Pierce Ultimate Configuration (PUC)

Service Manual

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Chapter 1

Introduction

Chapter Contents

INTRODUCTION

1. ABOUT THIS MANUAL

The purpose of this manual is to provide general maintenance instructions pertaining to your Pierce Fire Apparatus. The maintenance procedures found in this manual are specific to your particular vehicle chassis or aerial device, based on the options found in your specific job. Major inconsistencies between your vehicle and the information in this manual should be directed to your Pierce sales organization or sales representative.

Some of the details of your vehicle's design and construction may be unique to your department alone. For this reason, information contained in this manual may be generic at times. Questions on major inconsistencies between your vehicle's configuration and the information contained in this manual should be directed to your Pierce sales organization or sales representative.

2. HOW TO USE THIS MANUAL

The structure and format of this service manual is unique. It consists of a collection of "stand-alone" service groups (procedures) created for your vehicle, based your vehicle's factory ordered options. A Table of Contents is located at the front of the manual. The Table of Contents is divided into major systems (chapters) such as: Introduction, Troubleshooting, Brakes, Engine, etc. These major system headings also appear at the top of every page in the body of the manual.

3. GROUP NUMBERING

Each service group (chapter) in this manual can be identified by a unique group number found at the top of every page. Table 1-1 describes how to interpret group number **0301-P-001-0305**

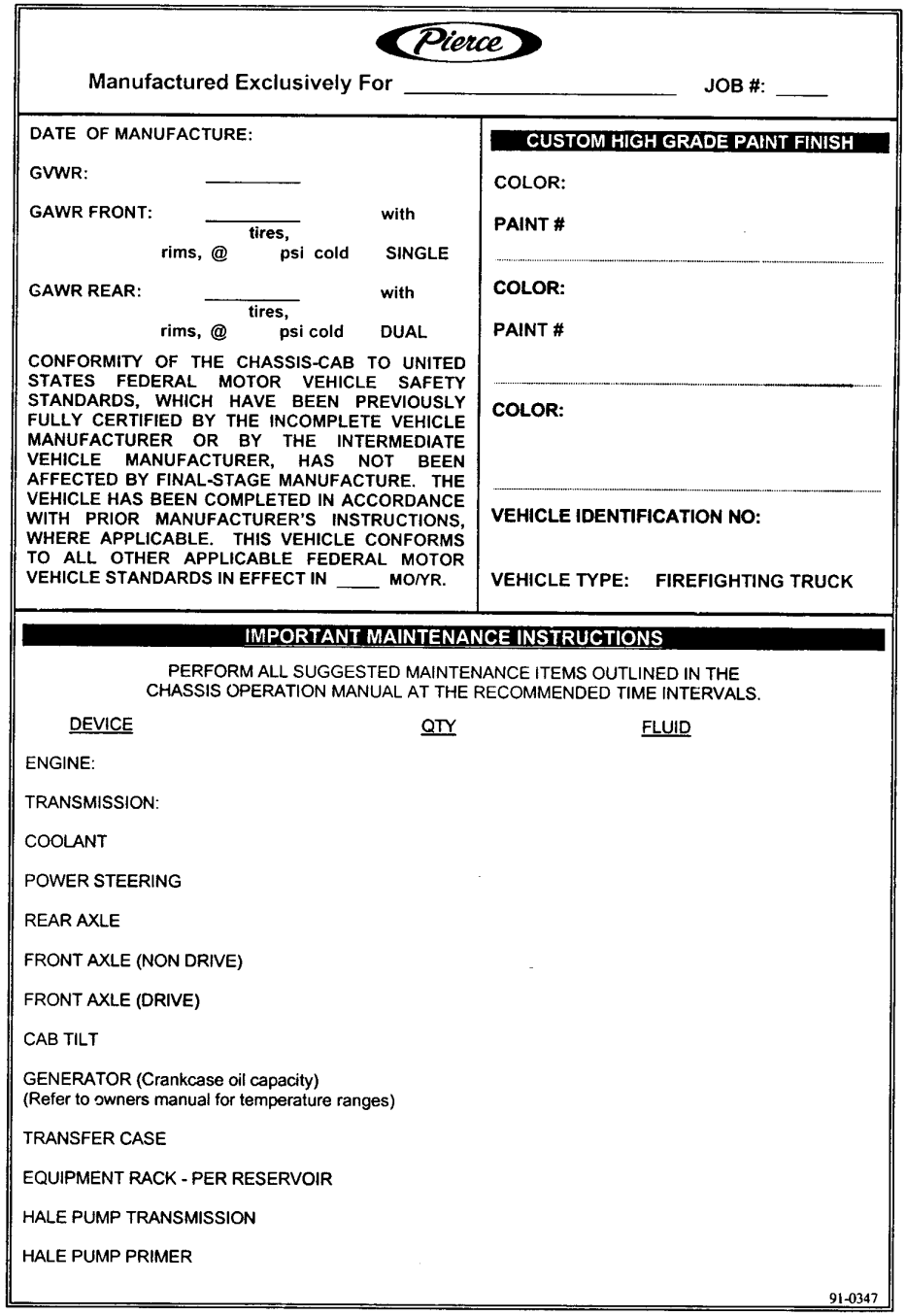
Table 1-1: Sample Group Number

	FGC		SOURCE		Sequence		REV DATE
TOP OF PAGE	0301	-	P	-	001	-	0305

- **FGC** - The Functional Group Code is a four-digit code used to identify the major assembly, subassembly or system to which the procedure applies (0251 = Brake System, 0301 = Engine, etc.) A listing of all functional group codes used on your apparatus can be found in the Table of Contents section of your Parts Catalog.
- **SOURCE** - This code designates the source of the service information: P = Pierce, V = Vendor or Supplier.
- **SEQUENCE** - A unique sequence number assigned to a service group within each functional group. This sequence number is similar to a chapter number used in a conventional manual. Your manual may skip sequence numbers because of options not present on your apparatus.
- **REV DATE** - This four-digit number indicates the revision date of the service group (1104 = November 2004; 0305 = March 2005; 0606 = June 2006, etc.)

4. CHASSIS/FLUID LEVEL NAME TAG

The use of individual Pierce Job Numbers is essential to correctly identify service parts or component used on your apparatus. Your Pierce Job Number can be found on the yellow Chassis/Fluid Level placard located in the driver's area of the cab interior. The label also contains other important information, such as Gross Vehicle Weight Rating (GVWR), Gross Axle Weight Rear (GAWR), Gross Axle Weight Front (GAWF), paint colors, Vehicle Identification Number (VIN), and fluid capacities.



Pierce

Manufactured Exclusively For _____ JOB #: ____

DATE OF MANUFACTURE:

GVWR: _____

GAWR FRONT: _____ with _____ tires, _____ rims, @ _____ psi cold SINGLE

GAWR REAR: _____ with _____ tires, _____ rims, @ _____ psi cold DUAL

CONFORMITY OF THE CHASSIS-CAB TO UNITED STATES FEDERAL MOTOR VEHICLE SAFETY STANDARDS, WHICH HAVE BEEN PREVIOUSLY FULLY CERTIFIED BY THE INCOMPLETE VEHICLE MANUFACTURER OR BY THE INTERMEDIATE VEHICLE MANUFACTURER, HAS NOT BEEN AFFECTED BY FINAL-STAGE MANUFACTURE. THE VEHICLE HAS BEEN COMPLETED IN ACCORDANCE WITH PRIOR MANUFACTURER'S INSTRUCTIONS, WHERE APPLICABLE. THIS VEHICLE CONFORMS TO ALL OTHER APPLICABLE FEDERAL MOTOR VEHICLE STANDARDS IN EFFECT IN ____ MO/YR.

CUSTOM HIGH GRADE PAINT FINISH

COLOR:

PAINT #

COLOR:

PAINT #

COLOR:

VEHICLE IDENTIFICATION NO:

VEHICLE TYPE: FIREFIGHTING TRUCK

IMPORTANT MAINTENANCE INSTRUCTIONS

PERFORM ALL SUGGESTED MAINTENANCE ITEMS OUTLINED IN THE CHASSIS OPERATION MANUAL AT THE RECOMMENDED TIME INTERVALS.

DEVICE	QTY	FLUID
ENGINE:		
TRANSMISSION:		
COOLANT		
POWER STEERING		
REAR AXLE		
FRONT AXLE (NON DRIVE)		
FRONT AXLE (DRIVE)		
CAB TILT		
GENERATOR (Crankcase oil capacity) (Refer to owners manual for temperature ranges)		
TRANSFER CASE		
EQUIPMENT RACK - PER RESERVOIR		
HALE PUMP TRANSMISSION		
HALE PUMP PRIMER		

91-0347

5. ELECTRICAL DRAWINGS

Electrical drawings are provided by the Pierce Manufacturing Engineering Department for each vehicle. A set of electrical drawings can be found in a pouch located inside the front cover of the service manual.

CUSTOMER ASSISTANCE INFORMATION

Your satisfaction with your Pierce apparatus is important to your dealer and Pierce Manufacturing Inc. Normally, any question or concern you may have with your apparatus can be handled by your selling or servicing dealer. Your dealer has the facility, trained technicians, special tools, and up-to-date information to promptly address any issue which may arise. Pierce Manufacturing Inc. has empowered dealers to make decisions and repair vehicles, and they are eager to resolve your issues to your complete satisfaction. Should you encounter an issue with your Pierce apparatus that requires service, take the following steps:

1. Contact your authorized Pierce selling or servicing dealer. They will make the necessary arrangements to order the necessary parts and make the required repairs.
2. If they are not able to repair the problem to your satisfaction, discuss your concern with a member of dealer management. Normally, concerns can be quickly resolved at that level. If the matter has already been reviewed with the Sales, Service, or Parts Manager, contact the owner of the dealership or the General Manager.
3. If, after contacting a member of the dealership management, it appears your question or concern cannot be resolved by the dealership without further help, you may contact Pierce Manufacturing Inc. at 1-800-YPIERCE.

   For prompt assistance, please have the following information available for the Customer Service Representative:

   - Your name, address, and phone number;
   - The Pierce job number of your apparatus;
   - Dealer name and location;
   - Present mileage;
   - Nature of the concern or question.

   When contacting Pierce Manufacturing Inc., please remember that your concern will likely be resolved in the dealership, using the dealer's facilities, equipment, and personnel. This is why we suggest you follow Step 1 first if you have a concern.

SERVICE AND OWNER PUBLICATIONS

Service manuals, parts catalogs, operator's manuals, and other service literature are available for purchase for all current and many past Pierce Manufacturing Inc. apparatus. Contact your dealer for availability and ordering information.

GENERAL MAINTENANCE INSTRUCTIONS

WARNING

Hazards of Combustion Products: Carbon monoxide and carbon dioxide can be found in the combustion products of diesel fuel and other forms of hydrocarbon combustion. Carbon monoxide in moderate concentrations can cause symptoms of headache, nausea, vomiting, increased cardiac output, and confusion. Exposure to higher concentrations of carbon monoxide can cause loss of consciousness, heart damage, brain damage, and/or death. Exposure to high concentrations of carbon dioxide can cause simple asphyxiation by displacing available oxygen. Combustion of diesel fuel and other similar materials should only be carried out in well ventilated areas.

1. MAINTENANCE INTRODUCTION

This section provides general procedures to be followed. When a special procedure is used, the detailed procedure will be in the section covering that component.

a. Ground Handling

1. TOWING

Two hooks and tow eyes may be found on the front or rear of many Pierce Apparatus.

2. PARKING

Per Federal Motor Carrier Safety Regulation 393.41, parking brakes are designed to hold the vehicle's gross vehicle weight (GVW) on a minimum of 7 to 9 percent grade, pointing either uphill or downhill.

b. General Removal Instructions

CAUTION

Equipment may be damaged by foreign matter if hoses and tubes are not plugged and capped when being removed.

1. WORK REQUIRED

Remove component if repair or replacement is required. Do not disassemble any component any further than required.

2. PREPARATION

Before removal of any electrical, hydraulic, or air system components, ensure system component is not energized or pressurized. Disconnect battery ground cables on vehicles not equipped with a battery shut-off switch. The battery shut-off switch may be used to shut off the batteries. Relieve air system pressure before removal of fasteners (nuts, locknuts). Remove any paint on threads to prevent binding of fastener.

3. IDENTIFICATION

To aid in assembly and installation, tag and mark shims, connectors, wires, and mating ends of lines prior disconnecting them. Identify similar parts to ensure proper assembly.

4. POSITION OF VALVES

To aid in assembly of valve handles, mark or diagram handle positions when in the open and closed positions.

5. TIRE REMOVAL

Prior to removing any tires, position jackstands under axles, walking beams, or frame. This will secure the vehicle for safe tire removal.

6. LOCATION

Prior to removing cable ties, cushion clamps, hoses, tubing, wiring, etc., note the location, position, and routing to ensure proper assembly.

c. General Disassembly Instructions

1. CLEANLINESS

Work area must be as clean as possible to prevent contamination to components.

IMPORTANT

Self-locking fasteners that are loosened must be replaced, not tightened.

2. LOCKING PARTS

Replace all lockwire, lockwashers, cotter pins, and locknuts at time of reassembly.

3. EXPENDABLE PARTS

All gaskets, o-rings, and seals removed during repair should be discarded and replaced with new.

4. REMOVING SEALS

Be sure all traces of oil, gasketing material, and sealant is removed from any component. When possible, use wood or plastic probes and scrapers to prevent damage to machined surfaces.

d. General Cleaning Instructions

⚠ WARNING

- **Dry-cleaning Solvent is TOXIC and flammable. Wear protective goggles, face shield, and gloves; use only in a well-ventilated area; avoid contact with skin, eyes, and clothes, and do not breathe vapors. Keep away from heat or flame. Never smoke when using solvent. The flashpoint for Type II Dry-cleaning Solvent is 140°F (60°C) and Type III Dry-cleaning Solvent is 200°F (93°C). Failure to do so may result in injury or death to personnel.**
- **If personnel become dizzy while using cleaning solvent, immediately get fresh air and medical help. If solvent contacts skin or clothes, flush with cold water. If solvent contacts eyes, immediately flush eyes with water and get immediate medical attention.**
- **Never use fuel to clean parts. Fuel is highly flammable. Serious personal injury could result if fuel ignites during cleaning.**

1. CLEANING SOLVENT

Use only approved cleaning solvents to clean parts. Always work in a well-ventilated area.

2. REMOVING DEPOSITS

Soak parts in dry-cleaning solvent and wash away deposits by flushing or spraying. When necessary, brush with a soft bristle brush (not wire) moistened in solvent. Use compressed air to dry parts, except bearings, after cleaning. Bearings must drip and air dry.

3. TOOLS

Do not use wire brushes, abrasive wheels, or compounds to clean parts unless specifically approved in the detailed procedures. Parts may be scratched or altered and may weaken a highly stressed part.

4. BALL AND ROLLER BEARINGS

When cleaning ball or roller bearings, place them in a basket and suspend them in a container of dry-cleaning solvent. If needed, use a brush to remove caked grease, chips, etc. Avoid rotating bearing before solid particles are removed to prevent damaging races and balls. When bearings have been cleaned, coat them lightly with lubricating oil to remove solvent.

⚠ CAUTION

Do not clean tires, lubricant seals, rubber hoses, or electrical components with solvent mixture.

5. RUBBER PARTS

Do not clean o-rings or other rubber parts in dry-cleaning solvent. Wipe parts clean with a dry, cleaning cloth.

⚠ WARNING

Steam cleaning creates hazardous noise levels and severe burn potential. Eye, skin, and ear protection is required. Failure to comply may result in injury to personnel.

6. EXTERIOR PARTS

To aid in inspection and disassembly, steam clean all exterior parts thoroughly before removing.

⚠ WARNING

Solvents used with a spray gun must be used in a spray booth with filter. Face shield must be used by personnel operating spray gun. Failure to comply may result in injury to personnel.

7. ENGINE, CAB, AND BODY

Use a spray gun and solvent mixture for cleaning the exterior of the engine, cab, and body. Allow mixture to remain on surface being cleaned for 10 minutes before rinsing. Rinse with hot water under 80 to 120 pounds of pressure, if available. An ordinary garden hose with nozzle may be used if other equipment is not available. Rinse thoroughly.

⚠ CAUTION

To prevent corrosion, parts should be dipped in rust preventive within two hours of degreasing.

8. DEGREASING MACHINE

A degreasing machine may be used to remove heavy grease and oil from metal parts.

9. PASSAGES

After degreasing, check all oil passages and cavities for dirt or blockage before coating with lubricating oil. Run a thin, flexible wire through oil passages to make sure they are not clogged. Use a pressure spray gun and dry-cleaning solvent to clean dirty passages.

10. ELECTRICAL PARTS

Electrical parts, such as coils, junction blocks, and switches should not be soaked or sprayed with cleaning solutions. Clean these parts with a cleaning cloth moistened with dry-cleaning solvent.

⚠ CAUTION

Do not use soap or alkalies for cleaning tank interiors.

11. OIL AND FUEL TANKS

Pay special attention to all warnings and cautions when working on vehicle's fuel tank. Oil tanks and fuel tanks should be flushed, using a spray gun and dry-cleaning solvent.

⚠ WARNING

- **▲ Hydrogen and oxygen gases are produced in the cells during normal battery operations; hydrogen is flammable and oxygen supports combustion. These gases enter the air through the vent caps. To avoid the chance of a fire or explosion, keep sparks and other sources of ignition away from the battery.**
- **▲ Wash hands thoroughly before eating, drinking, or smoking after handling batteries.**
- **▲ Wear recommended eye protection. If clothing becomes saturated with acid, remove and wash affected area with water for 15 minutes. Discard saturated clothing.**

12. BATTERY

Exterior surfaces of the electrical system and battery should be cleaned with a weak solution of baking soda and water. Apply solution with a bristle brush to remove corrosion.

13. HYDRAULIC SYSTEM

Use dry-cleaning solvent to cleaning hydraulic system components. Clean and dry parts thoroughly to make sure no residue remains. If a coating preservative is required before assembly, apply a light film of lubricating oil. If petroleum-free solvents are not available, use the same hydraulic fluid as used in the vehicle's system.

e. General Inspection Instructions

1. CLEANING

Clean all components before inspection. Check for defects such as physical distortion, wear, cracks, and pitting.

2. SEALING SURFACES

Inspect all surfaces in contact with gaskets, o-rings, or seals for nicks and burrs. If any defect is found, remove it before assembly.

3. BEARINGS

Inspect bearings for rusted or pitted balls, races, or separators. Inspect balls and races for brinnelling, abrasion, and serious discoloration. The following are conditions for bearing rejection:

- Cuts or grooves parallel to ball or roller rotation.
- Fatigue pits (not minor machine marks or scratches).
- Cracks.

4. GEARS AND SPLINED SHAFTS

Inspect gears and splined shafts for wear, pittings, rolling, peening, scoring, burning, brinnelling, and fatigue cracks.

5. TUBING, HOSES, AND FITTINGS

Inspect all hose surfaces for broken or frayed fabric. Check for breaks caused by sharp kinks or contact with other components of the vehicle. Inspect copper tubing lines for kinks. Inspect fittings, tubing, mating surfaces, and threads for nicks, cracks, scratches, and other damage. Replace any defective component. Check for leaks after assembly and during initial vehicle operation period.

6. ELECTRICAL COMPONENTS

Inspect all wiring harnesses for broken, chafed, or burned wiring. Inspect all terminal connectors for loose connections and broken components.

7. METAL COMPONENTS

Visually inspect all castings and weldments for cracks. Components that carry a great load should receive magnetic particle inspection. Critical nonferrous parts may be inspected with fluorescent penetrant.

8. DRAIN PLUGS

When removing drain plugs from transmission, engine, hydraulic system components, or axle differential and planetary hubs, check amount of sediment on plugs. Accumulations of grit or fine metal particles may indicate actual or potential component failure. A few fine particles are normal. This inspection helps to determine if there are defective parts prior to internal inspection of the component and to predict degradation of the equipment.

f. General Repair Instructions

1. BURRS

Remove burrs from surface teeth with a fine-cut file or crocus cloth.

2. EXTERIOR PARTS

Chassis and exterior painted parts may be resurfaced when paint is damaged, or where parts have been repaired.

⚠ CAUTION

Polished or machined steel parts not protected by cadmium, tin, copper, or other plating or surface treatments require protection. Bare metal surfaces must be free of moisture when protective coating is applied.

3. PROTECTING PARTS

Protect bare steel surfaces from rust when not actually undergoing repair work. Dip components in, or spray them with, corrosion preventive compound. Aluminum parts may require protection in atmospheres having a high salt content.

4. DENTS

Straighten minor body dents by bumping with a soft-faced hammer while using a wooden block backing.

5. SHEET METAL REPAIR

Repair minor skin cracks by installing patches.

6. SCREWS, NUTS, AND FITTINGS

Replace any screw, nut, or fitting with damaged threads. Inspect tapped holes for thread damage. If cross-threading is evident, retap the hole for the next oversize screw or stud. If retapping will weaken the component, or if the cost of the component makes retapping impractical, replace the component. Chasing the threads with proper size tap or die may be adequate. Some screws are coated with Loctite 242 when new. Reapply Loctite 242 to precoated screws when reinstalling on components or vehicle.

7. STUD INSTALLATION

When installing studs use the proper driver. A worn stud driver may damage the end thread. Then a chasing die must be used before a nut can be screwed on. This procedure will remove cadmium plating and allow corrosion. Before installing stud(s), inspect the hole(s) for chips. Blow out foreign matter and start stud by hand. Before final insertion, coat thread with a light coating of antiseize compound. Install stud to proper “setting height,” which is the total projecting length.

g. General Assembly Instructions

1. PREPARATION

Prior to installation, remove protective grease coating from new components.

2. O-RING INSTALLATION

Lubricate all o-rings with a light coat of lubricating oil before installing. To install o-ring, clean the groove, then stretch packing and place into position. Place component on flat surface and uniformly press o-ring into position. Ensure o-rings are not nicked or torn during assembly.

⚠ CAUTION

Use sealing compound sparingly and only on male threads. Do not apply compound on first two threads to avoid contamination of system from compound. Do not apply compound to hose connections or fittings with o-rings. Damage to equipment may result.

3. PIPE JOINTS AND FITTINGS

Use sealing compound, sealant, or adhesive as indicated in each maintenance task.

4. OIL SEALS

Coat oil seals evenly with oil or grease before installing. Install oil seals with seal lip facing toward lubricant, applying an even force to outer edge of seal. If oil seals are installed over keyed or splined shafts, use a guide to prevent sharp edge of keyway or splines from cutting the leather or neoprene seal. Construct guides of very thin gauge sheet metal and shape to the required diameter. Make certain guide edges are not sharp and are bent slightly inward so they do not cut the seal.

5. BEARINGS AND SHAFTS

When mounting bearings on shafts always apply force to inner races. When mounting bearings in housing always apply the force to the outer race.

6. BEARING LUBRICATION

Lubricate bearings before assembly with lubricant used in related housing or container to provide the first run-in until lubricant from the system can reach the bearings.

⚠ WARNING

On direct contact, uncured silicone sealant irritates eyes. In case of contact, flush eyes with water and seek medical attention. In case of skin contact, wipe off and flush with water.

7. SILICONE SEALANT

Silicone sealant is often used instead of a gasket to seal mating parts. The mating parts must be clean, dry, and free of oil or grease for proper adhesion. After silicone sealant has been applied, the mating components must be assembled immediately. Silicone sealant starts to set-up in 15 minutes and takes 24 hours to completely cure. Wipe off excess silicone sealant after assembling the mating components.

8. GASKETS

Remove all traces of old gasket material and sealant before installing new gasket. Coat both sides of gasket with sealant to provide added sealing.

h. General Installation Instructions

1. PREPARATION

When unpacking components, remove all packing material, barrier paper, tape, plastic bags, protective caps, and protective grease coatings. Handle and store removed components carefully.

⚠ CAUTION

Use sealing compound sparingly and only on male threads. Do not apply compound on first two threads to avoid contamination of system from compound. Do not apply compound to hose connections or fittings with o-rings. Damage to equipment may result.

2. SEALING COMPOUNDS

Use sealing compounds as required in each maintenance task.

3. TORQUING

Tighten bolts, screws, washers, hoses, and fittings as required in each maintenance task. If no torque value is listed in task, follow the torque specification chart in the back of this manual.

4. IDENTIFICATION TAGS

Put hoses, tubes, lines, and electrical wiring in place by matching identification tags and markings on equipment.

5. HOSES, AIR LINES, AND WIRING

After installing hoses, air lines, and wiring, ensure that they do not contact moving parts or components edges. Secure in place, out of way with cable ties and cushion clips.

i. Chemicals And Lubricants

A number of chemicals and lubricants are available for use during vehicle maintenance and repair. They include a wide variety of products ranging from cleaning solvents and degreasers to lubricants and protective sprays for rubber, plastic, and vinyl.

1. CLEANERS

- **Carburetor Cleaner and Choke Cleaner** - A strong solvent for used for removal gum, varnish, and carbon. Most carburetor cleaners leave a dry-type lubricant film which will not harden or gum up. Because of this film it is not recommended for use on electrical components.
- **Brake System Cleaner** - Used to remove grease and brake fluid from the brake system, where clean surfaces are absolutely necessary. It leaves no residue and often eliminates brake squeal caused by contaminants.
- **Electrical Cleaner** - Removes oxidation, corrosion and carbon deposits from electrical contacts, restoring full current flow. It can also be used to clean spark plugs, carburetor jets, voltage regulators, and other components where an oil-free surface is desired.
- **Demoisturants** - Remove water and moisture from electrical components such as alternators, voltage regulators, electrical connectors and fuse blocks. They are nonconducting, noncorrosive, and nonflammable.
- **Degreasers** - Are heavy-duty solvents used to remove grease from the outside of the engine and from chassis components. They can be sprayed or brushed on and depending on the type, and are rinsed off either with water or solvent.

2. LUBRICANTS

- **Motor Oil** - Is formulated for use in engines. It normally contains a wide variety of additives to prevent corrosion and reduce foaming and wear. Motor oil comes in various weights (viscosity ratings) from 5 to 80. The recommended weight of the oil depends on the season, temperature, and the demands on the engine. Light oil is used in cold climates and under light load conditions. Heavy oil is used in hot climates and where high loads are encountered. Multiviscosity oils are designed to have characteristics of both light and heavy oils and are available in a number of weights from 5W-20 to 20W-50.
- **Gear Oil** - Is designed to be used in differentials, manual transmissions, and other areas where high-temperature lubrication is required.
- **Chassis and Wheel Bearing Grease** - Is a heavy grease used where increased loads and friction are encountered, such as wheel bearings, balljoints, tie-rod ends, and universal joints.

- **High-Temperature Wheel Bearing Grease** - Is designed to withstand extreme temperatures encountered by wheel bearings in disc brake equipped vehicles. It usually contains molybdenum disulfide (moly), which is a dry-type lubricant.
- **White Grease** - Is a heavy grease for metal-to-metal applications where water is a problem. White grease stays soft under both low and high temperatures (usually from -100 to +190°F), and will not wash off or dilute in the presence of water.
- **Assembly Lube** - Is a special extreme pressure lubricant, usually containing moly, used to lubricate high-load parts (such as main, rod bearings, and cam lobes) for initial start-up of a new engine. The assembly lube lubricates the parts without being squeezed out or washed away until the engine oiling system begins to function.
- **Silicone Lubricants** - Are used to protect rubber, plastic, vinyl, and nylon parts.
- **Graphite Lubricants** - Are used where oils cannot be used due to contamination problems, such as in locks. The dry graphite will lubricate metal parts while remaining uncontaminated by dirt, water, oil, or acids.
- **Moly Penetrants** - Loosen and lubricate frozen, rusted, and corroded fasteners and prevents future rusting or freezing.
- **Heat-Sink Grease** - Is a special electrically nonconducting grease that is used for mounting electronic ignition modules where it is essential that heat is transferred away from the module.

3. SEALANTS

- **RTV Sealant** - Is one of the most widely used gasket compounds. Made from silicone, RTV is air curing; seals, bonds, waterproofs, fills surface irregularities, remains flexible, doesn't shrink, is relatively easy to remove, and is used as a supplementary sealer with almost all low and medium temperature gaskets.
- **Anaerobic Sealant** - Is much like RTV in that it can be used either to seal gaskets or to form gaskets by itself. It remains flexible, is solvent resistant, and fills surface imperfections. The difference between an anaerobic sealant and an RTV-type sealant is in the curing. RTV cures when exposed to air, while an anaerobic sealant cures only in the absence of air. This means that an anaerobic sealant cures only after the components are assembled, sealing them together.
- **Thread and Pipe Sealant** - Is used for sealing hydraulic and pneumatic fittings and vacuum lines. It is usually made from a teflon compound, and comes in a spray, a paint-on liquid, and as a wrap-around tape.

4. CHEMICALS

- **Antiseize Compound** - Prevents seizing, galling, cold welding, rust, and corrosion in fasteners. High-temperature antiseize, usually made with copper and graphite lubricants, is used for exhaust system and exhaust manifold bolts.
- **Anaerobic Locking Compound** - Is used to keep fasteners from vibrating or working loose and cure only after installation, in the absence of air. Medium strength locking compound is used for small nuts, bolts and screws that may be removed later. High-strength locking compound is for large nuts, bolts, and studs which aren't removed on a regular basis.
- **Oil Additives** - Range from viscosity index improvers to chemical treatments that claim to reduce internal engine friction. It should be noted that most oil manufacturers caution against using additives with their oils.
- **Gas Additives** - Depending on their chemical makeup, gas additives can perform several functions. They usually contain solvents that help dissolve gum and varnish that buildup on carburetor, fuel injector, and intake parts. They also serve to break down carbon deposits that form on the inside surfaces of the combustion chambers. Some additives contain upper cylinder lubricants for valves and piston rings, and others contain chemicals to remove condensation from the gas tank.

5. MISCELLANEOUS

- **Brake Fluid** - Is specially formulated hydraulic fluid that can withstand the heat and pressure encountered in brake systems. Care must be taken so this fluid does not come in contact with painted surfaces or plastics. An opened container should always be resealed to prevent contamination by water or dirt.
- **Weatherstrip Adhesive** - Is used to bond weatherstripping around doors, windows, and trunk lids. It is sometimes used to attach trim pieces.
- **Undercoating** - Is a petroleum-based, tar-like substance that is designed to protect metal surfaces on the underside of the vehicle from corrosion. It also acts as a sound-deadening agent by insulating the bottom of the vehicle.

SAFETY LABELS AND WARNINGS

Only trained personnel should operate this vehicle or perform maintenance. Proper tools and service equipment must be used taking appropriate precautions as required by accepted safety practices, to prevent personal injury and/or equipment damage.

1. SUMMARY

a. Danger, Warning, Caution, Important, And Note

DANGER

DANGER is used when serious personal injury or death WILL happen if certain precautions are not followed.

WARNING

WARNING is used when serious personal injury or death MAY happen if certain precautions are not followed.

CAUTION

CAUTION is used when there is a risk of damage to property or equipment if certain precautions are not followed.

IMPORTANT

IMPORTANT is used to relate information that is not safety related but needs more emphasis than a NOTE.

NOTE: *NOTE is used to relate additional information, but is not safety related.*

Study this service manual carefully and ensure that all operators and other users are completely familiar with the contents. The warnings, cautions, and procedures listed in this manual must be incorporated into the safety program of the fire department to which the vehicle is assigned.

b. Safety Defect Reporting

If you believe that your vehicle has a defect that could cause a crash or could cause serious injury or death, it should be reported immediately to the National Highway Traffic Safety Administration (NHTSA) and to Pierce Manufacturing Inc. If NHTSA receives a number of similar complaints, it may open an investigation. If the investigation reveals a latent safety defect, NHTSA may order a recall and remedy campaign. NHTSA will not become involved in individual complaints between customers, dealers, and manufacturers.

To contact NHTSA, call the Auto Safety Hotline at 1-800-424-9393 or write to NHTSA, U.S. Department of Transportation, Washington, D.C., 20590.

Driveline

Chapter Contents

PUC DRIVESHAFT AND VIBRATION DAMPER

1. DRIVESHAFT SHIELD

NOTE: *Depending on the truck configuration and engine options, the driveshaft shield configuration and mounting may vary. Use the procedure that matches your application.*

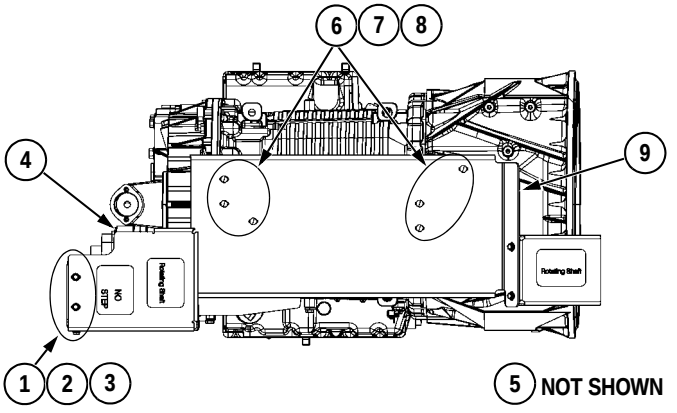
a. Removal—Type 1 (Step Plate Style)

1. Attach a “DO NOT START” tag to truck ignition switch.

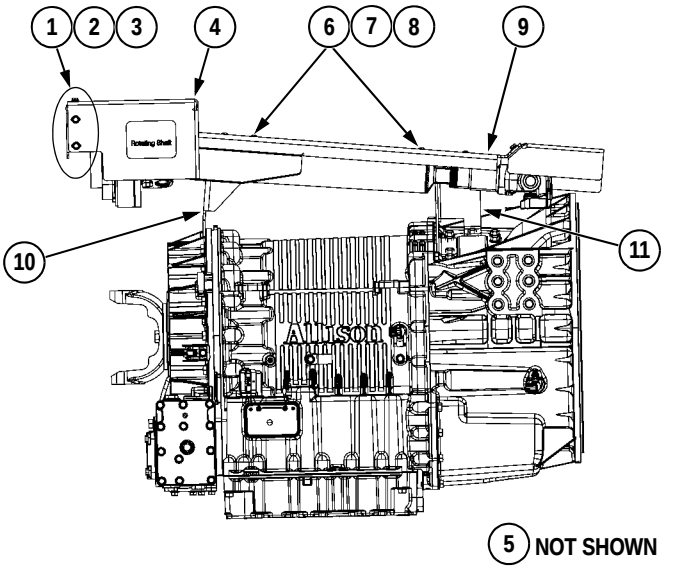
⚠ WARNING

Cab stay arm must be in the support position before working under the cab or on cab lift components. Failure to comply may result in serious injury or death to personnel.

2. Raise cab. (Refer to “Operation & Maintenance Manual.”)
3. Turn battery switch OFF (if equipped), or disconnect batteries. (See “Battery Connect/Disconnect,” Group 0925-P-001.)



Driveshaft Shield Assembly—Top View



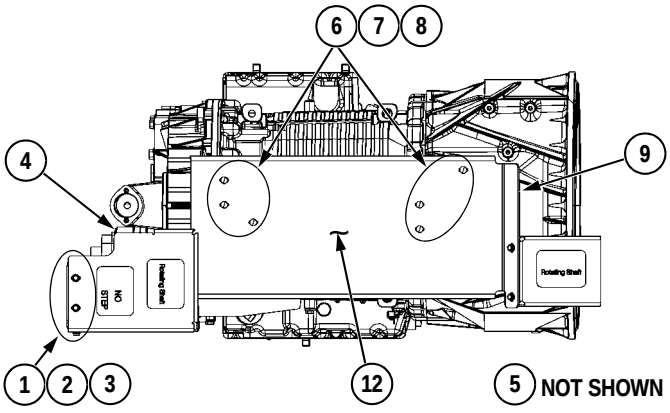
Driveshaft Shield Assembly—Side View

4. Remove four screws (1), lockwashers (2), and flat washers (3), and remove rear yoke cover (4) from the bracket (5) mounted on the pump.

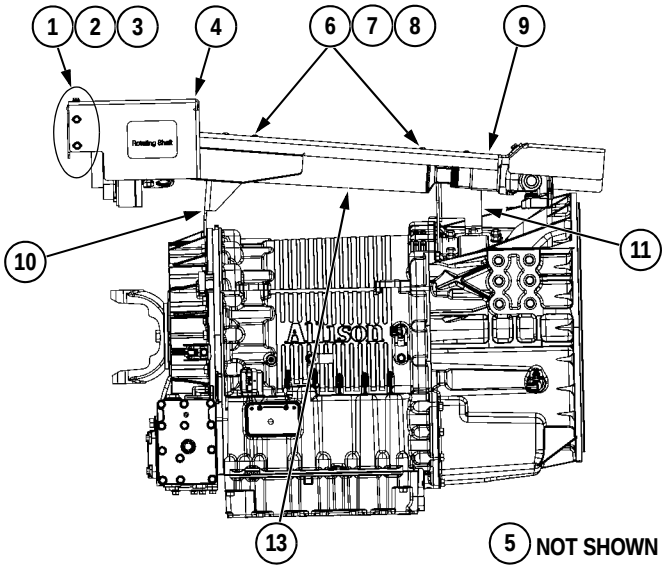
NOTE: *Note the location of the fender washers before removing to ensure correct clearance between the step plate and the PTO driveshaft.*

5. Remove six screws (6), locknuts (7), and fender washers (8) from driveshaft shield/step plate assembly (9) and brackets (10 and 11).

b. Installation—Type 1 (Step Plate Style)



Driveshaft Shield Assembly—Top View



Driveshaft Shield Assembly—Side View

⚠ WARNING

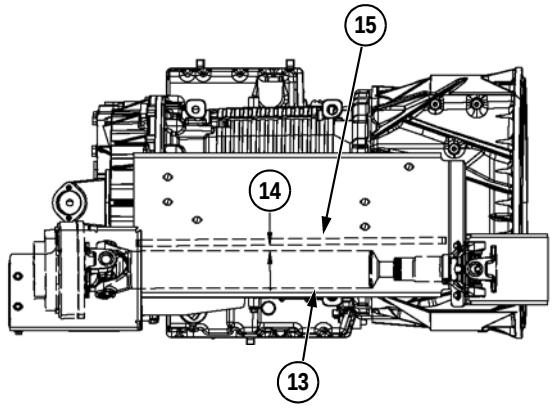
Do not operate the vehicle without the driveshaft shield in place. Failure to comply may result in serious injury to personnel and damage to equipment.

NOTE:

- *Install the fender washers in the same locations as noted during removal.*
- *Always use new locknuts for installation.*

1. Place the driveshaft shield/step plate assembly (9) on brackets (10 and 11), and install six screws (6), fender washers (8), and locknuts (7).
2. Check the clearance between the bottom of the step plate (12) and the driveshaft (13). The clearance should be 0.375 inch (10 mm).

   If the gap is less than 0.375 inch (10 mm), add fender washers between the step plate (12) and brackets (10 and 11) as needed until clearance is obtained.



PTO Driveshaft/Driveshaft Shield—Top View

3. Check the clearance (14) between the driveshaft (13) and step plate support gusset (15). The clearance should be 0.375 inch (10 mm).

   If the clearance does not meet specifications, loosen screws (6) and locknuts (7) and reposition the driveshaft shield/step plate assembly (9) until the correct clearance is obtained. Tighten locknuts (7).
4. Install the rear yoke cover (4) on the bracket (5) mounted on the pump using four screws (1), lockwashers (2), and flat washers (3).
5. Turn battery switch ON (if equipped), or connect batteries. (See “Battery Connect/Disconnect,” Group 0925-P-001.)
6. Lower cab. (Refer to “Operation & Maintenance Manual.”)
7. Remove “DO NOT START” tag from truck ignition switch.

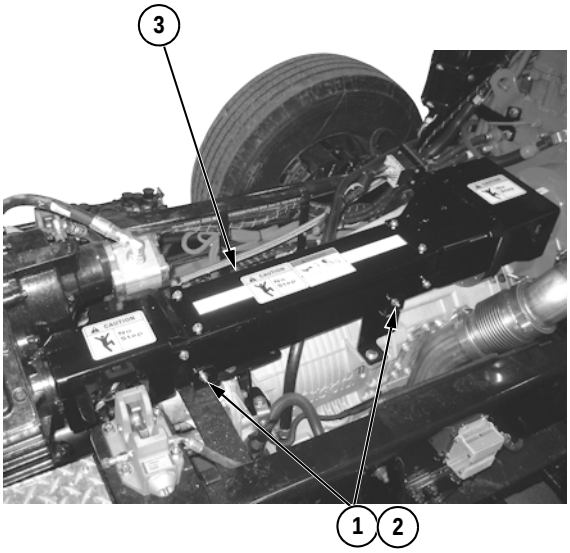
c. Removal—Type 2

1. Attach a “DO NOT START” tag to truck ignition switch.

⚠ WARNING

Cab stay arm must be in the support position before working under the cab or on cab lift components. Failure to comply may result in serious injury or death to personnel.

2. Raise cab. (Refer to “Operation & Maintenance Manual.”)
3. Turn battery switch OFF (if equipped), or disconnect batteries. (See “Battery Connect/Disconnect,” Group 0925-P-001.)



4. Remove four (two each side) screws (1) and nuts (2), and remove shield (3).

d. Installation—Type 2

⚠ WARNING

Do not operate the vehicle without the driveshaft shield in place. Failure to comply may result in serious injury to personnel and damage to equipment.

1. Install shield (3) using four (two each side) screws (1) and nuts (2).
2. Turn battery switch ON (if equipped), or connect batteries. (See “Battery Connect/Disconnect,” Group 0925-P-001.)
3. Lower cab. (Refer to “Operation & Maintenance Manual.”)
4. Remove “DO NOT START” tag from truck ignition switch.

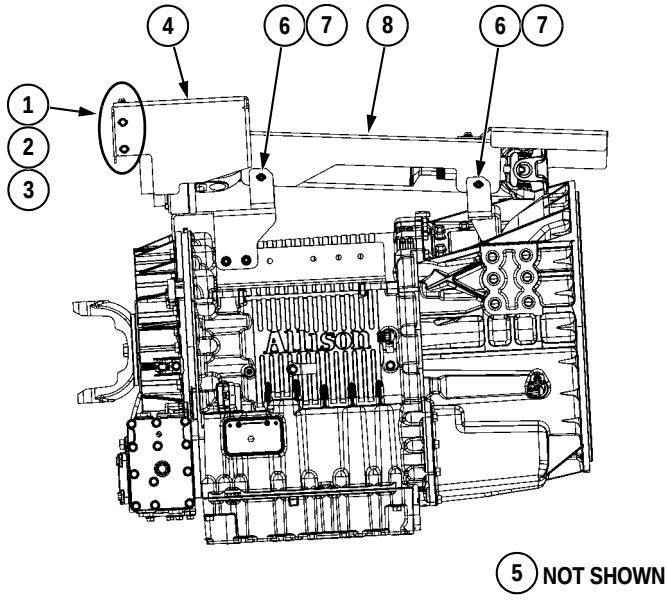
e. Removal—Type 3

1. Attach a “DO NOT START” tag to truck ignition switch.

⚠ WARNING

Cab stay arm must be in the support position before working under the cab or on cab lift components. Failure to comply may result in serious injury or death to personnel.

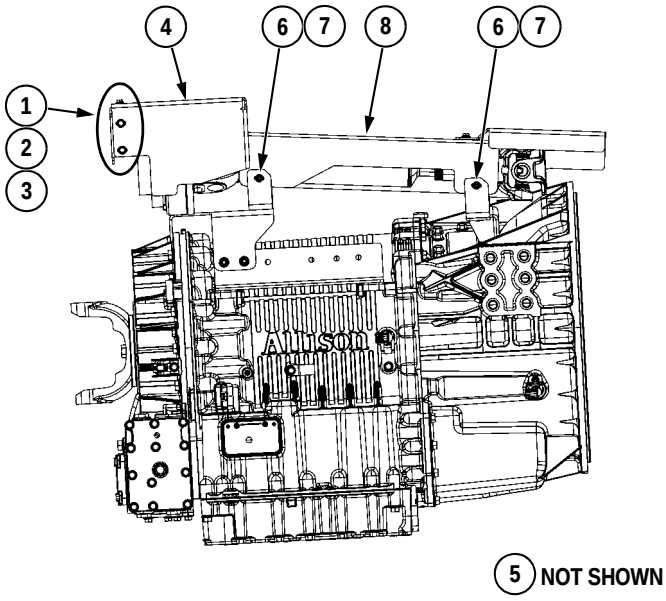
2. Raise cab. (Refer to “Operation & Maintenance Manual.”)
3. Turn battery switch OFF (if equipped), or disconnect batteries. (See “Battery Connect/Disconnect,” Group 0925-P-001.)



Driveshaft Shield—Side View

4. Remove four screws (1), lockwashers (2), and flat washers (3), and remove rear yoke cover (4) from the bracket (5) mounted on the pump.
5. Remove four (two each side) carriage bolts (6) and locknuts (7), and remove shield (8).

f. Installation—Type 3



⚠ WARNING

Do not operate the vehicle without the driveshaft shield in place. Failure to comply may result in serious injury to personnel and damage to equipment.

NOTE: *Always use new locknuts for installation.*

1. Install shield (8) using four (two each side) carriage bolts (6) and locknuts (7).
2. Install the rear yoke cover (4) on the bracket (5) mounted on the pump using four screws (1), lockwashers (2), and flat washers (3).
3. Turn battery switch ON (if equipped), or connect batteries. (See “Battery Connect/Disconnect,” Group 0925-P-001.)
4. Lower cab. (Refer to “Operation & Maintenance Manual.”)
5. Remove “DO NOT START” tag from truck ignition switch.

2. DRIVESHAFT

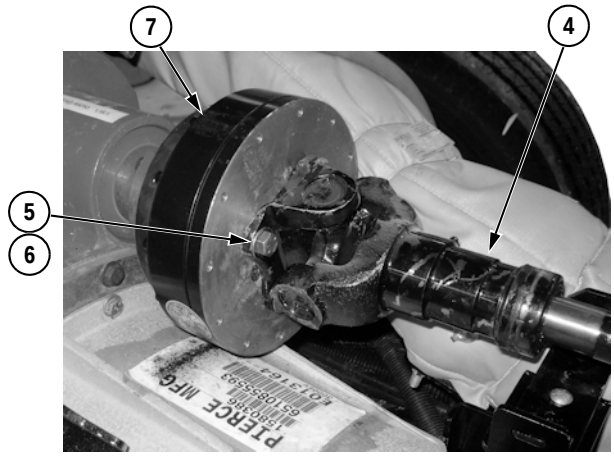
a. Removal

1. Attach a “DO NOT START” tag to truck ignition switch.

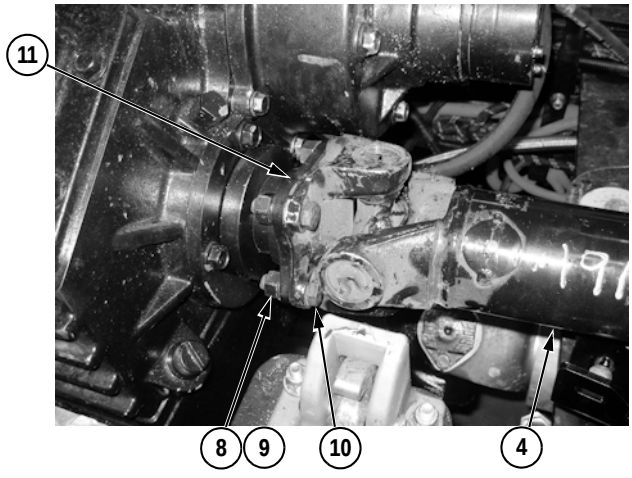
⚠ WARNING

Cab stay arm must be in the support position before working under the cab or on cab lift components. Failure to comply may result in serious injury or death to personnel.

2. Raise cab. (Refer to “Operation & Maintenance Manual.”)
3. Turn battery switch OFF (if equipped), or disconnect batteries. (See “Battery Connect/Disconnect,” Group 0925-P-001.)
4. Remove the driveshaft shield. (See **“1. Driveshaft Shield”** on page 1.)



Driveshaft—Front Mounting Hardware



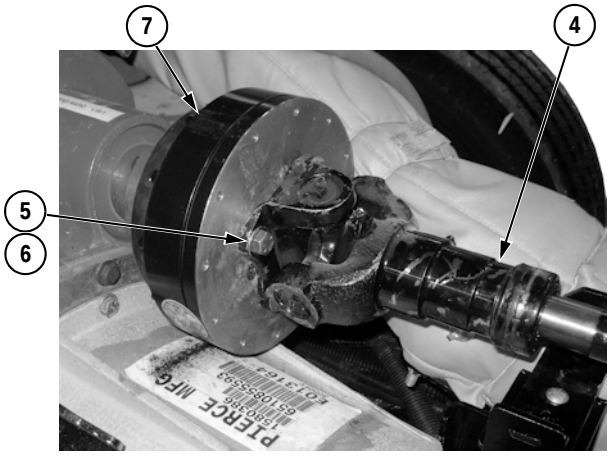
Driveshaft—Rear Mounting Hardware

NOTE: *Depending on the truck configuration, the vibration damper may be installed either on the pump side or on the engine side of the driveshaft. Note the location before removing to ensure correct installation. Engine-side mounting shown.*

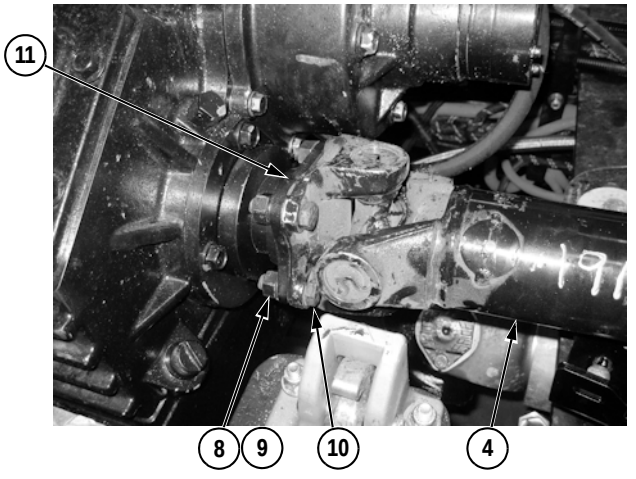
5. Support driveshaft (4).

6. Remove four screws (5) and lockwashers (6) from the driveshaft (4) and vibration damper (7).
7. Remove four nuts (8), lockwashers (9), and screws (10) from the driveshaft (4) and pump transmission drive input flange (11).
8. Remove the driveshaft (4).

b. Installation



Driveshaft—Front Mounting Hardware



Driveshaft—Rear Mounting Hardware

1. Apply Loctite® 271 high-strength threadlocker (Pierce P/N 95-1564) to the threads of all vibration damper screws (5) before installation.
2. Connect the driveshaft (4) to vibration damper (7) using four screws (5) and lockwashers (6). Tighten screws to 70 lb-ft (95 N·m).
3. Connect the driveshaft (4) to the pump transmission drive input flange (11) using four screws (10), lockwashers (9), and nuts (8). Tighten nuts to 70 lb-ft (95 N·m).
4. Apply Sentry Seal (Pierce P/N 95-1356) to screws (5) and nuts (8).

⚠ WARNING

Do not operate the vehicle without the driveshaft shield in place. Failure to comply may result in serious injury to personnel and damage to equipment.

5. Install driveshaft shield. (See **“1. Driveshaft Shield”** on page 1.)
6. Turn battery switch ON (if equipped), or connect batteries. (See “Battery Connect/Disconnect,” Group 0925-P-001.)
7. Lower cab. (Refer to “Operation & Maintenance Manual.”)
8. Remove “DO NOT START” tag from truck ignition switch.

3. VIBRATION DAMPER

NOTE: *Depending on the truck configuration, the vibration damper may be installed either on the pump side or on the engine side of the driveshaft. Use the procedure that matches your application.*

a. Removal—Pump Side Mounting

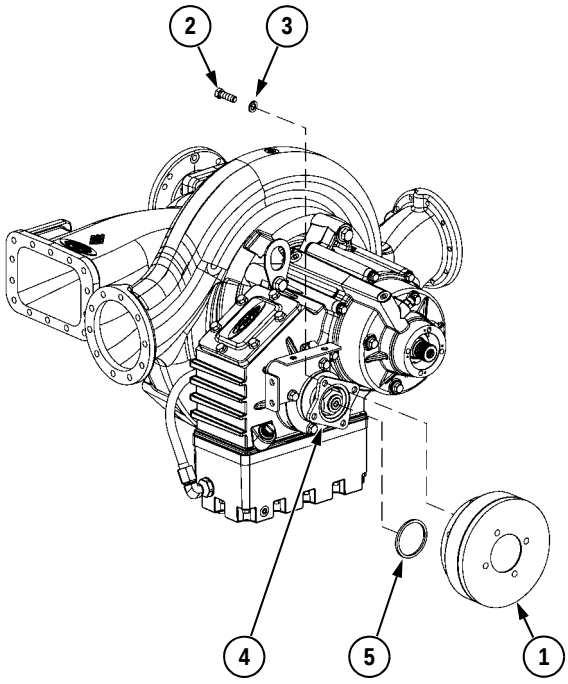
NOTE: *The vibration damper should be 86°F (30°C) or colder before beginning work.*

1. Attach a “DO NOT START” tag to truck ignition switch.

⚠ WARNING

Cab stay arm must be in the support position before working under the cab or on cab lift components. Failure to comply may result in serious injury or death to personnel.

2. Raise cab. (Refer to “Operation & Maintenance Manual.”)
3. Turn battery switch OFF (if equipped), or disconnect batteries. (See “Battery Connect/Disconnect,” Group 0925-P-001.)
4. Remove driveshaft. (See **“2. Driveshaft”** on page 4.)



5. Support the vibration damper (1).
6. Remove four screws (2) and lockwashers (3), and remove the vibration damper (1) from the drive input yoke (4).
7. Remove the flange adapter ring (5) from the drive input yoke (4).
8. Refer to “Voith Universal Coupling (PUC Driveline Damper),” Group 0510-P-001, for additional information.

b. Installation—Pump Side Mounting

1. Install the flange adapter ring (5) in the drive input yoke (4).
2. Apply Loctite® 271 high-strength threadlocker (Pierce P/N 95-1564) to the threads of all vibration damper screws (2) before installation.
3. Install the vibration damper (1) on the pump transmission drive input yoke (4) using four screws (2) and lockwashers (3). Tighten screws to 70 lb-ft (95 N·m).
4. Install driveshaft. (See **“2. Driveshaft”** on page 4.)
5. Turn battery switch ON (if equipped), or connect batteries. (See “Battery Connect/Disconnect,” Group 0925-P-001.)
6. Lower cab. (Refer to “Operation & Maintenance Manual.”)
7. Remove “DO NOT START” tag from truck ignition switch.

c. Removal—Engine Side Mounting

NOTE:

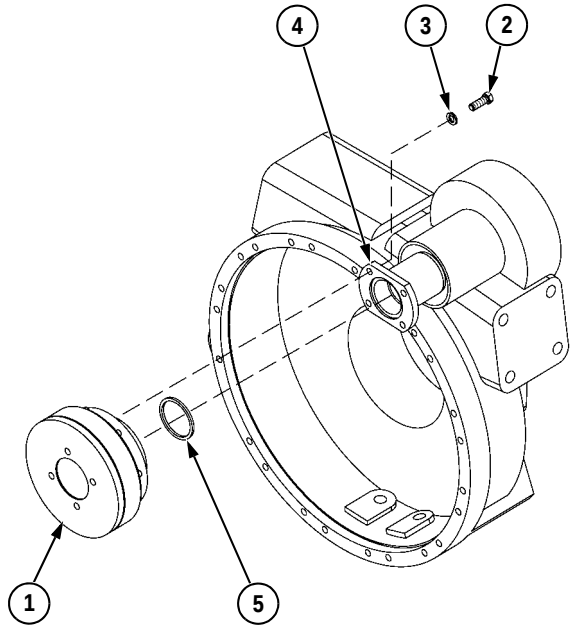
- *Depending on the truck configuration, the vibration damper may be installed with the large flange either toward the PTO flange or toward the driveshaft. Install the vibration damper in the same orientation as noted during removal.*
- *The vibration damper should be 86°F (30°C) or colder before beginning work.*

1. Attach a “DO NOT START” tag to truck ignition switch.

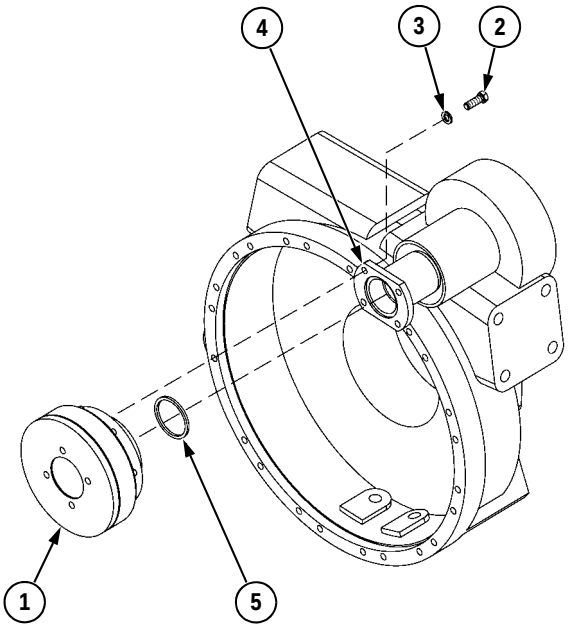
WARNING

Cab stay arm must be in the support position before working under the cab or on cab lift components. Failure to comply may result in serious injury or death to personnel.

