

WATEROUS

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TQC Power Take-Offs

Overhaul

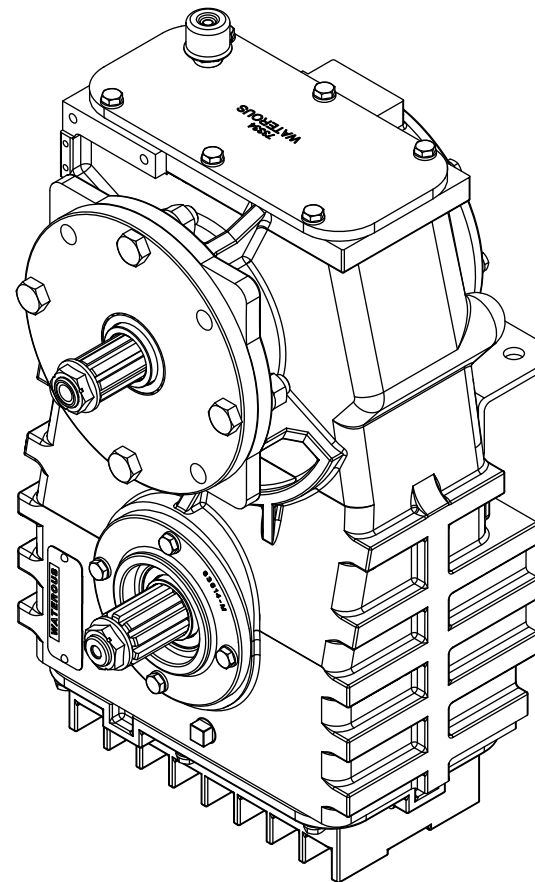
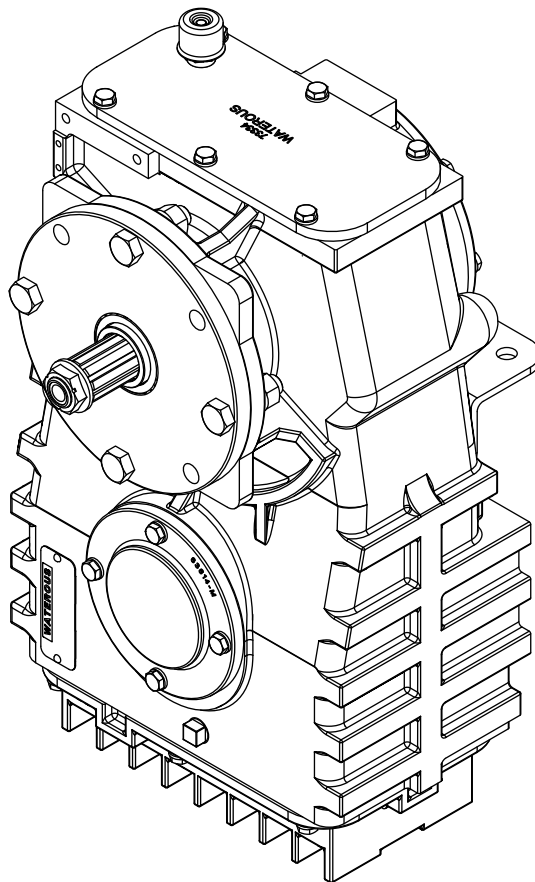
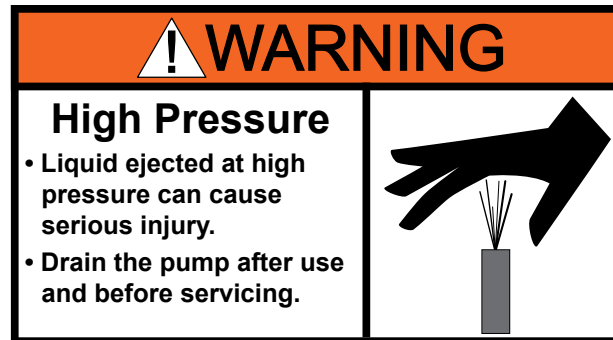


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Safety Precautions

- Read and understand all the associated documentation before you begin operating the product.
- Contact Waterous when you have questions about operating or maintaining the equipment.
- Read and understand all the notices and safety precautions.
- Do not operate the equipment when safety guards are removed.
- Do not modify the equipment.



Use this document to overhaul your Waterous equipment. Please understand the following conditions before proceeding:

- Be aware that these instructions are only guidelines and are not meant to be definitive. Contact Waterous when you have questions.
- Understand that your configuration may require additional steps, that are not described in the illustrations or instructions, to perform the overhaul.
- The equipment described in this document is intended to be overhauled by a person or persons with the necessary skills and knowledge to perform the overhaul.
- The information in this document is subject to change without notice.

This document is divided into the following sections:

SAFETY

This section describes general precautions and alert symbols in the document.

INTRODUCTION

This section is an overview of the document.

DISASSEMBLY

This section describes disassembly procedures.

ASSEMBLY

This section describes assembly procedures.

Using this Document

Use the guidelines below when viewing this document.

Viewing the Document Electronically

- View this document in landscape orientation.
- Use the table of contents to navigate directly to that section.
- Text **with this appearance** is linked to a reference.

Printing the Document

- The document is designed to be printed on both sides and in color.
- Use a 3-ring binder to store the document.

Additional Documentation

Additional documentation is available through the MyWaterous login at waterousco.com. Use your serial number to gain access to the service parts list associated with your system. Dimensional drawings are available through the Waterous Service department.

Symbols

Symbols are used to illustrate additional tools or operations that are required to complete the instruction.



Arbor press—This symbol tells you to use an arbor press to complete this step.



Discard—This symbol tells you to discard or recycle the part in accordance with local regulations.



Finger tight, then quarter turn—This symbol tells you to secure the hardware to finger tight and then use a wrench to turn the hardware an additional quarter turn.



High-pressure grease—This symbol tells you to apply high-pressure grease to the surfaces that you are pressing together.



Sealant—This symbol tells you to apply an appropriate sealant to the part.



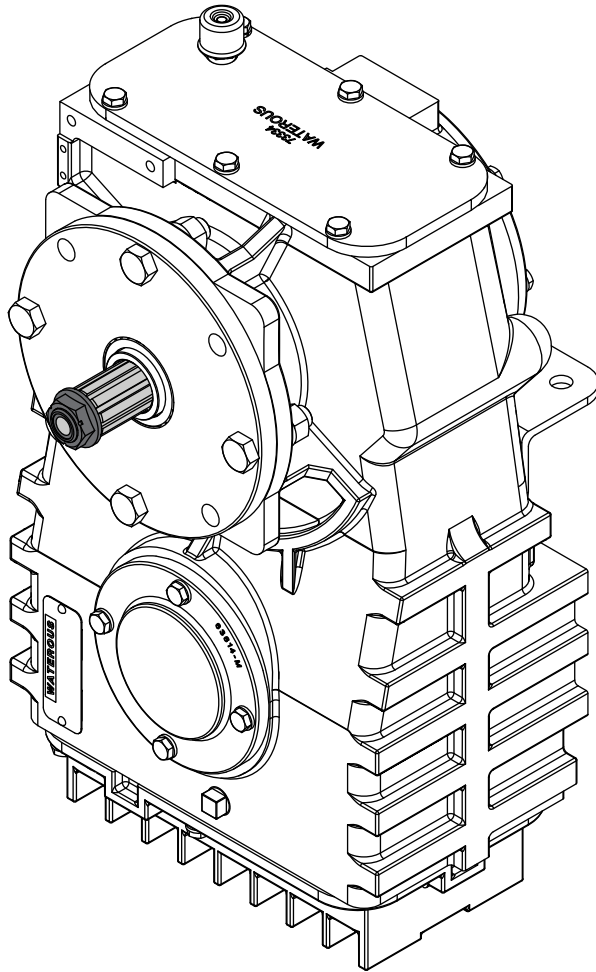
Tap—This symbol tells you to use a non-marring hammer to gently tap the part into position.



Torque to specification—This symbol tells you to torque the hardware to the specified value.

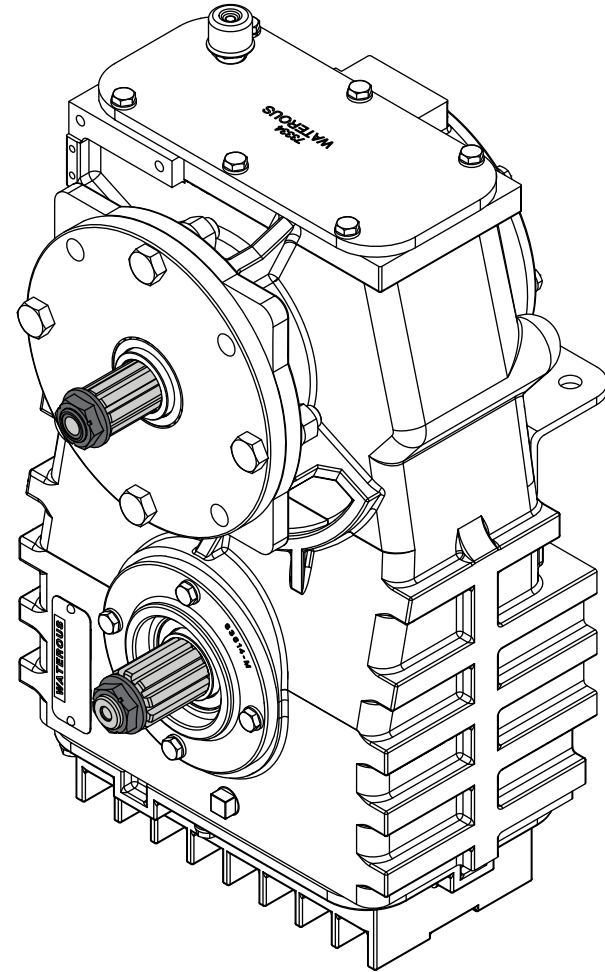
Output Configurations

Opposite Side Output



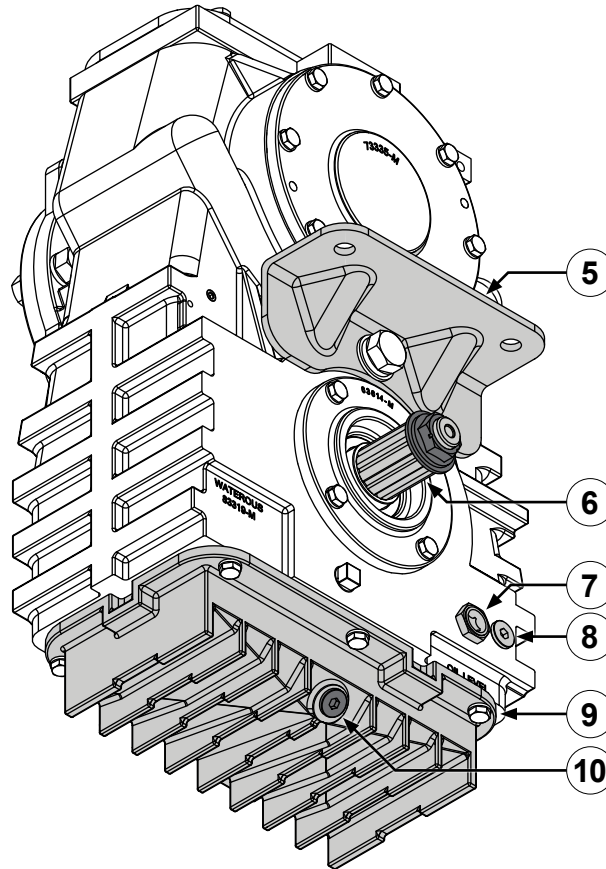
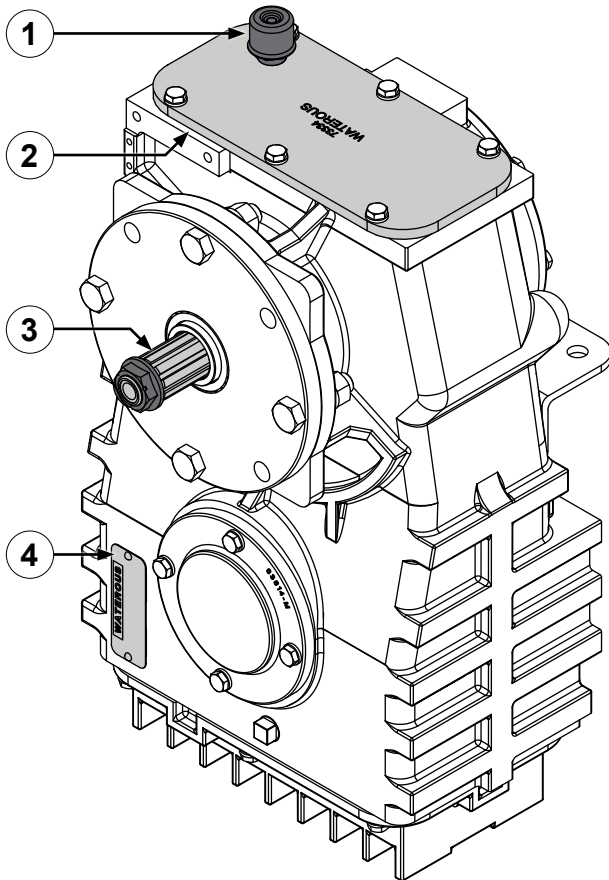
Input and output are on opposite sides of the case.

Same Side Output



Input and output are on the same side of the case.

