

# Model 350/351 Control Valves

## Operation, Parts, and Instruction Manual



**Figure 1** 350 Control Valve & DFC Actuator

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### NOTICE

These instructions are meant to be used with the Dyna-Flo 350/351 Technical Bulletin as they refer to Figures and Tables therein. If you do not have the Technical Bulletin, contact Dyna-Flo immediately, or visit [www.dynaflo.com](http://www.dynaflo.com)

Each control valve is factory checked. Check the calibration for the specific application, before a valve is put into service.

It is the intention of this document to provide users with an accurate guide for safe installation and maintenance of the 350 Control Valves. Revisions and updates are available at above mentioned website.

## GENERAL

**The following instructions are to be thoroughly reviewed and understood prior to installing, operating or performing maintenance on this equipment. Work on this equipment should be performed by experienced personnel. Throughout the manual, safety and caution notes appear and must be strictly followed, to prevent serious injury or equipment malfunction.**

## SCOPE

The control valve configuration and construction materials were selected to meet particular pressure, temperature, and process conditions. Some material combinations are limited in their pressure and temperature ranges. Do not apply any other conditions to the valve without first contacting your Dyna-Flo sales office.

This manual is written to be a practical and useful guide maintaining the Dyna-Flo 350/351 Control Valve.

Throughout this manual, unless otherwise specified, references to the Model 350 & 351 will also refer to their "H" configurations as well. To request a copy of the 350H/351H bulletin, contact your Dyna-Flo Sales Office.

## SAFETY CAUTION

**Only well trained experienced technicians should perform these procedures. Use safe work practices and lock out procedures when isolating valves and actuators. It is also important to wear the proper protective equipment when performing any installation or maintenance activity. Use only parts and materials rated for the process being used, operating conditions, and environmental conditions products will be used in.**

**To avoid personal injury or installation damage as a result of the sudden release of process pressure or damage to equipment, do not install the valve assembly where service conditions could exceed the limits stated in this manual, sales bulletin or on the equipment nameplates. Use government codes, accepted industry standards and good piping practices, and select proper pressure-relieving equipment for protection of your installation. Always be aware of flammable process and instrument gas.**

**Always be aware of the hazards of actuators, especially spring-loaded actuators. Be sure that the actuator is de-energized or in the failed position before performing any maintenance procedure.**

**These valves have dangerous pinch points. Never put your hands inside the valve unless you are certain that the plug and stem will not move.**

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### SPECIFICATIONS

#### Configurations

The Model 350/351 control valve is a high capacity single port, globe style valve, with a bolted type bonnet.

The Model 350H/351H control valve is a high capacity, high pressure single port, globe style valve, with a bolted type bonnet.

The standard valve plug action is push down to close.

PTFE Seat and Metal Seat Available.

Consult your Dyna-Flo sales office for other available configurations.

#### Sizes and Connection Styles

Models: 350, 350H, 351, and 351H

Size:

350, 351: 8x6", 10x8", 12x6", and 12x8"  
350H, 351H: 8x6"

Body: Globe

Rating:

350, 351: ASME 150 / 300 / 600  
350H, 351H: ASME 900

Connections: RF / RTJ / BWE - Refer to Tables 1 and 2 for available configurations.

#### Maximum Inlet Temperature and Pressures

Flanged valves consistent with ASME Class rating as per ASME B16.34, unless limited as follows:

**Temperature Limits:** Tables 10, 12, 13, and 14 of Bulletin.

**Standard Valve Trim:** Figures 11, 12, and 13 of Bulletin.

**Low-Noise Valve Trim:** Figure 14 of the Sales Bulletin.

**Anti-Cavitation Trim:** Figure 15 of the Sales Bulletin.

#### Maximum Pressure Drops

Maximum pressure drop is the same as maximum inlet pressure unless restricted by the following:

**Standard Valve Trim:** Figures 11, 12, and 13 of Bulletin.

**Anti-Cavitation Trim:** Figure 15 of Sales Bulletin.

**Low-Noise Valve Trim:** Figure 14 of the Sales Bulletin.

**NOTE:** 8x6 control valves are limited to ASME Class 600 pressure drops unless used with Anti-Cavitation trim, 8x6 Anti-Cavitation valves are capable of full Class 900 pressure drops.

#### Dimensions

##### Valve and Actuator Outline Dimension Diagram

Refer to Figure 2 of the Sales Bulletin.

##### Valve and Actuator Assembly Dimensions

Refer to Tables 7 to 9 of the Sales Bulletin.

#### Characteristic and Flow Direction

- Equal Percentage (Standard) - Flow Down
- Quick Opening - Flow Down
- Linear - Flow Down
- Low-Noise (Linear) - Flow Up
- Anti-Cavitation 1-Stage (Linear) - Flow Down
- Anti-Cavitation 2-Stage (Linear) - Flow Down

#### Approximate Valve Body Weights

Refer to Table 3.

#### Materials

Body and bonnet material options include:

LCC (A350-LF2 optional\* bonnet material)

WCC (A350-LF2 optional\* bonnet material)

WC9 (A182-F22 optional\* bonnet material)

CF8M (A182-F316 optional\* bonnet material)

**\*NOTE:** Dyna-Flo reserves the right to substitute a cast material with the forged bar equivalent in the event a casting is not available.

Refer to Figure 10 of Sales Bulletin for valve construction material temperature limitations.

Refer to Tables 11 & 12 of the Sales Bulletin for trim selections.

#### Cross-Section of the Model 350 & 351 Control Valves

Refer to Figure 34.

#### Port Diameters and Maximum Valve Plug Travel

Refer to Tables 3 to 5 of the Sales Bulletin.

#### Packing Type

The Standard packing is PTFE V-ring. Live-loaded low emission, graphite, KALREZ®, and other packing arrangements are available. Refer to Figures 29, 31, 32, 33.

#### Maximum Valve Sizing Coefficients

For full list of coefficients refer to document P-CVSM.

#### Service Application

Refer to Tables 11, 12, & 14 of the Sales Bulletin.

For more information and other options contact your Dyna-Flo sales office.



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**Table 1**

### Available Valve Configurations and Shut-Off Class

Valve Model	Valve Size Inch	ASME Class	Valve Seat	Shut-Off Class (in accordance with ASME / FCI 70.2)
350	8x6, 10x8, 12x6, 12x8	150 / 300 / 600	Metal	IV (Standard)
			PTFE	V <sup>(1)</sup> (Optional)
350H	8x6	900	Metal	V (Optional)
			PTFE	IV (Standard)
350 with Anti-Cavitation 1-Stage	8x6, 10x8, 12x6, 12x8	600	Metal	V <sup>(1)</sup> (Optional)
				IV (Standard)
350 with Anti-Cavitation 2-Stage	8x6, 12x6, 12x8	600	Metal or PTFE	V
350H with Anti-Cavitation 2-Stage	8x6	900	Metal or PTFE	V
351	8x6, 10x8, 12x6, 12x8	150 / 300 / 600	Metal	II (Standard)
				III (Optional)
				IV <sup>(2)</sup> (Optional)
351H	8x6	900	Metal	II (Standard)
				III (Optional)
				IV <sup>(2)</sup> (Optional)
<b>Notes:</b>	<b>1</b> - Class V shut-off requires spring-loaded seal ring, radius-seat plug, and wide-bevel seat ring. Not available for 8 inch port and quick opening trim. Not available with S31600 plug and seat ring.			
	<b>2</b> - Class IV shut-off requires multiple graphite piston rings.			

**Table 2**

### Available Valve Configurations for Class VI Shut-Off (in accordance with ASME / FCI 70.2)

Valve Model	Port Size Inch	Valve Seat	Minimum Seat Load
350	$\geq 3.4375 \leq 7$	Metal	300 lbs./lineal inch
	$\geq 3.4375 \leq 7$	PTFE	Consult Dyna-Flo

**Note:** Class VI shut-off requires special seal materials. Refer to Table 12 of Bulletin for Class VI trim materials.

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**Table 3**

### Approximate Valve Body Weights

Valve Size (inch)	Connection	ASME Class					
		150 / 300		600		900	
		lb	Kg	lb	Kg	lb	Kg
8x6	Flanged	625	284	680	308	1,350	612
	Buttweld	-	-	600	272	1,000	454
10x8	Flanged	1,250	567	1,640	744	-	-
	Buttweld	-	-	1,130	512	-	-
12x6	Flanged	1,102	500	1,590	721	-	-
	Buttweld	-	-	1,160	526	-	-
12x8	Flanged	1,440	653	1,890	857	-	-
	Buttweld	-	-	1,450	658	-	-

### UNPACKING VALVE FROM SHIPPING CONTAINER

#### Special Tools Required:

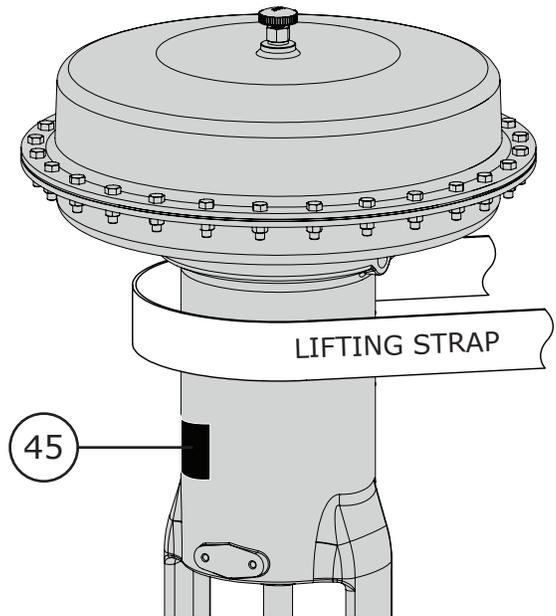
- Properly Rated Lifting Straps (2 – 4 Straps) refer to Table 3 and appropriate actuator manual for assembly weights.
- Lifting Device (Example: Crane)

Check the packing list, verify that the list includes all the materials in the shipping container before unpacking. Valve information can be found on the nameplate (Key 45). Refer to Figure 2 for nameplate location.

When lifting the valve from shipping container, place properly rated lifting straps securely around the neck of the actuator, refer to Figure 2 for strap placement. Straps should be placed to avoid damage to tubing and other mounted accessories.

For valve assemblies without an attached actuator, use caution when lifting or positioning straps so as not to damage the valve stem.

Lift the valve/actuator assembly using proper lifting techniques.



**Figure 2** Actuator Lifting Suggestions



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### INSTALLATION

#### Before You Begin:

- Read the General and Scope section of this manual (Page 2).
- Read Safety Caution (Page 2).
- Sudden movement of actuator can cause damage or injury. It helps to have the actuator de-energized.
- Use safe work practices and lock out procedures before placing valve in-line.

**NOTE:** For butt weld valve bodies, depending on the body material, post-weld heat treatment might be required. Soft parts, seals, some metal trim, threading and shrink-fit parts can be damaged by post-weld heat treatment. If post-weld heat treatment is required, it is recommended that all internal valve parts be removed from the valve body. Contact Dyna-Flo for more information.

#### Parts Required:

- Appropriate Line Flange Nuts and Bolts
- Appropriate Line Flange Gaskets
- If the valve has small internal flow passages such as Anti-Cavitation or Low-Noise trim, the installation of an upstream strainer should be considered to prevent clogging of these small passages.

#### Installation Steps:

- 1 Check the packing box bolting (Key 27 & 39) for proper tightness. Refer to Packing Installation on Page 22 for proper packing tightening instructions.
- 2 The valve assembly may be installed in any position unless limited by vibration considerations, it is however recommended that the valve be installed with the valve stem (Key 5) perpendicular to the ground. **NOTE:** For some non-vertical orientations, the valve actuator may need to be supported.
- 3 Install the valve with flow through the valve in the direction shown by the flow arrow on the valve body.
- 4 Install the appropriate line flange gaskets.
- 5 Apply Permatex® Nickel Anti-Seize to the threads of the flange studs and install them.
- 6 When possible, before tightening the line bolting, stroke the valve and check for smooth operation through the full stroke. Unsteady valve stem movement could be an indication of an internal problem.
- 7 Tighten the line flange bolting in even increments in a crisscross pattern until the correct line bolt torque specification is reached.

### AIR PIPING

#### WARNING:

Property damage, environmental harm, and personal injury can result from the use of supply gas other than clean, non-corrosive, oil and moisture free air. Do not exceed the supply pressure indicated on the serial plate located on the actuator (Key 45).

#### Before You Begin:

**Note:** Standard actuators accept ¼" (6 mm) NPT connections.

- Refer to the appropriate actuator instruction manual when necessary.

#### Piping Installation Steps:

- 1 Use 3/8" (outside diameter) tubing (or equivalent) for air lines.
- 2 Install the required line vents, valves, drains, seals, and filters to the actuator.

### PERIODIC INSPECTION

#### Special Equipment Required:

- Bypass or block valves.

#### Before You Begin:

- Read Safety Caution (Page 2).
- Use safe work practices and lock out procedures.
- Disconnect supply lines (air or gas), electric power, or control signal to the actuator. Sudden movement of actuator can cause damage or injury, make sure actuator will not operate.
- Vent any pneumatic actuator loading pressure and relieve any actuator spring preload if present.
- Relieve process pressure and drain the process fluid from up and down stream of valve.
- Be aware of potentially hazardous process material that may be present in-line and in-valve. Isolate the valve from process pressure. Use a bypass or block valve if necessary, or completely shut off the process.

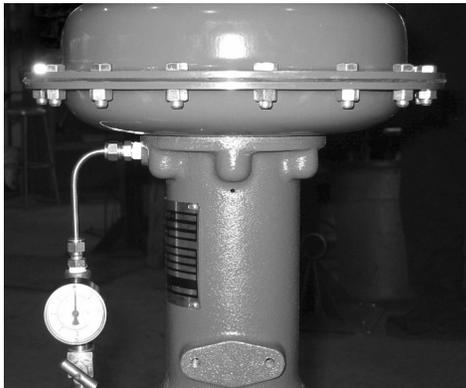
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### Inspection Steps:

- 1 Check for visible signs of leakage around all seal and gasket areas.
- 2 Check the valve for damage, especially damage caused by corrosive fumes or process drippings.
- 3 Clean and repaint the areas as required.
- 4 Ensure all accessories, mounting brackets, and fasteners are secure.
- 5 Clean any dirt and foreign material from the valve stem (Key 5).



**Figure 3** Needle Valve with Gauge setup

### ACTUATOR REMOVAL

**Note:** Actuator removal does not require that the valve be removed from the pipeline.

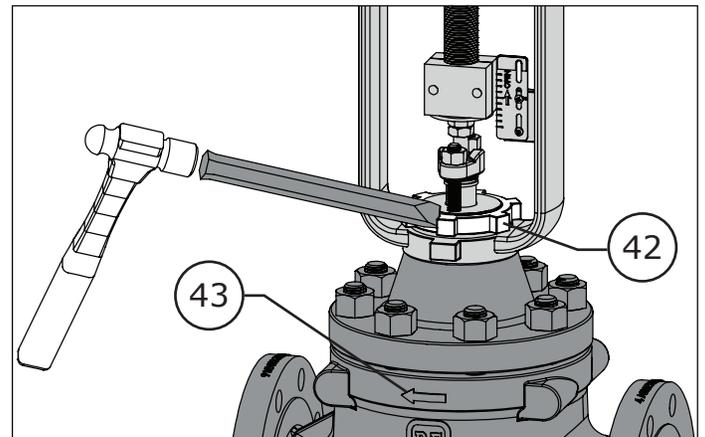
#### Tools Needed:

- Properly Rated Lifting Straps or Chains
- Lifting Device (Example: Crane)

#### Before You Begin:

- Read Safety Caution (Page 2).
- Use safe work practices and lock out procedures.
- Disconnect supply lines (air or gas), electric power, or control signal to the actuator. Sudden movement of actuator can cause damage or injury, make sure actuator will not operate.
- Vent any pneumatic actuator loading pressure and relieve any actuator spring preload if present.

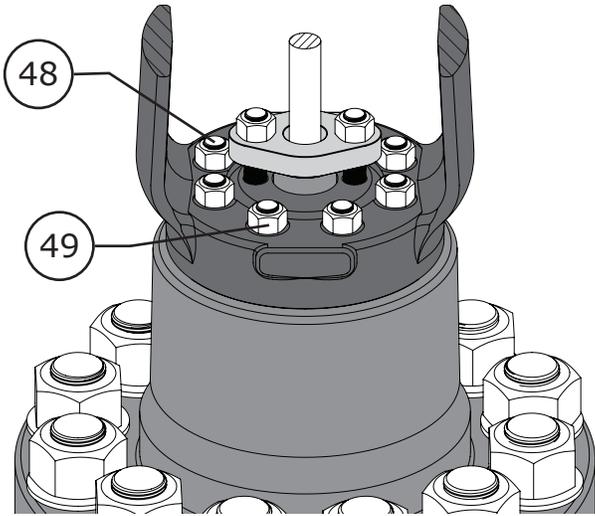
- 1 Refer to the appropriate actuator instruction manual for more information regarding the actuator being removed.
- 2 If the valve has been removed from the pipeline, place the valve assembly on a flat work surface that can support the weight.
- 3 Before the actuator is removed, support the actuator using lifting hooks or straps rated to support the weight of the actuator.
- 4 If the actuator is a spring and diaphragm actuator, determine if that actuator is fail open or fail closed. Fail closed actuators will need to be energized to remove downward force from the stem connector. Connect a supply line to the inlet port of the actuator, be sure not to exceed the maximum casing pressure. Refer to Figure 3 for recommended needle valve and gauge setup.
- 5 Remove the stem connector (Refer to Figure 5).
- 6 **For DFC/DFO:** Use a blunted heavy chisel to loosen the yoke nut (Key 42). Unscrew the yoke nut and remove the actuator from the valve. If the actuator was energized during removal, de-energize the actuator (Refer to Figure 4).  
**For DFLP:** Remove the actuator mounting nuts (Key 48) (Refer to Figure 4a).
- 7 Remove the jam nut and hex nut (Keys 40 & 41) and travel indicator from the valve stem (Key 5).



**Figure 4** Yoke Nut being loosened with a Chisel

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**Figure 4a** DFLP Mounting Nuts & Bolts

### MAINTENANCE

**Note:** Seals, soft parts, and packing (including live loaded packing) should all be inspected frequently for leaks, wear and damage. Maintenance to the valve can be performed while the valve is still in-line, the actuator must be removed to replace packing (Refer to Page 7 for Actuator Removal instructions).

#### Before you begin:

- Read Safety Caution (Page 2).
- Determine if the valve has standard or live loaded packing (Refer to Figures 29, 31, 32, & 33).
- Follow Steps 1 – 6 of Before You Begin from PERIODIC INSPECTION (Page 7).

#### Packing Maintenance

If the packing is leaking, proper tightening of the packing may correct the leak. If re-tightening the packing to the proper specifications does not stop the leakage it is possible that the stem or wall of the packing box is damaged. Replace or repair parts as necessary. For instructions on packing removal only, refer to the Disassembly, Packing Removal section on Page 9.

- 1 Determine the type of packing installed in the valve. Refer to Figures 29, 31, 32, & 33 for packing styles.

