

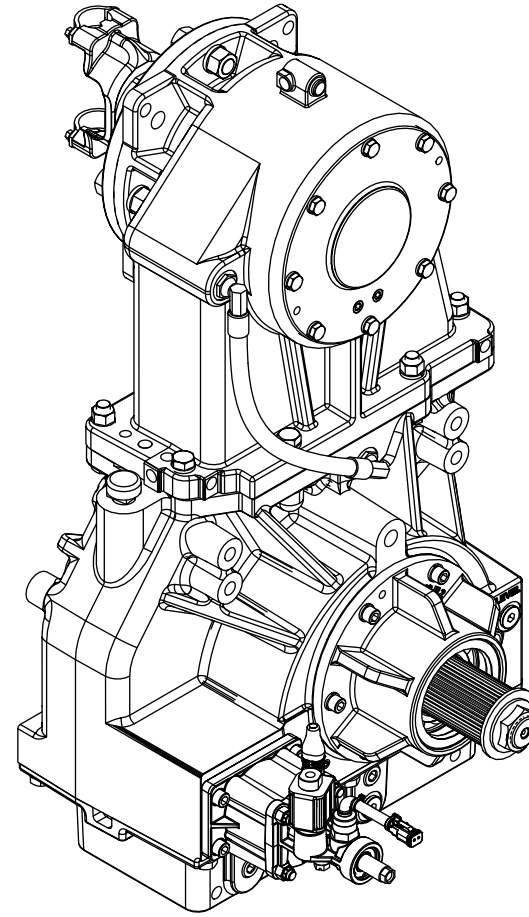
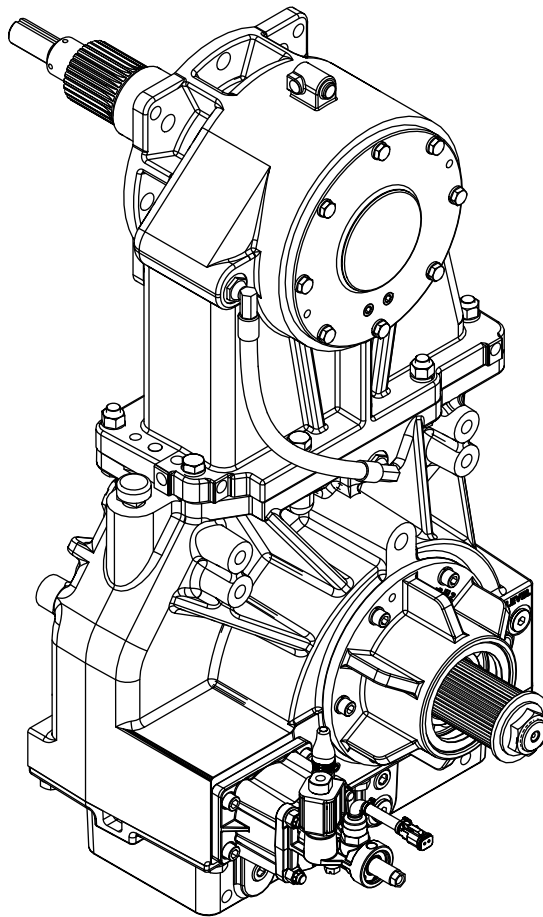
# WATEROUS

Form Number: F-3057

Issue Date: Oct 28, 2024

## C23 Transmissions & TC23 Power Take-Offs Overhaul Instructions

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[www.waterousco.com](http://www.waterousco.com)





# Table of Contents

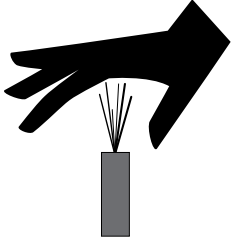
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<b>Safety</b>	<b>6</b>	<b>Assembly</b>	<b>34</b>
Safety Precautions	6	Preparing to Assemble the Equipment	34
<b>Introduction</b>	<b>7</b>	Tools Required	34
Using this Document	7	Best Practices	34
Viewing the Document Electronically	7	Assembling the Components	34
Printing the Document	7	Installing the Equipment	34
Additional Documentation	7	Understanding the Illustrations	34
Symbols	8	CRU-2 Series Pumps with Front Drive and No Output	36
<b>Overview</b>	<b>10</b>	Assembling the Driven Shaft	37
Driveline Options	10	Installing the Driven Shaft	38
C23 Driven Shaft Outputs	11	Installing the Driven Shaft	39
TC23 Driven Shaft Outputs	12	Installing the Bearing Cover	40
Identifying Exterior Components	13	Installing the Bearing Cover	41
Drive Shaft Removal Sleeve	14	CRU-2 Series Pumps with Hydraulic Output	42
Pin Installation Tool	15	Assembling the Driven Shaft	43
<b>Disassembly</b>	<b>16</b>	Installing the Driven Shaft	44
Preparing to Disassemble the Equipment	16	Installing the Driven Shaft	45
Tools Required	16	Installing the Hydraulic Adapter	46
Preparing the Apparatus	16	Installing the Hydraulic Adapter	47
Best Practices	16	TC23 Series PTOs with Single Yoke Output	48
Removing the Equipment	16	Assembling the Driven Shaft	49
Disassembling the Components	16	Installing the Driven Shaft	50
Draining the Lubricant	17	Installing the Bearing Cover	51
Disconnecting the Oil Hose	18	Installing the Bearing Cover	52
Disconnecting the Cooling Lines	19	Installing the Oil Seal Housing	53
Removing the Transmission Pan	20	Installing the Oil Seal Housing	54
Removing the Pneumatic Shift Unit	21	TC23 Series PTOs with Dual Yoke and Hydraulic Output	56
Input and Output Shaft Configurations	23	Assembling the Driven Shaft	57
Removing the Output Shaft	23	Installing the Driven Shaft	58
Disassembling the Output Shaft	24	Installing the Hydraulic Adapter	59
Input Shaft Only Configurations	25	Installing the Hydraulic Adapter	60
Removing the Output Bearing Housing	25	Installing the Oil Seal Housing	61
Removing the Chain	26	Installing the Oil Seal Housing	62
Removing the Drive Components	28	Installing the Bearing Lock Washer and Nut	64
Removing the Cap	30	Installing the Driven Shaft End Yoke	65
Removing the Driven Shaft	31	Installing the Cap	66
Disassembling the Driven Shaft	33	Installing the Drive Components	67
		Assembling the Drive Sprocket	67
		Assembling the Drive Shaft	68
		Installing the Drive Shaft Housing	69
		Installing the Drive Sprocket	70

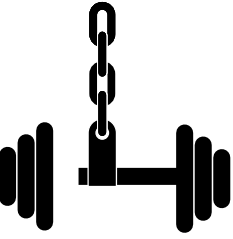
Installing the Drive Components—Input and Output Shaft Configurations.....	71
Assembling the Output Shaft.....	72
Assembling the Output Shaft Housing.....	73
Installing the Shims.....	74
Installing the Output Shaft Assembly.....	76
Installing the Drive Components—Input Shaft Only Configurations.....	77
Installing the Drive Shaft.....	77
Installing the Output Bearing Housing.....	78
Installing the Shift Fork.....	79
Installing the Chain.....	80
Installing the Pneumatic Shift Unit.....	82
Installing the Transmission Pan.....	83
Installing the Drive Shaft End Yoke or Companion Flange.....	84
Installing the Oil Hose.....	85
Installing the Cooling Lines.....	86
Adding Lubricant to the Transmission.....	87

## Safety Precautions

- Read and understand this document before you begin the overhaul.
- Read and understand all the notices and safety precautions.
- Be aware that these instructions are only guidelines and are not meant to be definitive. Contact Waterous when you have questions.
- Do not overhaul this equipment if you are not familiar with the tools and skills needed to safely perform the required procedures.
- Do not modify the equipment.
- Waterous reserves the right to make modifications to the instructions without notice.

! WARNING	
<p><b>High Pressure</b></p> <ul style="list-style-type: none"> <li>• Liquid ejected at high pressure can cause serious injury.</li> <li>• Drain the pump after use and before servicing.</li> </ul>	

! WARNING	
<p><b>Hot Surface</b></p> <ul style="list-style-type: none"> <li>• Hot surfaces can burn you.</li> <li>• Do not touch the surface during operation—allow it to cool after operating.</li> </ul>	

! WARNING	
<p><b>Unsupported Equipment</b></p> <ul style="list-style-type: none"> <li>• Unsupported equipment may shift or fall during disassembly, causing injury or damage.</li> <li>• Always support heavy equipment while servicing.</li> </ul>	

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

- 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.

#### OVERVIEW

This section describes the components that make up the system and any available overhaul tools.

#### 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 a 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 view and store this document.

## Additional Documentation

Additional documentation is available through the MyWaterous login at [waterousco.com](http://waterousco.com). Use your serial number to gain access to the service parts list (SPL) 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 instructions.



Anti-seize compound—This symbol tells you to apply the appropriate anti-seize compound to the part.



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—This symbol tells you to secure the hardware to finger tight.



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



Lubrication—This symbol tells you to apply an appropriate lubricant to the part.



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.



Threadlocker—This symbol tells you to apply an appropriate threadlocker to the part.



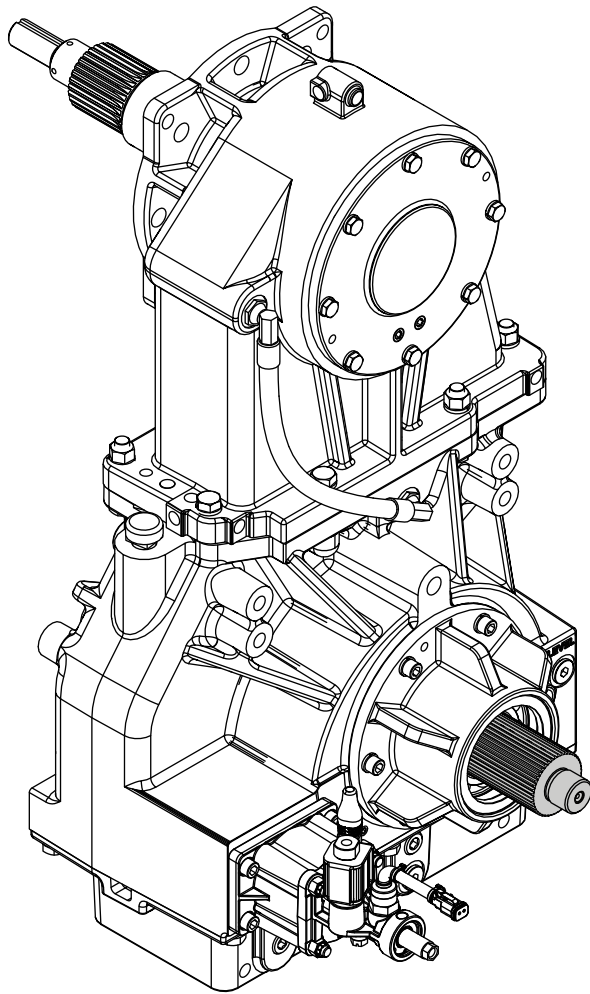
Torque to specification—This symbol tells you to torque the hardware to the specified value.



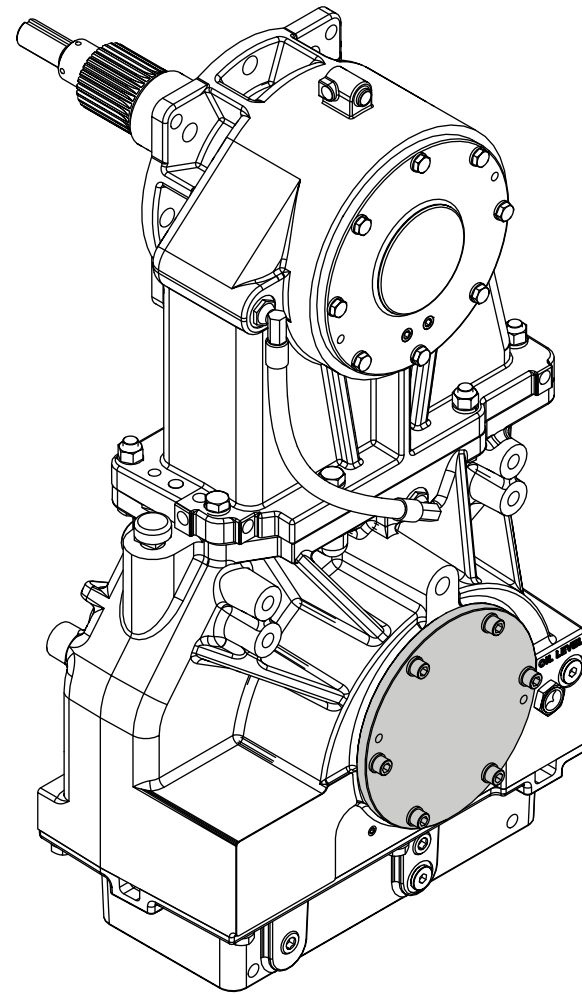


## Driveline Options

C23 Series transmissions and TC23 Series PTOs are available with an input and output shaft or an input shaft only. The driveline options depend on the pump model and mounting location. Input shaft only configurations do not include a pneumatic shift unit.



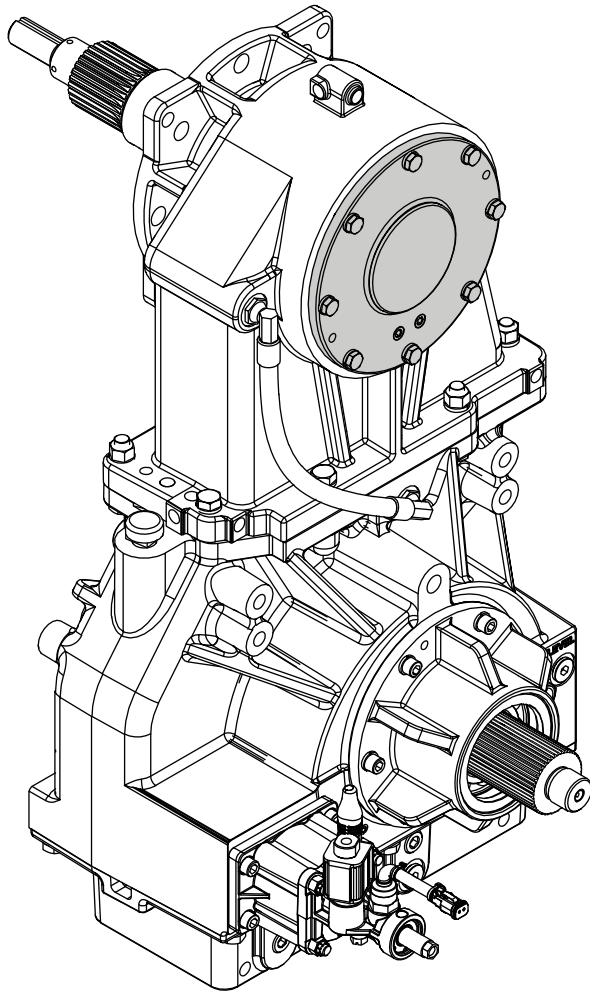
Input and Output Shaft



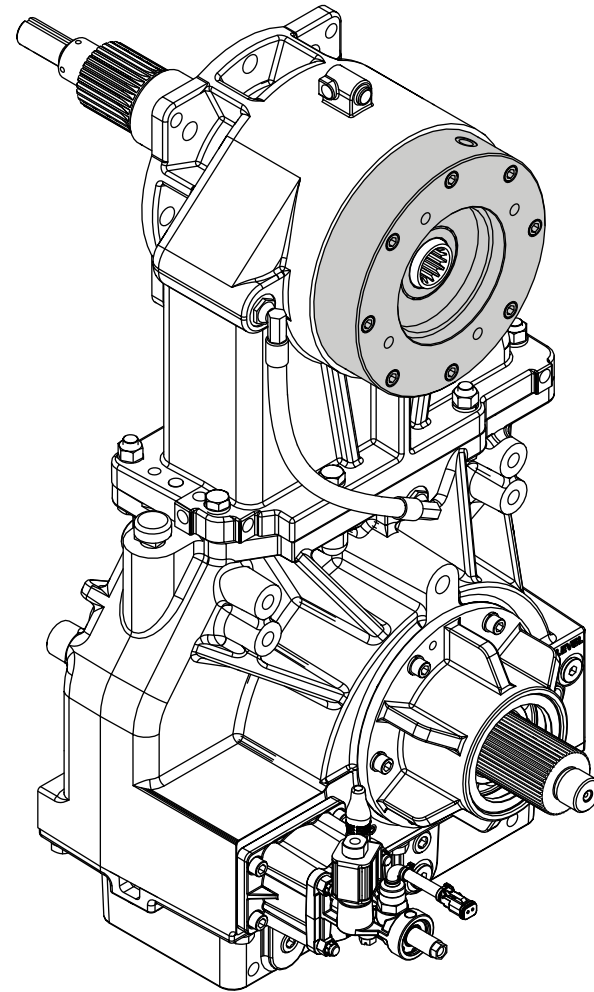
Input Shaft Only

## C23 Driven Shaft Outputs

C23 Series transmissions have an option for a hydraulic adapter for the driven shaft. Additionally, the driven shaft can be purchased with no output.



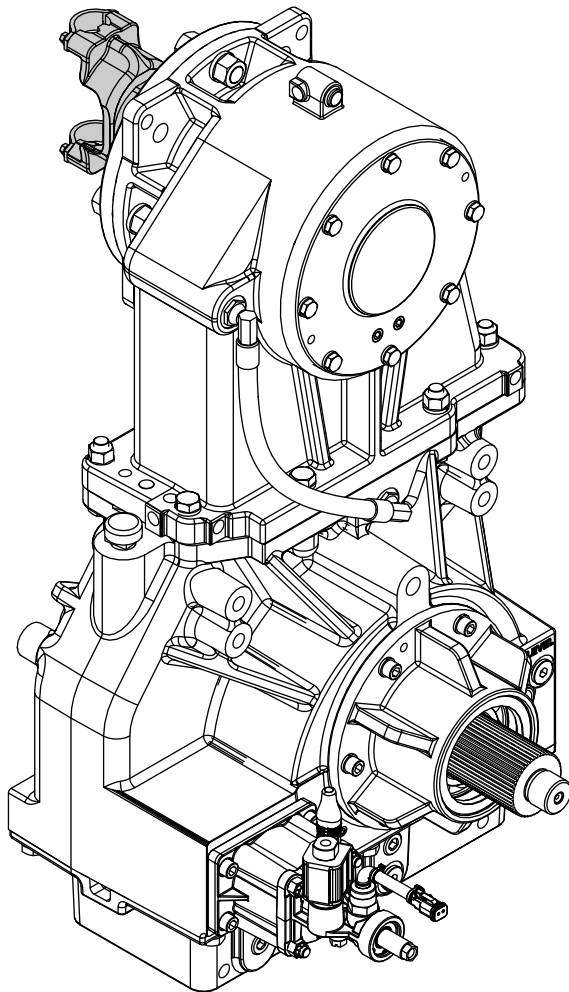
None



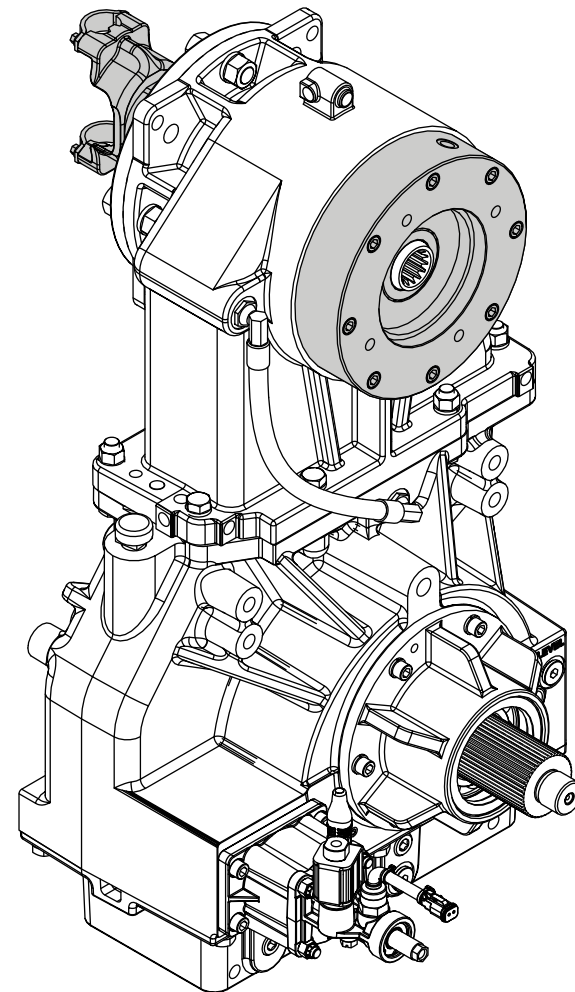
Hydraulic Adapter

## TC23 Driven Shaft Outputs

TC23 Series power take-offs are available with two connection options for the driven shaft output: single output with an end yoke or a dual output with an end yoke and hydraulic adapter. Output connections can be placed on either or both sides of the PTO to suit your application.

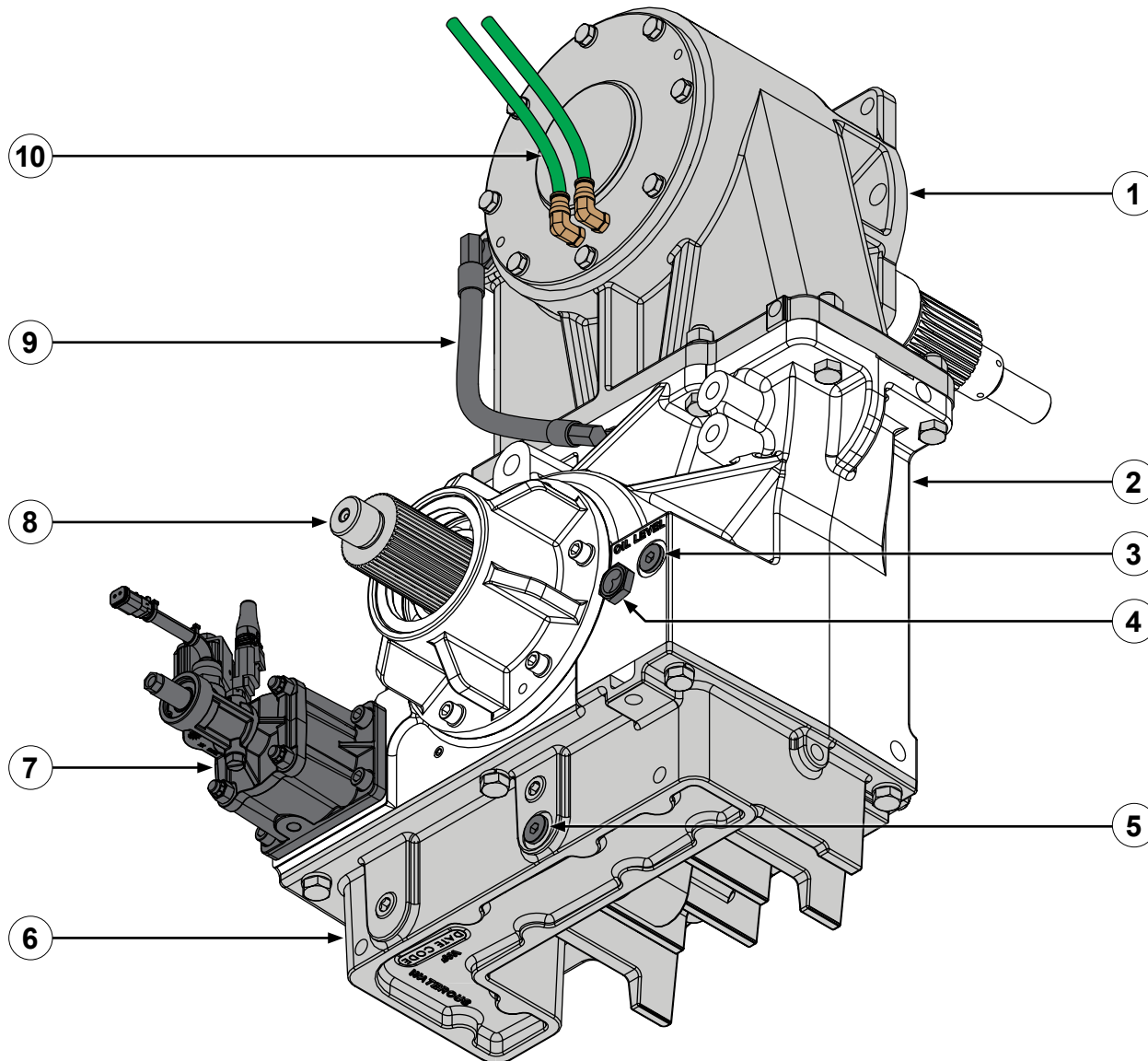


Single Output (End Yoke)



Dual Output (End Yoke and Hydraulic Adapter)

## Identifying Exterior Components

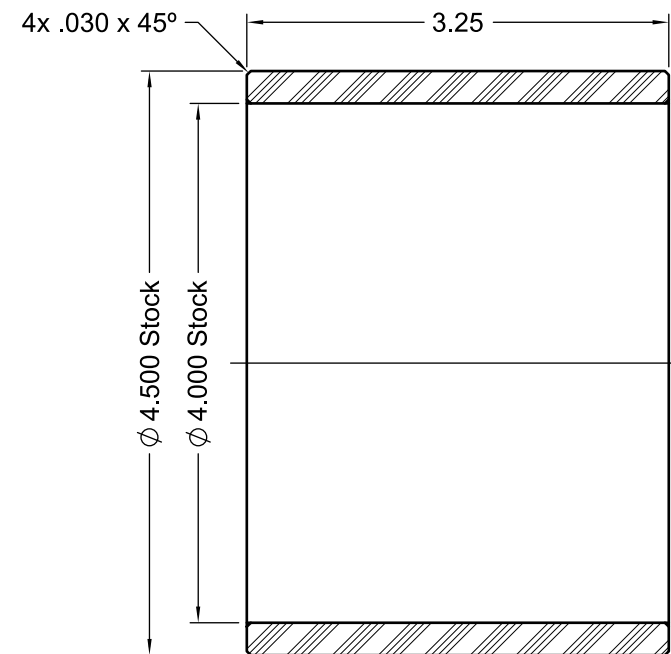
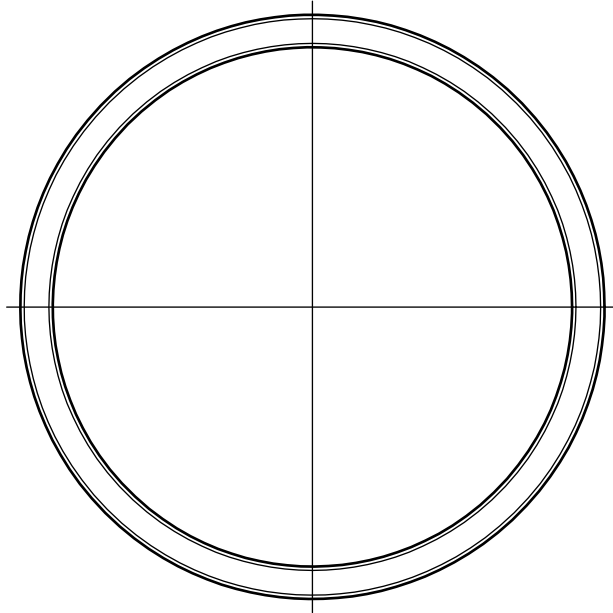


Use the illustration to identify various components on the transmission.

- |    |                         |
|----|-------------------------|
| 1  | Transmission cap        |
| 2  | Transmission case       |
| 3  | Magnetic plug—oil fill  |
| 4  | Oil level sight plug    |
| 5  | Magnetic plug—oil drain |
| 6  | Transmission pan        |
| 7  | Pneumatic shift unit    |
| 8  | Driveline               |
| 9  | Oil hose                |
| 10 | Cooling line—optional   |

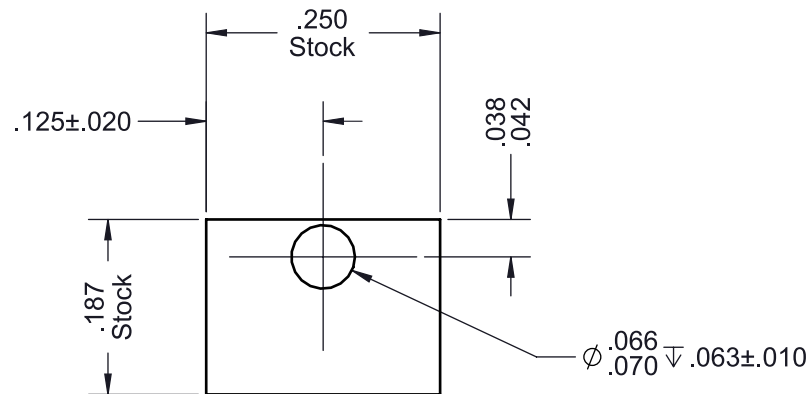
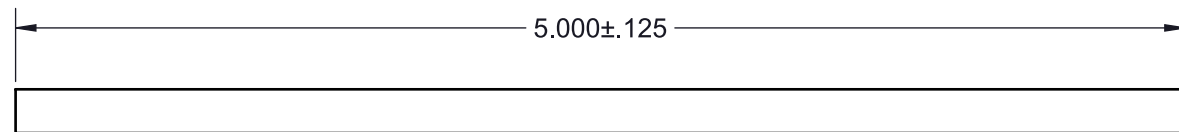
## Drive Shaft Removal Sleeve

An optional drive shaft removal sleeve is available (63431) is available from Waterous to support the drive shaft components during disassembly. Use schedule 40 PVC pipe to fabricate your own—dimensions shown in inches.



## Pin Installation Tool

An optional pin installation tool (53402) is available from Waterous to aid in installing the spirol pin into the drive chain connecting link. Use steel to fabricate your own—dimensions shown in inches.



## Preparing to Disassemble the Equipment

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- Read and understand the instructions before disassembling the equipment.
- Prepare a workspace suitable to accommodate and support the equipment.
- 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 for more information.

## Tools Required

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

## Preparing the Apparatus

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- 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

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- Remove any dirt, sand, grease, or oil from the enclosure before you disassemble the equipment. Surface debris can transfer into the equipment 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 Equipment

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Removing the equipment for overhaul varies by application. Your application may require components such as cooling lines, support brackets, plumbing connections, and other accessories to be removed or disconnected before removing the equipment.

Furthermore, some applications require you to remove the transmission and pump together before separating the transmission from the pump. Other applications allow you to remove the transmission without removing the pump from the apparatus. Refer to the pump instructions before proceeding.

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 Components

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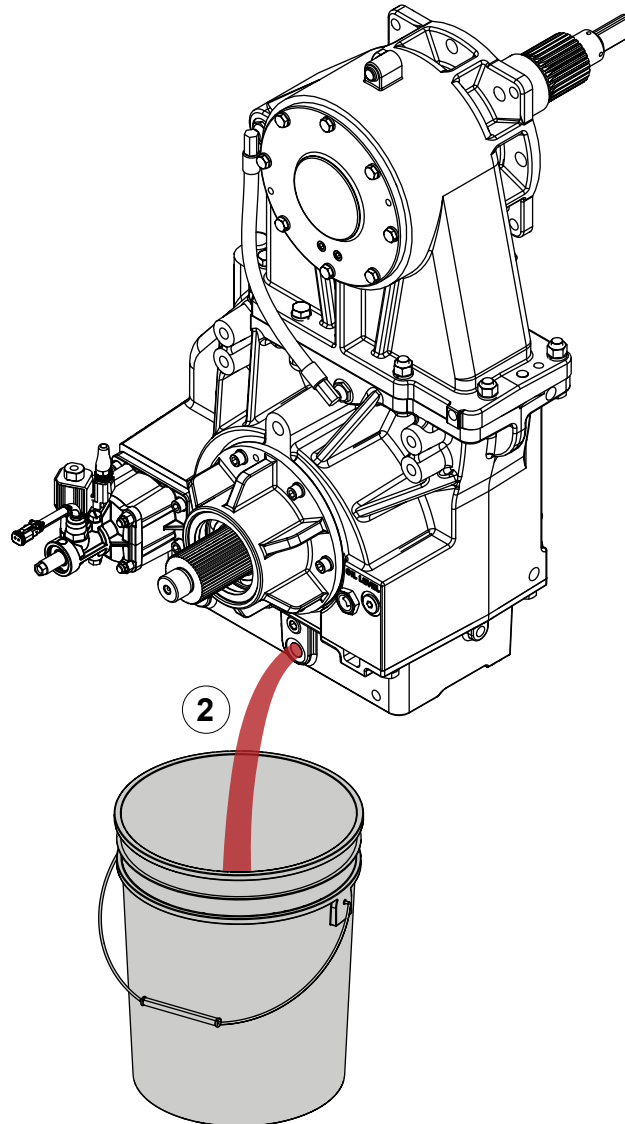
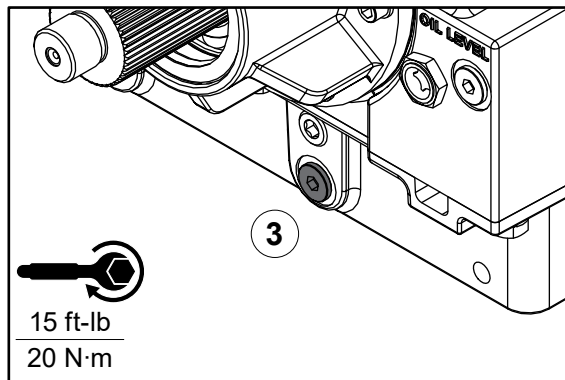
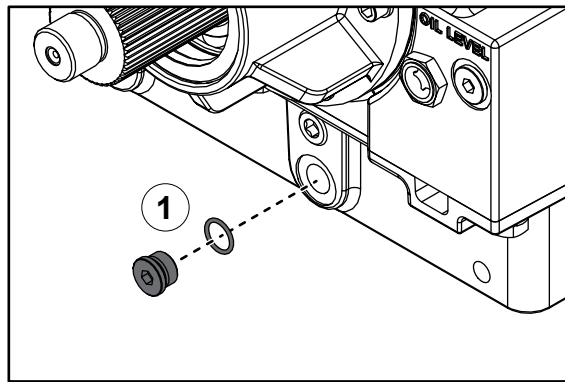
- Refer to the SPL for part identification and disassembly order.