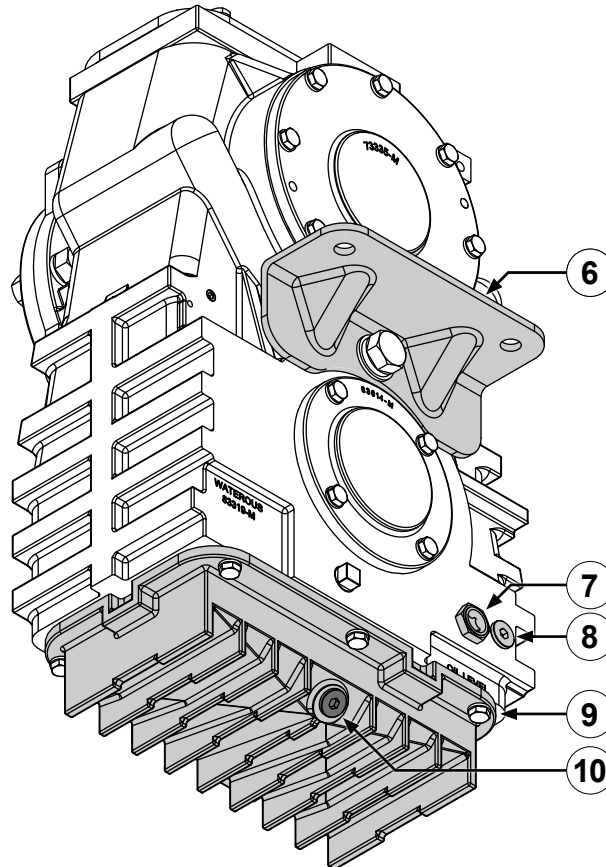
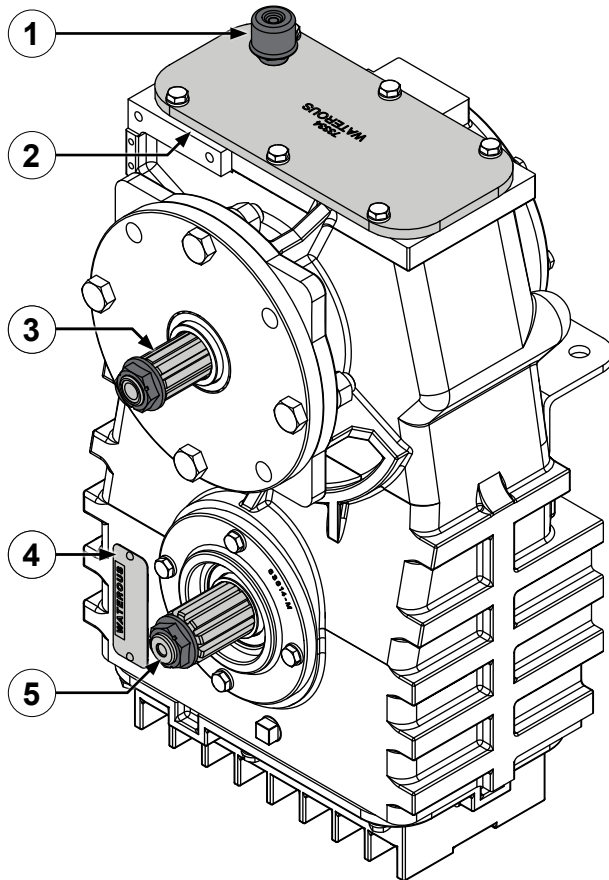
Identifying Exterior Components—Opposite-Side Output



Use the illustration to identify various components on the PTO.

- | | |
|----|----------------------|
| 1 | Breather |
| 2 | Case cover |
| 3 | Output shaft |
| 4 | Serial plate |
| 5 | Mounting bracket |
| 6 | Input shaft |
| 7 | Oil level sight plug |
| 8 | Oil fill plug |
| 9 | Transmission pan |
| 10 | Oil drain plug |

Identifying Exterior Components—Same-Side Output



Use the illustration to identify various components on the PTO.

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| 8 | Oil fill plug |
| 9 | Transmission pan |
| 10 | Oil drain plug |

Preparing to Disassemble the Power Take-Off

- Read and understand the instructions before disassembling the equipment.
- Prepare a workspace suitable to accommodate and support the power take-off (PTO).
- Gather the necessary tools, cleaning cloths, brushes, and penetrating fluids.
- Understand that your configuration may require additional steps that are not described in the illustrations or instructions to perform the disassembly.
- This equipment is intended to be disassembled by a person or persons with the basic knowledge of servicing similar equipment. Contact Waterous with questions.

Tools Required

- Typical automotive mechanics hand tools.
- Suitable arbor press.
- Suitable support and lifting equipment.

Preparing the Apparatus

- Park the apparatus on a level surface in a well-lit area.
- Engage the parking brake.
- Shut off the engine and remove the key from the ignition switch.
- Allow the apparatus to cool before servicing.

Best Practices

- Remove any dirt, sand, grease, or oil from the enclosure before you disassemble the PTO. Surface debris can transfer into the PTO interior and prematurely wear internal parts.
- Only use a clean, lint-free cloth, a debris free work surface, and properly maintained tools to perform the disassembly.
- Replace any gaskets and O-ring seals during the overhaul.
- Do not reuse the lock nuts.
- Apply penetrating oil to screws and nuts before disassembly.

Removing the Power Take-Off

- Removing the PTO for overhaul varies by application. Your application may require components such as cooling lines, support brackets, plumbing connections, and other accessories be removed or disconnected before removing the PTO.
- Record the process used to remove the equipment from the apparatus. Use this information to install the equipment into the apparatus after the overhaul.

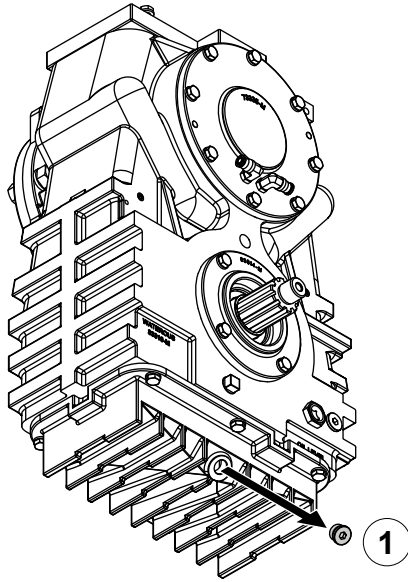
Disassembling the Power Take-Off Components

- Refer to the service parts list (SPL) for part identification and disassemble order.

Note: Documents specific to your application are available through the MyWaterous login at waterousco.com by entering the serial number for your system. Depending on the application, the serial number for your equipment is located on the operator panel, pump, PTO, or some combination of the three.

- Use established industry practices to disassemble the PTO.
- Record or mark components as you remove them to make sure that you install them in the same orientation.
- Discard or recycle drained fluids collected during the overhaul in accordance with your local regulations.

Draining the Lubricant



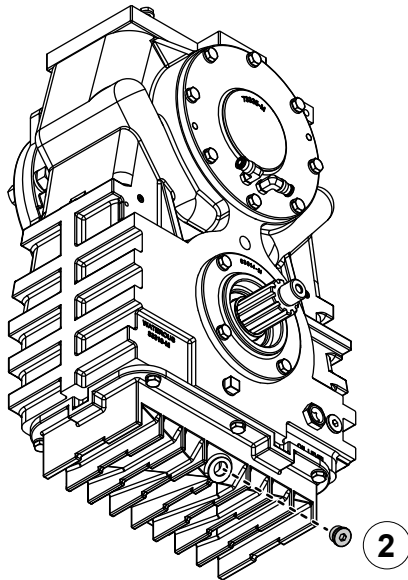
Use the illustrations and instructions to drain the lubricant.

Note: The illustrations show the opposite-side configuration. Apply the same instructions to your application if it is the same-side configuration.

- 1 Place a suitable container under the PTO to collect the drained lubricant, then remove the oil drain plug. Allow the lubricant to drain.

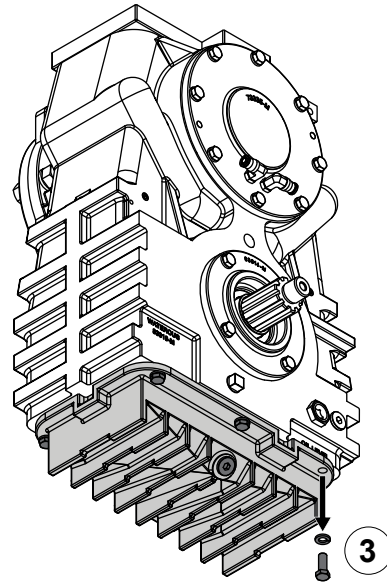
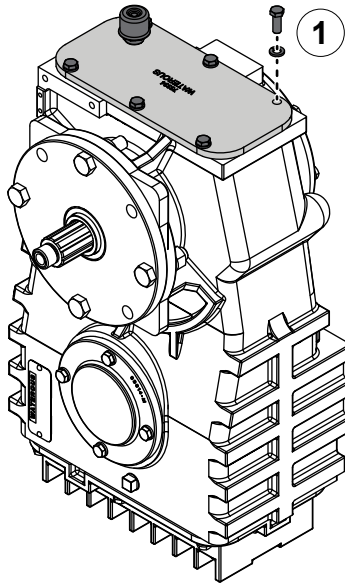
- 2 Install the oil drain plug.

Note: Make sure that you do not over-tighten the plug.



<15 ft-lb
<20 N·m

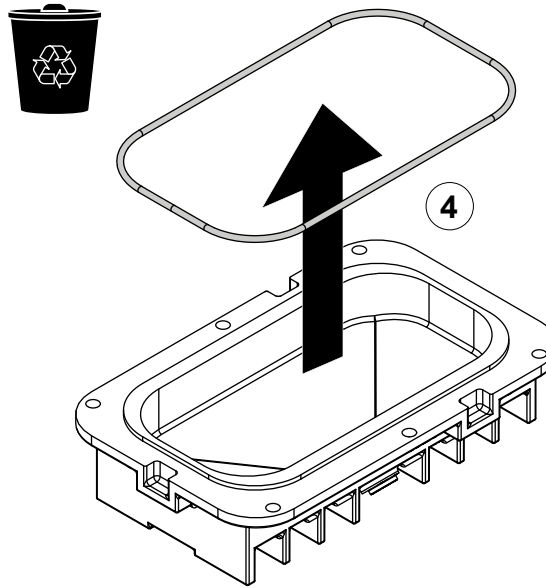
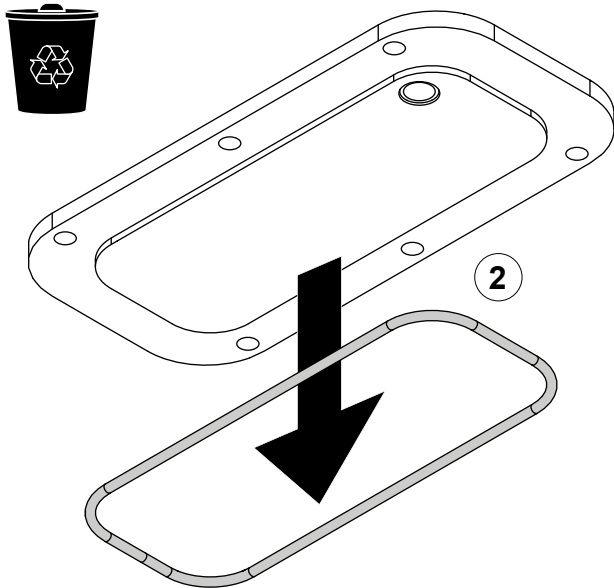
Removing the Case Cover and Transmission Pan



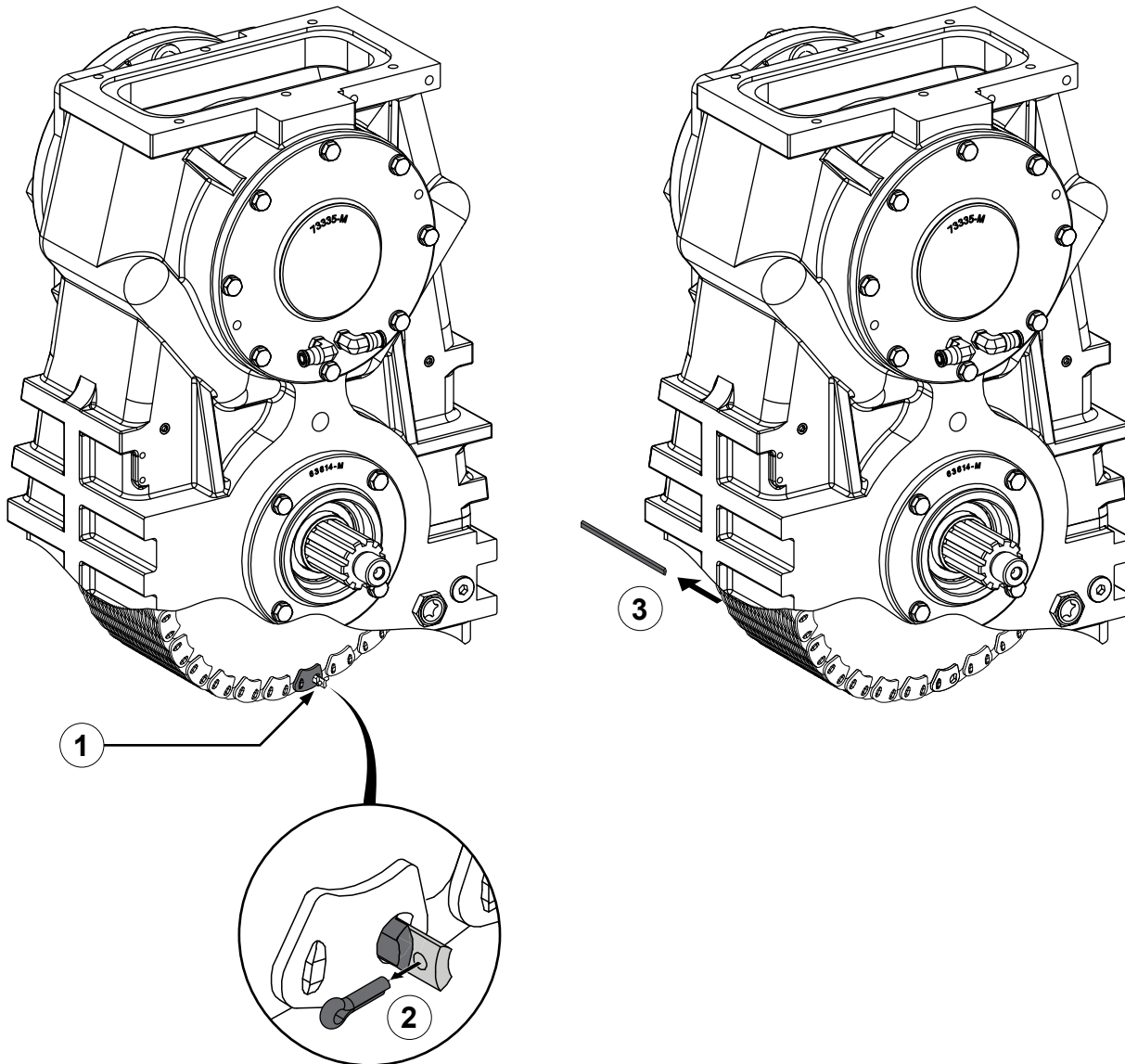
Use the illustrations and instructions to remove the case cover and transmission pan.

Note: The illustrations show the opposite-side configuration. Apply the same instructions to your application if it is the same-side configuration.

- 1 Remove and set aside the hardware from the case cover and remove it.
- 2 Remove and discard the O-ring.
- 3 Remove and set aside the hardware from the transmission pan and remove it.
- 4 Remove and discard the O-ring.



