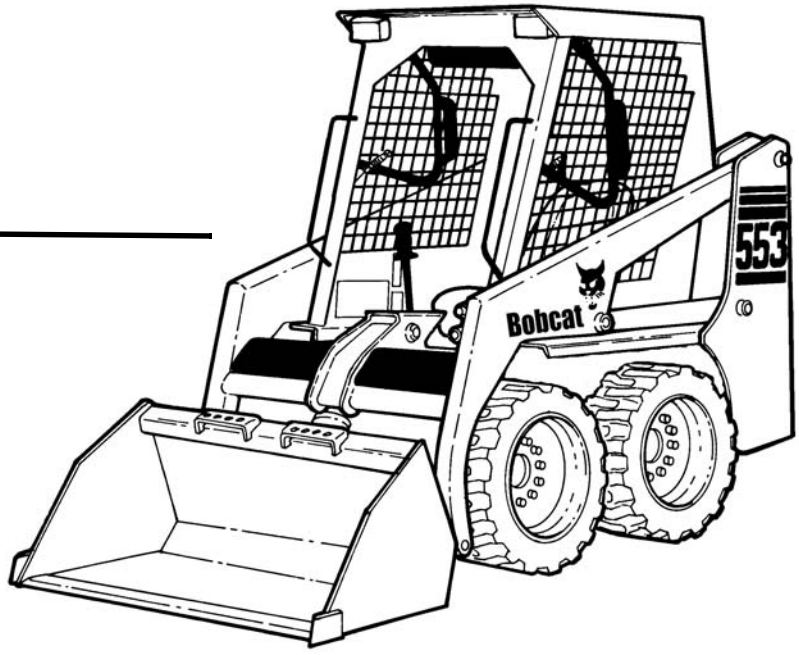
553

Bobcat®

Service Manual

S/N 528011001 & Above
S/N 528111001 & Above



EQUIPPED WITH BOBCAT INTERLOCK CONTROL SYSTEM (BICS™)

6903125 (2-06)

Ingersoll Rand
Compact Vehicle Technologies

Printed in U.S.A.

SAFETY INSTRUCTIONS

Safety Alert Symbol

This symbol with a warning statement means: "Warning, be alert! Your safety is involved!" Carefully read the message that follows.

WARNING

Instructions are necessary before operating or servicing machine. Read and understand the Operation & Maintenance Manual, Operator's Handbook and signs (decals) on machine. Follow warnings and instructions in the manuals when making repairs, adjustments or servicing. Check for correct function after adjustments, repairs or service. Untrained operators and failure to follow instructions can cause injury or death.

W-2003-0903

WARNING

Warnings on the machine and in the manuals are for your safety. Failure to obey warnings can cause injury or death.

W-2044-1285

IMPORTANT

This notice identifies procedures which must be followed to avoid damage to the machine.

I-2019-0284

The following publications provide information on the safe use and maintenance of the Bobcat machine and attachments:

- The Delivery Report is used to assure that complete instructions have been given to the new owner and that the machine is in safe operating condition.
- The Operation & Maintenance Manual delivered with the machine or attachment contains operating information as well as routine maintenance and service procedures. It is a part of the machine and can be stored in a container provided on the machine. Replacement Operation & Maintenance Manuals can be ordered from your Bobcat dealer.
- Machine signs (decals) instruct on the safe operation and care of your Bobcat machine or attachment. The signs and their locations are shown in the Operation & Maintenance Manual. Replacement signs are available from your Bobcat dealer.
- An Operator's Handbook fastened to the operator cab. It's brief instructions are convenient to the operator. The handbook is available from your dealer in an English edition or one of many other languages. See your Bobcat dealer for more information on translated versions.
- The AEM Safety Manual delivered with the machine gives general safety information.
- The Service Manual and Parts Manual are available from your dealer for use by mechanics to do shop-type service and repair work.
- The Skid-Steer Loader Operator Training Course is available through your local dealer or at **www.training.bobcat.com** or **www.bobcat.com**. This course is intended to provide rules and practices of correct operation of the Skid-Steer Loader. The course is available in English and Spanish versions.
- Service Safety Training Courses are available from your Bobcat dealer or at **www.training.bobcat.com** or **www.bobcat.com**. They provide information for safe and correct service procedures.
- The Skid-Steer Loader Safety Video is available from your Bobcat dealer or at **www.training.bobcat.com** or **www.bobcat.com**.

LIFTING AND BLOCKING THE LOADER

Figure 10-10-1

⚠ WARNING

Instructions are necessary before operating or servicing machine. Read and understand the Operation & Maintenance Manual, Handbook and signs (decals) on machine. Follow warnings and instructions in the manuals when making repairs, adjustments or servicing. Check for correct function after adjustments, repairs or service. Untrained operators and failure to follow instructions can cause injury or death.

W-2003-0199

Procedure

Always park the loader on a level surface.

⚠ WARNING

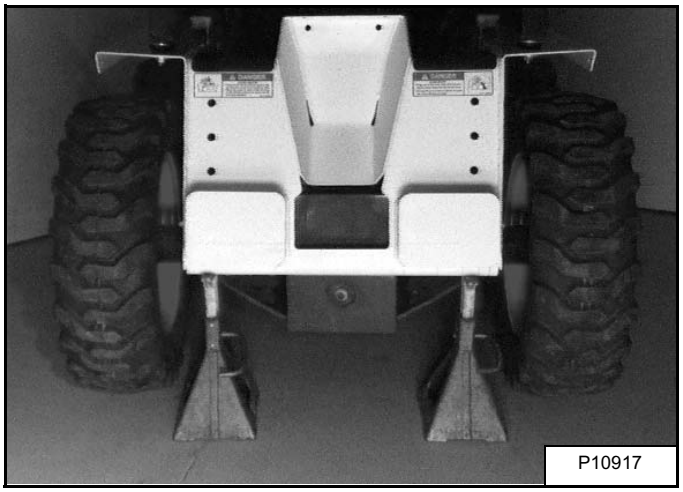
Put jackstands under the front axles and rear corners of the frame before running the engine for service. Failure to use jackstands can allow the machine to fall or move and cause injury or death.

W-2017-0286

Figure 10-10-2

Lift the rear of the loader and install jackstands **[Figure 10-10-2]**.

Figure 10-10-3



Lift the front of the loader and put jackstands under the loader frame **[Figure 10-10-3]**.

NOTE: Make sure the jackstands do not touch the tires.

TRANSPORTING THE BOBCAT LOADER

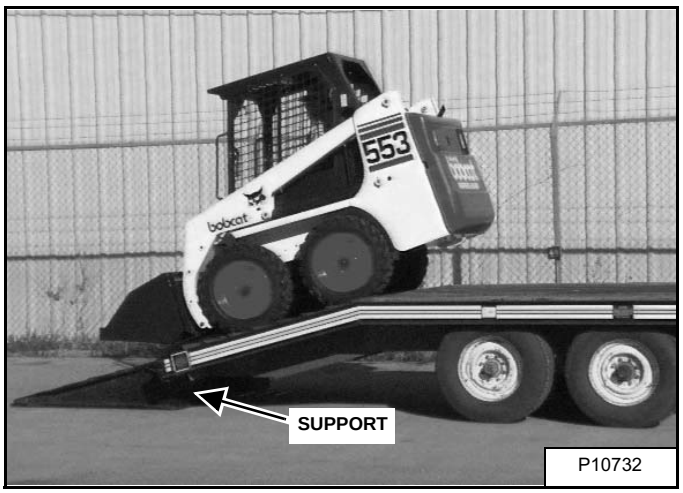
Procedure

⚠ WARNING

Adequately designed ramps of sufficient strength are needed to support the weight of the machine when loading onto a transport vehicle. Wood ramps can break and cause personal injury.

W-2058-0494

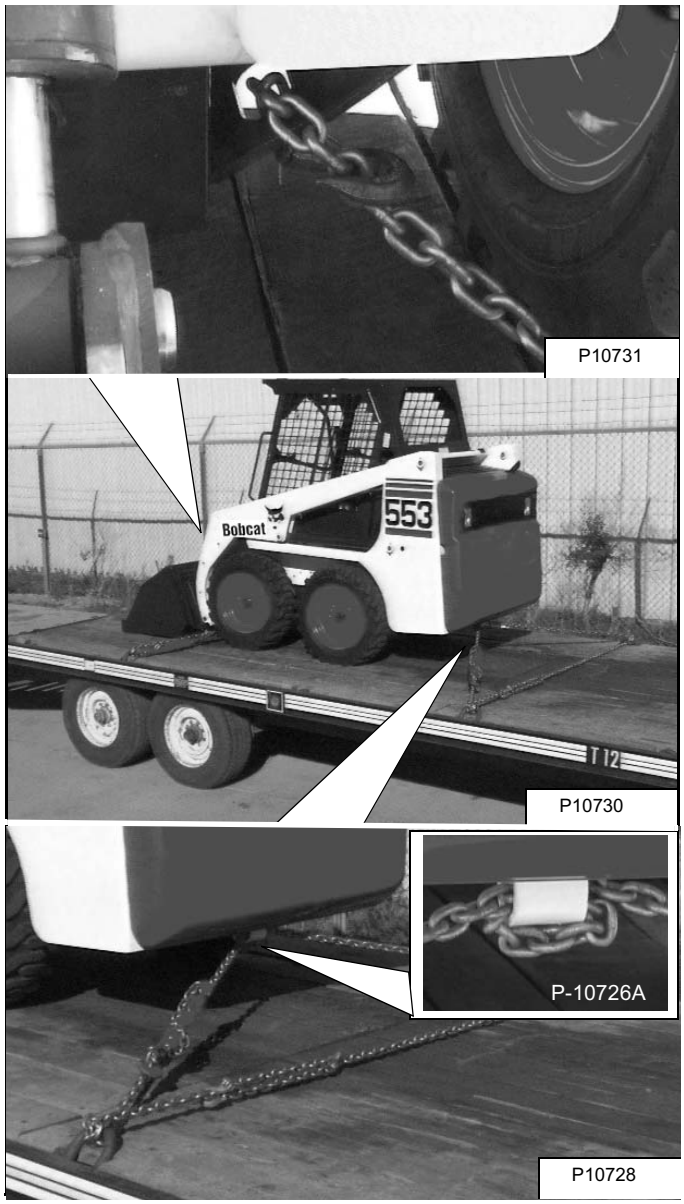
Figure 10-40-1



A loader with an empty bucket or no attachment must be loaded backward onto the transport vehicle **[Figure 10-40-1]**.

The rear of the trailer must be blocked or supported **[Figure 10-40-1]** when loading or unloading the loader to prevent the front end of the trailer from raising up.

Figure 10-40-2



Use the following procedure to fasten the Bobcat loader to the transport vehicle to prevent the loader from moving during sudden stops or when going up or down slopes **[Figure 10-40-2]**.

- Lower the bucket or attachment to the floor.
- Stop the engine.
- Engage the parking brake.
- Install chains at the front and rear loader tie down positions (Inset) **[Figure 10-40-2]**.

Stopping The Bobcat Loader

When the steering levers are moved to the neytral position, the hydrostatic transmission will act as a *service brake* and stop the loader.

Cleaning The Cooling System

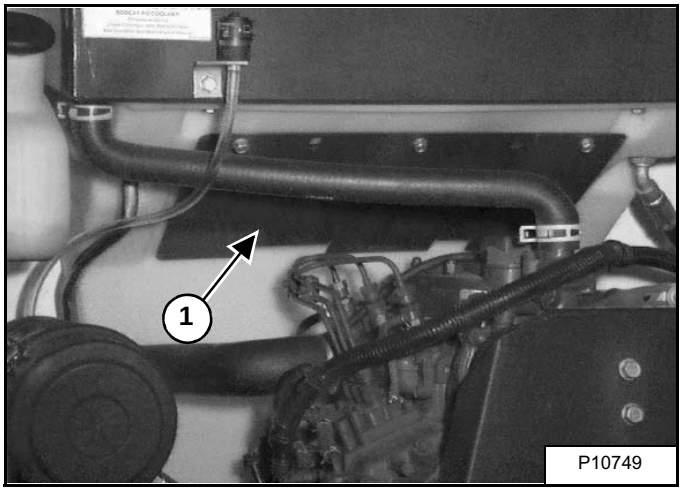
⚠ WARNING

Wear safety glasses to prevent eye injury when any of the following conditions exist:

- **When fluids are under pressure.**
- **Flying debris or loose material is present.**
- **Engine is running.**
- **Tools are being used.**

W-2019-1285

Figure 10-90-1



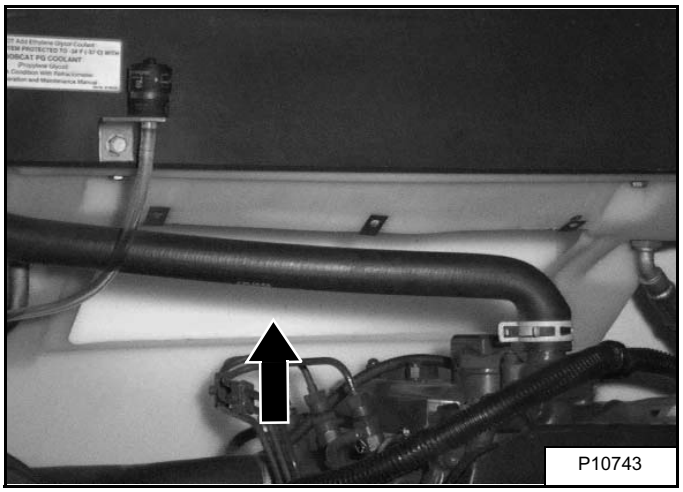
Check the cooling system every day to prevent overheating, loss of performance or engine damage.

Open the rear door.

Remove the access panel from the blower housing (Item 1) **[Figure 10-90-1]**.

Remove the rear grill. (See Removal And Installation Page 50-60-1.)

Figure 10-90-2



Use air pressure or water pressure to remove the debris in the area of the radiator and oil cooler **[Figure 10-90-2]**.

Install the rear grill and close the rear door.

HYDRAULIC/HYDROSTATIC SYSTEM

Description

The hydraulic and hydrostatic systems use the same hydraulic fluid reservoir.

The system has an engine driven pump that supplies fluid to the control valve, lift and tilt cylinders.

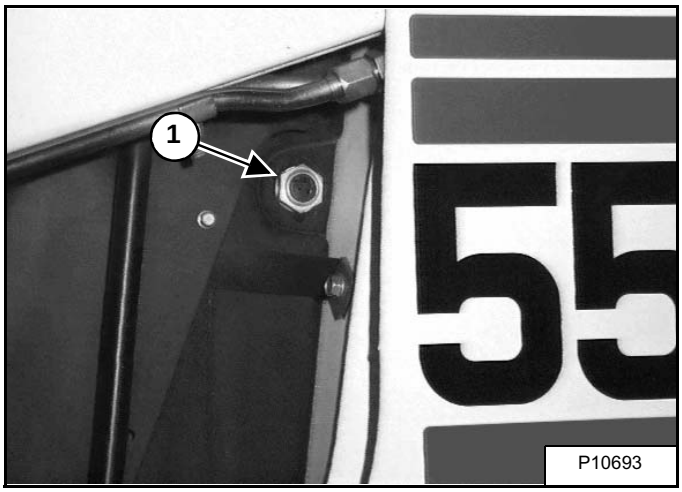
Fluid also goes from the control valve to the hydrostatic transmission pumps to provide charge pressure and cooling.

A filter is installed on the right side of the engine compartment. This filter cleans the fluid for the hydrostatic transmission.

The oil cooler is under the radiator. The oil cooler cools the hydraulic fluid before it returns to the hydrostatic pump.

Checking And Adding Fluid

Figure 10-120-1



Use only recommended fluid in the hydraulic/hydrostatic system. (See Hydraulic System on Page SPCE-10-3.)

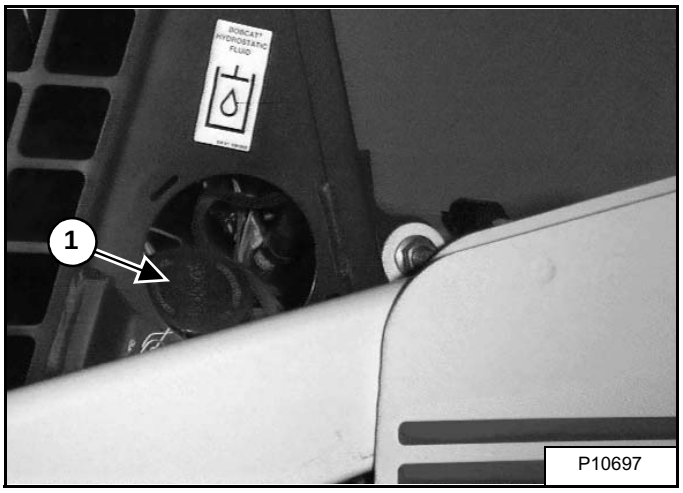
Put the loader on a level surface.

Lower the lift arms and put the attachment flat on the ground.

Stop the engine.

Hydraulic fluid must show in the sight gauge (Item 1) **[Figure 10-120-1]**.

Figure 10-120-2



Remove the filler cap (Item 1) **[Figure 10-120-2]**.

