

# PIG VALVE MODEL D

Service and Repair



MANUAL



**ARGUS**

Manufacturing Intelligent Solutions

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# PIG VALVE MODEL D

## 1.0 Scope

Argus manufactures pig launching and receiving ball valves (herein referred to as Pig Valves) with flanged pipeline connections. This manual covers the service and repair procedures for the 6" 900 ASME Class through 20" 600 ASME Class Model D Pig Valves.

## 2.0 General

Service and repair of Pig Valves shall comply with the procedures as described in this manual.

All soft seals (o-rings and back-up rings) must be discarded and replaced whenever the Pig Valve is serviced or repaired. Seal kits can be ordered from the contact information on the back cover of this manual. All other components need to be inspected after disassembly.

Throughout this manual, cautions (⚠) are used to highlight issues that could cause damage to equipment and warnings (⚠) for issues that could cause injury to personnel. Notes are used to highlight issues that could otherwise be easily missed.

## 3.0 Applicable Standards

The Pig Valve has been designed to meet the requirements of the following applicable standards:

- API 6D/ISO 14313 †‡
- API 598
- NACE MR0175
- ASME B16.5, B16.34, B31.3, and Section VIII
- MSS SP-25

† Face-to-face dimensions for the Model D Pig Valve exceed API 6D specifications (see TB-PV-030 for details).

‡ Pig Valves with a "left-to-right" flow direction are in full compliance with API 6D and are marked with the API 6D Monogram.

Pig Valves with a "right-to-left" flow direction are not marked with the API Monogram. Although these valves meet all other design requirements of API 6D, the "right-to-left" close direction is counterclockwise which does not meet the clockwise to close requirement specified in API 6D.

## 4.0 Preparation

### ⚠ Caution:

The Pig Valve contains many sealing surfaces which can be easily damaged during the assembly/disassembly process. Exercise care during the assembly/disassembly process, to reduce the possibility of damage to these surfaces.

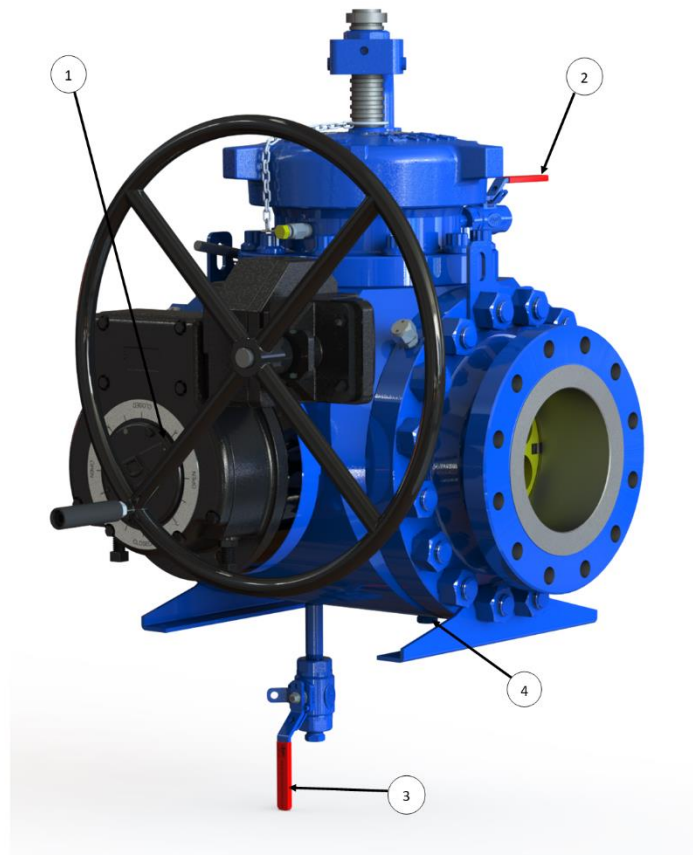
1. Visually inspect the Pig Valve before proceeding with repair procedures. Make note of any missing or potentially tampered-with components.
2. Confirm the Pig Valve is at least partially open (1), and the vent valve (2) is fully open as shown in Figure 1.

**⚠ Warning:**

If the Pig Valve is not at least partially opened, and the vent valve is not opened, treat the Pig Valve as still containing pressurized process media. Take all relevant safety precautions, including the use of any applicable personal protective equipment (PPE), if there is this potential of remaining media.

If the Pig Valve is in the closed position and the vent valve has not been opened, place the valve in a suitable area and carefully open the vent valve (2). Then actuate the gear operator (1) to partially open the valve.

3. If needed, clean the outside of the Pig Valve before any disassembly.
4. Drain any fluid from the bottom of the Pig Valve body cavity using the drain valve (3), if present, or remove the drain plug (4).
5. If necessary, leave the opened and drained Pig Valve in a well-ventilated area until all liquids have evaporated and vapors have dissipated.



**Figure 1: Assembled Pig Valve**

## 5.0 Disassembly

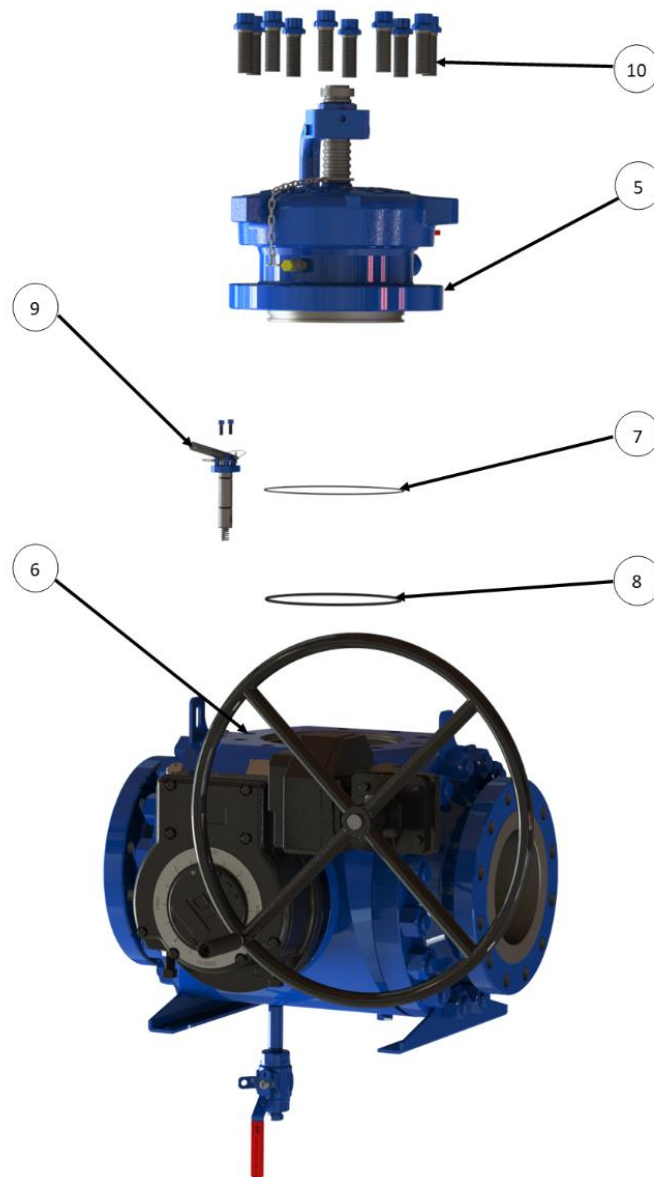
### 5.1 Equalization

1. Remove any vent and drain valve connections (2) and (3) in Figure 1.
2. Remove any equalization valves or lines (9) in Figure 2. Remove any soft seals as applicable.

