Rebuilding the Bulkhead Swivel

Use the following procedures to replace the seals and O-rings in a leaky bulkhead swivel.

Contents

Figure B-1: Bulkhead Swivel used in Models 2652, 55100, 80160, and OMAX FABRICATOR

Removing the Bulkhead Swivel

Caution: ***Prior to removing swivels from the OMAX high-pressure plumbing system, it is recommended that you review the information presented in Servicing the High-pressure Plumbing System provided in The OMAX JetMachining Center Service and Maintenance Guide. It explains how high-pressure fittings work and includes important information for assembling and maintaining them.***

Figure B-2 below illustrates a typical bulkhead swivel installation:

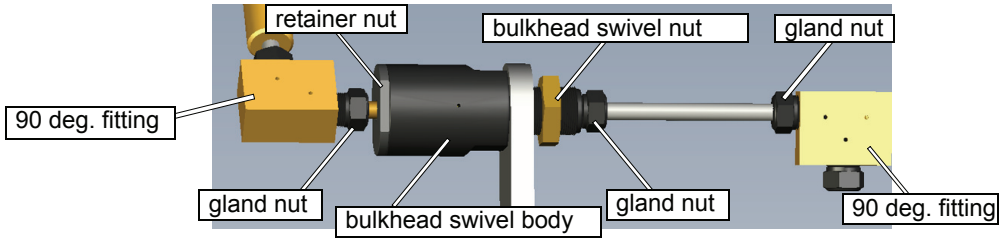

Figure B-2: Typical Bulkhead Swivel Installation

Tools Required to Remove a Bulkhead Swivel:

- 1 5/8" open end wrench to hold swivel body
- 1 3/16" open end wrench for gland nut
- 1 3/8" open end wrench for bulkhead swivel nut
- 1" (or adjustable) open end wrench for holding 90 degree fitting when working with gland nut

To remove a bulkhead swivel:

1. When necessary, reposition the **nozzle** and the **swivel** being serviced to a location providing easy removal access.
2. Switch Off the AC power for both the OMAX pump and table. Disconnect the main AC power breaker for both. Attach an “Out of Service” tag on the breakers involved and observe all applicable electrical safety procedures.

3. Carefully wash off the entire Z-axis, nozzle, and swivel assembly using water and compressed air. Be especially careful to completely remove all grit and abrasive material.
4. Remove the **gland nut** from the body side of the swivel by placing the 1 5/8" wrench onto the swivel body and using the 13/16" wrench to remove the gland nut. **Always use two wrenches when removing and replacing gland nuts!**

Caution: ***Be careful while removing gland nuts! The high-pressure support structure will become unsupported and can fall once these nuts are removed.***

5. Remove the gland nut from the retainer nut side of the swivel by securing the 90 degree fitting with a 1" open end wrench and using the 13/16" open end to unscrew the gland nut.
6. When all plumbing has been removed from the swivel ends, place the 1 5/8" open end wrench onto the swivel body and unscrew the bulkhead swivel nut using the 1 3/8" open wrench (Figure B-2).
7. Remove the swivel assembly from the table and take it to a clean room environment for rebuilding.

Disassembling the Bulkhead Swivel

Caution: ***All swivel assembly components must be thoroughly cleaned prior to rebuilding.***

Tools and Materials Required

- Bulkhead swivel repair kit (P/N 301665)
- Bulkhead swivel repair tool (P/N 201726)
- M5 screws (P/N 200024)
- 3/4" open end wrench
- Torque wrench, 50 ft. lb. capacity (67.8 Nm)
- 1 5/8" open end wrench (or adjustable)
- Blue Goop (P/N 200365)
- Lubriplate grease (P/N 201304)
- Soft-jawed vice

