

Fisher™ Large ET/EWT and ED/EWD Valves NPS 12 through 30

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Figure 1. Fisher NPS 12 Valve with Piston Actuator and FIELDVUE™ DVC6200 Digital Valve Controller



X0237-1

Introduction

Scope of Manual

This instruction manual includes installation, maintenance, and parts information for NPS 12 through 30 Fisher ET/EWT and ED/EWD valves, through CL600 ratings.

Refer to separate manuals for instructions covering the actuator and accessories.

Do not install, operate, or maintain ET/EWT or ED/EWD valves 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 sales office](#) before proceeding.

Educational Services

For information on available courses for Fisher Large ET/EWT and ED/EWD valves, as well as a variety of other products, contact:

Emerson Automation Solutions
Educational Services - Registration
Phone: 1-641-754-3771 or 1-800-338-8158
E-mail: education@emerson.com
emerson.com/fishervalvetraining

Description

Fisher NPS 12 through 30 CL150 through CL600 ET/EWT and ED/EWD series control valves are used for either throttling or on/off control of a wide variety of liquids and gasses.

ET/EWT series valves utilize a hanging cage and a seat ring that is threaded into the cage. These valves have two spring loaded seal rings, one between the cage and plug and another between the seat ring and valve body, which provide up to a Class V standard shutoff. They are used for low to medium temperature applications between -46°C (-50°F) and 232°C (450°F). This temperature range can be extended to 316°C (600°F) for non-oxidizing service and to 260°C (500°F) for oxidizing service by using the High Temperature (HTS1) seal.

The temperature range of the ET/EWT series can be extended to cryogenic temperatures as low as -198° (-325°F) with the ET-C and EWT-C specialized versions of these valves. The specialized valves feature unique trim, seals, and a longer extension bonnet to tolerate the extreme cold.

ED/EWD series valves utilize a hanging cage and a seat ring that is bolted into the body. These valves have two graphite piston rings between the cage and plug, which provide up to a Class IV standard shutoff. They are used for high temperature applications between 316°C (600°F) and 593°C (1100°F). Shutoff can be improved to Class V by using the Bore seal.

A range of severe service trims are available for noise abatement or cavitation control. Noise abatement trims help with aerodynamic noise attenuation in gas services and feature a Whisper Trim III or WhisperFlo cage. Cavitation control trims help prevent the damaging effects of liquid cavitation and include either a Cavitrol III cage (for services without entrained particulate) or Dirty Service Trim (DST) set (for services with entrained particulate).

Specifications

Typical specifications for these valves are shown in table 1.

Table 1. Specifications

<p>Valve Sizes ED, ET, and ET-C: ■ NPS 12, ■ 14, ■ 16, ■ 18, ■ 20, and ■ 30 EWD, EWT, and EWT-C⁽²⁾: ■ NPS 16x12, ■ 20x16, ■ 24x16, and ■ 24x20</p> <p>End Connection Styles Flanged: CL150, 300, and 600 raised-face or ring-type joint flanges per ASME B16.5. NPS 30 valve size has series A or B flanges, per ASME B16.47 Buttwelding: All ASME B16.25 schedules through schedule 120 that are compatible with the ASME B16.34 valve body rating For other end connections, contact your Emerson sales office for details.</p> <p>Maximum Inlet Pressure⁽¹⁾ Flanged: Consistent with CL150, 300, and 600 pressure-temperature ratings per ASME B16.34 Buttwelding: Consistent with CL600 pressure-temperature ratings per ASME B16.34</p> <p>Shutoff Classifications per ANSI/FCI 70-2 and IEC 60534-4 ET, ET-C, EWT, and EWT-C: <i>Standard:</i> Class V <i>Optional (for all cages except Cavitrol III):</i> Class IV ED and EWD: <i>Standard:</i> Class IV <i>Optional:</i> Class V</p>	<p>Flow Characteristics Standard Cages: ■ Linear or ■ Equal percentage Whisper Trim III and WhisperFlo Cages: Linear Cavitrol III Cages: Linear For other characteristics, contact your Emerson sales office for details.</p> <p>Flow Direction Standard Cages: Down Whisper Trim III and WhisperFlo Cages: Up Cavitrol III Cages: Down</p> <p>Yoke Boss and Stem Diameters ■ 127 mm (5H-inch) diameter yoke boss, with 31.8 mm (1.25 inch) diameter valve stem for all valves except NPS 30 ■ 179 mm (7-inch) diameter yoke boss, with 50.8 mm (2 inch) diameter valve stem for NPS 30 valve</p> <p>Bonnet Style ED, EWD, ET, and EWT: Style 1 extension ET-C and EWT-C: Style 3 extension</p> <p>Approximate Weights See table 2</p>
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1. Do not exceed the pressure or temperature limits in this manual, on the equipment nameplate, and any applicable code limitations.
2. Size designations are "end connection size" x "nominal trim size".

Table 2. Approximate Weights

VALVE SIZE, NPS	PRESSURE CLASS	END CONNECTION TYPE	APPROXIMATE WEIGHT							
			ED/EWD and ET/EWT				ET-C/EWT-C			
			Short Neck ⁽²⁾		Long Neck ⁽²⁾		Short Neck ⁽²⁾		Long Neck ⁽²⁾	
			Kg	Lb	Kg	Lb	Kg	Lb	Kg	Lb
12	CL150-300	Flanged	950	2100	1090	2400	982	2170	1122	2470
	CL600	Flanged	1270	2800	1410	3100	1302	2870	1442	3170
		Buttwelding	1130	2500	1270	2800	1162	2570	1302	2870
14	CL150-300	Flanged	1130	2500	1230	2700	1162	2570	1262	2770
	CL600	Flanged	1410	3100	1590	3500	1442	3170	1622	3570
		Buttwelding	1180	2600	1360	3000	1212	2670	1392	3070
16x12	CL150-300	Flanged	1320	2900	1450	3200	1352	2970	1482	3270
	CL600	Flanged	1680	3700	1810	4000	1712	3770	1842	4070
		Buttwelding	1410	3100	1540	3400	1442	3170	1572	3470
16	CL150-300	Flanged	1720	3800	2040	4500	1752	3870	2072	4570
	CL600	Flanged	2310	5100	2590	5700	2342	5170	2622	5770
		Buttwelding	2090	4600	2360	5200	2122	4670	2392	5270
18	CL150-300	Flanged	2310	5100	2500	5500	2342	5170	2532	5570
	CL600	Flanged	2900	6400	3130	6900	2932	6470	3162	6970
		Buttwelding	2540	5600	2770	6100	2572	5670	2802	6170
20x16	CL150-300	Flanged	2500	5500	2680	5900	2532	5570	2712	5970
	CL600	Flanged	3180	7000	3360	7400	3212	7070	3392	7470
		Buttwelding	2770	6100	2990	6600	2802	6170	3022	6670
24x16	CL150-300	Flanged	3360	7400	3810	8400	3392	7470	3842	8470
	CL600	Flanged	4260	9400	4810	10600	4292	9470	4842	10670
		Buttwelding	3770	8300	4220	9300	3802	8370	4252	9370
20	CL150-300	Flanged	4122	9088	4526	9978	(1)	(1)	(1)	(1)
	600	Flanged	4736	10442	5112	11269	(1)	(1)	(1)	(1)
		Buttwelding	4583	10104	4808	10600	(1)	(1)	(1)	(1)
24x20	CL150-300	Flanged	5507	12140	5856	12910	(1)	(1)	(1)	(1)
	600	Flanged	6796	14982	7172	15811	(1)	(1)	(1)	(1)
		Buttwelding	6327	13949	6549	14437	(1)	(1)	(1)	(1)
30	CL150-300	Flanged	7390	16300	8350	18400	7535	16620	18545	18720
	CL600	Flanged	9544	21040	10038	22130	(1)	(1)	(1)	(1)
		Buttwelding	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)

1. Contact your [Emerson sales office](#) for these weights.
 2. Dependent on valve travel, refer to product bulletin 51.1:ET/ED (Large) ([D103554X012](#)) for addition details.

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 the sudden release of pressure may result if the valve assembly is installed where service conditions could exceed the limits given in table 1 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. Responsibility for the safety of process media and compatibility of valve materials with process media rests solely with the purchaser and end-user. Since some valve 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 sales office](#).

Before installing the valve, inspect the valve and pipelines for any damage and any foreign material which may cause product damage.

1. Before installing the valve, inspect the valve and associated equipment for any damage and any foreign material.
2. Make certain that the valve body interior is clean, that pipelines are free of foreign material, and the valve is oriented so that pipeline flow is in the same direction as the arrow on the side of the valve.
3. The control valve assembly may be installed in any orientation unless limited by seismic criteria. However, the normal method is with the actuator vertical above the valve. Other positions may result in uneven valve plug and cage wear and improper operation. Support the actuator if it is not installed in the vertical position. For more information, consult your Emerson sales office.
4. Use accepted piping and welding practices when installing the valve in the line. For flanged valves, use a suitable gasket between the valve and pipeline flanges.

CAUTION

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. In general, if post weld heat treating is to be performed, all trim parts should be removed. Contact your Emerson sales office for additional information.

5. With a leak-off bonnet construction, remove the pipe plugs (key 46) 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. Check with your process or safety engineer for any additional measures that must be taken to protect against process media.

