Fisher Controls

Instruction Manual

Type 67AF and 67AFR Filter Regulators

March 1986 *Form 5144*

Introduction

Scope of Manual

This manual describes and provides instructions and parts lists for Type 67AF and 67AFR regulators. Although sometimes shipped separately for line or panel mounting, these regulators are usually shipped installed on other equipment. Instructions and parts lists for other equipment, as well as for other 67 Series regulators not covered in this manual, are found in separate manuals.

Product Description

Type 67AF and 67AFR self-operated, aluminum-body, filter regulators provide constant reduced pressures in a variety of applications. They are commonly used as supply pressure regulators for pneumatic instruments as shown in figure 1.

A Type 67AF and 67AFR regulator with a cellulose or stainless steel filter removes particles greater than 0.0016 inch (0.040 mm) in diameter, or with a glass filter removes particles greater than 0.0004 inch (0.010 mm) in diameter.

The Type 67AFR regulator additionally has an integral low-capacity internal relief valve. In this construction, the stem seats against a soft-seated orifice in the diaphragm assembly. A downstream pressure increase above the outlet pressure setting moves the diaphragm assembly off the stem, venting the excess pressure through a hole drilled or tapped in the spring case.

Specifications

Table 1 gives some general Type 67AF and 67AFR regulator ratings and other specifications. A label on the spring case gives the recommended and actual control spring range for a given regulator as it comes from the factory.

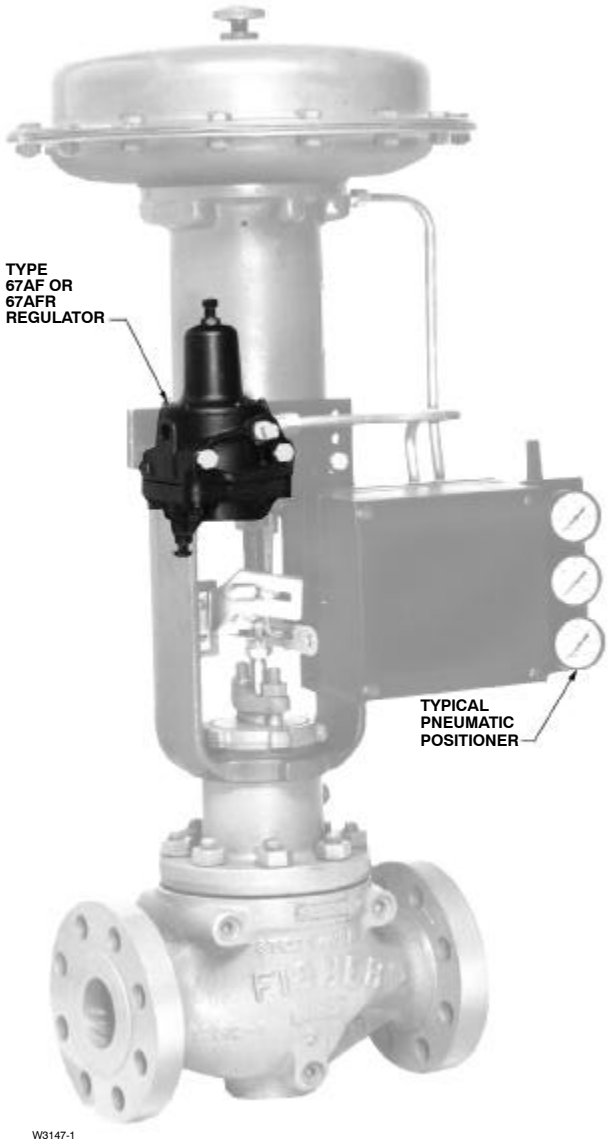

Figure 1. Type 67AF or 67AFR Regulator Mounted on Control Valve Assembly

D100251 X012

Table 1. Specifications

BODY SIZE AND END CONNECTION STYLE	1/4-inch NPT screwed	**INTERNAL RELIEF PERFORMANCE (TYPE 67AFR REGULATOR ONLY)**	Low capacity for seat leakage only; external relief valve must be provided if inlet pressure can exceed maximum emergency outlet pressure
MAXIMUM ALLOWABLE INLET PRESSURE(1)	250 psig (17 bar)	**TEMPERATURE CAPABILITIES(1)**	**Nitrile Parts: -**20°F to 150°F (-29°C to 66°C) **Fluoroelastomer Parts:** 0°F to 350°F (-18°C to 177°C)
OUTLET PRESSURE RANGES	3 to 100 psig (0.21 to 6.9 bar) with the springs shown in parts list key 9		
MAXIMUM EMERGENCY OUTLET PRESSURE(1)	50 psig (3.4 bar) over outlet pressure setting, or 100 psig (7.6 bar), whichever is greater	**PRESSURE REGISTRATION**	Internal