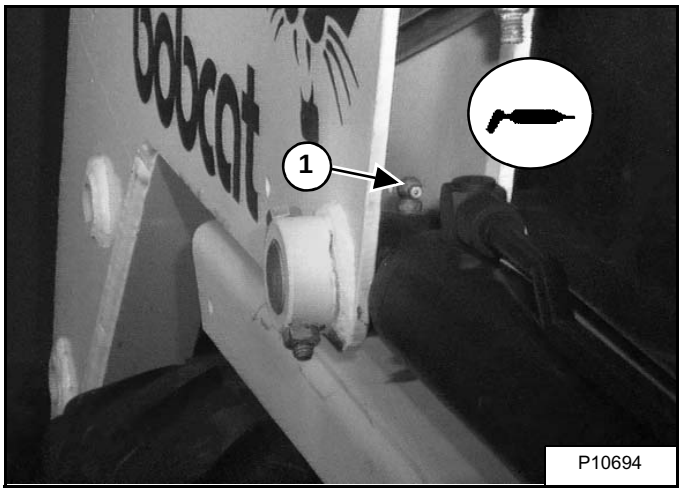
Add fluid to the reservoir until it shows in the sight gauge **[Figure 10-120-1]**.

Install the filler cap **[Figure 10-120-2]**.

LUBRICATION OF THE BOBCAT LOADER

Procedure

Figure 10-160-1



Lubricate the loader as specified in the *SERVICE SCHEDULE*, Contents Page 10-01, for the best performance of the loader.

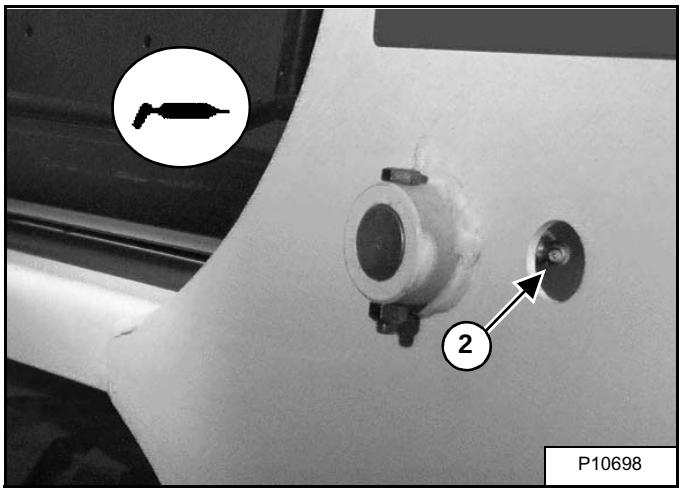
Record the operating hours each time you lubricate the Bobcat loader.

Always use a good quality lithium based multi-purpose grease when you lubricate the loader. Apply lubricant until extra grease shows.

Lubricate the following locations on the loader:

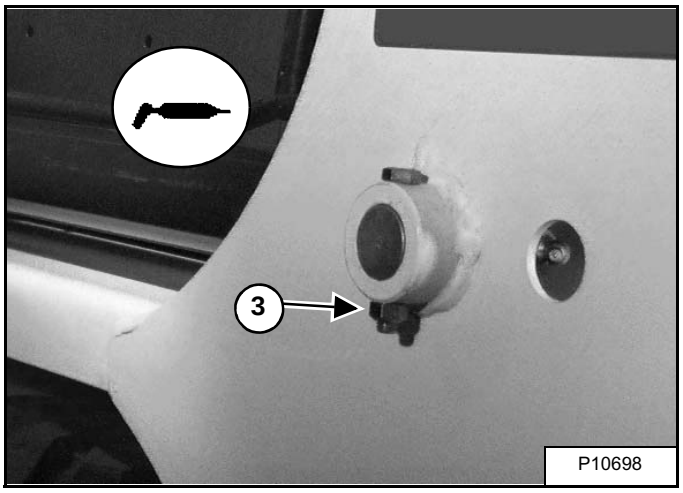
1. Rod End Lift Cylinder (Both Sides) **[Figure 10-160-1]**.

Figure 10-160-2



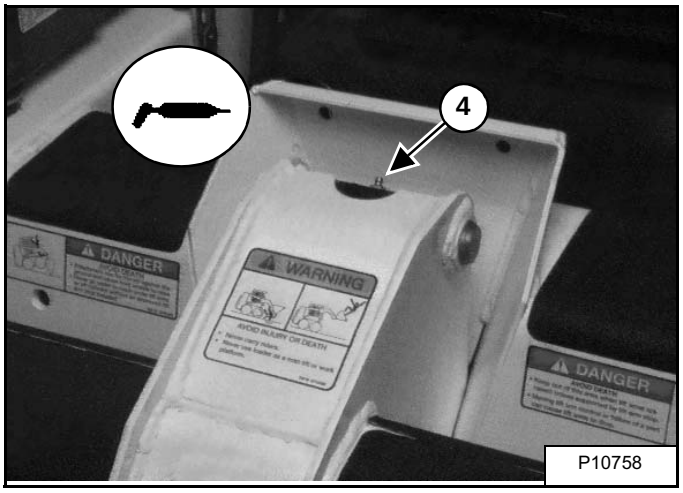
2. Base End Lift Cylinder (Both Sides) **[Figure 10-160-2]**.

Figure 10-160-3



3. Lift Arm Pivot Pin (Both Sides) **[Figure 10-160-3]**

Figure 10-160-4

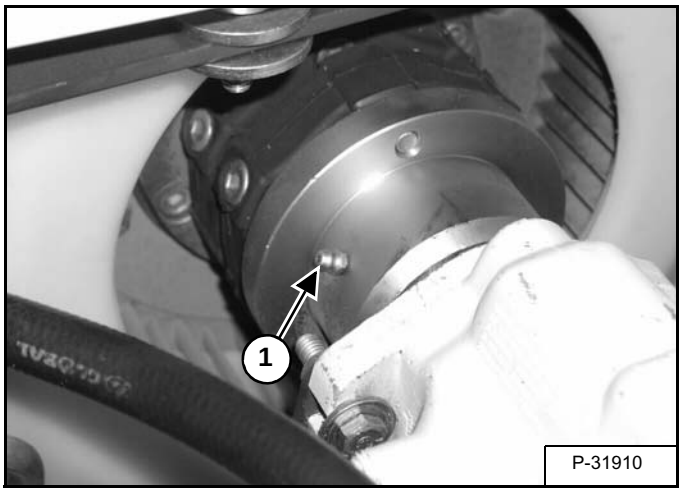


4. Base End Tilt Cylinder (Both Sides) **[Figure 10-160-4]**.

RUBBER COUPLER LUBRICATION

Procedure

Figure 10-210-1



(See SERVICE SCHEDULE on Page 10-70-1), for the correct service interval to lubricate the rubber coupler grease fitting (Item 1) **[Figure 10-210-1]**.

Raise the operator cab. (See Raising The Operator Cab on Page 10-30-1.)

Use the special U-joint grease (P/N 6599719) for correct lubrication for the U-joint.

Lower the operator cab. (See Lowering The Operator Cab on Page 10-30-2.)

IMPORTANT

When repairing hydrostatic and hydraulic systems, clean the work area before disassembly and keep all parts clean. Always use caps and plugs on hoses, tubelines and ports to keep dirt out. Dirt can quickly damage the system.

I-2003-0888

Tighten Procedures

For tightening torques for hydraulic fittings, tubelines etc., (See HYDRAULIC CONNECTION SPECIFICATIONS on Page SPEC-40-1.)

Troubleshooting Chart

The following troubleshooting chart is provided for assistance in locating and correcting problems which are most common. Many of the recommended procedures must be done by authorized Bobcat Service Personnel only.

⚠ WARNING

Check for correct function after adjustments, repairs or service. Failure to make correct repairs or adjustments can cause injury or death.

W-2004-1285

PROBLEM	CAUSE
The hydraulic system will not operate.	1, 2, 3, 5, 8
The transmission warning light comes ON when hydraulics are operating.	1, 3,
Slow hydraulic system action.	1, 3, 4, 6, 8
Hydraulic action is not smooth.	1, 4, 5, 6, 7
Lift arms go up slowly at full engine RPM.	1, 3, 4, 5, 6, 7, 8, 9
The lift arms or Bob-Tach will move when the pedal is in neutral position.	4
The lift arms come down with the pedal in the neutral position.	4, 9, 10, 11

KEY TO CORRECT THE CAUSE
1. The fluid level is not correct.
2. The pedal linkage is disconnected.
3. The hydraulic pump has damage.
4. The pedal linkage is not adjusted correctly.
5. Relief valve is not at the correct pressure.
6. Suction leak on the inlet side of the hydraulic pump.
7. Fluid is cold. Wrong viscosity fluid. (See LOADER SPECIFICATIONS on Page SPEC-10-1.)
8. Using the loader for more than its rated capacity.
9. Internal leak in the lift cylinder(s).
10. External leak from the lift cylinder(s).
11. Damaged lift spool.

CYLINDER (TILT)

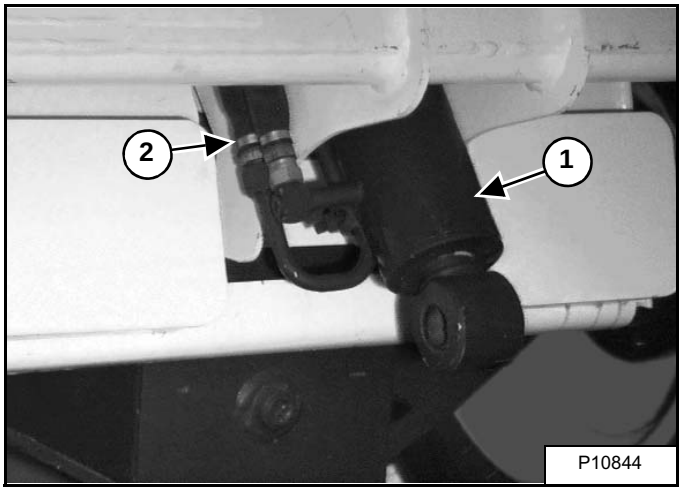
Checking

WARNING

Hydraulic fluid escaping under pressure can have sufficient force to enter a person's body by penetrating the skin. This can cause serious injury and possible death if proper medical treatment by a physician familiar with this injury is not received immediately.

W-2145-0290

Figure 20-21-1



Remove the attachment from the Bob-Tach.

Retract the tilt cylinder (Item 1) **[Figure 20-21-1]**.

NOTE: The Bob-Tach is disconnected from the tilt cylinder for photo clarity purposes only.

Stop the engine and raise the seat bar.

Disconnect the hose (Item 2) **[Figure 20-21-1]** from the base end of the tilt cylinder.

Install a plug in the hose and tighten the plug.

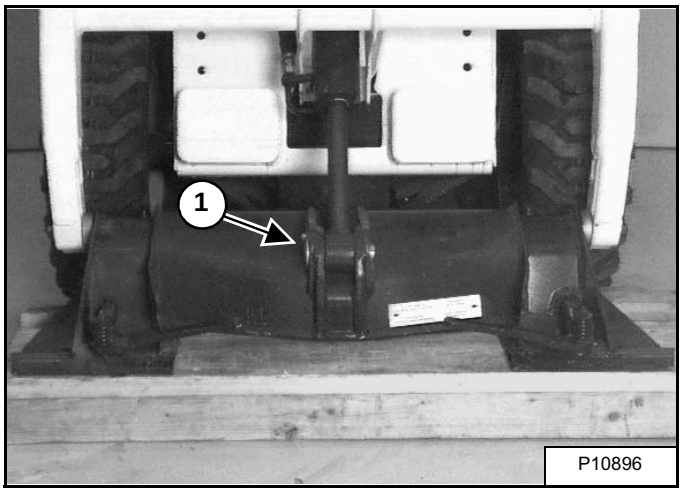
Lower the seat bar and start the engine, be sure the parking brake is engaged.

Push the bottom (heel) of the tilt pedal.

If there is leakage from the open port of the tilt cylinder, remove the cylinder for repair. (See Page 20-21-1.)

Removal And Installation

Figure 20-21-2



Remove the attachment from the Bob-Tach.

Roll the Bob-Tach fully out with the lift arms slightly raised.

Stop the engine.

Pull up on the lift arm by-pass and lower the Bob-Tach onto blocks **[Figure 20-21-2]**.

Raise the seat bar.

Place jackstands under the rear of the loader. (See Procedure on Page 10-10-1.)

Remove the retainer bolt (Item 1) **[Figure 20-21-2]** and nut from the tilt cylinder rod end pivot pin.

Installation: Tighten the retainer bolt and nut to 18-20 ft.-lbs. (24-27 Nm) torque.

HYDRAULIC CONTROL VALVE

Removal And Installation

WARNING

Never work on a machine with the lift arms up unless the lift arms are secured by an approved lift arm support device. Failure to use an approved lift arm support device can allow the lift arms or attachment to fall and cause injury or death.

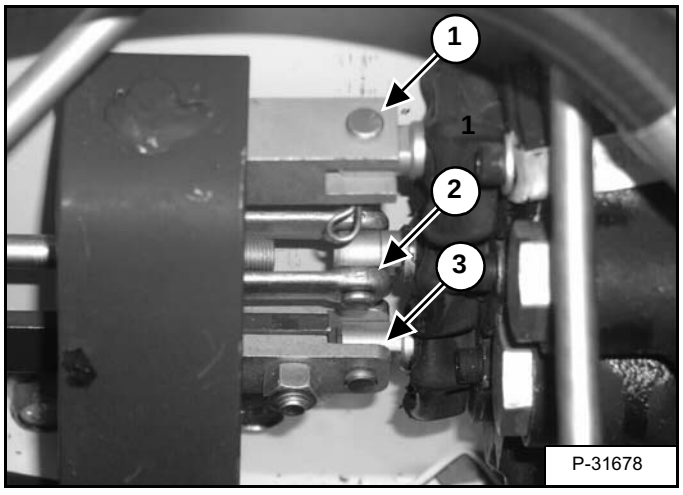
W-2059-0598

IMPORTANT

When repairing hydrostatic and hydraulic systems, clean the work area before disassembly and keep all parts clean. Always use caps and plugs on hoses, tubelines and ports to keep dirt out. Dirt can quickly damage the system.

I-2003-0888

Figure 20-40-1



Lift and block the loader. ((See Procedure on Page 10-10-1.)

Raise the lift arms and install an approved lift arm support device (See Installing Lift Arm Support Device on Page 10-20-1.)

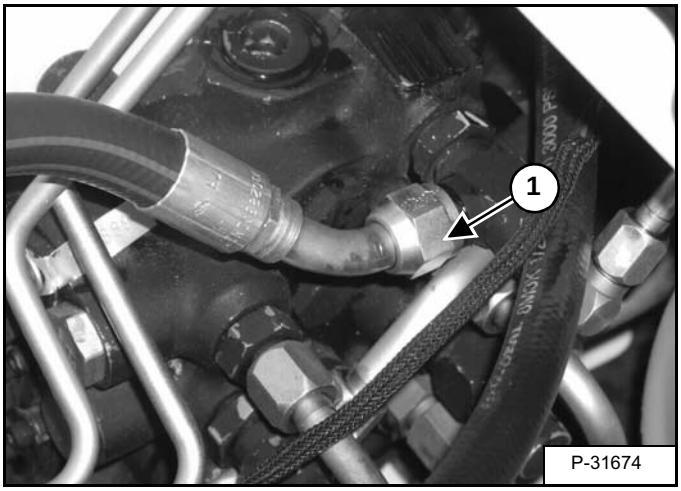
Pull up on the lift arm bypass control and move the lift pedal to release the hydraulic pressure. Raise the seat bar.

Raise the operator cab. (See Raising The Operator Cab on Page 10-30-1.)

Thoroughly clean the control valve area.

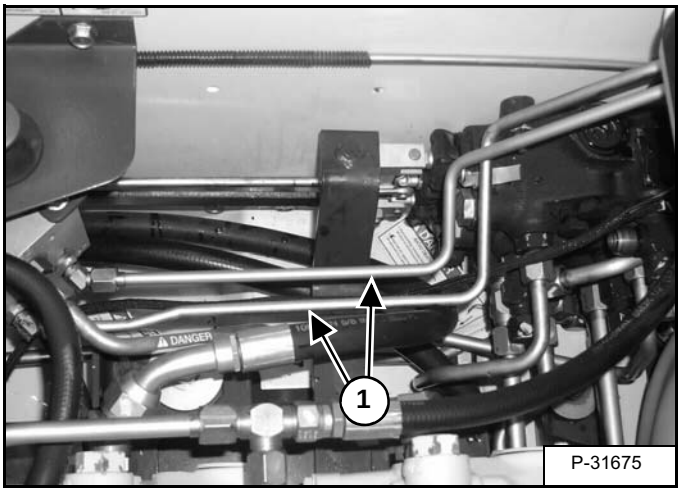
Disconnect the lift (Item 1) **[Figure 20-40-1]**, tilt (Item 2) **[Figure 20-40-1]** and auxiliary spool (Item 3) **[Figure 20-40-1]** linkages from the control valve.

Figure 20-40-2



Disconnect the control valve inlet hose (Item 1) **[Figure 20-40-2]** which comes from the hydraulic pump.

Figure 20-40-3



Disconnect and remove the two tubelines (Item 1) **[Figure 20-40-3]** that are routed over the control valve which come from the lift lock valve.

