Fisher® SS-83 Angle Valve

Contents

Introduction

Scope of Manual

This instruction manual includes installation, maintenance, and parts information for the Fisher SS-83 angle valve (figure 1). Refer to separate manuals for instructions covering the actuator and accessories.

Do not install, operate, or maintain an SS-83 valve without being fully trained and qualified in valve, actuator, and accessory installation, operation, and maintenance. **To avoid personal injury or property damage, it is important to carefully read, understand, and follow all the contents of this manual, including all safety cautions and warnings.** If you have any questions about these instructions, contact your Emerson Process Management sales office before proceeding.

Description

The SS-83 is an integral bonnet angle control valve. It is designed for handling highly corrosive fluids and is usually mounted on a tank. Body sizes refer to nominal inlet and outlet dimensions (for example, a 4 x 6 body has an NPS 4 nominal inlet and an NPS 6 nominal outlet).

Specifications

Some specifications for this valve can be found on the valve or actuator nameplate. Other specifications and limits were specified when you ordered this valve. If you are not sure what the specifications and limits for this valve are, contact your Emerson Process Management sales office. Specify the valve serial number and any other information about the valve.

Installation

⚠ WARNING

Always wear protective gloves, clothing, and eyewear when performing any installation operations to avoid personal injury.

Personal injury or equipment damage caused by sudden release of pressure may result if the valve assembly is installed where service conditions could exceed the limits specified when the valve was purchased or on the appropriate nameplates. To avoid such injury or damage, provide a relief valve for over-pressure protection as required by government or accepted industry codes and good engineering practices.

Check with your process or safety engineer for any additional measures that must be taken to protect against process media.

If installing into an existing application, also refer to the WARNING at the beginning of the Maintenance section in this instruction manual.

CAUTION

When ordered, the valve configuration and construction materials were selected to meet particular pressure, temperature, pressure drop and controlled fluid conditions. Because some body/trim material combinations are limited in their pressure drop and temperature ranges, do not apply any other conditions to the valve without first contacting your Emerson Process Management sales office.

If hoisting the valve, use a nylon sling to protect the surfaces. Carefully position the sling to prevent damage to the actuator tubing and any accessories. Also, take care to prevent people from being injured in case the hoist or rigging slips unexpectedly. Be sure to use adequately sized hoists and chains or slings to handle the valve.

1. Before installing the valve, inspect the valve body cavity and associated equipment for any damage and any foreign material.
2. Make certain the body interior is clean, that pipelines are free of foreign material, and that the valve is oriented so that pipeline flow is in the same direction as the arrow on the side of the valve.
3. If possible, install the valve with the valve stem vertical. All valves with size 80 or larger actuators mounted between 45° above and 45° below horizontal should be supported. Small actuators might also need support if vibrational or other non-gravitational forces are present. For more information on seismic considerations, consult your Emerson Process Management sales office.
4. Use accepted piping, flange, or welding practices when installing the valve in the line. For flanged valve bodies, use a suitable gasket between the body and pipeline flanges.

Note

For valves with a welding-end, depending on valve body materials used, post weld heat treating may be required. If so, damage to internal elastomeric and plastic parts, as well as internal metal parts is possible. Shrink-fit pieces and threaded connections may also loosen. In general, if post weld heat treating is to be performed, remove all trim parts. Contact your Emerson Process Management sales office for additional information.

5. With a leak-off bonnet construction, remove the pipe plug from the bonnet to hook up the leak-off piping. If continuous operation is required during inspection or maintenance, install a three-valve bypass around the control valve assembly.
6. If the actuator and valve are shipped separately, refer to the actuator mounting procedure in the appropriate actuator instruction manual.

⚠ WARNING

Personal injury could result from packing leakage. Valve packing was tightened before shipment; however, the packing might require some readjustment to meet specific service conditions.

Valves with ENVIRO-SEAL™ live-loaded packing or HIGH-SEAL live-loaded packing will not require this initial re-adjustment. See the Fisher instruction manuals, ENVIRO-SEAL Packing System for Sliding-Stem Valves or HIGH-SEAL Live-Loaded Packing System (as appropriate), for packing instructions.

Maintenance

Valve parts are subject to normal wear and must be inspected and replaced as necessary. Inspection and maintenance frequency depends on the severity of service conditions. This section includes instructions for packing lubrication, packing maintenance, trim maintenance, and lapping metal seats.

