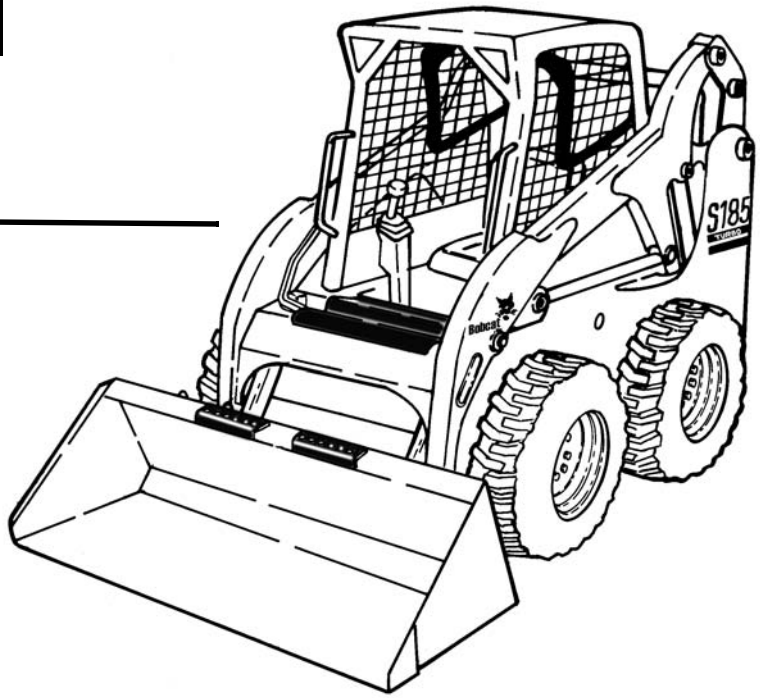
S175
S185
TURBO

INCLUDES HIGH FLOW

Bobcat®

Service Manual

S/N 525011001 & Above
S/N 525111001 & Above
S/N 525211001 & Above
S/N 525311001 & Above



EQUIPPED WITH BOBCAT INTERLOCK CONTROL SYSTEM (BICS™)

6902732 (7-09)

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

LIFTING AND BLOCKING THE LOADER

Figure 10-10-1

B-7023A

⚠ WARNING

AVOID INJURY OR DEATH

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-2003-0807

Procedure

Always park the loader on a level surface.

⚠ WARNING

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

W-2017-0286

Figure 10-10-2

N-18877

Put the floor jack under the front of the loader **[Figure 10-10-2]**.

Lift the front of the loader and put jackstands under the axle tubes **[Figure 10-10-2]**.

NOTE: Make sure the jackstands do not touch the tires. Make sure tires clear floor or any obstacles.

Figure 10-10-3

P-31849

Put the floor jack under the rear of the loader **[Figure 10-10-3]**.

Lift the rear of the loader and install jackstands **[Figure 10-10-3]**.

TOWING THE LOADER

Procedure

Because of the design of the loader, there is not a recommended towing procedure.

- The loader can be lifted onto a transport vehicle.

- The loader can be skidded a short distance to move for service (EXAMPLE: Move onto a transport vehicle.) without damage to the hydrostatic system. (The tires/tracks will not turn.) There might be slight wear to the tires/tracks when the loader is skidded.

  The towing chain (or cable) must be rated at 1 & 1/2 times the weight of the loader. (See LOADER SPECIFICATIONS on Page SPEC-10-1.)

Cleaning The Cooling System

WARNING

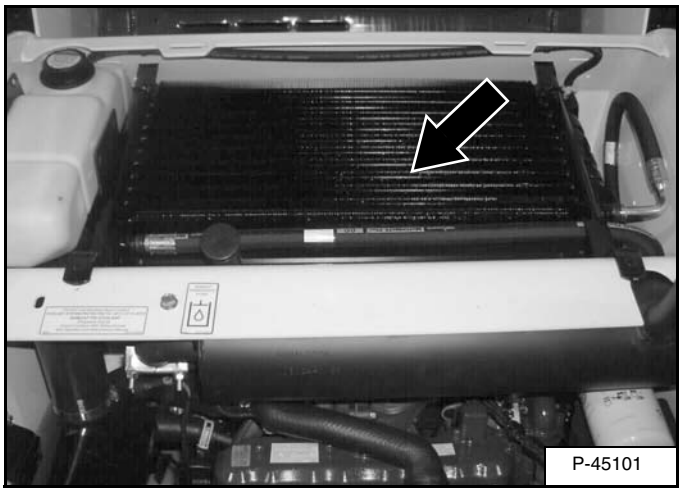
AVOID INJURY OR DEATH

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

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

W-2019-0907

Figure 10-90-1



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

Open the rear door and remove the rear grill. (See Removal And Installation on Page 50-60-1.)

Use air pressure or water pressure to clean the top of the oil cooler **[Figure 10-90-1]**.

WARNING

AVOID INJURY OR DEATH

DO NOT operate the utility work machine with the tow bolts installed. By-passing the parking brake can cause machine roll away.

W-2460-0403

IMPORTANT

AVOID ENGINE DAMAGE

Always use the correct ratio of water to antifreeze.

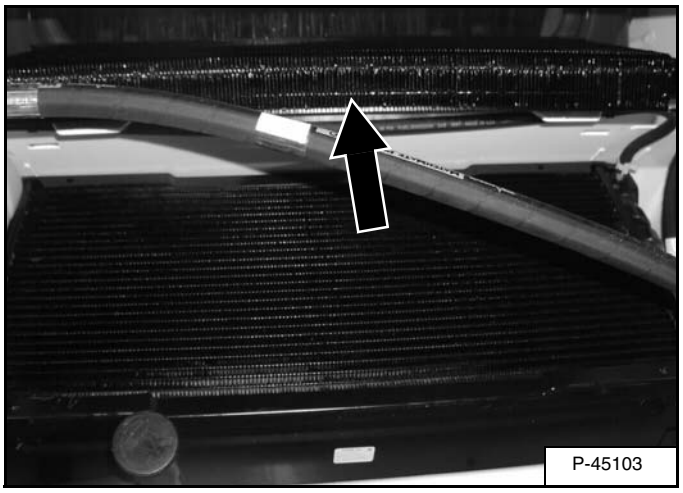
Too much antifreeze reduces cooling system efficiency and may cause serious premature engine damage.

Too little antifreeze reduces the additives which protect the internal engine components; reduces the boiling point and freeze protection of the system.

Always add a premixed solution. Adding full strength concentrated coolant can cause serious premature engine damage.

I-2124-0497

Figure 10-90-2



Raise the air conditioning condenser (If equipped) and the oil cooler and clean the top of the radiator **[Figure 10-90-2]**.

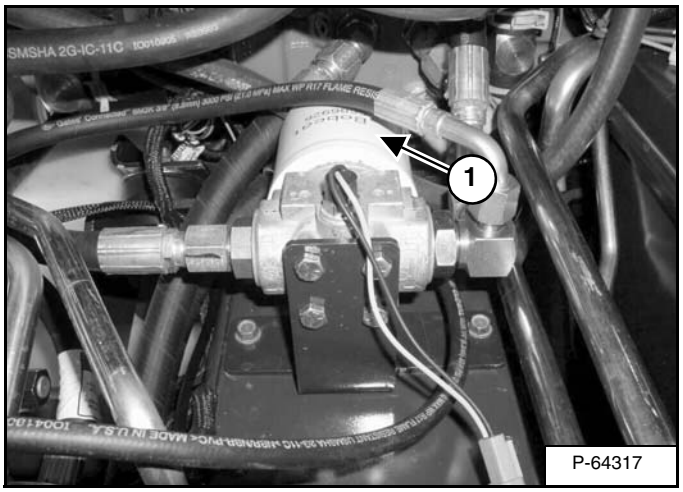
Lower the oil cooler on the loader frame.

Check cooling system for leaks.

Lower the rear grill and close the rear door.

Replacing Hydraulic Fluid (Cont'd)

Figure 10-120-6



On SJC equipped loaders, the hydrostatic charge pressure filter (Item 1) **[Figure 10-120-6]** is located on a bracket mounted to the transmission.

Remove and replace the hydrostatic charge pressure filter.

Add the correct fluid to the reservoir until the fluid level is at the center of the sight gauge (Do not overfill).

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

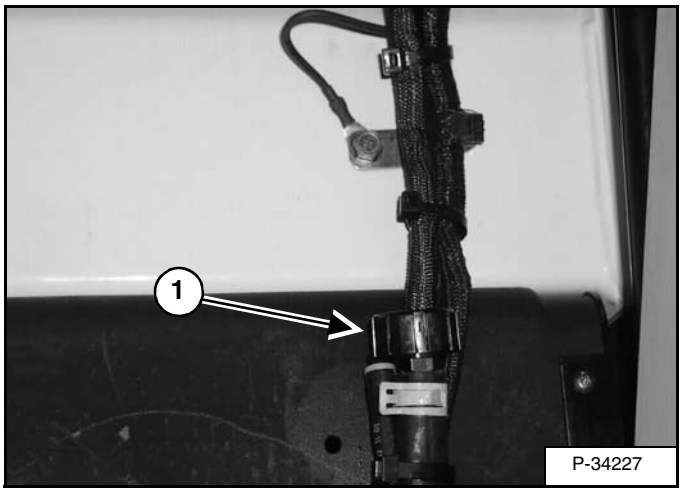
Start the engine and operate the loader hydraulic controls.

Stop the engine and check for leaks.

Check the fluid level in the reservoir and add as needed.

Breather Cap

Figure 10-120-7



(See SERVICE SCHEDULE on Page 10-70-1), for the correct replacement interval.

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

Remove the breather cap (Item 1) **[Figure 10-120-7]** and discard.

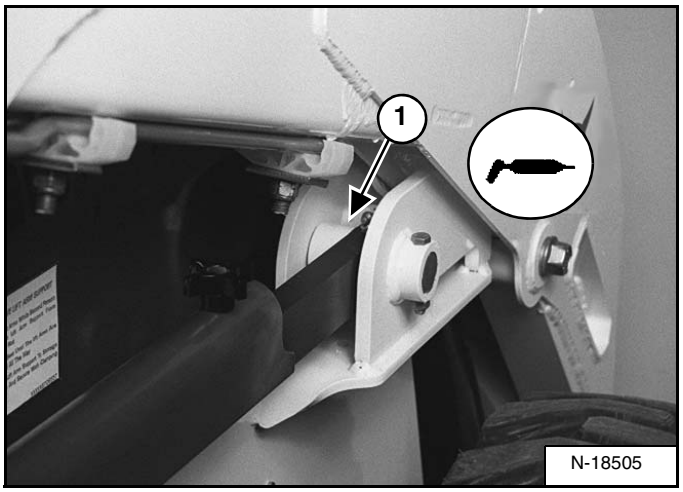
Install new cap.

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

LUBRICATION OF THE BOBCAT LOADER

Procedure

Figure 10-160-1



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

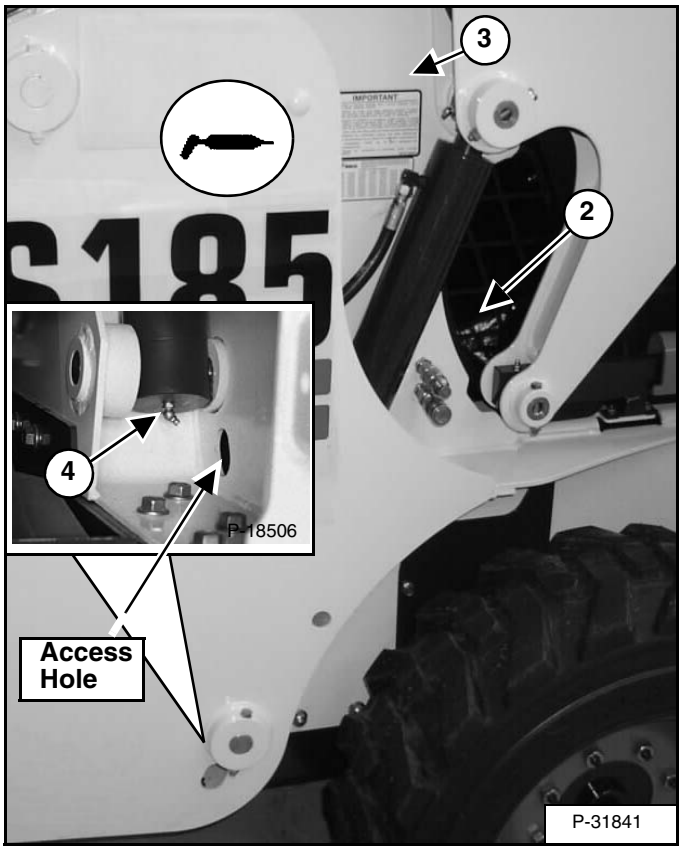
Record the operating hours each time you lubricate the Bobcat loader.

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

Lubricate the following locations on the loader:

1. Stabilizer Rod - Front (Both Sides) **[Figure 10-160-1]**.

Figure 10-160-2

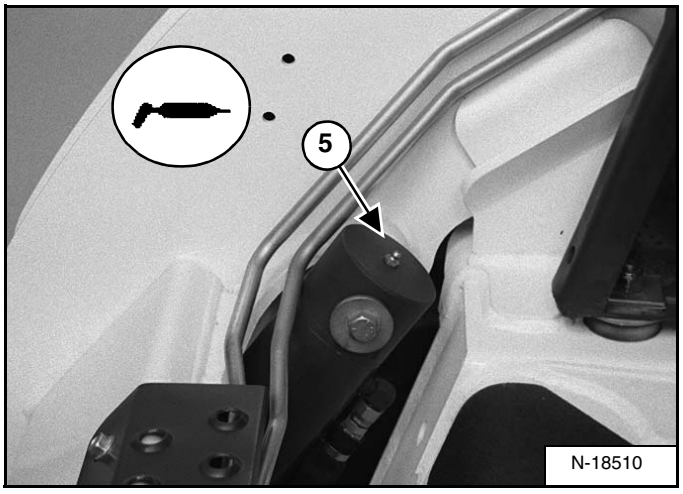


2. Stabilizer Rod - Rear (Both Sides) **[Figure 10-160-2]**

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

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

Figure 10-160-3



5. Tilt Cylinder Base End (Both Sides) **[Figure 10-160-3]**

HYDRAULIC SYSTEM (CONT'D)

Continued On Next Page

HYDRAULIC/HYDROSTATIC SCHEMATIC
WITH HIGH FLOW OPTION
S175 (S/N 525215000 AND ABOVE)
(S/N 525315000 AND ABOVE)
S185 (S/N 525015000 AND ABOVE)
(S/N 525115000 AND ABOVE)
(PRINTED JULY 2005)
V-0566legend

LEGEND

1. RESERVOIR:
   Capacity . . . . . 19.2 Qts. (18,2 L)
2. SPRING LOADED FILTER BY-PASS VALVE: 45-55 PSI (3,1-3,8 Bar)
3. DIFFERENTIAL PRESSURE SWITCH:
   36-44 PSI (2,5-3,0 Bar)
   Normally Closed
4. DRIVE MOTOR SHUTTLE VALVE
5. RELIEF/REPLENISHING VALVE - HIGH PRESSURE: 5000 PSI (345 Bar)
6. RELIEF VALVE - CHARGE INLET:
   220-270 PSI (15,1-18,6 Bar)
   at High Engine Idle
   With 140 degrees F. (60 degrees C.) Fluid
7. FRONT AUXILIARY MANUAL PRESSURE BLEED-OFF VALVE
8. HYDRAULIC PUMP . . . . . Gear Type
   16.9 GPM (64 L/min.) at High Engine Idle
9. RELIEF VALVE - MAIN:
   3250-3350 PSI (224-231 Bar)
   at Front Quick Couplers
10. RELIEF/ANTICAVITATION VALVE - PORT 3500 PSI (241,3 Bar)
11. ANTICAVITATION VALVE
12. SOLENOID ACTIVATED DIRECTIONAL CONTROL VALVE - AUXILIARY
13. RELIEF/ANTICAVITATION VALVE - PORT (OPTIONAL) 3500 PSI (241,3 Bar)
14. LOAD CHECK VALVE
15. LIFT CYLINDER SPOOL - MADE TO RESTRICT FLOW DURING BOOM DOWN BUT NOT DURING BOOM UP
16. SOLENOID ACTIVATED DIRECTIONAL CONTROL VALVE - BICS CONTROL
17. PILOTED ACTIVATED DIRECTIONAL CONTROL VALVE - TILT CONTROL
18. PILOTED ACTIVATED DIRECTIONAL CONTROL VALVE - LIFT CONTROL
19. PULL BUTTON ACTIVATED DIRECTIONAL CONTROL VALVE - LIFT ARM BY-PASS
20. PILOTED ACTIVATED DIRECTIONAL CONTROL VALVE - UNLOADING SPOOL
21. PILOTED ACTIVATED DIRECTIONAL CONTROL VALVE - FLOW CONTROL SPOOL
22. FLOW DIVIDER ADJUSTMENT VALVE
23. SOLENOID ACTIVATED DIRECTIONAL CONTROL VALVE - BASE
24. SOLENOID ACTIVATED DIRECTIONAL CONTROL VALVE - ROD
25. LOAD SHUTTLE VALVE - BLEED OFF
26. SOLENOID ACTIVATED DIRECTIONAL CONTROL VALVE - TWO COIL
27. PILOT ACTIVATED DIRECTIONAL CONTROL VALVE - REAR AUXILIARY
28. RESTRICTOR - 0.140 inch (3,6 mm)
29. RESTRICTOR - 0.031 inch (0,8 mm)
30. RELIEF VALVE: 3300 PSI (228 Bar)
31. FILTER - HYDRAULIC (CANISTER)
32. FILTER - CASE DRAIN (SINTERED BRONZE)
33. FILTER - BICS CONTROL VALVE (SCREEN)
34. CHECK VALVE - BUCKET POSITION VALVE
35. RESTRICTION
36. VARIABLE CAPACITY DISPLACEMENT BIDIRECTIONAL HYDROSTATIC PUMP
37. SHUTTLE RELIEF VALVE
    (Not Adjustable - Factory Set)
    65 PSI (4,5 Bar)
38. FIXED CAPACITY DISPLACEMENT BIDIRECTIONAL HYDROSTATIC MOTOR
39. CHECK VALVE - With 80 PSI (5,5 Bar) Spring
40. SOLENOID ACTIVATED DIRECTIONAL CONTROL VALVE - BUCKET POSITION VALVE (ON/OFF)
41. CHECK VALVE - BICS CONTROL VALVE
42. AUXILIARY HYDRAULIC PUMP - 9.5 GPM (36 L/min) at High Engine Idle
43. CHECK VALVE - With 300 PSI (20,7 Bar) Spring And With 0.016 inch (0,40 mm) Orifice
44. PILOT ACTIVATED DIRECTIONAL CONTROL VALVE - HYDRAULIC POWERED BOB-TACH
45. RESTRICTION - 0.089 inch (2,26 mm)
46. RESTRICTION - 0.025 inch (0,6 mm)
47. RELIEF VALVE - 2000 PSI (137 Bar)
48. RELIEF VALVE - 1200 PSI (83 Bar)
49. SOLENOID ACTIVATED DIRECTIONAL CONTROL VALVE (TWO COIL)
50. RELIEF VALVE - 3300 PSI (228 Bar)
51. DUMP VALVE - (ON/OFF)
52. CHECK VALVE
53. FILTER - BOB-TACH VALVE
    (S/N 525217391 & Above)
    (S/N 525315822 & Above)
    (S/N 525019833 & Above)
    (S/N 525115274 & Above)

NOTE: Unless otherwise specified springs have NO significant pressure value.

Troubleshooting Chart

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

WARNING

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

W-2004-1285

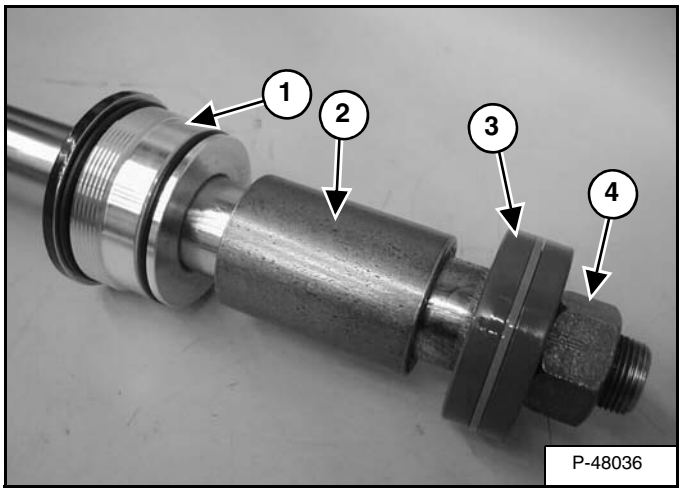
PROBLEM	CAUSE
The hydraulic system will not operate.	1, 2, 3, 5, 8
The transmission warning light come ON when hydraulics are operating.	1, 3
Slow hydraulic system action.	1, 3, 4, 6, 8
Hydraulic action is not smooth.	1, 4, 5, 6, 7
Lift arms go up slowly at full engine RPM	1, 3, 4, 5, 6, 7, 8, 9
The lift arms or Bob-Tach will move when the pedal is in neutral position	4
The lift arms come down with the pedal is in neutral position	4, 9, 10, 11
Bypass valve stuck	12
Bypass valve stem bent or broke	13

KEY TO CORRECT CAUSE

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

Assembly (Cont'd)

Figure 20-20-21

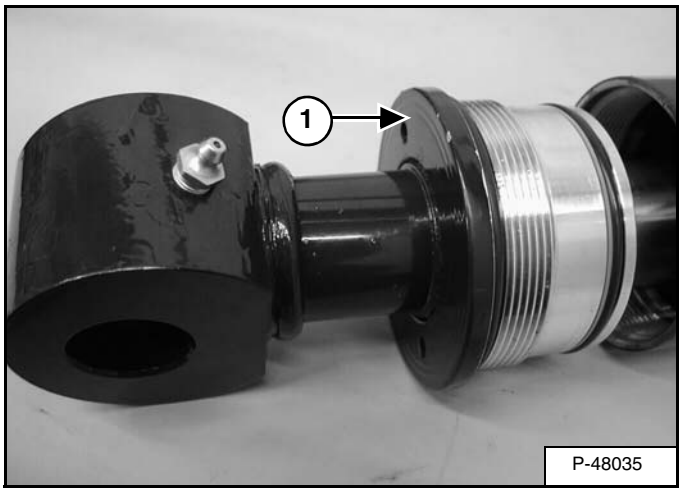


NOTE: Clean and dry the threads before installing the nut. Install the new nut from the kit.

Install the head (Item 1), spacer (Item 2) piston (Item 3), and nut (Item 4) **[Figure 20-20-21]**.

Tighten the nut (Item 4) **[Figure 20-20-21]** to 600 ft.-lb. (814 N•m) torque.

Figure 20-20-22

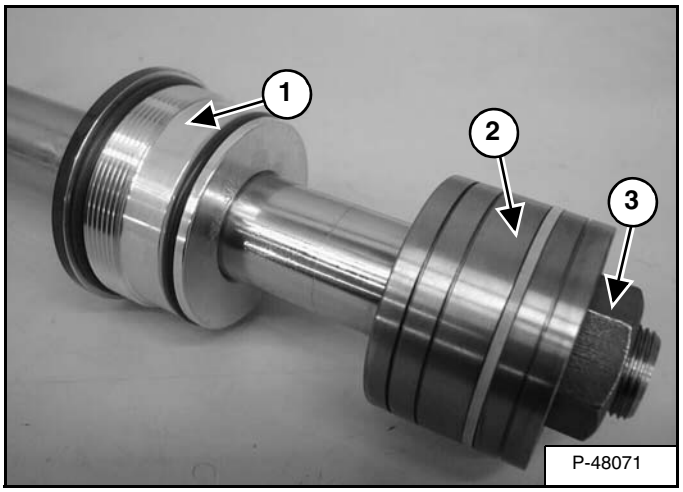


Put the base end of the hydraulic cylinder in a vise.

Tighten the head (Item 1) **[Figure 20-20-22]** using a spanner wrench.

Assembly (Cont'd)

Figure 20-21-22

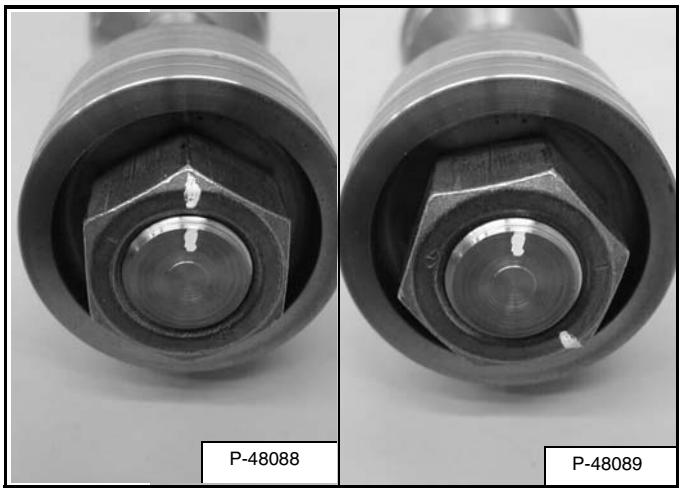


NOTE: Clean and dry the threads before installing the nut. Install the new nut from the kit.

Install the head (Item 1), piston (Item 2) and nut (Item 3) **[Figure 20-21-22]**.

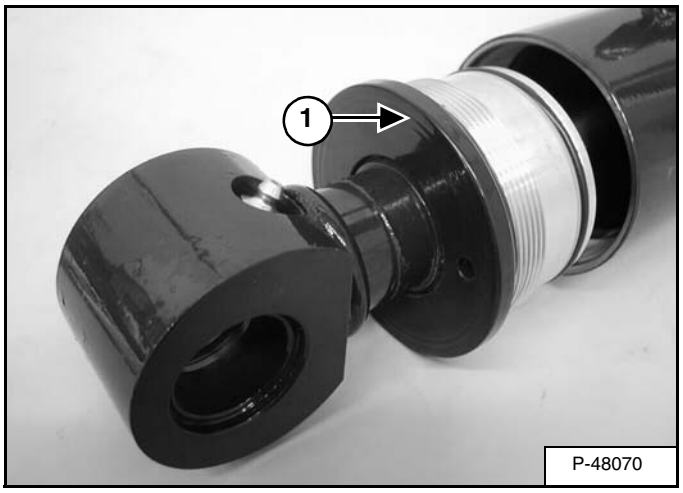
Tighten the nut (Item 3) **[Figure 20-21-22]** to 100 ft.-lb. (136 N•m) torque.

Figure 20-21-23



Mark the end of the shaft and nut. Tighten the nut an additional 135 degrees or 2-1/4 flats **[Figure 20-21-23]**.

Figure 20-21-24



Put the base end of the hydraulic cylinder in a vise.

Tighten the head (Item 1) **[Figure 20-21-24]** using a spanner wrench.

MAIN RELIEF VALVE

Checking

IMPORTANT

The hydraulic tester must be in the fully open position before you start the engine.

I-2024-0284

⚠ WARNING

When the engine is running during service, the steering levers must be in neutral and the parking brake engaged. Failure to do so can cause injury or death.

W-2006-0284

⚠ WARNING

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

W-2017-0286

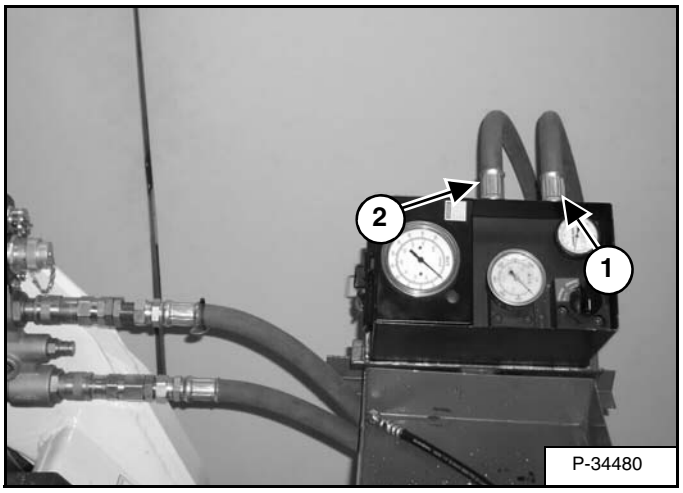
The tools listed will be needed to do the following procedure:

MEL10003 - Hydraulic Tester
MEL10006 - Hydraulic Test Kit

Turn the key switch to the OFF position. To release the hydraulic pressure at the front auxiliary quick couplers push the couplers into the coupler block and hold for three seconds.

Lift and block the loader. (See Procedure on Page 10-100-1.)

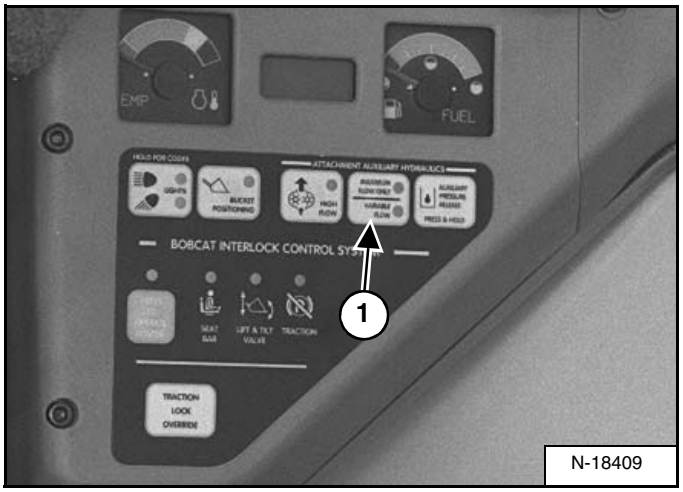
Figure 20-30-1



Connect the IN port (Item 1) **[Figure 20-30-1]** of the hydraulic tester to the bottom (female) quick coupler on the loader.

Connect the OUT port (Item 2) **[Figure 20-30-1]** of the hydraulic tester to the top (male) quick coupler on the loader.

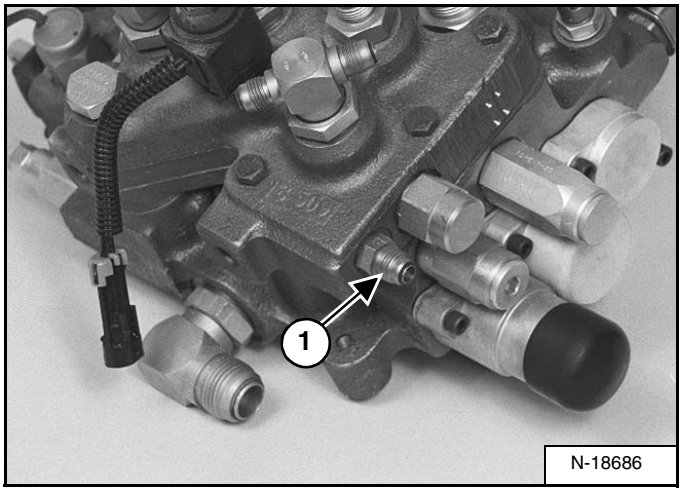
Figure 20-30-2



- Press the AUXILIARY HYDRAULICS Button (Item 1) **[Figure 20-30-2]** Maximum Flow.

BICS Valve, Lift Arm Bypass Orifice Removal And Installation

Figure 20-40-18



Remove the fitting (Item 1) **[Figure 20-40-18]** from the valve.

Figure 20-40-19

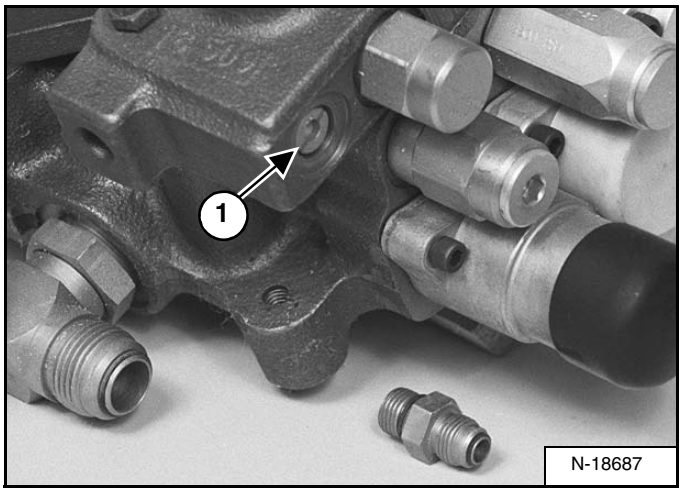
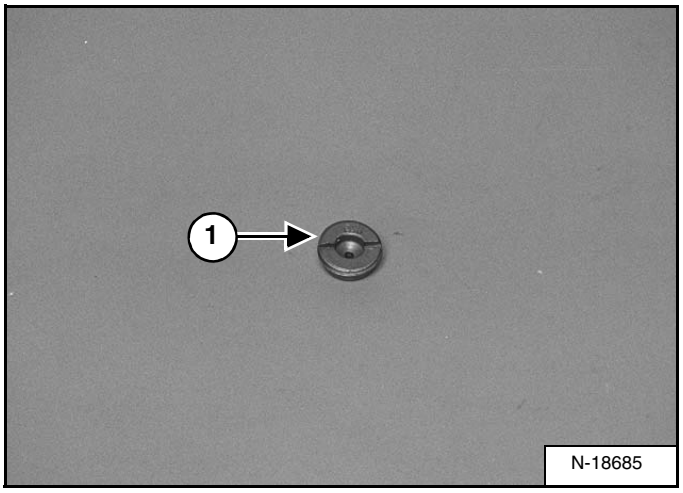


Figure 20-40-20



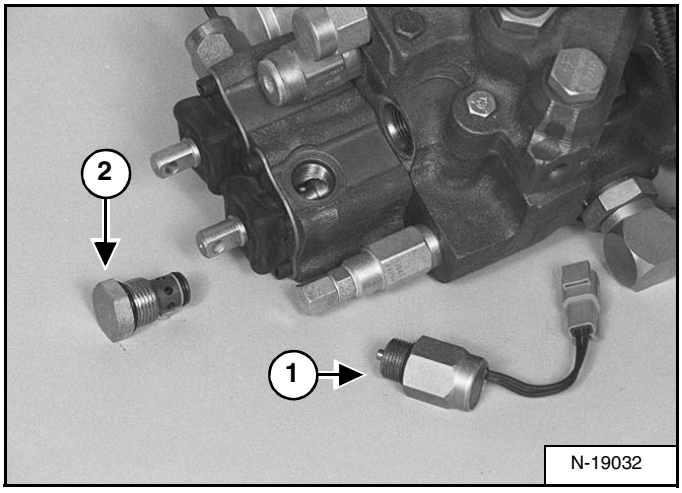
Using a flat blade screw driver, remove the lift arm bypass orifice (Item 1) **[Figure 20-40-19]** & **[Figure 20-40-20]**.

Orifice size is 0.078 in.

Reverse the removal procedure to install the lift arm bypass orifice.

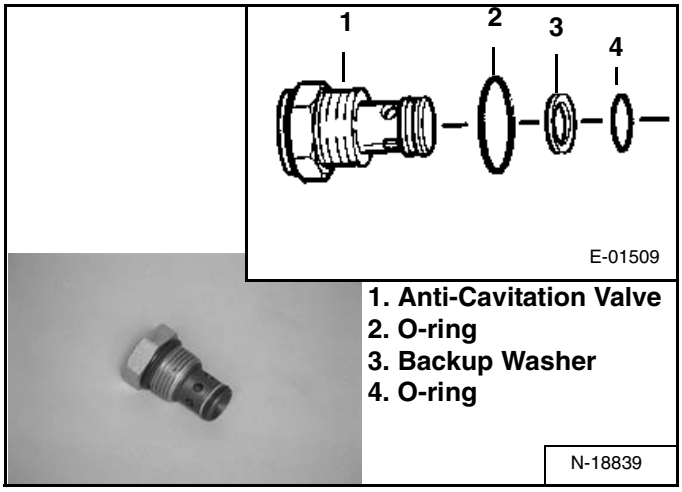
Anti-Cavitation Valve (Cont'd)

Figure 20-40-49



Remove the anti-cavitation valve (Item 2) **[Figure 20-40-48]** & **[Figure 20-40-49]** from the control valve for the lift section.

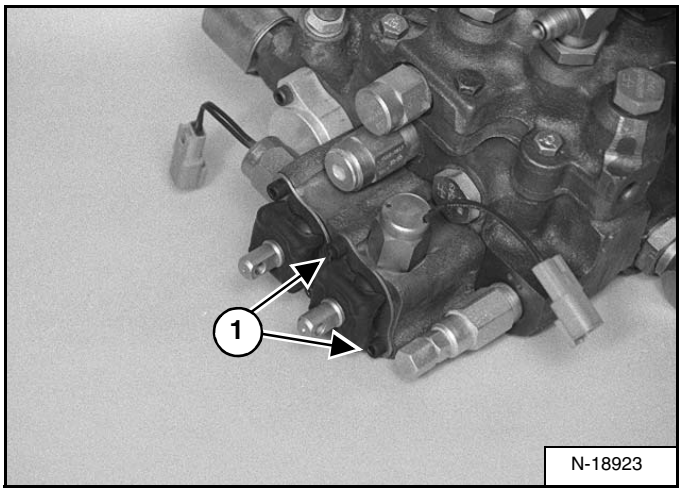
Figure 20-40-50



Remove the O-rings and back-up washer from the anti-cavitation valve **[Figure 20-40-50]**.

Rubber Boot

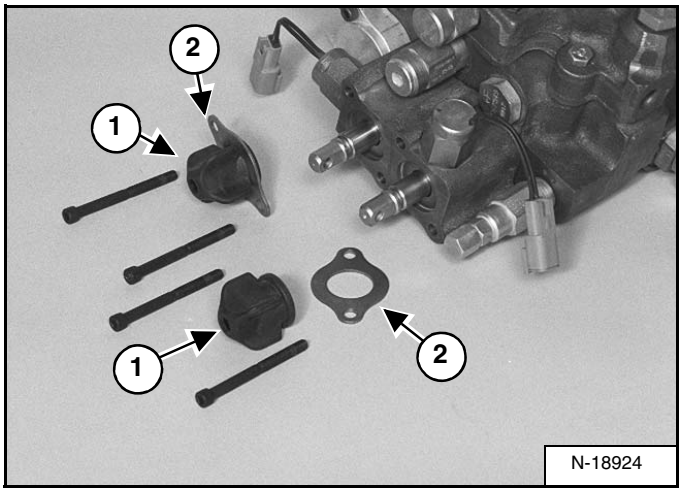
Figure 20-40-51



Remove the two screws (Item 1) **[Figure 20-40-51]** on the rubber boot retainer.

Installation: Tighten the screws to 90 - 100 in.-lb. (10,2 - 11,3 N•m) torque.

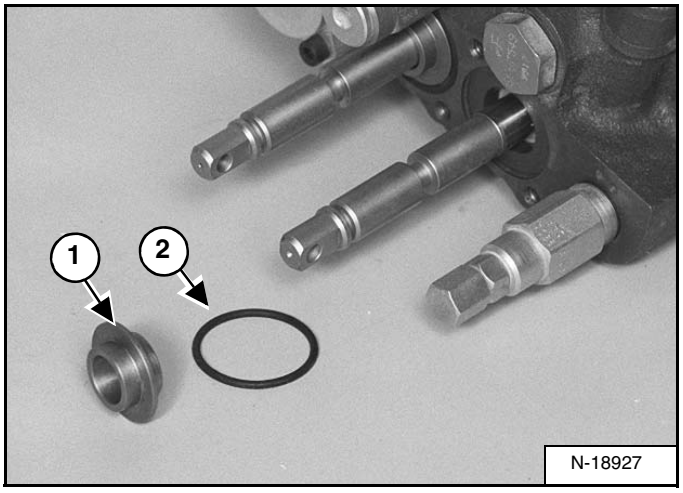
Figure 20-40-52



Remove the rubber boot (Item 1) and retainer (Item 2) **[Figure 20-40-52]**.

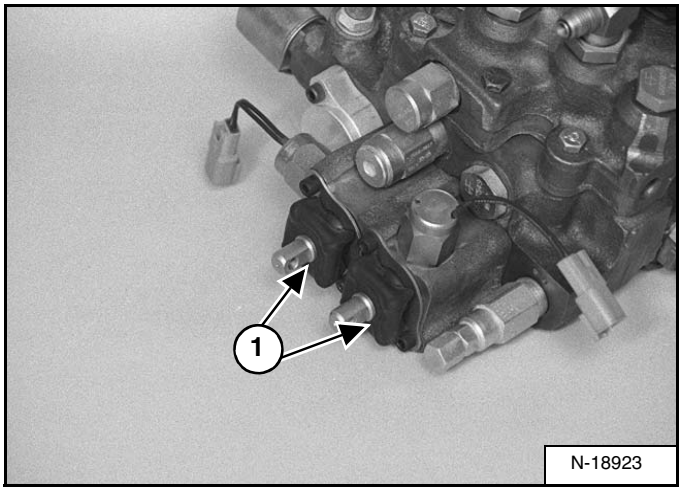
Lift Spool and Detent (Cont'd)

Figure 20-40-89



Install the spacer (Item 1) and O-ring (Item 2) **[Figure 20-40-89]** on the linkage end of the lift spool.

