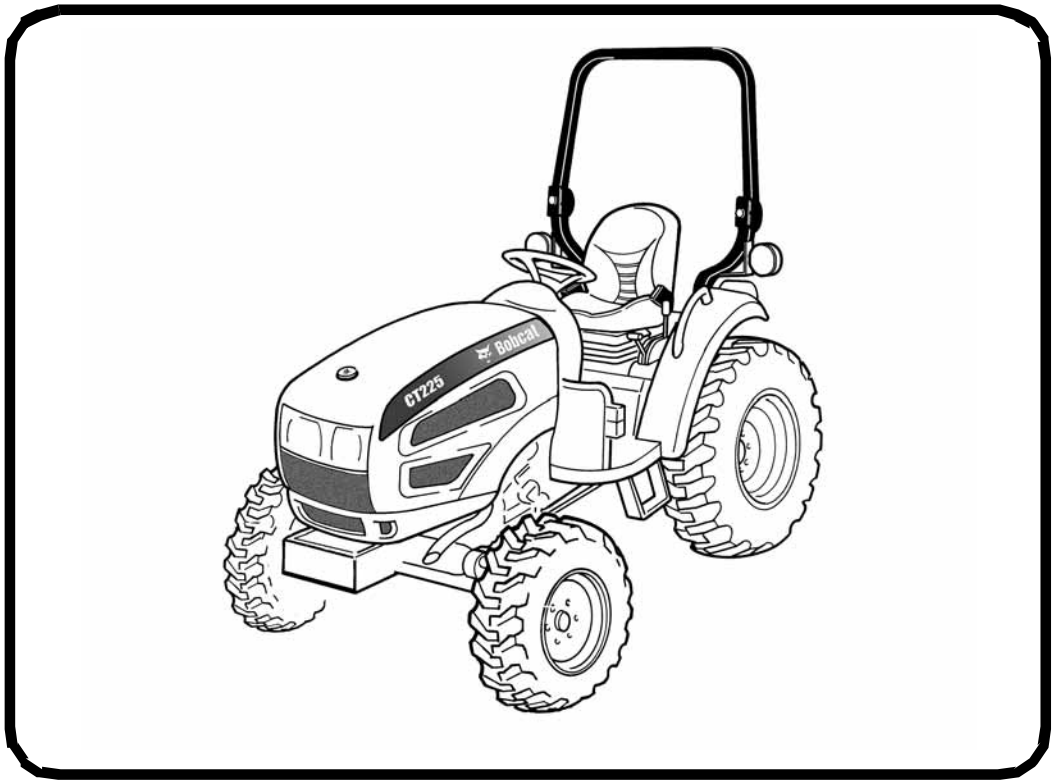
Bobcat®

Service Manual

CT225, CT230 & CT235 Compact Tractor

S/N ABFJ11001 & Above
S/N ABFP11001 & Above
S/N A9JY11001 & Above



6987029 (12-09)

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

IMPORTANT

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

I-2019-0284

DANGER

The signal word DANGER on the machine and in the manuals indicates a hazardous situation which, if not avoided, will result in death or serious injury.

D-1002-1107

WARNING

The signal word WARNING on the machine and in the manuals indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.

W-2044-1107

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 / implement 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 / implement. 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 below the instrument panel. 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.

SI CT-1008 SM

SAFETY AND MAINTENANCE

Continued On Next Page

TRANSPORTING THE COMPACT TRACTOR ON A TRAILER

Loading And Unloading

WARNING

AVOID SERIOUS INJURY OR DEATH

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-2058-0807

IMPORTANT

Do not operate the Toolcat Utility Work Machine at high speeds when the differential lock is engaged.

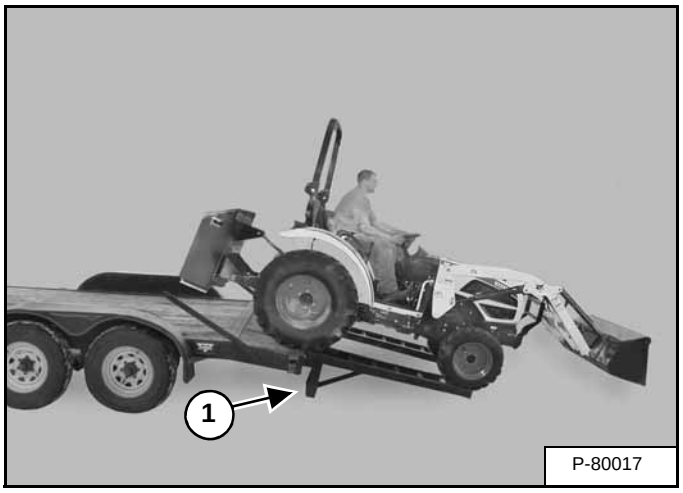
Always operate the machine at low speeds.

Disengage differential lock when driving at high range speeds.

I-2225-0104

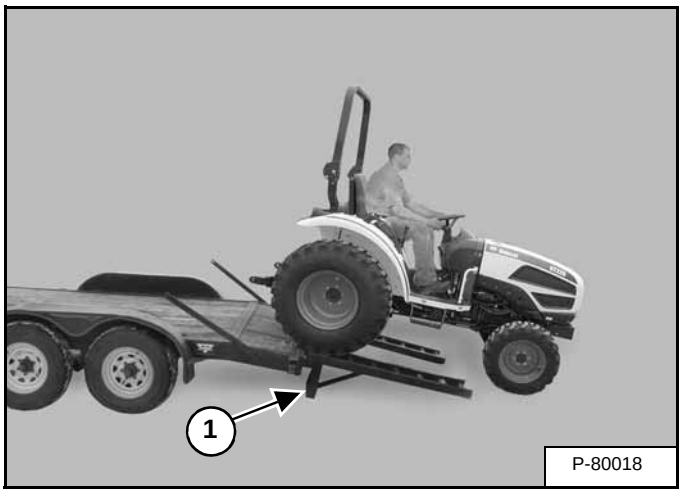
Be sure the transport and towing vehicles are of adequate size and capacity. See Performance for weight of machine. (See SPECIFICATIONS on Page SPEC-1.)

Figure 10-40-1



A compact tractor with a loader, attachment and rear ballast must be loaded backward onto the trailer **[Figure 10-40-1]**.

Figure 10-40-2



A compact tractor with or without an implement must be loaded backward **[Figure 10-40-2]**.

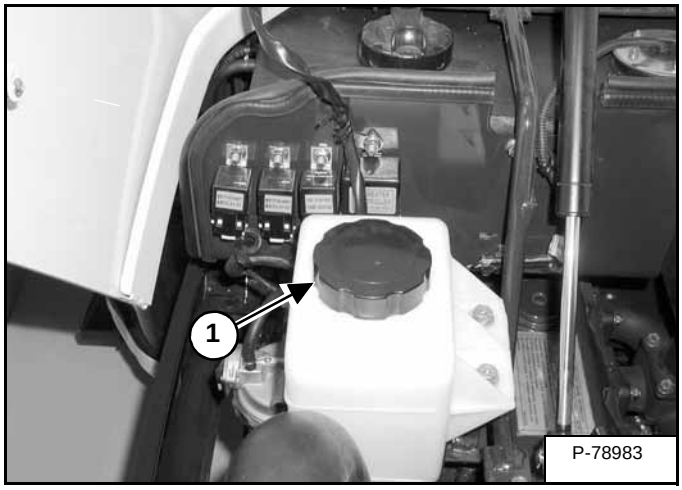
The rear of the trailer must be blocked or supported (Item 1) **[Figure 10-40-1]** and **[Figure 10-40-2]** when loading or unloading to prevent the front end of the trailer from raising up.

ENGINE COOLING SYSTEM

Checking Level

Open the engine cover. (See Opening And Closing on Page 10-20-1.)

Figure 10-90-1



The coolant recovery tank (Item 1) **[Figure 10-90-1]** is located on the right side of the engine.

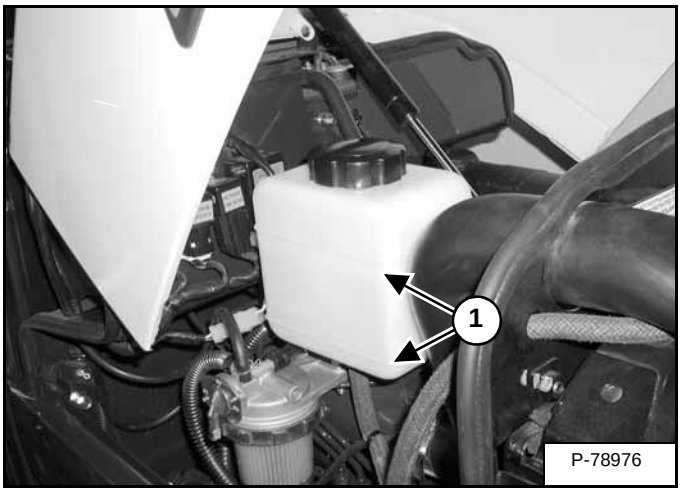
⚠ WARNING

AVOID INJURY

Stop the engine and allow to cool before adding coolant or you can be burned.

W-2106-0907

Figure 10-90-2



The coolant level in the recovery tank must be between the marks on the tank (Item 1) **[Figure 10-90-2]** when the engine is cool.

NOTE: The cooling system is factory filled with ethylene glycol coolant. DO NOT mix ethylene glycol with propylene glycol.

Ethylene Glycol

Add premixed coolant; 50% water 50% ethylene glycol to the recovery tank if the coolant level is low.

One gallon (3,8 L) ethylene glycol mixed with one gallon (3,8 L) of water is the correct mixture of coolant to provide a -34°F (-37°C) freeze protection.

Use a refractometer to check the condition of ethylene glycol in your cooling system.

HYDRAULIC / HYDROSTATIC / TRANSMISSION SYSTEM

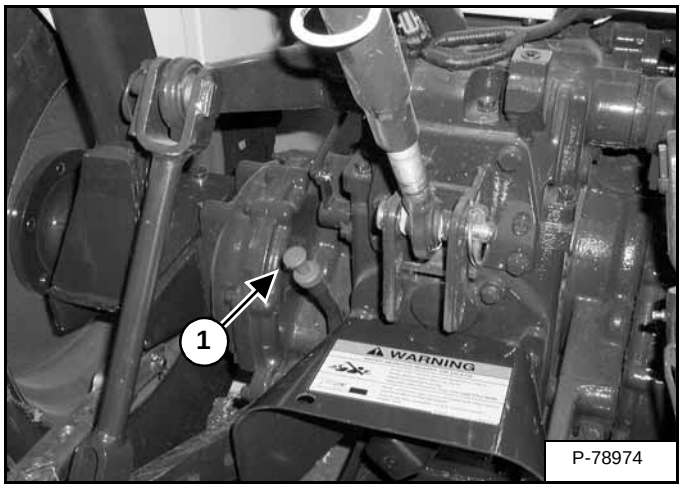
Checking And Adding Fluid

Use only recommended fluid in the hydraulic / hydrostatic / transmission system. (See Transmission / Differential Fluid Chart on Page 10-120-1.)

Put the compact tractor on a flat level surface, lower the loader arms (if equipped) and lower implement (if equipped).

Stop the engine.

Figure 10-120-1



Check the fluid level at the dipstick (Item 1) **[Figure 10-120-1]**.

Keep the oil level between the marks on the dipstick.

Transmission / Differential Fluid Chart

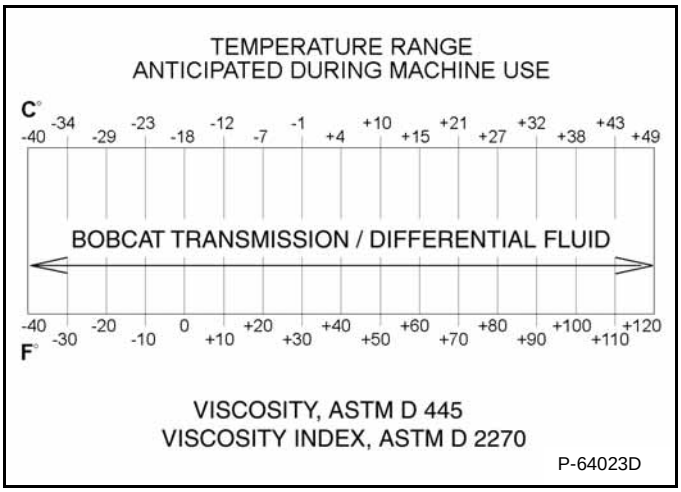
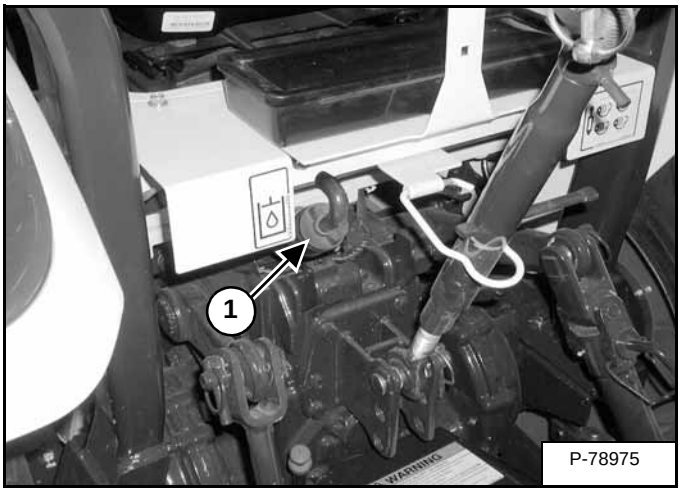


Figure 10-120-2



If needed, remove the fill cap (Item 1) **[Figure 10-120-2]** and add fluid. (See chart above.)

ALTERNATOR BELT

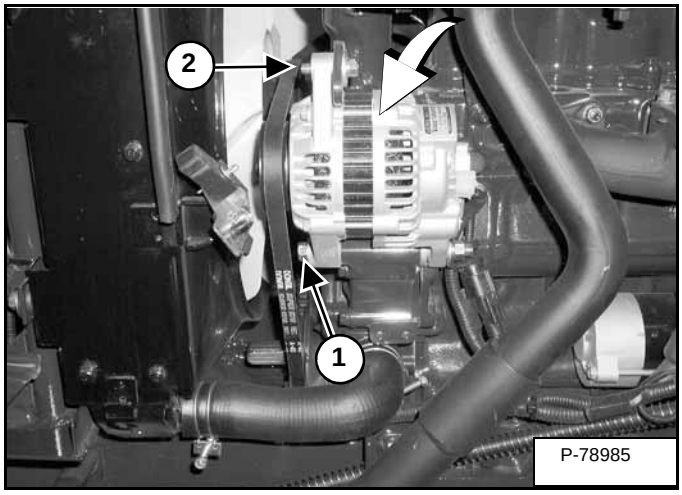
Belt Adjustment

Stop the engine and engage the parking brake.

Open the engine cover. (See Opening And Closing on Page 10-20-1.)

Remove the right side engine panel. (See Removal And Installation on Page 50-100-1.)

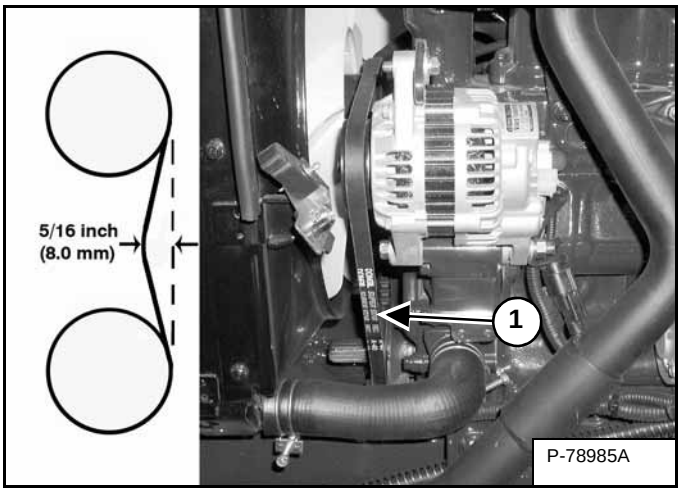
Figure 10-160-1



Loosen the mounting bolt (Item 1) and adjustment bolt (Item 2) **[Figure 10-160-1]**.

Move the top of the alternator outward **[Figure 10-160-1]** to tighten the belt.

Figure 10-160-2



The tension is correct with 5/16 in. (8 mm) belt movement at mid span (Item 1) **[Figure 10-160-2]** when 15 lb. (67 N) force is applied to the belt.

Tighten the mounting bolt (Item 1) and adjustment bolt (Item 2) **[Figure 10-160-1]**.

Belt Replacement

Loosen the mounting bolt (Item 1) and adjustment bolt (Item 2) **[Figure 10-160-1]**. and move the alternator all the way in. Remove the belt.

Install the new belt and adjust as shown above.

SAFETY INTERLOCK SYSTEM - NEUTRAL START

Inspection And Maintenance

WARNING

AVOID INJURY OR DEATH

The Safety Interlock System must not allow the compact tractor's engine to be started unless: The operator is in the operator's seat, the PTO lever(s) and the travel control pedal are in neutral. Contact your dealer for service if the Safety Interlock System does not function properly. DO NOT MODIFY THE SYSTEM.

W-2653-0907

The Safety Interlock System - Neutral Start:

The engine will not start unless all the following conditions are present:

1. The operator is seated in the operator's seat.
2. The rear-PTO lever and mid-PTO lever(s) (if equipped) are disengaged (OFF).
3. The travel direction control pedal is in neutral.

The compact tractor's engine must NOT START **unless** the Operator is in the operator's seat, the PTO levers are in neutral, and the travel control pedal is in neutral.

a. Sit in the operator's seat and fasten the seat belt - Put all controls in neutral - Engage the rear-PTO lever - Turn the key to start; **THE ENGINE MUST NOT START**

b. Sit in the operator's seat and fasten the seat belt - Put all controls in neutral - Engage the mid-PTO lever (if equipped) - Turn the key to start; **THE ENGINE MUST NOT START**

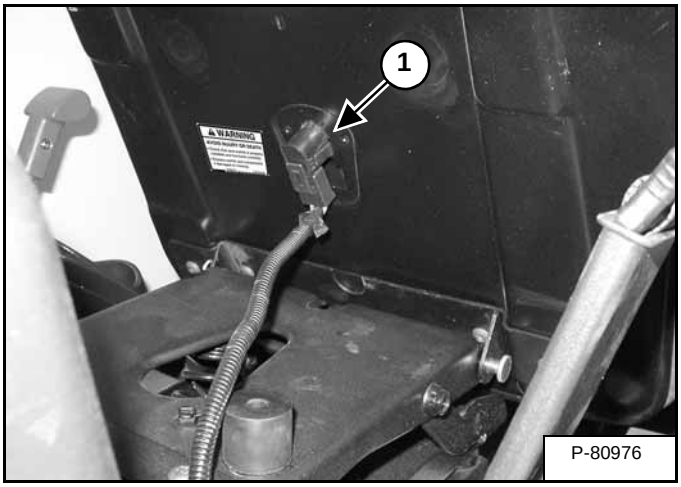
c. Sit in the operator's seat and fasten the seat belt - Put all controls in neutral - Press the Travel Control Pedal in the Forward direction - Turn the key to start; **THE ENGINE MUST NOT START**

d. Sit in the operator's seat and fasten the seat belt - Put all controls in neutral - Press the Travel Control Pedal in the Reverse direction - Turn the key to start; **THE ENGINE MUST NOT START**

e. Sit in the operator's seat and fasten the seat belt - Put all controls in neutral - Raise off of the seat - Turn the key to start; **THE ENGINE MUST NOT START**

If the engine starts after performing any of the above procedures, further troubleshooting and testing must be done.

Figure 10-200-1



The seat switch (Item 1) **[Figure 10-200-1]** is installed in the bottom of the seat. Replace the seat switch and components if damaged or missing. See your Bobcat dealer for parts.

WARNING

AVOID INJURY OR DEATH

- **Check that seat switch is properly installed and functions correctly.**
- **Replace switch and components if damaged or missing.**

W-2676-0907

CLUTCH SYSTEM

Inspection And Maintenance

The clutch can be inspected by measuring pedal free travel.

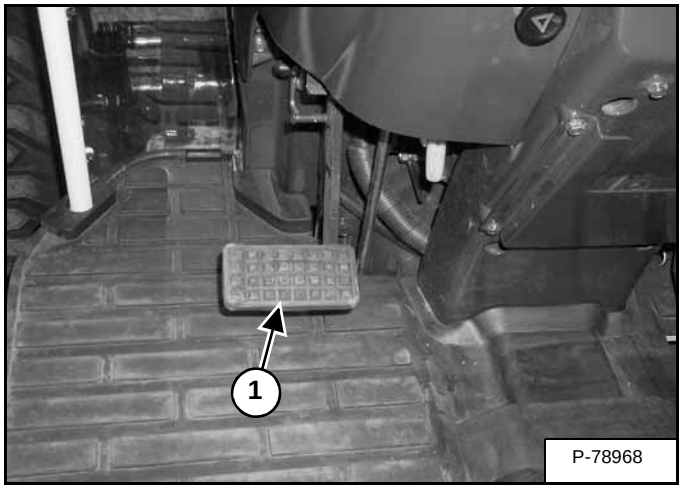
⚠ WARNING

AVOID INJURY OR DEATH

Lock brake pedals together and engage the parking brake, stop the engine and chock both rear tires before inspecting or adjusting clutch.

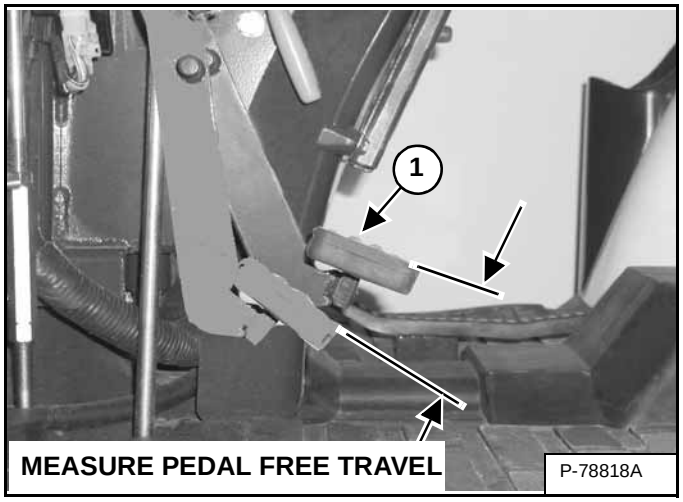
W-2597-0907

Figure 10-250-1



The clutch pedal (Item 1) **[Figure 10-250-1]** must be inspected for proper free travel.

Figure 10-250-2



Lightly press down on the clutch pedal (Item 1) **[Figure 10-250-2]** until resistance is felt.

Measure the distance that the pedal traveled.

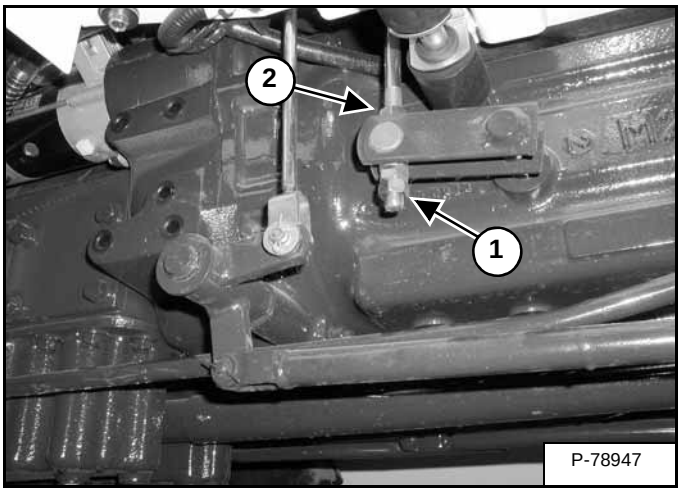
The correct pedal free travel is:

Clutch pedal free travel	0.78 - 1.18 in. (20 - 30 mm)

Adjusting

The adjustment linkage for the clutch pedal is located under the left floor plate.

Figure 10-250-3



To adjust the clutch pedal free travel, loosen the lock nut (Item 1) **[Figure 10-250-3]**.

Turn the nut (Item 2) **[Figure 10-250-3]** up or down to change the clutch pedal travel.

When the clutch pedal has been set to the correct free travel, tighten the lock nut (Item 1) **[Figure 10-250-3]**.

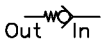
NOTE: If the clutch pedal free travel can not be properly set, the clutch will need to be serviced. (See CLUTCH ASSEMBLY on Page 70-130-1.)

Glossary Of Hydraulic/Hydrostatic Symbols For Compact Tractors (Cont'd)

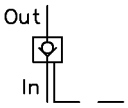
SYMBOL DESCRIPTION

NON–RETURN VALVE, SHUTTLE VALVE: Valve which allows free flow in one direction only

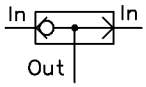
NON–RETURN VALVE (Check Valve) – Used as Replenishing Valve, Load Check Valve or Anticavitation Valve – Opens if the Inlet pressure is higher than the Outlet pressure. Often contains internal spring which has NO significant pressure value



SPRING LOADED VALVE (Bypass Valve) – Opens if the Inlet pressure is greater than the Outlet pressure plus the spring pressure



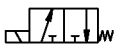
PILOT CONTROLLED NON–RETURN VALVE – It is possible to open the valve by pilot pressure



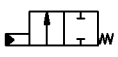
SHUTTLE VALVE – The Inlet port connected to the higher pressure is automatically connected to the Outlet port while the other Inlet port is closed

DIRECTIONAL CONTROL VALVE: Valve providing for the opening (fully or restricted) or the closing of one or more flow paths (represented by several squares)

TWO PORTS and CLOSED FLOW PATHS



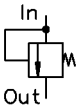
SOLENOID ACTIVATED DIRECTIONAL CONTROL VALVE (Two Position) – controlled by an electric solenoid (with return spring)



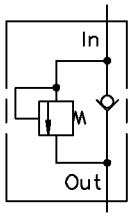
PILOT ACTIVATED DIRECTIONAL CONTROL VALVE (Two Position) – controlled by pressure (with return spring)

SYMBOL DESCRIPTION

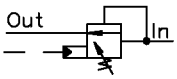
PRESSURE CONTROL VALVE: Valve ensuring the control of pressure



RELIEF VALVE – When the Inlet pressure overcomes the opposing force of the spring, the valve opens permitting flow from the Outlet port.

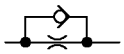


RELIEF/REPLENISHING VALVE or RELIEF/ANTICAVITATION VALVE – When the Inlet pressure overcomes the opposing force of the spring, the valve opens permitting flow from the Outlet port – Allows free flow in the opposite direction



DUAL PRESSURE RELIEF VALVE – When the inlet pressure overcomes the opposing force of the spring, the valve opens permitting flow from the Outlet port. Pilot pressure provides a second pressure value.

FLOW CONTROL VALVE: Valve controlling the flow in one or both directions



ONE WAY RESTRICTOR VALVE (Non–Return Valve with Restriction) – Unit allowing free flow in one direction but restricted flow in the other direction

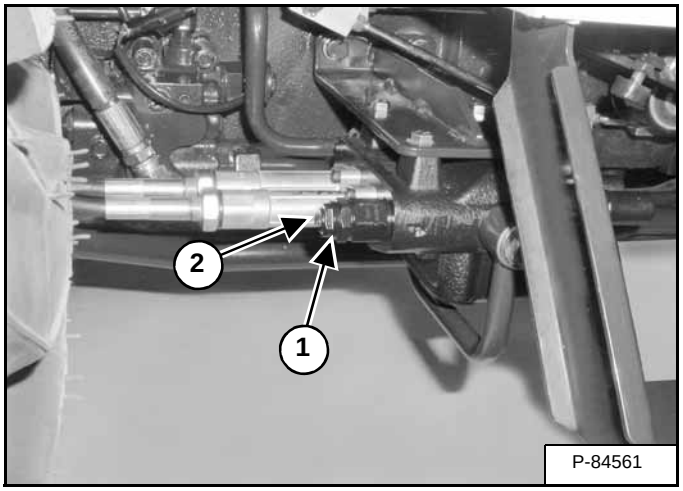
TOW VALVE – Normally in closed position

MS-1892-3

Testing And Adjusting The Main Relief Valve (Cont'd)

For machines equipped with joystick and without rear auxiliary hydraulics (Cont'd)

Figure 20-20-10



Loosen the nut (Item 1) and turn the adjustment screw (Item 2) **[Figure 20-20-10]** clockwise to increase pressure, counter clockwise to decrease pressure.

Retest the main relief valve after adjustment.

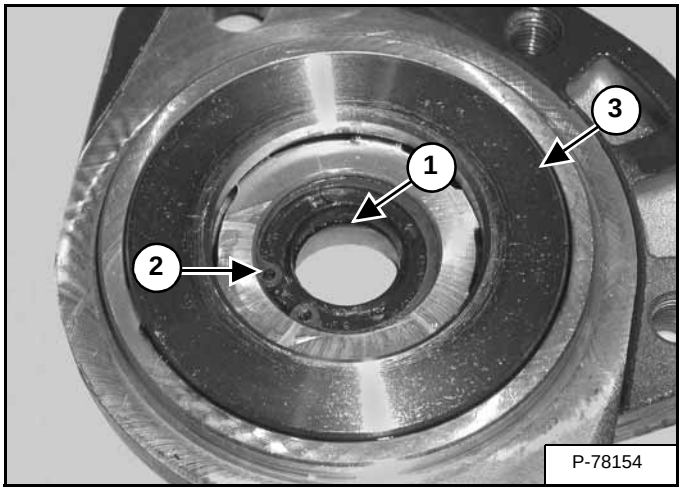
Assembly

Inspect all parts for wear or damage. Replace any worn or damaged parts.

Always install new seals and O-rings. Lubricate all seals and O-rings with clean hydraulic fluid before installation.

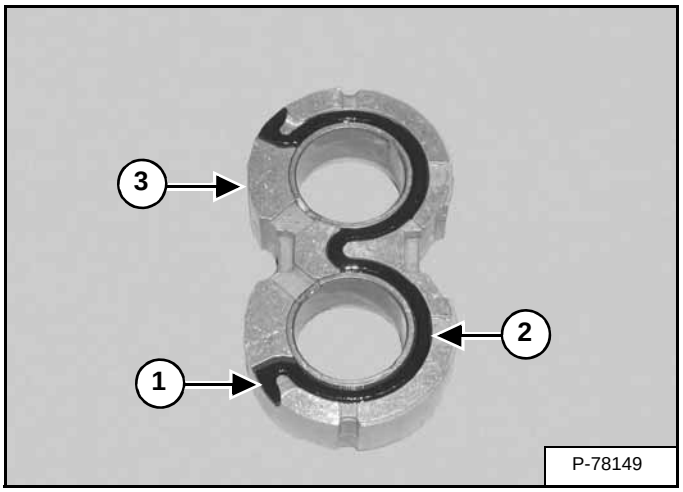
Clean all parts in solvent and dry with compressed air.

Figure 20-30-23



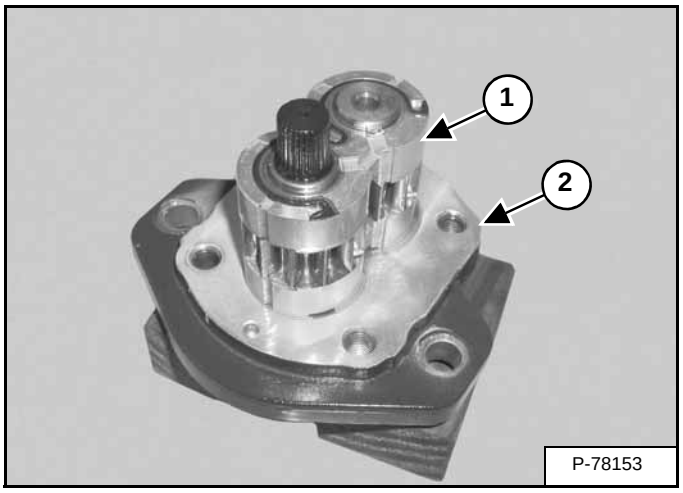
Install the seals (Item 1), snap ring (Item 2) and ring (Item 3) **[Figure 20-30-23]** into the mounting flange.