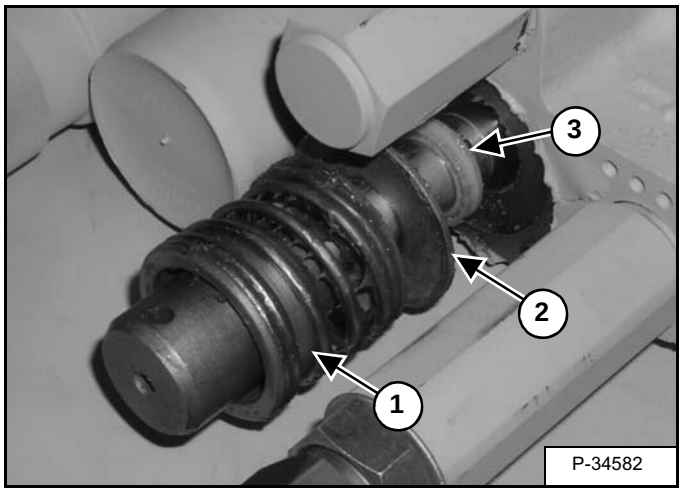
Lift Spool Detent (Cont'd)

IMPORTANT

The detent assembly has small springs and balls. Do not lose these parts during disassembly and assembly.

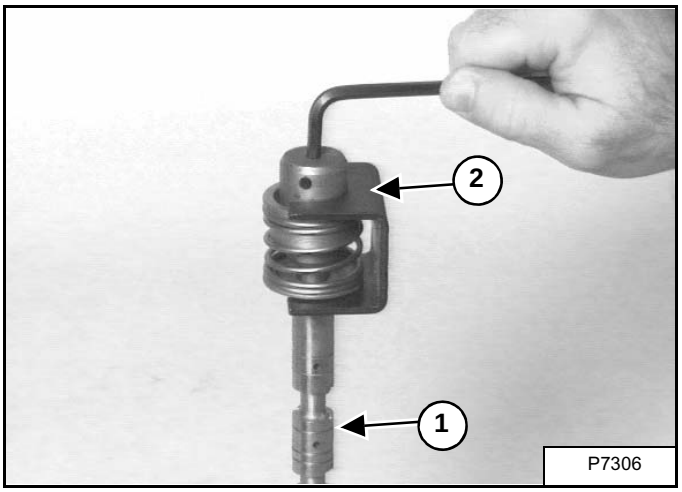
I-2012-0284

Figure 20-40-33



Remove the spool assembly (Item 1) **[Figure 20-40-33]** back-up washer (Item 2) **[Figure 20-40-33]**, and spool seal (Item 3) [**[Figure 20-40-33]** from the control valve.

Figure 20-40-34

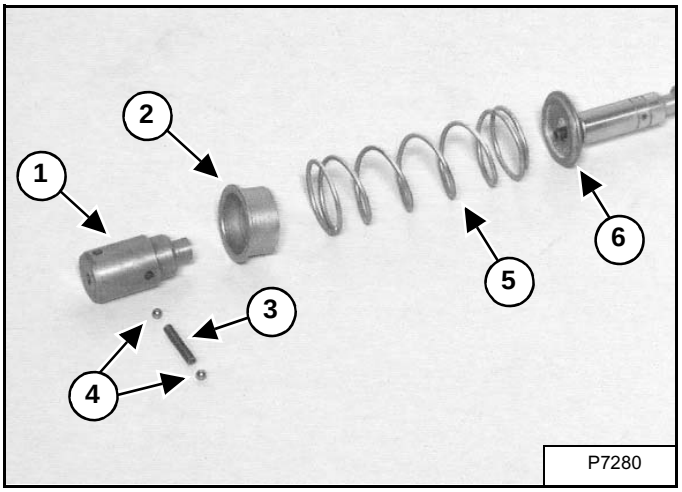


Put the linkage end of the spool assembly (Item 1) **[Figure 20-40-34]** in a vise.

Install MEL1285 Spring Compressor Tool (Item 2) **[Figure 20-40-34]** on the spring assembly.

Loosen the detent adapter **[Figure 20-40-34]**.

Figure 20-40-35



Wrap a clean rag around the assembled detent adapter (Item 1) **[Figure 20-40-35]** and adapter retainer (Item 2) **[Figure 20-40-35]**.

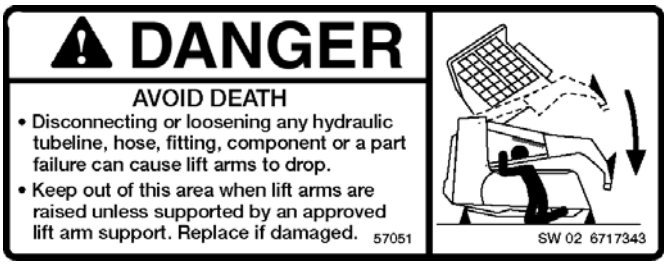
Remove the detent adapter (Item 1) **[Figure 20-40-35]** from the adapter retainer (Item 2) **[Figure 20-40-35]**.

Remove the detent spring (Item 3) **[Figure 20-40-35]** and detent balls (Item 4) **[Figure 20-40-35]**.

Remove the centering spring (Item 5) **[Figure 20-40-35]** and end cap (Item 6) **[Figure 20-40-35]** from the spool.

TILT LOCK VALVE

Removal And Installation

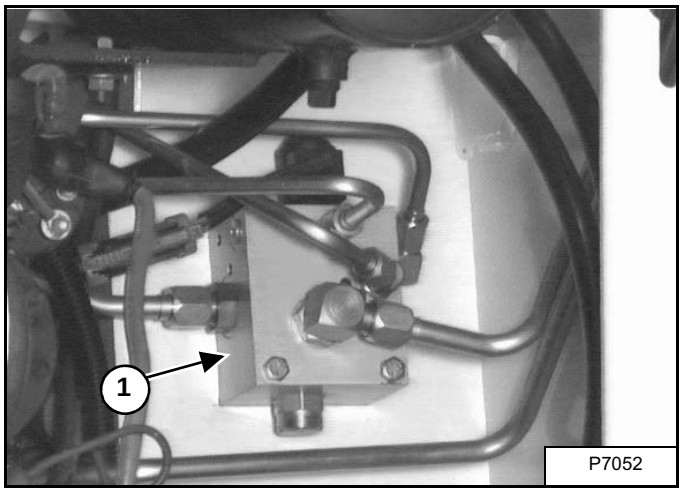


WARNING

Never work on a machine with the lift arms up unless the lift arms are secured by an approved lift arm support device. Failure to use an approved lift arm support device can allow the lift arms or attachment to fall and cause injury or death.

W-2059-0598

Figure 20-51-1



Place jackstands under the rear corners of the loader. (See Procedure on Page 10-10-1.)

Raise the loader lift arms and install an approved lift arm support device.(See Installing Lift Arm Support Device on Page 10-20-1.)

Raise the operator cab.(See Raising The Operator Cab on Page 10-30-1.)

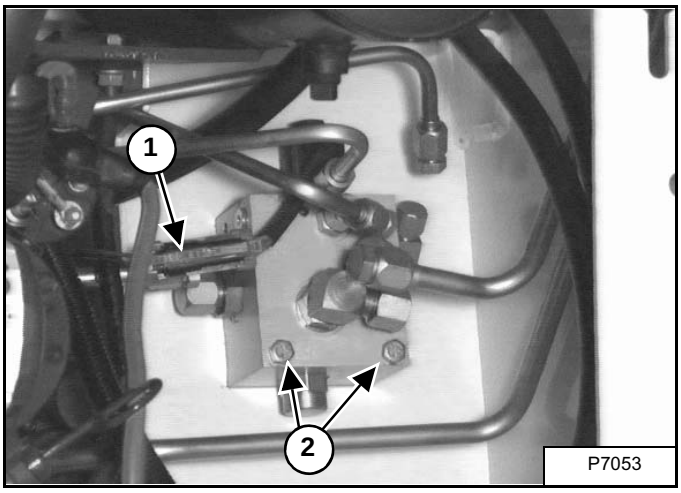
Drain the hydraulic fluid reservoir.(See Replacing Hydraulic Fluid on Page 10-120-2.)

Remove the battery from the loader. (See Removal And Installation on Page 60-20-1.)

The tilt lock valve (Item 1) **[Figure 20-51-1]** is located at the engine compartment on the right side of the loader frame.

Disconnect the five tubelines connected to the tilt lock valve **[Figure 20-51-1]** .

Figure 20-51-2



Remove the Do Not Modify sta-strap (P/N 6665527) from the electric solenoid connector (Item 1) **[Figure 20-51-2]**.

Installation: Install a new Do Not Modify sta-strap (P/N 6665527) on the electric solenoid connector (Item 1) **[Figure 20-51-2]**.

Disconnect the solenoid connector (Item 1) **[Figure 20-51-2]**.

Remove the two mounting bolts (Item 2) **[Figure 20-51-2]** and nuts from the tilt lock valve.

Installation: Tighten the two mounting bolts to 180-200 in.-lbs. (21-23 Nm) torque.

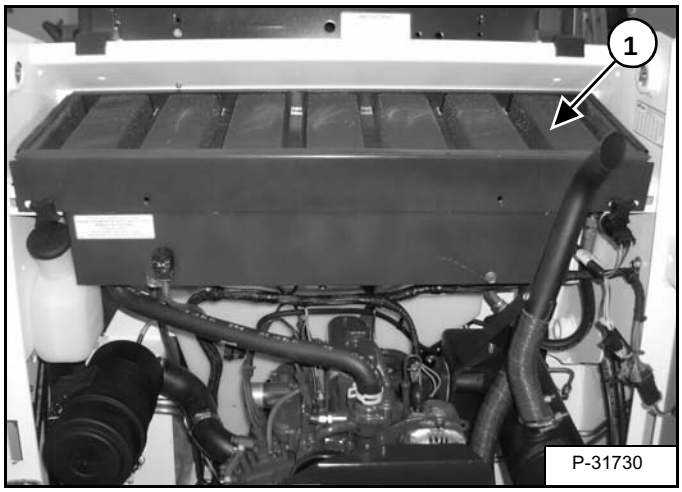
Remove the tilt lock valve.

Reverse the removal procedure to install the tilt lock valve.

HYDRAULIC FILTER HOUSING

Removal and Installation

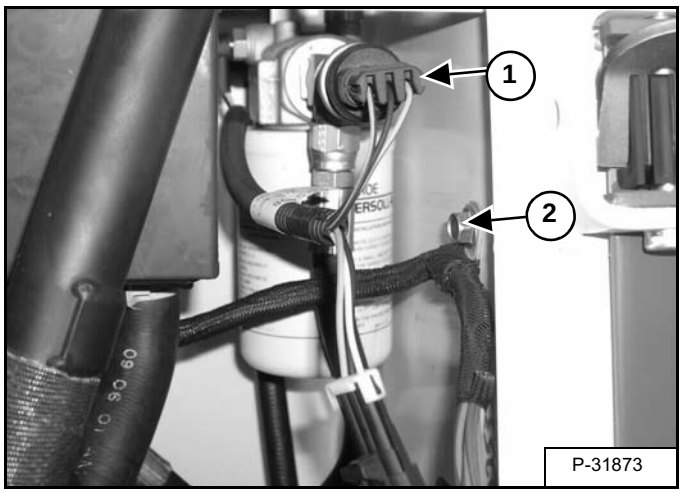
Figure 20-70-1



Stop the engine and open the rear door.

Remove the rear grill (Item 1) **[Figure 20-70-1]**. (See Removal And Installation on Page 50-60-1.)

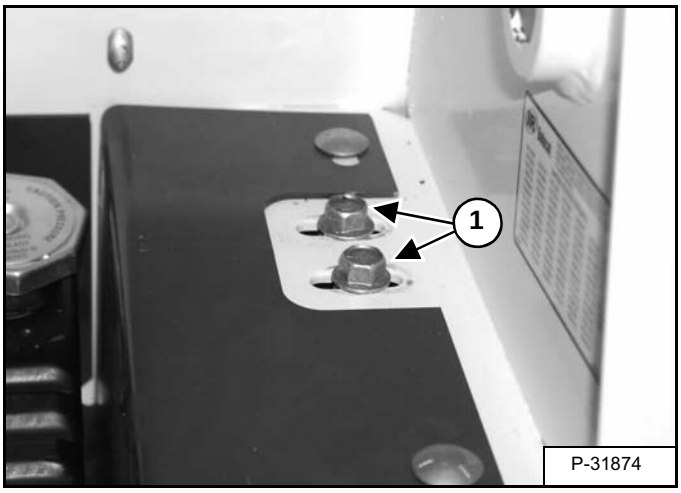
Figure 20-70-2



Disconnect the wires from the charge pressure switch (Item 1) **[Figure 20-70-2]**.

Remove the mounting bolt (Item 2) **[Figure 20-70-2]** holding the loader wiring harness clip and lower the harness.

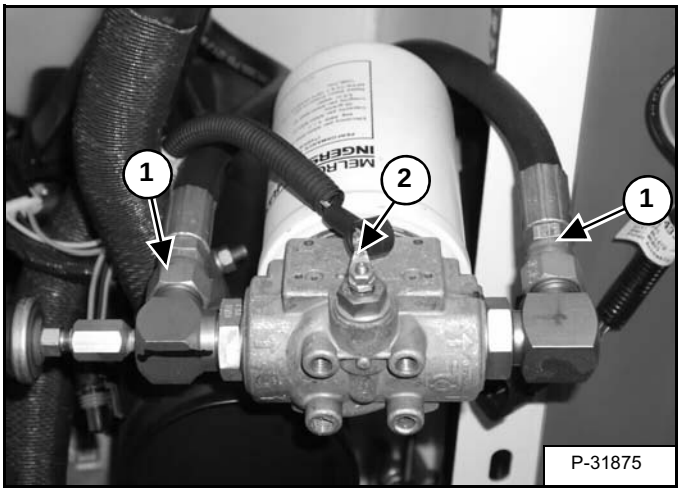
Figure 20-70-3



Remove the two mounting bolts (Item 1) **[Figure 20-70-3]** from the filter housing.

Installation: Tighten the filter housing mounting bolts to 25-28 ft.-lbs. (34-38 Nm) torque.

Figure 20-70-4



Pull the filter housing (attached to the hoses) out of the rear compartment **[Figure 20-70-4]**.

Disconnect the hoses (Item 1) **[Figure 20-70-4]** from the filter housing. Disconnect the wire (Item 2) **[Figure 20-70-4]** from the differential pressure switch, and remove the filter housing.

Replace the filter housing if necessary.

Use the reverse removal procedure to install the filter housing and filter.

STEERING

Lever Removal and Installation

⚠ WARNING

Put jackstands under the front axles and rear corners of the frame before running the engine for service. Failure to use jackstands can allow the machine to fall or move and cause injury or death.

W-2017-0286

⚠ WARNING

Never work on a machine with the lift arms up unless the lift arms are secured by an approved lift arm support device. Failure to use an approved lift arm support device can allow the lift arms or attachment to fall and cause injury or death.

W-2059-0598

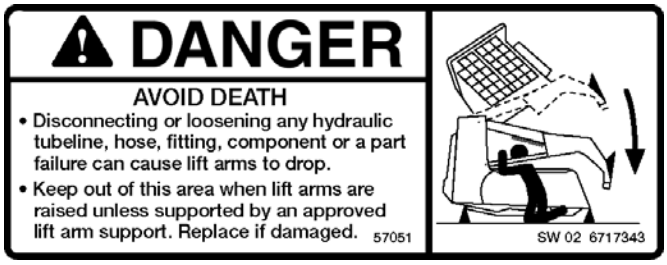
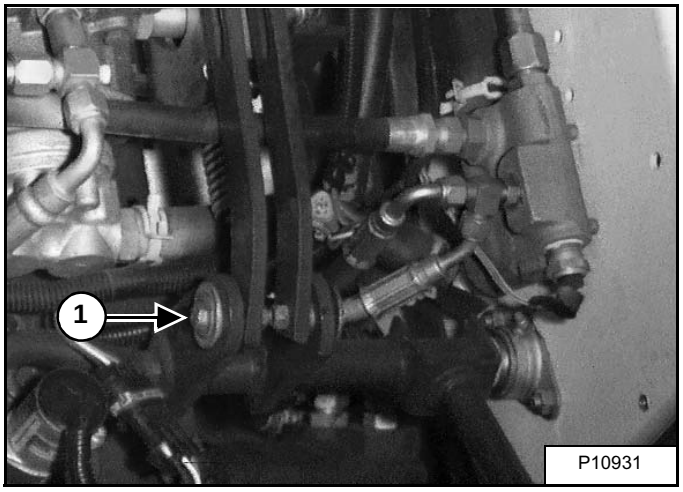


Figure 30-30-1



Lift and block the loader. (See Procedure on Page 10-10-1.)

Raise the lift arms and install an approved lift arm support device. (See Installing Lift Arm Support Device on Page 10-20-1.)

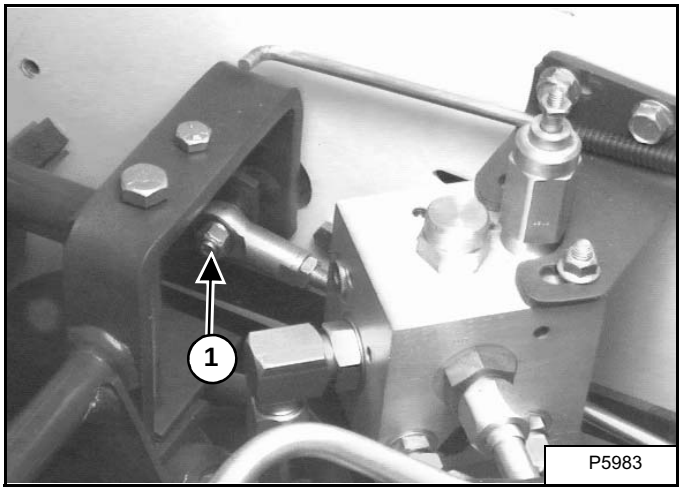
Raise the operator cab. (See Raising The Operator Cab on Page 10-30-1.)

