



Model
390 Control Valve
 Operation, Parts and Instruction Manuals



Figure 1 390 Control Valve & DFC Actuator

Dyna-Flo 390

Operation, Parts and Instruction Manual

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!NOTICE!

These instructions are meant to be used with the Dyna-Flo Model 390 Technical (Sales) Bulletin. If you do not have the Technical Bulletin, contact Dyna-Flo immediately, or visit **www.dynaflo.com**

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

Introduction

The 390 Series control valves (Figure 1) are heavy duty globe style control valves. These valves are used in all kinds of demanding applications, including oil and gas production and chemical process. Metal seats are used for increased seat life.

390 Series valves are cage guided, single port valves that can be used in either snap on/off acting or throttling applications of either liquids or gases. A bolted bonnet is standard and a typical actuator is a Dyna-Flo DFC or DFO model linear actuator.

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 only be done 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 valve configuration and construction materials were selected to meet particular pressure, pressure drop, temperature, and process fluid conditions. Some body and trim 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 successfully using the Dyna-Flo Model 390 for many years.

! CAUTION !

To avoid personal injury or installation damage as a result of the sudden release of process pressure or the breaking of parts, do not install the valve assembly where service conditions could exceed the limits stated in this manual or on the equipment nameplates. Use government codes, accepted industry standards and good piping practices to select pressure-relieving equipment for protection of your installation. It is also important to wear the proper protective equipment when performing any installation or maintenance activity.



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Specifications

Configurations

See Table 1 of Sales Bulletin

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

Sizes and Connection Styles

Models: 390, 391
Size: 2", 3", 4"
Rating: ASME 900 or 1500
Connections: RF / RTJ

Maximum Inlet Temperatures and Pressures

Consistent with ASME class rating as per ASME B16.34, unless limited by either material pressure or temperature limitations.

Maximum Pressure Drops

Same as maximum inlet pressure unless otherwise rated by specific trim construction. For Actuator and Valve assembly shut off pressure drops see Tables 7 and 8 of Sales Bulletin

Standard Seat Leakage Classifications

See Table 1 of Sales Bulletin

Dimensions

Valve and Actuator Assembly Dimensions
See Table 3 of Sales Bulletin

Valve and Actuator Assembly Dimensions
See Figure 2 of Sales Bulletin

Approximate Valve Body and Actuator Weights

See Table 2 of Sales Bulletin

Bonnet Bolting

Standard service body to bonnet studs are steel SA193-B7 and steel SA-194-2H nuts.

For NACE-2002 the studs are SA-193-B7M and steel SA-194-2HM for nuts.

For NACE-2003 applications contact Dyna-Flo.

Flow Characteristics

- Equal Percentage (Standard)
- Linear
- Quick Opening

Packing Type

The standard packing is PTFE V-Ring. Live loaded low emission, graphite and other packing arrangements are also available.

Valve Sizing Coefficients

See Table 4 of Sales Bulletin

Trim Sizes and Yoke Boss Sizes

See Table 9 of Sales Bulletin

Trim Materials

See Table 10 of Sales Bulletin

Valve Parts List, Material and Temperature Limitations

See Table 5, 6, 10 and 11 of Sales Bulletin
Parts List Page 16



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Unpacking Valve from Shipping Container

Check the packing list against materials received, while unpacking the valve. The Packing List describes the valve and accessories in each shipping container.

When lifting the valve from shipping container, it is advisable to remove 2 actuator casing bolts, 180° apart, and temporarily replace them with eyebolts and nuts. See Figure 3 for details. Position the lifting straps through the eyebolts to avoid damage to the tubing and mounted accessories.

! WARNING !

The following maintenance procedures require removing the control valve from service. To avoid personnel injury, only qualified technicians should perform the following procedures. Always ensure the control valve is fully released of pressure or process fluid before starting maintenance.

Installation

Before installing the valve, clean dirt, welding chips, scale or other foreign material from the line.

Inspect flange gasket surfaces for damage.

Check packing box bolting for proper tightness. Packing nuts should be slightly over finger-tight; however, tighten only as necessary to prevent stem leakage.

If the valve has small internal flow passages such as anti-cavitation or reduced-noise trim the installation of an upstream strainer should be considered to prevent clogging of these small passages.

! CAUTION !

Do not over tighten packing! This can cause excessive packing wear and high stem friction that may impede stem movement! Refer to Table For Packing Torque.

- 1 Install the valve with flow through the valve in the direction shown by the flow arrow on the valve body. The valve assembly may be installed in any position unless limited by vibration considerations.

! CAUTION !

The normal method is with the actuator vertical above the valve body. In some non-vertical applications, the actuator may need to be supported.

! WARNING !

**Keep hands, hair and clothing away from all moving parts when operating the valve!
Serious injury can result from failure to do so!**

- 2 When possible, stroke the valve and check for smooth operation through the full-stroke. Unsteady valve stem movement could be an indication of an internal problem.

Air Piping

The actuators are designed to accept 1/4" NPT connection. Use 3/8" OD tubing (or equivalent) for all air lines. All connections must be free of leaks.

! CAUTION !

Do not exceed maximum casing pressure indicated on serial plate located on the yoke of the actuator.



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Periodic Inspection

! CAUTION !

Use safe work practices and lock out procedures when isolating valves and actuators! Always be aware of flammable instrument gas!

- 1 Avoid personal injury from sudden release of process pressure! Before performing any maintenance operation:
 - a Disconnect any power supply media lines providing air / gas pressure, electric power, or a control signal to the actuator. Ensure the actuator cannot suddenly operate the valve.
 - b Isolate the valve from process pressure with bypass valves or completely shut off the process. Relieve process pressure, and drain the process fluid from the up and down stream of the valve.
 - c Vent the pneumatic actuator loading pressure and relieve any actuator spring preload.
 - d Use Safety lock-out procedures to be sure that the above provisions stay in effect while you complete the work on your equipment.
- 2 Check for process fluid leakage to the atmosphere through the body to bonnet joint and (if equipped) any NPT connection.
- 3 Examine the valve for damage caused by corrosive fumes or process drippings.
- 4 Clean the valve and repaint areas of severe oxidation.
- 5 Make sure positioner linkage (if equipped) and stem connector are securely fastened. If the stem connector is loose, check plug thread engagement and retighten. Refer to the Dyna-Flo Model DFC, or DFO Manual for detailed instructions.
- 6 Ensure all accessories, mounting brackets and fasteners are secure.
- 7 Clean any dirt and foreign material from the valve stem.

Figure 2 Needle Valve w/Gauge setup

Maintenance

Only "Certified Technicians" should be disassembling and inspecting these valves and actuators.

! CAUTION !

Actuator spring is under compression.

