CURTISS-WRIGHT

Dyna-Flo DFLP Actuator

Operation, Parts and Instruction Manual

Figure 1 Model DFLP Actuator

Table of Contents

Principles of Operation

The DFLP (Figure 1) is a linear pneumatic piston actuator specifically designed for demanding high powered applications. As air pressure is supplied to one side of the piston while pressure is unloaded on the other side, causing the piston to move.

Dyna-Flo Control Valves

Notice

These instructions are meant to be used with the Dyna-Flo DFLP 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.cw-dynaflo.com**

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

Each actuator is factory checked. Check the calibration for the specific application, before an actuator 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 DFLP Actuator. Revisions are available at above mentioned website.

⚠ WARNING - GENERAL INFORMATION

The following instructions are to be thoroughly reviewed and understood prior to installing, operating or performing maintenance on this equipment. Work on this equipment should be done by experienced personnel and it is the responsibility of the end user to perform regular maintenance and inspections on this equipment. Throughout the manual, safety warnings and caution notes appear and must be strictly followed to prevent serious injury or equipment malfunction.

⚠ WARNING - SCOPE OF MANUAL

The actuator configuration and construction materials were selected to meet particular pressure, temperature, and process conditions. Some material combinations are limited in their pressure and temperature ranges. It is the responsibility of the purchaser and end user to ensure that this equipment meets the required construction material combinations for safe usage in the intended process control application. Do not apply any conditions outside the intended factory manufactured specifications to the actuator without first contacting your Dyna-Flo sales office.

This manual is written to be a practical and useful guide to maintaining the Dyna-Flo DFLP Actuator.

⚠ WARNING - SAFETY INFORMATION

Only well trained, experienced technicians should perform these procedures. Use safe work practices and lock out procedures when isolating valves and actuators. It is also important to wear the proper protective equipment when performing any installation or maintenance activity. It is the responsibility of the end user of this product to select the proper parts and materials rated for the process being used, temperature requirements/limitations, operating conditions, and environmental conditions products will be used in. Special paint systems are available to alleviate effects of corrosion.

To avoid personal injury or installation damage as a result of the sudden release of process pressure or damage to equipment, do not install the actuator 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, 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. Be sure that the actuator is de-energized or in the failed position before performing any maintenance procedure. Refer to any appropriate auxiliary equipment and instrumentation instruction manuals; also enquire with your safety department or process engineer for additional protection measures.

These actuators have dangerous pinch points. Never put your hands near equipment unless you are certain that actuator parts will not move.

Specifications

Actuator Sizes

Model: DFLP

Sizes: 113 and 154

Stem Connection and Yoke Boss Sizes

Stem Size	Yoke Boss Size	Actuator Size	
		113	154
3/4" (0.75mm)	3-9/16" (90.5mm)	✓	×
1" (25.4mm)	5" (127mm)	✓	✓
1-1/4" (31.8mm)	5" (127mm) bolted (5H)	✓	✓

Actuator Configurations

- Double-Acting
- Throttling (Positioner Required)
- On-Off (Switching Device Required)

Cylinder Operating Pressure

Minimum Recommended:

- 20 PSIG (1.38 BARG)
- When used with a positioner, always set supply pressure 5 PSI (0.35 BAR) above actuator requirement. DO NOT exceed the Maximum Allowable Operating Pressure (Table 1).

Maximum Allowable Travel

Actuator Size	Travel	
	Inch	mm
3113-4	4	101.6
4113-4	4	101.6
4113-8	8	203.2
5113-4	4	101.6
5113-8	8	203.2
4154-4	4	101.6
4154-8	8	203.2
5154-4	4	101.6
5154-8	8	203.2

Stroking Time

Stroking time is dependant on actuator size, length of travel, and positioner (if used). For more information, consult your Dyna-Flo Sales Office.

Maximum Temperature Limitations

-40°F to 180°F (-40°C to 82°C)

Pressure Connections

1/4" (6.35mm) FNPT (Standard)

3/4" (19.1mm) FNPT (Optional pipe-away vent)

Actuator Mounting

Vertical on valve yoke, 360° rotatable for optimum accessory orientation.

Construction Materials

Refer to Page 20 for actuator parts construction materials.

Contact your Dyna-Flo Sales Office for more information.

Cross-Section of the DFLP

Refer to Figure 28.

Actuator Dimensions

Refer to Figure 2 of the Sales Bulletin.

Refer to Table 1 of the Sales Bulletin.

Approximate Actuator Weights

Size 113: 245 lb. (111 Kg)

Size 154: 295 lb. (134 Kg)

For more information and other options contact your Dyna-Flo Sales Office.

Table 1

Available Piston Area, Maximum Operating Pressure and Maximum Available Thrust

Actuator Size	Piston Diameter		Piston Area		Max. Operating Pressure		Max. Thrust	
	Inch	mm	$Inch^2$	cm^2	Psi	Bar	lbf.	N
3113	12	305	113.10	730	85	5.86	9,605	42,725
4113	12	305	113.10	730	110	7.58	12,430	55,291
5113	12	305	113.10	730	110	7.58	12,430	55,291
4154	14	356	153.94	993	110	7.58	16,940	75,353
5154	14	356	153.94	993	110	7.58	16,940	75,353

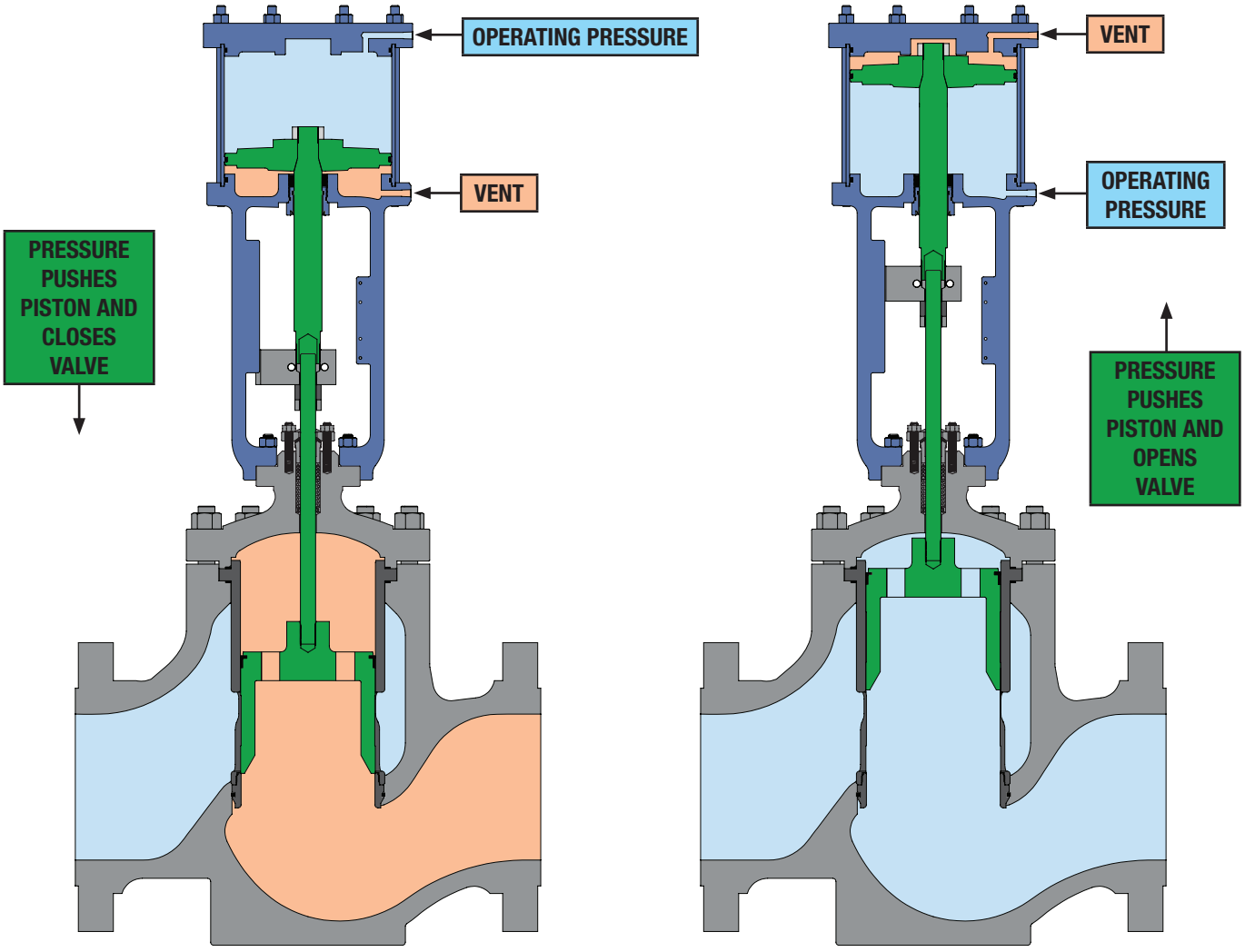

Figure 2 Actuator Operation and Valve Plug Placement for Direct Acting (Push-Down-to-Close) Valves

Unpacking Actuator From Shipping Container

Special Tools Required:

- Properly Rated Lifting Straps (2 – 4 Straps) refer to Page 3 for actuator weights.
- Lifting Device (Example: Crane)

Check the packing list, verify that the list includes all the proper items in the shipping container before unpacking. Product information can be found on the nameplate (Key 26), verify that the product is correct. Refer to Figure x for nameplate location.

NOTE: Actuators are typically shipped from factory mounted to a control valve as an assembly. Refer to the appropriate valve instruction manual as necessary.

⚠ WARNING

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

When lifting the valve assembly from shipping container, place properly rated lifting straps securely around the neck of the actuator and valve body. Straps should be placed to avoid damage to tubing and other mounted accessories. Strap placement may need to be adjusted for actuators that are not connected to a valve.

Lift the valve/actuator assembly using proper lifting techniques.