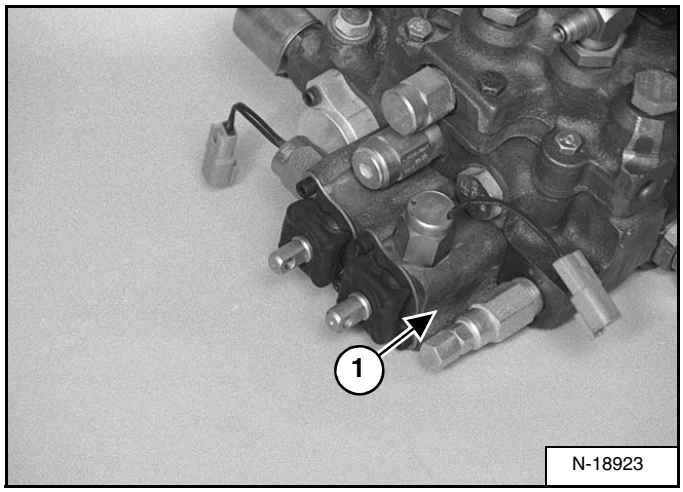
Figure 20-40-90



Install the lift and tilt lock block (Item 1) **[Figure 20-40-90]**. (See Lift And Tilt Lock Block Removal And Installation on Page 20-40-18.)

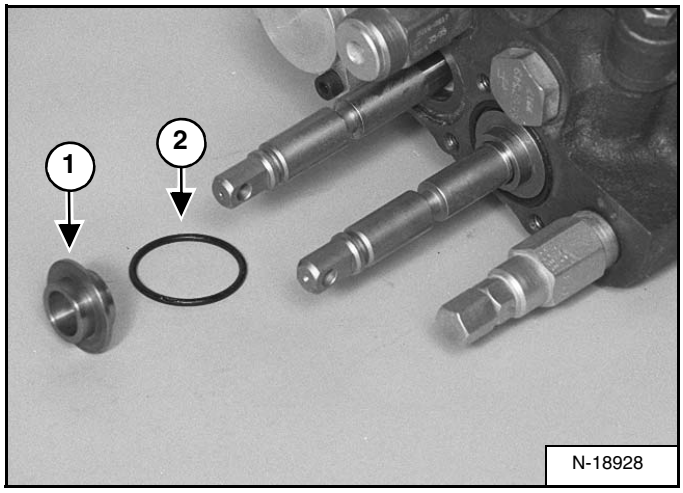
Tilt Spool Removal And Installation

Figure 20-40-91



Remove the lift and tilt lock block (Item 1) **[Figure 20-40-91]** from the control valve. (See Lift And Tilt Lock Block Removal And Installation on Page 20-40-18.)

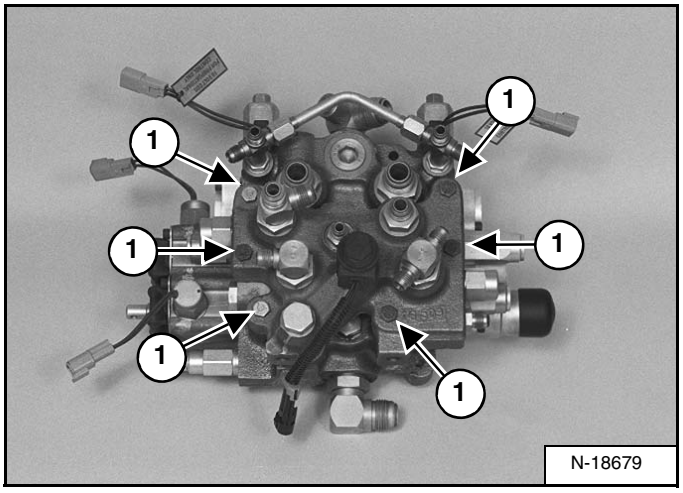
Figure 20-40-92



Remove the spacer (Item 1) and O-ring (Item 2) **[Figure 20-40-92]** from the tilt spool.

BICS Valve Removal And Installation

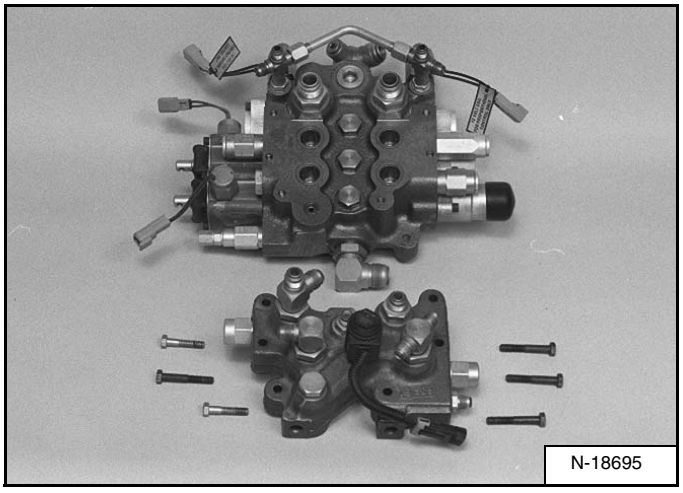
Figure 20-41-14



Remove the control valve. (See Removal and Installation Page 20-41-1.)

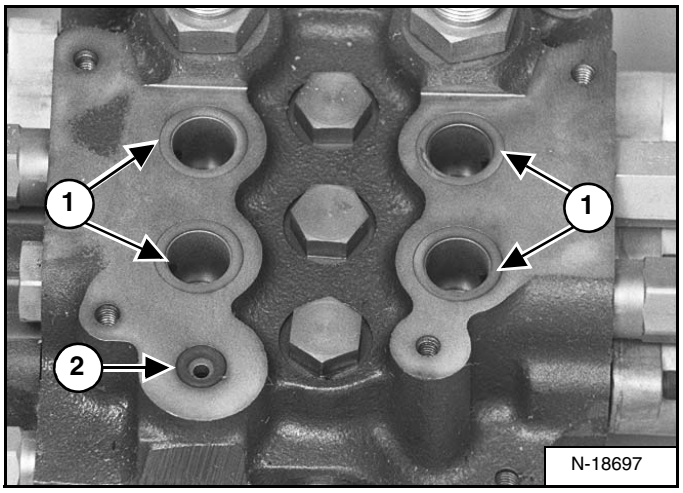
To remove the BICS from the control valve loosen and remove the six mounting bolts (Item 1) **[Figure 20-41-14]**.

Figure 20-41-15



Remove the BICS valve assembly from the top of the control valve **[Figure 20-41-15]**.

Figure 20-41-16

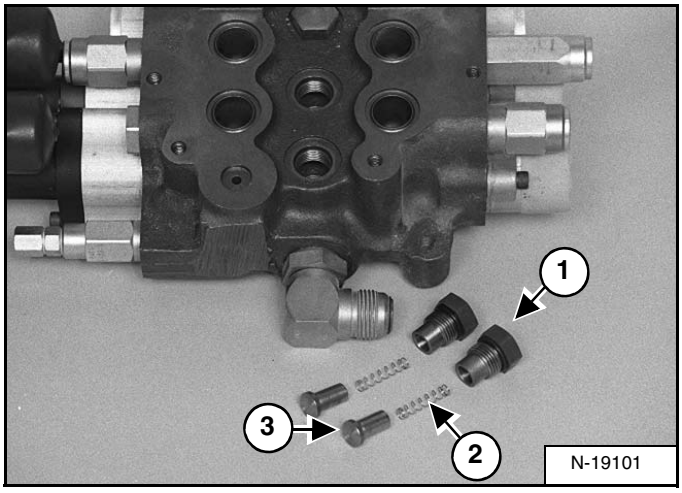


Remove the four large O-rings (Item 1) and the small O-ring (Item 2) **[Figure 20-41-16]** from the top of the control valve.

Install the four large O-rings (Item 1) and the small O-ring (Item 2) **[Figure 20-41-16]** on the top of the control valve.

Load Check Valve (Cont'd)

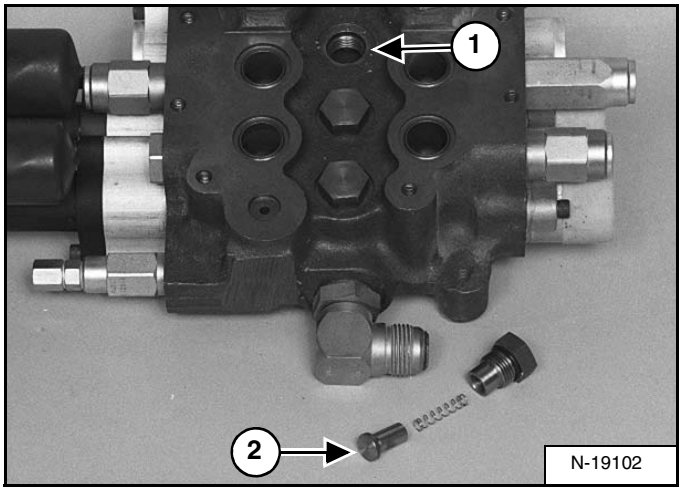
Figure 20-41-41



Remove the load check plugs (Item 1) **[Figure 20-41-41]**.

Remove the spring (Item 2) and poppet (Item 3) **[Figure 20-41-41]**.

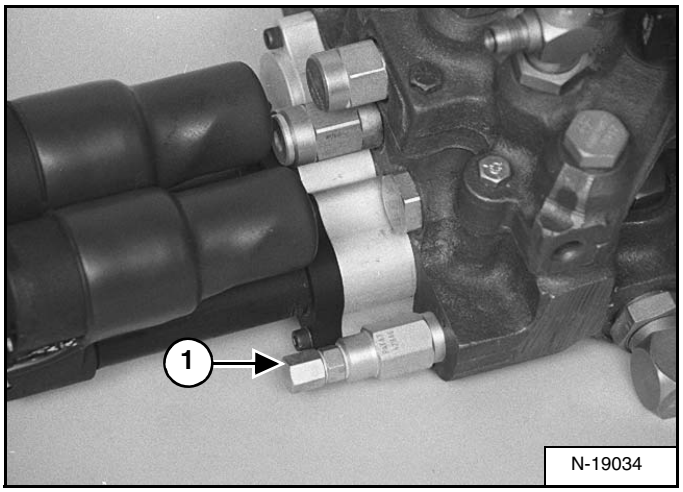
Figure 20-41-42



The auxiliary section (Item 1) uses an orifice load check poppet (Item 2) **[Figure 20-41-42]**.

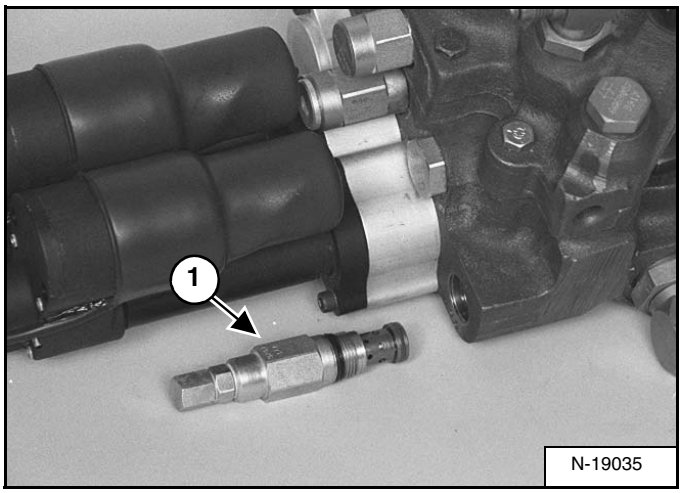
Main Relief Valve

Figure 20-41-43



Loosen the main relief valve (Item 1) **[Figure 20-41-43]**.

Figure 20-41-44

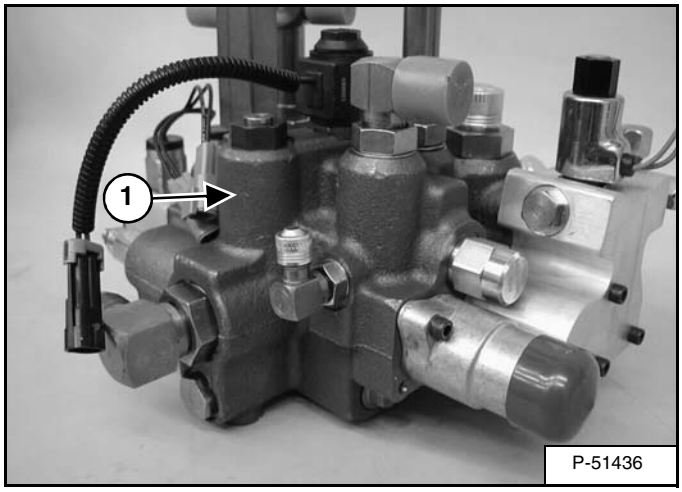


Remove the main relief valve (Item 1) **[Figure 20-41-44]**.

HYDRAULIC CONTROL VALVE (1 PIECE CASTING) (FOOT CONTROL)

Identification

Figure 20-42-1



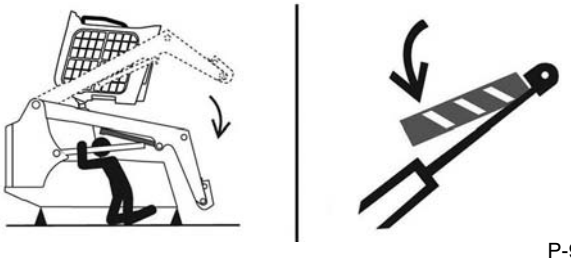
The hydraulic control valve (1 piece casting) (foot control) (Item 1) **[Figure 20-42-1]** does not have a removable BICS section.

The BICS section and main control valve are in one casting.

For identification of the hydraulic control valve (2 piece casting) (foot control), (See Identification on Page 20-40-1.)

Removal And Installation

DANGER



AVOID DEATH

- **Disconnecting or loosening any hydraulic tubeline, hose, fitting, component or a part failure can cause lift arms to drop.**
- **Keep out of this area when lift arms are raised unless supported by an approved lift arm support. Replace if damaged.**

D-1009-0409

WARNING

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

W-2059-0598

IMPORTANT

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

I-2003-0888

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

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

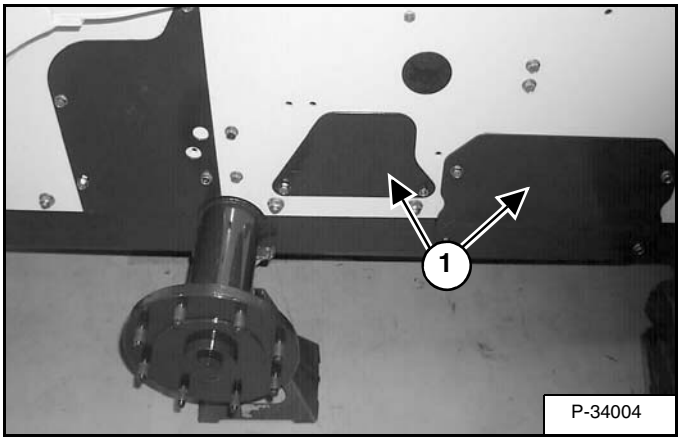
Raise the operator cab. (See Raising The Operator Cab on Page 10-30-1.)

Clean the area around the control valve.

Drain the hydraulic reservoir. (See Replacing Hydraulic Fluid on Page 10-120-1.)

Remove the control panel. (See Removal and Installation on Page 50-100-1.)

Figure 20-42-2

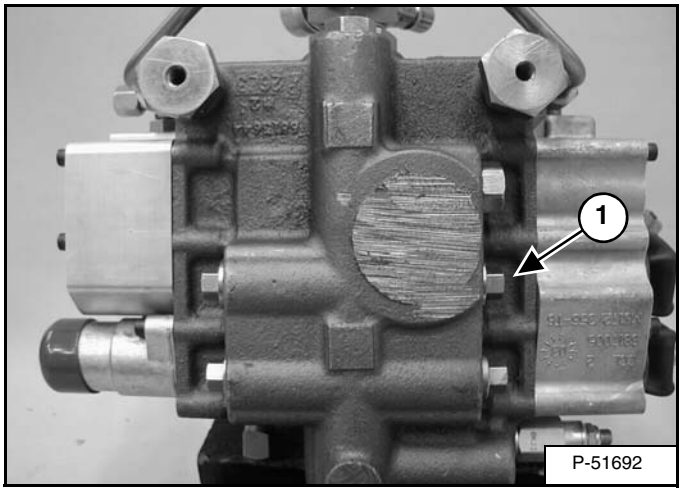


Remove the right rear tire.

Locate and remove the access covers (Item 1) **[Figure 20-42-2]** on the right side of the machine.

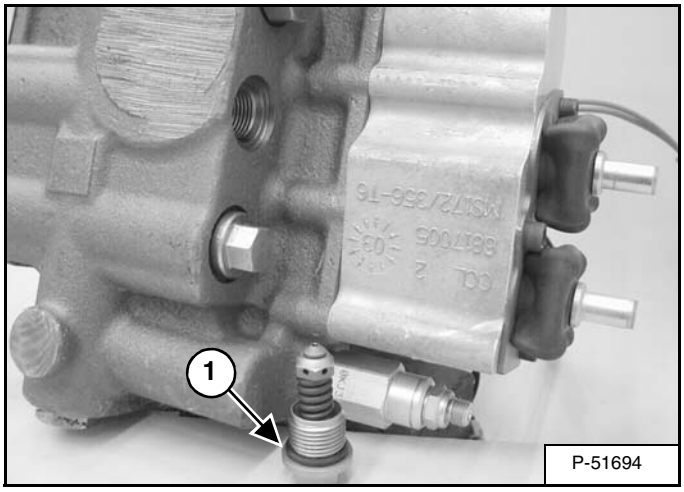
Port Relief/Anti-Cavitation Valve (Tilt, Rod End)

Figure 20-42-34



Remove the tilt port relief/anti cavitation valve (Item 1) **[Figure 20-42-34]** from the rod end of the tilt section.

Figure 20-42-35

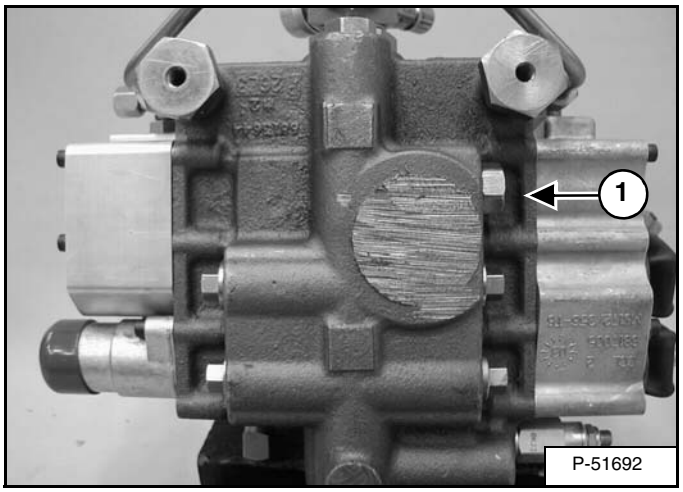


Replace the O-ring (Item 1) **[Figure 20-42-35]** before installation.

Installation: Tighten to 38 - 45 ft.-lb. (52 - 61 N•m) torque.

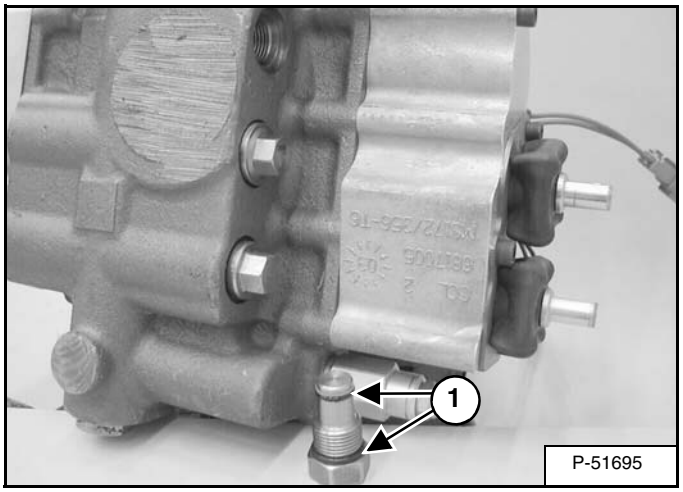
Port Relief Valve

Figure 20-42-36



Remove the port relief plug (Item 1) **[Figure 20-42-36]** from the auxiliary circuit of the control valve.

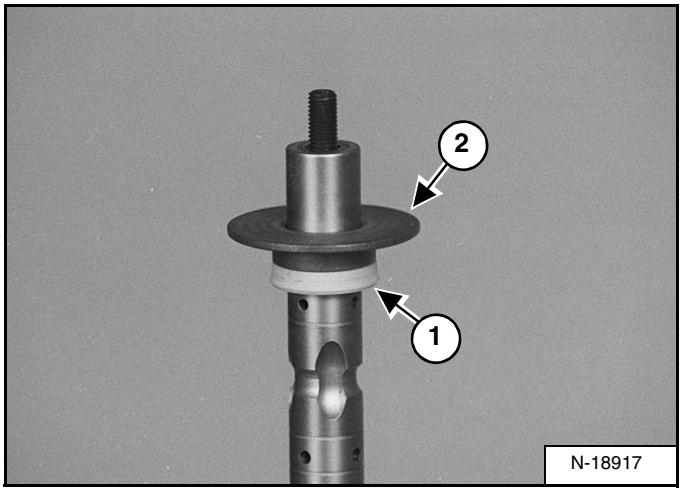
Figure 20-42-37



Installation: Always use new O-rings (Item 1) **[Figure 20-42-37]**. Tighten to 38 - 45 ft.-lb. (52 - 61 N•m) torque.

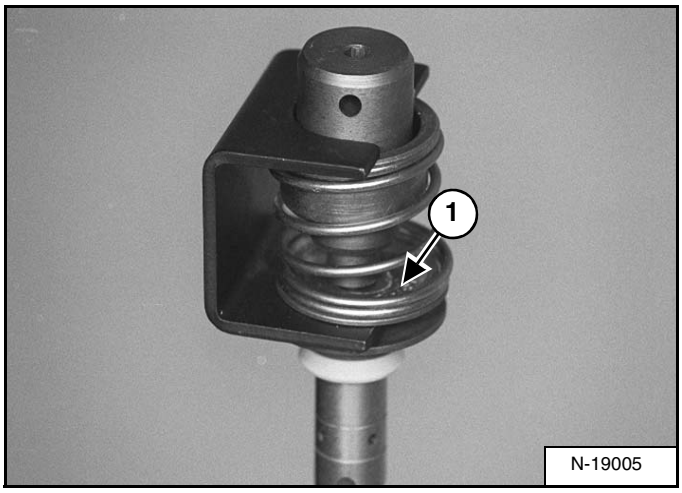
Lift Spool and Detent Removal and Installation (Cont'd)

Figure 20-42-74



Install the spool seal (Item 1) and back-up washer (Item 2) **[Figure 20-42-74]**.

Figure 20-42-75



Install the spring assembly to the lift spool hand tight **[Figure 20-42-75]**.

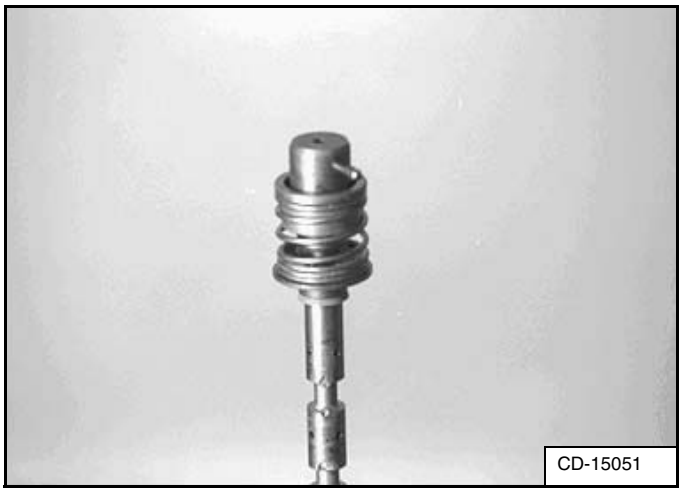
Remove the spring tool.

Check the alignment of the detent adapter and the washer.

Tighten the adapter to 90 - 100 in.-lb. (10,2 - 11,3 N•m).

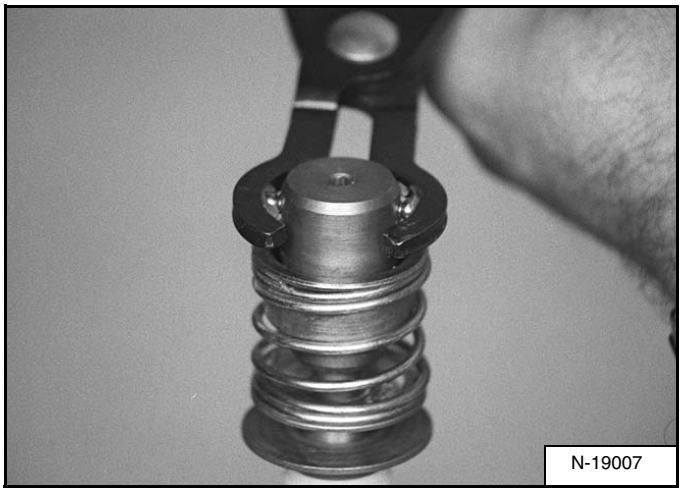
NOTE: The adapter must fit in the center of the washer (Item 1) [Figure 20-42-75].

Figure 20-42-76



Install the detent balls and spring **[Figure 20-42-76]**.

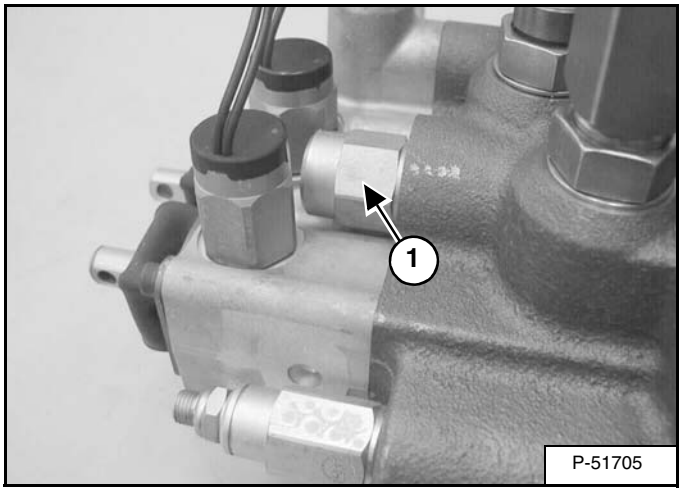
Figure 20-42-77



Hold the detent balls in place with the detent pliers **[Figure 20-42-77]**.

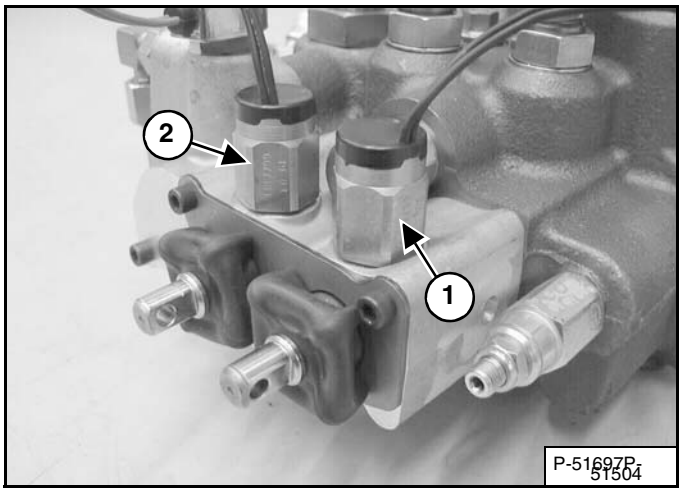
BICS Valve, Lock Valve Removal And Installation (Cont'd)

Figure 20-42-113



Locate the tilt circuit lock valve (Item 1) **[Figure 20-42-113]**.

Figure 20-42-114

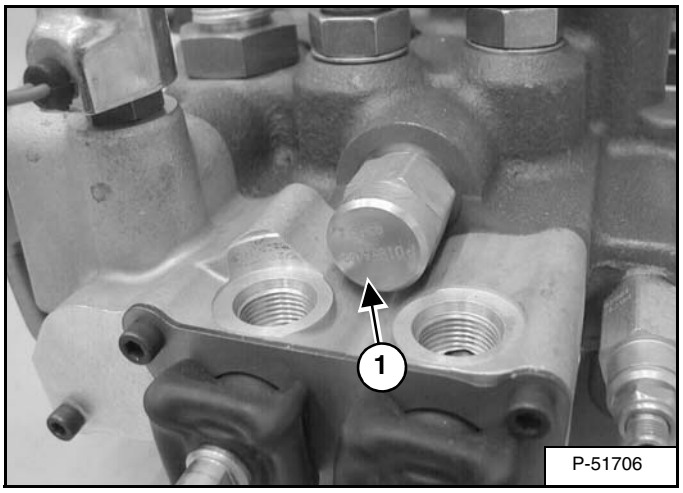


Remove the lift spool lock solenoid (Item 1) **[Figure 20-42-114]**.

Remove the tilt spool lock solenoid (Item 2) **[Figure 20-42-114]**.

Installation: Lubricate the O-rings and tighten the spool lock solenoids to 38 - 45 ft.-lb. (52 - 61 N•m) torque.

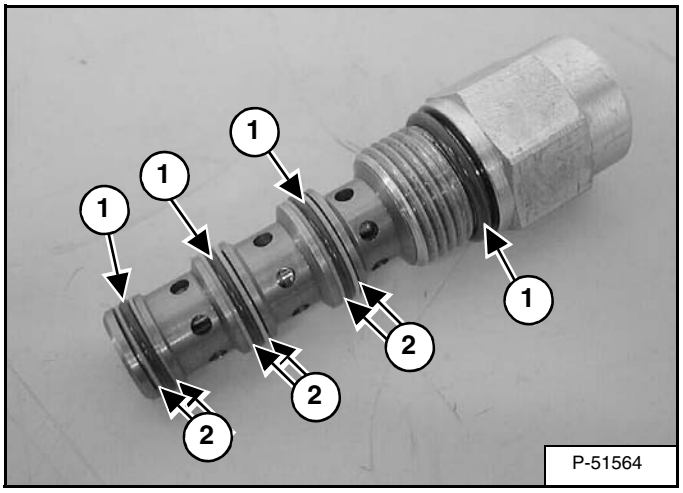
Figure 20-42-115



Remove the tilt lock valve (Item 1) **[Figure 20-42-115]** from the front of the control valve.

Installation: Lightly lubricate the lock valve o-rings and tighten to 20 - 24 ft.-lb. (27 - 33 N•m) torque.

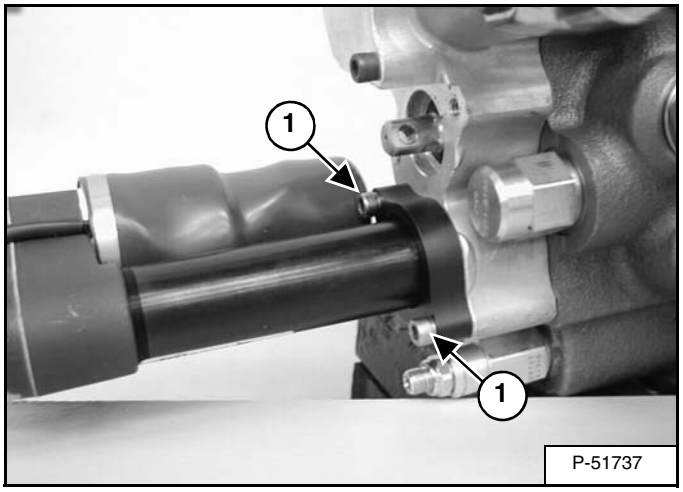
Figure 20-42-116



Remove the O-rings (Item 1) and back-up rings (Item 2) **[Figure 20-42-116]** from the tilt lock valve, and replace with new.

Actuator Removal And Installation (Out of Loader) (Cont'd)

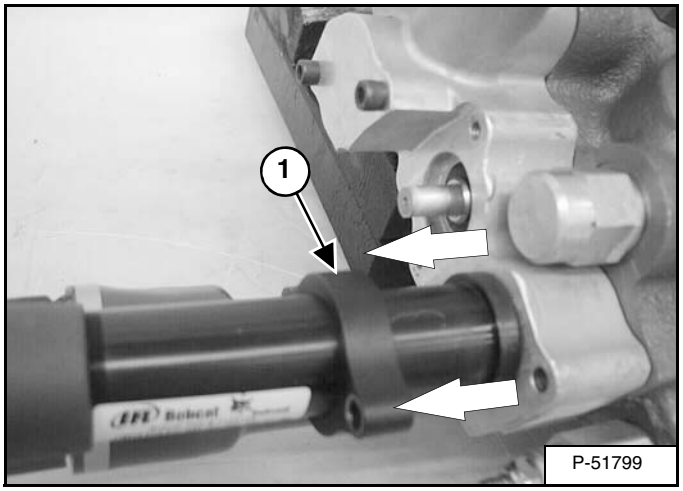
Figure 20-43-22



Remove the two mount bolts (Item 1) **[Figure 20-43-22]** from the lift actuator.

Installation: Tighten the mounting bolts to 90 - 100 in.-lb. (10,2 - 11,3 N•m) torque.

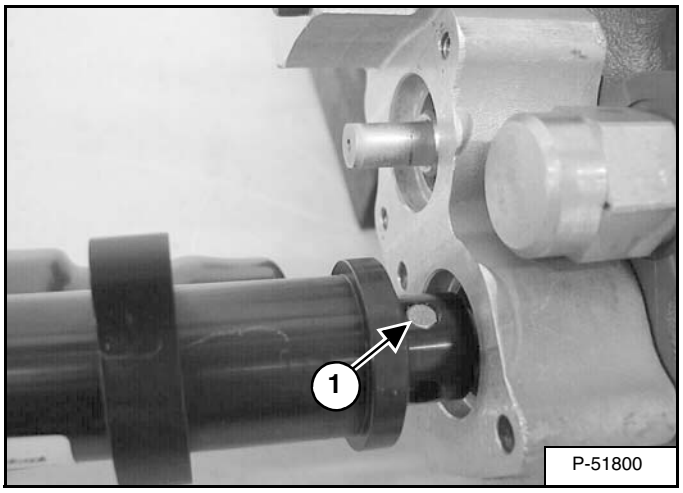
Figure 20-43-23



Slide the actuator mount bracket (Item 1) **[Figure 20-43-23]** away from the control valve.

Pull the actuator away from the control valve **[Figure 20-43-23]**.

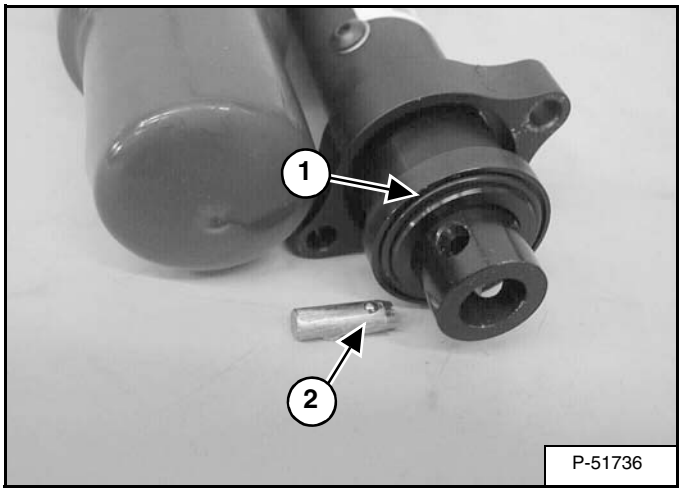
Figure 20-43-24



Using a drift pin and a hammer, remove the actuator linkage pin (Item 1) **[Figure 20-43-24]** from the actuator and the tilt spool.

Remove the actuator and linkage pin from the valve.

Figure 20-43-25



Inspect the O-ring (Item 1) **[Figure 20-43-25]** on the face of the actuator, and replace as needed.

Check the linkage pin (Item 2) **[Figure 20-43-25]** and replace as needed.

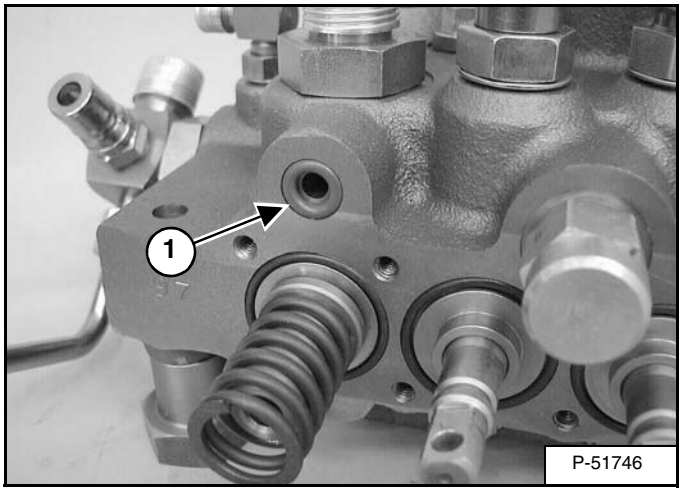
Lift Spool Removal and Installation

The tool listed will be needed to do the following procedure:

MEL 1285 - Spring Tool

Remove the end cap block from the control valve.

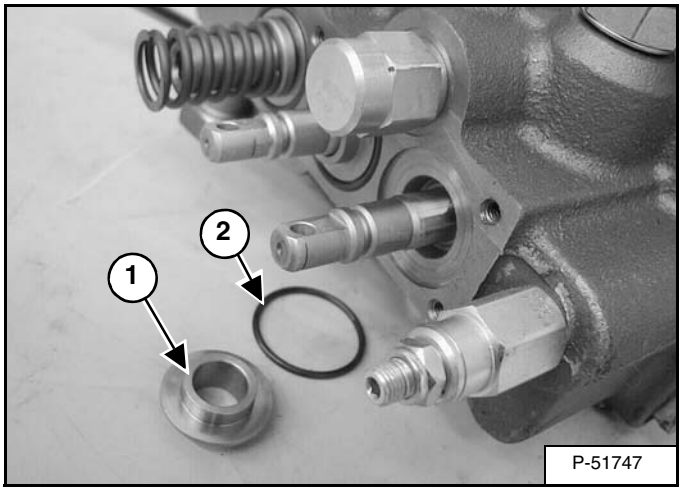
Figure 20-43-54



Remove the O-ring (Item 1) **[Figure 20-43-54]**.

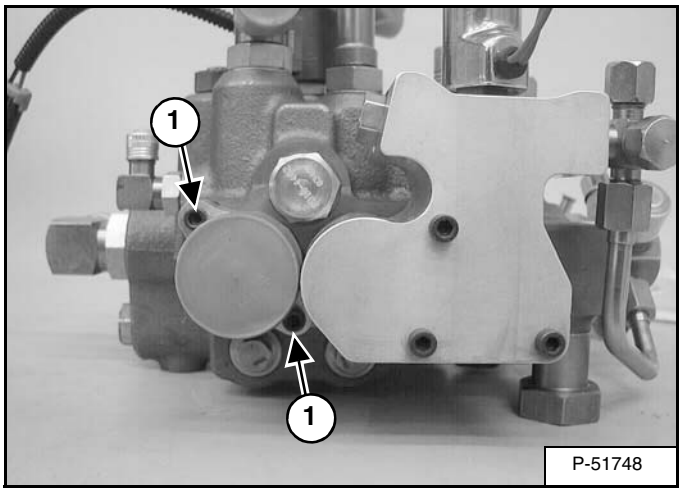
Installation: Replace the O-ring, and lubricate lightly with oil before installation of the end cap block.

Figure 20-43-55



Remove the spacer (Item 1) and O-ring (Item 2) **[Figure 20-43-55]** from the lift spool.