2. Raise cab. (Refer to “Operation & Maintenance Manual.”)
3. Turn battery switch OFF (if equipped), or disconnect batteries. (See “Battery Connect/Disconnect,” Group 0925-P-001.)
4. Remove driveshaft. (See **“2. Driveshaft”** on page 4.)



Vibration Damper, Flange Toward Driveshaft



Vibration Damper, Flange Toward PTO Flange

5. Support the vibration damper (1).
6. Remove four screws (2) and lockwashers (3), and remove the vibration damper (1) from the PTO output yoke (4).
7. Remove the flange adapter ring (5) from the PTO output yoke (4).
8. Refer to “Voith Universal Coupling (PUC Driveline Damper),” Group 0510-P-001, for additional information.

d. Installation—Engine Side Mounting

1. Install the flange adapter ring (5) in the drive input yoke (4).
2. Apply Loctite® 271 high-strength threadlocker (Pierce P/N 95-1564) to the threads of all vibration damper screws (2) before installation.
3. Install the vibration damper (1) on the PTO output yoke (4) using four screws (2) and lockwashers (3). Tighten screws to 70 lb-ft (95 N·m).
4. Install driveshaft. (See **“2. Driveshaft”** on page 4.)
5. Turn battery switch ON (if equipped), or connect batteries. (See “Battery Connect/Disconnect,” Group 0925-P-001.)
6. Lower cab. (Refer to “Operation & Maintenance Manual.”)
7. Remove “DO NOT START” tag from truck ignition switch.

VOITH UNIVERSAL COUPLING (PUC DRIVELINE DAMPER)

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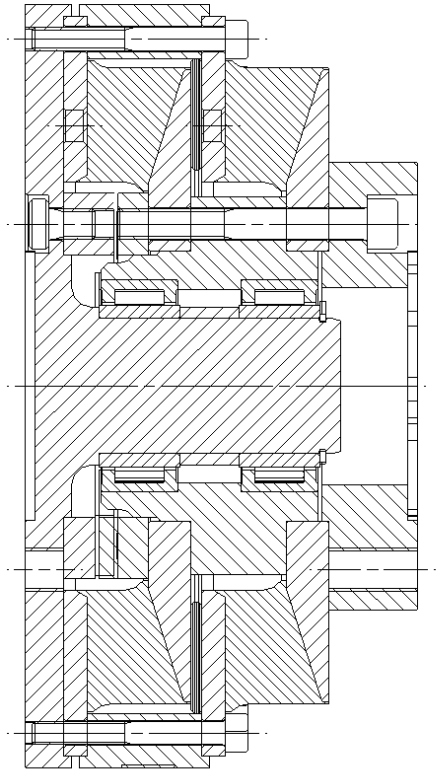

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Version: 1.3 2009-04-03 Abt.: aift	Voith Turbo Hochelastische Kupplungen GmbH & Co KG Centrumstraße 2 D-45307 Essen +49 201 55783-61 (Fax -65)	Seite 1 / 21

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1 Safety instructions

1.1 Work on the highly flexible coupling

For all work on the coupling it must be ensured that both the drive engine and the driven machine are at a standstill and cannot be started up under any circumstances.

Work should only be begun when the coupling has cooled down to below 30°C.

1.2 Rotating parts

Rotating parts such as the coupling itself and exposed shaft components are to be fitted with a guard to prevent injuries. However, this must not impair ventilation.

1.3 Fire protection

The coupling contains flammable materials. This must be taken into account when operating the coupling. More information on this can be obtained from VOITH.

2 Operating instructions

When operating the coupling, the following points are to be observed:

2.1 Media compatibility

The fluids listed in the following table must not enter into the coupling. This particularly applies to maintenance and cleaning of the unit in which the coupling is installed. They may cause damage to the elastomer element, damper and non-friction bearing.

- all types of mineral oils
- fuels (petrol, diesel…)
- hydraulic oils
- brake fluid
- alcohols
- acetone
- glycols (anti-freeze agents)
- glycerine
- distilled and demineralised water
- acids (sulphuric acid…)
- alkalis (soap suds, sodium lye)

More information on and exceptions to this table can be obtained from VOITH.

When cleaning with a steam jet, it should be ensured that the jet is not sprayed into the bearing and bolted connections.

2.2 Thermal compatibility

Excess temperatures in the elastomer element lead to reversals (melting), premature ageing and accelerated fatigue of the elastomer material. The coupling should therefore always be well (air-)cooled.

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Ambient temperature and internal dissipated energy lead to an increase in the core temperature in the coupling element. This should not exceed

- for natural rubber (NR): 100°C
- for silicon (SI): 140°C

Empirical values state that the ambient temperature, depending on the application, should not exceed:

- for natural rubber (NR): 70°C
- for silicon (SI): 110°C

These are recommended values, which may be higher or lower in individual cases. A more exact analysis can be obtained from VOITH.

3 Functional description

The VOITH highly flexible coupling is an industrial torsional vibration damper, which both displaces resonance frequencies and dampens torque peaks.

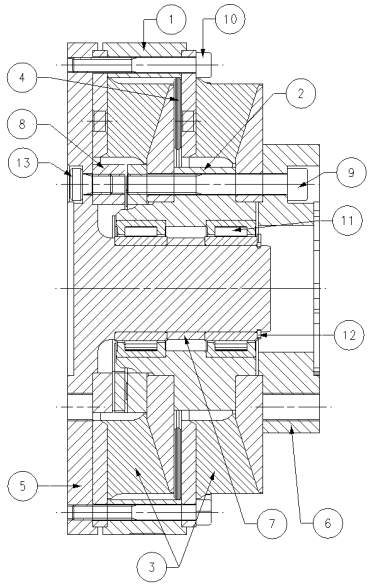
For this purpose, the drive line is coordinated with the aid of the coupling by arranging mass inertias, torsion spring strengths and dampings in such a way that the permitted torsional vibration or load surge levels are not exceeded. This coordination is carried out by means of a torsional vibration calculation (TVC), which can be included in the coupling delivery on request. The necessary information for the coupling design and the TVC must be provided by the customer. If this information is not available, empirical values or values from the relevant literature can be used for individual parameters. The system administrator is responsible for checking these assumptions.

For lifetime-oriented design of the coupling, the level of strain due to the vibration loads, resulting from the TVC, and also the frequency of their occurrence are decisive factors. For this reason the customer should state load spectra which reflect the actual operating states of the unit.

A torsional vibration measurement is also recommended, in order to determine in particular the operational loads which are a part of the load spectrum, in addition to checking the values assumed for the design.

VOITH is only responsible for the design of the coupling if this is clearly part of the scope of supply.

4 Installation instructions



Before installation, the corrosion protection on the contact surfaces of the coupling must be removed with a conventional solvent.

The coupling is attached in assembled state on the drive side. The tightening torque of the bolted connection is either specified by the drive motor manufacturer or is to be determined in accordance with VDI directive 2230. No washers are to be used.

The cardan shaft can now be mounted and bolted on. The instructions of the cardan shaft manufacturer concerning the bolts to be used, tightening torques, flange surface preparation etc. must be observed.

5 Commissioning instructions

The direction of rotation of the coupling is arbitrary. Observe the safety instructions when commissioning (section 1).

If unusual torsional vibrations (high noise level) occur after the engine or drive unit is switched on, the system is to be shut down immediately and the coupling manufacturer VOITH must be contacted.

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6 Checking the adhesive friction torque

After long periods of storage or standstill of the coupling, the coefficient of friction between the friction disk and the opposite steel surface may increase. Depending on the duration of this downtime and the environmental conditions during the downtime, the coefficient of friction may increase to such an extent that the adhesive friction torque becomes so high that the coupling is at first rigid in a limited area.

The correct adhesive friction torque of the coupling can be checked with a simple test. For this, the coupling must be firmly clamped with the flywheel side. The hub side must be free. Then, using a suitable lever arm, a torque can be applied to the hub side and the freedom of movement of the coupling in both directions of rotation can be checked.

With a maximum torque on the lever arm of approx. 30% of the nominal coupling torque T_{CN} (see drawing), a rotation of the coupling through a few angular degrees should always be achieved. If this is possible, the coupling is fully functional and may be operated further.
If the coupling cannot be rotated even with torques above 30% of T_{CN}, the adhesive friction torque would be too high for trouble-free, low-wear operation of the coupling and the machine. In this case, please contact Voith.

7 Disassembly and dismantling of the flexible coupling

To disassemble the coupling, the cardan shaft bolted to the universal coupling must be undone and pulled off.

Now the coupling must be detached from the drive and then completely removed.

To dismantle the coupling, the bolts (10) must be undone and the trunnion (5) as well as the inner rings of the needle bearings (11) and the spacer ring (7) must be pulled out of the hub (2). The cam ring (8) can remain on the trunnion (5) for the whole inspection time. As the inner rings of the needle bearings (11) and the spacer ring (7) are fixed with a retaining ring (12), they remain on the trunnion (5),too.

By undoing the bolts (9), the coupling can be dismantled into its individual parts. The outer rings of the needle bearings (11) are pressed into the hub (2) and can remain in the hub.

Note: If the bearing is to be examined, the retaining ring (12) must be removed and the inner rings of the needle bearings (11) and the spacer ring (7) pulled off the trunnion (5). The outer rings of the needle bearings (11) pressed into the hub (2) must also be pulled out.

8 Maintenance and replacement of wear parts

8.1 Cleaning and checking the coupling components

After dismantling the coupling, all parts should be cleaned. The elastomer material must not come into contact with petrol, kerosene or oil (see also section 2.1).

If only slightly dirty, e.g. dry dust, a hand brush is sufficient for cleaning the coupling components.

The roller-burnished running surfaces of the adjacent steel parts for the friction disk (4) must not be damaged. Reworking of these surfaces is not possible due to the precision of the surfaces.

If very dirty, e.g. sticky rubber residue, which may occur with raced coupling elements, the steel parts of the coupling can be cleaned in a degreasing agent (e.g. Inwac K 2000 from Inwac GmbH).

All parts of the coupling are to be inspected for damage and checked in accordance with the instructions in section 9.

8.2 Assembly instructions

When assembling the coupling, the tightening torques of the bolts given in the drawing must be observed (see also section 9.3).

Note: If the bearing was examined, the outer rings of the needle bearings (11) must first be pressed into the hub (2). Then first one inner ring of the needle bearings (11) and then the spacer ring (7) and the second inner ring of the needle bearings (11) must be pulled onto the trunnion (5). After that, the retaining ring (10) must be inserted.

Otherwise, assembly begins with inserting the second part of the cam ring (8) onto the cam ring bolted with the trunnion (5).

Then one coupling element (3), the casing (1), the friction disk (4), the hub (2) are mounted. The tapped holes of the cam ring (8) should almost align with the holes of the coupling element (3).

Now the second coupling element (3) is inserted and bolted with the bolts (10). Finally the centring hub (6) is mounted with the bolts (9).

After assembly of the coupling on the drive side, the cardan shaft can be mounted and bolted on. The instructions and tightening torques of the drive and cardan shaft manufacturer are to be observed (see also section 8.3).

8.3 Assembly of bolted connections

The following points must always be observed for bolted connections with which flanges are clamped, which are to transmit power or torque frictionally engaged:

- The flange surfaces must be clean and free of grease or oil (max. coefficient of friction of the torque-transmitting surfaces)
- The tapped hole or nut must be clean (i.e. free of swarf, dust etc.) (max. conversion of starting power to bolt tension force)
- The thread of the bolt and the bolt head contact surface must be lightly oiled (max. conversion of starting power to bolt tension force)
- No washers or similar must be used unless otherwise expressly stated.
- The torques specified in the drawing must be exactly observed. Insufficient or excessive tightening may lead to failure of the connection.

8.4 Balancing

All universal shaft couplings are balanced with a balance quality grade of G = 6.3 in accordance with DIN ISO 1940. New parts produced in our company are well below the permitted threshold values.

Wear parts to be replaced in the event of repair are rotationally symmetrical and from experience do not lead to not unauthorised imbalance.

If excessive imbalance occurs unexpectedly, the balance must be checked. The permitted imbalance values are given in the drawing.

9 Replacement intervals and wear limits

The VOITH highly flexible coupling contains wear parts (needle bearing (bearing) and friction disk (damper)) and fatigue parts (coupling element).

Physically, the wear rate of the bearings and dampers correlates only to a very limited degree with the fatigue rate of the elastomer material in the coupling element. Generally, however, the bearing and damper wear rate as at most as great as the elastomer material fatigue rate.

To achieve high availability of the system, it is recommended to measure the wear rate of the bearing (needle bearing) and **if the wear limit of the bearing (needle bearing) is exceeded, also to replace the damper (friction disk) and the coupling element**. However, these parts are to be replaced at the latest **during the general overhaul of the engine**. The wear limits for the bearing are given in section 9.2 and those of the damper in the following table:

Size	005	010	015	020	025	030	035	040	045	050	055	060	065	070	075	080
Damper thickness	3.0	3.0	3.0	3.0	3.0	4.0	4.0	4.0	4.0	5.0	5.0	6.0	6.0	6.0	7.0	7.0
Wear limit	2.7	2.7	2.7	2.7	2.7	3.6	3.6	3.6	3.6	4.5	4.5	5.4	5.4	5.4	6.3	6.3

However, depending on the area of application, the elastomer material in the coupling element may have a considerably longer service life than the bearing-damper system. More detailed information and calculations can be obtained from the manufacturer.

9.1 Highly flexible coupling element

The elastomer material of the coupling element has only a limited service life. It is influenced by the load spectrum, the element temperature and the age of the element.

The load spectrum depends only on the operating states of the unit. The element temperature depends on the ambient temperature and the dissipated energy, which occurs in the coupling due to alternating torques.

It is not yet possible to define the (residual) service life of an elastomer material. The elastomer material in the coupling element should therefore be assessed based on the number of operating hours for which it was in operation:

Operation with very low dynamic torque loads: 40,000 hrs

no engine slipping, no load surges, speed variation between idling and nominal speed < 5 x p.hr.

Potential applications with comparable load spectrum:

Gensets, railcars

Operation with medium dynamic torque loads: 20,000 hrs

engine slipping in exceptional cases, load surges (< Tnom) < 30 x p.hr., speed variation between idling and nominal speed < 30 x p.hr., load surges (< Tkmax) ≤ 1 x p.hr.

Potential applications with comparable load spectrum:

Railcars, main-line locomotives, dumper trucks, mobile cranes, working boats, waterjet drives, pleasure boats, accessory and auxiliary drives

Operation with high dynamic torque loads: 10,000 hrs

engine slipping is seldom (<5sec) ≤ 1 x p.hr., load surges (< Tnom) < 60 x p.hr., speed variation between idling and nominal speed < 60 x p.hr., load surges (< Tkmax) < 2 x p.hr.

Potential applications with comparable load spectrum:

Shunting engines, wheeled loaders, hydraulic excavators, engine test benches, sewage boats, secondary marine drives

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+49 201 55783-61 (Fax -65)

Ageing limit **max 10 years**

However, the service life may be considerably longer or shorter than the stated values. Therefore an intensive visual inspection of the coupling element should be carried out before it is reinstalled:

For economic reasons, in particular for lower bell housing installation, we generally recommend replacing the coupling element when the bell housing is open. In our experience, the costs for disassembly of the engine unit and opening the bell housing far exceeds the price of a replacement part.

The underlying reason for the ageing limit is the natural ageing process of elastomer material, which leads to a continual reduction of the residual service life. To reliably transmit load peaks, we recommend replacing the coupling element after the ageing limit has been reached as part of preventive maintenance. However, this recommendation should not result in the system being shut down if the coupling is still being operated without problems.

The coupling element can be inspected for possible detachments and cracks by being pulled apart axially under a press. The pulling distance must not exceed max. 1/3 of the overall coupling element height. When pulled apart, any detachments and cracks become visible. If this is the case, the element must be replaced.

9.2 Bearings (antifriction bearings)

Due to the exclusively oscillating movement of the antifriction bearings during operation of the coupling, they are subject to a certain degree of wear.

This is checked when the coupling is dismantled. The bearings are to be checked for external signs of damage and discoloration. It should be possible to easily turn the bearing evenly. No tangible play must exist during a radial or axial movement of the inner ring against the outer ring.

If the bearing is not easily moved and free of play, it must be replaced.

9.3 Bolted connections

All bolted connections should generally be replaced.

10 Replacement parts list

The replacement parts list corresponds to the parts list (see Appendix). It is recommended to keep the following wear parts in stock:

- coupling element
- friction disk
- roller bearings
- retaining ring

11 Repair service

On request, the coupling can be repaired by VOITH using tested used parts. It is then in as-new condition.

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12 Instructions on environmental protection and disposal

The coupling element and friction disk of the highly flexible couplings must be disposed of separately from household waste due to their chemical constituents.

They must be disposed of as special waste or returned to VOITH Turbo for disposal.

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13 Transport and storage instructions

13.1 Transport

- The couplings should be transported in such a way that damage can be excluded.
- Transport fixtures on the couplings are to be used (tapped holes for eyebolts).

13.2 Storage

- Flexible couplings are to be stored in accordance with DIN 7716 point 3.
- The couplings are stored on pallets or lying in skeleton containers (horizontal).

13.3 Preservation

- When delivered, the VOITH highly flexible couplings are provided as standard with a synthetic resin primer (RAL 7032 pebble grey). The specification can be obtained from VOITH.
- Attention: Permanent corrosion protection is only achieved with a suitable surface lacquer.
- Customers' requests concerning the colour and quality of the lacquer can of course be considered.
- On delivery, the connecting surfaces are treated with transparent corrosion protection.
- With correct storage, it is recommended to renew the corrosion protection after two years.
- Unpainted aluminium or stainless steel surfaces do not require corrosion protection and are untreated when delivered.

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+49 201 55783-61 (Fax -65)

VOITH	User's Manual Universal coupling Series 170/171	aift

14 Manufacturer's Statement in Accordance with Guideline 98/37/EG, Appendix II B

We declare that the coupling described in this operations manual is intended for installation in machines. Initial operation may not begin before it has been determined that the machine in which the coupling is to be installed corresponds to the regulations of the above referenced EU Guideline.

Essen, 2009-04-03

ppa. K. Becker

Markus K. Becker

Leiter Technik, VTKH

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Version: 1.3 2009-04-03 Abt.: aift	Voith Turbo Hochelastische Kupplungen GmbH & Co KG Centrumstraße 2 D-45307 Essen +49 201 55783-61 (Fax -65)	Seite 20 / 21

15 Contact

VOITH

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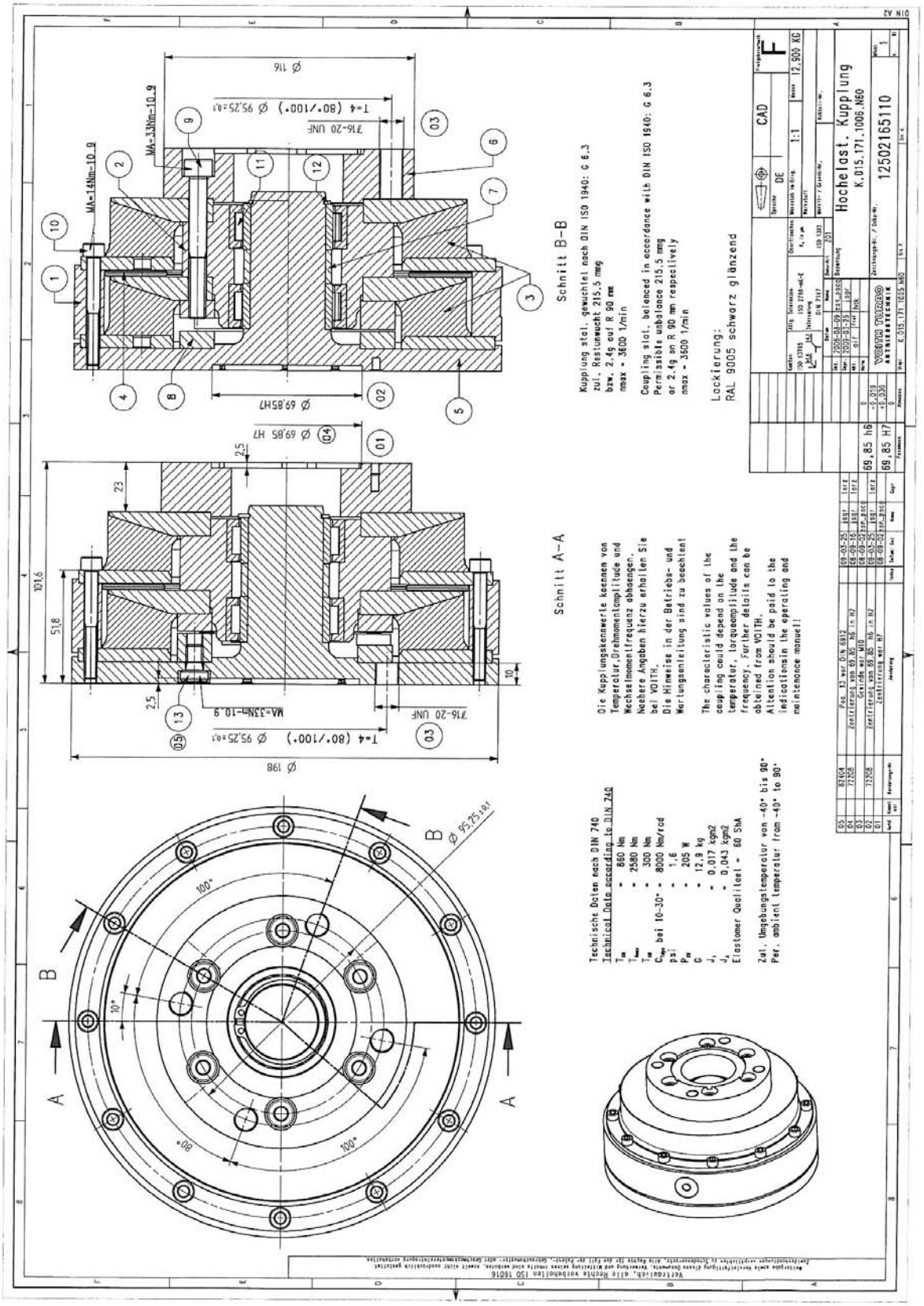

Schnitt B–B
Schnitt A–A
Kupplung stat. gewuchtet nach DIN ISO 1940: G 6.3
zul. Restunwucht 215,5 mmg
bzw. 2,4g auf R 90 mm
nmax = 3600 1/min
Coupling stat. balanced in accordance with DIN ISO 1940: G 6.3
Permissible unbalance 215,5 mmg
or 2.4g on R 90 mm respectively
nmax = 3600 1/min
Lackierung:
RAL 9005 schwarz glänzend
Hochelast. Kupplung
K.015.171.1006.N60
12502165110
CAD
Technische Daten nach DIN 740
Technical Data according to DIN 740
Die Kupplungskennwerte koennen von Temperatur, Drehmomentamplitude und Wechselmomentfrequenz abhaengen. Naehere Angaben hierzu erhalten Sie bei VOITH.
Die Hinweise in der Betriebs- und Montageanleitung sind zu beachten!
The characteristic values of the coupling could depend on the temperatur, torqueamplitude and the frequency. Further details can be obtained from VOITH.
Attention should be paid to the indications in the operating and maintenance manuel!
Elastomer Qualität - 60 ShA
Zul. Umgebungstemperatur von -40° bis 90°
Per. ambient temperature from -40° to 90°

09.04.2009/10:53:48 Explode BOM: level by level / BOM application PP01 Uid: TERZ Sys: AP1 Page 1

plant material no. valid from	denomination RV document no.	dty Dpa DV DS	Pcha MS BS product hierarchy document designation	requ.quantity UoM DI Al base quantity UoM SM PS
1272 125.0216511000 26.01.2009	high. flex. coupling K.015.171.1006.N60		E050 70 70	1,00 PC 2 1,00 PC

stage	item	component no.	denomination	Pcha MS BS DG FG DI sortfield	SM	PI	BM	quantity	UoM	IC	As
1	0001	125.0134570001	shell K.015.038.1004 C45+N	K040 70				1,00	PC	L	_
1	0002	125.022358100A	hub K.015.045.1044 C45+N	K040 70				1,00	PC	L	_
1	0003	125.0006890001	coupling element K.015.050.0009	E030 70 70				2,00	PC	L	X
1	0004	125.0019580001	friction disc K.015.055.0012 RG3 CS	K040 70				1,00	PC	L	_
1	0005	125.022359100A	supporting journal - K.015.070.1149 C45*	K040 70				1,00	PC	L	_
1	0006	125.022360100A	spigot hub K.015.082.1033 C45+N	K040 70				1,00	PC	L	_
1	0007	125.021547100A	spacer ring — K.015.099.1200 C45+N	K040 70				1,00	PC	L	_
1	0008	125.022361100A	cam ring K.015.061.1001 C45+N	K040 70				2,00	PC	L	_
1	0009	H01.000349	socket head screw M8X65 10.9	K050 70			X	6,00	PC	L	_
1	0010	H01.000336	socket head screw M6X50 10.9	K050 70			X	12,00	PC	L	_
1	0011	H01.098116	needle-type bearing NA4907-2RS W.ST.	K050 70				2,00	PC	L	_
1	0012	H01.031687	snap ring W-35 FED.ST.	K050 70				1,00	PC	L	_
1	0013	H01.231696	socket head screw M8X12 10.9	K050 70				6,00	PC	L	_

Plumbing

Chapter Contents

PIERCE ULTIMATE CONFIGURATION (PUC)

1. PUMP TRANSMISSION LUBRICATION

The Pierce® Ultimate Configuration (PUC) pump transmission incorporates an internal lubrication pump, providing forced lubrication for power transmission components.

The positive lubrication system provides an effective means to filter, cool, and distribute lubricant in a controlled manner.

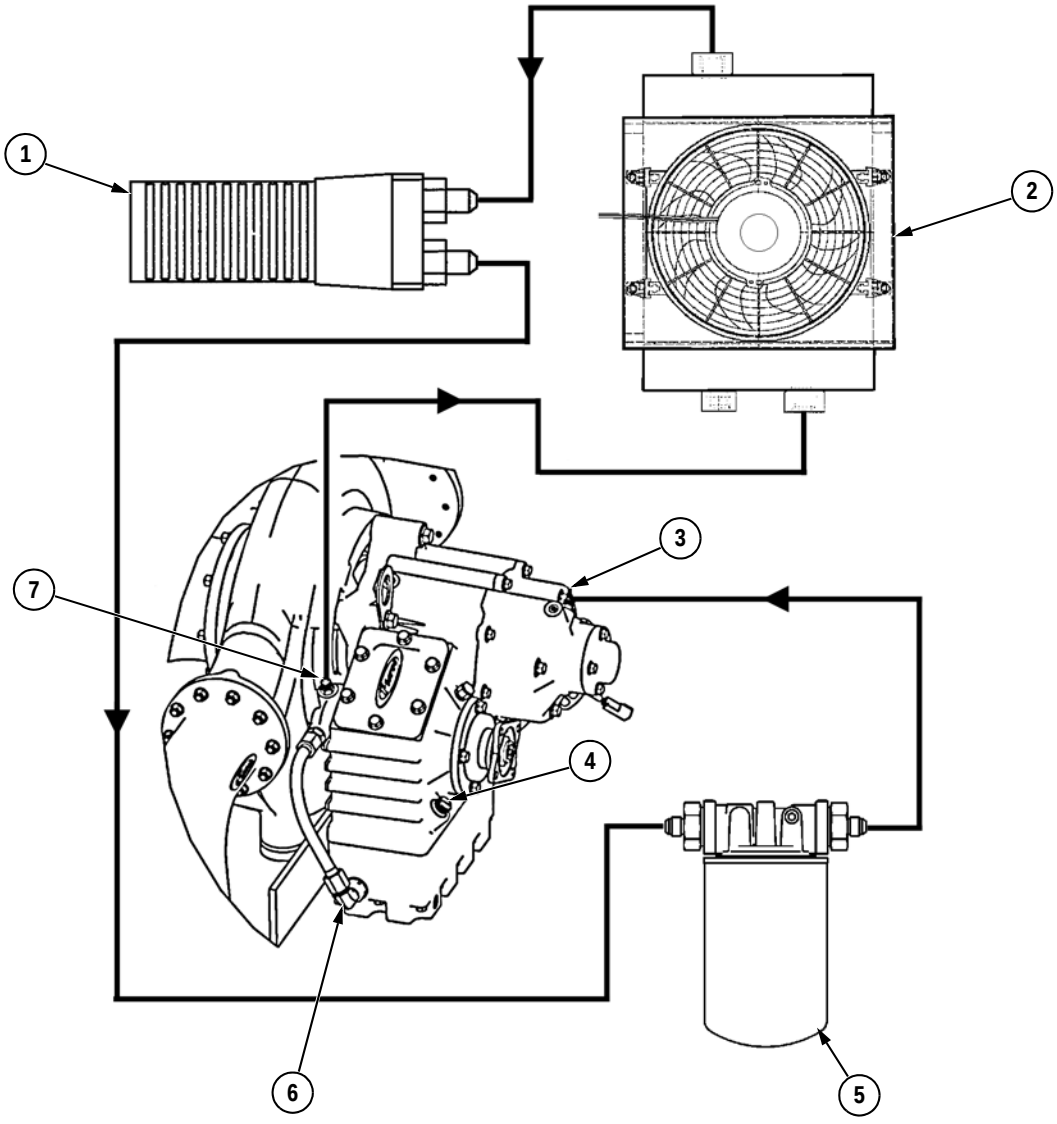
Two oil coolers are used to provide oil cooling in all situations:

- An oil-to-air cooler is used to cool the transmission oil when the truck is in transit, or when no water is moving through the pump. This oil cooler uses an electric fan to provide air flow through the heat exchanger.
- An oil-to-water heat exchanger mounted in the suction tee is used to cool the transmission oil when the water is flowing through the pump.

Pump transmission lubricant is circulated from the transmission reservoir through a filter and oil coolers, then back into the transmission assembly at the outboard impeller shaft bearing. Internal oil passageways distribute oil to component contact surfaces, minimizing contact wear.

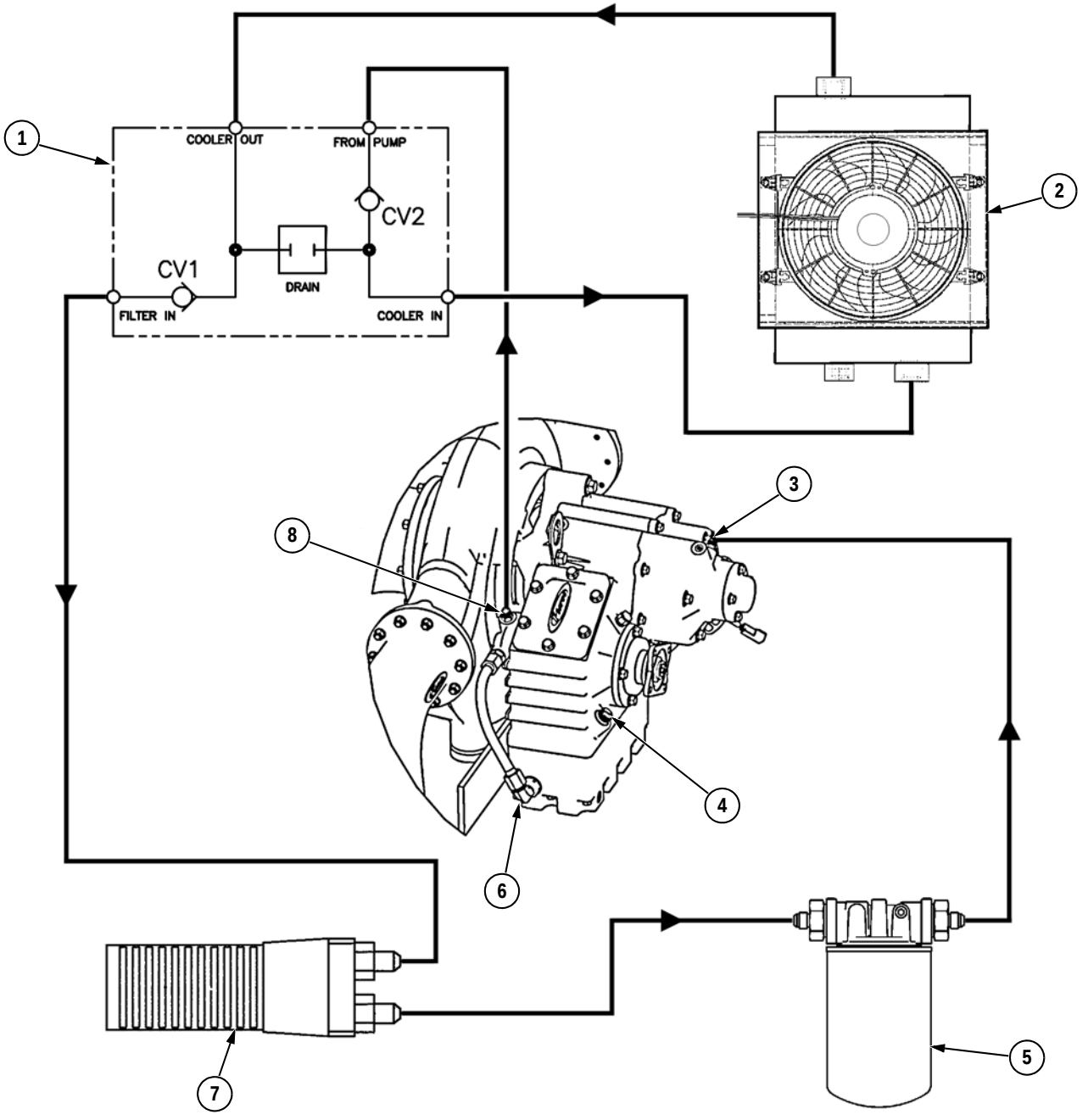
In top mount applications, a check valve manifold is used to prevent oil from draining out of the oil-to-air oil cooler when the pump is not engaged.

a. Lubrication System Schematic—Side Control Applications



1. Oil Cooler (Oil-to-Water)
2. Oil Cooler (Oil-to-Air)
3. Lubrication Return Port
4. Oil Fill Port and Oil Level Dipstick
5. Oil Filter
6. Lubrication Pump Suction Line and Screen
7. Lubrication Pump Discharge Port

b. Lubrication System Schematic—Top Mount Applications



1. Check Valve Manifold
2. Oil Cooler (Oil-to-Air)
3. Lubrication Return Port
4. Oil Fill Port and Oil Level Dipstick
5. Oil Filter
6. Lubrication Pump Suction Line and Screen
7. Oil Cooler (Oil-to-Water)
8. Lubrication Pump Discharge Port

c. Check Transmission Oil Level

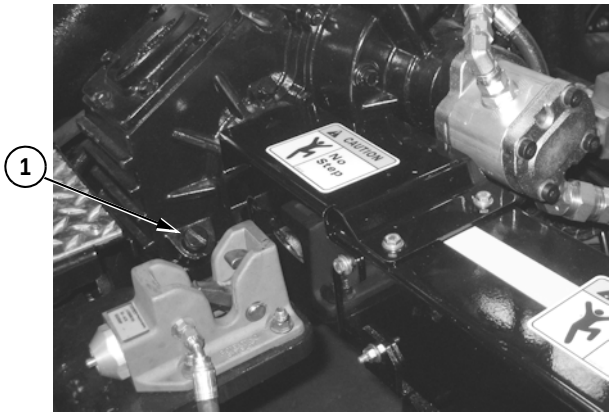
Check oil level every 25 hours of pumping operation or every three months. Change oil and filter every 100 hours or 6 months.

1. Attach a “DO NOT START” tag to truck ignition switch.

⚠ WARNING

Cab stay arm must be in the support position before working under the cab or on cab lift components. Failure to comply may result in serious injury or death to personnel.

2. Raise cab. (Refer to “Operation & Maintenance Manual.”)



NOTE: *When checking oil level, dipstick must be screwed all the way in and then removed for accurate readings.*

3. Remove dipstick (1) and check oil level. The oil level should be at a point between the two grooves on the oil level dipstick.

⚠ CAUTION

- **Use only the recommended PUC XPL Extreme Performance Lubricant in the PUC transmission. Failure to comply will cause damage to equipment and void the warranty.**
- **Do not overfill. Overfilling may cause excessive transmission operating temperatures.**
- **Do not use grease as a transmission lubricant.**

4. Add oil as needed through the dipstick opening. Use only PUC XPL Extreme Performance Lubricant (Pierce P/N 1915175).

⚠ CAUTION

- **Never run the pump dry, except momentarily and at low speeds.**
- **Do not use this pump for hose testing. Failure to comply could result in damage to equipment.**

5. Run engine for a short period to distribute oil.
6. Shut engine off.
7. Recheck oil level and add additional oil as needed.
8. Lower cab. (Refer to “Operation & Maintenance Manual.”)
9. Remove “DO NOT START” tag from truck ignition switch.

2. OIL FILTER

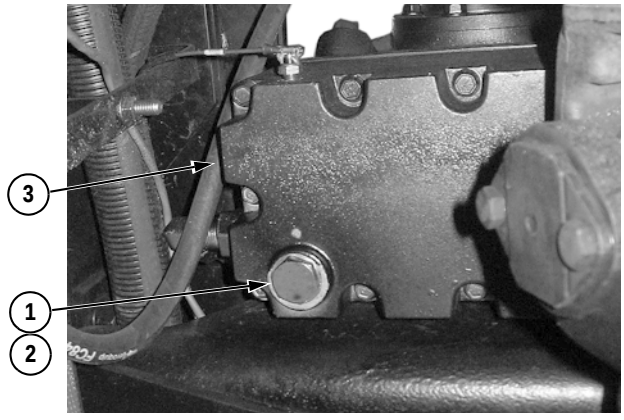
a. Removal

1. Attach a “DO NOT START” tag to truck ignition switch.

⚠ WARNING

Cab stay arm must be in the support position before working under the cab or on cab lift components. Failure to comply may result in serious injury or death to personnel.

2. Raise cab. (Refer to “Operation & Maintenance Manual.”)
3. Turn battery switch OFF (if equipped), or disconnect batteries. (See “Battery Connect/Disconnect,” Group 0925-P-001.)



⚠ WARNING

Transmission becomes hot during normal operation. Allow transmission to cool slightly prior to performing this task. Failure to comply could result in serious injury to personnel.

IMPORTANT

DO NOT POLLUTE! Dispose of used oil in an environmentally responsible manner. If available, take used oil to a collection center for recycling. If recycling is not available, inquire as to the correct procedure for disposal.

4. Place a suitable container under the drain plug (1) to catch draining oil.
5. Remove drain plug (1) and O-ring (2), and drain oil from transmission sump (3).
6. Inspect oil for debris or cloudiness (water entrapped in oil). If any abnormalities are noted in the oil, determine the cause and make repairs as needed.

NOTE: *Always use new O-rings for installation.*

7. Apply a thin film of Dow Corning® 111 (Silicone Compound) grease (Pierce P/N 1788950) to O-ring (2), and install O-ring (2) on drain plug (1).
8. Install drain plug (1) and O-ring (2) in transmission sump (3).

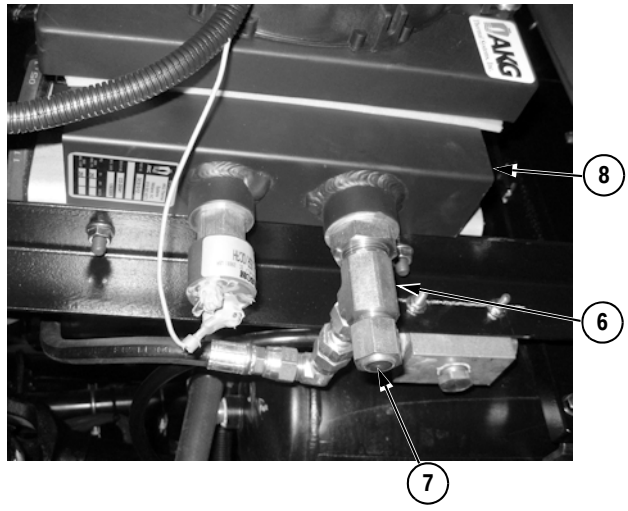
9. Place a suitable container under the filter (4) to catch draining coolant.
10. Remove filter (4) from filter head (5).

NOTE: *When removing the filter, some or all of the gasket may remain attached to the filter head.*

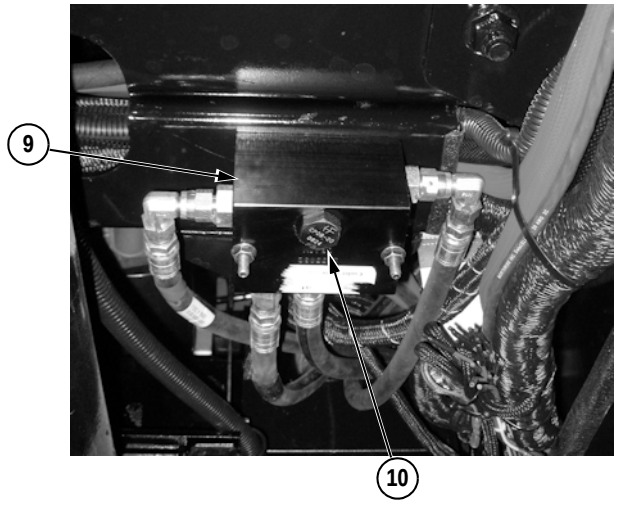
11. Check the filter head (5) to make sure all gasket residue is removed.

NOTE: *The oil-to-air oil cooler must be drained:*

- *Side Control Applications: Proceed to steps 12 through 14.*
- *Top Mount Applications: Proceed to steps 15 through 17.*



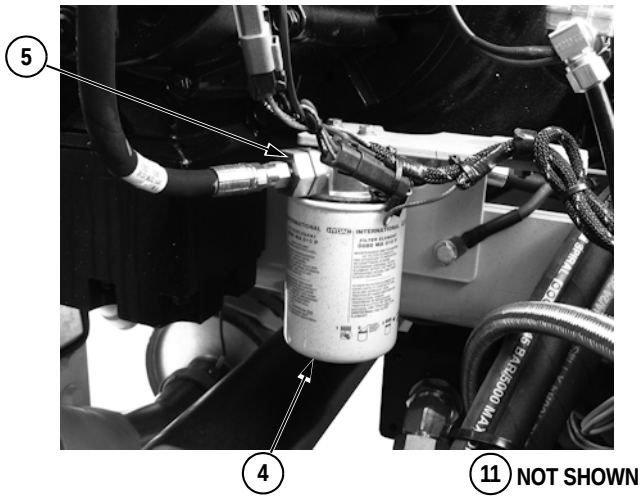
12. Place a suitable container under the T-fitting (6) to catch draining oil.
13. Remove the oil drain cap (7) from the T-fitting (6) at the bottom of the oil-to-air cooler (8).
14. Replace the drain cap (7) on the T-fitting.



NOTE: *The check valve manifold is located under PUC pump assembly, on the driver's side.*

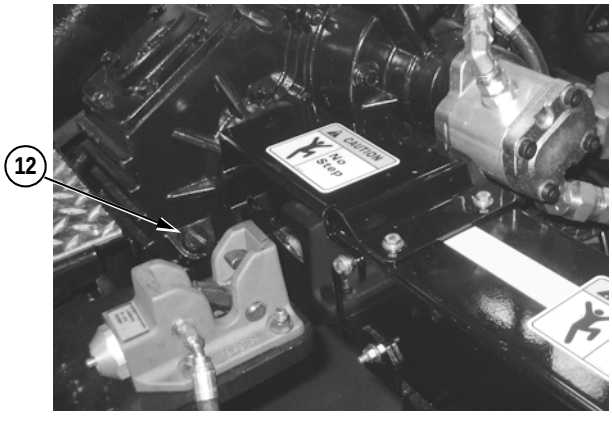
15. Place a suitable container under the check valve manifold (9) to catch draining oil.
16. Remove the drain plug (10), and allow the oil to drain.
17. Install the drain plug (10).

b. Installation



NOTE: *The spin-on filter element should have a 10-micron rating with a 5-gpm (8.9-L/min) or greater flow capacity (Pierce P/N 1777990).*

1. Apply a thin film of clean transmission oil (PUC XPL Extreme Performance Lubricant [Pierce P/N 1915175]) to the filter gasket (11).
2. Fill the filter (4) with clean transmission oil and install filter on filter head (5).



NOTE: *The transmission oil reservoir capacity is approximately 4 quarts (3.8 liters) of lubricant. Oil filter and cooler will require an additional 2 quarts (1.9 liters) when completely drained.*

3. Remove dipstick (12) and fill the oil sump to proper level with PUC XPL Extreme Performance Lubricant (Pierce P/N 1915175). (See **"Check Transmission Oil Level"** on page 3-5)
4. Turn battery switch ON (if equipped), or connect batteries. (See "Battery Connect/Disconnect," Group 0925-P-001.)

CAUTION

- **Never run the pump dry, except momentarily and at low speeds.**
- **Do not use this pump for hose testing. Failure to comply could result in damage to equipment.**

5. Run engine for a short period to distribute oil and check for leaks.
6. Shut engine off.
7. Recheck oil level and add additional oil as required.
8. Lower cab. (Refer to "Operation & Maintenance Manual.")
9. Remove "DO NOT START" tag from truck ignition switch.

3. OIL FILTER HEAD

a. Removal

1. Attach a "DO NOT START" tag to truck ignition switch.

WARNING

Cab stay arm must be in the support position before working under the cab or on cab lift components. Failure to comply may result in serious injury or death to personnel.

2. Raise cab. (Refer to "Operation & Maintenance Manual.")
3. Turn battery switch OFF (if equipped), or disconnect batteries. (See "Battery Connect/Disconnect," Group 0925-P-001.)

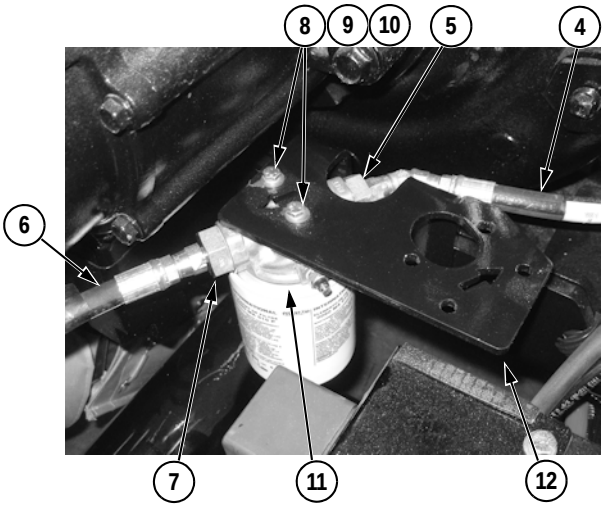
⚠ WARNING

Transmission becomes hot during normal operation. Allow transmission to cool slightly prior to performing this task. Failure to comply could result in serious injury to personnel.

4. Remove oil filter (1). (See **"Removal"** on page 3-5.)

NOTE: *Label all wiring connectors and note their locations before removing to ensure correct installation.*

5. Disconnect wiring connector (2) from sending unit (3).



NOTE: *Label all hoses before disconnecting to ensure correct installation.*

6. Disconnect hose (4) from fitting (5). Install a plug in hose to prevent contamination and loss of oil from the system.
7. Disconnect hose (6) from fitting (7). Install a plug in hose to prevent contamination and loss of oil from the system.

NOTE: *Note the orientation of the filter head before removing to ensure correct installation.*

8. Remove two screws (8), lockwashers (9), and flat washers (10), and remove filter head (11) from bracket (12).
9. Remove fittings and O-rings (5 and 7) from filter head (11).

b. Installation

NOTE:

- ✍ *Inspect O-rings before installation. Replace O-rings as needed.*
- ✍ *Lightly lubricate O-rings with clean hydraulic oil before installation.*
- ✍ *See "Hydraulic Hose & Tube Fitting Torque Specifications," Group 9600-P-003, for torque specifications.*
- ✍ *Install the filter head in the same orientation as noted during removal.*
- ✍ *Connect hoses to the same locations as noted during removal.*

1. Install fittings and O-rings (5 and 7) in filter head (11).
2. Install filter head (11) on bracket (12) using two screws (8), lockwashers (9), and flat washers (10).
3. Connect hose (4) to fitting (5).
4. Connect hose (6) to fitting (7).

5. Install filter (1) on filter head (11). (See **"Installation"** on page 3-7.)

NOTE: *Connect wiring connectors to the same locations as noted during removal.*

6. Connect wiring connector (2) to sending unit (3).

⚠ WARNING

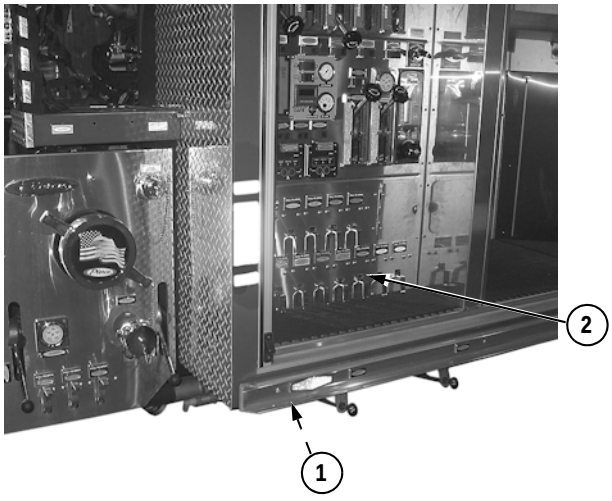
Adhesives, solvents, and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin and clothing. Keep away from open fire and use in well-ventilated area. If adhesives, solvents, or sealing compounds get on skin or clothing, wash immediately with soap and water. Failure to comply could result in serious injury or death to personnel.

NOTE: *All exposed positive and negative connections and connecting hardware must be protected against moisture, contamination, and corrosion by applying a sealer to connecting hardware and studs.*

7. Apply Sealer Protective, Dow Corning® P/N 1890 (Pierce P/N 95-1289) to sending unit connections. Make sure all conductive surfaces are covered.
8. Turn battery switch ON (if equipped), or connect batteries. (See “Battery Connect/Disconnect,” Group 0925-P-001.)
9. Recheck oil level and add additional oil as required.
10. Lower cab. (Refer to “Operation & Maintenance Manual.”)
11. Remove “DO NOT START” tag from truck ignition switch.

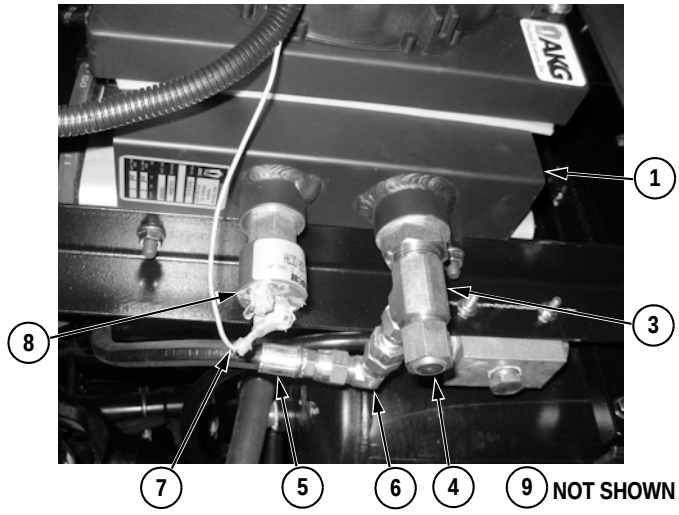
4. OIL COOLER (OIL-TO-AIR)—SIDE CONTROL

a. Removal



NOTE: *The oil cooler assembly (1) is located on the outside of the left (driver) side frame rail, at the front of the body. Access can be gained from below the body, or by removing the lower control panel (2). Depending on the application, some equipment may need to be removed to gain access to oil cooler components.*

1. Attach a “DO NOT START” tag to truck ignition switch.
2. Turn battery switch OFF (if equipped), or disconnect batteries. (See “Battery Connect/Disconnect,” Group 0925-P-001.)



⚠ WARNING

Transmission oil becomes hot during normal operation. Allow oil cooler to cool slightly prior to performing this task. Failure to comply could result in serious injury to personnel.

IMPORTANT

DO NOT POLLUTE! Dispose of used oil in an environmentally responsible manner. If available, take used oil to a collection center for recycling. If recycling is not available, inquire as to the correct procedure for disposal.

3. Place a suitable container under the T-fitting (3) to catch draining oil.
4. Remove the oil drain cap (4) from the T-fitting (3) at the bottom of the oil cooler assembly (1).
5. Replace the drain cap (4) on the T-fitting.

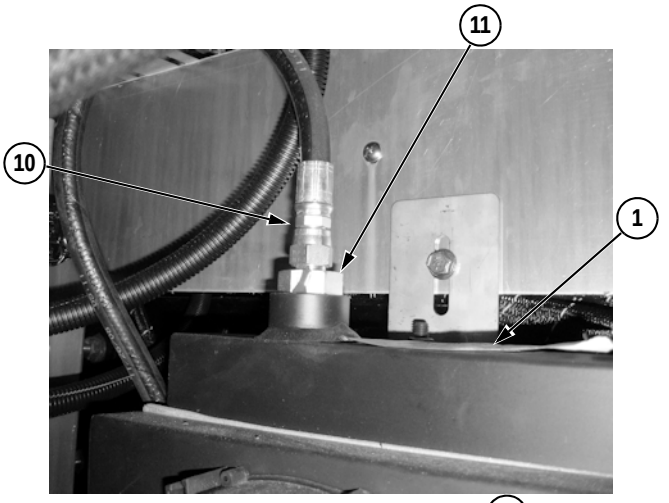
NOTE:

- *Label all hoses and note their locations before disconnecting to ensure correct installation.*
- *Install plugs in hoses to prevent the loss of hydraulic oil, and to prevent contaminates from entering the hydraulic system.*

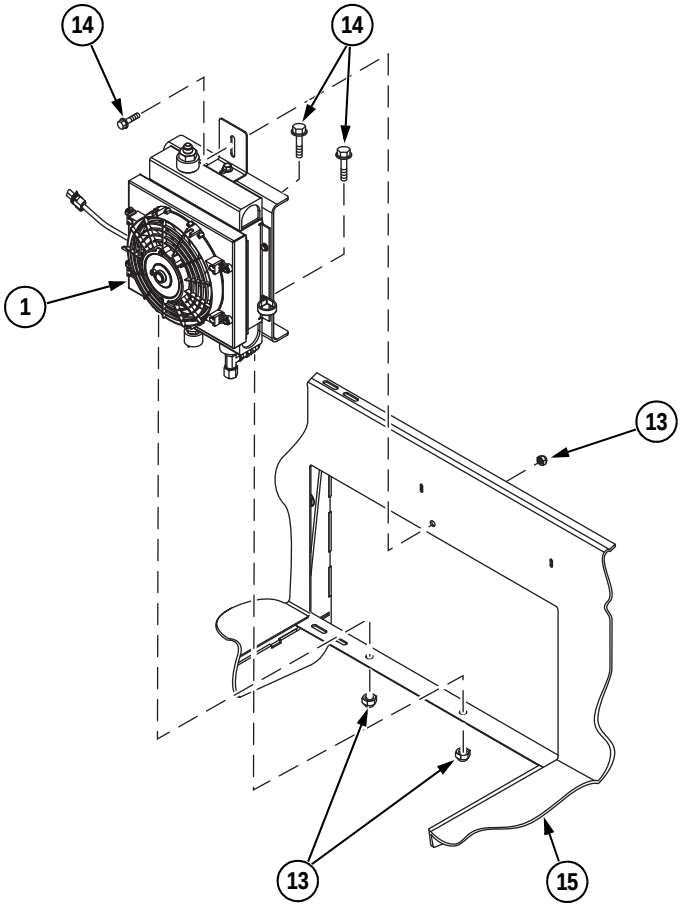
6. Disconnect hose (5) from 90° elbow (6). Install a plug in hose to prevent contamination and loss of oil from the system.

NOTE: *Label all wires and note their locations to ensure correct installation.*

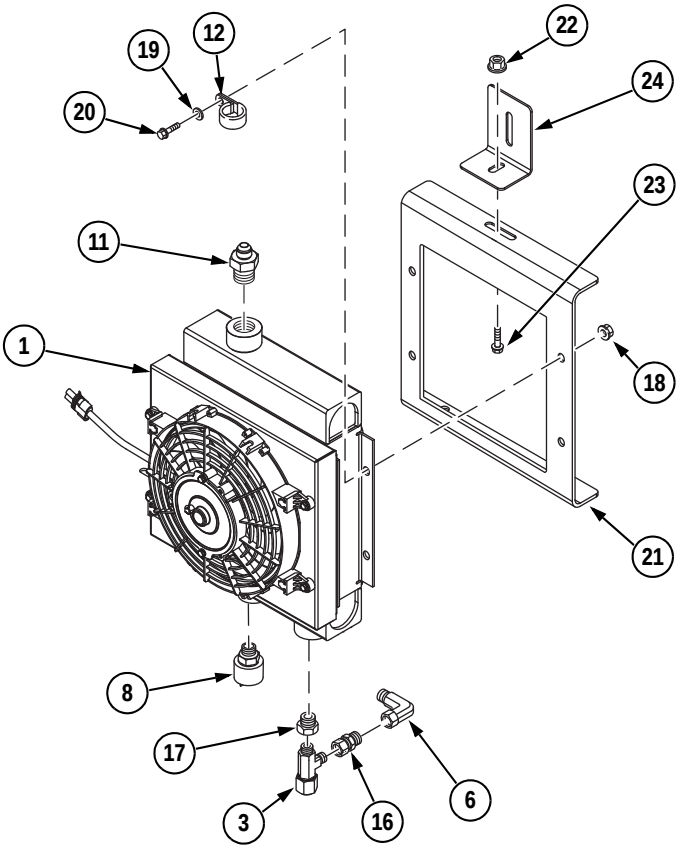
7. Remove sealant from the terminal and disconnect the wire (7) from the temperature switch (8).
8. Disconnect the fan wiring harness connector (9) from the truck harness.