⚠ WARNING

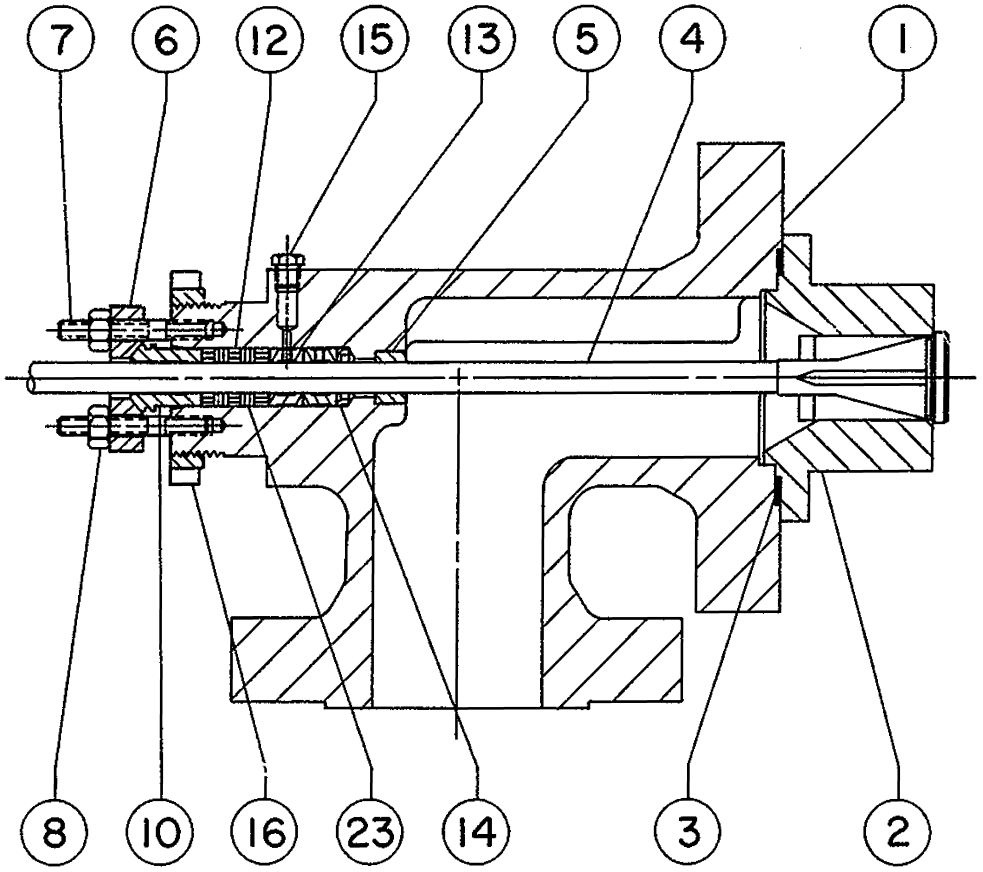
Avoid personal injury or damage to property from sudden release of pressure or uncontrolled process fluid. Before starting disassembly:

- **Do not remove the actuator from the valve while the valve is still pressurized.**
- **Always wear protective gloves, clothing, and eyewear when performing any maintenance operations to avoid personal injury.**
- **Disconnect any operating lines providing air pressure, electric power, or a control signal to the actuator. Be sure the actuator cannot suddenly open or close the valve.**
- **Use bypass valves or completely shut off the process to isolate the valve from process pressure. Relieve process pressure on both sides of the valve. Drain the process media from both sides of the valve.**
- **Vent the power actuator loading pressure and relieve any actuator spring precompression.**
- **Use lock-out procedures to be sure that the above measures stay in effect while you work on the equipment.**
- **The valve packing box may contain process fluids that are pressurized, *even when the valve has been removed from the pipeline.* Process fluids may spray out under pressure when removing the packing hardware or packing rings, or when loosening the packing box pipe plug.**
- **Check with your process or safety engineer for any additional measures that must be taken to protect against process media.**

Note

Whenever a gasket seal is disturbed by removing or shifting gasketed parts, install a new gasket upon reassembly. This is necessary to ensure a good gasket seal because the used gasket may not seal properly.

