CURTISS-WRIGHT

Dyna-Flo Model 362

Control Valve Operation, Parts and Instruction Manual

Figure 1 Model 362 Control Valve with DFC-2105

Product Description

Dyna-Flo 362 valves are standard pressure range control valves typically used in general purpose applications. These valves are top guided, unbalanced and single port; suitable for either throttling or on/off control of liquids or gases. Metal-to-metal seating is standard, with soft-seat options available.

DFC or DFO linear spring and diaphragm actuators are the standard option for the 362. Refer to Figure 6 on Page 8 for a detailed description of valve/actuator operation.

Table of Contents

Description	Page
General Information	2
Scope of Manual	2
Safety Warnings	2
Specifications	3
Available Valve Configurations - Table 1	4
Standard Valve Shut-Off - Table 2	4
Valve Weights	4
Unpacking Valve	5
Installation	5
Air Piping	6
Periodic Inspection	6
Actuator Removal	7
Valve Maintenance	9
Valve Disassembly	9
Packing Removal	9
Bonnet Removal	10
Trim Parts Removal	11
Packing Parts Removal	12
Lapping	12
Valve Assembly	14
Stud Installation	14
Trim Parts Installation	14
Bonnet Installation	15
Packing Installation	16
Typical Valve Cross Section - Figure 24	21
Angle Valve Cross Section - Figure 25	22
Body to Bonnet Bolting Torque Specifications	26
Packing Torque Specifications	26
Valve Stem Connection Torque Specifications	26
Valve Parts List	27
Valve Model Numbering System	36

Dyna-Flo Control Valves

Notice

These instructions are meant to be used with the Dyna-Flo 362 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**

It is the responsibility of the purchaser and end user to source and reference the latest edition of any technical or instructional literature related to the safe operation of this equipment.

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 362 Control Valves. Revisions are available at above mentioned website.

⚠ WARNING - GENERAL INFORMATION

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 done by experienced personnel and it is the responsibility of the end user to perform regular maintenance and inspections on this equipment. Throughout the manual, safety warnings and caution notes appear and must be strictly followed to prevent serious injury or equipment malfunction.

⚠ WARNING - SCOPE OF MANUAL

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. It is the responsibility of the purchaser and end user to ensure that this equipment meets the required construction material combinations for safe usage in the intended process control application. Do not apply any conditions outside the intended factory manufactured specifications to the valve without first contacting your Dyna-Flo sales office.

This manual is written to be a practical and useful guide to maintaining the Dyna-Flo 362 Control Valve.

⚠ WARNING - SAFETY INFORMATION

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. It is the responsibility of the end user of this product to select the proper parts and materials rated for the process being used, temperature requirements/limitations, operating conditions, and environmental conditions products will be used in. Special paint systems are available to alleviate effects of corrosion.

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. Refer to any appropriate auxiliary equipment, instrumentation, and actuator instruction manuals; also enquire with your safety department or process engineer for additional protection measures.

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.

Specifications

Configurations
The Model 362 control valve is a high capacity single port globe style valve with a bolted type bonnet. The standard valve plug action is push-down-to-close. Refer to Table 1.

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

Valve Sizes and Connection Styles (Refer to Table 1)

Model:	362
Size:	1" • 1-1/2" • 2" • 3" • 4" • 6" • 8" NPS (25 • 40 • 50 • 80 • 100 • 150 • 200 DN)
Body:	Globe (All Sizes) • Angle (1" & 2" to 6")
Rating:	ASME Class 150 / 300 / 600
Connection:	RF • RTJ • BWE: All Sizes NPT & SWE: 1" • 1-1/2" • 2"

Maximum Inlet Pressures and Temperatures
Flanged valves consistent with ASME Class 150, 300 & 600 rating as per ASME B16.34, unless limited.

Shutoff Classification
Refer to Table 2 on Page 4.

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

Standard Valve Trim - Figures 8A to 8D of Sales Bulletin.

Characteristic and Flow Direction
Equal Percentage (Standard): Flow Up (Globe Body) • Flow Down (Angle Body)

Quick Opening: Flow Up (Globe Body) • Flow Down (Angle Body)

Linear: Flow Up (Globe Body) • Flow Down (Angle Body)

Maximum Valve Sizing Coefficients
For standard coefficients at maximum travel, refer to Table 25 & 26 of the Sales Bulletin. For full list of coefficients, refer to FloSpec.

Dimensions
Valve Outline Dimension Diagram: Refer to Figure 2 of Sales Bulletin.

Valve Assembly Dimensions: Refer to Tables 6 to 16 of Sales Bulletin.

Port Diameters and Maximum Valve Plug Travel
Refer to Tables 4 & 5 of the Sales Bulletin.

Approximate Assembly Weights
Refer to Table 3 on Page 4.

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 Tables 20 & 22 of the Sales Bulletin for valve trim slections.

Temperature Limitations
Refer to Figures 8A to 8D of the Sales Bulletin for valve construction material temperature limitations.

Valve Assembly Cross-Section
Refer to Figure 24 on Page 21.

Packing Type
Standard packing is PTFE V-ring. Live-loaded low-emission, graphite, KALREZ® and other packing arrangements are available. Refer to Figures 21, 22 & 23 on Page 19.

Service Applicaiton
Refer to Tables 17 to 26 of the Sales Bulletin.

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

Table 1

Available Valve Configurations

Valve Model	Valve Size Inch (DN)	End Connection					
		NPT[1]	RF[2] and RTJ[3] (Flanged)			BWE[4]	SWE[5]
			ASME Class 150	ASME Class 300	ASME Class 600		
362	1 / 1-1/2 / 2 (25 / 40 / 50)	✓	✓	✓	✓	✓	✓
	3 / 4 / 6 / 8 (80 / 100 / 150 / 200)	×	✓	✓	✓	✓	×
362A	1 & 2 (25 & 50)	×	✓	✓	✓	✓	×
	3 / 4 / 6 (80 / 100 / 150)	×	✓	✓	✓	✓	×

Notes:

1 - NPT = Screwed.

2 - RF = Raised Face.

3 - RTJ = Ring Type Joint.

4 - BWE = Butt Weld (ASME Class 600 Only).

5 - SWE = Socket Weld (ASME Class 600 Only).

Table 2

Standard Shut-Off Classifications (in accordance with ANSI/FCI 70.2 and IEC 60534-4)

Valve Trim	Seat Option	Shut-Off Class	
All	PTFE (Soft Seated)	Standard	Class VI
	Metal	Standard	Class IV
	PTFE (Soft Seated)	Optional	Class V
Notes:	For information on other Shut-off Classes and seat options, contact Dyna-Flo.		

Table 3

Valve Body / Actuator Configurations and Approximate Weights

Valve Size Inch (DN)	Body Only lb (Kg)	With Fail Open Actuator Size	Valve and Actuator Assembly Weight lb (Kg)	With Fail Close Actuator Size	Valve and Actuator Assembly Weight lb (Kg)
1 (25)	30 (14)	DFO - 1046	66 (30)	DFC - 1046	64 (29)
		DFO - 1069	70 (32)	DFC - 1069	78 (26)
1-1/2 (40)	45 (20)	DFO - 1046	81 (37)	DFC - 1046	79 (36)
		DFO - 1069	85 (39)	DFC - 1069	93 (42)
2 (50)	85 (39)	DFO - 2069	136 (62)	DFC - 2069	135 (61)
		DFO - 2105	167 (76)	DFC - 2105	175 (79)
3 (80)	125 (57)	DFO - 2069	176 (80)	DFC - 2069	175 (79)
		DFO - 2105	207 (94)	DFC - 2105	215 (98)
4 (100)	170 (77)	DFO - 2105	252 (114)	DFC - 2105	260 (118)
		DFO - 2156	277 (126)	DFC - 2156	291 (132)
6 (150)	350 (159)	DFO - 3156	466 (211)	DFC - 3156	471 (214)
		DFO - 3220	585 (266)	DFC - 3220	604 (274)
8 (200)	900 (408)	DFO - 3220	1135 (515)	DFC - 3220	1154 (523)

Unpacking Valve From Shipping Container

Special Tools Required:

- Properly Rated Lifting Straps (2 – 4 Straps) refer to Table 3 for valve 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 43). Refer to Figure 2 for nameplate location.

⚠ WARNING

Avoid sharp edges and corners when removing equipment from shipping container.

When lifting the valve assembly 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.

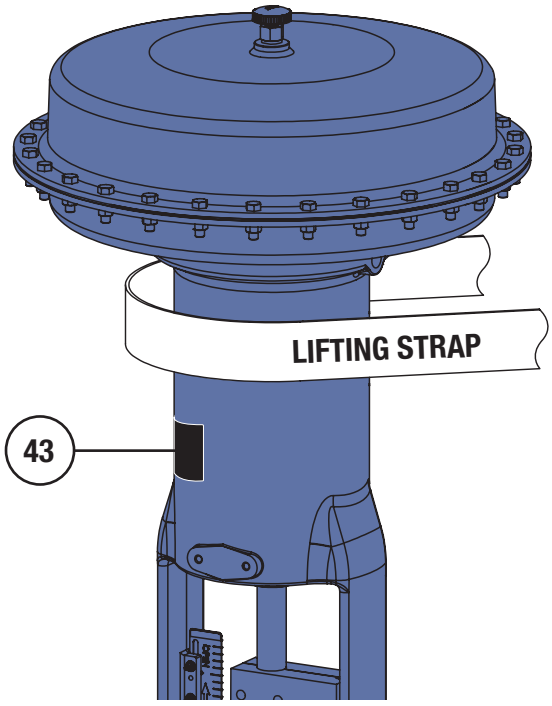


Figure 2 Actuator Lifting Strap Placement Suggestion

Installation

⚠ WARNING

Before You Begin:

- Read the Warnings on Page 2.
- Sudden movement of actuator can cause damage or injury. De-energized the actuator before performing any work.
- Use safe work practices and lock out procedures before placing valve or actuator in-line.
- Always wear the appropriate personal protective equipment.
- Standard actuators accept ¼" (6 mm) NPT connections.
- Do not use operating pressure that exceeds the Maximum Actuator Casing Pressure.
- 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.
- Operating medium must be controlled and directed, if a positioner was not ordered or unavailable, use a loading device such as a 4-way switching valve or regulator. For more information on positioner installation and operation, refer to the appropriate positioner instruction manual for your positioner type.
- Valve packing leakage could cause property damage or personal injury. Valve packing was properly tightened in factory, however, it is recommended that packing tightness be checked prior to installation.
- 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 25 & 34) for proper tightness. Refer to Packing Installation on Page 16 for proper packing tightening instructions.

Installation (Continued)

Installation Steps (Continued):

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.

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:

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

⚠ WARNING

Before You Begin:

- Read the Warnings on Page 2.
- Sudden movement of actuator can cause damage or injury. De-energized the actuator before performing any work, vent any pneumatic loading pressure and relieve any spring preload. Disconnect supply lines (air or gas), electric power, or control signal to the actuator.
- Use safe work practices and lock out procedures before taking valve out of line.
- 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 (especially valve packing). Isolate the valve from process pressure. Use a bypass or block valve if necessary, or completely shut off the process. Refer to the appropriate valve instruction manual and enquire with your safety department or process engineer for additional protection measures.
- It is the responsibility of the end user to perform regular maintenance and inspections on this equipment.

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).

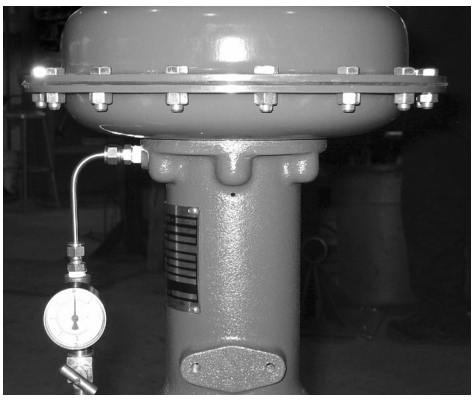


Figure 3 Needle Valve with Gauge Setup

Actuator Removal

NOTE: Actuator removal does not require that the valve be removed from the pipeline. Refer to the appropriate actuator instruction manual for actuator installation instructions.

⚠ WARNING

Before You Begin:

- Read the Warnings on Page 2.
- Sudden movement of actuator can cause damage or injury. De-energized the actuator before performing any work, vent any pneumatic loading pressure and relieve any spring preload. Disconnect supply lines (air or gas), electric power, or control signal to the actuator.
- Do not separate the actuator from the valve while the actuator is still pressurized and do not remove the stem connector while spring force or loading pressure is applied.

Tools Required:

- Properly Rated Lifting Straps or Chains
- Lifting Device (Example: Crane)
- Hammer and Blunted Chisel

1 Refer to the appropriate actuator instruction manual for more information regarding the actuator removal.

2 If the valve has been removed from the pipeline, place the valve assembly on a flat work surface that can support the weight. If not, refer to the Periodic Inspection WARNING and drain the process fluid from the valve.

3 Before the actuator is removed, support the actuator using lifting hooks or straps rated to support the weight of the actuator. It may also help to mark the orientation of the actuator on the bonnet.

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 (refer to Figure 5). 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 Use a blunted heavy chisel to loosen the yoke nut (Key 40). Unscrew the yoke nut and remove the actuator from the valve. If the actuator was energize during removal, de-energize the actuator (Refer to Figure 4).

