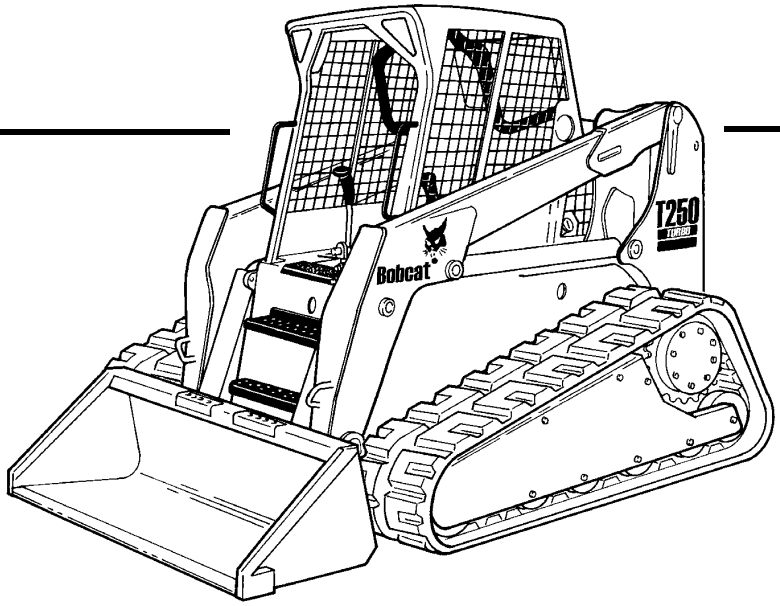
T250
TURBO

T250
TURBO
HIGH FLOW

Bobcat®

Service Manual

S/N 525611001 & Above
S/N 525711001 & Above



Doosan purchased Bobcat Company from Ingersoll-Rand Company in 2007. Any reference to Ingersoll-Rand Company or use of trademarks, service marks, logos, or other proprietary identifying marks belonging to Ingersoll-Rand Company in this manual is historical or nominative in nature, and is not meant to suggest a current affiliation between Ingersoll-Rand Company and Bobcat Company or the products of either.

EQUIPPED WITH BOBCAT INTERLOCK CONTROL SYSTEM (BICS™)

6902724 (6-12)

Ingersoll Rand
Compact Vehicle Technologies

Printed in U.S.A.

SAFETY INSTRUCTIONS

Safety Alert Symbol

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

WARNING

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

W-2003-0903

WARNING

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

W-2044-1285

IMPORTANT

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

I-2019-0284

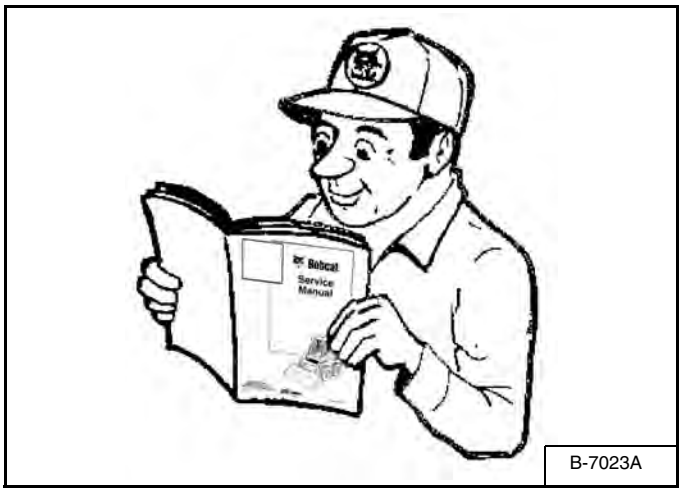
The following publications provide information on the safe use and maintenance of the Bobcat machine and attachments:

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

LIFTING AND BLOCKING THE LOADER

Procedure

Figure 10-10-1



⚠ 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

Read the Removal & Installation, Disassembly & Assembly, etc. completely to become familiar with the procedure before beginning **[Figure 10-10-1]**.

Always park the loader on a level surface.

⚠ WARNING

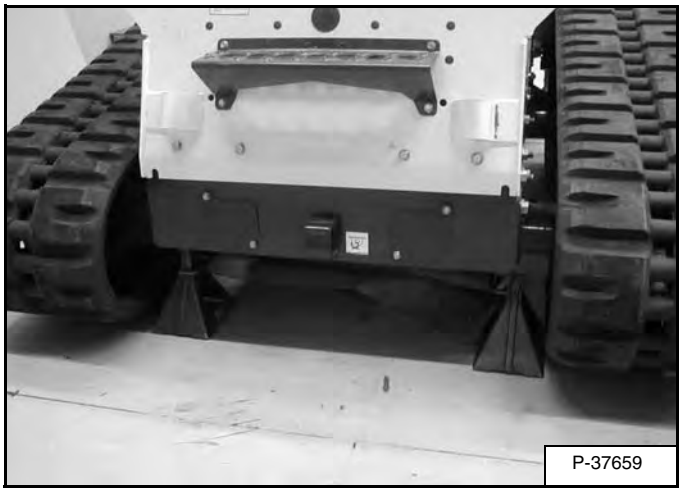
Put jackstands under the front axles and rear corners of the frame before running the engine for service. Failure to use jackstands can allow the machine to fall or move and cause injury or death.

W-2017-0286

Figure 10-10-2

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

Figure 10-10-3



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

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

TOWING THE LOADER

Procedure

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

- The loader can be lifted onto a transport vehicle.

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

  The towing chain (or cable) must be rated at 1 & 1/2 times the weight of the loader (See LOADER SPECIFICATIONS (T250) on Page SPEC-10-1.)

ENGINE COOLING SYSTEM

Cleaning Cooling System

Figure 10-90-1

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

⚠ WARNING

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

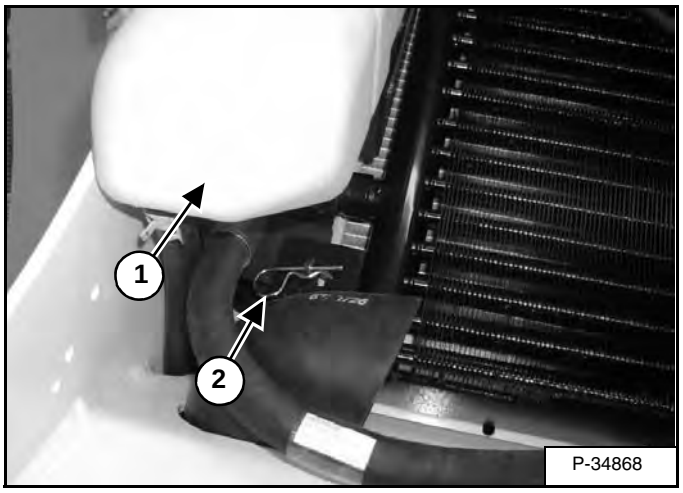
- **When fluids are under pressure.**
- **Flying debris or loose material is present.**
- **Engine is running.**
- **Tools are being used.**

W-2019-1285

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

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

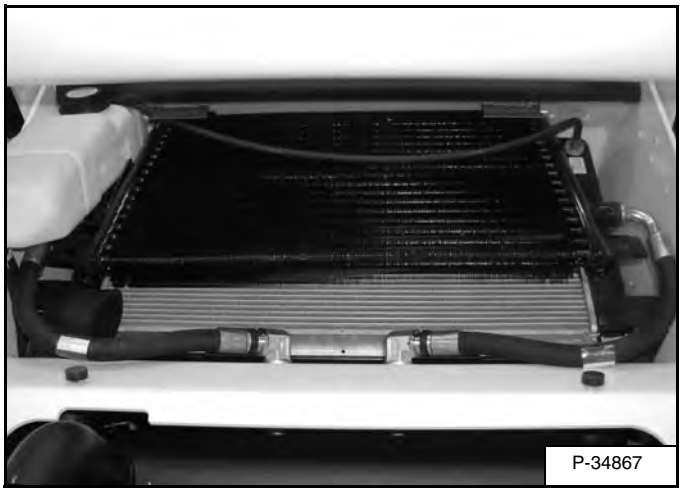
Figure 10-90-2



Lift the overflow tank (Item 1) **[Figure 10-90-2]** out of its mount bracket.

Remove the cotter pin (Item 2) **[Figure 10-90-2]** (both sides) from the oil cooler.

Figure 10-90-3

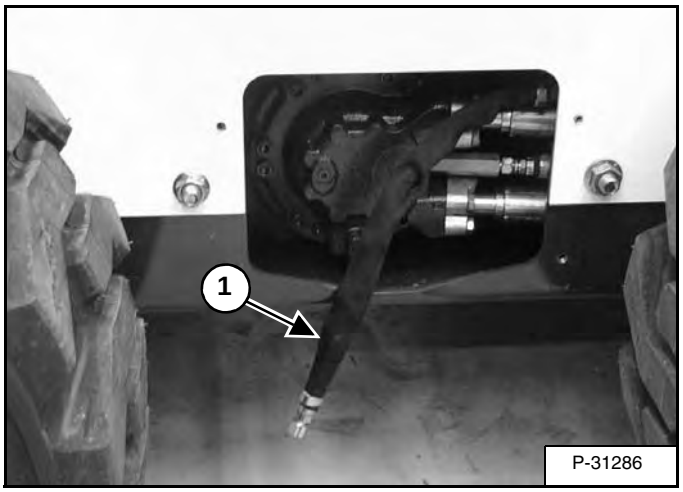


Raise the oil cooler **[Figure 10-90-3]**.

Use air pressure or water pressure to clean the top of the engine oil cooler.

Replacing Hydraulic Fluid And Case Drain Filters

Figure 10-120-5



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

Replace the fluid if it be comes contaminated or after major repair.

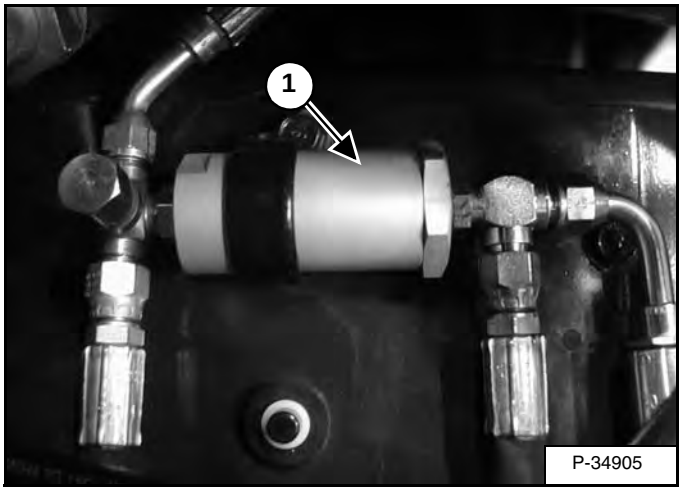
Also clean the hydrostatic motor case drain filter thoroughly after a major repair.

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

Remove the left hydrostatic motor cover.

Pull the reservoir drain hose (Item 1) **[Figure 10-120-5]** out the motor cover hole. Remove the plug and drain the fluid into a container.

Figure 10-120-6



Disconnect the hoses from the hydrostatic motor case drain filter (Item 1) **[Figure 10-120-6]**.

Remove the case drain filter and clean thoroughly with clean solvent.

Install the case drain filter and tighten the hoses.

Install the pl ug in the reservoir drain hose and tighten. Install the motor cover.

Continued On Next Page

HYDRAULIC/HYDROSTATIC SCHEMATIC
WITH SJC OPTION
T250 (S/N 525611001 - 525612999)
(S/N 525711001 - 525711999)

(PRINTED FEBRUARY 2005)
V-0420legend

Printable Version Click Here

LEGEND

1. RESERVOIR: Capacity . . . . . 21 qt. (19.9 L)
2. FILTER - CASE DRAIN (90 Micron)
3. FILTER - HYDRAULIC (CANISTER)
4. SPRING LOADED FILTER BYPASS VALVE: 45-55 PSI (3,1-3,8 bar)
5. SOLENOID ACTIVATED DIRECTIONAL CONTROL VALVE - BUCKET POSITION VALVE (ON/OFF)
6. DIFFERENTIAL PRESSURE SWITCH: 36-44 PSI (2,5-3,0 bar)
7. FLOW DIVIDER ADJUSTMENT VALVE
8. CHECK VALVE - BUCKET POSITION VALVE
9. FIXED CAPACITY DISPLACEMENT BIDIRECTIONAL HYDROSTATIC MOTOR
10. PILOTED ACTIVATED DIRECTIONAL CONTROL VALVE - FLOW CONTROL SPOOL
11. PILOTED ACTIVATED DIRECTIONAL CONTROL VALVE - UNLOADING SPOOL
12. PILOTED ACTIVATED DIRECTIONAL CONTROL VALVE - TILT CONTROL
13. PILOTED ACTIVATED DIRECTIONAL CONTROL VALVE - LIFT CONTROL
14. SOLENOID ACTIVATED DIRECTIONAL CONTROL VALVE - BICS CONTROL
15. PULL BUTTON ACTIVATED DIRECTIONAL CONTROL VALVE - LIFT ARM BY PASS
16. FILTER - BICS CONTROL VALVE (SCREEN)
17. ONE WAY RESTRICTOR
18. LOAD CHECK VALVE
19. RELIEF VALVE - MAIN: at Front Quick Couplers 3250-3350 PSI (224-231 bar)
20. RELIEF VALVE - PORT: 4000 PSI (275 bar)
21. ANTICAVITATION VALVE
22. RELIEF/ANTICAVITATION VALVE - PORT (TILT BASE END) 3500 PSI (241 bar)
23. RELIEF VALVE - PORT: 4000 PSI (275 bar)
24. SOLENOID ACTIVATED DIRECTIONAL CONTROL VALVE - AUXILIARY
25. RELIEF VALVE - PORT: . . . . . (Optional) 3500 PSI (241 bar)
26. RELIEF/REPLENISHING VALVE - HIGH PRESSURE: 5220 PSI (345 bar)
27. PRESSURE SWITCH
28. RELIEF VALVE - CHARGE: 140 degrees F. (60 degrees C.)Fluid at High Engine Idle 330 - 360 PSI (22,7 - 24,8 bar)
29. CHARGE PUMP: 11.1 GPM (42 L/min) (for each pump) at High Engine Idle
30. HYDRAULIC PUMP . . . . . Gear Type 20.7 GPM (78,4 L/min) at High Engine Idle
31. DRIVE MOTOR SHUTTLE VALVE
32. SHUTTLE RELIEF VALVE: 200 PSI (13,8 bar)
33. SOLENOID ACTIVATED DIRECTIONAL CONTROL VALVE - Base
34. SOLENOID ACTIVATED DIRECTIONAL CONTROL VALVE - Rod
35. LOAD SHUTTLE VALVE - BLEED OFF
36. PILOT ACTIVATED DIRECTIONAL CONTROL VALVE - (Two Coil)
37. PILOT ACTIVATED DIRECTIONAL CONTROL VALVE - REAR AUXILIARY
38. ORIFICE - With 0.140 inch (3,6 mm)
39. RELIEF VALVE: 3000 PSI (207 bar)
40. ORIFICE - With 0.031 inch (0,79 mm)
41. CHECK VALVE - BICS CONTROL VALVE
42. RESTRICTION
43. CHECK VALVE
44. FRONT AUXILIARY MANUAL PRESSURE BLEED-OFF VALVE
45. VARIABLE CAPACITY DISPLACEMENT BIDIRECTIONAL HYDROSTATIC PUMP
46. RELIEF VALVE - 2000 PSI (138 bar)
47. SOLENOID ACTIVATED DIRECTIONAL CONTROL VALVE (TWO COIL)
48. RELIEF VALVE - 1200 PSI (83 bar)
49. CHECK VALVE - With 80 PSI (5,5 bar) Spring
50. CHECK VALVE - With 300 PSI (20,7 bar) Spring and 0.016 inch (0,40 mm) orifice
51. ORIFICE - With 0.025 inch (0,64 mm)
52. PILOT ACTIVATED DIRECTIONAL CONTROL VALVE - HYDRAULIC POWERED BOB-TACH
53. FILTER - CASE DRAIN (ATTACHMENT)
54. SOLENOID ACTIVATED DIRECTIONAL CONTROL VALVE - BRAKE
55. HYDRAULIC BRAKE - SPRING APPLIED - PRESSURE RELEASE
56. ORIFICE - With 0.089 inch (2,26 mm)
57. DISPLACEMENT CONTROL VALVE
58. PUMP SERVO
59. PRESSURE CONTROL PILOT VALVE (2 COILS) 0 - 0.085 Ampere

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

HYDRAULIC/HYDROSTATIC SCHEMATIC
WITH SJC AND HIGH FLOW OPTION
T250 (S/N 525613000 & Above)
(S/N 525712000 & Above)

(PRINTED MARCH 2005)

V-0675legend

Printable Version Click Here

LEGEND

1. RESERVOIR: Capacity . . . . . 21 qt. (19.9 L)
2. FILTER - CASE DRAIN (90 Micron)
3. FILTER - HYDRAULIC (CANISTER)
4. SPRING LOADED FILTER BYPASS VALVE: 45-55 PSI (3,1-3,8 bar)
5. SOLENOID ACTIVATED DIRECTIONAL CONTROL VALVE - BUCKET POSITION VALVE (ON/OFF)
6. DIFFERENTIAL PRESSURE SWITCH: 36-44 PSI (2,5-3,0 bar)
7. FLOW DIVIDER ADJUSTMENT VALVE
8. CHECK VALVE - BUCKET POSITION VALVE
9. FIXED CAPACITY DISPLACEMENT BIDIRECTIONAL HYDROSTATIC MOTOR
10. PILOTED ACTIVATED DIRECTIONAL CONTROL VALVE - FLOW CONTROL SPOOL
11. PILOTED ACTIVATED DIRECTIONAL CONTROL VALVE - UNLOADING SPOOL
12. PILOTED ACTIVATED DIRECTIONAL CONTROL VALVE - TILT CONTROL
13. PILOTED ACTIVATED DIRECTIONAL CONTROL VALVE - LIFT CONTROL
14. SOLENOID ACTIVATED DIRECTIONAL CONTROL VALVE - BICS CONTROL
15. PULL BUTTON ACTIVATED DIRECTIONAL CONTROL VALVE - LIFT ARM BY PASS
16. FILTER - BICS CONTROL VALVE (SCREEN)
17. FILTER - BOB-TACH VALVE
18. LOAD CHECK VALVE
19. RELIEF VALVE - MAIN: at Front Quick Couplers 3250-3350 PSI (224-231 bar)
20. RELIEF/ANTICAVITATION VALVE - PORT (LIFT BASE END) 4000 PSI (275 bar)
21. ANTICAVITATION VALVE
22. RELIEF/ANTICAVITATION VALVE - PORT (TILT BASE END) 4000 PSI (275 bar)
23. RELIEF/ANTICAVITATION VALVE - PORT (TILT ROD END) 4000 PSI (275 bar)
24. SOLENOID ACTIVATED DIRECTIONAL CONTROL VALVE - AUXILIARY
25. RELIEF/ANTICAVITATION VALVE - PORT - OPTIONAL: 3100 PSI (214 bar)
26. RELIEF/REPLENISHING VALVE - HIGH PRESSURE: 5220 PSI (345 bar)
27. PRESSURE SWITCH
28. RELIEF VALVE - CHARGE: 140 degrees F. (60 degrees C.)Fluid at High Engine Idle 330 - 360 PSI (22,7 - 24,8 bar)
29. CHARGE PUMP: 11.1 GPM (42 L/min) (for each pump) at High Engine Idle
30. HYDRAULIC PUMP . . . . . Gear Type 20.7 GPM (78,3 L/min) at High Engine Idle
31. DRIVE MOTOR SHUTTLE VALVE
32. SHUTTLE RELIEF VALVE: 200 PSI (13,8 bar)
33. SOLENOID ACTIVATED DIRECTIONAL CONTROL VALVE - Base
34. SOLENOID ACTIVATED DIRECTIONAL CONTROL VALVE - Rod
35. LOAD SHUTTLE VALVE - BLEED OFF
36. PILOT ACTIVATED DIRECTIONAL CONTROL VALVE - (Two Coil)
37. PILOT ACTIVATED DIRECTIONAL CONTROL VALVE - REAR AUXILIARY
38. ORIFICE - With 0.140 inch (3,6 mm)
39. RELIEF VALVE: 3000 PSI (207 bar)
40. ORIFICE - With 0.031 inch (0,79 mm)
41. CHECK VALVE - BICS CONTROL VALVE
42. RESTRICTION
43. CHECK VALVE
44. FRONT AUXILIARY MANUAL PRESSURE BLEED-OFF VALVE
45. VARIABLE CAPACITY DISPLACEMENT BIDIRECTIONAL HYDROSTATIC PUMP
46. RELIEF VALVE - 2000 PSI (138 bar)
47. SOLENOID ACTIVATED DIRECTIONAL CONTROL VALVE (TWO COIL)
48. RELIEF VALVE - 1200 PSI (83 bar)
49. CHECK VALVE - With 80 PSI (5,5 bar) Spring
50. CHECK VALVE - With 300 PSI (20,7 bar) Spring and 0.016 inch (0,40 mm) orifice
51. ORIFICE - With 0.025 inch (0,64 mm)
52. PILOT ACTIVATED DIRECTIONAL CONTROL VALVE - HYDRAULIC POWERED BOB-TACH
53. FILTER - CASE DRAIN (ATTACHMENT)
54. SOLENOID ACTIVATED DIRECTIONAL CONTROL VALVE - BRAKE
55. HYDRAULIC BRAKE - SPRING APPLIED - PRESSURE RELEASE
56. ORIFICE - With 0.089 inch (2,26 mm)
57. DISPLACEMENT CONTROL VALVE
58. PUMP SERVO
59. PRESSURE CONTROL PILOT VALVE (2 COILS) 0 - 0.085 Ampere
60. AUXILIARY HYDRAULIC PUMP

    S/N 525613000 - 525613399
    S/N 525712000 - 525712099
    10.5 GPM (39,7 L/min) at High Engine Idle

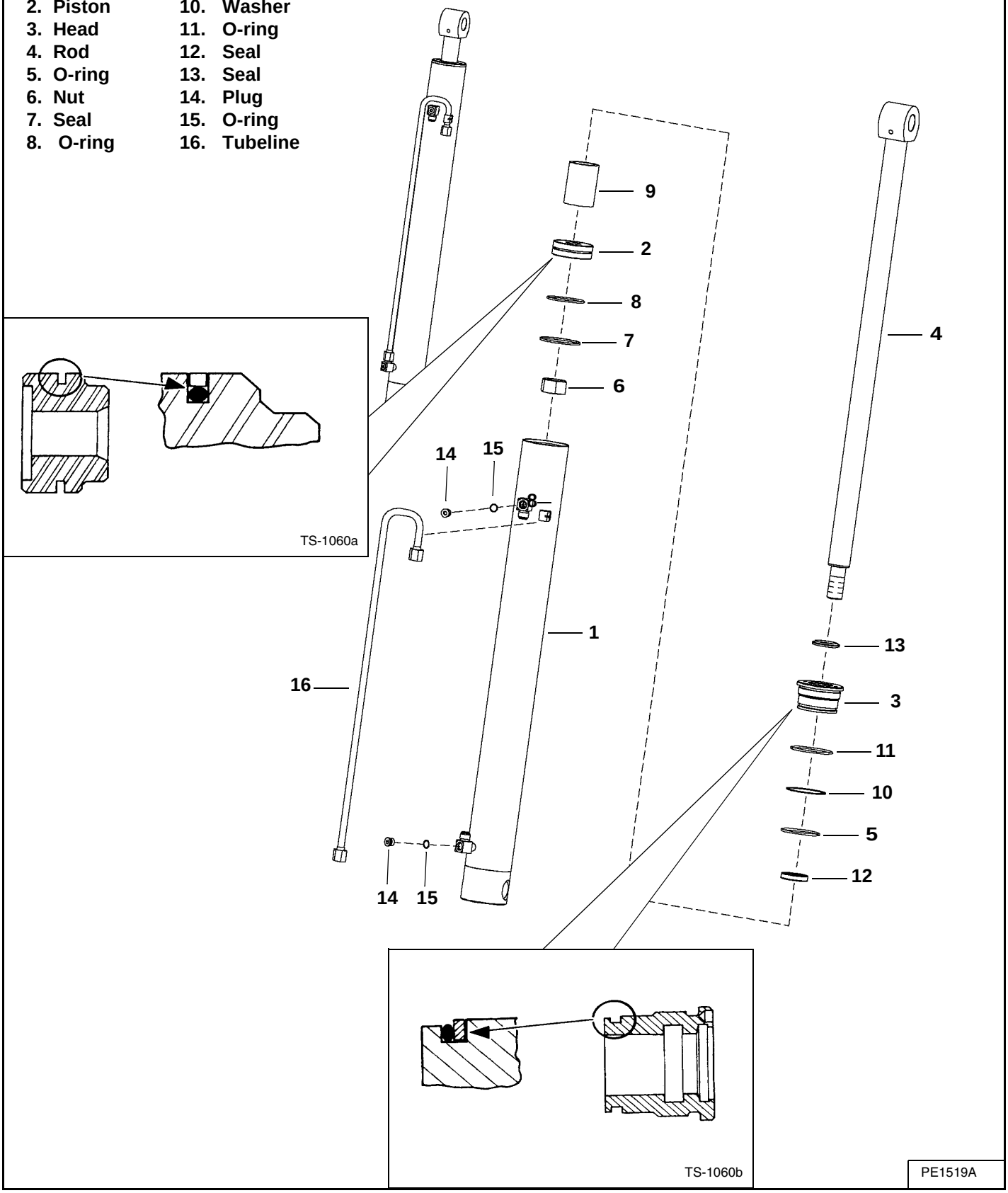
    S/N 525613400 & Above
    S/N 525712100 & Above
    18.7 GPM (70,8 L/min) at High Engine Idle

61. RELIEF VALVE - PORT: 3300 PSI (228 bar)
62. DUMP VALVE - ON/OFF
63. CHECK VALVE

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

Parts Identification

1. Case
2. Piston
3. Head
4. Rod
5. O-ring
6. Nut
7. Seal
8. O-ring
9. Spacer
10. Washer
11. O-ring
12. Seal
13. Seal
14. Plug
15. O-ring
16. Tubeline



Disassembly

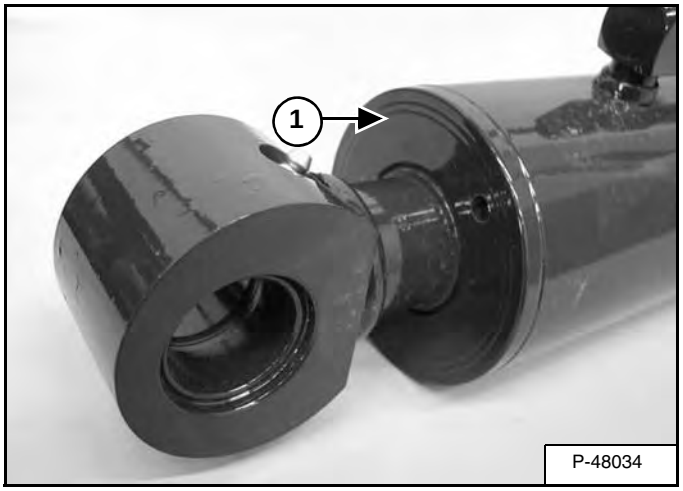
Use the following tools to disassemble the cylinder:

MEL1074 - O-ring Seal Hook
Spanner Wrench

Hold the hydraulic cylinder over a drain pan and move the rod in and out slowly to remove the fluid from the cylinder.

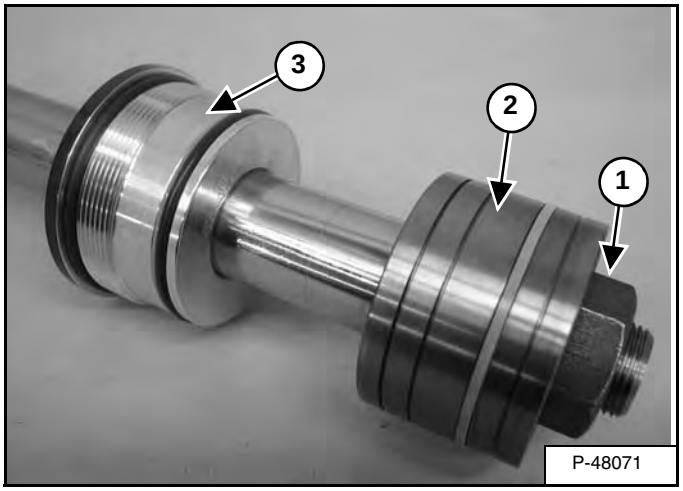
Put the base end of the cylinder in a vise.

Figure 20-21-12



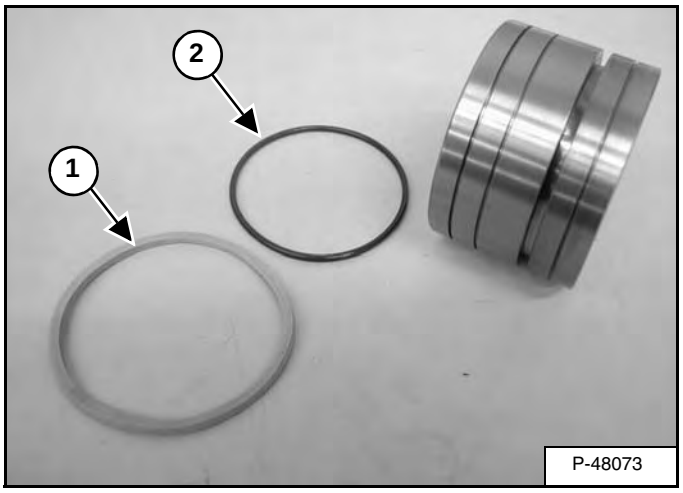
Use a s panner wrench to l oosen the head (Item 1) **[Figure 20-21-12]** from the cylinder case.

Figure 20-21-13



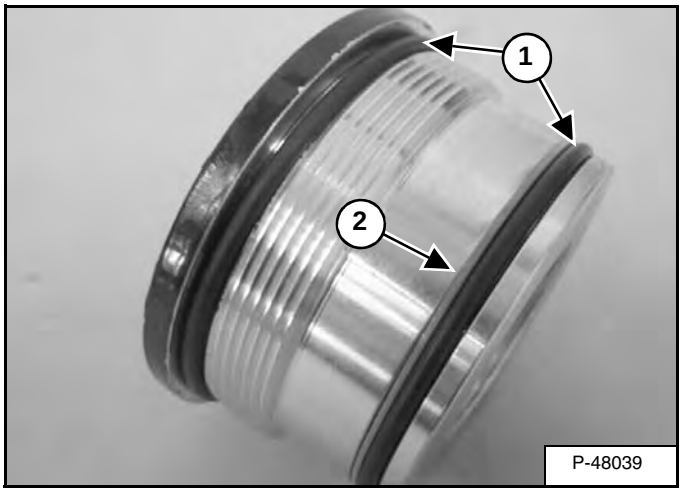
Remove the nut (Item 1), piston (Item 2) and head (Item 3) **[Figure 20-21-13]**.

Figure 20-21-14



Remove the seal (Item 1), and O-ring (Item 2) **[Figure 20-21-14]** from the piston.

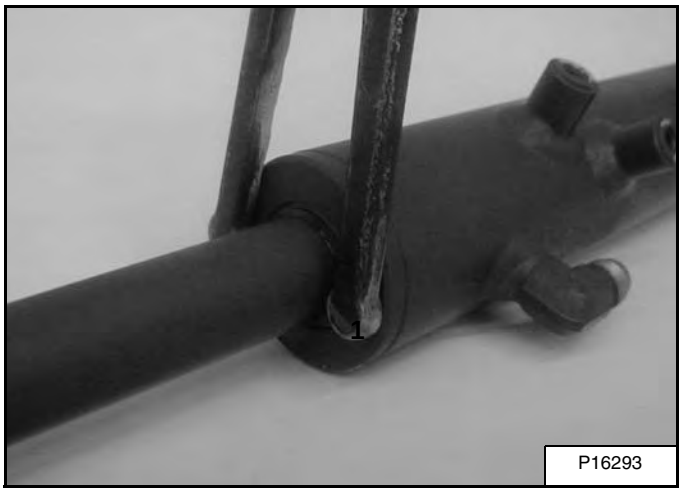
Figure 20-21-15



Remove the two O-rings (Item 1) and the back-up washer (Item 2) **[Figure 20-21-15]** from the cylinder head.

Assembly (Cont'd)

Figure 20-22-17

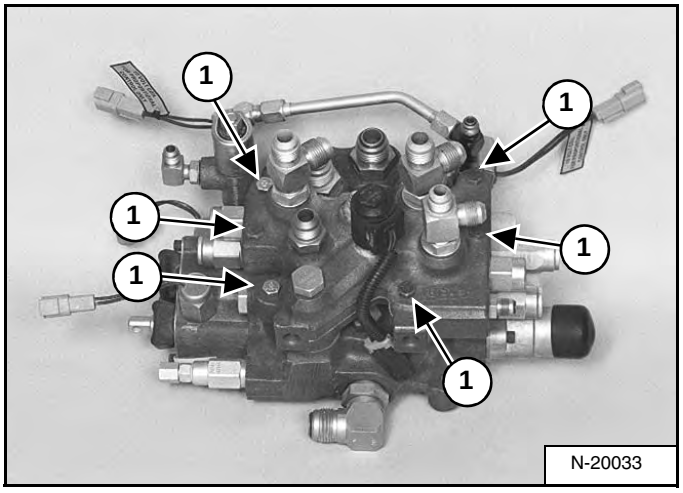


Put the base end of the hydraulic cylinder in a vise.

Tighten the head using a spanner wrench **[Figure 20-22-17]**.

BICS™ Valve, Removal And Installation

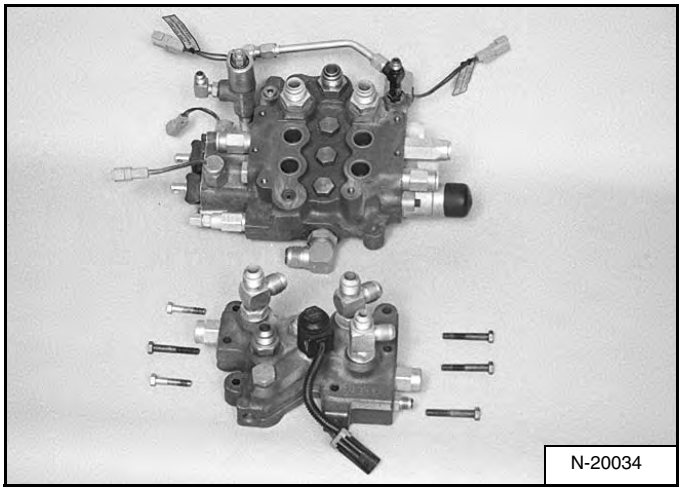
Figure 20-40-15



Remove the control valve. (See Removal And Installation on Page 20-40-1.)

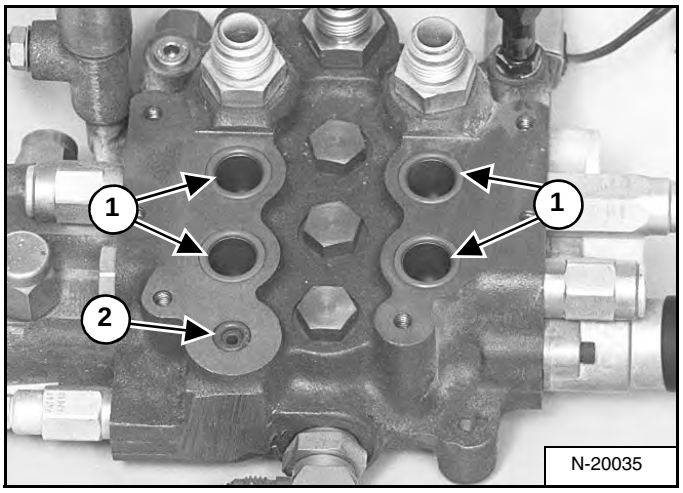
To remove the BICS™ valve from the control valve, loosen and remove the six mounting bolts (Item 1) **[Figure 20-40-15]**.

Figure 20-40-16



Remove the BICS™ valve assembly from the top of the control valve **[Figure 20-40-16]**.

Figure 20-40-17

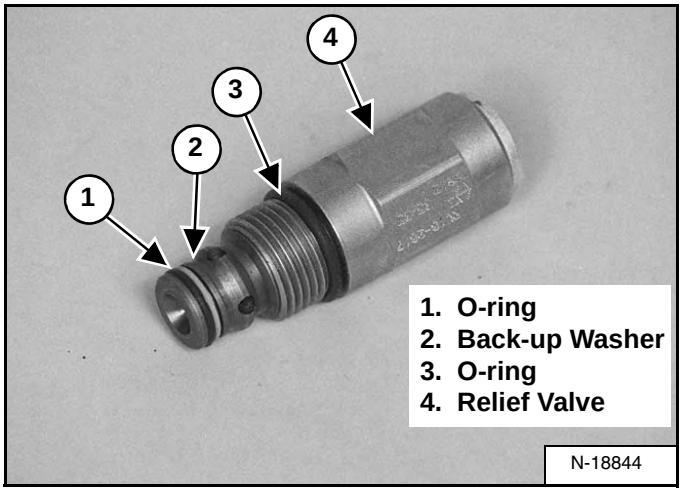


Remove the four large O-rings (Item 1) and the small O-ring (Item 2) from the top of the control valve **[Figure 20-40-17]**.

Install the four large O-rings (Item 1) and the small O-ring (Item 2) on the top of the control valve **[Figure 20-40-17]**.

Port Relief Valve, Tilt Spool (Cont'd)

Figure 20-40-42

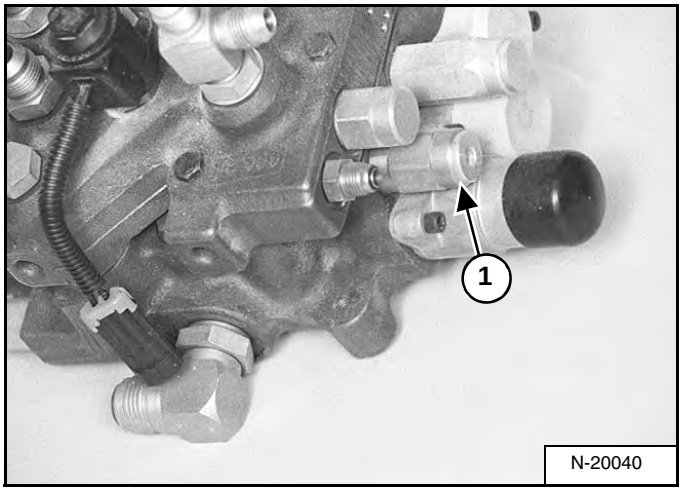


Remove the O-rings and back-up washer from the port relief valve **[Figure 20-40-42]**.

Installation: Always use new O-rings and back-up washers. Tighten to 35-40 ft.-lb. (47-54 N•m) torque.

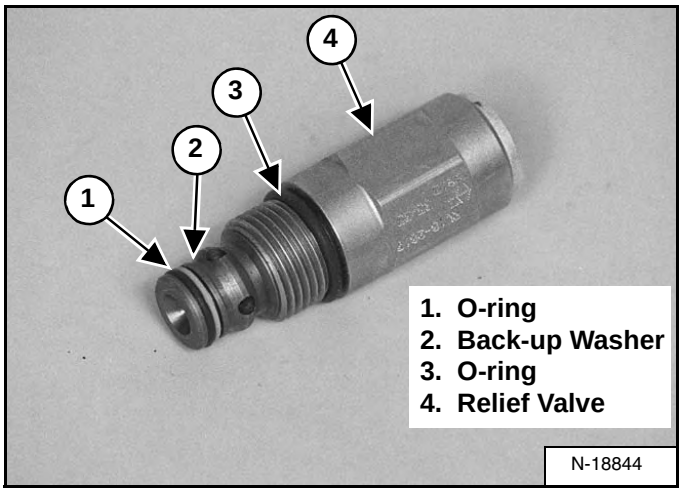
Port Relief Valve, Lift Spool

Figure 20-40-43



Remove the port relief valve (Item 1) **[Figure 20-40-43]** from the control valve lift section.

Figure 20-40-44

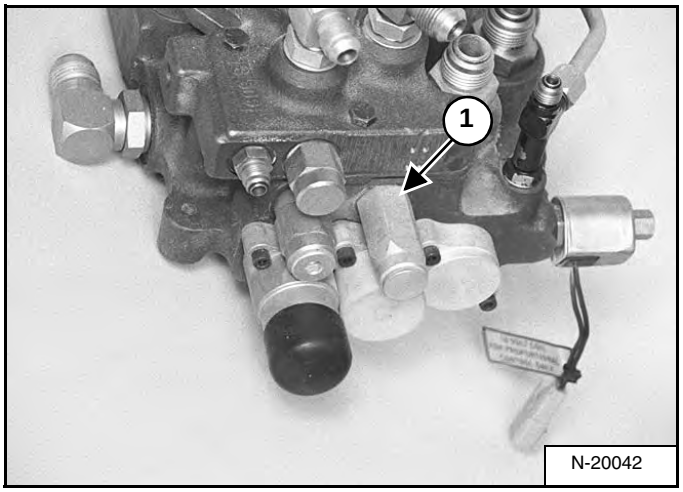


Remove the O-rings and back-up washer from the port relief valve **[Figure 20-40-44]**.

Installation: Always use new O-rings and back-up washers. Tighten to 35-40 ft.-lb. (47-54 N•m) torque.

Anti-Cavitation Valve/Port Relief Valve, Tilt Spool

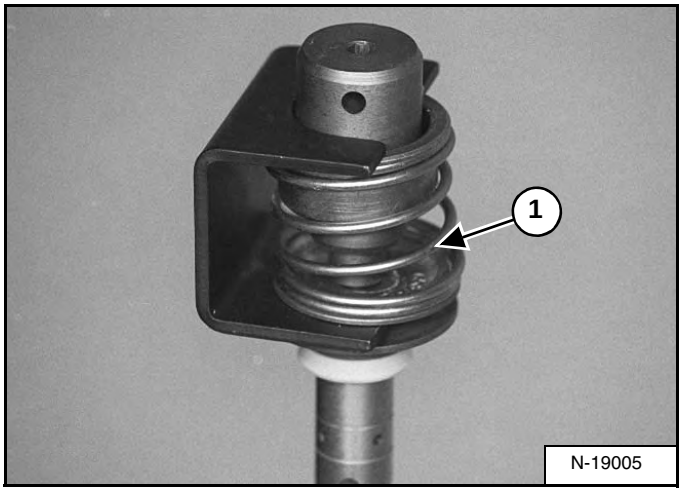
Figure 20-40-45



Remove the anti-cavitation/port relief valve (Item 1) **[Figure 20-40-45]** from the control valve tilt section.

Lift Spool And Detent Assembly (Cont'd)

Figure 20-40-79



Install the spring assembly to the lift spool hand tight **[Figure 20-40-79]**.