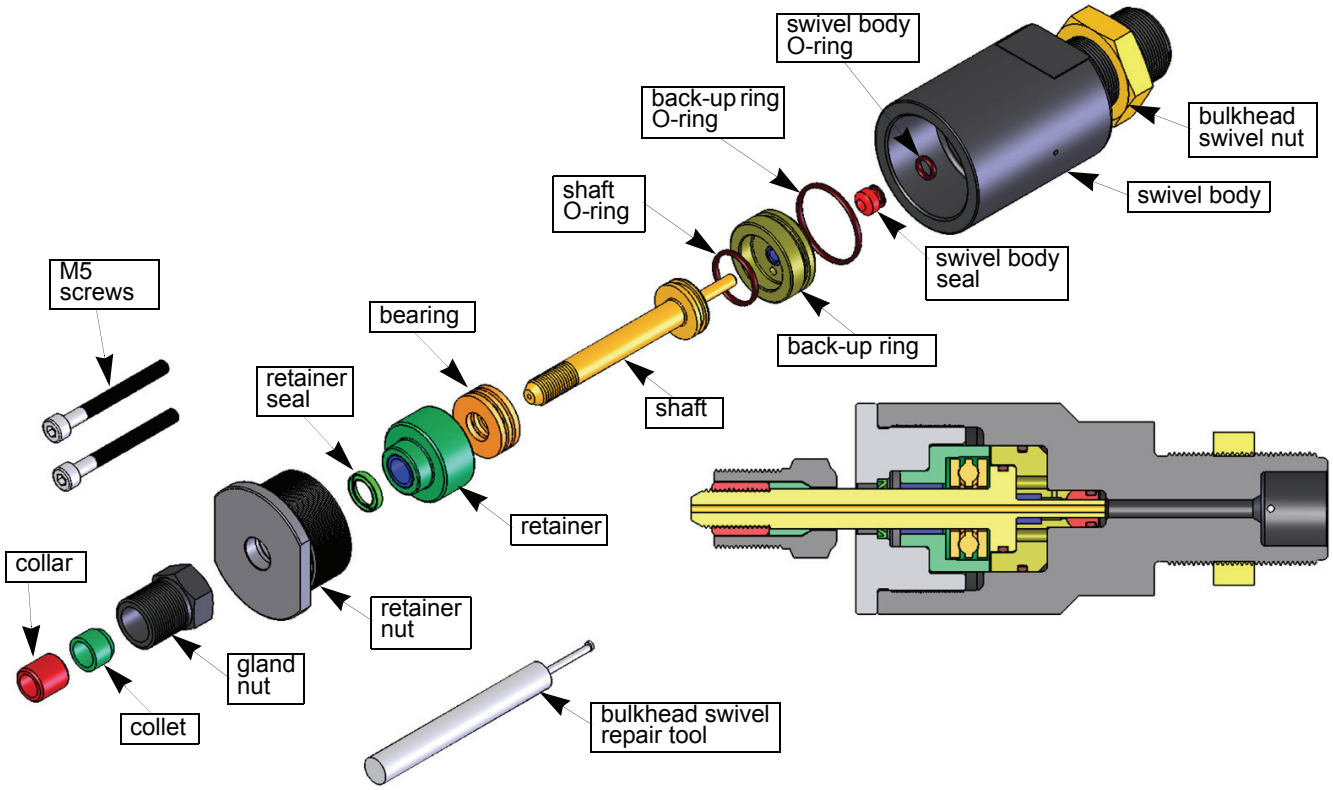

Figure B-3: Components of the Bulkhead Swivel Assembly

1. Remove the **collar** (left-hand threads), **collet** (on shaft, following collar removal), and **gland nut** from the swivel assembly **shaft**.

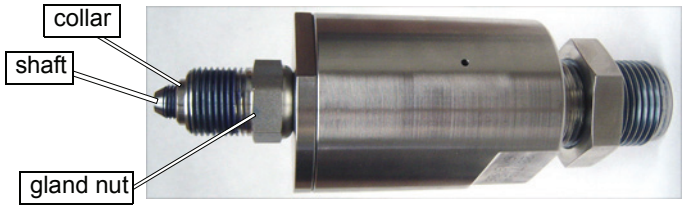

Figure B-4: Swivel Assembly with Collar, Collet, and Gland Nut on Shaft

2. Place the **swivel body** in a soft-jawed vice and using the 1 5/8" open end wrench, remove the swivel assembly **retainer nut**:

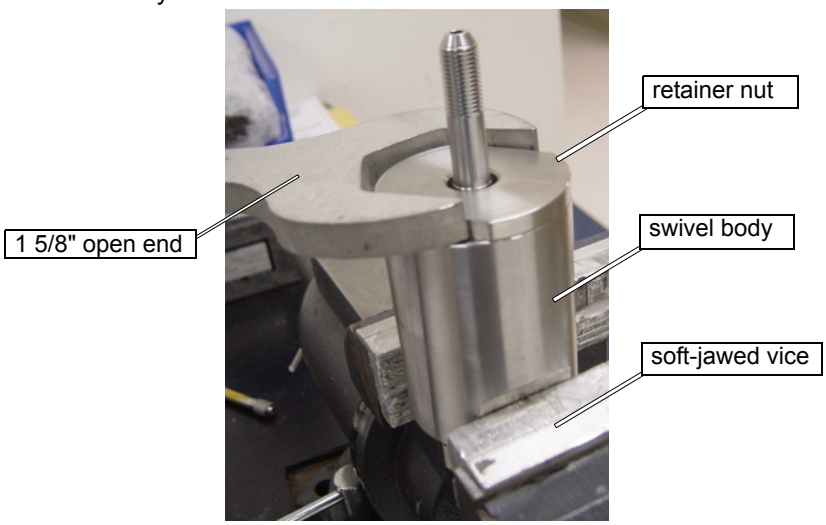

Figure B-5: Remove the Retainer Nut from the Swivel Body

3. With the **retainer nut** removed, pull out the **shaft** and all of its attached parts from the **swivel body**:

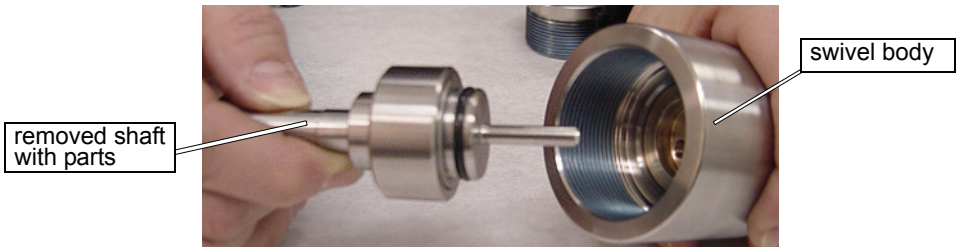

Figure B-6: Remove the Shaft and Attached Parts from the Swivel Body

4. Screw both the **M5 screws** (Figure B-7) into the threaded holes in the **back-up ring** and gently pull the back-up ring from the **swivel body** applying an even, steady pressure:

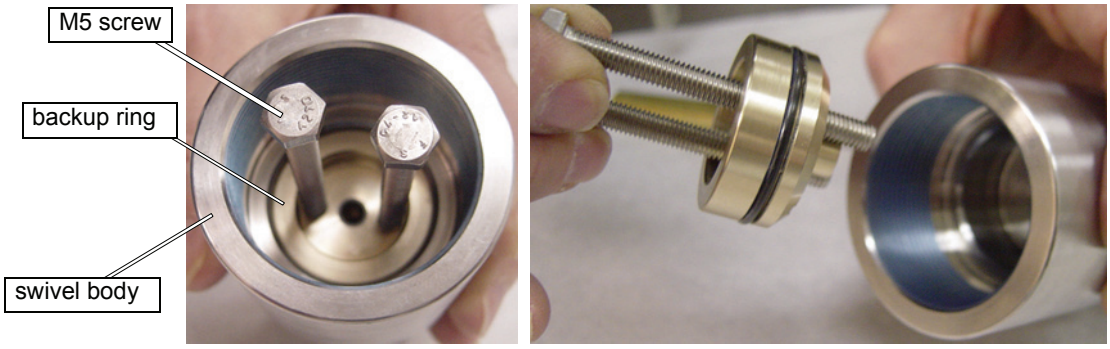

Figure B-7: Use the two M5 Screws to Remove the Back-up Ring

5. Insert the **bulkhead swivel repair tool** into the **swivel body seal** and pull it from the **swivel body**. Discard this seal and O-ring.