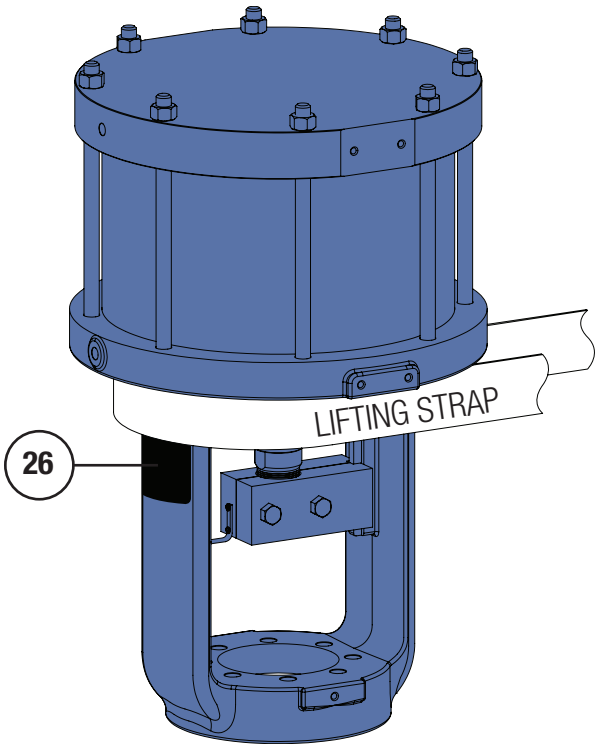

Figure 3 Actuator Lifting Suggestions

Installation

⚠ WARNING

Before You Begin:

- Read the Warnings on Page 2.
- Sudden movement of actuator can cause damage or injury. Remove any operating medium to the actuator before performing any work.
- Use safe work practices and lock out procedures before placing valve or actuator in-line.
- Always wear the appropriate personal protective equipment.
- Do not use operating pressure that exceeds the Maximum Actuator Casing Pressure. Refer to Table 1. Also, be sure that the operating pressure does not create a force on the piston rod (Key 9) that is greater than the maximum allowable thrust.
- Property damage, environmental harm, and personal injury can result from the use of supply gas other than clean, non-corrosive, oil and moisture free air.
- Operating medium must be controlled and directed, if a positioner was not ordered or unavailable, use a loading device such as a 4-way switching valve or regulator. For more information on positioner installation and operation, refer to the appropriate positioner instruction manual for your positioner type.

Actuators are typically shipped from factory as an assembly already mounted to the valve. Actuator and valve assemblies should be stroked before installation to verify proper travel and operation, placement of the connecting block (Key 18) may need to be adjusted if travel needs to be adjusted. Follow the appropriate valve installation instructions to install the actuator/valve assembly in-line.

If the actuator was shipped separately, it will be necessary to mount the actuator to the valve prior to installation, refer to the Actuator Mounting instructions on Page 6.

Air Piping:

NOTE: Standard actuators accept ¼" (6 mm) NPT connections. Refer to the Specifications and Table 1 for the proper actuator supply pressure required.

Piping Installation Steps:

1. Use 3/8" (8x10mm) outside diameter tubing (or equivalent) for air lines. Keep lines as short as possible. **NOTE:** If a Positioner or Regulator is attached to the assembly from factory, connect the supply lines to the instrumentation as appropriate.

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

Installation (Continued)

Actuator Mounting:

NOTE: The following mounting instructions are for Direct Acting (Push-Down-to-Close) valve assemblies only. If you require instructions for mounting the actuator to a Reverse Acting (Push-Down-to-Open) valve, please contact Dyna-Flo Control Valve Services.

Lubricants Required:

- Permatex® Nickel Anti-Seize or equivalent (Key A)

⚠ WARNING

For safety purposes, it is recommended that the actuator be de-energized before mounting. It may however be necessary to apply operating pressure to move the piston rod (Key 9) away from the valve stem (Key V) to avoid damage before mounting.

1 Secure the valve assembly in place on a flat work surface or clamping device that will support the combined weight of the valve and actuator assembly. Place the valve into its closed position.

2 Thread the jam nut (Key 21) and hex nut (Key 22) down the valve stem (Key V) to the end of the threads.

NOTE: DFLP actuators with a yoke boss smaller than 5 inch (127 mm), Size 113, utilize a yoke locknut (Key 20) to secure the actuator to the valve. Actuators with a yoke boss of 5 inch (127 mm) are secured to the valve by bolting with 8 studs and nuts (Keys 2 & 13).

3 Apply Permatex® Nickel Anti-Seize (Key A) to the threads of the valve bonnet or actuator mounting studs (Key 23). **NOTE:** If the 8 actuator mounting studs were removed or never installed, install them now by threading them into the valve bonnet with the material stamp of the stud facing up and visible.

4 Carefully lift and lower the actuator into place on the valve and orientate the actuator as shown in Figure 4. **NOTE:** For Size 113 actuators, the travel disc (Key 17) and yoke locknut (Key 20) must be passed through the window of the actuator and between the valve and piston rod (Key 9) when the actuator is being lowered. Refer to Figures 4 & 6.

5 Secure the actuator to the valve by tightening either the yoke locknut (Key 20) or hex nuts (Key 24). Refer to Figures 5 & 7 for tightening procedures. **NOTE:** Tighten the hex nuts in an alternating criss-cross pattern until completely tight.

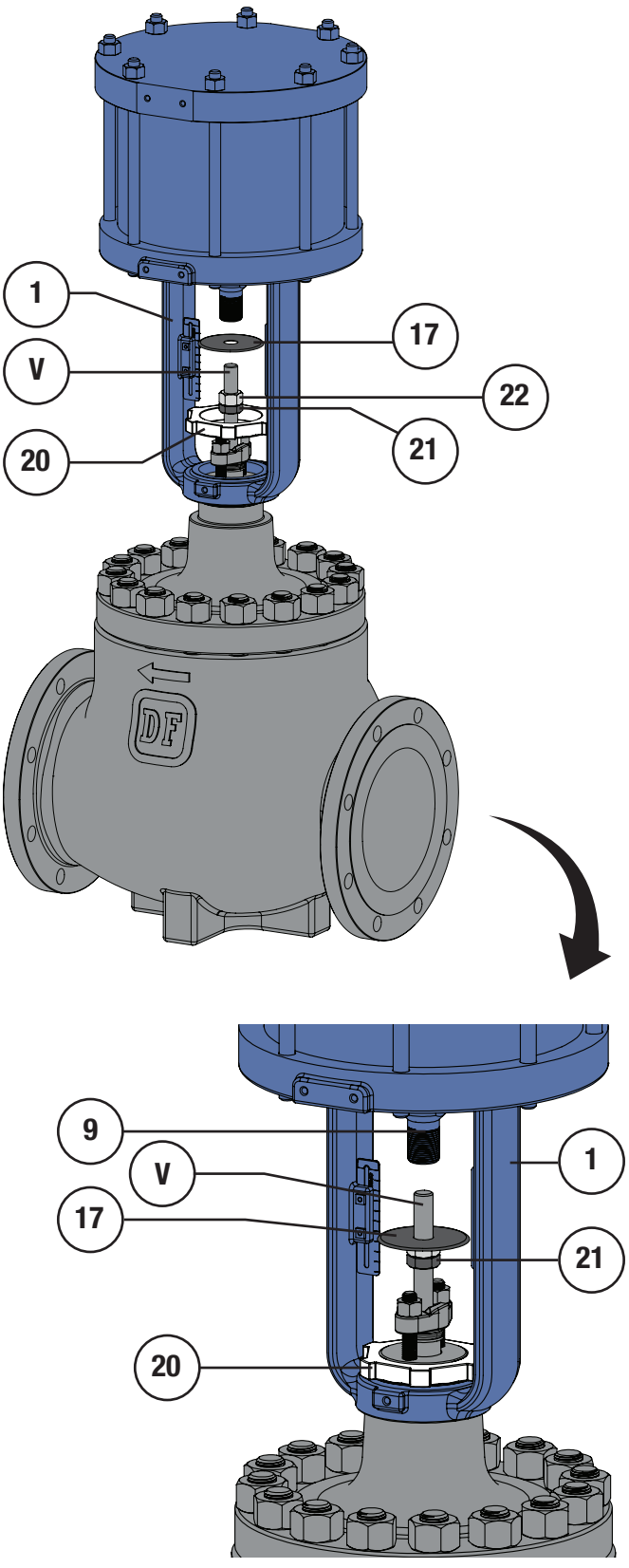

Figure 4 Size 113 Actuator Mounting (3-9/16" Yoke Boss)

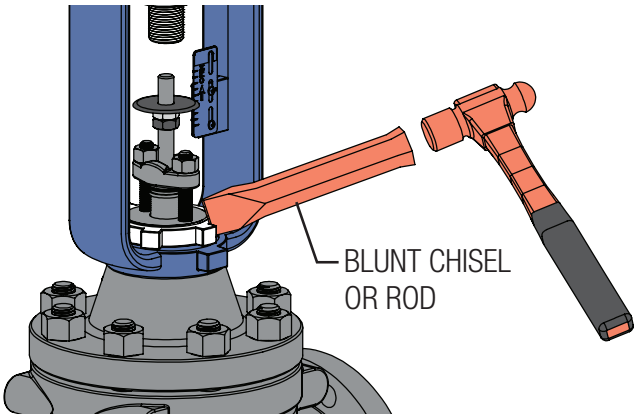

Figure 5 Yoke Lock Nut Tightening (Size 113)

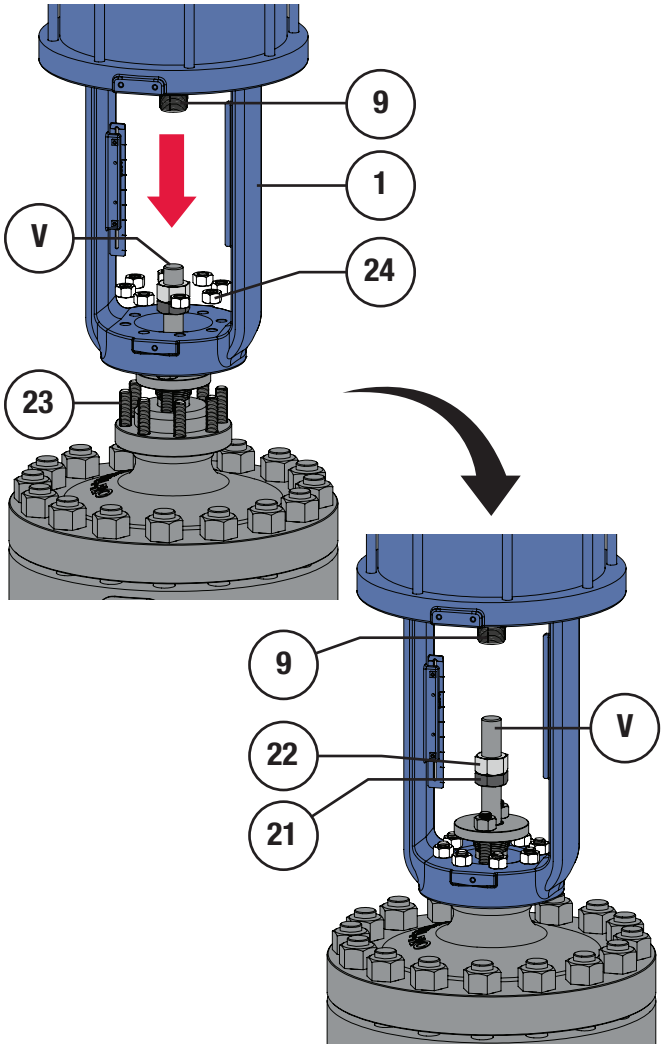

Figure 6 Size 154 Actuator Mounting

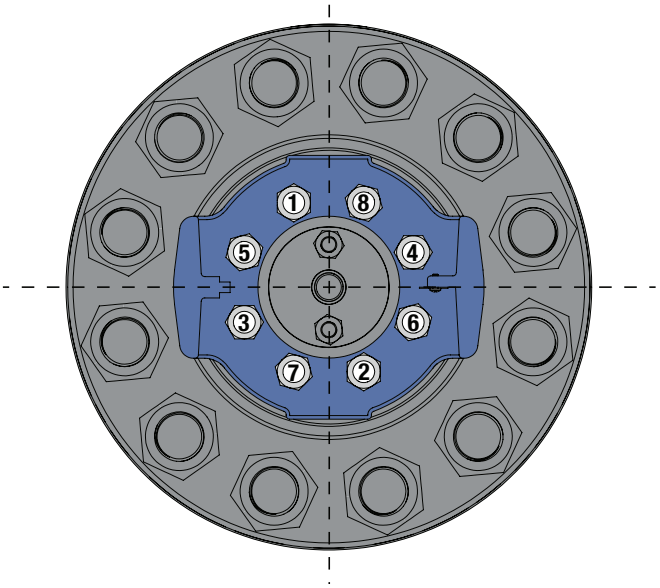

Figure 7 Mounting Nut Tightening Order

Installation (Continued)

Connecting Block Installation:

NOTE: The following mounting instructions are for Direct Acting (Push-Down-to-Close) valve assemblies only. If you require instructions for mounting the actuator to a Reverse Acting (Push-Down-to-Open) valve, please contact Dyna-Flo Control Valve Services.