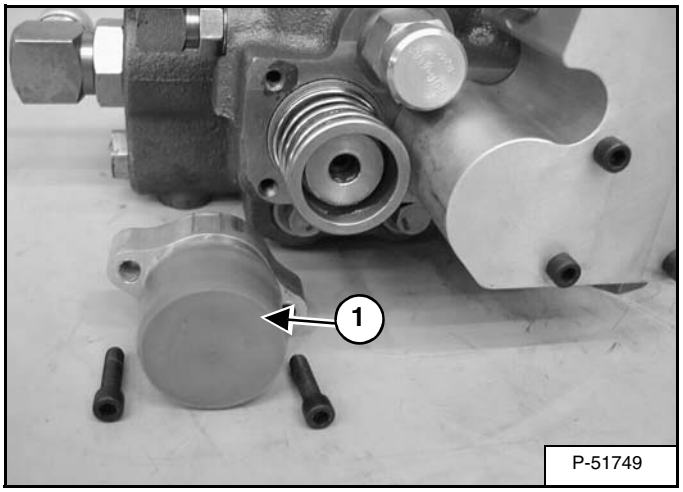
Figure 20-43-56



Remove the two screws (Item 1) **[Figure 20-43-56]** from the lift spool end cap.

Installation: Lubricate the screws and tighten to 90 - 100 in.-lb. (10,2 - 11,3 N•m) torque.

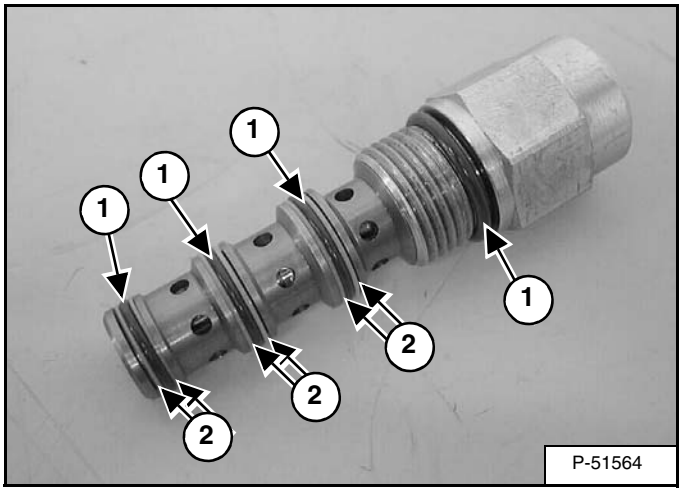
Figure 20-43-57



Remove the lift spool end cap (Item 1) **[Figure 20-43-57]** from the control valve.

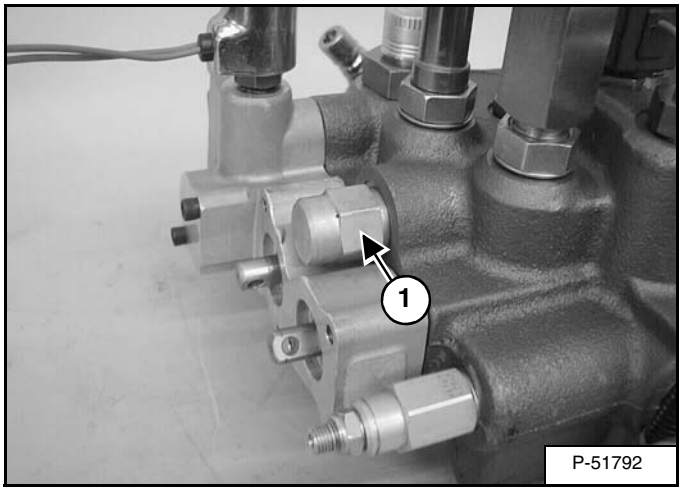
BICS Valve, Lock Valve Removal And Installation (Cont'd)

Figure 20-43-94



Remove the O-rings (Item 1) and back-up rings (Item 2) **[Figure 20-43-94]** from the lift lock valve, and replace with new.

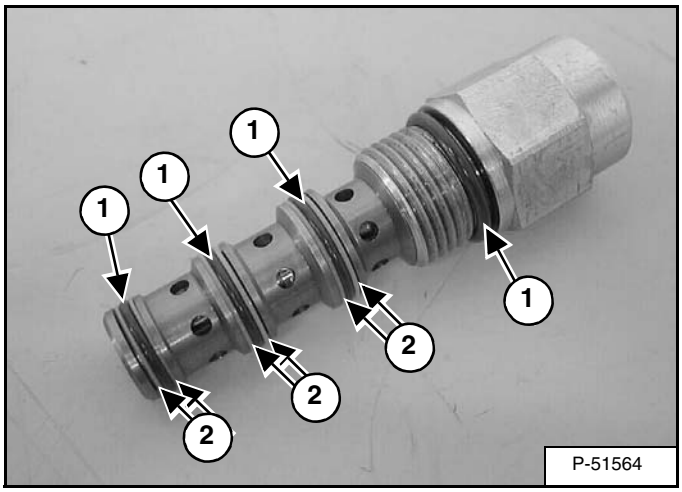
Figure 20-43-95



Remove the tilt lock valve (Item 1) **[Figure 20-43-95]** from the back of the control valve.

Installation: Lightly lubricate the lock valve o-rings and tighten to 20 - 24 ft.-lb. (27 - 33 N•m) torque.

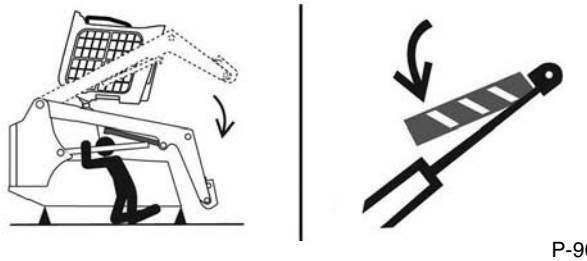
Figure 20-43-96



Remove the O-rings (Item 1) and back-up rings (Item 2) **[Figure 20-43-96]** from the tilt lock valve, and replace with new.

Removal And Installation

⚠ DANGER



P-90328

AVOID DEATH

- **Disconnecting or loosening any hydraulic tubeline, hose, fitting, component or a part failure can cause lift arms to drop.**
- **Keep out of this area when lift arms are raised unless supported by an approved lift arm support. Replace if damaged.**

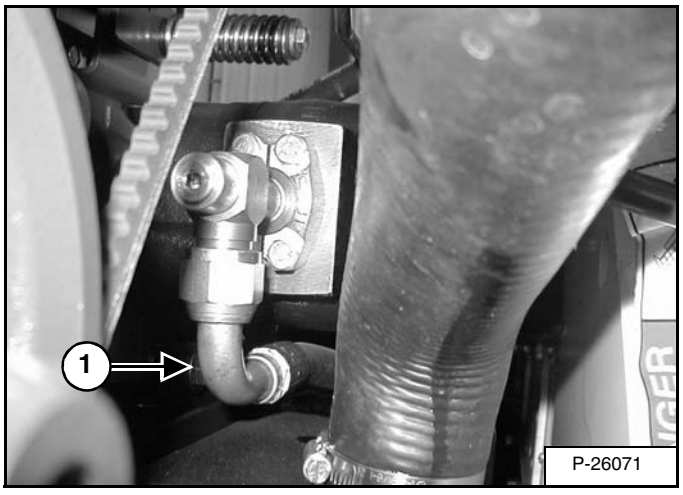
D-1009-0409

⚠ WARNING

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

W-2059-0598

Figure 20-60-7



Raise the lift arms and install an approved lift arm support device. (See Procedure on Page 10-10-1.)

Stop the engine. Raise the seat bar.

Lift and block the rear of the loader. (See Installing Lift Arm Support Device on Page 10-20-1.)

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

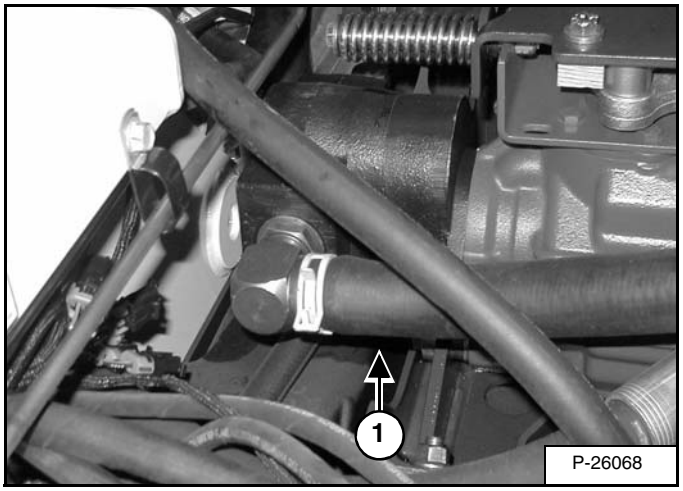
Drain the hydraulic fluid from the reservoir. (See Replacing Hydraulic Fluid on Page 10-120-1.)

Open the rear door of the loader.

Remove the Power Bob-Tach block if equipped. (See Removal And Installation on Page 20-120-1.)

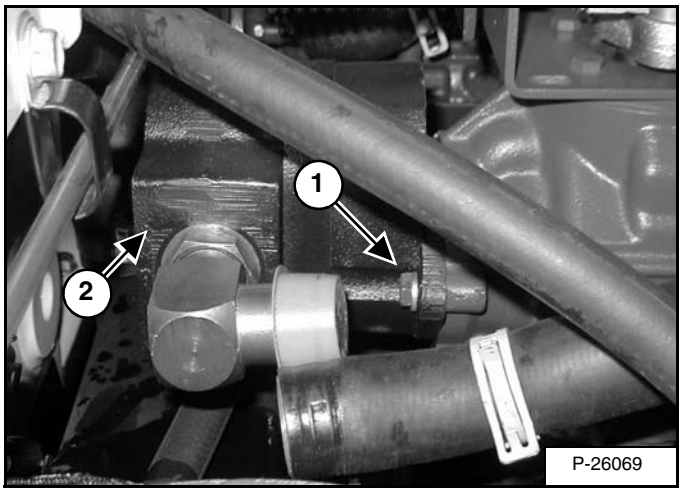
Disconnect and cap the outlet hose (Item 1) **[Figure 20-60-7]** from the back of the hydraulic pump.

Figure 20-60-8



Disconnect and cap the inlet hose (Item 1) **[Figure 20-60-8]** from the front of the hydraulic pump.

Figure 20-60-9



Remove the two mounting bolts (Item 1) **[Figure 20-60-9]** from the hydraulic pump.

Installation: Tighten the mounting bolts to 27 - 37 in.-lb. (37 - 50 N•m) torque.

Remove the hydraulic pump (Item 2) **[Figure 20-60-9]** from the hydrostatic pump.

Check The Output Of The Hydraulic Pump With Power Bob-Tach.

⚠ WARNING

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

W-2017-0286

⚠ WARNING

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

W-2059-0598

The tools listed will be needed to do the following procedure:

MEL1563 - Remote Start Tool
MEL10103 - Hydraulic Tester
MEL10106 - Hydraulic Test Kit

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

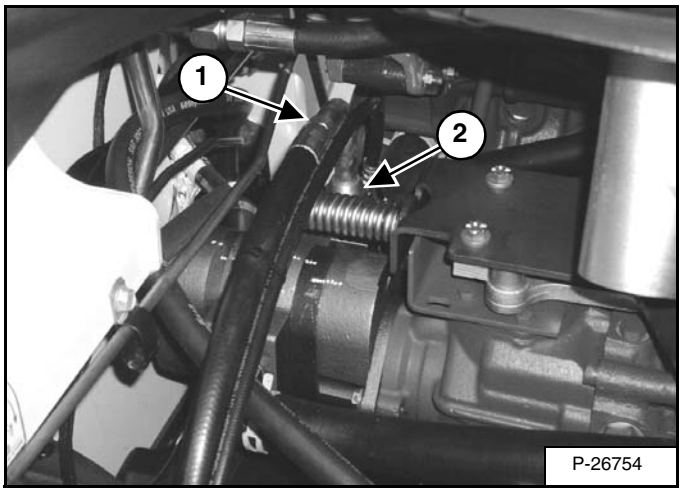
Raise the lift arms and install an approved lift arm support device. (See Installing Lift Arm Support Device on Page 10-20-1.)

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

Open the rear door of the loader.

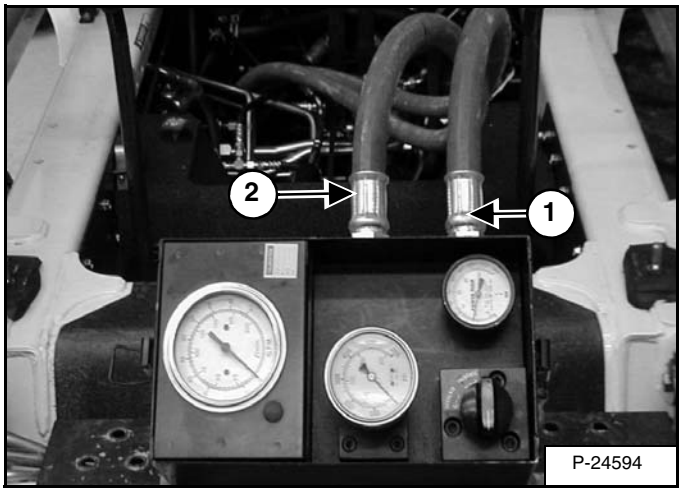
Connect the remote start tool. (See Procedure on Page 10-60-1.)

Figure 20-61-4



Disconnect the OUTLET hose (Item 1) **[Figure 20-61-4]** from the top of the Power Bob-Tach block.

Figure 20-61-5



Connect the INLET hose (Item 1) **[Figure 20-61-5]** from the tester to the OUTLET fitting (Item 2) **[Figure 20-61-4]** on the top of the Power Bob-Tach block. Connect the OUTLET hose (Item 2) **[Figure 20-61-5]** from the tester to the hose (Item 1) **[Figure 20-61-4]** which was disconnected from the Power Bob-Tach block.

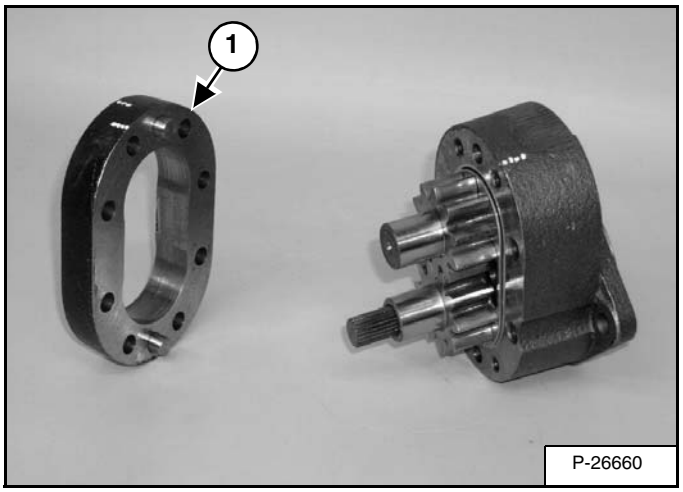
IMPORTANT

The hydraulic tester must be in the fully open position before you start the engine.

I-2024-0284

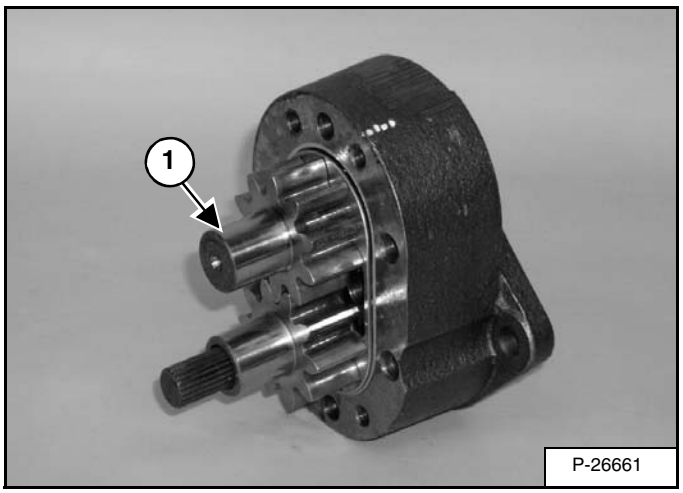
Disassembly And Assembly (Cont'd)

Figure 20-61-29



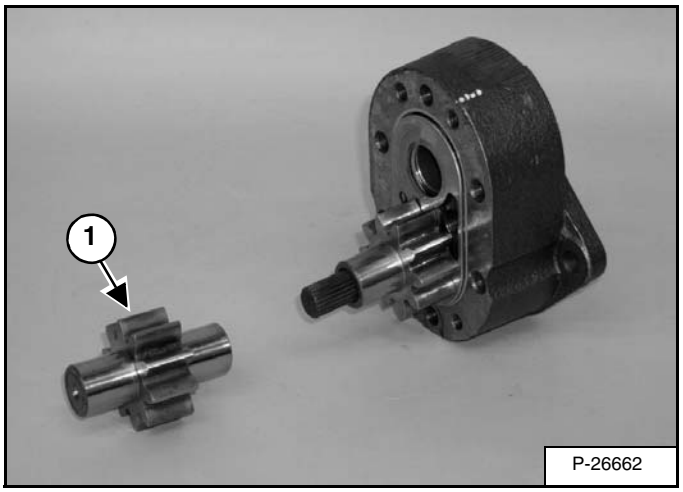
NOTE: Inspect the pump section (Item 1) [Figure 20-61-29]. If excessive wear or damage is visible, the pump must be replaced.

Figure 20-61-30



Remove the idler gear (Item 1) **[Figure 20-61-30]** & **[Figure 20-61-31]**.

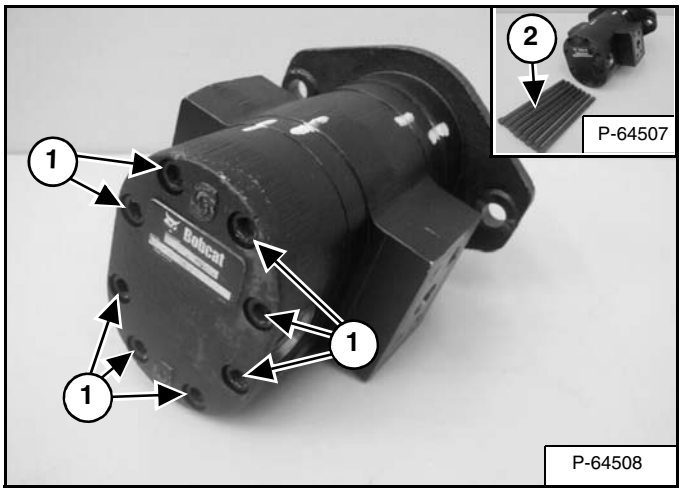
Figure 20-61-31



NOTE: Inspect the idler gear (Item 1) [Figure 20-61-31]. If excessive wear or damage is visible, the pump must be replaced.

Disassembly And Assembly

Figure 20-62-11



Mark the pump sections for correct assembly **[Figure 20-62-11]**.

Remove the eight pump housing bolts (Item 1) **[Figure 20-62-11]**.

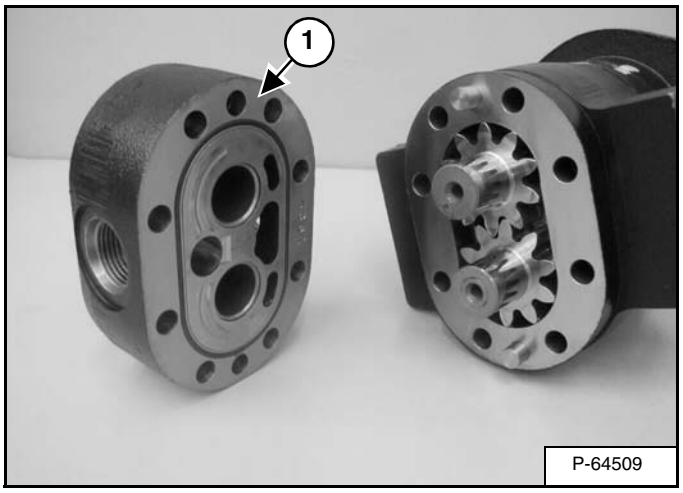
Installation: Tighten the bolts (Item 2) **[Figure 20-62-11]** to 54 ft.-lb. (73,2 N•m) torque.

IMPORTANT

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

I-2003-0888

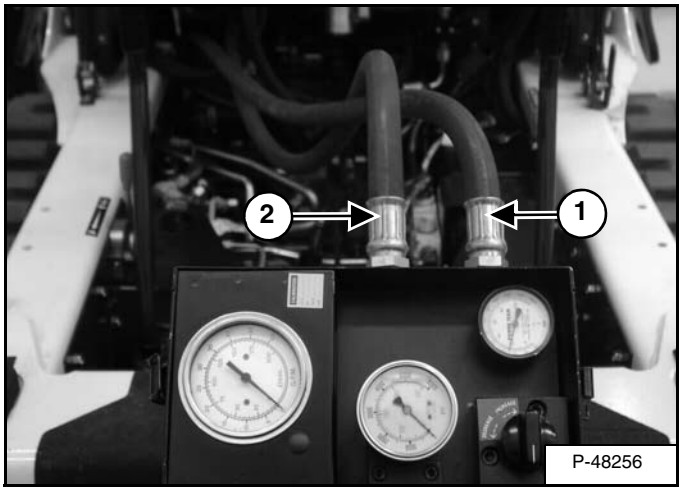
Figure 20-62-12



Remove the pump end section (Item 1) **[Figure 20-62-12]**.

Test The Output Of The Hydraulic Charge Pump (Cont'd)

Figure 20-63-5



Connect the INLET hose (Item 1) **[Figure 20-63-5]** from the tester, to the charge pump OUTLET hose (Item 1) **[Figure 20-63-4]** coming from the gear pump. Connect the OUTLET hose (Item 2) **[Figure 20-63-5]** from the tester, to the INLET fitting (Item 2) **[Figure 20-63-4]** at the charge filter housing.

IMPORTANT

The hydraulic tester must be in the fully open position before you start the engine.

I-2024-0284

Start the engine and run at low idle RPM. Make sure the tester is connected correctly. If no flow is indicated on the tester, the hoses are connected wrong. With the hoses connected correctly, increase the engine speed to full RPM*.

Warm the fluid to 140° F (60° C) by turning the restrictor control (Item 1) **[Figure 20-63-3]** on the tester to about 1000 PSI (6895 kPa). **DO NOT exceed 2000 PSI**.

Open the restrictor control and record the free flow (GPM) at full RPM.

Turn the restrictor down to 2000 PSI. **DO NOT EXCEED 2000 PSI**. The high pressure flow must be at least 80% of free flow.

$$\%= \frac{\text{HIGH PRESSURE FLOW (GPM)}}{\text{FREE FLOW (GPM)}} \text{ X100}$$

A low percentage may indicate a failed pump.

**Refer to Hydraulic Schematics for pump flow and full RPM.*

Disassembly And Assembly (Cont'd)

Figure 20-63-26

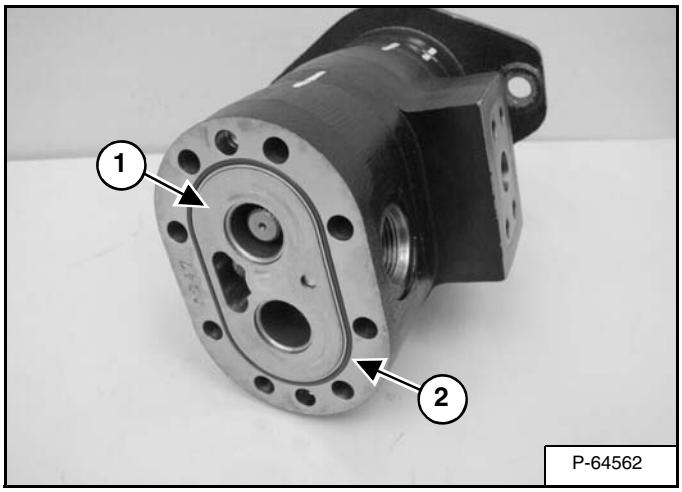
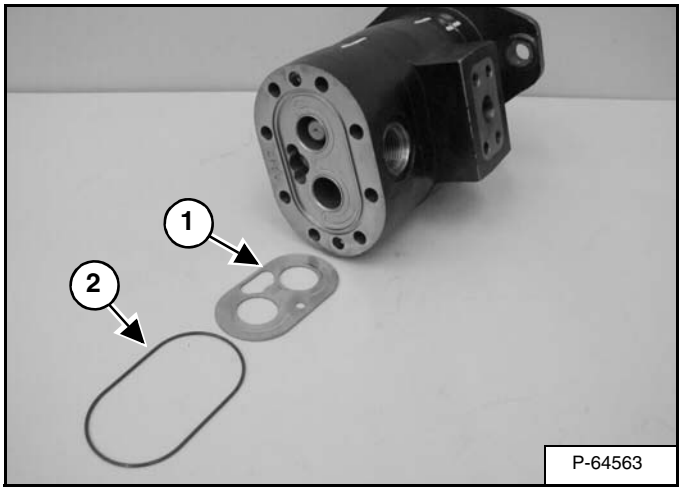


Figure 20-63-27



Remove the wear plate (Item 1) and O-ring (Item 2) **[Figure 20-63-26]** & **[Figure 20-63-27]** from the charge center section. Inspect for damage and replace as needed.

NOTE: Position wear plate (Item 1) [Figure 20-63-27] inlets and traps as shown with bronze side toward gears.

Figure 20-63-28

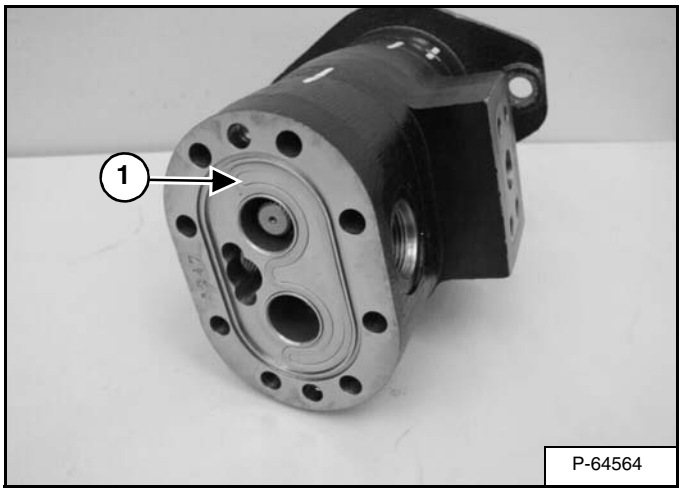
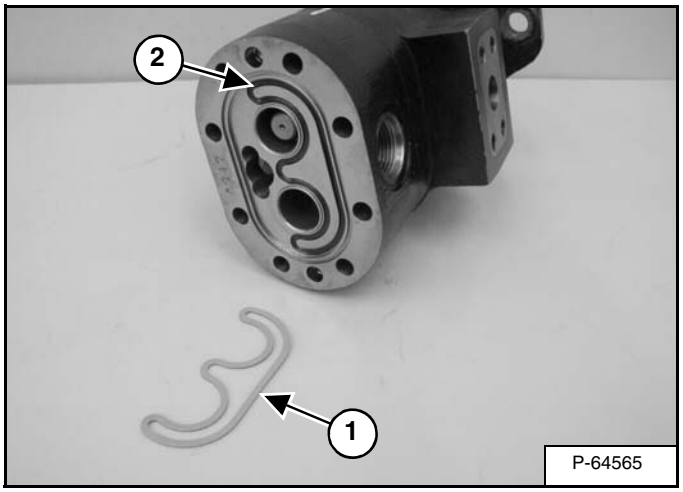


Figure 20-63-29



Remove the load seal (Item 1) **[Figure 20-63-28]** & **[Figure 20-63-29]**. Inspect for damage and replace as needed.

Remove the pre-load seal (Item 2) **[Figure 20-63-29]**.

HYDRAULIC / HYDROSTATIC FILTER HOUSING

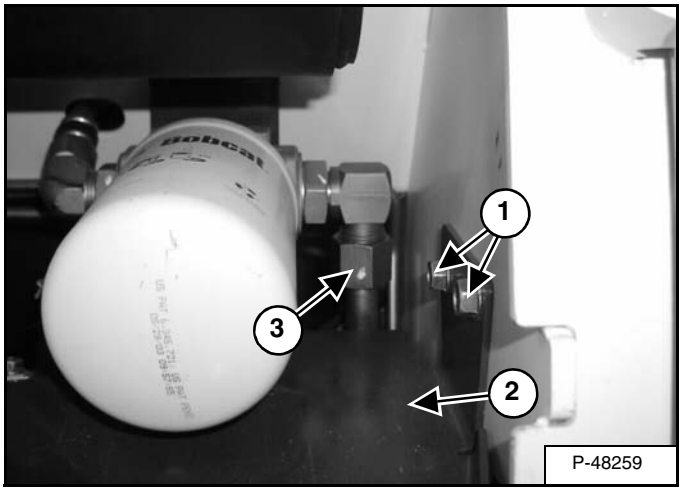
Removal And Installation

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.

Implement Filter Housing

Figure 20-70-1



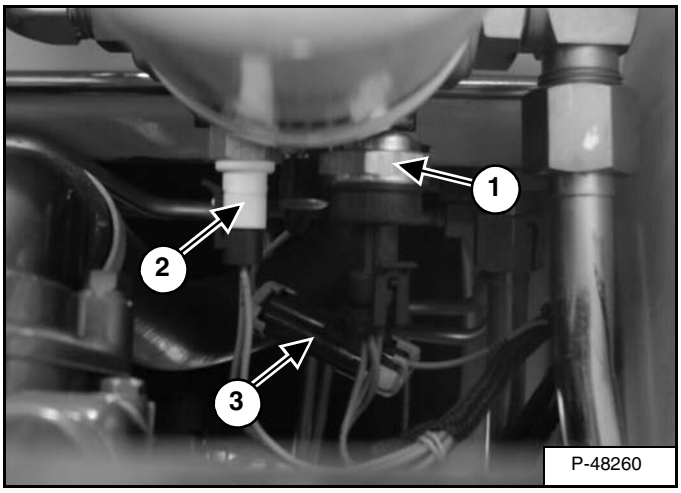
Stop the engine and open the rear door.

Drain the hydraulic fluid. (See Replacing Hydraulic Fluid on Page 10-120-1.)

Remove the two mounting bolts (Item 1) and remove the hydraulic filter drip pan (Item 2) **[Figure 20-70-1]**.

Disconnect the tubeline (Item 3) **[Figure 20-70-1]** from the filter housing.

Figure 20-70-2

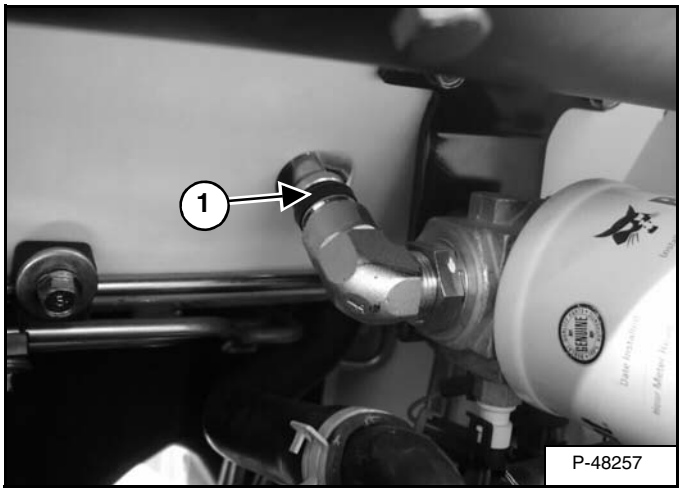


Disconnect the wires from the charge pressure sender (Item 1) **[Figure 20-70-2]** from the filter housing.

Disconnect the temperature sender connector (Item 2) **[Figure 20-70-2]** from the filter housing.

Disconnect the wire connector (Item 3) **[Figure 20-70-2]** from the differential pressure switch on the filter housing.

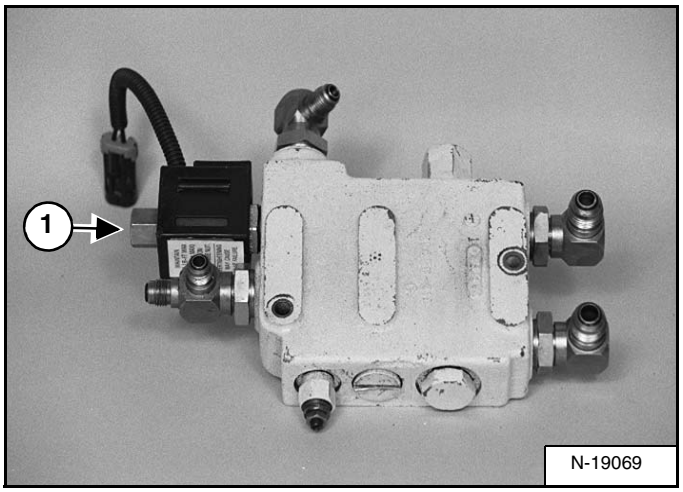
Figure 20-70-3



Using MEL 1558 tool disconnect the oil cooler tubeline (Item 1) **[Figure 20-70-3]** from the filter housing.

Disassembly And Assembly

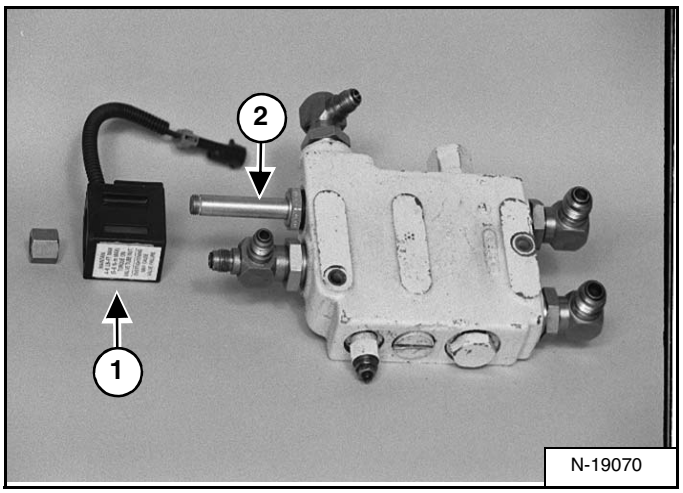
Figure 20-90-11



Remove the solenoid nut (Item 1) **[Figure 20-90-11]**.

Installation: Tighten the nut to 4 - 6 ft.-lb. max. (5 - 8 N•m max.) torque. Overtighten may cause valve failure.

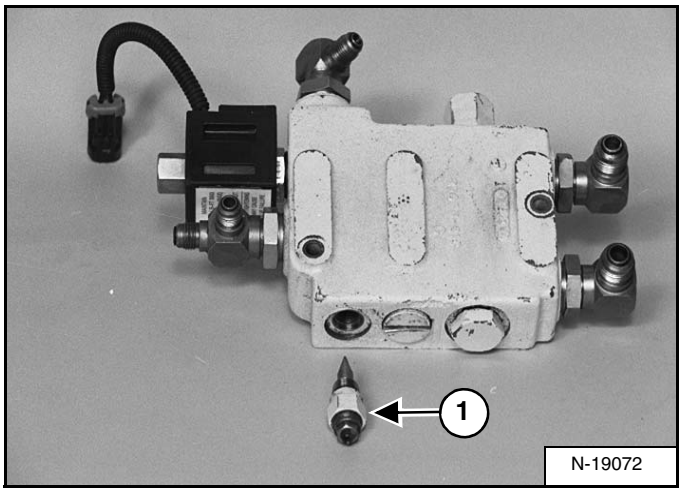
Figure 20-90-12



Remove the solenoid (Item 1) and the solenoid stem (Item 2) **[Figure 20-90-12]**.

Installation: Tighten the solenoid stem to 30 - 35 ft.-lb. (40,8 - 47,6 N•m) torque.

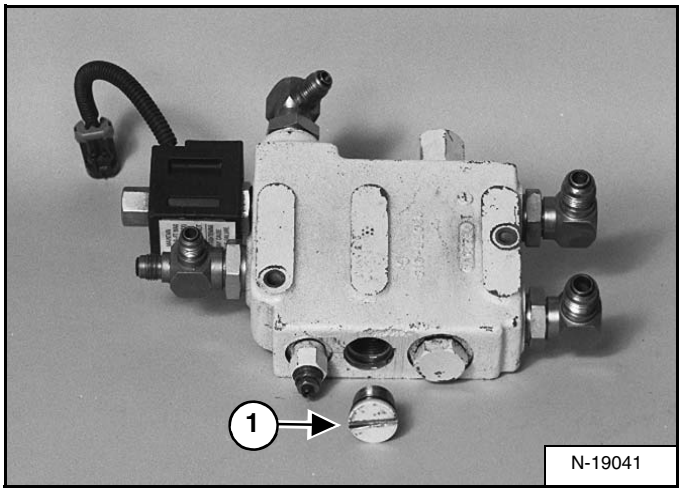
Figure 20-90-13



Remove the flow adjustment valve and O-ring (Item 1) **[Figure 20-90-13]**

NOTE: Always install new O-rings before any parts are installed into the valve. Check the parts for wear or damage and replace as needed.

Figure 20-90-14

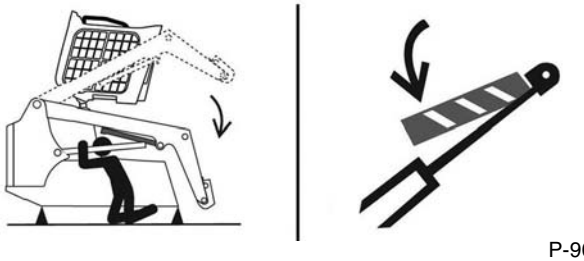


Remove the plug (Item 1) **[Figure 20-90-14]**.

REAR AUXILIARY DIVERTER VALVE

Removal And Installation

DANGER



P-90328

AVOID DEATH

- **Disconnecting or loosening any hydraulic tubeline, hose, fitting, component or a part failure can cause lift arms to drop.**
- **Keep out of this area when lift arms are raised unless supported by an approved lift arm support. Replace if damaged.**

D-1009-0409

WARNING

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

W-2059-0598

WARNING

AVOID INJURY OR DEATH

Always clean up spilled fuel or oil. Keep heat, flames, sparks or lighted tobacco away from fuel and oil. Failure to use care around combustibles can cause explosion or fire.

W-2103-0508

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

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

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

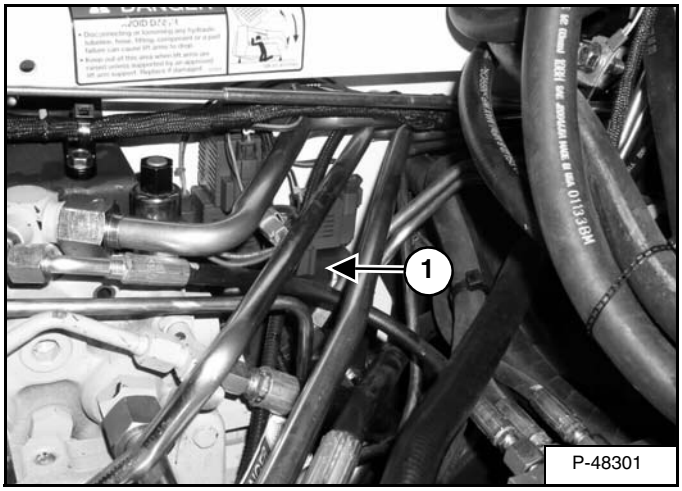
Disconnect the negative battery cable. (See Removal And Installation on Page 60-20-1.)

Remove the speed control lever. (See Control Lever Removal And Installation on Page 50-100-1.)

Remove the control panel. (See Removal and Installation on Page 50-100-1.)

Remove the right rear tire. (See TIRE MAINTENANCE on Page 10-170-1.)

Figure 20-110-1



The rear auxiliary valve (Item 1) **[Figure 20-110-1]** is located between the control valve and the gear pump on the right side of the loader.

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

POWER BOB-TACH BLOCK

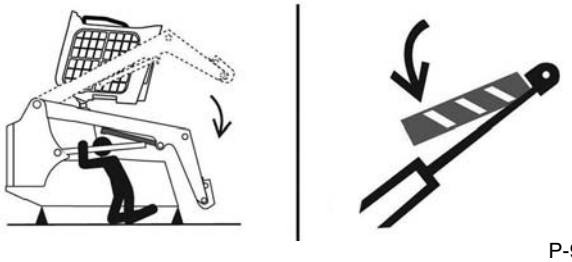
Removal And Installation

WARNING

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

W-2059-0598

DANGER



P-90328

AVOID DEATH

- **Disconnecting or loosening any hydraulic tubeline, hose, fitting, component or a part failure can cause lift arms to drop.**
- **Keep out of this area when lift arms are raised unless supported by an approved lift arm support. Replace if damaged.**

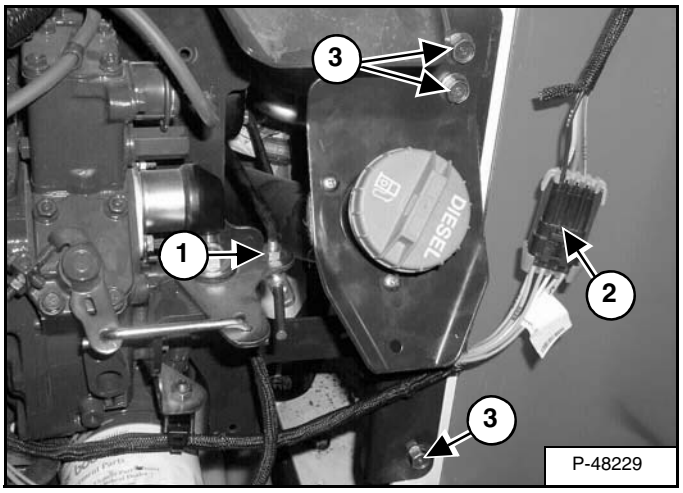
D-1009-0409

IMPORTANT

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

I-2003-0888

Figure 20-120-1



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

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

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

Open the rear door.