1. The pressure/temperature limits in this manual and any applicable code or standard limitations, must not be exceeded.

Installation

WARNING

Personal injury, property damage, equipment damage, or leakage due to escaping 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 table 1, or where conditions exceed any ratings of the adjacent piping or piping connections. To avoid such injury or damage, provide pressure-relieving or pressure-limiting devices (as required by the appropriate code, regulation, or standard) to prevent service conditions from exceeding those limits. The Type 67AFR regulator, because of its low-capacity internal relief, does provide very limited downstream overpressure protection, but it should not be considered complete protection against overpressure.

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

Regulator operation within ratings does not preclude the possibility of damage from debris in the lines or from external sources. A regulator should be inspected for damage periodically and after any overpressure condition.

Note

If the regulator is shipped mounted on another unit, install that unit according to the appropriate instruction manual.

1. Only personnel qualified through training and experience should install, operate, and maintain a regulator. For a regulator that is shipped separately, make sure that there is no damage to, or foreign material in, the regulator. Also ensure that all tubing and piping have been blown free.

2. Install the regulator so that flow is from the IN to the OUT connection as marked on the regulator body. Cutout dimensions for a panel-mounting regulator are shown in figure 2.

3. For best filter drainage, orient the drain valve (key 17, figure 2) to the lowest possible point on the filter cap (key 25, figure 2). This orientation may be improved by rotating the filter cap with respect to the body assembly (key 1, figure 2).

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 area. The vent line or stack opening must be protected against condensation or clogging.

4. A clogged spring case vent hole may cause the regulator to function improperly. To keep this vent hole from being plugged (and to keep the spring case from collecting moisture, corrosive chemicals, or other foreign material) orient the vent to the lowest possible point on the spring case or otherwise protect it. Inspect the vent hole regularly to make sure it has not been plugged. Spring case vent hole orientation may be changed by rotating the spring case with respect to the body. A type 67AF or 67AFR regulator with a tapped spring case may be remotely vented by installing 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 in the remote end of the vent pipe.

5. For use in regulator shutdown, install upstream and downstream vent valves or provide some other suitable means of properly venting the regulator inlet and outlet pressures.

6. If using pipe, apply a good grade of pipe compound to the pipe threads before making the connections.

7. Install tubing or piping into the 1/4-inch NPT inlet connection on the body assembly (key 1, figure 2) and also into the 1/4-inch NPT body outlet connection, unless this connection already has been factory-piped to another unit.

Startup and Adjustment

Key numbers are referenced in figure 2.

1. With proper installation completed and downstream equipment properly adjusted, slowly open the upstream and downstream shutoff valve while using pressure gauges to monitor pressure.

2. Regulator outlet pressure may be monitored on a gauge installed at some point downstream from the regulator, such as the supply pressure gauge of a pneumatic instrument for which the regulator is providing reduced pressure. Or, outlet pressure may be monitored on a gauge (key 21, not shown) installed on the body of a regulator with a tapped side outlet. If the regulator has no gauge but the side outlet is tapped and plugged, the pipe plug (key 21, not shown) may be removed and a gauge temporarily installed for monitoring.

WARNING

To avoid personal injury, property damage, or equipment damage caused by bursting of pressure containing parts or explosion of accumulated gas, never adjust the control spring to produce an outlet pressure higher than the upper limit of the outlet pressure range for that particular spring. If the desired outlet pressure is not within the range of the control spring, install a spring of the proper range according to the diaphragm parts maintenance procedure.

Note

Each regulator is factory-set for the pressure setting specified on the order. If no setting was specified, outlet pressure was factory-set at the midrange of the control spring.