**Note:**

An integral equalization valve (9) is shown in Figure 2, but depending on the Pig Valve, there instead may be an external piped line with a ball valve between the flanges of one tailpiece. Note the how the components are assembled and remove before continuing with disassembly.

## 5.2 Entry Cap Sub-Assembly



**Figure 2: Entry Cap**

1. Remove 12-point screws (10).
2. Remove entry cap sub-assembly (5) in a vertical direction to prevent misalignment.
3. Remove weather seal o-ring (7) from the bottom of the entry cap sub-assembly.
4. Remove primary seal o-ring (8) from the groove on the bottom of the entry cap sub-assembly.



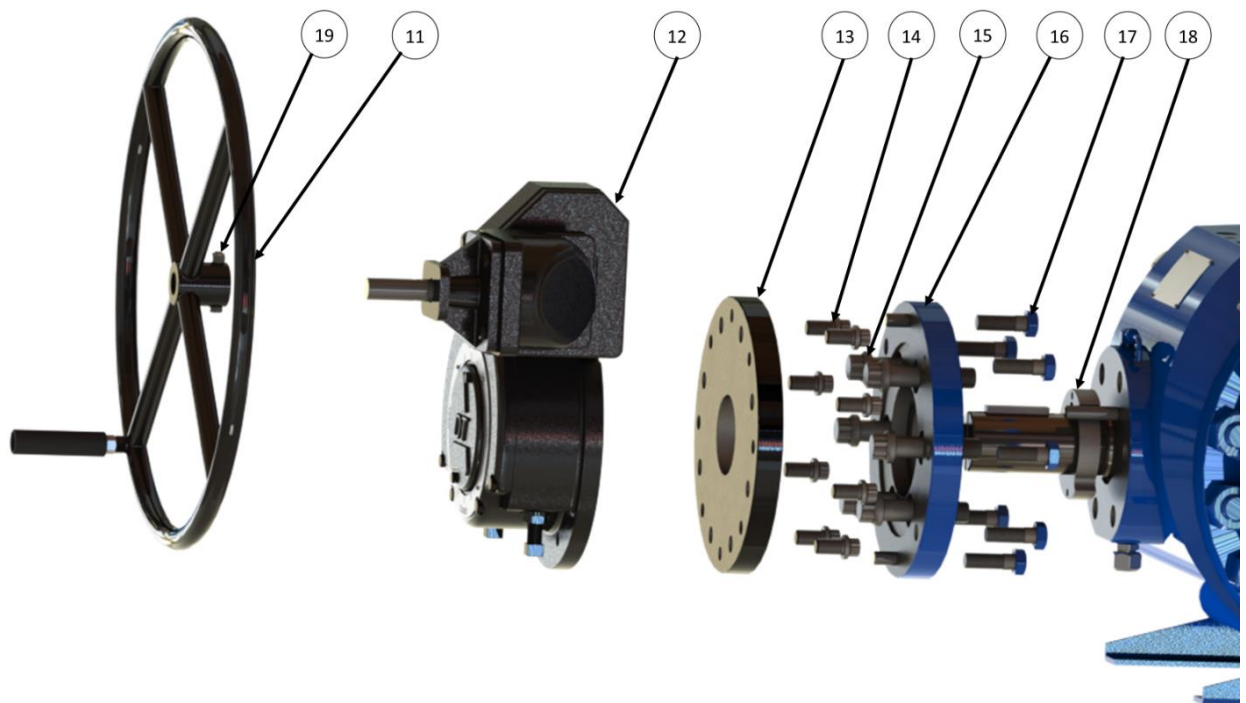
**Caution:**

When removing o-rings extra care must be taken to ensure that the surfaces of the o-ring groove remain undamaged.

**Note:**

Entry cap sub-assembly can remain assembled unless there is damage to any of the components.

### 5.3 Gear Operator



**Figure 2: Gear Operator**

1. Remove gear operator sub-assembly (19, 11, 12, 13, 14) by removing hex head screws (17).

**Note:**

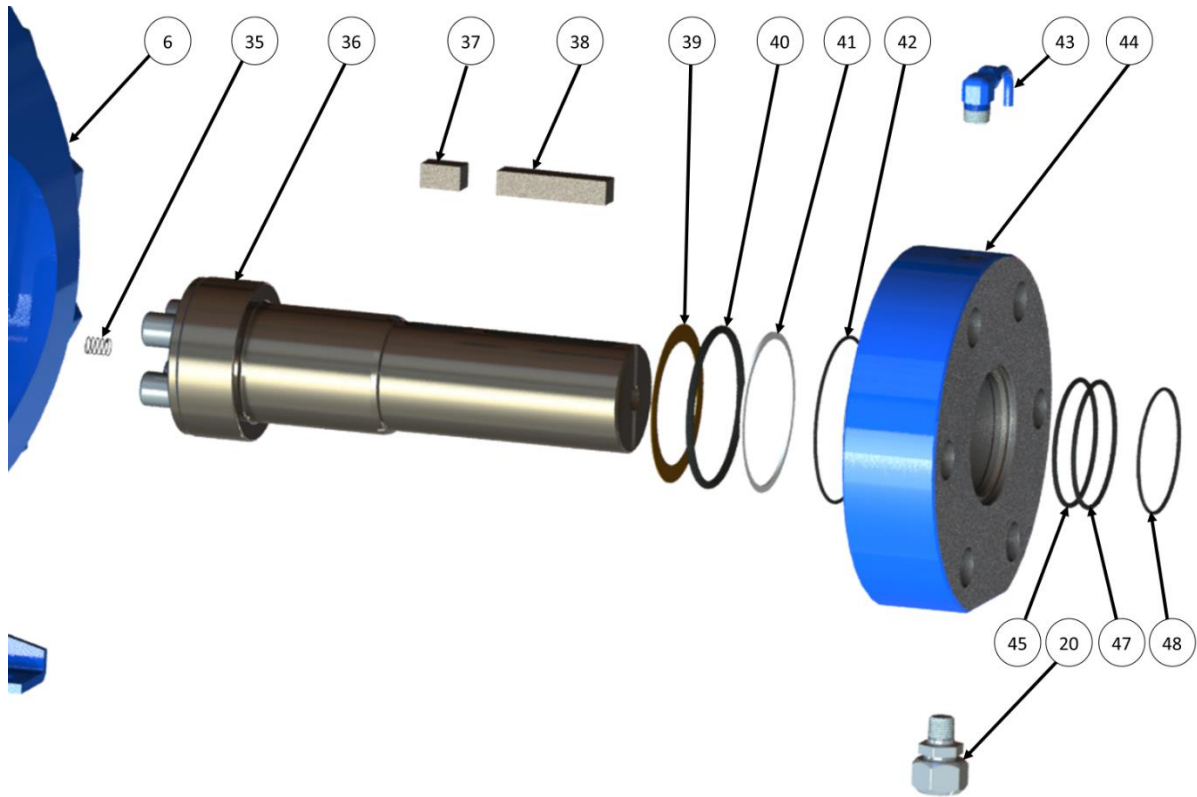
Gear operator sub-assembly can remain assembled unless there is damage to any of the components.