**Note:** Documents specific to your application are available through the MyWaterous login at [waterousco.com](http://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, transmission, or some combination of the three.

- The SPL specific to your application is determined by the following:
  - The pump connected to the transmission.
  - The transmission drive method.
  - Whether the transmission drives a CAFS compressor.
- Use established industry practices to disassemble the equipment.
- 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 from the transmission.

- 1 Place a suitable container under the transmission to collect the drained lubricant, then remove the oil drain plug. Clear any debris that may have adhered to the drain plug. If needed, replace the O-ring.
- 2 Allow the lubricant to drain.
 

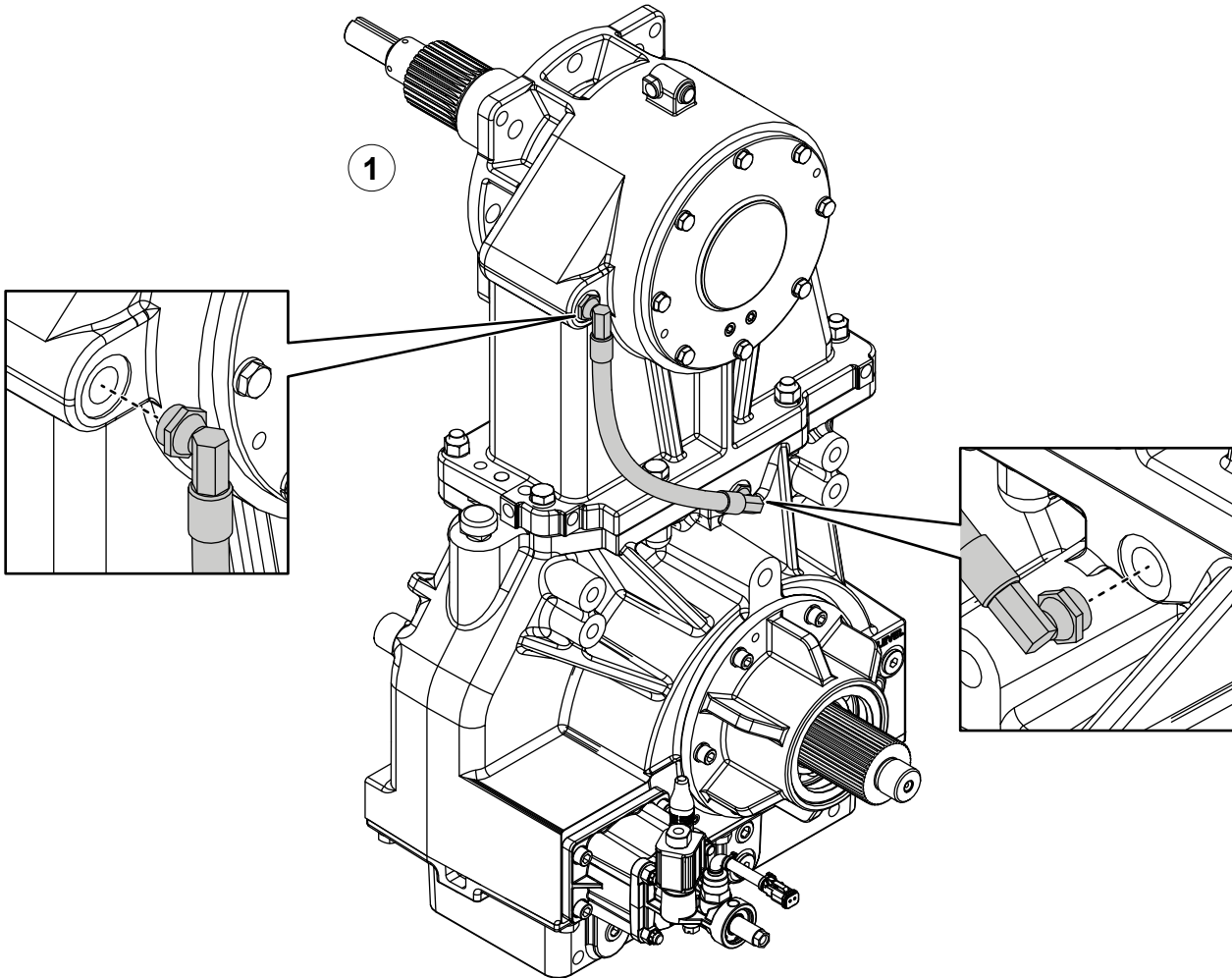
**Note:** It may take several minutes for the lubricant to completely drain from the transmission's internal chambers.
- 3 Install the oil drain plug.
 

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

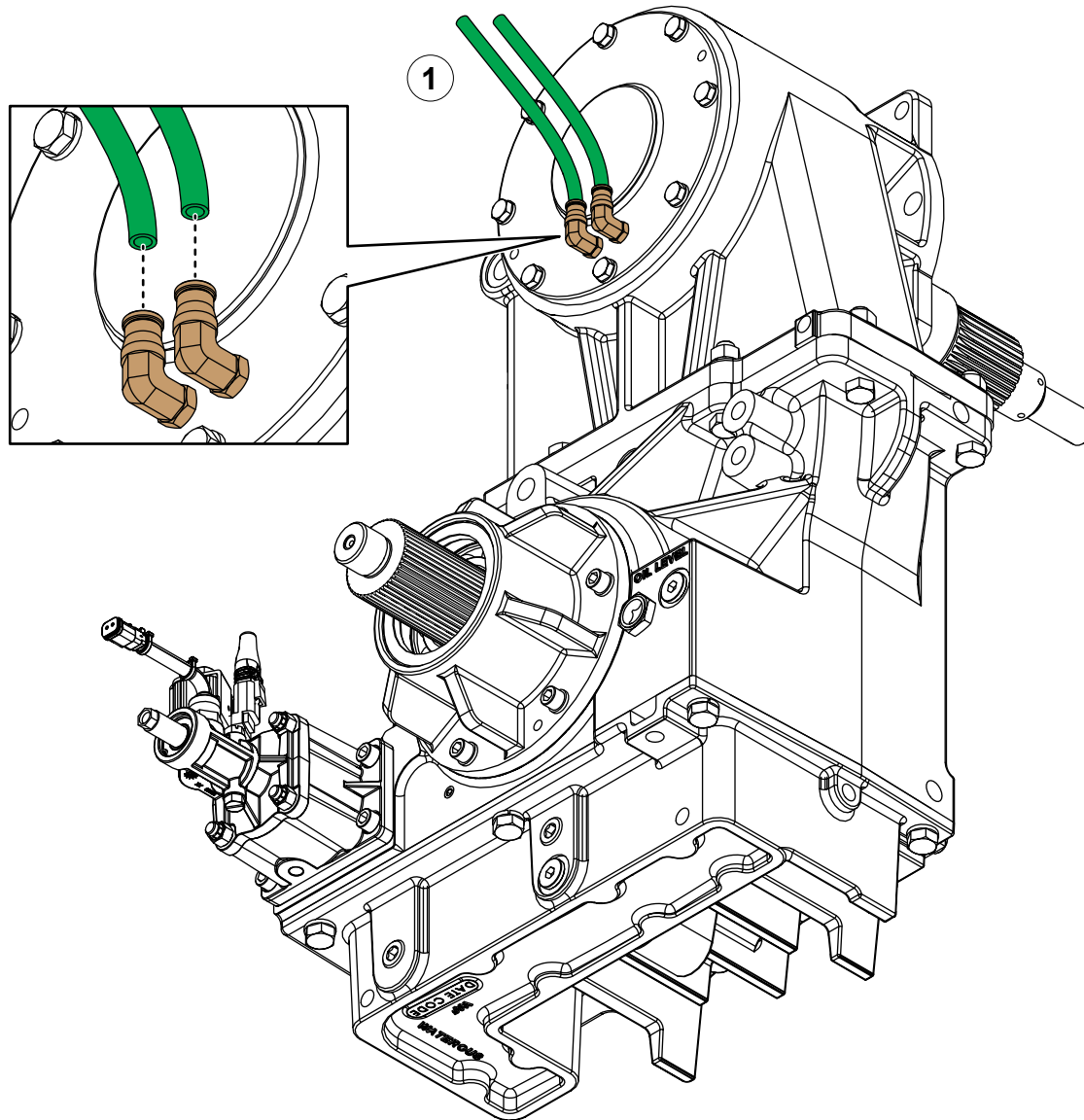
## Disconnecting the Oil Hose

Use the illustration and instructions to disconnect the oil hose.

- 1 Remove the oil hose.



## Disconnecting the Cooling Lines

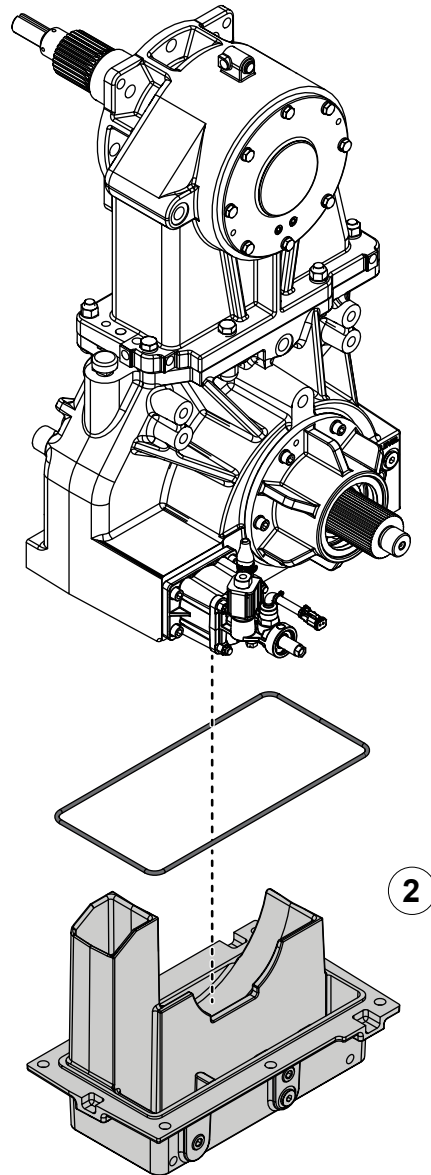
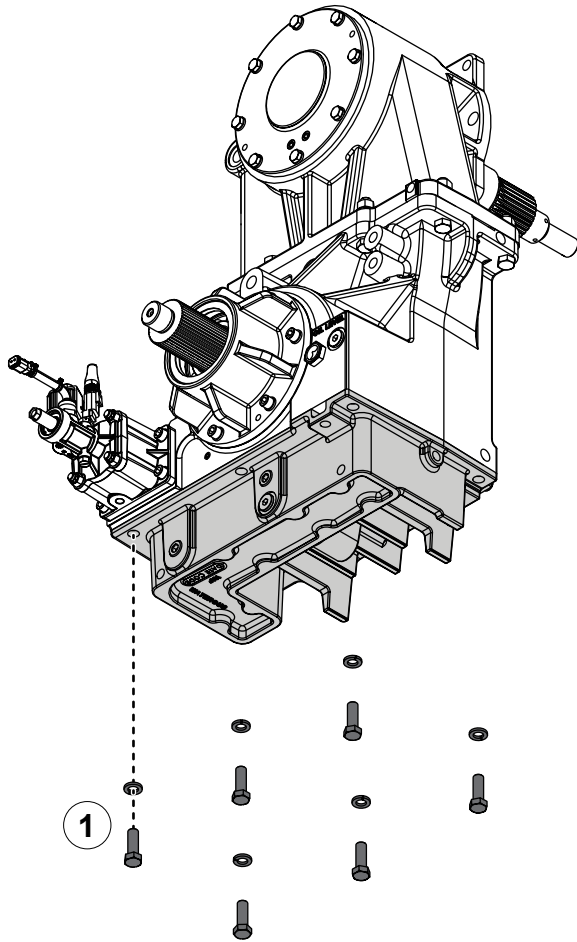


If included in your application, use the illustration and instructions to disconnect the cooling lines.

- 1 Drain any water in the cooling lines, then remove the tubing from the fittings on the bearing cover or optional hydraulic adapter.

**Note:** Standard bearing cover shown.

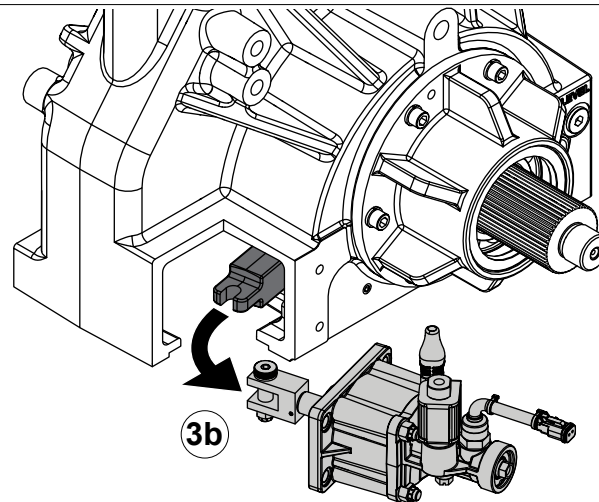
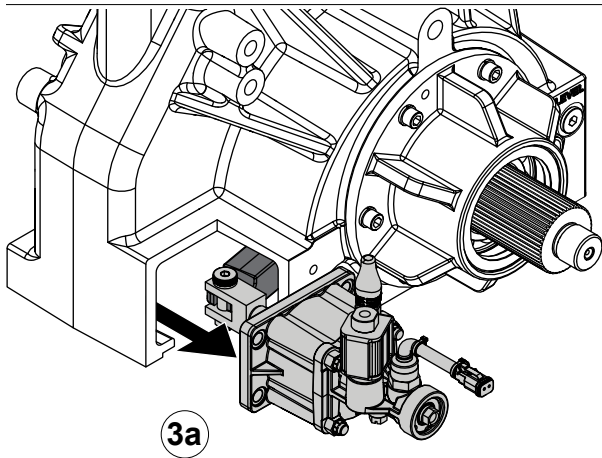
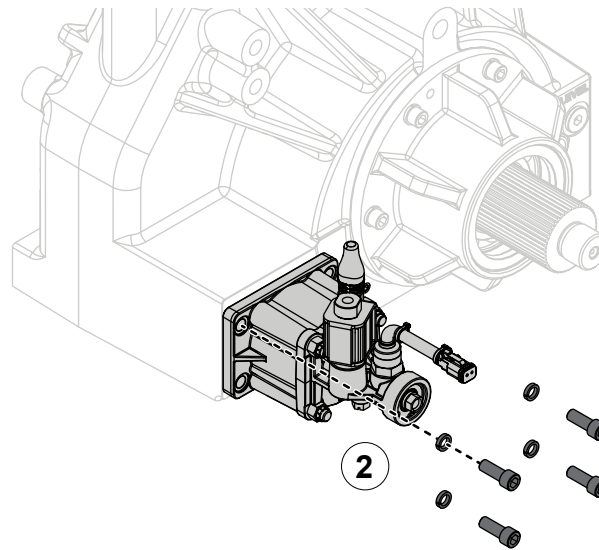
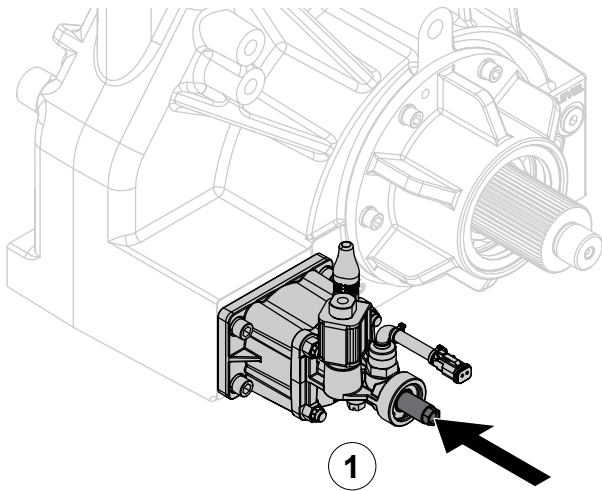
## Removing the Transmission Pan



Use the illustrations and instructions to remove the transmission pan.

- 1 Remove the hardware securing the transmission pan to the case.
- 2 Remove the transmission pan, then remove and discard the transmission pan gasket.

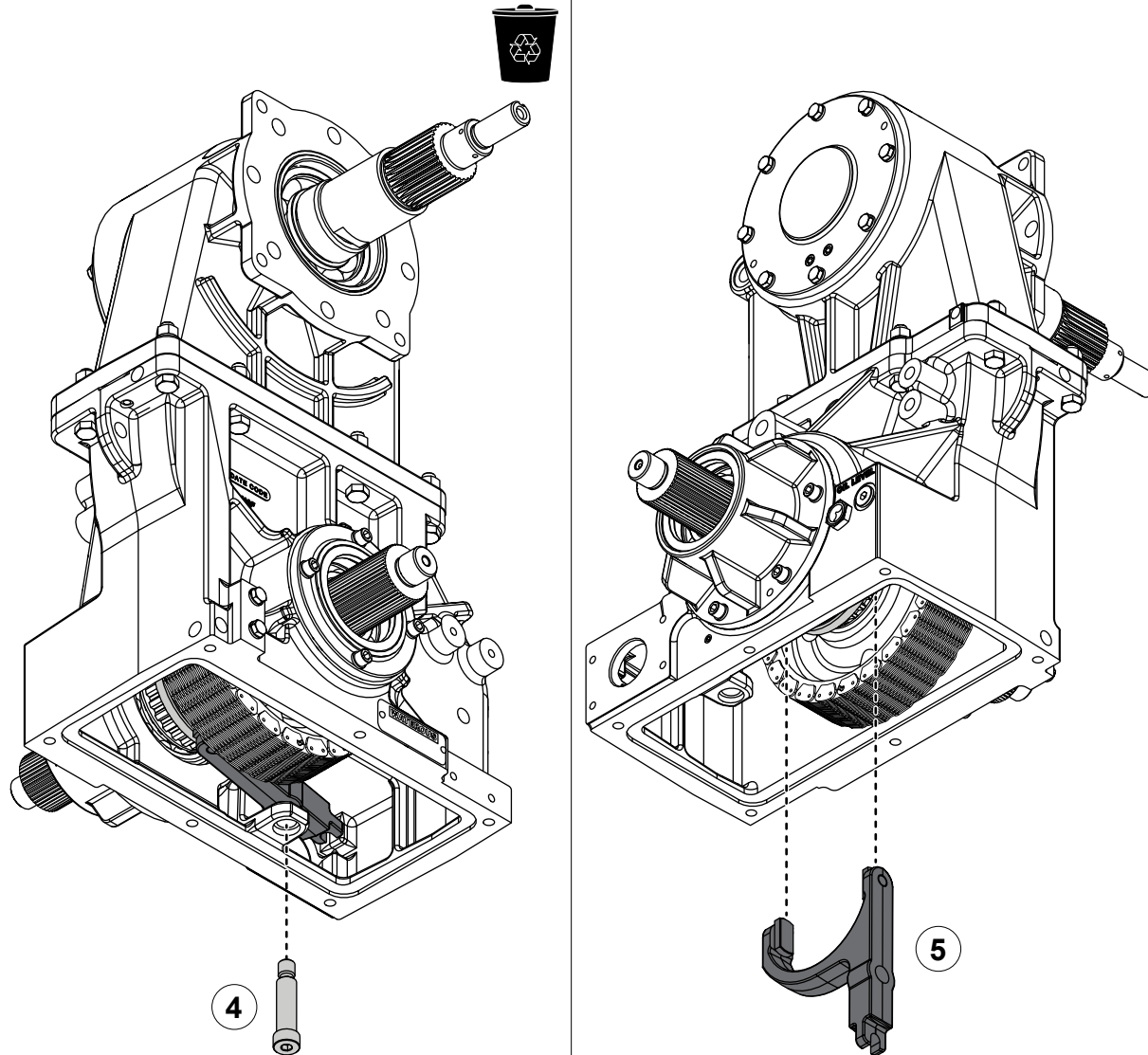
## Removing the Pneumatic Shift Unit



If included in your application, use the illustrations and instructions to remove the pneumatic shift unit.

- 1 Move the shift unit into road position.
- 2 Remove the shift unit hardware.
- 3
  - a. Pull the shift unit away from the case.
  - b. Tilt the shift unit toward the center of the case to disengage the clevis.

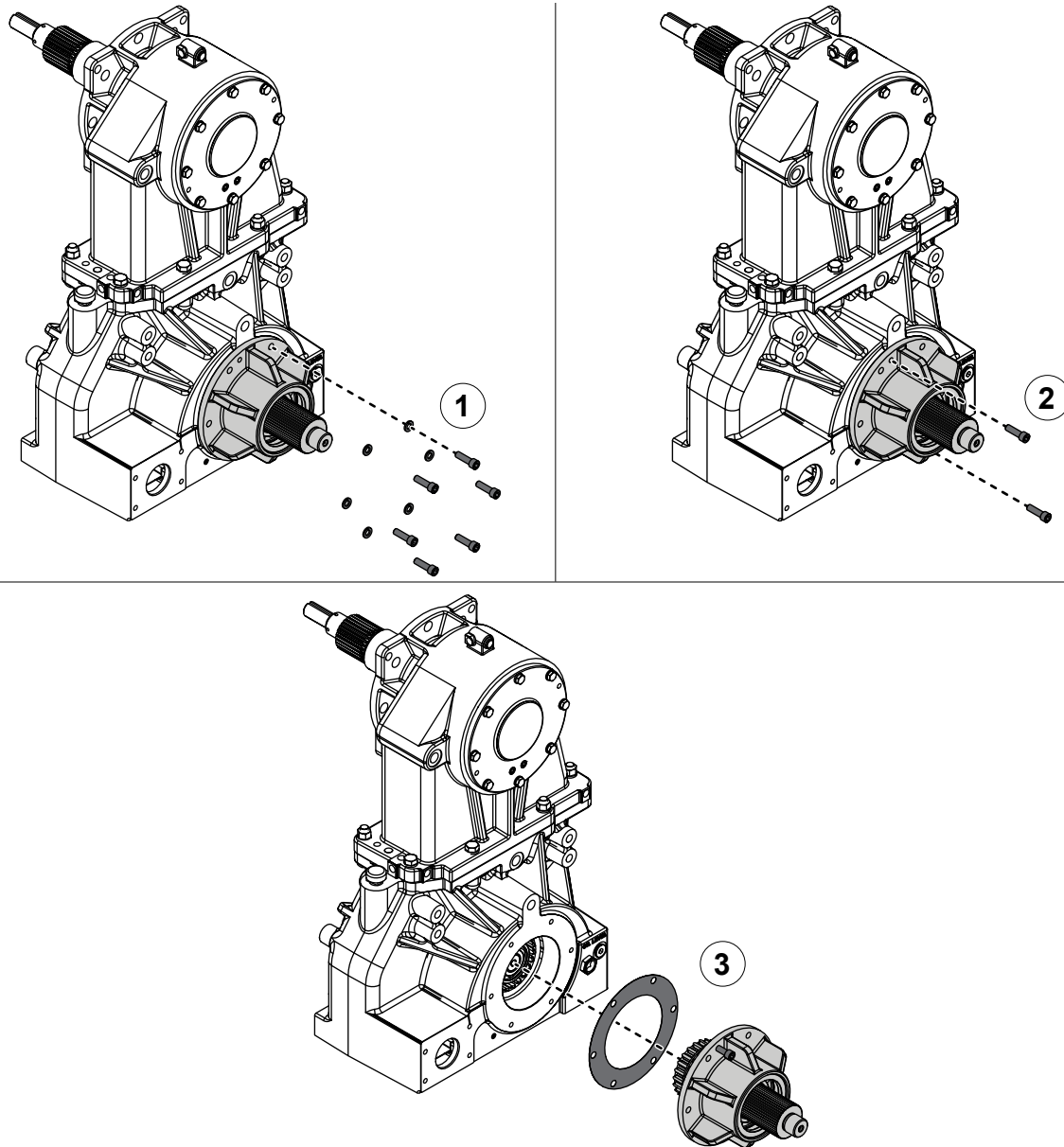
## Removing the Pneumatic Shift Unit



If included in your application, use the illustrations and instructions to remove the pneumatic shift unit.

- 4 Move the shift collar into pump position, then remove and discard the shoulder screw.
- 5 Remove the shift fork.

## Input and Output Shaft Configurations

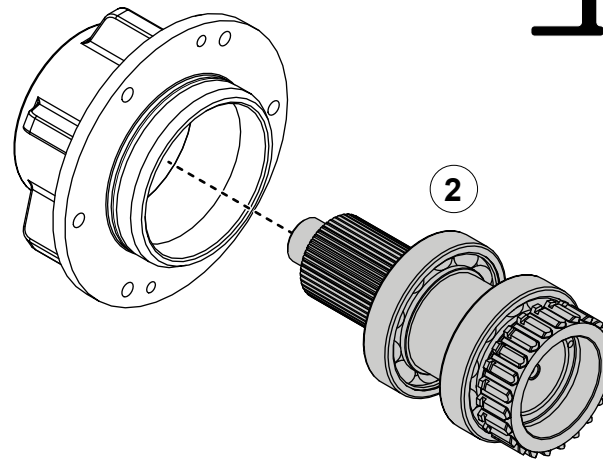
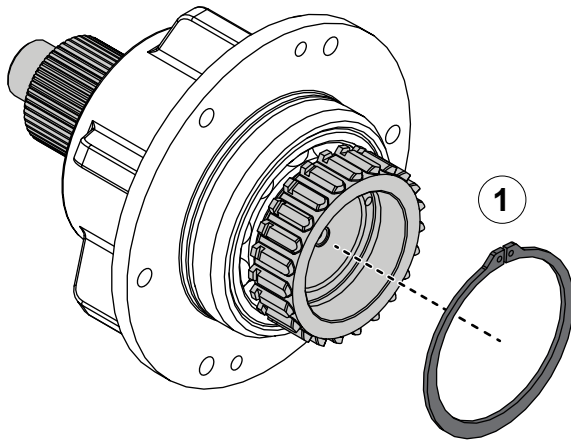


### Removing the Output Shaft

Use the illustrations and instructions to remove the output shaft assembly.

- 1 Remove the output shaft housing hardware.
- 2 Use the screws previously removed (or locally sourced 3/8-16 jacking screws) to separate the output shaft housing from the case.
- 3 Remove the output shaft assembly, then remove the shims.

## Input and Output Shaft Configurations



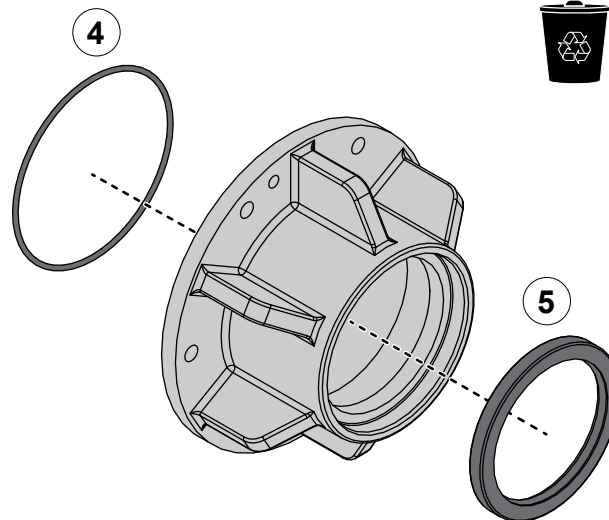
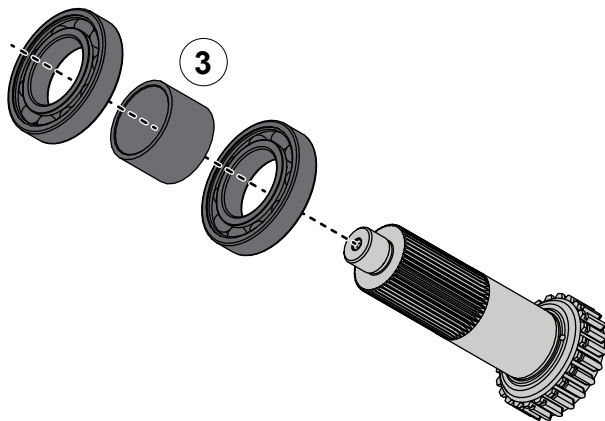
### Disassembling the Output Shaft

Use the illustrations and instructions to disassemble the output shaft assembly.

- 1 Remove the retaining ring from the output shaft.
- 2 Press the output shaft from the housing.

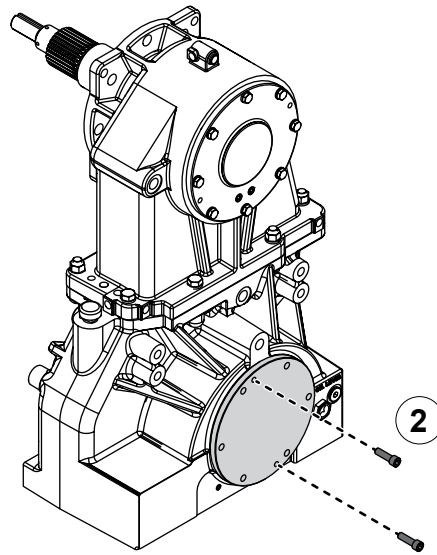
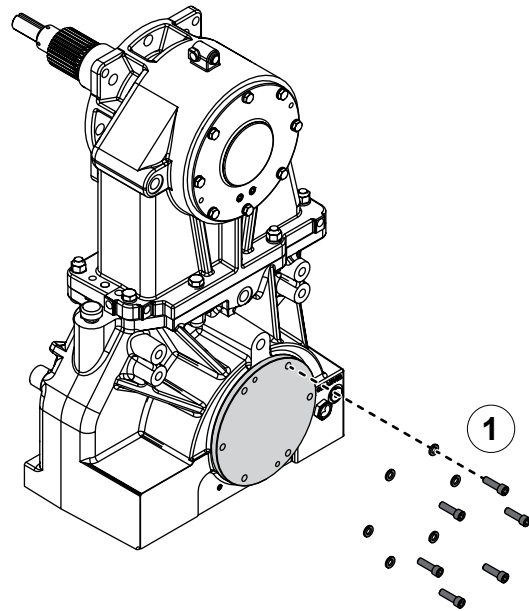
**Note:** If the pilot bearing sticks inside the output shaft bore, use a punch to tap it out through the bore access holes.

- 3 Remove the outer bearing, spacer, and inner bearing from the shaft.
- 4 Remove and discard the O-ring.
- 5 Remove and discard the oil seal.





## Input Shaft Only Configurations



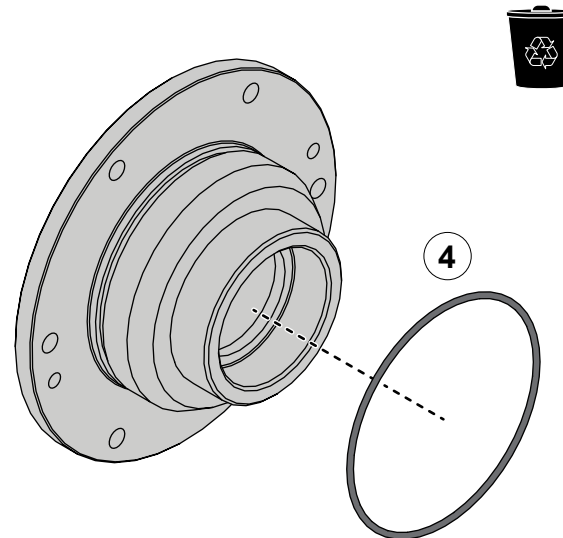
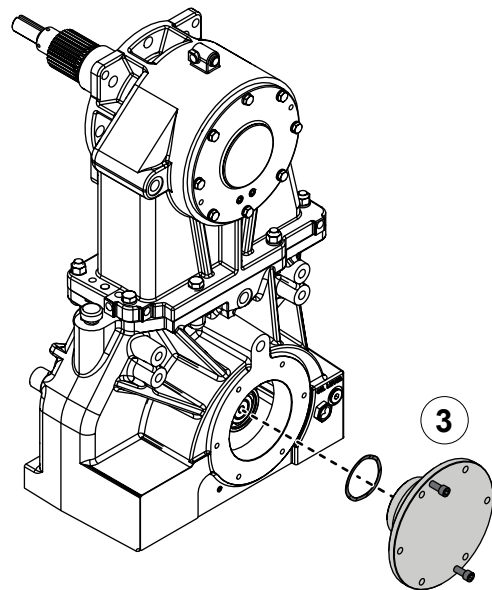
### Removing the Output Bearing Housing

Use the illustrations and instructions to remove the output bearing housing.

