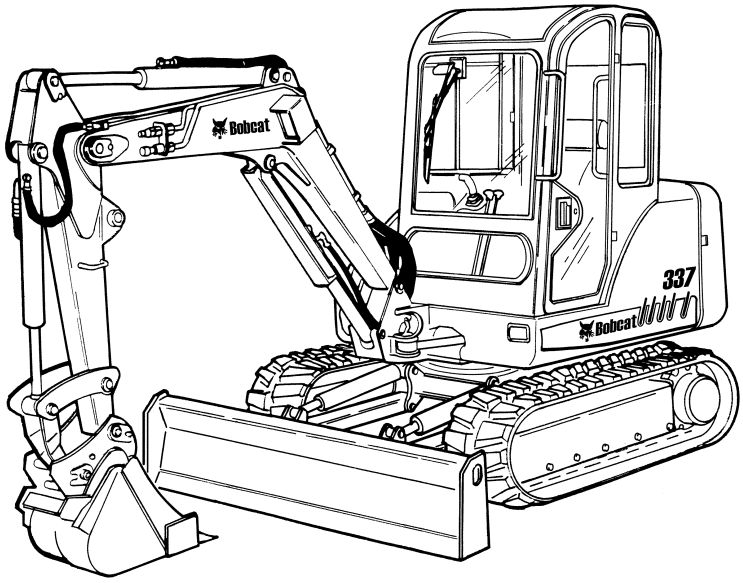
337
341

Bobcat®

Service Manual

337 - S/N 234611001 & Above
341 - S/N 234711001 & Above
(G Series)



6902741 (11-09) 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 Compact Excavator 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 Bobcat excavator. 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 Bobcat compact excavator Safety Video is available from your Bobcat dealer or at **www.training.bobcat.com** or **www.bobcat.com**.

LIFTING AND BLOCKING THE EXCAVATOR

⚠ WARNING

Put jackstands under the blade and rear corners of the undercarriage before working under the machine. Failure to block up the machine may allow it to move or fall and result in injury or death.

W-2218-1195

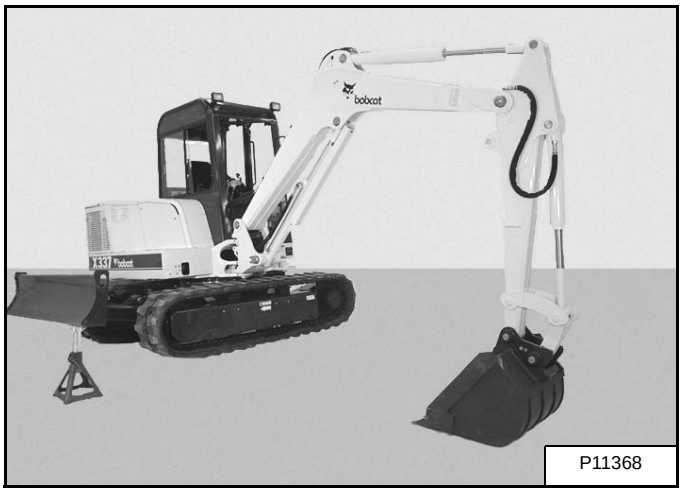
⚠ WARNING

AVOID INJURY

Keep fingers and hands out of pinch points when checking the track tension.

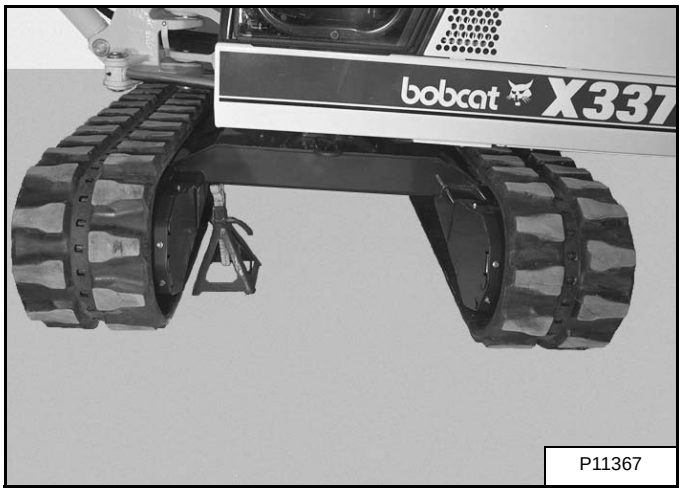
W-2142-0903

Figure 10-10-1



Raise the machine using the boom and arm **[Figure 10-10-1]**.

Figure 10-10-2



Fully raise the blade and install jackstands under the blade **[Figure 10-10-1]** and track frame **[Figure 10-10-2]**.

Raise the boom until all the machine weight is on the jackstands.

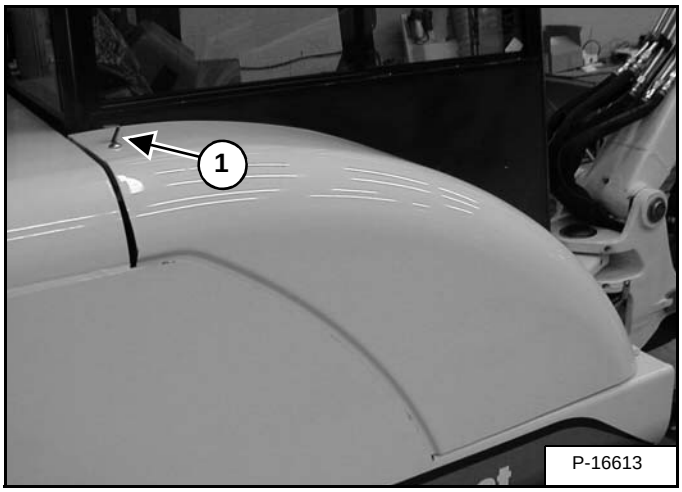
Repeat the procedure for the other side.

Stop the engine.

RIGHT SIDE COVER

Opening And Closing The Right Side Cover

Figure 10-41-1



Pull the latch up (Item 1) **[Figure 10-41-1]** and raise the right side cover.

NOTE: The right side cover can be locked using the start key.

FUEL SYSTEM

Fuel Specifications

Use only clean, high quality diesel fuel, Grade No. 2 or Grade No. 1.

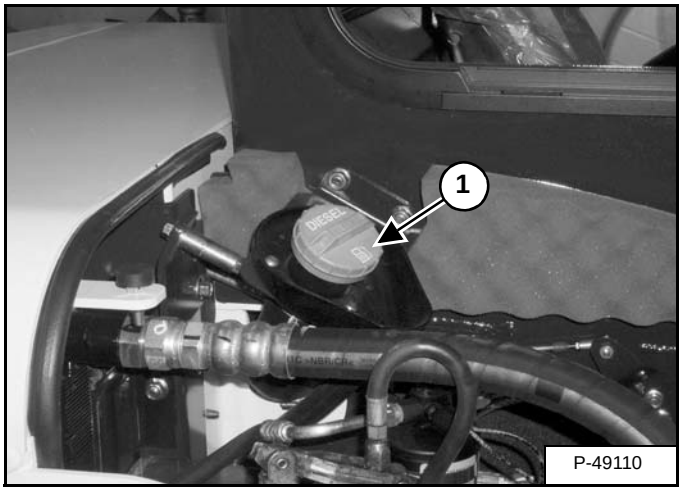
The following is a suggested blending guideline which should prevent fuel gelling problems during freezing temperature

Temp. F° (C°)	No. 2	No. 1
Above +15° (-9°)	100%	0%
Down to -20° (-29°)	50%	50%
Below -20° (-29°)	0%	100%

See your fuel supplier for local recommendations.

Filling The Fuel Tank

Figure 10-80-1



Open the right side cover and remove the fuel fill cap (Item 1) **[Figure 10-80-1]**.

Use a clean, approved safety container to add fuel. Add fuel only in an area that has a free movement of air and no flames or sparks. **NO SMOKING!**

Install and tighten the fuel fill cap. Close the right side cover.

Clean up any spilled fuel.

⚠ WARNING

AVOID INJURY OR DEATH

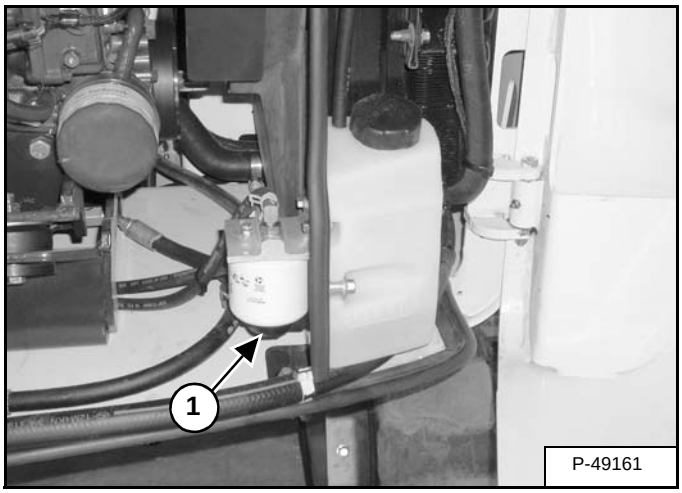
Always clean up spilled fuel or oil. Keep heat, flames, sparks or lighted tobacco away from fuel and oil. Failure to use care around combustibles can cause explosion or fire.

W-2103-0508

Removing Water From The Fuel Filter

Open the tailgate.

Figure 10-80-2



Loosen the drain (Item 1) **[Figure 10-80-2]** at the bottom of the filter to drain water from the filter.

See the Service Schedule (See SERVICE SCHEDULE on Page 10-50-1) for the service interval when to remove the water from the fuel filter.

Close the tailgate.

LUBRICATION OF THE EXCAVATOR

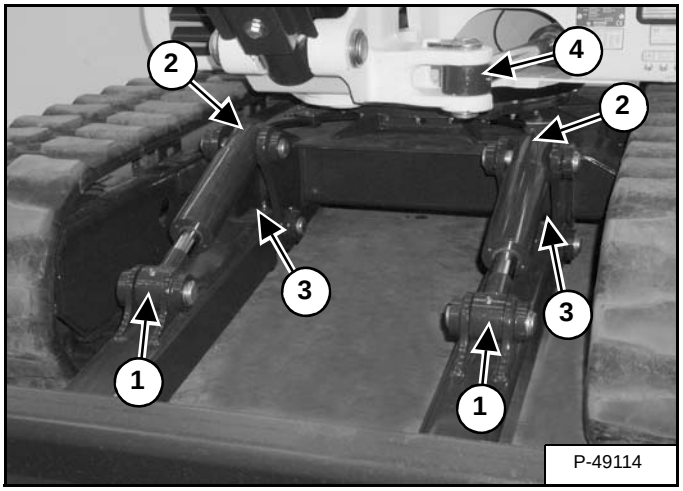
Procedure

Lubricate the hydraulic excavator as specified in the SERVICE SCHEDULE (See SERVICE SCHEDULE on Page 10-50-1) for the best performance of the machine.

Always use a good quality lithium based multipurpose grease when lubricating the machine. Apply the lubricant until extra grease shows.

Lubricate the following locations on the hydraulic excavator EVERY 8-10 HOURS:

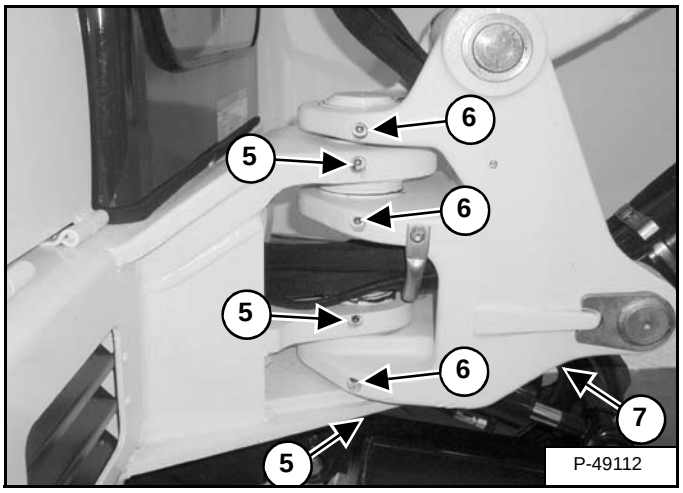
Figure 10-110-1



Ref Description (# of Fittings)

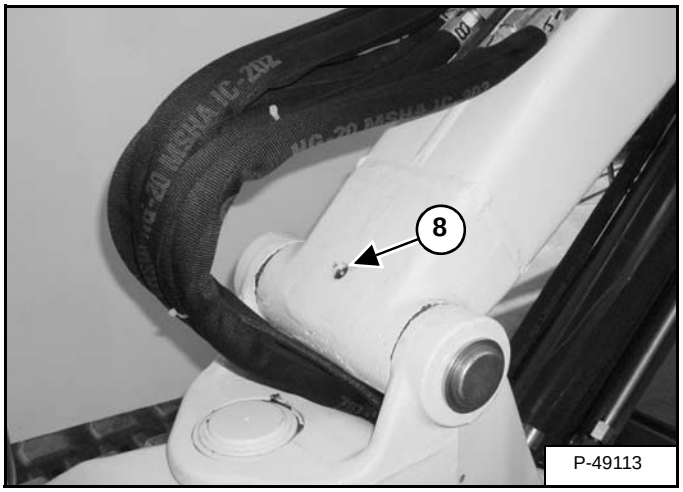
1. Blade Cylinder Rod End (2) **[Figure 10-110-1]**
2. Blade Cylinder Base End (2) **[Figure 10-110-1]**
3. Blade Pivots (2) **[Figure 10-110-1]**
4. Boom Swing Cylinder Rod End (1) **[Figure 10-110-1]**

Figure 10-110-2



5. Boom Swing Pin (3) **[Figure 10-110-2]**
6. Boom Swing Pivot (3) **[Figure 10-110-2]**
7. Boom Cylinder Base End (1) **[Figure 10-110-2]**

Figure 10-110-3



8. Boom Pivot (1) **[Figure 10-110-3]**

SEAT BELT

Inspection And Maintenance

WARNING

Failure to properly inspect and maintain the seat belt can cause lack of operator restraint resulting in serious injury or death.

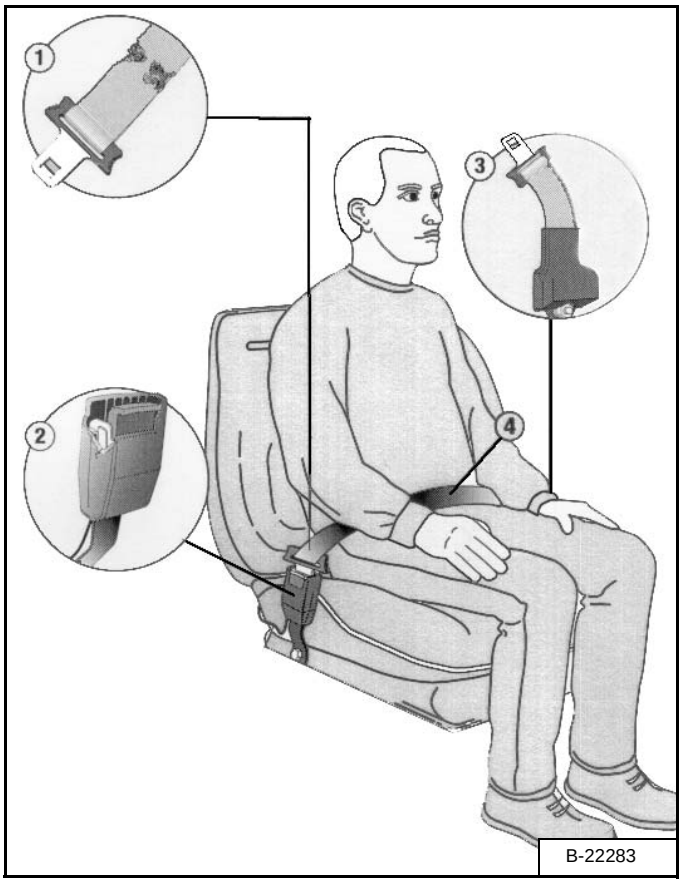
W-2466-0703

Check the seat belt daily for correct function.

Inspect the seat belt system thoroughly yearly or more often if the machine is exposed to severe environmental conditions or applications.

The seat belt system should be repaired or replaced if it shows cuts, fraying, extreme or unusual wear, significant discolorations due to ultraviolet (UV) rays from the sun, dusty/dirty conditions, abrasion to the seat belt webbing, or damage to the buckle, latch plate, retractor (if equipped), or hardware.

Figure 10-150-1



The items below are referenced in **[Figure 10-150-1]**.

1. Check the seat belt webbing. If the system is equipped with a retractor, pull the webbing completely out and inspect the full length of the webbing. look for cuts, wear, fraying, dirt and stiffness.

2. Check the buckle and latch for proper function. Make sure latch plate is not excessively worn, deformed or buckle is not damaged.

3. Check the retractor web storage device (if equipped) by extending the seat belt webbing to determine if it extends and retracts the webbing correctly.

4. Check webbing in areas exposed to ultraviolet (UV) rays from the sun or extreme dust or dirt. If the original color of the webbing in these areas is extremely faded and / or the webbing is packed with dirt, the webbing strength may have weakened.

See your Bobcat dealer for approved seat belt system replacement parts for your machine.

HYDRAULIC/HYDROSTATIC SCHEMATIC
337 AND 341 EXCAVATOR
337 (S/N 234611164 – 234613190, 234613192 - 234613247)
341 (S/N 234711198 - 234713440)

(PRINTED June 2006)
V-0560legend

LEGEND

1. CROSS PORT RELIEF VALVE (Travel Motor) 3810 PSI (263 bar)
2. COUNTERBALANCE SPOOL (Travel Motor)
3. TWO SPEED SHIFT SPOOL
4. FLUSHING VALVE 360 PSI (25 bar)
5. LOAD SENSE BLEED CARTRIDGE 0.185 GPM (0.70 L/min.)
6. ORIFICE (Offset Base) 0.108 in. (2,7 mm)
7. ORIFICE (Offset Rod) 0.083 in. (2,1 mm)
8. LOAD SENSE RELIEF VALVE
9. BUILD UP VALVE 105 PSI (7,24 bar)
10. ORIFICE, STRAIGHT TRAVEL 0.031 in. (0,80 mm)
11. DIAGNOSTIC COUPLER (Load Sense)
12. AUXILIARY DIRECT TO TANK (Optional)
13. AUXILIARY QUICK COUPLERS
14. PORT RELIEF VALVE (With Anti-Cavitation Valve) - (Bucket Cylinder) 4200 PSI (290 bar)
15. PORT RELIEF VALVE (With Anti-Cavitation Valve) - (Bucket Cylinder) 4200 PSI (290 bar)
16. PORT RELIEF VALVE (With Anti-Cavitation Valve) - (Arm Cylinder) 4200 PSI (290 bar)
17. PORT RELIEF VALVE (With Anti-Cavitation Valve) - (Arm Cylinder) 4200 PSI (290 bar)
18. PORT RELIEF VALVE (With Anti-Cavitation Valve) - (Boom Cylinder) 4200 PSI (290 bar)
19. PORT RELIEF VALVE (With Anti-Cavitation Valve) - (Boom Cylinder) 4200 PSI (290 bar)
20. PORT RELIEF VALVE (With Anti-Cavitation Valve) - (Auxiliary Return Port) 3000 PSI (207 bar)
21. PORT RELIEF VALVE (With Anti-Cavitation Valve) - (Auxiliary Pressure Port) 3000 PSI (207 bar)
22. DIAGNOSTIC COUPLER (Pump)
23. RETURN PORT (Capped)
24. DIAGNOSTIC COUPLER (Build Up Valve)
25. TWO STAGE PILOT SPOOL 250 PSI (17 bar)
26. SHUTTLE (Dual Sequence Valve)
27. ANTI-CAVITATION VALVE
28. #20 MICRON DRAIN FILTER With 25 PSI (1,72 bar) By-Pass Valve
29. ORIFICE, BRAKE - 0.030 in. (0,76 mm)
30. HYDRAULIC OIL TEMPERATURE SWITCH 224-234 Degrees F. (107-112 Degrees C.)
31. #3 MICRON MAIN FILTER With 50 PSI (3,45 bar) By-Pass Valve With Normally Closed Switch
32. HYDRAULIC RESERVOIR (PRESSURIZED) with Fill Strainer Reservoir Volume - 10 Gal. (37,9 L) Oil Volume - 6 Gal. (22,7 L)
33. PUMP PRESSURE PORT - (Capped)
34. PRESSURIZED BREATHER/FILL CAP 5 PSI (0,345 bar) Outlet 0.435 PSI (0,03 bar) Inlet 40 Micron Filter
35. CROSS PORT RELIEF VALVE - 2 stage 2800 PSI (193 bar)
36. PORT RELIEF VALVE (with Anti-Cavitation Valve) (Blade Cylinder) 3750 PSI (259 bar)
37. PUMP MARGIN SPOOL 220 PSI (15 bar)
38. PRESSURE REDUCING VALVE 435 PSI (30 bar)
39. ACCUMULATOR Nitrogen 165 PSI (11 bar) Precharged
40. BRAKE RELEASE SPOOL 80 PSI (5,5 bar)
41. TORQUE LIMITER SUPPLY SPOOL With 0.031 in. (0,8 mm) Orifice
42. HYDRAULIC PISTON PUMP Minimum Displacement 3.96 GPM (15 L/min.) at 2500 RPM Maximum Displacement 47 GPM (177,9 L/min.) at 2500 RPM
43. TORQUE LIMITER 37 hp (27,6 kW) at 2500 RPM
44. MINIMUM PUMP DISPLACEMENT ADJUSTMENT 4.0 - 4.5 GPM (15,14 - 17,03 L/min.)
45. LOAD CHECK (Two per Section 14 Total) Only 7 Shown
46. COMPENSATOR - With Priority Slots (Slew, Right Hand Travel and Left Hand Travel)
47. COMPENSATOR - Standard (Offset, Blade, Bucket, Arm, Boom and Auxiliary)
48. SOLENOID SUPPLY - VARIABLE PILOT SUPPLY
49. SOLENOID VALVE - TWO SPEED
50. SOLENOID VALVE - AUXILIARY FEMALE COUPLER
51. SOLENOID VALVE - AUXILIARY MALE COUPLER

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

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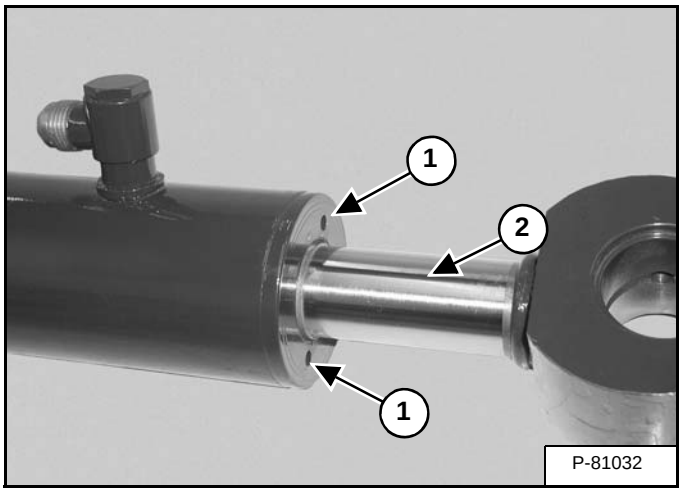
Troubleshooting The Travel Circuit

TROUBLESHOOTING THE TRAVEL CIRCUIT		
PROBLEM	**CAUSE**	**CORRECTION**
Travel system inoperable.	Pilot pressure too low.	Repair or readjust.
	Console switch not closed.	Repair or replace.
	Excessive joystick leakage.	Repair or replace.
	Lever linkage incorrectly adjusted.	Readjust.
	Track tension too tight.	Readjust.
	Defective pump.	Check, repair or replace.
	Travel motor counter balance spool sticking.	Repair or replace.
	Travel motor internal leakage excessive.	Repair or replace.
	Travel motor defective.	Repair or replace.
	Travel motor gears defective.	Repair or replace.
	Swivel joint defective.	Repair or replace.
	Pump pressure too low.	Readjust.
Travel power.	Track tension too tight.	Readjust.
	Travel motor check valve leaking.	Readjust or replace.
	Pump pressure too low.	Readjust.
	Torque limiter.	Readjust.
	Swivel joint leaking.	Repair or replace.
	Travel motor counterbalance spool sticking.	Repair or replace.
Travel speed too slow.	Engine RPM low.	Readjust.
	Pilot pressure low.	Readjust.
	Pump margin too low.	Readjust.
	Lever linkage incorrectly adjusted.	Readjust.
	Swivel joint internal leakage excessive.	Repair or replace.
	Control valve internal leakage excessive.	Repair or replace.
	Low pump pressure.	Check, repair or replace.
	Travel motor internal leakage excessive.	Repair or replace.
Travel motor seal leakage.	Return line filter plugged.	Inspect, clean or replace.
Machine not running straight.	Straight travel orifice plugged.	Repair or replace.
	Lever linkage incorrectly adjusted.	Readjust.
	Track tension not equal.	Readjust.
	Travel motor internal leakage not equal.	Repair or replace.
	Travel motor counter balance spool sticking.	Repair or replace.
	Pump pressure set too low.	Repair or replace.
	Swivel joint internal leakage excessive.	Repair or replace.
	Control valve internal leakage not equal.	Repair or replace.
Machine will not hold on slope or while digging.	Valve compensators not equal.	Repair or replace.
	Travel motor counterbalance valve leakage excessive.	Repair or replace.
Blade drops while machine is moving.	Lever linkage unaligned.	Readjust.
	Cylinder internal leakage excessive.	Repair or replace.
	Control valve internal leakage excessive.	Repair or replace.
	Swivel joint internal leakage from travel motor pressure circuit into blade cylinder circuit.	Repair or replace.
High/low gear switch inoperative (2-speed).	Control valve defective.	Replace.
	Torque limiter set too low.	Readjust.
	Pump pressure set too low.	Readjust.
	Switch defective.	Replace.
	Faulty pressure reducing valve.	Repair or replace.
	Bad solenoid.	Replace.

Disassembly (Cont'd)

Figure 20-20-18

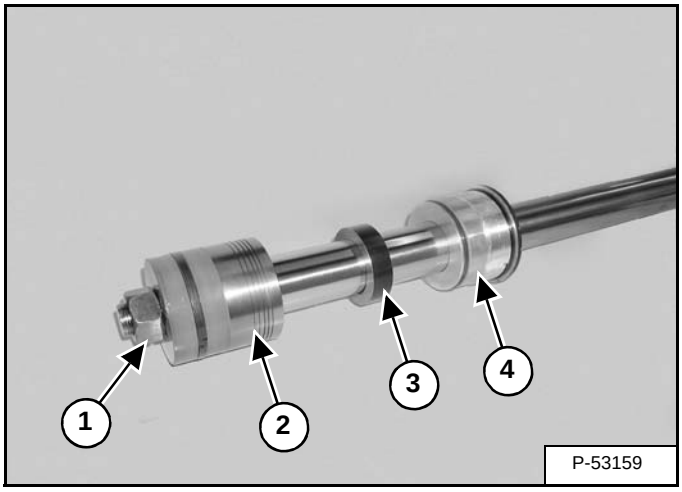


Insert the adjustable gland nut wrench into the holes (Item 1) **[Figure 20-20-18]** to loosen the head.

Remove the head and the rod assembly (Item 2) **[Figure 20-20-18]** from the cylinder.

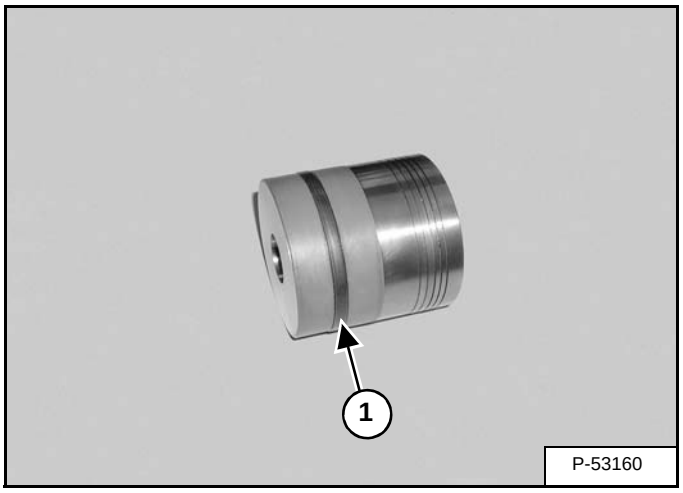
Put the rod end in a vise.

Figure 20-20-19



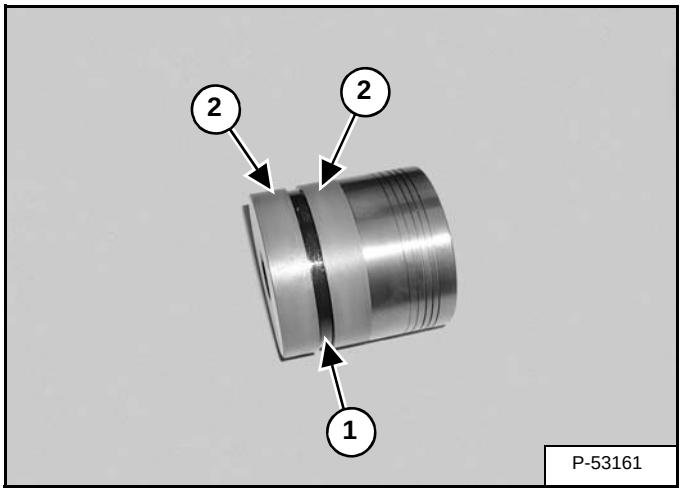
Remove the nut (Item 1), piston (Item 2), spacer (Item 3), and head (Item 4) **[Figure 20-20-19]**.

Figure 20-20-20



Remove the seal (Item 1) **[Figure 20-20-20]**.

Figure 20-20-21



Remove the backup ring (Item 1) **[Figure 20-20-21]**.

NOTE: If the fiber surface (Item 2) [Figure 20-20-21] on the piston head becomes damaged, the complete piston head must be replaced.

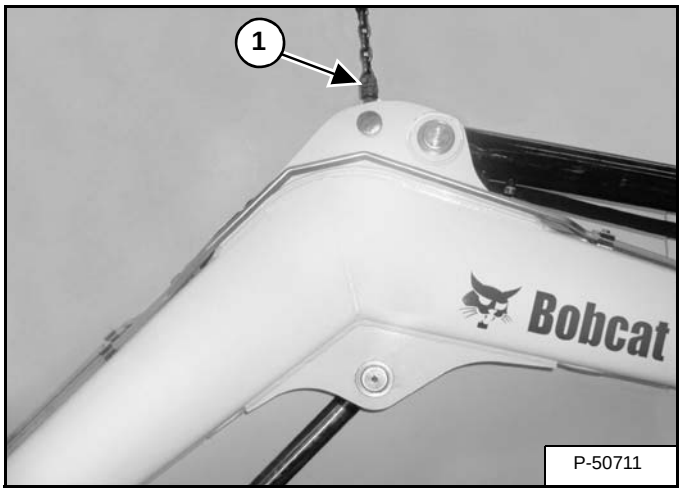
ARM CYLINDER (CONT'D)

Removal and Installation

Lower the boom/bucket and blade to the ground.

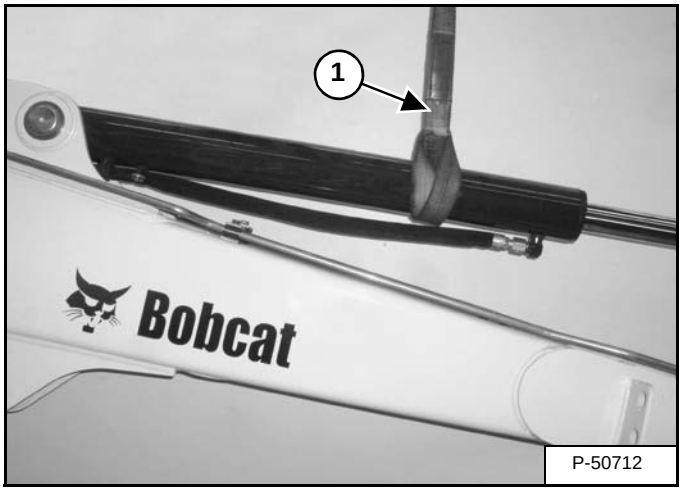
With the engine off, turn the key to the ON position and move both hydraulic control levers to relieve hydraulic pressure.

Figure 20-21-6



Support the boom with a chain hoist **[Figure 20-21-6]**.

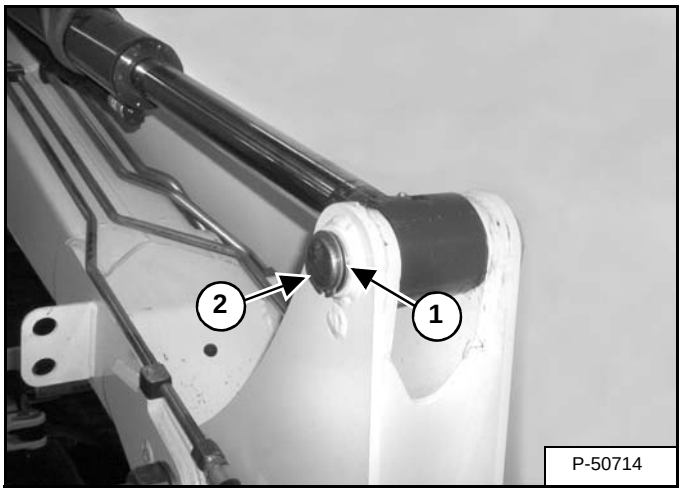
Figure 20-21-7



Install a sling and hoist (Item 1) **[Figure 20-21-7]** on the rod end of the arm cylinder.

Support the cylinder with the hoist.

Figure 20-21-8

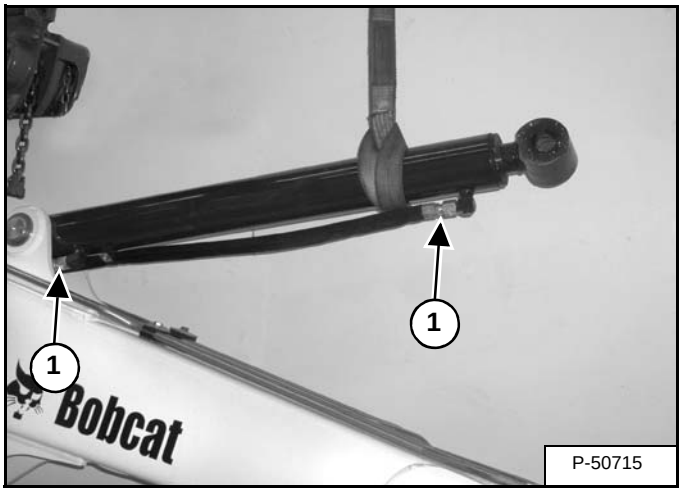


Remove the snap ring and washers (Item 1) **[Figure 20-21-8]** from the rod end of the arm cylinder.

Remove the pin (Item 2) **[Figure 20-21-8]**.

Raise the hoist to access the base end hose.

Figure 20-21-9



Mark and remove the hoses (Item 1) **[Figure 20-21-9]**.

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.

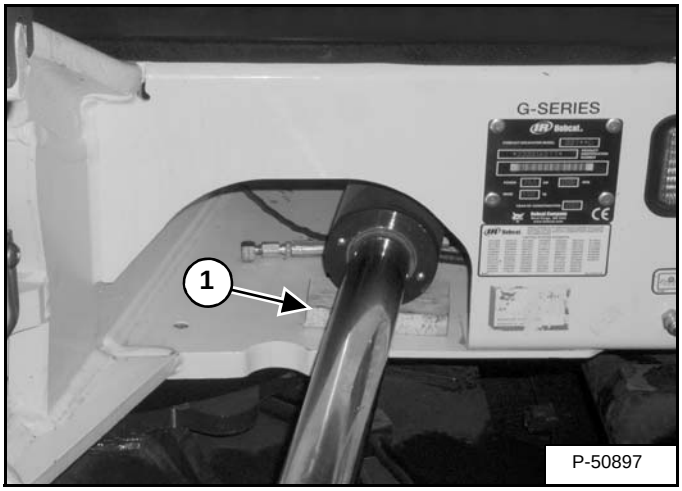
I-2003-0888

BOOM SWING CYLINDER

Testing

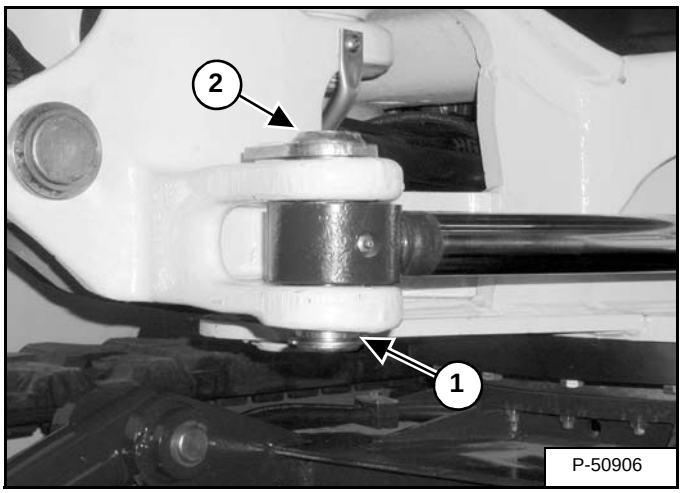
Lower the boom/bucket and blade to the ground.

Figure 20-22-1



Place a block (Item 1) **[Figure 20-22-1]** under the rod end of the boom swing cylinder.

Figure 20-22-2



Remove the snap ring and washer (Item 1) **[Figure 20-22-2]** from the rod end pin of the cylinder.

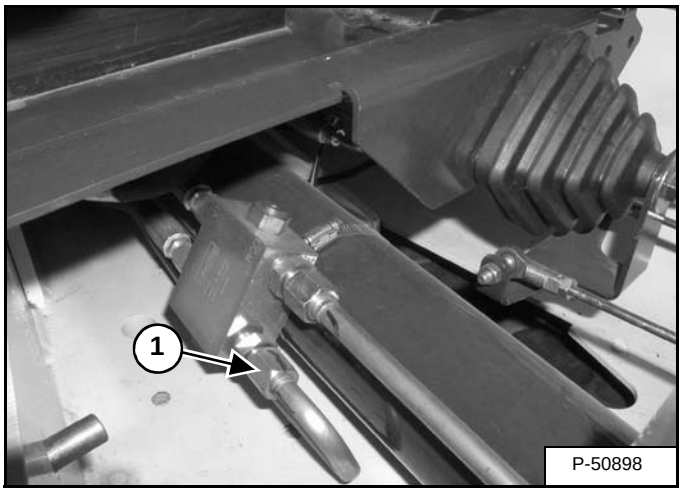
Remove the pin (Item 2) **[Figure 20-22-2]**.

Start the engine and retract the cylinder **[Figure 20-22-2]**.

Stop the engine.

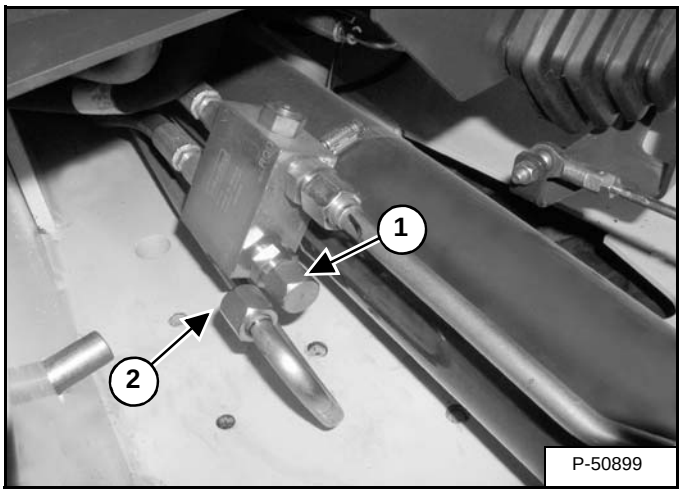
Remove the floormat and floor plate. (See Removal And Installation on Page 40-120-1.)

Figure 20-22-3



At the boom swing lock valve, on the boom swing cylinder, remove the tubeline (Item 1) **[Figure 20-22-3]** from the lock valve.

Figure 20-22-4



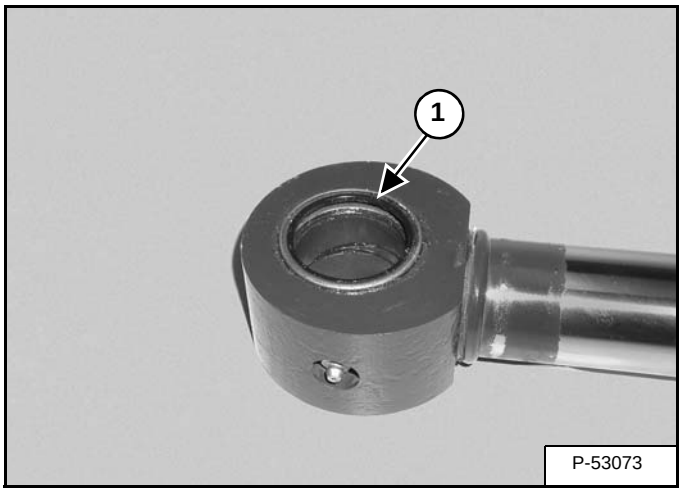
Cap the fitting (Item 1) **[Figure 20-22-4]** on the swing lock valve.

Start the engine and retract the cylinder.

If there is any oil leakage from the base end fitting (Item 2) **[Figure 20-22-4]** on the boom swing cylinder, remove the cylinder for repair or replacement.

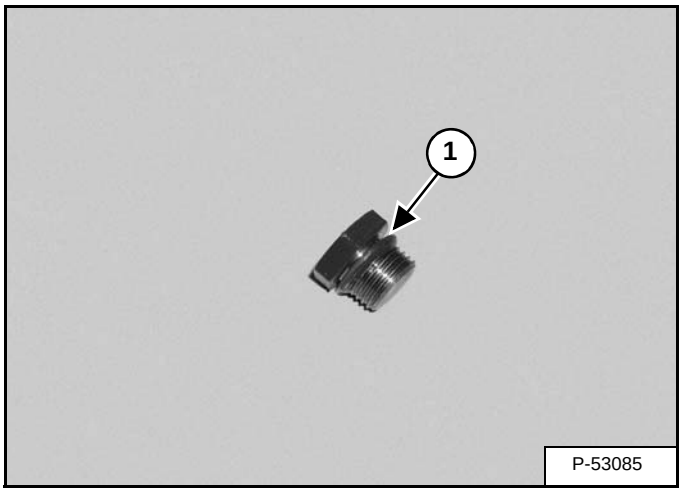
Assembly (Cont'd)

Figure 20-22-31



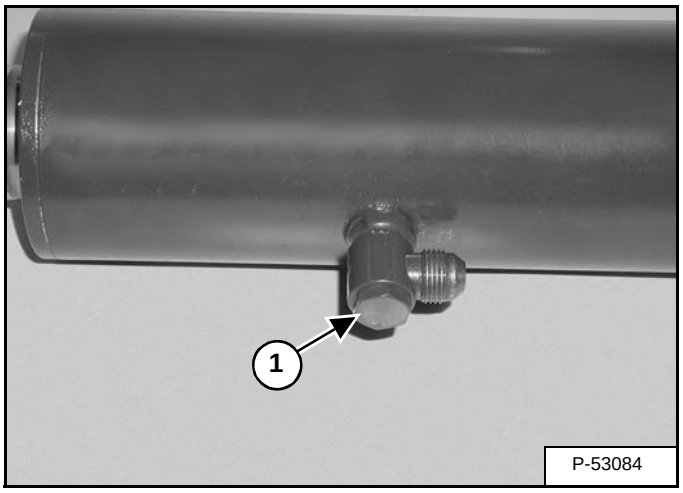
Install the seal (Item 1) **[Figure 20-22-31]**. (Both sides)

Figure 20-22-32



Install the O-ring (Item 1) **[Figure 20-22-32]** on the plugs.

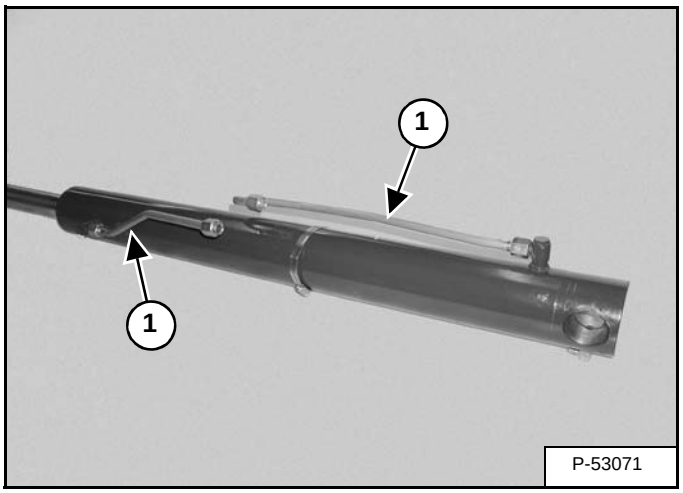
Figure 20-22-33



Install the plug **[Figure 20-22-33]** in both hose fittings.

Tighten the plug to 37 ft.-.lb. (50 N•m) torque.