2. Remove 12-point cap screws (15) then remove stem stop (18) and stuffing box adapter (16).

**Note:**

Stem stop pin and gear operator alignment pins can remain in stuffing box adapter (16).

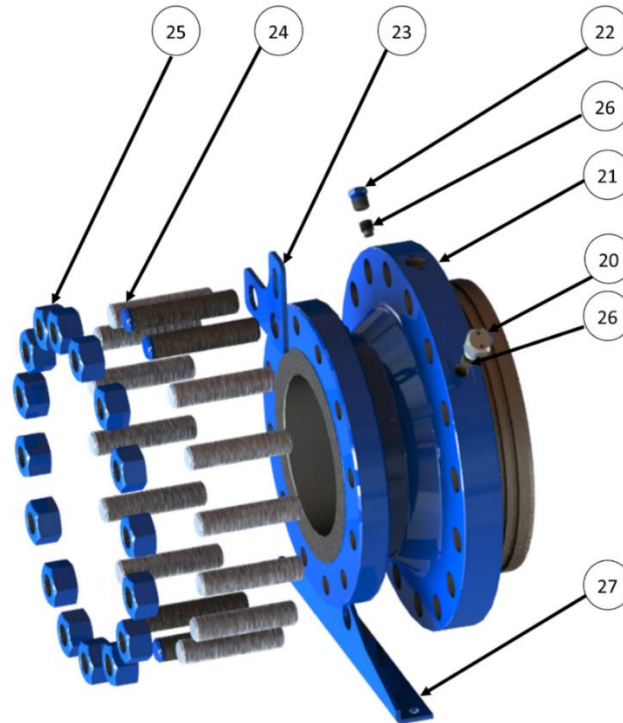
## 5.4 Stuffing Box and Stem



**Figure 3: Stem and Stuffing Box**

1. Remove keys (37, 38) and weather seal o-ring (48) from stem (36).
2. Remove stuffing box (44) from main body (6) and remove giant button head (20). Grease relief tube (43) can remain in the stuffing box (44).
3. Remove primary o-rings (45, 47) from inside of stuffing box (44).
  - ⚠ **Caution:**  
When removing o-rings, extra care must be taken to ensure that the surfaces of the o-ring groove remain undamaged.
4. Remove stem (36) from main body (6). The pins can remain in the stem. (36)
  - ⚠ **Caution:**  
When removing stem (36) from stuffing box (44), care must be taken to ensure that the anti-static spring (35) is not misplaced. It is important this component is reassembled with the stem and stuffing box to maintain compliance with API 6D.
5. Remove thrust bearing (39), primary o-ring (40), back-up ring (41), and weather seal o-ring (42) from stuffing box.
  - ⚠ **Caution:**  
When removing o-rings, extra care must be taken to ensure that the surfaces of the o-ring groove remain undamaged.

## 5.5 First Tailpiece



**Figure 4: Tailpiece**

**⚠ Caution:**

The left and right tailpieces are very similar. However, one tailpiece will have a pressure equalization feature (integral valve or external line). Make a note which side this tailpiece was on. Tailpieces must NOT be interchanged during re-assembly.

1. Pick one tailpiece to remove first.
2. Remove giant button heads (20) and/or pipe plugs (22). Also remove inner check valves (26).
3. Rotate the entire Pig Valve assembly so it is standing on the other tailpiece.

**⚠ Caution:**

Extra care must be taken to avoid damaging the raised face gasket profile on the end of the tailpiece by standing on a rubber mat or similar.

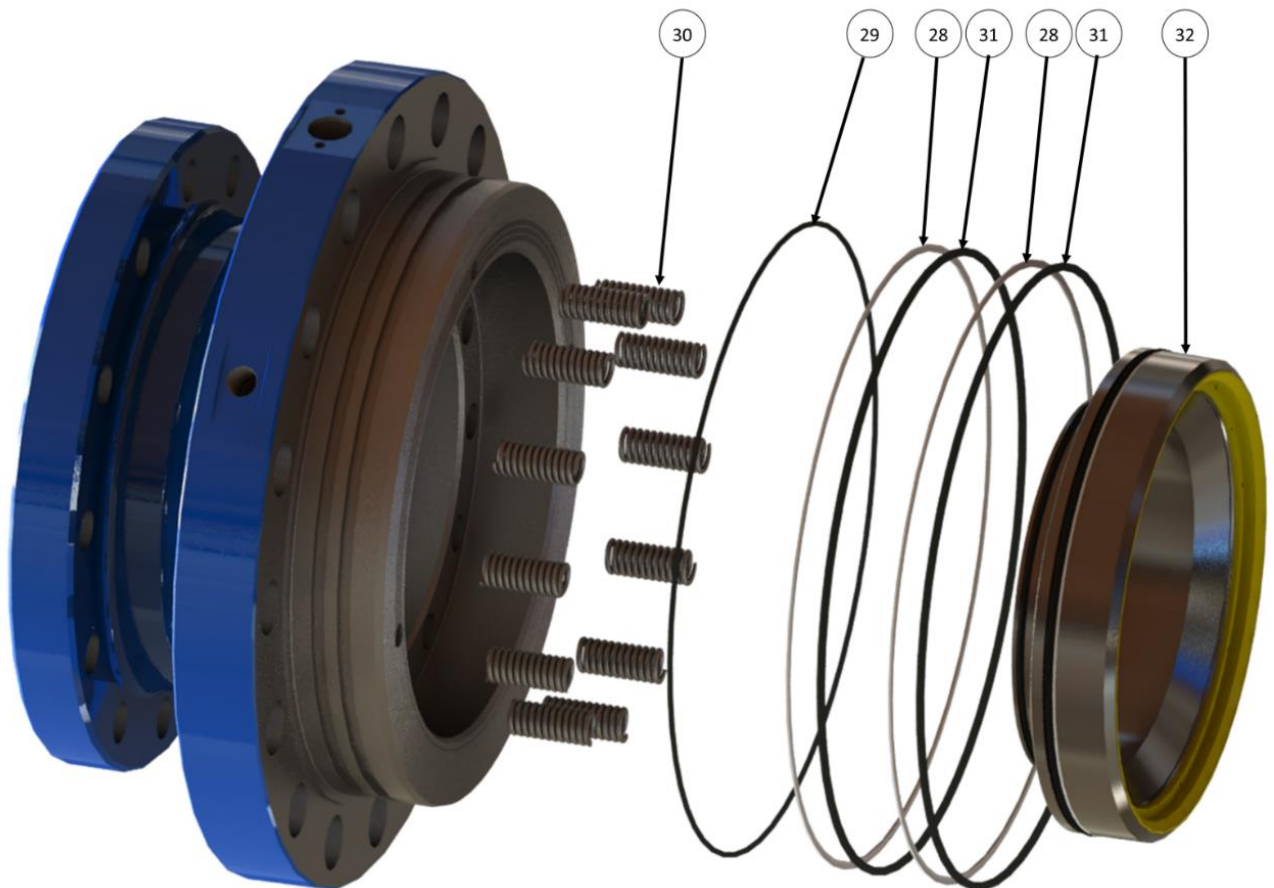
4. Remove all hex nuts (25).
5. Remove lifting lug (23) and valve stand bracket (27).
6. Remove the tailpiece (21) in a vertical direction to prevent misalignment.

