

# Fisher™ V280 Full-Bore Ball Control Valve

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Figure 1. Fisher V280 Control Valve



X1611

## Introduction

### Scope of Manual

This instruction manual provides installation, operation, maintenance, and parts information for the Fisher V280 Full-Bore Ball control valve (see figure 1). Refer to separate manuals for information concerning the actuator, positioner, and accessories.

Do not install, operate, or maintain a V280 valve without being fully trained and qualified in valve, actuator, and accessory installation, operation, and maintenance. To avoid personal injury or property damage, it is important to carefully read, understand, and follow all the contents of this manual, including all safety cautions and warnings. If you have any questions about these instructions, contact your [Emerson sales office](#) before proceeding.

### Description

The Fisher V280 is a three-piece, trunnion mounted, full-bore control valve designed with features for optimized pressure, flow, and process control. The V280 comes standard as a single-seal construction with optional dual-seal construction allowing for bidirectional flow and double block-and-bleed operation, with or without attenuation. Valve constructions with attenuators combine the efficiency of a rotary valve with the noise reducing capability of a special trim. Valve constructions without attenuators present little or no restriction to flow at full travel. The V280 construction meets ANSI/NACE MR0175/ISO 15156 as standard.

## Specifications

### Valve Sizes and End Connection Styles

NPS ■ 6, ■ 8, ■ 10, ■ 12, and ■ 16 flanged valve size with CL900 raised-face flanges compatible with ASME B16.5. Consult your [Emerson sales office](#) for other end connection styles

### Maximum Inlet Pressure and Temperatures<sup>(1)</sup>

Consistent with CL900 pressure-temperature ratings per ASME B16.34

### Maximum Allowable Shutoff Pressure Drop<sup>(1)</sup>

For Single-Seal and Dual-Seal Construction (except where further limited by pressure-temperature rating of the valve body):

CL900: 153.2 bar (2220 psig) at 38°C (100°F)

### Shutoff Classifications

Single or Dual-Seal Construction

Class IV standard: ANSI/FCI 70-2 and IEC 65034-4

Class VI optional: ANSI/FCI 70-2 and IEC 65034-4

### Flow Characteristic

- Modified linear with single high-density attenuator
- Modified equal percentage with single characterized attenuator
- Modified equal percentage without attenuator

### Flow and Shutoff Direction

Unidirectional flow is forward flow. Seal is upstream

**Single Seal Construction:** Should be used for unidirectional flow and unidirectional shutoff only

**Dual Seal Construction:** V280 with Aerodome and unattenuated V280 may be used for unidirectional and bidirectional flow

V280 with Hydrodome should be used for unidirectional flow only for effective anti-cavitation protection. Bidirectional shutoff requires dual seal construction

### Flow Coefficients

See Fisher [Catalog 12](#)

### Seal Material and Temperature Capabilities<sup>(1)</sup>

**Standard:** POM (polyoxymethylene) -29 to 82°C (-20 to 180°F)

**Optional:** POM (polyoxymethylene) with Nitrile MoS<sub>2</sub> Impregnated O-rings -46 to 82°C (-50 to 180°F) or PTFE/PEEK<sup>(2)</sup> with fluorocarbon O-rings -23 to 204°C (-10 to 400°F)

### Maximum Ball Rotation

90°

### Actuator Mounting

Right-hand or left-hand mounted as viewed from the valve inlet from forward flow

### Packing Arrangements

**PTFE Packing:** Standard construction

**ENVIRO-SEAL™ Packing:** This optional packing system provides improved sealing, guiding, and transmission of loading force to control liquid and gas emissions

### Approximate Weights

See table 2

### Options

- Double block-and-bleed applications (Dual seal construction is required)
- Two or three-stage Aerodome attenuator, two-stage or three-stage Hydrodome attenuator
- Ring type joint flanges
- Inconel drive shaft
- Keyed shaft
- Nitrile MoS<sub>2</sub> Impregnated O-rings
- S31600 SST ENC ball
- PTFE/PEEK seal insert
- Contact your Emerson sales office for other options

1. The pressure or temperature limits in this bulletin and any applicable standard or code limitation for this valve should not be exceeded.

2. PTFE stands for Polytetrafluoroethylene and PEEK stands for PolyEtherEtherKetone.

Table 1. Standard Materials of Construction

Part	Material
Valve Body	LF2 Carbon Steel
Ball	Carbon Steel ENC
Seal	POM with S31600 SST Seal Blank
Drive Shaft	S17400 SST H1150D
Dome Attenuator	S17400 SST
Wave Spring	N07750
Retaining Ring	N07750
Tailpiece	LF2 Carbon Steel
Tailpiece Mounting Bolting	B7M Steel
Bearing Plate	Carbon Steel
Bearings	N04400 with PTFE
Thrust Washer	Carbon filled PTFE
Packing Box Housing	Carbon Steel
Packing	PTFE/Carbon filled PTFE
Packing Bolting	B7M Steel
Packing Follower, Packing Box Ring	Annealed S31600 SST
Groove Pins	S31600
O-Rings	Nitrile
Actuator Mounting Bolting	Steel Grade 5

