

Model 360/361 Control Valves

Operation, Parts, and Instruction Manual



Figure 1 360 Control Valve & DFC Actuator

TABLE OF CONTENTS

| | | | |
|----------------------------|----------|--|-----------|
| General | 2 | Lapping | 13 |
| Scope | 2 | Assembly | 15 |
| Specifications | 3 | Stud Installation | 15 |
| Unpacking | 5 | Plug Seal Assembly | 15 |
| Installation | 5 | Trim Parts Assembly | 19 |
| Air Piping | 6 | Bonnet Installation | 20 |
| Periodic Inspection | 7 | Packing Installation | 21 |
| Actuator Removal | 7 | Globe Valve Cross Section - Figure 32 | 26 |
| Maintenance | 8 | Angle Valve Cross Section - Figure 34 | 28 |
| Packing Maintenance | 8 | Body to Bonnet Stud Torque - Table 5 | 32 |
| Disassembly | 9 | Packing Nut Torque - Table 6 | 32 |
| Packing Removal | 9 | Valve Stem Connection Information - Table 7 | 32 |
| Bonnet Removal | 9 | Parts | 33 |
| Trim Parts Removal | 11 | Model Builder | 49 |
| Packing Parts Removal | 11 | | |
| Plug Seal Removal | 12 | | |



Model 360/361 Control Valves

Operation, Parts, and Instruction Manual

NOTICE

These instructions are meant to be used with the Dyna-Flo 360/361 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 360/361 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 360 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.

Model 360/361 Control Valves

Operation, Parts, and Instruction Manual



SPECIFICATIONS

Configurations

The Model 360 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.

PTFE Seat and Metal Seat Available.

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

Sizes and Connection Styles (Refer to Table 1)

| | |
|-------------|--|
| Model: | 360 |
| Size: | 1", 1-1/2", 2", 3", 4", 6", 8" |
| Body: | Globe (All Sizes), Angle (1" / 2" / 3" / 4" / 6") |
| Rating: | ASME 150 / 300 / 600 |
| Connection: | RF / RTJ / BWE - All Sizes SWE / NPT - 1", 1-1/2", and 2" |

Maximum Inlet Pressures and Temperatures

Flanged valves consistent with ASME Class 150, 300, and 600 rating as per ASME B16.34, unless limited.

Maximum Pressure Drops

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

- Standard Valve Trim:** Figures 10A - 10D.
- Anti-Cavitation Trim:** Figures 10A - 10D.
- Low-Noise Valve Trim:** Figures 10A - 10D.

Characteristic and Flow Direction

- Equal Percentage (Standard) - Flow Down
- Quick Opening - Flow Down
- Linear - Flow Down
- Low-Noise 3 (Linear) - Flow Up
- Anti-Cavitation 1-Stage (Linear) - Flow Down
- Anti-Cavitation 2-Stage (Linear) - Flow Down

Dimensions

Valve and Actuator Outline Dimension Diagram

Refer to Figure 2 of the Sales Bulletin.

Valve and Actuator Assembly Dimensions

Refer to Tables 8 to 19 of the Sales Bulletin.

Approximate Valve Body and Actuator Weights

Refer to Table 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 Figures 10A - 10D of the Sales Bulletin for valve construction material temperature limitations. Refer to Tables 23 - 25 of the Sales Bulletin for trim selections.

Cross-Section of the Model 360 Control Valves

Refer to Figures 32 to 40.

Port Diameters and Maximum Valve Plug Travel

Refer to Tables 4 to 6 of the Sales Bulletin.

Packing Type and Examples

The Standard packing is PTFE V-ring. Live-loaded low emission, graphite, KALREZ® and other packing arrangements are available. Refer to Figures 27, 29, 30, & 31.

Maximum Valve Sizing Coefficients

For standard coefficients at maximum travel, refer to Table 29 & 30 of the Sales Bulletin. For full list of coefficients refer to the Dyna-Flo Configurator.

Service Application

Refer to Tables 20 - 28 of the Sales Bulletin.

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



Model 360/361 Control Valves

Operation, Parts, and Instruction Manual

Table 1

Available Valve Configurations

| Valve Model | Valve Size Inch | End Connection | | | | | |
|---------------|--|--------------------|--|----------------|----------------|--------------------|--------------------|
| | | NPT ⁽¹⁾ | RF ⁽²⁾ and RTJ ⁽³⁾ (Flanged) | | | BWE ⁽⁴⁾ | SWE ⁽⁵⁾ |
| | | | ASME Class 150 | ASME Class 300 | ASME Class 600 | | |
| 360 | 1 / 1-1/2 / 2 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| | 3 / 4 / 6 / 8 | ✗ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 360A | 1 & 2 | ✗ | ✓ | ✓ | ✓ | ✓ | ✓ |
| | 3 / 4 / 6 | ✗ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 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 (Except Anti-Cavitation) | PTFE (Soft Seated) | Standard | Class V (Air Test) |
| | | Optional | Class V Class VI ⁽¹⁾ |
| | Metal | Standard | Class IV |
| | | Optional | Class V ⁽²⁾ Class VI ⁽¹⁾ |
| Anti-Cavitation 1 Stage | Metal | Standard | Class IV |
| | | Optional | Class V |
| Anti-Cavitation 2 Stage | Metal | Standard | Class V |
| Notes: | 1 - Refer to Table 3. | | |
| | 2 - Class V shut-off requires a spring-loaded seal ring, radius-seat plug, and wide-bevel seat ring. Not available with 8 inch port quick opening cages. | | |

Table 3

Available Valve Configurations for Class VI Shut-Off (in accordance with ANSI/FCI 70.2 and IEC 60534-4)

| Valve Model | Port Size Inch | Valve Seat | Minimum Seat Load |
|-----------------------------------|-------------------|----------------------|----------------------|
| 360 Refer to Table 23 for Trim | ≥3.4375≤7 | Metal ⁽¹⁾ | 300 lbs./lineal inch |
| | ≥3.4375≤7 | PTFE | Consult Dyna-Flo |

Note: 1 - Class VI shut-off requires a spring-loaded seal ring, radius-seat plug, and wide-bevel seat ring.

Model 360/361 Control Valves

Operation, Parts, and Instruction Manual



UNPACKING VALVE FROM SHIPPING CONTAINER

Special Tools Required:

- Properly Rated Lifting Straps (2 – 4 Straps) refer to Table 4 for actuator 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 47). 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.

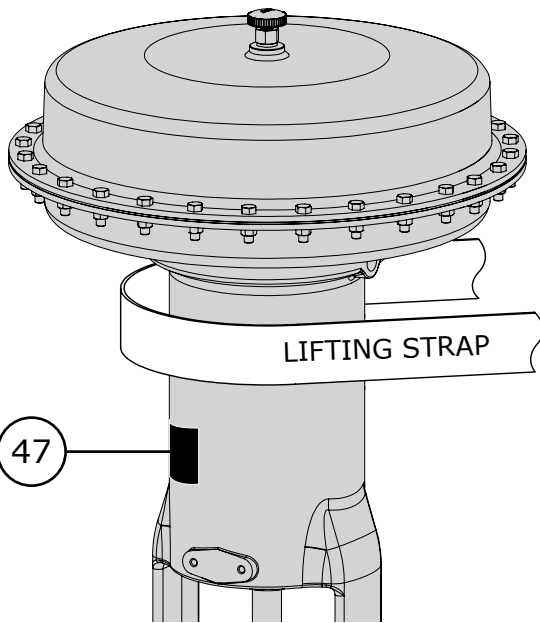


Figure 2 Actuator Lifting Suggestions

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 1/4" (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 38) for proper tightness. Refer to Packing Installation on Page 20 for proper packing tightening instructions.



Model 360/361 Control Valves

Operation, Parts, and Instruction Manual

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 1/4" (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.

| Valve Body / Actuator Configurations and Approximate Weights | | | | | |
|---|------------------------------|---|---|--|---|
| Valve Size (inch) | 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 | 30 (14) | DFO - 1046 | 66 (30) | DFC - 1046 | 64 (29) |
| | | DFO - 1069 | 70 (32) | DFC - 1069 | 78 (26) |
| 1-1/2 | 45 (20) | DFO - 1046 | 81 (37) | DFC - 1046 | 79 (36) |
| | | DFO - 1069 | 85 (39) | DFC - 1069 | 93 (42) |
| 2 | 85 (39) | DFO - 2069 | 136 (62) | DFC - 2069 | 135 (61) |
| | | DFO - 2105 | 167 (76) | DFC - 2105 | 175 (79) |
| 3 | 125 (57) | DFO - 2069 | 176 (80) | DFC - 2069 | 175 (79) |
| | | DFO - 2105 | 207 (94) | DFC - 2105 | 215 (98) |
| 4 | 170 (77) | DFO - 2105 | 252 (114) | DFC - 2105 | 260 (118) |
| | | DFO - 2156 | 277 (126) | DFC - 2156 | 291 (132) |
| 6 | 350 (159) | DFO - 3156 | 466 (211) | DFC - 3156 | 471 (214) |
| | | DFO - 3220 | 585 (266) | DFC - 3220 | 604 (274) |
| 8 | 900 (408) | DFO - 3220 | 1135 (515) | DFC - 3220 | 1154 (523) |

Model 360/361 Control Valves

Operation, Parts, and Instruction Manual



PERIODIC INSPECTION

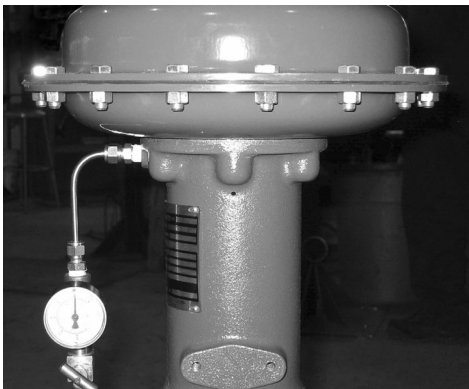
! WARNING

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).



ACTUATOR REMOVAL

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

! 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 Needed:

- 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 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. 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.
 - 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 Use a blunted heavy chisel to loosen the yoke nut (Key 44). 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).
 - 7 Remove the jam nut and hex nut (Keys 42 & 43) and travel indicator from the valve stem (Key 5).

Figure 3 Needle Valve with Gauge setup



Model 360/361 Control Valves

Operation, Parts, and Instruction Manual

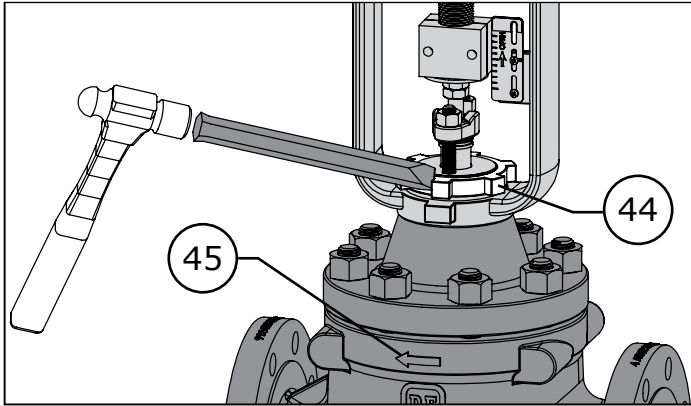


Figure 4 Yoke Nut being loosened with a Chisel

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 6 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 27, 29, 30 & 31).
- Follow Steps 1 – 6 of Before You Begin from PERIODIC INSPECTION (Page 7).

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 27, 29, 30, and 31 for packing styles.

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

Tighten the packing nuts (Key 38) evenly in an alternating pattern until the shoulder of the packing follower (Key 35) makes contact with the top face of the bonnet (Key 26). Proceed to tighten the packing nuts to the torque specification listed in Table 6. Refer to Figure 27.

For Double PTFE V-Ring and Graphite Packing:

Tighten the packing nuts (Key 38) evenly in an alternating pattern to the minimum recommended torque specifications listed in Table 6 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.

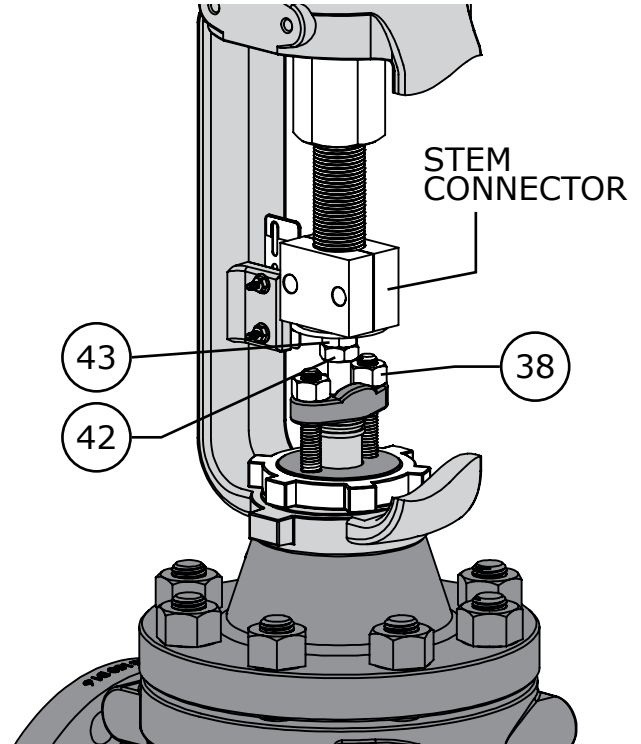


Figure 5 Packing Nut and Stem Connector Detail

Model 360/361 Control Valves

Operation, Parts, and Instruction Manual



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).
- For Angle Body Valves refer to Figure 34.

PACKING REMOVAL

For Live Loaded Packing refer to Figure 31 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 26) 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 38).
- 2 Remove the upper wiper (Key 36) if present, graphite packing does not include an upper wiper.
- 3 Remove the packing follower (Key 35).
- 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 30, 31, 32, 33, & 34) 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 26). For packing reassembly refer to Packing Installation section (Page 21).

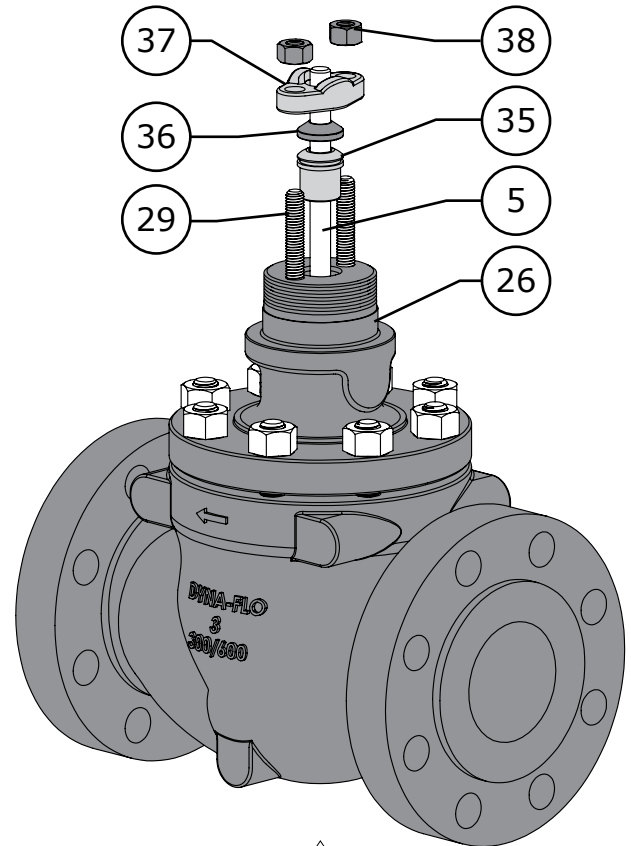


Figure 6 Packing Removal (Steps 1 - 3)

BONNET REMOVAL

⚠ 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 26). 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.

- 1 Loosen the bonnet nuts (Key 28) 1 full turn after the contact between the nuts and the top surface of the bonnet (Key 26) has been broken. Do not remove the bonnet nuts until any trapped process pressure has been vented. Refer to Figure 7.



Model 360/361 Control Valves

Operation, Parts, and Instruction Manual

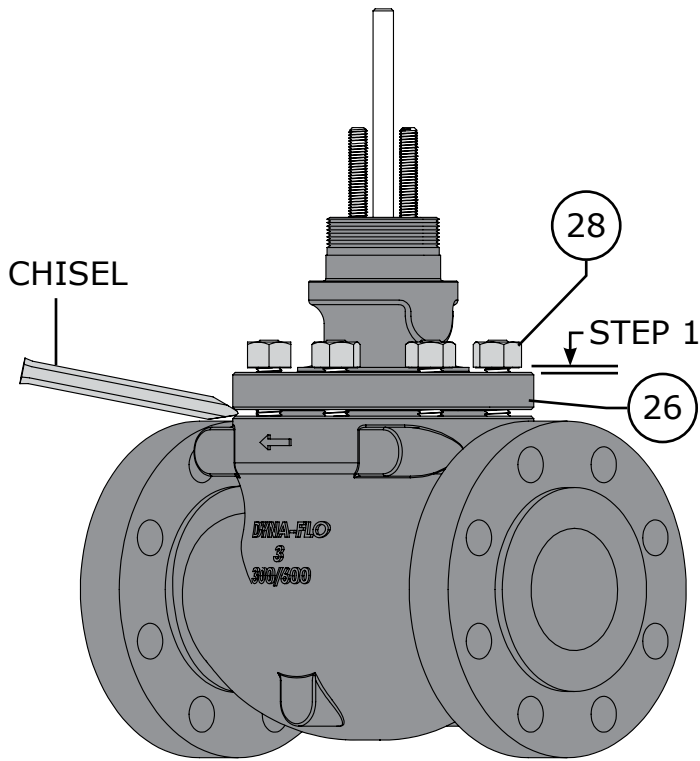


Figure 7 Bonnet Removal (Steps 1 - 2)

DISASSEMBLY (Continued)

BONNET REMOVAL (Continued)

- 2 Break the contact between the valve body (Key 1) and the bonnet (Key 26), use a pry bar or blunt chisel to help with the separation if necessary.
- 3 If no process fluid or gas escapes from the body-to-bonnet joint proceed by completely removing the bonnet nuts (Key 28). Refer to Figure 8.
- 4 Carefully lift the bonnet (Key 26) 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.
- 5 The bonnet gasket (Key 22) may stick to the bonnet during removal. Remove the bonnet gasket.

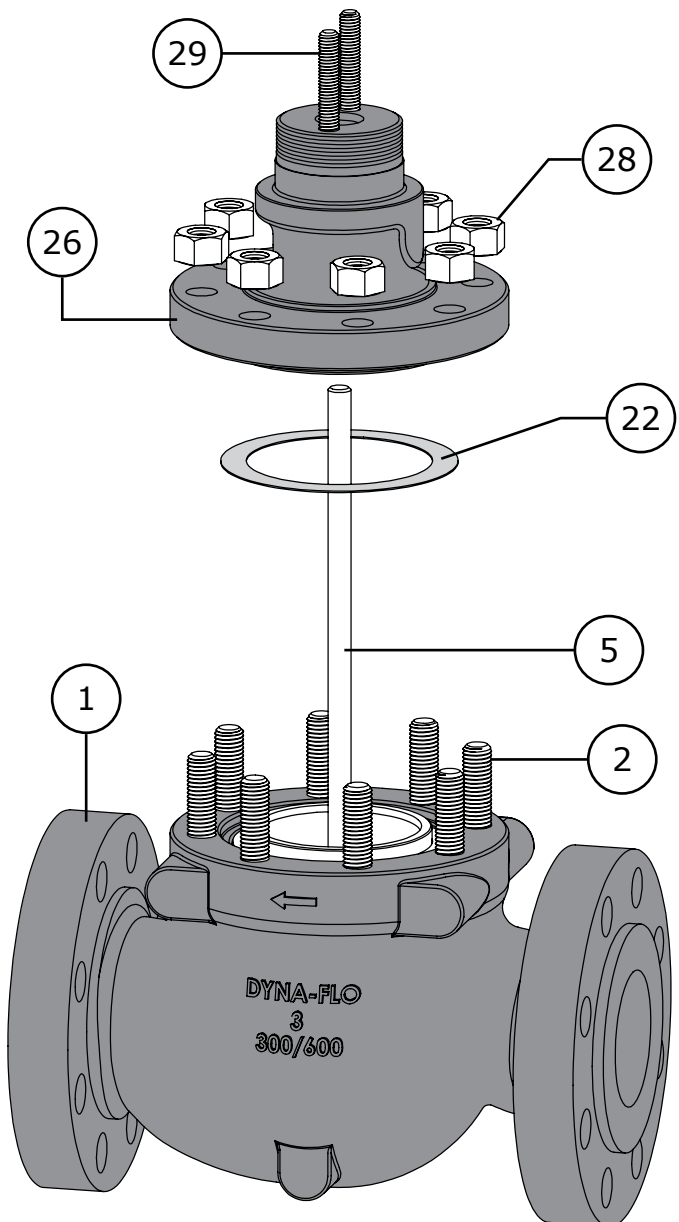


Figure 8 Bonnet Removal (Steps 3 - 4)

Model 360/361 Control Valves

Operation, Parts, and Instruction Manual



DISASSEMBLY (Continued)

TRIM PARTS REMOVAL

For Reduced Trim:

- A** Remove the cage adapter ring (Key 24). Refer to Figure 37.
- B** Remove the cage adapter gasket (Key 25), metal shim (Key 21), and spiral wound gasket (Key 20).

For 8 inch valve assemblies:

- A** Remove the load ring (Key 23). Refer to Figure 38 & 41.
- 1** Remove the metal shim (Key 21) and spiral wound gasket (Key 20) if they haven't already been removed. Refer to Figure 9.
- 2** Remove the valve stem (Key 5) / valve plug (Key 3) assembly from the valve body (Key 1), refer to Figure 9. Refer to Plug Seal Removal section for disassembly instructions.
- 3** Carefully remove the cage (Key 19).
- 4** Remove the seat ring (Key 15) and seat ring gasket (Key 12). **For Soft Seat valves:** Remove the disk retainer (Key 18), PTFE disk (Key 17), disk seat (Key 16), and seat ring gasket (Key 12). Refer to Figure 38.
- 5 For Reduced Trim:** Remove the seat ring adapter (Key 13) and seat ring adapter gasket (Key 14). Refer to Figure 37. **NOTE:** 1-1/2x1 & 6x4 inch valves do not use a seat ring adapter.
- 6** 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.

