

Design EUD, EUT-2, EWD, and EWT-2 Valves

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Introduction

Scope of Manual

This instruction manual includes installation and maintenance information for 12- through 24 x 20-inch Class 150 through 600 Design EUD, EUT-2, EWD and EWT-2 valves and the 20 x 16-inch Class 900 Design EWD and EWT-2 valves. (Size designations such as 20 x 16 are end connection size x nominal trim size.)

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

No person may install, operate, or maintain a Design EUD, EUT-2, EWD, or EWT-2 valve without first ● being fully trained and qualified in valve, actuator, and accessory installation, operation, and maintenance, and ● carefully reading and understanding the contents of this manual. If you have any questions about these instructions, contact your Fisher sales office before proceeding.



W6119/IL

Figure 1. Typical Design EWT or EWT-2 Valve

Note

Neither Emerson®, Emerson Process Management, Fisher®, nor any of their affiliated entities assumes responsibility for the selection, use and maintenance of any product. Responsibility for the selection, use, and maintenance of any product remains with the purchaser and end-user.



EUD, EUT-2, EWD, and EWT-2 Valves

Table 1. Specifications

<p>Valve Sizes</p> <p>Designs EUT-2 and EUD: ■ 12-, ■ 16-, and ■ 20-inch</p> <p>Designs EWT-2 and EWD: ■ 16x12-, ■ 20x16-, ■ 24x16-, and ■ 24x20-inch valves (size designations are end connection size x nominal trim size)</p> <p>End Connection Styles</p> <p><i>Flanged:</i> ANSI Class 150, 300, 600, and 900⁽¹⁾ raised-face or ring-type joint flanges per ASME B16.5</p> <p><i>Buttwelding:</i> All ASME B16.25 schedules through schedule 120 that are compatible with the ASME B16.34 valve body rating</p> <p>For other end connections, contact your Fisher sales office for details</p> <p>Maximum Inlet Pressure and Temperature⁽²⁾</p> <p><i>Flanged:</i> Consistent with Class 150, 300, 600, and 900⁽¹⁾ pressure/temperature ratings per ASME B16.34</p> <p><i>Buttwelding:</i> Consistent with Class 600 per ASME B16.34</p> <p>Also see the Installation section</p> <p>Shutoff Classifications per ANSI/FCI 70-2 and IEC 60534-4</p> <p>Design EUT-2 and EWT-2 with Metal Seats <i>Standard (for all trims except 2-Stage Cavitrol® Trim):</i> Class IV <i>Standard (for 2-Stage Cavitrol Trim):</i> Class V <i>Optional (for all trims except 2-Stage Cavitrol Trim):</i> Class V</p> <p>Design EUT-2 and EWT-2 with Soft Seats: Class V</p>	<p>Shutoff Classifications per ANSI/FCI 70-2 and IEC 60534-4 (continued)</p> <p>Design EUD and EWD with Metal Seats <i>Standard:</i> Class III <i>Optional:</i> Class IV</p> <p>Flow Characteristics</p> <p>Standard Cages: ■ Linear or ■ equal percentage</p> <p>Whisper Trim® III and Cavitrol III Cages: Linear</p> <p>Flow Direction</p> <p>Standard and Cavitrol III Cages: Down</p> <p>Whisper Trim III Cages: Up</p> <p>Port Diameters</p> <p>12-Inch Trim: 279.4 mm (11.00 inches)</p> <p>16-Inch Trim: ■ 374.7 mm (14.75 inches), ■ 412.8 mm (16.25 inches) for EUT-2 and EWT-2 valves with Whisper Trim III cage</p> <p>20-Inch Trim: ■ 463.6 mm (18.25 inches) or ■ 502 mm (19.75 inches) for Design EUT-2 and EWT-2 valves with Whisper Trim III cage</p> <p>Valve Plug Travel</p> <p>102 through 381 mm (4 to 15 inches). Contact your Fisher sales office for further details if needed</p> <p>Yoke Boss and Stem Diameters</p> <p>■ 127 mm (5-inch) or ■ 127 mm (5H-inch) diameter yoke boss, each with 31.8 mm (1-1/4 inch) diameter valve stem</p> <p>Approximate Weights</p> <p>See table 5</p>
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1. Class 900 end connections are available only for 20 x 16-inch Design EWD or EWT-2 valves.
 2. Do not exceed the pressure or temperature limits in this manual, on the equipment nameplate, and any applicable code limitations.

Table 2. WhisperFlo® Specifications

<p>Trim Material and Selection</p> <ul style="list-style-type: none"> ■ 410 Stainless Steel ■ Others per application <p>Pressure/Temperature Capability</p> <ul style="list-style-type: none"> ■ -20 to 800°F (-29 to 427°C) ■ Others per application <p>Maximum Pressure Drops</p> <p>As shown in this bulletin. Also see Bulletin 80.3:010 WhisperFlo Aerodynamic Attenuation Trims</p> <p>WhisperFlo Aerodynamic Trim Pressure Ratings^(1,2)</p> <p>Up to 1500 psi drop</p> <p>Velocity Limits</p> <p>WhisperFlo trim is designed for 0.3 MACH as an inherent outlet velocity limit. Variations higher and lower may be applied per special applications - consult your Fisher sales office</p>	<p>Flow Characteristic</p> <p>Linear (restricted linear cages and special, characterized cages are available—consult your Fisher sales office)</p> <p>Rangeability</p> <p>100:1</p> <p>Flow Direction</p> <p><i>Standard:</i> Flow up—through the seat ring and out through the cage orifices</p> <p>Noise Attenuation</p> <p>Approximately -40 dBA maximum depending on the $\Delta P/P_1$ ratio per IEC 534-8-3 calculation procedure See FIRSTVUE® 2.0</p> <p>Shutoff Classification</p> <ul style="list-style-type: none"> ■ Class IV ■ Others per application
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1. Other pressures on application.

2. The pressure/temperature limits in this instruction manual and in any applicable standard limitations should not be exceeded.

Description

All valve types covered in this manual (Design EUD, EUT-2, EWD, and EWT-2 valves) are general-purpose valves that can be used for either throttling or on-off control of a wide variety of liquids and gasses. They are single-port, globe-style valves with cage guiding, balanced valve plugs, and a push-down-to-close action. Design EUT and EWT-2 valves have a spring-loaded PTFE seal between the plug and cage; the Design EUD and EWD valves have two graphite piston rings between the plug and cage. See figure 6 for seal details.

Design EUT-2 and EWT-2 valves have a seat ring threaded into the cage. A spring-loaded PTFE seal is used to seal between the seat ring and the valve body. Standard seating is metal-to-metal, but optional soft seats are also available. A typical Design EUT-2 or EWT-2 valve is shown in figure 7.

Design EUD and EWD valves have a seat ring bolted into the valve body with cap screws. Seating is metal-to-metal. A typical Design EUD or EWD valve is shown in figure 8.

Cavitrol III and Whisper Trim III cages are available in these valves. Cavitrol trim eliminates cavitation damage with liquid in a properly sized valve and Whisper Trim cages help attenuate aerodynamic noise in gas service.

Fisher WhisperFlo® trim represents state of the art solutions for applications that demand ultimate noise attenuation.