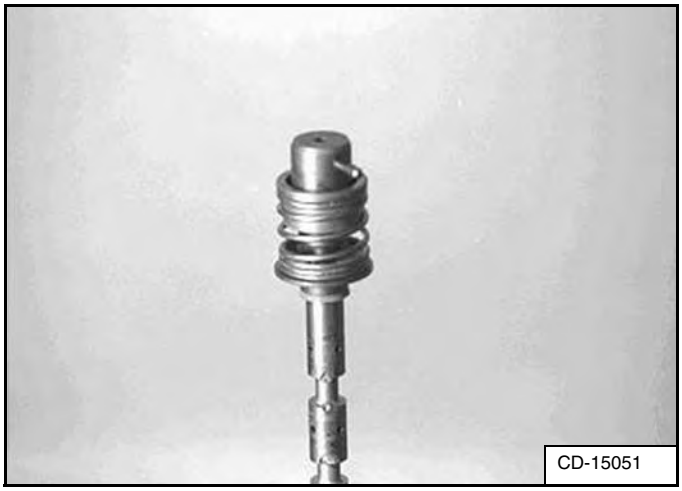
Remove the spring tool.

Check the alignment of the detent adapter and the washer.

NOTE: The adapter must fit in the center of the washer (Item 1) [Figure 20-40-79].

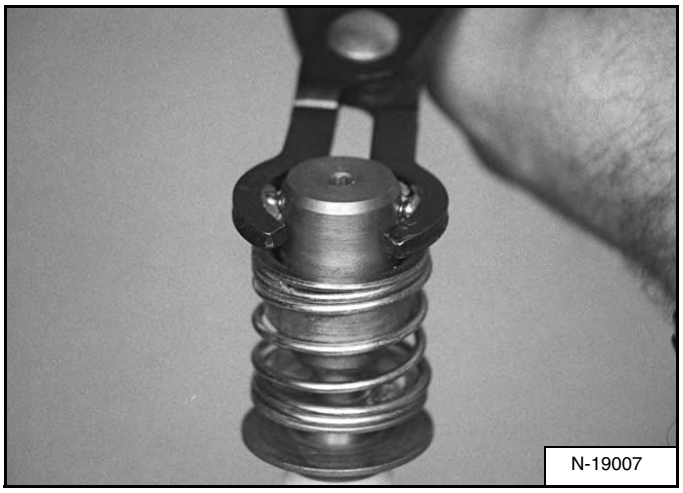
Tighten the adapter to 90-100 in.-lb. (10,2-11,3 N•m).

Figure 20-40-80



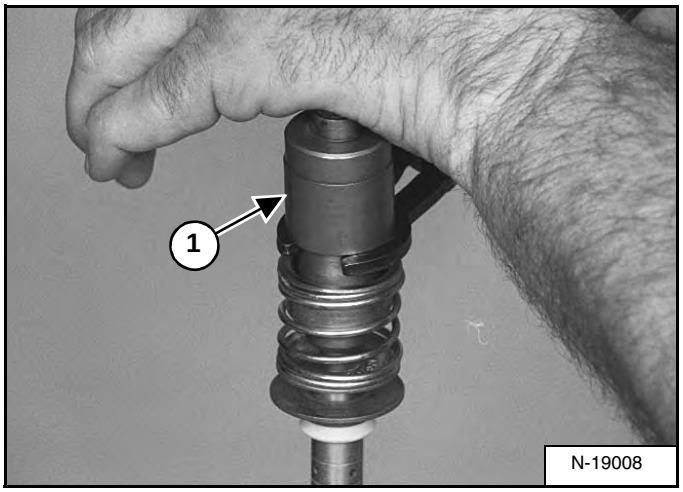
Install the detent balls and spring **[Figure 20-40-80]**.

Figure 20-40-81



Hold the detent balls in place with the detent pliers **[Figure 20-40-81]**.

Figure 20-40-82

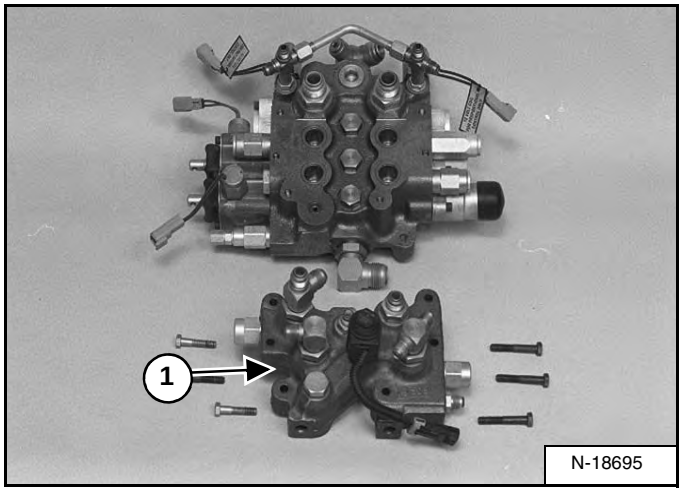


Install the detent sleeve (Item 1) **[Figure 20-40-82]** to the detent adapter.

HYDRAULIC CONTROL VALVE (2 PIECE CASTING) (ADVANCED CONTROL SYSTEM) (ACS)

Identification

Figure 20-41-1



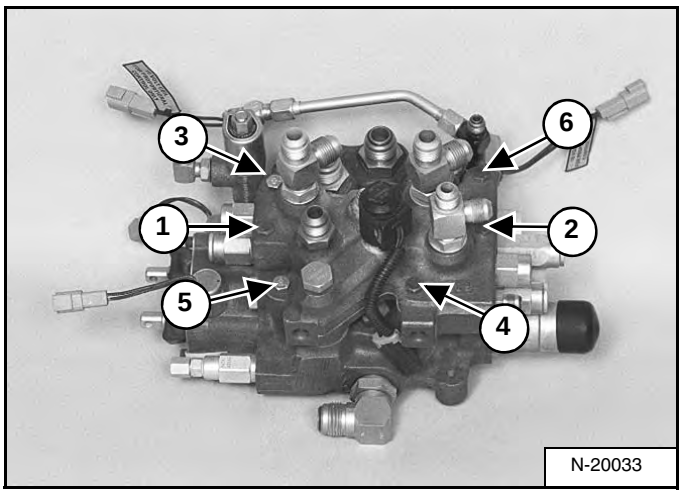
The hydraulic control valve (2 piece casting) (Advance Control System) (ACS) has a removable BICS™ section (Item 1) **[Figure 20-41-1]**.

The BICS™ section and main control valve are in two seperate castings.

For identification of the hy draulic control valve (1 piece casting) (Advanced Control System) (ACS), (See Identification on Page 20-44-1.))

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

Figure 20-41-27



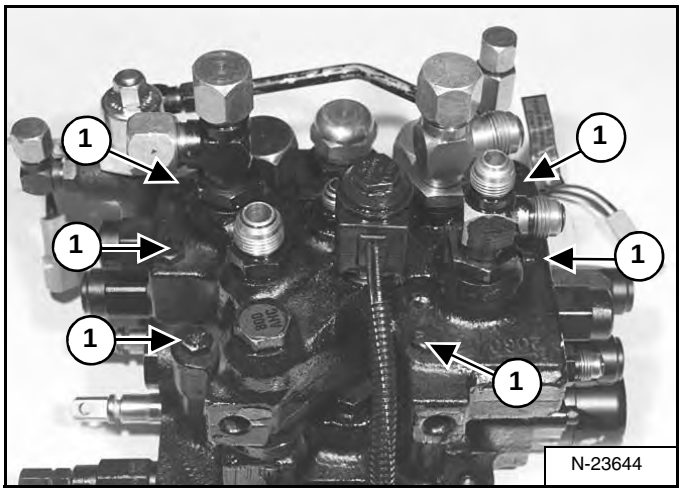
Install the six mounting bolts **[Figure 20-41-27]**.

The chart below lists the c orrect torque specifications and tightening sequence when reinstalling the BICS™ valve assembly to the control valve. Thoroughly clean and dry bolts and threads in valve. Use liquid adhesive LOCTITE #242 or equivalent.

Step	Torque	Sequence
1	110-130 in.-lb. (12,4-14,7 N•m)	1, 2, 3, 4, 5 & 6
2	190-210 in.-lb. (21,5-23,7 N•m)	
3*	190-210 in. lb. (21,5-23,7 N•m)	

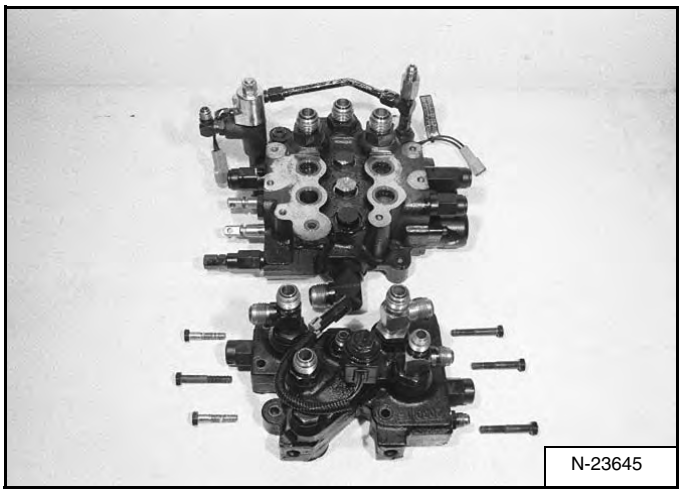
*Torque must be 190-210 in.-lb. (21,5-23,7 N•m) for every bolt or repeat step 3.

Figure 20-41-28



To remove the BICS™ valve from the control valve, loosen and remove the s ix mounting bolts (Item 1) **[Figure 20-41-28]**.

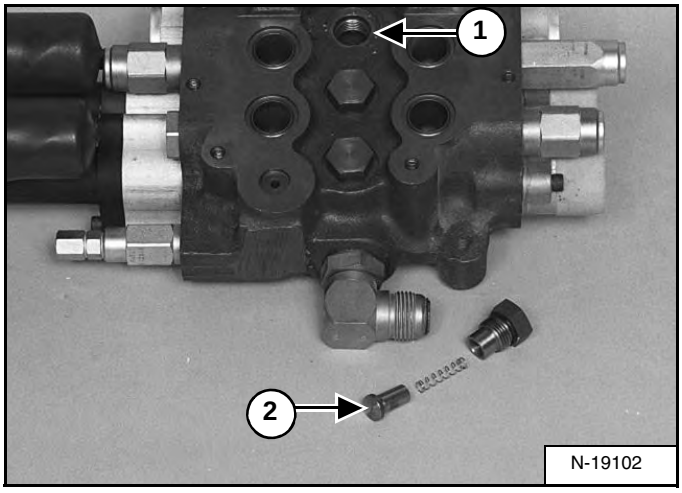
Figure 20-41-29



Remove the BICS™ valve assembly from the top of the control valve **[Figure 20-41-29]**.

Load Check Valve (Cont'd)

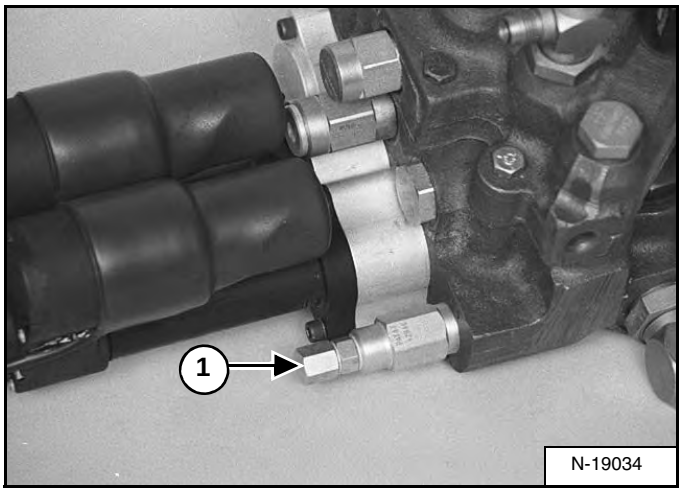
Figure 20-41-51



The auxiliary section (Item 1) uses an orifice load check poppet (Item 2) **[Figure 20-41-51]**.

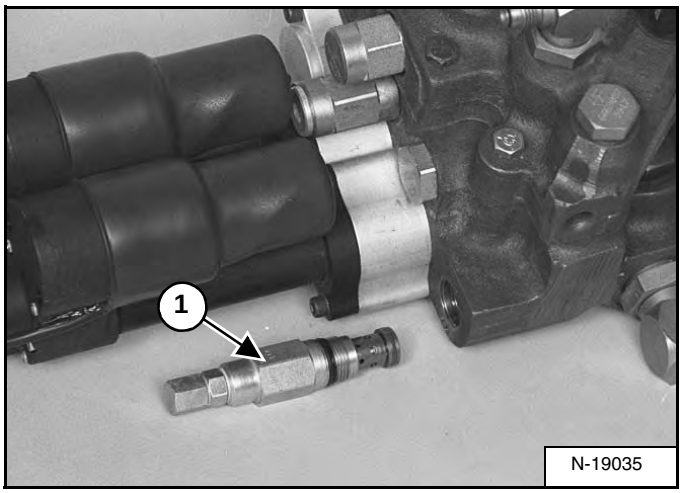
Main Relief Valve

Figure 20-41-52



Loosen the main relief valve (Item 1) **[Figure 20-41-52]**.

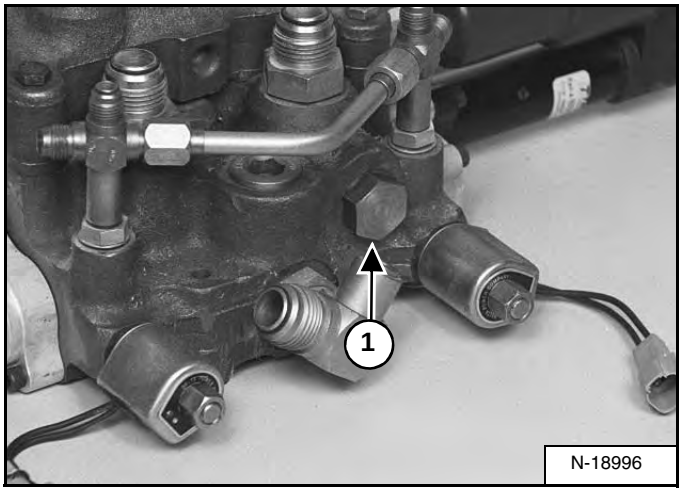
Figure 20-41-53



Remove the main relief valve (Item 1) **[Figure 20-41-53]**.

Port-Auxiliary Section Disassembly

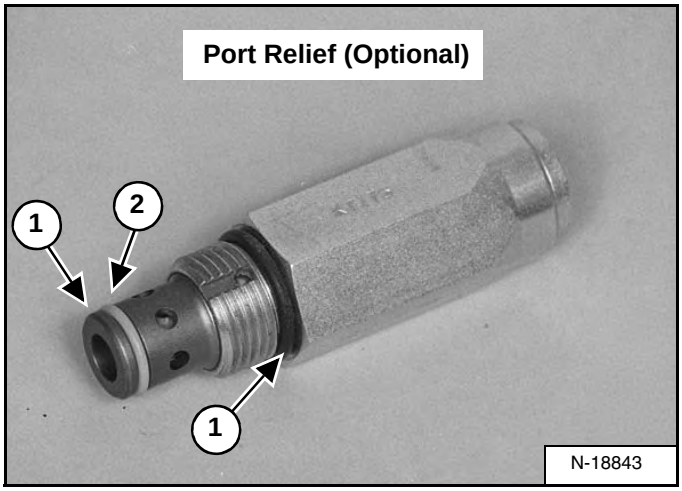
Figure 20-41-84



Remove the plug (Item 1) **[Figure 20-41-84]** or optional port relief valve from the control valve.

NOTE: Optional port relief (Item 1) [Figure 20-41-84] is either 2500 PSI or 3000 PSI depending on the option used.

Figure 20-41-85



Remove the O -rings (Item 1) **[Figure 20-41-85]** & **[Figure 20-41-85]** and back-up ring (Item 2) **[Figure 20-41-85]** & **[Figure 20-41-85]** from the plug.

Cleaning And Inspection

Clean all components with clean solvent and dry with compressed air.

Check the spools for wear or scratches.

Check that the spools are not loose in their bore.

Check that the centering springs are not broken.

Check that the load check valve seats are not worn.

Check the load check poppets for damage.

Check the rubber boots and retainers

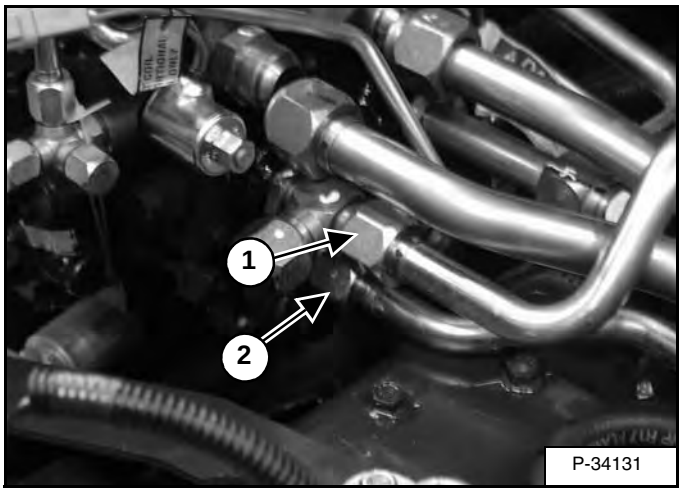
Replace the parts as needed.

Use new O-rings and back-up rings.

Apply oil to all new O-rings and back-up rings before installation.

Removal And Installation (Cont'd)

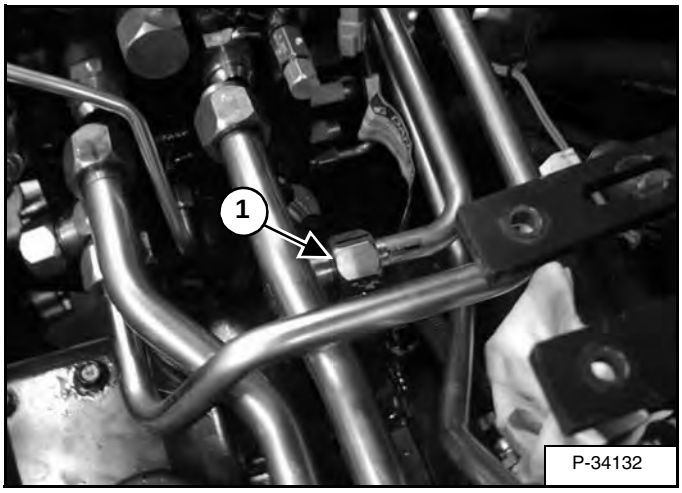
Figure 20-42-22



Disconnect the tilt tubeline (Item 1) **[Figure 20-42-22]** from the control valve.

Disconnect the lift tubeline (Item 2) **[Figure 20-42-22]** from the control valve.

Figure 20-42-23



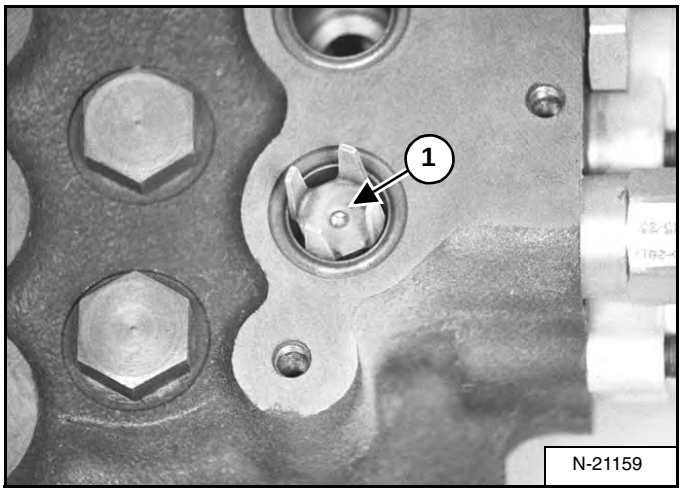
Disconnect the tilt tubeline (Item 1) **[Figure 20-42-23]** at the tee fitting.

Cap and plug the tubeline and fitting.

Remove the control valve from the loader.

Lift Base End Restrictor

Figure 20-42-47

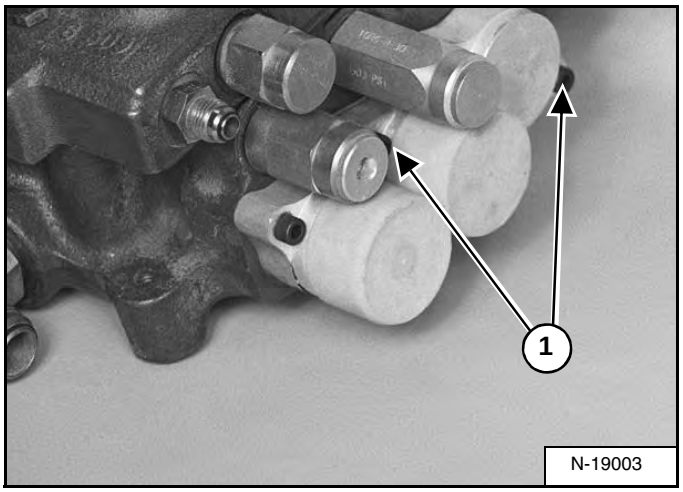


Remove the BICS™ valve assembly from the c ontrol valve. (See BICS™ Valve, Removal And Installation on Page 20-41-10.)

Remove the restrictor (Item 1) **[Figure 20-42-47]** from the lift section base end port.

Auxiliary Spool Removal And Installation

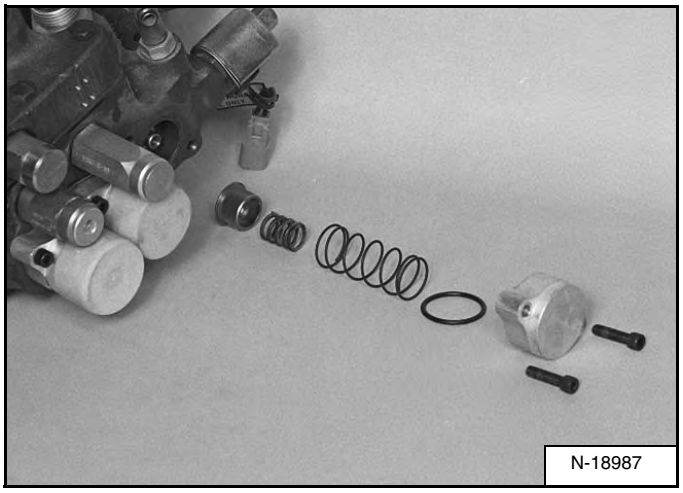
Figure 20-42-77



Remove the screws (Item 1) **[Figure 20-42-77]** from the end cap (both sides).

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

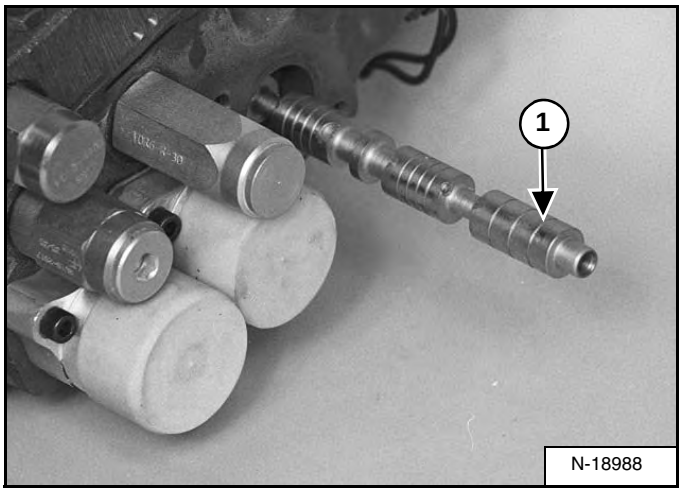
Figure 20-42-78



Remove the end cap, O-ring, springs and washer (both sides) **[Figure 20-42-78]**.

Assembly: Always use a new spool seal.

Figure 20-42-79

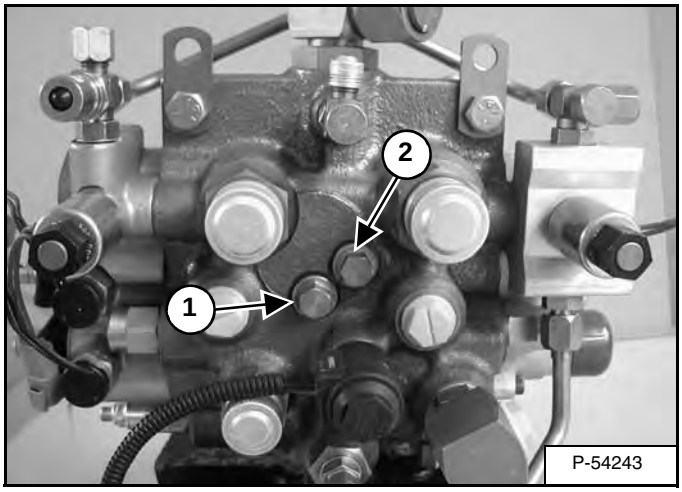


Remove the spool (Item 1) **[Figure 20-42-79]**.

Assembly: Put grease on all the centering spring component parts.

Load Check Valve Removal And Installation (Tilt & Auxiliary)

Figure 20-43-19

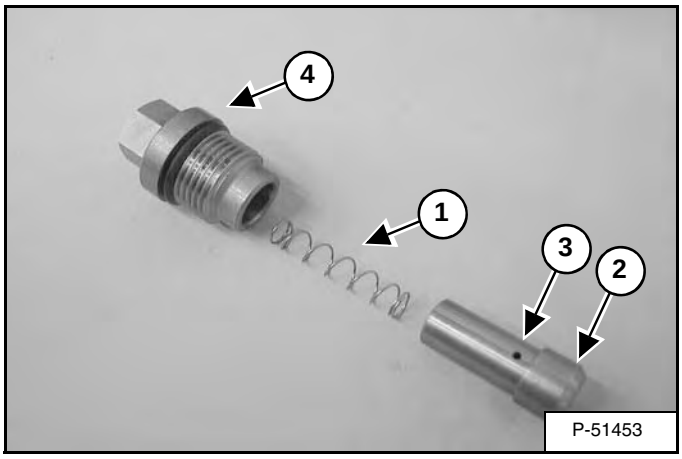


At the front side of the control valve locate the tilt section load check valve (Item 1) **[Figure 20-43-19]**.

At the front side of the control valve locate the auxiliary section load check valve (Item 2) **[Figure 20-43-19]**.

NOTE: The tilt and auxiliary load check valves are interchangeable.

Figure 20-43-20



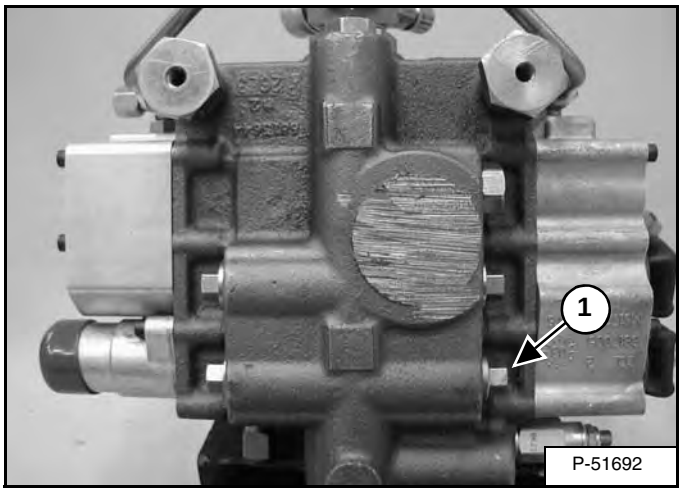
Remove the spring (Item 1) and poppet (Item 2) **[Figure 20-43-20]**.

Check the o rifice (Item 3) **[Figure 20-43-20]** in the poppet to be sure it is not plugged.

Installation: Install a new O-ring (Item 4) **[Figure 20-43-20]** on the plug and lightly lubricate with oil before installing. Tighten the p lug to 38-45 ft.-lb. (52-61 N•m) torque.

Anti-Cavitation Valve (Lift, Rod End)

Figure 20-43-21



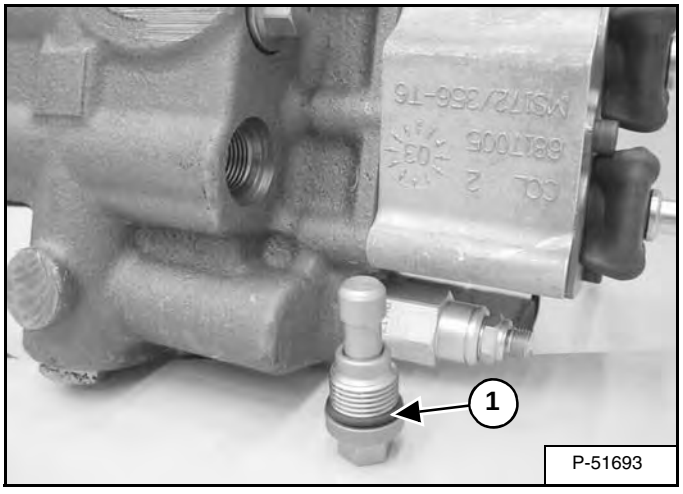
At the back side of the control valve, remove the lift section anti-cavitation valve (Item 1) **[Figure 20-43-21]**.

⚠ WARNING

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

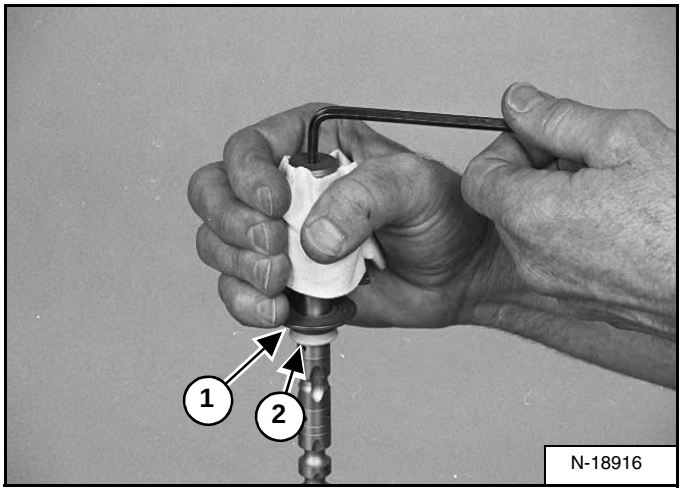
Figure 20-43-22



Installation: Always use new O-ring (Item 1) **[Figure 20-43-22]** on the anti-cavitation valve plug. Tighten the plug to 38-45 ft.-lb. (52-61 N•m) torque.

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

Figure 20-43-55

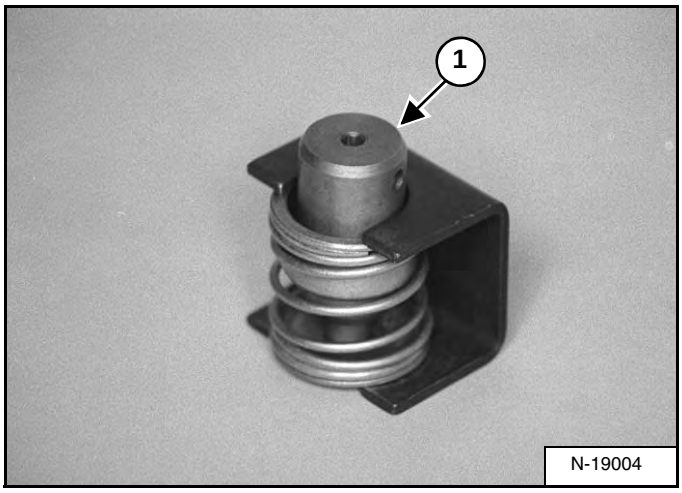


Put a rag around the detent assembly **[Figure 20-43-55]**. This will prevent the detent balls and spring from being lost when the detent adapter is removed.

Remove the detent adapter with an Alan wrench.

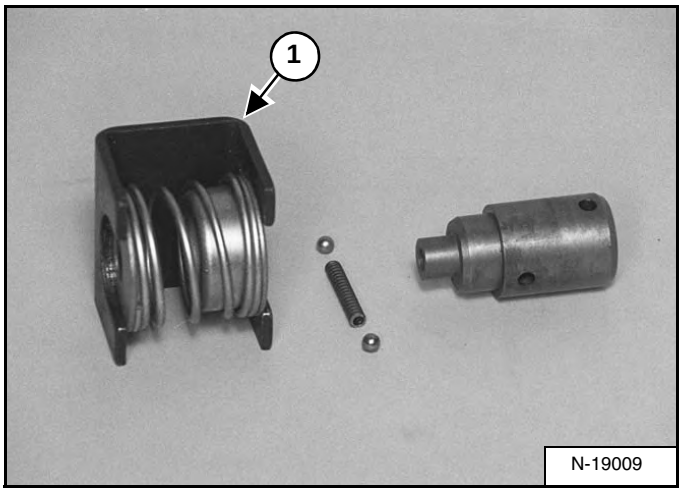
Remove the back-up washer (Item 1) and spool seal (Item 2) **[Figure 20-43-55]**.

Figure 20-43-56



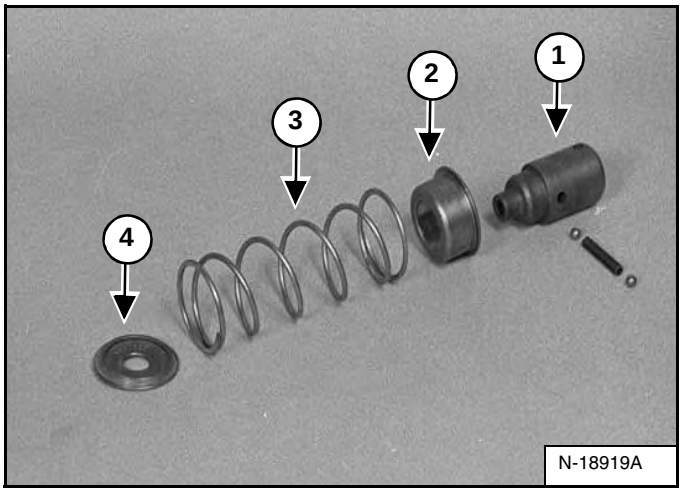
Remove the detent adapter (Item 1) **[Figure 20-43-56]** from the spring assembly.

Figure 20-43-57



Remove spring tool (Item 1) **[Figure 20-43-57]** from the spring assembly.

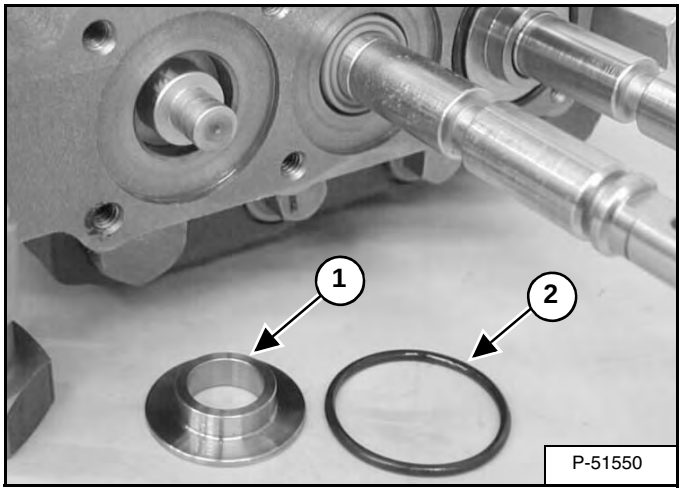
Figure 20-43-58



Inspect the adapter (Item 1), collar (Item 2), spring (Item 3) and washer (Item 4) **[Figure 20-43-58]**.

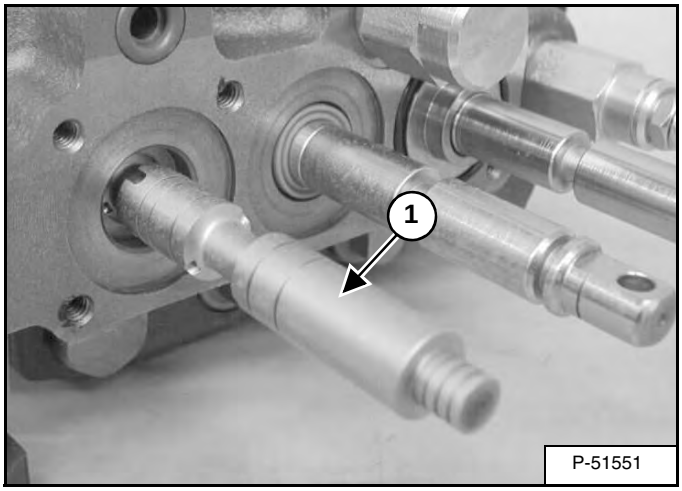
Auxiliary Spool Removal And Installation (Cont'd)

Figure 20-43-94



Remove the spacer (Item 1) and O-ring (Item 2) from the auxiliary spool **[Figure 20-43-94]**.

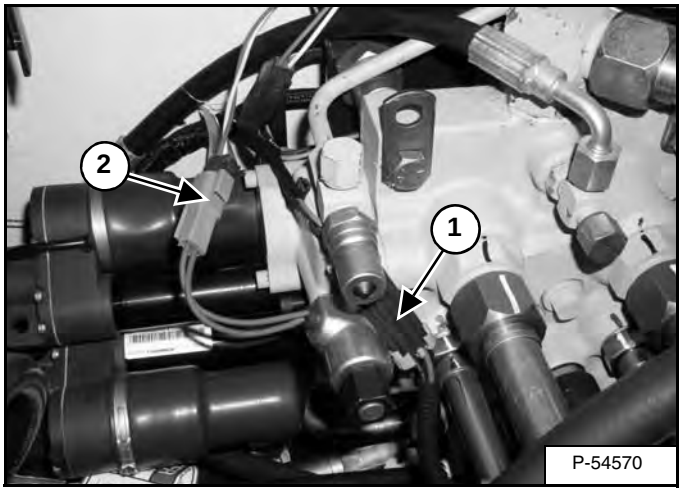
Figure 20-43-95



Remove the spool (Item 1) **[Figure 20-43-95]**.

Removal And Installation (Cont'd)

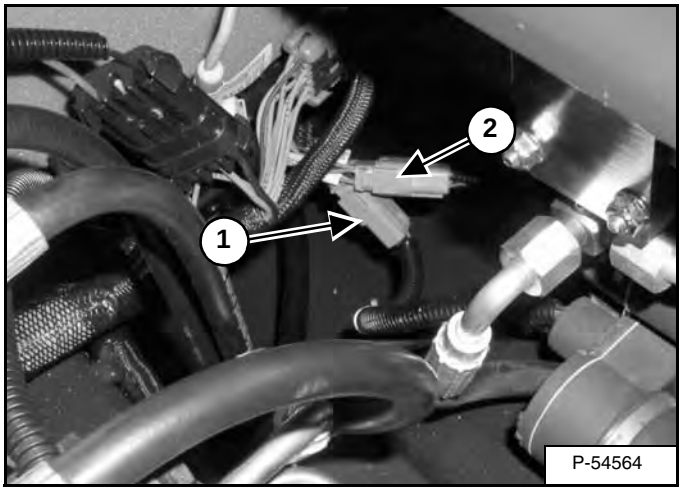
Figure 20-44-4



Mark the two wire connectors for proper installation.

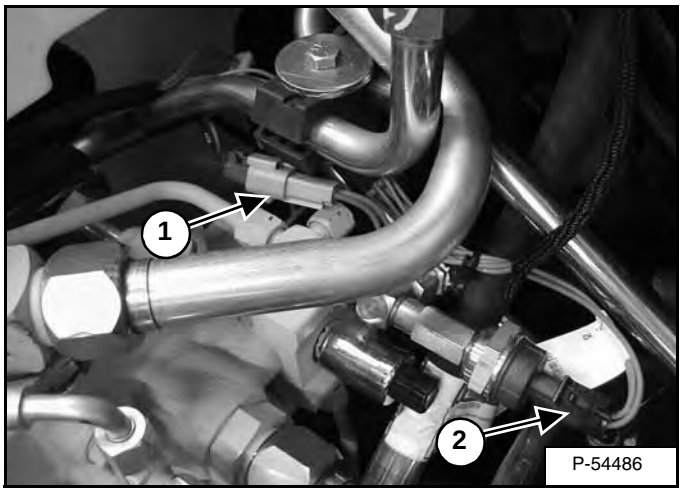
Disconnect the wire harness connector (Item 1) from the BICS™ valve solenoid and (Item 2) from auxiliary valve solenoid **[Figure 20-44-4]**.

Figure 20-44-5



Disconnect the lift and tilt actuator electrical connectors (Item 1) and (Item 2) **[Figure 20-44-5]** from the control valve.

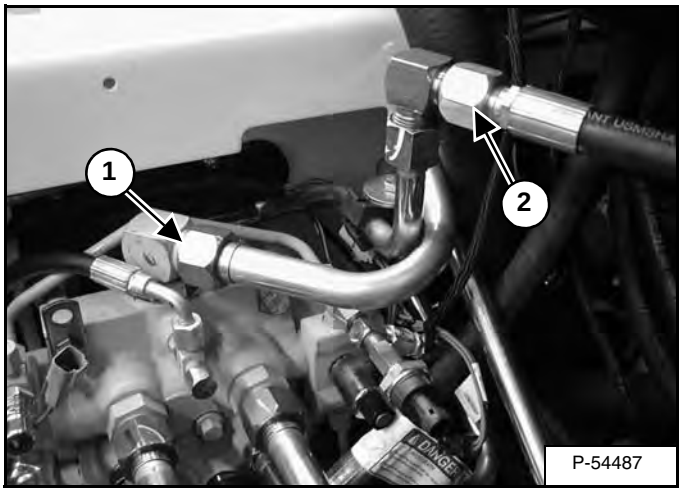
Figure 20-44-6



Disconnect the harness connector (Item 2) **[Figure 20-44-6]** from the auxiliary valve solenoid.

Disconnect the charge pressure sender wire connector (Item 2) **[Figure 20-44-6]** from the charge pressure sender.

Figure 20-44-7

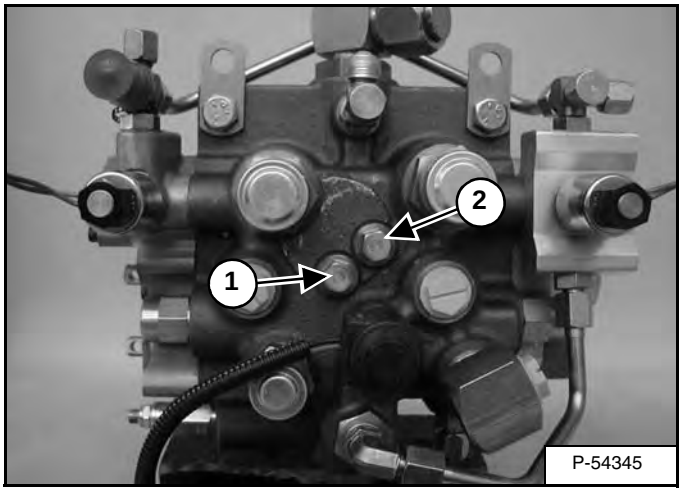


Disconnect the tubeline (Item 1) **[Figure 20-44-7]** that goes from the control valve to the hydraulic cooler.

Disconnect the hose (Item 2) **[Figure 20-44-7]** that goes from the control valve to the gear pump.