Table 2. Face-to-Face Dimensions<sup>(1)</sup> and Approximate Weights

VALVE SIZE, NPS	CLASS	FACE-TO-FACE DIMENSION		APPROXIMATE WEIGHT	
		mm	Inches	kg	lbf
6	900	610	24.00	415	915
8		737	29.00	753	1660
10		838	33.00	1143	2520
12		965	38.00	1823	4020
16		1130	44.50	2885	6360

1. Dimensions per ASME B16.10-2017.

## Educational Services

For information on available courses for Fisher V280 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](mailto:education@emerson.com)  
[emerson.com/fishervalvetraining](http://emerson.com/fishervalvetraining)

## Installation

### **▲ WARNING**

- To avoid personal injury, always wear protective gloves, clothing, and eyewear when performing any installation operations.
- To avoid personal injury or property damage resulting from the bursting of pressure retaining parts, be certain the service conditions do not exceed the limits given in this manual.
- To avoid personal injury or property damage that can result from the sudden release of process pressure if valve or mating pipe flange pressure ratings are exceeded, provide a relief valve for over-pressure protection as required by government or accepted industry codes and good engineering practices.
- Service conditions are limited for valve and trim material combinations. Do not apply any other service conditions to the valve without first contacting your [Emerson sales office](#).
- Personal injury could result from packing leakage. See the Packing Maintenance section for adjustment information.
- 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.
- Use proper lifting and rigging practices while moving the valve or valve/actuator assembly.

Key number locations are shown in figure 4 unless otherwise noted. Throughout this manual, the component key number will be identified for clarity.

1. Install a three-valve bypass around the control valve assembly if continuous operation will be necessary during inspection and maintenance of the valve.
2. The valve is normally shipped as part of a control valve assembly, with a factory adjusted actuator mounted on the valve. If the valve or actuator has been purchased separately, or if the actuator has been removed, refer to the Actuator Mounting section and the appropriate actuator instruction manual for installation and adjustment procedures.
3. The standard valve construction allows uni-directional flow. If possible, install the valve in a horizontal pipeline with the drive shaft (key 20) horizontal. The actuator can be right- or left-hand mounted in any of the positions shown in the actuator instruction manual.

### **CAUTION**

**Be certain the valve and adjacent pipelines are free of any foreign material that could damage the valve sealing surfaces. Impurities or entrained solids in the process fluid could plug the passages in the trim. If the process fluid is not clean, install a filter upstream to keep the pipeline free of impurities or entrained solids.**

4. Provide appropriate flange gaskets, and place the valve in the pipeline. Tighten flange bolting in a star pattern to ensure the flange gaskets are compressed evenly.

#### **Note**

Standard Fisher V280 valve packings (key 105) are composed of:

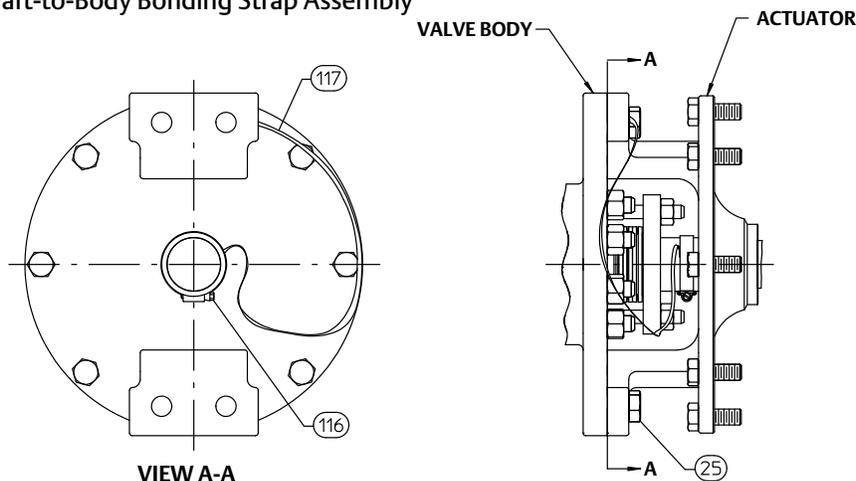
- Conductive packing ring (graphite ribbon packing), or

- Partially conductive packing rings (for example: a carbon-filled PTFE female adaptor with PTFE V-ring packing or a graphite-composition packing ring with a PTFE/composition packing ring).

To electrically bond the drive shaft to the valve body for hazardous area service, an alternate shaft-to-body bonding strap can be provided by using the follow step (see figure 2).

- For hazardous area applications where redundant shaft-to-body grounding is preferred, attach the optional bonding strap assembly (key 117) to the valve drive shaft (key 20) with the clamp (key 116) and connect the other end of the bonding strap assembly to the valve body with the mounting cap screw (key 25) as shown in figure 2.

Figure 2. Optional Shaft-to-Body Bonding Strap Assembly



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## Maintenance

Valve parts are subject to normal wear and must be inspected and replaced as necessary. The frequency of inspection and replacement depends upon the severity of service conditions.