9. Disconnect hose (10) from the fitting (11) at the top of the oil cooler assembly (1).
10. Route hose (10) through the clamps (12) mounted on the side of the oil cooler assembly (1)



11. Support the oil cooler assembly (1).
12. Remove three flanged nuts (13) and screws (14), and remove the oil cooler assembly (1) from the body support frame (15).



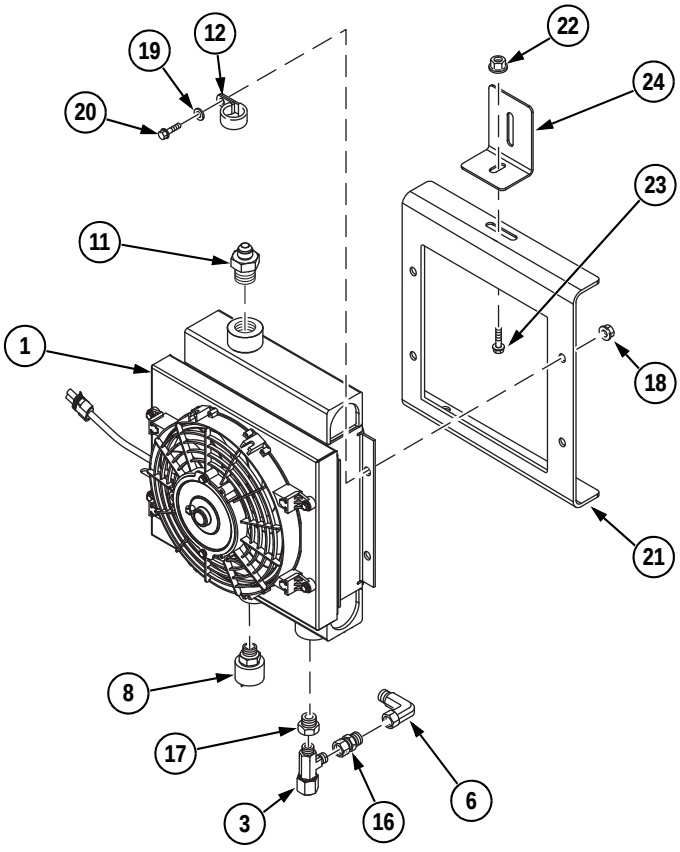
NOTE: *Note the location and orientation of the fittings before removing to ensure correct installation.*

13. Remove fitting and O-ring (11) from oil cooler assembly (1).
14. Remove 90° elbow and O-ring (6), swivel adapter and O-ring (16), T-fitting and O-ring (3), and reducer and O-ring (17) from oil cooler assembly (1).
15. Remove oil temperature switch and O-ring (8) from oil cooler assembly (1).

NOTE: *Note the location of the clamps before removal to ensure correct installation.*

16. Remove four locknuts (18), washers (19), and screws (20), and remove the oil cooler assembly (1) and two clamps (12) from mounting bracket (21).
17. Remove locknut (22) and screw (23), and remove bracket (24) from mounting bracket (21).

b. Installation



NOTE: *Always use new locknuts for installation.*

1. Install bracket (24) to mounting bracket (21) using screw (23) and locknut (22).

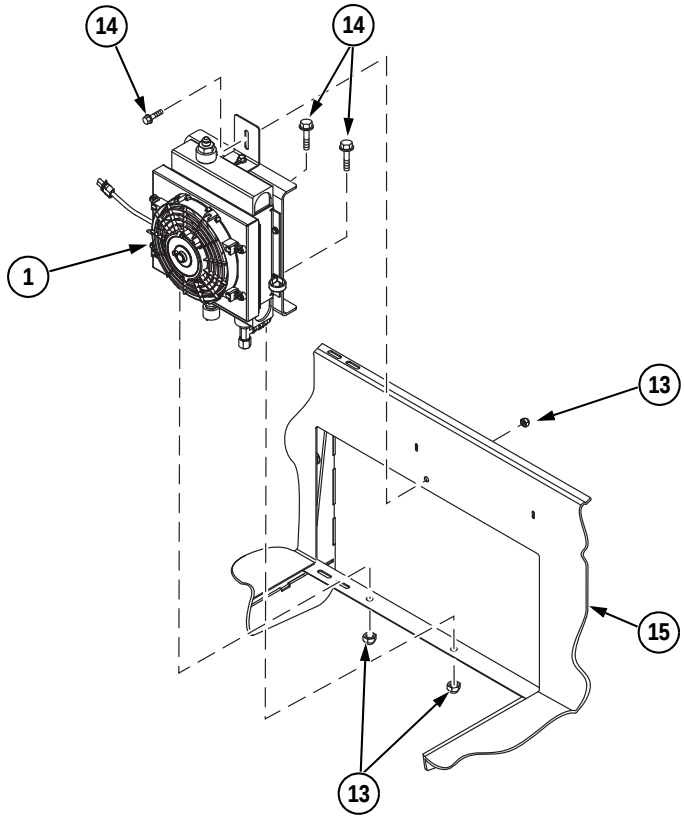
NOTE: *Install the clamps on the same side as noted during removal.*

2. Install mounting bracket (21) and clamps (12) on oil cooler assembly (1) using four locknuts (18), washers (19), and screws (20).

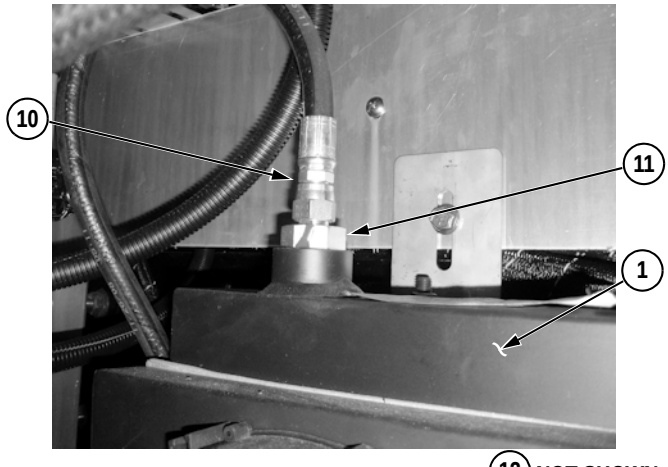
NOTE:

- *Inspect O-rings before installation. Replace O-rings as needed.*
- *Lightly lubricate O-rings with clean hydraulic oil before installation.*
- *Install fittings in the same locations and orientations as noted during removal.*
- *See "Hydraulic Hose & Tube Fitting Torque Specifications," Group 9600-P-003, for torque specifications.*

3. Install oil temperature switch and O-ring (8) on oil cooler assembly (1).
4. Install fitting and O-ring (11) on oil cooler assembly (1).
5. Install 90° elbow and O-ring (6), swivel adapter and O-ring (16), T-fitting and O-ring (3), and reducer and O-ring (17) on oil cooler assembly (1).



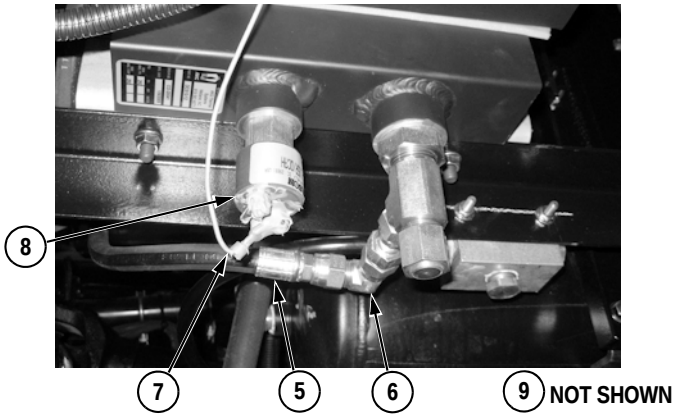
6. Install oil cooler assembly (1) on the body support frame (15) using three screws (14) and flanged nuts (13).



7. Route hose (10) through the clamps (12) mounted on the side of the oil cooler assembly (1).

NOTE: *Connect all hoses to the same locations as noted during removal.*

8. Connect hose (10) to fitting (11) at the top of the oil cooler assembly (1).



NOTE: *Connect all hoses to the same locations as noted during removal.*

9. Connect hose (5) to 90° elbow (6).

NOTE: *Connect all wires to the same locations as noted during removal.*

10. Connect wire (7) to the oil temperature switch (8).
11. Connect the fan wiring harness connector (9) to the truck harness.

⚠ WARNING

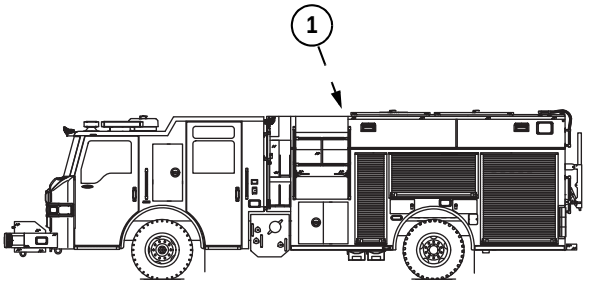
Adhesives, solvents, and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin and clothing. Keep away from open fire and use in well-ventilated area. If adhesives, solvents, or sealing compounds get on skin or clothing, wash immediately with soap and water. Failure to comply could result in serious injury or death to personnel.

NOTE: *All exposed positive and negative connections and connecting hardware must be protected against moisture, contamination, and corrosion by applying a sealer to connecting hardware and studs.*

12. Apply Sealer Protective, Dow Corning® P/N 1890 (Pierce P/N 95-1289) to oil temperature switch connections. Make sure all conductive surfaces are covered.
13. Turn battery switch ON (if equipped), or connect batteries. (See “Battery Connect/Disconnect,” Group 0925-P-001.)
14. Check oil level and add additional oil as required. (See **“Check Transmission Oil Level”** on page 3-5)
15. Lower cab. (Refer to “Operation & Maintenance Manual.”)
16. Remove “DO NOT START” tag from truck ignition switch.

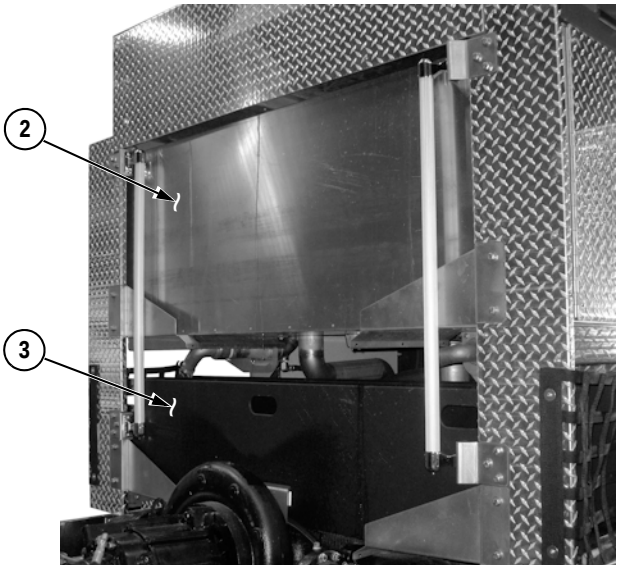
5. OIL COOLER (OIL-TO-AIR)—TOP MOUNT

a. Removal

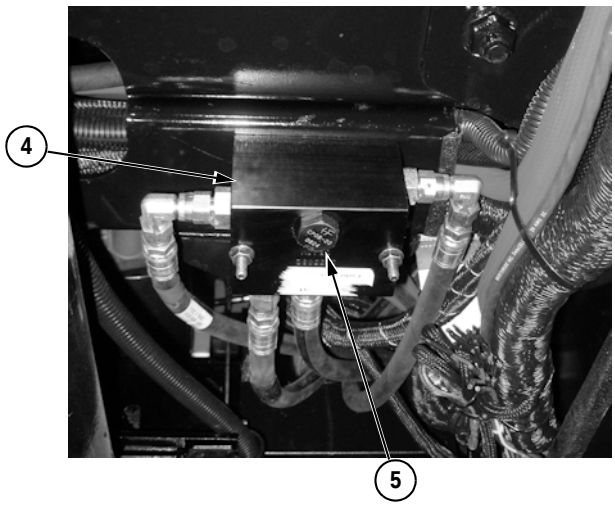


NOTE: *The oil cooler assembly (1) is located inside the pumphouse, at the front of the body cross divider. Access can be gained with the cab raised through the opening at the front of the pumphouse.*

1. Attach a “DO NOT START” tag to truck ignition switch.
2. Turn battery switch OFF (if equipped), or disconnect batteries. (See “Battery Connect/Disconnect,” Group 0925-P-001.)



3. Remove hose trays (2 and 3) to gain access to the oil cooler.



⚠ WARNING

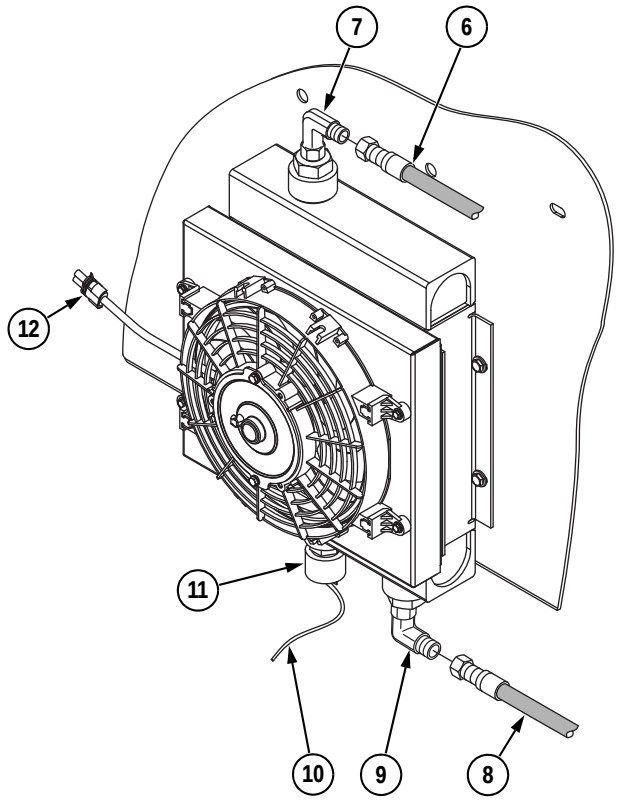
Transmission oil becomes hot during normal operation. Allow oil cooler to cool slightly prior to performing this task. Failure to comply could result in serious injury to personnel.

IMPORTANT

DO NOT POLLUTE! Dispose of used oil in an environmentally responsible manner. If available, take used oil to a collection center for recycling. If recycling is not available, inquire as to the correct procedure for disposal.

NOTE: *The check valve manifold is located under PUC pump assembly, on the driver's side.*

4. Place a suitable container under the check valve manifold (4) to catch draining oil.
5. Remove the drain plug (5) and allow the oil to drain.
6. Install the drain plug (5).

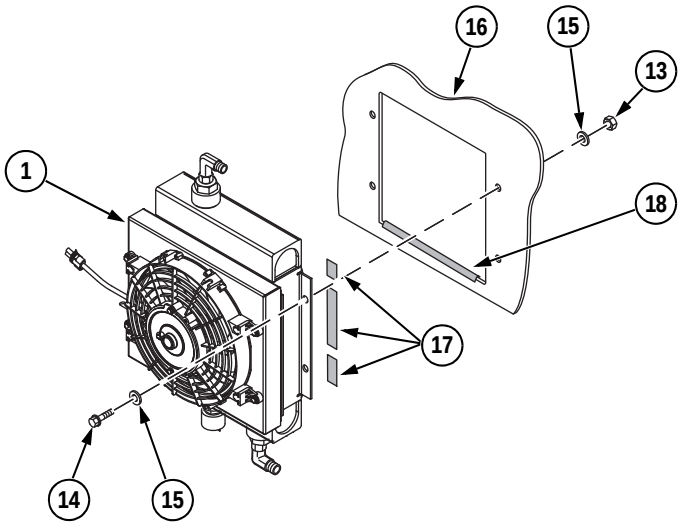


NOTE: *Label all hoses and note their locations before disconnecting to ensure correct installation.*

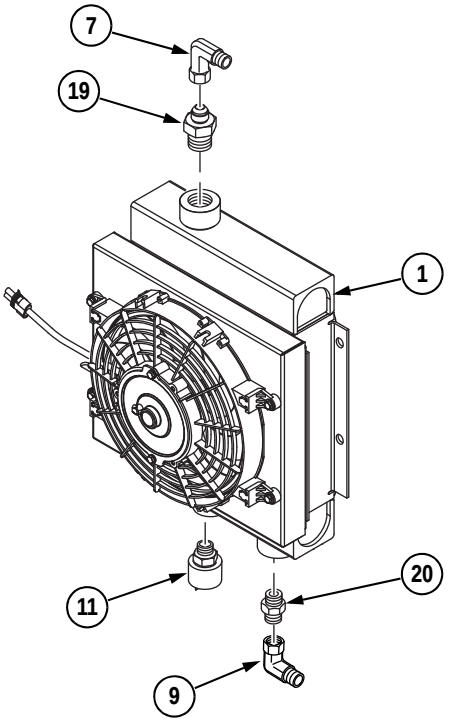
7. Disconnect hose (6) from the 90° elbow (7). Install a plug in hose to prevent contamination and loss of oil from the system.
8. Disconnect hose (8) from the 90° elbow (9). Install a plug in hose to prevent contamination and loss of oil from the system.

NOTE: *Label all wires and note their locations to ensure correct installation.*

9. Remove sealant from the terminal and disconnect wire (10) from the temperature switch (11).
10. Disconnect the fan wiring harness connector (12) from the truck harness.



11. Support the oil cooler assembly (1).
12. Remove four nuts (13) and screws (14), and eight washers (15), and remove the oil cooler assembly (1) from the body cross divider (16).
13. Remove vinyl hinge tape (17) from both heat exchanger assembly mounting flanges.
14. Remove lip style seal (18) along the bottom edge of the body cross divider opening (16).



NOTE: *Note the location and orientation of the fittings before removing to ensure correct installation.*

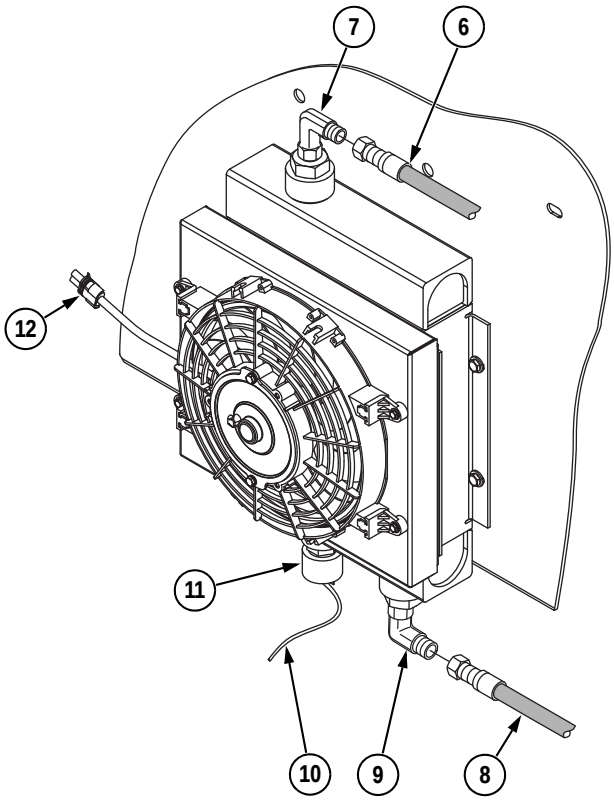
15. Remove the 90° elbow and O-ring (7) and fitting and O-ring (19) from oil cooler assembly (1).
16. Remove the 90° elbow and O-ring (9) and fitting and O-ring (20) from oil cooler assembly (1).
17. Remove oil temperature switch and O-ring (11) from oil cooler assembly (1).

b. Installation

NOTE:

- ✍ *Inspect O-rings before installing. Replace O-rings as needed.*
- ✍ *Lightly lubricate O-rings with clean hydraulic oil before installation.*
- ✍ *Install fittings in the same locations and orientations as noted during removal.*
- ✍ *See "Hydraulic Hose & Tube Fitting Torque Specifications," Group 9600-P-003, for torque specifications.*

1. Install the 90° elbow and O-ring (7) and fitting and O-ring (19) on oil cooler assembly (1).
2. Install the 90° elbow and O-ring (9) and fitting and O-ring (20) on oil cooler assembly (1).
3. Install the oil temperature switch and O-ring (11) on oil cooler assembly (1).
4. Install lip style seal (18) along the bottom edge of the body cross divider opening (16).
5. Apply vinyl hinge tape (17) (Pierce P/N 943111) to both heat exchanger assembly mounting flanges.
6. Install heat exchanger assembly (1) on the body cross divider (16) using four screws (14) and nuts (13) and eight washers (15).



NOTE:

- ✍ *Install fittings in the same locations and orientations as noted during removal.*
- ✍ *See "Hydraulic Hose & Tube Fitting Torque Specifications," Group 9600-P-003, for torque specifications.*

7. Connect hose (8) to 90° elbow (9).
8. Connect hose (6) to 90° elbow (7).

NOTE: *Connect all wires to the same locations as noted during removal.*

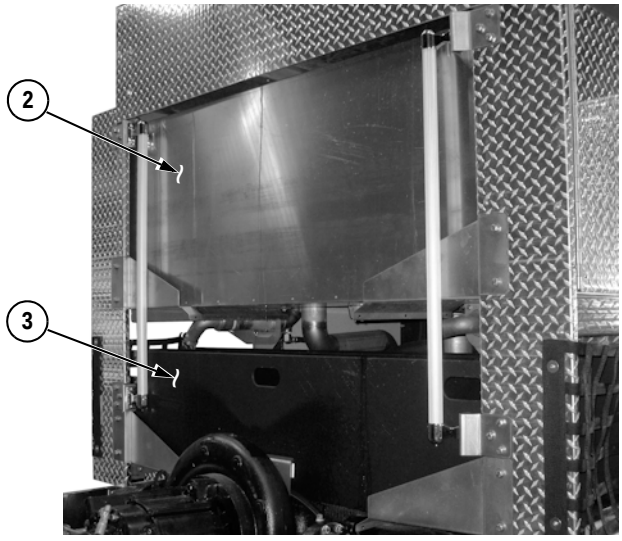
9. Connect wire (10) to the oil temperature switch (11).
10. Connect fan wiring harness connector (12) to truck harness.

⚠ WARNING

Adhesives, solvents, and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin and clothing. Keep away from open fire and use in well-ventilated area. If adhesives, solvents, or sealing compounds get on skin or clothing, wash immediately with soap and water. Failure to comply could result in serious injury or death to personnel.

NOTE: *All exposed positive and negative connections and connecting hardware must be protected against moisture, contamination, and corrosion by applying a sealer to connecting hardware and studs.*

11. Apply Sealer Protective, Dow Corning® P/N 1890 (Pierce P/N 95-1289) to oil temperature switch connections. Make sure all conductive surfaces are covered.



12. Install hose trays (2 and 3).
13. Turn battery switch ON (if equipped), or connect batteries. (See "Battery Connect/Disconnect," Group 0925-P-001.)
14. Check oil level and add additional oil as required. (See **"Check Transmission Oil Level"** on page 3-5)
15. Lower cab. (Refer to "Operation & Maintenance Manual.")
16. Remove "DO NOT START" tag from truck ignition switch.

6. VALVE ACTUATOR BRACKET ASSEMBLY

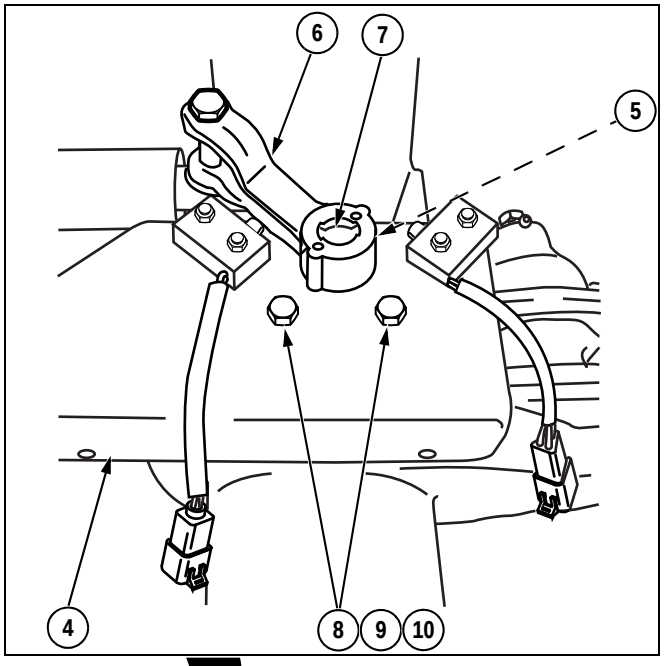
a. Removal

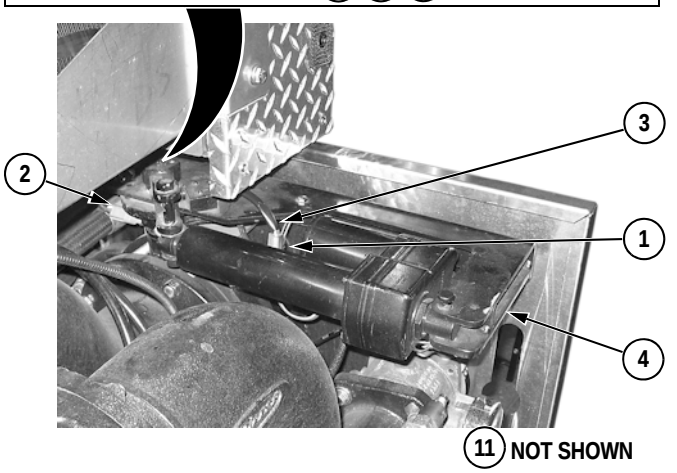
1. Attach a “DO NOT START” tag to truck ignition switch.

⚠ WARNING

Cab stay arm must be in the support position before working under the cab or on cab lift components. Failure to comply may result in serious injury or death to personnel.

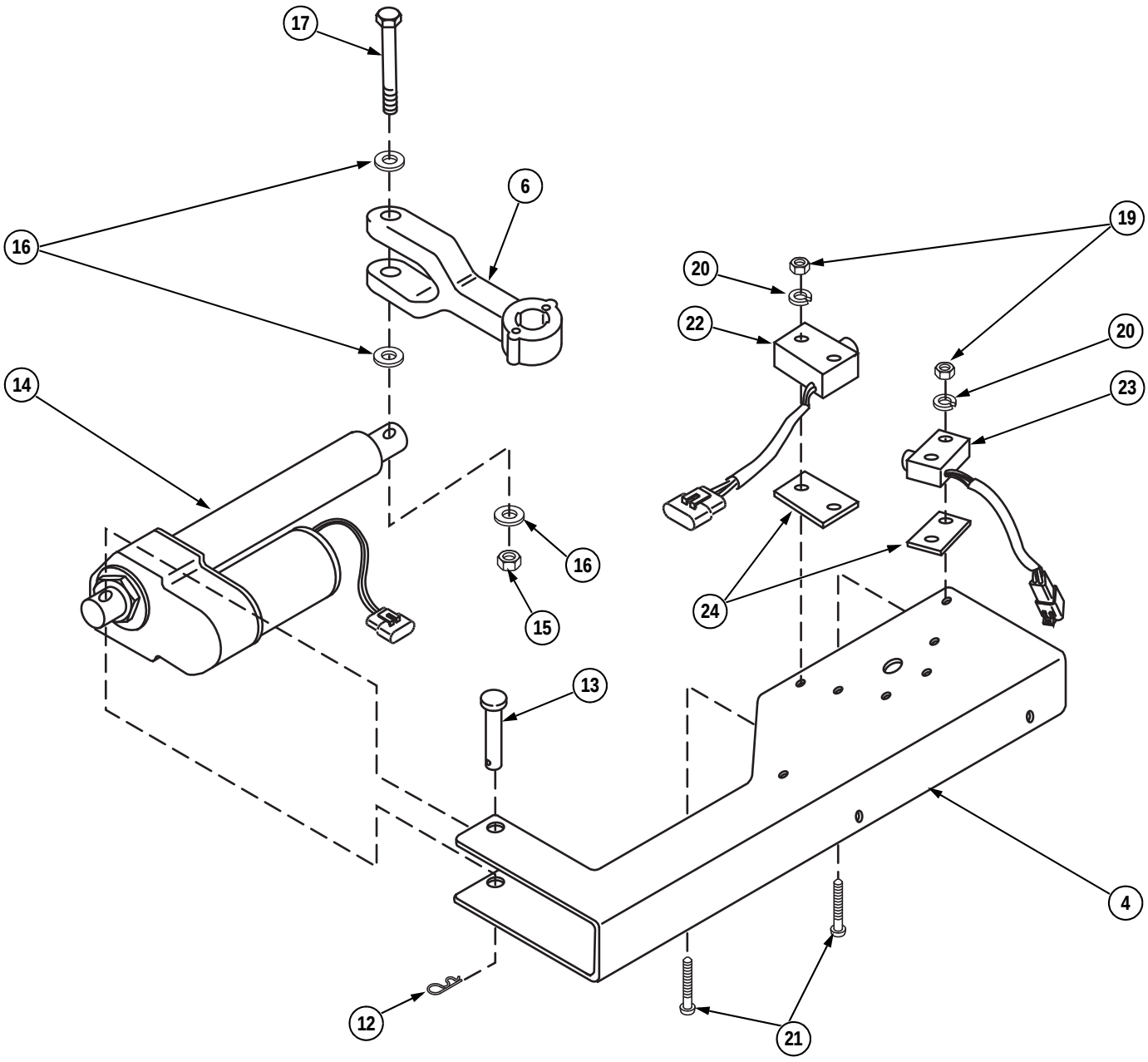
2. Raise cab. (Refer to “Operation & Maintenance Manual.”)
3. Turn battery switch OFF (if equipped), or disconnect batteries. (See “Battery Connect/Disconnect,” Group 0925-P-001.)





NOTE: *Label all wiring connectors and note their locations before disconnecting to ensure correct installation.*

4. Disconnect actuator wiring harness connector (1) from truck wiring harness.
5. Disconnect limit switch wiring connectors (2 and 3) from truck wiring harness.
6. Support actuator bracket assembly (4).
7. Loosen set screw (5) and remove actuator lever (6) from valve shaft (7).
8. Remove two nuts (8), lockwashers (9), and screws (10), and remove actuator bracket assembly (4) from valve flange (11).



9. Remove hairpin clip (12) and clevis pin (13) from the base of actuator (14), and remove actuator from bracket (4).
10. Remove locknut (15), three washers (16), and screw (17) from rod end of actuator (14) and actuator lever (6), and remove actuator lever from the rod end of the actuator.

NOTE: *Perform step 11 only if replacing limit switches.*

11. Remove four (two per switch) nuts (19), lockwashers (20) and screws (21), and remove limit switches (22 and 23) and shim plates (24) from bracket (4).

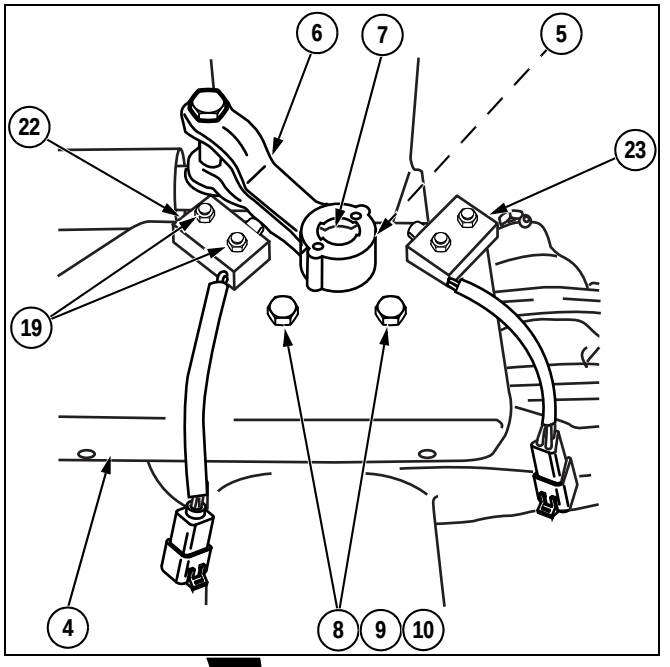
b. Installation

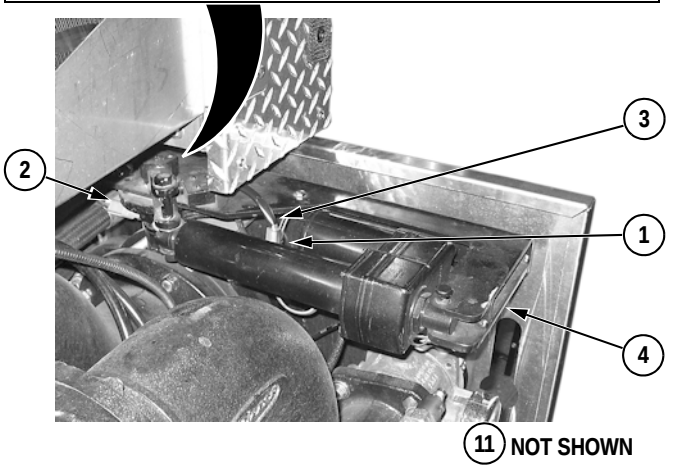
NOTE: *Perform step 1 only if limit switches were replaced.*

1. Install limit switches (22 and 23) and shim plates (24) on bracket (4) using four (two per switch) screws (21), lockwashers (20), and nuts (19).

NOTE: *Always use new locknuts for installation.*

2. Install actuator lever (6) on rod end of actuator (14) using a screw (17), three washers (16), and locknut (15).
3. Install base of actuator (14) to bracket (4) using a clevis pin (13) and hairpin clip (12).





4. Install two screws (10), lockwashers (9), and nuts (8) in actuator assembly bracket (4) and valve flange (11).
5. Install actuator lever (6) on valve shaft (7). Secure lever by tightening set screw (5).
6. Adjust limit switches:
   a. Move the actuator to the CLOSED position.
   b. Loosen nuts (19) and move the limit switch (22) toward the actuator lever (6) until the switch is fully engaged.
   c. Tighten nuts (19).
   d. Move the actuator to the OPEN position and repeat steps b and c to adjust the limit switch (23).

NOTE: *Connect all wires to the same locations as noted during removal.*

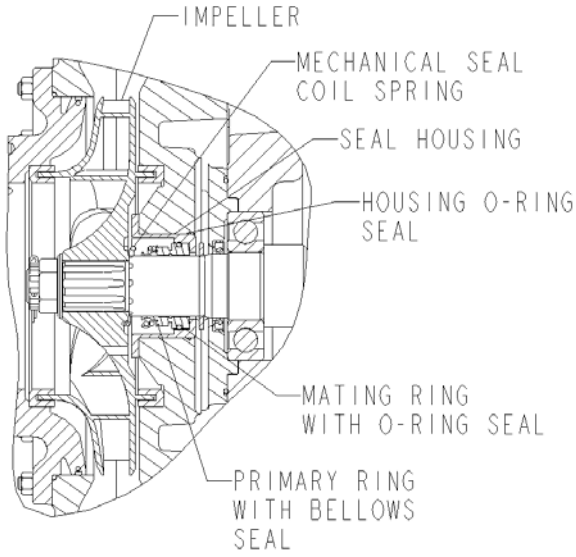
7. Connect actuator wiring harness connector (1) to the truck wiring harness.
8. Connect limit switch wiring connectors (2 and 3) to truck wiring harness.
9. Turn battery switch ON (if equipped), or connect batteries. (See “Battery Connect/Disconnect,” Group 0925-P-001.)
10. Lower cab. (Refer to “Operation & Maintenance Manual.”)
11. Remove “DO NOT START” tag from truck ignition switch.

7. MECHANICAL SEAL

a. Basic Information

This pump assembly incorporates a high-quality mechanical shaft seal separating the pump housing components from atmosphere. Seal size, design type, component materials, and housing configuration have been specifically designed for this pump application and rated operating parameters.

A mechanical seal is a device that houses two highly polished components (known as faces). One face rotates, the other is stationary. A secondary elastomer bellows seals the primary ring to the shaft. An O-ring or cup seal seals the mating ring in the housing. The polished seal faces of primary and mating rings are pressed together by a spring mechanism to provide adequate force to effect a seal. The force acting between seal faces increases in direct proportion to product pressure.



The elastomer bellows seal used in this pump has the following design features:

- Mechanical drive of the primary seal ring. The drive band's notch design eliminates overstressing the elastomer sealing bellows.
- Bellows design provides automatic compensation for shaft end-play, run-out, and primary ring wear.
- Seal face contact pressure is controlled by a single, non-clogging coil spring. This coil spring has been custom welded per design specifications to eliminate high-speed spring distortion.

The seal housing is designed and ported to provide optimal water flow and pressure, ensuring proper cooling and flushing of the seal components.

b. Operation and Maintenance

When operated within rated operating conditions of this pump, the seal will provide trouble-free service for extended periods.

Properly selected and applied mechanical shaft seals are leak free and require no adjustment. Should the seal area develop a leak, investigate the cause as soon as possible. Seal failure (leakage) may be the result of worn seal faces, leaking bellows, or damaged O-rings. These failures may be attributed to bearing failure, impeller blockage, impeller imbalance, seal housing contamination, operating beyond pump design rating, or dry running.

Mechanical shaft seal design relies on the sealed medium, in this case, water, to cool and lubricate the sealing surfaces. Therefore, extended dry operation may cause overheating and scoring or damage to the sealing surfaces, resulting in excessive leakage or a much shortened seal life.

To maximize seal life, minimize operation at pump pressures higher than pump rating. While operating at pressures beyond rating will not immediately damage the seal, it will increase sealing surface wear rate.

c. Mechanical Seal Removal

NOTE:

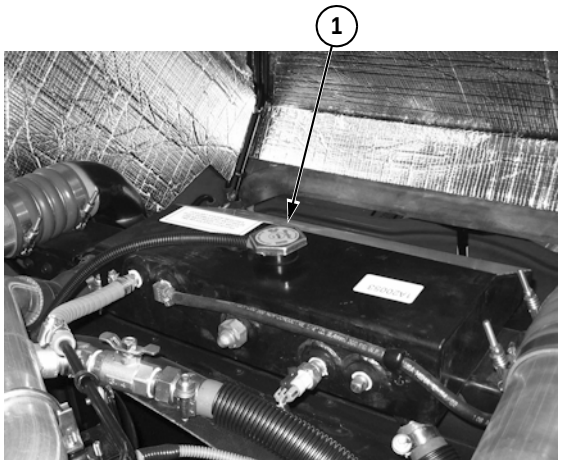
- *Depending on the engine installed in your truck and optional equipment, the connections may vary slightly from the example shown.*
- *Refer to "Pierce Ultimate Configuration (PUC) Parts Catalog," Group 2925-P-004 for seal kit and other replacement part numbers.*

1. Attach a "DO NOT START" tag to truck ignition switch.
2. Open all valves and drain the pump system.

WARNING

Cab stay arm must be in the support position before working under the cab or on cab lift components. Failure to comply may result in serious injury or death to personnel.

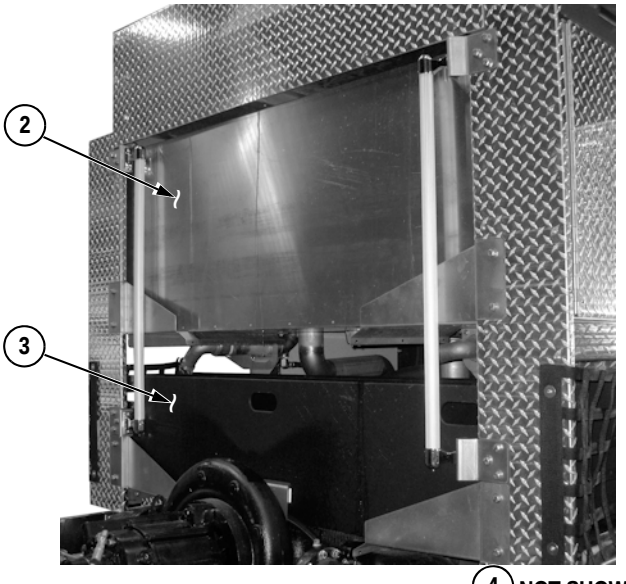
3. Raise cab. (Refer to "Operation & Maintenance Manual.")
4. Turn battery switch OFF (if equipped), or disconnect batteries. (See "Battery Connect/Disconnect," Group 0925-P-001.)



⚠ WARNING

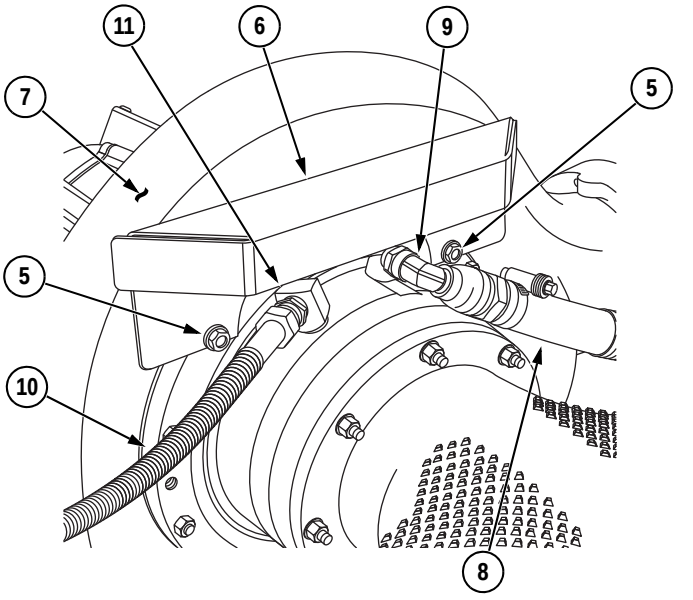
- **Radiator, radiator cap, coolant, and hoses are very hot and pressurized during truck operation. Let radiator cool before checking system.**
- **Avoid wearing gloves when removing radiator cap. Gloves can soak up hot coolant which can contribute to burns.**
- **Use extreme care when removing the radiator cap. Always allow engine to cool completely before opening radiator cap. Wrap a thick, heavy cloth around cap. Push down and turn radiator cap to first notch position. Pause before opening completely to allow any remaining pressure to escape. Failure to comply could result in burns from hot steam or coolant.**

5. Loosen radiator cap (1) and relieve cooling system pressure.



6. Remove hose trays (2 and 3) as needed to gain access to the rear of pump.

7. Open drain valve (4) at the bottom of pump to drain any water remaining in the pump. Close drain after water has been drained.



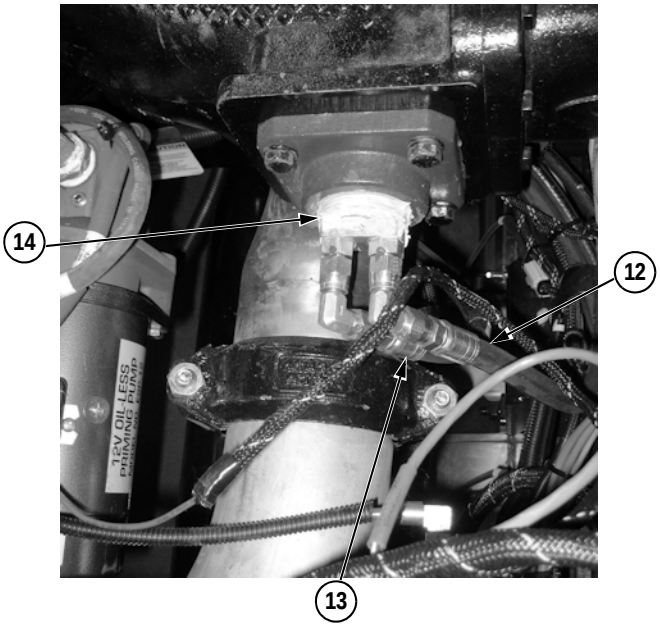
8. Remove two flanged nuts (5) and remove shield (6) from the pump housing (7).

IMPORTANT

DO NOT POLLUTE! Dispose of used engine coolant in an environmentally responsible manner. If available, take used coolant to a collection center for recycling. If recycling is not available, inquire as to the correct procedure for disposal.

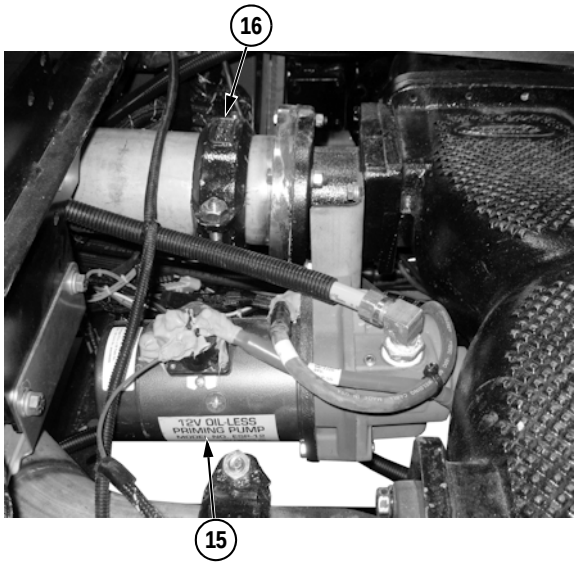
NOTE: *Label all hoses before removing to ensure correct installation.*

9. Place a suitable container under the pump to catch draining coolant.
10. Remove coolant hose (8) from fitting (9). Plug hose to prevent excessive loss of coolant.
11. Disconnect air line (10) from fitting (11).

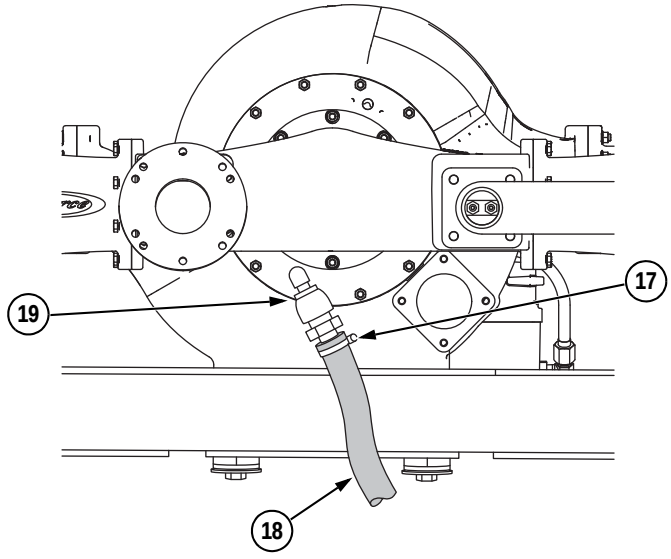


NOTE: *Label all hoses before removing to ensure correct installation.*

12. Disconnect hoses (12 and 13) from oil-to-water heat exchanger (14). Install a plug in hose to prevent contamination and loss of oil from the system.



13. Remove the primer pump (15). (See “Hale Oilless Primer Pump [Waterous and Hale Applications]),” Group 2930-P-004.)
14. Remove “Vic” coupler (16). (See “’Vic’ Coupler, “Group 2000-P-001.)

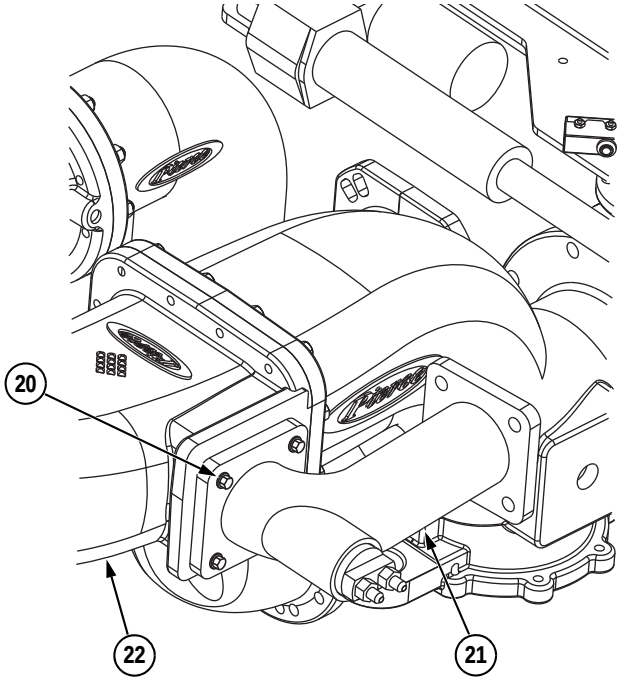


IMPORTANT

DO NOT POLLUTE! Dispose of used engine coolant in an environmentally responsible manner. If available, take used coolant to a collection center for recycling. If recycling is not available, inquire as to the correct procedure for disposal.

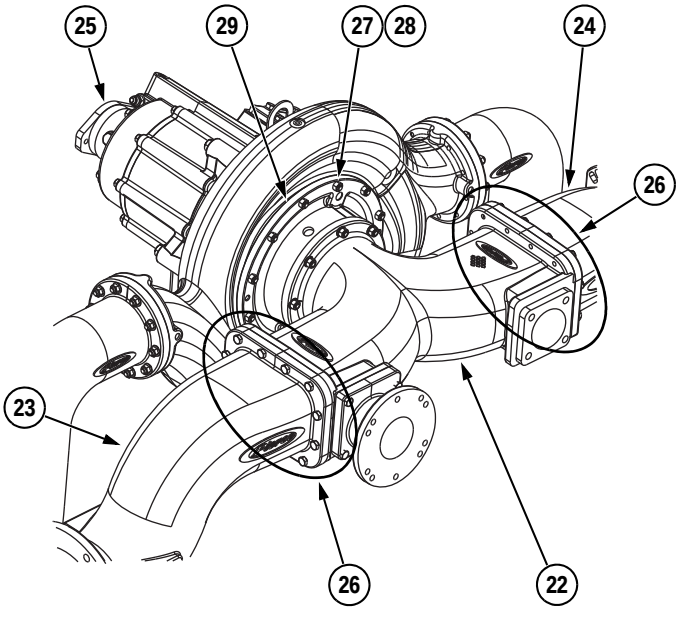
NOTE: *Label all hoses before removing to ensure correct installation.*

15. Place a suitable container under the pump to catch draining coolant.
16. Loosen clamp (17) and remove coolant hose (18) from fitting (19). Plug hose to prevent excessive loss of coolant.



NOTE: *Perform step 17 only if the pump is equipped with an intake relief manifold.*

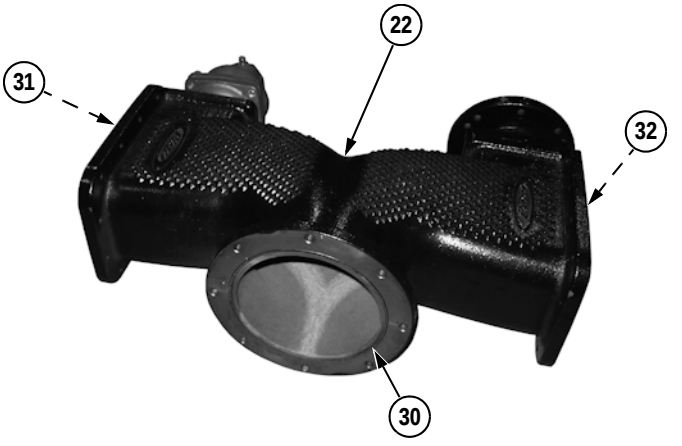
17. Remove four screws (20) and remove the intake relief manifold (21) from the suction tee (22).



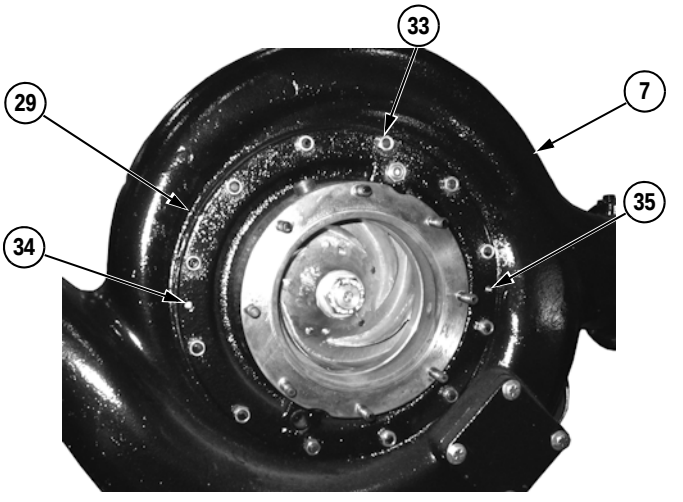
⚠ WARNING

The suction tee, inlet manifolds, and transmission, are heavy and must be properly supported before removing mounting hardware. Failure to comply may result in serious injury to personnel and damage to equipment.

18. Support suction tee (22), inlet manifolds (23 and 24), and front of transmission housing (25).
19. Remove 12 screws (26) from each inlet manifold (23 and 24).
20. Remove eight nuts (27) and lockwashers (28) holding the suction tee (22) to pump suction head (29), and remove suction tee from chassis.

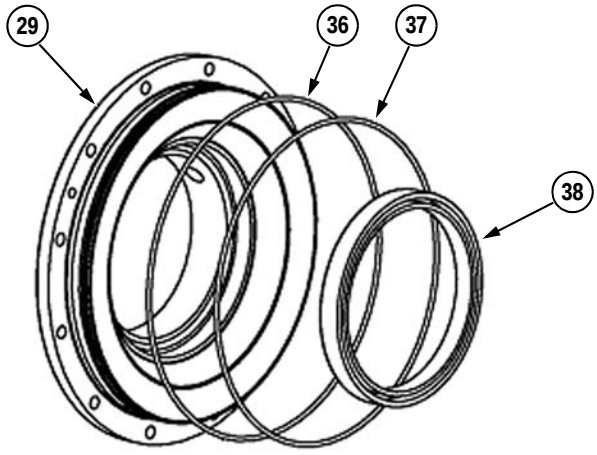


21. Remove and discard O-rings (30, 31, and 32) from suction tee (22).



NOTE: *Note the orientation of the suction head to ensure correct installation.*

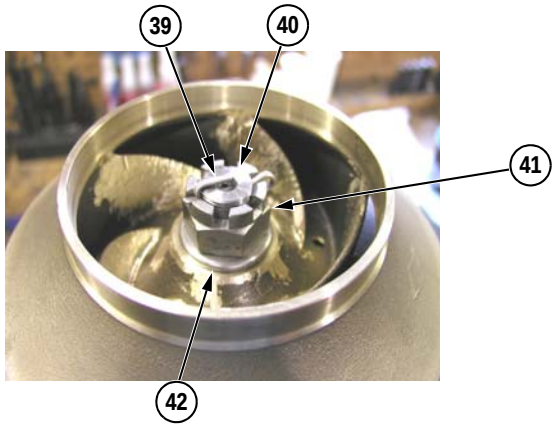
22. Remove 12 nuts (33) from suction head (29).
23. Remove suction head (29) from pump housing (7):
    a. Install a 3/8-16NC screw in each of the threaded holes (34 and 35) in the suction head (29).
    b. Turn each screw clockwise, 1/4 turn at a time, until the suction head (29) is free from the pump housing (7).



24. Remove and discard O-rings (36 and 37) from suction head (29).
25. Inspect seal (wear) ring (38). (See **"Suction Head"** on page 3-45.)