Load Check Valve Removal And Installation (Tilt & Auxiliary)

Figure 20-44-33

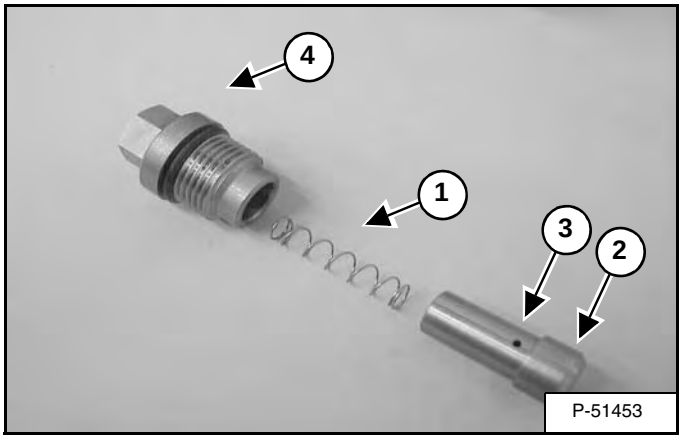


At the front side of the control valve locate the tilt section load check valve (Item 1) **[Figure 20-44-33]**.

At the front side of the control valve locate the auxiliary section load check valve (Item 2) **[Figure 20-44-33]**.

NOTE: The tilt and auxiliary load check valves are interchangeable.

Figure 20-44-34



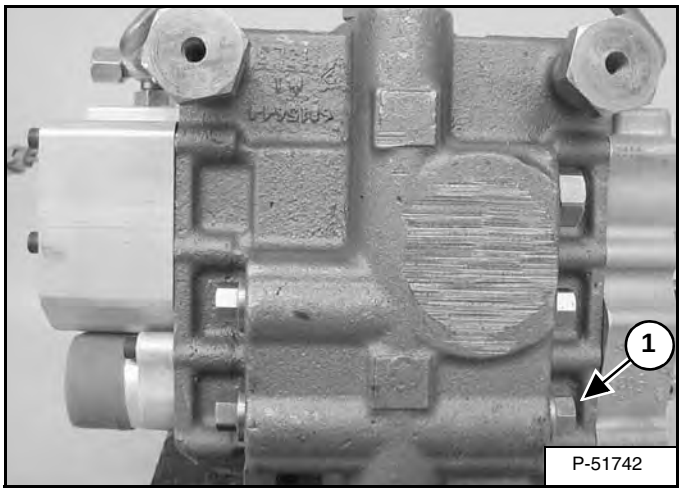
Remove the spring (Item 1) and poppet (Item 2) **[Figure 20-44-34]**.

Check the o rifice (Item 3) **[Figure 20-44-34]** in the poppet to be sure it is not plugged.

Installation: Install a new O-ring (Item 4) **[Figure 20-44-34]** on the plug and lightly lubricate with oil before installing. Tighten the p lug to 38-45 ft.-lb. (52-61 N•m) torque.

Anti-Cavitation Valve (Lift, Rod End)

Figure 20-44-35



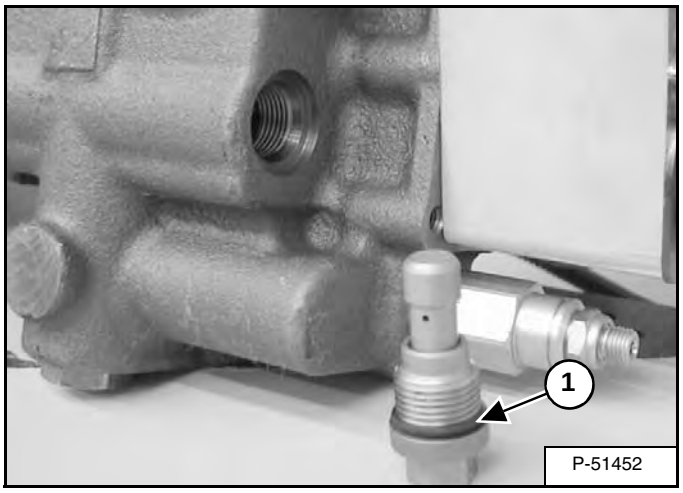
At the back side of the control valve, remove the lift section anti-cavitation valve (Item 1) **[Figure 20-44-35]**.

⚠ WARNING

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 20-44-36

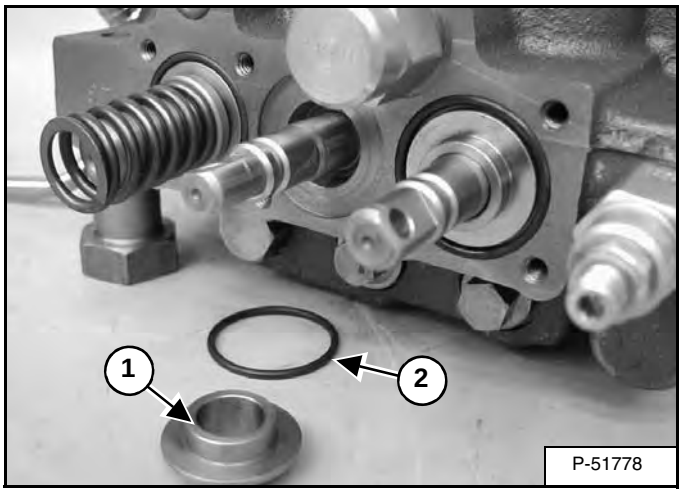


Always use new O-ring (Item 1) **[Figure 20-44-36]** on the anti-cavitation valve plug.

Tilt Spool Removal And Installation

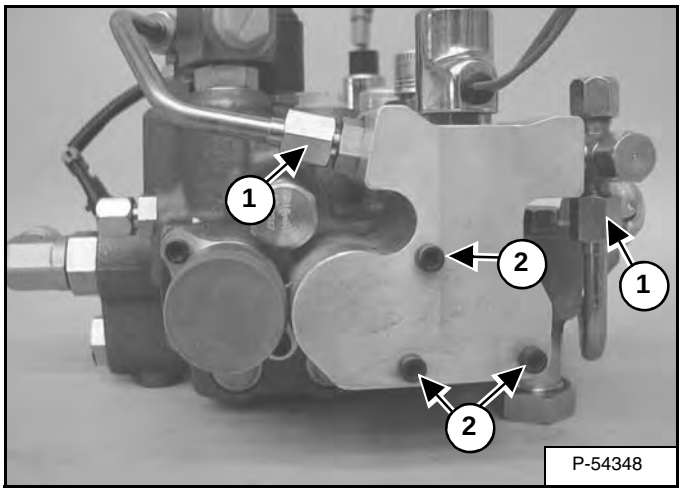
Remove the end cap block. (See End Cap B lock Removal And Installation on Page 20-44-18.)

Figure 20-44-70



Remove the spacer (Item 1) and O-ring (Item 2) **[Figure 20-44-70]** from the tilt spool.

Figure 20-44-71

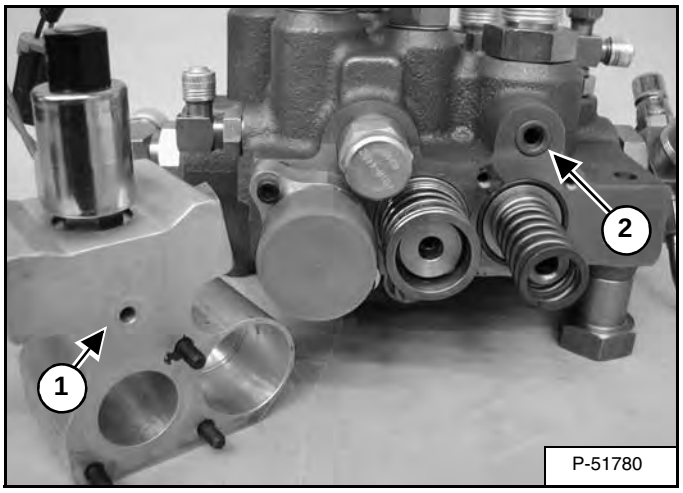


Disconnect the two tubelines (Item 1) **[Figure 20-44-71]**.

Remove the three screws (Item 2) **[Figure 20-44-71]** from the spool centering block.

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

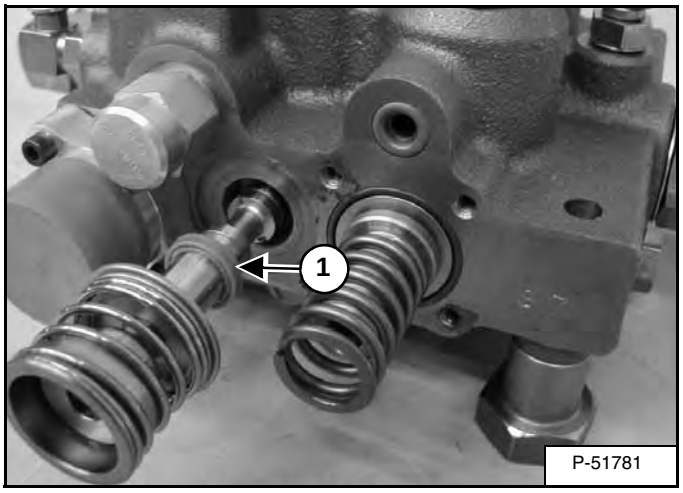
Figure 20-44-72



Remove the spool centering block (Item 1) **[Figure 20-44-72]** from the control valve.

Installation: Replace the O-ring (Item 2) **[Figure 20-44-72]** and lubricate lightly with oil/grease before installation of the end cap block.

Figure 20-44-73



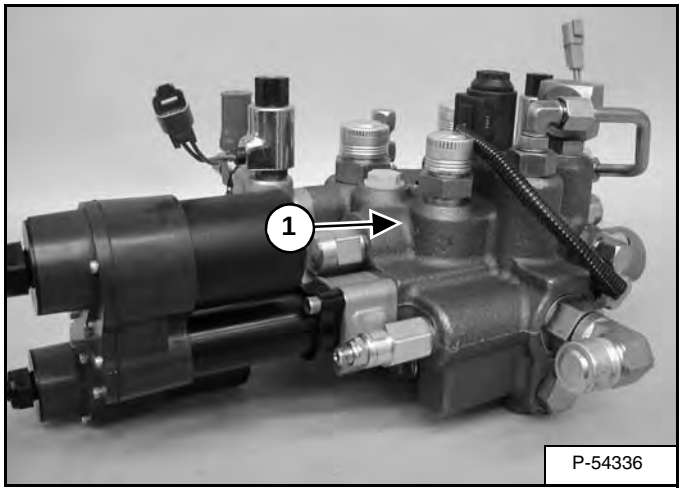
Remove the tilt spool, centering spring, back-up washer and spool seal (Item 1) **[Figure 20-44-73]**.

Assembly: Always use a new spool seal.

HYDRAULIC CONTROL VALVE (1 PIECE CASTING) (SELECTABLE JOYSTICK CONTROL) (SJC)

Identification

Figure 20-45-1



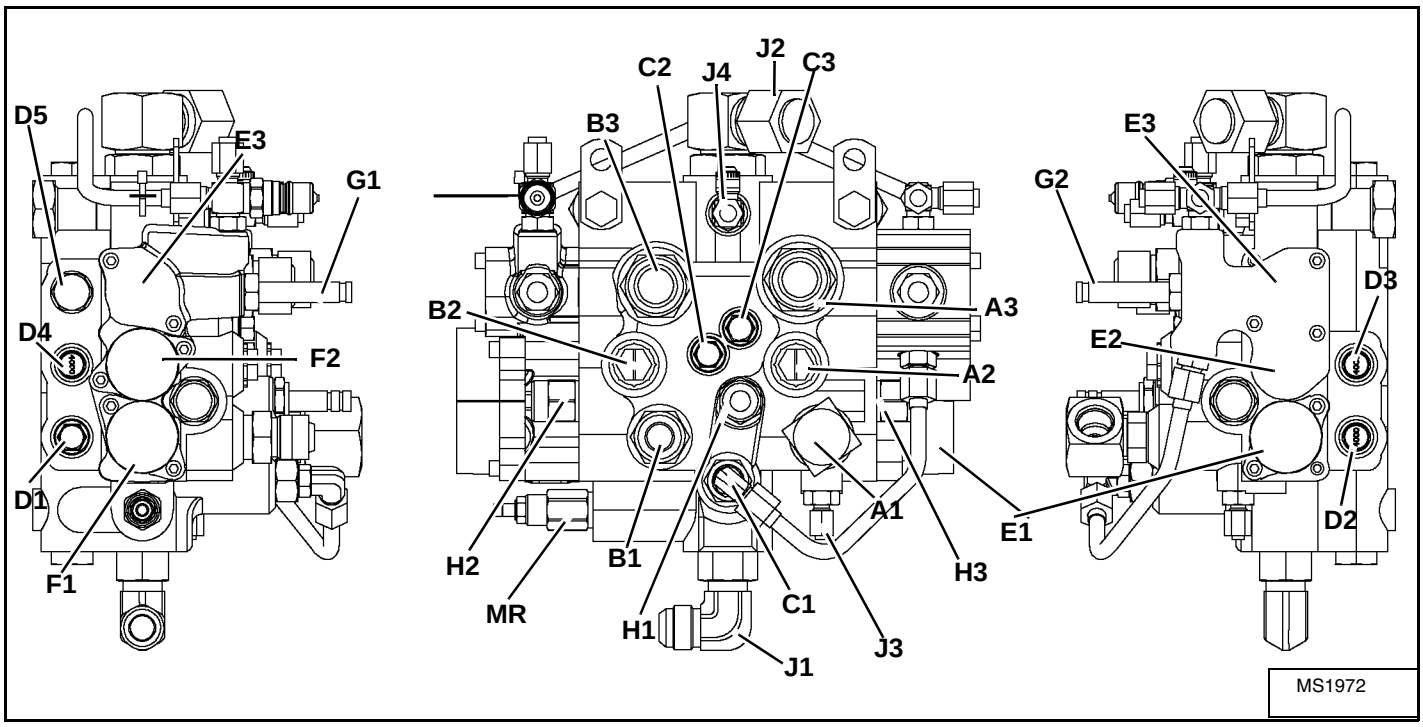
The hydraulic control valve (1 piece casting) (SJC) (Item 1) **[Figure 20-45-1]** does not have a removable BICS™ section.

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

For identification of the hy draulic control valve (2 piece casting), (See Identification on Page 20-42-1.)

Identification Chart

Figure 20-45-29

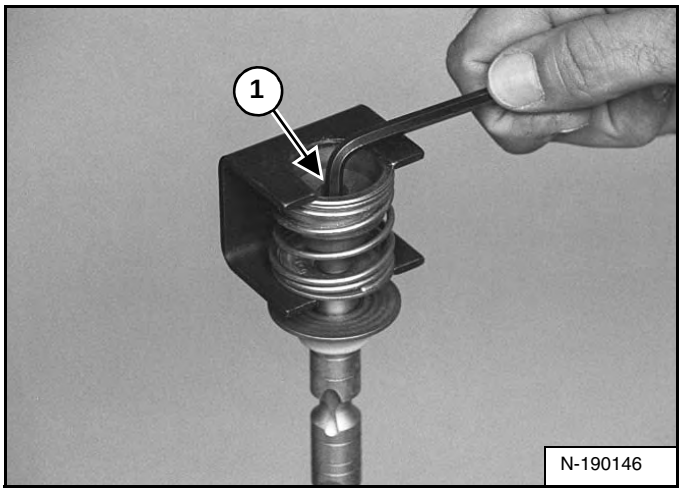


ITEM	T250 LOADER
A1	Lift Cylinder Base End
A2	Tilt Cylinder Base End
A3	Auxiliary Hydraulic Rod End
B1	Lift Cylinder Rod End
B2	Tilt Cylinder Rod End
B3	Auxiliary Hydraulics Base End
C1	Load Check/BICS™ Valve Lift
C2	Load Check Valve Tilt Function
C3	Load Check Valve Auxiliary Function
D1	Anti-Cavitation Valve Lift (Rod End)
D2	Port Relief/Anti-Cavitation Valve – 4000 PSI Lift (Base End)
D3	Port Relief/Anti-Cavitation Valve – 4000 PSI Tilt (Base End)
D4	Port Relief/Anti-Cavitation Valve – 4000 PSI Tilt (Rod End)
D5	Port Relief/Anti-Cavitation Valve (Auxiliary) 3500 PSI (Optional)

ITEM	T250 LOADER
E1	Lift Spool Centering Spring
E2	Tilt Spool Centering Spring
E3	Auxiliary Spool/Centering Springs
F1	LIft Spool
F2	Tilt Spool
G1	Auxiliary Solenoid Stem
G2	Auxiliary Solenoid Stem
H1	BICS™ Valve Solenoid
H2	BICS™ Lock Valve (Tilt)
H3	BICS™ Lock Valve (Lift)
J1	Inlet Fluid Flow (From Pump)
J2	Outlet Fluid Flow (Return to Tank)
J3	Lift Arm By-Pass Orifice
J4	Drain (Case)
MR	Main Relief Valve – 3300 PSI

Lift Spool Removal And Installation (Cont'd)

Figure 20-45-62

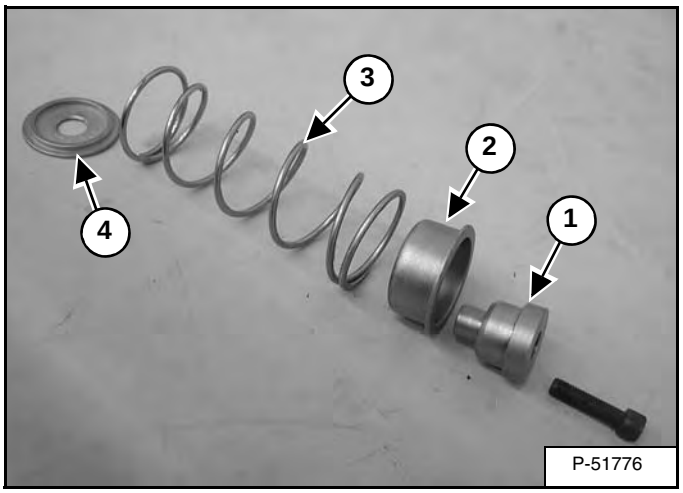


Remove the bolt (Item 1) **[Figure 20-45-62]** holding the centering spring to the spool.

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

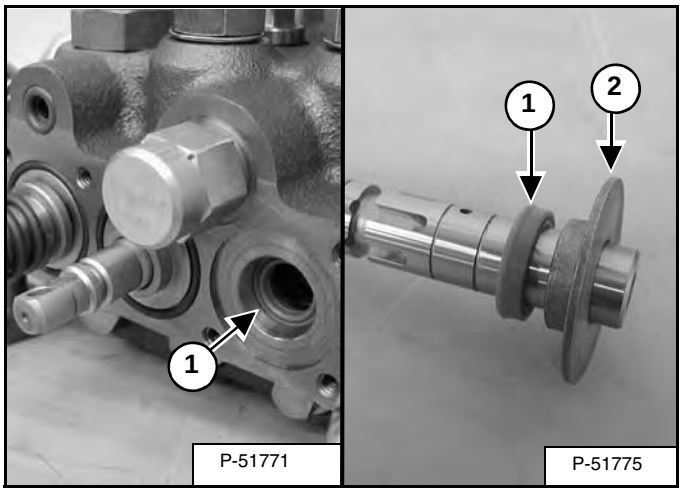
Remove spring tool from the spring assembly.

Figure 20-45-63



Inspect the adapter (Item 1), collar (Item 2), spring (Item 3) and washer (Item 4) **[Figure 20-45-63]**.

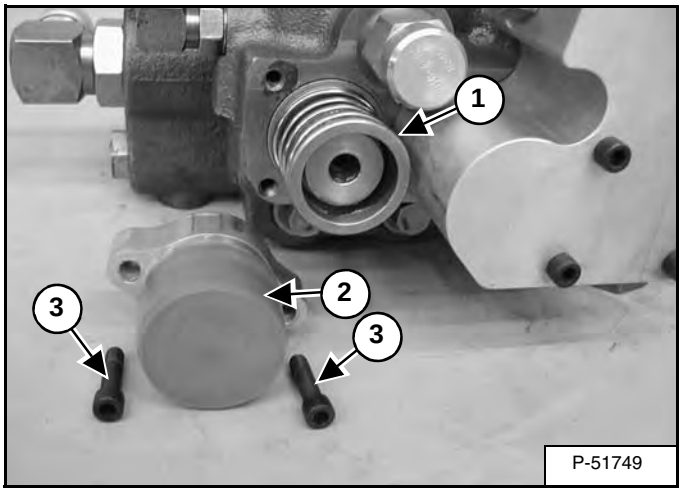
Figure 20-45-64



Remove the spool seal(s) (Item 1) and the back-up washer (Item 2) **[Figure 20-45-64]**.

Assembly: Always use a new spool seal.

Figure 20-45-65



Install the lift spool assembly (Item 1) **[Figure 20-45-65]** in the spool bore.

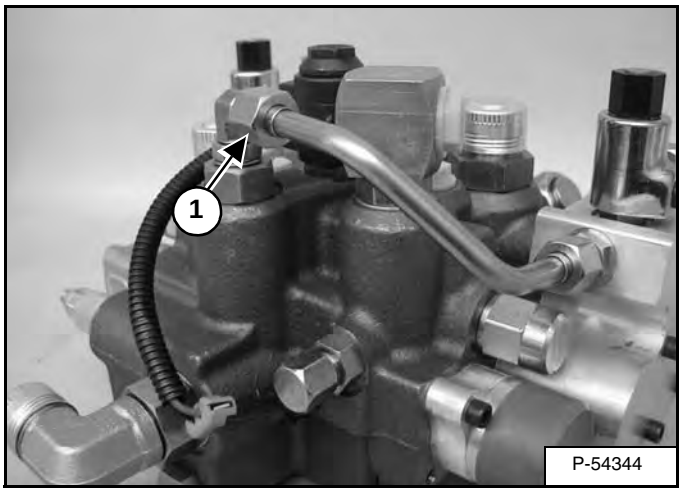
Install the end cap (Item 2) **[Figure 20-45-65]**.

Install the mounting screws (Item 3) **[Figure 20-45-65]**.

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

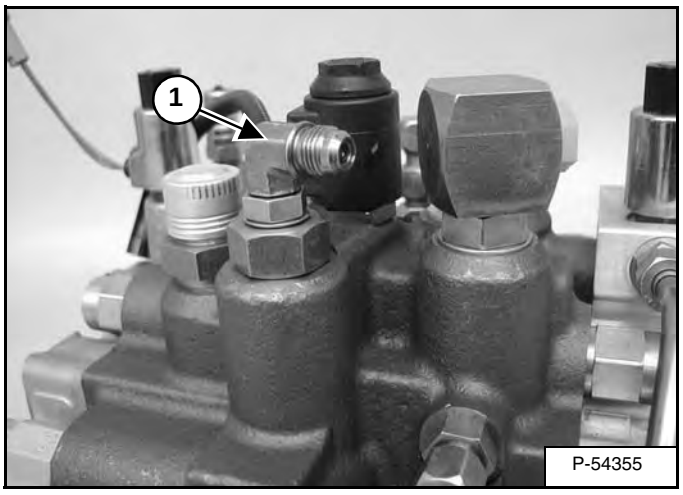
BICS™ Valve, Check Valve Removal And Installation

Figure 20-45-97



Remove the charge tubeline (Item 1) **[Figure 20-45-97]** from the fitting on the top of the lift load check valve.

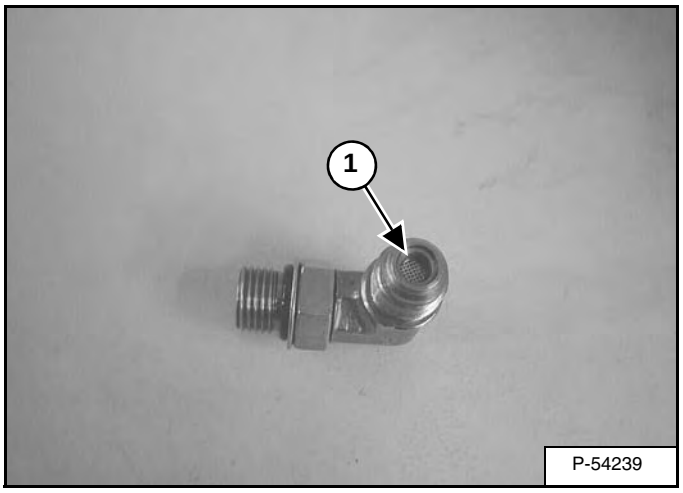
Figure 20-45-98



Remove the BICS™ check valve fitting (Item 1) **[Figure 20-45-98]** from the top of the lift load check valve.

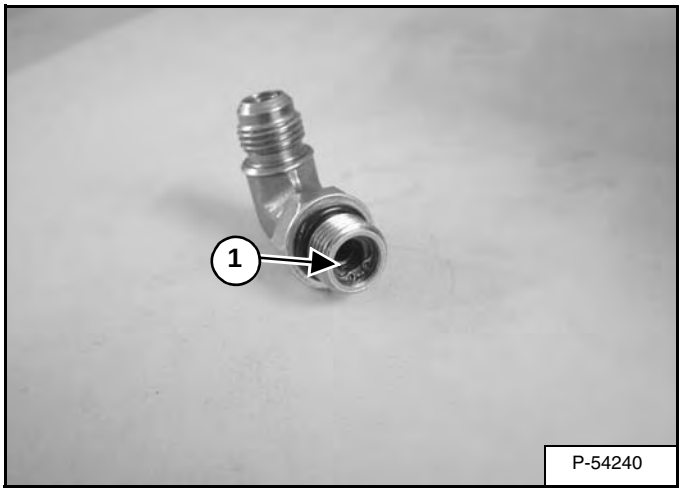
Installation: Lubricate the o-ring and tighten the valve to 20-24 ft.-lb. (27-33 N•m) torque.

Figure 20-45-99



Check the fitting screen (Item 1) **[Figure 20-45-99]**.

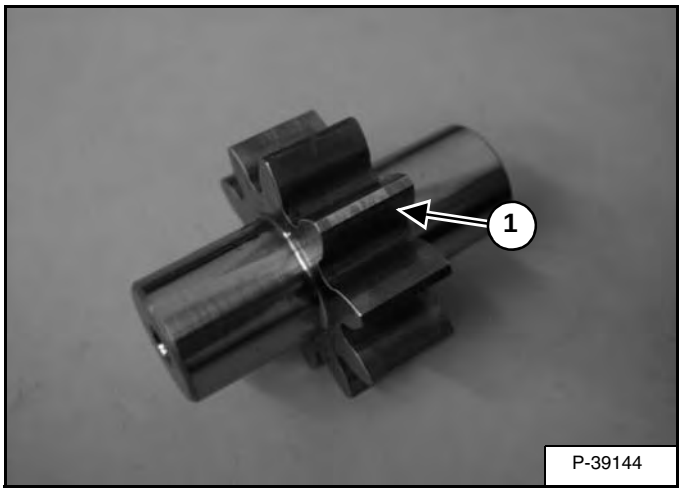
Figure 20-45-100



Inspect the fitting check valve (Item 1) **[Figure 20-45-100]**.

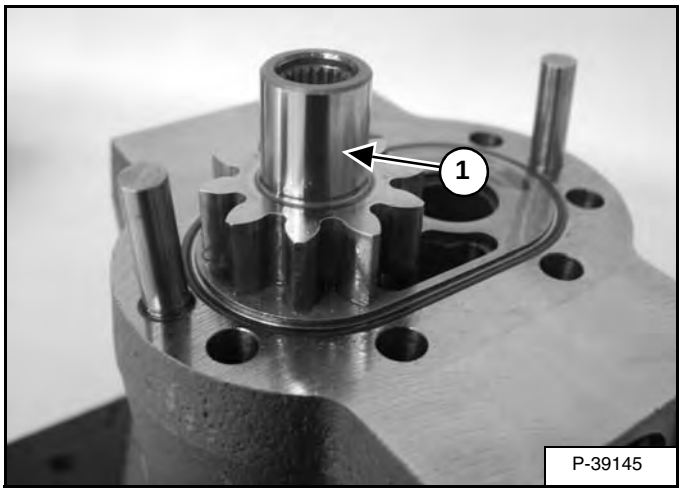
Disassembly And Assembly (Cont'd)

Figure 20-60-15



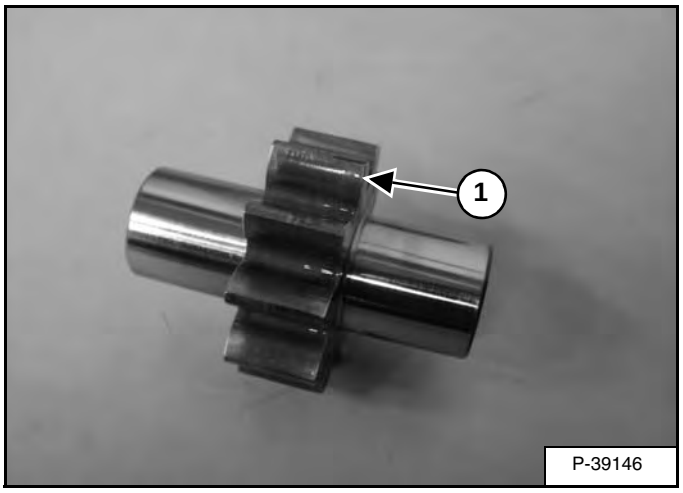
NOTE: Inspect the idler gear (Item 1) [Figure 20-60-15]. If excessive wear or damage is visible, the pump must be replaced.

Figure 20-60-16



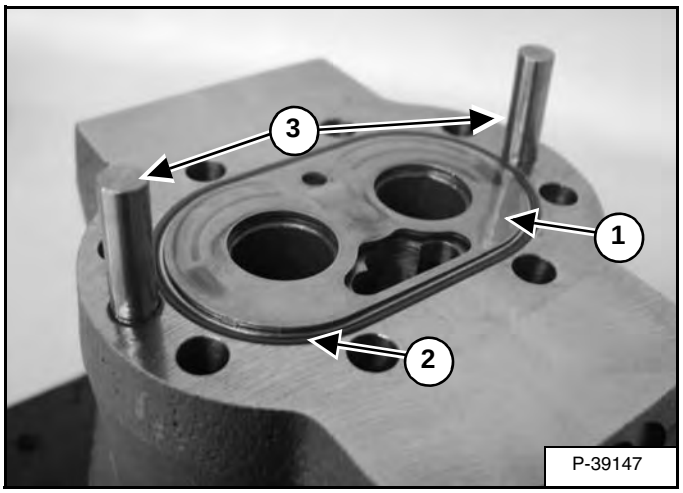
Remove the drive gear (Item 1) **[Figure 20-60-16]** from the charge pump.

Figure 20-60-17



NOTE: Inspect the drive gear (Item 1) [Figure 20-60-17]. If excessive wear or damage is visible, the pump must be replaced.

Figure 20-60-18



Remove the wear plate (Item 1) and section seal (Item 2) **[Figure 20-60-18]** from the front section of the charge pump.

Remove the locating pins (Item 3) **[Figure 20-60-18]** from the front section of the charge pump.

HYDRAULIC PUMP (HIGH FLOW)

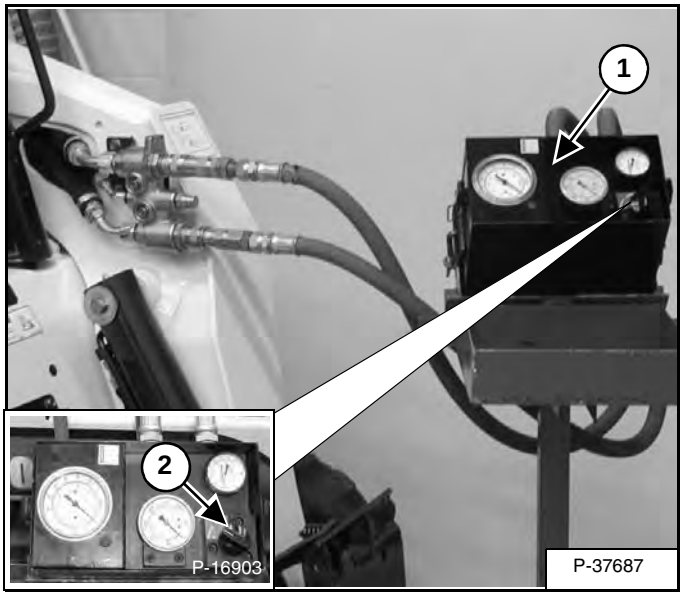
Hydraulic Pump Test (30 GPM)

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

MEL10103 - Hydraulic Tester
MEL10106 - Hydraulic Test Kit

NOTE: Machines with S/N 525613399 and Below with the high flow option will have the (30 GPM). Machines with S/N 525613400 and Above with the high flow option will have the (40 GPM).

Figure 20-62-1



NOTE: When testing the hydraulic flow of a machine hoses must be at least 3/4 inch in diameter and connected directly to the hydraulic tester without using any type of "quick coupler" on the connection to the tester. Also make sure your hydraulic tester is capable of at least 50 GPM.

Install a hydraulic tester (Item 1) **[Figure 20-62-1]** onto the front auxiliary quick couplers.

This procedure will require a operator in the cab and one operator running the tester.

Start the engine and run at low idle RPM. Press the Front Auxiliary button. Engage the front auxiliary with the trigger on the right handle. Make sure the tester is connected correctly. If no flow is indicated on the tester, the hoses are connected wrong. With the hoses connected correctly, increase the engine speed to full RPM*.

Warm the fluid to 140°F. (60°C.) by turning the restrictor control clockwise on the tester so it reads about a 1000 PSI (69 bar).

NOTE: *DO NOT EXCEED 3300 PSI.*

Turn the restrictor control (Item 2) **[Figure 20-62-1]** on the tester counterclockwise to obtain free flow, the flow should be at 21 GPM. Start turning the restrictor clockwise, causing more restriction on the flow. The GPM should drop off slightly until the pressure reaches approximately 2800 PSI. At approximately 2800 PSI the flow should start decreasing rapidly until the pressure reaches 3250-3300 PSI. At 3250-3300 PSI the flow should be at 0 GPM. Turn the restrictor (Item 2) **[Figure 20-62-1]** counter clockwise to free flow. Shut the front auxiliary hydraulics off.

If flow and pressure specs are not obtained, go to the Inline Standard Hydraulic Pump Test. (See Inline Hydraulic Pump Test (Standard) on Page 20-62-3.) If flow and pressure specs are obtained continue on to the next paragraph.

With the engine running at low idle RPM. Press the Front Auxiliary button. Engage the front auxiliary with the trigger on the right handle. Make sure the tester is connected correctly. If no flow is indicated on the tester, the hoses are connected wrong. With the hoses connected correctly, increase the engine speed to full RPM*.

Warm the fluid to 140°F. (60°C.) by turning the restrictor control on the tester to about 1000 PSI (69 bar).

NOTE: *DO NOT EXCEED 3300 PSI.*

Turn the restrictor control (Item 2) **[Figure 20-62-1]** on the tester counter clockwise, to obtain free flow, the flow should be at 21 GPM. Press the High Flow button. The flow should increase to 31.7 GPM. Start turning the restrictor clockwise, causing more restriction on the flow. The GPM should drop off slightly until the pressure reaches approximately 3100 PSI. At approximately 3100 PSI the flow should start decreasing rapidly until the pressure reaches 3250-3350 PSI. At 3250-3350 PSI the flow should be at 0 GPM. Turn the restrictor control (Item 2) **[Figure 20-62-1]** counter clockwise to free flow. Shut the front auxiliary hydraulics off.

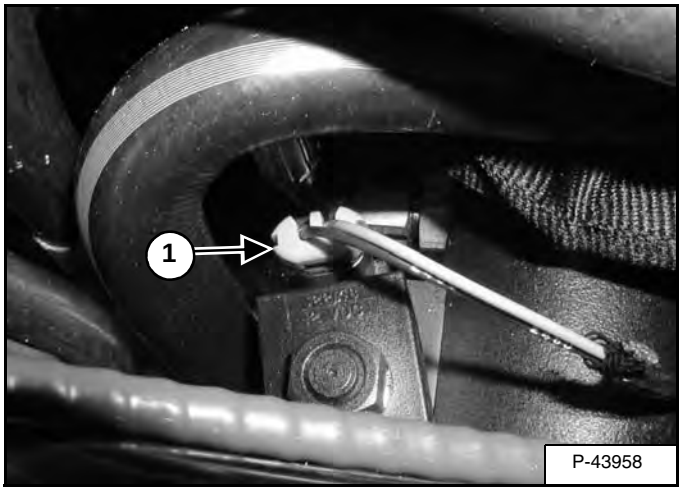
If the specs from above are reached, the high flow hydraulic pump is OK.

If the flow and pressure were not obtained, go to the Inline High Flow Hydraulic Pump Test (See Inline Hydraulic Pump Test (High Flow) (30 GPM And 40 GPM) on Page 20-62-5.)

*(See LOADER SPECIFICATIONS (T250) on Page SPEC-10-1.) for system relief pressure and full RPM.

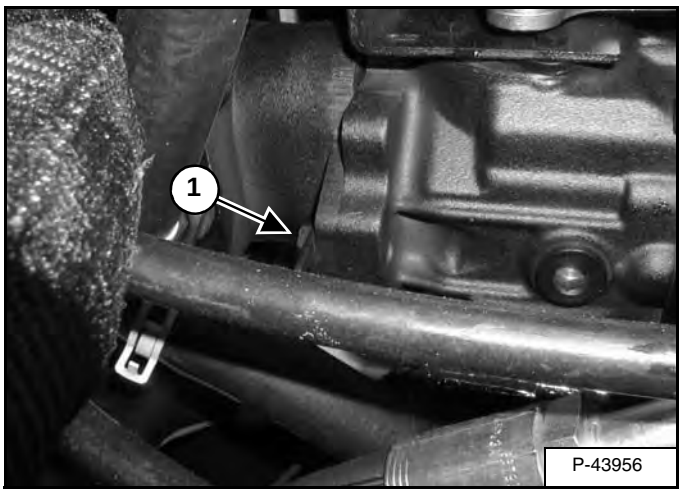
Removal And Installation (30 GPM And 40 GPM) (Cont'd)

Figure 20-62-20



At the right side access hole, disconnect the electrical connector (Item 1) **[Figure 20-62-20]** from the high flow pump solenoid.

Figure 20-62-21



Remove the two mounting bolts (Item 1) **[Figure 20-62-21]** from the hydraulic pump.

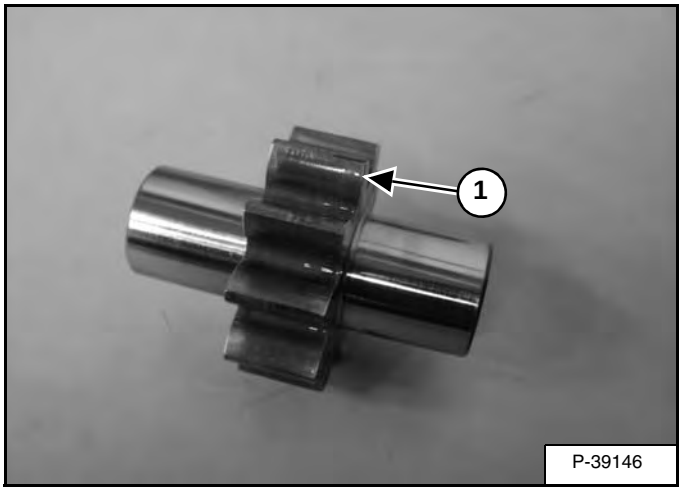
Installation: Tighten the mounting bolts to 27-37 ft.-lb. (37-50 N•m) torque.

Remove the hydraulic pump from the hydrostatic pump.

Installation: Use a new O-ring when installing the hydraulic pump.

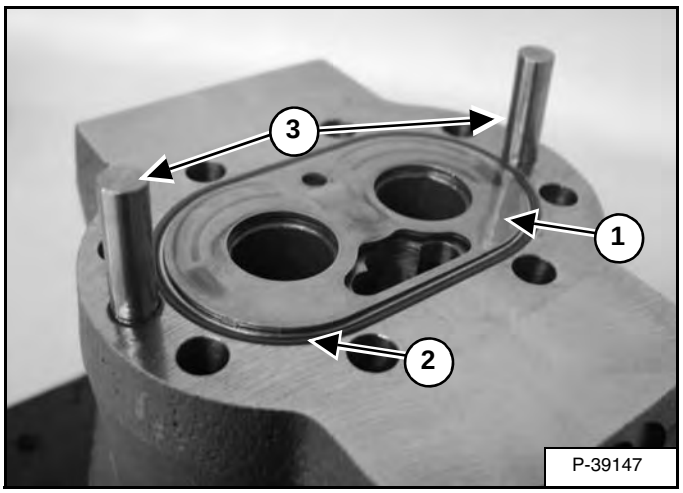
Disassembly And Assembly (30 GPM And 40 GPM) (Cont'd)

Figure 20-62-50



NOTE: Inspect the drive gear (Item 1) [Figure 20-62-50]. If excessive wear or damage is visible, the pump must be replaced.

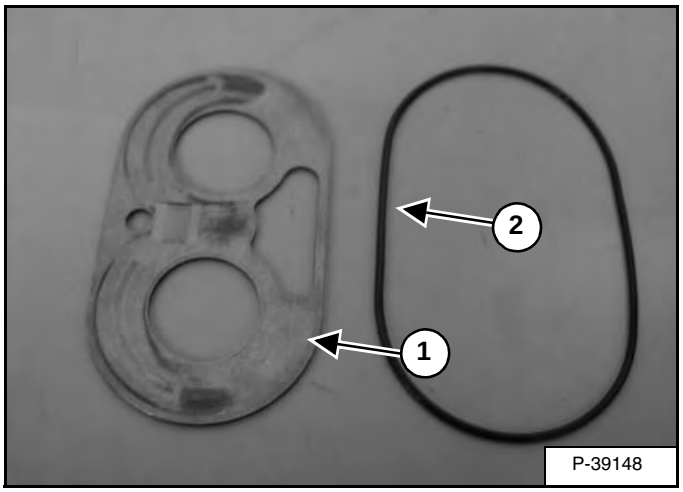
Figure 20-62-51



Remove the wear plate (Item 1) and section seal (Item 2) **[Figure 20-62-51]** from the front section of the charge pump.

Remove the locating pins (Item 3) **[Figure 20-62-51]** from the front section of the charge pump.

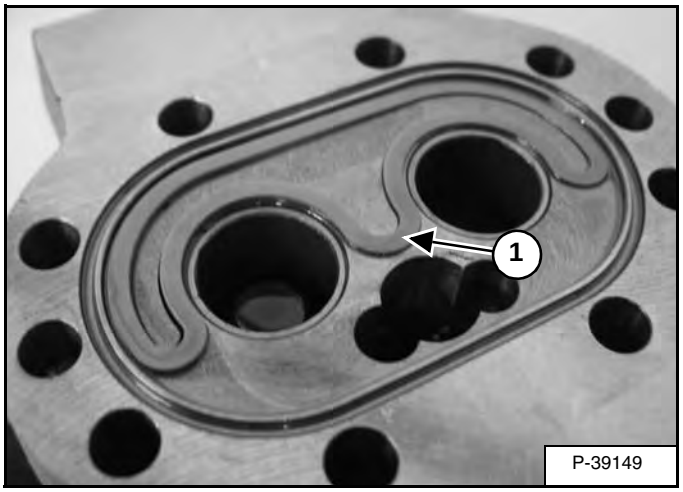
Figure 20-62-52



Inspect the wear plate (Item 1) and the section seal (Item 2)**[Figure 20-62-52]** and replace as needed.

NOTE: Position the wear plate (Item 1) [Figure 20-62-52] inlets and traps as shown with the bronze side toward the gears.

Figure 20-62-53



Remove the load seal (Item 1) **[Figure 20-62-53]** from the front section of the charge pump.