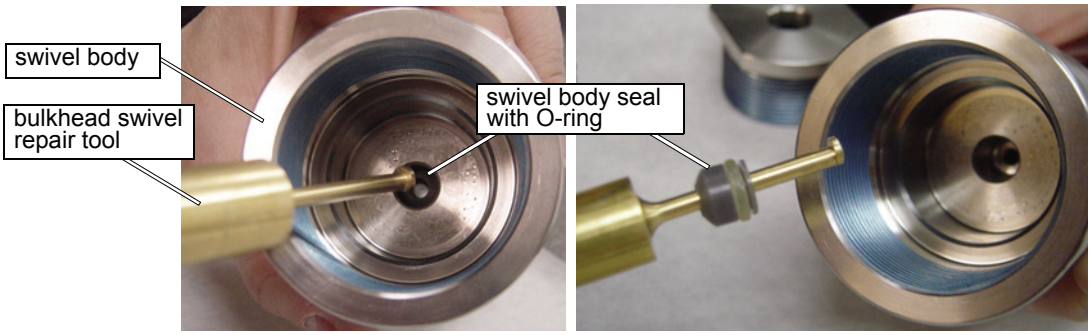

Figure B-8: Pulling the Swivel Body Seal from the Swivel Body

6. Pull the **retainer nut**, the **retainer**, and the **bearing** off the **shaft**:

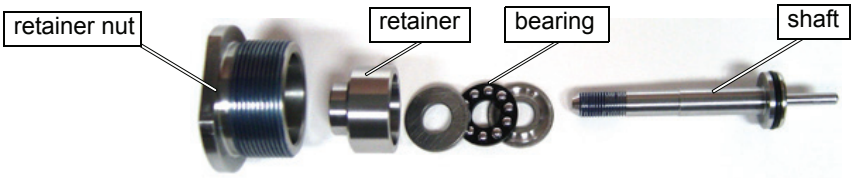

Figure B-9: Removing the Retainer Nut, Retainer, and Bearing from the Shaft

7. Remove all the **seals** and **O-rings** from their swivel components and discard them. Replacements are provided in the bulkhead swivel repair kit.

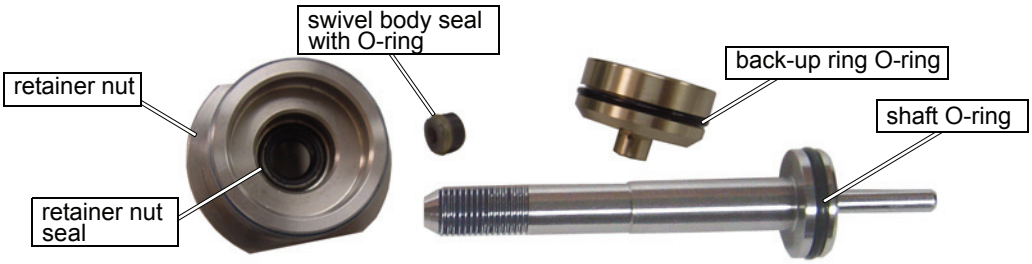

Figure B-10: Remove the Replaceable Seals and O-rings

Note: *The flat end of the bulkhead swivel repair tool can be used to push the retainer nut seal from the retainer nut.*

Reassembling the Bulkhead Swivel

1. Thoroughly clean all swivel assembly parts using non-abrasive soap and water or a good solvent. You may wish to use an ultrasonic cleaner. Blow dry all parts before continuing.
2. Inspect the swivel **shaft** for scratches or other signs of damage. If the shaft is scored or scratched, replace it.
3. Apply **Lubriplate** onto the **shaft O-ring** and install it onto the **shaft**.
4. Apply **Lubriplate** onto the **shaft** immediately in front of and behind the shaft O-ring (Figure B-11**)**.
5. Verify that the swivel **shaft** fits snugly into the **back-up ring**. If not, replace the back-up ring.