#### For Single PTFE V-Ring Packing (Spring-Loaded):

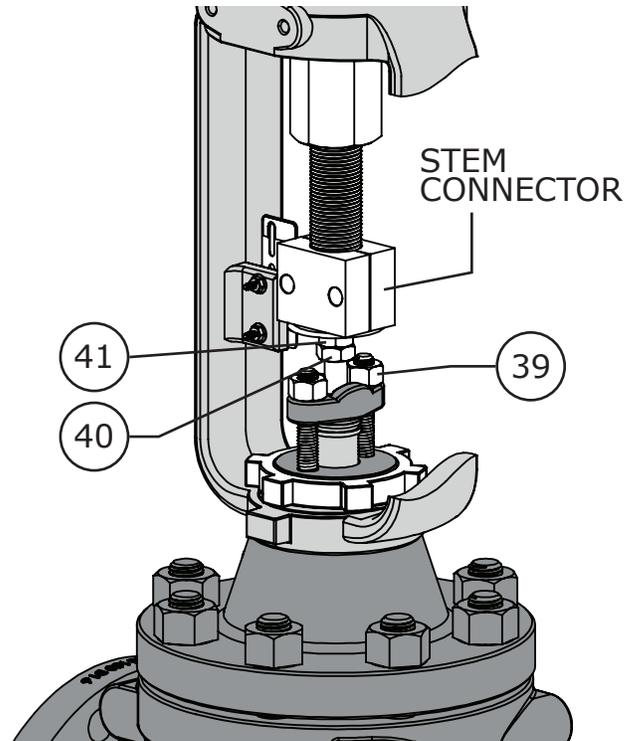
Tighten the packing nuts (Key 39) evenly in an alternating pattern until the shoulder of the packing follower (Key 36) makes contact with the top face of the bonnet (Key 24) and torque value in Table 5 is reached. Refer to Figure 29.

#### For Double PTFE V-Ring and Graphite Packing:

Tighten the packing nuts (Key 39) evenly in an alternating pattern to the minimum recommended torque specifications listed in Table 5 on Page 30, continue tightening until leakage stops or the maximum torque specification is reached. If leakage continues after reaching the maximum recommended torque the packing will need to be replaced, do not tighten the packing past the maximum recommended torque as this will cause excessive packing friction.

#### For Live-Loaded Packing:

Refer to the Sliding Stem Live-Loaded Packing Manual (P-LLPS) for proper maintenance procedures.



**Figure 5** Packing Nut and Stem Connector Detail

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### DISASSEMBLY

#### Before You Begin:

- Read Safety Caution (Page 2).
- Use safe work practices and lock out procedures.
- Remove the actuator from the valve (Refer to Actuator Removal Instructions, Page 7).
- Relieve process pressure and drain the process fluid from up and down stream of valve.
- Be aware of potentially hazardous process material that may be present in-line and in-valve. Isolate the valve from process pressure. Use a bypass or block valve if necessary, or completely shut off the process.

#### PACKING REMOVAL

For Live Loaded Packing refer to Figure 32 and the Live Loaded Sliding Stem Packing Manual (P-LLPS).

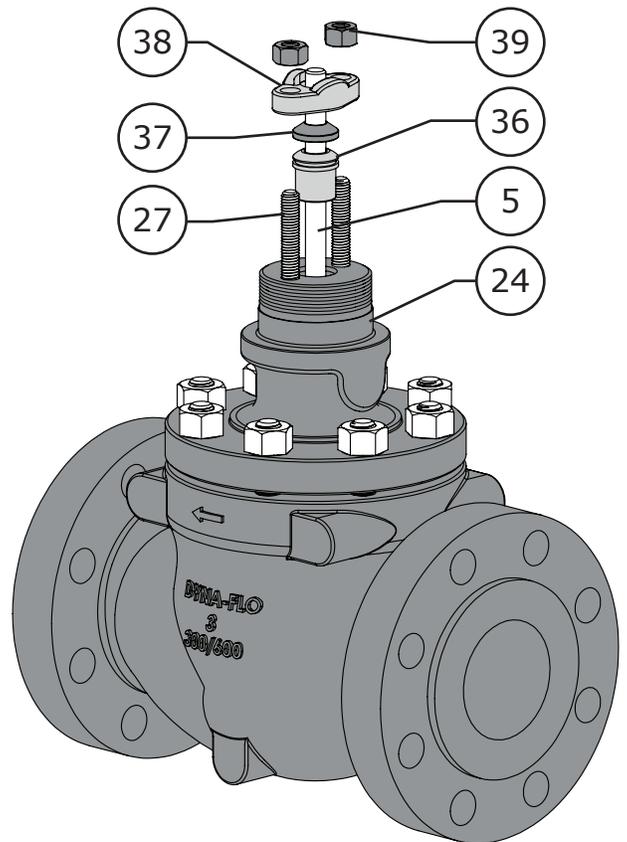
#### Special Tools Required:

- Mechanics Pick Set

**NOTE:** Packing box parts are easier to remove after the bonnet (Key 24) has been separated from the valve body (Key 1) and the valve stem (Key 5) has been removed. If the packing is all that needs to be removed, it is possible to extract packing box parts carefully using a mechanics pick set.

**WARNING:** Process medium and pressure may become stored in the packing, use caution when removing packing parts.

- 1 Remove the packing nuts (Key 39).
- 2 Remove the upper wiper (Key 37) if present, graphite packing does not include an upper wiper.
- 3 Remove the packing follower (Key 36).
- 4 It is recommended to proceed to the Bonnet Removal section to continue with valve disassembly. If the packing is all that needs to be removed, remove the contents of the packing box (Keys 28 to 35) using a mechanics pick set being careful not to damage the valve stem (Key 5) or wall of the packing box of the bonnet (Key 24). For packing reassembly refer to the Packing Installation section (Page 22).



**Figure 6** Packing Removal (Steps 1 - 3)

#### BONNET REMOVAL

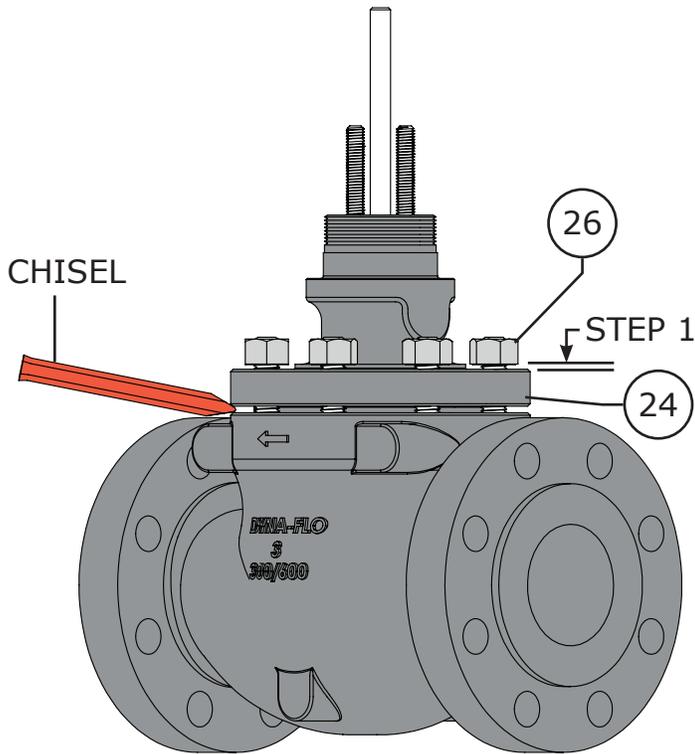
**WARNING:** Process medium and pressure may be trapped inside the valve body (Key 1). Use caution when removing the valve bonnet (Key 24). Refer to Safety Caution on Page 2.

- 1 Loosen the bonnet nuts (Key 36) 1 full turn after contact between the nuts and the top surface of the bonnet (Key 24) has been broken. Do not remove the bonnet nuts until any trapped process pressure has been vented. Refer to Figure 7.
- 2 Break the contact between the valve body (Key 1) and the bonnet (Key 24) by rocking the bonnet. Use a pry bar or blunt chisel to help with the separation if necessary.



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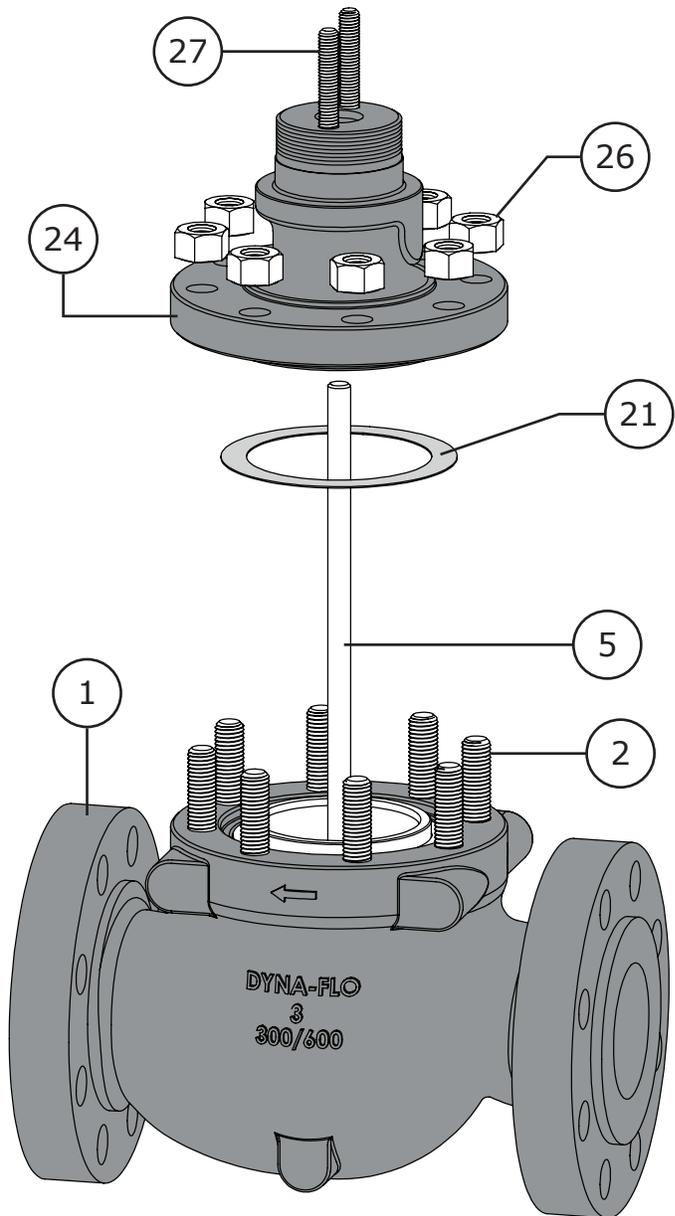


**Figure 7** Bonnet Removal (Steps 1 - 2)

### DISASSEMBLY (Continued)

#### BONNET REMOVAL (Continued)

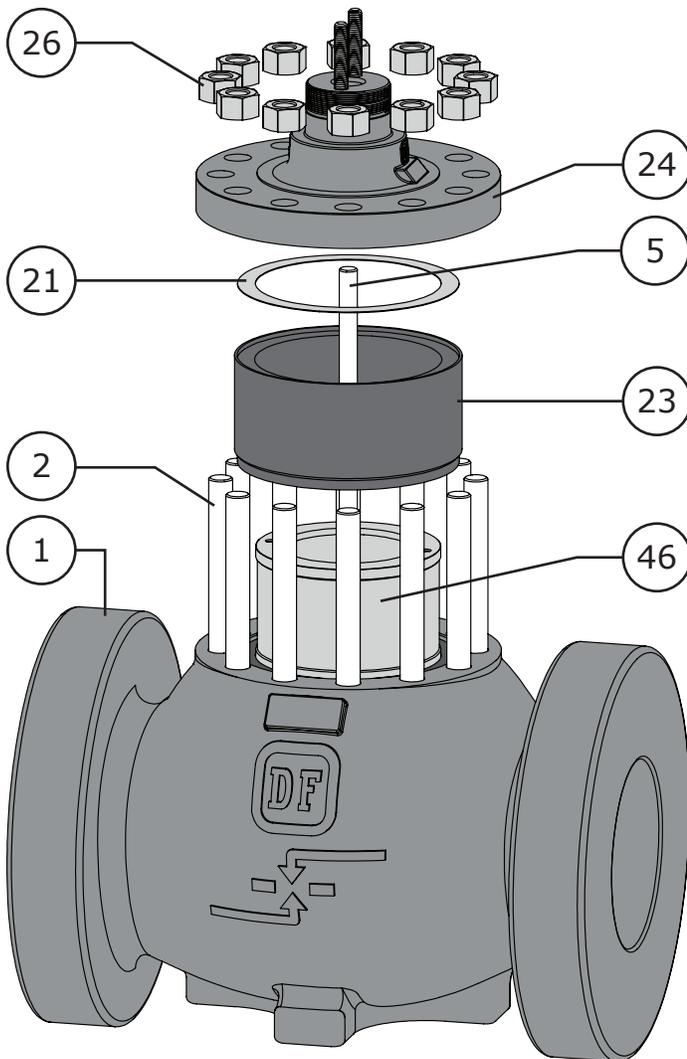
- 3 If no process fluid or gas escapes from the body-to-bonnet joint, proceed by completely removing the bonnet nuts (Key 26).
- 4 Carefully lift the bonnet (Key 24) from the valve body (Key 1), be sure that the valve stem (Key 5) and plug (Key 3) assembly do not drop from the bonnet and get damaged. Also, if the valve plug and stem assembly begin to lift when lifting the bonnet, it may be necessary to gently tap the stem from the bonnet using a rubber mallet as the bonnet is being lifted. **NOTE:** Use extra caution removing a bonnet from a valve with a bonnet spacer (Key 23).
- 5 The bonnet gasket (Key 21) may stick to the bonnet during removal. Remove the bonnet gasket.



**Figure 8** Bonnet Removal (Steps 3 - 4)

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**Figure 9** Bonnet Removal (Valves with Bonnet Spacer)

### DISASSEMBLY (Continued)

#### BONNET REMOVAL (Continued)

- 6 Remove the bonnet spacer (Key 23) if included as part of the valve assembly. For valves with load rings, refer to the Trim Parts Removal section below.

#### TRIM PARTS REMOVAL

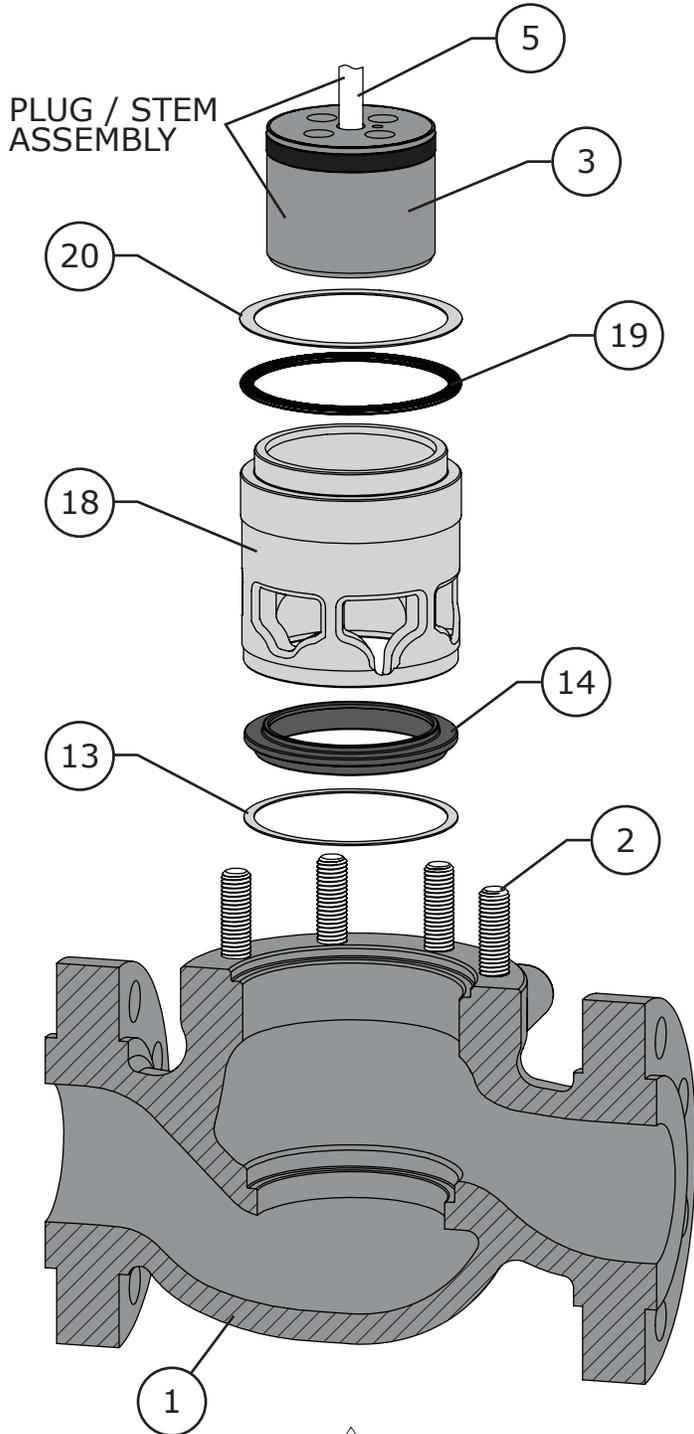
- 1 Remove the metal shim (Key 20) and spiral wound gasket (Key 19) if they haven't already been removed. Refer to Figures 10.
- 2 Remove the valve stem (Key 5) / valve plug (Key 3) assembly from the valve body (Key 1), refer to Figure 10. Refer to the Plug Seal Removal section for disassembly instructions.
- 3 Carefully remove the cage (Key 18).
- 4 Remove the seat ring (Key 14) and seat ring gasket (Key 13). **For Soft Seat valves:** Remove the disk retainer (Key 17), PTFE disk (Key 16), disk seat (Key 15), and seat ring gasket (Key 13). Refer to Figure 11.
- 5 Clean and inspect all parts for damage, especially gasket seal surfaces. Replace all damaged parts and gaskets with new parts as necessary, gaskets cannot be reused.

**For Low Noise Trim:** Remove the valve stem (Key 5) / valve plug (Key 3), cage retainer (Key 46) or cage retainer assembly (Key 47) for Low Noise D3 trim, cage (Key 18) and seat ring (Key 14). Refer to Figure 38.