3. If outlet pressure adjustment is necessary, monitor outlet pressure with a gauge during the adjustment procedure. A standard Type 67AF or 67AFR regulator is adjusted by loosening the locknut (key 11, if used) and turning the adjusting screw or handwheel (key 10) clockwise to increase, or counterclockwise to decrease, the outlet pressure setting. Then, tighten the locknut (if used) to maintain the adjustment position. On some regulators, a closing cap (key 28, not shown) must be removed before adjustment and replaced afterward.

Shutdown

First close the nearest upstream shutoff valve and then close the nearest downstream shutoff valve to vent the regulator properly. Next, open the vent valve between the regulator and the downstream shutoff valve nearest to it. All pressure between these shutoff valves will be released through the open vent valve, since a Type 67AF or 67AFR, regulator remains open in response to the decreasing downstream pressure.

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 on the severity of service conditions and upon applicable codes and government regulations. Open the drain valve (key 17, figure 2) periodically to empty accumulated moisture from the filter cap (key 25, figure 2).

WARNING

To avoid personal injury, property damage, or equipment damage caused by sudden release of pressure or explosion of accumulated gas, do not attempt any maintenance or disassembly without first isolating the regulator from system pressure and relieving all internal pressure from the regulator.

Note

If sufficient clearance exists, the body assembly (key 1) may remain mounted on other equipment or in a line or panel unless the entire regulator will be replaced.

Key numbers are referenced in figure 2 unless otherwise noted.

Filter Element and Trim Parts

1. Use a 12-point socket wrench to remove the cap screws (key 18). Remove the filter cap and gasket (keys 25 and 19).

2. The retainer assembly and filter element (keys 43 and 29) may come off with the filter cap; if not, remove these parts to let the plug spring (key 6),plug spring seat (key 5), and plug/stem assembly (key 4) drop freely from the body.

3. Inspect the removed parts, replace as necessary, and make sure the plug seating surfaces are free from debris. A dirty filter element may be cleaned with solvent and blown dry.

4. Apply a good grade of lubricant to the gasket (key 19) before installing it. Stack the gasket, retainer assembly, filter element, plug spring, plug spring seat, and plug/stem assembly (keys 19, 43, 29, 6, 5, and 4) on the filter cap (key 25). Install the filter cap with stacked parts into the body assembly (key 1) and secure with the cap screws (key 18).

Diaphragm Parts

1. Remove the closing cap if used (key 28, not shown), loosen the locknut if used (key 11), and back out the adjusting screw or handwheel (key 10) until compression is removed from the control spring (key 9).

2. Remove the machine screws (key 12) and separate the spring case (key 2) from the body assembly (key 1). Remove the control spring seat and control spring (keys 8 and 9).

3. Remove the diaphragm assembly (key 7) and inspect the diaphragm.

4. Install the diaphragm assembly (key 7) and push down on it to see if the plug/stem assembly (key 4) strokes smoothly and approximately 1/16 inch (2 mm).

Note

In step 5, if installing a control spring of a different range from the one that was removed, be sure to delete the spring range originally appearing on the control spring label (key 20, not shown) and indicate the new spring range.

5. Stack the control spring and control spring seat (keys 9 and 8) onto the diaphragm assembly (key 7).

6. Install the spring case (key 2) on the body assembly (key 1) with the vent oriented to prevent clogging or entrance of moisture. Install the machine screws (key 12) and torque to 5 to 7 foot-pounds (7 to 9 N•m).

7. When all maintenance is complete, refer to the startup and adjustment section to put the regulator back into operation and adjust the pressure setting. Tighten the locknut if used (key 11), and install the closing cap if used (key 28, not shown).

Parts Ordering

When corresponding with the Fisher sales office or sales representative about this regulator, include the type number and all other pertinent information stamped on the bottom of the filter cap and on the control spring label. Specify the eleven-character part number when ordering new parts from the following parts list.