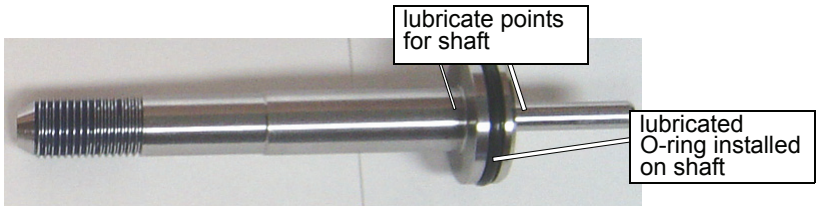

Figure B-11: Install the Shaft O-ring onto the Shaft

6. Apply **Lubriplate** onto the back-up ring's **O-ring** and install the O-ring onto the **back-up ring**.

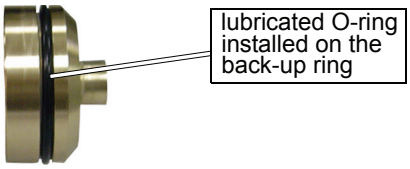

Figure B-12: Install the O-ring on the Back-up Ring

7. Apply **Lubriplate** onto the **swivel body O-ring** and install it onto the **swivel body seal**.

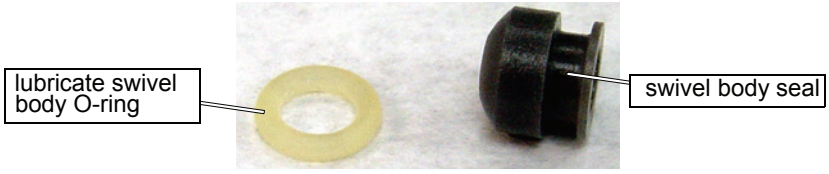

Figure B-13: Install the Swivel Body O-ring on the Swivel Body Seal

8. Apply the anti-galling compound, **Blue Goop**, onto the **shaft threads**, **retainer nut**, **collar**, **gland nut**, and **swivel body**.

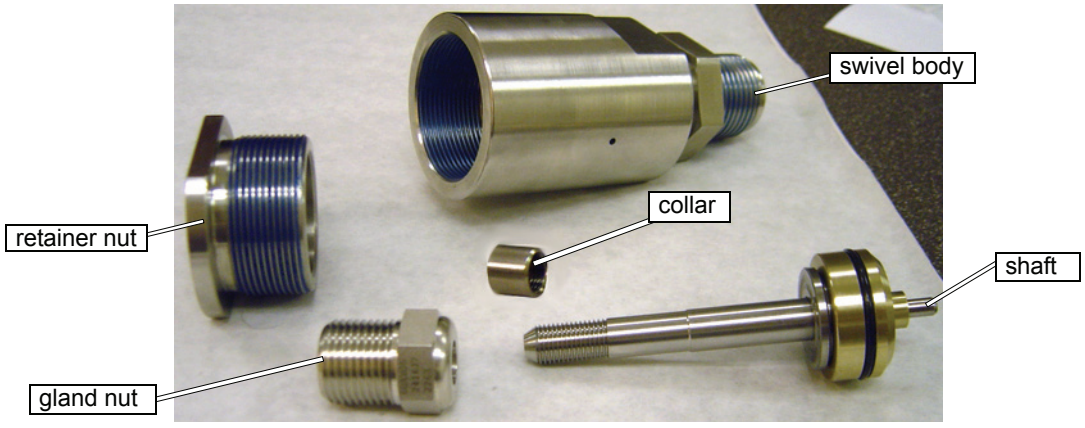

Figure B-14: Apply Blue Goop to the threads of these Swivel Components

9. Insert the **back-up ring** with the lubricated O-ring installed onto the shaft and slide it over the **shaft O-ring**.

