Model 390, 391, 392 Control Valves

Operation, Parts, and Instruction Manual

Figure 1 *390 Control Valve & DFC Actuator*

TABLE OF CONTENTS

NOTICE

These instructions are meant to be used with the Dyna-Flo 390 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**

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 390 Control Valves. Revisions and updates are available at above mentioned website.

GENERAL

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

SCOPE

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

This manual is written to be a practical and useful guide to maintaining the Dyna-Flo 390 Control Valve.

SAFETY CAUTION

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

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

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

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

SPECIFICATIONS

Configurations

The Model 390 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 of the Sales Bulletin.

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

Sizes and Connection Styles

(Refer to Table 1 of Sales Bulletin)

Model:	390 & 391
Size:	2", 3", 4", 6"
Body:	Globe (All Sizes), Angle (2" to 6")
Rating:	ASME Class 900 & 1500
Connection:	RF / RTJ / BWE - All Sizes

Maximum Inlet Pressures and Temperatures

Flanged valves consistent with ASME Class 900 and 1500 rating as per ASME B16.34, unless limited.

Maximum Pressure Drops

Standard Valve Trim: Refer to Figures 33 to 36.

Anti-Cavitation 2 Stage Trim: 2,160 Psi (14,893 kPa).

Anti-Cavitation 3 Stage Trim: 3,000 Psi (20,684 kPa).

Low-Noise Valve Trim: Figure 35.

Characteristic and Flow Direction

- Equal Percentage (Standard) - Flow Down
- Modified Equal Percentage - Flow Down
- Linear - Flow Down
- Low-Noise III (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 6 to 11 of the Sales Bulletin.

Approximate Valve Body and Actuator Weights

Refer to Table 1.

Materials

Body and bonnet material options include:

LCC (A350-LF2 optional* bonnet material)

WCC (A350-LF2 optional* bonnet material)

WC9 (A182-F22 optional* bonnet material)

CF8M (A182-F316 optional* bonnet material)

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

Refer to Figure 9 of the Sales Bulletin for valve construction material temperature limitations. Refer to Table 14 of the Sales Bulletin for trim selections.

Cross-Section of the Model 390 Control Valves

Refer to Figure 31.

Port Diameters and Maximum Valve Plug Travel

Refer to Tables 3 and 4 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 28 to 30.

Maximum Valve Sizing Coefficients

For standard coefficients at maximum travel, refer to Table 18 & 19 of the Sales Bulletin. For full list of coefficients refer to document P-CVSM.

Service Application

Refer to Tables 12 - 17 of the Sales Bulletin.

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

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UNPACKING VALVE FROM SHIPPING CONTAINER

Special Tools Required:

- Properly Rated Lifting Straps (2 – 4 Straps) See Table 1 for valve weights.
- Lifting Hooks and Chains (for valve actuators with lifting hooks attached)
- 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 33). Refer to Figure 2 and 31 for possible nameplate locations.

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

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

Lift the valve/actuator assembly using proper lifting techniques.

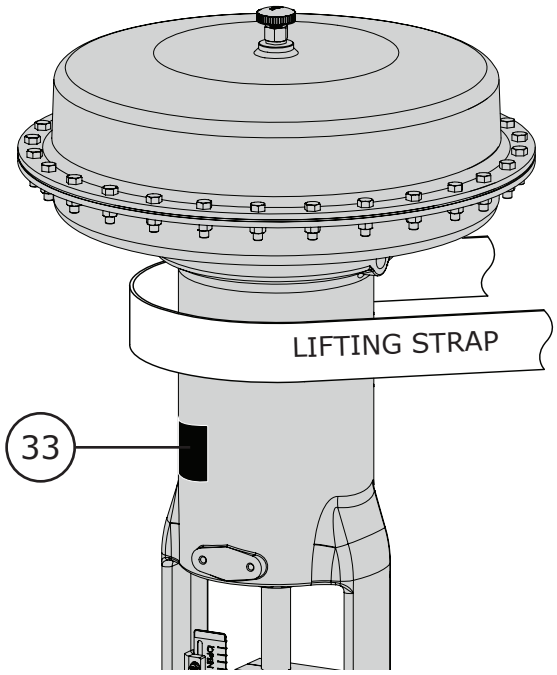

Figure 2 *Actuator Lifting Suggestions*

INSTALLATION

Before You Begin:

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

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

Parts Required:

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

Installation Steps:

1 Check the packing box bolting (Key 25) for proper tightness. Refer to Packing Installation on Pages 18 & 20 for proper packing tightening instructions.

2 The valve assembly may be installed in any position unless limited by vibration considerations, it is however recommended that the valve be installed with the valve stem (Key 5) perpendicular to the ground. **NOTE:** For some non-vertical orientations, the valve actuator may need to be supported.

3 Install the valve with flow through the valve in the direction shown by the flow arrow on the valve body.

4 Install the appropriate line flange gaskets.

5 Apply anti-seize compound 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.

INSTALLATION (Continued)

AIR PIPING

WARNING:

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

Before You Begin:

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

- Refer to the appropriate actuator instruction manual when necessary.

Piping Installation Steps:

1 Use 3/8" (outside diameter) tubing (or equivalent) for air lines.

2 Install the required line vents, valves, drains, seals, and filters to the actuator.

Table 1

Globe Valve Approximate Weights lb (kg)

Valve Size (Inch)	Class	Body	
		Flanged	BWE
2	900 / 1500	160 (73)	115 (52)
3	900	275 (125)	---
3	1500	286 (130)	213 (97)
4	900	510 (231)	---
4	1500	552 (250)	444 (201)
6	900	1125 (510)	---
6	1500	1228 (557)	1003 (455)

Angle Valve Approximate Weights lb (kg)

Valve Size	Class	Body	
		Flanged	BWE
2	900 / 1500	153 (69)	110 (50)
3	1500	272 (123)	173 (78)
4	1500	399 (181)	258 (117)
6	1500	788 (357)	445 (202)

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PERIODIC INSPECTION

Special Equipment Required:

- Bypass or block valves.

Before You Begin:

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

Inspection Steps:

1 Check for visible signs of leakage around all seal and gasket areas.

2 Check the valve for damage, especially damage caused by corrosive fumes or process drippings.

3 Clean and repaint the areas as required.

4 Ensure all accessories, mounting brackets, and fasteners are secure.

5 Clean any dirt and foreign material from the valve stem (Key 5).

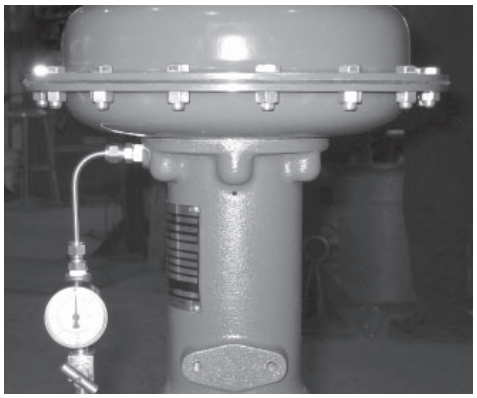


Figure 3 *Needle Valve with Gauge setup*

ACTUATOR REMOVAL

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

Tools Needed:

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

Before You Begin:

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

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

2 If the valve has been removed from the pipeline, place the valve assembly on a flat work surface that can support the weight.

3 Before the actuator is removed, support the actuator using lifting hooks or straps rated to support the weight of the actuator.

4 If the actuator is a spring and diaphragm actuator, determine if that actuator is fail open or fail closed. Fail closed actuators will need to be energized to remove downward force from the stem connector. Connect a supply line to the inlet port of the actuator, be sure not to exceed the maximum casing pressure. See 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 31). 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 29 & 30) and travel indicator from the valve stem (Key 5).

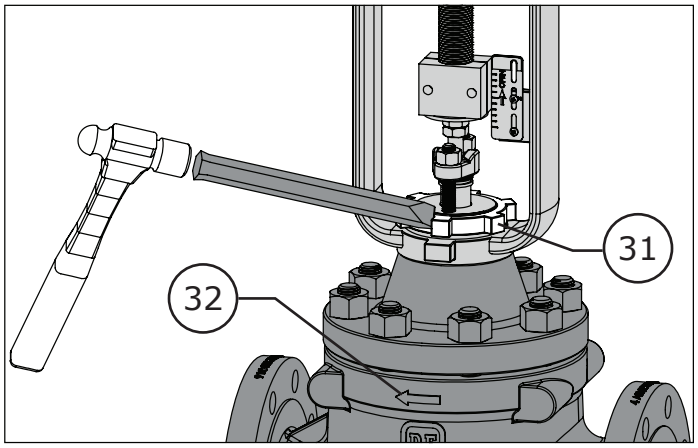


Figure 4 *Yoke Nut being loosened with a Chisel*

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).

Before you begin:

- Read Safety Caution (Page 2).
- Determine if valve has regular or live loaded packing (Refer to Figures 28, 29, & 30).
- Follow Steps 1 – 6 of Before You Begin from PERIODIC INSPECTION (Page 6).

Packing Maintenance

If the packing is leaking, proper tightening of the packing may correct the leak. If re-tightening the packing to the proper specifications does not stop the leakage it is possible that the stem or wall of the packing box is damaged. Replace or repair parts as necessary. For instructions on packing removal only, refer to the Disassembly, Packing Removal section on Page 11.

1 Determine the type of packing installed in the valve. Refer to Figures 28, 29, and 30 for packing styles.

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

Tighten the packing nuts (Key 25) evenly in an alternating pattern until the shoulder of the packing follower (Key 22) makes contact with the top face of the bonnet (Key 14). Proceed to tighten the packing nuts to the torque specification listed in Table 3. Refer to Figure 27.

For Double PTFE V-Ring and Graphite Packing:

Tighten the packing nuts (Key 25) evenly in an alternating pattern to the minimum recommended torque specifications listed in Table 3 on Page 26, continue tightening until leakage stops or the maximum torque specification is reached. If leakage continues after reaching the maximum recommended torque the packing will need to be replaced, do not tighten the packing past the maximum recommended torque as this will cause excessive packing friction.

For Live-Loaded Packing:

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

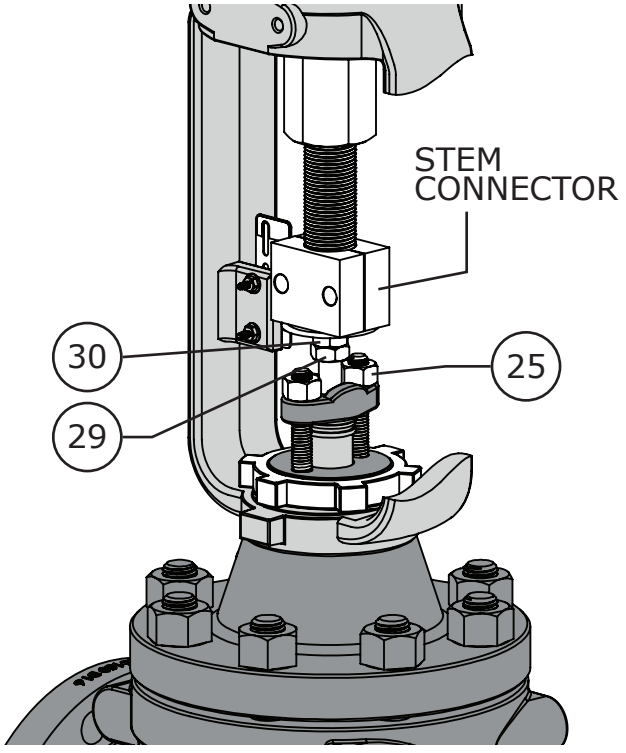


Figure 5 *Packing Nut and Stem Connector Detail*

DISASSEMBLY

Before You Begin:

- Read Safety Caution (Page 2).
- Use safe work practices and lock out procedures.
- Remove the actuator from the valve (Refer to Actuator Removal Instructions, Page 6).
- Relieve process pressure and drain the process fluid from up and down stream of valve.
- Be aware of potentially hazardous process material that may be present in-line and in-valve. Isolate the valve from process pressure. Use a bypass or block valve if necessary, or completely shut off the process.
- For Angle Body Valves refer to Figure 32.

PACKING REMOVAL

Special Tools Required:

- Mechanics Pick Set

NOTE: Packing box parts are easier to remove after the bonnet (Key 14) has been separated from the valve body (Key 1) and the valve stem (Key 5) has been removed. If the packing is all that needs to be removed, it is possible to extract packing box parts carefully using a mechanics pick set.

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

1 Remove the packing nuts (Key 25).

2 Remove the upper wiper (Key 23) if present, graphite packing does not include an upper wiper.

3 Remove the packing follower (Key 22).

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 21, 20, 19, 18, & 17) 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 14). For packing reassembly refer to Packing Assembly section (Pages 18 to 20).

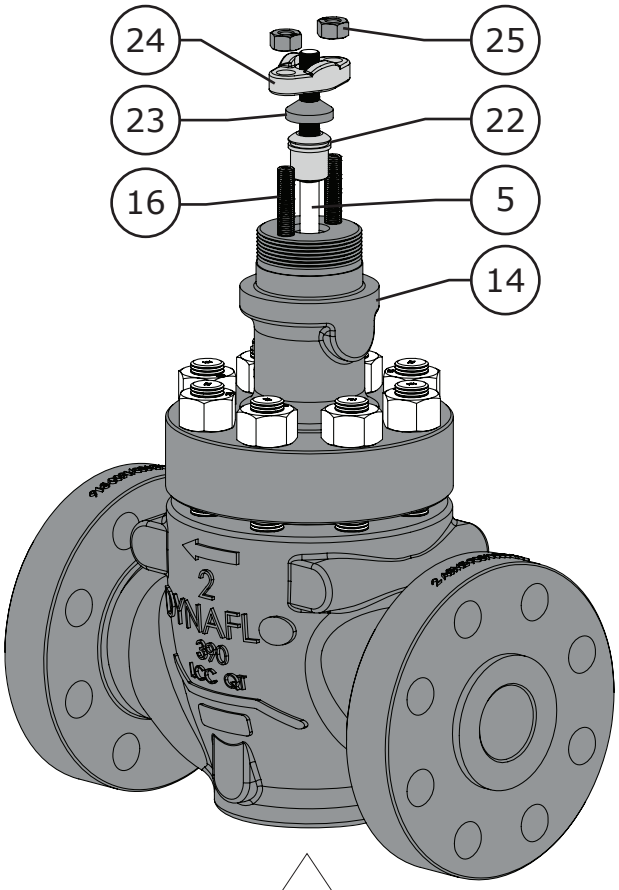


Figure 6 *Packing Removal (Steps 1 - 3)*

BONNET REMOVAL

WARNING: Process medium and pressure may be trapped inside the valve body (Key 1). Use caution when removing the valve bonnet (Key 14). Refer to Safety Caution on Page 2.

1 Loosen the bonnet nuts (Key 15) 1 full turn after the contact between the nuts and the top surface of the bonnet (Key 14) has been broken. Do not remove the bonnet nuts until any trapped process pressure has been vented. Refer to Figure 7.

2 Break the contact between the valve body (Key 1) and the bonnet (Key 14), 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 15).

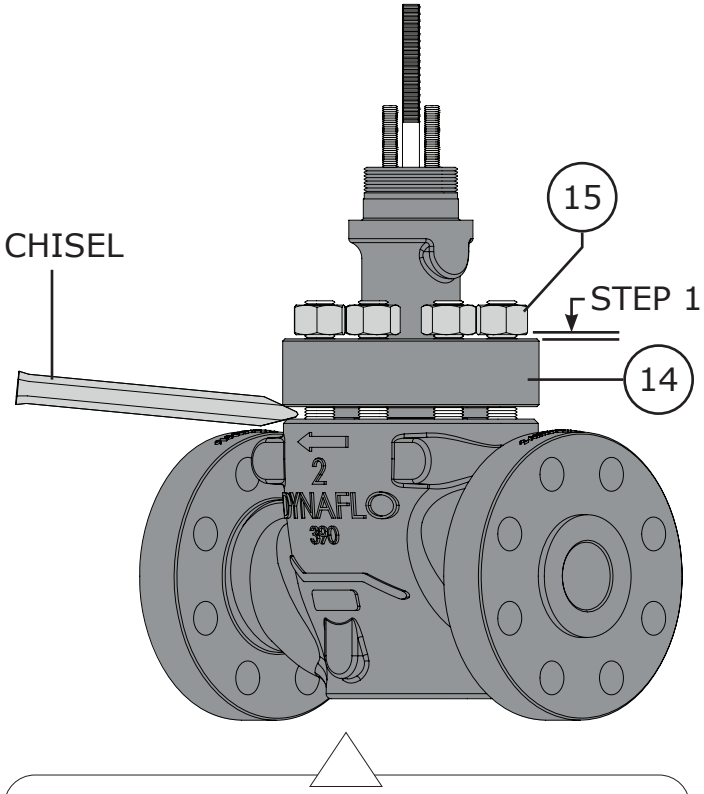


Figure 7 *Bonnet Removal (Steps 1 - 2)*

DISASSEMBLY (Continued)

BONNET REMOVAL (Continued)

4 Carefully lift the bonnet (Key 14) 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.

TRIM PARTS REMOVAL

1 Remove the valve stem (Key 5) / valve plug (Key 3) assembly from the valve body (Key 1). Refer to Plug Seal Removal section for instructions for disassembling Model 390 and 391 plug seals. Model 392 plugs do not have seals.

