

Rebuilding the Dual-Port Swivel

Introduction

A swivel rebuild involves disassembling a leaky swivel and replacing the dynamic seal, static seal, O-rings and backup ring. If you see water exiting any of the Dual-Port Swivel weep holes, take the swivel offline and inspect it immediately. Don't delay! Water can erode internal swivel components requiring their replacement .

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Safety

Labels

The following safety instructions must be followed when installing, operating or servicing OMAX equipment. If ignored, physical injury or death may follow, or damage may occur to the equipment. Always observe applicable safety precautions when working with this equipment.



WARNING

Electrical Hazard! This symbol indicates the presence of life-threatening voltages. Never access areas labeled as such without first taking appropriate safety precautions: locking out power, verifying no voltage present on circuits prior to maintenance activities, etc.



Lock out power!

Never do maintenance on your OMAX equipment with the main AC disconnect ON, unlocked, or with the pump in operation. Always follow standard lockout/tagout procedures.



Read the operator's guide!

Read your equipment's operator's guide for specific operator instructions and additional safety requirements.



Wear Gloves

Bacteria in the tank water can build up. A minor break in the skin can introduce harmful bacteria into a wound. Always wear protective gloves if you have cuts or open wounds on your hands. When setting up material for cutting, wear gloves that provide protection against sharp metal edges.



Eye Protection

Always wear approved safety goggles whenever cutting. Regular glasses do not provide sufficient eye protection! Have an eyewash station located near the work area in the event abrasive spray splashes into your eyes. The garnet abrasive is not a chemical irritant, but if not quickly washed out, it can injure an eye just as any sand would. In addition, tank water could contain particles from the material or chemicals irritants.

General Safety

The following embedded safety symbols are found throughout this guide and are used to identify safety issues and recommend actions to avoid the hazard.

WARNING

Indicates a hazardous situation which, if not avoided could result in death or serious injury.

CAUTION

Indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.







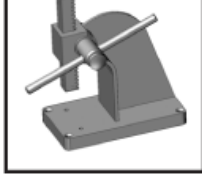
NOTICE

Used to address practices not related to physical injury.



Used to provide supplementary information, emphasize a point, or give a tip for easier operation.

Required Tools

Icon	Tool	Size(s)
	Socket wrench	1/2 in. drive
	Socket wrench	Torque wrench range: 20-150 ft-lb (1/2 in. drive)
	Soft-jaws vise	
	Allen wrench	5 mm, 6 mm
	Lubriplate® Multi-purpose grease	
	Jet-Lube Arctic® Extreme-service grease	
	Arbor press	

Icon	Tool	Size(s)
	Blue Goop®	
	Extreme-pressure lubricant (#3)	
	Magnifying glass	
	Acid brush	

Required Tools (Order from OMAX)	
P/N	Description
400700	Diagram, Exploded Pictorial, Dual Port Swivel
308920	Swivel wrench
308921	Swivel holder
201726	Bulkead swivel repair tool

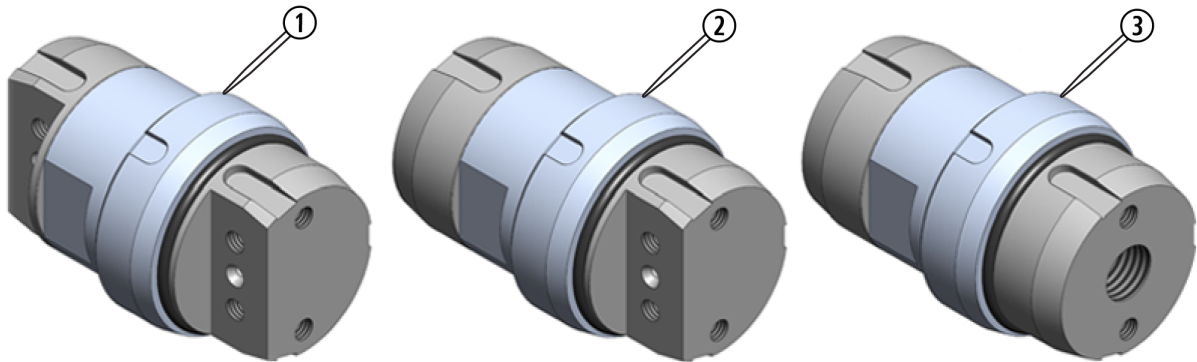
Preparation

1. Move the **Z-axis** to a location that enables easy installation.
2. If installing on a **machine** in the field, thoroughly wipe the area clean to ensure it is free of abrasive and other debris.
3. Use compressed air and water to wash down your work area and **swivel**.
4. Turn the main AC power to the machine and pump **OFF** and place a "lockout tag" on the power disconnect to alert others that maintenance is in progress.
5. Turn the water and air supply **OFF**.
6. Bleed off any residual air pressure from the system by removing the **air line** from the **main air source** and ensure there is no pressurized water in the **high-pressure lines**.
7. Place a piece of cardboard or other material over the **slats** of the working area so that tools or hardware do not fall in the tank.
8. Extend the **scissor arms** to place the **swivel** within easy access.

Dual-Port Swivels

Swivel Types

There are three basic dual-port swivel types: a swivel with **dual side-ports** [1] a swivel with **dual end-ports** [2] and a swivel with one **side port** and one **end port** [3].



See drawing 400700 for complete swivel component diagram.

Swivel Weep-Holes

Each swivel type provides dedicated weep holes where water leaks first appear. Water exiting from a weep hole means an internal component has failed.



Always repair a swivel as soon as a leak is detected. The longer the delay, the more likely a major component replacement will be required.