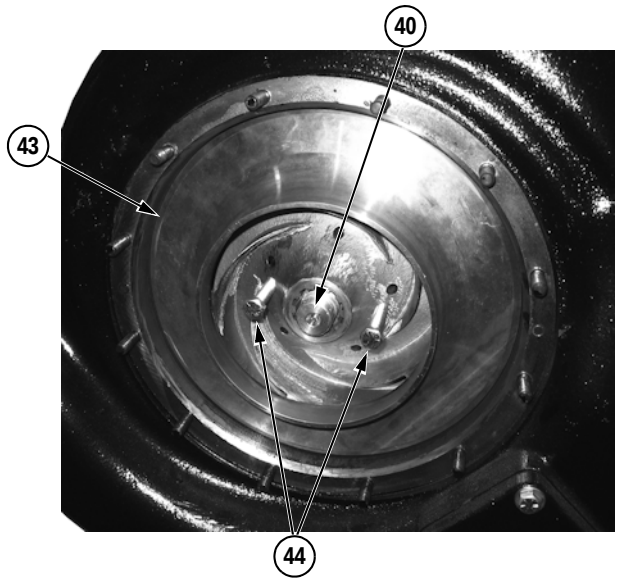
NOTE: *Perform step 26 only if it is determined that the seal (wear) ring replacement is required.*

26. Remove (pry) the seal (wear) ring (38) out of suction head (29).

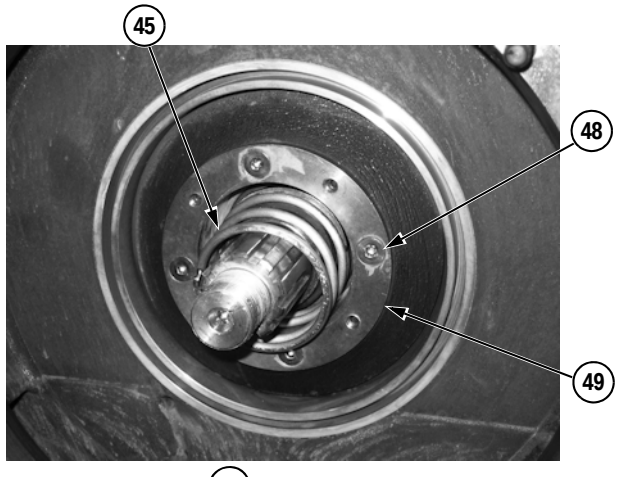


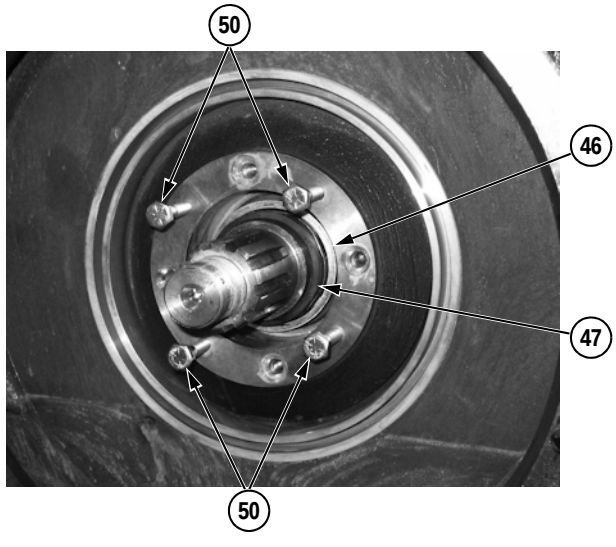
NOTE: *If needed, an impact wrench can be used to loosen the impeller nut.*

27. Remove cotter pin (39) from impeller shaft (40) and remove the impeller nut (41) and washer (42).



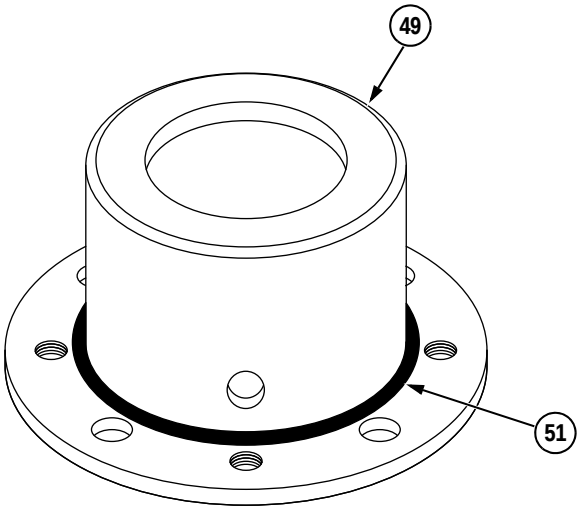
28. Remove impeller (43) from impeller shaft (40):
    a. Install a 3/8-16NC screw (44) in each of the threaded holes in impeller hub.
    b. Turn each screw clockwise, 1/4 turn at a time, until the impeller (43) is free from impeller shaft (40).





29. Remove and discard the mechanical seal spring (45).
30. Remove primary ring (46) and mechanical seal (47).
31. Remove four stainless steel, flush-head machine screws (48) and remove mechanical seal housing (49).

    If the housing cannot be removed by hand, install four 1/4-20 screws (50) in the four threaded holes in the housing. Turn the first screw 1/4 of a turn; move to each screw in turn (moving clockwise) and turn each screw 1/4 turn. Continue this pattern until the housing is free.



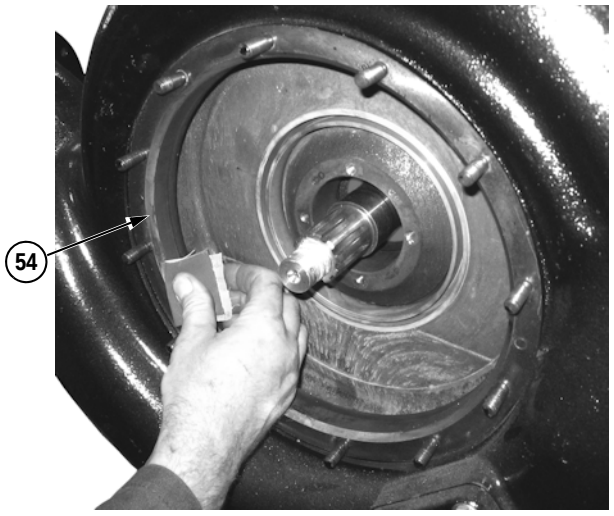
32. Remove and discard O-ring (51) from the mechanical seal housing (49).

33. Remove and discard O-ring (52) from the pump housing.
34. Inspect inboard seal (wear) ring (53). (See **"Pump Housing"** on page 3-44)

NOTE: *Perform step 35 only if it is determined that the seal (wear) ring replacement is required.*

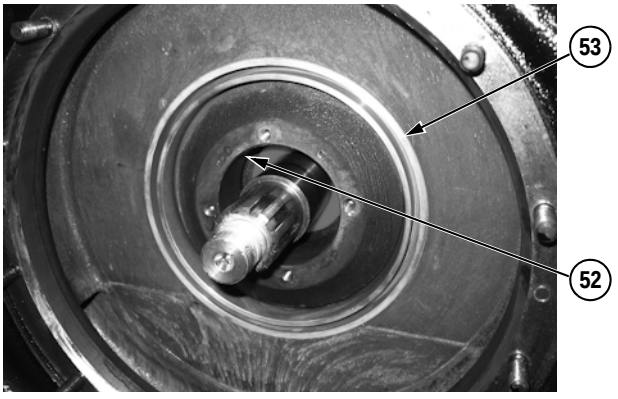
35. Remove (pry) the inboard seal (wear) ring (53) out of pump housing.

d. Mechanical Seal Installation



NOTE: *The pump housing O-ring mating surface must be free of dirt, debris, and surface defects (nicks, etc.) to ensure a proper O-ring seal.*

1. Clean and inspect pump housing O-ring mating surface (54). Remove small surface defects using fine emory paper.



⚠ WARNING

Adhesives, solvents, and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin and clothing. Keep away from open fire and use in well-ventilated area. If adhesives, solvents, or sealing compounds get on skin or clothing, wash immediately with soap and water. Failure to comply could result in serious injury or death to personnel.

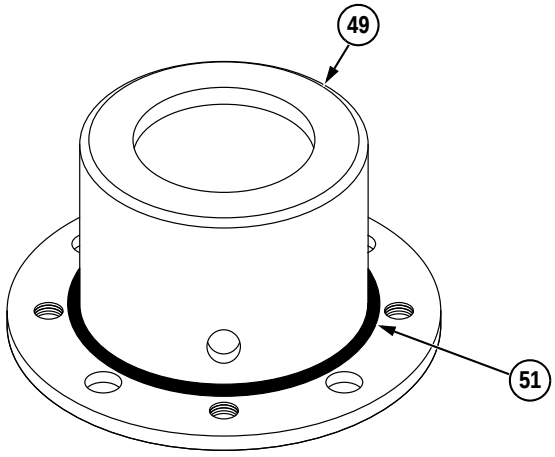
NOTE: *Perform step 2 if the seal (wear) ring was removed.*

2. Apply Loctite® 609 (Pierce P/N 1788949) to the outside diameter of the seal (wear) ring (53), and install (press) seal into the pump housing until the seal (wear) ring is firmly and squarely seated in the pocket.

NOTE:

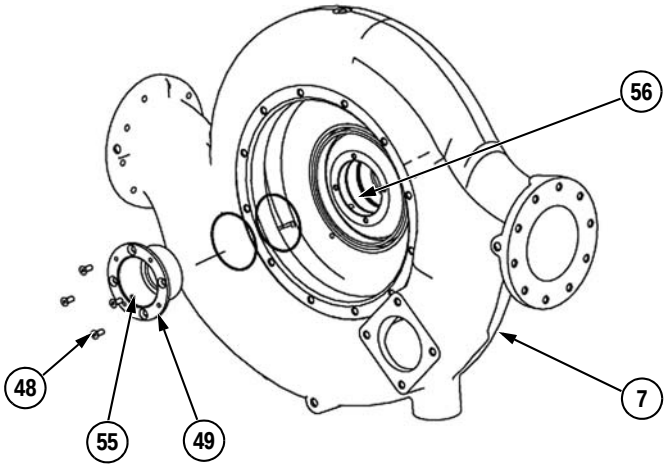
- *Always use new O-rings for installation.*
- *Apply grease to O-rings only; do not place grease in O-ring grooves. Placing grease in O-ring grooves may prevent O-rings from seating properly.*

3. Apply a thin film of Dow Corning® 111 (Silicone Compound) grease (Pierce P/N 1788950) to O-ring (52).
4. Install O-ring (52) in groove in the pump housing bore.



NOTE: *Always use new O-rings for installation.*

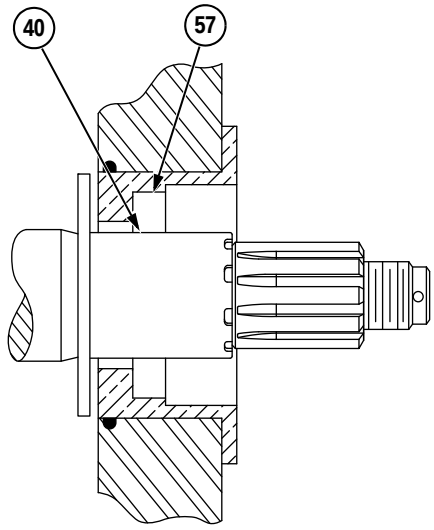
5. Apply a thin film of Dow Corning® 111 (Silicone Compound) grease (Pierce P/N 1788950) to O-ring (51), and install O-ring on mechanical seal housing (49).



CAUTION

When installing the mechanical seal housing, verify that the flushing water holes are aligned with each other. Failure to comply could result in premature seal failure.

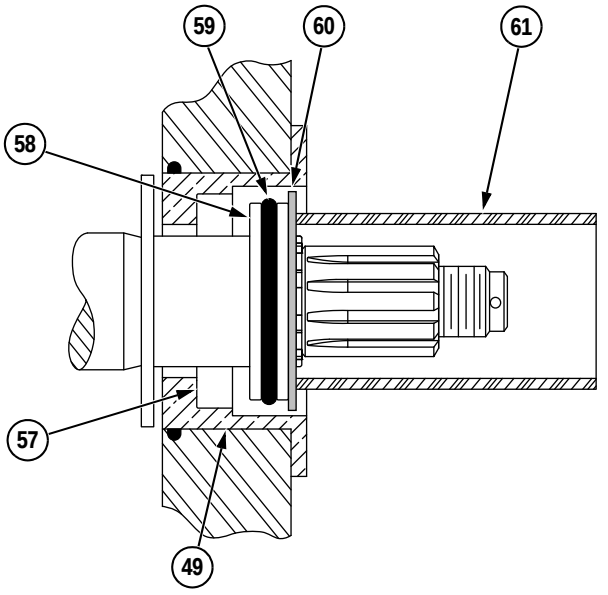
6. Align mechanical seal housing (49) with pump housing (7) by placing four stainless steel, flush-head machine screws (48) in seal housing and pump housing holes. Verify that the holes (55 and 56) are aligned.
7. Press mechanical seal housing (49) into the pump housing (7) until it is firmly seated.
8. Remove stainless steel, flush-head machine screws (48).
9. Apply Loctite® 243 (Pierce P/N 1788946) to threads, and install stainless steel, flush-head machine screws (48) in mechanical seal housing (49). Tighten screws to 72 lb-in (8 N·m).



CAUTION

- **The mechanical seal is a precision product and should be handled with care. When handling the mechanical seal, use caution to prevent scratching or contamination of the lapped surfaces of the primary and mating rings.**
- **Do not touch the lapped surfaces of the primary and mating rings with bare hands. Failure to comply may result in premature failure of the mechanical seal.**

10. Install the mechanical seal:
    a. Inspect mating ring pocket (57) in seal housing and surface of impeller shaft (40) under the shaft seal bellows for dirt or debris. Clean surfaces as needed using isopropyl alcohol.
    b. Carefully unwrap mechanical seal. Do not damage or contaminate the lapped surfaces of mating or primary ring.



CAUTION

Do not use soapy water to lubricate the O-ring. Soap may cause the O-ring to stick during installation or could contaminate the sealing surface, preventing the O-ring from sealing properly.

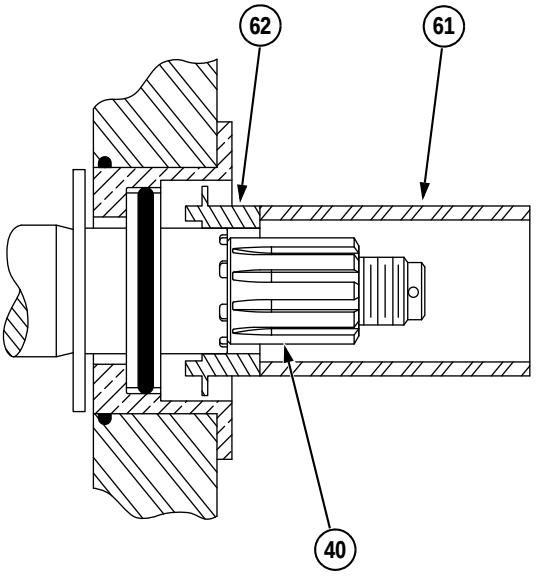
c. Hold mating ring (58) by the inside diameter. Apply Lubricant, Rubber Emulsion (Pierce P/N X8019), or equivalent water soluble lubricant (not soapy water), to the O-ring (59) on mating ring.

d. Insert mating ring into mechanical seal housing (49) with the mirrored surface facing out.

e. Place a clean cardboard circle (60) against the mating ring (58) and push the mechanical seal into the cavity until it is firmly and squarely seated in the mating ring pocket (57).

   If it is not possible to seat the stationary mating ring with finger pressure. Use a suitable plastic pipe (61), free of contaminants, to seat the mating ring.

f. Remove cardboard circle (60) (if used).

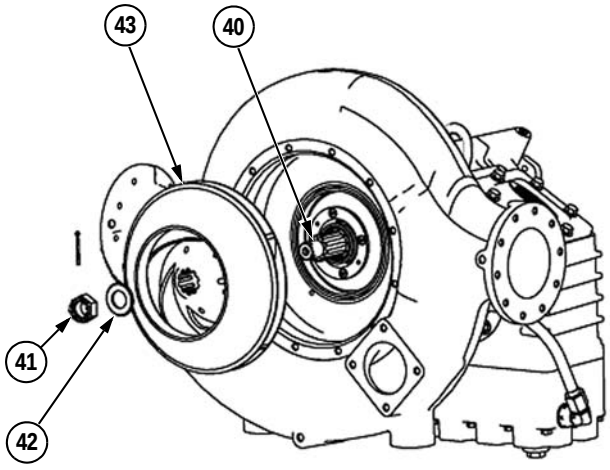


g. Apply Lubricant, Rubber Emulsion (Pierce P/N X8019), or equivalent water soluble lubricant (not soapy water), to primary ring and bellows assembly (62).

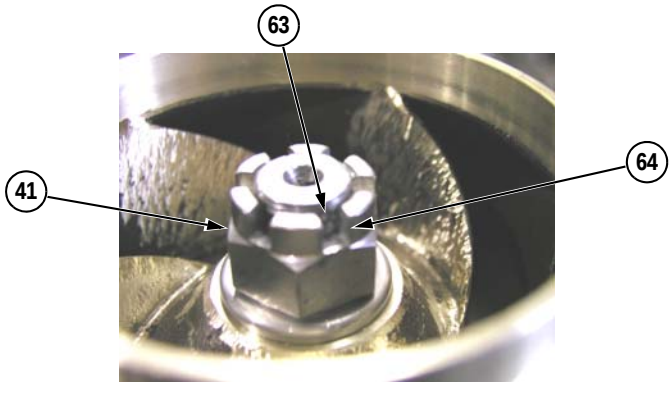
h. Place primary ring and bellows assembly (62) on the shaft (but not the spring at this time) on impeller shaft (40), and slide the assembly into position so that the seal surfaces make contact.

   If it is not possible to seat the bellows assembly with finger pressure, use a suitable plastic pipe (61) to seat the bellows assembly.

11. Install mechanical seal spring (45) and seat it against the retainer stop flange on the primary ring.



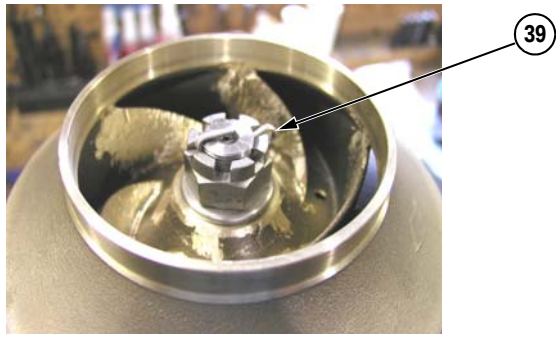
12. Slide impeller (43) onto shaft (40). Verify that the seal spring aligns with the impeller retaining groove.
13. Install impeller washer (42).
14. Apply Loctite® 243 (Pierce P/N 1788946) to impeller nut (41) and shaft threads.



CAUTION

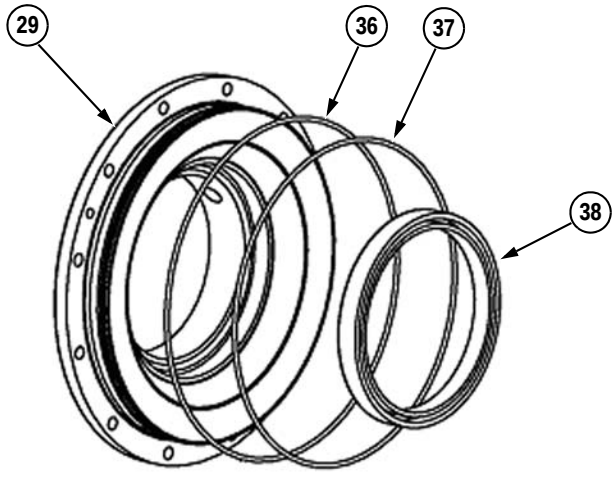
When installing impeller nut, DO NOT use an impact wrench. Use of impact wrenches has proven to damage the impeller washer, impeller, and impeller shaft.

15. Install impeller nut (41), finger tight only. Using a wrench, rotate nut until the hole (63) in the shaft and the notch (64) in the castle nut are aligned.



NOTE: *Always use new stainless steel cotter pins for installation.*

16. Install stainless steel cotter pin (39). Bend the ends of the cotter pin as shown to secure nut.



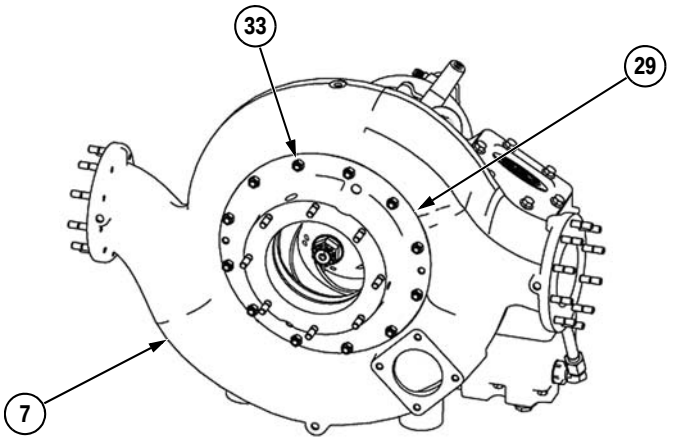
NOTE: *Perform step 17 if the seal (wear) ring was removed.*

17. Apply Loctite® 609 (Pierce P/N 1788949) to the outside diameter of the seal (wear) ring (38), and install (press) the seal (wear) ring into suction head (29) until it is firmly and squarely seated in the pocket.

NOTE:

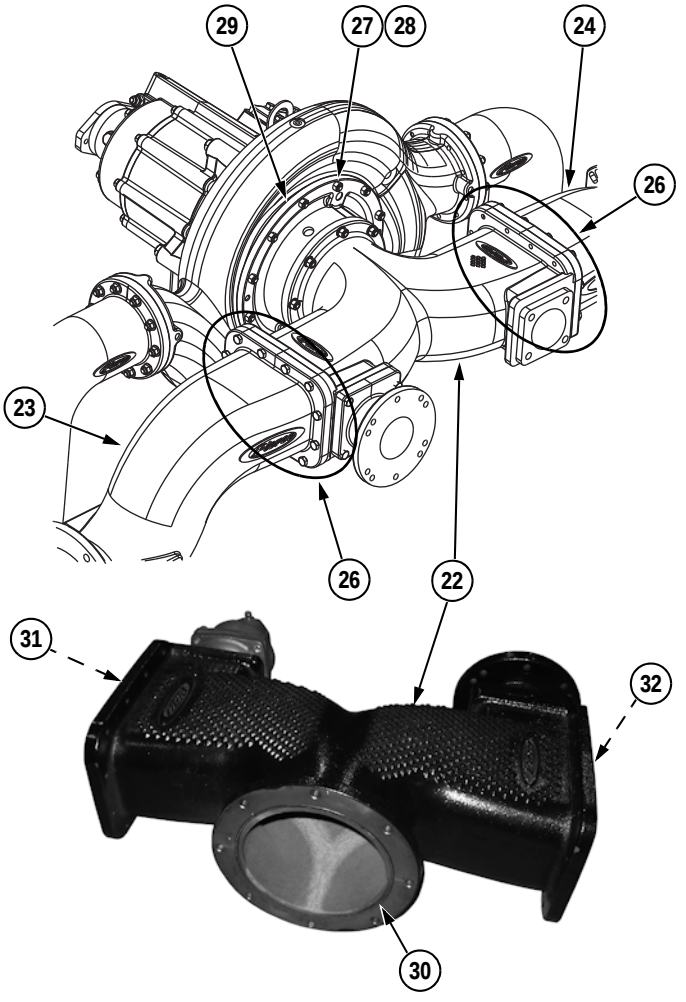
- *Always use new O-rings for installation.*
- *Apply grease to O-rings only; do not place grease in O-ring grooves. Placing grease in O-ring grooves may prevent O-rings from seating properly.*

18. Apply a thin film of Dow Corning 111 (Silicone Compound) grease (Pierce P/N 1788950) to O-rings (36 and 37), and install O-rings in the grooves in the suction head (29).



NOTE: *Install the suction head in the same orientation as noted during removal.*

19. Install suction head (29) on pump housing (7) using 12 nuts (33). Tighten nuts to 23 lb-ft (31 N·m).



NOTE: *The suction head, suction tee, and inlet manifold O-ring mating surfaces must be free of dirt, corrosion, debris, and surface defects (nicks, etc.) to ensure a proper O-ring seal.*

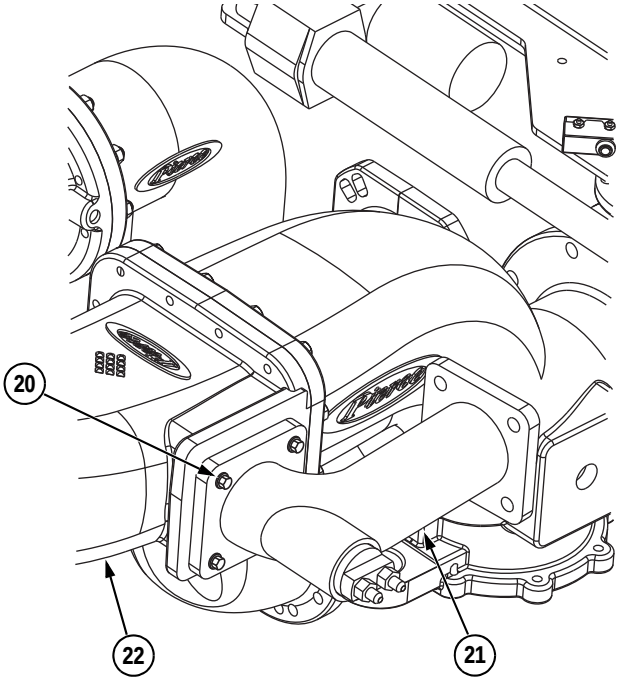
20. Clean and inspect suction head (29), suction tee (22), and inlet manifolds (23 and 24) O-ring mating surfaces. Remove small surface defects using fine emory paper or a file.

NOTE:

- ✍ *Always use new O-rings for installation.*
- ✍ *Apply grease to O-rings only; do not place grease in O-ring grooves. Placing grease in O-ring grooves may prevent O-rings from seating properly.*

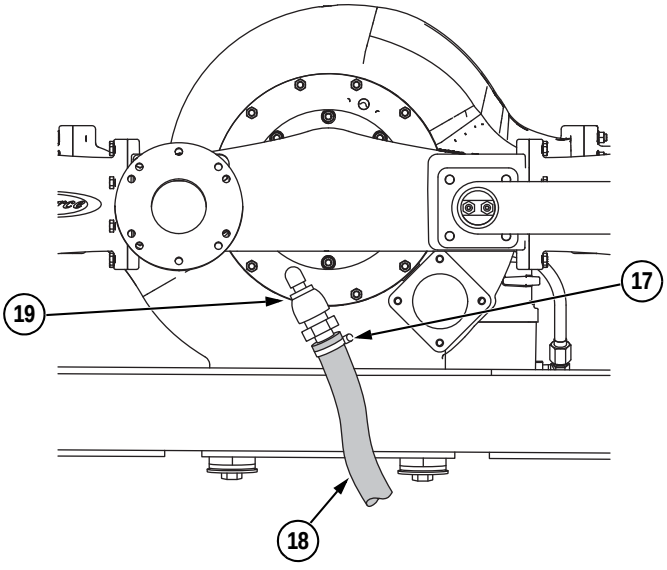
21. Apply a thin film of Dow Corning® 111 (Silicone Compound) grease (Pierce P/N 1788950) to O-rings (30, 31 and 32) and install O-rings in the grooves in the suction tee (22).

22. Install suction tee (22) on pump suction head (29) and inlet manifolds (23 and 24):
    a. Attach suction tee (22) to the suction head (29) using eight nuts (27) and lockwashers (28).
    b. Attach suction tee (22) to inlet manifolds (23 and 24) using 12 screws (26) on each side.



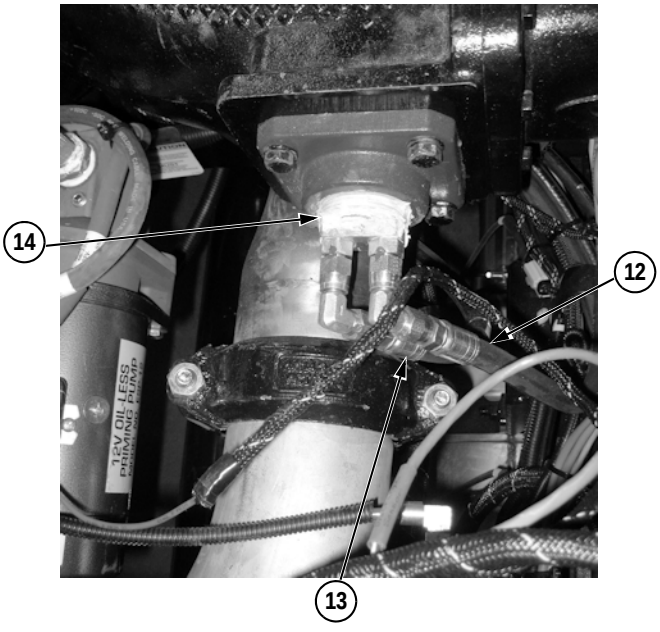
NOTE: *Perform step 23 only if the pump is equipped with an intake relief manifold.*

23. Install intake relief manifold (21) on suction tee (22) using four screws (20).



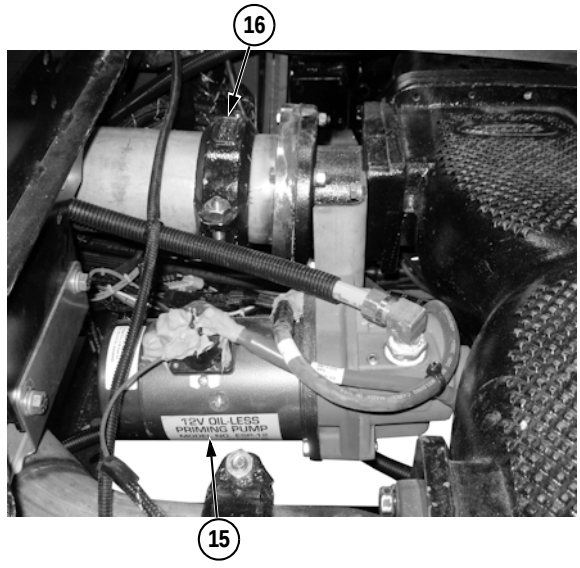
NOTE: *Install all hoses in the same locations as noted during removal*

24. Slide clamp (17) over the end of coolant hose (18), and connect coolant hose to fitting (19).



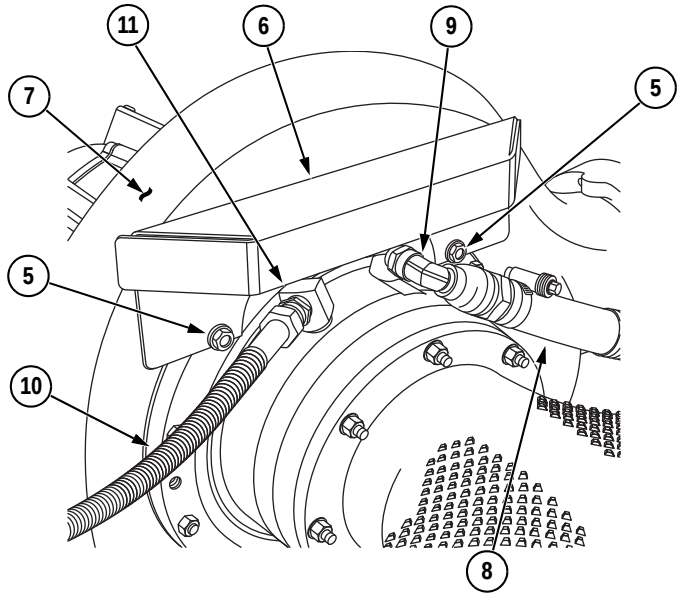
NOTE: *Connect hoses to the same locations as noted during removal.*

25. Connect hoses (12 and 13) to oil-to-water heat exchanger (14).



26. Install “Vic” coupler (16). (See “‘Vic’ Coupler,” Group 2000-P-001.)

27. Install primer pump (15). (See “Hale Oilless Primer Pump [Waterous and Hale Applications]),” Group 2930-P-004.)



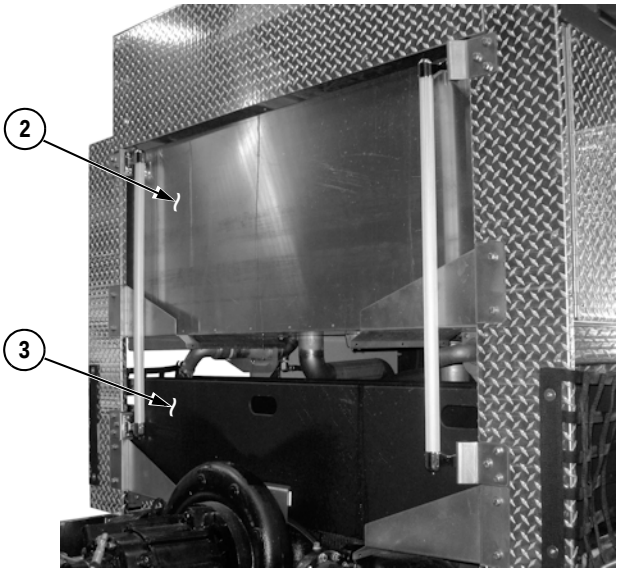
NOTE: *Install all hoses in the same locations as noted during removal*

28. Connect air line (10) to fitting (11).

29. Connect coolant hose (8) to fitting (9).

30. Install shield (6) on pump housing (7) using two flanged nuts (5).

31. Remove supports from inlet manifolds and pump transmission.



32. Install hose trays (2 and 3).
33. Remove dipstick and check oil level. Add oil as needed. (See "**Check Transmission Oil Level**" on page 3-5.)
34. Check coolant level. Add coolant as needed.
35. Turn battery switch ON (if equipped), or connect batteries. (See "Battery Connect/Disconnect," Group 0925-P-001.)

⚠ CAUTION

- ▲ **Never run the pump dry, except momentarily and at low speeds.**
- ▲ **Do not use this pump for hose testing. Failure to comply could result in damage to equipment.**

36. Connect the pump to a water source. Run pump and check for leaks.

    If leaks are noted, it may be necessary to run pump for approximately 30 minutes at 50 to 60 psi (345 to 414 kPa) to flush out lubricants and other contaminants.
37. Lower cab. (Refer to "Operation & Maintenance Manual.")
38. Remove "DO NOT START" tag from truck ignition switch.

8. PUMP AND TRANSMISSION ASSEMBLY

a. Removal

NOTE:

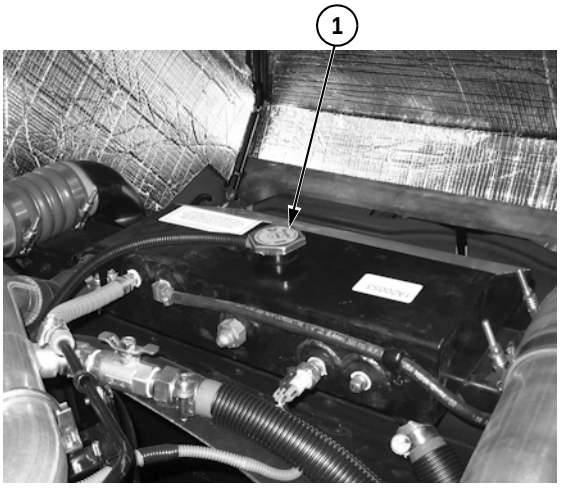
- ✍ *Several assistants may be required to perform this procedure.*
- ✍ *Depending on the engine installed in your truck and optional equipment, the connections may vary slightly from the example shown.*

1. Attach a "DO NOT START" tag to truck ignition switch.
2. Open all valves and drain the pump system.

⚠ WARNING

Cab stay arm must be in the support position before working under the cab or on cab lift components. Failure to comply may result in serious injury or death to personnel.

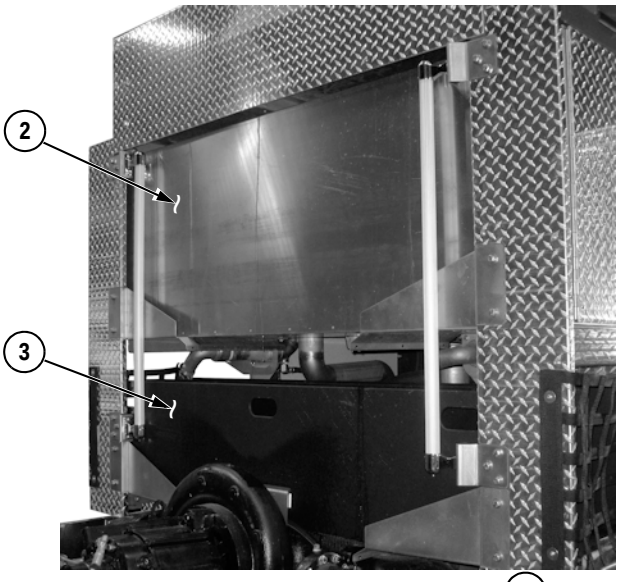
3. Raise cab. (Refer to "Operation & Maintenance Manual.")
4. Turn battery switch OFF (if equipped), or disconnect batteries. (See "Battery Connect/Disconnect," Group 0925-P-001.)



⚠ WARNING

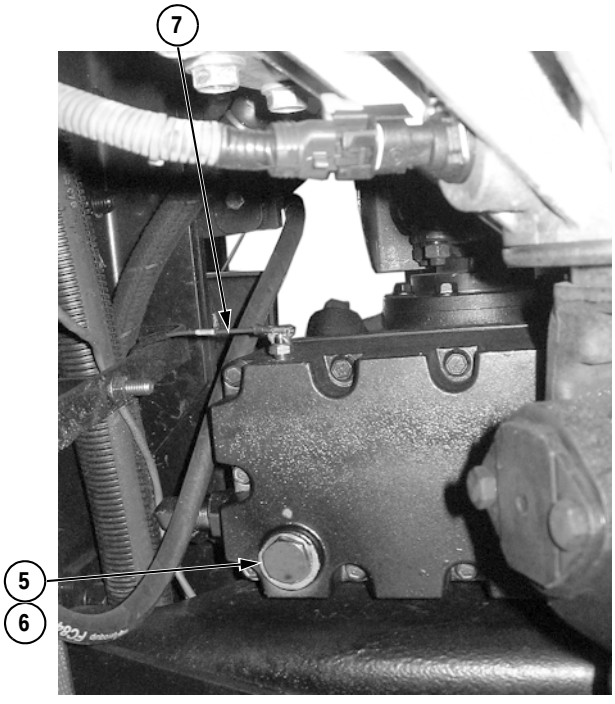
- ▲ **Radiator, radiator cap, coolant, and hoses are very hot and pressurized during truck operation. Let radiator cool before checking system.**
- ▲ **Avoid wearing gloves when removing radiator cap. Gloves can soak up hot coolant which can contribute to burns.**
- ▲ **Use extreme care when removing the radiator cap. Always allow engine to cool completely before opening radiator cap. Wrap a thick, heavy cloth around cap. Push down and turn radiator cap to first notch position. Pause before opening completely to allow any remaining pressure to escape. Failure to comply could result in burns from hot steam or coolant.**

5. Loosen radiator cap (1) and relieve cooling system pressure.



4 NOT SHOWN

6. Remove hose trays (2 and 3) to allow access to the rear of the pump.
7. Open drain valve (4) at the bottom of the pump to drain any water remaining in the pump. Close drain after water has been drained.



⚠ WARNING

Transmission becomes hot during normal operation. Allow transmission to cool slightly prior to performing this task. Failure to comply could result in serious injury to personnel.

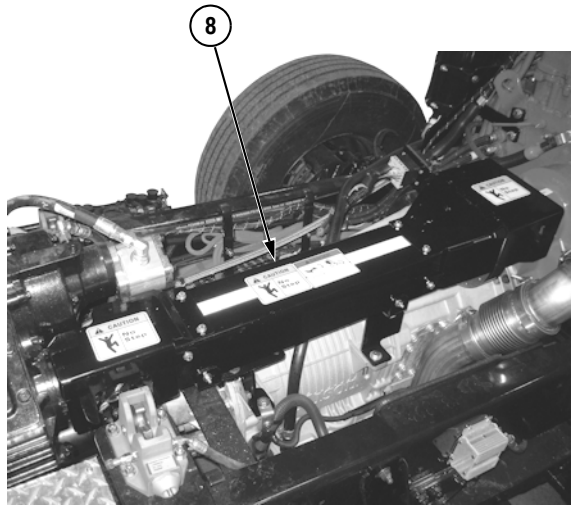
IMPORTANT

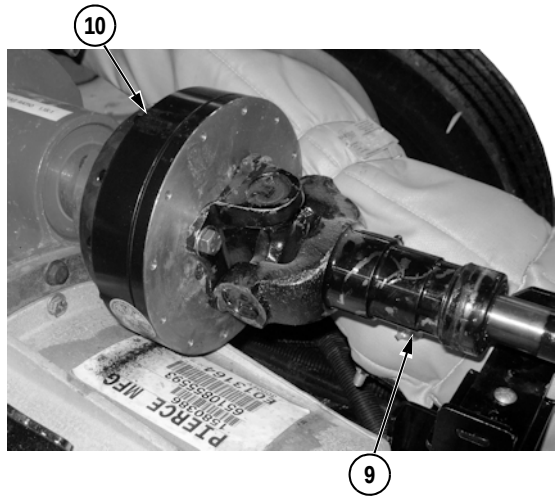
DO NOT POLLUTE! Dispose of used oil in an environmentally responsible manner. If available, take used oil to a collection center for recycling. If recycling is not available, inquire as to the correct procedure for disposal.

8. Place a suitable container under the transmission to catch draining oil.
9. Remove drain plug (5) and O-ring (6), and drain oil from transmission. Install drain plug after oil has been drained.
10. Inspect oil for debris or cloudiness (water entrapped in oil).

NOTE: *Label all wires and note their locations to ensure correct installation.*

11. Disconnect wire (7) from oil temperature sensor (if equipped).

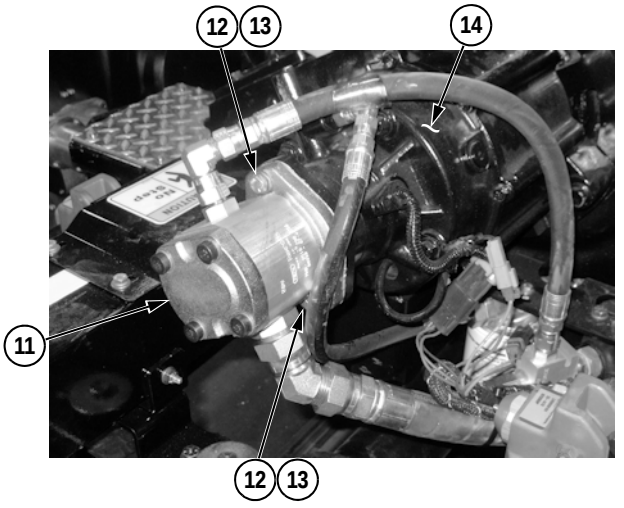




NOTE:

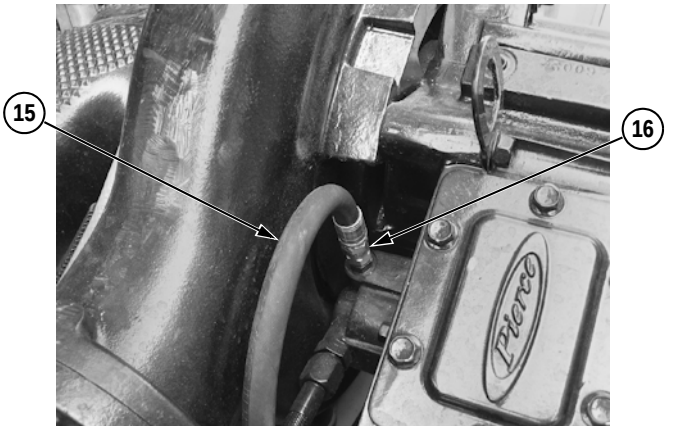
- *The driveshaft cover configuration will vary depending on the chassis application.*
- *The vibration damper may be installed either on the pump side or engine side of the drive shaft, depending on the truck configuration.*

12. Remove driveshaft cover (8), driveshaft (9), and vibration damper (10). (See “PUC Driveshaft and Vibration Damper,” Group 0510-P-002.)



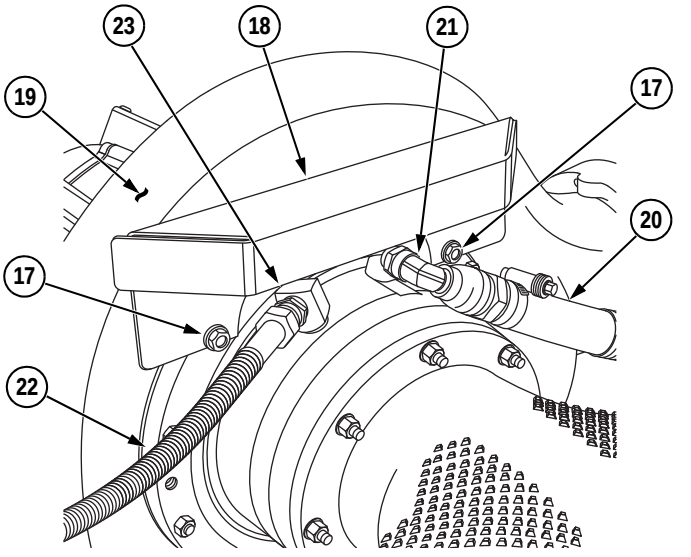
NOTE: *Perform steps 13 and 17 if equipped with an auxiliary hydraulic pump.*

13. Support the auxiliary hydraulic pump (11).
14. Remove two screws (12) and lockwashers (13), and remove auxiliary hydraulic pump (11) from the pump transmission (14). Move the auxiliary hydraulic pump aside.



NOTE: *Label all hoses before removing to ensure correct installation.*

15. Disconnect hose (15) from fitting (16) on the lubricant discharge port.



16. Remove two flanged nuts (17), and remove shield (18) from the pump housing (19).

IMPORTANT

DO NOT POLLUTE! Dispose of used engine coolant in an environmentally responsible manner. If available, take used coolant to a collection center for recycling. If recycling is not available, inquire as to the correct procedure for disposal.

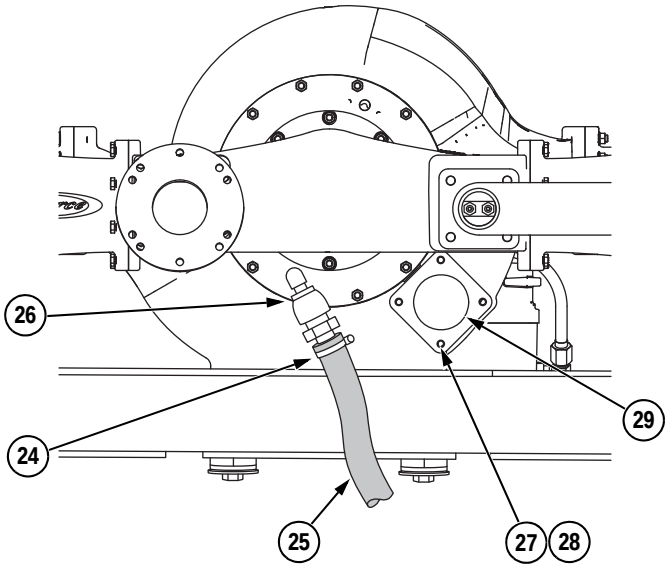
NOTE: *Label all hoses before disconnecting to ensure correct installation.*

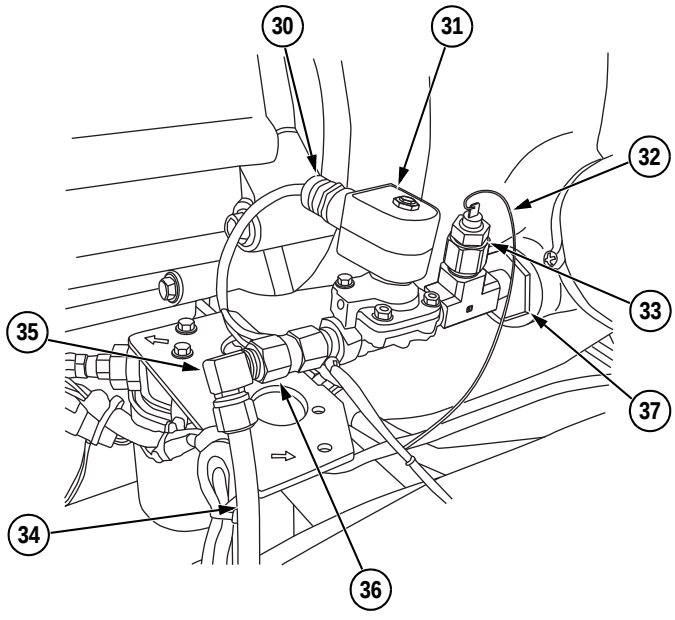
17. Place a suitable container under the pump to catch draining coolant.
18. Remove coolant hose (20) from fitting (21). Plug hose to prevent excessive loss of coolant.

⚠ WARNING

Air lines under pressure will move violently when removed. Air system must be drained prior to removing air lines. Failure to comply may result in serious injury to personnel.

19. Disconnect air line (22) from fitting (23).





IMPORTANT

DO NOT POLLUTE! Dispose of used engine coolant in an environmentally responsible manner. If available, take used coolant to a collection center for recycling. If recycling is not available, inquire as to the correct procedure for disposal.

NOTE: *Label all hoses before removing to ensure correct installation.*

20. Place a suitable container under the pump to catch draining coolant.
21. Loosen clamp (24) and remove coolant hose (25) from fitting (26). Plug hose to prevent excessive loss of coolant.
22. Remove four screws (27) and lockwashers (28) from tank-to-pump supply tube (29) at the bottom of the pump.

NOTE:

- *Perform steps 23 through 27 if equipped with optional pump overheat control valve.*
- *Label all wiring connectors before removing to ensure correct installation.*
- *Remove cable ties as needed.*

23. Disconnect screw-on electrical connector (30) from pump overheat control valve (31).
24. Disconnect the wire (32) from coolant temperature sensor (33).

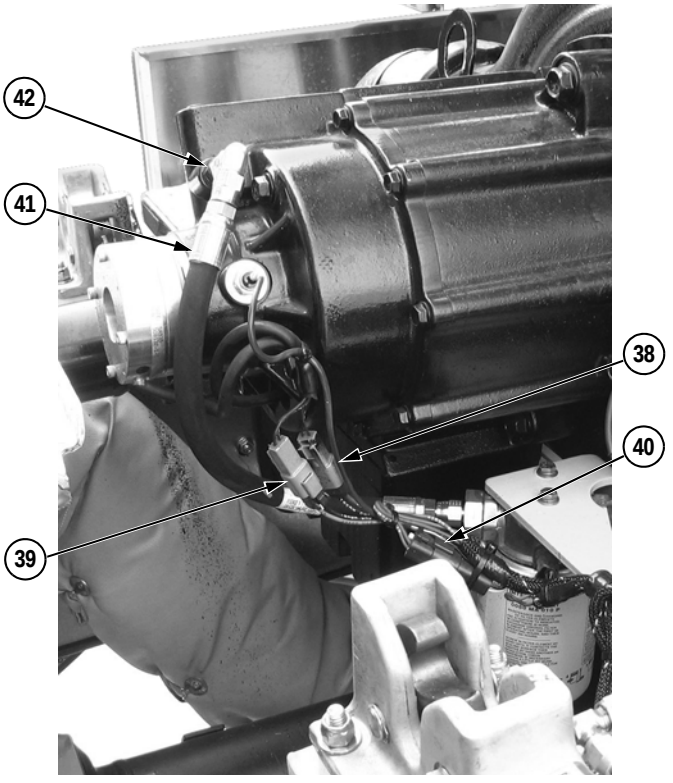
WARNING

Air lines under pressure will move violently when removed. Air system must be drained prior to removing air lines. Failure to comply may result in serious injury to personnel.

25. Disconnect air hose (34) from elbow (35).

NOTE: *Note the orientation of all fittings before removing to ensure correct installation.*

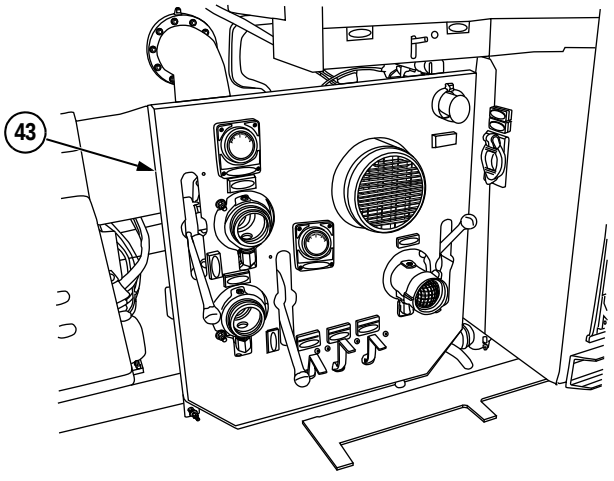
26. Remove elbow (35) and fitting (36) from pump overheat control valve (31).
27. Remove pump overheat control valve (31) and coolant temperature sensor (33) from strainer fitting (37).



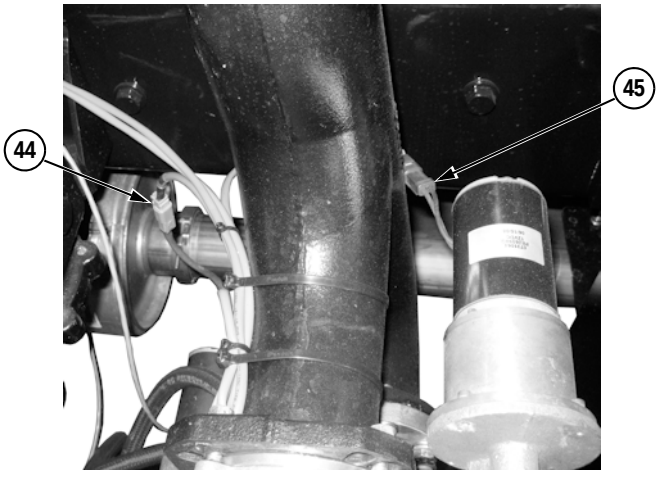
NOTE:

- ✍ *Label all wiring connectors before disconnecting to ensure correct installation.*
- ✍ *Remove cable ties as needed.*

28. Disconnect brake (38), clutch (39), and tach sensor (40) wiring connectors from truck harness.
29. Disconnect hose (41) from fitting (42).



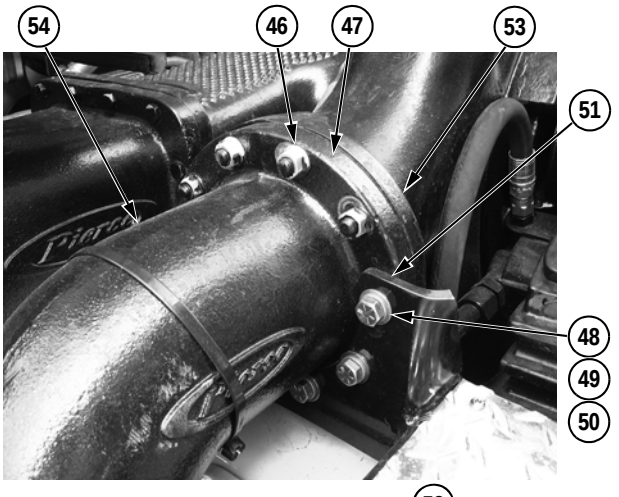
30. Remove pump side panels (43) from both sides of the truck.



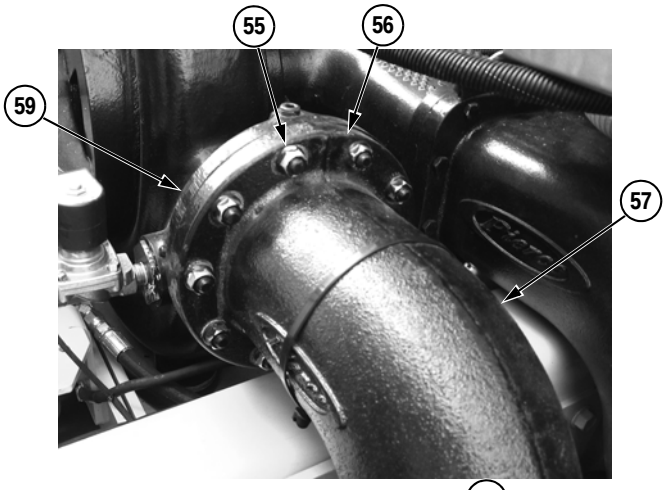
NOTE:

- ✍ *Label all wiring connectors before disconnecting to ensure correct installation.*
- ✍ *Remove cable ties as needed.*

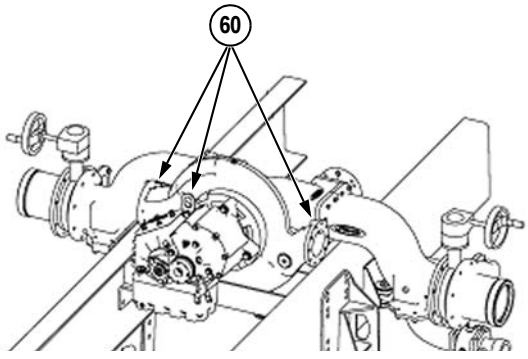
31. Disconnect the discharge actuator wiring connectors (44 and 45) from the truck wiring harness.



32. Remove the passenger-side discharge extension:
    a. Remove seven flange nuts (46) from discharge extension flange (47).
    b. Remove three screws (48), lockwashers (49), and washers (50) from discharge extension flange (47) and bracket (51).
    c. Remove and discard O-ring (52) from pump discharge outlet flange (53).
    d. Move discharge extension (54) away from pump to clear studs.
    e. Support discharge extension (54).



33. Remove the driver-side discharge extension:
    a. Remove ten flange nuts (55) from discharge extension flange (56).
    b. Move discharge extension (57) away from pump to clear the studs.
    c. Support discharge extension (57).
    d. Remove and discard O-ring (58) from pump discharge outlet flange (59).