Removing the Drive Chain

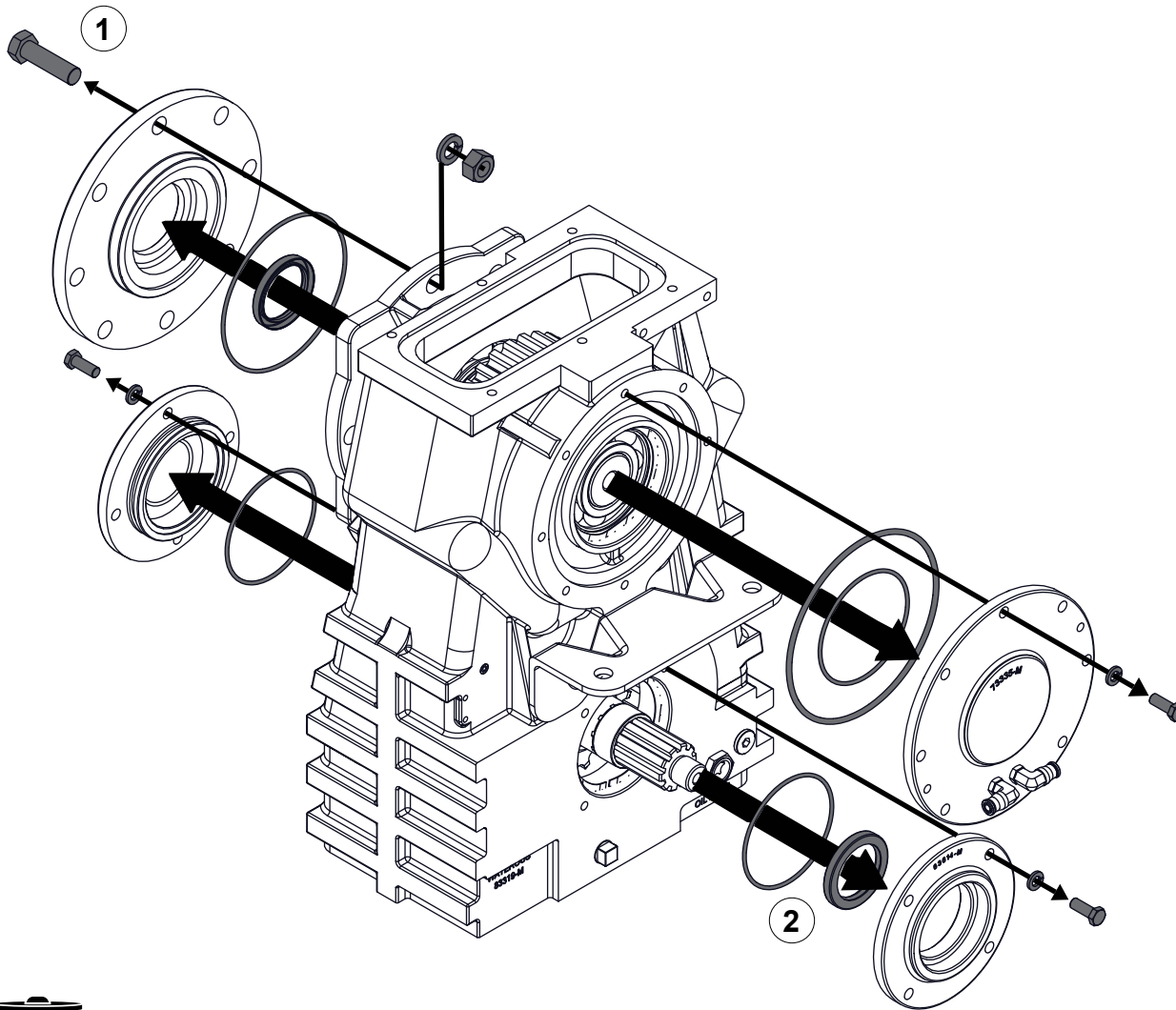


Use the illustrations and instructions to separate and remove the drive chain.

Note: The illustrations show the opposite-side configuration. Apply the same instructions to your application if it is the same-side configuration.

- 1 Locate the connecting link.
- 2 Use needle-nose pliers, or a similar tool, to remove the cotter pin. Set the cotter pin aside.
Note: Replace the cotter pin if you damaged it during removal.
- 3 Remove the connecting pin and rocker, then set them aside. Remove the chain.

Removing the Bearing Covers and Oil Seal Housings



Use the illustration and instructions to remove the bearing covers, oil seal housings, and the associated components.

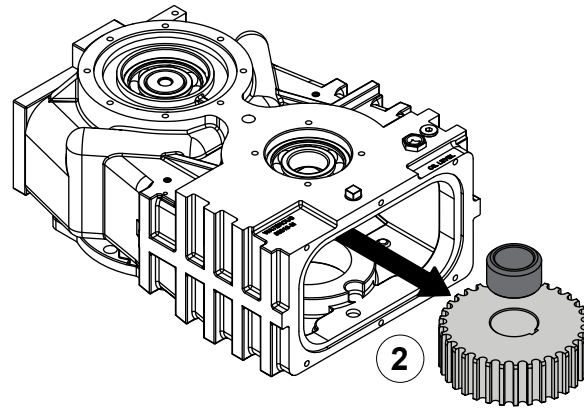
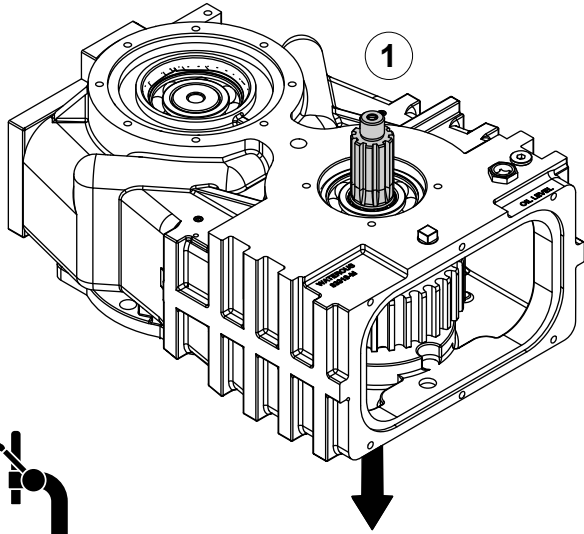
Note: The illustrations show the opposite-side configuration. Apply the same instructions to your application if it is the same-side configuration.

- 1 Remove and set aside the hardware securing the bearing covers and oil seal housings.
- 2 Remove and discard the associated O-rings and oil seals.

Note: You can also remove the oil seal during the shaft disassembly.



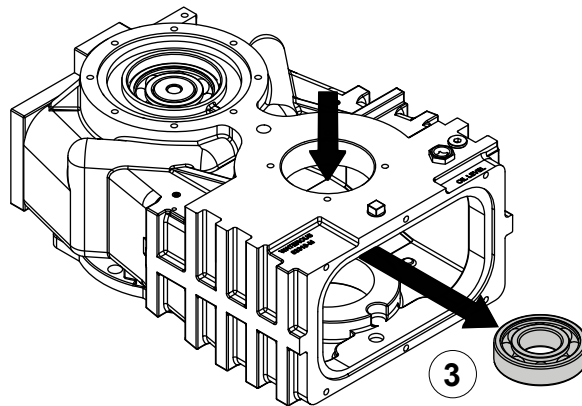
Removing the Drive Components



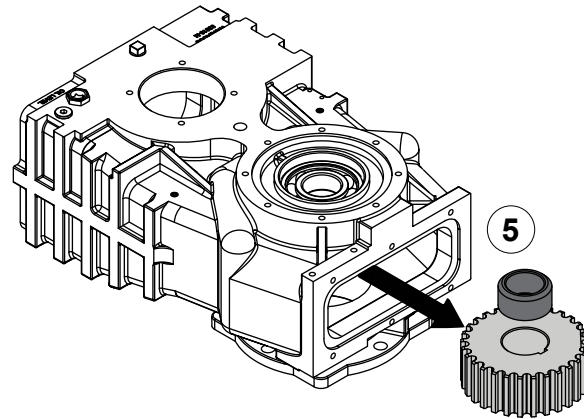
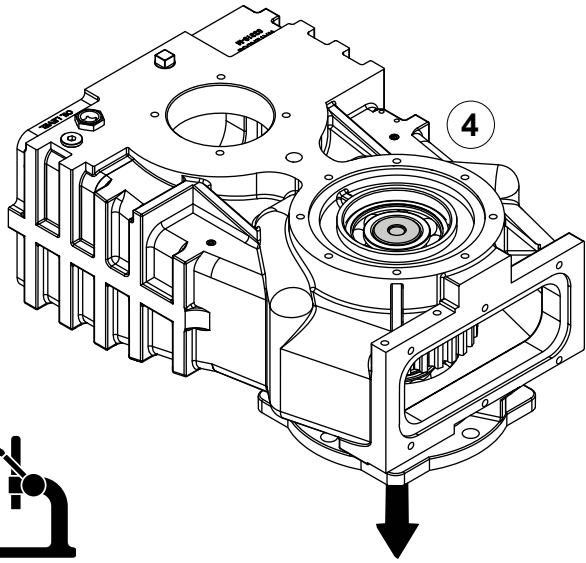
Use the illustrations and instructions to remove the drive components.

Note: The illustrations show the opposite-side configuration. Apply the same instructions to your application if it is the same-side configuration.

- 1 Remove the drive shaft with bearing.
- 2 Remove the spacer and sprocket.
- 3 Remove the bearing.



Removing the Driven Components



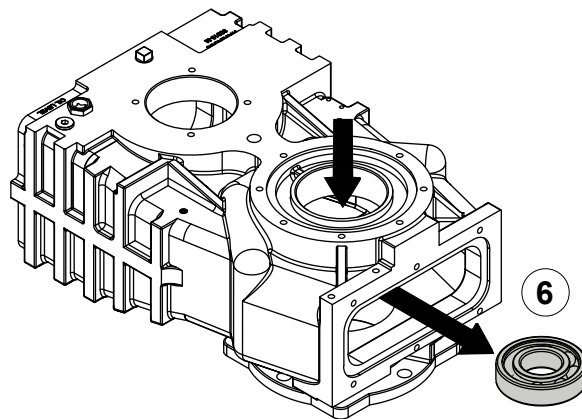
Use the illustrations and instructions to remove the drive components.

Note: The illustrations show the opposite-side configuration. Apply the same instructions to your application if it is the same-side configuration.

-
- 4 Remove the driven shaft with bearing.

 - 5 Remove the spacer and sprocket.

 - 6 Remove the bearing.



Preparing to Assemble the Power Take-Off

- Read and understand the instructions before assembling the power take-off (PTO).
- Prepare a workspace suitable to accommodate and support the PTO.
- Gather the necessary tools.
- Gather the cleaning cloths, brushes, and fluids.
- Gather the penetrating fluids, lubricants, sealant, and anti-seize.
- Understand that your configuration may require additional steps that are not described in the illustrations or instructions to perform the assembly.
- This equipment is intended to be assembled by a person or persons with the basic knowledge of servicing similar equipment. Contact Waterous with question.

Tools Required

- Typical automotive mechanics hand tools.
- Suitable arbor press.
- Torque wrench capable of 450 ft-lb (610 N·m).
- Suitable support and lifting equipment.

Best Practices

- Remove any dirt, sand, grease, or oil from the enclosure before you begin the overhaul. Surface debris can transfer into the PTO interior and prematurely wear internal parts.
- Replace any gaskets and O-ring seals during the assembly.
- Do not reuse the lock nuts.
- Apply anti-seize to the lock nut threads before installation.

Assembling the Power Take-Off Components

- Refer to the service parts list (SPL) for part identification.
Note: Documents specific to your application are available through the MyWaterous login at waterousco.com by entering the serial number for your system. Depending on the application, the serial number for your equipment is located on the operator panel, pump, PTO, or some combination of the three.
- Use established industry practices to assemble the PTO.
- Tighten hardware to industry standard torque specification—unless otherwise noted.
- Install retaining rings with the flat face towards the component you are retaining.
- Replace items such as O-rings, bearings, gaskets, oil seals, lubricants, and lock nuts with their equivalent.

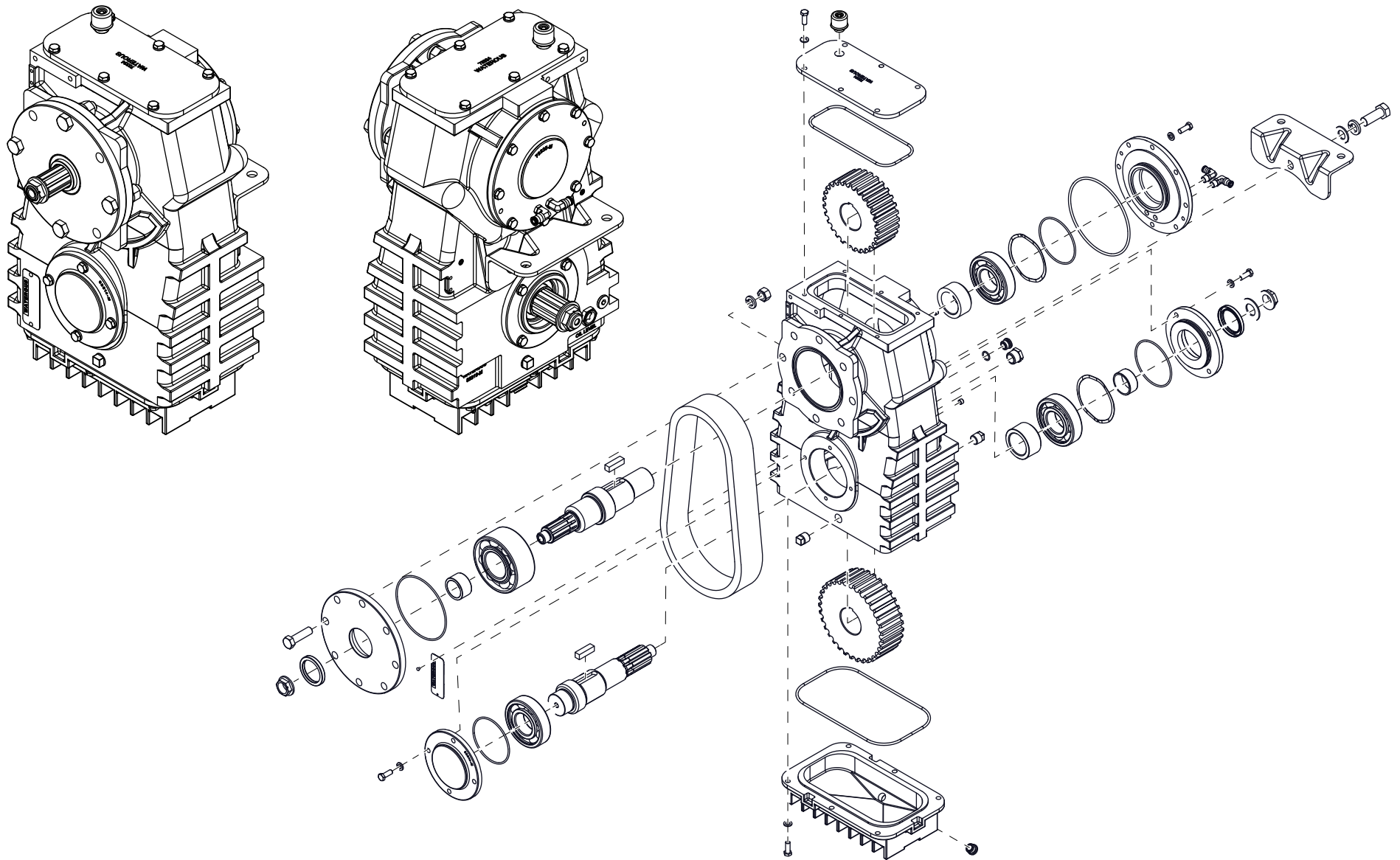
Installing the Power Take-Off

Use the information that you recorded when you removed the equipment to install it into the apparatus.