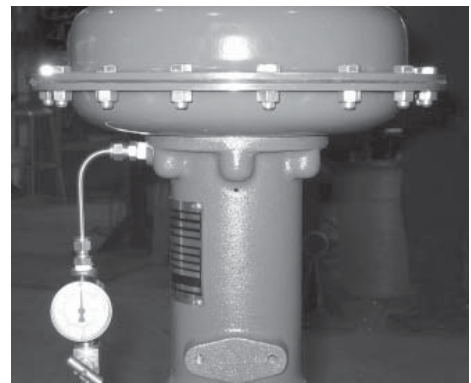
The actuator is also under pneumatic / gas pressure. Ensure actuator has been disconnected from supply lines before starting any work on the actuator.

The actuator needs to be supported before the yoke nut can be removed, failure to support actuator could result in actuator damage and/or personal injury.

Removing Actuator from Valve

Refer to the Dyna-Flo Model DFC/DFO Manual for detailed instructions.

- 1 Disconnect all pneumatic/gas supply lines and any other lines that might supply pressure to the actuator.
ON MODEL DFC (FAIL CLOSED) ACTUATORS: Connect a 30 psi supply line to the inlet port of the actuator. Be sure not to exceed the maximum casing pressure. This will open the valve and take downward force off the stem connector.





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Maintenance (con't)

Removing Actuator from Valve (Con't)

- 2 Remove the stem connector (Refer to the DFC / DFO Instruction Manual for stem connector removal instructions).
- 3 Support the actuator - the actuator may be able to be removed manually on the smaller sizes. For rigging use two eyebolts in place of two of the casing bolts; make sure they are located 180° apart so that the actuator can be lifted vertically off the valve. Use a sling or chain with hooks to lift the actuator from the valve with the eyebolts. Refer to Figure 3 for rigging setup.
- 5 Remove the jam nuts and travel indicator from the valve stem. Refer to DFC / DFO actuator manual for disassembly procedures for actuators.
- 6 Once actuator has been removed from the valve the air pressure in the actuator can be released. (DFC actuator only)



Figure 3 Rigging Setup

- 4 Use a blunted heavy chisel to loosen yoke nut (See Figure 4), unscrew yoke nut off of bonnet. Lift actuator off of valve and store in a safe place.

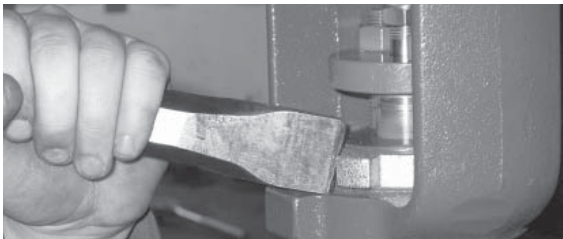


Figure 4 Yoke Nut being loosened with a Chisel

Packing Maintenance

Refer to Figures 8, 9 & 10 for packing orientation and Key numbers for the following section.

For single (spring-loaded) packing:

- a Spring-loaded packing has constant force applied to the packing set (Key 2) through a spring (Key 5) in the packing bore. Ensure that the packing follower (Key 8) is in contact with the bonnet (Key 1), if not tighten the packing nuts (Key 12) until the packing follower comes in contact with the bonnet. If this does not stop the leak then the packing will need to be replaced. In some cases the bonnet and/or stem (Key 17) may need to be polished or replaced.
- b Refer to **Valve Disassembly** section for Packing Removal and Inspection.

! CAUTION !

Do not tighten the packing nuts past the recommended maximum torque value as this will cause high stem friction and could cause the valve to operate incorrectly.

For double packing / graphite ring packing:

- a Double packing consists of two packing sets (Key 2) separated by a lantern ring (Key 6). This style of packing requires that the packing nuts (Key 12) be kept tight to keep force on the packing. If leakage is detected from the packing, the packing nuts can be tightened to apply more force on the packing set (make sure not to exceed the maximum allowable torque values, see Table 2). If this does not seal off the leak then the packing will need to be replaced. In some cases the bonnet (Key 1) and/or stem (Key 17) may need to be polished or replaced.
- b Refer to **Valve Disassembly** section for Packing Removal and Inspection.



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Valve Disassembly

! CAUTION !

If maintenance is to be performed on the valve inline, relieve process pressure and drain the process media from the upstream and downstream sides of the valve. Check that bypass valves are used or the process has been completely shut down.

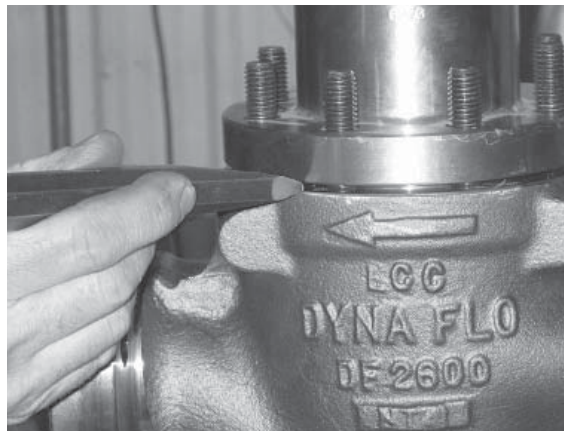
Bonnet Removal

- 1 Loosen the packing nuts (Key 12) until the packing follower (Key 8) is loose. Loosen the bonnet nuts (Key 25) one turn after contact with the bonnet is broken. The bonnet may need to be rocked loose or loosened from the body by prying at the bonnet-to-body joint (See Figure 5). Take care not to damage the gasket-sealing surface when separating the bonnet. If no process medium leaks from the bonnet-to-body joint removal of the bonnet nuts (Key 25) can proceed.
- 2 When removing the bonnet (Key 1) ensure that the stem / plug assembly (Key 19) does not drop out of the bonnet. This could damage the plug seating surface.
- 3 A razor or a pick-set can be used to remove old gaskets. Inspect the gasket-sealing surface for scratches or dents that may cause the gasket to leak.

! NOTE !

Spiral wound gaskets (Keys 22 & 23) make their seal by being crushed. Spiral wound gaskets cannot be reused.

- 4 Inspect threads on bonnet studs (Key 24) and on packing studs (Key 11) for any damage.



Trim Parts Removal (plug/seat/cage)

Refer to Figures 10 & 12 for Key numbers

! NOTE !

For instructions on Cavitation and Noise Reduction Trim contact the Dyna-Flo Sales Office.

1 seal ring (spring-loaded):

To remove the seal ring (Key 28), first pry the retaining ring (Key 26) out of the groove, then remove the metal backup ring (Key 27). Finally remove the seal ring from the plug.

piston ring:

Piston rings (Key 29) will be broken in half, simply pull apart the sections of piston ring and remove.