Drain the hydraulic reservoir. (See Replacing Hydraulic Fluid on Page 10-120-1.)

Remove the nut from the speed control linkage (Item 1) and unplug the rear lights electrical connector (Item 2) **[Figure 20-120-1]**.

Remove the fuel fill bracket mounting bolts (Item 3) **[Figure 20-120-1]**.

HYDROSTATIC SYSTEM INFORMATION

Troubleshooting Chart

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

⚠ WARNING

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

W-2004-1285

PROBLEM	CAUSE
No drive on one side, in one direction.	1, 2
No drive on one side in both directions.	2, 3, 4, 5
The loader does not move in a straight line.	2, 3, 5, 6, 7
The hydrostatic system is overheating.	8, 9

KEY TO CORRECT THE CAUSE
1. The hydrostatic pump replenishing valves not seating.
2. The steering linkage needs adjustment.
3. The hydrostatic pump has damage.
4. The final drive chains are broken.
5. The hydrostatic motor has damage.
6. The tires do not have the correct tire pressure.
7. The tires are not the same size.
8. The hydrostatic fluid is not at the correct level.
9. The oil cooler has a restriction.

Assembly (Wet Bolt)

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

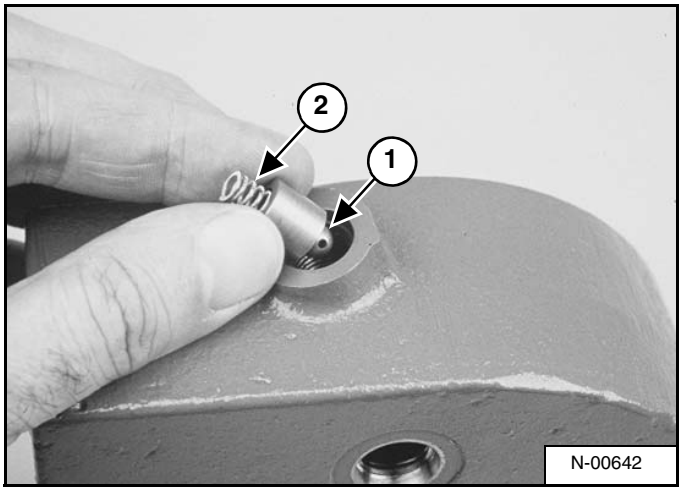
Prior to assembly:

Clean all parts with solvent and dry with compressed air.

Put grease on O-rings.

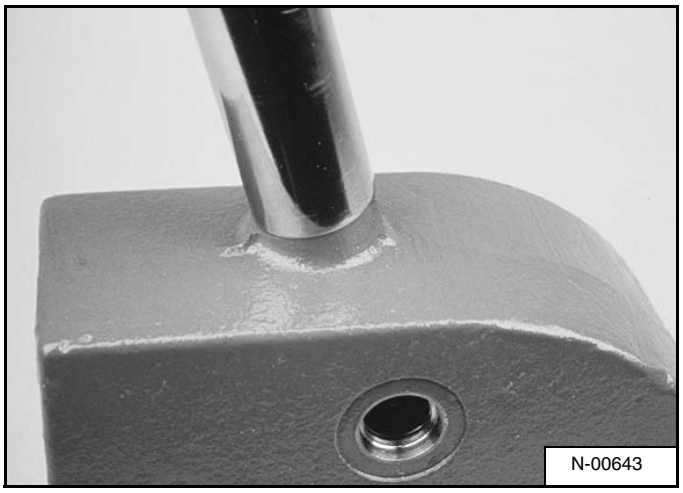
Lubricate parts with oil.

Figure 30-20-27



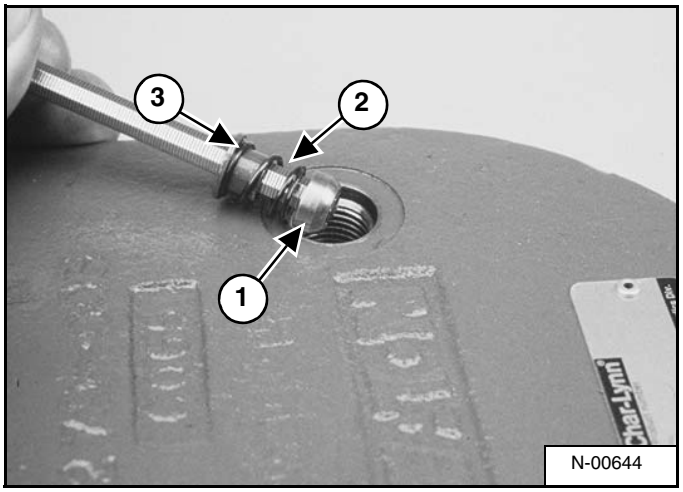
Install the poppet (Item 1) and spring (Item 2) **[Figure 30-20-27]** in the low pressure relief port in the end cover.

Figure 30-20-28



Install the new O-ring on the plug and tighten to 300 in.-lb. (34 N•m) torque **[Figure 30-20-28]**.

Figure 30-20-29

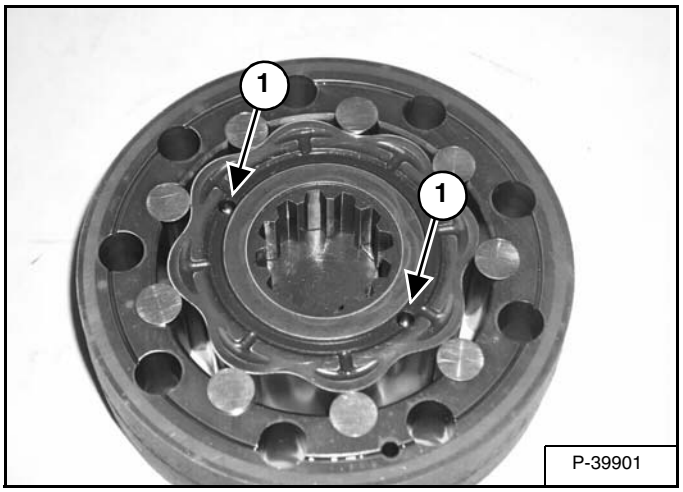


Install the poppet (Item 1), the spring (Item 2) and the spring seat (Item 3) **[Figure 30-20-29]** in the end cover.

NOTE: The tapered end of the poppet must face towards the shuttle valve.

Disassembly and Assembly (Dry Bolt) (Cont'd)

Figure 30-20-60



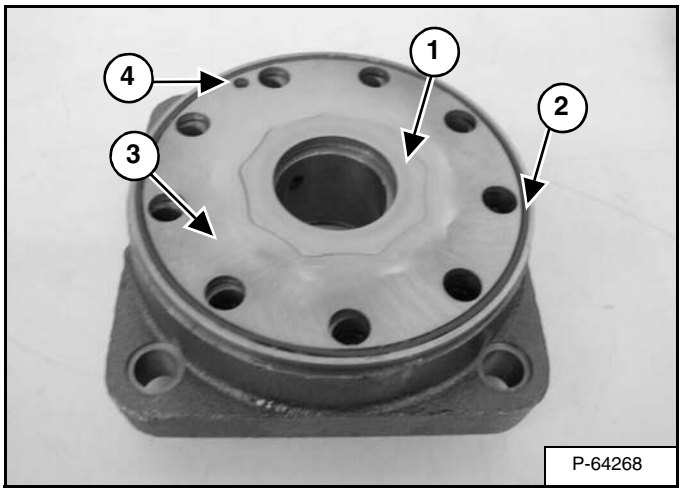
Remove the two check balls (Item 1) **[Figure 30-20-60]** from the geroler.

Assembly: Check for scoring and wear on the geroler assembly. Apply grease to check balls to keep them from falling out of there seats when assembling.

NOTE: Care should be taken to keep the geroler assembly together.

NOTE: If rollers are removed, put them back in their original bore.

Figure 30-20-61



Remove the center piece of the balance plate (Item 1) **[Figure 30-20-61]**.

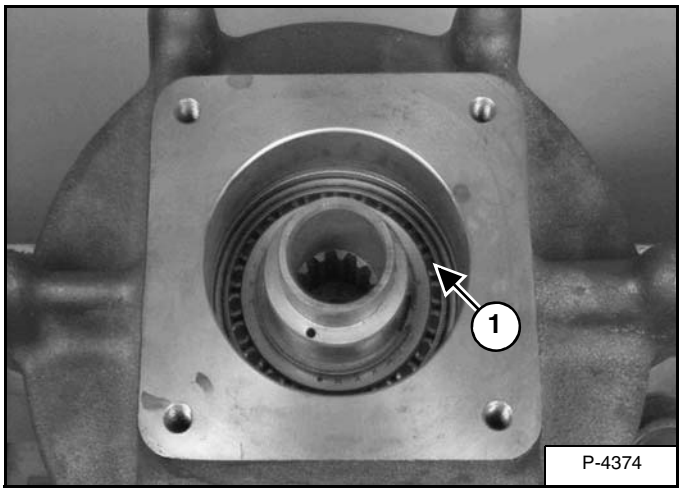
Remove and inspect/replace the seal (Item 2) **[Figure 30-20-61]**.

Remove the balance plate (Item 3) **[Figure 30-20-61]**.

Assembly: Apply grease to seals. Note location of case drain hole (Item 4) **[Figure 30-20-61]**. Align hole with other sections on drive motor.

Disassembly and Assembly (Cont'd)

Figure 30-21-21



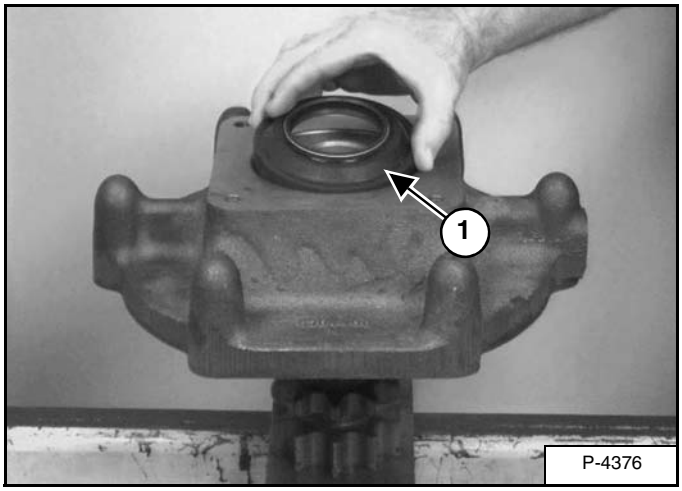
Put the snap ring (Item 1) **[Figure 30-21-21]** over the end of the sprocket shaft.

NOTE: Use the snap ring pliers to spread the snap ring so it will fit over the sprocket shaft.

Using the press and driver tools, press the snap ring (Item 1) **[Figure 30-21-21]** over the sprocket.

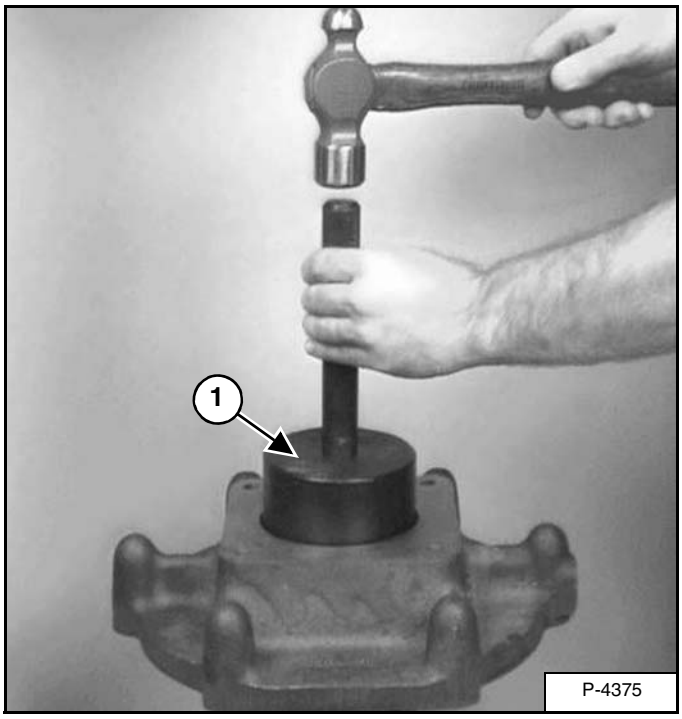
Press the snap ring on until it snaps into the groove on the shaft.

Figure 30-21-22



Put a new shaft seal (Item 1) **[Figure 30-21-22]** on the sprocket shaft.

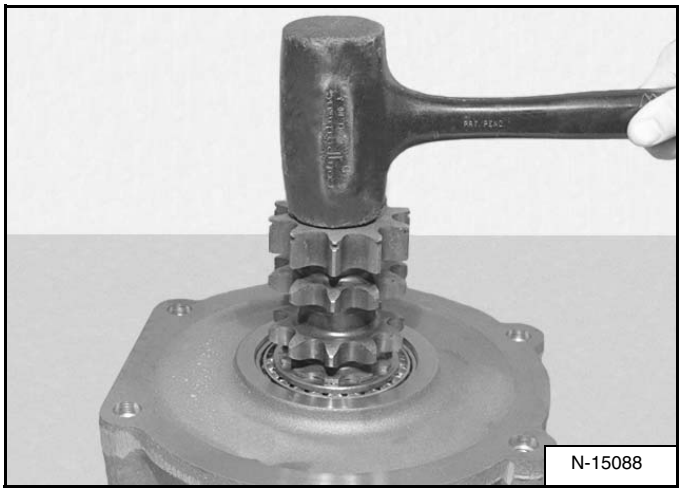
Figure 30-21-23



Use MEL1420 Carrier Seal Tool (Item 1) **[Figure 30-21-23]** and install the shaft seal.

Hit the tool with a hammer until the seal is fully seated on the carrier shaft **[Figure 30-21-23]**.

Figure 30-21-24

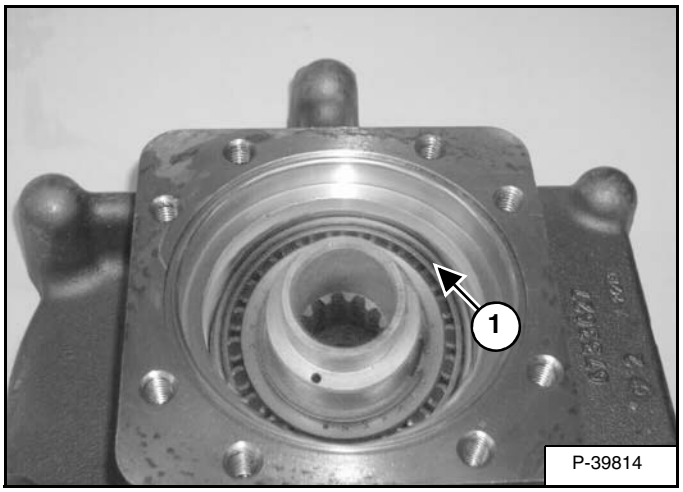


Check the end play of the motor carrier as follows:

Use a rubber mallet **[Figure 30-21-24]**, tap down on the cluster shaft.

Disassembly and Assembly (Cont'd)

Figure 30-22-21



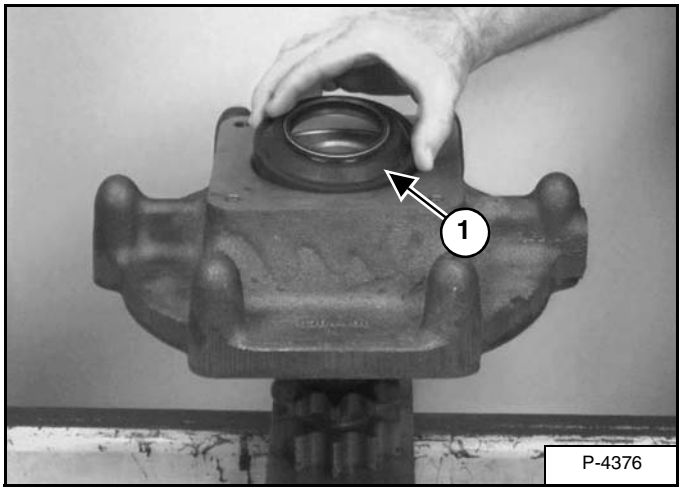
Put the snap ring (Item 1) **[Figure 30-22-21]** over the end of the sprocket shaft.

NOTE: Use the snap ring pliers to spread the snap ring so it will fit over the sprocket shaft.

Using the press and driver tools, press the snap ring (Item 1) **[Figure 30-22-21]** over the sprocket.

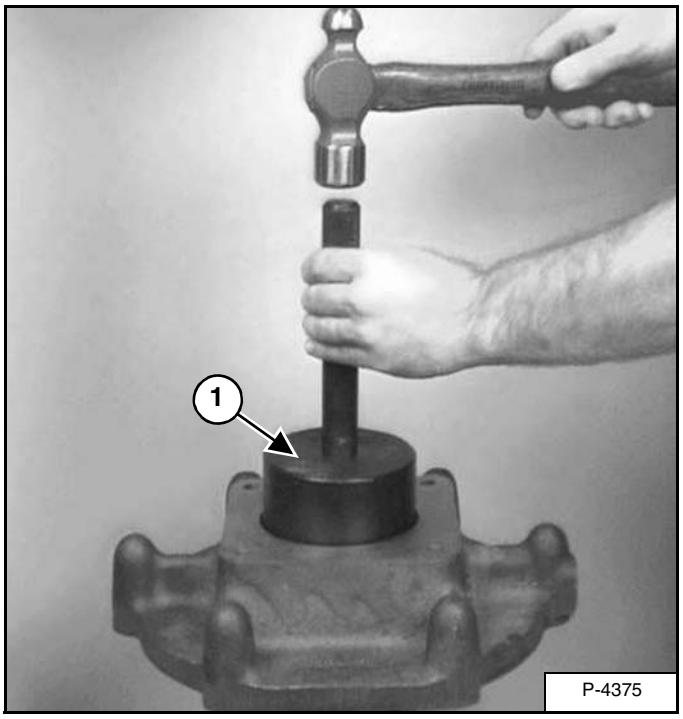
Press the snap ring on until it snaps into the groove on the shaft.

Figure 30-22-22



Put a new shaft seal (Item 1) **[Figure 30-22-22]** on the sprocket shaft.

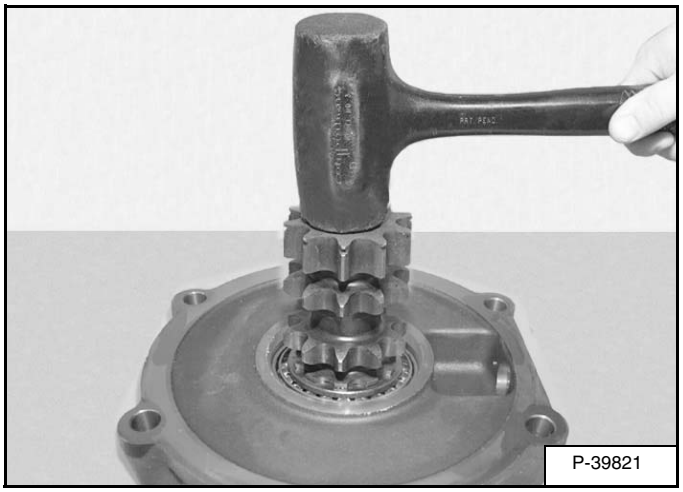
Figure 30-22-23



Use MEL1420 Carrier Seal Tool (Item 1) **[Figure 30-22-23]** and install the shaft seal.

Hit the tool with a hammer until the seal is fully seated on the carrier shaft **[Figure 30-22-23]**.

Figure 30-22-24



Check the end play of the motor carrier as follows:

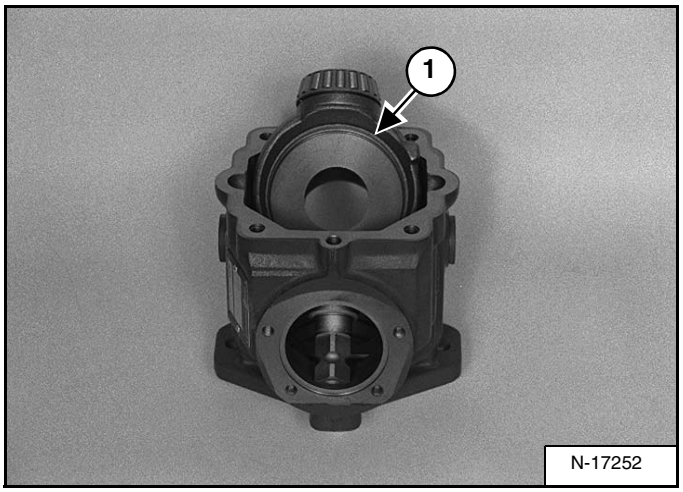
Use a rubber mallet **[Figure 30-22-24]**, tap down on the cluster shaft.

Parts Identification (Right Half) (Cont'd)

Ref.	Description
1.	Bolt
2.	End Cap
3.	Plug
4.	O-ring
5.	Plug
6.	O-ring
7.	O-ring
8.	Relief Valve
9.	Bolt
10.	Gasket
11.	Bearing
12.	Plug
13.	O-ring
14.	O-ring
15.	Relief Valve
16.	Pin
17.	Valve Plate
18.	Retainer
19.	Washer
20.	Spring
21.	Washer
22.	Block
23.	Retainer
24.	Pin
25.	Washer
26.	Retainer
27.	Retainer
28.	Piston Assembly
29.	Plate
30.	Swash Plate
31.	Pin
32.	Housing
33.	Plug
34.	Bearing
35.	Seal
36.	O-ring
37.	Cover
38.	Bolt
39.	Shaft
40.	Snap Ring
41.	Bearing
42.	Snap Ring
43.	Snap Ring
44.	Plug
45.	O-ring
46.	Bearing
47.	O-ring
48.	Plate
49.	Bolt

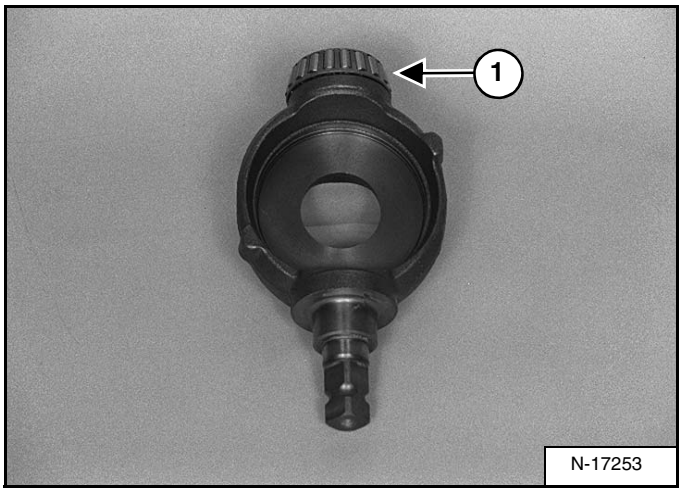
Assembly

Figure 30-40-36



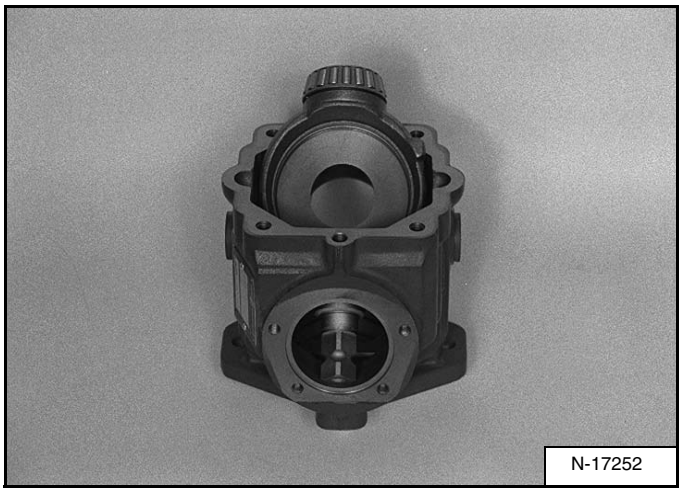
Tilt the swash plate (Item 1) **[Figure 30-40-36]** and remove the swash plate and lower bearing from the pump housing.

Figure 30-40-37



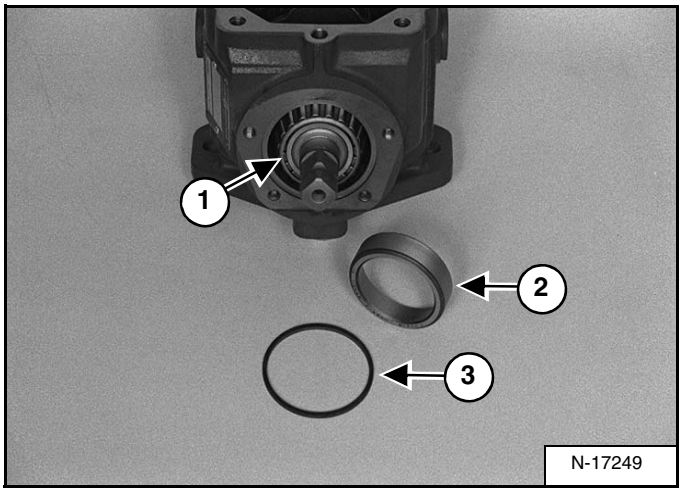
Install the lower bearing (Item 1) **[Figure 30-40-37]** on the swash plate.

Figure 30-40-38



Install the swash plate and bearing into the pump housing **[Figure 30-40-38]**.

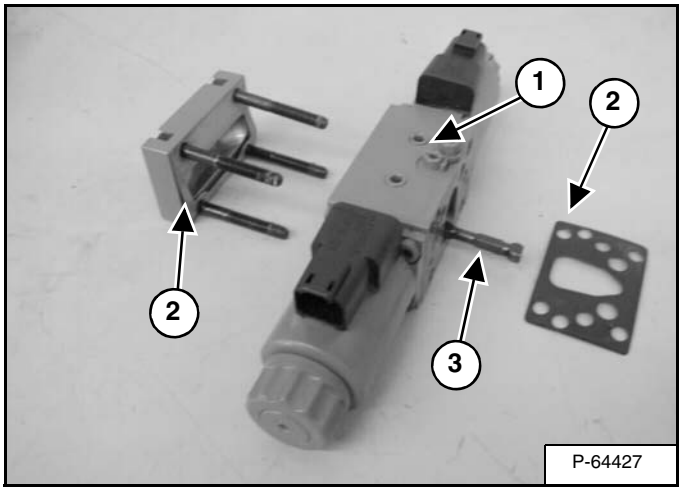
Figure 30-40-39



Install the tapered bearing (Item 1) **[Figure 30-40-39]** on the swash plate shaft.

Hydraulic Controller Removal And Installation (Cont'd)

Figure 30-41-5

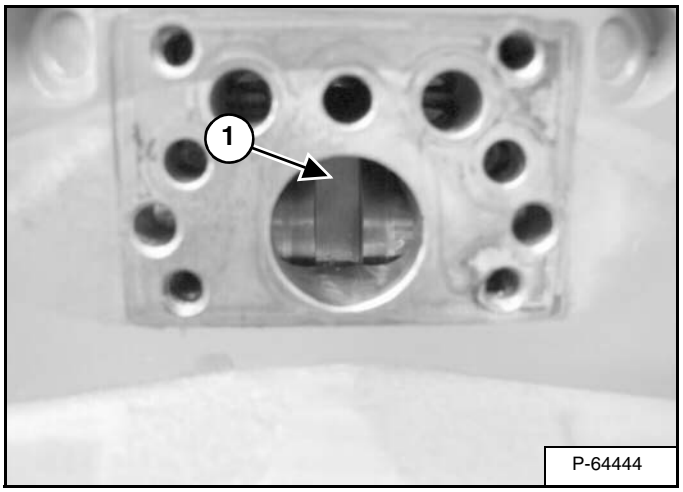


Remove the controller (Item 1) **[Figure 30-41-5]** from the pump.

Remove the controller gaskets (Item 2) **[Figure 30-41-5]** from the pump.

Installation:

Figure 30-41-6

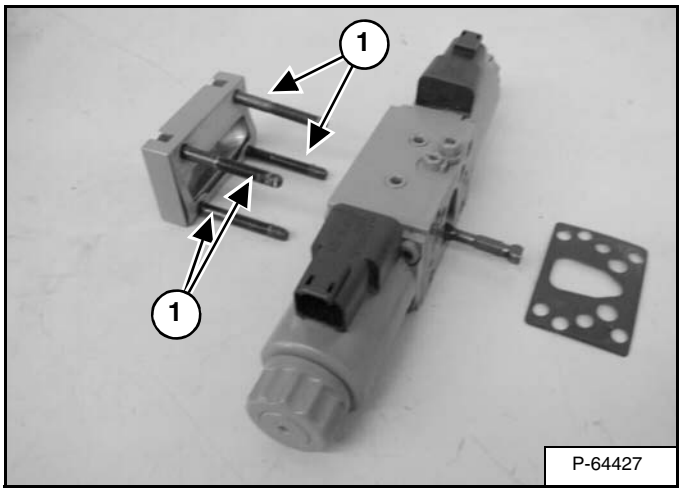


Be sure the feedback lever (Item 3) **[Figure 30-41-5]** is in the center of the servo piston groove (Item 1) **[Figure 30-41-6]**.

Use a small amount of grease on a new gasket and install the gasket on the hydraulic controller (Item 1) **[Figure 30-41-5]**.

Be sure the pump surface is clean.

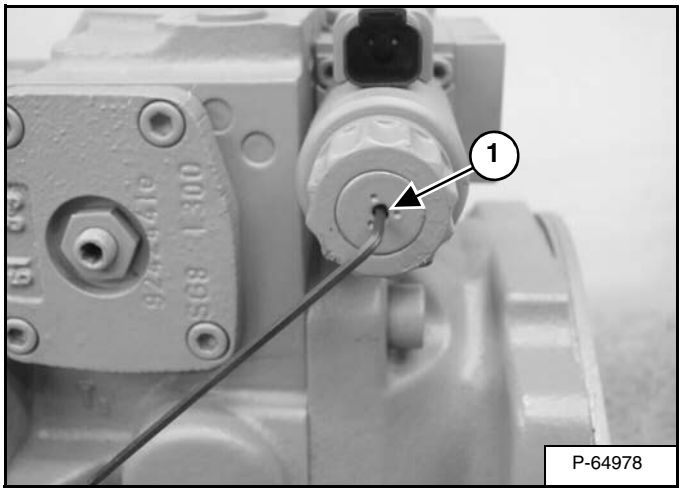
Figure 30-41-7



Alternately tighten bolts (Item 1) **[Figure 30-41-7]** to 7.7 ft.-lb. (10,4 N•m) torque. Ensure bolts are tight to specifications.

NOTE: When a hydraulic controller is replaced, the hydrostatic pumps must be calibrated. (See Hydraulic Controller Neutral Adjustment on Page 30-41-28.)

Figure 30-41-8



With the engine running and the loader on jack stands: Bleed the trapped air in the controller by loosening the small set screw (Item 1) **[Figure 30-41-8]** a maximum of 2 turns. Leave the screw loose until oil comes dripping out of the set screw. Tighten set screw to 18 in.-lb. (2 N•m) torque.

Repeat the bleeding procedure for all of the solenoids.

Disassembly and Assembly (Cont'd)

Figure 30-41-35

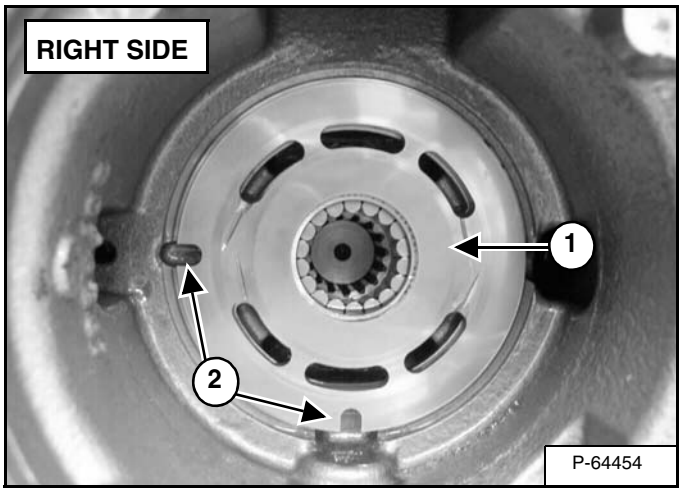
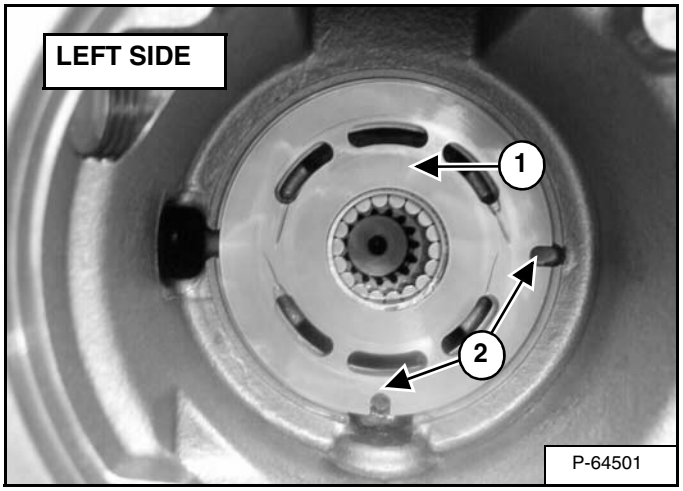


Figure 30-41-36



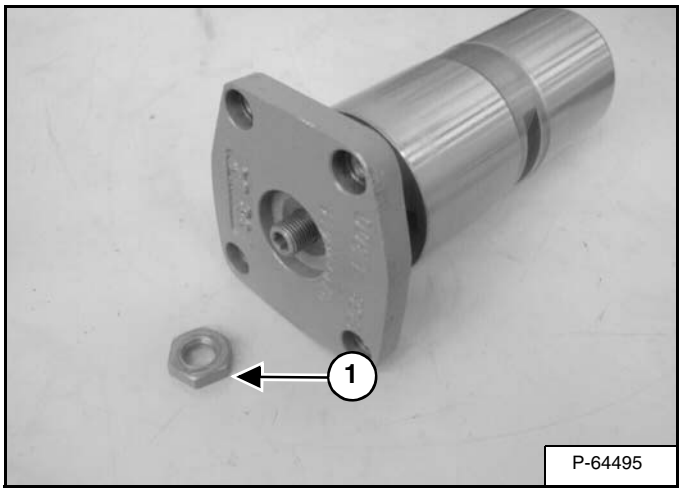
Remove valve plate (Item 1) **[Figure 30-41-35]** and **[Figure 30-41-36]** from the case housing.

Inspect valve plate for scratches or scoring. Replace a valve plate if the scratches are deep enough to catch with a fingernail.

NOTE: Pay attention to the notches (Item 2) [Figure 30-41-35] and [Figure 30-41-36] in the valve plate for assembly reasons. There are different valve plates for the left and right side. The valve plates are NOT interchangeable.

Disassembly and Assembly (Cont'd)

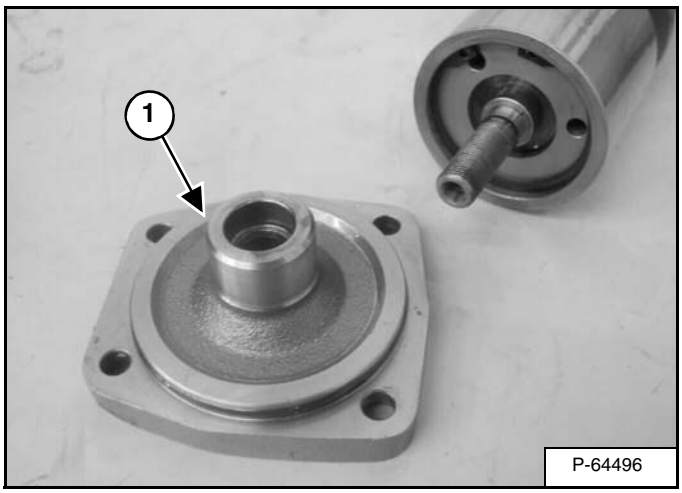
Figure 30-41-71



Remove the lock nut (Item 1) **[Figure 30-41-71]** from the servo piston.

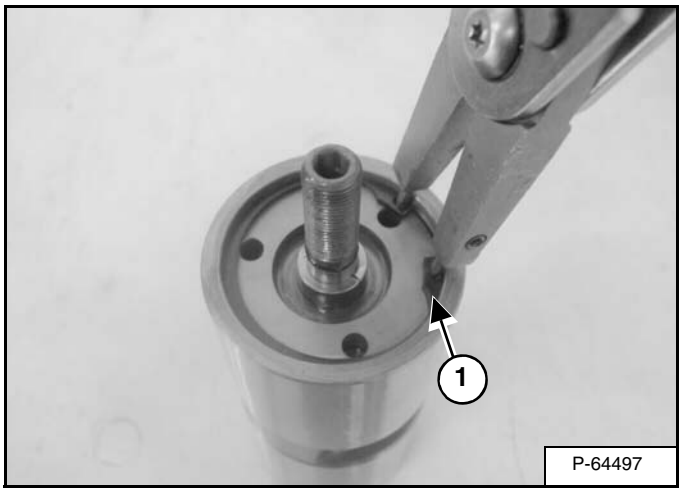
Assembly: Tighten lock nut to 22 ft.-lb. (30 N•m) torque.

Figure 30-41-72



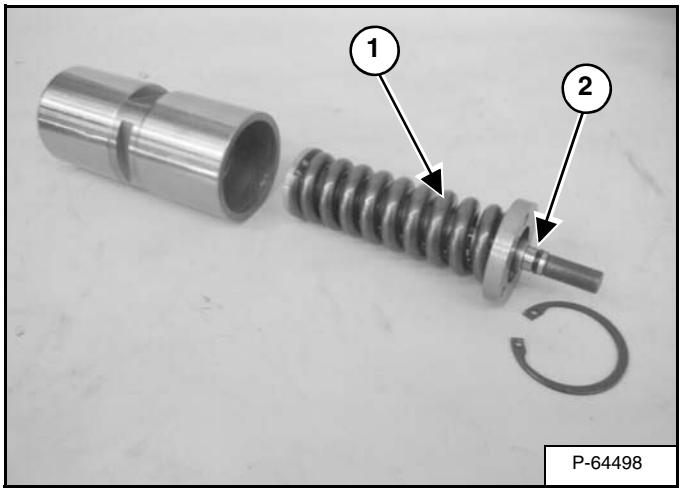
Remove the servo cover (Item 1) **[Figure 30-41-72]** from the servo piston.

Figure 30-41-73



Remove snap ring (Item 1) **[Figure 30-41-73]** from the servo piston.

Figure 30-41-74



Remove the piston stop adjustment mechanism (Item 1) **[Figure 30-41-74]** from the servo piston.

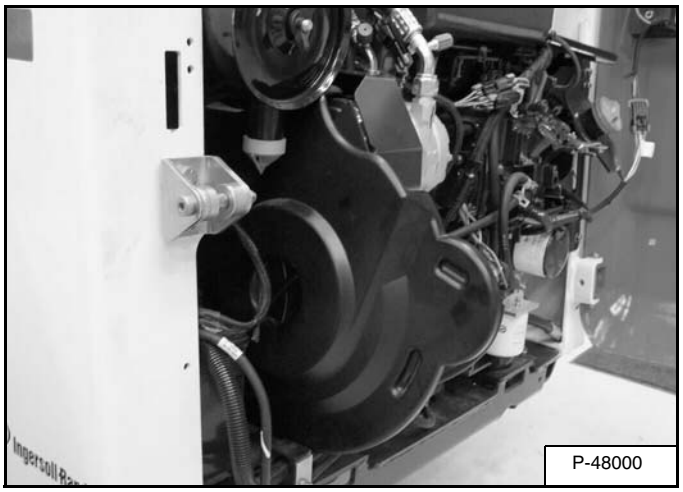
Inspect mechanism for broken parts.