2 Remove the bonnet gasket (Key 13).

3 Carefully remove the cage (Key 12).

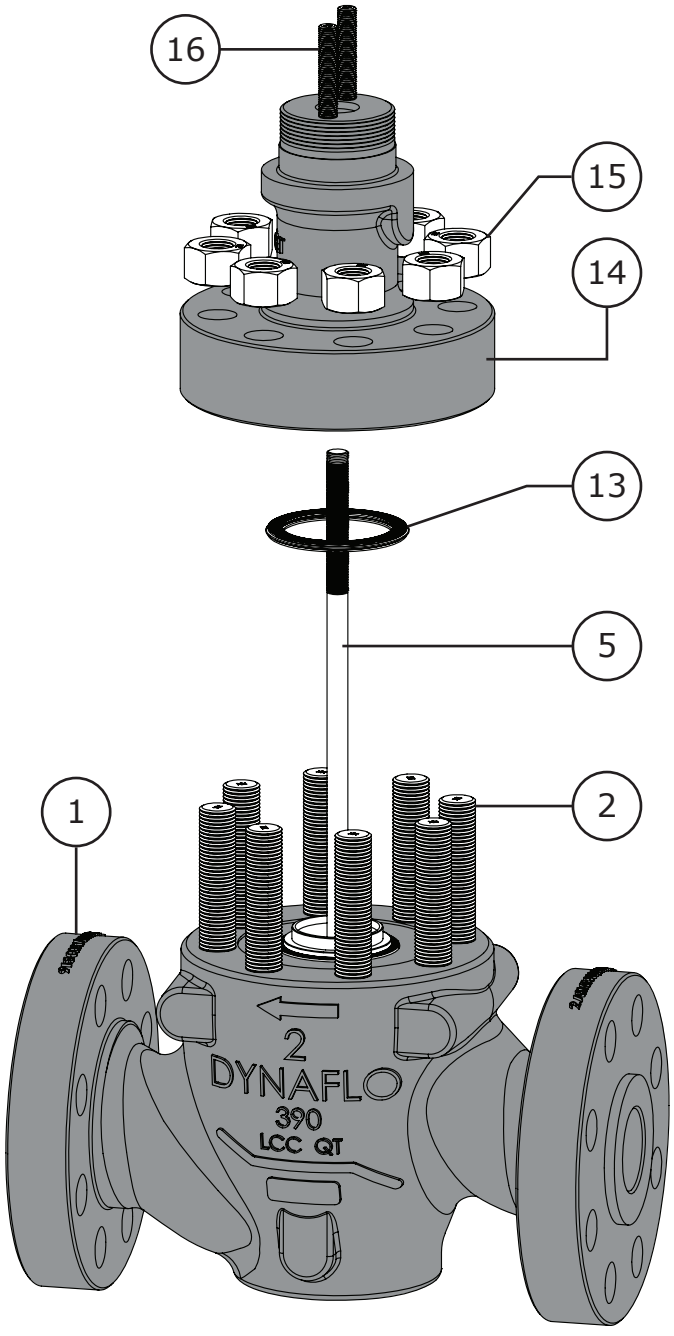


Figure 8 *Bonnet Removal (Steps 3 - 4)*

DISASSEMBLY (Continued)

TRIM PARTS REMOVAL (Continued)

4 Remove the seat ring (Key 11). Refer to Figure 32 for Angle Body valve assemblies.

5 Remove the seat ring gasket (Key 10).

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.

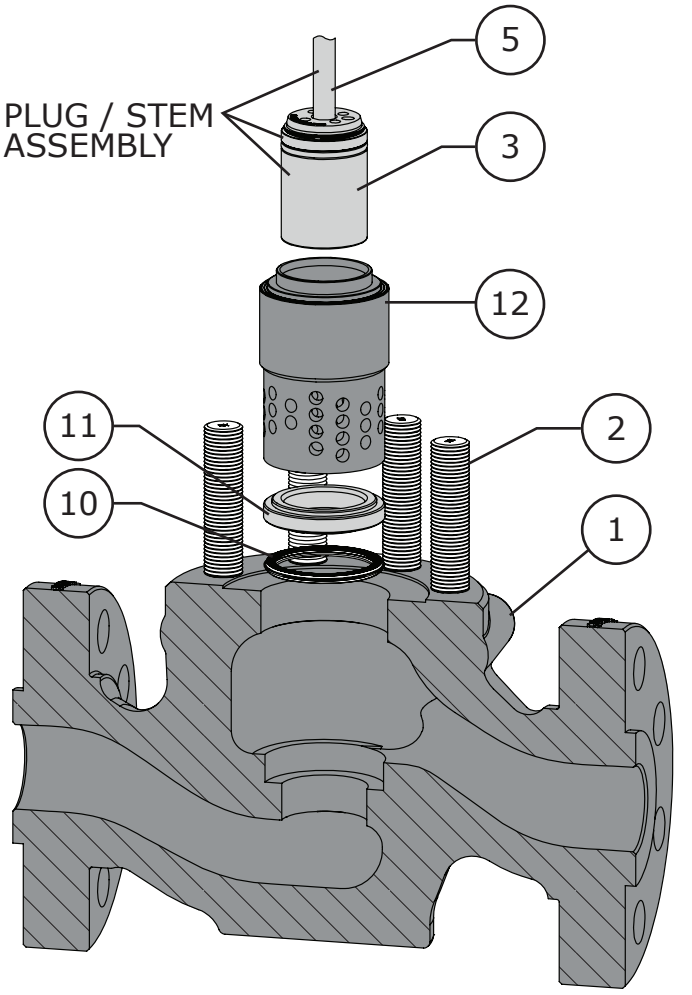


Figure 9 *Trim Parts Removal (Steps 1 - 6)*

PLUG SEAL REMOVAL

For Model 390 Valves (See Figure 10):

1 Carefully remove the retaining ring (Key 8) from the plug groove, a pick set or flat screw driver may be required.

2 Remove the backup ring (Key 7).

3 Remove the anti-extrusion ring (Key 39). The anti-extrusion ring is only included in 390 valve assemblies rated for over 450°F (232°C).

4 Remove the seal ring (Key 6).

For Model 391 Valves (Refer to Figure 11):

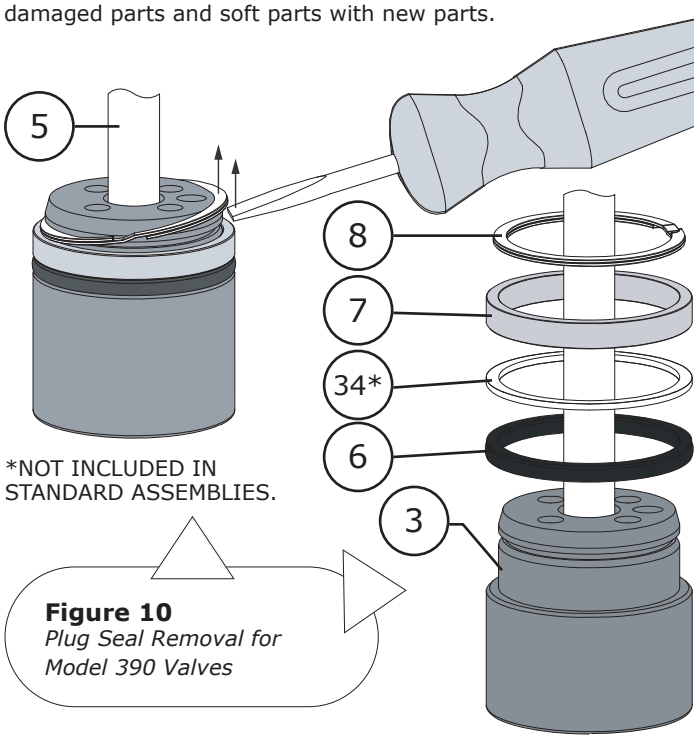
1 Remove the piston rings (Key 9). **NOTE:** Piston rings are broken in half and can be easily pulled apart.

For Model 392 Valves (Refer to Figures 12, & 33 to 36):

NOTE: Model 392 valves do not have plug seals.

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.



*NOT INCLUDED IN STANDARD ASSEMBLIES.

Figure 10
Plug Seal Removal for Model 390 Valves

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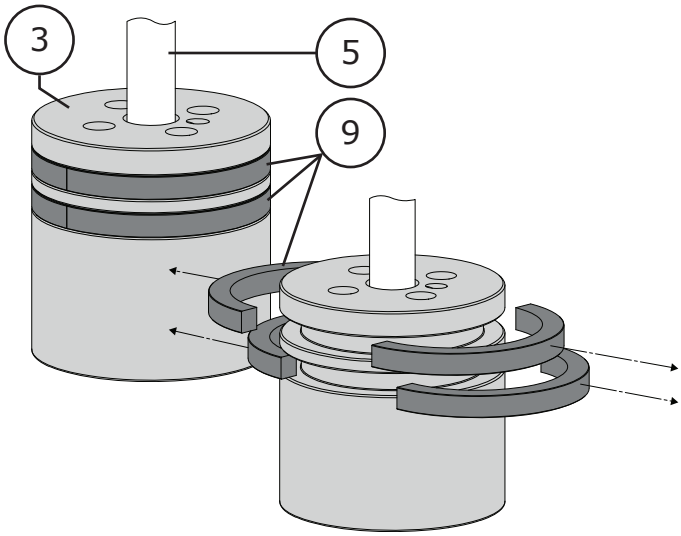


Figure 11 *Model 391 Piston Ring Removal*

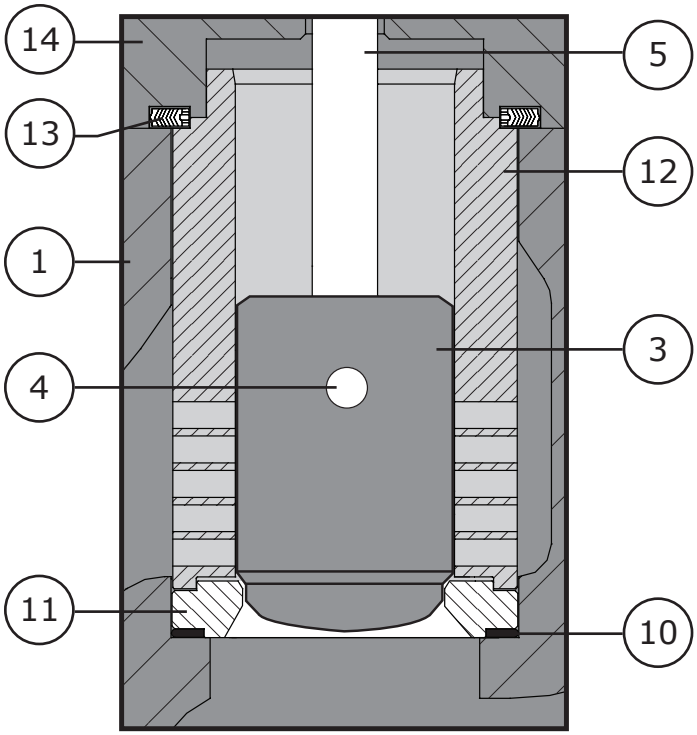


Figure 12 *Model 392 Plug Diagram (Refer to Figures 36 to 39*

DISASSEMBLY (Continued)

PACKING PARTS REMOVAL

WARNING: Compressed gasses could be trapped between packing rings.

1 Using a blunt or rounded tool or rod, carefully tap the packing parts (Keys 21, 20, 19, 18, and 17) out of the packing bore of the bonnet (Key 14). A mechanic's pick set can also be used to pull packing parts from the bore.

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.

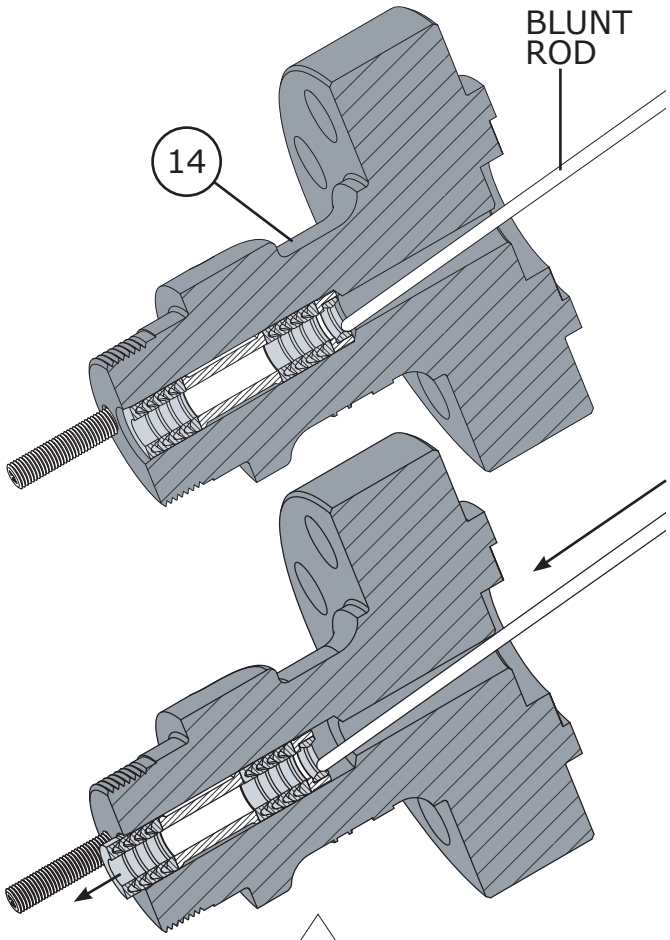


Figure 13 *Packing Parts Removal (Step 1)*

LAPPING

Expect a certain amount of leakage in valves with metal seats. In some cases where leakage has become excessive, lapping can improve sealing performance. Before performing the lapping process, insure all trim parts have been thoroughly cleaned and are free of debris.

NOTE: Spiral wound gaskets (Keys 10 & 13) 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, 11, and 12) before removal and reassembly. If trim parts are reassembled out of their lapped alignment excessive leakage may result.

Special Tools Required:

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

Lapping Procedure

1 Install the used seat ring gasket (Key 10) into the valve body (Key 1).

2 Install the seat ring (Key 11). Mark the position of seat ring using the marker.

3 Install the cage (Key 12). Mark the position of cage using the marker.

4 Do not install any plug seals into the valve plug (Key 3). Apply fine grit lapping compound to the seating surface of the valve plug (Key 3). 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 a used bonnet gasket (Key 13).

6 Carefully lift the bonnet (Key 14) into place and secure the bonnet using 4 of the bonnet nuts (Key 15). Mark the position of the valve plug (Key 3) on the bonnet (Key 14) using the marker.

7 Install the packing follower (Key 22).

8 Install the jam nut (Key 29) 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 30).

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 11) using the wrench handles.

10 If a seat leak test is to be performed after lapping to test valve shut off, disassembly the lapping setup after a few cycles of back and forth plug movement. Replace the used gaskets (Keys 10 & 13) 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.