- 2 Inspect the valve stem (Key 17) for any deep scratching or corrosion also inspect the threads for any damage. Minor scratching or corrosion is acceptable. A minor scratch can be defined as a scratch that will not stop your fingernail when you run it across the scratch. Anything other than a minor scratch will need to be sent to the factory to be refurbished back to the 4µin finish.
- 3 Inspect the seating area on the plug (Key 16). Some minor scratching or corrosion can be lapped out of the plug. The plug can be machined and lapped to remove damage caused by normal wear, corrosion or erosion. Care must be taken not to machine the seat surface back to far as this will effect the position of the seal ring in the cage and may cause failure.
- 4 Inspect the seal ring sealing surface on the plug for any scratching.
- 5 Inspect the seat ring (Key 21) surface for any damage caused by erosion, corrosion or deep scratching. Minor scratching or corrosion can be removed by lapping or machining. Seat ring will need to be replaced if lapping or machining can not remove the damage. Also inspect the gasket-sealing surface for any damage.
- 6 Inspect the inside diameter of the cage (Key 18) for signs of erosion, corrosion or deep scratching. Cages can be polished, but any deep scratching or corrosion is cause for replacement.

Figure 5 Body being separated with a chisel



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Valve Disassembly (Cont'd)

Packing and Packing Parts Removal

! CAUTION ! _____
Concentrated gases could be trapped in the packing!

- 1 Remove all packing parts (Keys 2 through 7, 13 & 14) from the packing bore. Use a rounded tool to remove the packing set (Keys 2, 3 & 4) from the packing bore being careful not to damage the walls of the packing box. Clean all metal parts; if they are not damaged they can be reused.
- 2 Inspect the packing bore for any scratching or corrosion; minor scratching or pitting in the packing bore can be polished out.

Body Gasket Removal

- 1 A razor or a pick-set can be used to remove old gaskets.

! CAUTION ! _____
Care must be taken to avoid damaging these surfaces.

! NOTE ! _____
Spiral wound gaskets (Keys 22 & 23) make their seal by being crushed. Spiral wound gaskets cannot be reused.

- 3 Inspect the internal body surfaces for any signs of corrosion, erosion or irregular wear.

Lapping

Expect a certain amount of leakage in valves with metal seating. In some cases during maintenance or where leakage has become excessive, sealing performance of metal seats can be improved by lapping.

Before proceeding with LAPPING process, inspect the plug / stem and seat as described in **Trim Parts Removal** (page 7).

! NOTE ! _____
Spiral wound gaskets (Keys 22 & 23) make their seal by being crushed. Spiral wound gaskets cannot be reused, this includes reusing a gasket after the lapping procedure has been performed. It may be desirable to use an "old" gasket for the lapping process and replace it after with a new gasket. CAUTION: after performing the lapping process with an "old" gasket it is important not to change the position of the cage (Key 18), seat ring (Key 21) or valve plug (Key 16)! Mark their position using a soft felt marker or similar method before removal. Failure to place trim parts back into their original lapped position after replacing the spiral wound gasket may result in excessive leakage.

- 1 Ensure all valve parts have been thoroughly cleaned before lapping. If the valve plug (Key 16) and seat ring (Key 21) have minor scratches on the seating surface, lapping can remove these scratches without having to replace or machine the plug or seat ring.
- 2 Trim parts should be installed according to the instructions presented in the Assembly: Trim Parts Assembly section, install the "old" seat ring gasket (Key 23), seat ring (Key 21), cage (Key 18) and "old" bonnet gasket (Key 22).
- 3 Be sure to remove any piston rings (Key 29) or seal rings (Key 28) from the valve plug (Key 16) before proceeding. Apply fine grit lapping compound (400 - 600 grit) to the bottom of the valve plug and install the valve plug / stem assembly into the valve.



Figure 6 Handle Construction for Lapping



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Lapping (Cont'd)

- 4 Place the bonnet (Key 1) over the stem and onto the valve. Secure the bonnet using 4 of the bonnet nuts (Key 25). It may be desirable to place the packing follower (Key 8) onto the valve stem and into the packing bore before constructing a handle, this will help keep the stem and plug centered. Attach a handle to the valve stem, such as one made using two wrenches and stem lock nuts as seen in Figure 6.
- 5 Rotate the valve plug (Key 16) in a clockwise then counter-clockwise direction using the handle (only a small amount of rotation is required). After a few cycles of rotation, disassemble the set up as necessary and mark the position of the cage, seat ring, and plug with a soft tip marker before changing out the gaskets. Test for shutoff and repeat lapping procedure if necessary.

Assembly

Ensure that all parts have been cleaned and inspected as per disassembly section.

Trim Parts Assembly

! NOTE !
For instructions on Anti-Cavitation and Noise Reduction Trim contact the Dyna-Flo Sales Office.

! NOTE !
Use an anti-seize compound that is approved for the service conditions that the valve is being installed into.

! NOTE !
Spiral wound gaskets (Keys 22 & 23) make their seal by being crushed. Spiral wound gaskets cannot be reused.

- 1 Coat the seat ring gasket with nickle anti-seize compound and insert it into the seat pocket in the body. Insert seat ring (Key 21) into seat pocket.

2 Plug Seals:

For seal ring (Key 28):

- a Refer to assembly diagram (Figure 10). Lubricate plug seal diameter and install seal ring (Key 28) with cup facing the

correct direction as shown in Figure 12. Install back up ring (Key 27) and retaining ring (Key 26) as shown.

- c Allow time for the PTFE material to shrink back to its original size before installing the plug into the cage.

! NOTE !
Ensure the seal ring (Key 28) does not shift out of the plug groove when installing the plug into the cage.

For piston rings (Key 29):

! NOTE !
Replacement piston rings (Key 29) come in one piece. Before installation it is necessary to break the piston ring into two pieces. Do not saw or cut piston rings.

vise break:

piston rings can be broken into two pieces using a vise with smooth jaws or softeners add. Place the unbroken piston ring into the jaws of the vise so that they will compress the ring into an oval. Slowly compress the piston ring until the ring snaps on both sides, if one side snaps first simply keep compressing until the other side snaps.

scoring:

if no vise is present, score (don't cut) the piston ring and snap over a hard surface such as the edge of a work bench or table.

- 2 Lubricate the valve plug / stem (Key 19) assembly with light assembly grease and insert into the cage (Key 18).

Bonnet Assembly

! NOTE !
Spiral wound gaskets (Keys 22 & 23) make their seal by being crushed. Spiral wound gaskets cannot be reused.

- 1 Coat gasket sealing surface on bonnet with nickle based anti-seize compound. Place bonnet (Key 1) over stem (Key 17) and tighten bonnet nuts (Key 25) to specified torque values. Follow standard torque sequence when tightening bolts. Refer to Table 1 for specific torque values.