Replace O-ring (Item 2) **[Figure 30-41-74]**

DRIVE BELT (CONT'D)

Drive Belt Replacement

Figure 30-50-6



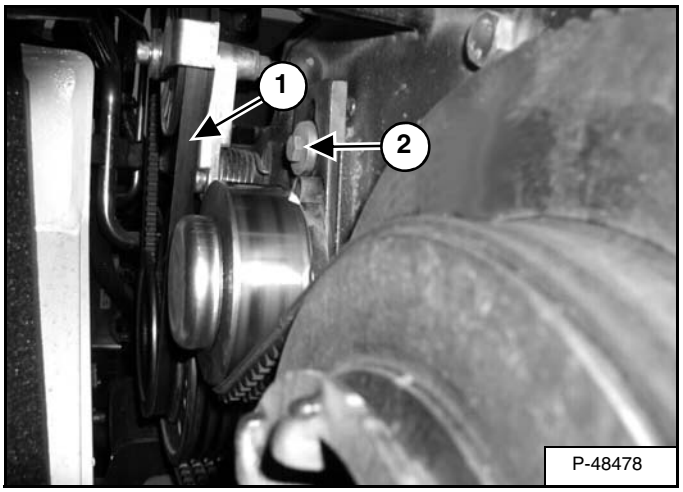
Stop the engine. Open the rear door.

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

Remove the negative (-) cable from the battery. The battery may be removed for additional working clearance. (See Removal And Installation on Page 60-20-1.)

Remove the belt shield **[Figure 30-50-6]**. (See Shield Removal And Installation, Page 30-50-1.)

Figure 30-50-7



Remove the fan drive belt (Item 1) **[Figure 30-50-7]**.

Remove the air conditioner belt if so equipped.

The belt tensioner is located between the flywheel and pump pulley. Loosen and remove the bolt (Item 2) **[Figure 30-50-7]** from the belt tensioner.

Remove the belt tensioner assembly.

Figure 30-50-8

Remove the drive belt from the pump pulley and flywheel. Remove the drive belt from the loader **[Figure 30-50-8]**.

Install the new drive belt. Install the belt tensioner assembly.

Install the fan drive belt.

Adjust the drive belt. (See Adjusting, Page 30-50-1.)

Reinstall belt shield and connect the negative (-) cable to the battery.

BRAKE

Disk Removal And Installation

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

⚠ WARNING

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

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

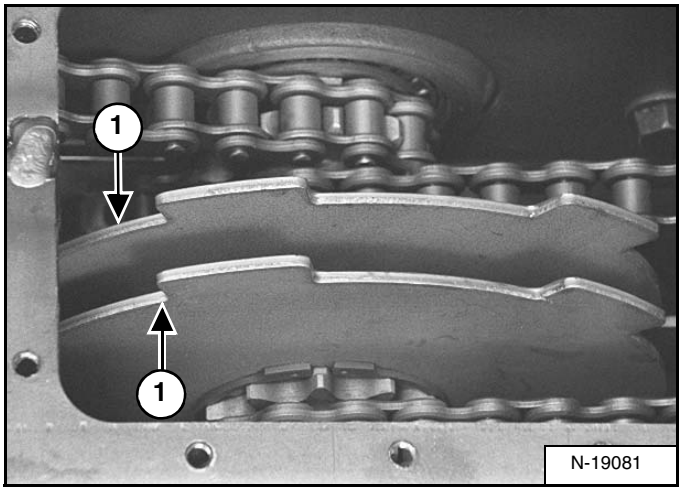
Disconnect and remove the engine speed control. (See Removal And Installation on Page 70-20-1.)

Remove the control panel from the loader. (See Removal and Installation on Page 50-100-1.)

Remove the center chaincase cover. (See Center Cover Removal And Installation on Page 40-30-3.)

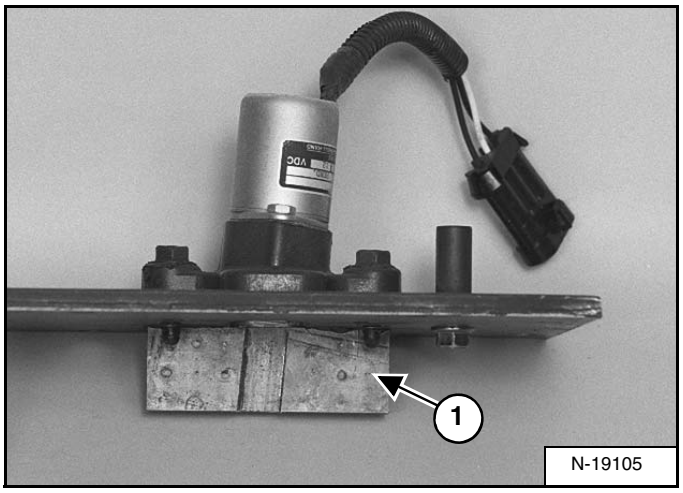
Remove the traction lock assembly. (See TRACTION LOCK on Page 60-110-1.)

Figure 40-10-1



The parking brake discs (Item 1) **[Figure 40-10-1]** are located beneath the center chaincase cover.

Figure 40-10-2

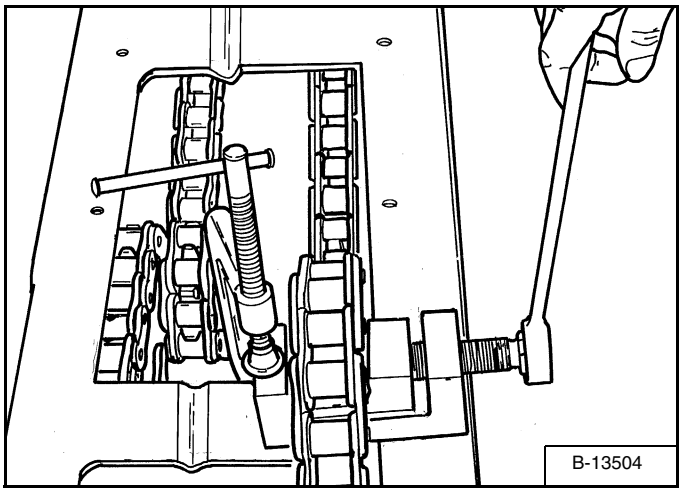


Inspect the traction lock guides (Item 1) **[Figure 40-10-2]** and the brake disc for damage or wear and replace as necessary.

(See Inspecting on Page 60-110-3.)

Chain Removal And Installation (Cont'd)

Figure 40-20-22



The tool listed is needed for the following procedure:

MEL1037 - Chain Link Tool

Installation: If a new chain is installed, a connector link must be used to connect the chain together.

Use MEL1037 Chain Link Tool and #80 chain adapter.

Secure the tool and place the connector link in the tool as shown **[Figure 40-20-22]**.

Turn the threaded rod of the tool and press the connector link together on the chain **[Figure 40-20-22]**. Tighten the threaded rod of the chain link tool to 130 ft.-lb. (176 N•m) torque.

⚠ WARNING

DO NOT exceed the recommended torque. The tool may fail under too much torque. Put cloth around the tool to protect yourself from flying debris.

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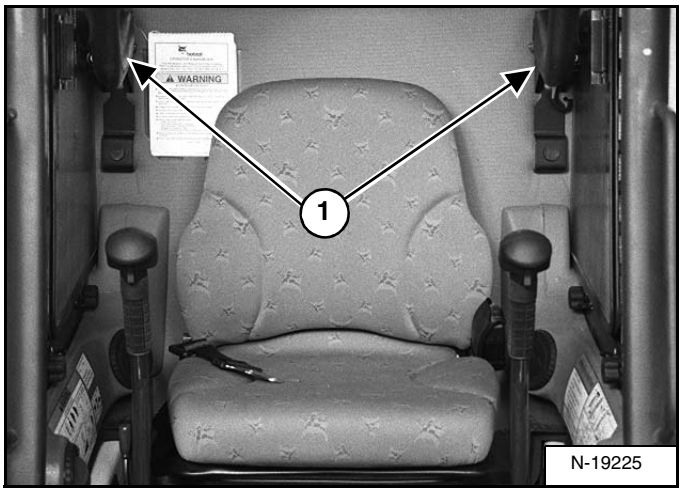
SEAT BAR

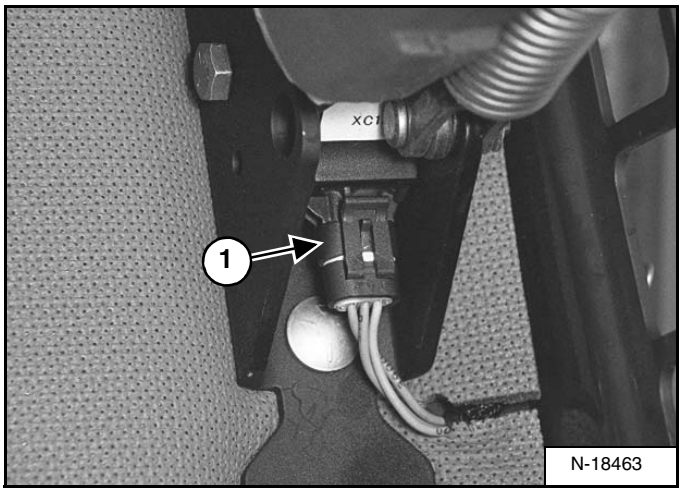
Removal And Installation

Figure 50-10-1



Raise the seat bar (Item 1) **[Figure 50-10-1]**.

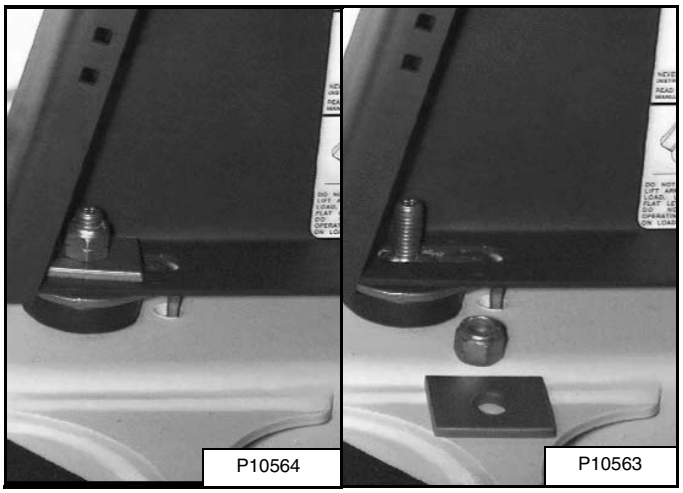
Figure 50-10-2



Disconnect the seat bar sensor (Item 1) **[Figure 50-10-2]** from the cab harness.

Lower the seat bar.

Figure 50-10-3



Loosen the nut (both sides) at the front corners of the operator cab **[Figure 50-10-3]**.

Remove the nuts and plates (both sides) **[Figure 50-10-3]**.

Installation: Tighten the nuts to 40 - 50 ft.-lb. (54 - 68 N•m) torque.

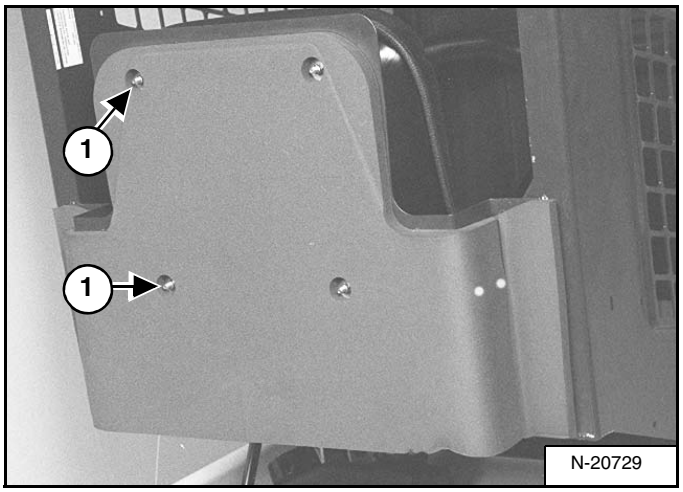
Figure 50-10-4

Lift on the grab handle and bottom of the operator cab slowly until the cab is all the way up and the latching mechanism engages **[Figure 50-10-4]**.

OPERATOR SEAT

Removal And Installation

Figure 50-30-1



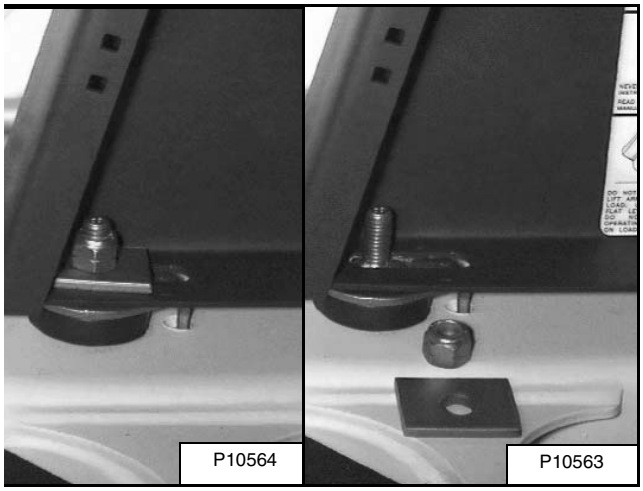
Raise the operator cab. (See Raising The Operator Cab on Page 10-30-1.)

Remove the four seat mounting nuts (Item 1) **[Figure 50-30-1]** and washers from the operator seat mounting studs.

Installation: Tighten the mounting nuts to 20 ft.-lb. (27 N•m) torque.

NOTE: Ensure the washers are installed.

Figure 50-30-2



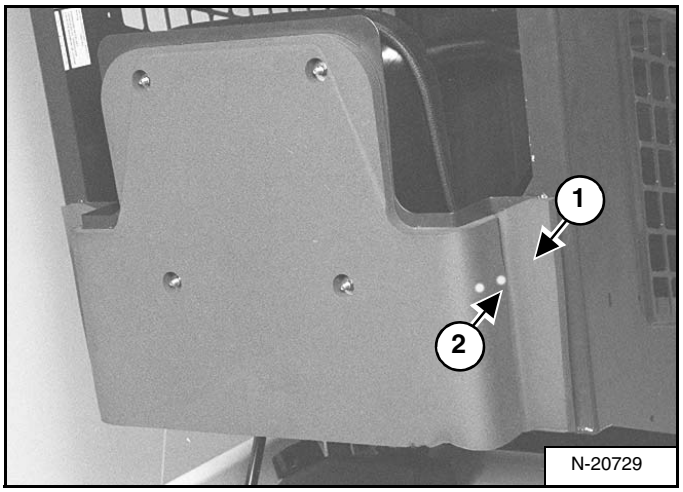
Lower the cab and install one of the mounting washers and a nut **[Figure 50-30-2]**.

NOTE: With the seat removed the cab will raise.

Reverse the removal procedure to install the operator seat.

Seat Belt Removal And Installation

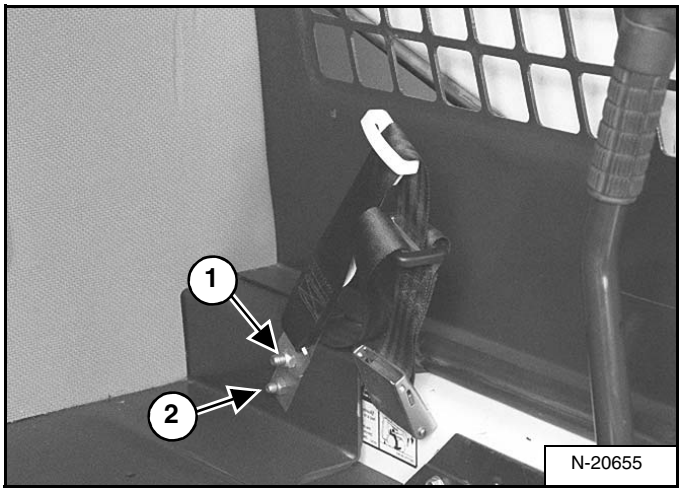
Figure 50-30-3



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

Locate the seat belt bolts under seat pan insulation (Item 1 & 2) **[Figure 50-30-3]** and peel back or cut insulation to gain access to the head.

Figure 50-30-4



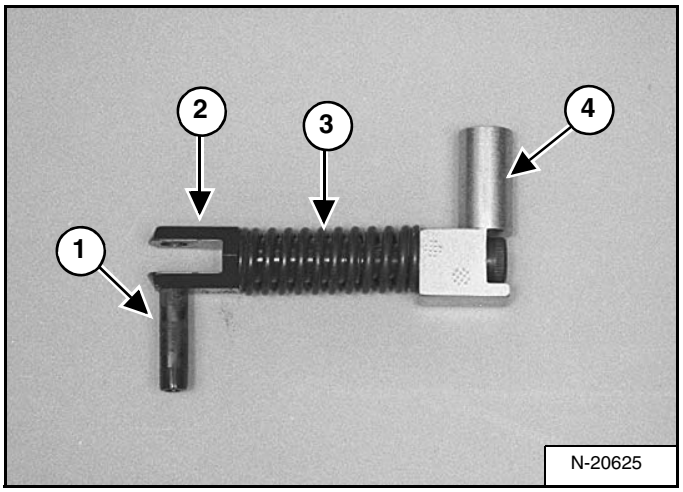
Remove the two nuts (Item 1 & 2) **[Figure 50-30-4]**.

Installation: Tighten nut (Item 1) **[Figure 50-30-4]** to 54 ft.-lb. (73 N•m) torque. Tighten nut (Item 2) **[Figure 50-30-4]** to 34 ft.-lb. (46 N•m) torque.

Repeat for other half of seat belt and guide

Bob-Tach Lever And Wedge (Cont'd)

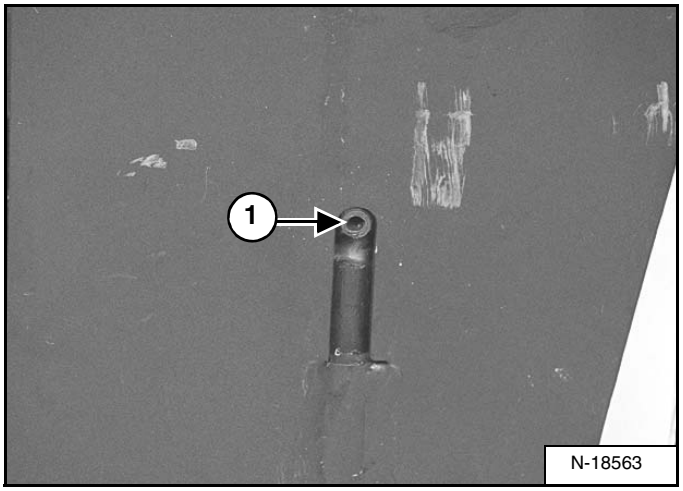
Figure 50-40-9



If the bolt (Item 1), handle pivot (Item 2), spring (Item 3), or clevis (Item 4) **[Figure 50-40-9]** are damaged, put the assembly in a vise.

Remove the bolt and replace the damaged parts as needed.

Figure 50-40-10

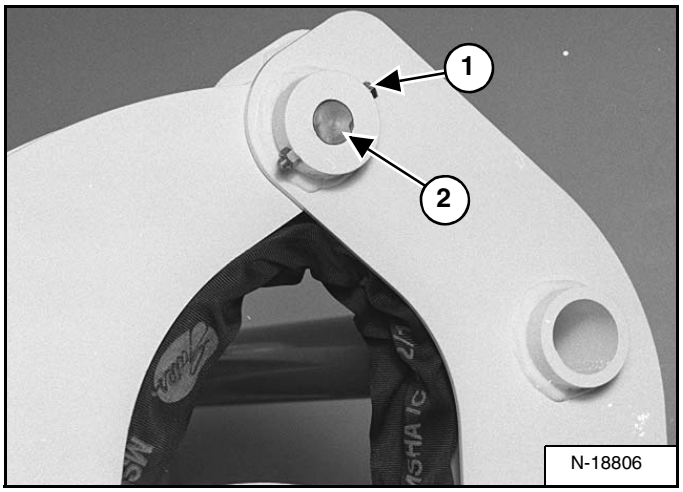


Use a punch and hammer to drive the roll pin (Item 1) **[Figure 50-40-10]** flush with the face of the Bob-Tach.

Reverse the removal procedure to install the Bob-Tach lever and wedge **[Figure 50-40-10]**.

Link Removal And Installation

Figure 50-50-14



Lower the lift arms. Stop the engine.

Remove the retainer bolt (Item 1) **[Figure 50-50-14]** and nut from the lift arm pivot pin.

Installation: Tighten to 18 - 20 ft.-lb. (24 - 27 N•m) torque.

Use a drift pin and hammer, remove the lift arm pivot pin (Item 2) **[Figure 50-50-14]** (both sides).

⚠ WARNING

AVOID INJURY OR DEATH

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

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

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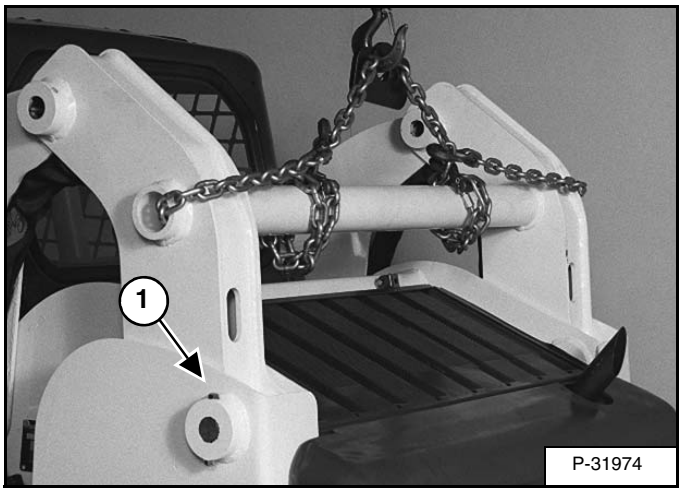
Figure 50-50-15

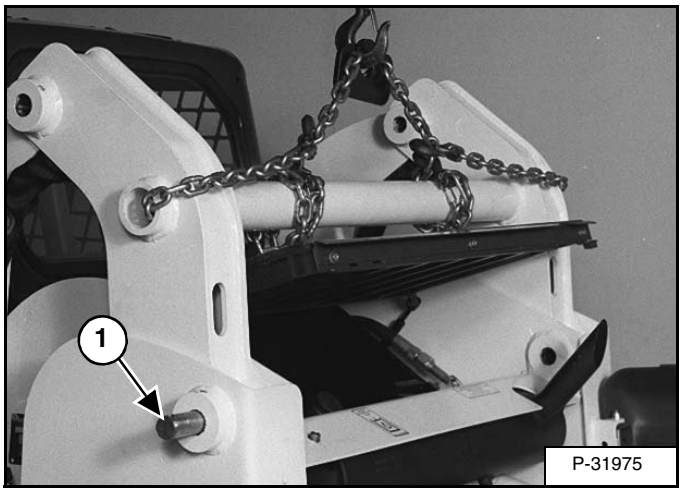


Connect a chain and chain hoist on the lift arm link **[Figure 50-50-15]**.

Remove the retainer bolt (Item 1) **[Figure 50-50-15]** and nut from the lift arm link pivot pin.

Installation: Tighten to 18 - 20 ft.-lb. (24 - 27 N•m) torque.

Figure 50-50-16



Open the rear door.

Raise the radiator cover part way to gain access to the pivot pin.

Use a drift pin and hammer, remove the lift arm pivot pin (Item 1) **[Figure 50-50-16]** (both sides).

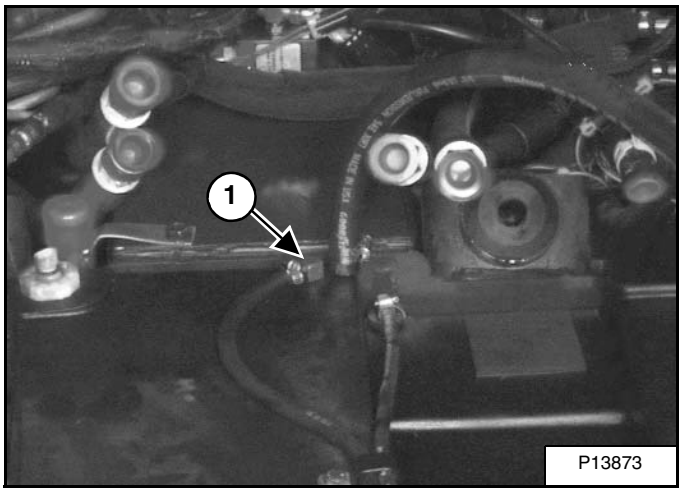
Lower the rear grill. Close the rear door.

Raise the lift arm link with the chain hoist and remove it from the loader frame.

Reverse the removal procedure to install the lift arm link on the loader.

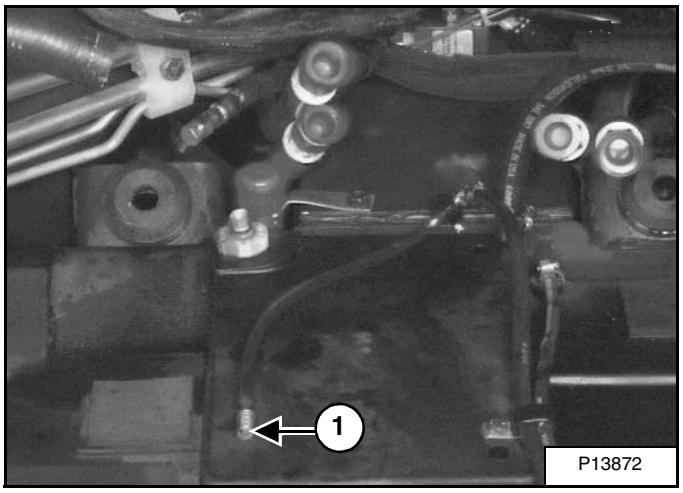
Fuel Fill Screen (Cont'd)

Figure 50-80-9



Remove the fitting (Item 1) **[Figure 50-80-9]** and grommet from the tank.

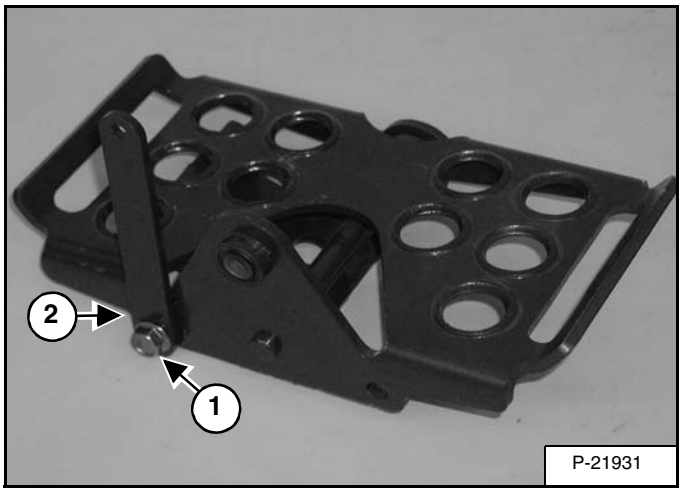
Figure 50-80-10



Remove the fuel supply screen (Item 1) **[Figure 50-80-10]** from the hose. Check the screen for damage and replace if necessary.

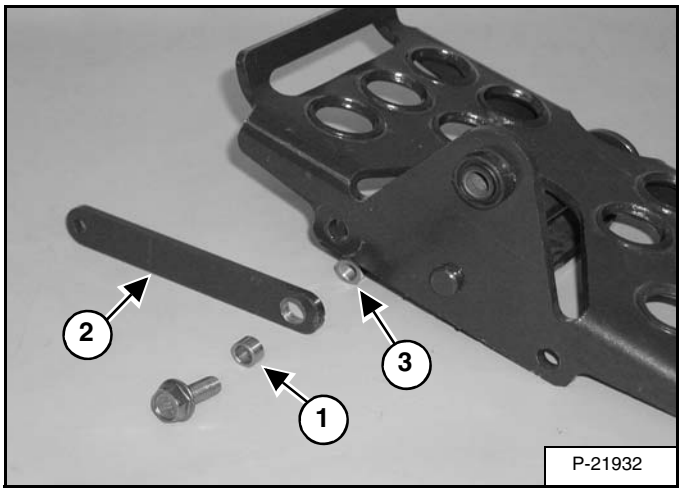
Foot Pedal Linkage Disassembly And Assembly

Figure 50-91-7



Remove the bolt (Item 1) holding the linkage (Item 2) to the side of the foot pedal **[Figure 50-91-7]**.

Figure 50-91-8

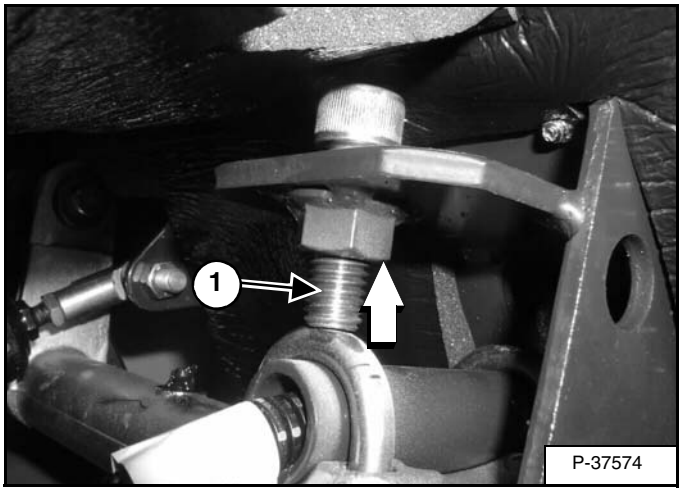


Remove the spacer (Item 1), linkage (Item 2), and nut (Item 3) from the foot pedal **[Figure 50-91-8]**.

CONTROL PANEL (NON-ADJUSTABLE PINTLES) (CONT'D)

Linkage Adjustment (Cont'd)

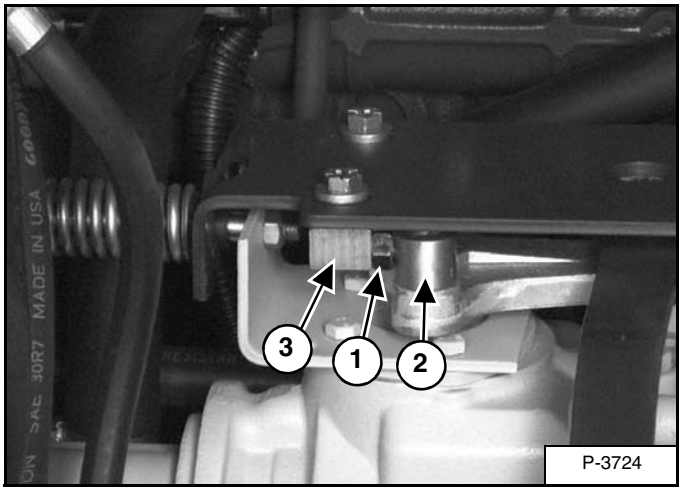
Figure 50-100-23



Remove access plug from the top of the control valve.

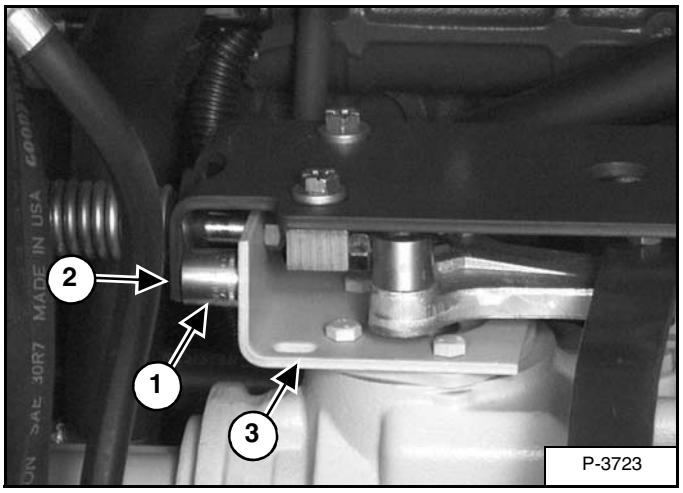
Turn the control lever drift adjustment bolts (Item 1) **[Figure 50-100-23]** (one on each control lever) out until it is flush with the bottom of the nut.

Figure 50-100-24



Move the right side steering lever to the rear and install a 3/8 in. (10 mm) thick spacer (Item 1) between the pintle arm cam (Item 2) and the centering block (Item 3) **[Figure 50-100-24]**.

Figure 50-100-25

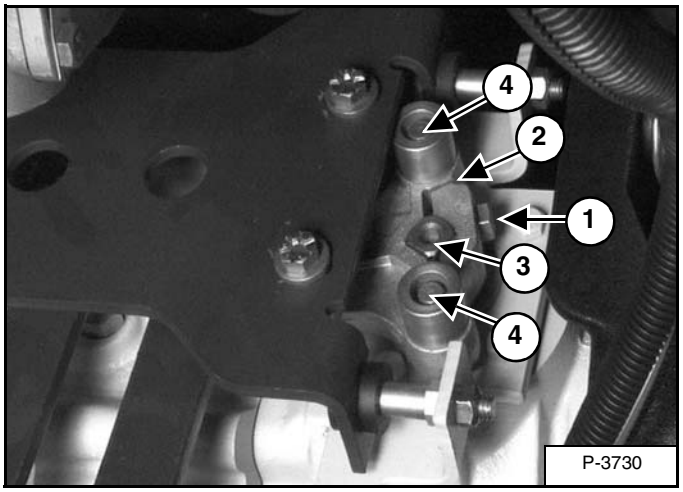


Move the right side steering lever forward and install a 15/16 in. (24 mm) thick spacer (Item 1) between the center plate (Item 2) and the mounting plate (Item 3) **[Figure 50-100-25]**.

This will allow the pintle arms to move freely while adjusting the steering linkage for full forward travel speed.

Remove the 3/8 in. (10 mm) thick spacer (Item 1) **[Figure 50-100-25]**.

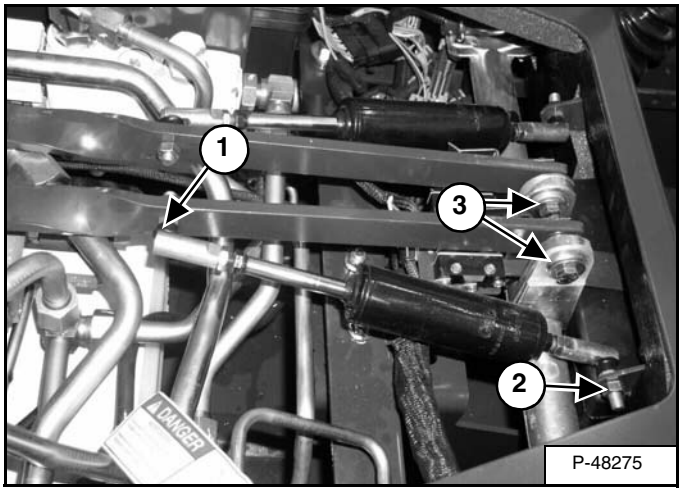
Figure 50-100-26



Before adjusting the linkage, check that the pintle arm mounting bolt (Item 1) is tight, 25 - 28 ft.-lb. (34 - 38 N•m) torque and that there is no play between the pintle arm (Item 2) and the square pump shaft (Item 3). Also check that the cam mounting bolts (Item 4) **[Figure 50-100-26]** are tight, 45 - 50 ft.-lb. (62 - 68 N•m) torque.

Shock Removal And Installation

Figure 50-101-10



Remove the mounting nut (Item 1) **[Figure 50-101-10]** from the end of the shock connected to the steering linkage.

Remove the mounting nut (Item 2) **[Figure 50-101-10]** from the other end of the shock connected to the bracket on the control panel.

Installation: Tighten the mounting bolts to 25 - 28 ft.-lb. (34 - 38 N•m) torque.

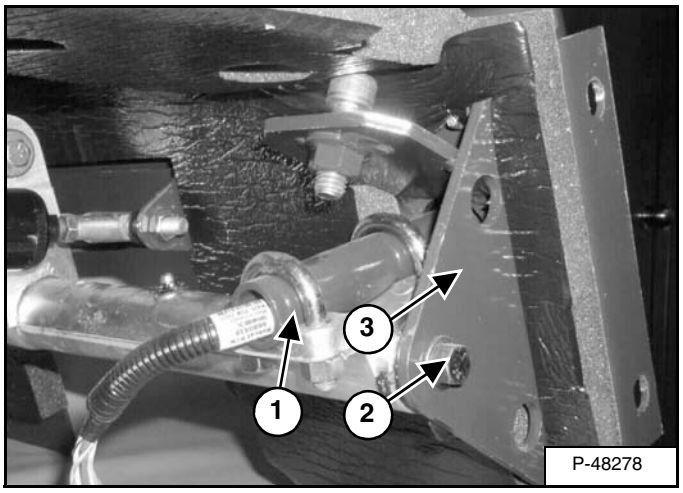
Shaft Removal And Installation

NOTE: The steering shaft can be removed without removing the control panel from the loader. Photo [Figure 50-101-11] shows the control panel removed for clarity purpose only.

Remove the steering linkage mounting bolts (Item 3) **[Figure 50-101-10]**.

Remove the steering shock mounting nuts (Item 2) **[Figure 50-101-10]**.

Figure 50-101-11



Remove Control Handle Lever (Item 1) **[Figure 50-101-11]**. (See Control Lever Removal And Installation on Page 50-110-1.)

Remove the steering shaft pivot bolt (Item 2) **[Figure 50-101-11]** from both sides of the control panel.

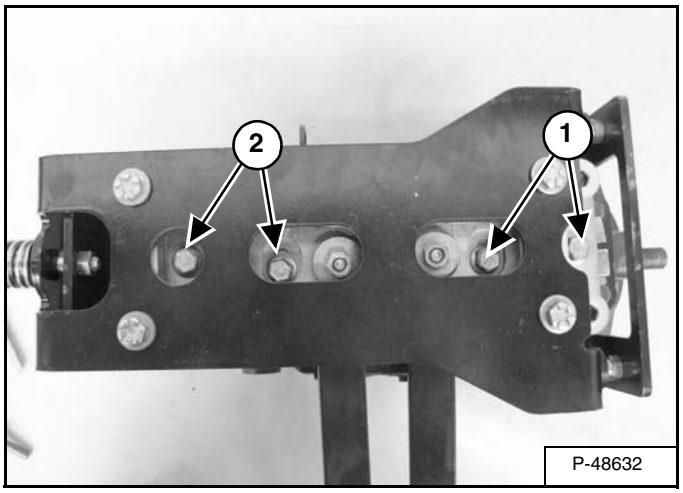
Installation: Tighten the pivot bolts to 25 - 28 ft.-lb. (34 - 38 N•m) torque.

Remove the steering shaft from the control panel.

Linkage Neutral Adjustment (Cont'd)

Start the neutral adjustment procedure with the left pump first and complete the neutral adjustment for the left pump before adjusting the right pump.

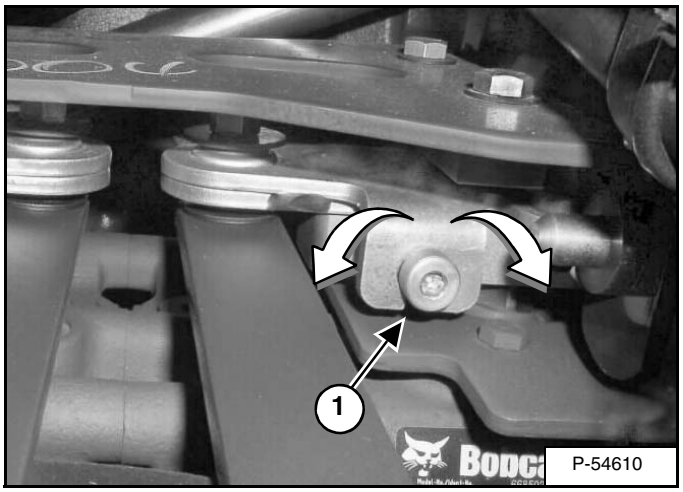
Figure 50-101-36



Loosen the left pump pintle adjustment lock bolts (Item 1). (The right pump pintle adjustment lock bolts are (Item 2) **[Figure 50-101-36]**.) Loosen the bolts enough to allow free movement between the pintle arm and the pintle base.

NOTE: If the bolts are too loose or too tight, the neutral adjustment may be affected.

Figure 50-101-37



Move the engine speed control to high idle.

NOTE: The neutral range (dead-band) will vary between the hydrostatic pumps.

NOTE: This procedure is shown for neutral adjustment on the left side of the loader. The procedure is the same for the right side neutral adjustment.