7 Remove the jam nut and hex nut (Keys 38 & 39) and travel indicator from the valve stem (Key 5).

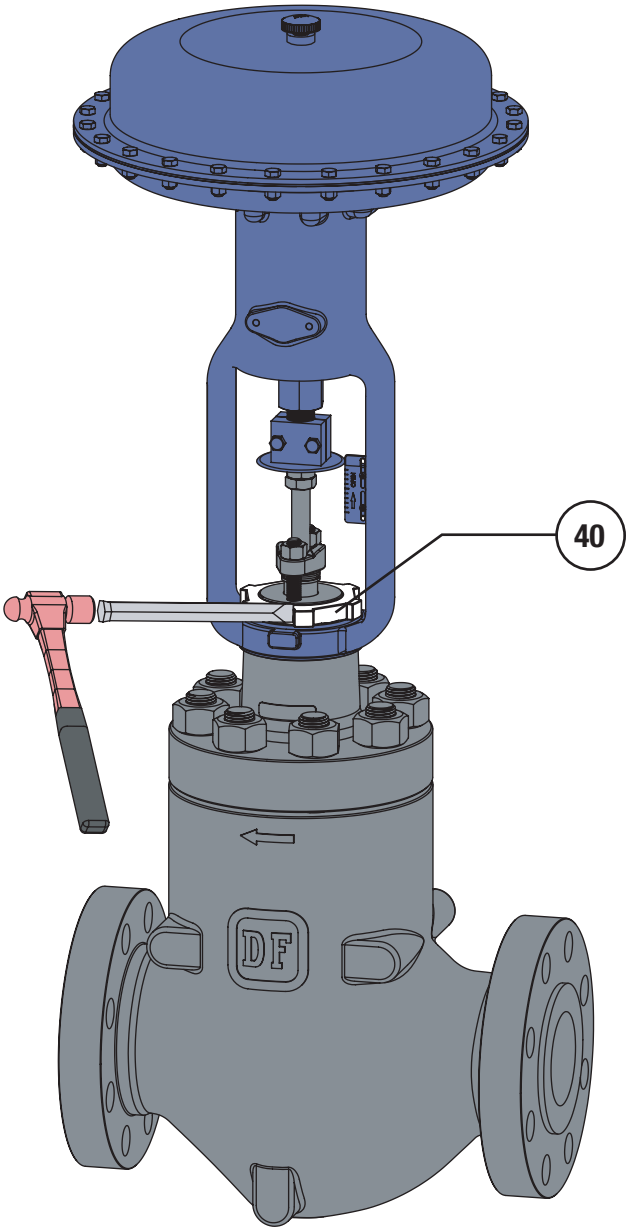


Figure 4 Yoke Nut Loosening Technique

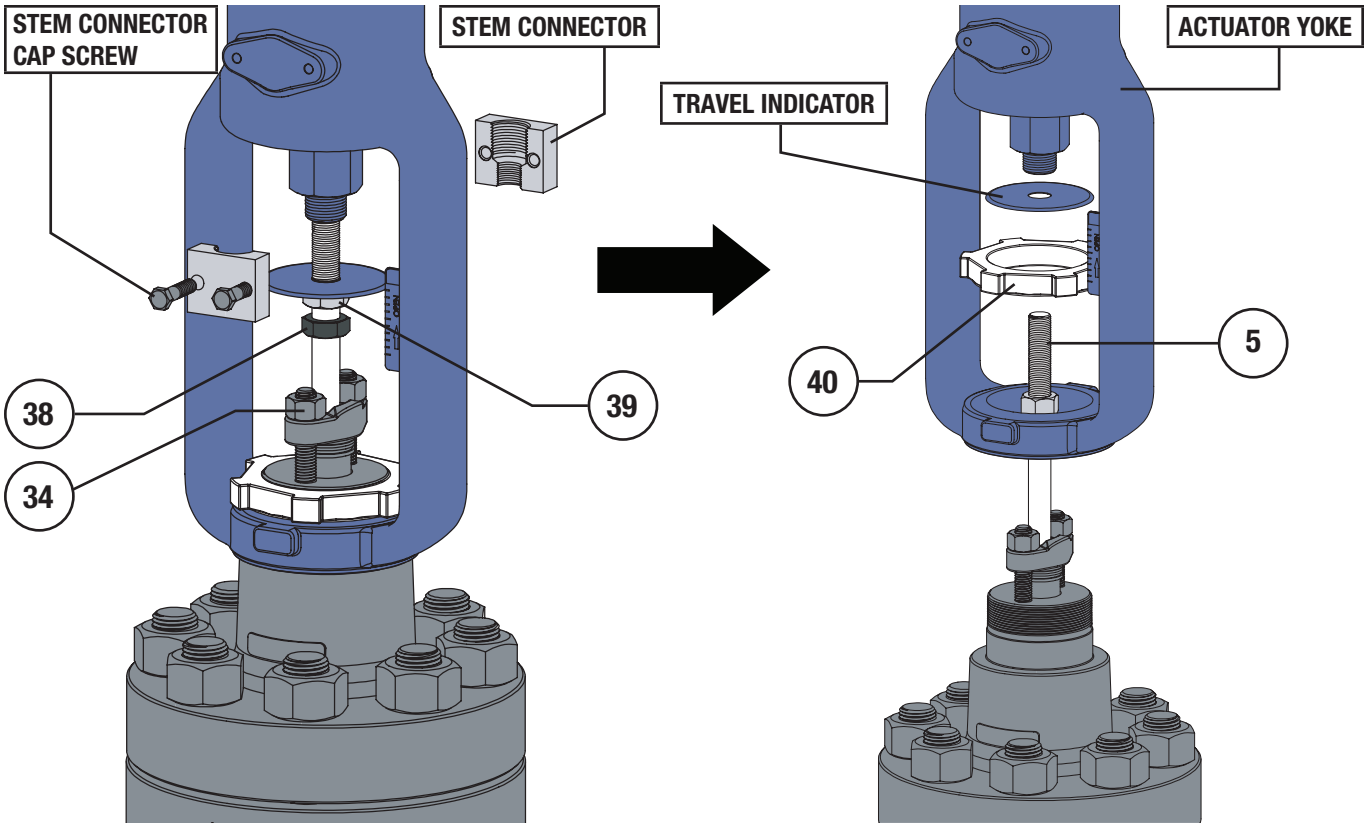


Figure 5 Actuator Removal Steps

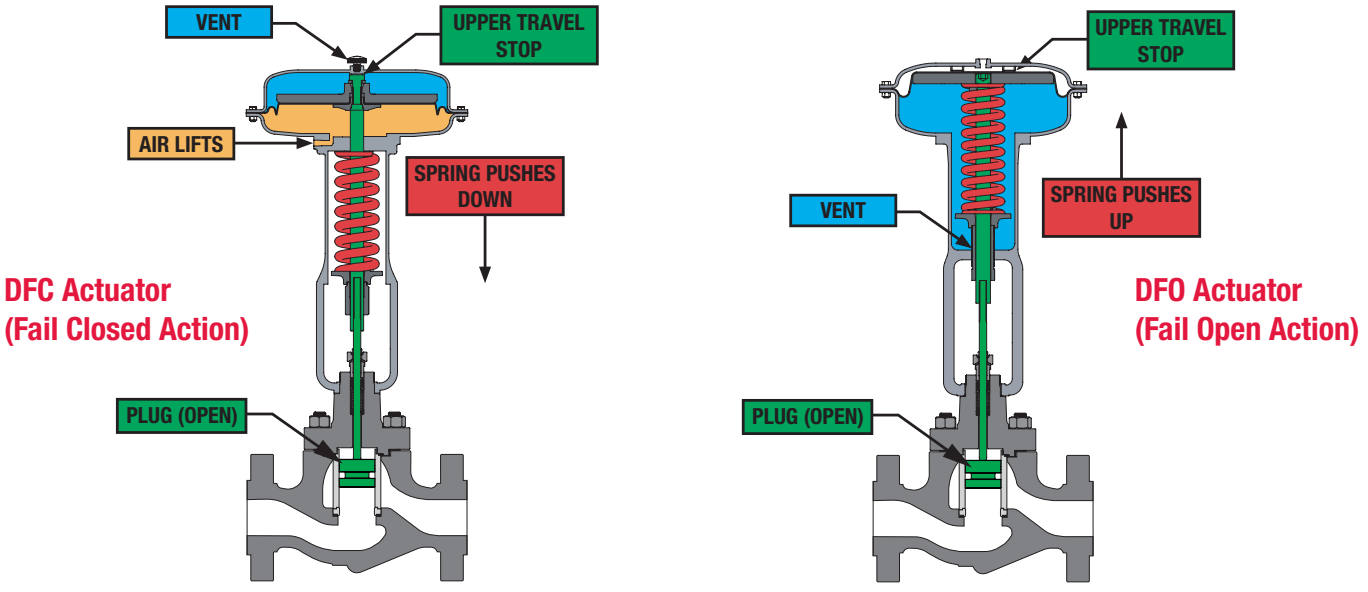


Figure 6 Actuator Operation and Valve Plug Placement

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).

⚠ WARNING

Before You Begin:

- Read the Warnings on Page 2.
- Refer to the Periodic Inspection WARNING and the Actuator Removal WARNING.
- Use safe work practices and lock out procedures before working on equipment.
- Be aware of potentially hazardous process material that may be present in-line and in-valve (especially valve packing).
- It is the responsibility of the end user to perform regular maintenance and inspections on this equipment.
- Determine if valve has standard or live loaded packing (Refer to Figures 7, 19, 21, 22 & 23).
- Follow Steps 1 – 6 of Before You Begin from Periodic Inspection (Page 6).

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.

1 Determine the type of packing installed in the valve.

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

Tighten the packing nuts (Key 34) evenly in an alternating pattern until the shoulder of the packing follower (Key 31) makes contact with the top face of the bonnet (Key 21). Proceed to tighten the packing nuts to the torque specification listed in Tables 7 & 8. Refer to Figure 26.

For Double PTFE V-Ring and Graphite Packing:

Tighten the packing nuts (Key 34) evenly in an alternating pattern to the minimum recommended torque specifications listed in Tables 7 & 8 on Page 26, 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.

For Live-Loaded Packing:

Tighten the packing nuts (Key 34) evenly in an alternating pattern while keeping the packing flange parallel to the top of the bonnet. Tighten the packing nuts until you reach the specified torque value listed in Table 5 for Graphite.

Or

To reach the "target load" (85% compression), tighten the packing nuts until the spring washers are 100% compressed (completely flat). Loosen each packing nut ½ turn (180 degrees) for PTFE or ¼ turn (90 degrees) for Graphite. **FOR KALREZ®**: Loosen each packing nut (Key 34) evenly in an alternating pattern until the difference between the measurements between the decompressed height and compressed height equal 1/3 or 33%.

Refer to the Sliding Stem Live-Loaded Packing Manual (P-LLPS) for more information.

Disassembly

⚠ WARNING

Before You Begin:

- Read the Warnings on Page 2.
- Use safe work practices and lock out procedures before working on equipment.
- 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 (especially in valve packing). Isolate the valve from process pressure. Use a bypass or block valve if necessary, or completely shut off the process. Refer to the appropriate valve instruction manual and enquire with your safety department or process engineer for additional protection measures.
- Remove the actuator from the valve (Refer to Actuator Removal Instructions and WARNINGS, Page 7).

Packing Removal:

For Live Loaded Packing refer to Figure 23 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 21) 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.

1 Remove the packing nuts (Key 34).

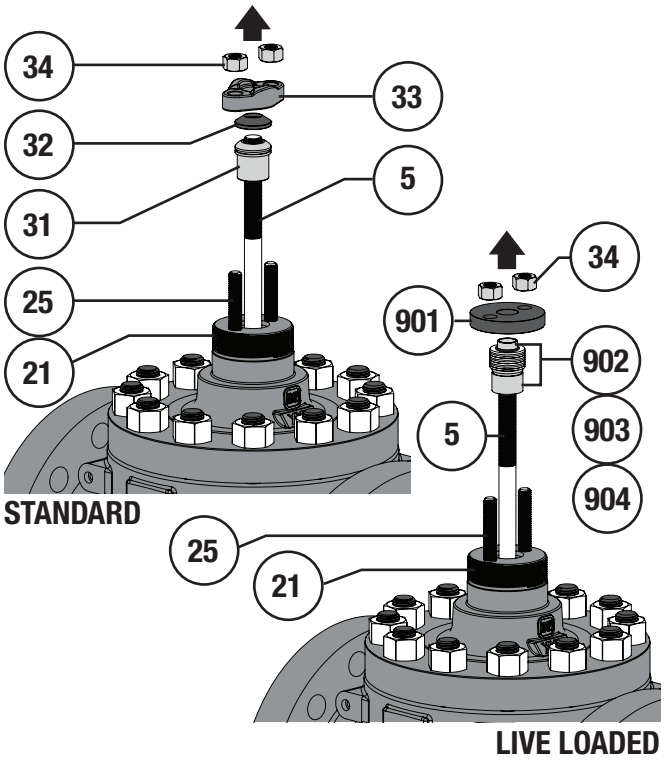


Figure 7 Packing Removal (Steps 1 - 3)

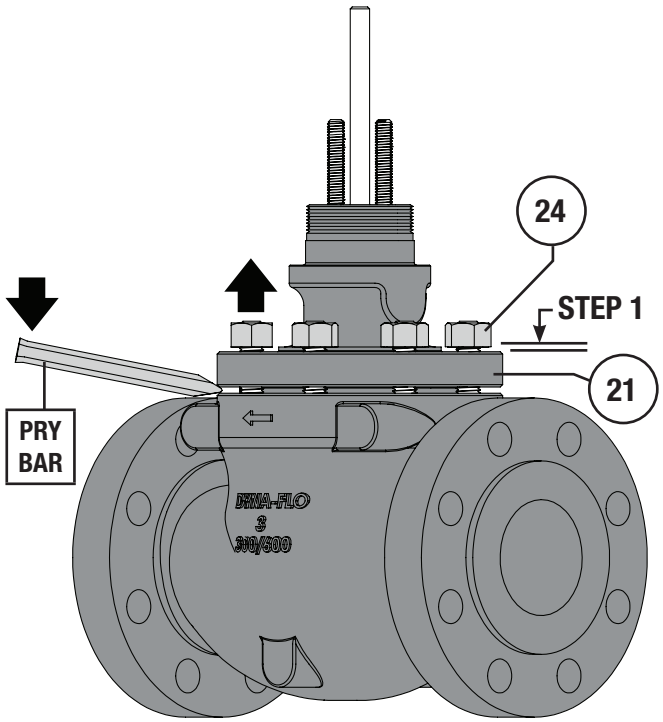


Figure 8 Bonnet Removal (Steps 1 & 2)

Disassembly (Continued)

Packing Removal:

2 Remove the upper wiper (Key 32) if present, graphite packing does not include an upper wiper.

3 Remove the packing follower (Key 31).

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 26, 27, 28, 29, 30, 35, 36, 37) 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 21). For packing reassembly refer to Packing Installation section (Page 16).

⚠ WARNING

Process medium and pressure may be trapped inside the valve body (Key 1), sudden release of this pressure could cause damage or injury. Use caution when removing the valve bonnet (Key 24). Refer to the WARNINGS on Page 2 and the following instructions. Do not use mechanical equipment to pull on a stuck bonnet, powerful mechanical equipment can deform material or store energy for recoil. Recoil from pulling can cause damage or injury.

Bonnet Removal:

1 Loosen the bonnet nuts (Key 24) 1 full turn after contact between the nuts and the top surface of the bonnet (Key 21) has been broken. Do not remove the bonnet nuts until any trapped process pressure has been vented. Refer to Figure 8.

2 Break the contact between the valve body (Key 1) and the bonnet (Key 21), use a pry bar or blunt chisel to help with the separation if necessary. Refer to Figure 8.

3 If no process fluid or gas escapes from the body-to-bonnet joint, proceed by completely removing the bonnet nuts (Key 24). Refer to Figure 9.

4 Carefully lift the bonnet (Key 21) 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. If the valve plug/stem assembly begin to lift with the bonnet, it may be necessary to gently tap the stem from the bonnet using a rubber mallet as the bonnet is being lifted.

5 The bonnet gasket (Key 17) may stick to the bonnet during removal. Remove the gasket when ready.

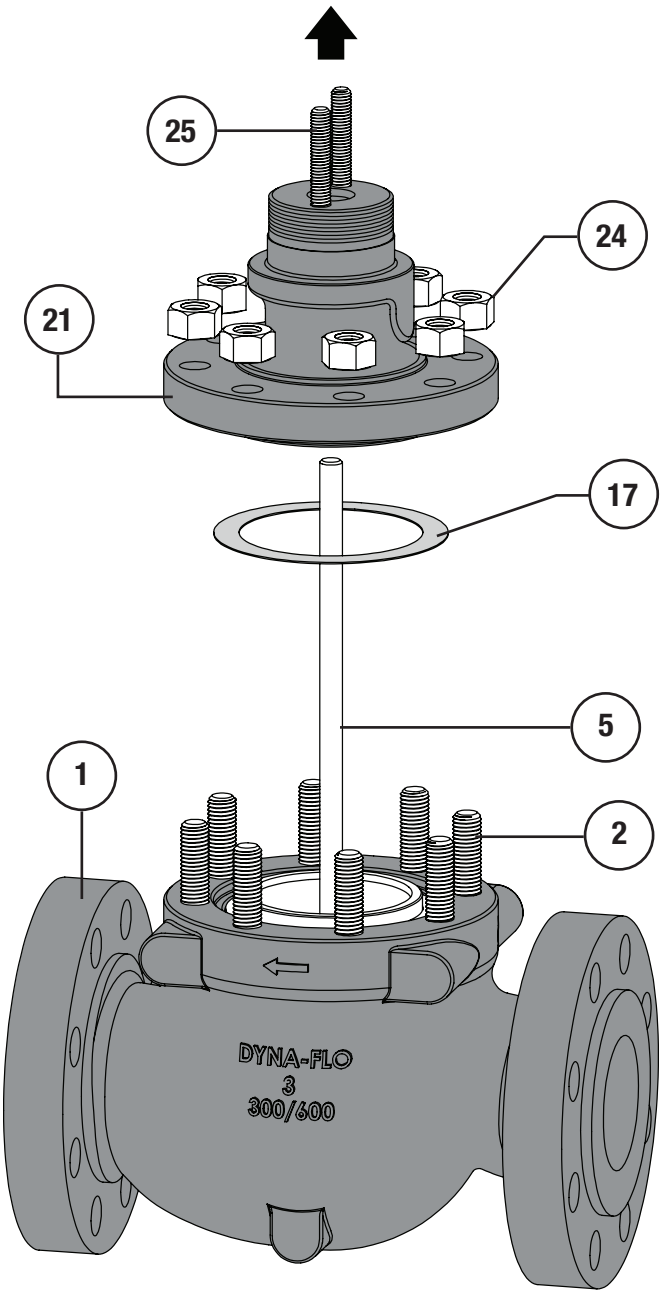


Figure 9 Bonnet Removal (Steps 3 & 4)

Disassembly (Continued)

Trim Parts Removal:

For Reduced Port Trim:

A Remove the cage adapter ring (Key 19). Refer to Figure 28.