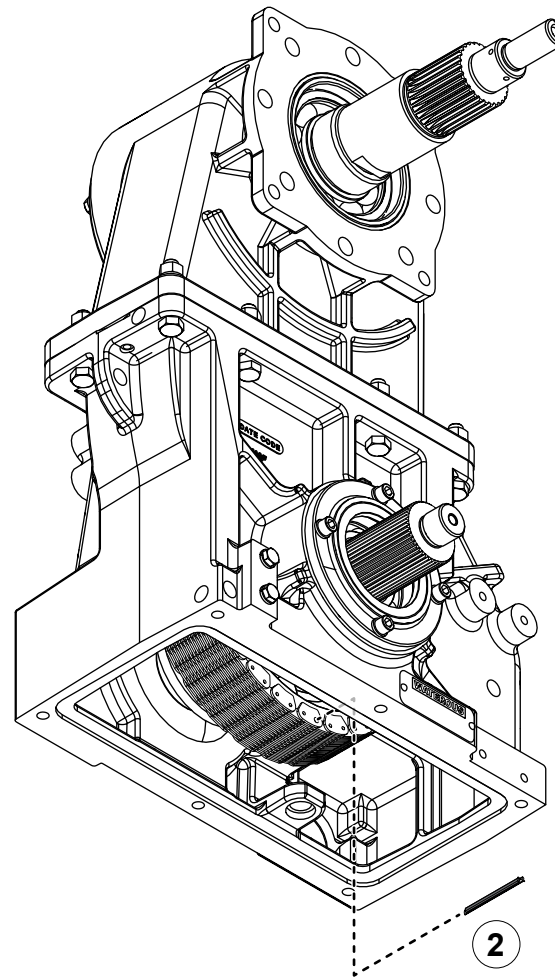
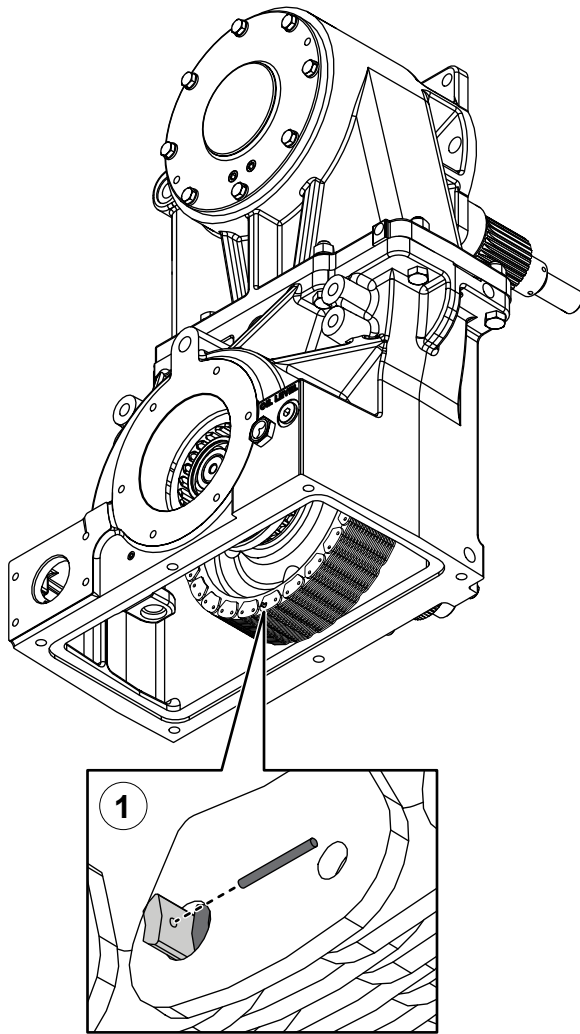
- 1 Remove the bearing housing hardware.
- 2 Use the screws that you just removed (or locally sourced 3/8-16 jacking screws) to separate the bearing housing from the case.
- 3 Remove the bearing housing, then remove the wave spring.

**Note:** If the pilot bearing comes out with the bearing housing, a bearing puller can be used to remove it. The bearing will most likely be damaged and made unusable if removed using this method.

- 4 Remove and discard the O-ring.



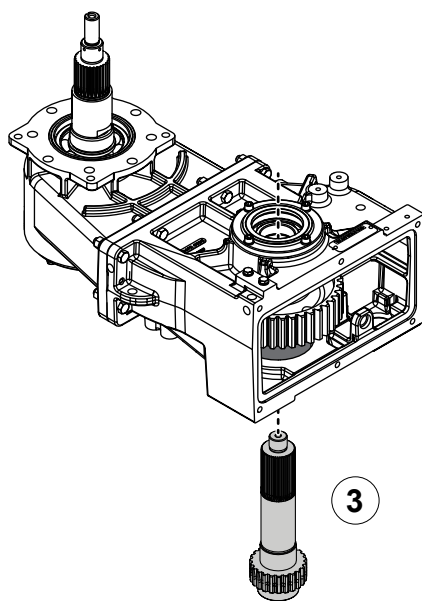
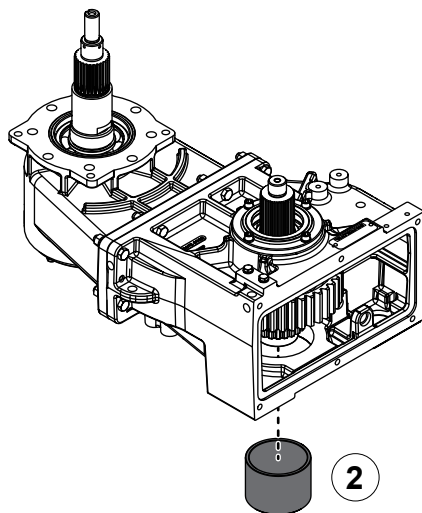
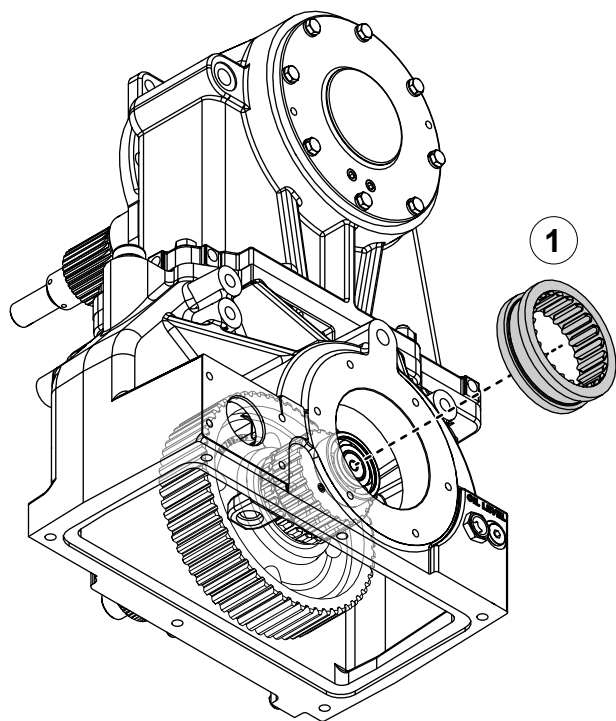
## Removing the Chain



Use the illustrations and instructions to remove the drive chain.

- 1 Locate the connecting link, then remove the spiro pin.
- 2 Remove the connecting pin and rocker, then remove the chain from the case.

## Removing the Drive Shaft

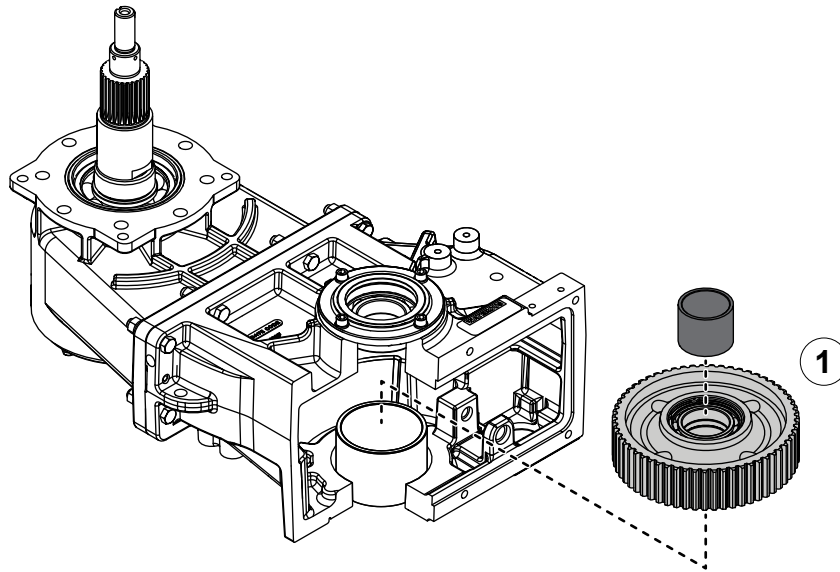


Use the illustrations and instructions to remove the drive shaft assembly.

- 1 Remove the shift collar.
- 2 Install the drive shaft removal sleeve below the shift collar.
- 3 Make sure that the case is level, then press the drive shaft out of the case.

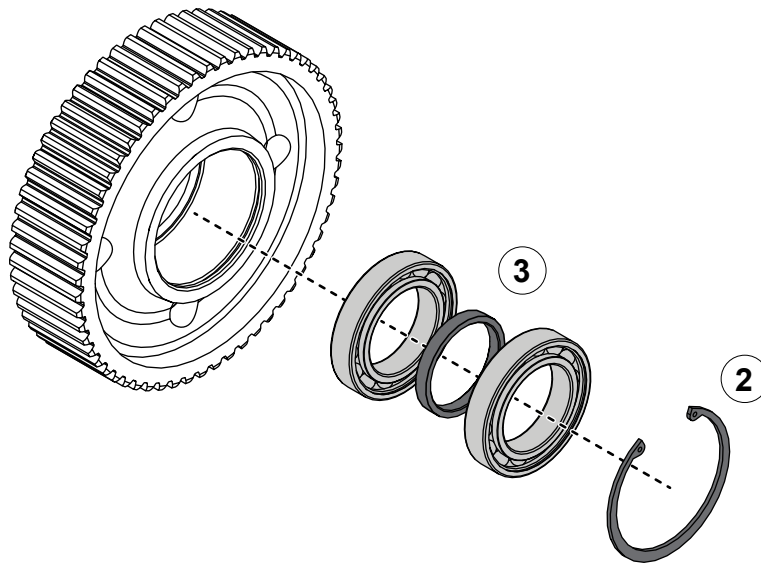


## Removing the Drive Components

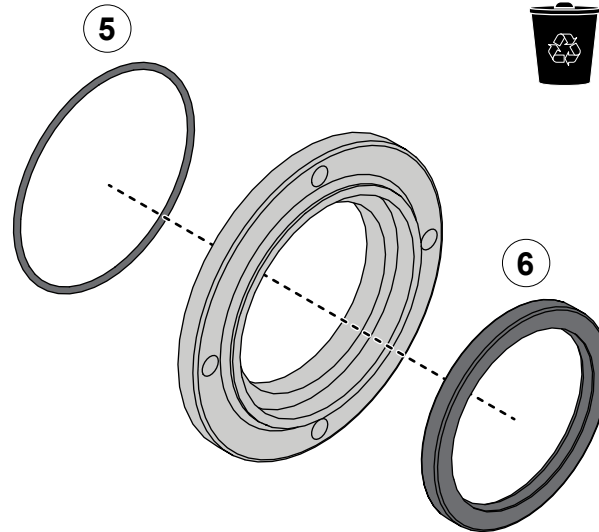
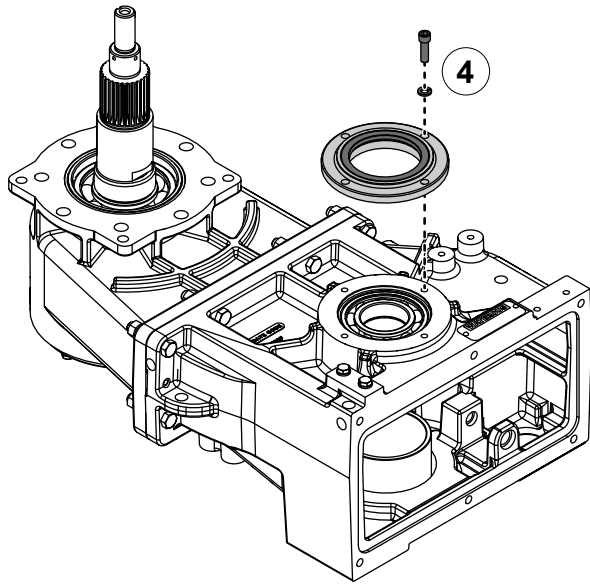


Use the illustration and instructions to remove the drive components from the transmission case.

- 1 Remove the sprocket assembly and spacer.
- 2 Remove the retaining ring.
- 3 Press the outer bearing, spacer, and inner bearing out of the sprocket.

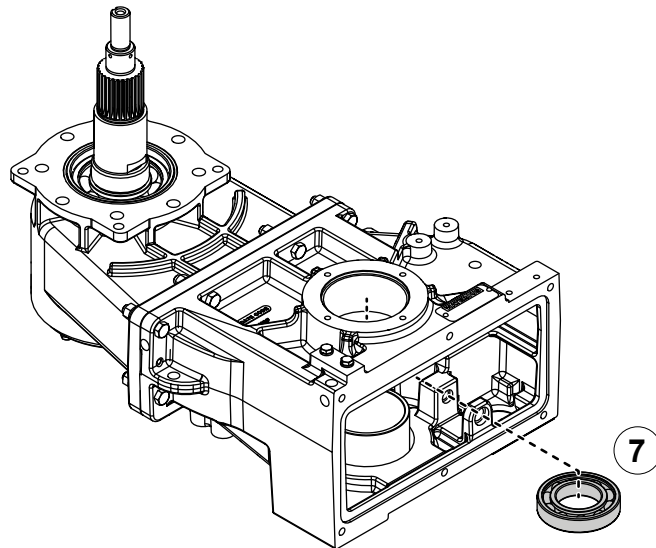


## Removing the Drive Components

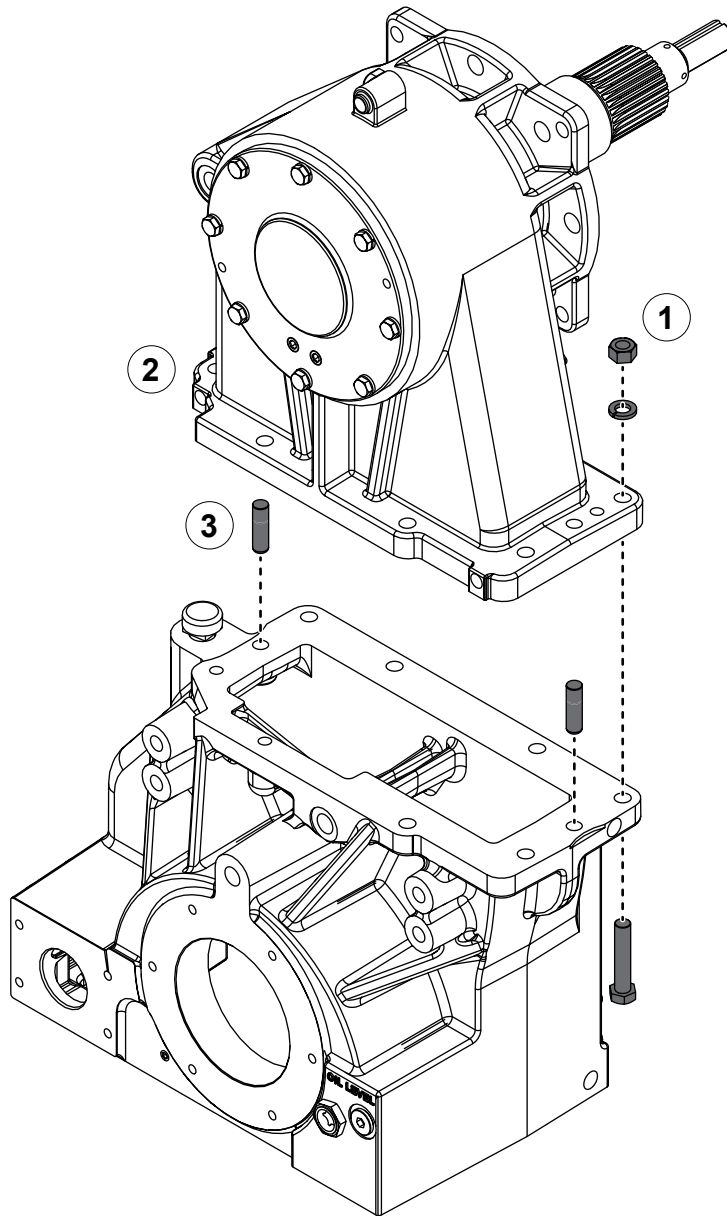


Use the illustrations and instructions to remove the drive components from the transmission case.

- 4 Remove the drive shaft housing hardware, then remove the drive shaft housing.
- 5 Remove and discard the O-ring.
- 6 Remove and discard the oil seal.
- 7 Press the bearing out of the case.



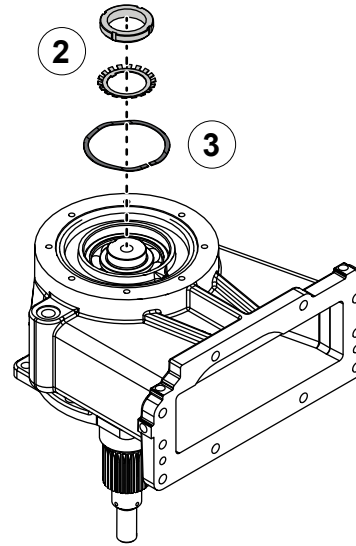
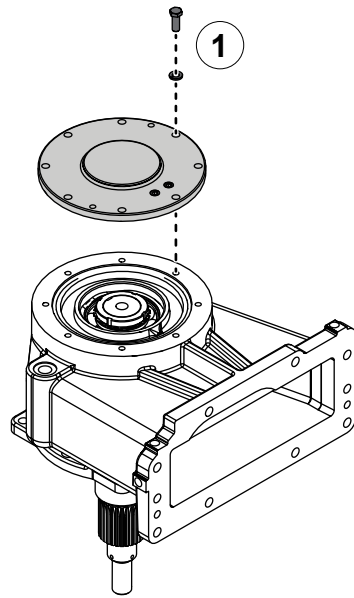
## Removing the Cap



Use the illustration and instructions to remove the cap from the transmission case.

- 1 Remove the cap hardware.
- 2 Separate the cap from the case.
- 3 If needed, remove the dowel pins.

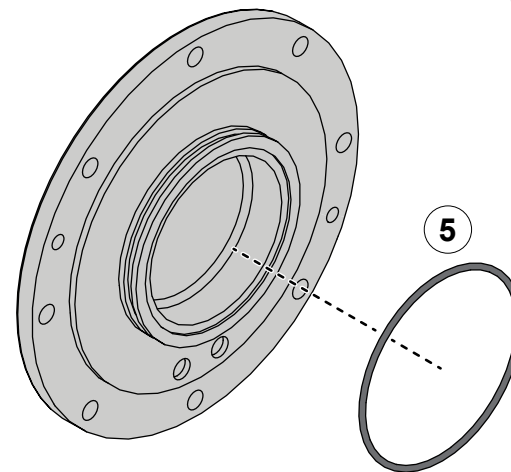
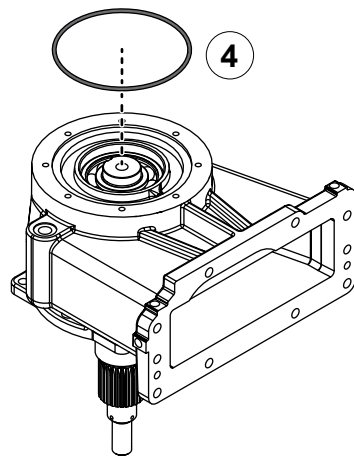
## Removing the Driven Shaft



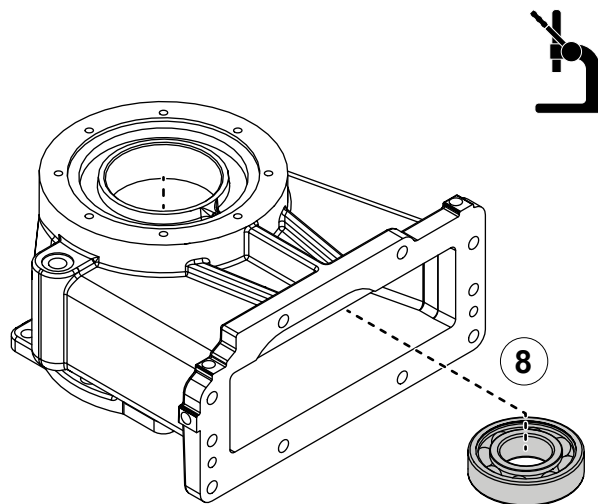
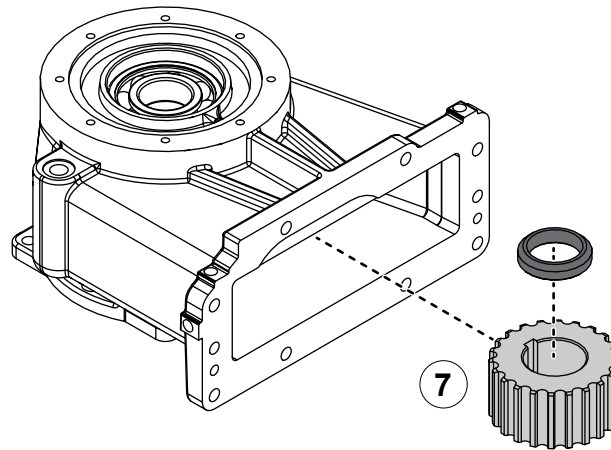
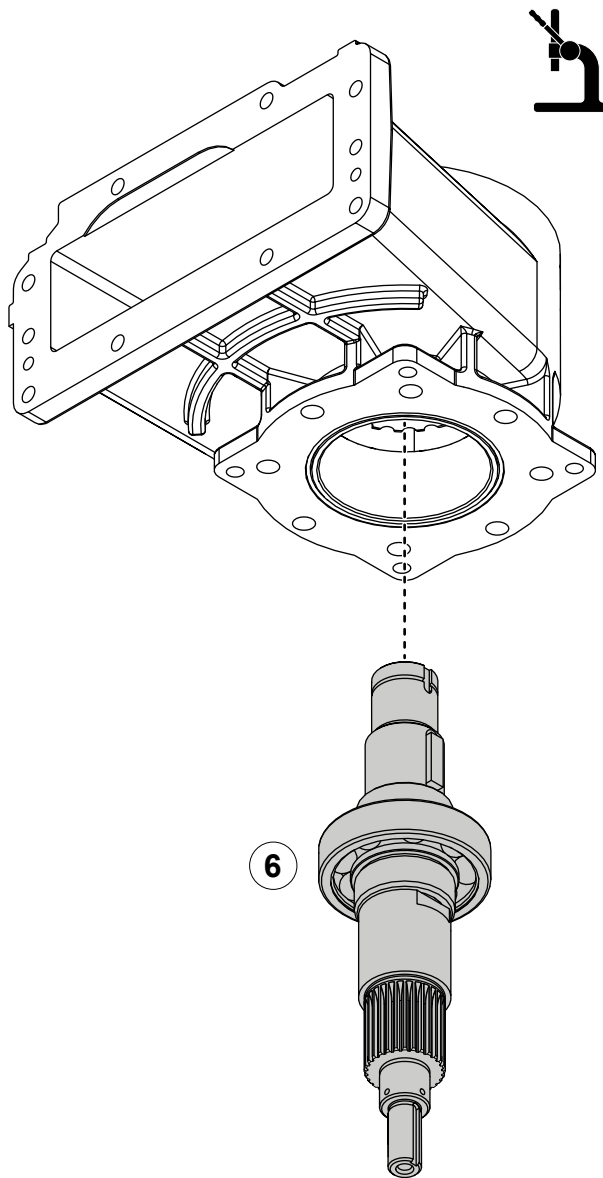
Use the illustrations and instructions to remove the driven shaft assembly from the cap.

**Note:** *The illustrations may not depict your specific configuration. The removal process is similar regardless of the output and shaft design.*

- 1 Remove the bearing cover hardware, then remove the bearing cover.
- 2 Straighten the tab on the lock washer, then remove the lock nut and washer.
- 3 Remove the wave spring.
- 4 Remove and discard the O-ring.
- 5 Remove and discard the O-ring.



## Removing the Driven Shaft

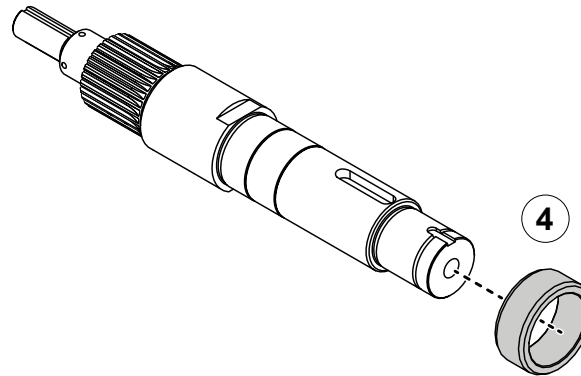
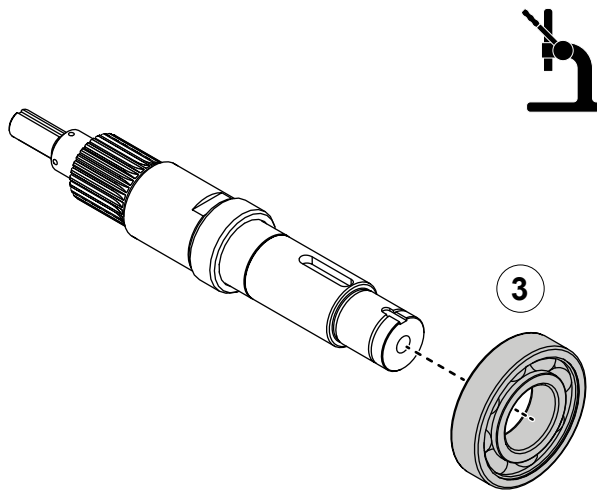
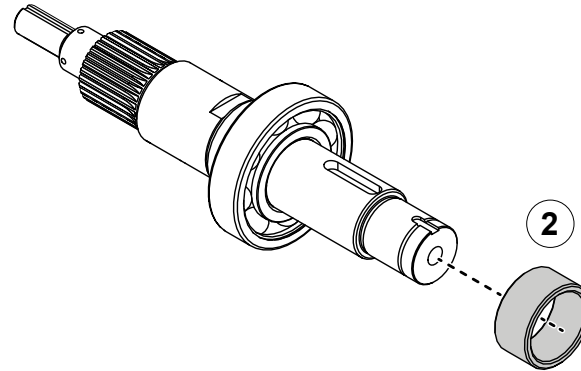
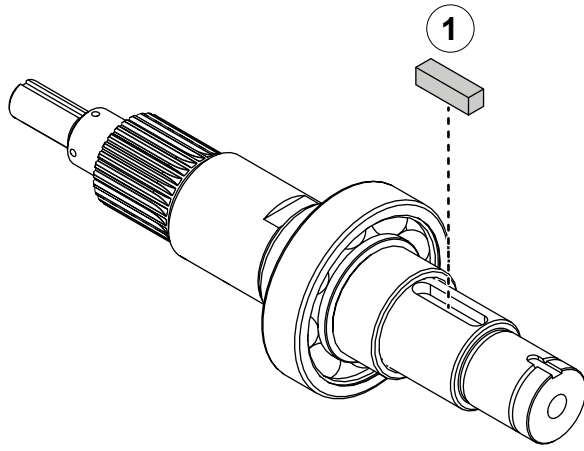


Use the illustrations and instructions to remove the driven shaft assembly from the cap.

- 6 Press the driven shaft out of the cap.
- 7 Remove the sprocket and spacer.
- 8 Press the bearing out of the cap.



## Disassembling the Driven Shaft



Use the illustrations and instructions to disassemble the driven shaft.

- 1 Remove the key.
- 2 Remove the spacer.
- 3 Remove the bearing.
- 4 Remove the spacer.

## Preparing to Assemble the Equipment

---

- Read and understand the instructions before assembling the equipment.
- Prepare a workspace suitable to accommodate and support the equipment.
- Gather the necessary tools and assembly aids.
- Gather the overhaul components, such as lubricant, bearings, seals, and O-rings—only use equivalent components.
- 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 for more information.

## Tools Required

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- 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

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- Remove any dirt, sand, grease, or oil from the enclosure before you begin the overhaul. Surface debris can transfer into the equipment 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 Components

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- Refer to the SPL for part identification.
- The SPL specific to your application is determined by the following:
  - The transmission drive method.
  - Whether the transmission drives a CAFS compressor.

**Note:** Documents specific to your application are available through the MyWaterous login at [waterousco.com](http://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, transmission, or some combination of the three.

- Use established industry practices to assemble the equipment.
- Tighten hardware to industry standard torque specifications—unless otherwise noted.
- Make sure that you do not over-tighten plugs.
- Replace components such as O-rings, bearings, gaskets, oil seals, lock nuts, lock washers, and lubricants with equivalent components.

## Installing the Equipment

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

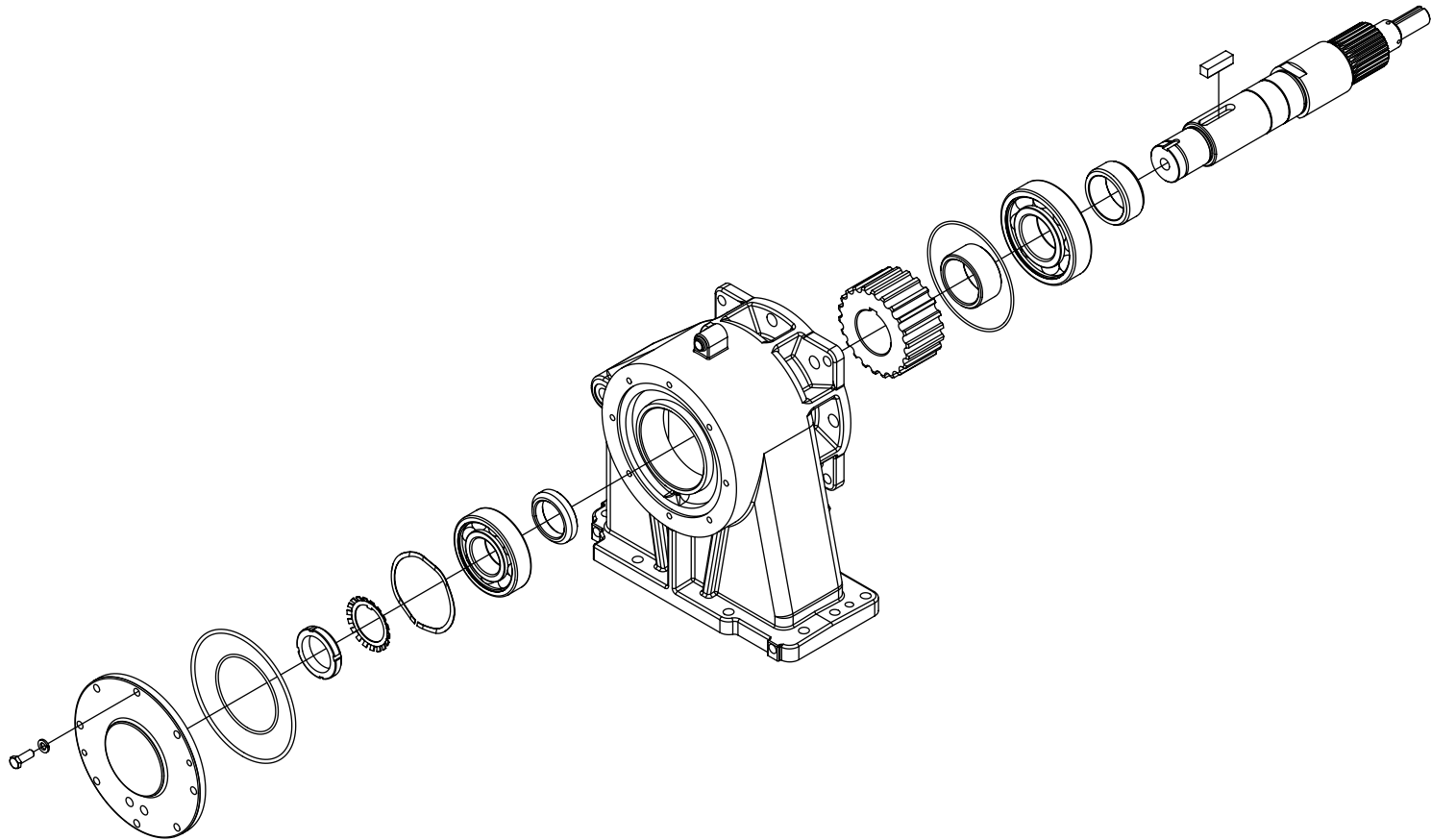
## Understanding the Illustrations

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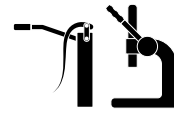
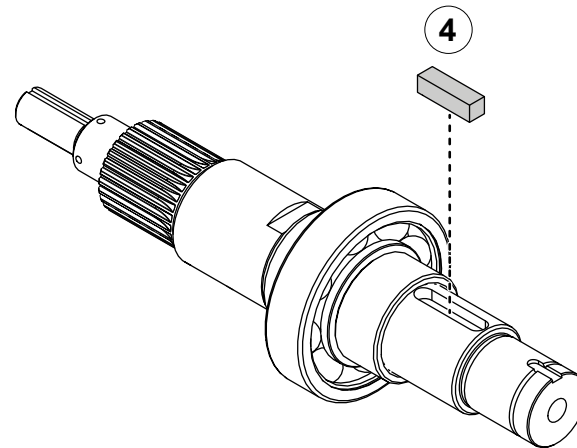
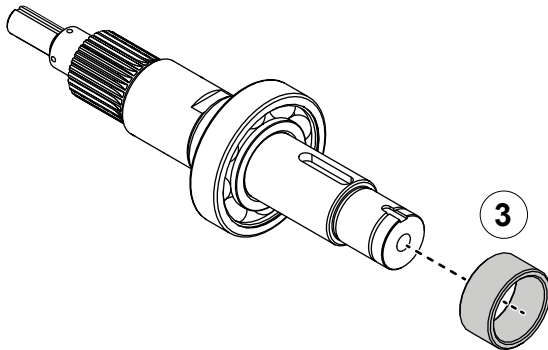
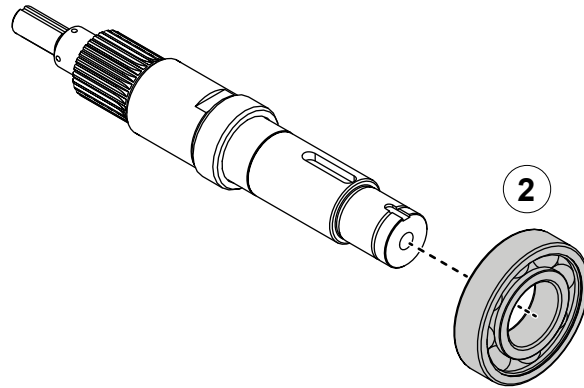
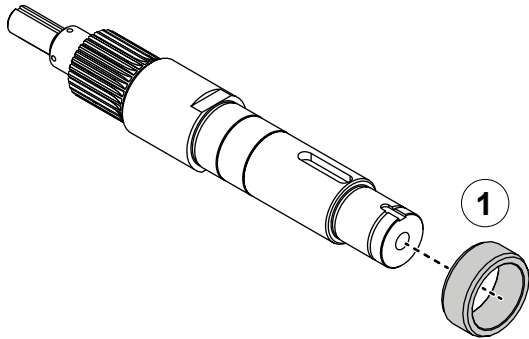
The assembly illustrations depict a typical application. Plugs, breathers, cooling hoses, and fittings are not illustrated as they may be in a different location on your application. Refer to the SPL for your application to identify the various plug locations.