**Note:**

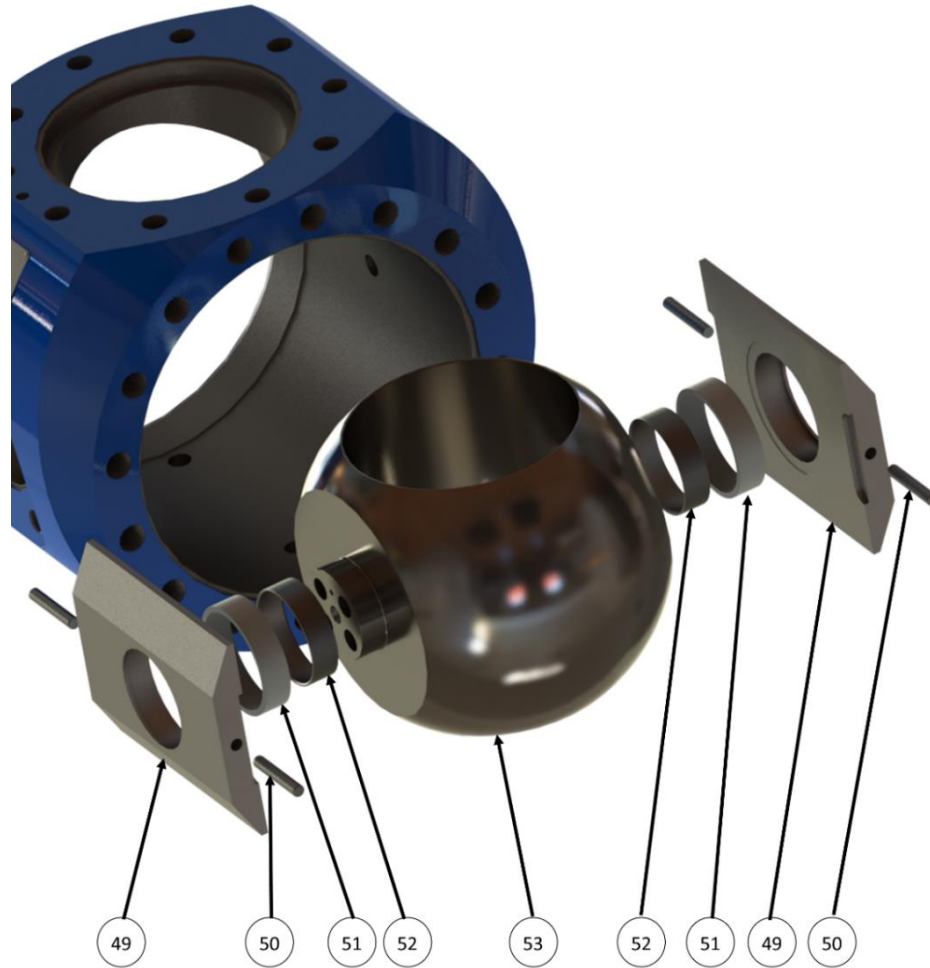
Do not misplace alignment pin that will be on tailpiece (or possibly in main body) once the tailpiece is removed.

7. Place the removed tailpiece on a work surface with the seat sub-assembly (32) facing down.

8. Using an aluminum punch, gently hammer on the visible edge of the seat sub-assembly (32), continuously moving around this edge, to remove seat sub-assembly (32).
  - ⚠ **Caution:**  
Using a steel punch could result in damage to the seat sub-assembly (32) and/or tailpiece.
  - ⚠ **Caution:**  
During removal of the seat sub-assembly (32), extra care must be taken to ensure that the polymer seat insert (pictured in yellow in Figure 6) remains undamaged.
9. Once the seat sub-assembly has been removed, flip the tailpiece over.
  - ⚠ **Caution:**  
Extra care must be taken to avoid damaging the raised face gasket profile on the end of the tailpiece by standing on a rubber mat or similar.
10. Remove weather seal o-ring (29) from tailpiece.
11. Remove primary o-rings (31) and back up rings (28) from tailpiece.
  - ⚠ **Caution:**  
When removing o-rings, extra care must be taken to ensure that the surfaces of the o-ring groove remain undamaged.
12. Remove the two o-rings from the outside of the seat sub-assembly (32).
13. Remove compression springs (30).



**Figure 5: Seat and Seals**



**Figure 6: Ball and Trunnion Bearing Plates**

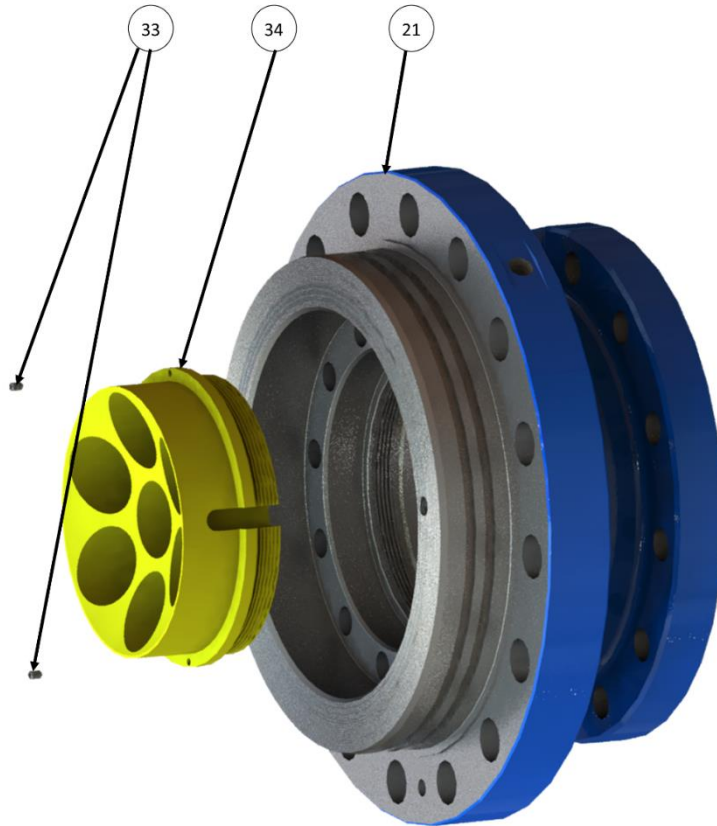
1. Vertically lift ball (52, 53) and trunnion bearing plates (49, 50, 51) from inside main body.

**⚠ Caution:**

When removing the ball and trunnion bearing plates, extra care must be taken to ensure the surface of the ball (52, 53) is not damaged.