Figure 1. Fisher SS-83 Valve



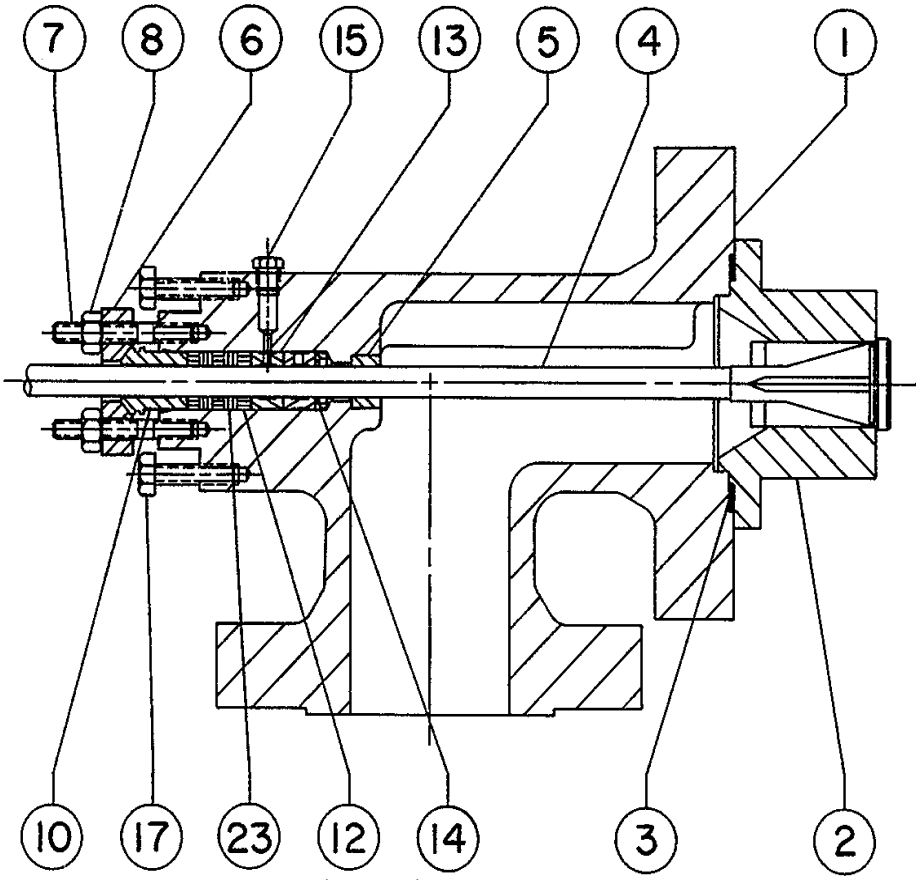
Packing Lubrication

Note

ENVIRO-SEAL or HIGH-SEAL packing does not require lubrication.

If a lubricator or lubricator/isolating valve is provided for PTFE/composition or other packings that require lubrication, it will be installed in place of the pipe plug (key 15). Use a good quality silicon-base lubricant. Do not lubricate packing used in oxygen service or in processes with temperatures over 260°C (500°F). To operate the lubricator, simply turn the cap screw clockwise to force the lubricant into the packing box. The lubricator/isolating valve operates the same way, except open the isolating valve before turning the cap screw and then close the isolating valve after lubrication is completed.

Figure 1. Fisher SS-83 Valve (Continued)