Turn the adjustment screw (Item 1) **[Figure 50-101-37]** counterclockwise until forward creep is seen.

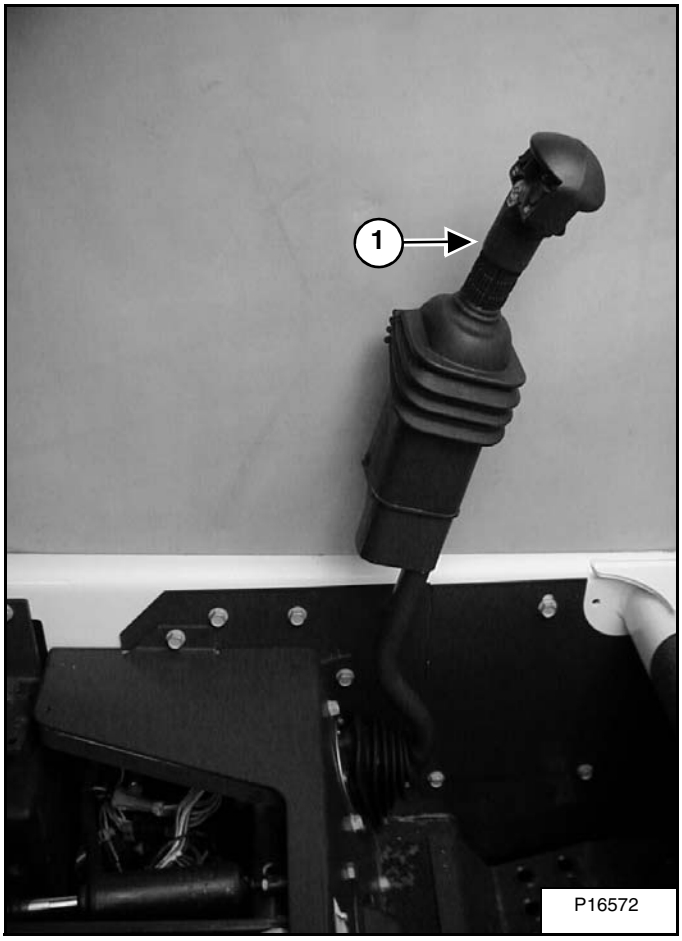
Turn the adjustment screw (Item 1) **[Figure 50-101-37]** counterclockwise to a point between forward and reverse where there is **zero** creep.

Stroke the left steering lever to forward and allow the lever to return to neutral. Stroke the left steering lever to reverse and allow the lever to return to neutral. Check that there is zero creep when the lever returns from either direction, on the left side. Turn the adjustment screw (if necessary) until zero creep is obtained.

CONTROL HANDLE (ADVANCED CONTROL SYSTEM) (ACS)

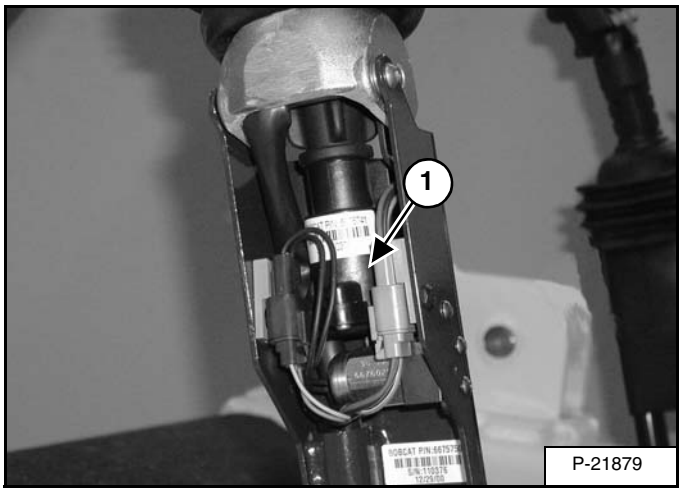
Components Identification

Figure 50-111-1



Control Handle (Item 1) **[Figure 50-111-1]**.

Figure 50-111-2

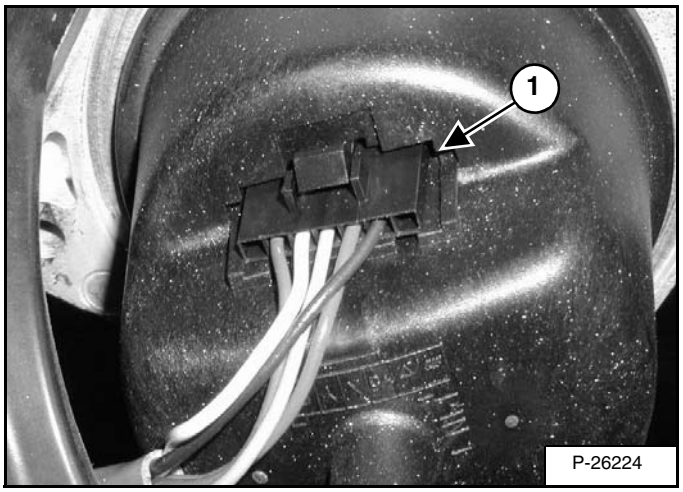


Handle Sensor (Item 1) **[Figure 50-111-2]**.

NOTE: The calibration procedure must be followed when replacing handle sensor, foot pedal sensor, actuator or ACS Controller. (See Calibration Procedure (ACS) on Page 60-160-11.)

Joystick Removal (Right & Left) (Cont'd)

Figure 50-112-9



Disconnect the electrical harness (Item 1) **[Figure 50-112-9]** from the joystick.

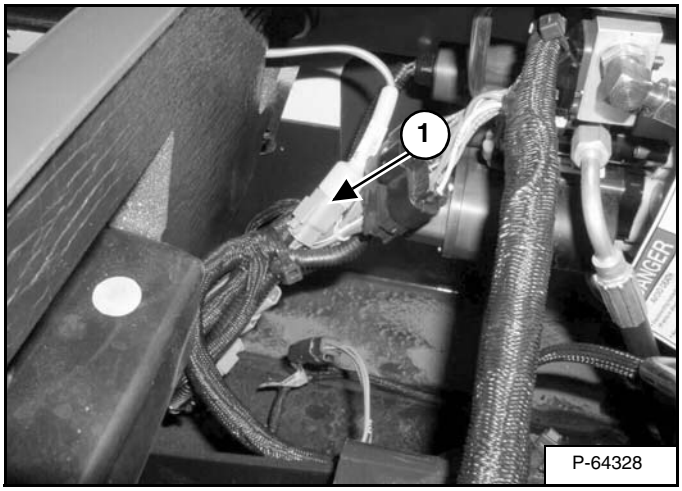
Remove the joystick from the loader.

Lever Assembly Removal (Right & Left)

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

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

Figure 50-112-10



Disconnect the joystick wiring harness connectors (Item 1) on both the right and left hand joysticks **[Figure 50-112-10]**.

WIRING SCHEMATIC
(With SJC Option)

S175 (S/N 525218875 AND ABOVE)
(S/N 525316212 AND ABOVE)
S185 (S/N 525022473 AND ABOVE)
(S/N 525115405 AND ABOVE)
(PRINTED JULY 2005)
V-0719

RELAY GROUNDS 2000-2060 ARE CONNECTED IN SERIES

GROUNDS

HIGH FLOW — C415 — BLUE TIE STRAP

WIRES CONNECT BY LETTER ACROSS CONNECTORS

SOME CONNECTOR BODIES NOT SHOWN FOR DRAWING CLARITY

UNSWITCHED POWER 1000-1999 RED
FUSED, UNSWITCHED POWER 1000-1999 RED/WHT
SWITCHED POWER 1000-1999 RNG
GROUND 2000-2999 BLK
MONITORING 3000-3999 LBL
HYDRAULIC 4000-4999 LGN
ATTACHMENT CONTROLS 5000-5999 YEL
LIGHTS 6000-6999 PNK
ACCESSORIES 7000-7999 WHT
ENGINE 8000-8999 TAN
COMMUNICATION 9000-9999 PUR

RED = RED
RNG = ORANGE
BLK = BLACK
LBL = LIGHT BLUE
DBL = DARK BLUE
LGN = LIGHT GREEN
DGN = DARK GREEN
YEL = YELLOW
PNK = PINK
WHT = WHITE
BRN = BROWN
TAN = TAN
PUR = PURPLE
GRY = GRAY

REAR ROD — C413 — BROWN TIE STRAP
REAR BASE — C414 — WHITE TIE STRAP
BUCKET POSITIONING — C423
DIVERTER — C416 — YELLOW TIE STRAP
FRONT AUX RELIEF — C422 — GREEN TIE STRAP
REAR AUX RELIEF — C417

LIFT SPOOL LOCK (Not Use For This Model) — C422
TILT SPOOL LOCK (NOT Used For This Model) — C421
BICS HYDRAULIC LOCK — C420
FRONT ROD — C418
FRONT BASE — C419
SPEED SENSOR — C106

CAB 6727178

MAIN FRAME — C2 — CAB

RIGHT PANEL: BUZZER, START, DATA, CLOCK/LATCH, SYSTEM Tx, SYSTEM Rx, COMPUTER POWER, PROTECTED POWER, RUN/EMITTER SWITCH, GROUND, OPEN
LEFT PANEL: BUZZER, START, DATA, CLOCK/LATCH, SYSTEM Tx, SYSTEM Rx, COMPUTER POWER, PROTECTED POWER, RUN/EMITTER SWITCH, GROUND, OPEN

SEAT BAR — 1930 SWITCH — C435 RIGHT — C434 LEFT — FRONT WORKLIGHTS

C408 — SEE FUSE/RELAY CENTER C407

HARNESS 7112800

HYDRAULIC TEMPERATURE SENDER 500-3000 ohm — C108
HYDRAULIC CHARGE PRESSURE SENDER 0.5 - 7.5 V — C105
HYDRAULIC OIL FILTER (DIFFERENTIAL) SWITCH — C112
HYDRAULIC OIL FILTER (DIFFERENTIAL) SWITCH — C111
C110
ENGINE OIL PRESSURE SENDER 0.5-7.5 V — C107

SEE J2-48

ENGINE HARNESS 7101311

ENGINE COOLANT SENDER 500-3000 ohm — C104
SUPPLY 1020 — C110 — 1800 EXCITATION
ALTERNATOR — 2010
STARTER — C109
C113 — SEE J2-8

FUEL SHUTOFF — 6736515 — C101
10.9 ohm — 740
0.3 ohm — 740

J1 — J2

SEE C110
SEE C113
AIR FILTER SWITCH
FUEL SENDER 30-270 ohm — C405 C406
See C492

J1 P01 — J2 P05

C426 — ACD & REMOTE START CONNECTOR — TO OPTIONS (ATTACHMENT CONTROL)

NOT USED FOR THIS MODEL — C409
NOT USED FOR THIS MODEL — C410

6732781 — C425 — OPEN
Brake Valve

TO OPTIONS (ACCESSORY CONNECTOR) — C103
TO OPTIONS (BACKUP ALARM SWITCH) — C404
TO OPTIONS (ACCESSORY CONNECTOR) — C488
TO OPTIONS (ACCESSORY CONNECTOR) — C489

GLOW PLUGS 1.0 ohm each

SEE CAB CONNECTOR C407

(ALTERNATOR & KITS) FUSE 11 25A
(ATTACHMENT) FUSE 10 25A
(HEATER FUSE 1 25A

SWITCHED POWER — MARKER LIGHT — REAR LIGHT — GLOW PLUG — STARTER — FUEL PULL — TRACTION LOCK

FUSE 2 15A — FUSE 3 15A — FUSE 6 30A — FUSE 5 30A — FUSE 4 25A (COMPUTER)
FUSE 9 25A (UNSWITCHED POWER) — FUSE 12 25A (ACS)

RELAY GROUNDS 2000-2060 ARE CONNECTED IN SERIES

FUSE / RELAY CENTER

C492 — TO OPTIONS (HORN/BLINKER) — C497

C441 NOT USED FOR THIS MODEL — C437 NOT USED FOR THIS MODEL — C404 TO OPTIONS (BACKUP ALARM)

TO OPTIONS (BRAKE LIGHT) — C474

MAINFRAME HARNESS 7112824

BATTERY CABLE — BATTERY — 100A

Printed in U.S.A.

V-0719 (7-12-05)

DRIVE CONTROLLER — J5 DRIVE

6736808 — C454 LEFT SIDE WHEEL SPEED — C453 RIGHT SIDE WHEEL SPEED
7114735 RED TIE STRAPS — C350 RIGHT SWASH PLATE POSITION SENSOR — C355 LEFT SWASH PLATE POSITION SENSOR
C360 — C365 RIGHT FORWARD DRIVE SOLENOID — C364 RIGHT REVERSE DRIVE SOLENOID — C362 LEFT REVERSE DRIVE SOLENOID — C361 LEFT FORWARD DRIVE SOLENOID
C500

C449 LEFT JOYSTICK — C459
C450 RIGHT JOYSTICK — C460

C429 LEFT ACTUATOR — C428 TILT ACTUATOR

J3 (Gray) — J1 — J2 (Black) — ACS Controller

SJC HARNESS 7110406

Removal And Installation (Cont'd)

Installation

Figure 60-20-4

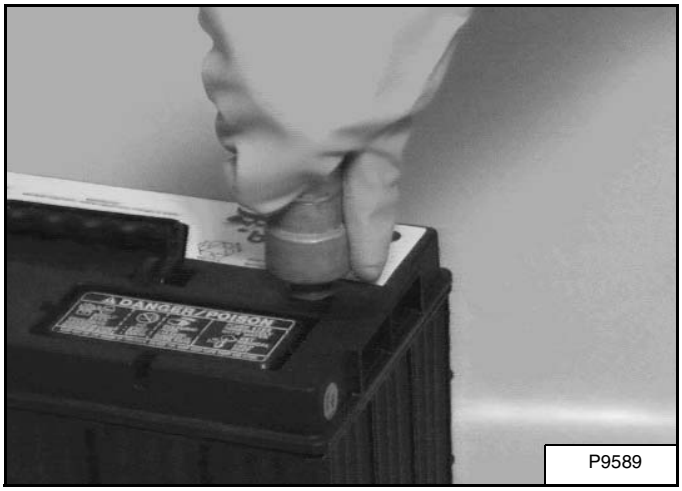
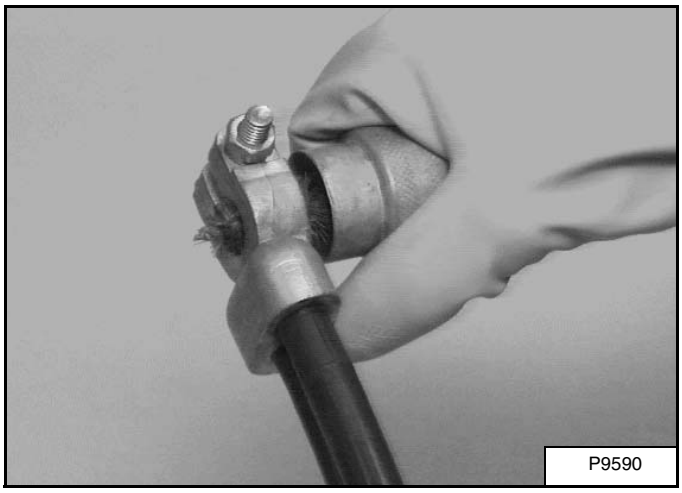


Figure 60-20-5



Always clean the terminals and cable ends when installing a new battery **[Figure 60-20-4]** & **[Figure 60-20-5]**.

When installing the battery in the loader, 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.

Install the battery holddown clamp.

Servicing

WARNING

AVOID INJURY OR DEATH

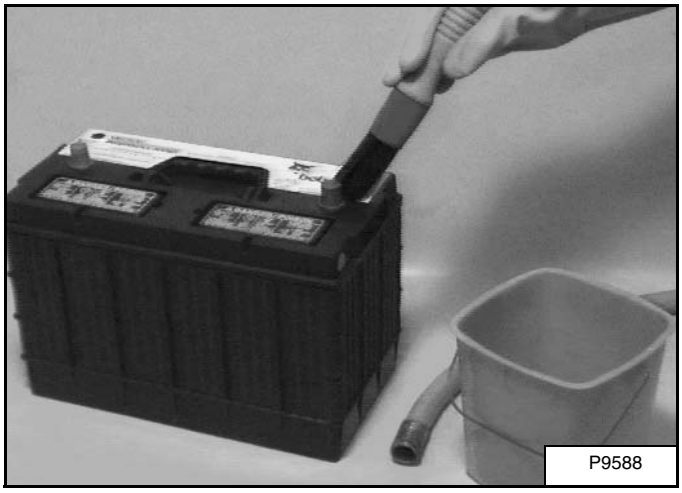
Batteries contain acid which burns eyes and skin on contact. Wear goggles, protective clothing and rubber gloves to keep acid off body.

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 60-20-6



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 **[Figure 60-20-6]**.

Clean the terminals and cable ends as shown in figure **[Figure 60-20-4]** and **[Figure 60-20-5]**.

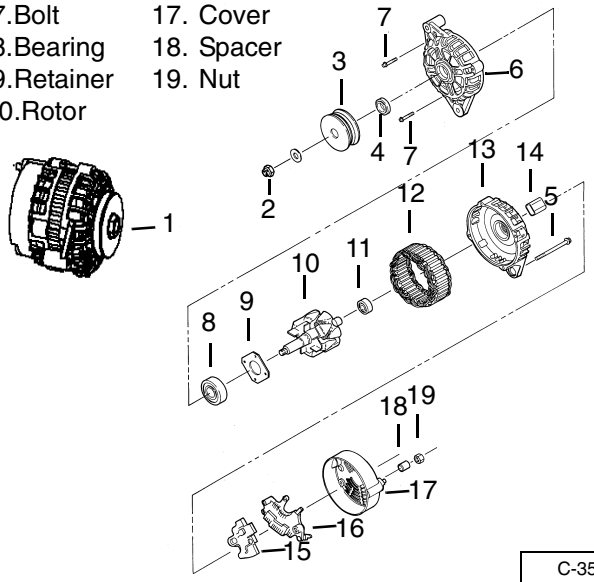
Check the electrolyte level in the battery. Add distilled water as needed.

Put battery saver or grease on the battery terminals and cable ends to prevent corrosion.

Disassembly

Figure 60-30-17

1.Alternator
2.Nut
3.Pulley
4.Spacer
5.Bolt
6.Bracket
7.Bolt
8.Bearing
9.Retainer
10.Rotor
11. Bearing
12. Stator
13. Bracket
14. Sleeve
15. Regulator
16. Rectifier
17. Cover
18. Spacer
19. Nut



Disassemble the alternator. (See Parts Identification Figure **[Figure 60-30-17]**.)

Remove the regulator cover.

Remove the four bolts holding halves together.

Pry the halves apart (use a press if needed).

Use a soft jaw vise to hold rotor while removing pulley nut.

Remove front case half from the rotor using a plastic hammer or press.

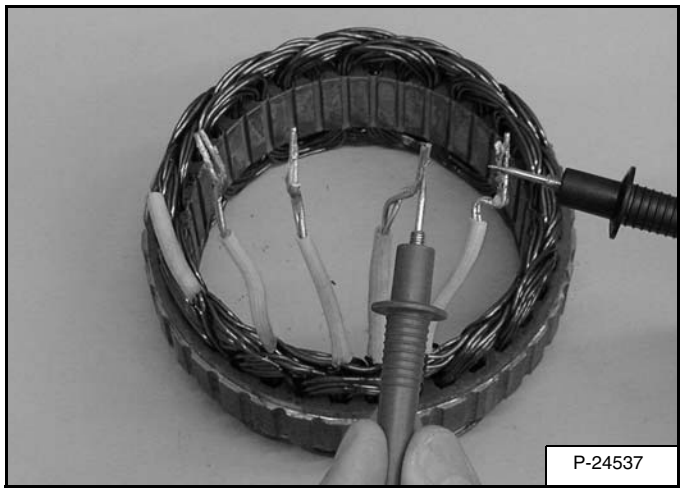
Unsolder the stator leads from the rectifier. Remove the stator.

Unsolder the two leads between the rectifier and regulator. Remove the regulator from rectifier.

ALTERNATOR (CONT'D)

Stator Continuity Test

Figure 60-30-18



Use an ohmmeter to test the stator.

Touch the probes to two of the bare stator wires **[Figure 60-30-18]**.

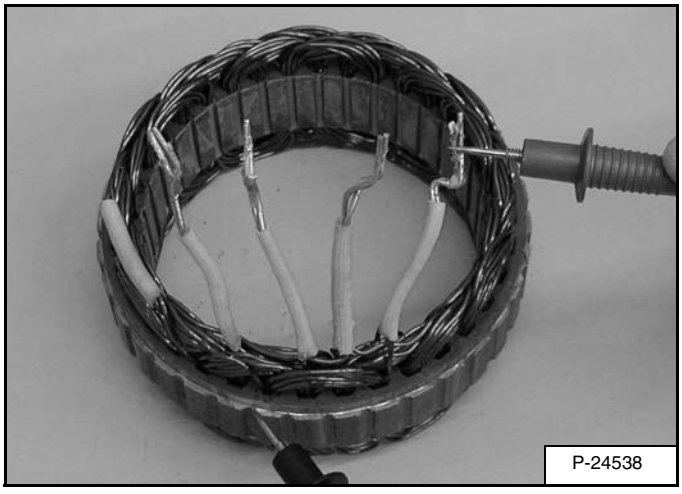
Move one of the probes to the third wire.

The readings should be the same.

If there is no continuity, replace the stator.

Stator Ground Test

Figure 60-30-19



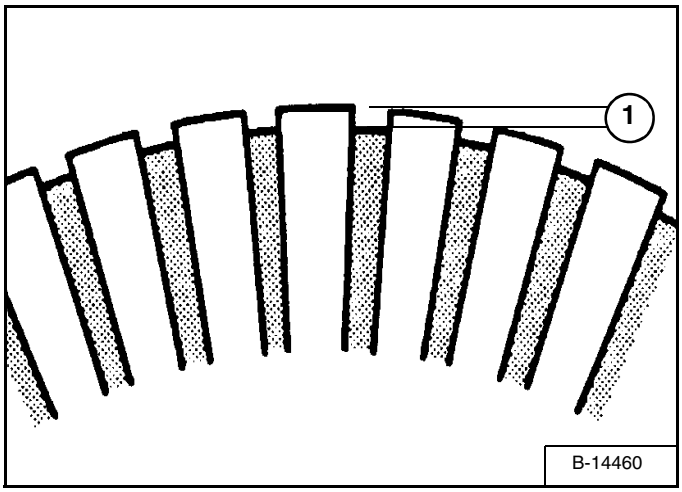
Touch one probe to a bare stator lead and the other probe to the bare metal surface of the stator **[Figure 60-30-19]**.

There should be no continuity.

Replace the stator if there is continuity.

Inspection And Repair (Cont'd)

Figure 60-40-21



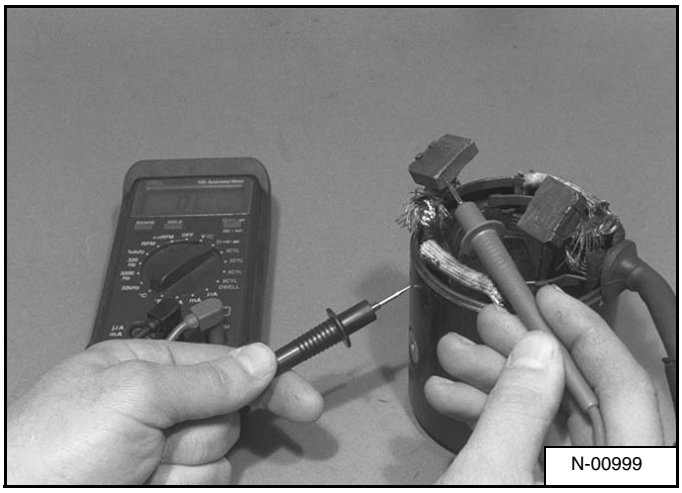
Measure the segment mica depth (Item 1) **[Figure 60-40-21]**.

Service Limit - 0.012 in. (0,3 mm)

If it is worn, replace the armature.

Check the commutator surface for burned spots which usually indicates an open-circuit, and correct it using #400 sand paper.

Figure 60-40-22



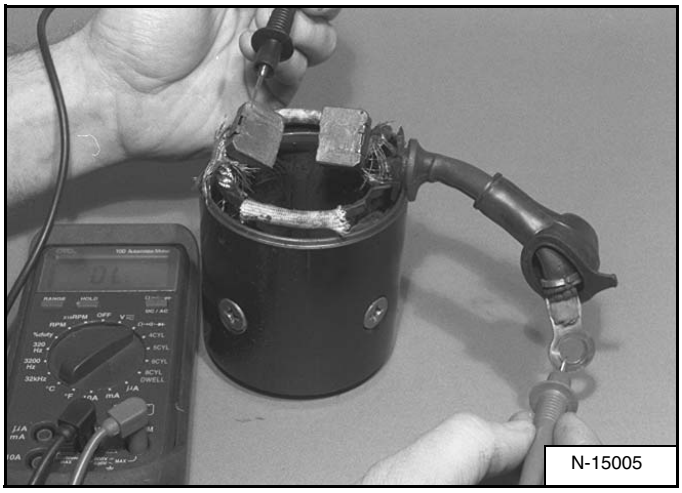
Check the field windings for wear and damage.

Check all the connections for clean and tight solder joints.

Field Winding Ground Test: Use a circuit tester, touch one probe to the field winding end of the brush and the other probe to the surface of the frame **[Figure 60-40-22]**. There should be no continuity. If there is continuity, the field windings are grounded.

Replace the frame.

Figure 60-40-23



Field Windings Continuity Test: Use a circuit tester, touch one probe to the wire and the other probe to the brush **[Figure 60-40-23]**. There should be continuity. If there is no continuity, the field windings are open-circuited.

Replace the frame.

Option And Field Accessory Panels (If Equipped)

Figure 60-50-9

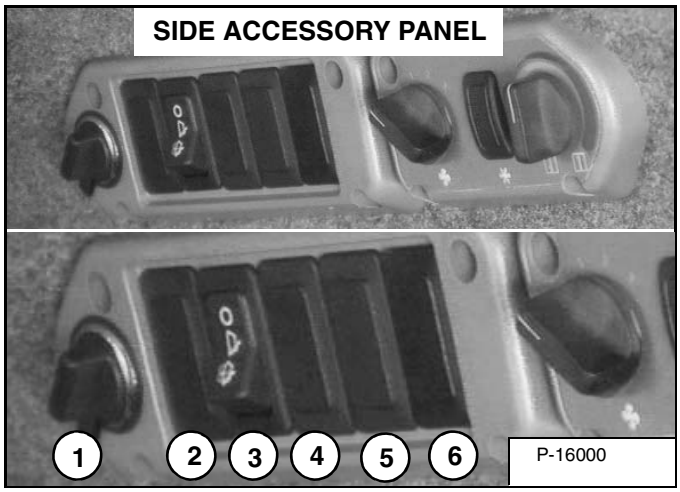


Figure 60-50-10

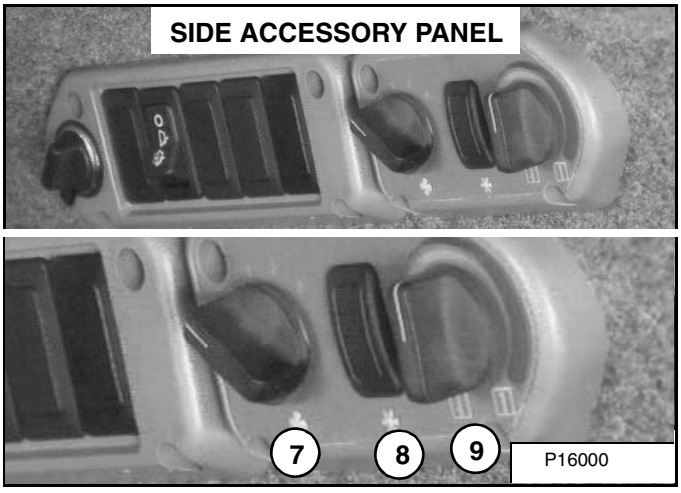
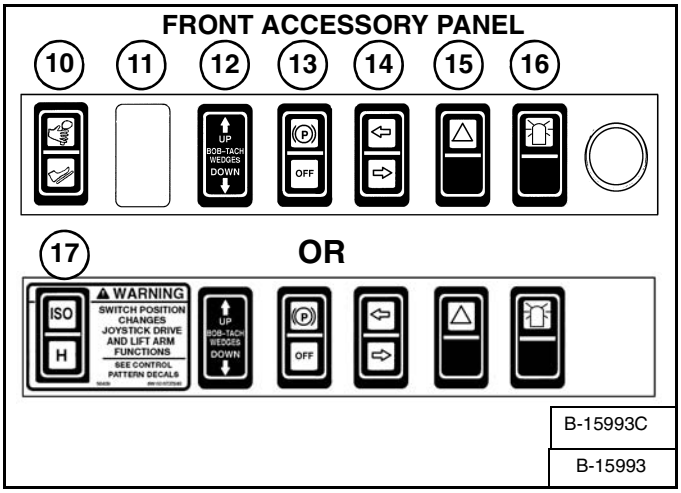


Figure 60-50-11



Side Accessory Panel **[Figure 60-50-9]** and **[Figure 60-50-10]**.

REF. NO.	DESC.	FUNCTION/OPERATION
1.	POWER PLUG	Provides a 12V receptacle for accessories.
2.	NOT USED	---
3.	FRONT WIPER	Press the top of the switch to start the front wiper (press and hold for washer fluid). Press the bottom of the switch to stop the wiper.
4.	REAR WIPER	Press the bottom of the switch to start the rear wiper. Press the top of the switch to provide washer fluid to clean the rear window.
5.	NOT USED	---
6.	NOT USED	---
7.	FAN MOTOR	Turn clockwise to increase fan speed; counterclockwise to decrease. There are four positions; OFF-1-2-3.
8.	AIR COND. SWITCH	Press top of switch to start; bottom to stop. Fan Motor (Item 7) must be ON for A/C to operate.
9.	TEMP. CONTROL	Turn clockwise to increase the temperature; counterclockwise to decrease.

Front Accessory Panel **[Figure 60-50-11]**

REF. NO.	DESC.	FUNCTION/OPERATION
10.	ADVANCED CONTROL SYSTEM (ACS)	Press the top to select Hand Controls; bottom to select Foot Controls.
11.	NOT USED	---
12.	POWER BOB-TACH (If Equipped)	Press and hold the up arrow to disengage the the Bob-Tach wedges. Press and hold the down arrow to engage the wedges into the mounting frame holes.
13.	PARKING BRAKE	Press the top to engage the PARKING BRAKE; bottom to disengage.
14.	TURN SIGNAL INDICATORS	Indicates left or right TURN SIGNALS are ON.
15.	HAZARD LIGHTS	Press the left side (or top) to turn the HAZARD LIGHTS ON; right side (or bottom) to turn OFF.
16.	ROTATING BEACON	Press the left side (or top) to turn the ROTATING BEACON ON; right side (or bottom) to turn OFF.
17.	SELECTABLE JOYSTICK CONTROL (SJC)	Press the top to select 'ISO' Control Pattern; bottom to select 'H' Control Pattern.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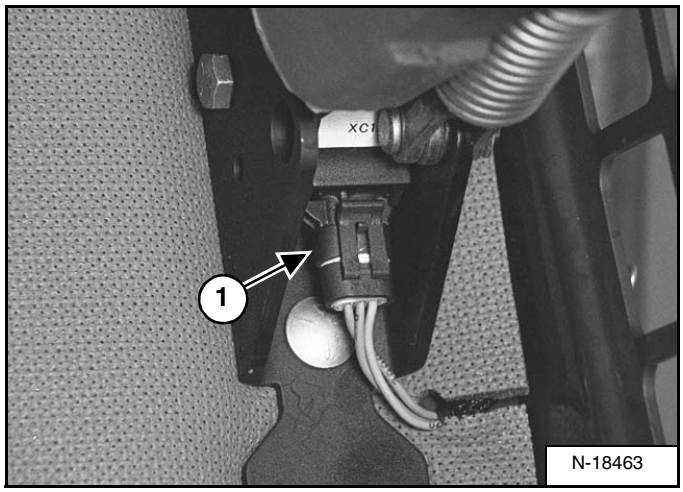
Number Codes List (Cont'd)

CODE		CODE	
38-04	No communication from joystick controller	38-53	Left forward drive solenoid error OFF
38-05	Left joystick X axis not in neutral	38-54	Left reverse drive solenoid error OFF
38-06	Right joystick X axis not in neutral	38-55	Right forward drive solenoid error OFF
38-07	Left joystick Y as not in neutral	38-56	Right reverse drive solenoid error OFF
38-08	Right joystick Y axis not in neutral	38-57	Front right extend steering solenoid error OFF
38-09	Control pattern switch - Short to Battery or Ground	38-58	Front right retract steering solenoid error OFF
38-11	Lift actuator not in neutral	38-59	Front left extend steering solenoid error OFF
38-12	Tilt actuator not in neutral	38-60	Front left retract steering solenoid error OFF
38-13	Lift actuator fault	38-61	Rear right extend steering solenoid error OFF
38-14	Tilt actuator fault	38-62	Rear right retract steering solenoid error OFF
38-15	Right wheel speed fault	38-63	Rear left extend steering solenoid error OFF
38-16	Left wheel speed fault	38-64	Rear left retract steering solenoid error OFF
38-17	Tilt actuator reduced performance	38-65	Steering pressure solenoid error OFF
38-18	Lift actuator reduced performance	38-66	Back-up alarm error OFF
38-19	Left joystick X axis out of range high	38-67	No communication from Bobcat controller
38-20	Right joystick X axis out of range low	38-68	Wheel angles (alignment) not calibrated
38-21	Left joystick Y axis out of range high	38-69	Lift & tilt actuators not calibrated
38-22	Right joystick Y axis out of range high	38-70	Interrupted power
38-23	Front right steering sensor out of range high	38-71	Battery out of range
38-24	Front left steering sensor out of range high	38-72	Drive pump not calibrated
38-25	Rear right steering sensor out of range high	38-73	Steering mode / drive mode switch flipped while operating
38-26	Rear left steering sensor out of range high	38-74	Uncommanded right wheel speed error ON
38-27	Lift actuator out of range high	38-75	Uncommanded left wheel speed error ON
38-28	Tilt actuator out of range high	38-76	Undercurrent steer pressure solenoid
38-29	Left joystick X axis out of range low	38-77	Undercurrent front right extend steer solenoid
38-30	Right joystick X axis out of range low	38-78	Undercurrent front right retract steer solenoid
38-31	Left joystick Y axis out of range low	38-79	Undercurrent front left extend steer solenoid
38-32	Right joystick Y axis out of range low	38-80	Undercurrent front left retract steer solenoid
38-33	Front right steering sensor out of range low	38-81	Undercurrent rear right extend steer solenoid
38-34	Front left steering sensor out of range low	38-82	Undercurrent rear right retract steer solenoid
38-35	Rear right steering sensor out of range low	38-83	Undercurrent rear left extend steer solenoid
38-36	Rear left steering sensor out of range low	38-84	Undercurrent rear left retract steer solenoid
38-37	5 volt sensor supply 1 out of range low	38-85	5 Volt sensor supply 1 out of range high
38-38	5 volt sensor supply 2 out of range low	38-86	5 Volt sensor supply 2 out of range high
38-39	Lift actuator short to ground / out of range low	38-87	Front right wheel blocked (steering mechanical failure)
38-40	Tilt actuator short to ground / out of range low	38-88	Front left wheel blocked (steering mechanical failure)
38-41	Tilt actuator wrong direction	38-89	Rear right wheel blocked (steering mechanical failure)
38-42	Lift actuator wrong direction	38-90	Rear left steering error
38-43	Left forward drive solenoid error ON	38-91	Right speed sensor missing pulses
38-44	Left reverse drive solenoid error ON	38-92	Left speed sensor missing pulses
38-45	Right forward drive solenoid error ON	38-93	Unresponsive right speed sensor
38-46	Right reverse drive solenoid error ON	38-94	Unresponsive left speed sensor
38-47	Front right steering solenoid error ON	38-95	Left speed sensor reverse direction
38-48	Front left steering solenoid error ON	38-96	Right speed sensor reverse direction
38-49	Rear right steering solenoid error ON	38-98	Controller in drive calibration mode
38-50	Rear left steering solenoid error ON	38-99	Controller in wheel position calibration mode.
38-51	Steering pressure solenoid error ON		
38-52	Back-up alarm error ON		

SEAT BAR SENSOR (CONT'D)

Test

Figure 60-100-1

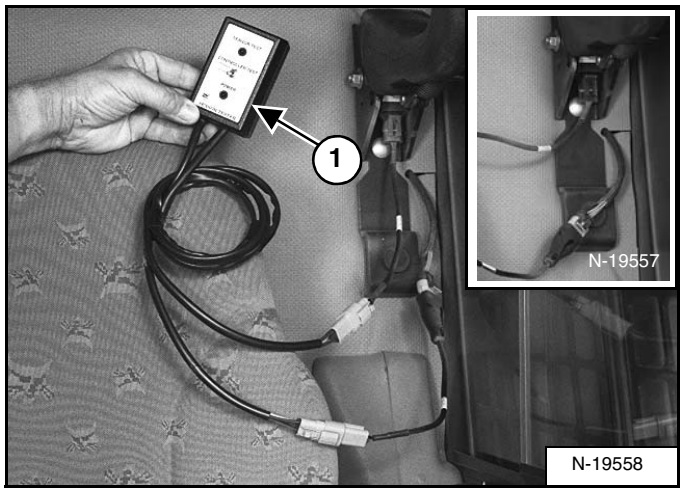


Use Sensor Tester (MEL1428) and seat bar sensor tester adapter (MEL1567) for the following procedure:

Connect the seat bar adapter sensor leads (MEL1567) to the sensor tester.

Disconnect the seat bar sensor connector (Item 1) **[Figure 60-100-1]**.

Figure 60-100-2

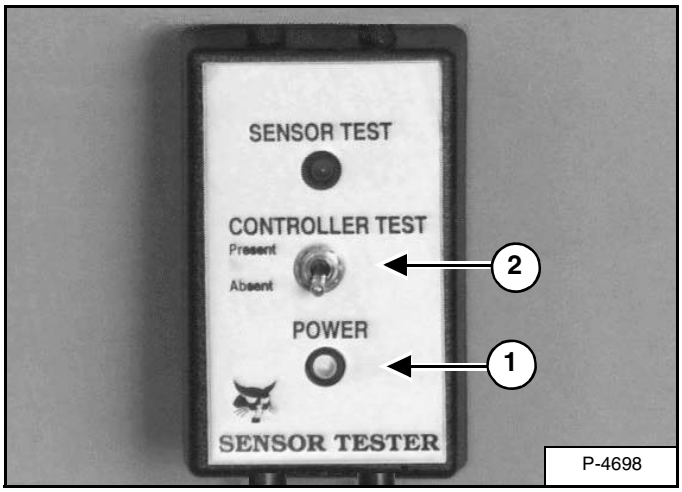


Connect the Sensor Tester (Item 1) **[Figure 60-100-2]** inline, to the seat bar sensor connectors. See inset **[Figure 60-100-2]**.

Turn the key to the ON position. **DO NOT START THE ENGINE**.

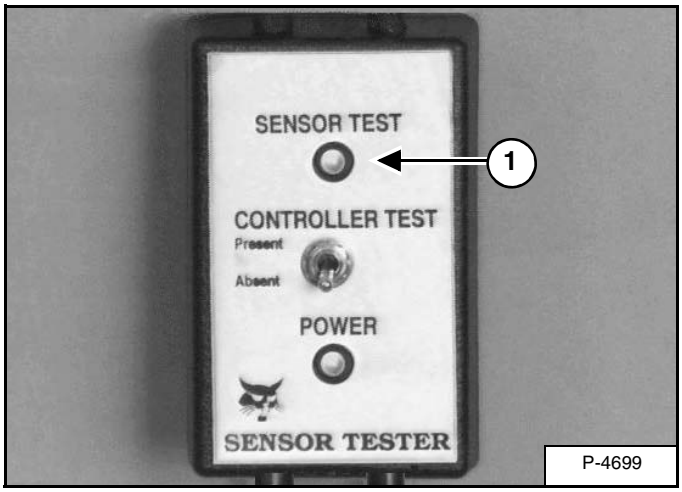
The toggle switch (Item 2) **[Figure 60-100-3]** can be in either the ***Absent*** or ***Present*** position.

Figure 60-100-3



If there is no power light (Item 1) **[Figure 60-100-3]** on the sensor tester, check the tester or wiring harness.

Figure 60-100-4



Lower the seat bar. The Sensor Test light (Item 1) **[Figure 60-100-4]** should illuminate.

Raise the seat bar. The Sensor Test light (Item 1) **[Figure 60-100-4]** should go off.