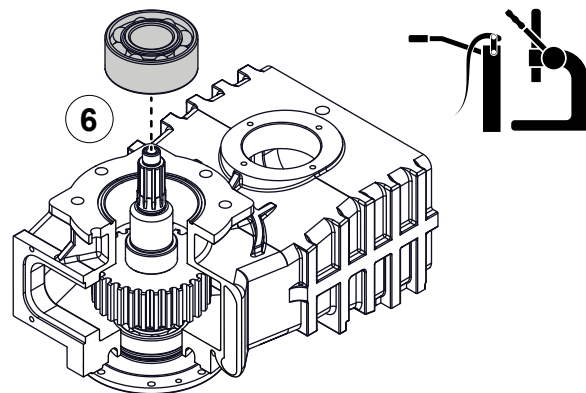
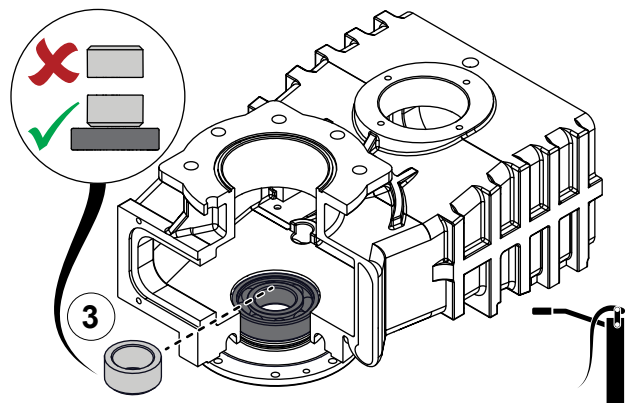
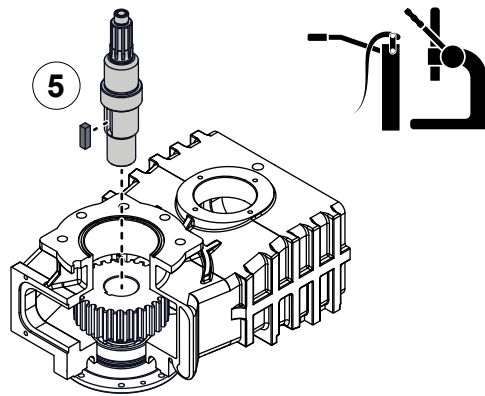
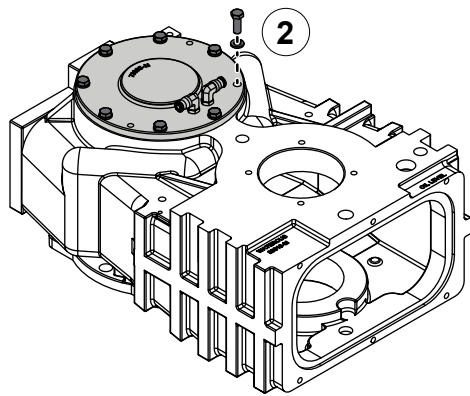
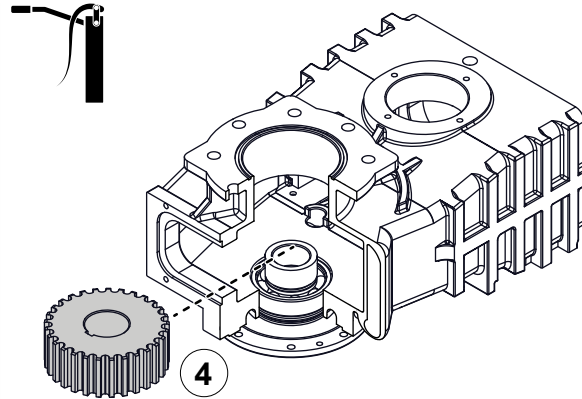
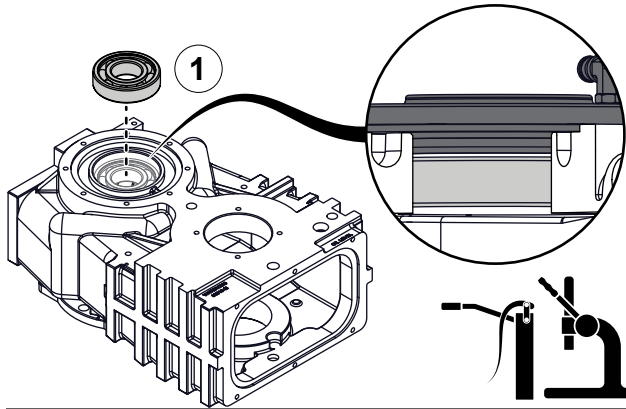
Understanding the Illustrations

The assembly illustrations depict a typical application. Plugs, breathers, cooling hoses, and fittings are not illustrated as they may be in a different location on your application. Refer to the SPL for your application to identify the various plug locations.

Opposite-Side Input



Opposite-Side Input



Installing the Driven Shaft Components

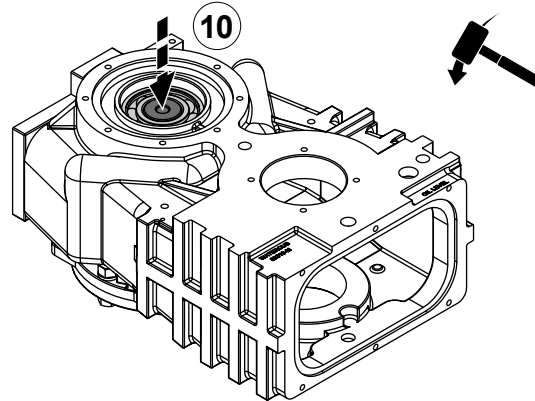
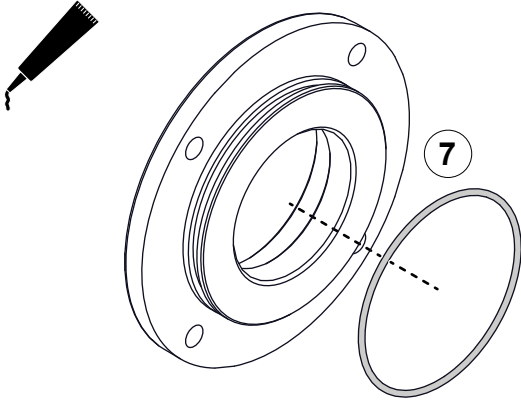
Use the illustrations and instructions to install the driven shaft assembly and the associated components.

- 1 To install the bearing, do the following:
 - Apply grease to the inner and outer bearing races.
 - Press the bearing into the bore.

Note: Make sure that you press the bearing so that it is deeper than the inner flange on the bearing cover.
- 2 To temporarily install the bearing cover, do the following:
 - Make sure that you removed the O-ring from the bearing cover.
 - Use the hardware that you removed earlier to install the bearing cover.
- 3 To install the bearing spacer, do the following:
 - Apply grease to the inner surface of the bearing spacer.
 - Align the bearing spacer over the bearing.

Note: Make sure that you install the beveled edge on the spacer towards the bearing.
- 4 Apply grease to the driven sprocket bore and align it over the bearing spacer.
- 5 To install the driven shaft, do the following:
 - Install the key into the keyway.
 - Apply grease to the driven shaft.
 - Align the key on the driven shaft to the keyway on the driven sprocket.
 - Press the assembly together.
- 6 Apply grease to the inner and outer bearing races and press it onto the driven shaft.

Opposite-Side Input



Installing the Driven Shaft Components

Use the illustrations and instructions to install the driven shaft assembly and the associated components.

7 Apply sealant to the O-ring and install it into the groove.

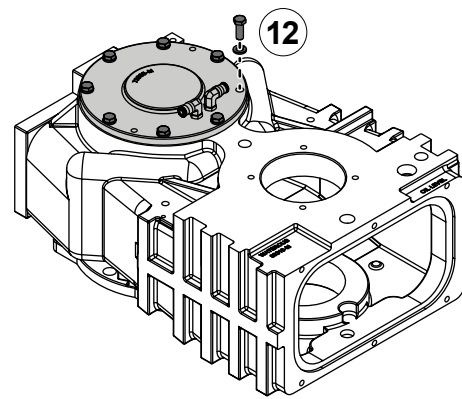
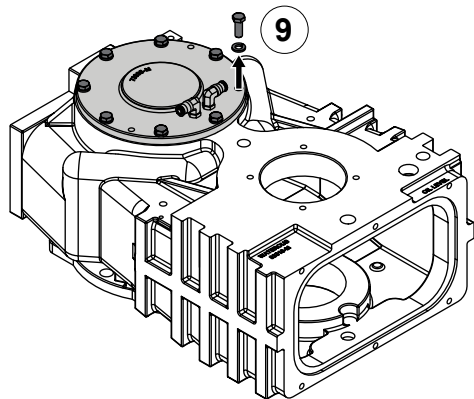
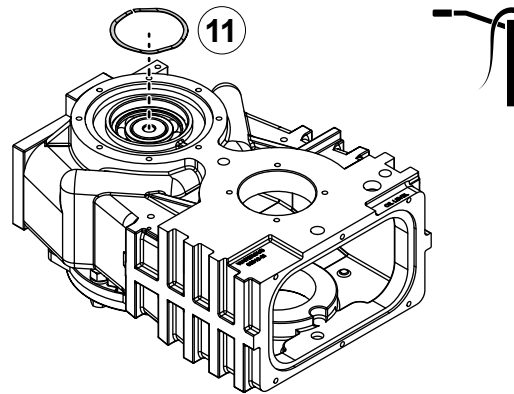
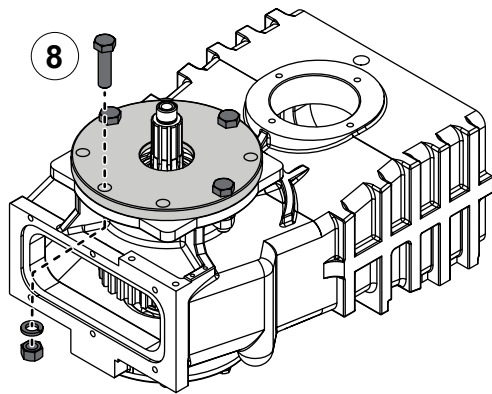
8 Use the hardware that you removed earlier to install the oil seal cover.

9 Remove and set aside the bearing cover and hardware.

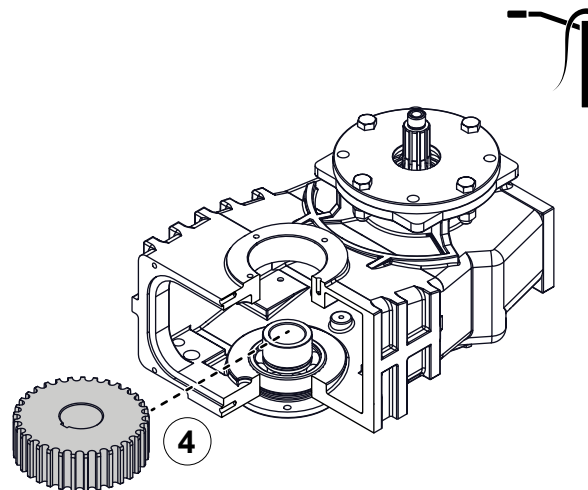
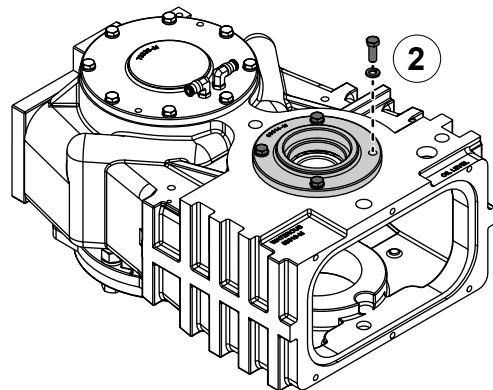
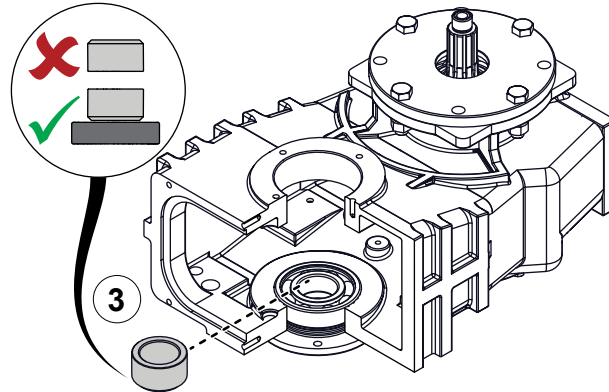
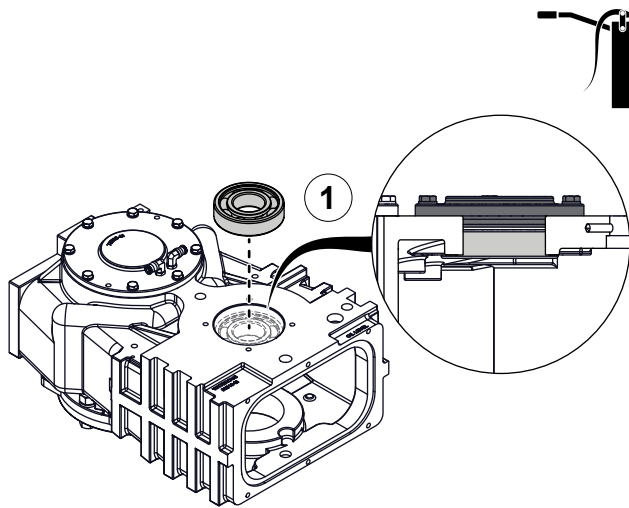
10 Use a non-marring hammer to gently tap the driven assembly into final position—against the bearing cover.