⚠ WARNING

It is important that the valve stem (Key V) not be rotated during connecting block installation, stem rotation can damage internal valve parts. Once installed, the connecting block has an anti-rotation track.

1 If the travel scale (Key 14) was removed or not yet installed, loosely install the travel scale using the nuts (Key 16) and machine screws (Key 15). **NOTE:** The travel scale will help measure the required distance of stem travel when installing the connecting block.

2 Place the valve into the closed position. Move the piston rod (Key 9) of the actuator to the top of its stroke. **NOTE:** Operating medium may need to be applied to the actuator to move the piston (Key 10) and piston rod.

3 Adjust the jam nut (Key 21) and hex nut (Key 22) so that they are threaded on the valve stem (Key V) as far as possible. If not already installed, place the travel disc (Key 17, not used on some sizes) on the valve stem so that it sits on the hex nut.

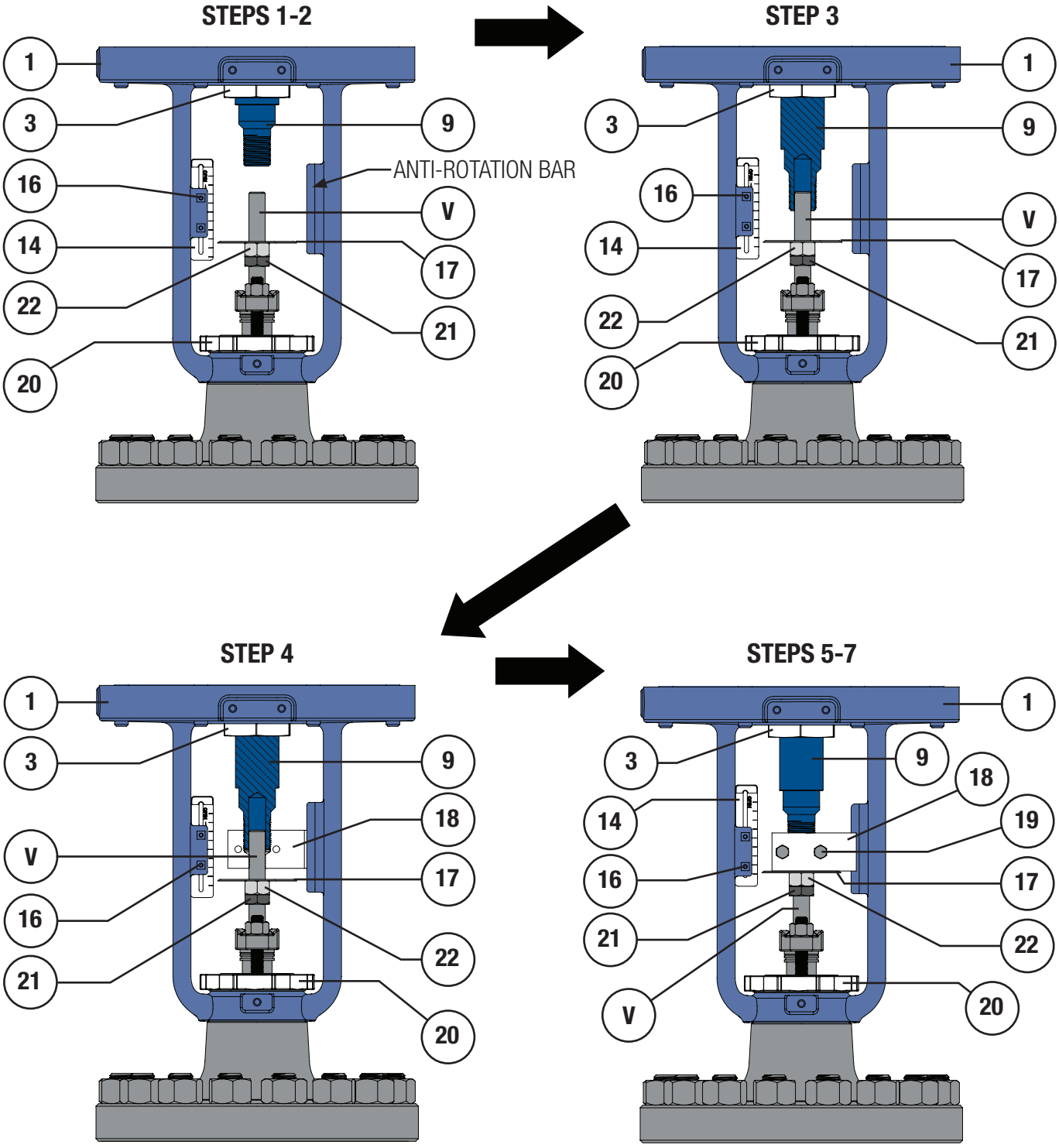

Figure 8 Connecting Block Installation (Size 3113 / 3-9/16" Yoke Boss Shown)

Installation (Continued)

Connecting Block Installation (Continued):

4 Apply the appropriate amount of regulated operating pressure to the actuator to achieve the required amount of actuator travel (distance the piston rod moves).

⚠ WARNING

Apply operating pressure and moving the piston rod (Key 9) closer to the valve stem (Key V) will create a dangerous pinch point, use caution. Also, be cautious not to damage either the piston rod or valve stem as the piston rod should overlap the valve stem at full travel.

5 Install the connecting block (Key 18) using the cap screws (Key 19) as shown in Figures 8 & 9. **NOTE:** Proper alignment of the connecting block is essential, the threads of the connecting block should engage the threads of the valve stem (Key V) and piston rod (Key 9) by a distance equal to that of the stem/rod diameter or greater. Avoid cross-threading any parts, a slight change in supply pressure may be necessary to achieve proper alignment.

6 Re-adjust the jam nut (Key 21), hex nut (Key 22) and travel disc (Key 17, not included on some sizes) so that the travel disc is snug to the bottom of the connecting block (Key 18).

7 Re-position the travel scale (Key 14) so that the travel disc (Key 17) or travel indicator (Key 18A) is aligned with the scales closed position.

8 Stroke the actuator and valve to verify travel accuracy and that the assembly is operating correctly. If the travel is incorrect, it may be necessary to repeat the connecting block installation procedures or to re-adjust the connecting block (Key 18) position on the piston rod/stem.

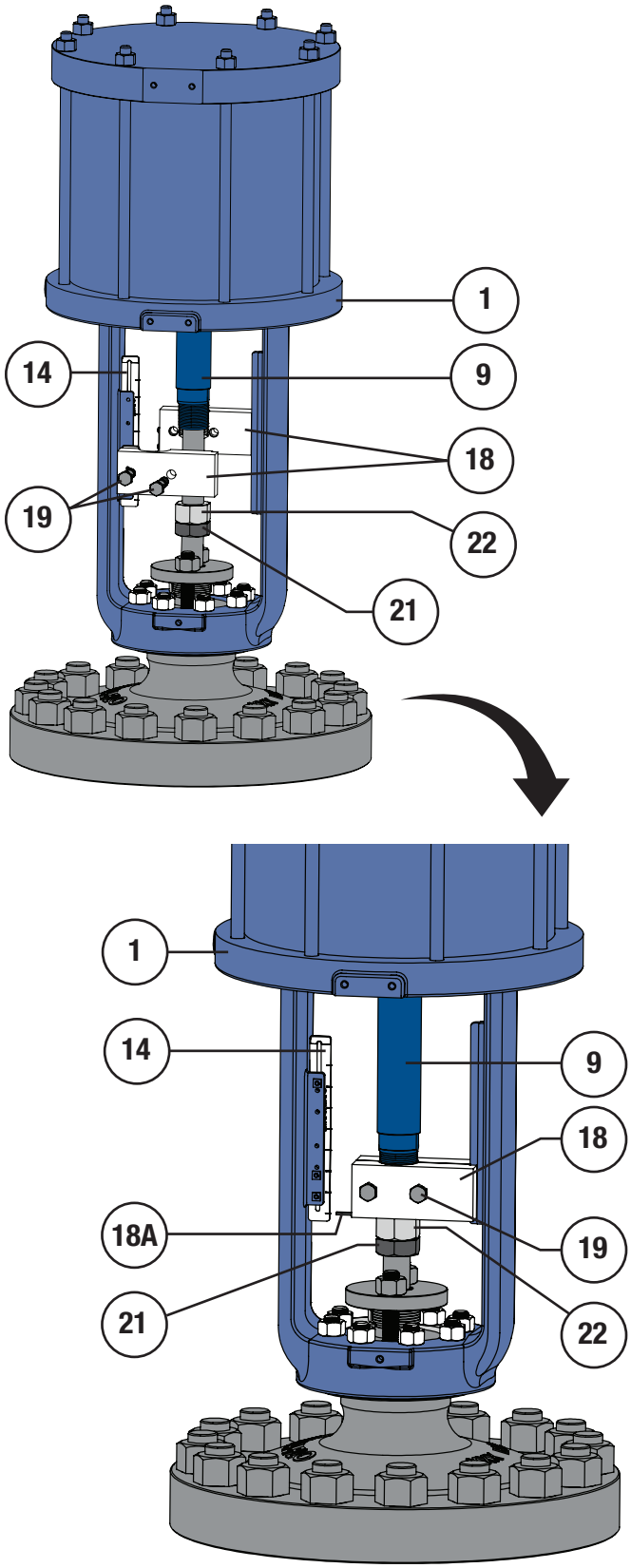

Figure 9 Large Size Connecting Block Installation Detail

Periodic Inspection / Maintenance

⚠ WARNING

Before You Begin:

- Read the Warnings on Page 2.
- Use safe work practices and lock out procedures as necessary.
- Be aware of potentially hazardous process material that may be present in-line, in-valve and in the area. Refer to the appropriate equipment manuals and enquire with your safety department or process engineer for additional protection measures.
- Seals and soft parts should all be inspected frequently for leaks, wear and damage. It is the responsibility of the end user to perform regular inspections and maintenance on this equipment.