B Remove the cage adapter gasket (Key 20), metal shim (Key 16), and spiral wound gasket (Key 15).

For 8 inch NPS (200 DN) Valve Assemblies:

A Remove the load ring (Key 18). Refer to Figure 31.

1 Remove the metal shim (Key 16) and spiral wound gasket (Key 15) if they haven't already been removed. Refer to Figure 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 Plug Seal Removal section for disassembly instructions.

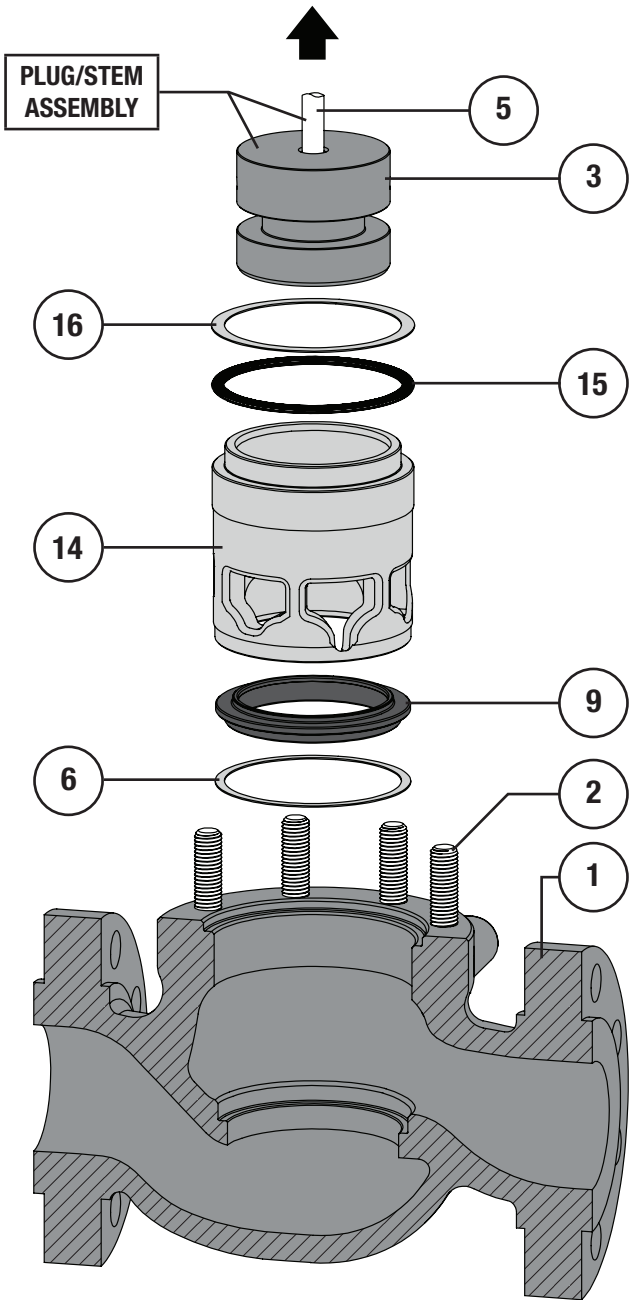


Figure 10 Standard Trim Parts Removal (Steps 1 - 6)

Disassembly (Continued)

Trim Parts Removal (Continued):

3 Carefully remove the cage (Key 14).

4 Remove the seat ring (Key 9) and seat ring gasket (Key 6). **For Soft Seat valves:** Remove the disk retainer (Key 13), PTFE disk (Key 12), disk seat (Key 11), and seat ring gasket (Key 6). Refer to Figure 29.

5 **For Reduced Port Trim:** Remove the seat ring adapter (Key 7) and seat ring adapter gasket (Key 8). Refer to Figure 28.

6 Clean and inspect all parts for damage, especially gasket seal surfaces, stem (Key 5) and plug (Key 3). 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, soft parts and gaskets with new parts, gaskets cannot be reused.

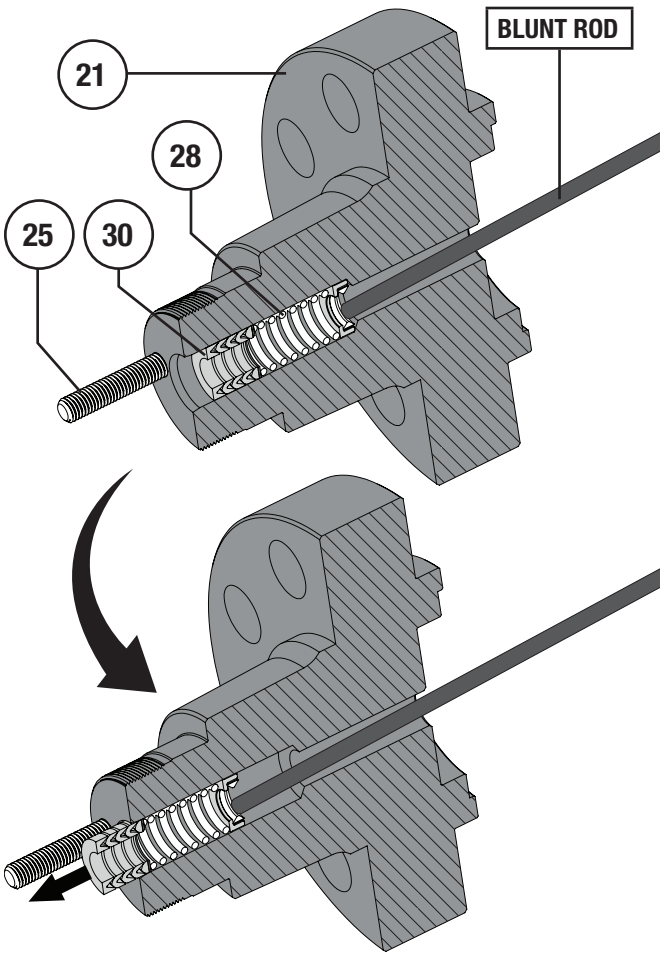


Figure 11 Packing Parts Removal (Steps 1 - 2)

⚠ WARNING

Compressed gasses could be trapped between packing rings, sudden release of this pressure could cause damage or injury.

Packing Parts Removal:

NOTE: For Live Loaded Packing refer to Figure 23 and the Live Loaded Sliding Stem Packing Manual (P-LLPS).

1 Using a blunt or rounded tool or rod, carefully tap the packing parts (Keys 26, 27, 28, 29 and 30) out of the packing bore of the bonnet (Key 21). A mechanic's pick set can also be used to pull packing parts from the bore. For other packing arrangements, refer to Figures 21 to 22.

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.

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.

NOTE: Spiral wound gaskets (Key 15) 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, 9, and 14) before removal and reassembly. If trim parts are reassembled out of their lapped alignment excessive leakage may result.

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 (Continued)

Lapping Procedure:

1 Install the used seat ring gasket (Key 6) into the valve body (Key 1).

2 Install the seat ring (Key 9). Mark the position of seat ring using the marker.

3 Install the cage (Key 14). Mark the position of cage using the marker.

4 Apply fine grit Clover® compound to the seating surface of the seat ring (Key 9) as shown in Figure 12. Install the valve plug / stem assembly (Keys 3, 4, 5) into the valve. Mark the position of the plug / stem assembly using the marker. **NOTE:** Be very careful when applying the lapping compound, lapping compound can easily damage parts.

5 Install used bonnet gaskets (Keys 15, 16 & 17).

6 Carefully lift the bonnet (Key 21) into place and secure the bonnet using half of the bonnet nuts (Key 34). Mark the position of the valve plug (Key 3) on the bonnet (Key 21) using the marker.

7 Install the packing follower (Key 31), this will help to center the valve stem and plug (Keys 3 & 5).

8 Install the jam nut (Key 38) on to the valve stem (Key 5) and build a handle as shown in Figure 13 and 14 using the two wrenches and the hex nut (Key 39).

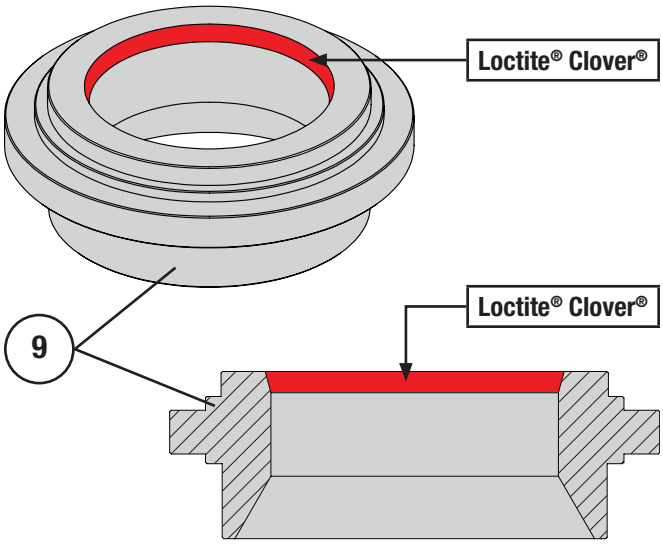


Figure 12 Lapping Compound Application Area

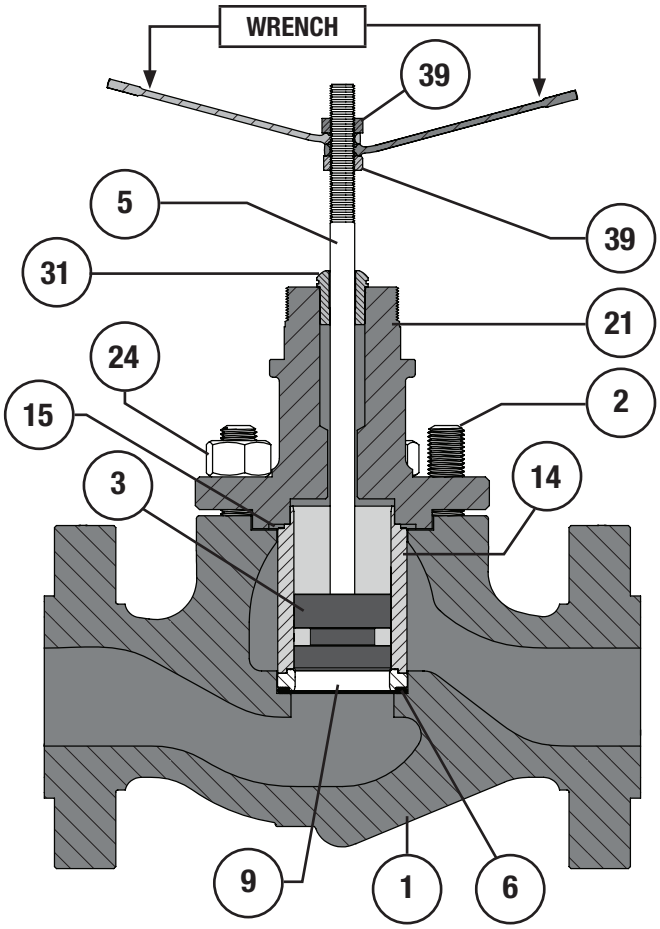


Figure 13 Lapping Procedure Setup (Steps 1 - 8)

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 9) using the wrench handles.

10 Once lapping is complete, disassemble the valve and thoroughly clean all parts. Be sure to clean away all traces of lapping compound.

11 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. Replace the used gaskets (Keys 6, 15, 16 & 17) 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.

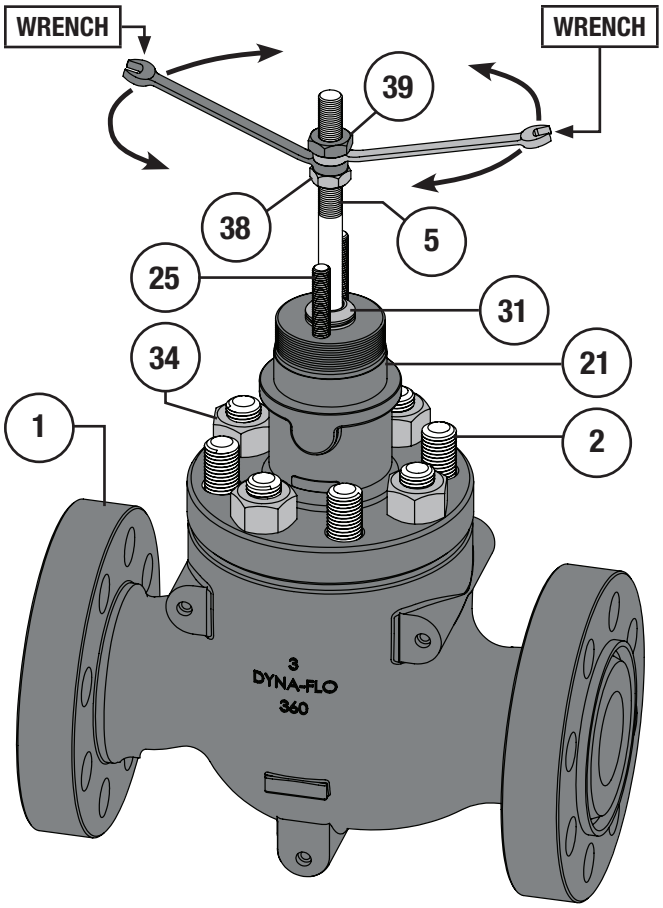


Figure 14 Packing Procedure Setup (Steps 8 - 10)

Assembly

⚠ WARNING

Before You Begin:

- Read the Warnings on Page 2.
- Clean and inspect all parts.
- Replace or repair damaged parts. Replace all soft parts (Seals, o-rings, gaskets).
- Always use properly rated studs (Key 2) and nuts (Key 34 approved by Dyna-Flo Control Valve Services with visible material grade identification marks. Service pressures can lead to excessive stress on material unapproved for use in this particular service, property damage or personal injury may result.

Lubricants Required:

- Permatex® Nickel Anti-Seize or equivalent (Key A)
- Dow Corning Molykote® 5 or equivalent (Key B)
- Lubriplate® No. 105 Grease or equivalent (Key C)

⚠ WARNING

Dow Corning Molykote® 5 is not to be used in applications involving highly oxidative service, such as liquid oxygen or liquid chlorine. Fire, explosion, property damage or personal injury may result.

Stud Installation:

1 If the studs (Key 2) were replaced, removed, or never installed, apply Permatex® 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.

⚠ WARNING

Never reuse a Stem (Key 5) when replacing a damaged Plug (Key 3). Plugs may be reused with a new Stem if the Stem need to be replaced. Contact Dyna-Flo for more information.

Trim Parts Installation:

⚠ WARNING

Spiral wound gaskets (Key 15) make their seal by being crushed and cannot be reused. Replace all gaskets, regular gaskets (Key 13) should be replaced as well.

1 Apply Permatex® Nickel Anti-Seize (Key A) to the seat ring pocket of the valve body (Key 1) and top surface of the seat ring gasket (Key 6). Install the seat ring gasket into the valve body (Key 1). Refer to Figure 15.

2 **For Reduced Port Trim:** Install the seat ring adapter (Key 7) into the valve body (Key 1). Apply Permatex® Nickel Anti-Seize (Key A) to the top of the seat ring adapter and to the top of the second seat ring gasket (Key 6). Install the gasket onto the seat ring adapter, refer to Figures 28 & 30.