11 Apply grease to the wave spring and install it.

12 Use the hardware that you removed earlier to install the bearing cover.



Opposite-Side Input



Installing the Drive Shaft Components

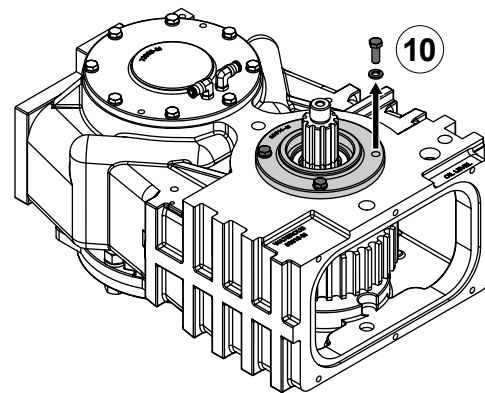
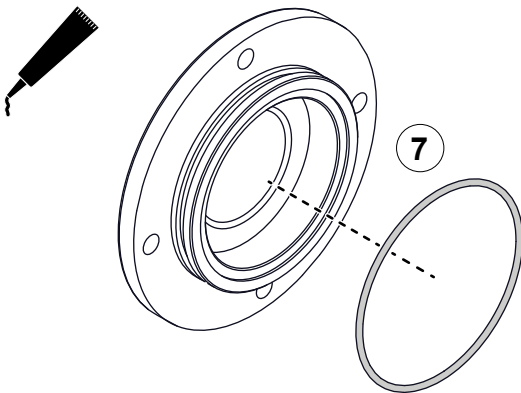
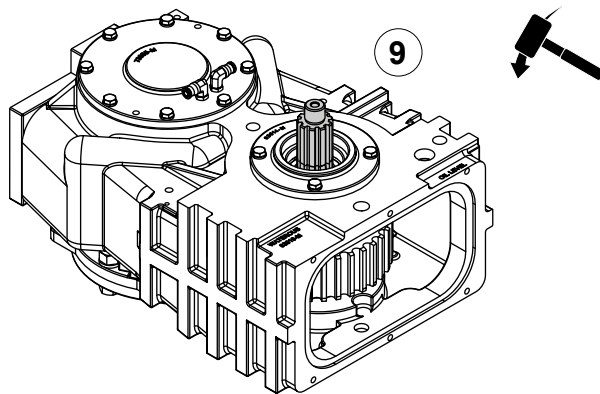
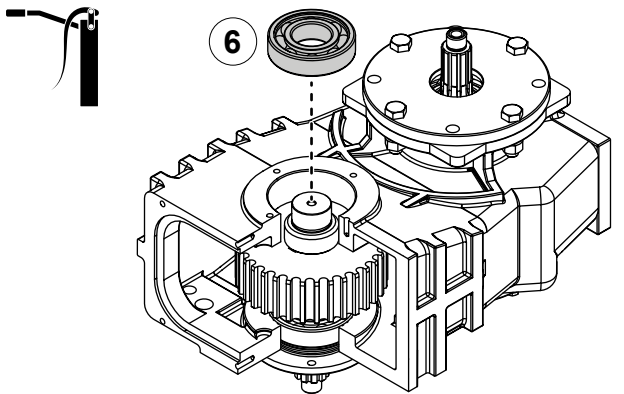
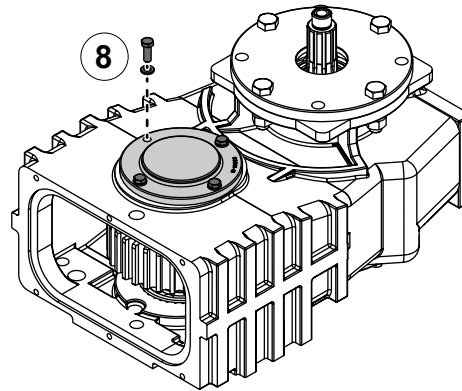
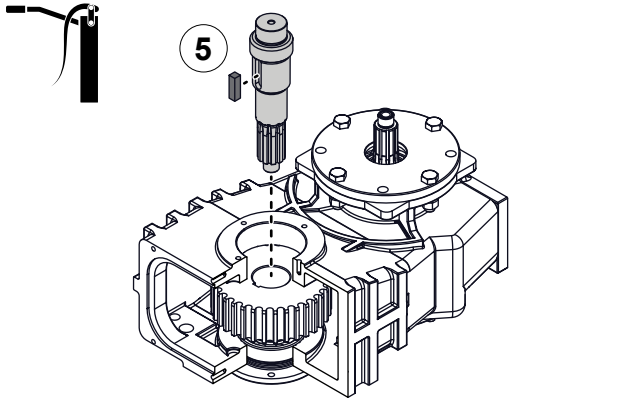
Use the illustrations and instructions to install the drive shaft assembly and the associated components.

- 1 To install the bearing, do the following:
 - Apply grease to the inner and outer bearing races.
 - Press the bearing into the bore.

Note: Make sure that you press the bearing so that it is deeper than the inner flange on the oil seal cover.
- 2 To temporarily install the oil seal cover, do the following:
 - Make sure that you removed the O-ring from the oil seal cover.
 - Use the hardware that you removed earlier to install the oil seal cover.
- 3 To install the bearing spacer, do the following:
 - Flip the case over.
 - Apply grease to the inner surface of the bearing spacer.
 - Align the bearing spacer over the bearing.

Note: Make sure that you install the beveled edge of the spacer toward the bearing.
- 4 Apply grease to the drive sprocket bore and align it over the bearing spacer.

Opposite-Side Input

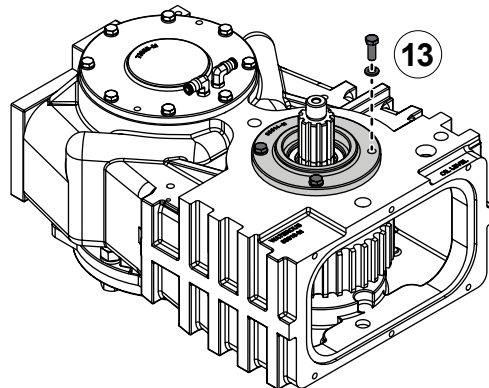
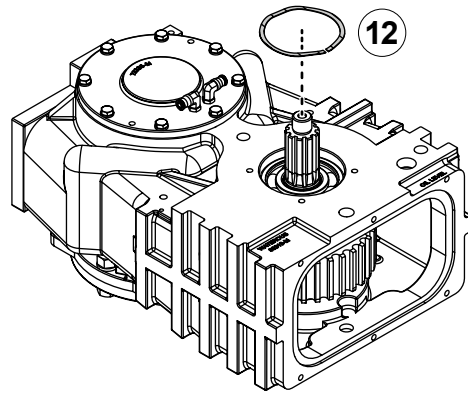
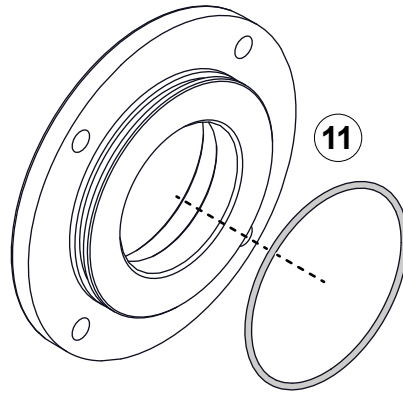


Installing the Drive Shaft Components

Use the illustrations and instructions to install the drive shaft assembly and the associated components.

- 5 To install the drive shaft, do the following:
 - Install the key into the keyway.
 - Apply grease to the drive shaft.
 - Align the key on the drive shaft to the keyway on the drive sprocket.
 - Press the assembly together.
- 6 Apply grease to the inner and outer bearing races and press it onto the drive shaft.
- 7 Apply sealant to the O-ring and install it into the groove.
- 8 Use the hardware that you removed earlier to install the bearing cover.
- 9 To position the drive assembly, do the following:
 - Flip the case over.
 - Use a non-marring hammer to gently tap the drive assembly into final position—against the bearing cover.
- 10 Remove and set aside the oil seal cover and hardware.

Opposite-Side Input

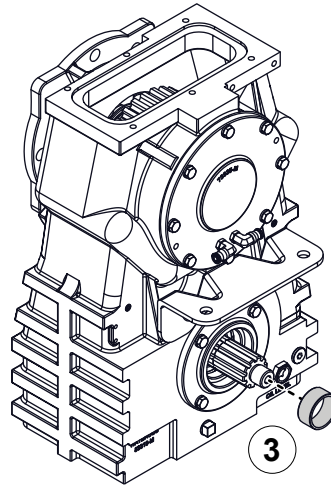
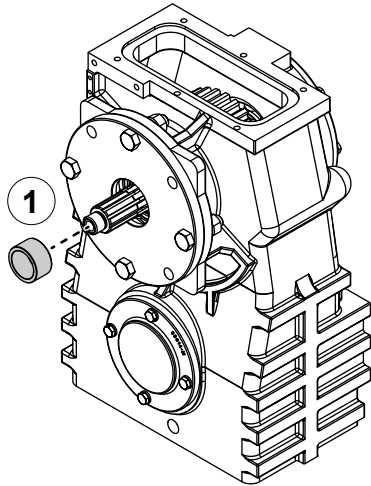


Installing the Drive Shaft Components

Use the illustrations and instructions to install the drive shaft assembly and the associated components.

- 11 Apply sealant to the O-ring and install it into the groove.
- 12 Apply grease to the wave spring and install it.
- 13 Use the hardware that you removed earlier to install the bearing cover.

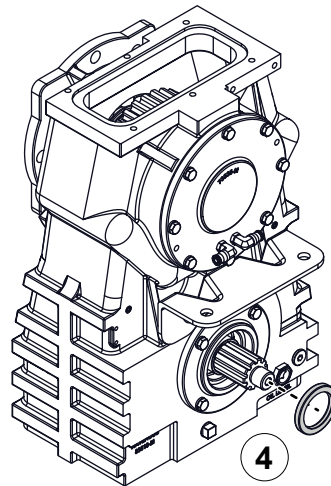
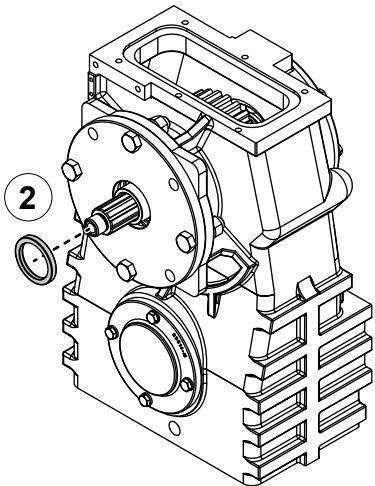
Opposite-Side Input



Installing the Oil Seal Sleeves and Oil Seals

Use the illustrations and instructions to install the oil seal sleeves and oil seals.

- 1 Apply grease to the oil seal sleeve and install it onto the shaft.
- 2 Apply sealant to the oil seal and install it into the oil seal housing.
- 3 Apply grease to the oil seal sleeve and install it onto the shaft.
- 4 Apply sealant to the oil seal and install it into the oil seal housing.