## CRU-2 Series Pumps with Front Drive and No Output



## CRU-2 Series Pumps with Front Drive and No Output

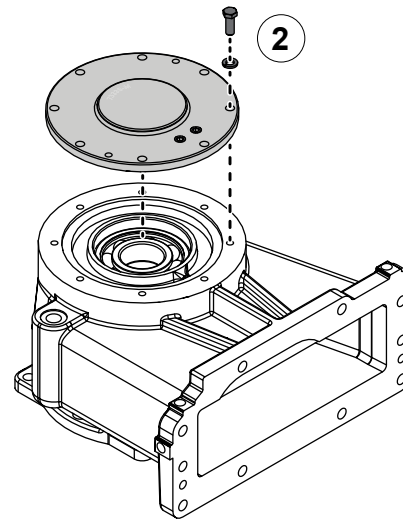
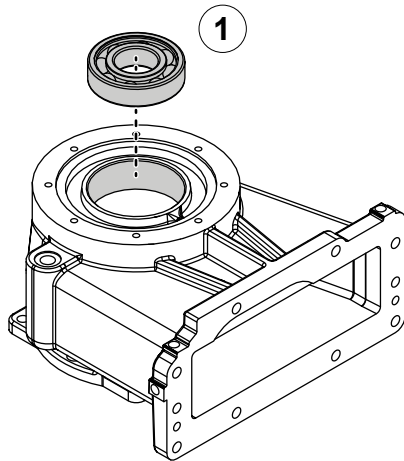
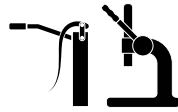


### Assembling the Driven Shaft

Use the illustrations and instructions to assemble the driven shaft.

- 1 Install the spacer onto the shaft.
- 2 Apply grease to the shaft, then press the bearing onto the shaft.
- 3 Install the spacer onto the shaft.
- 4 Install the key into the key slot.

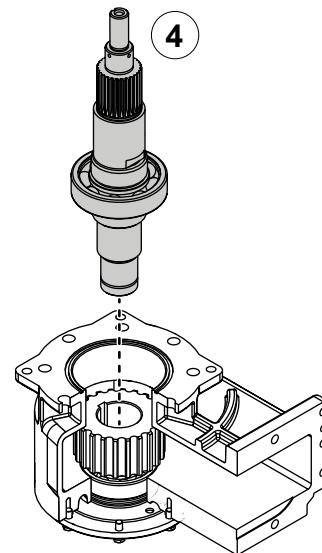
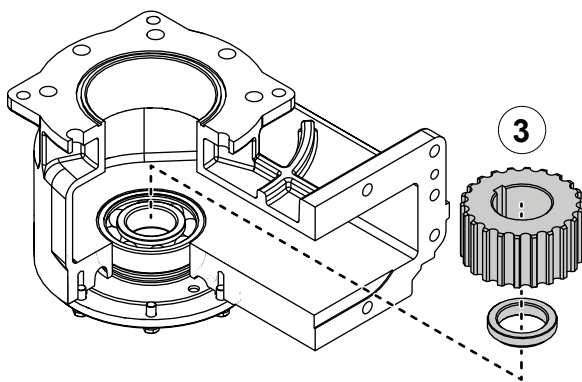
## CRU-2 Series Pumps with Front Drive and No Output



### Installing the Driven Shaft

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

- 1 Apply grease to the output bore of the cap, then press the bearing into the bore.
- 2 Temporarily install the bearing cover onto the cap.
- 3 Flip the cap so that the output side is facing down, then position the spacers and sprocket inside the cap.
- 4 Press the driven shaft assembly through the cap, spacers, and sprocket.



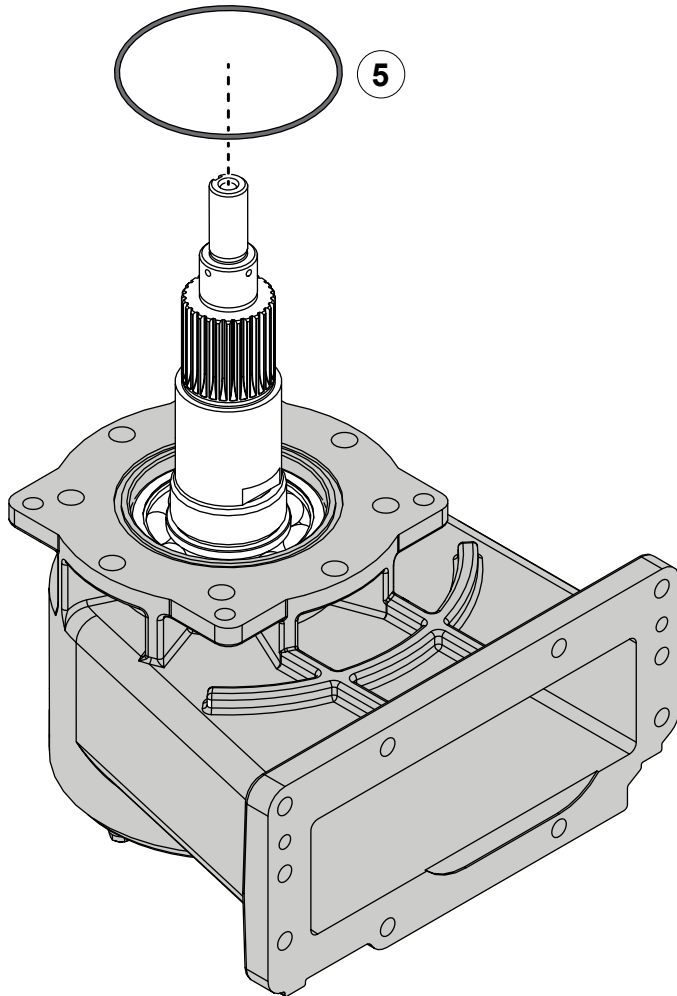
## CRU-2 Series Pumps with Front Drive and No Output



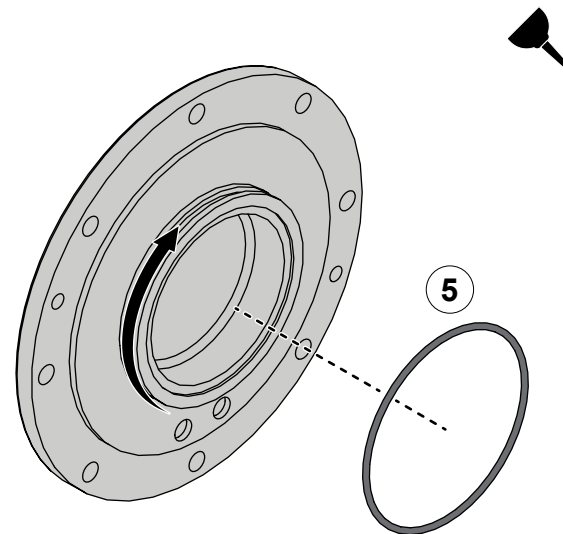
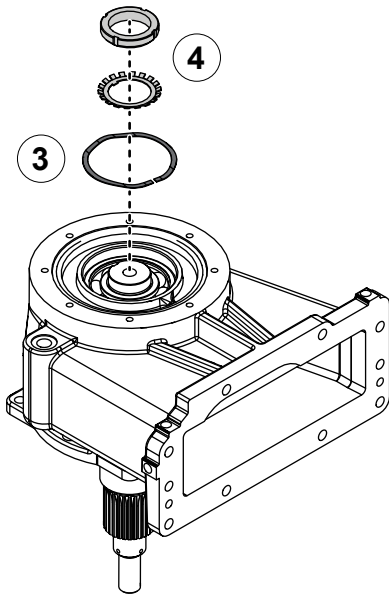
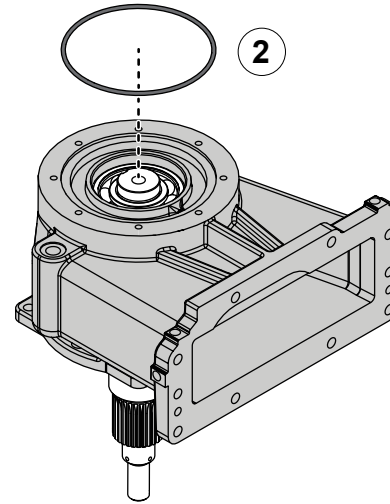
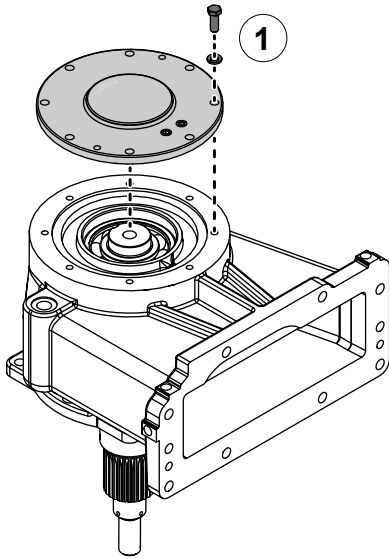
### Installing the Driven Shaft

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

- 5 Apply lubricant to the O-ring groove, then install the O-ring into the groove.



## CRU-2 Series Pumps with Front Drive and No Output



### Installing the Bearing Cover

Use the illustrations and instructions to install the bearing cover.

- 1 Remove the bearing cover.
- 2 Apply lubricant to the O-ring groove, then install the O-ring into the groove.
- 3 Install the wave spring into the cap.
- 4 Install the bearing lock nut and washer. Refer to: **"Installing the Bearing Lock Washer and Nut" on page 64.**
- 5 Apply lubricant to the O-ring groove, then install the O-ring into the groove.



## CRU-2 Series Pumps with Front Drive and No Output

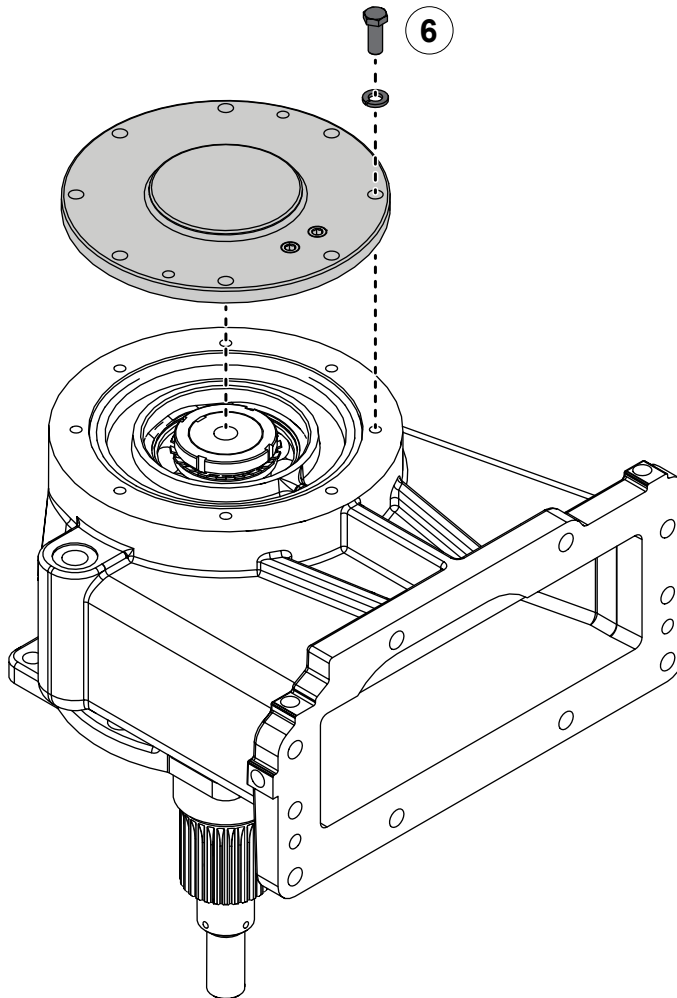


31 ft-lb  
42 N·m

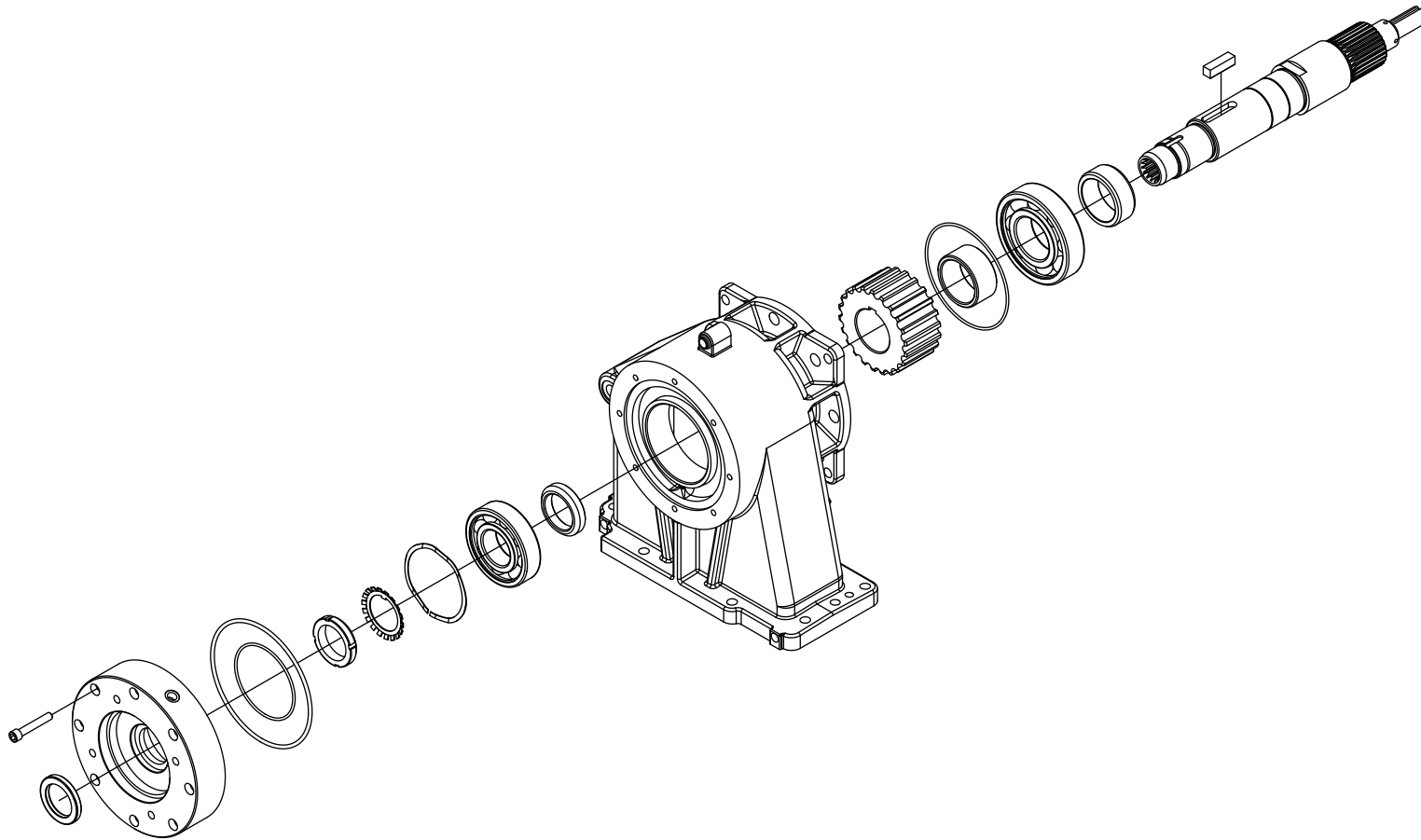
### Installing the Bearing Cover

Use the illustration and instructions to install the bearing cover.

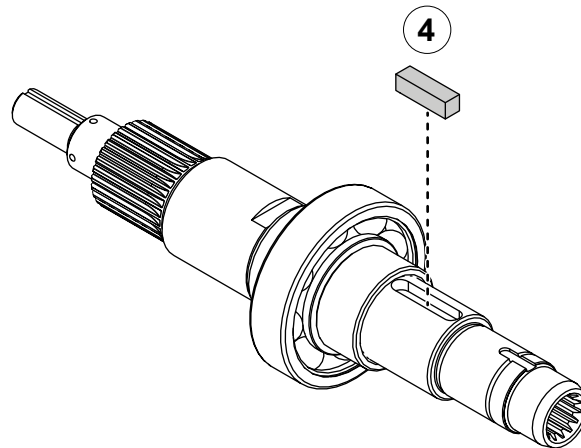
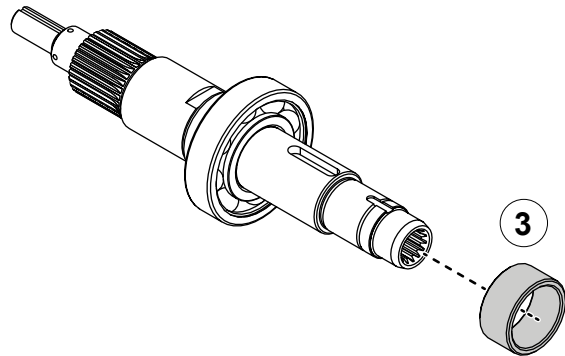
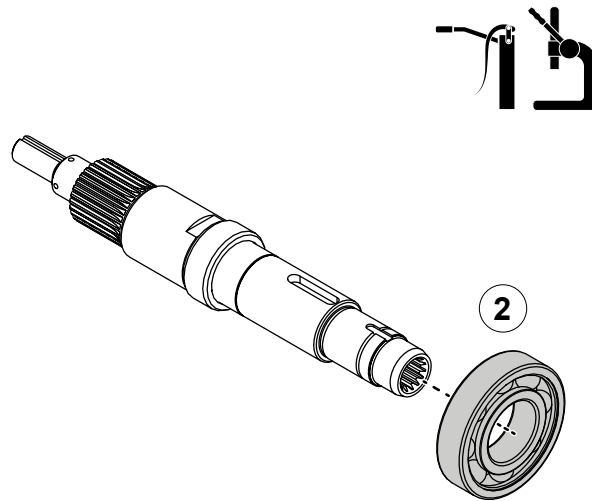
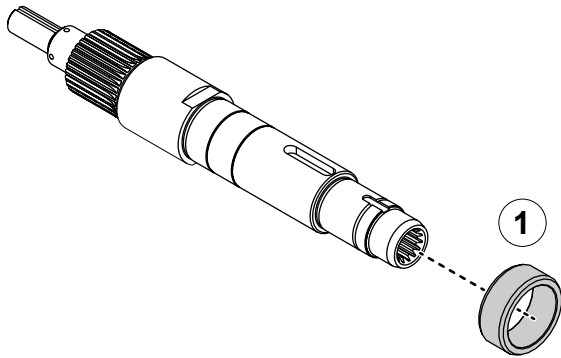
- 6 Use the mounting hardware to secure the bearing cover to the cap.



## CRU-2 Series Pumps with Hydraulic Output



## CRU-2 Series Pumps with Hydraulic Output

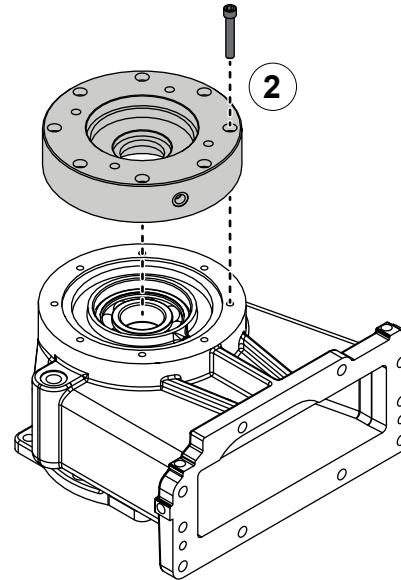
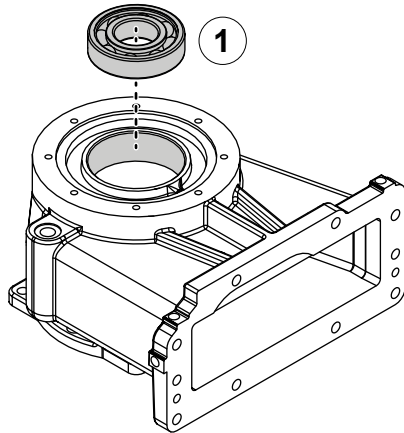
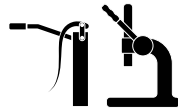


### Assembling the Driven Shaft

Use the illustrations and instructions to assemble the driven shaft.

- 1 Install the spacer onto the shaft.
- 2 Apply grease to the shaft, then press the bearing onto the shaft.
- 3 Install the spacer onto the shaft.
- 4 Install the key into the key slot.

## CRU-2 Series Pumps with Hydraulic Output



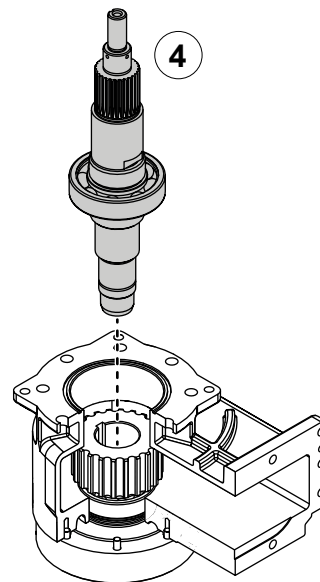
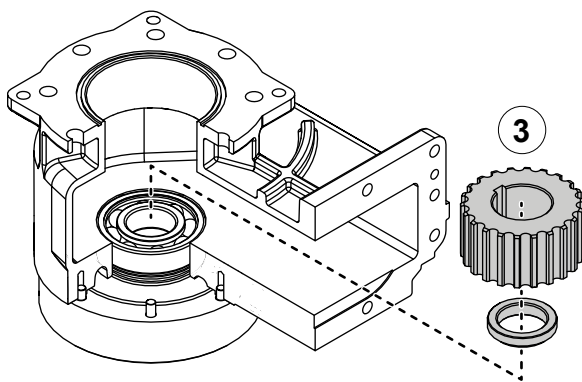
### Installing the Driven Shaft

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

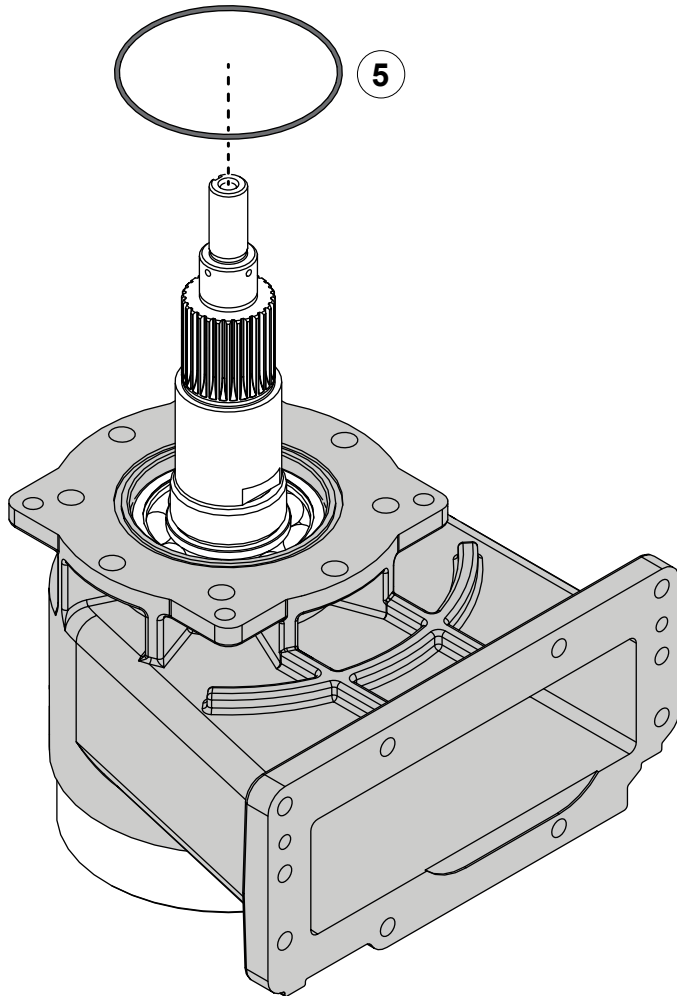
- 1 Apply grease to the output bore of the cap, then press the bearing into the bore.
- 2 Temporarily install the hydraulic adapter onto the cap.

**Note:** Use the information that you recorded during the disassembly to determine component orientation.

- 3 Flip the cap so that the output side is facing down, then position the sprocket and spacer inside the cap.
- 4 Press the driven shaft assembly through the cap, sprocket, and spacer.



## CRU-2 Series Pumps with Hydraulic Output

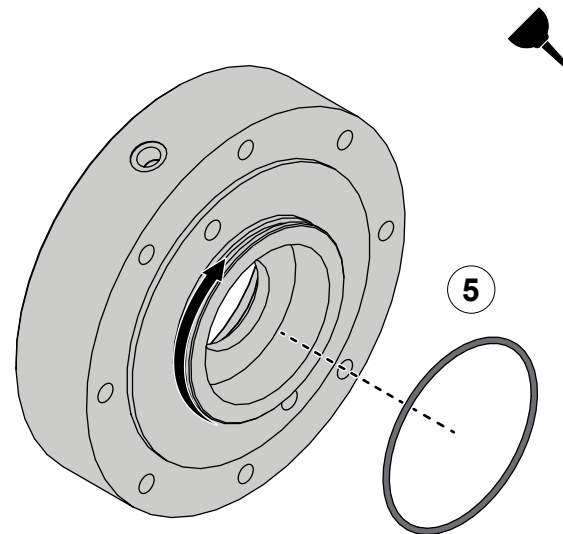
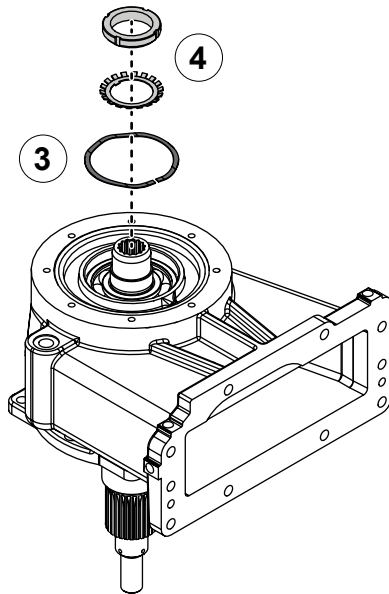
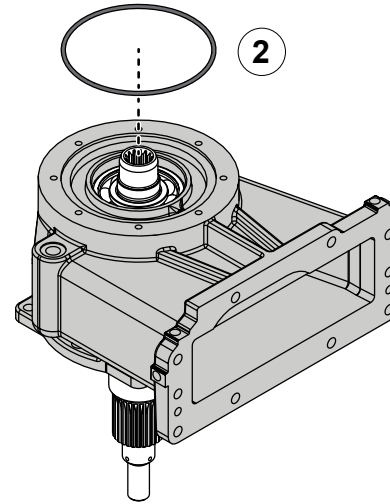
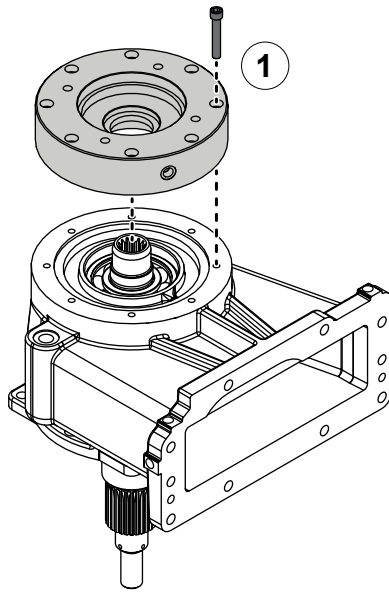


### Installing the Driven Shaft

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

- 5 Apply lubricant to the O-ring groove, then install the O-ring into the groove.

## CRU-2 Series Pumps with Hydraulic Output

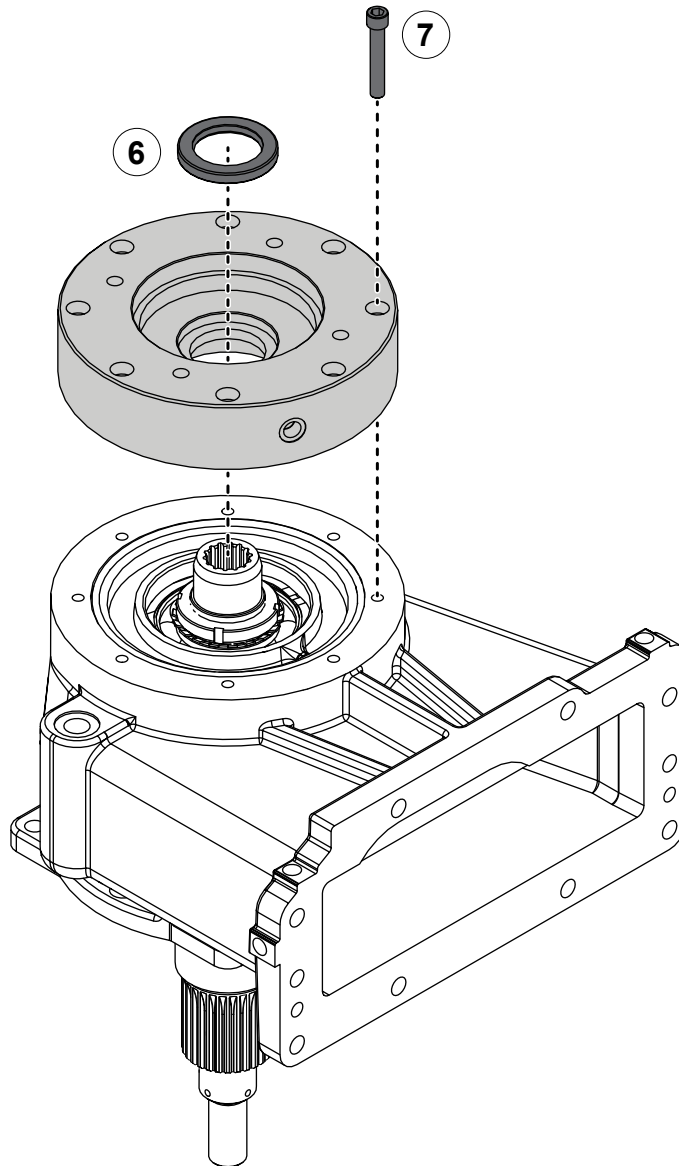


### Installing the Hydraulic Adapter

Use the illustrations and instructions to install the hydraulic adapter.