PACKING PARTS REMOVAL

! WARNING

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

NOTE: For Live Loaded Packing refer to Figure 31 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 30, 31, 32, 33, and 34) out of the packing bore of the bonnet (Key 26). A mechanic's pick set can also be used to pull packing parts from the bore. For other packing arrangements, refer to Figures 29 to 31.

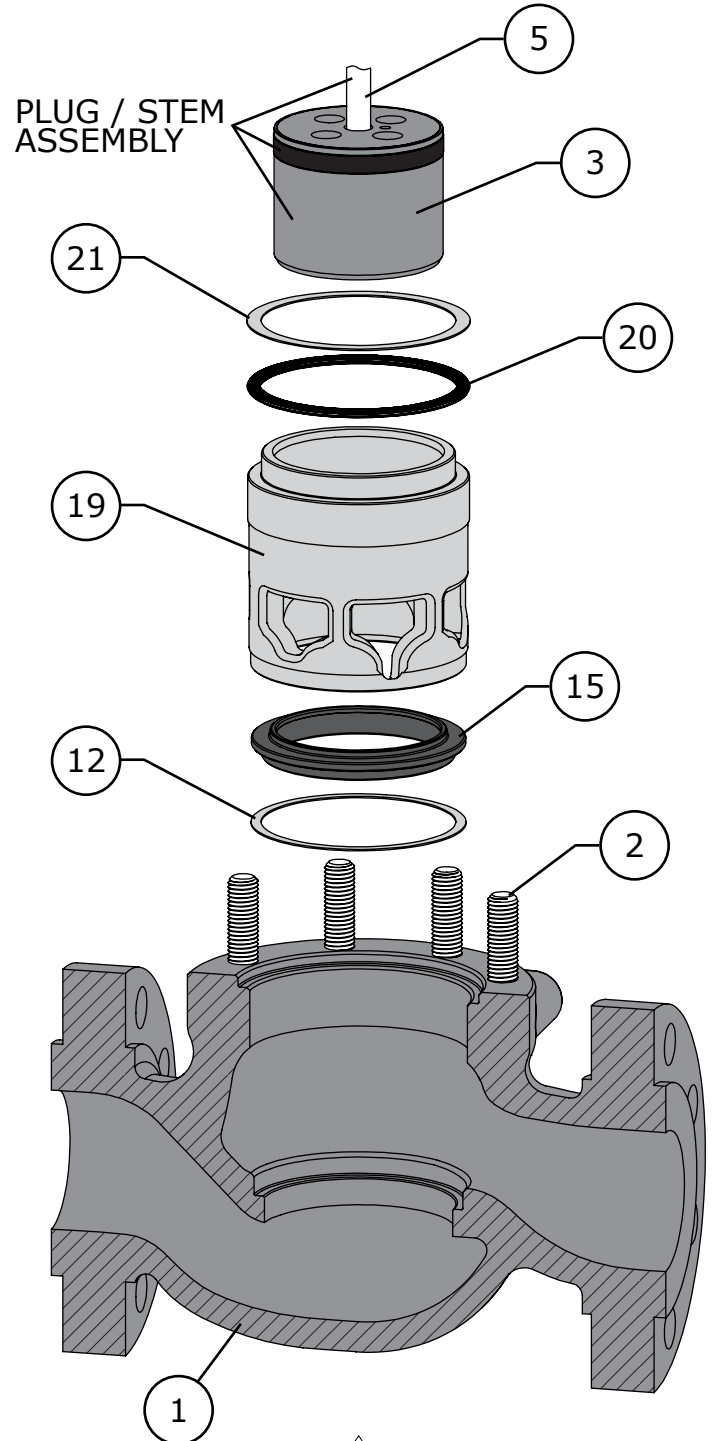


Figure 9 Standard Trim Parts Removal (Steps 1 - 6)



Model 360/361 Control Valves

Operation, Parts, and Instruction Manual

DISASSEMBLY (Continued)

PACKING PARTS REMOVAL (Continued)

- 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.

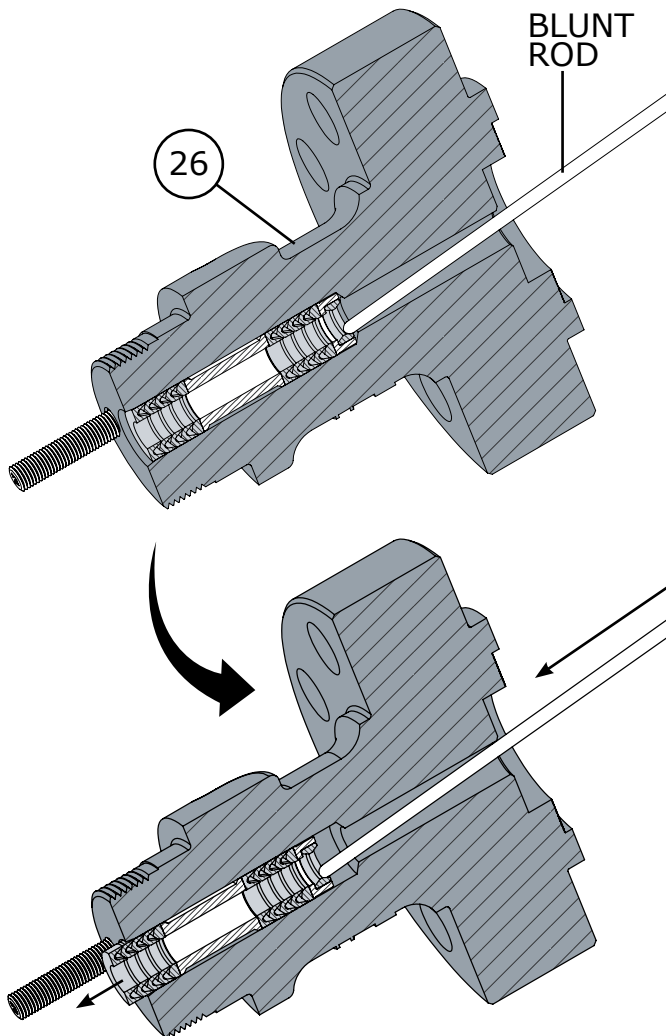


Figure 10 Packing Parts Removal (Step 1)

PLUG SEAL REMOVAL

For Model 360 Two-Piece Plug Seal Ring Assemblies:

- 1 Carefully remove the seal ring (Key 7) from the plug groove, a pick set or flat screw driver may be required. Refer to Figure 11.
- 2 Carefully remove the backup ring (Key 6) from the plug groove, a pick set or flat screw driver may be required.

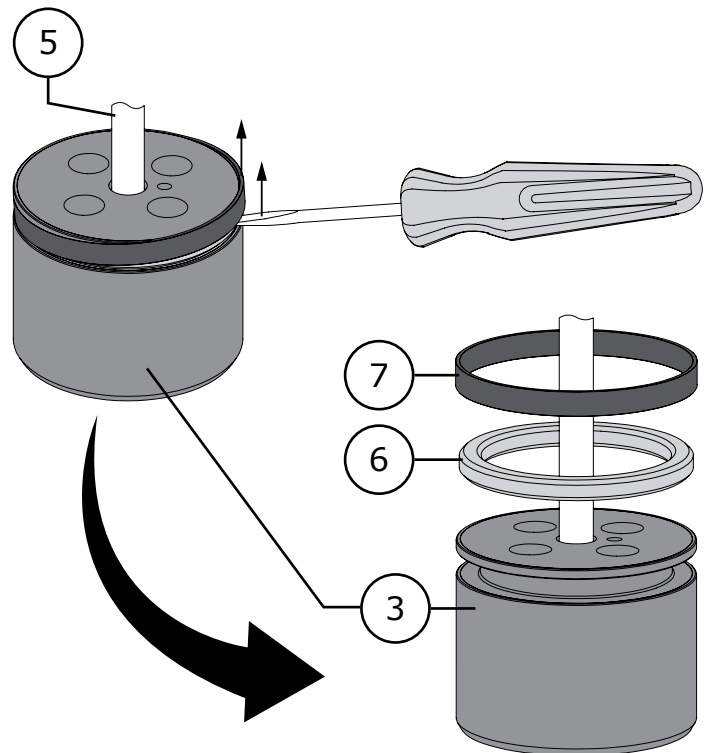


Figure 11 Two-Piece Plug Seal Ring Removal (Model 360)

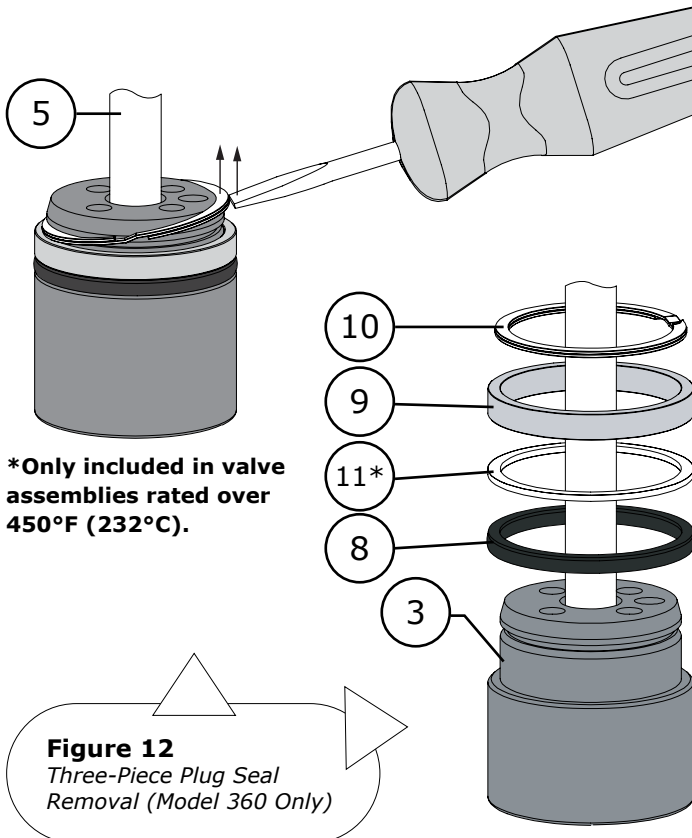
For Model 360 Three-Piece Seal Ring Assemblies:

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. Refer to Figure 12.
- 2 Remove the backup ring (Key 9).
- 3 Remove the seal ring (Key 8).

Model 360/361 Control Valves

Operation, Parts, and Instruction Manual



DISASSEMBLY (Continued)

PLUG SEAL REMOVAL (Continued)

For Model 360 Three-Piece Plug Seal Ring Assemblies with Anti-Extrusion Rings:

- 1 Carefully remove the retaining ring (Key 10) from the plug, 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 12.
- 2 Remove the backup ring (Key 9).
- 3 Remove the anti-extrusion ring (Key 11). The anti-extrusion ring is only included in valve assemblies rated for over 450°F (232°C).
- 4 Remove the seal ring (Key 8).

For Model 361 Valves (Refer to Figure 13):

- 1 Remove the piston rings (Key 48). **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.

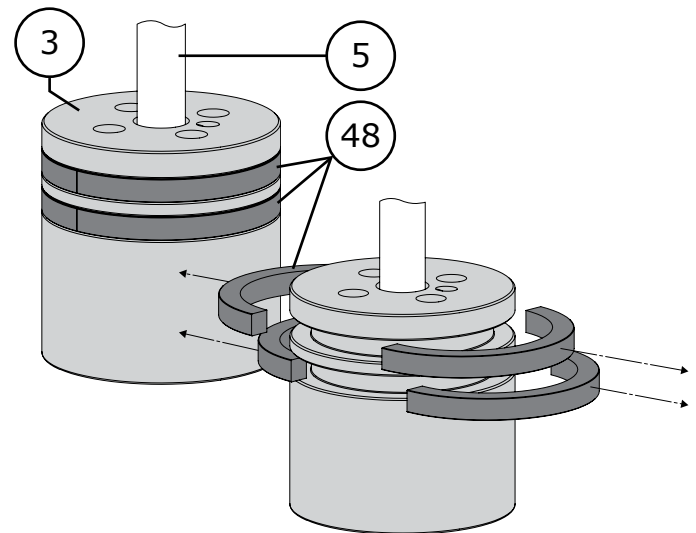


Figure 13 Model 361 Piston Ring Removal

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 20) 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, 15, and 19) before removal and reassembly. If trim parts are reassembled out of their lapped alignment excessive leakage may result.



Model 360/361 Control Valves

Operation, Parts, and Instruction Manual

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 12) into the valve body (Key 1).
- 2 Install the seat ring (Key 15). Mark the position of seat ring using the marker.
- 3 Install the cage (Key 19). 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 20, 21, & 22).
- 6 Carefully lift the bonnet (Key 26) into place and secure the bonnet using half of the bonnet nuts (Key 28). Mark the position of the valve plug (Key 3) on the bonnet (Key 26) using the marker.
- 7 Install the packing follower (Key 35).
- 8 Install the jam nut (Key 42) on to the valve stem (Key 5) and build a handle as shown in Figure 14 and 16 using the two wrenches and the hex nut (Key 43).
- 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 15) 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. Replace the used gaskets (Keys 12, 20, 21, & 22) 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.

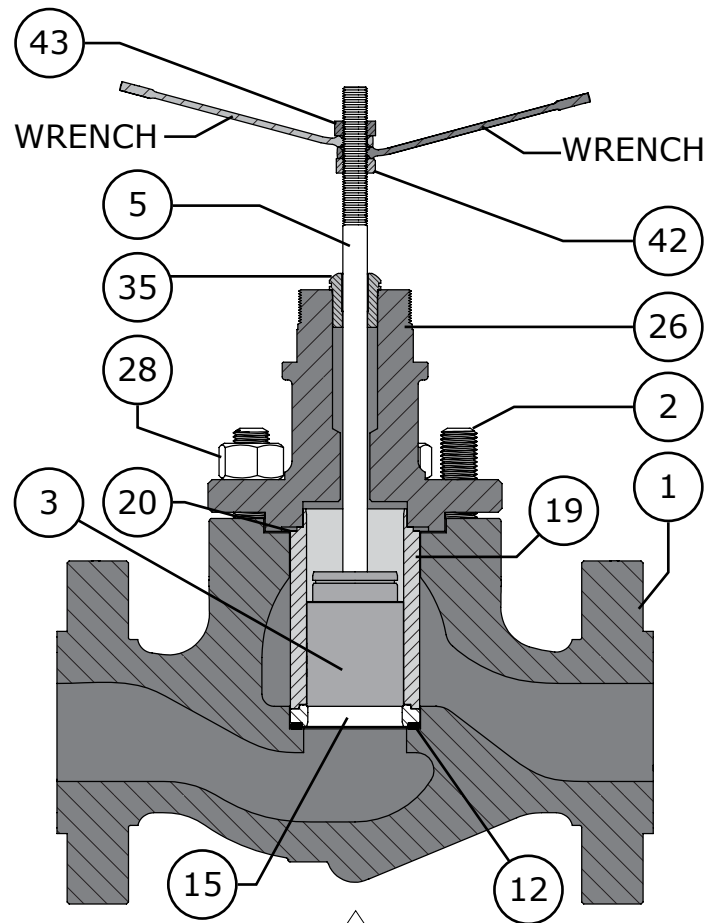


Figure 14 Lapping Procedure Setup (Steps 1 - 8)

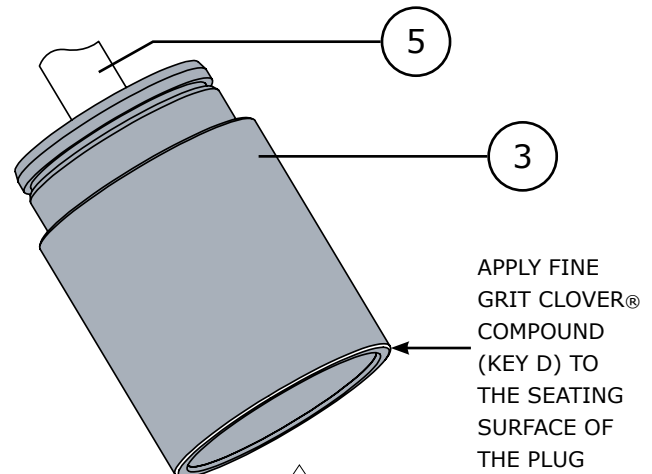


Figure 15 Lapping Compound Application

Model 360/361 Control Valves

Operation, Parts, and Instruction Manual

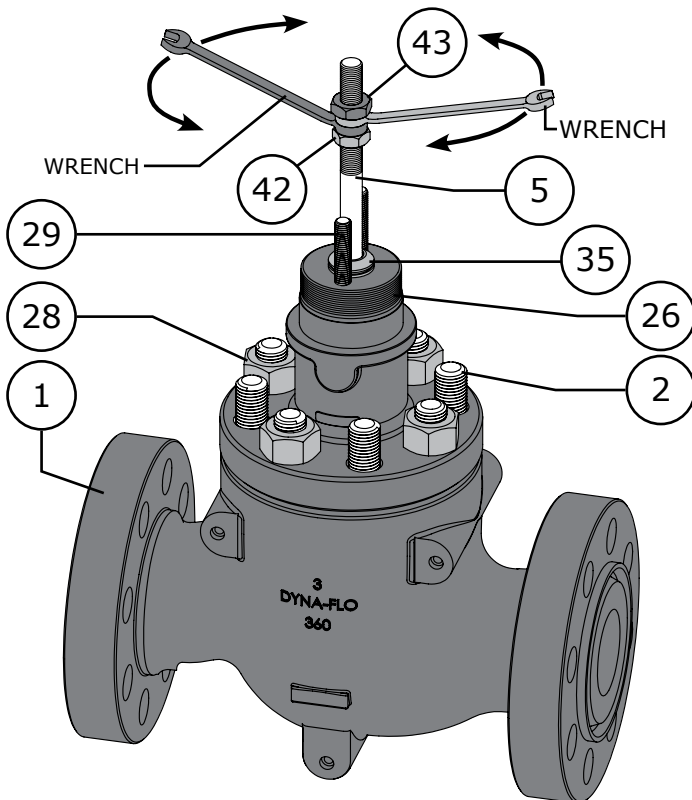


Figure 16 Lapping Procedure Setup (Steps 8 - 10)

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 28) 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)

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 360 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 17.
- 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 17.
- 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 17.

For Model 360 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 18 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 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 19).



Model 360/361 Control Valves

Operation, Parts, and Instruction Manual

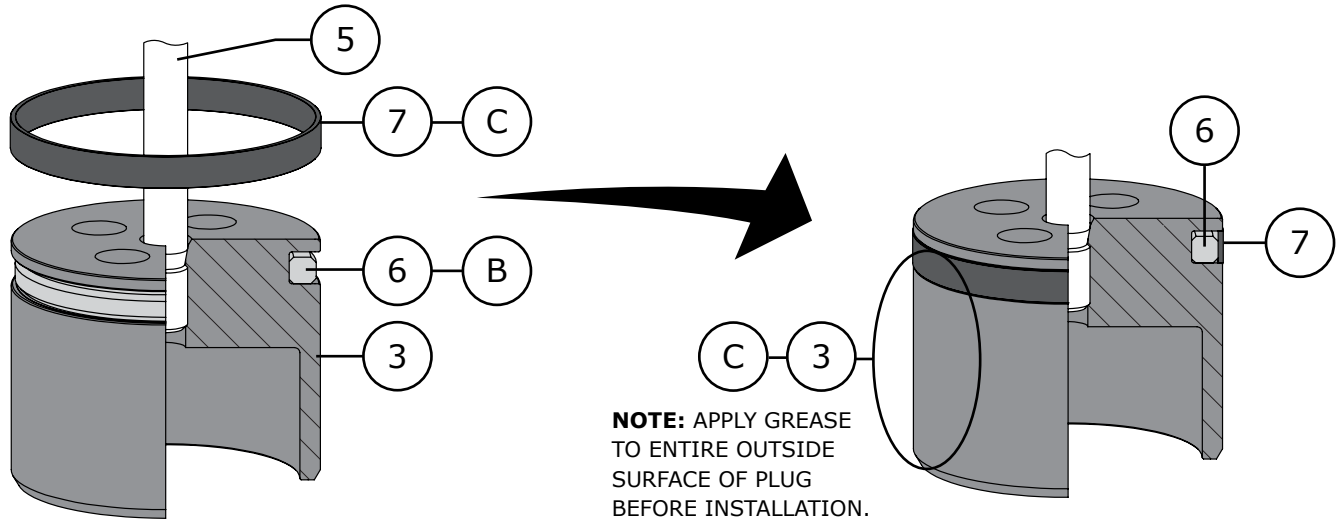


Figure 17 Two-Piece Plug Seal Assembly (Model 360 Only)

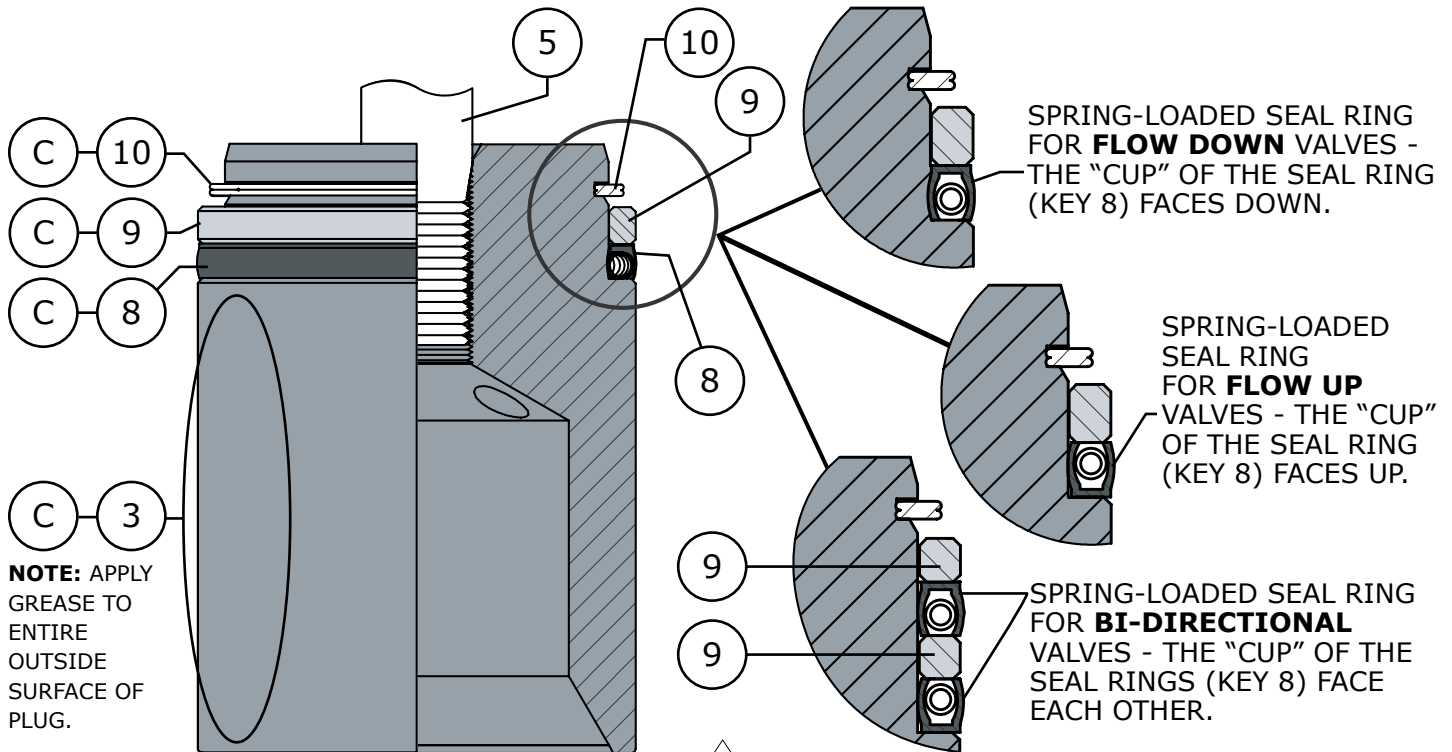


Figure 18 Three-Piece Plug Seal Assembly (Model 360 Only)