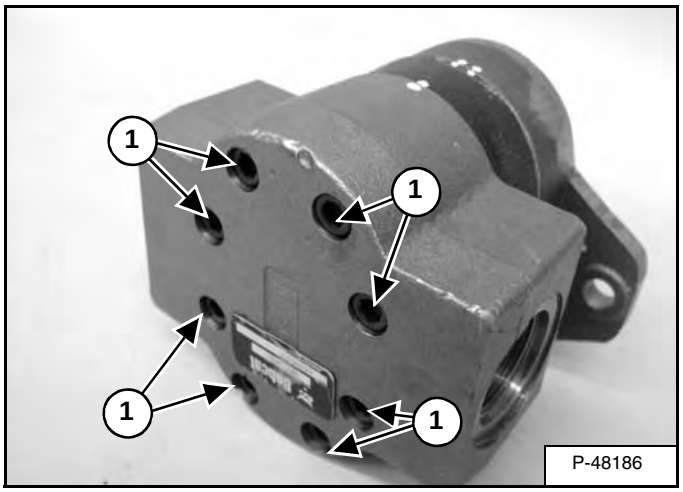
Disassembly And Assembly

IMPORTANT

When repairing hydrostatic and hydraulic systems, clean the work area before disasembly 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 20-63-8

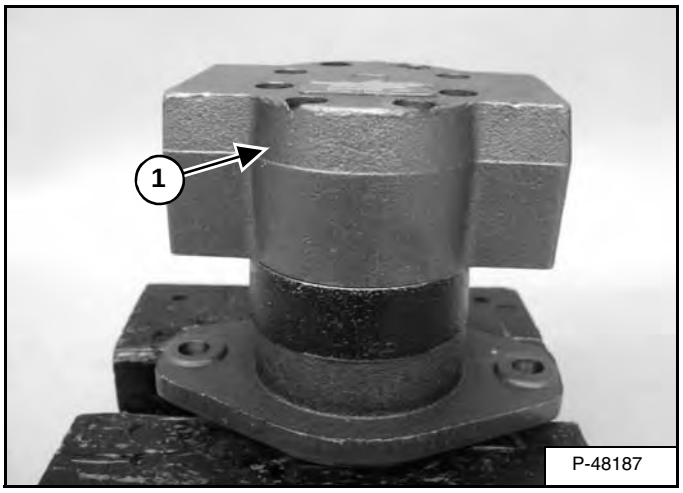


Mark the pump sections for correct assembly **[Figure 20-63-8]**.

Remove the eight pump housing bolts (Item 2) **[Figure 20-63-8]**.

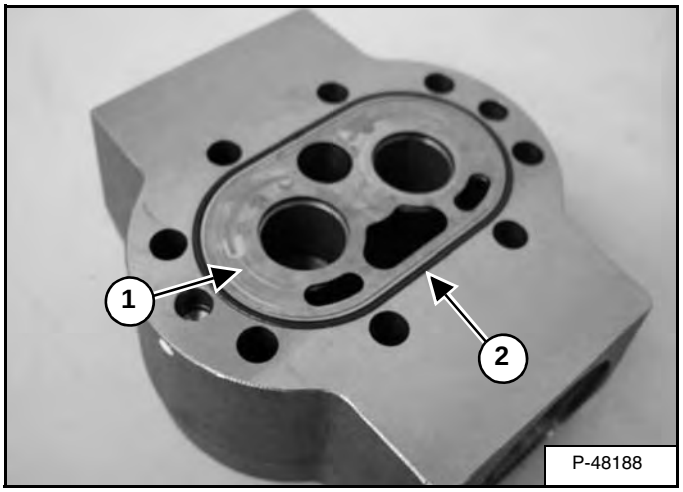
Installation: Tighten the eight bolts (Item 1) **[Figure 20-63-8]** to 45-50 ft.-lbs (60-67 N•m) torque.

Figure 20-63-9



Set the pump on end, and remove the pump end section (Item 1) **[Figure 20-63-9]** from the charge pump.

Figure 20-63-10



Remove the wear plate (Item 1) and the s ection seal (Item 2) **[Figure 20-63-10]**.

Inline Hydraulic Pump Test (High Flow) (30 GPM And 40 GPM)

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

MEL10103 - Hydraulic Tester
MEL10106 - Hydraulic Test Kit

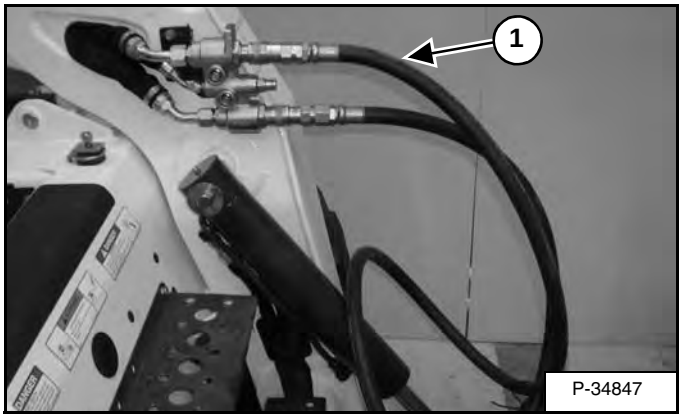
⚠ WARNING

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

W-2017-0286

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

Figure 20-64-6



Install a jumper hose (Item 1) **[Figure 20-64-6]** onto the front auxiliary quick couplers.

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

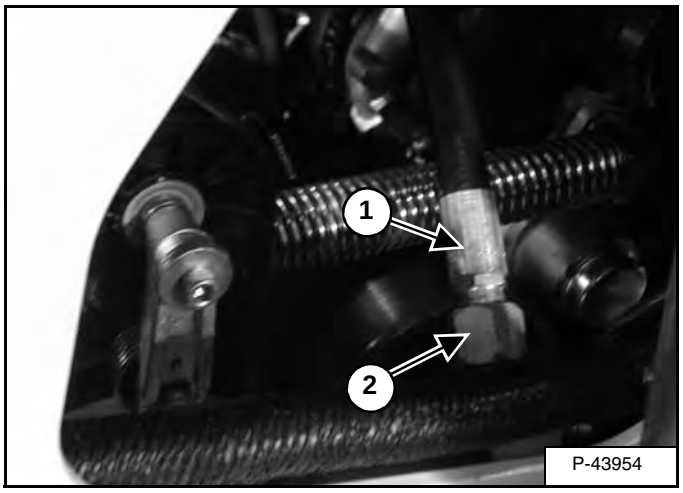
⚠ WARNING

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

W-2059-0598

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

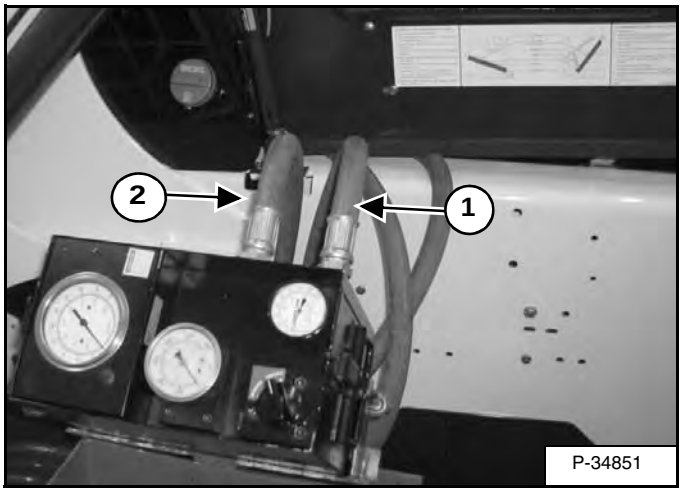
Figure 20-64-7



Remove the left side access cover.

Disconnect the high flow pump OUTLET hose (Item 1) **[Figure 20-64-7]** from the fitting (Item 2) **[Figure 20-64-7]** on the tubeline.

Figure 20-64-8



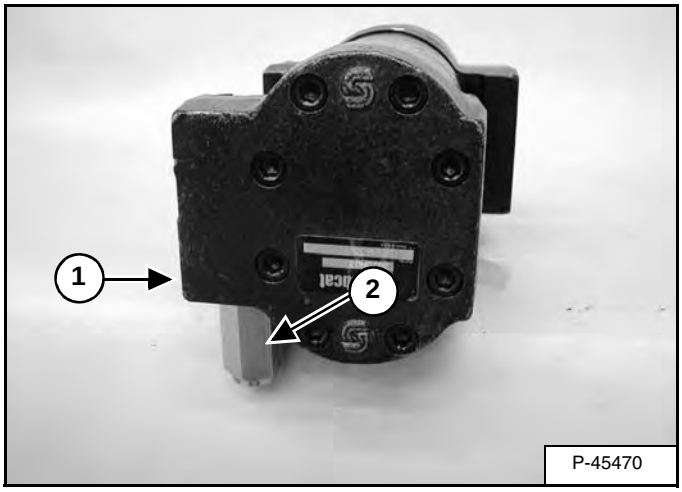
NOTE: When testing the hydraulic flow of a machine hoses must be at least 3/4 inch in diameter and connected directly to the hydraulic tester without using any type of "quick coupler" on the connection to the tester. Also make sure your hydraulic tester is capable of at least 50 GPM.

Connect the INLET hose (Item 1) **[Figure 20-64-8]** from the tester to the OUTLET hose (Item 1) **[Figure 20-64-7]** of the pump. Connect the OUTLET hose (Item 2) **[Figure 20-64-8]** from the tester to the fitting (Item 2) **[Figure 20-64-7]** on the tubeline.

Lower the cab down.

Disassembly And Assembly (30 GPM And 40 GPM) (Cont'd)

Figure 20-64-26

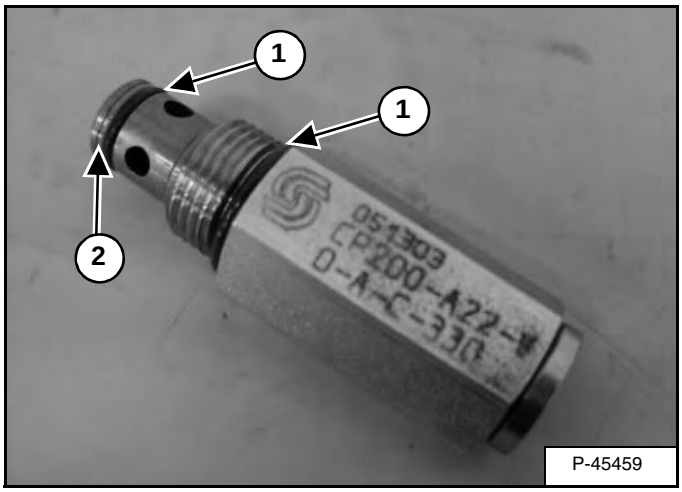


NOTE: Mark the pump housing (Item 1) [Figure 20-64-26] for proper installation of the relief valve.

Remove the relief valve (Item 2) **[Figure 20-64-26]** from the pump

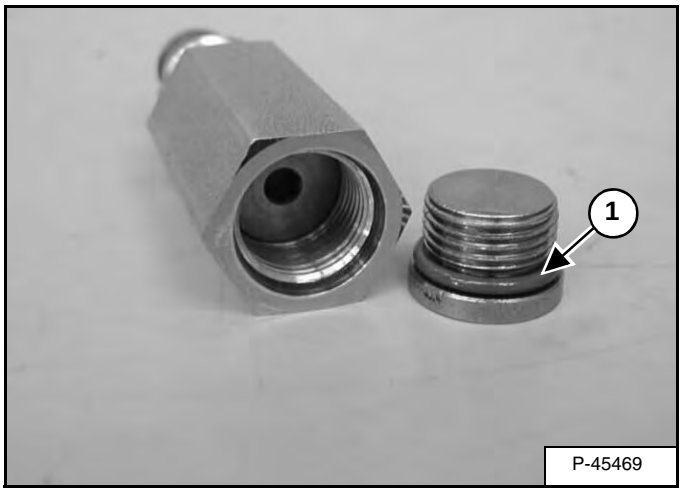
Installation: Tighten the relief valve to 30-35 ft.-lbs (41-47 N•m) torque.

Figure 20-64-27



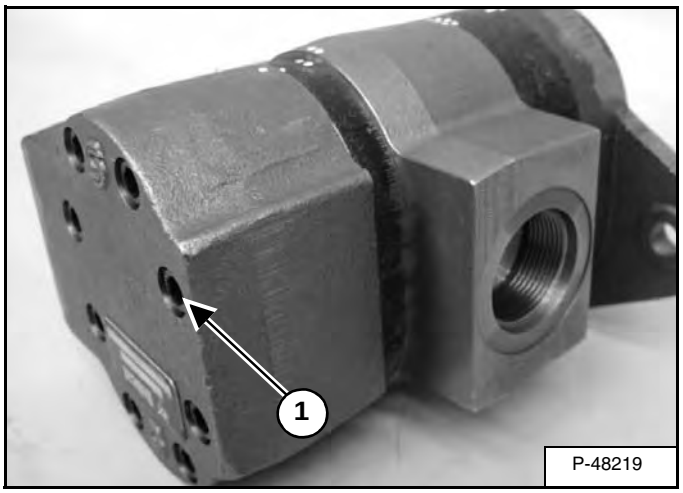
Inspect the relief valve and replace the two o-rings (Item 1) and back-up washer (Item 2)**[Figure 20-64-27]**.

Figure 20-64-28



Inspect the o-ring (Item 1) **[Figure 20-64-28]** on the relief valve adjustment plug for damage and replace as needed.

Figure 20-64-29



Mark the pump sections for proper installation.

Remove the eight bolts (Item 1) **[Figure 20-64-29]**.

Installation: Tighten the assembly bolts to 45-50 ft.-lbs (60-67 N•m).

HYDRAULIC FLUID RESERVOIR

Fluid Removal

WARNING

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 which can result in injury or death.

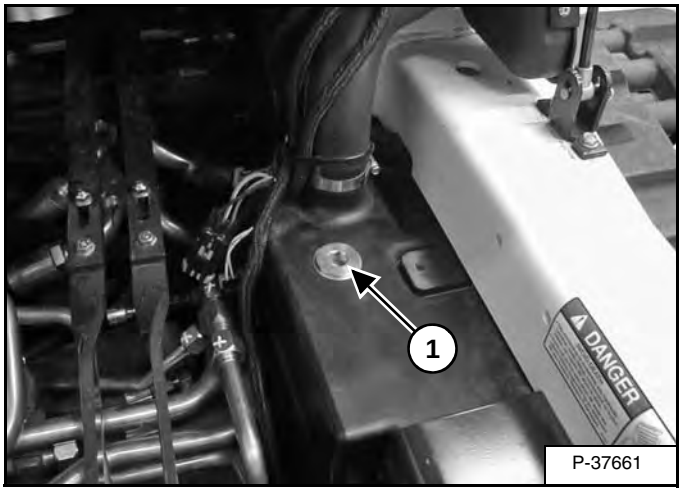
W-2103-1295

WARNING

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

W-2059-0598

Figure 20-80-1



Remove the pl ug (Item 1) **[Figure 20-80-1]** from the hydraulic reservoir, with a suction pump remove the fluid.

Removal And Installation

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

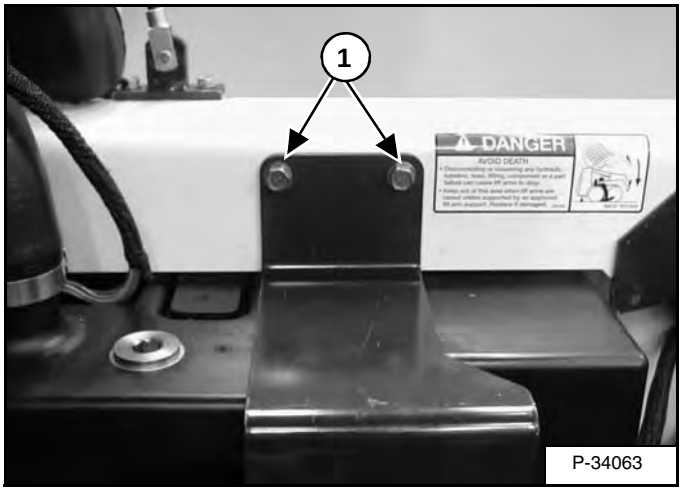
Raise the operator cab. (See Raising The Operator Cab on Page 10-30-1.)

Remove the fluid from the reservoir.

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

Remove bucket position valve. (If so equipped.) (See Removal And Installation on Page 20-90-2.)

Figure 20-80-2



Remove the two mount bolts (Item 1) **[Figure 20-80-2]** from the bucket positon valve mount plate. (If so equipped.)

Remove the mount plate from the loader. (If so equipped.)

Disassembly And Assembly

Figure 20-100-8

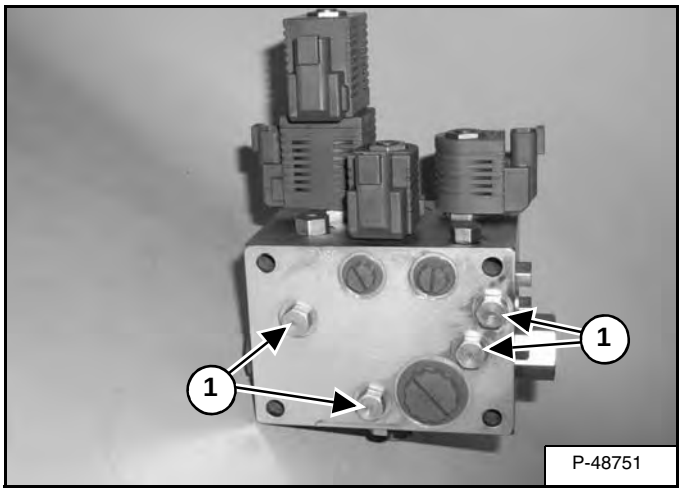
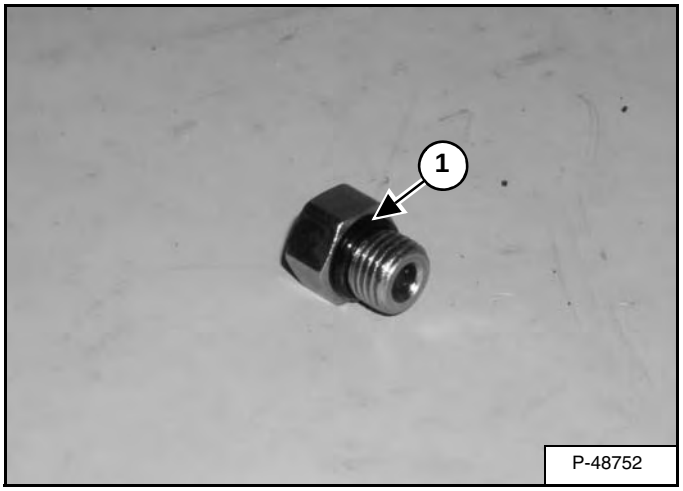


Figure 20-100-9



Clean the diverter valve to remove dirt before disassembly. Valve ports are labeled for correct assembly.

Several plugs (Item 1) **[Figure 20-100-8]** & **[Figure 20-100-9]** are located all over the diverter valve and can be removed for cleanout purposes.

Installation: Put oil on O-rings and back-up washers.Tighten to 10 ft.-lb. (13,6 N•m) torque.

IMPORTANT

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

I-2003-0888

Figure 20-100-10

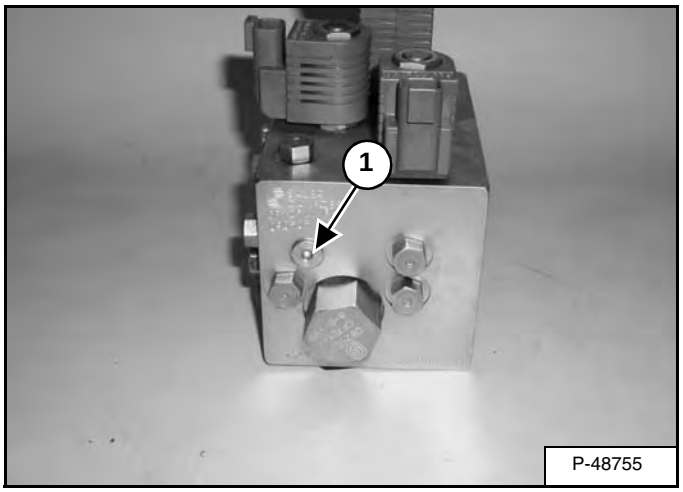
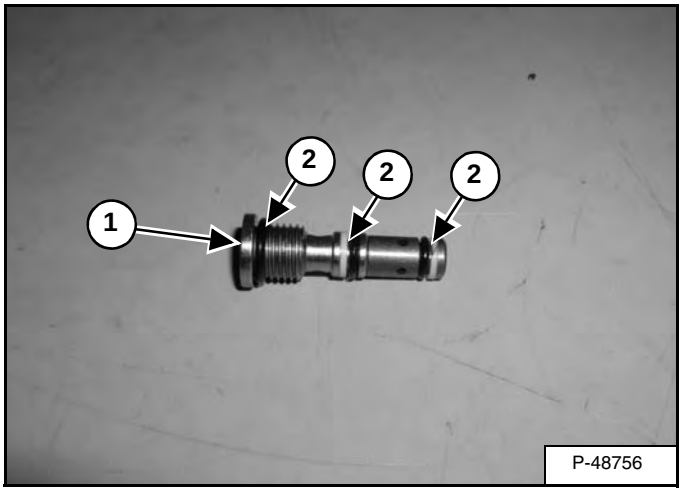


Figure 20-100-11

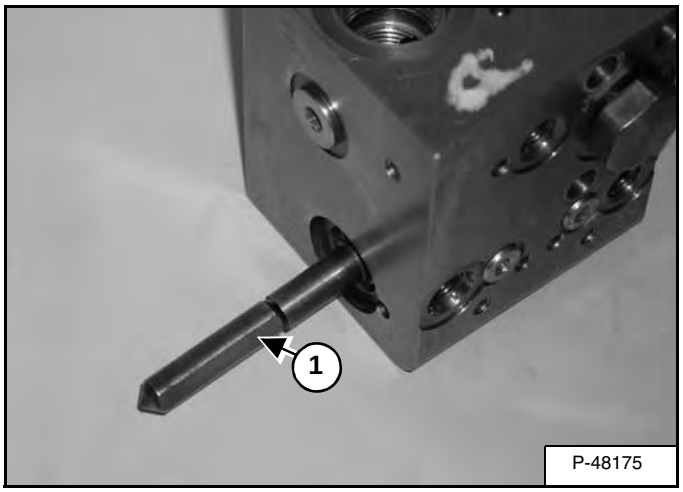


Remove the shuttle valve (Item 1) **[Figure 20-100-10]** & **[Figure 20-100-11]** from diverter valve and inspect the O-rings and back-up washers (Item 2) **[Figure 20-100-11]** for damage.

Installation: Put oil on the O-rings and back-up washers. Tighten to 10-12 ft.-lb. (14-16 N•m) torque.

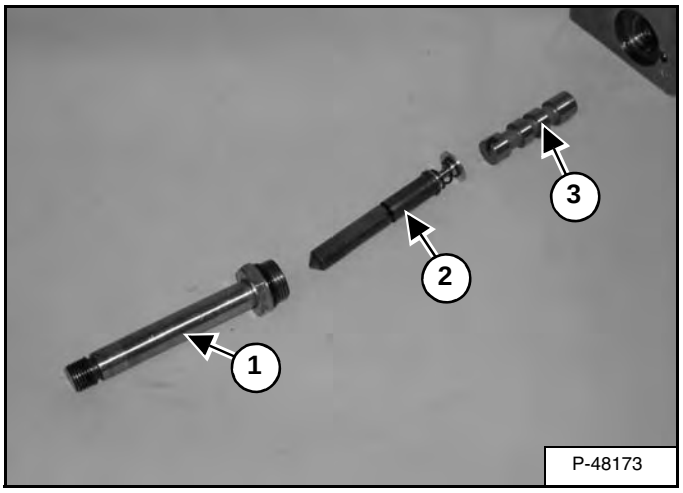
Disassembly And Assembly (Cont'd)

Figure 20-110-15



Remove the armature rod assembly (Item 1) **[Figure 20-110-15]**.

Figure 20-110-16

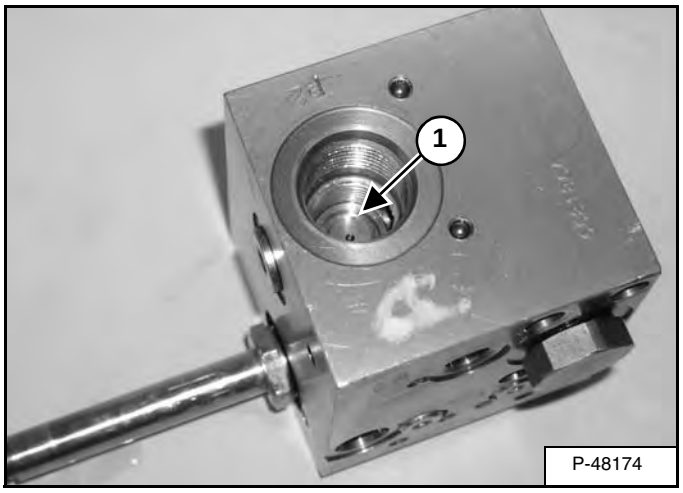


Inspect the solenoid stem (Item 1), armature assembly (Item 2) and the spool (Item 3) for damage **[Figure 20-110-16]**.

NOTE: If the solenoid stem is damaged (Item 1) check the armature assembly (Item 2) for damage.

The armature assembly (Item 2) and spool (Item 3) are non-serviceable parts. If they are damaged, order a new power Bob-Tach block assembly from Bobcat parts [Figure 20-110-16].

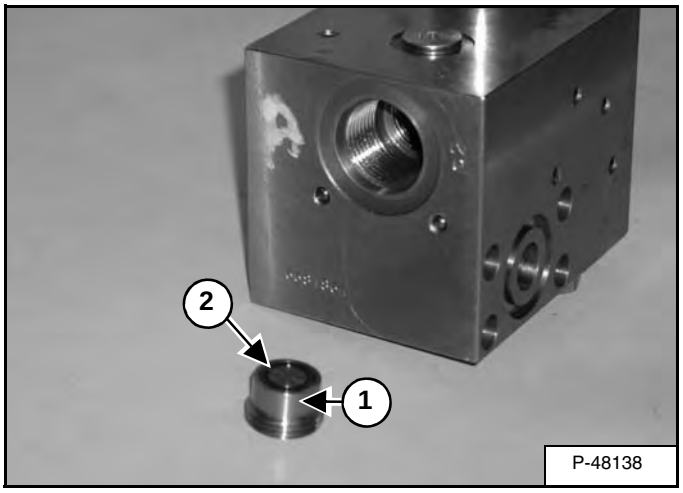
Figure 20-120-17



Remove the screened orifice plug (Item 1) **[Figure 20-120-17]**.

Installation: Tighten the screened orifice plug to to 11-12 ft.-lb. (14,9-16,3 N•m) torque.

Figure 20-110-18



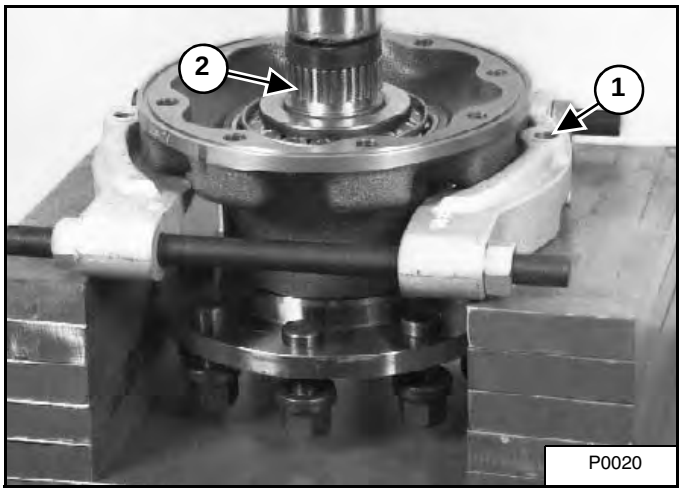
Inspect the screened orifice plug (Item 1) **[Figure 20-110-18]** for damage replace as needed. If the screened orifice plug is blocked replace with a new plug.

Check the O-ring (Item 2) **[Figure 20-110-18]** and replace as needed.


Bobcat®

Disassembly (Cont'd)

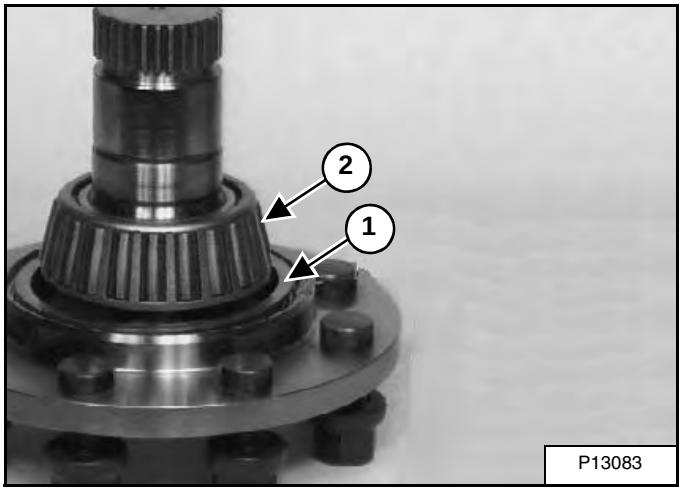
Figure 30-20-33



Install the bearing puller (Item 1) **[Figure 30-20-33]** under the front housing and support the puller and housing with blocks.

Press the shaft (Item 2) **[Figure 30-20-33]** from the housing.

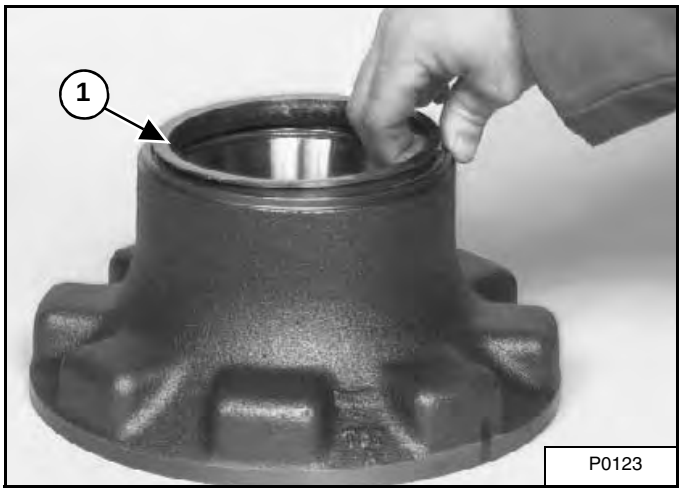
Figure 30-20-34



Remove the face seal (Item 1) **[Figure 30-20-34]** from the shaft.

Discard the face seal.

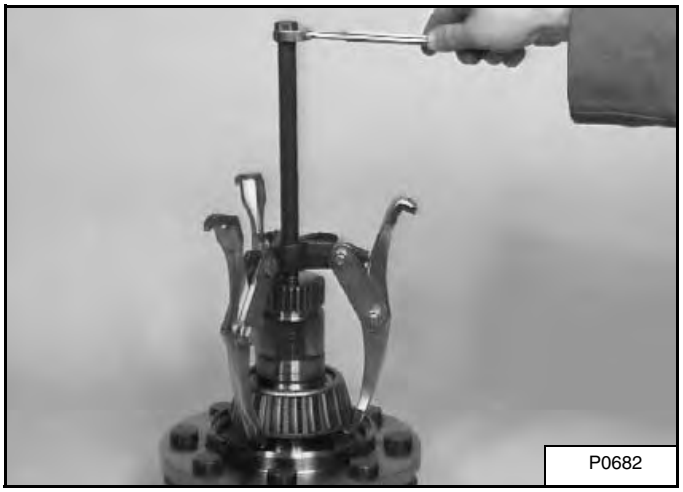
Figure 30-20-35



Remove the face seal (Item 1) **[Figure 30-20-35]** from the front housing.

Discard the face seal.

Figure 30-20-36

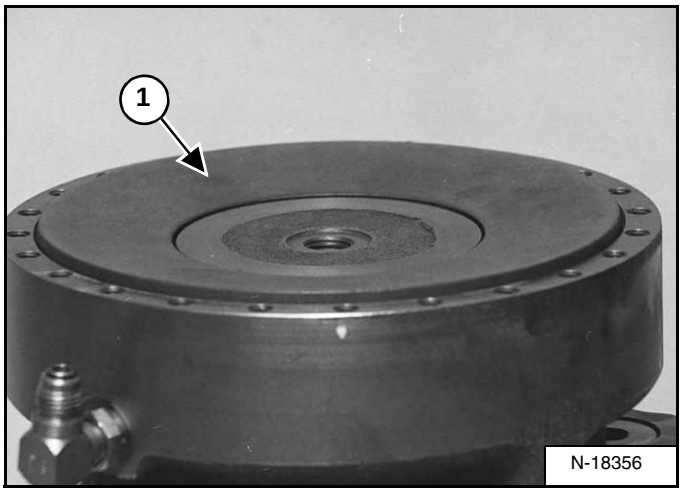


Use a bearing puller to remove the bearing from the shaft **[Figure 30-20-36]**.

NOTE: The bearing will be destroyed during the removal procedure. Be sure to have a new bearing on hand before removing the old bearing.

Assembly (Cont'd)

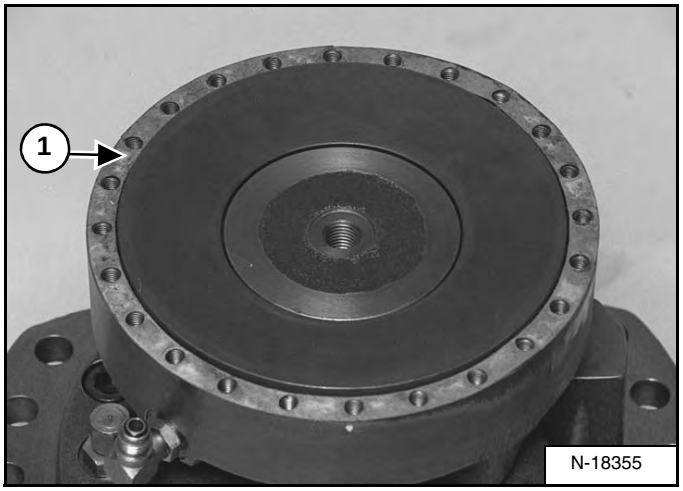
Figure 30-20-73



Put multi-purpose moly grease on the surface of the disc spring where it contacts the piston.

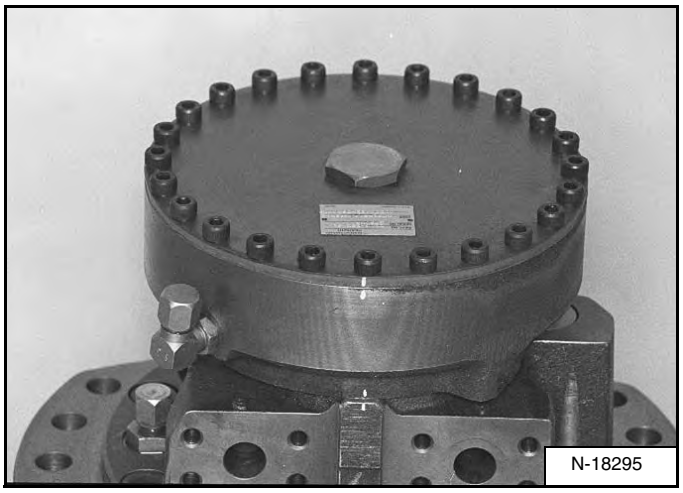
Install the disc spring (Item 1) **[Figure 30-20-73]** on the top of the piston as shown.

Figure 30-20-74



Install a new gasket (Item 1)**[Figure 30-20-74]**.

Figure 30-20-75



Align the marks on the end cover and install on the brake housing **[Figure 30-20-75]**.

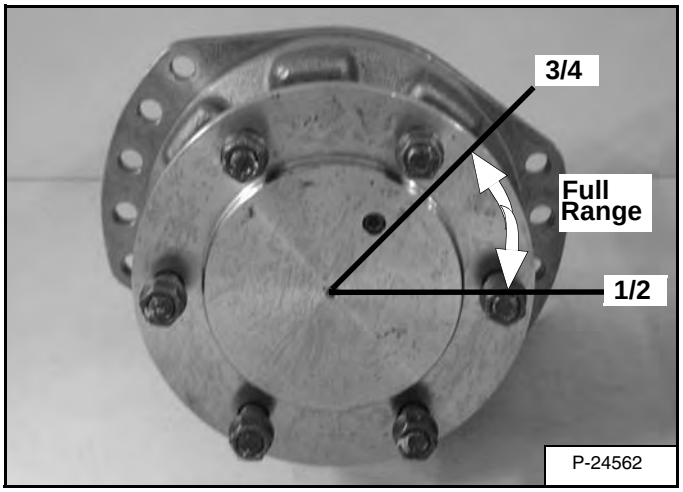
Install the socket head bolts into the end cover and finger tighten only.

NOTE: Tighten the bolts alternately one turn at a time until the end cover is fully seated.

Tighten the bolts to 10-12 ft.-lb. (14-16 N•m) torque.

Filling

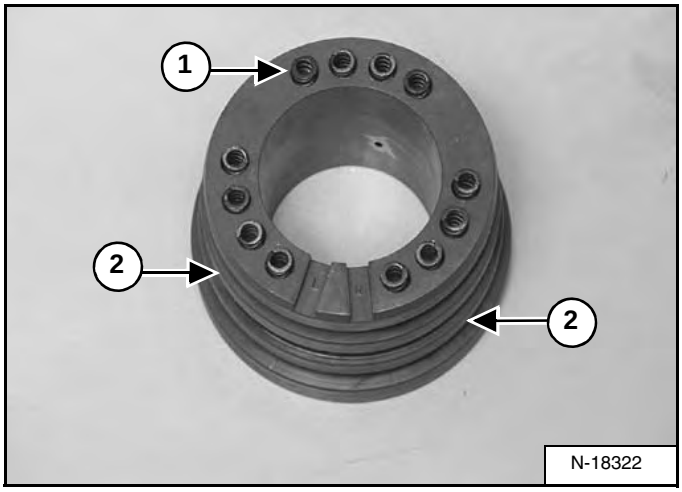
Figure 30-20-76



Fill housing with synthetic Mobilgear SHC XMP 150, fill with plug in fill range **[Figure 30-20-76]** 1/2 to 3/4 full.

Disassembly (Cont'd)

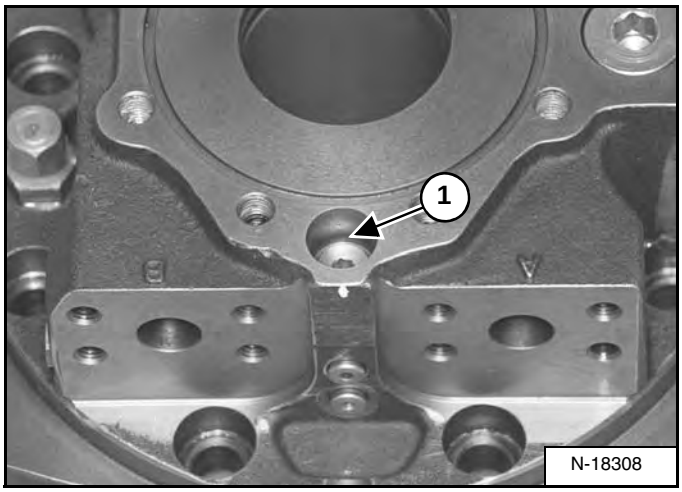
Figure 30-21-18



Remove the twelve springs from the distributor (Item 1) **[Figure 30-21-18]**.

Remove the two seals and back-up O-rings (Item 2) **[Figure 30-21-18]** under the seals, from the distributor.

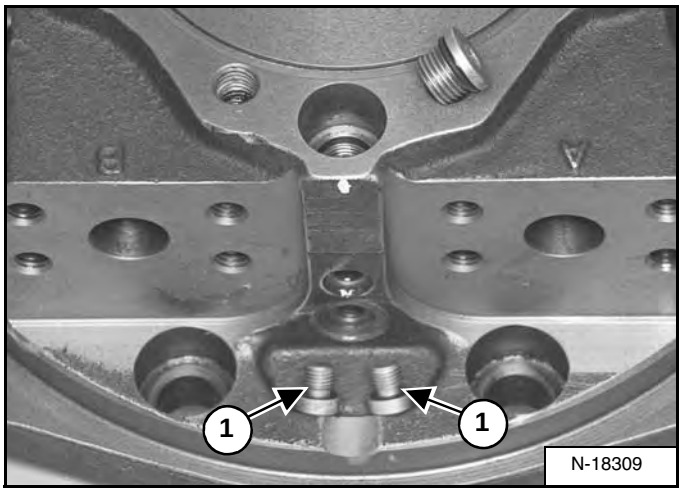
Figure 30-21-19



Remove the plug (Item 1) **[Figure 30-21-19]** from the rear housing assembly.

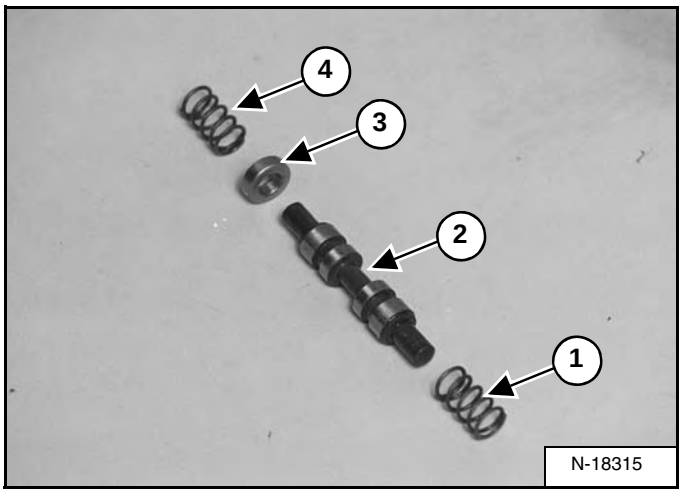
Remove the spring (Item 1), spool (Item 2), and washer (Item 3) and rear spring (Item 4) **[Figure 30-21-21]**.

Figure 30-21-20



Remove the plugs (Item 1) **[Figure 30-21-20]** from the rear housing assembly to check alignment of springs, washer and spool when reassembling.

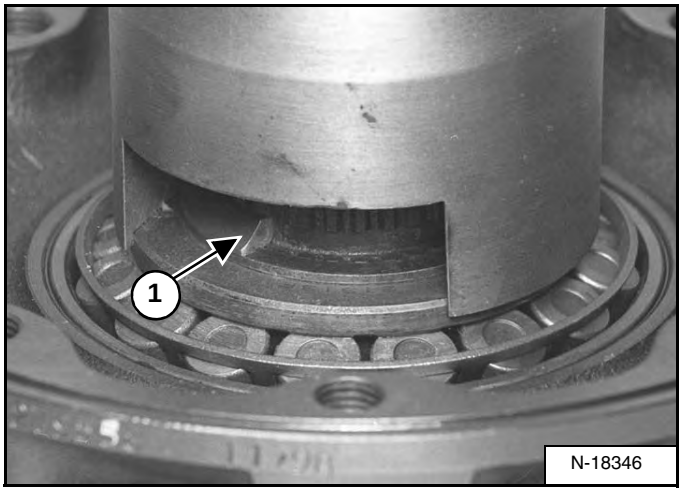
Figure 30-21-21



Inspect all parts and replace as needed **[Figure 30-21-21]**.