- 1 Remove the hydraulic adapter.
- 2 Apply lubricant to the O-ring groove, then install the O-ring into the groove.
- 3 Install the wave spring into the cap.
- 4 Install the bearing lock nut and washer. Refer to: **"Installing the Bearing Lock Washer and Nut" on page 64.**
- 5 Apply lubricant to the O-ring groove, then install the O-ring into the groove.

## CRU-2 Series Pumps with Hydraulic Output



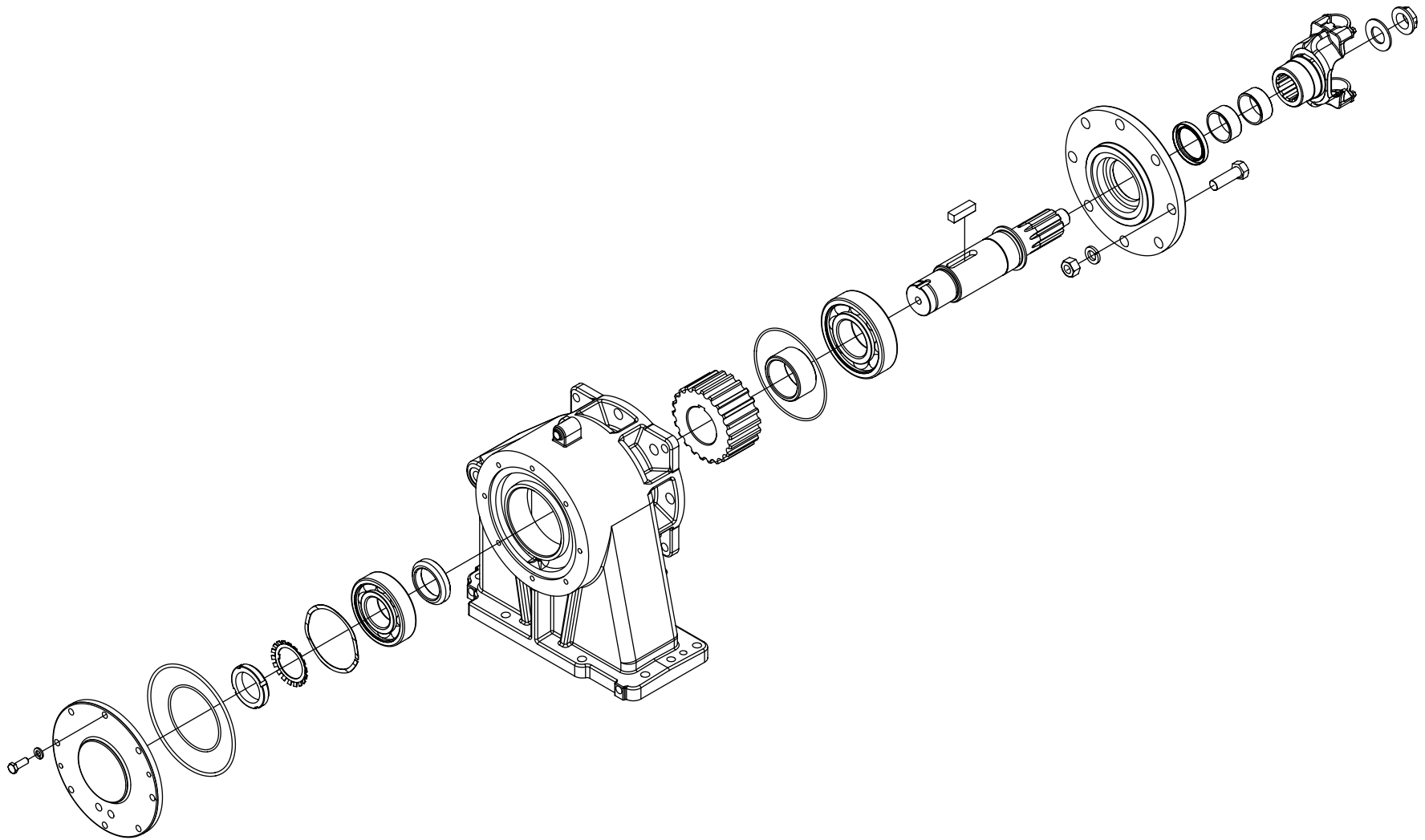
31 ft-lb  
42 N·m

### Installing the Hydraulic Adapter

Use the illustration and instructions to install the hydraulic adapter.

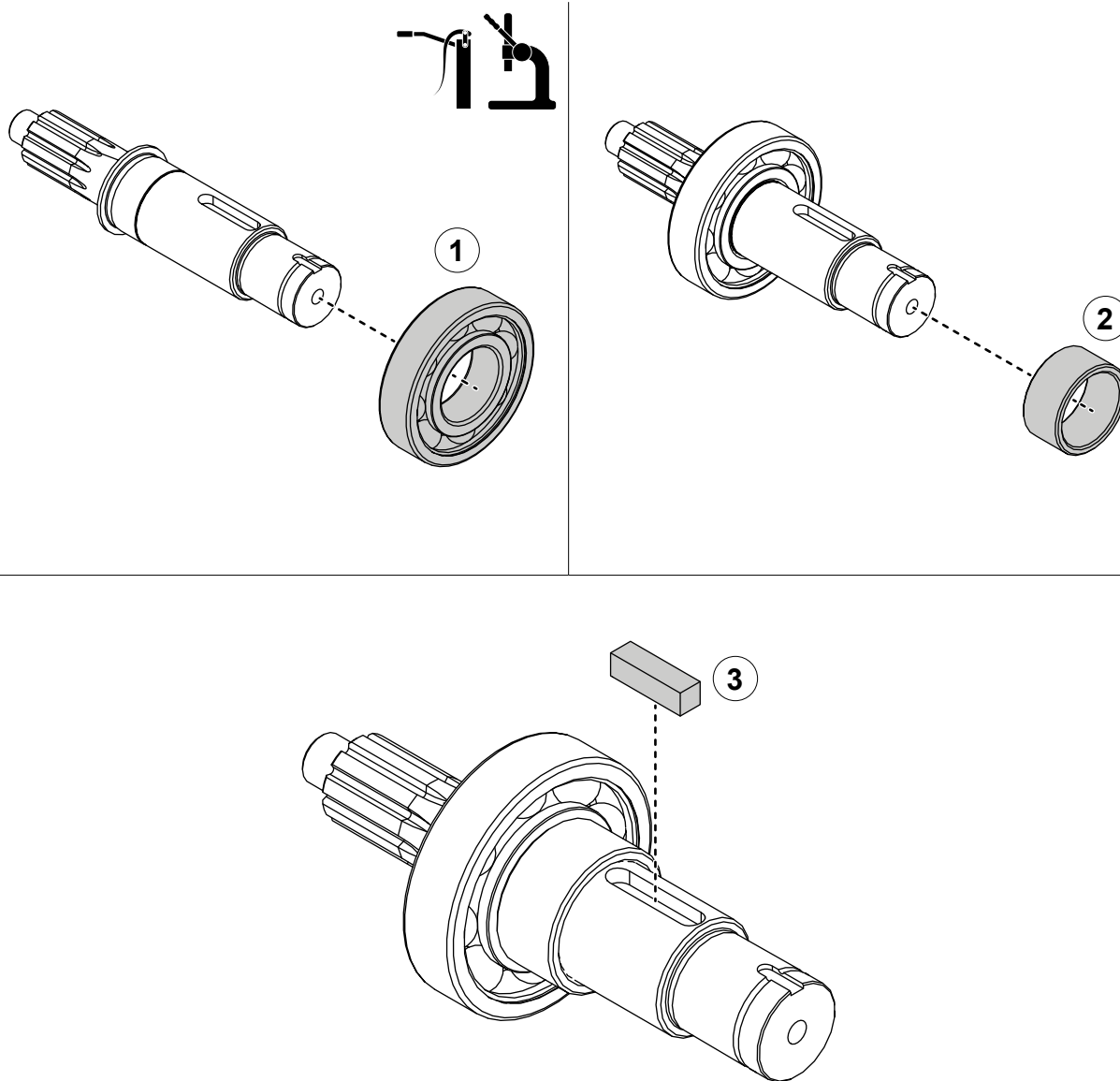
- 6 Apply sealant around the oil seal, then install it into the hydraulic adapter.
- 7 Use the mounting hardware to secure the hydraulic adapter to the cap.

## TC23 Series PTOs with Single Yoke Output





## TC23 Series PTOs with Single Yoke Output

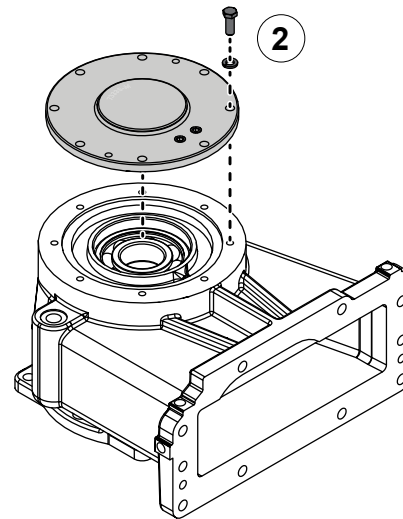
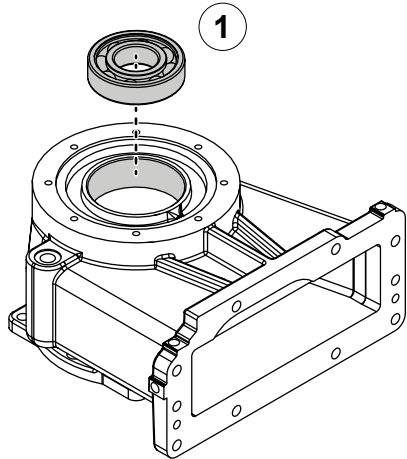
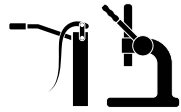


### Assembling the Driven Shaft

Use the illustrations and instructions to assemble the driven shaft.

- 1 Apply grease to the shaft, then press the bearing onto the shaft.
- 2 Install the spacer onto the shaft.
- 3 Install the key into the key slot.

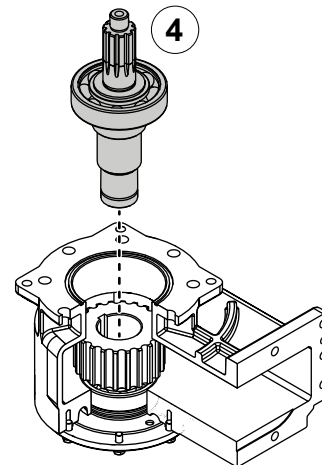
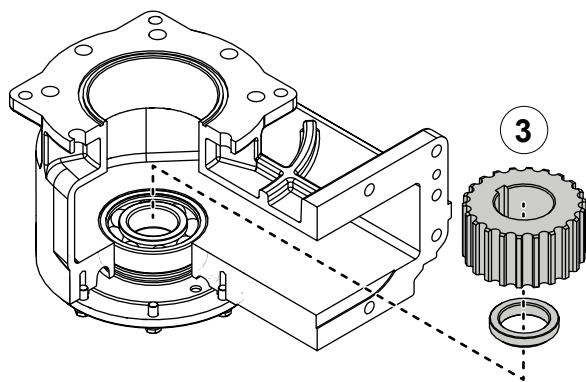
## TC23 Series PTOs with Single Yoke Output



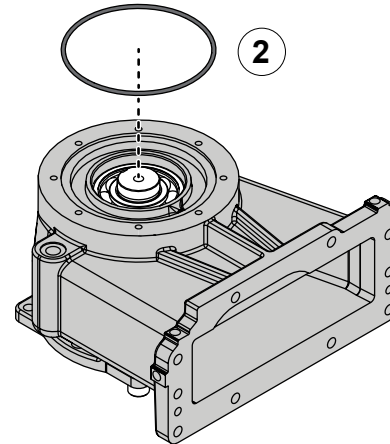
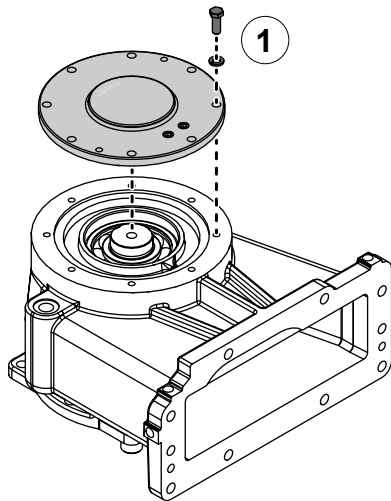
### Installing the Driven Shaft

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

- 1 Apply grease to the output bore of the cap, then press the bearing into the bore.
- 2 Temporarily install the bearing cover onto the cap.
- 3 Flip the cap so that the output side is facing down, then position the spacers and sprocket inside the cap.
- 4 Press the driven shaft assembly through the cap, spacers, and sprocket.



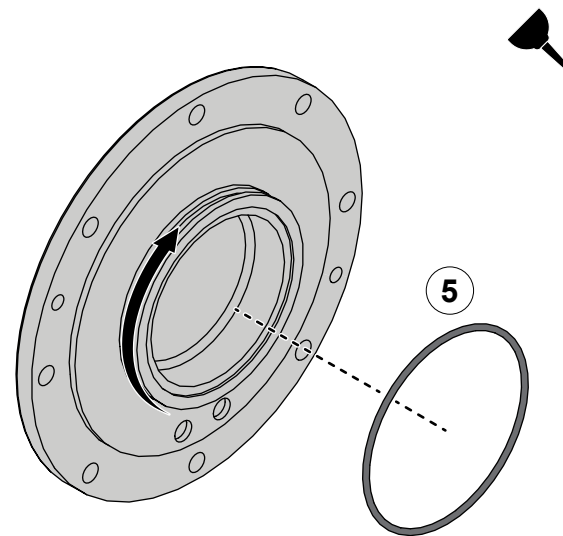
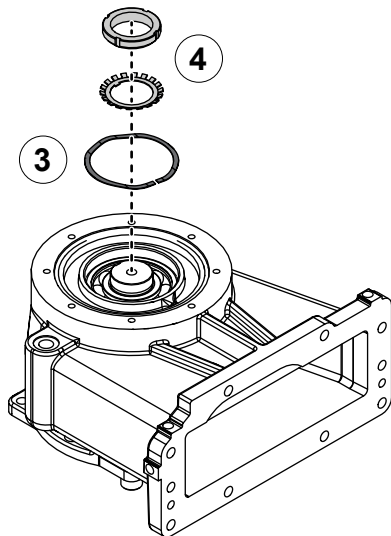
## TC23 Series PTOs with Single Yoke Output



### Installing the Bearing Cover

Use the illustrations and instructions to install the bearing cover.

- 1 Remove the bearing cover.
- 2 Apply lubricant to the O-ring groove, then install the O-ring into the groove.
- 3 Install the wave spring into the cap.
- 4 Install the bearing lock nut and washer. Refer to: **"Installing the Bearing Lock Washer and Nut" on page 64.**
- 5 Apply lubricant to the O-ring groove, then install the O-ring into the groove.



## TC23 Series PTOs with Single Yoke Output

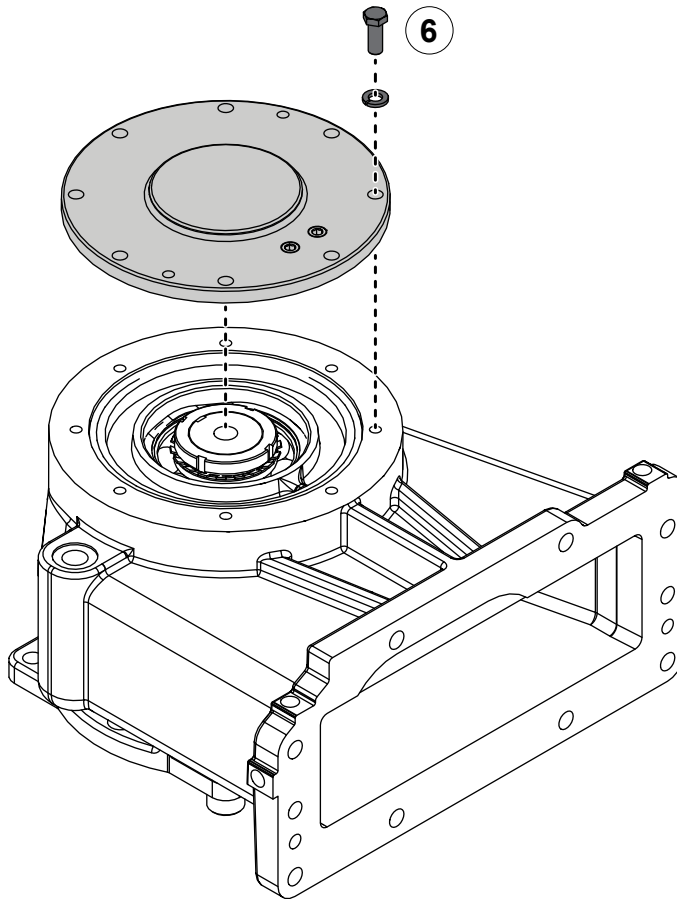


31 ft-lb  
42 N·m

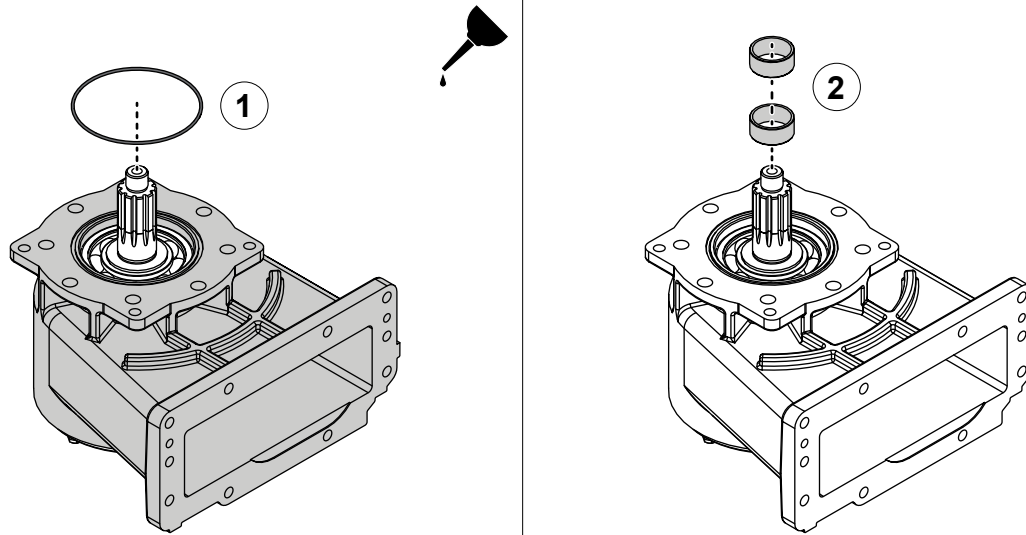
### Installing the Bearing Cover

Use the illustration and instructions to install the bearing cover.

- 6 Use the mounting hardware to secure the bearing cover to the cap.



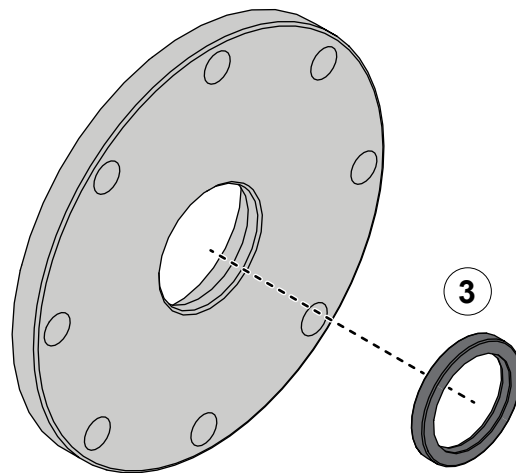
## TC23 Series PTOs with Single Yoke Output



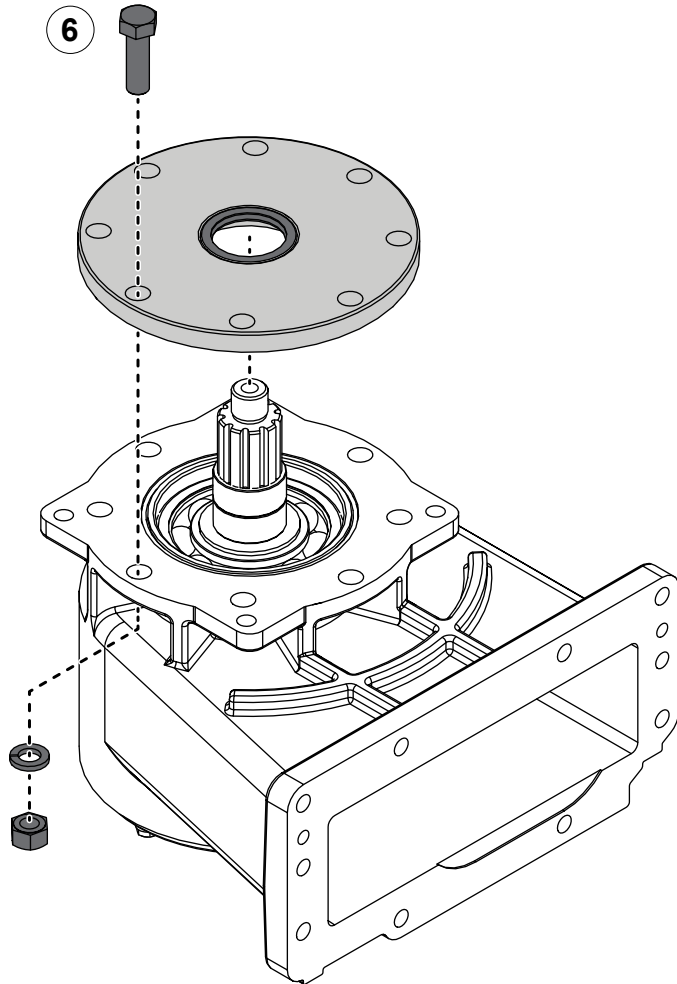
### Installing the Oil Seal Housing

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

- 1 Apply lubricant to the O-ring groove, then install the O-ring into the groove.
- 2 Install sleeves over the shaft.
- 3 Apply sealant around the oil seal, then install it into the oil seal housing.



## TC23 Series PTOs with Single Yoke Output



31 ft-lb  
42 N·m

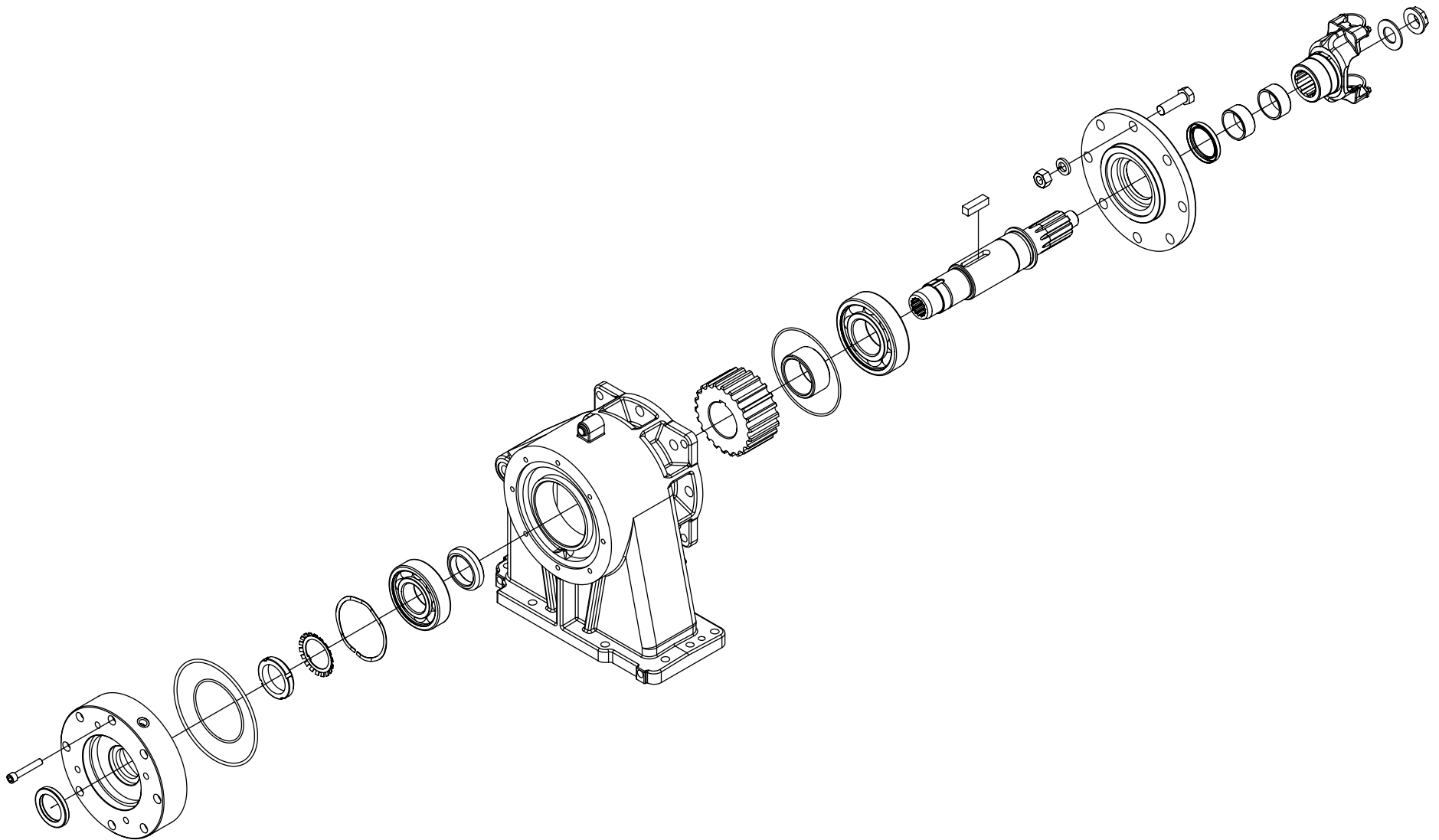
### Installing the Oil Seal Housing

Use the illustration and instructions to install the oil seal housing.

- 6 Use the mounting hardware to secure the oil seal housing to the cap.



## TC23 Series PTOs with Dual Yoke and Hydraulic Output



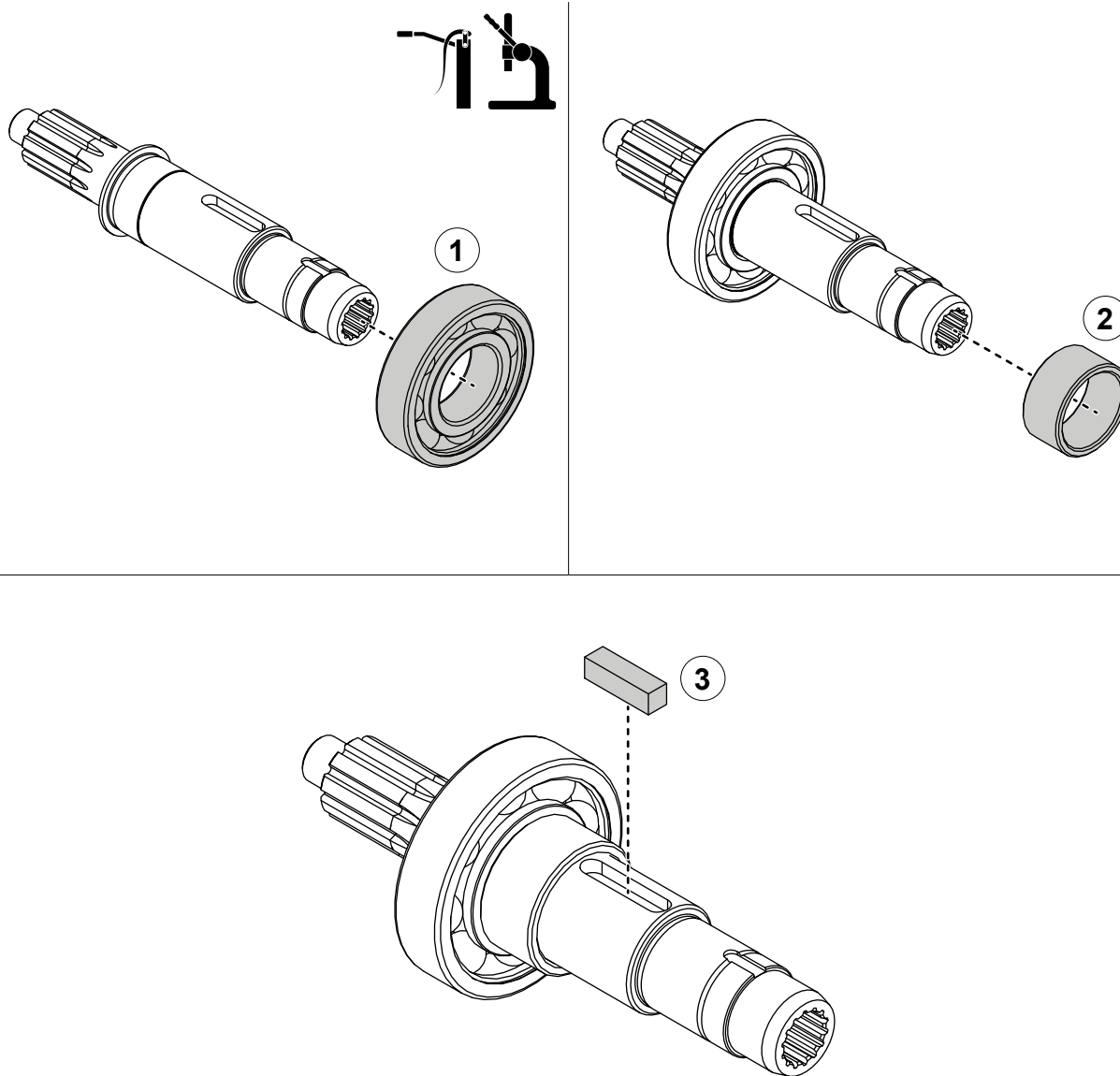


## TC23 Series PTOs with Dual Yoke and Hydraulic Output

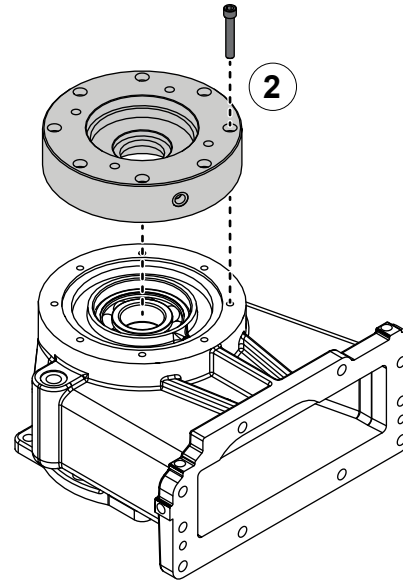
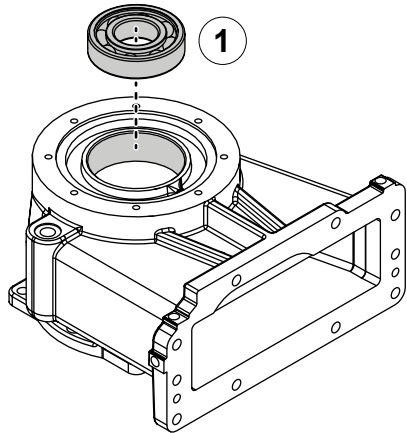
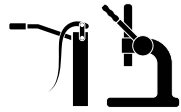
### Assembling the Driven Shaft

Use the illustrations and instructions to assemble the driven shaft.

- 1 Apply grease to the shaft, then press the bearing onto the shaft.
- 2 Install the spacer onto the shaft.
- 3 Install the key into the key slot.