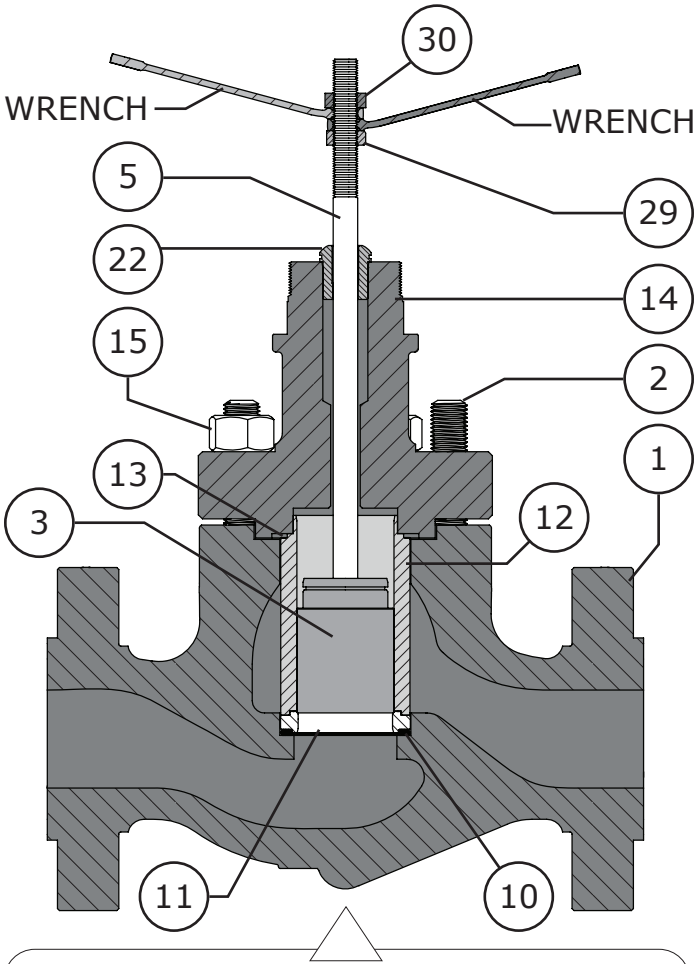


Figure 14 *Lapping Procedure Setup (Steps 1 - 8)*

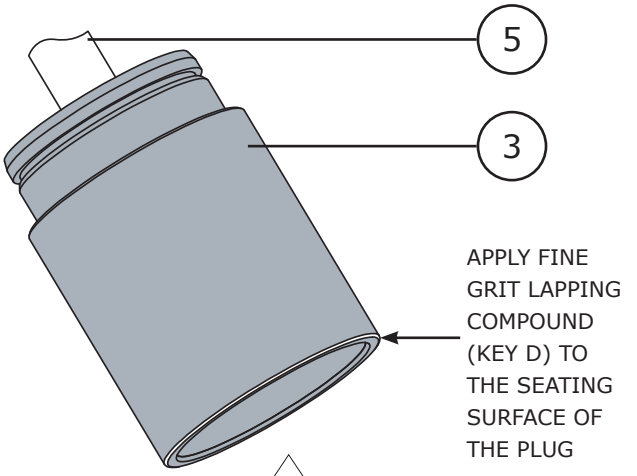


Figure 15 *Lapping Compound Application*

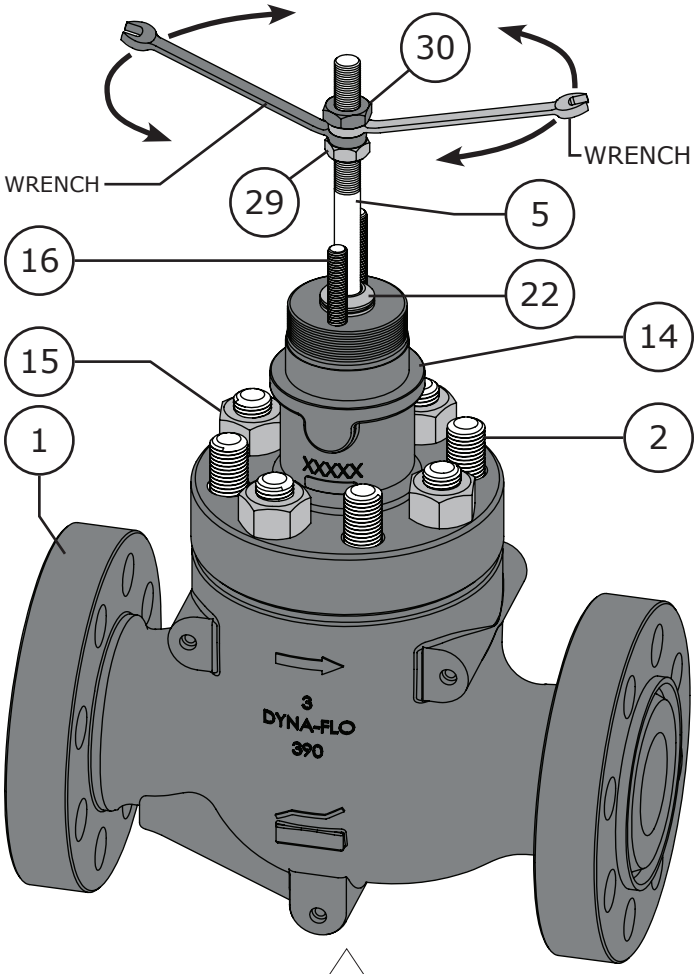


Figure 16 *Lapping Procedure Setup (Steps 9 - 10)*

ASSEMBLY

Before You Begin:

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

Lubricants Required:

- Anti-Seize Compound (Key A)
- Silicone-based O-Ring Compound (Key B)
- White Petroleum Grease (Key C)

STUD INSTALLATION

1 If the studs (Key 2) were replaced, removed, or never installed, apply anti-seize compound (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) anti-seize coated end first, until they are completely threaded into the valve body.

PLUG SEAL ASSEMBLY

For Model 390 Valves:

1 Apply white petroleum grease (Key C) to the surface of the seal ring (Key 6).

2 Install the seal ring (Key 6) onto the valve plug (Key 3), refer to Figure 17 for proper seal ring orientation.

3 If required, apply white petroleum grease (Key C) to the anti-extrusion ring (Key 34) and install the anti-extrusion ring on to the valve plug as shown in Figure 18. **NOTE:** Anti-extrusion rings are only used for valve assemblies rated to exceed 450ºF (232ºC).

4 Apply white petroleum grease (Key C) to the backup ring (Key 7) and install the backup ring onto the valve plug (Key 3).

5 Apply white petroleum grease to the retaining ring (Key 8) 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 12).

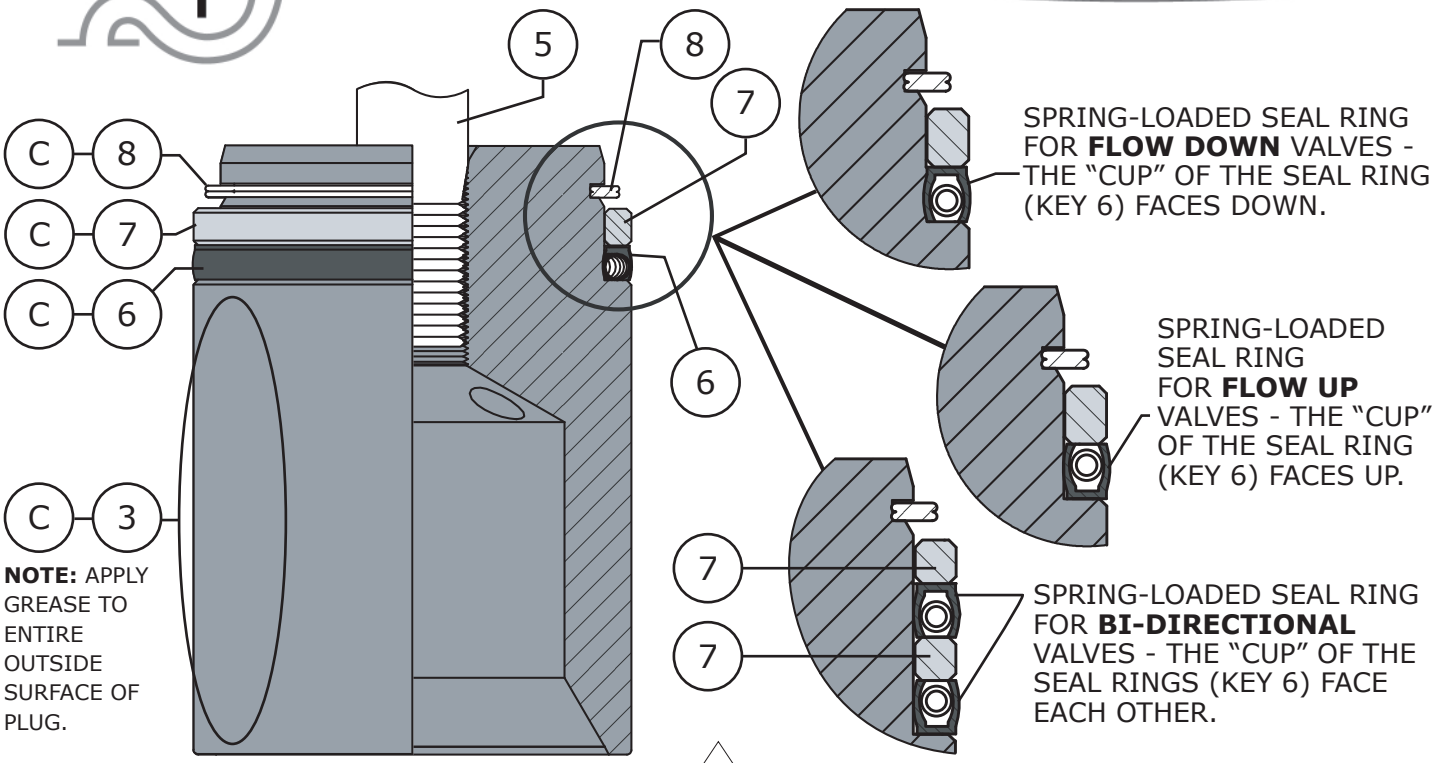


Figure 17 *Model 390 Plug Seal Standard Assembly*

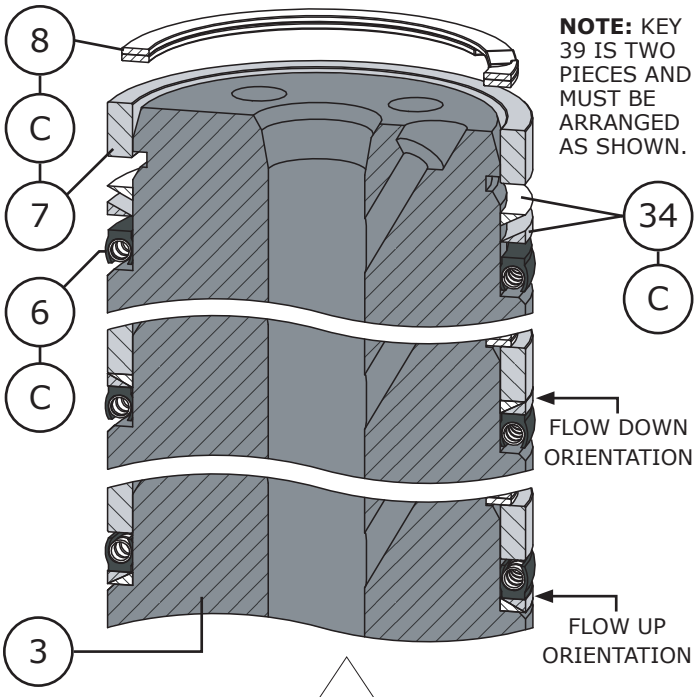


Figure 18 *Plug Seal Assembly with Anti-Extrusion Ring*

ASSEMBLY (Continued)

PLUG SEAL ASSEMBLY (Continued)

For Model 391 Valves:

NOTE: Replacement piston rings (Key 9) 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 9) 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 9). Electrical tape will help contain the piston ring while it is being broken. (Figure 20)

2 Place the piston ring into the jaws of the vise as shown in Figure 21.

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.

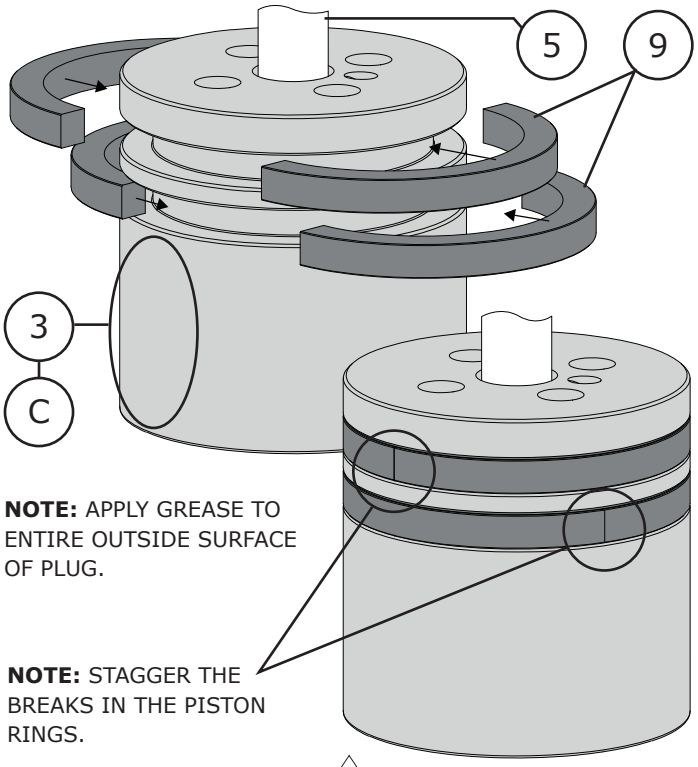


Figure 19 *391 Piston Ring Installation*

ASSEMBLY (Continued)

PLUG SEAL ASSEMBLY (Continued)

For Model 391 Valves (Continued)**:**

Piston Ring Scoring Break Method:

If no vise is available, piston rings (Key 9) 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 9). Electrical tape will help contain the piston ring while it is being broken. Refer to Figure 20.

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 19.

For Model 392 Valves:

Model 392 valve plugs (Key 3) do not use plug seals of any kind. Refer to Figure 12 on Page 11 for detail and Figures 33 to 36 on Page 25. Proceed to Trim Parts Assembly Instructions.

Figure 20 *Piston Ring Assembly for Model 391 Valves (Step 1)*

Figure 21 *Piston Ring Assembly for Model 391 Valves (Step 2)*

ASSEMBLY (Continued)

TRIM PARTS ASSEMBLY

NOTE: Spiral wound gaskets (Keys 10 & 13) make their seal by being crushed and cannot be reused.

1 Apply anti-seize compound (Key A) to the top and bottom surfaces of the seat ring gasket (Key 10). Install the seat ring gasket into the valve body (Key 1). See Figure 22.

2 Install the seat ring (Key 11) into the valve body (Key 1). Apply anti-seize compound to the top surface of the seat ring (Key 11). Refer to Figure 32 for Angle Body valve assemblies.

3 Install the cage (Key 12).

4 Apply white petroleum grease (Key B) to the side of the valve plug (Key 3) (See Figures 17 & 19). Install the valve plug assembly into the cage (Key 12) (See Figure 22).

5 Apply anti-seize compound to the top and bottom surface of the bonnet gasket (Key 13). Install the bonnet gasket.

BONNET INSTALLATION

Before You Begin:

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

1 Apply anti-seize compound (Key A) to the gasket sealing surface of the valve bonnet (Key 14).

2 Lift and lower the valve bonnet (Key 14) into place over the valve stem (Key 5). Be careful not to damage either the stem, bonnet, or valve body (Key 1).

3 Apply anti-seize compound (Key A) to the threads of the bonnet studs (Key 14). Thread the bonnet nuts (Key 15) 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

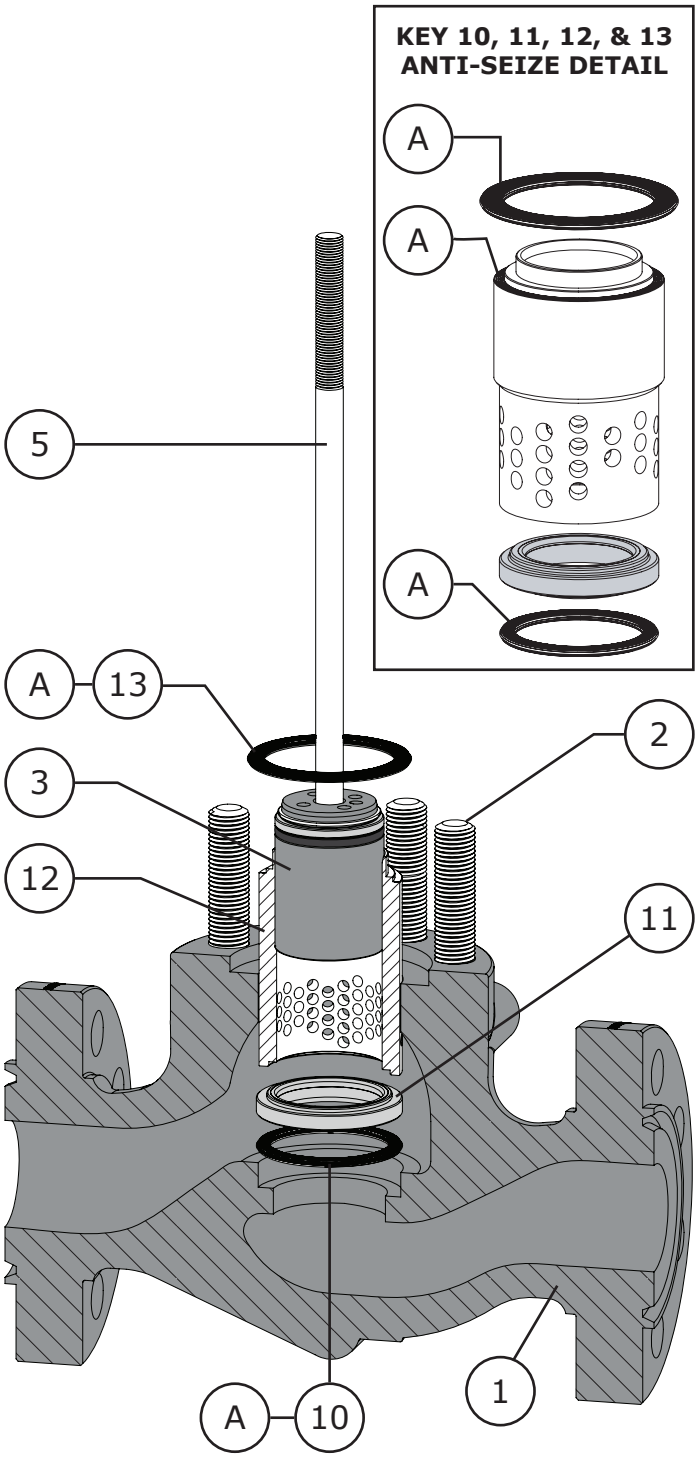


Figure 22 *Trim Parts Assembly*

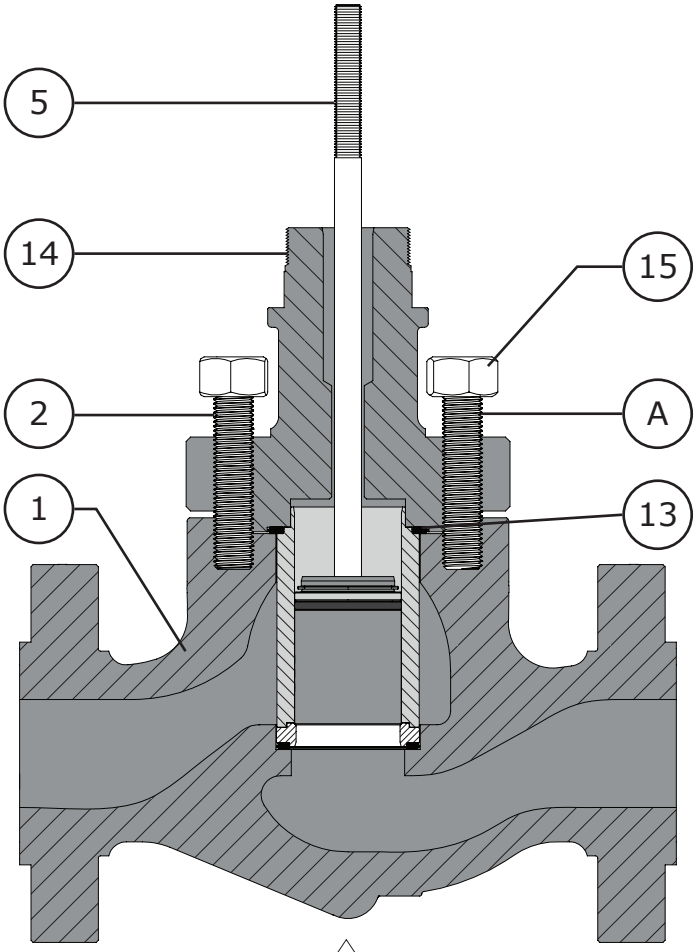


Figure 23 *Bonnet Installation*

ASSEMBLY (Continued)