Parts List (figure 2)

Key	Description	Part Number
	Parts Kit (included are keys 4, 5, 6, 7, 17, 19, and 29)	
	For Type 67AF regulator w/o internal relief	
	With nonbrass parts to provide sour gas corrosion resistance capability(1)	R67AF X00N12
	With brass parts for other than sour gas corrosion resistance applications	R67AF X00012
	For Type 67AFR regulator w/internal relief	
	With nonbrass parts to provide sour gas corrosion resistance capability	R67AFR X0N12
	With brass parts for other than sour gas corrosion resistance applications	R67AFR X0012
1	Body Assembly	
	To provide sour gas corrosion resistance capability, aluminum w/316 stainless steel bushing	
	One outlet	15A5969 X052
	Two outlets	15A5969 X062
	For other than sour gas corrosion resistance applications	
	Aluminum w/brass bushing	
	One outlet	15A5969 X012
	Two outlets	15A5969 X032
	Aluminum w/304 stainless steel bushing	
	One outlet	15A5969 X022
	Two outlets	15A5969 X042
2	Spring Case	
	W/drilled-hole vent, aluminum	2B7974 08012
	W/1/4-inch NPT vent tapping	
	To provide sour gas corrosion resistance capability, aluminum	25A6220 X012
	For other than sour gas corrosion resistance applications, brass	
	W/o closing cap	1E1674 000A2
	W/closing cap	10A3075 X012
	For 1-hole panel mtg, aluminum	20B0667 X012
	For 3-hole panel mtg, zinc w/stainless steel bushing	3B9855 000B2
4*	Plug/Stem Assembly	
	To provide sour gas corrosion resistance capability, nitrile plug w/stainless steel stem	1D5604 000B2

Key	Description	Part Number
4*	Plug/Stem Assembly (Continued)	
	For other than sour gas corrosion resistance applications	
	Nitrile plug w/brass stem	1D5604 000A2
	Nitrile plug w/stainless steel stem	1D5604 000B2
	Fluoroelastomer plug w/brass stem	1N3798 71662
	Fluoroelastomer plug w/stainless steel stem	1N3798 000C2
	All-brass plug and stem	1C7503 14012
	All-stainless steel plug and stem	1C7503 35032
5*	Plug Spring Seat	
	For use w/stainless steel stem and to provide sour gas corrosion resistance capability, 316 stainless steel	1L2511 35072
	For use w/brass stem and for other than sour gas corrosion resistance applications, aluminum	1E5322 11052
6*	Plug Spring	
	To provide sour gas corrosion resistance capability, Inconel(2)	19A2856 X012
	For other than sour gas corrosion resistance applications, 302 stainless steel	1C1273 37022
7*	Diaphragm Assembly	
	For Type 67AF regulator w/o internal relief	
	To provide sour gas corrosion resistance capability, nitrile diaphragm w/heat-treated AISI steel diaphragm plate and control spring seat guide	1B7980 X0112
	For other than sour gas corrosion resistance applications	
	Nitrile diaphragm w/pl steel diaphragm plate and control spring seat guide	1B7980 000B2
	Fluoroelastomer diaphragm w/pl steel diaphragm plate and control spring seat guide	B7980 000C2
	For Type 67AFR regulator w/internal relief	
	To provide sour gas corrosion resistance capability, nitrile diaphragm w/aluminum relief valve seat & soft molded insert	19A7667 X032

Key	Description	Part Number
7*	Diaphragm Assembly (Continued)	
	For other than sour gas corrosion resistance applications	
	Nitrile diaphragm w/brass relief valve seat & soft molded insert	19A7667 X012
	Nitrile diaphragm w/stainless steel relief valve seat & soft molded insert	19A7667 X022
	Fluoroelastomer diaphragm w/ brass relief valve seat & soft molded insert	19A7667 X042
	Fluoroelastomer diaphragm w/ stainless steel relief valve seat & soft molded insert	19A7667 X052
8	Control Spring Seat	
	To provide sour gas corrosion resistance capability, heat-treated AISI steel	1B7985 X0012
	For other than sour gas corrosion resistance applications, Zn pl steel	1B7985 25062
9	Control Spring	See following table
10	Adjusting Screw, pl steel	
	For spring case w/o closing cap	1B7986 28982
	For spring case w/closing cap	1H3050 28982
10	Handwheel	
	For 1-hole panel mtg, Zn pl steel	20B2830 X012
	For 3-hole panel mtg	
	Zinc	1B7992 000A2
	Chrome pl steel	1U1715 000C2
11	Locknut (not used w/panel mtg spring case) pl steel	1A9463 24122
11	Mounting Nut (for use only w/1-hole panel mtg spring case), 303 stainless steel	10B2657 X012
12	Machine Screw, p l steel (6 req d)	
	To provide sour gas corrosion resistance capability and for 1-hole panel mtg & 1/4-inch NPT tapped spring cases	1B2752 28982
	For all other constructions	1B7839 28982
14	Mounting Screw (for use only w/3□hole panel mtg spring case) steel (2 req d)	1C2760 28992

*Recommended spare parts
1. As detailed in National Association of Corrosion Engineers (NACE) standard MR-01-75.
2. Trademark of International Nickel Co.