Figure 20-30-24



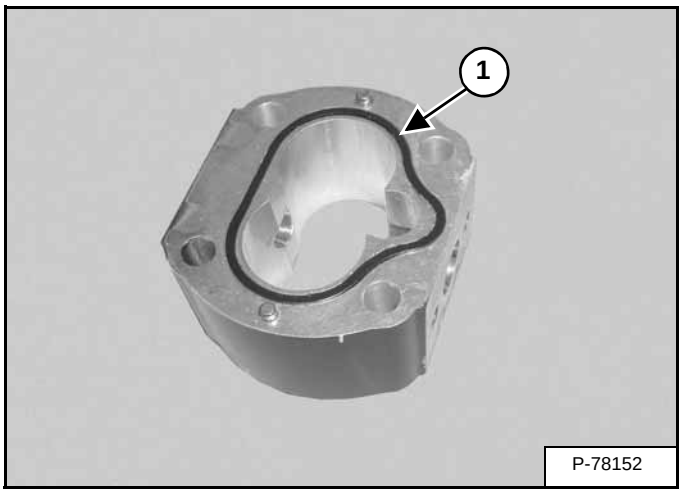
Install the backup ring (Item 1) and seal (Item 2) into the bearing (Item 3) **[Figure 20-30-24]**.

Figure 20-30-25



Assemble the bearings/gears (Item 1) and install onto the mounting flange (Item 2) **[Figure 20-30-25]** in the position shown.

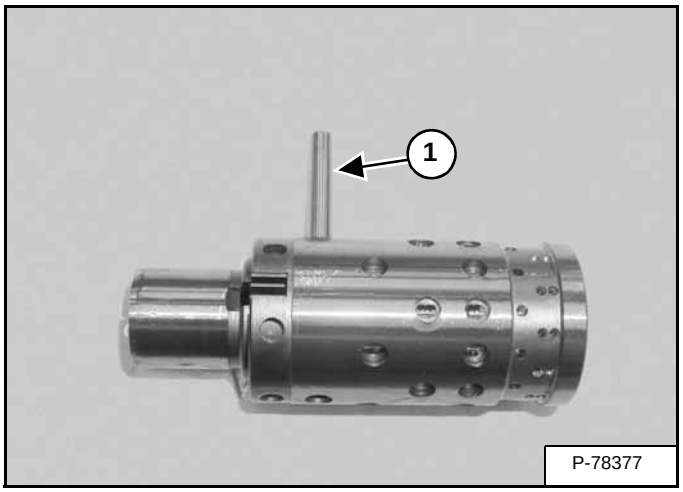
Figure 20-30-26



Install the quad ring (Item 1) **[Figure 20-30-26]** into the housing (both sides).

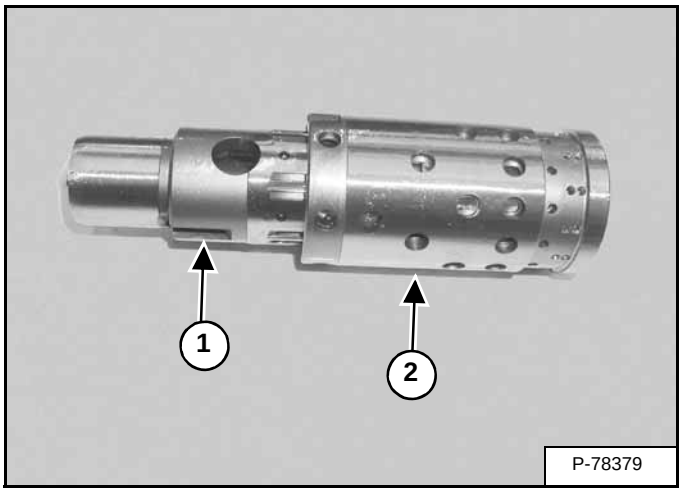
Disassembly (Cont'd)

Figure 20-40-21



Remove the drive pin (Item 1) **[Figure 20-40-21]**.

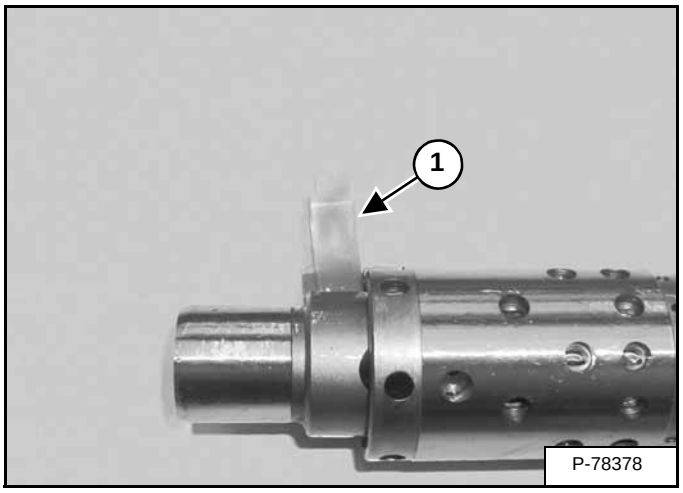
Figure 20-40-22



Remove the spool (Item 1) from the sleeve (Item 2) **[Figure 20-40-22]**.

NOTE: If the spool and sleeve will not slide or rotate within each other freely or in the housing, they must replaced.

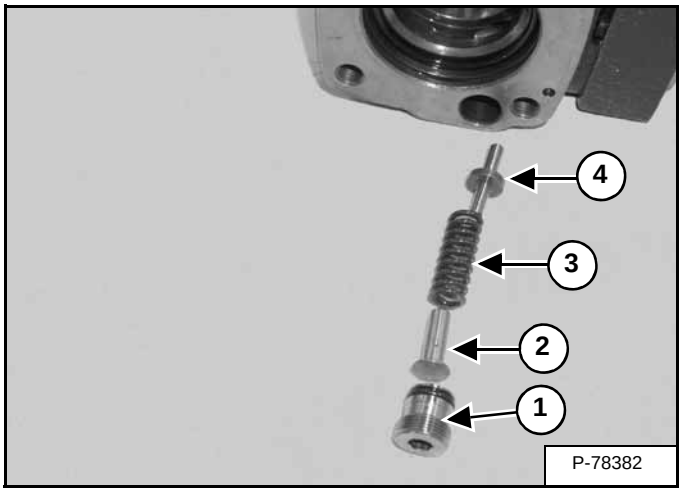
Figure 20-40-23



Remove the springs (Item 1) **[Figure 20-40-23]** from the spool.

NOTE: There are six springs positioned three per side and back to back.

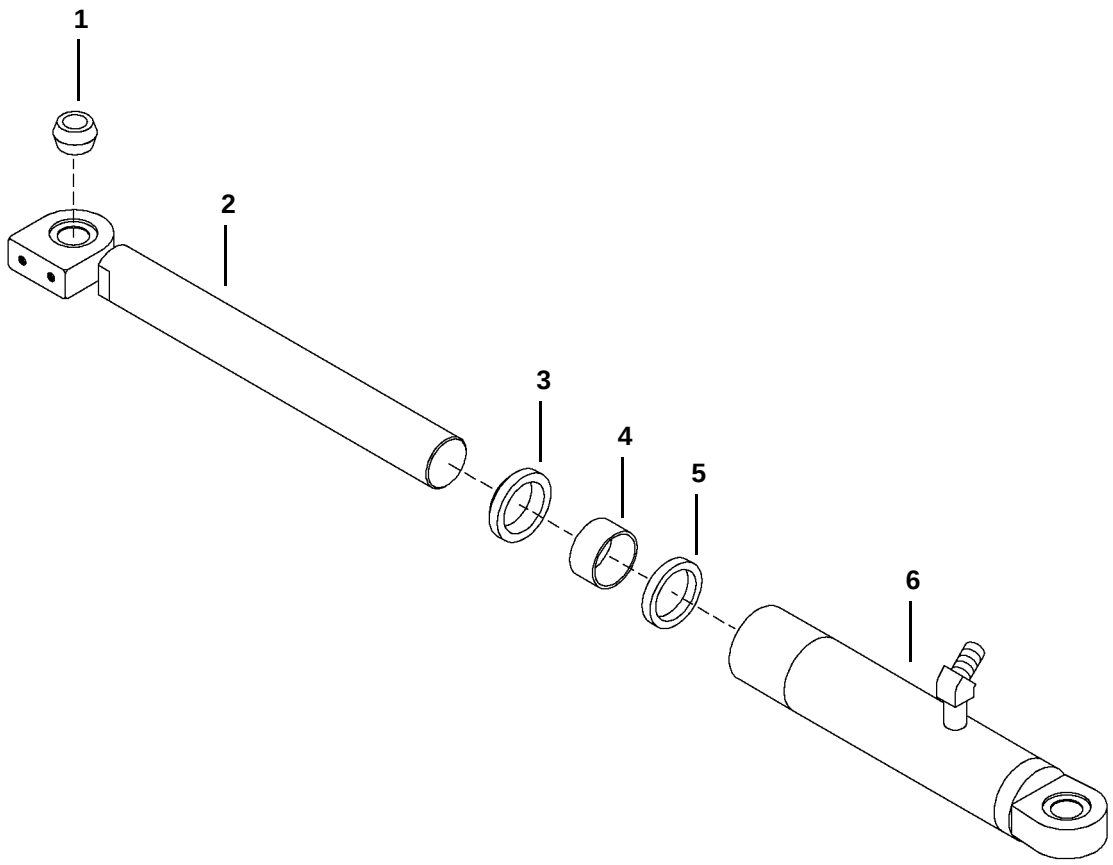
Figure 20-40-24



Remove the check valve plug (Item 1), piston (Item 2), spring (Item 3) and poppet (Item 4) **[Figure 20-40-24]** from the housing.

Parts Identification

1. Bearing
2. Rod
3. Dust Seal
4. Bushing
5. Seal
6. Housing



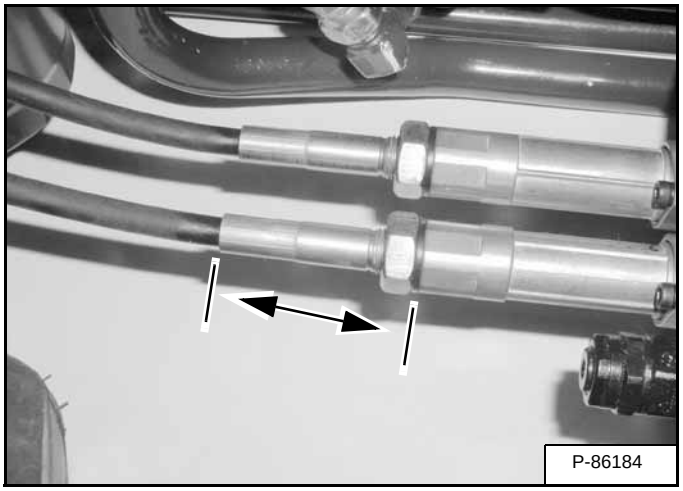
MS2512S

RIGHT JOYSTICK VALVE (IF EQUIPPED)

Removal And Installation

NOTE: The fender is removed for photo clarity.

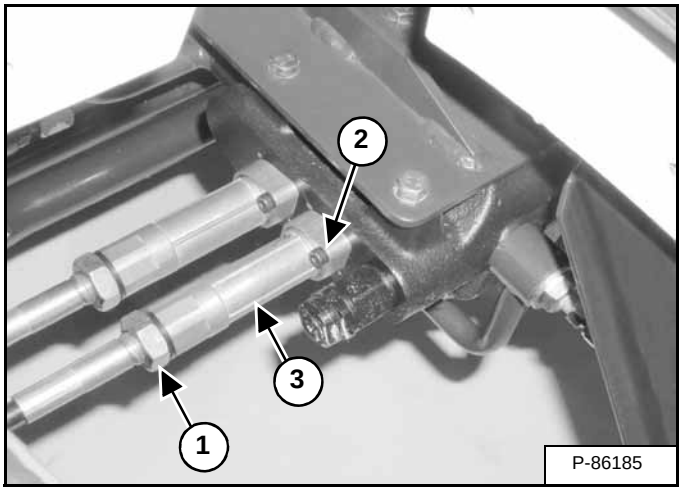
Figure 20-61-1



Measure and record the cable dimension as shown **[Figure 20-61-1]**.

NOTE: The factory measurement is approximately 2.75 in. (70 mm).

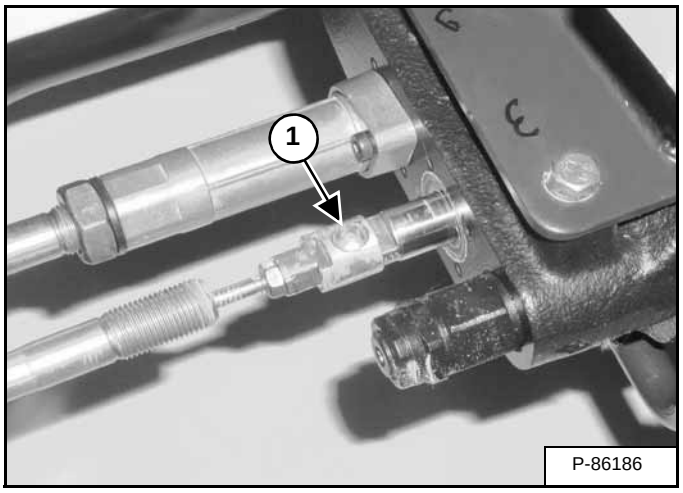
Figure 20-61-2



Loosen the nut (Item 1) and remove the two screws (Item 2). Unthread the flange (Item 3) **[Figure 20-61-2]** from the cable.

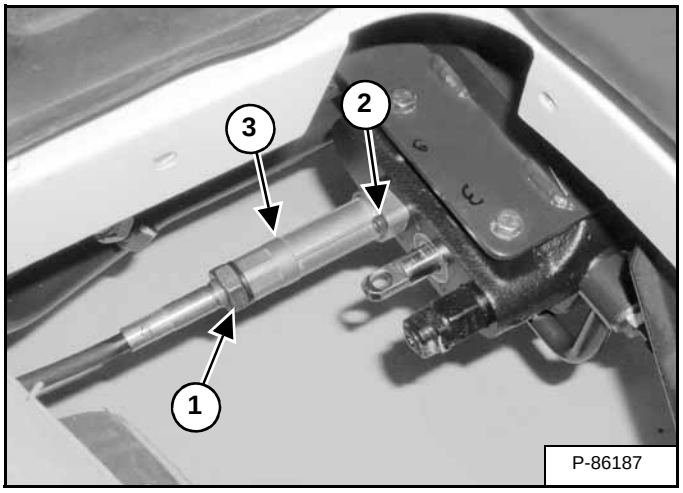
Installation: Tighten the screws (Item 2) **[Figure 20-61-2]** to 7 ft.-lb. (6,6 N•m) torque.

Figure 20-61-3



Remove the pin (Item 1) **[Figure 20-61-3]**.

Figure 20-61-4

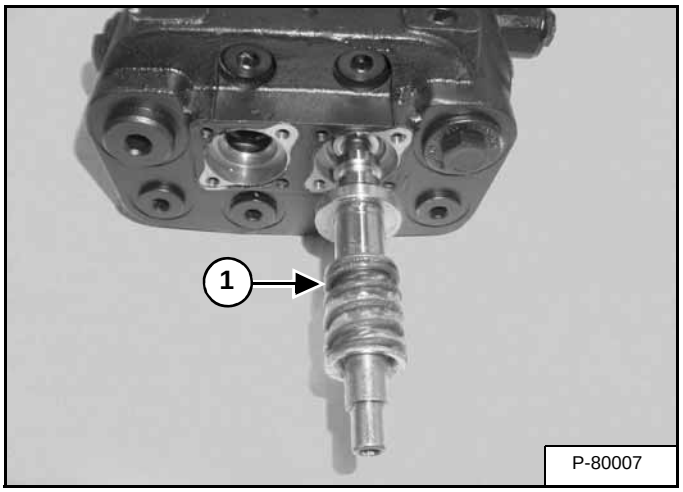


Loosen the nut (Item 1) and remove the two screws (Item 2). Unthread the flange (Item 3) **[Figure 20-61-4]** from the cable.

Installation: Tighten the screws (Item 2) to 7 ft.-lb. (6,6 N•m) torque.

Assembly (Cont'd)

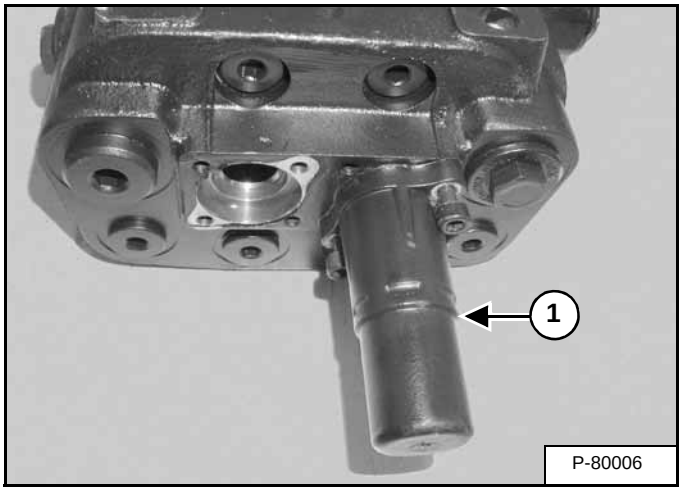
Figure 20-61-33



Install the spool (Item 1) **[Figure 20-61-33]** into the valve body.

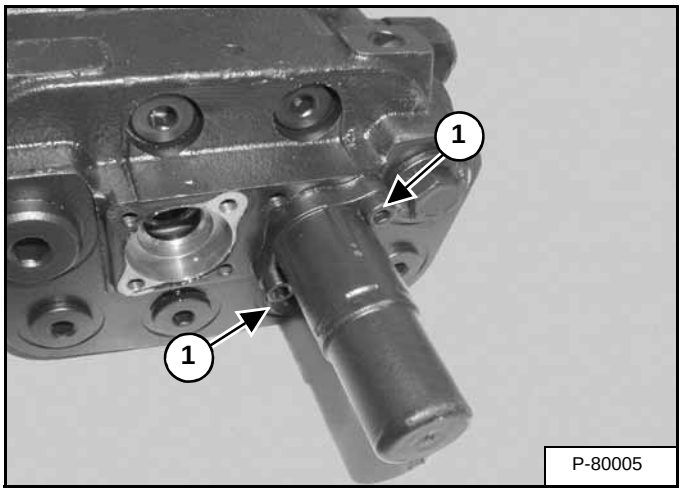
NOTE: The spools are not interchangeable and must be installed into the same bore they were removed from.

Figure 20-61-34



Install the spool cap (Item 1) **[Figure 20-61-34]**.

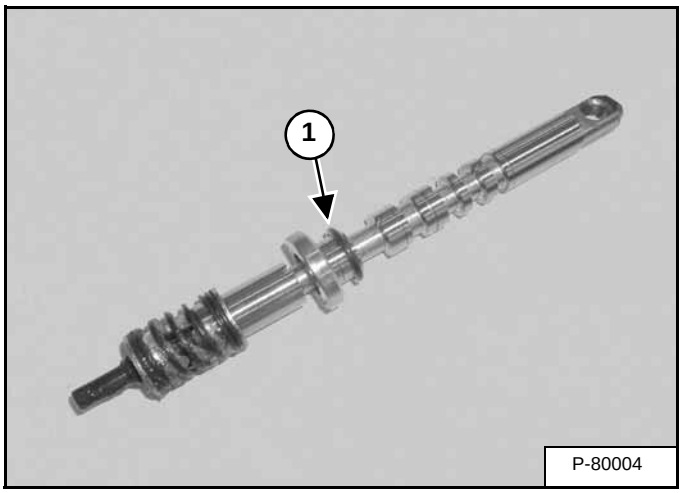
Figure 20-61-35



Install the two screws (Item 1) **[Figure 20-61-35]**.

Tighten the screws to 7 ft.-lb. (6,6 N•m) torque.

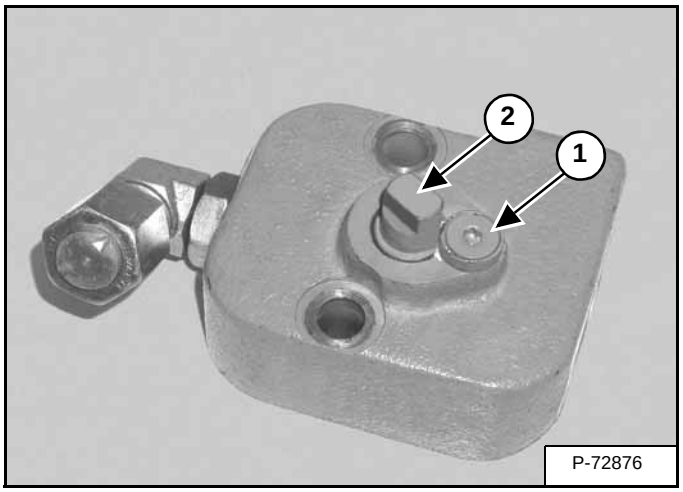
Figure 20-61-36



Install the O-ring (Item 1) **[Figure 20-61-36]** onto the float spool.

Inlet Valve Section Disassembly & Assembly (Cont'd)

Figure 20-100-8

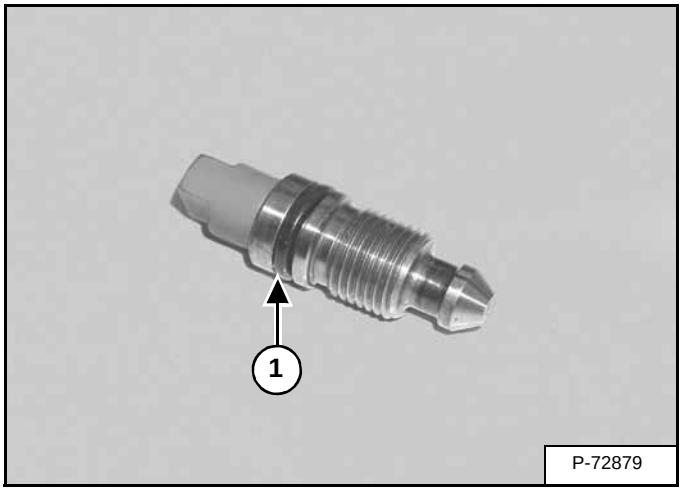


Remove the screw and retainer (Item 1) **[Figure 20-100-8]**.

NOTE: Record the position of the metering spool (Item 2) [Figure 20-100-8].

Remove the metering spool (Item 2) **[Figure 20-100-8]**.

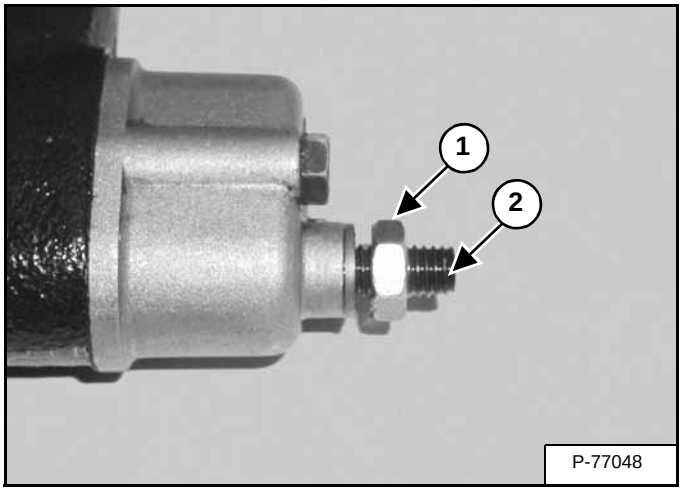
Figure 20-100-9



Remove the O-ring (Item 1) **[Figure 20-100-9]** from the metering spool.

No. 2 Valve Section Disassembly And Assembly (Cont'd)

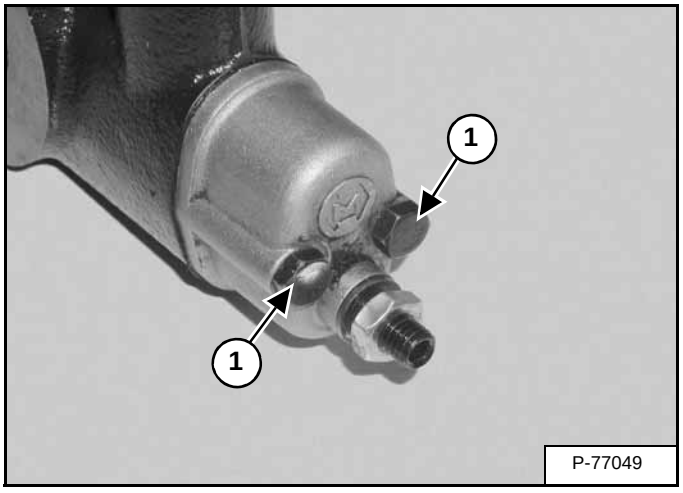
Figure 20-100-38



Loosen the jam nut (Item 1) **[Figure 20-100-38]**.

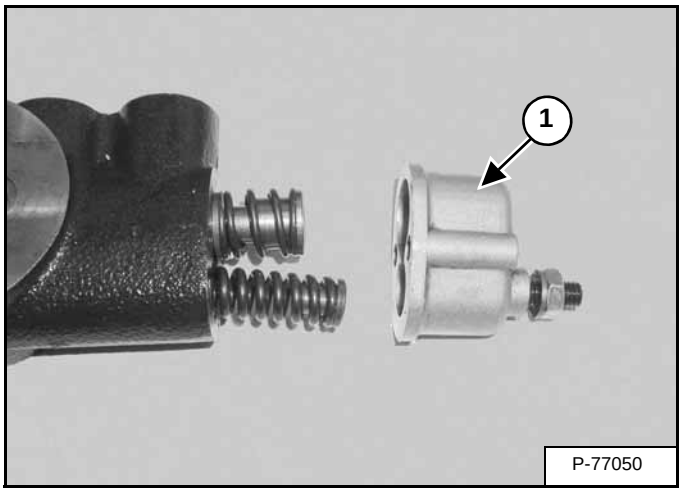
Loosen the adjustment screw (Item 2) **[Figure 20-100-38]**.

Figure 20-100-39



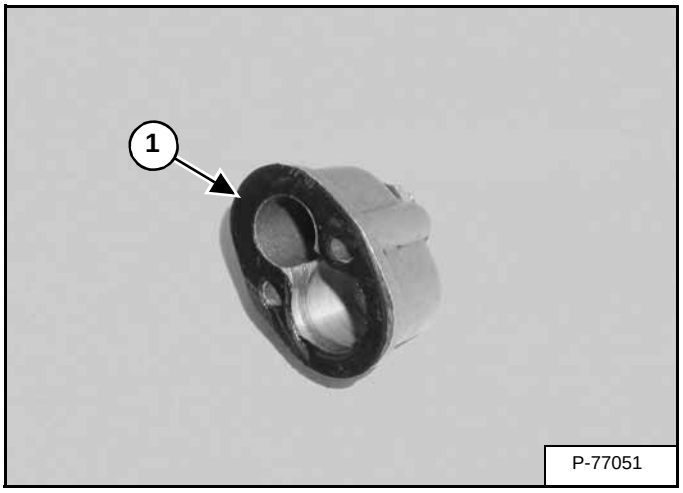
Remove the two bolts (Item 1) **[Figure 20-100-39]**.

Figure 20-100-40



Remove the end cap (Item 1) **[Figure 20-100-40]**.

Figure 20-100-41



Remove the gasket (Item 1) **[Figure 20-100-41]** and replace.

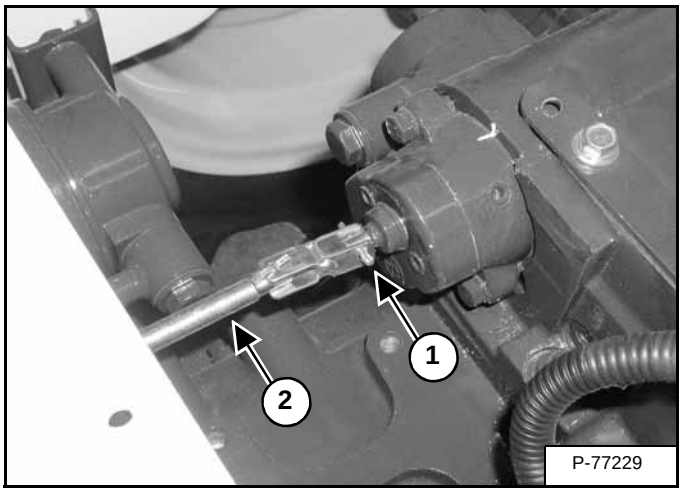
MLS VALVE

Removal And Installation

Drain the transmission. (See Checking And Adding Fluid on Page 10-120-1.)

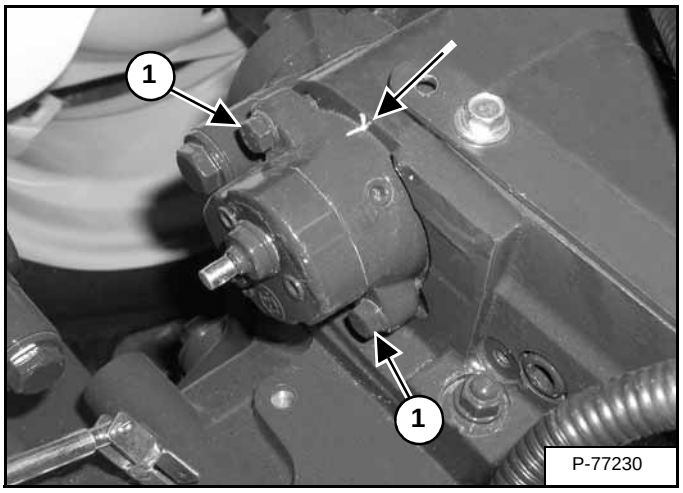
Remove the operator seat. (See Removal And Installation on Page 50-10-1.)

Figure 20-120-1



Remove the cotter pin (Item 1) and lower the shaft (Item 2) **[Figure 20-120-1]**.

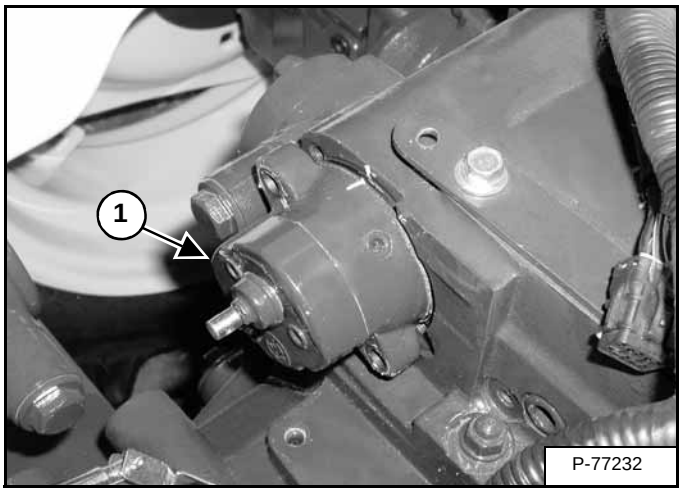
Figure 20-120-2



Mark the MLS valve assembly for correct installation and remove the two bolts (Item 1) **[Figure 20-120-2]**.