Remove the engine speed control. (See Removal And Installation on Page 70-20-1.)

Remove the control panel from the loader. (See Removal and Installation on Page 30-20-1.)

Remove the mounting bolt (Item 1) **[Figure 30-30-1]** and nut from the steering linkage (both sides) to disconnect the linkage from the steering levers.

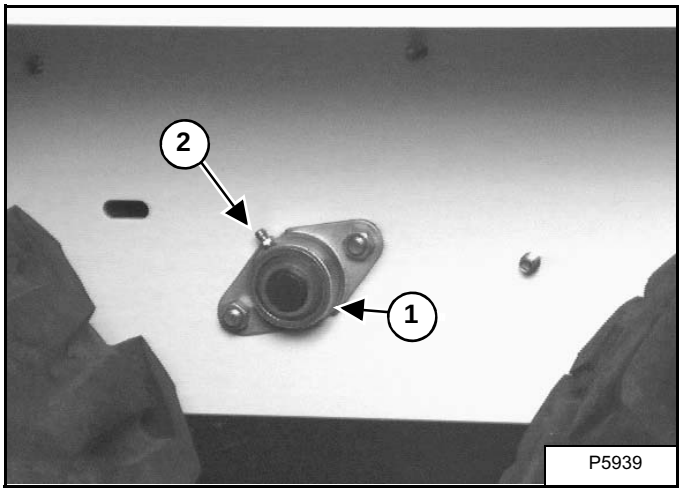
Figure 30-30-2



Disconnect the auxiliary control linkage (Item 1) **[Figure 30-30-2]** from the right steering lever.

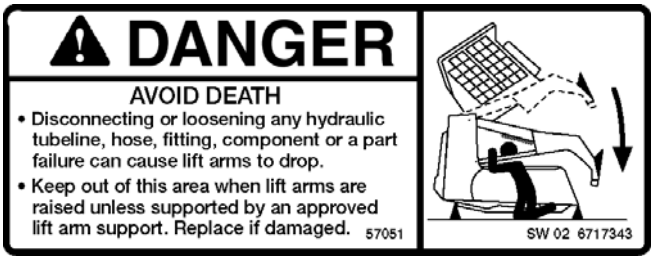
Installation: Tighten the mounting bolt to 80-90 in.-lbs. (9-10 Nm) torque.

Figure 30-30-3



HYDROSTATIC MOTOR

Removal And Installation

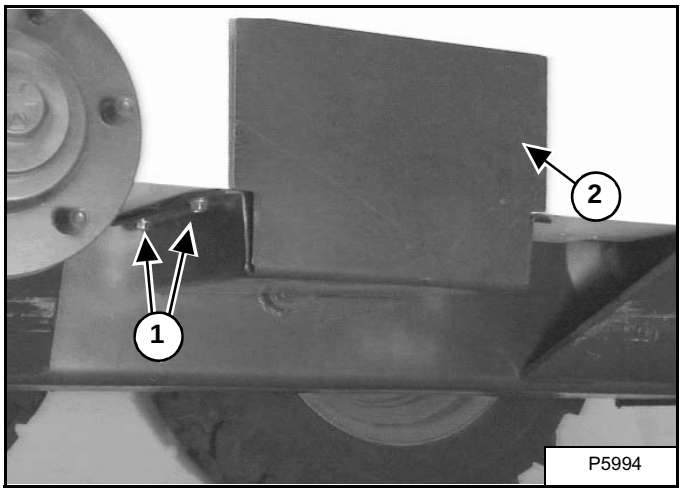


WARNING

Never work on a machine with the lift arms up unless the lift arms are secured by an approved lift arm support device. Failure to use an approved lift arm support device can allow the lift arms or attachment to fall and cause injury or death.

W-2059-0598

Figure 30-40-1



Lift and block the loader. (See Procedure on Page 10-10-1.)

Raise the lift arms and install an approved lift arm support device. (See Installing Lift Arm Support Device on Page 10-20-1.)

Raise the operator cab. (See Raising The Operator Cab on Page 10-30-1.)

Remove the front and rear wheel/tire assemblies. (See TIRE MAINTENANCE on Page 10-170-1.)

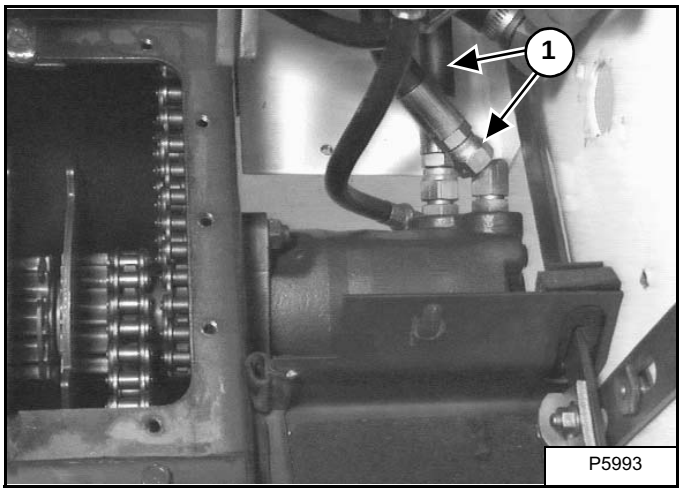
Remove the control panel. (See Removal and Installation on Page 30-20-1.)

Remove the center cover and brake solenoid.

Remove the four mounting bolts (Item 1) **[Figure 30-40-1]** from the motor cover (Item 2) **[Figure 30-40-1]** and remove the cover from the loader.

Installation: Tighten the motor cover mounting bolts to 25-28 ft.-lbs. (34-38 Nm) torque.

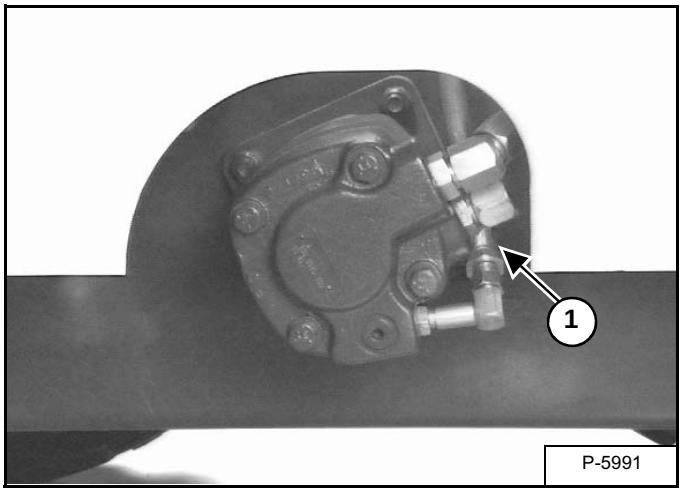
Figure 30-40-2



Mark the two drive hoses (Item 1) **[Figure 30-40-1]** to ensure correct installation.

Disconnect the two drive hoses (Item 1) **[Figure 30-40-1]** from the hydrostatic motor.

Figure 30-40-3



Disconnect the case drain hose (Item 1) **[Figure 30-40-3]** from the drive motor.

Disassembly And Assembly (Cont'd)

Figure 30-40-33

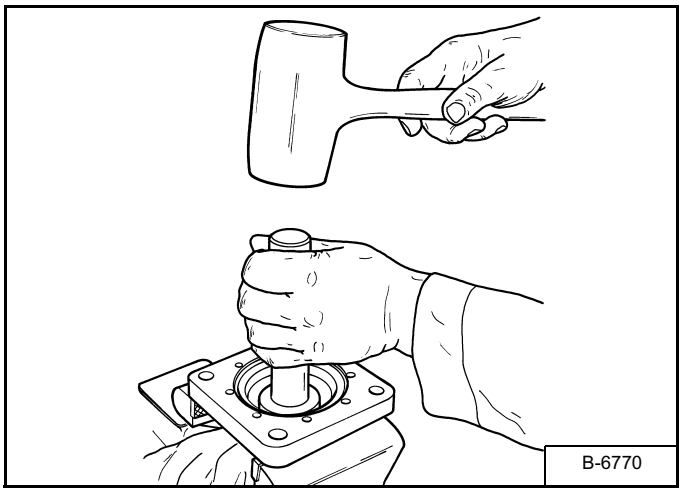
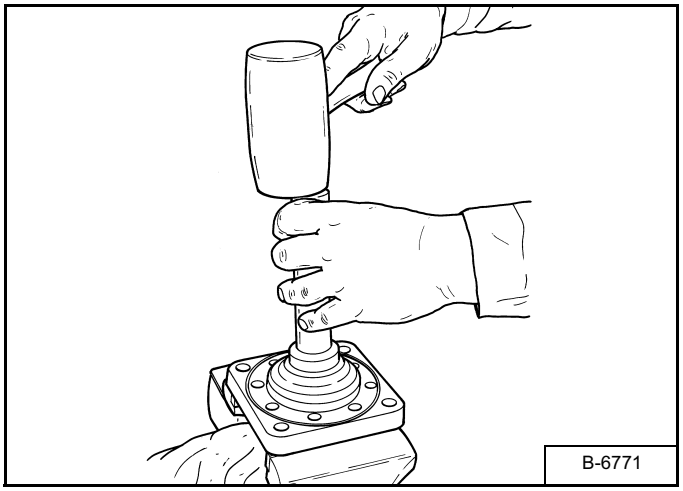


Figure 30-40-34

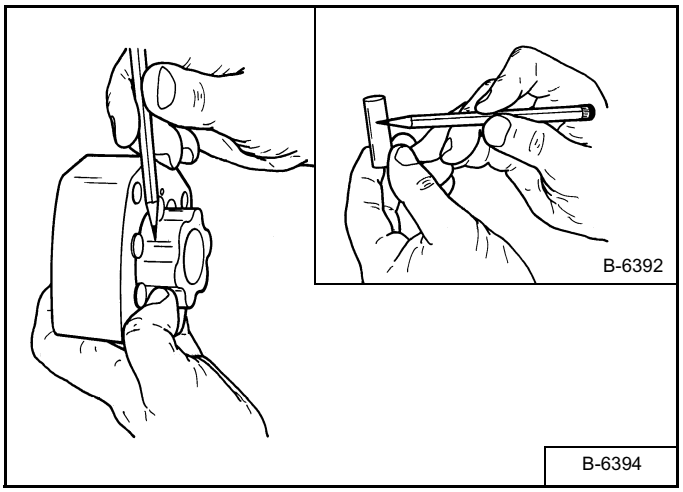


Assembly: Use the correct size seal driver tool and install the shaft seal the dust seal **[Figure 30-40-33]** & **[Figure 30-40-34]**.

NOTE: Always use new O-rings, gaskets and seals when assembling the hydrostatic motor.

Inspection

Figure 30-40-35



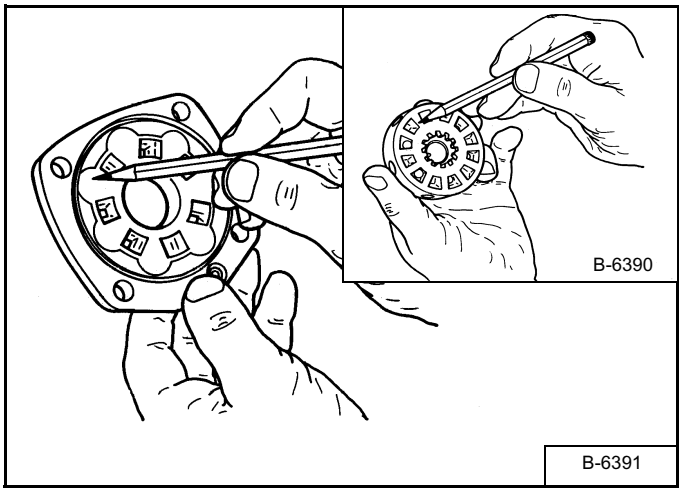
Clean all the parts in solvent and use air pressure to dry them. DO NOT use cloth or paper because small pieces of material can get into the system and cause damage.

Before the motor is assembled, check the following items:

Check the geroler roller and rotor for wear and scratches **[Figure 30-40-35]**.

NOTE: Put all the rollers back in their position.

Figure 30-40-36

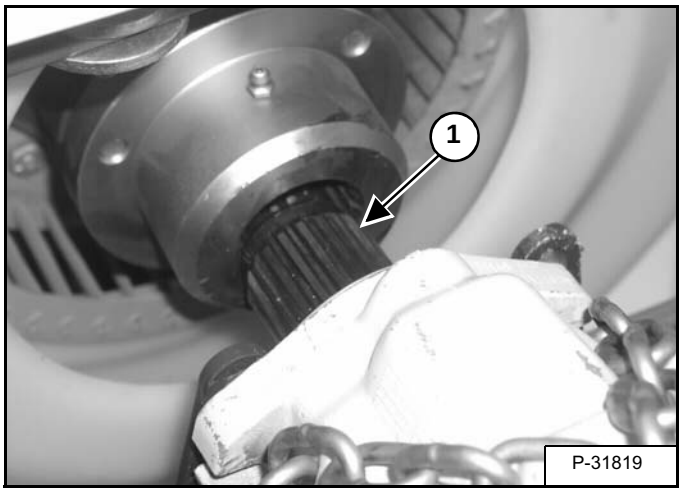


Check the balance plate for scratches **[Figure 30-40-36]**.

Check the valve drive and main drive for wear.

Removal And Installationm (Cont'd)

Figure 30-60-15



Install a chain hoist securely around the hydrostatic pump assembly.

Slide the pump drive (Item 1) **[Figure 30-60-15]** out of the rubber drive coupler .

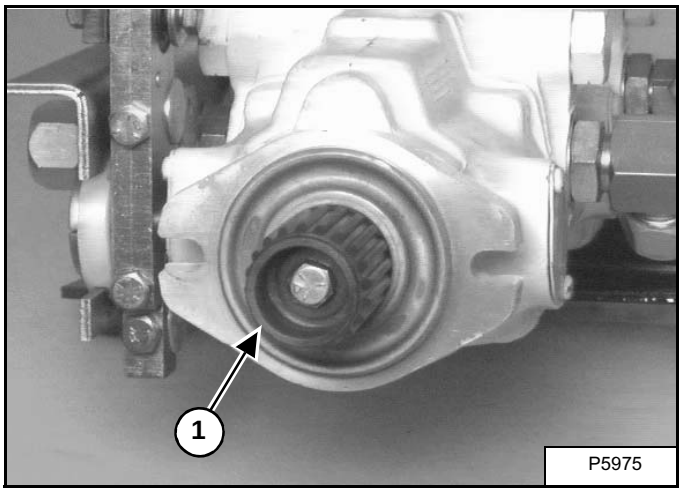
Installation: Grease the pump drive coupler and the splines of the rubber coupler for easier installation.

Remove the hydrostatic pump assembly from the loader.

Reverse the removal procedure to install the hydrostatic pump assembly in the loader.

Drive Coupler Removal And Installation

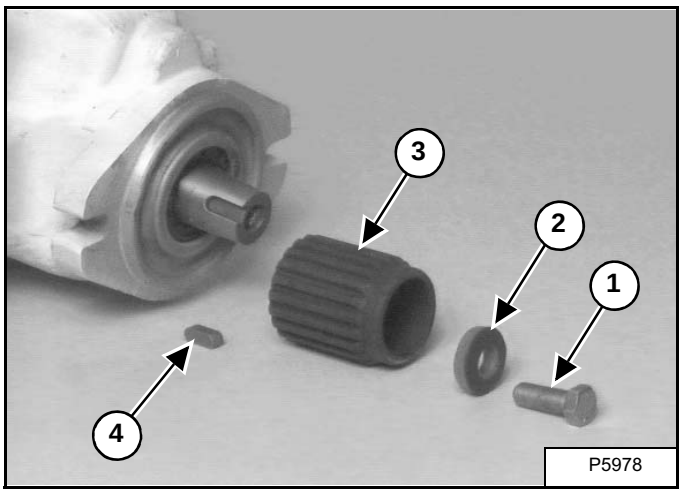
Figure 30-60-16



Remove the hydrostatic pump assembly from the loader. (See Removal And Installation on Page 30-60-2.)

The drive coupler (Item 1) **[Figure 30-60-16]** is located on the shaft of the rear hydrostatic pump.

Figure 30-60-17

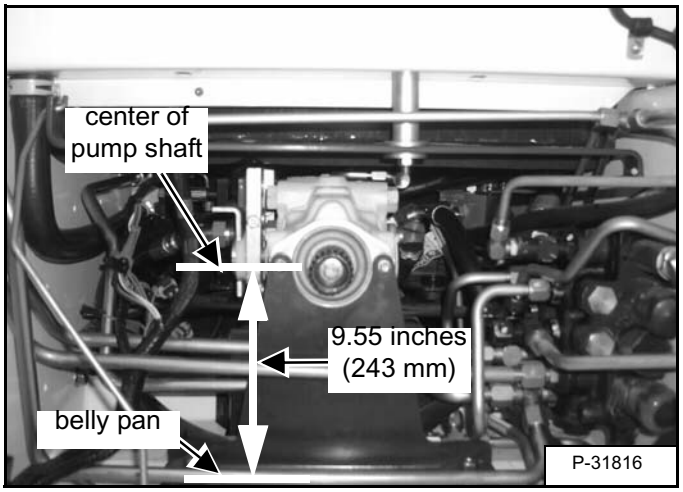


Remove the drive coupler mounting bolt (Item 1) **[Figure 30-60-17]** and washer (Item 2) **[Figure 30-60-17]** from the hydrostatic pump shaft. Be careful to not damage the splines on the coupler.