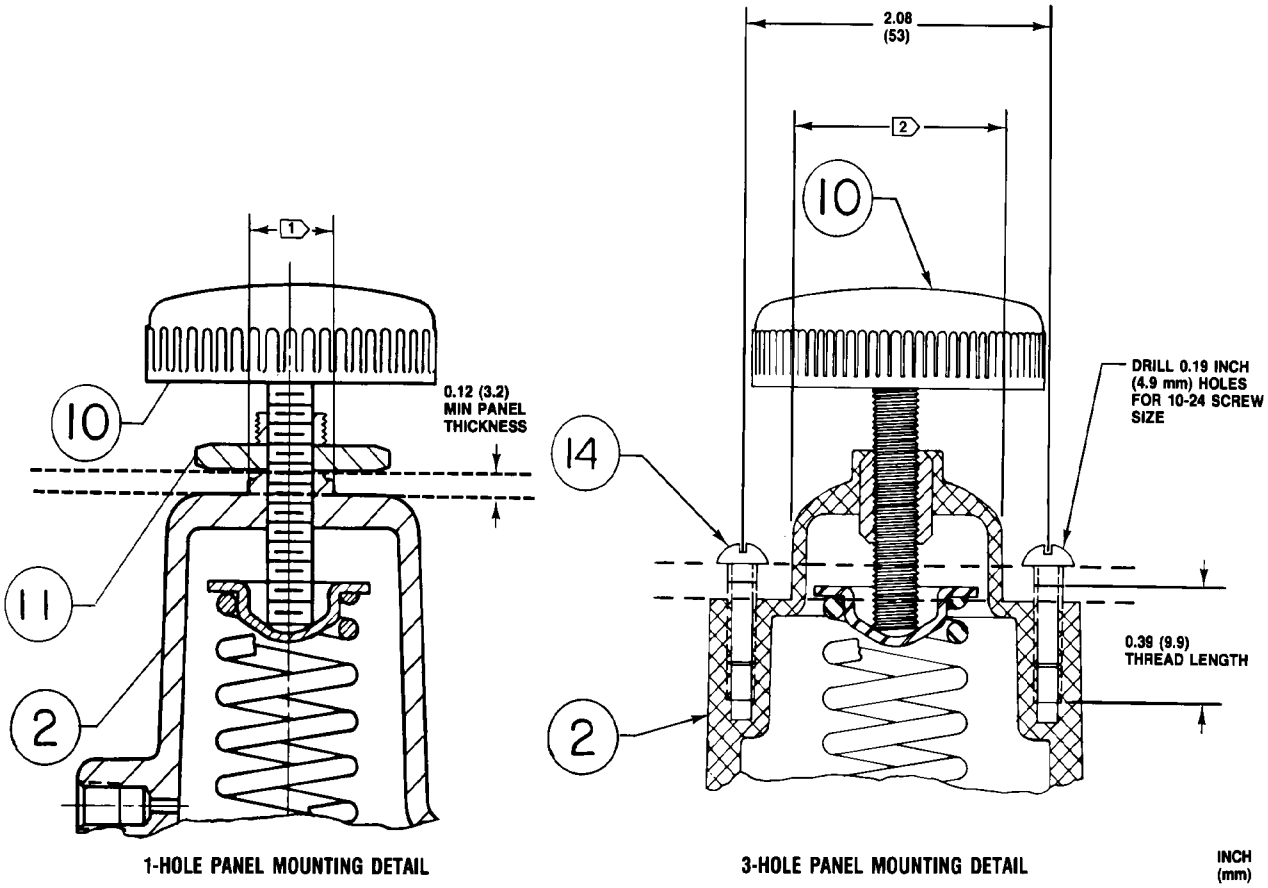

Figure 2. Type 67AF and 67AFR Regulator Assemblies

Key	Description	Part Number
17*	Drain Valve	
	To provide sour gas corrosion resistance capability, aluminum	1K4189 000B2
	For other than sour gas corrosion resistance applications	
	Aluminum	1K4189 000B2
	Brass	1K4189 18992
	Stainless steel	AH3946 000B2
18	Cap Screw, Cd pl steel (4 req d)	1K7647 24052
19*	Gasket, neoprene	1C1280 03012
20	Control Spring Label (not shown), paper	See following table