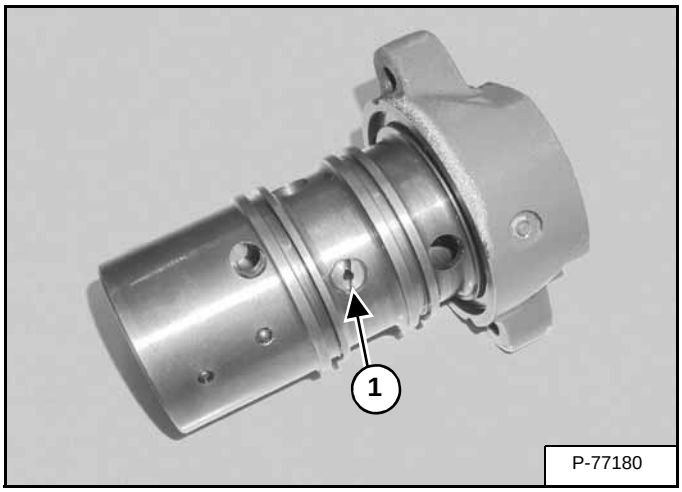
Installation: Tighten the two bolts evenly to 17 - 20 ft.-lb. (24 - 27 N•m) torque.

Figure 20-120-3



Remove the MLS valve assembly (Item 1) **[Figure 20-120-3]**.

Figure 20-120-35



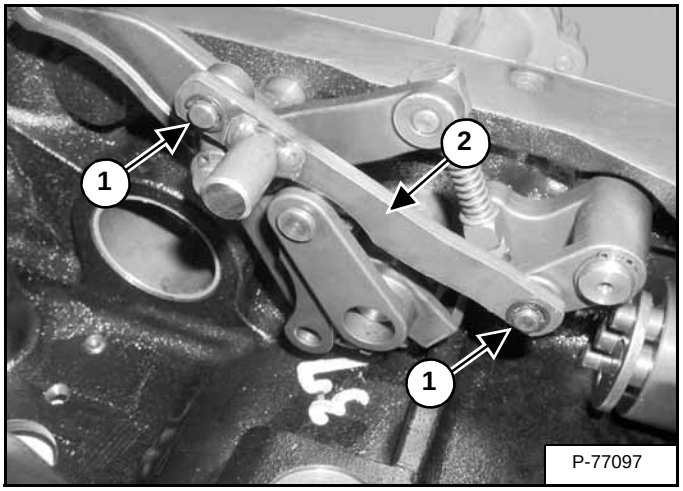
Remove the orifice (Item 1) **[Figure 20-120-35]** from the valve body.

THREE POINT CYLINDER CONTROL

Disassembly And Assembly

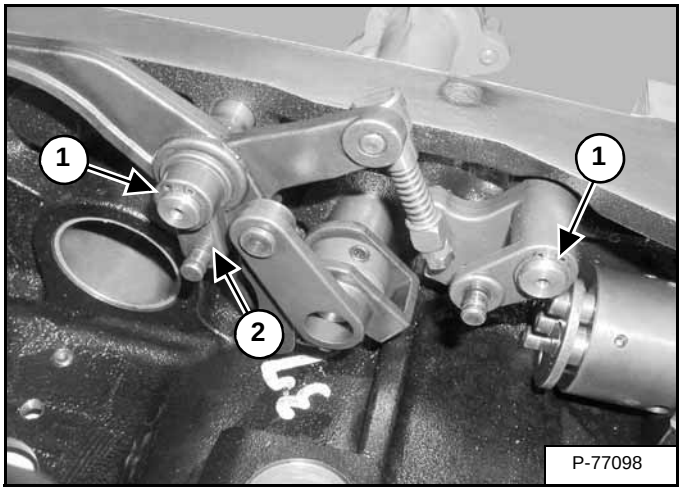
Remove the three point cylinder. (See Disassembly And Assembly on Page 20-130-1.)

Figure 20-140-1



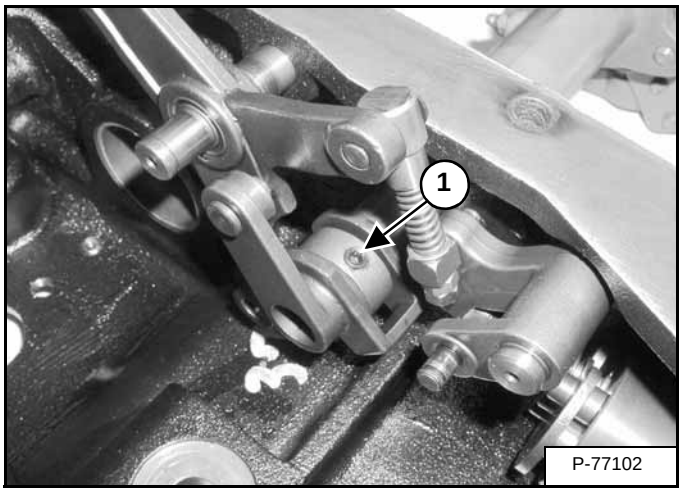
Remove the two “C” clips (Item 1) and safety rod (Item 2) **[Figure 20-140-1]**.

Figure 20-140-2



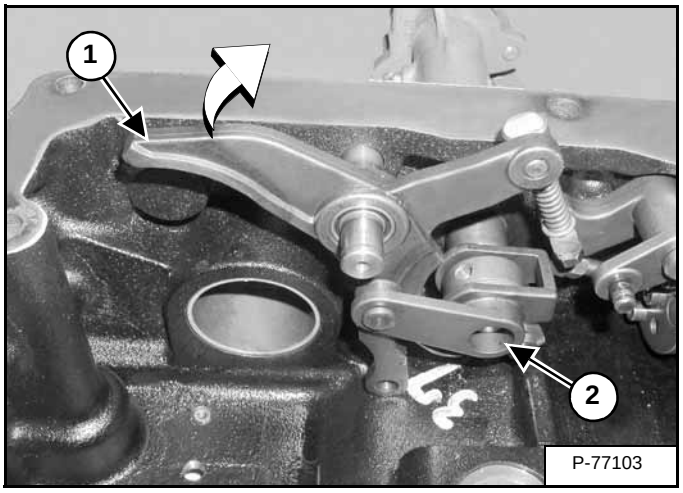
Remove the two snap rings (Item 1) and short linkage (Item 2) **[Figure 20-140-2]**.

Figure 20-140-3



Remove the set screw (Item 1) **[Figure 20-140-3]**.

Figure 20-140-4



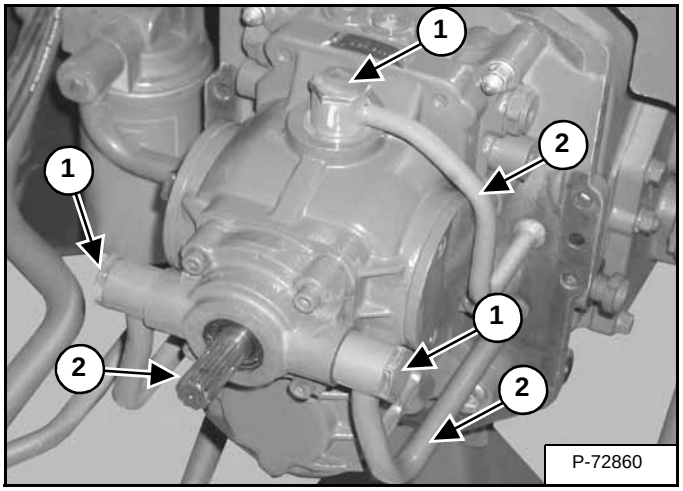
Lift up on the arm (Item 1) and slide the linkage assembly (Item 2) **[Figure 20-140-4]** from the shaft.

HYDROSTATIC PUMP (CT 225 & CT 230)

Removal And Installation

Remove the hydrostatic transmission case. (See Removal And Installation on Page 50-30-1.)

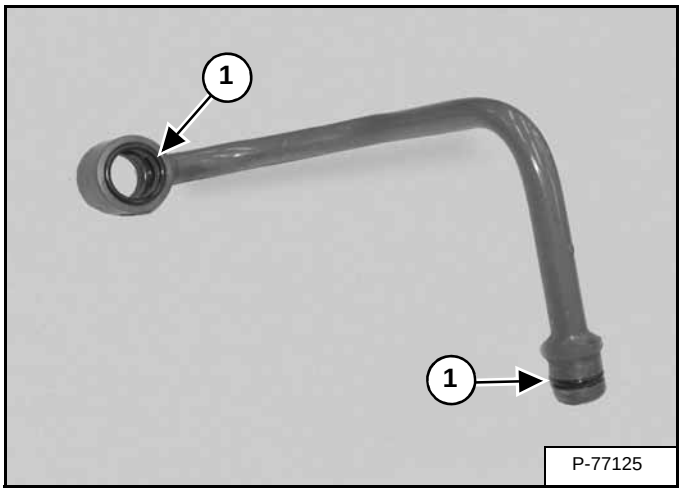
Figure 30-20-1



Remove the three tubeline bolts (Item 1) and pull the three tubelines (Item 2) **[Figure 30-20-1]** from the middle case.

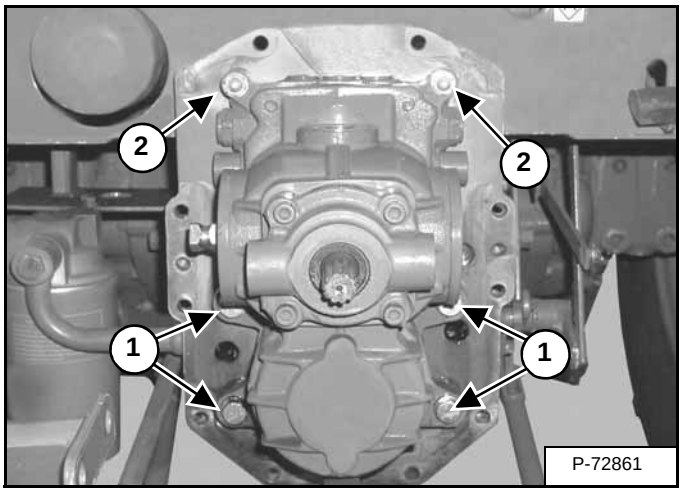
Installation: Tighten the tubeline bolts to 33 ft.-lb. (44 N•m) torque.

Figure 30-20-2



Remove and replace the three O-rings (Item 1) **[Figure 30-20-2]** on the tubelines.

Figure 30-20-3

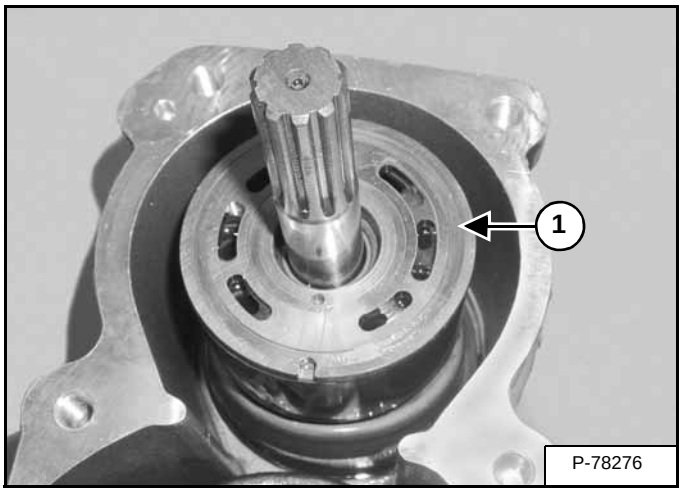


Remove the four bolts (Item 1) and nuts (Item 2) **[Figure 30-20-3]** and remove the hydrostatic pump.

Installation: Tighten to 35 - 41 ft.-lb. (47 - 56 N•m) torque.

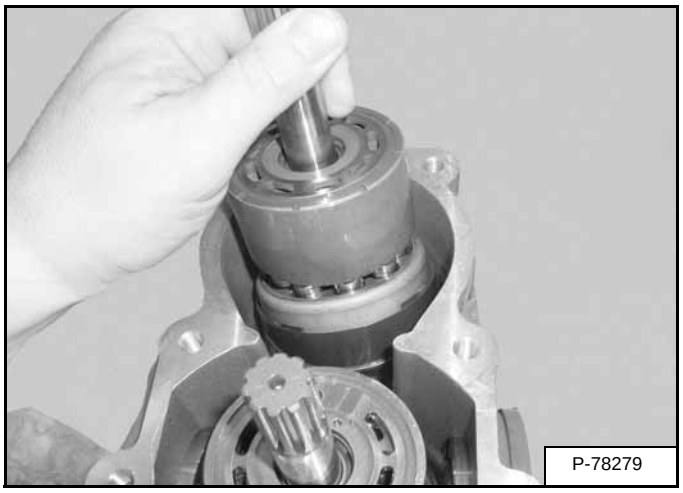
Disassembly (Cont'd)

Figure 30-20-36



Mark the valve plate (Item 1) **[Figure 30-20-36]** location and remove.

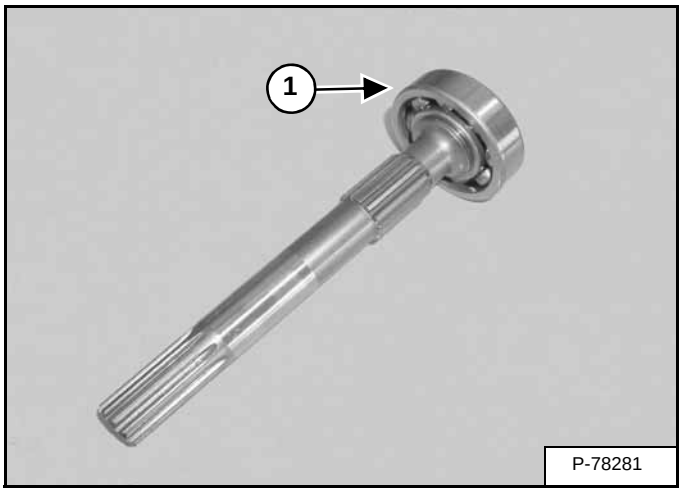
Figure 30-20-37



Remove the cylinder block/pistons by pulling upward on the shaft **[Figure 30-20-37]**.

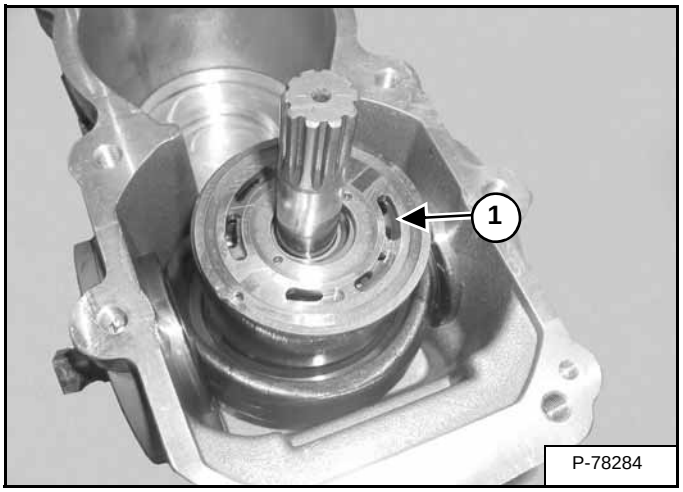
Remove the shaft assembly from the cylinder block/pistons.

Figure 30-20-38



Remove the bearing (Item 1) **[Figure 30-20-38]** from the shaft.

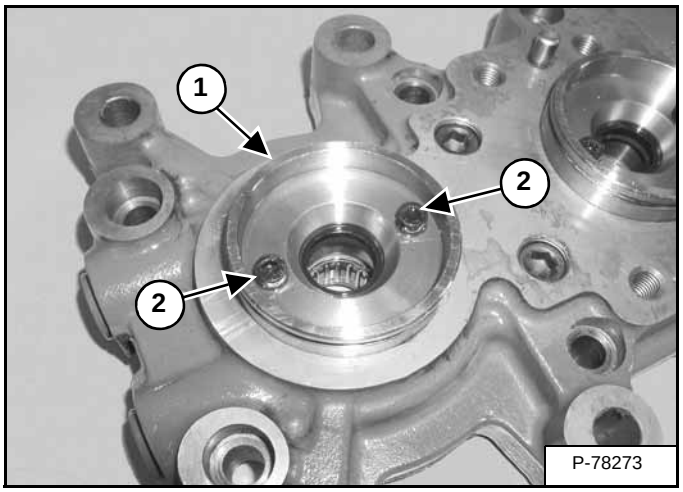
Figure 30-20-39



Mark the valve plate (Item 1) **[Figure 30-20-39]** location and remove.

Assembly (Cont'd)

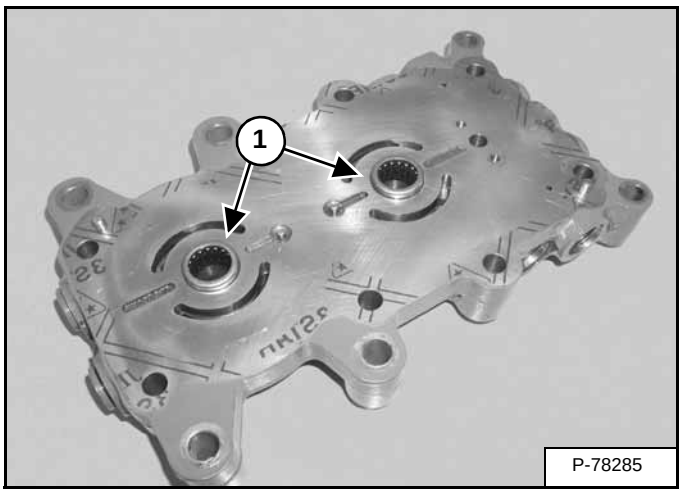
Figure 30-20-74



Install the seal cover (Item 1) and the two bolts (Item 2) **[Figure 30-20-74]**.

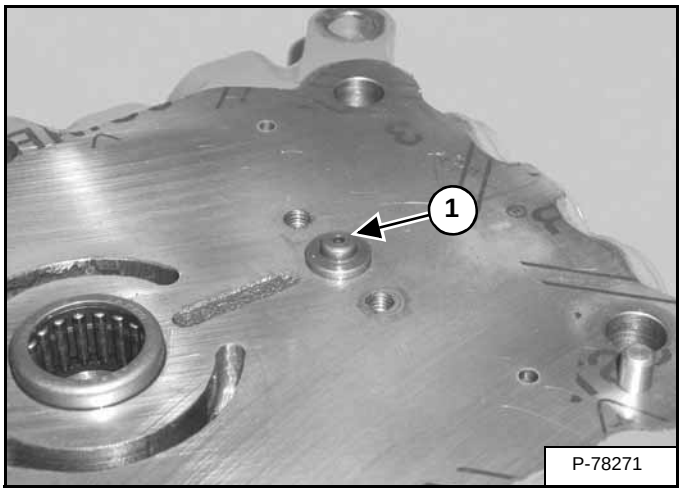
Repeat above procedures for second seal cover.

Figure 30-20-75



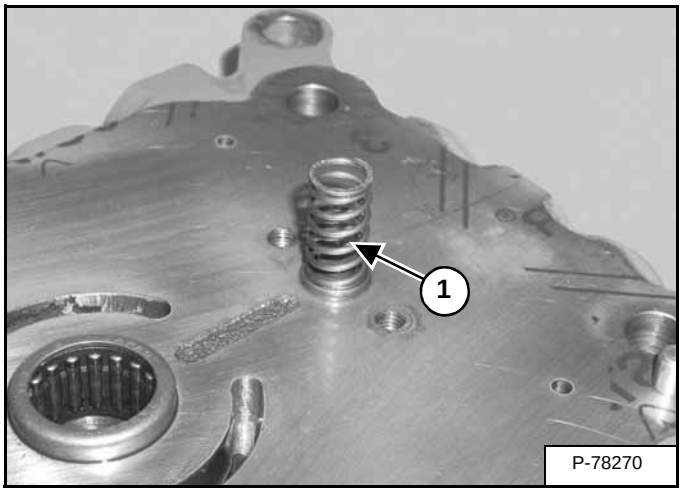
Install the two bearings (Item 1) **[Figure 30-20-75]**.

Figure 30-20-76



Install the charge relief valve (Item 1) **[Figure 30-20-76]**.

Figure 30-20-77



Install the spring (Item 1) **[Figure 30-20-77]** onto the check valve.

Disassembly

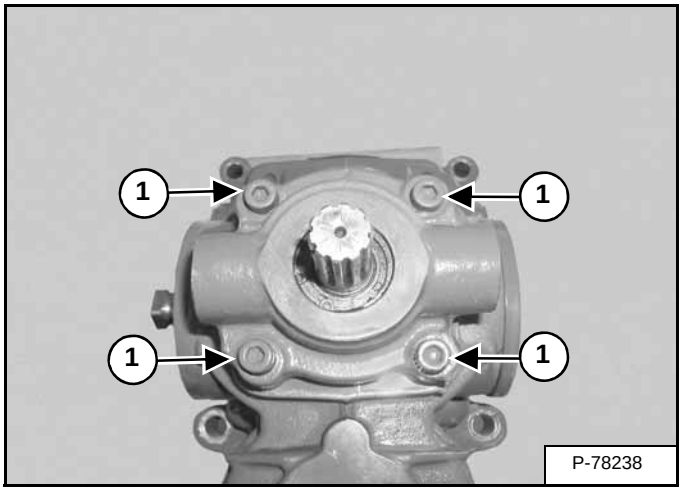
IMPORTANT

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

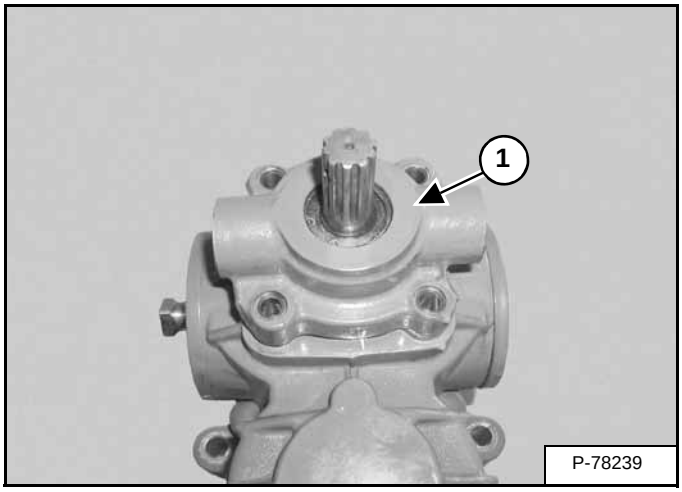
Mark the housing for ease of assembly.

Figure 30-21-4



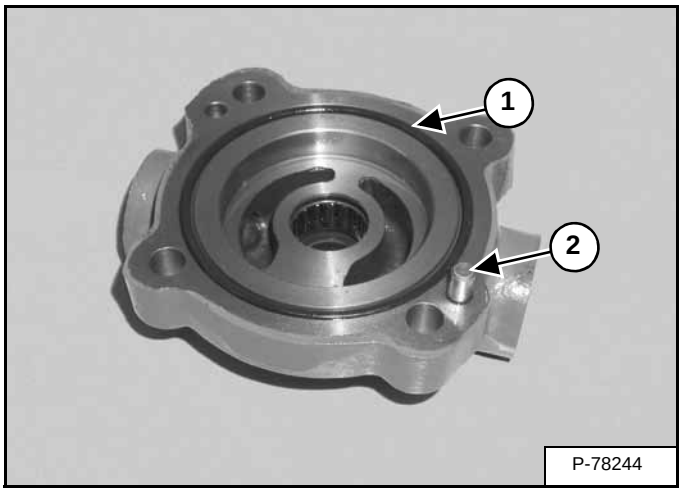
Remove the four bolts (Item 1) **[Figure 30-21-4]**.

Figure 30-21-5



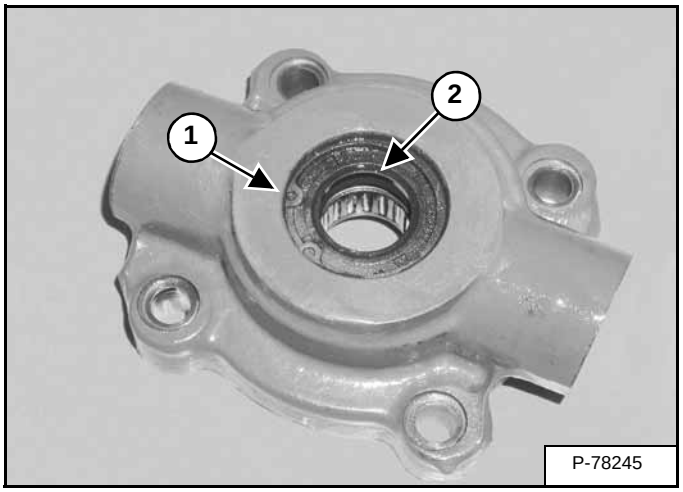
Remove the charge pump cover (Item 1) **[Figure 30-21-5]**.

Figure 30-21-6



Remove the O-ring (Item 1) and pin (Item 2) **[Figure 30-21-6]** from the charge pump cover.

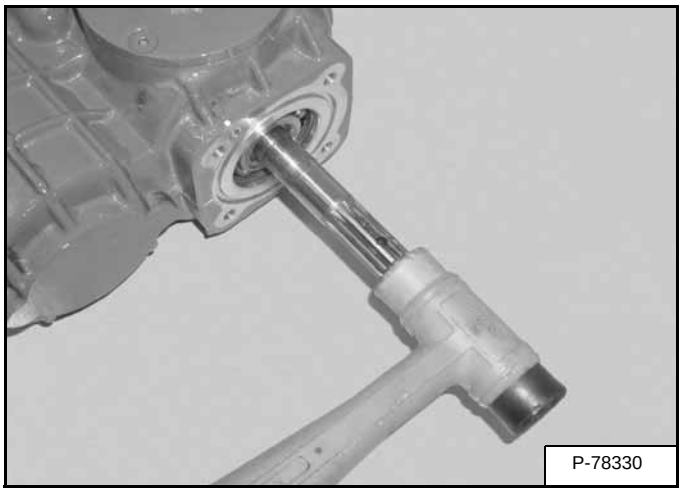
Figure 30-21-7



Remove the snap ring (Item 1) and seal (Item 2) **[Figure 30-21-7]**.

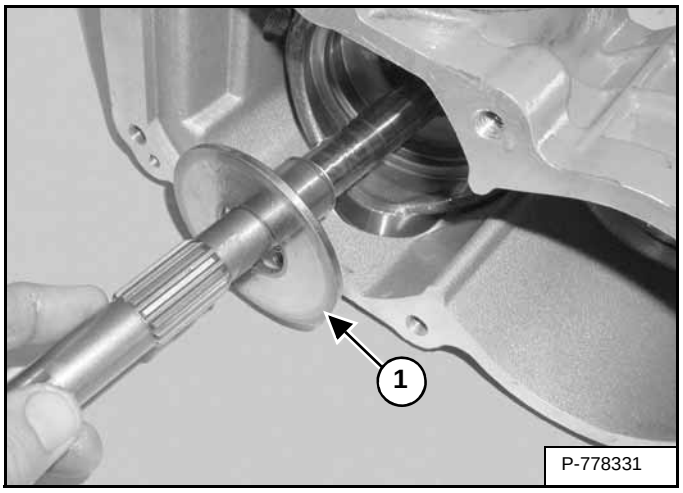
Disassembly (Cont'd)

Figure 30-21-44



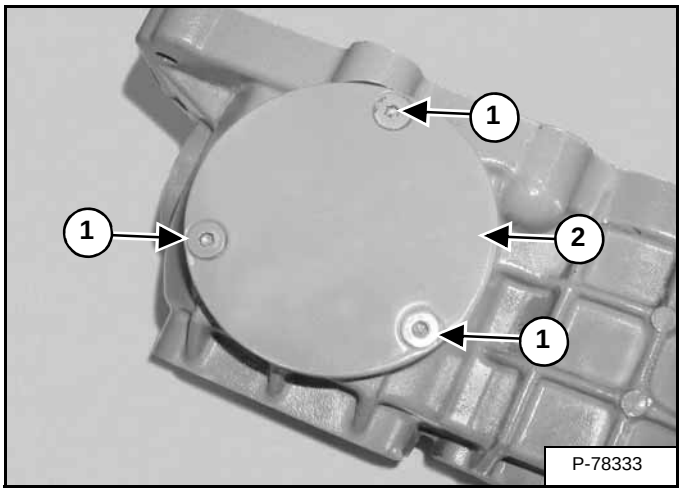
Using a soft faced hammer, remove the shaft (Item 2) **[Figure 30-21-44]**.

Figure 30-21-45



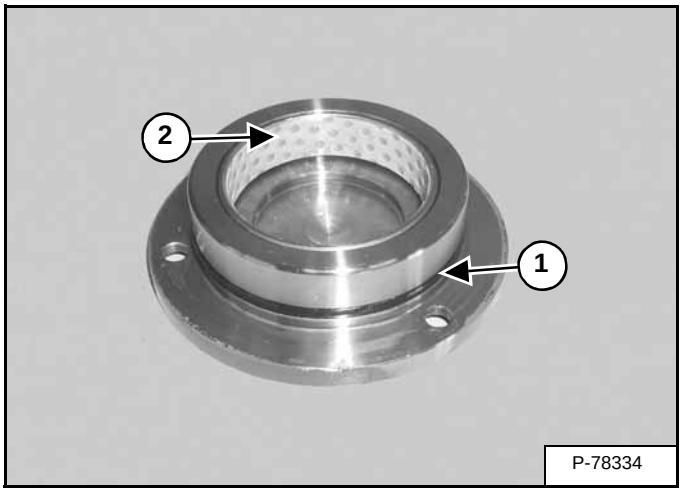
NOTE: When the shaft is removed the shoe plate (Item 1) [Figure 30-21-45] will be removed.

Figure 30-21-46



Remove the three bolts (Item 1) and side cover (Item 2) **[Figure 30-21-46]**.

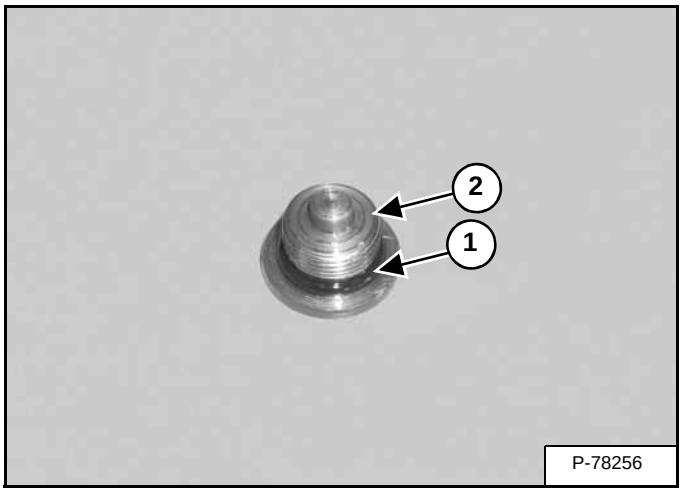
Figure 30-21-47



Remove the O-ring (Item 1) and seal (Item 2) **[Figure 30-21-47]** from the side cover.