End-Port Swivel Leaks

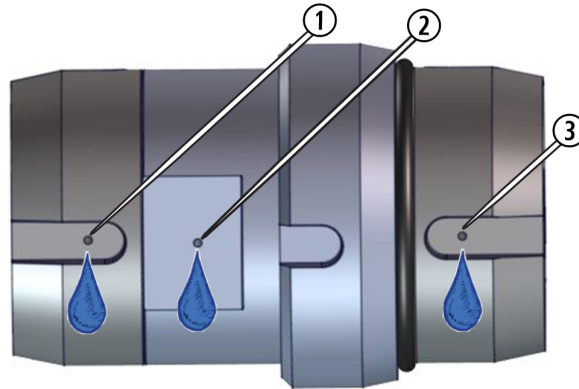


Figure 1

Leak Point	Leak Description	Suspected Causes	Recommended Actions
[1]	Dynamic end-port weep hole	Nipple cone, collet, or slotted-collet failure	Verify nipple cone installed and sealing correctly; disassemble swivel for kit rebuild and inspect all components for any signs of failure; replace all end port rebuild kit components as identified in figure below. See End-Port Swivel Section for leak information on swivels also having a side port.
[2]	Main housing weep-hole	Dynamic-seal failure, O-ring failure, backup-ring failure	
[3]	Static end-port weep hole	Nipple cone, collet, or slotted-collet failure	

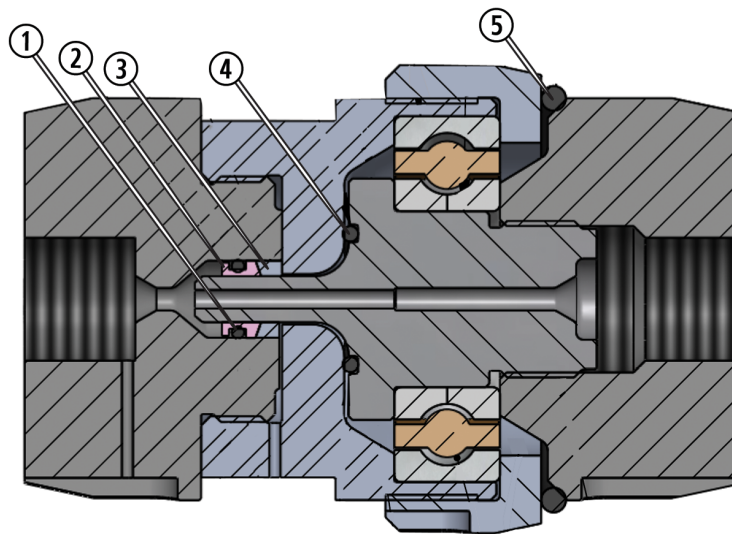


Figure 2

- [1] O-ring
- [2] Dynamic-seal assembly
- [3] Backup ring
- [4] O-ring
- [5] O-ring

Side-Port Swivel Leaks

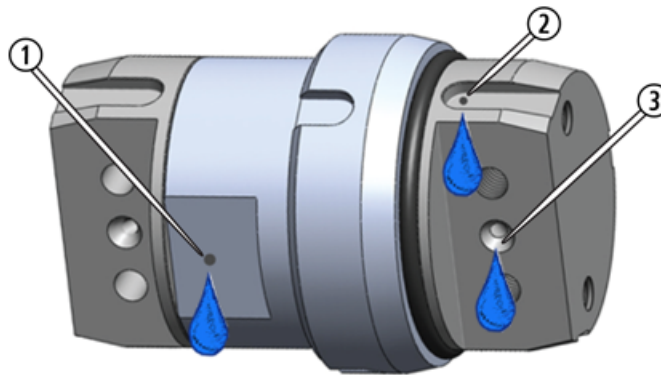


Figure 3

Leak Point	Leak Description	Suspected Causes	Recommended Actions
[1]	Main housing weep hole	Dynamic-seal failure, O-ring failure, backup-ring failure.	Verify end caps sealing correctly and inspect for damage. Disassemble swivel for rebuild and inspect all components for any signs of failure; replace all rebuild kit components for side ports as identified in figure below. See End-Port Swivel Section for leak information on swivels also having an end port.
[2]	Static side-port weep hole	Static-seal failure; side port end cap may have crack or erosion from water leakage.	
[3]	Static side-port nipple	Nipple damage or not seated properly.	

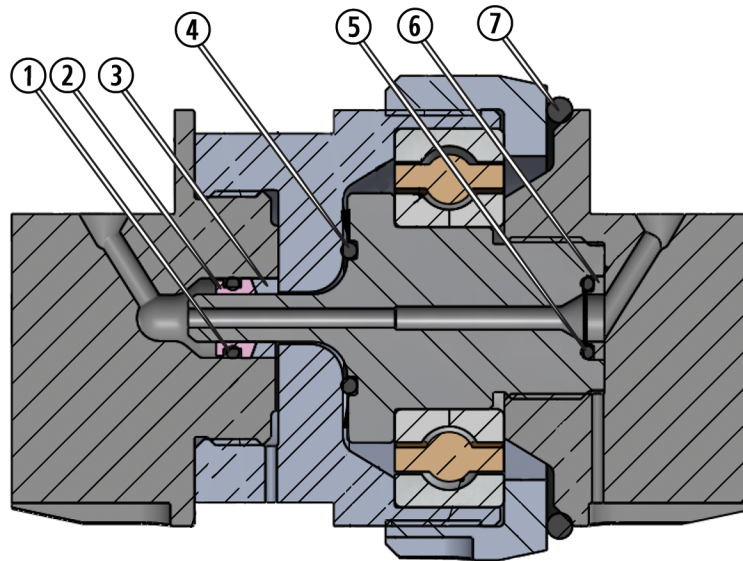


Figure 4

- [1] O-ring
- [2] Dynamic-seal assembly
- [3] Backup ring
- [4] O-ring
- [5] O-ring
- [6] Static seal
- [7] O-ring

Rebuilding a Leaky Swivel

The following procedures detail rebuilding a leaky dual-port swivel. For all other swivel components found to be defective during this rebuild, please contact OMAX Technical Support to obtain replacement parts.

Remove the Swivel from the Scissors

1. Extend the **swivel scissor-arms** to bring the **swivel** within easy reach. Adequately support the **scissor arms** to ensure they are secured in place when the **swivel** is removed.
2. Remove all **bolts** [1] from the **T-bars** [2] to disconnect the swivel for removal.