Key	Description	Part Number
21	Pipe Plug (for use only w/2-outlet body not shown)	
	To provide sour gas corrosion resistance capability, hex head, Cd pl steel	1A7675 24662
	For other than sour gas corrosion resistance applications	
	Hex head, Cd pl steel	1A7675 24662
	Square head, brass	1A5726 14012
	Socket head, steel	1C3335 28992

Key	Description	Part Number
21	Pressure gauge (for use only w/2-outlet body not shown)	
	0 to 30 psig(3)	1J9460 99012
	0 to 60 psig(3)	1J9752 99012
	0 to 100 psig(3)	1J9753 99012
	0 to 160 psig(3)	1J9754 99012
25	Filter Cap, aluminum	35A5963 X012
28	Closing Cap For use w/tapped spring case 25A6220 X012 to provide sour gas corrosion resistance capability, aluminum	1H2369 X0012

*Recommended spare part
3. Consult your Fisher sales office or sales representative for gauges in other units.

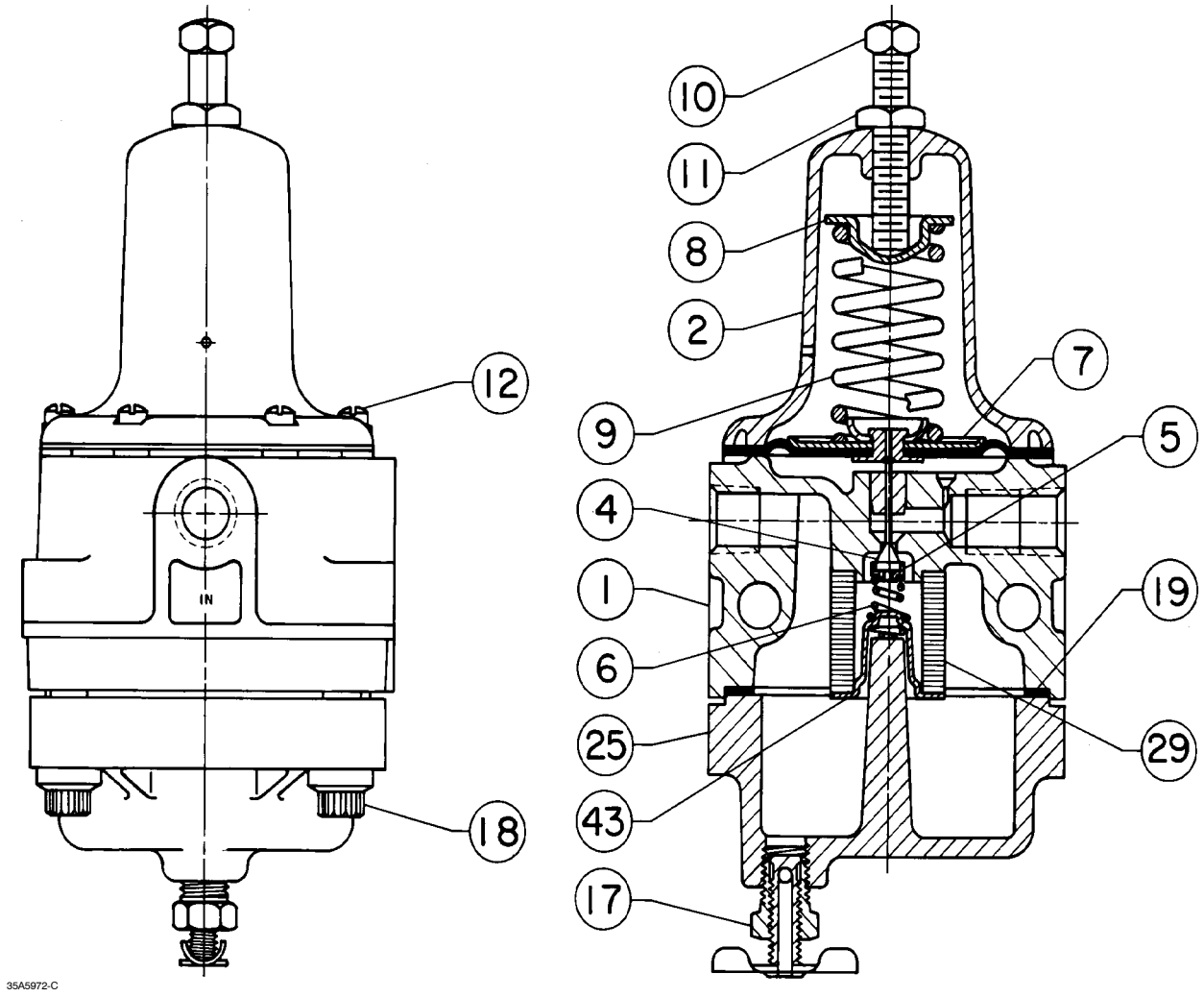

Figure 2. Type 67AF and 67AFR Regulator Assemblies (Continued)

Key	Description	Part Number
28	Closing Cap	
	For use w/tapped spring case	10A3075 X012
	for other than sour gas corrosion resistance applications, brass	1H2369 14012
29*	Filter Element	
	0.0004-inch (0.010 mm) rating, glass	17A1457 X012
	0.0016-inch (0.040 mm) rating, Cellulose	1F2577 06992
	Stainless steel	15A5967 X012
43	Retainer Assembly	
	To provide sour gas corrosion resistance capability, Zn pl steel retainer w/Inconel spring	17A9423 X022
	For other than sour gas corrosion resistance applications, pl steel retainer w/302 stainless steel spring	17A9423 X012
44	NACE Tag (for use only on constructions w/sour gas corrosion resistance capability not shown), 18-8 stainless steel	19A6034 X012