## TC23 Series PTOs with Dual Yoke and Hydraulic Output



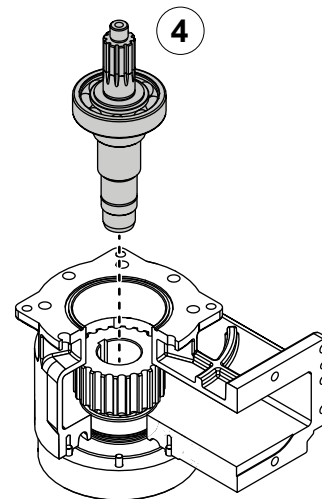
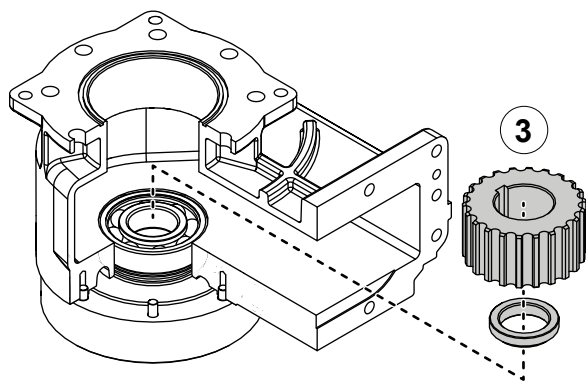
### Installing the Driven Shaft

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

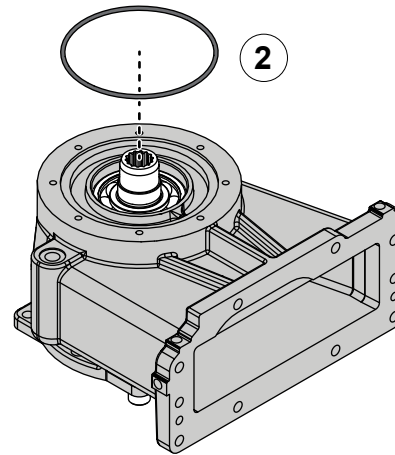
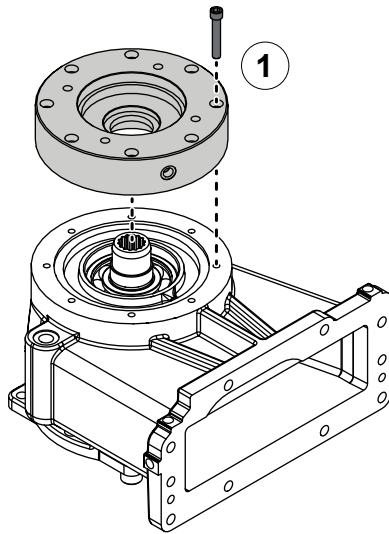
- 1 Apply grease to the output bore of the cap, then press the bearing into the bore.
- 2 Temporarily install the hydraulic adapter onto the cap.

**Note:** Use the information that you recorded during the disassembly to determine component orientation.

- 3 Flip the cap so that the output side is facing down, then position the sprocket and spacer inside the cap.
- 4 Press the driven shaft assembly through the cap, sprocket, and spacer.



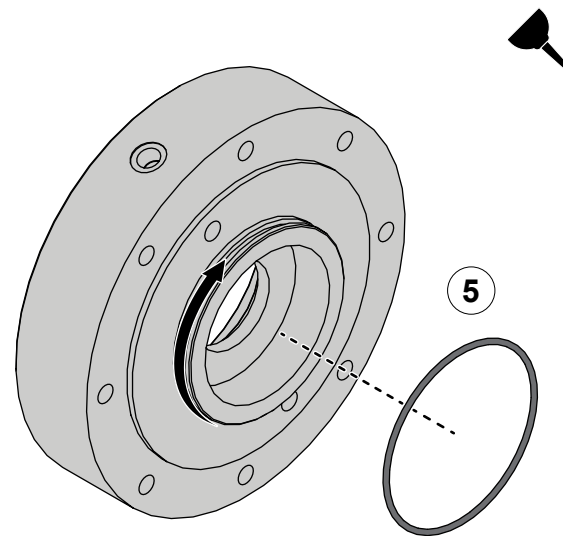
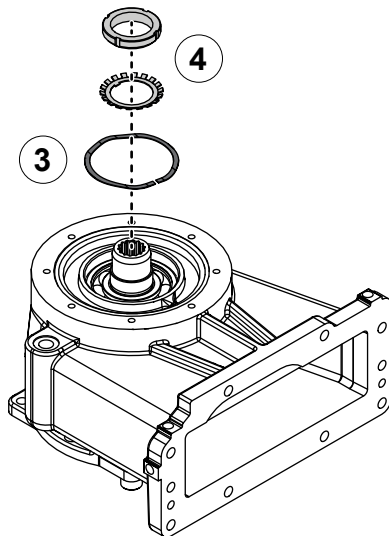
## TC23 Series PTOs with Dual Yoke and Hydraulic Output



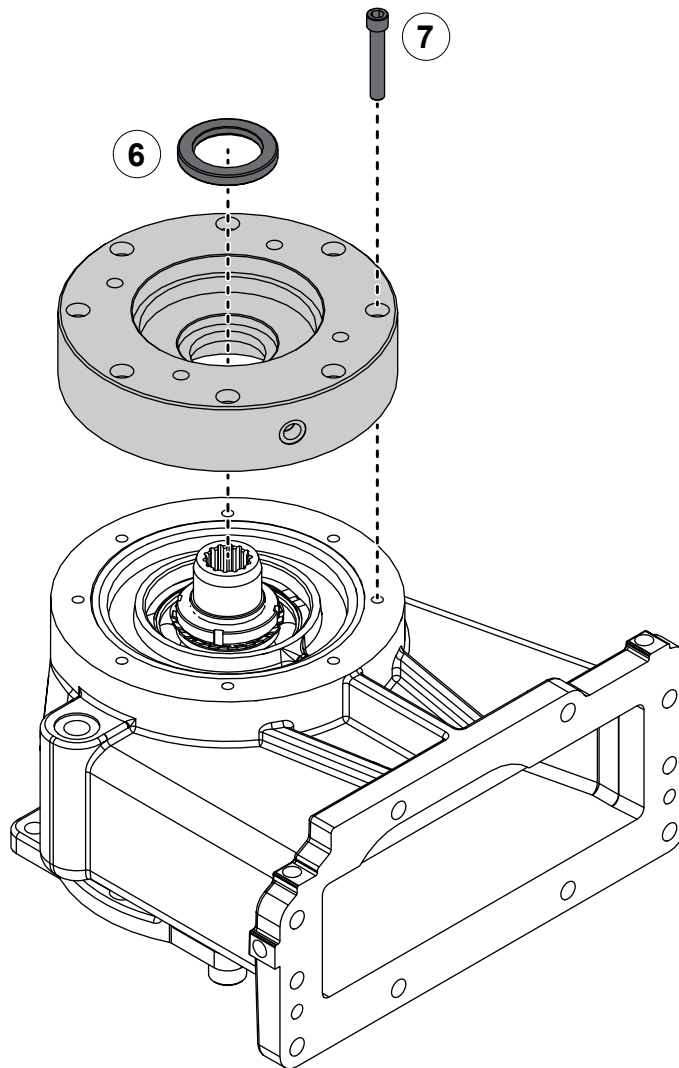
### Installing the Hydraulic Adapter

Use the illustrations and instructions to install the hydraulic adapter.

- 1 Remove the hydraulic adapter.
- 2 Apply lubricant to the O-ring groove, then install the O-ring into the groove.
- 3 Install the wave spring into the cap.
- 4 Install the bearing lock nut and washer. Refer to: **"Installing the Bearing Lock Washer and Nut" on page 64.**
- 5 Apply lubricant to the O-ring groove, then install the O-ring into the groove.



## TC23 Series PTOs with Dual Yoke and Hydraulic Output



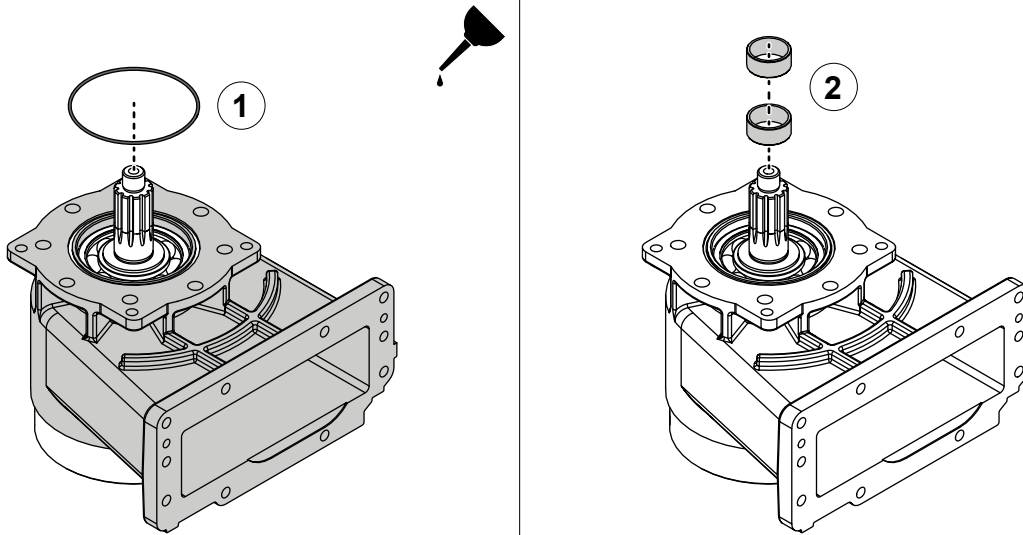
31 ft-lb  
42 N·m

### Installing the Hydraulic Adapter

Use the illustration and instructions to install the hydraulic adapter.

- 6 Apply sealant around the oil seal, then install it into the hydraulic adapter.
- 7 Use the mounting hardware to secure the hydraulic adapter to the cap.

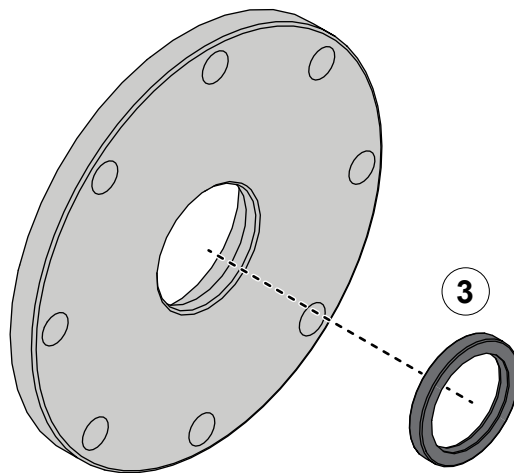
## TC23 Series PTOs with Dual Yoke and Hydraulic Output



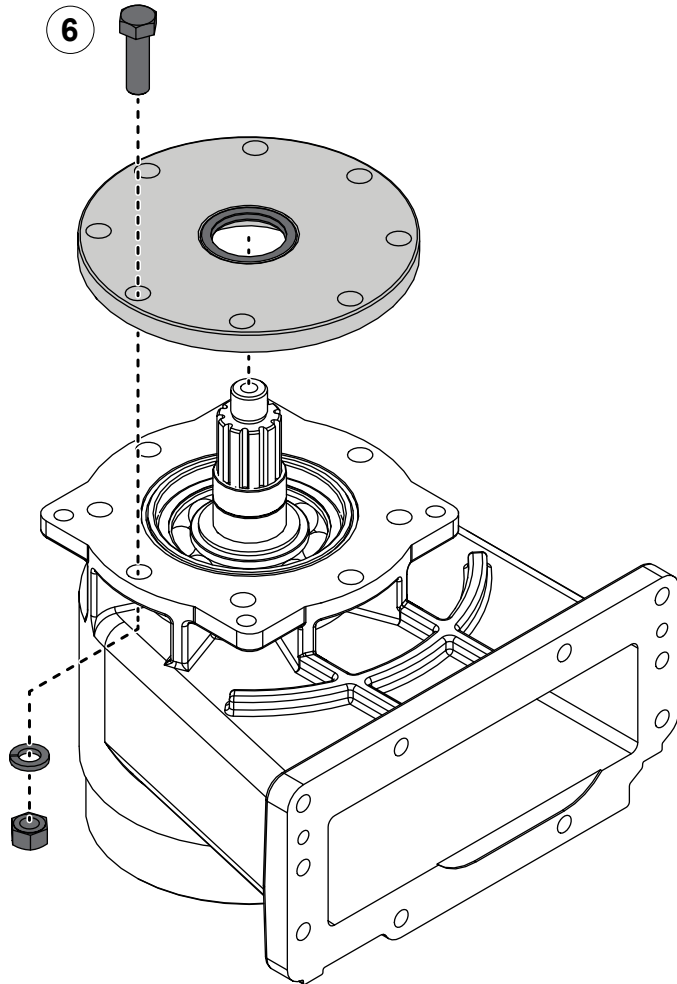
### Installing the Oil Seal Housing

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

- 1 Apply lubricant to the O-ring groove, then install the O-ring into the groove.
- 2 Install sleeves over the shaft.
- 3 Apply sealant around the oil seal, then install it into the oil seal housing.



## TC23 Series PTOs with Dual Yoke and Hydraulic Output



31 ft-lb  
42 N·m

### Installing the Oil Seal Housing

Use the illustration and instructions to install the oil seal housing.

- 6 Use the mounting hardware to secure the oil seal housing to the cap.

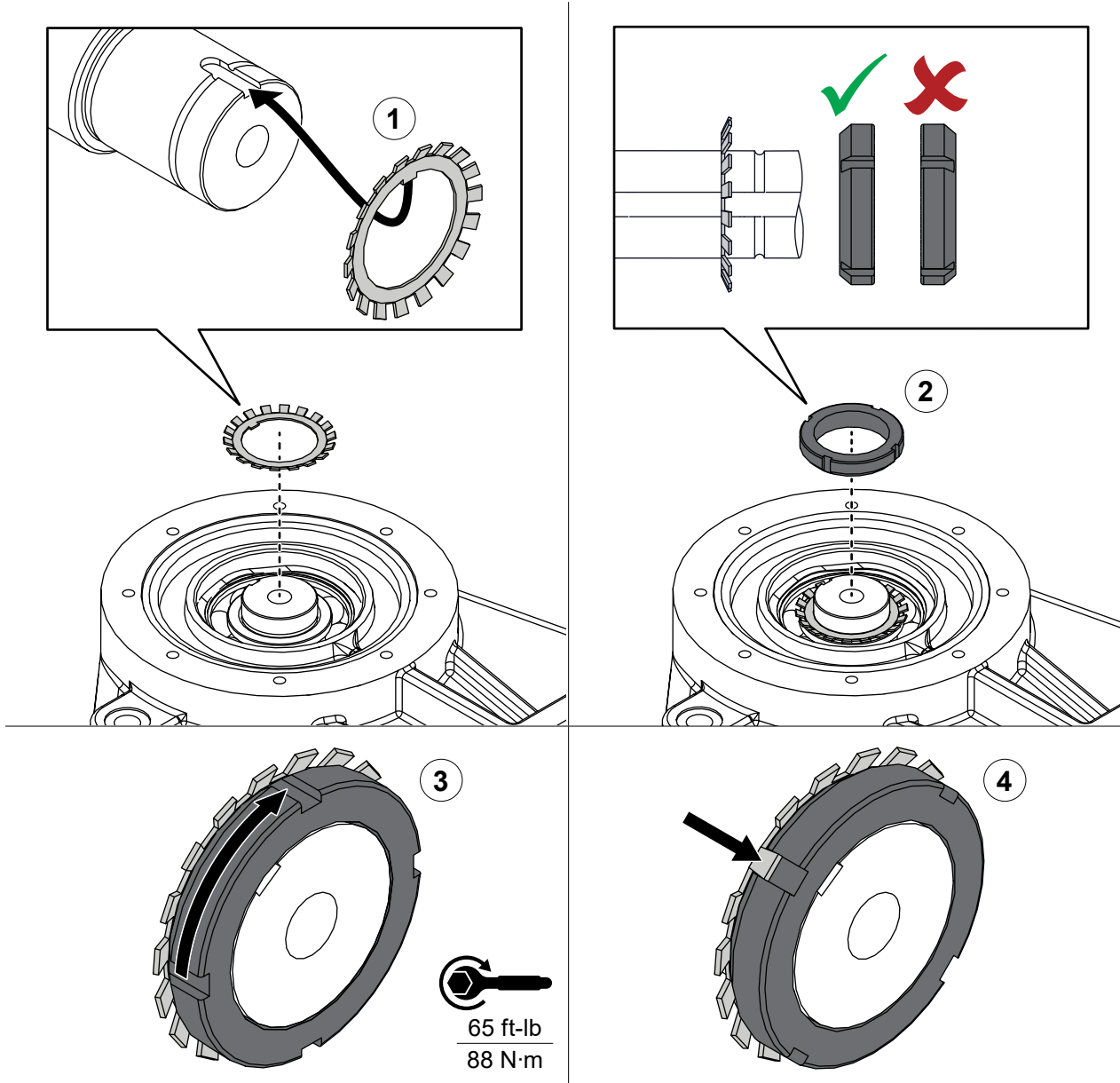


## Installing the Bearing Lock Washer and Nut

Use the illustrations and instructions to install the bearing lock washer and nut.

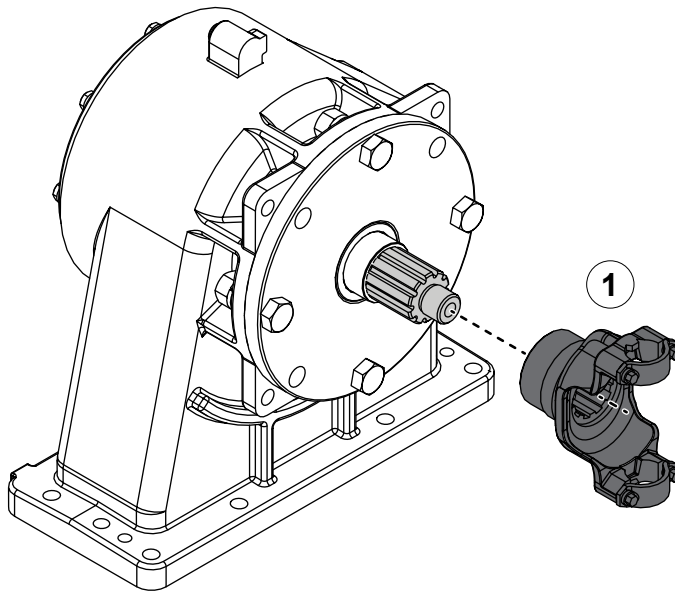
- 1 Align the inner tab on the bearing lock washer with the slot in the shaft, then install the washer onto the end of the shaft.
- 2 Install the nut onto the shaft.
- 3 Install the bearing lock nut and torque it to 65 ft-lb (88 N·m).
- 4 Bend one outer tab that aligns with a slot on the bearing lock nut.

**Note:** Do not loosen the nut to align it with a tab. Tighten the nut purposefully to achieve alignment.



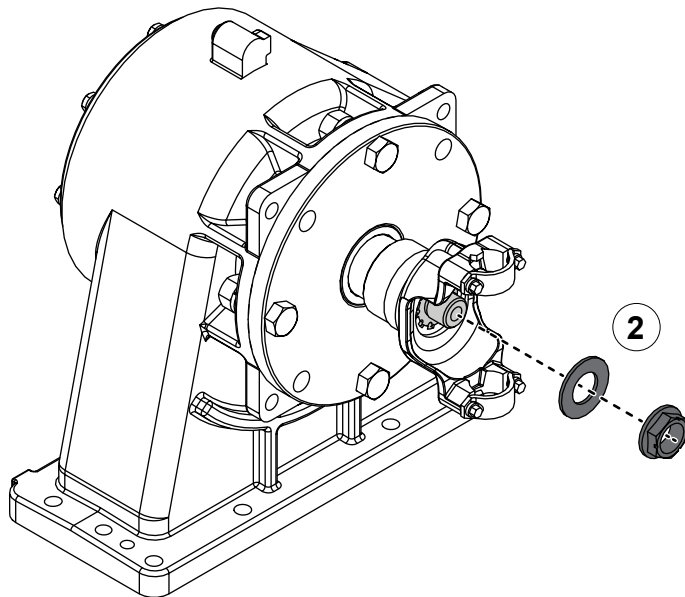


## Installing the Driven Shaft End Yoke



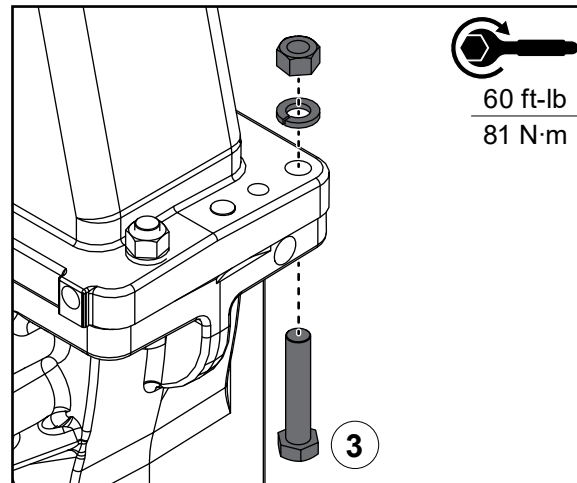
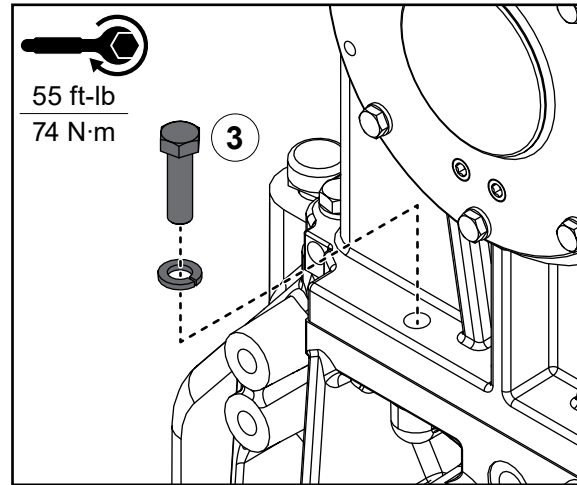
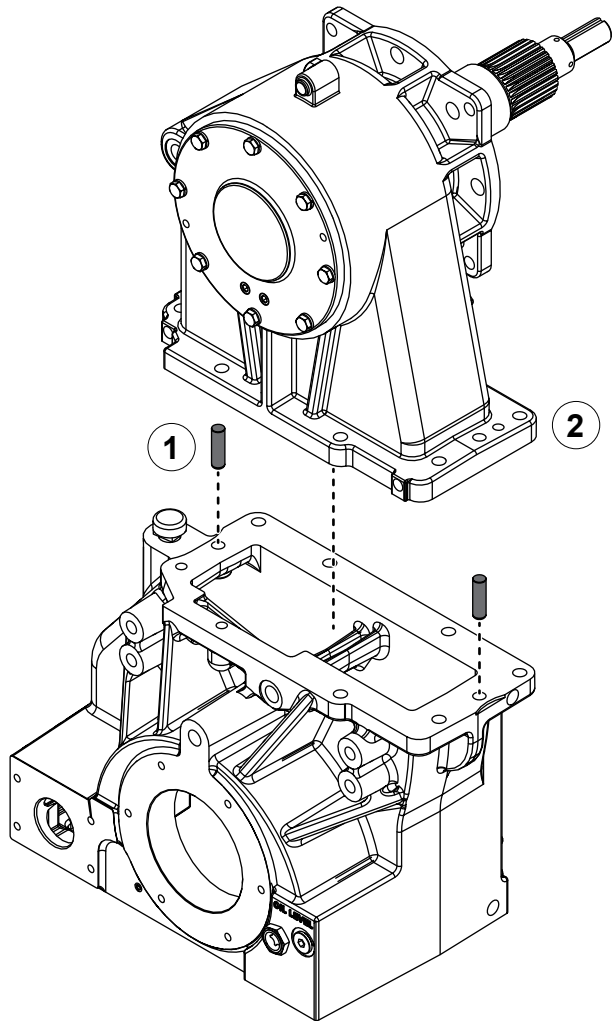
Use the illustrations and instructions to install the driven shaft end yoke.

- 1 Apply grease to the driven shaft, then install the end yoke onto the shaft.
- 2 Apply anti-seize to the lock nut threads, then install the washer and lock nut onto the shaft.



425 ft-lb  
576 N·m

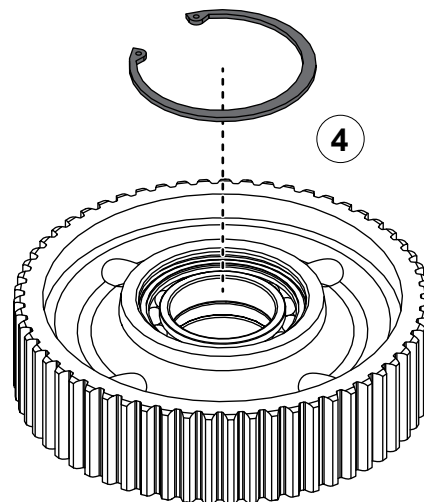
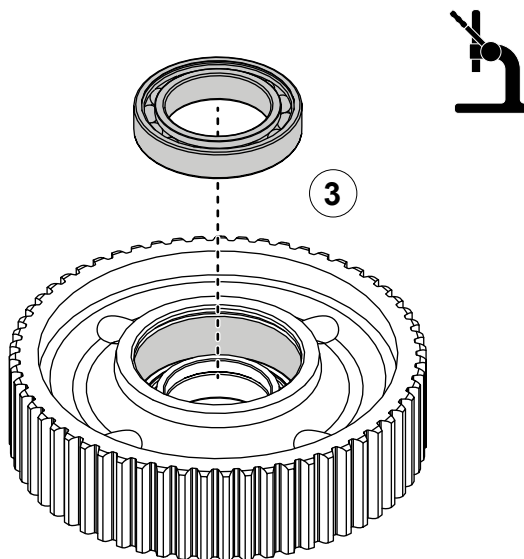
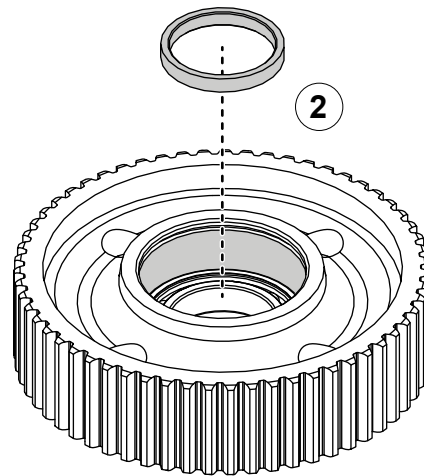
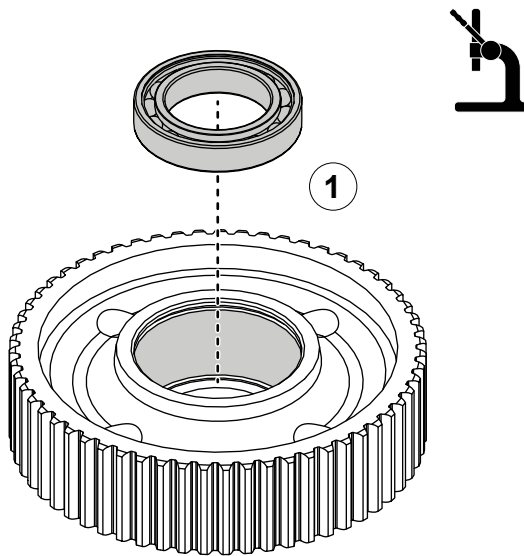
## Installing the Cap



Use the illustrations and instructions to install the cap onto the transmission case.

- 1 If needed, install the dowel pins.
- 2 Apply sealant to the flanges, then install the cap.
- 3 Use the mounting hardware to secure the cap to the case.
  - Torque hardware that screws directly into the cap or case to 55 ft-lb (74 N·m).
  - Torque hardware that requires a nut to 60 ft-lb (81 N·m).

## Installing the Drive Components

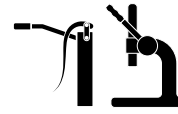


### Assembling the Drive Sprocket

Use the illustrations and instructions to assemble the drive sprocket assembly.

- 1 Grease the inside of the sprocket, then press the inner bearing into the sprocket.
- 2 Install the spacer into the sprocket.
- 3 Press the outer bearing into the sprocket.
- 4 Install the retaining ring into the sprocket.

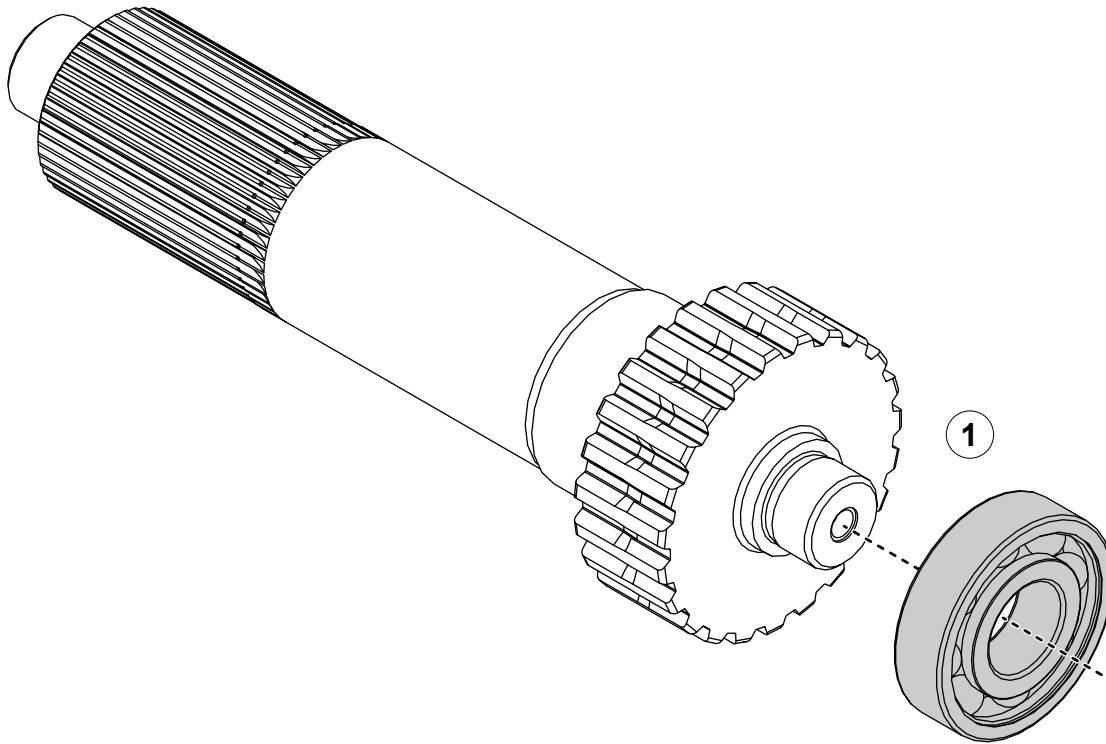
## Installing the Drive Components



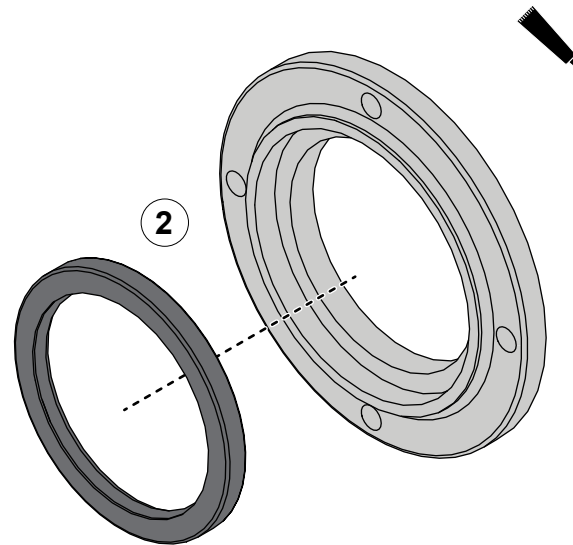
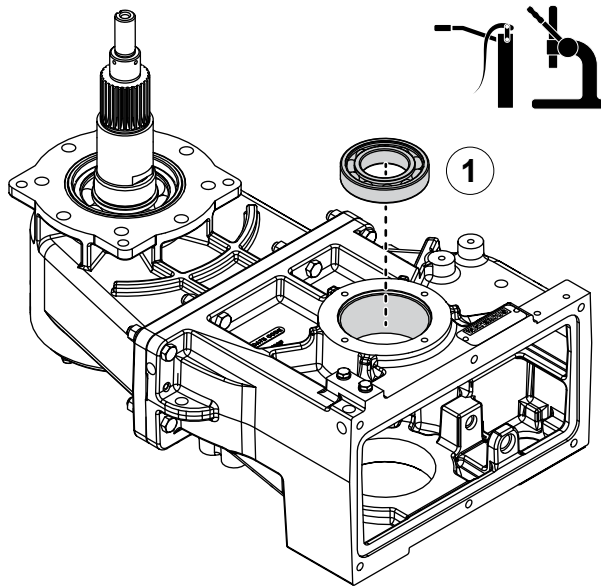
### Assembling the Drive Shaft

Use the illustration and instructions to assemble the drive shaft assembly.

- 1 Apply grease to the shaft, then press the pilot bearing onto the shaft.