Inspection Steps:

1 Check for visible signs of leakage around all seal, o-ring and gasket areas.

2 Check the assembly for damage, especially damage caused by corrosive fumes or process drippings. Pay special attention to scratches or damage to the piston rod (Key 9).

3 Clean and repaint areas as required.

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

5 Clean any dirt and foreign material from the piston rod (Key 9).

Maintenance:

Recommended maintenance for DFLP actuators consists of disassembling the actuator and replacing seals and damaged parts. Refer to the DISASSEMBLY section on Page 11 for instructions on the removal of seals and parts.

Valve/Actuator Separation

⚠ WARNING

Before You Begin:

- Read the Warnings on Page 2. Use appropriate safe work practices and lock out procedures.
- Relieve process pressure and drain the process fluid from up and down stream of valve.
- Sudden movement of actuator can cause damage or injury. It is recommended that the actuator be de-energized before removal, however, it may be necessary to apply operating pressure to move the piston rod (Key 9) away from the valve stem (Key V) to avoid damage.
- Always wear the appropriate personal protective equipment.
- Do not use operating pressure that exceeds the Maximum Actuator Casing Pressure. Refer to Table 1.
- 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.
- Remove the actuator from the valve using properly rated lifting hooks or straps.
- Use safe work practices and lock out procedures before separating the actuator from valve when in service. 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, in-valve and in area. Use a bypass or block valve if necessary, or completely shut off the process. Refer to the appropriate valve instruction manual and enquire with your safety department or process engineer for additional protection measures.

Special Tools Required:

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

NOTE: The actuator can be separated from the valve while the valve body remains in the pipeline. Support the weight of the actuator using properly rated lifting hooks or straps. If the valve assembly has been removed from the pipeline, place the assembly on a flat work surface or clamping device that can support the combined weight.

1 Separating the valve from the actuator will usually require the disconnection of instrumentation and/or tubing connected to the actuator. Refer to the appropriate instrument instruction manuals. **NOTE:** Regulated operating supply pressure may be required when separating the actuator from the valve.

2 Place the valve into the closed position and vent any pressure to the actuator. Support the actuator with a lifting device.

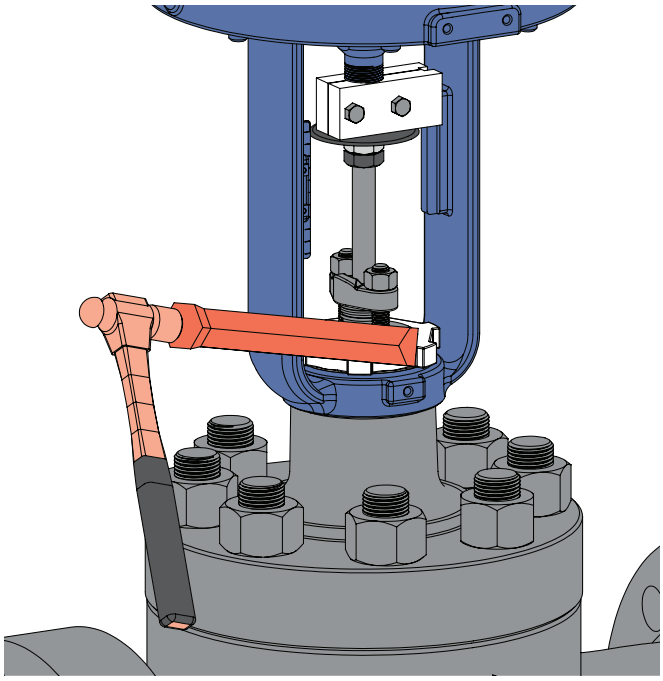

Figure 10 Yoke Lock Nut Loosening

Valve/Actuator Separation (Continued)

3 Loosen and lower the jam nut (Key 21), hex nut (Key 22) and travel disc (Key 17, for smaller sized actuators) away from the connecting block (Key 18). Refer to Figure 8.

4 Remove the connecting block cap screws (Key 19) and separate/remove the connecting block (Key 18).

⚠ WARNING

Be careful not to damage either the piston rod or valve stem as the piston rod should overlap the valve stem at full travel. It is also important that the valve stem (Key V) not be rotated during actuator removal. Rotating the valve stem can cause internal valve damage.

5 Use the blunted chisel and hammer to remove the yoke locknut (Key 20) or remove the nuts (Key 24) depending on the size of the DFLP actuator. Refer to Figures 5 and 6.

6 Carefully lift the actuator off of the valve body. Remove any parts that may have been installed between the actuator and valve, such as travel disc (Key 17) and yoke locknut (Key 20).

7 To prepare for actuator disassembly, secure the actuator assembly in a clamping device or on a work surface that will support the weight of the assembly.

Disassembly

⚠ WARNING

Before You Begin:

- Read the Warnings on Page 2.
- Sudden movement of actuator can cause damage or injury. Remove any operating medium to the actuator before performing any work.
- Use safe work practices and lock out procedures before working on any equipment that is in service.
- Always wear the appropriate personal protective equipment.
- Disassembly of the actuator may be conducted without separating the actuator from the valve, it is however recommended that they be separated before disassembly. Refer to Valve/Actuator Separation instructions on Page 10.
- Relieve process pressure and drain the process fluid from up and down stream of valve if necessary.
- Be aware of potentially hazardous process material that may be present in-line, in-valve and in area. Isolate the valve from process pressure. Use a bypass or block valve if necessary, or completely shut off the process. Relieve process pressure and drain the process fluid from up and down stream of valve if necessary. Refer to the appropriate valve instruction manual and enquire with your safety department or process engineer for additional protection measures.
- Do not use operating pressure that exceeds the Maximum Actuator Casing Pressure. Refer to Table 1.

Special Tools Required:

- Mechanic's pick set

1 Disconnect any instrumentation and/or tubing connected to the actuator. Refer to the appropriate instrument instruction manuals. **NOTE:** Regulated operating supply pressure may still be required when disassembling the actuator.

NOTE: The following instructions assume that the actuator was separated from the valve. If the actuator is still attached to the valve, remove the connecting block (Key 18) by following Steps 2-4 of the Valve/Actuator Separation instructions on Page 10.

2 Remove the cylinder nuts (Key 13).

3 Remove the cylinder plate (Key 12).

4 Remove the cylinder plate o-ring (Key 7) using a mechanic's pick set. **NOTE:** All o-rings must be replaced.

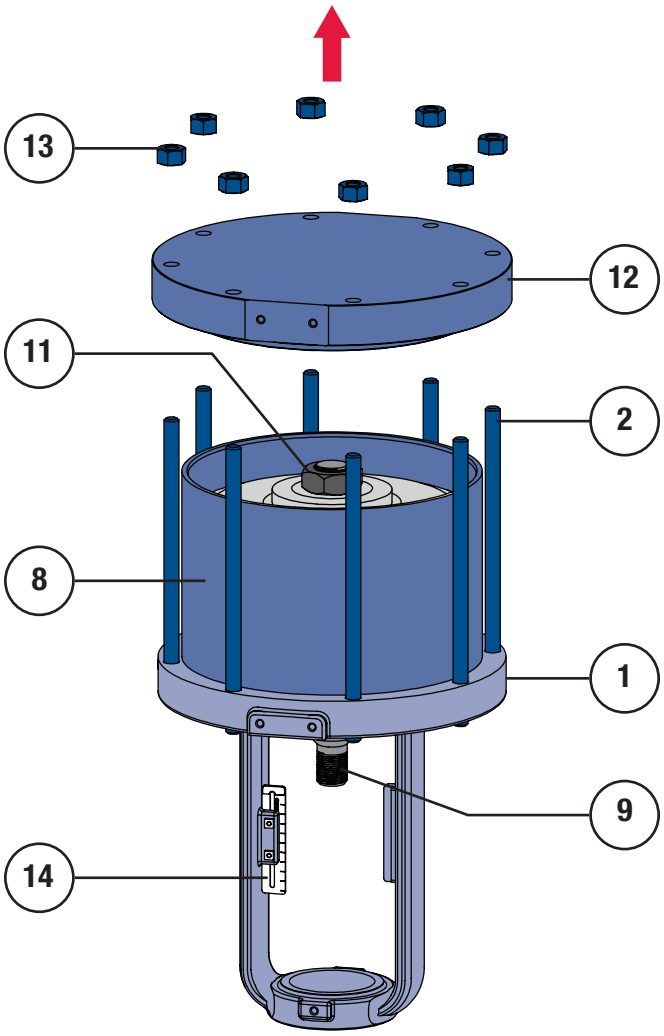

Figure 11 Cylinder Plate Removal

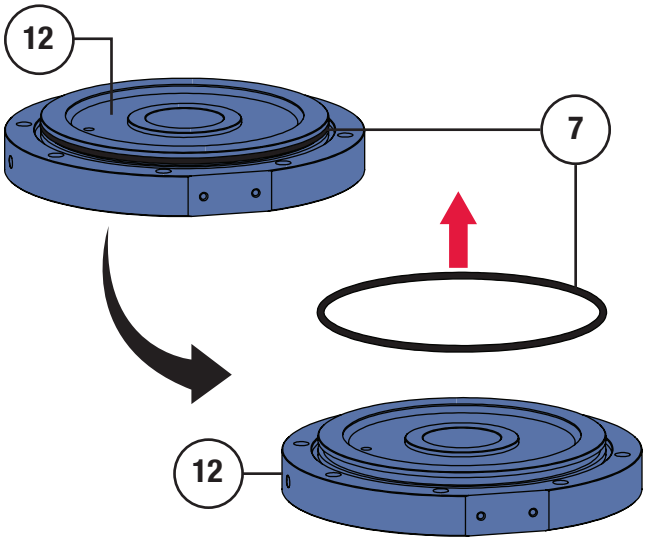

Figure 12 Cylinder Plate O-Ring Removal

Disassembly (Continued)

5 Remove the piston assembly (Keys 7, 9, 10, 11) through the open end of the cylinder (Key 8). **NOTE:** Only separate the piston assembly (Keys 9, 10, 11) if necessary, the o-ring (Key 7) must always be removed and replaced.

Piston Assembly Separation:

A Place a wrench on the flats of the piston rod (Key 9) and remove the jam nut (Key 11) as shown in Figure 14 (or double nut the end of the piston rod to keep the rod from twisting).

B Remove the piston (Key 10) from the piston rod (Key 9).