Valves with ENVIRO-SEAL™ live-loaded packing or HIGH-SEAL ULF live-loaded packing will not require this initial readjustment. See the Fisher instruction manuals titled ENVIRO-SEAL Packing System for Sliding-Stem Valves ([D101642X012](#)) or HIGH-SEAL ULF Live-Loaded Packing System ([D101453X012](#)) (as appropriate) for packing instructions. If you wish to convert your present packing arrangement to ENVIRO-SEAL packing, refer to the retrofit kits listed in the Parts Kits section.

Maintenance

Unless otherwise noted, refer to the following figures for key numbers: figure 5: ED/EWD Valves, figure 6: ET/EWT Valves, figure 7: ET/EWT Valves with HTS1 Seals, or figure 8: ET-C/EWT-C Valves.

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, and trim maintenance. All maintenance operations may be performed with the valve in the line.

⚠ WARNING

Avoid personal injury or property damage from sudden release of process pressure or bursting of parts. Before performing any maintenance operations:

- 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 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.
- 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, a new gasket should be installed upon reassembly. This is necessary to ensure a good gasket seal because the used gasket might not seal properly.

Packing Lubrication

Note

ENVIRO-SEAL and HIGH-SEAL packing do not require lubrication.

⚠ WARNING

To avoid personal injury or property damage resulting from fire or explosion, do not lubricate packing used in oxygen service or in processes with temperatures over 260°C (500°F).

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 46). Use a good quality silicon-base lubricant. 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.

Packing Maintenance

Note

For valves with ENVIRO-SEAL packing, see the Fisher instruction manual, ENVIRO-SEAL Packing System for Sliding-Stem Valves, [D101642X012](#), for packing instructions.

For valves with HIGH-SEAL packing, see the Fisher instruction manual, HIGH-SEAL ULF Live-Loaded Packing System, [D101453X012](#), for packing instructions.

For spring-loaded single PTFE V-ring packing, the spring (key 8, figure 2) maintains a sealing force on the packing. If leakage is noted around the packing follower (key 13, figure 2), check to be sure the shoulder on the packing follower is touching the bonnet (key 35). If the shoulder is not touching the bonnet, tighten the packing flange nuts (key 5) until the shoulder is against the bonnet. If leakage cannot be stopped in this manner, proceed to the Replacing Packing section.

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 valve stem (key 2B) and if tightening the packing flange nuts does not stop the leakage, it is possible that the valve stem is 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, it is possible that the leakage is 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.

Replacing Packing

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 use lock-out procedures to prevent injury while you work on the equipment.
2. Remove the actuator from the valve body by following the appropriate Actuator Removal procedure from the actuator instruction manual.
3. Loosen the packing flange nuts (key 5) so that the packing is not tight on the valve stem (key 2B). Remove any travel indicator parts and locknuts from the valve stem threads.

⚠ WARNING

To avoid personal injury or property damage caused by uncontrolled movement of the bonnet, loosen the bonnet by following the instructions in the next step. Do not remove a stuck bonnet by pulling on it with equipment that can stretch or store energy in any other manner. The sudden release of stored energy can cause uncontrolled movement of the bonnet.

CAUTION

Avoid damage to the seating surfaces caused by the valve plug and stem assembly dropping from the bonnet after being lifted part way out. When lifting the bonnet, temporarily install a locknut on the valve stem. This locknut will prevent the valve plug and stem assembly (key 2) from dropping out of the bonnet.

If the cage (key 3) starts to lift with the bonnet, tap it with a plastic mallet, or other soft material, to be sure it stays in the valve body.

Note

The following step also provides additional assurance that the valve body fluid pressure has been relieved.

4. Hex nuts (key 16) attach the bonnet (key 35) to the valve body. Loosen these nuts or cap screws approximately 3 mm (1/8 inch). Then loosen the body-to-bonnet gasketed joint by either rocking the bonnet or prying between the bonnet and valve body. Work the prying tool around the bonnet until the bonnet loosens. If no fluid leaks from the joint, remove the nuts completely and carefully lift the bonnet.
5. Remove the locknut from the valve stem and separate the valve plug and stem assembly from the bonnet. Set the parts on a protective surface to prevent damage to gasket or seating surfaces.
6. Remove the bonnet gasket (key 11) and cover the opening in the valve to protect the gasket surface and prevent foreign material from getting into the valve body cavity.

CAUTION

To prevent possible product damage, cover the opening in the valve in the following procedure to prevent foreign material from getting into the valve body cavity.

7. Remove the packing flange nuts (key 5), packing flange (key 37), upper wiper (key 12, figure 2), and packing follower (key 13, figure 2). Carefully push out all the remaining packing parts from the valve side of the bonnet using a rounded rod or other tool that will not scratch the packing box wall. Clean the packing box and the metal packing parts.
8. Inspect the valve stem threads and packing box surfaces for any sharp edges that might cut the packing. Scratches or burrs could cause packing box leakage or damage to the new packing. If the surface condition cannot be improved by light sanding, replace the damaged parts by following the appropriate steps in the Trim Maintenance section.
9. Remove the cover protecting the valve body cavity.
10. Install a new bonnet gasket (key 11), making sure the gasket seating surfaces are clean and smooth. Place the valve plug and stem assembly into the valve body, making sure it is properly centered on the seat ring (key 9). Also make sure the valve plug (key 2A) sealing parts are evenly engaged by the chamfer in the top inside diameter of the cage (key 3) to avoid damaging the parts. Then slide the bonnet over the valve stem (key 2B) and onto the studs (key 15).

Note

Proper performance of the bolting procedures in step 11 compresses the bonnet and cage gaskets (key 11) enough to seal the body-to-bonnet joint.

The proper bolting procedures in step 11 include--but are not limited to--ensuring that bolting threads are clean and evenly tightening the hex nuts onto the studs in a crisscross pattern. Tightening one nut may loosen an adjacent nut. Repeat the crisscross tightening pattern several times until each nut is tight and the body-to-bonnet seal is made.

Studs and hex nuts should be installed such that the manufacturer's trademark and material grade marking is visible, allowing easy comparison to the materials selected and documented in the Emerson/Fisher serial card provided with this product.

⚠ WARNING

Personal injury or damage to equipment could occur if improper stud and nut materials or parts are used. Do not operate or assemble this product with stud(s) and nut(s) that are not approved by Emerson/Fisher engineering and/or listed on the serial card provided with this product. Use of unapproved materials and parts could lead to stresses exceeding the design or code limits intended for this particular service. Install studs with the material grade and manufacturer's identification mark visible. Contact your [Emerson sales office](#) if a discrepancy between actual parts and approved parts is suspected.

11. Lubricate the studs (key 15) and install hex nuts (key 16), using accepted bolting procedures during tightening, so that the body-to-bonnet joint will withstand test pressures and application service conditions. Use the bolt torques in table 4 as guidelines.
12. Install new packing and the metal packing box parts according to the appropriate arrangement in figure 2. Place a smooth-edged pipe over the valve stem, and gently tap each soft packing part into the packing box one piece at a time, being sure that air is not trapped between adjacent soft parts.
13. Slide the packing follower (key 13, figure 2), upper wiper (key 12, figure 2), and packing flange (key 37) into position. Lubricate the packing flange studs (key 4) and the faces of the packing flange nuts (key 5). Replace the packing flange nuts.
14. For **spring-loaded PTFE V-ring packing**, tighten the packing flange nuts until the shoulder on the packing follower (key 13, figure 2) contacts the bonnet.

For **graphite packing**, tighten the packing flange nuts to the maximum recommended torque shown in table 3. Then, loosen the packing flange nuts and retighten them to the recommended minimum torque shown in table 3.

For **other packing types**, tighten the packing flange nuts alternately in small, equal increments until one of the nuts reaches the minimum recommended torque shown in table 3. Then, tighten the remaining flange nut until the packing flange (key 3, figure 2) is at a 90-degree angle to the valve stem.

15. Mount the actuator on the valve assembly, and reconnect the actuator and valve stem according to the procedure in the appropriate actuator instruction manual.

Trim Maintenance

⚠ WARNING

Refer to the **WARNING** at the beginning of the Maintenance section in this instruction manual.