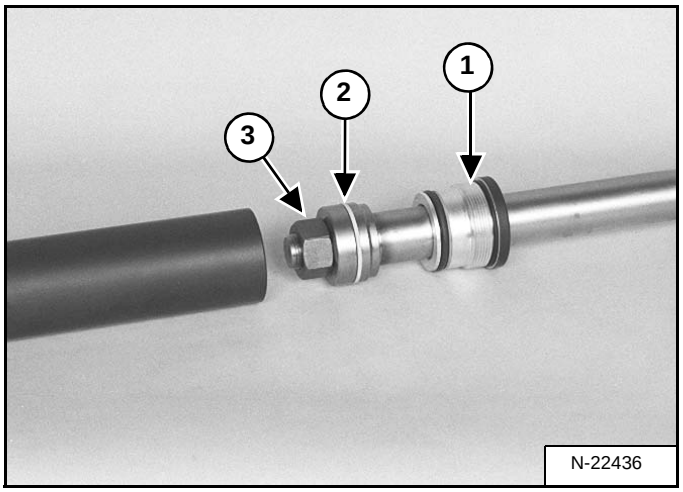
Figure 20-22-34



Install the tubelines (Item 1) **[Figure 20-22-34]**.

Assembly (Cont'd)

Figure 20-23-24



Install the head (Item 1) and the piston (Item 2) **[Figure 20-23-24]** on the rod as shown.

Grease the piston where the nut contacts the piston. Do not get grease on the threads.

Provide an adequate support for the cylinder before tightening.

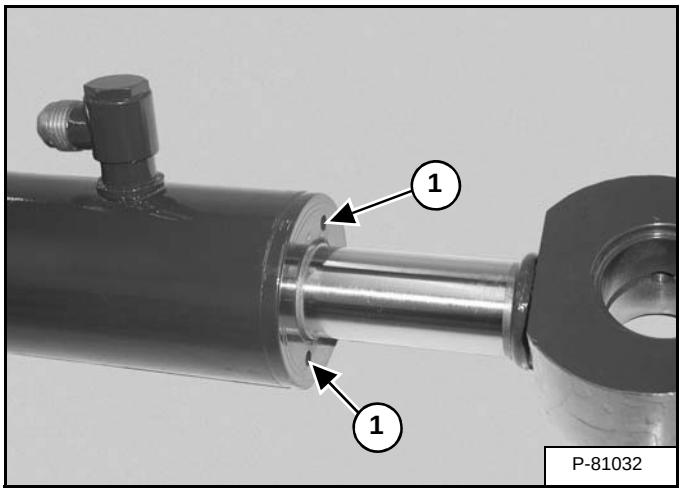
Install the nut (Item 3) **[Figure 20-23-24]**.

NOTE: Clean and dry the rod threads. Install a NEW NUT with pre-applied Loctite®.

Tighten the nut to 850 ft.-lb. (1152 N•m) torque.

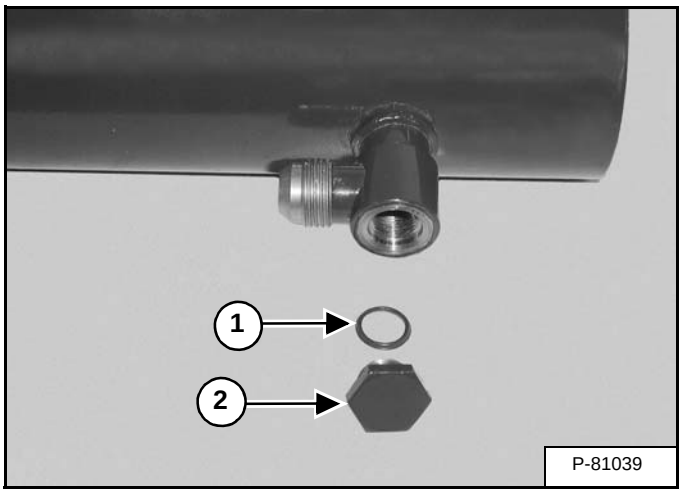
Put the base end of the hydraulic cylinder in a vise.

Figure 20-23-25



Insert the adjustable gland nut wrench into the holes (Item 1) **[Figure 20-23-25]** to tighten the head. Head to be torqued until flush with the end of the housing.

Figure 20-23-26



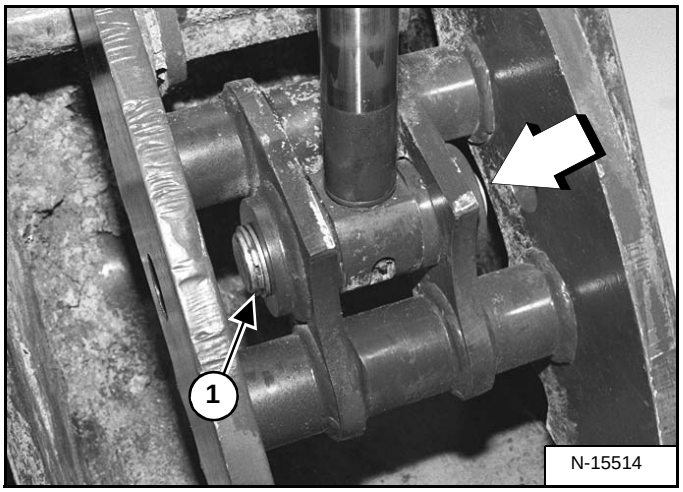
Install the O-ring (Item 1) and plug (Item 2) **[Figure 20-23-26]**.

Tighten the plug to 37 ft.-lb. (50 N•m) torque.

CLAMP CYLINDER

Testing

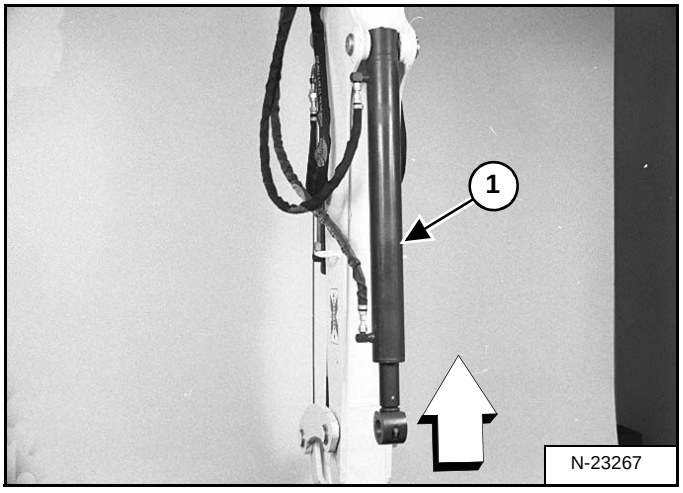
Figure 20-25-1



Remove the snap ring and washer (Item 1) **[Figure 20-25-1]** from the clamp cylinder pin.

Remove the pin from the rod end of the clamp cylinder **[Figure 20-25-1]**.

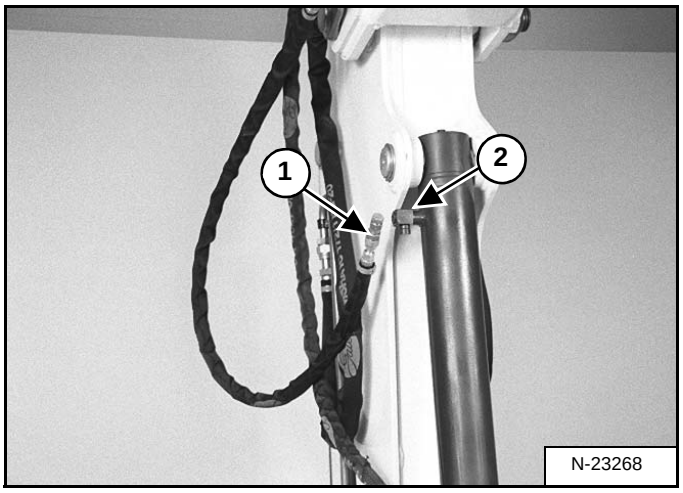
Figure 20-25-2



Start the engine and retract the clamp cylinder (Item 1) **[Figure 20-25-2]**.

Stop the engine.

Figure 20-25-3



Disconnect the hydraulic hose (Item 1) **[Figure 20-25-3]** from the base end of the cylinder.

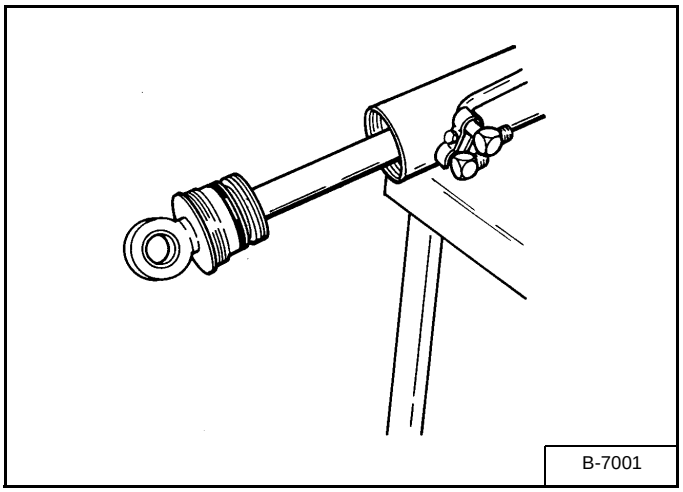
Cap the hose (Item 1) **[Figure 20-25-3]**.

Start the and retract the cylinder.

If there is any oil leakage from the base end fitting (Item 2) **[Figure 20-25-3]** on the cylinder, remove the cylinder for repair or replacement.

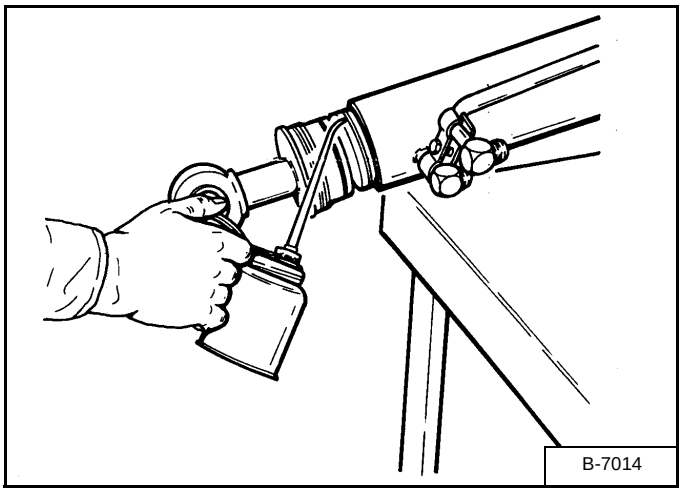
Assembly (Cont'd)

Figure 20-25-29



Install the rod assembly in the housing **[Figure 20-25-29]**.

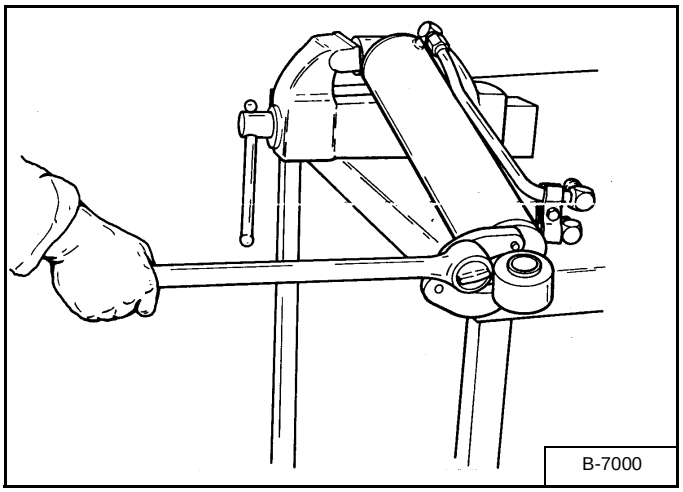
Figure 20-25-30



Apply oil to the seals on the head **[Figure 20-25-30]**.

Apply oil to the threads of the head.

Figure 20-25-31



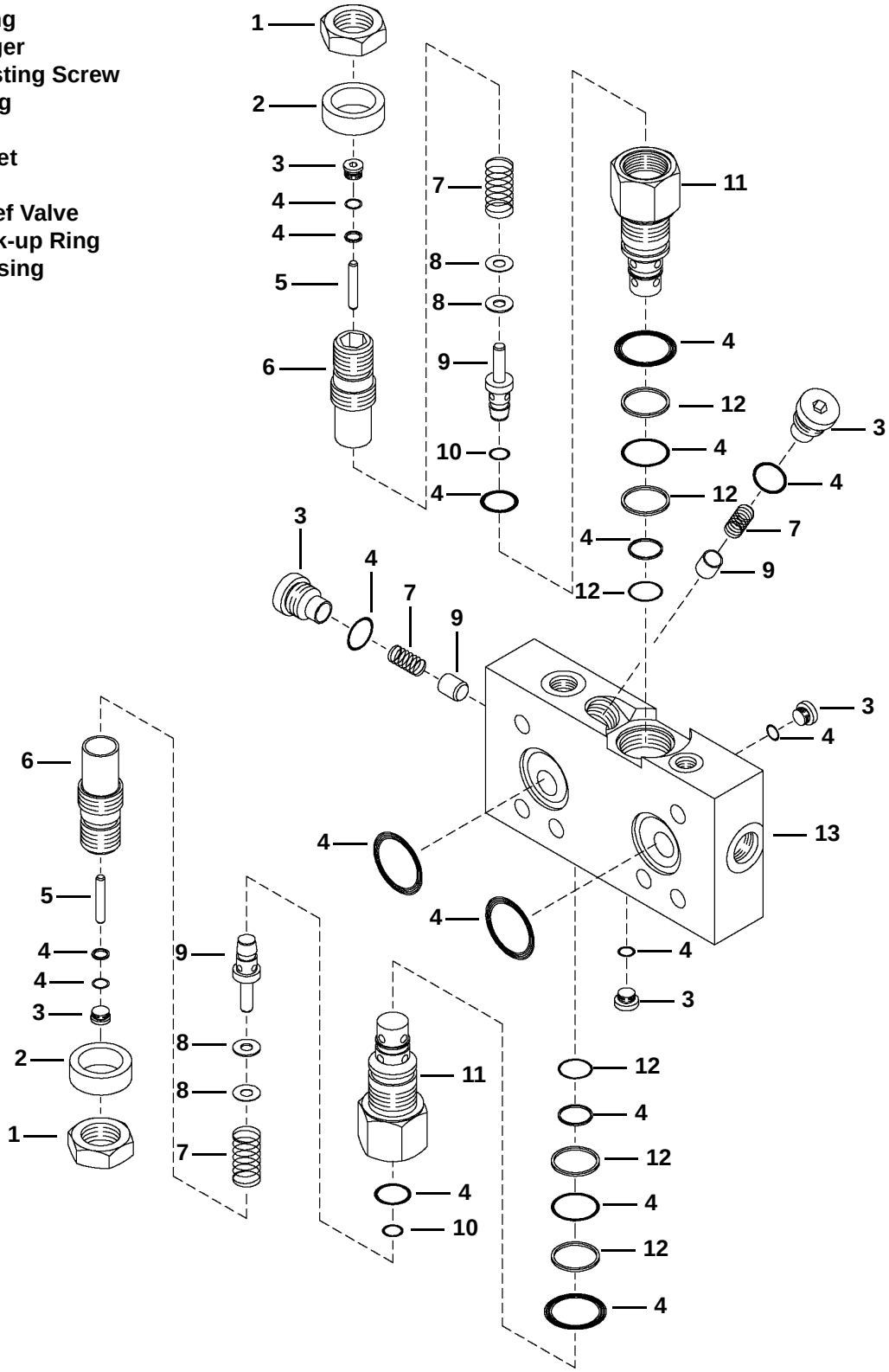
Use the adjustable gland nut wrench to tighten the head **[Figure 20-25-31]**.

NOTE: Tighten gland until it is flush with the end of the housing.

Move rod in and out of cylinder housing and make sure that it moves freely.

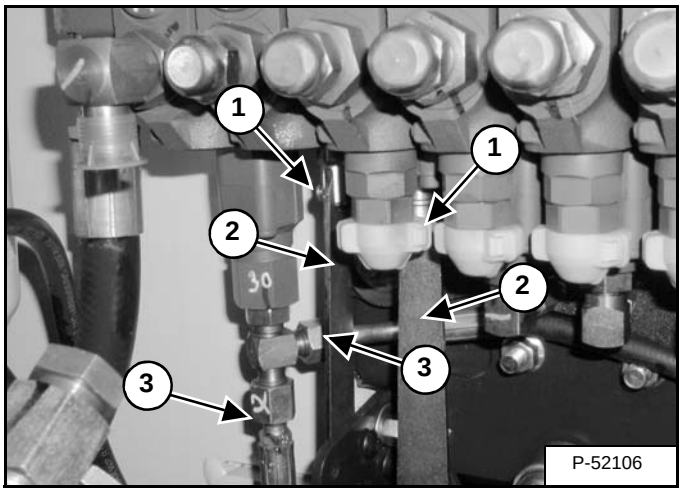
Parts Identification

1. Nut
2. Spacer
3. Plug
4. O-Ring
5. Plunger
6. Adjusting Screw
7. Spring
8. Shim
9. Poppet
10. Seal
11. Relief Valve
12. Back-up Ring
13. Housing



Removal And Installation (Cont'd)

Figure 20-40-7

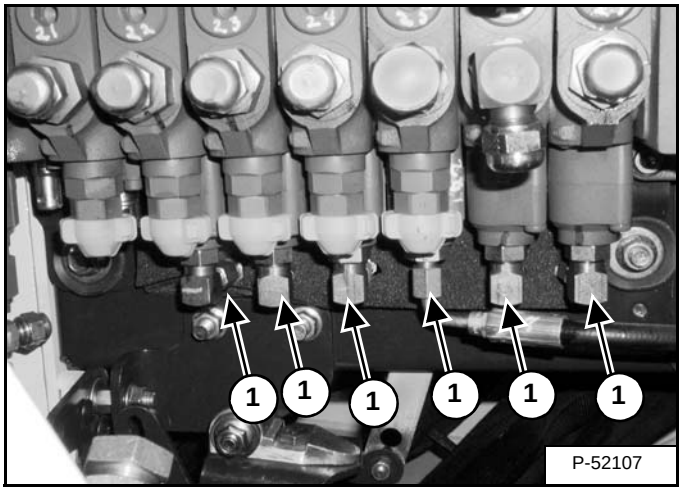


Remove the cotter pins and clevis pins (Item 1) from the swing and blade linkages (Item 2) **[Figure 20-40-7]**.

Remove the linkages.

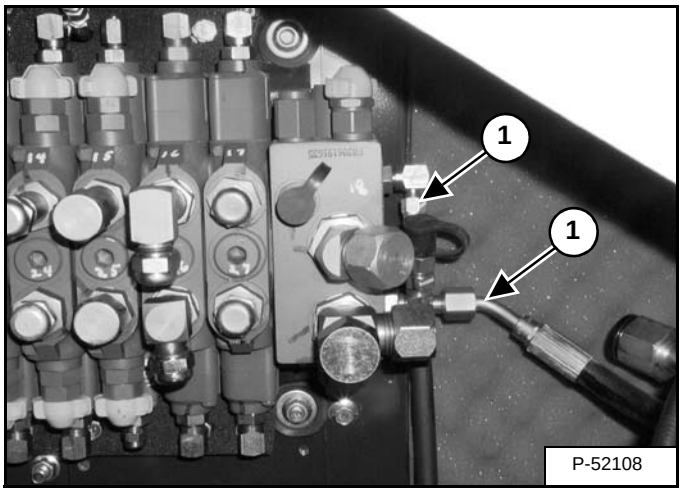
Remove the 2 hoses (Item 3) **[Figure 20-40-7]**.

Figure 20-40-8



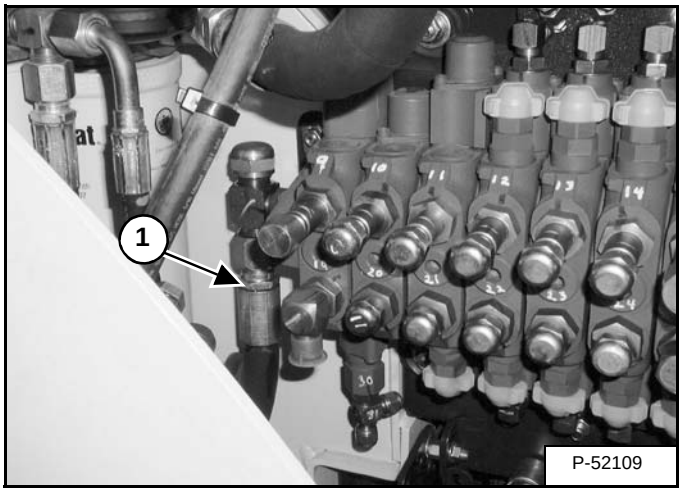
Remove the 6 hoses (Item 1) **[Figure 20-40-8]**.

Figure 20-40-9



Remove the 2 hoses (Item 1) **[Figure 20-40-9]**.

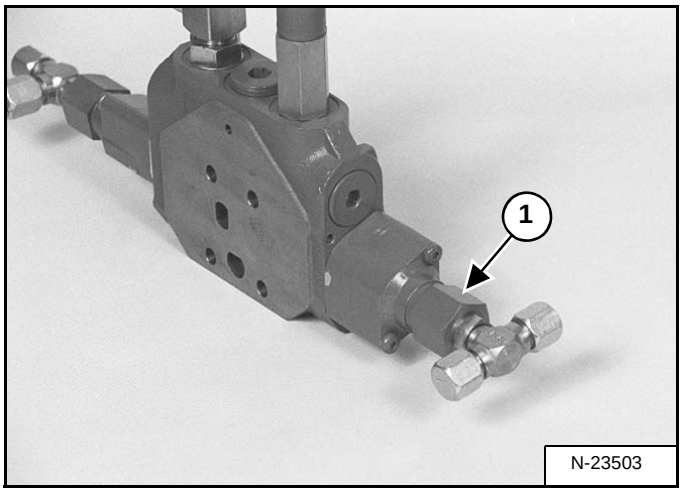
Figure 20-40-10



Remove the hose (Item 1) **[Figure 20-40-10]**.

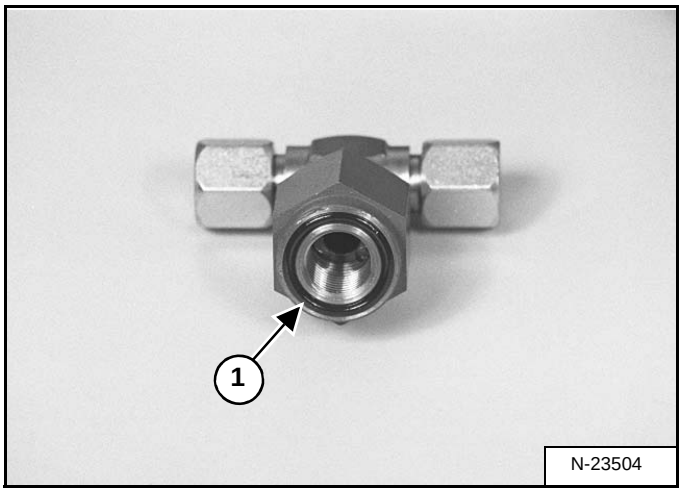
Slew Valve Section (Cont'd)

Figure 20-40-41



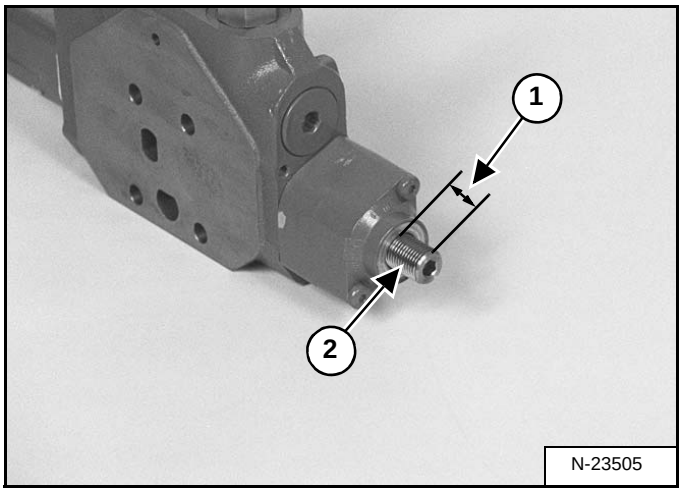
Remove the nut (Item 1) **[Figure 20-40-41]** from the valve section.

Figure 20-40-42



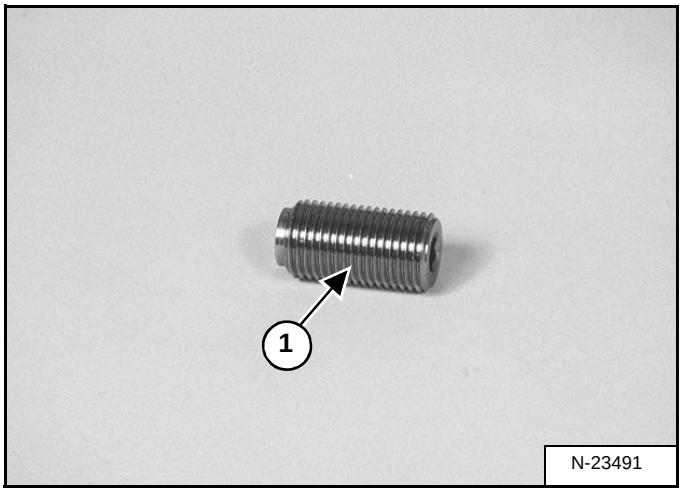
Remove the O-ring (Item 1) **[Figure 20-40-42]** from the nut.

Figure 20-40-43



Measure and record the length (Item 1) of the adjustment screw (Item 2) **[Figure 20-40-43]**.

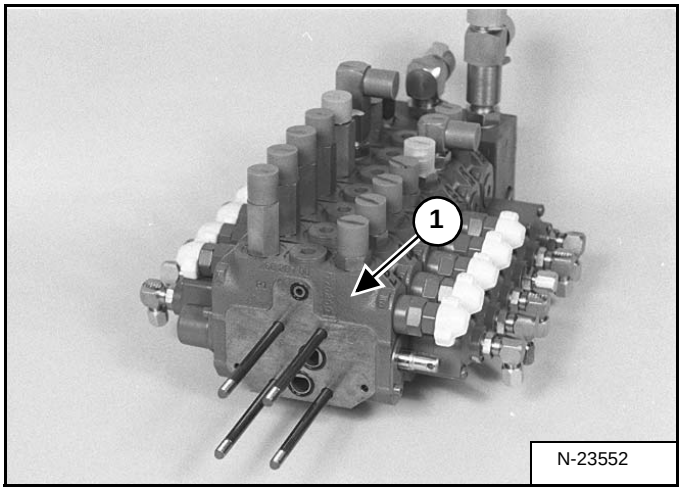
Figure 20-40-44



Remove the adjustment screw (Item 1) **[Figure 20-40-44]** from the valve section.

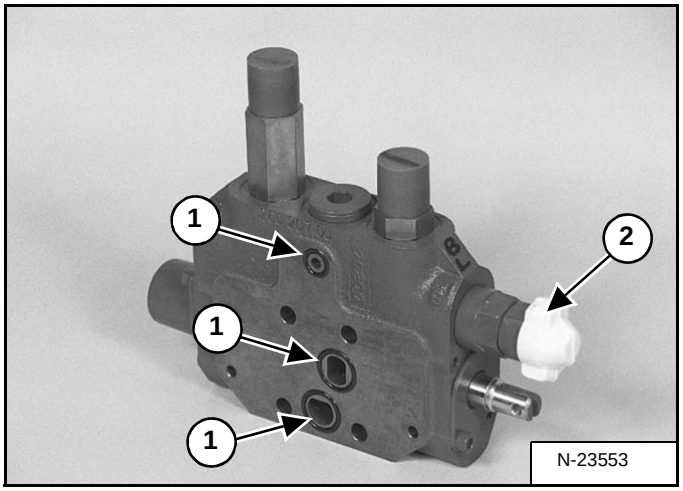
Blade Valve Section (S/N 234611001-234611163 And S/N 234711001-234711197)

Figure 20-40-78



Remove the blade valve section (Item 1) **[Figure 20-40-78]** from the control valve.

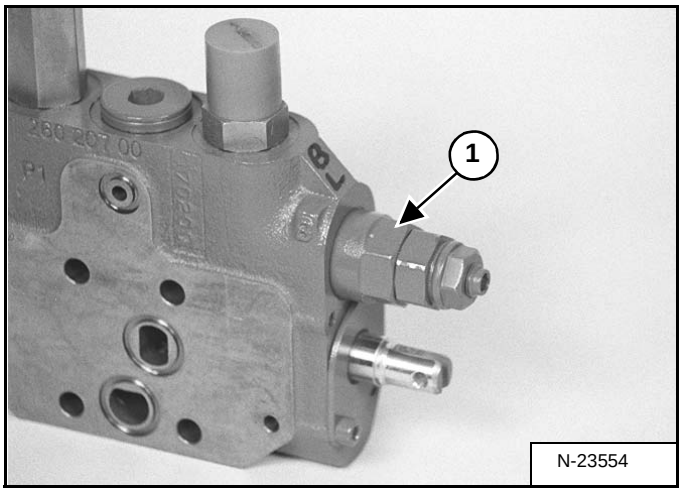
Figure 20-40-79



Remove the O-rings (Item 1) **[Figure 20-40-79]** from the valve section.

Remove the protective cover (Item 2) **[Figure 20-40-79]** from the valve section port relief/anti-cav valve.

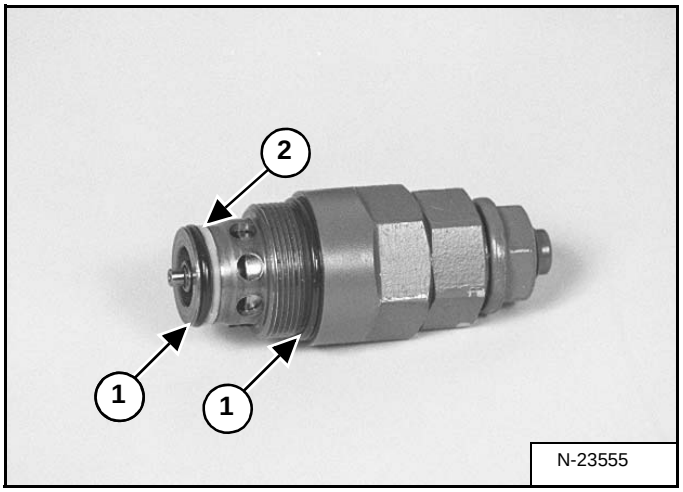
Figure 20-40-80



Remove the port relief/anti-cav valve (Item 1) **[Figure 20-40-80]** from the valve section.

Assembly: Tighten the port relief/anti-cav valve to 46 - 57 ft.-lb. (63 - 77 N•m) torque.

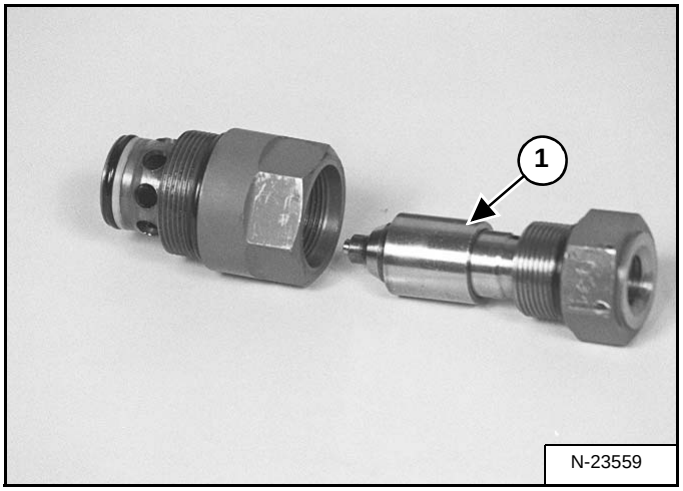
Figure 20-40-81



Remove the O-rings (Item 1) and back-up ring (Item 2) **[Figure 20-40-81]** from the port relief/anti-cav valve.

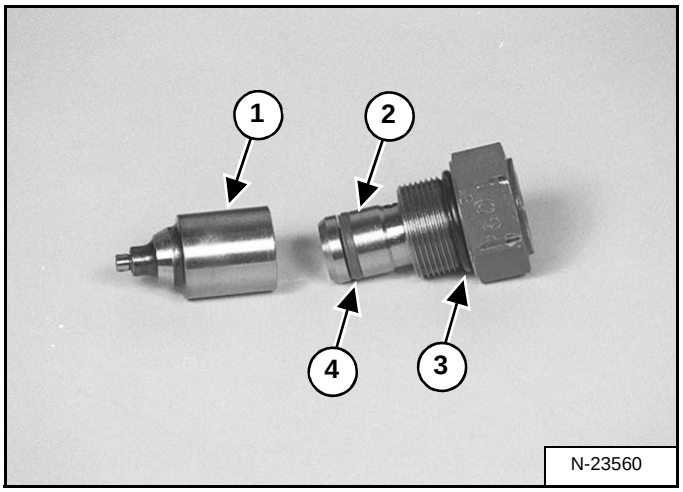
Blade Valve Section (S/N 234611164 & Above And 234711198 & Above) (Cont'd)

Figure 20-40-118



Remove the relief valve assembly (Item 1) **[Figure 20-40-118]** from the housing.

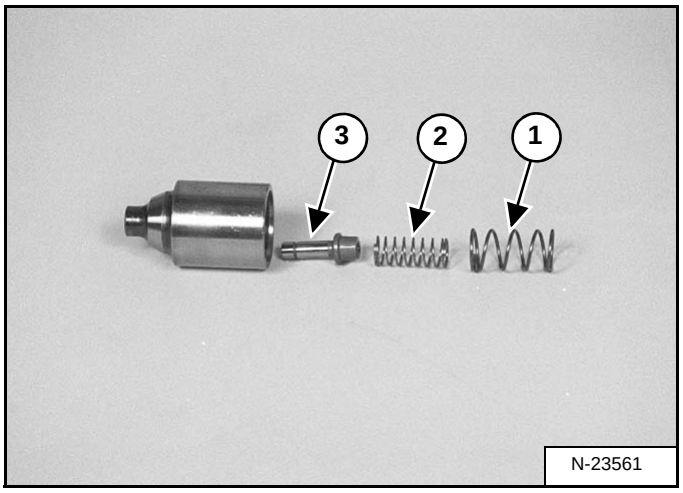
Figure 20-40-119



Remove the front section (Item 1) from the relief valve (Item 2) **[Figure 20-40-119]**.

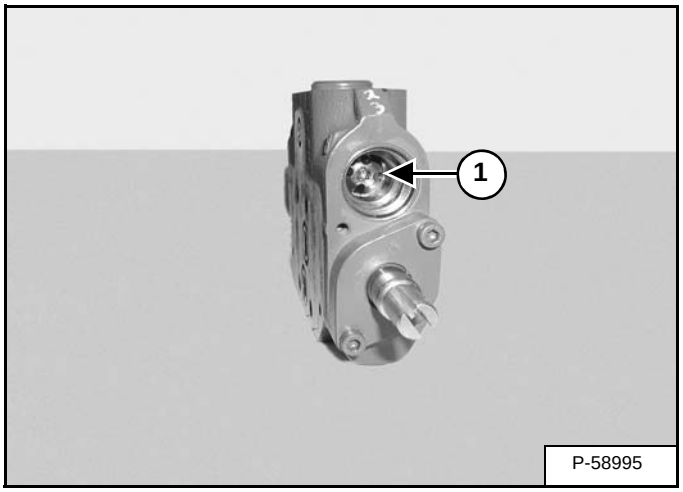
Remove the O-ring (Item 3) and seal (Item 4) **[Figure 20-40-119]**.

Figure 20-40-120



Remove the spring (Item 1), spring (Item 2) and poppet (Item 3) **[Figure 20-40-120]**.

Figure 20-40-121

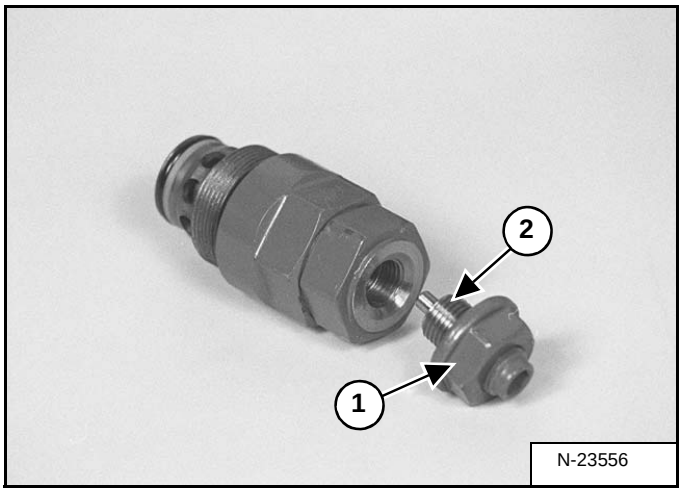


Remove the load check valve (Item 1) **[Figure 20-40-121]** from the valve section.

Assembly: Tighten the load check valve to 80 - 97 in.-lb. (9 - 11 N•m) torque.

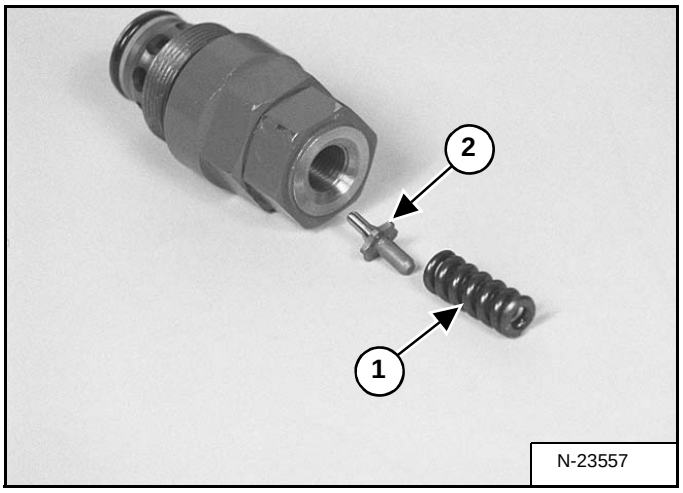
Bucket Valve Section (Cont'd)

Figure 20-40-156



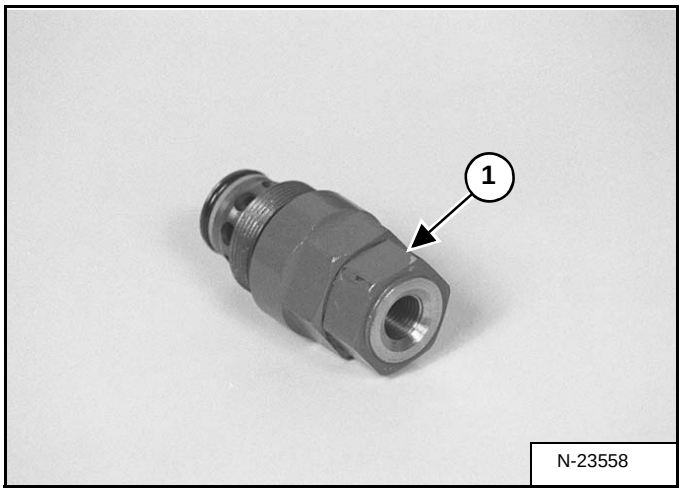
Remove the jam nut (Item 1) and adjustment screw (Item 2) **[Figure 20-40-156]** from the port relief/anti-cav valve.

Figure 20-40-157



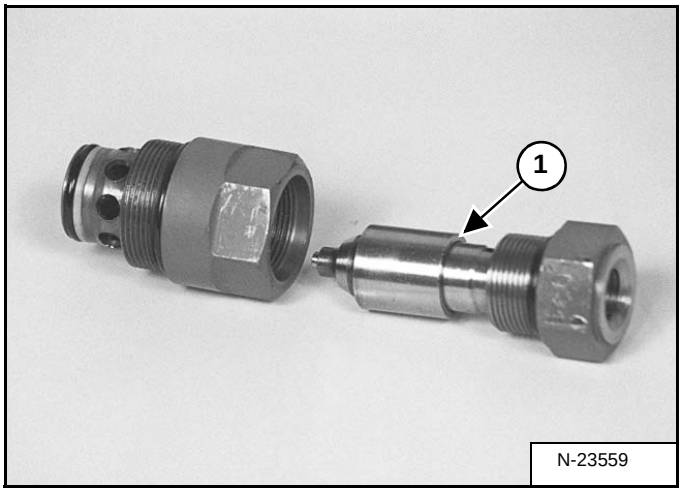
Remove the spring (Item 1) and poppet (Item 2) **[Figure 20-40-157]** from the port relief/anti-cav body.

Figure 20-40-158



Remove the nut (Item 1) **[Figure 20-40-158]** from the front housing of the port relief/anti-cav valve.

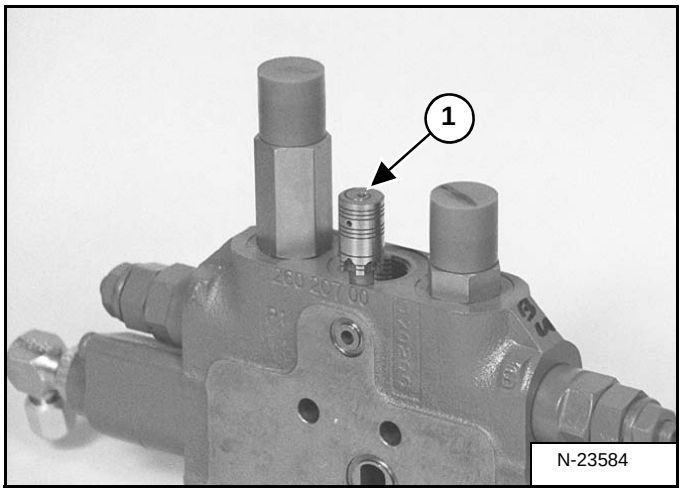
Figure 20-40-159



Remove the relief valve assembly (Item 1) **[Figure 20-40-159]** from the front housing of the valve.

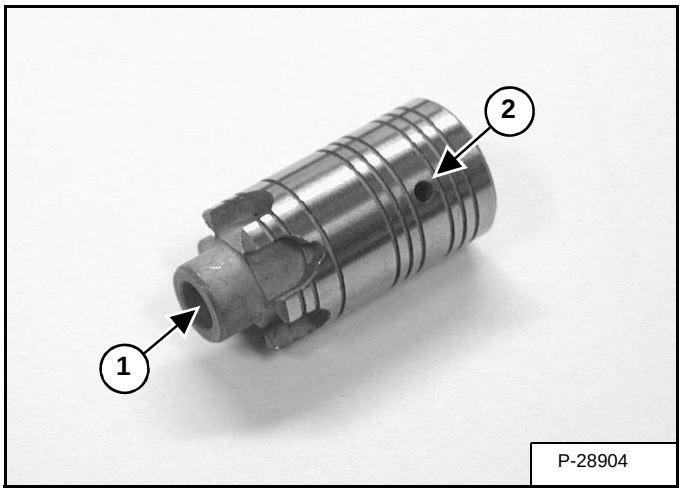
Arm Valve Section (Cont'd)

Figure 20-40-192



Remove the compensator (Item 1) **[Figure 20-40-192]** from the valve section.

Figure 20-40-193



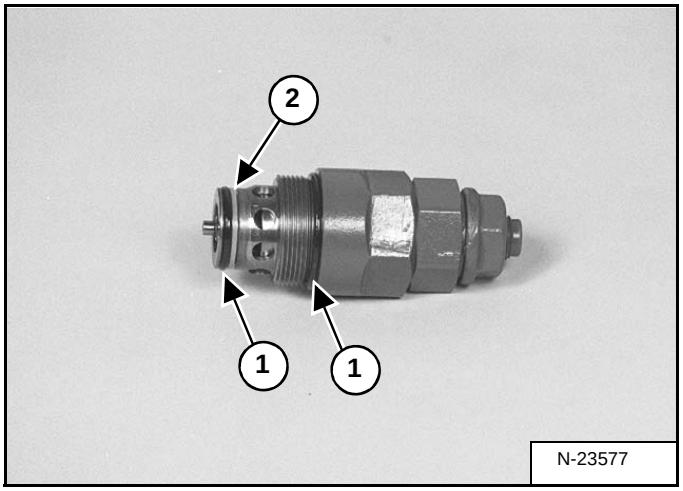
Check the orifice (Item 1) **[Figure 20-40-193]** in the compensator to be sure it is not plugged.

Check the crossport hole (Item 2) **[Figure 20-40-193]** to be sure it is not plugged.