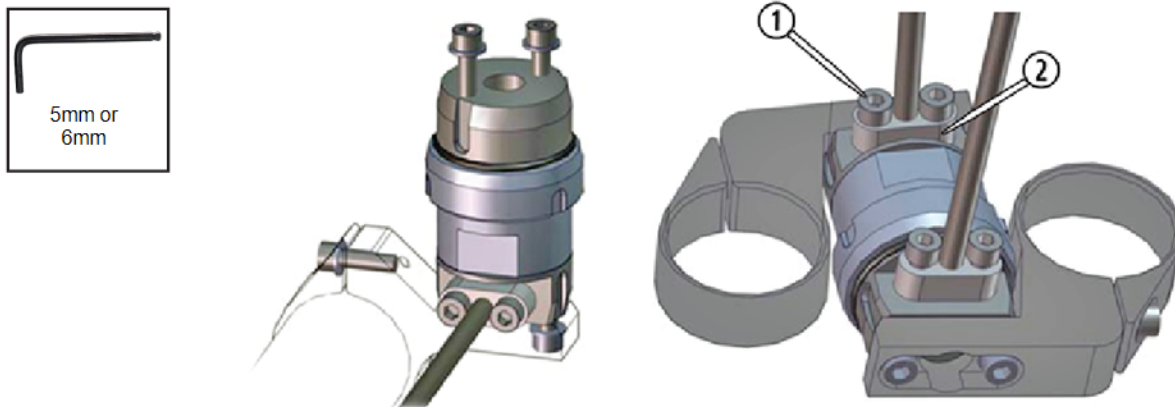


Figure 5

Disassembling an End-Port Swivel

Two custom wrenches are required for this rebuild. The two wrenches are used in combination for disassembly and reassembly.

- **Swivel holder** [1] comes with two jaws, featuring wide and narrow flats. Both are designed to accept the flats machined into the swivel. A built-in handle is designed to be clamped into a vise.
- **Swivel wrench** [2] comes with two jaws, featuring small and large sizes. Both openings have three teeth which slide into slots machined into the swivel body at various locations. A 1/2 in. square drive-hole is provided for socket and torque wrenching.

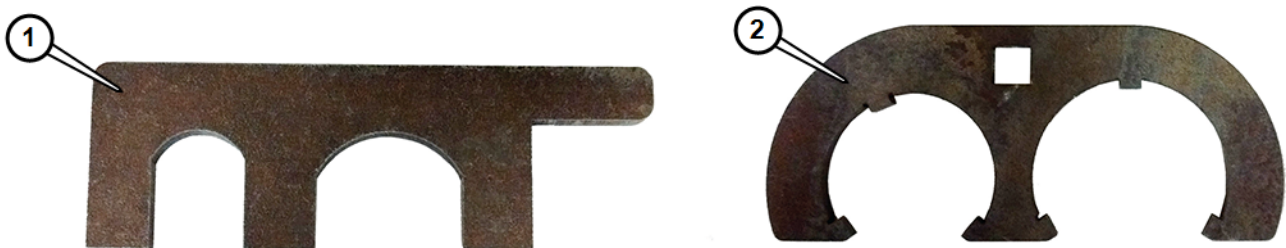


Figure 6



Remove soft-jaws when clamping the swivel holder's handle into a vise.

1. Clamp the handle on the **swivel holder** [1] into a vise.
2. With the swivel's **static end-port** face-down, slide the flats below the **dynamic end-port** [3] into the wide flats on the swivel holder.
3. Fit the **swivel wrench** [2] over the **dynamic end-port** and remove it from the **main housing**.

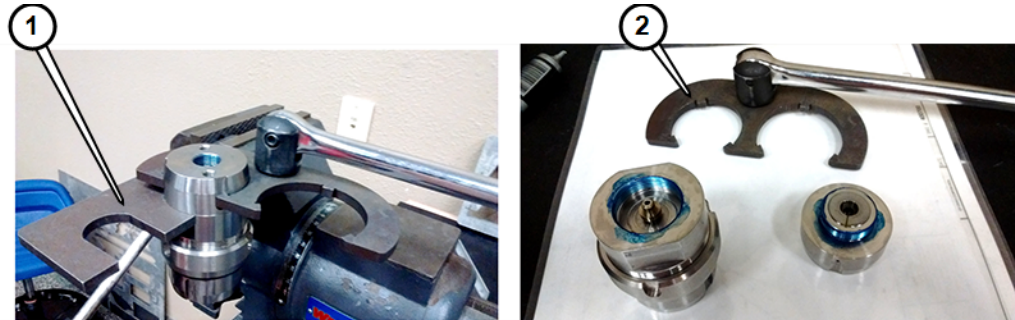
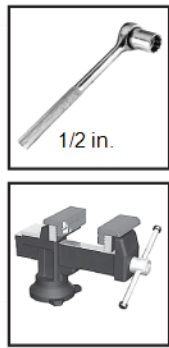


Figure 7

4. Remove the **dynamic seal** and **backup ring** from the **dynamic end-port** [1] using the bulkhead swivel repair tool.



Do not scratch or score the internal swivel-body when removing the dynamic seal.

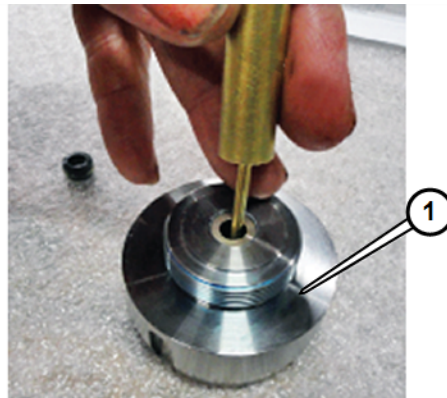


Figure 8

5. Apply a light coat of Lubriplate® onto the **O-ring** and place it on the **dynamic-seal assembly**.



Ensure the dynamic seal and O-ring remain free of contaminants.