Model 360/361 Control Valves

Operation, Parts, and Instruction Manual

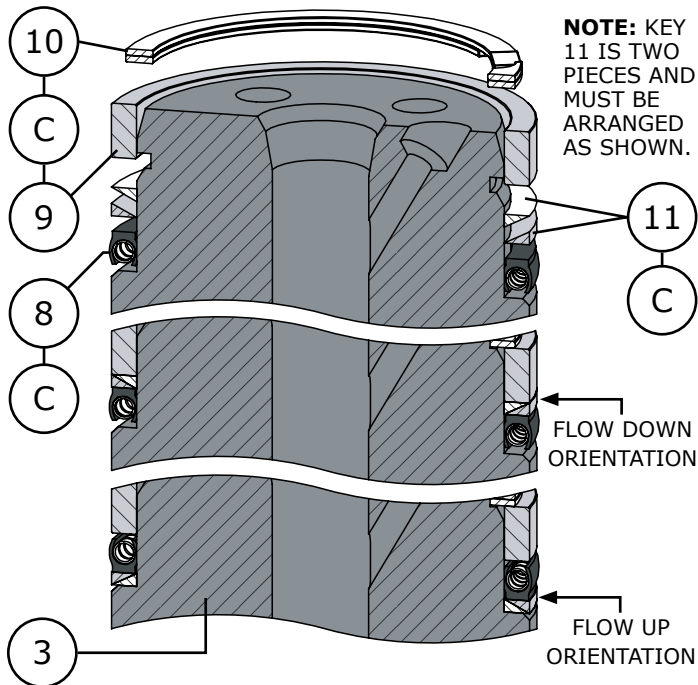


Figure 19 Plug Seal Assembly with Anti-Extrusion Ring

ASSEMBLY (Continued)

PLUG SEAL ASSEMBLY (Continued)

For Model 360 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 18 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 19. **CAUTION:** 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 19).

For Model 361 Valves:

NOTE: Replacement piston rings (Key 48) 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 48) 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 48). Electrical tape will help contain the piston ring while it is being broken. Refer to Figure 21.
- 2 Place the piston ring into the jaws of the vise as shown in Figure 22.
- 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.

Piston Ring Scoring Break Method:

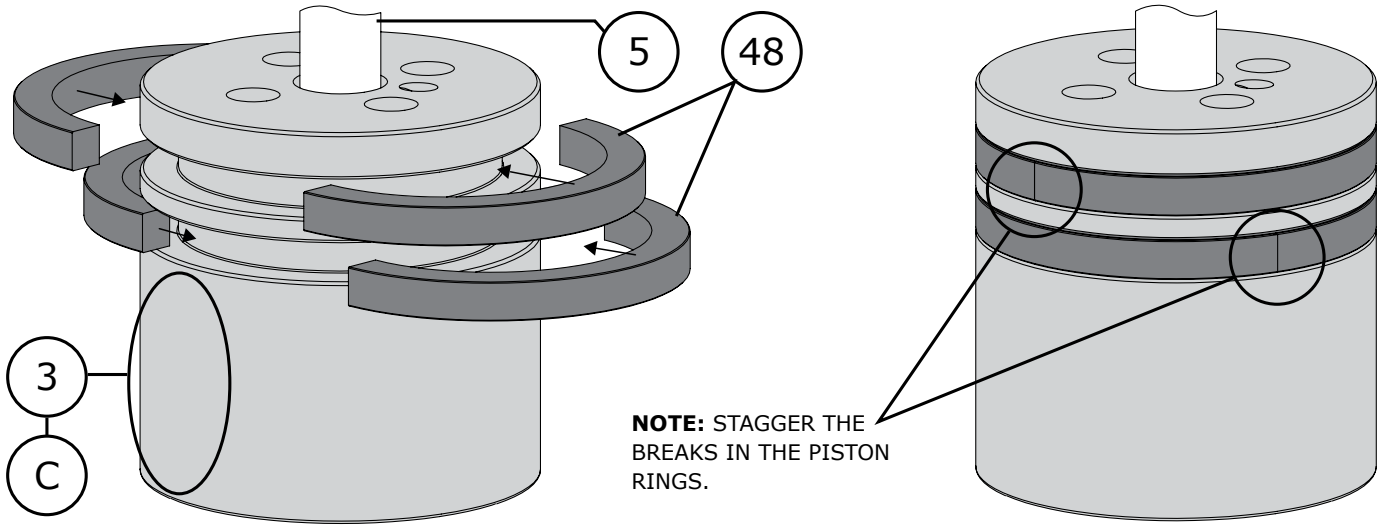
If no vise is available, piston rings (Key 48) can be scored with a knife and broken over a hard surface. Do not saw or cut the piston rings in half.

- 1 Wrap electrical tape once around the outside diameter of the piston ring (Key 48). Electrical tape will help contain the piston ring while it is being broken. Refer to Figure 21.
- 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 20.



Model 360/361 Control Valves

Operation, Parts, and Instruction Manual



NOTE: APPLY GREASE TO ENTIRE OUTSIDE SURFACE OF PLUG.

Figure 20 Model 361 Piston Ring Installation



Figure 21 Model 361 Piston Ring Vise Break Method (Step 1)



Figure 22 Model 361 Piston Ring Vise Break Method (Step 2)

Model 360/361 Control Valves

Operation, Parts, and Instruction Manual



ASSEMBLY (Continued)

TRIM PARTS ASSEMBLY

CAUTION: Spiral wound gaskets (Keys 20) make their 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) and top surface of the seat ring gasket (Key 12). Install the seat ring gasket into the valve body (Key 1). Refer to Figure 23.
- 2 **For Reduced Trim:** Install the seat ring adapter (Key 13) into the valve body. Apply nickel anti-seize (Key A) to the top of the seat ring adapter and top of the second seat ring gasket (Key 14) and install it onto the seat ring adapter. Refer to Figure 37. **NOTE:** 1-1/2x1 & 6x4 inch reduced trim does not use a seat ring adapter, they use a special seat ring (Key 15), refer to Figure 40.
- 3 Install the seat ring (Key 15) into the valve body (Key 1). Refer to Figure 34 for Angle Body valve assemblies.
For Soft Seat Valves: Install the disk seat (Key 16) onto the seat ring gasket (Key 12). Install the PTFE disk (Key 17) onto the disk seat. Install the disk retainer (Key 18) onto the PTFE disk. Refer to Figure 36.
- 4 Install the cage (Key 19). Install the baffle (Key 50) and cage retainer for Low-Noise trim, refer to Figure 35 for Low-Noise trim.
- 5 Apply Lubriplate® No. 105 (Key C) to the side of the valve plug (Key 3) (Refer to Figures 17, 18, & 20). Install the valve plug assembly into the cage (Key 19) (Refer to Figure 23).
- 6 Apply nickel anti-seize (Key A) to the gasket surface of the cage (Key 19) or cage retainer (Key 49) and top surface of the spiral wound gasket (Key 20), metal shim (Key 21), and bonnet gasket (Key 22). Install the gaskets and shim as shown in Figure 23 or 35 for Low-Noise trim.
For Low-Noise Valves: Install the bonnet spacer (Key 26A) as shown in Figure 35. Apply nickel anti-seize (Key A) to the gasket seating surface of the bonnet spacer (Key 26A) and top surface of the bonnet gasket (Key 22) and install. Install the load ring (Key 23).
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 22) and install. Install the load ring (Key 23). Refer to Figure 38 and 41.
- 7 **For Reduced Trim:** Install the cage adapter (Key 24). Apply nickel anti-seize (Key A) to the top of the cage adapter and top surface of the cage adapter gasket (Key 25) and install. Refer to Figure 37.

For Reduced Trim:

NOTE: 6x4 inch reduced trim does use a cage adapter, 6x4 inch valves have a seat ring (Key 15), refer to Figure 40.

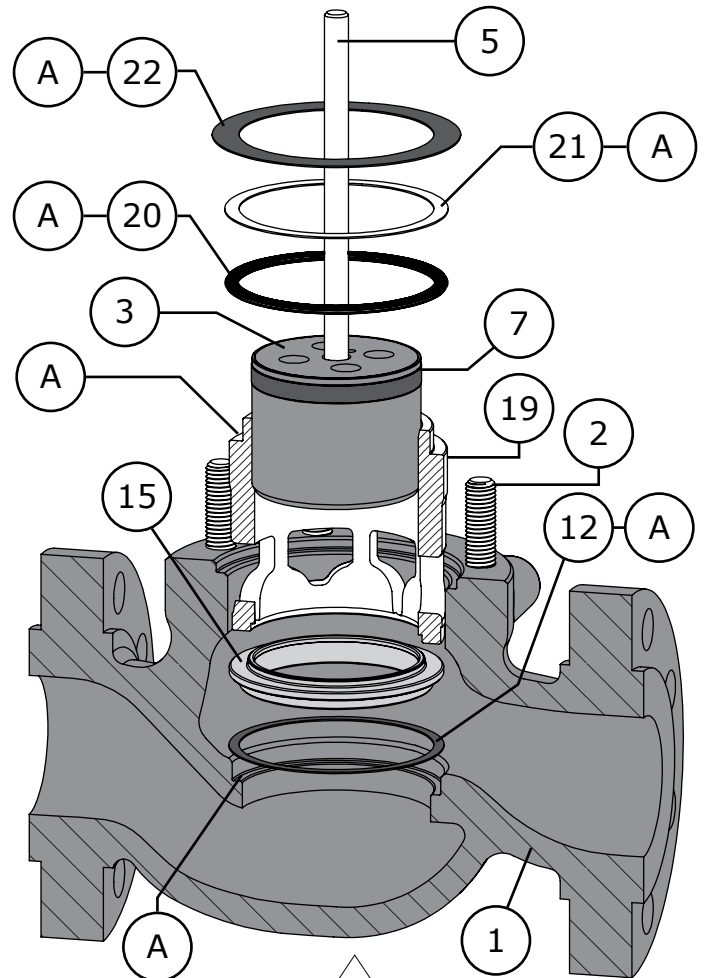


Figure 23 Trim Parts Assembly

BONNET INSTALLATION

! WARNING

Before You Begin:

- Read the Warnings on Page 2 and 15.
- Clean and inspect all parts.
- Replace or repair damaged parts. Replace all soft parts (Seals, o-rings, gaskets).

Model 360/361 Control Valves

Operation, Parts, and Instruction Manual

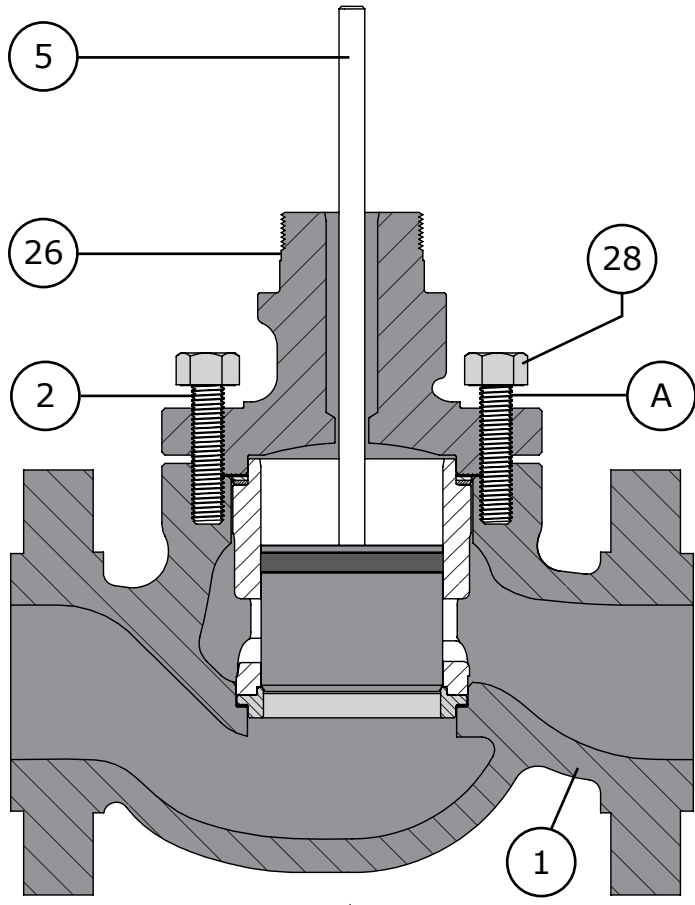


Figure 24 Bonnet Installation

ASSEMBLY (Continued)

BONNET INSTALLATION (Continued)

- 1 Apply nickel anti-seize (Key A) to the gasket sealing surface of the valve bonnet (Key 26).
- 2 Lift and lower the valve bonnet (Key 26) 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 28) 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 22) 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 28) $\frac{1}{4}$ (25%) of the torque value listed in Table 5, torque the nuts in a crisscross pattern as shown in Figure 25. Hot torquing the valve nuts is not recommended.
- 7 Continue tightening the bonnet nuts (Key 28), increasing the torque by $\frac{1}{4}$ (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.

SAMPLE BOLT CONFIGURATION

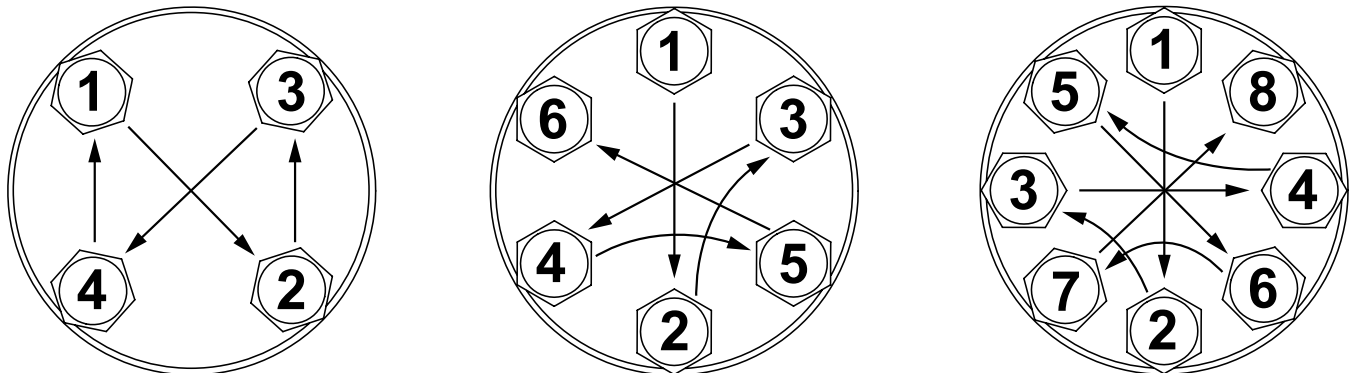


Figure 25 Bolt Tightening Pattern Diagram

Model 360/361 Control Valves

Operation, Parts, and Instruction Manual



ASSEMBLY (Continued)

PACKING INSTALLATION

For Live Loaded packing instructions see the Live Loaded Sliding Stem Packing Manual (Part Number P-LLPS). For other packing arrangements refer to Figures 27, 29, 30, & 31.

⚠ WARNING

- Do not lubricated packing intended for use in oxygen service. Fire, explosion, property damage or personal injury may result from applying Molykote® 5 or any other lubrication to packing that will be installed into oxygen service.

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)

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 35) 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 26.

- If the packing studs (Key 29) 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.
- Thread the studs (Key 29) into the valve bonnet (Key 26) anti-seize coated end first until they are completely threaded into the bonnet.

For Single Style (Spring-Loaded) Packing:

- Apply Molykote® 5 (Key B) to the lower stem wiper (Key 30). Insert the lower stem wiper into the packing box ring (Key 31). Insert the packing box ring into the packing bore of the valve bonnet (Key 26). **WARNING:** For oxygen service do not apply Molykote® 5.
- Install the packing spring (Key 32).
- Install the special washer (Key 33).
- Apply Molykote® 5 (Key B) to the PTFE packing rings (Key 34). Install the packing rings one ring at a time (as shown in Figure 26) in the proper order and orientation as shown in Figure 27. **WARNING:** For oxygen service do not apply Molykote® 5.

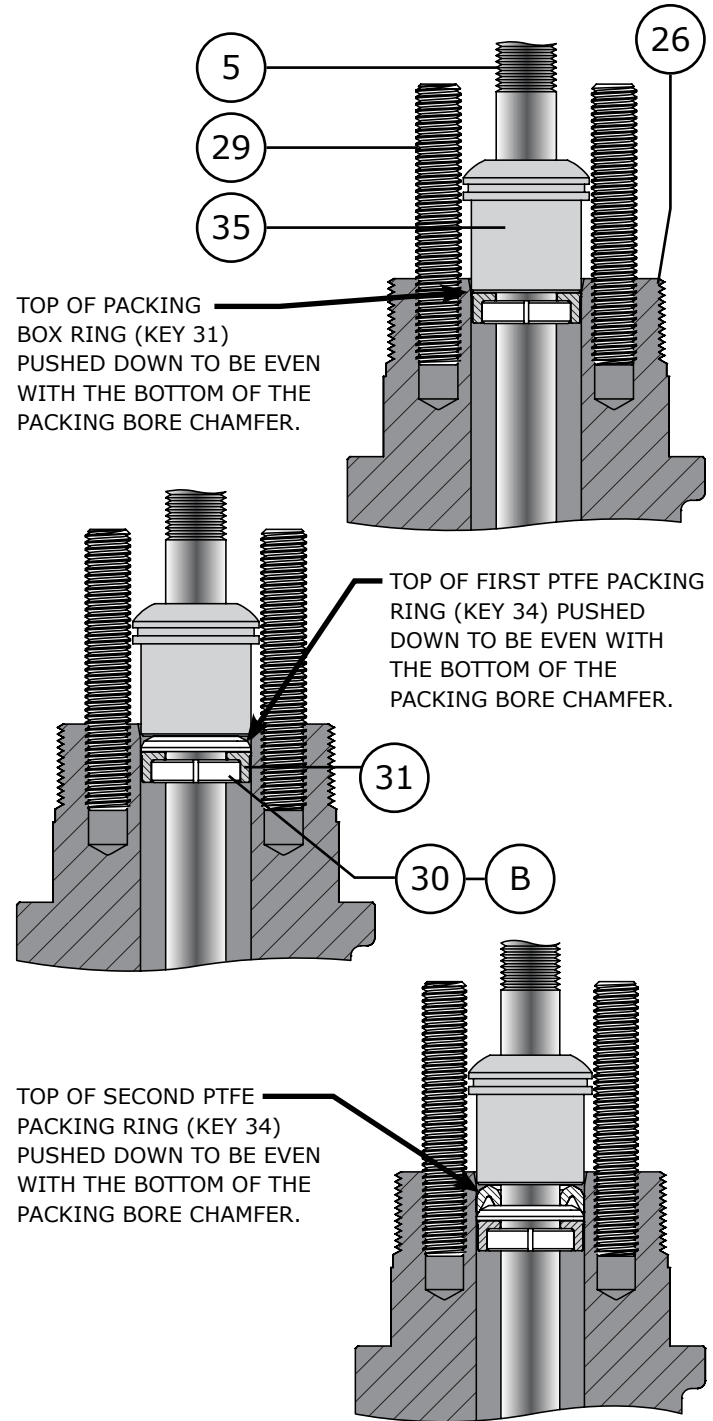
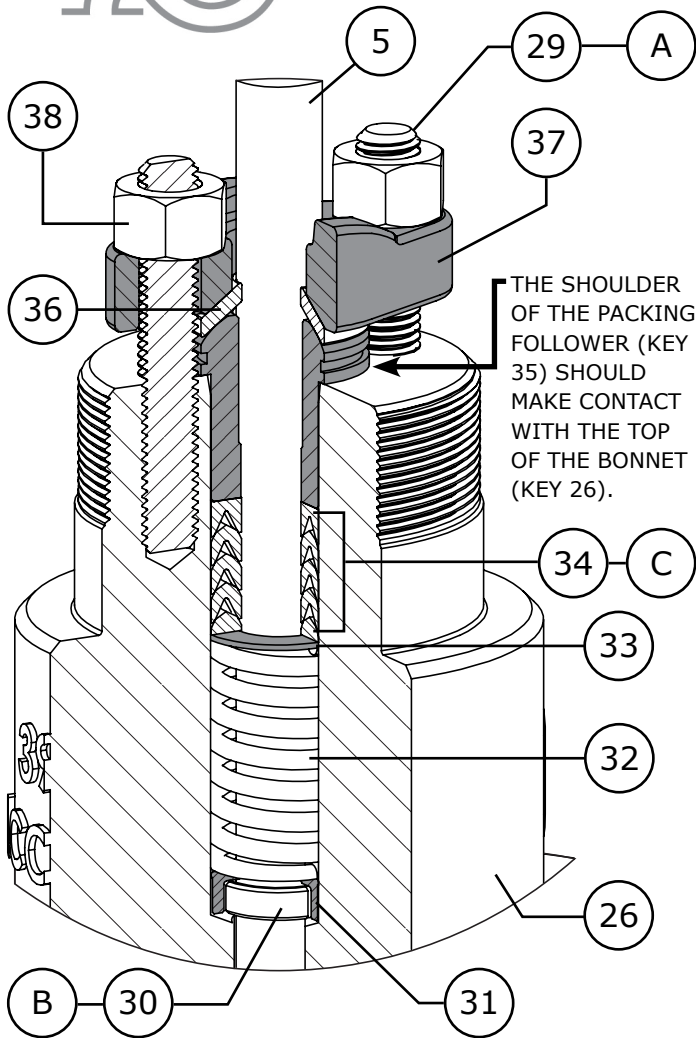


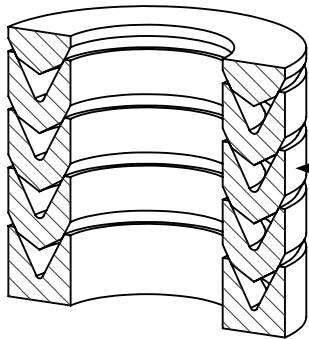
Figure 26 Proper Packing Ring Installation

Model 360/361 Control Valves

Operation, Parts, and Instruction Manual



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



FOR VACUUM PACKING APPLICATIONS, REVERSE THE DIRECTION OF THE CUP OF THE PTFE PACKING RINGS (KEY 34) AS SHOWN.