### ⚠ WARNING

**Avoid personal injury or equipment damage from sudden release of process pressure or uncontrolled movement of parts. Before performing any maintenance operations:**

- Do not remove the actuator from the valve while the valve is still pressurized.
- Do not loosen any pressure retaining bolting while the valve is still pressurized. This includes the body-to-tailpiece nuts (key 18), packing box housing nuts (key 21), packing nuts (key 101) or pipe plug (keys 26).
- Avoid injury by keeping hands, tools, and other objects away from the ball while stroking the valve.
- 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. Check that the actuator cannot suddenly open or close the valve.
- Vent the power actuator loading pressure and relieve any actuator spring precompression.
- Use bypass valves or completely shut off the process to isolate the valve from process pressure, relieve any process pressure from both sides of the valve body, and drain the process media from both sides of the valve.

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- **Dual-seal constructions can retain pressure and process fluid even after process pressure has been removed from both sides of the valve. The ball should be partially opened to relieve this pressure before disassembling or removing the valve from the line. Take additional care if the process fluid is hot, flammable, caustic, or hazardous.**
  - **A tip over hazard exists for the valve/actuator assembly. Ensure the valve/actuator assembly is properly secured and always supported to prevent falling or rolling which may cause injury or property damage.**
  - **Use lock-out/tag-out best practices and procedures to be sure that the above measures stay in effect while you work on the equipment.**
  - **The valve packing box housing 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.**
  - **Check with your process or safety engineer for any additional measures that must be taken to protect against process media.**
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## Packing Maintenance

Refer to figure 3 for details of the standard PTFE V-ring packing (left) and the ENVIRO-SEAL packing system (right). All maintenance operations in this section may be performed on an unpressurized valve that is still installed inline.

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### Note

For additional information on the ENVIRO-SEAL packing system refer to the ENVIRO-SEAL Packing System Instruction Manual ([D101643X012](#)).

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## Stopping Leakage

For standard PTFE V-ring packing, leakage around the packing follower may be stopped by tightening the packing follower nuts. If the packing is relatively new and tight on the drive shaft, and if tightening the packing follower nuts does not stop the leakage, the drive shaft may be worn or nicked so that a seal cannot be made. If the leakage comes from the outside diameter of the packing, the leakage may be caused by nicks or scratches on the packing box housing packing gland bore.

For ENVIRO-SEAL packing, optimal performance is obtained when the Belleville springs are compressed to the required target load. The target load is the point where the springs are compressed to 85% of their maximum deflection.

Under normal conditions, the packing nuts should not require re-tightening. However, when servicing, if the springs do not remain at the target load of 85% compression, retighten the packing nuts (key 101) per the following:

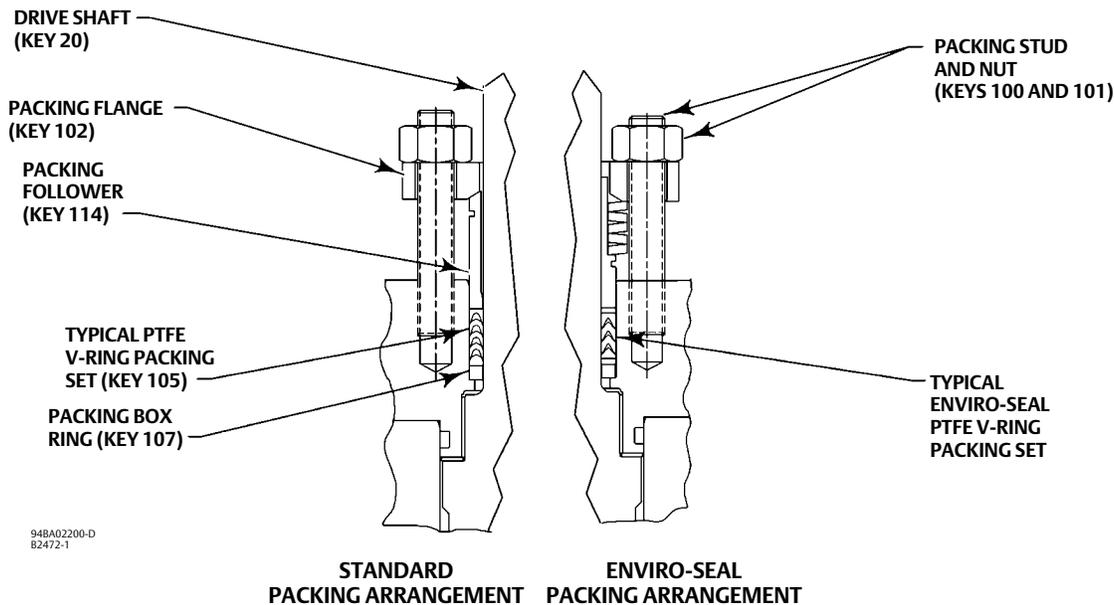
1. Tighten the packing flange nuts (key 101) alternately and evenly, keeping the packing flange parallel with the valve flange (see figure 3), until the Belleville springs are compressed 100% (or completely flat).
  - a. For PTFE packing, loosen each packing flange nut one half turn (180° of rotation).
2. The target load of 85% compression has now been reached. If leakage continues, replace the packing components and inspect the packing box housing, packing gland bore, and valve drive shaft for damage as described in the following procedures.

