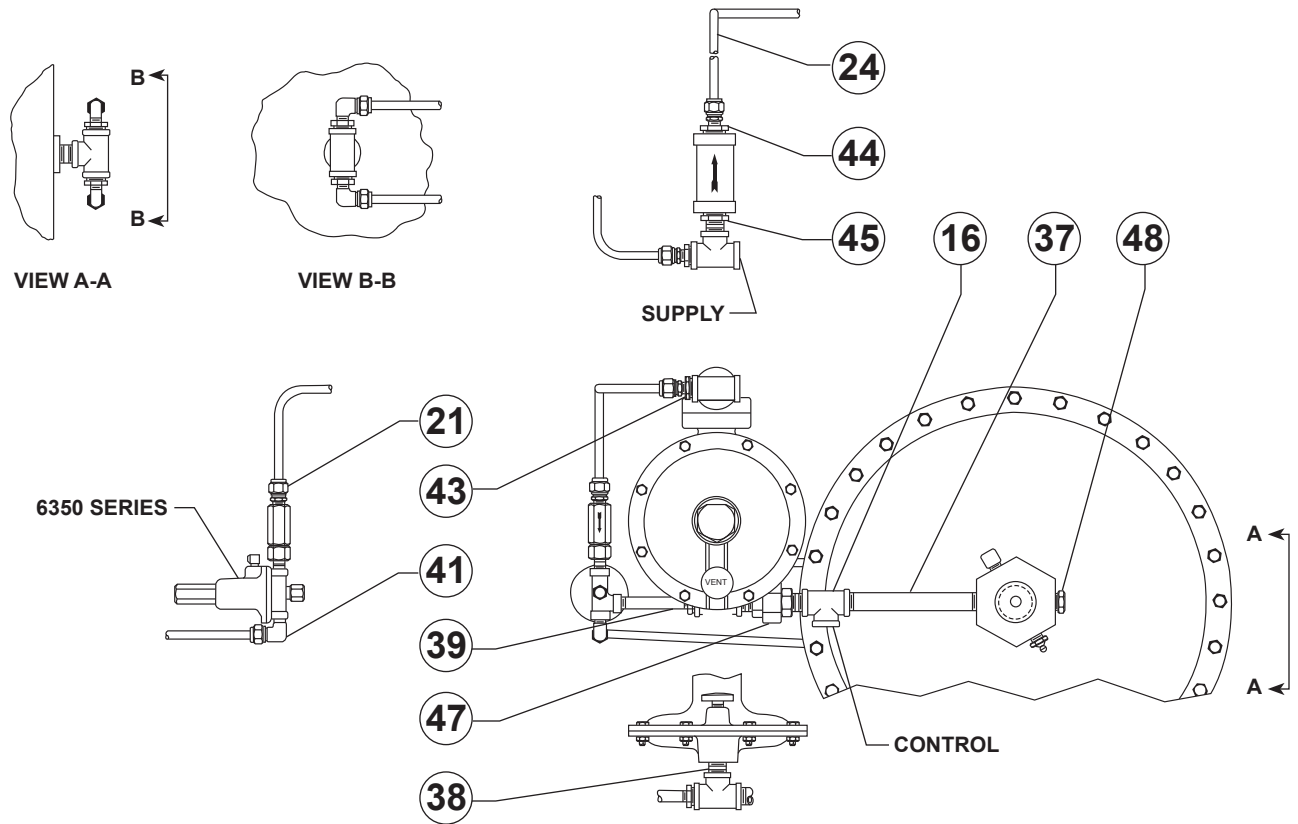
Figure 28. Type 1098-EGR with Type Y600AM Mounting Parts

Mounting Parts (continued)

Type 1098-EGR with Type Y600AM Mounting Parts (Figure 28)