Figure 27 Single Style Packing Installation Diagram

ASSEMBLY (Continued)

PACKING INSTALLATION (Continued)

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

- 5 Install the packing follower (Key 35).
- 6 Install the upper stem wiper (Key 36).
- 7 Install the packing flange (Key 35).
- 8 Apply nickel anti-seize (Key A) to the top threads of the packing studs (Key 29). Thread the packing nuts (Key 38) onto the threads of the packing studs, tighten the packing nuts evenly in an alternating pattern until the shoulder of the packing follower (Key 35) makes contact with the bonnet (Key 26). Proceed to tighten the packing nuts to the torque specification listed in Table 6.

For Double Style PTFE Packing:

- 1 Apply Molykote® 5 (Key B) to the lower stem wiper (Key 30). Insert the lower stem wiper into the packing box ring (Key 31). Insert the packing box ring into the packing bore of the valve bonnet (Key 26). **WARNING:** For oxygen service do not apply Molykote® 5.
- 2 Apply Molykote® 5 (Key B) to the first set of packing rings (Key 34). Install the packing rings one ring at a time (as shown in Figure 26) in the proper order and orientation as shown in Figure 29. **NOTE:** For 3/8" (9.5 mm) valve stems, remove a packing ring from the middle of the packing set. **WARNING:** For oxygen service do not apply Molykote® 5.
- 3 Install the lantern ring (Key 39).
- 4 Apply Molykote® 5 (Key B) to the second set of packing rings (Key 34). Install the packing rings one ring at a time (as shown in Figure 26) in the proper order and orientation as shown in Figure 29. **WARNING:** For oxygen service do not apply Molykote® 5.
- 5 Install the packing follower (Key 35).
- 6 Install the upper stem wiper (Key 36).
- 7 Install the packing flange (Key 37).
- 8 Apply nickel anti-seize (Key A) to the top threads of the packing studs (Key 29).

Model 360/361 Control Valves

Operation, Parts, and Instruction Manual



ASSEMBLY (Continued)

PACKING INSTALLATION (Continued)

For Double Style PTFE Packing (Continued):

- 9 Thread the packing nuts (Key 38) 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 6. Tighten the remaining packing flange nut until the packing flange (Key 37) becomes level (is parallel with the top face of the bonnet), refer to Figure 28.

For Graphite Packing:

- 1 Install the packing box ring (Key 31).
- 2 Install the first lantern ring (Key 39A).
- 3 Install the second lantern ring (Key 39).
- 4 Install 1 ring of graphite filament (Key 40) as shown in Figure 26. **NOTE:** Graphite filament is a wound material that typically looks like rope and is split.
- 5 Install 1 ring of graphite ribbon (Key 41) as shown in Figure 26. **NOTE:** Graphite ribbon is compressed into rings and not split like the graphite filament.
- 6 Install the remainder of the graphite filament (Key 40) and graphite ribbon (Key 41) one at a time (as shown in Figure 26) in the proper order and orientation as shown in Figure 30.
- 7 Install the packing follower (Key 35).
- 8 Install the packing flange (Key 37).
- 9 Apply nickel anti-seize (Key A) to the top threads of the packing studs (Key 29). Thread the packing nuts (Key 38) 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 6. Loosen the packing nuts and retighten them to the minimum recommended torque shown in Table 6.

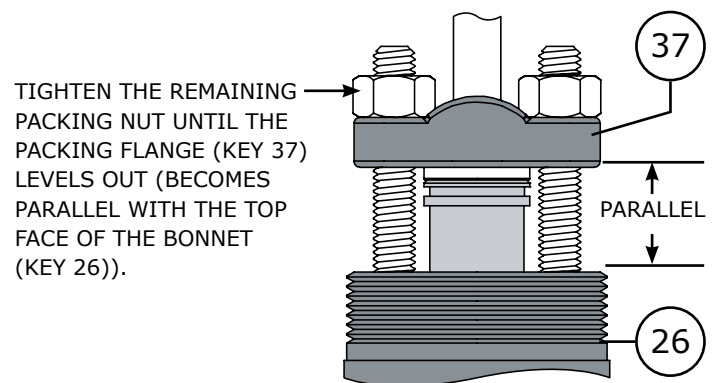
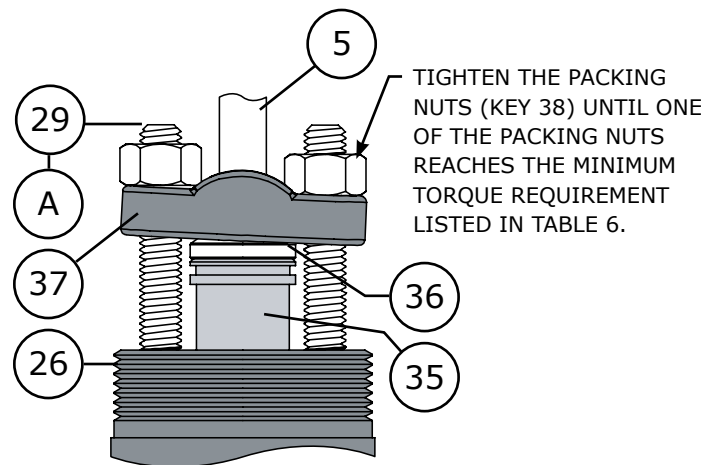


Figure 28 Double PTFE V-Ring Packing Tightening Diagram



Model 360/361 Control Valves

Operation, Parts, and Instruction Manual

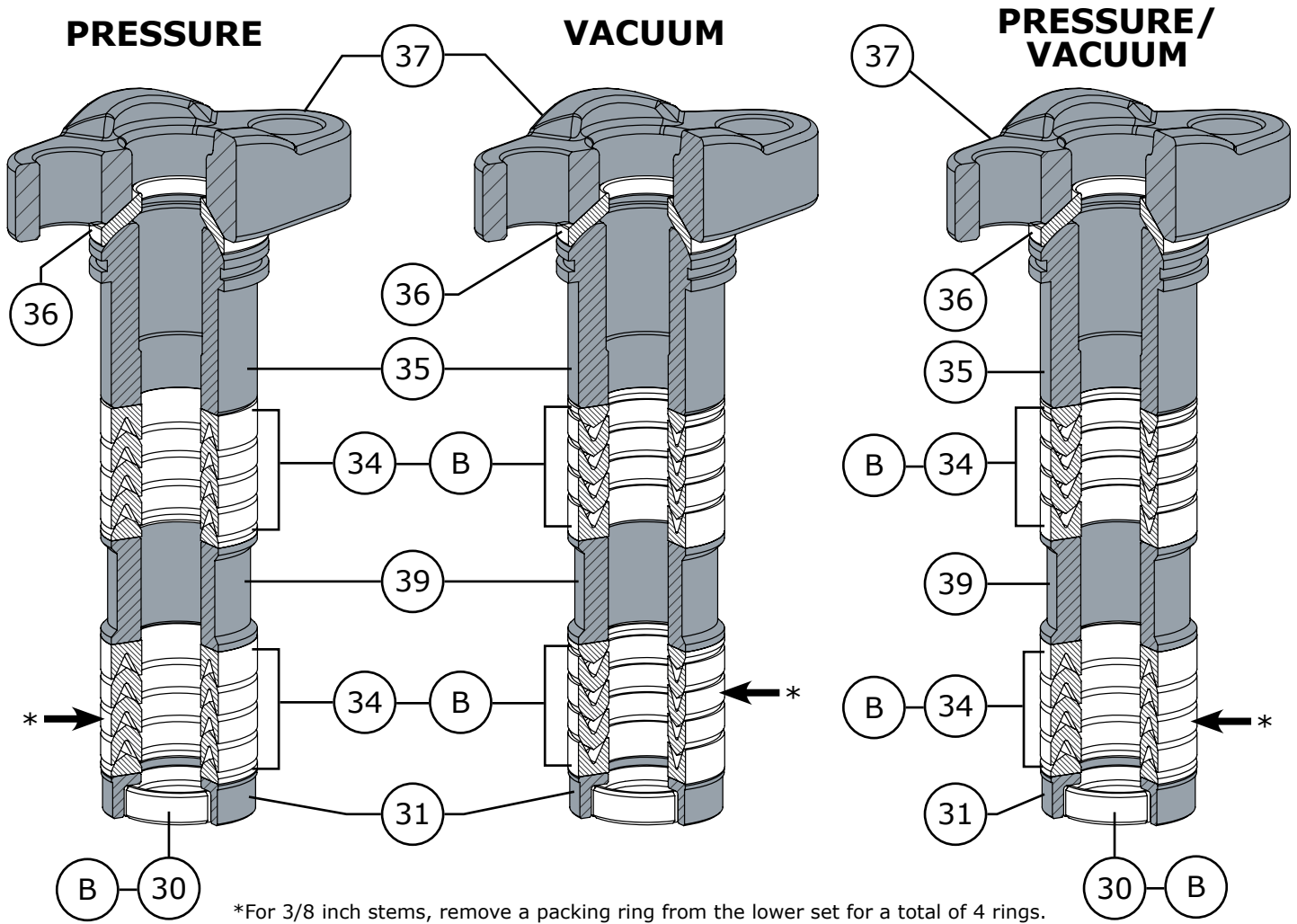
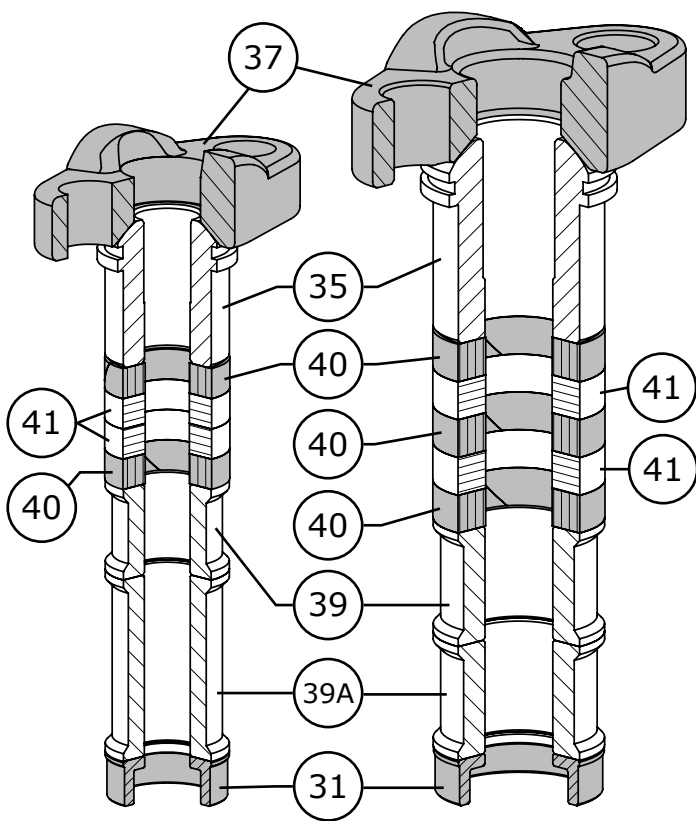