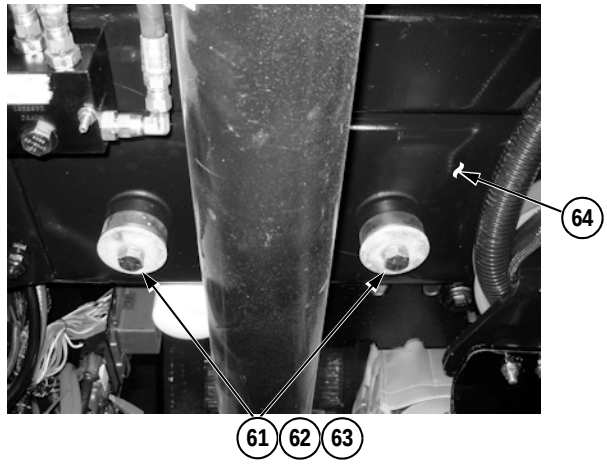
⚠ WARNING

The pump and transmission assembly is heavy and must be properly supported before removing mounting hardware. Failure to comply may result in serious injury to personnel and damage to equipment.

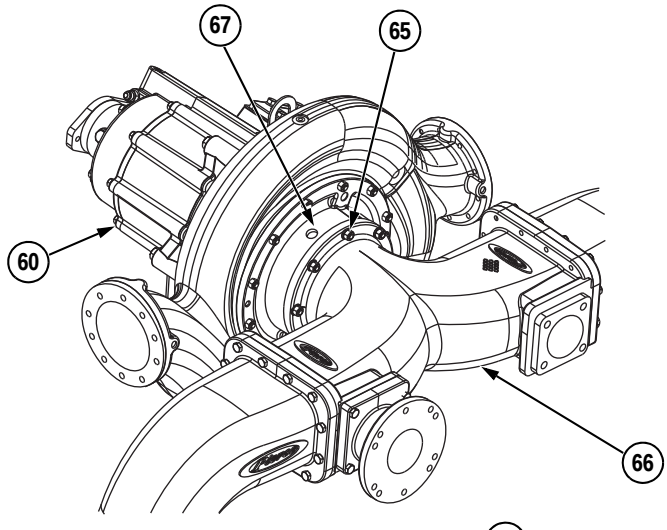
NOTE:

- *The pump/transmission assembly weighs approximately 450 pounds (204 kg).*
- *The entire PUC pump (with discharge and suction extensions) weighs approximately 750 pounds (340 kg).*

34. Attach a suitable lifting device to the pump/transmission assembly (60). Attach lifting device at three points to balance the pump/transmission.



35. Remove two screws (61), washers (62), and rubber isolators (63) from frame crossmember (64) and the bottom of pump.



36. Remove eight nuts (65) holding the suction tee (66) to the pump suction head (67). Slide pump/transmission assembly (60) forward to clear the suction tee studs; lift and remove from chassis. Remove and discard O-ring (68) from suction tee.

b. Installation

NOTE:

- ✍ *Several assistants may be required to perform this procedure.*
- ✍ *Depending on the engine installed in your truck and optional equipment, the connections may vary slightly from the example shown.*

NOTE: *The suction head and suction tee O-ring mating surfaces must be free of dirt, corrosion, debris, and surface defects (nicks, etc.) to ensure a proper O-ring seal.*

1. Clean and inspect suction head (67) and suction tee (66) O-ring mating surfaces. Remove small surface defects using fine emory paper or a file.

NOTE:

- ✍ *Always use new O-rings for installation.*
- ✍ *Apply grease to O-rings only; do not place grease in O-ring grooves. Placing grease in O-ring grooves may prevent O-rings from seating properly.*

2. Apply a thin film of Dow Corning® 111 (Silicone Compound) grease (Pierce P/N 1788950) to O-ring (68) and install O-ring in the grooves in the suction tee (66).

NOTE:

- ✍ *The pump/transmission assembly weighs approximately 450 pounds (204 kg).*
- ✍ *The entire PUC pump (with discharge and suction extensions) weighs approximately 750 pounds (340 kg).*

3. Attach a suitable lifting device to the pump/transmission assembly (60). Attach lifting device at three points to balance pump/transmission.
4. Lift pump/transmission assembly (60) into chassis, and position the assembly several inches in front of the suction tee (66).
5. Install pump/transmission assembly (60) on suction tee (66). Secure assembly using eight nuts (65).
6. Install two screws (61), washers (62), and rubber isolators (63) in the frame crossmember (64) and bottom of pump.

NOTE: *The discharge extension and pump flange O-ring mating surfaces must be free of dirt, corrosion, debris, and surface defects (nicks, etc.) to ensure a proper O-ring seal.*

7. Clean and inspect discharge extension flange (56) and pump discharge outlet flange (59) O-ring mating surfaces. Remove small surface defects using fine emory paper or a file.

NOTE:

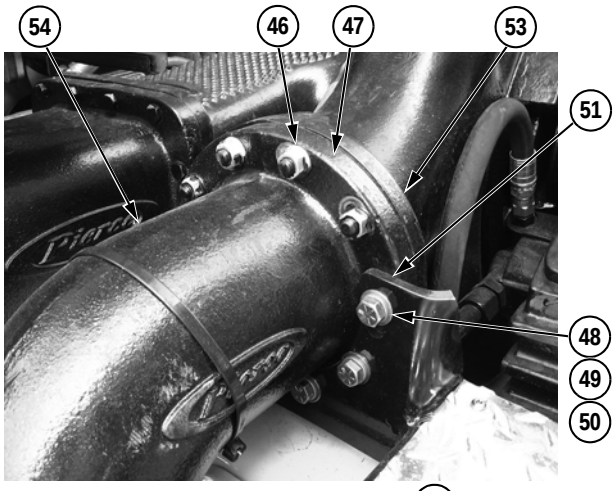
- ✍ *Always use new O-rings for installation.*
- ✍ *Apply grease to O-rings only; do not place grease in O-ring grooves. Placing grease in O-ring grooves may prevent O-rings from seating properly.*

8. Apply a thin film of Dow Corning® 111 (Silicone Compound) grease (Pierce P/N 1788950) to O-ring (58).

⚠ WARNING

Adhesives, solvents, and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin and clothing. Keep away from open fire and use in well-ventilated area. If adhesives, solvents, or sealing compounds get on skin or clothing, wash immediately with soap and water. Failure to comply could result in serious injury or death to personnel.

9. Install driver-side discharge extension:
   a. Install an O-ring (58) in the groove in the pump discharge outlet flange (59).
   b. Install discharge extension (57) on pump discharge outlet flange (59) using ten flange nuts (55).
   c. Apply Sentry Seal (Pierce P/N 95-1356) to flange nuts (55).



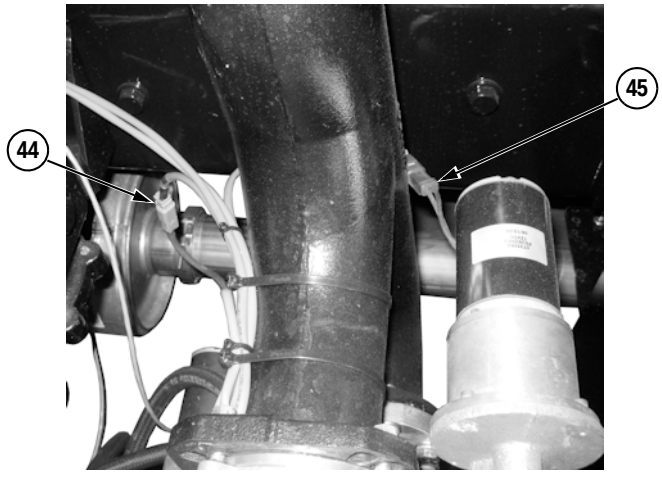
NOTE: *The discharge extension and pump flange O-ring mating surfaces must be free of dirt, corrosion, debris, and surface defects (nicks, etc.) to ensure a proper O-ring seal.*

10. Clean and inspect discharge extension flange (47) and pump discharge outlet flange (53) O-ring mating surfaces. Remove small surface defects using fine emory paper or a file.

NOTE:

- *Always use new O-rings for installation.*
- *Apply grease to O-rings only; do not place grease in O-ring grooves. Placing grease in O-ring grooves may prevent O-rings from seating properly.*

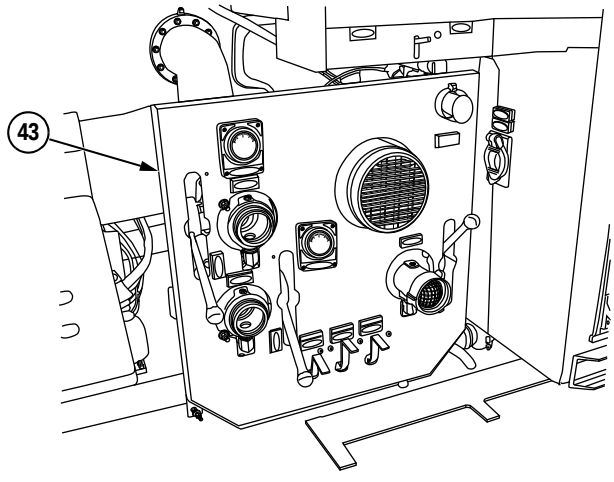
11. Apply a thin film of Dow Corning® 111 (Silicone Compound) grease (Pierce P/N 1788950) to O-ring (52) and install O-ring in the grooves in the discharge extension flange (47).
12. Install passenger-side discharge extension:
    a. Install a new O-ring (52) on pump discharge outlet flange (47).
    b. Install discharge extension (54) on pump outlet flange (53) and bracket (51) using seven flange nuts (46), and three screws (48), lockwashers (49), and flat washers (50).
    c. Apply Sentry Seal (Pierce P/N 95-1356) to flange nuts (46) and screws (48).



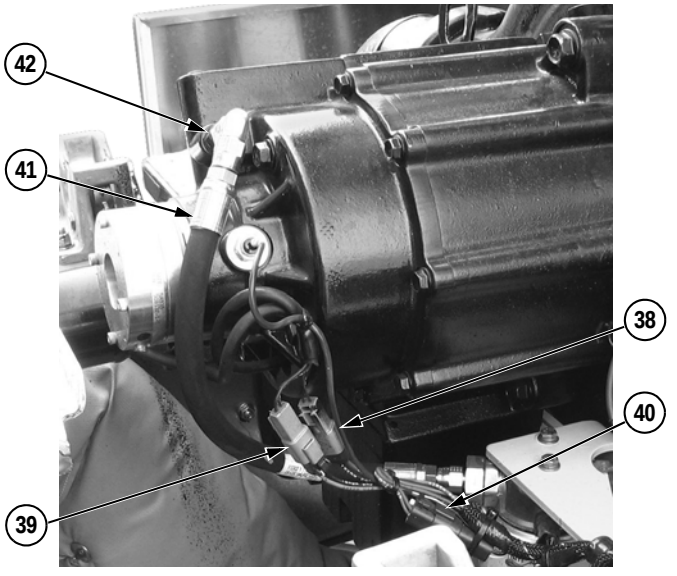
NOTE:

- *Connect all wiring connectors to the same connectors as noted during removal.*
- *Secure the wiring harnesses using cable ties as needed.*

13. Connect the discharge actuator wiring connectors (44 and 45) to the truck wiring harness.



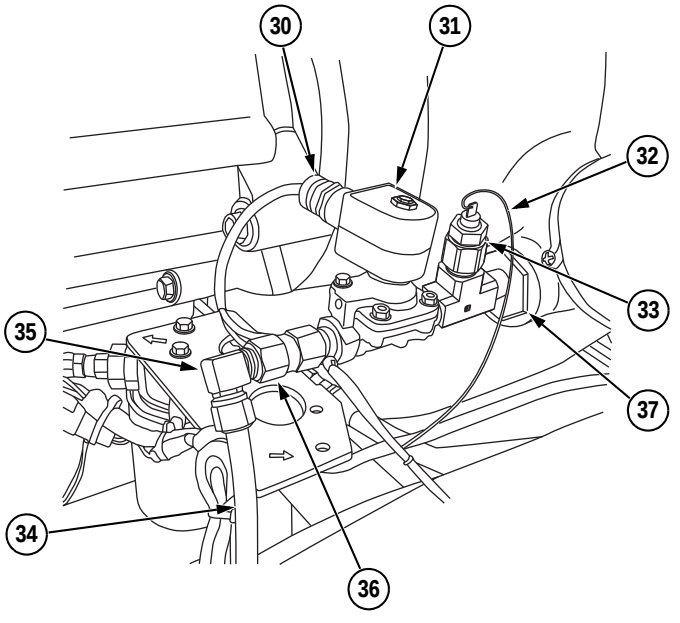
14. Install the pump side panels (43) on both sides of the truck.



NOTE:

- ✍ *Connect all wiring connectors to the same connectors as noted during removal.*
- ✍ *Secure the wiring harnesses using cable ties as needed.*

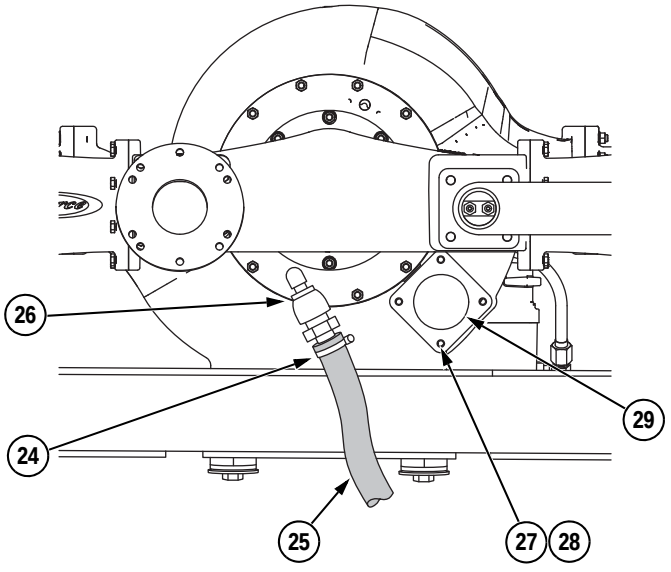
15. Connect brake (38), clutch (39), and tach sensor (40) wiring connectors to truck harness.
16. Connect hose (41) to fitting (42).



NOTE:

- ✍ *Perform steps 17 through 21 if equipped with optional pump overheat control valve.*
- ✍ *Install the pump overheat control valve, fitting, and elbow in the same orientation as noted during removal.*

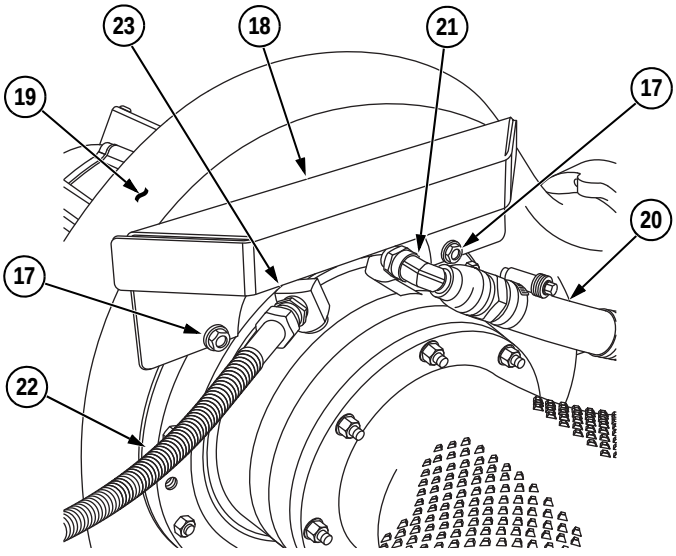
17. Install pump overheat control valve (31) and coolant temperature sensor (33) on strainer fitting (37).
18. Install fitting (36) and elbow (35) on pump overheat control valve (31).
19. Connect air hose (34) to elbow (35).
20. Connect screw-on electrical connector (30) to pump overheat control valve (31).
21. Connect wire (32) to coolant temperature sensor (33).



22. Install tank-to-pump supply tube (29) at the bottom of pump using four screws (27) and lockwashers (28).

NOTE: *Connect all hoses to the same locations as noted during removal.*

23. Slide clamp (24) over the end of coolant hose (25) and connect coolant hose to fitting (26).

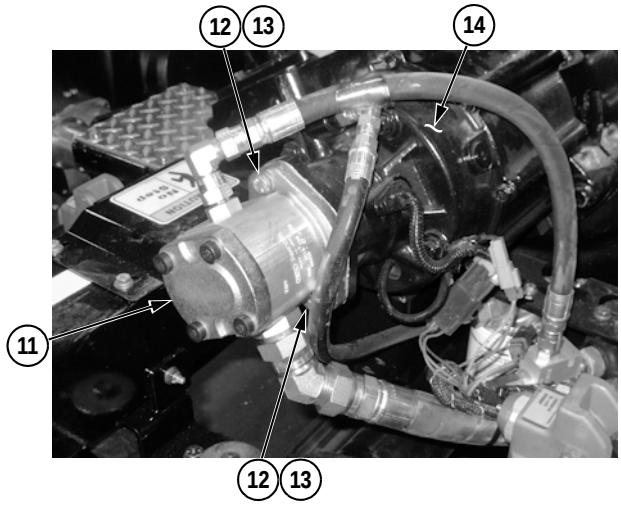


NOTE: *Connect all hoses to the same locations as noted during removal.*

24. Connect coolant hose (20) to fitting (21).
25. Connect air line (22) to fitting (23).
26. Install shield (18) on pump housing (19) using two flanged nuts (17).

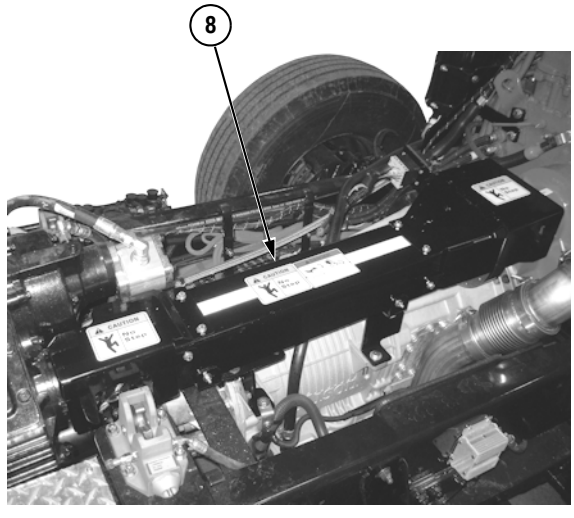
NOTE: *Install all hoses to the same location as noted during removal.*

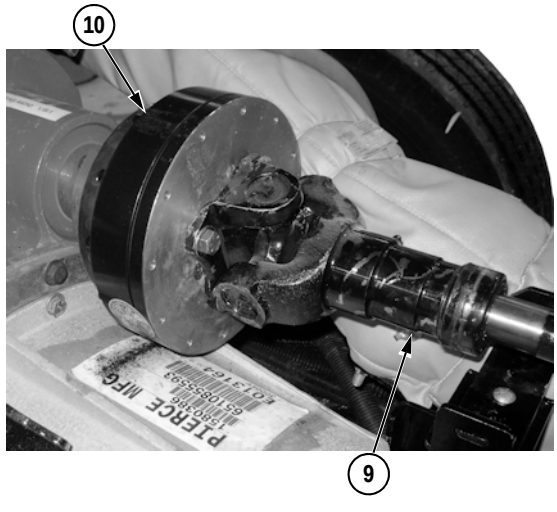
27. Connect hose (15) to fitting (16) on lubricant discharge port.



NOTE: *Perform step 28 if equipped with an auxiliary hydraulic pump.*

28. Install auxiliary hydraulic pump (11) on pump transmission (14) using two screws (12) and lockwashers (13).





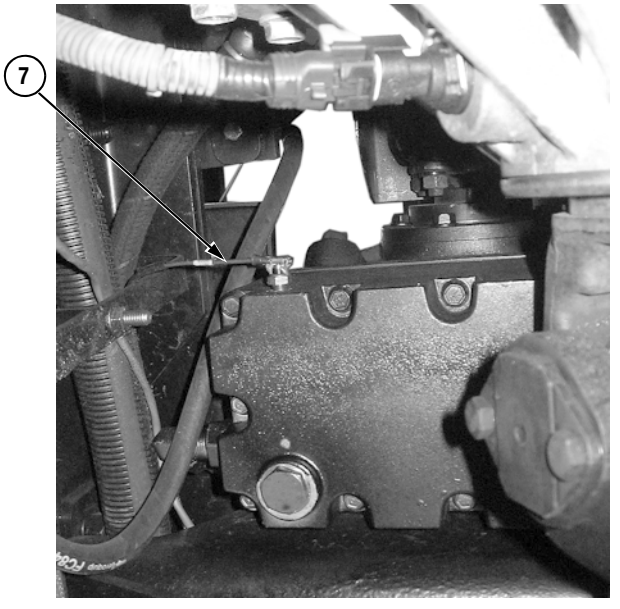
⚠ WARNING

Do not operate the vehicle without the driveshaft cover in place. Failure to comply may result in serious injury to personnel and damage to equipment.

NOTE:

- ✍ *The driveshaft cover configuration will vary depending on the chassis application.*
- ✍ *The vibration damper may be installed either on the pump side or engine side of the drive shaft, depending on the truck configuration.*

29. Install vibration damper (10), driveshaft (9), and driveshaft cover (8). (See “PUC Driveshaft and Vibration Damper,” Group 0510-P-002 or contact Pierce Customer Service for current information.)



NOTE:

- ✍ *Perform steps 30 and 31 if equipped with the optional transmission oil temperature sending unit.*
- ✍ *Connect all wires to the same locations as noted during removal.*

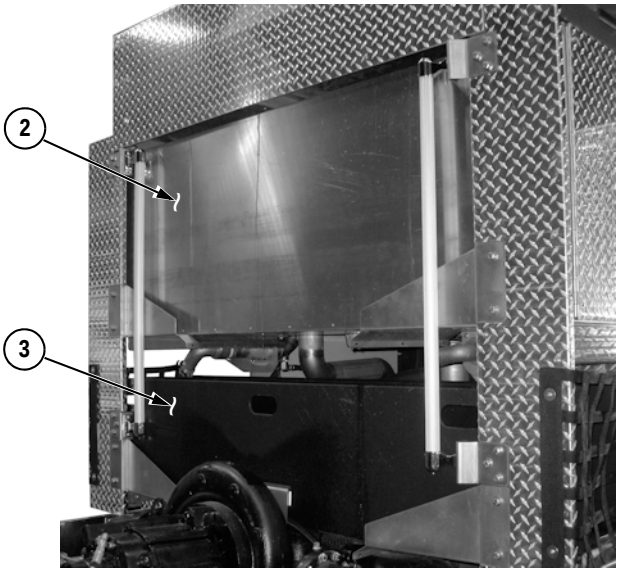
30. Connect wire (7) to oil temperature sending unit (if equipped).

⚠ WARNING

Adhesives, solvents, and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin and clothing. Keep away from open fire and use in well-ventilated area. If adhesives, solvents, or sealing compounds get on skin or clothing, wash immediately with soap and water. Failure to comply could result in serious injury or death to personnel.

NOTE: *All exposed positive and negative connections and connecting hardware must be protected against moisture, contamination, and corrosion by applying a sealer to connecting hardware and studs.*

31. Apply Sealer Protective, Dow Corning® P/N 1890 (Pierce P/N 95-1289) to sending unit connections. Make sure all conductive surfaces are covered.



32. Install hose trays (2 and 3).
33. Check oil level. Add oil as needed. (See “**Check Transmission Oil Level**” on page 3-5.)
34. Check coolant level. Add coolant as needed.
35. Turn battery switch ON (if equipped), or connect batteries. (See “Battery Connect/Disconnect,” Group 0925-P-001.)

⚠ CAUTION

- ▲ **Never run the pump dry, except momentarily and at low speeds.**
- ▲ **Do not use this pump for hose testing. Failure to comply could result in damage to equipment.**

36. Connect the pump to a water source. Run the pump and check for leaks.

    If leaks are noted, it may be necessary to run the pump for approximately 30 minutes at 50 to 60 psi (345 to 414 kPa) to flush out lubricants and other contaminants.

37. Lower cab. (Refer to “Operation & Maintenance Manual.”)

38. Remove “DO NOT START” tag from truck ignition switch.

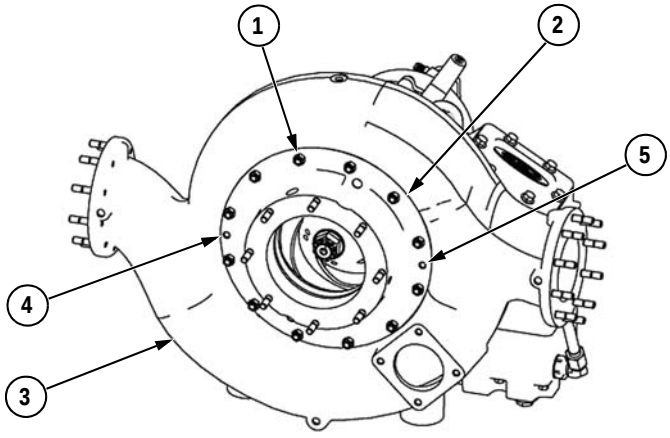
9. PUMP

a. Disassembly

WARNING

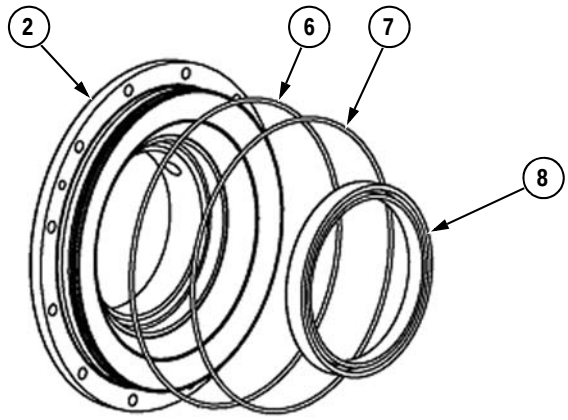
Place the pump/transmission assembly on a solid work surface capable of supporting at least 450 pounds (204 kg). Failure to comply may result in serious injury to personnel and damage to equipment.

NOTE: *Clean all parts and carefully examine for wear or deterioration. Replace any questionable parts.*



NOTE: *Note the orientation of the suction head before removing to ensure correct installation.*

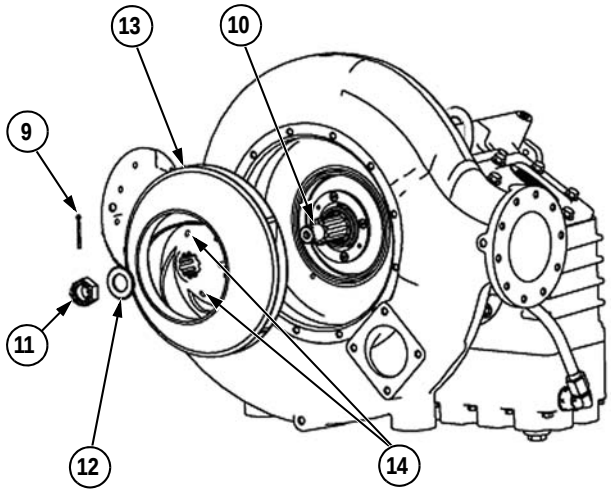
1. Remove 12 nuts (1) from suction head (2).
2. Remove suction head (2) from pump housing (3):
   a. Install a 3/8-16NC screw in each of the threaded holes (4 and 5) in the suction head (2).
   b. Turn each screw clockwise, 1/4 turn at a time, until the suction head (2) is free from the pump housing (3).



3. Remove and discard O-rings (6 and 7).
4. Inspect seal (wear) ring (8). (See “**Suction Head**” on page 3-45.)

NOTE: *Perform step 5 only if it is determined that the seal (wear) ring replacement is required.*

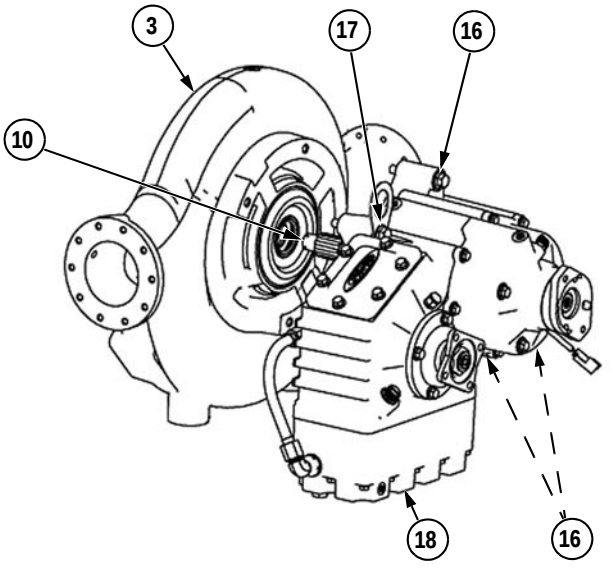
5. Remove (pry) the seal (wear) ring (8) out of suction head (2) (if required after inspection).



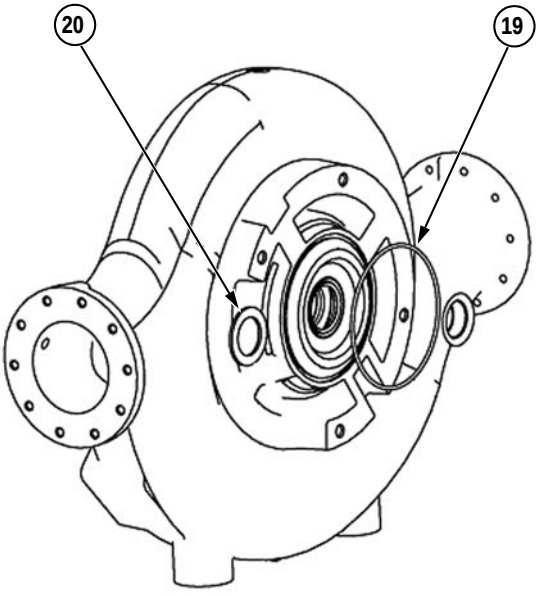
NOTE: *If needed, an impact wrench can be used to loosen the impeller nut.*

6. Remove cotter pin (9) from impeller shaft (10), and remove impeller nut (11) and washer (12). Discard cotter pin.
7. Remove impeller (13) from impeller shaft (10):
   a. Install a 3/8-16NC screw in each of the threaded holes (14) in impeller (13).
   b. Turn each screw clockwise, 1/4 turn at a time, until impeller (13) is free from shaft (10).
   c. Remove screws from impeller (13).

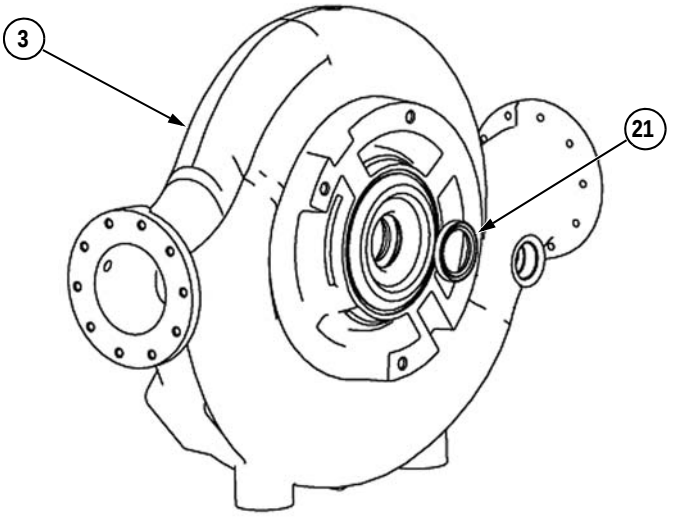
8. Remove and discard the mechanical seal spring (15).



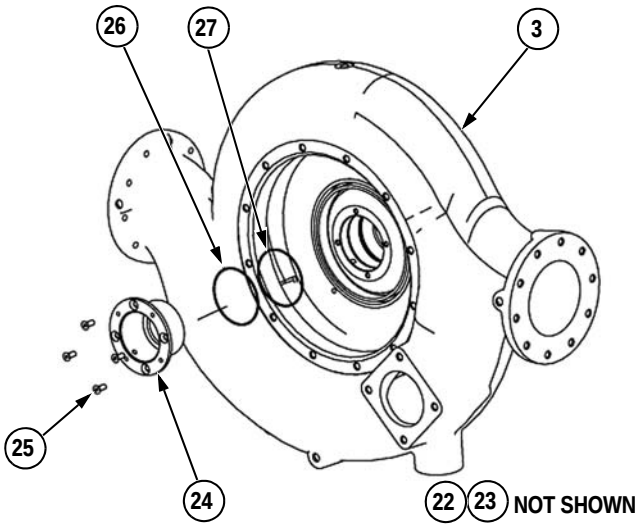
9. Remove four screws (16 and 17) holding pump housing (3) to transmission (18). Carefully slide pump housing off impeller shaft (10), keeping the shaft square with bore to avoid damage to parts.



10. Remove and discard O-ring (19).
11. Remove water slinger (20) from cavity.



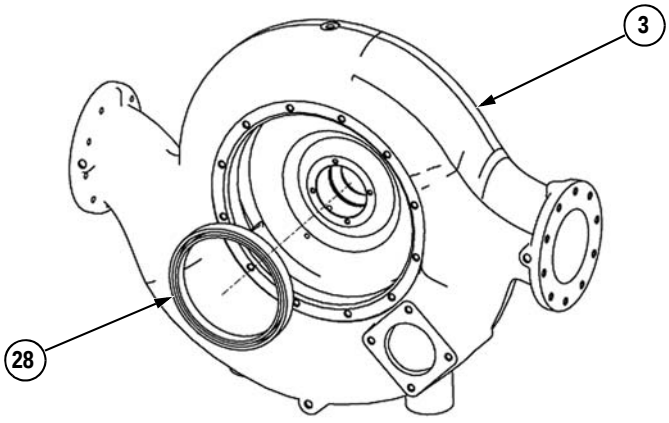
12. Remove oil seal (21) from pump housing (3).



13. Remove and discard mechanical seal primary ring and bellows assembly (22).
14. Remove and discard mechanical seal mating ring and O-ring (23) from mechanical seal housing (24).
15. Remove four stainless steel, flush-head machine screws (25) and remove mechanical seal housing (24).

    If the housing cannot be removed by hand, install four 1/4-20 screws in four threaded holes in the housing. Turn the first screw 1/4 turn; move to each screw in turn (moving clockwise) and turn each 1/4 turn. Continue this pattern until the housing is free.

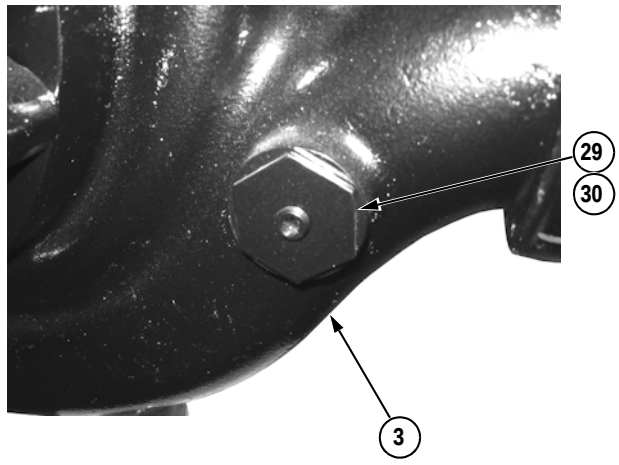
    Remove and discard O-rings (26 and 27) from pump housing (3).



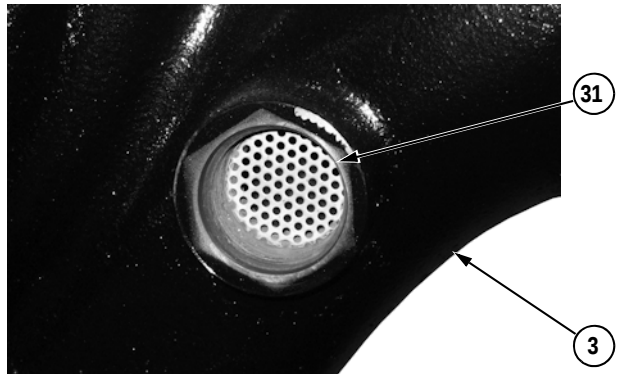
16. Inspect inboard seal (wear) ring (28). (See "**Suction Head**" on page 3-45.)

NOTE: *Perform step 17 only if it is determined that seal (wear) ring replacement is required.*

17. Remove (pry) the inboard seal (wear) ring (28) out of pump housing (3).



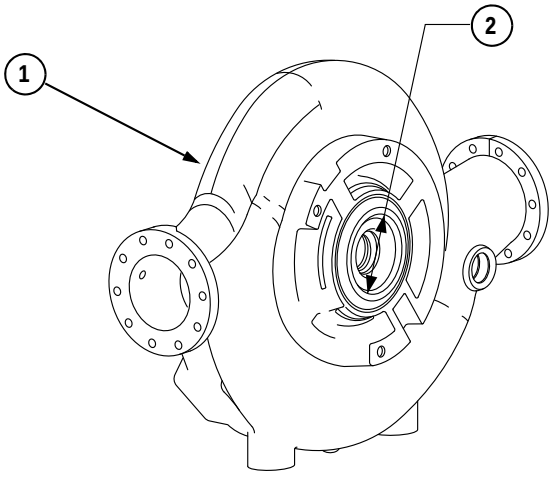
18. Remove strainer fitting (29) and O-ring (30) from pump housing (3).



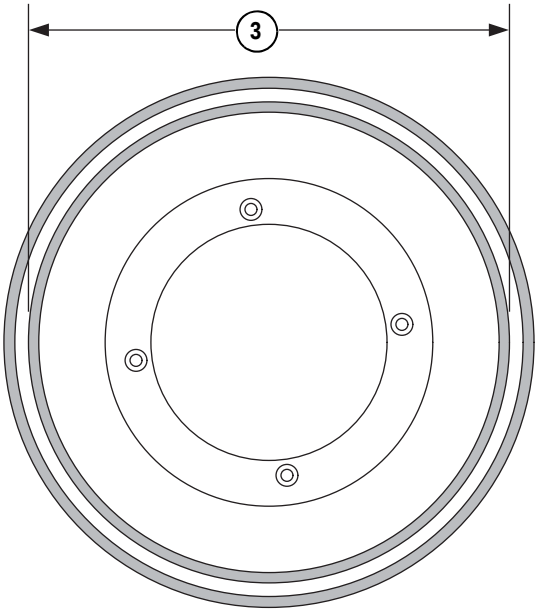
19. Remove strainer screen (31) from pump housing (3). Clean and inspect strainer screen.

b. Component Inspection

1. PUMP HOUSING

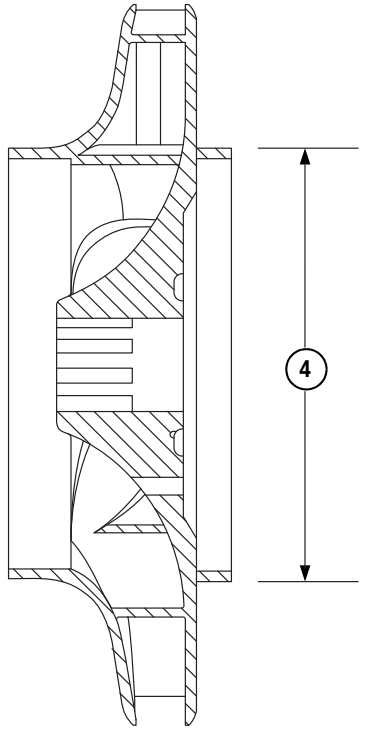


1. Clean pump housing (1) and carefully examine for wear or damage. Replace pump housing if any damage is noted.
2. Measure pump housing bearing bore inside diameter (2). The bearing bore diameter should measure 4.3308 to 4.3315 inches (110.0023 to 110.0201 mm) Replace pump housing if the bore exceeds 4.332 inches (110.0328 mm).
3. Determine impeller-to-seal (wear) ring outer clearance:



NOTE: *The outside diameter of the seal ring groove should measure 6.639 to 6.641 inches (168.631 to 168.681 mm).*

a. Measure outside diameter (3) of the seal (wear) ring groove. Note measurement.



Impeller—Cross-Section View

NOTE: *The outside diameter of the impeller flange should measure 6.623 to 6.625 inches (168.224 to 168.275 mm).*

b. Measure the outside diameter (4) of impeller flange. Note measurement.

c. Subtract impeller flange outside diameter (4) from the seal (wear) ring groove outside diameter (3):

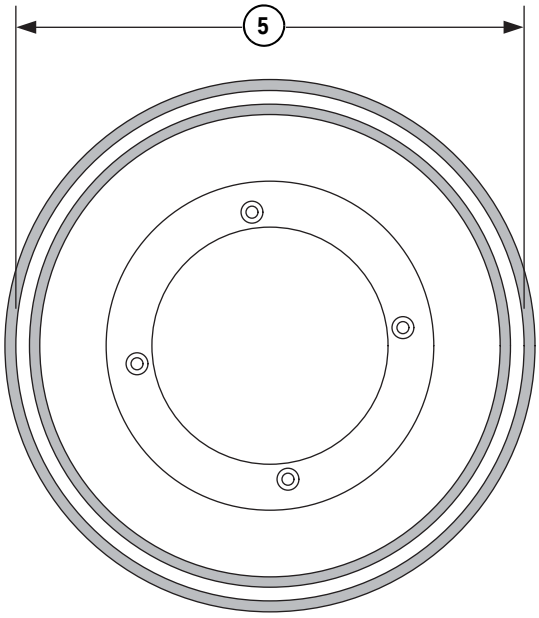
Example:

Seal Ring Outside Diameter = 6.641 inches (168.681 mm)

Impeller Flange Outside Diameter = 6.625 inches (168.275 mm)

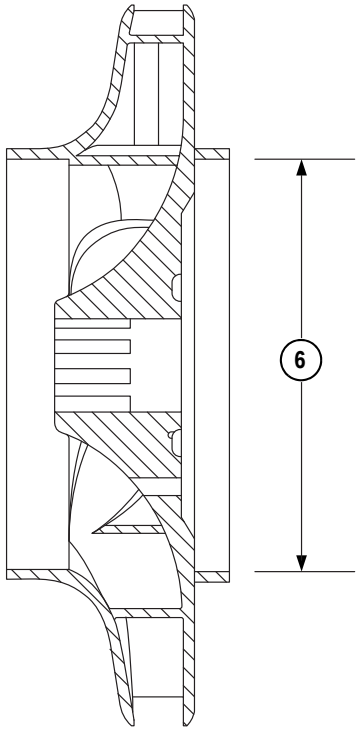
Clearance (on Diameter) = 0.016 inch (0.406 mm)

4. Determine impeller-to-seal (wear) ring inner clearance:



NOTE: *The inside diameter of the seal ring groove should measure 6.299 to 6.301 inches (159.995 to 160.045 mm).*

a. Measure the inside diameter (5) of the seal (wear) ring groove. Note measurement.



Impeller—Cross-Section View

NOTE: *The inside diameter of the impeller flange should measure 6.315 to 6.317 inches (160.401 to 169.452 mm).*

b. Measure the inside diameter (6) of the impeller flange. Note measurement.

c. Subtract seal (wear) ring groove inside diameter (5) from the impeller flange inside diameter (6):

Example:

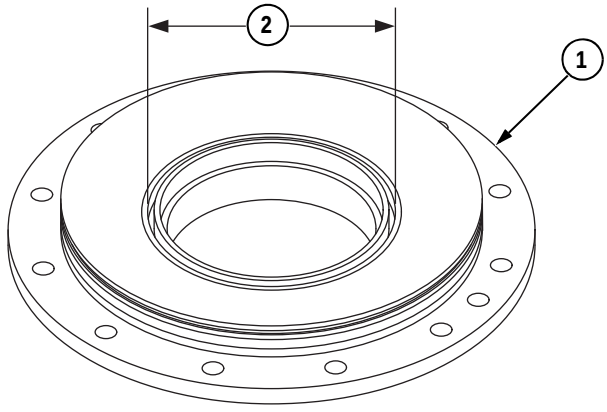
Impeller Flange Inside Diameter = 6.317 inches (160.4521 mm)

Seal Ring Inside Diameter = 6.301 inches (160.045 mm)

Clearance (on Diameter) = 0.016 inch (0.406 mm)

Clearance on either side of the impeller should be 0.014 to 0.018 inch (0.356 to 0.457 mm). If clearance exceeds 0.025 inch (0.635 mm) on diameter, impeller seal rings can be restored to their original size by soldering a ring over trued surface that retains at least 0.090 inch (2.286 mm) wall thickness. Stationary seal rings should also be replaced or you may purchase undersize seal rings. Contact your Pierce® Custom Chassis Dealer or Sales Representative for further information.

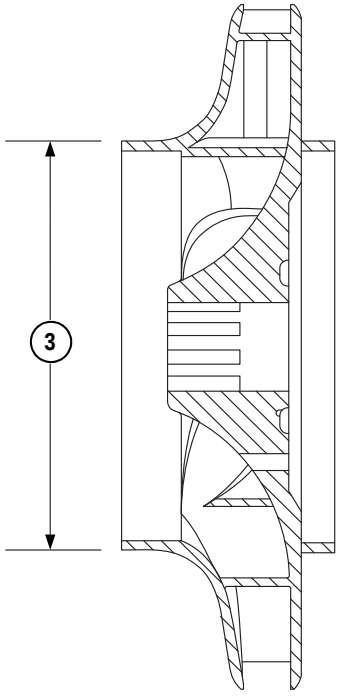
2. SUCTION HEAD



1. Clean suction head (1) and carefully examine for wear or damage. Replace suction head if any damage is noted.
2. Determine impeller-to-seal (wear) ring outer clearance:

NOTE: *The outside diameter of the seal ring groove should measure 6.639 to 6.641 inches (168.631 to 168.681 mm).*

a. Measure the outside diameter (2) of the seal (wear) ring groove. Note measurement.



Impeller—Cross-Section View

NOTE: *The outside diameter of the impeller flange should measure 6.623 to 6.625 inches (168.224 to 168.275 mm).*

b. Measure the outside diameter (3) of the impeller flange. Note measurement.

c. Subtract the impeller flange outside diameter (3) from the seal (wear) ring groove outside diameter (2):

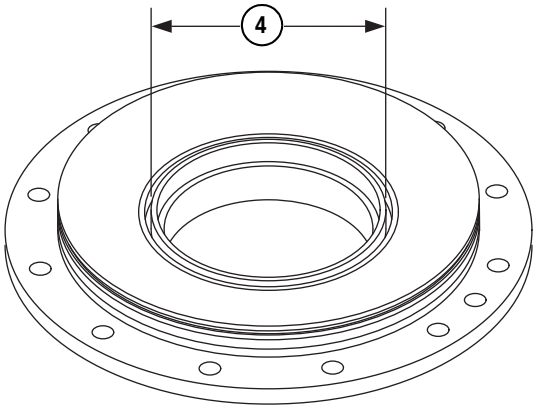
Example:

Seal Ring Outside Diameter = 6.641 inches (168.681 mm)

Impeller Flange Outside Diameter = 6.625 inches (168.275 mm)

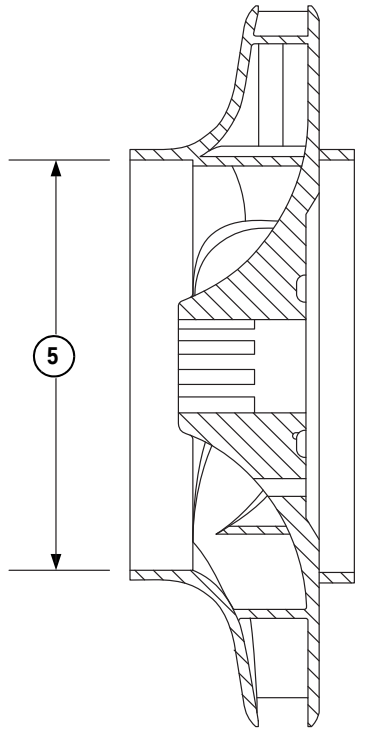
Clearance (on Diameter) = 0.016 inch (0.406 mm)

3. Determine the impeller-to-seal (wear) ring inner clearance:



NOTE: *The inside diameter of the seal ring groove should measure 6.299 to 6.301 inches (159.995 to 160.045 mm).*

a. Measure the inside diameter (4) of the seal (wear) ring groove. Note measurement.



Impeller—Cross-Section View

NOTE: *The inside diameter of the impeller flange should measure 6.315 to 6.317 inches (160.401 to 169.452 mm).*

b. Measure the inside diameter (5) of the impeller flange. Note measurement.

c. Subtract the seal (wear) ring groove inside diameter (4) from the impeller flange inside diameter (5):

Example:

Impeller Flange Inside Diameter = 6.317 inches (160.4521 mm)

Seal Ring Inside Diameter = 6.301 inches (160.045 mm)

Clearance (on Diameter) = 0.016 inch (0.406 mm)

Clearance on either side of the impeller should be 0.014 to 0.018 inch (0.356 to 0.457 mm). If clearance exceeds 0.025 inch (0.635 mm) on diameter, impeller seal rings can be restored to their original size by soldering a ring over trued surface that retains at least 0.090 inch (2.286 mm) wall thickness. Stationary seal rings should also be replaced or you may purchase undersize seal rings. Contact your Pierce® Custom Chassis Dealer or Sales Representative for further information.

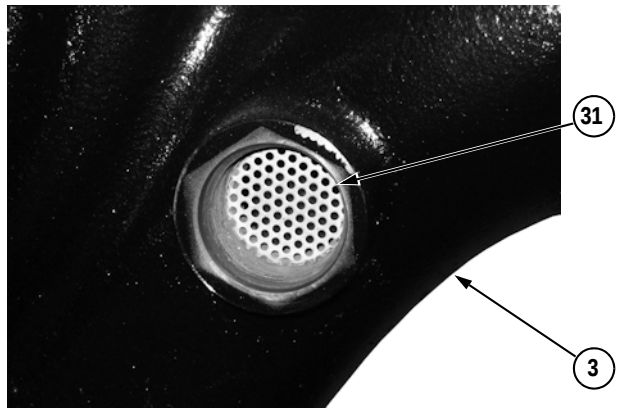
3. IMPELLER

1. Inspect impeller vanes (1) for wear, stone damage, or pitting caused by cavitation. Replace impeller if any damage is noted.
2. Inspect impeller openings (2) for imbedded stones or other debris. Remove stones or debris as needed. Check for damage, and replace impeller if any damage is noted.

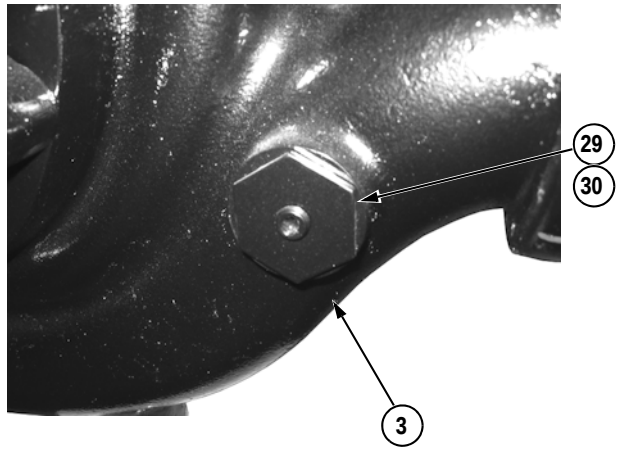
c. Assembly

For Best Results:

- Work with clean tools in clean surroundings during assembly.
- Always use new O-rings, seals, and bearings for assembly.
- Clean parts thoroughly and keep free from nicks and abrasions.
- Keep loose parts marked or otherwise identified to avoid error in assembly.

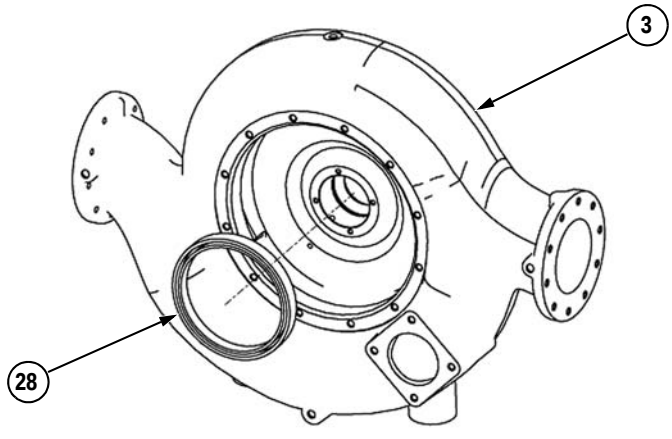


1. Install strainer screen (31) in pump housing (3).



NOTE: *Always use new O-rings for installation.*

2. Apply a thin film of Dow Corning® 111 (Silicone Compound) grease (Pierce P/N 1788950) to O-ring (30).
3. Install O-ring (30) on strainer fitting (29).
4. Install fitting (29) and O-ring (30) in pump housing (3).

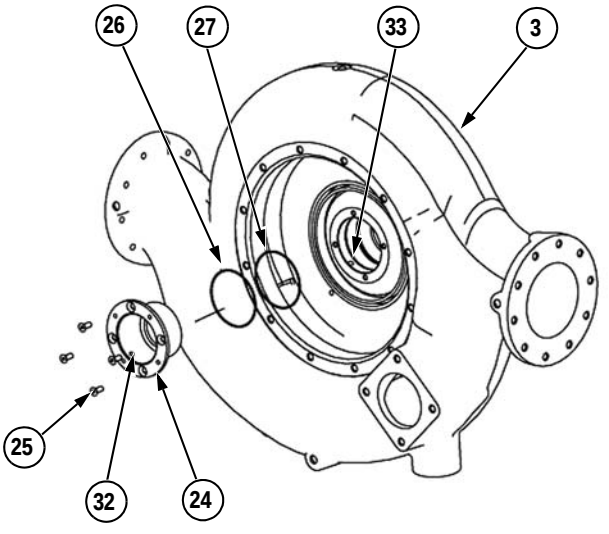


⚠ WARNING

Adhesives, solvents, and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin and clothing. Keep away from open fire and use in well-ventilated area. If adhesives, solvents, or sealing compounds get on skin or clothing, wash immediately with soap and water. Failure to comply could result in serious injury or death to personnel.

NOTE: *Perform step 5 if the seal (wear) ring was removed.*

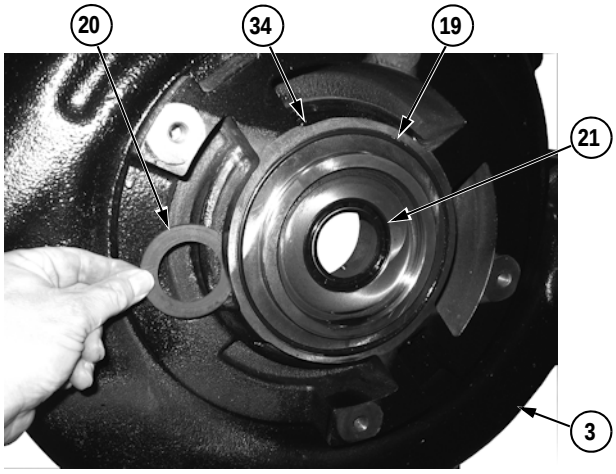
5. Apply Loctite® 609 (Pierce P/N 1788949) to the outside diameter of the seal (wear) ring (28), and install (press) the seal into pump housing (3) until seal is firmly and squarely seated in the pocket.



NOTE:

- ✍ *Always use new O-rings for installation.*
- ✍ *Apply grease to O-rings only; do not place grease in O-ring grooves. Placing grease in O-ring grooves may prevent O-rings from seating properly.*

6. Apply a thin film of Dow Corning® 111 (Silicone Compound) grease (Pierce P/N 1788950) to O-ring (27).
7. Install O-ring (27) in the groove in the pump housing bore.
8. Apply a thin film of Dow Corning® 111 (Silicone Compound) grease (Pierce P/N 1788950) to O-ring (26), and install O-ring on the mechanical seal housing (24).
9. Align the mechanical seal housing (24) with pump housing (3) by placing four stainless steel, flush-head machine screws (25) in the seal housing and pump housing holes. Verify that the flushing water holes (32 and 33) are aligned.
10. Press mechanical seal housing (24) into pump housing (3) until it is firmly seated.
11. Remove screws (25).
12. Apply Loctite® 243 (Pierce P/N 1788946) to threads, and install screws (25) in the mechanical seal housing (24). Tighten screws to 72 lb-in. (8 N·m).