Assembly (Cont'd)

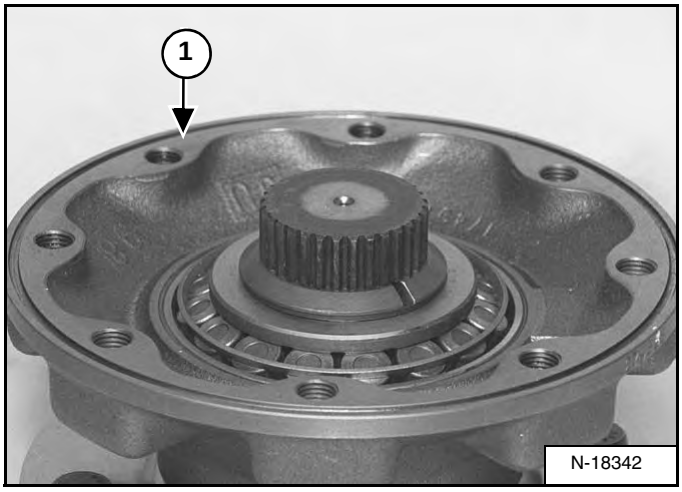
Figure 30-21-58



Install the tool and press the bearing to 90 00 lb. pressure.

Install the split rings (Item 1) **[Figure 30-21-58]**.

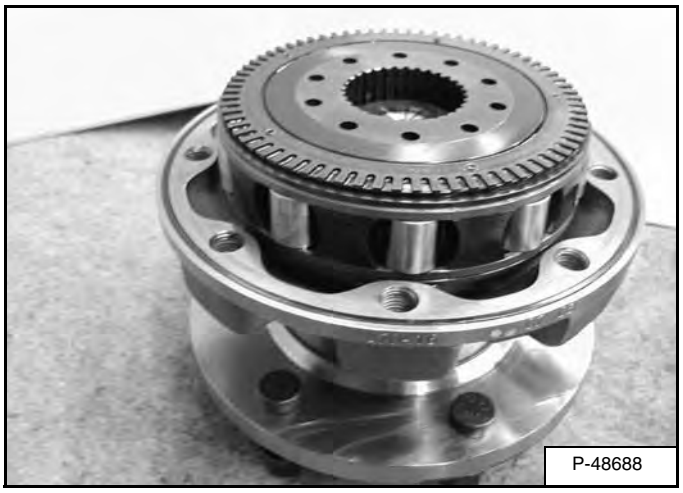
Figure 30-21-59



Remove from press.

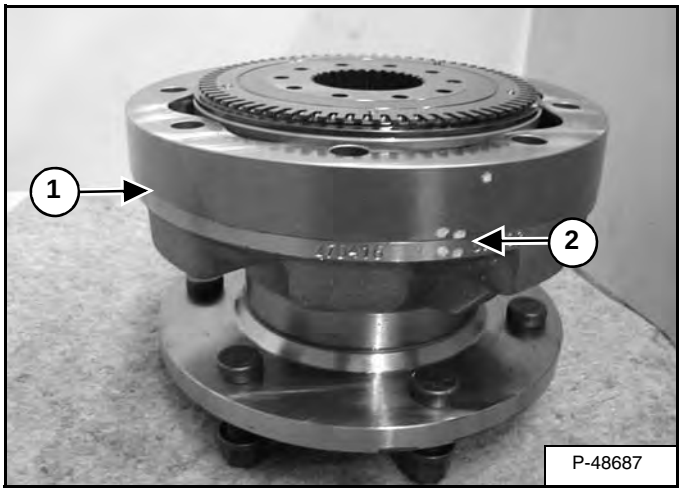
Install a new O-ring on the front housing assembly (Item 1) **[Figure 30-21-59]** and lightly smear with grease.

Figure 30-21-60



Install the cylinder block on the front housing **[Figure 30-21-60]**.

Figure 30-21-61

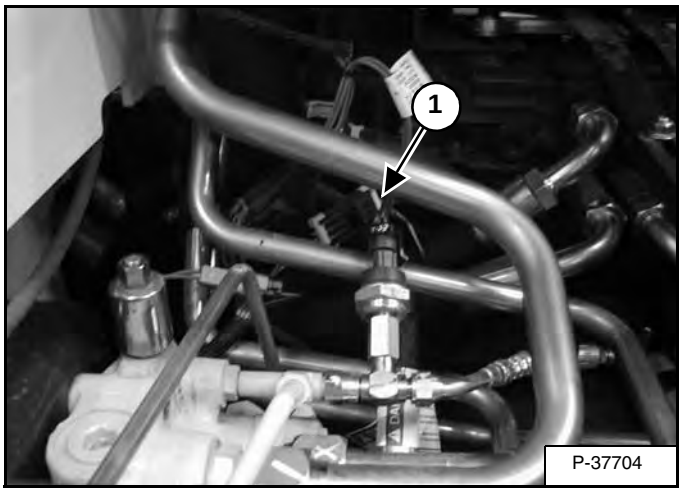


Install the cam ring (Item 1) **[Figure 30-21-61]** on the front housing.

Align the marks (Item 2) **[Figure 30-21-61]** on the ca m ring to the front housing.

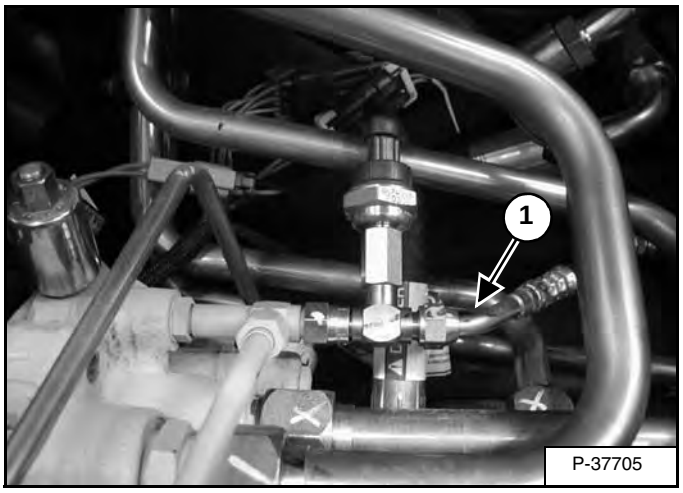
Removal And Installation

Figure 30-30-6



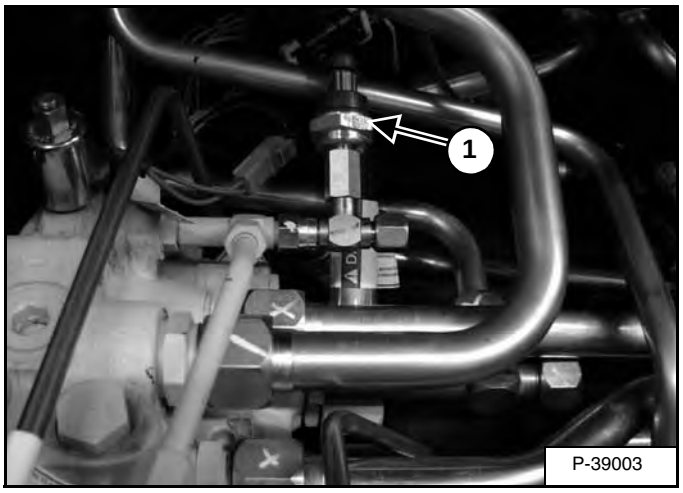
Disconnect the wire (Item 1) **[Figure 30-30-6]** from the sender.

Figure 30-30-7



Remove the charge pressure line (Item 1) **[Figure 30-30-7]**.

Figure 30-30-8

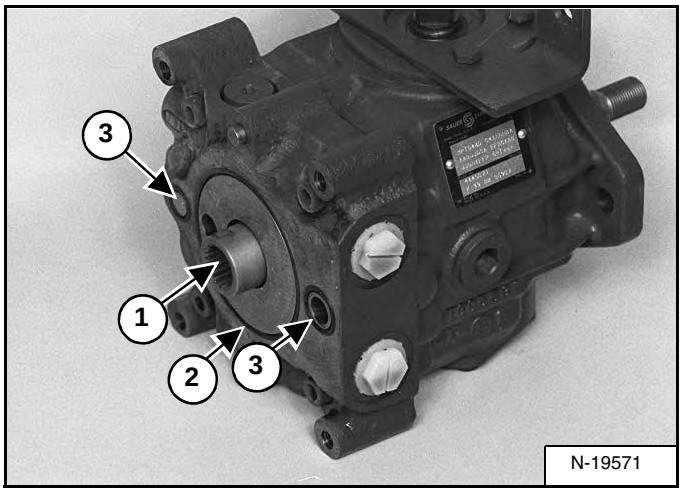


Remove the sender (Item 1) **[Figure 30-30-8]** from the hydraulic control valve.

Installation: Tighten the charge pressure sender to 7.4-8.1 ft.-lb. (10-11 N•m) torque.

Pump Separation (Cont'd)

Figure 30-40-14



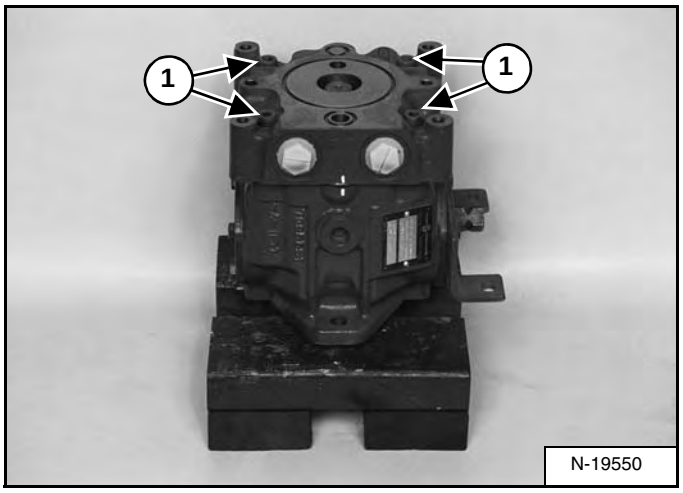
Remove the pump coupler (Item 1) **[Figure 30-40-14]**.

Remove the large O-ring (Item 2) **[Figure 30-40-14]**.

Remove the two small O-rings (Item 3) **[Figure 30-40-14]**.

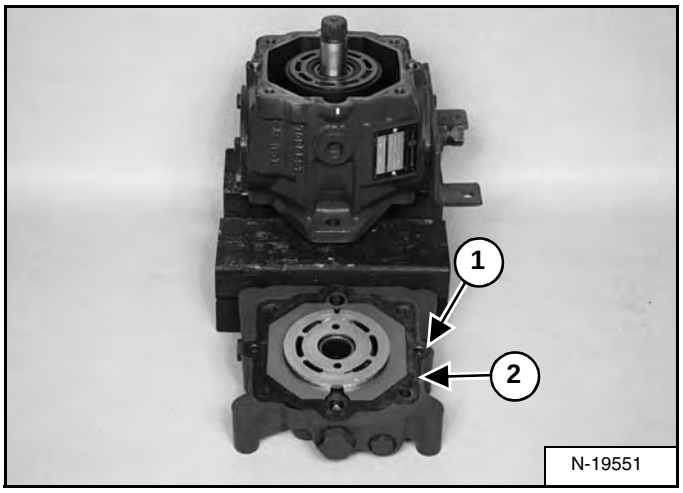
Disassembly

Figure 30-40-15



Remove the four bolts (Item 1) **[Figure 30-40-15]** from the pump housing end cap.

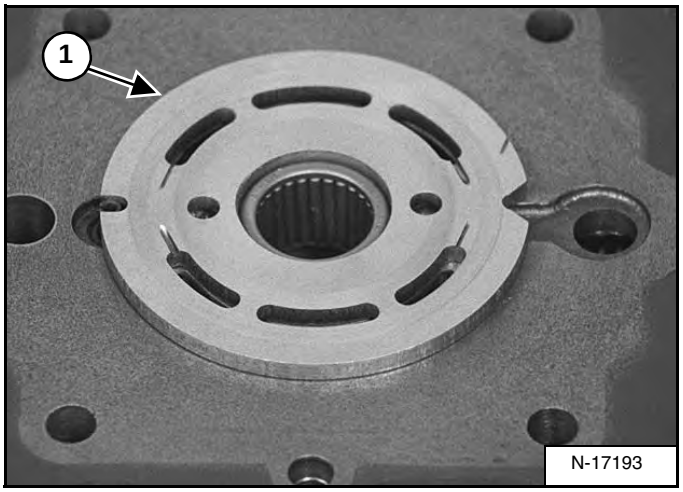
Figure 30-40-16



Remove the pump housing end cap (Item 1) **[Figure 30-40-16]**.

Remove the gasket (Item 2) **[Figure 30-40-16]**.

Figure 30-40-17

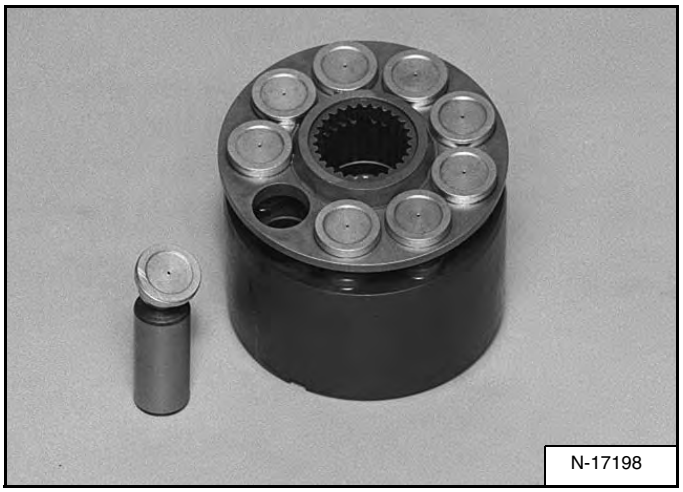


Remove the valve plate (Item 1) **[Figure 30-40-17]**.

Check the valve plate for wear. (Both Sides.)

Assembly (Cont'd)

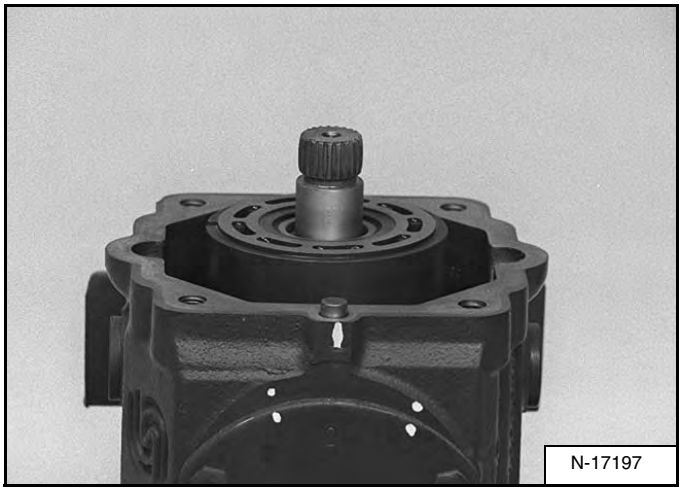
Figure 30-40-53



Assemble the piston assemblies into the slipper guide. Lubricate the pistons and cylinder block bores and insert the piston assemblies into the cylinder bores **[Figure 30-40-53]**.

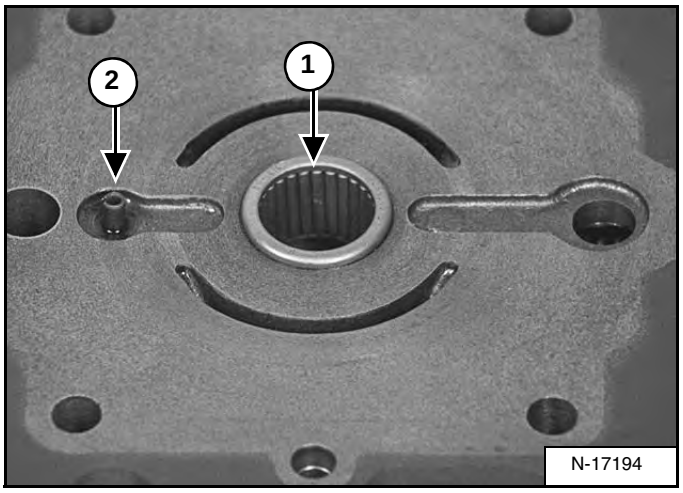
Lay the pump housing on its side and install the cylinder block, piston assembly into the housing.

Figure 30-40-54



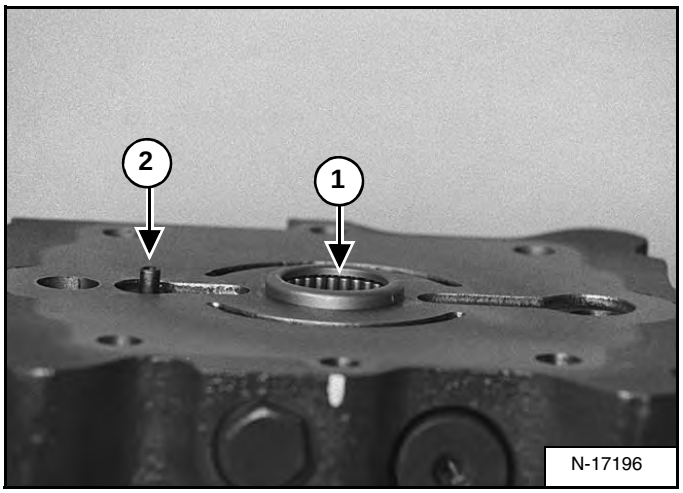
Place the pump on a w ork surface with the end cap opening up **[Figure 30-40-54]**.

Figure 30-40-55



Replace the needle bearing (Item 1) and valve plate locating pin (Item 2) **[Figure 30-40-55]** in the charge pump.

Figure 30-40-56

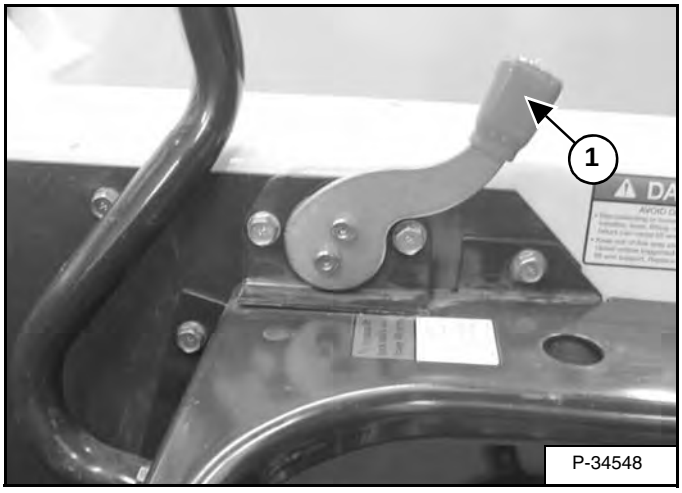


The bearing cage (Item 1) **[Figure 30-40-56]** will protrude from 0.08-0.10 inch (2,0-2,5 mm) from the surface of the charge pump.

The valve plate locating spring pin (Item 2) **[Figure 30-40-56]** will protrude from .165-0.185 inch (4,19-4,70 mm) from the surface of the charge pump.

Hydrostatic Pump Calibration (Cont'd)

Figure 30-41-24



Move the throttle (Item 1) **[Figure 30-41-24]** to high idle.

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

The calibration procedure will stop.

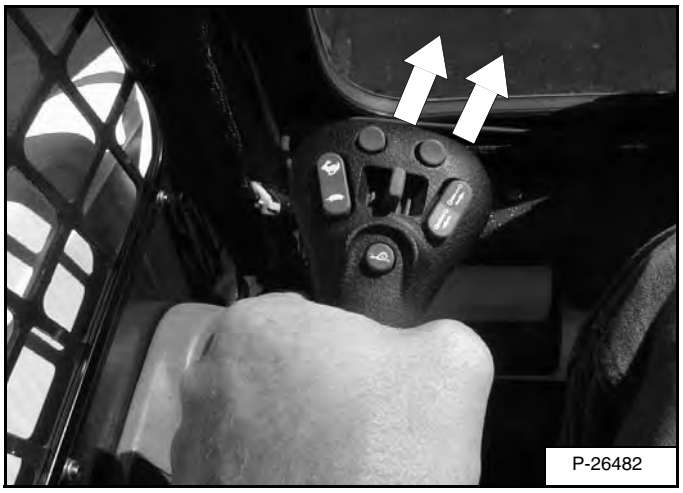
To return to calibration mode the operator must start the complete procedure from the beginning.

⚠ WARNING

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

W-2017-0286

Figure 30-41-25



Move and hold the left joystick to the forward position **[Figure 30-41-25]** until the forward calibration is completed.

The pump controller will start increasing the electrical current to the hydrostatic pumps until it sees a pulse from the wheel sensors.

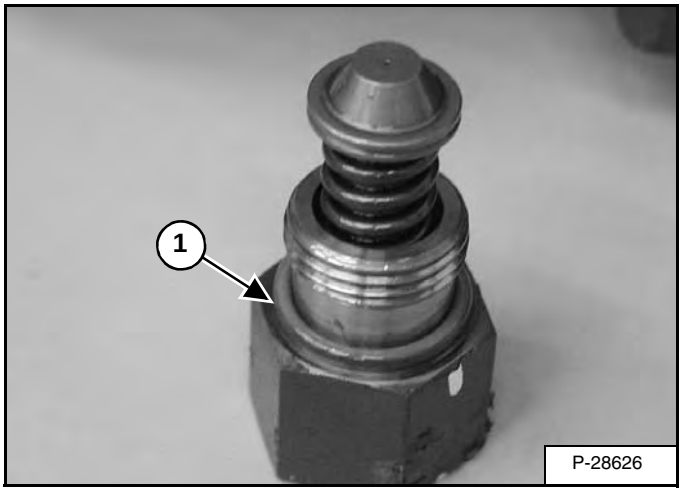
The loader wheels will rotate a short distance forward each time it sees a pulse.

The four wheels will then go to *Full Speed Forward*. Continue holding the joystick in the forward position until the wheels stop and there is an audible beep. Forward calibration is complete.

NOTE: If the wheels do not stop going in *Full Speed Forward* in 2 minutes or less, there was an error in the calibration procedure. The operator must shut the loader OFF, and start the calibration procedure from the beginning.

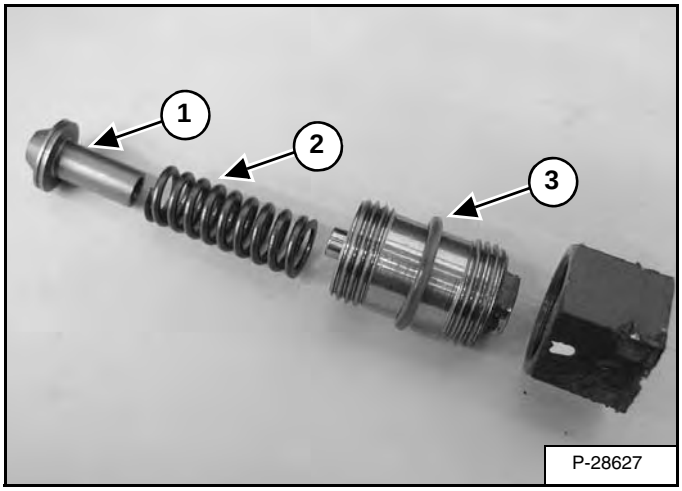
Charge Relief Valve (Cont'd)

Figure 30-41-42



Check and replace the O-ring (Item 1) **[Figure 30-41-42]**.

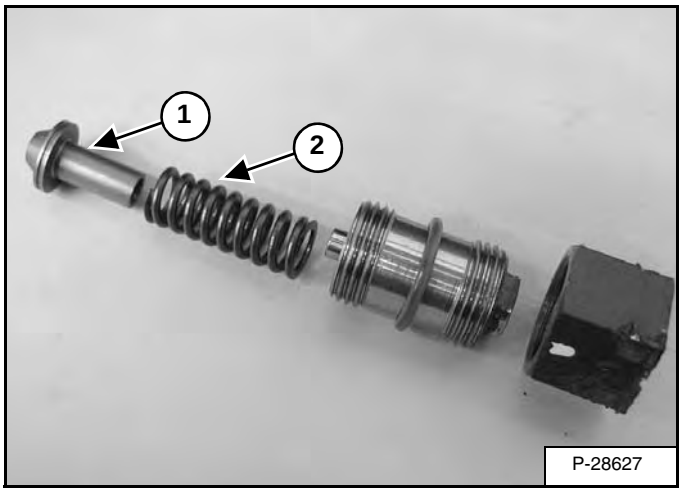
Figure 30-41-43



Inspect the poppet (Item 1) **[Figure 30-41-43]** and the mating seat in the pump housing for damage or foreign material.

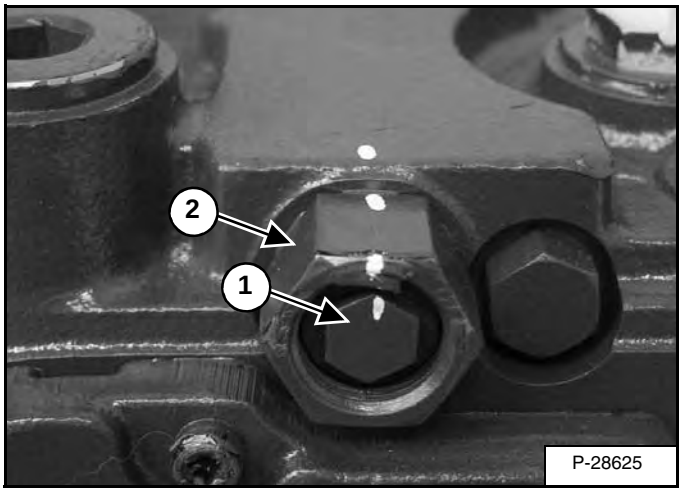
Inspect the spring (Item 2) and the adjustable charge relief valve (Item 3) **[Figure 30-41-43]** .

Figure 30-41-44



Install the poppet (Item 1) and spring (Item 2) **[Figure 30-41-44]** into the pump housing.

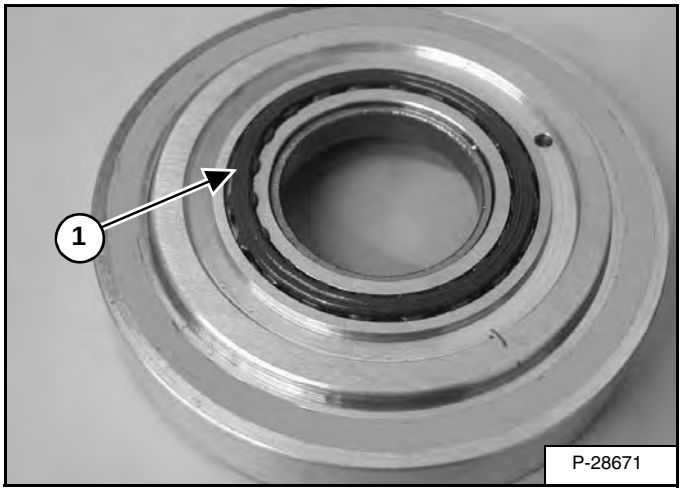
Figure 30-41-45



Install the plug (Item 1) and its lock nut (Item 2) **[Figure 30-41-45]**, align the marks made during disassembly. Tighten to 34-42 ft.-lb. (47-57 N•m) torque.

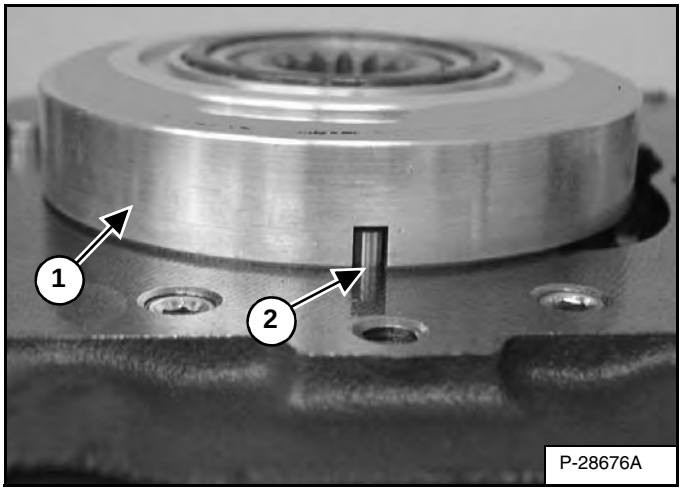
Charge Pump Installation (Cont'd)

Figure 30-41-81



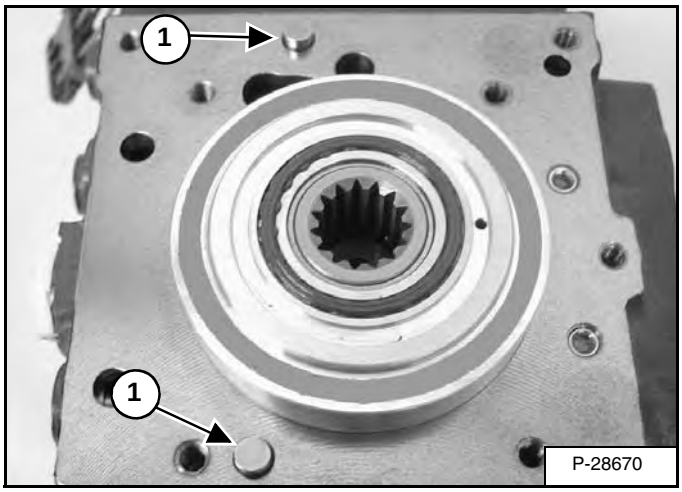
Install the new O-ring (Item 1) **[Figure 30-41-81]** on the gerotor cover.

Figure 30-41-82



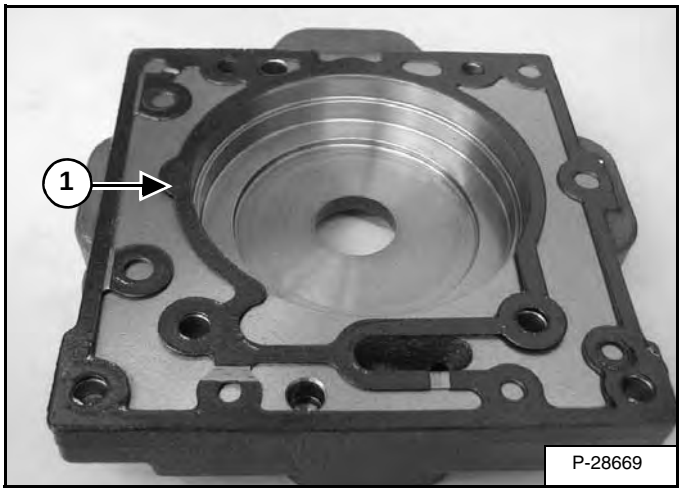
Install the gerotor cover over the gerotor assembly (Item 1) and align the pin in the cover (Item 2) **[Figure 30-41-82]**.

Figure 30-41-83



Install the charge pump cover locating pins (Item 1) **[Figure 30-41-83]**.

Figure 30-41-84

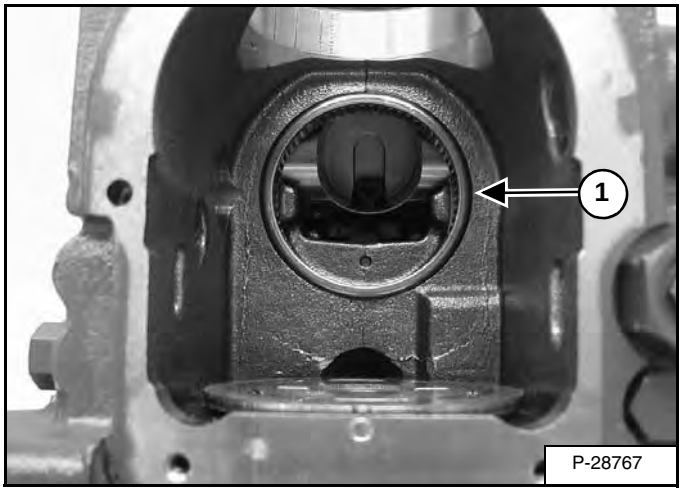


Install a new charge pump cover gasket (Item 1) **[Figure 30-41-84]**

.

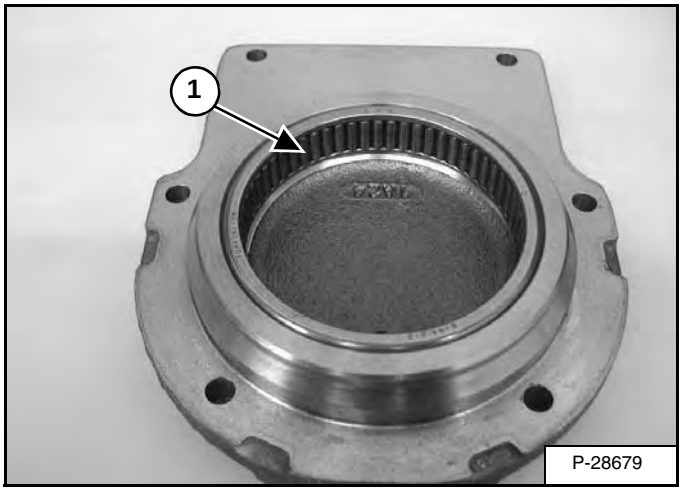
Inspection (Cont'd)

Figure 30-41-120



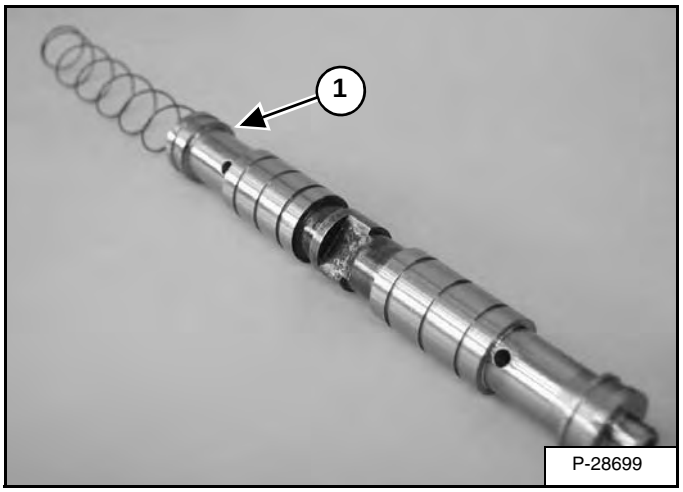
Check the pump housing swashplate needle bearing (Item 1) **[Figure 30-41-120]** for wear. If this bearing needs to be changed, the complete pump housing must be replaced, as the bearing is a non-serviceable part.

Figure 30-41-121



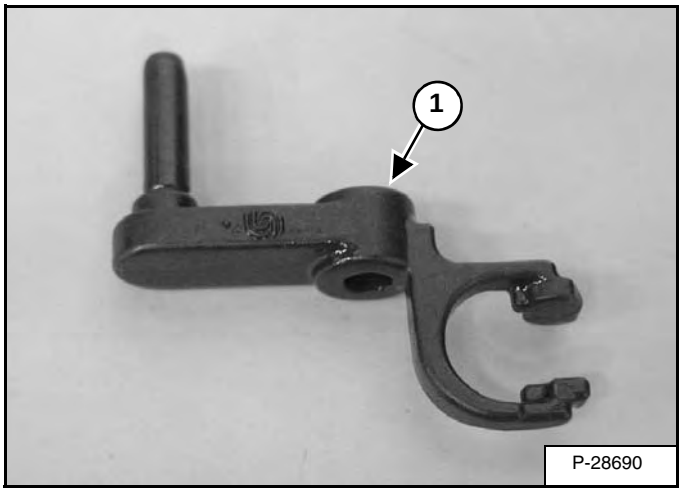
Check the pump side cover swashplate needle bearing (Item 1) **[Figure 30-41-121]** for wear. If this bearing needs to be changed, the complete pump side cover must be replaced, as the bearing is a non-serviceable part.

Figure 30-41-122



Check the control spool and spring (Item 1) **[Figure 30-41-122]** for wear and replace as needed.

Figure 30-41-123



Check the summing link (Item 1) **[Figure 30-41-123]** for wear and replace as needed.

Assembly (Cont'd)

Figure 30-41-160

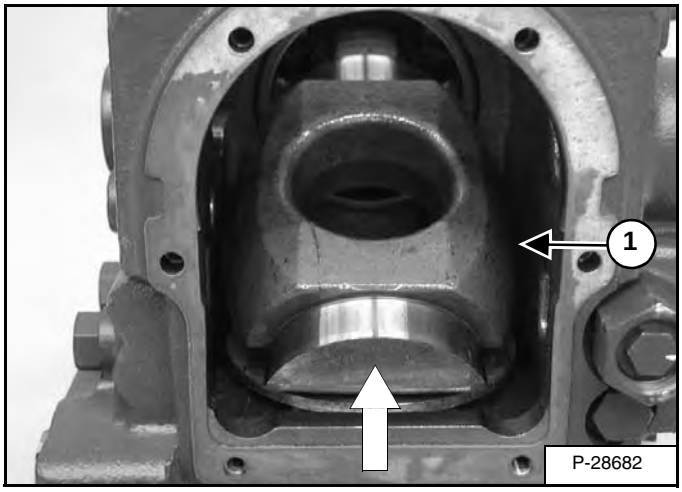
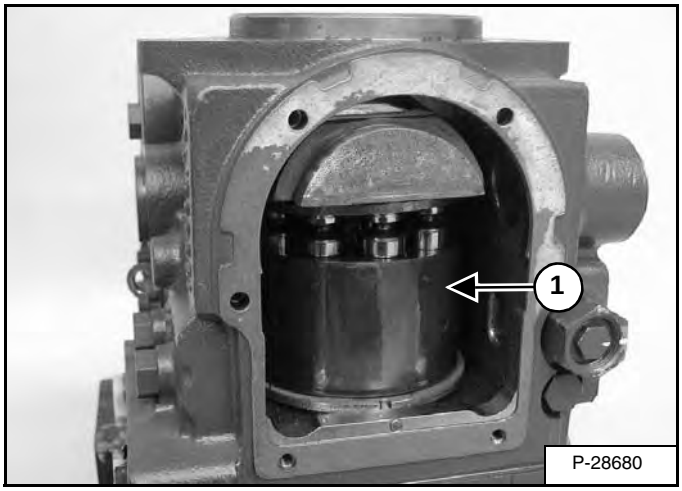


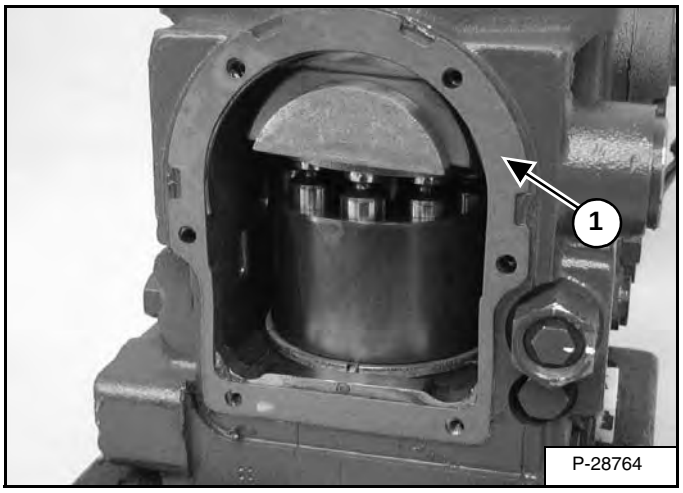
Figure 30-41-161



Lift the the end of the swashplate (Item 1) **[Figure 30-41-160]** and insert the cylinder block assembly (Item 1) **[Figure 30-41-161]**.

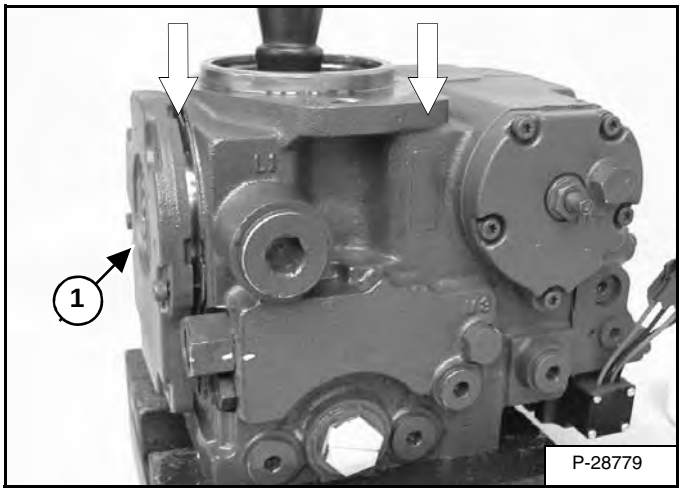
Visually center the c ylinder block assembly over the valve plate **[Figure 30-41-161]**.

Figure 30-41-162



Install a new gasket (Item 1) **[Figure 30-41-162]** on the side cover.

Figure 30-41-163

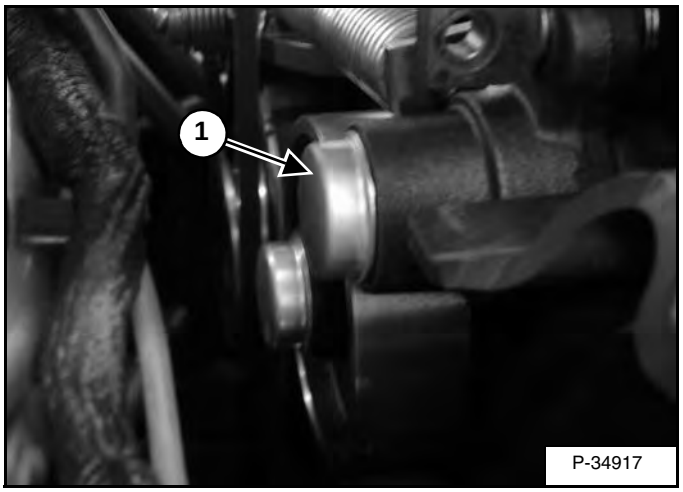


Press down on the swashplate, with a clean rubber mallet.

Install the side cover/swashplate bearing assembly (Item 1) **[Figure 30-41-163]** into the pump housing .