Disassembly

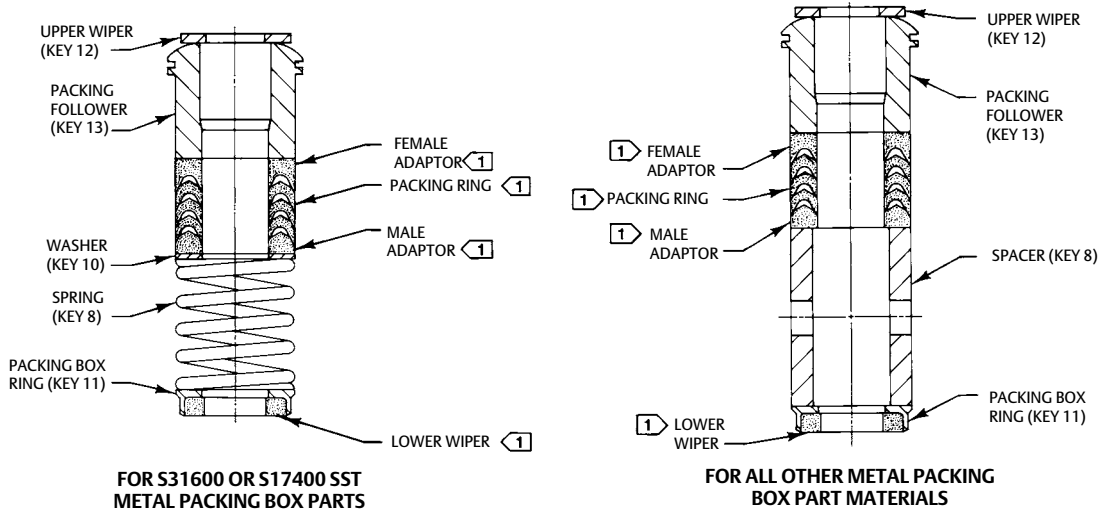
1. Complete steps 1 through 5 of the Replace Packing section to remove the actuator, bonnet, and plug and stem from the valve body. Remove the bonnet gasket (key 11).

⚠ WARNING

To avoid personal injury due to leaking fluid, avoid damaging gasket sealing surfaces. The surface finish of the valve stem (key 2B) is critical for making a good packing seal. The inside surface of the cage (key 3) is critical for smooth operation of the valve plug. The seating surfaces of the valve plug (key 2A) and seat ring (key 9) are critical for proper shutoff. Unless inspection reveals otherwise, assume all these parts are in good condition and protect them accordingly.

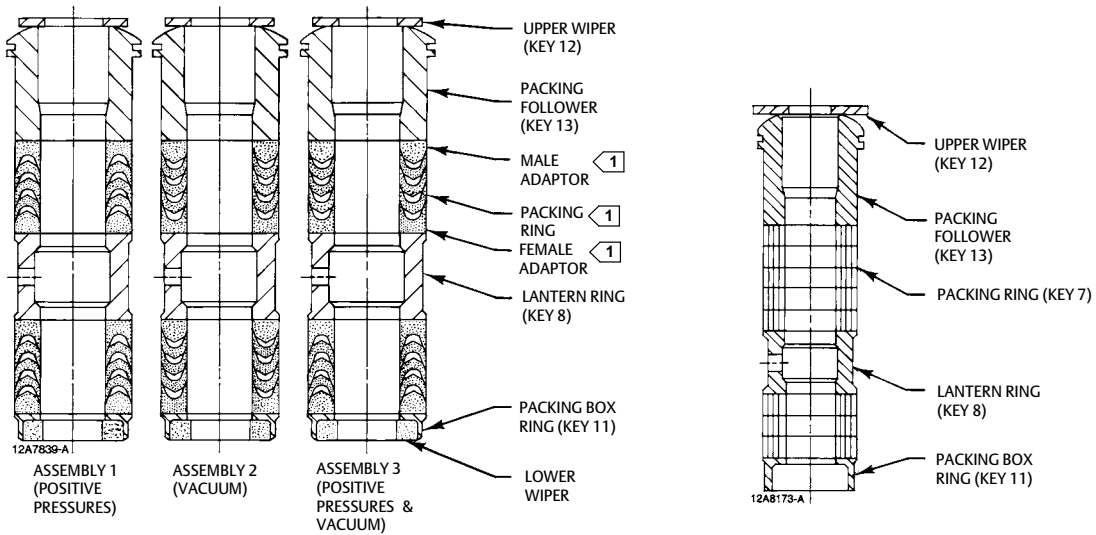
2. Packing parts can be removed if desired. Replace these parts as described in the Replace Packing section.
3. Install 3/8"-16 UNC-2A eye bolts with a minimum threaded length of 13 mm (0.5 inches) into the tapped holes in the top of the cage (key 3) and carefully lift it out of the valve body. For ET/EWT valves, the seat ring (key 9) will be removed with the cage as an assembly due to the seat ring being screwed into the bottom of the cage and secured with tack welds. If the cage is stuck in the valve, use a rubber mallet to strike the exposed portion of the cage at several points around its circumference. Set the part(s) on a protective surface to prevent damage to gasket or seating surfaces.
4. Remove the cage gasket (key 11).
5. Proceed as appropriate:

Figure 2. Typical Packing



12A7837-A

PTFE V-RING SINGLE ARRANGEMENTS



12A7839-A

12A8173-A

**31.8 and 50.8 mm
(1-1/4 and 2 INCH) STEM**

**PTFE V-RING
DOUBLE ARRANGEMENTS**

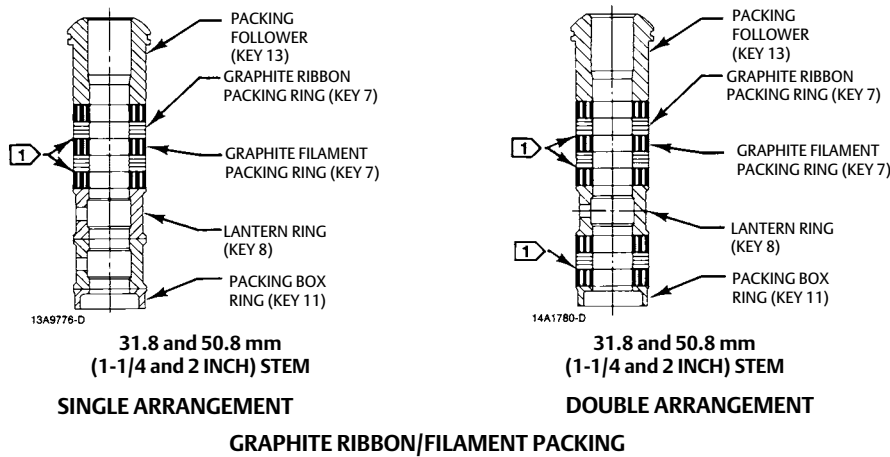
**31.8 and 50.8 mm
(1-1/4 and 2 INCH) STEM**

**PTFE/COMPOSITION
ARRANGEMENT**

NOTE:
 PACKING SET (KEY 6) (2 REQUIRED FOR DOUBLE ARRANGEMENTS)

B2398

Figure 2. Typical Packing (Continued)



NOTE:
 1 0.102 mm (0.004 INCH) THICK SACRIFICIAL ZINC WASHERS:
 USE ONLY ONE BELOW EACH GRAPHITE RIBBON RING.
 A6060

Table 3. Packing Flange Nut Torque for Packing Without a Spring

VALVE STEM DIAMETER		PRESSURE RATING	GRAPHITE-TYPE PACKING				PTFE-TYPE PACKING			
			Minimum Torque		Maximum Torque		Minimum Torque		Maximum Torque	
mm	Inch		N•m	Lbf•ft	N•m	Lbf•ft	N•m	Lbf•ft	N•m	Lbf•ft
31.8	1-1/4	CL150 & 300	33	24.3	49	36.1	16	11.8	25	18.4
		CL600	45	33.2	67	49.4	21	15.5	33	24.3
50.8	2	CL300	43	32	65	48	20	15	31	23
		CL600	61	45	91	67	27	20	41	30

Table 4. Body-to-Bonnet Bolt Torque

BOLT SIZE, INCH	THREADS PER INCH	BOLTING TORQUE ⁽¹⁾	
		N•m	Lbf•ft
1-1/4	8	990	730
1-1/2	8	1750	1290
1-3/4	8	2806	2070
2	8	4244	3130

1. Torque values listed apply to the following stud and nut materials lubricated with Lubriplate MAG-1.

- SA-193-B7 studs with SA-194-2H nuts
- SA-193-B7M studs with SA-194-2HM nuts
- SA-193-B16 studs with SA-194-7 nuts
- SA-193-B8M Class 2 studs with SA-194-8M nuts
- N07718 HT studs with N07718 HT chrome coat nuts
- SA479 S20910 chrome coat studs with SA479 S20910 nuts

For ET/EWT Valves, using the below procedure, disassemble the seat ring from the cage:

- Grind or file off the two tack welds that prevent the seat ring from unscrewing from the cage.
- Install 3/8"-16 UNC-2A bolts or cap screws into the two equally spaced tapped holes in the bottom of the seat ring. These bolts or cap screws will need to have a minimum of 0.5 inches of thread engagement and the length will be determined by the pry bar diameter used in this step.
- Using a pry bar to pry against the cap screws, turn the seat ring counter-clockwise to unscrew it from the cage.
- Set the seat ring on a protective surface taking care not to damage the seat ring seal ring (key 223).

For ED/EWD and ET-C/EWT-C Valves, using the below procedure, disassemble the seat ring from the valve body:

- a. Unscrew the seat ring cap screws (key 49).
 - b. Install 3/8"-16 eye bolts with a minimum threaded length of 0.5 inches into the two equally spaced tapped holes in the top of the seat ring (key 9).
 - c. Carefully lift the seat ring out of the valve body using the eye bolts as lifting points.
 - d. Set the seat ring on a protective surface.
 - e. Remove the seat ring gasket (key 13) from the valve body.
6. Cover the opening in the valve to protect the gasket surface and prevent foreign material from getting into the valve body cavity. Inspect parts for wear and damage which would prevent proper operation of the valve. If the cage requires replacement take note that for ET/EWT valves a replacement is available individually (key 3 only) or as a cage and seat ring assembly (key 3 and 9). The valve plug and seat ring, along with their respective sealing parts, will be inspected in the Valve Plug and Seat Ring maintenance procedures.