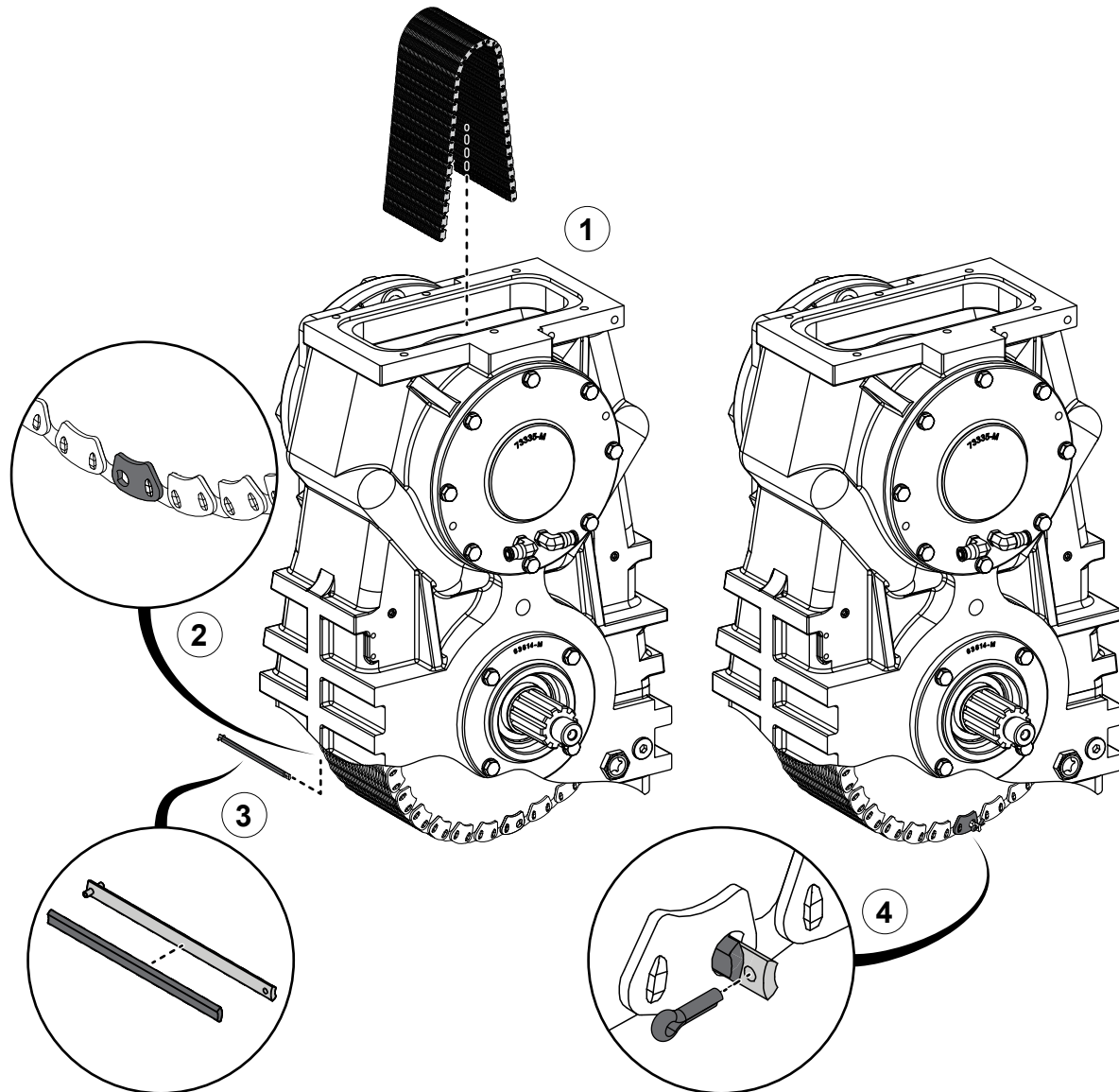


Installing the Drive Chain

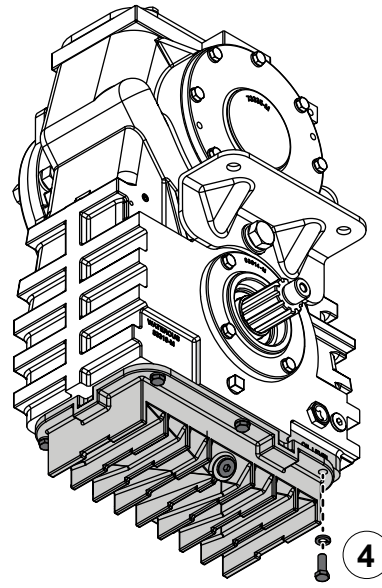
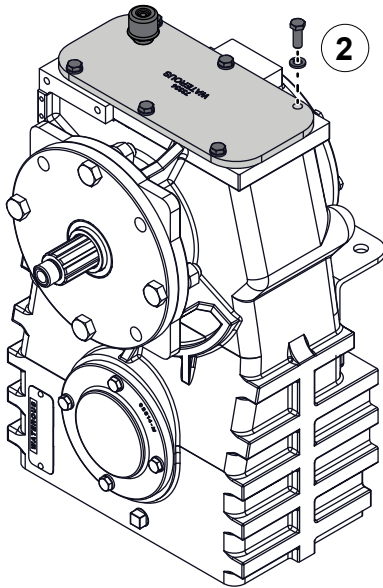
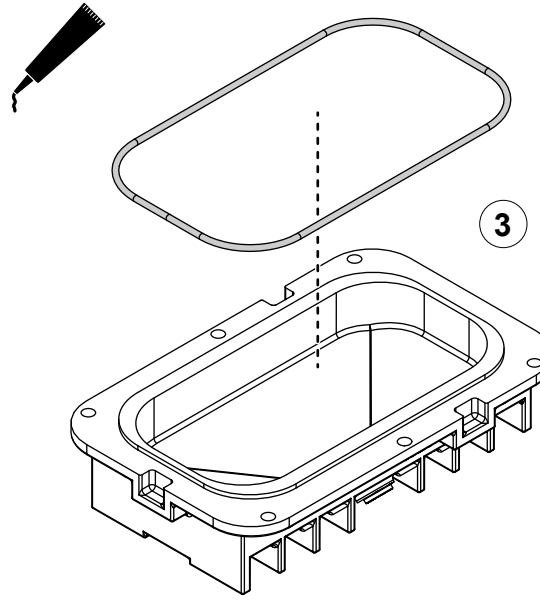
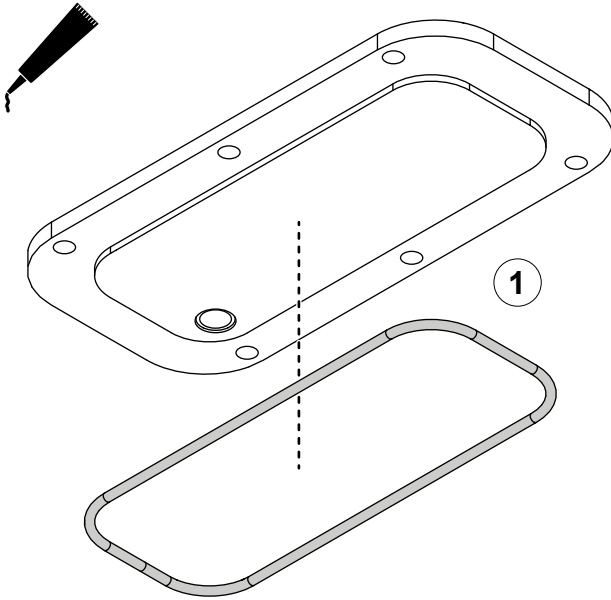
Use the illustrations and instructions to install the drive chain. Replace any components that are worn or damaged.

- 1 Install the chain into the case.
- 2 Align the chain ends.
- 3 Align the connecting pin and rocker with their curved faces toward each other at the entrance of the connecting link, then push the connecting pin and rocker through the connecting link.
- 4 Use the cotter pin to secure the connecting pin and rocker.

Note: Make sure that you bend the ends of the cotter pin so that it stays in place.



Opposite-Side Input

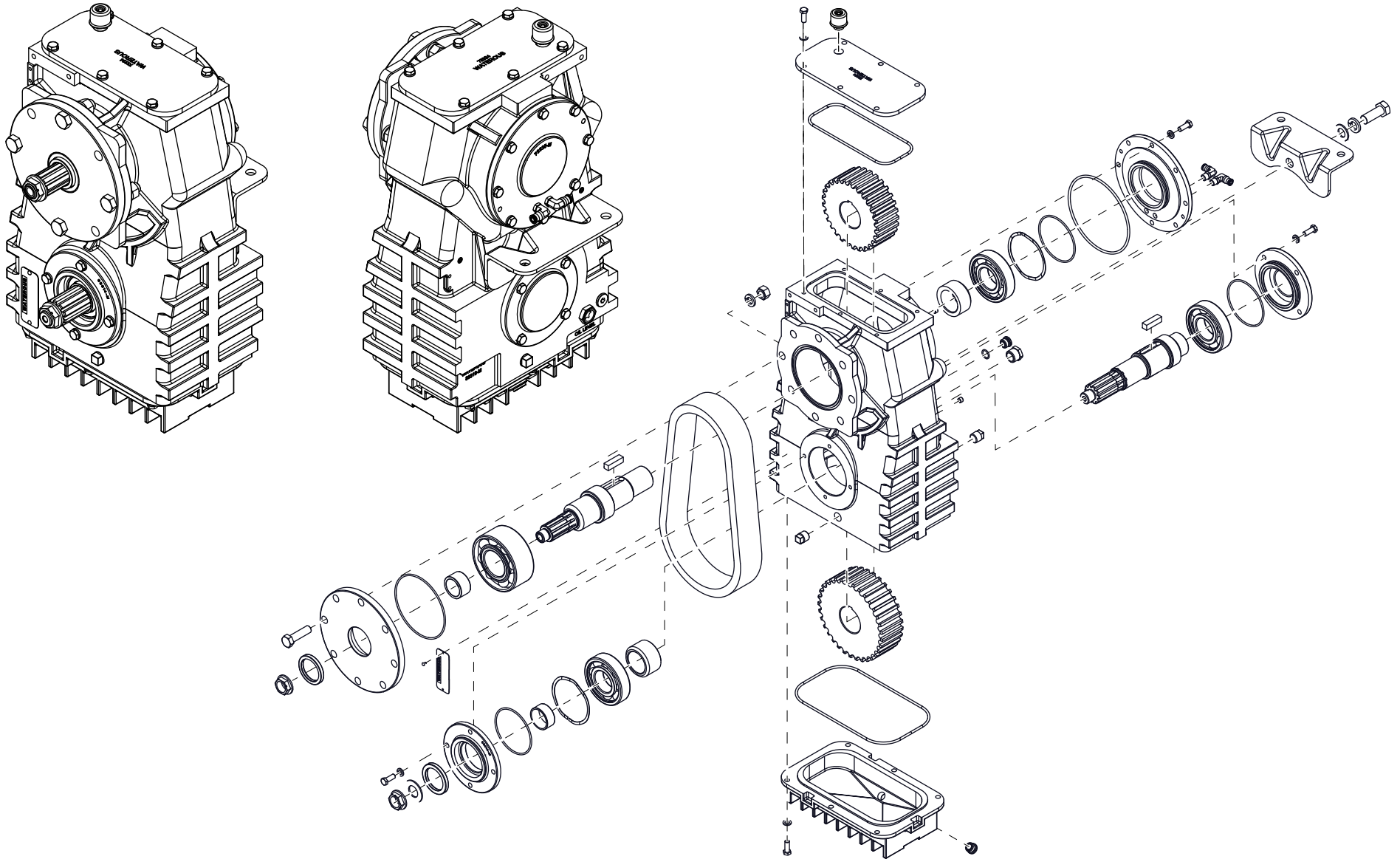


Installing the Top and Transmission Pan

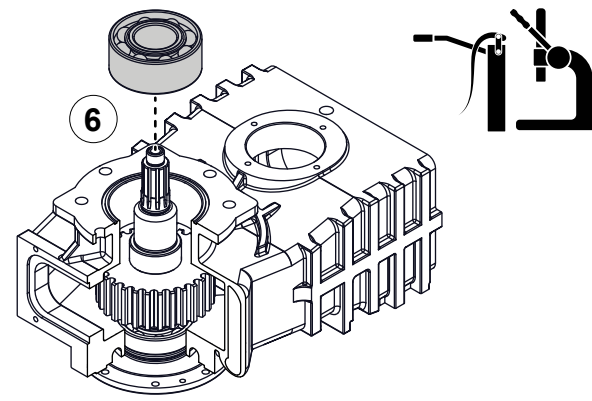
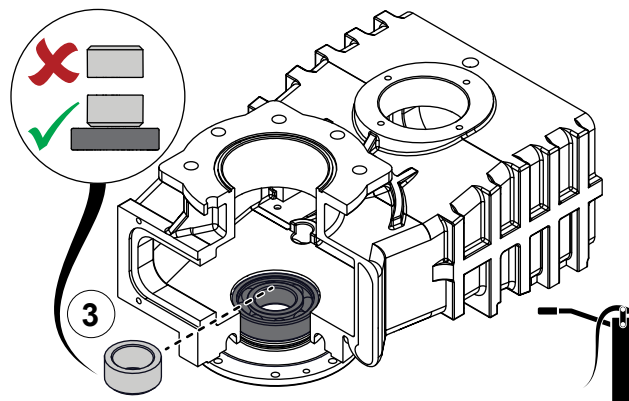
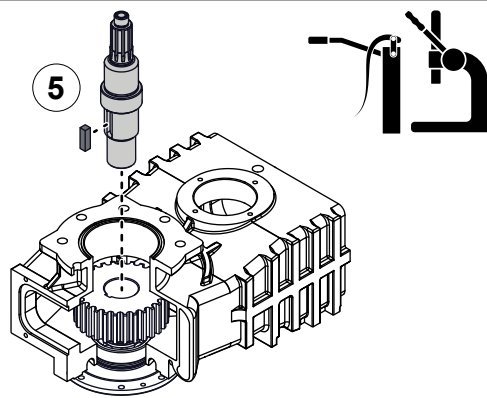
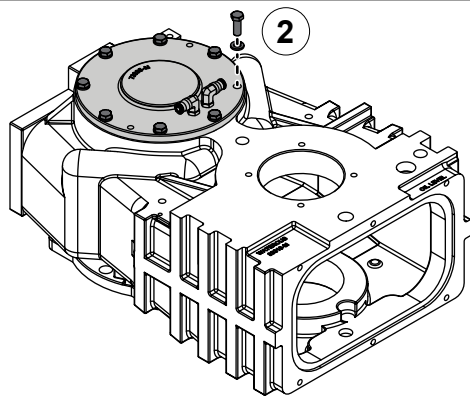
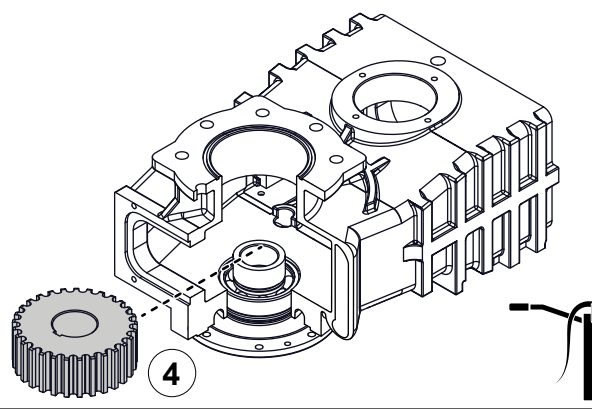
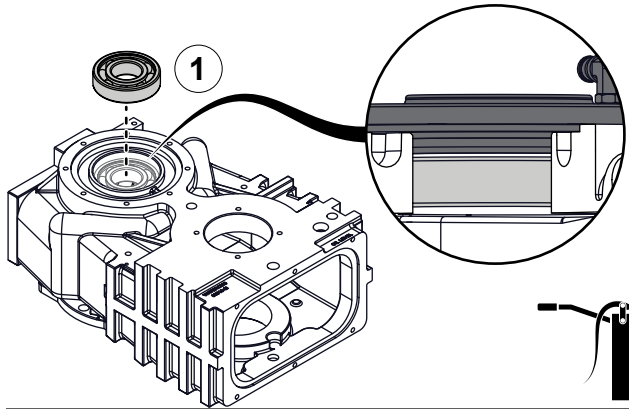
Use the illustrations and instructions to install the top and transmission pan.

- 1 Apply sealant to the O-ring and install it to the top cover.
- 2 Use the hardware that you removed earlier to install the top cover.
- 3 Apply sealant to the O-ring and install it to the transmission pan.
- 4 Use the hardware that you removed earlier to install the transmission pan.

Same-Side Input



Same-Side Input



Installing the Driven Shaft Components

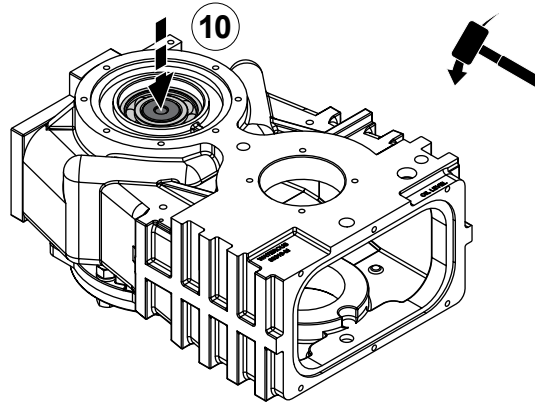
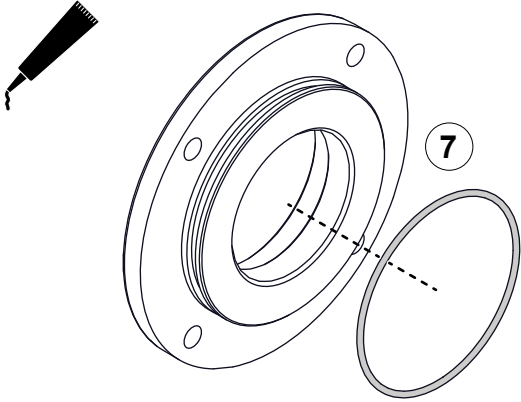
Use the illustrations and instructions to install the driven shaft assembly and the associated components.

- 1 To install the bearing, do the following:
 - Apply grease to the inner and outer bearing races.
 - Press the bearing into the bore.

Note: Make sure that you press the bearing so that it is deeper than the inner flange on the bearing cover.
- 2 To temporarily install the bearing cover, do the following:
 - Make sure that you removed the O-ring from the bearing cover.
 - Use the hardware that you removed earlier to install the bearing cover.
- 3 To install the bearing spacer, do the following:
 - Apply grease to the inner surface of the bearing spacer.
 - Align the bearing spacer over the bearing.