Control valves with WhisperFlo cages (figure 2) provide additional aerodynamic noise attenuation in very demanding vapor or gas applications with high-pressure drops. A WhisperFlo cage with an appropriately sized valve body is designed to reduce the noise level up to -40 dBA. For special applications, -50 dBA attenuation can be achieved.

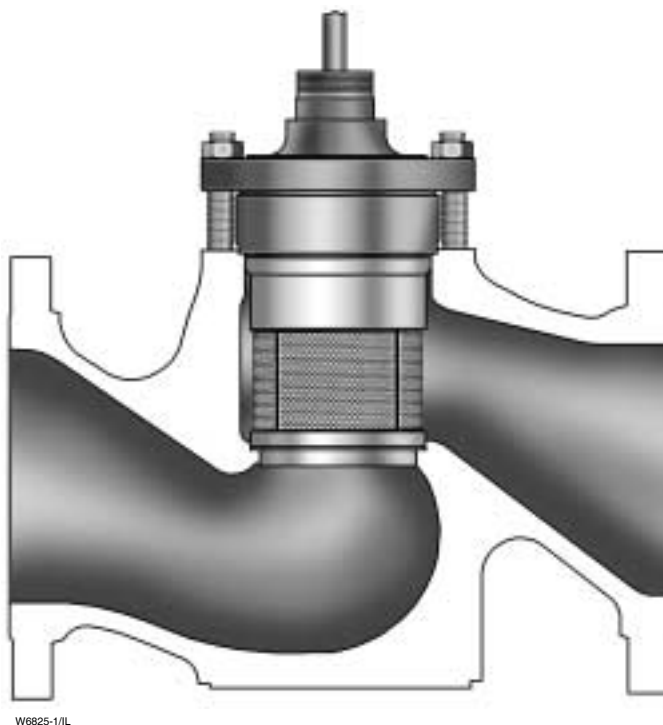


Figure 2. Cutaway Detail of the WhisperFlo® Trim, Valve Body Typical

Specifications

Typical specifications for these valves are shown in tables 1 and 2. Some of the specifications for a given valve assembly as it comes from the factory appear on the actuator nameplate if the valve is part of a complete control valve assembly.

Installation



WARNING

To avoid personal injury or property damage resulting from the sudden release of pressure, do not install the valve assembly where service conditions could exceed the limits given in this manual or on the appropriate nameplates. Use pressure-relieving devices as required by government or accepted industry codes and good engineering practices.

Always wear protective gloves, clothing, and eyewear when

performing any installation operations to avoid personal injury.

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

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

 **WARNING**

If you are hoisting the valve, use nylon slings to protect the surfaces.

Carefully position the slings 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. Refer to table 1 for valve assembly weights. It is important to use adequately sized hoists and chains or slings to handle the valve.

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.

CAUTION

For longer service life and more effective operation, the process liquid must be clean. If the valve being installed has a Whisper Trim, WhisperFlo, or Cavitrol Trim cage with small internal flow passages, impurities or entrained solids in the process liquid may cause irreparable erosion damage to the seating surfaces and may plug cage holes and passages, causing cavitation damage. During valve installation or the plant cleaning cycle, install a strainer upstream from the valve to help free pipelines of foreign material.

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 in improper operation. Support the actuator if it is not installed in the vertical position. For more information, consult your Fisher sales office.
4. Use accepted piping and welding practices when installing the valve in the line. You can leave internal elastomeric parts in place when welding. For flanged valves, use a suitable gasket between the valve and pipeline flanges.

CAUTION

Depending on valve body materials used, post weld heat treating might 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 might also loosen. In general, if post weld heat treating is to be performed, all trim parts should be removed. Contact your Fisher sales office for additional information.

5. With a leak-off bonnet construction, remove the 1/4-inch NPT pipe plugs (key 14, figure 5) from the bonnet to hook up the leak-off piping.
6. If continuous operation is required during inspection or maintenance, install a three-valve bypass around the control valve assembly.
7. 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 some readjustment will be required to meet specific service conditions.

If the valve has ENVIRO-SEAL® live-loaded packing or HIGH-SEAL™ ULF live-loaded packing installed, this initial re-adjustment will probably not be required. See the Fisher instruction manuals titled ENVIRO-SEAL Packing System for Sliding-Stem Valves or HIGH-SEAL ULF 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, lapping seating surfaces, and valve plug maintenance. All maintenance operations may be performed with the valve in the line.

WARNING

Avoid personal injury from sudden release of process pressure. Before performing any maintenance operations:

- 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.

1. Isolate the control valve from the line pressure, release pressure from both sides of the valve body, 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.

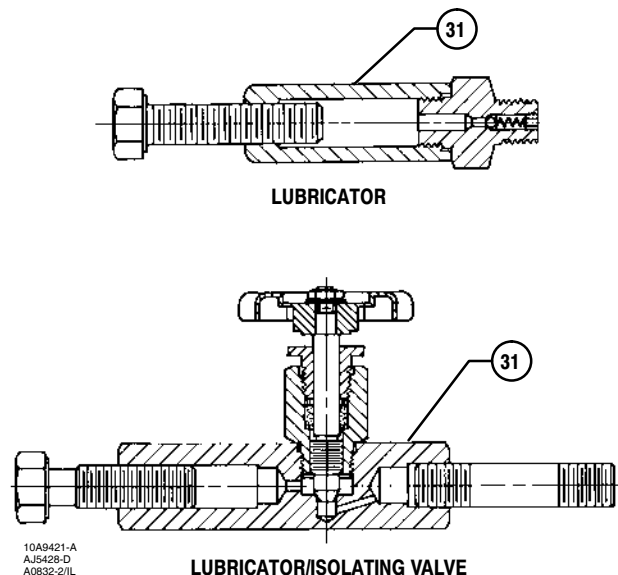


Figure 3. Lubricator and Lubricator/Isolating Valve

Note

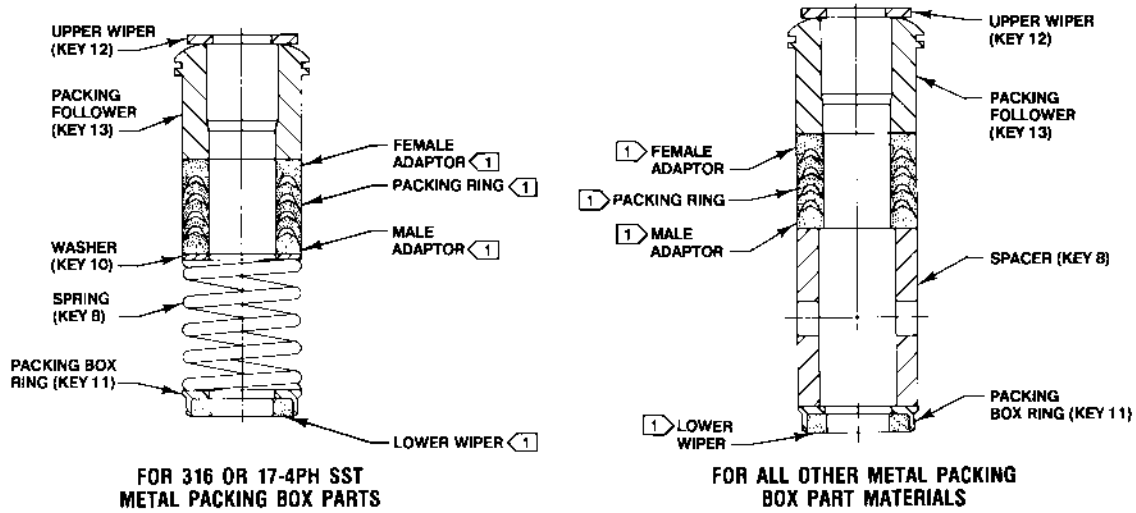
Whenever a gasket seal is disturbed by removing or shifting gasketed parts, a new gasket should be installed upon reassembly. This is necessary to ensure a good gasket seal because the used gasket might not seal properly.