Figure 29 Model 360 Control Valve PTFE Packing Diagrams

Model 360/361 Control Valves

Operation, Parts, and Instruction Manual



3/8" (9.5 mm) Stem
1/2" (12.7 mm) Stem

3/4" (19.1 mm) Stem
1" (25.4 mm) Stem
1-1/4" (31.8 mm) Stem

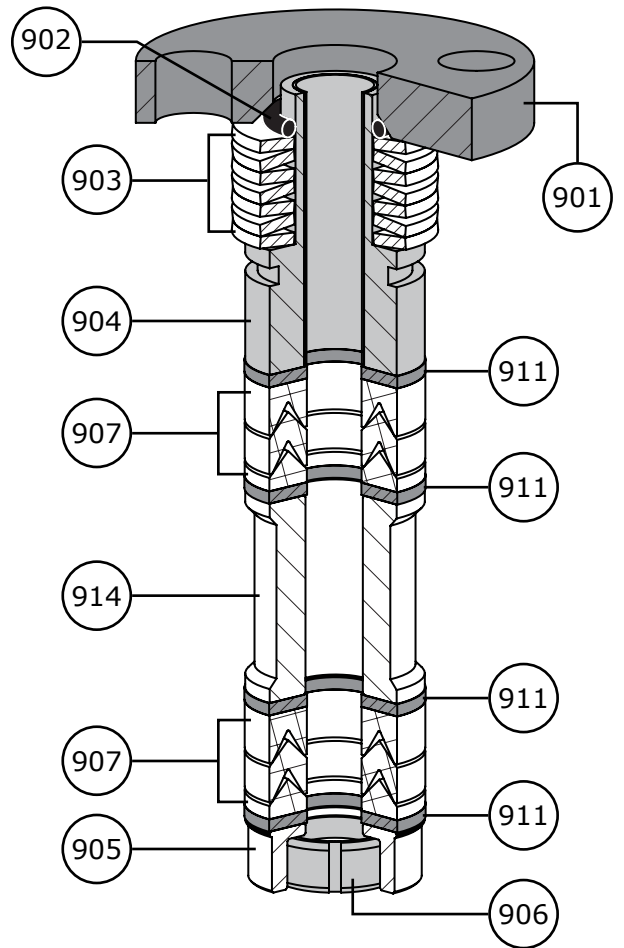


Figure 30 Graphite Packing Arrangement Diagram

Figure 31 Live Loaded Packing Example

Model 360/361 Control Valves

Operation, Parts, and Instruction Manual

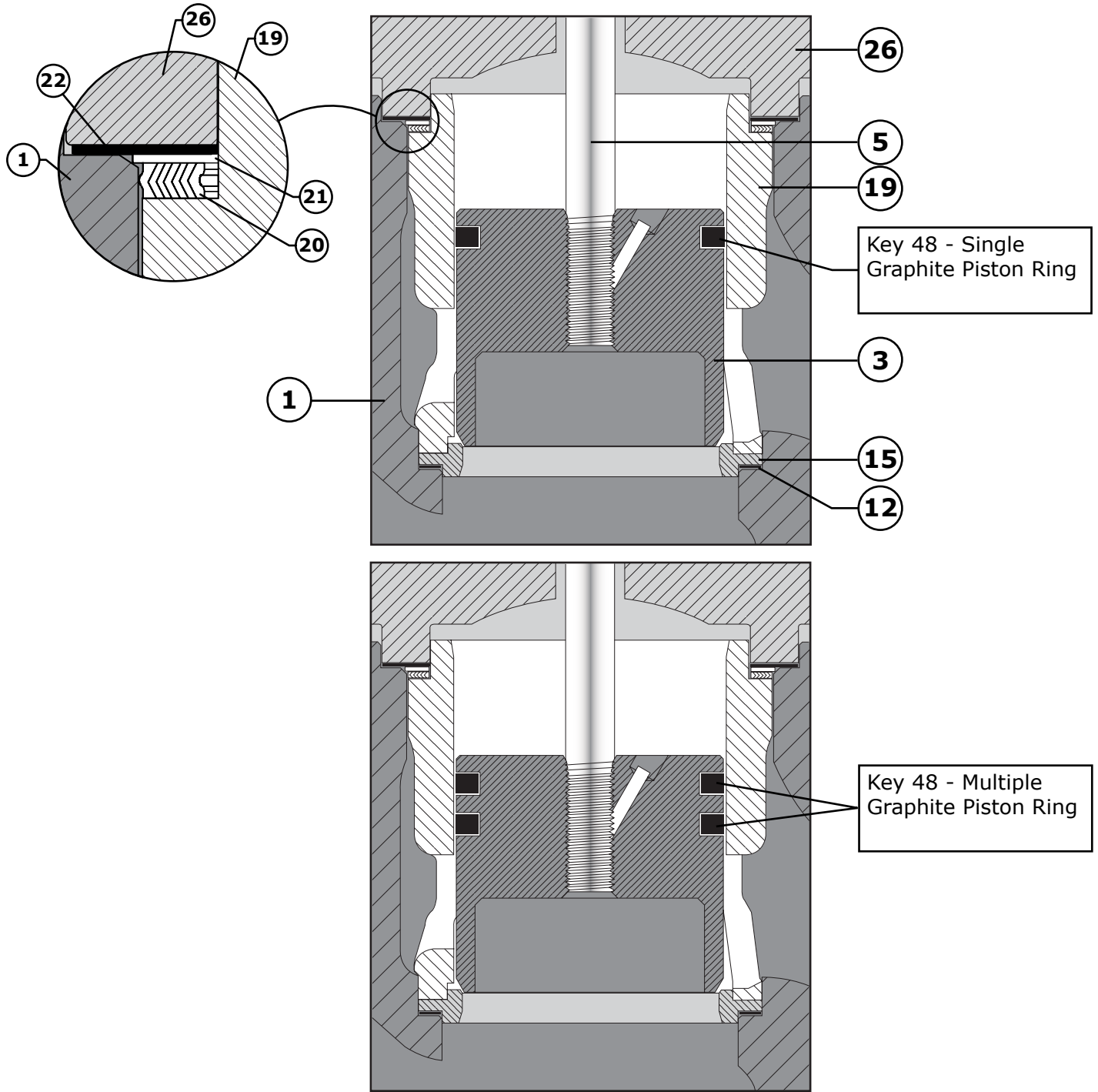


Figure 33 Model 361 Piston Ring Detail

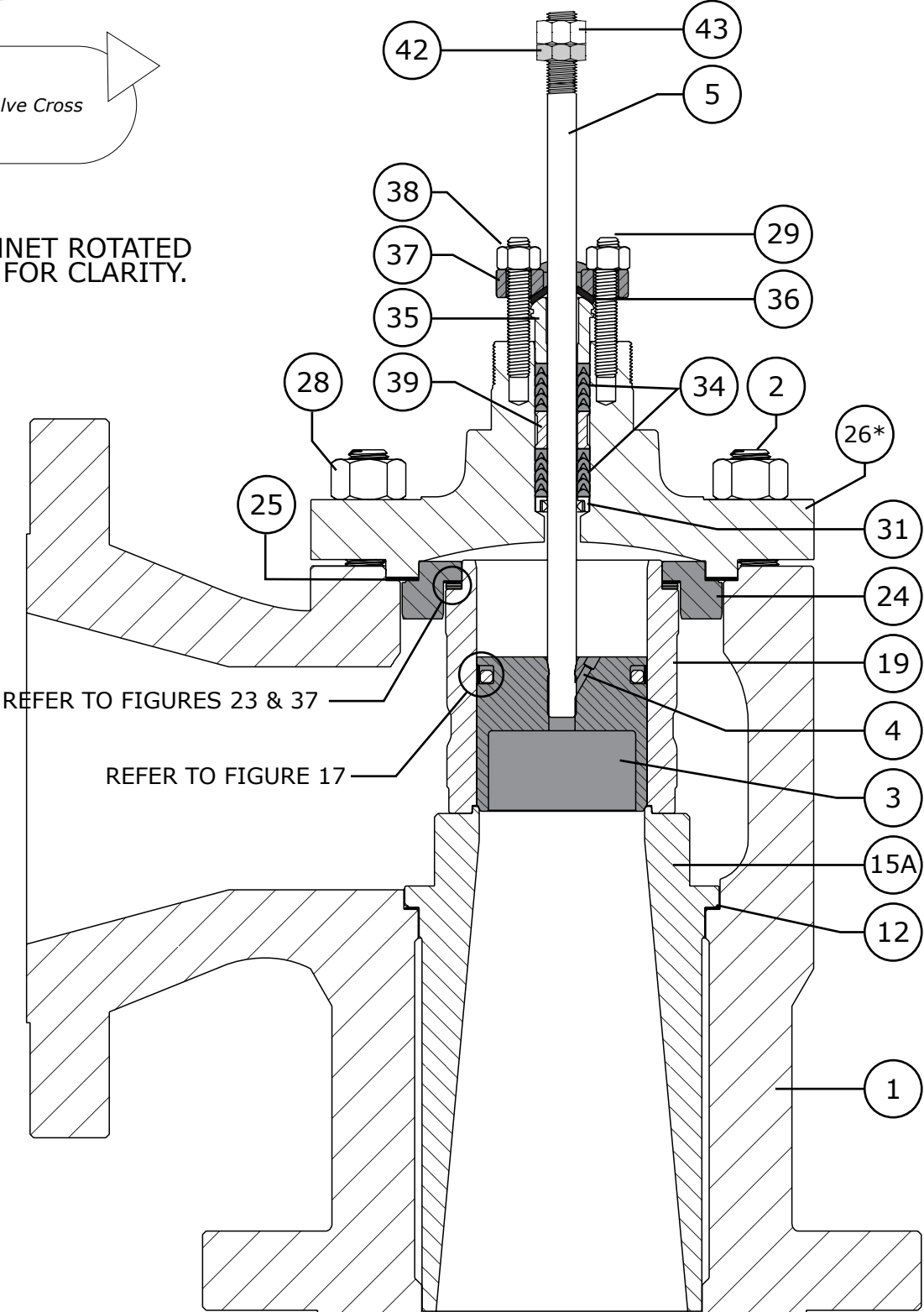
Model 360/361 Control Valves

Operation, Parts, and Instruction Manual



Figure 34
Angle Body Valve Cross
Section

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



Model 360/361 Control Valves

Operation, Parts, and Instruction Manual

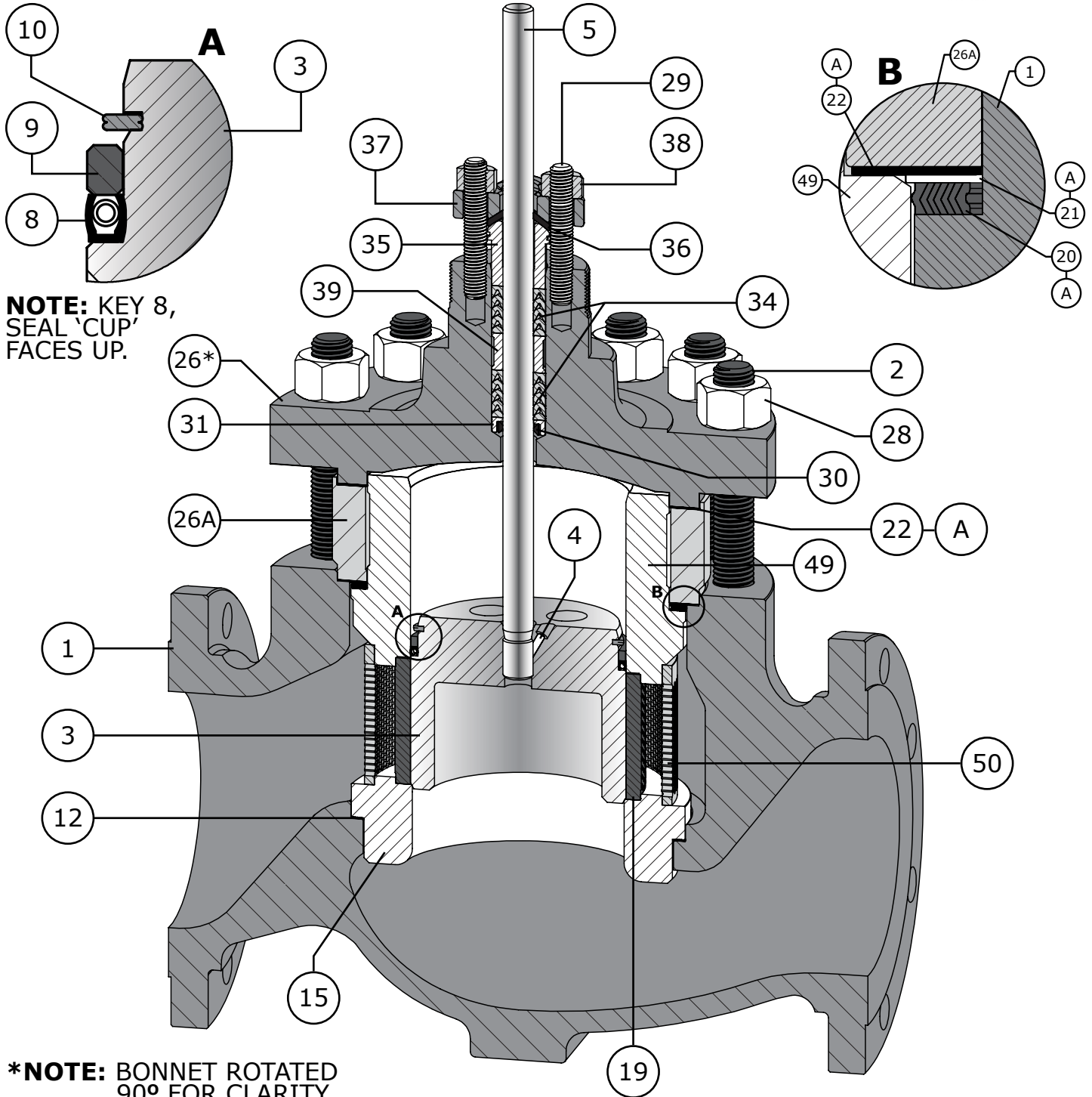


Figure 35 Model 360 Low-Noise Control Valve with Bonnet Spacer Cross Section



Model 360/361 Control Valves

Operation, Parts, and Instruction Manual

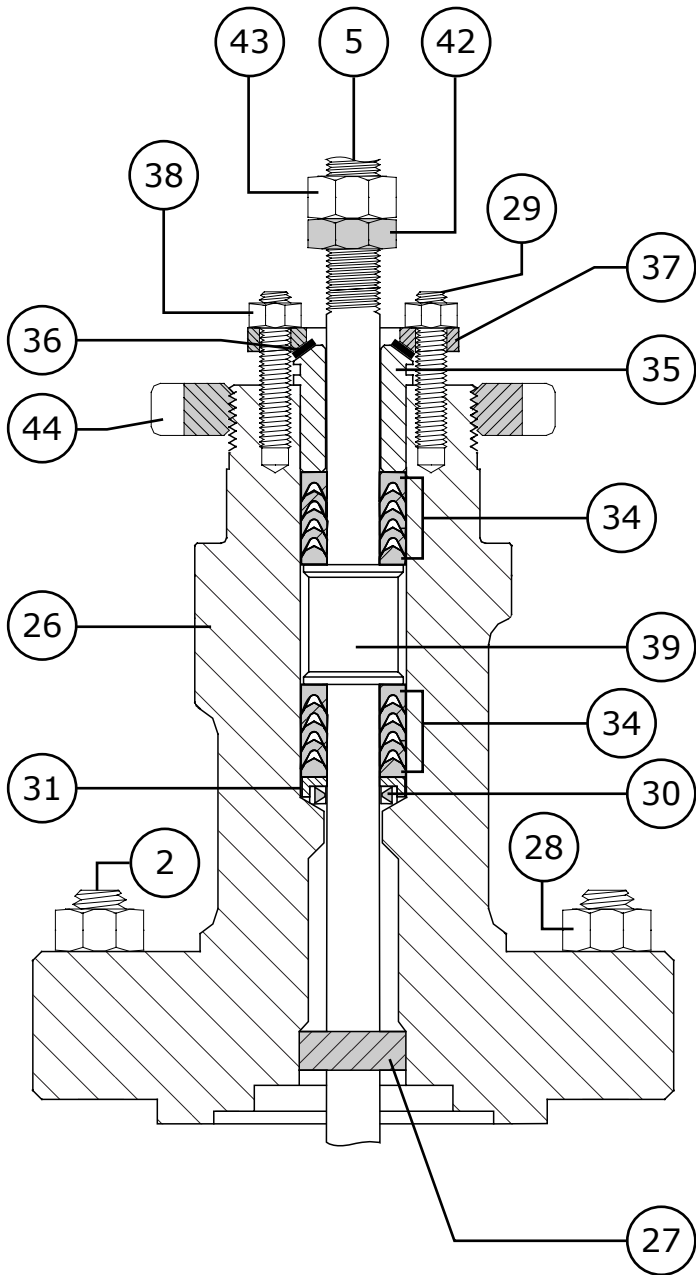


Figure 36 Extension Bonnet Diagram

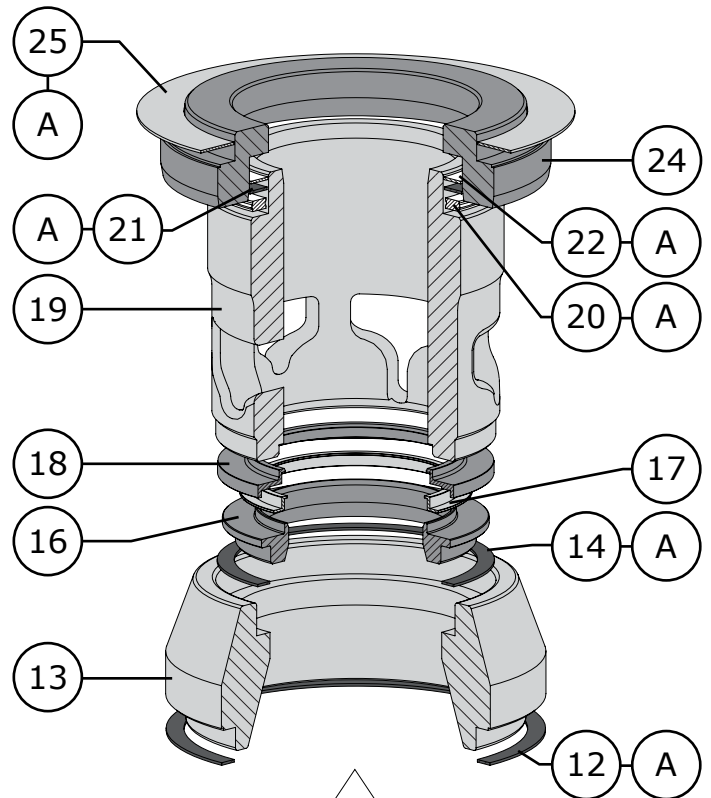


Figure 37 Restricted Trim / Soft Seat Diagram

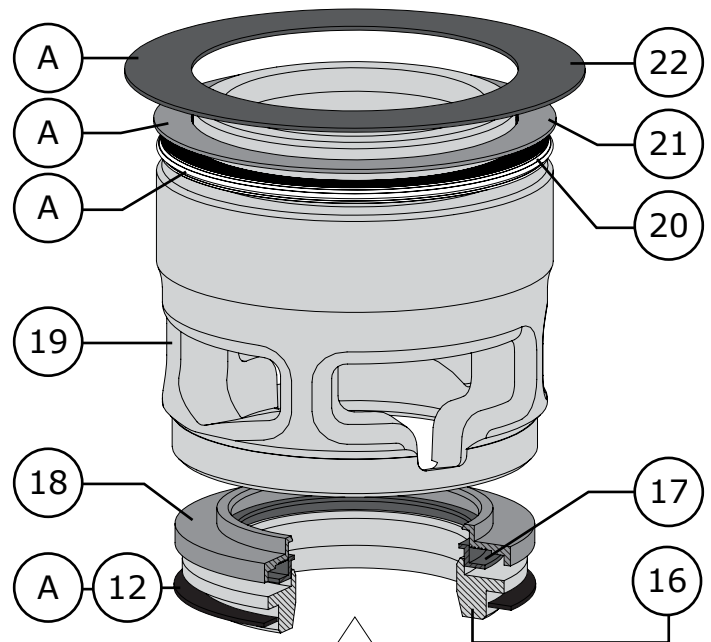


Figure 38 Soft Seat Diagram

Model 360/361 Control Valves

Operation, Parts, and Instruction Manual

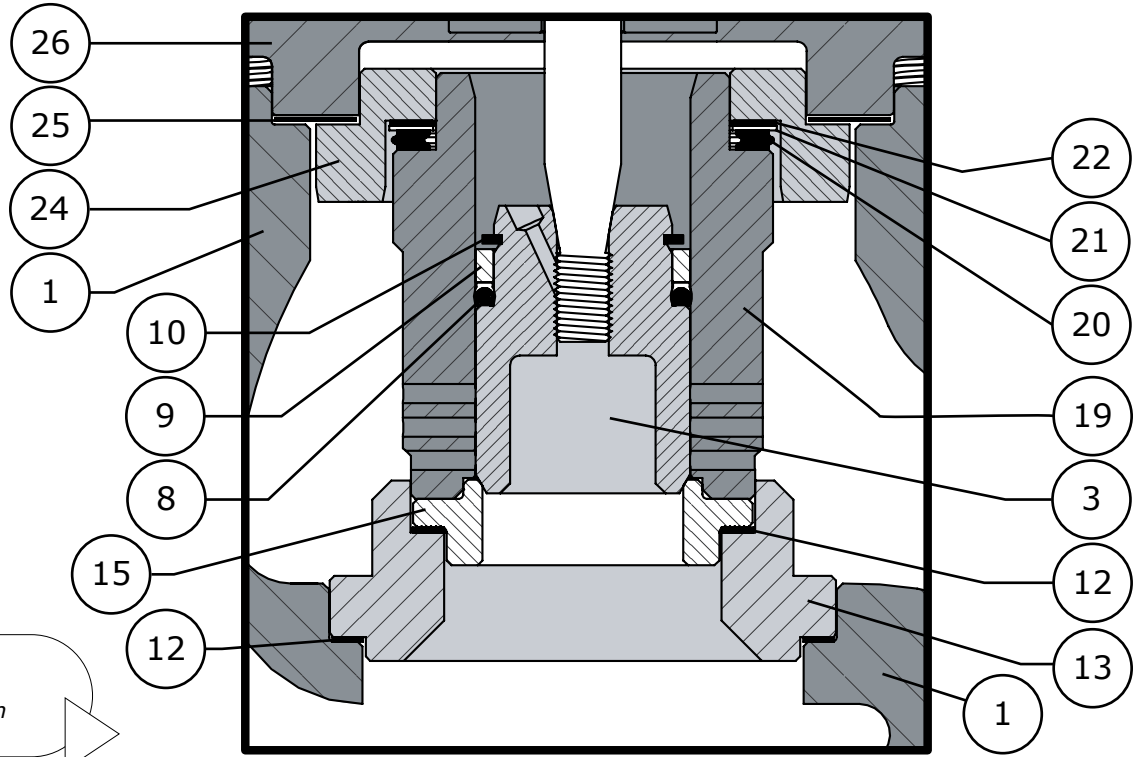


Figure 39 *Restricted Trim Metal Seat Design*

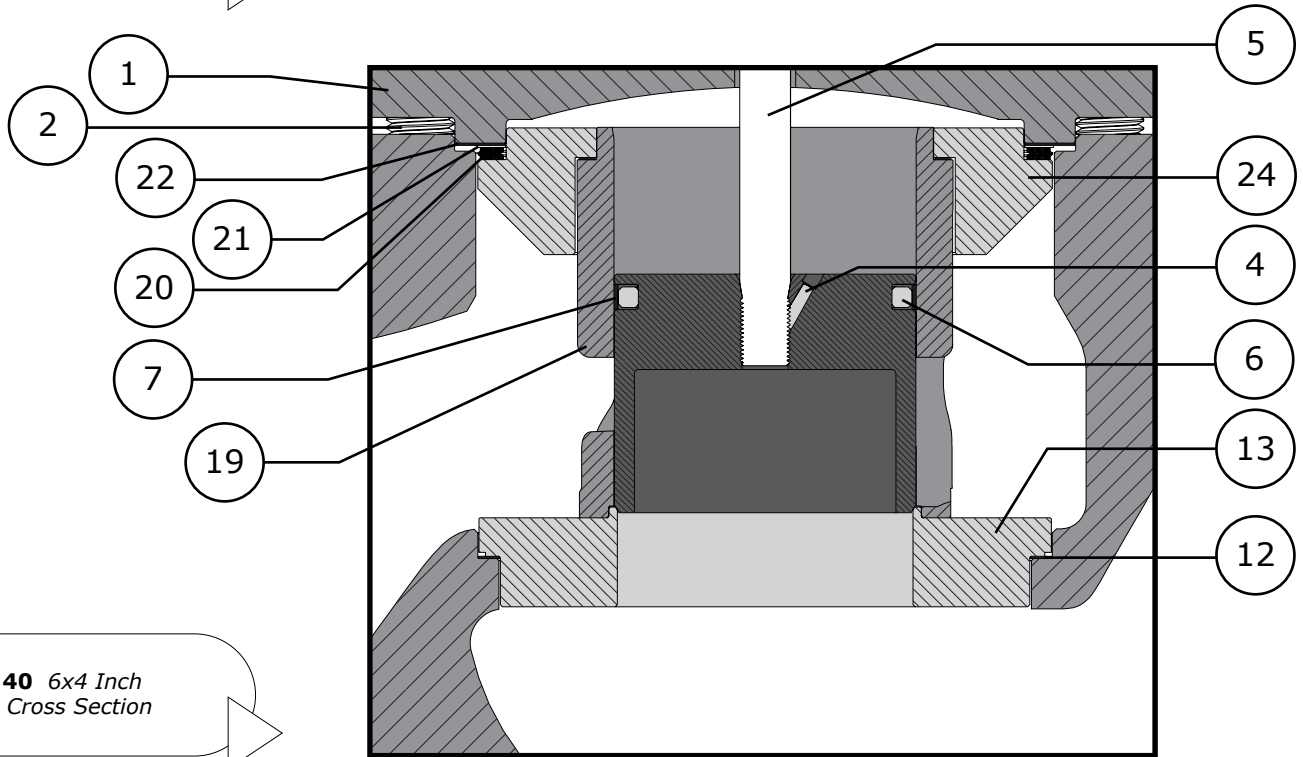


Figure 40 *6x4 Inch Sample Cross Section*

Model 360/361 Control Valves

Operation, Parts, and Instruction Manual



SEAL RING DETAIL

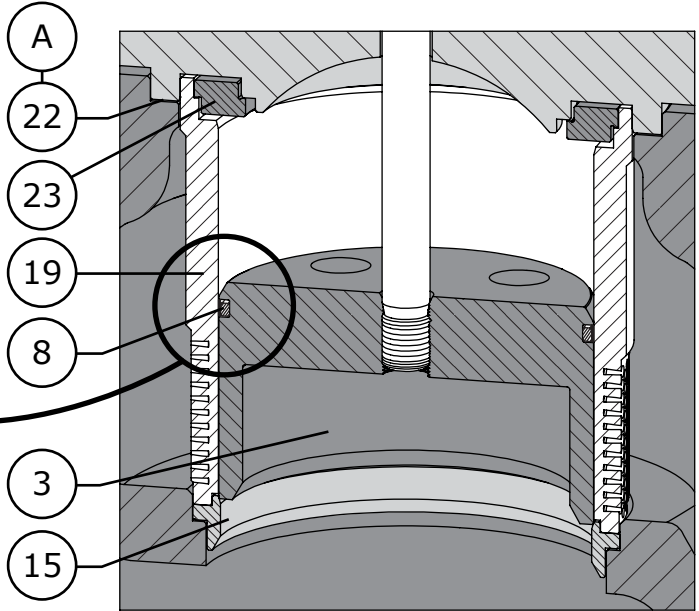
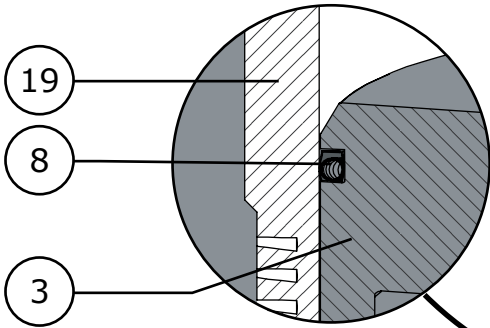


Figure 41 Load Ring Diagram (8 Inch Valve Assembly)

Model 360/361 Control Valves

Operation, Parts, and Instruction Manual



Table 5

| Valve Sizes (Inch) | | Bolt Torques | | | | | |
|---------------------------------|-------------------|------------------------|---------|---|---------|--------------------|---------|
| Globe Body Valves | Angle Body Valves | B7 B7 Fluorokote #1 | | B7M B7M Fluorokote #1 B8M CL2 (strain hardened) | | B8M CL1 (annealed) | |
| | | N•m | lbf-ft. | N•m | lbf-ft. | N•m | lbf-ft. |
| 1 | 1 | 127 | 94 | 102 | 75 | 62 | 46 |
| 1-1/2, 1-1/2x1, 2, or 2x1 | 2 or 2x1 | 88 | 65 | 71 | 52 | 43 | 32 |
| - | 3 ⁽¹⁾ | 127 | 94 | 102 | 75 | 62 | 46 |
| 3, 3x2 | 4 or 4x2 | 175 | 129 | 141 | 104 | 87 | 64 |
| 4, 4x3 | 6 | 312 | 230 | 250 | 184 | 153 | 113 |
| 6 | - | 549 | 405 | 549 | 405 | 370 | 273 |
| 8 | - | 746 | 550 | 746 | 550 | 544 | 401 |

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

Table 6

| 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 7

| VSC Diameter Inches (mm) | Torque lbf-ft. (N•m) | Hole Size Inches (mm) |
|-----------------------------|-------------------------|-----------------------------|
| 3/8 (9.5) | 25 - 35 (34 - 47) | 0.095 - 0.097 (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) |



Model 360/361 Control Valves

Operation, Parts, and Instruction Manual

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 | |

| Key | Description | Part Number |
|----------|--|------------------------|
| | 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 | Refer to Tables 8 - 18 |
| 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 | Refer to Tables 8 - 18 |
| 6 | Backup Ring, Two-Piece Plug Seal, | |
| | -Fluoroelastomer (Viton) | |
| | 1-5/16 inch port diameter | 1V65900529D |
| | 1-7/8 inch port diameter | 1V65920529D |
| | 2-5/16 inch port diameter | 1V55070529D |
| | 2-7/8 inch port diameter | 1V65940529D |
| | 3-7/16 inch port diameter | 1V65960529D |
| | 4-3/8 inch port diameter | 1V65980529D |
| | 7 inch port diameter | 1V66000529D |
| | -Nitrile | |
| | 1-5/16 inch port diameter | 1V65900305D |
| | 1-7/8 inch port diameter | 1V65920305D |
| | 2-5/16 inch port diameter | 1V55070305D |
| | 2-7/8 inch port diameter | 1V65940305D |
| | 3-7/16 inch port diameter | 1V65960305D |
| | 4-3/8 inch port diameter | 1V65980305D |
| | 7 inch port diameter | 1V66000305D |
| | -Ethylene Propylene | |
| | 1-5/16 inch port diameter | 1V6590X004D |
| | 1-7/8 inch port diameter | 1V6592X003D |
| | 2-5/16 inch port diameter | 1V5507X004D |
| | 2-7/8 inch port diameter | 1V6594X003D |
| | 3-7/16 inch port diameter | 1V6596X003D |
| | 4-3/8 inch port diameter | 1V6598X002D |
| | 7 inch port diameter | 1V6600X002D |
| 7 | Seal Ring, Two-Piece Plug Seal, | |
| | -Carbon-filled PTFE (Standard) | |
| | 1-5/16 inch port diameter | 1V65910509D |
| | 1-7/8 inch port diameter | 1V65930509D |