5-INCH (127 mm) YOKE BOSS

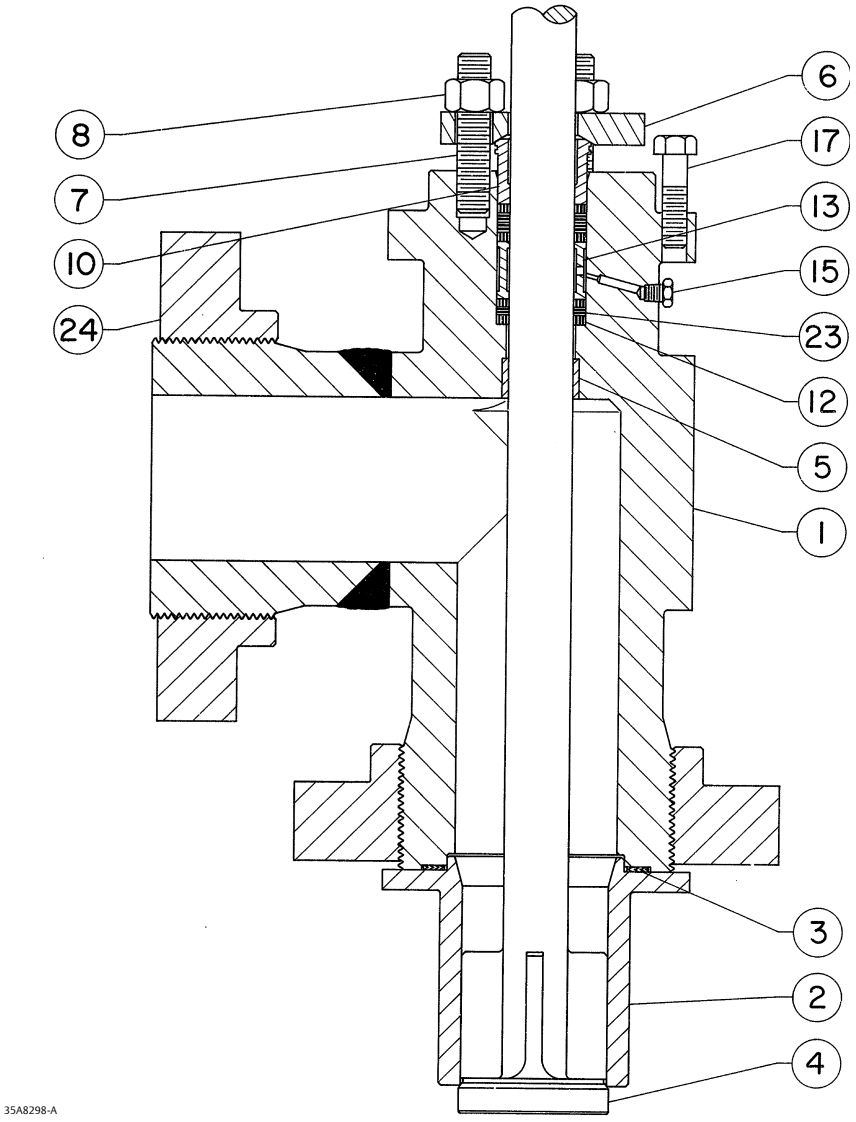
Packing Maintenance

Note

For valves with ENVIRO-SEAL live-loaded packing, see the Fisher instruction manual, ENVIRO-SEAL Packing System for Sliding-Stem Valves, for packing instructions. For valves with HIGH-SEAL live-loaded packing, see the Fisher instruction manual, HIGH-SEAL Live-Loaded Packing System, for packing instructions.

For spring-loaded single PTFE V-ring packing, the packing spring maintains a sealing force on the packing. If leakage is noted around the packing follower, check to be sure the shoulder on the packing follower is touching the bonnet. If the shoulder is not touching the bonnet, tighten the packing flange nuts until the shoulder is against the bonnet. If leakage cannot be stopped in this manner, proceed to the Replacing Packing procedure.

Figure 1. Fisher SS-83 Valve (Continued)



7-INCH (178 mm) YOKE BOSS

If there is undesirable packing leakage with other than spring-loaded packing, first try to limit the leakage and establish a stem seal by tightening the packing flange nuts.

If the packing is relatively new and tight on the stem and if tightening the packing flange nuts does not stop the leakage, the valve stem may be worn or nicked so that a seal cannot be made. The surface finish of a new valve stem is critical for making a good packing seal. If the leakage comes from the outside diameter of the packing, the leakage may be caused by nicks or scratches around the packing box wall. If performing any of the following procedures, inspect the valve stem and packing box wall for nicks and scratches.

CAUTION

Use care to avoid damaging gasket sealing surfaces.

The surface finish of the valve stem is critical for making a good packing seal. The seating surfaces of the valve plug and the seat ring on a metal-seat construction are critical for tight shutoff. Assume all these parts are in good condition and protect them accordingly, unless inspection reveals otherwise

⚠ WARNING

Refer to the warning at the beginning of the maintenance section.