Auxiliary Valve Section (Cont'd)

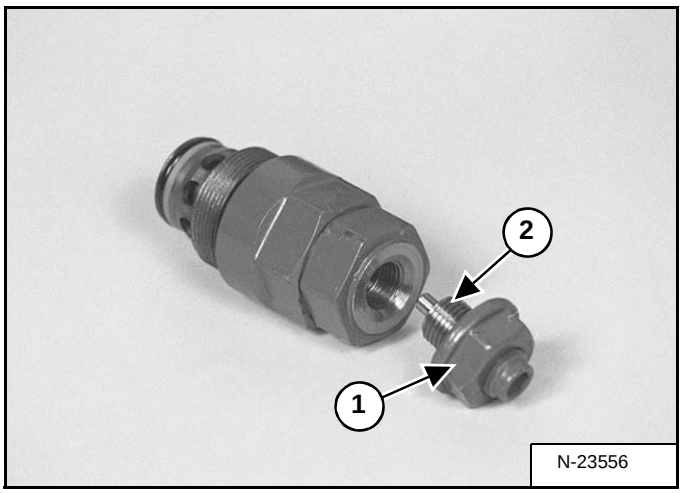
Port Relief Anti-Cav

Figure 20-40-224



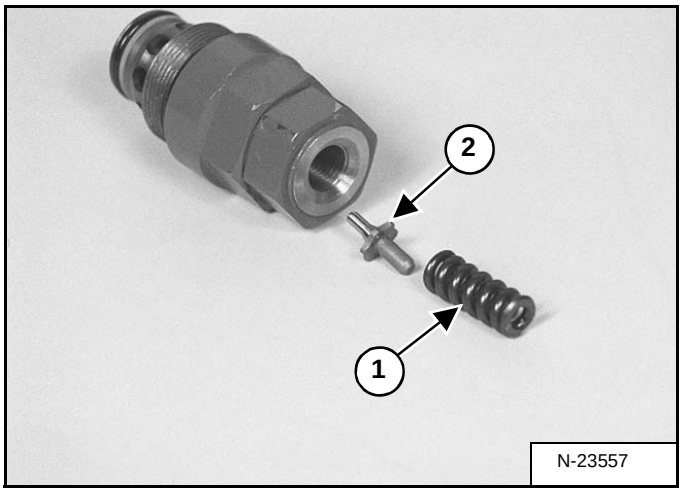
Remove the O-rings (Item 1) and back-up ring (Item 2) **[Figure 20-40-224]** from the port relief/anti-cav valve.

Figure 20-40-225



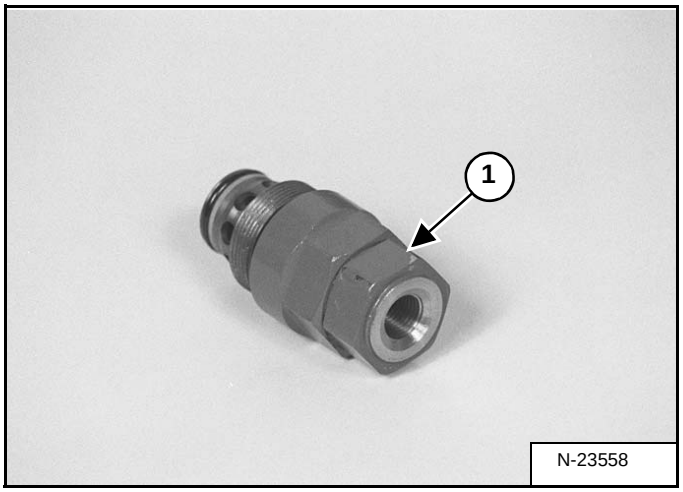
Remove the nut (Item 1) and adjustment screw (Item 2) **[Figure 20-40-225]** from the port relief/anti-cav valve.

Figure 20-40-226



Remove the spring (Item 1) and poppet (Item 2) **[Figure 20-40-226]** from the port relief/anti-cav valve.

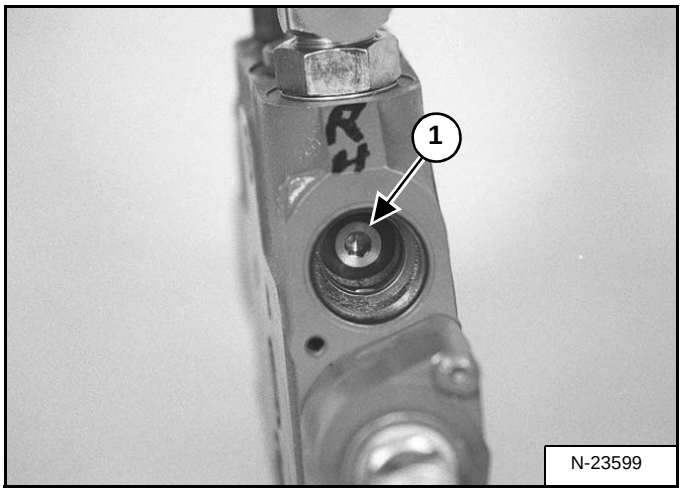
Figure 20-40-227



Remove the nut (Item 1) **[Figure 20-40-227]** from the front housing of the port relief/anti-cav valve.

Left Travel Valve Section (Cont'd)

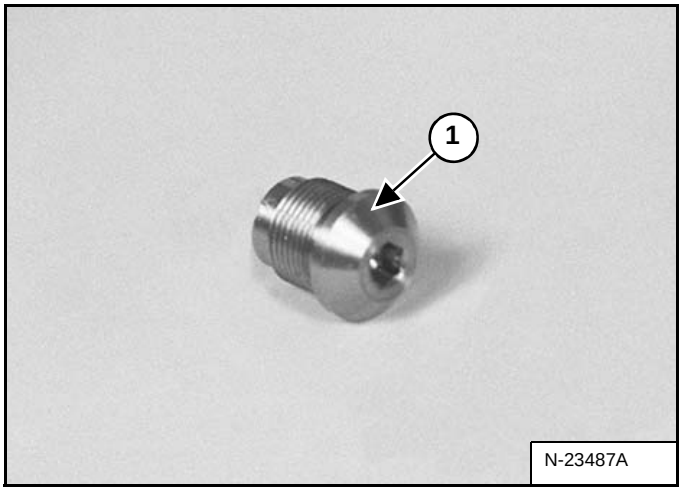
Figure 20-40-262



Remove the plug (Item 1) **[Figure 20-40-262]** from the valve section. (Both ends)

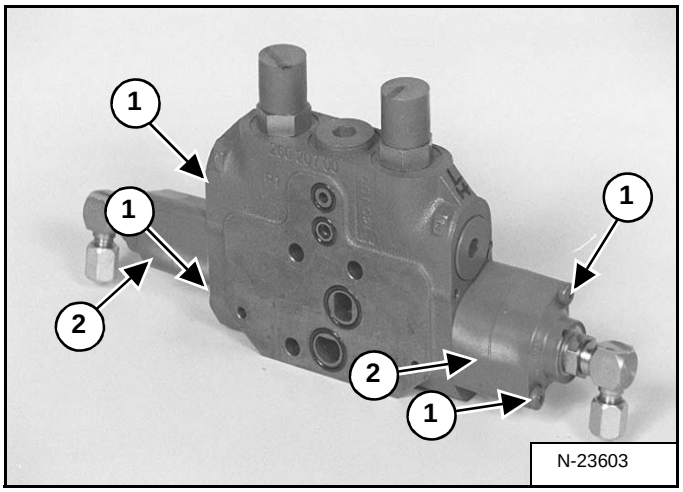
Assembly: Tighten the plugs to 80 - 97 in.-lb. (9 - 11 N•m) torque.

Figure 20-40-263



Check the plug (Item 1) **[Figure 20-40-263]** for wear and replace as needed.

Figure 20-40-264

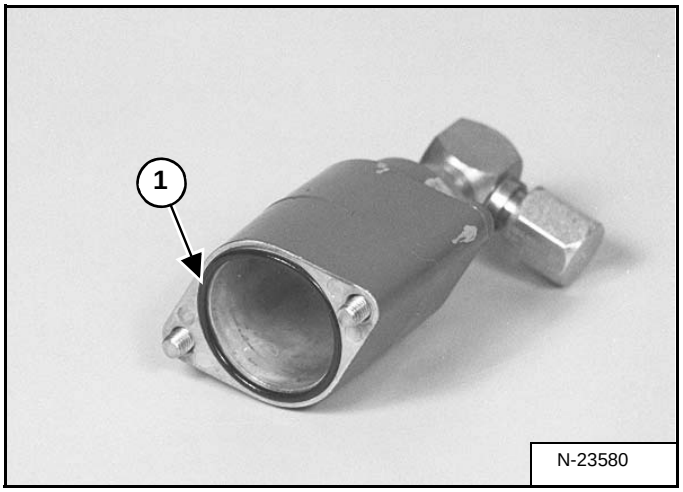


Remove the 2 bolts (Item 1) from the valve section end cap (Item 2) **[Figure 20-40-264]**. (Both ends)

Remove the end caps.

Assembly: Tighten the bolts to 48 - 58 in.-lb. (5,4 - 6,6 N•m) torque.

Figure 20-40-265



Remove the O-ring (Item 1) **[Figure 20-40-265]** from the end caps.

Hydraulic Pump Work Sheet (Cont'd)

V. Torque Limiter Adjustment (See Torque Limiter Adjustment on Page 20-50-14.)

31. Install Jumper Hose with a Test Port, Between the Pump Diagnostic Port and the Load Sense Diagnostic Port at the Control Valve

32. Install a **5000 PSI gauge** to the test port on the hydraulic test hose.

33. Adjust the Hydraulic Tester to 1450 PSI (100 bar).

34. Adjust the Torque Limiter to obtain 35 - 39 GPM (132 - 148 L/m)

35. Record Flow and Engine RPM.

_____ **FLOW**

_____ **ENGINE RPM**

36. Adjust the Hydraulic Tester to 3300 PSI (228 bar).

37. Adjust the Torque Limiter to obtain 14 - 18 GPM (53 - 68 L/m)

38. Record Flow and Engine RPM.

_____ **FLOW**

_____ **ENGINE RPM**

ALL PUMP ADJUSTMENTS ARE NOW COMPLETED

39. Remove the Jumper Hose

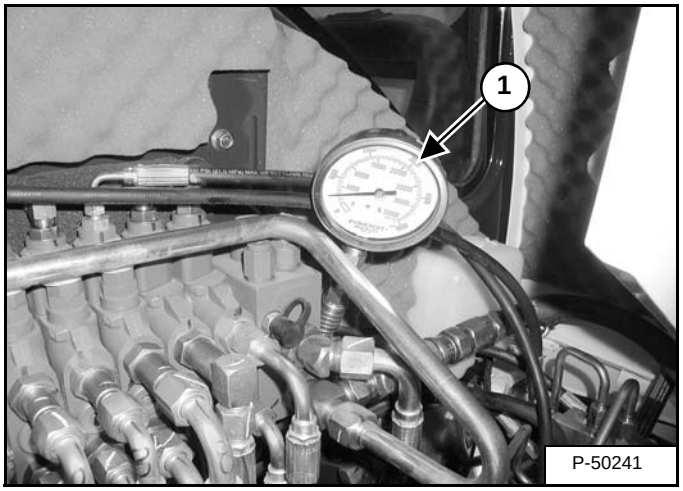
40. Remove the Hydraulic Tester

HYDRAULIC PUMP (234611001 - 234613190, 234613193 - 234613247, 234711001 - 234713440) (CONT'D)

Pump Testing (Cont'd)

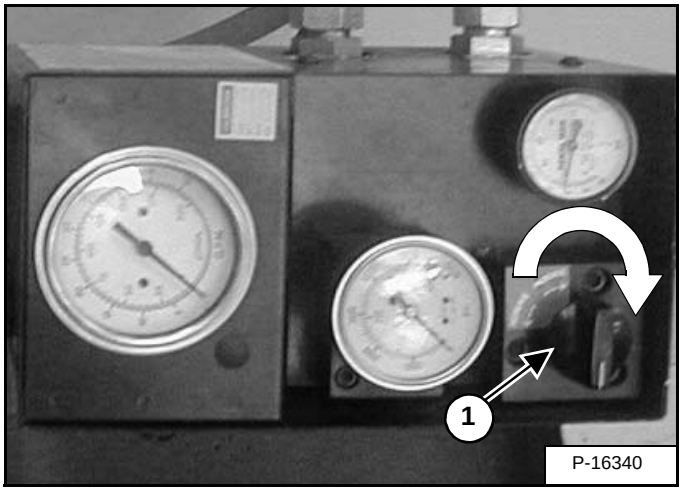
Pump Pressure Adjustment

Figure 20-50-30



Install a **5000 PSI gauge** (Item 1) **[Figure 20-50-30]** to the pump diagnostic port on the control valve.

Figure 20-50-31



Turn the hydraulic tester flow control (Item 1) **[Figure 20-50-31]** clockwise until maximum restriction.

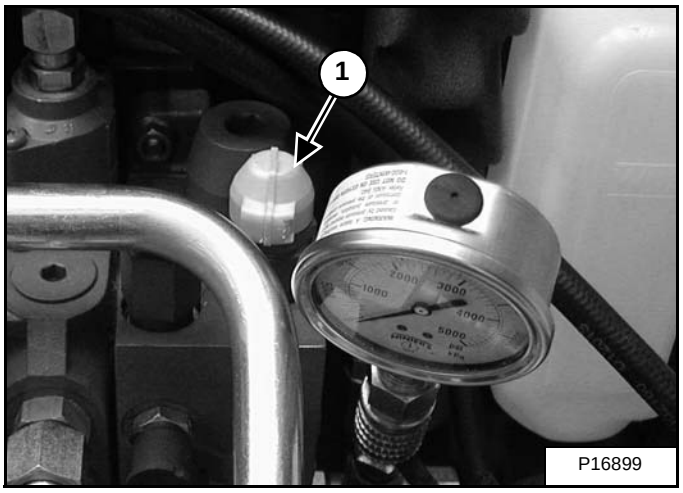
Start the engine and run at high idle.

Raise the blade and deadhead the blade in the up position.

Have another person check the pressure gauge (Item 1) **[Figure 20-50-30]** and record the pump pressure.

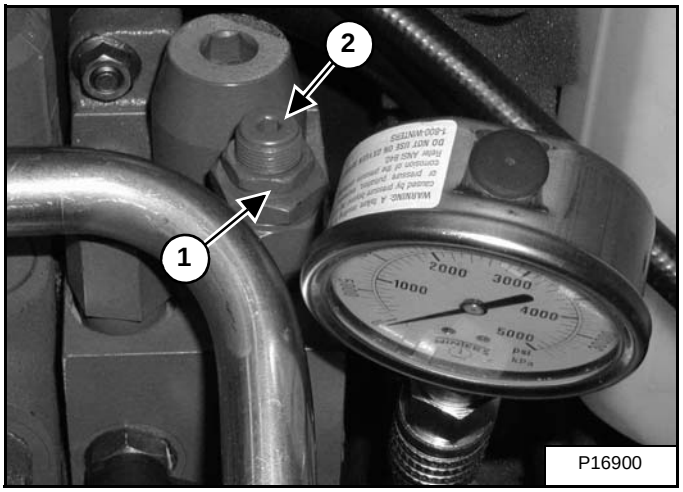
The pump pressure should be **3750 PSI ± 50 PSI (259 bar ± 3,44 bar)**.

Figure 20-50-32



Remove the protective cap (Item 1) **[Figure 20-50-32]** from the top of the Load Sense Relief Valve.

Figure 20-50-33



Loosen the lock nut (Item 1) **[Figure 20-50-33]** and with an Allen wrench adjust the pressure to **3750 PSI ± 50 PSI (259 bar ± 3,44 bar)**.

If pump pressure cannot be obtained, disassemble and clean the load sense relief valve.

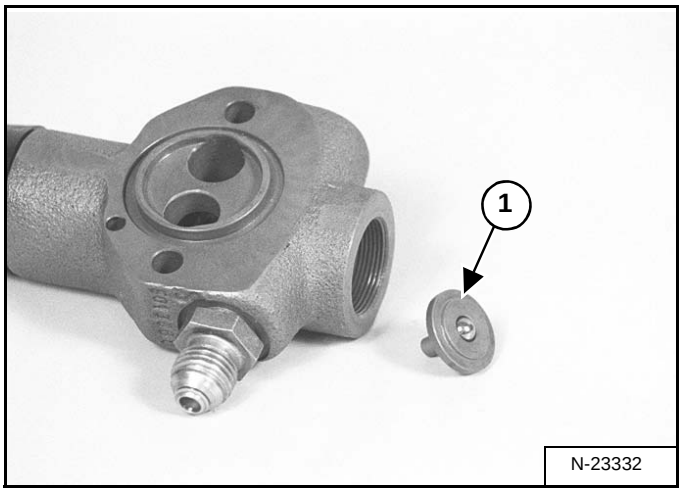
When pump pressure is set, tighten the nut (Item 2) **[Figure 20-50-33]**.

Remove the 5000 PSI gauge from the pump diagnostic port on the control valve.

Pump Pressure Adjustment is now completed.

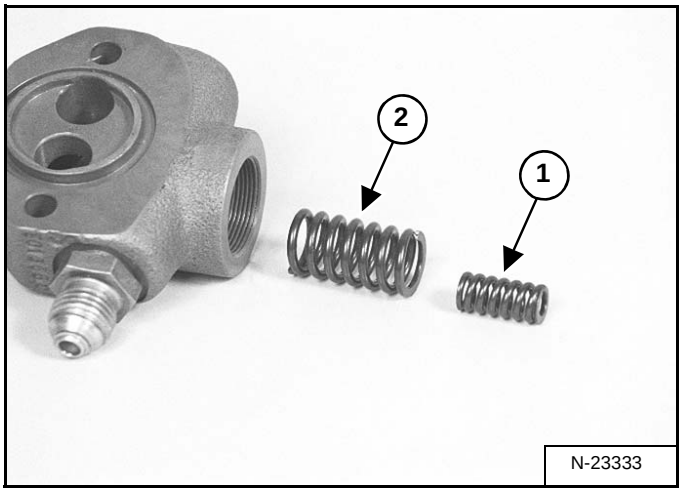
Torque Limiter Valve Disassembly (Cont'd)

Figure 20-50-58



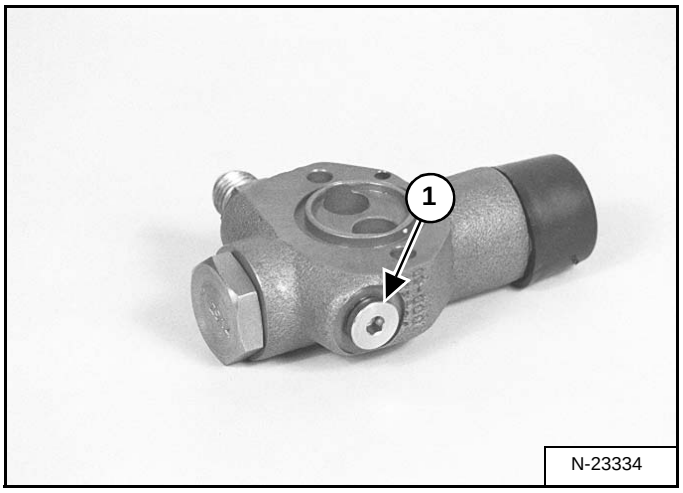
Remove the spring retainer (Item 1) **[Figure 20-50-58]** from the torque limiter valve.

Figure 20-50-59



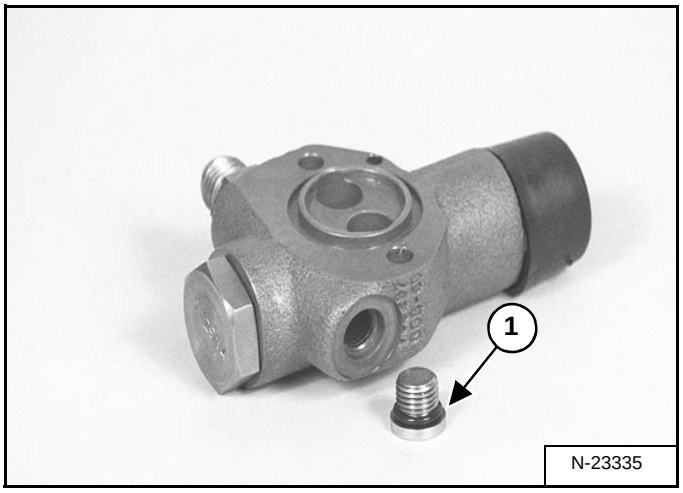
Remove the springs (Items 1 & 2) **[Figure 20-50-59]**.

Figure 20-50-60



Remove the plug (Item 1) **[Figure 20-50-60]**.

Figure 20-50-61

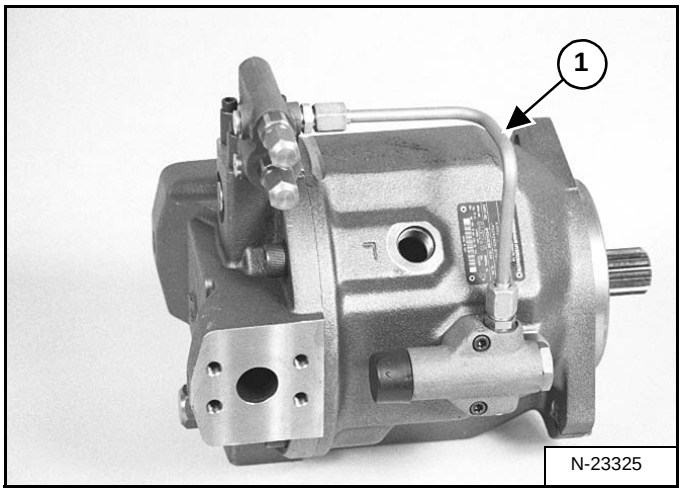


Check the O-ring (Item 1) **[Figure 20-50-61]** and replace as needed.

Install the plug.

Pump Control Removal And Installation

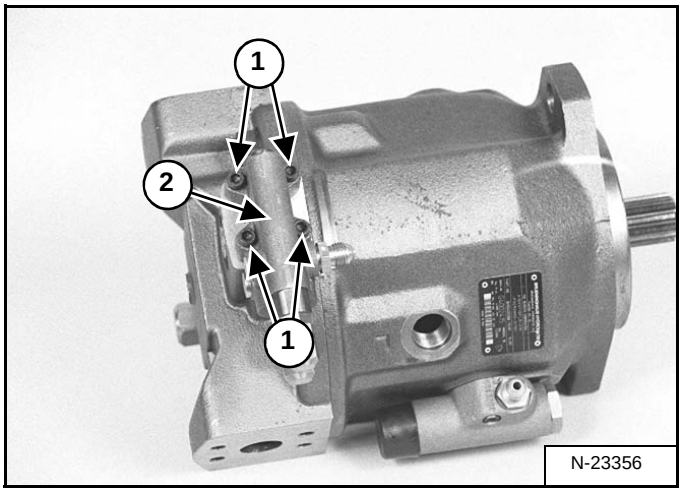
Figure 20-50-88



Mark the tubeline (Item 1) **[Figure 20-50-88]** for correct assembly.

Loosen and remove the tubeline (Item 1) **[Figure 20-50-88]** from the pump control and torque limiter valve.

Figure 20-50-89

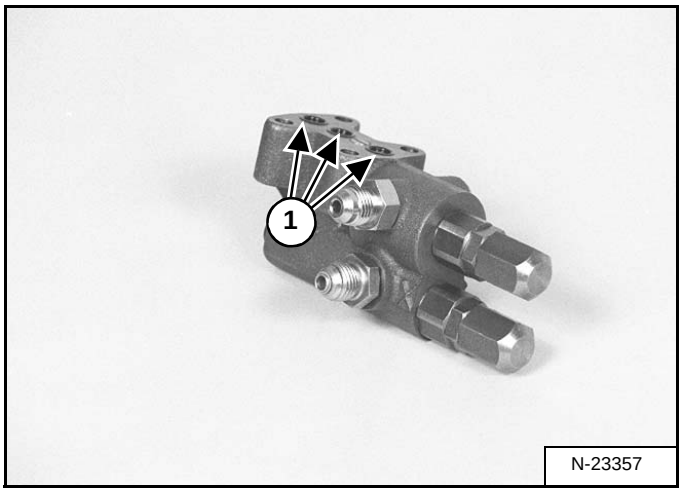


Loosen and remove the four bolts (Item 1) and remove the pump control (Item 2) **[Figure 20-50-89]** from the hydraulic piston pump.

Installation: Tighten to 10 ft.-lb. and (13 N•m) torque.

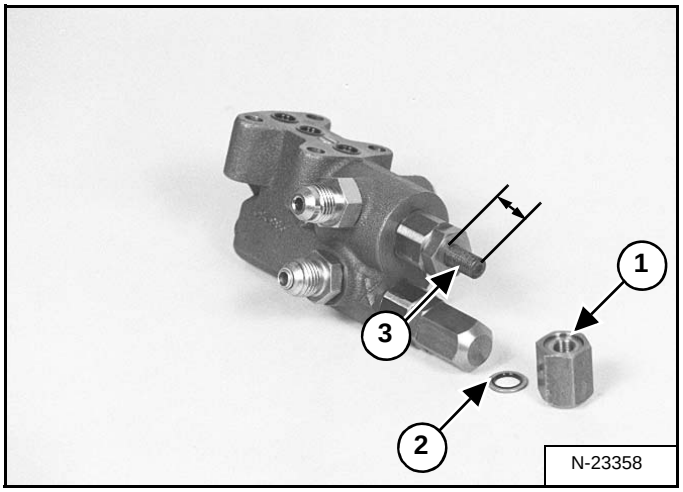
Pump Control Disassembly And Assembly

Figure 20-50-90



Remove the three O-rings (Item 1) **[Figure 20-50-90]** from the valve.

Figure 20-50-91



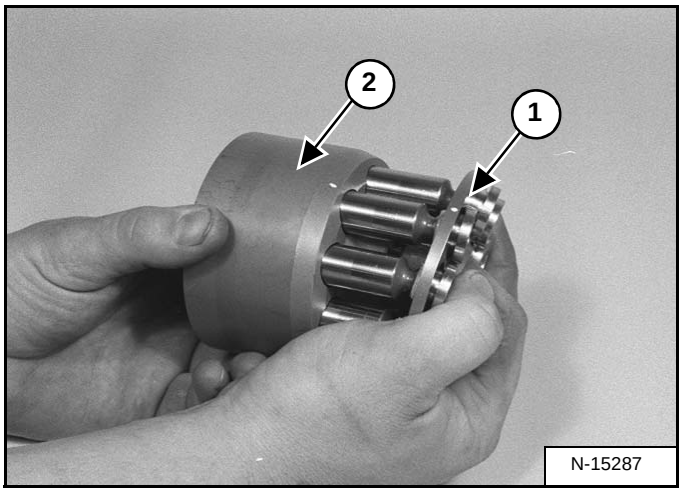
Pump Margin Control

Before disassembling the pump margin control, remove the cap (Item 1) and O-ring washer (Item 2) **[Figure 20-50-91]** from the adjustment assembly.

Measure the adjustment screw (Item 3) **[Figure 20-50-91]**, thread length for the correct initial adjustment.

Disassembly (Cont'd)

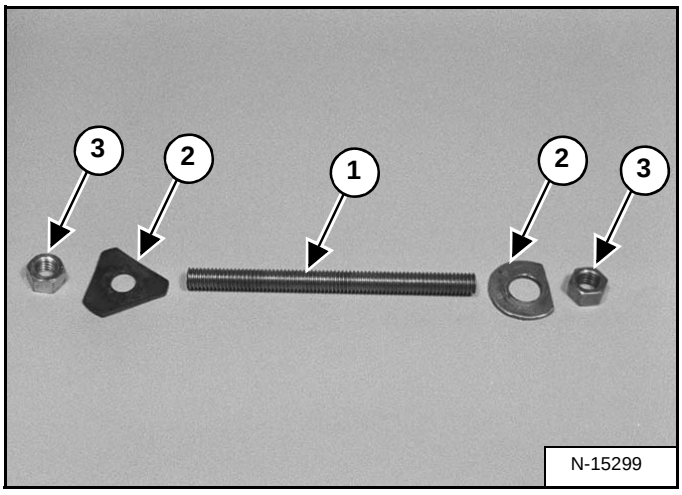
Figure 20-50-120



Remove the retainer plate and pistons (Item 1) from the cylinder block (Item 2) **[Figure 20-50-120]**.

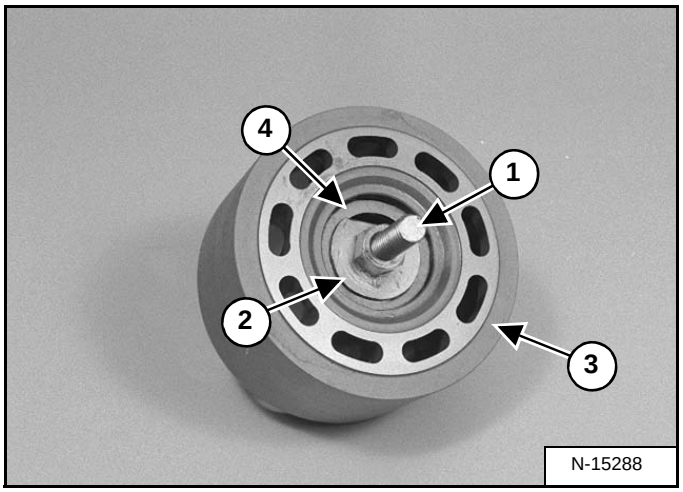
NOTE: The following procedure shown is to disassemble the rotating group for inspection only. The rotating group parts can not be ordered separately and must be ordered as an assembly.

Figure 20-50-121



To remove the spring from inside the cylinder block, use a threaded rod (or bolt) (Item 1) trimmed washers (Item 2) and nuts (Item 3) **[Figure 20-50-121]**.

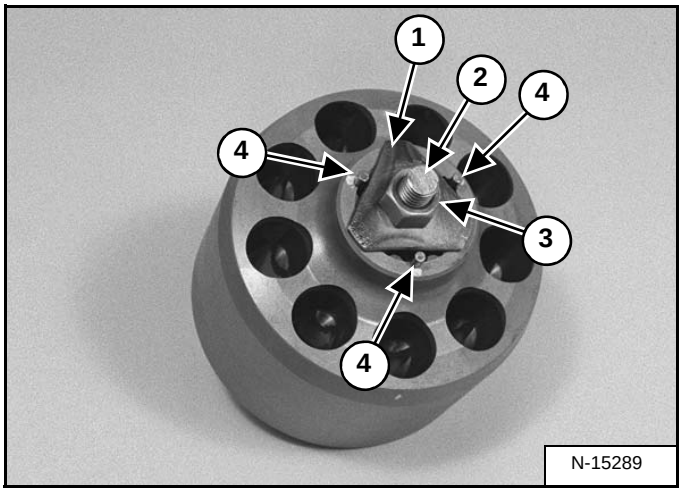
Figure 20-50-122



Install the threaded rod and nut (Item 1) through the trimmed washer (Item 2) and through the block assembly (Item 3) **[Figure 20-50-122]**.

NOTE: The modified washer (Item 2) must fit over the spring but must also fit inside the snap ring (Item 4) [Figure 20-50-122].

Figure 20-50-123

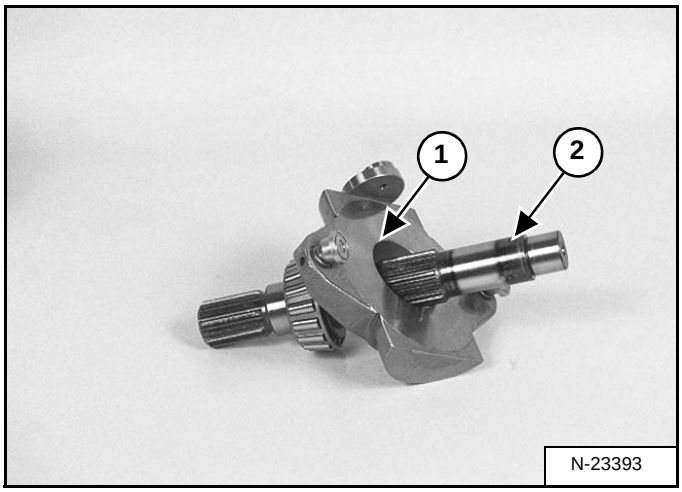


Install the second trimmed washer (Item 1) over the threaded rod (Item 2) install the nut (Item 3) **[Figure 20-50-123]**.

NOTE: The modified washer (Item 1) must fit between the pins (Item 4) [Figure 20-50-123].

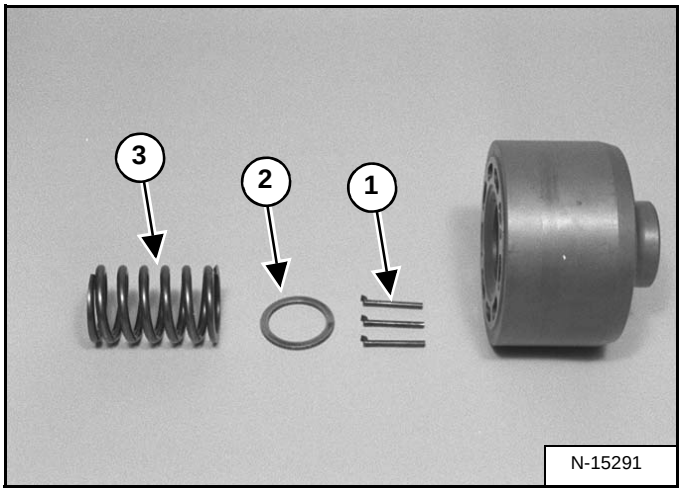
Assembly (Cont'd)

Figure 20-50-157



Install the cradle (Item 1) on the shaft (Item 2) **[Figure 20-50-157]**.

Figure 20-50-158

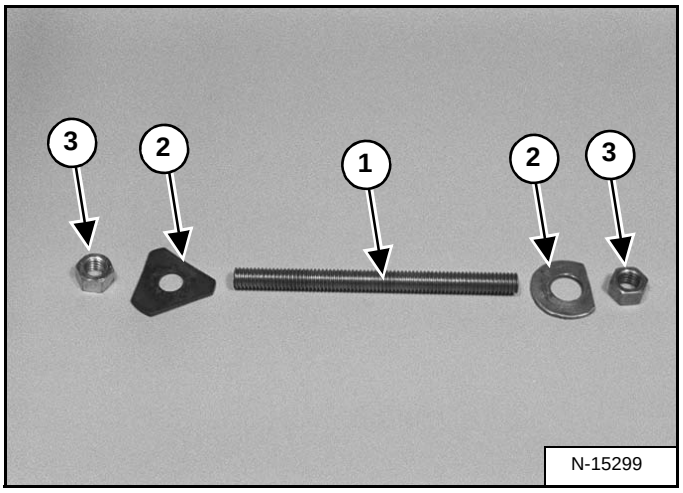


Apply clean grease to the pins (Item 1) **[Figure 20-50-158]** and install them in the appropriate groove.

Install the washer (Item 2) and the spring (Item 3) **[Figure 20-50-158]**.

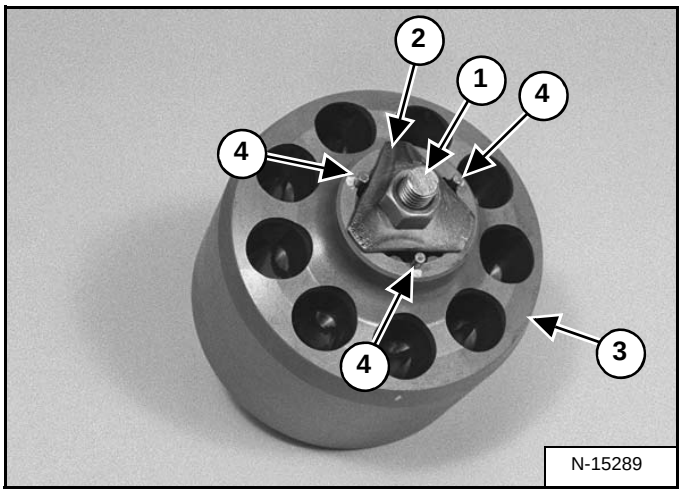
NOTE: If the rotating group is damaged, the parts can not be ordered separately and must be ordered as an assembly.

Figure 20-50-159



To compress the spring inside the cylinder block, use a threaded rod (or bolt) (Item 1), trimmed washers (Item 2) and nuts (Item 3) **[Figure 20-50-159]**.

Figure 20-50-160

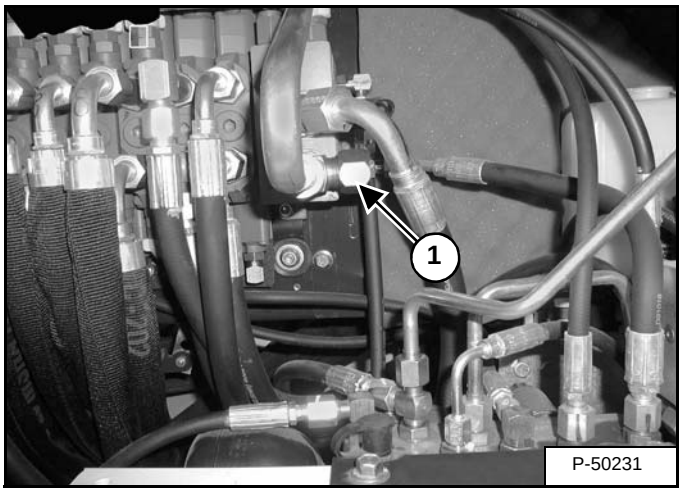


Install the threaded rod and nut (Item 1) through the modified washer (Item 2) and the block assembly (Item 3) **[Figure 20-50-160]**.

NOTE: The modified washer (Item 2) must fit between the pins (Item 4) [Figure 20-50-160].

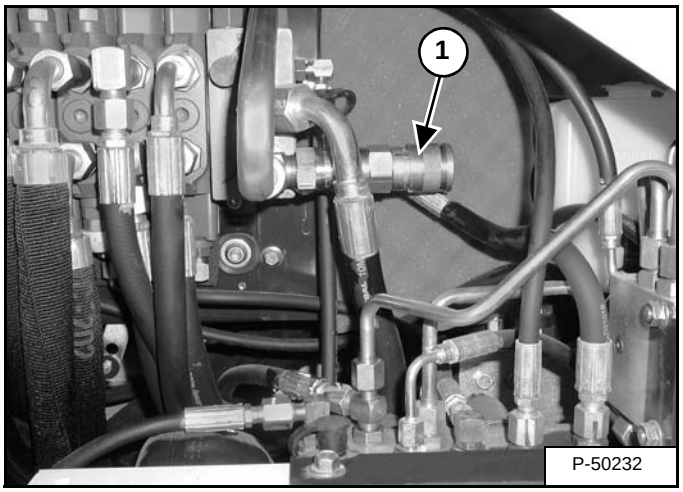
Pump Testing (Cont'd)

Figure 20-51-4



Remove the cap (Item 1) **[Figure 20-51-4]** from the control valve.

Figure 20-51-5



Install a female quick coupler (Item 1) **[Figure 20-51-5]** on the hydraulic control valve.

Test Fittings are Now Installed.

The values read at the Hydraulic Tester (MEL10003) are based on the use of 3/4" (19,05 mm) hoses on the tester. Different size hoses will cause variation in the readings.

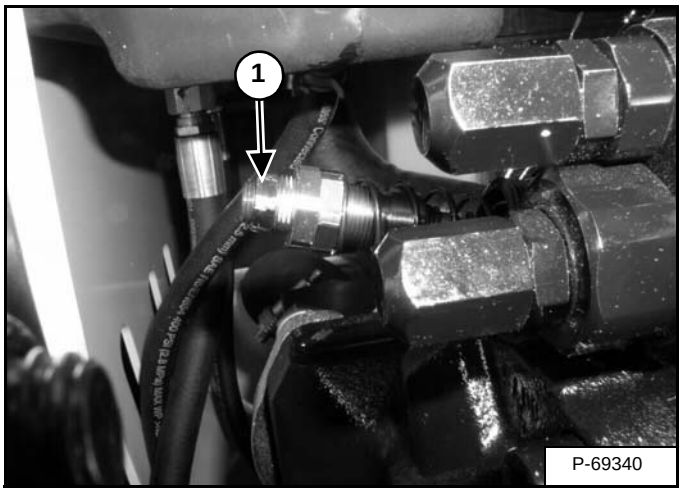
Record the no load engine RPM, registered on the right hand operator panel display.

See high idle specification (See Engine On Page SPEC-10-8).

Stop the engine and adjust the engine RPM if necessary.

Pump Testing (Cont'd)

Figure 20-51-32



If the flow at high pressure must be adjusted, adjust the flow at the hydraulic pump torque limiter. Stop the engine, remove the torque limiter cover and loosen the small jam nut (Item 1) **[Figure 20-51-32]** and with an Allen wrench adjust the *flow at high pressure*.

If this flow at high pressure cannot be obtained, remove and replace the torque limiter spool assembly.

When the proper flow is obtained, **14 - 18 GPM (53 - 68 L/min.) at 3300 PSI (228 bar)**, lock the small jam nut (Item 1) **[Figure 20-51-32]**.

NOTE: When adjusting the flow at high pressure, the engine RPM must not fall below 2100 RPM.

NOTE: If adjustments were made to *flow at high pressure* verify the *flow at low pressure*. (See Torque Limiter Adjustment on Page 20-51-13.)

Install the cap on the hydraulic pump torque limiter and tighten.

Torque Limiter Adjustment is now completed.

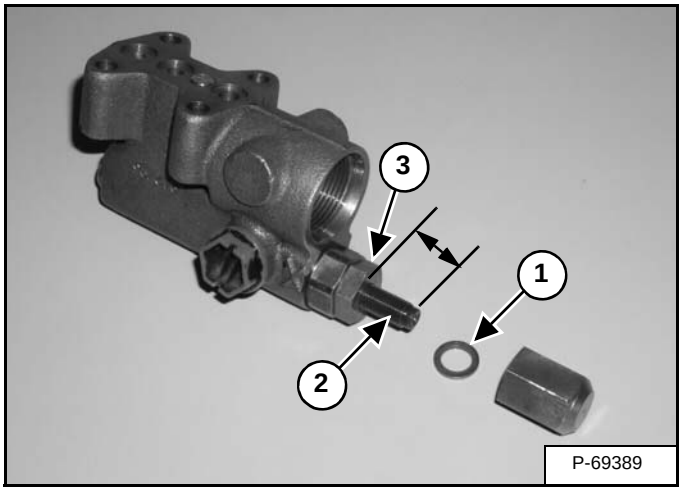
ALL PUMP ADJUSTMENTS ARE NOW COMPLETED

Remove the hydraulic tester and all test fittings from the excavator.

Pump Control Disassembly And Assembly (Cont'd)

Pump Margin Control (Cont'd)

Figure 20-51-56

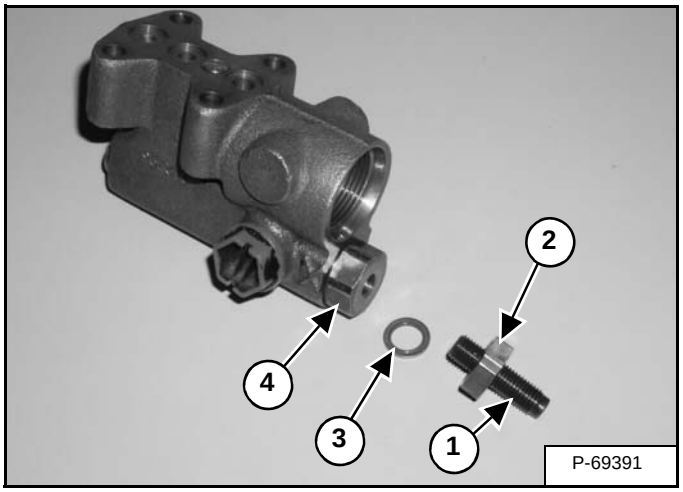


Before disassembling the pump margin control, remove the O-ring washer (Item 1) **[Figure 20-51-56]** from the adjustment assembly.

Measure the adjustment screw (Item 2) **[Figure 20-51-56]**, thread length for the correct initial adjustment.

Loosen the nut (Item 3) **[Figure 20-51-56]**.

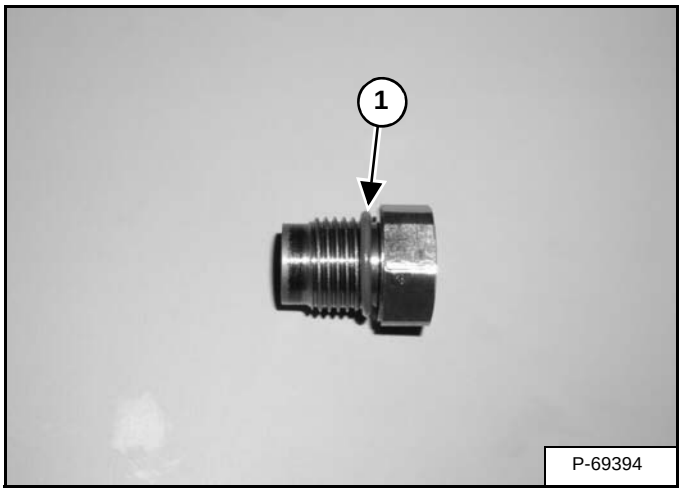
Figure 20-51-57



Remove the adjustment screw (Item 1), nut (Item 2), and O-ring washer (Item 3) from the adjustment assembly (Item 4) **[Figure 20-51-57]**.

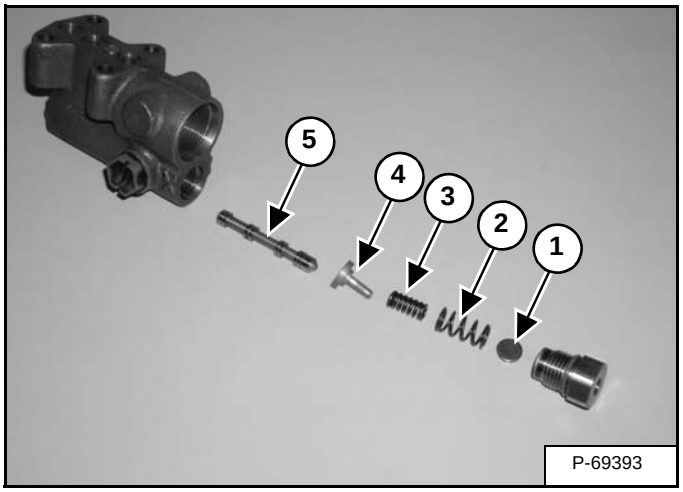
Remove the adjustment assembly (Item 4) **[Figure 20-51-57]** from the pump control assembly.