Installation: Apply (LOCTITE #242) adhesive to the drive coupler mounting bolt, tighten the mounting bolt to 25-28 ft.-lbs. (34-37 Nm) torque.

Remove the drive coupler (Item 3) from the keyed pump shaft. Inspect the key (Item 4) **[Figure 30-60-17]** for wear or damage and replace if necessary.

Figure 30-60-18



NOTE: During installation, if the distance from the belly pan to the center of the pump shaft is not 9.55 inches (243 mm), check that the rubber mounts are fully inserted into the pump mounting plate.

OIL COOLER

Removal and Installation

Figure 30-70-1

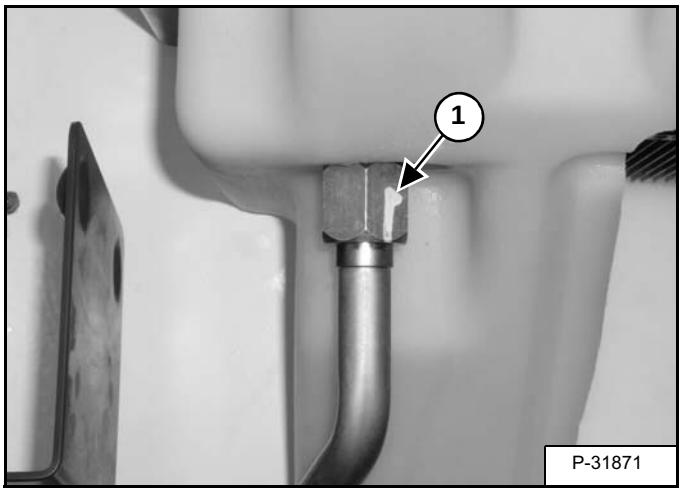
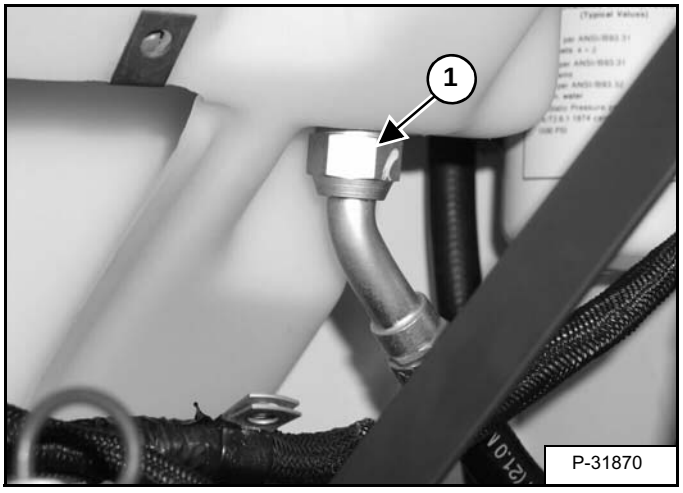


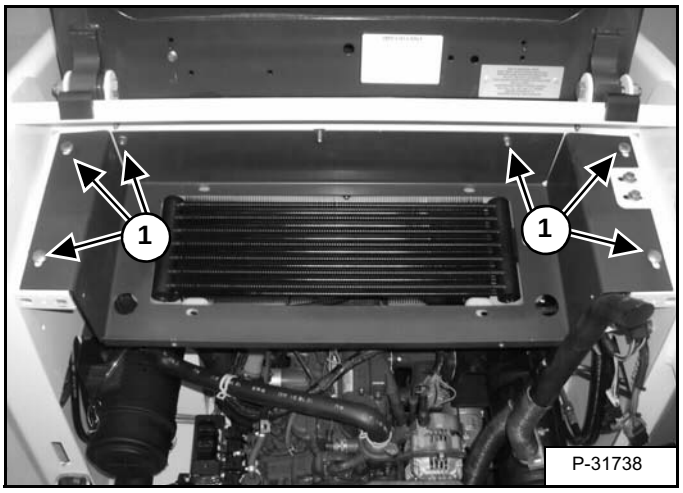
Figure 30-70-2



Remove the loader radiator. (See Removal And Installation on Page 70-50-1.)

Remove the tubeline (Item 1) **[Figure 30-70-1]** and the hose (Item 1) **[Figure 30-70-2]** from the oil cooler.

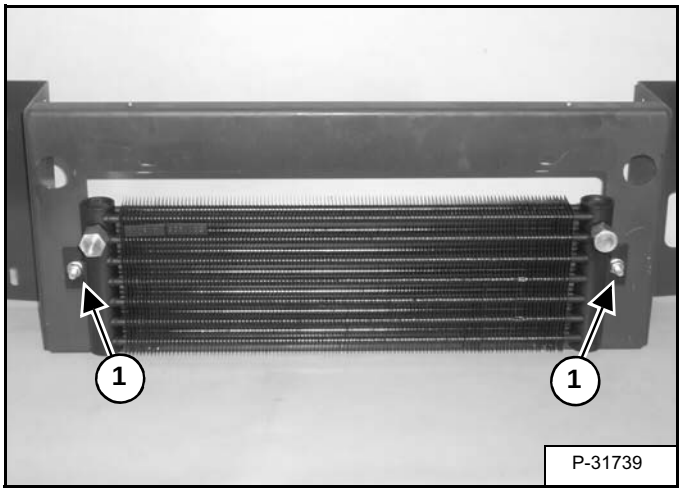
Figure 30-70-3



Remove the mounting bolts (Item 1) **[Figure 30-70-3]** from the mounting bracket.

Remove the oil cooler and mounting bracket.

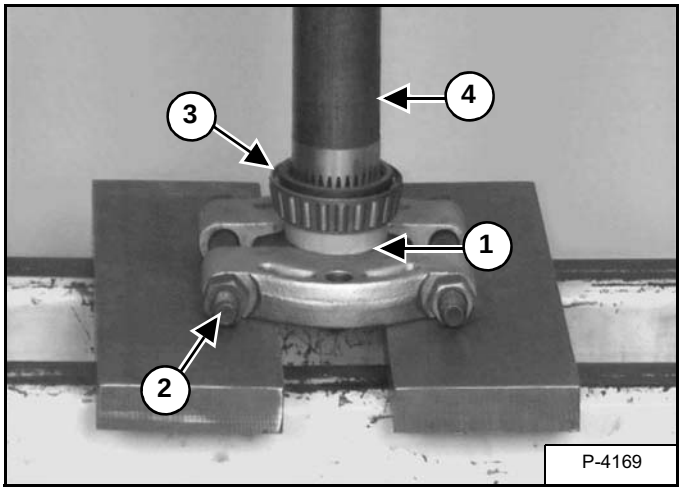
Figure 30-70-4



Remove the nuts (Item 1) **[Figure 30-70-4]** and remove the oil cooler from the mounting bracket.

Axle, Bearing, And Sprocket Removal And Installation (Cont'd)

Figure 40-20-13



Installation: A piece of round tubing (Item 1) **[Figure 40-20-13]** is needed to install the bearing on the axle shaft. The tubing needs to measure approximately 1/2 inch (12,7 mm) to 1 inch (25,4 mm) in length. The inside diameter of the tubing should not be under 1.8 inches (45,7 mm) and the outside diameter should not be over 2.1 inches (50,3 mm),

A bearing puller (Item 2) **[Figure 40-20-13]** is also needed to install the bearing on the axle.

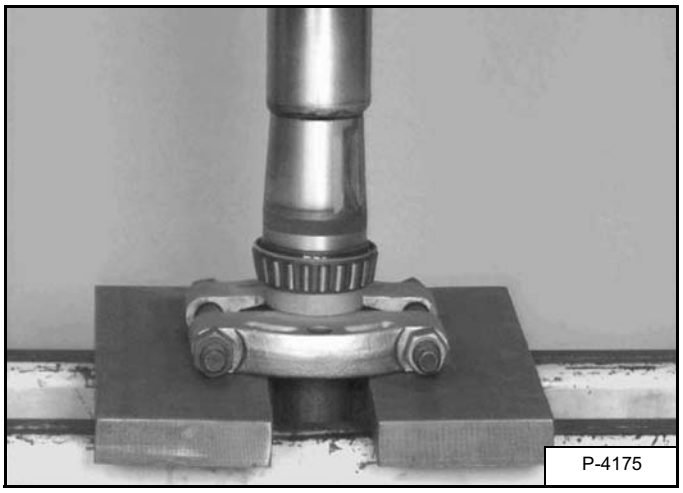
Put the tubing (Item 1) **[Figure 40-20-13]** on the bearing puller (Item 2) **[Figure 40-20-13]**.

Put the bearing (Item 3) **[Figure 40-20-13]** on the tube as shown.

Put the spline end of the axle shaft (Item 4) **[Figure 40-20-13]** in the bearing and press the bearing onto the axle.

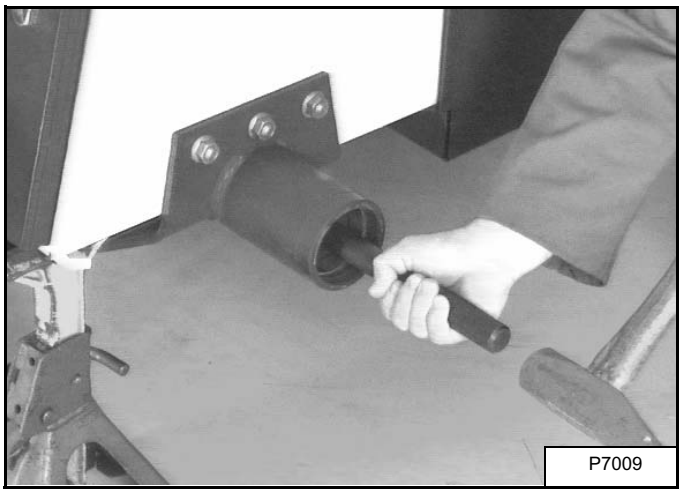
Be sure to hold onto the axle during installation, as it will slide freely along the axle shaft after the spline end has passed through the bearing and until it reaches the bearing mounting surface on the axle.

Figure 40-20-14



When the bearing reaches the bearing mounting surface, continue the installation until the bearing is fully seated **[Figure 40-20-14]**.

Figure 40-20-15



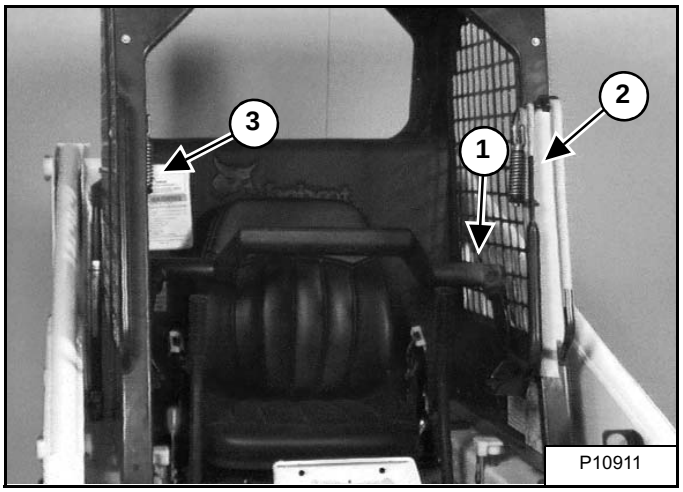
Use the tools provided in the MEL1202B Axle Bearing Service Set for bearing cup removal and installation. A slide hammer is also necessary for this procedure.

Use the long rod and bearing cup tool to remove the inner bearing cup **[Figure 40-20-15]**.

Hit the long rod with a hammer to remove the bearing cup from the axle tube **[Figure 40-20-15]**.

Removal And Installation (Cont'd)

Figure 50-10-9



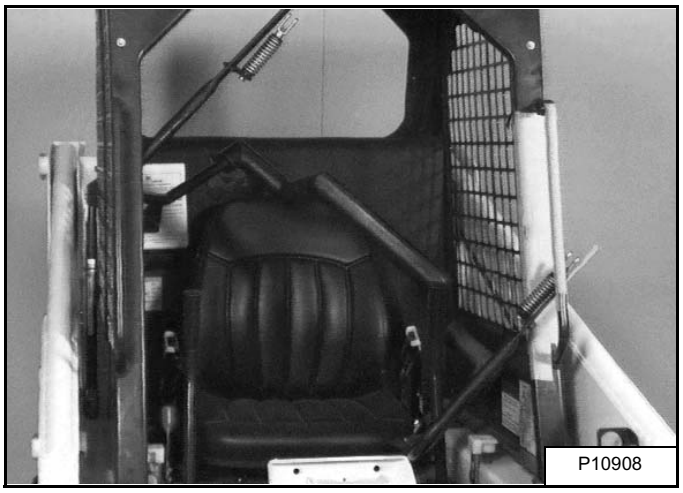
Position the seat bar in the recess on the left side of the cab (Item 1) **[Figure 50-10-9]**. Position the left side pivot end of the seat bar between the cab and the grab handle (Item 2) **[Figure 50-10-9]**.

Lift straight up on the right side (Item 3) **[Figure 50-10-9]** of the seat bar.

Figure 50-10-10

Continue to lift on the right side of the seat bar and allow the left side of the seat bar to rotate between the cab and the grab handle (Item 1) **[Figure 50-10-10]**.

Figure 50-10-11



Lift the right side of the seat bar until it clears the right side screen of the cab **[Figure 50-10-11]**.

Figure 50-10-12

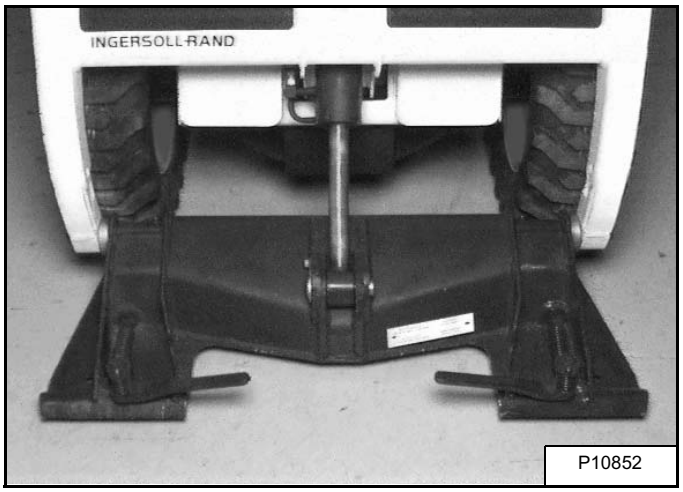
Remove the left side of the seat bar pivot from between the cab and grab handle and remove the seat bar from the cab **[Figure 50-10-12]**.

Reverse the above procedure to install the seat bar into the operator cab.

BOB-TACH

Removal And Installation

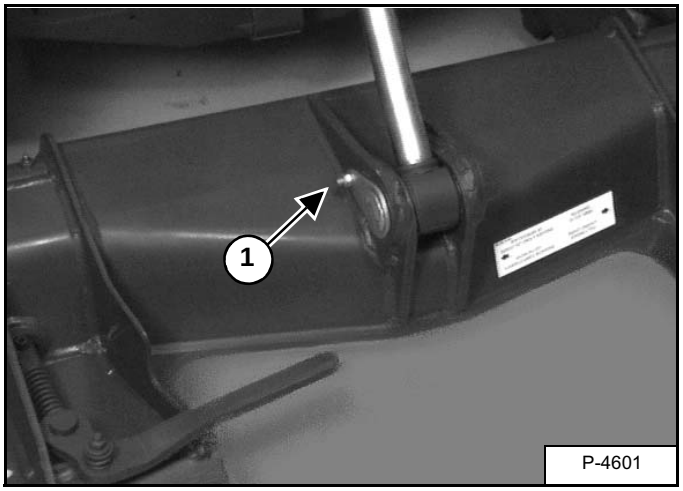
Figure 50-40-1



Tilt the Bob-Tach forward, so it is parallel to the floor.

Lower the Bob-Tach onto blocks **[Figure 50-40-1]**.

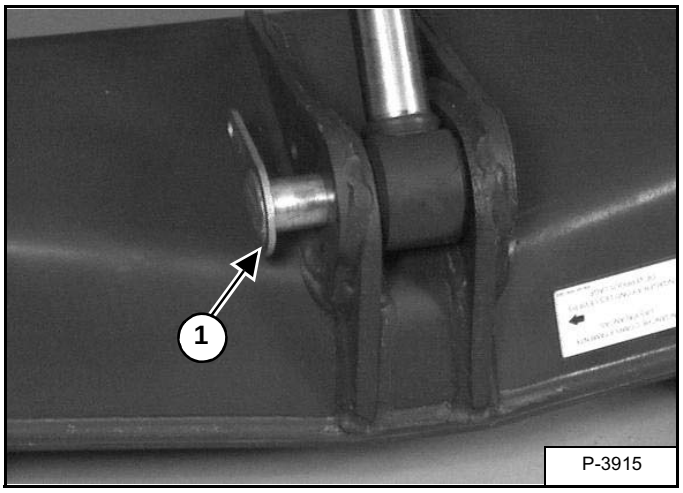
Figure 50-40-2



Remove the retainer bolt (Item 1) **[Figure 50-40-2]** from the pivot pin.