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Assembly (Cont'd)

Packing Assembly

Refer to Figure 8 & 9 for packing orientation and Key numbers for the following section.

- 1 Ensure all parts have been cleaned and inspected prior to replacing packing. (See Disassembly section for inspection procedures)

! NOTE !

To prevent trapping air when installing packing rings it is necessary to add packing rings one at a time. Do not force packing rings below the chamfer of the packing bore before adding another ring. Packing should not be pushed down more than the thickness of the added ring (See Figure 7).

For single style (spring-loaded) packing:

- a Lubricate the packing box ring (Key 13) and lower wiper (Key 14) with silicone-based lubricant. Insert both parts into the packing bore followed by spring (Key 5) and special washer (Key 7).
- b Lubricate the packing set (Key 2) with silicone-based lubricant and insert on top of the washer (Key 7) in the packing bore.
- c Place the packing follower (Key 8) on top of the packing set followed by the upper wiper (felt) (Key 9) and packing flange (Key 10).
- d Tighten the packing nuts (Key 12) until the packing follower comes into contact with the bonnet (Key 1).

For double style packing:

- a Lubricate packing box ring (Key 13), lower wiper (Key 14) and lower packing set (Key 2) with silicone-based lubricant. Insert these parts into the packing bore followed by the lantern ring (Key 6).
- b Lubricate the upper packing set (Key 2) and place it into the packing bore followed by the packing follower (Key 8).
- c Insert the upper wiper (felt) (Key 9) and the packing flange (Key 10) over the stem (Key 17) and tighten the packing nuts (Key 12) to the proper torque value as specified in Table 2.

For double style graphite packing:

- a Refer to Figures 8 & 9 for single and double packing arrangements. Choose proper arrangement based on stem size and single or double configurations.

Install bonnet as described in the Assembly section. Install packing box ring and packing arrangement as shown. Note that Key 4 is graphite filament wound material that typically looks like rope.

Key 3 is graphite ribbon compressed into rings and not split as the graphite filament ring is. Install packing follower (Key 8) and flange (Key 10) and torque as per Table 2.

! CAUTION !

Graphite ribbon packing damages easily, care is to be taken when installing it into the packing bore.

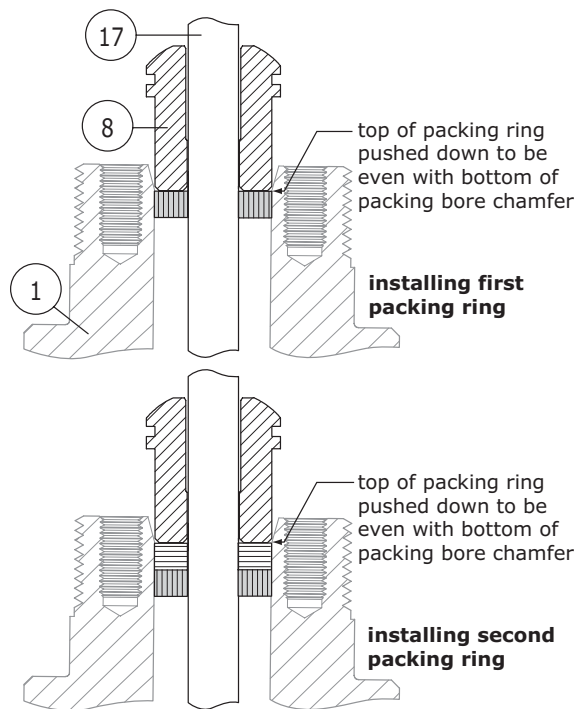


Figure 7 Packing Ring Installation



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Table 1

Body to Bonnet Stud Torque

Valve Sizes (Inch)

Bolt Torques

| | SA193-B7/B7M Studs | | SA193-B8/B8M Studs | |
|---|---------------------------|----------------|---------------------------|----------------|
| | N•m | Ft-lbs. | N•m | Ft-lbs. |
| 2 | 390 | 290 | 240 | 180 |
| 3 | 730 | 540 | 530 | 390 |
| 4 | 970 | 720 | 730 | 540 |

Table 2

Packing Nut Torque Values

| Valve Stem Diameter Inch (mm) | ANSI Class | Packing Flange Nuts (Not Live Loaded) | | | |
|--|-------------------|--|------------|--------------------|------------|
| | | Min. Torque | | Max. Torque | |
| | | Ft-lbs. | N•m | Ft-lbs. | 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 |

Table 3

Valve Stem Connection Assembly Torque and Pin Replacement

| Valve Size Inches | VSC* Diameter Inches (mm) | Torque Ft-lbs. (N•m) | | Hole Size Inches (mm) |
|------------------------------|--------------------------------------|---------------------------------|----------------|----------------------------------|
| | | Minimum | Maximum | |
| 2 | 1/2 (12.7) | 60 (81) | 85 (115) | 1/8 (3.175) |
| | 3/4 (19.1) | 175 (237) | 250 (339) | |
| 3 | 1/2 (12.7) | 60 (81) | 85 (115) | 3/16 (4.763) |
| | 3/4 (19.1) | 175 (237) | 250 (339) | |
| 4 | 3/4 (19.1) | 175 (237) | 250 (339) | 3/16 (4.763) |