6 Remove the cylinder (Key 8).

7 Remove and replace the o-ring (Key 7) from the yoke (Key 1).

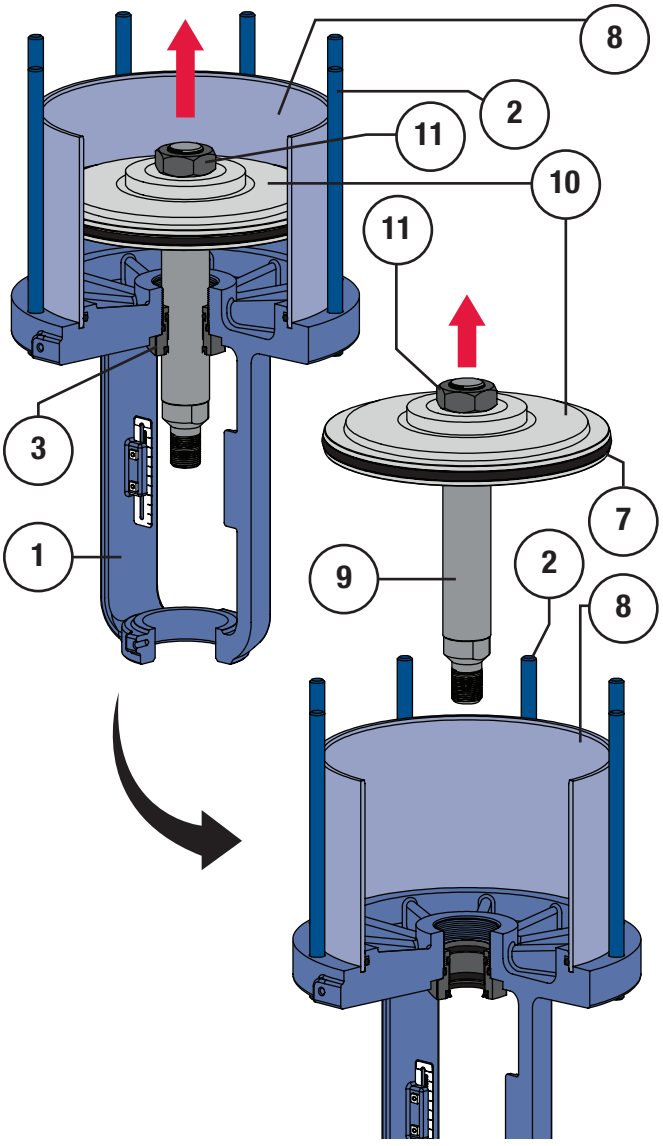

Figure 13 Piston Assembly Removal

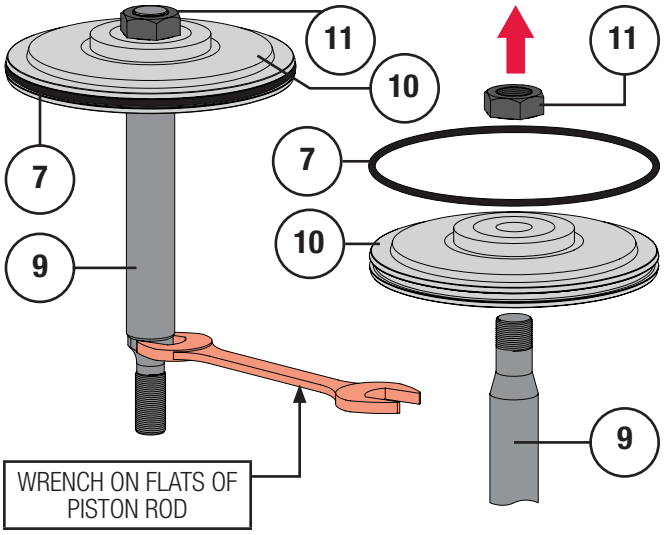

Figure 14 Piston Assembly Separation

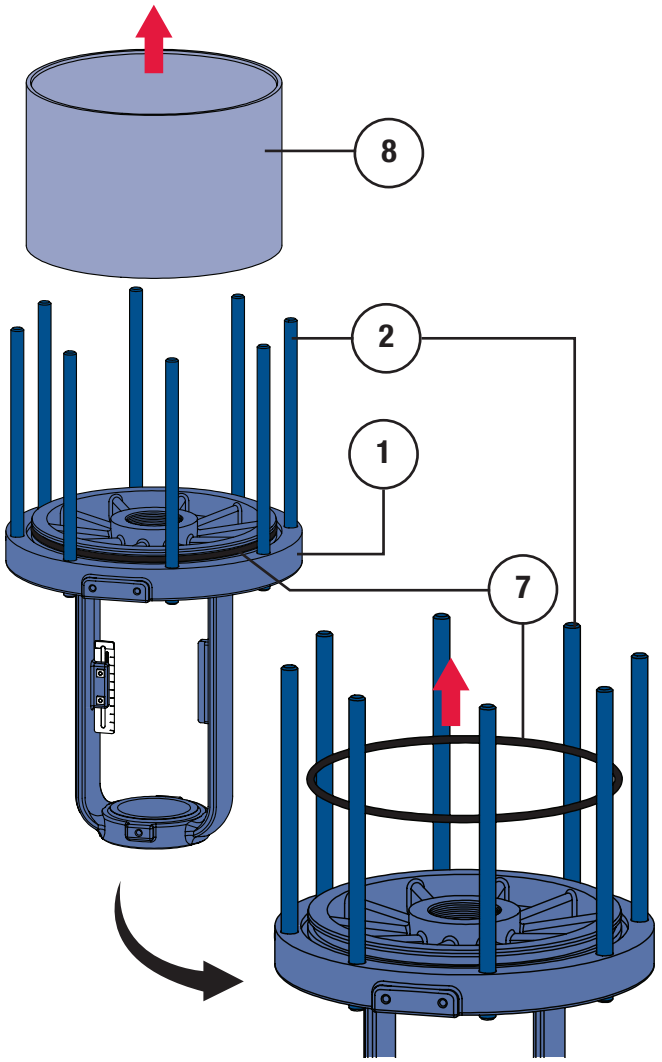

Figure 15 Cylinder and O-Ring Removal

Disassembly (Continued)

8 Remove the travel stop (Key 25) if installed. Refer to Figure 20 on Page 15.

9 Remove the busing (Key 3). Refer to Figure 16.

10 Using a mechanic's pick set, remove both o-rings (Key 4 & 5) and lower wiper (Key 6) from the bushing (Key 3). Refer to Figure 17.

11 If necessary, remove the travel scale (Key 14) by removing the nuts (Key 16) and machine screws (Key 15). Refer to Figure 18.

12 Clean and inspect all parts for damage. Replace or repair parts as necessary. All soft parts such as the lower wiper (Key 6) and o-rings must be replaced.

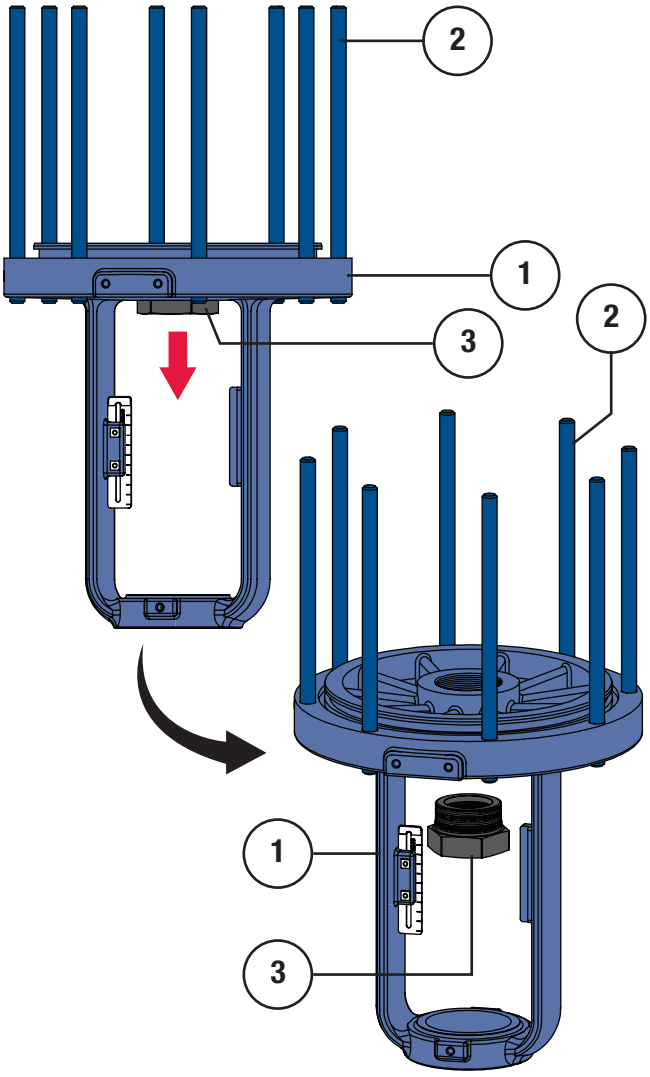

Figure 16 Bushing Removal

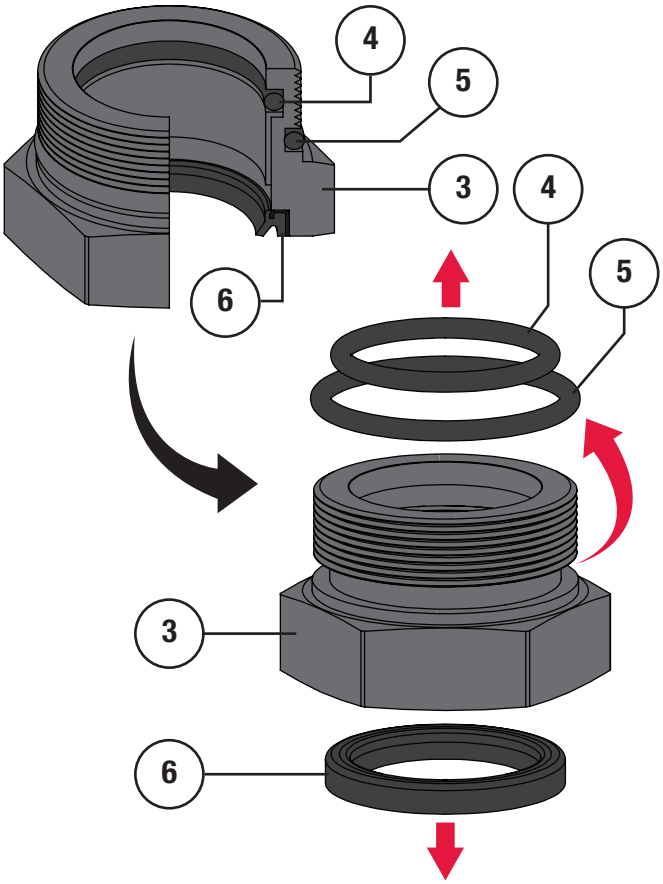

Figure 17 Bushing O-Ring Removal

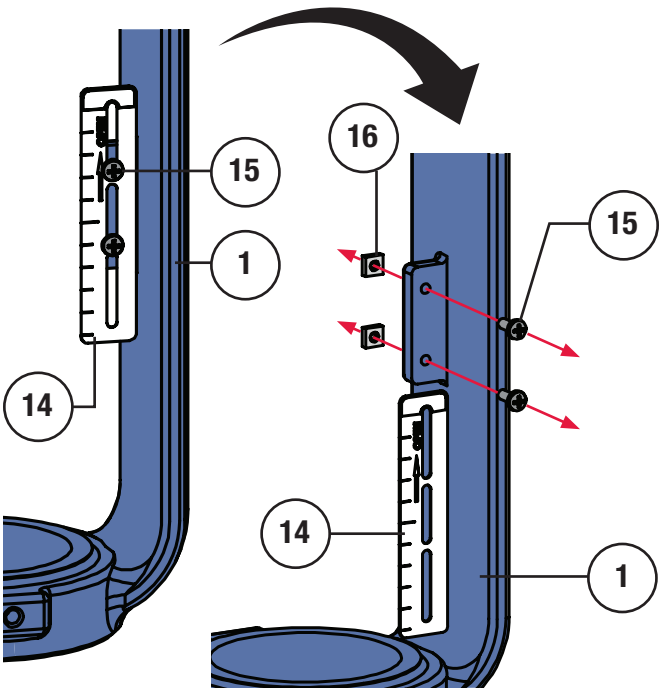

Figure 18 Travel Scale Removal

Assembly

⚠ WARNING

Before You Begin:

- Read the Warnings on Page 2.
- Clean and inspect all parts.
- Replace or repair damaged parts. Replace all soft parts (Seals, o-rings and gaskets).
- Always wear the appropriate personal protective equipment.
- Always use properly rated studs (Keys 2 & 23) and nuts (Key 13 & 24) approved by Dyna-Flo Control Valve Services with visible material grade identification marks. Service pressures and operation can lead to excessive stress on material unapproved for use in this particular service, property damage or personal injury may result.
- Do not use operating pressure that exceeds the Maximum Actuator Casing Pressure. Refer to Table 1.
- Property damage, environmental harm, and personal injury can result from the use of supply gas other than clean, non-corrosive, oil and moisture free air.
- Operating medium must be controlled and directed, use a loading device such as a 4-way switching valve or regulator. Refer to the appropriate instruction manual for the instrumentation used.

Lubricants Required:

- Permatex® Nickel Anti-Seize or equivalent (Key A)
- Dow Corning Molykote® 5 or equivalent (Key B)
- LOCTITE® 565 Instant Adhesive or equivalent (Key D)

Cylinder Stud Installation:

1 If the cylinder studs (Key 2) were damaged and removed, or never installed, apply Permatex® Nickel Anti-Seize (Key A) to the threads of the end of the stud without a material stamp.

2 Thread the stud (Key 2) completely into the yoke (Key 1) as shown in Figure 19.

Travel Stop Installation:

1 Apply Permatex® Nickel Anti-Seize (Key A) to the threads of the travel stop (Key 25).

2 Thread the travel stop (Key 25) into the yoke (Key 1) as shown in Figure 20.

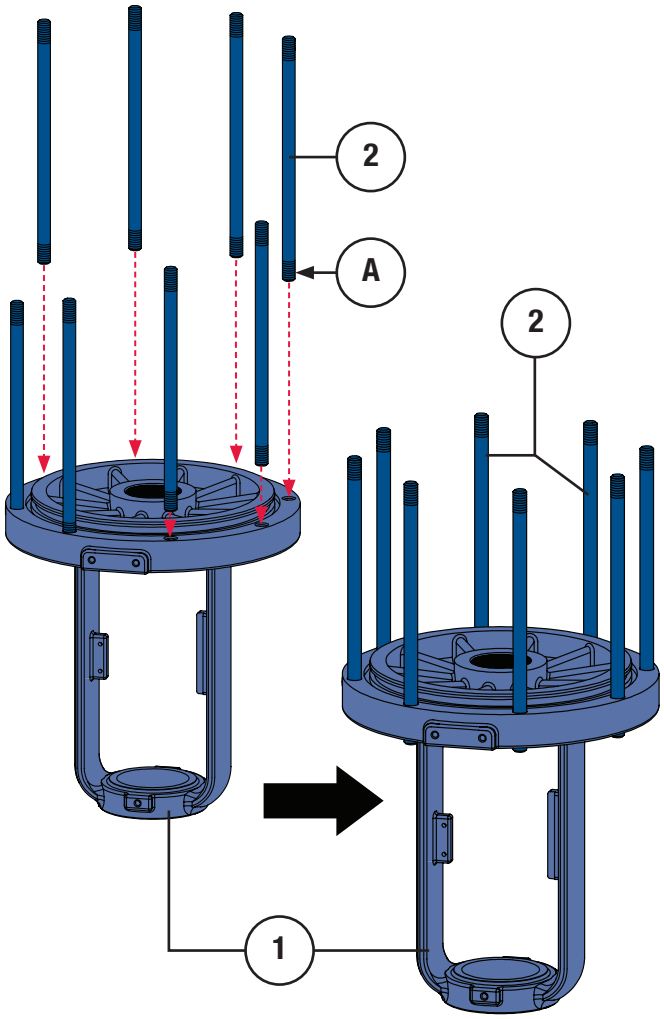

Figure 19 Cylinder Stud Installation

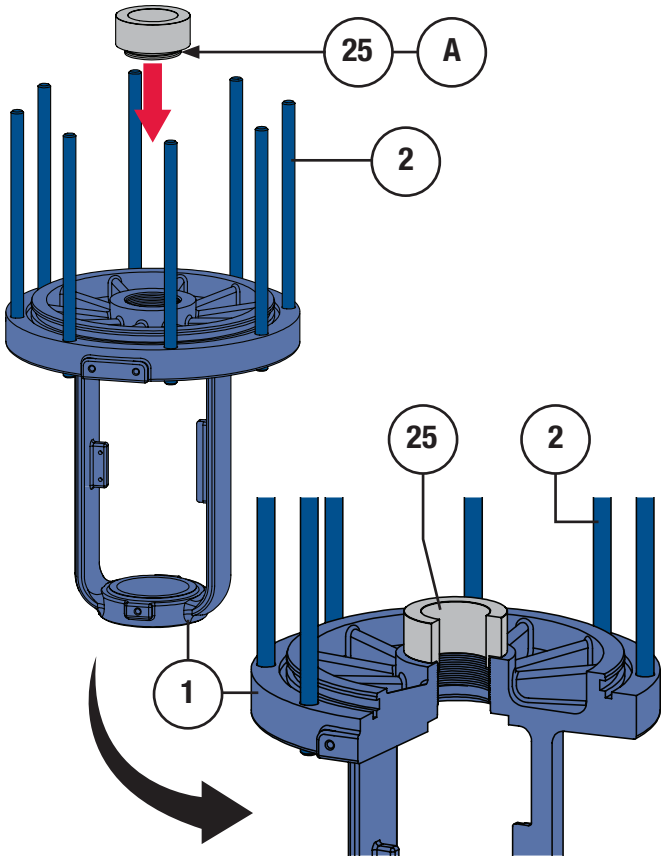

Figure 20 Down Travel Stop Installation

Assembly (Continued)

Bushing Assembly:

1 Apply Dow Corning Molykote® 5 (Key B) to the bushing o-rings (Keys 4 & 5) and install them as shown in Figure 21.

2 Apply Dow Corning Molykote® 5 (Key B) to the lower wiper (Key 6) and install it as shown in Figure 21.

Bushing Installation:

1 Thread the bushing assembly (Key 3, 4, 5 & 6) into the yoke (Key 1) until hand tight.

2 Using a wrench, snug the bushing (Key 3) into the yoke (Key 1) just tighter than hand tight.

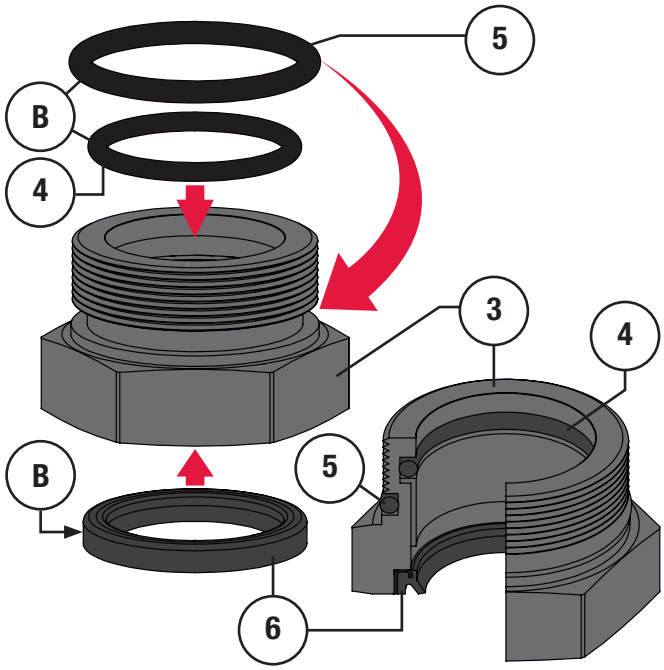

Figure 21 Bushing Assembly

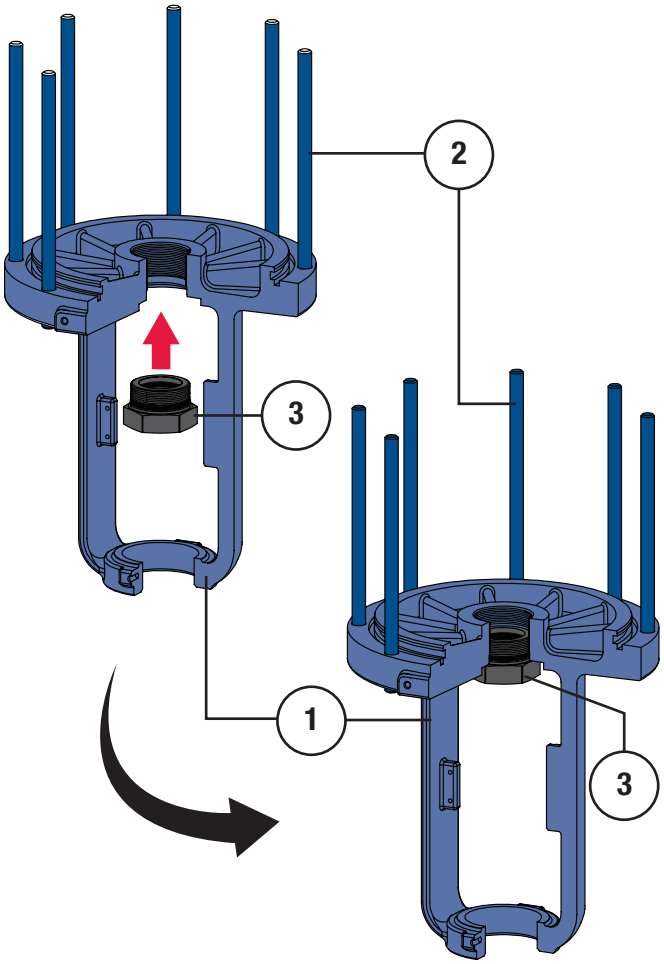

Figure 22 Bushing Assembly Installation

Cylinder Installation:

1 Apply Dow Corning Molykote® 5 (Key B) to the cylinder o-ring (Key 7) and install it into the o-ring groove of the yoke (Key 1) as shown in Figure 23.