Model 360/361 Control Valves

Operation, Parts, and Instruction Manual



Parts (Continued)

| Key | Description | Part Number |
|-----------|--|-------------|
| 7 | Seal Ring, Two-Piece Plug Seal (Continued) | |
| | -Carbon-filled PTFE (Standard) | |
| | 2-5/16 inch port diameter | 1V55080509D |
| | 2-7/8 inch port diameter | 1V65950509D |
| | 3-7/16 inch port diameter | 1V65970509D |
| | 4-3/8 inch port diameter | 1V65990509D |
| | 7 inch port diameter | 1V66010509D |
| 8 | Seal Ring, Three-Piece Plug Seal, Carbon-filled PTFE/Elgiloy | |
| | 1-5/16 inch port diameter | 10A4207X03D |
| | 1-7/8 inch port diameter | 10A4216X03D |
| | 2-5/16 inch port diameter | 10A4206X03D |
| | 2-7/8 inch port diameter | 10A4215X03D |
| | 3-7/16 inch port diameter | 10A5351X06D |
| | 4-3/8 inch port diameter | 10A4223X03D |
| | 7 inch port diameter | 10A2643X03D |
| | 8 inch port diameter | 10A3261X03D |
| 9 | Backup Ring, Three-Piece Plug Seal, S31600/S31603 Dual Grade | |
| | 1-5/16 inch port diameter | 10A4209X02D |
| | 1-7/8 inch port diameter | 10A4218X01D |
| | 2-5/16 inch port diameter | 10A4208X02D |
| | 2-7/8 inch port diameter | 10A4217X02D |
| | 3-7/16 inch port diameter | 10A5349X02D |
| | 4-3/8 inch port diameter | 10A4224X02D |
| 10 | Retaining Ring, Three-Piece Plug Seal, S31600 | |
| | 1-5/16 inch port diameter | 10A4211X01D |
| | 1-7/8 inch port diameter | 10A4220X01D |
| | 2-5/16 inch port diameter | 10A4210X01D |
| | 2-7/8 inch port diameter | 10A4219X01D |
| | 3-7/16 inch port diameter | 10A5350X01D |
| 11 | Anti-Extrusion Ring, Three-Piece Plug Seal, PolyEtherEtherKetone (PEEK) | |
| | 1-5/16 inch port diameter | 23B6125X01D |
| | 1-7/8 inch port diameter | 22B4694X01D |
| | 2-5/16 inch port diameter | 21B9340X01D |
| | 2-7/8 inch port diameter | 22B2617X01D |
| | 3-7/16 inch port diameter | 23B6126X01D |
| | 4-3/8 inch port diameter | 21B9341X01D |
| | 7 inch port diameter | 22B5998X01D |

| Key | Description | Part Number |
|------------|--|-------------------------|
| 12 | 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 |
| 13 | Seat Ring Adapter, Reduced Trim, S31600/S31603 Dual Grade | Refer to Table 27 |
| 14 | Gasket, Seat Ring Adapter, S31600/Graphite | |
| | 2 x 1 inch | 1R2862X011D |
| | 3 x 2 inch | 1R3296X004D |
| 15 | Seat Ring | Refer to Tables 28 - 29 |
| 15A | Liner, Angle Body Valves | Contact Dyna-Flo |
| 16 | Disk Seat, Soft Seat Valves, S31600/S31603 Dual Grade | Refer to Table 30 |
| 17 | PTFE Disk, Soft Seat Valves, PTFE | Refer to Table 30 |
| 18 | Disk Retainer, Soft Seat Valves, S31600/S31603 Dual Grade | Refer to Table 30 |
| 19 | Cage | Refer to Tables 18 - 26 |
| 20 | 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 | |
| | 1-1/2 x 1 inch | 1R28609944D |
| | 2 x 1 inch | 1R28609944D |
| 6 x 4 inch | 1U50859944D | |
| 21 | Metal Shim, S30400 | |
| | 1 inch | 16A1936X01D |
| | 1-1/2 inch | 16A1937X01D |
| | 2 inch | 16A1938X01D |
| | 3 inch | 16A1940X01D |
| | 4 inch | 16A1941X01D |
| | 6 inch | 16A1942X01D |



Model 360/361 Control Valves

Operation, Parts, and Instruction Manual

Parts (Continued)

| Key | Description | Part Number |
|------------|---|-------------|
| 22 | Gasket, Body/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 |
| | 8 inch | 10A3265X11D |
| 23 | Load Ring, 8 inch valve only, S17400 | 20A3267X01D |
| 24 | Cage Adapter, Reduced Trim Refer to Table 27 | |
| 25 | Bonnet Gasket for Cage Adapter, S31600/Graphite | |
| | 1-1/2 x 1 inch | 1R3101X003D |
| | 2 x 1 inch | 1R3299X004D |
| | 3 x 2 inch | 1R3484X004D |
| 26 | Bonnet | |
| | If you need a bonnet as a replacement part, order by valve size and stem diameter, serial number and desired material. | |
| 26A | 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. | |
| 27 | Baffle, included as part of extension bonnet assembly | |
| 28 | 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 |

| Key | Description | Part Number |
|-----------|---|-------------------|
| | 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 |
| 29 | Stud, Packing, B8M, 2 Required | |
| | 3/8 inch (9.5 mm) Stem | 1E94413522D |
| | 1/2 inch (12.7mm) Stem | 1E94443525D |
| | 3/4 inch (19.1mm) Stem | 1E94493525D |
| | 1 inch (25.4 mm) Stem | 0V00253522D |
| 30 | Lower Wiper, Teflon | |
| | 3/8 inch (9.5 mm) Stem | 1J87210699D |
| | 1/2 inch (12.7mm) Stem | 1J87220699D |
| | 3/4 inch (19.1mm) Stem | 1J87240699D |
| | 1 inch (25.4 mm) Stem | 1J87240699D |
| 31 | 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 |
| 32 | Spring, Packing, SST | Refer to Table 32 |

Model 360/361 Control Valves

Operation, Parts, and Instruction Manual



Parts (Continued)

| Key | Description | Part Number |
|-----------|---|-------------------|
| 33 | Special Washer, SST | Refer to Table 32 |
| 34 | Packing Set, PTFE | Refer to Table 32 |
| 35 | 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 |
| 36 | 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 |
| 37 | 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 | 0V00243507D |
| 38 | 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 |
| 39 | Lantern Ring, | Refer to Table 32 |
| | S31600/S31603 Dual Grade | |
| 40 | Graphite Filament, | Refer to Table 32 |
| 41 | Graphite Ribbon, | Refer to Table 32 |
| 42 | 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 |
| 43 | 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 |

| Key | Description | Part Number |
|--------------|--------------------------------------|-------------------|
| 44 | 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 |
| 45 | Flow Arrow, S30400 | |
| | 1 inch | 1V10593898D |
| | 1-1/2" - 8" | 1V10603898D |
| 46 | Name Tag, S30400 | NAMEXSBODYD |
| 47 | Name Plate, S30400 | Refer to Actuator |
| 48 | Piston Ring, Graphite | Refer to Table 34 |
| 49 | Cage Retainer | Contact Dyna-Flo |
| | Low-Noise III A3, B3, C3 Trim | |
| 50 | Baffle | Contact Dyna-Flo |
| | Low-Noise III A3, B3, C3 Trim | |
| 49/50 | 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 | |



Model 360/361 Control Valves

Operation, Parts, and Instruction Manual

⚠ WARNING - PARTS ORDERING

Whenever corresponding with Dyna-Flo about a 360 Series Control Valve, refer to the nameplate (Key 46) or name tag (Key 47) 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. Use only genuine Dyna-Flo replacement parts, the use of non-Dyna-Flo replacement parts could void your warranty, effect the performance of you equipment, or cause property damage and personal injury.

Table 8

360 Globe Valve Plug / Stem* Assembly Standard Temperature (Keys 3, 4, & 5) - For Two-Piece Plug Seals with Standard Bonnets

| Valve Size | Port Size | Stem Diameter | Travel | Plug Material | | | |
|--------------------------|---------------|---------------|--------------|---------------|-------------|-----------------------|-------------------------------|
| | | | | S41600 HT | S31600 | S31600 / Alloy 6 Seat | S31600 / Alloy 6 Seat & Guide |
| 1", 2" X 1" | 1-5/16 (33.3) | 3/8 (9.5) | 3/4 (19.1) | 1V6571XN03D | 1V6571XN05D | 11A5315XN3D | 11A5317XN4D |
| | | 1/2 (12.7) | 3/4 (19.1) | 1V6572XN02D | 1V6572XN06D | 11A5316XN2D | 11A5318XN4D |
| 1-1/2 | 1-7/8 (47.6) | 3/8 (9.5) | 3/4 (19.1) | 1V6573XN04D | 1V6573XN05D | 11A5321XN2D | 10A4438XN2D |
| | | 1/2 (12.7) | 3/4 (19.1) | 1V6574XN01D | 1V6574XN03D | 10A4439XN4D | 10A4611XN4D |
| 1-1/2 x 1 ⁽²⁾ | 1-5/16 (33.3) | 3/8 (9.5) | 3/4 (19.1) | 1V6571XN04D | 1V6571XN09D | 11A5315XN7D | 11A5317XN7D |
| | | 1/2 (12.7) | 3/4 (19.1) | 1V6572XN04D | 1V6572XN09D | 11A5316XN4D | 11A5318XN3D |
| 2, 3 x 2 ⁽²⁾ | 2-5/16 (58.7) | 1/2 (12.7) | 1-1/8 (28.6) | 1V6575XN05D | 1V6575XN06D | 11A5324XN2D | 11A5326XN2D |
| | | 3/4 (19.1) | 1-1/8 (28.6) | 1V6576XN01D | 1V6576XN03D | 11A5325XN2D | 11A5327XN1D |
| 3 | 3-7/16 (87.3) | 1/2 (12.7) | 1-1/2 (38.1) | 1V6579XN09D | 1V6579XN11D | 11A5336XN3D | 11A5337XN8D |
| | | 3/4 (19.1) | 1-1/2 (38.1) | 1V6580XN01D | 1V6580XN03D | 11A5014XN1D | 11A5338XN1D |
| 4 | 4-3/8 (111.1) | 1/2 (12.7) | 2 (50.8) | 1V6581XN04D | 1V6581XN05D | 11A5341XN3D | 11A5344XN2D |
| | | 3/4 (19.1) | 2 (50.8) | 1V6582XN02D | 1V6582XN07D | 11A5342XN1D | 11A5345XN4D |
| 4 x 2-1/2 ⁽²⁾ | 2-7/8 (73.0) | 1/2 (12.7) | 1-1/2 (38.1) | 1V6577XN04D | 1V6577XN06D | 11A5330XN2D | 11A5332XN2D |
| | | 3/4 (19.1) | 1-1/2 (38.1) | 1V6578XN01D | 1V6578XN02D | 11A5331XN2D | 11A5333XN1D |
| 6 | 7 (177.8) | 3/4 (19.1) | 2 (50.8) | 1V6584XN04D | 1V6584XN06D | 11A5350XN3D | 21A5351XN6D |
| | | 1 (25.4) | 2 (50.8) | 1V6585XN01D | 1V6585XN02D | 10A5107XN1D | 20A0103XN1D |
| 6 x 4 ⁽²⁾ | 4-3/8 (111.1) | 3/4 (19.1) | 2 (50.8) | 1V6582XN01D | 1V6582XN05D | 11A5342XN4D | 11A5345XN7D |
| | | 1 (25.4) | 2 (50.8) | 360N6503N1D | 360N6503N2D | 360N6504N3D | 360N6505N5D |

NOTE: For 8 inch valves refer to Table 10.

* - Stem material is S20910.

1 - 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.

2 - Indicates Reduced Trim.

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

Model 360/361 Control Valves

Operation, Parts, and Instruction Manual



Table 9

360 Globe Valve Plug / Stem* Assembly Standard Temperature (Keys 3, 4, & 5) - For Two-Piece Plug Seals with Style 1 Extension Bonnets

| Valve Size | Port Size | Stem Diameter | Travel | Plug Material | | | |
|-------------------------|---------------|---------------|--------------|---------------|-------------|-----------------------|-------------------------------|
| | | | | S41600 HT | S31600 | S31600 / Alloy 6 Seat | S31600 / Alloy 6 Seat & Guide |
| Inch | Inch (mm) | Inch (mm) | Inch (mm) | | | | |
| 1 | 1-5/16 (33.3) | 3/8 (9.5) | 3/4 (19.1) | 1V6571XN07D | 1V6571XN06D | 11A5315X13D | 11A5317XN8D |
| | | 1/2 (12.7) | 3/4 (19.1) | 1V6572XN03D | 1V6572XN12D | 11A5316XN3D | 11A5318X14D |
| 1-1/2 | 1-7/8 (47.6) | 3/8 (9.5) | 3/4 (19.1) | 1V6573XN07D | 1V6573XN12D | 11A5321XN4D | 10A4438XN3D |
| | | 1/2 (12.7) | 3/4 (19.1) | 1V6574XN05D | 1V6574XN06D | 10A4439XN5D | 10A4611X11D |
| 1-1/2x1 ⁽²⁾ | 1-5/16 (33.3) | 3/8 (9.5) | 3/4 (19.1) | 1V6571XN10D | 1V6571XN12D | 11A5315X17D | 11A5317XN5D |
| | | 1/2 (12.7) | 3/4 (19.1) | 1V6572XN15D | 1V6572XN19D | 11A5316X14D | 11A5318X13D |
| 2 3x2 ⁽²⁾ | 2-5/16 (58.7) | 1/2 (12.7) | 1-1/8 (28.6) | 1V6575XN18D | 1V6575XN12D | 11A5324XN4D | 11A5326XN6D |
| | | 3/4 (19.1) | 1-1/8 (28.6) | 1V6576XN11D | 1V6576XN13D | 11A5325X12D | 11A5327X13D |
| 2x1 ⁽²⁾ | 1-5/16 (33.3) | 1/2 (12.7) | 3/4 (19.1) | 1V6572XN03D | 1V6572XN12D | 11A5316XN3D | 11A5318X14D |
| 3 | 3-7/16 (87.3) | 1/2 (12.7) | 1-1/2 (38.1) | 1V6579XN08D | 1V6579XN07D | 11A5336X13D | 11A5337XN6D |
| | | 3/4 (19.1) | 1-1/2 (38.1) | 1V6580X101D | 1V6580X103D | 11A5014X11D | 11A5338X11D |
| 4 | 4-3/8 (111.1) | 1/2 (12.7) | 2 (50.8) | 1V6581XN07D | 1V6581XN06D | 11A5341X13D | 11A5344XN5D |
| | | 3/4 (19.1) | 2 (50.8) | 1V6582X102D | 1V6582X107D | 11A5342X11D | 11A5345XN5D |
| 4x2-1/2 ⁽²⁾ | 2-7/8 (73.0) | 1/2 (12.7) | 1-1/2 (38.1) | 1V6577XN05D | 1V6577XN12D | 11A5330X12D | 11A5332X20D |
| | | 3/4 (19.1) | 1-1/2 (38.1) | 1V6578XN11D | 1V6578XN12D | 11A5331X12D | 11A5333X11D |
| 6 | 7 (177.8) | 3/4 (19.1) | 2 (50.8) | 1V6584XN05D | 1V6584XN11D | 11A5350X12D | 21A5351XN5D |
| | | 1 (25.4) | 2 (50.8) | 1V6585X101D | 1V6585X102D | 10A5107X11D | 20A0103X11D |
| 6x4 ⁽²⁾ | 4-3/8 (111.1) | 3/4 (19.1) | 2 (50.8) | 1V6582X101D | 1V6582X105D | 11A5342X14D | 11A5345X17D |
| | | 1 (25.4) | 2 (50.8) | 360N650311D | 360N650312D | 360N650413D | 360N650515D |

* - Stem material is S20910.

1 - 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.

2 - Indicates Reduced Trim.

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



Model 360/361 Control Valves

Operation, Parts, and Instruction Manual

Table 10

360 Globe Valve Plug / Stem* Assembly Standard Temperature (Keys 3, 4, & 5) - For Three-Piece Plug Seals without Anti-Extrusion Rings (Standard Bonnets)

| Valve Size | Port Size | Stem Diameter | Travel | Plug Material | | | |
|---------------------------|---------------|---------------|--------------|---------------|-------------|-----------------------|-------------------------------|
| Inch | Inch (mm) | Inch (mm) | Inch (mm) | S41600 HT | S31600 | S31600 / Alloy 6 Seat | S31600 / Alloy 6 Seat & Guide |
| 1, 2 x 1 ⁽²⁾ | 1-5/16 (33.3) | 3/8 (9.5) | 3/4 (19.1) | 20A4103XN5D | 20A4103XN6D | 360N1104N3D | 20A4104XN2D |
| | | 1/2 (12.7) | 3/4 (19.1) | 360N1112N1D | 360N1112N2D | 360N1113N3D | 360N1114N5D |
| 1-1/2 | 1-7/8 (47.6) | 3/8 (9.5) | 3/4 (19.1) | 20A6711XN3D | 20A6711XN4D | 360N5138N3D | 22A5941XN2D |
| | | 1/2 (12.7) | 3/4 (19.1) | 20A4150XN6D | 20A4150XN2D | 360N5147N3D | 20A4151XN5D |
| 1-1/2 x 1 ⁽²⁾ | 1-5/16 (33.3) | 3/8 (9.5) | 3/4 (19.1) | 20A4103XN4D | 20A4103XN7D | 360N5104N3D | 20A4104XN3D |
| | | 1/2 (12.7) | 3/4 (19.1) | 360N5112N1D | 360N5112N2D | 360N5113N3D | 360N5114N5D |
| 2 3 x 2 ⁽²⁾ | 2-5/16 (58.7) | 1/2 (12.7) | 1-1/8 (28.6) | 20A4097XN6D | 20A4097N18D | 360N2008N3D | 20A4099N10D |
| | | 3/4 (19.1) | 1-1/8 (28.6) | 20A4098XN6D | 20A4098N18D | 360N2181N3D | 20A4100N10D |
| 3 | 3-7/16 (87.3) | 1/2 (12.7) | 1-1/2 (38.1) | 20A5414XN6D | 20A5414XN5D | 360N3342N3D | 22A3458XN2D |
| | | 3/4 (19.1) | 1-1/2 (38.1) | 20A5342XN8D | 20A5342XN2D | 360N3351N3D | 20A5344XN4D |
| 4 | 4-3/8 (111.1) | 1/2 (12.7) | 2 (50.8) | 20A2641XN4D | 20A2641N16D | 360N4428N3D | 21A0187XN2D |
| | | 3/4 (19.1) | 2 (50.8) | 20A4194XN5D | 20A4194XN2D | 360N4437N3D | 20A4197XN1D |
| 4 x 2-1/2 ⁽²⁾ | 2-7/8 (73.0) | 1/2 (12.7) | 1-1/2 (38.1) | 20A9533XN5D | 20A9533XN6D | 360N9312N3D | 20A9534XN9D |
| | | 3/4 (19.1) | 1-1/2 (38.1) | 20A4144XN1D | 20A4144XN2D | 360N9321N3D | 20A4146XN1D |
| 6 | 7 (177.8) | 3/4 (19.1) | 2 (50.8) | 20A2642XN5D | 20A2642XN6D | 360N6532N3D | 21A8443XN3D |
| | | 1 (25.4) | 2 (50.8) | 20A5621XN5D | 20A5621XN6D | 360N6541N3D | 20A6706XN3D |
| 6 x 4 ⁽²⁾ | 4-3/8 (111.1) | 3/4 (19.1) | 2 (50.8) | 20A4194XN3D | 20A4194XN7D | 360N6498N3D | 20A4197XN3D |
| | | 1 (25.4) | 2 (50.8) | 360N6506N1D | 360N6506N2D | 360N6507N3D | 360N6508N5D |
| 8 ⁽¹⁾ | 8 (203.2) | 3/4 (19.1) | 2 (50.8) | 21A5356XN1D | 21A5356XN2D | 21A5359XN1D | 21A5362XN1D |
| | | 1 (25.4) | 2 (50.8) | 21A5357XN1D | 21A5357XN2D | 21A5360XN1D | 21A5363XN1D |
| | | 3/4 (19.1) | 3 (76.2) | 21A5356XN1D | 21A5356XN2D | 21A5359XN1D | 21A5362XN1D |
| | | 1 (25.4) | 3 (76.2) | 21A5357XN1D | 21A5357XN2D | 21A5360XN1D | 21A5363XN1D |

* - Stem material is S20910.

1 - 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). 8" plug/stems are assembled with a style 1 extension bonnet as standard construction.

2 - Indicates Reduced Trim.

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

Model 360/361 Control Valves

Operation, Parts, and Instruction Manual



Table 11

360 Globe Valve Plug / Stem* Assembly Standard Temperature (Keys 3, 4, & 5) - Three-Piece Plug Seals with Anti-Cavitation 2 Stage (Standard Bonnets)

| Valve Size | Port Size | Stem Diameter | Travel | Plug Material | |
|----------------------|---------------|---------------|--------------|---------------|-------------------------------|
| | | | | S42000 HT | S31600 / Alloy 6 Seat & Guide |
| Inch | Inch (mm) | Inch (mm) | Inch (mm) | | |
| 1 | 1 (25.4) | 1/2 (12.7) | 1 (25.4) | 24A5265XN8D | 24A5519XN2D |
| 1-1/2 | 1-5/16 (33.3) | 1/2 (12.7) | 1-1/2 (38.1) | 24A5266XN2D | 24A5286XN2D |
| 2 | 1-7/8 (47.6) | 1/2 (12.7) | 2 (50.8) | 24A3038XN2D | 24A5287XN2D |
| | | 3/4 (19.1) | 2 (50.8) | 24A5550XN2D | 24A5551XN2D |
| 3 | 2-7/8 (73.0) | 1/2 (12.7) | 3 (76.2) | 24A5269XN2D | 24A5290XN2D |
| | | 3/4 (19.1) | 3 (76.2) | 23A9452XN2D | 24A5291XN2D |
| 4 | 2-7/8 (73.0) | 1/2 (12.7) | 4 (101.6) | 360N4462N8D | 360N4463N5D |
| | | 3/4 (19.1) | 4 (101.6) | 23A5818XN3D | 24A5292XN5D |
| 4 x 2 ⁽²⁾ | 2-5/16 (58.7) | 1/2 (12.7) | 2-1/2 (63.5) | 360N4454N8D | 360N4455N5D |
| | | 3/4 (19.1) | 2-1/2 (63.5) | 360N4458N8D | 360N4459N5D |
| 6 | 5-3/8 (136.5) | 3/4 (19.1) | 4 (101.6) | 23A5803XN2D | 24A5294XN2D |
| | | 1 (25.4) | 4 (101.6) | 24A3028XN5D | 24A5295XN3D |

* - Stem material is S20910.

2 - Indicated Reduced Trim.