Note: Make sure that you install the beveled edge of the spacer toward the bearing.
- 4 Apply grease to the driven sprocket bore and align it over the bearing spacer.
- 5 To install the driven shaft, do the following:
 - Install the key into the keyway.
 - Apply grease to the driven shaft.
 - Align the key on the driven shaft to the keyway on the driven sprocket.
 - Press the assembly together.
- 6 Apply grease to the inner and outer bearing races and press it onto the driven shaft.

Same-Side Input



Installing the Driven Shaft Components

Use the illustrations and instructions to install the driven shaft assembly and the associated components.

7 Apply sealant to the O-ring and install it into the groove.

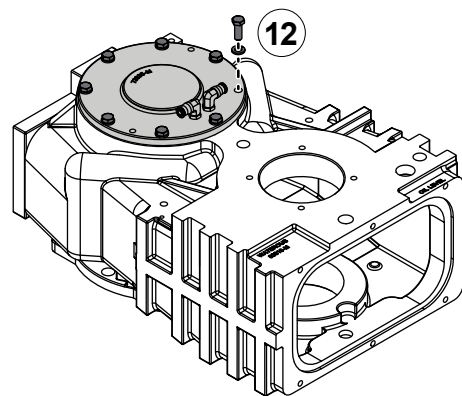
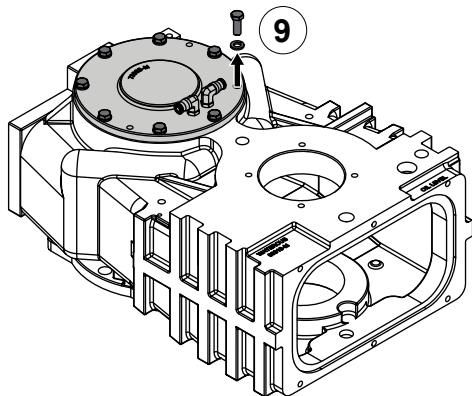
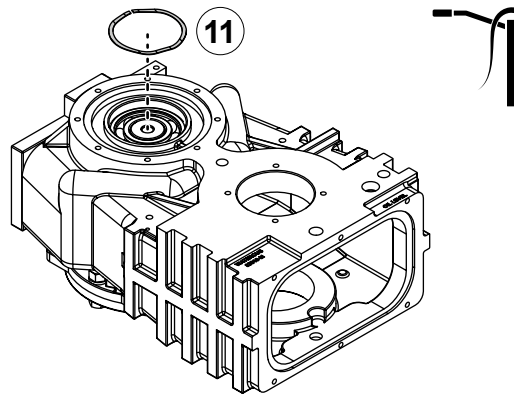
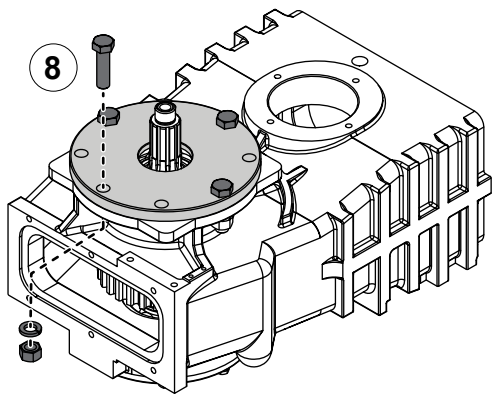
8 Use the hardware that you removed earlier to install the oil seal cover.

9 Remove and set aside the bearing cover and hardware.

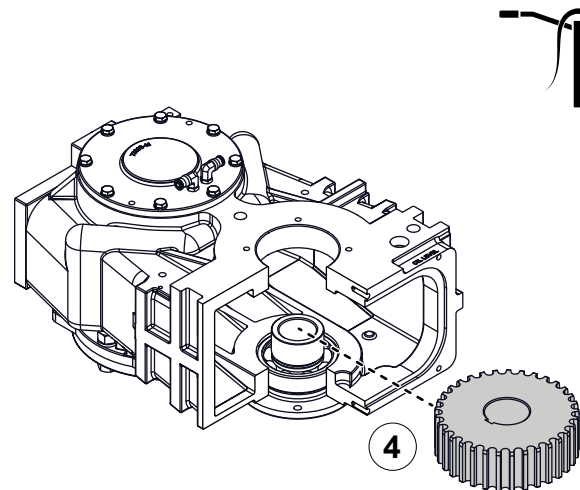
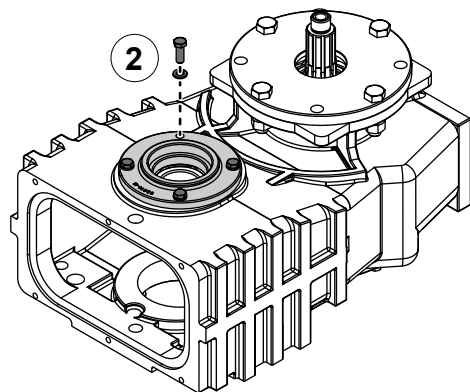
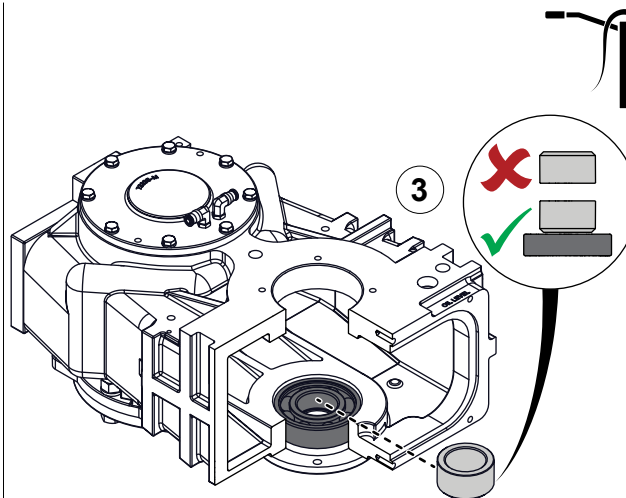
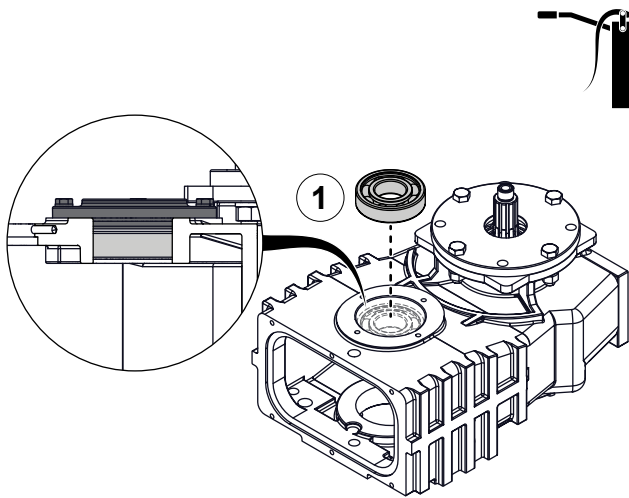
10 Use a non-marring hammer to gently tap the driven assembly into final position—against the bearing cover.

11 Apply grease to the wave spring and install it.

12 Use the hardware that you removed earlier to install the bearing cover.



Same-Side Input



Installing the Drive Shaft Components

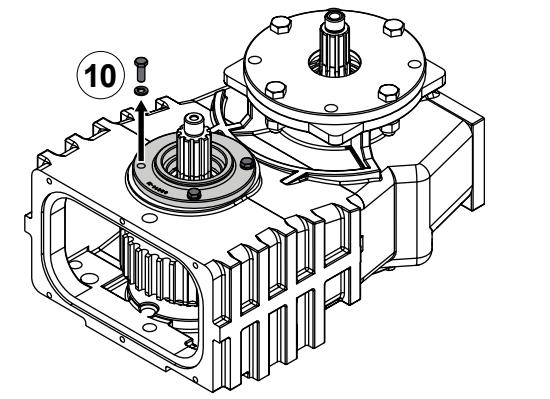
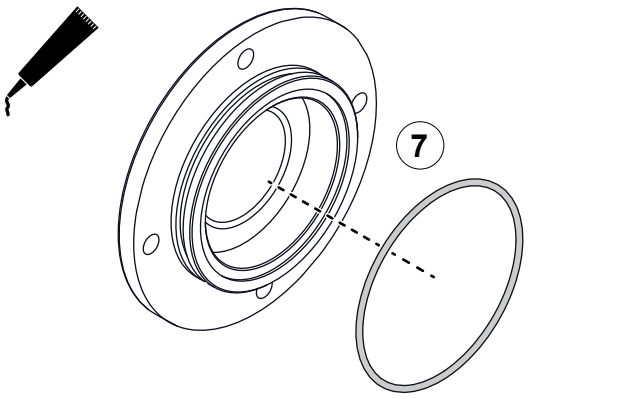
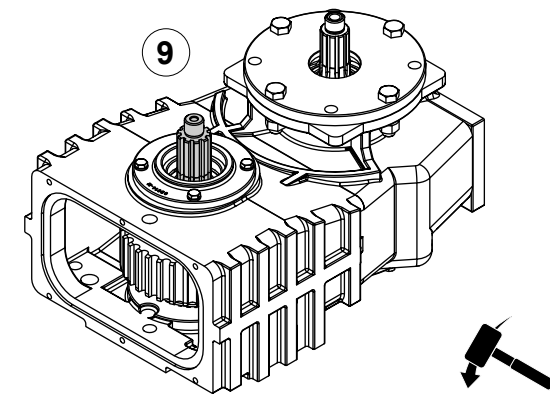
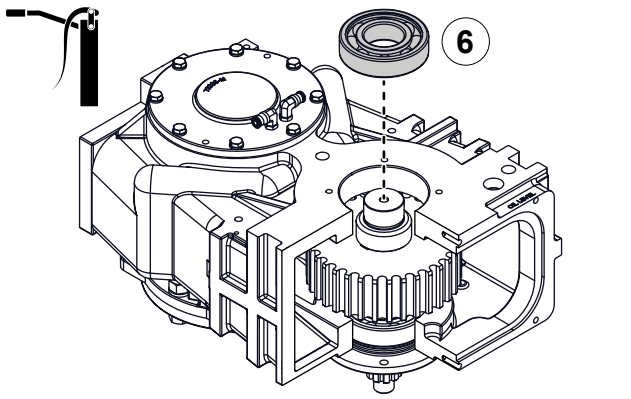
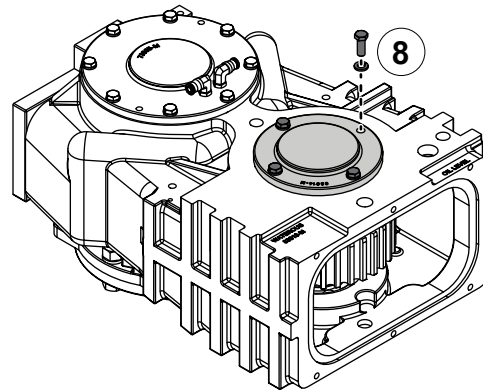
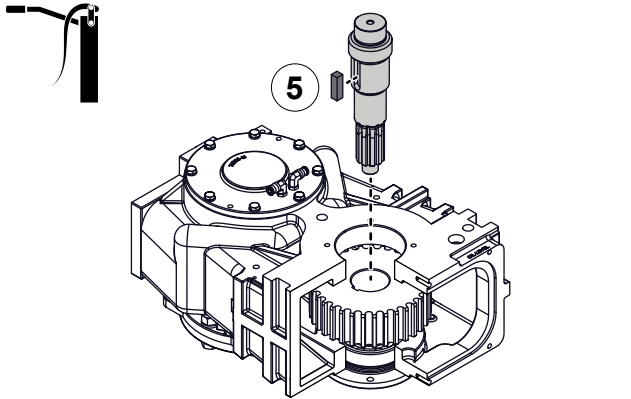
Use the illustrations and instructions to install the drive shaft assembly and the associated components.

- 1 To install the bearing, do the following:
 - Apply grease to the inner and outer bearing races.
 - Press the bearing into the bore.

Note: Make sure that you press the bearing so that it is deeper than the inner flange on the oil seal cover.
- 2 To temporarily install the oil seal cover, do the following:
 - Make sure that you removed the O-ring from the oil seal cover.
 - Use the hardware that you removed earlier to install the oil seal cover.
- 3 To install the bearing spacer, do the following:
 - Flip the case over.
 - Apply grease to the inner surface of the bearing spacer.
 - Align the bearing spacer over the bearing.

Note: Make sure that you install the beveled edge of the spacer toward the bearing.
- 4 Apply grease to the drive sprocket bore and align it over the bearing spacer.

Same-Side Input

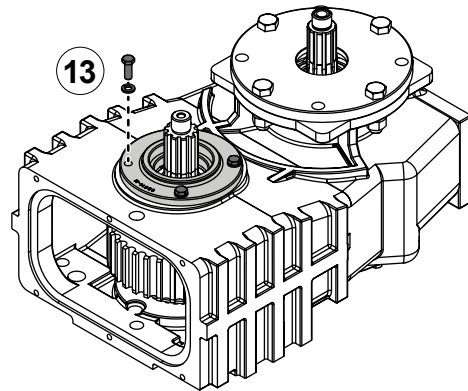
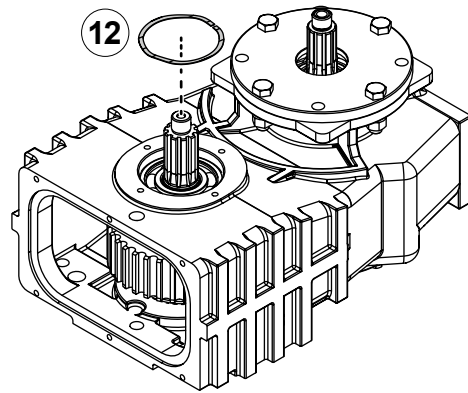
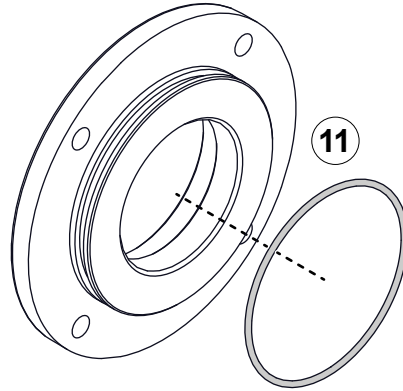


Installing the Drive Shaft Components

Use the illustrations and instructions to install the drive shaft assembly and the associated components.

- 5 To install the drive shaft, do the following:
 - Install the key into the keyway.
 - Apply grease to the drive shaft.
 - Align the key on the drive shaft to the keyway on the drive sprocket.
 - Press the assembly together.
- 6 Apply grease to the inner and outer bearing races and press it onto the drive shaft.
- 7 Apply sealant to the O-ring and install it into the groove.
- 8 Use the hardware that you removed earlier to install the bearing cover.
- 9 To position the drive assembly, do the following:
 - Flip the case over.
 - Use a non-marring hammer to gently tap the drive assembly into final position—against the bearing cover.
- 10 Remove and set aside the oil seal cover and hardware.