*VSC - Valve Stem Connection



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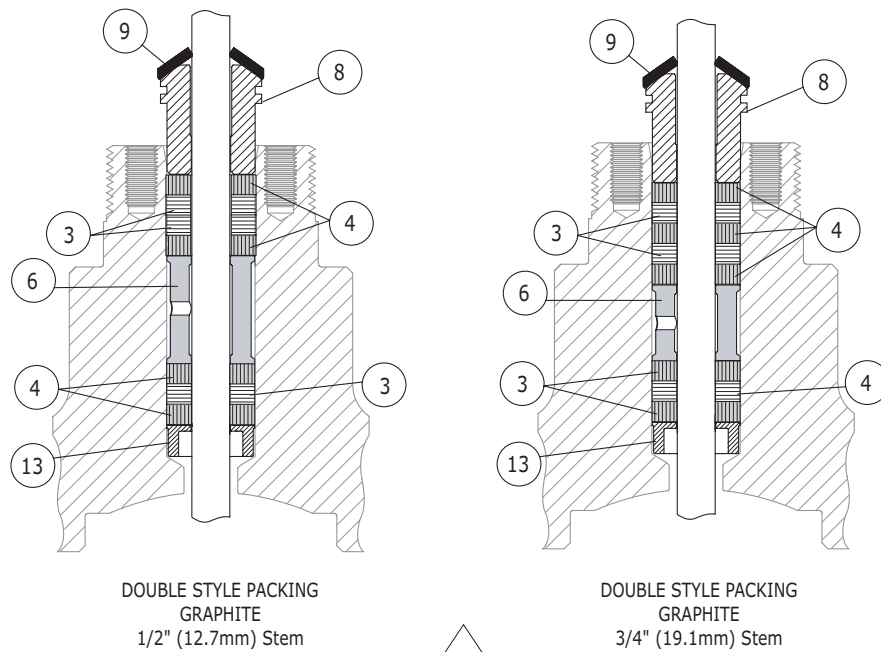
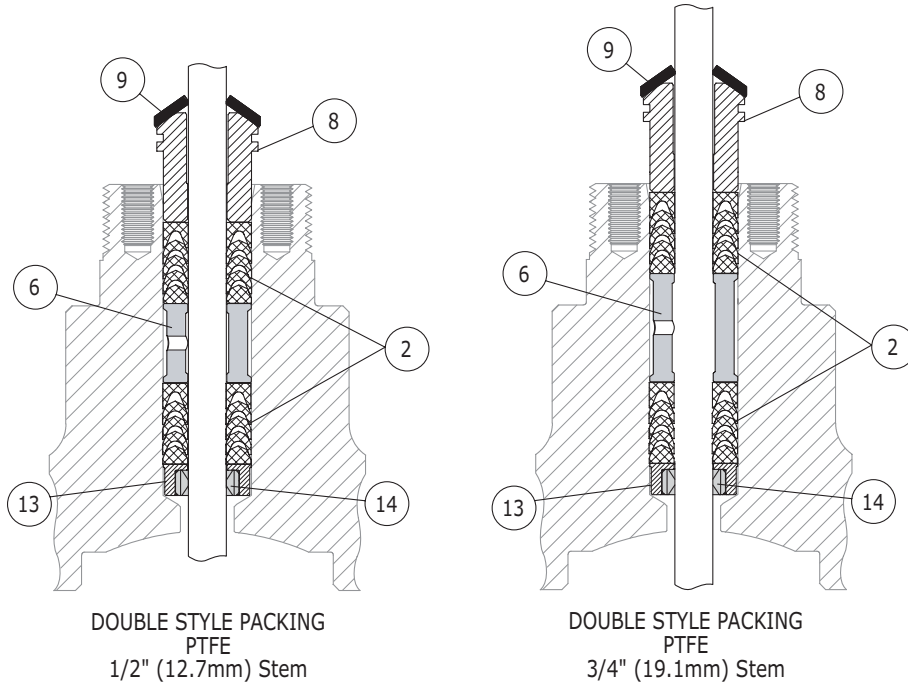
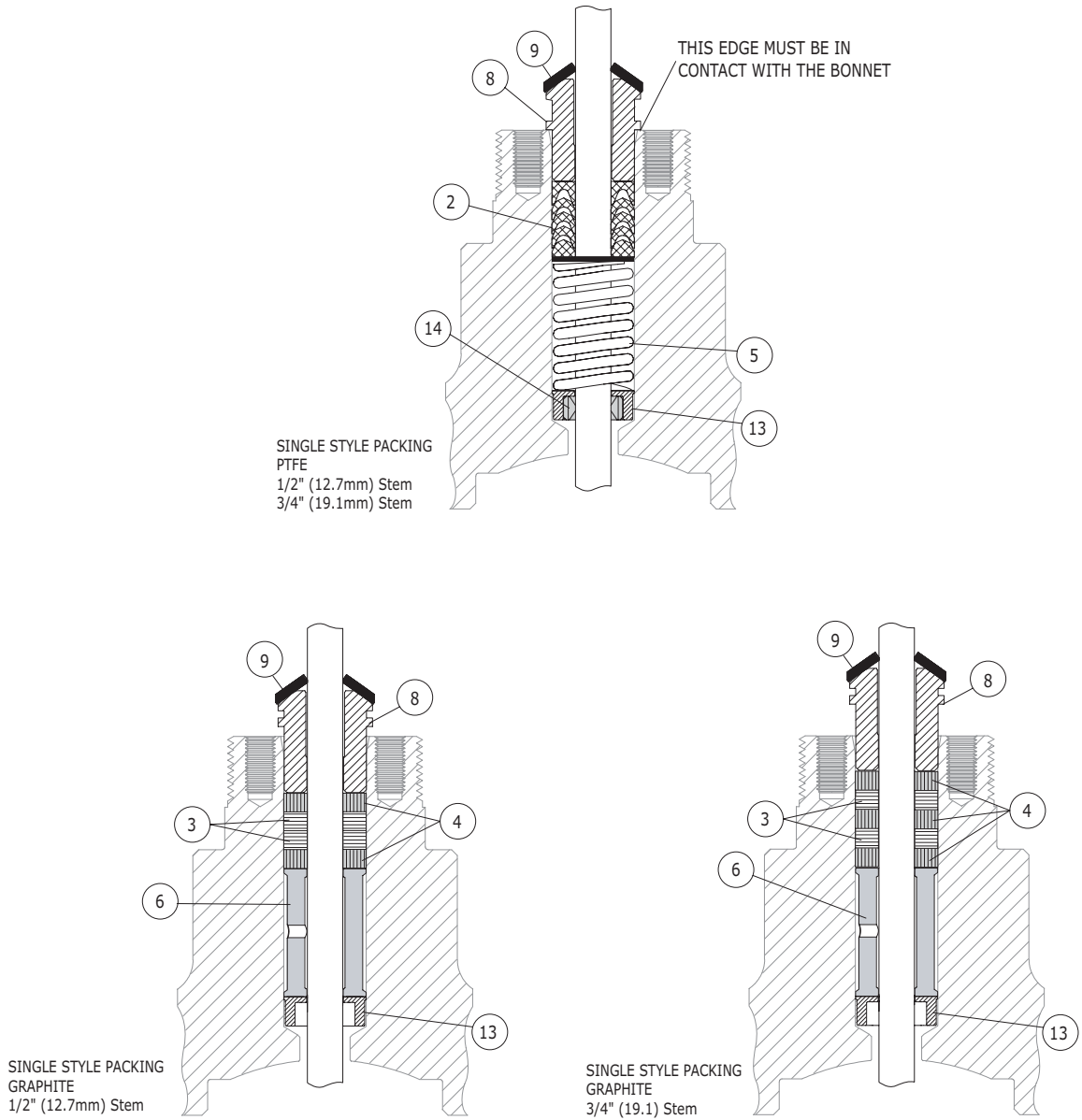


Figure 8 390 Series Control Valve Packing Diagrams



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▲
Figure 9 390 Series Control Valve Packing Diagrams