## Replacing Packing

Replacing the packing requires bleeding off the system and removing the actuator from the valve. Valve/actuator adjustments cannot be made correctly without observing the fully open or closed position of the valve ball (key 3). It is not necessary to remove the valve from the pipeline to make adjustments if care is taken to note the position and alignment of the actuator lever and valve shaft and to not disturb the actuator turnbuckle position.

Refer to figure 3 which identifies the V280 packing components by key number (also see the Parts List section of this manual).

Figure 3. Packing Arrangement Details



### Packing Disassembly

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, shut off all pressure lines (or other power source) to the power actuator, release pressure from the actuator, and disconnect the pressure lines from the actuator. Use lockout/tagout procedures to be sure that the above measures stay in effect while disassembling the equipment.

#### **⚠ WARNING**

- See the **WARNING** at the beginning of the Maintenance section for more information before removing the valve from the pipeline.
- Use proper lifting and rigging practices while moving the valve or valve/actuator assembly.

2. Remove line bolting, remove the control valve from the pipeline, and place the actuator/valve assembly on a flat surface.
3. To assist with future reassembly, note and mark the orientation of the actuator with respect to the valve body and the actuator lever orientation with respect to the valve drive shaft.
4. Refer to the appropriate actuator instruction manual for information on removal.

#### **CAUTION**

When removing the actuator from the valve, do not use a hammer or similar tool to drive the lever or actuator off the valve drive shaft (key 20). Driving the lever or actuator off the valve drive shaft could damage the ball, seals, and valve.

**If necessary, use a wheel puller to remove the lever or actuator from the valve drive shaft. Tap the wheel puller screw lightly to loosen the lever or actuator. Do not hit the screw with excessive force. Using excessive force could damage the ball, seal, and valve.**

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5. Loosen the actuator lever locking device cap screw. Loosening the lever turnbuckle adjustment is not necessary during disassembly. When remounting the actuator, the turnbuckle will be used for actuator adjustments.
6. Remove the actuator mounting screws, bolts, or nuts while properly supporting the actuator and separate the actuator and mounting bracket from the valve.
7. Slide the lever along the valve drive shaft (key 20) while removing the actuator from the valve.
8. If necessary, remove the bonding strap assembly, shown in figure 2 from the valve before removing the packing parts.
9. Remove the packing follower nuts, packing flange, spring pack (only applicable to ENVIRO-SEAL), and packing follower (keys 101, 102, and 114).
10. Remove the packing parts:
  - a. **If the packing box housing (key 6) is mounted on the valve:** Use a formed wire hook with a sharp end to pierce the packing rings, and pull the rings out of the packing box housing. Do not scratch the drive shaft or packing gland bore. Scratching these surfaces could cause leakage. Clean, inspect, and obtain replacement parts as necessary for reassembly. Examine the drive shaft and packing gland bore for any signs of damage that may prevent proper sealing.
  - b. **If the packing box housing is separated from the valve (refer to Seal Ring Maintenance section of this manual for disassembly instructions):** Remove the drive shaft (key 20) from the packing box housing. With the drive shaft removed, remove all internal packing parts. Clean, inspect, and obtain replacement parts as necessary for reassembly. Examine the drive shaft and packing gland bore for any signs of damage that may prevent proper sealing.

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**Note**

Verify that the grounding ball is installed in the drive shaft-to-ball tang interface to guarantee electrical continuity between ball trim and valve drive shaft.

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The packing sets (key 105) listed in the parts list do not include any metal parts. Either clean and reuse metal packing parts or obtain replacements by ordering them individually.

## Packing Assembly

For additional information on the ENVIRO-SEAL packing system refer to the ENVIRO-SEAL Packing System Instruction Manual ([D101643X012](#)).

If the packing housing box (key 6) is removed from the valve, use the valve assembly steps to reinstall the drive shaft (key 4) and packing box housing assembly on the valve. (Refer to Seal Ring Maintenance section of this manual for additional assembly instructions).

1. Place the new packing components over the valve drive shaft (key 20) and slide each into the packing box housing until properly seated at the bottom of the packing gland bore. Use the parts sequence shown in figure 3 and verify the correct configuration.
2. For standard packing arrangements, secure the packing follower and packing flange with packing nuts (keys 114, 102, and 101). Tighten the packing flange nuts alternately and evenly until leakage has stopped during operating

conditions (only applicable to standard packing), keeping the packing flange parallel with the valve flange (see figure 3).

3. If necessary, install the bonding strap assembly (keys 116 and 117) shown in figure 2.
4. Use the steps provided in the Actuator Mounting section to install the actuator on the valve. For actuator travel adjustments, refer to the appropriate actuator instruction manual.
5. When the control valve is in operation, carefully examine the packing follower region for any signs of leakage.

## Seal Ring Maintenance

### **⚠ WARNING**

- See the **WARNING** at the beginning of the Maintenance section for more information before removing the valve from the pipeline.
- Use proper lifting and rigging practices while moving the valve or valve/actuator assembly.

## Valve Disassembly

Refer to figure 4 to identify the V280 valve components by key number.