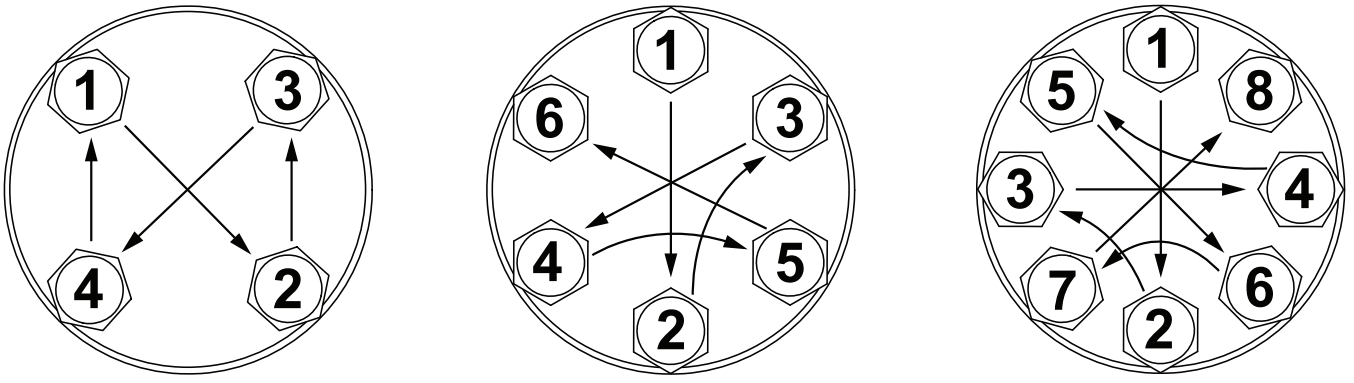
BONNET INSTALLATION (Continued)

5 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 15) ¼ of the torque value listed in Table 2, torque the nuts in a crisscross pattern as shown in Figure 24. Hot torquing the valve nuts is not recommended.

7 Continue tightening the bonnet nuts (Key 15), increasing the torque by ¼ 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 a final time after the final torque value was reached.



SAMPLE BOLT CONFIGURATIONS

Figure 24 *Bolt Tightening Pattern Diagram*

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 26, 28, 29, & 30.

Lubricants Required:
- Anti-seize compound (Key A)
- White petroleum grease (Key B)
- Silicone-based o-ring compound (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 22) 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 25.

1 If the packing studs (Key 16) were replaced, removed, or never installed, apply anti-seize compound (Key A) to the threads of the end of the stud without a material stamp.

2 Thread the studs (Key 16) into the valve bonnet (Key 14) anti-seize coated end first until they are completely threaded into the bonnet.

For Single Style (Spring-Loaded) Packing:

1 Apply silicone-based o-ring compound (Key C) to the lower stem wiper (Key 17). Insert the lower stem wiper into the packing box ring (Key 18). Insert the packing box ring into the packing bore of the valve bonnet (Key 14).

2 Install the packing spring (Key 19).

3 Install the special washer (Key 20).

4 Apply silicone-based o-ring compound (Key C) to the PTFE packing rings (Key 21). Install the packing rings one ring at a time (as shown in Figure 25) in the proper order and orientation as shown in Figure 26. **WARNING:** For oxygen service do not apply silicone-based o-ring compound, silicone-based compound in oxygen service applications can cause an explosion.

5 Install the packing follower (Key 22).

6 Install the upper stem wiper (Key 23).

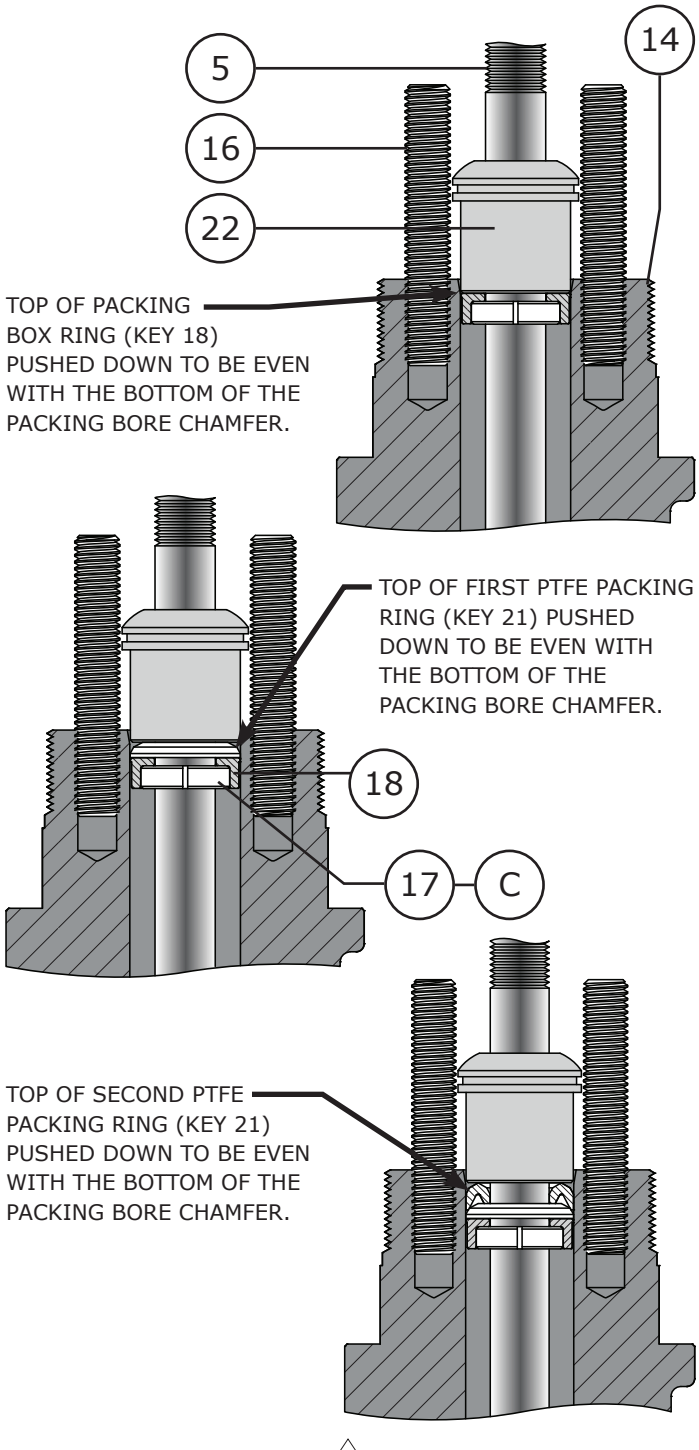
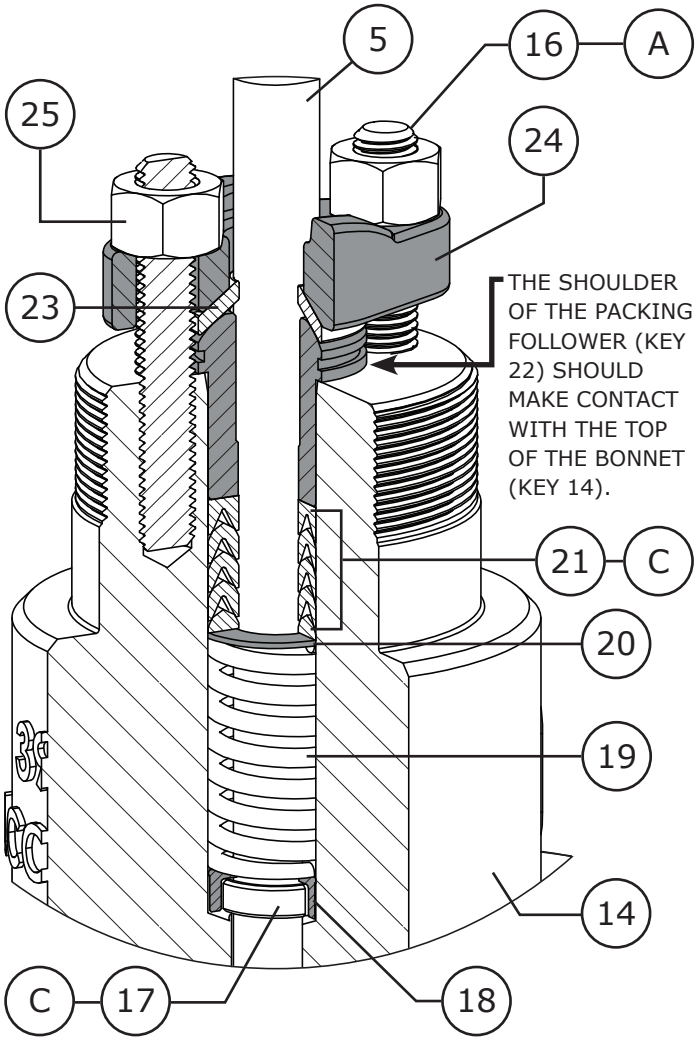
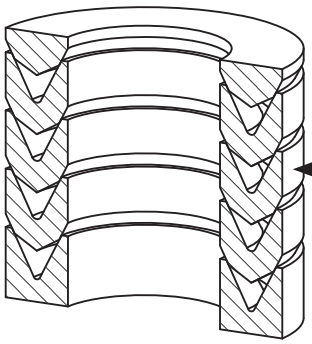


Figure 25 Proper Packing Ring Installation





NOTE: SILICONE-BASED O-RING COMPOUND (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 21) AS SHOWN.

Figure 26 Single Style Packing Installation Diagram

ASSEMBLY (Continued)

PACKING INSTALLATION (Continued)

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

7 Install the packing flange (Key 24).

8 Apply anti-seize compound (Key A) to the top threads of the packing studs (Key 16). Thread the packing nuts (Key 25) onto the threads of the packing studs, tighten the packing nuts evenly in an alternating pattern until the shoulder of the packing follower (Key 22) makes contact with the bonnet (Key 14).Proceed to tighten the packing nuts to the torque specification listed in Table 3.

For Double Style PTFE Packing:

1 Apply silicone-based o-ring compound (Key C) to the lower stem wiper (Key 17). Insert the lower stem wiper into the packing box ring (Key 18). Insert the packing box ring into the packing bore of the valve bonnet (Key 14).

2 Apply silicone-based o-ring compound (Key C) to the first set of packing rings (Key 21). Install the packing rings one ring at a time (as shown in Figure 25) in the proper order and orientation as shown in Figure 28. **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 silicone-based o-ring compound, silicone-based compound in oxygen service applications can cause an explosion.

3 Install the lantern ring (Key 26).

4 Apply silicone-based o-ring compound (Key C) to the second set of packing rings (Key 21). Install the packing rings one ring at a time (as shown in Figure 25) in the proper order and orientation as shown in Figure 28. **WARNING:** For oxygen service do not apply silicone-based o-ring compound, silicone-based compound in oxygen service applications can cause an explosion.

5 Install the packing follower (Key 22).

6 Install the upper stem wiper (Key 23).

7 Install the packing flange (Key 24).

8 Apply anti-seize compound (Key A) to the top threads of the packing studs (Key 16).

ASSEMBLY (Continued)

PACKING INSTALLATION (Continued)

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

9 Thread the packing nuts (Key 25) 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 3. Tighten the remaining packing flange nut until the packing flange (Key 24) becomes level (is parallel with the top face of the bonnet), refer to Figure 27.

For Graphite Packing:

1 Install the packing box ring (Key 18).

2 Install the first lantern ring (Key 26A).

3 Install the second lantern ring (Key 26).

4 Install 1 ring of graphite filament (Key 27) as shown in Figure 25. **NOTE:** Graphite filament is a wound material that typically looks like rope and is split.

5 Install 1 ring of graphite ribbon (Key 28) as shown in Figure 25. **NOTE:** Graphite ribbon is compressed into rings and not split like the graphite filament.

6 Install the remainder of the graphite filament (Key 27) and graphite ribbon (Key 28) one at a time (as shown in Figure 25) in the proper order and orientation as shown in Figure 29.

7 Install the packing follower (Key 22).

8 Install the packing flange (Key 24).

9 Apply anti-seize compound (Key A) to the top threads of the packing studs (Key 16). Thread the packing nuts (Key 25) 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 3. Loosen the packing nuts and retighten them to the minimum recommended torque shown in Table 3.