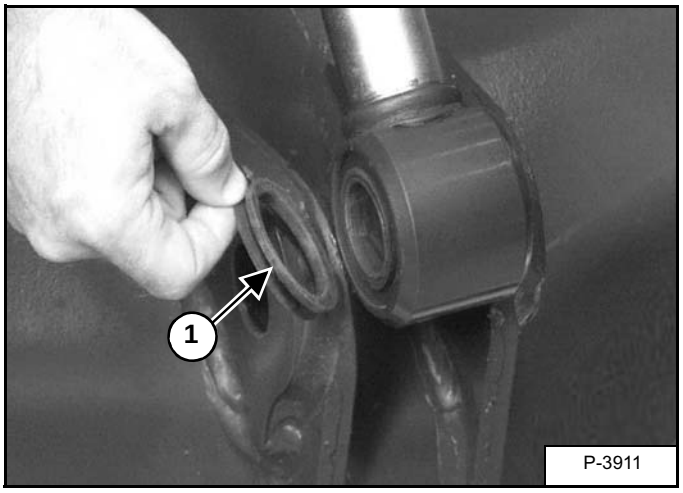
Installation: Tighten the retainer bolt to 18-20 ft.-lbs. (24-27 Nm) torque.

Figure 50-40-3



Remove the rod end pivot pin (Item 1) **[Figure 50-40-3]**.

Figure 50-40-4



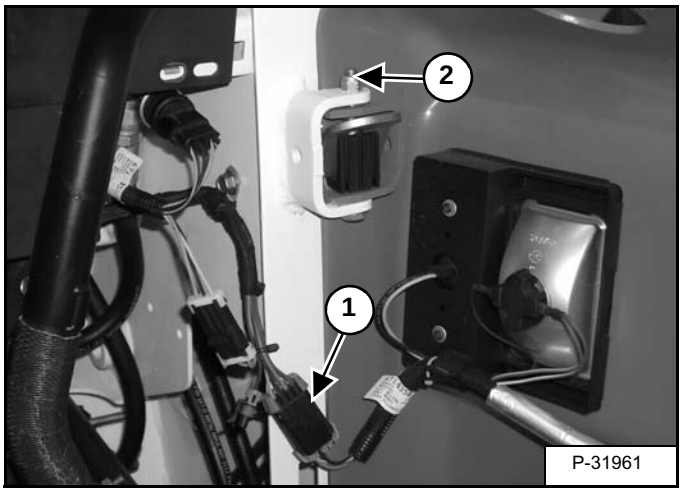
Remove the tilt cylinder rod end.

Remove the seals (Item 1) **[Figure 50-40-4]**.

REAR DOOR

Removal And Installation

Figure 50-70-1



The following tools are necessary to remove the rear door:

Two Lifting Straps
Chain Hoist

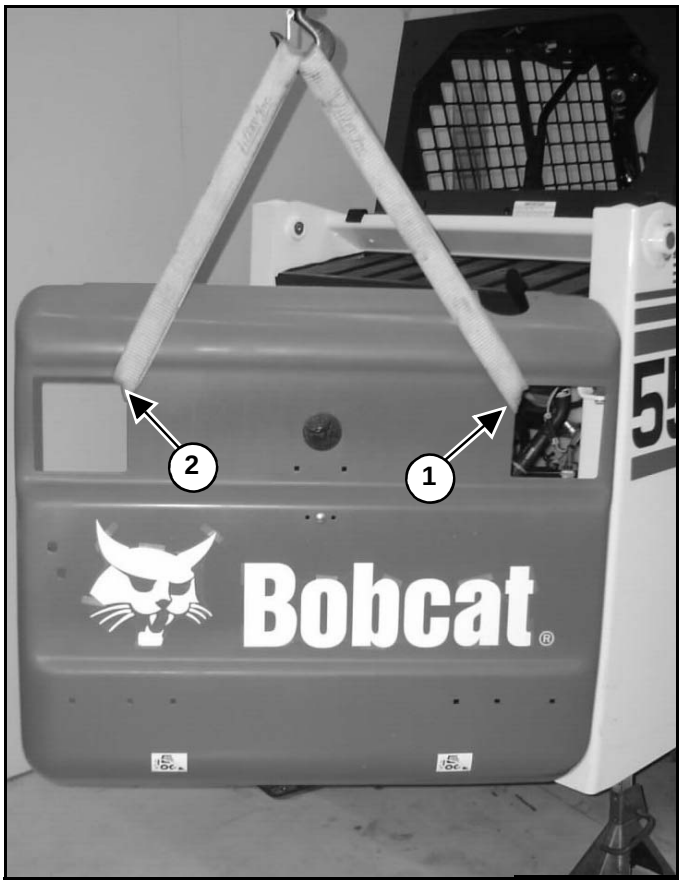
Place jackstands under the rear of the loader. (See Procedure on Page 10-10-1.)

Stop the loader engine and open the rear door.

Disconnect the rear light harness (Item 1) **[Figure 50-70-1]** from the rear door if so equipped.

Remove the rear lights from the door.

Figure 50-70-2



Install one lifting strap (Item 1) **[Figure 50-70-2]** through the top hole on the right side of the rear door.

Connect the lifting strap to the chain hoist **[Figure 50-70-2]**.

Install the second lifting strap (Item 2) **[Figure 50-70-2]** through the top hole on the left side of the rear door.

Connect the lifting strap to the chain hoist **[Figure 50-70-2]**.

Remove the nuts (Item 2) **[Figure 50-70-1]** from the two hinge pins in the rear door.

Remove the rear door.

Reverse the procedure to install the rear door.

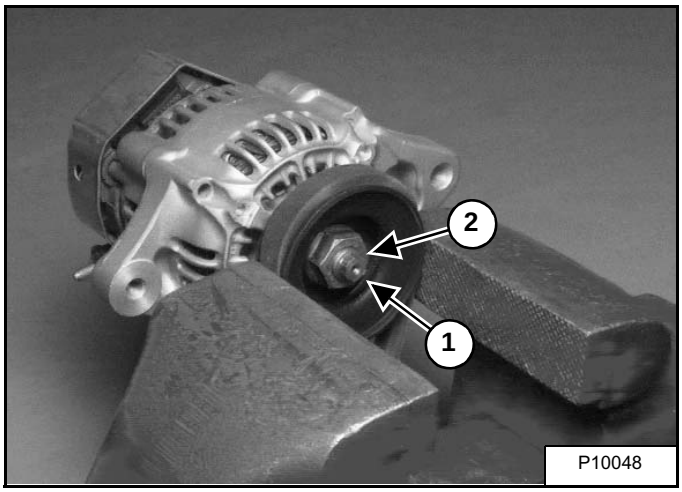
ELECTRICAL SYSTEM

Continued On Next Page


Bobcat®

Pulley Removal And Installation

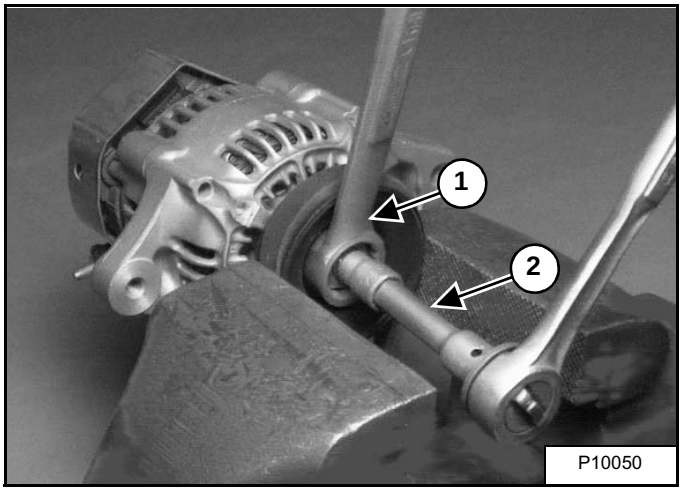
Figure 60-30-9



Remove the alternator from the loader. (See Page 60-30-1.)

Wrap a V-belt in the alternator pulley and clamp the pulley into a vise as shown **[Figure 60-30-9]**. Do not over tighten vise.

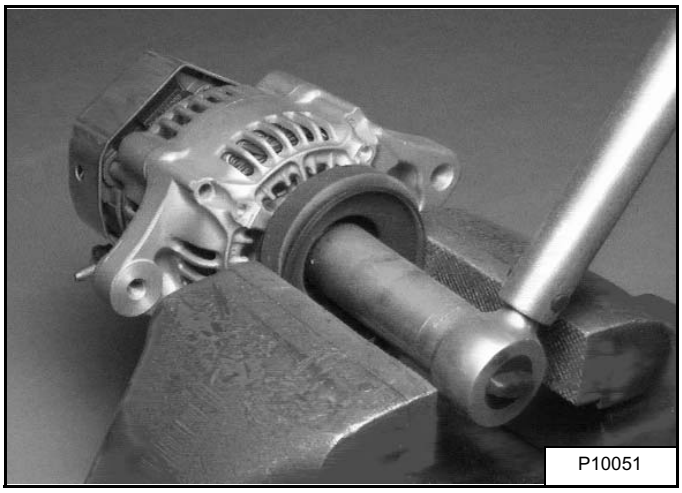
Figure 60-30-10



Using a box end wrench (Item 1) **[Figure 60-30-10]** (22 mm) loosen and remove the nut (Item 1) **[Figure 60-30-9]** while the pulley shaft (Item 2) **[Figure 60-30-9]** is held firmly with a 6-point socket (Item 2) **[Figure 60-30-10]** (10 mm).

NOTE: A six point box end wrench should be used, a twelve point box end wrench may damage the corners of the nut.

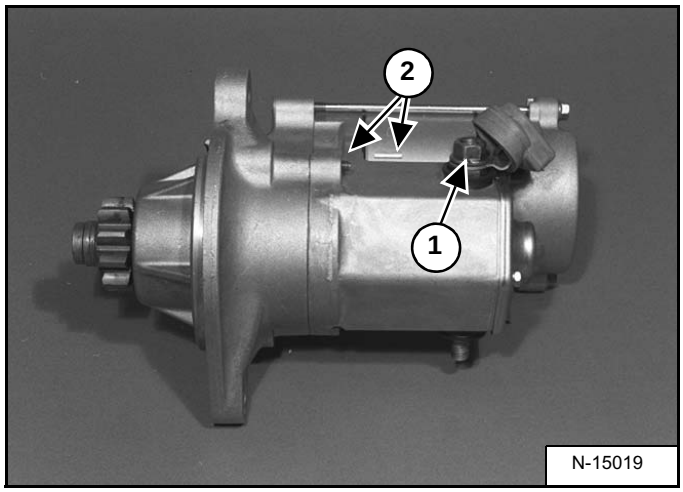
Figure 60-30-11



Assembly: Tighten the pulley nut **[Figure 60-30-11]** as shown to 70-94 ft.-lbs. (94-127 Nm) torque.

Disassembly

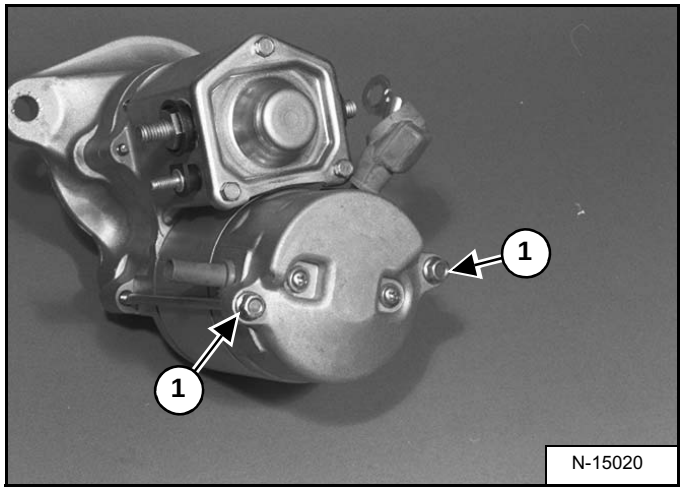
Figure 60-40-5



Remove the cable (Item 1) **[Figure 60-40-5]** from the magnetic switch.

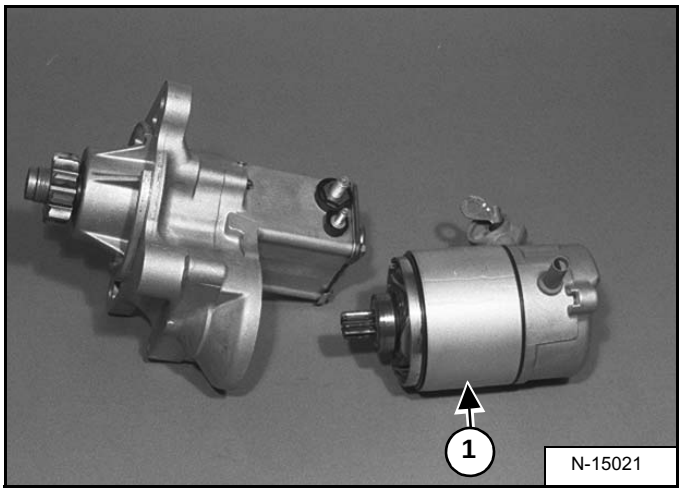
Mark the frame and magnetic switch (Item 2) **[Figure 60-40-5]** for ease of assembly.

Figure 60-40-6



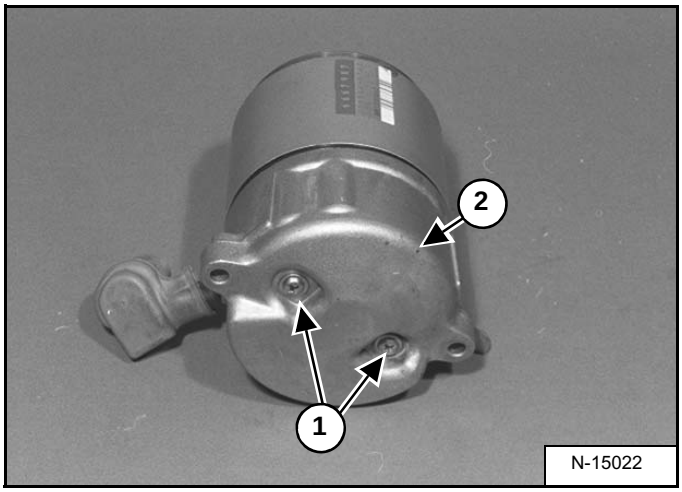
Remove the bolts (Item 1) **[Figure 60-40-6]**.

Figure 60-40-7



Remove the frame (Item 1) **[Figure 60-40-7]** from the magnetic switch.

Figure 60-40-8

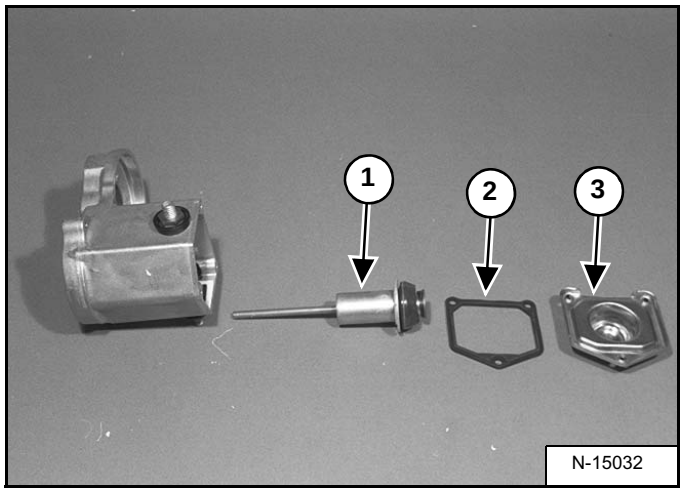


Remove the screws (Item 1) **[Figure 60-40-8]** from the brush cover (Item 2) **[Figure 60-40-8]**.

Remove the cover (Item 2) **[Figure 60-40-8]**.

Assembly

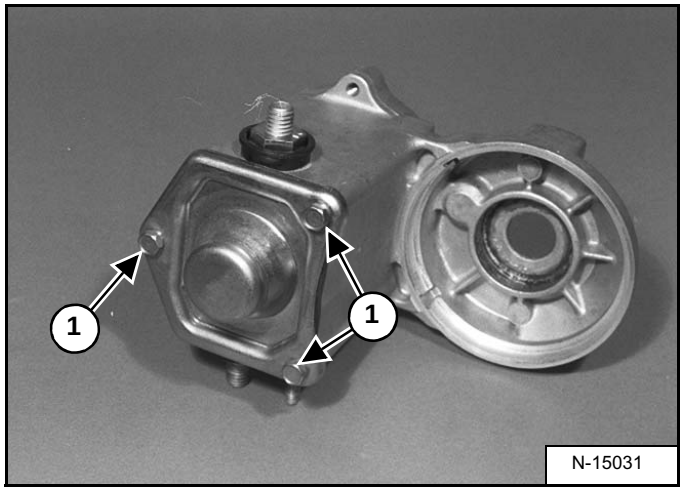
Figure 60-40-40



Clean all parts and apply high temperature grease to the armature bearing, return spring, steel ball, over running clutch, and idler gear rollers.

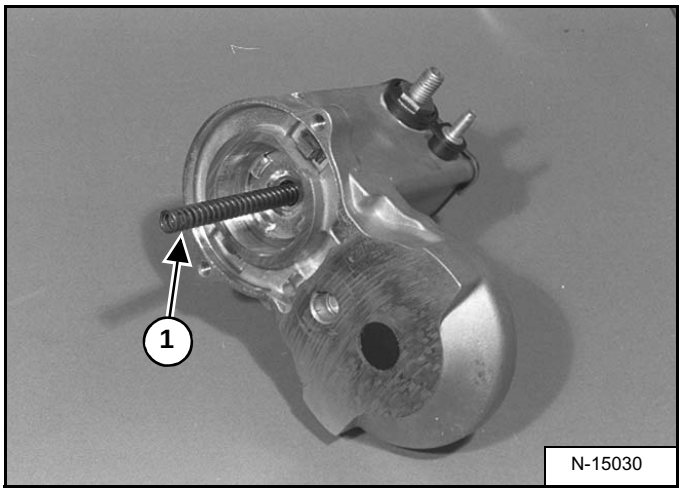
Install the switch plunger (Item 1) **[Figure 60-40-40]**, gasket (Item 2) **[Figure 60-40-40]** and cover (Item 3) **[Figure 60-40-40]** on the switch housing.