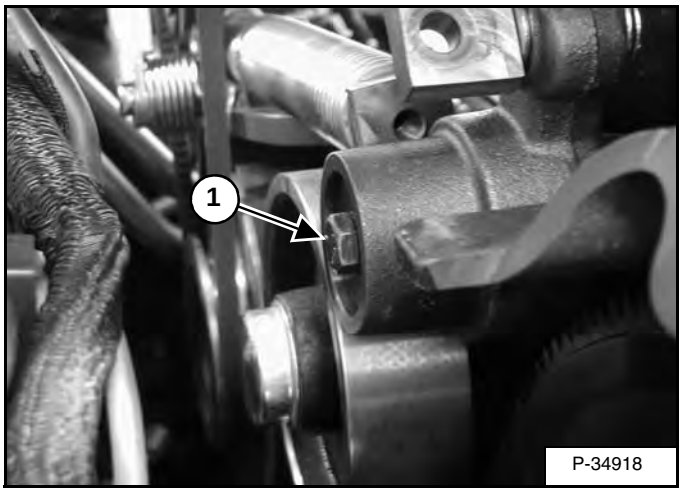
Tensioner Pulley Removal And Installation (Cont'd)

Figure 30-50-8



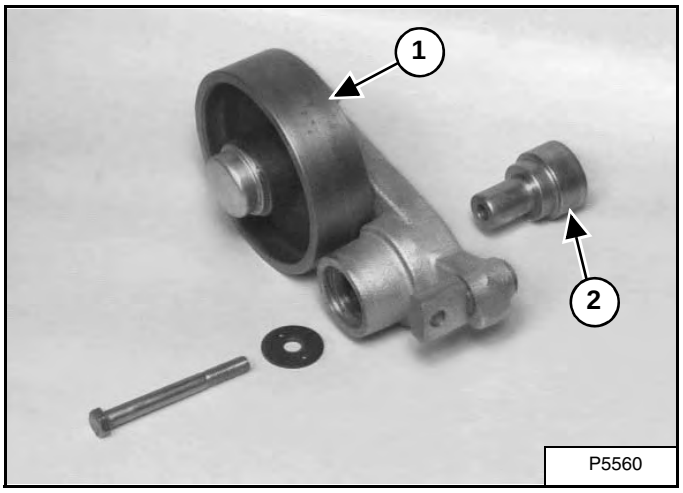
Remove the end cap (Item 1) **[Figure 30-50-8]** from the tension pulley arm.

Figure 30-50-9



Remove the mounting bolt (Item 1) **[Figure 30-50-9]** from the tension pulley arm.

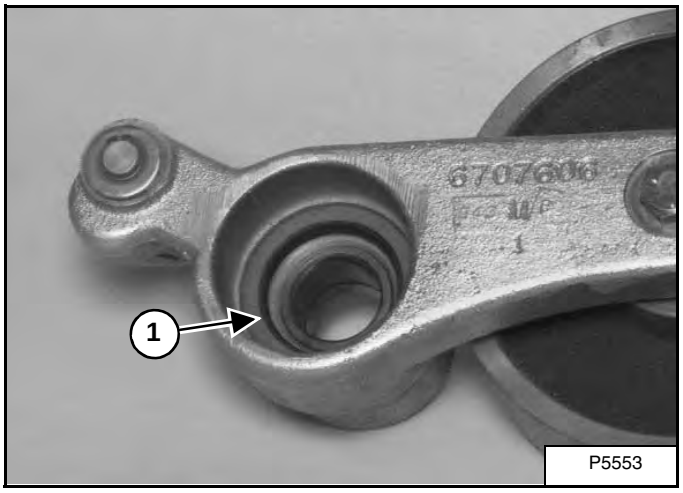
Figure 30-50-10



Remove the pulley/arm assembly (Item 1) **[Figure 30-50-10]** from the engine housing.

Remove the arm bushing (Item 2) **[Figure 30-50-10]**. Check for wear and replace as needed.

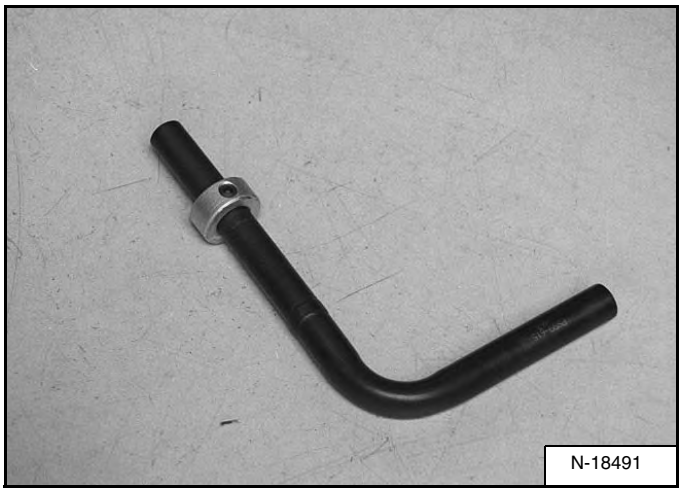
Figure 30-50-11



Check the arm seal (Item 1) **[Figure 30-50-11]**. Replace the seal as needed.

Track Removal And Installation

Figure 40-20-8



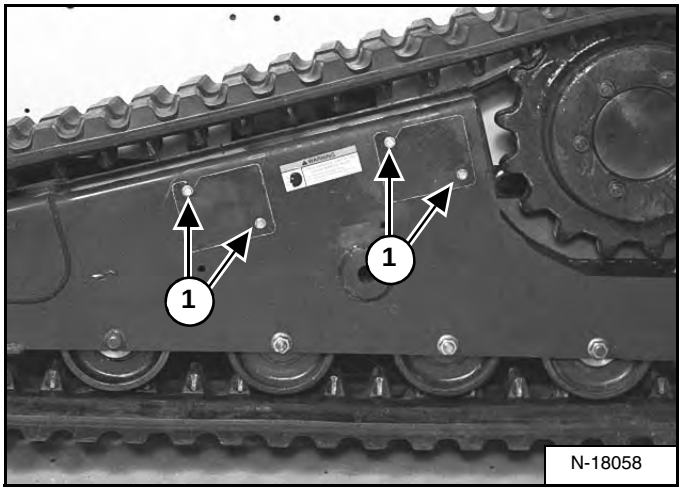
The tool listed will be needed to do the following procedure:

MEL1560- Bleed Tool **[Figure 40-20-8]**.

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

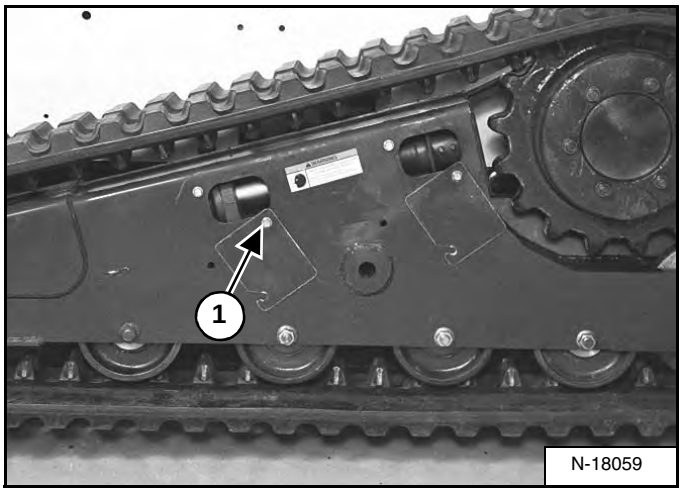
NOTE: When the loader is on jack stands be sure the bottom of the track clears the floor by at least 3 inches (76 mm).

Figure 40-20-9



Loosen the four mount bolts (Item 1) **[Figure 40-20-9]** from the covers.

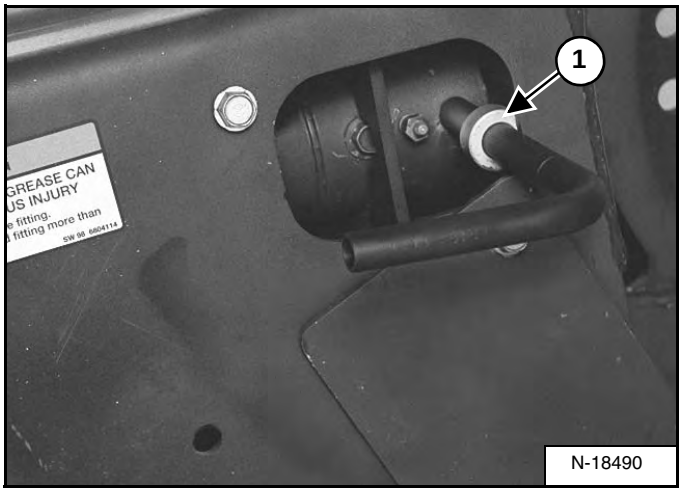
Figure 40-20-10



Pivot the covers downward **[Figure 40-20-10]**.

Loosen the cover mount bolt (Item 1) **[Figure 40-20-10]** so it is flush with the metal on the track frame.

Figure 40-20-11

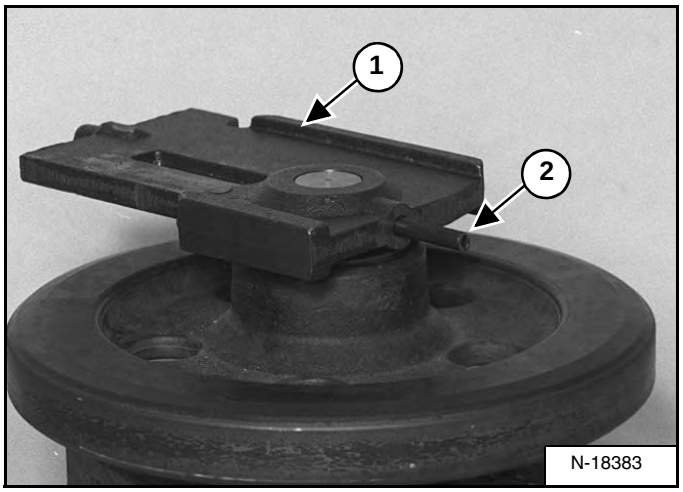


Install the MEL1560 tool on the bleed fitting **[Figure 40-20-11]**.

Be sure the collar (Item 1) **[Figure 40-20-11]** is positioned behind the track housing plate.

Track Idler (Front) Assembly (Early Version) (Cont'd)

Figure 40-20-38

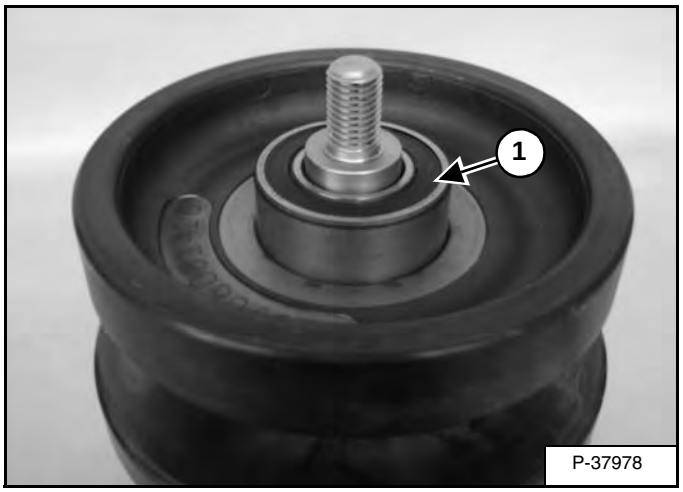


Install the block (Item 1) on the idler axle shaft and drive the roll pin (Item 2) **[Figure 40-20-38]** through the axle shaft. (Both sides of the idler.)

The two blocks must point in the same direction.

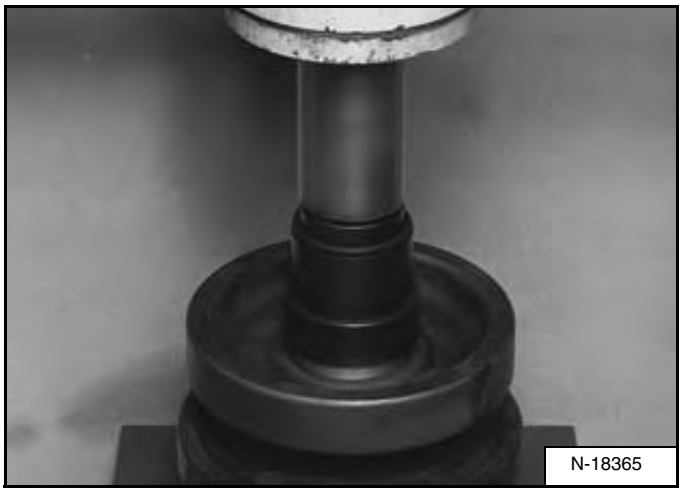
Track Roller Assembly (Early Version) (Cont'd)

Figure 40-20-64



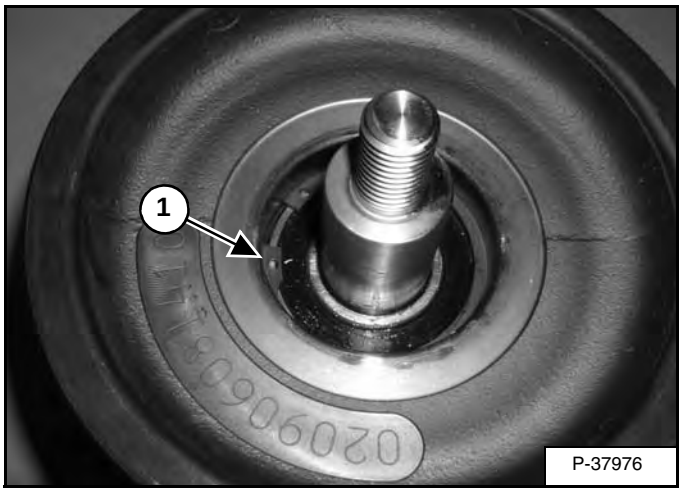
Install a new bearing (Item 1) **[Figure 40-20-64]** over the axle shaft.

Figure 40-20-65



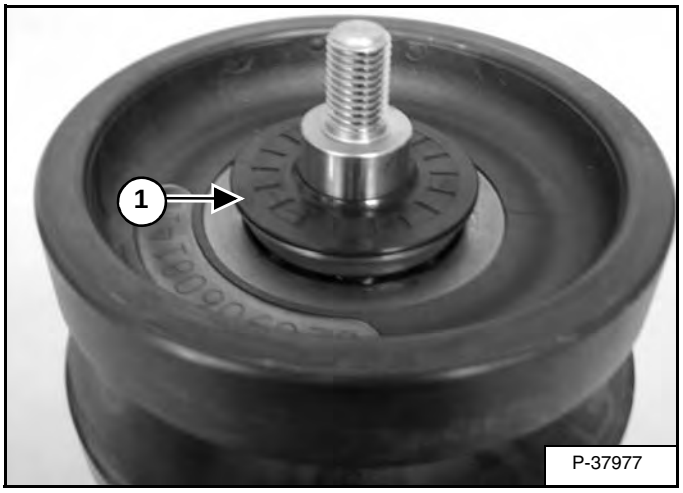
With a bearing driver tool and a press, press a new bearing into the roller **[Figure 40-20-65]**.

Figure 40-20-66



Install the snap ring (Item 1) **[Figure 40-20-66]**.

Figure 40-20-67



With a seal driver, install the seal (Item 1) **[Figure 40-20-67]** into the roller. (Both sides of the roller.)

NOTE: The seals must be installed, so they are seated against the hub of the roller without distorting the seal surface. [Figure 40-20-67]

Install the seal cover on t he roller. (Both sides of th e roller.)

Install the roller assembly in the track housing.

Track Damage Identification (Cont'd)

Cuts On The Edges Of Track Roller Side

Figure 40-20-92

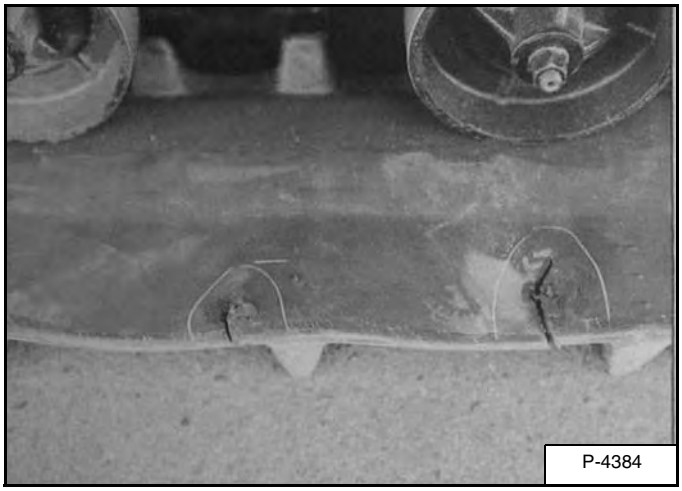
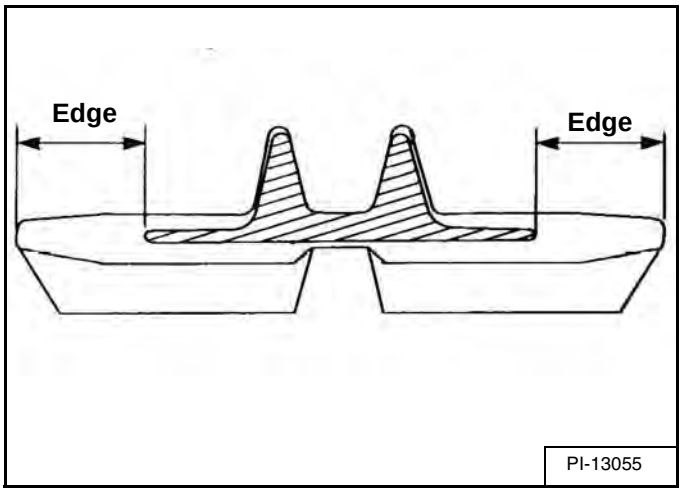


Figure 40-20-93



Damage:

Both edges of a rubber track have no special reinforcements. It sometimes occurs during operation that they are cut or torn off **[Figure 40-20-92]** & **[Figure 40-20-93]**.

Replacement:

In such case, the rubber track does not have to be replaced.

Causes of the damage:

This damage is caused by objects on the field or by interference with the machine frame.

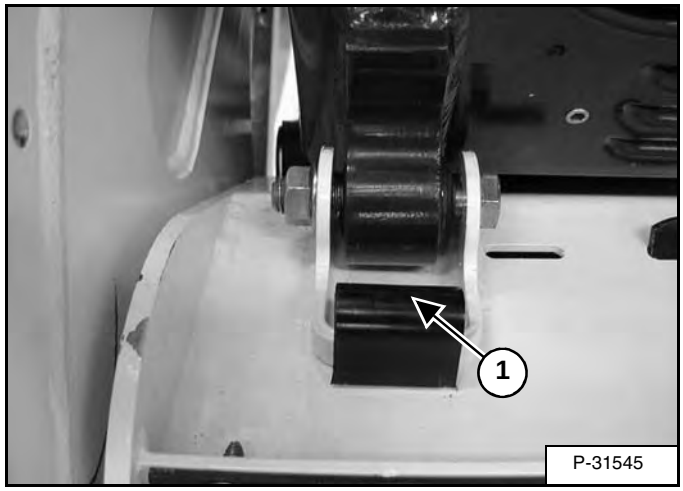
Gas Cylinder Removal And Installation (3rd Gas Spring)

⚠ WARNING

Cylinder contains high pressure gas. Do not open. Opening cylinder can release rod and cause injury or death.

W-2113-0288

Figure 50-20-7

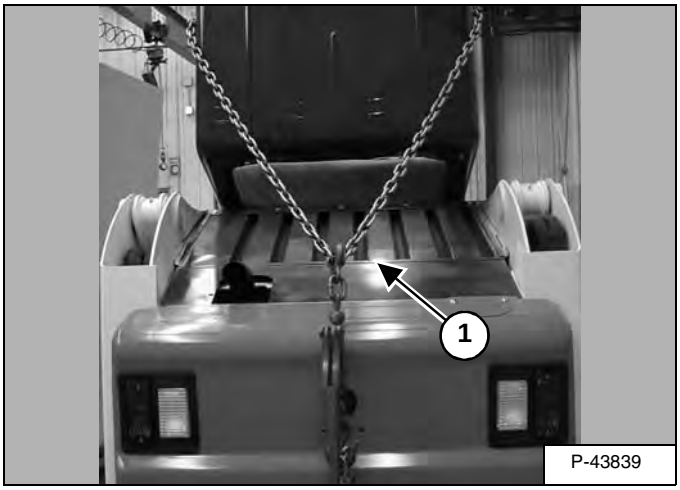


Remove the operator cab stop (Item 1) (Item 1) **[Figure 50-20-7]**. (Both sides.)

NOTE: Be careful not to break the rear window (if so equipped) when the cab is raised after the cab stops are removed.

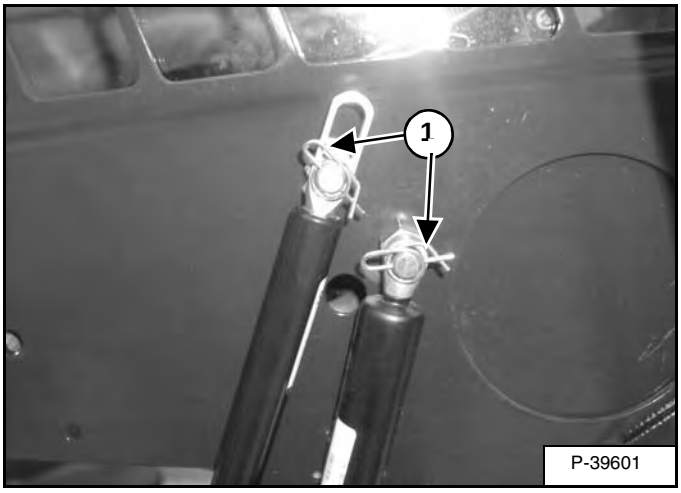
Raise the operator cab. (See Raising The Operator Cab on Page 10-30-1.)

Figure 50-20-8



Install a ch ain (Item 1) **[Figure 50-20-8]** from the operator cab to the loader main frame to prevent the cab from tipping forward when the gas cylinder(s) are removed.

Figure 50-20-9



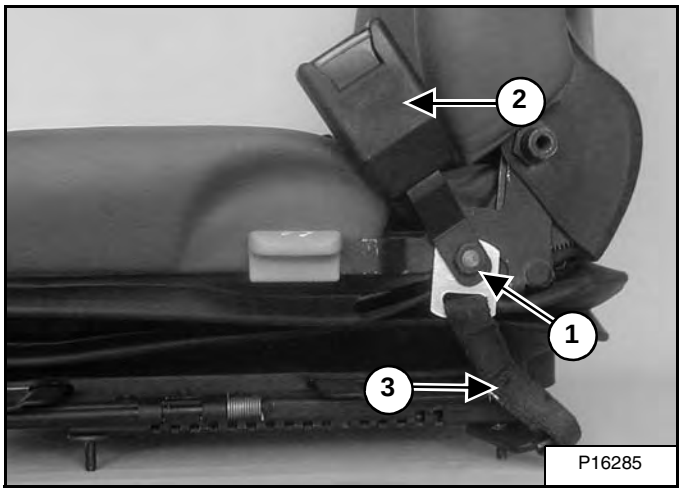
Remove the retaining pins (Item 1) **[Figure 50-20-9]** from the cab pivot pins.

3-Point Seat Belt Removal And Installation

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

Remove the operator seat. (See Removal And Installation on Page 50-30-1.)

Figure 50-30-13

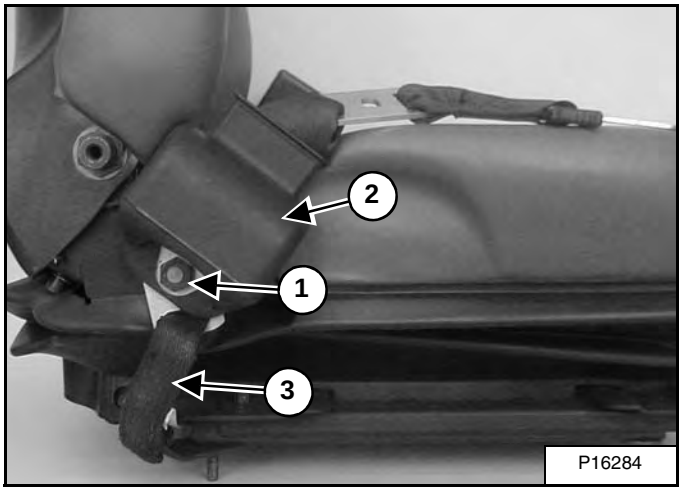


Remove the mounting nut (Item 1) **[Figure 50-30-13]**

Remove the end release buckle (Item 2) **[Figure 50-30-13]**

Installation: Be sure tether strap (Item 3) **[Figure 50-30-13]** is on the seat belt stud behind the end release buckle.

Figure 50-30-14

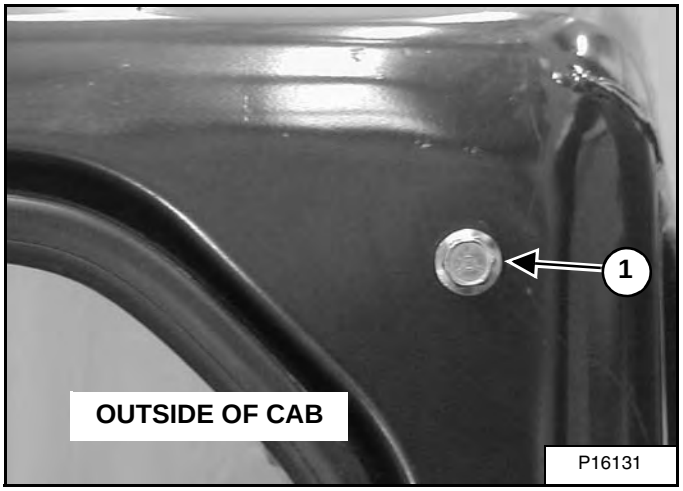


Remove the mounting nut (Item 1) **[Figure 50-30-14]**

Remove the seat belt retractor (Item 2) **[Figure 50-30-14]**

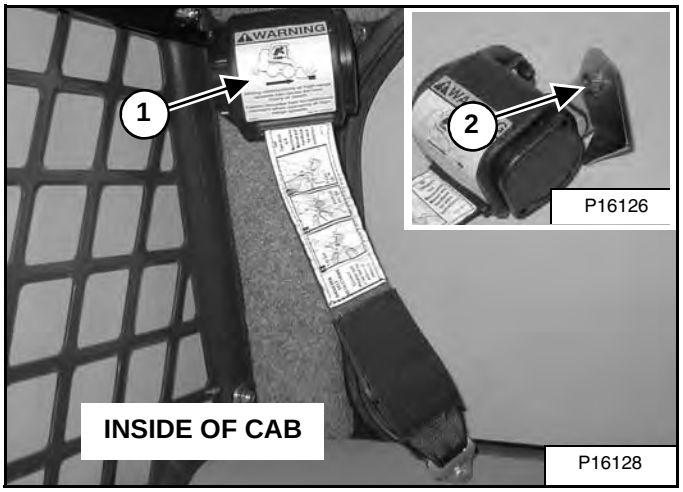
Installation: Be sure tether strap (Item 3) **[Figure 50-30-14]** is on the seat belt stud behind the seat belt retractor.

Figure 50-30-15



Remove the mounting bolt (Item 1) **[Figure 50-30-15]**

Figure 50-30-16

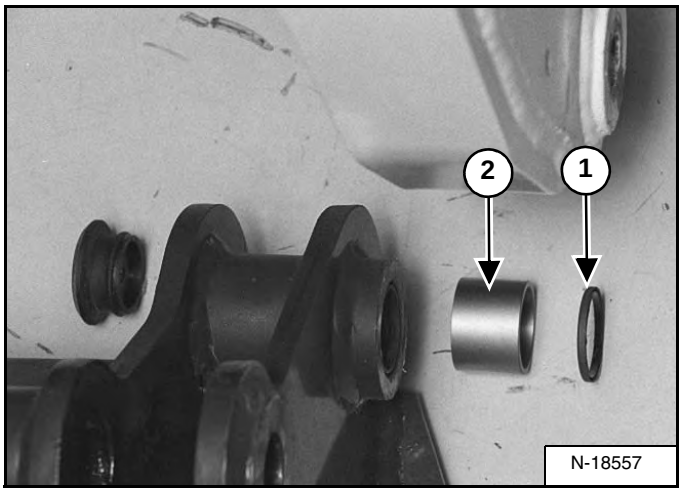


Remove the shoulder harness retractor (Item 1) **[Figure 50-30-16]**

Installation: Line up the bolt (Item 1) **[Figure 50-30-15]** with the mounting bracket (Item 2) **[Figure 50-30-16]** on the inside of the cab.

Pivot Pin Bushing And Seal Replacement

Figure 50-41-16



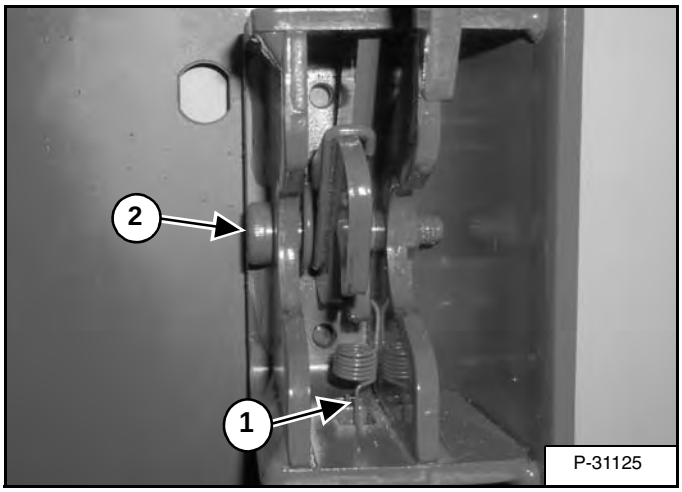
Remove the Power Bob-Tach. (See Removal And Installation on Page 50-41-1.)

Use a seal pick to remove seal (Item 1) **[Figure 50-41-16]** on the Bob-Tach.

Remove and replace bushing (Item 2) **[Figure 50-41-16]** with a driver tool and hammer.

Latch Removal And Installation

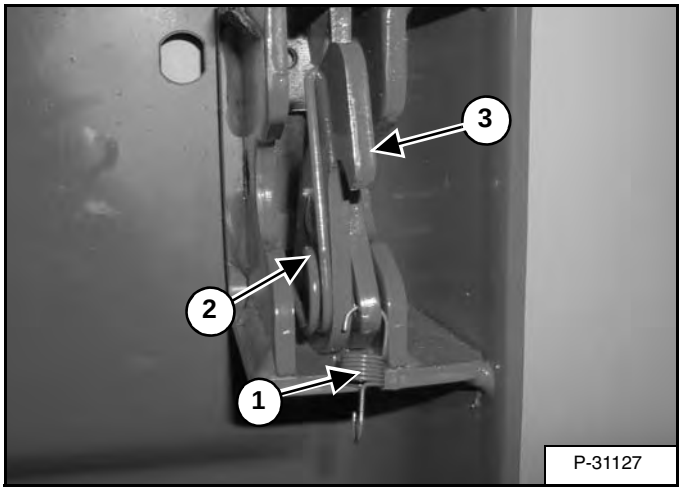
Figure 50-70-7



Disconnect the spring (Item 1) **[Figure 50-70-7]** from the rear door.

Remove the bolt and nut (Item 2) **[Figure 50-70-7]** from the latch.

Figure 50-70-8

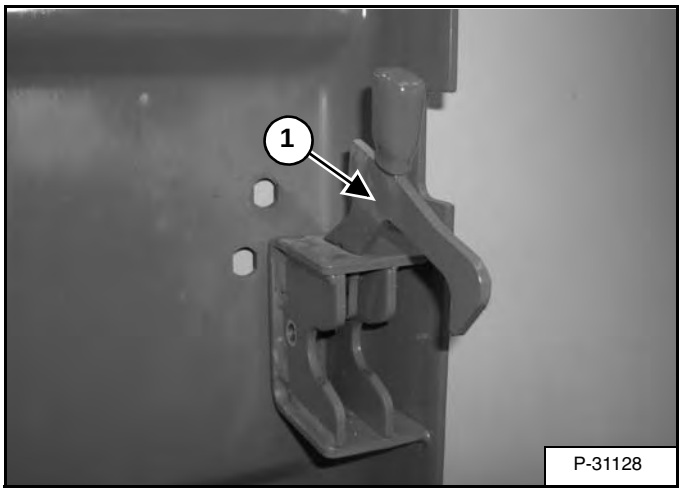


Remove the spring (Item 1) **[Figure 50-70-8]** from the door handle.

Remove the spring (Item 2) **[Figure 50-70-8]** from the door latch.

Remove the door latch (Item 3) **[Figure 50-70-8]** from the door handle.

Figure 50-70-9



Remove the door handle (Item 1) **[Figure 50-70-9]** from the rear door.

CONTROL PANEL (NON-ADJUSTABLE PINTLES)

Removal And Installation

⚠ WARNING

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

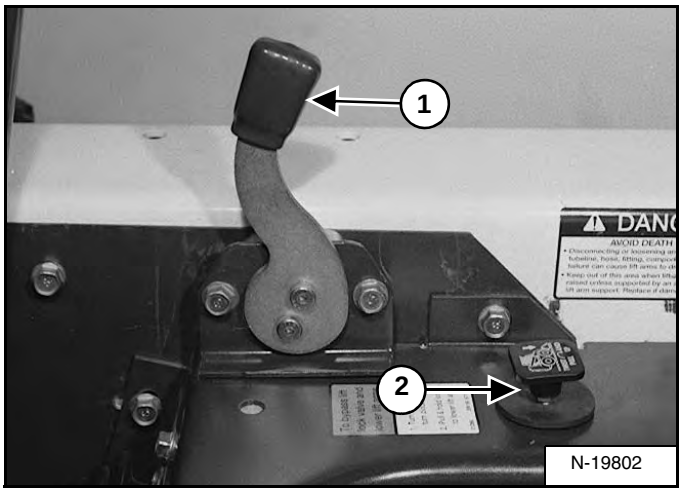
W-2017-0286

⚠ WARNING

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

W-2059-0598

Figure 50-100-1



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

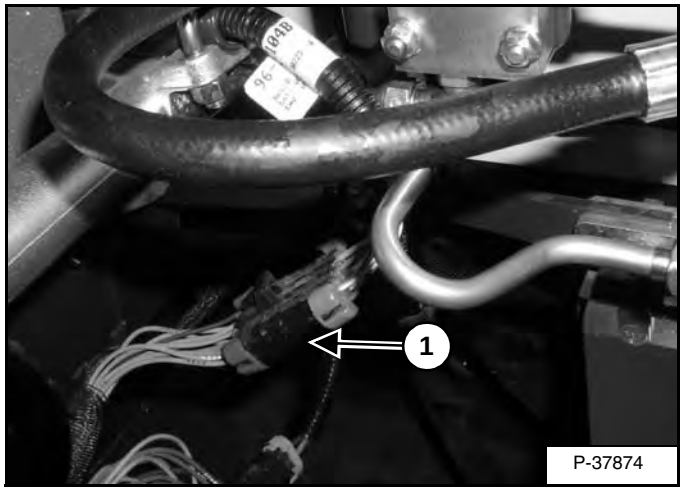
Raise the operator cab. (See Raising The Operator Cab on Page 10-30-1.)

Remove the engine speed control (Item 1) **[Figure 50-100-1]**. (See Removal And Installation on Page 70-20-1.)

Loosen the jam nut from the by-pass control knob (Item 2) **[Figure 50-100-1]**.

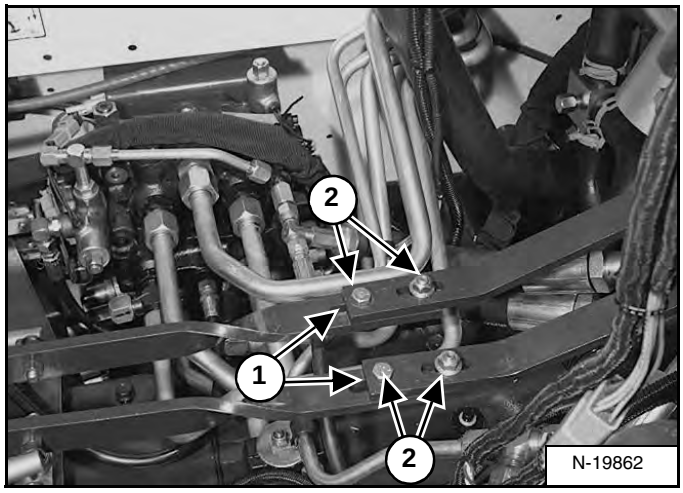
Remove the control knob, jam nut, and rubber washer.

Figure 50-100-2



Disconnect the control harness connector (Item 1) **[Figure 50-100-2]** from the right side steering lever.

Figure 50-100-3



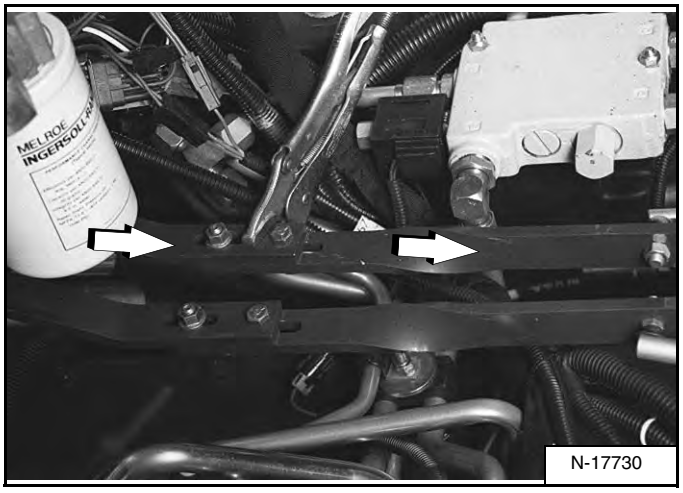
Scribe a mark across the top of the steering linkage bars (Item 1) **[Figure 50-100-3]**.

Remove the four steering linkage mounting bolts (Item 2) **[Figure 50-100-3]**.

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

Linkage Neutral Adjustment (Cont'd)

Figure 50-100-33



Move the left side steering lever to the full forward position, then pull forward on the left side rear linkage bar until the pintle arm is rotated to the front as far as possible. Use a clamping plier and clamp the two linkage bars together **[Figure 50-100-33]**.

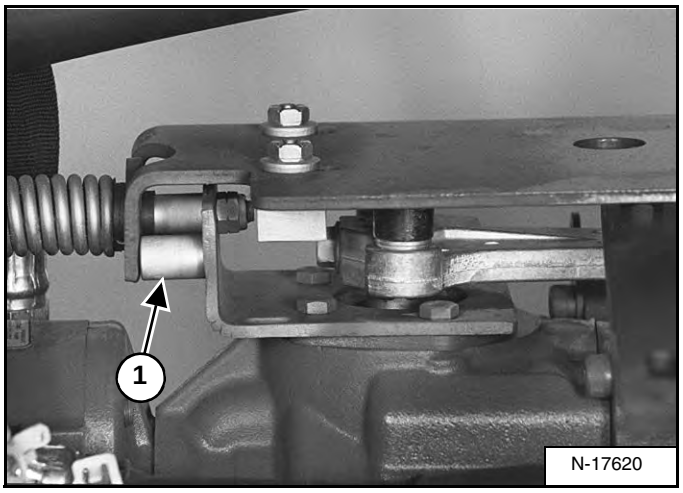
Tighten the nuts and bolts to 25-28 ft.-lb. (34-38 N•m) torque.

Check the lever movement to make sure that the pintle arm and the steering lever are both at full stroke at the same time. This will allow for maximum forward speed.

Repeat the procedure for the right side steering linkage bar.

After both sides of the linkage bars have been adjusted, the feel of both levers at full stroke should be the same. Readjust the linkage if necessary.

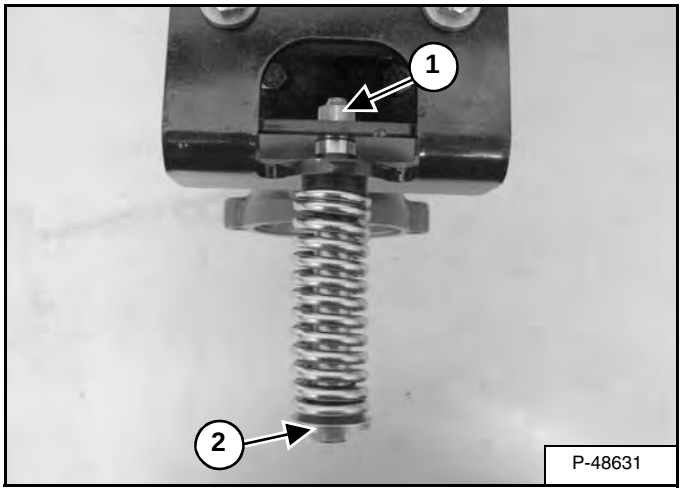
Figure 50-100-34



Remove the spacer (Item 1) **[Figure 50-100-34]**.

Linkage Removal And Installation (Cont'd)

Figure 50-101-14

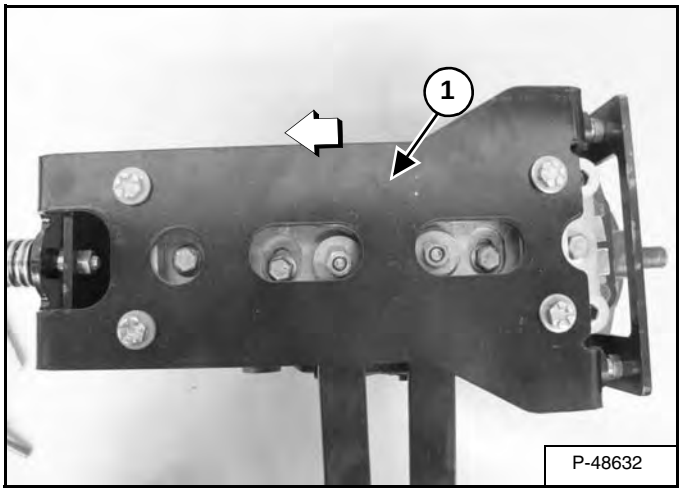


Remove the nut (Item 1) from the end of the centering spring shoulder bolt (Item 2) **[Figure 50-101-14]**.

Remove the bolt/spring assembly.

Installation: Tighten the centering spring bolt and a **NEW** lock nut to 25-28 ft.-lb. (34-38 N•m) torque.

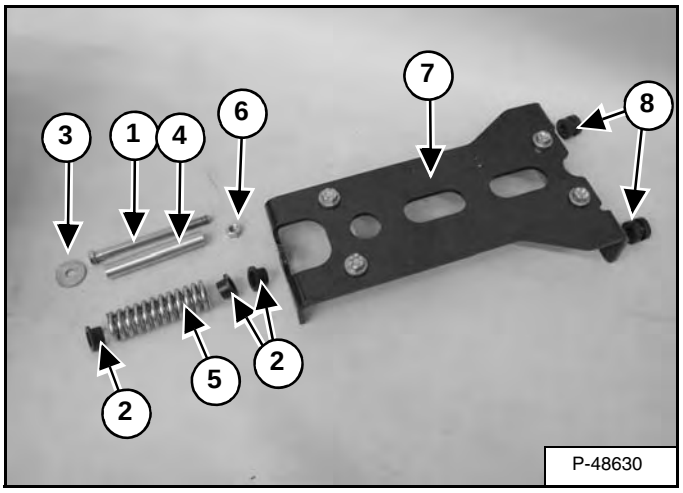
Figure 50-101-15



Slide the centering plate (Item 1) **[Figure 50-101-15]** to the right to remove it from the hydrostatic pumps.

NOTE: Directions are shown and stated as if you were sitting in the operators seat.