Disassemble the valve only to the extent necessary to accomplish the needed inspection and repairs. For some repairs complete disassembly of the valve is not necessary. Follow the disassembly procedures to the point necessary to accomplish the repair, then skip to the appropriate assembly steps to complete the reassembly of the valve. Always clean and protect sealing surfaces from damage.

### **Note**

It is not necessary to remove the base bracket for maintenance.

Mark parts as necessary to allow them to be returned to the same position and orientation as removed. The tailpiece, for instance, shall be returned to the same end of the valve from which it was removed. The seal assembly shall also be returned to the same tailpiece and in the same orientation from which it was removed.

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, shut off all pressure lines to the power actuator, release pressure from the actuator, and disconnect the pressure lines from the actuator. Use lockout/tagout procedures to be sure that the above measures stay in effect while working on the equipment.
2. Remove line bolting, remove the control valve from the pipeline, and clean all valve surfaces. Place the actuator/valve assembly on a flat working surface.
3. Mark parts as necessary to allow them to be returned to the same position during reassembly.
4. Refer to the appropriate actuator instruction manual for information on removal. Loosen the actuator mounting screws, bolts, or nuts while properly supporting the actuator then separate the actuator and mounting bracket from the valve. When valve maintenance is complete, refer to the Mounting Actuator procedure in this manual to reinstall the actuator on the valve.

5. Provide a clean soft working surface to protect the tailpiece-flange serrated surface. Lift the valve and place it on either tailpiece flange face. Be sure the valve is in a stable, upright position before releasing the hoist connection.

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**Note**

If the packing (key 105) is in good condition, it is possible to remove and replace the seal assembly (key 5) without removing the packing box housing assembly. However, the packing box housing assembly must be removed to remove the ball (key 3) from the valve body.

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6. Remove the packing box housing nuts (key 21).
7. Remove the packing box housing assembly from the valve. The assembly includes the drive shaft (key 20), O-ring and back-up ring (keys 13 and 16), shaft bearing (key 7), shaft thrust washer (key 11), and all packing parts.

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**Note**

Verify that the grounding ball is installed in the drive shaft-to-ball tang interface to guarantee electrical continuity between ball (key 3) and valve drive shaft (key 20).

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8. If it is desired to separate the packing box assembly parts, loosen or remove the packing components and slide the shaft down and out the valve side of the packing box housing. Inspect the drive shaft bushing (key 7) and the thrust washer (key 11). If necessary, replace worn components.
9. Remove the valve body nuts (key 18) from the studs (key 4) on the upper tailpiece and remove the tailpiece (key 2) from the valve body (key 1).

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**CAUTION**

**While lifting the tailpiece (key 2) with seal (key 5) from the valve body (key 1), check to see if the seal (key 5) is lifting with the tailpiece. If so, use caution in case the seal falls out and protect the ball and the body sealing surfaces. An additional strap can be employed to ensure the seal is captured in the event it disengages from the tailpiece.**

**If the valve assembly is resting on the base bracket during disassembly, secure the valve when removing the tailpieces from the body to prevent tipping.**

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10. Turn the tailpiece assembly over so the seal is facing up and place it on a clean soft surface to protect the flange serrated surface.
11. Remove the seal (key 5) from the tailpiece by using the 1/4-20 UNC jack bolt tappings on the seal flange. This will aid with disengaging the O-ring from the tailpiece seal gland. Be sure to not use any tools that could cause damage to the sealing surface. Note the configuration of the seal O-ring (key 14) and back-up ring (key 15) and the wave spring (key 17). Ensure the bearing plate (key 8) dowel pins (key 23) are accounted for.
12. If the tailpiece has an attenuator dome (key 24), place a flat head screw driver in the removal notch on the retaining ring (key 28) and pry the retaining ring out of the groove. Once the removal notch end of the retaining ring is out of the groove, pull up on the removal notch end to unseat the retaining ring from the groove. Be sure not to scratch the O-ring sealing surface while performing this operation. Clean and protect all sealing surfaces.

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**⚠ WARNING**

**When lifting the ball, ensure the bearing plates (key 8) are secure on the ball trunnions to prevent parts from falling which may cause personal injury or property damage.**

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13. Turn the ball (key 3) to the closed position. Use an approved lifting sling through the ball bore to lift the ball out of the valve body. Lift the ball and set it on a clean soft surface.
14. Remove the two bearing plates (key 8) and thrust washers (key 10) from the ball. Inspect the lined bushing (key 9) in each bearing plate and the thrust washers. If necessary, replace worn components.
15. Evenly loosen the nuts (key 18) from the studs (key 4) on the lower tailpiece and lift the body (key 1) from the tailpiece (key 2).
16. For dual seal constructions, repeat step 11.
17. For dual dome attenuator constructions, repeat step 12.

## Valve Assembly

Be sure to replace valve parts in the same position and orientation from which they were removed. Use the following steps to reassemble the valve.

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### Note

Clean and protect all sealing surfaces from damage while installing parts. Lubricate components when necessary as an aid for installation, and to help protect sealing surfaces.

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Refer to figure 4 that identifies the V280 valve components by key number.

During assembly, visually inspect component surfaces that interface with an O-ring or seal for any damage or foreign material that may prevent proper sealing.