Valve Plug Maintenance

With the valve plug and stem assembly (key 2) removed according to the Disassembly procedure, proceed as appropriate:

CAUTION

Be careful not to scratch the surfaces of the seal ring grooves in the valve plug (key 2A) or any surfaces of the replacement parts.

For ET/EWT Valves

1. Carefully pry or cut out the plug seal ring (key 28) from its groove in the valve plug (key 2A). Discard the old plug seal ring.
2. Inspect the valve plug (key 2A) and stem (key 2B) for nicks, scratches, or other damage that would prevent proper operation of the valve. If replacement of either is necessary, replace as a complete valve plug and stem assembly (key 2).

CAUTION

To avoid damaging the seal ring, slowly and gently stretch it for the following procedure. Avoid jerking sharply on the ring.

3. Install the replacement plug seal ring (key 28) with the open side facing the top or bottom of the valve plug, depending on flow direction. The open side of the seal ring should face up (toward the actuator) in flow-up installations and down in flow-down installations.

To install the seal ring on the valve plug, first lubricate it with a general purpose silicone-base lubricant. Then gently stretch the seal ring and work it over the top edge of the valve plug. The PTFE material in the seal ring must be permitted time to cold-flow during the stretching procedure, so avoid jerking sharply on the ring. Stretching the seal ring over the valve plug may make it seem unduly loose when in the groove, but it will contract to its original size after insertion into the cage.

For ET/EWT Valves Equipped with HTS1 Seals

1. Carefully pry the plug retaining ring (key 27) from its groove in the valve plug (key 2A). Then remove the plug seal ring (key 28), backup ring (key 29), and anti-extrusion ring (key 63). Inspect the retaining ring and backup ring for damage and replace as needed. Discard the old plug seal ring and anti-extrusion ring.
2. Inspect the valve plug (key 2A) and stem (key 2B) for nicks, scratches, or other damage that would prevent proper operation of the valve. If replacement of either is necessary, replace as a complete valve plug and stem assembly (key 2).
3. Install the replacement plug seal ring (key 28) and anti-extrusion ring (key 63) with the open side of the seal ring facing the top or bottom of the valve plug, depending on flow direction. The open side of the seal ring should face up (toward the actuator) in flow-up installations and down in flow-down installations. Make sure the anti-extrusion ring is adjacent to the closed side of the seal ring. Then install the plug backup ring (key 29) and retaining ring (key 27).

To install the parts on the valve plug, first lubricate each with a general purpose silicone-base lubricant. Then gently slide each over the top edge of the valve plug.

For ET-C/EWT-C Valves

1. Carefully pry the plug retaining ring (key 27) from its groove in the valve plug (key 2A). Then remove the plug seal ring (key 28) and backup ring (key 29). Inspect the retaining ring and backup ring for damage and replace as needed. Discard the old plug seal ring.
2. Inspect the valve plug (key 2A) and stem (key 2B) for nicks, scratches, or other damage that would prevent proper operation of the valve. If replacement of either is necessary, replace as a complete valve plug and stem assembly (key 2).
3. Install the replacement plug seal ring (key 28) with the open side of the seal ring facing the top or bottom of the valve plug, depending on flow direction. The open side of the seal ring should face up (toward the actuator) in flow-up installations and down in flow-down installations. Then install the plug backup ring (key 29) and retaining ring (key 27).

To install the parts on the valve plug, first lubricate each with a general purpose silicone-base lubricant. Then gently slide each over the top edge of the valve plug.

For ED/EWD Valves

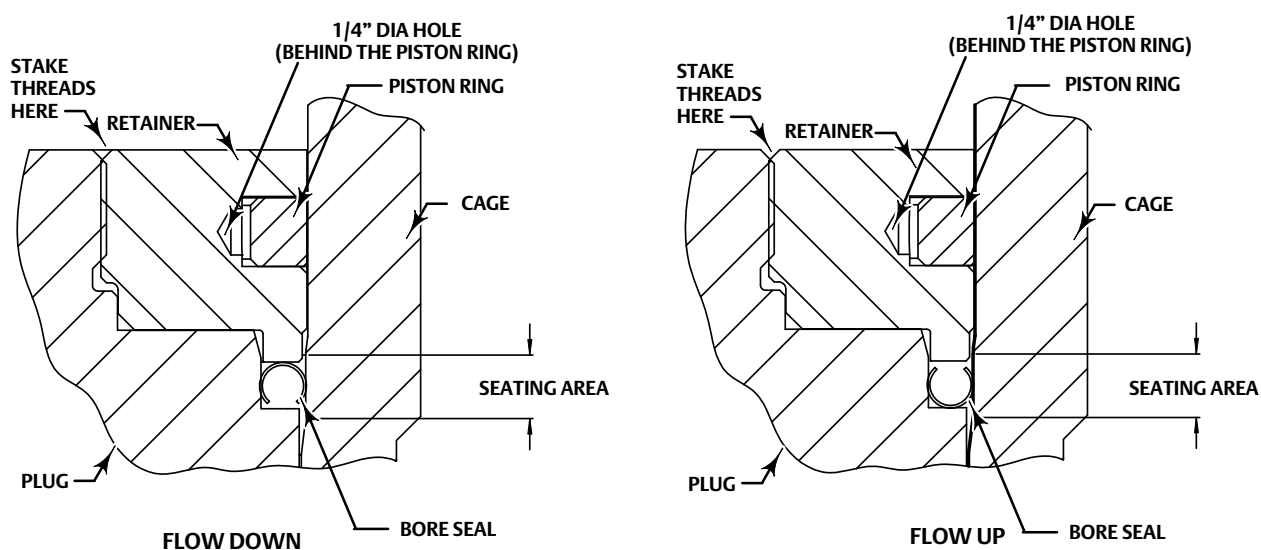
1. Remove and discard the piston rings (key 6). The rings can be easily removed since each is in two pieces.
2. Inspect the valve plug (key 2A) and stem (key 2B) for nicks, scratches, or other damage that would prevent proper operation of the valve. If replacement of either is necessary replace as a complete valve plug and stem assembly (key 2).
3. Each new piston ring (key 6) is furnished as a complete ring, and each must be broken into two approximately equal portions. Do this by placing the ring on edge on a smooth, hard surface and striking the ring squarely with a hammer.
4. Install the replacement piston ring(s) into the groove(s) in the valve plug (key 2A). Be sure to match the broken ends when installing the ring sections in the groove(s).

For ED/EWD Valves Equipped with the Bore Seal

1. Remove and discard the piston ring (key 6). The ring can be easily removed since it is in two pieces. Also inspect the bore seal (key 64) and retainer (key 2C) for nicks, scratches, or other damage that would prevent proper operation of the valve. If replacement of the bore seal is necessary complete steps 2 – 12, otherwise proceed directly to step 13.
2. Referring to figure 3, locate the staked thread on top of the valve plug (key 2A). The staked thread secures the retainer (key 2C). Use a drill with a 1/8 inch bit to drill out the staked area of the thread. Drill approximately 1/8 inch into the metal to remove the staking.

3. Referring to figure 3, locate the 1/4-inch diameter hole in the groove where the piston ring was installed.
4. Select an appropriate tool such as a punch and place the tip of the tool into the hole with the body of the tool held tangent to the outside diameter of the retainer. Strike the tool with a hammer to rotate the retainer and free it from the valve plug. Remove the retainer from the valve plug.
5. Use an appropriate tool such as a flat-blade screwdriver to pry the bore seal (key 64) off the valve plug. Use caution to avoid scratches or other damage to the seating surfaces where the bore seal makes contact with the valve plug (see figure 3).

Figure 3. Fisher ED/EWD Valve Equipped with the Bore Seal



6. Apply a suitable high-temperature lubricant to the inside diameter of the bore seal. Also, lubricate the outside diameter of the valve plug where the bore seal must be pressed into the proper seating position (see figure 3).
7. Referring to figure 3, orient the bore seal for correct sealing action based on the process fluid flow direction through the valve.
 - The open interior of the bore seal must face up in a valve with flow-up construction.
 - The open interior of the bore seal must face down in a valve with flow-down construction.
8. Place the bore seal over the top of the valve plug. The retainer will help guide the bore seal down onto the valve plug. Do not force the bore seal over the valve plug. For flow down constructions, skip to step 10.
9. An installation tool (see figure 4 and table 5) must be inserted into the bore seal prior to using the retainer to guide it down the valve plug.
10. Apply a suitable high-temperature lubricant to the threads on the valve plug. Then, place the retainer onto the valve plug and tighten the retainer using an appropriate tool such as a strap wrench. For flow-down constructions, skip to step 12.
11. Remove the retainer and then the installation tool. Place the retainer back onto the valve plug and tighten the retainer using an appropriate tool such as a strap wrench.
12. Using an appropriate tool such as a center punch, stake the threads on top of the valve plug in one place to secure the retainer (see figure 3).
13. Inspect the valve plug (key 2A) and stem (key 2B) for nicks, scratches, or other damage that would prevent proper operation of the valve. If replacement of either is necessary replace as a complete valve plug and stem assembly (key 2).