6. Slide a new **dynamic seal backup-ring** [1] onto the **male swivel body** [2].

7. Ensure the **concave surface** faces outward.

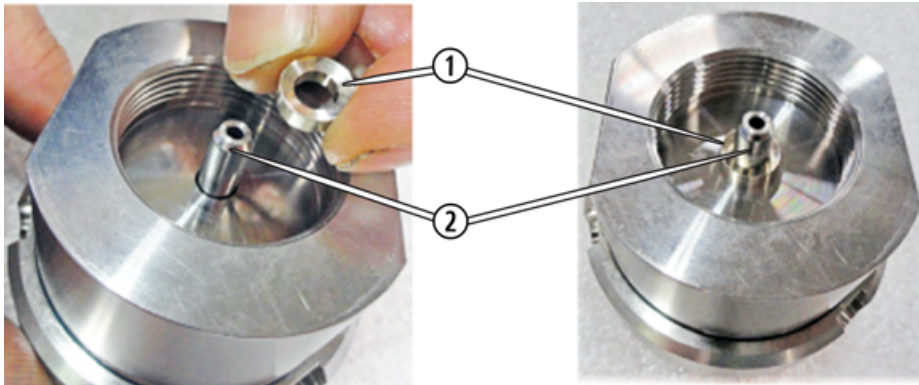


Figure 9

8. Place the **backup ring** [2] on the **male swivel body** [3] followed by the **dynamic-seal assembly** [2].

9. Ensure the **domed face** of the **dynamic seal** mates with the **concave face** of the **backup ring**.

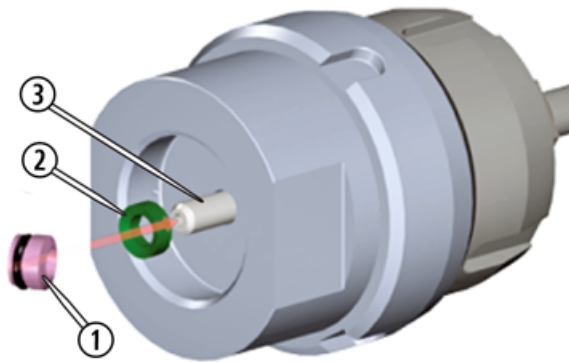


Figure 10


 The jaws of the special wrenching tool must maintain a 90-degree angle to the horizontal axis of the torque-wrench handle - throughout the torquing rotation. Other angles of orientation will alter the set torque.



Figure 11

10. Inspect the **male swivel body** [1] and **dynamic end-port** [2] or damage. If no damage is identified, torque the **dynamic end-port** back onto on the **male swivel body** with the special tools (swivel wrench and swivel holder).

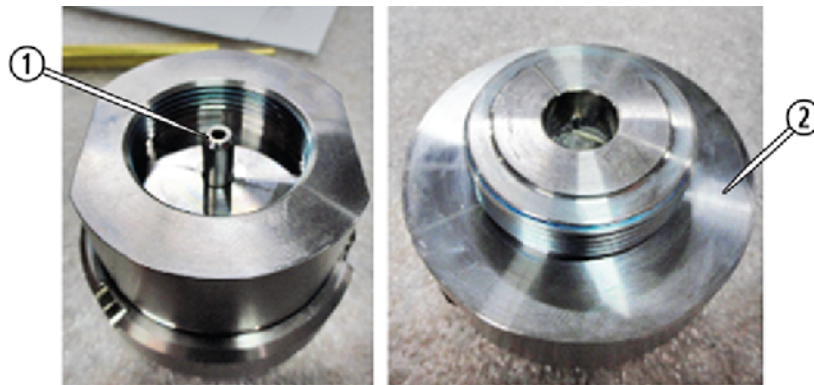
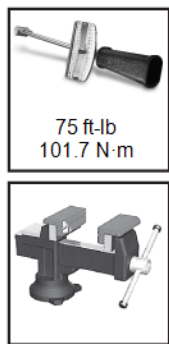


Figure 12

Inspect Internal Components for Damage

NOTICE

The photos below show a crack [1], [2] forming in the port causing water leakage at the weep hole.

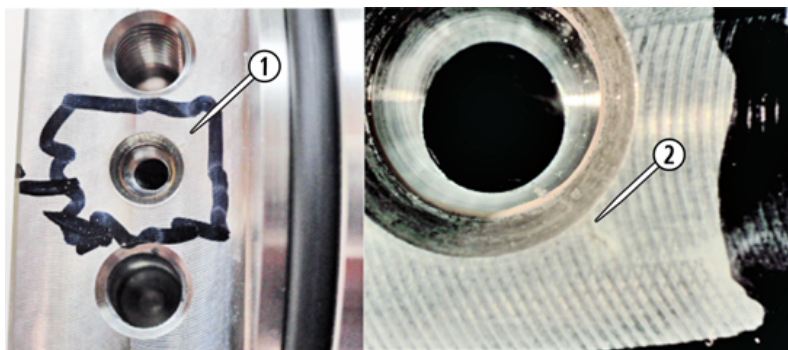


Figure 13

NOTICE

The top nipple [1] shows how an undamaged cone should appear (See Figure 14). The two other nipples [2], [3] both have cone damage caused by over-tightening the gland nut. Damaged components cause leaks and must always be replaced.

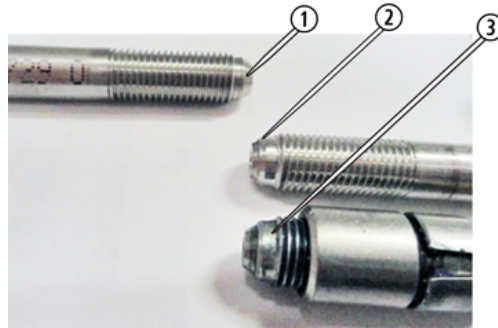


Figure 14

NOTICE

If internal components of the swivel are damaged, or if the swivel bearing does not turn smoothly, the swivel bearing may be damaged and requires a major rebuild. Contact OMAX Customer Service for assistance.

Continue with Swivel Disassembly

1. Clamp the handle on the **swivel holder** [1] into a vise.
2. With the swivel's **static end-port** face-up, slide the swivel flats, below the **swivel nut**, into the wide flats on the swivel holder.

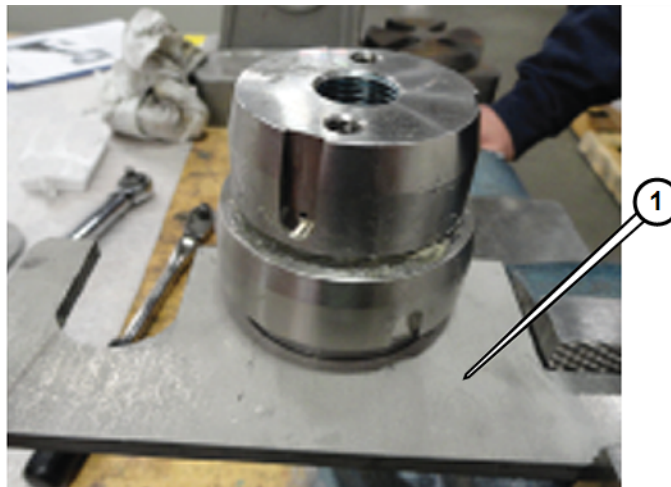


Figure 15

3. Place the **swivel wrench** [1] into the teeth under the **swivel nut** [2] and loosen it to remove the **main body** [3].