Same-Side Input

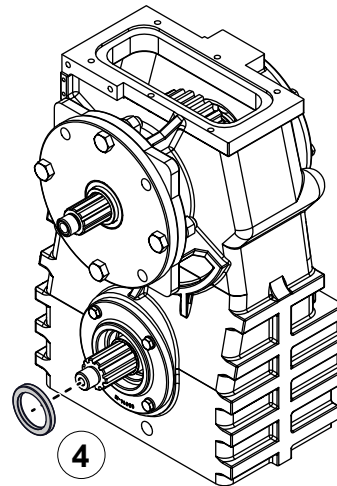
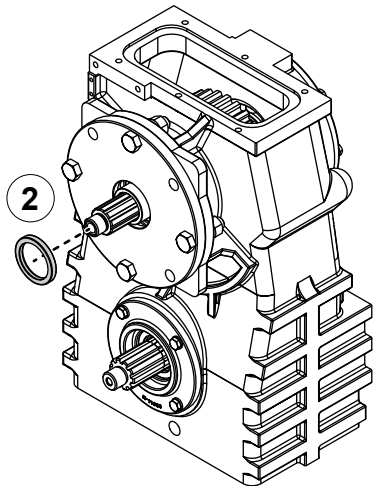
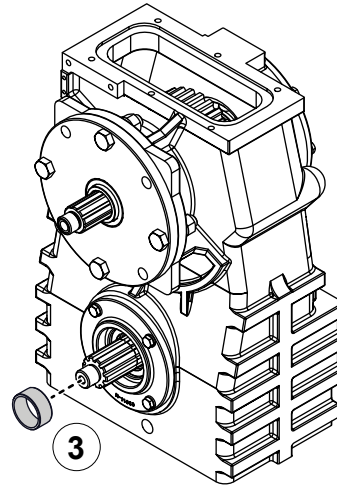
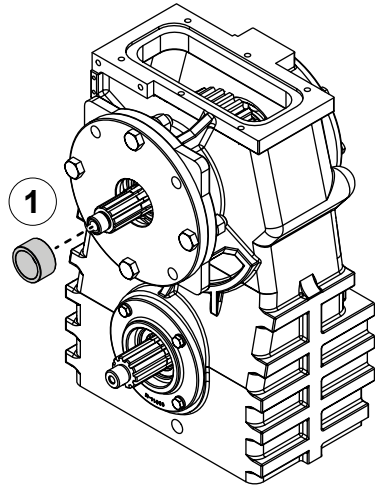


Installing the Drive Shaft Components

Use the illustrations and instructions to install the drive shaft assembly and the associated components.

- 11 Apply sealant to the O-ring and install it into the groove.
- 12 Apply grease to the wave spring and install it.
- 13 Use the hardware that you removed earlier to install the bearing cover.

Same-Side Input



Installing the Oil Seal Sleeves and Oil Seals

Use the illustrations and instructions to install the oil seal sleeve and oil seal.

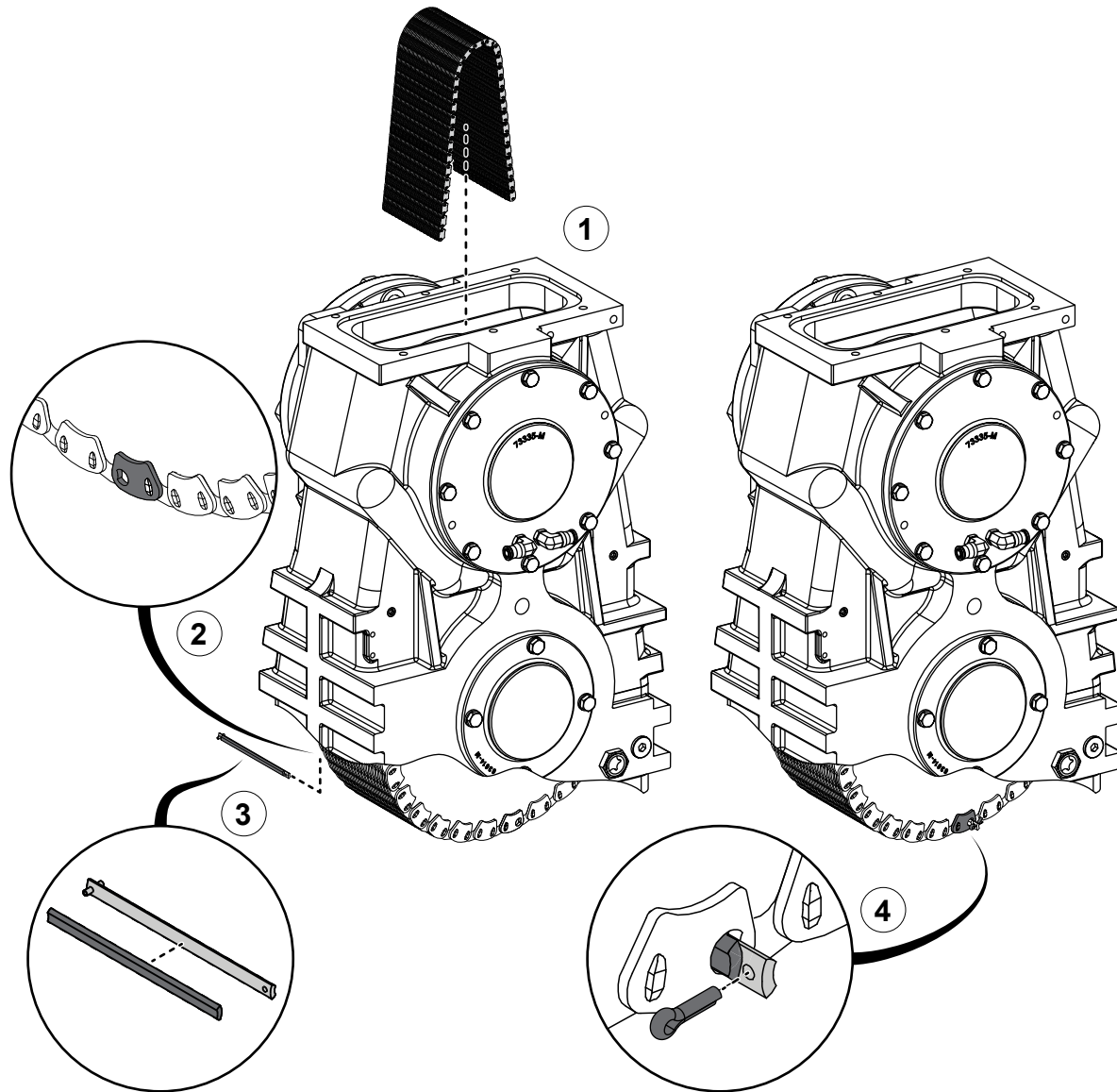
- 1 Apply grease to the oil seal sleeve and install it onto the shaft.
- 2 Apply sealant to the oil seal and install it into the oil seal housing.
- 3 Apply grease to the oil seal sleeve and install it onto the shaft.
- 4 Apply sealant to the oil seal and install it into the oil seal housing.

Installing the Drive Chain

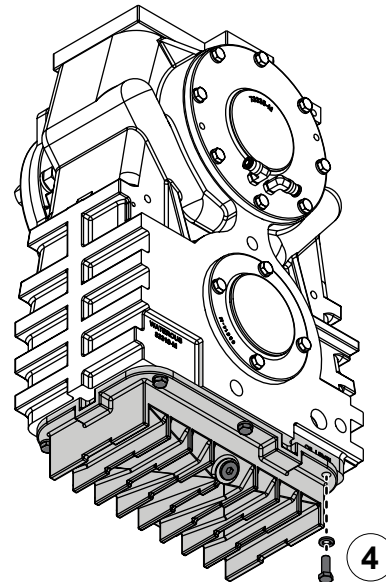
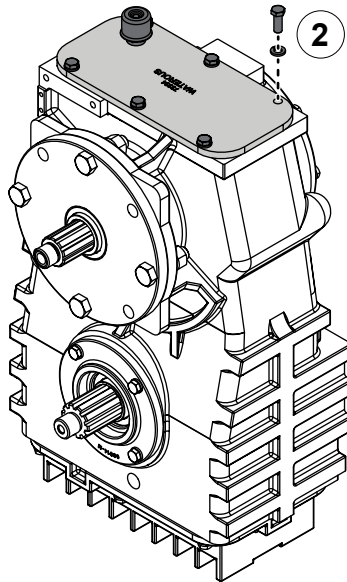
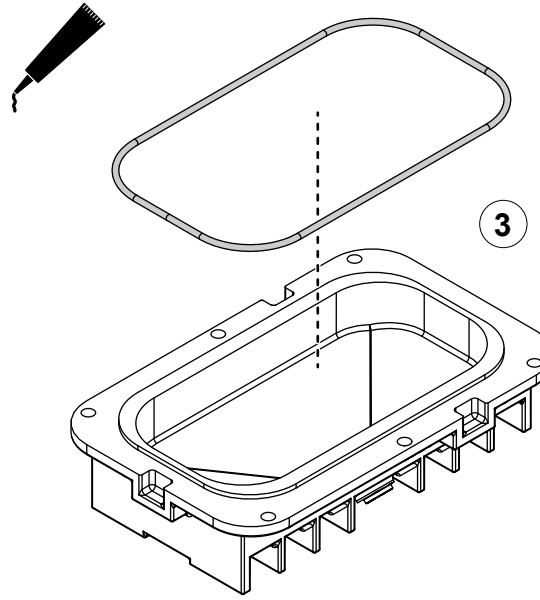
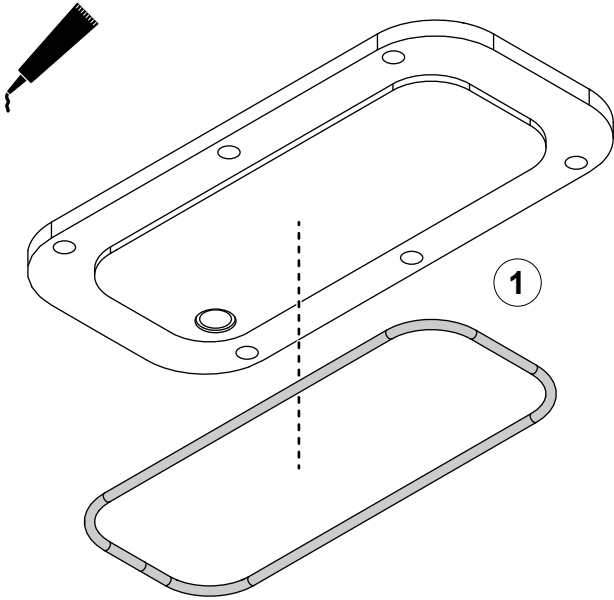
Use the illustrations and instructions to install the drive chain. Replace any components that are worn or damaged.

- 1 Install the chain into the case.
- 2 Align the chain ends.
- 3 Align the connecting pin with the rocker, then insert them through the chain ends.
- 4 Locate the cotter pin that you set aside earlier and install it.

Note: Make sure that you bend the ends to secure the pin into place.



Same-Side Input

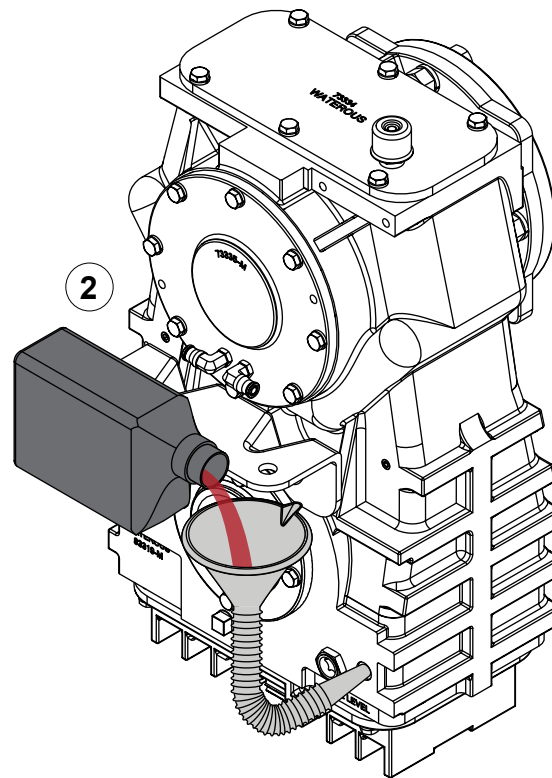
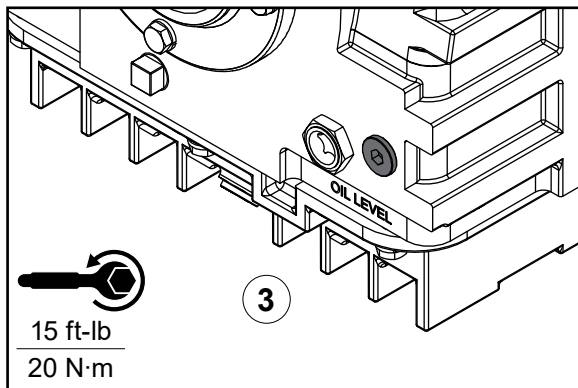
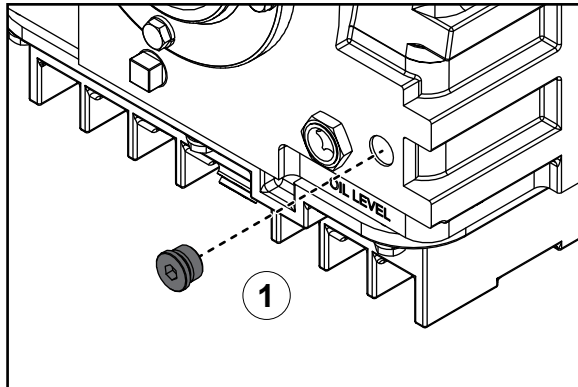


Installing the Top and Transmission Pan

Use the illustrations and instructions to install the top and transmission pan.

- 1 Apply sealant to the O-ring and install it to the top cover.
- 2 Use the hardware that you removed earlier to install the top cover.
- 3 Apply sealant to the O-ring and install it to the transmission pan.
- 4 Use the hardware that you removed earlier to install the transmission pan.

Adding Lubricant to the Power Take-Off



Use the illustrations and instructions to add lubricant to the PTO. Use automatic transmission fluid (ATF) that meets the requirements of DEXRON III or MERCON V.

- 1 Remove the oil fill plug.
- 2 Add lubricant until it reaches halfway up the oil level sight plug.
Note: After pouring some lubricant into the case, allow it to settle before adding more to avoid over-filling.
- 3 Securely install the oil fill plug.
Note: Make sure that you do not over-tighten the plug.

WATEROUS

Waterous Company
125 Hardman Avenue South
South Saint Paul, MN 55075
(651) 450-5000
www.waterousco.com