2. Pull each trunnion bearing plate (49, 50, 51) from the ball (52, 53). No further disassembly of any of these components is required.

## 5.7 Second Tailpiece (With Pig Stopper)



**Figure 7: Pig Stopper**

1. Repeat steps 2 through 13 from section 5.5.

**Note:**

If second tailpiece has pig stopper (34) installed, it will be more difficult to remove the seat sub-assembly (32) in step 8 from section 5.5. The only place to position the aluminum punch will be through two milled slots (one is visible in Figure 8) on either side of the pig stopper (34). Alternate between these two positions until the seat sub-assembly (32) has been removed.

**Note:**

For the remaining steps, only remove the pig stopper (34) if the intent is to modify the type (receiver to launcher) of Pig Valve or if it has been damaged.

2. Remove two set screws (33)
3. Rotate to remove pig stopper (34) from tailpiece (21).

## 6.0 Cleaning

- Discard all soft seals (o-rings and back-up rings).
- Wash all components with mineral spirits.
- Remove all grease, thread sealant, and process media residue to help find any potential wear and/or damage to components.

## 7.0 Inspection

- Inspect all Pig Valve components for wear and/or damage. Special attention should be taken to examine all o-ring grooves, mating sealing surfaces, seat inserts, and ball surface.
  - Any bearings interactions should be close-fitting but freely rotate.
  - Replace all worn or damaged components.

**⚠ Caution:**

Only use OEM components when repairing Argus Pig Valves. Seal kits and replacement components can be ordered from the contact information on the back cover of this manual.

## 8.0 Assembly

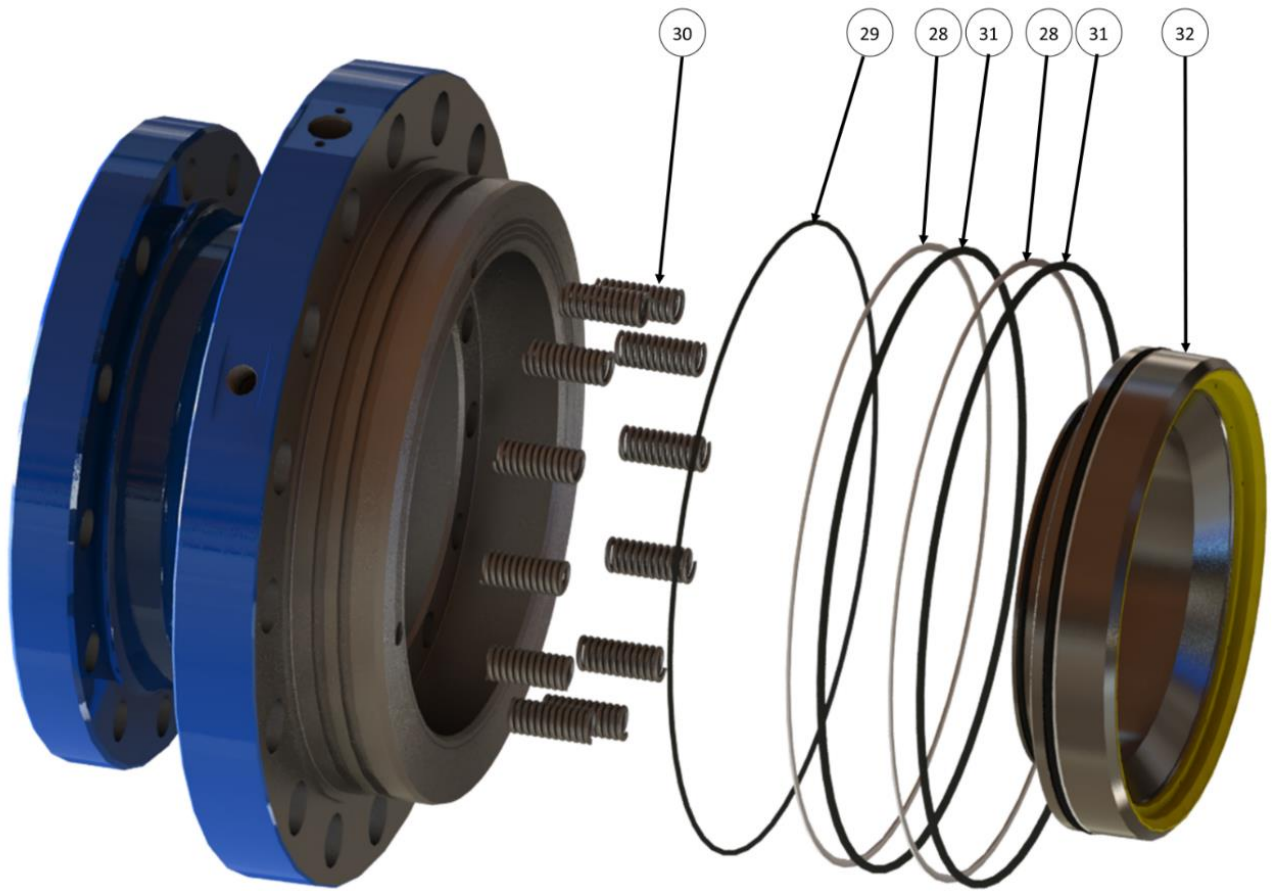
**Note:**

Argus requires two different assembly lubricants: A general assembly grease (such as *Lubriplate 105 Motor Assembly Grease* or equivalent) for all seals and mating components and a lithium based thread compound (such as *Topco API Modified* or equivalent) for all threaded components. A thread sealant (such as Loctite 567 or Jet-Lube Petro Tape) will also be required.

**⚠ Warning:**

Read all relevant safety data sheets for the chemical products chosen for servicing or repairing Argus Pig Valves. Take all relevant safety precautions for those used, including the use of any applicable personal protective equipment (PPE), as recommended.

## 8.1 Prepare First Tailpiece



**Figure 8: Tailpiece Assembly**

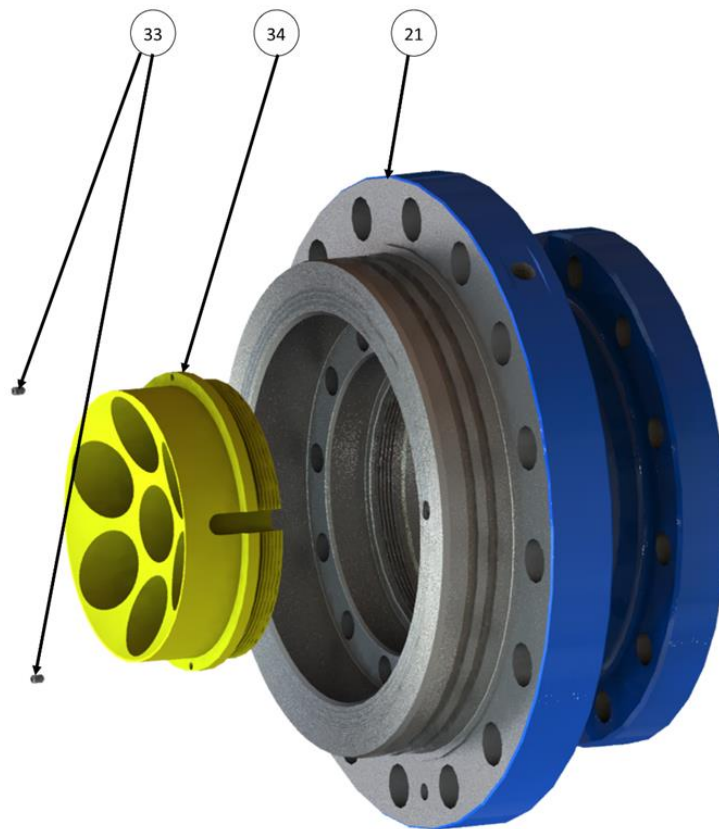
1. Set tailpiece on pipeline connection flanged end.