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

Table 12

360 Globe Valve Plug / Stem* Assembly Standard Temperature (Keys 3, 4, & 5) - Anti-Cavitation 1 stage with Standard Bonnets (without Anti-Extrusion Rings)

| Valve Size | Port Size | Stem Diameter | Travel | Plug Material |
|------------|---------------|---------------|--------------|---------------|
| | | | | S42000 HT |
| Inch | Inch (mm) | Inch (mm) | Inch (mm) | |
| 1 | 1-5/16 (33.3) | 1/2 (12.7) | 3/4 (19.1) | 360N1001N8D |
| 1-1/2 | 1-7/8 (47.6) | 1/2 (12.7) | 3/4 (19.1) | 28A1002XN1D |
| 2 | 2-5/16 (58.7) | 1/2 (12.7) | 1-1/8 (28.6) | 28A1003XN1D |
| | | 3/4 (19.1) | 1-1/8 (28.6) | 28A1004XN1D |
| 3 | 3-7/16 (87.3) | 1/2 (12.7) | 1-1/2 (38.1) | 28A1007XN1D |
| | | 3/4 (19.1) | 1-1/2 (38.1) | 28A1008XN1D |
| 4 x 2-1/2 | 2-7/8 (73) | 1/2 (12.7) | 1-1/2 (38.1) | 28A1005XN1D |
| | | 3/4 (19.1) | 1-1/2 (38.1) | 28A1006XN1D |
| 4 | 4-3/8 (111.1) | 1/2 (12.7) | 2 (50.8) | 360N4002N8D |
| | | 3/4 (19.1) | 2 (50.8) | 28A1010XN1D |
| 6 | 7 (177.8) | 3/4 (19.1) | 2 (50.8) | 360N6000N8D |
| | | 1 (25.4) | 2 (50.8) | 28A1013XN1D |
| 6x4 | 4-3/8 (111.1) | 1/2 (12.7) | 2 (50.8) | 28A1010XN2D |
| | | 3/4 (19.1) | 2 (50.8) | 28A1011XN2D |

* - Stem material is S20910.



Model 360/361 Control Valves

Operation, Parts, and Instruction Manual

Table 13

360 Globe Valve Plug / Stem* Assembly High Temperature (Keys 3, 4, & 5) - For Three-Piece Plug Seals with Anti-Extrusion Rings (Standard Bonnets) - No Radius on Plug Seat

| Valve Size | Port Size | Stem Diameter | Travel | Plug Material | | |
|---------------------------|---------------|---------------|--------------|---------------|-----------------------|-------------------------------|
| Inch | Inch (mm) | Inch (mm) | Inch (mm) | S31600 | S31600 / Alloy 6 Seat | S31600 / Alloy 6 Seat & Guide |
| 1, 2 x 1 ⁽²⁾ | 1-5/16 (33.3) | 3/8 (9.5) | 3/4 (19.1) | 360N1106HN2D | 360N1107HN3D | 360N1108HN5D |
| | | 1/2 (12.7) | 3/4 (19.1) | 360N1004HN2D | 360N1116HN3D | 360N1003HN5D |
| 1-1/2 | 1-7/8 (47.6) | 3/8 (9.5) | 3/4 (19.1) | 360N5140HN2D | 360N5141HN3D | 360N5142HN5D |
| | | 1/2 (12.7) | 3/4 (19.1) | 360N5149HN2D | 360N5150HN3D | 360N5151HN5D |
| 1-1/2 x 1 ⁽²⁾ | 1-5/16 (33.3) | 3/8 (9.5) | 3/4 (19.1) | 360N5106HN2D | 360N5107HN3D | 360N5108HN5D |
| | | 1/2 (12.7) | 3/4 (19.1) | 360N5115HN2D | 360N5116HN3D | 360N5117HN5D |
| 2 3 x 2 ⁽²⁾ | 2-5/16 (58.7) | 1/2 (12.7) | 1-1/8 (28.6) | 360N2006HN2D | 360N2175HN3D | 360N2176HN5D |
| | | 3/4 (19.1) | 1-1/8 (28.6) | 360N2183HN2D | 360N2184HN3D | 360N2185HN5D |
| 3 | 3-7/16 (87.3) | 1/2 (12.7) | 1-1/2 (38.1) | 360N3344HN2D | 360N3345HN3D | 360N3346HN5D |
| | | 3/4 (19.1) | 1-1/2 (38.1) | 360N3353HN2D | 360N3354HN3D | 360N3355HN5D |
| 4 | 4-3/8 (111.1) | 1/2 (12.7) | 2 (50.8) | 360N4430HN2D | 360N4431HN3D | 360N4432HN5D |
| | | 3/4 (19.1) | 2 (50.8) | 360N4439HN2D | 360N4440HN3D | 360N4441HN5D |
| 4 x 2-1/2 ⁽²⁾ | 2-7/8 (73.0) | 1/2 (12.7) | 1-1/2 (38.1) | 360N4314HN2D | 360N4315HN3D | 360N4316HN5D |
| | | 3/4 (19.1) | 1-1/2 (38.1) | 360N4323HN2D | 360N4324HN3D | 360N4325HN5D |
| 6 | 7 (177.8) | 3/4 (19.1) | 2 (50.8) | 360N6534HN2D | 360N6535HN3D | 360N6536HN5D |
| | | 1 (25.4) | 2 (50.8) | 360N6543HN2D | 360N6544HN3D | 360N6545HN5D |
| 6 x 4 ⁽²⁾ | 4-3/8 (111.1) | 3/4 (19.1) | 2 (50.8) | 360N6500HN2D | 360N6501HN3D | 360N6502HN5D |
| | | 1 (25.4) | 2 (50.8) | 360N6509HN2D | 360N6510HN3D | 360N6511HN5D |
| 8 ⁽¹⁾ | 8 (203.2) | 3/4 (19.1) | 2 (50.8) | 360N8593H12D | 360N8594H13D | 360N8595H15D |
| | | 1 (25.4) | 2 (50.8) | 360N8599H12D | 360N8600H13D | 360N8601H15D |

* - Stem material is S20910.

1 - 8" plug/stems are assembled with a style 1 extension bonnet as standard construction.

2 - Indicates Reduced Trim.

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

Model 360/361 Control Valves

Operation, Parts, and Instruction Manual



Table 14

360 Globe Valve Plug / Stem* Assembly High Temperature (Keys 3, 4, & 5) - For Three-Piece Plug Seals with Anti-Extrusion Rings (Style 1 Extension Bonnets) - No Radius on Plug Seat

| Valve Size | Port Size | Stem Diameter | Travel | Plug Material | | |
|---------------------------|---------------|---------------|--------------|---------------|-----------------------|-------------------------------|
| Inch | Inch (mm) | Inch (mm) | Inch (mm) | S31600 | S31600 / Alloy 6 Seat | S31600 / Alloy 6 Seat & Guide |
| 1, 2 x 1 ⁽¹⁾ | 1-5/16 (33.3) | 3/8 (9.5) | 3/4 (19.1) | 360N1106H12D | 360N1107H13D | 360N1108H15D |
| | | 1/2 (12.7) | 3/4 (19.1) | 360N1004H12D | 360N1116H13D | 360N1003H15D |
| 1-1/2 | 1-7/8 (47.6) | 3/8 (9.5) | 3/4 (19.1) | 360N5140H12D | 360N5141H13D | 360N5142H15D |
| | | 1/2 (12.7) | 3/4 (19.1) | 360N5149H12D | 360N5150H13D | 360N5151H15D |
| 1-1/2 x 1 ⁽¹⁾ | 1-5/16 (33.3) | 3/8 (9.5) | 3/4 (19.1) | 360N5106H12D | 360N5107H13D | 360N5108H15D |
| | | 1/2 (12.7) | 3/4 (19.1) | 360N5115H12D | 360N5116H13D | 360N5117H15D |
| 2 3 x 2 ⁽¹⁾ | 2-5/16 (58.7) | 1/2 (12.7) | 1-1/8 (28.6) | 360N2006H12D | 360N2175H13D | 360N2176H15D |
| | | 3/4 (19.1) | 1-1/8 (28.6) | 360N2183H12D | 360N2184H13D | 360N2185H15D |
| 3 | 3-7/16 (87.3) | 1/2 (12.7) | 1-1/2 (38.1) | 360N3344H12D | 360N3345H13D | 360N3346H15D |
| | | 3/4 (19.1) | 1-1/2 (38.1) | 360N3353H12D | 360N3354H13D | 360N3355H15D |
| 4 | 4-3/8 (111.1) | 1/2 (12.7) | 2 (50.8) | 360N4010H12D | 360N4431H13D | 360N4432H15D |
| | | 3/4 (19.1) | 2 (50.8) | 360N4439H12D | 360N4440H13D | 360N4441H15D |
| 4 x 2-1/2 ⁽¹⁾ | 2-7/8 (73.0) | 1/2 (12.7) | 1-1/2 (38.1) | 360N4314H12D | 360N4315H13D | 360N4316H15D |
| | | 3/4 (19.1) | 1-1/2 (38.1) | 360N4323H12D | 360N4324H13D | 360N4325H15D |
| 6 | 7 (177.8) | 3/4 (19.1) | 2 (50.8) | 360N6534H12D | 360N6535H13D | 360N6536H15D |
| | | 1 (25.4) | 2 (50.8) | 360N6543H12D | 360N6544H13D | 360N6545H15D |
| 6 x 4 ⁽¹⁾ | 4-3/8 (111.1) | 3/4 (19.1) | 2 (50.8) | 360N6500H12D | 360N6501H13D | 360N6502H15D |
| | | 1 (25.4) | 2 (50.8) | 360N6509H12D | 360N6510H13D | 360N6511H15D |

* - Stem material is S20910.

1 - Indicates Reduced Trim.

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



Model 360/361 Control Valves

Operation, Parts, and Instruction Manual

Table 15

361 Globe Valve Plug / Stem* Assembly Standard Temperature (Keys 3, 4, & 5) - For Double Piston Rings with Standard Bonnets

| Valve Size | Port Size | Stem Diameter | Travel | Plug Material | | | |
|--------------------------|---------------|---------------|--------------|---------------|-------------|-----------------------|-------------------------------|
| | | | | S41600 HT | S31600 | S31600 / Alloy 6 Seat | S31600 / Alloy 6 Seat & Guide |
| Inch | Inch (mm) | Inch (mm) | Inch (mm) | S41600 HT | S31600 | S31600 / Alloy 6 Seat | S31600 / Alloy 6 Seat & Guide |
| 1", 2" X 1" | 1-5/16 (33.3) | 3/8 (9.5) | 3/4 (19.1) | 1V6571XN03D | 1V6571XN05D | 11A5315XN3D | 11A5317XN4D |
| | | 1/2 (12.7) | 3/4 (19.1) | 1V6572XN02D | 1V6572XN06D | 11A5316XN2D | 11A5318XN4D |
| 1-1/2 | 1-7/8 (47.6) | 3/8 (9.5) | 3/4 (19.1) | 1V6573XN04D | 1V6573XN05D | 11A5321X02D | 10A4438XN2D |
| | | 1/2 (12.7) | 3/4 (19.1) | 1V6574XN01D | 1V6574XN03D | 10A4439XN4D | 10A4611XN4D |
| 1-1/2 x 1 ⁽¹⁾ | 1-5/16 (33.3) | 3/8 (9.5) | 3/4 (19.1) | 1V6571XN04D | 1V6571XN09D | 11A5315XN7D | 11A5317XN7D |
| | | 1/2 (12.7) | 3/4 (19.1) | 1V6572XN04D | 1V6572XN09D | 11A5316XN4D | 11A5318XN3D |
| 2, 3 x 2 ⁽¹⁾ | 2-5/16 (58.7) | 1/2 (12.7) | 1-1/8 (28.6) | 1V6575XN05D | 1V6575XN06D | 11A5324XN2D | 11A5326XN2D |
| | | 3/4 (19.1) | 1-1/8 (28.6) | 1V6576XN01D | 1V6576XN03D | 11A5325XN2D | 11A5327XN3D |
| 3 | 3-7/16 (87.3) | 1/2 (12.7) | 1-1/2 (38.1) | 1V6579XN09D | 1V6579XN11D | 11A5336XN3D | 11A5337XN8D |
| | | 3/4 (19.1) | 1-1/2 (38.1) | 1V6580XN01D | 1V6580XN03D | 10A5104XN3D | 11A5338XN1D |
| 4 | 4-3/8 (111.1) | 1/2 (12.7) | 2 (50.8) | 1V6581XN04D | 1V6581XN05D | 11A5341XN3D | 11A5344XN2D |
| | | 3/4 (19.1) | 2 (50.8) | 1V6582XN02D | 1V6582XN07D | 11A5342XN3D | 11A5345XN4D |
| 4 x 2-1/2 ⁽¹⁾ | 2-7/8 (73.0) | 1/2 (12.7) | 1-1/2 (38.1) | 1V6577XN04D | 1V6577XN06D | 11A5330XN2D | 11A5332XN2D |
| | | 3/4 (19.1) | 1-1/2 (38.1) | 1V6578XN01D | 1V6578XN02D | 11A5331XN2D | 11A5333XN2D |
| 6 | 7 (177.8) | 3/4 (19.1) | 2 (50.8) | 1V6584XN04D | 1V6584XN06D | 11A5350XN3D | 21A5351XN6D |
| | | 1 (25.4) | 2 (50.8) | 1V6585XN01D | 1V6585XN02D | 10A5107XN1D | 20A0103XN1D |
| 6 x 4 ⁽¹⁾ | 4-3/8 (111.1) | 3/4 (19.1) | 2 (50.8) | 1V6582XN01D | 1V6582XN05D | 11A5342XN4D | 11A5345XN7D |
| | | 1 (25.4) | 2 (50.8) | 360N6202N1D | 360N6202N2D | 360N6203N3D | 360N6204N5D |

NOTE: For 8 inch valves refer to Table xx.

* - Stem material is S20910.

1 - Indicates Reduced Trim.

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

Model 360/361 Control Valves

Operation, Parts, and Instruction Manual



Table 16

361 Globe Valve Plug / Stem* Assembly Standard Temperature (Keys 3, 4, & 5) - For Double Piston Rings with Style 1 Extension Bonnets

| Valve Size | Port Size | Stem Diameter | Travel | Plug Material | | | |
|---------------------------|---------------|---------------|--------------|---------------|-------------|-----------------------|-------------------------------|
| | | | | S41600 HT | S31600 | S31600 / Alloy 6 Seat | S31600 / Alloy 6 Seat & Guide |
| Inch | Inch (mm) | Inch (mm) | Inch (mm) | | | | |
| 1, 2 x 1 ⁽²⁾ | 1-5/16 (33.3) | 3/8 (9.5) | 3/4 (19.1) | 1V6571XN07D | 1V6571XN06D | 11A5315X13D | 11A5317XN8D |
| | | 1/2 (12.7) | 3/4 (19.1) | 1V6572XN03D | 1V6572XN12D | 11A5316XN3D | 11A5318X14D |
| 1-1/2 | 1-7/8 (47.6) | 3/8 (9.5) | 3/4 (19.1) | 1V6573XN07D | 1V6573XN12D | 11A5321XN4D | 10A4438XN3D |
| | | 1/2 (12.7) | 3/4 (19.1) | 1V6574XN05D | 1V6574XN06D | 10A4439XN5D | 10A4611X11D |
| 1-1/2 x 1 ⁽²⁾ | 1-5/16 (33.3) | 3/8 (9.5) | 3/4 (19.1) | 1V6571XN10D | 1V6571XN12D | 11A5315X17D | 11A5317XN5D |
| | | 1/2 (12.7) | 3/4 (19.1) | 1V6572XN15D | 1V6572XN19D | 11A5316X14D | 11A5318X13D |
| 2 3 x 2 ⁽²⁾ | 2-5/16 (58.7) | 1/2 (12.7) | 1-1/8 (28.6) | 1V6575XN18D | 1V6575XN12D | 11A5324XN4D | 11A5326XN6D |
| | | 3/4 (19.1) | 1-1/8 (28.6) | 1V6576XN11D | 1V6576XN13D | 11A5325X12D | 11A5327X13D |
| 3 | 3-7/16 (87.3) | 1/2 (12.7) | 1-1/2 (38.1) | 1V6579XN08D | 1V6579XN07D | 11A5336X13D | 11A5337XN6D |
| | | 3/4 (19.1) | 1-1/2 (38.1) | 1V6580X101D | 1V6580X103D | 11A5014X11D | 11A5338X11D |
| 4 | 4-3/8 (111.1) | 1/2 (12.7) | 2 (50.8) | 1V6581XN07D | 1V6581XN06D | 11A5341X13D | 11A5344XN5D |
| | | 3/4 (19.1) | 2 (50.8) | 1V6582X102D | 1V6582X107D | 11A5342X11D | 11A5345XN5D |
| 4 x 2-1/2 ⁽²⁾ | 2-7/8 (73.0) | 1/2 (12.7) | 1-1/2 (38.1) | 1V6577XN05D | 1V6577XN12D | 11A5330X12D | 11A5332X20D |
| | | 3/4 (19.1) | 1-1/2 (38.1) | 1V6578XN11D | 1V6578XN12D | 11A5331X12D | 11A5333X11D |
| 6 | 7 (177.8) | 3/4 (19.1) | 2 (50.8) | 1V6584XN05D | 1V6584XN11D | 11A5350X12D | 21A5351XN5D |
| | | 1 (25.4) | 2 (50.8) | 1V6585X101D | 1V6585X102D | 10A5107X11D | 20A0103X11D |
| 6 x 4 ⁽²⁾ | 4-3/8 (111.1) | 3/4 (19.1) | 2 (50.8) | 1V6582X101D | 1V6582X105D | 11A5342X14D | 11A5345X17D |
| | | 1 (25.4) | 2 (50.8) | 360N650311D | 360N650312D | 360N650413D | 360N650515D |
| 8 ⁽¹⁾ | 8 (203.2) | 3/4 (19.1) | 2 (50.8) | 27A3956XN1D | 27A3956XN2D | 360N823913D | 27A3962XN1D |
| | | 1 (25.4) | 2 (50.8) | 27A3957XN1D | 27A3957XN2D | 360N824213D | 27A3963XN1D |

* - Stem material is S20910.

1 - 8" plug/stems are assembled with a style 1 extension bonnet as standard construction.

2 - Indicates Reduced Trim.

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



Model 360/361 Control Valves

Operation, Parts, and Instruction Manual

Table 17

361 Globe Valve Plug / Stem* Assembly High Temperature (Keys 3, 4, & 5) - For Double Piston Rings with Standard Bonnets

| Valve Size | Port Size | Stem Diameter | Travel | Plug Material | | |
|--------------------------|---------------|---------------|--------------|---------------|-----------------------|-------------------------------|
| Inch | Inch (mm) | Inch (mm) | Inch (mm) | S31600 | S31600 / Alloy 6 Seat | S31600 / Alloy 6 Seat & Guide |
| 1", 2" X 1" | 1-5/16 (33.3) | 3/8 (9.5) | 3/4 (19.1) | 360N1500HN2D | 360N1501HN3D | 11A5319XN2D |
| | | 1/2 (12.7) | 3/4 (19.1) | 360N1503HN2D | 360N1504HN3D | 11A5320XN2D |
| 1-1/2 | 1-7/8 (47.6) | 3/8 (9.5) | 3/4 (19.1) | 360N5506HN2D | 360N5507HN3D | 11A5322XN2D |
| | | 1/2 (12.7) | 3/4 (19.1) | 360N5509HN2D | 360N5510HN3D | 11A5323XN2D |
| 1-1/2 x 1 ^(A) | 1-5/16 (33.3) | 3/8 (9.5) | 3/4 (19.1) | 360N5512HN2D | 360N5513HN3D | 11A5319XN5D |
| | | 1/2 (12.7) | 3/4 (19.1) | 360N5515HN2D | 360N5516HN3D | 11A5320XN4D |
| 2, 3 x 2 ^(A) | 2-5/16 (58.7) | 1/2 (12.7) | 1-1/8 (28.6) | 360N2118HN2D | 360N2119HN3D | 11A5328XN2D |
| | | 3/4 (19.1) | 1-1/8 (28.6) | 360N2121HN2D | 360N2122HN3D | 11A5329XN2D |
| 3 | 3-7/16 (87.3) | 1/2 (12.7) | 1-1/2 (38.1) | 360N3148HN2D | 360N3149HN3D | 11A5339XN2D |
| | | 3/4 (19.1) | 1-1/2 (38.1) | 360N3154HN2D | 360N3155HN3D | 11A5340XN1D |
| 4 | 4-3/8 (111.1) | 1/2 (12.7) | 2 (50.8) | 360N4172HN2D | 360N4173HN3D | 360N4174HN5D |
| | | 3/4 (19.1) | 2 (50.8) | 360N4178HN2D | 360N4179HN3D | 11A5347XN2D |
| 4 x 2-1/2 ^(A) | 2-7/8 (73.0) | 1/2 (12.7) | 1-1/2 (38.1) | 360N4142HN2D | 360N4143HN3D | 11A5334XN4D |
| | | 3/4 (19.1) | 1-1/2 (38.1) | 360N4145HN2D | 360N4146HN3D | 11A5335XN2D |
| 6 | 7 (177.8) | 3/4 (19.1) | 2 (50.8) | 360N6208HN2D | 360N6209HN3D | 21A5353XN4D |
| | | 1 (25.4) | 2 (50.8) | 360N6214HN2D | 360N6215HN3D | 21A5354XN1D |
| 6 x 4 ^(A) | 4-3/8 (111.1) | 3/4 (19.1) | 2 (50.8) | 360N6196HN2D | 360N6197HN3D | 11A5348XN9D |
| | | 1 (25.4) | 2 (50.8) | 360N6202HN2D | 360N6203HN3D | 360N6204HN5D |

NOTE: For 8 inch valves refer to Table 18.

* - Stem material is S20910.

1 - Indicates Reduced Trim.