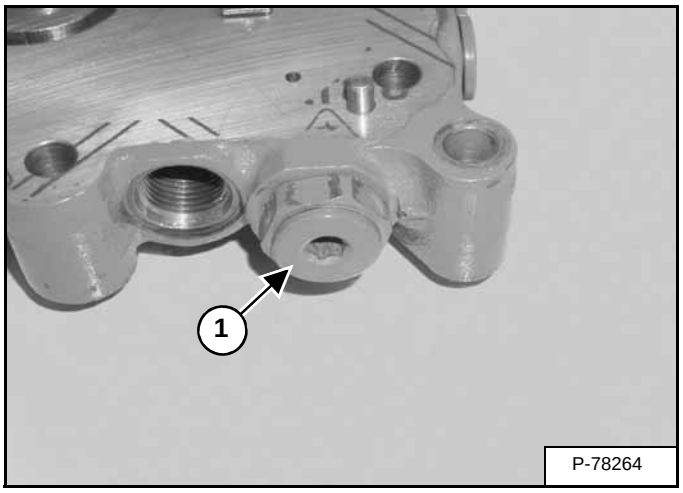
Assembly (Cont'd)

Figure 30-21-83



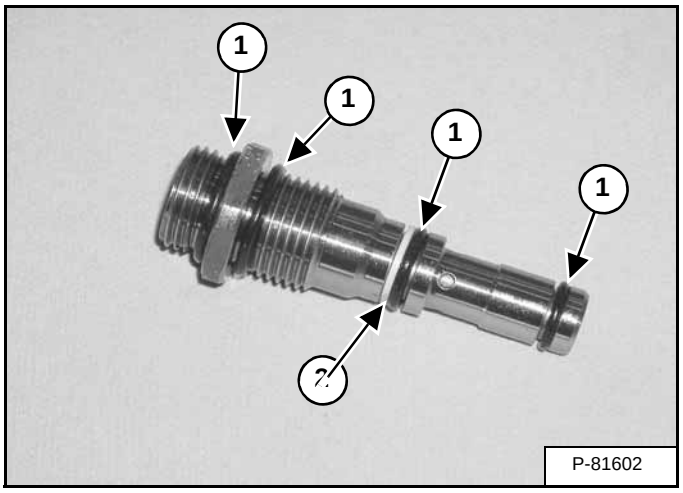
Install a new O-ring (Item 1) on the plug (Item 2) **[Figure 30-21-83]**.

Figure 30-21-84



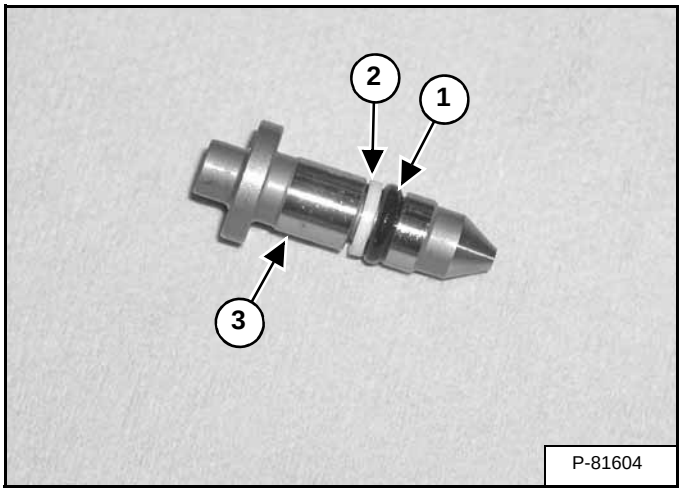
Install the plug (Item 1) **[Figure 30-21-84]**.

Figure 30-21-85



Install the four O-rings (Item 1) and backup ring (Item 2) **[Figure 30-21-85]** onto the valve assembly.

Figure 30-21-86



Install the O-ring (Item 1) and backup ring (Item 2) onto the check valve (Item 3) **[Figure 30-21-86]**.

HYDROSTATIC PUMP TESTING (CONT'D)

Forward Drive Relief Testing

All testing is done with the hydraulic oil at operating temperature.

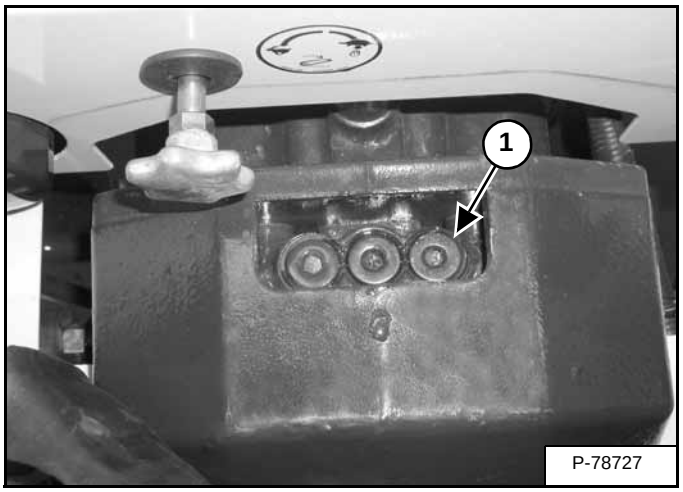
The following tools will be needed for the testing of the drive pressure:

MEL1654 - Compact Tractor Hydraulic Test Kit

Support the compact tractor on jackstands. (See Procedure on Page 10-10-1.)

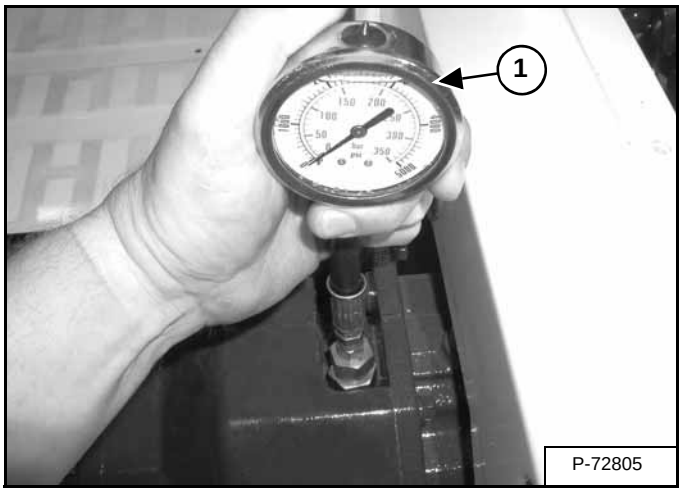
Remove the floor mat. (See Removal And Installation on Page 50-70-1.)

Figure 30-30-5



Remove the plug (Item 1) **[Figure 30-30-5]** from the hydrostatic pump.

Figure 30-30-6



Install the adapter / 5000 PSI gauge (Item 1) **[Figure 30-30-6]** into the hydrostatic pump.

With the aid of an assistant, start the engine, apply and **hold** the brake, increase the engine speed to full RPM, and engage the travel pedal to the forward position.

The drive pressure for the CT225 / 230 should be 4061 psi (280 bar).

The drive pressure for the CT235 should be 4351 psi (300 bar).

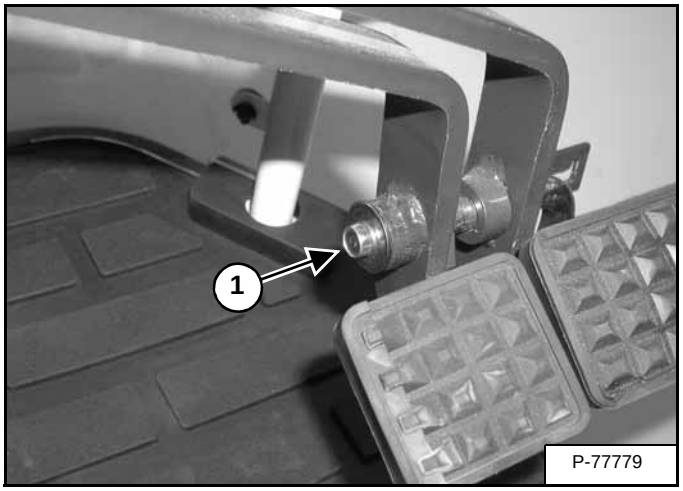
Lower the engine RPM and stop the engine.

BRAKE PEDAL ASSEMBLY

Removal And Installation

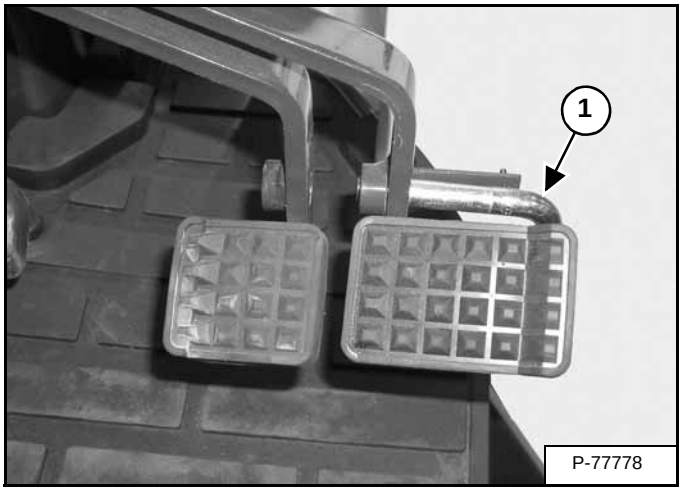
Remove the instrument panel. (See Removal And Installation on Page 60-80-1.)

Figure 40-20-1



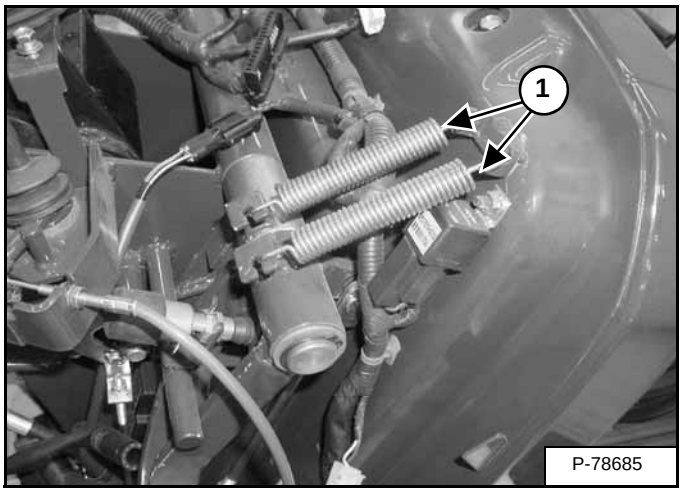
Remove the bolt (Item 1) **[Figure 40-20-1]**, lock washer and washer from the brake pedals.

Figure 40-20-2



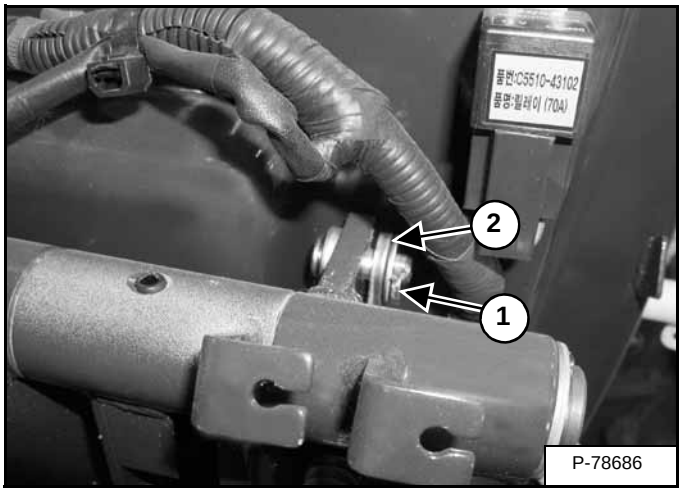
Slide the pedal lock pin (Item 1) **[Figure 40-20-2]** out, separating the brake pedals.

Figure 40-20-3



Remove the two springs (Item 1) **[Figure 40-20-3]**.

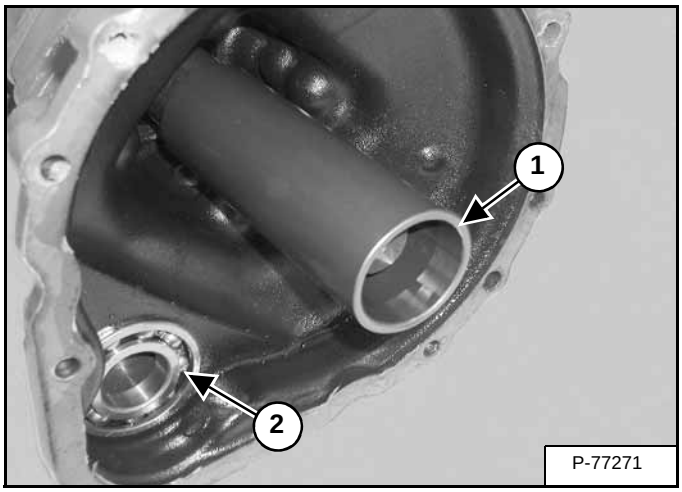
Figure 40-20-4



Remove the cotter pin (Item 1) and washer (Item 2) **[Figure 40-20-4]**.

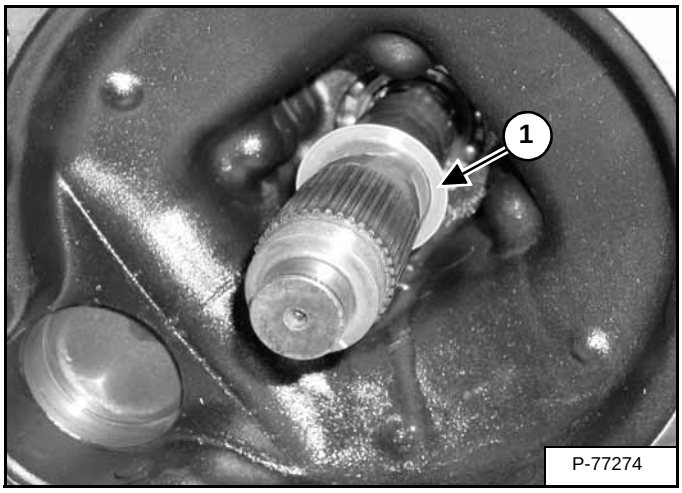
Disassembly And Assembly (Cont'd)

Figure 40-40-10



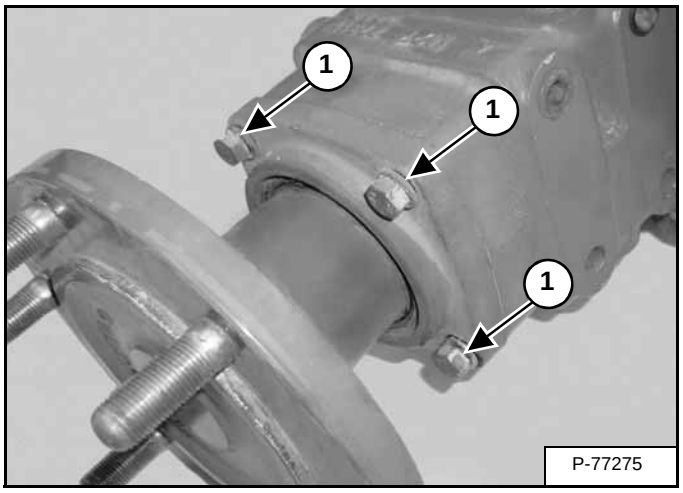
Remove the spacer tube (Item 1) and bearing (Item 2) **[Figure 40-40-10]**

Figure 40-40-11



Remove the copper washer (Item 1) **[Figure 40-40-11]**.

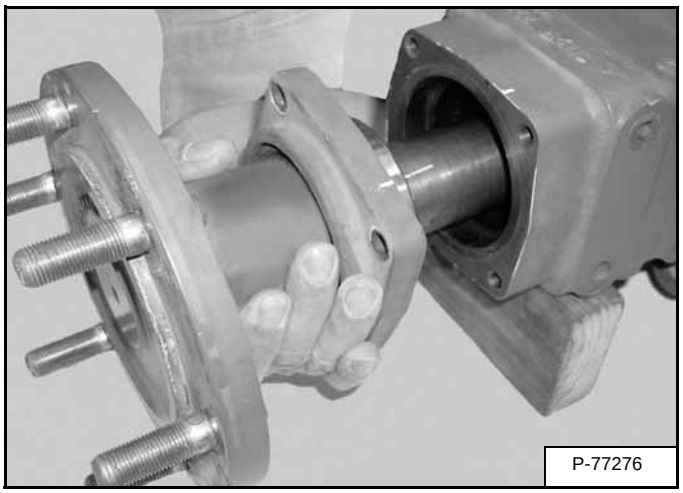
Figure 40-40-12



Remove the four bolts (Item 1) **[Figure 40-40-12]**.

Assembly: Tighten the bolts to 35 ft.-lb. (49 N•m) torque.

Figure 40-40-13

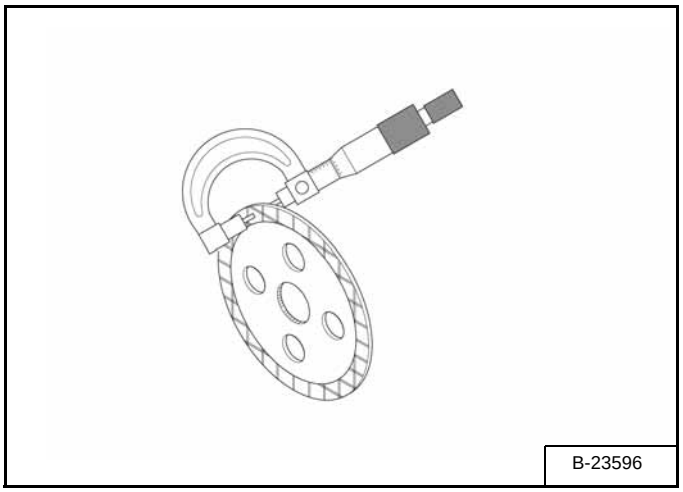


Remove the axle shaft **[Figure 40-40-13]**.

BRAKE CASE (CONT'D)

Inspection

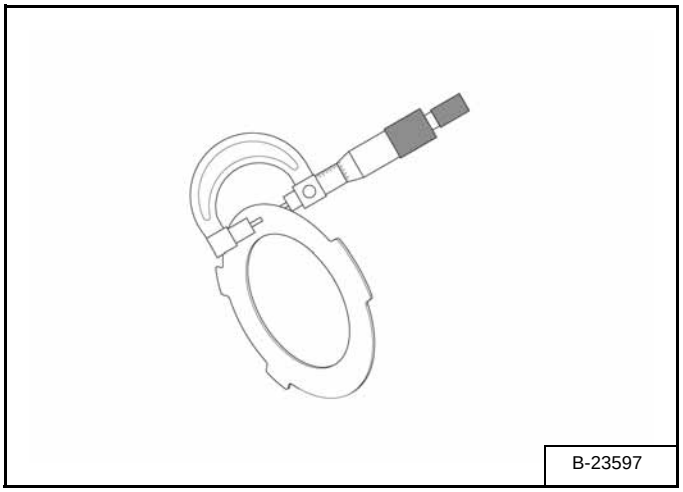
Figure 40-50-20



Measure the thickness of the brake disc **[Figure 40-50-20]**. If the measured value exceeds the allowable limit, replace the brake disc.

Sect.	Specified	Allowable Limit
Thickness of brake disc	0.181 - 0.189 in. (4,60 - 4,80 mm)	0.165 in. (4,2 mm)

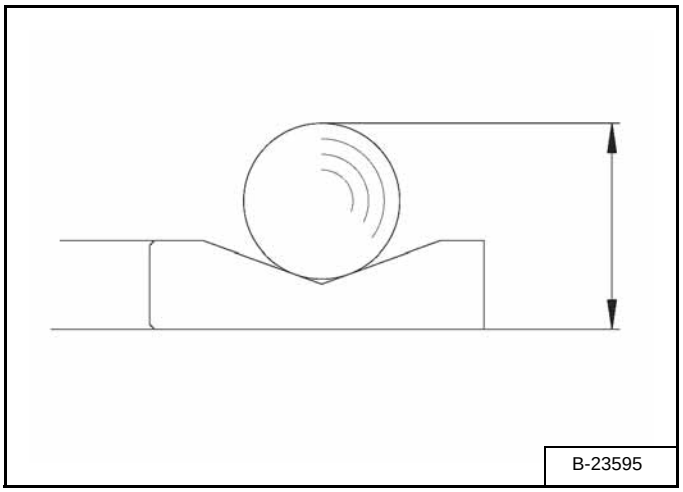
Figure 40-50-21



Measure the thickness of the brake plate **[Figure 40-50-21]**. If the measured value exceeds the allowable limit, replace it.

Sect.	Specified	Allowable Limit
Thickness of brake plate	0.1000 - 0.1047 in. (2,54 - 2,66 mm)	0.0433 in. (2,10 mm)

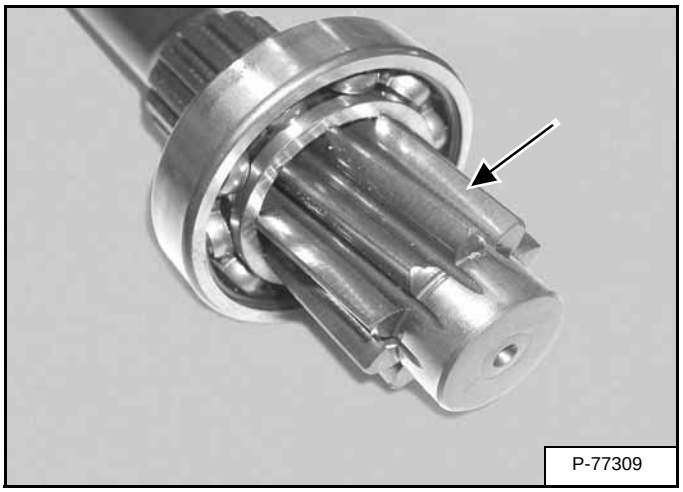
Figure 40-50-22



Seat the ball into the cam plate and measure the height of the ball from the bottom of the cam plate **[Figure 40-50-22]**. If the measured value exceeds the allowable limit, replace the cam plate and ball.

Sect.	Specified	Allowable Limit
Height of ball from bottom of cam plate	0.7909 - 0.7913 in. (20,09 - 21,1 mm)	0.7898 in. (20,06 mm)

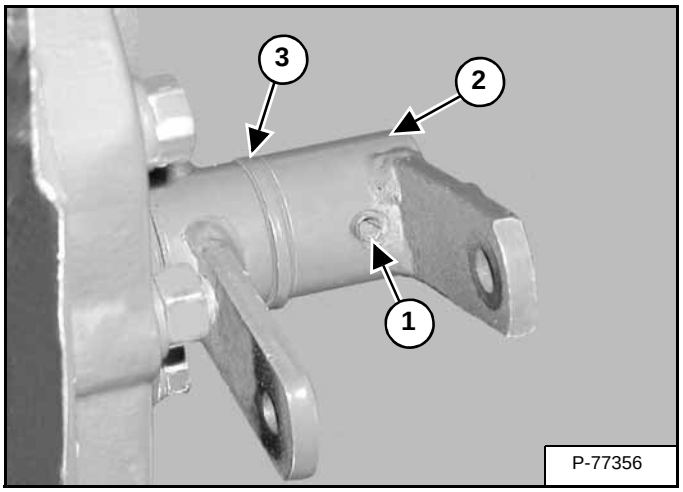
Figure 40-50-23



Inspect the axle shaft teeth for broken or damaged teeth **[Figure 40-50-23]**. Replace axle shaft if damaged.

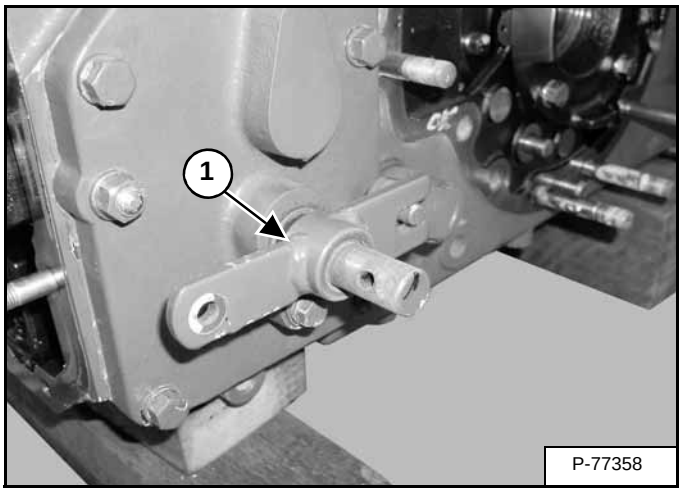
Range Shifter Shaft Group Disassembly

Figure 40-60-19



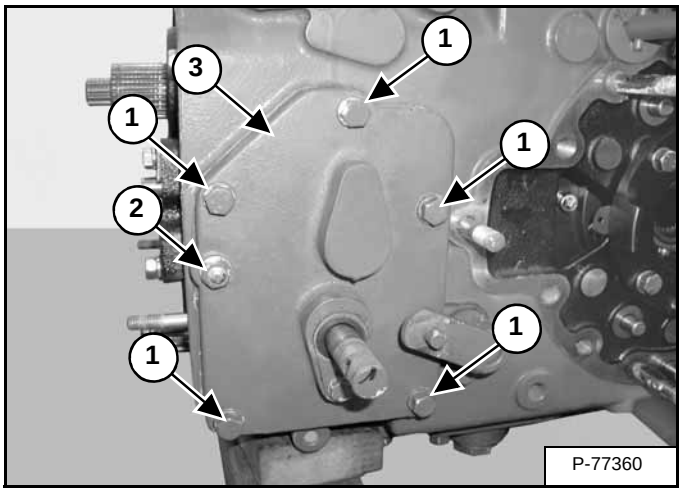
Remove the roll pin (Item 1), shifting lever (Item 2) and washer (Item 3) **[Figure 40-60-19]**.

Figure 40-60-20



Remove the linkage (Item 1) **[Figure 40-60-20]** from the shifting arm.

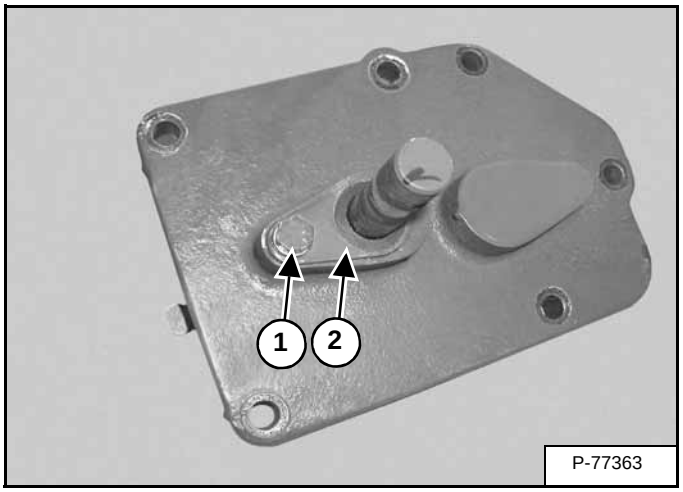
Figure 40-60-21



Remove the five bolts (Item 1) and nut (Item 2) **[Figure 40-60-21]**.

Remove the shifting cover (Item 3) **[Figure 40-60-21]**.

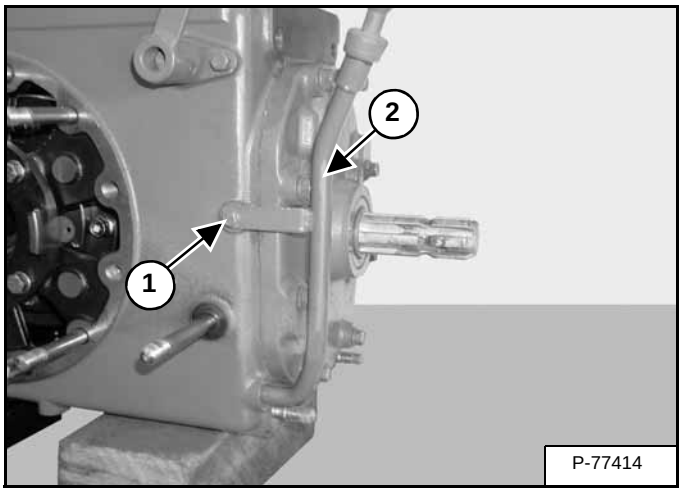
Figure 40-60-22



Remove the retainer bolt (Item 1) and retainer plate (Item 2) **[Figure 40-60-22]**.

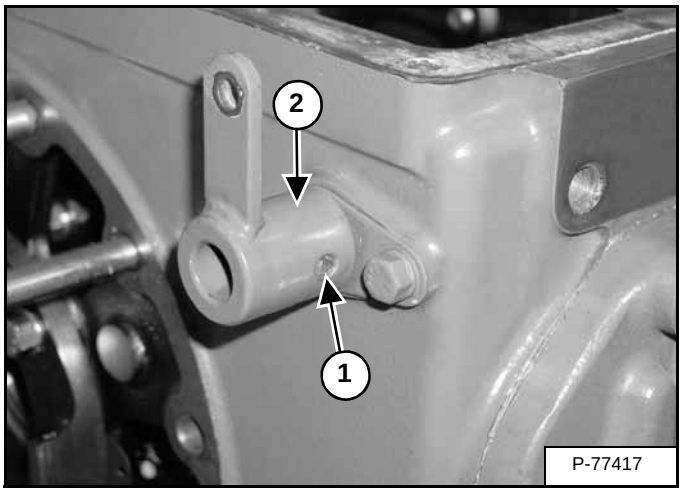
Rear PTO Group Disassembly

Figure 40-60-53



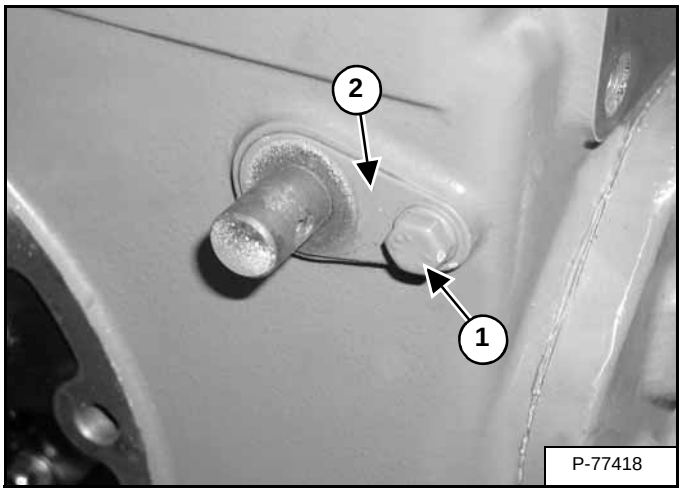
Remove the bolt (Item 1) and dipstick tube (Item 2) **[Figure 40-60-53]**.

Figure 40-60-54



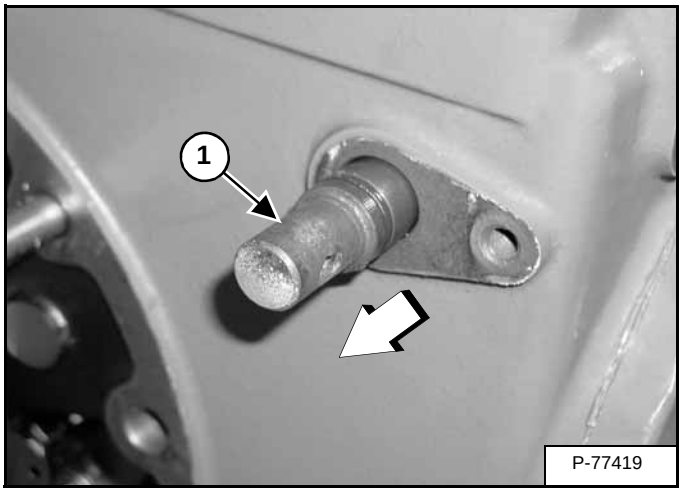
Remove the roll pin (Item 1) and connecting arm (Item 2) **[Figure 40-60-54]**.

Figure 40-60-55



Remove the bolt (Item 1) and retainer plate (Item 2) **[Figure 40-60-55]**.