Note

If the valve has ENVIRO-SEAL live-loaded packing or HIGH-SEAL ULF live-loaded packing installed, see the Fisher instruction manuals titled ENVIRO-SEAL Packing System for sliding-stem valves or HIGH-SEAL ULF Live-Loaded Packing System (as appropriate) for packing instructions.

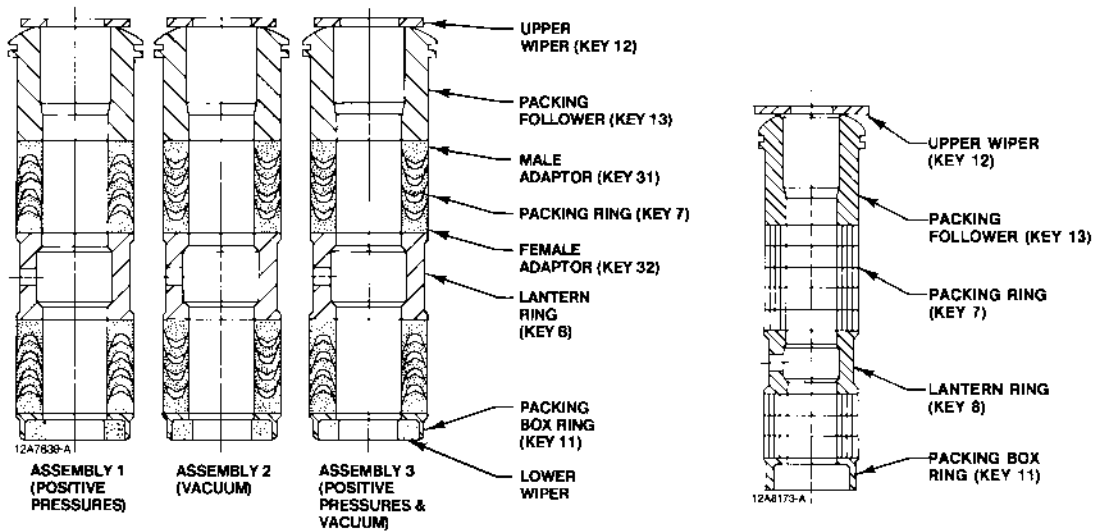
Packing Lubrication

If a lubricator or lubricator/isolating valve (figure 3) is provided for PTFE/composition or other packings that require lubrication, it will be installed in place of the 1/4-inch NPT pipe plug (key 14, figure 5). Use a silicon-base lubricant. To operate the lubricator, turn the cap screw clockwise to force the lubricant into the packing box. The lubricator/isolating valve operates the same way except the isolating valve must first be opened and then closed after lubrication is completed.



12A7837-A

PTFE V-RING SINGLE ARRANGEMENTS



12A7839-A

ASSEMBLY 1
(POSITIVE PRESSURES)

ASSEMBLY 2
(VACUUM)

ASSEMBLY 3
(POSITIVE PRESSURES & VACUUM)

12A8173-A

1-1/4 INCH
(31.8 mm) STEM

PTFE V-RING DOUBLE ARRANGEMENTS

1-1/4 INCH
(31.8 mm) STEM

PTFE/COMPOSITION ARRANGEMENT

NOTE:

1) PACKING SET (KEY 6) (2 REQ'D FOR DOUBLE ARRANGEMENTS)

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Figure 4. Typical Packing

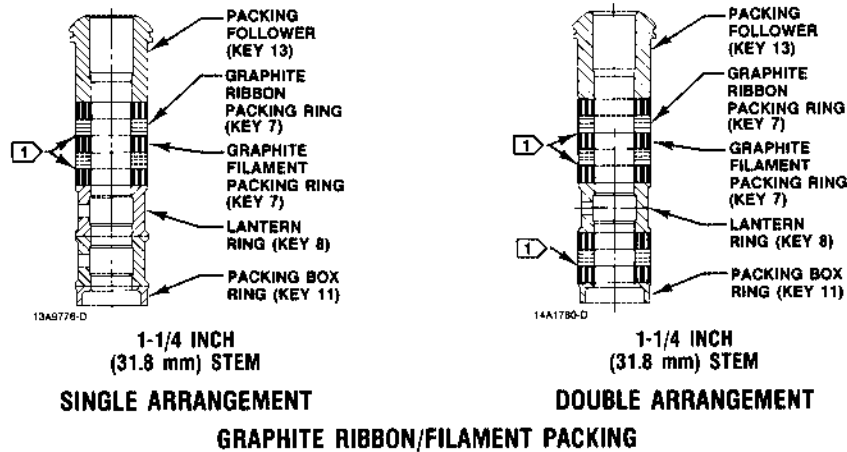
Packing Maintenance

This procedure does not cover ENVIRO-SEAL or HIGH-SEAL packing; refer to separate manuals for instructions on those packing types.

Key numbers are shown in figure 4 unless otherwise indicated.

For spring-loaded single PTFE V-ring packing, the spring (key 8) maintains a sealing force on the packing. If leakage is noted around the packing

EUD, EUT-2, EWD, and EWT-2 Valves



NOTE:
1 0.004 INCH (0.102 mm) THICK SACRIFICIAL ZINC WASHERS:
 USE ONLY ONE BELOW EACH GRAPHITE RIBBON RING.
 A60601L

Figure 4. Typical Packing (Continued)

follower (key 13), 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 (key 5, figure 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 stem 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 body, 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 any leak-off piping from the bonnet. Disconnect the stem connector, and then remove the actuator from the valve by unscrewing the hex nuts (key 26, figure 5).
3. Loosen the packing flange nuts (key 5, figure 5) so that the packing is not tight on the valve stem. Remove any travel indicator parts and stem locknuts from the valve stem threads.