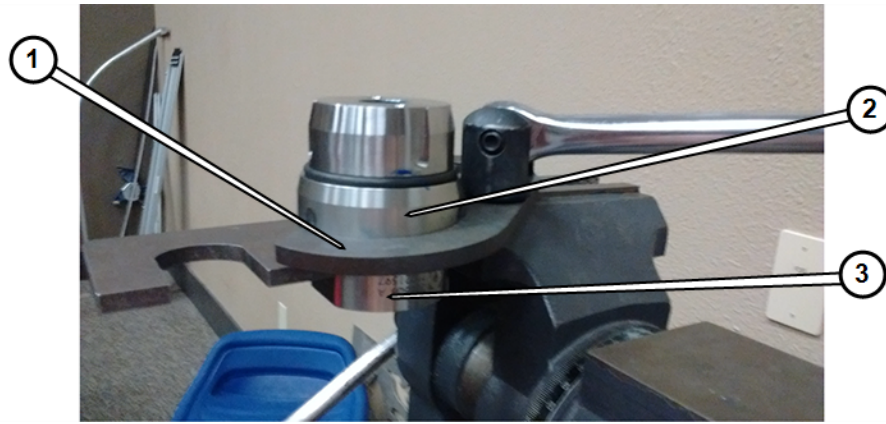


Figure 16

4. Insert the flats on the **male swivel-body** [1] into the narrow flats on the swivel holder.

5. Place swivel wrench on the **static end-port** [2] and remove the **static end-port** and large **O-ring**[3].

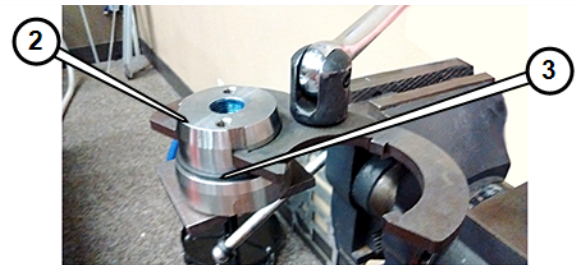
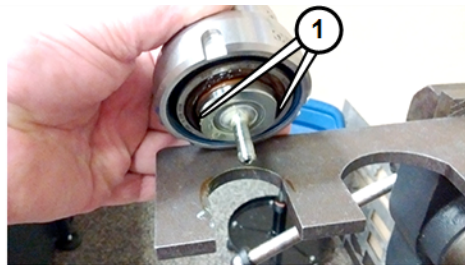