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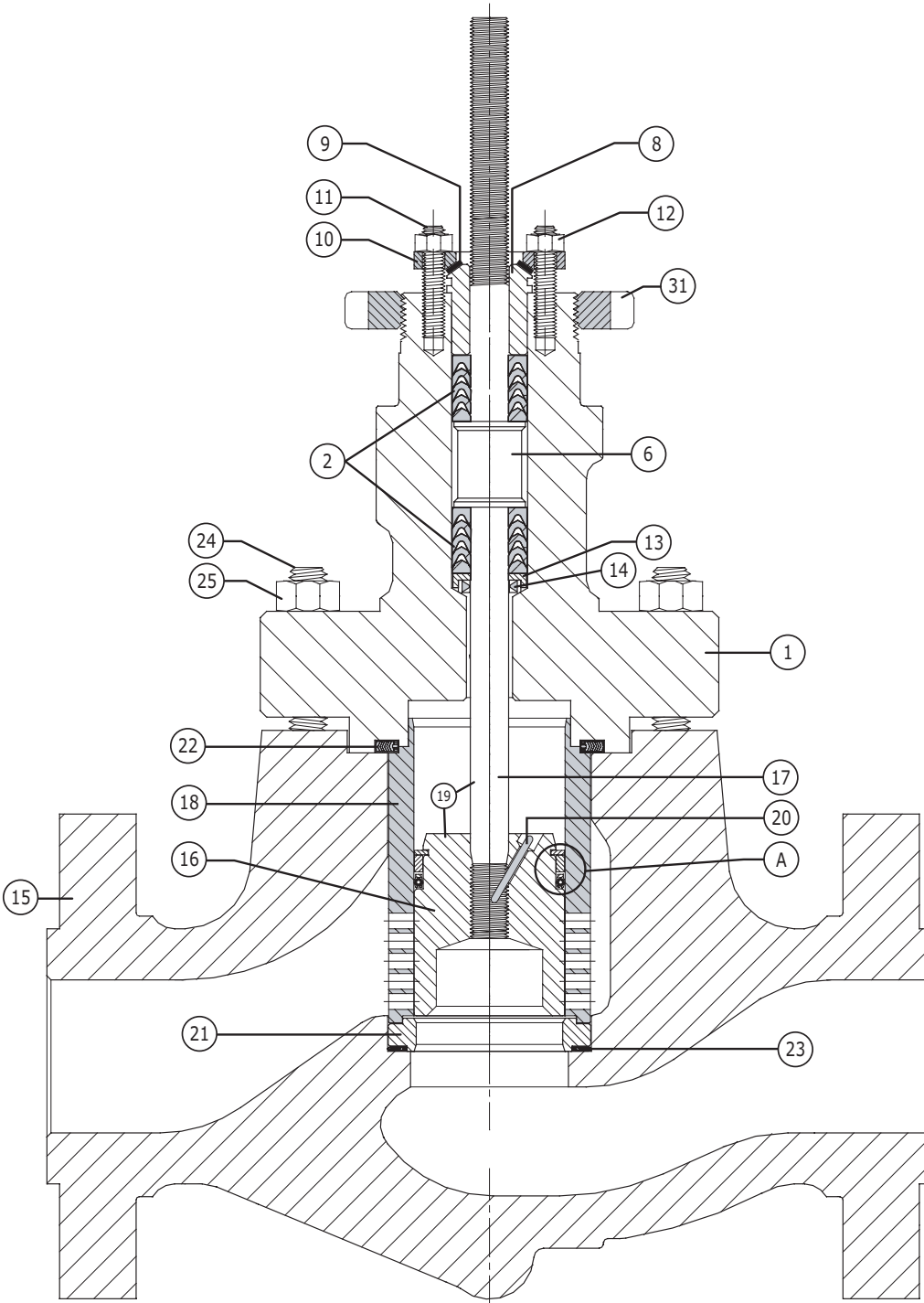


Figure 10 Model 390 Control Valve Cross Section



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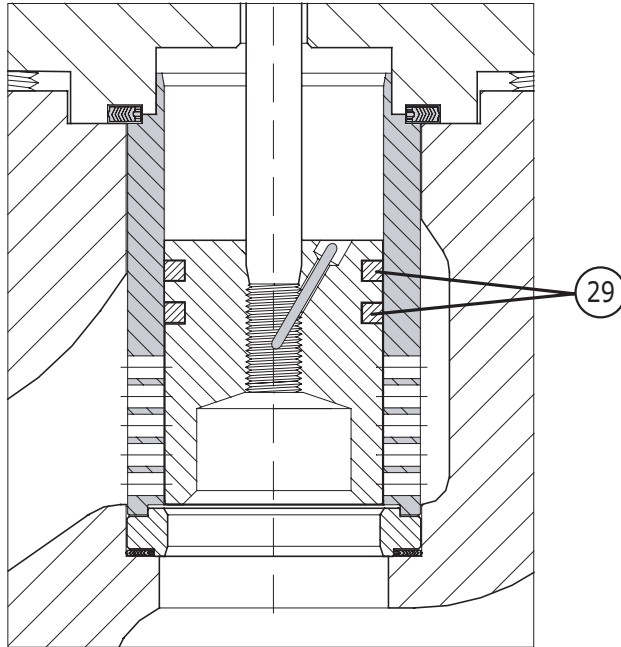
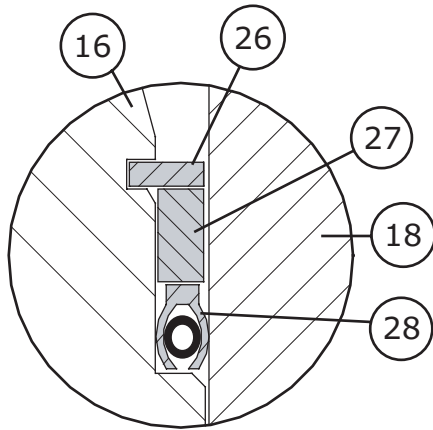
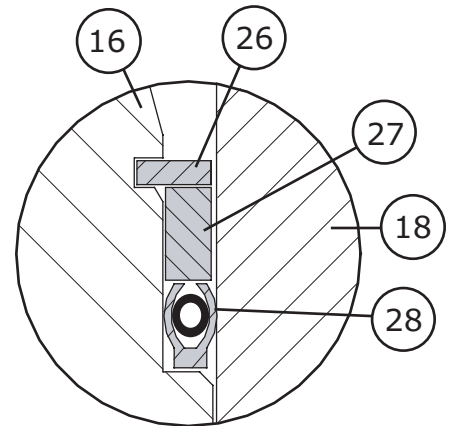


Figure 11 391 Control Valve Piston Ring Diagram



ONE-PIECE SEAL RING
Spring-Loaded
Flow Down
(Cup Faces Down)



ONE-PIECE SEAL RING
Spring-Loaded
Flow Up
(Cup Faces Up)