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

Model 360/361 Control Valves

Operation, Parts, and Instruction Manual



Table 18

361 Globe Valve Plug / Stem* Assembly High Temperature (Keys 3, 4, & 5) - For Double Piston Rings with Style 1 Extension Bonnets

| Valve Size | Port Size | Stem Diameter | Travel | Plug Material | | |
|---------------------------|---------------|---------------|--------------|---------------|-----------------------|-------------------------------|
| Inch | Inch (mm) | Inch (mm) | Inch (mm) | S31600 | S31600 / Alloy 6 Seat | S31600 / Alloy 6 Seat & Guide |
| 1, 2 x 1 ⁽²⁾ | 1-5/16 (33.3) | 3/8 (9.5) | 3/4 (19.1) | 360N1500H12D | 360N1501H13D | 11A5319X13D |
| | | 1/2 (12.7) | 3/4 (19.1) | 360N1503H12D | 360N1504H13D | 11A5320XN3D |
| 1-1/2 | 1-7/8 (47.6) | 3/8 (9.5) | 3/4 (19.1) | 360N5506H12D | 360N5507H13D | 11A5322XN3D |
| | | 1/2 (12.7) | 3/4 (19.1) | 360N5509H12D | 360N5510H13D | 11A5323XN3D |
| 1-1/2 x 1 ⁽²⁾ | 1-5/16 (33.3) | 3/8 (9.5) | 3/4 (19.1) | 360N5512H12D | 360N5513H13D | 11A5319XN7D |
| | | 1/2 (12.7) | 3/4 (19.1) | 360N5515H12D | 360N5516H13D | 11A5320X11D |
| 2 3 x 2 ⁽²⁾ | 2-5/16 (58.7) | 1/2 (12.7) | 1-1/8 (28.6) | 360N2118H12D | 360N2119H13D | 11A5328XN3D |
| | | 3/4 (19.1) | 1-1/8 (28.6) | 360N2121H12D | 360N2122H13D | 11A5329XN3D |
| 3 | 3-7/16 (87.3) | 1/2 (12.7) | 1-1/2 (38.1) | 360N3148H12D | 360N3149H13D | 11A5339XN3D |
| | | 3/4 (19.1) | 1-1/2 (38.1) | 360N3154H12D | 360N3155H13D | 11A5340X11D |
| 4 | 4-3/8 (111.1) | 1/2 (12.7) | 2 (50.8) | 360N4172H12D | 360N4173H13D | 11A5347XN3D |
| | | 3/4 (19.1) | 2 (50.8) | 360N4178H12D | 360N4179H13D | 11A5348X15D |
| 4 x 2-1/2 ⁽²⁾ | 2-7/8 (73.0) | 1/2 (12.7) | 1-1/2 (38.1) | 360N4142H12D | 360N4143H13D | 11A5334XN6D |
| | | 3/4 (19.1) | 1-1/2 (38.1) | 360N4145H12D | 360N4146H13D | 11A5335X11D |
| 6 | 7 (177.8) | 3/4 (19.1) | 2 (50.8) | 360N6208H12D | 360N6209H13D | 21A5353XN3D |
| | | 1 (25.4) | 2 (50.8) | 360N6214H12D | 360N6215H13D | 21A5354X11D |
| 6 x 4 ⁽²⁾ | 4-3/8 (111.1) | 3/4 (19.1) | 2 (50.8) | 360N6196H12D | 360N6197H13D | 11A5348X19D |
| | | 1 (25.4) | 2 (50.8) | 360N6503H12D | 360N6504H13D | 360N6505H15D |
| 8 ⁽¹⁾ | 8 (203.2) | 3/4 (19.1) | 2 (50.8) | 360N8238H12D | 360N8239H13D | 27A3965X11D |
| | | 1 (25.4) | 2 (50.8) | 360N8241H12D | 360N8242H13D | 27A3966XN1D |

* - Stem material is S20910.

1 - 8" plug/stems are assembled with a style 1 extension bonnet as standard construction.

2 - Indicates Reduced Trim.

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



Model 360/361 Control Valves

Operation, Parts, and Instruction Manual

Table 19

Cage (Key 19) - 360 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) | 2V37223327D | 2V37221150D | 2V37194617D |
| 8 | - | 8 (203.2) | 20A3249X01D | 20A3249X02D | 20A5469X01D |

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

Table 20

Cage (Key 19) - 360 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) | 2V37183327D | 2V37181150D | 2V37124893D |
| 8 | - | 8 (203.2) | 20A3247X01D | 20A3247X05D | 20A5468X01D |

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

Model 360/361 Control Valves

Operation, Parts, and Instruction Manual



Table 21

| Cage (Key 19) - 360 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) | 2V37233327D | 2V37231150D | 2V37134893D |
| 8 | - | 8 (203.2) | 20A3245X01D | 20A3245X05D | 20A5467X01D |

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

Table 22

| Cage (Key 19) - 360 Anti-Cavitation (S17400 H900 Cage Material) | | |
|--|-------------------------------|-------------------------|
| Valve Size Inch | Port Size Inch (mm) | Stage Stage 1 |
| 1 | 1 (25.4) | 38A1018X01D |
| 1-1/2 | 1-5/16 (33.3) | 38A1019X01D |
| 2 | 1-7/8 (47.6) | 38A1020X01D |
| 3 | 2-7/8 (73.0) | 38A1023X01D |
| 4 | 4-3/8 (111.1) | 38A1025X01D |
| 4 x 2-1/2 ⁽¹⁾ | 2-7/8 (73.0) | 38A1021X01D |
| 6 | 7 (177.8) | 38A1027X01D |
| 8 | 8 (203.2) | 360C8000X1D |

1 - Indicates Reduced Trim

Table 23

| Cage (Key 19) - 360 Anti-Cavitation (S17400 H900 Cage Material) | | |
|--|-------------------------------|-------------------------|
| Valve Size Inch | Port Size Inch (mm) | Stage Stage 2 |
| 1 | 1 (25.4) | 24A5558X01D |
| 1-1/2 | 1-5/16 (33.3) | 24A5559X02D |
| 2 | 1-7/8 (47.6) | 24A3031X03D |
| 3 | 2-7/8 (73.0) | 23A9453X02D |
| 4 | 2-7/8 (73.0) | 23A5817X03D |
| 4 x 2-1/2 ⁽¹⁾ | 2-5/16 (58.7) | 360C4009X1D |
| 6 | 5-3/8 (136.5) | 360C6011X1D |
| 8 | 7 (177.8) | 360C8004X1D |

1 - Indicates Reduced Trim



Model 360/361 Control Valves

Operation, Parts, and Instruction Manual

Table 24

Cage (Key 19) - 361 Equal Percentage - Double Piston Ring

| Valve Size Inch | Port Size | Cage Material | | |
|--------------------|---------------|---------------|---------------|--------------|
| Globe Body | Inch (mm) | S17400 H900 | S17400 DH1150 | S31600 / ENC |
| 1, 1-1/2x1, 2x1 | 1-5/16 (33.3) | 2U21533327D | 2U21531150D | 2U74084893D |
| 1-1/2 | 1-7/8 (47.6) | 2U21953327D | 2U21951150D | 2U74094893D |
| 2, 3x2 | 2-5/16 (58.7) | 2U22373327D | 2U22371150D | 2U74104893D |
| 3 | 3-7/16 (87.3) | 2U23213327D | 2U23211150D | 2U74124893D |
| 4 | 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) | 2V37233327D | 2V37231150D | 2V37134893D |
| 8 2 Inch Travel | 8 (203.2) | 20A3245X01D | 20A3245X05D | 20A5467X01D |

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

Table 25

Cage (Key 19) - 361 Linear - Double Piston Ring

| Valve Size Inch | Port Size | Cage Material | | |
|--------------------|---------------|---------------|---------------|--------------|
| Globe Body | Inch (mm) | S17400 H900 | S17400 DH1150 | S31600 / ENC |
| 1, 1-1/2x1, 2x1 | 1-5/16 (33.3) | 2U21563327D | 2U21561150D | 2U74144893D |
| 1-1/2 | 1-7/8 (47.6) | 2U21983327D | 2U21983150D | 2U74154893D |
| 2, 3x2 | 2-5/16 (58.7) | 2U22403327D | 2U22401150D | 2U74164893D |
| 3 | 3-7/16 (87.3) | 2U23243327D | 2U23241150D | 2U74184893D |
| 4 | 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) | 2V37183327D | 2V37181150D | 2V37124893D |
| 8 2 Inch Travel | 8 (203.2) | 20A3247X01D | 20A3247X05D | 20A5468X01D |

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

Model 360/361 Control Valves

Operation, Parts, and Instruction Manual



Table 26

Cage (Key 19) - 361 Quick Opening - Double Piston Ring

| Valve Size Inch | Port Size | Cage Material | | |
|--------------------|---------------|---------------|---------------|--------------|
| | | S17400 H900 | S17400 DH1150 | S31600 / ENC |
| Globe Body | Inch (mm) | S17400 H900 | S17400 DH1150 | S31600 / ENC |
| 1, 1-1/2x1, 2x1 | 1-5/16 (33.3) | 2U21503327D | 2U21501150D | 2U74034893D |
| 1-1/2 | 1-7/8 (47.6) | 2U21923327D | 2U21921150D | 2U72544893D |
| 2, 3x2 | 2-5/16 (58.7) | 2U22343327D | 2U22341150D | 2U74044893D |
| 3 | 3-7/16 (87.3) | 2U23183327D | 2U23181150D | 2U74064893D |
| 4 | 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) | 20A3249X01D | 20A3249X02D | 20A5469X01D |
| 8 2 Inch Travel | 8 (203.2) | 2V37223327D | 2V37221150D | 2V37144893D |

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

Table 27

Reduced Trim Adapters (Keys 13 & 24)

- S31600/S31603 Dual Grade Material

| Globe Body Inch | Angle Body Inch | Part | |
|--------------------|--------------------|----------------------------|-----------------------|
| | | Seat Ring Adapter (Key 13) | Cage Adapter (Key 24) |
| 1-1/2 x 1 | 2x1 | - | 1U2218X316D |
| 2x1 | - | 1U2262X316D | 1U1207X316D |
| - | 3 x 1-1/2 | 1U2304X316D | 1U2302X316D |
| 3 x 2 | 4 x 2 | 1U2346X316D | 1U1246X316D |
| 4 x 2-1/2 | - | 1U2396X316D | 1U1251X316D |
| 6 x 4 | - | - | 360G6401X2D |

- LF2 (ASTM A350/A105 DUAL GRADE FORGED MATERIAL)

| Globe Body Inch | Angle Body Inch | Part | |
|--------------------|--------------------|----------------------------|-----------------------|
| | | Seat Ring Adapter (Key 13) | Cage Adapter (Key 24) |
| 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 |
| 6 x 4 | - | - | 360G6401X1D |



Model 360/361 Control Valves

Operation, Parts, and Instruction Manual

Table 28

Seat Ring (Keys 15) - 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 |

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

Table 29

Seat Ring (Keys 15) - For Anti-Cavitation Trim

| Globe Body Inch | Stage | | | |
|--------------------|-------------|--|-------------|--|
| | Stage 1 | | Stage 2 | |
| | S17400 H900 | S31600 / Alloy 6 Hard Faced Seat & Bore | S17400 H900 | S31600 / Alloy 6 Hard Faced Seat & Bore |
| 1 | 23A7567X01D | 23A7567X02D | 24A5231X01D | 24A5239X01D |
| 1-1/2 | 23A7568X01D | 23A7568X02D | 24A5232X01D | 24A5240X01D |
| 2 | 23A7569X01D | 23A7569X02D | 24A3039X01D | 24A5241X01D |
| 3 | 24A3016X01D | 24A3016X02D | 360R338X09D | 360R3001X5D |
| 4 | 24A1135X01D | 24A1135X02D | 23A5813X01D | 24A5244X01D |
| 6 | 23A5820X03D | 23A5820X01D | 360R6015X9D | 360R6016X5D |
| 8 | 360R8000X9D | 360R8001X3D | 360R8002X9D | 360R8004X5D |

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

Model 360/361 Control Valves

Operation, Parts, and Instruction Manual



Table 30

Soft Seat Valve Parts (Keys 16, 17, & 18)

| 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 | 360R022X1D |
| 8 | - | 20A4467X01D | 20A4468X01D | 10A4466X01D |

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

Table 31

Gaskets and Shim Repair Kits (Keys 12, 14, 20, 21, 22, & 25)

| Valve Size inch | | Gasket Kit |
|-----------------|-------------|-------------|
| Globe Valve | Angle Valve | |
| 1 | 1 | RGASKETX31D |
| 1-1/2 | 2 | RGASKETX32D |
| 1-1/2 x 1 | 2 x 1 | RGASKETX24D |
| 2 | - | RGASKETX33D |
| 2 x 1 | - | RGASKETX25D |
| - | 3 | RGASKETX34D |
| - | 3 x 1-1/2 | RGASKETX26D |
| 3 | 4 | RGASKETX35D |
| 3 x 2 | 4 x 2 | RGASKETX27D |
| 4 | 6 | RGASKETX36D |
| 4 x 2-1/2 | - | RGASKETX28D |
| 6 | - | RGASKETX37D |
| 6 x 4 | - | RGASKETX37D |
| 8 | - | RGASKETX23D |

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

NOTE: Low-Noise III trim requires 2 bonnet gaskets (Key 22). Consult Dyna-Flo.



Model 360/361 Control Valves

Operation, Parts, and Instruction Manual

Table 32

Packing Parts (Keys 32, 33, 34, 39, 40, & 41)

PTFE Packing

| Key # | Description | | Stem Diameter Inch (mm) | | | |
|-------|---|-------------|-------------------------|-------------|-------------|-------------|
| | | | 3/8 (9.5) | 1/2 (12.7) | 3/4 (19.1) | 1 (25.4) |
| 32 | Packing Spring (S30400) For Single Packing Only. | Part # | 1F12543701D | 1F12553701D | 1F12563701D | 1D58293701D |
| | | Qty. | 1 | 1 | 1 | 1 |
| 33 | Special Washer (S30400) For Single Packing Only. | Part # | 1F12523604D | 1F12513604D | 1F12503604D | 1H98223604D |
| | | Qty. | 1 | 1 | 1 | 1 |
| 34* | 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 |
| 39 | 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) |
| 39 | Lantern Ring (S31600/S31603 Dual Grade) | Part # | DFX0000031D | DFX0000021D | DFX0000041D | DFX0000051D |
| | | Qty. | 2 | 1 | 2 | 2 |
| 39A | Lantern Ring (S31600/S31603 Dual Grade) | Part # | N/A | DFX0000001D | N/A | N/A |
| | | Qty. | N/A | 1 | N/A | N/A |
| 40 | Graphite Filament Ring | Part # | 1F3370X032D | 1E3190X022D | 1E3191X028D | 1D7518X013D |
| | | Qty. | 2 | 2 | 3 | 3 |
| 41 | Graphite Ribbon Ring | Part # | 1V3160X002D | 1V3802X002D | 1V2396X002D | 1U6768X002D |
| | | Qty. | 2 | 2 | 2 | 2 |

* - For 3/8 inch stems, remove a packing ring from the lower set for a total of 4 rings.

Table 33

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 |

Model 360/361 Control Valves

Operation, Parts, and Instruction Manual



Table 34

Model 361 Parts - Piston Ring (Graphite)

| Key | Description | Part Number |
|-----|--------------|-------------|
| 48 | 1-5/16" Port | 1U2174X002D |
| | 1-7/8" Port | 1U2216X002D |
| | 2-5/16" Port | 1U2258X002D |
| | 2-7/8" Port | 1U2300X002D |
| | 3-7/16" Port | 1U2342X002D |
| | 4-3/8" Port | 1U2392X002D |
| | 7" Port | 1U5069X002D |
| | 8" Port | 10A3262X03D |

Model 360/361 Control Valves

Operation, Parts, and Instruction Manual



This page intentionally left blank.

Model 360/361 Control Valves

Operation, Parts, and Instruction Manual



This page intentionally left blank.

Model 360/361 Control Valves

Operation, Parts, and Instruction Manual



Our Commitment to Quality

Dyna-Flo is committed to continuous improvement. While all efforts have been made to ensure the accuracy of the content in this document, modifications or improvements to the information, specifications, and designs may occur at any time without notice. This document was published for informational purposes only, and does not express or imply suitability, a warranty, or guarantee regarding the products or services described herein or their use or applicability.

Neither Dyna-Flo Control Valve Services Ltd., nor any of their affiliated entities assumes responsibility for the selection, use and maintenance of any product. Responsibility for selection, use and maintenance of any product remains with the purchaser and end-user.

Model 360/361 Control Valves

MODEL NUMBERING SYSTEM



SAMPLE PART NUMBER: 361-3AFL-2FP2-GES2

| | | | | | | | | |
|----|--|----|----------------------|-----------------|------------------------------------|---|----------------------|---|
| | | | | | | BODY STYLE | | |
| - | GLOBE | A | ANGLE | E | GLOBE PED 2014/68/EU | EA | ANGLE PED 2014/68/EU | - |
| | | | | | | VALVE SIZE | | |
| 1 | 1 INCH | 5 | 1-1/2 INCH | 2 | 2 INCH | 3 | 3 INCH | 3 |
| 4 | 4 INCH | 6 | 6 INCH | 8 | 8 INCH | E | 10 X 8 INCH | |
| | | | | | | ASME RATING | | A |
| A | 150 | B | 300 | C | 600 | | | |
| | | | | | | END CONNECTION | | |
| F | RF | J | RTJ | N | NPT | T | BWE SCH 40 | F |
| L | BWE SCH 80 | S | SOCKET WELD | | | | | |
| | | | | | | 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 | TRIM D1 | 2 | TRIM D2 | 4 | TRIM D4 | 6 | TRIM D6 | 2 |
| C | TRIM DC | E | TRIM DE | J | TRIM DJ | 2H | TRIM D2H | |
| 4H | TRIM D4H | 6H | TRIM D6H | 7H | TRIM D7H | 8H | TRIM D8H | |
| | | | | | | PORT SIZE | | |
| F | FULL PORT | | R | REDUCED PORT | | | | F |
| | | | | | | PACKING STYLE | | |
| P | SINGLE PTFE V-RING (PRESSURE) | | | J | DOUBLE PTFE V-RING (PRESSURE) | | | P |
| 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 | | |
| 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) | 2 |
| | | | | | | PAINT | | |
| - | DFPS-01 (STANDARD) | | | 2 | DFPS-02 (SEVERE SERVICE) | | | - |
| 3 | DFPS-03 (HIGH TEMPERATURE) | | | | | | | |
| | | | | | | PISTON RING | | G |
| G | GRAPHITE PISTON RING | | | H | MULTIPLE GRAPHITE PISTON RINGS | | | |
| | | | | | | CHARACTERISTIC | | |
| E | EQUAL PERCENT | L | LINEAR | Q | QUICK OPENING | | | E |
| 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) | | | | | | | |
| | | | | | | CHARACTERISTIC (EXTENDED TRAVEL) | | |
| R | MODIFIED EQUAL PERCENT | | | S | MODIFIED LINEAR | | | |
| T | MODIFIED QUICK OPENING | | | W | MODIFIED LOW-NOISE III A1 (LINEAR) | | | |
| | | | | | | BONNET STYLE | | |
| S | STANDARD | | T | STANDARD TAPPED | | E | EXTENSION STYLE 1 | S |
| H | EXTENSION STYLE 2 | | | | | | | |
| | | | | | | SHUT-OFF CLASS | | |
| 2 | CLASS II | | 3 | CLASS III | | 4 | CLASS IV | 2 |

361



Model 360/361 Control Valves

MODEL NUMBERING SYSTEM

SAMPLE PART NUMBER: 360-3AFL-5FP2-VES4

| | | | | | | |
|----------------------------------|--|----|-------------|----------------------|---|----------|
| BODY STYLE | | | | | | - |
| - | GLOBE | A | ANGLE | | | |
| VALVE SIZE | | | | | | 3 |
| 1 | 1 INCH | 5 | 1-1/2 INCH | 2 | 2 INCH | 3 |
| 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 |
| L | BWE SCH 80 | S | SOCKET WELD | | | |
| BODY MATERIAL | | | | | | L |
| L | LCC | W | WCC | M | CF8M | 9 |
| BOLTING | | | | | | - |
| - | B7 / 2H (STANDARD) | | | A | B7M / 2HM | |
| B | B8M / 8M | | | K | B7 FLUOROKOTE #1 / 2H FLUOROKOTE #1 | |
| L | B7M FLUOROKOTE #1 / 2HM FLUOROKOTE #1 | | | | | |
| TRIM | | | | | | 5 |
| 1 | TRIM D1 | 2 | TRIM D2 | 4 | TRIM D4 | 5 |
| 6 | TRIM D6 | 7 | TRIM D7 | 8 | TRIM D8 | 9 |
| L | TRIM DL | J | TRIM DJ | T | TRIM DT | C |
| E | TRIM DE | N | TRIM DN | R | TRIM DR | 2H |
| 4H | TRIM D4H | 6H | TRIM D6H | 7H | TRIM D7H | 8H |
| 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 |
| | | | | | | 5 |
| | | | | | | 1" |
| PAINT | | | | | | - |
| - | DFPS-01 (STANDARD) | | | 2 | DFPS-02 (SEVERE SERVICE) | |
| 3 | DFPS-03 (HIGH TEMPERATURE) | | | | | |
| BACKUP RING / SEAL RING | | | | | | V |
| V | VITON / CARBON-FILLED PTFE | | | E | EPDM / CARBON-FILLED PTFE | |
| C | S31600 / CARBON-FILLED PTFE-ELGILOY | | | K | S31600 / KEL-F - ELGILOY | |
| P | CARBON-FILLED PTFE-ELGILOY (8" 360) | | | | | |
| R | S31600 / CARBON-FILLED PTFE-ELGILOY WITH PEEK AE RINGS | | | | | |
| CHARACTERISTIC | | | | | | E |
| E | EQUAL PERCENT | L | LINEAR | Q | QUICK OPENING | |
| A | ANTI-CAVITATION 1 STAGE (LINEAR) | | | K | ANTI-CAVITATION 2 STAGE (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) | | | | | |
| CHARACTERISTIC (EXTENDED TRAVEL) | | | | | | |
| R | EQUAL PERCENT - EXTENDED TRAVEL | | | S | LINEAR - EXTENDED TRAVEL | |
| T | QUICK OPENING - EXTENDED TRAVEL | | | W | LOW-NOISE III A1 (LINEAR) - EXTENDED TRAVEL | |
| V | ANTI-CAVITATION 1 STAGE (LINEAR) -EXTENDED TRAVEL | | | | | |
| 4 | LOW-NOISE III A1 (LINEAR) EXTENDED 4" TRAVEL (8" VALVE ONLY) | | | | | |
| BONNET STYLE | | | | | | S |
| S | STANDARD | | T | STANDARD TAPPED | | E |
| H | EXTENSION STYLE 2 | | | | EXTENSION STYLE 1 | |
| SHUT-OFF CLASS | | | | | | 4 |
| 4 | CLASS IV | | 5 | CLASS V | | 6 |
| | | | | | | CLASS VI |

360