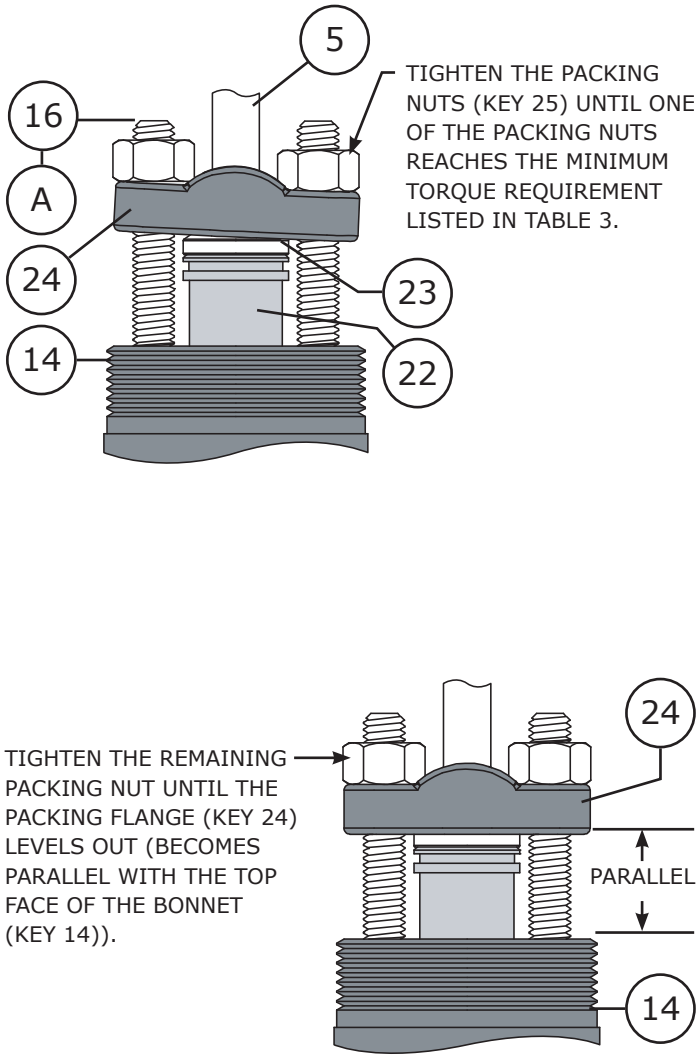


Figure 27 Double PTFE V-Ring Packing Tightening Diagram

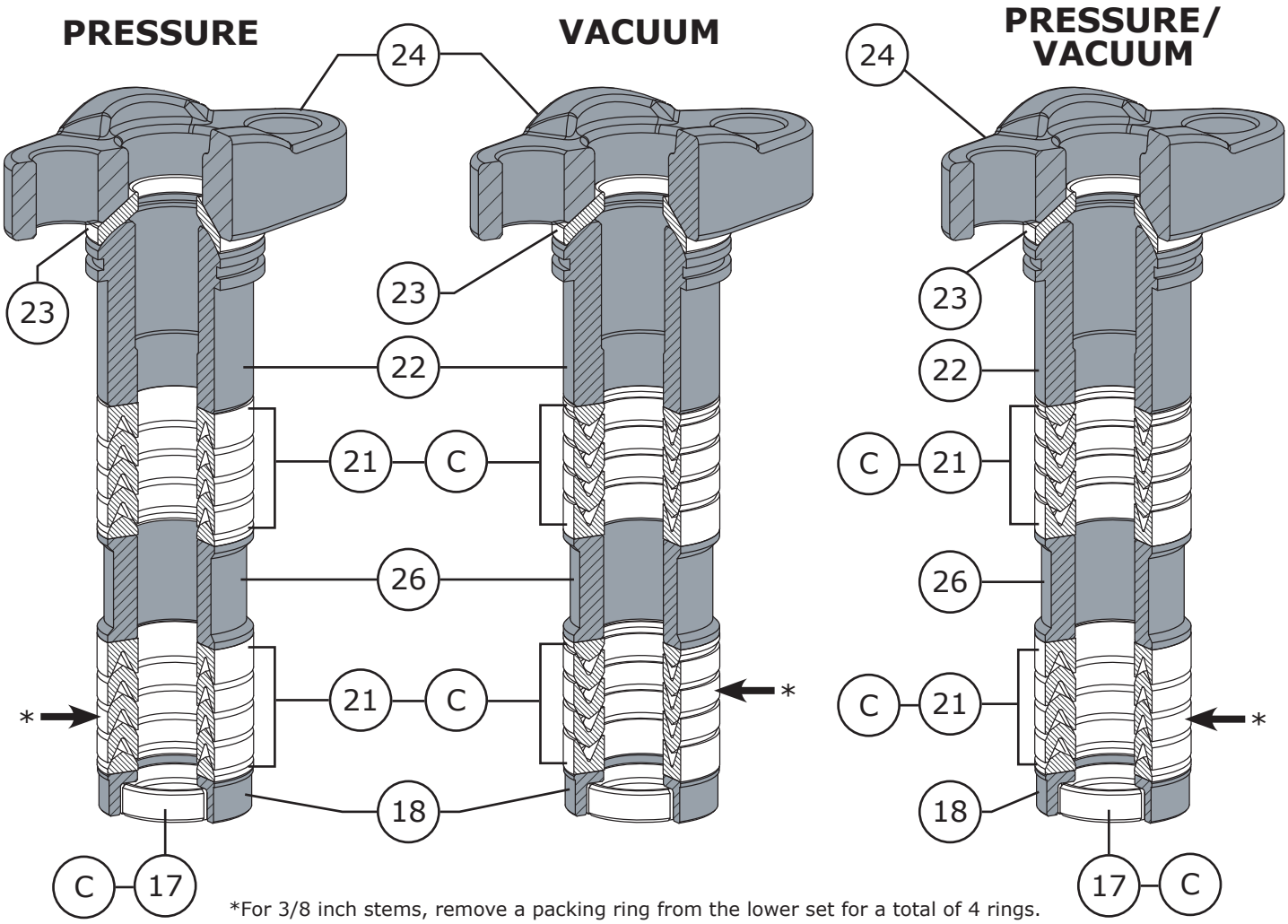


Figure 28 390 Series Control Valve PTFE Packing Diagrams

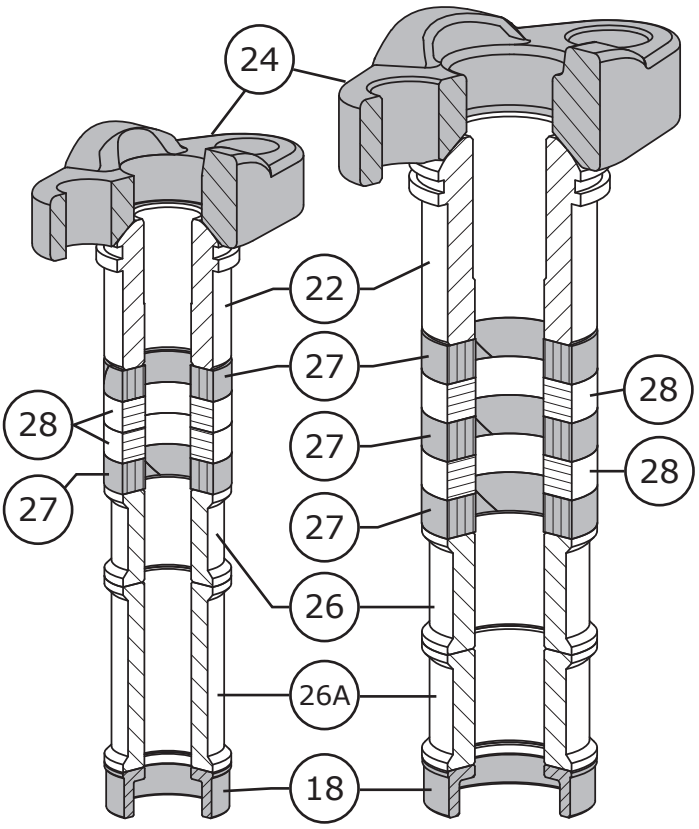


Figure 29 Single Graphite Packing Arrangement

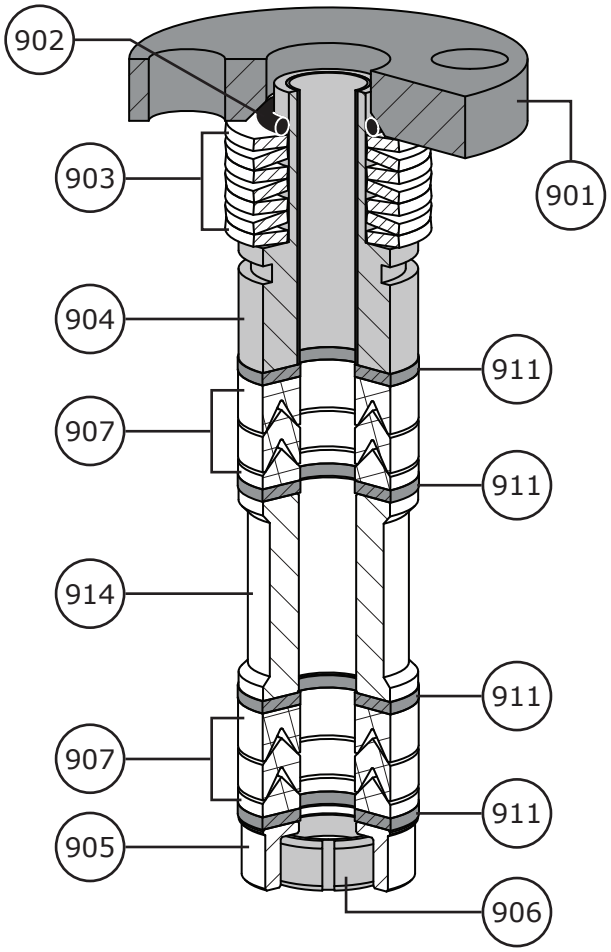


Figure 30 Live Loaded Packing Example

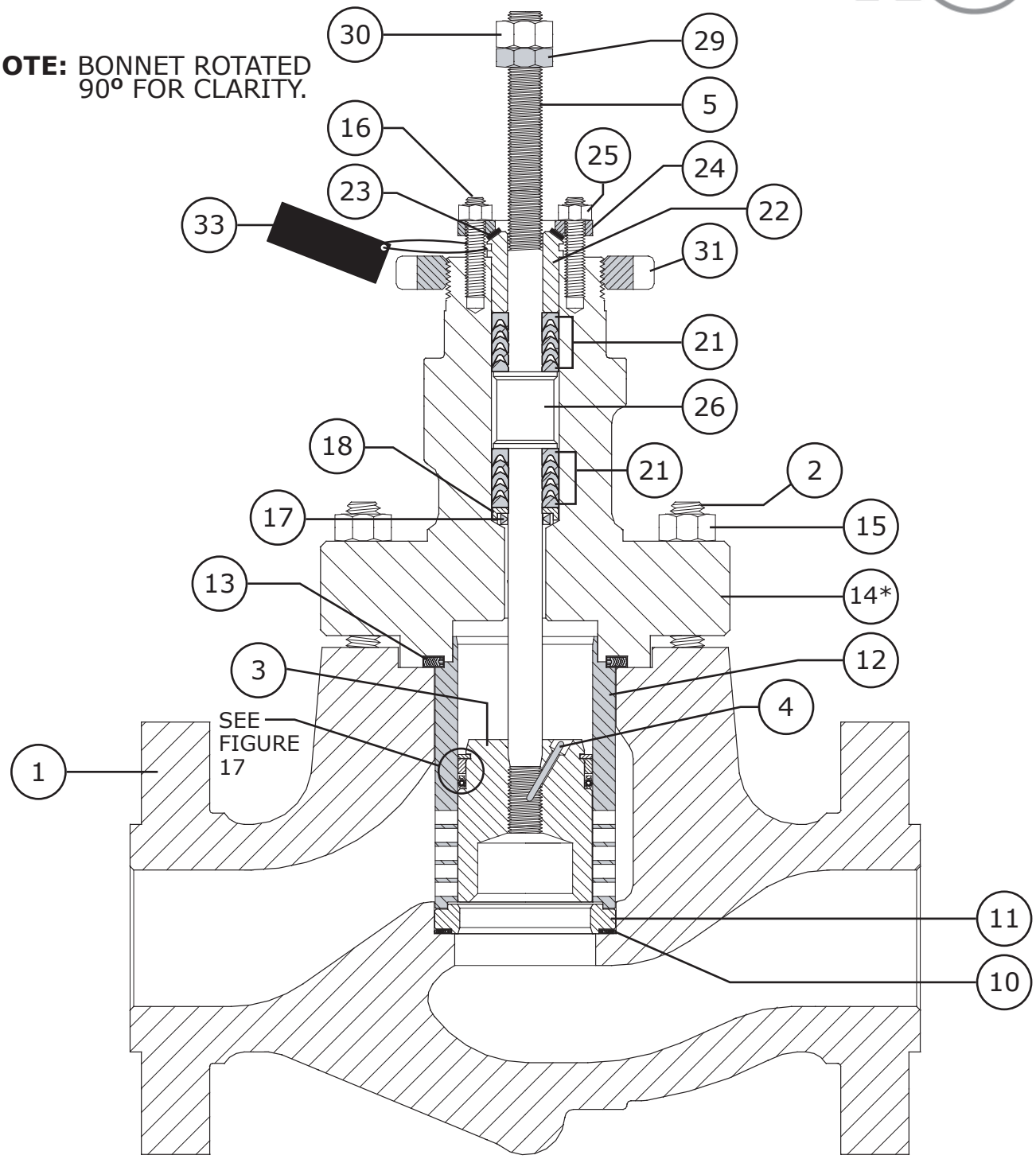
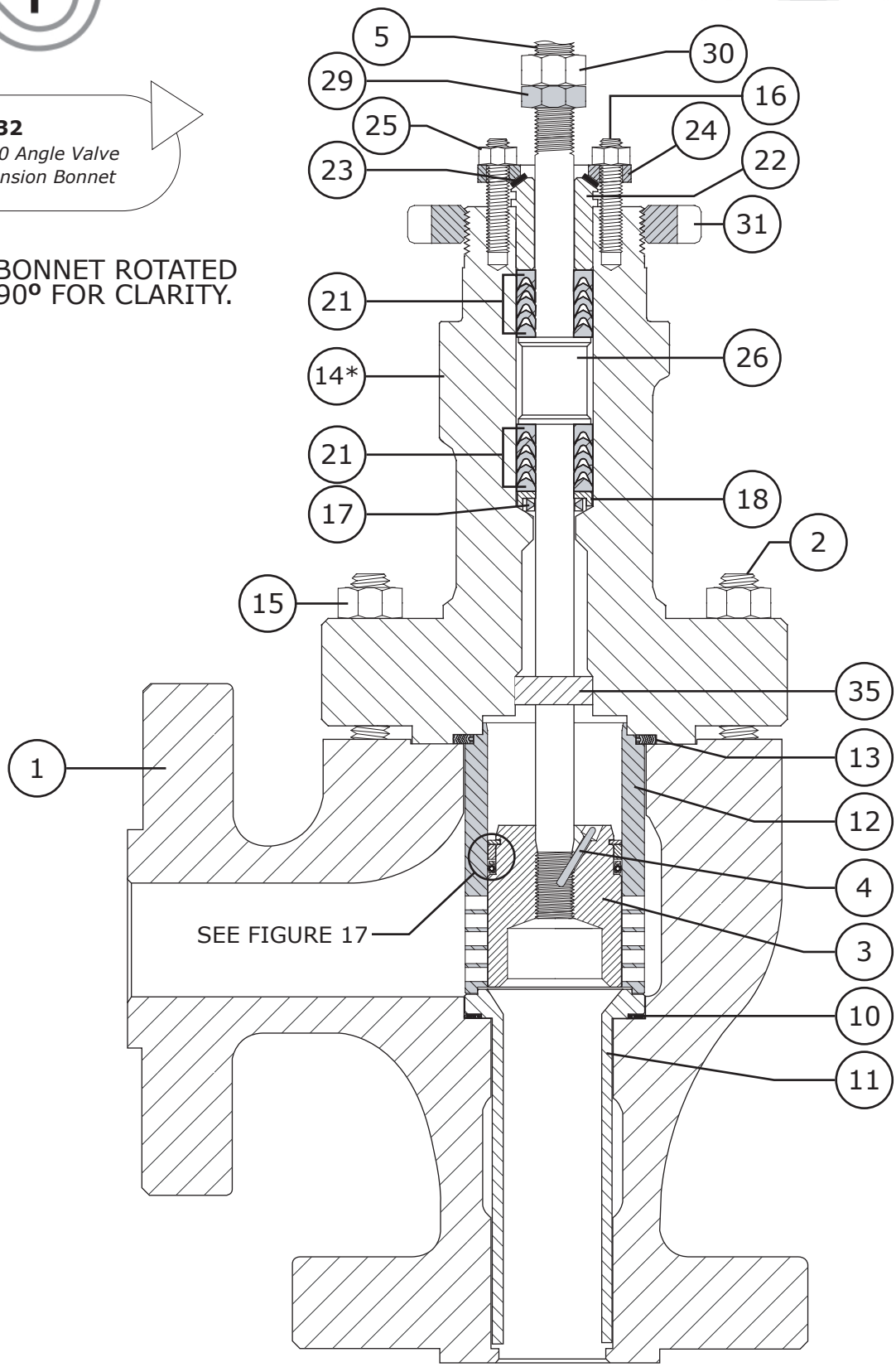