Figure 60-40-41



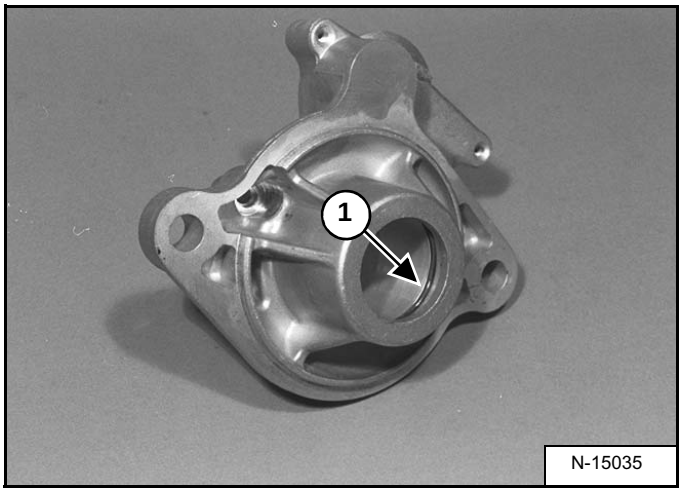
Install the bolts (Item 1) **[Figure 60-40-41]**.

Figure 60-40-42



Install the spring (Item 1) **[Figure 60-40-42]** on the magnetic switch.

Figure 60-40-43



Install the O-ring (Item 1) **[Figure 60-40-43]** in the starter housing.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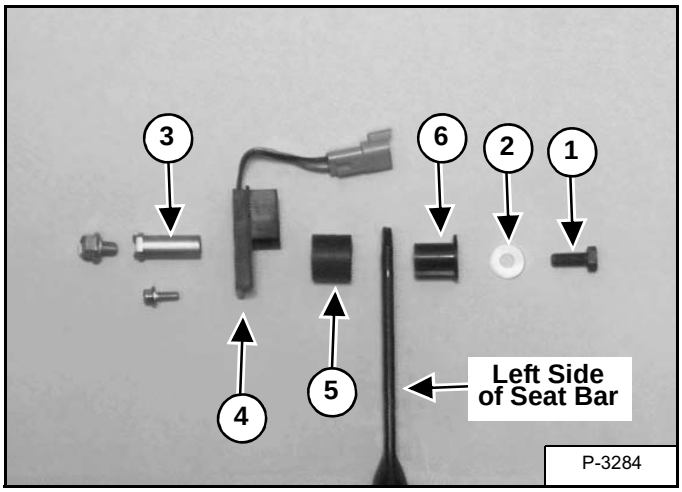
Removal And Installation (Cont'd)

Figure 60-90-8



Pull the seat back and remove the assembly as follows:

NOTE: The sensor assembly [Figure 60-90-8] is shown removed from the operator cab for clarity purpose only. The sensor assembly can be removed without removing the seat bar from the operator cab.

Remove the pivot bushing mounting bolt (Item 1) **[Figure 60-90-8]** and the washer (Item 2) **[Figure 60-90-8]** from the pivot bushing (Item 3) **[Figure 60-90-8]**.

Installation: Tighten the pivot bushing mounting bolt to 180-200 in.-lbs. (21-23 Nm) torque.

Remove the pivot bushing (Item 3) **[Figure 60-90-8]**, sensor (Item 4) **[Figure 60-90-8]**, magnet (Item 5) **[Figure 60-90-8]** and plastic bushing (Item 6) **[Figure 60-90-8]** from the seat bar.

Inspect all parts for damage and wear and replace if necessary.

Reverse the removal procedure to install the seat bar sensor.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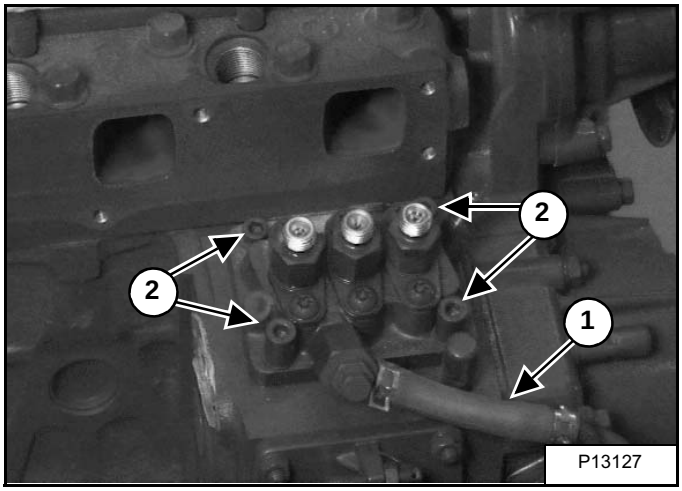
Fuel Injection Pump Removal And Installation (Cont'd)

Figure 70-70-19

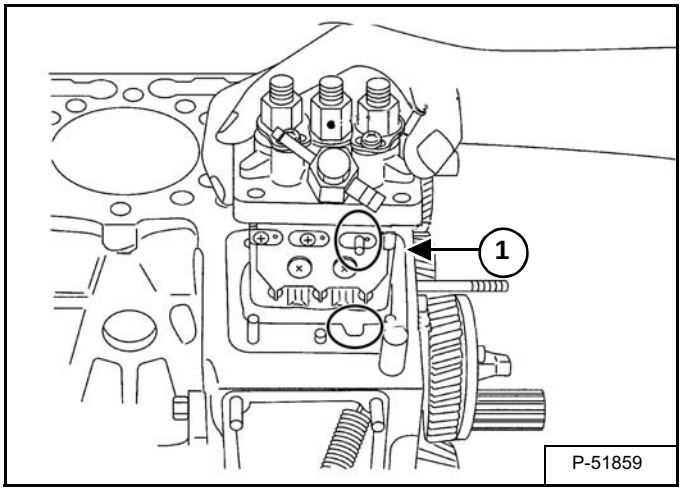


Disconnect the fuel inlet hose (Item 1) **[Figure 70-70-19]** from the injection pump.

Remove the four mounting bolts (Item 2) **[Figure 70-70-19]** from the top of the injection pump.

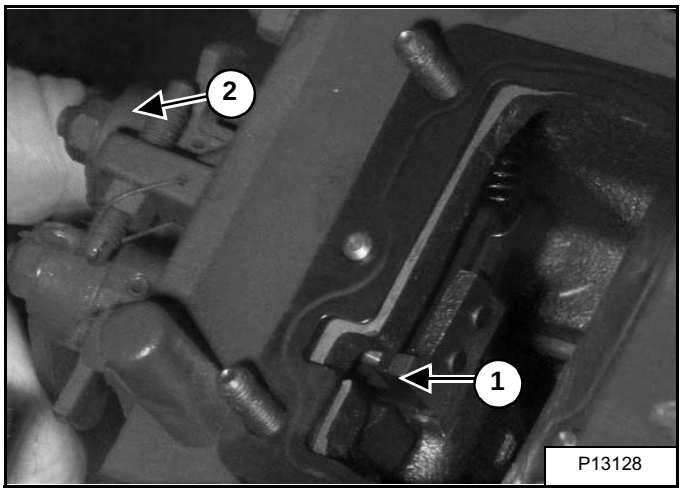
Installation: Tighten the mounting bolts to 16-20 ft.-lbs. (22-27 Nm) torque.

Figure 70-70-20



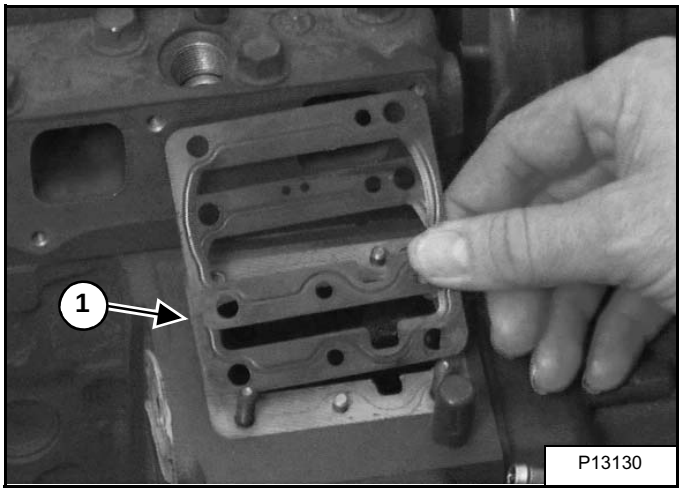
Remove the injection pump from the engine **[Figure 70-70-20]**.

Figure 70-70-21



Installation: The fuel rack pin (Item 1) **[Figure 70-70-20]** on the injection pump must be aligned with the notch (Item 1) **[Figure 70-70-21]** located inside the injection pump chamber. Use the throttle lever (Item 2) **[Figure 70-70-21]** on the side of the injection pump chamber to align the notch.

Figure 70-70-22

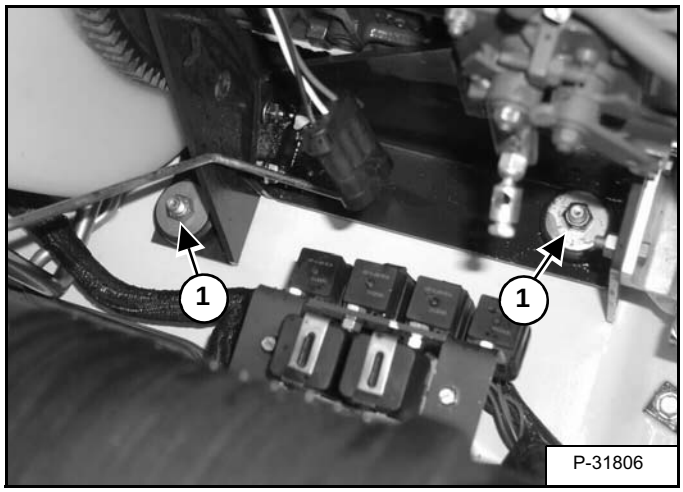


Install the shim(s) (Item 1) **[Figure 70-70-22]** on the injection pump mounting surface. (See Page 70-70-7) for information on number of shims used.

Install the injection pump in the engine.

Removal And Installation (Cont'd)

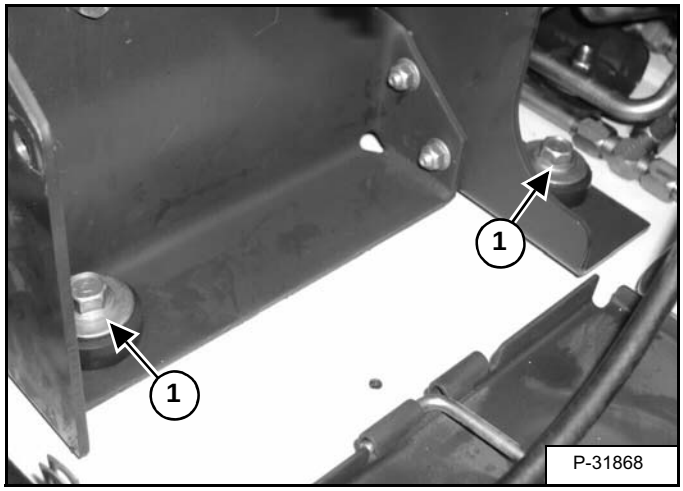
Figure 70-80-10



Remove the two engine mounting bolts (Item 1) **[Figure 70-80-10]**, nuts, and washers from the left side engine mounting brackets.

Tighten the engine mounting bolts to 65-70 ft.-lbs. (88-95 Nm) torque.

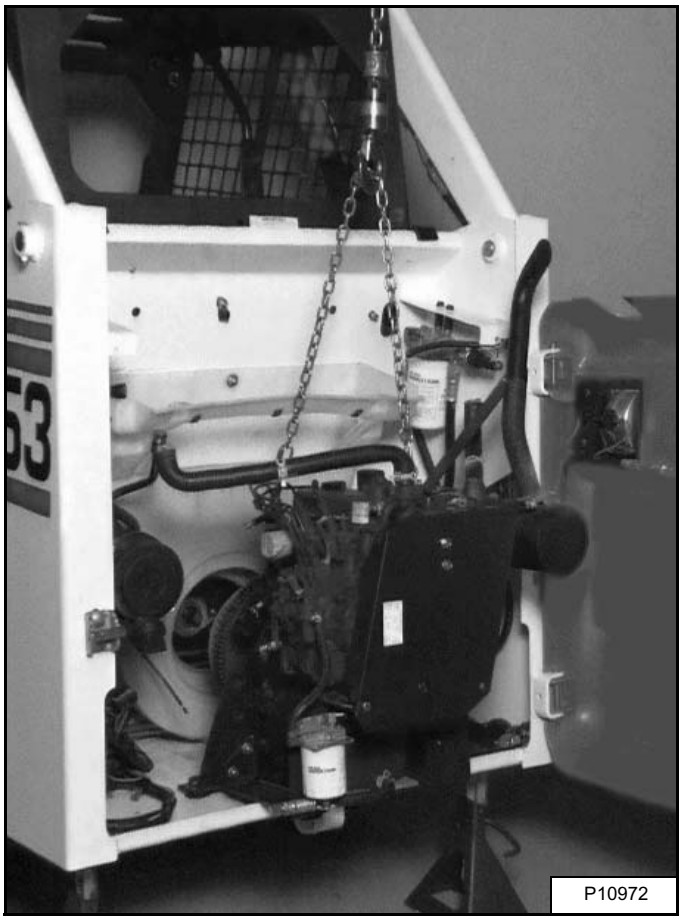
Figure 70-80-11



Remove the two engine mounting bolts (Item 1) **[Figure 70-80-11]**, nuts, and washers from the right engine mounting brackets.

Tighten the engine mounting bolts to 65-70 ft.-lbs. (88-95 Nm) torque.

Figure 70-80-12



Attach a chain with a hook on each end, to each lift eye on the engine.

Lift the engine slowly with the chain hoist until the rear engine mounts clear the rear lip of the loader frame **[Figure 70-80-12]**.

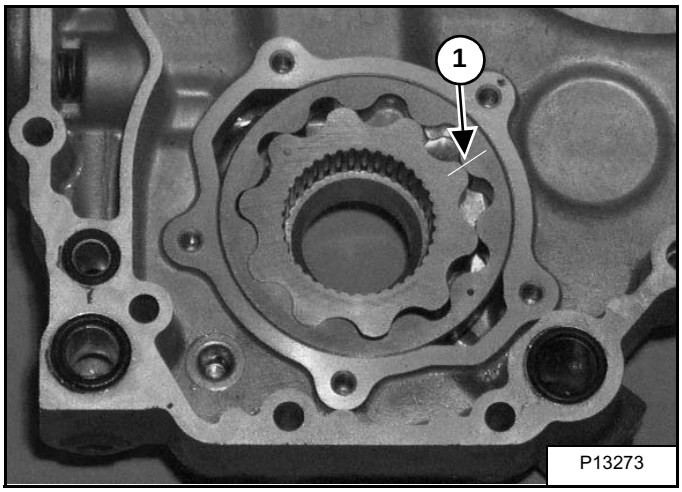
Pull the engine out of the engine compartment **[Figure 70-80-12]**.

Be sure the front engine mounts clear the rear lip of the loader frame as the engine is removed.

Replace the engine mounts if they are worn or damaged.

Checking Oil Pump (Cont'd)

Figure 70-100-20



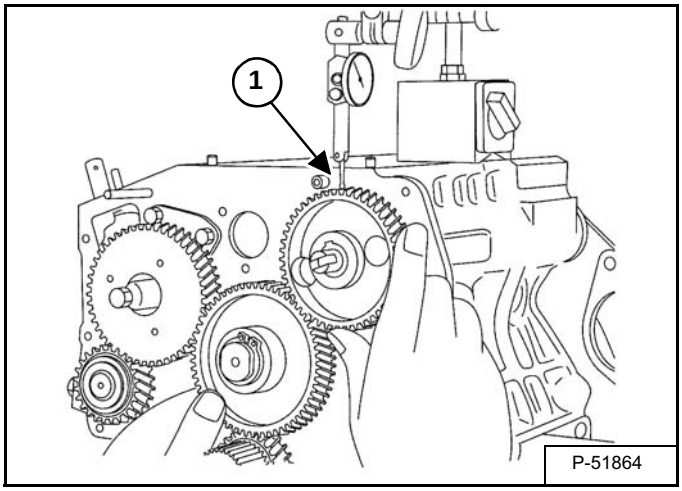
Remove the cover and measure the width of the pressed plastigauge (Item 1) **[Figure 70-100-20]**.

End Clearance	0.0010-0.0029 inch (0,025-0,75 mm)

If the clearance exceeds the allowable limit, replace the oil pump rotor assembly.