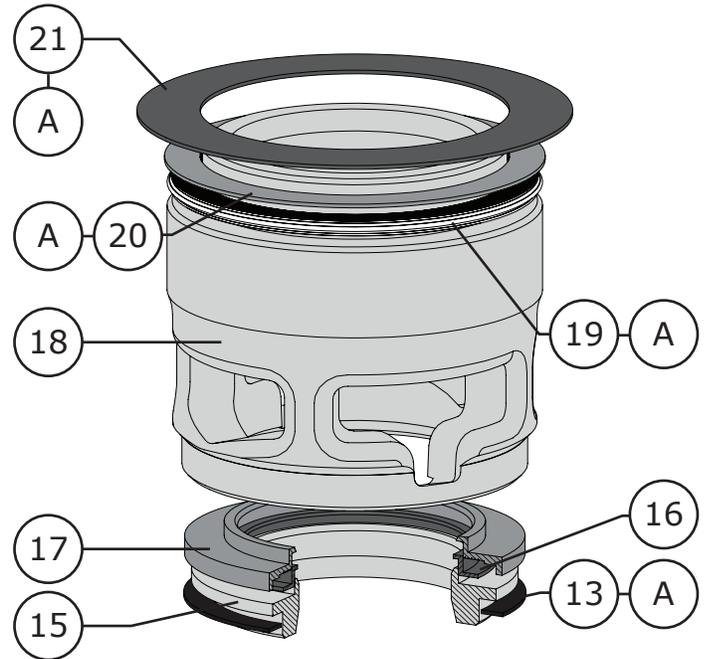


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**Figure 10** Standard Trim Parts Removal (Steps 1 - 6)



**Figure 11** Soft Seat Parts Removal

### DISASSEMBLY (Continued)

#### PACKING PARTS REMOVAL

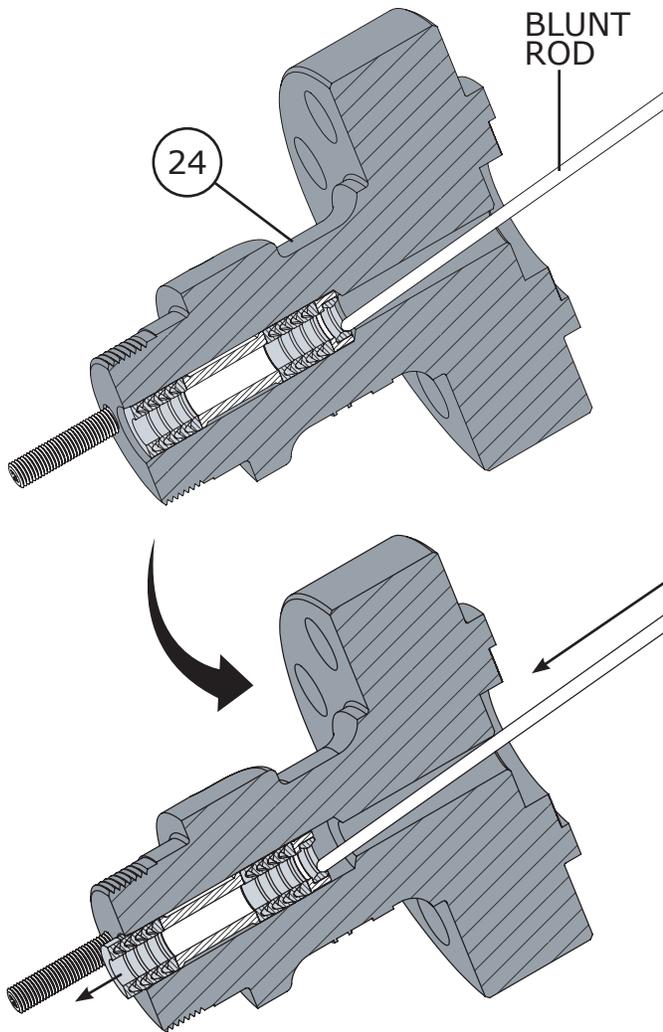
**WARNING:** Compressed gasses could be trapped between packing rings.

**NOTE:** For Live Loaded Packing refer to Figure 32 and the Live Loaded Sliding Stem Packing Manual (P-LLPS).

- 1 Using a blunt or rounded tool/rod, carefully tap the packing parts (Keys 28 to 38) out of the packing bore of the bonnet (Key 24). A mechanic's pick set can also be used to pull packing parts from the bore. Refer to Figure 12.
- 2 Clean and inspect the bonnet for damage, pay particular attention to the packing bore surface and the gasket sealing surface. Replace or repair the bonnet as necessary. Metal packing parts can be reused if they are not damaged, all other packing parts should be replaced.

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**Figure 12** Packing Parts Removal (Step 1)

### DISASSEMBLY (Continued)

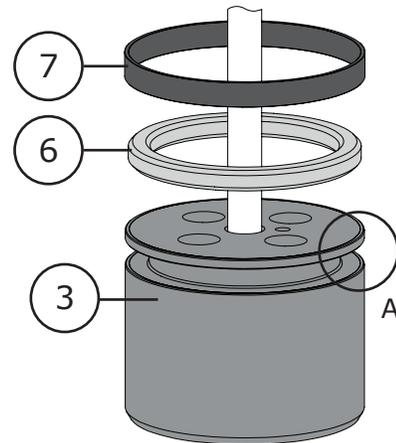
#### PLUG SEAL REMOVAL

##### For Model 350 Two-Piece Plug Seal Ring Assemblies:

**NOTE:** 8 inch valve assemblies have only one-piece plug seals, they only use a seal ring (Key 8).

- 1 Using a sharp knife, lightly cut the surface of the seal ring, then pry or twist the cut groove with a small screwdriver. This will break the seal ring and allow for easy removal without damaging the seal groove of the plug.

- 2 Use the same process as described in Step 1 to remove the backup ring (Key 6). **WARNING:** Seal ring groove in the plug (Key 3) is a critical area and damage to the area may reduce or eliminate the sealing function of the plug. Refer to Figure 13.



DETAIL A

**WARNING:** AREA IN BOLD IS A CRITICAL AREA. DAMAGE TO THE AREA MAY REDUCE OR ELIMINATE THE SEALING FUNCTION OF THE PLUG.

**Figure 13** Two-Piece Plug Seal Ring Removal (Model 350)

##### For Model 350 Three-Piece Seal Ring Assemblies:

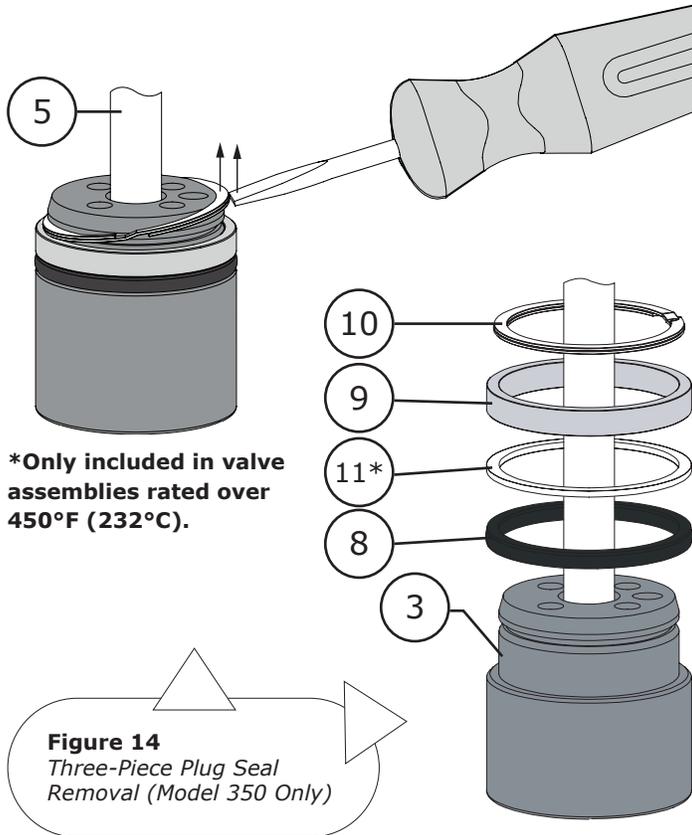
**NOTE:** 8 inch valve assemblies have only one-piece plug seals, they only use a seal ring (Key 8).

- 1 Carefully remove the retaining ring (Key 10) from the plug groove, a pick set or flat screw driver may be required to pry the spiral rings of the retaining ring apart to assist removal. Refer to Figure 14.
- 2 Remove the backup ring (Key 9).
- 3 Remove the seal ring (Key 8).



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**\*Only included in valve assemblies rated over 450°F (232°C).**

**Figure 14**  
Three-Piece Plug Seal  
Removal (Model 350 Only)

### DISASSEMBLY (Continued)

#### PLUG SEAL REMOVAL (Continued)

##### For Model 350 Three-Piece Plug Seal Ring Assemblies with Anti-Extrusion Rings:

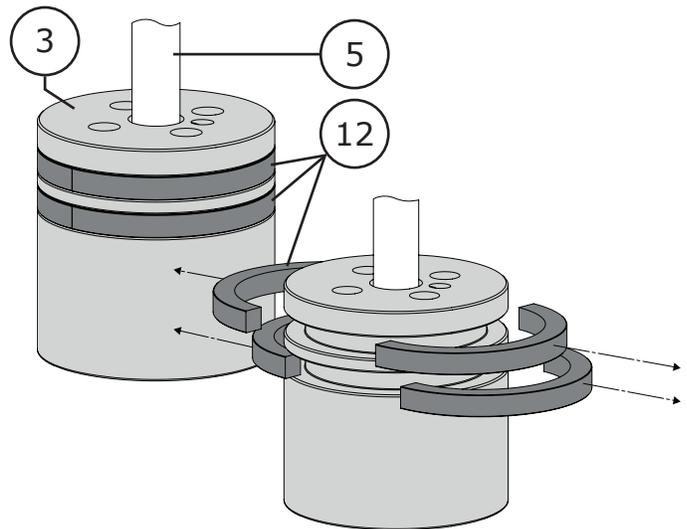
- 1 Carefully remove the retaining ring (Key 10) from the plug groove, a pick set or flat screw driver may be required to pry the spiral rings of the retaining ring apart to assist removal. Refer to Figure 14.
- 2 Remove the backup ring (Key 9).
- 3 Remove the anti-extrusion ring (Key 11). The anti-extrusion ring is two pieces and only included in valve assemblies rated for over 450°F (232°C).
- 4 Remove the seal ring (Key 8).

##### For Model 351 Valves (Refer to Figure 15):

- 1 Remove the piston rings (Key 12). **NOTE:** Piston rings are broken in half and can be easily pulled apart.

#### For All Models:

Clean and inspect all parts for damage, especially the stem (Key 5) and plug (Key 3) surfaces. Minor scratches can be buffed or lapped out, major scratches (scratches that will stop a finger nail) will need to be machined or replaced. Replace all damaged parts and soft parts with new parts.



**Figure 15** Model 351 Piston Ring Removal

### LAPPING

Expect a certain amount of leakage in valves with metal seats. In some cases where leakage has become excessive, lapping can improve sealing performance. Before performing the lapping process, insure all trim parts have been thoroughly cleaned and are free of debris. Do not lap soft seat valves.

**NOTE:** Spiral wound gaskets (Key 19) make their seal by being crushed and cannot be reused, this includes gaskets required to be used during the lapping process. It may be desirable to use an already crushed gasket in the lapping process to be replaced with new gaskets during reassembly.

**CAUTION:** Once lapping has been performed with a previously crushed gasket, it is important to mark the position and alignment of all trim parts (Keys 3, 14, and 18) before removal and reassembly. If trim parts are reassembled out of their lapped alignment excessive leakage may result.

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### LAPPING (Continued)

#### Special Tools Required:

- Soft felt marker
- Two wrenches that will slide over the valve stem (Key 5)
- 400 – 600 grit (fine grit) Loctite® Clover® compound (Key D)

#### Lapping Procedure

- 1 Install the used seat ring gasket (Key 13) into the valve body (Key 1).
- 2 Install the seat ring (Key 14). Mark the position of seat ring using the marker.
- 3 Install the cage (Key 18). Mark the position of cage using the marker.
- 4 Do not install any plug seals into the valve plug (Key 3). Apply fine grit Clover® compound to the seating surface of the valve plug. Install the valve plug/stem assembly (Keys 3, 4, 5) into the valve. Mark the position of the plug/stem assembly using the marker.
- 5 Install used bonnet gaskets (Keys 19, 20, & 21).
- 6 Carefully lift the bonnet (Key 24) into place and secure the bonnet using half of the bonnet nuts (Key 26). Mark the position of the valve plug (Key 3) on the bonnet (Key 24) using the marker.
- 7 Install the packing follower (Key 36).
- 8 Install the jam nut (Key 40) on to the valve stem (Key 5) and build a handle as shown in Figures 16 and 18 using the two wrenches and the hex nut (Key 41).
- 9 Rotate the valve plug (Key 3) back and forth about a quarter of a full rotation (only a small amount of movement is required, do not make full rotations) over the seat ring (Key 14) using the wrench handles.
- 10 If a seat leak test is to be performed after lapping to test valve shut off, disassemble the lapping setup after a few cycles of back and forth plug movement. Clean the lapping compound from inside the valve. Replace the used gaskets (Keys 13, 19, 20, & 21) with new gaskets and reassemble the valve for testing. **NOTE:** Another set of new gaskets will need to be used for the final valve assembly if the lapping procedure needs to be repeated after seat leak testing.

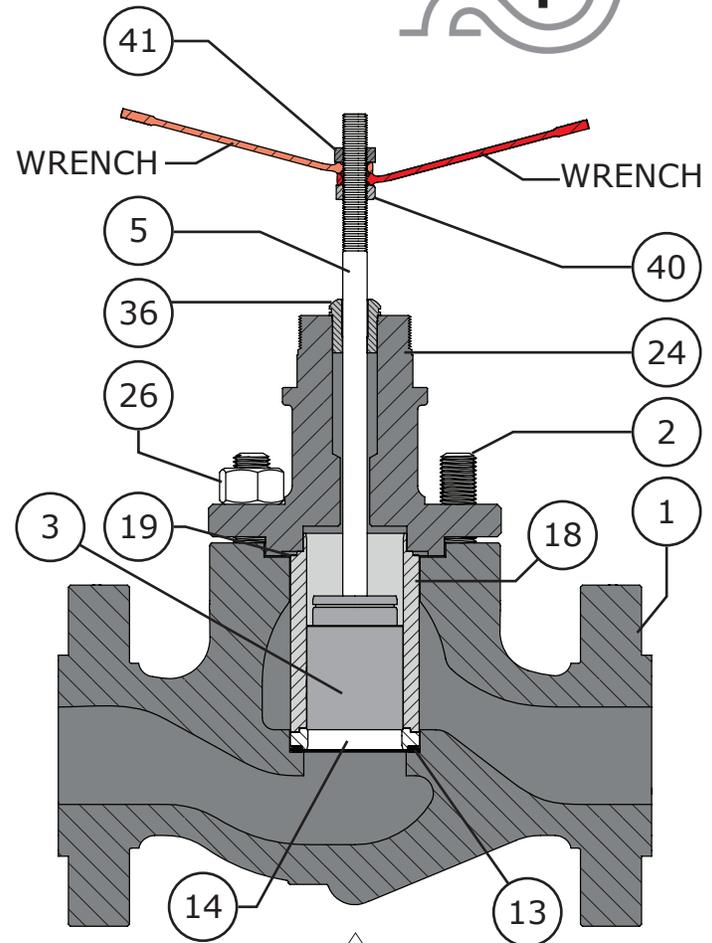


Figure 16 Lapping Procedure Setup (Steps 1 - 8)

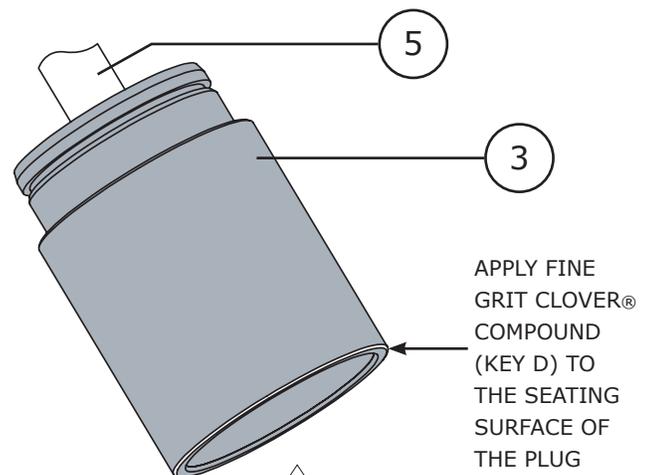
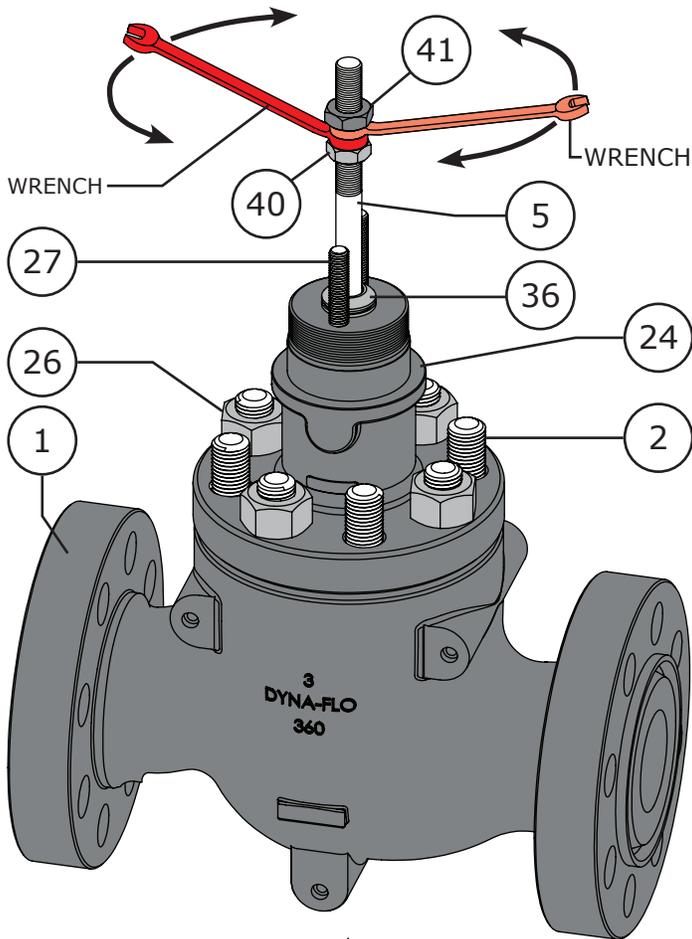


Figure 17 Lapping Compound Application

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**Figure 18** Lapping Procedure Setup (Steps 8 - 10)

### ASSEMBLY

#### Before You Begin:

- Read Safety Caution (Page 2).
- Use safe work practices and lock out procedures.
- Clean and inspect all parts.
- Replace or repair damaged parts. Replace all soft parts (Seals, o-rings, gaskets, live loaded packing).

#### Lubricants Required:

- Permatex® Nickel Anti-Seize or equivalent (Key A)
- Dow Corning Molykote® 111 or equivalent (Key B)
- Lubriplate® No. 105 Grease or equivalent (Key C)

### STUD INSTALLATION

- 1 If the studs (Key 2) were replaced, removed, or never installed, apply nickel anti-seize (Key A) to the threads of the end of the stud without a material stamp.
- 2 Thread the studs (Key 2) into the valve body (Key 1) nickel anti-seize coated end first, until they are completely threaded into the valve body.