14. Each new piston ring (key 6) is furnished as a complete ring, and each must be broken into two approximately equal portions. Do this by placing the ring on edge on a smooth, hard surface and striking the ring squarely with a hammer.
15. Install the piston ring into the groove in the retainer (key 2C). Be sure to match the broken ends when installing the ring sections in the groove.

CAUTION

To avoid excessive leakage and seat erosion, the valve plug must be initially seated with sufficient force to overcome the resistance of the Bore Seal and contact the seat ring. You can correctly seat the valve plug by using the same force calculated for full load when sizing your actuator. With no pressure drop across the valve, this force will adequately drive the valve plug to the seat ring, thus giving the Bore Seal a predetermined permanent set.

With full actuator force applied and the valve plug fully seated, align the actuator travel indicator scale with the lower end of valve travel. Refer to the appropriate actuator instruction manual for information on this procedure.

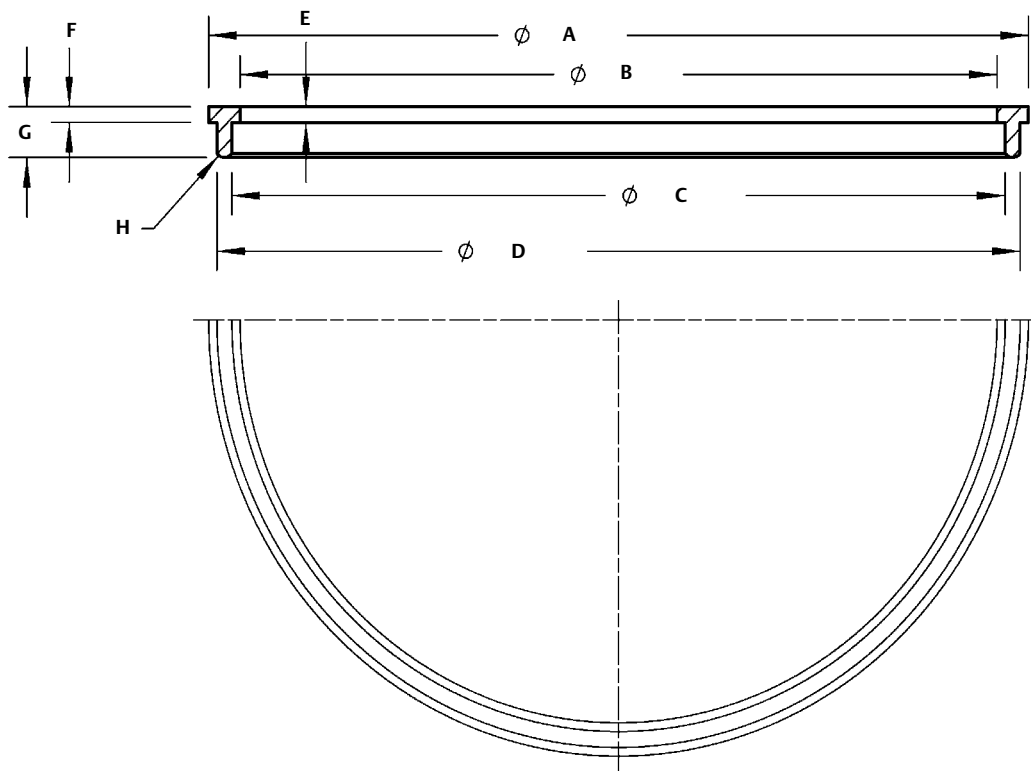
Seat Ring Maintenance

With the seat ring (key 9) removed, according to the Disassembly procedure, proceed as appropriate:

CAUTION

Be careful not to scratch the surfaces of the seating surface or groove in the seat ring or the surfaces of the replacement parts.

Figure 4. Bore Seal Installation Tool



GE22109-A

Table 5. Bore Seal Installation Tool Dimensions

VALVE PORT SIZE, INCH	Dimensions, Inches (See Figure 4)								Tool Part Number
	A	B	C	D	E	F	G	H	
10.00	10.12	9.7	9.80-9.82	10.00-10.02	0.10	0.10	0.32	R.06	GE17914X012
11.00	12.59	12.17	12.27-12.29	12.49-12.47	0.10	0.10	0.32	R.07	GE18183X012
14.75	14.84	14.424-14.416	14.516-14.536	14.736-14.716	0.10	0.10	0.32	R.05	GE34073X012
18.25	18.35	17.925-17.935	18.030-18.050	18.230-18.250	0.10	0.10	0.32	R.06	GG43649X012
24.00	(1)								(1)

1. Contact your [Emerson sales office](#) for this tool and dimensions.

For ET/EWT Valves

- Carefully pry or cut out the seat ring seal ring (key 223) from its groove in the seat ring (key 9). Discard the old seat ring seal ring.
- Then inspect the seat ring (key 9) for nicks, scratches, or other damage that would prevent proper operation of the valve. Replace the seat ring if necessary. A replacement seat ring is available individually (key 9 only) or as a seat ring and cage assembly (key 9 and 3). If replacing individually proceed to step 3, otherwise proceed directly to step 7.
- Make sure the bolts or cap screws that were installed in the seat ring during the Disassembly procedure are still installed.
- Orient the cage (key 3) and seat ring so that the threads on each are facing one another for assembly. The bottom of the cage should be facing the top of the seat ring.
- Using a pry bar to pry against the bolts or cap screws, turn the seat ring clockwise into the cage until tight. Afterwards remove the two bolts or cap screws.

6. Tack weld the seat ring to the cage using minimal heat. Two welds, 6 mm (1/4-inch) long and 180 degrees apart, are required.

CAUTION

To avoid damaging the seal ring, slowly and gently stretch it for the following procedure. Avoid jerking sharply on the ring.

7. Install the replacement seat ring seal ring (key 223) with the open side facing the top or bottom of the seat ring, depending on flow direction. The open side of the seal ring should face down (toward the bottom of the valve body) in flow-up installations and up in flow-down installations.

To install the seal ring on the seat ring, first lubricate it with a general purpose silicone-base lubricant. Then gently stretch the seal ring and work it over the bottom edge of the seat ring. The PTFE material in the seal ring must be permitted time to cold-flow during the stretching procedure, so avoid jerking sharply on the ring. Stretching the seal ring over the seat ring may make it seem unduly loose when in the groove, but it will contract to its original size after insertion into the valve body.

For ET/EWT Valves Equipped with HTS1 Seals

1. Carefully pry the seat ring retaining ring (key 221) from its groove in the seat ring (key 9). Then remove the seat ring seal ring (key 223), backup ring (key 220), and anti-extrusion ring (key 219). Inspect the retaining ring and backup ring for damage and replace as needed. Discard the old seat ring seal ring and anti-extrusion ring.
2. Then inspect the seat ring (key 9) for nicks, scratches, or other damage that would prevent proper operation of the valve. Replace the seat ring if necessary. A replacement seat ring is available individually (key 9 only) or as a seat ring and cage assembly (key 9 and 3). If replacing individually proceed to step 3, otherwise proceed directly to step 7.
3. Make sure the bolts or cap screws that were installed in the seat ring during the Disassembly procedure are still installed.
4. Orient the cage and seat ring so that the threads on each are facing one another for assembly. The bottom of the cage should be facing the top of the seat ring.
5. Using a pry bar to pry against the bolts or cap screws, turn the seat ring clockwise into the cage until tight. Afterwards remove the two bolts or cap screws.
6. Tack weld the seat ring to the cage using minimal heat. Two welds, 6 mm (1/4-inch) long and 180 degrees apart, are required.
7. Install the replacement seat ring seal ring (key 223) and anti-extrusion ring (key 219) with the open side of the seal ring facing the top or bottom of the seat ring, depending on flow direction. The open side of the seal ring should face down (toward the bottom of the valve body) in flow-up installations and up in flow-down installations. Make sure the anti-extrusion ring is adjacent to closed side of the seal ring. Then install the seat ring backup ring (key 220) and retaining ring (key 221).

To install the parts on the seat ring, first lubricate each with a general purpose silicone-base lubricant. Then gently slide each over the bottom edge of the seat ring.

For ED/EWD and ET-C/EWT-C Valves

1. Inspect the seat ring (key 9) for nicks, scratches, or other damage that would prevent proper operation of the valve. Replace if necessary.

Bore Seal Retrofit

Note

Additional actuator thrust is required for a valve equipped with the bore seal. When installing the bore seal in an existing valve, contact your [Emerson sales office](#) for assistance in determining new actuator thrust requirements.

The bore seal retrofit will require a new valve plug and stem assembly (key 2), bore seal (key 64), and piston ring (key 6). The following steps will guide you in the assembly of these parts. Final installation into the valve body will be per the Assembly procedure.

CAUTION

To avoid leakage when the valve is returned to service, use appropriate methods and materials to protect all sealing surfaces of the new trim parts while assembling the individual parts and during installation in the valve body.