Figure 17

Reassemble the Swivel

1. Use an acid brush to apply a light coat of Blue Goop® to the threads of the **male swivel body**.

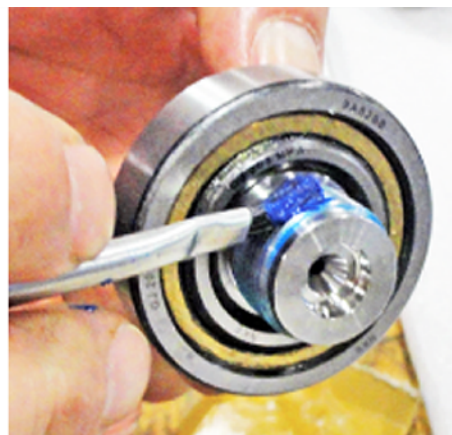


Figure 18

2. Place the **swivel nut** [1] over the **male swivel-body** [3] and **bearing** [2].

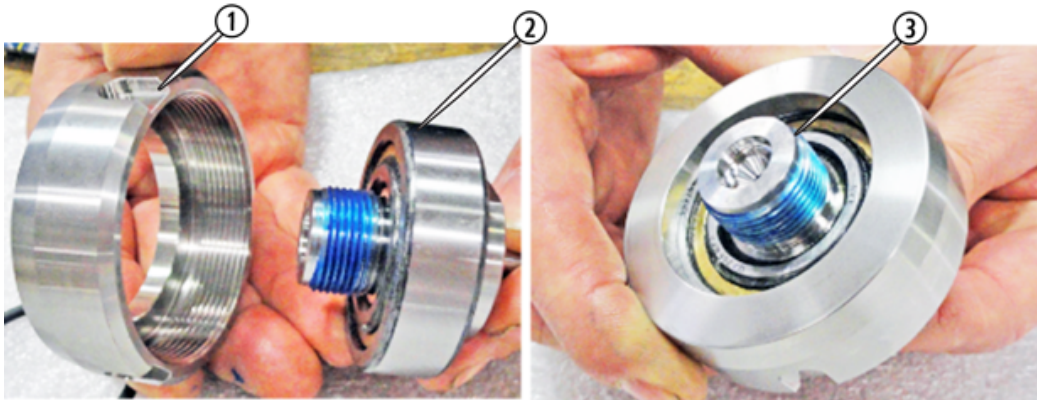


Figure 19

3. Thread the **male swivel-body** [2] onto the **static end-port** [1] and **swivel nut** [3] and hand-tighten.

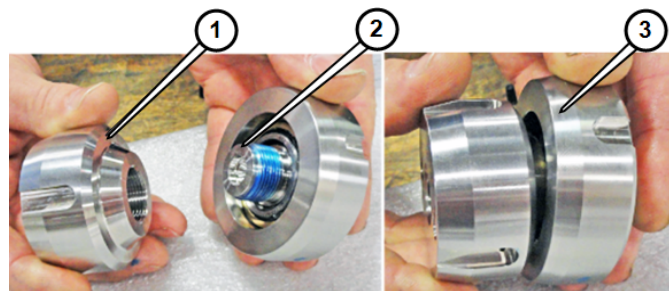


Figure 20

4. Insert the **flats** [1] on the **male swivel-body** into the narrow flats on the swivel holder.

5. Place the **swivel wrench** [2] onto the **static end-port** [3] and torque.

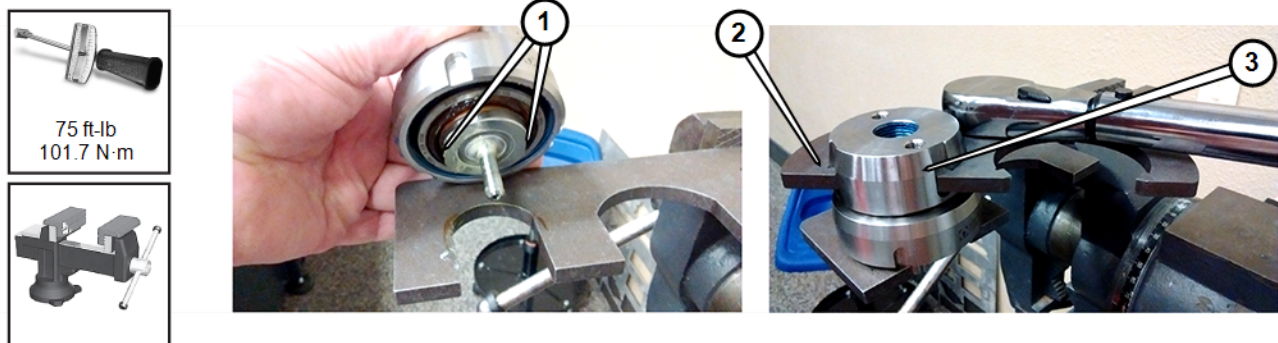


Figure 21

6. Apply a thin coat of Lubriplate® onto the **O-ring** [1] and place it into the **groove** in the **male swivel-body** [2]. Pack the **groove** [3] between the **male swivel-body** and the **swivel nut** with a heavy coat of Arctic® grease.



Figure 22



Always maintain a clean work area. Never allow the O-ring, Arctic grease or Lubriplate® to become contaminated.

7. Use an acid brush to apply a light coat of Blue Goop® to the threads of the **main body** [1]. Thread the **main body** into the **swivel nut** [2] and hand-tighten.

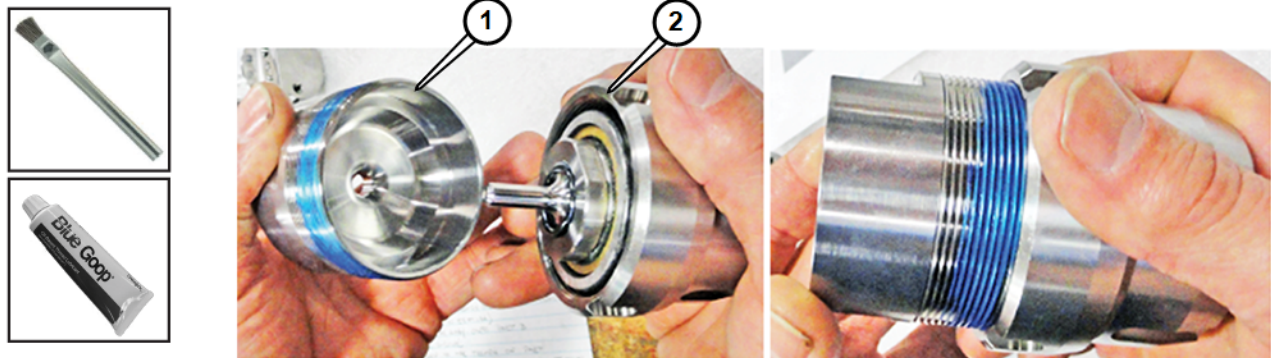


Figure 23

8. With the swivel's **static end-port** face-up, insert the flats below the **swivel nut** into the wide flats in the **swivel holder** [1].

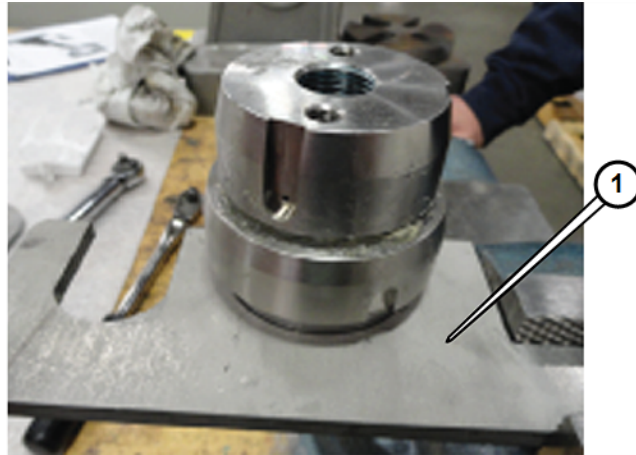


Figure 24

9. Place the **swivel wrench** [1] into the slots under the **swivel nut** [2] and torque.



75 ft-lb
101.7 N·m

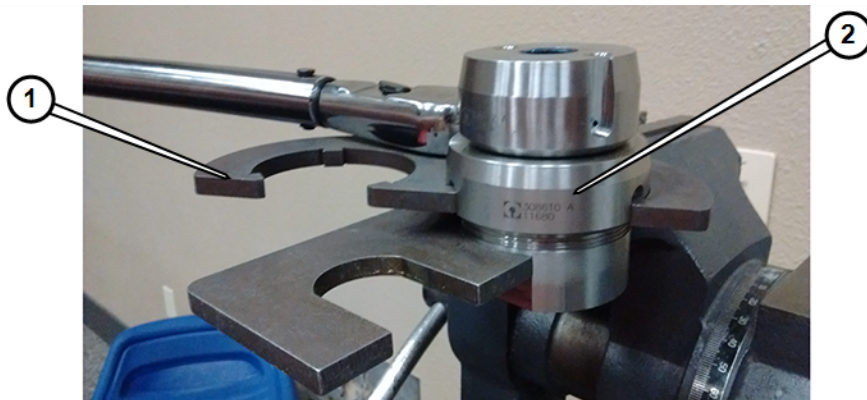


Figure 25

10. With the chamfer side facing out, slide the **static seal backup-ring** [1] onto the **stem** [2] of the **male swivel-body**.