### PLUG SEAL ASSEMBLY

#### For Model 350 Two-Piece Plug Seal Ring Assemblies:

**Note:** Two-piece seals are not available for 8 inch valves.

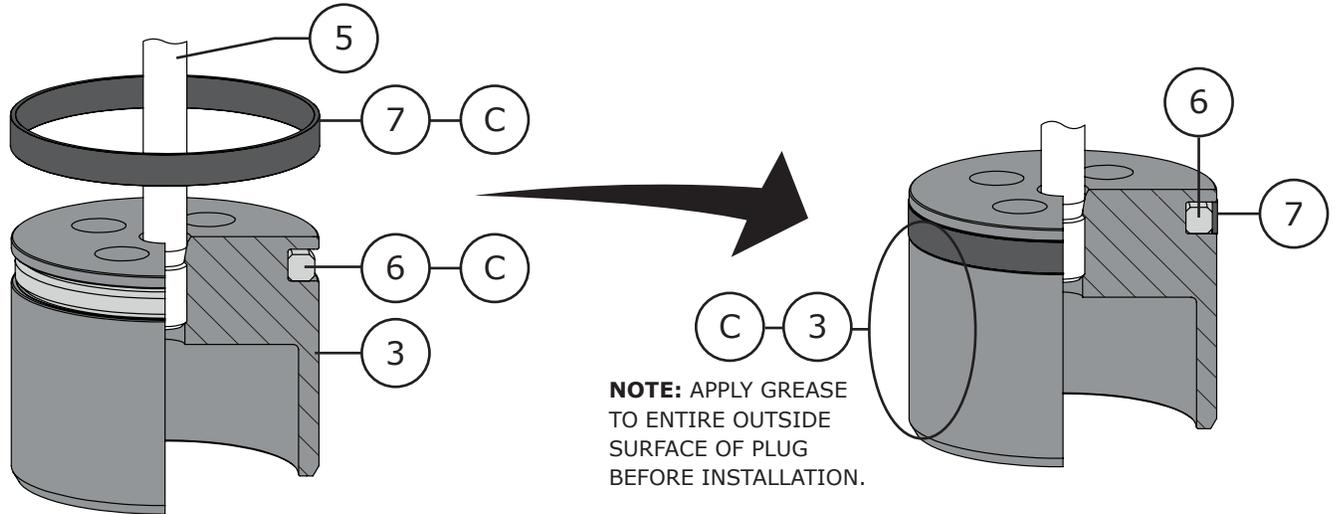
- 1 Apply Lubriplate® No. 105 (Key C) to the surface of the backup ring (Key 6).
- 2 Carefully slide the backup ring (Key 6) over the top of the valve plug (Key 3) and into the groove. Refer to Figure 19.
- 3 Apply Lubriplate® No. 105 (Key C) to the seal ring (Key 7). Carefully slide the seal ring over the top edge of the valve plug (Key 3) and into the groove, refer to Figure 19.
- 4 Allow time for the seal ring (Key 7) to shrink back to its original size after installation.
- 5 Before installing the plug/stem assembly into the valve, apply Lubriplate® No. 105 (Key C) to the outside surface of the plug (Key 3) as shown in Figure 19.

#### For Model 350 Three-Piece Plug Seal Ring Assemblies:

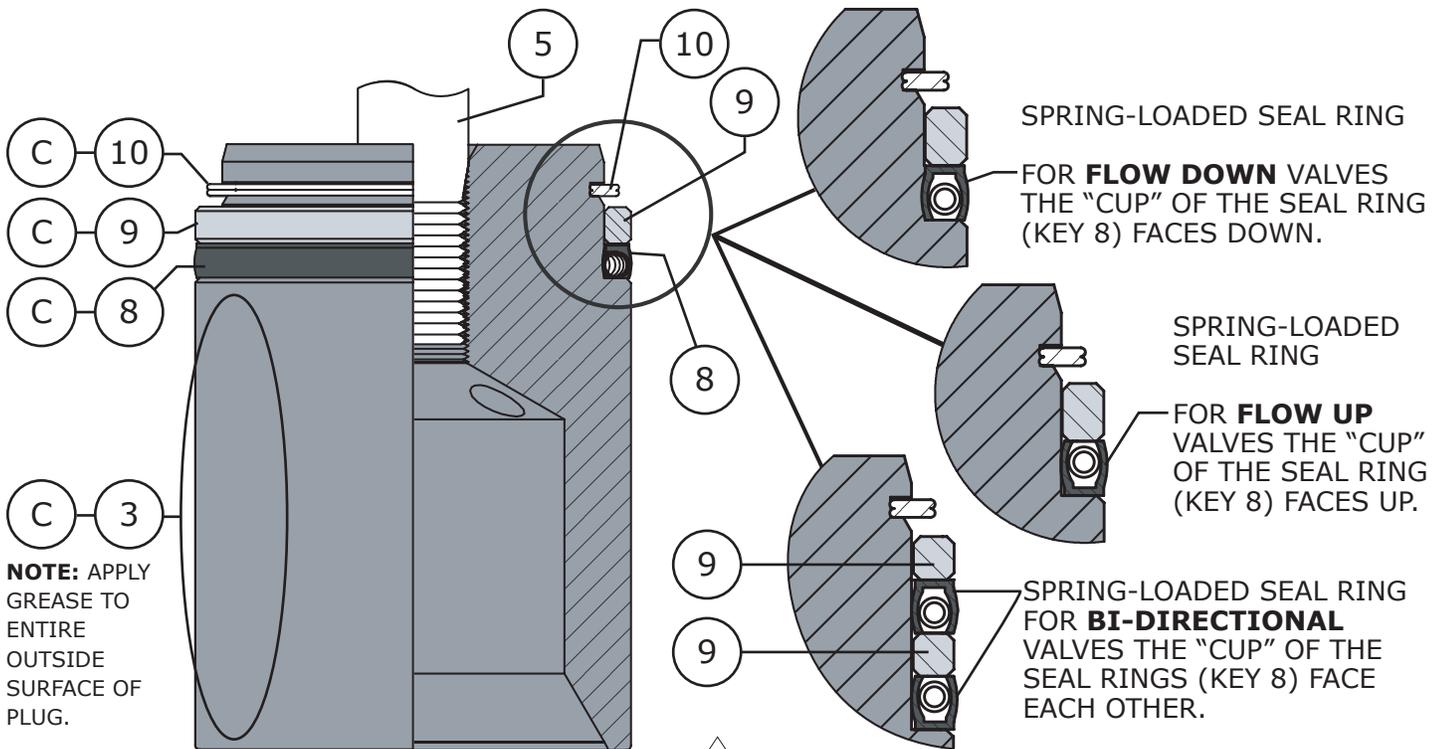
- 1 Apply Lubriplate® No. 105 (Key C) to the surface of the seal ring (Key 8).
- 2 Install the seal ring (Key 8) onto the valve plug (Key 3), refer to Figure 20 for proper seal ring orientation. **NOTE:** 8 inch valves are technically one-piece plug seals, 8 inch valve assemblies use a seal ring only and do not make use of a backup ring (Key 9) or retaining ring (Key 10).
- 4 Apply Lubriplate® No. 105 (Key C) to the backup ring (Key 9) and install the backup ring onto the valve plug (Key 3).
- 5 Apply Lubriplate® No. 105 (Key C) to the retaining ring (Key 10) and install the retaining ring into the retaining ring groove on the valve plug (Key 3).
- 6 Install the plug assembly into the cage (Key 18).

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**Figure 19** Two-Piece Plug Seal Assembly (Model 350 Only)



**Figure 20** Three-Piece Plug Seal Assembly (Model 350 Only)

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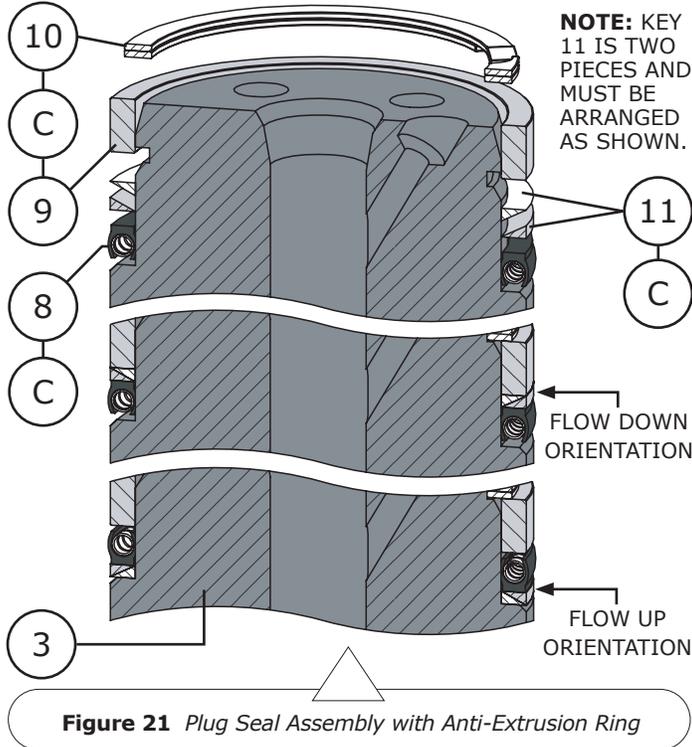


Figure 21 Plug Seal Assembly with Anti-Extrusion Ring

### ASSEMBLY (Continued)

#### PLUG SEAL ASSEMBLY (Continued)

##### For Model 350 Three-Piece Plug Seal Ring Assemblies with Anti-Extrusion Rings:

- 1 Apply Lubriplate® No. 105 (Key C) to the surface of the seal ring (Key 8).
- 2 Install the seal ring (Key 8) onto the valve plug (Key 3), refer to Figure 21 for proper seal ring orientation. **NOTE:** 8 inch valves are technically one-piece plug seals, 8 inch valve assemblies use a seal ring only and do not make use of a backup ring (Key 9) or retaining ring (Key 10).
- 3 Apply Lubriplate® No. 105 (Key C) to the anti-extrusion ring (Key 11) and install the anti-extrusion ring on to the valve plug as shown in Figure 21. **NOTE:** Anti-extrusion rings are only used for valve assemblies rated to exceed 450°F (232°C).
- 4 Apply Lubriplate® No. 105 (Key C) to the backup ring (Key 9) and install the backup ring onto the valve plug (Key 3).
- 5 Apply Lubriplate® No. 105 (Key C) to the retaining ring (Key 10) and install the retaining ring into the retaining ring groove on the valve plug (Key 3).

- 6 Allow time for the seal ring material to shrink back to its original size after being stretched over the valve plug before installing the plug assembly into the cage (Key 18).

#### For Model 351 Valves:

**NOTE:** Replacement piston rings (Key 12) come in one piece. Before installation it is necessary to break the piston ring into two pieces. Do not saw or cut the piston rings. Use caution when breaking piston rings as they can be easily damaged.

#### Piston Ring Vise Break Method:

Piston rings (Key 12) can be broken into two pieces using a vise with smooth jaws or jaw softeners.

#### Special Tools Required:

- Vise
- Electrical Tape

- 1 Wrap electrical tape once around the outside diameter of the piston ring (Key 12). Electrical tape will help contain the piston ring while it is being broken. Refer to Figure 23.
- 2 Place the piston ring into the jaws of the vise as shown in Figure 24.
- 3 Slowly compress the piston ring in the vise until the ring snaps on both sides. If one side of the piston ring snaps first, continue compressing the piston ring until the other side snaps as well. Refer to Figure 22 for installation.

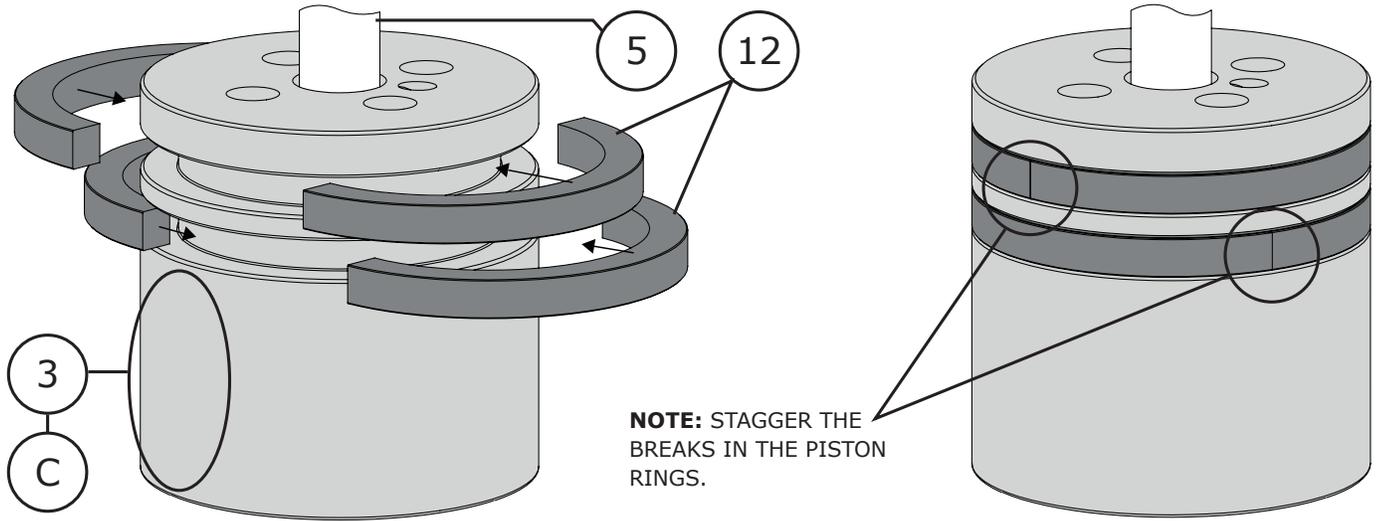
#### Piston Ring Scoring Break Method:

If no vise is available, piston rings (Key 12) can be scored with a knife and broken over a hard surface. Do not saw or cut the piston rings in half.

- 1 Wrap electrical tape once around the outside diameter of the piston ring (Key 12). Electrical tape will help contain the piston ring while it is being broken. Refer to Figure 23.
- 2 Score (do not cut) the top surface of the piston ring.
- 3 Place half of the piston ring over the edge of a hard surface (such as a table edge) so that the score marks are in a parallel line with the edge of the hard surface.
- 4 Apply downward pressure to both sides of the piston ring until it snaps in half.
- 5 Remove the electrical tape. Install each half of the broken piston ring into the piston ring groove in the valve plug (Key 3). Refer to Figure 22.

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**NOTE:** APPLY GREASE TO ENTIRE OUTSIDE SURFACE OF PLUG.

**Figure 22** Model 351 Piston Ring Installation



**Figure 23** Model 351 Piston Ring Vise Break Method (Step 1)



**Figure 24** Model 351 Piston Ring Vise Break Method (Step 2)



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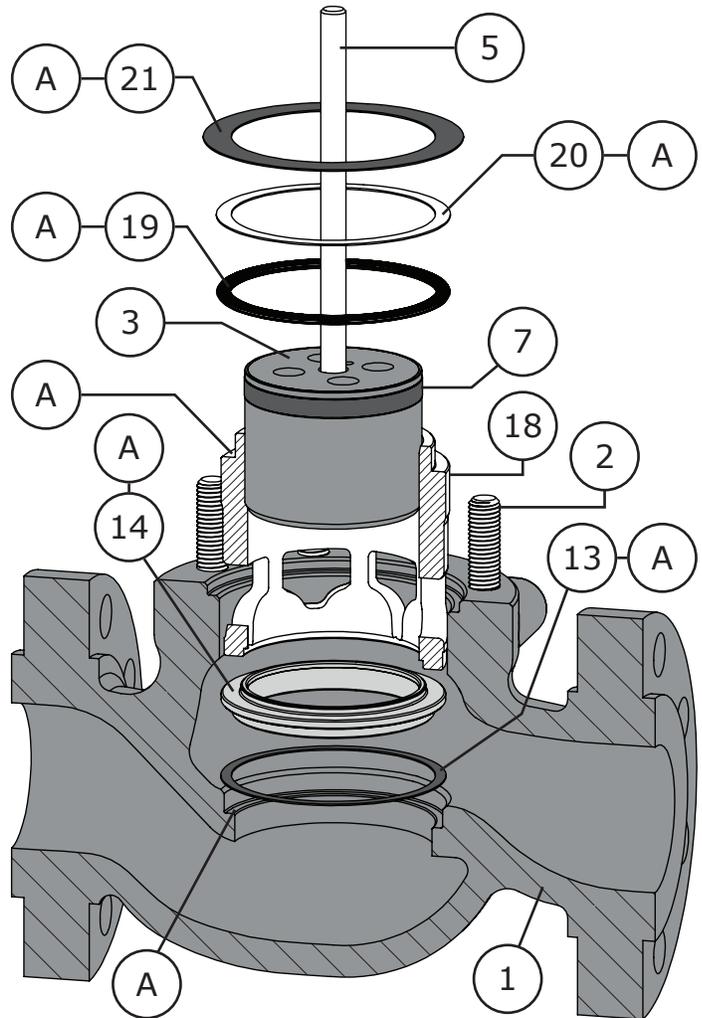
### ASSEMBLY (Continued)

#### TRIM PARTS ASSEMBLY

**NOTE:** The spiral wound gasket (Key 19) makes its seal by being crushed and cannot be reused.

- 1 Apply nickel anti-seize (Key A) to the seat ring pocket of the valve body (Key 1). Install the seat ring gasket (Key 13) into the valve body (Key 1). Apply nickel anti-seize (Key A) to the top of the seat ring gasket (Key 13). Refer to Figure 25.
- 4 Install the seat ring (Key 14) into the valve body (Key 1).
 

**For Soft Seat Valves:** Install the disk seat (Key 15) onto the seat ring gasket (Key 13). Install the PTFE disk (Key 16) onto the disk seat. Install the disk retainer (Key 17) onto the PTFE disk. Refer to Figure 11.
- 5 Install the cage (Key 18).
- 6 Apply Lubriplate® No. 105 (Key C) to the side of the valve plug (Key 3) (Refer to Figures 19, 20, 21, & 22). Install the valve plug assembly into the cage (Key 18) (Refer to Figure 25).
- 7 Apply nickel anti-seize (Key A) to the gasket surface of the cage (Key 18) and top surface of the spiral wound gasket (Key 19), metal shim (Key 20), and bonnet gasket (Key 21). Install the gaskets and shim as shown in Figure 25.



▲  
**Figure 25** Trim Parts Assembly

### ASSEMBLY (Continued)

#### BONNET INSTALLATION

##### Before You Begin:

- Read Safety Caution (Page 2).
- Clean and inspect all parts.
- Replace or repair damaged parts. Replace all soft parts (Seals, o-rings, gaskets, live loaded packing).

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### ASSEMBLY (Continued)

#### BONNET INSTALLATION (Continued)

- 1 Apply nickel anti-seize (Key A) to the gasket sealing surface of the valve bonnet (Key 24).
- 2 Lift and lower the valve bonnet (Key 24) into place over the valve stem (Key 5). Be careful not to damage either the stem, bonnet, or valve body (Key 1).
- 3 Apply nickel anti-seize (Key A) to the threads of the bonnet studs (Key 2). Thread the bonnet nuts (Key 26) onto the bonnet studs until hand tight.
- 4 Stroke the valve a few times to center the valve trim.
- 5 It may help to install the packing follower (Key 36) during bonnet installation to act as a visual cue to indicate areas of over or under tightening. If the packing follower begins to bind or appear lop-sided, this is an indication that torquing procedures in Steps 6 & 7 need to be altered to correct areas that need more tightening or less. The packing follower should remain centered during the torquing process.
- 6 Follow proper body-to-bonnet bolting procedures. Begin to torque the bonnet nuts (Key 26)  $\frac{1}{4}$  of the torque value listed in Table 4, torque the nuts in a crisscross pattern as shown in Figure 27. Hot torquing the valve nuts is not recommended.
- 7 Continue tightening the bonnet nuts (Key 26), increasing the torque by  $\frac{1}{4}$  of the final torque specification each round of tightening while repeating the crisscross pattern until the final torque specification is reached.
- 8 Double check the tightness of all nuts by torquing the nuts to the final torque specification one more time after the final torque value was reached.