Figure 20-51-58



Replace the O-ring (Item 1) **[Figure 20-51-58]** before installation.

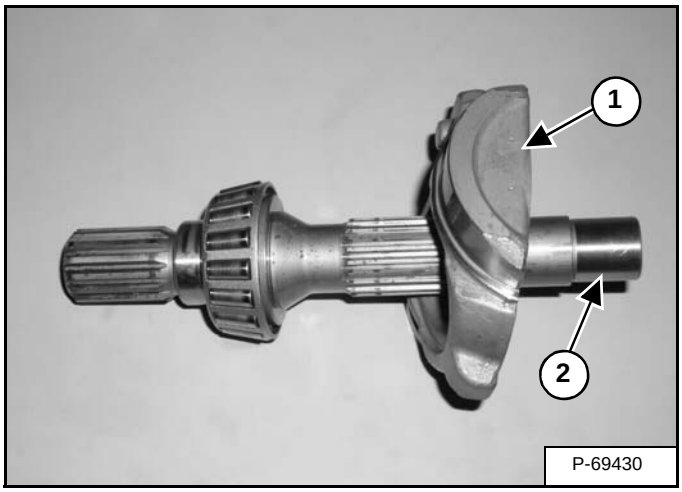
Figure 20-51-59



Remove the disc (Item 1), large spring (Item 2), small spring (Item 3), spring retainer (Item 4) and spool (Item 5) **[Figure 20-51-59]** from the pump control.

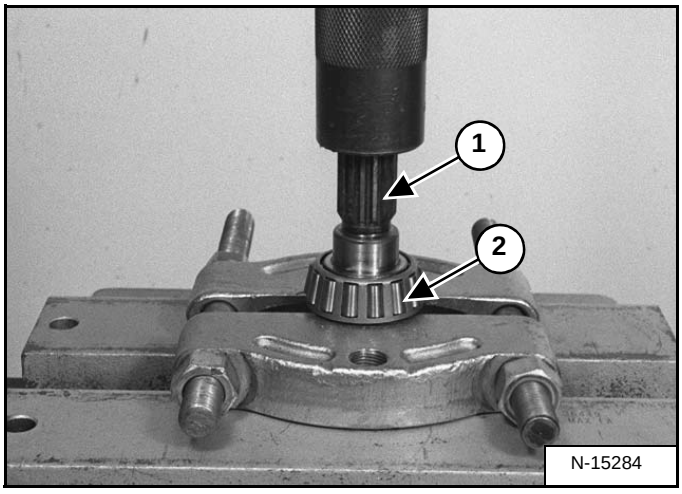
Disassembly And Assembly (Cont'd)

Figure 20-51-88



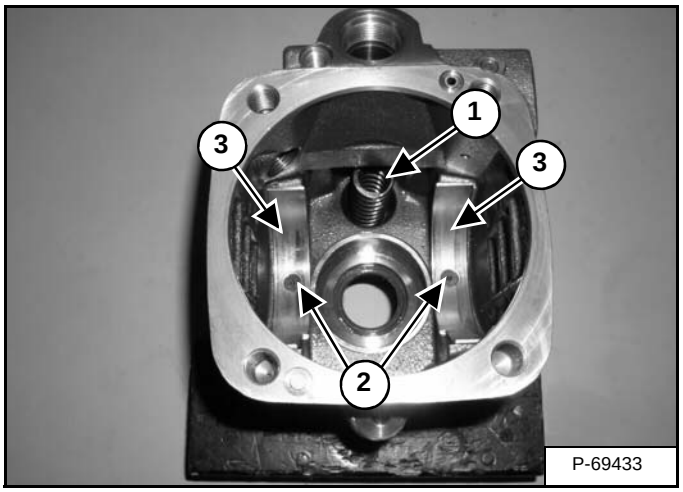
Remove the swash plate (Item 1) from the shaft (Item 2) **[Figure 20-51-88]**.

Figure 20-51-89



Press the shaft (Item 1) from the bearing (Item 2) **[Figure 20-51-89]**.

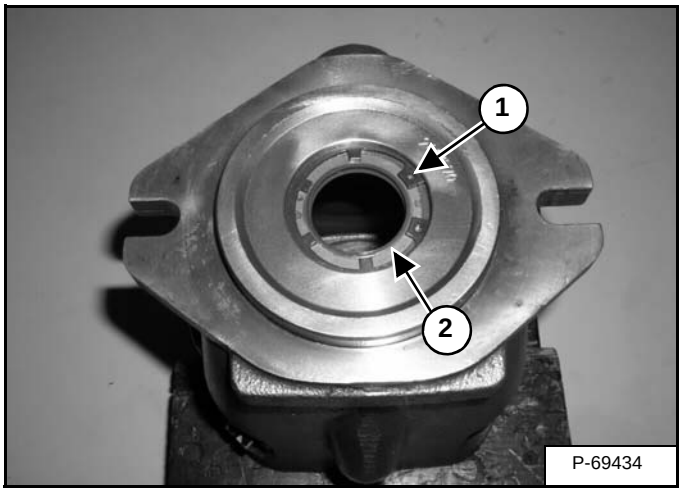
Figure 20-51-90



Stand the hydraulic pump vertically and remove the spring (Item 1) **[Figure 20-51-90]** from the pump housing.

Remove the screws (Item 2) and brass bearings (Item 3) **[Figure 20-51-90]** from the pump housing.

Figure 20-51-91

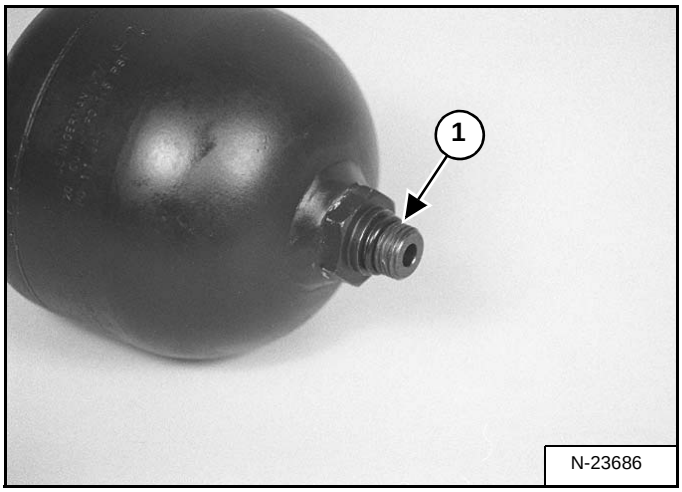


Rotate the pump housing over and remove the snap ring (Item 1) **[Figure 20-51-91]** from the housing.

Remove the seal (Item 2) **[Figure 20-51-91]** from the housing.

Disassembly And Assembly (Cont'd)

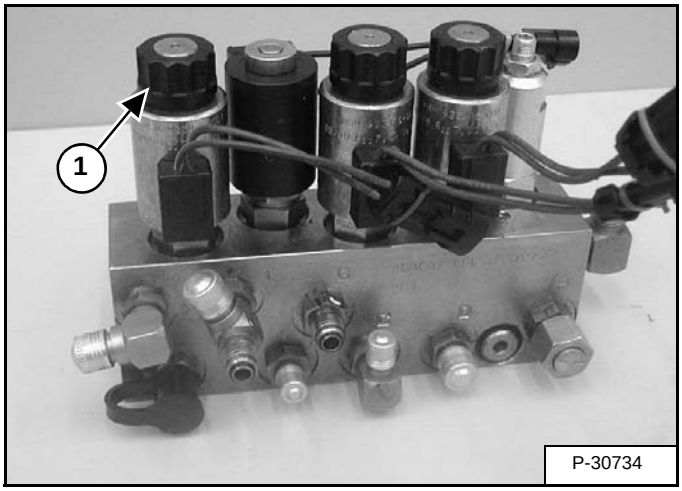
Figure 20-60-21



Remove the O-ring (Item 1) **[Figure 20-60-21]** from the accumulator.

Installation: Tighten the accumulator to 22 - 24 ft.-lb. (29 - 33 N•m) torque.

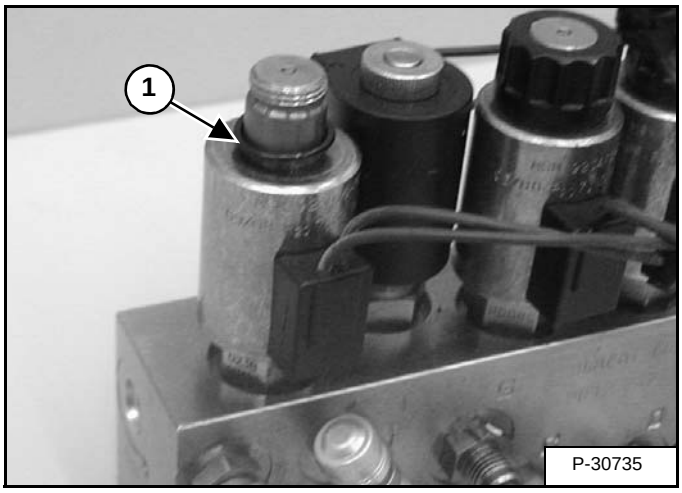
Figure 20-60-22



Remove the nut (Item 1) **[Figure 20-60-22]** from the variable pilot supply solenoid.

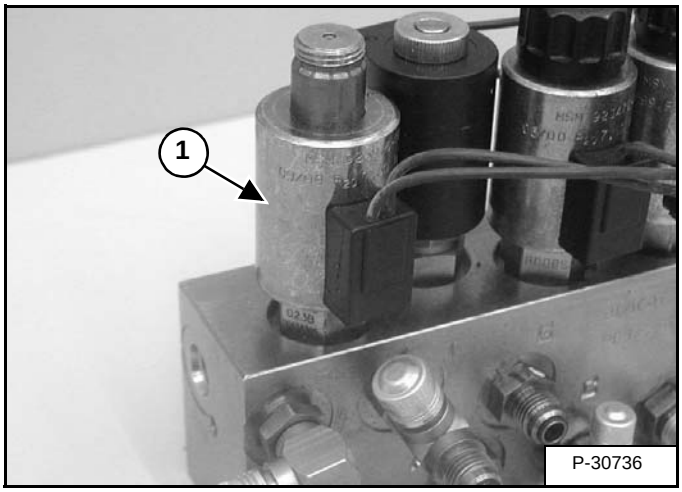
Installation: Tighten the solenoid nut to 36 - 54 in.-lb. (4,1 - 6,1 N•m) torque.

Figure 20-60-23



Remove the O-ring (Item 1) **[Figure 20-60-23]** from the spool.

Figure 20-60-24



Remove the solenoid (Item 1) **[Figure 20-60-24]** from the spool.

TRAVEL MOTOR

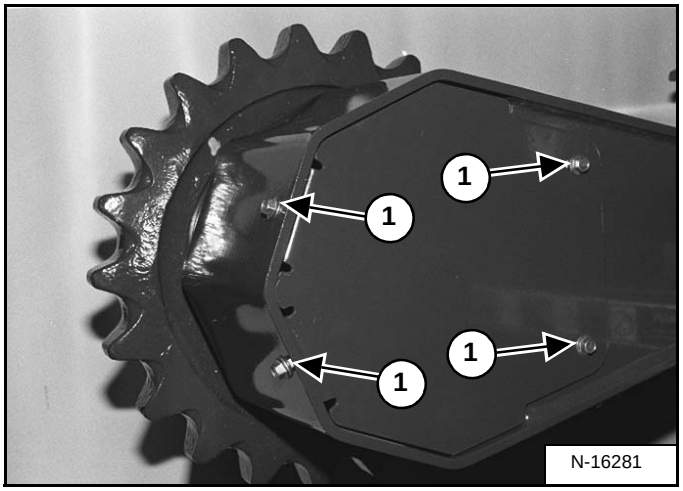
Removal And Installation

Lift and block the side of the track frame where the travel motor will be removed.

Release the rubber track tension and remove the track. (See Rubber Track Removal And Installation on Page 30-20-6.) (If equipped)

Release the steel track tension and remove the track. (See Steel Track Removal on Page 30-20-9.) (If equipped)

Figure 20-70-1



Remove the 4 bolts (Item 1) **[Figure 20-70-1]** from the track frame cover.

Installation: Tighten the bolts to 20 - 25 ft.-lb. (27 - 34 N•m) torque.

Remove the cover.

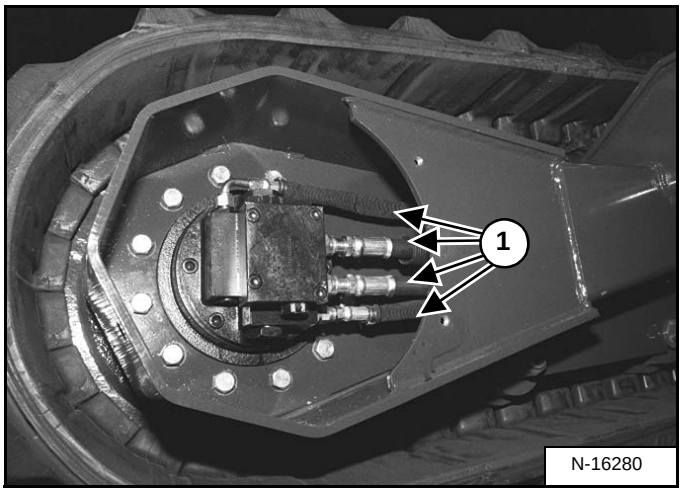
IMPORTANT

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

I-2003-0888

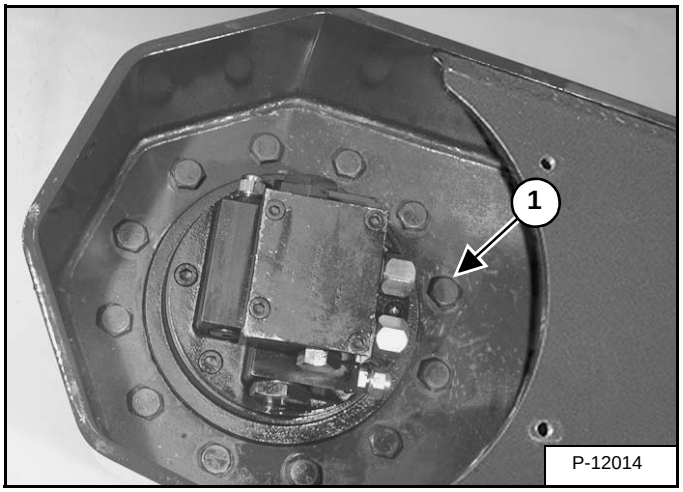
Mark the hoses for correct installation.

Figure 20-70-2



Remove the hoses (Item 1) **[Figure 20-70-2]** from the travel motor.

Figure 20-70-3



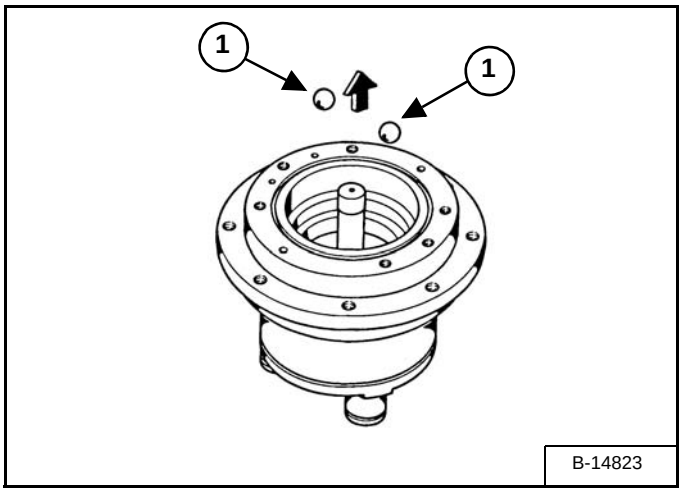
Remove the bolts (Item 1) **[Figure 20-70-3]** from the travel motor.

Installation: Apply thread lock adhesive Loctite® 242 to the bolts and tighten to 118 - 133 ft.-lb. (160 - 180 N•m) torque.

Remove the travel motor from the track frame.

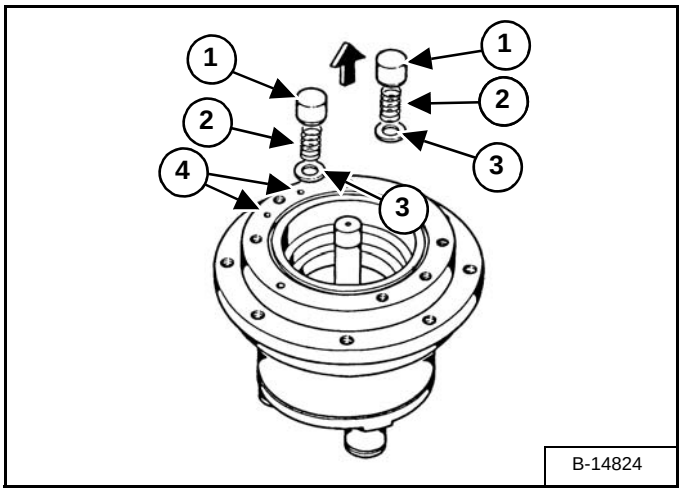
Disassembly (Cont'd)

Figure 20-70-35



Remove the 2 balls (Item 1) **[Figure 20-70-35]**.

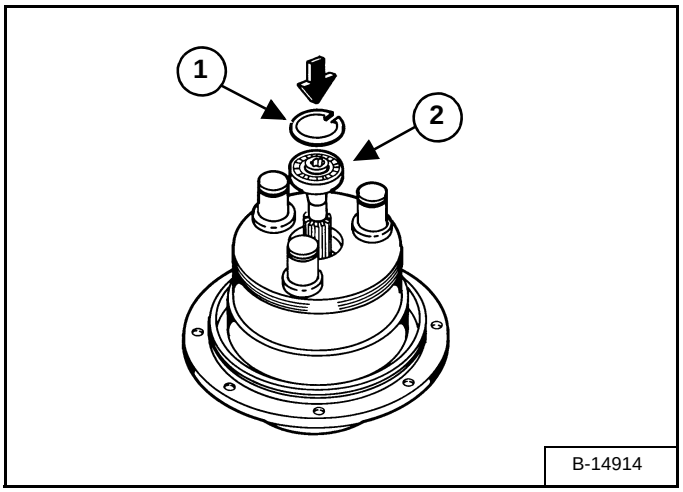
Figure 20-70-36



Remove the 2 displacement control pistons (Item 1), springs (Item 2) and washers (Item 3) **[Figure 20-70-36]**.

NOTE: To ease removal of the pistons, apply low air pressure to the oil hole (Item 4) [Figure 20-70-36].

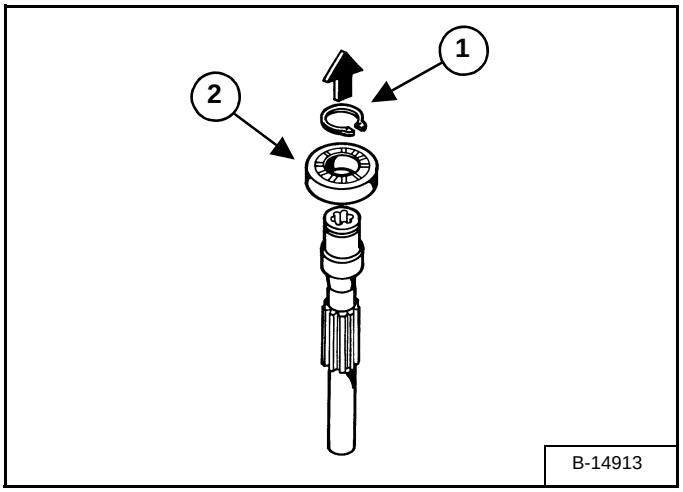
Figure 20-70-37



Remove the internal snap ring (Item 1) **[Figure 20-70-37]** retaining the bearing/drive shaft to the hub.

Push the drive shaft (Item 2) **[Figure 20-70-37]** from the bottom to remove the shaft from the hub.

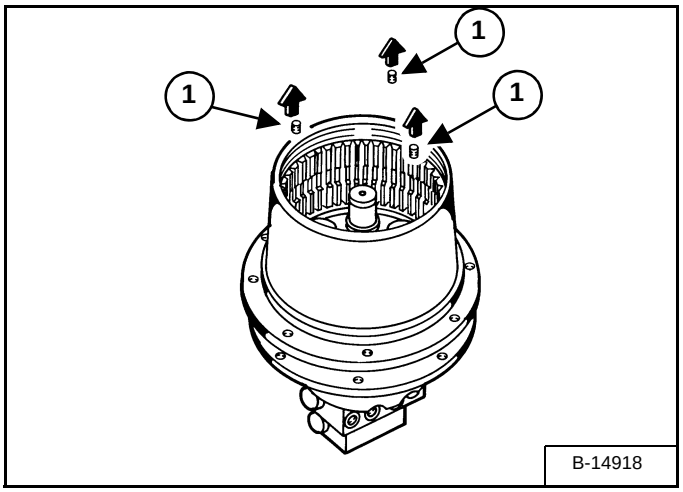
Figure 20-70-38



Remove the snap ring (Item 1) and bearing (Item 2) **[Figure 20-70-38]** from the drive shaft.

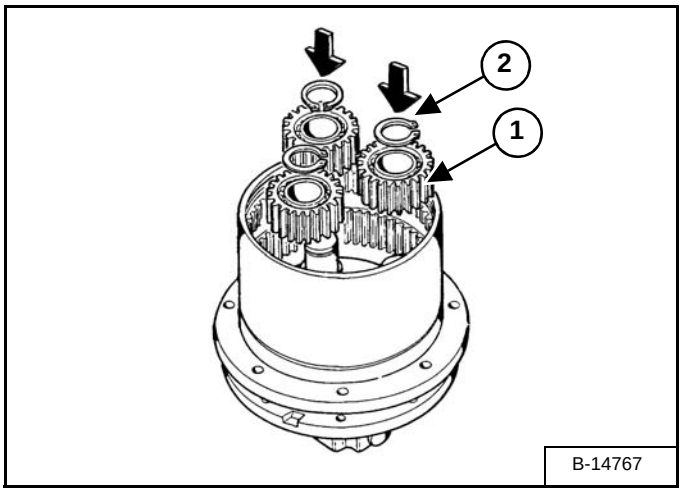
Assembly (Cont'd)

Figure 20-70-71



Apply thread lock adhesive Loctite® 242 to the ring nut retaining screws (Item 1) **[Figure 20-70-71]**. Install the screws.

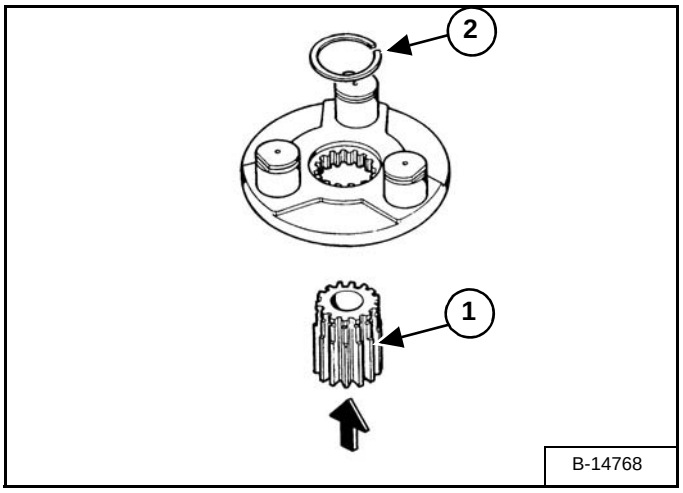
Figure 20-70-72



Install the planetary gears/bearings (Item 1) and snap rings (Item 2) **[Figure 20-70-72]**.

NOTE: The second stage planetary gears/bearings must be installed with the bearing race flare facing down to match the shoulder on the pins.

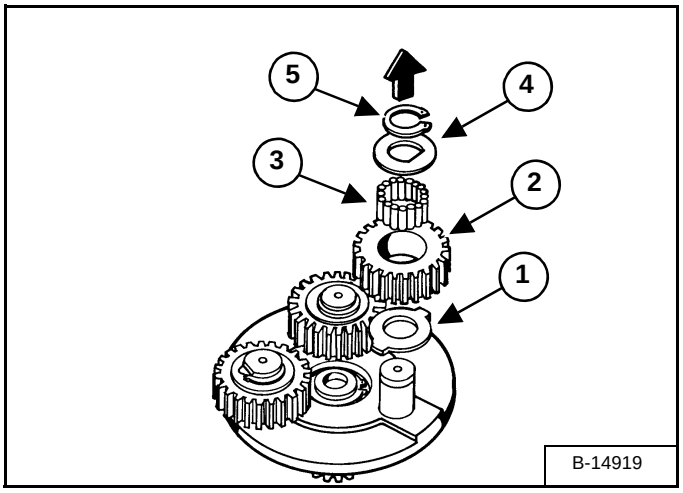
Figure 20-70-73



Install the sun gear (Item 1) **[Figure 20-70-73]** into the outer planetary carrier.

Install the snap ring (Item 2) on the sun gear (Item 1) **[Figure 20-70-73]**.

Figure 20-70-74

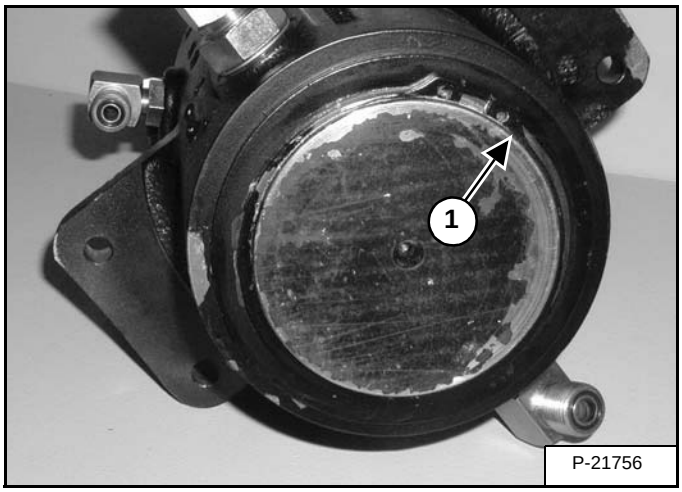


Install the thrust washers (Item 1), planetary gears (Item 2), bearings (Item 3), anti-rotation washers (Item 4) and external snap rings (Item 5) **[Figure 20-70-74]**.

Install the snap rings (Item 5) **[Figure 20-70-74]** so the opening of the snap ring is towards the outside.

Assembly (Cont'd)

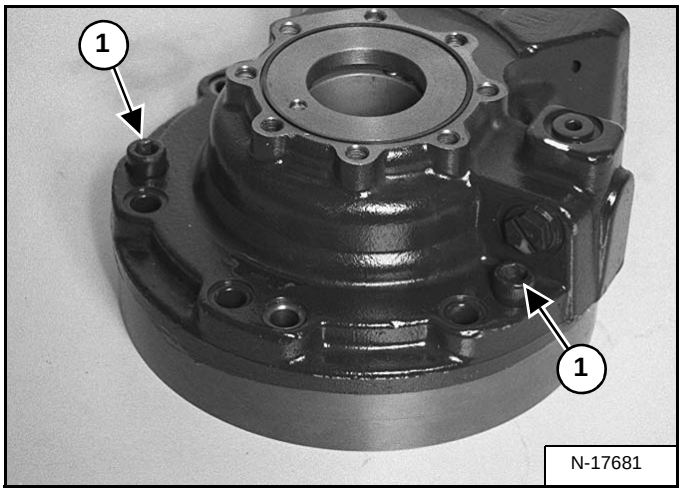
Figure 20-80-20



Install the snap ring (Item 1) **[Figure 20-80-20]** on the bottom of the rotor.

Disassembly (Cont'd)

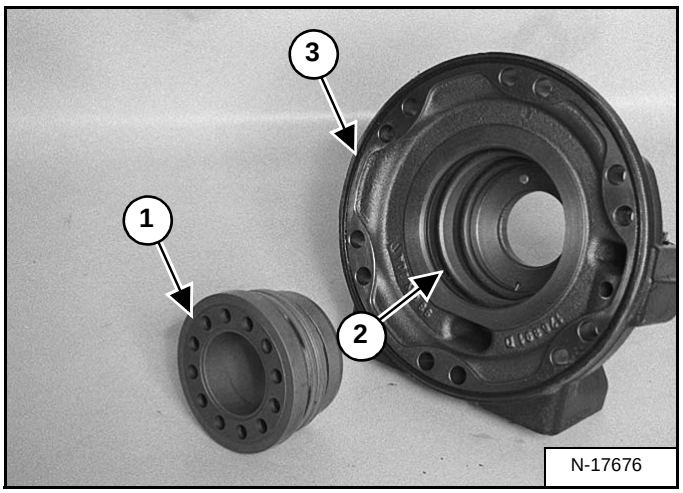
Figure 20-90-26



Remove the cam ring bolts (Item 1) **[Figure 20-90-26]** from the housing.

Remove the cam ring.

Figure 20-90-27



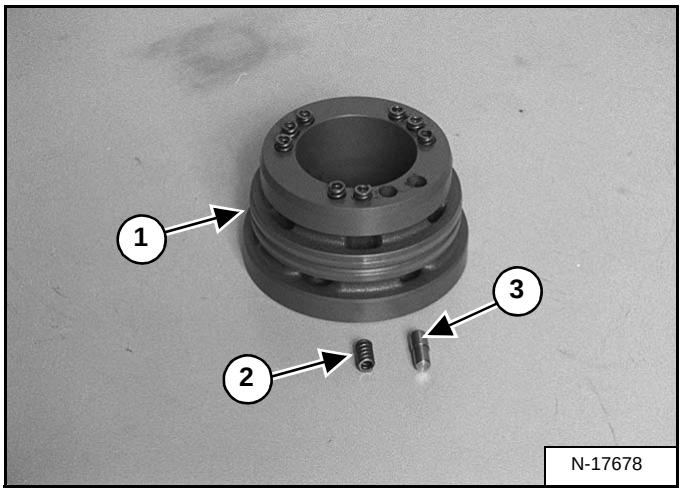
Use a brass drift and hammer to remove the distributor (Item 1) **[Figure 20-90-27]** from the housing.

Remove the seals and O-rings (Item 2) **[Figure 20-90-27]** from inside the housing.

Remove the large outer O-ring (Item 3) **[Figure 20-90-27]** from the housing.

NOTE: Make a note of the position of the back-up rings and seal before removing them for correct assembly.

Figure 20-90-28



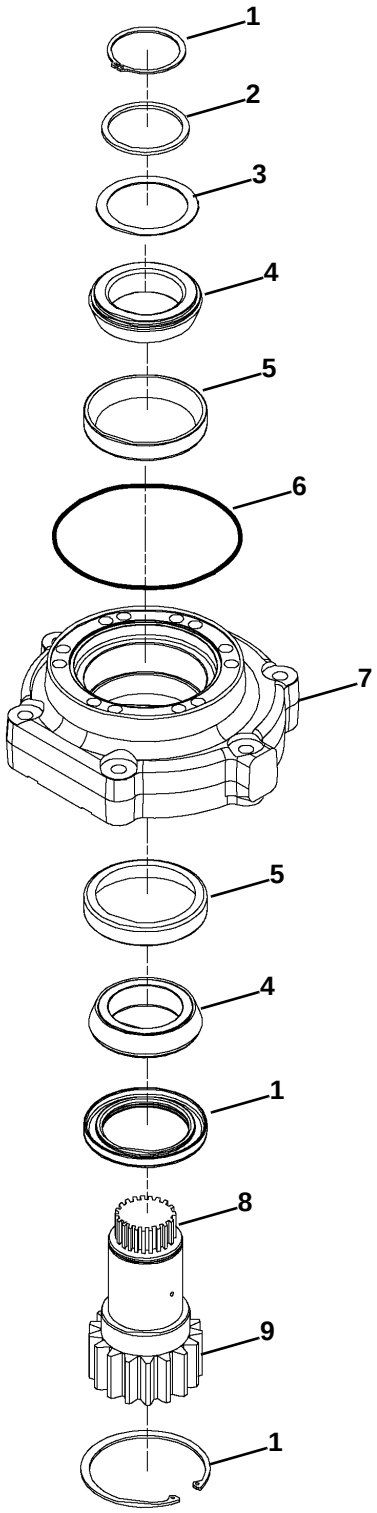
Remove the seal and back-up rings (Item 1) **[Figure 20-90-28]** from the distributor.

Remove the 9 springs (Item 2) **[Figure 20-90-28]**.

Remove the alignment pin (Item 3) **[Figure 20-90-28]**.

Parts Identification

1. Snap Ring
2. Spacer
3. Shim
4. Bearing
5. Race
6. O-ring
7. Carrier
8. Seal
9. Shaft



TS-01815

CONTROL PATTERN SELECTOR VALVE

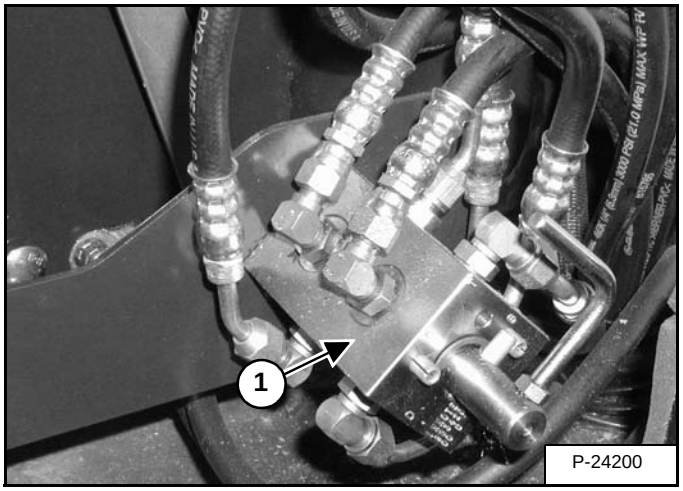
Removal And Installation

Remove the right console cover. (See Console Cover Removal And Installation on Page 40-50-1.)

Remove the right console base. (See Console Base Removal And Installation on Page 40-50-2.)

Mark all hydraulic hoses for proper installation.

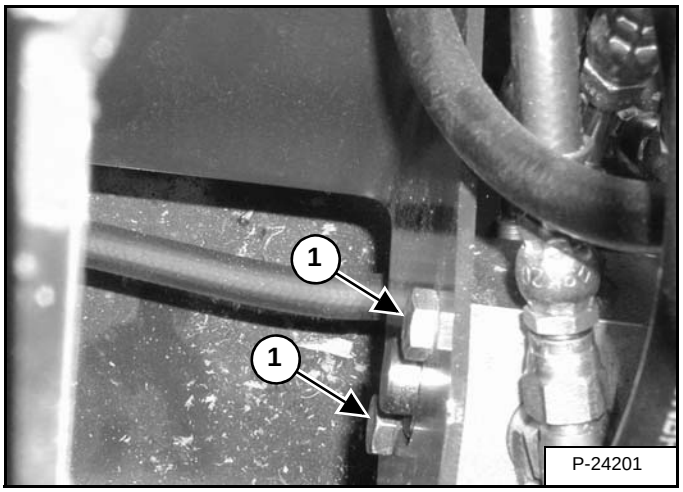
Figure 20-100-1



Remove the 8 hoses from the control pattern selector valve (Item 1) **[Figure 20-100-1]**.

Cap and plug the hoses and fittings.

Figure 20-100-2

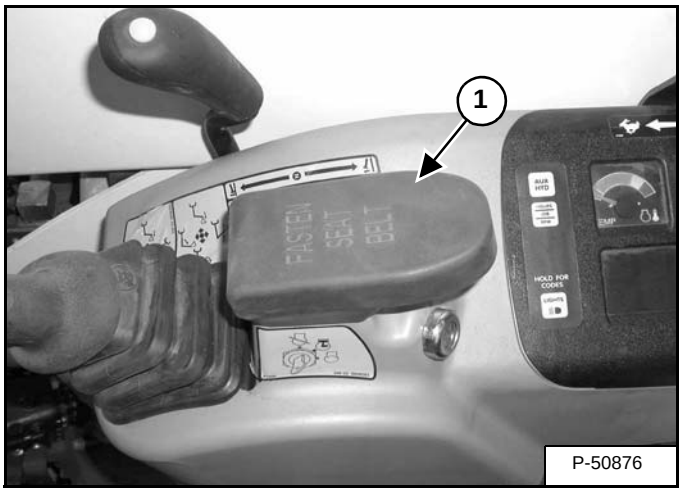


Remove the 2 selector valve mount bolts (Item 1) **[Figure 20-100-2]**.

Remove the control pattern selector valve from the excavator.

Joystick Assembly Removal And Installation

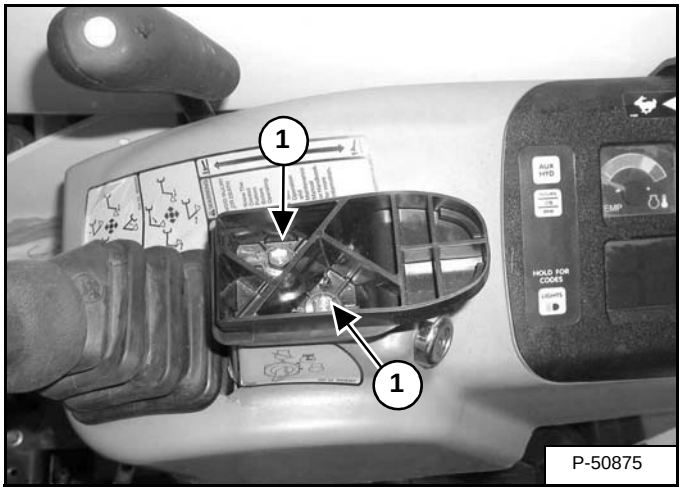
Figure 20-110-22



Remove the cover (Item 1) **[Figure 20-110-22]** from the arm rest.

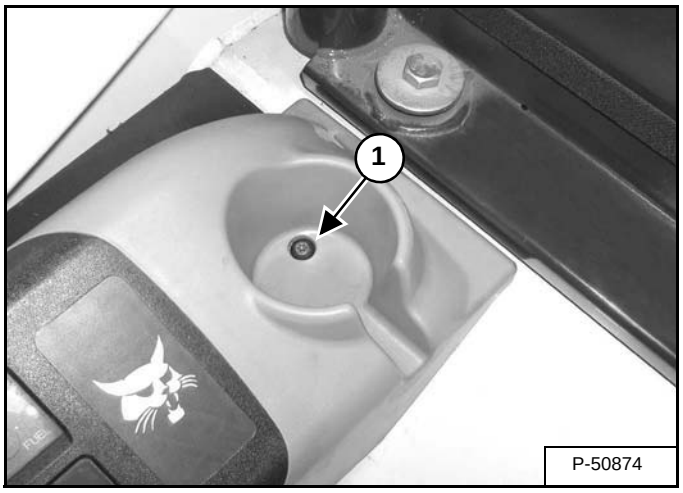
Lift up on the rear of the cover and slide the cover ahead to remove it.

Figure 20-110-23



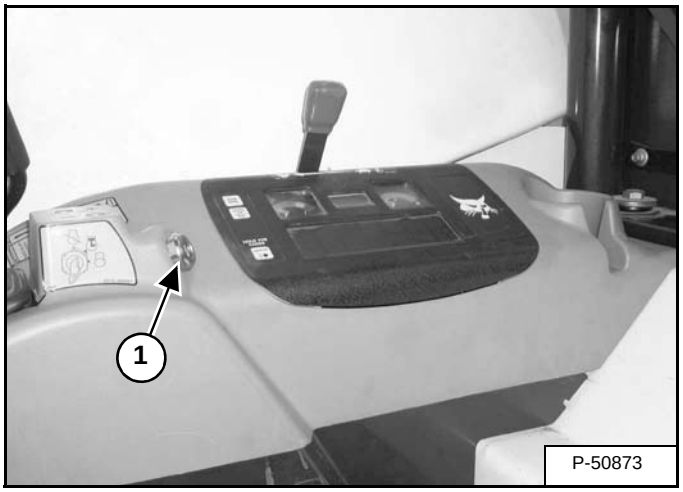
Remove the two bolts (Item 1) **[Figure 20-110-23]** from the arm rest. Remove the arm rest.

Figure 20-110-24



Remove the screw (Item 1) **[Figure 20-110-24]** from the cup holder.

Figure 20-110-25

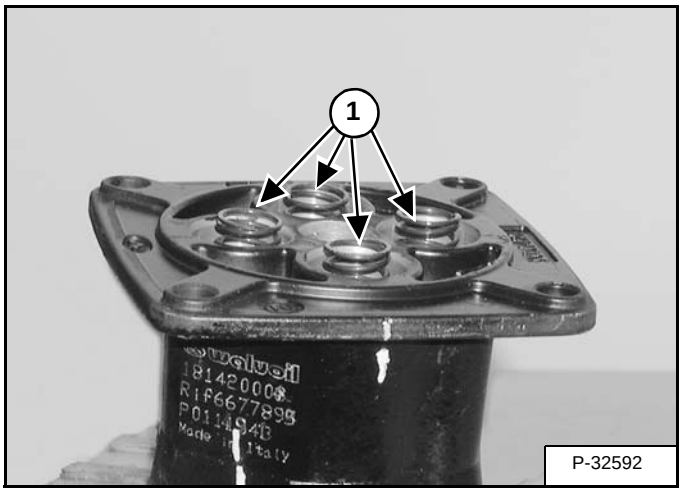


Remove the nut from the key switch (Item 1) **[Figure 20-110-25]** (if equipped). Allow the switch to drop inside the console.

Lift the console up and over the joystick.

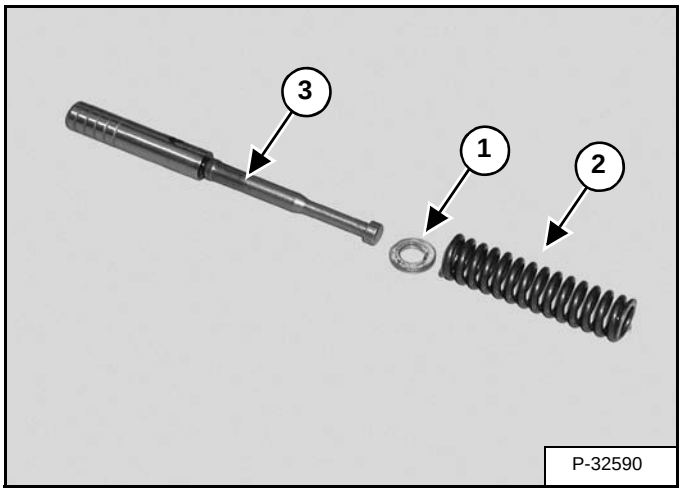
Assembly (Cont'd)

Figure 20-110-52



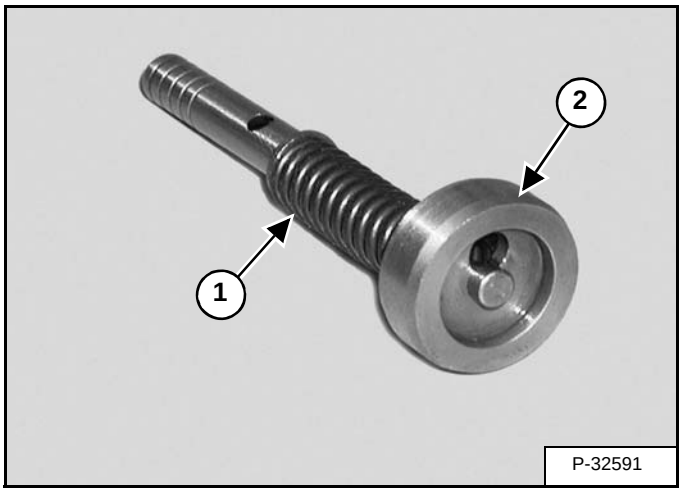
Install the four springs (Item 1) **[Figure 20-110-52]**.

Figure 20-110-53



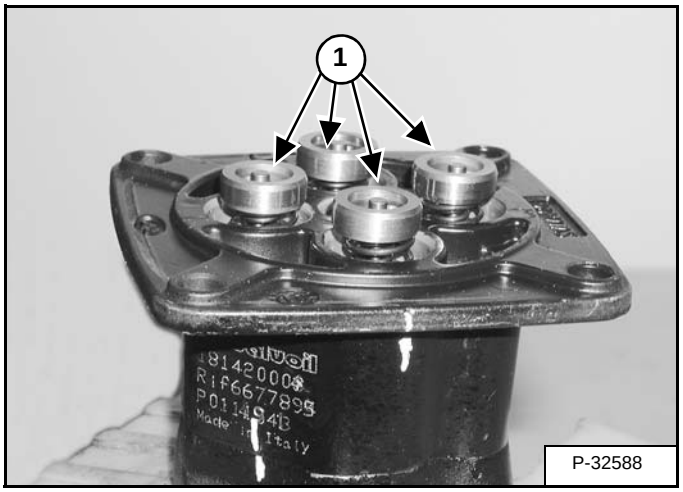
Install the shim (Item 1) and spring (Item 2) on the spool (Item 3) **[Figure 20-110-53]**.

Figure 20-110-54



Compress the spring (Item 1) and install the spring seat (Item 2) **[Figure 20-110-54]**.