Figure 31 Model 390 Control Valve Cross Section

Figure 32
Model 390 Angle Valve with Extension Bonnet

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



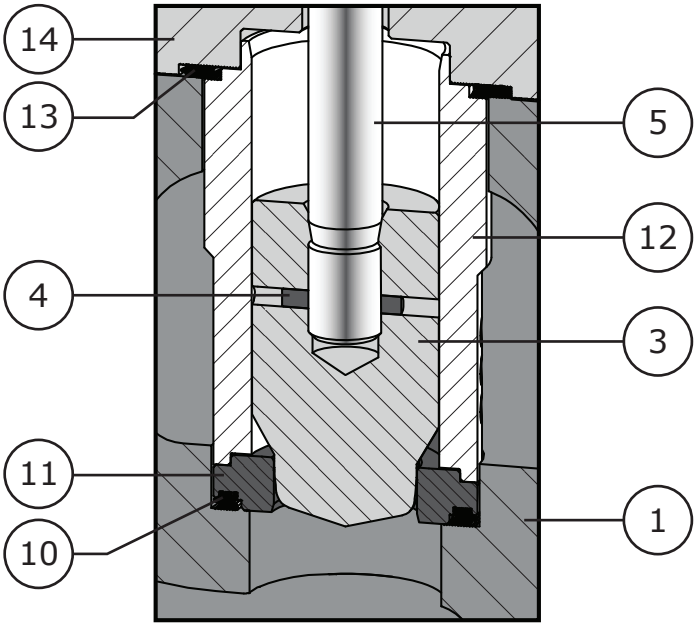


Figure 33 *Dyna-Form Trim Detail*

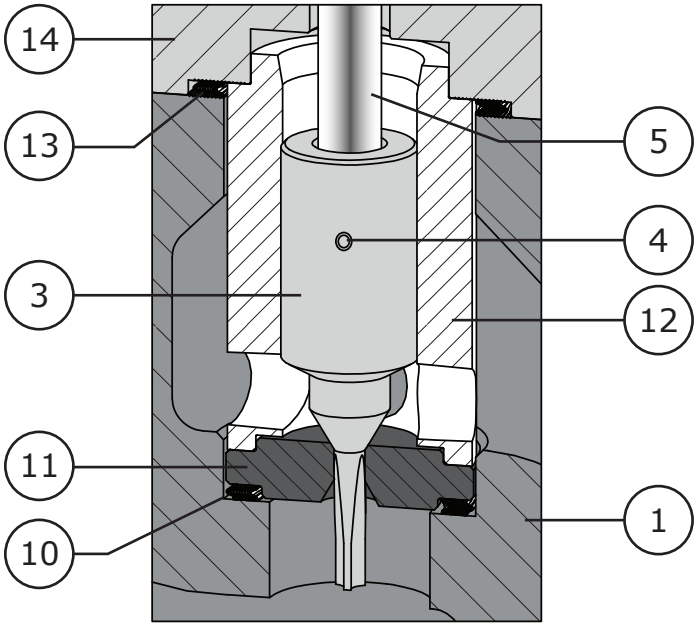


Figure 34 *Dyna-Flute Trim Detail*

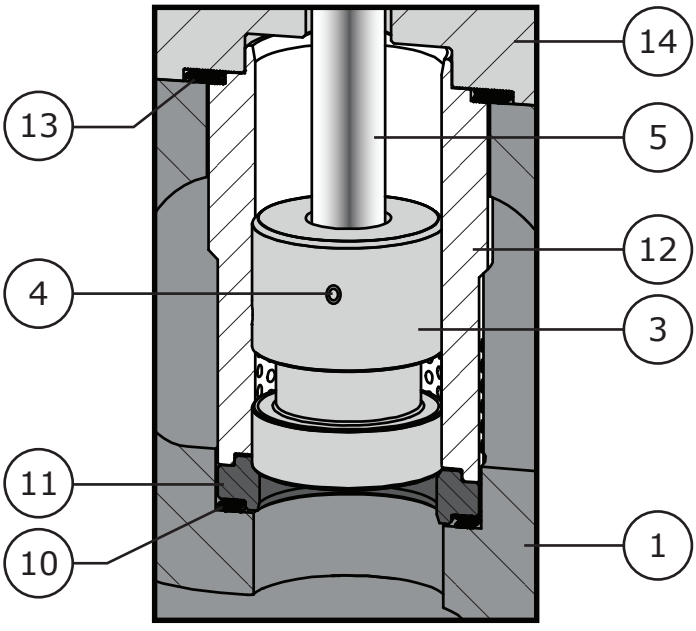


Figure 35 *Low-Noise Trim Detail*

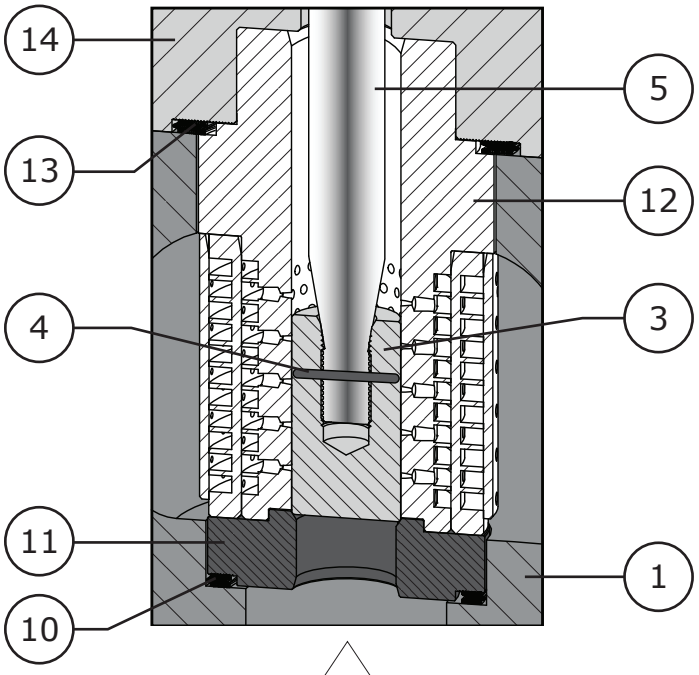


Figure 36 *Anti-Cavitation Trim Detail*

Table 2

Body to Bonnet Stud Torque

Valve Sizes (Inch)		Stud Size	Bolt Torques B7, B7M, B8M CL2	
Globe Body	Angle Body		N•m	lbf-ft.
1	1	3/4″	260	192
2	2 & 3	7/8″	372	275
3	4	1-1/8″	711	525
4	6	1-1/4″	942	695
6	-	1-1/2″	1654	1220

Table 3

Packing Nut Torque Values

Valve Stem Diameter Inch (mm)	ASME Class	Packing Flange Nuts (Not Live Loaded)			
		Min. Torque		Max. Torque	
		lbf-ft.	N•m	lbf-ft.	N•m
1/2 (12.7)	900	9	12	13	18
	1500	11	15	16	22
3/4 (19.1)	900	20	27	30	41
	1500	25	34	37	50
1 (25.4)	900	31	42	46	62
	1500	38	52	57	77
1-1/4 (31.8)	900	41	56	61	83

Table 4

Valve Stem Connection Assembly Torque and Pin Replacement

VSC (Valve Stem Connection) Diameter Inches (mm)	Torque lbf-ft. (N•m)		Hole Size Inches (mm)
	Minimum	Maximum	
3/8 (9.5)	25 (34)	35 (47)	3/32 (2.38)
1/2 (12.7)	60 (81)	85 (115)	1/8 (3.175)
3/4 (19.1)	175 (237)	250 (340)	3/16 (4.763)
1 (25.4)	310 (420)	355 (481)	1/4 (6.350)
1-1/4 (31.8)	610 (827)	670 (908)	1/4 (6.350)

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 to Body, 8 Required	
	-B7	
	1 Inch	1N35653101D
	2 Inch	1A36573101D
	3 Inch	11A5189X01D
	4 Inch	1P92523101D
	6 Inch	12A0595X01D
	-B8M	
	1 Inch	1N35653522D
	2 Inch	1A3657X004D
	3 Inch	11A5189X02D
	4 Inch	1P9252X005D
	6 Inch	12A0595X07D
	-B7M	
	1 Inch	1N3565B7MDD
	2 Inch	1A3657X006D
	3 Inch	11A5189X06D
	4 Inch	1P9252B7MDD
	6 Inch	12A0595B7MD
	-B7 Fluorokote #1	
	1 Inch	1N3565XFK1D
	2 Inch	1A3657XFK1D
	3 Inch	11A5189FK1D
	4 Inch	1P9252XFK1D
	6 Inch	12A0595FK1D
	-B7M Fluorokote #1	
	1 Inch	1N3565XFK3D
	2 Inch	1A3657XFK3D
	3 Inch	11A5189FK3D
	4 Inch	1P9252XFK3D
	6 Inch	12A0595FK3D
3	**Valve Plug**	Refer to Tables 5 - 14
4	**Pin,** Model 390/391/392, S31600	
	1/2 Inch (12.7mm) Stem	1V32273507D
	3/4 Inch (19.1mm) Stem	1V32603507D
	1 Inch (25.4 mm) Stem	1V33403507D
	1-1/4 Inch (31.8 mm) Stem	1V33403507D

Key	Description	Part Number
5	**Valve Stem**	Refer to Tables 5 - 14
6	**Seal Ring**	
	-Standard, Carbon-filled PTFE / R30003	
	2 Inch (1-7/8" Port)	10A4216X03D
	3 Inch (2-7/8" Port)	10A4215X03D
	4 Inch (2-7/8" Port)	10A4215X03D
	4 Inch (3-5/8" Port)	16A5485X03D
	6 Inch (4-3/8" Port)	10A4223X03D
	6 Inch (5-3/8" Port)	10A5411X03D
	-2 Stage Anti-Cavitation, Carbon-filled PTFE / R30003	
	2 Inch (1-3/4" Port)	17A2296X03D
	3 Inch (2-1/2" Port)	17A4309X03D
	4 Inch (3-7/16" Port)	10A5351X06D
	6 Inch (5-1/4" Port)	17A4396X03D
	-3 Stage Anti-Cavitation, Carbon-filled PTFE / R30003	
	2 Inch	—
	3 Inch (1-7/8" Port)	10A4216X03D
	4 Inch (2-7/8" Port)	10A4215X03D
	6 Inch (4-9/16" Port)	17A4413X03D
7	**Backup Ring,** (S31600/S31603 Dual Grade)	
	2 Inch (1-7/8" Port)	10A4218X01D
	3 Inch (2-7/8" Port)	10A4217X01D
	4 Inch (2-7/8" Port)	10A4217X02D
	4 Inch (3-5/8" Port)	16A5483X02D
	6 Inch (4-3/8" Port)	10A4224X02D
	6 Inch (5-3/8" Port)	10A5409X02D
	-2 Stage Anti-Cavitation	
	2 Inch (1-3/4" Port)	17A2297X01D
	3 Inch (2-1/2" Port)	17A4310X02D
	4 Inch (3-7/16" Port)	10A5349X02D
	6 Inch (5-1/4" Port)	17A4397X02D
	-3 Stage Anti-Cavitation	
	3 Inch (1-7/8" Port)	10A4218X01D
	4 Inch (2-7/8" Port)	10A4217X02D
	6 Inch (4-9/16" Port)	17A4414X02D
8	**Retaining Ring,** S31600	
	1-3/4" Port	17A2298X01D
	1-7/8" Port	10A4220X01D
	2-1/2" Port	17A4311X01D
	2-7/8" Port	10A4219X01D
	3-7/16" Port	10A5350X01D
	3-5/8" Port	16A5484X01D
	4-3/8" Port	10A4225X01D

Parts (Continued)

Key	Description	Part Number
8	**Retaining Ring,** S31600 (Continued)	
	4-9/16" Port	17A4415X01D
	5-1/4" Port	17A4398X01D
	5-3/8" Port	10A5410X01D
9	**Piston Ring** (Model 391 Only)	Refer to Table 19
10	**Gasket,** Seat Ring, Spiral Wound	Refer to Table 20
	N06600 / Graphite	
11	**Seat Ring**	Refer to Tables 15 & 17
12	**Cage**	Refer to Tables 16 & 18
13	**Gasket,** Bonnet, Spiral Wound,	
	N06600 / Graphite	Refer to Table 20
14	**Bonnet**	
	If you need a bonnet as a replacement part, order by valve size and stem diameter, serial number and desired material.	
15	**Nut,** Bonnet, 8 Required	
	-2H	
	1 Inch	1A3520X060D
	2 Inch	1C17272407D
	3 Inch	1A44522407D
	4 Inch	1A44532407D
	6 Inch	1A50112407D
	-8M	
	1 Inch	1A35203525D
	2 Inch	1C17273525D
	3 Inch	1A44523525D
	4 Inch	1A4453X002D
	6 Inch	1A5011X002D
	-2HM	
	1 Inch	1A35202HMDD
	2 Inch	1C1727X004D
	3 Inch	1A44522HMDD
	4 Inch	1A44532HMDD
	6 Inch	1A501122HMD
	-2H Fluorokote #1	
	1 Inch	1A3520XFK1D
	2 Inch	1C1727XFK1D
	3 Inch	1A4452XFK1D
	4 Inch	1A4453XFK1D
	6 Inch	1A5011XFK1D

Key	Description	Part Number
	-2HM Fluorokote #1	
	1 inch	1A3520XFK3D
	2 Inch	1C1727XFK3D
	3 Inch	1A4452XFK3D
	4 Inch	1A4453XFK3D
	6 Inch	1A5011XFK3D
16	**Studs,** Packing, B8M, 2 Required	
	1/2 inch (13 mm) Stem	1E94443522D
	3/4 inch (19 mm) Stem	1E94493522D
	1 Inch (25.4 mm) Stem	0V00253522D
	1-1/4 Inch (31.8 mm) Stem	1N35653522D
17	**Lower Wiper,** Teflon	
	1/2 Inch (13 mm) Stem	1J87220699D
	3/4 Inch (19 mm) Stem	1J87230699D
	1 Inch (25.4 mm) Stem	1J87240699D
	1-1/4 Inch (31.8 mm) Stem	1J87250699D
18	**Packing Box Ring,** S31600/S31603 Dual Grade	
	1/2 Inch (13 mm) Stem	1J87323507D
	3/4 Inch (19 mm) Stem	1J87333507D
	1 Inch (25.4 mm) Stem	1J87343507D
	1-1/4 Inch (31.8 mm) Stem	1J87353507D
19	**Spring,** Packing, SST	Refer to Table 21
20	**Special Washer,** SST	Refer to Table 21
21	**Packing Set,** PTFE	Refer to Table 21
22	**Packing Follower,** S31600/S31603 Dual Grade	
	1/2 Inch (13 mm) Stem	1E94433507D
	3/4 Inch (19 mm) Stem	1E94473507D
	1 Inch (25.4 mm) Stem	1H98233507D
	1-1/4 Inch (31.8 mm) Stem	1H99843507D
23	**Upper Wiper,** Felt	
	1/2 Inch (13 mm) Stem	1J87270633D
	3/4 Inch (19 mm) Stem	1J87280633D
	1 Inch (25.4 mm) Stem	1J87290633D
	1-1/4 Inch (31.8 mm)	1J87300633D

Parts (Continued)

Key	Description	Part Number
24	**Packing Flange**	
	-Carbon Steel - Plated	
	1/2 Inch (13 mm) Stem	1E94422307D
	3/4 Inch (19 mm) Stem	1E94482307D
	1 Inch (25.4 mm) Stem	0V00242505D
	1-1/4 Inch (31.8 mm) Stem	0W08562505D
	-S31600/S31603 Dual Grade	
	1/2 Inch (13 mm) Stem	12B6924X01D
	3/4 Inch (19 mm) Stem	12B6925X01D
	1 Inch (25.4 mm) Stem	12B6654X01D
	1-1/4 Inch (31.8 mm) Stem	12B6680X01D
25	**Nut,** Packing, 8M, 2 Required	
	1/2 Inch (13 mm) Stem	1E94453525D
	3/4 Inch (19 mm) Stem	1E94463525D
	1 Inch (25.4 mm) Stem	1A34333525D
	1-1/4 Inch (31.8 mm) Stem	1A36813525D
26	**Lantern Ring,**	Refer to Table 21
	S31600/S31603 Dual Grade	
27	**Graphite Filament**	Refer to Table 21
28	**Graphite Ribbon**	Refer to Table 21
29	**Jam Nut,** Valve Stem, Steel / Zinc Plated	
	1/2 Inch (13 mm) Stem	NHJFZ12
	3/4 Inch (19 mm) Stem	NHJFZ34
	1 Inch (25.4 mm) Stem	NHJFZ100
	1-1/4 Inch (31.8 mm) Stem	NHJFZ114
30	**Hex Nut,** Valve Stem, Steel / Zinc Plated	
	1/2 Inch (13 mm) Stem	NHFZ12
	3/4 Inch (19 mm) Stem	NHFZ34
	1 Inch (25.4 mm) Stem	NH8FZ100
	1-1/4 Inch (31.8 mm) Stem	NHFZ114
31	**Yoke Nut,** Steel / Zinc Plated	
	2-13/16 Inch yoke boss	1E80742306D
	3-9/16 Inch yoke boss	1E83272306D
32	**Flow Arrow,** S30400	1V10603898D
33	**Name Plate,** S30400	NAME12SLIDD

Parts (Continued)

Key	Description	Part Number
34	Anti-Extrusion Ring, Valve Plug, PEEK	
	2 Inch (1-7/8" Port)	22B4694X01D
	3 Inch (1-7/8" Port)	22B4694X01D
	3 Inch (2-7/8" Port)	22B2617X01D
	4 Inch (2-7/8" Port)	22B2617X01D
	4 Inch (3-7/16" Port)	23B6126X01D
	4 Inch (3-5/8" Port)	21B2115X01D
	6 Inch (4-3/8" Port)	21B9341X01D
	6 Inch (5-3/8" Port)	21B9342X01D
35	**Baffle,** Extension Bonnets, Material	
	Included with bonnet	

Parts (Live Loaded Packing)

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

Parts Ordering

Whenever corresponding with Dyna-Flo about a 390 Series Control Valves, refer to the nameplate (Key 33) for the serial number of the unit. Please order by the complete part number (as given in the part lists) of each part required.

Table 5

Model 390 Valve Plug / Stem* Assembly (Keys 3, 4, & 5) - For Standard Bonnet (Key 14)

Valve Size	Port Size	Stem Diameter	Travel	Plug Material	
Inch	Inch (mm)	Inch (mm)	Inch (mm)	S41600 HT	S31600 / Alloy 6 Seat & Guide
2	1-7/8 (47.6)	1/2 (12.7)	1-1/8 (28.6) / 1-1/2 (38.1)	32B6010XN2D	32B6011XN1D
		3/4 (19.1)	1-1/8 (28.6) / 1-1/2 (38.1)	32B6012XN1D	32B6013XN1D
3	2-7/8 (73)	1/2 (12.7)	1-1/2 (38.1) / 2 (50.8)	36A5350XN1D	36A5429XN1D
		3/4 (19.1)	1-1/2 (38.1) / 2 (50.8)	36A5351XN1D	36A5430XN1D
4	3-5/8 (92.1)	3/4 (19.1)	1-1/2 (38.1) / 2 (50.8)	36A5358XN1D	36A5437XN9D
		1 (25.4)	1-1/2 (38.1)	36A5359XN1D	36A5438XN6D
6	5-3/8 (136.5)	3/4 (19.1)	2-1/2 (63.5) / 3 (76.2)	36A5365XN1D	36A5444XN1D
		1 (25.4)	2-1/2 (63.5) 3 (76.2)	36A5366XN2D	36A5445XN1D

* - Stem material is S20910.

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

- For Anti-Cavitation and Low-Noise Trim consult the Dyna-Flo Sales Office.

Table 6

Model 390 Valve Plug / Stem* Assembly (Keys 3, 4, & 5) - For Standard Bonnet (Key 14) and Anti-Extrusion Rings (Key 34)

Valve Size	Port Size	Stem Diameter	Travel	Plug Material	
Inch	Inch (mm)	Inch (mm)	Inch (mm)	S41600 HT	S31600 / Alloy 6 Seat & Guide
2	1-7/8 (47.6)	1/2 (12.7)	1-1/8 (28.6) / 1-1/2 (38.1)	31B2146XN1D	390N2103N5D
		3/4 (19.1)	1-1/8 (28.6) / 1-1/2 (38.1)	31B2147XN1D	390N2107N5D
3	2-7/8 (73)	1/2 (12.7)	1-1/2 (38.1) / 2 (50.8)	31B2148XN1D	390N3119N5D
		3/4 (19.1)	1-1/2 (38.1) / 2 (50.8)	31B2149XN1D	390N3123N5D
4	3-5/8 (92.1)	3/4 (19.1)	1-1/2 (38.1) / 2 (50.8)	31B2151XN1D	390N4151N5D
		1 (25.4)	1-1/2 (38.1)	31B2152XN1D	390N4155N5D
6	5-3/8 (136.5)	3/4 (19.1)	2-1/2 (63.5) / 3 (76.2)	390N6190N1D	390N6191N5D
		1 (25.4)	2-1/2 (63.5) / 3 (76.2)	390N6194N1D	390N6195N5D

* - Stem material is S20910.