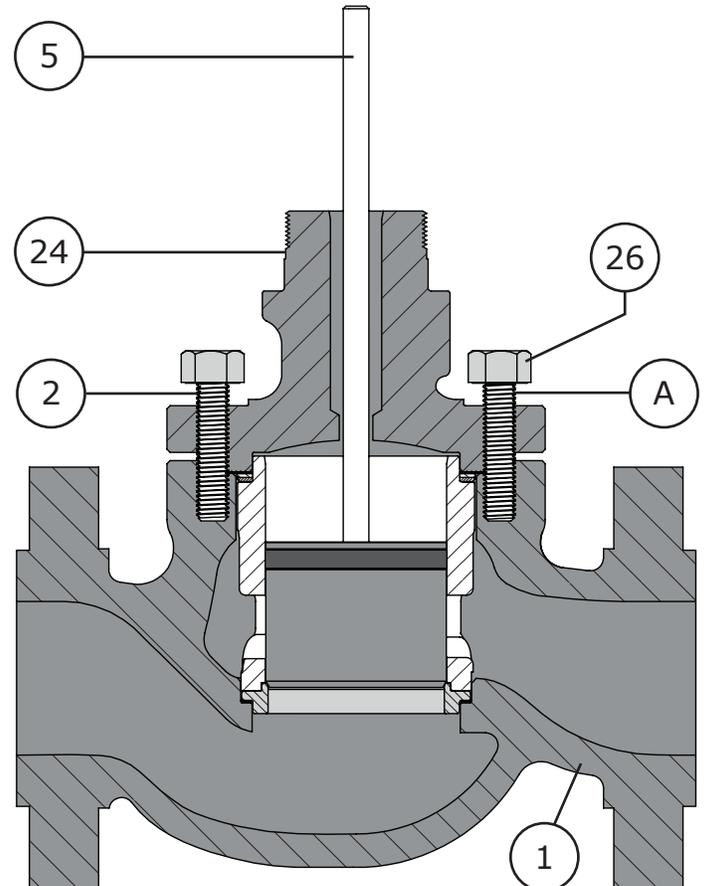


Figure 26 Bonnet Installation

#### SAMPLE BOLT CONFIGURATION

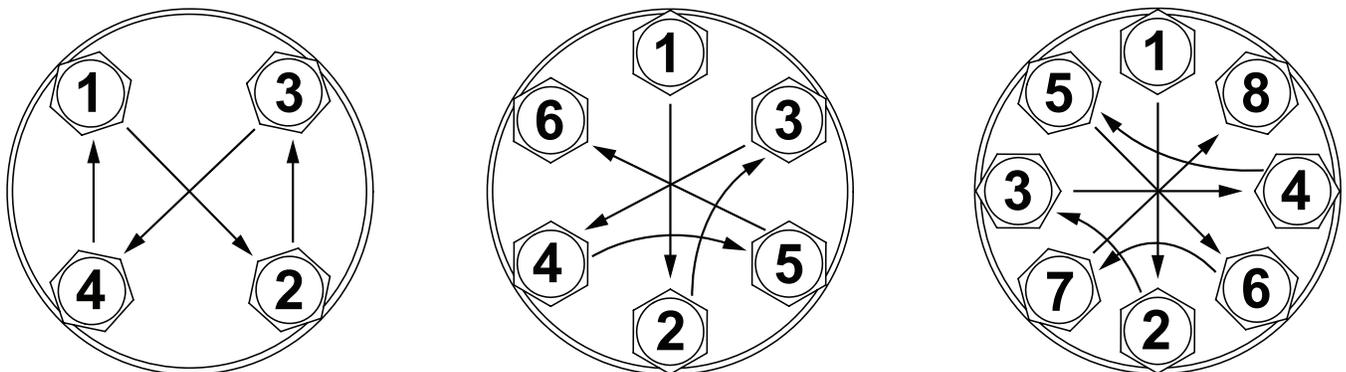


Figure 27 Bolt Tightening Pattern Diagram



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### ASSEMBLY (Continued)

#### PACKING INSTALLATION

For Live Loaded packing instructions refer to the Live Loaded Sliding Stem Packing Manual (Part Number P-LLPS). For other packing arrangements refer to Figures 29, 31, 32, & 33.

#### Lubricants Required:

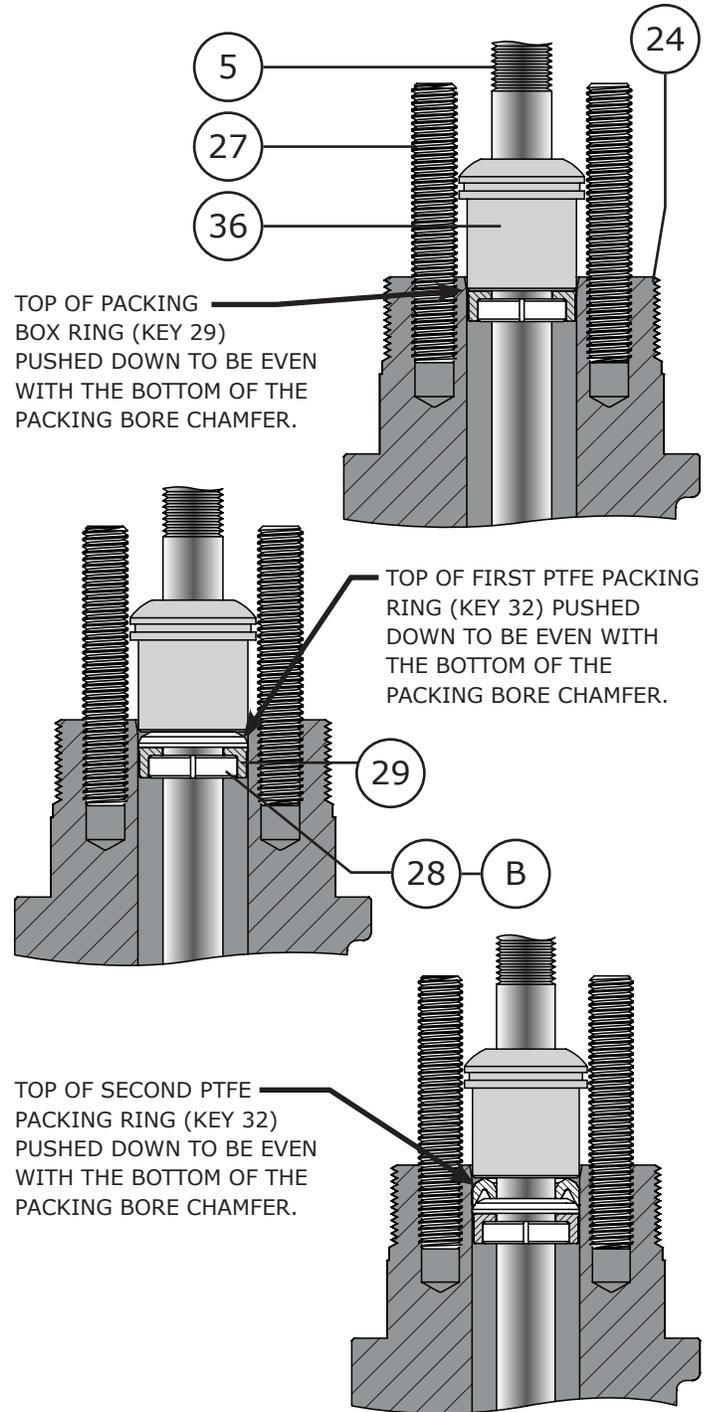
- Permatex® Nickel Anti-Seize or equivalent (Key A)
- Dow Corning Molykote® 111 or equivalent (Key B)
- Lubriplate® No. 105 Grease or equivalent (Key C)

**NOTE:** To prevent trapping air between packing during installation, it is recommended that packing rings be installed one at a time using the packing follower (Key 36) to push the packing rings in place. Do not force packing rings below the chamfer of the packing bore before adding another ring, packing rings should only be pushed down the thickness of the added ring. Refer to Figure 28.

- 1 If the packing studs (Key 27) were replaced, removed, or never installed, apply nickel anti-seize (Key A) to the threads of the end of the stud without a material stamp.
- 2 Thread the studs (Key 27) into the valve bonnet (Key 24) anti-seize coated end first until they are completely threaded into the bonnet.

#### For Single Style (Spring-Loaded) Packing:

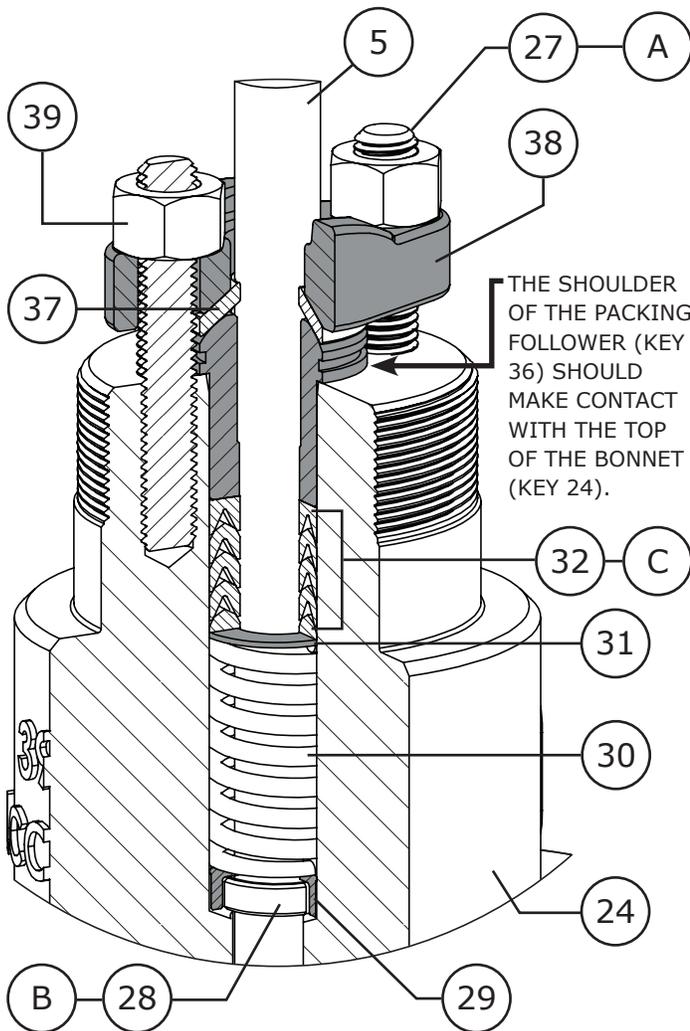
- 1 Apply Molykote® 111 (Key B) to the lower stem wiper (Key 28). Insert the lower stem wiper into the packing box ring (Key 29). Insert the packing box ring into the packing bore of the valve bonnet (Key 24). Refer to Figure 29.
- 2 Install the packing spring (Key 30).
- 3 Install the special washer (Key 31).
- 4 Apply Molykote® 111 (Key B) to the PTFE packing rings (Key 32). Install the packing rings one ring at a time (as shown in Figure 28) in the proper order and orientation as shown in Figures 29, 30-33. **WARNING:** For oxygen service do not apply Molykote® 111, Molykote® 111 in oxygen service applications can cause an explosion.
- 5 Install the packing follower (Key 36).
- 6 Install the upper stem wiper (Key 37).



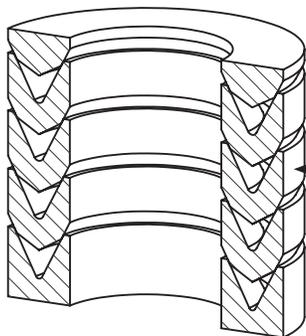
**Figure 28** Proper Packing Ring Installation

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**NOTE: Molykote® 111 (KEY B) SHOULD NOT BE USED WITH OXYGEN SERVICE.**



FOR VACUUM PACKING APPLICATIONS, REVERSE THE DIRECTION OF THE CUP OF THE PTFE PACKING RINGS (KEY 32) AS SHOWN.

**Figure 29** Single Style Packing Installation Diagram

### ASSEMBLY (Continued)

#### PACKING INSTALLATION (Continued)

##### For Single Style (Spring-Loaded) Packing (Continued):

- 7 Install the packing flange (Key 38).
- 8 Apply nickel anti-seize (Key A) to the top threads of the packing studs (Key 27). Thread the packing nuts (Key 39) onto the threads of the packing studs, tighten the packing nuts evenly in an alternating pattern until the shoulder of the packing follower (Key 36) makes contact with the bonnet (Key 24) and the torque value in Table 5 is reached.

##### For Double Style PTFE Packing:

- 1 Apply Molykote® 111 (Key B) to the lower stem wiper (Key 28). Insert the lower stem wiper into the packing box ring (Key 29). Insert the packing box ring into the packing bore of the valve bonnet (Key 24).
- 2 Apply Molykote® 111 (Key B) to the first set of packing rings (Key 32). Install the packing rings one ring at a time (as shown in Figure 28) in the proper order and orientation as shown in Figure 33. **WARNING:** For oxygen service do not apply Molykote® 111, Molykote® 111 in oxygen service applications can cause an explosion.
- 3 Install the lantern ring (Key 35).
- 4 Apply Molykote® 111 (Key B) to the second set of packing rings (Key 32). Install the packing rings one ring at a time (as shown in Figure 28) in the proper order and orientation as shown in Figure 33. **WARNING:** For oxygen service do not apply Molykote® 111, Molykote® 111 in oxygen service applications can cause an explosion.
- 5 Install the packing follower (Key 36).
- 6 Install the upper stem wiper (Key 37).
- 7 Install the packing flange (Key 38).
- 8 Apply nickel anti-seize (Key A) to the top threads of the packing studs (Key 27).



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### ASSEMBLY (Continued)

#### PACKING INSTALLATION (Continued)

##### For Double Style PTFE Packing (Continued):

- 9 Thread the packing nuts (Key 39) onto the threads of the packing studs, tighten the packing nuts evenly in an alternating pattern until one of the packing nuts reaches the minimum torque requirement shown in Table 5. Tighten the remaining packing flange nut until the packing flange (Key 38) becomes level (is parallel with the top face of the bonnet), refer to Figure 30.

##### For Graphite Packing:

- 1 Install the packing box ring (Key 29).
- 2 Install the first lantern ring (Key 35).
- 3 Install the second lantern ring (Key 35).
- 4 Install 1 ring of graphite filament (Key 33) as shown in Figure 31 and described in Figure 28. **NOTE:** Graphite filament is a wound material that typically looks like rope and is split.
- 5 Install 1 ring of graphite ribbon (Key 34) as shown in Figure 31 and described in Figure 28. **NOTE:** Graphite ribbon is compressed into rings and not split like the graphite filament.
- 6 Install the remainder of the graphite filament (Key 33) and graphite ribbon (Key 34) one at a time (as described in Figure 28) in the proper order and orientation as shown in Figure 31.
- 7 Install the packing follower (Key 36).
- 8 Install the packing flange (Key 38).
- 9 Apply nickel anti-seize (Key A) to the top threads of the packing studs (Key 27). Thread the packing nuts (Key 39) onto the threads of the packing studs, tighten the packing nuts evenly in an alternating pattern until the packing nuts reach the maximum recommended torque shown in Table 5. Loosen the packing nuts and retighten them to the minimum recommended torque shown in Table 5.

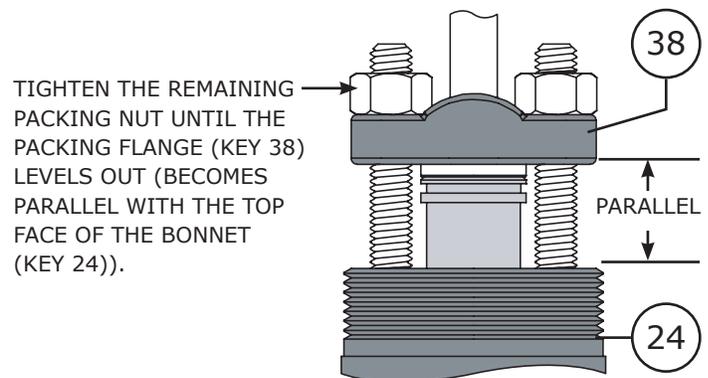
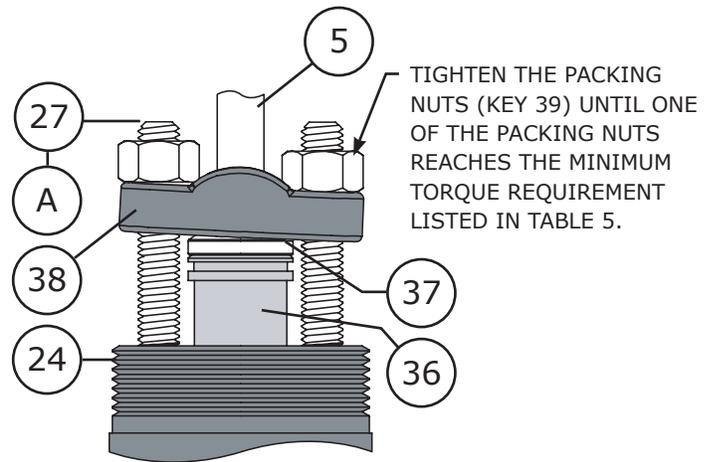
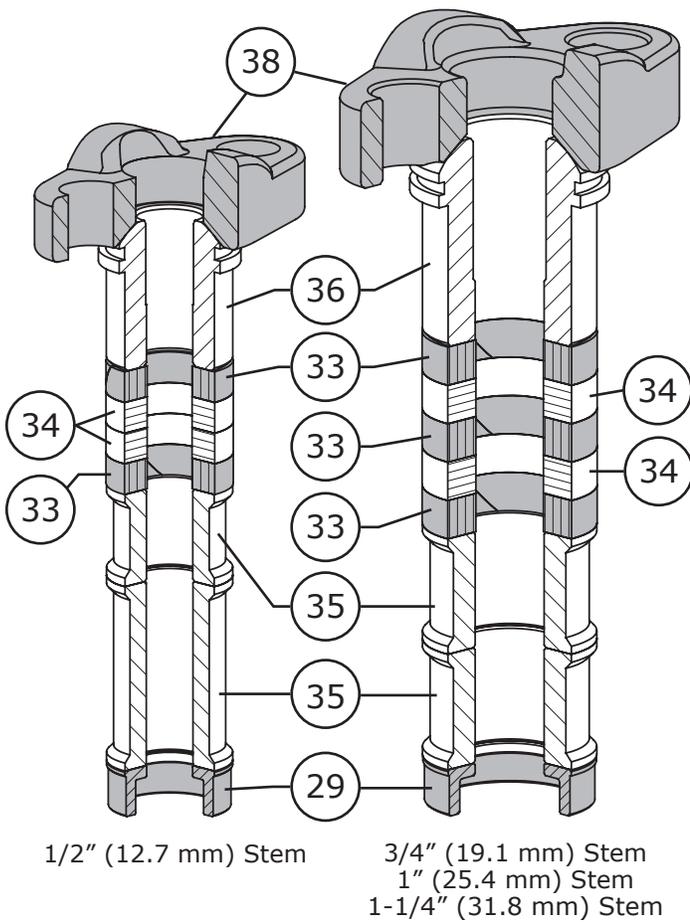