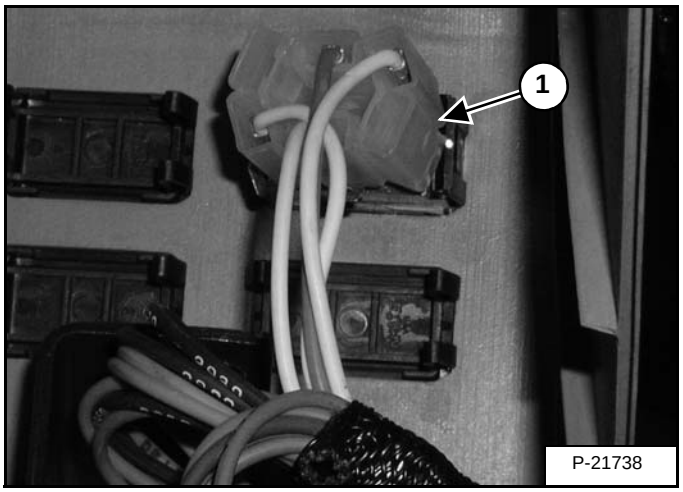
Figure 20-110-55



Install the four spool assemblies (Item 1) **[Figure 20-110-55]** into the housing.

Joystick Assembly Removal And Installation (Cont'd)

Figure 20-111-20

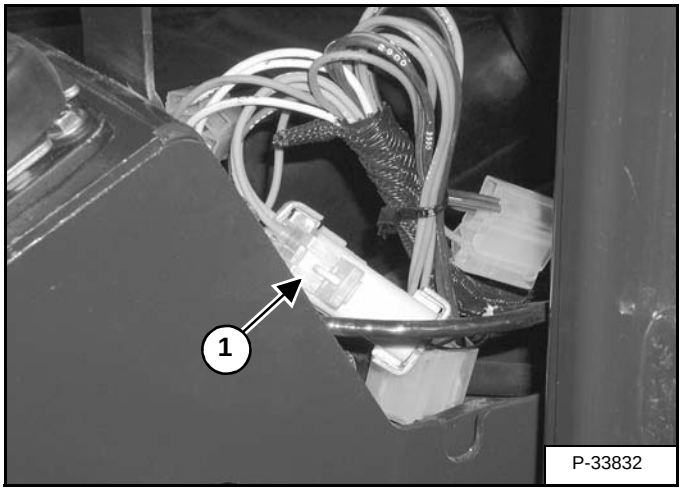


Disconnect the wire harness (Item 1) **[Figure 20-111-20]**.

NOTE: These connectors are keyed so they can be plugged in only one way.

Remove the console cover.

Figure 20-111-21



Disconnect the wire harness (Item 1) **[Figure 20-111-21]**.

Figure 20-111-22

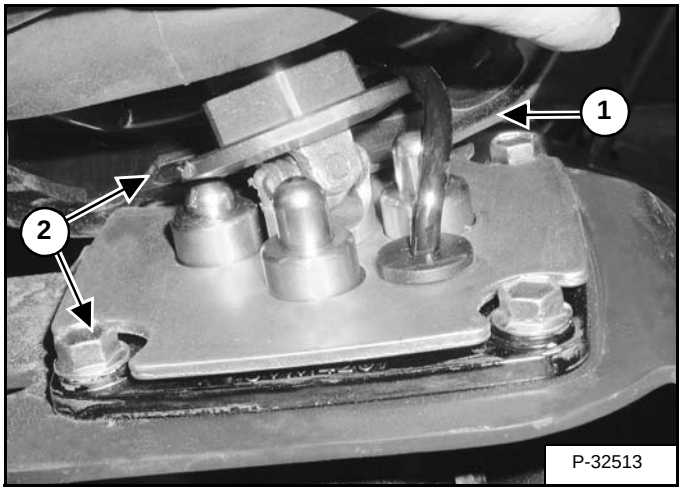
Mark and remove the hoses **[Figure 20-111-22]**.

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 20-111-23



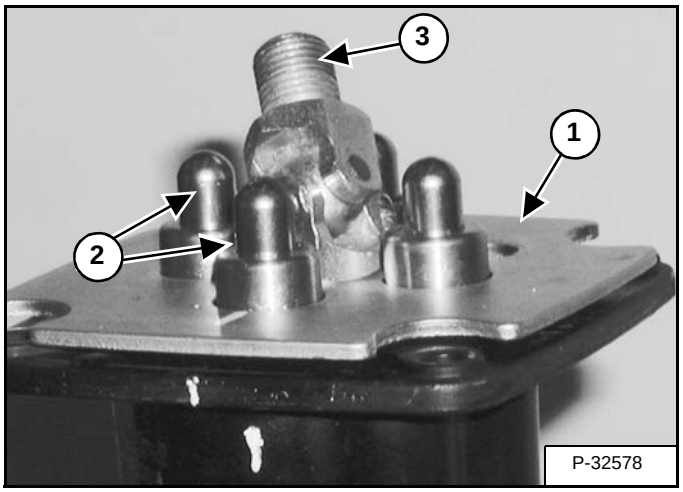
Pull the boot (Item 1) up **[Figure 20-111-23]**.

Remove the four bolts (Item 2) **[Figure 20-111-23]** from the mounting plate.

Remove the joystick assembly.

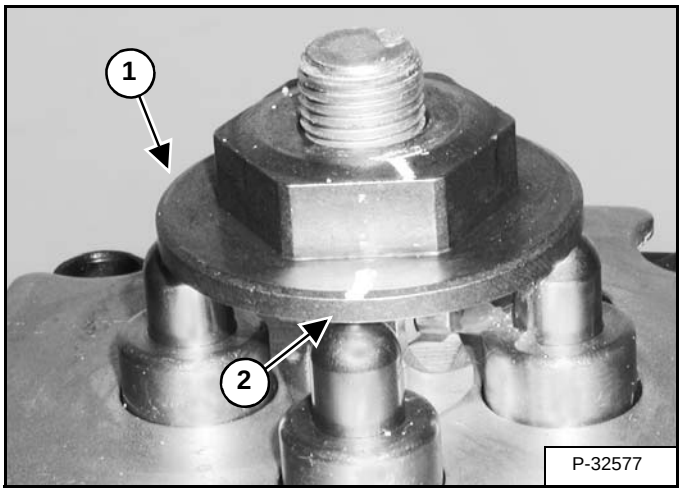
Assembly (Cont'd)

Figure 20-111-52



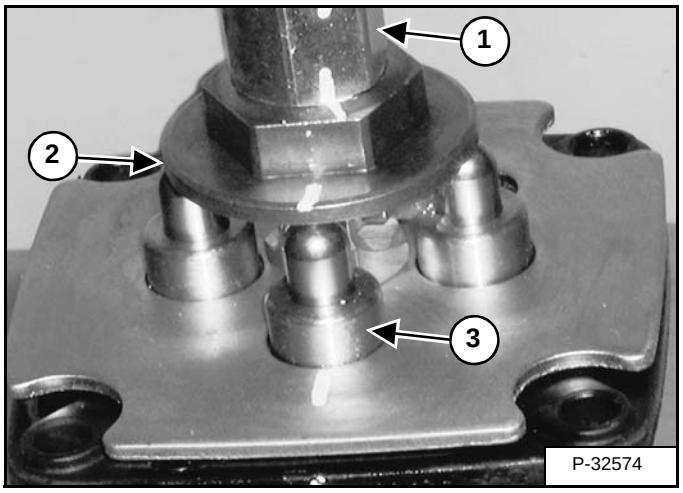
Press down on the plate (Item 1) keeping the plunger assemblies (Item 2) fully seated and install the U-joint (Item 3) **[Figure 20-111-52]**.

Figure 20-111-53



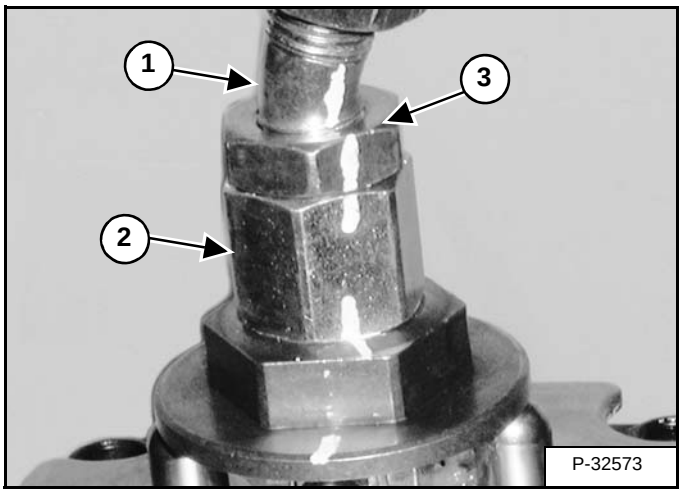
Install the control plate (Item 1) until the plate makes light contact with all four plungers (Item 2) **[Figure 20-111-53]**.

Figure 20-111-54



Align the coupler (Item 1) with the control plate (Item 2) and plunger (Item 3) **[Figure 20-111-54]**. Tighten the coupler.

Figure 20-111-55



Install the connector **[Figure 20-111-55]**.

Align the connector with the coupler (Item 2) and tighten the nut (Item 3) **[Figure 20-111-55]**.

HYDRAULIC RESERVOIR

Removal And Installation

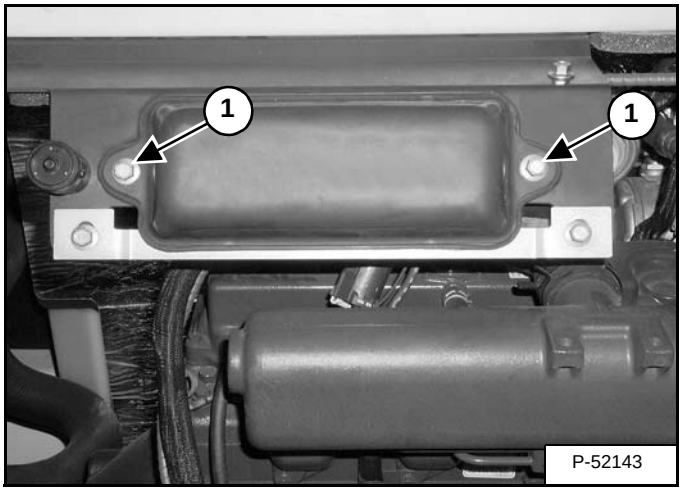
Open the tailgate.

Drain the hydraulic reservoir. (See Replacing The Hydraulic Oil on Page 10-100-2.)

Remove the air cleaner. (See Removal And Installation on Page 60-30-1.)

Remove the muffler. (See Removal And Installation on Page 60-20-1.)

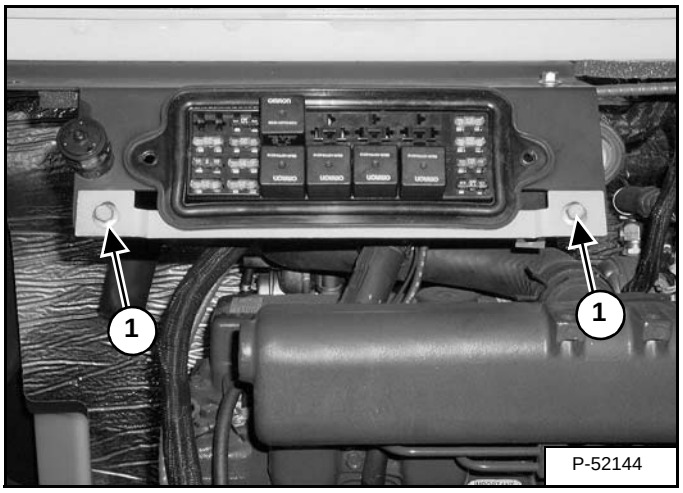
Figure 20-130-1



Remove the two fuse cover mount bolts (Item 1) **[Figure 20-130-1]**.

Remove the fuse cover.

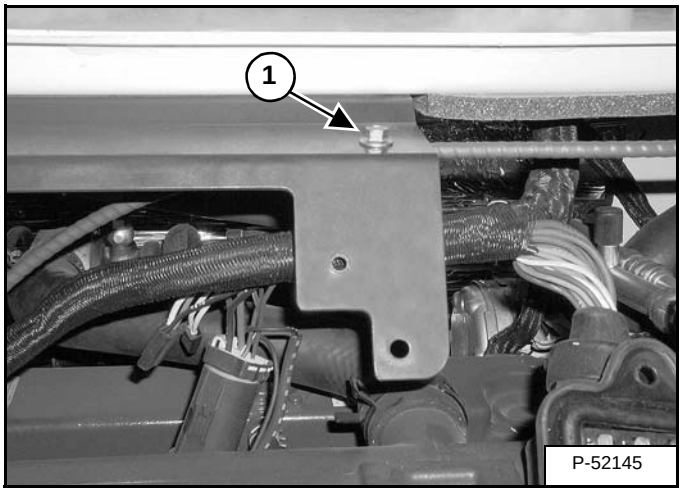
Figure 20-130-2



Remove the two mount bolts (Item 1) **[Figure 20-130-2]** from the fuse box support bar.

Remove the bar, and move the fuse holder and wiring from the mount plate.

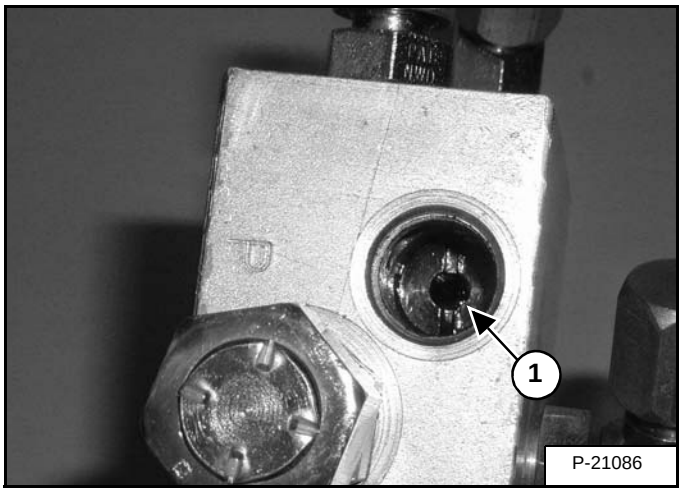
Figure 20-130-3



Remove the nut and bolt (Item 1) **[Figure 20-130-3]** from the throttle cable support clamp.

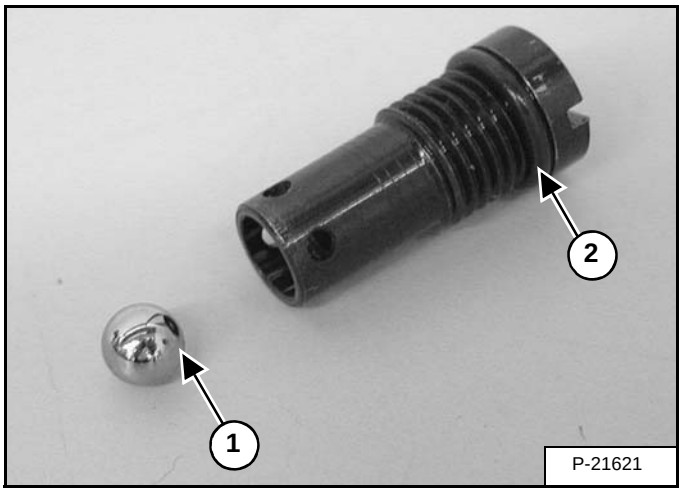
Disassembly And Assembly (Cont'd)

Figure 20-150-9



Remove the plug (Item 1) **[Figure 20-150-9]**.

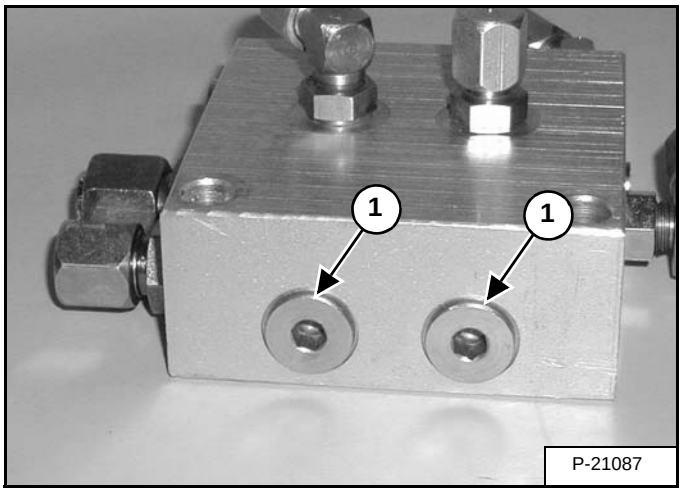
Figure 20-150-10



Remove the ball (Item 1) **[Figure 20-150-10]** from the plug.

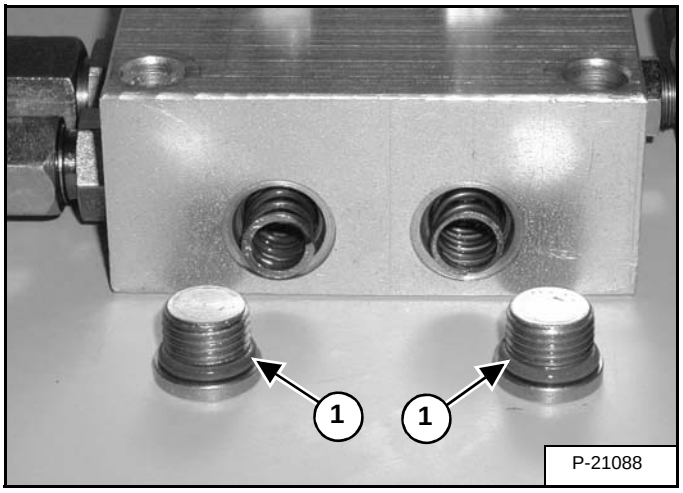
Remove the O-ring (Item 2) **[Figure 20-150-10]**.

Figure 20-150-11



Remove the plugs (Item 1) **[Figure 20-150-11]**.

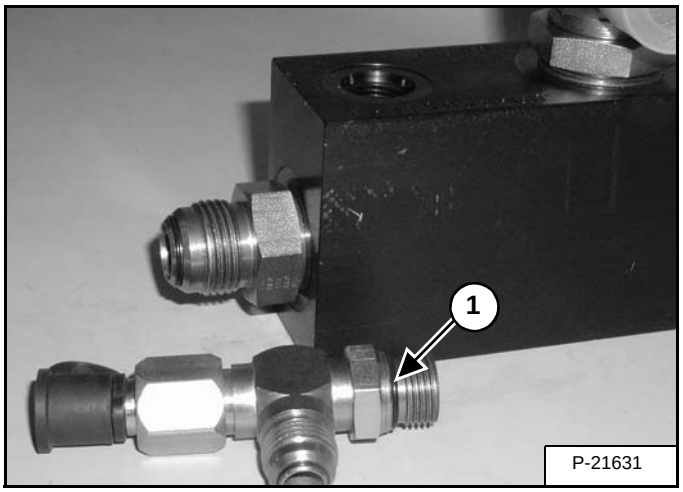
Figure 20-150-12



Remove the O-ring (Item 1) **[Figure 20-150-12]** from the plugs.

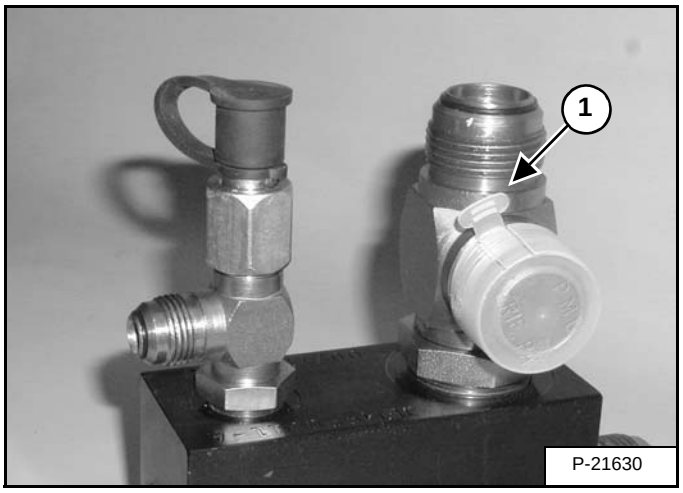
Disassembly And Assembly (Cont'd)

Figure 20-170-12



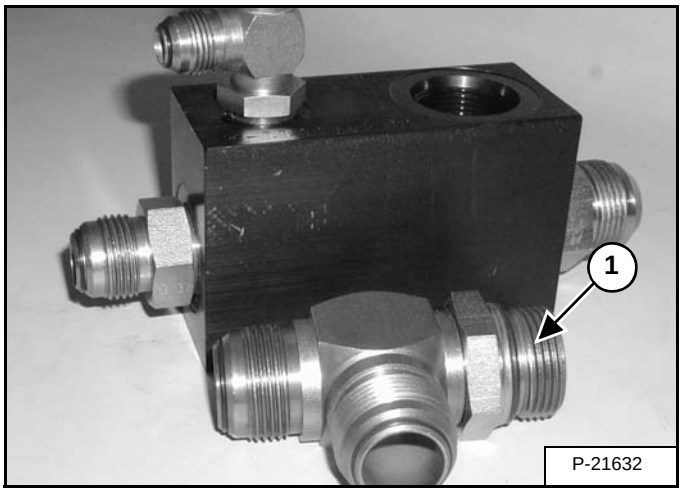
Remove the O-ring (Item 1) **[Figure 20-170-12]** from the fitting.

Figure 20-170-13



Remove the fitting (Item 1) **[Figure 20-170-13]** from (Port 3) on the housing.

Figure 20-170-14



Remove the O-ring (Item 1) **[Figure 20-170-14]** from the fitting.

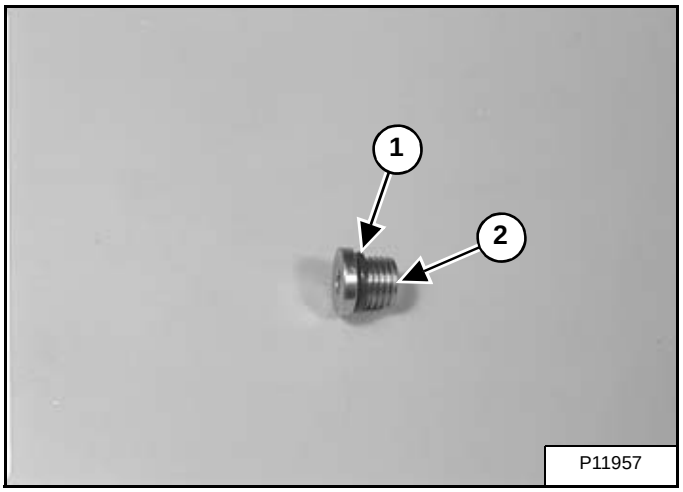
Clean all parts in solvent and dry with compressed air.

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

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

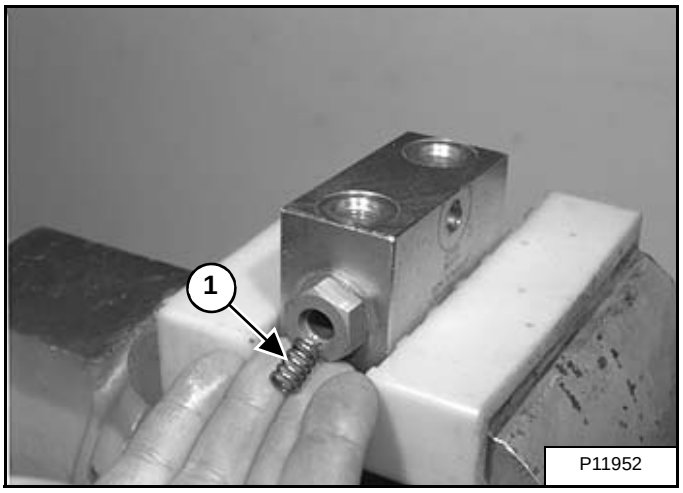
Disassembly (Cont'd)

Figure 20-200-9



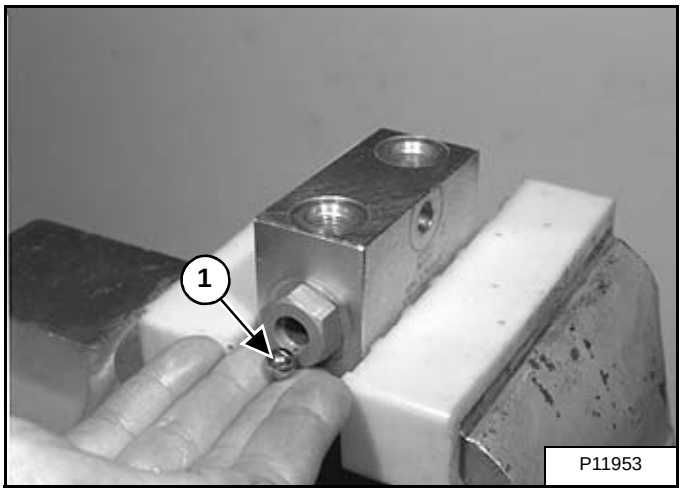
Remove the O-ring (Item 1) from the plugs (Item 2) **[Figure 20-200-9]**.

Figure 20-200-10



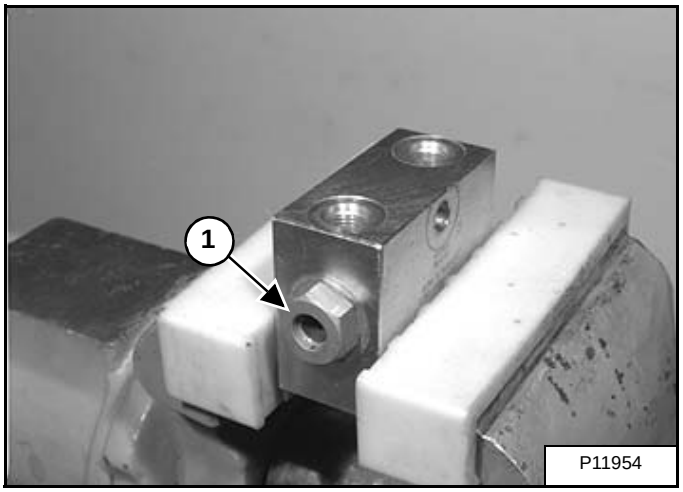
Remove the spring (Item 1) **[Figure 20-200-10]** from both ends of the valve body.

Figure 20-200-11



Remove the ball (Item 1) **[Figure 20-200-11]** from both ends of the valve body.

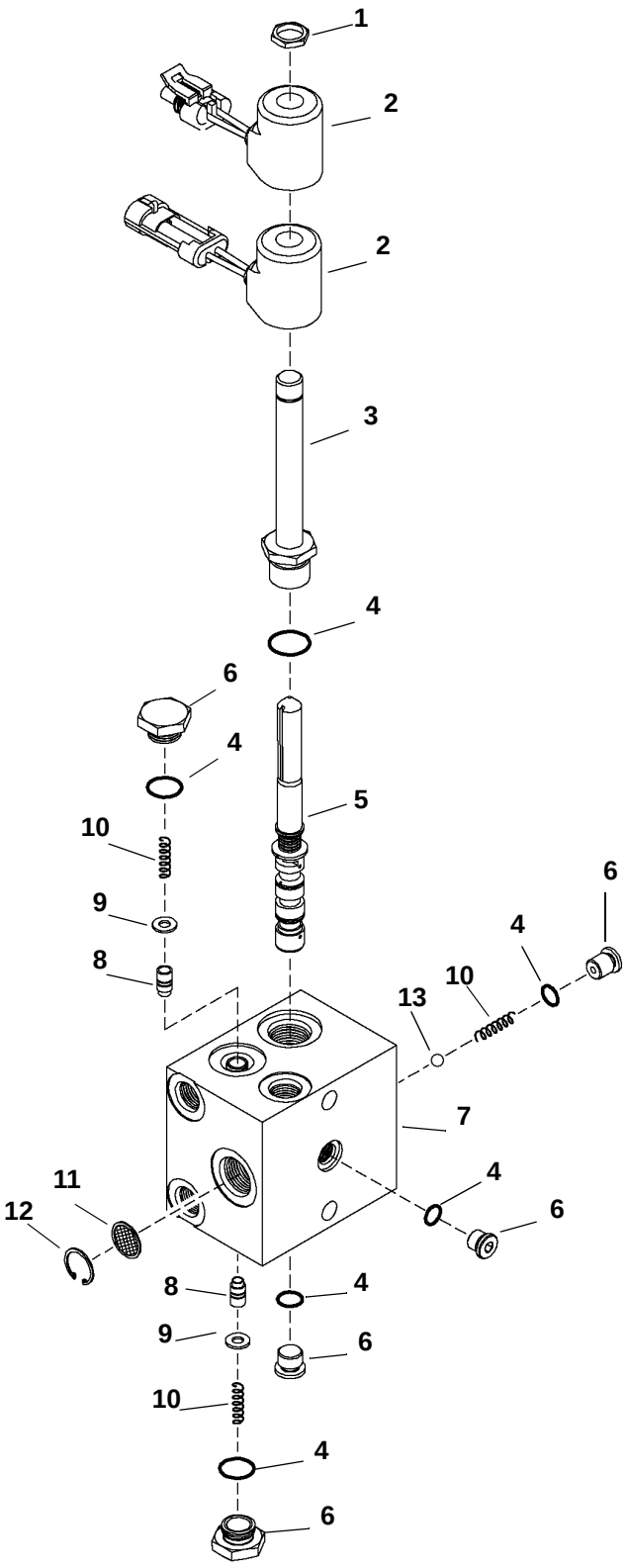
Figure 20-200-12



Remove the valve bodies (Item 1) **[Figure 20-200-12]** from both ends of the valve housing.

Parts Identification

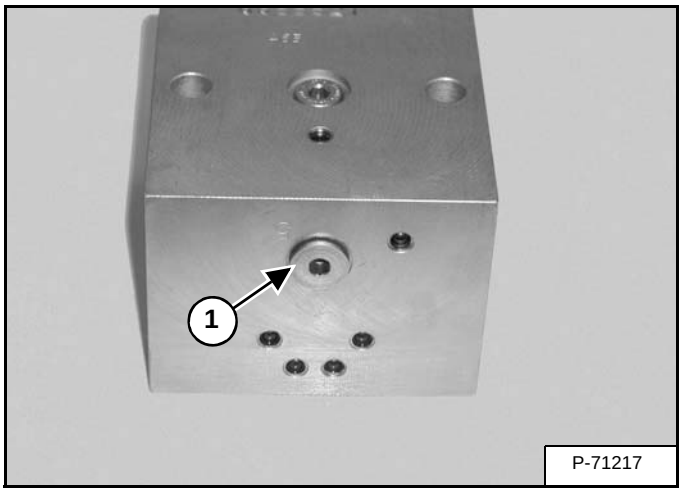
1. Nut
2. Solenoid
3. Spool
4. O-ring
5. Actuator Assembly
6. Plug
7. Valve
8. Poppet
9. Flat Washer
10. Spring
11. Screen
12. Snap Ring
13. Ball



MS-1461S

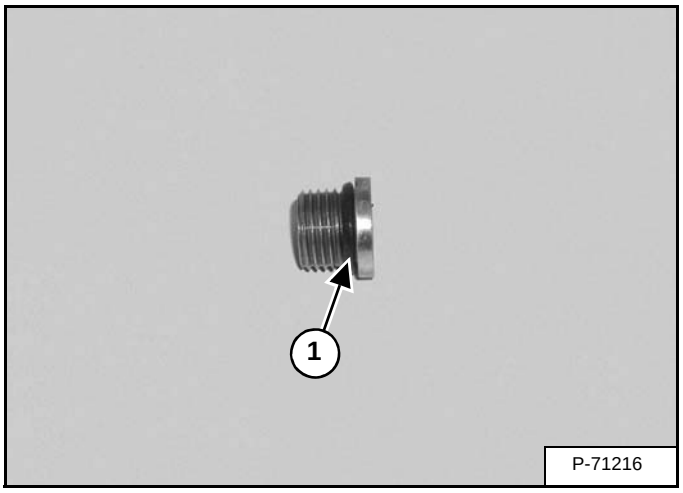
Assembly (Cont'd)

Figure 20-210-47



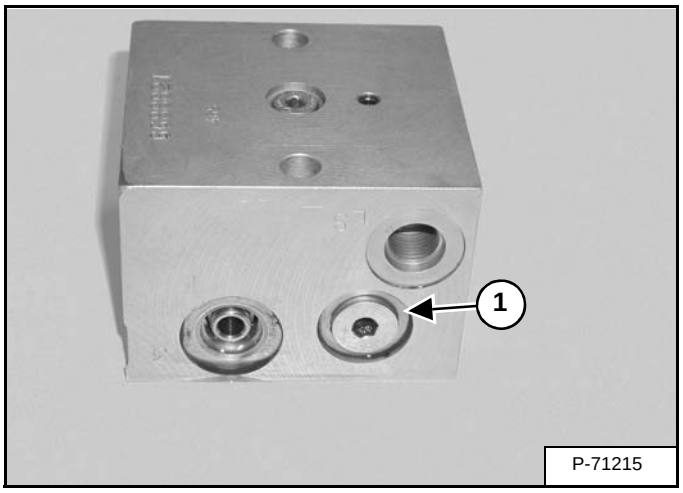
Install the plug (Item 1) **[Figure 20-210-47]**.

Figure 20-210-48



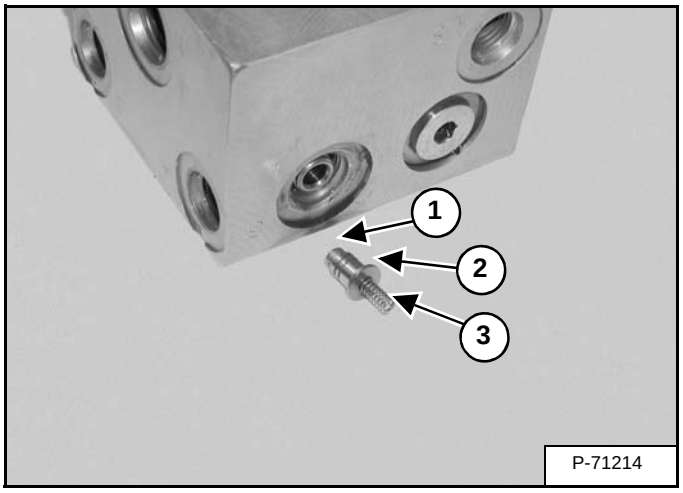
Install the O-ring (Item 1) **[Figure 20-210-48]** on the plug.

Figure 20-210-49



Install the plug (Item 1) **[Figure 20-210-49]**.

Figure 20-210-50



Install the poppet (Item 1), flat washer (Item 2) and spring (Item 3) **[Figure 20-210-50]**.

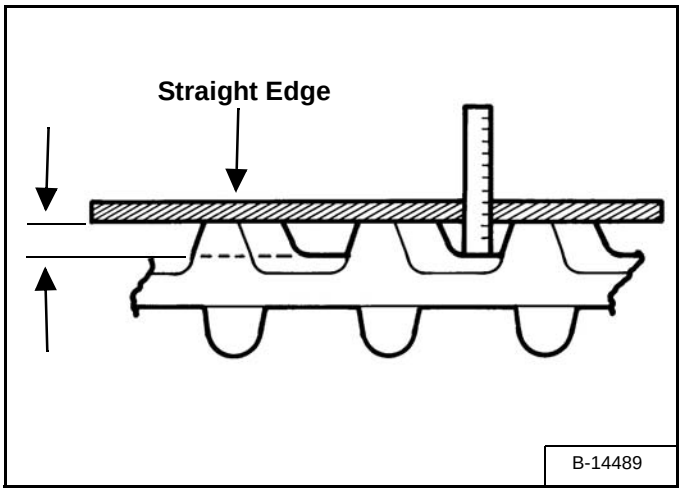
TRACKS

Track Lug Height

Rubber Track

The lug height of a new rubber track is 0.984 inch (25,0 mm).

Figure 30-20-1



To find the percentage of wear on an Excavator track, measure the height of the lug by placing a straight edge across the top of three lugs and measure the distance from the base of the track to the bottom of the straight edge **[Figure 30-20-1]**.

Divide this measurement by the new track height and multiply by 100. This will give the percentage of track lug left.

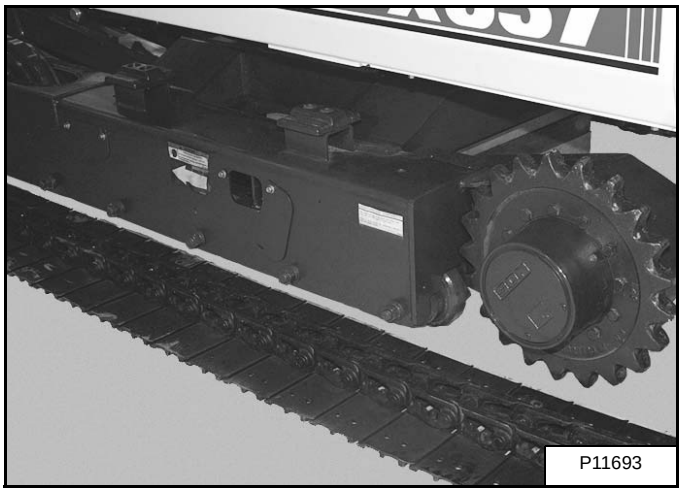
Example: lug height 0.787 inch (20,0 mm)

$$\frac{0.787}{0.984} \times 100 = 80$$

80% of the track lug is remaining with 20% wear on the track lugs.

Steel Track Installation

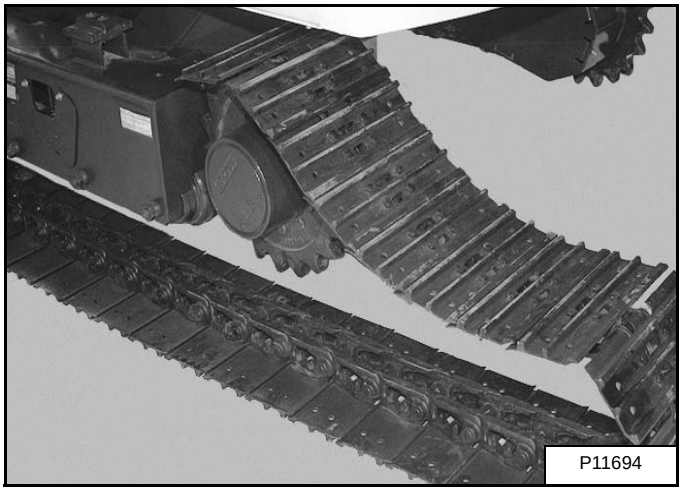
Figure 30-20-28



Position the track under the track frame **[Figure 30-20-28]**.

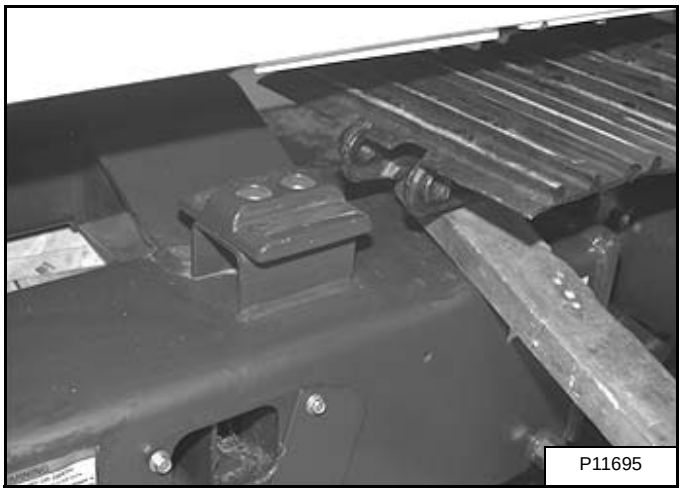
NOTE: Position the track so the master link pin is installed from the outside of the track frame.

Figure 30-20-29



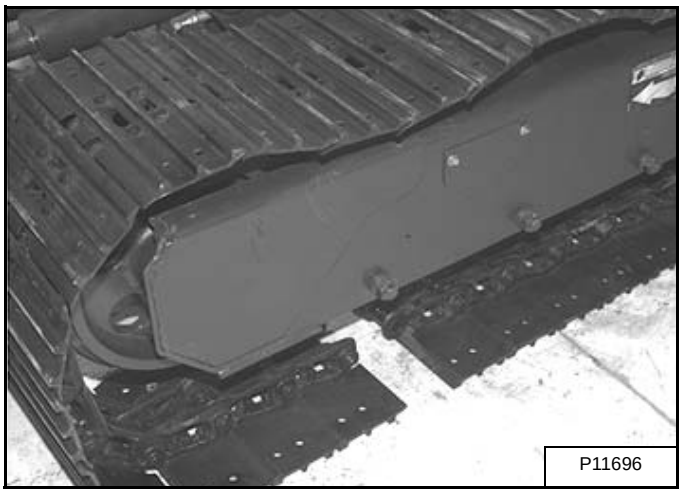
Pull the opposite end of the track up and forward. Position the end links of the steel track onto the sprocket **[Figure 30-20-29]**.

Figure 30-20-30



With the help of a second person, start the Excavator and run the engine at low idle. Make sure that the swing locking lever is in the locked position. Use the travel lever (on which side the track is being installed) to slowly turn the drive motor in the forward direction. Hold the end of the track up as the drive motor slowly moves the track forward. Guide the end of the track over the top of the guide block and up to and over the front idler wheel **[Figure 30-20-30]**.

Figure 30-20-31



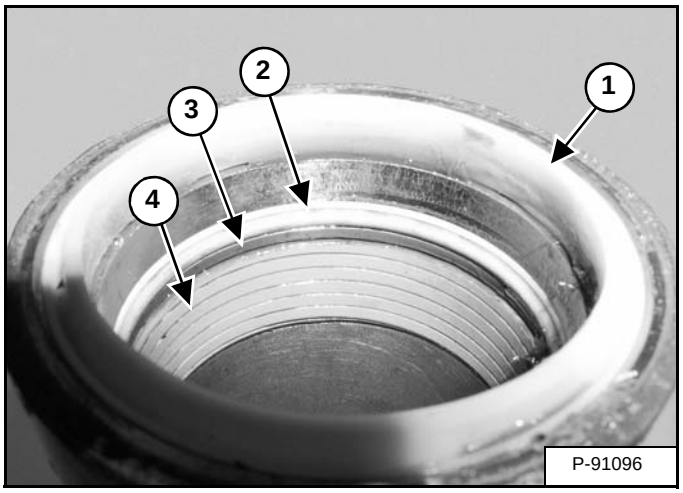
Continue to run the drive motor until the track is positioned as shown **[Figure 30-20-31]**.

Stop the engine.

Recoil Spring Cylinder Disassembly And Assembly (With Replaceable Shaft) (Cont'd)

EARLY MODELS

Figure 30-30-15

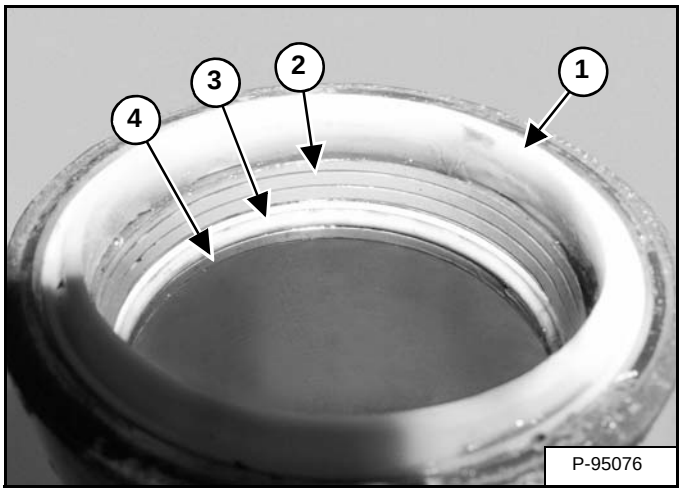


Remove the wiper seal (Item 1), back-up ring (Item 2), O-ring (Item 3) and wear ring (Item 4) **[Figure 30-30-15]**.

Installation: Apply oil to the O-ring, back-up ring, and seal before installation.

LATER MODELS

Figure 30-30-16



Remove the wiper seal (Item 1), wear ring (Item 2), back-up ring (Item 3) and O-ring (Item 4) **[Figure 30-30-16]**.

Installation: Apply oil to the O-ring, back-up ring, and seal before installation.

TRACK DAMAGE IDENTIFICATION

Cutting Of Steel Cords

The following pages show photos and illustrations of track damage and the probable cause of the damage. It is intended to be used for identifying the reason for track damage and how to avoid future track damage.