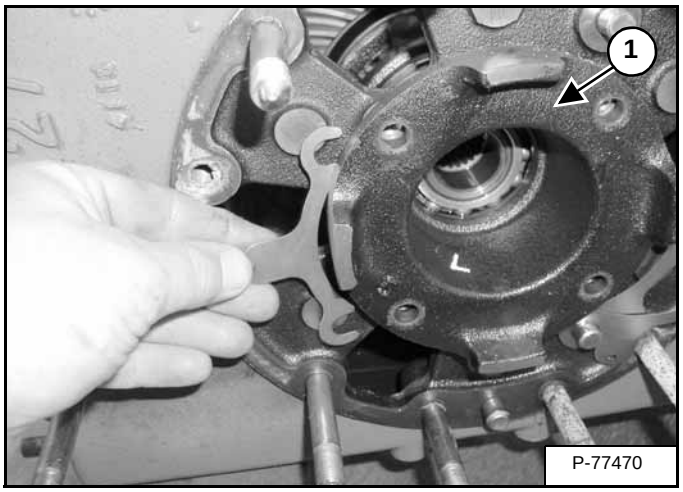
Figure 40-60-56



Slide the shifting arm (Item 1) **[Figure 40-60-56]** out.

Differential Disassembly (Cont'd)

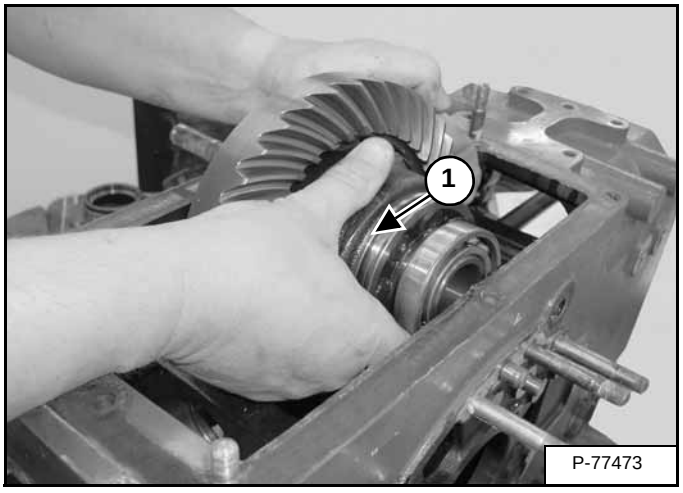
Figure 40-60-88



Record the number and location of the shims and remove **[Figure 40-60-88]**.

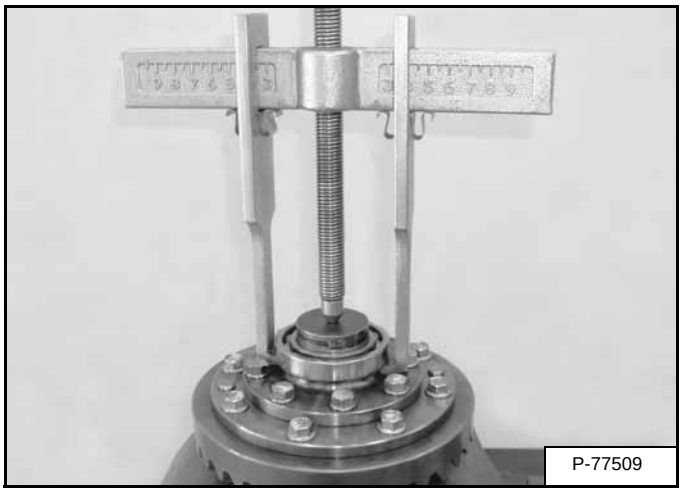
Remove the bearing case (Item 1) **[Figure 40-60-88]**. (Both sides)

Figure 40-60-89



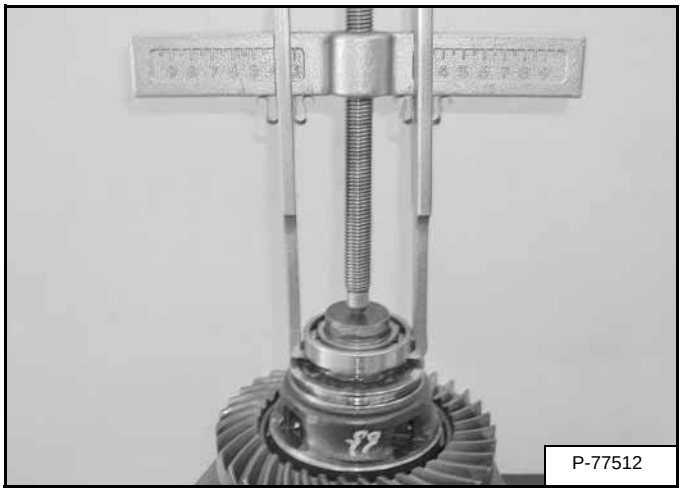
Remove the differential assembly **[Figure 40-60-89]**.

Figure 40-60-90



Support the differential assembly and remove the outer bearing **[Figure 40-60-90]**.

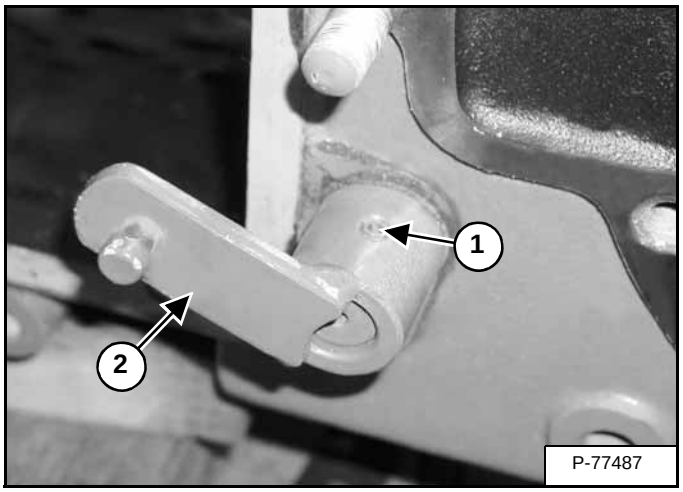
Figure 40-60-91



Remove the inner bearing **[Figure 40-60-91]**.

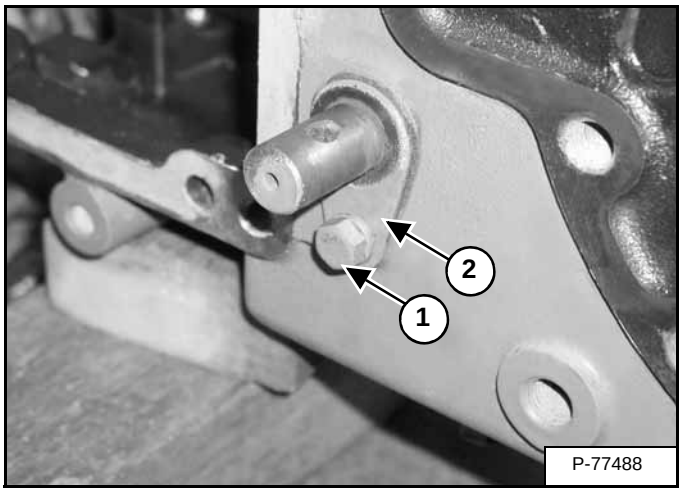
Front Wheel Driveshaft Disassembly

Figure 40-60-115



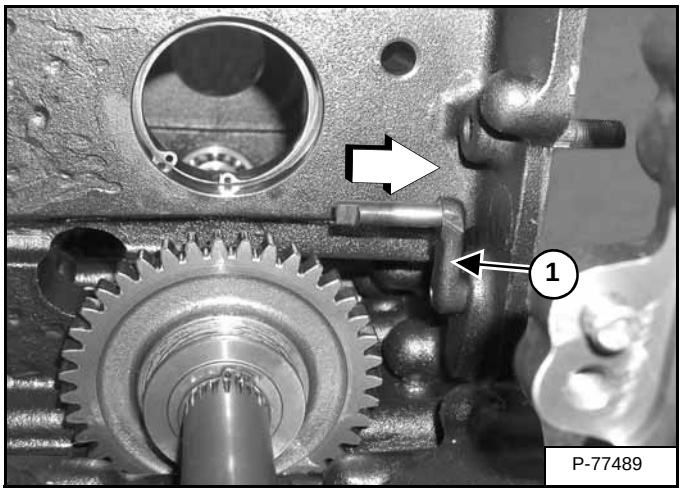
Remove the roll pin (Item 1) and lever (Item 2) **[Figure 40-60-115]** from the shifter arm.

Figure 40-60-116



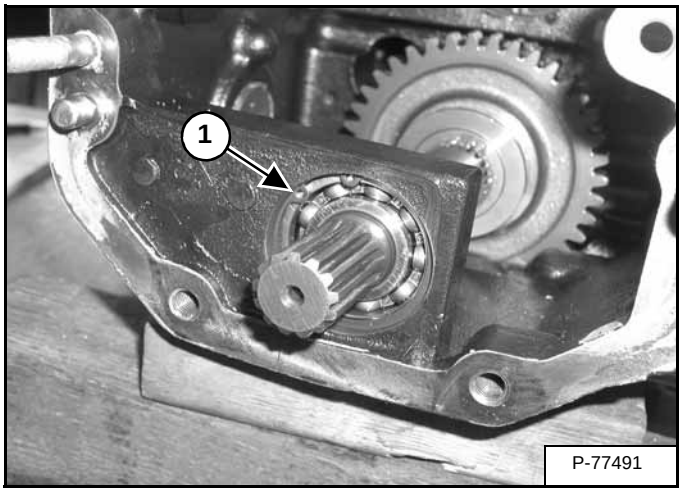
Remove the bolt (Item 1) and retainer plate (Item 2) **[Figure 40-60-116]**.

Figure 40-60-117



Slide the shifter arm (Item 1) **[Figure 40-60-117]** out and up in the position shown.

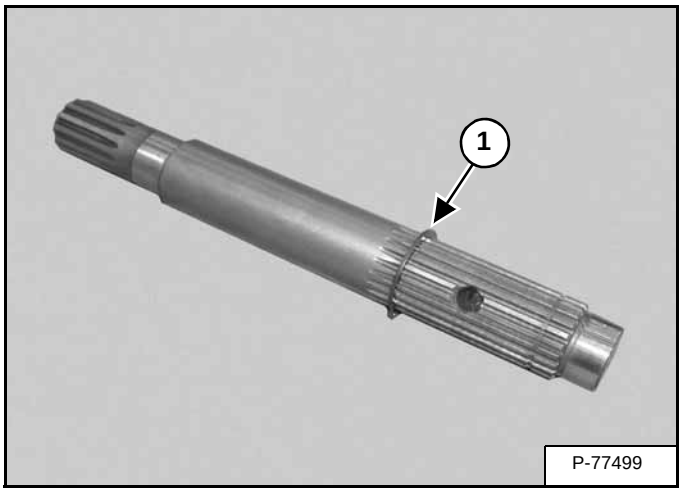
Figure 40-60-118



Remove the snap ring (Item 1) **[Figure 40-60-118]**.

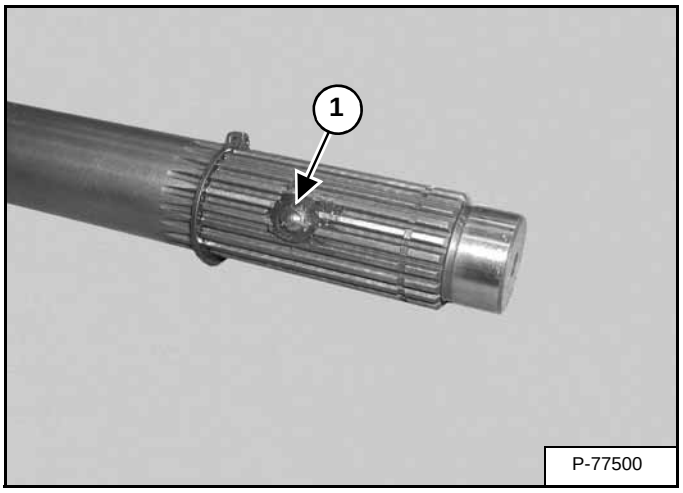
Front Wheel Driveshaft Assembly

Figure 40-60-144



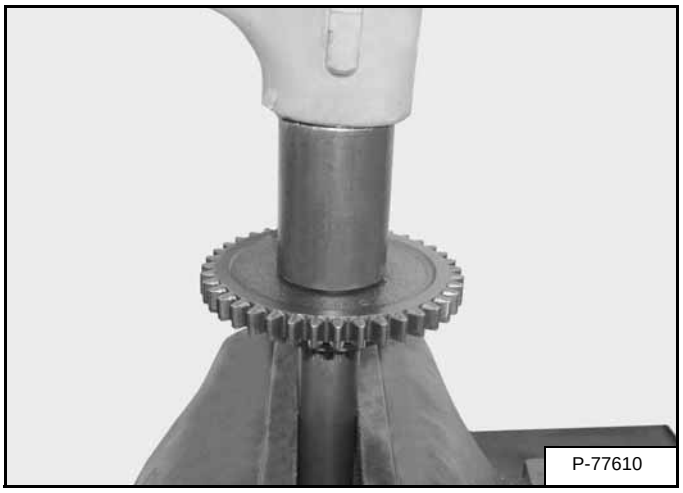
Install the snap ring (Item 1) **[Figure 40-60-144]** onto the shaft.

Figure 40-60-145



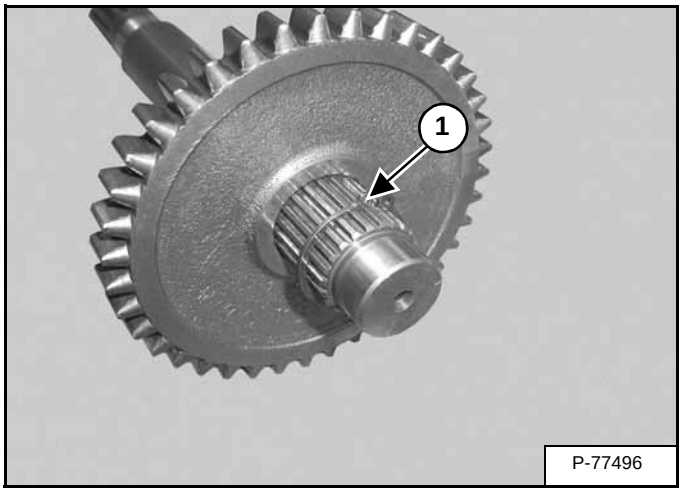
Apply grease into the hole in the shaft and install the spring with a ball (Item 1) **[Figure 40-60-145]** on each side.

Figure 40-60-146



Install the 39 gear onto the shaft and slide over the two balls **[Figure 40-60-146]**.

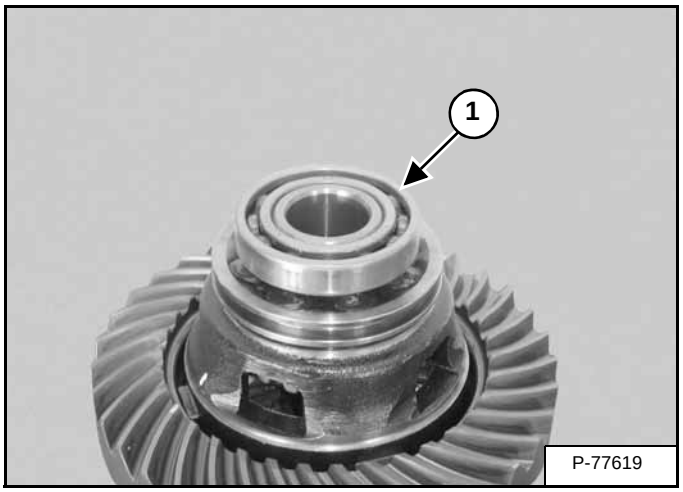
Figure 40-60-147



Install the snap ring (Item 1) **[Figure 40-60-147]**.

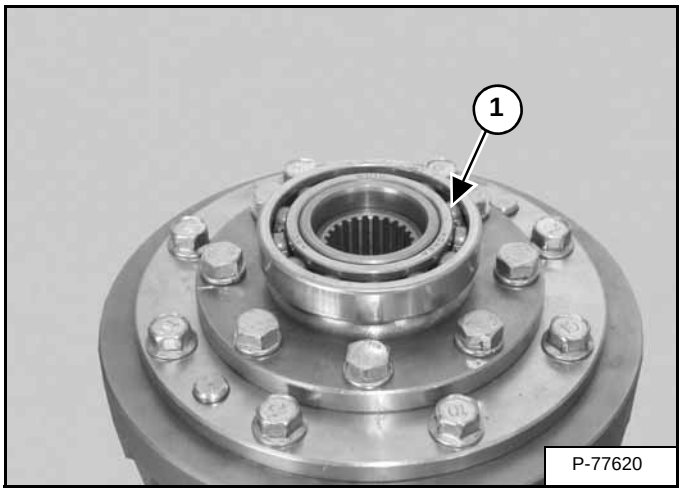
Differential Assembly (Cont'd)

Figure 40-60-181



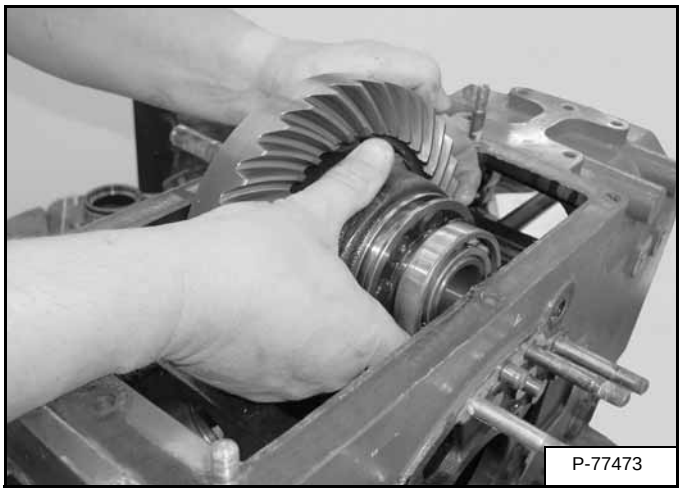
Install the bearing (Item 1) **[Figure 40-60-181]** until it is fully seated.

Figure 40-60-182



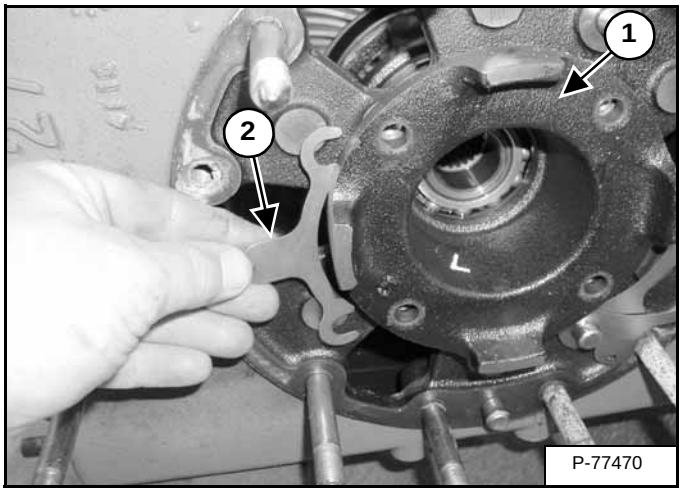
Install the bearing (Item 1) **[Figure 40-60-182]** until it is fully seated.

Figure 40-60-183



Install the differential assembly into the housing **[Figure 40-60-183]**.

Figure 40-60-184

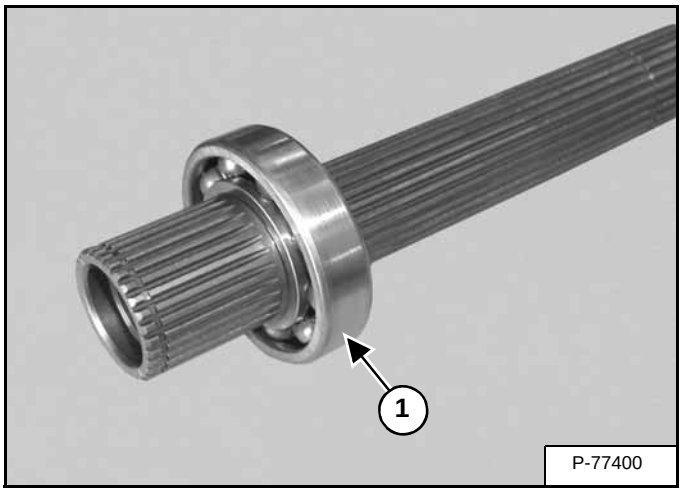


Install the bearing cases (Item 1) **[Figure 40-60-184]** (as marked earlier) to support the differential assembly.

Install the shim pack (Item 2) **[Figure 40-60-184]** (removed earlier) behind the bearing cases as marked earlier.

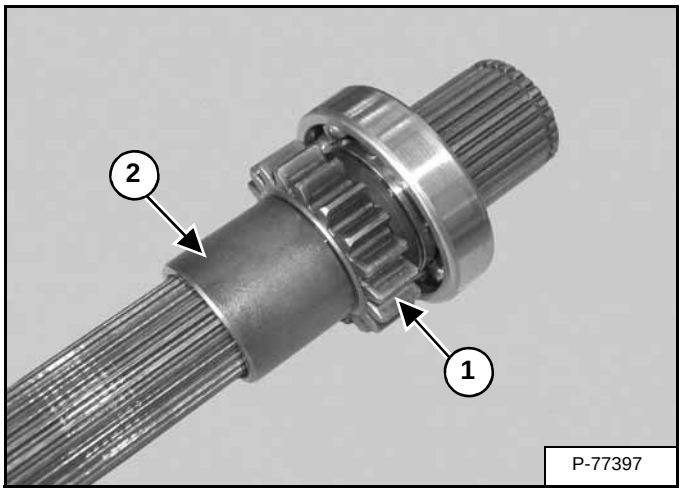
Range Shifter Shaft Group Assembly

Figure 40-60-219



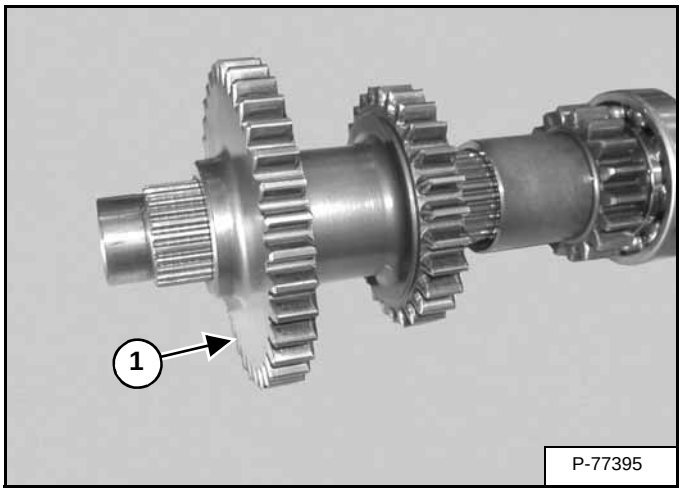
Install the bearing (Item 1) **[Figure 40-60-219]** until it is fully seated.

Figure 40-60-220



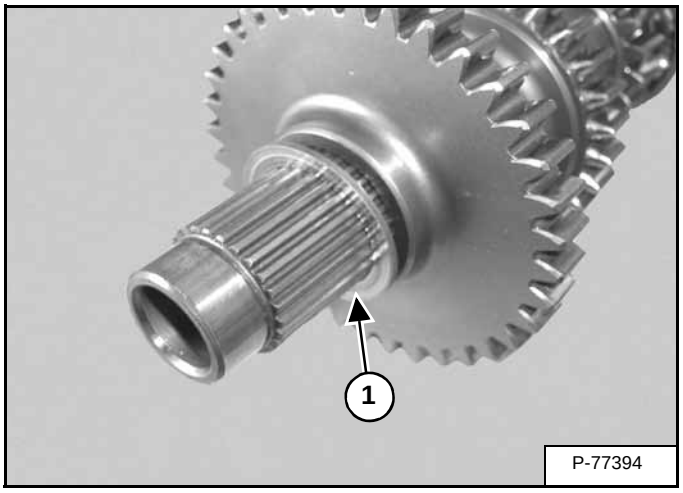
Install 19 gear (Item 1) and spacer (Item 2) **[Figure 40-60-220]** onto the shaft.

Figure 40-60-221



Install the 27-36 gear (Item 1) **[Figure 40-60-221]**.

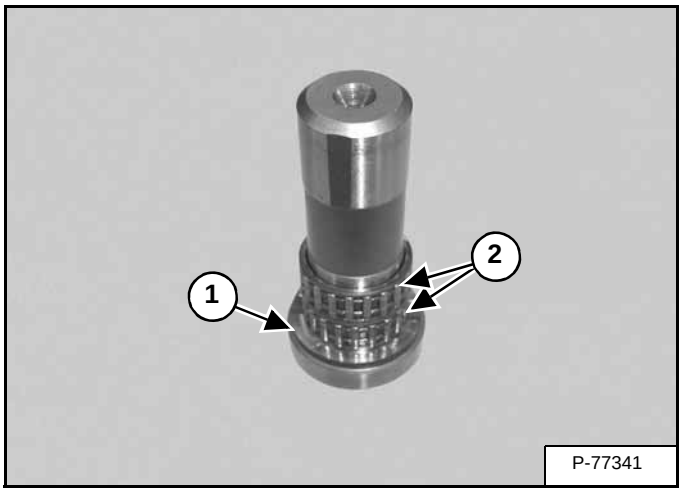
Figure 40-60-222



Install the thrust collar (Item 1) **[Figure 40-60-222]**.

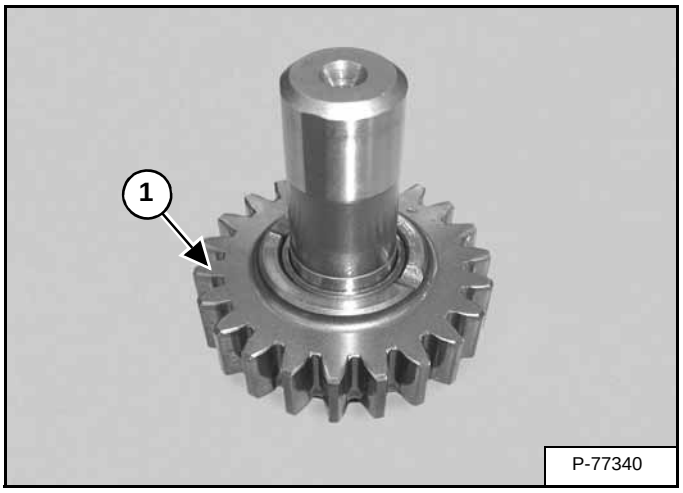
Middle Case/Output Shaft Group Assembly (Cont'd)

Figure 40-60-257



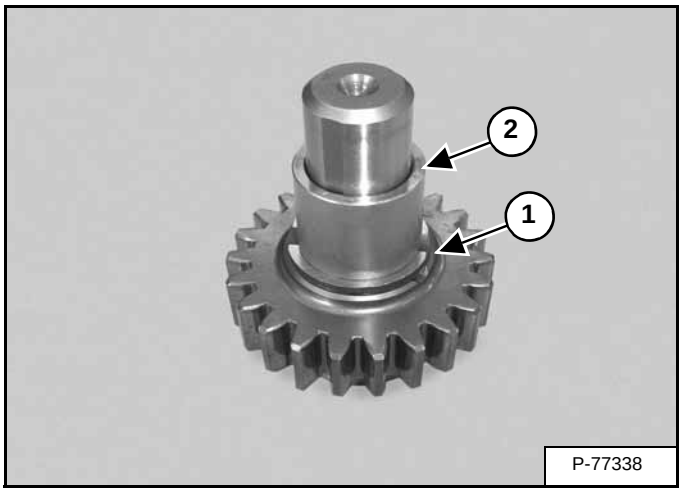
Install the washer (Item 1) and two needle bearings (Item 2) **[Figure 40-60-257]** onto the shaft.

Figure 40-60-258



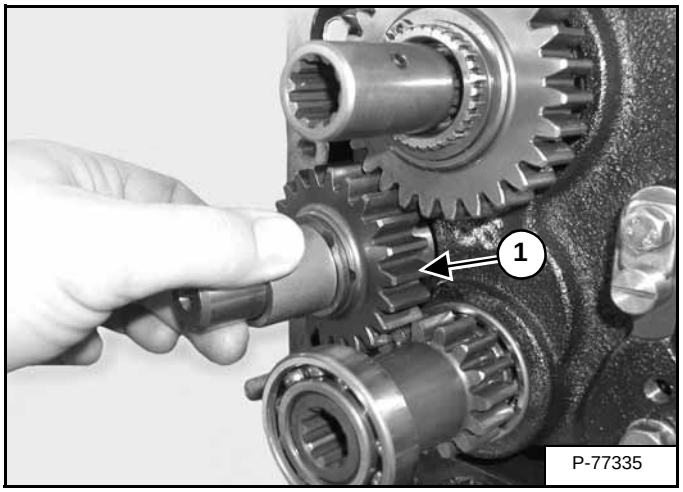
Install the gear (Item 1) **[Figure 40-60-258]** onto the shaft.

Figure 40-60-259



Install the washer (Item 1) and collar (Item 2) **[Figure 40-60-259]** onto the shaft assembly.

Figure 40-60-260

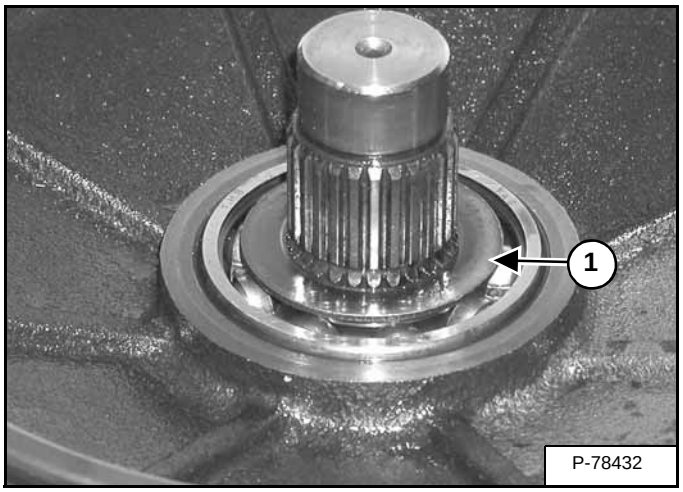


Install the counter shaft (Item 1) **[Figure 40-60-260]**.

NOTE: The two holes in the shaft must be aligned with the two pins in the housing.

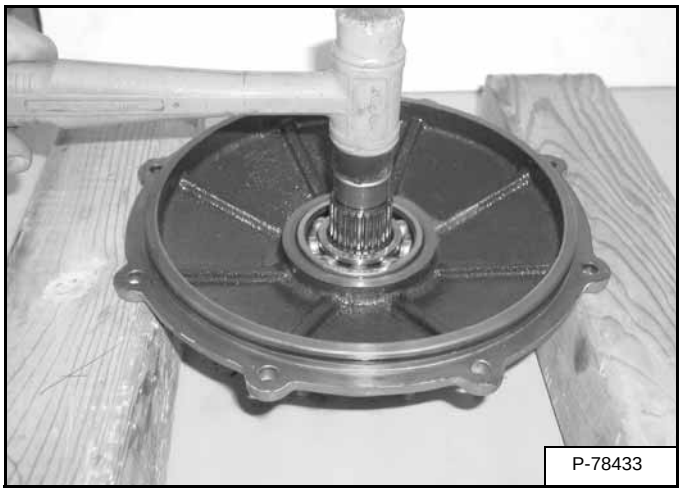
Gear Case Cover Disassembly (Cont'd)

Figure 40-80-8



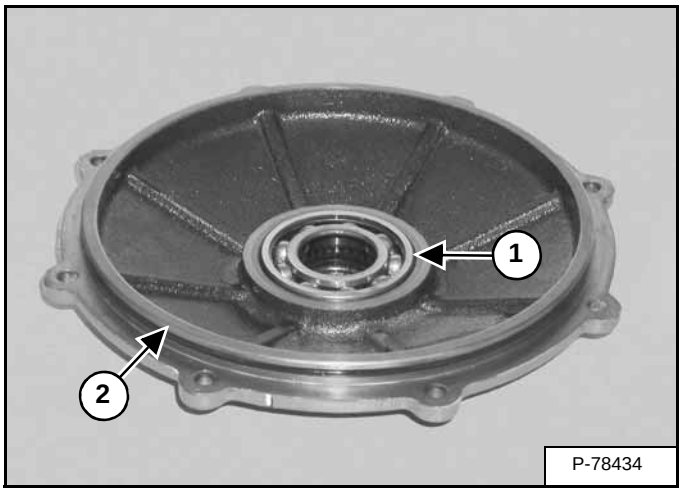
Remove the spacer (Item 1) **[Figure 40-80-8]**.