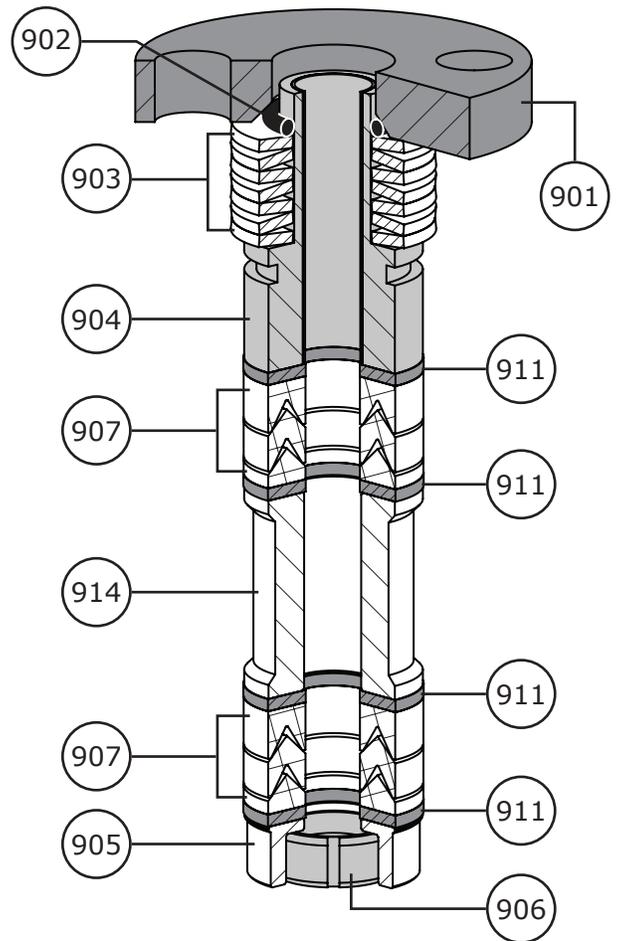
Figure 30 Double PTFE V-Ring Packing Tightening Diagram

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**Figure 31** Graphite Packing Arrangement Diagram

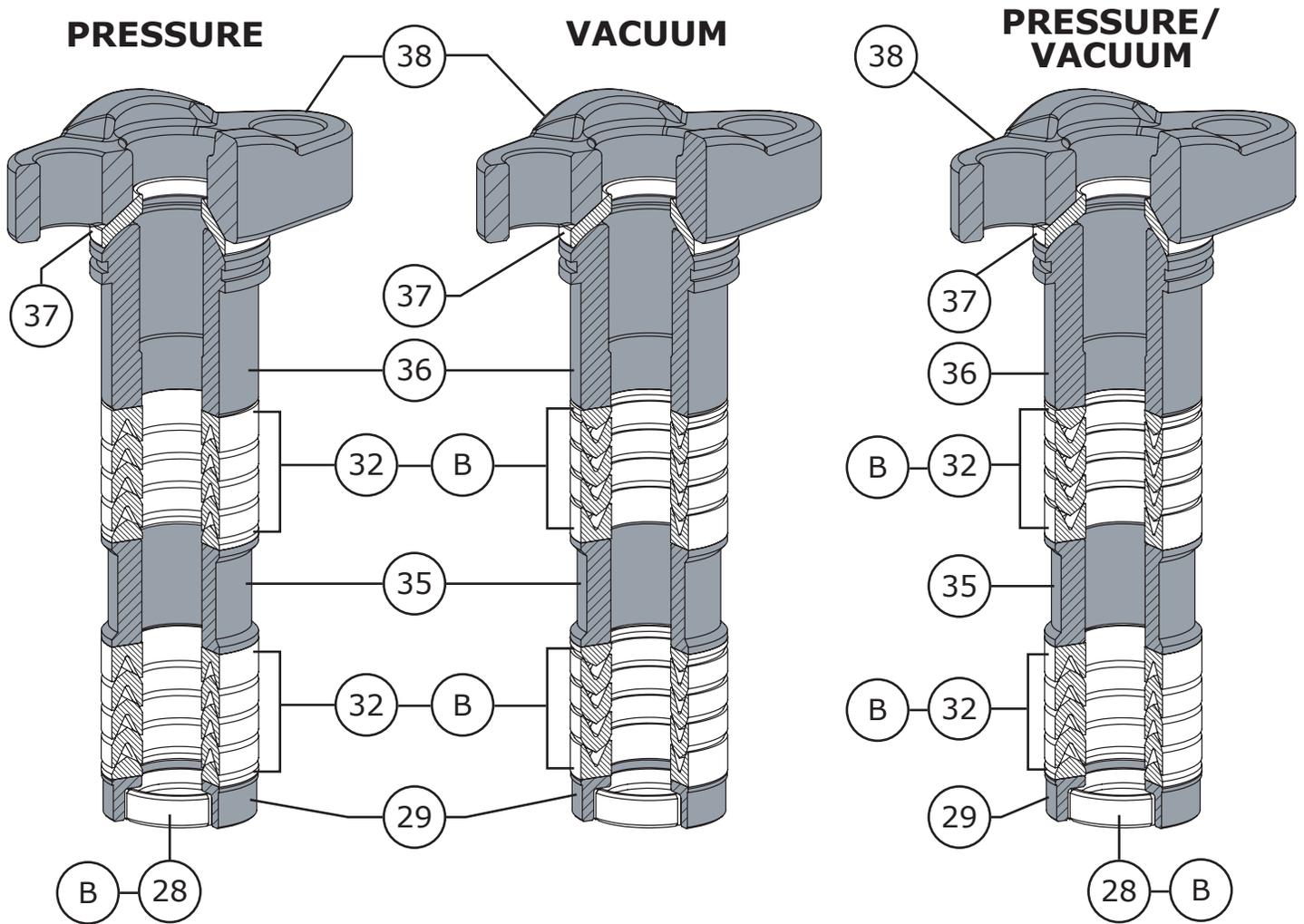


**Figure 32** Live Loaded Packing Example



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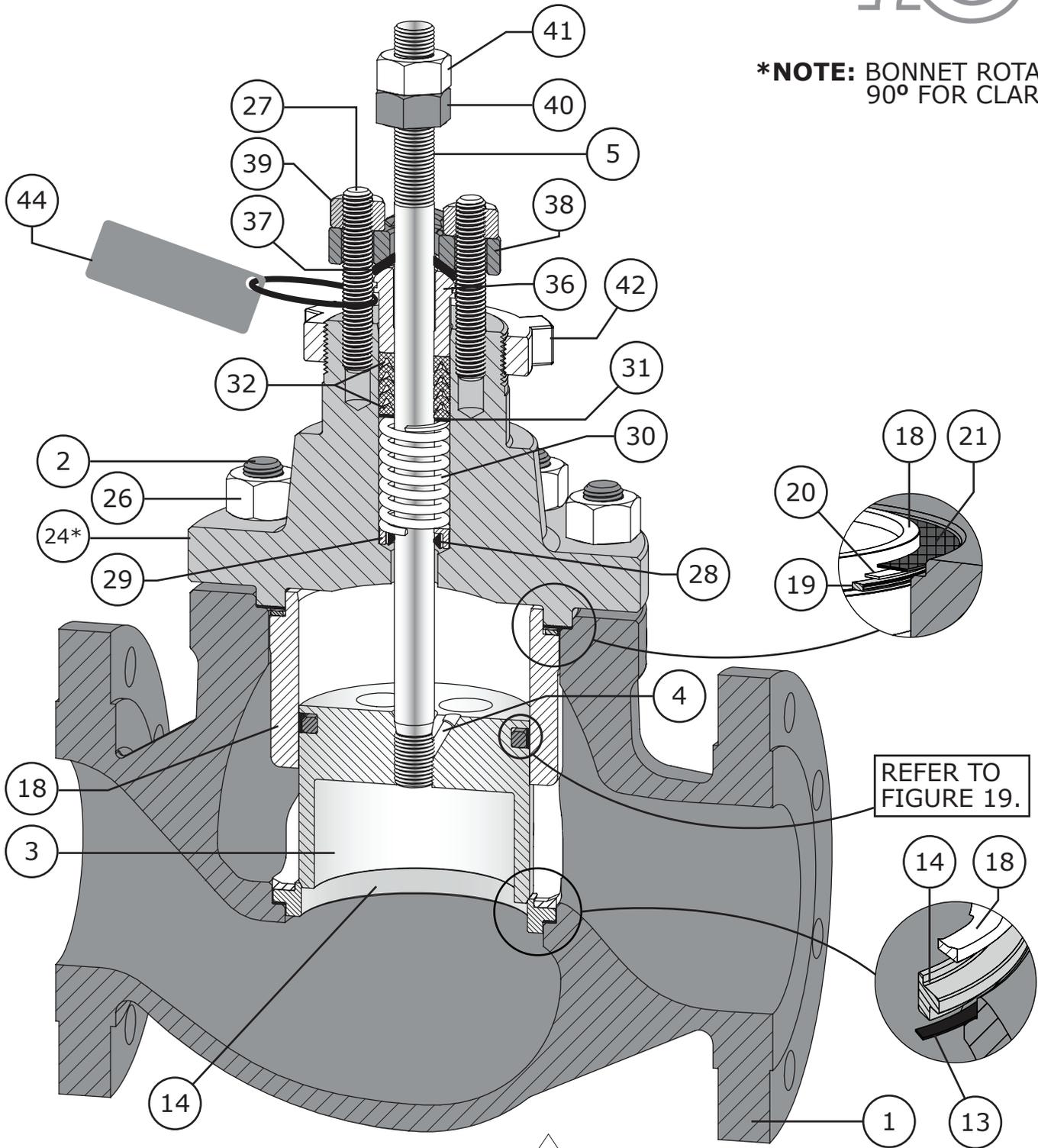
**Figure 33** Double PTFE Packing Diagrams

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**\*NOTE:** BONNET ROTATED 90° FOR CLARITY.

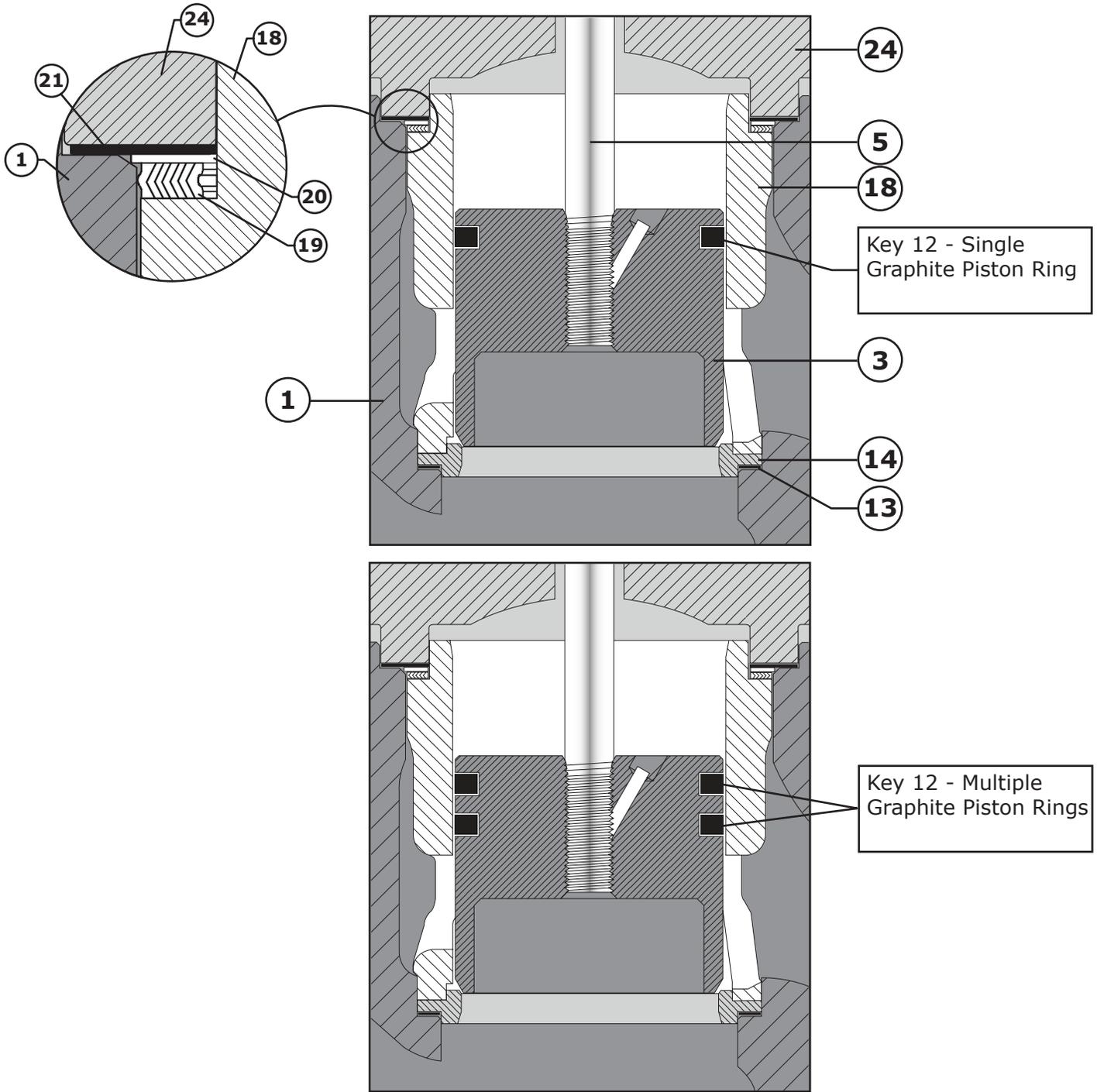


**Figure 34** Model 350 Control Valve Cross Section



# Model 350/351 Control Valves

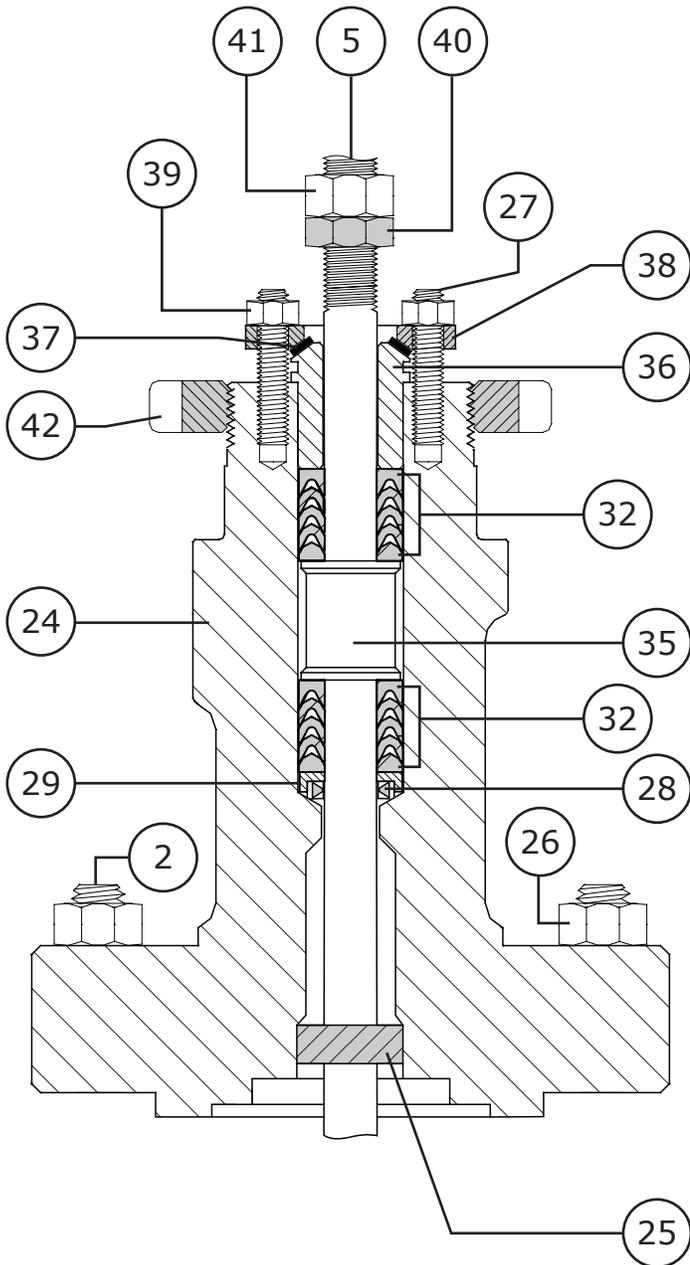
## Operation, Parts, and Instruction Manual



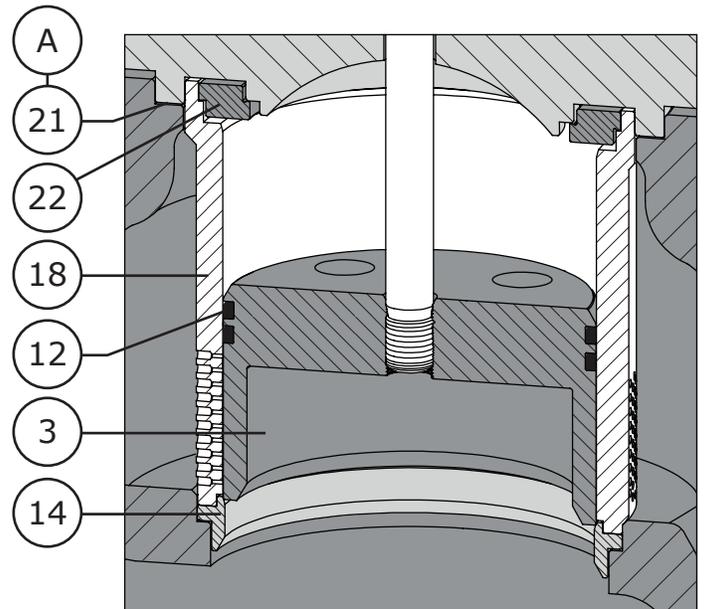
**Figure 35** Model 351 Piston Ring Detail

# Model 350/351 Control Valves

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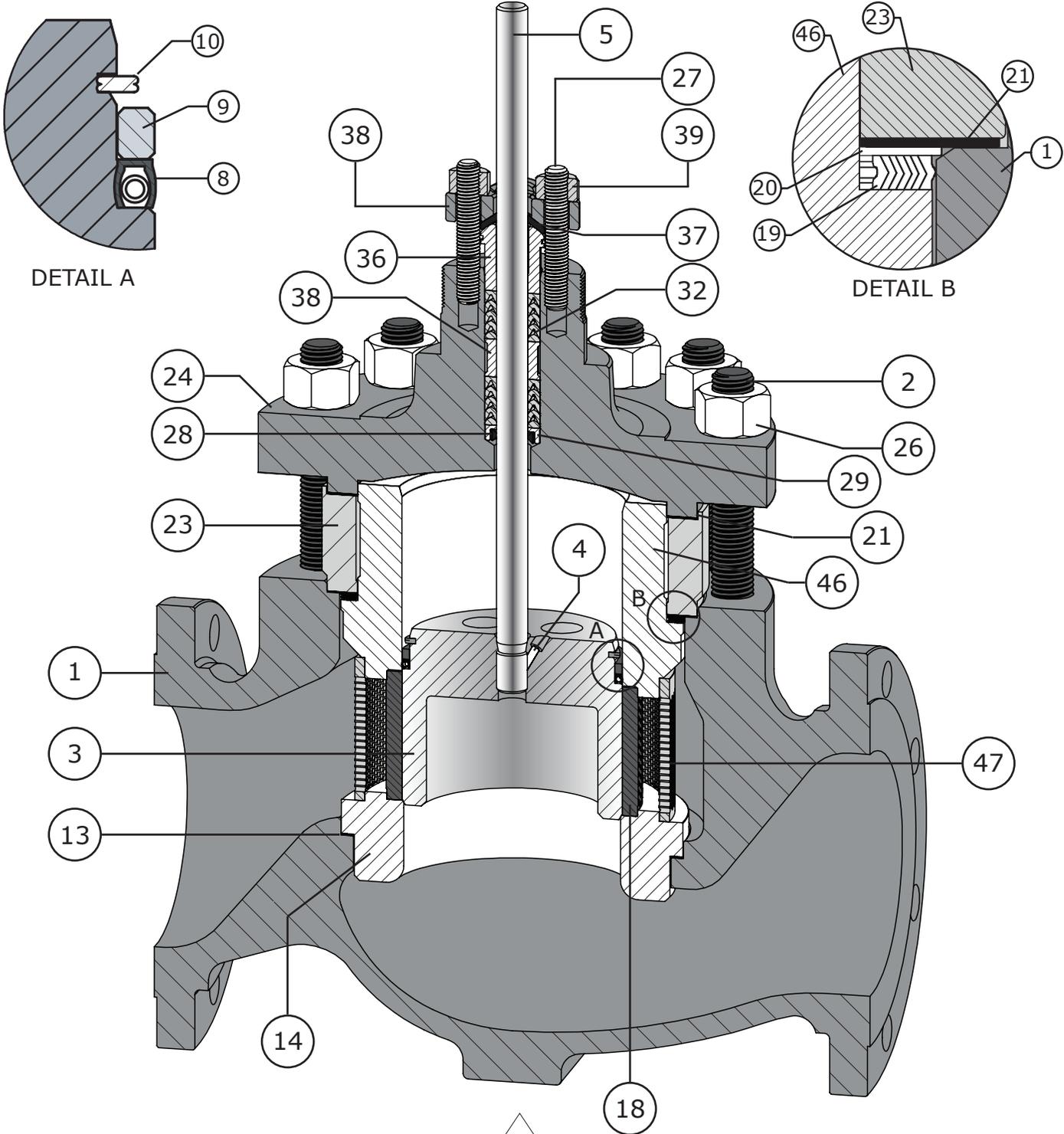