Figure 12 Detail A - 390 Seal Ring Diagrams



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Parts

| Key | Description | Part Number |
|-------|---|--------------------|
| 1 | Bonnet , if you need a bonnet as a replacement part, order by valve size and stem diameter, serial number and desired material | |
| 2 - 7 | Packing Box Parts Refer to Packing Box Parts Table 5. | |
| 8 | Packing Follower 316 SST | |
| | 1/2" (13 mm) Stem | 1E94433507D |
| | 3/4" (19 mm) Stem | 1E94473507D |
| 9 | Upper Wiper Felt | |
| | 1/2" (13 mm) Stem | 1J87270633D |
| | 3/4" (19 mm) Stem | 1J87280633D |
| 10 | Packing Flange Carbon Steel-Plated | |
| | 1/2" (13 mm) Stem | 1E94422307D |
| | 3/4" (19 mm) Stem | 1E94482307D |
| | 316 SST | |
| | 1/2" (13 mm) Stem | 1F38033507D |
| | 3/4" (19 mm) Stem | 1F38043507D |
| 11 | Packing Stud SA-193-B7 (Qty. 2) | |
| | 1/2" (13 mm) Stem | 1E94443103D |
| | 3/4" (19 mm) Stem | 1E94493103D |
| | SA-193-B8M (Qty. 2) | |
| | 1/2" (13 mm) Stem | 1E94443522D |
| | 3/4" (19 mm) Stem | 1E94493522D |
| 12 | Packing Nut SA-194-2H (Qty. 2) | |
| | 1/2" (13 mm) Stem | 1E94452411D |
| | 3/4" (19 mm) Stem | 1E94462411D |
| | SA-194-8M (Qty. 2) | |
| | 1/2" (13 mm) Stem | 1E94453525D |
| | 3/4" (19 mm) Stem | 1E94463525D |
| 13 | Packing Box Ring 316 SST | |
| | 1/2" (13 mm) Stem | 1J87323507D |
| | 3/4" (19 mm) Stem | 1J87333507D |
| 14 | Lower Wiper Teflon | |
| | 1/2" (13 mm) Stem | 1J87220699D |
| | 3/4" (19 mm) Stem | 1J87230699D |
| 15 | Body , if you need a body as a replacement part, order by valve size and stem diameter, serial number and desired material. | |
| 16 | Valve Plug | Refer to Table 4 |
| 17 | Valve Stem | Refer to Table 6 |
| 18 | Cage | Refer to Table 7 |
| 19 | Valve Plug/Stem Assembly | (Keys 16, 17 & 20) |
| 20 | Pin 316 SST | |
| | 1/2 inch (12.7mm) stem | 1V32273507D |
| | 3/4 inch (19.1mm) stem | 1V32603507D |
| 21 | Seat Ring 316 - Alloy 6 | |
| | 2 inch | 22B6005X01D |
| | 3 inch | 22B6095X01D |
| | 4 inch | 22B9339X01D |
| | 416 SST | |
| | 2 inch | 22B6004X01D |
| | 3 inch | 22B6094X01D |
| | 4 inch | 22B9338X01D |
| 22 | Bonnet Gasket (spiral wound) Inconel 600 / Graphite (Refer to Table 9 for Part Numbers) | |
| 23 | Seat Ring Gasket (spiral wound) Inconel 600 / Graphite (Refer to Table 9 for Part Numbers) | |
| 24 | Bonnet Stud (Qty. 8) SA-193-B7 | |
| | 2 inch | 1D1712X014D |
| | 3 inch | 11A5189X15D |
| | 4 inch | 1P92523101D |
| | SA-193-B8M | |
| | 2 inch | 1D1712X006D |
| | 3 inch | 11A5189X02D |
| | 4 inch | 1P9252X005D |
| | SA-193-B7M | |
| | 2 inch | 1D1712X010D |
| | 3 inch | 11A5189X19D |
| | 4 inch | 1P9252X007D |
| 25 | Bonnet Nut (Qty. 8) SA-194-2H | |
| | 2 inch | 1C1727X033D |
| | 3 inch | 1A4452X042D |
| | 4 inch | 1A44532407D |
| | SA-194-8M | |
| | 2 inch | 1C17273525D |
| | 3 inch | 1A44523525D |
| | 4 inch | 1A4453X002D |



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Parts

| Key | Description | Part Number |
|-----------|--|-------------|
| 25 | Bonnet Nut (con't.) | |
| | SA-194-2HM | |
| | 2 inch | 1C1727X031D |
| | 3 inch | 1A4452X041D |
| | 4 inch | 1A4453X009D |
| 26 | Retaining Ring | |
| | 302 SST | |
| | 2 inch | 10A4220X01D |
| | 3 inch | 10A4219X01D |
| | 4 inch | 16A5484X01D |
| 27 | Backup Ring | |
| | 316 SST | |
| | 2 inch | 10A4218X01D |
| | 3 inch | 10A4217X02D |
| | 4 inch | 16A5483X02D |
| 28 | Seal Ring (model 390) | |
| | Carbon / PTFE / Elgiloy | |
| | 2 inch | 10A4216X01D |
| | 3 inch | 10A4215X01D |
| | 4 inch | 16A5485X01D |
| 29 | Piston Ring (model 391 - Qty: 2) | |
| | Carbon / Graphite | |
| | -425°F to 800°F (-253°C to 426°C) | |
| | 2 inch | 1U2216X001D |
| | 3 inch | 1U2300X001D |
| | 4 inch | 16A5482X01D |
| 30 | Flow Arrow | |
| | Steel | |
| 31 | Yoke Nut | |
| | Steel / Zinc Plated | |
| | 2-13/16 yoke boss | 1E80742306D |
| | 3-9/16 yoke boss | 1E83272306D |
| 32 | Nameplate | |
| | SST | 18A5087X0AD |

Table 4

Key 16 Valve Plug

| Valve Model | Valve Size inch | Port Size inch (mm) | Stem Diameter inch (mm) | Materials | |
|-------------|--------------------|------------------------|----------------------------|-------------|----------------------|
| | | | | 416 SST | 316 SST ¹ |
| 390 | 2 | 1-7/8 (48) | 1/2 (13) | 32B6010X01D | 32B6011X01D |
| | 3 | 2-7/8 (73) | 1/2 (13) | 36A5350X01D | 36A5429X01D |
| | | | 3/4 (19) | 36A5351X01D | 36A5430X01D |
| | 4 | 3-5/8 (98) | 3/4 (19) | 36A5358X01D | 36A5437X09D |
| 391 | 2 | 1-7/8 (48) | 1/2 (13) | 32B6006X01D | 32B6007X01D |
| | 3 | 2-7/8 (73) | 1/2 (13) | 32B8246X01D | 32B8247X01D |
| | | | 3/4 (19) | 32B8248X01D | 32B8249X01D |
| | 4 | 3-5/8 (98) | 3/4 (19) | 32B9346X01D | 32B9347X01D |

1 - 316 SST Plug with Alloy 6 Seat and Guide.