Figure 50-101-16



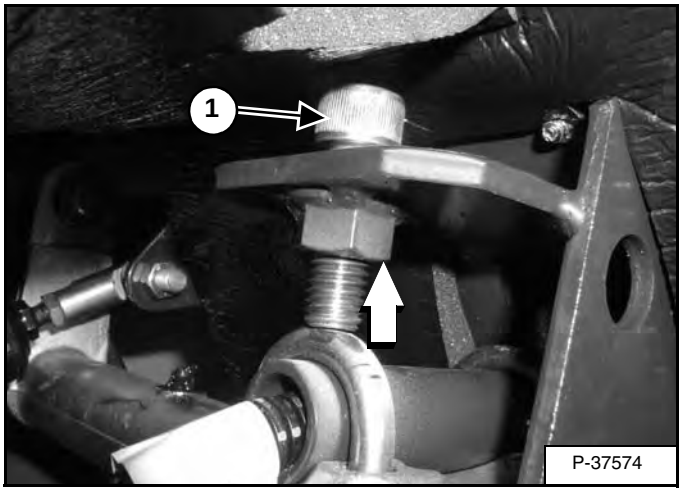
The centering plate/centering spring assembly consists of the following parts:

ITEM	DESCRIPTION
1	Bolt
2	Bushings
3	Washer
4	Bushing Spacer
5	Spring
6	Lock Nut
7	Centering Plate
8	Guide Bushings

CONTROL PANEL (ADJUSTABLE PINTLES) (CONT'D)

Linkage Travel Adjustment (Cont'd)

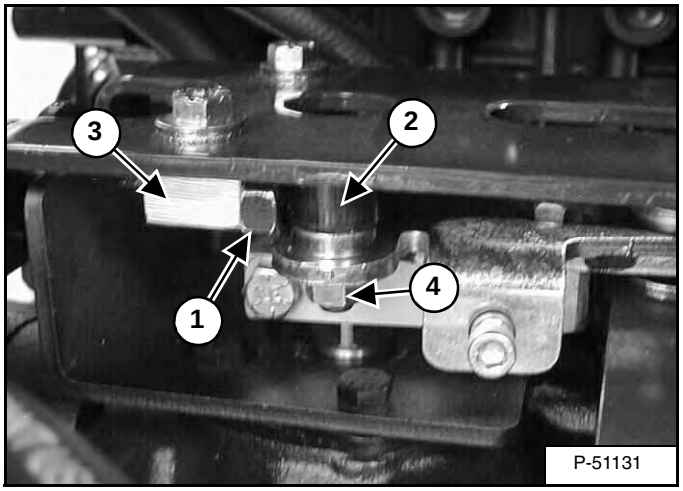
Figure 50-101-39



Remove access plug from the top of the control panel.

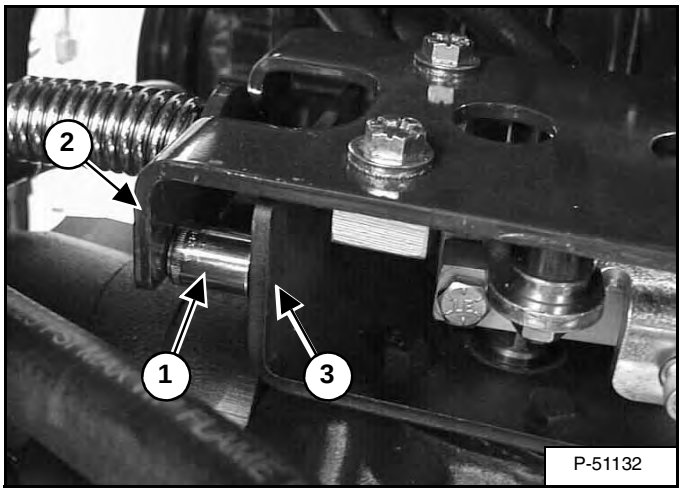
Turn the control lever drift adjustment bolts (Item 1) **[Figure 50-101-39]** (one on each control lever) out until it is flush with the bottom of the nut.

Figure 50-101-40



Move the right side steering lever to the rear and install a 3/8 inch (10 mm) thick spacer (Item 1) between the pintle arm cam (Item 2) and the centering block (Item 3) **[Figure 50-101-40]**.

Figure 50-101-41

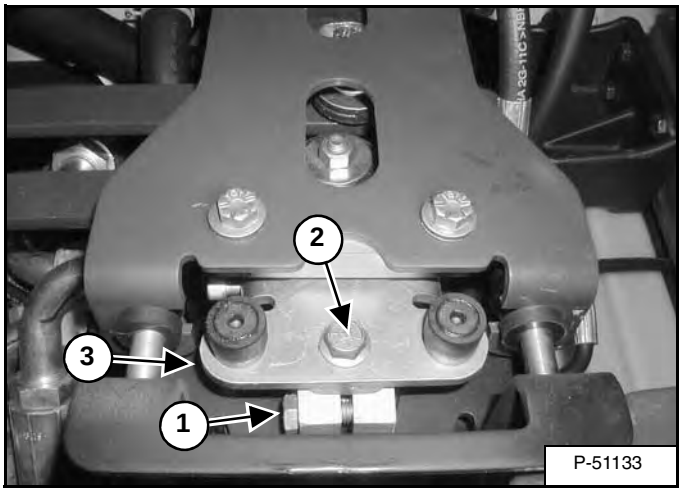


Move the right side steering lever forward and install a 15/16 inch (24 mm) thick spacer (Item 1) between the center plate (Item 2) and the mounting plate (Item 3) **[Figure 50-101-41]**.

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

Remove the 3/8 inch (10 mm) thick spacer.

Figure 50-101-42



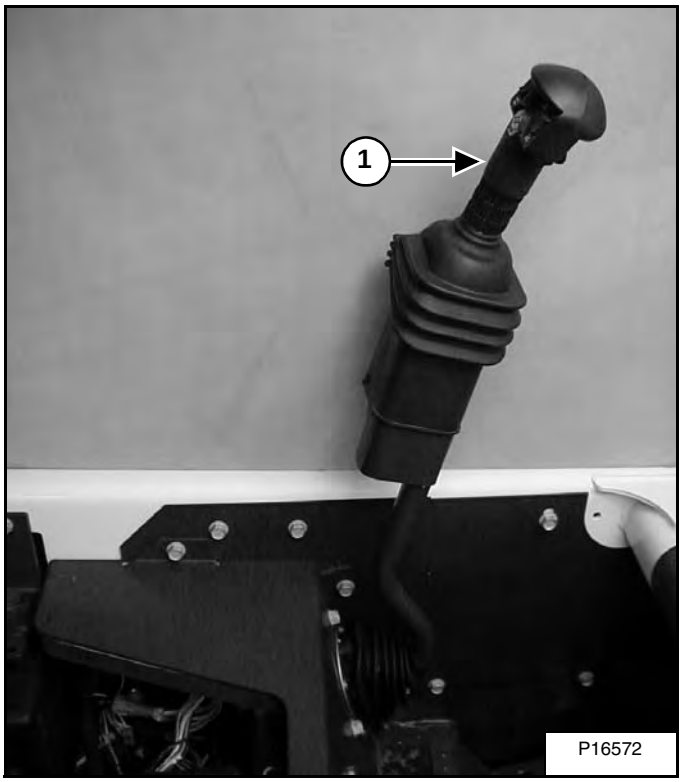
Before adjusting the linkage, check that the base pintle arm mounting bolt (Item 1) and both of the upper pintle mount bolts (Item 2) and tighten to 35-40 ft.-lb. (48-54 N•m) torque. There should be no play between the pintle arm and the square pump shaft.

Also check that the cam mounting nuts (Item 4) **[Figure 50-101-40]** are tight, 35-40 ft. lb. (48-54 N•m) torque.

CONTROL HANDLE (ADVANCED CONTROL SYSTEM) (ACS) SELECTABLE HAND/FOOT CONTROL

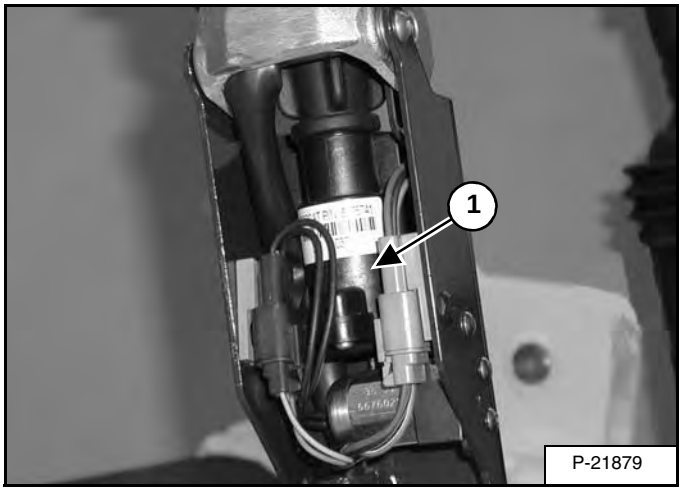
Components Identification

Figure 50-111-1



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

Figure 50-111-2

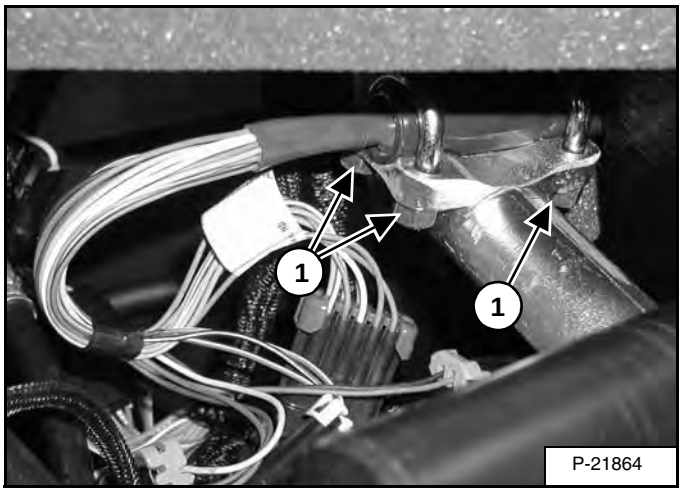


Handle Sensor (Item 1) **[Figure 50-111-2]**.

NOTE: The calibration procedure must be followed when replacing handle sensor, foot pedal sensor, actuator or ACS Controller. (See CALIBRATION on Page 60-160-1.)

Handle Sensor Removal And Installation

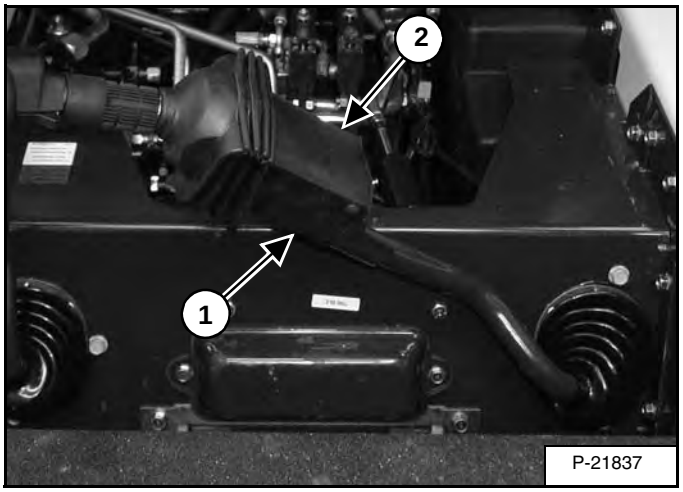
Figure 50-111-3



Loosen the nuts (Item 1) **[Figure 50-111-3]**.

Installation: Tighten the u-bolts so the lever can not be moved either right or left when seated in the operator seat. Be sure the control lever does not interfere with the operator cab when lowering or raising the cab.

Figure 50-111-4

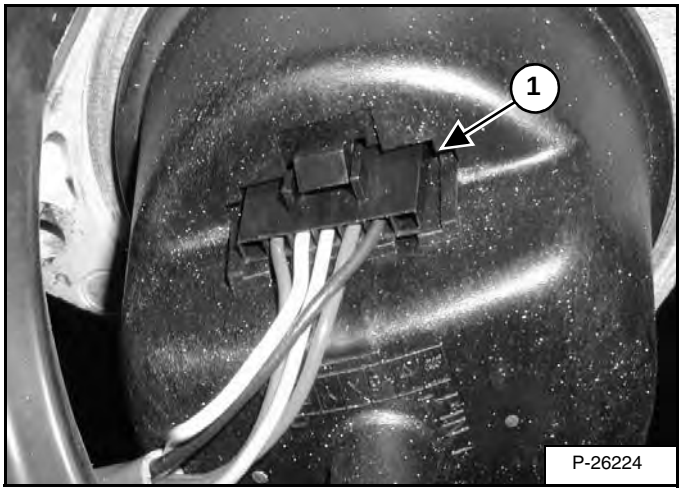


Tilt the control handle (Item 1) **[Figure 50-111-4]** to the center of the loader.

Lift the boot cover (Item 2) **[Figure 50-111-4]**.

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

Figure 50-112-9

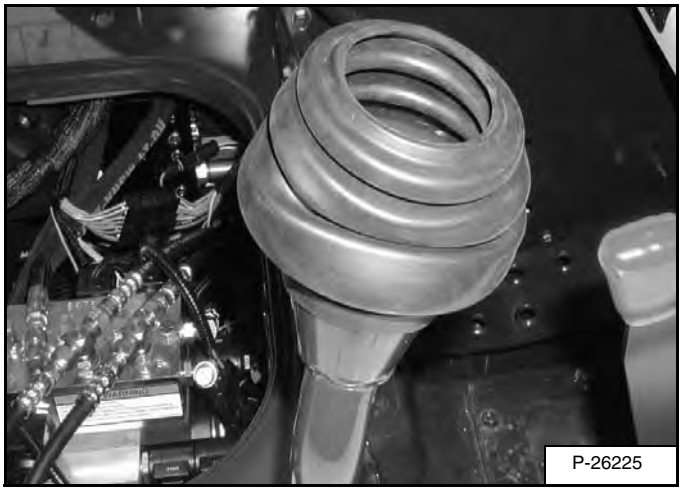


Disconnect the electrical harness (Item 1) **[Figure 50-112-9]** from the joystick.

Remove the joystick from the loader.

Joystick Boot Removal (Right & Left)

Figure 50-112-10



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

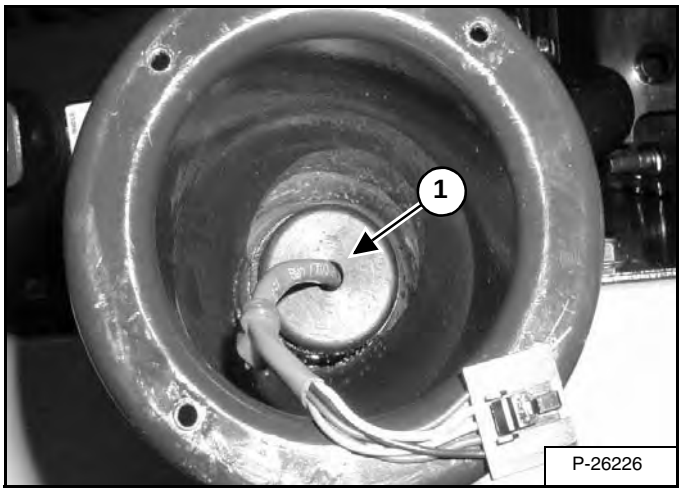
Raise the operator cab. (See Raising The Operator Cab on Page 10-30-1.)

Remove the joystick. (See Joystick Removal (Right & Left) on Page 50-112-2.)

Remove the joystick boot from the control lever assembly **[Figure 50-112-10]**.

Lever Assembly Removal (Right & Left)

Figure 50-112-11



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

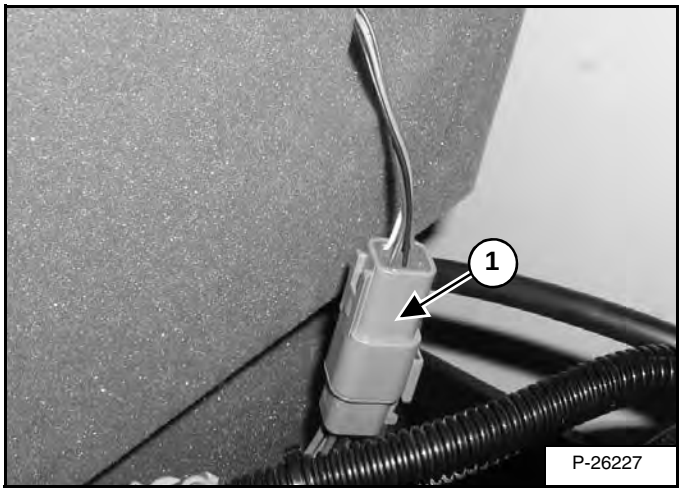
Raise the operator cab. (See Raising The Operator Cab on Page 10-30-1.)

Remove the joystick. (See Joystick Removal (Right & Left) on Page 50-112-2.)

Remove the joystick boot. (See Joystick Boot Removal (Right & Left) on Page 50-112-3.)

Remove the joystick wiring grommet (Item 1) **[Figure 50-112-11]**

Figure 50-112-12



Disconnect the joystick wiring harness connector (Item 1) **[Figure 50-112-12]**.

ELECTRICAL SYSTEM & ANALYSIS (CONT'D)

WIRING SCHEMATIC
(Without Option)
T250 (S/N 525611001 - 525612999)
(S/N 525711001 - 525711999)
(PRINTED FEBRUARY 2005)
V-0422

WIRING SCHEMATIC
(Without Option)
T250 (S/N 525613000 & ABOVE)
(S/N 525712000 & ABOVE)
(PRINTED FEBRUARY 2005)
V-0676

WIRING SCHEMATIC
(With ACS Option)
T250 (S/N 525611001 - 525612999)
(S/N 525711001 - 525711999)
(PRINTED FEBRUARY 2005)
V-0423

WIRING SCHEMATIC
(With ACS Option)
T250 (S/N 525613000 & ABOVE)
(S/N 525712000 & ABOVE)
(PRINTED FEBRUARY 2005)
V-0677

WIRING SCHEMATIC
(With SJC Option)
T250 (S/N 525611001 525612999)
(S/N 525711001 - 525711999)
(PRINTED FEBRUARY 2005)
V-0424

WIRING SCHEMATIC
(With SJC Option)
T250 (S/N 525613000 & ABOVE)
(S/N 525712000 & ABOVE)
(PRINTED FEBRUARY 2005)
V-0678

WIRING SCHEMATIC
OPTIONS
T250 (S/N 525611001 & ABOVE)
(S/N 525711001 & ABOVE)
(PRINTED FEBRUARY 2005)
V-0425

WIRING SCHEMATIC
OPTIONS
T250 (S/N 525611001 & ABOVE)
(S/N 525711001 & ABOVE)
(PRINTED FEBRUARY 2005)
V-0426

Servicing The Electrical System

⚠ WARNING

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

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

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

W-2065-1296

Figure 60-20-8

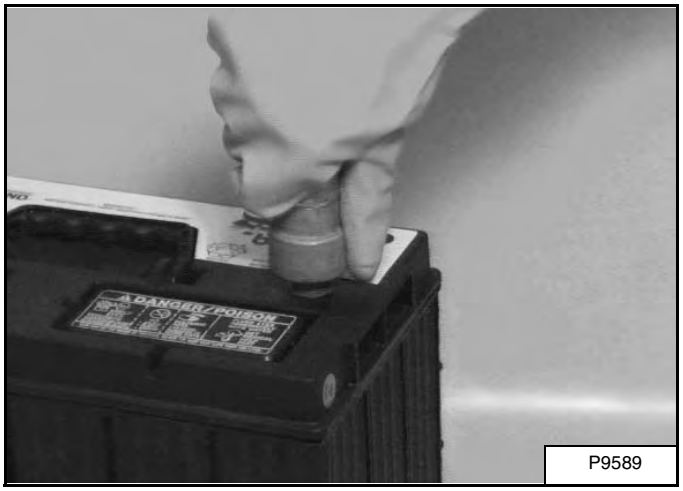
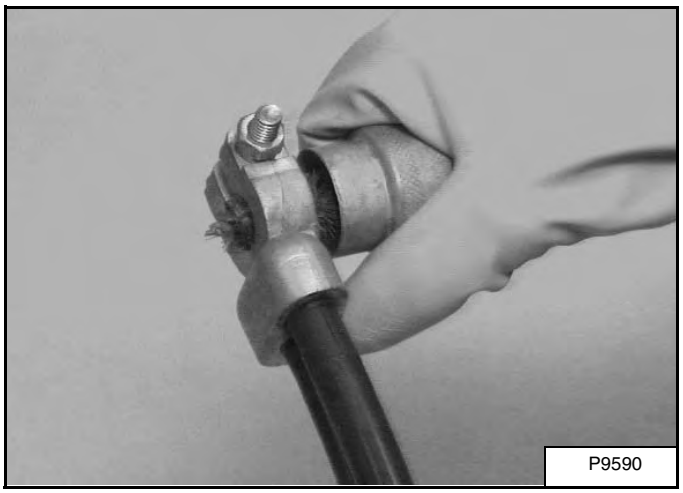
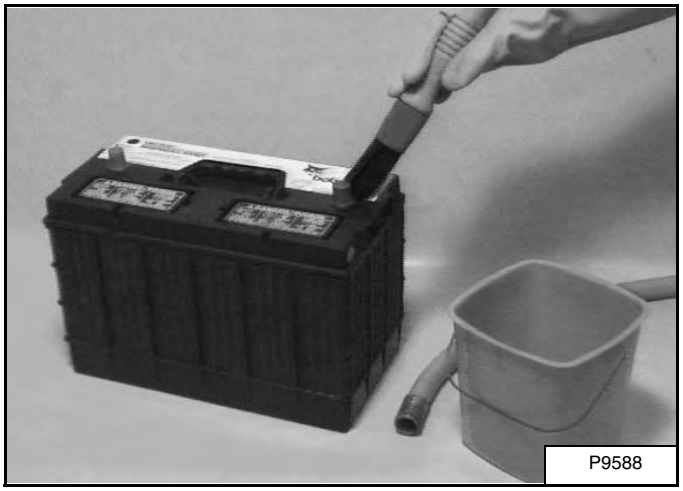


Figure 60-20-9



Clean the terminals and cable ends as shown in **[Figure 60-20-8]** & **[Figure 60-20-9]**.

Figure 60-20-10



The battery cables must be clean and the connections tight. Remove acid or corrosion from the bat tery and cables with a s odium bicarbonate (baking soda) and water solution **[Figure 60-20-10]**.

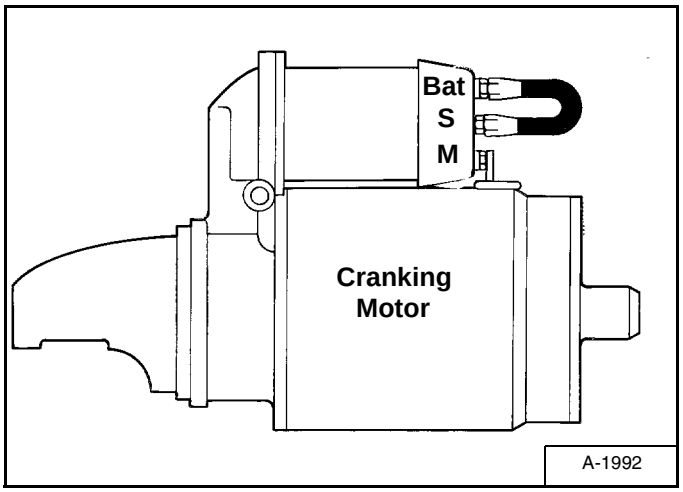
Check the electrolyte level in the battery. Add distilled water as needed.

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

STARTER

Checking

Figure 60-40-1



The key switch must be in the OFF position.

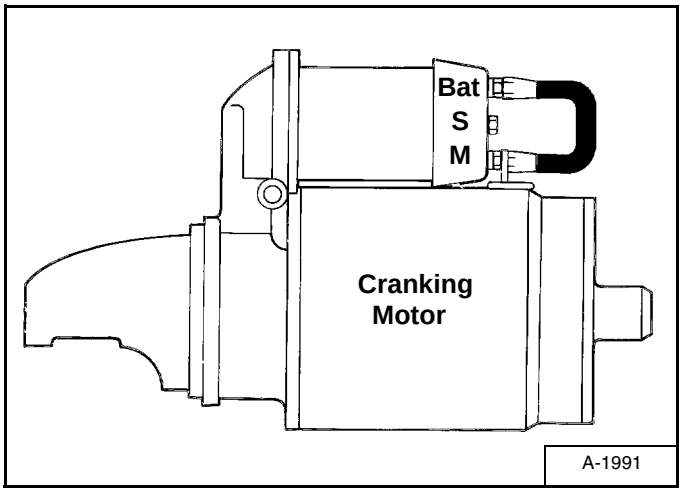
The battery must be at full charge.

The cable connections on the battery must be clean and tight.

Connect a jumper wire between S terminal and BAT terminal **[Figure 60-40-1]**.

If the starter turns but does not turn the engine, the starter drive has a defect.

Figure 60-40-2

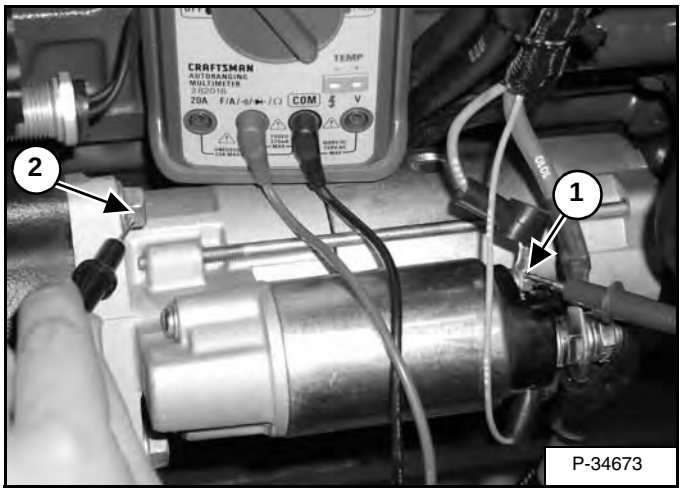


Connect a jumper wire **(of at least 4 gauge in size)** between the M terminal and the BAT terminal **[Figure 60-40-2]**.

If the starter turns, the defect is in the solenoid.

If the starter does not turn, the starter is defective.

Figure 60-40-3

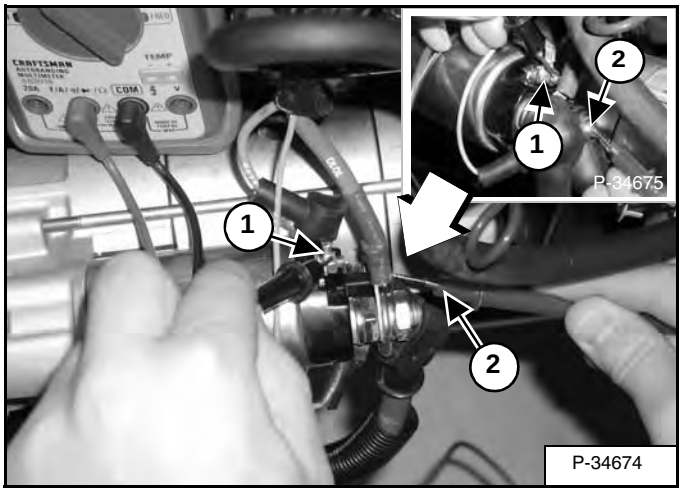


Disconnect the negative cable from the battery. (See Removal And Installation on Page 60-20-1.)

Disconnect the S terminal on the starter (Item 1) **[Figure 60-40-3]**.

Hold-In Test: Use circuit tester, touch one probe to the S terminal (Item 1) and one probe to the mounting bolt (Item 2) **[Figure 60-40-3]** on the magnetic switch (solenoid). If there is no continuity replace the magnetic switch (solenoid).

Figure 60-40-4



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

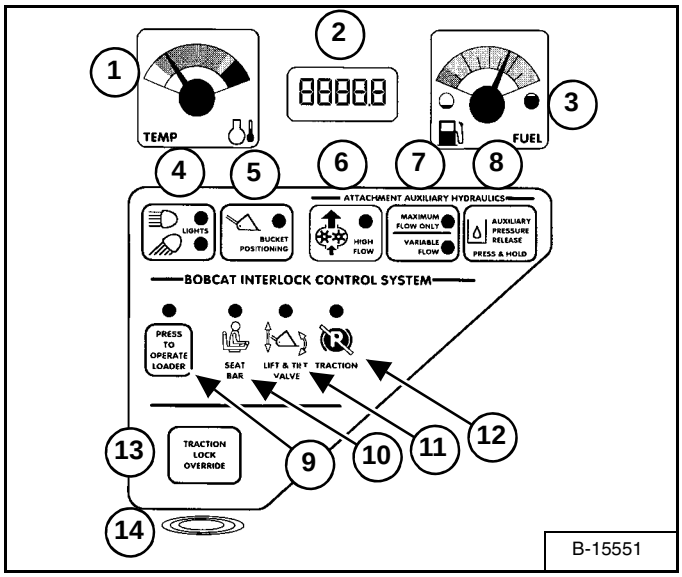
Disconnect the S terminal on the starter (Item 1) **[Figure 60-40-4]**.

Pull-In Test: Use circuit tester, touch one probe to the S terminal (Item 1) and one probe to the starter motor terminal (Item 2) **[Figure 60-40-4]**. If there is no continuity replace the magnetic switch (solenoid).

INSTRUMENT PANEL

Left Panel

Figure 60-50-1



The left instrument panel is the same for both the Standard and Deluxe Instrument Panels **[Figure 60-50-1]**.

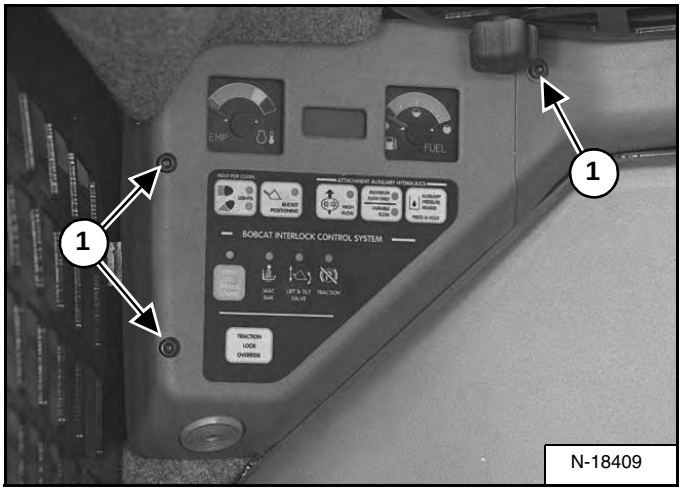
The table below shows the DESCRIPTION and FUNCTION/OPERATION for each of the components of the left panel.

Press and hold LIGHTS button (Item 4) for two seconds to view SERVICE CODES in the HOURMETER/CODE DISPLAY (Item 2) **[Figure 60-50-1]**. If mo re than one SERVICE CODE is present, the codes will scroll on the HOURMETER/CODE DISPLAY.

REF. NO	DESCRIPTION	FUNCTION / OPERATION
1	TEMPERATURE GAUGE	Shows the engine coolant temperature.
2	HOURMETER / CODE DISPLAY / GLOW PLUG COUNTDOWN	HOURMETER - Records operating hours of loader. CODE DISPLAY - Display numeric SERVICE CODES* relating to the loader monitoring system. COUTNTDOWN - Glow Plug time remaning
3	FUEL GAUGE	Shows the amount of fuel in the tank.
4	LIGHTS / HOLD FOR CODES	LIGHTS - Press once for FRONT LIGHTS. Press a second time for FRONT AND REAR lights. Press a third time to turn all lights off. HOLD FOR CODES - Press and hold two seonds for display of SERVICE CODES (Item 2). (CODES* show only when there is an error found by loader monitoring system.)
5	BUCKET POSITIONING (Option)	Press to engage the BUCKET POSITIONING function. Press again to disengage. Press and hold 2 seconds to view BASE or SHTDN (◆ SHUTDOWN) feature in HOURMETER/CODE DISPLAY.
	ATTACHMENT AUXILIARY HYDRAULICS	
6	HIGH FLOW (Option)	Press to engage the HIGH FLOW auxiliary hydraulics. Press again to disengage.
7	MAXIMUM FLOW / VARIABLE FLOW	Press once to engage the VARIABLE FLOW auxiliary hydraulics. Press a second time to engage MAXIMUM FLOW. Press a third time to disengage all auxiliary hydraulics. [VARIABLE FLOW allows for slow-to-fast movement of auxiliary functions (The farther you move the switch, the faster the movement of auxiliary functions.) MAXIMUM FLOW allows for only fast movement.]
8	AUXILIARY PRESSURE RELEASE	Press and hold for two seconds. The engine wil stop. Hydraulic pressure will be released in the rear auxiliary (If so equipped) or right side front auxiliary circuit (If so equipped).
	BOBCAT INTERBLOCK CONTROL SYSTEM (BICS™) **(SEE TROUBLESHOOTING GUIDE ON PAGE 60-100-4.)**	
9	PRESS TO OPERATE LOADER	Press to activate BICS™ System when the Seat Bar is down and operator is seated in operating position.
10	SEAT BAR	The light comes *ON* when the seat bar is down.
11	LIFT & TILT VALVE	The light comes *ON* when the seat bar is down and the PRESS TO OPERATE Button is pressed. The lift and tilt functions can be operated when the light is *ON*.
12	TRACTION	The light comes *ON* when the seat bar is down, engine is running, and parking brake is released. The loader can be moved forward or backward when the light is *ON*.
13	TRACTION LOCK OVERRIDE	(Function Only When Seat Bar Is Raised And The Engine Is Running) Press to unlock the brakes. Allows you to use the steering levers to move the loader forward or backward when using the backhoe attachment or for loader service. (See TRACTION LOCK on Page 60-120-1.) Press a second time to lock the brakes.
14	ALARM	The ALARM beeps when there is an Error, WARNING or ◆SHUTDOWN condition.

Standard & Deluxe Panel Removal And Installation (Left Side)

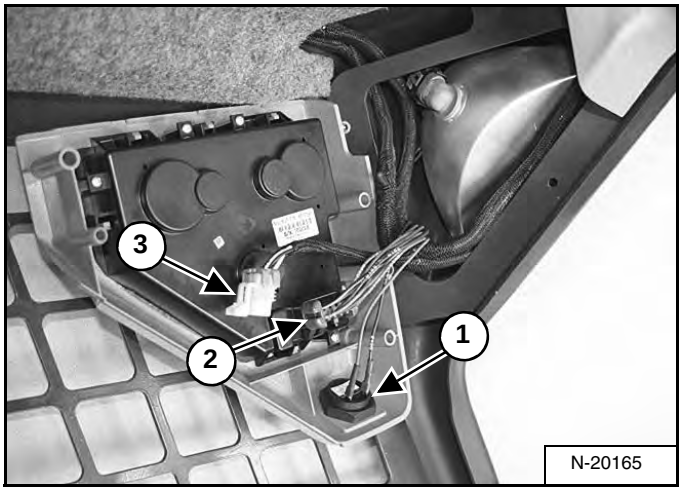
Figure 60-50-20



Remove the three mounting bolts (Item 1) **[Figure 60-50-20]**.

Installation: Be careful to not overtighten the instrument panel mounting bolts to prevent stripping of the threaded holes in the panels.

Figure 60-50-21



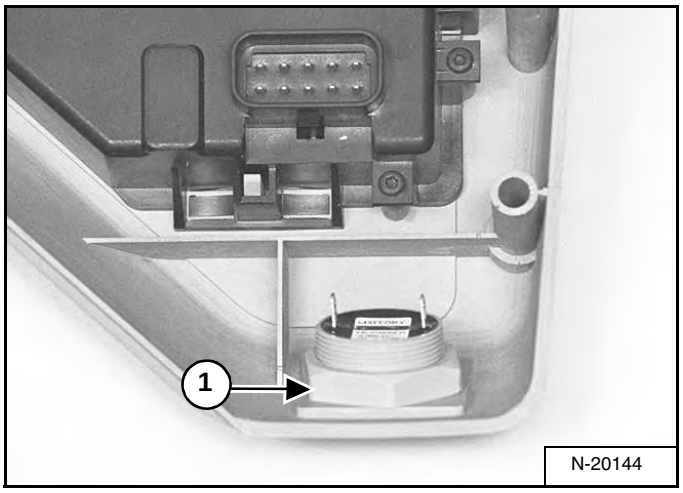
Pull the left instrument panel down and disconnect the wire harness connector (Item 1) **[Figure 60-50-21]** from the loader alarm.

Disconnect the wire harness connector (Item 2) **[Figure 60-50-21]** from the loader instrument panel.

NOTE: The wiring harness (Item 3) [Figure 60-50-21] is an optional accessory harness.

Remove the instrument panel from the loader.

Figure 60-50-22



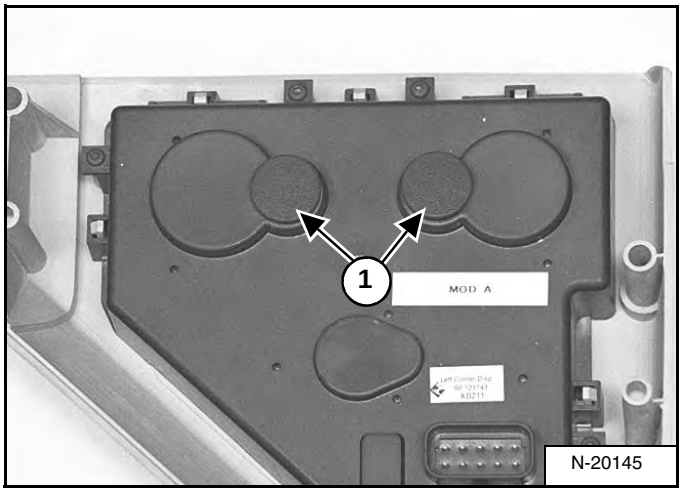
Alarm Removal and Installation

Remove the left side instrument panel.

Remove the r etaining nut (Item 1) **[Figure 60-50-22]** from the loader alarm.

Remove the alarm from the loader instrument panel.

Figure 60-50-23



Bulb Removal And Installation

Remove the left side instrument panel.

Remove the two light bulb covers (Item 1) **[Figure 60-50-23]** from the back of the instrument panel.


Bobcat®

Number Codes List (Cont'd)

CODE		CODE	
		32-57	Lift actuator reduced performance
24-02	Rear rod solenoid error ON	32-58	Tilt actuator reduced performance
24-03	Rear rod solenoid error OFF	32-59	Lift actuator wrong direction
		32-60	Tilt actuator wrong direction
25-02	Rear auxiliary relief solenoid error ON	32-61	Handle lock short to ground
25-03	Rear auxiliary relief solenoid error Off	32-62	Handle lock short to battery
		32-63	Pedal lock short to ground
26-02	Front base solenoid error ON	32-64	Pedal lock short to battery
26-03	Front base solenoid error OFF	32-65	Sensor supply voltage out of range
		32-66	Battery voltage out of range
27-02	Front rod solenoid error ON	32-67	Switch flipped while operating
27-03	Front rod solenoid error OFF	32-68	Lift handle information error
		32-69	Control pattern switch flipped while operating
28-02	Diverter solenoid error ON	32-70	Right drive handle short to ground
28-03	Diverter solenoid error OFF	32-71	Right drive handle short to battery
		32-75	Interrupted unswitched power
29-02	High flow solenoid error ON		
29-03	High flow solenoid error OFF	33-23	Main Controller (Bobcat Controller) not programmed
30-28	Controller Memory failure	34-04	Deluxe panel no communication to Bobcat controller
31-28	Interrupted power failure	35-02	Two-speed fan error ON
		35-03	Two-speed fan error OFF
32-04	ACS not communicating with Bobcat Controller		
32-23	ACS Not calibrated	36-48	ACD multiple controllers present
32-31	Tilt actuator fault		
32-32	Tilt actuator wiring fault	37-02	Two-speed secondary error ON
32-33	Tilt handle wiring fault	37-03	Two-speed secondary error OFF
32-34	Tilt actuator not in neutral		
32-35	Tilt handle/pedal not in neutral		
32-36	Lift actuator fault		
32-37	Lift actuator wiring fault		
32-38	Lift handle wiring fault		
32-39	Lift actuator not in neutral		
32-40	Lift handle/pedal not in neutral		
32-41	No communication		
32-49	Lift actuator short to ground		
32-50	Tilt actuator short to ground		
32-51	Lift actuator short to battery		
32-52	Tilt actuator short to battery		
32-53	Lift handle/pedal short to ground		
32-54	Tilt handle/pedal short to ground		
32-55	Lift handle/pedal short to battery		
32-56	Tilt handle/pedal short to battery		

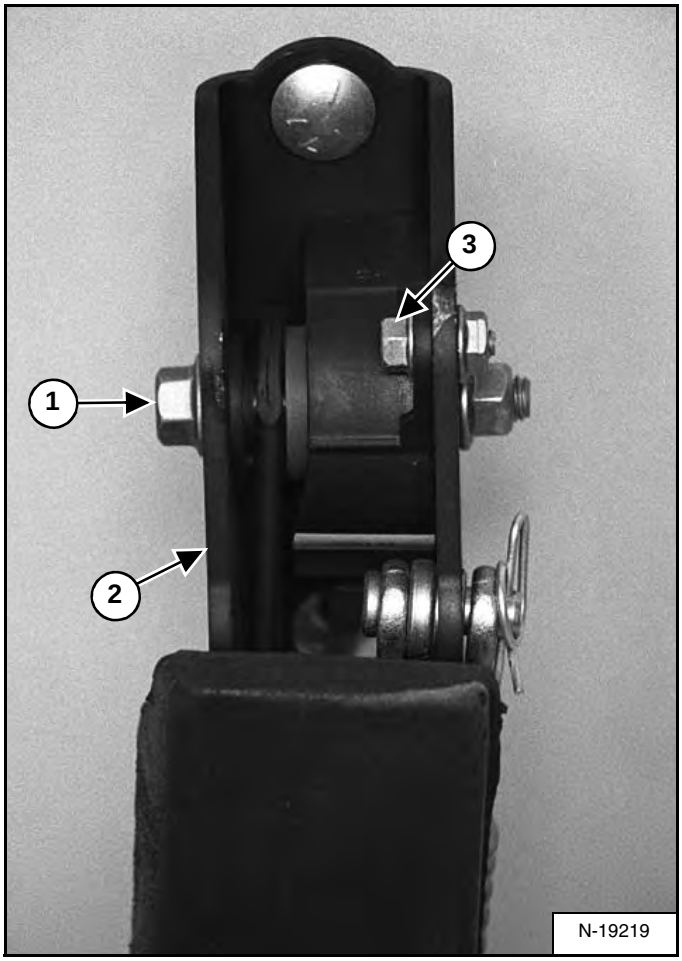
SEAT BAR SENSOR (CONT'D)

Removal And Installation

Figure 60-110-5

Remove the seat bar (Item 1) **[Figure 60-110-5]** from the loader. (See Removal And Installation on Page 50-10-1.)

Figure 60-110-6

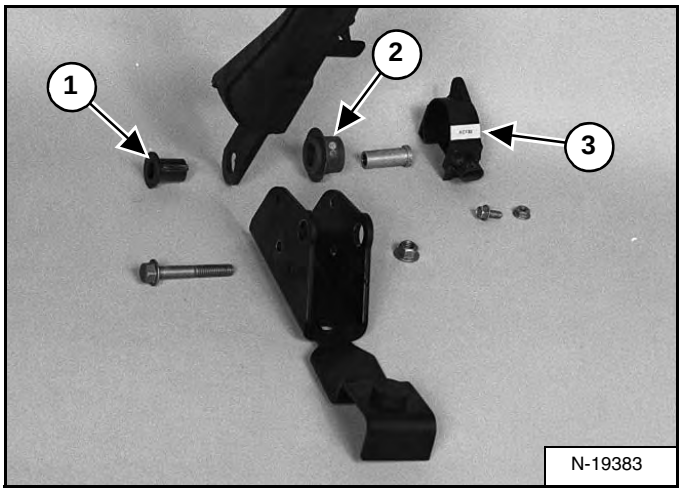


Remove the mounting bolt (Item 1) from the seat bar mount (Item 2) **[Figure 60-110-6]**.