1. Apply a suitable high-temperature lubricant to the inside diameter of the bore seal. Also, lubricate the outside diameter of the valve plug where the bore seal must be pressed into the proper seating position (see figure 3).
2. Referring to figure 3, orient the bore seal for correct sealing action based on the process fluid flow direction through the valve.
 - The open interior of the bore seal must face up in a valve with flow-up construction.
 - The open interior of the bore seal must face down in a valve with flow-down construction.
3. Place the bore seal over the top of the valve plug. The retainer will help guide the bore seal down onto the valve plug. Do not force the bore seal over the plug. For flow-down constructions, skip to step 5.
4. An installation tool (see figure 4 and table 5) must be inserted into the bore seal prior to using the retainer to guide it down the valve plug.
5. Apply a suitable high-temperature lubricant to the threads on the valve plug. Then, place the retainer onto the valve plug and tighten the retainer using an appropriate tool such as a strap wrench. For flow-down constructions, skip to step 7.
6. Remove the retainer and then the installation tool. Place the retainer back onto the valve plug and tighten the retainer using an appropriate tool such as a strap wrench.
7. Using an appropriate tool such as a center punch, stake the threads on top of the valve plug in one place to secure the retainer (see figure 3).
8. Each new piston ring (key 6) is furnished as a complete ring, and each must be broken into two approximately equal portions. Do this by placing the ring on edge on a smooth, hard surface and striking the ring squarely with a hammer.
9. Install the piston ring into the groove in the retainer (key 2C). Be sure to match the broken ends when installing the ring sections in the groove.

CAUTION

To avoid excessive leakage and seat erosion, the valve plug must be initially seated with sufficient force to overcome the resistance of the Bore Seal and contact the seat ring. You can correctly seat the valve plug by using the same force calculated for full load when sizing your actuator. With no pressure drop across the valve, this force will adequately drive the valve plug to the seat ring, giving the Bore Seal a predetermined permanent set.

With full actuator force applied and the valve plug fully seated, align the actuator travel indicator scale with the lower end of valve travel. Refer to the appropriate actuator instruction manual for information on this procedure.

Assembly

After completing Packing Maintenance and/or Trim Maintenance procedures, the following steps will guide you through reassembly of the valve.

For ED/EWD and ET-C/EWT-C Valves only

1. Remove the cover protecting the valve body cavity.
2. Install a new seat ring gasket (key 13) into the valve body. Make sure the eye bolts that were installed in the seat ring (key 9) during the Disassembly procedure are still installed. Then using the eye bolts as lifting points, carefully lower the seat ring into the valve body. Make sure that the cap screw holes in the seat ring are lined up with their mating holes in the valve body. Remove the two eye bolts from the seat ring.

CAUTION

Uneven tightening of the cap screws (key 49) will result in the seat ring seating surface being askew from the valve plug seating surface, thereby preventing the valve from attaining its rated shutoff class. This is especially critical in ED/EWD valves equipped with the bore seal. If after assembly the rated shutoff class is not attained your [Emerson sales office](#) can provide further assistance.

3. Secure the seat ring to the valve body using the cap screws (key 49). Tighten the cap screws in a criss-cross pattern working up to the final torque in four equal increments as specified in table 6.
4. Install a new cage gasket (key 11) into the valve body.
5. Make sure the eye bolts that were installed in the cage (key 3) or cage assembly during the Disassembly procedure are still installed. Then using the eye bolts as lifting points, carefully lower the cage into the valve body. Any rotational orientation of the cage with respect to the valve is acceptable.
6. Complete reassembly according to steps 10 through 15 of the Replace Packing section.

Table 6. Seat Ring Cap Screw Torque

VALVE SIZE, NPS	FIRST INCREMENT		SECOND INCREMENT		THIRD INCREMENT		FOURTH INCREMENT FINAL TORQUE	
	N • m	Lbf • ft	N • m	Lbf • ft	N • m	Lbf • ft	N • m	Lbf • ft
12, 14, and 16x12	9.75	7	19.5	14	29.25	21	39	28
16, 18, 20x16, 24x16, 20, 24x20, and 30	23	17	46	34	69	51	92	68

For ET/EWT Valves only

1. Remove the cover protecting the valve body cavity.
2. Install a new cage gasket (key 11) into the valve body.
3. Make sure the eye bolts that were installed in the cage (key 3) or cage assembly during the Disassembly procedure are still installed. Then using the eye bolts as lifting points, carefully lower the cage into the valve body. Any rotational orientation of the cage with respect to the valve is acceptable. Use care to avoid damaging the seat ring seal ring (key 223) while handling the heavy parts. To help insert the cage assembly into the valve, lubricate the outside diameter of the seat ring seal ring with general purpose silicone-base lubricant.
4. Complete reassembly according to steps 10 through 15 of the Replace Packing section.

Parts Ordering

Each body-bonnet assembly is assigned a serial number, which can be found on the valve. This same number also appears on the actuator nameplate when the valve is shipped from the factory as part of a control valve assembly. Refer to the serial number when contacting your [Emerson sales office](#) for technical assistance.

⚠ WARNING

Use only genuine Fisher replacement parts. Components that are not supplied by Emerson Automation Solutions 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 Kits

Seal Ring and Piston Ring Kits

Repair kits include parts to replace the seal rings and piston rings for the valve plug and seat ring.

Valve Size, NPS	Port Diameter, mm (Inch)	ED/EWD Valves		ET/EWT Valves		
		Standard (includes key 6)	With Bore Seal (includes key 6)	Standard (includes keys 28 and 223)	With HTS1 Seals (includes keys 28, 63, 223, and 219)	ET-C/EWT-C (includes key 28)
12, 14, 16x12	254 (10)	RSEALX00012	Consult factory	RSEALX00042	RSEALX00062	RSEALX00082
	279 (11)	RSEALX00022	RSEALX00032	RSEALX00052	RSEALX00072	RSEALX00092
16, 18, 20x16, 24x16	375 (14.75)	RSEALX00102	RSEALX00112	RSEALX00122	RSEALX00142	RSEALX00162
	413 (16.25)	---	---	RSEALX00132	RSEALX00152	---
20, 24x20	18.25	RSEALX00192	RSEALX00202	RSEALX00212	RSEALX00232	RSEALX00252
	19.75	---	---	RSEALX00222	RSEALX00242	---
30	610 (24)	Consult factory	Consult factory	RSEALX00172	Consult factory	Consult factory
	660 (26)	---	---	RSEALX00182	Consult factory	---

Gasket Kits

Valve Size, NPS	Pressure Class	Valve Travel, mm (Inch)	ED/EWD and ET-C/EWT-C Valves (includes keys 11 and 13)	ET/EWT Valves (includes key 11)
12, 14, 16x12	CL150-600	All	RGASKETXE62	RGASKETXE92
16, 18, 20x16, 24x16	CL150-600	less than 378 (14.88)	RGASKETXE72	RGASKETXF12
		378 (14.88)	RGASKETXE82	RGASKETXF22
20, 24x20	CL150-600	203 (8.00), 276 (10.88), 378 (14.88)	RGASKETXF42	RGASKETXF62
24x20	CL150-600	429 (16.88)	RGASKETXF52	RGASKETXF72
30	CL150-300	All	Consult factory	RGASKETXF32
	CL600			RGASKETXH12

Standard Packing Kits (Non Live-Loaded)

Stem Diameter, mm (Inches) Yoke Boss Diameter, mm (Inches)	31.8 (1-1/4) 127 (5H)	50.8 (2) 178 (7)
Single PTFE (Contains keys 6, 8, 10, 11, and 12)	RPACKX00352	Consult factory
Double PTFE (Contains keys 6, 8, 11, and 12)	RPACKX00372	Consult factory
Single Graphite Ribbon/Filament (Contains keys 7 [ribbon ring], 7 [filament ring], and 11)	RPACKX00542	RPACKX00552

ENVIRO-SEAL Packing Kits

Repair kits include parts to replace the “soft” packing materials in valves that already have ENVIRO-SEAL packing arrangements installed or in valves that have been upgraded with ENVIRO-SEAL retrofit kits. For part numbers of individual components, refer to instruction manual ENVIRO-SEAL Packing System for Sliding-Stem Valves, D101642X012. PTFE repair kits include keys 214, 215, and 218. Graphite ULF repair kits include keys 207, 208, 209, 210, and 214. Duplex repair kits include keys 207, 209, 214, and 215.

Retrofit kits include parts to convert valves to the ENVIRO-SEAL packing box construction. For part numbers of individual components, refer to instruction manual ENVIRO-SEAL Packing System for Sliding-Stem Valves, D101642X012. PTFE kits include keys 200, 201, 211, 212, 214, 215, 217, 218, tag, and cable tie. Graphite ULF kits include keys 200, 201, 207, 208, 209, 210, 211, 212, 214, 216, 217, tag, and cable tie. Duplex kits include keys 200, 201, 207, 209, 211, 212, 214, 215, 216, 217, tag, and cable tie.

Stem Diameter, mm (Inches) Yoke Boss Diameter, mm (Inches)	REPAIR KIT		RETROFIT KIT	
	31.8 (1-1/4) 127 (5H)	50.8 (2) 178 (7)	31.8 (1-1/4) 127 (5H)	50.8 (2) 178 (7)
ENVIRO-SEAL Double PTFE	RPACKX00232	Consult factory	RPACKXRT052	Consult factory
ENVIRO-SEAL Graphite ULF	RPACKX00632	Consult factory	RPACKXRT302	Consult factory
ENVIRO-SEAL Duplex	RPACKX00332	Consult factory	RPACKXRT252	Consult factory

Parts List

Note

Contact your [Emerson sales office](#) for Part Ordering information.