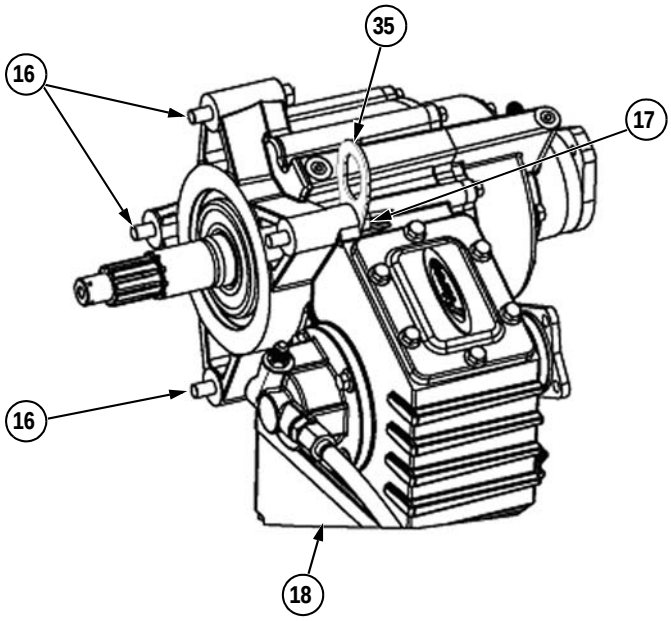


13. Place oil seal (21) into pump housing (3) with the spring facing away from the housing. Press the oil seal into the housing until it is fully seated.
14. Apply clean transmission oil to the lips of oil seal (21).

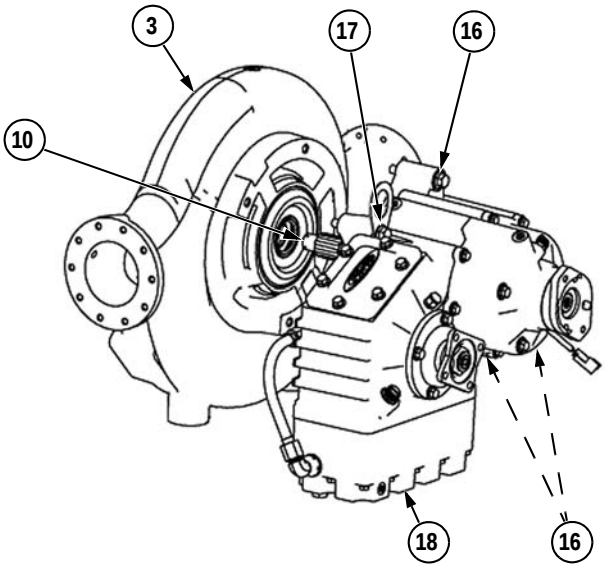
NOTE:

- ✍ *Always use new O-rings for installation.*
- ✍ *Apply grease to O-rings only; do not place grease in O-ring grooves. Placing grease in grooves may prevent O-rings from seating properly.*

15. Apply a thin film of Dow Corning® 111 (Silicone Compound) grease (Pierce P/N 1788950) to seal housing O-ring (19), and install O-ring into the groove in the pump housing flange (34).
16. Apply a dab of Dow Corning® 111 (Silicone Compound) grease (Pierce P/N 1788950) to the face of the water slinger (20) to hold the water slinger in place on the seal housing.
17. Slide water slinger (20) through the slot in the pump housing (3). Align the slinger with the housing bore and press the slinger against seal housing.



18. Install three screws (16) into the transmission (18).
19. Install one screw (17) and lifting eye (35) into the transmission (18).

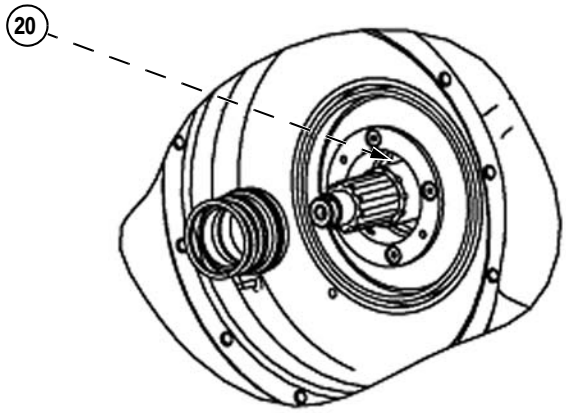


20. Lightly lubricate the impeller shaft (10) with clean transmission oil.

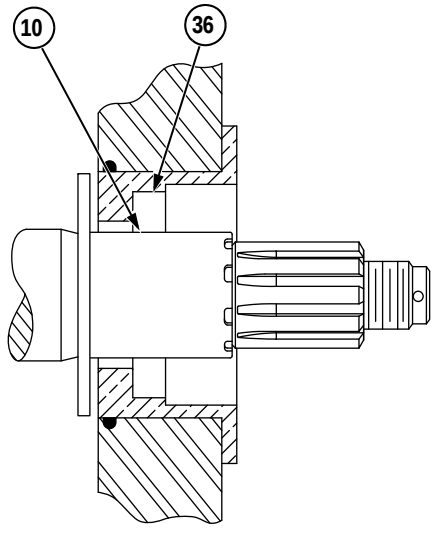
CAUTION

When installing the pump housing, avoid contact of the oil seal and water slinger with the impeller shaft. Failure to comply can result in damage to the oil seal.

21. Hold the water slinger in alignment with the bore, and carefully slide pump housing (3) over impeller shaft (10) until the pump housing contacts transmission (18).
22. Secure pump housing (3) to transmission (18) using four screws (16 and 17). Tighten screws to 56 to 64 lb-ft (76 to 87 N·m).



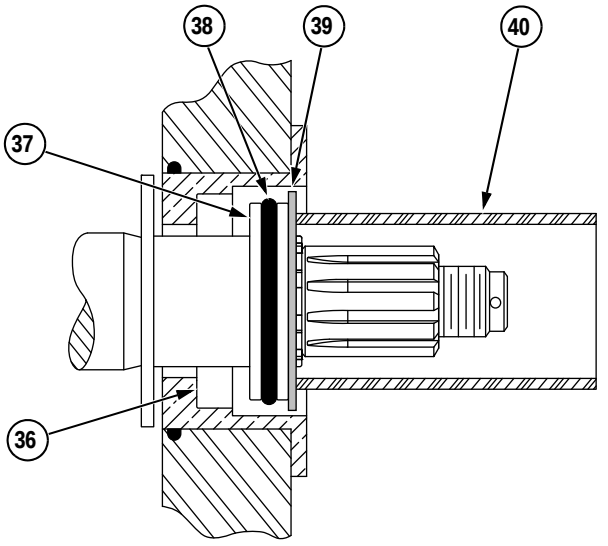
23. Slide water slinger (20) back into the groove in the input shaft using pusher (Pierce P/N X6384).



CAUTION

- **The mechanical seal is a precision product and should be handled with care. When handling the mechanical seal, use caution to prevent scratching or contamination of the lapped surfaces of the primary and mating rings.**
- **Do not touch the lapped surfaces of the primary and mating rings with bare hands. Failure to comply may result in premature failure of the mechanical seal.**

24. Install mechanical seal:
    a. Inspect mating ring pocket (36) in the seal housing and the surface of impeller shaft (10) under the shaft seal bellows for dirt or debris. Clean surfaces as needed using isopropyl alcohol.
    b. Carefully unwrap the mechanical seal. Do not damage or contaminate the lapped surfaces of mating or primary rings.



CAUTION

Do not use soapy water to lubricate the O-ring. Soap may cause the O-ring to stick during installation or could contaminate the sealing surface, preventing the O-ring from sealing properly.

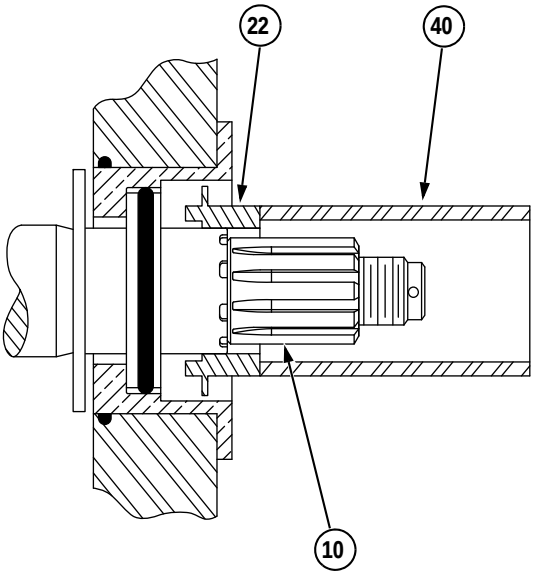
c. Hold mating ring (37) by the inside diameter. Apply Lubricant, Rubber Emulsion (Pierce P/N X8019), or equivalent water soluble lubricant (not soapy water), to the O-ring (38) on mating ring.

d. Insert mating ring (37) into the housing with the mirrored surface facing out.

e. Place a clean cardboard circle (39) against mating ring (37) and push the mechanical seal into the cavity until it is firmly and squarely seated in the mating ring pocket (36).

   If it is not possible to seat the stationary mating ring with finger pressure, use a suitable plastic pipe (40), free of contaminants, to seat the mating ring.

f. Remove cardboard circle (39) (if used).

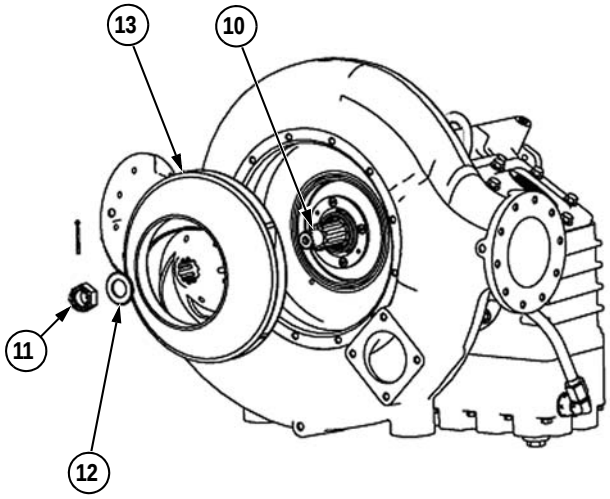


g. Apply Lubricant, Rubber Emulsion (Pierce P/N X8019), or equivalent water soluble lubricant (not soapy water), to primary ring and bellows assembly (22).

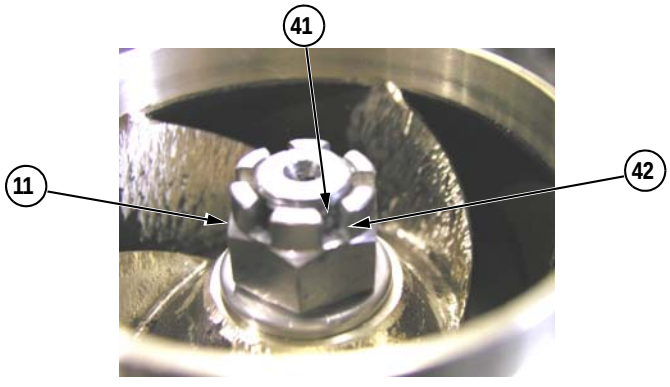
h. Place primary ring and bellows assembly (22) on the impeller shaft (10) (do not install spring at this time), and slide the assembly into position so that the seal surfaces make contact.

   If it is not possible to seat the bellows assembly with finger pressure, use a suitable plastic pipe (40) to seat the bellows assembly.

i. Install mechanical seal spring (15) and seat against the retainer stop flange on the primary ring.



25. Slide impeller (13) onto impeller shaft (10). Verify that the seal spring aligns with the impeller retaining groove.
26. Install impeller washer (12).
27. Apply Loctite® 243 (Pierce P/N 1788946) to impeller nut (11) and shaft threads.



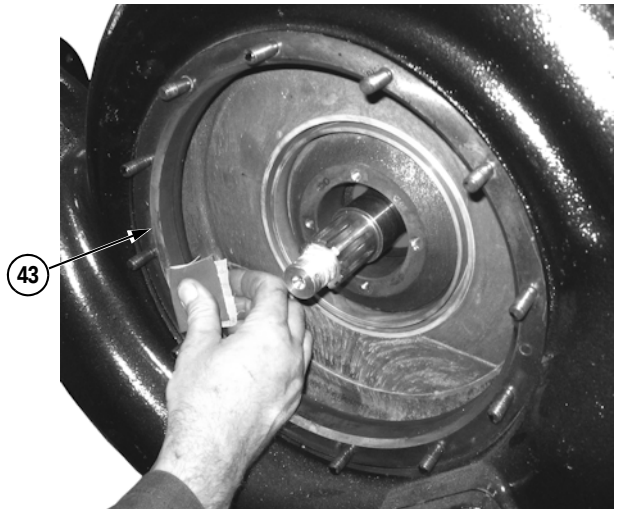
CAUTION

When installing impeller nuts, DO NOT use an impact wrench. Use of impact wrenches has proven to damage the impeller washers, impellers, and impeller shafts.

28. Install impeller nut (11), finger tight only. Using a wrench, rotate nut until the hole (41) in the shaft and the notch (42) in the castle nut are aligned.

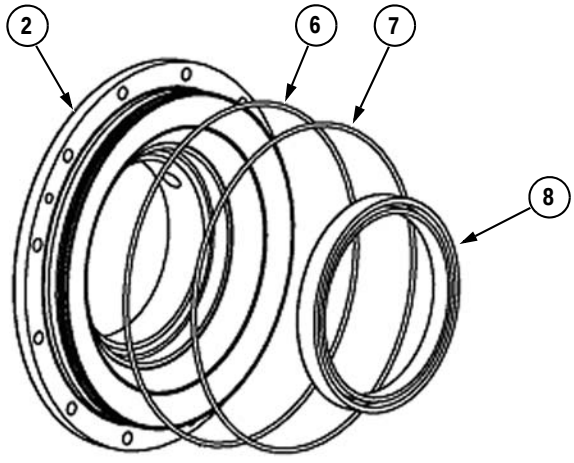
NOTE: *Always use new stainless steel cotter pins for installation.*

29. Install stainless steel cotter pin (9). Bend the ends of cotter pin as shown to secure nut.



NOTE: *The pump housing O-ring mating surface must be free of dirt, debris, and surface defects (nicks, etc.) to ensure a proper O-ring seal.*

30. Clean and inspect the pump housing O-ring mating surface (43). Remove small surface defects using fine emory paper.



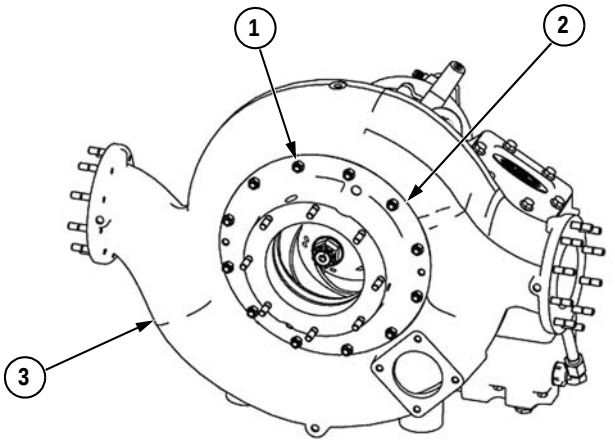
NOTE: *Perform step 31 if the seal (wear) ring was removed.*

31. Apply Loctite® 609 (Pierce P/N 1788949) to the outside diameter of the seal (wear) ring (8), and install (press) the seal (wear) ring into suction head (2) until it is firmly and squarely seated in the pocket.

NOTE:

- ✍ *Always use new O-rings for assembly.*
- ✍ *Apply grease to O-rings only; do not place grease in O-ring grooves. Placing grease in O-ring grooves may prevent O-rings from seating properly.*

32. Apply a thin film of Dow Corning 111 (Silicone Compound) grease (Pierce P/N 1788950) to O-rings (6 and 7), and install O-rings in the grooves in the suction head (2).



NOTE: *Install the suction head in the same orientation as noted during removal.*

33. Install suction head (2) on pump housing (3) using 12 nuts (1). Tighten nuts to 23 lb-ft (31 N·m).

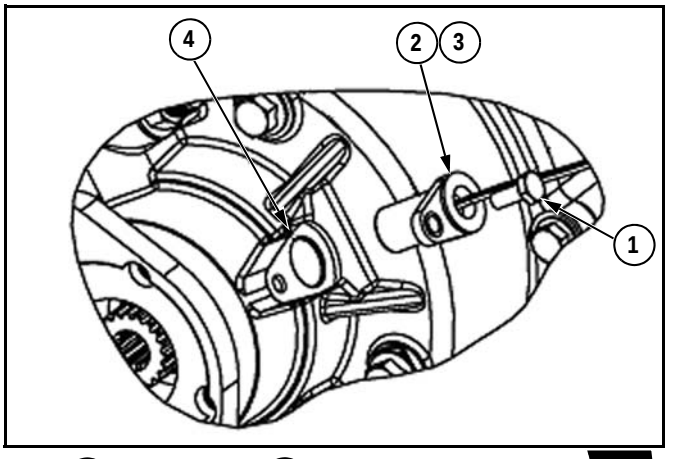
10. TRANSMISSION

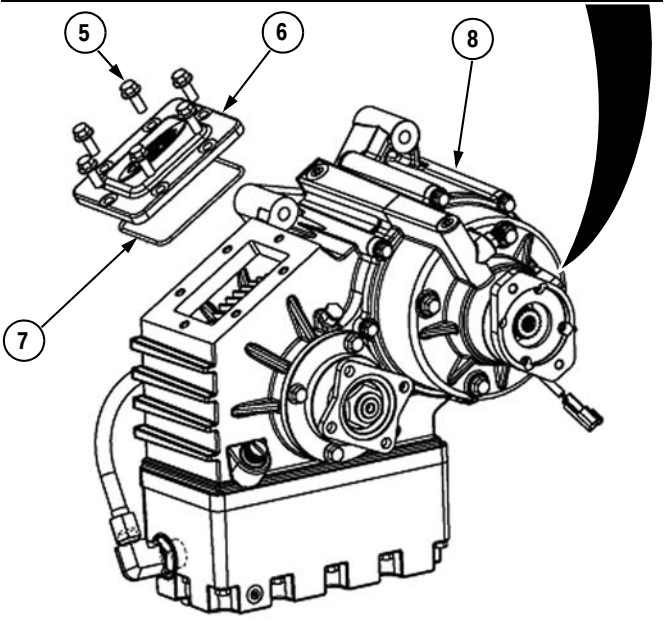
a. Disassembly

NOTE:

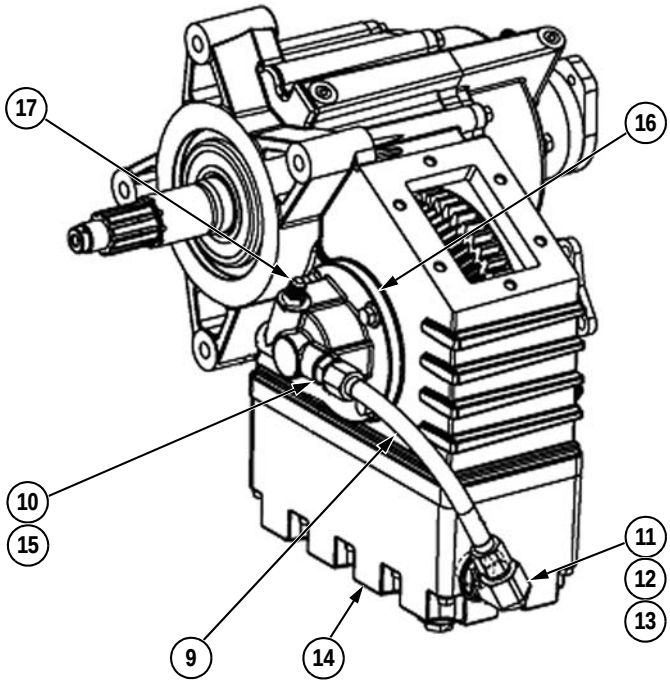
- ✍ *Clean all parts and carefully examine for wear or deterioration. Replace any questionable parts.*
- ✍ *Discard and replace all O-rings, seals, and bearings during overhaul process.*

1. Remove/disassemble pump from transmission housing. (See "**Disassembly**" on page 3-41.)

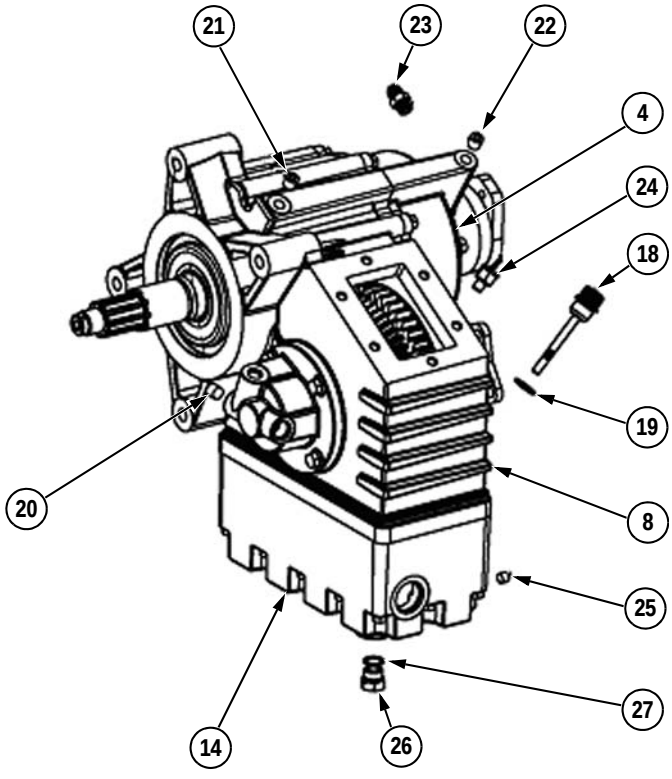




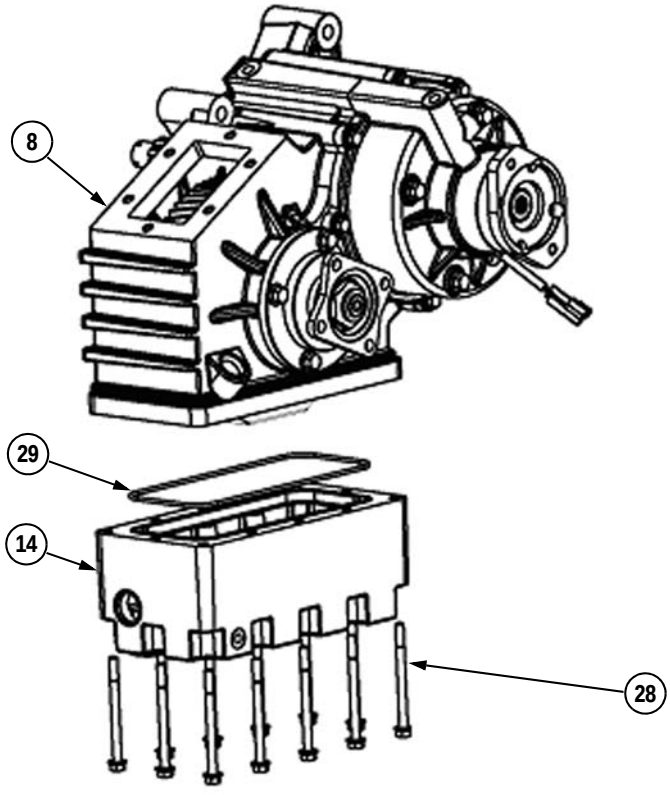
2. Remove screw (1), and remove tach sensor (2) and O-ring (3) from clutch housing (4).
3. Remove six screws (5) and remove PTO cover plate (6) and O-ring (7) from transmission housing (8).



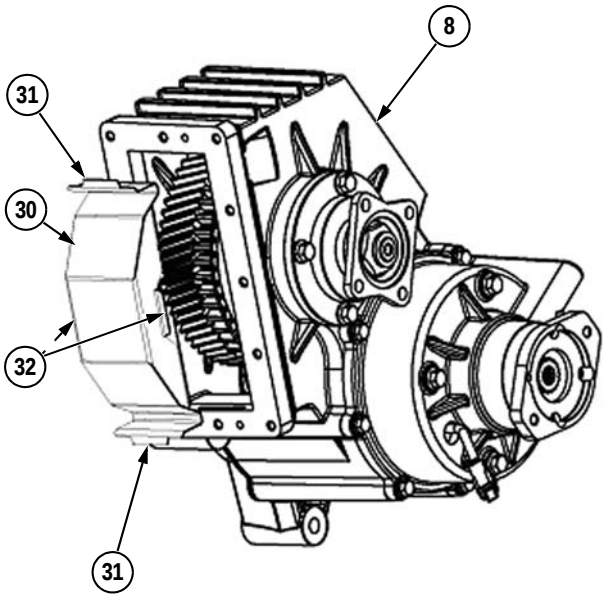
4. Remove lube pump suction tube (9) from fittings (10 and 11).
5. Remove fitting (11), O-ring (12), and strainer screw (13) from oil sump (14). Clean and inspect strainer screen.
6. Remove fitting (10) and O-ring (15) from lube pump (16).
7. Remove 3/8 JIC fitting (17) from lube pump (16).



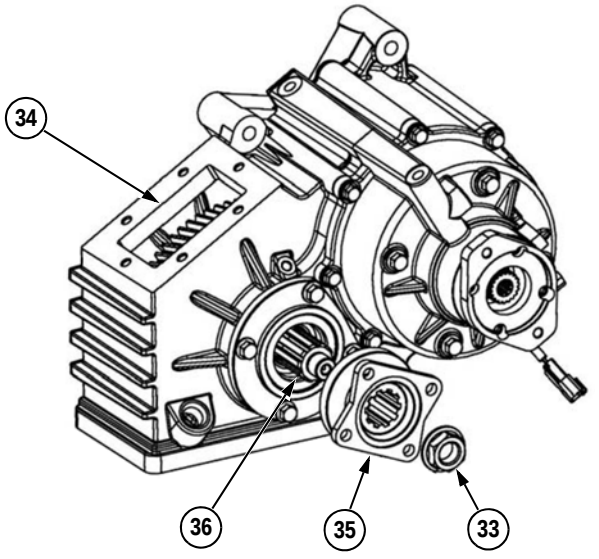
8. Remove oil level dipstick (18) and O-ring (19) from transmission housing (8).
9. Remove plugs (20 and 21) from transmission housing (8).
10. Remove plug (22) from clutch housing (4).
11. Remove 3/8 JIC lubrication fitting (23) from clutch housing (4).
12. Remove vent (24) from transmission housing (8).
13. Remove plug or oil temperature sending unit (25) from temperature sensor port.
14. Remove magnetic drain plug (26) and O-ring (27) from oil sump (14).



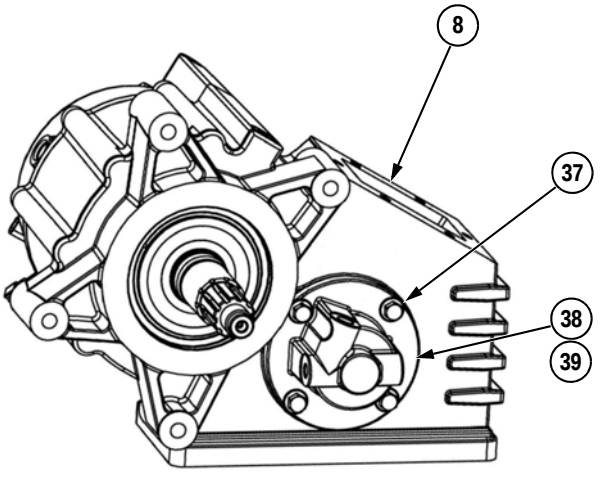
15. Remove 12 screws (28) from oil sump (14), and remove oil sump and O-ring (29) from transmission housing (8).
16. Clean and inspect interior cavity of the oil sump (14).



17. Remove oil deflection pan (30) from transmission housing (8) by gently depressing end (31) and side (32) tabs.

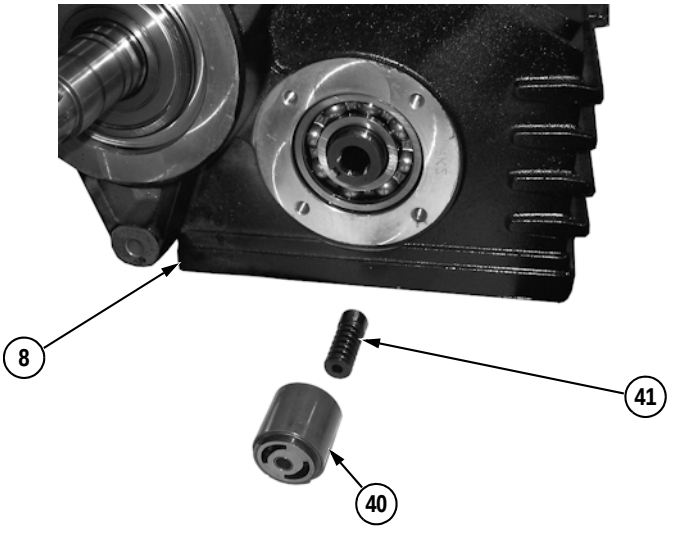


18. Remove companion flange retaining nut (33). Insert a soft aluminum or wood block between the drive gear teeth and PTO opening (34) to prevent the shaft from rotating while removing flange retaining nut.
19. Slide companion flange (35) off input shaft (36).
20. Inspect companion flange seal surface for scratches, blemishes, wear or corrosion.



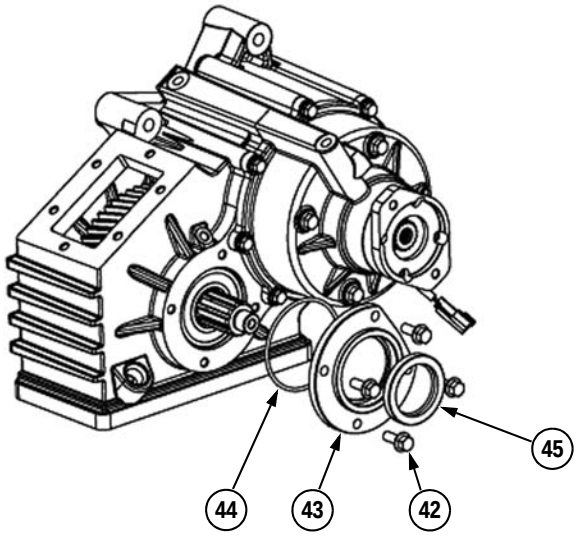
NOTE: *Note the orientation of the lube pump bearing cap before removing to ensure correct installation.*

21. Remove four screws (37) from the lube pump bearing cap (38), and remove bearing cap and O-ring (39) from transmission housing (8).

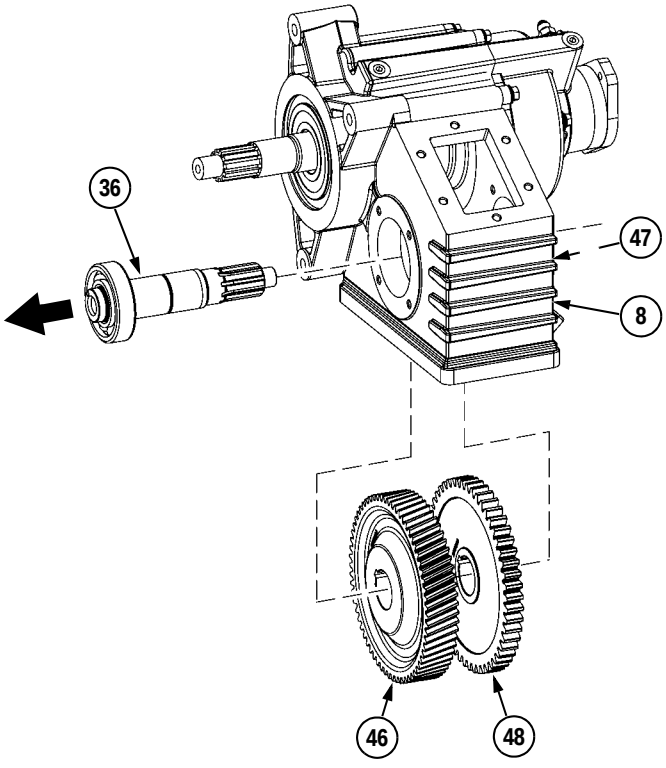


NOTE: *Note the orientation of the lubrication pump components while removing to ensure correct installation.*

22. Remove pump assembly (40) from transmission housing (8). Set components aside in an organized sequential manner for assembly reference.
23. Remove oil pump relief spring cartridge (41).



24. Remove four screws (42), and remove input side bearing cap (43) and O-ring (44).
25. Remove and discard oil seal (45) from the input side bearing cap (43).



CAUTION

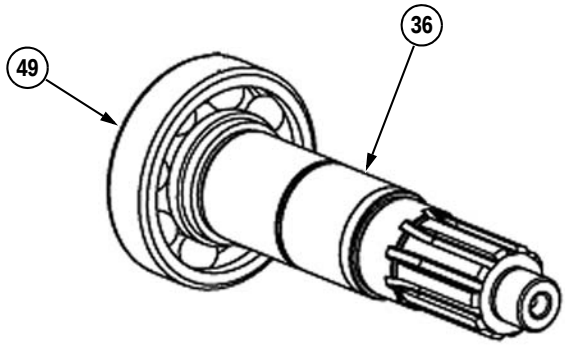
Use extreme caution when removing the input shaft from the drive gears and transmission housing. Support the transmission housing squarely and evenly across the entire face of the housing. Failure to comply may result in damage to the transmission housing.

NOTE: *When positioning the transmission housing on the supporting surface, provide an open space below the transmission housing to allow for input shaft travel.*

26. Support the outside of the transmission housing (8) squarely on press anvil.
27. Position the main drive gear (46) so that the face of the gear is resting against the inside of the transmission housing (8).
28. Press input shaft (36) out of bearing (47), PTO gear (48), and main drive gear (46).

NOTE: *Note the location and orientation of the main drive and PTO gears before removing to ensure correct installation.*

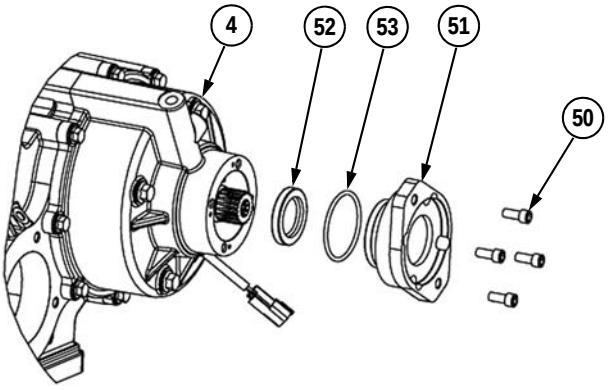
29. Remove main drive gear (46) and PTO gear (48) from the transmission housing (8).
30. Remove bearing (47) from transmission housing (8). Discard the bearing.



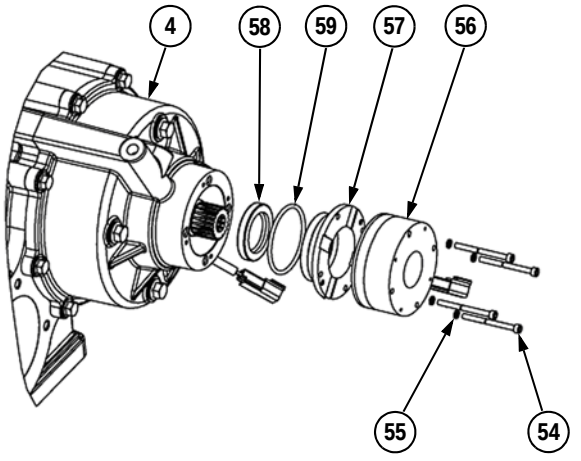
31. Remove (press) the input shaft (36) out of bearing (49). Discard bearing.

NOTE: *The transmission may be equipped with either a hydraulic pump adapter or electric brake assembly:*

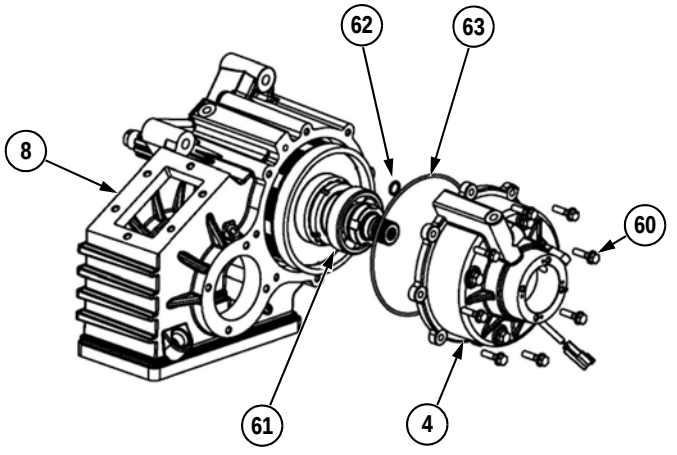
- *Perform steps 32 and 33 if equipped with a hydraulic pump adapter.*
- *Perform steps 34 and 35 if equipped with an electric brake assembly.*



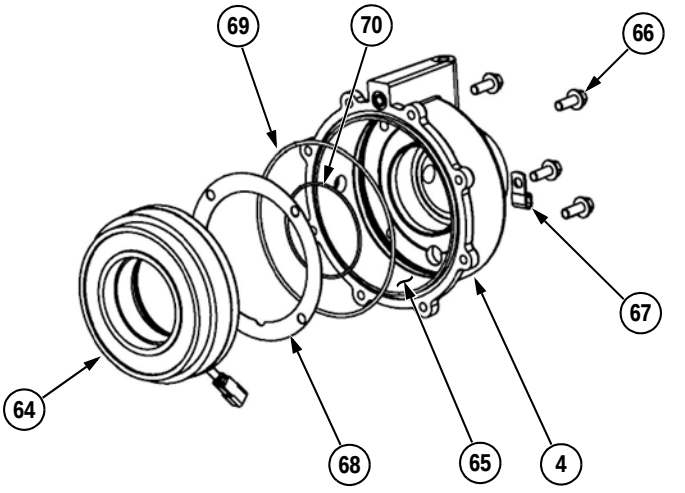
32. Remove four screws (50), and remove hydraulic pump adapter (51) from clutch housing (4).
33. Remove and discard oil seal (52) and O-ring (53) from adapter (51).



34. Remove four screws (54) and lockwashers (55), and remove electric brake assembly (56) and adapter (57) from clutch housing (4).
35. Remove and discard oil seal (58) and O-ring (59) from adapter (57).



36. Remove eight screws (60) from clutch housing (4).
37. Rotate clutch housing (4) slightly to break seal from transmission housing (8). Tap alternating ears of the clutch housing to extract outboard impeller shaft bearing (61) from the housing bearing pocket. Remove clutch housing.
38. Remove and discard O-rings (62 and 63).

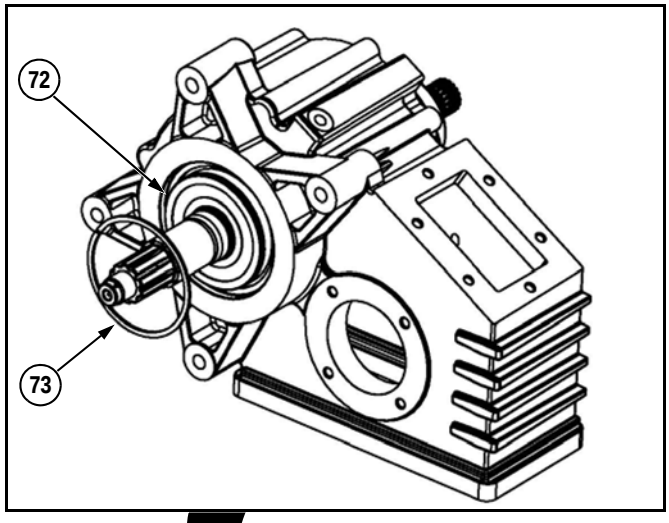


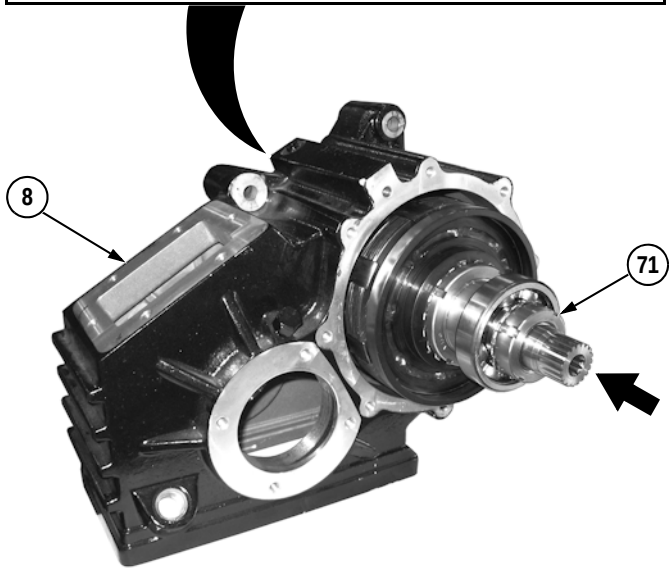
NOTE: *Do not remove the coil from housing unless required by inspection.*

39. Inspect coil (64) and housing interior (65) for defects.

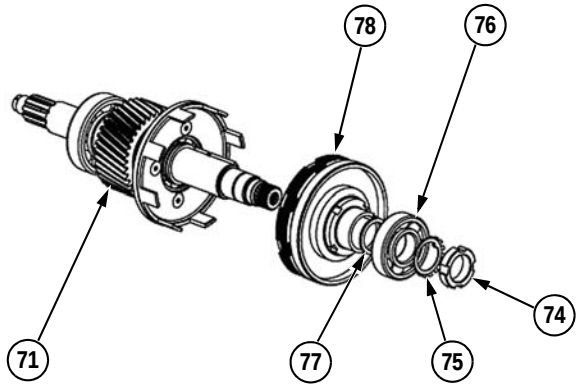
NOTE: *If clutch coil removal is required, perform steps 40 and 41.*

40. Remove four flange head screws (66), and remove clamp (67), clutch coil (64) and shim(s) (68) from clutch housing (4).
41. Remove O-rings (69 and 70) from clutch housing (4).





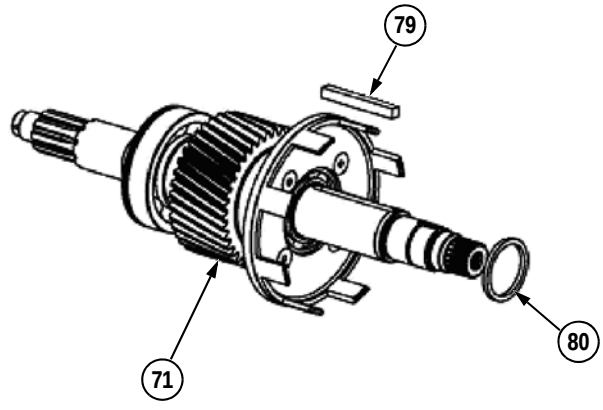
42. Slide the impeller shaft assembly (71) into the transmission housing (8), until the inboard bearing (72) extends through the housing enough to allow the removal of the bearing retaining ring (73).
43. Remove the bearing retaining ring (73) from the inboard bearing (72).
44. Slide entire impeller shaft, clutch, and impeller shaft assembly (71) out of the transmission housing (8).



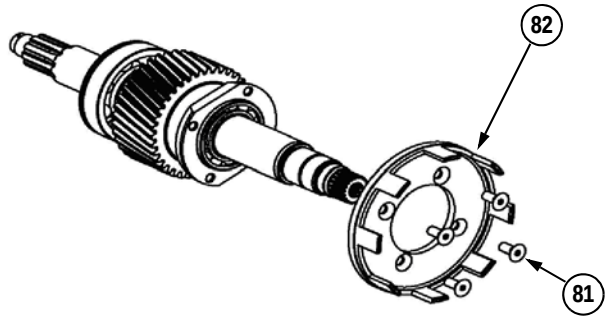
45. Support impeller shaft assembly (71) in soft-jaw vise or splined fixture.
46. Remove bearing locknut (74) and lockwasher (75).
47. Use a bearing puller to remove outboard bearing (76).

NOTE: *Do not disassemble the clutch body.*

48. Remove spacer (77) and slide clutch body (78) off of impeller shaft assembly (71).

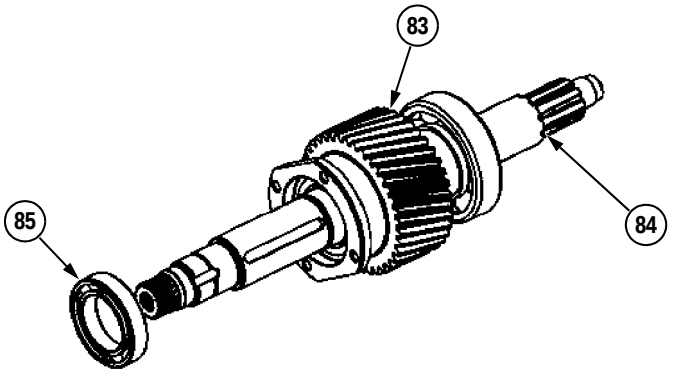


49. Remove key (79) and spacer ring (80) from impeller shaft assembly (71).

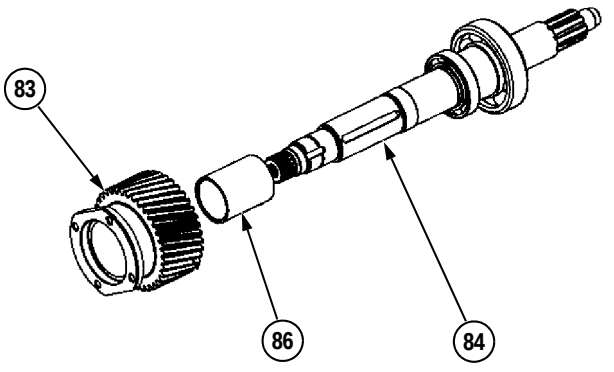


NOTE: *Do not remove clutch drive cup from pinion gear unless required due to wear or damage.*

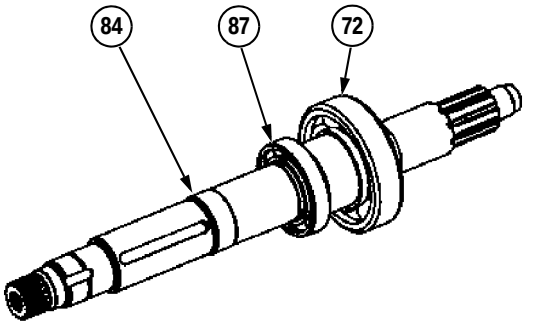
50. Remove and discard four screws (81) from clutch drive cup (82). To ease disassembly, apply a slight amount of heat to each screw head to break threadlocker bond.



51. While squarely supporting pinion gear face (83) firmly on press anvil surface, press impeller shaft (84) out of second pinion idler bearing (85). Discard bearing.



52. Remove pinion gear (83) and spacer (86) from impeller shaft (84).



53. Press impeller shaft (84) out of the first pinion idler bearing (87) and pump shaft bearing (72). Discard both bearings.

54. Inspect transmission housing and input and impeller shafts. (See **"Component Inspection"** on page 3-59.)

b. Component Inspection

1. IMPELLER SHAFT

NOTE: *Clean all parts and carefully examine for wear or damage. Replace any questionable parts.*

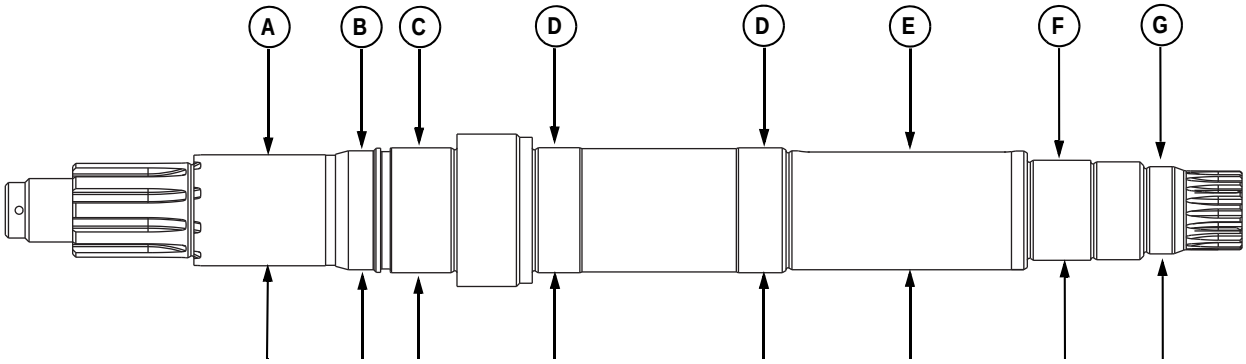


Table 3-1: Impeller Shaft Dimensions

Callout	Area	Dimension
A	Mechanical Seal Journal Diameter	1.749 to 1.750 inches (44.425 to 44.500 mm)
B	Pump Side Oil Seal Journal Diameter	1.872 to 1.878 inches (47.549 to 47.701 mm)
C	Pump Side Bearing Journal Diameter	1.9686 to 1.9690 inches (50.002 to 50.013 mm)
D	Pinion Idler Bearing Journal Diameter (2 Places)	1.9682 to 1.9687 inches (49.992 to 50.005 mm)
E	Clutch Journal Diameter	1.8725 to 1.8735 inches (47.562 to 47.587 mm)
F	Outboard Bearing Journal Diameter	1.5749 to 1.5753 inches (40.002 to 40.013 mm)
G	Auxiliary Output Oil Seal Journal Diameter	1.372 to 1.378 inches (34.849 to 35.001 mm)

Measure the impeller shaft and inspect for wear or damage. Pay particular attention to the oil seal running surfaces. These surfaces must be smooth and free of nicks to ensure proper operation.

Replace the impeller shaft if running surfaces are scratched or damaged, or if the bearing journals are worn below the minimum dimensions.

2. INPUT SHAFT

NOTE: *Clean all parts and carefully examine for wear or damage. Replace any questionable parts.*

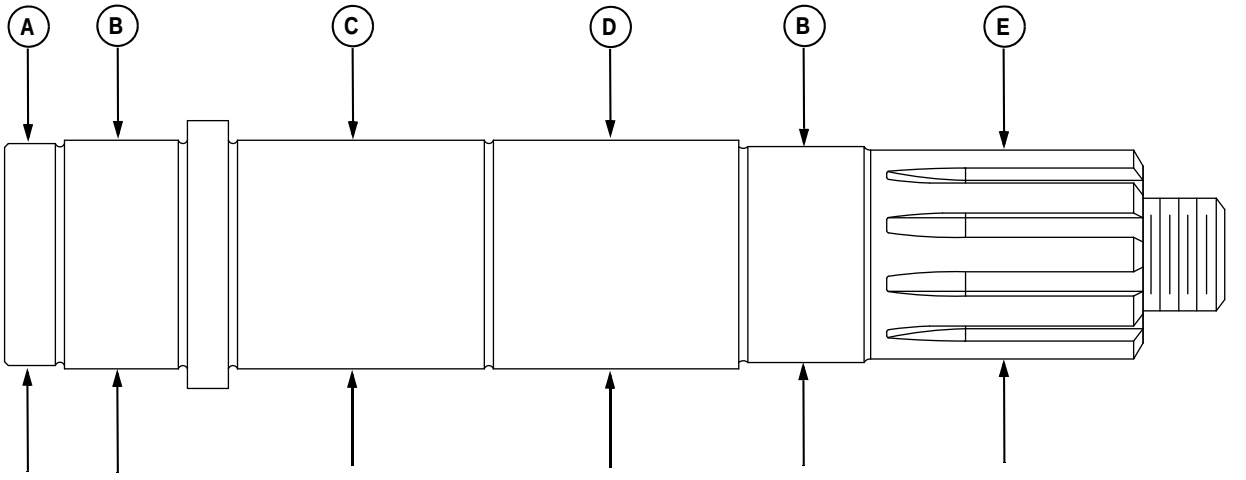


Table 3-1: Input Shaft Dimensions

Callout	Area	Dimension
A	Oil Pump Pilot Diameter	1.498 to 1.499 inches (38.049 to 38.075 mm)
B	Input Shaft Bearing Journal Diameter (2 Places)	1.5749 to 1.5753 inches (40.002 to 40.013 mm)
C	Drive Gear Journal Diameter	1.7496 to 1.7501 inches (44.440 to 44.453 mm)
D	PTO Drive Gear Journal Diameter	1.7395 to 1.7400 inches (44.183 to 44.196 mm)
E	Input Shaft Spline Major Diameter	1.497 to 1.498 inches 38.024 to 38.049 mm)

Measure the input shaft and inspect for wear or damage. Pay particular attention to the oil seal running surfaces. These surfaces must be smooth and free of nicks to ensure proper operation.

The original transmission input shaft drive gear journal diameter (C) is 1.7496 to 1.7501 inches (44.440 to 44.453 mm). The original drive gear bore inside diameter is 1.7500 to 1.7505 inches (44.45 to 44.463 mm) providing 0.0001 to 0.0009 inch (0.0025 to 0.0229 mm) clearance. The parts are still serviceable up to 0.0020 inch (0.0508 mm) clearance. The drive gear may be reversed to work the other side of gear teeth.

The original transmission input shaft PTO drive gear journal diameter (D) is 1.7395 to 1.7400 inches (44.183 to 44.196 mm). The original PTO drive gear bore inside diameter is 1.7400 to 1.7405 inches (44.196 to 44.209 mm) providing 0.0000 to 0.0010 inch (0.000 to 0.025 mm) clearance. The parts are still serviceable up to 0.0020 inch (0.0508 mm) clearance. The PTO drive gear may not be reversed.

3. TRANSMISSION AND CLUTCH HOUSINGS

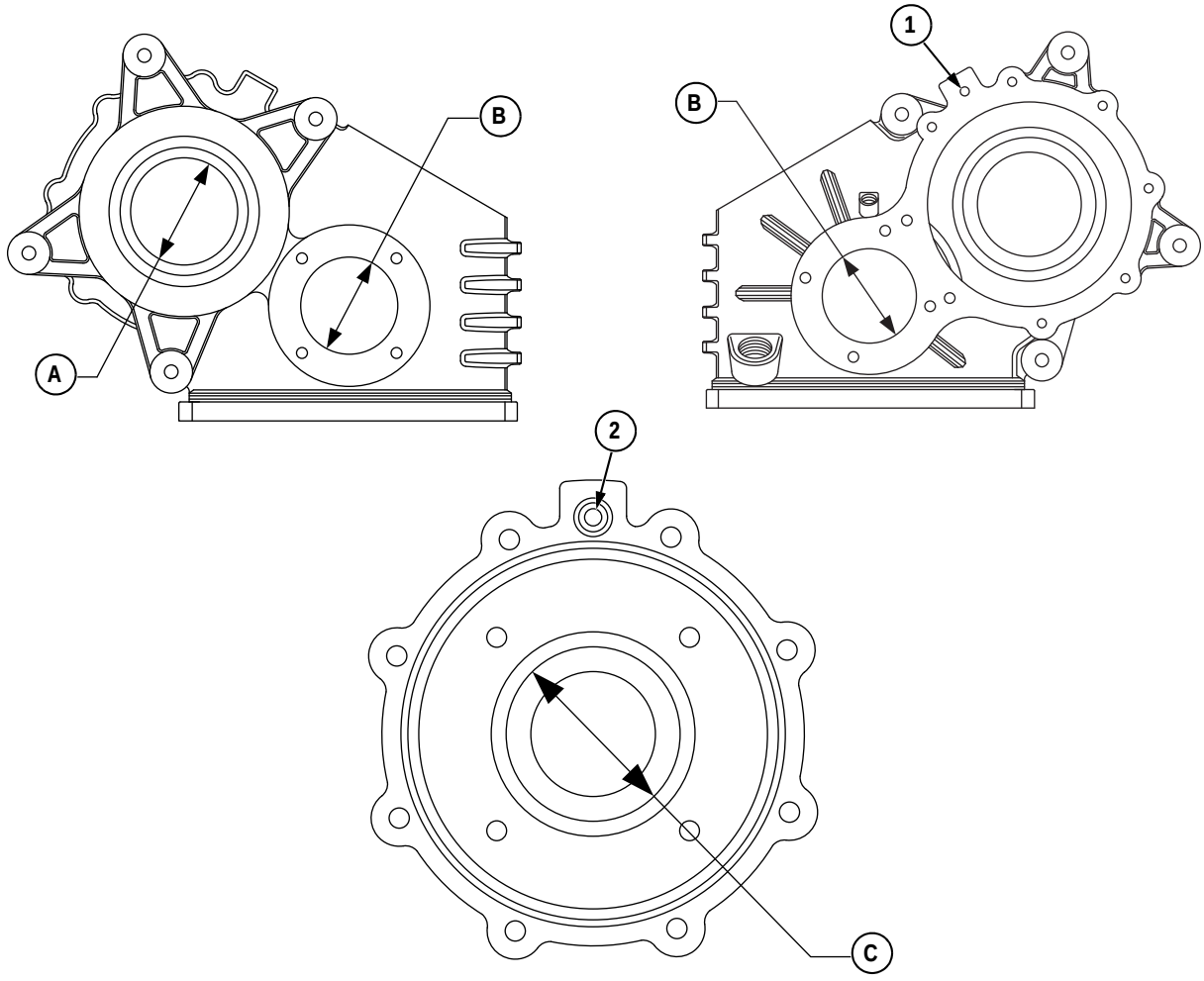


Table 3-1: Transmission and Clutch Housing Bearing Bore Dimensions

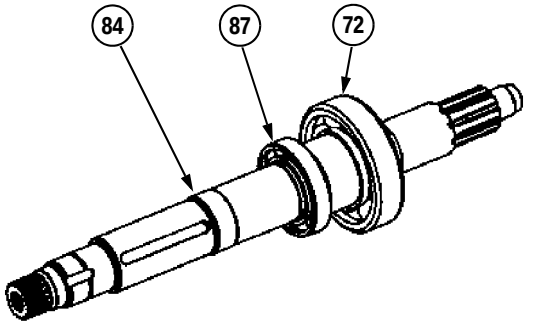
Callout	Area	Dimension	Wear Limit
A	Transmission Housing, Inboard Bearing Bore	4.3305 to 4.3313 inches (109.995 to 110.015 mm)	4.3318 inches (110.028 mm)
B	Transmission Housing, Input Shaft Bearing Bore (Front and Rear)	3.5431 to 3.5439 inches (89.995 to 90.015 mm)	3.5444 inches (90.028 mm)
C	Clutch Housing, Outboard Bearing Bore	3.5431 to 3.5439 inches (89.995 to 90.015 mm)	3.5444 inches (90.028 mm)

1. Inspect the oil passages (1 and 2) in the transmission and clutch housings for blockage. Flush as needed to remove dirt and debris.
2. Measure the transmission housing (A) and clutch housing (C) bearing bores for proper size. Replace the transmission or clutch housing if any bore exceeds the wear limit.
3. Inspect the transmission housing and clutch housing for wear, damage, or cracks. Replace the transmission or clutch housing if any damage is noted.

c. Assembly

For Best Results:

- Work with clean tools in clean surroundings during assembly.
- Always use new O-rings, seals, and bearings for assembly.
- Clean parts thoroughly and keep free from nicks and abrasions.
- Keep loose parts marked or otherwise identified to avoid error in assembly.