Replacing Packing

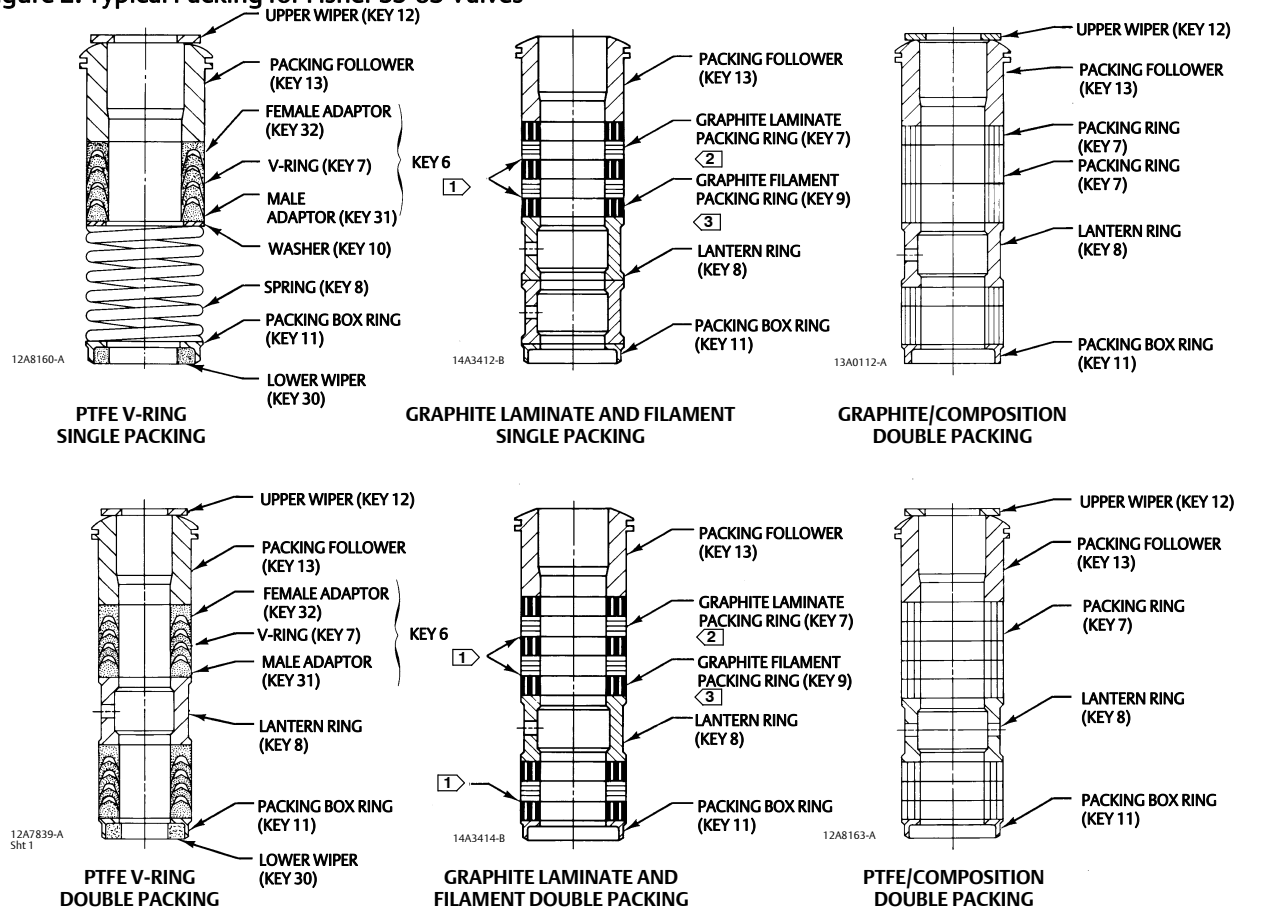
Key numbers are shown in figure 1 except where indicated.

1. Isolate the control valve from the line pressure, release pressure from both sides of the valve, and drain the process media from both sides of the valve. If using a power actuator, also shut off all pressure lines to the power actuator, release all pressure from the actuator and relieve spring compression from the actuator. Use lock-out procedures to be sure that the above measures stay in effect while you work on the equipment.
2. Disconnect the operating lines from the actuator and any leak-off piping from the valve.
3. Being careful to avoid damage to the valve plug (key 4), remove the valve from the line. Disconnect the stem connector, and then remove the actuator from the valve by unscrewing the yoke locknut (key 16) or the cap screws (key 17).
4. Remove any stem connector parts or locknuts. Remove packing flange nuts, packing flange, and packing follower (keys 8, 6, and 10).
5. Remove the seat ring (key 2) and the valve plug and stem assembly (key 4) through the bottom of the valve body. Set removed parts on a protective surface to prevent damage to gasket or seating surfaces.
6. Being careful to avoid damaging the packing box wall, remove all packing parts with a formed wire hook.
7. Clean the packing box and the metal packing box parts. When installing new packing, refer to figure 2 for the order of placement of packing box parts.
8. Clean the gasketed surfaces and install a new gasket (key 3). Install the seat ring (key 2) and slide the plug and stem assembly (key 4) back into the valve body.
9. Slide the packing box parts over the stem and into the packing box. Place a smooth-edged pipe over the valve stem and gently tap each soft packing part into the packing box, being sure that air is not trapped between adjacent soft parts. Refer to figure 2 for the order of placement of parts. Contact your Emerson Process Management sales office if your packing is not shown in figure 2.