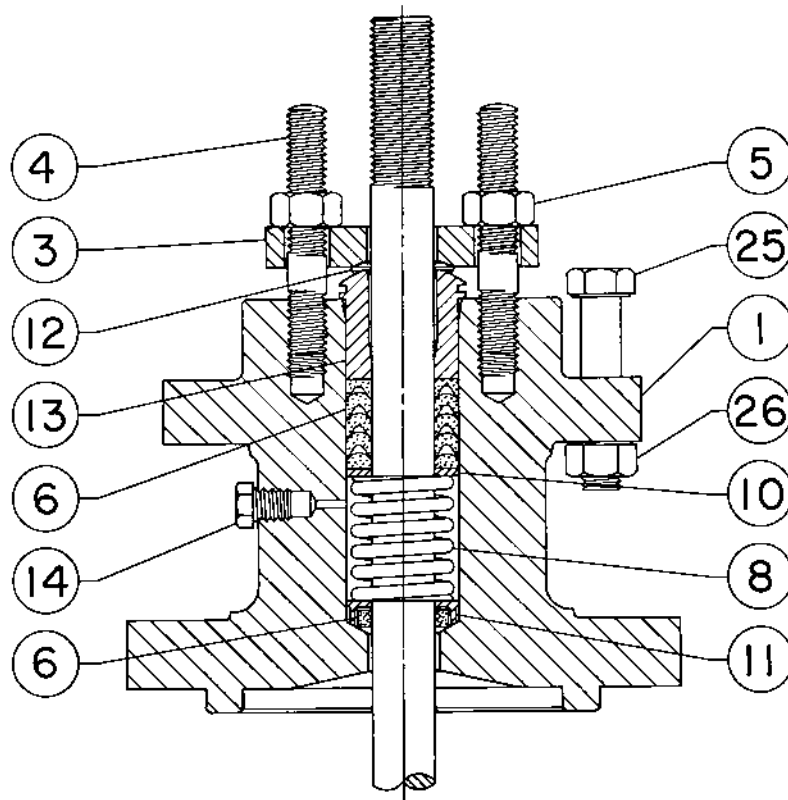
CAUTION

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 (key 1, figure 5), either be sure that the valve plug and stem assembly remains in the valve and on the seat or, temporarily install a valve stem locknut on the valve stem. This locknut will prevent the valve plug and stem assembly from dropping out of the bonnet.

⚠ 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



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Figure 5. Typical Globe Valve Bonnet

other manner. The sudden release of stored energy can cause uncontrolled movement of the bonnet. If the cage sticks to the bonnet, proceed carefully with bonnet removal.

Note

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

4. Hex nuts (key 16, figures 7 or 8) attach the bonnet 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 (key 1, figure 5).

5. Set the bonnet on a protective surface to prevent damage to the bonnet gasket surface.

6. Whenever the bonnet has been removed, replace the bonnet gasket and the cage gasket (keys 10 and 11, figure 7 and 8). Remove the bonnet gasket.

7. Lift the valve plug and stem assembly out of the valve body and set it on a protective surface. If the valve plug is to be reused, protect the valve plug seating surface to prevent scratches.

8. Install screws or bolts into the tapped holes in the top of the cage assembly (key 3), and carefully lift it out of the valve body. Remove the cage gasket (key 11).

9. If further trim maintenance is required, refer to the Trim Maintenance section.

CAUTION

To prevent damage to the valve cavity, packing box wall, and packing surfaces, observe the instructions in the next three steps.

10. Cover the opening in the valve body to protect the gasket surface and prevent foreign material from getting into the valve cavity.

EUD, EUT-2, EWD, and EWT-2 Valves

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

VALVE STEM DIAMETER		ANSI CLASS	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	150 & 300	33	290	49	430	16	140	25	220
		600	45	400	67	590	21	190	33	290
		900	56	490	83	730	27	240	41	360

Table 4. Body-to-Bonnet Bolt Torque

VALVE SIZE, INCHES	VALVE CLASS	BOLTING TORQUE ⁽¹⁾	
		N•m	Lbf•ft
12, 16 x 12	150 - 600	1750	1290
16	150 - 600	2800	2070
20 x 16, 24 x 16	150 - 600	2800	2070
20 x 16	900	1250	920
20, 24 x 20	150 - 600	4240	3130

1. For B7, B7M, B16, and 660 bolting materials.

11. Remove the packing flange nuts, packing flange, upper wiper, and packing follower (keys 5, 3, 12, and 13, figure 5). 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.

12. 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 or honing with a tool similar to an automotive brake-cylinder hone, replace the damaged parts.

13. Remove the covering protecting the valve cavity, and install a new cage gasket (key 11, figure 7 and 8), making sure the gasket seating surfaces are clean and smooth.

14. Re-install the trim parts by following the Trim Replacement section. Install a new bonnet gasket (key 10, figure 7 and 8).

Note

Proper performance of the tightening procedures in step 15 compresses the bonnet and cage gaskets (keys 10 and 11, figure 7 and 8) enough to seal the body-to-bonnet joint.

The bolting procedures in step 15 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. Because of the boltup

characteristics of the gaskets, 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.

15. Lubricate the stud bolts (key 15, figure 7 and 8) with anti-seize lubricant or equivalent, slide the bonnet over the stem and onto the bolts, and secure with the stud bolt nuts (key 16, figure 7 and 8), using accepted bolting procedures during tightening so that the body-to-bonnet joint will withstand test pressures and application service conditions. Refer to table 4 for bolting torque guidelines.

16. Install new packing and the metal packing box parts according to the appropriate arrangement in figure 4. 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.

17. Slide the packing follower, upper wiper, and packing flange (keys 13, 12, and 3, figure 5) into position. Lubricate the packing flange studs (key 4, figure 5) and the faces of the packing flange nuts (key 5, figure 5). Replace the packing flange nuts.

18. **For spring-loaded PTFE V-ring packing,** tighten the packing flange nuts until the shoulder on the packing follower (key 13, figure 5) 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 5) is at a 90-degree angle to the valve stem.

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

manual. Check for leakage around the packing follower when the valve is being put into service. Retighten the packing flange nuts as required.

Trim Maintenance

Trim Removal

Except where indicated, key numbers in this section are shown in figure 7 for Design EUT-2 and EWT-2 valves and in figure 8 for Design EUD and EWD valves.

1. Isolate the control valve from the line pressure, release pressure from both sides of the valve body, 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 and the bonnet according to steps 2 through 5 of the Replacing Packing Section.

CAUTION

Use care to avoid damaging gasket surfaces.

The surface finish of the valve stem (key 7) is critical for making a good packing seal. The inside surface of the cage or cage assembly (key 3) is critical for smooth operation of the valve plug and for making a seal with the seal ring (key 28). The seating surfaces of the valve plug (key 2) and seat ring (key 9) are critical for proper shutoff. Assume all these parts are in good condition, and protect them accordingly unless inspection reveals otherwise.

3. Packing parts can be removed if desired. Replace these parts as described in the Packing Replacement section.
4. Lift the valve plug and stem assembly out of the valve body and set it on a protective surface. If the valve plug is to be reused, protect the valve plug seating surface to prevent scratches.
5. Install screws or bolts into the tapped holes in the top of the cage assembly (key 3), and carefully lift it

out of the valve body. Remove the gaskets (keys 10 and 11).

6. Proceed as appropriate:

For Design EUT-2 or EWT-2 valves (figure 7), the valve has a seat ring seal ring (key 6). Inspect this seal ring, and remove it if replacement is necessary. The seat ring is screwed into the cage and secured with two tack welds, one on each side of the cage. Remove the tack welds by grinding or filing them off.

- *For all sizes except the 12- and 16 x 12-inch sizes,* there are slots cut in the seat ring. Insert a bar through the slots and turn the seat ring out of the cage.