3 Apply Permatex® Nickel Anti-Seize (Key A) to the upper and lower gasket seating surfaces of the seat ring (Key 9). Install the seat ring into the valve body (Key 1). Refer to Figure 25 for Angle Body Valve Assemblies.

For Soft Seat Valves: Install the disk seat (Key 11) onto the seat ring gasket (Key 6). Install the PTFE disk (Key 12) onto the disk seat. Install the disk retainer (Key 13) onto the PTFE disk. Refer to Figure 29.

4 Install the cage (Key 14). Install the baffle (Key 45) and cage retainer for Low-Noise trim, refer to Figure 26 for Low-Noise trim.

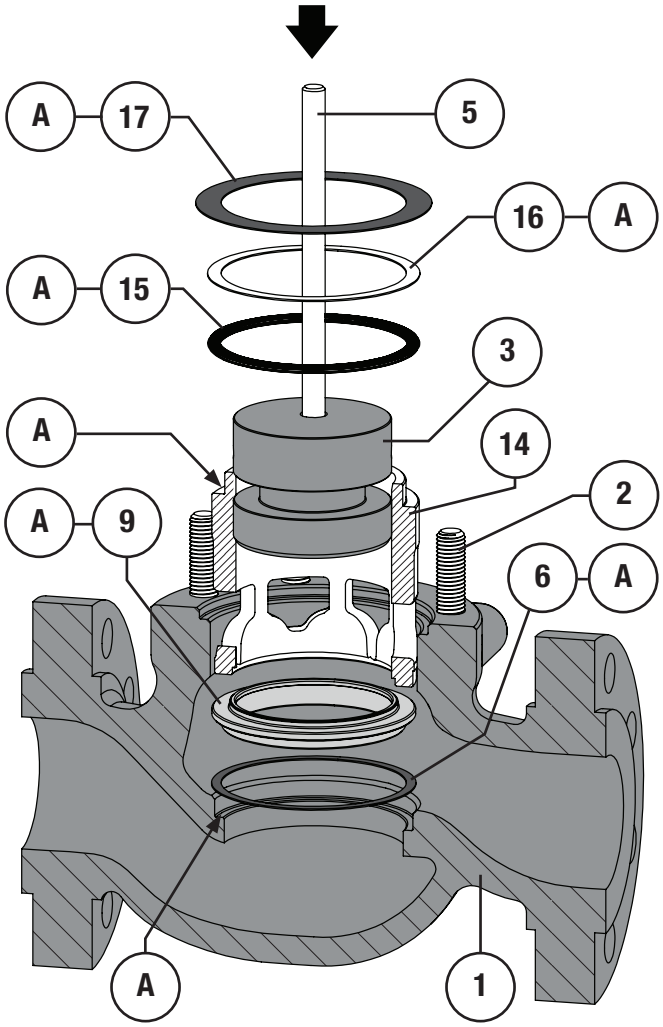


Figure 15 Trim Parts Assembly

Assembly (Continued)

Trim Parts Installation (Continued):

5 Apply Lubriplate® No. 105 (Key C) to the sides of the valve plug (Key 3), refer to Figure15. Install the valve plug assembly into the cage (Key 14), align any alignment marks made during disassembly or lapping.

6 Apply Permatex® Nickel Anti-Seize (Key A) to the gasket surface of the cage (Key 14) or cage retainer (Key 44) and top surface of the spiral wound gasket (Key 15), metal shim (Key 16), and bonnet gasket (Key 17). Install the gaskets and shim as shown in Figure 15 for Low-Noise trim.

For Low-Noise Valves: Install the bonnet spacer (Key 22) as shown in Figure 26. Apply nickel anti-seize (Key A) to the gasket seating surface of the bonnet spacer and top surface of the bonnet gasket (Key 17) and install. For 8 inch valves, install the load ring (Key 18).

For 8 Inch Valves: Apply nickel anti-seize (Key A) to the gasket seating surface of the valve body (Key 1) and top surface of the bonnet gasket (Key 17) and install. Install the load ring (Key 18). Refer to Figure 31.

7 **For Reduced Trim:** Install the cage adapter (Key 19). Apply Permatex® Nickel Anti-Seize (Key A) to the top of the cage adapter and top surface of the cage adapter gasket (Key 20) and install. Refer to Figure 30.

Bonnet Installation:

1 Apply Permatex® Nickel Anti-Seize (Key A) to the gasket sealing surface of the valve bonnet (Key 21). Refer to Figure 16.

2 Lift and lower the valve bonnet (Key 21) into place over the valve stem (Key 5). Be careful not to damage either the stem, bonnet, or valve body (Key 1).

3 Apply Permatex® Nickel Anti-Seize (Key A) to the threads of the bonnet studs (Key 2). Thread the bonnet nuts (Key 24) 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 31) 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 thetorquing process.

6 Follow proper body-to-bonnet bolting procedures. Begin to torque the bonnet nuts (Key 24) ¼ (25%) of the torque value listed in Table 4, torque the nuts in a crisscross pattern as shown in Figure 17. Hot torquing the valve nuts is not recommended.

7 Continue tightening the bonnet nuts (Key 24), increasing the torque by ¼ (25%) 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.

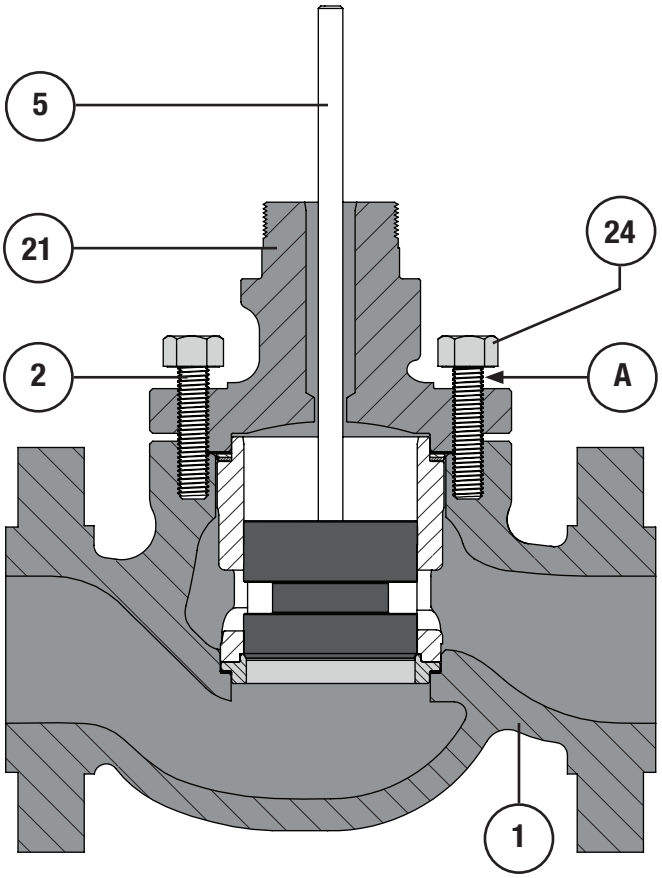


Figure 16 Bonnet Installation

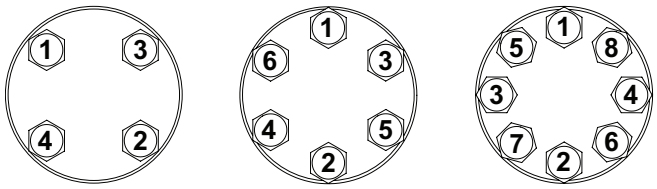


Figure 17 Bonnet Bolt Tightening Order Pattern

Assembly (Continued)

Packing Installation:

For more information on Live Loaded Packing refer to the Live Loaded Packing Manual (Part Number P-LLPS). For other packing arrangements refer to Figures 7, 19, 21, 22 & 23.

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 31) 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 18.

⚠ WARNING

Dow Corning Molykote® 5 is not to be used in applications involving highly oxidative service, such as liquid oxygen or liquid chlorine, fire, explosion, or personal injury may result.

1 If the packing studs (Key 25) 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 25) into the valve bonnet (Key 21) anti-seize coated end first until they are completely threaded into the bonnet.

For Single Style (Spring-Loaded) Packing:

1 Apply Dow Corning Molykote® 5 (Key B) to the lower stem wiper (Key 26). Insert the lower stem wiper into the packing box ring (Key 27). Insert the packing box ring into the packing bore of the valve bonnet (Key 21).

2 Install the packing spring (Key 28).

3 Install the special washer (Key 29).

4 Apply Dow Corning Molykote® 5 (Key B) to the PTFE packing rings (Key 30). Install the packing rings one ring at a time (as shown in Figure 18) in the proper order and orientation as shown in Figure 19.

5 Install the packing follower (Key 31).

6 Install the upper stem wiper (Key 32).

7 Install the packing flange (Key 33).

8 Apply Permatex® Nickel Anti-Seize (Key A) to the top threads of the packing studs (Key 25). Thread the packing nuts (Key 24) onto the threads of the packing studs, tighten the packing nuts evenly in an alternating pattern until the shoulder of the packing follower (Key 31) makes contact with the bonnet (Key 21). Proceed to tighten the packing nuts to the torque specification listed in Table 5.

For Double Style PTFE Packing:

1 Apply Dow Corning Molykote® 5 (Key B) to the lower stem wiper (Key 26). Insert the lower stem wiper into the packing box ring (Key 27). Insert the packing box ring into the packing bore of the valve bonnet (Key 21).

2 Apply Dow Corning Molykote® 5 (Key B) to the first set of packing rings (Key 30). Install the packing rings one ring at a time (as shown in Figure 18) in the proper order and orientation as shown in Figure 21. **NOTE:** For 3/8" (9.5 mm) valve stems, remove a packing ring from the middle of the packing set.

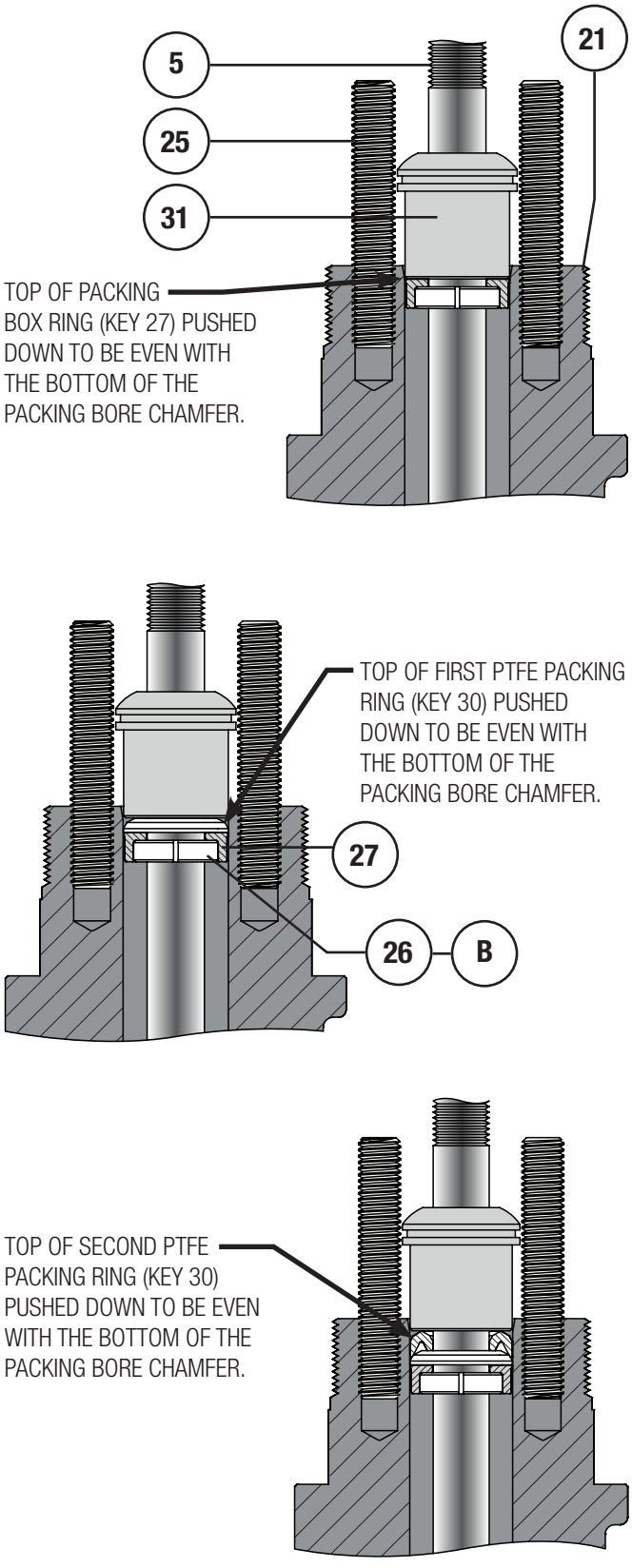


Figure 18 Proper Packing Ring Installation Technique

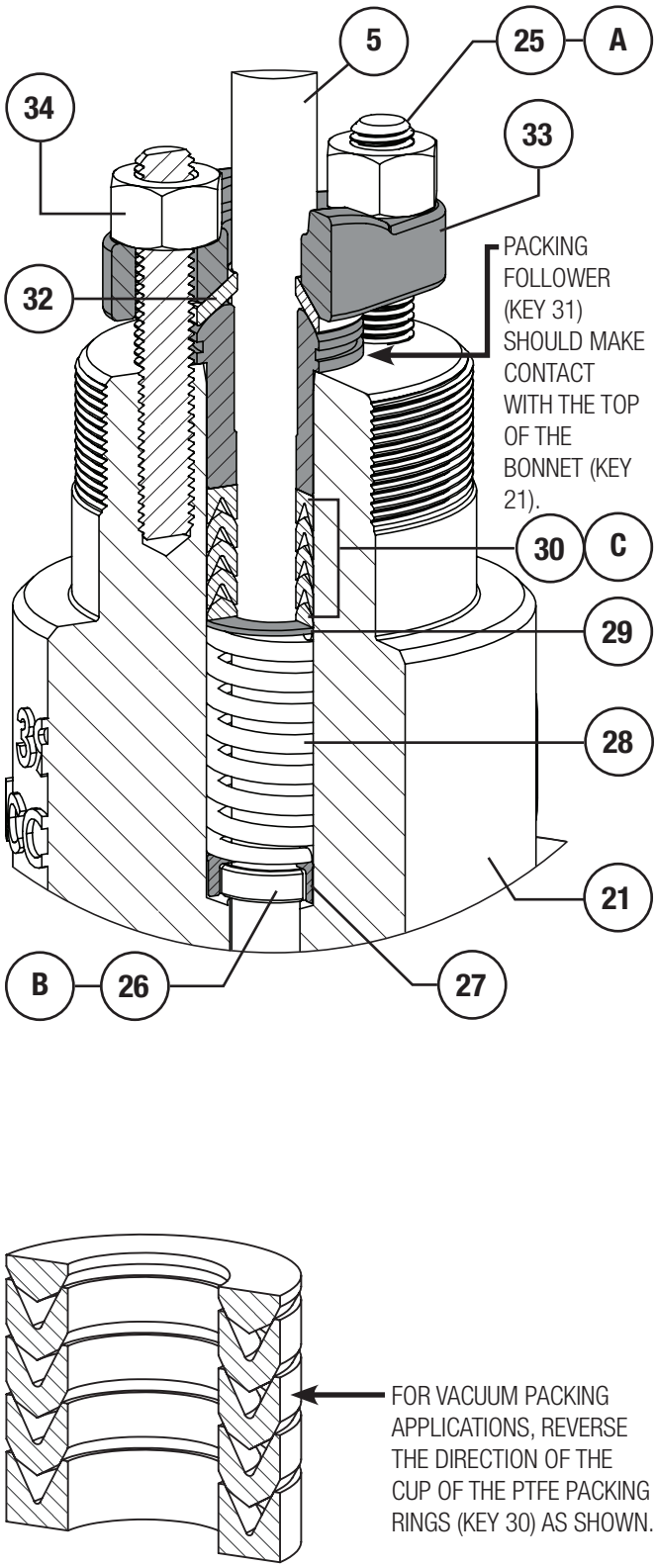


Figure 19 Single Style Packing Installation Diagram

Assembly (Continued)

Packing Installation (Continued):

For Double Style PTFE Packing (Continued):

3 Install the lantern ring (Key 35).

4 Apply Dow Corning Molykote® 5 (Key B) to the second set of packing rings (Key 30). Install the packing rings one ring at a time (as shown in Figure 18) in the proper order and orientation as shown in Figure 21.