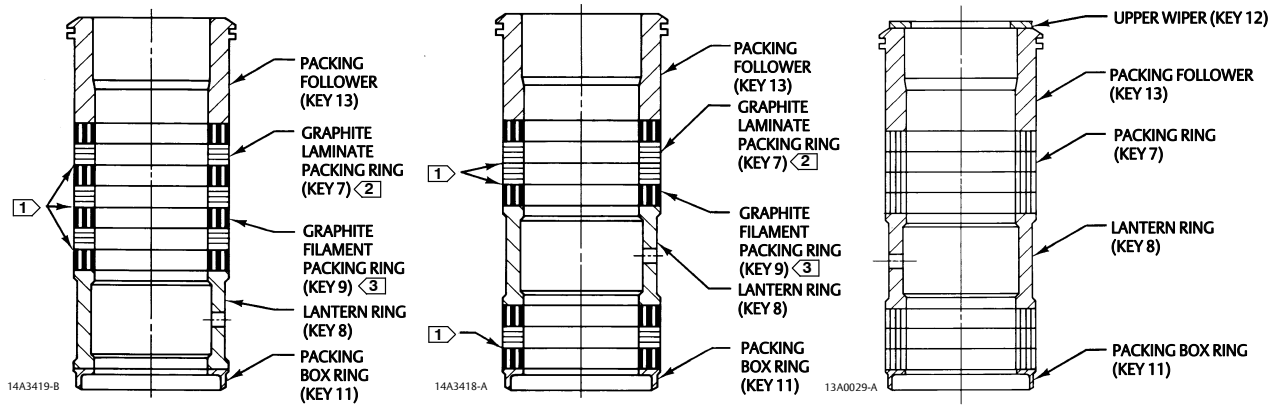
Key numbers are shown in figure 1 except where indicated.

10. Install the packing follower, packing box flange, and nuts. Tighten the packing flange nuts snuggly.
11. Before putting the valve in service, cycle the valve until packing friction is reduced to an acceptable level.
12. Install the actuator according to instructions in the appropriate actuator instruction manual. Install the valve back in the line.

Figure 2. Typical Packing for Fisher SS-83 Valves



PACKING ARRANGEMENTS FOR 1-1/4 INCH (31.8 mm) VALVE STEMS



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PACKING ARRANGEMENTS FOR 50.8 mm (2-INCH) VALVE STEMS

NOTES:
1 0.004 INCH (0.102 mm) THICK SACRIFICIAL ZINC WASHERS. USE ONLY ONE BELOW EACH GRAPHITE LAMINATE RING.
2 HAS THE APPEARANCE OF FLAT WASHERS PRESSED TOGETHER.
3 HAS THE APPEARANCE OF A WOVEN OR BRAIDED RING.

13. **For spring-loaded PTFE V-ring packing,** tighten the packing flange nuts until the shoulder on the packing follower contacts the bonnet.
For graphite packing, tighten the packing flange nuts to the maximum recommended torque shown in table 1. Then loosen the packing flange nuts, and retighten them to the recommended minimum torque shown in table 1. If the stem diameter of your valve is not shown in the table, contact your Emerson Process Management sales office.
For ENVIRO-SEAL or HIGH-SEAL live-loaded packing, refer to the note at the beginning of the Maintenance section.
For other types of packing, contact your Emerson Process Management sales office.
14. Mount the actuator on the valve assembly and reconnect the actuator and valve stem according to the procedure in the appropriate actuator instruction manual.