Checking Timing Gears

Figure 70-100-21

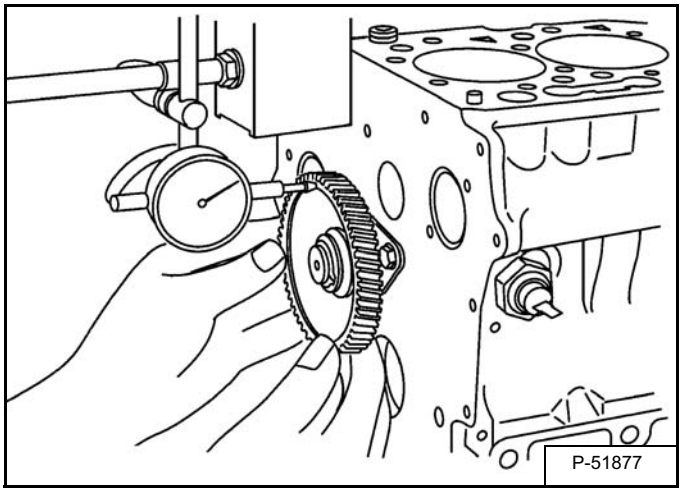


Set the tip of the dial indicator on the gear tooth (Item 1) **[Figure 70-100-21]**. Hold the idler gear and move the mating gear to measure the backlash.

Idler Gear and Crank Gear	0.0013 to 0.0045 inch (0.032 to 0.115 mm)
Idler Gear and Cam Gear	0.0014 to 0.0045 inch (0.036 to 0.114 mm)
Idler Gear and Injection Pump Gear	0.0013 to 0.0046 inch (0.034 to 0.116 mm)
Injection Pump Gear and the Governor Gear	0.0012 to 0.0046 inch (0.013 to 0.117 mm)
Allowable Limit	0.0059 inch (0.15 mm)

If the clearance exceeds the allowable limit, replace the gear.

Figure 70-100-22



Set the tip of the dial indicator on the front face of the idler gear **[Figure 70-100-22]**.

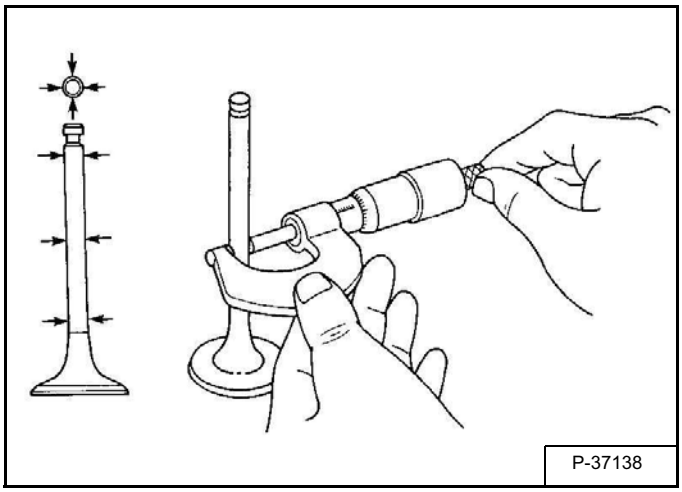
Move the idler gear to the front and rear to measure the end play.

End Play	0.0079 to 0.0201 in (0.20 to 0.51 mm)
Allowable Limit	0.0315 in (0.80 mm)

If the clearance exceeds the allowable limit, replace the idler gear collar.

Valve And Valve Guide Checking

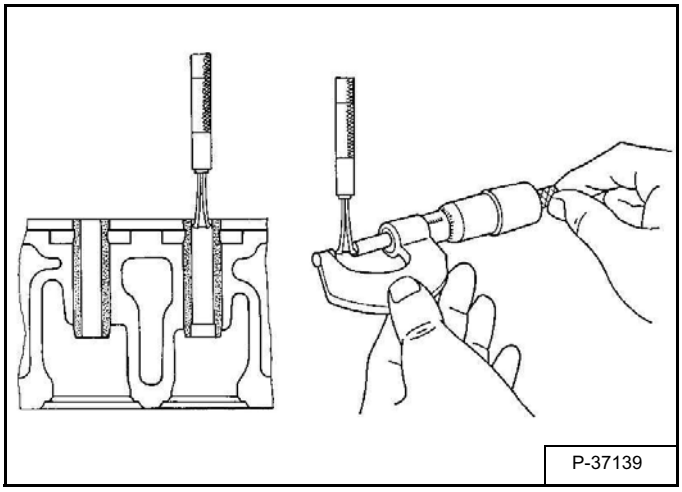
Figure 70-100-52



Remove any carbon from the valve guide area. Measure the outside diameter of the valves.

Valve Stem O.D.	0.2741 to 0.2764 inch (6.960 to 6.975 mm)

Figure 70-100-53



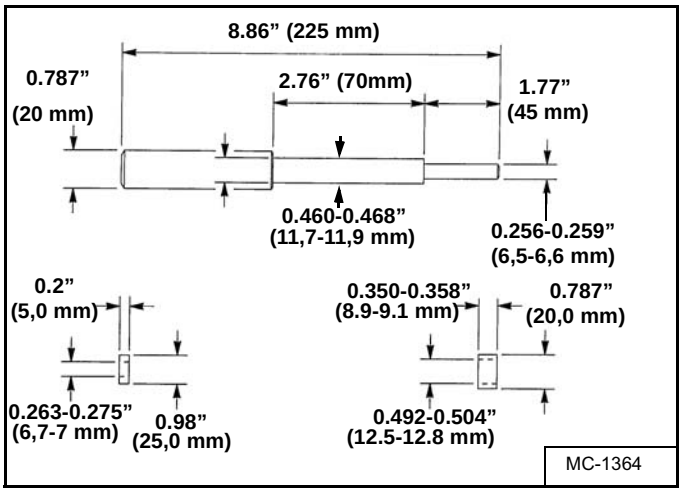
Measure the inside diameter of the valve guide.

Valve Guide I.D.	0.2760 to 0.2765 inch (7.010 to 7.025 mm)
Allowable Limit	0.0039 inch (0.10 mm)

If the clearance exceeds the allowable limit, replace the valves. If it still exceeds the allowable limit, replace the valve guide.

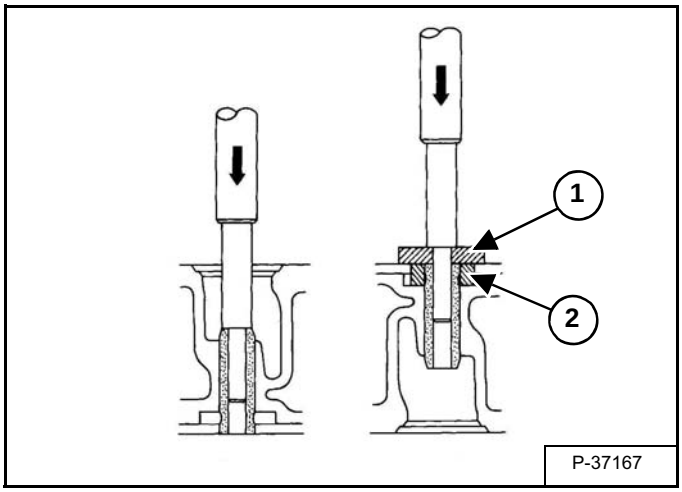
Valve Guide Replacement

Figure 70-100-54



To remove and replace the valve guide, make the driver tool as shown **[Figure 70-100-54]**.

Figure 70-100-55



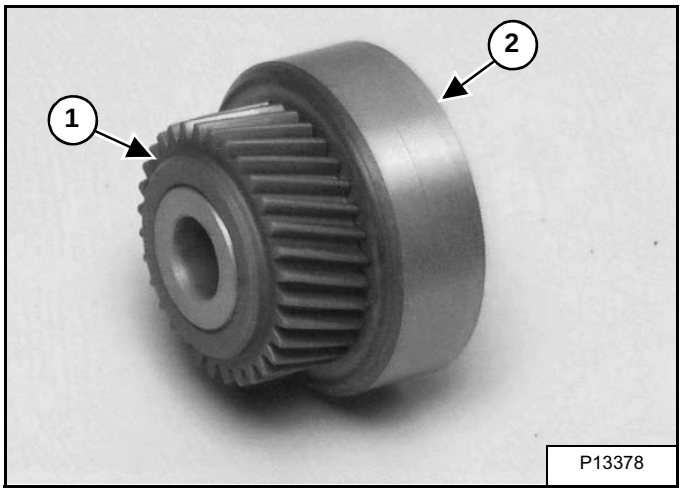
Press the used valve guide out of the cylinder head using the special driver tool **[Figure 70-100-55]**.

Put oil on the outside diameter of the new valve guide. Press the new valve guide into the cylinder head from the top side. Use the special driver tools (Items 1 & 2) **[Figure 70-100-55]**, press the new guide until the tool contacts the cylinder head.

Ream the valve guide to the correct specifications.

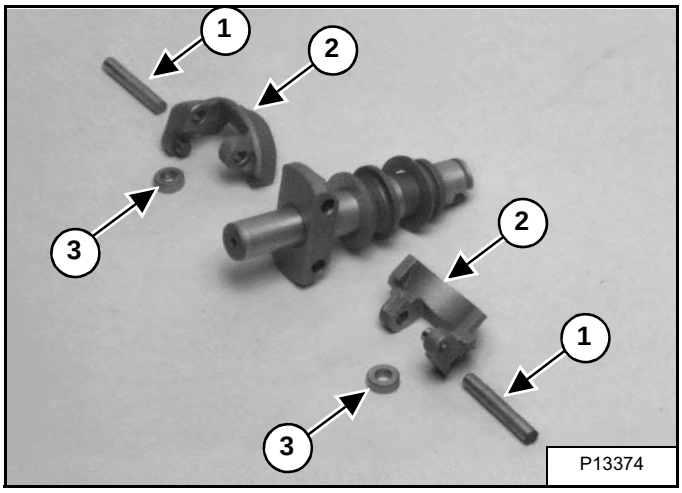
Governor Shaft Removal And Installation (Cont'd)

Figure 70-100-89



Remove the governor gear (Item 1) from the gear holder (Item 2) **[Figure 70-100-89]**.

Figure 70-100-90

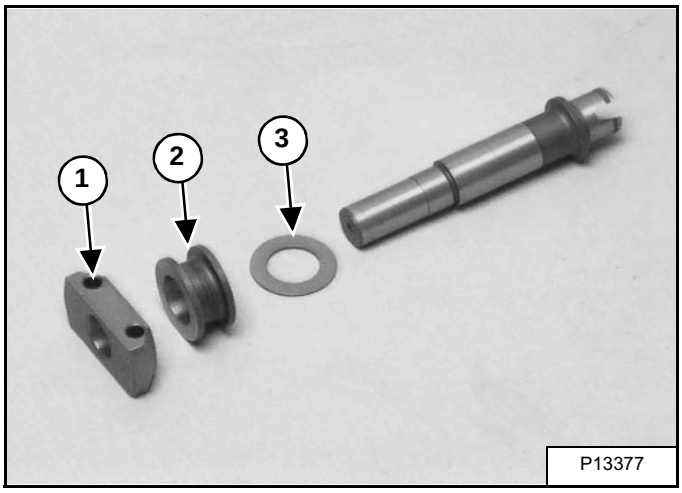


Remove the governor weight shafts (Item 1) from the governor weights (Item 2) **[Figure 70-100-90]**.

Remove the governor weights.

Remove the rollers (Item 3) **[Figure 70-100-90]** from the governor weights.

Figure 70-100-91



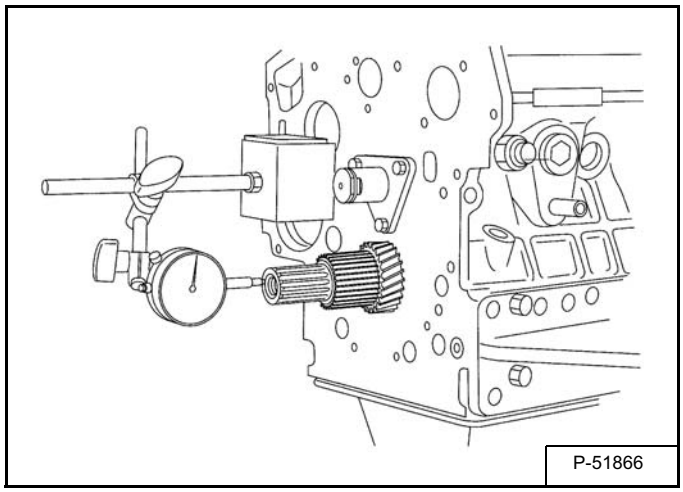
Remove the governor weight holder (Item 1) **[Figure 70-100-91]** from governor shaft.

Remove the governor sleeve (Item 2) and thrust washer (Item 3) **[Figure 70-100-91]** from governor shaft.

Check all parts and replace if needed.

Crankshaft End Play

Figure 70-100-121



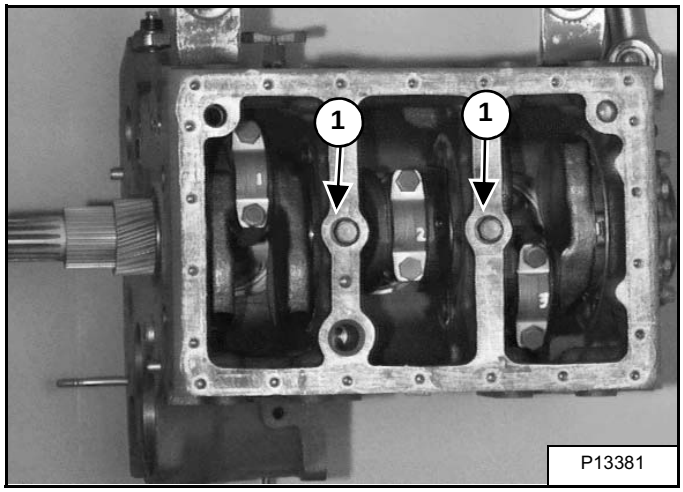
Before removing the crankshaft/main bearings, check the end play.

Install a dial indicator **[Figure 70-100-121]**. Move the crankshaft to the flywheel side and zero the dial indicator. Measure the end play by pulling the crankshaft toward the timing gear side. The tolerances are as follows:

End Play	0.0059-0.0122 inch (0.15-0.31 mm)
Allowable limit	0.0197 inch (0.05 mm)

Crankshaft Removal And Installation

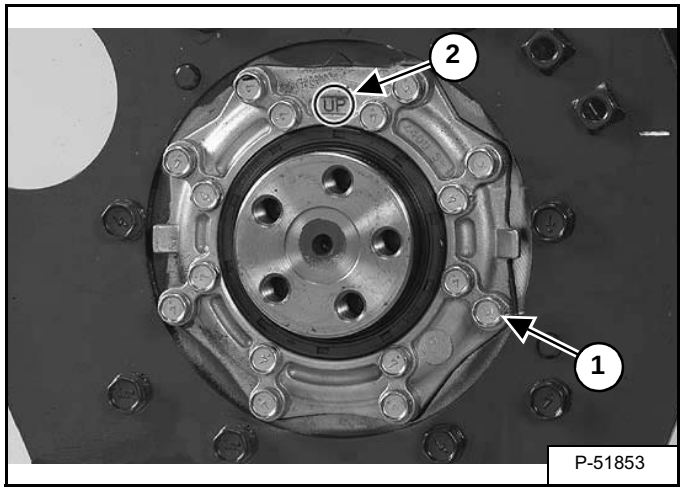
Figure 70-100-122



Remove the two main bearing mounting bolts (Item 1) **[Figure 70-100-122]**.

Installation: Tighten the mounting bolts to 36-40 ft.-lbs. (49-53,9 Nm) torque.

Figure 70-100-123



Remove the bearing case cover bolts (Item 1) **[Figure 70-100-123]** and remove the bearing case cover and crankshaft assembly.

Installation: Tighten the mounting bolts to 87-100 in.-lbs. (9,8-11 Nm) torque.

NOTE: The bearing case cover must be installed with the "UP" mark (Item 2) [Figure 70-100-123] in the upward position.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All dimensions are given in inches. Respective metric dimensions are given in millimeters enclosed by parentheses.

Valve Springs

Free Length	1.457-1.476 (37,0-37,5)
Limit Permitted	1.437 (36,5)
Fitted Length	1.22 (31,0)
Load to Compress to Fitted Length	26.4 lbs. (11,98 kg)
Limit Permitted	22.5 lbs. (10,2 kg)
Limit Permitted for spring tilt	0.039 (1,0)

Rocker Arms

O.D. of Rocker Arm Shaft	0.4714-0.4718 (11,973-11,984)
I.D. of Rocker Arm Bushings	0.4724-0.4731 (12,000-12,018)
Clearance Between Rocker Arm & Bushing	0.0006-0.0018 (0,016-0,045)
Limit Permitted	0.0039 (0,10)

Camshaft

O.D. of Camshaft Bearing Journal	1.4147-1.4153 (35,934-35,950)
I.D. of Camshaft Bearing	1.4173-1.4183 (36,000-36,025)
Clearance Between Camshaft Bearing & Journal	0.0020-0.0036 (0,050-0,091)
Limit Permitted	0.0059 (0,15)
Alignment of the Camshaft	0.0004 (0,01)
Cam Lobe Height (Intake)	1.1339 (28,80)
(Exhaust)	1.1417 (29,00)
Limit Permitted (Intake)	1.1319 (28,75)
(Exhaust)	1.1398 (28,95)
Gear Backlash	0.0014-0.0045 (0,036-0,114)
Limit Permitted	0.059 (0,15)

Cylinders

I.D. of Cylinder Liner	3.0709-3.0716 (78,000-76,019)
Limit Permitted	+0.0059 (+0,15)
I.D. of Oversized Liner	0.0197 (+0,5)