45	Tag Wire (for use only w/NACE tag key 44 not shown), 304 stainless steel	1U7581 X0012

*Recommended spare parts

Keys 9 and 20 Type 67AF Control Spring and Control Spring Label

SERVICE, MATERIAL	OUTLET PRESSURE RANGE				CONTROL SPRING KEY 9		CONTROL SPRING LABEL KEY 20
	U.S. Units, Psig		Metric Units, Bar				
	With Panel-Mtg Spring Case	With All Other Spring Cases	With Panel-Mtg Spring Case	With All Other Spring Cases	Part Number	Color Code	
All, pl steel	3 to 18	3 to 20	0.21 to 1.2	0.21 to 1.4	1B9860 27212	Green	1C3763 06032
	5 to 30	5 to 35	0.34 to 2.1	0.34 to 3.4	1B7883 27022	Cad plated	1C3764 06032
	30 to 50	30 to 60	2.1 to 3.4	2.1 to 4.1	1B7884 27022	Blue	1C3766 06032
	35 to 80	35 to 100	2.4 to 5.5	2.4 to 6.9	1K7485 27202	Red	1C3765 06032

Keys 9 and 20 Type 67AFR Control Spring and Control Spring Label

SERVICE, MATERIAL	OUTLET PRESSURE RANGE				CONTROL SPRING KEY 9		CONTROL SPRING LABEL KEY 20
	U.S. Units, Psig		Metric Units, Bar				
	With Panel-Mtg Spring Case	With All Other Spring Cases	With Panel-Mtg Spring Case	With All Other Spring Cases	Part Number	Color Code	
For sour gas corrosion resistance capability, Inconel	- - -	5 to 35	- - -	0.34 to 3.4	19A2852 X012	Cad plated	1C3764 06032
	- - -	30 to 60	- - -	2.1 to 4.1	19A2854 X012	Blue	1C3766 06032
For other than sour gas corrosion resistance applications, pl steel	3 to 18	3 to 20	0.21 to 1.2	0.21 to 1.4	1B9860 27212	Green	1C3763 06032
	5 to 30	5 to 35	0.34 to 2.1	0.34 to 3.4	1B7883 27022	Cad plated	1C3764 06032
	30 to 50	30 to 60	2.1 to 3.4	2.1 to 4.1	1B7884 27022	Blue	1C3766 06032
	35 to 80	35 to 100	2.4 to 5.5	2.4 to 6.9	1K7485 27202	Red	1C3765 06032

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