Damage:

Figure 30-40-1

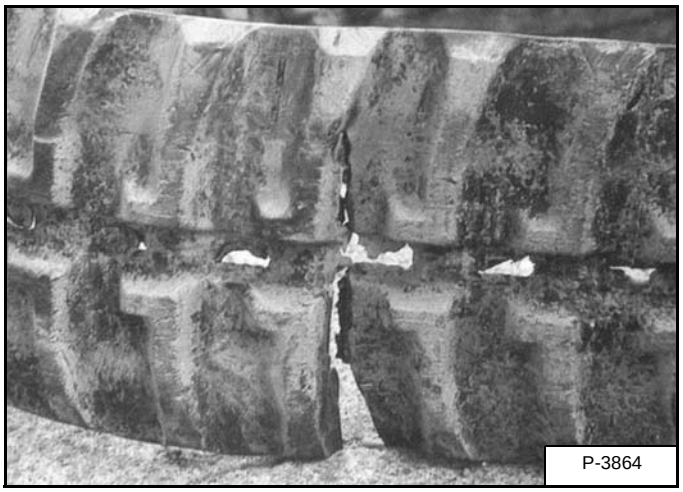
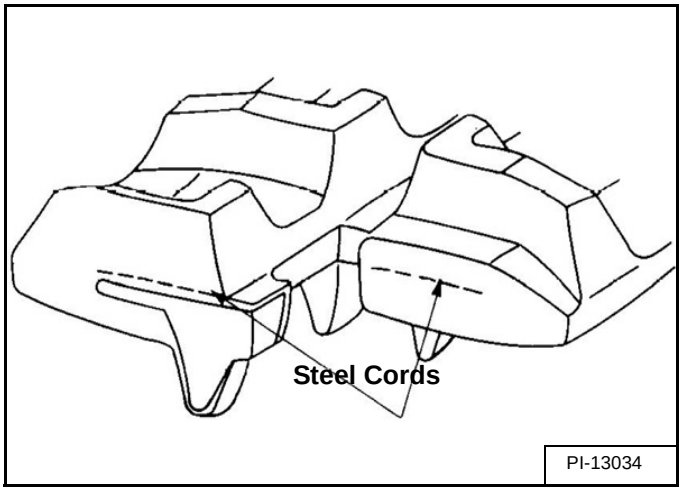


Figure 30-40-2



Embedded steel cords are cut off **[Figure 30-40-1]** & **[Figure 30-40-2]**.

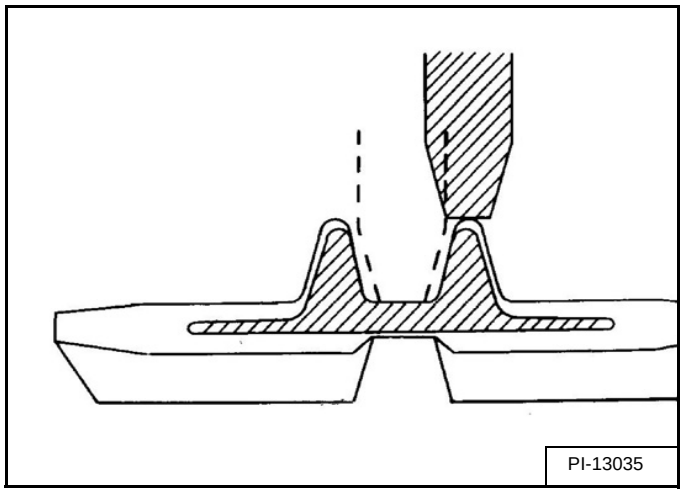
Replacement:

Replacement is required **[Figure 30-40-1]** & **[Figure 30-40-2]**.

Causes Of The Damage:

When applied to rubber tracks under the following circumstances, tension in excess of the breaking strength of the embedded steel cords causes steel cords to be cut:

Figure 30-40-3



When the rubber track is detracting, the idler or sprocket rides on the projections of the embedded metal **[Figure 30-40-3]**.

When the rubber track is detracted, projections of rubber tracks get stuck between the frame of the undercarriage.

The rubber track is clogged with stones or foreign obstacles.

Furthermore, when moisture invades through a cut on the lug side rubber surface, the embedded steel cords will corrode. The deterioration of the design strength may lead to the breaking off of the steel cords.

Prevention:

The following preventions should be taken to minimize the risk of this damage:

Periodical checking on site of the recommended track tension. (See Rubber Track Clearance on Page 30-20-2.)

Avoiding quick turns on bumpy and rocky fields.

Drive carefully to avoid having stones and other articles clog the rubber tracks.

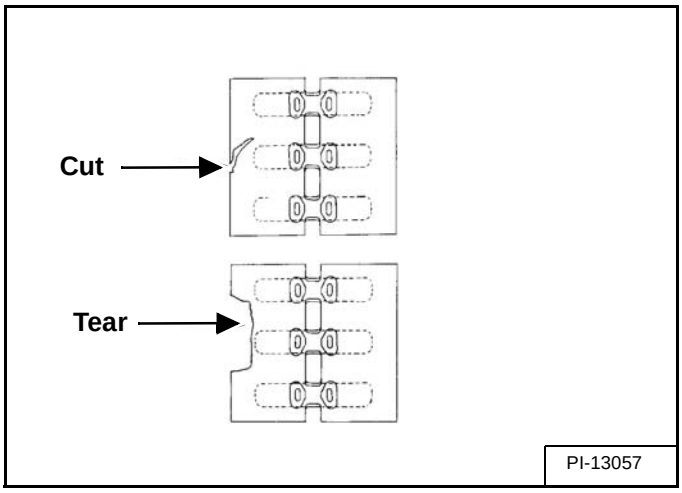
Driving over sharp objects should be avoided. If this is impossible, do not make turns while driving over sharp objects.

TRACK DAMAGE IDENTIFICATION (CONT'D)

Cuts On The Edges Of Track Roller Side (Cont'd)

In case of damage by interference with the machine frame:

Figure 30-40-25



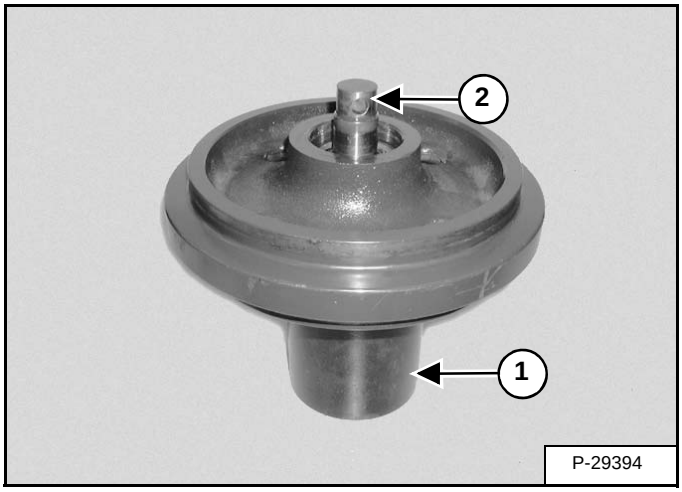
If a machine continues operating with rubber tracks being detracted, the rubber tracks may get caught up in the machine frame or undercarriage parts resulting in damage. Furthermore, when a machine travels along side slopes, the rubber tracks are deformed so much that they come into contact with the machine frame and undercarriage parts, which causes cutting, gouging and rubbing of rubber tracks in the end **[Figure 30-40-25]**.

Prevention:

When traveling, a machine operator should be careful not to drive over any projections on the ground. He should also prevent rubber tracks from coming into contact with concrete walls, ditches and ridges. If rubber tracks are detracked, the machine should be stopped immediately for retracking.

Disassembly (Cont'd)

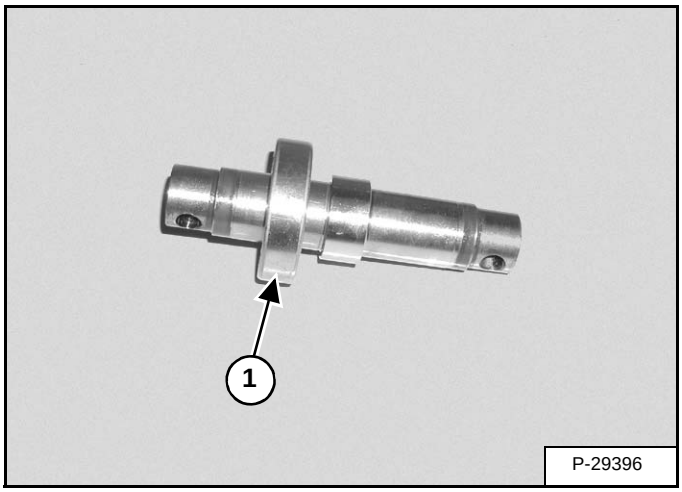
Figure 30-51-5



Place the idler on the support fixture (Item 1) **[Figure 30-51-5]**.

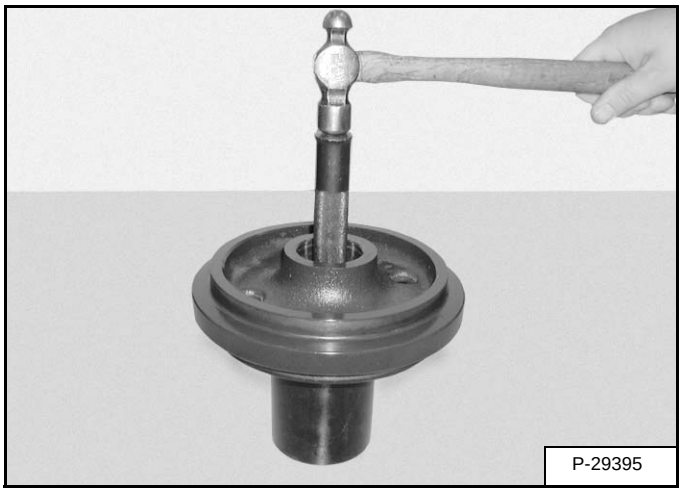
Using a soft faced hammer, tap the shaft (Item 2) **[Figure 30-51-5]** and bearing out the bottom of the idler.

Figure 30-51-6



Slide the bearing (Item 1) **[Figure 30-51-6]** off the shaft.

Figure 30-51-7

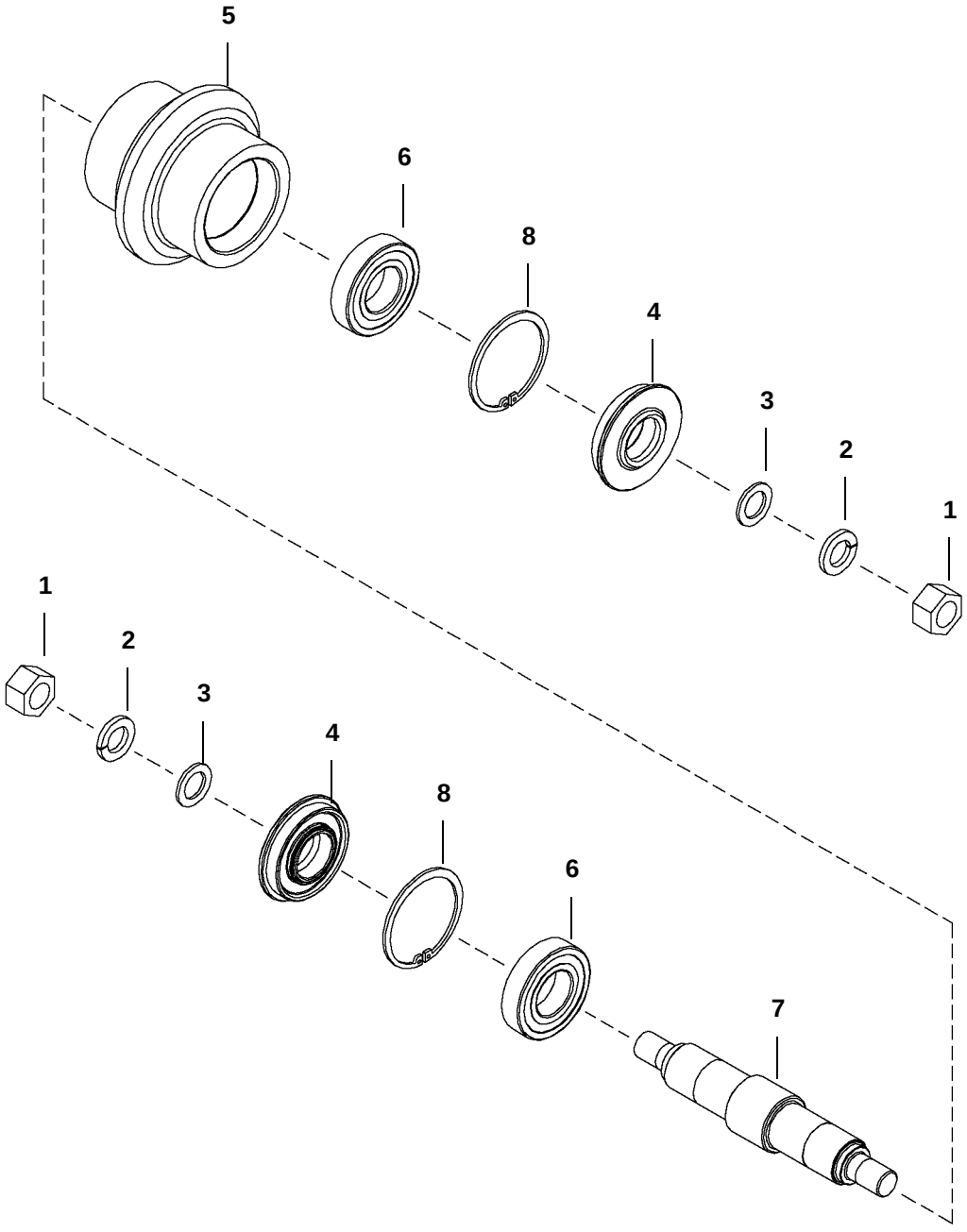


Turn the idler over, and using a bearing driver, remove the second bearing **[Figure 30-51-7]**.

TRACK ROLLER (S/N 234611164 & ABOVE AND 234711198 & ABOVE)

Parts Identification (Upper Roller)

1. Nut
2. Lock Washer
3. Washer
4. Inner Seal
5. Roller
6. Bearing
7. Shaft
8. Snap Ring



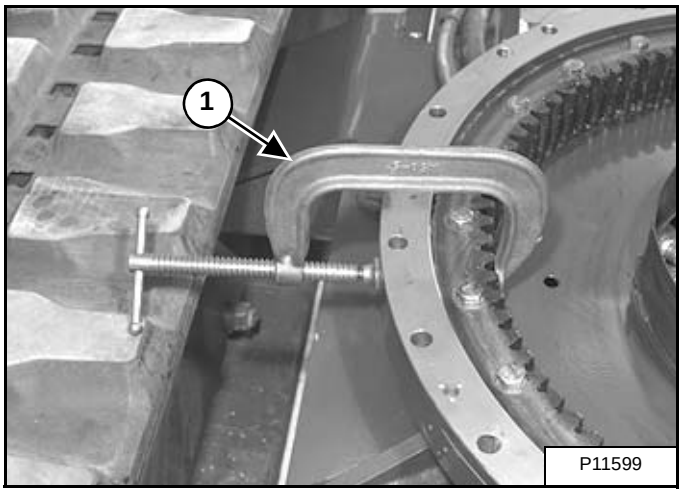
PE1914S

SWING CIRCLE GEAR (S/N 234611163 & BELOW AND 234711197 & BELOW)

Swing Bearing Removal

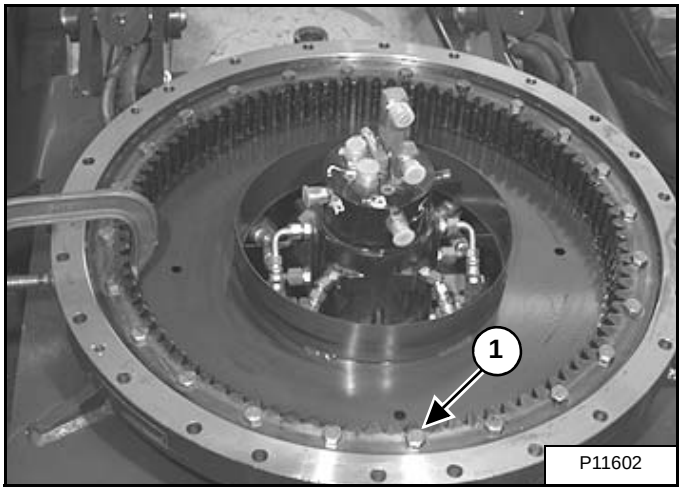
Remove the upperstructure. (See Removal on Page 40-10-1.)

Figure 30-70-1



Install a C-clamp (Item 1) **[Figure 30-70-1]** or other suitable retainer to prevent the swing bearing from turning while being removed.

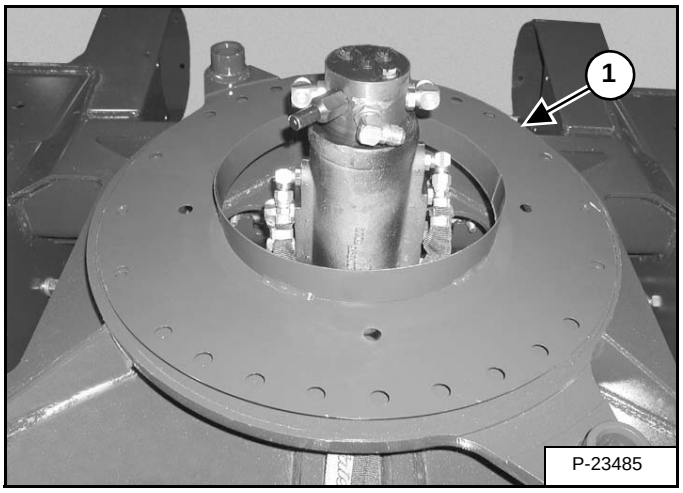
Figure 30-70-2



Remove the 24 bolts (Item 1) **[Figure 30-70-2]** and nuts that hold the swing bearing to the track frame.

Remove the swing bearing.

Figure 30-70-3

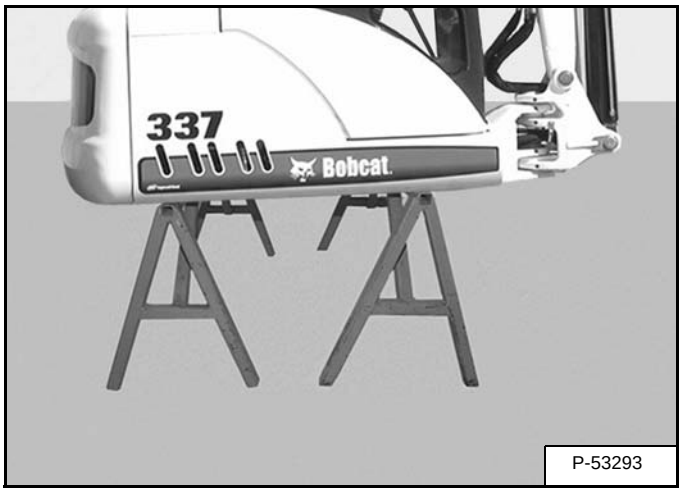


Remove the grease cover (Item 1) **[Figure 30-70-3]** from the track frame.

Clean and inspect the grease cover for damage. Replace as necessary.

Removal (Cont'd)

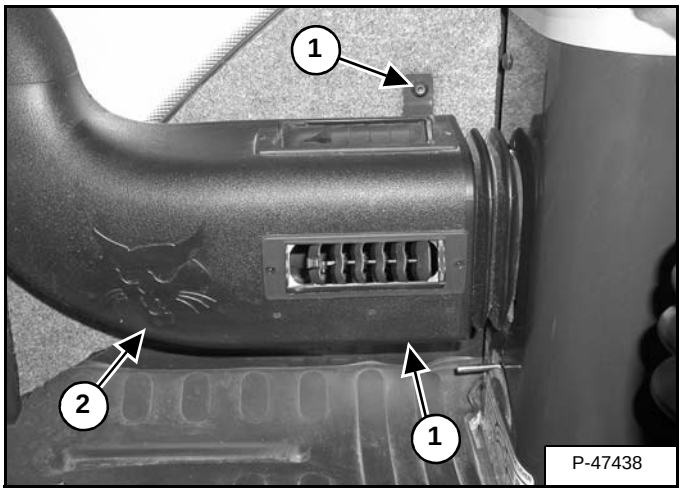
Figure 40-10-7



Lift the upperstructure off of the swing bearing. Put the upperstructure on suitable supporting stands or blocks **[Figure 40-10-7]**.

Removal And Installation (Cont'd)

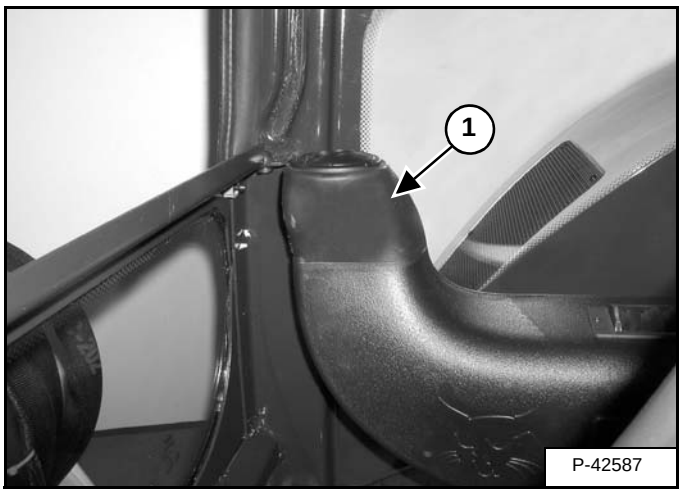
Figure 40-30-5



Remove the bolts (Item 1). Remove the air manifold (Item 2) **[Figure 40-30-5]**.

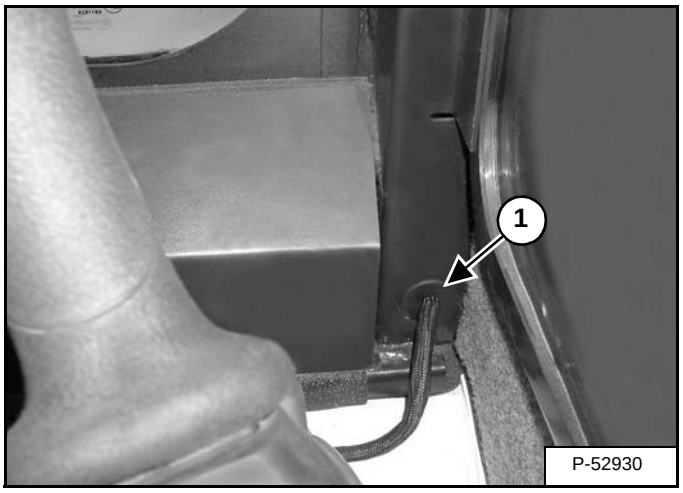
Heater Duct

Figure 40-30-6



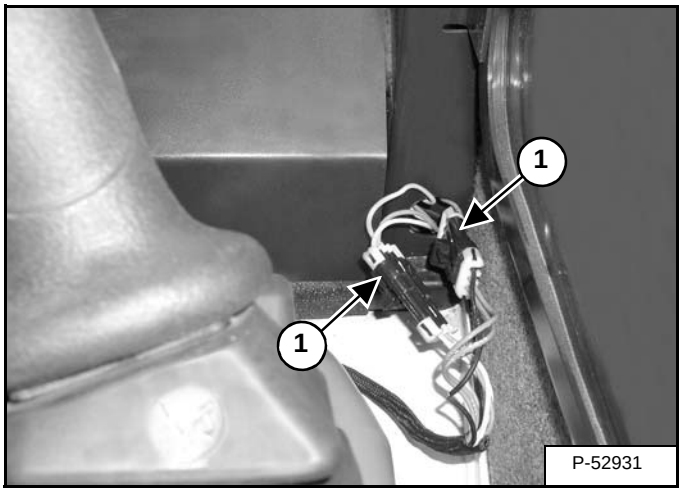
Remove the screw and pull straight up to remove the heater duct (Item 1) **[Figure 40-30-6]**.

Figure 40-30-7



Remove the grommet (Item 1) **[Figure 40-30-7]** located in the left rear corner of the cab.

Figure 40-30-8

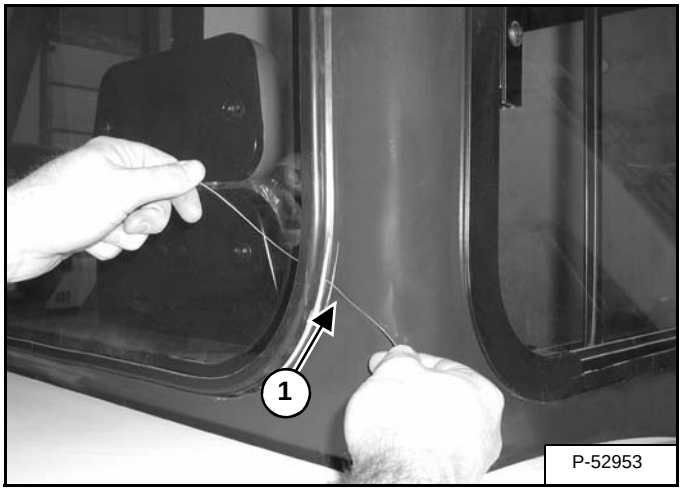


Remove the wire harness from the cab frame and disconnect the 2 wire connectors (Item 1) **[Figure 40-30-8]**.

Glass Removal

Use the following procedure to remove the glass from the cab and right side window assembly.

Figure 40-30-36



Push a small diameter wire (Item 1) **[Figure 40-30-36]** through the adhesive. Pull the wire around the perimeter of the glass to cut the adhesive.

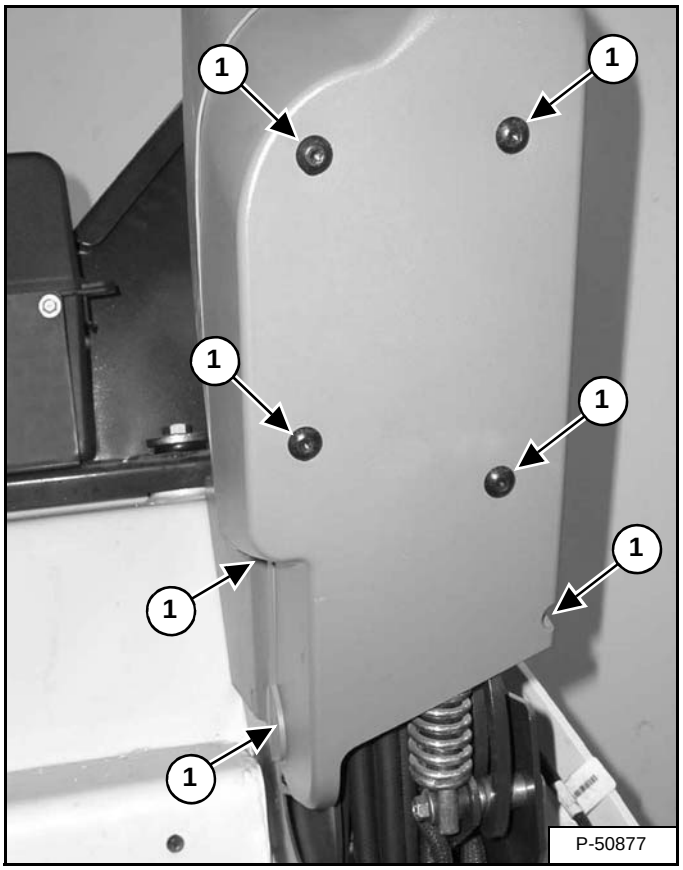
Remove the glass.

NOTE: The right side window frame is aluminum and will be destroyed when removed.

LEFT CONSOLE

Lower Console Cover Removal And Installation

Figure 40-60-1

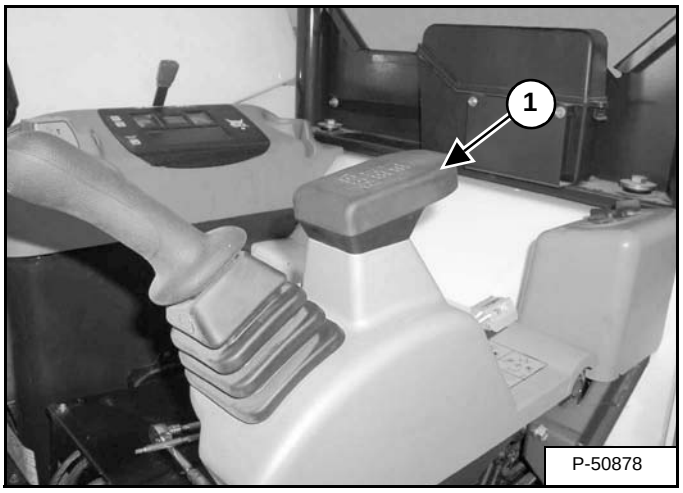


Remove the seven screws (Item 1) **[Figure 40-60-1]** from the lower half of the console cover.

Remove the lower half of the console cover.

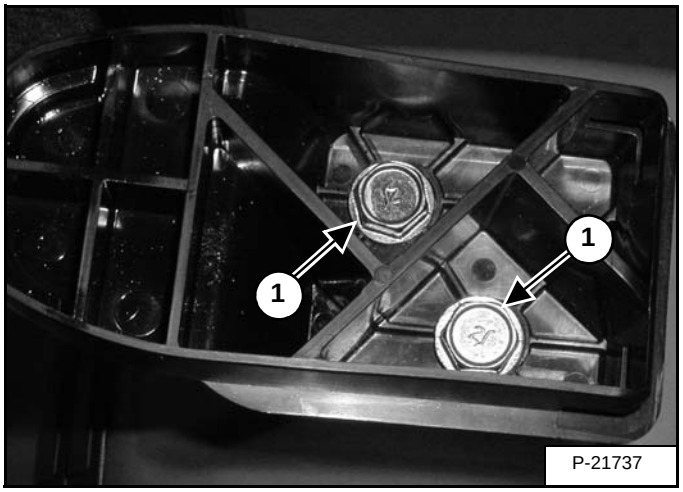
Lower the console.

Figure 40-60-2



Remove the cover (Item 1) **[Figure 40-60-2]** from the arm rest.

Figure 40-60-3



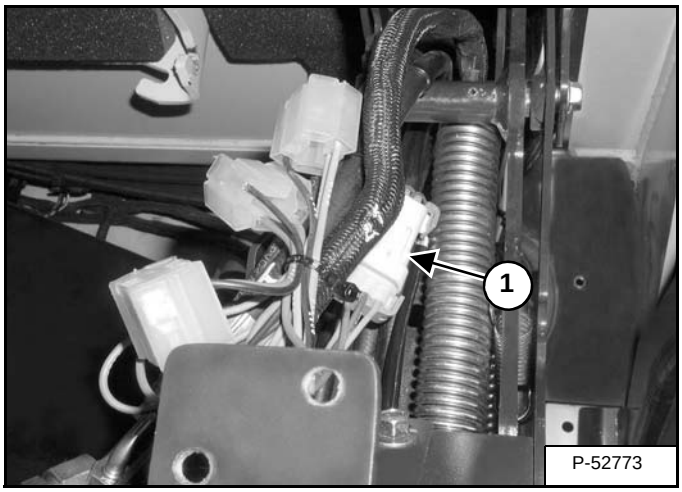
Remove the bolts (Item 1) **[Figure 40-60-3]** from the arm rest.

Remove the arm rest.

Raise the upper half of the console cover.

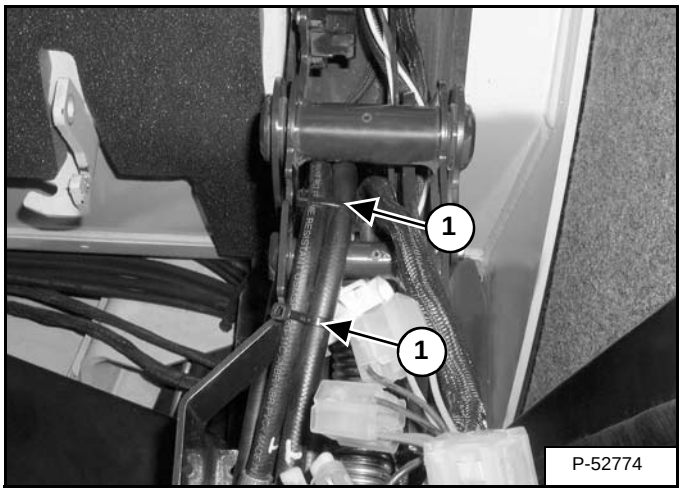
Console Removal And Installation (Cont'd)

Figure 40-60-27



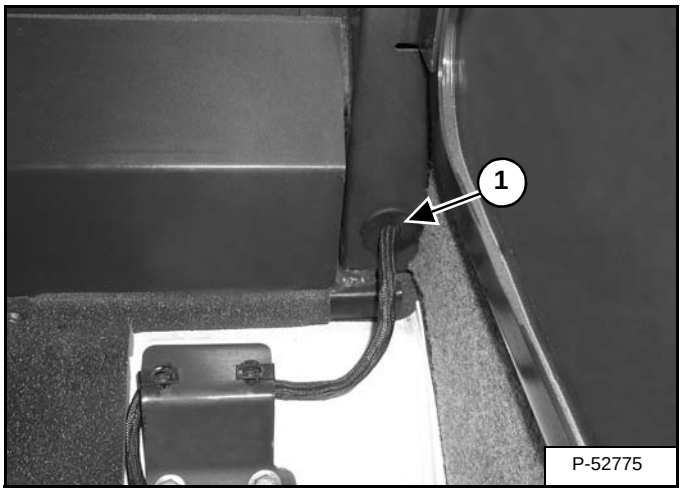
Lower the console. Disconnect the joystick wire harness (Item 1) **[Figure 40-60-27]**.

Figure 40-60-28



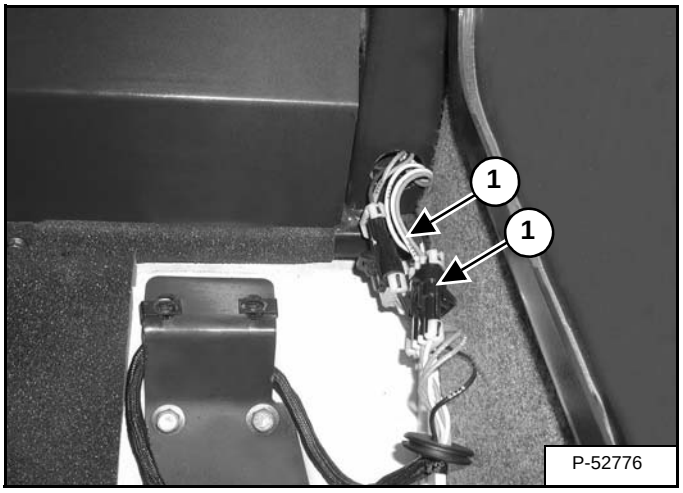
Remove the tie straps (Item 1) **[Figure 40-60-28]**.

Figure 40-60-29



Remove the grommet (Item 1) **[Figure 40-60-29]**.

Figure 40-60-30



Pull the wire harness out and disconnect the connectors (Item 1) **[Figure 40-60-30]**.

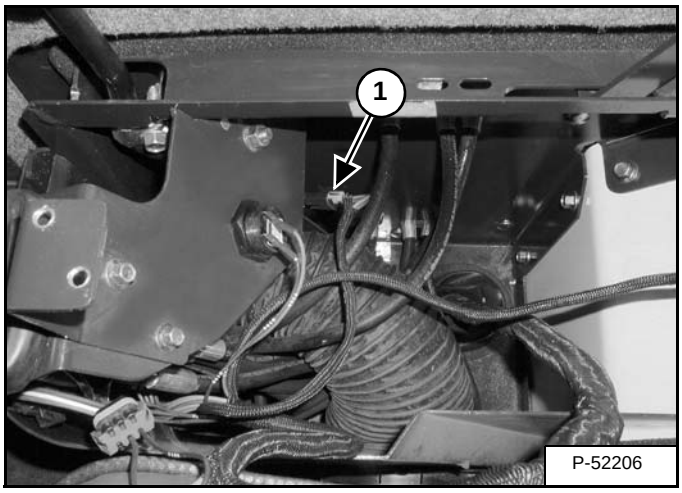
BLADE CONTROL

Lever Removal And Installation

Remove the right upper console cover. (See Console Cover Removal And Installation on Page 40-50-1.)

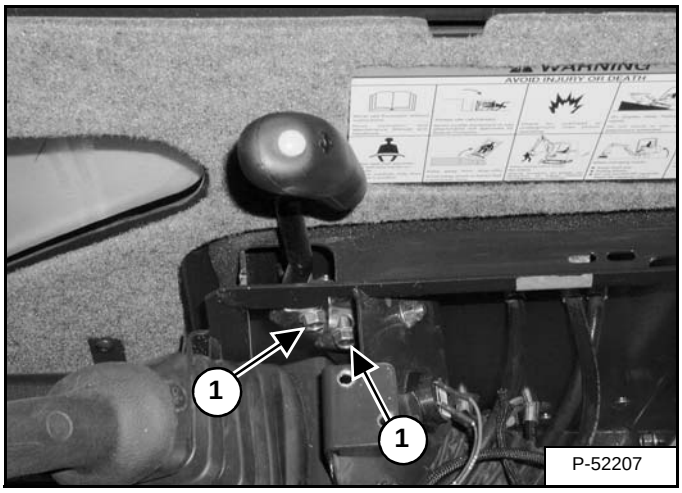
Remove the right lower console base. (See Console Base Removal And Installation on Page 40-50-2.)

Figure 40-80-1



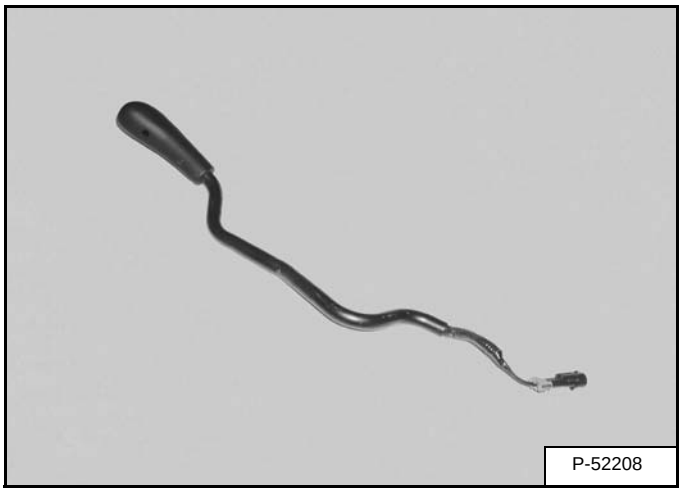
Disconnect the two speed wire connector (Item 1) **[Figure 40-80-1]**.

Figure 40-80-2



Remove the two blade control lever mounting bolts (Item 1) **[Figure 40-80-2]**.

Figure 40-80-3



Remove the blade control lever from the excavator **[Figure 40-80-3]**.

NOTE: If the two-speed switch needs to be replaced, the complete blade control lever must be replaced.

RIGHT PEDAL AND LINKAGE

Pedal Removal And Installation

Remove the floor mat and floor plate. (See Removal And Installation on Page 40-120-1.)

Figure 40-90-1

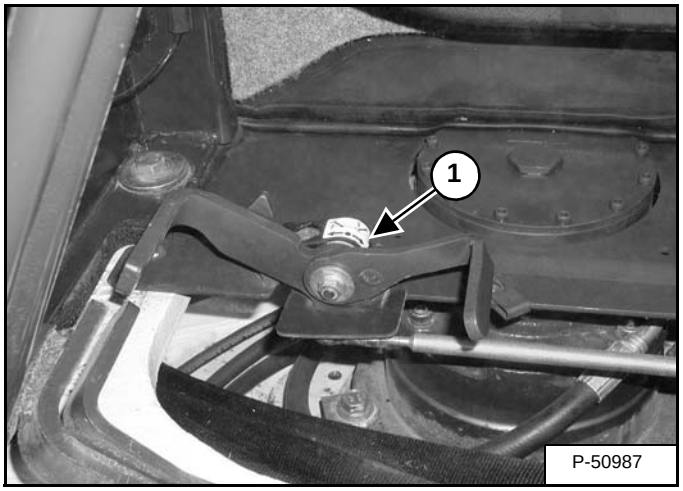
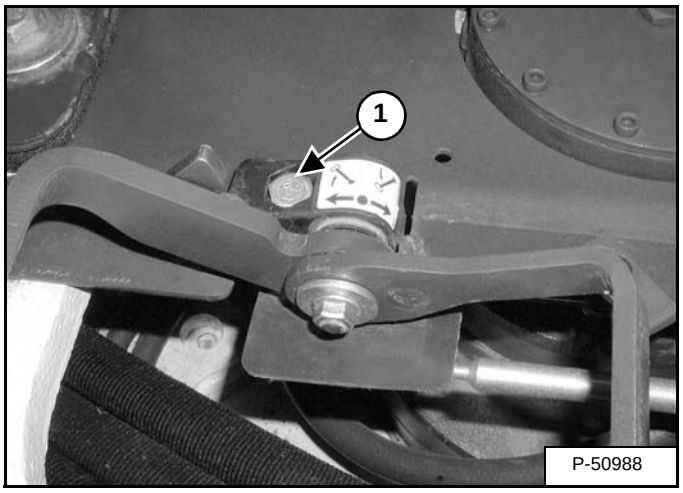


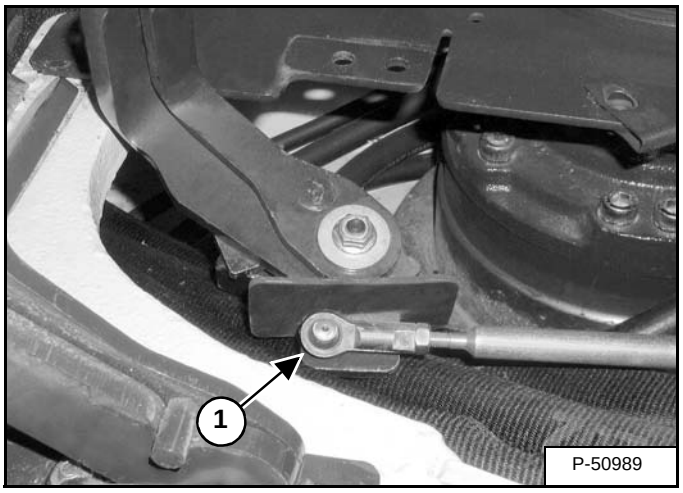
Figure 40-90-2



At the right pedal (Item 1) **[Figure 40-90-1]**, remove the mount bolt and nut (Item 1) **[Figure 40-90-2]**.

Remove the pedal and linkage from the floor plate.

Figure 40-90-3

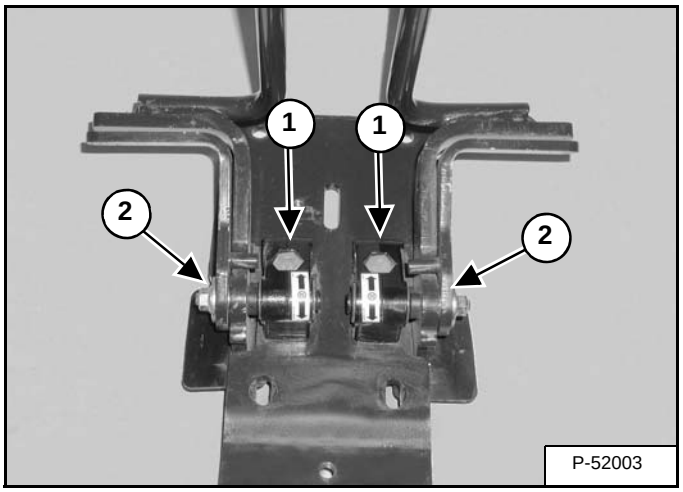


Remove the nut from the ball joint (Item 1) **[Figure 40-90-3]**.

Remove the pedal assembly from the excavator.

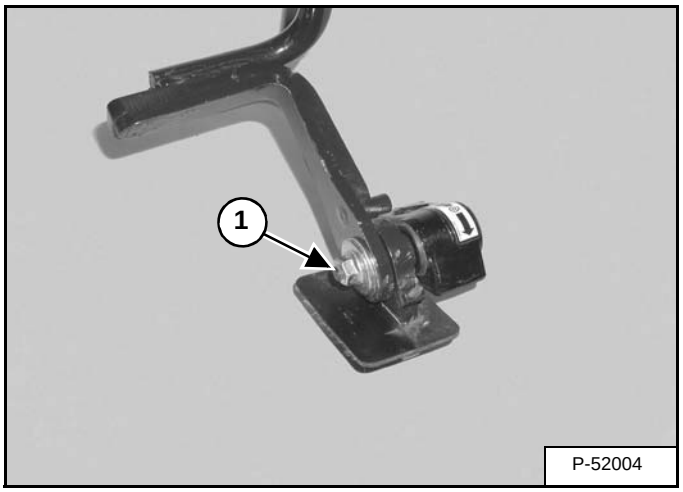
Disassembly And Assembly (Cont'd)

Figure 40-100-8



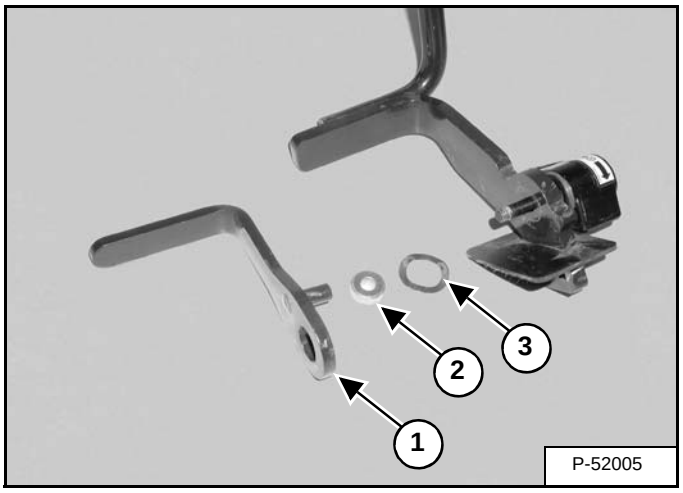
Remove the bolt (Item 1) from both travel control assemblies (Item 2) **[Figure 40-100-8]**. Remove the control assemblies.