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

- For Anti-Cavitation and Low-Noise Trim consult the Dyna-Flo Sales Office.

Table 7

Mode 390 Valve Plug / Stem* Assembly (Keys 3, 4, & 5) - For Style 1 Extension Bonnet (Key 14)

Valve Size	Port Size	Stem Diameter	Travel	Plug Material	
Inch	Inch (mm)	Inch (mm)	Inch (mm)	S41600 HT	S31600 / Alloy 6 Seat & Guide
2	1-7/8 (47.6)	1/2 (12.7)	1-1/8 (28.6) / 1-1/2 (38.1)	32B6010X12D	32B6011X11D
		3/4 (19.1)	1-1/8 (28.6) / 1-1/2 (38.1)	32B6012X11D	32B6013X11D
3	2-7/8 (73)	1/2 (12.7)	1-1/2 (38.1) / 2 (50.8)	36A5350X11D	36A5429X11D
		3/4 (19.1)	1-1/2 (38.1) / 2 (50.8)	36A5351X11D	36A5430X11D
4	3-5/8 (92.1)	3/4 (19.1)	1-1/2 (38.1) / 2 (50.8)	36A5358X11D	36A5437X19D
		1 (25.4)	1-1/2 (38.1)	36A5359X11D	36A5438X16D
6	5-3/8 (136.5)	3/4 (19.1)	2-1/2 (63.5) / 3 (76.2)	36A5365X11D	36A5444X11D
		1 (25.4)	2-1/2 (63.5) 3 (76.2)	36A5366X12D	36A5445X11D

* - Stem material is S20910.

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

- For Anti-Cavitation and Low-Noise Trim consult the Dyna-Flo Sales Office.

Table 8

Mode 390 Valve Plug / Stem* Assembly (Keys 3, 4, & 5) - For Style 1 Extension Bonnet (Key 14) and Anti-Extrusion Rings (Key 34)

Valve Size	Port Size	Stem Diameter	Travel	Plug Material	
Inch	Inch (mm)	Inch (mm)	Inch (mm)	S41600 HT	S31600 / Alloy 6 Seat & Guide
2	1-7/8 (47.6)	1/2 (12.7)	1-1/8 (28.6) / 1-1/2 (38.1)	31B2146X11D	390N210315D
		3/4 (19.1)	1-1/8 (28.6) / 1-1/2 (38.1)	31B2147X11D	390N210715D
3	2-7/8 (73)	1/2 (12.7)	1-1/2 (38.1) / 2 (50.8)	31B2148X11D	390N311915D
		3/4 (19.1)	1-1/2 (38.1) / 2 (50.8)	31B2149X11D	390N312315D
4	3-5/8 (92.1)	3/4 (19.1)	1-1/2 (38.1) / 2 (50.8)	31B2151X11D	390N415115D
		1 (25.4)	1-1/2 (38.1)	31B2152X11D	390N415515D
6	5-3/8 (136.5)	3/4 (19.1)	2-1/2 (63.5) / 3 (76.2)	390N619011D	390N619115D
		1 (25.4)	2-1/2 (63.5) 3 (76.2)	390N619411D	390N619515D

* - Stem material is S20910.

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

- For Anti-Cavitation and Low-Noise Trim consult the Dyna-Flo Sales Office.

Table 9

Model 391 Valve Plug / Stem* Assembly (Keys 3, 4, & 5) - For Standard Bonnet (Key 14)

Valve Size	Port Size	Stem Diameter	Travel	Plug Material	
Inch	Inch (mm)	Inch (mm)	Inch (mm)	S41600 HT	S31600 / Alloy 6 Seat & Guide
2 2 Piston Rings	1-7/8 (47.6)	1/2 (12.7)	1-1/8 (28.6) / 1-1/2 (38.1)	32B6006XN1D	32B6007XN5D
		3/4 (19.1)	1-1/8 (28.6) / 1-1/2 (38.1)	32B6008XN1D	32B6009XN5D
3 2 Piston Rings	2-7/8 (73)	1/2 (12.7)	1-1/2 (38.1) / 2 (50.8)	32B8246XN1D	32B8247XN5D
		3/4 (19.1)	1-1/2 (38.1) / 2 (50.8)	32B8248XN1D	32B8249XN5D
4 2 Piston Rings	3-5/8 (92.1)	3/4 (19.1)	1-1/2 (38.1) / 2 (50.8)	32B9346XN1D	32B9347XN5D
		1 (25.4)	1-1/2 (38.1)	32B9348XN1D	32B9349XN5D
6 3 Piston Rings	5-3/8 (136.5)	3/4 (19.1)	2-1/2 (63.5) / 3 (76.2)	36A5362XN1D	36A5441XN5D
		1 (25.4)	2-1/2 (63.5) 3 (76.2)	36A5363XN1D	36A5442XN5D

* - Stem material is S20910.

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

- For Anti-Cavitation and Low-Noise Trim consult the Dyna-Flo Sales Office.

Table 10

Model 391 Valve Plug / Stem* Assembly (Keys 3, 4, & 5) - For Style 1 Extension Bonnet (Key 14)

Valve Size	Port Size	Stem Diameter	Travel	Plug Material	
Inch	Inch (mm)	Inch (mm)	Inch (mm)	S41600 HT	S31600 / Alloy 6 Seat & Guide
2 2 Piston Rings	1-7/8 (47.6)	1/2 (12.7)	1-1/8 (28.6) / 1-1/2 (38.1)	32B6006X11D	32B6007X15D
		3/4 (19.1)	1-1/8 (28.6) / 1-1/2 (38.1)	32B6008X11D	32B6009X15D
3 2 Piston Rings	2-7/8 (73)	1/2 (12.7)	1-1/2 (38.1) / 2 (50.8)	32B8246X11D	32B8247X15D
		3/4 (19.1)	1-1/2 (38.1) / 2 (50.8)	32B8248X11D	32B8249X15D
4 2 Piston Rings	3-5/8 (92.1)	3/4 (19.1)	1-1/2 (38.1) / 2 (50.8)	32B9346X11D	32B9347X15D
		1 (25.4)	1-1/2 (38.1)	32B9348X11D	32B9349X15D
6 3 Piston Rings	5-3/8 (136.5)	3/4 (19.1)	2-1/2 (63.5) / 3 (76.2)	36A5362X11D	36A5441X15D
		1 (25.4)	2-1/2 (63.5) 3 (76.2)	36A5363X11D	36A5442X15D

* - Stem material is S20910.

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

- For Anti-Cavitation and Low-Noise Trim consult the Dyna-Flo Sales Office.

Table 11

Model 392 Valve Plug / Stem* Assembly (Keys 3, 4, & 5) - For Standard Bonnet (Key 14)

Valve Size	Port Size	Stem Diameter	Travel	Plug Material	
Inch	Inch (mm)	Inch (mm)	Inch (mm)	S41600 HT	S31600 / Alloy 6 Seat, Guide, & Contour
1 Dyna-Form Equal Percent	1/4 (6.4)	1/2 (12.7)	3/4 (19.1)	16A5327XN1D	16A5404XN3D
	1/2 (12.7)	1/2 (12.7)	3/4 (19.1) / 1-1/8 (28.6)(1)	16A5328XN5D	16A5405XN3D
	3/4 (19.1)	1/2 (12.7)	3/4 (19.1) / 1-1/8 (28.6)(1)	16A5329XN5D	16A5406XN3D
	1 (25.4)	1/2 (12.7)	3/4 (19.1) / 1-1/8 (28.6)(1)	16A5331XN5D	16A5408XN3D
	3/4 (19.1)	3/4 (19.1)	3/4 (19.1) / 1-1/8 (28.6)(1)	16A5330XN5D	16A5407XN3D
	1 (25.4)	3/4 (19.1)	3/4 (19.1) / 1-1/8 (28.6)(1)	16A5332XN5D	16A5409XN3D
2 Dyna-Form Equal Percent	1/4 (6.4)	1/2 (12.7)	3/4 (19.1)	23B0188XN5D	23B0165XN3D
	1/2 (12.7)	1/2 (12.7)	3/4 (19.1) / 1-1/8 (28.6)(1)	10B3297XN1D	11B7697XN3D
	3/4 (19.1)	1/2 (12.7)	3/4 (19.1) / 1-1/8 (28.6)(1)	19A5980XN5D	18A4133XN3D
	1 (25.4)	1/2 (12.7)	3/4 (19.1) / 1-1/8 (28.6)(1)	23B0166XN5D	23B0167XN3D
	1-1/4 (31.8)	1/2 (12.7)	3/4 (19.1) / 1-1/8 (28.6)(1)	18A1637XN5D	28A1638XN3D
	1-1/2 (38.1)	1/2 (12.7)	1-1/8 (28.6) / 1-1/2 (38.1)(1)	16A5402XN5D	26A5410XN3D
	1/4 (6.4)	3/4 (19.1)	3/4 (19.1)	392N2136N5D	392N2137N3D
	1/2 (12.7)	3/4 (19.1)	3/4 (19.1) / 1-1/8 (28.6)(1)	392N2138N5D	392N2139N3D
	3/4 (19.1)	3/4 (19.1)	3/4 (19.1) / 1-1/8 (28.6)(1)	23B0168XN5D	19A7924XN3D
	1 (25.4)	3/4 (19.1)	3/4 (19.1) / 1-1/8 (28.6)(1)	18A4222XN5D	10B8013XN3D
	1-1/4 (31.8)	3/4 (19.1)	3/4 (19.1) / 1-1/8 (28.6)(1)	18A1639XN5D	28A1640XN3D
	1-1/2 (38.1)	3/4 (19.1)	1-1/8 (28.6) / 1-1/2 (38.1)(1)	16A5333XN5D	26A5411XN3D

* - Stem material is S20910.

1 - Dyna-Form Modified Travel.

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

- For Anti-Cavitation and Dyna-Flute Trim consult the Dyna-Flo Sales Office.

Table 12

Model 392 Valve Plug / Stem* Assembly (Keys 3, 4, & 5) - For Standard Bonnet (Key 14)

Valve Size	Port Size	Stem Diameter	Travel	Plug Material	
Inch	Inch (mm)	Inch (mm)	Inch (mm)	S41600 HT	S31600 / Alloy 6 Seat & Guide
2 Equal Percent	1-7/8 (47.6)	1/2 (12.7)	1-1/8 (28.6)	16A5344XN5D	36A5423XN3D
		3/4 (19.1)	1-1/8 (28.6)	16A5345XN5D	36A5424XN3D
2 Modified Equal Percent	1-7/8 (47.6)	1/2 (12.7)	1-1/2 (38.1)	16A5344XN5D	36A5423XN3D
		3/4 (19.1)	1-1/2 (38.1)	16A5345XN5D	36A5424XN3D
2 Linear	1-7/8 (47.6)	1/2 (12.7)	1-1/2 (38.1)	16A5344XN5D	36A5423XN3D
		3/4 (19.1)	1-1/2 (38.1)	16A5345XN5D	36A5424XN3D

* - Stem material is S20910.

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

- For Anti-Cavitation and Dyna-Flute Trim consult the Dyna-Flo Sales Office.

Table 13

Model 392 Valve Plug / Stem* Assembly (Keys 3, 4, & 5) - For Style 1 Extension Bonnet (Key 14)

Valve Size	Port Size	Stem Diameter	Travel	Plug Material	
Inch	Inch (mm)	Inch (mm)	Inch (mm)	S41600 HT	S31600 / Alloy 6 Seat & Guide
2 Equal Percent	1-7/8 (47.6)	1/2 (12.7)	1-1/8 (28.6)	16A5344X15D	36A5423X13D
		3/4 (19.1)	1-1/8 (28.6)	16A5345X15D	36A5424X13D
2 Modified Equal Percent	1-7/8 (47.6)	1/2 (12.7)	1-1/2 (38.1)	16A5344X15D	36A5423X13D
		3/4 (19.1)	1-1/2 (38.1)	16A5345X15D	36A5424X13D
2 Linear	1-7/8 (47.6)	1/2 (12.7)	1-1/2 (38.1)	16A5344X15D	36A5423X13D
		3/4 (19.1)	1-1/2 (38.1)	16A5345X15D	36A5424X13D

* - Stem material is S20910.

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

- For Anti-Cavitation and Dyna-Flute Trim consult the Dyna-Flo Sales Office.

Table 14

Model 392 Valve Plug / Stem* Assembly (Keys 3, 4, & 5) - For Style 1 Extension Bonnet (Key 14)

Valve Size	Port Size	Stem Diameter	Travel	Plug Material	
Inch	Inch (mm)	Inch (mm)	Inch (mm)	S41600 HT	S31600 / Alloy 6 Seat, Guide, & Contour
1 Dyna-Form Equal Percent	1/4 (6.4)	1/2 (12.7)	3/4 (19.1)	16A5327X11D	16A5404X13D
	1/2 (12.7)	1/2 (12.7)	3/4 (19.1) / 1-1/8 (28.6)	16A5328X15D	16A5405X13D
	3/4 (19.1)	1/2 (12.7)	3/4 (19.1) / 1-1/8 (28.6)	16A5329X15D	16A5406X13D
	1 (25.4)	1/2 (12.7)	3/4 (19.1) / 1-1/8 (28.6)	16A5331X15D	16A5408X13D
	3/4 (19.1)	3/4 (19.1)	3/4 (19.1) / 1-1/8 (28.6)	16A5330X15D	16A5407X13D
	1 (25.4)	3/4 (19.1)	3/4 (19.1) / 1-1/8 (28.6)	16A5332X15D	16A5409X13D
2 Dyna-Form Equal Percent	1/4 (6.4)	1/2 (12.7)	3/4 (19.1)	23B0188X15D	23B0165X13D
	1/2 (12.7)	1/2 (12.7)	3/4 (19.1) / 1-1/8 (28.6)	10B3297X11D	11B7697X13D
	3/4 (19.1)	1/2 (12.7)	3/4 (19.1) / 1-1/8 (28.6)	19A5980X15D	18A4133X13D
	1 (25.4)	1/2 (12.7)	3/4 (19.1) / 1-1/8 (28.6)	23B0166X15D	23B0167X13D
	1-1/4 (31.8)	1/2 (12.7)	3/4 (19.1) / 1-1/8 (28.6)	18A1637X15D	28A1638X13D
	1-1/2 (38.1)	1/2 (12.7)	1-1/8 (28.6) / 1-1/2 (38.1)	16A5402X15D	26A5410X13D
	1/4 (6.4)	3/4 (19.1)	3/4 (19.1)	392N213615D	392N213713D
	1/2 (12.7)	3/4 (19.1)	3/4 (19.1) / 1-1/8 (28.6)	392N213815D	392N213913D
	3/4 (19.1)	3/4 (19.1)	3/4 (19.1) / 1-1/8 (28.6)	23B0168X15D	19A7924X13D
	1 (25.4)	3/4 (19.1)	3/4 (19.1) / 1-1/8 (28.6)	18A4222X15D	10B8013X13D
	1-1/4 (31.8)	3/4 (19.1)	3/4 (19.1) / 1-1/8 (28.6)	18A1639X15D	28A1640X13D
	1-1/2 (38.1)	3/4 (19.1)	1-1/8 (28.6) / 1-1/2 (38.1)	16A5333X15D	26A5411X13D

* - Stem material is S20910.

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

- For Anti-Cavitation and Low-Noise Trim consult the Dyna-Flo Sales Office.

Table 15

Model 390 & 391 Seat Ring (Key 11) - For Standard Construction*

Valve Size	Description	Port Size	Travel	Seat Ring Material	
Inch		Inch (mm)	Inch (mm)	S41600 HT	S31600 / Alloy 6 Seat
2	Equal Percent	1-7/8 (47.6)	1-1/8 (28.6)	22B6004X01D	22B6005X01D
	Modified Equal Percent	1-7/8 (47.6)	1-1/2 (38.1)	22B6004X01D	22B6005X01D
	Linear	1-7/8 (47.6)	1-1/2 (38.1)	22B6004X01D	22B6005X01D
3	Equal Percent	2-7/8 (73)	1-1/2 (38.1)	22B6094X01D	22B6095X01D
	Modified Equal Percent	2-7/8 (73)	2 (50.8)	22B6094X01D	22B6095X01D
	Linear	2-7/8 (73)	2 (50.8)	22B6094X01D	22B6095X01D
4	Equal Percent	3-5/8 (92.1)	1-1/2 (38.1)	22B9338X01D	22B9339X01D
	Modified Equal Percent	3-5/8 (92.1)	2 (50.8)	22B9338X01D	22B9339X01D
	Linear	3-5/8 (92.1)	2 (50.8)	22B9338X01D	22B9339X01D
6	Equal Percent	5-3/8 (136.5)	2-1/2 (63.5)	23B0093X01D	23B0094X01D
	Modified Equal Percent	5-3/8 (136.5)	3 (76.2)	23B0093X01D	23B0094X01D
	Linear	5-3/8 (136.5)	3 (76.2)	23B0093X01D	23B0094X01D

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

* For Anti-Cavitation and Low-Noise Trim consult the Dyna-Flo Sales Office.