⚠ WARNING

Adhesives, solvents, and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin and clothing. Keep away from open fire and use in well-ventilated area. If adhesives, solvents, or sealing compounds get on skin or clothing, wash immediately with soap and water. Failure to comply could result in serious injury or death to personnel.

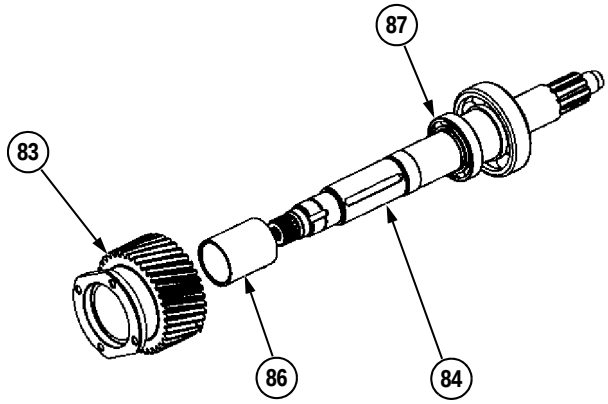
1. Apply a thin film of SKF LGAF 3E/0.5 Anti-Fretting Agent (Pierce P/N 1788951) to bearing journals and the inside diameter of bearings (72 and 87).

⚠ CAUTION

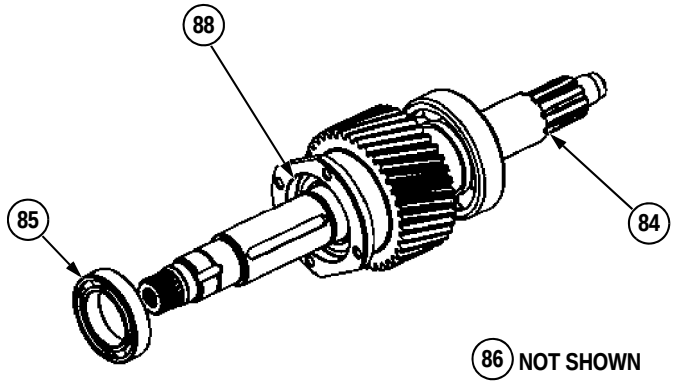
Use a press for forcing press fits whenever possible. If necessary to use a hammer, use one having soft plastic heads. Do not use brass or lead hammers, for the face of the hammer may easily chip or flake, contaminating the assembly, which can cause severe damage to bearings and other precision components.

NOTE: *When installing bearing, apply pressure to the inner race only.*

2. Install (press) the first pinion idler bearing (87) onto impeller shaft (84).
3. Install (press) pump shaft bearing (72) on impeller shaft (84) with the shield toward impeller splines.



4. Install spacer (86) on impeller shaft (84), making sure the spacer is firmly seated against the inner race of the first pinion idler bearing (87).
5. Install pinion gear (83) on spacer (86), and over the outboard pinion bearing (87).

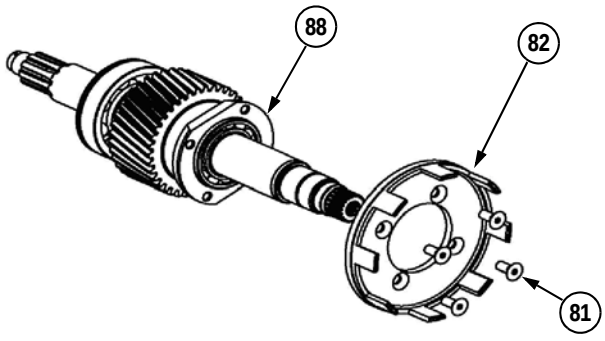


⚠ CAUTION

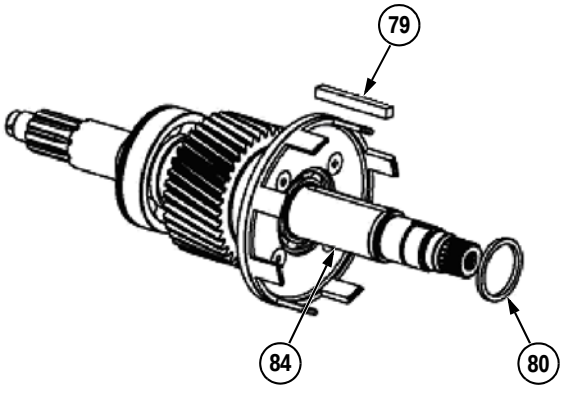
Use a press for forcing press fits whenever possible. If necessary to use a hammer, use one having soft plastic heads. Do not use brass or lead hammers, for the face of the hammer may easily chip or flake, contaminating the assembly, which can cause severe damage to bearings and other precision components.

NOTE: *When installing bearing, apply pressure to the inner race only.*

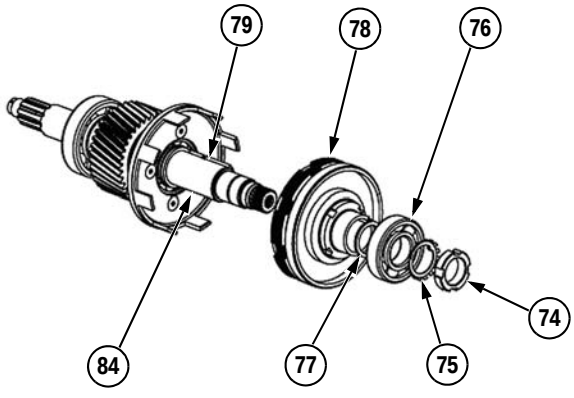
6. Install (press) the second pinion idler bearing (85) on impeller shaft (84), making sure that the bearing is seated in the bearing pilot housing (88) and the bearing inner race is firmly against spacer (86).



7. Apply Loctite® 2760 (Pierce P/N 95-3995) to threads of screws (81).
8. Install clutch drive cup (82) on bearing pilot housing (88) using four screws (81). Tighten screws to 21 to 26 lb-ft (28 to 35 N·m).



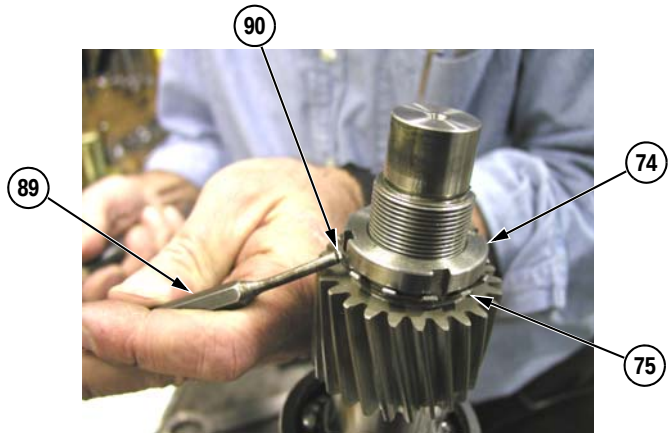
9. Install spacer ring (80) on impeller shaft (84), seating the spacer ring firmly against bearing inner race.
10. Install key (79).



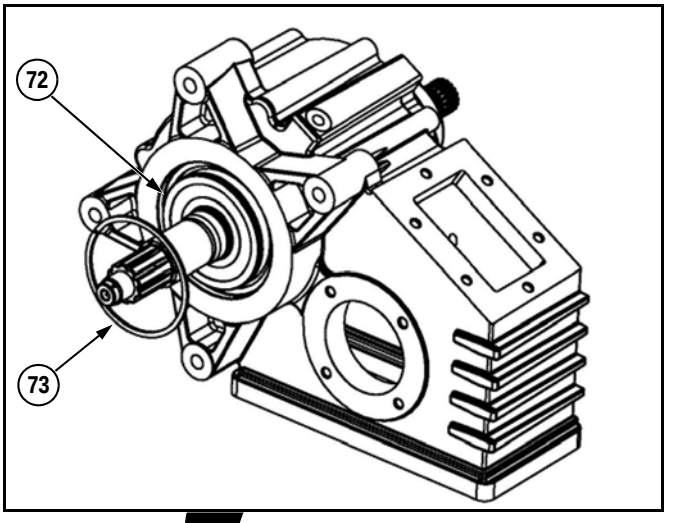
11. Apply a thin film of SKF LGAF 3E/0.5 Anti-Fretting Agent (Pierce P/N 1788951) or transmission oil to impeller shaft journal.
12. Align the keyway in clutch with key (79) installed on impeller shaft (84), and install clutch body (78) on the shaft. Position clutch body tight against spacer.
13. Install spacer (77) on impeller shaft (84).
14. Install outboard bearing (76) on impeller shaft (84).
15. Install bearing lockwasher (75) on impeller shaft (84), aligning the tab on the lockwasher with the keyway slot on the shaft.

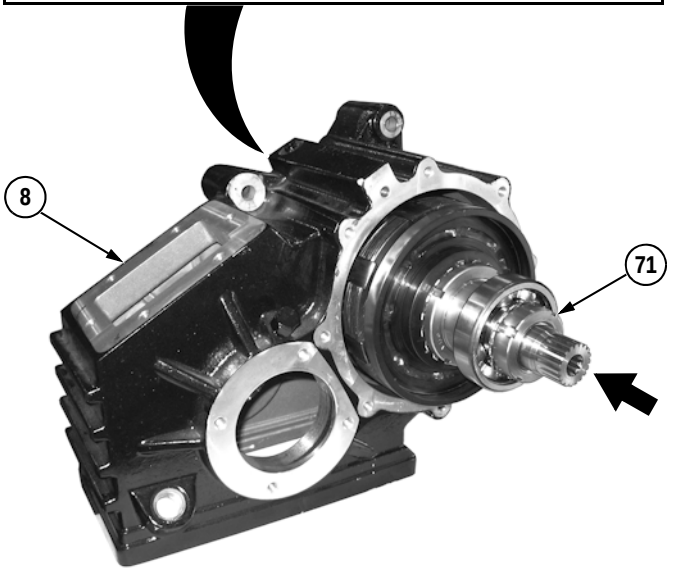
NOTE: *Install the cone (tapered) side of the bearing locknut toward the lockwasher.*

16. Install bearing locknut (74) on impeller shaft (84). Tighten locknut to 48 to 55 lb-ft (65 to 75 N·m) using spanner wrench (Pierce Special Tool Number X6370). Turn until a tab on the lockwasher (75) aligns with a slot on the locknut (74).

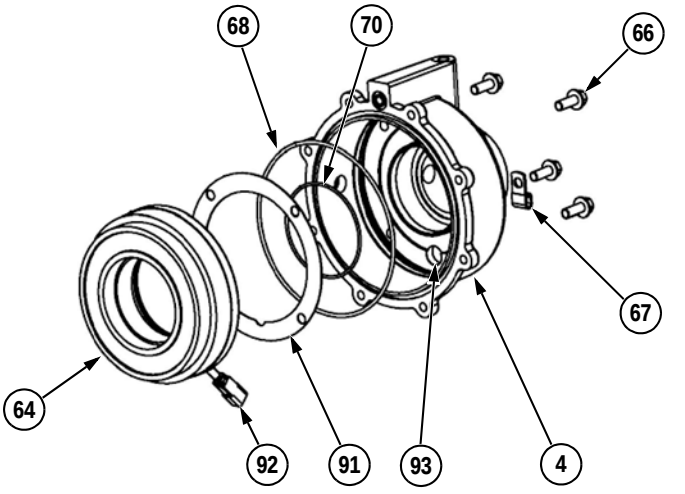


17. Use a punch (89) to bend tab (90) on the lockwasher (75) into the slot on bearing locknut (74).





18. Place transmission housing (8) on a flat, solid surface, and install impeller shaft assembly (71) into housing. When properly installed, the inboard bearing should extend through the housing enough to allow the installation of the bearing snap ring.
19. Install bearing retaining ring (73) on pump shaft bearing (72).
20. Slide the impeller shaft assembly (71) back into the housing until the retaining ring (73) is seated in the gear case counterbore.



NOTE:

- ✍ *Always use new O-rings for installation.*
- ✍ *Apply grease to O-rings only; do not place grease in O-ring grooves. Placing grease in O-ring grooves may prevent O-rings from seating properly.*

21. Apply a thin film of Dow Corning® 111 (Silicone Compound) grease (Pierce P/N 1788950) to O-rings (69 and 70), and install O-rings in clutch housing and clutch coil grooves.
22. Apply a thin film of Dow Corning® 111 (Silicone Compound) grease (Pierce P/N 1788950) to a 0.030 inch shim (91), and place the shim on the clutch coil face.

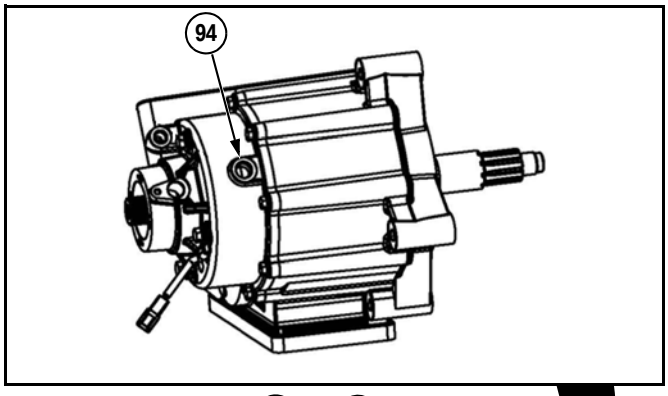
NOTE:

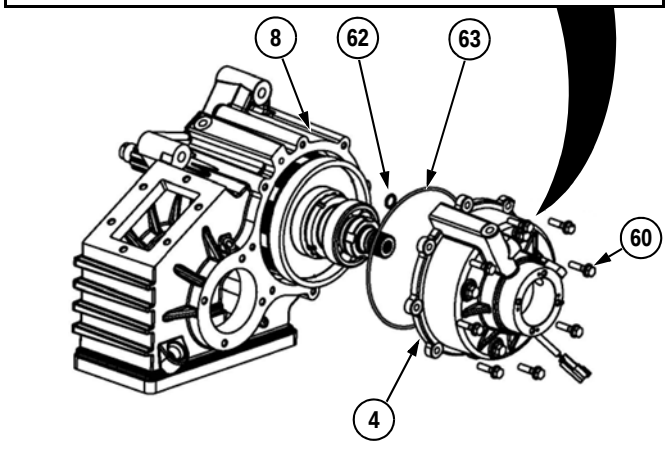
- ✍ *To aid installation of the clutch coil, alignment pins can be fabricated by cutting the heads off two 3/8-16 x 2-inch screws.*
- ✍ *Route the clutch coil wire (92) through the opening (93) in the clutch housing.*

23. Carefully slide the clutch coil (64) into clutch housing (4). Verify that the coil is properly seated.

NOTE: *Once several screws are installed to hold the clutch coil, remove the alignment pins and install the remaining screws.*

24. Secure clutch coil (64) to clutch housing (4) using four flange head screws (66). Install cushion clamp (67) under the lower right screw. Tighten screws to 12 to 15 lb-ft (28 to 35 N·m).





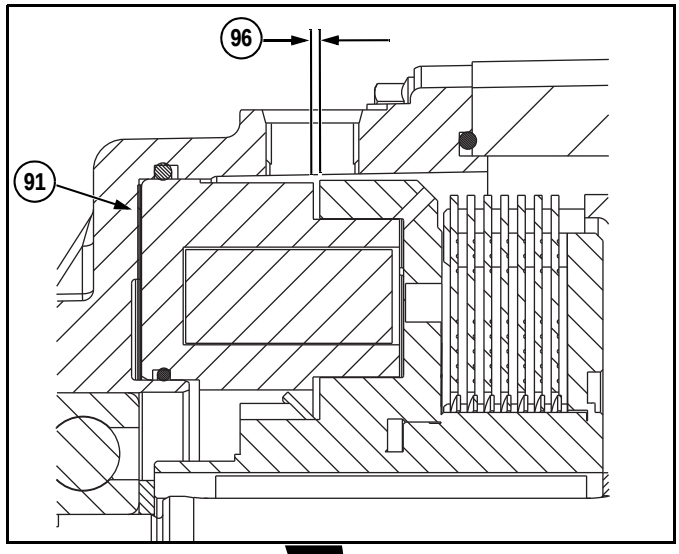
NOTE: *The transmission and clutch housing O-ring mating surfaces must be free of dirt, corrosion, debris, and surface defects (nicks, etc.) to ensure a proper O-ring seal.*

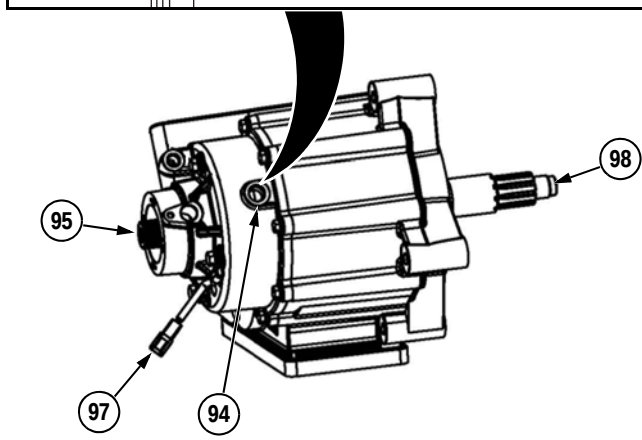
25. Clean and inspect the transmission housing (8) and clutch housing (4) O-ring mating surfaces. Remove small surface defects using fine emory paper or a file.

NOTE:

- *Always use new O-rings for installation.*
- *Apply grease to O-rings only; do not place grease in O-ring grooves. Placing grease in O-ring grooves may prevent O-rings from seating properly.*

26. Apply a thin film of Dow Corning® 111 (Silicone Compound) grease (Pierce P/N 1788950) to O-rings (62 and 63), and install O-rings in the grooves in the clutch housing (4).
27. Apply a thing film of clean hydraulic oil to the bearing bore inside the clutch housing.
28. Align clutch housing (4) with transmission housing (8), and install clutch housing using eight screws (60). Tighten screws in small increments, using an alternating (star) pattern to draw the clutch housing down evenly. Tighten screws to 12 to 15 lb-ft (16 to 20 N·m).
29. Remove the plug from the inspection port (94).

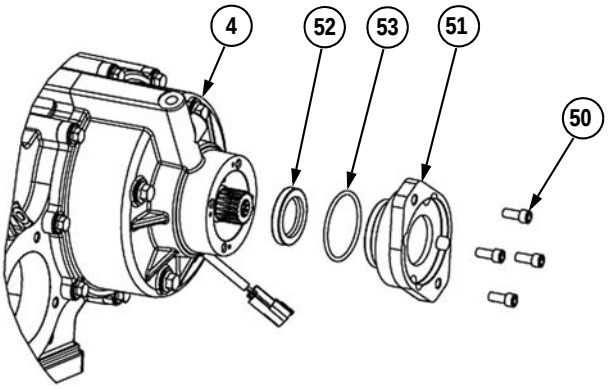




30. Check and adjust the clutch coil-to-clutch face air gap:
    a. Lightly tap the brake end (95) of the impeller shaft with a soft-headed hammer to seat the shaft in the forward direction.
    b. Using a feeler gauge, measure the air gap (96). Note the measurement. The air gap should measure 0.025 to 0.040 inches (0.6335 to 1.016 mm).
    c. Apply 12 volts DC to the coil leads (97), and lightly tap the impeller end (98) of the impeller shaft with a soft-headed hammer to seat the shaft in the rearward direction.
    d. Using a feeler gauge, measure the air gap (96). Note the measurement. The air gap should measure a minimum of 0.010 inch (0.254 mm).
    e. If the air gap does not meet specifications, remove the clutch housing. Remove the 0.030 inch shim (91) and replace it with a 0.010 inch shims as needed to obtain the correct air gap.
    f. Install plug in the inspection port (94).

NOTE:

- *The transmission may be equipped with either a hydraulic pump adapter or electric brake assembly:*
- *Perform steps 31 through 35 if equipped with a hydraulic pump adapter.*
- *Perform steps 36 through 41 if equipped with an electric brake assembly.*

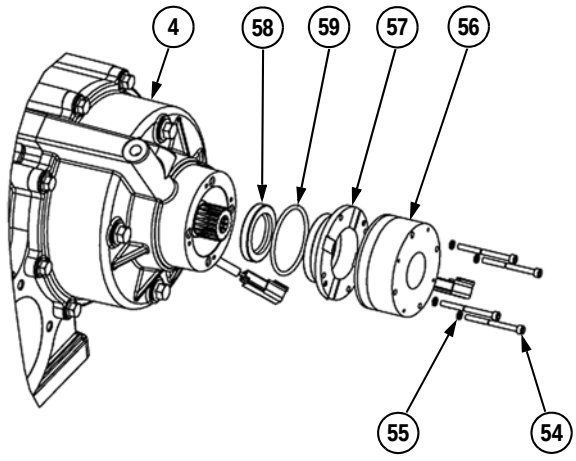


31. Lightly lubricate the oil seal (52) with clean transmission oil.
32. Place oil seal (52) in adapter (51) with the spring side toward bearing, and press the oil seal into adapter using a properly sized seal driver.

NOTE:

- *Always use new O-rings for installation.*
- *Apply grease to O-rings only; do not place grease in O-ring grooves. Placing grease in O-ring grooves may prevent O-rings from seating properly.*

33. Apply a thin film of Dow Corning® 111 (Silicone Compound) grease (Pierce P/N 1788950) to O-ring (53), and install O-ring in the groove in adapter (51).
34. Apply Grease, Synthetic High-Temperature EP grease (SYNCO Super Lube #71160), (Pierce P/N 1789086) to internal spine.
35. Position adapter (51) over input shaft, and install adapter on clutch housing (4) using four screws (50). Tighten screws in small increments, using an alternating (star) pattern to draw the adapter down evenly. Tighten screws to 7 to 8 lb-ft (9.5 to 11 N·m). Proceed to step 42.

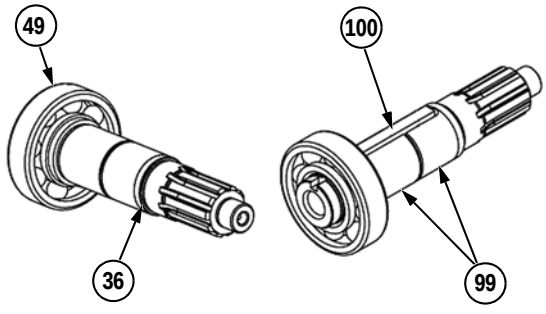


36. Lightly lubricate oil seal (58) with clean transmission oil.
37. Place oil seal (58) in adapter (57) with the spring side toward bearing, and press oil seal into adapter using a properly sized seal driver.

NOTE:

- *Always use new O-rings for installation.*
- *Apply grease to O-rings only; do not place grease in O-ring grooves. Placing grease in O-ring grooves may prevent O-rings from seating properly.*

38. Apply a thin film of Dow Corning® 111 (Silicone Compound) grease (Pierce P/N 1788950) to O-ring (59), and install O-ring in the groove in adapter (57).
39. Apply Grease, Synthetic High-Temperature EP grease (SYNCO Super Lube #71160), (Pierce P/N 1789086) to external spine.
40. Position adapter (57) over input shaft, and install adapter on clutch housing (4).
41. Install brake assembly (56) on adapter (57) using four screws (54) and lockwashers (55). Tighten screws in small increments, using an alternating (star) pattern to draw the brake down evenly. Tighten screws to 7 to 8 lb-ft (9.5 to 11 N·m).



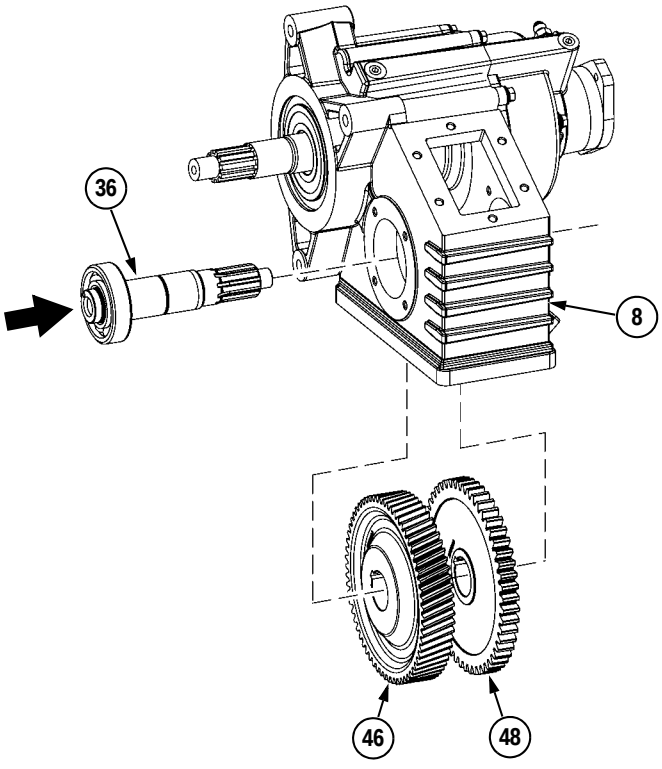
42. Apply a thin film of SKF LGAF 3E/0.5 Anti-Fretting Agent (Pierce P/N 1788951) to bearing journals (99) and the inside diameter of bearing (49).

CAUTION

Use a press for forcing press fits whenever possible. If necessary to use a hammer, use one having soft plastic heads. Do not use brass or lead hammers, for the face of the hammer may easily chip or flake, contaminating the assembly, which can cause severe damage to bearings and other precision components.

NOTE: *When installing bearing, apply pressure to the inner race only.*

43. Install (press) bearing (49) on input shaft (36).
44. Install key (100) in keyway in the input shaft (36).



NOTE: *Install main drive and PTO gears in the same orientation as noted during removal.*

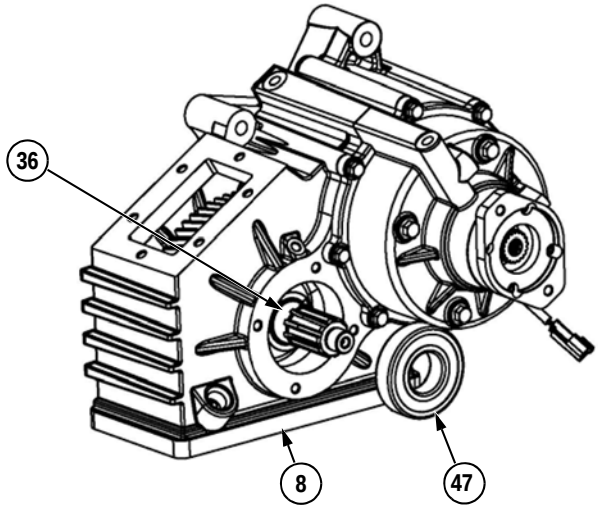
45. Install main drive (46) and PTO drive (48) gears in transmission housing (8).
46. Insert input shaft assembly (36) into transmission housing (8).

CAUTION

If a press is required to seat the input shaft in the drive gears and transmission housing, use extreme caution. Support the transmission housing squarely and evenly across the entire face of the housing. Failure to comply may result in damage to the transmission housing.

NOTE: *When positioning the transmission housing on the supporting surface, provide an open space below the transmission housing to allow for input shaft travel.*

47. Align main drive (46) and PTO drive (48) gears with the input shaft key, and slide into place. If required, use a press to seat shaft.
48. Attach retainer plate (Pierce P/N X63262) to transmission housing (8).



49. Apply a thin film of SKF LGAF 3E/0.5 Anti-Fretting Agent (Pierce P/N 1788951) to the input shaft journal (36) and inside diameter of bearing (47).

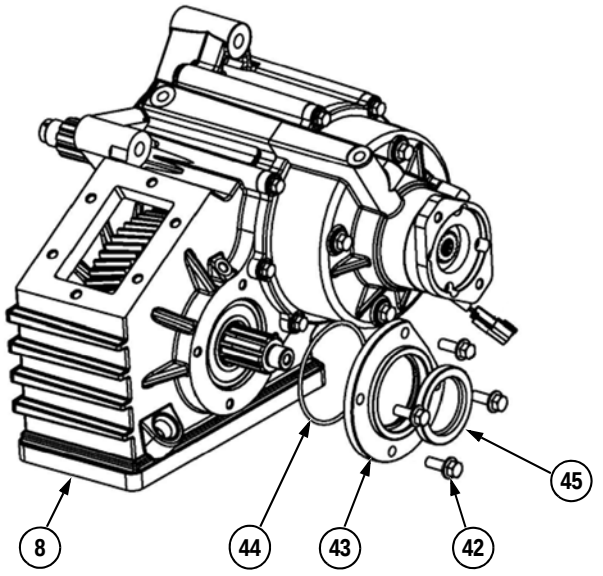
CAUTION

Use a press for forcing press fits whenever possible. If necessary to use a hammer, use one having soft plastic heads. Do not use brass or lead hammers, for the face of the hammer may easily chip or flake, contaminating the assembly, which can cause severe damage to bearings and other precision components.

NOTE:

- *Install the bearing with the sealed side facing out.*
- *When installing bearing, apply pressure to the inner race only.*

50. Place bearing (47) over the input shaft (36), and press bearing into transmission housing (8).



51. Place oil seal (45) in the bearing cap (43) with the spring side toward bearing, and press the oil seal into adapter using a properly sized seal driver.

NOTE: *The transmission and bearing cap O-ring mating surfaces must be free of dirt, corrosion, debris, and surface defects (nicks, etc.) to ensure a proper O-ring seal.*

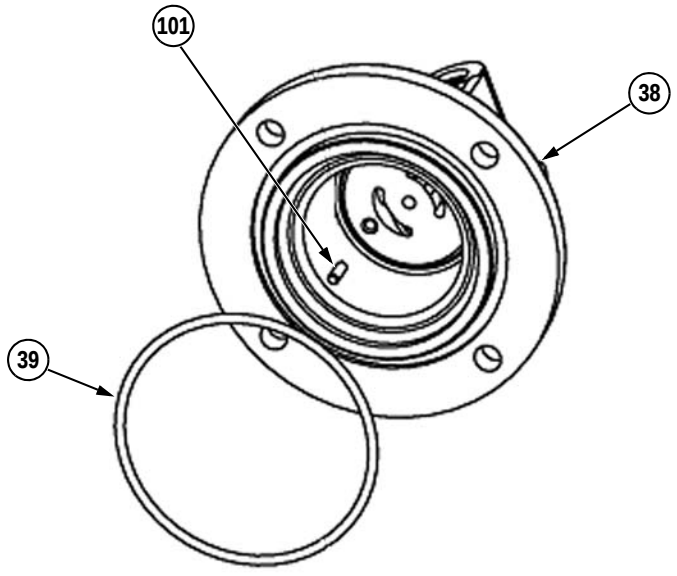
52. Clean and inspect the transmission housing (8) and bearing cap (43) O-ring mating surfaces. Remove small surface defects using fine emory paper or a file.

NOTE:

- *Always use new O-rings for installation.*
- *Apply grease to O-rings only; do not place grease in O-ring grooves. Placing grease in O-ring grooves may prevent O-rings from seating properly.*

53. Apply a thin film of Dow Corning® 111 (Silicone Compound) grease (Pierce P/N 1788950) to O-ring (44), and install O-ring in the groove in bearing cap (43).

54. Install bearing cap (43) on transmission housing (8) using four screws (42). Tighten screws to 21 to 26 lb-ft (28 to 35 N·m).



IMPORTANT

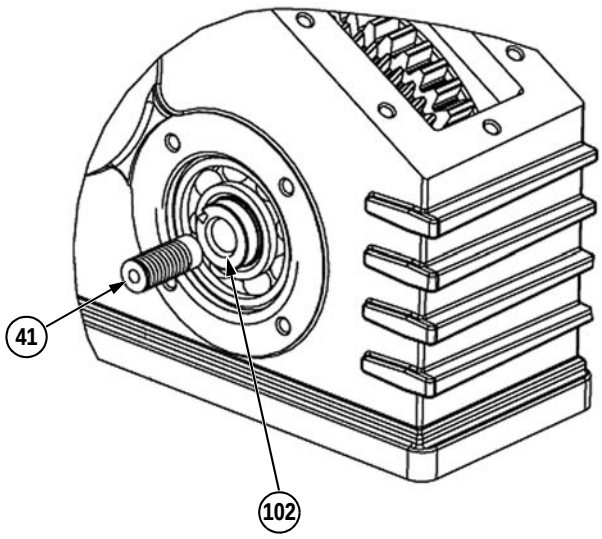
Dowel pin must be seated to the bottom of the hole. The dowel pin must not protrude more than 0.125 inch (3.175 mm).

55. Install dowel pin (101) into lube pump bearing cap (38) using a pin punch. Seat the dowel pin to the bottom of hole. Dowel pin protrusion must not exceed 0.125 inch (3.175 mm).

NOTE:

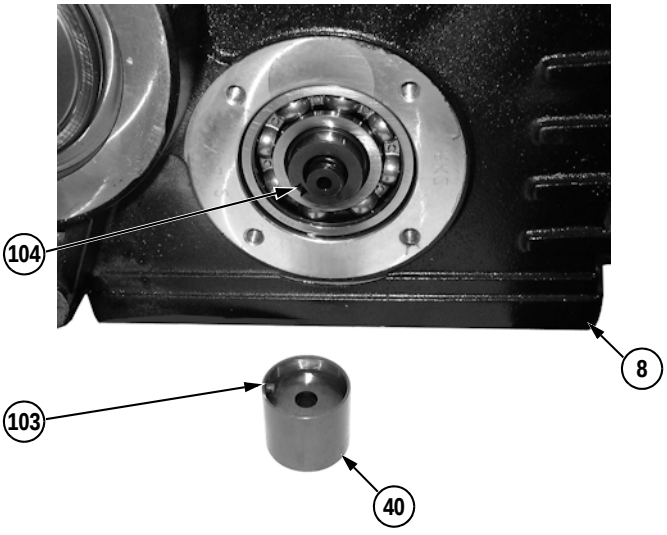
- *Always use new O-rings for installation.*
- *Apply grease to O-rings only; do not place grease in O-ring grooves. Placing grease in O-ring grooves may prevent O-rings from seating properly.*

56. Apply a thin film of Dow Corning® 111 (Silicone Compound) grease (Pierce P/N 1788950) to O-ring (39), and install O-ring in the groove in lube pump bearing cap (38).



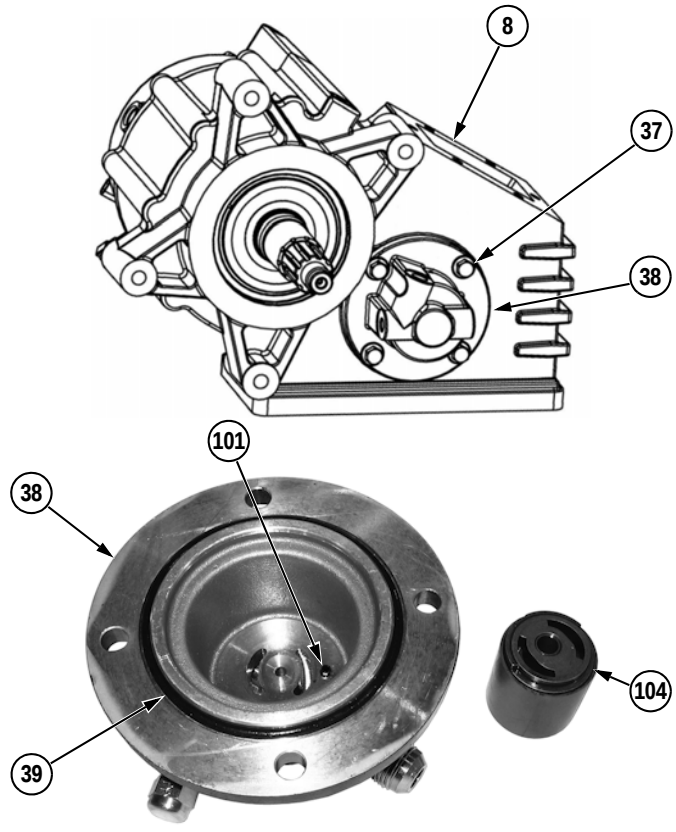
57. Remove retainer plate installed in step 41.

58. Lubricate the relief spring cartridge (41) and position it in the pilot hole (102).



NOTE: *If any lube pump components are worn or damaged, replace the entire lube pump.*

59. Position transmission housing (8) with the shaft vertical and the oil pump drive slot facing up. Lubricate the lube pump assembly (40) with clean transmission oil and position it on the input shaft.
    - Be sure to position the machined side of the rotor seal washer toward rotor face.
    - Be sure to align the lube pump dowel pin (103) with the slot (104) in the hub.
    - Be sure to position the slot in sector plate with the dowel pin when installing bearing cap.



NOTE: *The transmission and lube pump bearing cap O-ring mating surfaces must be free of dirt, corrosion, debris, and surface defects (nicks, etc.) to ensure a proper O-ring seal.*

60. Clean and inspect the transmission housing (8) and lube pump bearing cap (38) O-ring mating surfaces. Remove small surface defects using fine emory paper or a file.

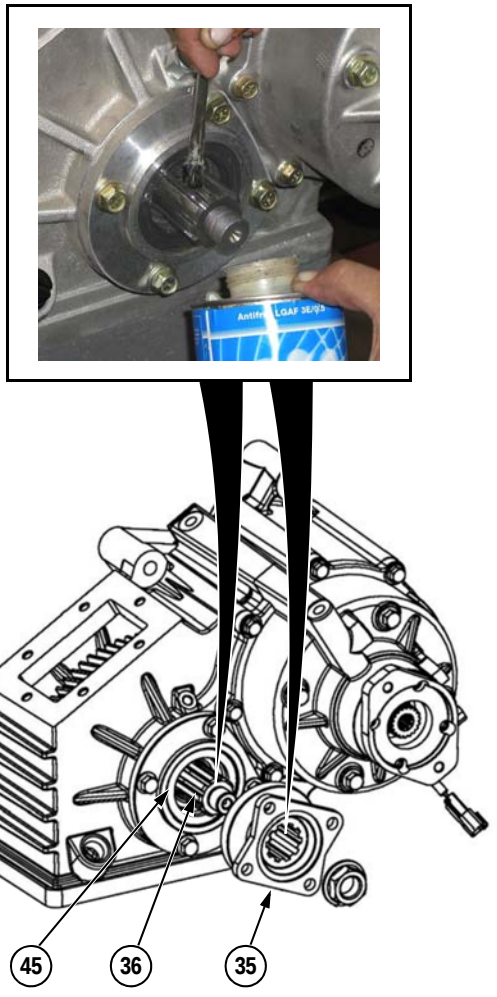
NOTE:

- *Always use new O-rings for installation.*
- *Apply grease to O-rings only; do not place grease in O-ring grooves. Placing grease in O-ring grooves may prevent O-rings from seating properly.*

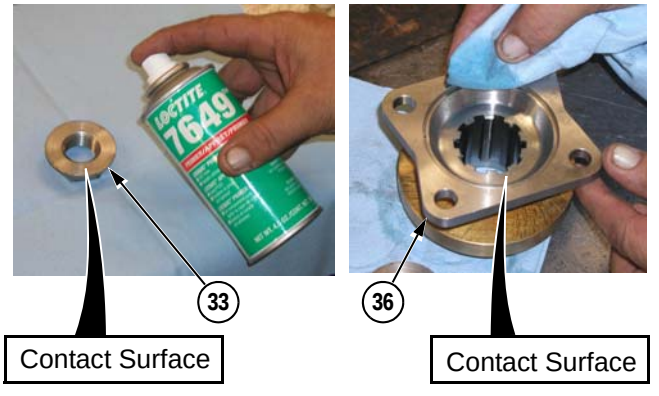
61. Apply a thin film of Dow Corning® 111 (Silicone Compound) grease (Pierce P/N 1788950) to O-ring (39), and install O-ring in the groove in the lube pump bearing cap (38).

NOTE: *Install the bearing cap in the same orientation as noted during removal.*

62. Align the lube pump bearing cap (38) dowel pin (101) with the lube pump drive groove (104) and transmission bore pilot, and install the lube pump bearing cap (38) on transmission housing (8) using four screws (37). Tighten screws to 21 to 26 lb-ft (28 to 35 N·m).

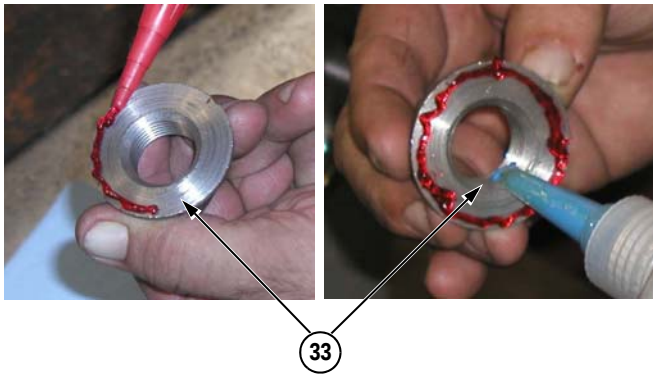


63. Lightly lubricate oil seal (45) with clean transmission oil.
64. Apply a thin film of SKF LGAF 3E/0.5 Anti-Fretting Agent (Pierce P/N 1788951) to the splines of input shaft (36) and companion flange (35).

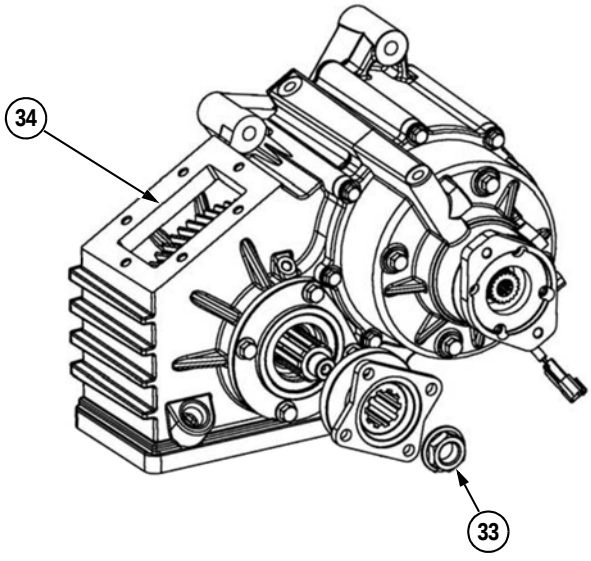


65. Clean contact surfaces of companion flange retaining nut (33) and companion flange (35) with Loctite® Primer N 7649 or equivalent.

66. Install companion flange (35) on input shaft (36).



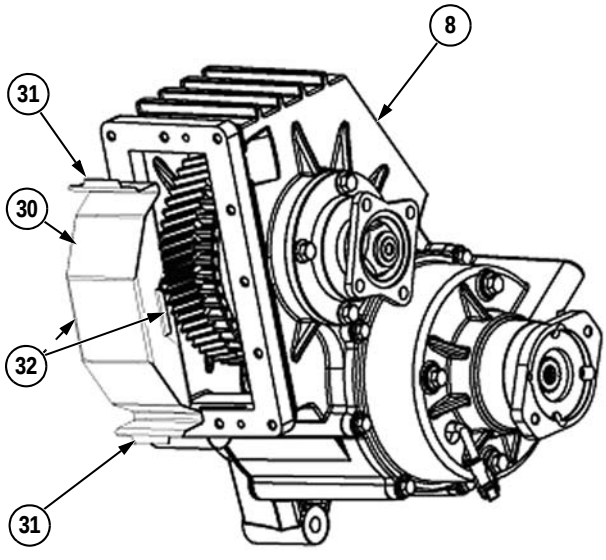
67. Apply 1/16 in. diameter bead of Loctite® 518 Gasket Eliminator to outside edge of companion flange retaining nut (33).
68. Apply two drops of Loctite® 243 (Pierce P/N 1788946) to threads of companion flange retaining nut (33).



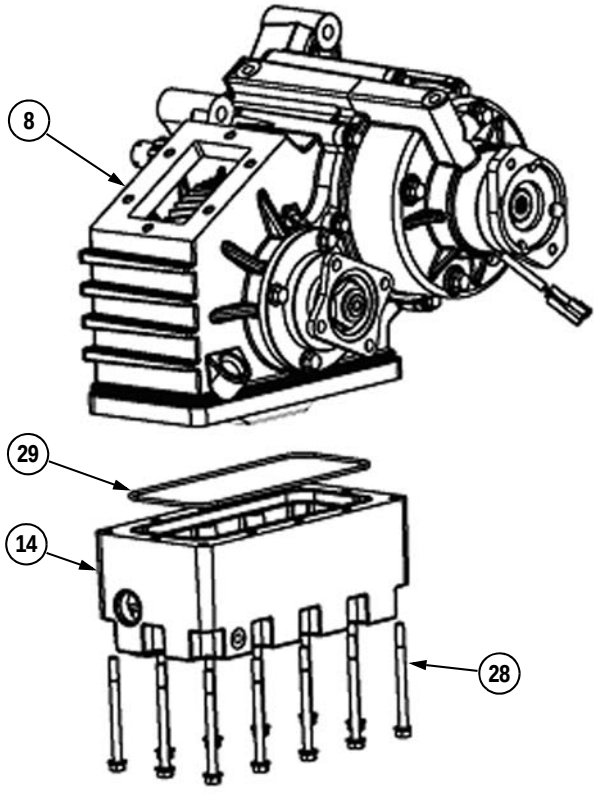
CAUTION

Use caution when tightening the nut. Failure to comply may result in damage to gear teeth.

69. Insert a soft aluminum or wood block between the drive gear teeth and PTO opening (34) to prevent the shaft from rotating while tightening companion flange retaining nut (33).
70. Install nut (33). Tighten nut to 300 to 350 lb-ft (407 to 450 N·m).



71. Install oil deflection pan (30) in transmission housing (8) by snapping the end (31) and side (32) tabs into the grooves.



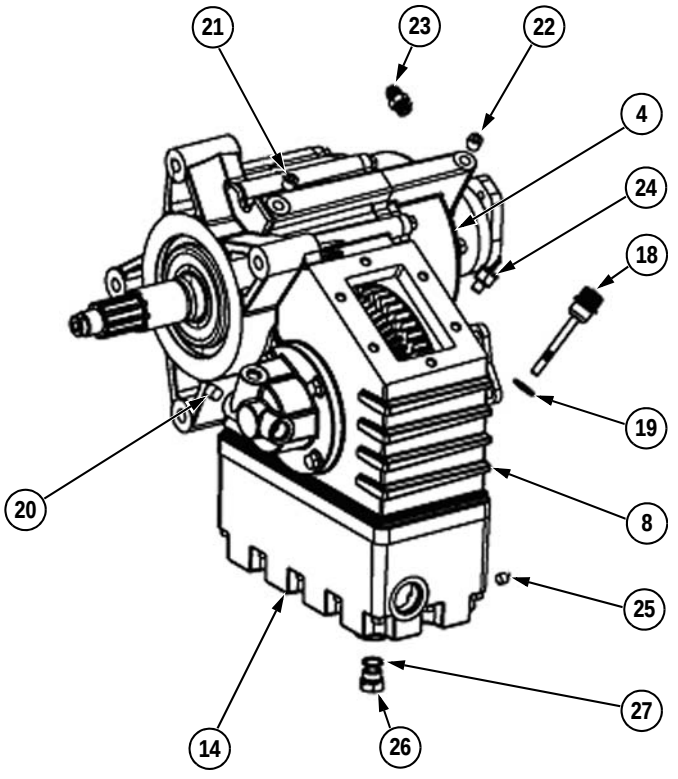
NOTE: *The transmission housing and oil sump O-ring mating surfaces must be free of dirt, corrosion, debris, and surface defects (nicks, etc.) to ensure a proper O-ring seal.*

72. Clean and inspect the transmission housing (8) and oil sump (14) O-ring mating surfaces. Remove small surface defects using fine emory paper or a file.

NOTE:

- *Always use new O-rings for installation.*
- *Apply grease to O-rings only, do not place grease in O-ring grooves. Placing grease in O-ring grooves may prevent O-rings from seating properly.*

73. Apply a thin film of Dow Corning® 111 (Silicone Compound) grease (Pierce P/N 1788950) to O-ring (29), and install O-ring into the groove in the oil sump (14).
74. Install oil sump (14) on transmission housing (8) using 12 screws (28). Tighten screws to 12 to 15 lb-ft (16 to 20 N·m).



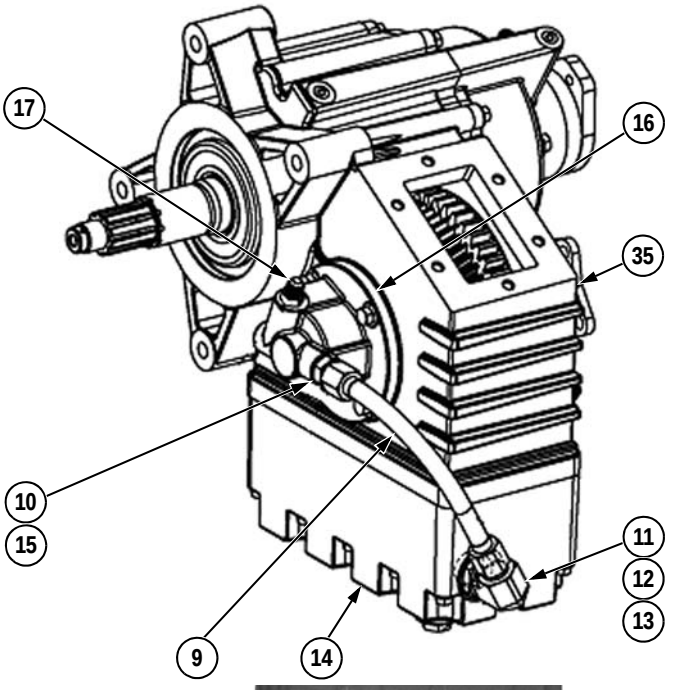
75. Apply thread sealant to threads, and install plugs (20 and 21) in transmission housing (8). (See “Pipe Thread Sealing Procedure,” Group 2000-P-002.)
76. Apply thread sealant to threads, and install plug (22) in clutch housing (4). (See “Pipe Thread Sealing Procedure,” Group 2000-P-002.)

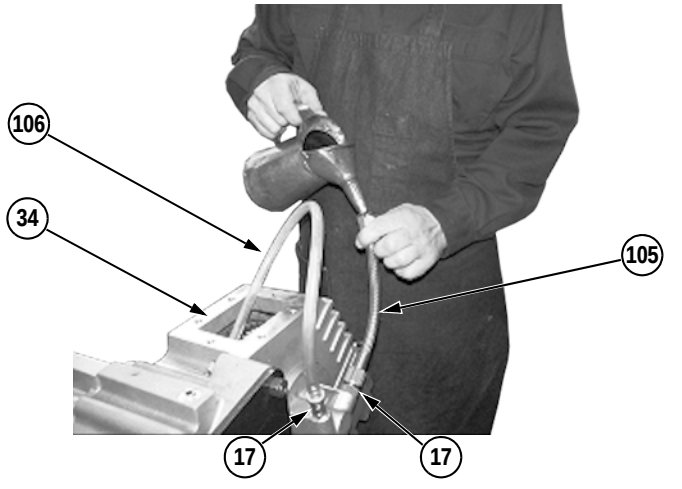
NOTE: *Always use new O-rings for installation.*

77. Apply a thin film of Dow Corning® 111 (Silicone Compound) grease (Pierce P/N 1788950) to O-ring (27).
78. Install O-ring (27) on magnetic drain plug (26), and install drain plug into oil sump (14). Tighten drain plug to 15 to 20 lb-ft (20 to 27 N·m).

NOTE: *See “Hydraulic Hose & Tube Fitting Torque Specifications,” Group 9600-P-003, for torque specifications.*

79. Install 3/8 JIC lubrication fitting (23) in clutch housing (4).
80. Install vent (24) in transmission housing (8).
81. Apply a thin film of Dow Corning® 111 (Silicone Compound) grease (Pierce P/N 1788950) to O-ring (19), and install O-ring on dipstick (18)
82. Install dipstick (18) in transmission housing (8).
83. Install plug or oil temperature sending unit (25) into the temperature sensor port.





84. Install 3/8 JIC lubrication fitting (17) in lube pump (16).

NOTE:

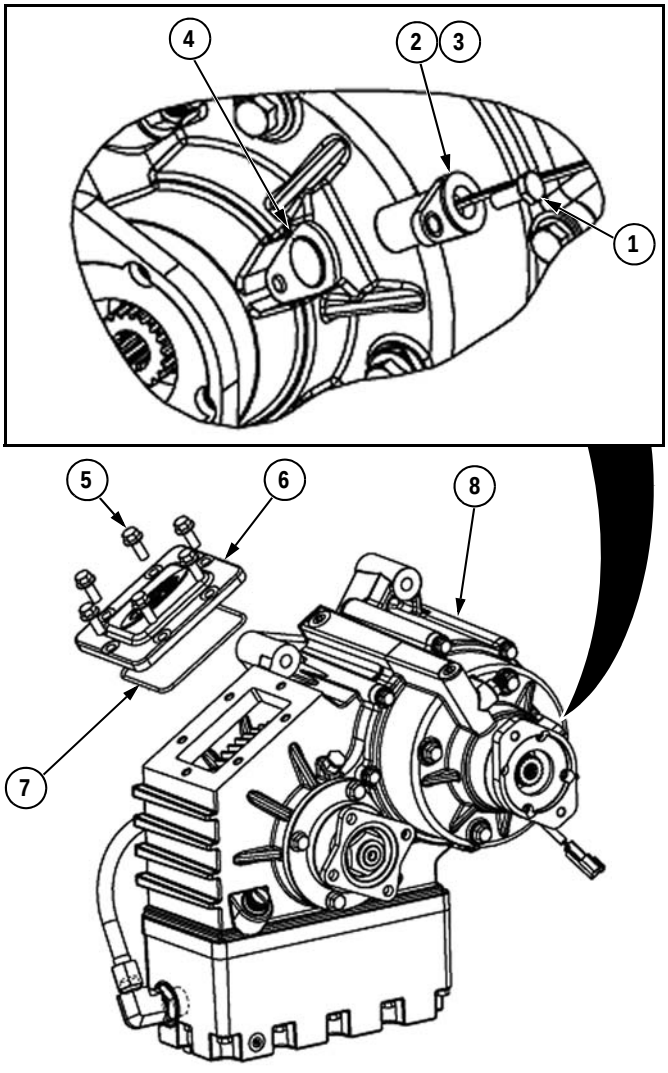
- *See “Hydraulic Hose & Tube Fitting Torque Specifications,” Group 9600-P-003, for torque specifications.*
- *Always use new O-rings for installation.*

85. Apply a thin film of Dow Corning® 111 (Silicone Compound) grease (Pierce P/N 1788950) to O-ring (12).
86. Install strainer screen (13), fitting (11) and O-ring (12) in oil sump (14).
87. Apply a thin film of Dow Corning® 111 (Silicone Compound) grease (Pierce P/N 1788950) to O-ring (15), and install fitting (10) in lube pump (16).

NOTE: *An assistant will be needed to perform the following procedure.*

88. Test oil pump flow before installing pump assembly to transmission:
    a. Connect a temporary hose (105) to pump intake port fitting (11).
    b. Connect a temporary hose (106) to pump discharge port fitting (10). Route the other end of the hose into the PTO opening (34).
    c. While pouring eight ounces of PUC XPL Extreme Performance Lubricant (Pierce P/N 1915175) into the hose (105) connected to the pump intake port fitting (11), have an assistant turn the companion flange (35). The oil should flow into the PTO opening if the pump is working correctly.

    If the pump does not operate properly, determine the problem and complete repairs before continuing.
89. Install lube pump suction tube (9) on fittings (10 and 11).



NOTE: *The transmission housing and PTO cover plate O-ring mating surfaces must be free of dirt, corrosion, debris, and surface defects (nicks, etc.) to ensure a proper O-ring seal.*

90. Clean and inspect the transmission housing (8) and PTO cover plate (6) O-ring mating surfaces. Remove small surface defects using fine emory paper or a file.