**Figure 36** Extension Bonnet Diagram



**Figure 37** Load Ring Diagram (8 Inch Valve Assembly)

# Model 350/351 Control Valves



**Figure 38** Model 350 Control Valve Cross Section - Low Noise Trim

# Model 350/351 Control Valves



Table 4

Body to Bonnet Stud Torque		Bolt Torques					
Globe Body Valves	Valve Sizes (Inch) ASME Class	B7 B7 Fluorokote #1		B7M B7M Fluorokote #1 B8M CL2 (strain hardened)		B8M CL2 (annealed)	
		N•m	lbf-ft.	N•m	lbf-ft.	N•m	lbf-ft.
		8x6	150 / 300 / 600 900	549 1315	405 970	549 1315	405 970
10x8	150 / 300 / 600	Contact Dyna-Flo	Contact Dyna-Flo	Contact Dyna-Flo	Contact Dyna-Flo	Contact Dyna-Flo	Contact Dyna-Flo
12x6	150 / 300 / 600	549	405	549	405	366	270
12x8	150 / 300 / 600	745	550	745	550	529	390

Table 5

Packing Nut Torque Values		PTFE Single and Double Type Packing				Graphite Single and Double Type Packing			
Valve Stem Diameter Inch (mm)	ASME Class	Min. Torque		Max. Torque		Min. Torque		Max. Torque	
		lbf-in.	N•m	lbf-in.	N•m	lbf-in.	N•m	lbf-in.	N•m
		1/2 (12.7)	150 300 600	17 27 35	2 3 4	35 44 58	4 5 7	44 58 80	5 7 9
3/4 (19.1)	150 300 600	44 62 89	5 7 10	71 97 133	8 11 15	97 133 186	11 15 21	150 204 274	17 23 31
1 (25.4)	300 600	106 150	12 17	159 221	18 25	230 310	26 35	336 469	38 53
1-1/4 (31.8)	300 600	152 209	17 24	228 314	26 36	318 437	36 49	477 655	54 74

Table 6

Valve Stem Connection Assembly Torque and Pin Replacement	VSC Diameter Inches (mm)	Torque lbf-ft. (N•m)	Hole Size Inches (mm)
	1/2 (12.7)	60 - 85 (81 - 115)	0.126 - 0.128 (3.20 - 3.25)
	3/4 (19.1)	175 - 250 (237 - 339)	0.189 - 0.192 (4.80 - 4.88)
	1 (25.4)	310 - 355 (420 - 481)	0.251 - 0.254 (6.38 - 6.45)
	1-1/4 (31.8)	610 - 670 (827 - 908)	0.251 - 0.254 (6.38 - 6.45)



# Model 350/351 Control Valves

## Operation, Parts, and Instruction Manual

### Parts

Key	Description	Part Number
<b>1</b>	<b>Body</b> If you need a body as a replacement part, order by valve size and stem diameter, serial number and desired material.	
<b>2</b>	<b>Stud, Bonnet/Body</b> <b>NOTE:</b> Anti-Cavitation 2 Stage and Low-Noise III D3 Trim may require a bonnet spacer and will require special studs. Consult Dyna-Flo.	
	-B7	
	8x6", 12x6" body (12 Required)	1A36563101D
	10x8", 12x8" body (16 Required)	1D94523101D
	-B8M	
	8x6", 12x6" body (12 Required)	1A36563522D
	10x8", 12x8" body (16 Required)	1D9452CL28D
	-B7M	
	8x6", 12x6" body (12 Required)	1A3656B7MDD
	10x8", 12x8" body (16 Required)	1D9452X011D
	-B7 Fluorokote #1	
	8x6", 12x6" body (12 Required)	1A3656XFK1D
	10x8", 12x8" body (16 Required)	1D9452XFK1D
	-B7M Fluorokote #1	
	8x6", 12x6" body (12 Required)	1A3656XFK3D
	10x8", 12x8" body (16 Required)	1D9452XFK3D
<b>3</b>	<b>Valve Plug</b>	Refer to Tables 7-9
<b>4</b>	<b>Pin</b>	
	-S31600	
	1/2 inch (12.7mm) Stem	1V32273507D
	3/4 inch (19.1mm) Stem	1V32603507D
	-S20910	
	1 inch (25.4 mm) Stem	1V3340NT05D
	1-1/4 inch (31.8 mm) Stem	1V3340NT05D
<b>5</b>	<b>Valve Stem</b>	Refer to Table 11
<b>6</b>	<b>Backup Ring, Two-Piece Plug Seal</b>	
	-Fluoroelastomer (Viton)	
	4-3/8 inch port diameter	1V65980529D
	7 inch port diameter	1V66000529D

Key	Description	Part Number
	-Nitrile	
	4-3/8 inch port diameter	1V65980305D
	7 inch port diameter	1V66000305D
	-Ethylene Propylene	
	4-3/8 inch port diameter	1V6598X002D
	5-3/8 inch port diameter	11A9728X04D
<b>7</b>	<b>Seal Ring, Two-Piece Plug Seal, C-TFE (Standard)</b>	
	4-3/8 inch port diameter	1V65990509D
	7 inch port diameter	1V66010509D
<b>8</b>	<b>Seal Ring, Three-Piece Plug Seal, PTFE/Elgiloy</b>	
	4-3/8 inch port diameter	10A4223X03D
	5-3/8 inch port diameter	10A5411X03D
	7 inch port diameter	10A2643X03D
	8 inch port diameter	10A3261X03D
<b>9</b>	<b>Backup Ring, Three-Piece Plug Seal</b>	
	S31600/S31603 Dual Grade	
	4-3/8 inch port diameter	10A4224X02D
	5-3/8 inch port diameter	12A3332X02D
	7 inch port diameter w/ Anti-Ext	12B5997X01D
	8 inch port diameter w/ Anti-Ext	11B8325X02D
<b>10</b>	<b>Retaining Ring, Three-Piece Plug Seal, S31600</b>	
	2-7/8 inch port diameter	10A4219X01D
	3-7/16 inch port diameter	10A5350X01D
	4-3/8 inch port diameter	10A4225X01D
	5-3/8 inch port diameter	10A5410X01D
	7 inch port diameter w/ Anti-Ext	14A4652X01D
	8 inch port diameter w/ Anti-Ext	11B8322X01D
<b>11</b>	<b>Anti-Extrusion Ring, Three-Piece Plug Seal</b> PolyEtherEtherKetone (PEEK)	
	4-3/8 inch port diameter	21B9341X01D
	5-3/8 inch port diameter	21B9342X01D
	7 inch port diameter	22B5998X01D
	8 inch port diameter	22B9203X01D
<b>12</b>	<b>Piston Ring, Model 351 Only, Graphite</b>	
	4-3/8 inch port diameter	1U2392X002D
	5-3/8 inch port diameter	11A9727X03D
	7 inch port diameter	1U5069X002D
	8 inch port diameter	10A3262X03D
<b>13</b>	<b>Gasket, Seat Ring, S31600/Graphite</b>	
	8x6", 12x6" body	1U5086X003D
	10x8", 12x8" body	10A3266X08D

# Model 350/351 Control Valves

## Operation, Parts, and Instruction Manual



### Parts (Continued)

Key	Description	Part Number
14	<b>Seat Ring</b>	Refer to Table 12
15	<b>Disk Seat</b> , Soft Seat Valves, S31600/S31603 Dual Grade	Refer to Table 13
16	<b>PTFE Disk</b> , Soft Seat Valves, PTFE	Refer to table 13
17	<b>Disk Retainer</b> , Soft Seat Valves S31600/S31603 Dual Grade	Refer to Table 13
18	<b>Cage</b>	Refer to Table 10
19	<b>Spiral Wound Gasket</b> , S30400/Graphite 8x6", 12x6" body	Refer to Table 14
20	<b>Metal Shim</b> , S30400 8x6", 12x6" body	Refer to Table 14
21	<b>Gasket</b> , Body/Bonnet, S31600/Graphite 8x6", 12x6" body 10x8", 12x8" body	Refer to Table 14 Refer to Table 14
22	<b>Load Ring</b> , 8 inch valve only S17400	20A3267X01D
23	<b>Bonnet Spacer</b> If you need a bonnet spacer as a replacement part, order by valve size and stem diameter, serial number and desired material.	
24	<b>Bonnet</b> If you need a bonnet as a replacement part, order by valve size and stem diameter, serial number and desired material.	
25	<b>Bonnet Bushing</b> , included as part of extension bonnet assembly	
26	<b>Nut</b> , Body/Bonnet	
	-2H	
	8x6", 12x6" body (12 Required)	1A44092407D
	10x8", 12x8" body (16 Required)	1A44522407D
	-2HM	
	8x6", 12x6" body (12 Required)	1A44092HMDD
	10x8", 12x8" body (16 Required)	1A44522HMDD
	-8M	
	8x6", 12x6" body (12 Required)	1A44093525D
	10x8", 12x8" body (16 Required)	1A44523525D

Key	Description	Part Number
	-2H Fluorokote #1	
	8x6", 12x6" body (12 Required)	1A4409XFK1D
	10x8", 12x8" body (16 Required)	1A4452XFK1D
	-2HM Fluorokote #1	
	8x6", 12x6" body (12 Required)	1A4409XFK3D
	10x8", 12x8" body (16 Required)	1A4452XFK3D
27	<b>Packing Stud</b> , B8M, 2 Required	
	1/2 inch (12.7mm) Stem	1E94443522D
	3/4 inch (19.1mm) Stem	1E94493522D
	1 inch (25.4 mm) Stem	0V00253522D
	1-1/4 inch (31.8 mm) Stem	1N35653522D
28	<b>Lower Wiper</b> , Teflon	
	1/2 inch (12.7mm) Stem	1J87220699D
	3/4 inch (19.1mm) Stem	1J87230699D
	1 inch (25.4 mm) Stem	1J87240699D
	1-1/4 inch (31.8 mm) Stem	1J87250699D
29	<b>Packing Box Ring</b> , S31600/S31603 Dual Grade	
	1/2 inch (12.7mm) Stem	1J87323507D
	3/4 inch (19.1mm) Stem	1J87333507D
	1 inch (25.4 mm) Stem	1J87343507D
	1-1/4 inch (31.8 mm) Stem	1J87353507D
30	<b>Packing Spring</b> , SST	Refer to Table 16
31	<b>Special Washer</b> , SST	Refer to Table 16
32	<b>Packing Set</b> , PTFE	Refer to Table 16
33	<b>Graphite Filament</b>	Refer to Table 16
34	<b>Graphite Ribbon</b>	Refer to Table 16
35	<b>Lantern Ring</b> S31600/S31603 Dual Grade	Refer to Table 16
36	<b>Packing Follower</b> , S31600/S31603 Dual Grade	
	1/2 inch (12.7mm) Stem	1E94433507D
	3/4 inch (19.1mm) Stem	1E94473507D
	1 inch (25.4 mm) Stem	1H98233507D
	1-1/4 inch (31.8 mm) Stem	1H99843507D
37	<b>Upper Wiper</b> , Felt	
	1/2 inch (12.7mm) Stem	1J87270633D
	3/4 inch (19.1mm) Stem	1J87280633D
	1 inch (25.4 mm) Stem	1J87290633D
	1-1/4 inch (31.8 mm) Stem	1J87300633D



# Model 350/351 Control Valves

## Operation, Parts, and Instruction Manual

### Parts (Continued)

Key	Description	Part Number
<b>38</b>	<b>Packing Flange, Carbon Steel - Plated</b>	
	-Carbon Steel - Plated	
	1/2 inch (12.7mm) Stem	1E94422307D
	3/4 inch (19.1mm) Stem	1E94482307D
	1 inch (25.4 mm) Stem	0V00242505D
	1-1/4 inch (31.8 mm) Stem	0W08562505D
	-S31600/S31603 Dual Grade	
	1/2 inch (12.7mm) Stem	12B6924X01D
	3/4 inch (19.1mm) Stem	12B6925X01D
	1 inch (25.4 mm) Stem	12B6654X01D
1-1/4 inch (31.8 mm) Stem	12B6680X01D	
<b>39</b>	<b>Packing Nut, 8M, 2 Required</b>	
	1/2 inch (12.7mm) Stem	1E94453525D
	3/4 inch (19.1mm) Stem	1E94463525D
	1 inch (25.4 mm) Stem	1A34333525D
	1-1/4 inch (31.8 mm) Stem	1A36813525D
<b>40</b>	<b>Jam Nut, Valve Stem, Steel/Zinc Plated</b>	
	1/2 inch (12.7mm) Stem	NHJFZ12
	3/4 inch (19.1mm) Stem	NHJFZ34
	1 inch (25.4 mm) Stem	NHJFZ100
	1-1/4 inch (31.8 mm) Stem	NHJFZ114
<b>41</b>	<b>Hex nut, Valve Stem, Steel/Zinc Plated</b>	
	1/2 inch (12.7mm) Stem	NHFZ12
	3/4 inch (19.1mm) Stem	NHFZ34
	1 inch (25.4 mm) Stem	NH8FZ100
	1-1/4 inch (31.8 mm) Stem	NHFZ114
<b>42</b>	<b>Yoke Locknut, Carbon Steel - Plated</b>	
	2-13/16 inch (71 mm) Yoke Boss	1E80742306D
	3-9/16 inch (91 mm) Yoke Boss	1E83272306D
<b>43</b>	<b>Flow Arrow, S30400</b>	1V10603898D
<b>44</b>	<b>Nameplate, Body S30400</b>	NAMEXSBODYD
<b>45</b>	<b>Nameplate, Actuator S30400</b>	NAMEXSRACD
<b>46</b>	<b>Cage Retainer</b>	Contact Dyna-Flo
<b>47</b>	<b>Cage Retainer Assembly</b>	Contact Dyna-Flo

Key	Description	Part Number
<b>48</b>	<b>Actuator Mounting Stud, B8M, 8 Required</b>	
	5" Yoke Boss / 1" Stem	1J6981B8MDD
	5H Yoke Boss / 1-1/4" Stem	1R3690CL28D
<b>49</b>	<b>Actuator Mounting Nut, 8 Required</b>	
	5" Yoke Boss / 1" Stem - 316	1A34333525D
	5H Yoke Boss / 1-1/4" Stem - 8M	1A35203525D

### Parts (Live Loaded Packing)

Key	Description	Part Number
<b>901</b>	<b>Live Loaded Packing Flange</b>	
	Refer to the P-LLPS Manual	
<b>902</b>	<b>O-Ring</b>	
	Refer to the P-LLPS Manual	
<b>903</b>	<b>Spring Washers</b>	
	Refer to the P-LLPS Manual	
<b>904</b>	<b>Live Loaded Packing Follower</b>	
	Refer to the P-LLPS Manual	
<b>905</b>	<b>Live Loaded Packing Box Ring</b>	
	Refer to the P-LLPS Manual	
<b>906</b>	<b>Live Loaded Lower Wiper</b>	
	Refer to the P-LLPS Manual	
<b>907</b>	<b>Live Loaded V-Ring Packing Set</b>	
	Refer to the P-LLPS Manual	
<b>911</b>	<b>Anti-Extrusion Ring</b>	
	Refer to the P-LLPS Manual	
<b>914</b>	<b>Live Loaded Lantern Ring</b>	
	Refer to the P-LLPS Manual	

### Parts Ordering

Whenever corresponding with Dyna-Flo about a 350 Series Control Valves, refer to the nameplate (Key 45) or name tag (Key 44) for the serial number of the unit. Please order by the complete part number (as given in the part lists) of each part required.

# Model 350/351 Control Valves

## Operation, Parts, and Instruction Manual



**Table 7**

### Model 350 Valve Plug (Key 3) - Two-Piece Seal Ring

Valve Size Inch	Travel Inch (mm)	Stem Diameter		Plug Material			
		Inch	mm	S41600 HT	S31600	S31600 / Alloy 6 Seat	S31600 / Alloy 6 Seat & Guide
8x4	2 (50.8)	1/2 <sup>(1)</sup>	12.7 <sup>(1)</sup>	1V65814617D	1V65813507D	11A5341X01D	11A5344X01D
		3/4	19.1	1V65824617D	1V65823507D	11A5342X01D	11A5345X01D
		1	25.4	1V65834617D	1V65833507D	11A5343X01D	11A5346X01D
8x6 12x6 (Except for Low-Noise III Construction)	2 (50.8) 3 (76.2)	3/4 <sup>(1)</sup>	19.1 <sup>(1)</sup>	1V65844617D	1V65843507D	11A5350X01D	21A5351X01D
		1	25.4	1V65854617D	1V65853507D	10A5107X01D	20A0103X01D
		1-1/4	31.8	1V65864617D	1V65863507D	10A5108X01D	20A4608X01D
	4 (102)	3/4 <sup>(1)</sup>	19.1 <sup>(1)</sup>	11A2622X01D	11A2622X02D	Consult Dyna-Flo	21A8128X01D
		1	25.4	Consult Dyna-Flo	Consult Dyna-Flo	Consult Dyna-Flo	Consult Dyna-Flo
		1-1/4	31.8	Consult Dyna-Flo	Consult Dyna-Flo	Consult Dyna-Flo	Consult Dyna-Flo

**Notes:**  
**1** - Standard option.  
 - All S31600 barstock is dual grade S31600/S31603 (316/316L).

**Table 8**

### Model 350 Valve Plug (Key 3) - Three-Piece Seal Ring (Except Anti-Cavitation Construction)

Valve Size Inch	Stem Diameter		Plug Material			
	Inch	mm	S41600 HT	S31600	S31600 / Alloy 6 Seat	S31600 / Alloy 6 Seat & Guide
8x4	1/2 <sup>(1)</sup>	12.7 <sup>(1)</sup>	20A2641X01D	20A2641X02D	360P4428X3D	21A0187X01D
	3/4	19.1	20A4194X01D	20A4194X0AD	360P4437X3D	20A4197X01D
	1	25.4	20A4195X01D	20A4195X03D	Consult Dyna-Flo	20A4198X01D
8x6 12x6 (Except for Low-Noise III Construction)	3/4 <sup>(1)</sup>	19.1 <sup>(1)</sup>	20A2642X01D	20A2642X02D	360P6532X3D	21A8443X01D
	1	25.4	20A5621X01D	20A5621X02D	21A8442X01D	20A6706X01D
	1-1/4	31.8	20A7343X01D	20A7343X02D	Consult Dyna-Flo	Consult Dyna-Flo
10x8 <sup>(2)</sup> 12x8 <sup>(2)</sup>	3/4 <sup>(1)</sup>	19.1 <sup>(1)</sup>	21A5356X01D	21A5356X02D	21A5359X01D	21A5362X01D
	1	25.4	21A5357X01D	21A5357X02D	21A5360X01D	21A5363X01D
	1-1/4	31.8	21A5358X01D	21A5358X02D	21A5361X01D	21A5364X01D

**Notes:**  
**1** - Standard option.  
**2** - Valve plugs for 8 inch (203.2 mm) ports use one-piece plug seals constructed with a seal ring (Key 8) only, they do not use backup rings (Key 9) or retaining rings (Key 10). These valves are also assembled with a style 1 extension bonnet as standard construction.  
 - All S31600 barstock is dual grade S31600/S31603 (316/316L).