Figure 40-100-9



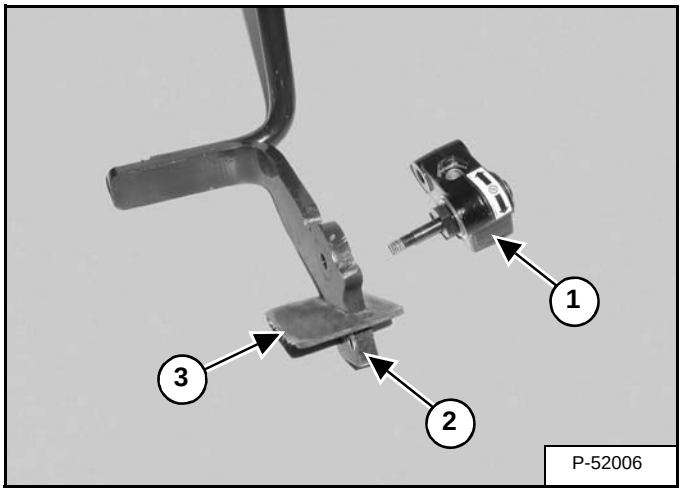
Remove the nut and washer (Item 1) **[Figure 40-100-9]**.

Figure 40-100-10



Remove the foot pedal (Item 1), bushing (Item 2) and wave washer (Item 3) **[Figure 40-100-10]**.

Figure 40-100-11



Remove the lever mount (Item 1) from the control lever (Item 2) **[Figure 40-100-11]**.

Remove the dust cover (Item 3) **[Figure 40-100-11]**.

NOTE: After the lever components are installed in the Excavator, the levers must be adjusted for neutral, forward and reverse. (See Adjustment on Page 40-100-4.)

Assembly

Clean all parts in solvent and dry with compressed air.

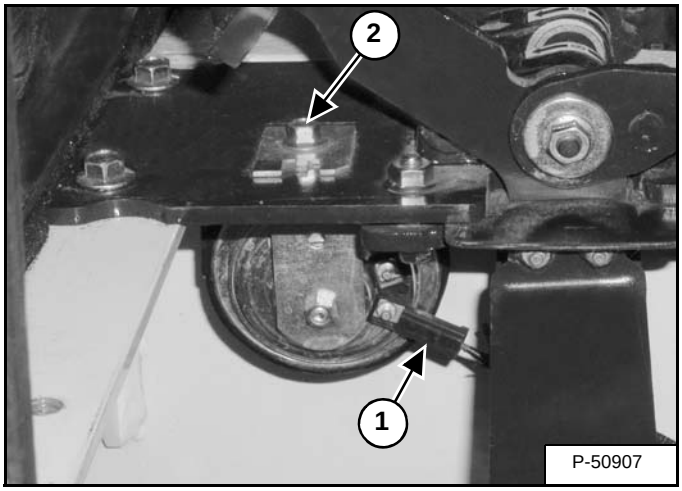
Inspect all parts for wear or damage. Replace any worn or damaged parts.

HORN

Removal And Installation

Remove the floor mat and floor plate. (See Removal And Installation on Page 40-120-1.)

Figure 40-140-1



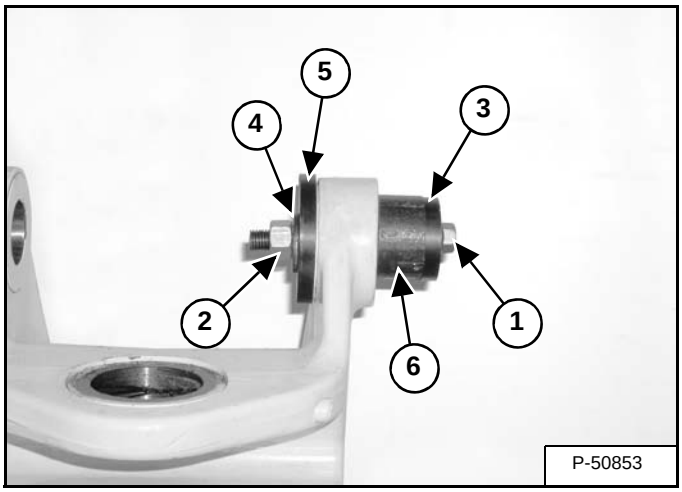
Disconnect the horn wire (Item 1) **[Figure 40-140-1]**.

Remove the bolt (Item 2) **[Figure 40-140-1]**.

Remove the horn from the Excavator.

Boom Pivot Pin Bushing Installation

Figure 40-150-20



The following parts will be needed for installation of the swing bracket boom pivot pin bushings **[Figure 40-150-20]**.

Item 1. [Figure 40-150-20] Bolt
- 3/4 x 6 1/2 inch (16 mm x 165 mm) long)

Item 2. [Figure 40-150-20] Nut
- 3/4 inch (16 mm)

Item 3. [Figure 40-150-20] Washer
- 7/8 I.D. x 2 1/2 inch O.D. x 1/2 inch
(22 mm I.D. x 63,5 mm O.D. x 13 mm) thick.

Item 4. [Figure 40-150-20] Washer
- 7/8 I.D. x 2 inch O.D. x 1/8 inch
(22 mm I.D. x 51 mm O.D. x 3 mm) thick.

Item 5. [Figure 40-150-20] Washer
- 7/8 I.D. x 4 1/2 inch O.D. x 1/2 inch
(22 mm I.D. x 114 mm O.D. x 13 mm) thick

Item 6. [Figure 40-150-20] Spacer
2-3/4 inch I.D. x 3 inch O.D. x 2 1/4 inches long
(70 mm I.D. x 76,2 mm O.D. x 57 mm) long

Apply a film of grease to the outer diameter of the bushing and to the inner diameter of the casting.

Center the bushing on the casting hole.

NOTE: Make sure that the bushing is centered in the casting hole and that it starts into the hole evenly and squarely.

Put the washer (Item 5) **[Figure 40-150-20]** over the flanged end of the bushing.

Put the spacer (Item 6) and the washer (Item 3) **[Figure 40-150-20]** over the bushing hole casting. Center the spacer and the washer over the bushing hole.

Install the bolt (Item 1) through the washers, the spacer and the bushing. Install the washer (Item 4) and nut (Item 2) **[Figure 40-150-20]**.

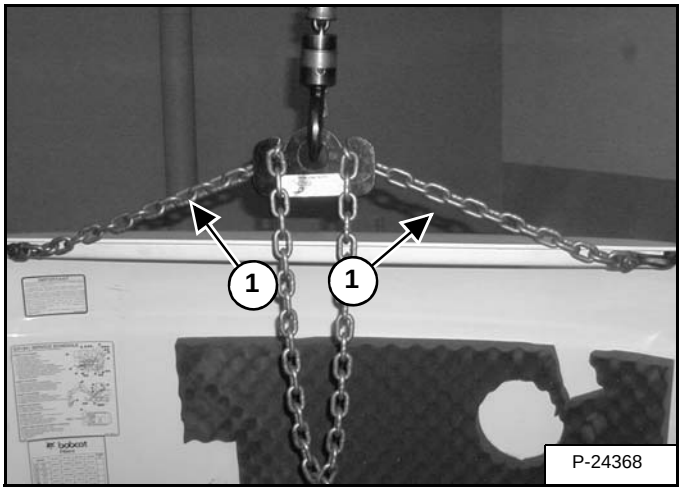
Tighten the bolt and nut until the bushing is seated in the casting.

TAILGATE

Removal And Installation

Open the tailgate.

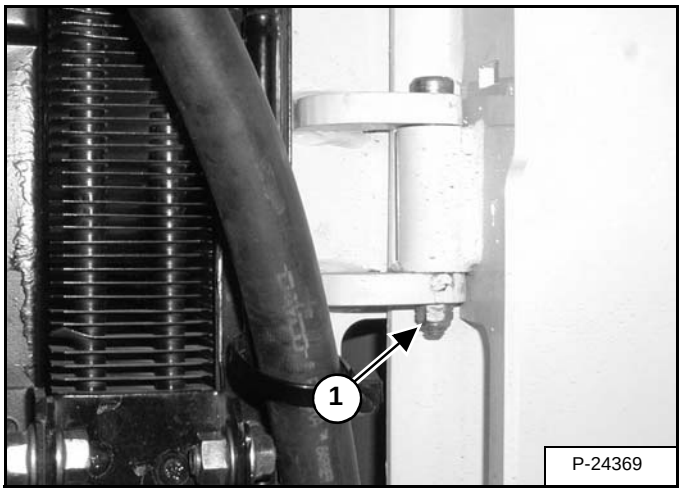
Figure 40-190-1



Install a chain (Item 1) **[Figure 40-190-1]** in the support mount at the top of the tailgate.

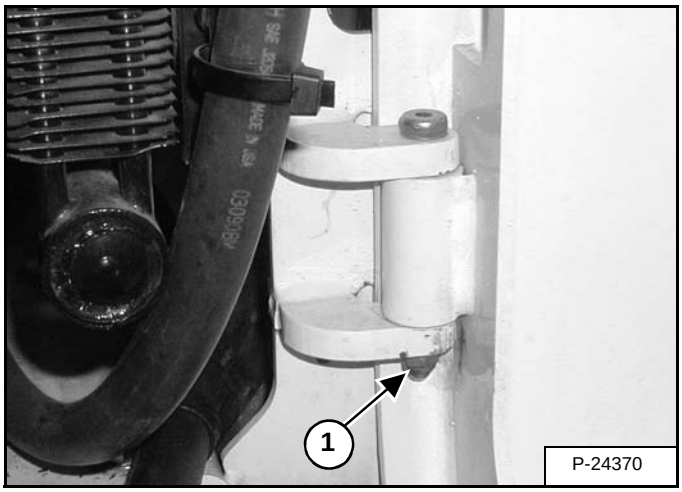
NOTE: Use a lifting device of sufficient capacity. Approximate weight of tailgate is 260 lbs. (118 kg).

Figure 40-190-2



Remove upper hinge bolt and nut (Item 1) **[Figure 40-190-2]**.

Figure 40-190-3

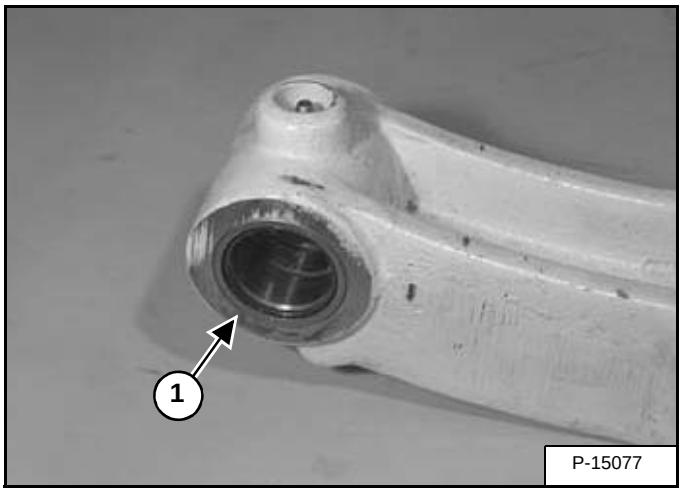


Remove the nut and bolt (Item 1) **[Figure 40-190-3]** from the lower hinge.

Remove the tailgate from the Excavator.

Disassembly (Cont'd)

Figure 40-200-21



Remove the 2 seals (1 per side) (Item 1) **[Figure 40-200-21]** from the bottom pivot point of the link.

Figure 40-200-22

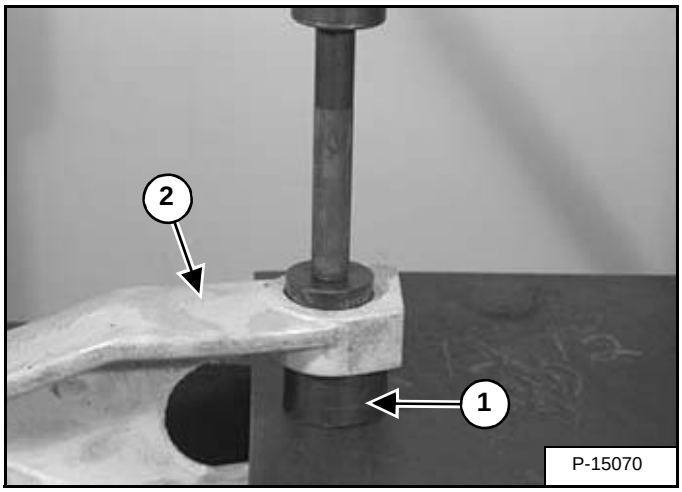
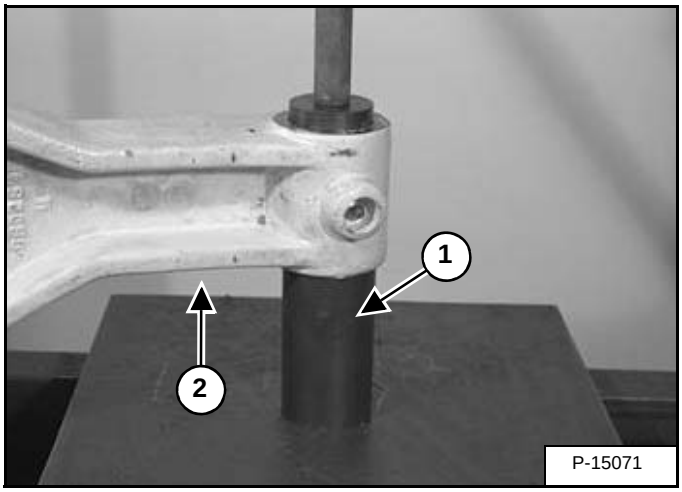


Figure 40-200-23



Use thick walled tubing (Item 1) **[Figure 40-200-22]** & **[Figure 40-200-23]** with an inside diameter larger than the outside diameter of the link bushing to support the link (Item 2) **[Figure 40-200-22]** & **[Figure 40-200-23]** and remove the bushings.

NOTE: Properly support the cast link to prevent damage when installing or removing the bushings.

Check Proper Latch Engagement (Cont'd)

⚠ 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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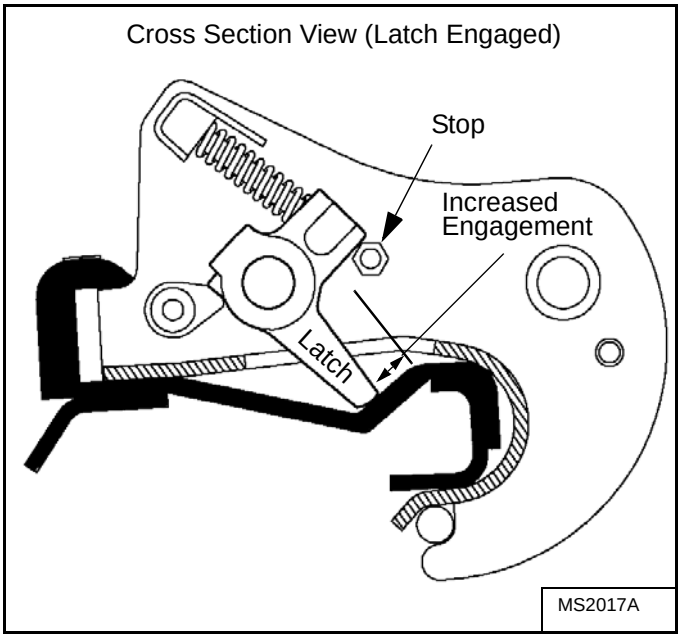
If latch engagement is less than 0.50 in. (12,7 mm), remove more material from the ramp of the interface.

Install the attachment on the machine, mark the interface and measure the new latch engagement again to verify latch engagement is 0.50 in. (12,7 mm) or more.

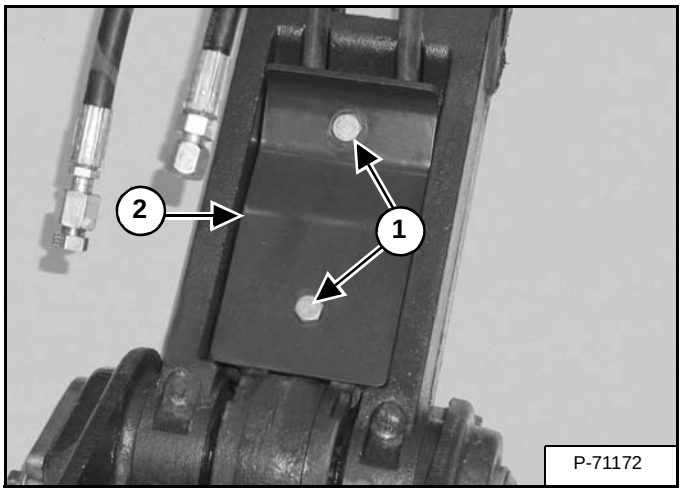
Figure 40-200-57



The latch may wear and become shorter, increasing latch engagement. Latch wear is dependent on the type of attachment used and the application. If wear becomes excessive, the latch will rest on the stop. The attachment will remain securely installed on the machine in this position, however the attachment can exhibit rattling noise during operation because the attachment interface is shifting slightly within the X-Change. Visual inspection can detect if the latch is resting on the stop without measurement. Latch replacement is recommended when wear becomes this excessive. **[Figure 40-200-57]**.

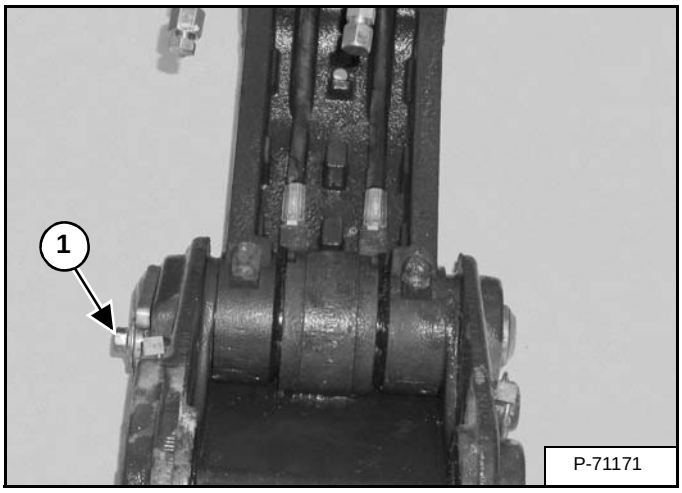
Disassembly

Figure 40-220-10



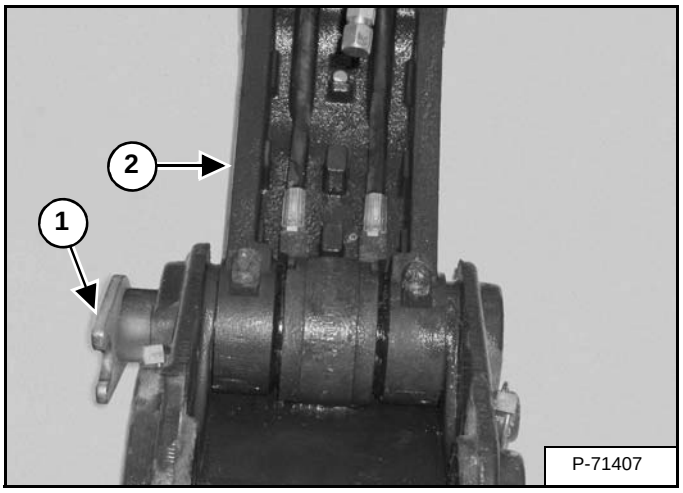
Remove the two bolts (Item 1) and the cover (Item 2) **[Figure 40-220-10]**.

Figure 40-220-11



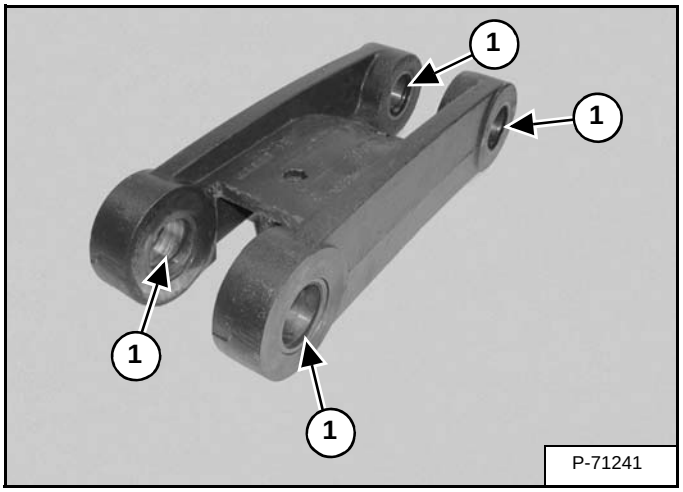
Remove the bolt (Item 1) **[Figure 40-220-11]** washer and spacer.

Figure 40-220-12



Remove the pin (Item 1) and the bucket link (Item 2) **[Figure 40-220-12]**.

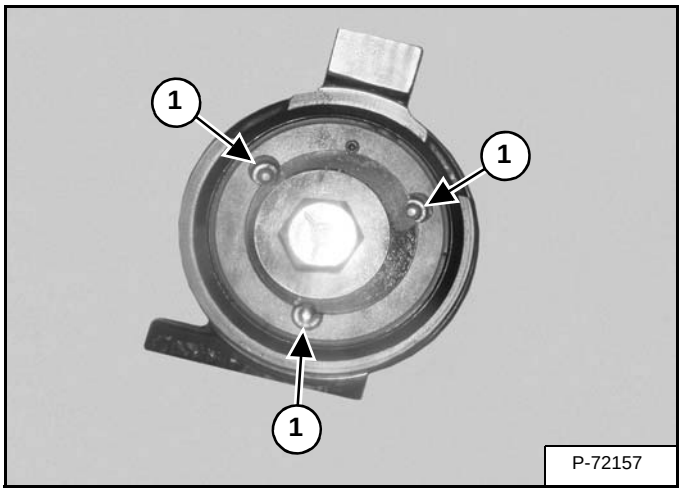
Figure 40-220-13



Remove the dust seals and bushings (Item 1) **[Figure 40-220-13]** from the bucket link.

Assembly (Cont'd)

Figure 40-220-50

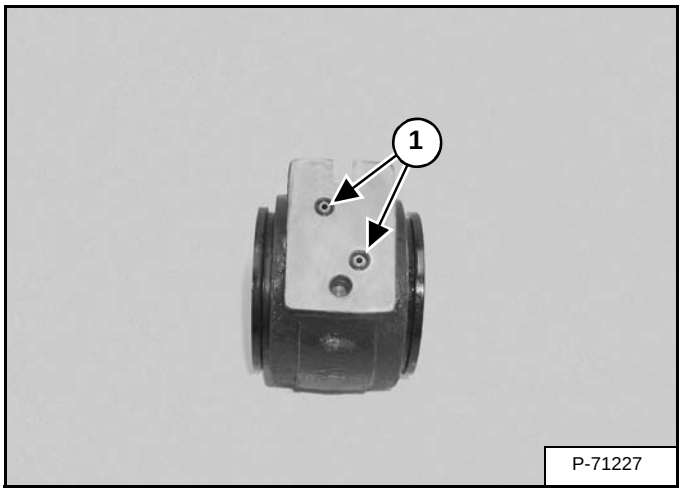


Tighten the swivel assembly screws (Item 1) **[Figure 40-220-50]** to 10.4 - 11.6 ft.-lb. (14,2 - 15,8 N•m) torque.

NOTE: This procedure must be followed to ensure the swivel assembly screws are tightened to the proper torque value.

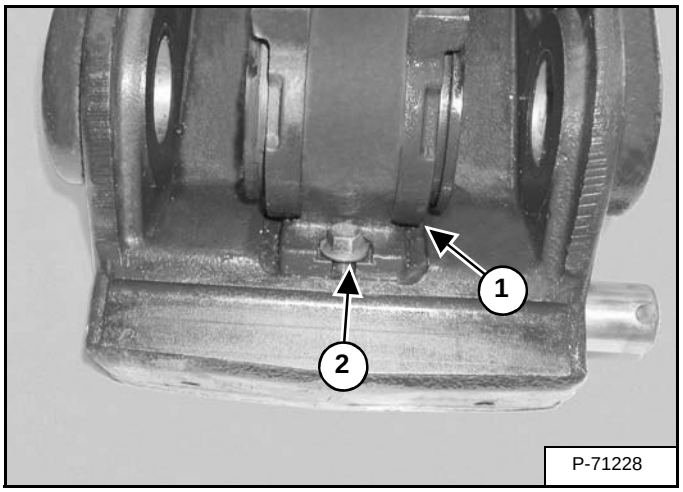
Remove the preload tool.

Figure 40-220-51



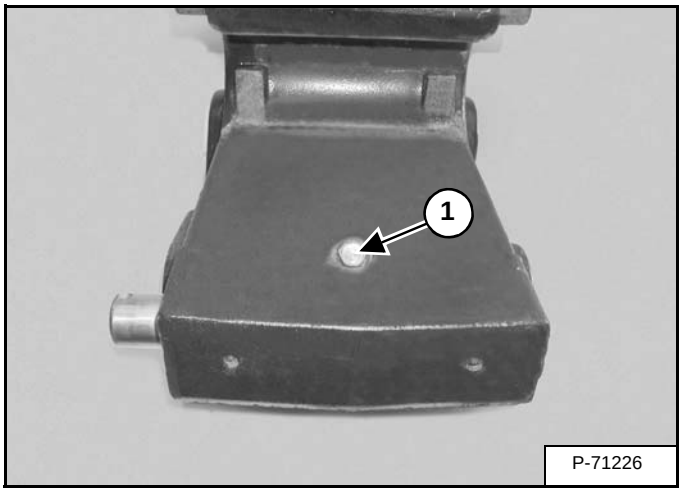
Install the two O-rings (Item 1) **[Figure 40-220-51]** into the swivel assembly.

Figure 40-220-52



Install the swivel assembly (Item 1) using the bolt (Item 2) **[Figure 40-220-52]**.

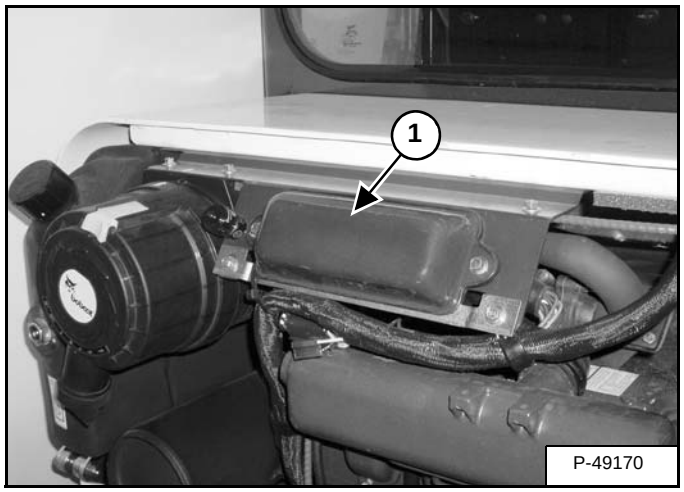
Figure 40-220-53



Install the bolt (Item 1) **[Figure 40-220-53]** and nut.

Description

Figure 50-10-1



The excavator has a 12 volt, negative ground electrical system. The electrical system is protected by fuses located under the right side cover of the excavator (Item 1) **[Figure 50-10-1]**. The fuses will protect the electrical system when there is an electrical overload. The reason for the overload must be found before starting the engine again.

The battery cables must be clean and tight. Check the electrolyte level in the battery. Add distilled water as needed. Remove acid or corrosion from the battery and cables with a sodium bicarbonate and water solution.

Put Battery Saver P/N 6664458 or grease on the battery terminals and cable ends to prevent corrosion.

⚠ 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.

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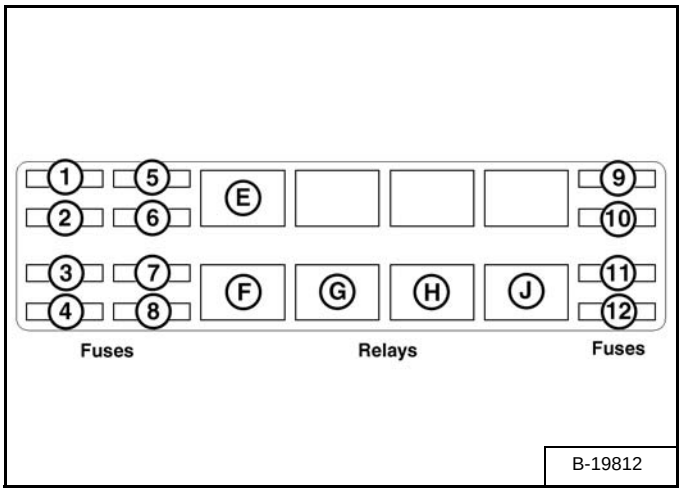
Fuse And Relay Location

A decal is inside the cover to show location and amp ratings.

Remove the cover to check or replace the fuses and relays.

Figure 50-10-2



The location and sizes are shown below and **[Figure 50-10-2]**.

REF	DESCRIPTION	AMP	REF	DESCRIPTION	AMP
1	***Not Used***	- -	11	Lights	20
2	Heater	25	12	ACC Plug	15
3	Ignition	5			
4	Fuel Solenoid	25			
5	Wiper	5			
6	Switch Power	20			
7	Alternator/ Heater	25			
8	ACD	25			
9	Controller	25			
10	ACD	25			

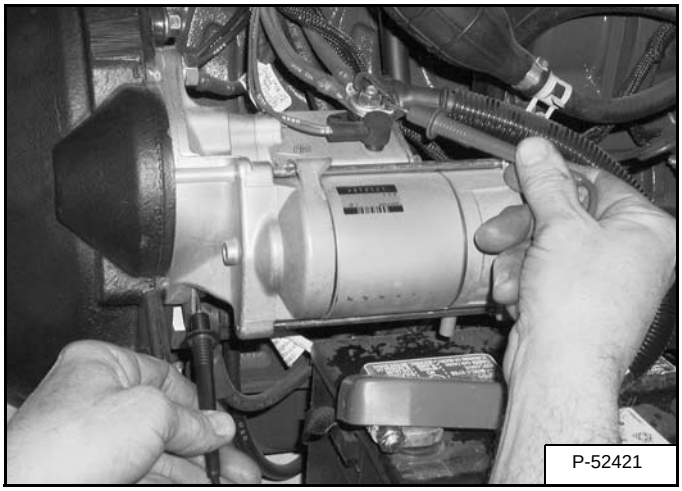
Always replace fuses using the same type and capacity.

REF	DESCRIPTION
E	Switch Power
F	Fuel Solenoid
G	Lights
H	Glow Plug
J	Starter

Alternator Voltage Test

Open the tailgate.

Figure 50-30-11



Start the engine and run at low idle. With a voltmeter, check the voltage between the B+ terminal and ground at the starter **[Figure 50-30-11]**.

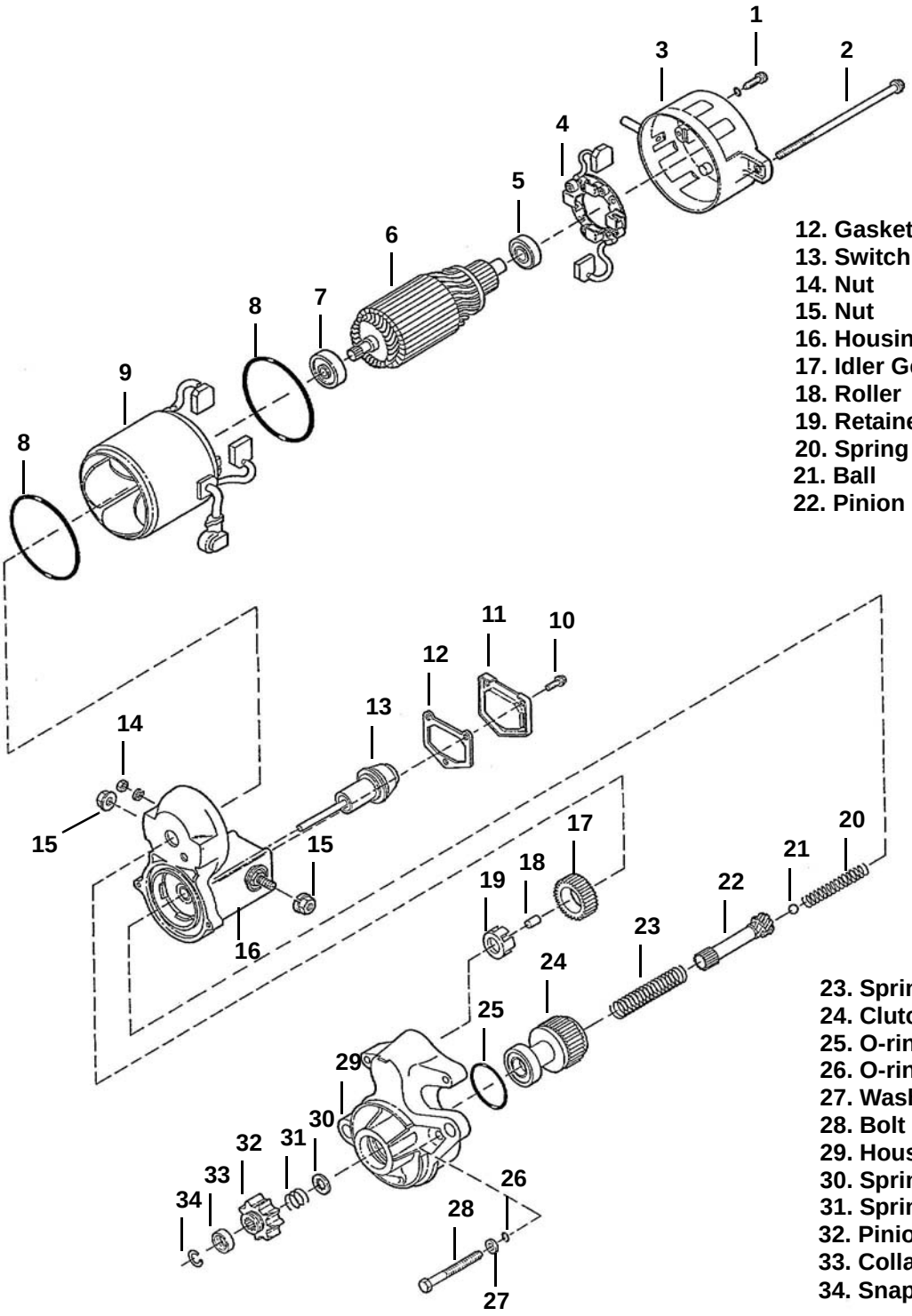
The voltage must be higher than 13.5 volts but lower than 14.7 volts at 70° F (Alternator Temperature).

If the voltage is higher than 14.7 volts, proceed to the high voltage test.

If the voltage is lower than 13.5 volts, run the engine at high idle and recheck voltage. If voltage is still below 13.5 volts, proceed to the low voltage test.

Parts Identification

1. Screw
2. Bolt
3. Brush Cover
4. Brush Holder
5. Bearing
6. Armature
7. Bearing
8. O-ring
9. Frame
10. Bolt
11. Cover



12. Gasket
13. Switch
14. Nut
15. Nut
16. Housing
17. Idler Gear
18. Roller
19. Retainer
20. Spring
21. Ball
22. Pinion Shaft
23. Spring
24. Clutch
25. O-ring
26. O-ring
27. Washer
28. Bolt
29. Housing
30. Spring Seat
31. Spring
32. Pinion Gear
33. Collar
34. Snap Ring

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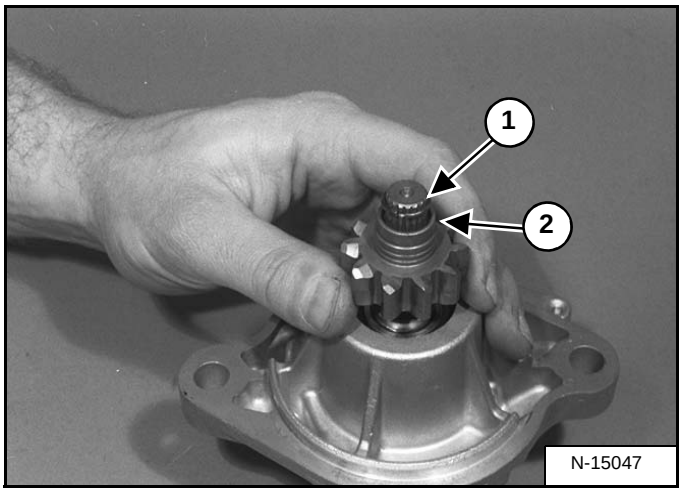
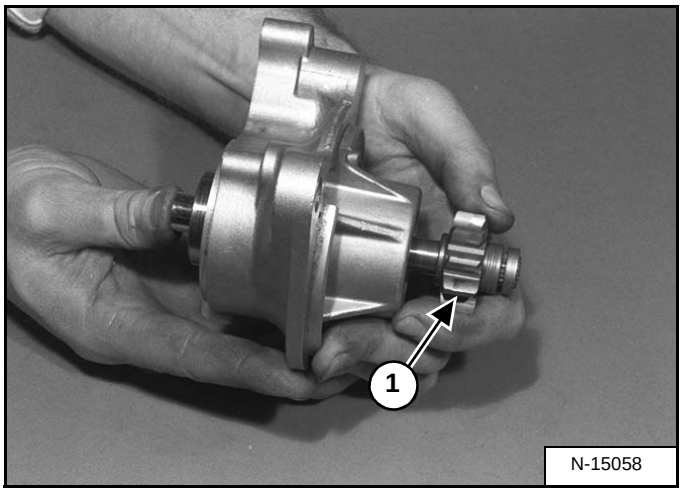
Assembly (Cont'd)

Figure 50-40-40



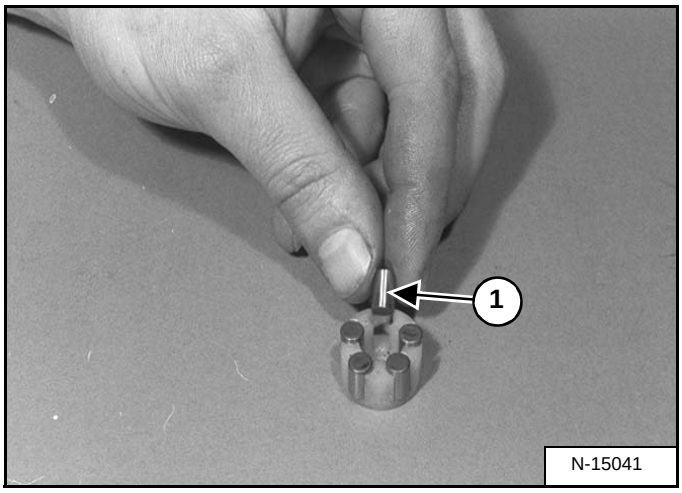
Install the snap ring (Item 1). Pull the collar (Item 2) **[Figure 50-40-40]** over the snap ring.

Figure 50-40-41



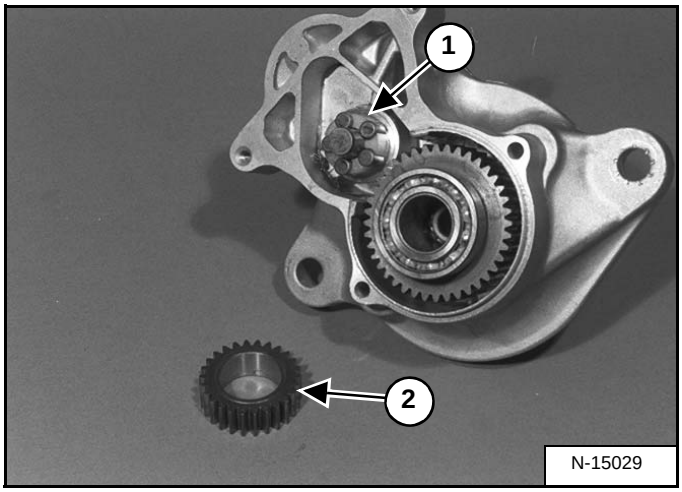
With the pinion shaft extended, extend and release the pinion (Item 1) **[Figure 50-40-41]**. The pinion must return to the fully retracted position.

Figure 50-40-42



Install the rollers (Item 1) **[Figure 50-40-42]** in the retainer.

Figure 50-40-43



Install the roller/retainer assembly (Item 1) **[Figure 50-40-43]** on the starter housing.

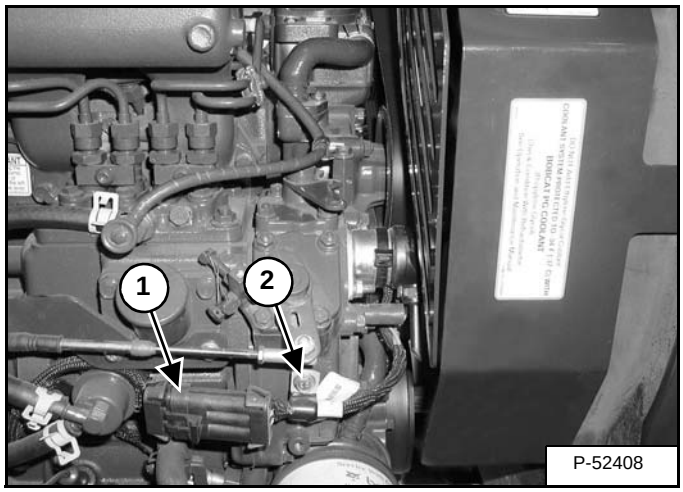
Install the idler gear (Item 2) **[Figure 50-40-43]** over the roller/retainer assembly.


Bobcat®


Bobcat®

Fuel Shut-off Solenoid Removal And Installation

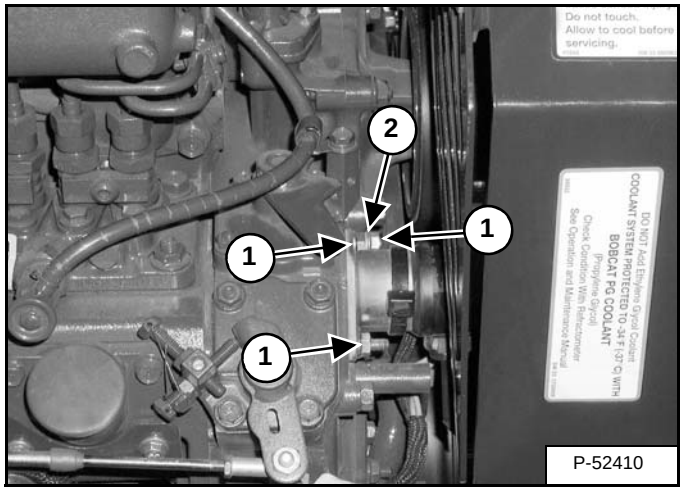
Figure 60-50-6



Disconnect the wire connector (Item 1) **[Figure 60-50-6]**.

Remove the bolt (Item 2) **[Figure 60-50-6]**.

Figure 60-50-7



Remove the nuts (Item 1) and electrical connector (Item 2) **[Figure 60-50-7]** from the solenoid mount bracket.

Remove the solenoid from the mount bracket.

Fuel Injector Nozzle Check

⚠ WARNING

During cold weather (32°F [0°C] and below), do not operate machine until the engine has run for at least five minutes at less than half throttle. This warm-up period is necessary for foot pedal operation and safe stopping. Do not operate controls during warm-up period.

When temperatures are below -20°F (-30°C), the hydrostatic oil must be heated or kept warm. The hydrostatic system will not get enough oil at low temperatures. Park the machine in an area where the temperature will be above 0°F (-18°C) if possible.

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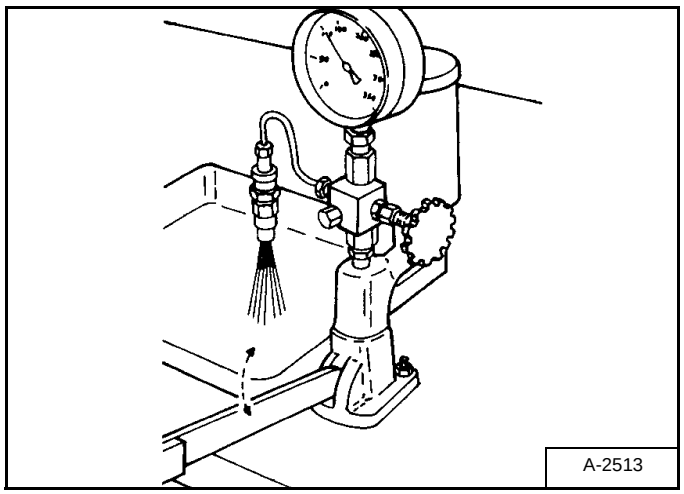
The tool listed will be needed to do the following procedure:

MEL 10018 - Injector Nozzle Tester

Figure 60-50-32



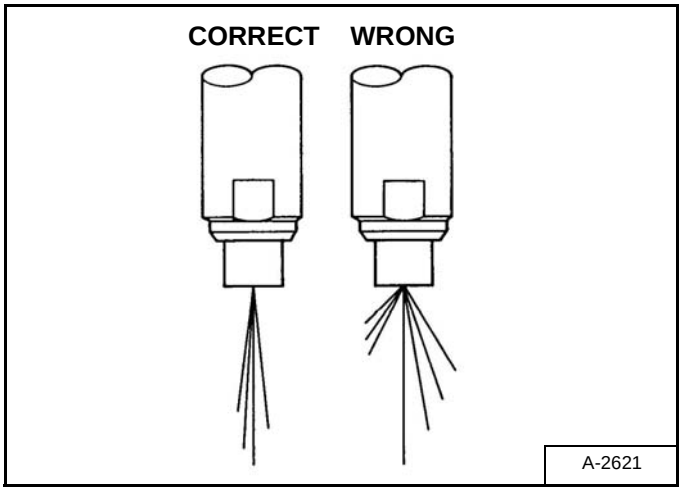
Connect the nozzle to the tester with the nozzle down **[Figure 60-50-32]**.