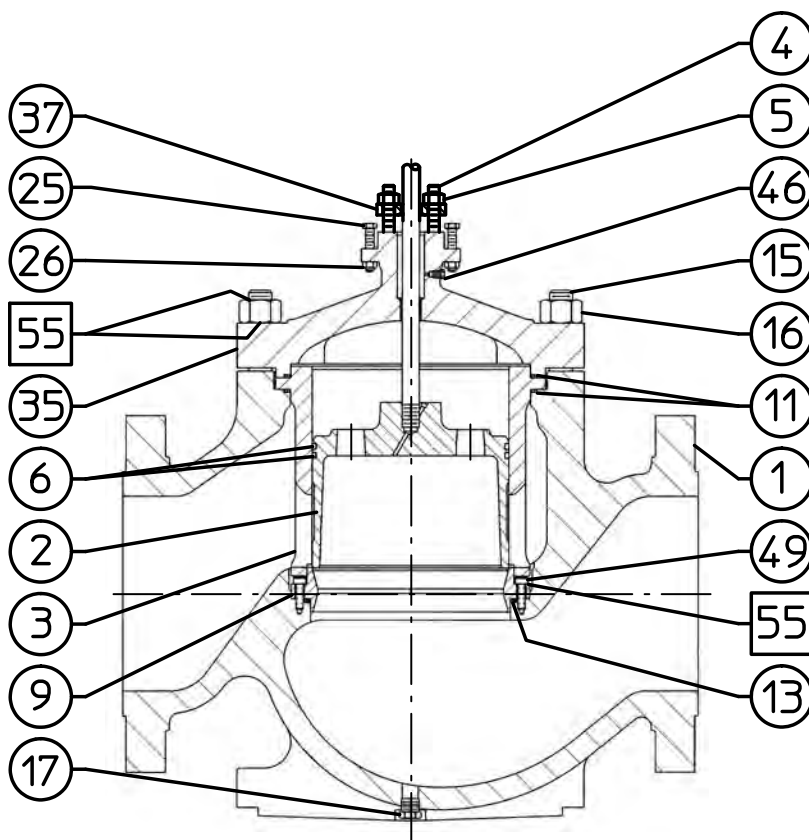
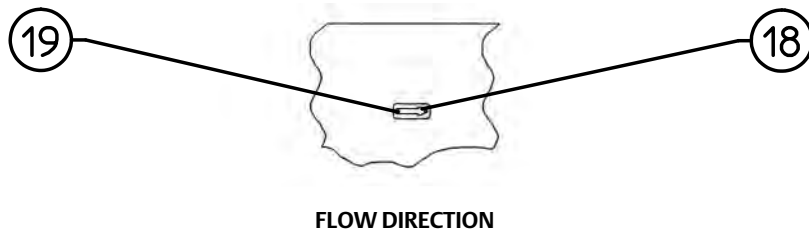
Valve Body (figures 5 through 8)

Key	Description	
1	Valve Body	
2*	Valve Plug and Stem Assembly	
2A	Valve Plug	
2B	Valve Stem	
2C	Retainer	
3*	Cage	
4	Packing Flange Stud	
5	Packing Flange Nut	
6*	Piston Ring	see parts kit
9*	Seat Ring	
11*	Cage or Bonnet Gasket	see parts kit
13*	Seat Ring Gasket	see parts kit
15	Stud	
16	Hex Nut	
17	Drain Plug	
18	Flow Arrow	
19	Drive Screw	
25	Actuator to Bonnet Cap Screw	
26	Actuator to Bonnet Nut	
27*	Plug Retaining Ring	
28*	Plug Seal Ring	see parts kit
29*	Plug Backup Ring	
31	Lubricator or Lubricator/Isolating Valve	
35	Bonnet	
37	Packing Flange	
46	Pipe Plug	
49	Cap Screw	
53	Nameplate	
55	Lubricant	
63*	Plug Anti-Extrusion Ring	see parts kit
64*	Bore Seal	
223*	Seat Ring Seal Ring	see parts kit
220*	Seat Ring Back-up Ring	
219*	Seat Ring Anti-Extrusion Ring	see parts kit
221*	Seat Ring Retaining Ring	

Packing (figure 2)

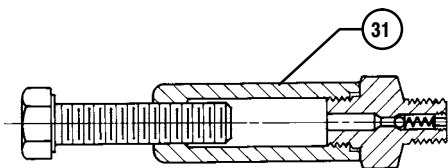
	PTFE V-Ring Single Packing	
6*	Packing Set	see parts kit
8	Spring	
10	Special Washer	
11*	Packing Box Ring	see parts kit
12*	Upper Wiper	see parts kit
13	Packing Follower	
	PTFE V-Ring Double Packing	
6*	Packing Set	see parts kit
8	Lantern Ring	
11*	Packing Box Ring	see parts kit
12*	Upper Wiper	see parts kit
13	Packing Follower	
	PTFE/Composition Packing	
7*	Packing Set	
8	Lantern Ring	
11*	Packing Box Ring	
12*	Upper Wiper	
13	Packing Follower	
	Graphite Ribbon/Filament Single or Double Packing	
7*	Packing Ring, Graphite Ribbon	see parts kit
7*	Packing Ring, Graphite Filament	see parts kit
8	Lantern Ring	
11*	Packing Box Ring	see parts kit
13	Packing Follower	
	ENVIRO-SEAL Packing	
	See Instruction Manual D101642X012	

Figure 5. Typical Fisher ED/EWD Valve



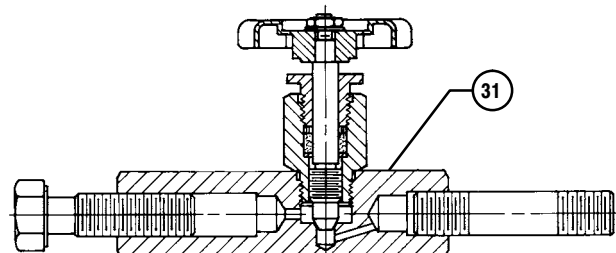
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APPLY LUBRICANT



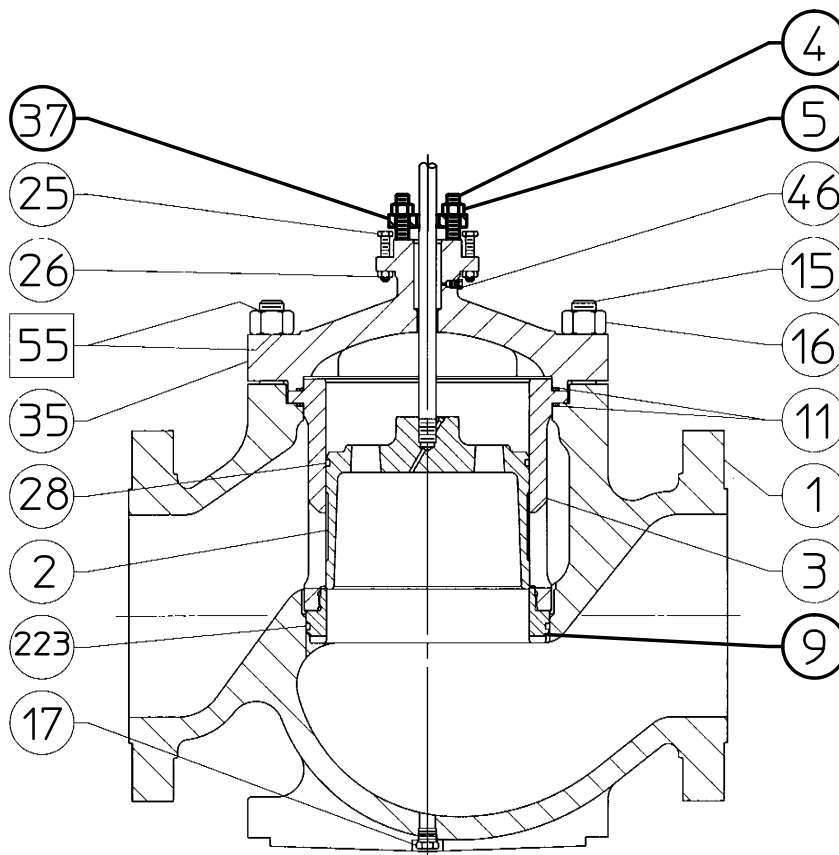
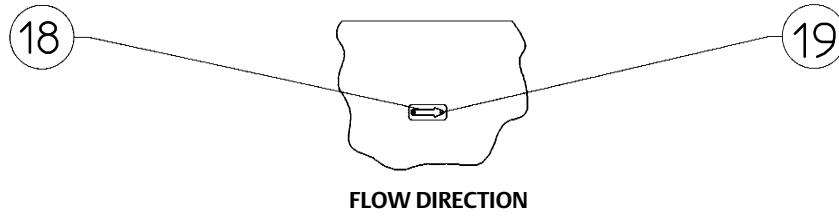
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OPTIONAL LUBRICATOR