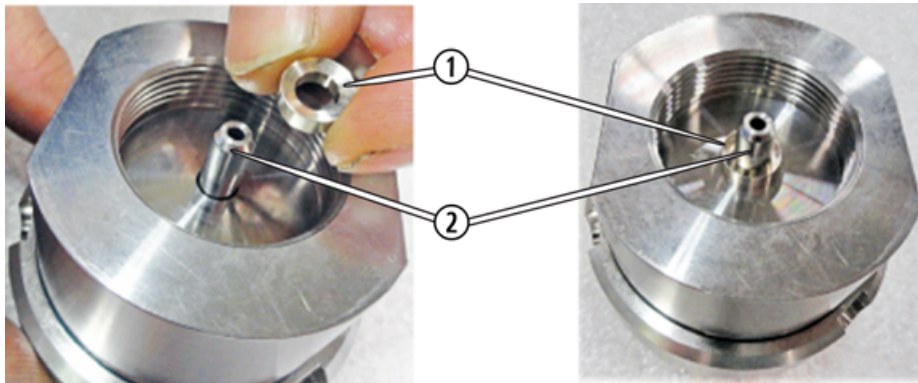


Figure 26

11. Apply a light coat of Lubriplate® to the **O-ring** [1] and install it on the **dynamic-seal assembly** [2].

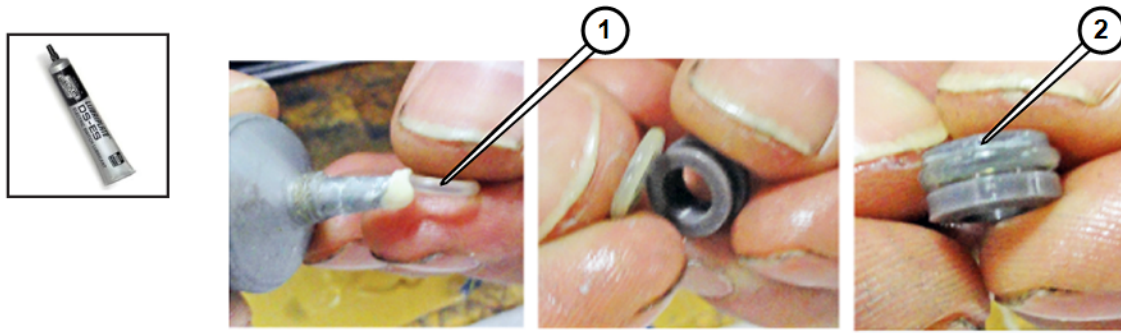
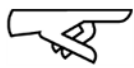


Figure 27



Always maintain a clean work area. Never allow the dynamic-seal assembly, O-ring or Lubriplate® to become contaminated.

12. With the beveled face of the **dynamic-seal assembly** [1] facing in, slide the **backup ring** [2] onto the **stem** [3] of the **male swivel body** and into the chamfer face of the **backup ring**.

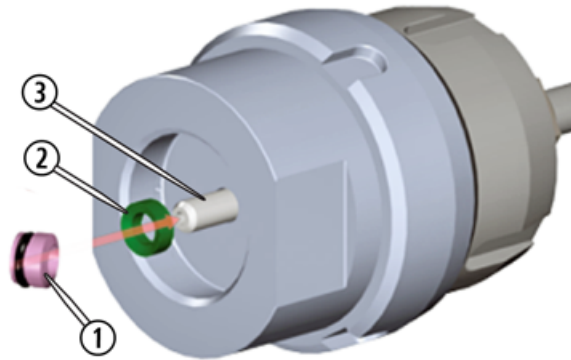


Figure 28

13. Use an acid brush to apply Blue Goop® to the threads of the **dynamic end-port**

NOTICE

Do not allow Blue Goop® to enter the bore. Damage to parts may occur.



Figure 29

14. Thread the **dynamic end-port** [1] into the **main housing** [2] and hand-tighten.

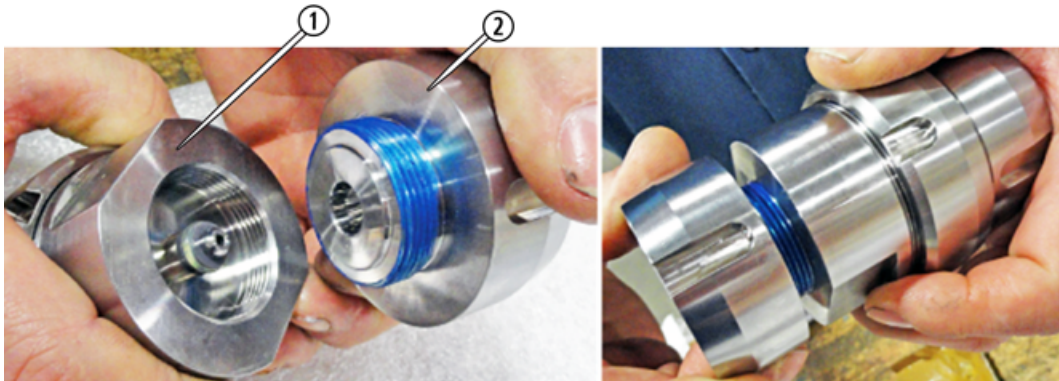


Figure 30

15. With the swivel's **static end-port** face-down, insert the flats below the **dynamic end-port** into the wide flats in the **swivel holder** [1].

16. Place the **swivel wrench** [2] into the slots on the **dynamic end-port** [3] and torque.

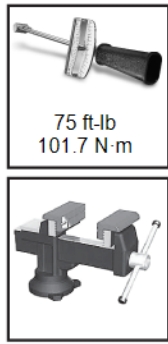


Figure 31

17. Install the large **O-ring** over the **static end-port** of the and into the groove.


 *Do not lubricate large O-ring.*



Figure 32

Disassembling the Side-Port Swivel

The side-port swivel rebuild follows a very similar process up to the end-port swivel. An extra step is required for placing a seal in the male swivel-body.

1. With the swivel's **side-port end cap** face-up, insert the flats above the **swivel nut** into the wide flats in the **swivel holder** [1].
2. Place the **swivel wrench** [2] into the slots on the **side-port end cap** [3] and separate it from the **static end-port** [4].