Operate the hand lever at a slow rate and record the opening pressure. If the pressure is not correct, replace the fuel injection nozzle.

Fuel Injection Pressure	2702 - 2916 PSI (187 - 201 bar)

Check for inside leakage. Operate the hand lever until the pressure is 1850 PSI (127,5 bar). Keep the nozzle under this pressure for 10 seconds, check to see if fuel leaks from the nozzle. If fuel leaks, replace the nozzle.

Figure 60-50-33

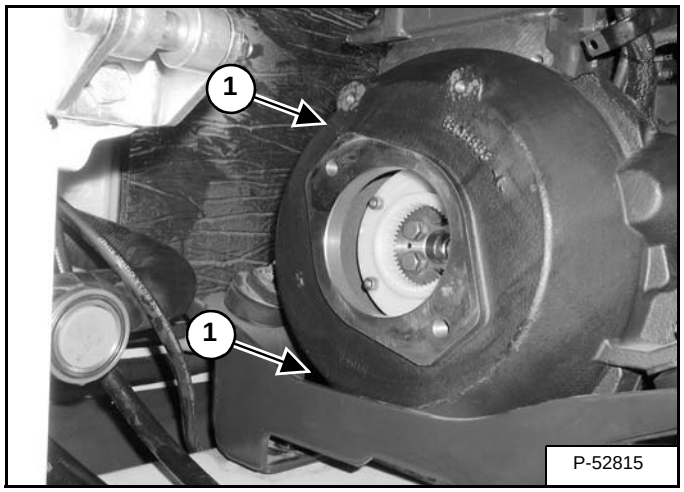


Check that the spray pattern is correct **[Figure 60-50-33]**.

1. Fuel does not come out the side of the nozzle.
2. Drops of fuel are not present at the nozzle.
3. The injector has an even flow coming from the nozzle.

Flywheel Removal And Installation (Cont'd)

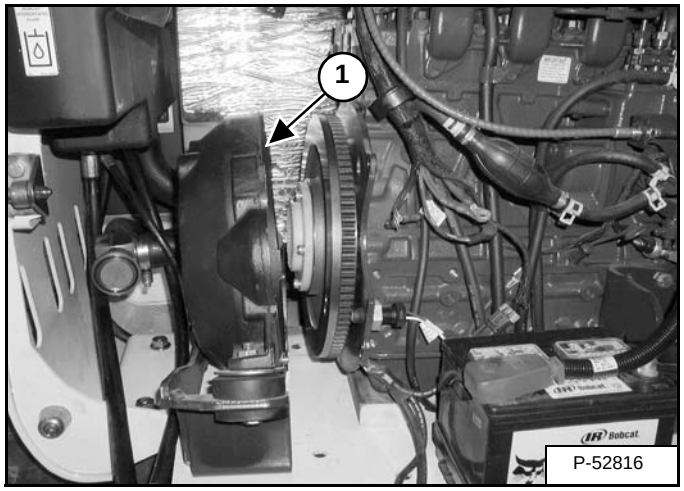
Figure 60-70-4



Remove the 2 flywheel housing bolts (Item 1) **[Figure 60-70-4]** from the front side of the engine.

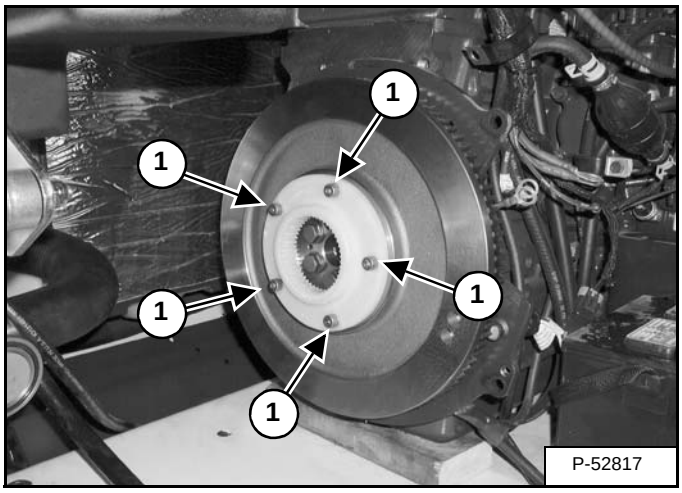
Installation: Position the housing over the alignment pins and tighten the bolts to 30 - 37 ft.-lb. (40 - 50 N•m) torque.

Figure 60-70-5



Remove the flywheel housing (Item 1) **[Figure 60-70-5]** from the engine.

Figure 60-70-6

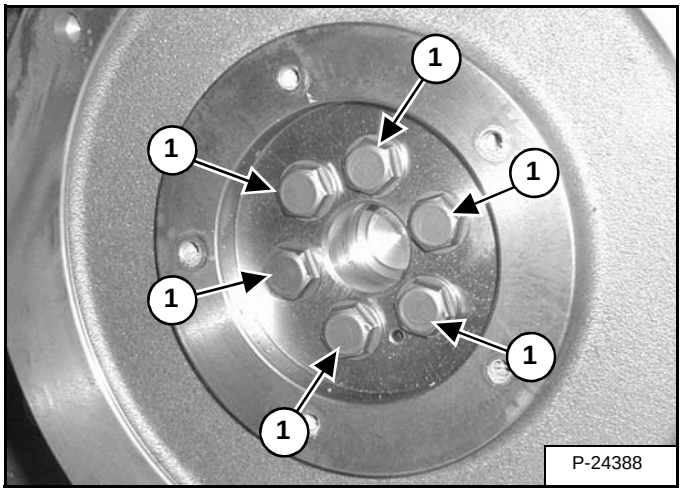


Remove the bolts (Item 1) **[Figure 60-70-6]** from the hydraulic pump coupler.

Installation: Tighten the bolts to 27 - 32 ft.-lb. (37 - 43 N•m) torque.

Remove the coupler.

Figure 60-70-7



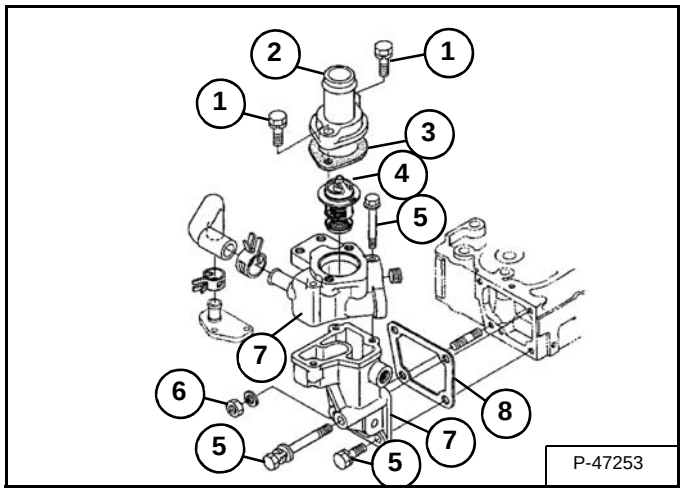
Remove the bolts (Item 1) **[Figure 60-70-7]** from the flywheel.

Installation: Tighten the bolts to 40 - 43 ft.-lb. (54 - 59 N•m) torque.

Remove the flywheel.

Cylinder Head Disassembly And Assembly

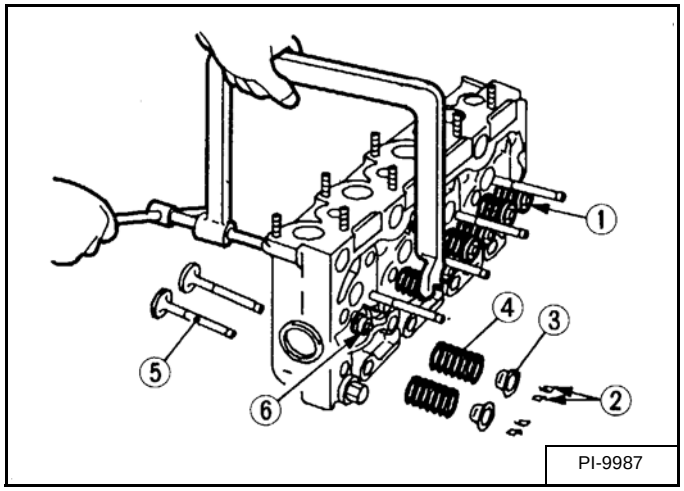
Figure 60-80-12



Remove the bolts (Item 1), housing (Item 2), gasket (Item 3) and thermostat (Item 4) **[Figure 60-80-12]**.

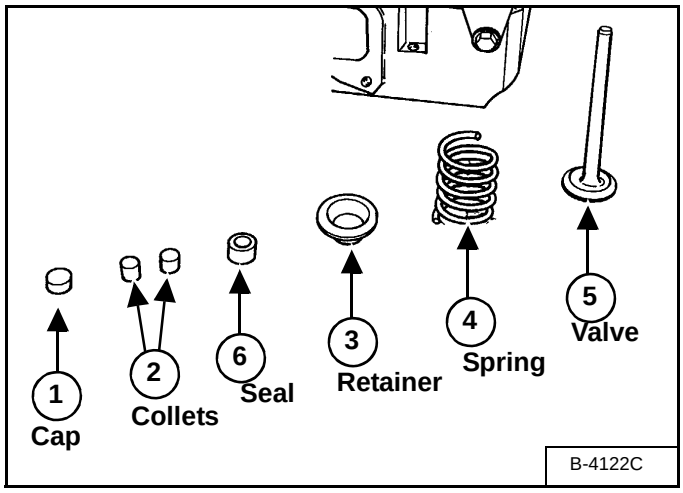
Remove bolts (Item 5), nut (Item 6), top and bottom housing (Item 7), and gasket (Item 8) from the cylinder head **[Figure 60-80-12]**.

Figure 60-80-13



Use a valve spring compressor to compress the valve spring **[Figure 60-80-13]**.

Figure 60-80-14



Remove the valve cap (Item 1) and valve spring collet (Item 2) **[Figure 60-80-13]** & **[Figure 60-80-14]**.

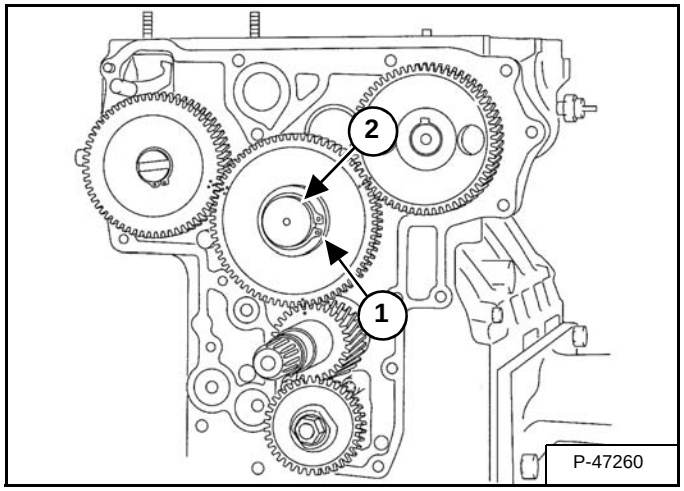
Remove the valve spring retainer (Item 3) and the spring (Item 4) **[Figure 60-80-13]** & **[Figure 60-80-14]**.

Remove the seal (Item 6) and the valve (Item 5) **[Figure 60-80-13]** & **[Figure 60-80-14]**.

Idler Gear And Camshaft Removal And Installation

Remove the timing gearcase cover. (See Timing Gearcase Cover Removal And Installation on Page 60-80-11.)

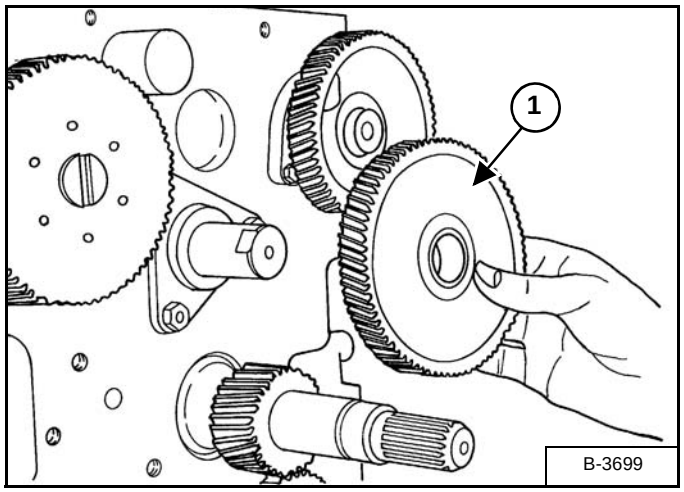
Figure 60-80-38



Remove the snap ring (Item 1) and collar from the idler gear shaft (Item 2) **[Figure 60-80-38]**.

Installation: Make sure the timing marks are in correct alignment when installing the timing gears **[Figure 60-80-38]**.

Figure 60-80-39

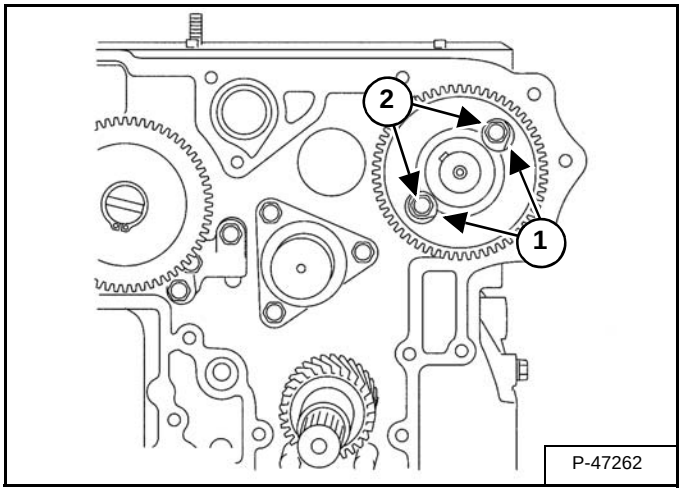


Remove the idler gear (Item 1) **[Figure 60-80-39]**.

Installation: Check the idler gear end play. If the clearance exceeds the allowable limit, replace the gear collar.

Idler Gear End Play	0.005 - 0.019 in. (0,12 - 0,48 mm)
Allowable Limit	0.035 in. (0,9 mm)

Figure 60-80-40

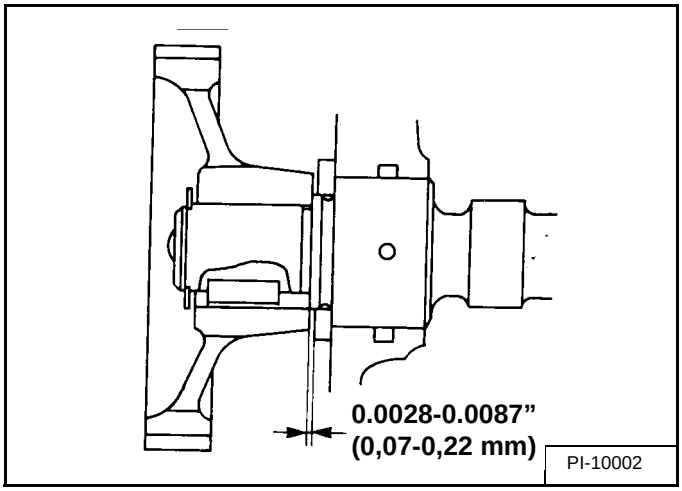


Align the holes (Item 1) on the camshaft gear with the camshaft retainer plate bolts (Item 2) **[Figure 60-80-40]**. Remove the bolts.

Installation: Tighten the camshaft retainer bolts to 17 - 20 ft.-lb. (23 - 27 N•m) torque.

Remove the camshaft from the engine block.

Figure 60-80-41



Installation: Check the camshaft end play. If clearance exceeds the allowable limit, replace the camshaft retainer plate **[Figure 60-80-41]**.

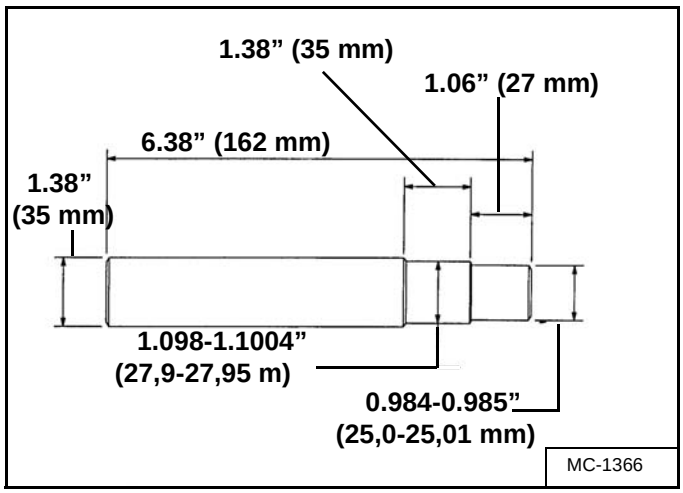
Camshaft End Play	0.0028 - 0.0087 in. (0,07 - 0,22 mm)
Allowable Limit	0.012 in. (0,3 mm)

Piston And Connecting Rod Servicing (Cont'd)

Calculate the oil clearance. If the clearance exceeds the allowable limit, replace the bushing. If it still exceeds the specifications, replace the piston pin.

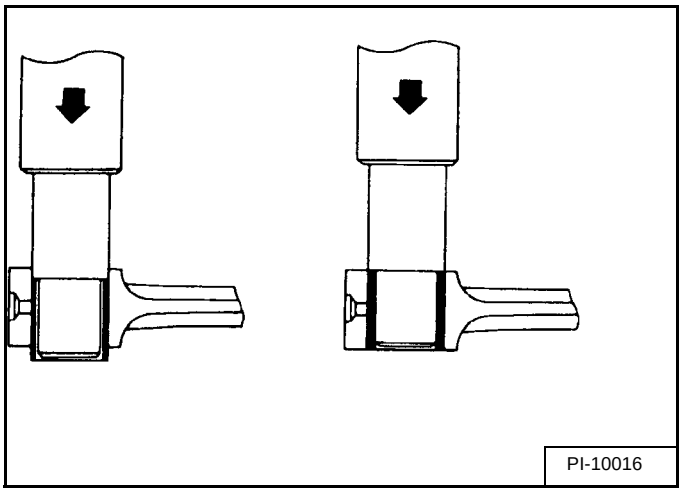
Piston Pin O.D.	0.984 - 0.985 in. (25,0 - 25,011 mm)
Bushing I.D.	0.985 - 0.986 in. (25,025 - 25,04 mm)
Oil Clearance Between Piston Pin & Bushing	0.0006 - 0.0015 in. (0,014 - 0,038 mm)
Allowable Limit	0.002 in. (0,05 mm)

Figure 60-80-69



To replace the connecting rod small end bushing, make a driver tool as shown **[Figure 60-80-69]**.

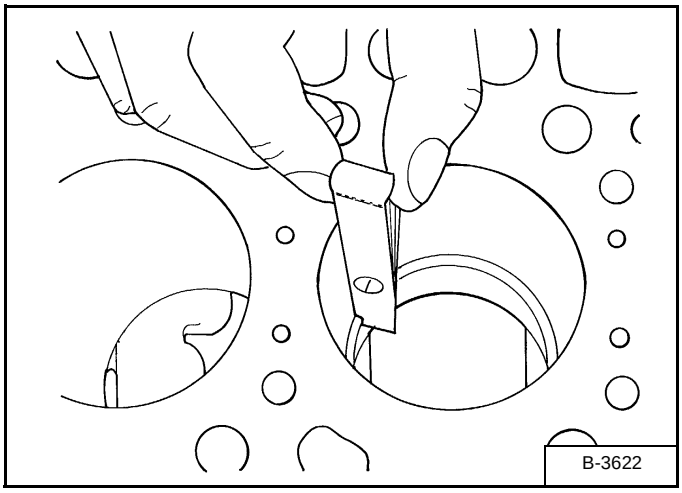
Figure 60-80-70



Use a press and special driver tool to remove the small end bushing **[Figure 60-80-70]**.

Installation: Clean the small end bushing and bore. Put oil on the bushing and press into the connecting rod until it is flush **[Figure 60-80-70]**.

Figure 60-80-71



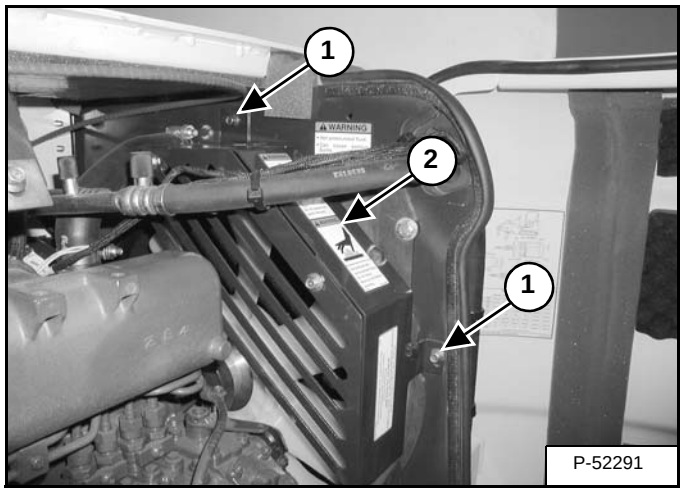
Install a piston ring into the lower part of the cylinder bore. Measure the ring gap with a feeler gauge **[Figure 60-80-71]**.

If the gap exceeds the allowable limit, replace the ring.

Top Ring Gap	0.008 - 0.0138 in. (0,2 - 0,35 mm)
Second Ring Gap	0.016 - 0.022 in. (0,40 - 0,55 mm)
Oil Ring Gap	0.01 - 0.018 in. (0,25 - 0,45 mm)
Allowable Limit	0.05 in. (1,25 mm)

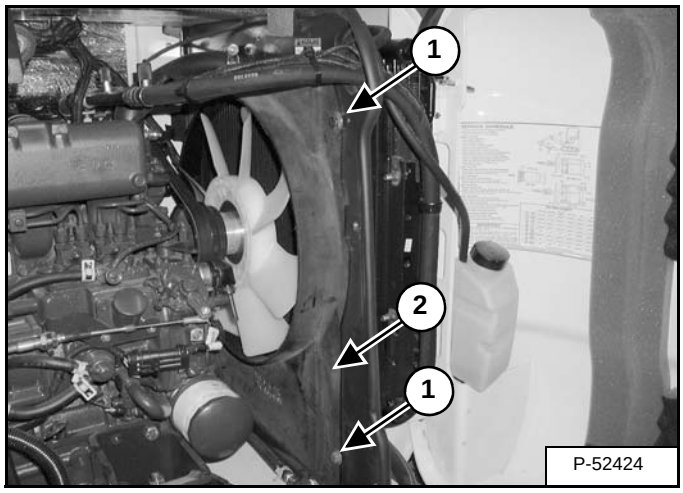
Fan Removal And Installation (Cont'd)

Figure 60-80-100



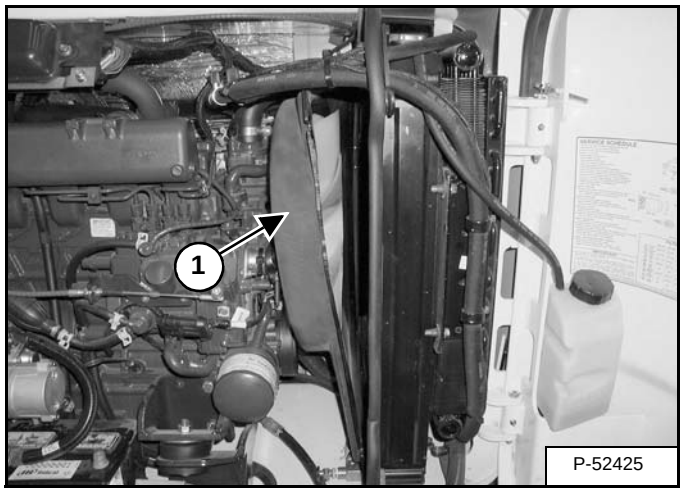
Remove the bolts (Item 1) from the guard (Item 2) **[Figure 60-80-100]**. Remove the guard.

Figure 60-80-101



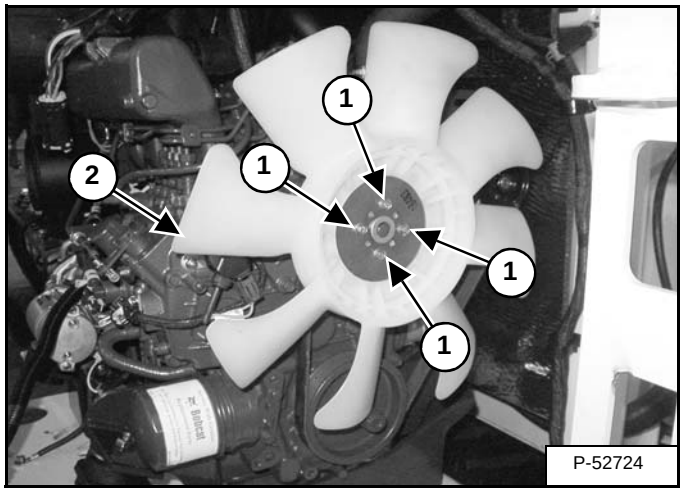
Remove the bolts (Item 1) from the shroud (Item 2) **[Figure 60-80-101]**.

Figure 60-80-102



Position the shroud (Item 1) **[Figure 60-80-102]** as shown.

Figure 60-80-103



Remove the bolts (Item 1) **[Figure 60-80-103]**.

NOTE: The engine is shown removed for photo clarity.

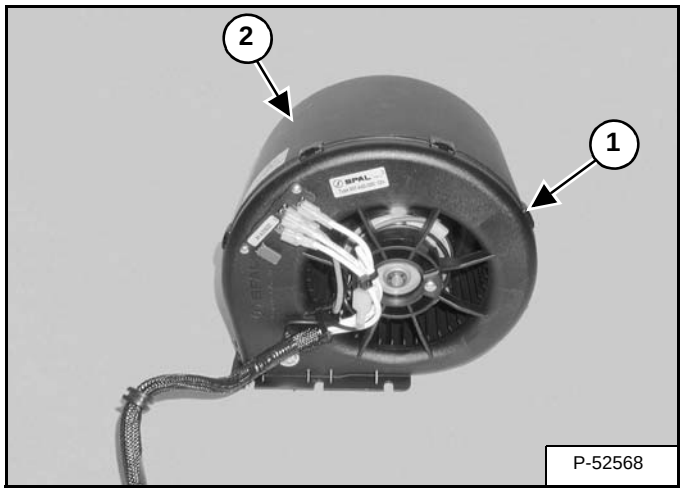
Installation: Install new bolts with pre-applied thread lock adhesive. Tighten the bolts to 12 - 15 ft.-lb. (16,27 - 20,34 N•m) torque.

Remove the fan (Item 2) **[Figure 60-80-103]**

BLOWER FAN (EARLY MODELS) (CONT'D)

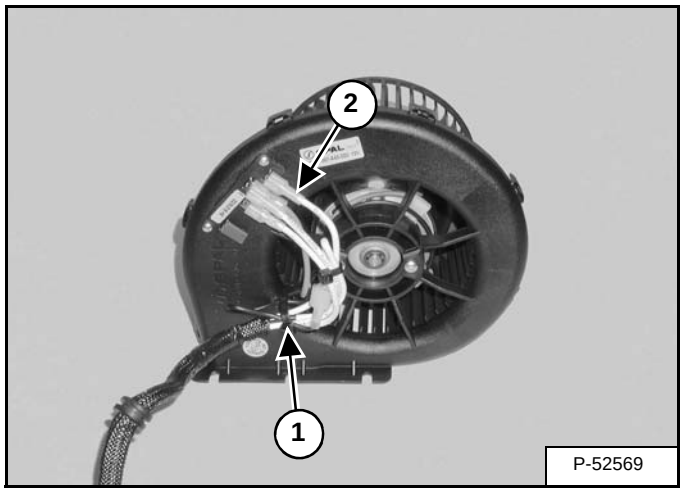
Disassembly And Assembly

Figure 70-20-3



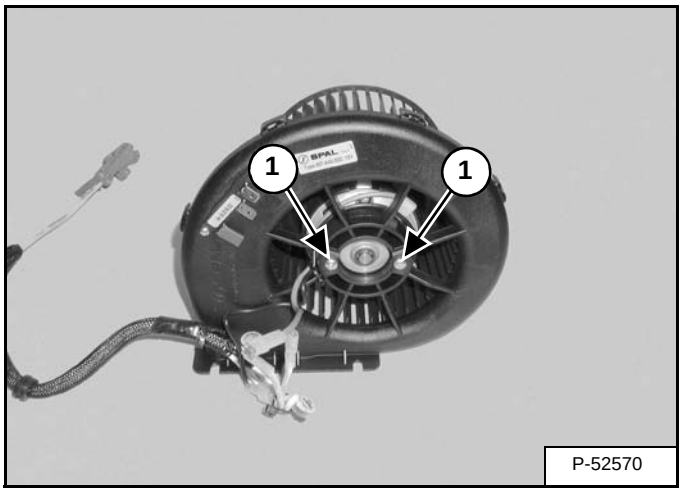
Release the clips (Item 1) on the housing (Item 2) **[Figure 70-20-3]**. Remove the housing.

Figure 70-20-4



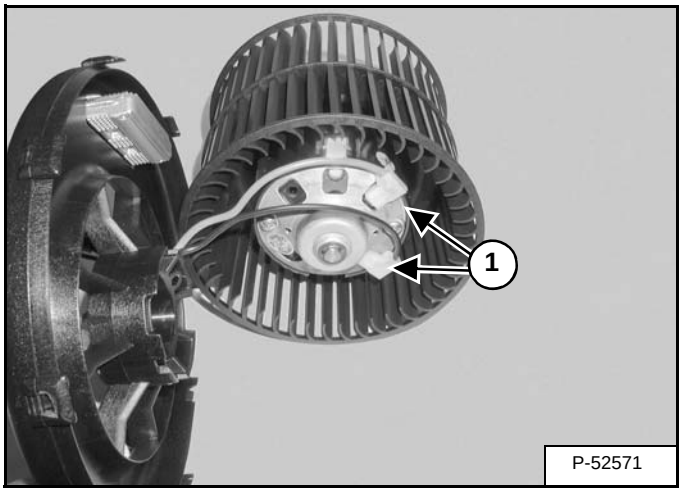
Remove the tie strap (Item 1). Mark the wires for proper installation. Remove the wires (Item 2) **[Figure 70-20-4]**.

Figure 70-20-5



Remove the bolts (Item 1) **[Figure 70-20-5]** from the fan motor.

Figure 70-20-6



Mark the wires for proper installation and remove the wires (Item 1) **[Figure 70-20-6]** from the fan motor.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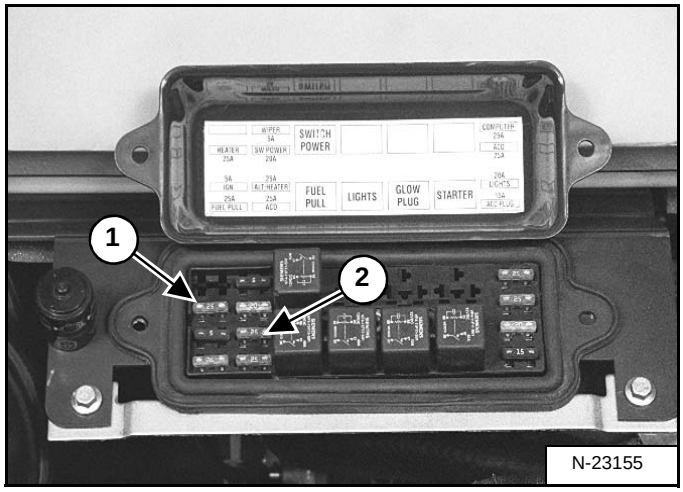
Checking The Electrical System (Cont'd)

Figure 70-80-15



If the compressor clutch does not engage, check the fuses (Item 1 & 2) **[Figure 70-80-15]** located in the engine compartment.

Replace the fuse if burned out.

NOTE: The decal inside the fuse cover, refers to the fuses as HEATER and ALT/HEATER. These fuses control the power for both the Heater and the A/C systems.

Figure 70-80-16

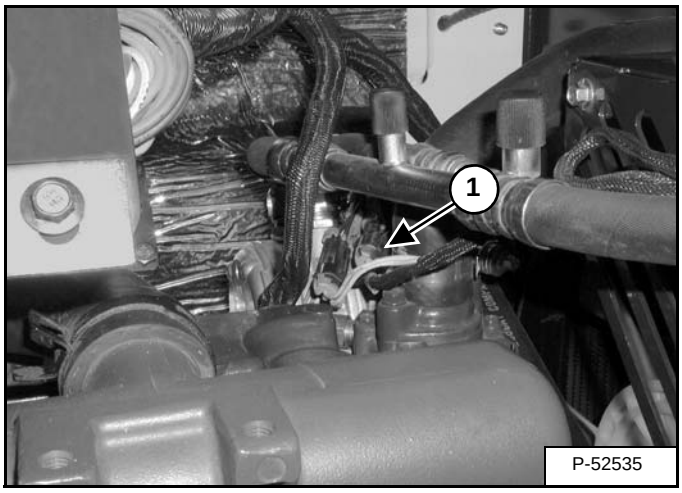
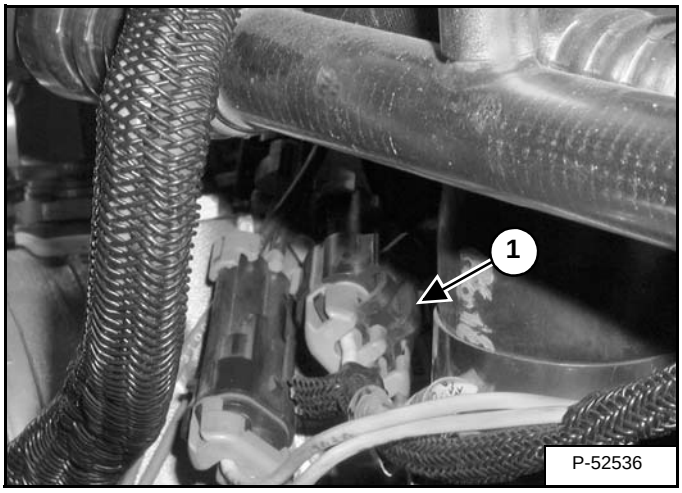


Figure 70-80-17



If the fuses are good, disconnect the wire harness (Item 1) **[Figure 70-80-16]** & **[Figure 70-80-17]** from the compressor clutch wire.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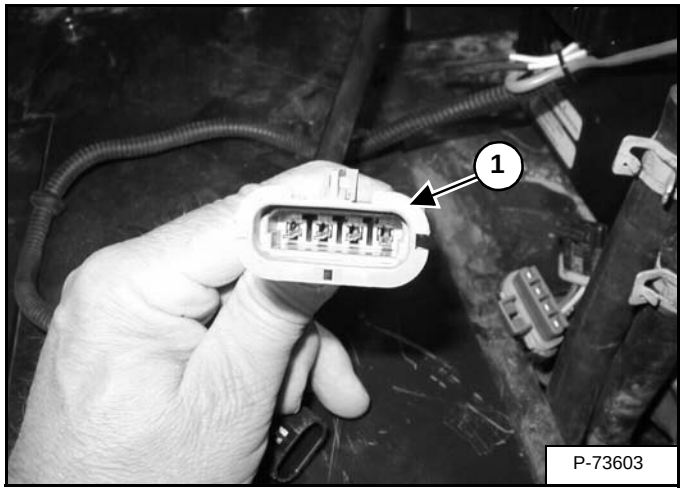
Checking The Electrical System (Cont'd)

Figure 70-81-28



If there is voltage at the wiring harness, check the resistance to the blower fan at the thermostat/blower fan wiring connector (Item 1) **[Figure 70-81-28]**.

Check the resistance between Pin 4 (BLACK wire # 2200) and Pin 3 (YELLOW wire # 5000).

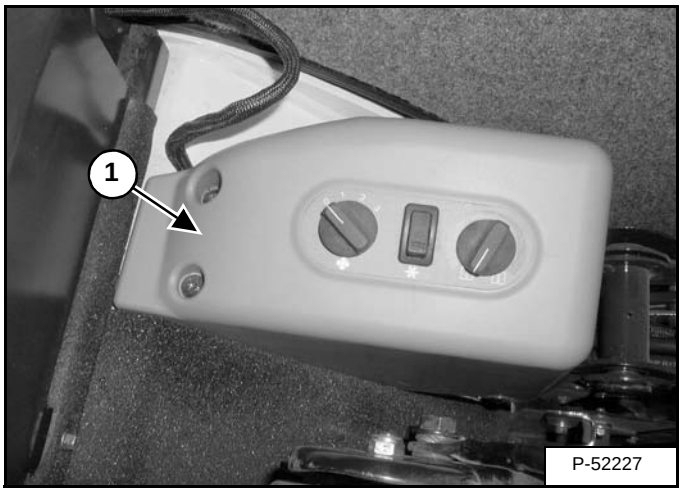
Check the resistance between Pin 4 (BLACK wire # 2200) and Pin 2 (RED wire # 1200).

Check the resistance between Pin 4 (BLACK wire # 2200) and Pin 1 (ORANGE wire # 1010).

If there is no resistance value at any of these pins, replace the blower fan. (See Removal And Installation on Page 70-21-1.)

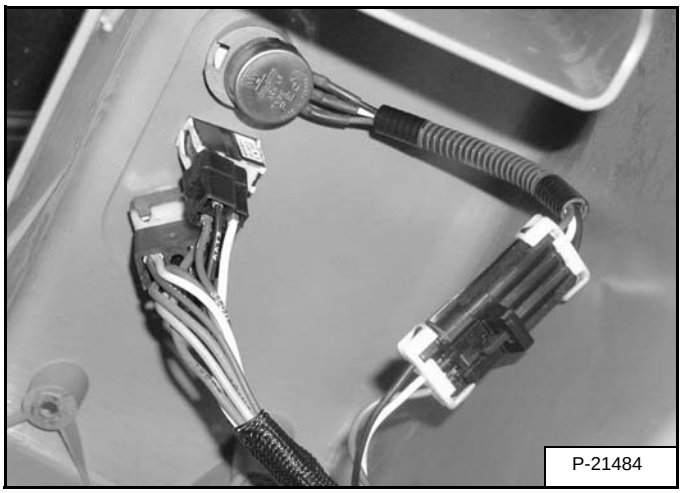
If there is resistance value at any of the pins, check the climate controls at the control panel inside the excavator cab.

Figure 70-81-29



Remove the upper left upper console (Item 1) **[Figure 70-81-29]**. (See Upper Console Cover Removal And Installation on Page 40-60-3.)

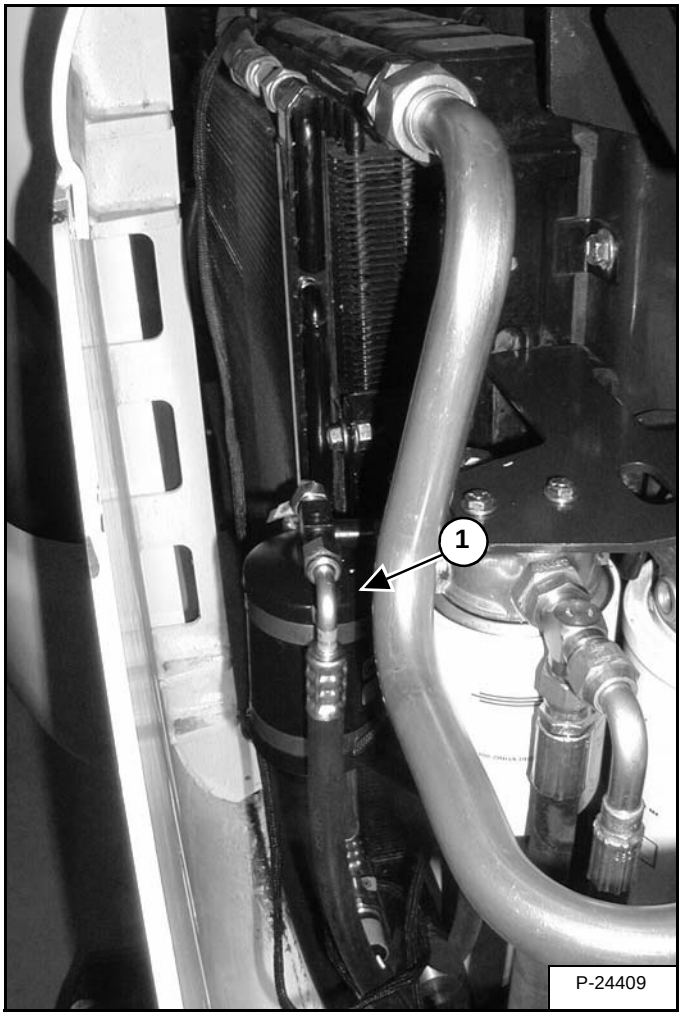
Figure 70-81-30



Position the console and wiring harness in the cab so the wiring harness can be checked **[Figure 70-81-30]**.

Component Replacement And Refrigeration Leaks

Figure 70-90-6



Whenever the A/C system is opened to the atmosphere or there has been a leak in the system, the receiver/drier (Item 1) **[Figure 70-90-6]** must be changed.

Never leave hose fittings, compressor fittings or components uncapped while working on the A/C system.

Reclamation Procedure (Cont'd)

Figure 70-130-3

Remove the protective cap and connect the Refrigerant Identifier to the low pressure hose (Item 1) **[Figure 70-130-3]**.

Connect the Refrigerant Identifier to its power source.

Follow the steps displayed on the refrigerant identifier screen.

Follow two minutes for the refrigerant identifier to display the type of refrigerant and air content. An alarm will sound if potentially flammable hydrocarbons are present and will also indicate on the visual display.

Disconnect the refrigerant identifier from the excavator A/C.

If the refrigerant is dangerous or flammable, it must be evacuated from the A/C system into a separate container and properly and safely disposed of.

If R134a is found, evacuate the system.

IMPORTANT: Only A/C trained technicians should perform the reclaiming and recharging procedure.

WARNING

HFC 134A refrigerant can be dangerous if not properly handled. Liquid 134A may cause blindness if it contacts the eyes and may cause serious frostbite if it contacts the skin.

- **Gaseous 134A becomes lethal (phosgene) gas when it contacts open flame or very hot substances.**
- **NEVER SMOKE when there is the possibility of even small amounts of 134A in the air.**

Any servicing work that involves release or addition of 134A to the system must be done by a competent refrigeration dealer who has the proper equipment, knowledge, and experience to service refrigeration equipment.

W-2373-0500

Figure 70-130-4

Use an approved recover/charging unit **[Figure 70-130-4]** to evacuate the system.

Connect the reclaimer to the excavator A/C charge ports.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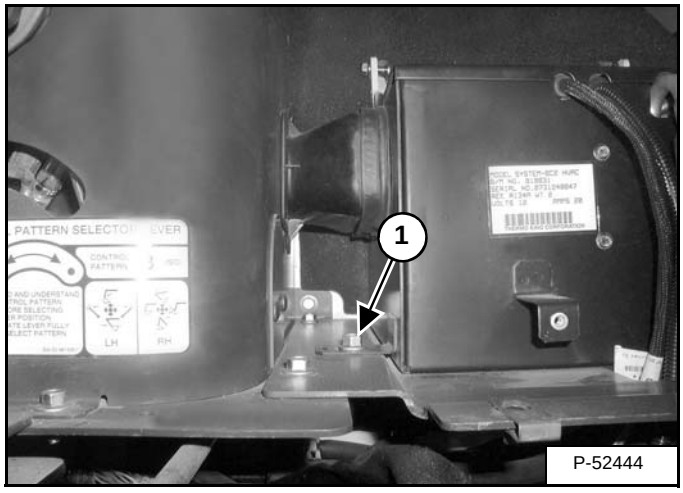
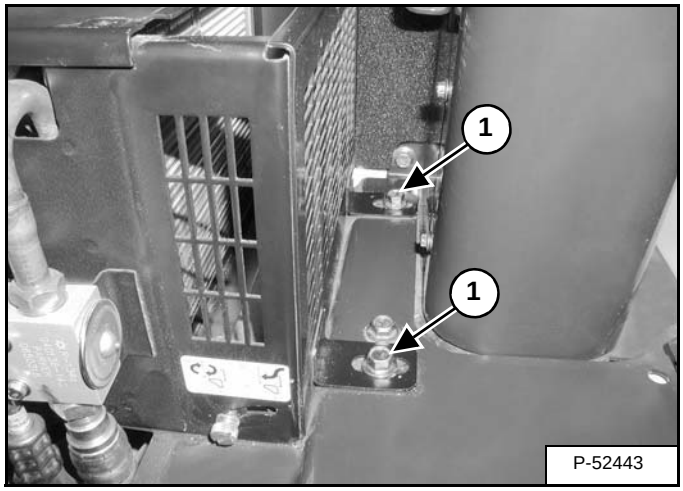
Removal And Installation (Cont'd)

Figure 70-190-4



Remove the bolt (Item 1) **[Figure 70-190-4]** on the right side of the evaporator/heater unit.

Figure 70-190-5



Remove the bolts (Item 1) **[Figure 70-190-5]** from the left side of the evaporator/heater unit and remove the unit from the excavator.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