**⚠ Caution:**

Extra care must be taken to avoid damaging the raised face gasket profile on the end of the tailpiece by standing on a rubber mat or similar.

2. Lubricate both primary seal grooves of the tailpiece with general assembly grease and install weather seal o-ring (29) over two seal grooves up against main body flange.
3. Install primary seal o-rings (31) and back-up rings (28) into two seal grooves.
4. Lubricate over top all seals and surrounding area once installed with general assembly grease.
5. Lubricate inside bore directly surrounding spring holes with general assembly grease.
6. Install compression springs (30) in spring holes.
7. Lubricate both seal grooves on outside of seat sub-assembly (32) with general assembly grease and install o-rings into the seal grooves.
8. Lubricate over top both seals and surrounding area with general assembly grease and install seat sub-assembly (32) into tailpiece. Apply even downward force with rotation to assist installation.

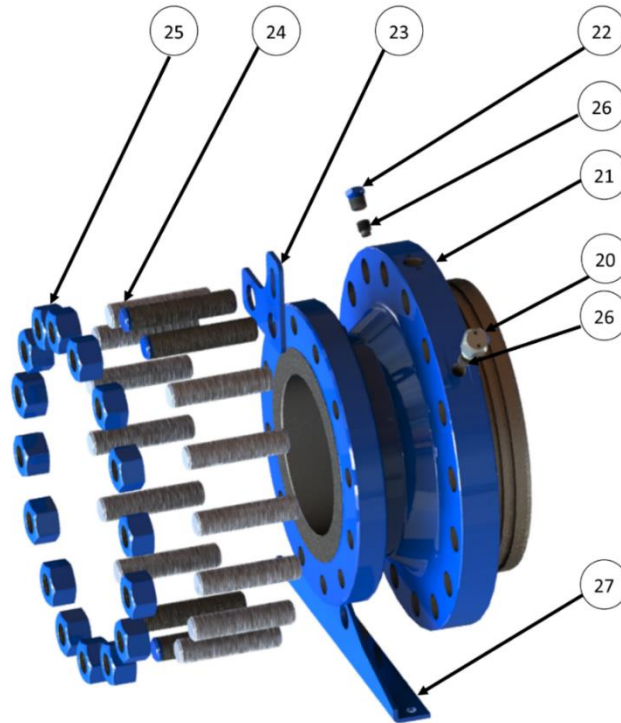
## 8.2 Prepare Second Tailpiece (With Pig Stopper)



**Figure 9: Tailpiece with Stopper**

1. Set tailpiece on pipeline connection flanged end.
  - ⚠ **Caution:**  
Extra care must be taken to avoid damaging the raised face gasket profile on the end of the tailpiece by standing on a rubber mat or similar.
2. If there was a pig stopper, and it was removed, lubricate threads of pig stopper (34) with thread compound and install into tailpiece until it stops rotating.
3. Lubricate threads of set screws (33) with thread compound and install to secure pig stopper in place.
4. Repeat steps 2 to 11 from section 8.1.

### 8.3 First Tailpiece



**Figure 10: Assembled Tailpiece**

1. Place main body on one end.
2. Lubricate end of studs (24) with thread compound and install into main body with a stud driver. These need to be bottomed out in the hole but have no additional tightening requirement.
3. Lower first tailpiece into main body.

**Note:**

Double check that this is the correct tailpiece for the side.

**Note:**

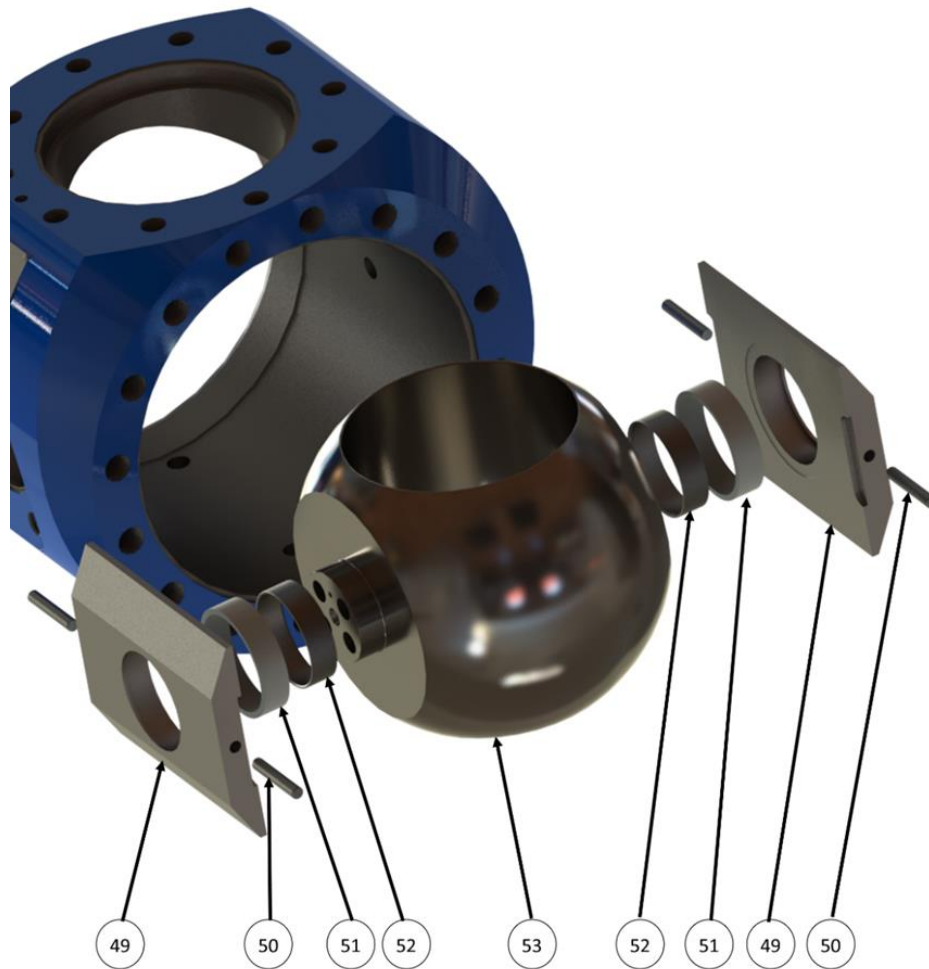
Use alignment pin on tailpiece and align with corresponding hole on main body during installation.