1. Place both tailpieces (key 2), flange end down on a clean soft surface with the seal assembly cavity facing up. Use caution to protect the flange end serrated surfaces.
2. For all attenuator dome constructions, lubricate the tailpiece retaining ring groove, attenuator dome counterbore surface, and the surface where the attenuator dome will rest against the tailpiece with an anti-seize lubricant (key 45). This will aid in the disassembly process.
3. For all attenuator dome constructions, install the grooved end of the groove pin (key 27) into the tailpiece as far as it will go. Take care not to bend the pin. This groove pin will prevent the attenuator dome from rotating within the tailpiece
4. Install the attenuator dome by aligning the pin hole in the attenuator dome with the groove pin (key 27) installed in the bottom of the tailpiece.
5. Install the retaining ring (key 28) into the tailpiece by expanding the coils of the retaining ring and installing one end into the groove. Hold the one end installed into the groove and press down around the perimeter of the retaining ring in a winding fashion until the ring is fully seated into the groove. There should be audible indication of the ring once it has fully seated in the groove. Take care to not damage the sealing surface of the tailpiece.
6. Lubricate (key 33) the tailpiece counterbore above the retaining ring groove where the seal will sit in the tailpiece.
7. On the seal (key 5), install the O-ring (key 14) and back-up ring (key 15) with the back-up ring towards the valve body (see figure 4).
8. Install the wave spring (key 17) into the tailpiece.
9. Lubricate (key 33) the installed O-ring and back-up ring on the seal and insert the seal assembly into the tailpiece counterbore. Maintain axial alignment of the two components as the seal assembly is drawn down into place.

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### Note

For single or dual characterized attenuator dome constructions, verify that the ball opens into the attenuator dome window(s) last. If not, remove the attenuator dome and tailpiece and rotate 180° to allow the window(s) to open last.

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10. Lubricate (key 33) the half-dovetail groove on the tailpiece (key 2) and install the O-rings (key 12) in both tailpieces.
11. If necessary, install the grooved end of the groove pins (key 23) into the bearing plate (key 8) as far as they will go.
12. Install new bushings (key 9) in the bearing plates (key 8) by aligning the split in the bushing towards the longer side of the bearing plate (see figure 4).

## **⚠ WARNING**

**When lifting the ball, ensure the bearing plates (key 8) are secure on the ball trunnions to prevent parts from falling which may cause personal injury or property damage.**

13. Use an approved lifting sling through the ball bore to lift the ball (key 3). Orient the ball so the port and trunnions are parallel with the ground.
14. Lubricate and install the thrust washers (key 10) and bearing plates on both ball trunnions.
15. Install the ball and bearing plates assembly onto the lower tailpiece. While lowering the ball, guide the groove pins in the bearing plates into their proper location in the tailpiece pin holes.
16. Place the body (key 1) on an appropriate work surface.
17. Install the grooved end of the groove pins (key 22) into the body. Take care to not bend the pins during assembly.
18. If studs (keys 4) were removed from valve body during disassembly, apply anti-seize lubricant (key 45) to the threads of the studs and holes and install in both sides of the body with the material identifier facing outward.
19. Lubricate (key 33) the tailpiece O-ring sealing surface of the body and lower the body over the ball and onto the tailpiece, guiding the body over the ball and aligning the pin holes on the tailpiece with the groove pins (key 22) installed in the body. Make sure that the body shaft bore is aligned to the same side as the tang slot on the ball.
20. Apply anti-seize lubricant (key 45) to the face and threads of the nuts (key 18). Install the nuts on the studs by hand with the material identifier facing outward. Use an appropriate torque device to apply the final torque specification (see table 3).
21. Repeat step 19 before installing the upper tailpiece.
22. Install the upper tailpiece from steps 1 through 10 over the studs (key 4) and pins (key 22) installed in the body.
23. Repeat step 20 once the upper tailpiece has been installed on the body.
24. Insert the drive shaft (key 20) through the body shaft bore to engage the shaft tang with the ball tang slot. Install the shaft thrust washer (key 11) onto the shaft.
25. Install the drive shaft bushing (key 7) in the packing box housing from the end that engages the body.
26. Lubricate (key 33) and install the O-ring (key 13) and back-up ring (key 16) on the packing box housing.
27. Lubricate the packing box housing studs (key 19) with an anti-seize lubricant (key 45) and install in the valve body.
28. After lubricating (key 33) the body shaft bore, position the packing box housing assembly over the drive shaft and slide into place ensuring the O-ring (key 7) properly engages the body shaft bore. Make sure to orient the length of the packing box housing perpendicular to the bore of the valve body (see figure 4).
29. Install the packing components as detailed in the Packing Maintenance section of this manual.
30. Apply anti-seize lubricant to the packing box housing nuts (key 21) and torque to the required specifications (see table 3)
31. For keyed shafts, install the valve shaft key (key 38), flat washer (key 39) and hex head bolt (key 40). The purpose of the washer and hex bolt is to prevent the key from migrating axially out of the keyway in-service.
32. If the base bracket was removed from the body during disassembly, place it on the body flats that correspond with the desired shaft orientation (horizontal or vertical). Lubricate the two socket head cap screws with an anti-seize lubricant (key 45), place a washer (key 41) over each screw, and install into the body. Torque to the required specifications (see table 4).