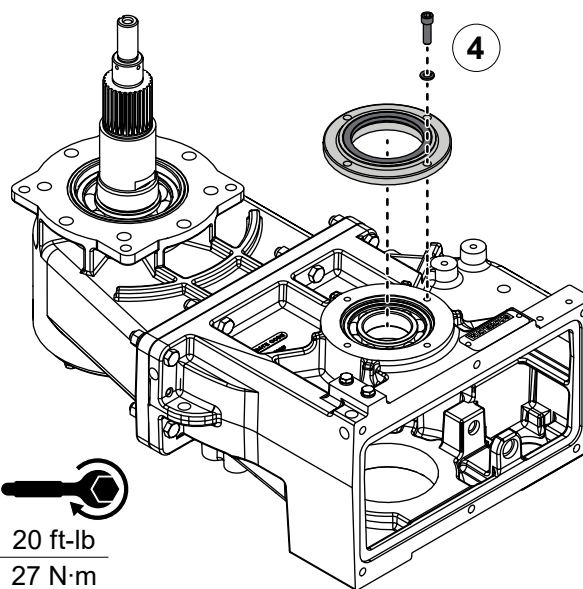
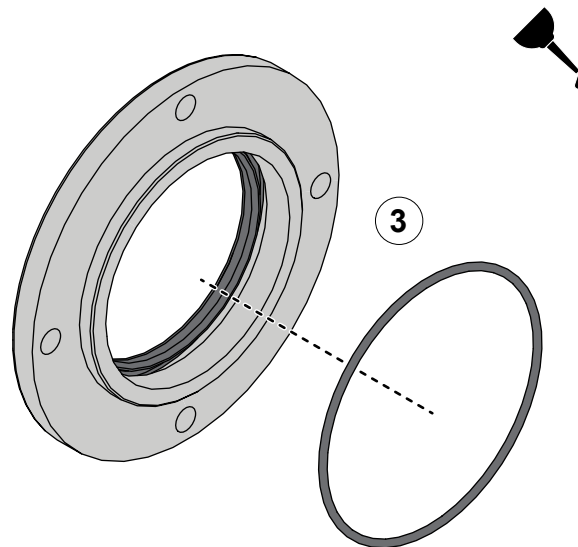
## Installing the Drive Components



### Installing the Drive Shaft Housing

Use the illustrations and instructions to install the drive shaft housing onto the transmission case.

- 1 Apply grease to the input bore of the case, then press the bearing into the bore.
- 2 Apply sealant around the oil seal, then install it into the housing.
- 3 Apply lubricant around the housing bore, then install the O-ring around the bore.
- 4 Use the mounting hardware to secure the housing to the case.

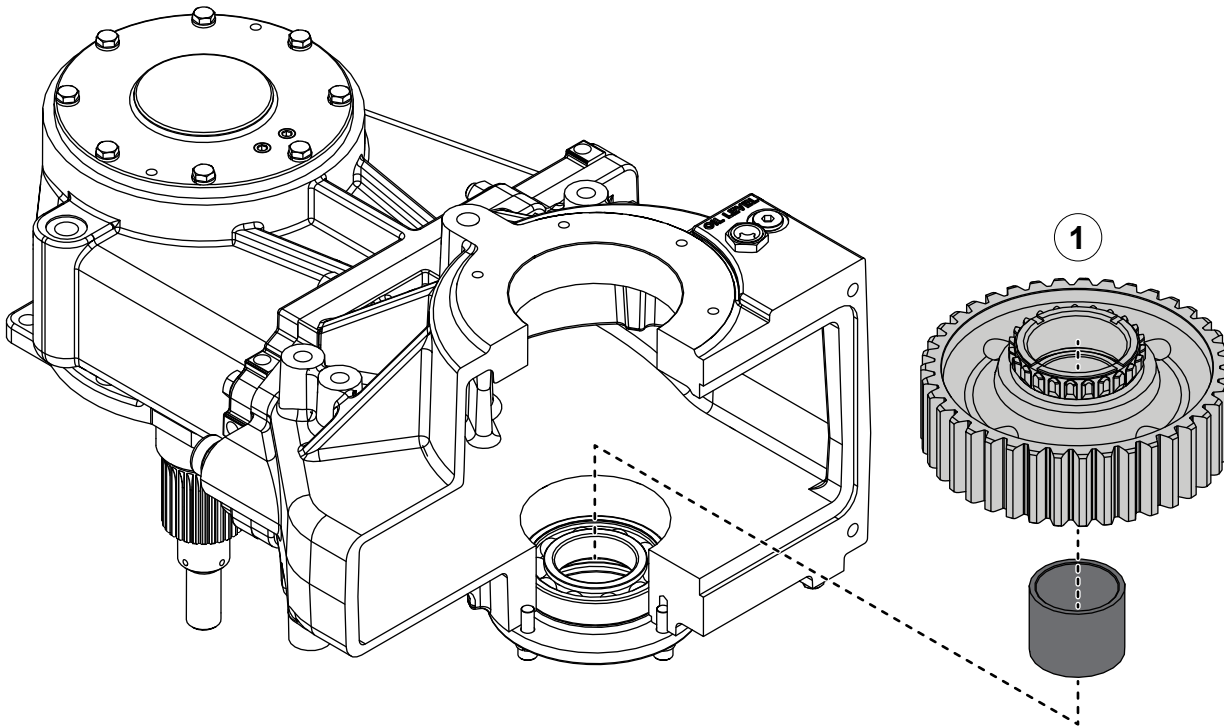


## Installing the Drive Components

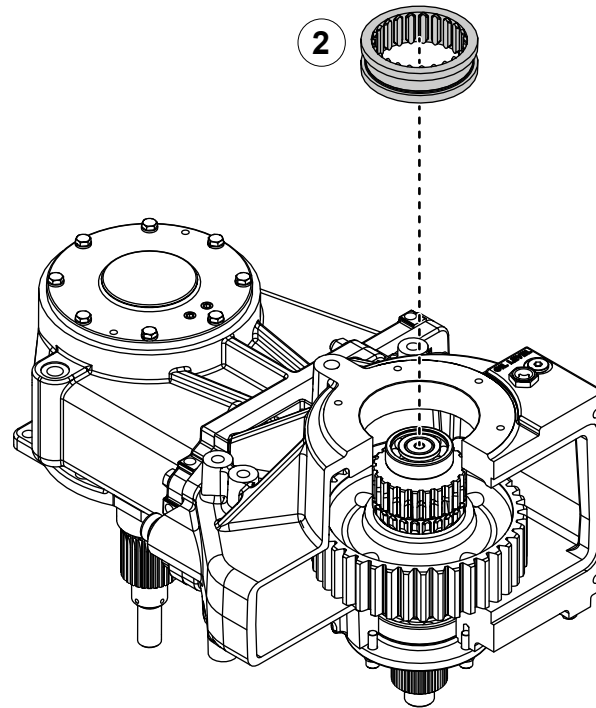
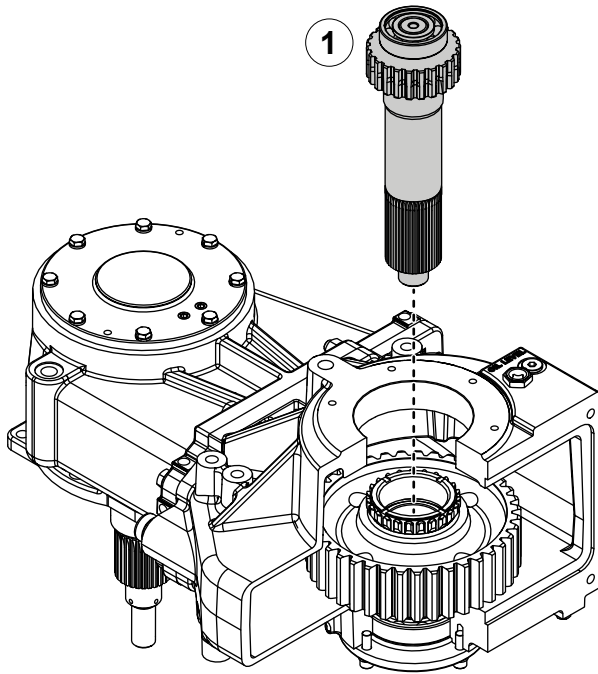
### Installing the Drive Sprocket

Use the illustration and instructions to install the drive sprocket into the transmission case.

- 1 Flip the case so that the input side is facing down, then position the sprocket and spacer inside the case.



## Installing the Drive Components—Input and Output Shaft Configurations

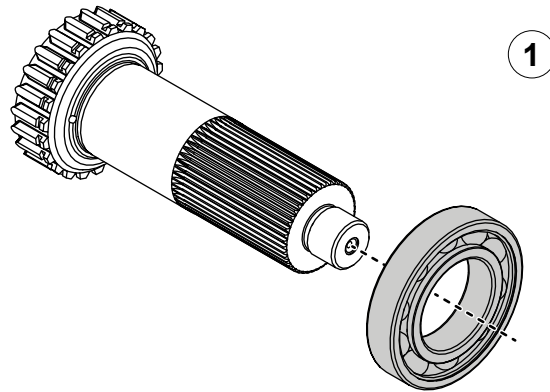


### Installing the Drive Shaft

Use the illustrations and instructions to install the drive components into the transmission case.

- 1 Press the drive shaft assembly through the case, sprocket, and spacer.
- 2 Install the shift collar onto the shaft so that it couples with the sprocket spline.

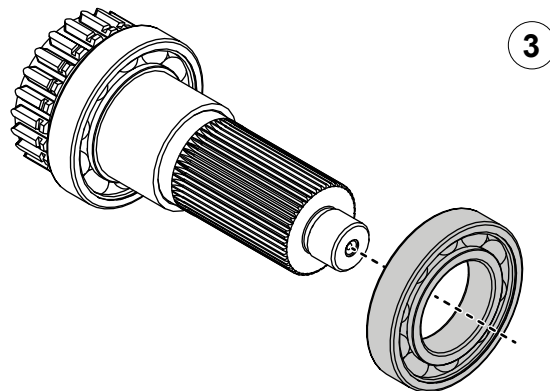
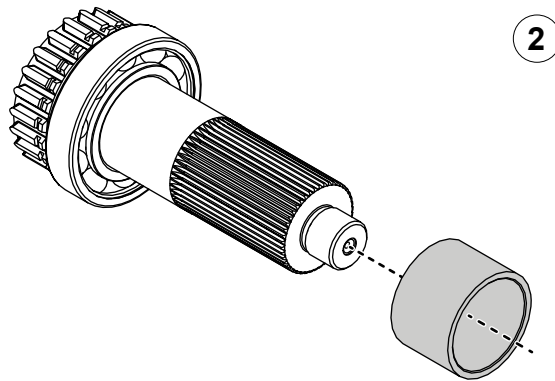
## Installing the Drive Components—Input and Output Shaft Configurations



### Assembling the Output Shaft

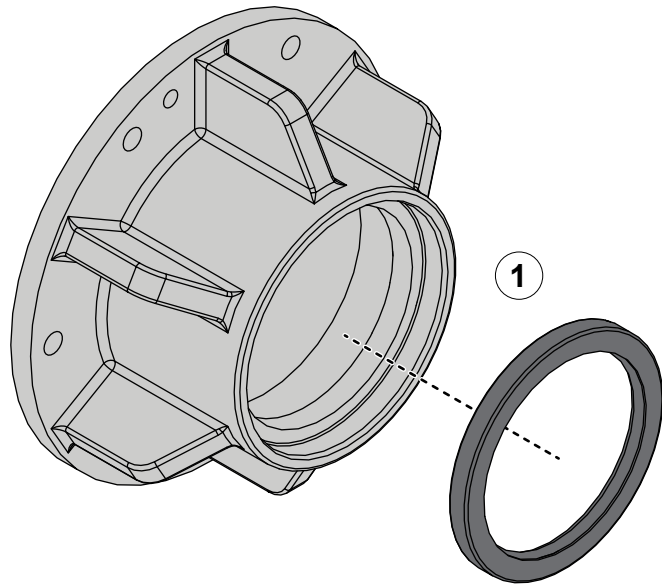
Use the illustrations and instructions to assemble the output shaft assembly.

- 1 Apply grease to the output shaft, then press the bearing onto the shaft.
- 2 Install the spacer onto the shaft.
- 3 Press the bearing onto the shaft.





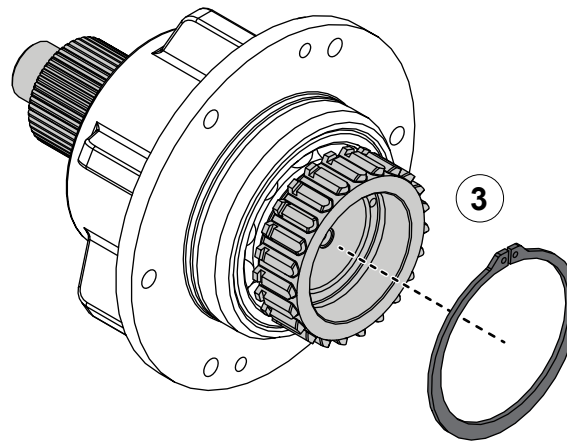
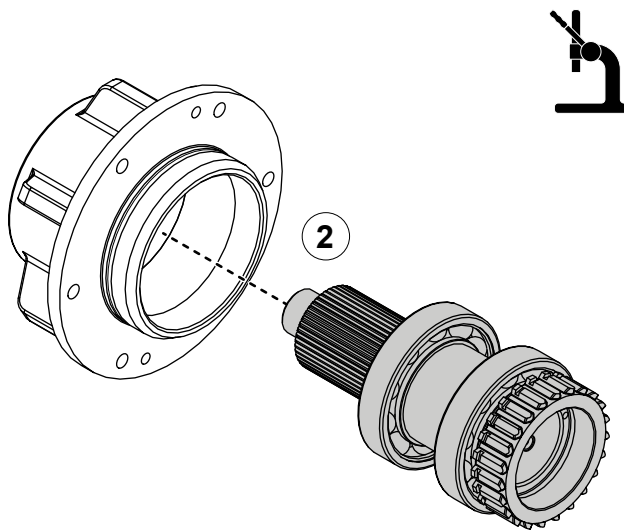
## Installing the Drive Components—Input and Output Shaft Configurations



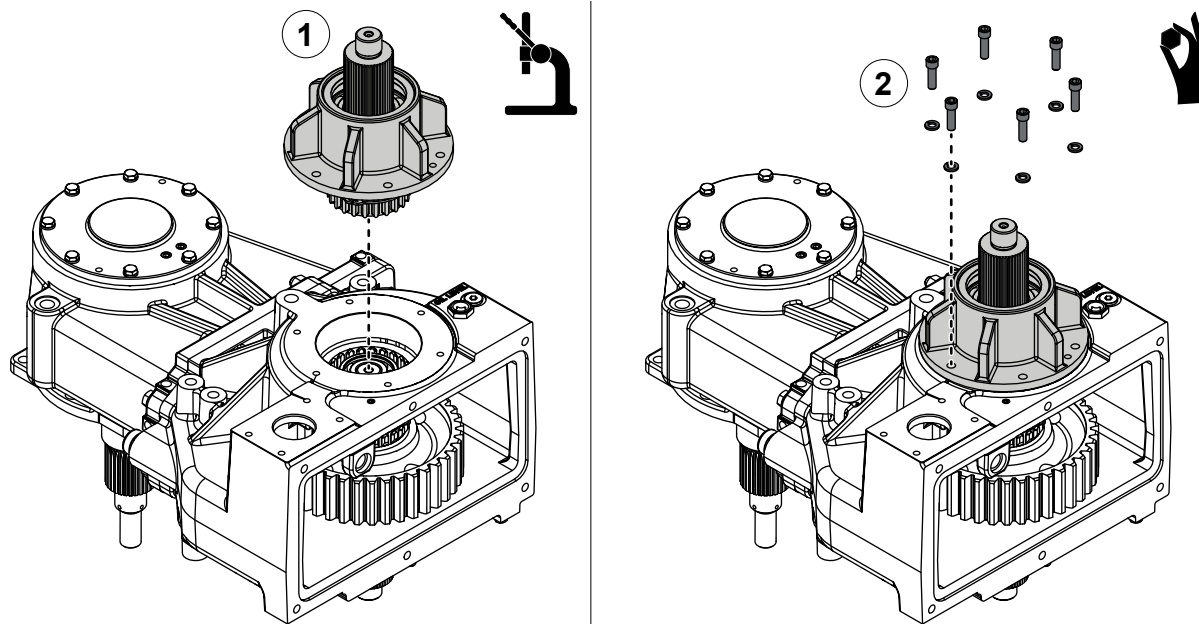
### Assembling the Output Shaft Housing

Use the illustrations and instructions to assemble the output shaft housing.

- 1 Apply sealant around the oil seal, then install it into the output shaft housing.
- 2 Press the output shaft assembly into the housing.
- 3 Install the retaining ring onto the shaft.



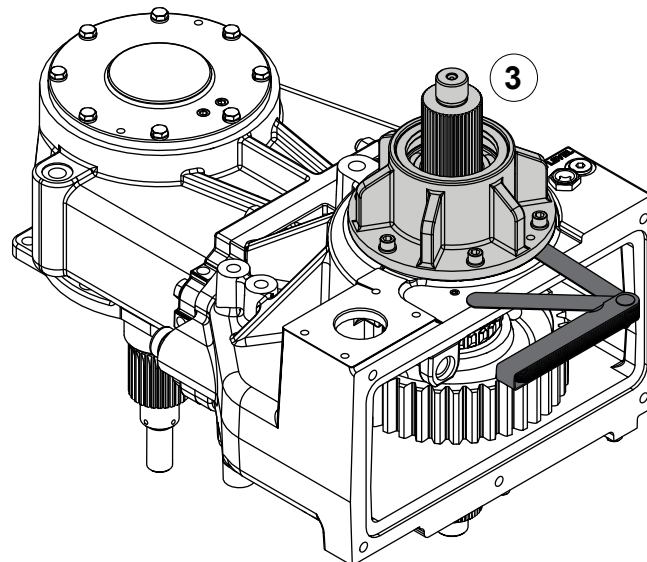
## Installing the Drive Components—Input and Output Shaft Configurations



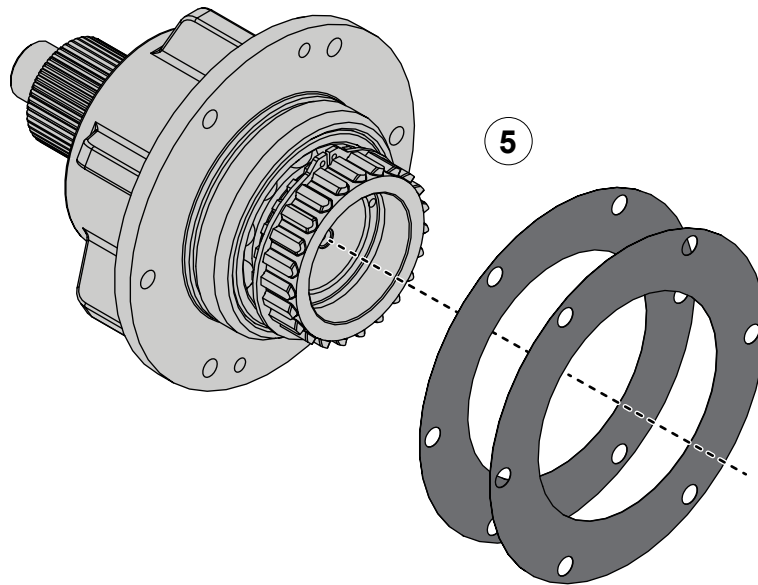
### Installing the Shims

Use the illustrations and instructions to install the shims between the output shaft housing and the transmission case.

- 1 Press the output shaft assembly onto the pilot bearing.
- 2 Use the mounting hardware to secure the housing to the case.
- 3 To determine the required shim thickness, do the following:
  - Measure the gap between the housing and the case.
  - Measure the gap at multiple points to make sure that the results are consistent.
  - Add 0.005 inch (0.127 mm) to the final measurement to achieve the recommended axial float (0.005 to 0.01 inch).
- 4 Remove the output shaft assembly. Refer to: **"Removing the Output Shaft" on page 23.**



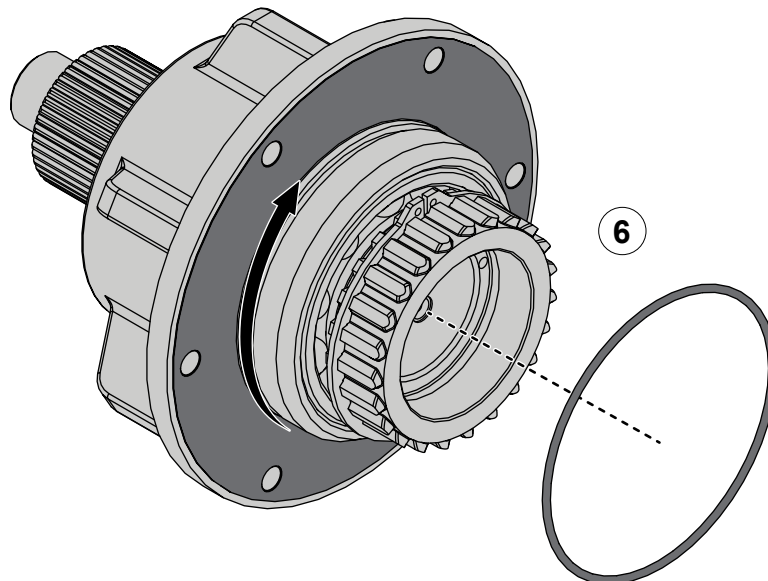
## Installing the Drive Components—Input and Output Shaft Configurations



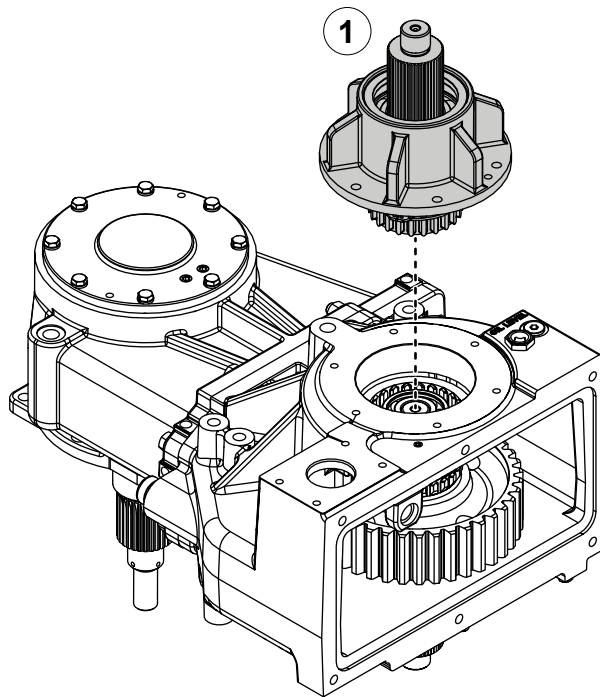
### Installing the Shims

Use the illustrations and instructions to install the shims between the output shaft housing and the transmission case.

- 5 Install the shims onto the output shaft housing flange.
- 6 Apply lubricant to the O-ring groove, then install the O-ring into the groove.



## Installing the Drive Components—Input and Output Shaft Configurations

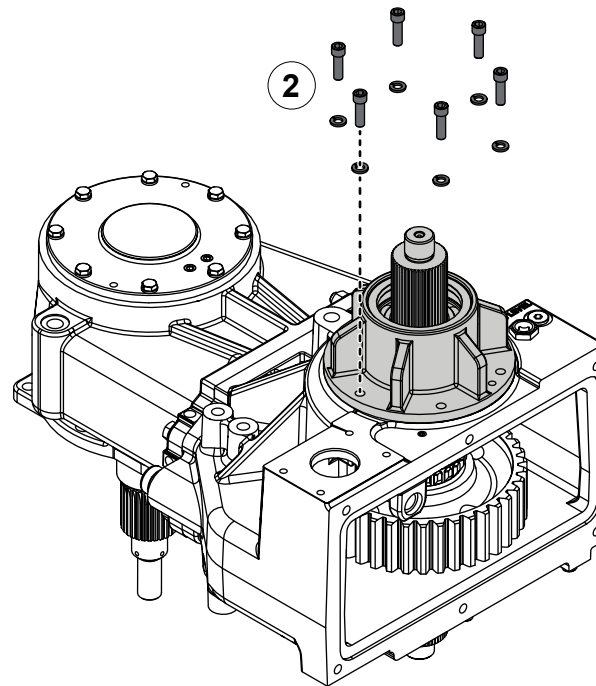


20 ft-lb  
27 N·m

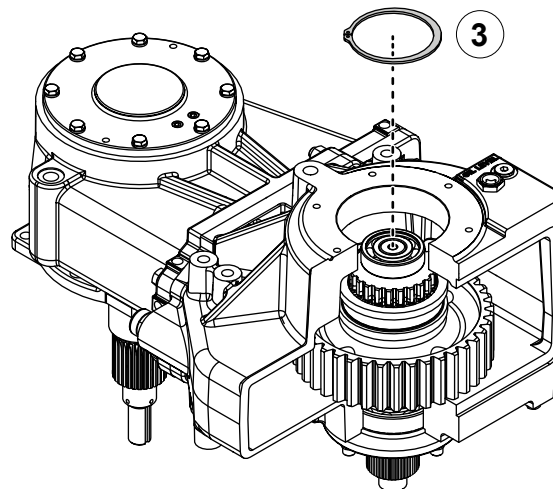
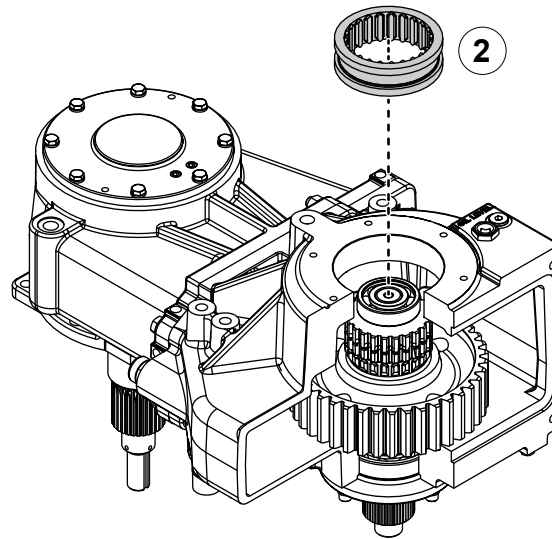
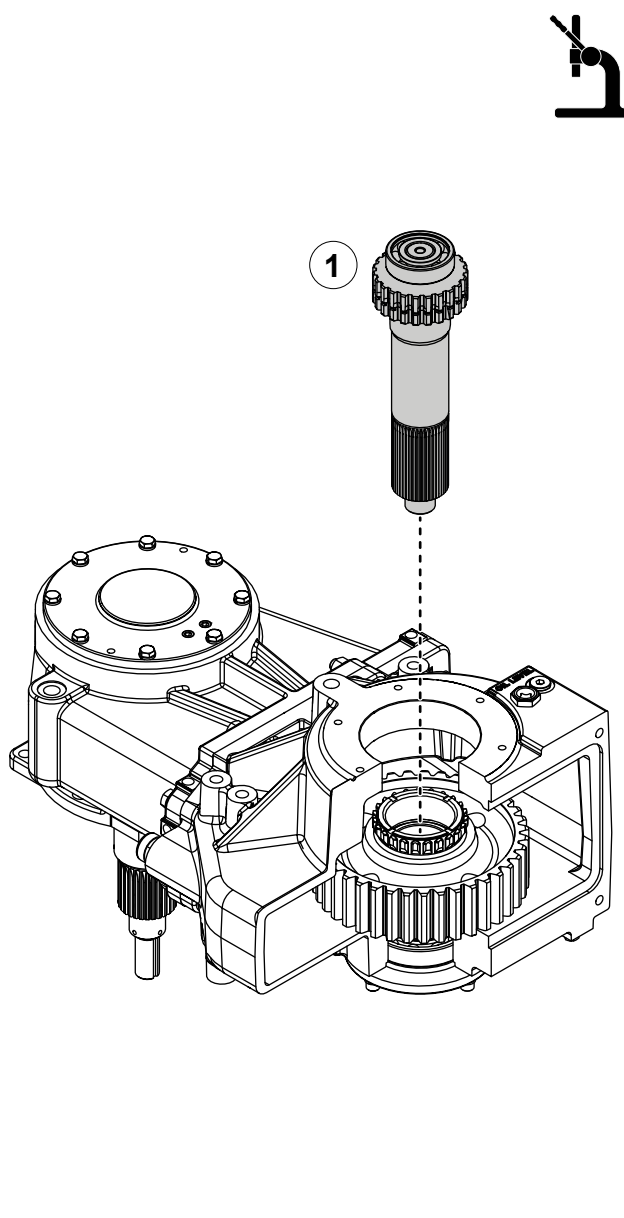
### Installing the Output Shaft Assembly

Use the illustrations and instructions to install the output shaft assembly.

- 1 Press the output shaft assembly onto the pilot bearing.
- 2 Use the mounting hardware to secure the housing to the case.



## Installing the Drive Components—Input Shaft Only Configurations

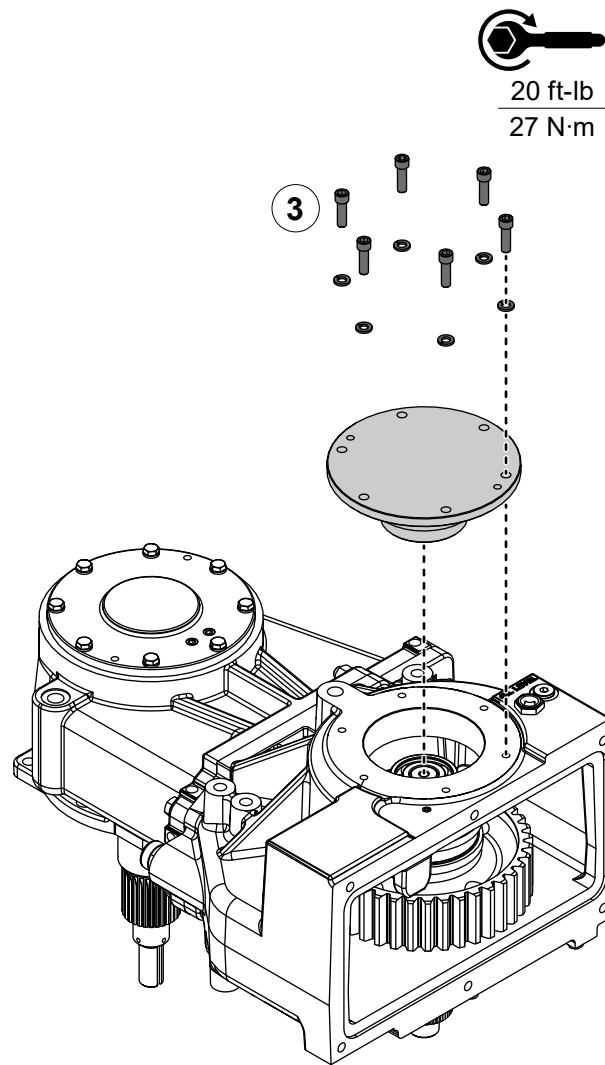
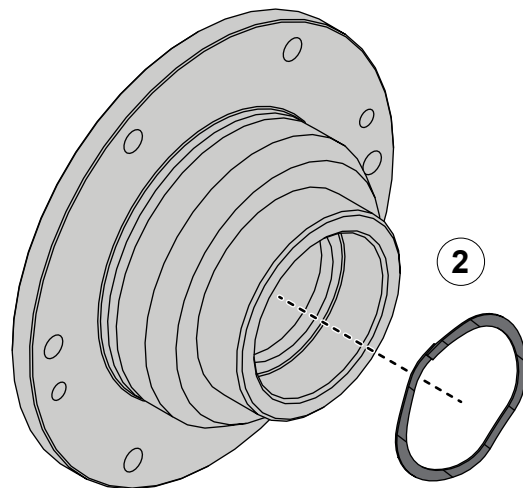
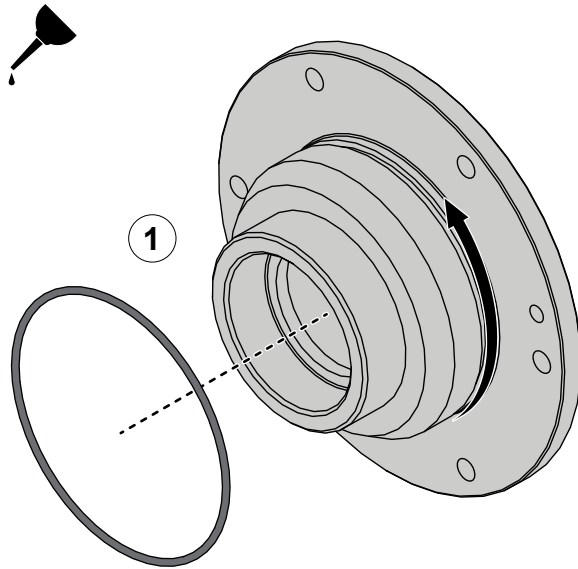


### Installing the Drive Shaft

Use the illustrations and instructions to install the drive components into the transmission case.

- 1 Press the drive shaft assembly through the case, sprocket, and spacer.
- 2 Install the shift collar onto the shaft so that it couples with the sprocket spline.
- 3 Install the retaining ring onto the shaft.