Table 16

Model 390 & 391 Cage (Key 12) - For Standard Construction*

Valve Size	Description	Port Size	Travel	Cage Material		
Inch		Inch (mm)	Inch (mm)	S17400 DH1150	S17400 H900	S31600 / ENC
2	Equal Percent	1-7/8 (47.6)	1-1/8 (28.6)	32B6028X03D	32B6028X01D	32B6029X0ED
	Modified Equal Percent	1-7/8 (47.6)	1-1/2 (38.1)	32B6028X03D	32B6028X01D	32B6029X0ED
	Linear	1-7/8 (47.6)	1-1/2 (38.1)	32B6025X03D	32B6025X01D	32B6026X0ED
3	Equal Percent	2-7/8 (73)	1-1/2 (38.1)	42B8240X03D	42B8240X01D	42B8241X0ED
	Modified Equal Percent	2-7/8 (73)	2 (50.8)	42B8240X03D	42B8240X01D	42B8241X0ED
	Linear	2-7/8 (73)	2 (50.8)	42B8242X03D	42B8242X01D	42B8243X0ED
4	Equal Percent	3-5/8 (92.1)	1-1/2 (38.1)	42B9320X03D	42B9320X01D	42B9321X0ED
	Modified Equal Percent	3-5/8 (92.1)	2 (50.8)	42B9320X03D	42B9320X01D	42B9321X0ED
	Linear	3-5/8 (92.1)	2 (50.8)	42B9322X03D	42B9322X01D	42B9323X0ED
6	Equal Percent	5-3/8 (136.5)	2-1/2 (63.5)	43B0261X03D	43B0261X01D	43B0080X0ED
	Modified Equal Percent	5-3/8 (136.5)	3 (76.2)	43B0261X03D	43B0261X01D	43B0080X0ED
	Linear	5-3/8 (136.5)	3 (76.2)	43B0079X03D	43B0079X01D	43B0081X0ED

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

- ENC = Electroless Nickel Coating.

* For Anti-Cavitation and Low-Noise Trim consult the Dyna-Flo Sales Office.

Table 17

Model 392 Seat Ring (Key 11) - For Standard Construction*

Valve Size	Port Size	Travel	Seat Ring Material	
Inch	Inch (mm)	Inch (mm)	S41600 HT	S31600 / Alloy 6 Seat
1 Dyna-Form Equal Percent	1/4 (6.4)	3/4 (19.1)	22B6020X01D	392R1002X3D
	1/2 (12.7)	3/4 (19.1)	22B6022X01D	392R1003X3D
	3/4 (19.1)	3/4 (19.1)	22B6023X01D	22B6064X01D
	1 (25.4)	3/4 (19.1)	22B6019X01D	22B6065X01D
1 Dyna-Form Modified Equal Percent	1/2 (12.7)	1-1/8 (28.6)	22B6022X01D	392R1003X3D
	3/4 (19.1)	1-1/8 (28.6)	22B6023X01D	22B6064X01D
	1 (25.4)	1-1/8 (28.6)	22B6019X01D	22B6065X01D
2 Dyna-Form Equal Percent	1/4 (6.4)	3/4 (19.1)	23B0170X01D	23B0171X01D
	1/2 (12.7)	3/4 (19.1)	23B0172X01D	23B0173X01D
	3/4 (19.1)	3/4 (19.1)	23B0174X01D	23B0175X01D
	1 (25.4)	3/4 (19.1)	23B0176X01D	23B0177X01D
	1-1/4 (31.8)	3/4 (19.1)	22B6000X01D	22B6001X01D
	1-1/2 (38.1)	3/4 (19.1)	22B6002X01D	22B6003X01D
2 Dyna-Form Modified Equal Percent	1/2 (12.7)	1-1/8 (28.6)	23B0172X01D	23B0173X01D
	3/4 (19.1)	1-1/8 (28.6)	23B0174X01D	23B0175X01D
	1 (25.4)	1-1/8 (28.6)	23B0176X01D	23B0177X01D
	1-1/4 (31.8)	1-1/8 (28.6)	22B6000X01D	22B6001X01D
	1-1/2 (38.1)	1-1/8 (28.6)	22B6002X01D	22B6003X01D
2 Equal Percent	1-1/8 (28.6)	1-1/8 (28.6)	22B6004X01D	22B6005X01D
	1-1/8 (28.6)	1-1/2 (38.1)	22B6004X01D	22B6005X01D
2 Linear	1-1/8 (28.6)	1-1/2 (38.1)	22B6004X01D	22B6005X01D

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

* For Anti-Cavitation and Dyna-Flute Trim consult the Dyna-Flo Sales Office.

Table 18

Model 392 Cage (Key 12) - For Standard Construction*

Valve Size	Port Size	Travel	Cage Material		
Inch	Inch (mm)	Inch (mm)	S17400 DH1150	S17400 H900	S31600 / ENC
1 Dyna-Form Equal Percent	1/4 (6.4)	3/4 (19.1)	22B6047X03D	22B6047X01D	22B6048X0ED
	1/2 (12.7)	3/4 (19.1)	22B6047X03D	22B6047X01D	22B6048X0ED
	3/4 (19.1)	3/4 (19.1)	22B6047X03D	22B6047X01D	22B6048X0ED
	1 (25.4)	3/4 (19.1)	22B6047X03D	22B6047X01D	22B6048X0ED
1 Dyna-Form Modified Equal Percent	1/2 (12.7)	1-1/8 (28.6)	22B6047X03D	22B6047X01D	22B6048X0ED
	3/4 (19.1)	1-1/8 (28.6)	22B6047X03D	22B6047X01D	22B6048X0ED
	1 (25.4)	1-1/8 (28.6)	22B6047X03D	22B6047X01D	22B6048X0ED
2 Dyna-Form Equal Percent	1/4 (6.4)	3/4 (19.1)	32B6028X03D	32B6028X01D	32B6029X0ED
	1/2 (12.7)	3/4 (19.1)	32B6028X03D	32B6028X01D	32B6029X0ED
	3/4 (19.1)	3/4 (19.1)	32B6028X03D	32B6028X01D	32B6029X0ED
	1 (25.4)	3/4 (19.1)	32B6028X03D	32B6028X01D	32B6029X0ED
	1-1/4 (31.8)	3/4 (19.1)	32B6028X03D	32B6028X01D	32B6029X0ED
	1-1/2 (38.1)	3/4 (19.1)	32B6028X03D	32B6028X01D	32B6029X0ED
2 Dyna-Form Modified Equal Percent	1/2 (12.7)	1-1/8 (28.6)	32B6028X03D	32B6028X01D	32B6029X0ED
	3/4 (19.1)	1-1/8 (28.6)	32B6028X03D	32B6028X01D	32B6029X0ED
	1 (25.4)	1-1/8 (28.6)	32B6028X03D	32B6028X01D	32B6029X0ED
	1-1/4 (31.8)	1-1/8 (28.6)	32B6028X03D	32B6028X01D	32B6029X0ED
	1-1/2 (38.1)	1-1/8 (28.6)	32B6028X03D	32B6028X01D	32B6029X0ED
2 Equal Percent	1-1/8 (28.6)	1-1/8 (28.6)	32B6028X03D	32B6028X01D	32B6029X0ED
	1-1/8 (28.6)	1-1/2 (38.1)	32B6028X03D	32B6028X01D	32B6029X0ED
2 Linear	1-1/8 (28.6)	1-1/2 (38.1)	32B6025X03D	32B6025X01D	32B6026X0ED

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

- ENC = Electroless Nickel Coating.

* For Anti-Cavitation and Dyna-Flute Trim consult the Dyna-Flo Sales Office.

Table 19

Model 391 Piston Ring (Graphite)

Valve Size 391	Valve Size 391A	Port Size	Quantity	Temperature Limitations		Part Number
				Minimum	Maximum	
2 Inch	2 & 3 Inch	1-7/8″	2	-50ºF (-46ºC)	1100ºF (593ºC)	1U2216X002D
3 Inch	4 Inch	2-7/8″	2	-50ºF (-46ºC)	1100ºF (593ºC)	1U2300X002D
4 Inch	6 Inch	2-7/8″	2	-50ºF (-46ºC)	1100ºF (593ºC)	1U2300X002D
		3-5/8″	2	-50ºF (-46ºC)	1100ºF (593ºC)	16A5482X02D
6 Inch	-	4-3/8″	4	-50ºF (-46ºC)	1100ºF (593ºC)	1U2392X002D
		5-3/8″	3	-50ºF (-46ºC)	1100ºF (593ºC)	11A9727X03D

Table 20

Gasket Kits - Bonnet & Seat Ring Gaskets (Keys 13 & 10) - N06600/Graphite

Valve Size Globe Body	Part Number	Valve Size Angle Body	Part Number
1 Inch	12B7100X01D (Standard)	1 Inch	12B7100X01D (Standard)
	12B7100XH1D (High Temp.)		12B7100XH1D (High Temp.)
2 Inch	12B7100X03D (Standard)	2 Inch	12B7100X03D (Standard)
	12B7100X13D (High Temp.)		12B7100X13D (High Temp.)
3 Inch	12B7100X05D (Standard)	3 Inch	Contact Dyna-Flo
	12B7100XH5D (High Temp.)		
4 Inch	12B7100X08D (Standard)	4 Inch	Contact Dyna-Flo
	12B7100XH8D (High Temp.)		
6 Inch	12B7100X11D (Standard)	6 Inch	Contact Dyna-Flo
	12B7100H11D (High Temp.)		

Table 21

Packing Parts (Keys 19, 20, 21, 26, 27, & 28)

PTFE Packing

Key #	Description		Stem Diameter Inch (mm)			
			1/2 (12.7)	3/4 (19.1)	1 (25.4)	1-1/4 (31.8)
19	Packing Spring (S30400) For Single Packing Only.	Part #	1F12553701D	1F12563701D	1D58293701D	1D38743701D
		Qty.	1	1	1	1
20	Special Washer (S30400) For Single Packing Only.	Part #	1F12513604D	1F12503604D	1H98223604D	1H99593604D
		Qty.	1	1	1	1
21*	Packing Set (Refer to Table 22 for Repair Kits)	Part #	1R2902010DD	1R2904010DD	1R29060101D	1R29080101D
		Qty. Single	1	1	1	1
		Qty. Double	2	2	2	2
26	Lantern Ring (S31600/S31603 Dual Grade) For Double PTFE Packing	Part #	DFX0000001D	DFX0000041D	DFX0000051D	DFX0000061D
		Qty.	1	1	1	1

Single Graphite Packing

Key #	Description		Stem Diameter Inch (mm)			
			1/2 (12.7)	3/4 (19.1)	1 (25.4)	1-1/4 (31.8)
26	Lantern Ring (S31600/S31603 Dual Grade)	Part #	DFX0000021D	DFX0000041D	DFX0000051D	DFX0000061D
		Qty.	1	2	2	2
26A	Lantern Ring (S31600/S31603 Dual Grade)	Part #	DFX0000001D	N/A	N/A	N/A
		Qty.	1	N/A	N/A	N/A
27	Graphite Filament Ring	Part #	1E3190X022D	1E3191X028D	1D7518X013D	1D7520X016D
		Qty.	2	3	3	3
28	Graphite Ribbon Ring	Part #	1V3802X002D	1V2396X002D	1U6768X002D	J122620165D
		Qty.	2	2	2	2

Table 22

Packing Repair Kits

Stem Diameter [Yoke Boss Diameter] inches (mm)	Single		Double
	PTFE	Graphite	PTFE
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

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Model 390, 391, 392 Control Valves

MODEL NUMBERING SYSTEM

SAMPLE PART NUMBER: 392-2CFL-S02P2-ES4

							BODY STYLE	**-**
-	GLOBE	**A**	ANGLE					
							VALVE SIZE	**2**
1	1 INCH	**2**	2 INCH					
							ASME RATING	**C**
C	900/1500							
							END CONNECTION	**F**
F	RF	**J**	RTJ	**L**	BWE SCH 80	**U**	BWE SCH 120	
P	BWE SCH 160	**S**	SWE					
							BODY MATERIAL	**L**
L	LCC	**W**	WCC	**M**	CF8M	**9**	WC9	
							BOLTING	**-**
-	B7 / 2H	**A**	B7M / 2HM	**B**	B8M / 8M			
K	B7 / 2H FLUOROKOTE #1			**L**	B7M / 2HM FLUOROKOTE #1			
							TRIM	**S**
S	TRIM S	**C**	TRIM C	**N**	TRIM N	**A**	TRIM A	
J	TRIM J							
							PORT SIZE	**02**
01	3/16“ PORT	**02**	1/4” PORT	**03**	3/8” PORT	**04**	1/2” PORT	
05	5/8” PORT	**06**	3/4” PORT	**07**	7/8” PORT	**08**	1” PORT	
10	1-1/4” PORT	**12**	1-1/2” PORT	**15**	1-7/8” 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® (PRESSURE)			**F**	LIVE LOADED KALREZ® FIRE SAFE (PRESSURE)			
							YOKE BOSS SIZE	**2**
2	2-13/16” (1/2” STEM)	**3**	3-9/16” (3/4” STEM)					
							PAINT	**-**
-	DFPS-01 (STANDARD)			**2**	DFPS-02 (SEVERE SERVICE)			
3	DFPS-03 (HIGH TEMPERATURE)							
							CHARACTERISTIC	**E**
E	EQUAL PERCENT			**M**	MODIFIED EQUAL PERCENT			
L	LINEAR			**2**	ANTI-CAVITATION 2 STAGE (LINEAR)			
3	ANTI-CAVITATION 3 STAGE (LINEAR)			**F**	DYNA-FORM (EQUAL PERCENT)			
T	DYNA-FORM (MODIFIED EQUAL PERCENT)			**Y**	DYNA-FLUTE 1 (EQUAL PERCENT)			
Z	DYNA-FLUTE 3 (EQUAL PERCENT)			**H**	LOW-NOISE III A1 (LINEAR)			
B	LOW-NOISE III B1 (LINEAR)			**P**	LOW-NOISE III B3 (LINEAR)			
I	LOW-NOISE III C3 (LINEAR)			**D**	LOW-NOISE III D3 (LINEAR)			
							BONNET STYLE	**S**
S	STANDARD	**T**	STANDARD TAPPED	**E**	EXTENSION STYLE 1			
							SHUT-OFF CLASS	**4**
4	CLASS IV	**5**	CLASS V					

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Model 390, 391, 392 Control Valves

MODEL NUMBERING SYSTEM

SAMPLE PART NUMBER: 390-3AFL-SFP2-CES4

MODEL								**390**
390	MODEL 390			**391**	MODEL 391			
BODY STYLE								**-**
-	GLOBE	**A**	ANGLE					
VALVE SIZE								**3**
2	2 INCH	**3**	3 INCH	**4**	4 INCH	**6**	6 INCH	
ASME RATING								**A**
A	900	**B**	1500	**C**	900 / 1500			
END CONNECTION								**F**
F	RF	**J**	RTJ	**L**	BWE SCH 80	**U**	BWE SCH 120	
P	BWE SCH 160							
BODY MATERIAL								**L**
L	LCC	**W**	WCC	**M**	CF8M	**9**	WC9	
BOLTING								**-**
-	B7 / 2H	**A**	B7M / 2HM	**B**	B8M / 8M			
K	B7 / 2H FLUOROKOTE #1			**L**	B7M / 2HM FLUOROKOTE #1			
TRIM								**S**
S	TRIM SPEC S	**C**	TRIM SPEC C	**N**	TRIM SPEC N	**A**	TRIM SPEC A	
PORT SIZE								**F**
F	FULL 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® (PRESSURE)			**F**	LIVE LOADED KALREZ® FIRE SAFE (PRESSURE)			
YOKE BOSS SIZE								**2**
2	2-13/16" (1/2" STEM)	**3**	3-9/16" (3/4" STEM)	**5**	5" (1" STEM)			
PAINT								**-**
-	DFPS-01 (STANDARD)			**2**	DFPS-02 (SEVERE SERVICE)			
3	DFPS-03 (HIGH TEMPERATURE)							
BACKUP RING / SEAL RING / PISTON RING								**C**
C	S31600 / CARBON-FILLED PTFE - ELGILOY			**K**	S31600 / KEL-F - ELGILOY			
R	S31600 / CARBON-FILLED PTFE - ELGILOY W/ PEEK AE RINGS							
G	DOUBLE GRAPHITE PISTON RINGS (391 ONLY)			**H**	TRIPLE GRAPHITE PISTON RINGS** (391 ONLY)			
CHARACTERISTIC								**E**
E	EQUAL PERCENT	**L**	LINEAR	**M**	MODIFIED EQ. PERCENT			
2	ANTI-CAVITATION 2 STAGE			**3**	ANTI-CAVITATION 3 STAGE			
H	LOW-NOISE III A1	**B**	LOW-NOISE III B1	**P**	LOW-NOISE III B3	**I**	LOW-NOISE III C3	
D	LOW-NOISE III D3							
BONNET STYLE								**S**
S	STANDARD	**T**	STANDARD TAPPED	**E**	EXTENSION STYLE 1			
SHUT-OFF CLASS								**4**
2	CLASS II (391 ONLY)	**3**	CLASS III (391 ONLY)	**4**	CLASS IV	**5**	CLASS V	

NOTE: Modified Equal Percent is a factor of travel and requires no special parts or trim options that differ from Equal Percent.

** - Triple Piston Rings are only available for valve sizes 3" to 6", for Class IV shutoff requirements for 2" valve sizes refer to Model 392 valves.

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