2 Apply Dow Corning Molykote® 5 (Key B) to the inside surface of the cylinder (Key 8) and then install the cylinder onto the yoke (Key 1) so that it seats as shown in Figure 23.

Piston Assembly:

1 Apply LOCTITE® 565 Instant Adhesive (Key D) to the tapered shoulder of the piston rod (Key 9) as shown in Figure 24.

2 Set the piston (Key 10) onto the piston rod (Key 9) as shown in Figure 24.

3 Apply Permatex® Nickel Anti-Seize (Key A) to the threads of the piston rod (Key 9) and thread on the jam nut (Key 11).

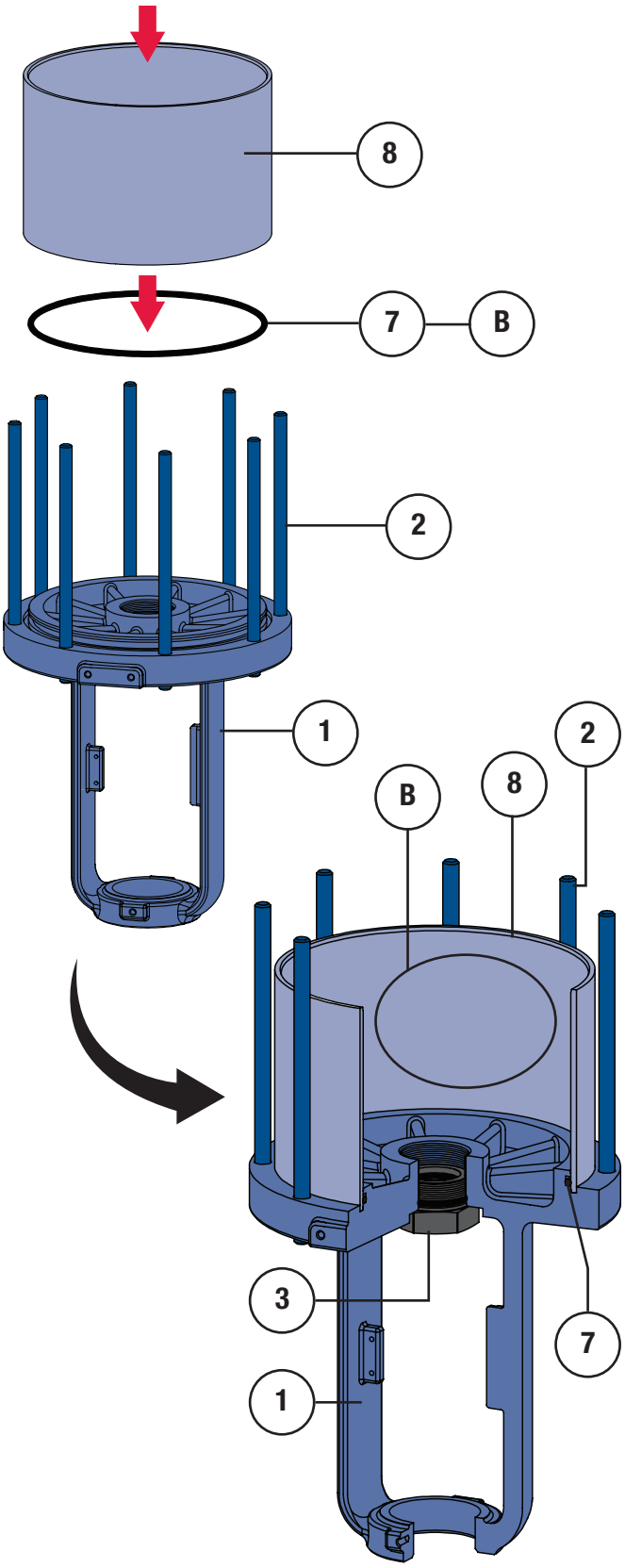

Figure 23 Cylinder Installation

Assembly (Continued)

Piston Assembly (Continued):

4 Hold the piston rod (Key 9) by placing a wrench on the flats as shown in Figure 24, or, double nut the bottom of the piston rod and use a wrench on the those nuts. Torque the jam nut (Key 11) to 635 lbf-ft (861 N•m).

5 Apply Dow Corning Molykote® 5 (Key B) to the piston o-ring (Key 7) and install it into the o-ring groove of the piston (Key 10). Refer to Figure 24.

6 Slide the piston assembly (Keys 7, 9, 10 & 11) through the bushing (Key 3) or travel stop (Key 25) and down into the cylinder (Key 8) as shown in Figure 25.

Cylinder Plate Installation:

1 Apply Dow Corning Molykote® 5 (Key B) to the o-ring (Key 7) and install it into the o-ring groove of the cylinder plate (Key 12) as shown in Figure 26.

2 Install the cylinder plate (Key 12).

3 Apply Permatex® Nickel Anti-Seize (Key A) to the threads of the cylinder studs (Key 2).

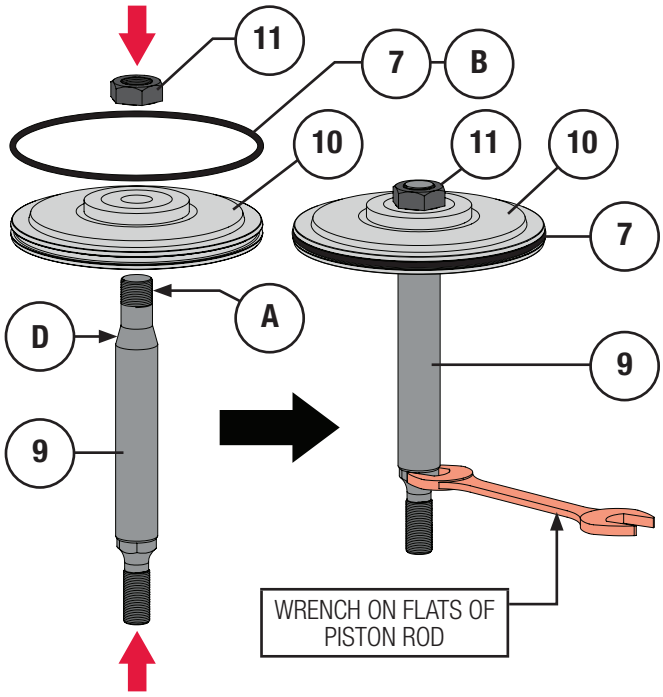

Figure 24 Piston Assembly

4 Thread the hex nuts (Key 13) onto the cylinder studs (Key 2) and torque them in an alternating criss-cross pattern to 50 lbf-ft (68 N•m).

Travel Scale Installation:

The travel scale (Key 14) is typically installed when installing the connecting block (Key 18) but may be installed loosely prior to mounting the actuator to the valve.

1 Install the travel scale (Key 14) using the machine screws (Key 15) and nuts (Key 16). Do not completely tighten the screws and nuts, the travel scale will need to be adjusted after mounting. Refer to Figure 18.