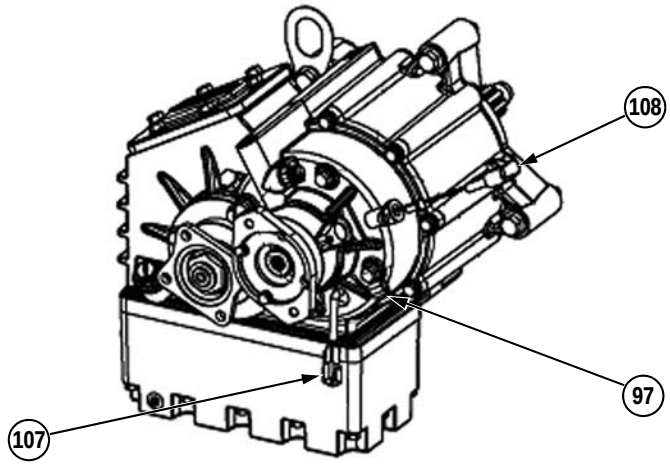
NOTE:

- *Always use new O-rings for installation.*
- *Apply grease to O-rings only; do not place grease in O-ring grooves. Placing grease in O-ring grooves may prevent O-rings from seating properly.*

91. Apply a thin film of Dow Corning® 111 (Silicone Compound) grease (Pierce P/N 1788950) to O-ring (7).
92. Install O-ring (7) in PTO cover plate (6), and install the plate on transmission housing (8) using six screws (5). Tighten screws to 21 to 26 lb-ft (28 to 35 N·m).

NOTE: *Always use new O-rings for installation.*

93. Apply a thin film of Dow Corning® 111 (Silicone Compound) grease (Pierce P/N 1788950) to O-ring (3) and clutch housing (4) bore.
94. Install tach sensor (2) into housing with a slight twisting motion to seat the O-ring. Secure the sensor to the clutch housing (4) using a screw (1). Tighten screw to 76 lb-in (9 N·m).

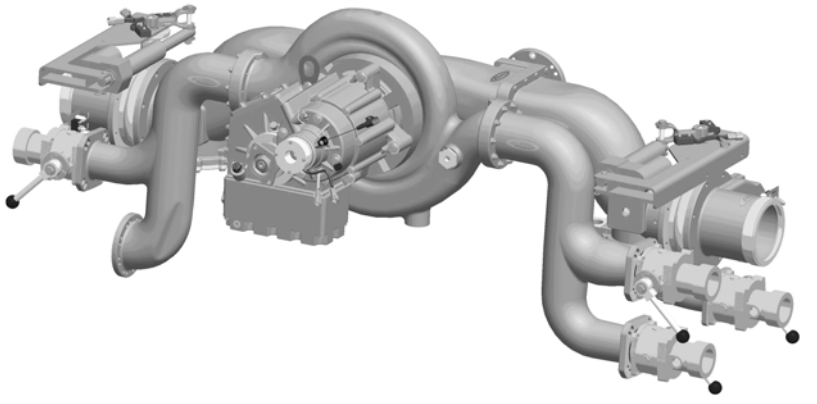


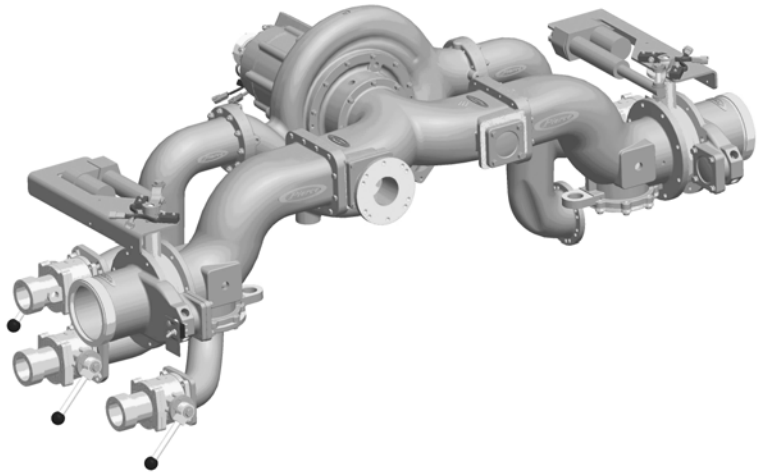
95. Route brake (107), clutch coil (97), and tach (108) wiring leads through cable clamp.
96. Fill gearcase to proper level with clean transmission oil. Use PUC XPL Extreme Performance Lubricant (Pierce P/N 1915175).
97. Install pump assembly on transmission. (See "**Assembly**" on page 3-47.)

PIERCE ULTIMATE CONFIGURATION (PUC) PARTS CATALOG (R2)

This Service group contains:

- Drawings and Parts Lists for the “Pierce Ulimate Configuration (PUC)”.
- Individual Kits for the Clutch Replacement and Impeller Repair (Major & Minor).
- Recommended Spare Parts List.
- Recommended Spare Parts List - Optional Items.





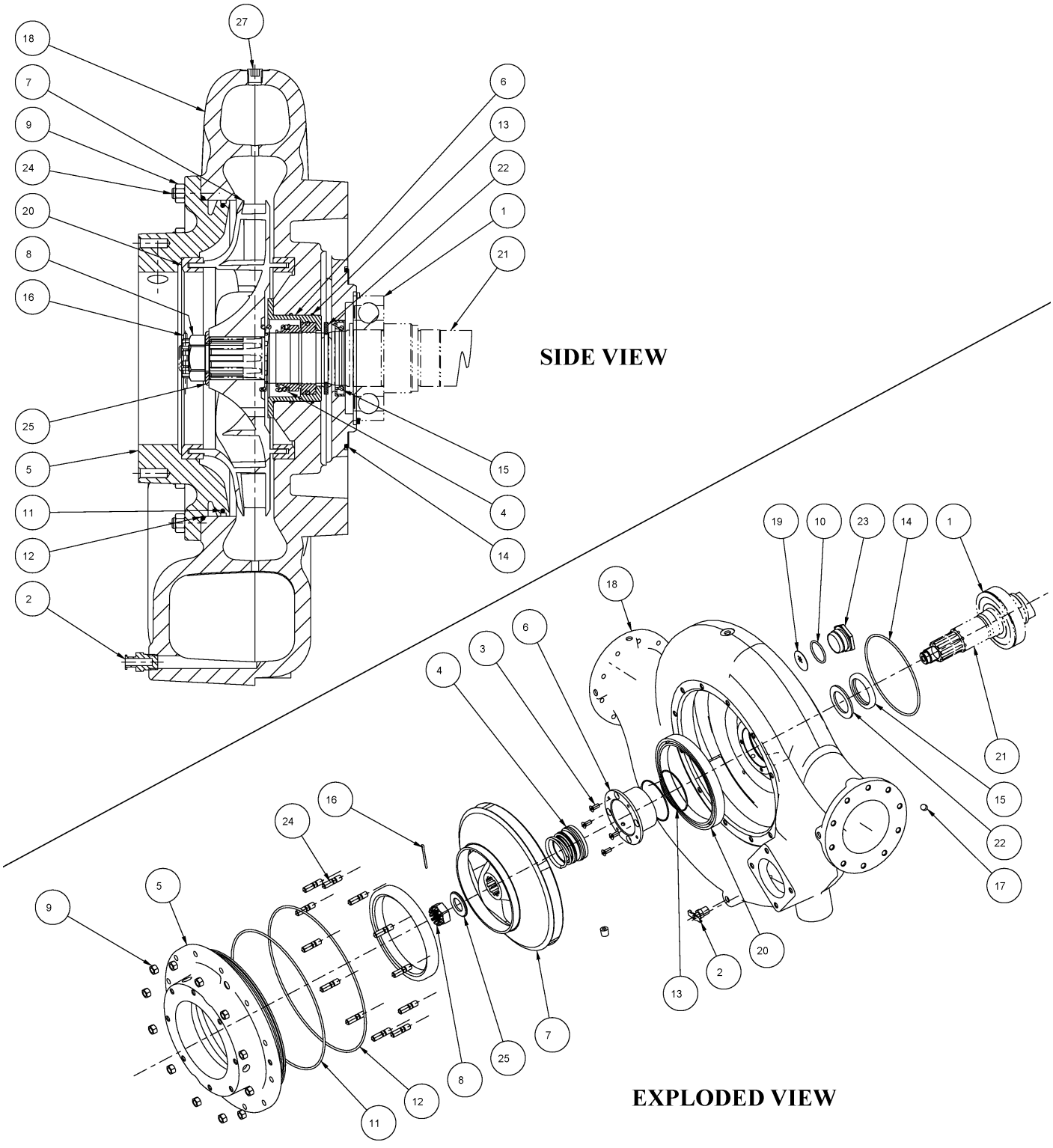


Figure 3-1: Mechanical Seal, Pierce PUC Pump (DPC0901)

Table 3-1: Parts List for Figure 3-1; Mechanical Seal

Item No.	Description	Pierce PN	Qty	Notes*
1	BEARING,BALL,NSK 6310NR-C3	1963586	1	A
2	FTG,45SW,06MNPTF,08PTCD,BR	1751037-0007	1	
3	FHMS - .250-20 x 0.63, SS	1788080	4	
4	FLOWSERVE SEAL - 1.75 WELD SPRG	1788081	1	
5	HEAD - SUCTION, PS, PUC	1788096	1	
6	HOUSING - MECHANICAL SEAL, PS	1788098	1	
7	IMPELLER - PS1500, LH	1788102	1	B
8	NUT - CASTLE, 1.14, 303	1788103	1	
9	NUT - HEX, .375-16, GR2	1788104	12	
10	O-RING - 1.47 x 1.71 x 0.09	1788110	1	
11	O-RING - 10.50 x 10.75 x 0.14	1788111	1	
12	O-RING - 11.00 x 11.25 x 0.12	1788115	1	
13	O-RING - 3.00 x 3.12 x 0.06	1788118	2	
14	O-RING - 6.00 x 6.25 x 0.12	1788120	1	
15	OIL SEAL - 1.875 ID x 2.627 OD	1788122	1	
16	PIN - COTTER, .125 x 1.5, SST	1788123	1	C
17	PLUG - PIPE, 0.125, SST SOC HD	1788124	1	
18	PUMP CASING,PUC,RETAINING RING	1963587	1	
19	SCREEN STRAINER	1788130	1	
20	SEAL RING - PS	1788132	2	D
21	SHAFT,IMPELLER,PUC,R2	1963589	1	
22	SLINGER - WATER, 1.661	1788133	1	
23	STRAINER - FITTING, 3/8 NPT	1788134	1	
24	STUD - 0.375-16 x 1.500, GR5	1788137	12	
25	WASHER - IMPELLER	1788138	1	
27	PLUG - PIPE, 0.250, SST SOC HD	1788139	1	

** See "Notes & Kit Cross-References" at the end of this Service Group for detailed information*

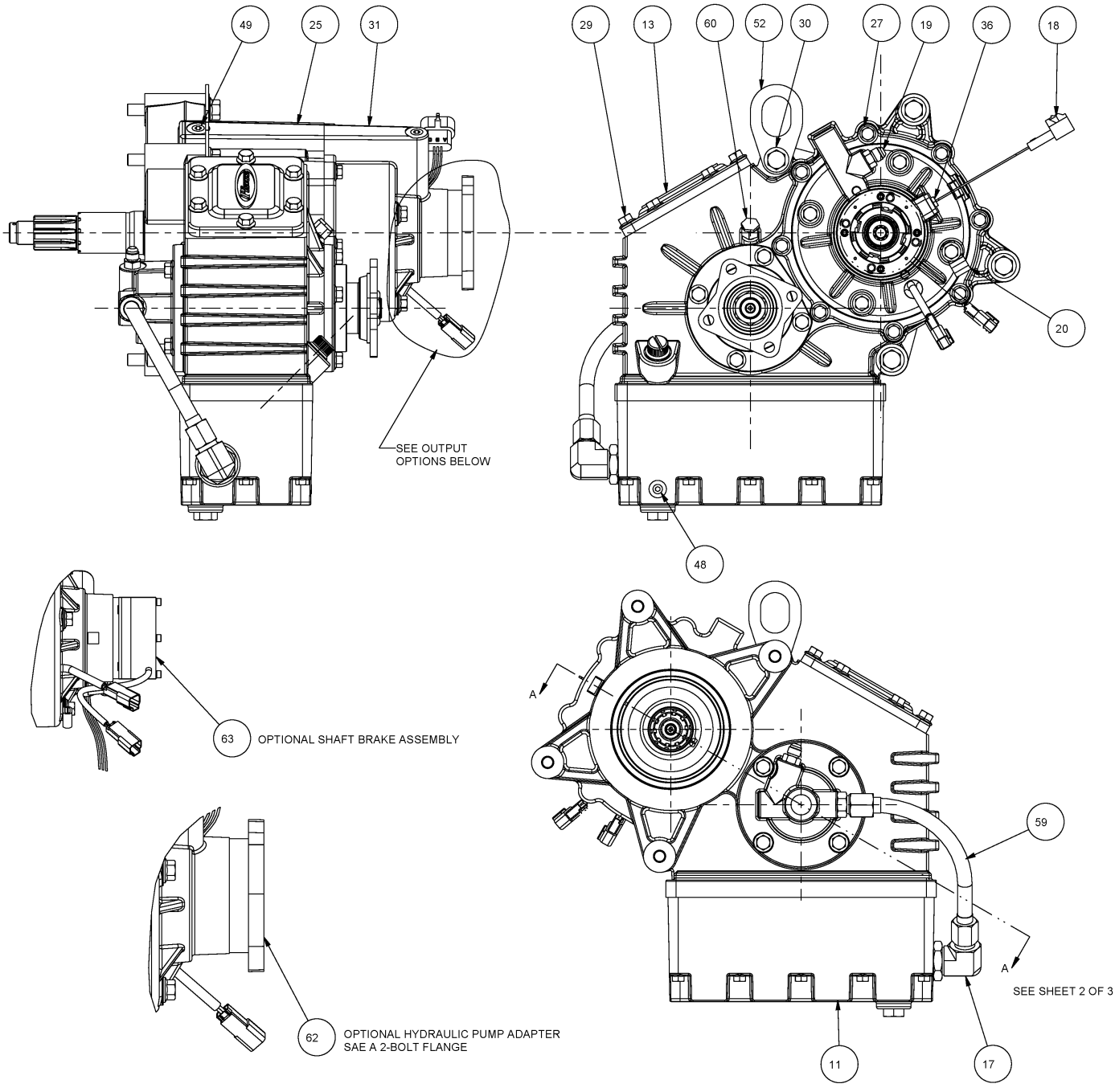


Figure 3-2: Rear Mounted PTO, 2-Gear, Pierce PUC Transmission (DCP0801 Sheet 1 of 3)

Table 3-2: Parts List for Figure 3-2; Rear Mounted PTO, 2-Gear (Sheet 1 of 3)

Item No.	Description	Pierce PN	Qty
11	COVER - GEAR CASE, PIERCE, PUC	1787928	1
13	COVER - PTO OPENING, PUC	1787930	1
17	FILTER - LUBE PUMP, 100 MESH	1787937	1
18	SENSOR - TACH, ENCAPSULATED	1788043	1
19	FTG - .38 JICM x 9/16-18, SAE ORB	1787939	2
20	CLAMP - DBL .25 TUBE, STEEL	1787940	1
25	GEARCASE - PUC 2 GEAR	1787947	1
27	HHCS - FLANGED, .313-18 x 1.25	1787948	8
29	HHCS - FLANGED, .375-16 x 1.00	1787951	18
30	HHCS - FLANGED, .500-13 x 3.50	1787952	4
31	HOUSING,CLUTCH,PUC,R2	1963592	1
36	HHCS - .25-20 x .63, GR 5 SST	1787958	1
48	PLUG,PIPE,0.125,ZN SOC HD	1963596	1
49	PLUG - PIPE, 0.250, BLK SOC HD	1788047	3
52	RING - LIFT	1788057	1
59	TUBE - LUBE PUMP SUCTION, PUC	1788067	1
60	VENT - GEARCASE, 1/8 NPT MALE	1788070	1
62	KIT - HYDRAULIC PUMP ADAPTER	1788074	1
63	KIT - SHAFT BRAKE W/ADAPTER	1788076	1

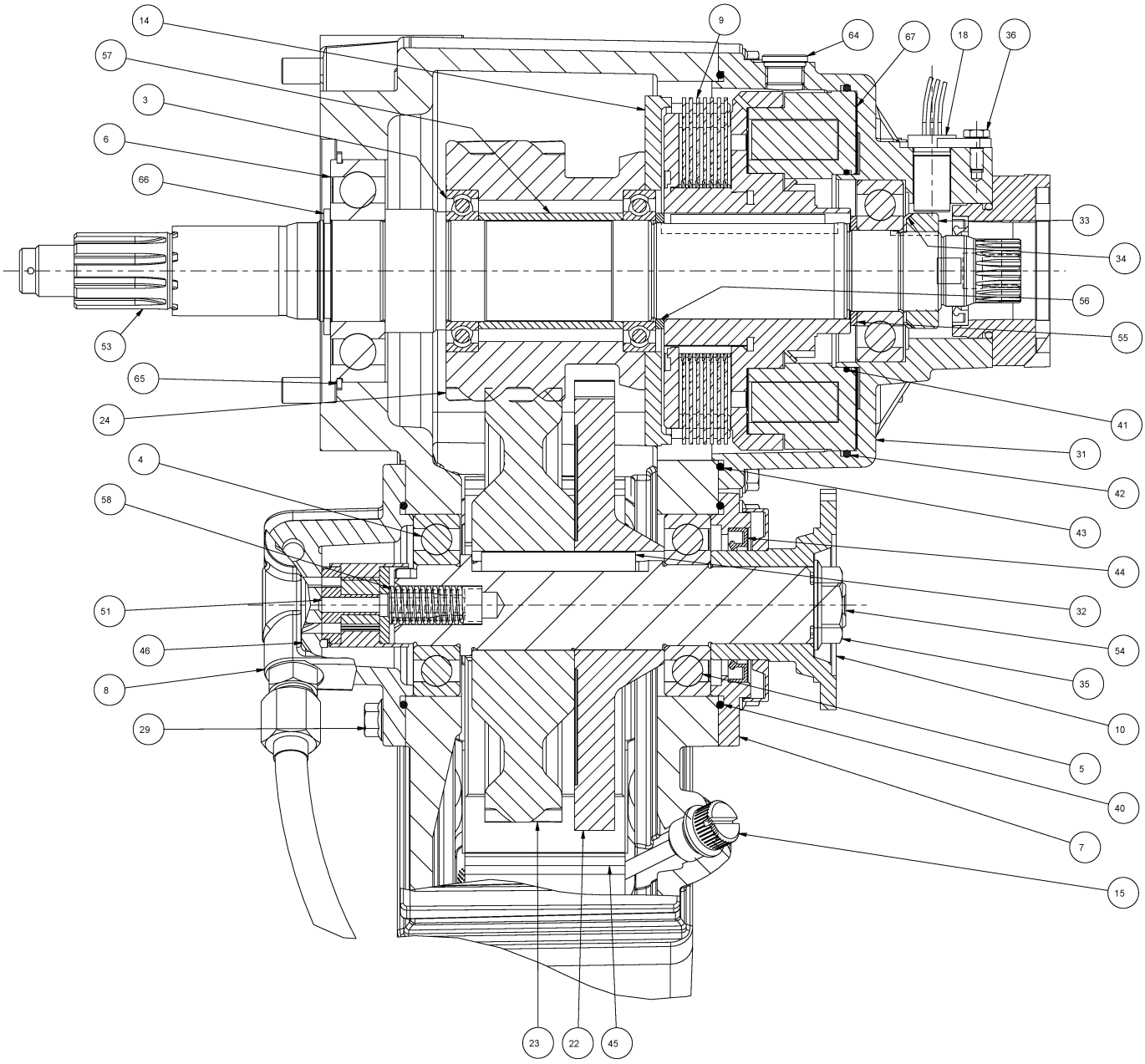


Figure 3-3: Rear Mounted PTO, 2-Gear, Pierce PUC Transmission (DCP0801 Sheet 2 of 3)

Table 3-3: Parts List for Figure 3-3; Rear Mounted PTO, 2-Gear (Sheet 2 of 3)

Item No.	Description	Pierce PN	Qty	Notes*
3	BEARING - BALL, 6010	1787908	2	A
4	BEARING - BALL, 308S	1787909	2	E
5	BEARING - BALL, 308SF	1787911	1	A
6	BEARING,BALL,NSK 6310NR-C3	1963586	1	A
7	CAP - BEARING, PUC INPUT	1787914	1	
8	CAP - BEARING, PUC, LUBE PUMP	1787919	1	
9	CLUTCH,12VDC,PUC,R2	1963449	1	F
10	COMP FLANGE - 1350/1410, 1.50-10	1787923	1	
14	CUP - CLUTCH DRIVE	1787934	1	G
15	DIPSTICK - M22x2.5 THR'D	1787935	1	
18	SENSOR - TACH, ENCAPSULATED	1788043	1	
22	GEAR - DRIVE, 51T. 6/8DP, SPUR	1787943	1	
23	GEAR - DRIVE, 8DP, LH HELIX	1787944	1	
24	GEAR - PINION, 8DP, RH HELIX	1787946	1	
29	HHCS - FLANGED, .375-16 x 1.00	1787951	18	
31	HOUSING,CLUTCH,PUC,R2	1963592	1	
32	KEY - SQ, .38 x 3.00	1787954	2	
33	LOCKNUT - BEARING, NO8SPL	1787955	1	
34	LOCKWASHER - BRG, WO8SPL	1787956	1	E
35	NUT,FLANGE,7/8-14	1963472	1	A
36	HHCS - .25-20 x .63, GR 5 SST	1787958	1	
40	O-RING - 3.75 x 4.00 x 0.12	1788029	2	
41	O-RING, 3.75 X 3.94 X 0.09	1963598	1	H
42	O-RING, 7.00 X 7.25 X 0.12	1963602	1	H
43	O-RING - 7.50 x 7.75 x 0.12	1788036	1	H
44	OIL SEAL - 2.125 ID x 3.000 OD	1788038	1	
45	PAN - OIL DEFLECTION	1788039	1	
46	PIN - DOWEL, 0.156 x 0.50, GR8	1788041	1	
51	PUMP - HYD, INTERNAL GEAR, PUC	1788054	1	
53	SHAFT,IMPELLER,PUC,R2	1963589	1	
54	SHAFT - INPUT, PUC	1788060	1	
55	SPACER - 1.57 x 2.00 x .125	1788062	1	
56	SPACER,1.88 X 2.25X .167	1963606	1	
57	SPACER - 1.97 x 2.25 x 2.810	1788065	1	
58	SPRING CARTRIDGE - OIL PUMP	1788066	1	
64	PLUG,3/4-16 SAE ORB, HEX SOC	1963607	1	
67	SHIM, COIL, .030	1963612	1	F

** See "Notes & Kit Cross-References" at the end of this Service Group for detailed information*

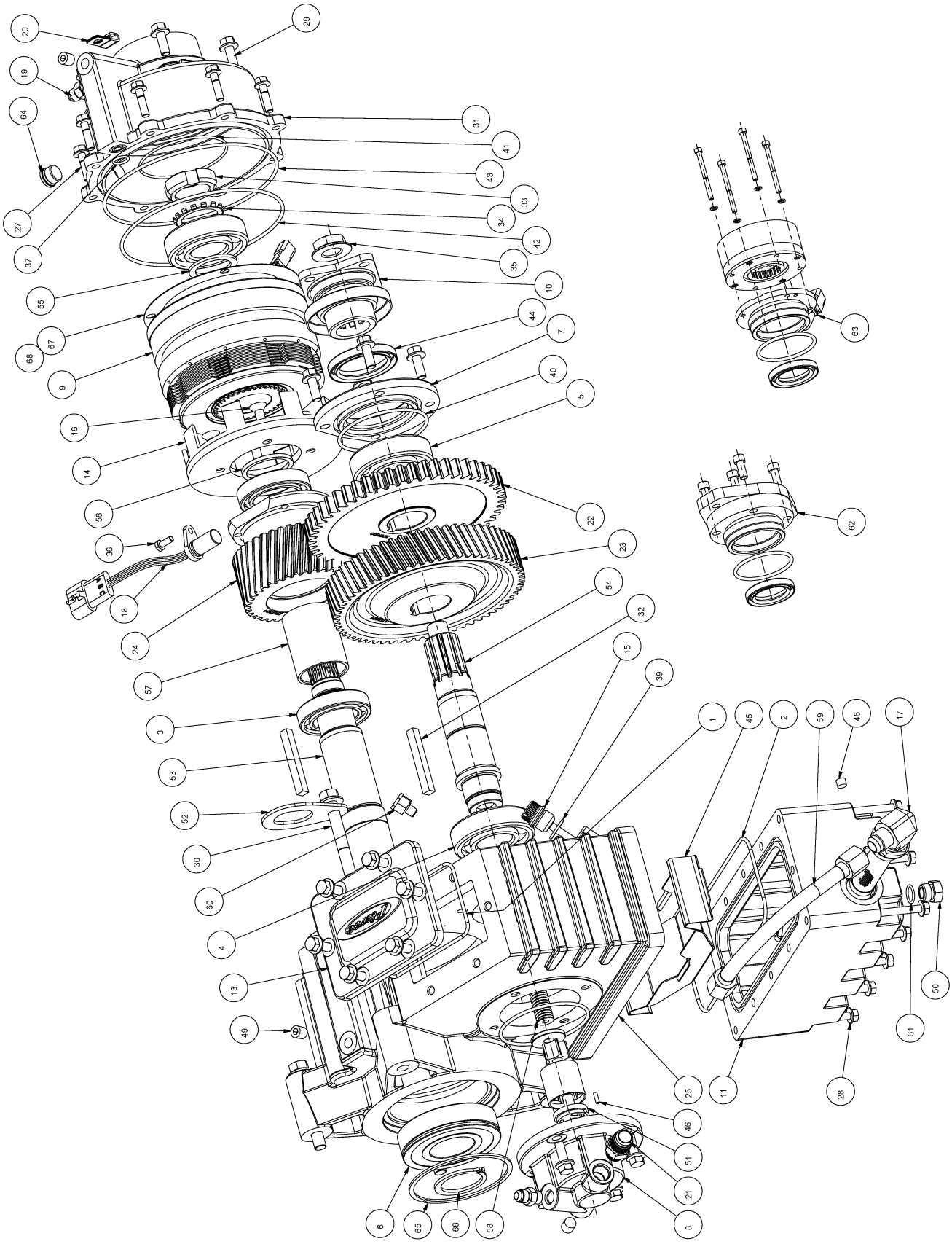


Figure 3-4: Rear Mounted PTO, 2-Gear, Pierce PUC Transmission (DCP0801 Sheet 3 of 3)

Table 3-4: Parts List for Figure 3-4; Rear Mounted PTO, 2-Gear (Sheet 3 of 3)

Item No.	Description	Pierce PN	Qty	Notes*
1	O-RING	1787906	1	
2	O-RING	1787907	1	
3	BEARING - BALL, 6010	1787908	2	A
4	BEARING - BALL	1787909	2	E
5	BEARING - BALL, 308SF	1787911	1	A
6	BEARING,BALL,NSK 6310NR-C3	1963586	1	A
7	CAP - BEARING, PUC INPUT	1787914	1	
8	CAP - BEARING, PUC, LUBE PUMP	1787919	1	
9	CLUTCH - 12 VDC, PUC	1963449	1	F
10	COMP FLANGE - 1350/1410, 1.50-10	1787923	1	
11	COVER - GEAR CASE, PIERCE, PUC	1787928	1	
13	COVER - PTO OPENING, PUC	1787930	1	
14	CUP - CLUTCH DRIVE	1787934	1	G
15	DIPSTICK - M22x2.5 THR'D	1787935	1	
16	FHSCS - .375-16 x 0.88, GR8	1787936	4	A
17	FILTER - LUBE PUMP, 100 MESH	1787937	1	
18	SENSOR - TACH, ENCAPSULATED	1788043	1	
19	FTG - .38 JICM x 9/16-18, SAE ORB	1787939	2	
20	CLAMP - DBL .25 TUBE, STEEL	1787940	1	
21	FTG - .62 JICM x 3/4-16 SAE ORB	1787941	1	
22	GEAR - DRIVE, 51T. 6/8DP, SPUR	1787943	1	
23	GEAR - DRIVE, 8DP, LH HELIX	1787944	1	
24	GEAR - PINION, 8DP, RH HELIX	1787946	1	
25	GEARCASE - PUC 2 GEAR	1787947	1	
27	HHCS - FLANGED, .313-18 x 1.25	1787948	8	
28	HHCS - FLANGED, .313-18 x 4.00	1787950	12	
29	HHCS - FLANGED, .375-16 x 1.00	1787951	18	
30	HHCS - FLANGED, .500-13 x 3.50	1787952	4	
31	HOUSING,CLUTCH,PUC,R2	1963592	1	
32	KEY - SQ, .38 x 3.00	1787954	2	
33	LOCKNUT - BEARING, NO8SPL	1787955	1	
34	LOCKWASHER - BRG, WO8SPL	1787956	1	E
35	NUT,FLANGE,7/8-14	1963472	1	A
36	HHCS - .25-20 x .63, GR 5 SST	1787958	1	
37	O-RING - 0.562 x 0.750 x 0.09	1787959	1	H
39	O-RING - 20MM x 25MM x 2.5MM	1788025	1	
40	O-RING - 3.75 x 4.00 x 0.12	1788029	2	
41	O-RING, 3.75 X 3.94 X 0.09	1963598	1	H
42	O-RING, 7.00 X 7.25 X 0.12	1963602	1	H
43	O-RING - 7.50 x 7.75 x 0.12	1788036	1	H
44	OIL SEAL - 2.125 ID x 3.000 OD	1788038	1	
45	PAN - OIL DEFLECTION	1788039	1	
46	PIN - DOWEL, 0.156 x 0.50, GR8	1788041	1	
48	PLUG,PIPE,0.125,ZN SOC HD	1963596	1	
49	PLUG - PIPE, 0.250, BLK SOC HD	1788047	3	
50	PLUG - MAGNETIC, 3/4-16UNF	1788049	1	
51	PUMP - HYD, INTERNAL GEAR, PUC	1788054	1	

Table 3-4: Parts List for Figure 3-4; Rear Mounted PTO, 2-Gear (Sheet 3 of 3)

Item No.	Description	Pierce PN	Qty	Notes*
52	RING - LIFT	1788057	1	
53	SHAFT,IMPELLER,PUC,R2	1963589	1	
54	SHAFT - INPUT, PUC	1788060	1	
55	SPACER - 1.57 x 2.00 x .125	1788062	1	
56	SPACER,1.88 X 2.25X .167	1963606	1	
57	SPACER - 1.97 x 2.25 x 2.810	1788065	1	
58	SPRING CARTRIDGE - OIL PUMP	1788066	1	
59	TUBE - LUBE PUMP SUCTION, PUC	1788067	1	
60	VENT - GEARCASE, 1/8 NPT MALE	1788070	1	
61	O-RING - .644 x .818 x 0.087	1788073	1	
62	KIT - HYDRAULIC PUMP ADAPTER	1788074	1	I
63	KIT - SHAFT BRAKE W/ADAPTER	1788076	1	I
64	PLUG,3/4-16 SAE ORB, HEX SOC	1963607	1	
65	RING, RETAINER, SKF 6310 BRG	1963609	1	
66	RING, RETAINER, SHR-193 STPA	1963610	1	
67	SHIM, COIL, .030	1963612	1	F
68	SHIM, COIL, .010	1963614	3	F

** See "Notes & Kit Cross-References" at the end of this Service Group for detailed information*

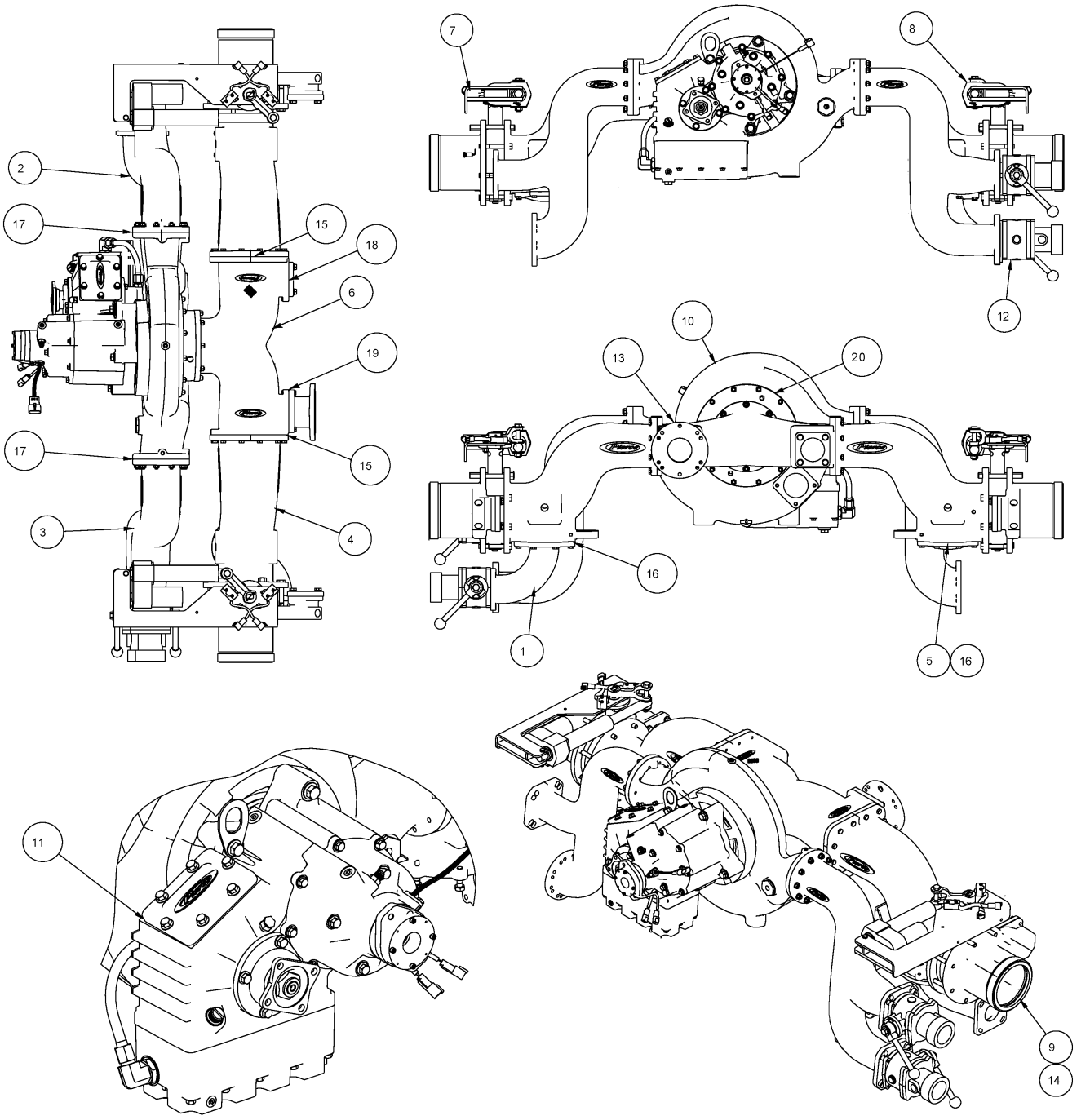


Figure 3-5: Rear Mounted PTO Pierce PUC Assembly (DPD1105)

Table 3-5: Parts List for Figure 3-5; Rear Mounted PTO Pierce PUC Assembly

Item No.	Description	Pierce PN	Qty
1	ASSY - EXT, AUXILIARY SUCTION, PUC	1788143	1
2	ASSY - EXT, DISCH, PUC	1788145	1
3	ASSY - EXT, DISCH, PUC	1788147	1
4	ASSY - EXT, SUCTION, PUC	1788150	2
5	ASSY - FLANGE COVER, BLANK	1788152	1
6	ASSY - TEE, SUCTION, PUC	1788155	1
7	12V ELECT ACT, 6 BFV	1788157	1
8	12V ELECT ACT, 8 BFV	1788158	1
9	NIPPLE - SUCT, 6.00 NH, 9.38BC	1788160	2
10	PUMP, PIERCE PUC, MECH SEAL	1788161	1
11	TRANS - PIERCE PUC	1788163	1
12	VALVE - AKRON BALL, 2.50"	1788166	4
13	VALVE - CHECK, TANK-PUMP	1788168	1
14	SCREEN, SUCTION, 6"	1933897	2
15	O-RING, 7.00 X 7.25 X 0.12	1788035	2
16	O-RING, 6.00 X 6.25 X 0.12	1788120	2
17	O-RING - 4.62 X 4.88 X 0.12	1975576	2
18	O-RING - 3.38 X 3.62 X 0.12	1975575	1
19	O-RING - 6.50 X 6.75 X 0.12	1975577	1
20	O-RING - 4.50 X 4.75 X 0.12	1975578	1

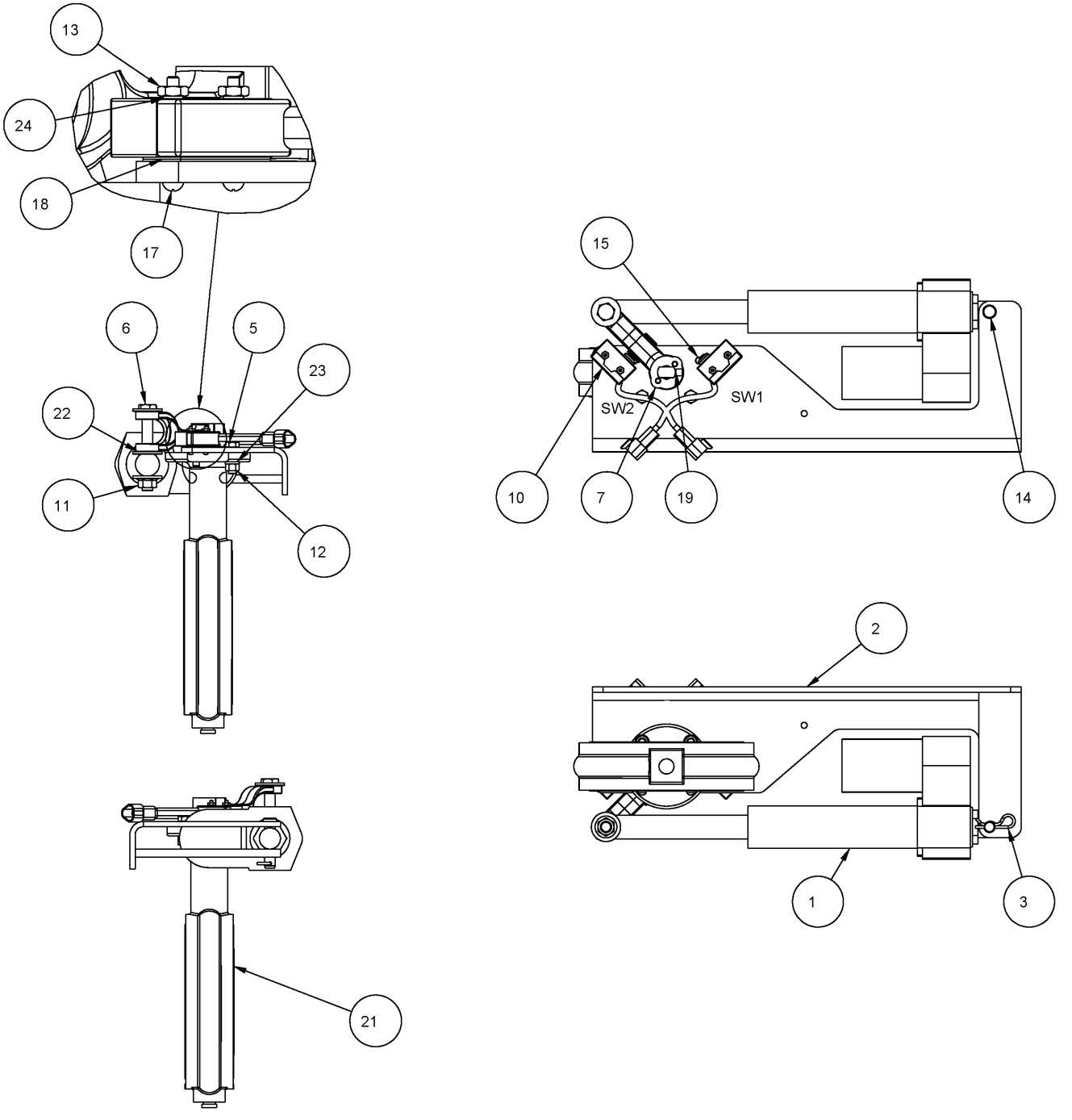


Figure 3-6: Pierce PUC, Passenger Side 12 Volt Electrical Actuator (DGD0105)

Table 3-6: Parts List for Figure 3-6; Passenger Side 12 Volt Electrical Actuator

Item No.	Description	Pierce PN	Qty
1	ACTUATOR	1787400	1
2	BRACKET - ACTUATOR, PASS SIDE	1787402	1
3	CLIP - HAIR PIN, 0.50"	1787857	1
5	HHCS - .375-16 x 1.25 GR5	1787863	2
6	HHCS - .500-12 x 4.00 GR5	1787865	1
7	LEVER - BFV. DEMCO	1787868	1
10	MICROSWITCH - OMRON	1787873	2
11	NUT - FLANGED TOP LOCK	1787875	1
12	NUT - HEX, .375-16, GR2	1788104	2
13	NUT - HEX, NO. 6-32 BR	1787879	4
14	PIN - CLEVIS .25 x 1.234 G.L.	1787883	1
15	PIN - SPRING 0.31 x 0.88	1787886	2
17	RHMS - NO. 6-32 x 1.25, GR5	1787888	4
18	SHIM - SWITCH SPACER, 0.025	1787889	4
19	SSS - .313 x 0.31, GR5	1787890	1
21	VALVE - BTRFLY, 6.00", 200 PSI	1787892	1
22	WASHER - FLAT, 1/2 STEEL	1787893	3
23	WASHER - LOCK, 0.375 ID	1787894	2
24	WASHER - LOCK, NO. 6 ID, SST	1787895	4

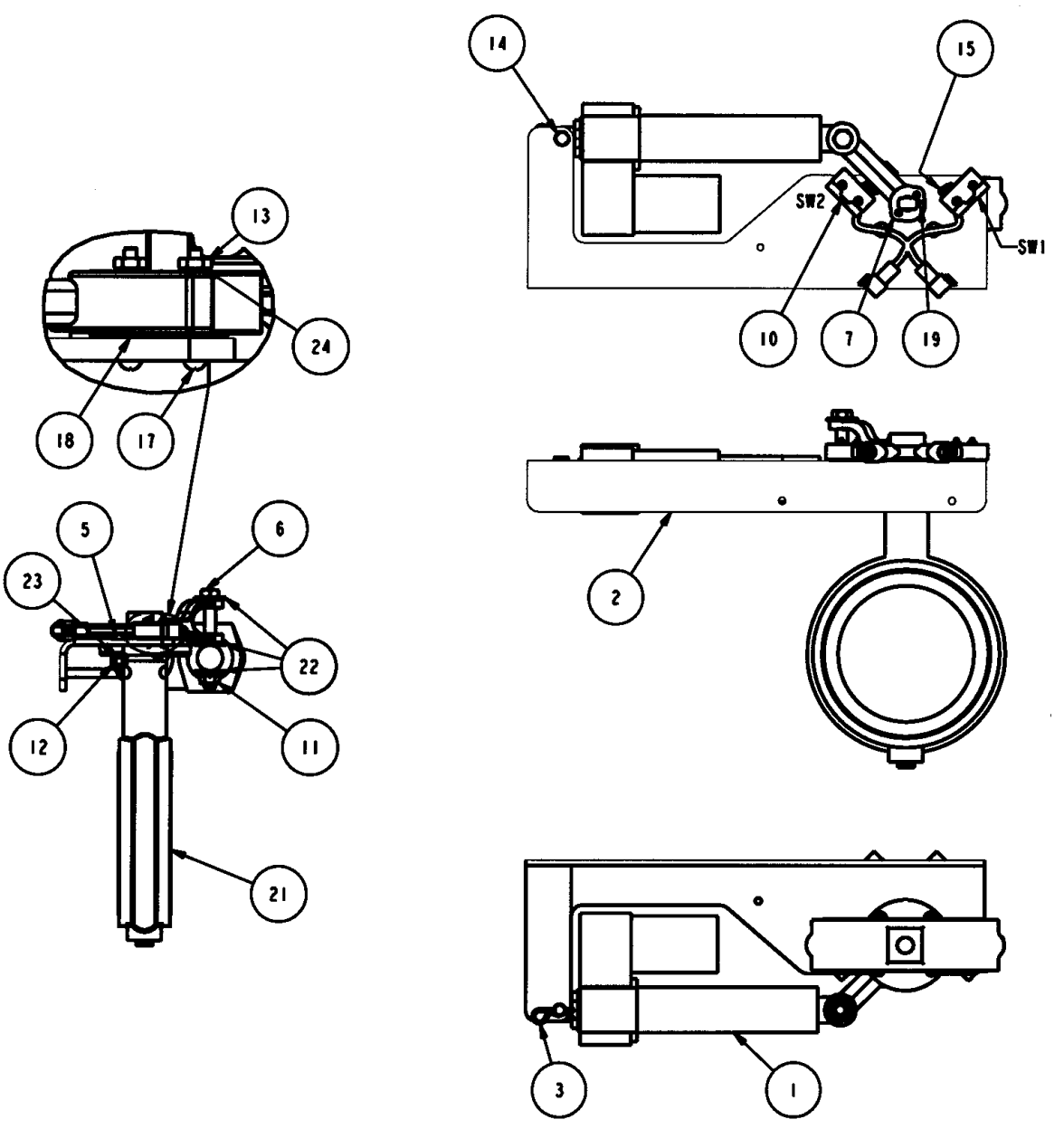


Figure 3-7: Pierce PUC, Driver Side 12 Volt Electrical Actuator (DGD0106)

Table 3-7: Parts List for Figure 3-7; Driver Side 12 Volt Electrical Actuator

Item No.	Description	Pierce PN	Qty
1	ACTUATOR	1787400	1
2	BRACKET - ACTUATOR, DRIVER SIDE	1787896	1
3	CLIP - HAIR PIN, 0.50"	1787857	1
5	HHCS - .375-16 x 1.25 GR5	1787863	2
6	HHCS - .500-12 x 4.00 GR5	1787865	1
7	LEVER - BFV. DEMCO	1787868	1
10	MICROSWITCH - OMRON	1787873	2
11	NUT - FLANGED TOP LOCK	1787875	1
12	NUT - HEX, .375-16, GR2	1788104	2
13	NUT - HEX, NO. 6-32 BR	1787879	4
14	PIN - CLEVIS .25 x 1.234 G.L.	1787883	1
15	PIN - SPRING 0.31 x 0.88	1787886	2
17	RHMS - NO. 6-32 x 1.25, GR5	1787888	4
18	SHIM - SWITCH SPACER, 0.025	1787889	4
19	SSS - .313 x 0.31, GR5	1787890	1
21	VALVE - BTRFLY, 6.00", 200 PSI	1787892	1
22	WASHER - FLAT, 1/2 STEEL	1787893	3
23	WASHER - LOCK, 0.375 ID	1787894	2
24	WASHER - LOCK, NO. 6 ID, SST	1787895	4

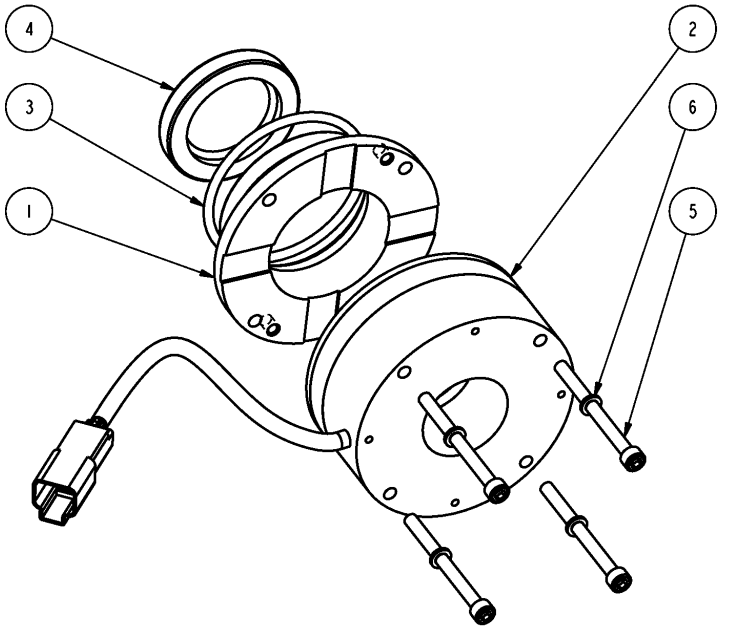


Figure 3-8: Shaft Brake W/Adapter (DGC2400)

Table 3-8: Parts List for Figure 3-8; Shaft Brake W/Adapter

Item No.	Description	Pierce PN	Qty	Notes*
1	ADAPTER - SHAFT BRAKE	1840823	1	
2	BRAKE - PUC IMPELLER SHAFT	1840824	1	
3	O-RING - 2.38 X 2.62 X 0.12	1840825	1	H
4	OIL SEAL - 1.375 ID X 2.129 OD	1840826	1	H
5	SHCS - NO.10-24 X 2.25, SST	1840827	4	
6	WASHER - LOCK, NO.10 ID, SST	1840828	4	

** See "Notes & Kit Cross-References" at the end of this Service Group for detailed information*

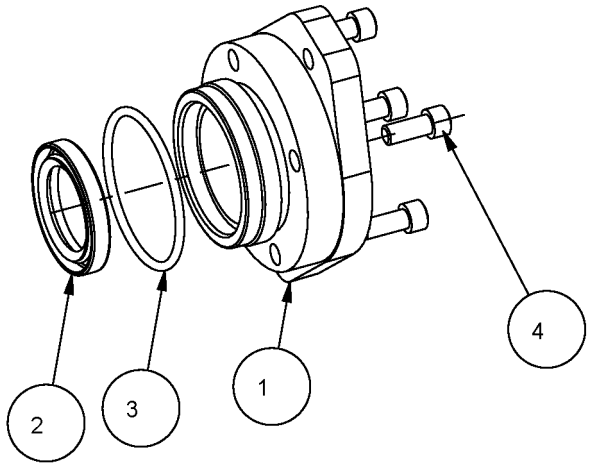


Figure 3-9: Hydraulic Pump Adapter

Table 3-9: Parts List for Figure 3-9; Hydraulic Pump Adapter

Item No.	Description	Pierce PN	Qty	Notes*
1	ADAPTER - HYD PUMP,SAE A	1966304	1	
2	SEAL, OIL, 1.375 ID x 2.129 OD	1840826	1	H
3	O-RING, 2.38 x 2.62 x 0.12	1840825	1	H
4	SHCS, .313-18 X 0.75,GR	1966306	4	

** See "Notes & Kit Cross-References" at the end of this Service Group for detailed information*

Table 3-10: Kit 1963498 - PUC Transmission Overhaul

Qty	Pierce PN	Description
2	1787908	BEARING, BALL, 6010
2	1787909	BEARING, BALL, 308S
1	1787911	BEARING, BALL, 308SF
1	1787934	CUP,CLUTCH DRIVE
4	1787936	FHSCS, .375, 16 X 0.88, GR8
1	1787956	LOCKWASHER - BRG, WO8SPL
1	1788123	PIN, COTTER, .125 X 1.5,SS
2	1788132	SEAL RING - PS
1	1963449	CLUTCH,12VDC,PUC,R2
1	1963472	NUT FLANGE 7/8-14
1	1963586	BEARING,BALL,NSK 6310NR-C3
1	1963612	SHIM, COIL, .030
3	1963614	SHIM, COIL, .010
1	1963649	KIT - GASKET,REPAIR,PUC,R2
1	1964134	KIT-PUC MECH SEAL REPLACEMENT

Table 3-11: Kit 1963499 - PUC Clutch Replacement

Qty	Pierce PN	Description
2	1787908	BEARING, BALL, 6010
2	1787909	BEARING, BALL, 308S
1	1787911	BEARING, BALL, 308SF
4	1787936	FHSCS, .375, 16 X 0.88, GR8
1	1787956	LOCKWASHER - BRG, WO8SPL
1	1787959	O-RING - 0.562 x 0.750 x 0.09
1	1788036	O-RING - 7.50 x 7.75 x 0.12
1	1788123	PIN, COTTER, .125 X 1.5, SST
2	1788132	SEAL RING, PS
1	1963586	BEARING,BALL,NSK 6310NR-C3
1	1963598	O-RING, 3.75 x 3.94 x 0.09
1	1963602	O-RING - 7.00 x 7.25 x 0.12
1	1963649	KIT-GASKET,REPAIR,PUC,R2
1	1964134	KIT-PUC MECH SEAL REPLACEMENT

Table 3-12: Kit 1964139 - PUC Impeller, Minor Repair

Qty	Pierce PN	Description
1	1788123	PIN, COTTER, .125 X 1.5, SST
2	1788132	SEAL RING, PS
1	1963649	KIT-GASKET,REPAIR,PUC,R2
1	1964134	KIT-PUC MECH SEAL REPLACEMENT

Table 3-13: Kit 1964151 - PUC Impeller, Major Repair

Qty	Pierce PN	Description
2	1787908	BEARING, BALL, 6010
2	1787909	BEARING, BALL
1	1787911	BEARING, BALL, 308SF
4	1787936	FHSCS, .375, 16 X 0.88, GR8
1	1787956	LOCKWASHER - BRG, WO8SPL
1	1788102	IMPELLER,PS1500,LH
1	1788123	PIN, COTTER, .125 X 1.5, SST
2	1788132	SEAL RING, PS
1	1963472	NUT FLANGE 7/8-14
1	1963586	BEARING,BALL,NSK 6310NR-C3
1	1963649	KIT - GASKET,REPAIR,PUC,R2
1	1964134	KIT-PUC MECH SEAL REPLACEMENT

Table 3-14: Recommended Spare Parts List

Qty	Pierce PN	Description	Notes*
2	1777990	ELEMENT, FILTER	
2	1787908	BEARING - BALL 6010	A
2	1787909	BEARING - BALL 308S	A
1	1787911	BEARING - BALL 308SF	A
4	1787936	FHSCS - .375-16 X 0.88 GR8	A
1	1787937	FILTER LUBE PUMP, 100 MESH	
2	1787954	KEY - SQ 0.38 X 3.00	
1	1787955	LOCKNUT BEARING, NO8SPL	
1	1787956	LOCKWASHER BRG WO8SPL	
1	1788043	SENSOR - TACH ENCAPSULATED	
1	1788049	PLUG MAGNETIC 3/4-16UNF	
1	1788103	NUT CASTLE 1.14, 303	
1	1788123	PIN, COTTER 0.125 X 1.5 SST	A
1	1788130	SCREEN STRAINER	
2	1788132	SEAL RING - PS	A
1	1788138	WASHER - IMPELLER	
2	1797090	ANODE, DARLEY, THREADED	
1	1915175	PUC TRANS/DRIVE OIL	
2	1933897	SCREEN, SUCTION, 6"	
1	1963472	NUT FLANGE 7/8-14	
1	1963586	BEARING,BALL,NSK 6310NR-C3	A
2	1963649	KIT - GASKET, REPAIR, PUC, R2	J
1	1964134	KIT - MECHANICAL SEAL REPLACMT	A

** See “Notes & Kit Cross-References” at the end of this Service Group for detailed information*

Table 3-15: Recommended Spare Parts List - Optional Items

Qty	Pierce PN	Description	Notes*
1	1787923	COMP FLANGE - 1350/1410, 1.5-10	
1	1787934	CUP - CLUTCH DRIVE	D
1	1787943	GEAR - DRIVE, 51T 6/8DP, SPUR	
1	1787944	GEAR - DRIVE, 8DP, LH HELIX	
1	1787946	GEAR - PINION, 8DP, RH HELIX	
1	1788054	PUMP - HYD, INTERNAL GEAR	
1	1788060	SHAFT - INPUT	
1	1788066	SPRING CARTRIDGE - OIL PUMP	
1	1788076	KIT, SHAFT BRAKE W/ADAPTER	I
1	1788098	HOUSING - MECHANICAL SEAL, PS	
1	1788102	IMPELLER,PS1500,LH	E
1	1963449	CLUTCH,12VDC,PUC,R2	D
1	1963589	SHAFT,IMPELLER,PUC,R2	
1	1963612	SHIM, COIL, .030	D
1	1963614	SHIM, COIL, .010	D

** See "Notes & Kit Cross-References" at the end of this Service Group for detailed information*

a. Notes & Kit Cross-References

A = Part of Kits - 1963498, 1964151

B = Part of Kit - 1964151

C = Part of Kits - 1963498, 1964139, 1964151

D = Part of Kits - 1964139, 1964151

E = Part of Kits - 1963498, 1963499, 1964151

F = Part of Kits - 1963498, 1963499

G = Part of Kit - 1963498

H = Part of Kit - 1963499

I = See Figures 8 & 9 for additional parts breakdown

J = Part of Kits 1963498, 1963499, 1964139, 1964151

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