4. Replace lifting lug (23) and valve stand bracket (27).
5. Lubricate other end of studs (24) with thread compound and install hex nuts (25). Torque nuts based on nominal size and pressure class as per Argus technical bulletin TB-PV-035.
6. Apply thread sealant to inner check valves (26) and install into tailpiece.
7. Apply thread sealant to giant button head (20) and/or pipe plugs (22) and install onto tailpiece.
8. Flip main body and tailpiece assembly onto flanged end.

**⚠ Caution:**

Extra care must be taken to avoid damaging the raised face gasket profile on the end of the tailpiece by standing on a rubber mat or similar.

## 8.4 Ball Assembly



**Figure 11: Ball Assembly**

1. Press both trunnion bearing plate assemblies (49, 50, 51) onto ball assembly (52, 53).

**Note:**

Unless any of these components were damaged, they should still be assembled.

2. Carefully lower these assembled components into the main body and first tailpiece.

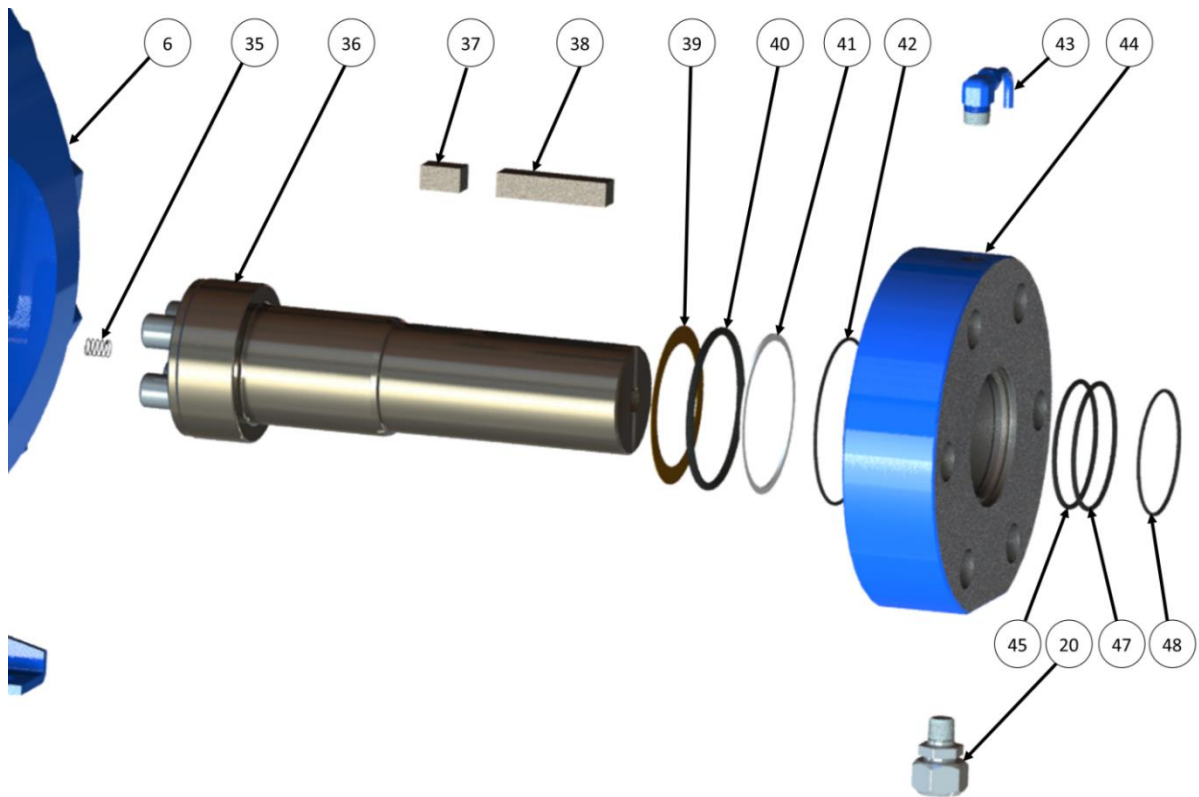
**Note:**

Ensure trunnion pins (50) are aligned with corresponding holes on tailpiece.

## 8.5 Second Tailpiece

1. Repeat steps 2 to 7 from section 8.3.

## 8.6 Stem and Stuffing Box

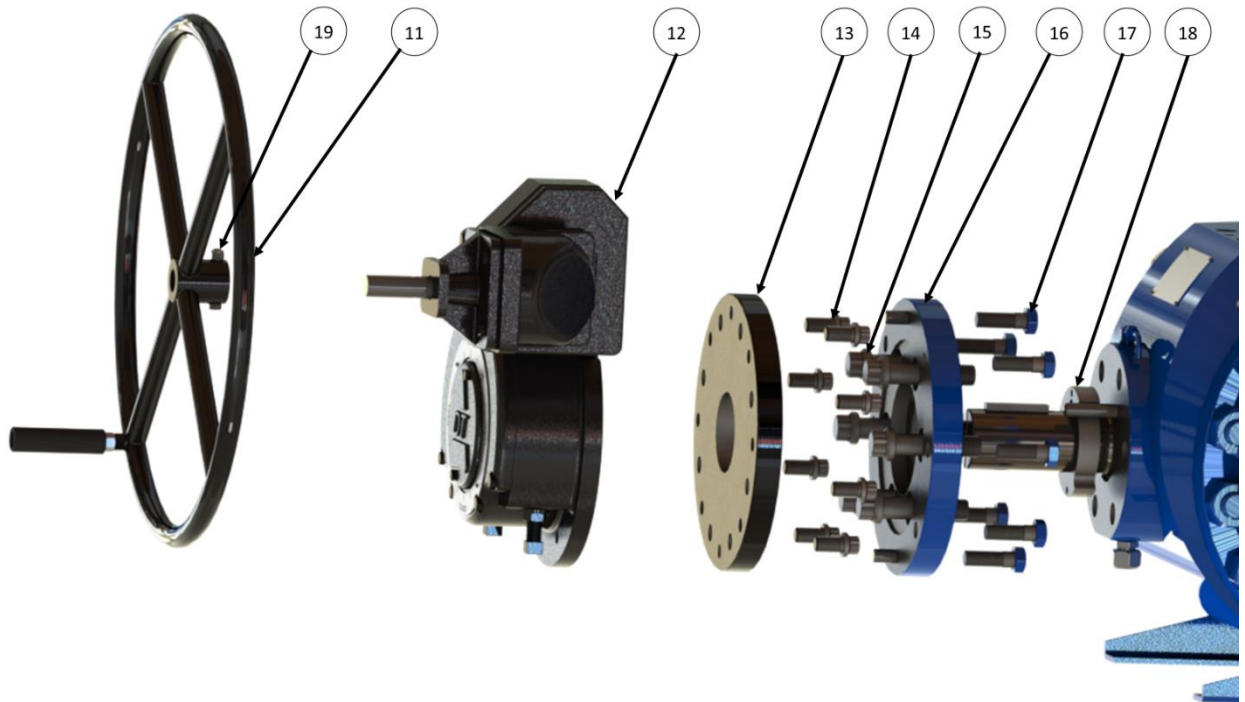


**Figure 12: Stem Assembly**

1. Place thrust bearing (39) on stem (36).
2. Insert anti-static spring (35) into hole in ball. Use a little general assembly grease to hold it in place if needed.
3. Install stem (36) onto the ball.  
**Note:**  
Ensure correct orientation of stem with ball. Position indication groove at small end of stem should be in line with the bore of ball.
4. Lubricate seal grooves inside stuffing box (44) with general assembly grease and install primary seal o-rings (45, 47) into stuffing box (44).
5. Lubricate over top seals and surrounding area inside stuffing box (44) with general assembly grease.
6. Lubricate seal groove on outside of stuffing box (44) with general assembly grease and install weather seal o-ring (42) over seal groove up against the flange.
7. Install primary seal o-ring (40) and back-up ring (41) on outside of stuffing box (44).
8. Lubricate over top seals and surrounding area once installed with general assembly grease.
9. Lubricate around stem from flange to keyway with general assembly grease.
10. Install stuffing box (44) with flat aligned with bottom of Pig Valve. It will be secured in the next section.
11. Place second weather seal o-ring (48) onto stem (44).