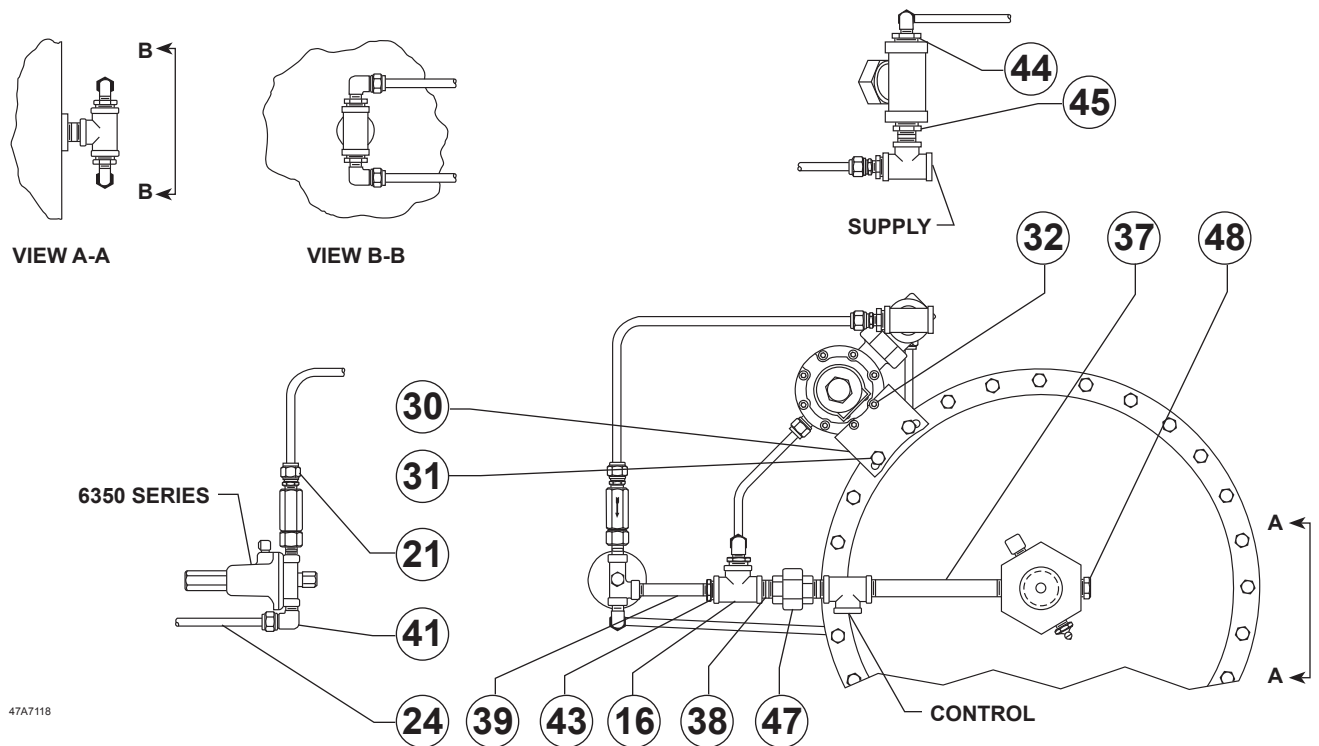
Key	Description	Part Number	Key	Description	Part Number
16	Pipe Tee Stainless steel	1P506938982	39	Pipe Nipple (3 required) 316 Stainless steel	1C488238982
22	Tubing Elbow Stainless steel	15A6002X612	43	Pipe Bushing (5 required) 316 Stainless steel	1C3790X0012
24	Tubing Stainless steel	0500213809W	44	Pipe Bushing 316 Stainless steel	1K2895X0012
30	Mounting Bracket, steel	24B0203X012	50	Pipe Cross 316 Stainless steel	1C6790X0012
31	Cap Screw, zinc plated steel (2 required)	1A582824052	51	Restrictor Fixed Restriction, 316 Stainless steel	1K9484X0022
32	Cap Screw, zinc plated steel (2 required)	1A579724052		Variable Restriction (Optional) Type 112	
35	Tubing Connector (4 required) Stainless steel	15A6002X602	52	Pipe Plug (2 required) Steel	
36	Pipe Bushing (3 required) Stainless steel	1A3424X0022		316 Stainless steel	1A767535072
38	Pipe Nipple 316 Stainless steel	15A4786X012	53	Pipe Tee 316 Stainless steel	1L9802X0012

Types 1098-EGR and 1098H-EGR



47A7118

TYPE Y600AM AND SIZE 70 TYPE 1098 COMBINATION



47A7118

TYPE 627M AND SIZE 70 TYPE 1098 COMBINATION

Figure 29. Boiler Fuel Pressure Control Assembly

Types 1098-EGR and 1098H-EGR

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