- *For the 12- and 16 x 12-inch sizes,* there are two 3/8-inch UNC tapped holes in the bottom of the seat ring. Screw cap screws into these holes. Use a bar to pry against the cap screws and turn the seat ring out of the cage.

For Design EUD and EWD valves (figure 8), unscrew the seat ring cap screws (key 49). Install screws or bolts into the tapped holes in the top of the seat ring (key 9) and carefully lift it out of the valve body. Remove the gasket (key 13).

7. Inspect parts for wear or damage that would prevent proper operation of the valve. Replace or repair trim parts according to the following Lapping Seating Surfaces or Valve Plug Maintenance procedures as appropriate.

Lapping Seating Surfaces

A certain amount of leakage should be expected with metal-to-metal seating in any valve body. If the leakage becomes excessive, however, the condition of the seating surfaces of the valve plug and seat ring can be improved by lapping. (Deep nicks should be machined out rather than ground out.) Use a good quality lapping compound of a mixture of 280 to 600-grit. Apply the compound to the bottom of the valve plug.

Assemble the valve to the extent that the cage or cage assembly is in place and the bonnet is bolted to the valve body. A simple handle can be made from a piece of strap iron locked to the valve plug stem with nuts. Rotate the handle alternately in each direction to lap the seats. After lapping, remove the bonnet, and clean the seat surfaces. Completely assemble the valve as described in the Trim Replacement section, and test the valve for shutoff. Repeat the lapping procedure if leakage is still excessive.

EUD, EUT-2, EWD, and EWT-2 Valves

Valve Plug Maintenance

Except where indicated, key numbers in this section are shown in figure 7 for Design EUT-2 and EWT-2 valves and in figure 8 for Design EUD and EWD valves.

CAUTION

For valves with a PTFE seal ring (figure 6), if replacing the valve plug seal ring (key 28), be careful not to scratch the surfaces of the ring groove in the valve plug or any of the surfaces of the replacement ring, or the replacement ring may not seal properly.

1. Remove the valve plug (key 2) according to the Disassembly section.
2. **For seal-ring constructions**, carefully pry or cut the seal ring (key 28, figure 6) from its groove in the plug.

Install the replacement spring-loaded seal ring 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, first lubricate it with general-purpose, lithium-base lubricant. Then gently stretch the seal ring and work it over the top edge of the valve plug. Give the PTFE material in the seal ring time to cold flow during the stretching procedure. Avoid jerking sharply on the ring. Stretching the seal ring over the valve plug might make it seem loose when it is in the groove, but it will shrink to its original size after you have installed the plug into the cage.

3. **For piston-ring constructions**, each of the piston rings (key 28, figure 6) is in two pieces; remove the pieces.

Each new graphite piston ring 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. Be sure to match

the broken ends when installing the ring sections in the valve plug grooves.

CAUTION

Never reuse an old stem (key 7) with a new valve plug. Using an old stem with a new plug requires drilling a new pin hole in the stem. This weakens the stem and may cause it to fail in service. However, a used valve plug may be reused with a new stem.

4. To replace the valve stem (key 7), drill out the pin (key 8) and unscrew the stem from the valve plug.
5. Screw the new stem tightly into the valve plug. Drill through the stem, using a 1/4-inch diameter drill for the 31.8 mm (1-1/4 inch) stem diameter used in this valve. Use the hole in the valve plug as a guide. Remove any chips or burrs, and drive in a new pin to lock the assembly.

Trim Replacement

Except where indicated, key numbers are shown in figure 7 and 8.

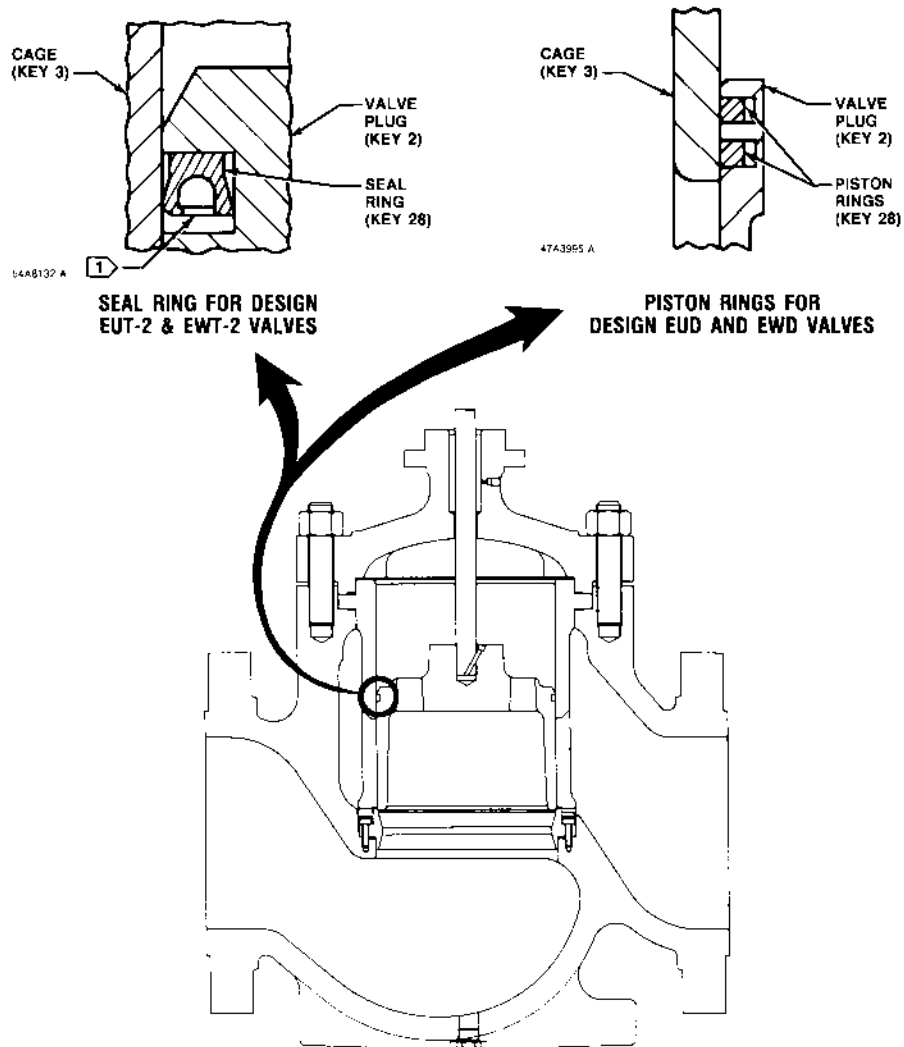
1. Proceed as appropriate:

For EUT-2 or EWT-2 valves:

For all sizes except 12- and 16 x 12-inch sizes, turn the seat ring (key 9) into the cage (key 3) with a bar inserted through the seat ring slots.

For 12- and 16 x 12-inch sizes, insert cap screws in the two 3/8-inch tapped holes in the bottom of the seat ring (key 9). Use a bar to pry against the cap screws and turn the seat ring (key 9) into the cage (key 3).