If the above test fails, there is a problem with the seat bar sensor.

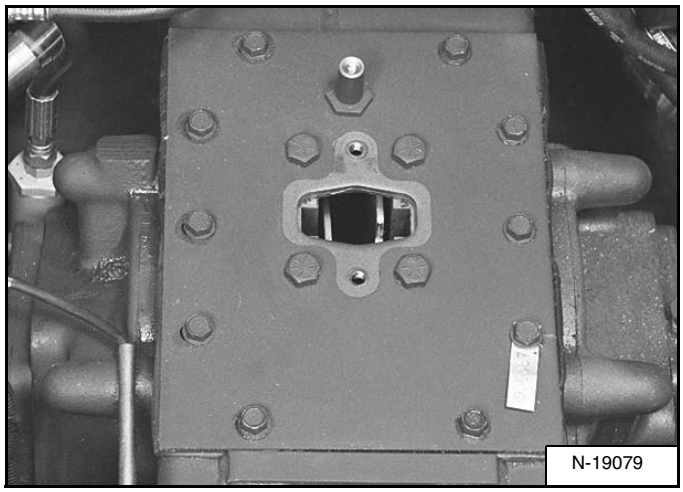
Disconnect the Sensor Tester.

Replace the Seat Bar Sensor. (See Removal And Installation on Page 60-100-3.)

If the above test passes, run the seat bar sensor BICS circuit test. (See BICS Circuit Test on Page 60-100-5.)

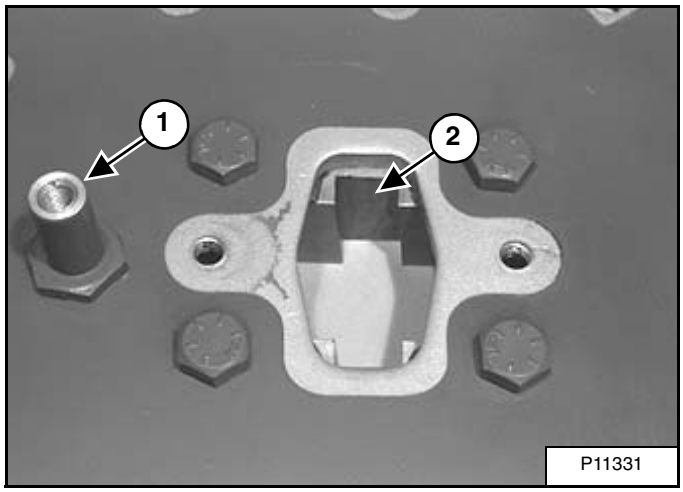
Guide Removal

Figure 60-110-9



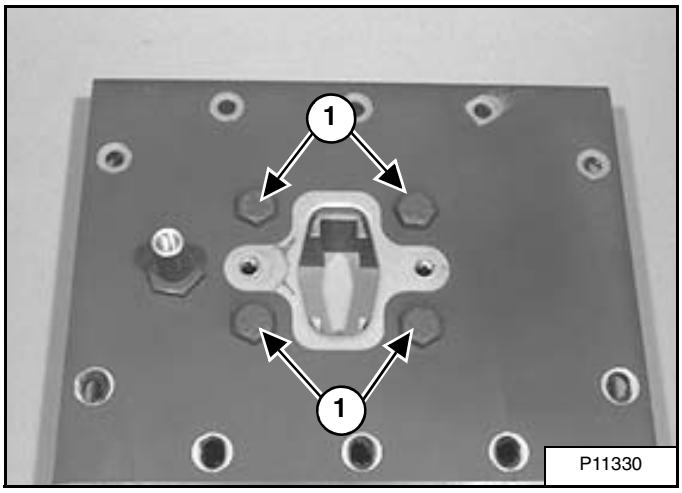
Remove the center chaincase cover **[Figure 60-110-9]** (See Center Cover Removal And Installation on Page 40-30-3.)

Figure 60-110-10



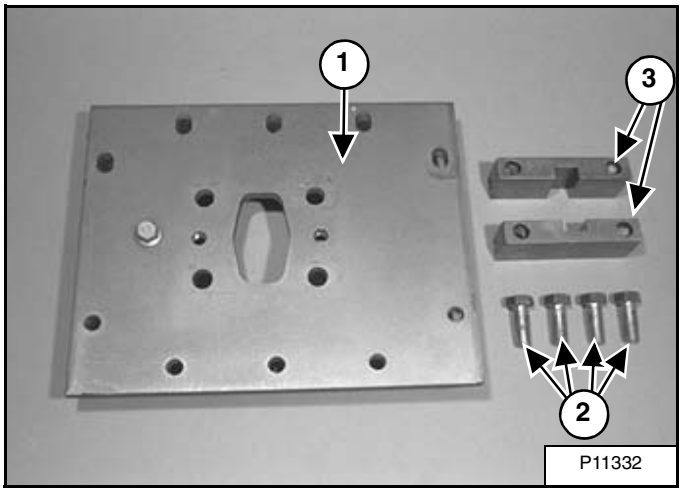
NOTE: Bolt (Item 1) is on the rear of the chaincase cover, notice the direction of the groove (Item 2) [Figure 60-110-10] in the traction lock guides.

Figure 60-110-11



To remove the traction lock guides remove the four bolts (Item 1) **[Figure 60-110-11]**.

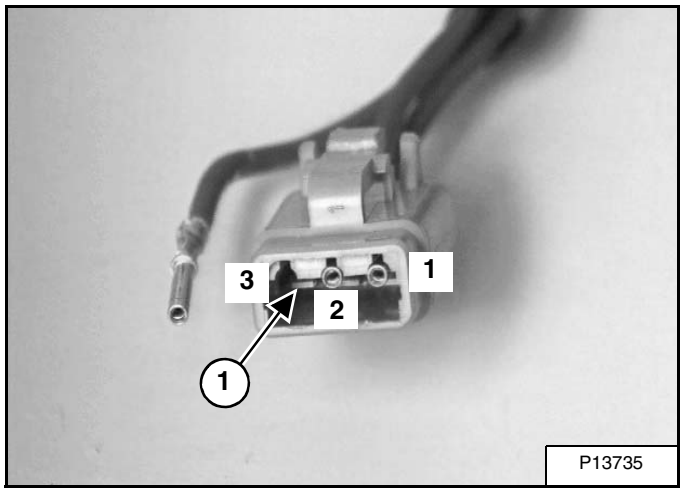
Figure 60-110-12



Thoroughly clean the polyurethane from the chaincase cover (Item 1), bolts (Item 2) and traction lock guides (Item 3) **[Figure 60-110-12]** and dry.

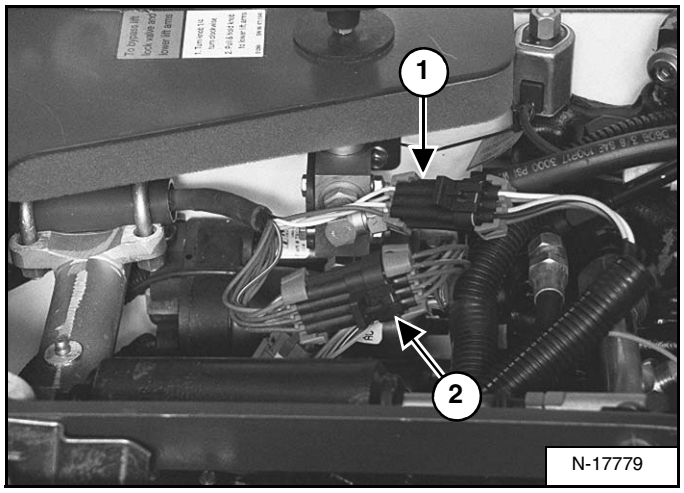
Switch Handle Removal (Cont'd)

Figure 60-120-16



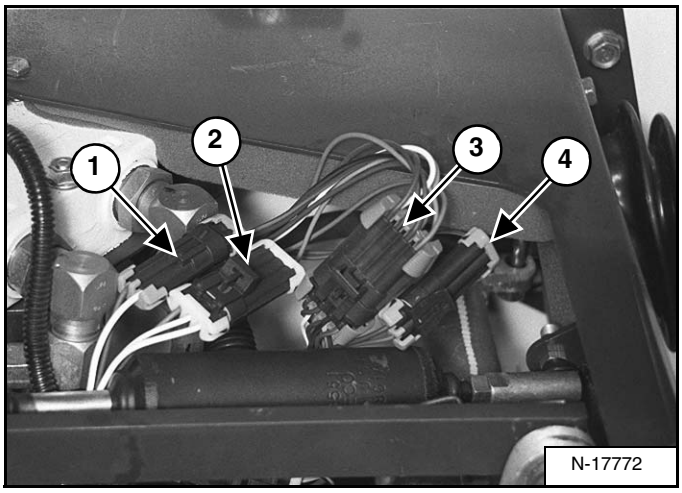
Using a pointed tool, press down on the tab (Item 1) **[Figure 60-120-16]** and pull the wire from the connector.

Figure 60-120-17



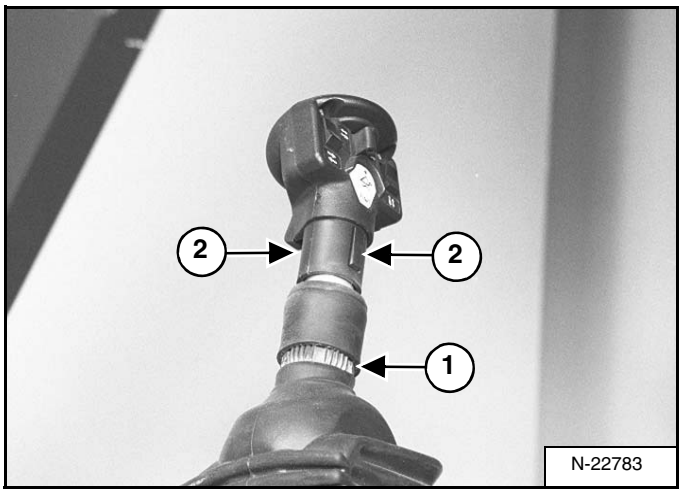
Disconnect the right switch handle connectors (Items 1 & 2) **[Figure 60-120-17]** from the loader wiring harness connectors.

Figure 60-120-18



Disconnect the left switch handle connectors (Items 1, 2, 3 & 4) **[Figure 60-120-18]** from the loader wiring harness connectors.

Figure 60-120-19

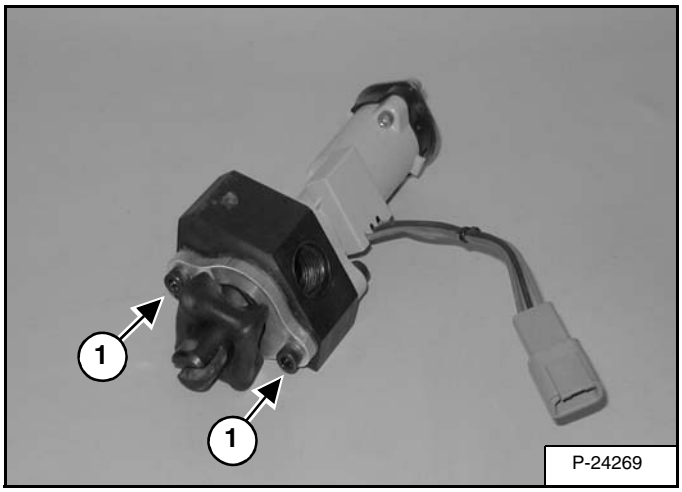


Roll the pistol grip handle cover (Item 1) **[Figure 60-120-19]** down.

Using a small screwdriver, lift the handle tabs (Item 2) **[Figure 60-120-19]** and slightly rotate the switch handle.

Foot Sensor Disassembly And Assembly

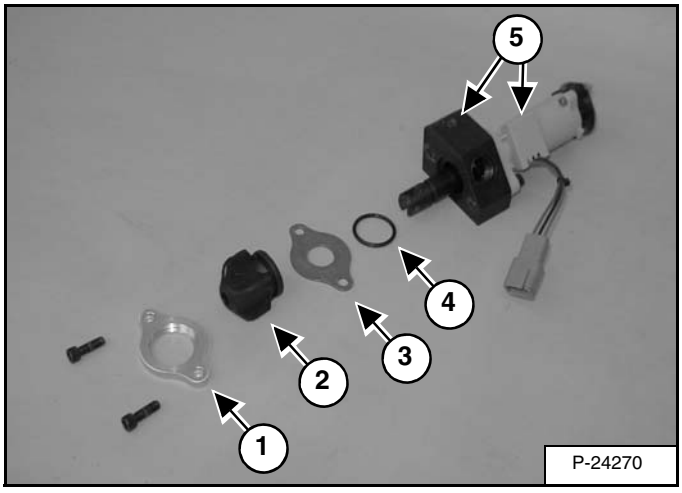
Figure 60-120-47



Remove the two bolts (Item 1) **[Figure 60-120-47]** from the end of the foot sensor.

Installation: Tighten the bolts to 90 in.-lb. (10,2 N•m) torque. Apply Loctite® 242 to the threads.

Figure 60-120-48

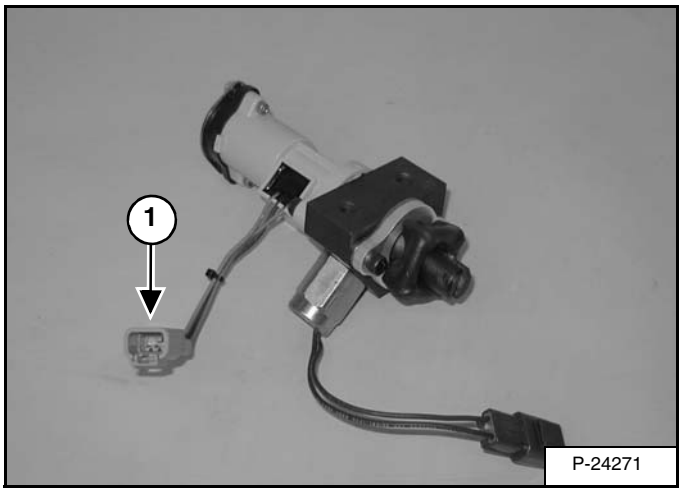


Remove the boot retainer (Item 1), boot (Item 2), spool stop plate (Item 3), O-ring (Item 4) **[Figure 60-120-48]**.

NOTE: Do not disassemble the sensor assembly (Item 5) [Figure 60-120-48]. The sensor assembly is a calibrated assembly and cannot be serviced. Order through Bobcat Parts.

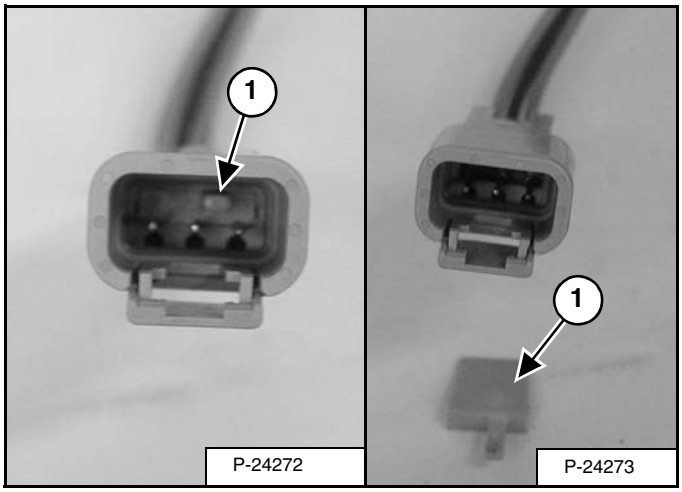
Foot Sensor Connector

Figure 60-120-49



The wire connector (Item 1) **[Figure 60-120-49]** can be removed from the sensor wires, using the following procedure:

Figure 60-120-50



Remove the wedge (Item 1) **[Figure 60-120-50]** from the connector.

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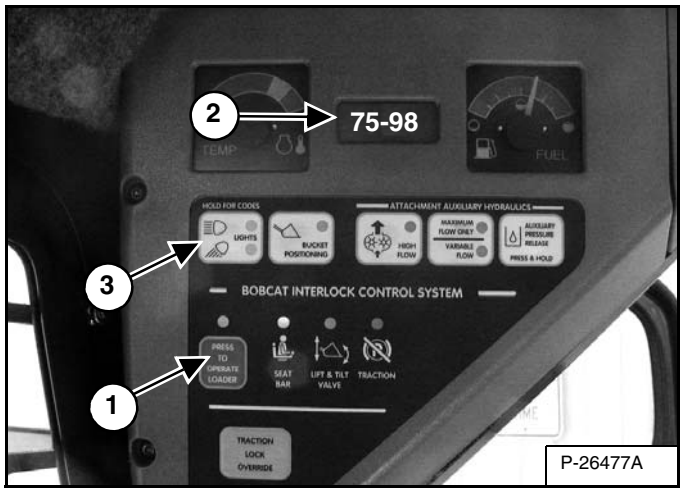
Hydrostatic Pump Calibration (SJC) (Cont'd)

Figure 60-160-20

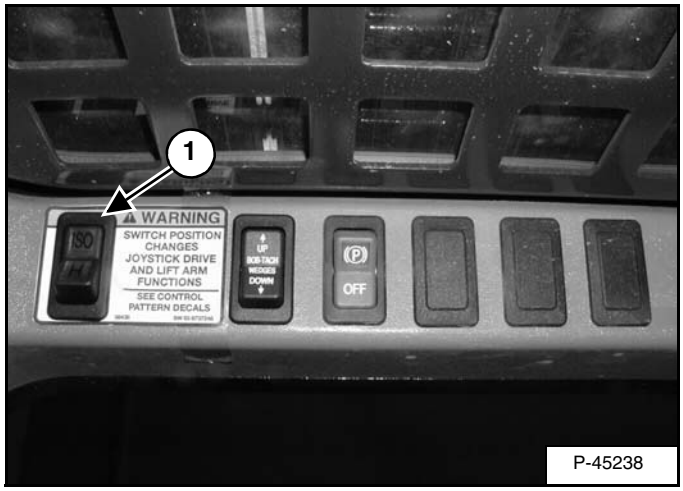


Press the *PRESS TO OPERATE LOADER* Button (Item 1) **[Figure 60-160-20]**.

Three audible beeps will sound and the error code (Item 2) **(75-98)** will be displayed if the operator presses the HOLD FOR CODES (LIGHTS) switch (Item 3) **[Figure 60-160-20]**.

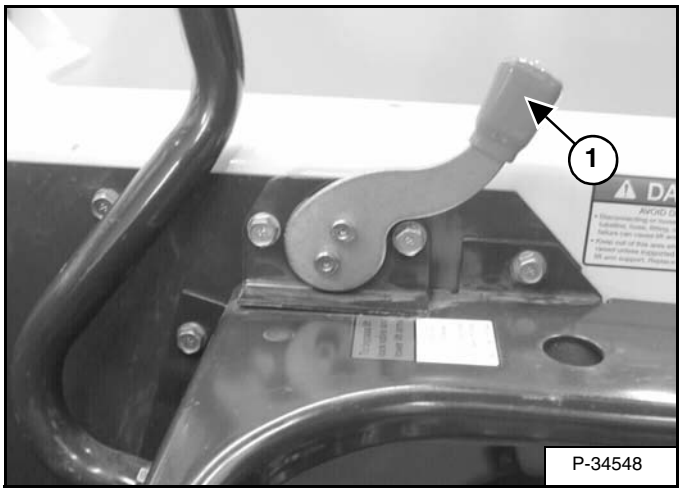
Start the engine from the *RUN, RUN/ENTER* position. **DO NOT TURN TO OFF POSITION**. This would cancel the calibration mode and the procedure would have to be repeated.

Figure 60-160-21



The Control Pattern **ISO** Switch (Item 1) **[Figure 60-160-21]** will stop flashing, and will remain ON for the rest of the calibration procedure.

Figure 60-160-22



Move the throttle (Item 1) **[Figure 60-160-22]** to high idle.

NOTE: If at any time, during calibration, the operator needs to stop the loader, turn the key OFF, lift the seat bar, or return the joystick to the neutral position.

The calibration procedure will stop.

To return to calibration mode, the operator must start the complete procedure from the beginning.

⚠ WARNING

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

W-2017-0286

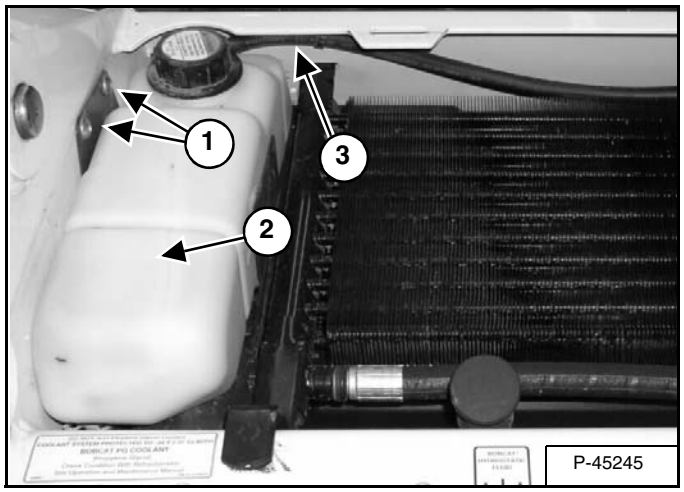
ENGINE SERVICE (CONT'D)

TIGHTEN ALL HARDWARE PER SIZE TO GRADE 5 TORQUE (SEE STANDARD TORQUE SPECIFICATIONS FOR BOLTS, SPEC SECTION) UNLESS OTHERWISE SPECIFIED.

SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE AND STANDARD ITEMS MAY VARY.

Removal And Installation (Cont'd)

Figure 70-50-4

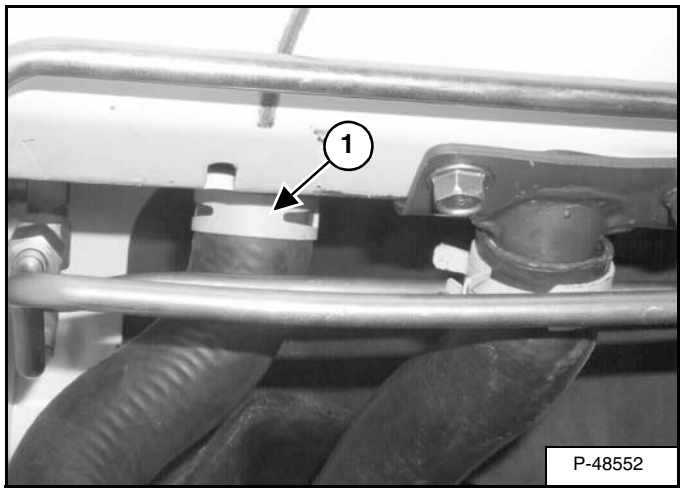


Remove the two pressurized expansion tank mounting bolts (Item 1) **[Figure 70-50-4]**.

Disconnect the pressurized expansion tank fill hose (Item 3) **[Figure 70-50-4]** at the radiator end.

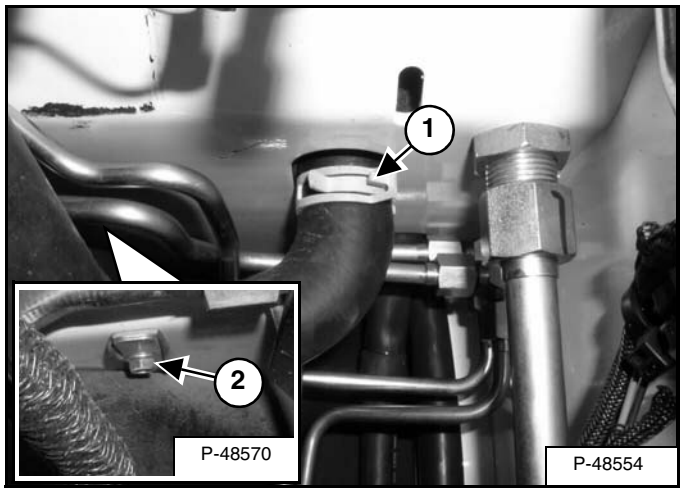
Remove the pressurized expansion tank (Item 2) with the pressurized expansion tank fill hose (Item 3) attached. **[Figure 70-50-4]**.

Figure 70-50-5



Remove the hose clamp (Item 1) **[Figure 70-50-5]** from the outlet hose.

Figure 70-50-6

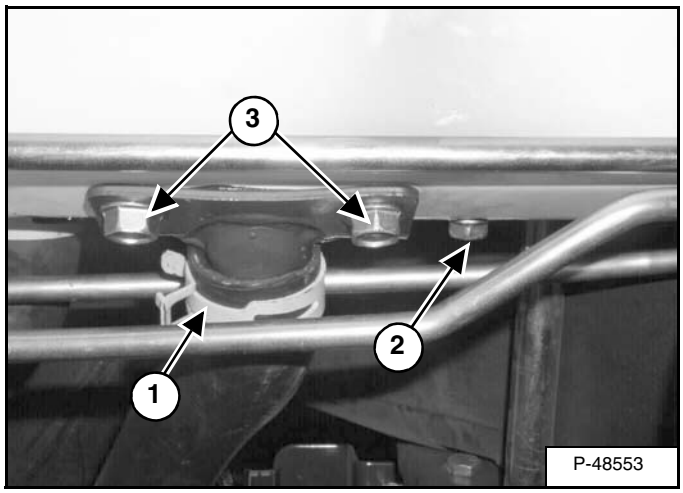


Remove the hose clamp (Item 1) **[Figure 70-50-6]** from the inlet hose.

Remove the radiator mounting bolt and block off plate (Item 2) **[Figure 70-50-6]**.

Installation: Tighten the radiator mounting bolt to 11 - 13 ft.-lb. (15 - 17 N•m) torque. Use sealant on the block off plate and bolt head (Item 2) **[Figure 70-50-6]**.

Figure 70-50-7



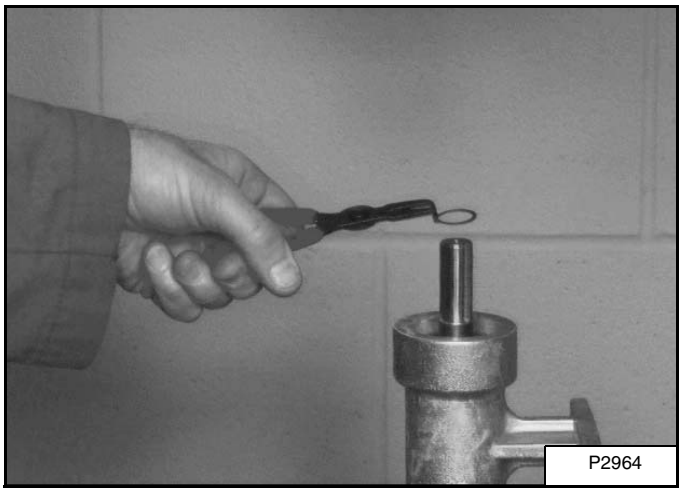
Remove the clamp (Item 1) **[Figure 70-50-7]** from the hydraulic fill tube.

Remove the radiator mounting bolt (Item 2) **[Figure 70-50-7]**.

Remove the two hydraulic fill tube mounting bolts (Item 3) **[Figure 70-50-7]**.

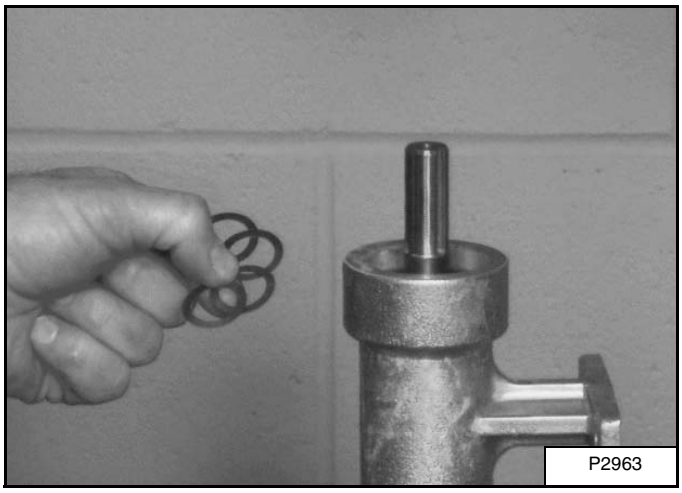
Gearbox Disassembly (Cont'd)

Figure 70-60-21



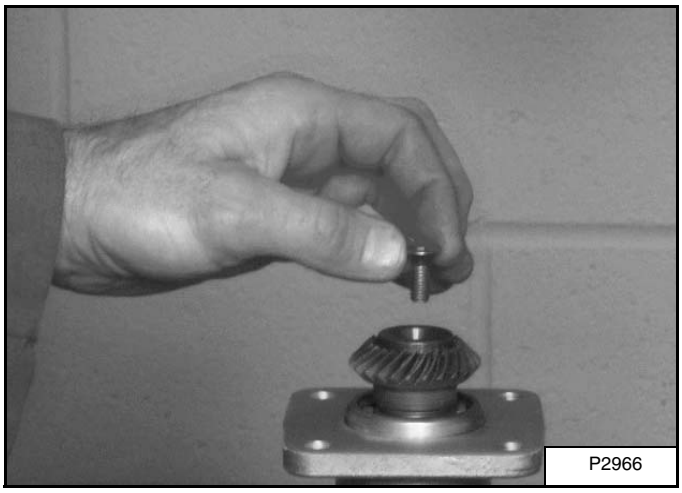
Remove the small snap ring **[Figure 70-60-21]**.

Figure 70-60-22



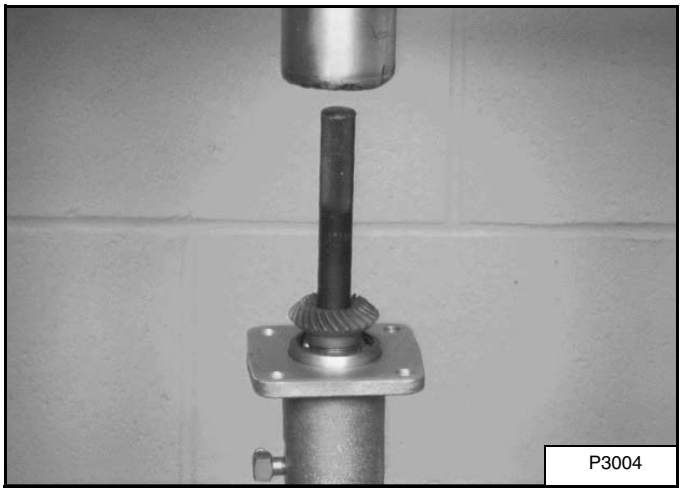
Remove the small shims **[Figure 70-60-22]**.

Figure 70-60-23



Remove the screw and washer from the shaft **[Figure 70-60-23]**.

Figure 70-60-24

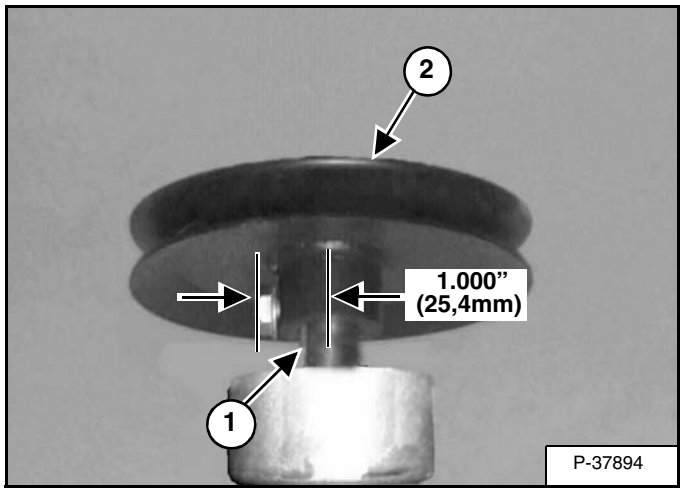


Support the lower flange and press the shaft from the bearing **[Figure 70-60-24]**.

NOTE: The gear and the other bearing (pulley end) will be removed with the shaft.

Gearbox Checking Backlash (Cont'd)

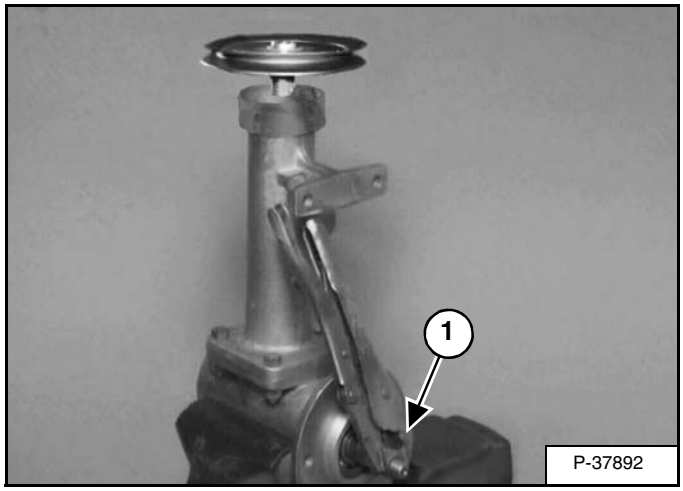
Figure 70-60-57



Install the long key (Item 1) and the pulley (Item 2) **[Figure 70-60-57]**.

Install a bolt in the set screw hole to maintain a 1.0 in. (25,4 mm) distance from the shaft center to the bolt head (to be used with a dial indicator) **[Figure 70-60-57]**.

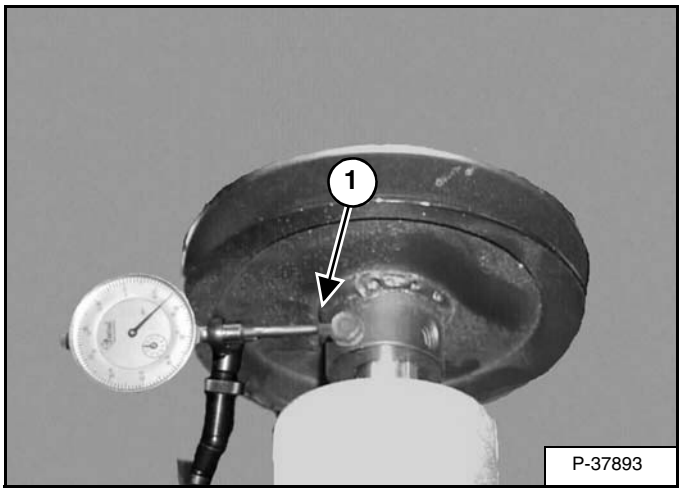
Figure 70-60-58



Put the fan nut (Item 1) **[Figure 70-60-58]** on the shaft and tighten snugly.

Install a locking pliers on the fan nut and support the handle against the long housing **[Figure 70-60-58]**.

Figure 70-60-59



Using a magnetic based dial indicator mounted on a bench vise, touch the dial stem on the bolt (Item 1) **[Figure 70-60-59]**.

Hold the locking pliers against the long housing and rotate the pulley back and forth to read the dial gauge **[Figure 70-60-59]**.

If the backlash is GREATER than 0.008 in. (0,203 mm), do the following:

1. Remove a square shim(s) (if present) between the two housings.

2. Remove a large shim(s) from the tapered end of the short shaft and add a small shim (s) of the same thickness between the bearing and the gear on the screw end of the shaft.

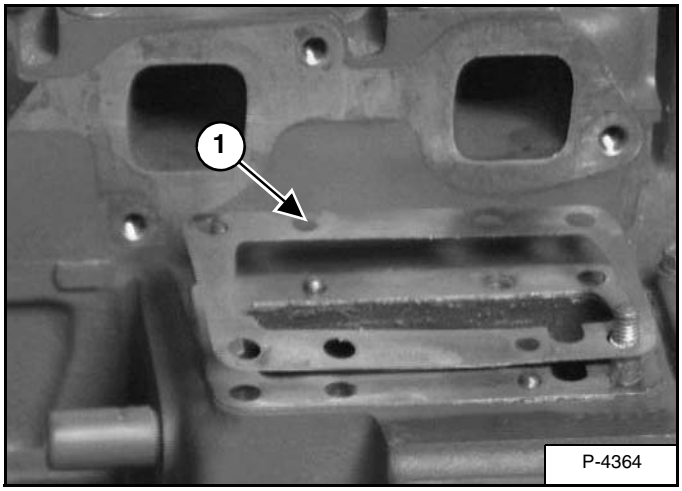
If the backlash is LESS than 0.005 in. (0,127 mm) do the following:

1. Add a square shim(s) between the two housings.

2. Remove a small shim(s) between the bearing and the gear on the screw end of the short shaft and add a large shim(s) of the same thickness between the snap ring and the bearing on the tapered end of the shaft.

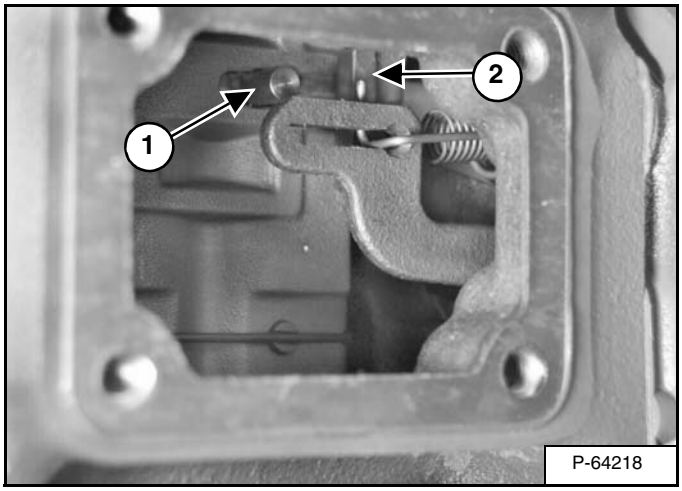
Fuel Injection Pump Removal And Installation (Turbo) (Cont'd)

Figure 70-70-22



Install the shim(s) (Item 1) **[Figure 70-70-22]** on the injection pump mounting surface. For information on the number of shims used. (See Timing The Injection Pump on Page 70-70-12.)

Figure 70-70-23



Install the injection pump in the engine.

Ensure the control rack pin (Item 1) is to the left side of the fork lever (Item 2) **[Figure 70-70-23]**.

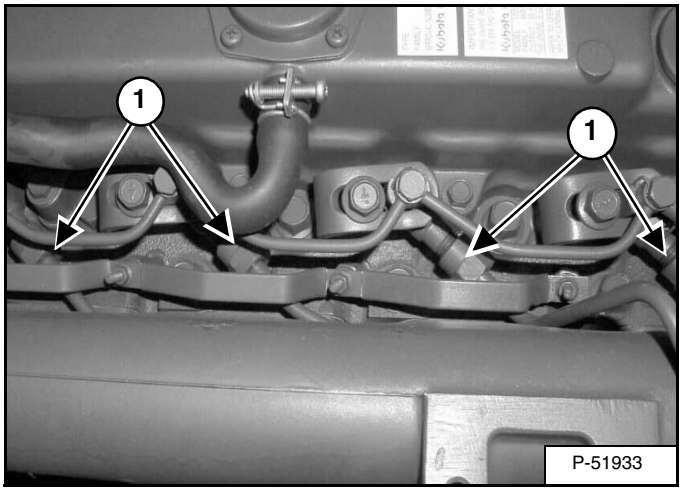
IMPORTANT

Do not attempt to maintain or adjust unless you are trained and have the correct equipment.

I-2028-0289

Fuel Injection Pump Removal And Installation (Non-Turbo)

Figure 70-70-24



Clean the area around the injection pump thoroughly.

Disconnect the high pressure fuel lines (Item 1) **[Figure 70-70-24]** from the fuel injectors.

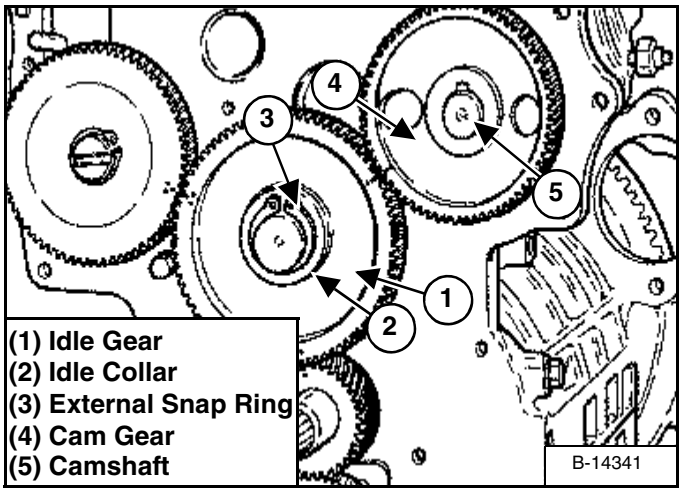
IMPORTANT

Do not bend the high pressure fuel injection tubes when removing or installing them.