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Keys 2, 3, 4, 5, 6 & 7 Packing Box Parts

Table 5

| Description | Key No. | Stem Diameter inch (mm) | | |
|-------------------------------------|---|-------------------------|-------------|-------------|
| | | 1/2 (12.7) | 3/4 (19.1) | |
| PTFE V-Ring Packing | Packing Set (PTFE) (Refer to Table 8 for Repair Kits) | 2 | 1R29020101D | 1R29040101D |
| | Spring (SST) (for single only) | 5 | 1F12533701D | 1F12563701D |
| | Lantern Ring (SST) (for double only) | 6 | 1J96233507D | 0N02843507D |
| | Quantity Required | Double | 2 | 1 |
| | Special Washer (SST) (for Single only) | 7 | 1F12513604D | 1F12503604D |
| Graphite Ribbon / Graphite Filament | Graphite Ribbon (Ring) | 3 | 1V3802X002D | 1V2396X002D |
| | Quantity Required | Single | 2 | 2 |
| | | Double | 3 | 3 |
| | Graphite Filament (Ring) | 4 | 1E3190X022D | 1E319X028D |
| | Quantity Required | Single | 2 | 3 |
| | | Double | 4 | 5 |
| | Lantern Ring (SST) | 6 | 1J96233507D | 0N02843507D |
| Quantity Required | Single | 3 | 2 | |
| | Double | 2 | 1 | |

Key 17 Valve Stem, S20910 (Nitronic 50)

Table 6

| Valve Size inches | Stem Diameter inches (mm) | Max Valve Travel inches (mm) | Part Number | |
|----------------------|------------------------------|---------------------------------|-------------|-------------|
| | | | 390 Valve | 391 Valve |
| 2 | 3/4 (19.1) | 1-1/2 (38) | 1N8210X009D | 1N8210X009D |
| 3 | 1/2 (12.7) | 2 (51) | 1U4369X007D | 1U2179X007D |
| | 3/4 (19.1) | 2 (51) | 1P6696X003D | 10A9265XV6D |
| 4 | 3/4 (19.1) | 2 (51) | 10A6088X05D | 1L4001X004D |

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Key 18 Cage

Table 7

| Valve Size, inches | 17-4 PH SST | |
|--------------------|-------------|-----------------------|
| | Linear Cage | Equal Percentage Cage |
| 2 | 32B6025X01D | 32B6028X01D |
| 3 | 42B8242X01D | 42B8240X01D |
| 4 | 42B9322X01D | 42B9320X01D |

| Valve Size, inches | 17-4 DH1150 | |
|--------------------|-------------|-----------------------|
| | Linear Cage | Equal Percentage Cage |
| 2 | 32B6025X03D | 32B6028X03D |
| 3 | 42B8242X03D | 42B8240X03D |
| 4 | 42B9322X03D | 42B9320X03D |

| Valve Size, inches | 316 SST (ENC) | |
|--------------------|---------------|-----------------------|
| | Linear Cage | Equal Percentage Cage |
| 2 | 32B6026X01D | 32B6029X01D |
| 3 | 42B8243X01D | 42B8241X01D |
| 4 | 42B9323X01D | 42B9321X01D |

Packing Repair Kits

Table 8

| Stem Diameter [Yoke Boss Diameter] inches (mm) | Single | | Double | | |
|--|-------------|-------------|-------------|-------------|------------------|
| | PTFE | Graphite | PTFE | Graphite | PTFE/Composition |
| 1/2 (12.7) [2-13/16 (71)] | RPACKX0002D | RPACKX0011D | RPACKX0005D | RPACKX0017D | RPACKX0008D |
| 3/4 (19.1) [3-9/16 (90)] | RPACKX0003D | RPACKX0012D | RPACKX0006D | RPACKX0018D | RPACKX0009D |

Keys 22 & 23, Gasket Kits (Qty: 2/kit)

Table 9

| Description | Part Number |
|-------------|-------------|
| 2 inch | 12B7100X03D |
| 3 inch | 12B7100X05D |
| 4 inch | 12B7100X08D |



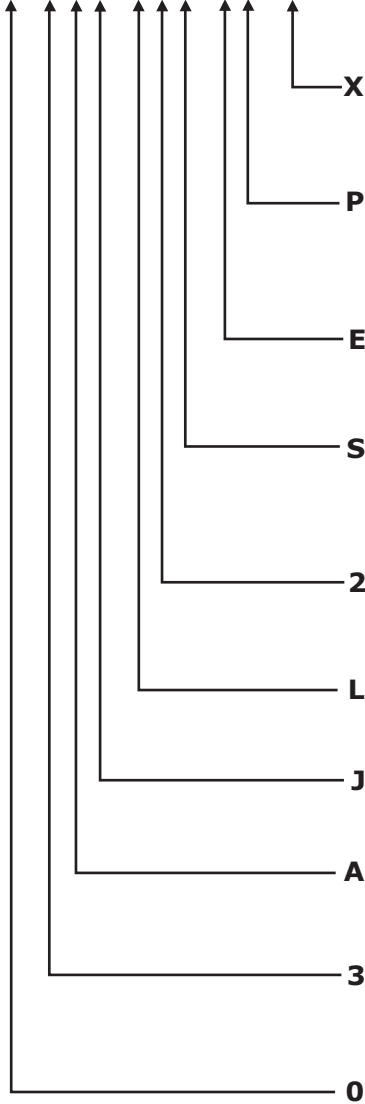
Model **390** Control Valve
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Ordering Guide

Dyna-Flo 390 Series Control Valve | Model Numbering System

Sample Part Number

390-3AJ-L2S-EP-X



| Code | Description |
|------------------------------|---------------------------|
| X | Special |
| Packing Style | |
| P | Spring Loaded PTFE V-Ring |
| D | Double PTFE V-Ring |
| G | Graphite High Temp |
| Characteristic | |
| E | Equal Percentage |
| L | Linear |
| Trim | |
| S | Standard |
| N | NACE / Low Temp |
| C | CF8M Construction |
| H | High Temp (391 Only) |
| X | Special |
| Valve Stem Connection | |
| 2 | 2-13/16" |
| 3 | 3-9/16" |
| Body Material | |
| L | LCC |
| W | WCC |
| M | CF8M |
| Connection Style | |
| F | RF |
| J | RTJ |
| ASME Rating | |
| A | 900 |
| B | 1500 |
| Valve Size | |
| 2 | 2 inch |
| 3 | 3 inch |
| 4 | 4 inch |
| Valve Model | |
| 0 | Style 390 |
| 1 | Style 391 |