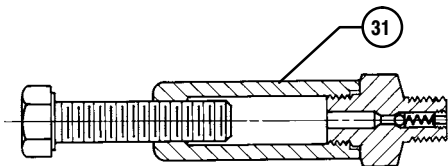
OPTIONAL LUBRICATOR/ISOLATING VALVE

Figure 6. Typical Fisher ET/EWT Valve



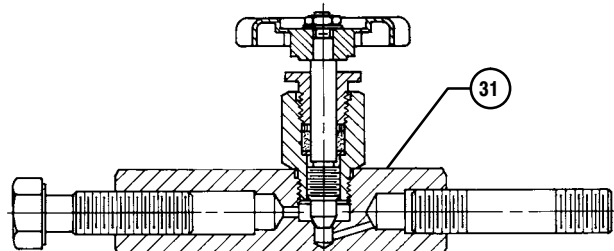
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APPLY LUBRICANT



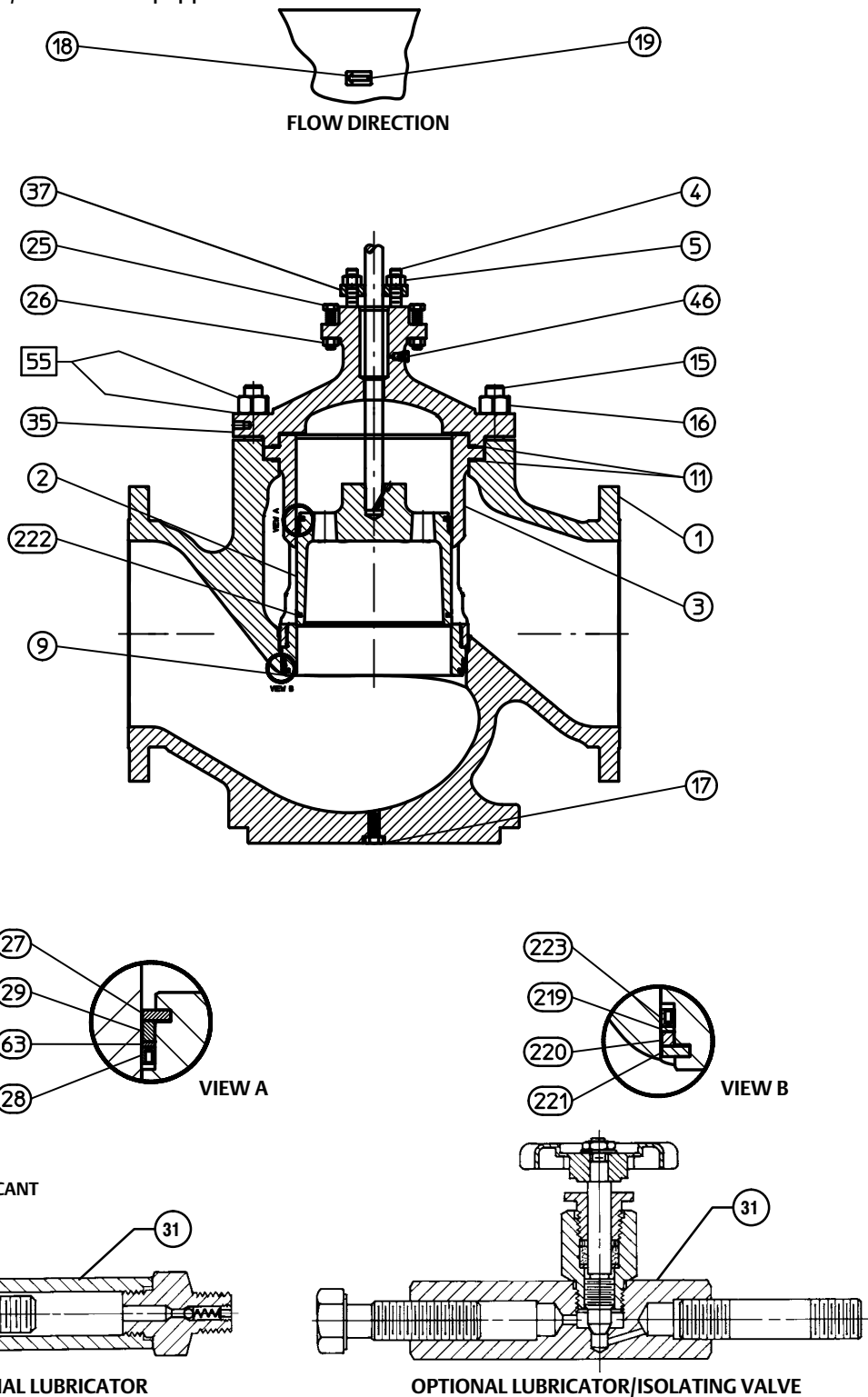
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A0832-2

OPTIONAL LUBRICATOR



OPTIONAL LUBRICATOR/ISOLATING VALVE

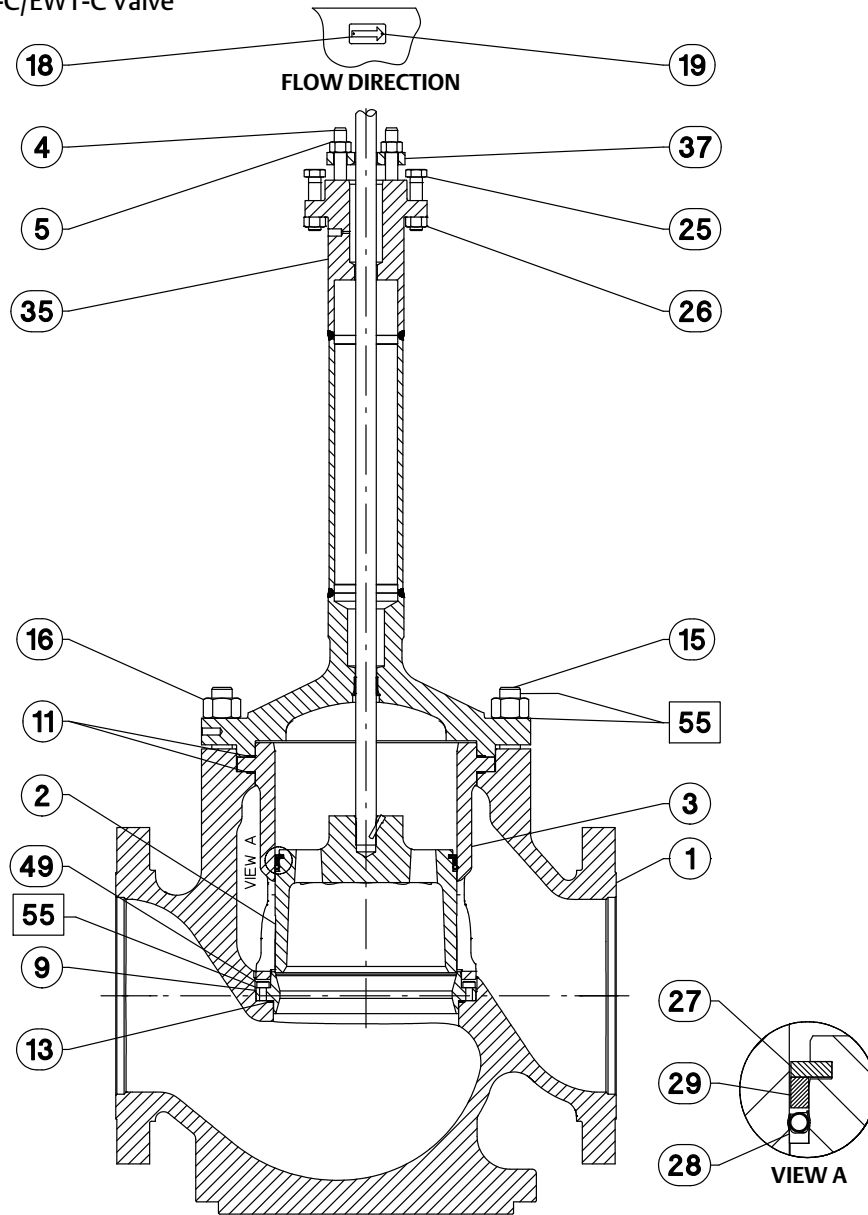
Figure 7. Typical Fisher ET/EWT Valve Equipped with HTS1 Seals



GG12454-C

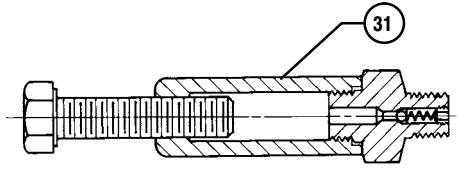
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Figure 8. Typical Fisher ET-C/EWT-C Valve



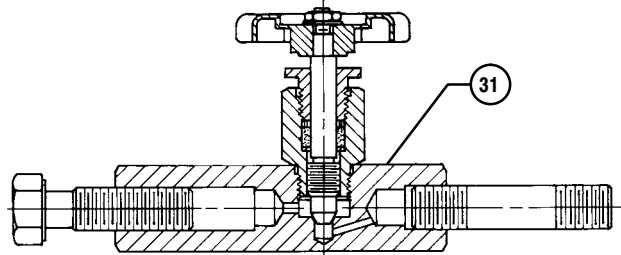
GE81255-A

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