## Installing the Drive Components—Input Shaft Only Configurations

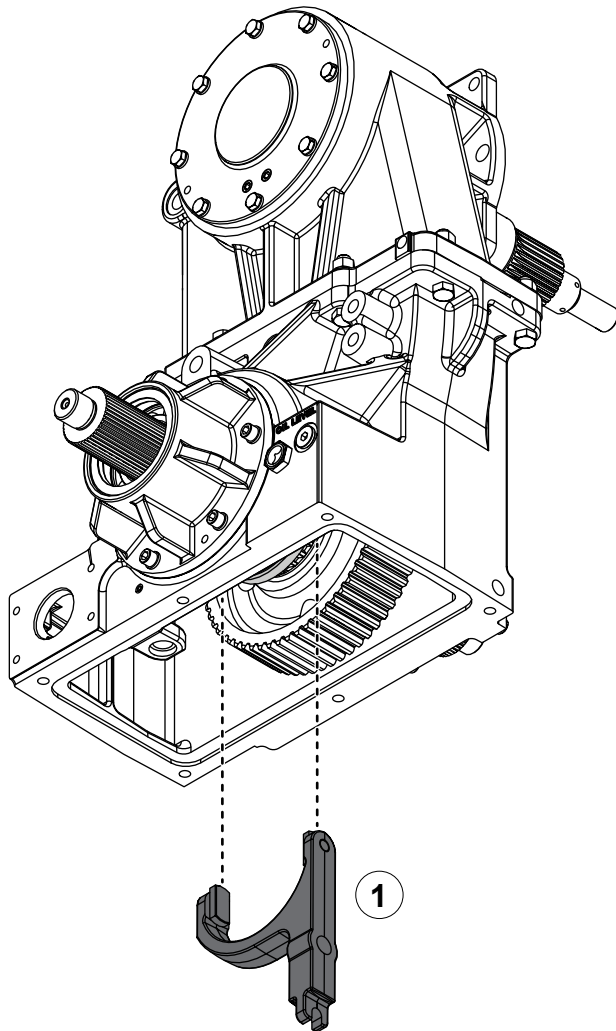


### Installing the Output Bearing Housing

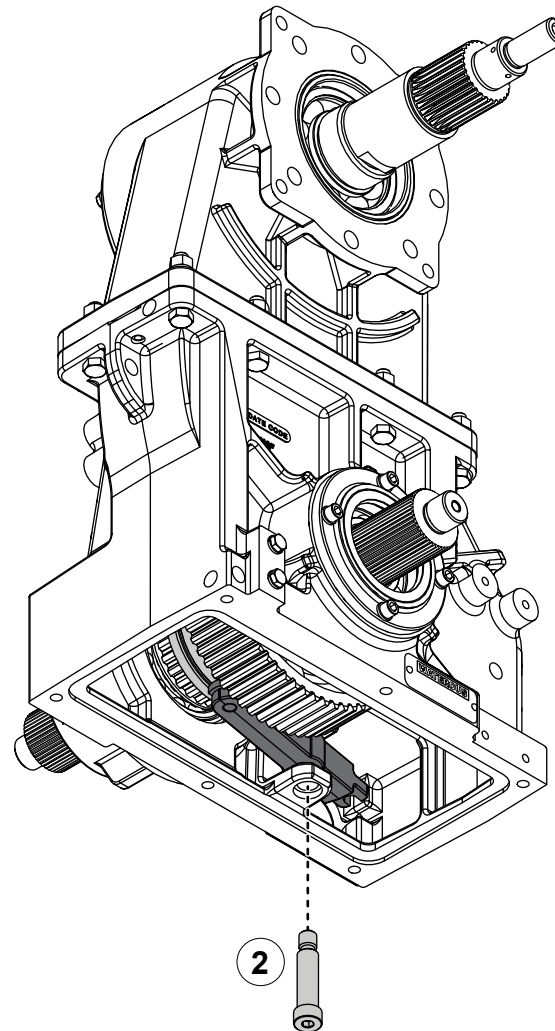
Use the illustrations and instructions to install the output bearing housing.

- 1 Apply lubricant to the O-ring groove, then install the O-ring into the groove.
- 2 Install the wave spring into the housing.
- 3 Use the mounting hardware to secure the housing to the case.

## Installing the Shift Fork



75 ft-lb  
101 N·m

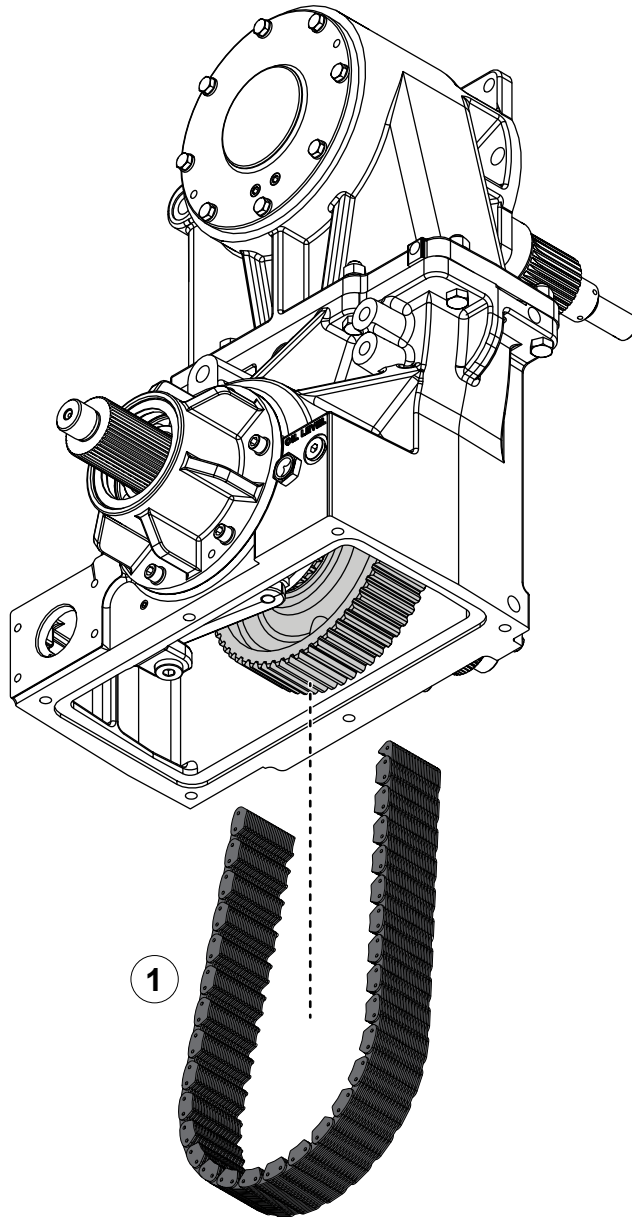


Use the illustrations and instructions to install the shift fork.

- 1 Move the collar into the pump position, then install the shift fork onto the collar.
- 2 Align the hole in the shift fork with the holes inside the case, then secure the shift fork with the shoulder screw.

**Note:** Always replace the shoulder screw during overhaul.

## Installing the Chain

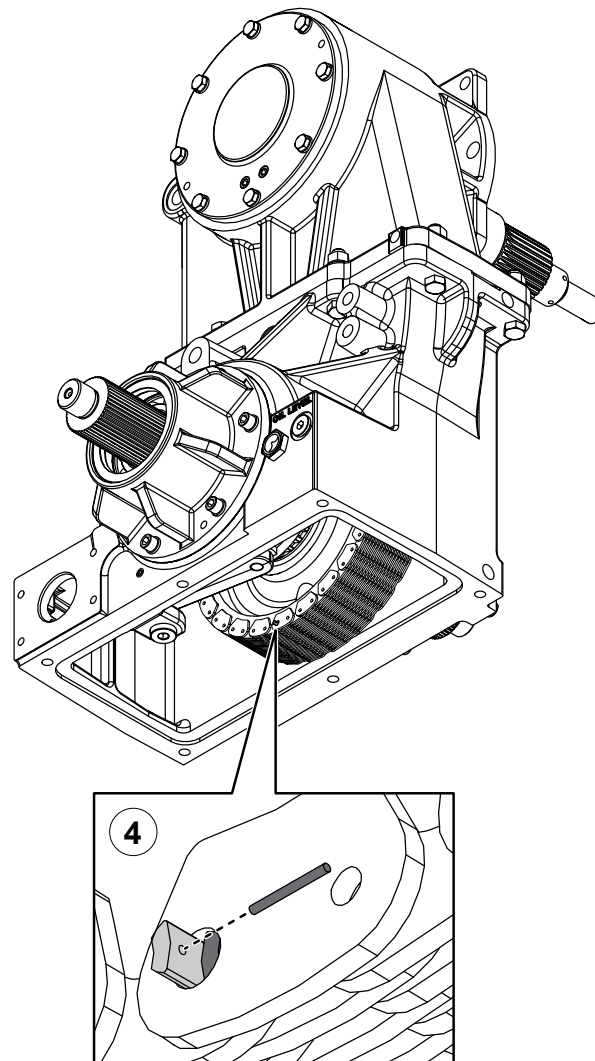
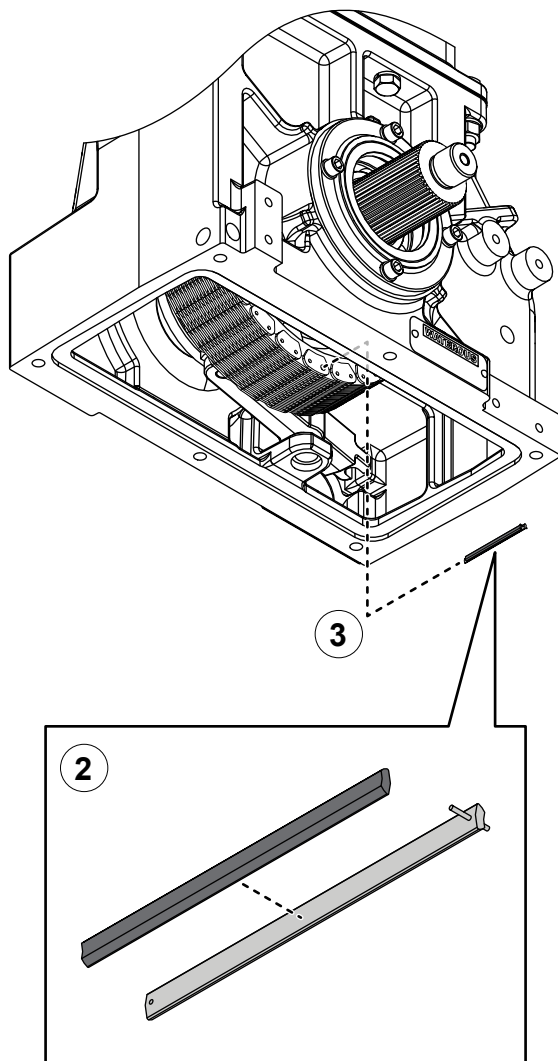


Use the illustration and instructions to install the chain into the transmission case.

- 1 Install the chain around the driven sprocket inside the case, then overlap the chain ends around the drive sprocket.



## Installing the Chain

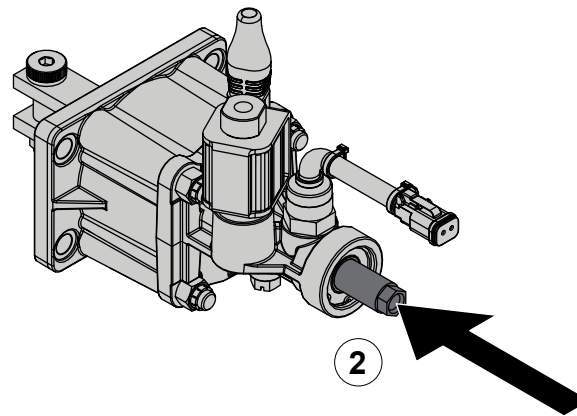
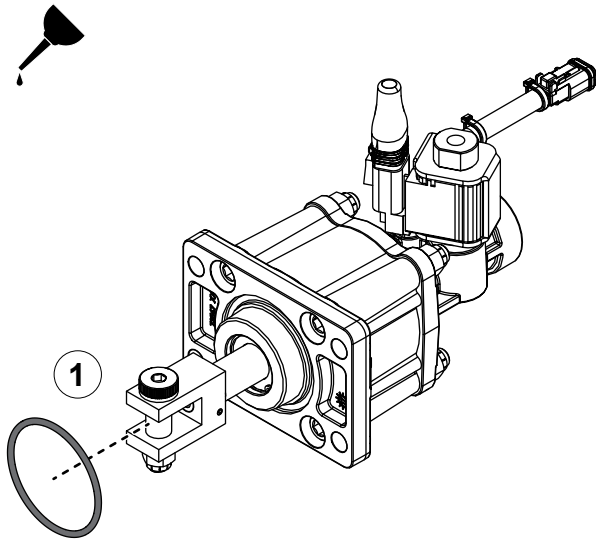


Use the illustrations and instructions to install the chain into the transmission case.

- 2 Align the connecting pin and rocker with their curved faces toward each other at the entrance of the connecting link.
- 3 Push the connecting pin and rocker through the connecting link.
- 4 Use the spiral pin to secure the connecting pin and rocker.

**Note:** An optional pin installation tool (53402) is available from Waterous.

## Installing the Pneumatic Shift Unit



If included in your application, use the illustrations and instructions to install the pneumatic shift unit.

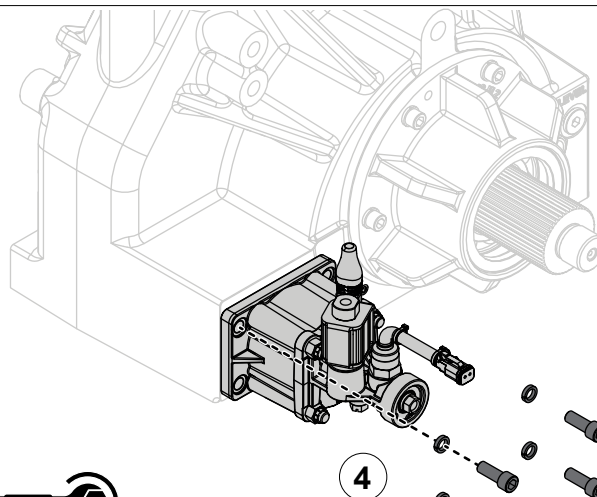
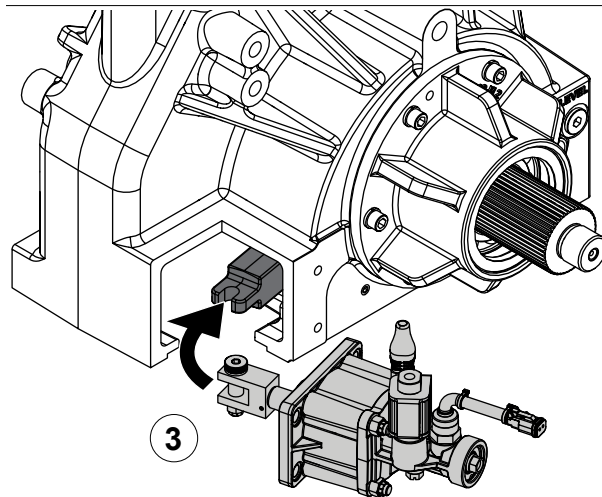
1 Apply lubricant to the O-ring groove, then install the O-ring into the groove.

2 Move the shift unit into the road position.

**Note:** Make sure that the shift collar is in the pump position before installing the shift unit.

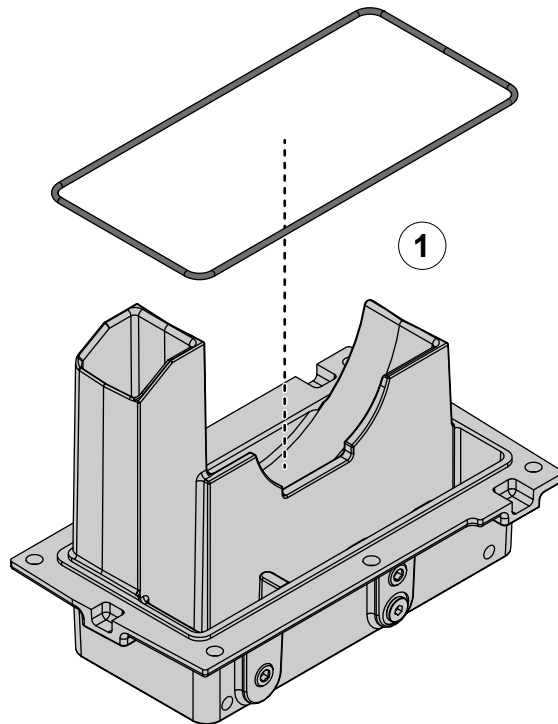
3 Tilt the shift unit away from the center of the case to engage the clevis with the shift fork.

4 Push the shift unit back against the case, then use the mounting hardware to secure it to the case.

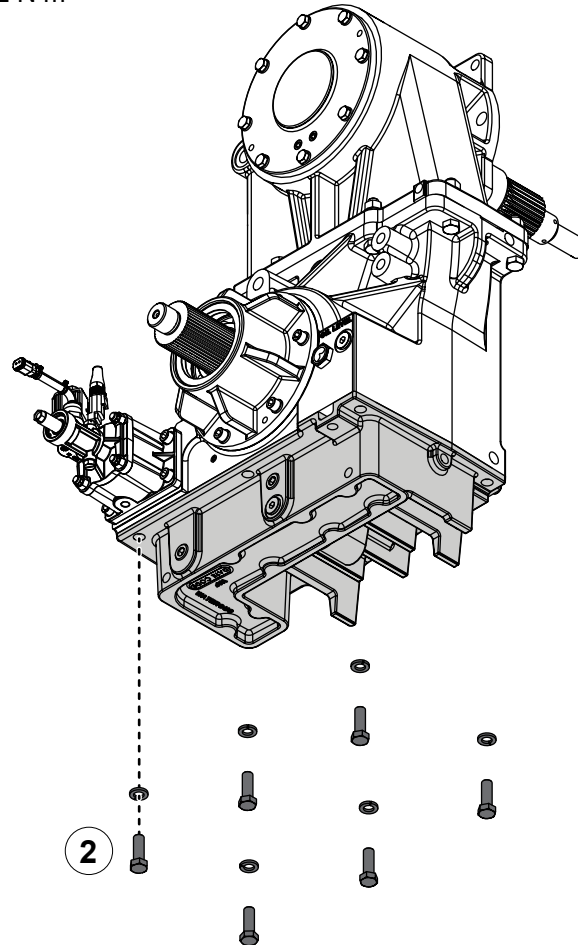


31 ft-lb  
42 N·m

## Installing the Transmission Pan



31 ft-lb  
42 N·m



Use the illustrations and instructions to install the transmission pan.

- 1 Apply grease to the O-ring groove, then install the O-ring into the transmission pan.
- 2 Use the mounting hardware to secure the transmission pan to the case.

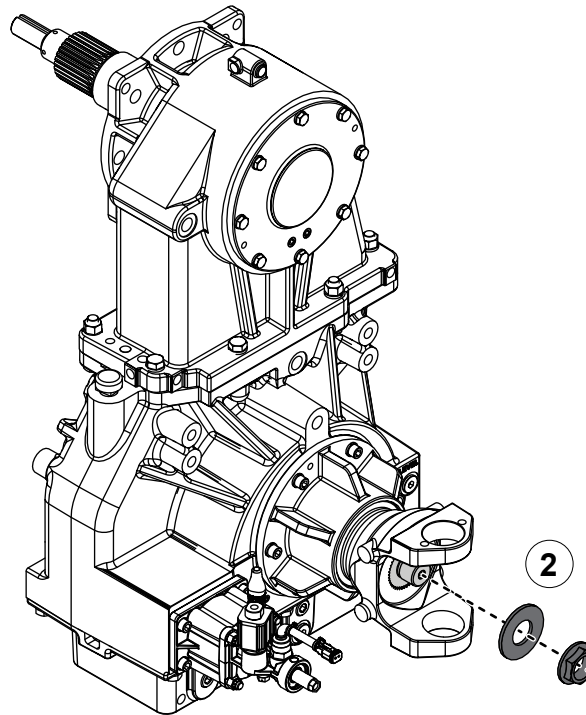
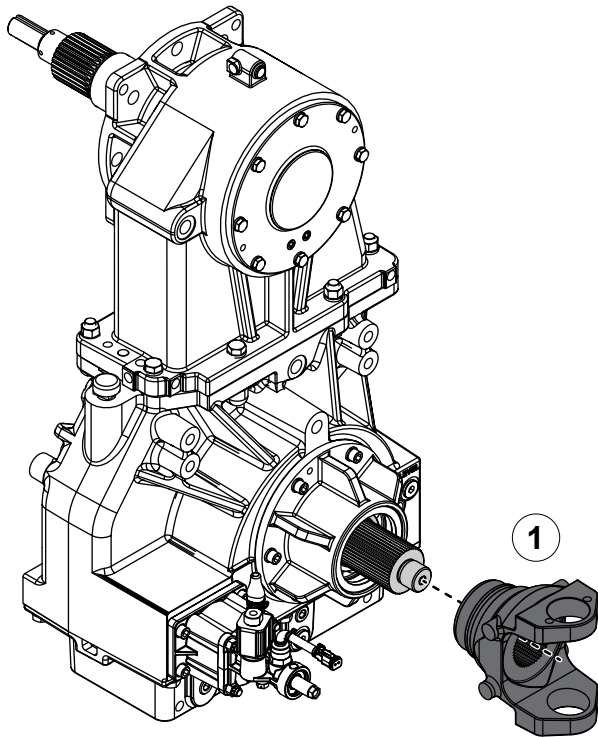
## Installing the Drive Shaft End Yoke or Companion Flange



475 ft-lb  
644 N·m

Use the illustrations and instructions to install the optional drive shaft end yoke or companion flange. The end yokes or companion flanges included in your application may be supplied by Waterous or the truck builder.

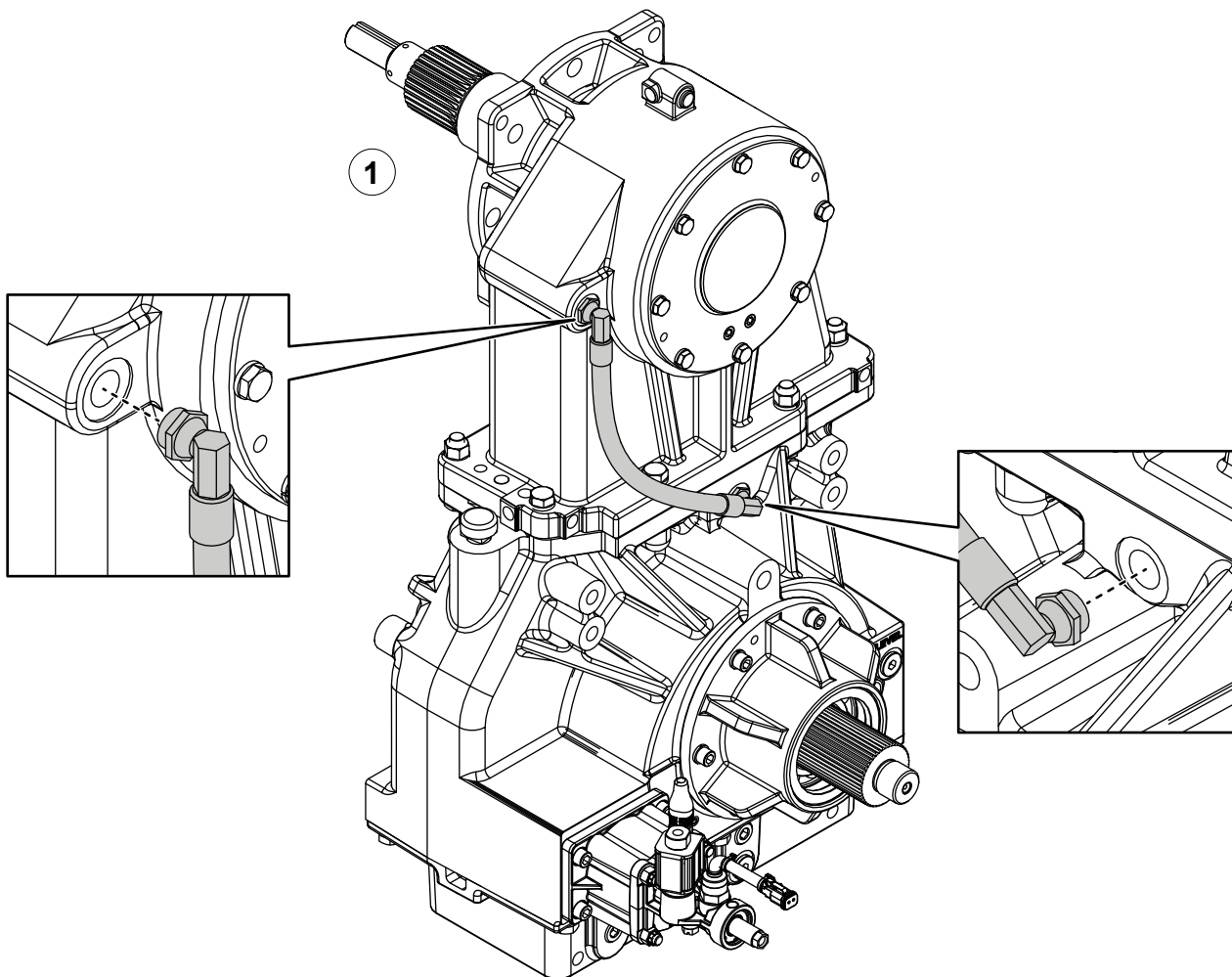
- 1 Apply grease to the drive shaft, then install the end yoke onto the shaft.
- 2 Apply anti-seize compound to the lock nut threads, then install the washer and lock nut onto the shaft.



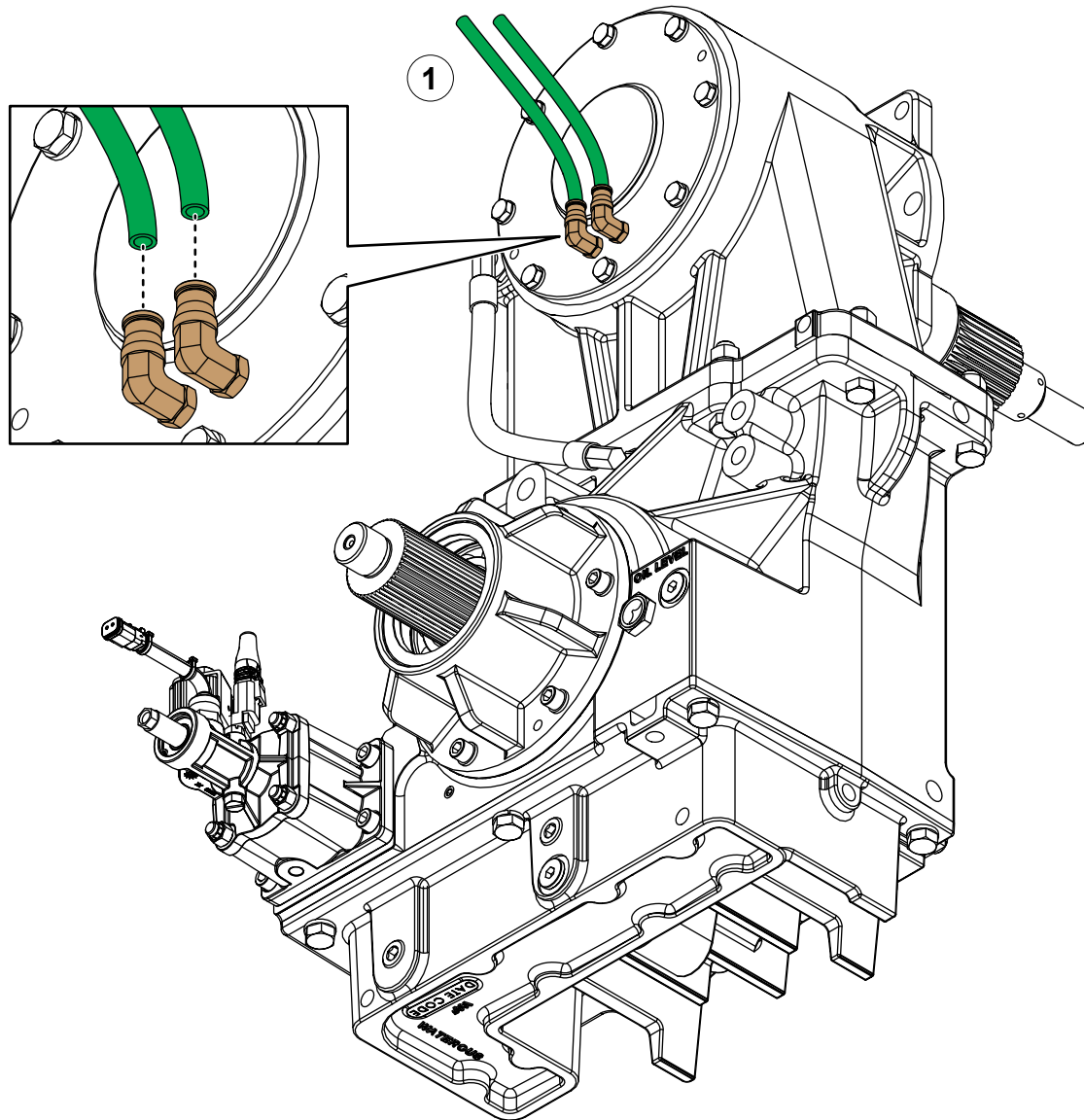
## Installing the Oil Hose

Use the illustration and instructions to install the oil hose.

- 1 Install the oil hose.



## Installing the Cooling Lines

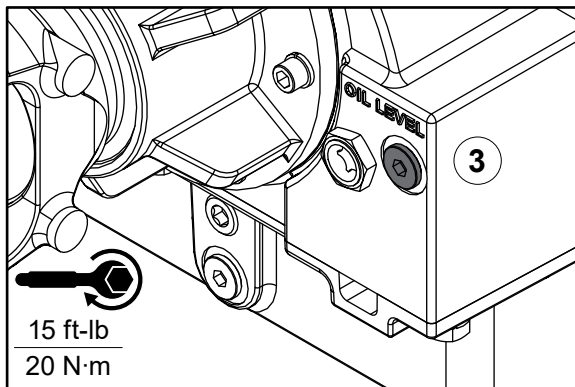
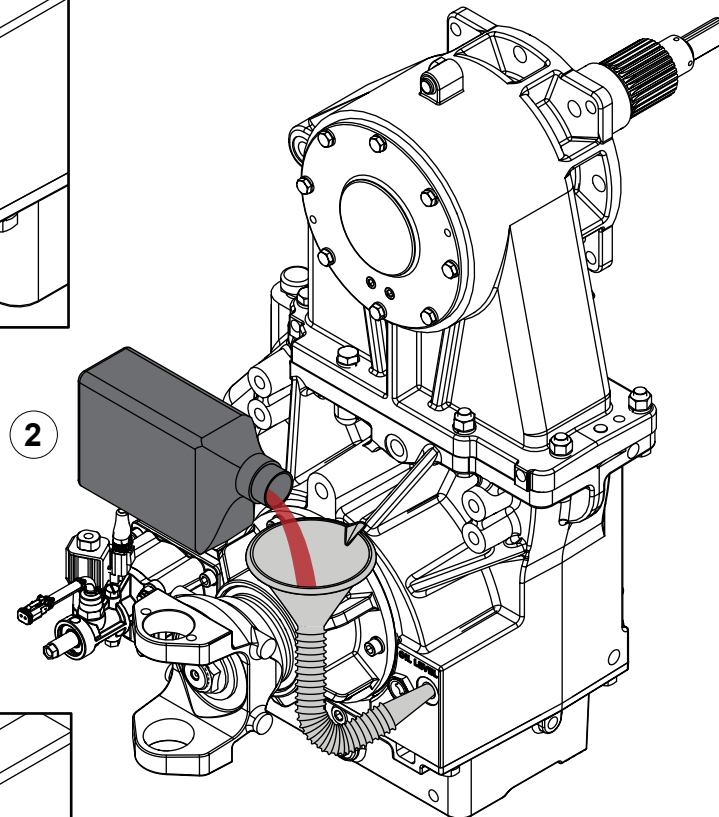
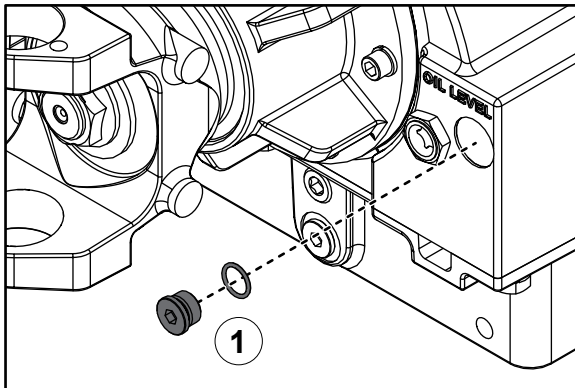


If included in your application, use the illustration and instructions to install the cooling lines.

- 1 Install the tubing into the fittings on the bearing cover or optional hydraulic adapter.

**Note:** Standard bearing cover shown.

## Adding Lubricant to the Transmission



Use the illustrations and instructions to add lubricant to the transmission. The transmission capacity is approximately 6 qt (5.68 L).

Use automatic transmission fluid that meets the requirements of DEXRON III or MERCON V.

- 1 Remove the oil fill plug. If needed, replace the O-ring.
- 2 Add lubricant to the transmission 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. It may take several minutes for the lubricant to flow into the transmission's internal chambers.

- 3 Securely install the oil fill plug.

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







**WATEROUS**

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