For all sizes, 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. Install the seat ring seal ring (key 6) so that its open side faces the valve stem for Cavitrol III trim. Reverse the seal ring for Whisper Trim III and WhisperFlo cages. Lubricate the seal ring with a general-purpose, lithium-base lubricant, and place it over the bottom end of the seat ring. Start the ring in the groove on one side of the seat ring, and gently work it over the seat ring.

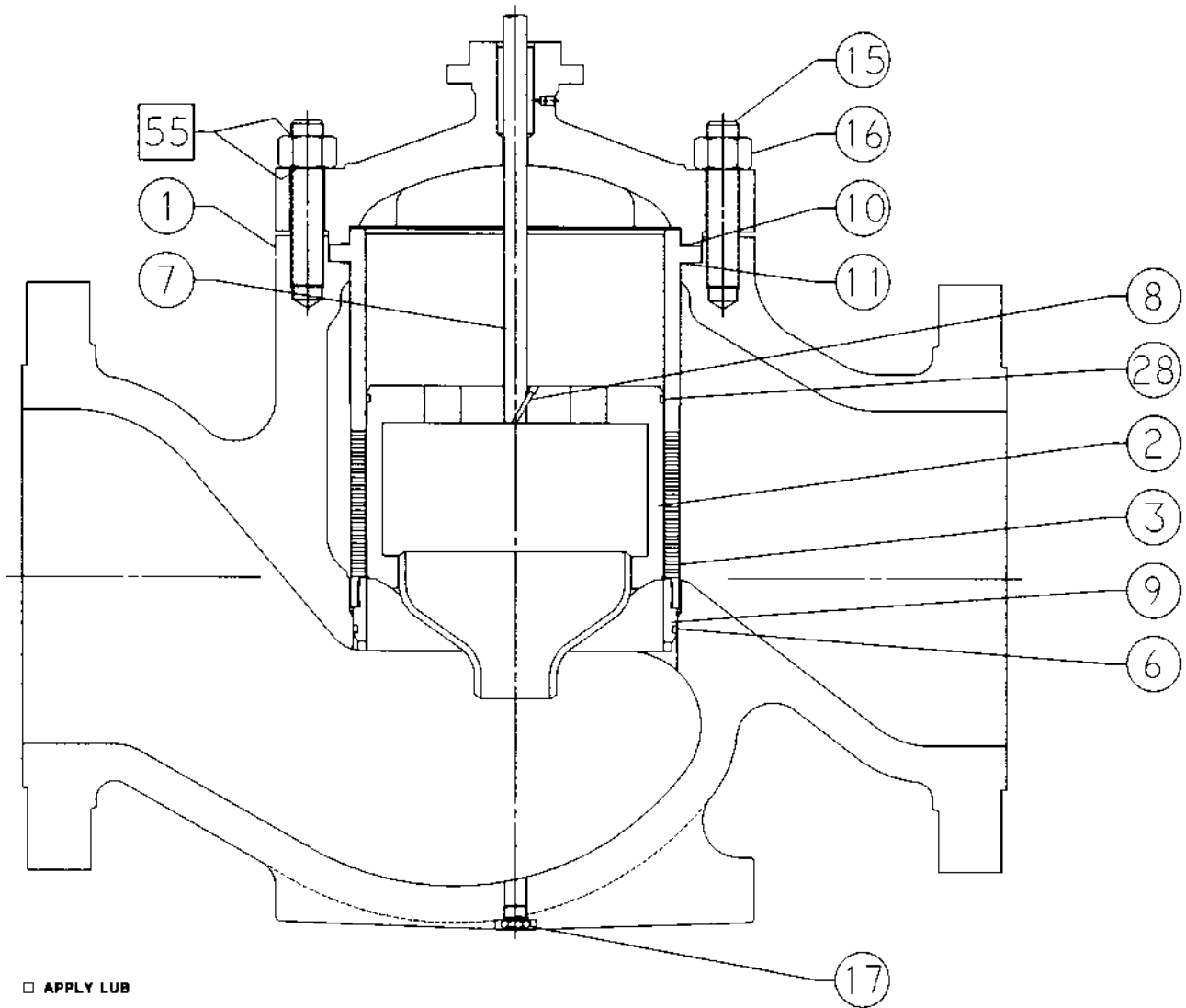


NOTES:

1 SEAL RING OPENING MUST FACE SEAT RING FOR FLOW-DOWN APPLICATIONS AND MUST FACE ACTUATOR FOR FLOW-UP APPLICATIONS.

B2425 / IL

Figure 6. Seal Ring and Piston Ring Details



□ APPLY LUB

B2399 / IL

Figure 7. Typical Design EUT-2 or EWT-2 Valve

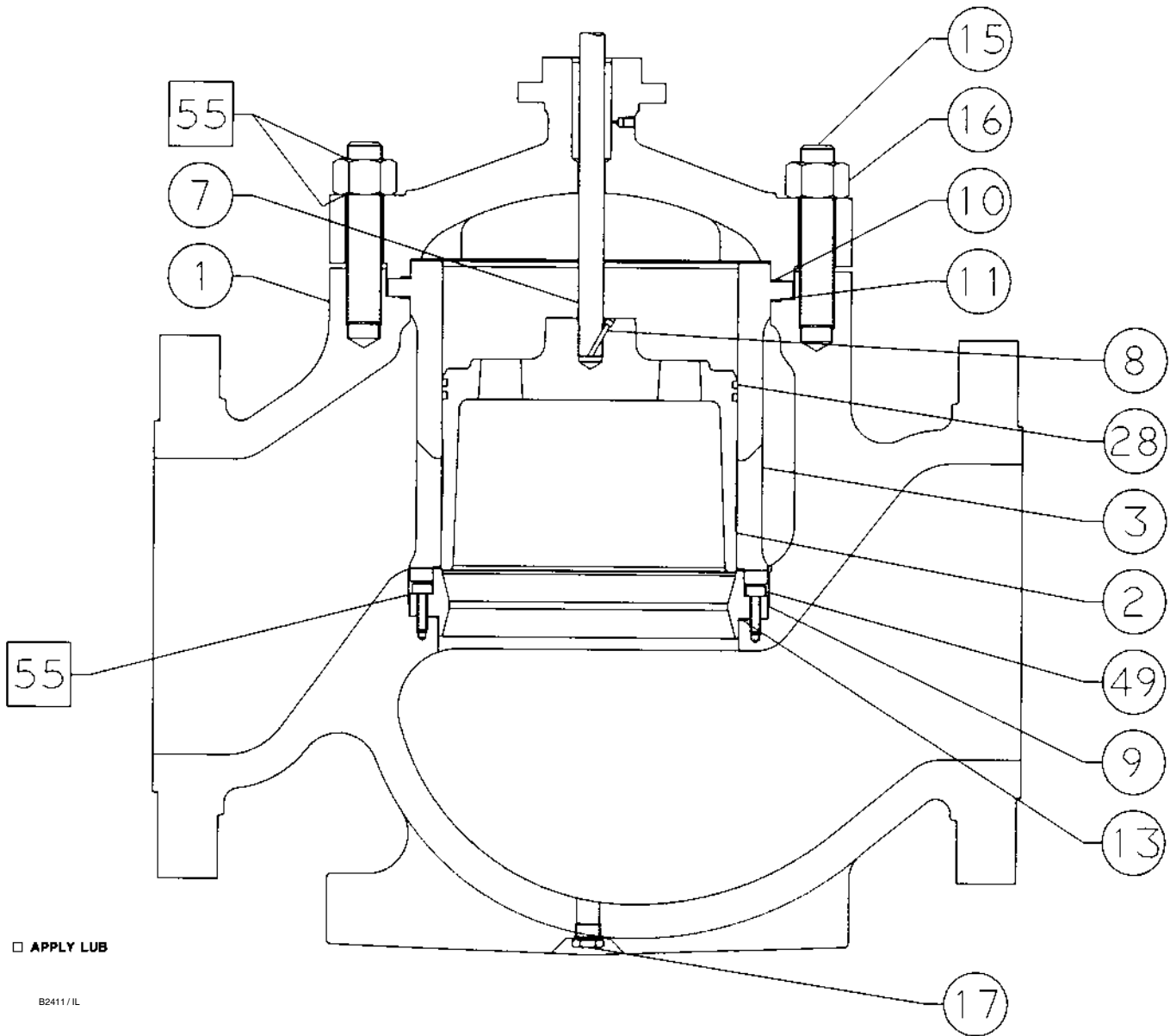


Figure 8. Typical EUD Valve

For Design EUD and EWD valves (figure 7), install the seat ring gasket (key 13).

Temporarily install screws or bolts into the tapped holes in the seat ring (key 9), making sure the seating surface is facing up. Lower the seat ring into the valve body. Remove the temporary screws or bolts.

Secure the seat ring (key 9) with the cap screws (key 49). Tighten the cap screws in a criss-cross pattern to a torque of 39 N•m (29 lbf•ft) for 12- and 16 x 12-inch valves and to 92 N•m (68 lbf•ft) for 16-through 24 x 20-inch valves.

2. Install a cage gasket (key 11) into the valve. Temporarily install screws or bolts into the tapped holes in the top of the cage assembly (key 3) to help while installing this piece into the valve. Any

EUD, EUT-2, EWD, and EWT-2 Valves

rotational orientation of the cage or assembly with respect to the valve is acceptable.

For Design EUT-2 and EWT-2 valves, use care to avoid damaging the seat ring seal ring and cage seating surfaces while handling the heavy parts. To help insert the cage or assembly into the valve, lubricate the outside diameter of the seat ring seal ring with lithium grease or equivalent.

3. Slide the valve plug (key 2) and stem assembly into the cage.

For designs with a seal ring, make sure the valve plug seal ring (key 28) is evenly engaged in the entrance chamfer at the top of the cage or cage assembly to avoid damaging the ring.

For Designs with piston rings, make sure the rings are fully engaged into the piston ring groove and flush with the outside diameter of the plug.

4. Install the bonnet gasket (key 10).

CAUTION

If the packing is to be reused and was not removed from the bonnet, use care when installing the bonnet to avoid damaging the packing with the valve stem threads.

5. Mount the bonnet on the valve, and complete assembly according to steps 15 through 19 of the Replacing Packing section, omitting steps 16 and 17 if new packing is not being installed and being sure to observe the note before step 15.

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 Fisher sales office for technical assistance. When ordering replacement parts, refer to the serial number and to the key number and part name from the following list. Specify the desired material, if known. Part numbers are shown for packing box parts. Specify the part number if you are ordering packing parts.

Note

Use only genuine Fisher replacement parts. Components that are not supplied by Fisher should not, under any circumstances, be used in any Fisher valve, because they will void your warranty, might adversely affect the performance of the valve, and might jeopardize worker and workplace safety.

Note

Neither Emerson, Emerson Process Management, Fisher, nor any of their affiliated entities assumes responsibility for the selection, use and maintenance of any product. Responsibility for the selection, use, and maintenance of any product remains with the purchaser and end-user.

Parts List

Note

Part numbers are shown for recommended spares only. For part numbers not shown, contact your Fisher sales office.

Key Description Part Number

Valve Body

- 1 Valve Body
- 2* Valve Plug
- 3* Cage
- 6* Seat Ring Seal (Design EUT-2 & EWT-2 Valves Only)
- 7* Valve Plug Stem
- 8* Pin
- 9* Seat Ring
- 10* Bonnet Gasket
- 11* Cage Gasket
- 13* Seat Ring Gasket (Design EUD and EWT valves only)
- 15 Stud
- 16 Hex Nut
- 17 Drain Plug
- 28* Seal Ring (Design EUT-2 and EWT-2 valves only)
- 28* Piston Ring (2 req'd) (Design EUD and EWD valves only)
- 49* Cap Screw (Design EUD and EWD valves only)

Bonnet

- 1 Valve Bonnet
- 3 Packing Box Flange
- 4 Packing Flange Stud (2 req'd)
- 5 Packing Flange Nut (2 req'd)

PTFE V-Ring Packing

- 6* Packing Set, PTFE (1 req'd for single packing; 2 req'd for double packing) 1R290801012
- 8 Spring, stainless steel (single packing only) 1D387437012
- 8 Lantern Ring, stainless steel (double packing only) 0W087135072
- 10 Special Washer, stainless steel (single packing only) 1H995936042

Key	Description	Part Number
PTFE/Composition Packing		
7*	Packing Ring, PTFE/compositon (8 req'd)	1D7520X0012
8	Lantern Ring, stainless steel	0W087135072
Graphite Ribbon/Filament Packing		
7*	Packing Ring, Graphite Ribbon (2 req'd for single packing; 3 req'd for double packing)	1V5666X0022
7*	Packing Ring, Graphite Filament (3 req'd for single packing; 3 req'd for double packing)	1D7520X0162
8	Lantern Ring, stainless steel (2 req'd for single packing; 1 req'd for double packing)	0W087135072
11	Packing Box Ring	
12*	Upper Wiper, Felt (PTFE packings only)	1J873006332
13	Packing Follower	
14	Pipe Plug	
25	Cap Screw (8 req'd)	
26	Hex Nut (8 req'd)	

Table 5. Approximate Weights

END CONNECTION		APPROXIMATE WEIGHT	
Size, Inches	Type ⁽¹⁾	kg	lb
12	RF	1410	3100
	RTJ		
	BW	1220	2700
16 x 12	RF	1720	3800
	RTJ		
	BW	1450	3200
16	RF	2540	5600
	RTJ		
	BW	2270	5000
20 x 16 Class 600	RF	3540	7800
	RTJ		
	BW	3130	6900
20 x 16 Class 900	RF	3720	8200
	RTJ		
	BW		
20	RF	5220	11,500
	RTJ		
	BW	4810	10,600
24 x 16	RF	5220	11,500
	RTJ		
	BW	4630	10,200
24 x 20	RF	7710	17,000
	RTJ		
	BW	7120	15,700