5 Install the packing follower (Key 31).

6 Install the upper stem wiper (Key 32).

7 Install the packing flange (Key 33).

8 Apply Permatex® Nickel Anti-Seize (Key A) to the top threads of the packing studs (Key 25).

9 Thread the packing nuts (Key 34) 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 33) becomes level (is parallel with the top face of the bonnet), refer to Figure 20.

For Graphite Packing:

1 Install the packing box ring (Key 27).

2 Install the first lantern ring (Key 35A).

3 Install the second lantern ring (Key 35).

4 Install 1 ring of graphite filament (Key 36) as shown in Figure 22. **NOTE:** Graphite filament is a wound material that typically looks like rope and is split.

5 Install 1 ring of graphite ribbon (Key 37) as shown in Figure 22. **NOTE:** Graphite ribbon is compressed into rings and not split like the graphite filament.

6 Install the remainder of the graphite filament (Key 36) and graphite ribbon (Key 37) one at a time (as shown in Figure 18) in the proper order and orientation as shown in Figure 22.

7 Install the packing follower (Key 31).

8 Install the packing flange (Key 33).

9 Apply Permatex® Nickel Anti-Seize (Key A) to the top threads of the packing studs (Key 25). Thread the packing nuts (Key 34) 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.

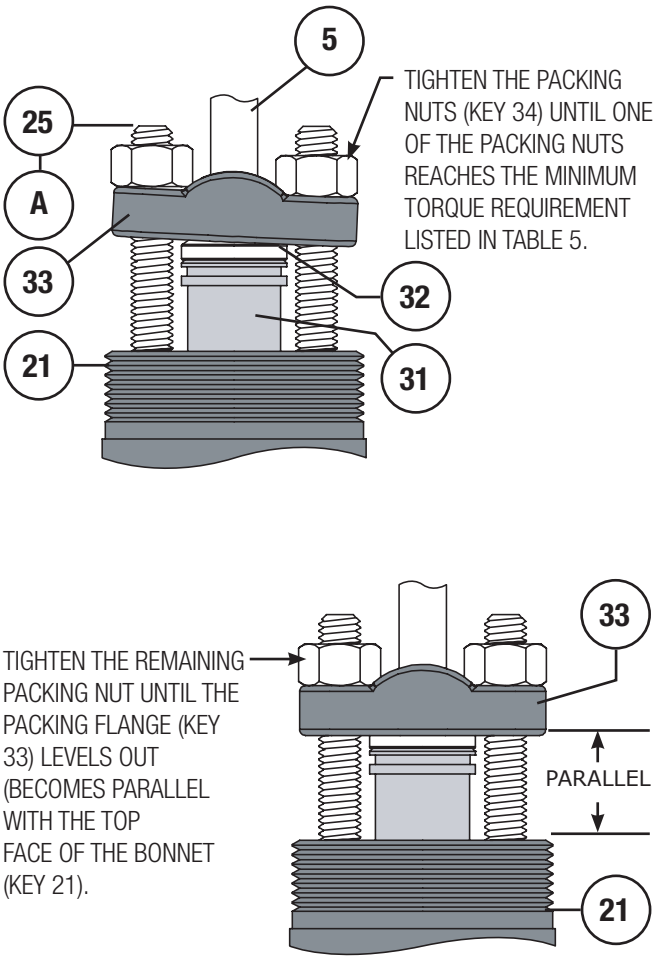
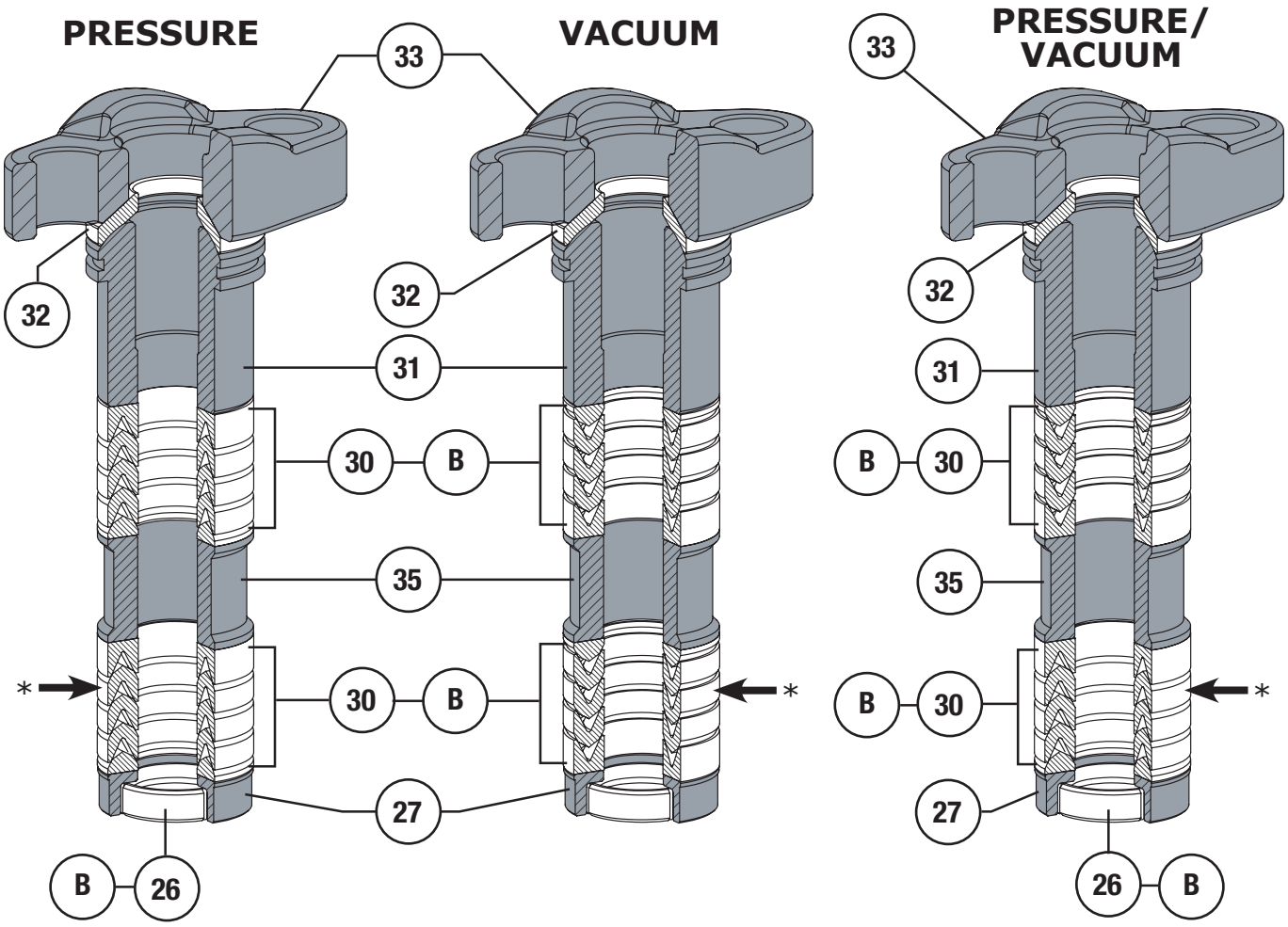


Figure 20 Double PTFE V-Ring Packing Tightening



NOTE

* For 3/8 inch valve stems, remove a packing ring fromt he lower PTFE packing set (Key 30) for a total of 4 rings.

Figure 21 PTFE Packing Arrangement Diagrams

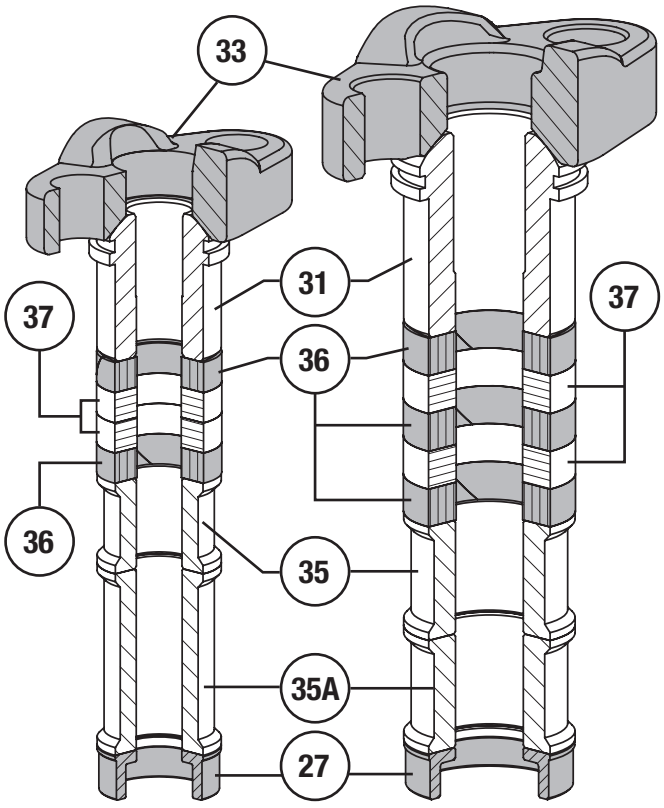


Figure 22 Graphite Packing Arrangement Diagrams

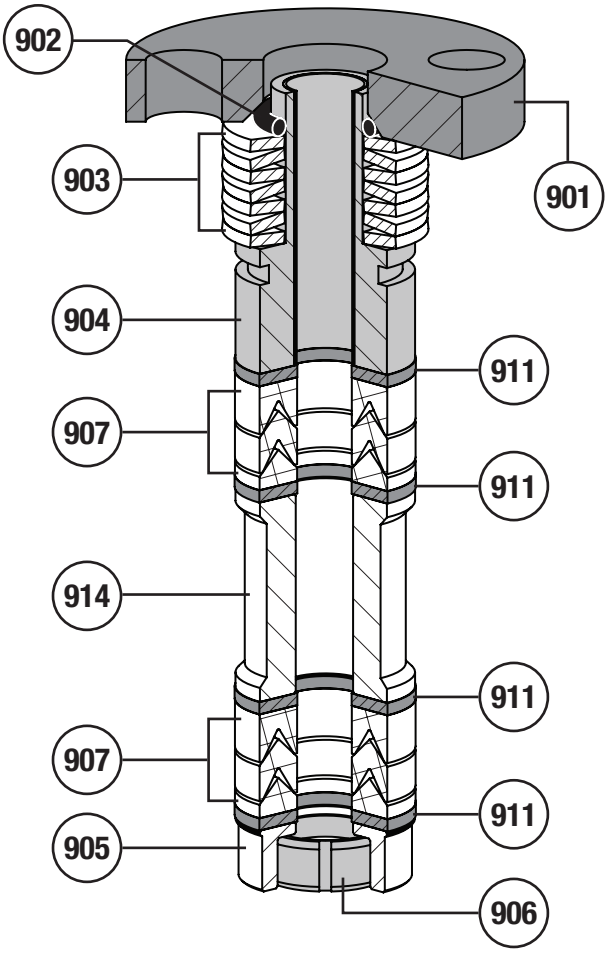


Figure 23 Live Loaded Packing Arrangement Example

NOTE: BONNET (KEY 21) ROTATED 90^0 FOR CLARITY.

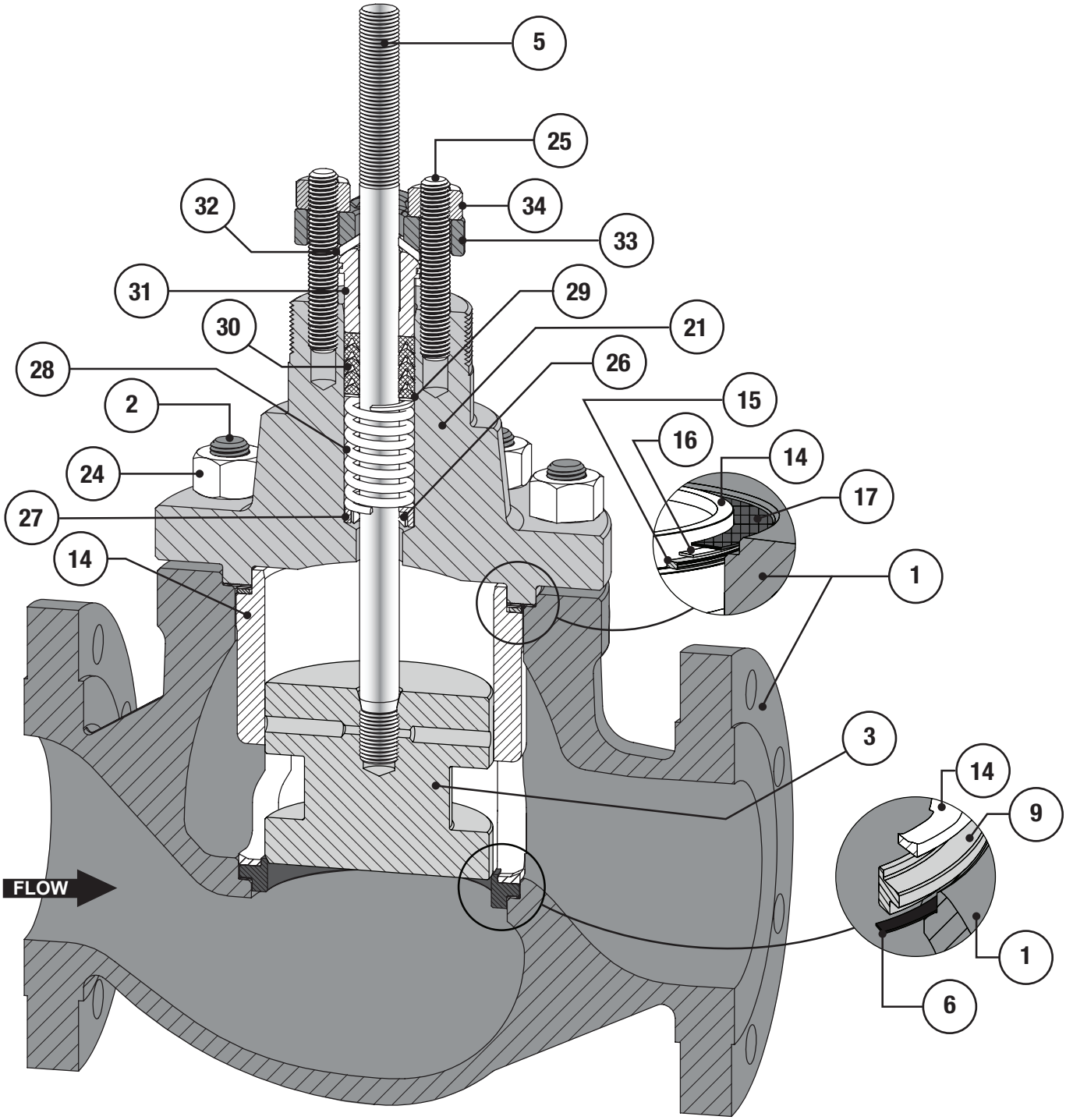


Figure 24 Typical Valve Assembly Diagram

NOTE: BONNET (KEY 21) ROTATED 90^0 FOR CLARITY.