I-2029-0289

Valve Timing, Checking

Figure 70-70-53



(1) Idle Gear
(2) Idle Collar
(3) External Snap Ring
(4) Cam Gear
(5) Camshaft

Stop the engine and open the rear door.

Remove the engine. (See Removal And Installation on Page 70-80-1.)

Remove the timing gearcase cover. (See Timing Gearcase Cover Removal And Installation on Page 70-100-10.)

Make sure the timing marks are in correct alignment **[Figure 70-70-53]**.

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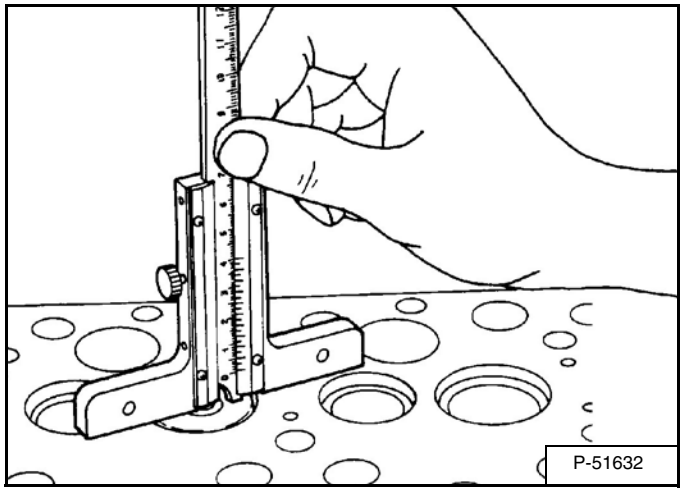
Valve Guide Checking

Remove the valve and spring from the cylinder head. (See Cylinder Head Disassembly And Assembly on Page 70-100-4.)

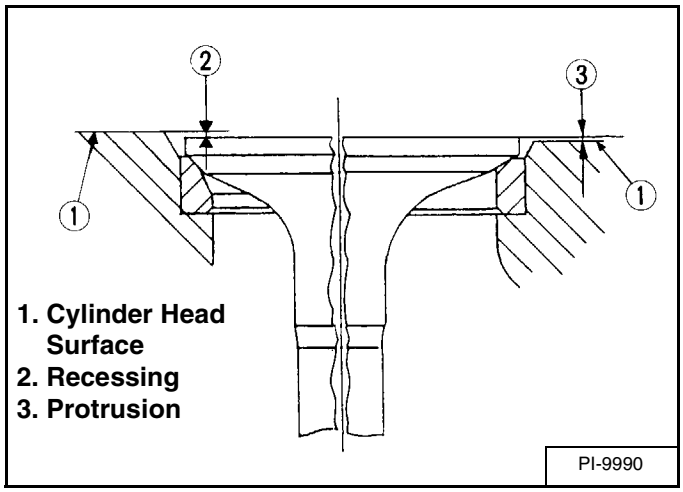
Clean the valve seat and combustion chamber.

Figure 70-100-18



Install the valve into the guide. Measure the valve recessing or protrusion with a depth gauge **[Figure 70-100-18]**.

Figure 70-100-19



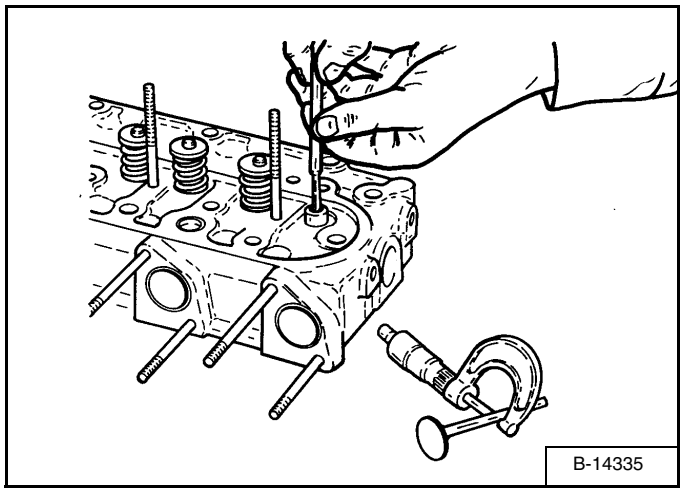
1. Cylinder Head Surface
2. Recessing
3. Protrusion

If the measurement exceeds the allowable limit, replace the valve or cylinder head **[Figure 70-100-19]**.

Protrusion	0.002 in. (0,5 mm)
Recessing	0.006 in. (0,15 mm)
Allowable Limit (Recessing)	0.016 in. (0,4 mm)

Remove the carbon from the valve guide.

Figure 70-100-20



Measure the valve stem O.D. **[Figure 70-100-20]**.

Measure the valve guide I.D. **[Figure 70-100-20]**.

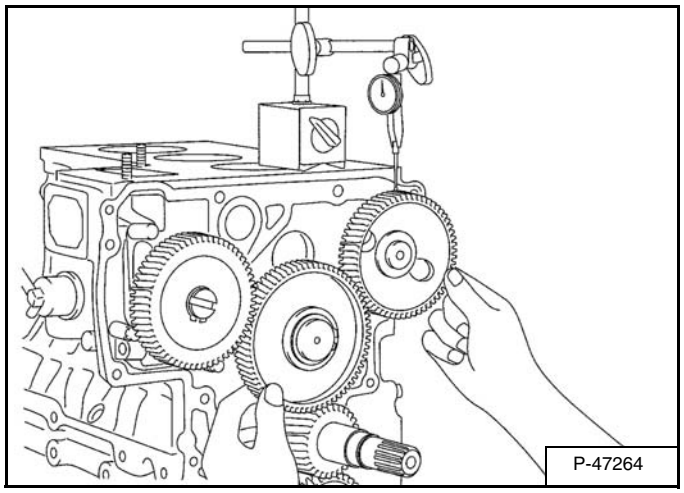
Calculate the clearance. If the clearance exceeds the allowable limit, replace the valve and/or valve guide.

Valve Guide I.D.	0.3156 - 0.3161 in. (8,015 - 8,03 mm)
Valve Stem O.D.	0.3134 - 0.3140 in. (7,96 - 7,98 mm)
Clearance Between Valve Stem and Guide	0.0016 - 0.0028 in. (0,04 - 0,07 mm)
Allowable Limit	0.004 in. (0,1 mm)

Timing Gears Checking Backlash

When the gears are installed, check the backlash of the gears.

Figure 70-100-49



Install a dial indicator **[Figure 70-100-49]**.

Hold one gear while turning the other gear **[Figure 70-100-49]**.

If the backlash exceeds the allowable limit, check the oil clearance of the shaft and gear. If the oil clearance is correct, replace the gear.

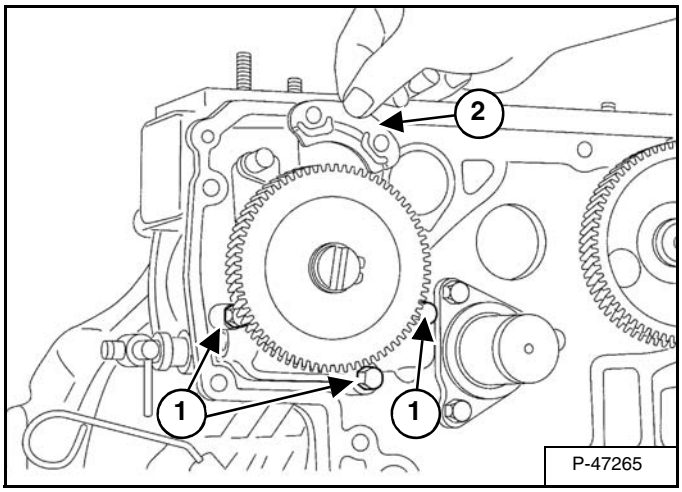
Crank Gear & Idler Gear	0.0016 - 0.0044 in. (0,042 - 0,112 mm)
Allowable Limit	0.0059 in. (0,15 mm)
Cam Gear & Idler Gear	0.0016 - 0.0045 in. (0,042 - 0,115 mm)
Allowable Limit	0.0059 in. (0,15 mm)
Injection Pump Gear & Idler Gear	0.0016 - 0.0045 in. (0,042 - 0,115 mm)
Allowable Limit	0.0059 in. (0,15 mm)
Oil Pump Gear & Crankgear	0.0016 - 0.0043 in. (0,042 - 0,109 mm)
Allowable Limit	0.0059 in. (0,15 mm)

Fuel Camshaft Removal And Installation

Remove the timing gearcase cover. (See Timing Gearcase Cover Removal And Installation on Page 70-100-10.)

Remove the idler gear. (See Idler Gear And Camshaft Removal And Installation on Page 70-100-13.)

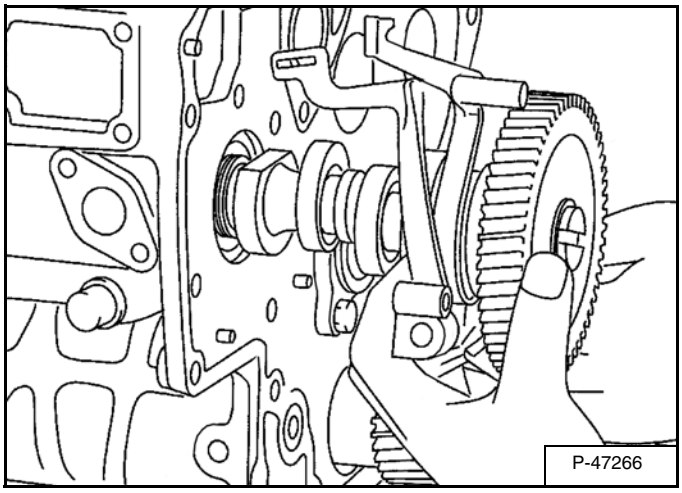
Figure 70-100-50



Remove the three bolts (Item 1) **[Figure 70-100-50]**.

Remove the two bolts and fuel camshaft retainer plate (Item 2) **[Figure 70-100-50]**.

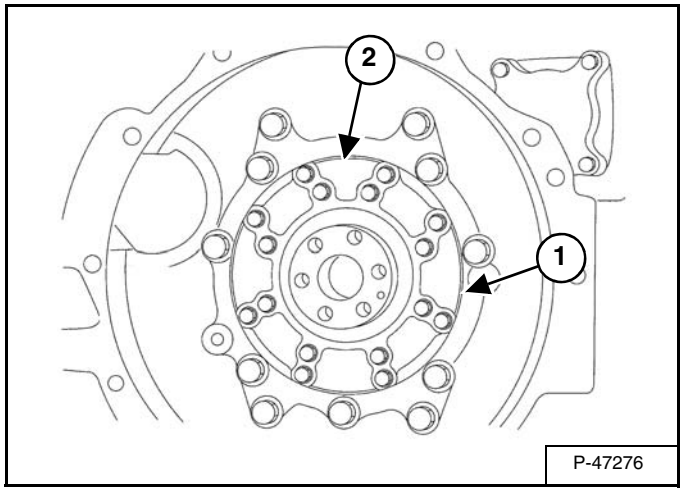
Figure 70-100-51



Remove the fuel camshaft and fork lever assembly at the same time **[Figure 70-100-51]**.

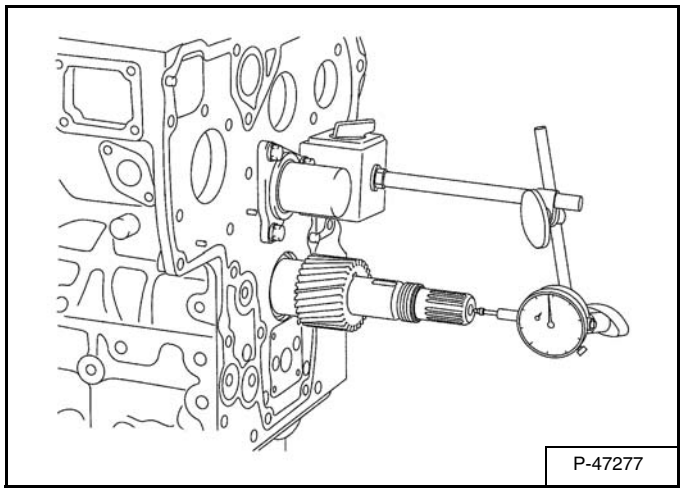
Crankshaft And Bearings Removal And Installation (Cont'd)

Figure 70-100-76



Install the bearing case cover (Item 1) **[Figure 70-100-76]** with the casting mark (Item 2) **[Figure 70-100-76]** in the upward position. Tighten the bolts to 17 - 20 ft.-lb. (23,5 - 27,5 N•m) torque.

Figure 70-100-77

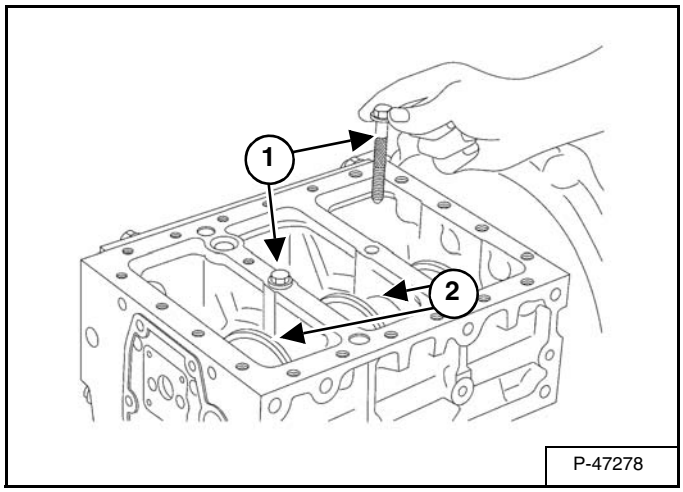


Before removing the crankshaft/main bearings, check the end play. Install a dial indicator. Move the crankshaft **[Figure 70-100-77]** to the flywheel side, zero the dial indicator. Measure the end play by pulling the crankshaft toward the gear case side.

If the measurement exceeds the allowable limit, replace the thrust washers **[Figure 70-100-77]**.

End Play	0.0059 - 0.0138 in. (0,15 - 0,35 mm)
Allowable Limit	0.0197 in. (0,5 mm)

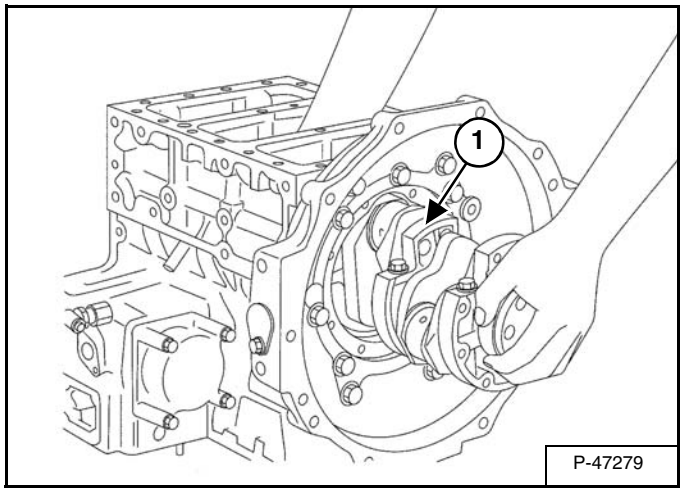
Figure 70-100-78



Remove the main bearing case bolt (Item 1) **[Figure 70-100-78]**.

Installation: Align the bearing case hole (Item 2) **[Figure 70-100-78]** with the hole in the block. Put oil on the bolt threads and tighten to 51 - 54 ft.-lb. (69 - 73 N•m) torque.

Figure 70-100-79



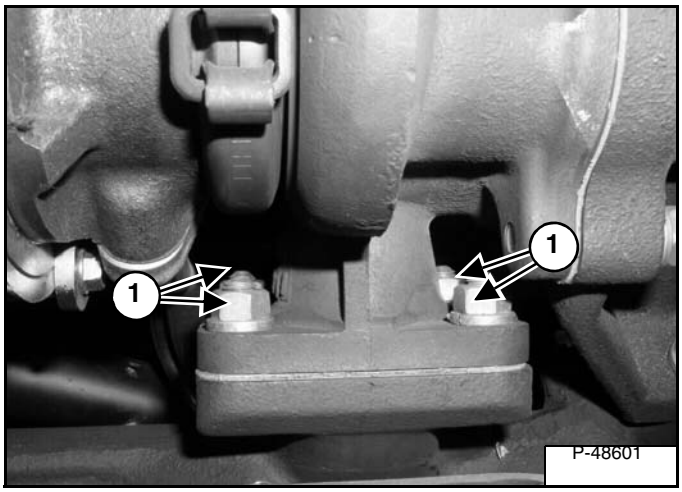
Remove the crankshaft/main bearing assembly from the engine block **[Figure 70-100-79]**.

NOTE: Turn the crankshaft as needed to allow the crank pin journals to pass through the cut out (Item 1) [Figure 70-100-79] of the engine block.

Mark the bearing case halves for correct installation.

Removal And Installation (Cont'd)

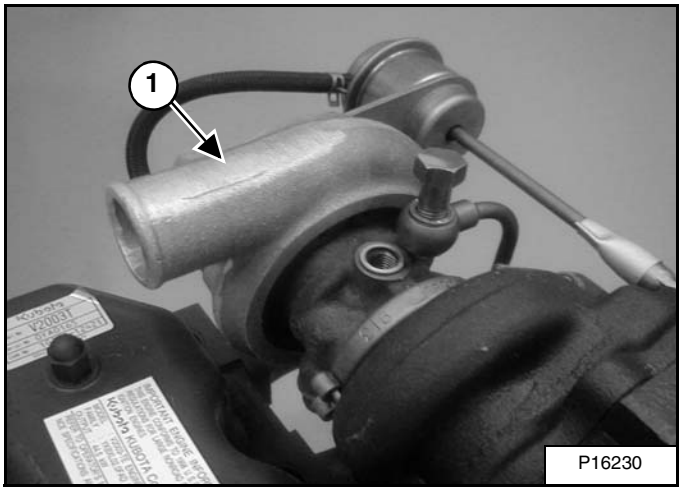
Figure 70-110-10



Remove the mounting nut and washer (Item 1) **[Figure 70-110-10]** from the turbocharger.

Installation: Tighten to 17 - 20 ft.-lb. (23,0 - 27,0 N•m) torque.

Figure 70-110-11



Remove the turbocharger assembly (Item 1) **[Figure 70-110-11]** from the engine.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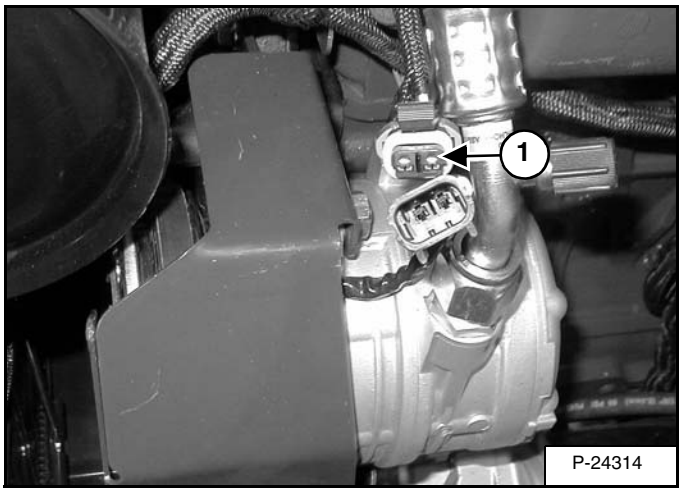
Checking The Electrical System (Cont'd)

Figure 80-50-11



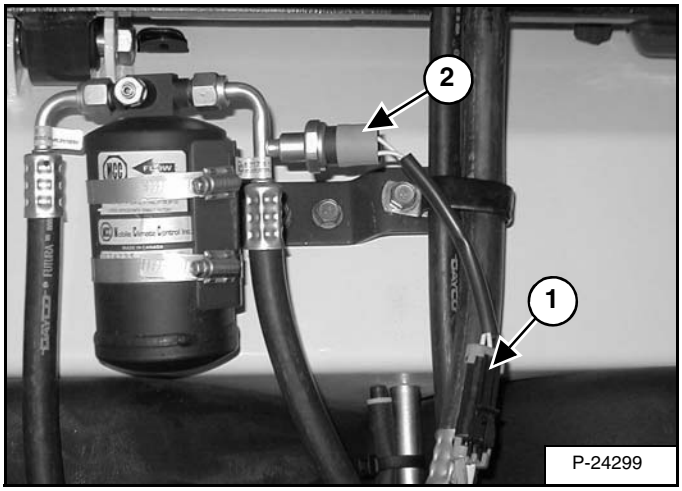
With a multimeter, check the voltage to the compressor clutch at the loader harness (Item 1) **[Figure 80-50-11]**

The voltage reading should be around 12 volts.

If there is no power at the clutch, check the wiring harness for broken wires.

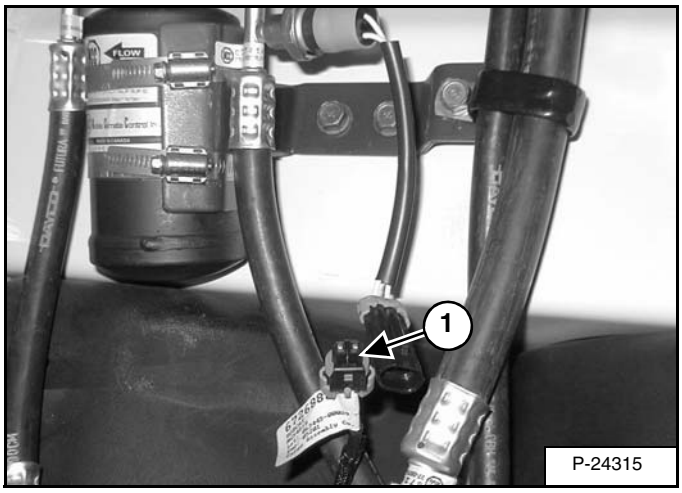
If there is power at the clutch, reconnect the wiring harness to the compressor clutch.

Figure 80-50-12



Disconnect the loader harness (Item 1) from the pressure switch (Item 2) **[Figure 80-50-12]**.

Figure 80-50-13

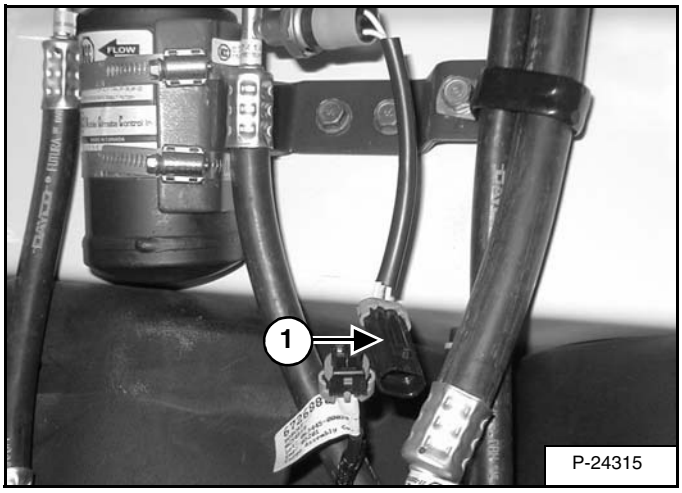


Using a multimeter check the loader wiring harness (Item 1) **[Figure 80-50-13]** for voltage.

The voltage should be around 12 volts.

If there is no voltage at the wiring harness, check the harness for broken wires.

Figure 80-50-14



If there is voltage at the harness, check the resistance at the pressure switch (Item 1) **[Figure 80-50-14]**.

If there is no resistance value, check for low refrigerant level. (See SYSTEM CHARGING AND RECLAMATION on Page 80-100-1.)

If a resistance value is observed, the pressure switch is good.

Reconnect the loader harness to the pressure switch.

Compressor Oil Check

Figure 80-60-2

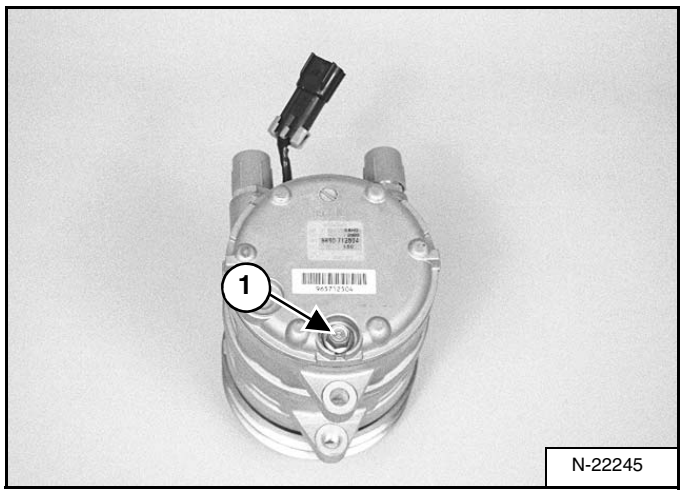
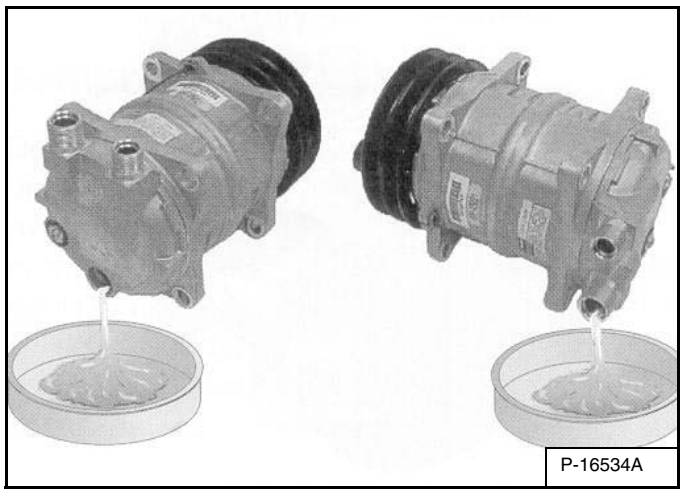


Figure 80-60-3



The compressor oil should be checked as follows when oil is being added to an in service loader.

There is a close affinity between oil and refrigerant. During normal operation, part of the oil circulates with the refrigerant in the system. Therefore, when checking the amount of oil in the system or replacing any system component, the compressor must be run in advance to insure return of oil to the compressor.

If the amount of refrigerant in the system has decreased, charge the system. (See CONDENSER on Page 80-120-1.)

Open the cab door and windows.

Run the blower at maximum speed.

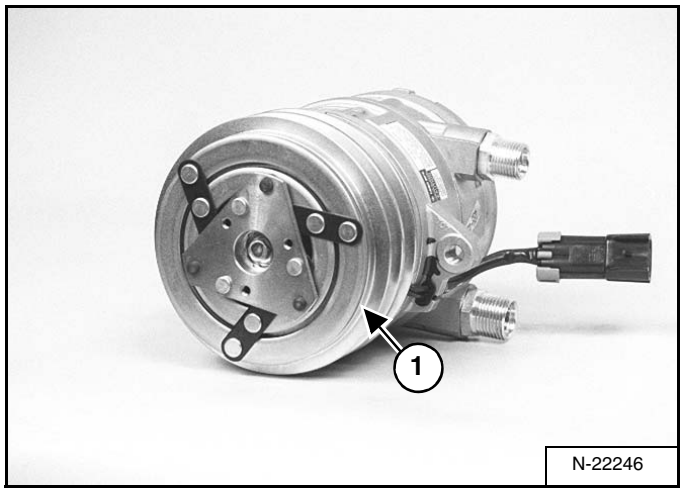
Run the compressor for at least 20 minutes at 800 - 1200 RPM.

Remove the compressor from the loader. (See COMPRESSOR on Page 80-110-1.)

Remove the oil drain plug (Item 1) **[Figure 80-60-2]** and drain the oil through the connectors and the oil drain hole **[Figure 80-60-3]**.

Installation: Tighten the oil drain plug to 9.4 - 10.8 ft.-lb. (13 - 15 N•m) torque.

Figure 80-60-4



NOTE: After draining the oil through the drain hole and the connectors, extract the remaining oil through the discharge-side connector by rotating the drive pulley (Item 1) [Figure 80-60-4] several times by hand.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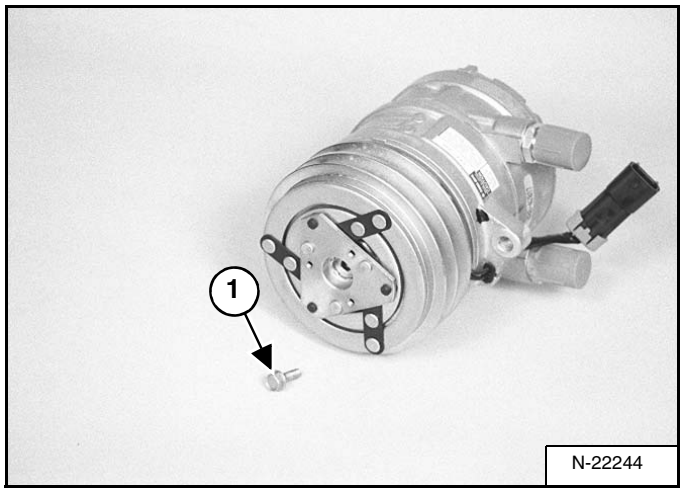
COMPRESSOR (CONT'D)

Compressor Clutch Disassembly

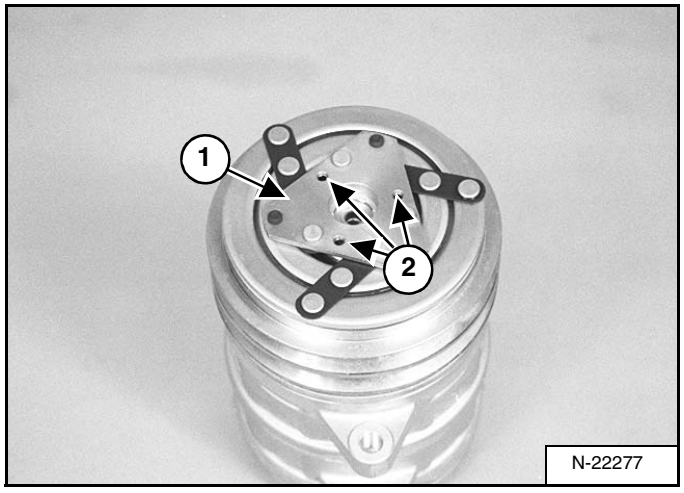
Figure 80-110-4



Remove the center armature bolt (Item 1) **[Figure 80-110-4]**.

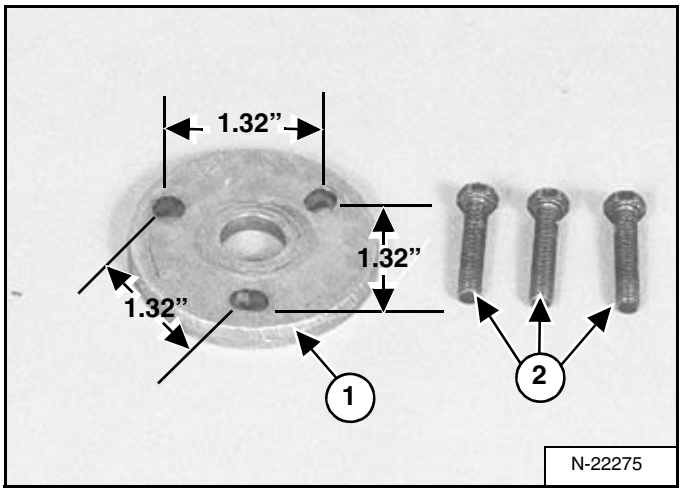
Installation: Tighten the armature bolt to 8 - 10 ft.-lb. (12 - 14 N•m) torque.

Figure 80-110-5



To remove the armature plate (Item 1) **[Figure 80-110-5]** from the clutch face, you must make an armature plate puller.

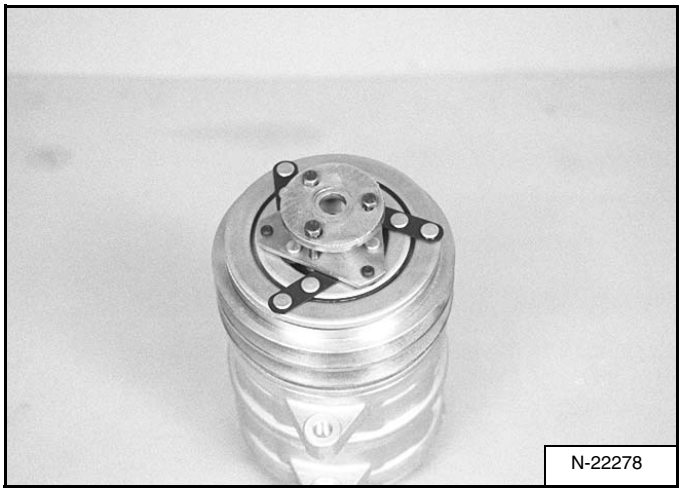
Figure 80-110-6



The armature plate puller, (Item 1) can be constructed by drilling three 10 mm holes in a flat circular plate, located 1.32 inches apart **[Figure 80-110-6]**.

Attach the puller to the armature plate using three 8 mm bolts (Item 2) **[Figure 80-110-6]**.

Figure 80-110-7



Turn the bolts into the three 8 mm holes (Item 2) **[Figure 80-110-5]** on the armature plate as shown in **[Figure 80-110-7]**.

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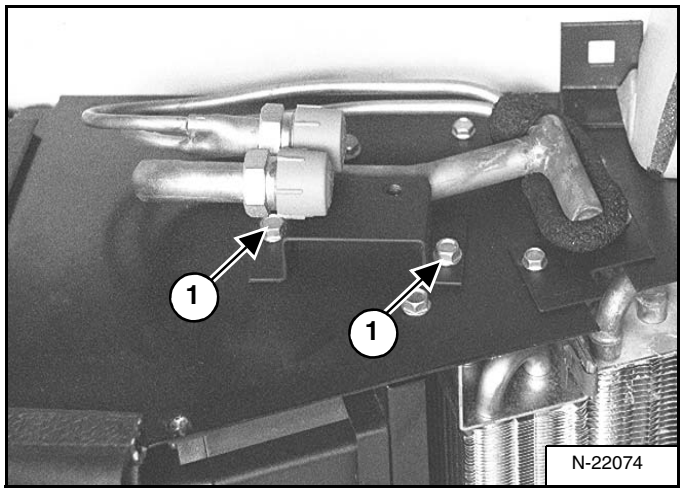
EXPANSION VALVE (CONT'D)

Removal And Installation (Cont'd)

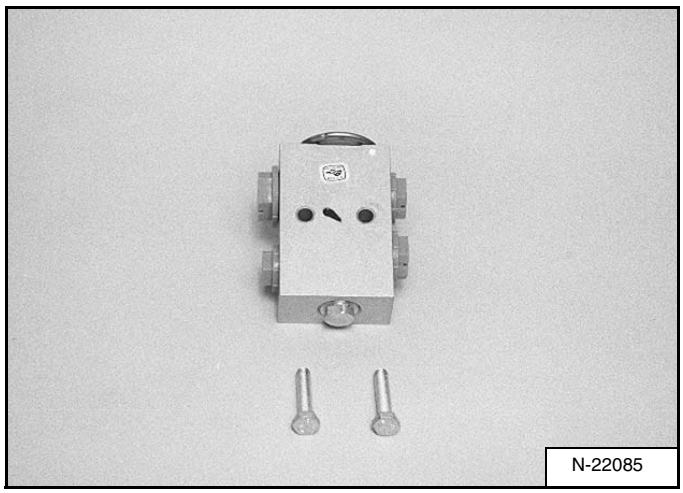
Figure 80-180-4



Remove the two mount bolts (Item 1) **[Figure 80-180-4]** from the expansion valve mount.

Remove the expansion valve mount from the unit.

Figure 80-180-5



The expansion valve **[Figure 80-180-5]** is replaced as a complete unit.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All dimensions are given in inches. Respective metric dimensions are given in millimeters enclosed by parentheses.

Valve Springs

Free Length	1.642 - 1.661 (41,7 - 42,2)
Allowable Limit	1.622 (41,2)
Fitted Length	1.378 (35,0)
Compress to Fitted Length	26.4 lb. (117,6 N)
Allowable Limit	22.5 lb. (100,0 N)

Valve Timing

Intake Valve (Open)	9 degrees B.T.D.C.
(Close)	45 degrees A.T.D.C.
Exhaust Valve (Open)	50 degrees B.T.D.C.
(Close)	12 degrees A.T.D.C.

Rocker Arms

O.D. of Rocker Arm Shaft	0.5501 - 0.5506 (13,973 - 13,984)
I.D. of Rocker Arm Bushings	0.5512 - 0.5519 (14,0 - 14,018)
Clearance Between Rocker Arm & Bushing	0.0006 - 0.0018 (0,016 - 0,045)
Allowable Limit	0.0039 (0,10)

Camshaft

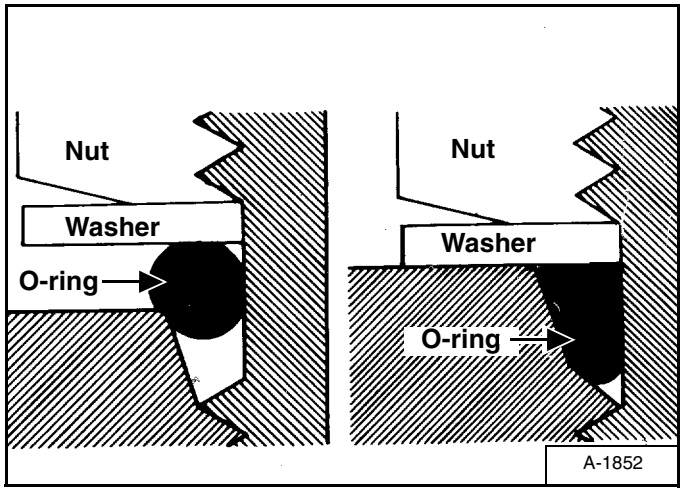
Journal O.D.	1.5722 - 1.5728 (39,934 - 39,95)
Bearing I.D.	1.5748 - 1.5758 (40,0 - 40,025)
Oil Clearance	0.002 - 0.0036 (0,05 - 0,091)
Allowable Limit	0.006 (0,15)
Alignment Allowable Limit	0.0004 (0,01)
Cam Lobe Height	1.3346 (33,90)
Allowable Limit	1.3327 (33,85)
End Clearance	0.0028 - 0.0087 (0,07 - 0,22)
Allowable Limit	0.012 (0,3)

Tappet

Clearance Between Tappet & Guide	0.0071 - 0.0087 (0,18 - 0,22)
Tappet O.D.	0.9433 - 0.9441 (23,959 - 23,98)
Tappet Guide I.D.	0.9449 - 0.9457 (24,0 - 24,021)

Straight Thread O-ring Fitting

Figure SPEC-40-3



Lubricate the O-ring before installing the fitting. Loosen the jam nut and install the fitting. Tighten the jam nut until the washer is tight against the surface **[Figure SPEC-40-3]**.

Tubelines And Hoses

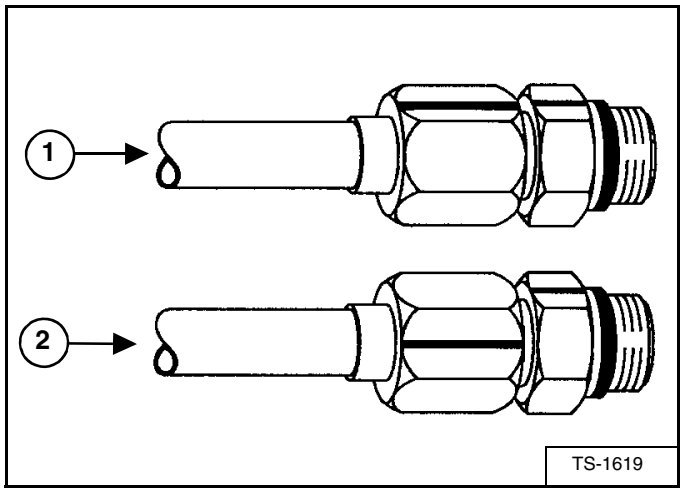
Replace any tubelines that are bent or flattened. They will restrict flow, which will slow hydraulic action and cause heat.

Replace hoses which show signs of wear, damage or weather cracked rubber.

Always use two wrenches when loosening and tightening hose or tubeline fittings.

Flare Fitting

Figure SPEC-40-4



Use the following procedure to tighten the flare fitting:

Tighten the nut until it makes contact with the seat. Make a mark across the flats of both the male and female parts of the connection (Item 1) **[Figure SPEC-40-4]**

Use the chart **[Figure SPEC-40-5 on Page 3]** to find the correct tightness needed (Item 2) **[Figure SPEC-40-4]**. If the fitting leaks after tightening, disconnect it and inspect the seat area for damage.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