1. RF—raised face; RTJ—ring-type joint; BW—butt welding.

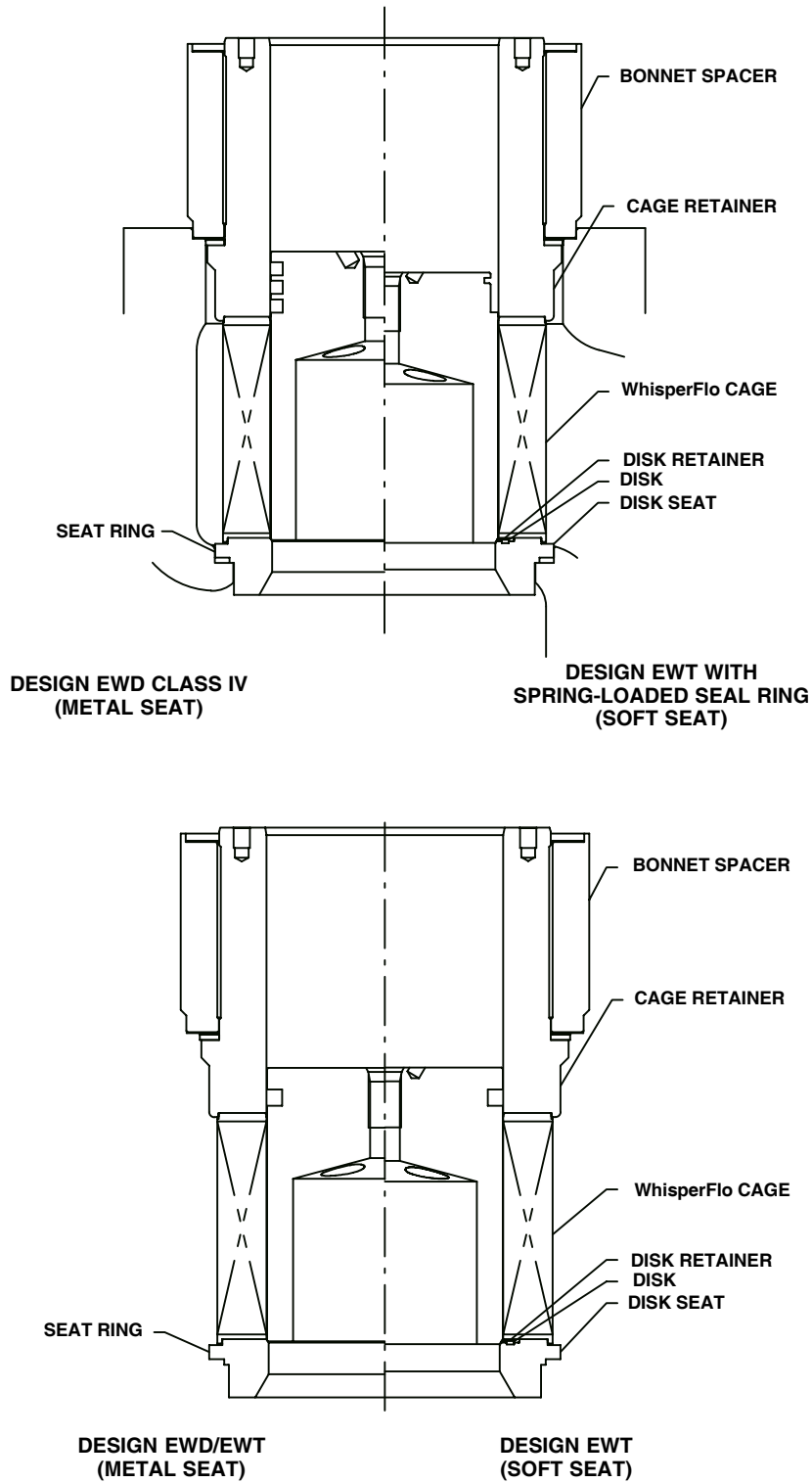


Figure 9. Typical WhisperFlo® Trims

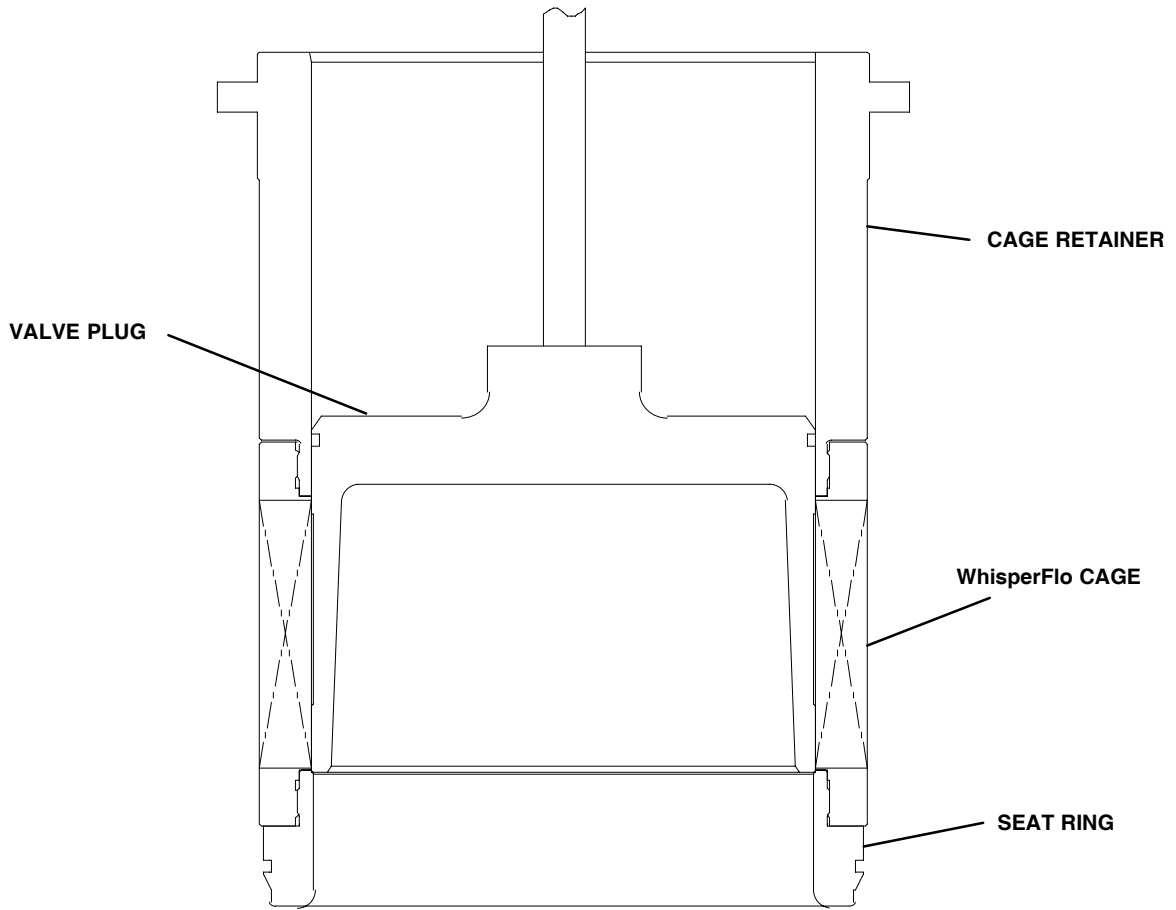


Figure 10. Typical Design EUT-2/EWT-2 WhisperFlo® Trim

EUD, EUT-2, EWD, and EWT-2 Valves

Instruction Manual

Form 5329
November 2005

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