Figure 40-80-9



Remove the axle shaft from the cover **[Figure 40-80-9]**.

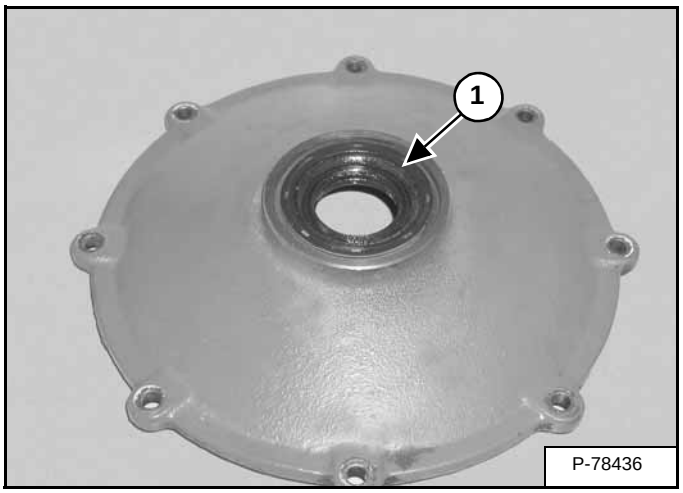
Figure 40-80-10



Remove the bearing (Item 1) **[Figure 40-80-10]**.

Remove the O-ring (Item 2) **[Figure 40-80-10]**.

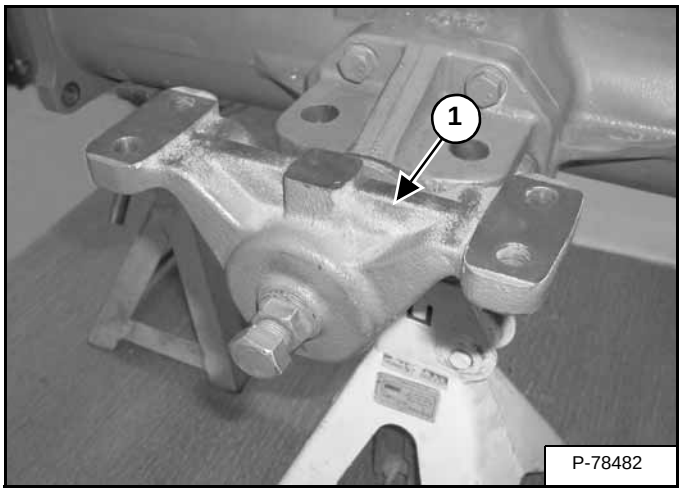
Figure 40-80-11



Remove the seal (Item 1) **[Figure 40-80-11]** from the cover.

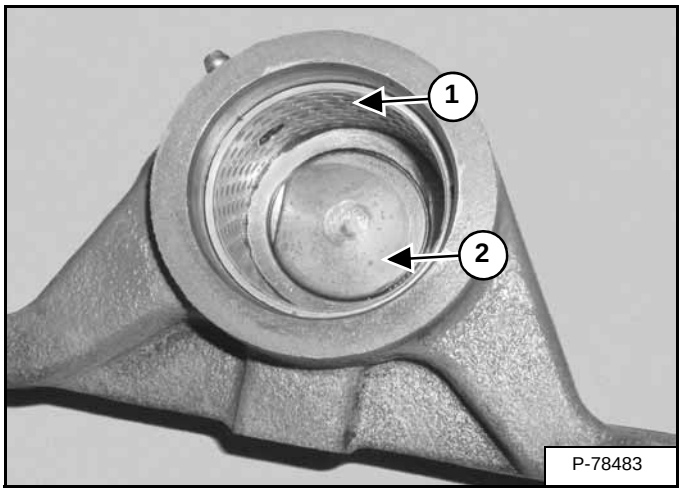
Axle Support Removal

Figure 40-80-38



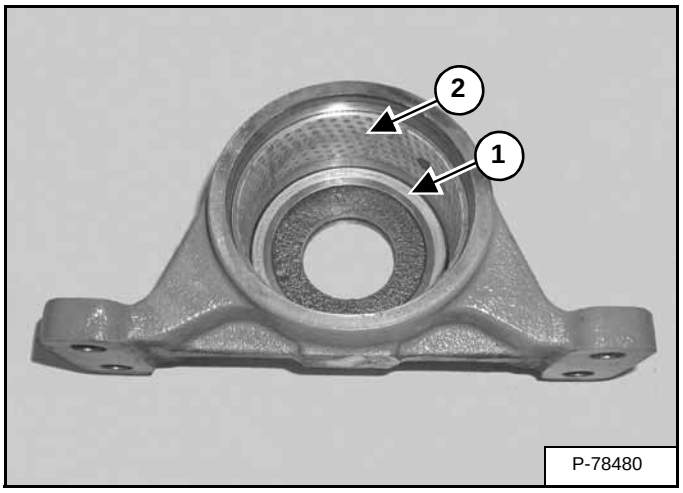
Remove the axle support (Item 1) **[Figure 40-80-38]** (both sides) by sliding off the axle.

Figure 40-80-39



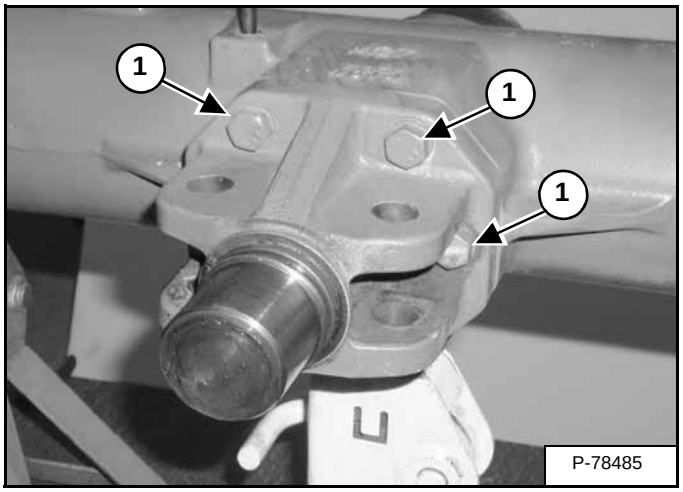
Remove the bushing (Item 1) and shim plate (Item 2) **[Figure 40-80-39]** from the axle support.

Figure 40-80-40



Remove the shim (Item 1) and bushing (Item 2) **[Figure 40-80-40]** from the axle support.

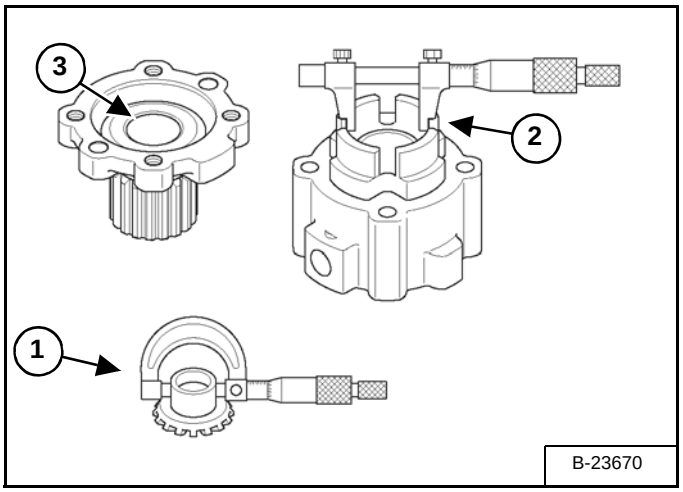
Figure 40-80-41



Remove the six bolts (Item 1) **[Figure 40-80-41]**.

Differential Inspection

Figure 40-80-66



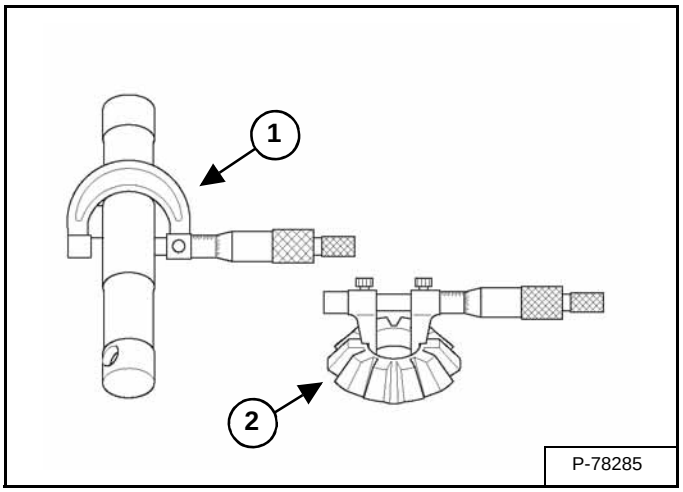
Measure and record the outside diameter of the side gear (Item 1), the inside diameter of the differential case (Item 2) and the inside diameter of the differential case cover (Item 3) **[Figure 40-80-66]**.

If the clearance exceeds the allowable limit, see chart below, replace parts as needed.

Item	Factory Spec.	Allowable Limit
Clearance between differential case (Differential case cover) and differential side gear	0.00197 - 0.00358 in. (0,050 - 0,091 mm)	0.0138 in. (0,35 mm)

Item	Factory Spec.	Allowable Limit
Differential case bore I.D.	1.26083 - 1.26181 in. (32,025 - 32,050 mm)	-
Differential case cover bore I.D.	1.26083 - 1.26181 in. (32,025 - 32,036 mm)	-
Differential side gear bore O.D.	1.25823 - 1.25886 in. (31,959 - 31,975 mm)	-

Figure 40-80-67



Measure and record the pinion shaft outside diameter (Item 1) and the inside diameter of the pinion gear (Item 2) **[Figure 40-80-67]**.

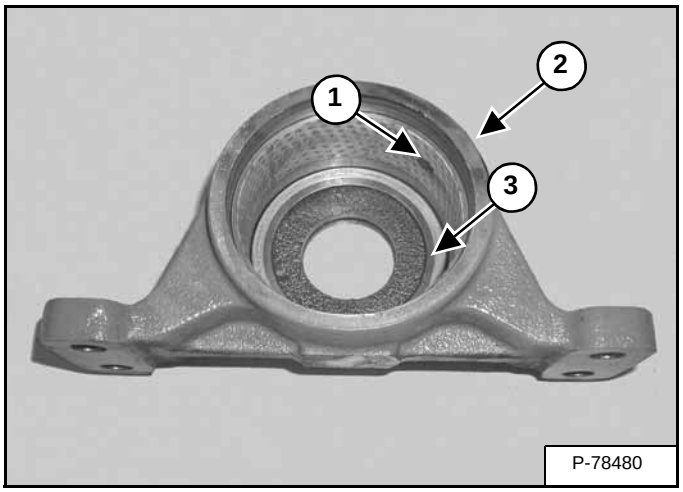
If the clearance exceeds the allowable limit, see chart below, replace parts as needed.

Item	Factory Spec.	Allowable Limit
Clearance between pinion shaft and differential pinion	0.00063 - 0.00205 in. (0,016 - 0,052 mm)	0.0098 in. (0,25 mm)

Item	Factory Spec.	Allowable Limit
Pinion shaft O.D.	0.62858 - 0.62929 in. (15,966 - 15,984 mm)	-
Differential pinion I.D.	0.62992 - 0.63063 in. (16,000 - 16,018 mm)	-

Axle Support Installation (Cont'd)

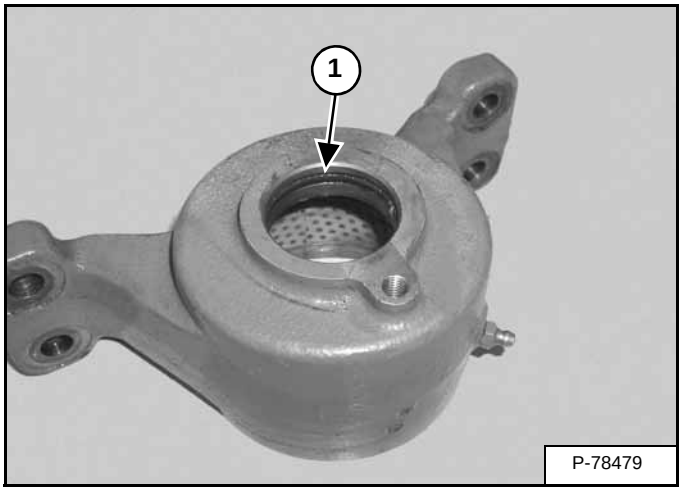
Figure 40-80-100



Align the hole in the bushing (Item 1) with the grease fitting (Item 2) **[Figure 40-80-100]** and press the bushing into the housing until it is fully seated.

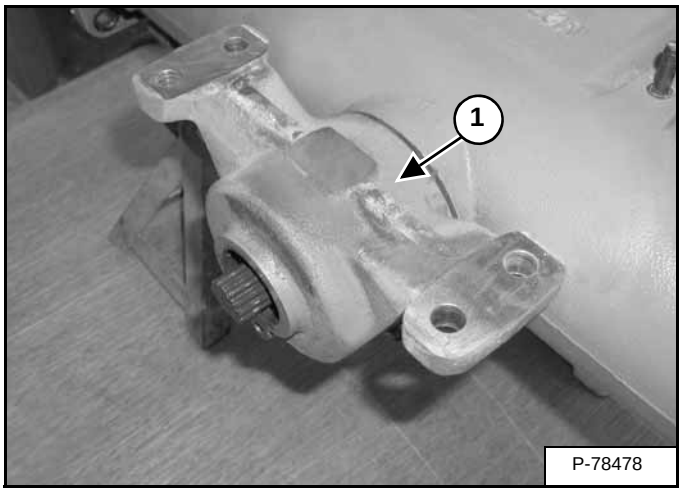
Install the shim (Item 3) **[Figure 40-80-100]**, removed earlier, into the axle support.

Figure 40-80-101



Install the O-ring (Item 1) **[Figure 40-80-101]** into the axle support.

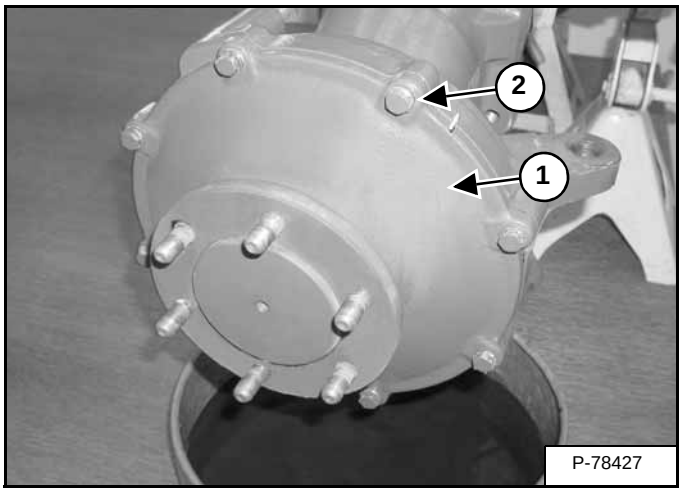
Figure 40-80-102



Install the axle support (Item 1) **[Figure 40-80-102]** onto the axle.

Axle Case Group Assembly (Cont'd)

Figure 40-80-137

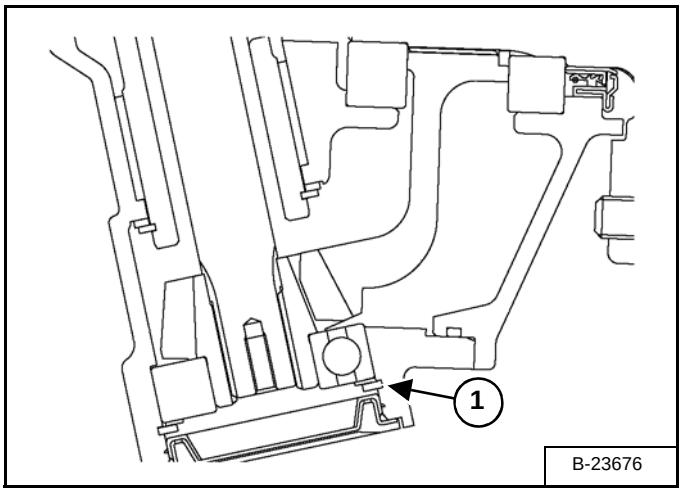


Install the gear case cover (Item 1) **[Figure 40-80-137]** onto the axle case.

Install the eight bolts (Item 2) **[Figure 40-80-137]** and tighten to 9 - 12 ft.-lb. (12 - 16 Nm) torque in a criss cross pattern.

Rotate the axle. Remove the axle case cover and measure the thickness of the plastic gauge with a micrometer.

Figure 40-80-138



If the backlash exceeds the allowable limit of 0.0059 - 0.0138 in. (0,15 - 0,35 mm) adjust the shim (Item 1) **[Figure 40-80-138]**.

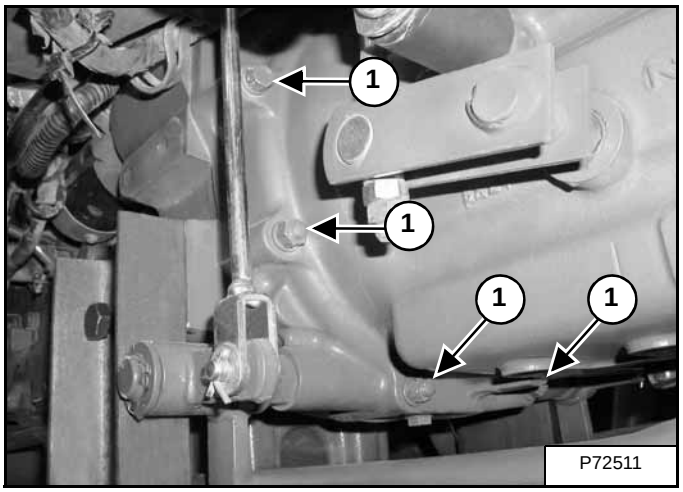
Select the correct shim thickness from the selection below:

0.039 in. (1,0 mm)
0.047in. (1,2 mm)
0.055 in. (01,4mm)
0.063 in. (1,6 mm)
0.071 in. (1,8 mm)
0.079 in. (2,0 mm)
0.087 in. (2,2 mm)

Install the axle case cover. (See **[Figure 40-80-137]**.)

Procedure (Cont'd)

Figure 40-100-21

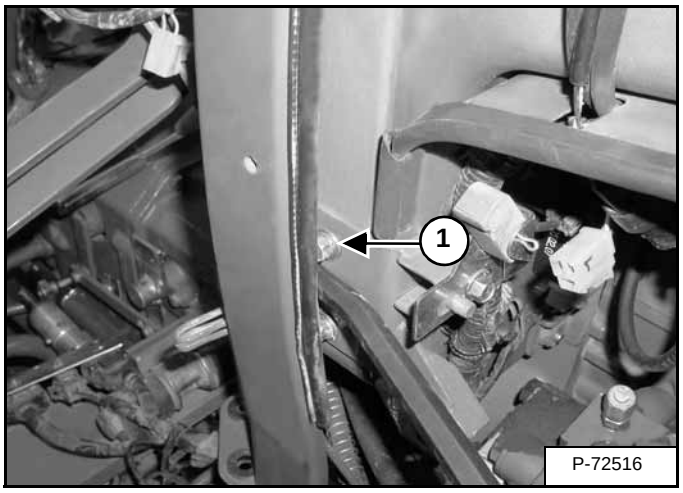


Remove the eight clutch housing mounting bolts and nuts (Item 1) **[Figure 40-100-21]**.

Installation: Tighten the nuts to 36 - 41 ft.-lb. (48 - 31 N•m) torque.

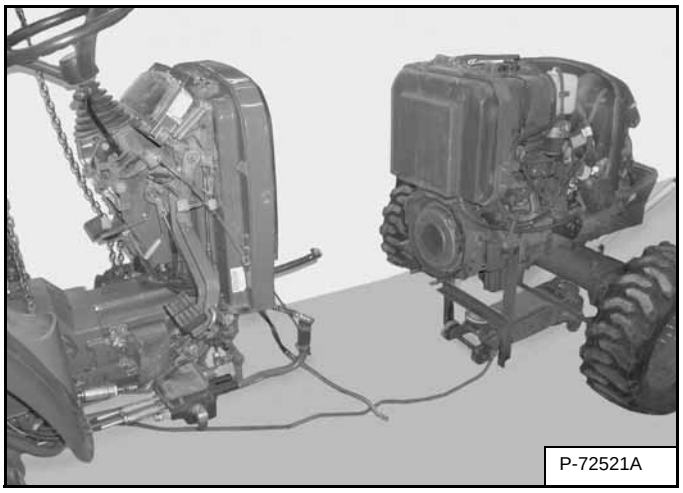
Installation: Tighten the bolts to 18 - 23 ft.-lb. (25 - 31 N•m) torque.

Figure 40-100-22



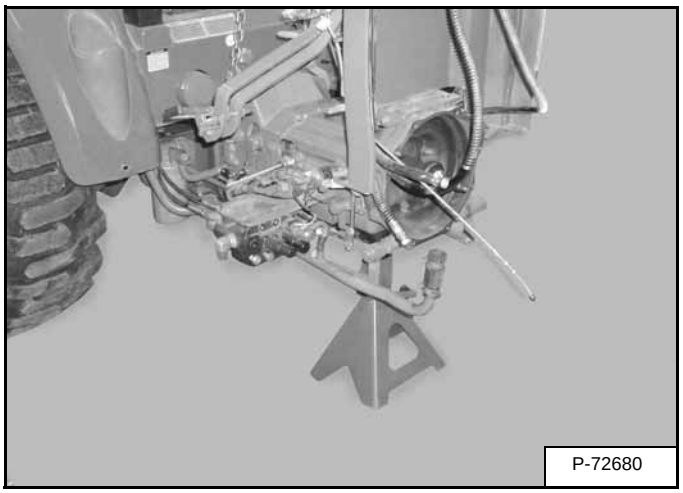
While rolling the front half of the machine forward, carefully pry the firewall frame assembly on both sides until the bolt heads (Item 1) **[Figure 40-100-22]** are released.

Figure 40-100-23



Continue to roll the tractor frame forward, lower the jack until the machine is resting on the support stand **[Figure 40-100-23]**.

Figure 40-100-24



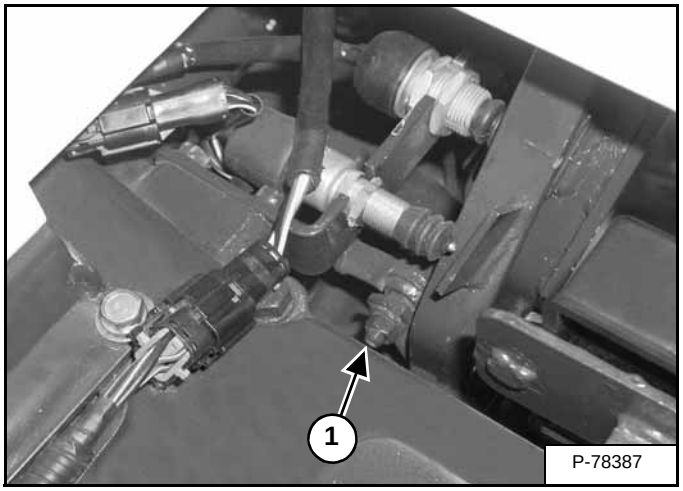
Place a stand under the clutch housing case assembly and lower the hoist **[Figure 40-100-24]**.

REAR PTO CONTROL

Linkage Removal And Installation

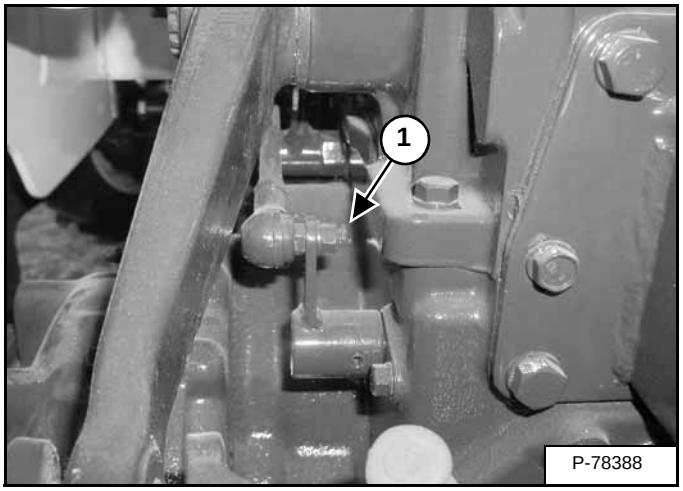
Remove the operator seat. (See Removal And Installation on Page 50-10-1.)

Figure 50-40-1



Remove the nut (Item 1) **[Figure 50-40-1]** and washer from the front of the linkage.

Figure 50-40-2

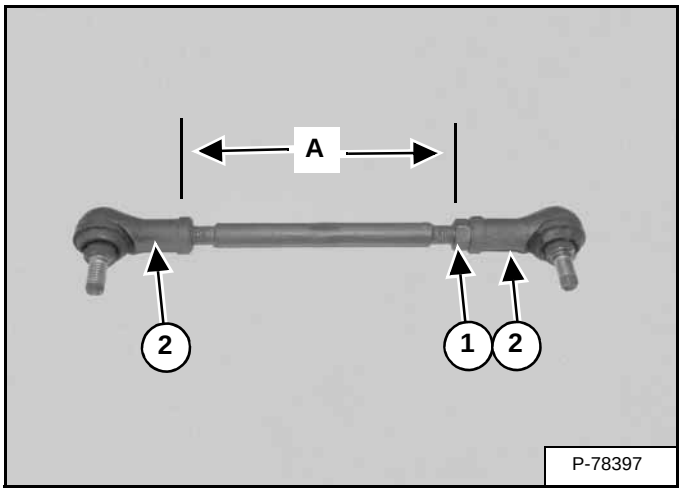


Remove the nut (Item 1) **[Figure 50-40-2]** and washer from the rear of the linkage.

Remove the linkage.

Disassembly And Assembly

Figure 50-40-3



Measure and record the distance “A” **[Figure 50-40-3]**. for correct assembly.

Loosen the lock nut (Item 1) and remove the linkage ends (Item 2) **[Figure 50-40-3]**.

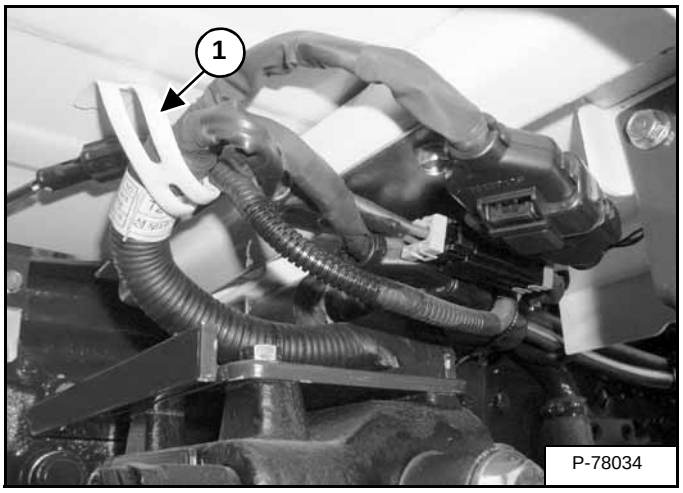
FLOOR PLATE (CONT'D)

Removal And Installation (Right Side)

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

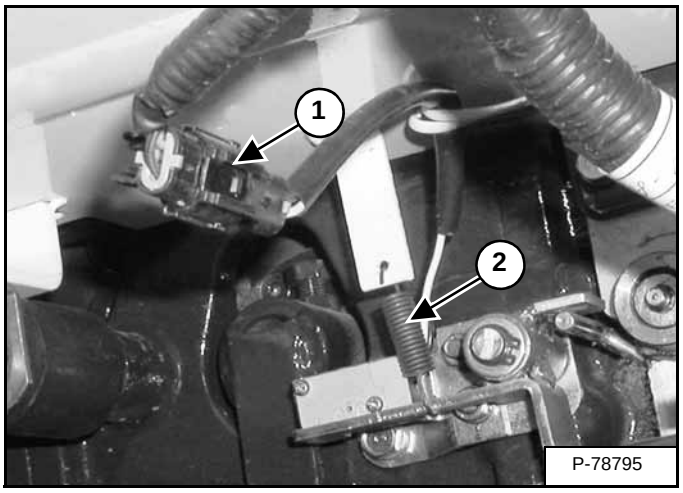
Remove the splash board. (See Removal And Installation on Page 50-60-1.)

Figure 50-80-8



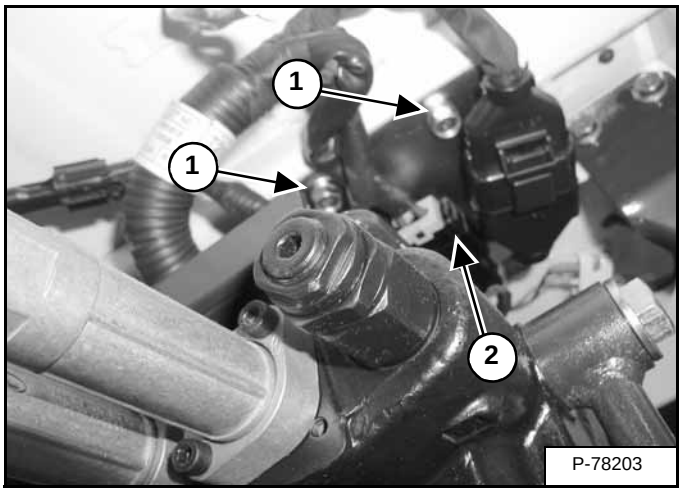
Release the electrical harness from the clips (Item 1) **[Figure 50-80-8]**.

Figure 50-80-9



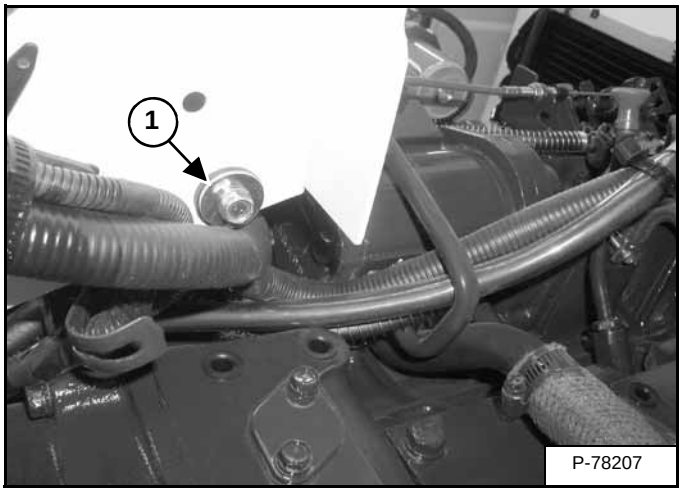
Unplug the connector (Item 1) and remove the end of the spring (Item 2) **[Figure 50-80-9]** from the floor plate.

Figure 50-80-10



Remove the two bolts (Item 1) and lower the plate (Item 2) **[Figure 50-80-10]**.

Figure 50-80-11



Remove the mounting bolt (Item 1) **[Figure 50-80-11]**.