- If the swivel hoist rings (key 35) were removed during disassembly, reinstall the two swivel hoist rings into the body flats that correspond with the desired shaft orientation (horizontal or vertical). Do not lubricate the threads. Torque to the required specifications (see table 4).

Table 3. Bolt Torque Specifications

VALVE SIZE, NPS	CLASS	FASTENER SIZE in	VALVE BODY HEAVY HEX NUT TORQUE <sup>(1)</sup>		FASTENER SIZE in	PACKING BOX HOUSING HEAVY HEX NUT TORQUE <sup>(1)</sup>	
			N • m	ft • lbf		N • m	ft • lbf
6	900	1-1/4-8	990	730	3/4-10	271	200
8		1-3/8-8	1329	980			
10		1-5/8-8	2235	1650			
12		1-7/8-8	3470	2560	1-1/8-8	746	550
16		2-1/4-8	6090	4490			

1. Fasteners must be lubricated to achieve proper preload.

Table 4. Required Base Bracket and Swivel Hoist Ring Torque Specifications

VALVE SIZE, NPS	FASTENER SIZE, INCH	VALVE BODY HEAVY HEX NUT TORQUE <sup>(1,2)</sup>	
		N • m	ft • lbf
6	3/4-10	136	100
8			
10			
12	1-8	312	230
16			

1. Base bracket fasteners must be lubricated to achieve proper preload.

2. Do not lubricate swivel hoist ring fasteners. If lubricated, consult your [Emerson sales office](#) for additional torque specifications.

## Actuator Mounting

Use the appropriate actuator instruction manual for mounting the actuator or changing the actuator position. Attach the actuator mounting bracket to the valve packing box and tighten the mounting bracket fasteners as detailed in table 5.

Table 5. Required Actuator Mounting Bracket-to-Valve Bolt Torque Specifications

VALVE SIZE, NPS	FASTENER SIZE, INCH	SAE J429 GRADE 5/NCF3 <sup>(1)</sup>	
		N • m	ft • lbf
6	3/4-10	339	250
8	7/8-9	508	375
10			
12	1-1/4-8	1490	1100
16			

1. Fasteners must be lubricated to achieve proper preload.

## Determining Closed Position

- To confirm proper actuator adjustment visually check the position of the ball.
- Adjust the actuator linkage or travel stops as described in the actuator instruction manual so that at the end of stroke, the valve ball bore diameter in the full open (100%) position is in alignment and centered within the upstream and downstream valve seal inside diameters. The actuator linkage or travel stops should be adjusted so that the full closed (0%) valve position is precisely 90 degrees from the visually verified 100% open position. The valve has a given dead band where the seal is in full contact with the ball, so if the valve position is not precisely 90 degrees from the visually verified 100% open position, leakage past the seal could occur.
- For reference, two parallel lines are machined on the actuator mounting end of the valve drive shaft (key 20). The lines represent the orientation of the valve ball bore. The ball is in the closed position when the two lines are perpendicular to the pipeline bore.