# Model 350/351 Control Valves

## Operation, Parts, and Instruction Manual

**Table 9**

**Model 351 Valve Plug (Key 3) - Piston Ring Construction**

Valve Size Inch	Stem Diameter		Plug Material			
	Inch	mm	S41600 HT	S31600	S31600 / Alloy 6 Seat	S31600 / Alloy 6 Seat & Guide
8x6 12x6 Single Piston Ring (Except For Low-Noise III Construction)	3/4 <sup>(1)</sup>	19.1 <sup>(1)</sup>	1V65844617D	1V65843507D	11A5350X01D	21A5351X01D
	1	25.4	1V65854617D	1V65853507D	10A5107X01D	20A0103X01D
	1-1/4	31.8	1V65864617D	1V65863507D	10A5108X01D	20A4608X01D
8x6 12x6 Triple Piston Ring (Except For Low-Noise III Construction)	3/4 <sup>(1)</sup>	19.1 <sup>(1)</sup>	27A3944X01D	27A3944X02D	Consult Dyna-Flo	27A3950X01D
	1	25.4	27A3945X01D	27A3945X02D	Consult Dyna-Flo	27A3951X01D
10x8 <sup>(2)</sup> 12x8 <sup>(2)</sup> Single Piston Ring	3/4 <sup>(1)</sup>	19.1 <sup>(1)</sup>	21A5356X01D	21A5356X02D	21A5359X01D	21A5362X01D
	1	25.4	21A5357X01D	21A5357X02D	21A5360X01D	21A5363X01D
	1-1/4	31.8	21A5358X01D	21A5358X02D	21A5361X01D	21A5364X01D
10x8 <sup>(2)</sup> 12x8 <sup>(2)</sup> Double Piston Ring	3/4 <sup>(1)</sup>	19.1 <sup>(1)</sup>	27A3956X01D	27A3956X02D	360P8239X3D	27A3962X01D
	1	25.4	27A3957X01D	27A3957X02D	Consult Dyna-Flo	27A3963X01D
<b>Notes:</b>	<b>1</b> - Standard option.					
	<b>2</b> - Valve plugs for 8 inch (203.2 mm) ports use one-piece plug seals constructed with a seal ring (Key 8) only, they do not use backup rings (Key 9) or retaining rings (Key 10). These valves are also assembled with a style 1 extension bonnet as standard construction.					
	- All S31600 barstock is dual grade S31600/S31603 (316/316L).					

# Model 350/351 Control Valves

## Operation, Parts, and Instruction Manual



**Table 10**

**Cage (Key 18) - Except for Anti-Cavitation and Low-Noise III Construction**

Valve Size Inch	Characteristic	Cage Material		
		S17400 H900	S17400 DH1150	S31600/ENC
8x6 12x6	Equal Percent	2U50593327D	2U50591150D	2U80674893D
	Linear	2U50613327D	2U50611150D	2U80684893D
	Quick-Opening	2U50633327D	2U50631150D	2U80694893D
10x8 12x8	Equal Percent	20A3245X01D	20A3245X05D	20A5467X01D
	Linear	20A3247X01D	20A3247X05D	20A5468X01D
	Quick-Opening	20A3249X01D	20A3249X02D	20A5469X01D
<b>Notes:</b>	- All S31600 barstock is dual grade S31600/S31603 (316/316L).			



# Model 350/351 Control Valves

## Operation, Parts, and Instruction Manual

**Table 11**

**Stem (Key 5) - S20910 - Except for Anti-Cavitation Construction**

Valve Size		Stem Diameter		Bonnet Style			
		Inch	mm	Standard	Style 1 Extension	Style 2 Extension	
8x4		1/2	12.7	1U2305NT50D	1U2306NT50D	1U2307NT50D <sup>(4)</sup>	
		3/4	19.1	1K5877NT50D	1U4446NT50D	Consult Dyna-Flo	
		1	25.4	Consult Dyna-Flo	Consult Dyna-Flo	Consult Dyna-Flo	
8x6 Class 150/300/600	2 inch (51 mm) Travel	3/4	19.1	1L9964NT50D	1U5071NT50D	Consult Dyna-Flo	
		1	25.4	Consult Dyna-Flo	Consult Dyna-Flo	Consult Dyna-Flo	
		1-1/4	31.8	Consult Dyna-Flo	Consult Dyna-Flo	Consult Dyna-Flo	
	3 inch (76 mm) Travel	3/4	19.1	Consult Dyna-Flo	Consult Dyna-Flo	Consult Dyna-Flo	
		1	25.4	Consult Dyna-Flo	Consult Dyna-Flo	Consult Dyna-Flo	
		1-1/4	31.8	Consult Dyna-Flo	Consult Dyna-Flo	Consult Dyna-Flo	
	4 inch (102 mm) Travel	3/4	19.1	1U2941NT50D	Consult Dyna-Flo	Consult Dyna-Flo	
	8x6 Class 900	2 inch (51 mm) Travel	3/4	19.1	1K5880X026D	Consult Dyna-Flo	Consult Dyna-Flo
			1	25.4	Consult Dyna-Flo	Consult Dyna-Flo	Consult Dyna-Flo
1-1/4			31.8	Consult Dyna-Flo	Consult Dyna-Flo	Consult Dyna-Flo	
3 inch (76 mm) Travel		3/4	19.1	1K5880X026D	Consult Dyna-Flo	Consult Dyna-Flo	
		1	25.4	Consult Dyna-Flo	Consult Dyna-Flo	Consult Dyna-Flo	
		1-1/4	31.8	Consult Dyna-Flo	Consult Dyna-Flo	Consult Dyna-Flo	
12x6 (Except for Low-Noise III Construction)	2 inch (51 mm) 3 inch (76 mm) Travel	3/4	19.1	1L9964NT50D	1U5071NT50D	Consult Dyna-Flo	
		1	25.4	Consult Dyna-Flo	Consult Dyna-Flo	Consult Dyna-Flo	
		1-1/4	31.8	Consult Dyna-Flo	Consult Dyna-Flo	Consult Dyna-Flo	
	4 inch (102 mm) Travel	3/4	19.1	1U2941NT50D	Consult Dyna-Flo	Consult Dyna-Flo	
10x8	2 inch (51 mm) Travel	3/4	19.1	1K5880X026D	1U9282NT50D	Consult Dyna-Flo	
		1	25.4	Consult Dyna-Flo	Consult Dyna-Flo	Consult Dyna-Flo	
	3 inch (76 mm) Travel	3/4	19.1	10A3282X22D	10A3282X22D	Consult Dyna-Flo	
		1	25.4	Consult Dyna-Flo	Consult Dyna-Flo	Consult Dyna-Flo	
<b>NOTES:</b>	1 - Not to be used in Model 351 valves with multiple piston rings.						

# Model 350/351 Control Valves

## Operation, Parts, and Instruction Manual



**Table 11 (Continued)**

**Stem (Key 5) - S20910 - Except for Anti-Cavitation Construction**

Valve Size		Stem Diameter		Bonnet Style		
				Standard	Style 1 Extension	Style 2 Extension
Inch		Inch	mm			
12x8 Class 150/300/600	2 inch (51 mm) Travel	3/4	19.1	Consult Dyna-Flo	Consult Dyna-Flo	Consult Dyna-Flo
		1	25.4	Consult Dyna-Flo	Consult Dyna-Flo	Consult Dyna-Flo
		1-1/4	31.8	Consult Dyna-Flo	Consult Dyna-Flo	Consult Dyna-Flo
	3 inch (76 mm) Travel	1	25.4	Consult Dyna-Flo	Consult Dyna-Flo	Consult Dyna-Flo
		1-1/4	31.8	Consult Dyna-Flo	Consult Dyna-Flo	Consult Dyna-Flo

**Table 12**

**Seat Ring (Key 14) - Except for Anti-Cavitation Construction**

Valve Size		Seat Ring Material		
		S41600 HT	S31600	S31600/Alloy 6 Hard Faced Seat
Inch				
8x6 Class 300/600 (Except for Low-Noise III Construction)	2 inch (51 mm) Travel	Consult Dyna-Flo	Consult Dyna-Flo	Consult Dyna-Flo
	3 inch (76 mm) Travel 4 inch (102 mm) Travel	Consult Dyna-Flo	Consult Dyna-Flo	Consult Dyna-Flo
8x6 Class 900	2 inch (51 mm) Travel	21A8231X01D	Consult Dyna-Flo	Consult Dyna-Flo
	3 inch (76 mm) Travel	Consult Dyna-Flo	Consult Dyna-Flo	Consult Dyna-Flo
12x6 (Except for Low-Noise III Construction)	2 inch (51 mm) Travel	Consult Dyna-Flo	Consult Dyna-Flo	Consult Dyna-Flo
	3 inch (76 mm) Travel	Consult Dyna-Flo	Consult Dyna-Flo	Consult Dyna-Flo
	4 inch (102 mm) Travel	Consult Dyna-Flo	Consult Dyna-Flo	Consult Dyna-Flo
10x8 12x8	All	20A3260X01D	20A3260X02D	20A3260X15D
<b>Notes:</b> - All S31600 barstock is dual grade S31600/S31603 (316/316L).				



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**Table 13**

**Soft Seat Valve Parts (Keys 15, 16, & 17)**

Valve Size inch	Travel	Parts		
		Disk Seat (S31600)(Key 15)	Disk (PTFE)(Key 16)	Disk Retainer (S31600)(Key 17)
8 X 6 CL300/CL600	2", 3"	1V71203309D	1V71190624D	1V71183309D
	4"	20A1180X01D	1V71190624D	1V71183309D
8 X 6 CL900	All	21A9344X01D	1V71190624D	1V71183309D
12 X 6	2", 3"	2V71273309D	1V71190624D	1V71183309D
	4"	20A1180X01D	1V71190624D	1V71183309D
10 x 8 12 x 8	All	20A4467X01D	20A4468X01D	10A4466X01D
<b>Notes:</b>	- All S31600 barstock is dual grade S31600/S31603 (316/316L).			

**Table 14**

**Gaskets and Shim Repair Kits (Keys 13, 19, 20, 21)**

Valve Size inch	Gasket Kit
Globe Valve	
8 x 6 12 x 6	RGASKETX39D
10 x 8 12 x 8	RGASKETX23D
<b>Notes:</b>	- All S31600 barstock is dual grade S31600/S31603 (316/316L). Low-Noise III trim requires 2 bonnet gaskets (Key 21). Consult Dyna-Flo.

**Table 15**

**Packing Repair Kits**

Stem Diameter [Yoke Boss Diameter] inches (mm)	Single		Double
	PTFE	Graphite	PTFE
1/2 (12.7) [2-13/16 (71)]	RPACKX0002D	RPACKX0011D	RPACKX0005D
3/4 (19.1) [3-9/16 (90)]	RPACKX0003D	RPACKX0012D	RPACKX0006D
1 (25.4) [5 (127)]	RPACKX0034D	RPACKX0053D	RPACKX0036D
1-1/4 [5H (32.5)]	RPACKX0035D	RPACKX0054D	RPACKX0037D

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Table 16

### Packing Parts (Keys 30, 31, 32, 33, 34, & 35)

#### PTFE Packing

Key #	Description		Stem Diameter Inch (mm)			
			1/2 (12.7)	3/4 (19.1)	1 (25.4)	1-1/4" (31.7)
30	Packing Spring (S30400) For Single Packing Only.	Part #	1F12553701D	1F12563701D	1D58293701D	1D38743701D
		Qty.	1	1	1	1
31	Special Washer (S30400) For Single Packing Only.	Part #	1F12513604D	1F12503604D	1H98223604D	1H99593604D
		Qty.	1	1	1	1
32*	Packing Set (Refer to Table 15 for Repair Kits)	Part #	1R2902010DD	1R2904010DD	1R29060101D	1R29080101D
		Qty. Single	1	1	1	1
		Qty. Double	2	2	2	2
35	Lantern Ring (S31600/S31603 Dual Grade) For Double PTFE Packing	Part #	DFX0000001D	DFX0000041D	DFX0000051D	DFX0000061D
		Qty.	1	1	1	1

#### Graphite Packing

Key #	Description		Stem Diameter Inch (mm)			
			1/2 (12.7)	3/4 (19.1)	1 (25.4)	1-1/4" (31.7)
35	Lantern Ring (S31600/S31603 Dual Grade)	Part #	DFX0000021D	DFX0000041D	DFX0000051D	DFX0000061D
		Qty.	1	2	2	2
35	Lantern Ring (S31600/S31603 Dual Grade)	Part #	DFX0000001D	-	-	-
		Qty.	1	-	-	-
33	Graphite Filament Ring	Part #	1E3190X022D	1E3191X028D	1D7518X013D	1D7520X016D
		Qty.	2	3	3	3
34	Graphite Ribbon Ring	Part #	1V3802X002D	1V2396X002D	1U6768X002D	J122620165D
		Qty.	2	2	2	2

#### Our Commitment to Quality

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# Model 350/351 Control Valves

## MODEL NUMBERING SYSTEM

SAMPLE PART NUMBER: 350-64AFL-5P2-VES4

						<b>VALVE SIZE</b>		<b>64</b>
<b>86</b>	8X6 INCH	<b>126</b>	12X6 INCH	<b>108</b>	10X8 INCH	<b>128</b>	12X8 INCH	
<b>ASME RATING</b>								<b>A</b>
<b>A</b>	150	<b>B</b>	300	<b>C</b>	600			
<b>END CONNECTION</b>								
<b>F</b>	RF	<b>J</b>	RTJ	<b>N</b>	NPT	<b>T</b>	BWE SCH 40	<b>F</b>
<b>L</b>	BWE SCH 80							
<b>BODY MATERIAL</b>								<b>L</b>
<b>L</b>	LCC	<b>W</b>	WCC	<b>M</b>	CF8M	<b>9</b>	WC9	
<b>BOLTING</b>								<b>-</b>
<b>-</b>	B7 / 2H (STANDARD)			<b>A</b>	B7M / 2HM			
<b>B</b>	B8M / 8M			<b>K</b>	B7 FLUOROKOTE #1 / 2H FLUOROKOTE #1			
<b>L</b>	B7M FLUOROKOTE #1 / 2HM FLUOROKOTE #1							
<b>TRIM</b>								<b>5</b>
<b>1</b>	TRIM D1	<b>2</b>	TRIM D2	<b>4</b>	TRIM D4	<b>5</b>	TRIM D5	
<b>6</b>	TRIM D6	<b>7</b>	TRIM D7	<b>8</b>	TRIM D8	<b>9</b>	TRIM D9	
<b>L</b>	TRIM DL	<b>J</b>	TRIM DJ	<b>T</b>	TRIM DT	<b>E</b>	TRIM DE	
<b>N</b>	TRIM DN	<b>R</b>	TRIM DR					
<b>PACKING STYLE</b>								
<b>P</b>	SINGLE PTFE V-RING (PRESSURE)			<b>J</b>	DOUBLE PTFE V-RING (PRESSURE)			<b>P</b>
<b>G</b>	SINGLE GRAPHITE (PRESSURE)			<b>V</b>	DOUBLE PTFE V-RING (VACUUM)			
<b>R</b>	DOUBLE PTFE V-RING (VACUUM / PRESSURE)			<b>L</b>	LIVE LOADED PTFE V-RING (PRESSURE)			
<b>T</b>	LIVE LOADED GRAPHITE (PRESSURE)			<b>D</b>	LIVE LOADED DUPLEX (PRESSURE)			
<b>K</b>	LIVE LOADED KALREZ® (PRESSURE)			<b>F</b>	LIVE LOADED KALREZ® FIRE SAFE (PRESSURE)			
<b>YOKE BOSS SIZE</b>								
<b>2</b>	2-13/16" (1/2" STEM)			<b>3</b>	3-9/16" (3/4" STEM)			<b>2</b>
<b>5</b>	5" (1" STEM)			<b>6</b>	5H (1-1/4" STEM)			
<b>PAINT</b>								<b>-</b>
<b>-</b>	DFPS-01 (STANDARD)			<b>2</b>	DFPS-02 (SEVERE SERVICE)			
<b>3</b>	DFPS-03 (HIGH TEMPERATURE)							
<b>BACKUP RING / SEAL RING</b>								<b>V</b>
<b>V</b>	VITON / CARBON-FILLED PTFE			<b>E</b>	EPDM / CARBON-FILLED PTFE			
<b>P</b>	PTFE-ELGILOY (8" 350)			<b>C</b>	S31600 / PTFE-ELGILOY			
<b>R</b>	S31600 / PTFE-ELGILOY WITH PEEK AE RINGS			<b>K</b>	S31600 / KEL-F - ELGILOY			
<b>CHARACTERISTIC</b>								<b>E</b>
<b>E</b>	EQUAL PERCENT	<b>L</b>	LINEAR	<b>Q</b>	QUICK OPENING			
<b>A</b>	ANTI-CAVITATION 1 STAGE (LINEAR)			<b>K</b>	ANTI-CAVITATION 2 STAGE (LINEAR)			
<b>Z</b>	LOW-NOISE III A1 (LINEAR)			<b>Y</b>	LOW-NOISE III B3 (LINEAR)			
<b>C</b>	LOW-NOISE III C3 (LINEAR)			<b>1</b>	LOW-NOISE III D1 (LINEAR)			
<b>D</b>	LOW-NOISE III D3 (LINEAR)							
<b>CHARACTERISTIC (EXTENDED TRAVEL)</b>								
<b>R</b>	EQUAL PERCENT - EXTENDED TRAVEL			<b>S</b>	LINEAR - EXTENDED TRAVEL			
<b>T</b>	QUICK OPENING - EXTENDED TRAVEL			<b>V</b>	ANTI-CAVITATION 1 STAGE (LINEAR) - EXTENDED TRAVEL			
<b>P</b>	LOW-NOISE I (LINEAR) - EXTENDED TRAVEL			<b>W</b>	LOW-NOISE III A1 (LINEAR) - EXTENDED TRAVEL			
<b>4</b>	LOW-NOISE III A1 (LINEAR) EXTENDED 4" TRAVEL (8" VALVE ONLY)							
<b>BONNET STYLE</b>								<b>S</b>
<b>S</b>	STANDARD	<b>T</b>	STANDARD TAPPED	<b>E</b>	EXTENSION STYLE 1			
<b>H</b>	EXTENSION STYLE 2							
<b>SHUT-OFF CLASS</b>								<b>4</b>
<b>2</b>	CLASS II	<b>3</b>	CLASS III	<b>4</b>	CLASS IV	<b>5</b>	CLASS V	
<b>6</b>	CLASS VI							

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