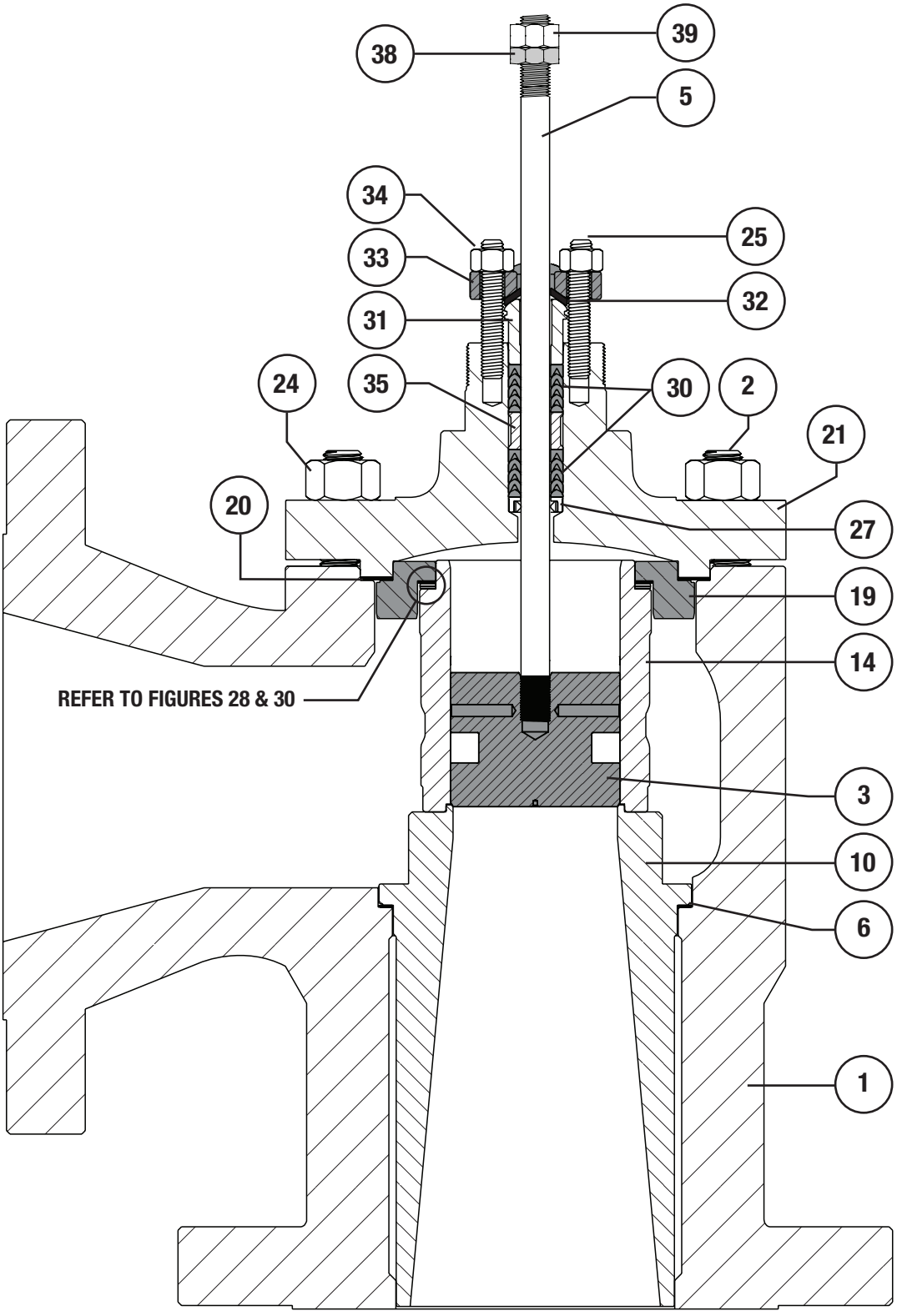


Figure 25 Typical Angle Body Assembly Diagram

NOTE: BONNET (KEY 21) ROTATED 90^0 FOR CLARITY.