12. Install keys (37, 38) into stem keyways.

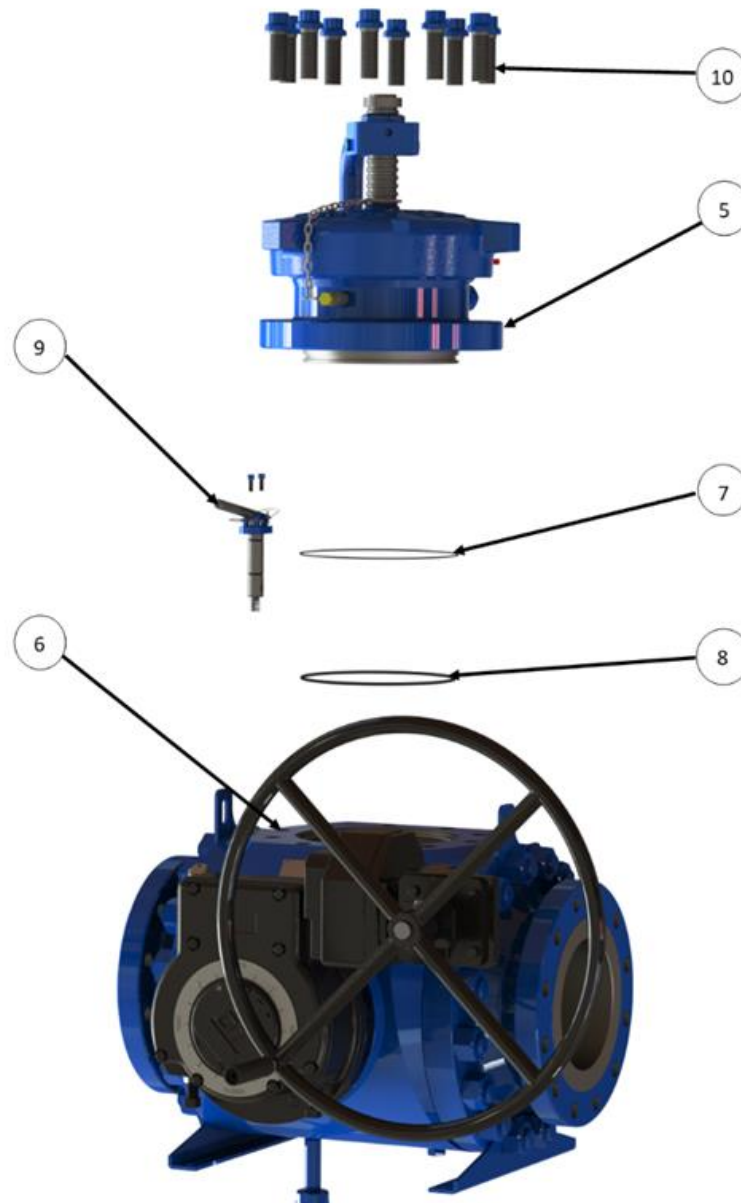
## 8.7 Gear Operator



**Figure 13: Gear Operator**

1. Install stuffing box adapter (16) over stem and against stuffing box (44, Figure 12)
2. Lubricate ends of 12-point cap screws (15) with thread compound and install through stuffing box adapter (16) which will also secure stuffing box (44, Figure 12). Torque screws based on nominal size and pressure class as per Argus technical bulletin TB-PV-035.
3. Place stem stop (18) over stem and into stuffing box adapter.
4. Place gear operator sub-assembly (19, 11, 12, 13, 14) over stem and against stuffing box adapter (16) using top and bottom alignment pins.
5. Lubricate ends of hex head screws (17) with thread compound and secure gear operator assembly (19, 11, 12, 13, 14).
6. Apply thread sealant to both giant button head (20, Figure 12) and grease relief tube (43, Figure 12) and install on stuffing box (44, Figure 12).

## 8.8 Entry Cap



**Figure 14: Entry Cap**

1. Lubricate seal groove on outside of entry cap sub-assembly (5) with general assembly grease and install weather seal o-ring (7) over seal groove up against flange.
2. Install primary seal o-ring (8) on outside of entry cap sub-assembly (5).
3. Lubricate over seals and surrounding area with general assembly grease and lower entry cap sub-assembly (5) into main body (6).

**Note:**

Ensure pressure alert valve (with chain and shown in yellow) is facing the front of the Pig Valve.

4. Lubricate ends of 12-point screws (10) with thread compound and secure entry cap sub-assembly (5). Torque screws based on nominal size and pressure class as per Argus technical bulletin TB-PV-035.

## 8.9 Equalization

1. Replace any equalization valves or lines (9, Figure 14).

**Note:**

An integral equalization valve is shown in Figure 14, but depending on the Pig Valve, there instead may be an external piped line with a ball valve between the flanges of one tailpiece.

### a. Integral Equalization Valve

- i. Lubricate seal grooves and install primary seal o-rings with general assembly grease.
- ii. Lubricate over seals with general assembly grease and install into main body (6, Figure 14)

**Note:**

Ensure valve lever is facing toward front of Pig Valve.

- iii. Lubricate ends of cap screws with thread compound and secure integral equalization valve. Torque screws based on nominal size and pressure class as per Argus technical bulletin TB-PV-035.

### b. External Equalization Line

- i. Apply thread sealant to all threaded connections and reinstall.
2. Apply thread sealant and reinstall any removed vent and drain valve connections (2, Figure 1) and (3, Figure 1).

## 9.0 Pressure Testing

1. Test the assembled unit as per API 6D & 598.

**Note:**

Pig Valve temperature, pressure rating and test information is published in TB-PV-006.

2. Grease valve using giant button heads before returning to service.

**Note:**

Argus recommends Sealweld® Equa-Lube Eighty lubricant, Chemola Desco 622 lubricant/sealant or equivalent.

## 10.0 Contact Information

For ordering Pig Valve seal kits, components, or service please contact us at:

Argus  
Order Desk (Assembly Division)  
5820 97 Street NW,  
Edmonton, Alberta, Canada  
T6E 3J1

Website: [argusinnovates.com](http://argusinnovates.com)  
Email: [info@argusinnovates.com](mailto:info@argusinnovates.com)  
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