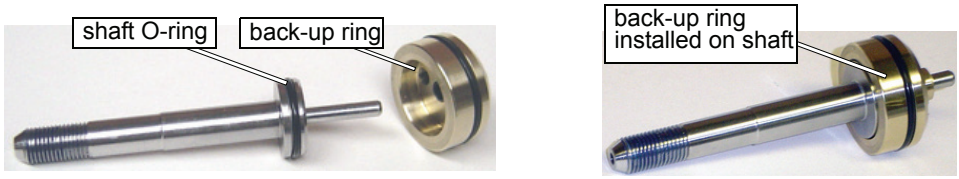

Figure B-15: Insert the Back-up Ring onto the Shaft O-ring

10. From the threaded side of the **shaft**, slide the **retainer** with **bearing** onto the shaft.

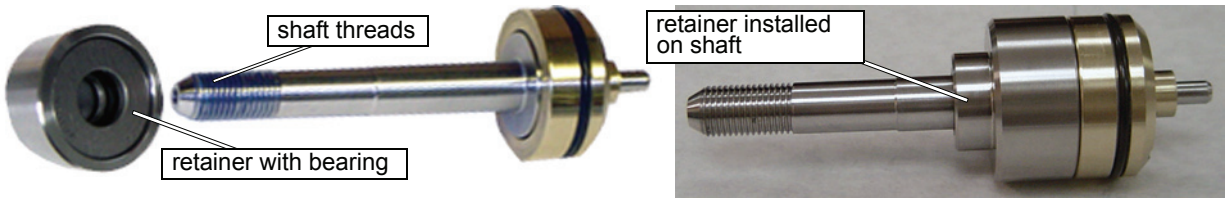

Figure B-16: Install the Retainer and Bearings

11. Slide the **swivel body seal** with the lubricated O-ring installed onto the shaft with the **back-up ring** attached (ensure that the O-ring end of the seal faces away from the back-up ring):

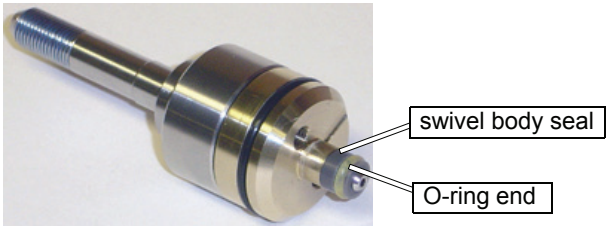

Figure B-17: Shaft with the swivel body seal installed

12. Apply **Lubriplate** onto the **retainer seal** and insert it onto the **shaft** with the flat side facing toward the **retainer**.

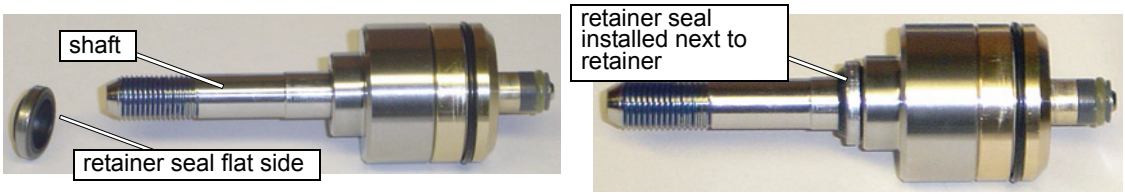

Figure B-18: Install the Retainer Seal onto the Shaft

13. Insert the **shaft components** into the **swivel body**.

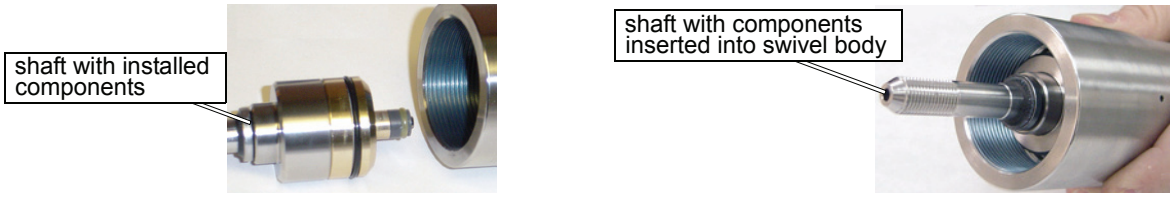

Figure B-19: Insert the Shaft with Components into the swivel body

14. Place the **swivel body** in the soft-jawed vice and screw the **retainer nut** into the swivel body. Torque to 50/ft lbs (68 Nm).