Table 1. Packing Flange Nut Torque for Graphite Packing

STEM DIAMETER		PRESSURE RATING	MINIMUM TORQUE		MAXIMUM TORQUE	
mm	Inches		N•m	Lbf•In	N•m	Lbf•In
19.1	3/4	CL150	11.2	99	16.9	149
		CL300	15.0	133	22.5	199
		CL600	20.6	182	30.9	274
		CL900	25.0	221	37.5	332
25.4	1	CL150	19.1	169	28.7	254
		CL300	25.5	226	38.3	339
		CL600	35.1	310	52.6	466
		CL900	42.5	376	63.8	564
31.8	1-1/4	CL150	26.9	238	40.4	357
		CL300	35.9	318	53.8	477
		CL600	49.4	437	74.0	655
		CL900	59.8	530	89.7	794
50.8	2	CL600	63.8	565	95.7	847
		CL900	77.3	684	116	1,026

Trim Maintenance

⚠ WARNING

Refer to the warning at the beginning of the maintenance section.

CAUTION

Use care to avoid damaging gasket sealing surfaces.

The surface finish of the valve stem is critical for making a good packing seal. The seating surfaces of the valve plug and the seat ring on a metal-seat construction are critical for tight shutoff. Assume all these parts are in good condition and protect them accordingly, unless inspection reveals otherwise.

1. Isolate the valve body and actuator from all pressure. Release all pressure from the valve. Disconnect any operating lines providing air pressure, electric power, or a control signal to the actuator. Be sure the actuator cannot suddenly open or close the valve.Use bypass valves or completely shut off the process to isolate the valve from process pressure. Relieve process pressure from both sides of the valve. Drain the process media from both sides of the valve.Vent the pneumatic actuator loading pressure and relieve any actuator spring precompression.Use lock-out procedures to be sure that the above measures stay in effect while you work on the equipment.
2. Disconnect the operating lines from the actuator and any leak-off piping from the valve.
3. Being careful to avoid damage to the valve plug (key 4), remove the valve from the line. Disconnect the stem connector, and then remove the actuator from the valve by unscrewing the yoke locknut (key 16) or the cap screws (key 17).

4. Remove any stem connector parts or locknuts. Loosen the packing flange nuts (key 8).
5. Remove the seat ring (key 2) and the valve plug and stem assembly (key 4) through the bottom of the valve body. Set removed parts on a protective surface to prevent damage to gasket or seating surfaces.
6. Inspect the plug and stem assembly for nicks, scratches, scoring, or signs of galling. (If the stem is worn, packing leakage can result.) Clean the gasketed surfaces and replace the seat ring gasket (key 3), seat ring (key 2), and valve plug and stem assembly (key 4).
7. Tighten the packing flange nuts snuggly.
8. Before putting the valve in service, cycle the valve until packing friction is reduced to an acceptable level.
9. Install the actuator according to instructions in the appropriate actuator instruction manual. Install the valve back in the line.
10. **For spring-loaded PTFE V-ring packing,** tighten the packing flange nuts until the shoulder on the packing follower contacts the bonnet.
    For graphite packing, tighten the packing flange nuts to the maximum recommended torque shown in table 1. Then loosen the packing flange nuts, and retighten them to the recommended minimum torque shown in table 1. If the stem diameter of your valve is not shown in the table, contact your Emerson Process Management sales office.
    For ENVIRO-SEAL or HIGH-SEAL live-loaded packing, refer to the note at the beginning of the Maintenance section.
    For other types of packing, contact your Emerson Process Management sales office.
11. Mount the actuator on the valve assembly and reconnect the actuator and valve stem according to the procedure in the appropriate actuator instruction manual.

Parts Ordering

Each valve is assigned a serial number which can be found on the valve or on the nameplate. The nameplate will normally be fitted to the actuator. Refer to this serial number when contacting your Emerson Process Management sales office for technical assistance. When ordering replacement parts refer to this serial number and give the part description from the following parts list.

⚠ WARNING

Use only genuine Fisher replacement parts. Components that are not supplied by Emerson Process Management should not, under any circumstances, be used in any Fisher valve, because they may void your warranty, might adversely affect the performance of the valve, and could cause personal injury and property damage.

Parts List

Note
For part numbers not shown, contact your Emerson Process Management sales office.

Valve (See figure 2 for Packing Parts)

Key	Description
1	Valve Body
2	Seat Ring
3*	Seat Ring Gasket
4*	Valve Plug and Stem Assembly
5	Bushing
6	Packing Box Flange
7	Packing Box Stud
8	Packing Box Nut
10	Packing Follower (also see figure 2)
12*	Packing Ring (also see figure 2)
13	Lantern Ring (also see figure 2)
14	Packing Box Ring (also see figure 2)
15	Pipe Plug
16	Yoke Locknut
17	Cap Screw
23*	Packing Ring (also see figure 2)

*Recommended spare parts

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