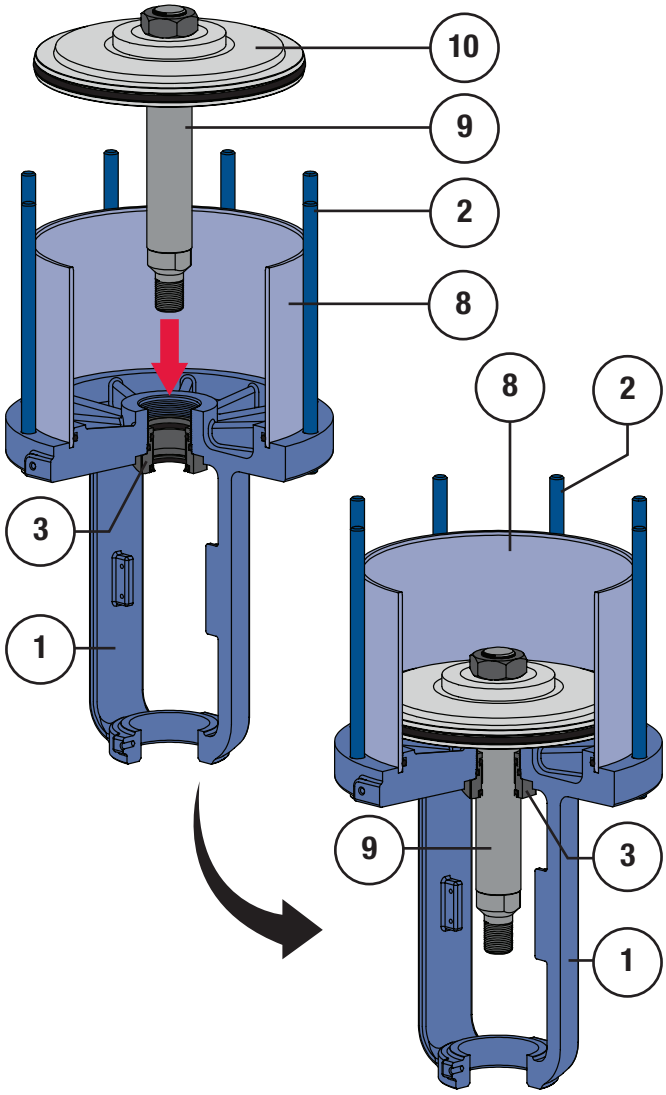

Figure 25 Piston Assembly Installation

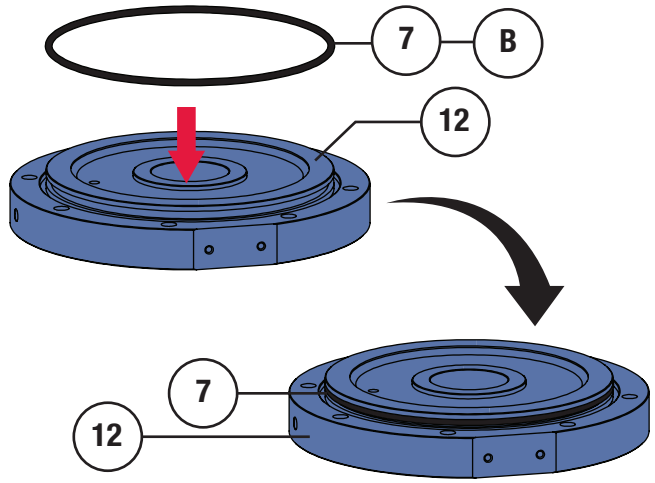

Figure 26 Cylinder Plate O-Ring Installation

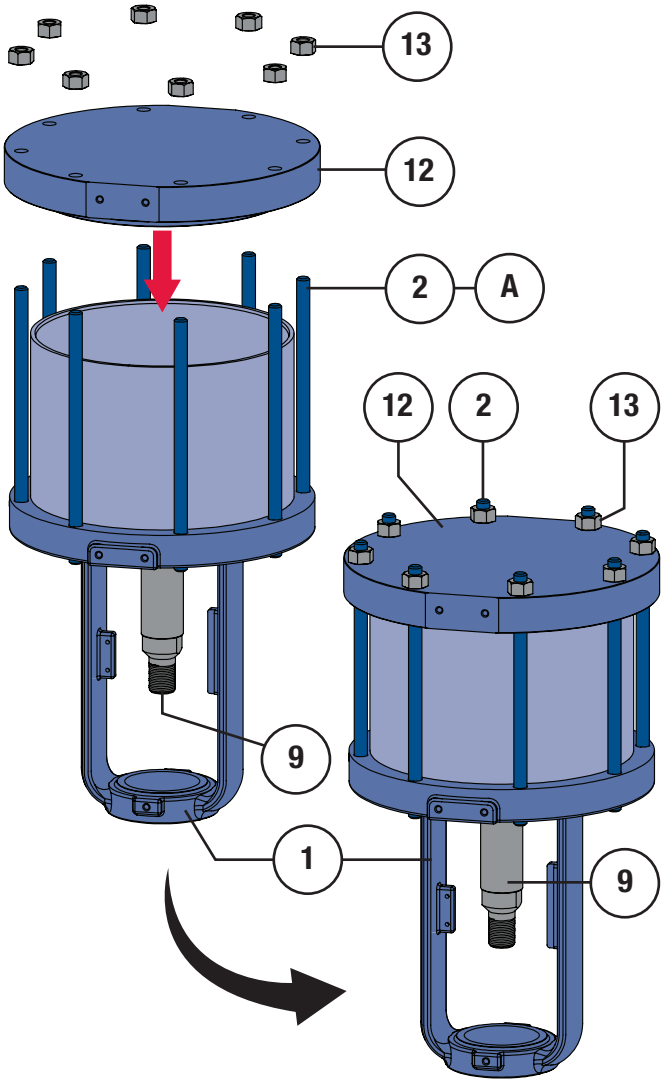

Figure 27 Cylinder Plate Installation

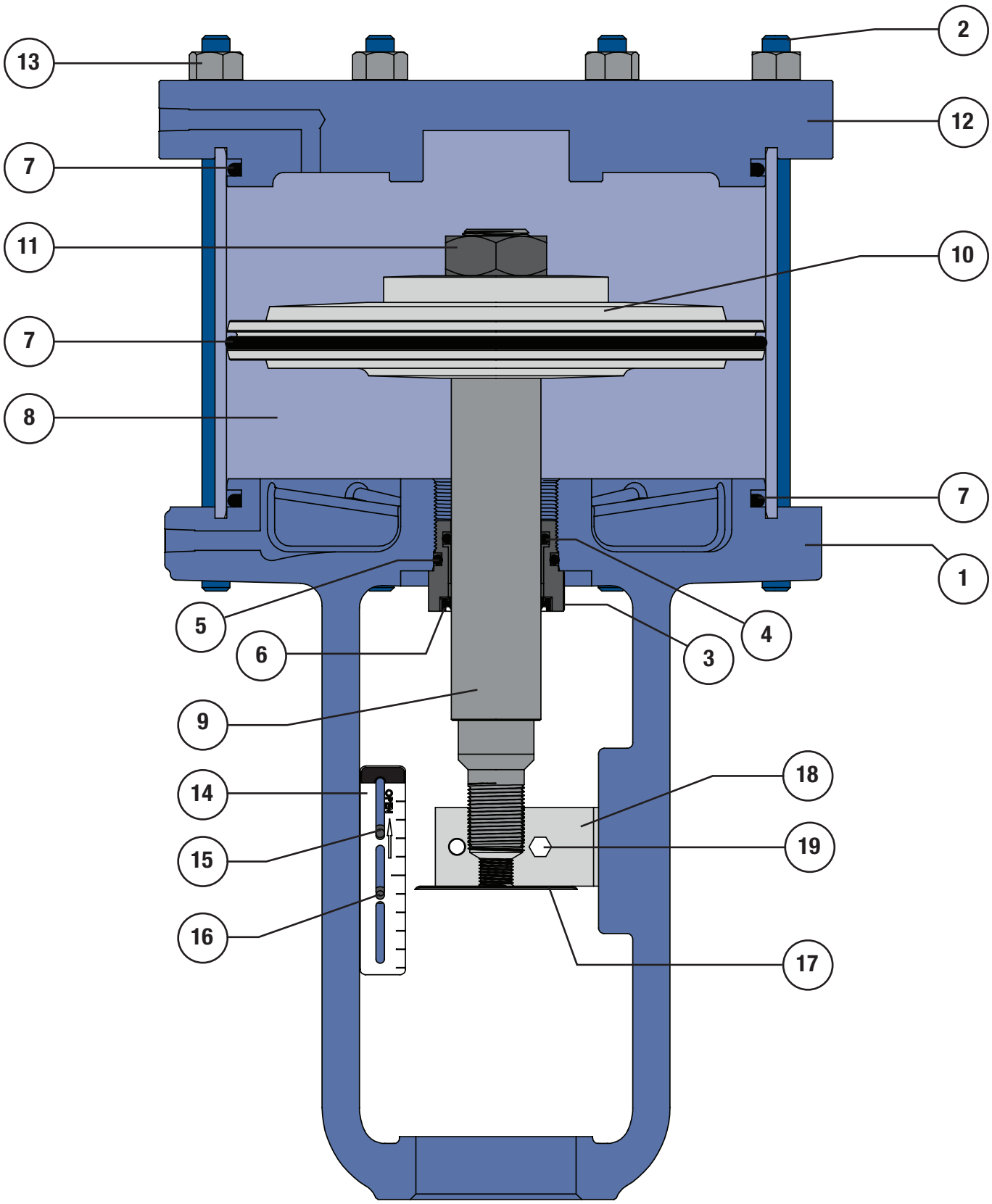

Figure 28 DFLP Cross Section

CURTISS-WRIGHT

DFLP Actuator Parts

Key	Description	Part Number
1	**Yoke**	
	If you need a yoke as a replacement part, order by size, serial number and desired material.	
2	**Cylinder Stud,** S17400 DH1150	
	Size 113 4" (101.6mm) Travel (8 Required)	DFP11326X1D
	Size 113 8-1/8" (206.4mm) Travel (8 Required)	Contact Dyna-Flo
	Size 154 4" (101.6mm) Travel (8 Required)	DFP15426X1D
	Size 154 8-1/8" (206.4mm) Travel (8 Required)	DFP15429X1D
3	**Bushing,** Brass/Nylotron	DFP11301X1D
4	**O-Ring,** Bushing - Inner	
	NITRILE (Standard)	1H86270699D
	VITON	1H8627X075D
5	**O-Ring,** Bushing - Outer	
	NITRILE (Standard)	1C33420699D
	VITON	1C3342X075D
6	**Lower Wiper Seal,** Polyurethane	DFP15485X1D
7	**O-Ring,** Cylinder/Piston (3 Required)	
	- NITRILE (Standard)	
	Size 113	DFRP113191D
	Size 154	DFRP154191D
	- VITON	
	Size 113	DFRP113192D
	Size 154	DFRP154192D
8	**Cylinder,** Composite	
	Size 113 4" (101.6mm) Travel	DFP11325X1D
	Size 113 8-1/8" (206.4mm) Travel	Contact Dyna-Flo
	Size 154 4" (101.6mm) Travel	DFP15425X1D
	Size 154 8-1/8" (206.4mm) Travel	DFP15428X1D
9	**Piston Rod,** S17400 H900	
	Size 113 4" (101.6mm) Travel	DFP11314X1D
	Size 113 8-1/8" (206.4mm) Travel	Contact Dyna-Flo
	Size 154 4" (101.6mm) Travel	DFP11315X1D
	Size 154 8-1/8" (206.4mm) Travel	DFP15418X1D
10	**Piston,** Aluminum	
	Size 113	DFP11313X1D
	Size 154	DFRP154111D
11	**Jam Nut,** Piston Rod, Zinc Plated Steel	NHJFZ112
12	**Cylinder Plate,** Aluminum	
	Size 113	DFRP113151D
	Size 154	DFRP154151D
13	**Hex Nut,** Cylinder Studs, 2H (8 Required)	1A3760X059D
14	**Travel Scale,** Steel	Contact Dyna-Flo
15	**Machine Screw,** Travel Scale, SST (2 Required)	DFCOTSS632D
16	**Nut,** Travel Scale, SST (2 Required)	DFCOTSN632D
17	**Travel Disc,** Size 113 3/4" VSC, S30400	1E83283899D
18	**Connecting Block,** Zinc Plated Steel	
	3/4" (25.4mm) VSC	DFP11351X1D
	1" (25.4mm) VSC	DFP15450X1D
	1-1/4" (25.4mm) VSC	DFP11350X1D
18A	**Travel Indicator,** Size 113/154, S30400	DFP11375X1D
19	**Cap Screws,** Connecting Block, SST (2 Required)	
20	**Yoke Locknut**	Included with Valve
21	**Jam Nut**	Included with Valve
22	**Hex Nut**	Included with Valve
23	**Mounting Stud**	Included with Valve
24	**Mounting Nut**	Included with Valve
25	**Travel Stop**	Contact Dyna-Flo
26	**Nameplate**	Contact Dyna-Flo

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MODEL NUMBERING SYSTEM

SAMPLE PART NUMBER: DFLP-3113-J-NN

							YOKE BOSS SIZE	3
3	3-9/16 INCH	**4**	5 INCH	**5**	5H			
							ACTUATOR SIZE	113
	113		113		**154**		154	
							TRAVEL	J
A	3/4 INCH	**B**	1-1/8 INCH	**C**	1-1/2 INCH	**D**	2 INCH	
E	2-1/2 INCH	**F**	3 INCH	**G**	4 INCH	**H**	5-1/2 INCH	
I	3-1/2 INCH	**J**	8 INCH	**4**	4-1/8 INCH	**8**	8-1/8 INCH	
							PAINT	-
-	DFPS-01 (STANDARD)			**2**	DFPS-02 (SEVERE SERVICE)			
3	DFPS-03 (HIGH TEMPERATURE)			**4**	DFPS-04 (HEAVY DUTY)			
							OPTIONS	N
N	NONE							
							HANDWHEEL / TRAVEL STOP	N
N	NONE			**4**	ADJUSTABLE UP TRAVEL STOP			

DFLP - ___ _____ - ___ ___ ___ ___ ___

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

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