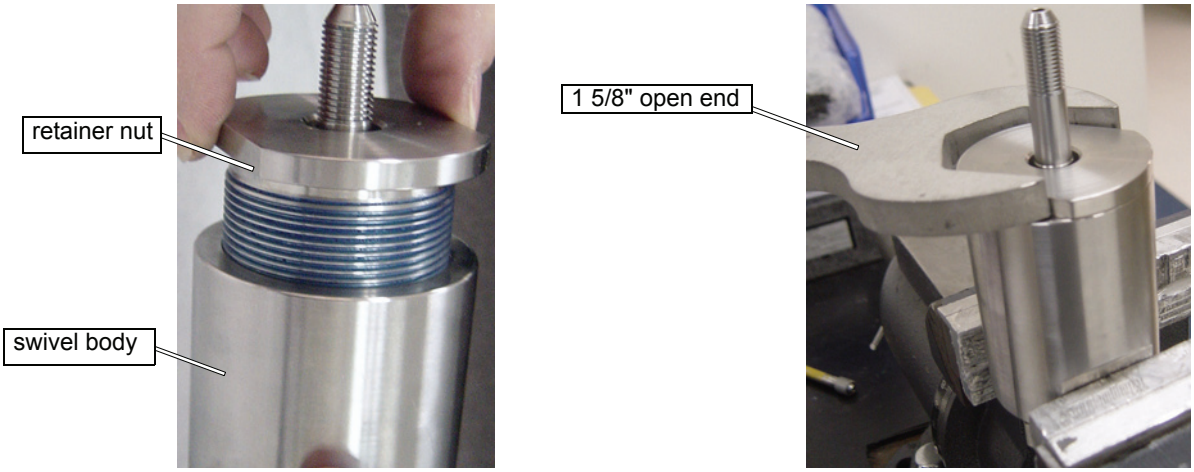

Figure B-20: Torque the Retainer Nut at 50 ft. lbs. (68 Nm)

15. Place the **gland nut** followed by the **collet** (taper end first) onto the shaft. Screw the **collar** onto the shaft, leaving at least three threads on the shaft exposed. The bulkhead swivel rebuild is now finished.

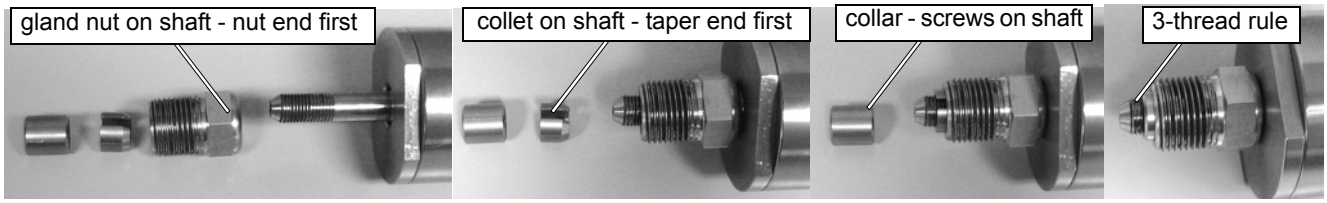

Figure B-21: Install the Gland Nut, Collet, and Collar onto the Swivel Shaft

Note: *The gland nut at the bottom of the swivel will not be accessible after the swivel is installed. It is extremely important that the gland nut be installed with three threads (three thread rule) showing on the High-pressure Tube and that the gland nut be tightened to 50 ft-lbs (68 Newton-meters).*

Installing the Bulkhead Swivel

Once rebuilt, swivel installation is the reverse of the removal instructions. During installation, it is important to torque gland nuts as follows:

1/4" tube, coning and threading, 60 Kpsi:	25 ft. lbs., 34 Nm
3/8" tube, coning and threading, 60 Kpsi:	50 ft. lbs., 68 Nm

For Assistance

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