FENDER

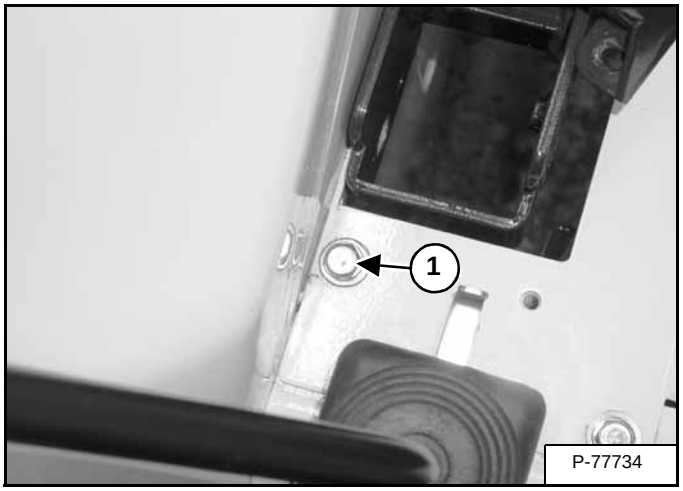
Removal And Installation

The following procedure shows the right fender being removed. The procedure for the left fender is the same.

Remove the operator seat. (See Removal And Installation on Page 50-10-1.)

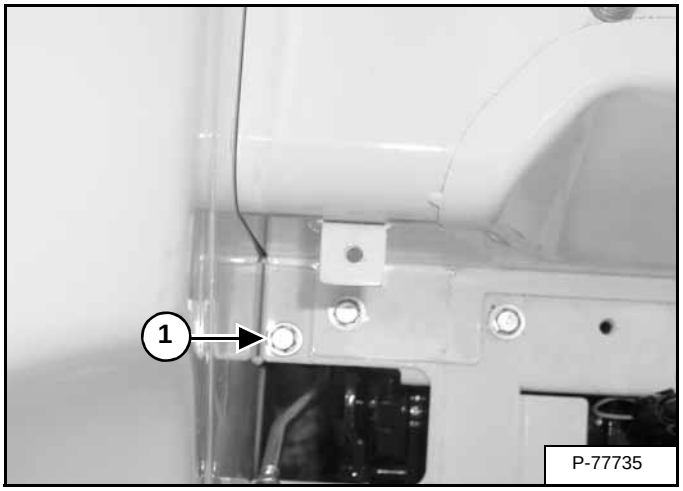
Remove the right console cover. (See Right Side Removal And Installation on Page 50-20-2.)

Figure 50-120-1



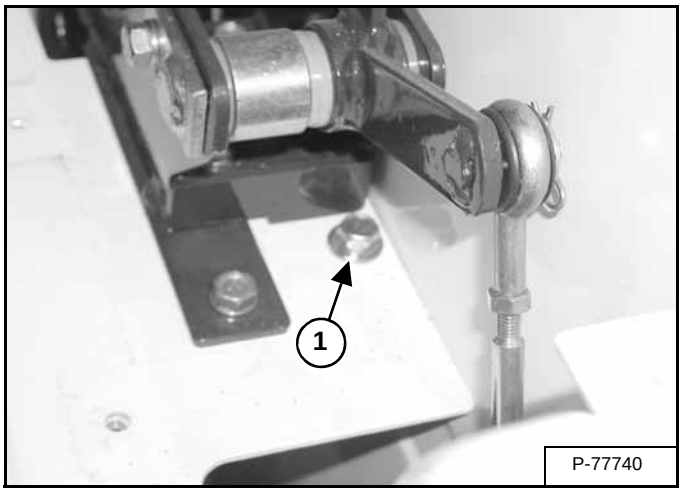
Remove the front fender to console cover plate mount bolt (Item 1) **[Figure 50-120-1]**.

Figure 50-120-2



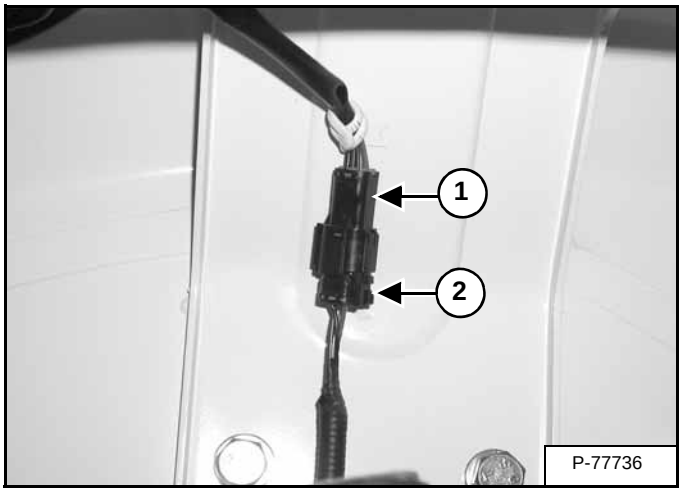
Remove the rear fender to console cover plate mount bolt (Item 1) **[Figure 50-120-2]**.

Figure 50-120-3



Remove the middle fender to console cover plate mount bolt (Item 1) **[Figure 50-120-3]**.

Figure 50-120-4



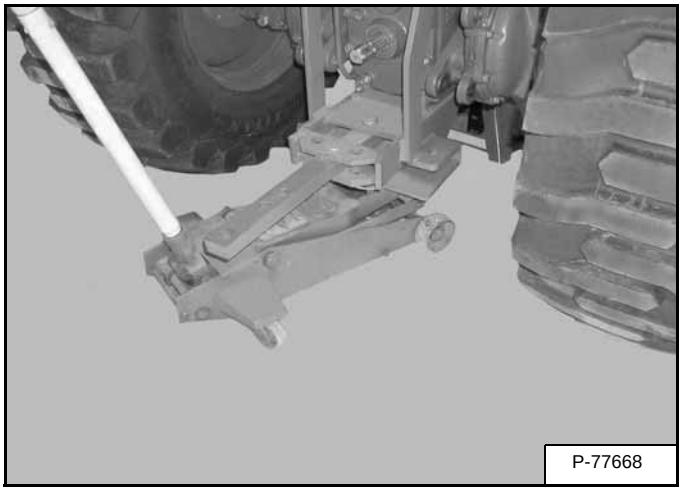
Disconnect the light connector (Item 1) from the main harness connector (Item 2) **[Figure 50-120-4]**.

DRAW BAR ASSEMBLY

Removal And Installation

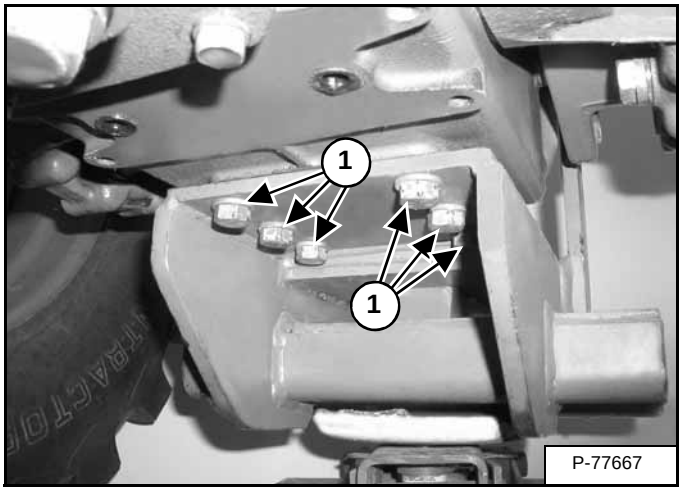
Remove the PTO safety shield. (See Removal And Installation on Page 50-150-1.)

Figure 50-170-1



Support the draw bar assembly with a floor jack **[Figure 50-170-1]**.

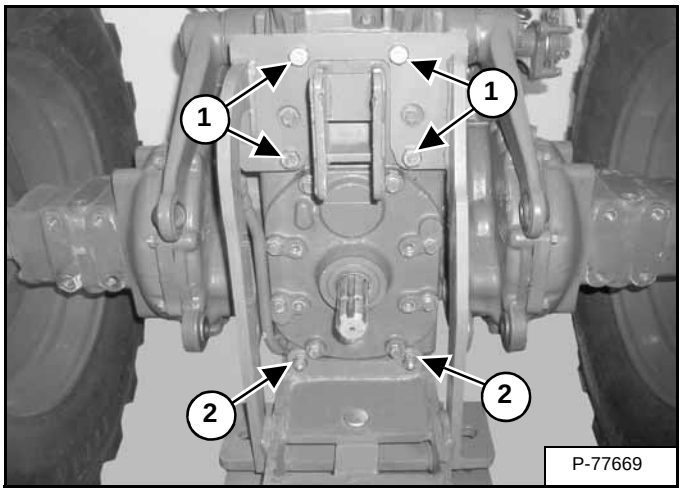
Figure 50-170-2



Remove the six bolts (Item 1) **[Figure 50-170-2]**.

Installation: Tighten the bolts to 91 - 108 ft.-lb. (174 - 147 N•m) torque.

Figure 50-170-3



Remove the four bolts (Item 1) and two nuts (Item 2) **[Figure 50-170-3]**.

NOTE: Only the CT 230 model is equipped with the four bolts (Item 1) [Figure 50-170-3].

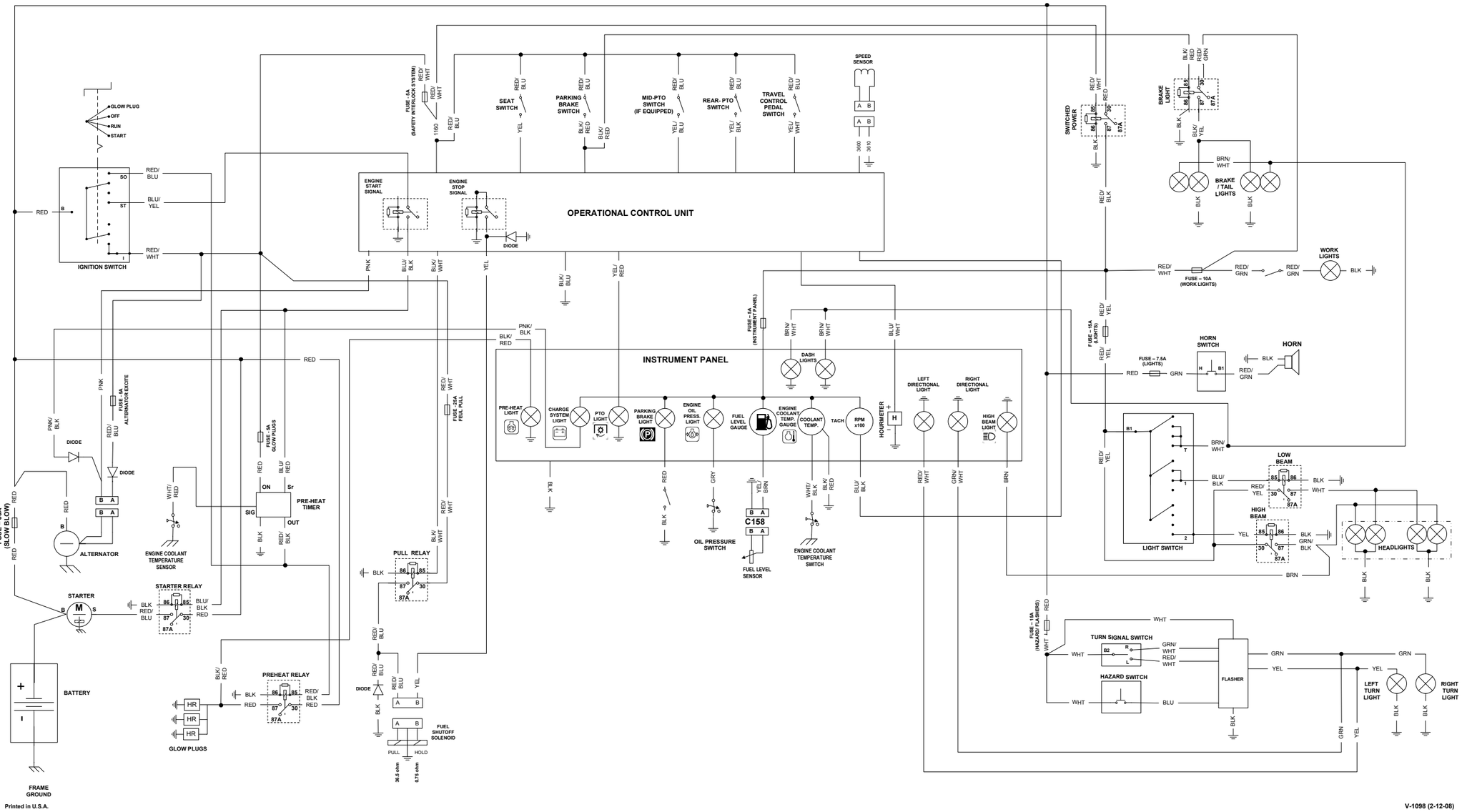
Installation: Tighten the bolts and nuts to 57 - 67 ft.-lb. (72 - 90 N•m) torque.

Lower the floor jack and remove the draw bar assembly.

WIRING SCHEMATIC

CT225 (S/N ABFJ11001 AND ABOVE)
CT230 (S/N ABFP11001 AND ABOVE)
CT235 (S/N A9JY11001 AND ABOVE)
(PRINTED FEBRUARY 2008)
V-1098

RED = RED
BLK = BLACK
BLU = BLUE
GRN = GREEN
YEL = YELLOW
PNK = PINK
WHT = WHITE
BRN = BROWN
GRY = GRAY



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V-1098 (2-12-08)

Battery Maintenance

Figure 60-20-2

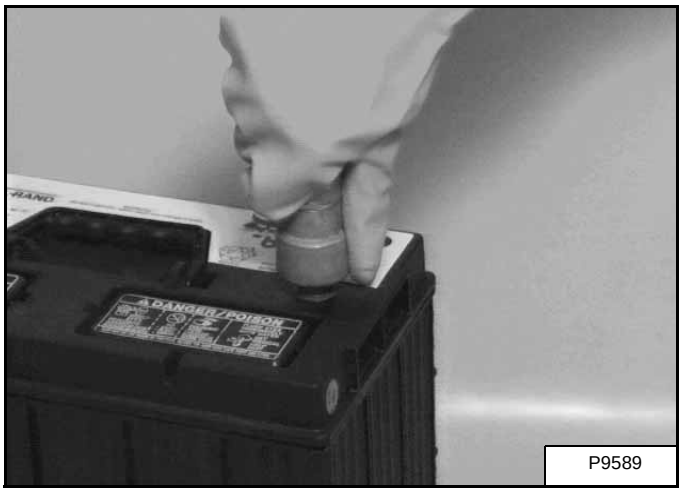
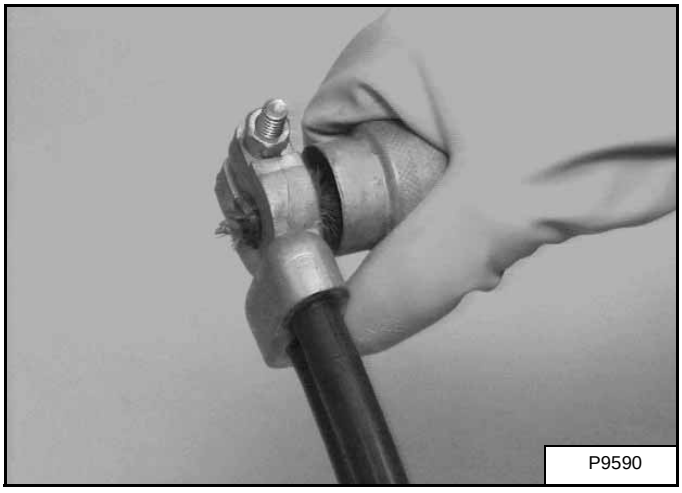


Figure 60-20-3



Installation: Always clean the terminals and cable ends when installing a new battery as shown in **[Figure 60-20-2]** & **[Figure 60-20-3]**.

When installing the battery in the compact tractor, do not touch any metal parts with the battery terminal posts.

Connect and tighten the battery cables. Connect the negative (-) cable last to prevent sparks.

⚠ WARNING

AVOID INJURY OR DEATH

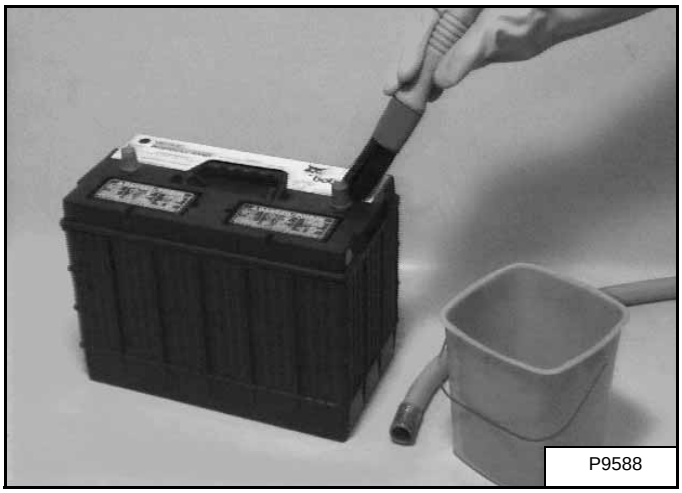
Batteries contain acid which burns eyes and skin on contact. Wear goggles, protective clothing and rubber gloves to keep acid off body.

In case of acid contact, wash immediately with water. In case of eye contact get prompt medical attention and wash eye with clean, cool water for at least 15 minutes.

If electrolyte is taken internally drink large quantities of water or milk! DO NOT induce vomiting. Get prompt medical attention.

W-2065-0807

Figure 60-20-4



The battery cables must be clean and the connections tight. Remove acid or corrosion from the battery and cables with a sodium bicarbonate (baking soda) and water solution as shown in **[Figure 60-20-4]**.

Clean the terminals and cable ends as shown in figure **[Figure 60-20-2]** and **[Figure 60-20-3]**.

Check the electrolyte level in the battery. Add distilled water as needed.

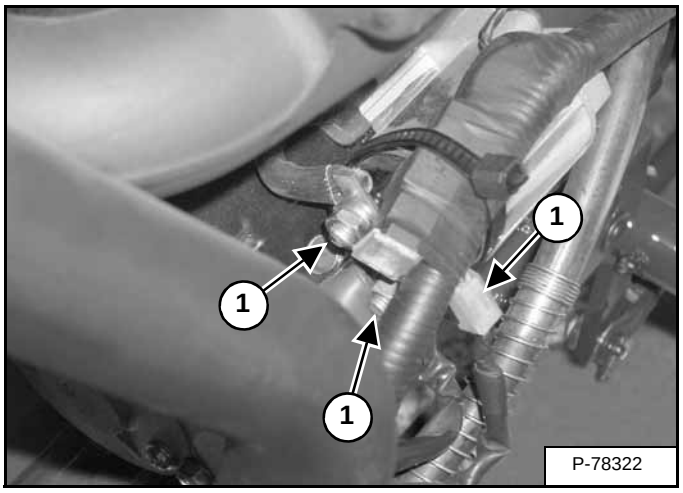
Put battery saver P/N (6664458) or grease on the battery terminals and cable ends to prevent corrosion.

STARTER (CONT'D)

Removal And Installation

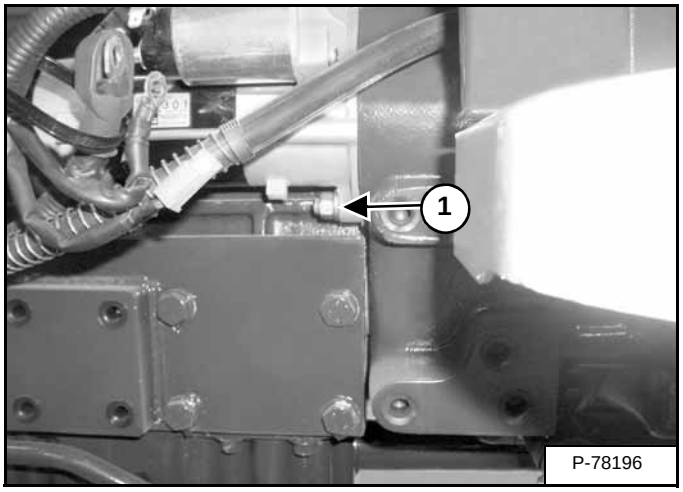
Disconnect the negative (-) cable from the battery.

Figure 60-40-3



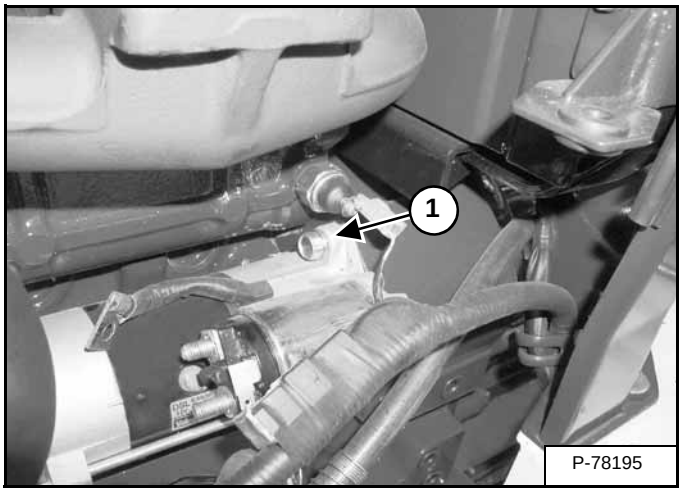
Disconnect the wires (Item 1) **[Figure 60-40-3]** from the starter.

Figure 60-40-4



Remove the bottom nut (Item 1) **[Figure 60-40-4]**.

Figure 60-40-5



Remove the top bolt (Item 1) **[Figure 60-40-5]**.

Remove the starter.


Bobcat®

ENGINE SERVICE (CONT'D)

Continued On Next Page

Specifications (CT225, Engine Model 3A139LWBC) (Cont'd)

Crankshaft

Item	Factory Specification	Allowable Limit
Crankshaft alignment	-	0.0031 in. (0,08 mm)
Clearance between crankshaft and crankshaft bearing 1	0.00157 - 0.00465 in. (0,040 - 0,118 mm)	0.0079 in. (0,20 mm)
Crankshaft O.D	2.04414 - 2.04488 in. (51,921 - 51,940 mm)	-
Crankshaft bearing 1 I.D	2.04646 - 2.04878 in. (51,980 - 52,039 mm)	-
Clearance between crankshaft and crankshaft bearing 2	0.00157 - 0.00409 in. (0,040 - 0,104 mm)	0.0079 in. (0,20 mm)
Crankshaft O.D	2.04414 - 2.04488 in. (51,921 - 51,940 mm)	-
Crankshaft bearing 2 I.D	2.04646 - 2.04823 in. (51,980 - 52,025 mm)	-
Clearance between crank pin and Crank pin bearing	0.0014 - 0.0037 in. (0,035 - 0,093 mm)	0.0079 in. (0,20 mm)
Crank pin O.D	1.73067 - 1.73130 in. (43,959 - 43,975 mm)	-
Crank pin bearing I.D	1.73268 - 1.73433 in. (44,010 - 44,052 mm)	-
Crankshaft side clearance	0.0059 - 0.0122 in. (0,15 - 0,31 mm)	0.020 in. (0,5 mm)

Specifications (CT230, Engine Model 3A150LWBC) (Cont'd)

Fuel Injection Pump

Injection timing (BTDC)	18°

Fuel Injection Nozzle

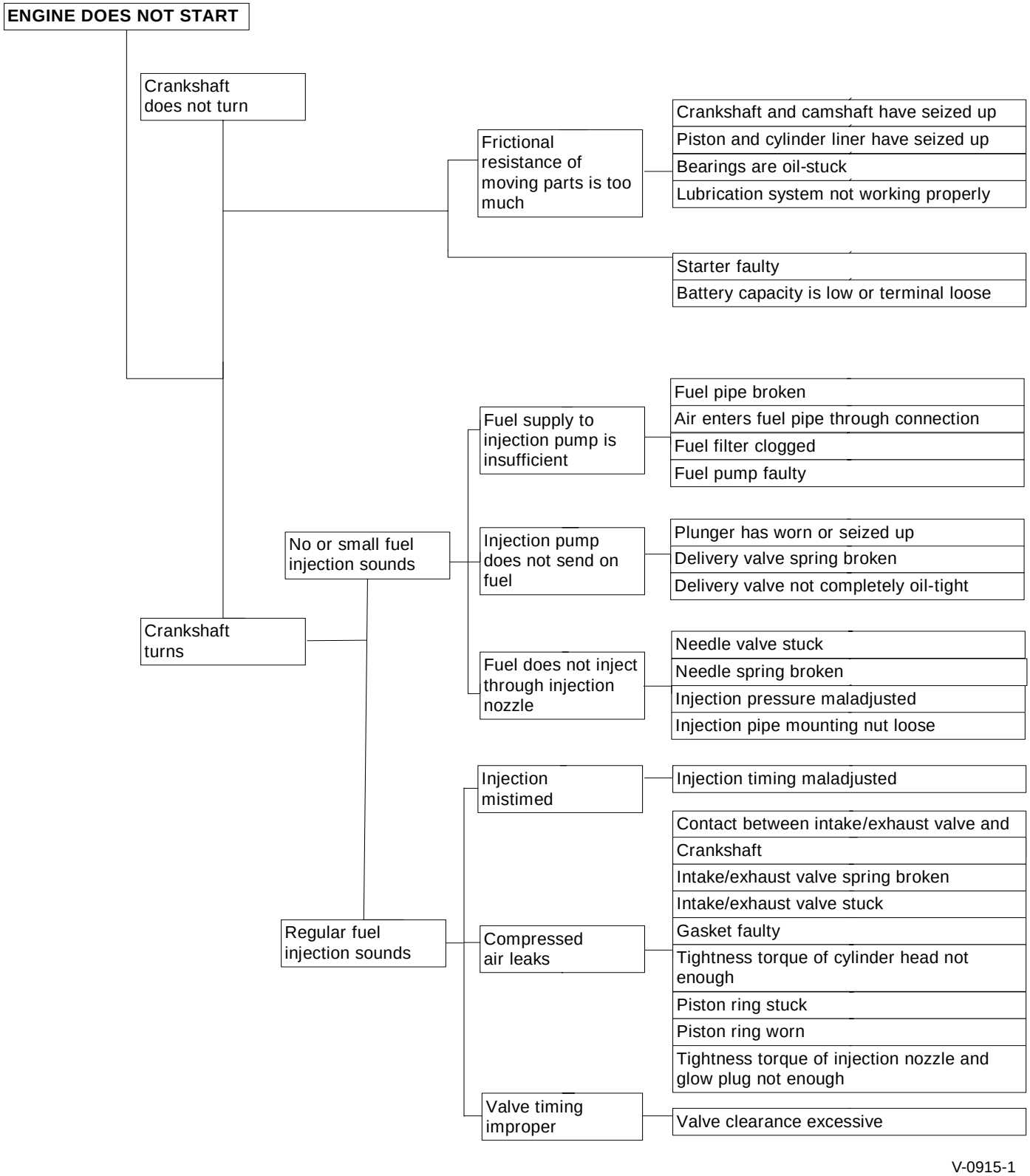
Fuel injection pressure	2,134 psi 150 kgf/cm^2 14.709 MPa
Fuel tightness of nozzle valve seat	No fuel leak for 5 sec. at pressure 1,849 psi 130 kgf/cm^2 12.75 MPa

NOTE:

Injection Sequence
Three Cylinders: 1 --> 2 --> 3
(The cylinder number is given in order from the gear case end.)

Troubleshooting

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.



V-0915-1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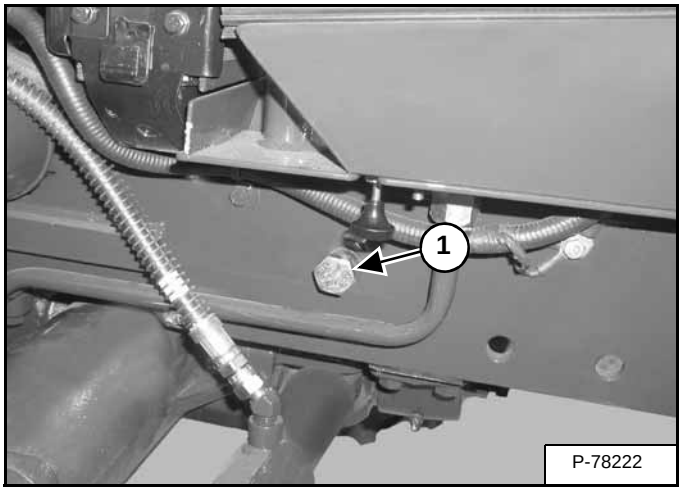
Radiator Removal And Installation (CT 225 & CT 230)

Turn the front wheels fully to the right and stop the engine.

Open the engine cover. (See Opening And Closing on Page 10-20-1.)

Remove the engine side covers. (See Removal And Installation on Page 50-100-1.)

Figure 70-50-2



Remove the plug (Item 1) **[Figure 70-50-2]** and drain the coolant from the radiator.

Recycle or dispose of coolant in an environmentally safe manner.

Figure 70-50-3

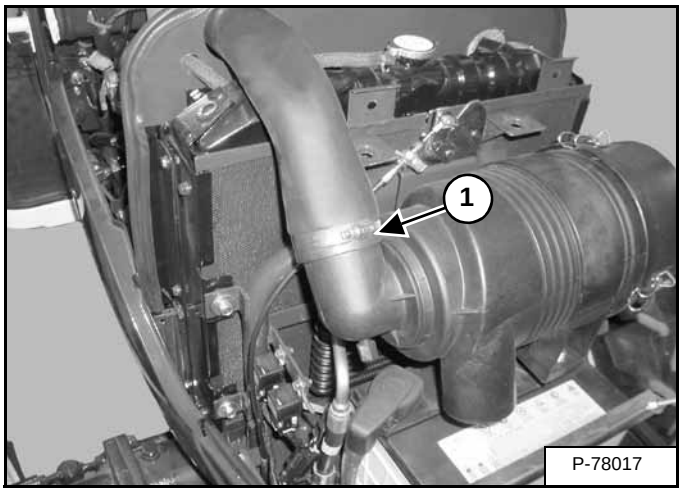
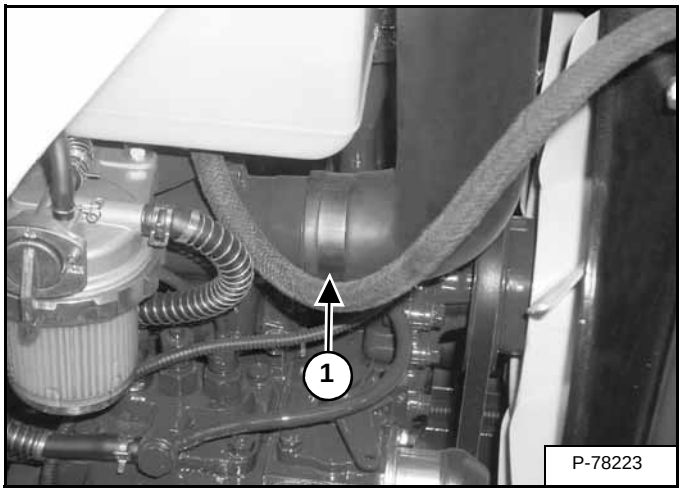


Figure 70-50-4



Loosen the hose clamps (Item 1) **[Figure 70-50-3]** and **[Figure 70-50-4]** from the air cleaner hose.