## Parts Ordering

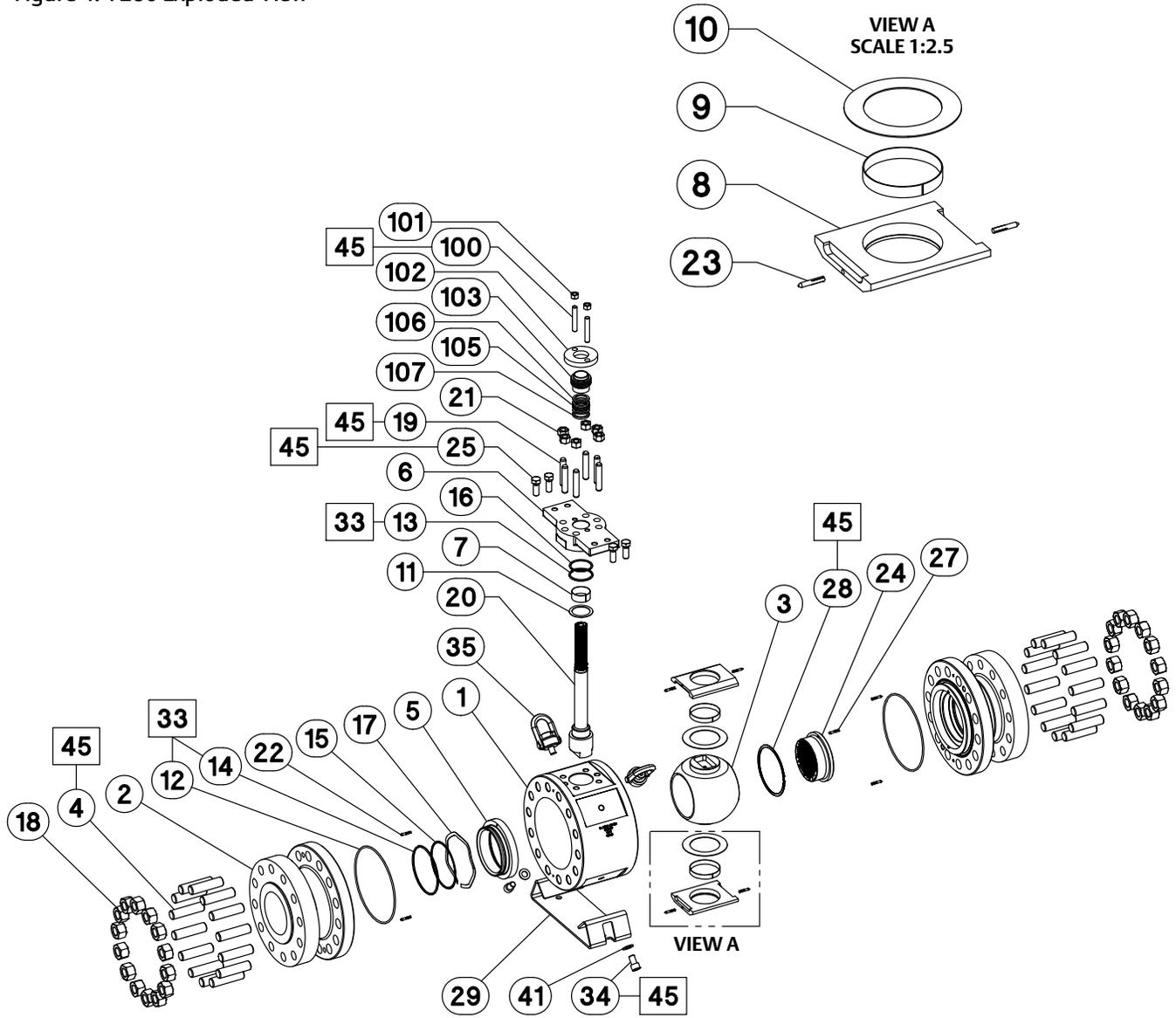
A serial number is assigned to each valve and stamped on the nameplate. Always refer to the valve serial number when corresponding with your [Emerson sales office](#) regarding spare parts or technical information. When ordering replacement parts, also specify the part name and desired material.

### **⚠ 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.**

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Figure 4. V280 Exploded View



NOTE:  
1. KEY NUMBERS 26, 30, 31, 32, 36, 37, 38, 39, 40, 42, 43, 44, 114, 116, 117 ARE NOT SHOWN  
□ APPLY LUBRICANT

GH01899

## Parts List

### Note

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

Key	Description	Key	Description
1	Valve Body If you need a valve body as a replacement part, order the valve size, pressure rating, serial number, and desired material.	22*	Valve Body Groove Pin
2	Tailpiece	23*	Bearing Plate Groove Pin
3	Ball	24	Attenuator Dome
4	Valve Body Bolt	25	Actuator Mounting Cap Screw (4 req'd)
5*	Seal	26	Hex Head Pipe Plug (not shown)
6	Packing Box Housing	27*	Attenuator Dome Groove Pin
7*	Shaft Bearing	28*	Retaining Ring (1 req'd for single, 2 req'd for dual-seal)
8	Bearing Plate	29	Base Bracket
9*	Trunnion Bearing (2 req'd)	30	Nameplate (not shown)
10*	Ball Thrust Washer (2 req'd)	31	Drive Screw (not shown)
11*	Shaft Thrust Washer	32	Flow Direction Arrow (not shown)
12*	Tailpiece O-Ring (2 req'd)	33	Grease Lubricant
13*	Packing Box House O-Ring	34	Socket Head Cap Screw (base bracket only)
14*	Seal O-Ring (1 req'd for single, 2 req'd for dual-seal)	35	Swivel Hoist Ring
15*	Seal Back-Up Ring (1 req'd for single, 2 req'd for dual-seal)	36	Warning Tag (not shown)
16*	Packing Box Housing Back-Up Ring	37	Warning Tag Drive Screw (not shown)
17	Wave Spring (1 req'd for single, 2 req'd for dual-seal)	38	Square Key (not shown)
18	Valve Body Heavy Hex Nut	39	Flat Washer (not shown)
19	Packing Box Housing Bolt	40	Socket Head Cap Screw (not shown)
20	Drive Shaft Assembly	41	Flat Washer (base bracket only)
21	Packing Box Housing Heavy Hex Nut	42	NACE Label (not shown)
		43	NACE Label Drive Screw (not shown)
		44	Thread Plug (not shown)
		45	Anti-Seize Lubricant
		100	Packing Stud (2 req'd for NPS 6-10, 4 req'd for NPS 12-16)
		101	Packing Nut (2 req'd for NPS 6-10, 4 req'd for NPS 12-16)
		102	Packing Flange
		103	Spring Pack
		105*	Packing Set ENVIRO-SEAL, PTFE/Carbon Filled PTFE Standard, PTFE/Carbon Filled PTFE
		106	Anti-Extrusion Ring
		107	Packing Box Ring
		114	Standard Packing Follower (not shown)
		116	Clamp (not shown)
		117	Ground Strap (not shown)

\*Recommended spare parts

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