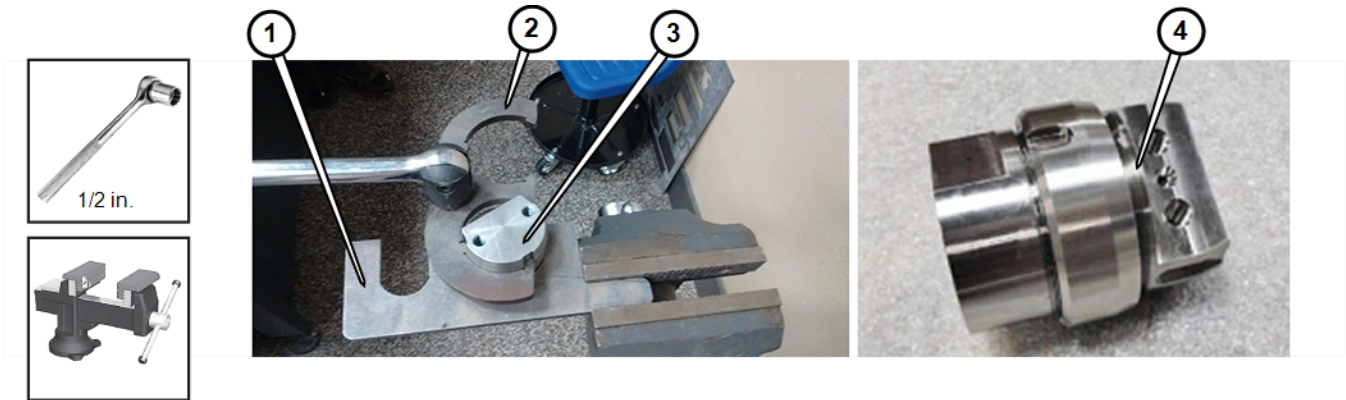


Figure 33

3. Return to the earlier section continue with swivel disassembly and complete steps 1-5.
4. Once complete, continue with following instructions (steps 5-9).
5. Lubricate the **O-ring** with LubriPlate® and slide onto the **seal lip**. Place the **seal** into the **male swivel-body** [1]. Ensure the **seal seats** completely against the **male swivel-body**.

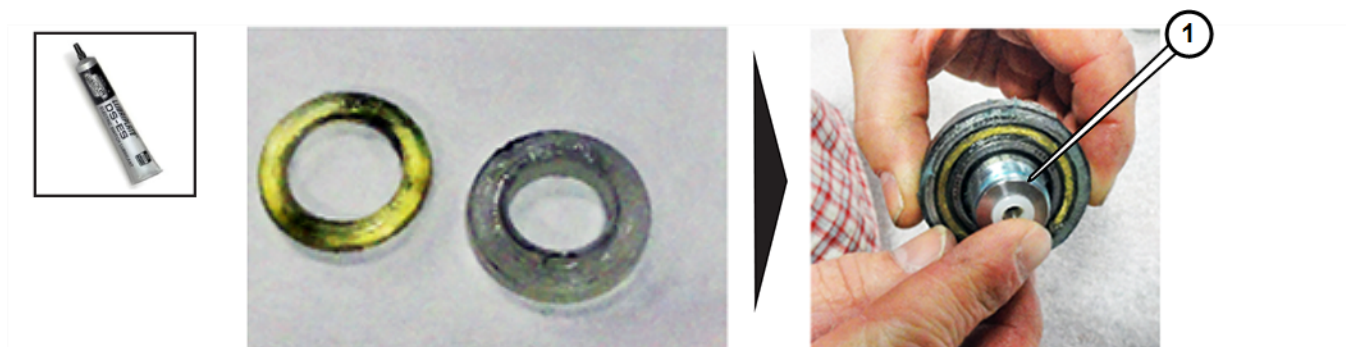


Figure 34

6. Thread the **side-port end cap** into the **swivel nut** [1].

- With the **static end-cap** face-up, insert the **flats** under the **male swivel-body** [2] into the narrow flats on the **swivel holder**.
- Place the **swivel wrench** [3] on the **static end-cap** and torque.

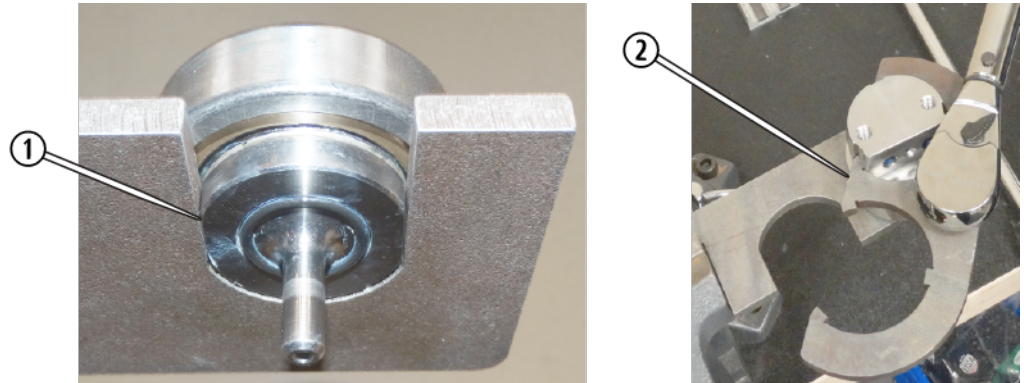
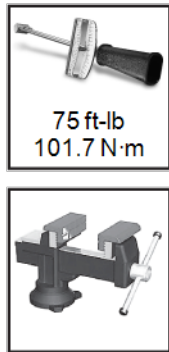


Figure 35

- Apply Lubriplate® to the **O-ring** [1] and place it into the groove in the **male swivel body** [2]. Pack the area [3] between the **male swivel body** and **swivel nut** with Arctic® grease.

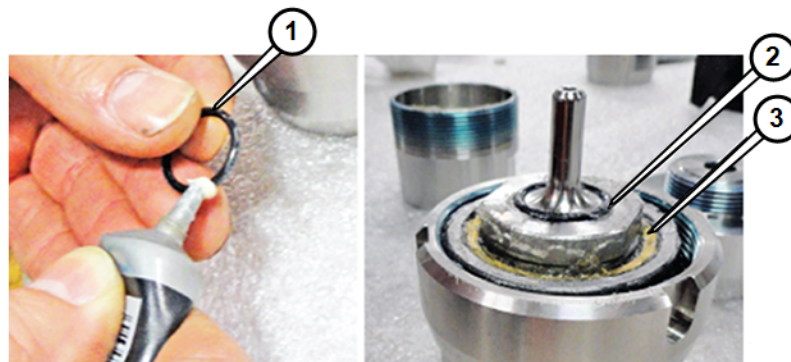


Figure 36

- To complete this rebuild, return to the section: reassemble the **swivel**, step 7.

Customer Support

Refer to the omax.com website for technical support contact information.

Original Instructions in English

June 2016

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