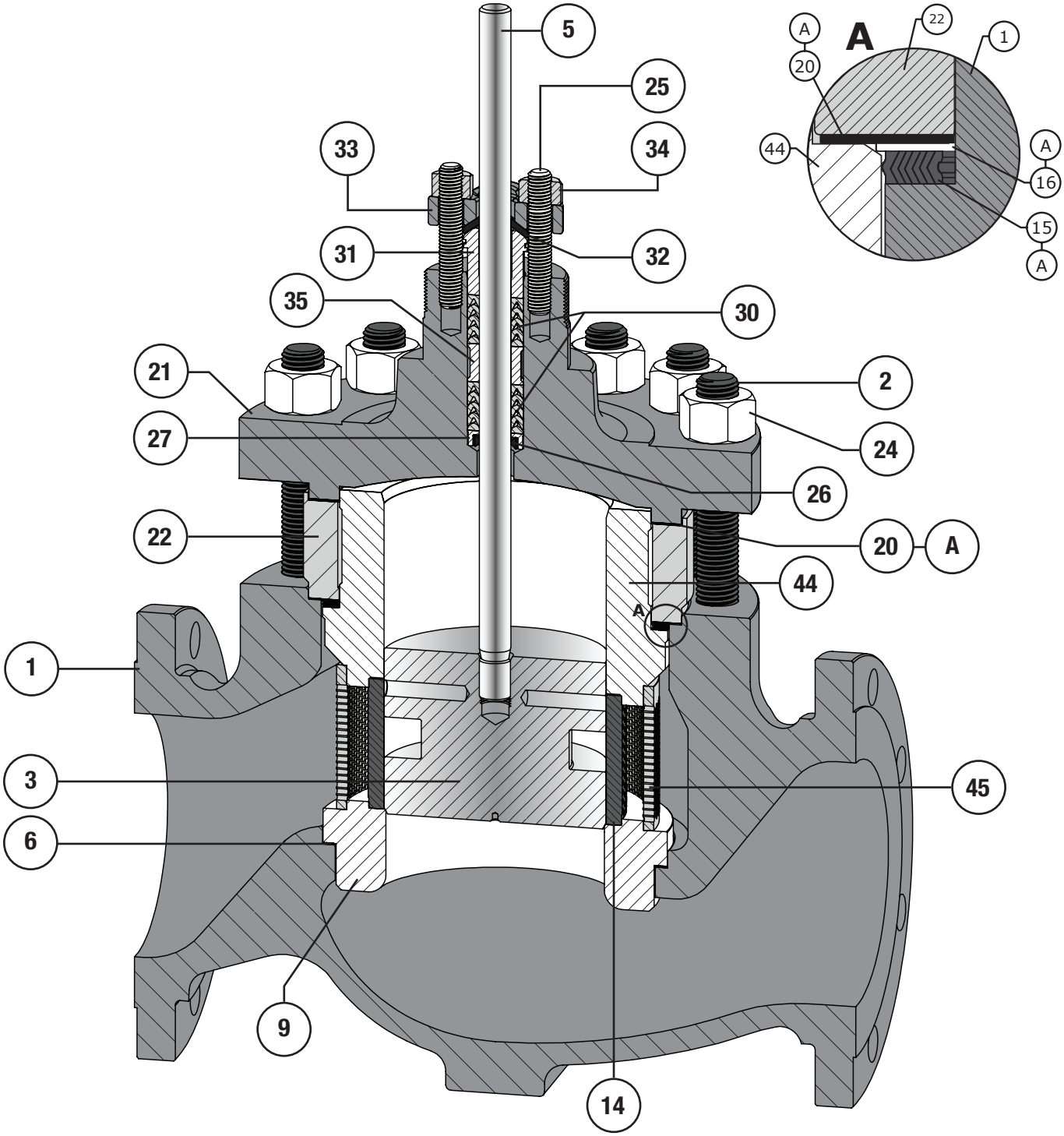


Figure 26 Low-Noise Valve Assembly with Bonnet Spacer Diagram

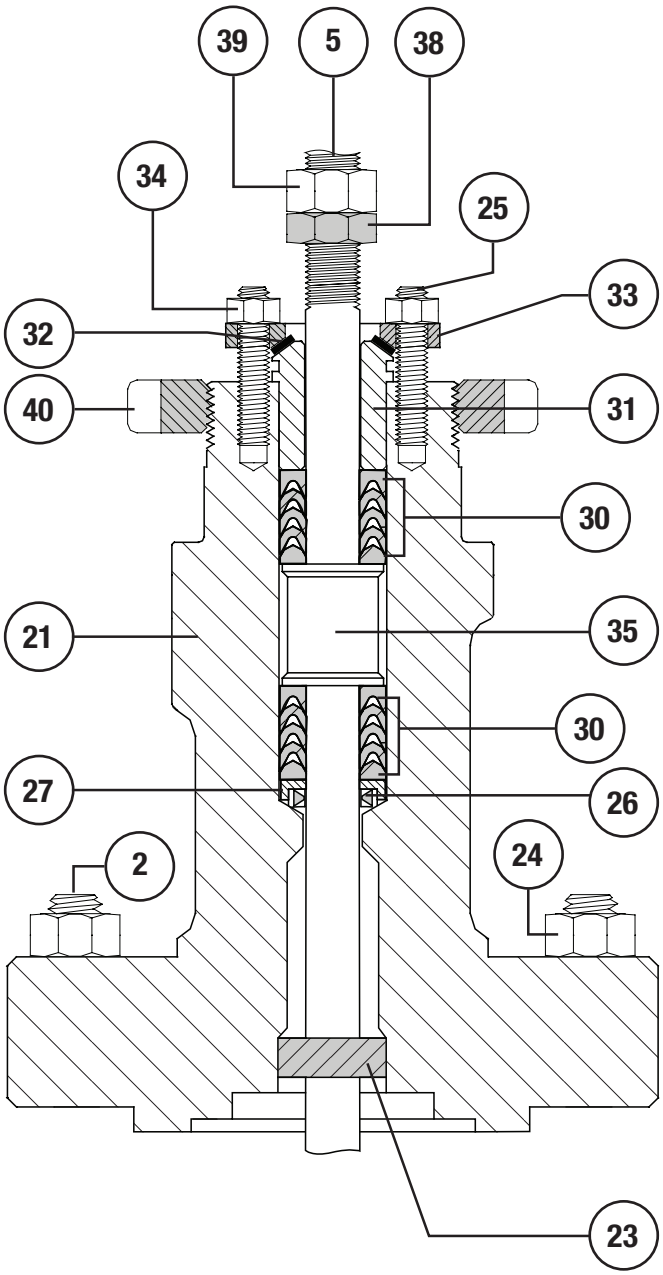


Figure 27 Extension Bonnet Diagram

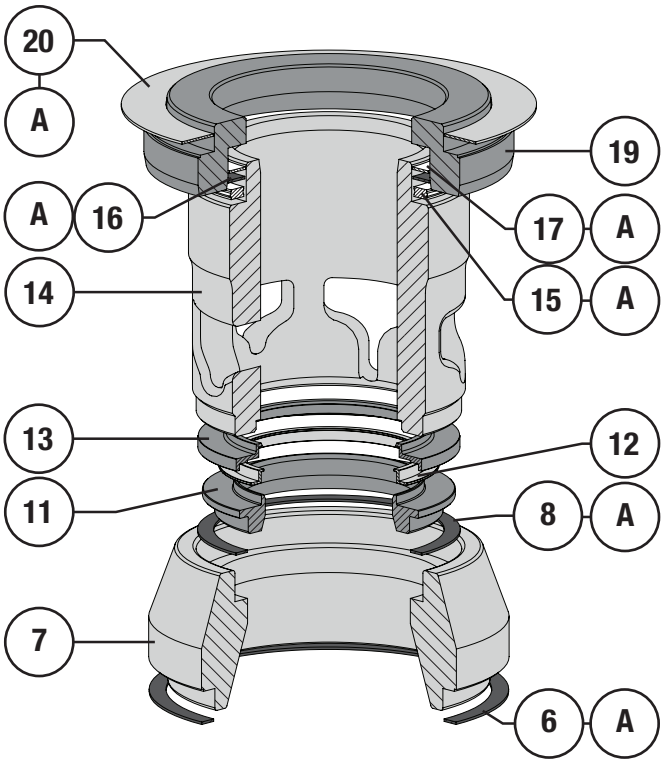


Figure 28 Reduced Soft Seat Trim Diagram

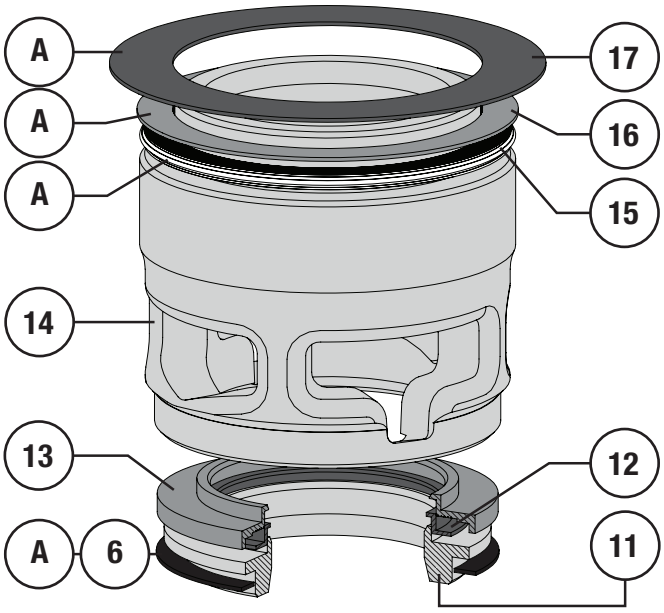


Figure 29 Standard Soft Seat Trim Diagram

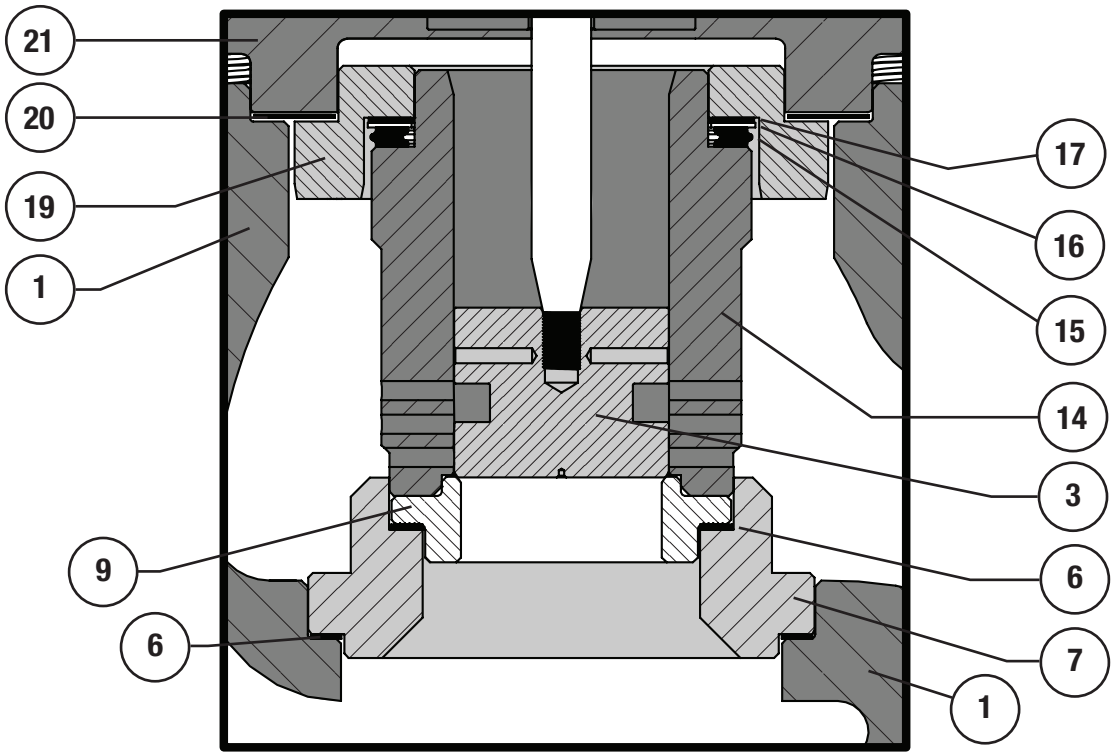


Figure 30 Metal Seat Restricted Trim Diagram

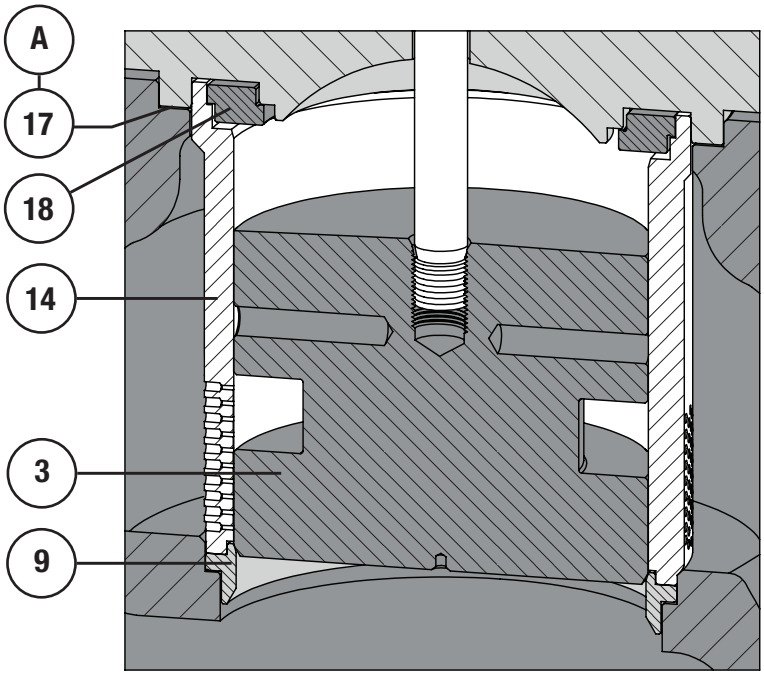


Figure 31 8 Inch Valve Load Ring Diagram

Table 4

Body to Bonnet Stud Torque

Valve Sizes - Inch		**Bolt Torques**			
		B7 B7 Fluorokote #1		B7M B7M Fluorokote #1 B8M CL2 (strain hardened)	
Globe Body Valves	Angle Body Valves	N•m	lbf-ft.	N•m	lbf-ft.
1	1	127	94	102	75
1-1/2, 1-1/2x1, 2, or 2x1	2 or 2x1	88	65	71	52
-	3[1]	127	94	102	75
3, 3x2	4 or 4x2	175	129	141	104
4, 4x3	6	312	230	250	184
6	-	549	405	549	405
8	-	746	550	746	550

NOTES: (1) - 3 inch Angle Body valves require the same size stud as the 1 inch valve bodies.

Table 5

Packing Nut Torque Values

Valve Stem Diameter Inch (mm)	**ASME Class**	**PTFE Single and Double Type Packing**				**Graphite Single and Double Type Packing**			
		Min. Torque		Max. Torque		Min. Torque		Max. Torque	
		lbf-in.	N•m	lbf-in.	N•m	lbf-in.	N•m	lbf-in.	N•m
3/8 (9.5)	150	9	1	17	2	27	3	44	5
	300	17	2	27	3	35	4	53	6
	600	27	3	35	4	53	6	71	8
1/2 (12.7)	150	17	2	35	4	44	5	71	8
	300	27	3	44	5	58	7	89	10
	600	35	4	58	7	80	9	124	14
3/4 (19.1)	150	44	5	71	8	97	11	150	17
	300	62	7	97	11	133	15	204	23
	600	89	10	133	15	186	21	274	31
1 (25.4)	300	106	12	159	18	230	26	336	38
	600	150	17	221	25	310	35	469	53

Table 6

Valve Stem Connection Assembly Torque and Pin Replacement

VSC Diameter Inches (mm)	**Torque** lbf-ft. (N•m)	**Hole Size** Inches (mm)
3/8 (9.5)	25 - 35 (34 - 47)	0.095 - 00.97 (2.41 - 2.46)
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)

Parts

Key	Description	Part Number
1	**Body**	
	If you need a body as a replacement part, order by valve size and stem diameter, serial number and desired material.	
2	**Stud,** Bonnet/Body	
	NOTE: Anti-Cavitation 2 Stage and Low-Noise III D3 Trim may require a bonnet spacer and will require special studs. Consult Dyna-Flo. Refer to Table 5 for Angle Body stud size equivalents.	
	- B7	
	1 inch (4 Required)	1R2848X057D
	1-1/2 inch (8 Required)	1K2429X056D
	2 inch (8 Required)	1K2429X056D
	3 inch (8 Required)	1A3781X045D
	4 inch (8 Required)	1R3690X042D
	6 inch (12 Required)	1A36563101D
	8 inch (16 Required)	1D94523101D
	- B8M	
	1 inch (4 Required)	1R28483522D
	1-1/2 inch (8 Required)	1K24293522D
	2 inch (8 Required)	1K24293522D
	3 inch (8 Required)	1A3781CL28D
	4 inch (8 Required)	1R3690CL28D
	6 inch (12 Required)	1A36563522D
	8 inch (16 Required)	1D9452CL28D
	- B7M	
	1 inch (4 Required)	1R2848B7MDD
	1-1/2 inch (8 Required)	1K2429B7MDD
	2 inch (8 Required)	1K2429B7MDD
	3 inch (8 Required)	1A3781B7MDD
	4 inch (8 Required)	1R3690B7MDD
	6 inch (12 Required)	1A3656B7MDD
	8 inch (16 Required)	1D9452X011D
	- B7 Fluorokote #1	
	1 inch (4 Required)	1R2848XFK1D
	1-1/2 inch (8 Required)	1K2429XFK1D
	2 inch (8 Required)	1K2429XFK1D
	3 inch (8 Required)	1A3781XFK1D
	4 inch (8 Required)	1R3690XFK1D
	6 inch (12 Required)	1A3656XFK1D
	8 inch (16 Required)	1D9452XFK1D
	- B7M Fluorokote #1	
	1 inch (4 Required)	1R2848XFK3D
	1-1/2 inch (8 Required)	1K2429XFK3D
	2 inch (8 Required)	1K2429XFK3D
	3 inch (8 Required)	1A3781XFK3D
	4 inch (8 Required)	1R3690XFK3D
	6 inch (12 Required)	1A3656XFK3D
	8 inch (16 Required)	1D9452XFK3D
3	**Valve Plug**	Consult Dyna-Flo
4	**Pin,** S31600	
	3/8 inch (9.5 mm) Stem	1V32263507D
	1/2 inch (12.7mm) Stem	1V32273507D
	3/4 inch (19.1mm) Stem	1V32603507D
	1 inch (25.4 mm) Stem	1V3340NT05D
5	**Valve Stem**	Consult Dyna-Flo
6	**Gasket,** Seat Ring, S31600/Graphite	
	1 inch	1R2862X011D
	1-1/2 inch	1R3098X005D
	2 inch	1R3296X004D
	3 inch	1R3481X005D
	4 inch	1J5047X006D
	6 inch	1U5086X003D
	8 inch	10A3266X08D
7	**Seat Ring Adapter,** Reduced Trim,	
	S31600/S31603 Dual Grade	Refer to Table 12
8	**Gasket,** Seat Ring Adapter, S31600/Graphite	
	2 x 1 inch	1R2862X011D
	3 x 2 inch	1R3296X004D
9	**Seat Ring**	Refer to Tables 13-14
10	**Liner,** Angle Body Valves	Contact Dyna-Flo
11	**Disk Seat,** Soft Seat Valves,	
	S31600/S31603 Dual Grade	Refer to Table 15
12	**PTFE Disk,** Soft Seat Valves,	
	PTFE	Refer to Table 15
13	**Disk Retainer,** Soft Seat Valves,	
	S31600/S31603 Dual Grade	Refer to Table 15
14	**Cage**	Refer to Tables 7-11
15	**Spiral Wound Gasket**	
	- S30400/Graphite	
	1 inch	1R2860X006D
	1-1/2 inch	1R30999928D
	2 inch	1R32979928D
	3 inch	1R34829928D
	4 inch	1R37229928D
	6 inch	1U50859928D
	- N06600/Graphite	
	1 inch	1R28609944D
	1-1/2 inch	1R30999944D
	2 inch	1R32979944D
	3 inch	1R34829944D
	4 inch	1R37229944D
	6 inch	1U50859944D

Parts (Continued)

Key	Description	Part Number
16	**Metal Shim,** S30400	
	1 inch	16A1936X01D
	1-1/2 inch	16A1937X01D
	2 inch	16A1938X01D
	3 inch	16A1940X01D
	4 inch	16A1941X01D
	6 inch	16A1942X01D
17	**Gasket,** Bonnet, S31600/Graphite	
	1 inch	1R2859X004D
	1-1/2 inch	1R3101X003D
	1-1/2 x 1 inch	1R2861X004D
	2 inch	1R3299X004D
	2 x 1 inch	1R2861X004D
	3 inch	1R3484X004D
	3 x 2 inch	1R3298X003D
	4 inch	1R3724X004D
	6 inch	1U5081X005D
	6 x 4 inch	360GSK61X1D
	8 inch	10A3265X11D
18	**Load Ring,** 8 inch valve only,	
	S17400	20A3267X01D
19	**Cage Adapter,** Reduced Trim,	
	S31600/S31603 Dual Grade	Refer to Table 12
20	**Bonnet Gasket for Cage Adapter,** S31600/Graphite	
	1-1/2 x 1 inch	1R3101X003D
	2 x 1 inch	1R3299X004D
	3 x 2 inch	1R3484X004D
21	**Bonnet**	
	If you need a bonnet as a replacement part, order by valve size and stem diameter, serial number and desired material.	
22	**Bonnet Spacer**	
	If you need a bonnet spacer as a replacement part, order by valve size and stem diameter, characteristic, serial number and desired material.	
23	**Baffle,** included as part of extension bonnet assembly	
24	**Nut,** Body/Bonnet	
-	2H	
	1 inch (4 Required)	1C33062407D
	1-1/2 inch (8 Required)	1A3772X066D
	2 inch (8 Required)	1A3772X066D
	3 inch (8 Required)	1A3760X059D
	4 inch (8 Required)	1A3520X060D
	6 inch (12 Required)	1A44092407D
	8 inch (16 Required)	1A44522407D
-	2HM	
	1 inch (4 Required)	1C33062HMDD
	1-1/2 inch (8 Required)	1A37722HMDD
	2 inch (8 Required)	1A37722HMDD
	3 inch (8 Required)	1A37602HMDD
	4 inch (8 Required)	1A35202HMDD
	6 inch (12 Required)	1A44092HMDD
	8 inch (16 Required)	1A44522HMDD
-	8M	
	1 inch (4 Required)	1C33063525D
	1-1/2 inch (8 Required)	1A3772X023D
	2 inch (8 Required)	1A3772X023D
	3 inch (8 Required)	1A37603525D
	4 inch (8 Required)	1A35203525D
	6 inch (12 Required)	1A44093525D
	8 inch (16 Required)	1A44523525D
-	2H Fluorokote #1	
	1 inch (4 Required)	1C3306XFK1D
	1-1/2 inch (8 Required)	1A3772XFK1D
	2 inch (8 Required)	1A3772XFK1D
	3 inch (8 Required)	1A3760XFK1D
	4 inch (8 Required)	1A3520XFK1D
	6 inch (12 Required)	1A4409XFK1D
	8 inch (16 Required)	1A4452XFK1D
-	2HM Fluorokote #1	
	1 inch (4 Required)	1C3306XFK3D
	1-1/2 inch (8 Required)	1A3772XFK3D
	2 inch (8 Required)	1A3772XFK3D
	3 inch (8 Required)	1A3760XFK3D
	4 inch (8 Required)	1A3520XFK3D
	6 inch (12 Required)	1A4409XFK3D
	8 inch (16 Required)	1A4452XFK3D
25	**Stud,** Packing, B8M, 2 Required	
	3/8 inch (9.5 mm) Stem	1E94413522D
	1/2 inch (12.7mm) Stem	1E94443522D
	3/4 inch (19.1mm) Stem	1E94493525D
	1 inch (25.4 mm) Stem	0V00253522D
26	**Lower Wiper,** Teflon	
	3/8 inch (9.5 mm) Stem	1J87210699D
	1/2 inch (12.7mm) Stem	1J87220699D
	3/4 inch (19.1mm) Stem	1J87230699D
	1 inch (25.4 mm) Stem	1J87240699D

Parts (Continued)

Key	Description	Part Number
27	**Packing Box Ring,** S31600/S31603 Dual Grade	
	3/8 inch (9.5 mm) Stem	1J87313507D
	1/2 inch (12.7mm) Stem	1J87323507D
	3/4 inch (19.1mm) Stem	1J87333507D
	1 inch (25.4 mm) Stem	1J87343507D
28	**Spring,** Packing, SST	Refer to Table 18
29	**Special Washer,** SST	Refer to Table 18
30	**Packing Set,** PTFE	Refer to Table 18
31	**Packing Follower,** S31600/S31603 Dual Grade	
	3/8 inch (9.5 mm) Stem	1E94393507D
	1/2 inch (12.7mm) Stem	1E94433507D
	3/4 inch (19.1mm) Stem	1E94473507D
	1 inch (25.4 mm) Stem	1H98233507D
32	**Upper Wiper,** Felt	
	3/8 inch (9.5 mm) Stem	1J87260633D
	1/2 inch (12.7mm) Stem	1J87270633D
	3/4 inch (19.1mm) Stem	1J87280633D
	1 inch (25.4 mm) Stem	1J87290633D
33	**Packing Flange**	
	- Carbon Steel - Plated	
	3/8 inch (9.5 mm) Stem	1E94372410D
	1/2 inch (12.7mm) Stem	1E94422307D
	3/4 inch (19.1mm) Stem	1E94482307D
	1 inch (25.4 mm) Stem	0V00242505D
	- S31600/S31603 Dual Grade	
	3/8 inch (9.5 mm) Stem	1E94373507D
	1/2 inch (12.7mm) Stem	12B6924X01D
	3/4 inch (19.1mm) Stem	12B6925X01D
	1 inch (25.4 mm) Stem	Contact Dyna-Flo
34	**Nut,** Packing, 8M, 2 Required	
	3/8 inch (9.5 mm) Stem	1E94403525D
	1/2 inch (12.7mm) Stem	1E94453525D
	3/4 inch (19.1mm) Stem	1E94463525D
	1 inch (25.4 mm) Stem	1A34333525D
35	**Lantern Ring,**	Refer to Table 18
	S31600/S31603 Dual Grade	
36	**Graphite Filament,**	Refer to Table 18
37	**Graphite Ribbon,**	Refer to Table 18
38	**Jam Nut,** Valve Stem, Steel/Zinc Plated	
	3/8 inch (9.5 mm) Stem	NHJFZ38
	1/2 inch (12.7mm) Stem	NHJFZ12
	3/4 inch (19.1mm) Stem	NHJFZ34
	1 inch (25.4 mm) Stem	NHJFZ100
39	**Hex Nut,** Valve Stem, Steel/Zinc Plated	
	3/8 inch (9.5 mm) Stem	NHFZ38
	1/2 inch (12.7mm) Stem	NHFZ12
	3/4 inch (19.1mm) Stem	NHFZ34
	1 inch (25.4 mm) Stem	NH8FZ100
40	**Yoke Locknut,** Steel Plated	
	2-1/8 inch (54 mm) Yoke Boss	1E79302306D
	2-13/16 inch (71 mm) Yoke Boss	1E80742306D
	3-9/16 inch (127 mm) Yoke Boss	1E83272306D
41	**Flow Arrow,** S30400	
	1 inch	1V10593898D
	1-1/2" - 8"	1V10603898D
42	**Name Tag, S30400**	NAMEXRBODYA
43	**Name Plate,** S30400	Refer to Actuator
44	**Cage Retainer**	Contact Dyna-Flo
	Low-Noise III A3, B3, C3 Trim	
45	**Baffle**	Contact Dyna-Flo
	Low-Noise III A3, B3, C3 Trim	
44/45	**Cage Retainer/Baffle Assembly**	Contact Dyna-Flo
	Low-Noise III D3	

Parts (Live Loaded Packing)

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

Parts Ordering

Whenever corresponding with Dyna-Flo about a 360 Series Control Valves, refer to the nameplate (Key 47) or name tag (Key 46) for the serial number of the unit. Please order by the complete part number (as given in the part lists) of each part required. **NOTE:** Not all the available replacement part numbers are shown in this manual, if you have inquiries about parts that are not listed please contact your Dyna-Flo Sales Representative.