Remove the air cleaner hose.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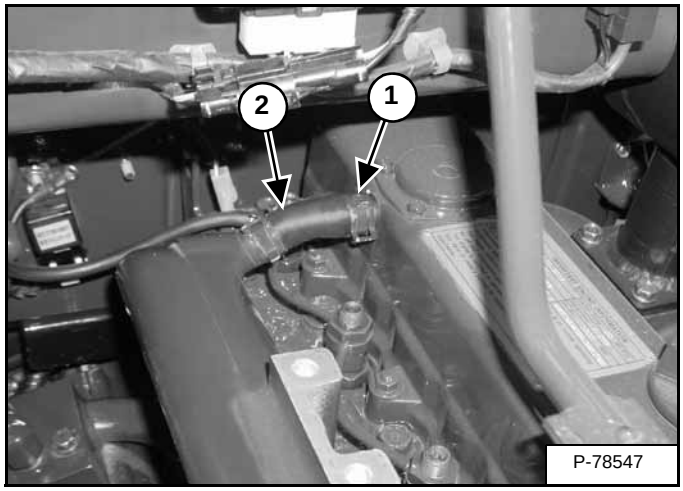
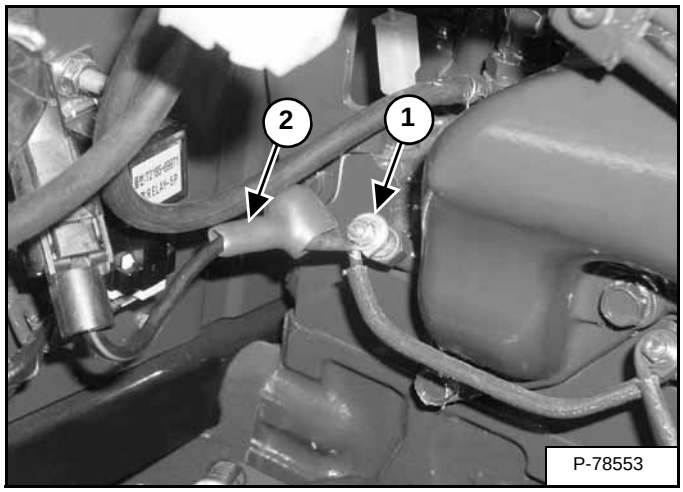
Fuel Injection Pump Removal And Installation (CT 225 & CT 230) (Cont'd)

Figure 70-70-17



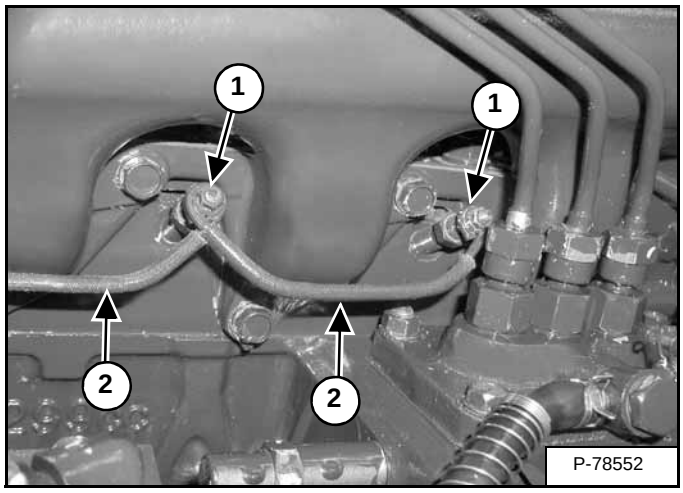
Loosen the clamp (Item 1) and remove the hose (Item 2) **[Figure 70-70-17]** from the rocker arm cover.

Figure 70-70-18



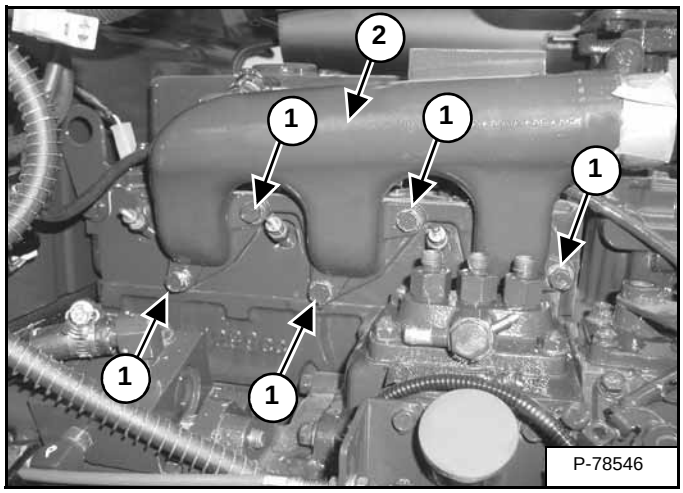
Remove the nut (Item 1) and glow plug wire (Item 2) **[Figure 70-70-18]**.

Figure 70-70-19



Remove the nuts (Item 1) from the two remaining glow plugs. Remove the strap (Item 2) **[Figure 70-70-19]** from the glow plugs.

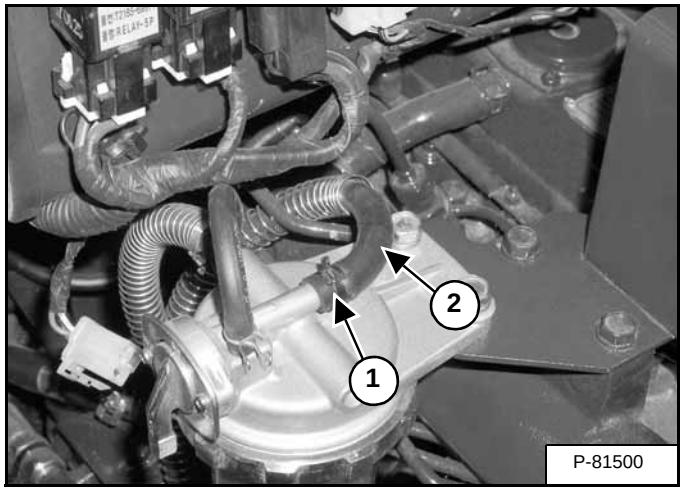
Figure 70-70-20



Remove the bolts (Item 1) and the intake manifold (Item 2) **[Figure 70-70-20]**.

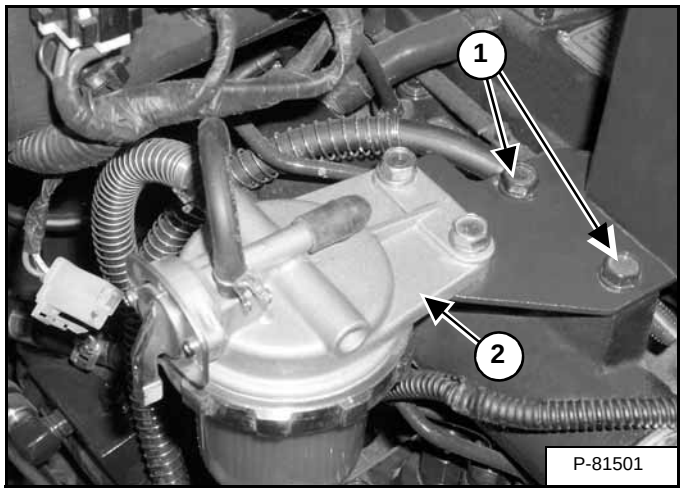
Fuel Injector Removal And Installation (CT 235)

Figure 70-70-50



Loosen the clamp (Item 1) and remove the fuel line (Item 2) **[Figure 70-70-50]** from the fuel filter.

Figure 70-70-51



Remove the two bolts (Item 1) and reposition the fuel filter and bracket (Item 2) **[Figure 70-70-51]**.

⚠ WARNING

AVOID INJURY OR DEATH

Diesel fuel or hydraulic fluid under pressure can penetrate skin or eyes, causing serious injury or death. Fluid leaks under pressure may not be visible. Use a piece of cardboard or wood to find leaks. Do not use your bare hand. Wear safety goggles. If fluid enters skin or eyes, get immediate medical attention from a physician familiar with this injury.

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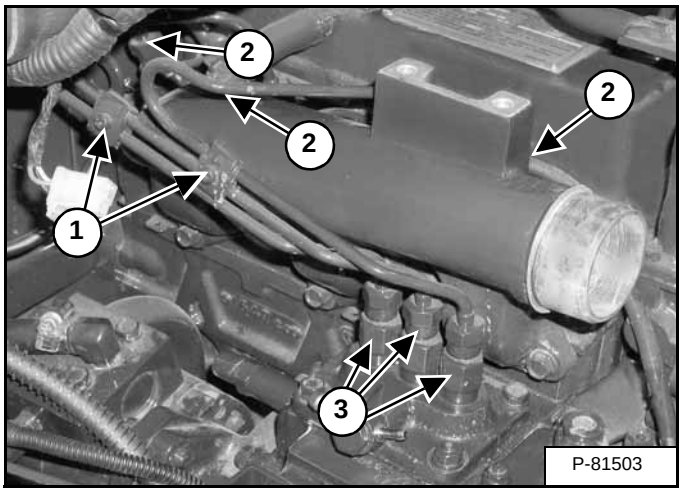
Figure 70-70-52

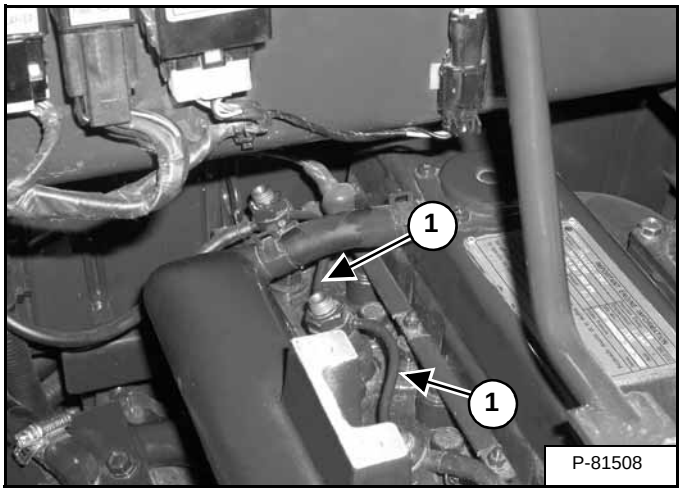


Remove the high pressure fuel line clamps (Item 1) **[Figure 70-70-52]**.

Remove the fuel lines from the injectors (Item 2) and injector pump (Item 3) **[Figure 70-70-52]**.

Remove the high pressure fuel lines.

Figure 70-70-53



Remove the fuel return hoses (Item 1) **[Figure 70-70-53]**.

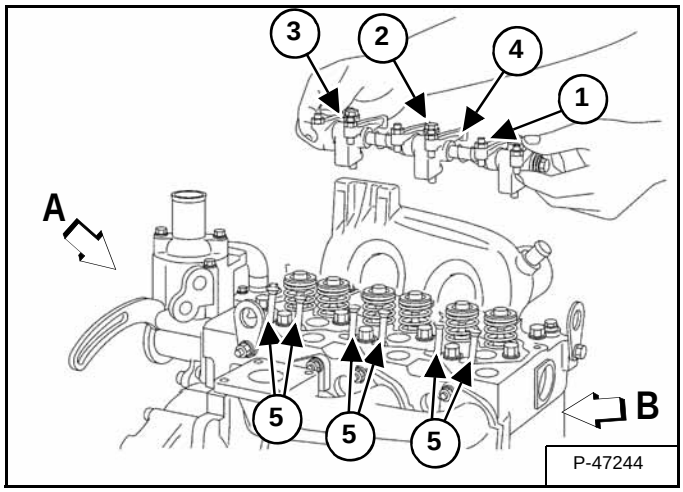
Loosen the injector nozzle.

Installation: Tighten the injector nozzle to 36 - 51 ft.-lb. (49 - 69 N•m) torque.

NOTE: Be sure to replace the copper washer and nozzle cap anytime new or reconditioned fuel injectors are installed.

Cylinder Head Removal And Installation (Cont'd)

Figure 70-80-15



Remove the rocker arm bolts in order of #3 to #1 (Item 1, 2, & 3) and remove the rocker arm assembly (Item 4) **[Figure 70-80-15]**.

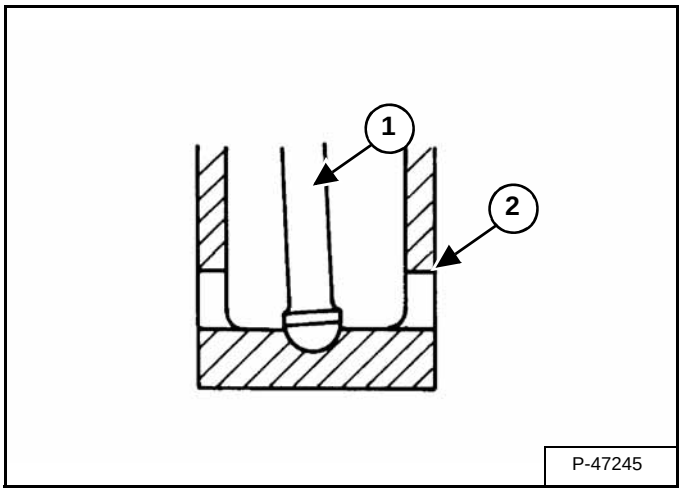
NOTE: (A) is the gearcase side, (B) is the flywheel side.

Installation: Tighten the bolts in the correct sequence in order of #3 to #1 (Item 1, 2, & 3) to the specified torque listed below.

Tightening torque	3A150 3A165	60,8 - 70,6 N•m 6,2 - 7,2 kg•m 44.8 - 52. ft-lb.
	3A139	29,4 - 34,3 N•m 3,0 - 3,5 kg•m 21.7 - 25.3 ft-lb.

Remove the pushrods (Item 5) **[Figure 70-80-15]**.

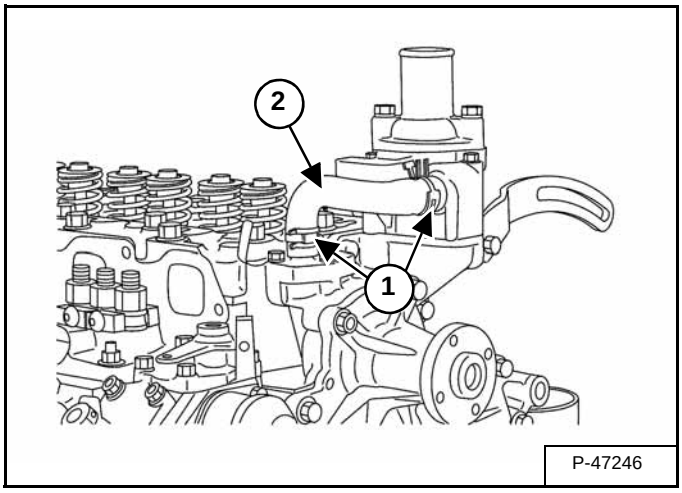
Figure 70-80-16



Installation: The push rod (Item 1) must be seated in the tappet (Item 2) **[Figure 70-80-16]** correctly or the push rods will be damaged.

After installing the rocker arm assembly and push rods, the valve lash must be adjusted. (See Valve Clearance Adjustment on Page 70-80-4.)

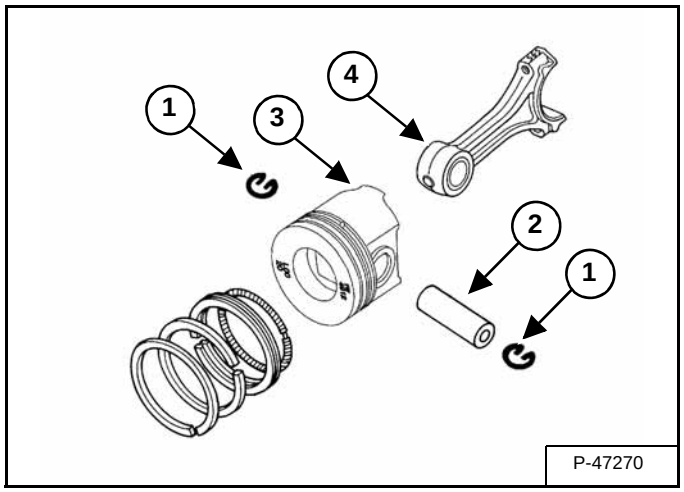
Figure 70-80-17



Remove the clamps (Item 1) and remove the hose (Item 2) **[Figure 70-80-17]**.

Piston And Connecting Rod Removal And Installation (Cont'd)

Figure 70-90-4

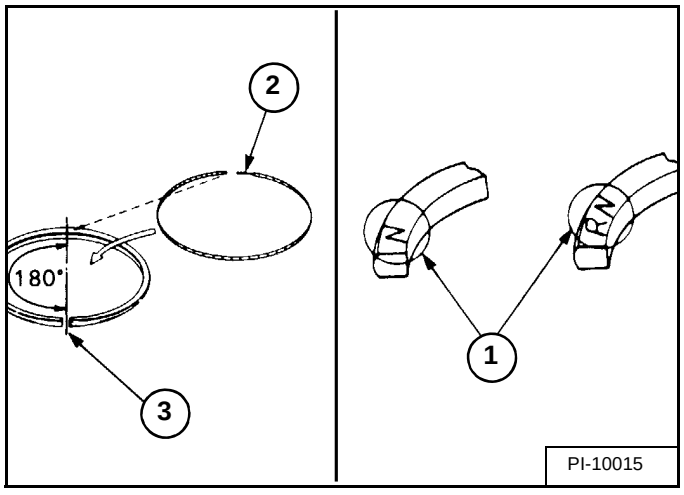


Remove the piston rings **[Figure 70-90-4]**.

Remove the snap ring (Item 1) and piston pin (Item 2) **[Figure 70-90-4]**.

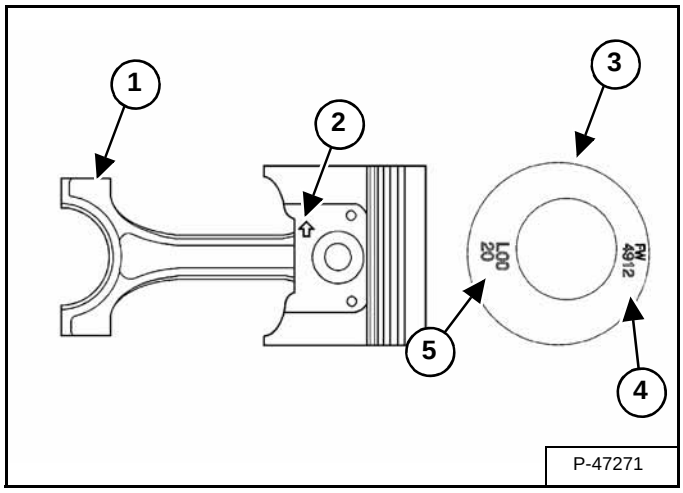
Separate the piston (Item 3) from the connecting rod (Item 4) **[Figure 70-90-4]**.

Figure 70-90-5



Installation: When installing new rings, assemble the ring so the mark (Item 1) near the gap faces the top of the piston. When installing the oil ring, place the expander joint (Item 2) on the opposite side of the oil ring gap (Item 3) **[Figure 70-90-5]**.

Figure 70-90-6



Installation: When reassembling, align the marks (Item 1) on the connecting rod and piston (Item 2). Heat the piston in clean engine oil to 176° F. (80° C.) and tap the piston pin into position. Place the piston rings so that there are gaps every 120° (Items 3, 4 & 5) **[Figure 70-90-6]** with no gap facing the piston pin in the cylinder.

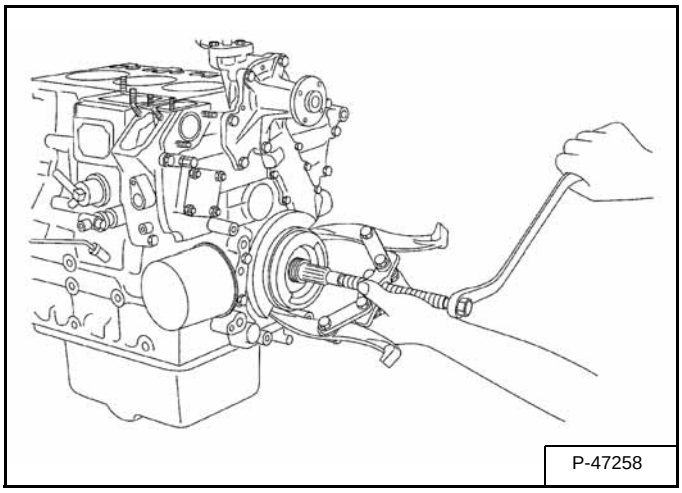
NOTE: (Item 1) and (Item 2) [Figure 70-90-6] should face the injection pump.

Timing Gearcase Cover Removal And Installation (Cont'd)

Remove the crankshaft pulley nut.

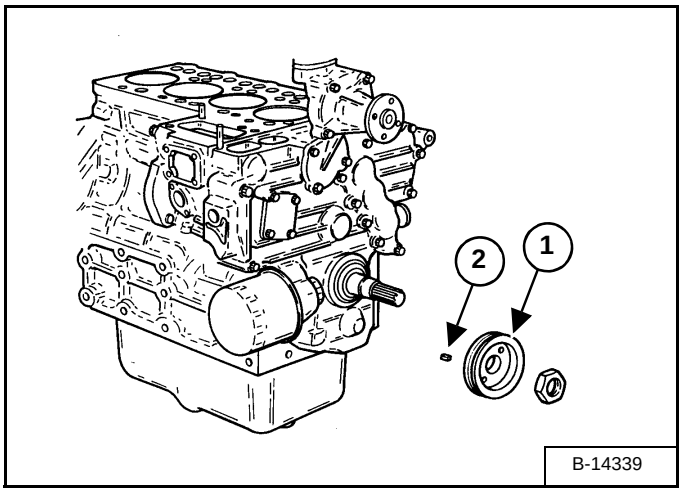
Installation: Tighten the nut to 101 - 116 ft.-lb. (137 - 157 N•m) torque.

Figure 70-100-5



Use a puller and remove the crankshaft pulley **[Figure 70-100-5]**.

Figure 70-100-6

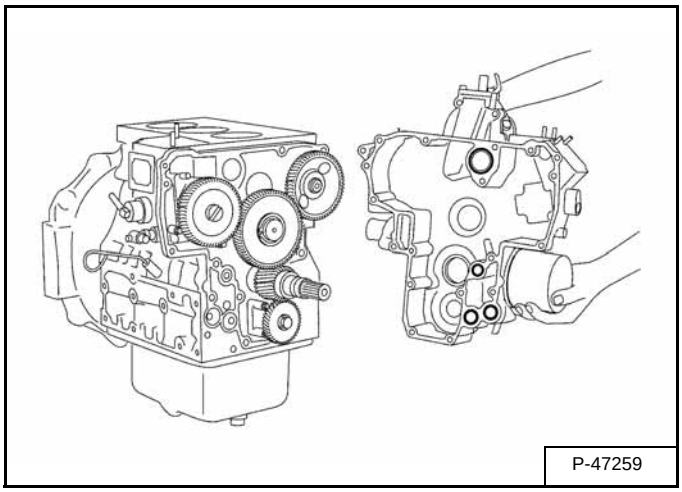


Remove the crankshaft pulley (Item 1) and key (Item 2) **[Figure 70-100-6]**.

Remove the bolts from the timing gearcase cover.

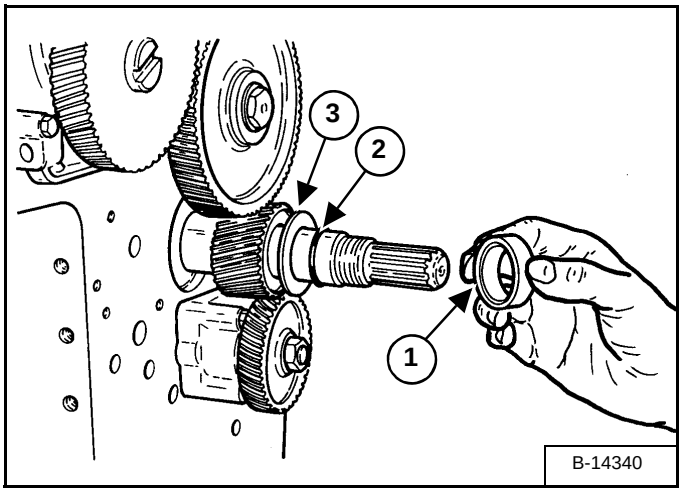
Installation: Tighten the bolts to 17 - 20 ft.-lb. (24 - 27 N•m) torque.

Figure 70-100-7



Remove the timing gearcase cover **[Figure 70-100-7]**.

Figure 70-100-8



Remove the crankshaft collar (Item 1), O-ring (Item 2) and oil slinger (Item 3) **[Figure 70-100-8]**.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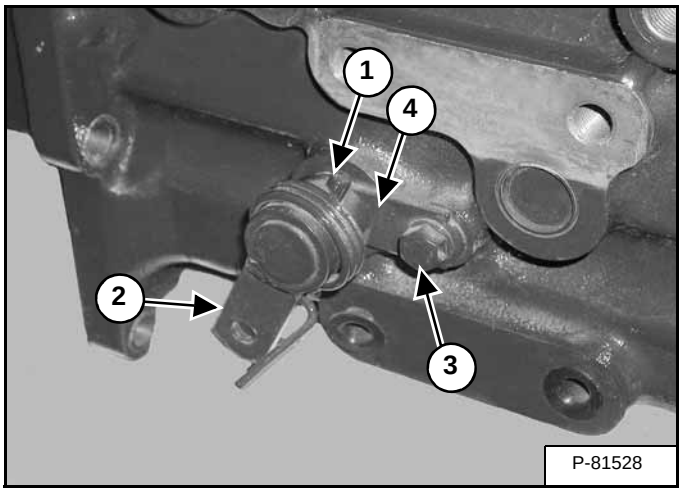
Disassembly (Cont'd)

Figure 70-140-22

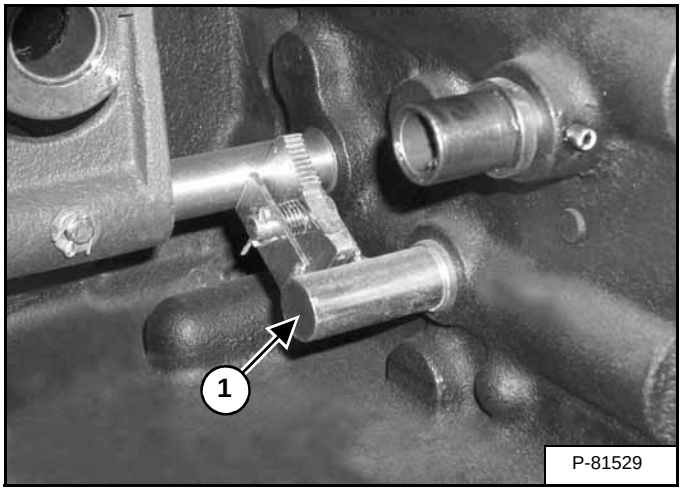


Remove the roll pin (Item 1) **[Figure 70-140-22]**.

Remove the spring/linkage assembly (Item 2) **[Figure 70-140-22]** from the shaft.

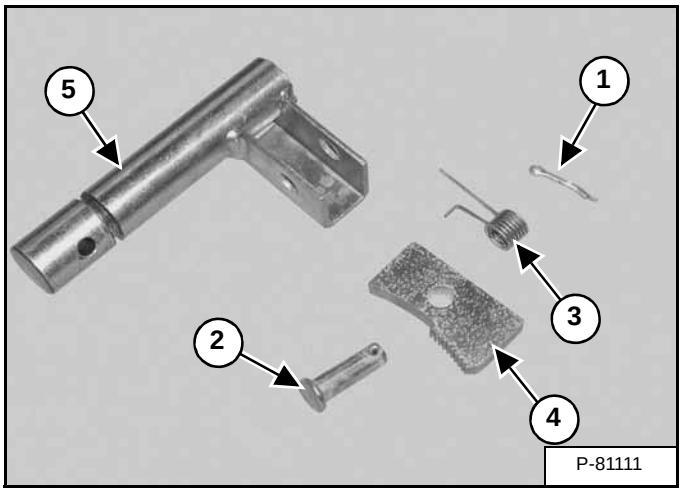
Remove the bolt (Item 3) and retainer plate (Item 4) **[Figure 70-140-22]**.

Figure 70-140-23



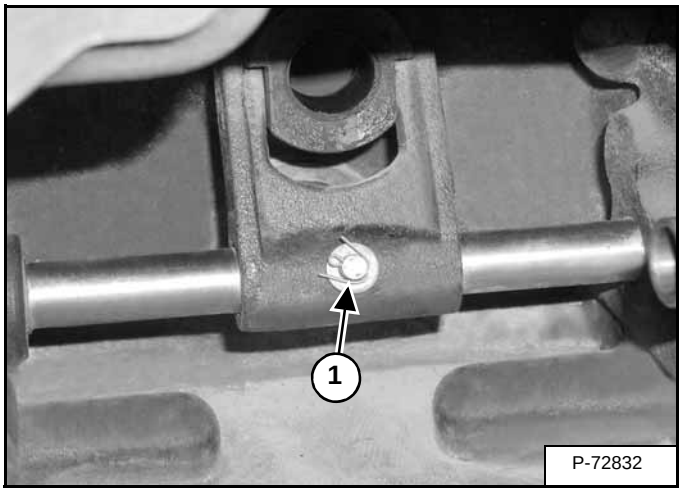
Remove the lock shaft assembly (Item 1) **[Figure 70-140-23]**.

Figure 70-140-24



Remove the cotter pin (Item 1), pin (Item 2), spring (Item 3) and shoe (Item 4) from the shaft (Item 5) **[Figure 70-140-24]**.

Figure 70-140-25



Remove the cotter pin, washer and pin (Item 1) **[Figure 70-140-25]** from the clutch fork shaft.

SPECIFICATIONS (CONT'D)

CT230 SPECIFICATIONS (CONT'D)

Engine

Make / Model	Daedong 3A150LWBC
Fuel / Cooling	Diesel / Liquid (Indirect Injection)
Horsepower, Maximum	30 HP (22,4 kW) @ 2600 RPM
High Idle RPM	2800 RPM
Low Idle RPM	1000 RPM
Number of Cylinders	3
Displacement	91.5 cu. in. (1,5 L)
Bore/Stroke	3.27 / 3.64 in. (83,0 mm / 82,4 mm)
Lubrication	Pressure System with Filter
Crankcase Ventilation	Closed Breathing
Air Cleaner	Dry replaceable paper cartridge (Dual Element)
Ignition	Diesel-Compression
Engine Coolant	Ethylene Glycol / Water Mixture
Starting Aid	Automatic Glow Plugs

Hydraulic System

Pump Type	Tandem Engine driven, gear type
Steering Pump Capacity	4.53 GPM (17,1 L/min.) @ 2600 RPM
Implement Pump Capacity	8.24 GPM (31,2 L/min.) @ 2600 RPM
System Relief at Quick Couplers	2611 PSI (180 bar)
Filter (Hydraulic)	Full flow replaceable, 88 - 118 micron pore size
Steering Cylinders	single acting, Bore: 1.72 in. (43,8 mm) Rod: 1.38 in. (35,0 mm) Stroke: 7.28 in. (185,0 mm)
Control Valve - Loader (if equipped)	Joystick control lever operated, open center, series type with float detent on lift.
Control Valve - Rear Remote Auxiliary Hydraulic (if equipped)	Lever(s) operated, open center, series type. (Full flow detent in section one on both the A and B coupler)
Fluid Lines	Metric tubelines, hoses and fittings
Fluid Type (Hydraulic / Hydrostatic / Transmission)	FLUID, Transmission / Differential

Electrical

Alternator	Belt driven, 50 amps, open
Battery	12 volts, 600 cold cranking amps @ 0° F (-18° C), 115 minute reserve capacity
Starter	12 volts, gear reduction type, 1.21 HP (0,9 kW)
Instrumentation	**Gauges:** Engine Coolant Temperature, Fuel Gauge, Engine RPM **LCD Display:** Hourmeter, **Warning lights (Red):** Parking Brake, Low Engine Oil Pressure, Low Battery Voltage. **Indicator Lights (Amber):** Glow Plugs Activated, PTO Activated (Rear-PTO and Mid-PTO). **Indicator Lights (Green):** Left and Right Turn Indicator. **Indicator Lights (Blue):** High Beam Indicator.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