Table 7

Cage (Key 14) - 362 Quick Opening

Valve Size Inch		**Port Size**	**Cage Material**		
Globe Body	Angle Body	Inch (mm)	S17400 H900	S17400 DH1150	S31600 / ENC
1, 1-1/2x1, 2x1	1, 2x1	1-5/16 (33.3)	2U21503327D	2U21501150D	2U74034893D
1-1/2	2, 3x1-1/2	1-7/8 (47.6)	2U21923327D	2U21921150D	2U72544893D
2, 3x2	4x2	2-5/16 (58.7)	2U22343327D	2U22341150D	2U74044893D
-	3	2-7/8 (73.0)	2U22763327D	2U22761150D	2U74054893D
3	4	3-7/16 (87.3)	2U23183327D	2U23181150D	2U74064893D
4	6	4-3/8 (111.1)	2U23603327D	2U23601150D	2U74074893D
4x2-1/2	-	2-7/8 (73.0)	2U22763327D	2U22761150D	2U74054893D
6	-	7 (177.8)	2U50633327D	2U50631150D	2U80694893D
6x4	-	4-3/8 (111.1)	2U23603327D	2U23603327D	2U23603327D
8	-	8 (203.2)	20A3249X01D	20A3249X02D	20A5469X01D
NOTE: All S31600 barstock is dual grade S31600/S31603 (316/316L).					

Table 8

Cage (Key 14) - 362 Linear

Valve Size Inch		**Port Size**	**Cage Material**		
Globe Body	Angle Body	Inch (mm)	S17400 H900	S17400 DH1150	S31600 / ENC
1, 1-1/2x1, 2x1	1, 2x1	1-5/16 (33.3)	2U21563327D	2U21561150D	2U74144893D
1-1/2	2, 3x1-1/2	1-7/8 (47.6)	2U21983327D	2U21983150D	2U74154893D
2, 3x2	4x2	2-5/16 (58.7)	2U22403327D	2U22401150D	2U74164893D
-	3	2-7/8 (73.0)	2U22823327D	2U22821150D	2U74174893D
3	4	3-7/16 (87.3)	2U23243327D	2U23241150D	2U74184893D
4	6	4-3/8 (111.1)	2U23663327D	2U23661150D	2U74194893D
4x2-1/2	-	2-7/8 (73.0)	2U22823327D	2U22821150D	2U74174893D
6	-	7 (177.8)	2U50613327D	2U50611150D	2U80684893D
6x4	-	4-3/8 (111.1)	2U23663327D	2U23661150D	2U74194893D
8	-	8 (203.2)	20A3247X01D	20A3247X05D	20A5468X01D
NOTE: All S31600 barstock is dual grade S31600/S31603 (316/316L).					

Table 9

Cage (Key 14) - 362 Equal Percentage

Valve Size Inch		**Port Size**	**Cage Material**		
Globe Body	Angle Body	Inch (mm)	S17400 H900	S17400 DH1150	S31600 / ENC
1, 1-1/2x1, 2x1	1, 2x1	1-5/16 (33.3)	2U21533327D	2U21531150D	2U74084893D
1-1/2	2, 3x1-1/2	1-7/8 (47.6)	2U21953327D	2U21951150D	2U74094893D
2, 3x2	4x2	2-5/16 (58.7)	2U22373327D	2U22371150D	2U74104893D
-	3	2-7/8 (73.0)	2U22793327D	2U22791150D	2U74114893D
3	4	3-7/16 (87.3)	2U23213327D	2U23211150D	2U74124893D
4	6	4-3/8 (111.1)	2U23633327D	2U23631150D	2U74134893D
4x2-1/2	-	2-7/8 (73.0)	2U22793327D	2U22791150D	2U74114893D
6	-	7 (177.8)	2U50593327D	2U50591150D	2U80674893D
6x4	-	4-3/8 (111.1)	2U23663327D	2U23661150D	2U74194893D
8	-	8 (203.2)	20A3245X01D	20A3245X05D	20A5467X01D
NOTE: All S31600 barstock is dual grade S31600/S31603 (316/316L).					

Table 10

Stage 2 Anti-Cavitation Trim Kits (Trim F)

Valve Size Inch	Cv	Part Number
1	0.30	TMXC362112FD
	1.02	TMXC362122FD
	1.66	TMXC362132FD
	2.30	TMXC362142FD
1-1/2	0.30	TMXC362512FD
	1.02	TMXC362522FD
	1.66	TMXC362532FD
	2.30	TMXC362542FD
2	0.30 (1/2" Stem Diameter)	TMXC362212FD
	4.10 (1/2" Stem Diameter)	TMXC362252FD
	0.30 (3/4" Stem Diameter)	TMXC362213FD
	4.10 (3/4" Stem Diameter)	TMXC362253FD

Table 11

Stage 2 Anti-Cavitation Trim Kits (Trim G)

Valve Size Inch	Cv	Part Number
1	0.30	TMXC362112GD
	1.02	TMXC362122GD
	1.66	TMXC362132GD
	2.30	TMXC362142GD
1-1/2	0.30	TMXC362512GD
	1.02	TMXC362522GD
	1.66	TMXC362532GD
	2.30	TMXC362542GD
2	0.30 (1/2" Stem Diameter)	TMXC362212GD
	4.10 (1/2" Stem Diameter)	TMXC362252GD
	0.30 (3/4" Stem Diameter)	TMXC362213GD
	4.10 (3/4" Stem Diameter)	TMXC362253GD

Table 12

Reduced Trim Adapters (Keys 7 & 19)

S31600/S31603 Dual Grade Material

Globe Body Inch	**Angle Body** Inch	**Part**	
		Seat Ring Adapter (Key 7)	Cage Adapter (Key 19)
1-1/2 x 1	2x1	-	1U2218X316D
2x1	-	1U2262X316D	1U1207X316D
-	3 x 1-1/2	1U23043507D	1U23023507D
3 x 2	4 x 2	1U2346X316D	1U1246X316D
4 x 2-1/2	-	1U2396X316D	1U1251X316D

LF2 (ASTM A350/A105 DUAL GRADE FORGED MATERIAL

Globe Body Inch	**Angle Body** Inch	**Part**	
		Seat Ring Adapter (Key 7)	Cage Adapter (Key 19)
1-1/2 x 1	2x1	-	1U22182449D
2x1	-	1U22622449D	1U12072449D
-	3 x 1-1/2	1U23042449D	1U23022449D
3 x 2	4 x 2	1U23462201D	1U12462201D
4 x 2-1/2	-	1U23962201D	1U12512201D

Table 13

Seat Ring (Keys 9) - For Standard Trim

Globe Body Inch	Angle Body Inch	Material		
		S41600 HT	S31600	S31600 / Alloy 6 Hard Faced Seat
1, 2 x 1	1	1U22254617D	1U22253507D	1U22253910D
1-1/2	2 x 1	1U22194617D	1U22193507D	1U22193910D
1-1/2 x 1	2	1U22204617D	1U22203507D	1U22203910D
2, 3 x 2	4 x 2	1U22264617D	1U22263507D	1U22263910D
-	3	1U22274617D	1U22273507D	1U22273910D
3	4	1U22284617D	1U22283507D	1U22283910D
4	6	1U22294617D	1U22293309D	1U22293910D
6	-	1U50804617D	1U50803309D	1U50803910D
6 x 4	-	360R6019X1D	360R6019X2D	360R6020X3D
8	-	20A3260X01D	20A3260X02D	20A3260X15D

NOTE: All S31600 barstock is dual grade S31600/S31603 (316/316L).

Table 15

Soft Seat Valve Parts (Keys 11, 12, & 13)

Valve Size inch		Parts		
Globe Valve	Angle Valve	Disk Seat (S31600)	Disk (PTFE)	Disk Retainer (S31600)
1, 2 x 1	1	1V71023507D	1V71010624D	1V71003507D
1-1/2	2, 3 x 1-1/2	1V71053507D	1V71040624D	1V71033507D
1-1/2 x 1	2 x 1	1V71223507D	1V71010624D	1V71213507D
2, 3 x 2	4 x 2	1V71063507D	1V71070624D	1V71083507D
4 x 2-1/2	3	1V71113507D	1V71100624D	1V71093507D
3	-	1V71143507D	1V71130624D	1V71123507D
4	6	1V71173309D	1V71160624D	1V71153309D
6	-	1V71203309D	1V71190624D	1V71183309D
6 x 4	-	360R6021X1D	360R6023X1D	360R6022X1D
8		20A4467X01D	20A4468X01D	10A4466X01D

NOTE: All S31600 barstock is dual grade S31600/S31603 (316/316L).

Table 16

Spiral Wound Gaskets (N06600/Graphite) and Shim Repair Kits (Keys 6, 8, 15, 16, 17, & 20)

Valve Size inch		**Gasket Kit**
Globe Valve	Angle Valve	
1	1	RGASKETX16D
1-1/2	2	RGASKETX17D
1-1/2 x 1	2 x 1	RGASKETX24D
2	-	RGASKETX18D
2 x 1	-	RGASKETX25D
-	3	RGASKETX19D
-	3 x 1-1/2	RGASKETX26D
3	4	RGASKETX20D
3 x 2	4 x 2	RGASKETX27D
4	6	RGASKETX21D
4 x 2-1/2	-	RGASKETX28D
6	-	RGASKETX22D
6 x 4	-	RGASKETR22D
8	-	RGASKETX23D

NOTE: All S31600 barstock is dual grade S31600/S31603 (316/316L).

Table 17

Packing Repair Kits

Stem Diameter [Yoke Boss Diameter] inches (mm)	**Single**		**Double**
	PTFE	Graphite	PTFE
3/8 (9.5) [2-1/8 (54)]	RPACKX0001D	RPACKXD010D	RPACKXD004D
1/2 (12.7) [2-13/16 (71)]	RPACKX0002D	RPACKXD011D	RPACKXD005D
3/4 (19.1) [3-9/16 (90)]	RPACKX0003D	RPACKXD012D	RPACKXD006D
1 (25.4) [5 (127)]	RPACKX0034D	RPACKX0053D	RPACKX0036D

Table 18

Packing Parts (Keys 28, 29, 30, 35, 36, & 37)

PTFE Packing

Key	Description		Stem Diameter Inch (mm)			
			3/8 (9.5)	1/2 (12.7)	3/4 (19.1)	1 (25.4)
28	Packing Spring (S30400) For Single Packing Only.	Part #	1F12543701D	1F12553701D	1F12563701D	1D58293701D
		Qty.	1	1	1	1
29	Special Washer (S30400) For Single Packing Only.	Part #	1F12523604D	1F12513604D	1F12503604D	1H98223604D
		Qty.	1	1	1	1
30(1)	Packing Set (Refer to Table 25 for Repair Kits)	Part #	1R2900010DD	1R2902010DD	1R2904010DD	1R29060101D
		Qty. Single	1	1	1	1
		Qty. Double	2	2	2	2
35	Lantern Ring (S31600/S31603 Dual Grade) For Double PTFE Packing	Part #	DFX0000031D	DFX0000001D	DFX0000041D	DFX0000051D
		Qty.	1	1	1	1

Single Graphite Packing

Key	Description		Stem Diameter Inch (mm)			
			3/8 (9.5)	1/2 (12.7)	3/4 (19.1)	1 (25.4)
35	Lantern Ring (S31600/S31603 Dual Grade)	Part #	DFX0000031D	DFX0000021D	DFX0000041D	DFX0000051D
		Qty.	2	1	2	2
35A	Lantern Ring (S31600/S31603 Dual Grade)	Part #	N/A	DFX0000001D	N/A	N/A
		Qty.	N/A	1	N/A	N/A
36	Graphite Filament Ring	Part #	1F3370X032D	1E3190X022D	1E3191X028D	1D7518X013D
		Qty.	2	2	3	3
37	Graphite Ribbon Ring	Part #	1V3160X002D	1V3802X002D	1V2396X002D	1U6768X002D
		Qty.	2	2	2	2

NOTE: (1) For 3/8 inch stems, remove a packing ring from the lower set for a total of 4 rings.

MODEL NUMBERING SYSTEM

SAMPLE PART NUMBER: 362-2AFL-1FP2-ES-4

							BODY STYLE	-
-	GLOBE BODY			A	ANGLE BODY			
							VALVE SIZE	2
1	1 INCH	5	1-1/2 INCH	2	2 INCH	3	3 INCH	
4	4 INCH	6	6 INCH	8	8 INCH			
							ASME RATING	A
A	150	B	300	C	600			
							END CONNECTION	F
F	RF	J	RTJ	N	NPT	T	BWE SCH 40	
L	BWE SCH 80							
							BODY MATERIAL	L
L	LCC	W	WCC	M	CF8M	9	WC9	
							BOLTING	-
-	B7 / 2H (STANDARD)			A	B7M / 2HM			
B	B8M / 8M			K	B7 / 2H FLUOROKOTE #1			
L	B7M / 2HM FLUOROKOTE #1							
							TRIM	1
1	TRIM D1	2	TRIM D2	4	TRIM D4	5	TRIM D5	
6	TRIM D6	7	TRIM D7	8	TRIM D8	9	TRIM D9	
J	TRIM DJ	T	TRIM DT	C	TRIM DC	E	TRIM DE	
N	TRIM DN	R	TRIM DR	2H	TRIM D2H	4H	TRIM D4H	
6H	TRIM D6H	8H	TRIM D8H					
							PORT SIZE	F
F	FULL PORT	R	REDUCED PORT					
							PACKING STYLE	P
P	SINGLE PTFE V-RING (PRESSURE)			J	DOUBLE PTFE V-RING (PRESSURE)			
G	SINGLE GRAPHITE (PRESSURE)			V	DOUBLE PTFE V-RING (VACUUM)			
R	DOUBLE PTFE V-RING (VACUUM / PRESSURE)			L	LIVE LOADED PTFE V-RING (PRESSURE)			
T	LIVE LOADED GRAPHITE (PRESSURE)			D	LIVE LOADED DUPLEX (PRESSURE)			
K	LIVE LOADED KALREZ®							
							YOKE BOSS SIZE	2
1	2-1/8" (3/8" STEM)	2	2-13/16" (1/2" STEM)	3	3-9/16" (3/4" STEM)	5	5" (1" STEM)	
							PAINT	-
-	DFPS-01 (STANDARD)			2	DFPS-02 (SEVERE SERVICE)			
3	DFPS-03 (HIGH TEMPERATURE)							
							CHARACTERISTIC	E
E	EQUAL PERCENTAGE			L	LINEAR			
Q	QUICK OPEN			N	LOW-NOISE I (LINEAR)			
Z	LOW-NOISE III A1 (LINEAR)			Y	LOW-NOISE III B3 (LINEAR)			
C	LOW-NOISE III C3 (LINEAR)			1	LOW-NOISE III D1 (LINEAR)			
D	LOW-NOISE III D3 (LINEAR)							
							BONNET STYLE	S
S	STANDARD (1" TO 6" VALVES)			E	EXTENSION STYLE 1			
H	EXTENSION STYLE 2			T	STANDARD (TAPPED)			
							SHUT-OFF CLASS	4
4	CLASS IV	5	CLASS V	6	CLASS VI			

362 ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___

Curtiss-Wright Flow Control Company Canada, doing business as Dyna-Flo Control Valve Services

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Offices Worldwide: For a listing of our global sales network, visit our website at www.cw-dynaflo.com/en-gb/distribution

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