Installation: Tighten the mounting bolt to 50-70 in.-lb. (5,6-7,9 N•m) torque.

Remove the sensor mounting bolt (Item 3) **[Figure 60-110-6]** and nut.

Figure 60-110-7



Remove the keyed plastic bushing (Item 1), magnetic bushing assembly (Item 2) and sensor bracket (Item 3) **[Figure 60-110-7]**.

IMPORTANT

Be careful to not overtighten the sensor mounting bolt and nut to prevent breakage of the sensor.

I-2088-1095

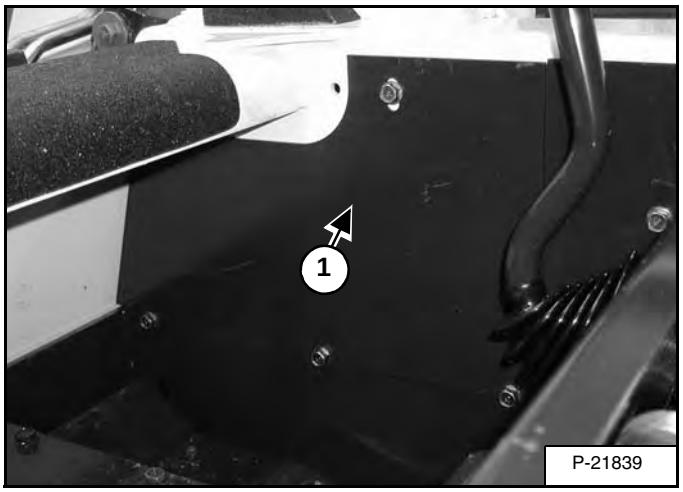
Installation: Be sure the tabs on the pivot bushing are positioned in the slotted hole (Item 1) **[Figure 60-110-7]** of the seat bar

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

Reverse the removal procedure to install the seat bar sensor.

ACS Controller Removal And Installation

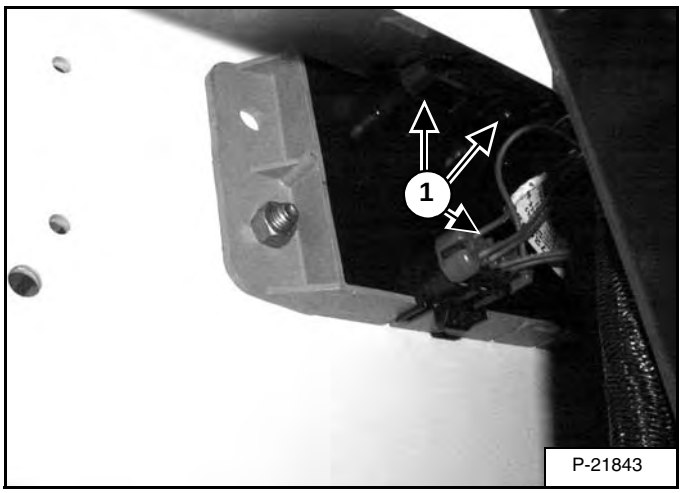
Figure 60-130-6



Loosen the bottom bolts and remove the top bolt.

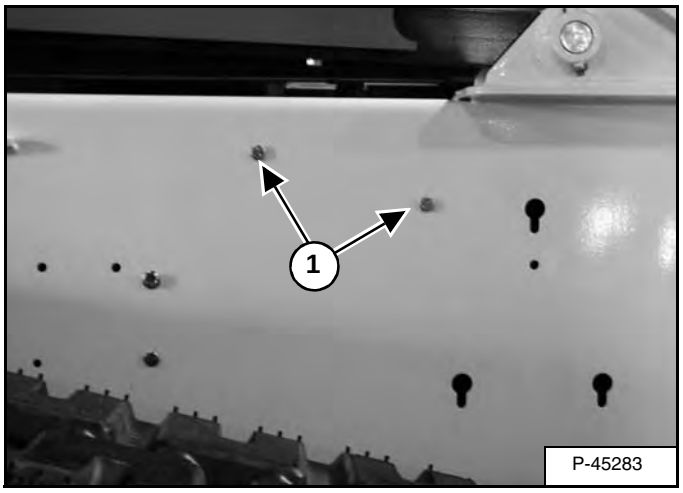
Remove the right front panel (Item 1) **[Figure 60-130-6]** from the loader.

Figure 60-130-7



Disconnect the wiring harness connectors (Item 1) **[Figure 60-130-7]** from the controller.

Figure 60-130-8



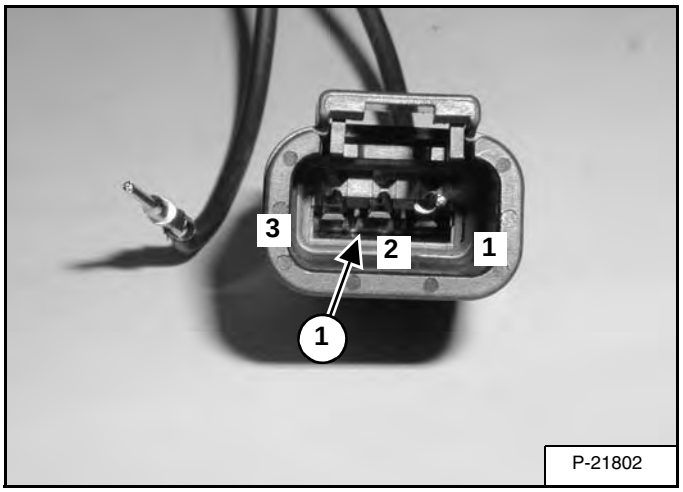
Remove the two mounting bolts (Item 1) **[Figure 60-130-8]** from the controller.

Remove the controller from the loader.

NOTE: The calibration procedure must be followed when replacing a handle sensor, foot pedal sensor, actuator or ACS Controller. (See CALIBRATION on Page 60-160-1.)

Handle Lock Solenoid Connector (Cont'd)

Figure 60-130-39



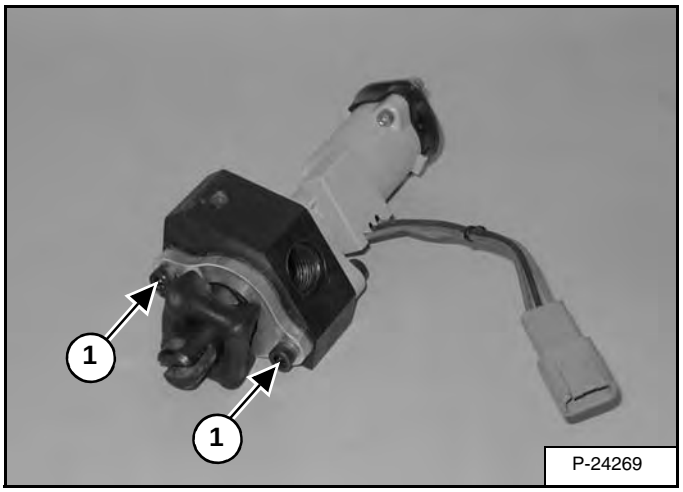
With a pointed tool, lift the tab (Item 1) **[Figure 60-130-39]** and pull the wire from the connector.

Installation: Install the wires into the connector as listed below **[Figure 60-130-39]**.

1 - Terminal - Black
2 - Terminal - Open
3 - Terminal - Black

Foot Sensor Disassembly And Assembly

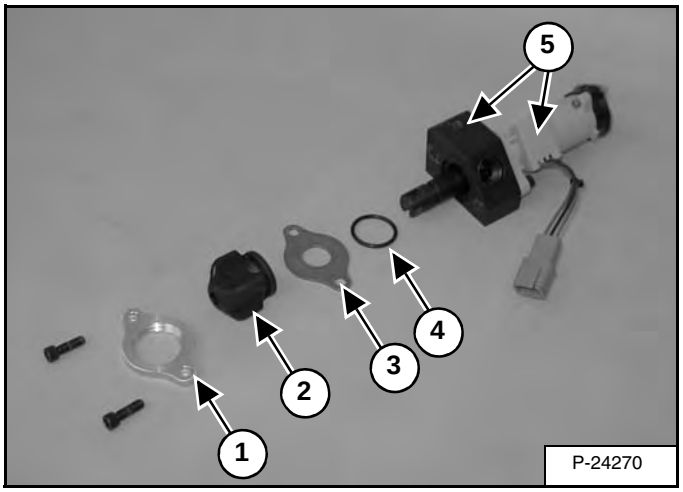
Figure 60-130-40



Remove the two bolts (Item 1) **[Figure 60-130-40]** from the end of the foot sensor.

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

Figure 60-130-41



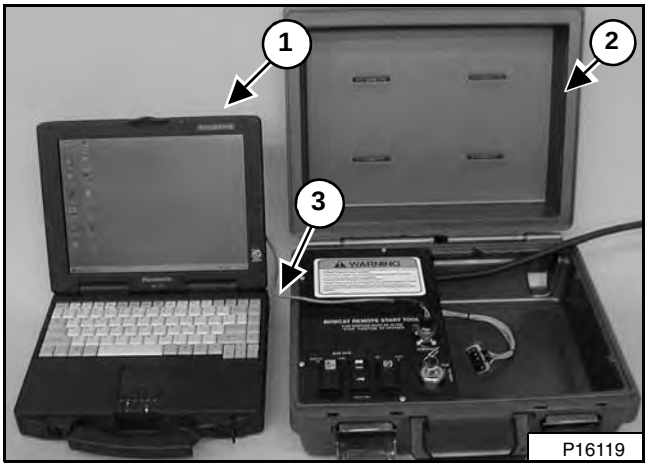
Remove the boot retainer (Item 1), boot (Item 2), spool stop plate (Item 3) and O-ring (Item 4) **[Figure 60-130-41]**.

NOTE: Do not disassemble the sensor assembly (Item 5) [Figure 60-130-41]. The sensor assembly is a calibrated assembly and cannot be serviced. Order through Bobcat Parts.

SERVICE PC (LAPTOP COMPUTER)

Connecting The Service PC To Remote Start Tool

Figure 60-150-1



Tools that will be needed to complete the following steps are:

MEL1563 - Remote Start Tool
MEL1565 - Service Tool Harness Control
MEL1566 -Service Tool Harness Communicator (Computer Interface)

NOTE: Make all connections with the key in the OFF position.

The Service PC (Item 1) with the remote start tool (Item 2) **[Figure 60-150-1]**. When connected to the loader, the Service PC is used to monitor, conduct diagnostic and load software.

Connect the Service Tool Harness Communicator (MEL1566) (Item 3) **[Figure 60-150-1]** to the designated serial port on the Service PC.

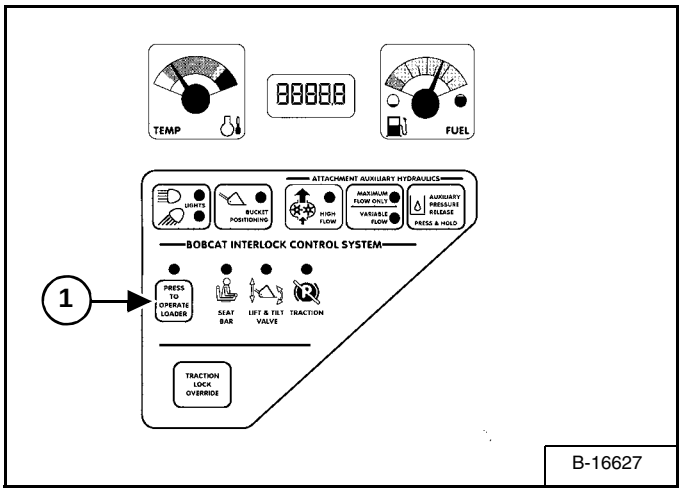
NOTE: The recommended serial cable length should not exceed 15 feet. A serial cable longer than 15 feet will create a degraded signal causing communication errors.

Connect the other end to the connector on the r emote start tool.

Connect the r emote start tool to the loader. (See Procedure on Page 10-60-3.)

Calibration Procedure (Advanced Control System) (ACS) (Cont'd)

Figure 60-160-24



Push the PRESS TO OPERATE button (Item 1) **[Figure 60-160-24]** to begin calibration.

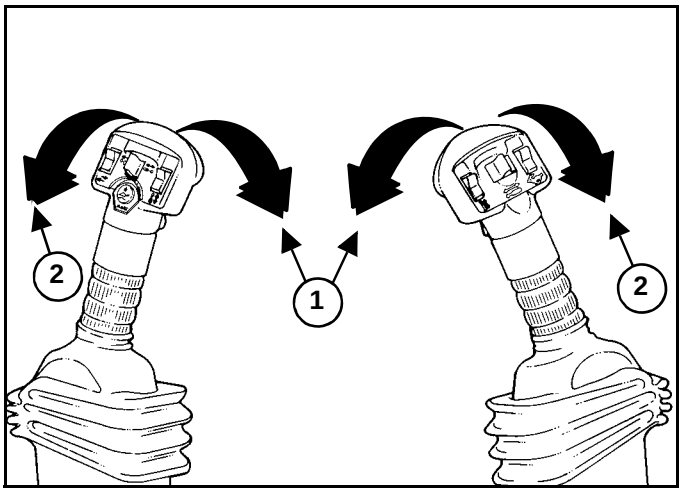
NOTE: The ACS icon will light up and if you listen closely the cycling of the actuators can be heard. The ACS icon will stay lit until the ignition key is cycled or the loader is started and a function is operated.

NOTE: During the calibration cycle, the system will beep three times. The calibration process generates two codes 32-35 (tilt handle not in neutral) and 32-40 (lift handle not in neutral). Ignore these two codes, this is normal during the calibration procedure.

Release the control handles.

NOTE: The remaining portion of the procedure must be completed in twenty seconds or less. If not the handles and pedals will lock and the procedure must be started over from the beginning.

Figure 60-160-25

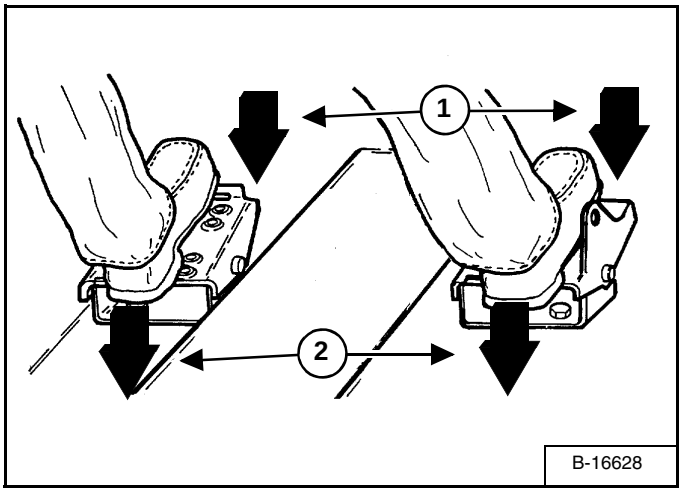


Fully move both handles in toward the center of the cab and hold the handles for one second (Item 1) **[Figure 60-160-25]**.

Fully move both handles out toward the cab side screens and hold for one second (Item 2) **[Figure 60-160-25]**.

Allow both handles to return to neutral.

Figure 60-160-26



Fully press the toe of the lift and tilt pedals (Item 1) **[Figure 60-160-26]** down and hold for one second.

Fully press the heel of the lift and tilt pedals (Item 2) **[Figure 60-160-26]** down and hold for one second.

Allow both pedals to return to neutral.

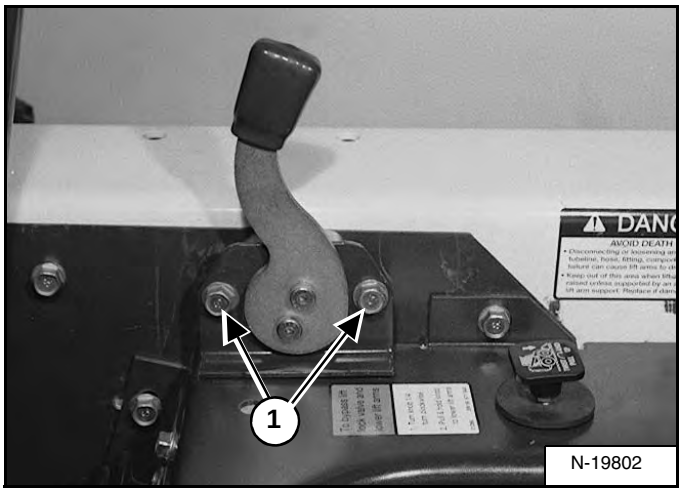
At the end of the twenty second time frame, the handles and pedals will lock.

Calibration is complete.

ENGINE SPEED CONTROL

Removal And Installation

Figure 70-20-1

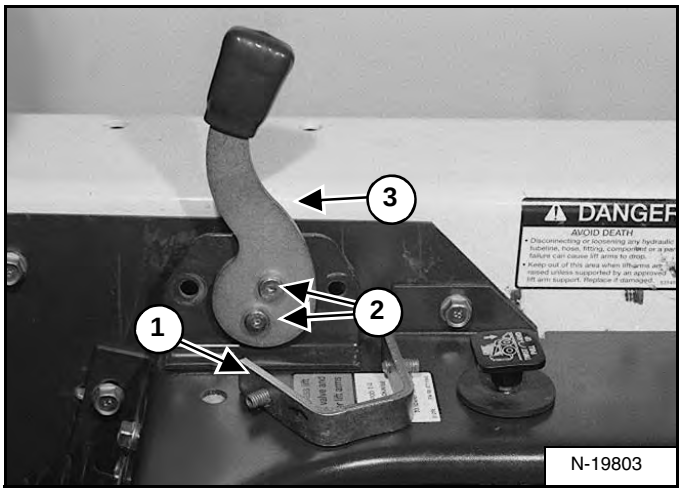


Raise the lift arms and install an approved lift arm device. (See Engaging The Lift Arm Support Device on Page 10-20-1.)

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

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

Figure 70-20-2



Mark the front of the stop bracket (Item 1) **[Figure 70-20-2]** and remove the stop bracket.

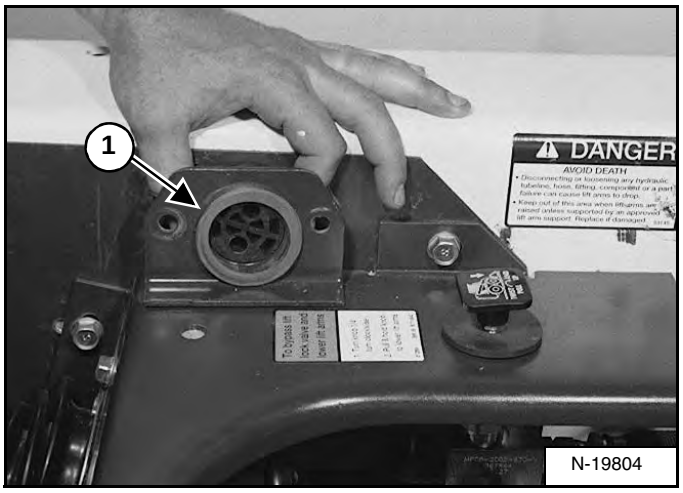
Installation: It is important for the front and rear stop on the bracket to be located correctly.

Remove the bolts (Item 2) **[Figure 70-20-2]**.

Installation: Tighten the bolts evenly until the speed control lever moves backward and forward at a comfortable tension.

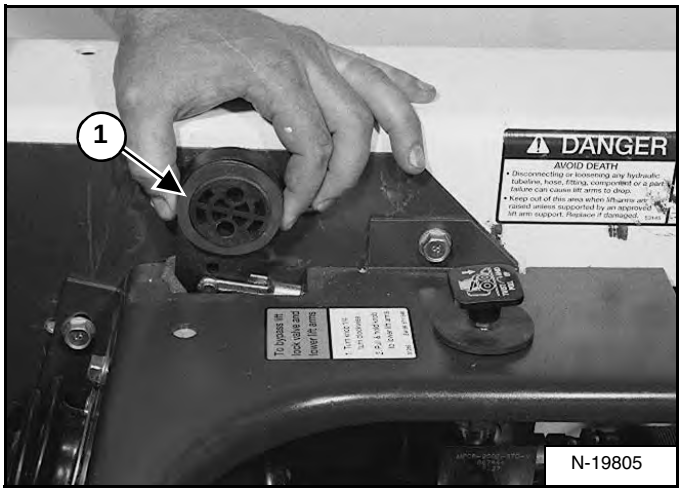
Remove the speed control lever (Item 3) **[Figure 70-20-2]**.

Figure 70-20-3



Remove the mounting bracket (Item 1) **[Figure 70-20-3]** from the speed control arm (Item 1) **[Figure 70-20-4]**

Figure 70-20-4

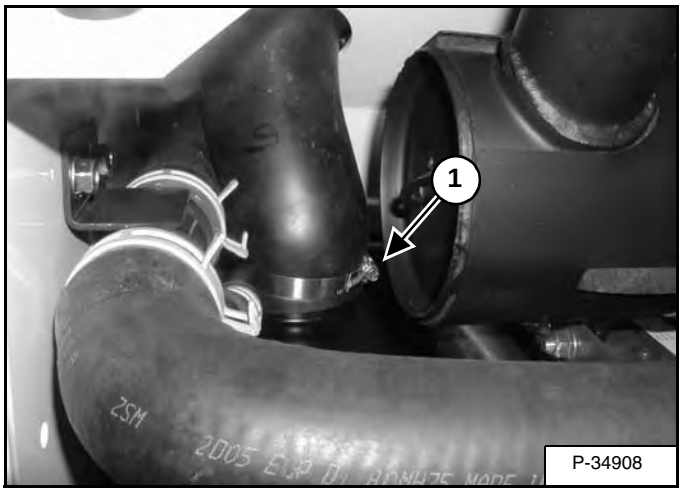


NOTE: Do not lubricate the speed control parts when assembling.

AIR CLEANER

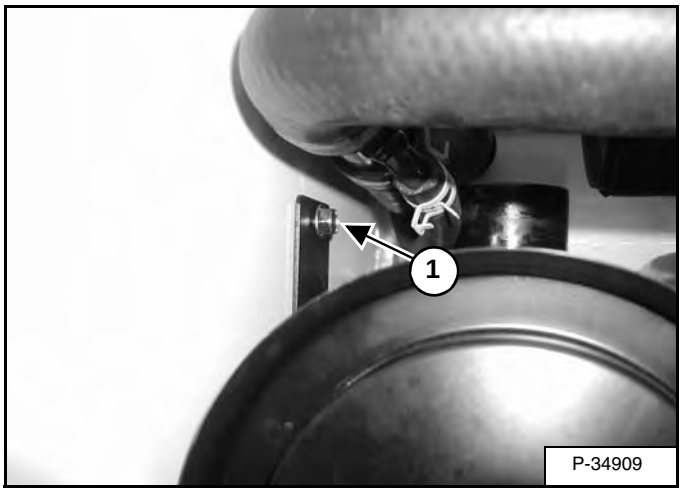
Housing Removal And Installation

Figure 70-40-1



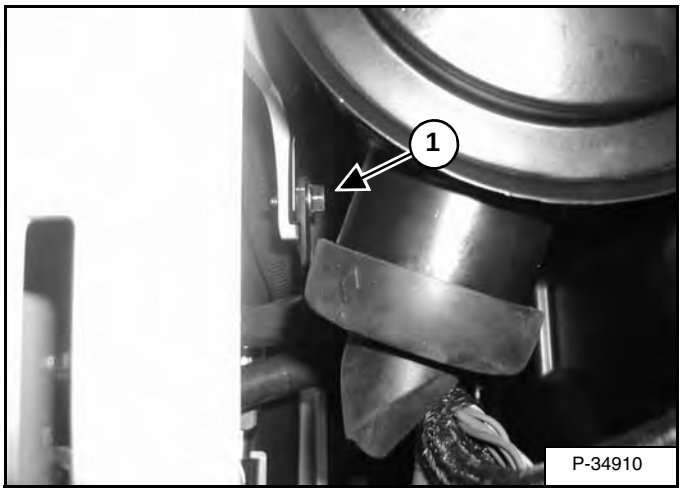
Loosen the hose clamp (Item 1) **[Figure 70-40-1]** and disconnect the inlet hose from the air cleaner.

Figure 70-40-2



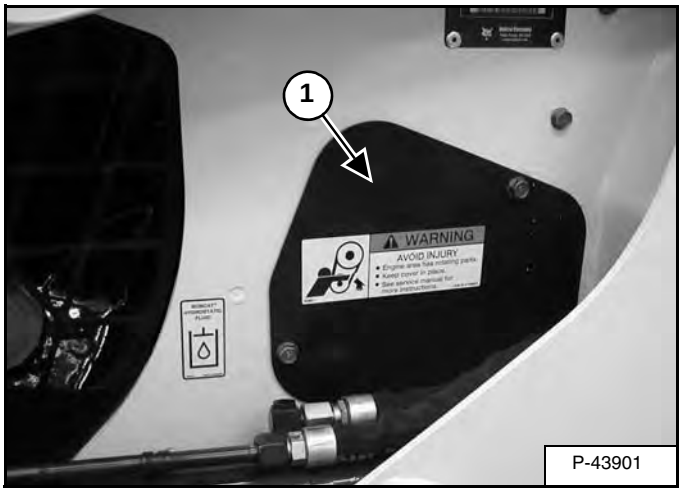
Remove the top mounting bolt (Item 1) **[Figure 70-40-2]** from the air cleaner mount bracket.

Figure 70-40-3



Remove the lower mount bolt (Item 1) **[Figure 70-40-3]** from the air cleaner mount bracket.

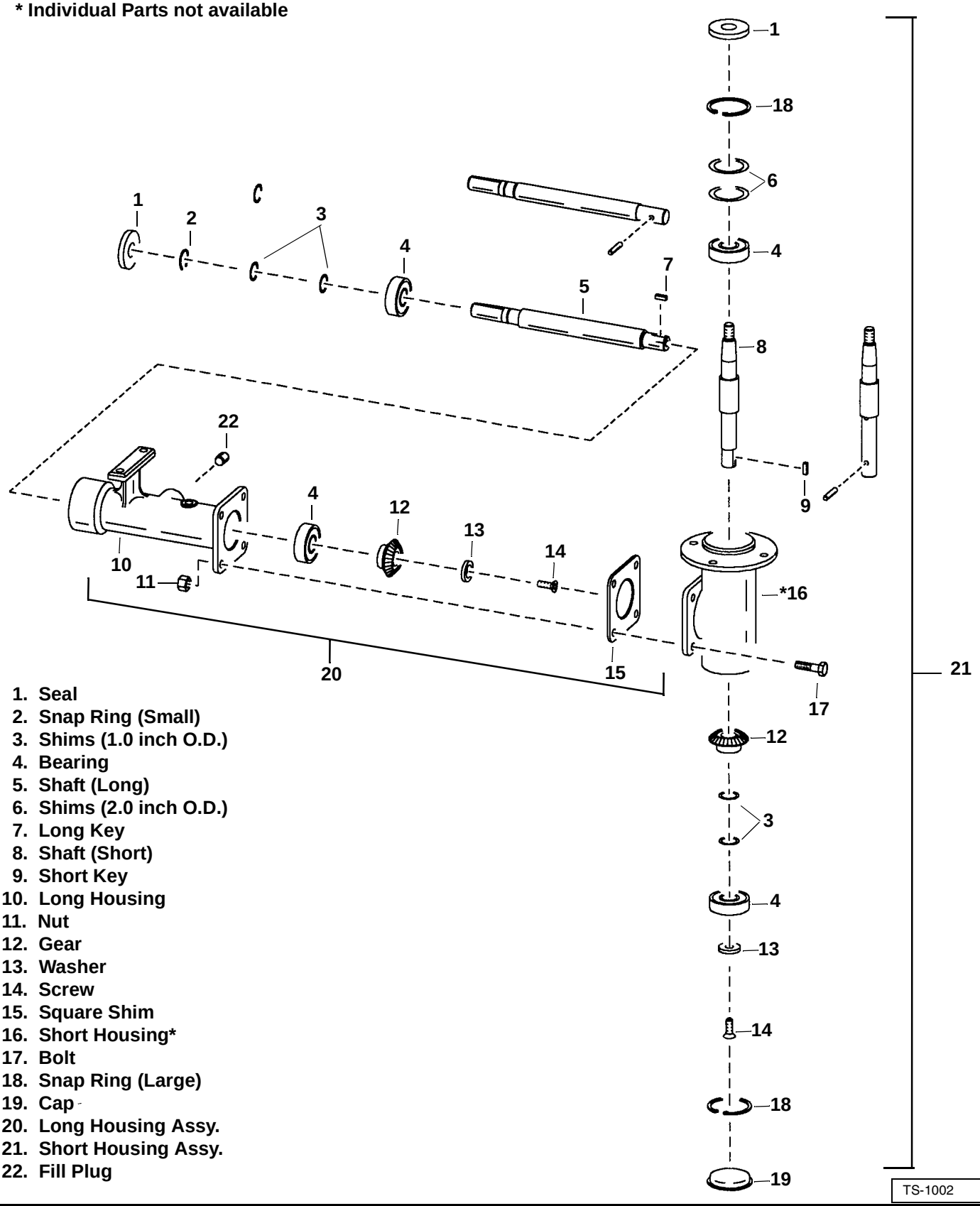
Figure 70-40-4



Remove the left side access panel (Item 1) **[Figure 70-40-4]** from the loader.

Gearbox Parts Identification

* Individual Parts not available



1. Seal
2. Snap Ring (Small)
3. Shims (1.0 inch O.D.)
4. Bearing
5. Shaft (Long)
6. Shims (2.0 inch O.D.)
7. Long Key
8. Shaft (Short)
9. Short Key
10. Long Housing
11. Nut
12. Gear
13. Washer
14. Screw
15. Square Shim
16. Short Housing*
17. Bolt
18. Snap Ring (Large)
19. Cap
20. Long Housing Assy.
21. Short Housing Assy.
22. Fill Plug

TS-1002

Gearbox Assembly (Cont'd)

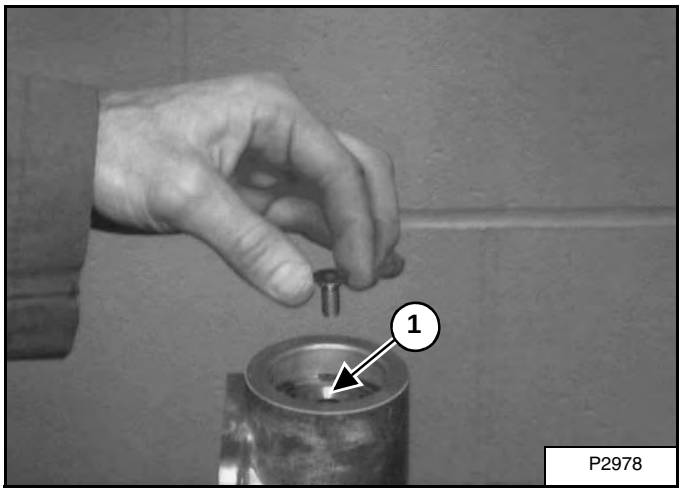
Figure 70-60-47

Install a bearing on the gear end of the shaft **[Figure 70-60-47]**.

Figure 70-60-48

Install the snap ring in the groove above the be aring **[Figure 70-60-48]**.

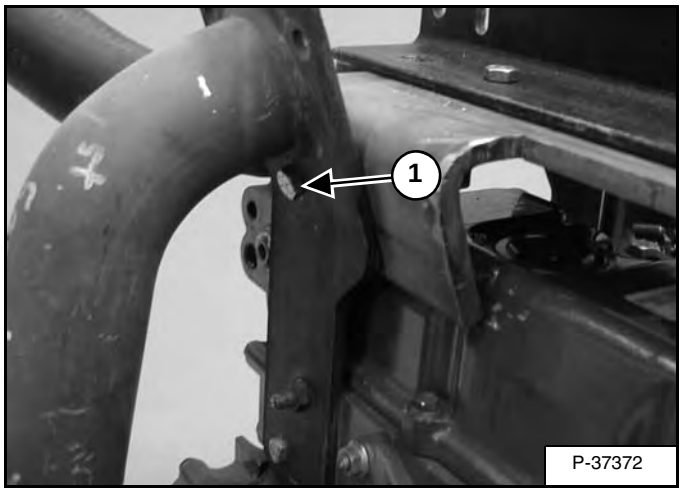
Figure 70-60-49



Install the washer (Item 1) on the shaft. Put liquid adhesive (LOCTITE #242) on the screw threads and install the screw **[Figure 70-60-49]**.

Removal And Installation (Cont'd)

Figure 70-70-25

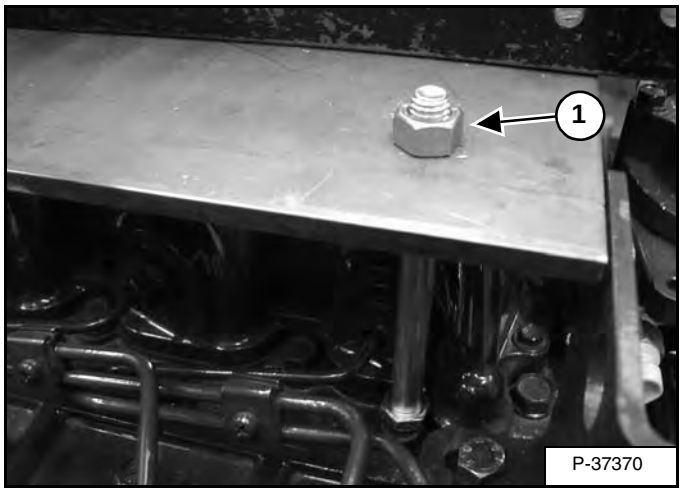


Install the bolt (Item 1) **[Figure 70-70-25]** through the exhaust bracket on the engine, and through the engine removal bracket.

Installation: Use .375 in. x 1.5 in (9.525 mm x 38,1mm) bolts and nuts.

Tighten the bolts and nuts.

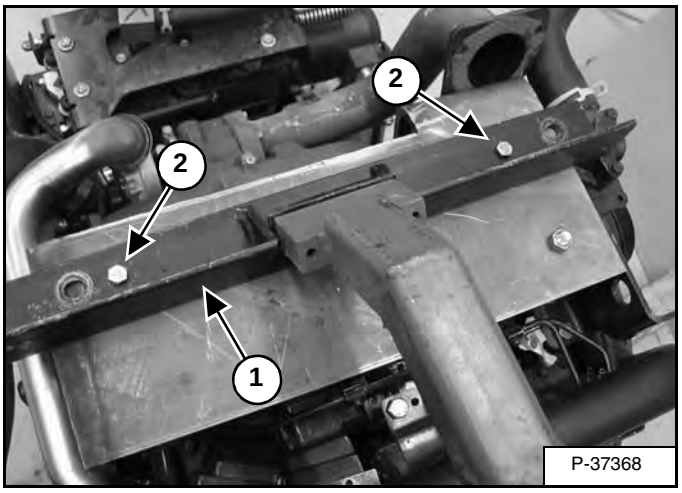
Figure 70-70-26



Install a bolt, with two nuts (Item 1) **[Figure 70-70-26]** through the engine removal bracket, and allow it to set on the engine head bolt. Use the nuts to adjust the length of the bolt against the engine head. Lock the nuts tight against the removal bracket, when the proper length has been obtained.

Installation: Use .500 in. x 5.5 in (12.7 mm x 139,7mm) bolt and nuts.

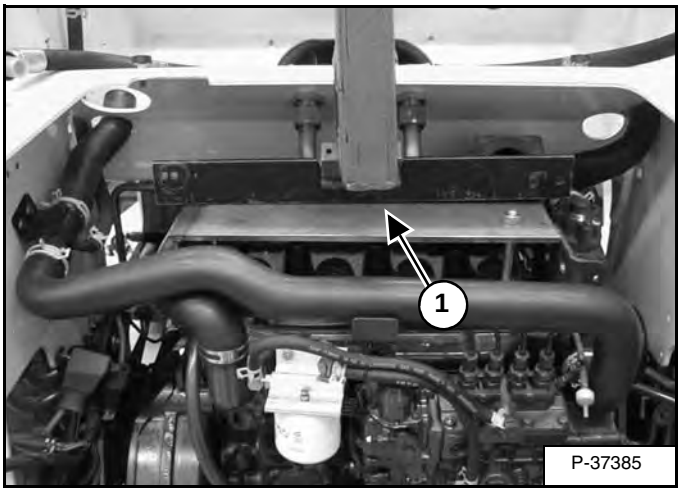
Figure 70-70-27



Install the engine lift bracket (Item 1) to the removal bracket using two bolts (Item 2) **[Figure 70-70-27]**.

Installation: Use two .375 in. x 1.5 in (9.525 mm x 38,1mm) bolts and nuts.

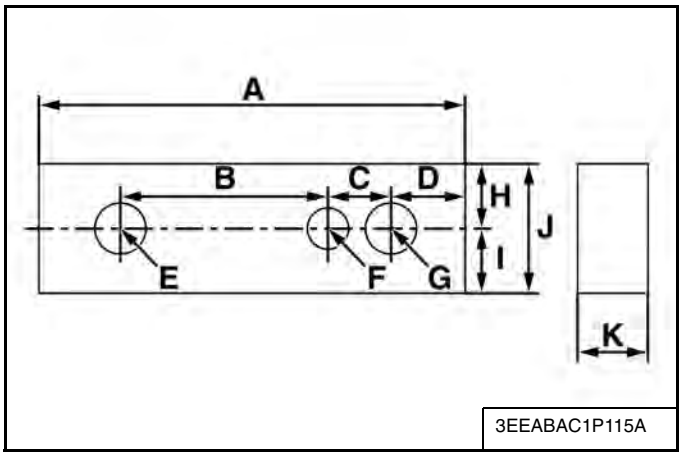
Figure 70-70-28



Check all bolts that attach the engine lift brackets (Item 1) **[Figure 70-70-28]** to the engine and tighten as needed.

Engine Tools Identification Chart (Cont'd)

Figure 70-90-11

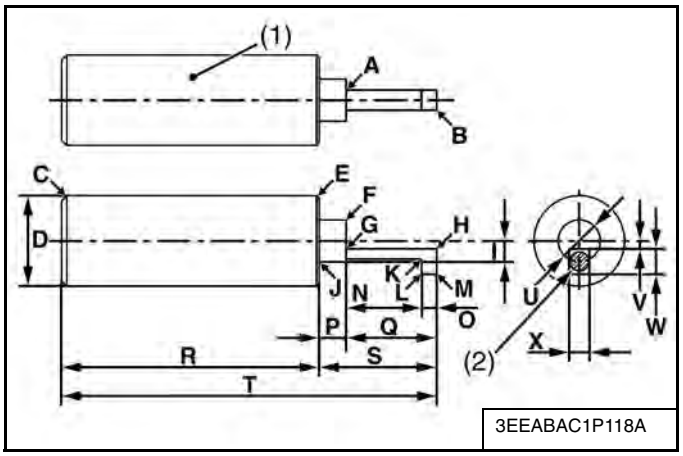


Tool for aligning the crankcase 1 and 2

Application: Use for aligning the crankcase 1 and 2.

A	115 mm (4.5276 in.)
B	56 mm (2.2047 in.)
C	17 mm (0.6693 in.)
D	20 mm (0.7874 in.)
E	f14 mm (0.5512 in. dia.)
F	f11 mm (0.4331 in. dia.)
G	f14 mm (0.5512 in. dia.)
H	17.5 mm (0.6890 in.)
I	17.5 mm (0.6890 in.)
J	35 mm (1.3780 in.)
K	19mm (0.7480 in.)

Figure 70-90-12



Jig for Governor Connecting Rod

Application: Use for connecting the governor connecting rod to the rack pin of the fuel injection pump assembly.

A	1 mm (0.0394 in.)
B	C0.2 mm (0.0079 in.)
C	C2 mm (0.0787 in.)
D	Ø 35 mm (1.3780 in. dia.)
E	C1 mm (00394 in.)
F	C0.1 mm (0.0039 in.)
G	1 mm (0.0394 in.)
H	C0.2 mm (0.0079 in.)
I	R8 mm (0.3150 in. dia.)
J	1 mm (0.0394 in.)
K	1mm (0.0394 in.)
L	C0.2 mm (0.0079 in.)
M	C0.2 mm (0.0079 in.)
N	29 mm (1.1417 in.)
O	6 mm (0.2362 in.
P	10.7 mm (0.4213 in.)
Q	35 mm (1.3780 in.)
R	99.3 mm (3.9095 in.)
S	45.7 ± 0.05 mm (1.7992 ± 0.0020 in.)
T	145 mm (5.7087 in.)
U	16.25 ± 0.1 mm (0.6398 ± 0.0039 in.)
V	3 mm (0.1181 in.)
W	10 mm (0.3937 in.)
X	8 mm (0.3150 in.)

(2) Permanent Magnet: Ø 8 mm (0.3150 in. dia.)
Thickness: 3 mm (0.1181 in.)

Valve Disassembly And Assembly

Figure 70-90-37

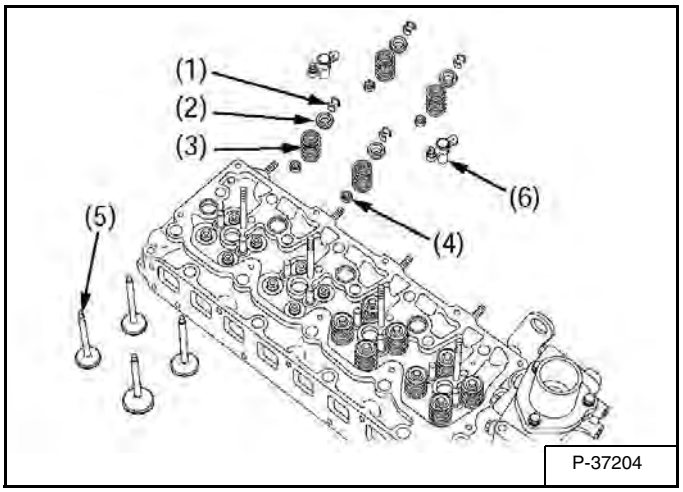
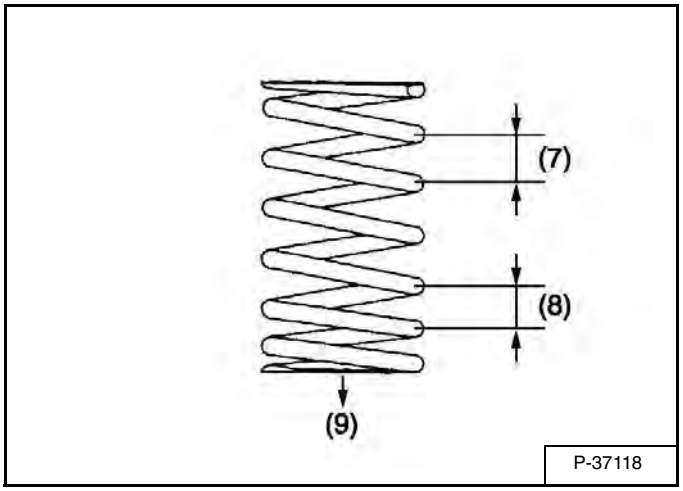


Figure 70-90-38



Remove the valve spring collets (Item 1) after compressing the valve spring (Item 3) with the valve spring retainer (Item 2) **[Figure 70-90-37]**.

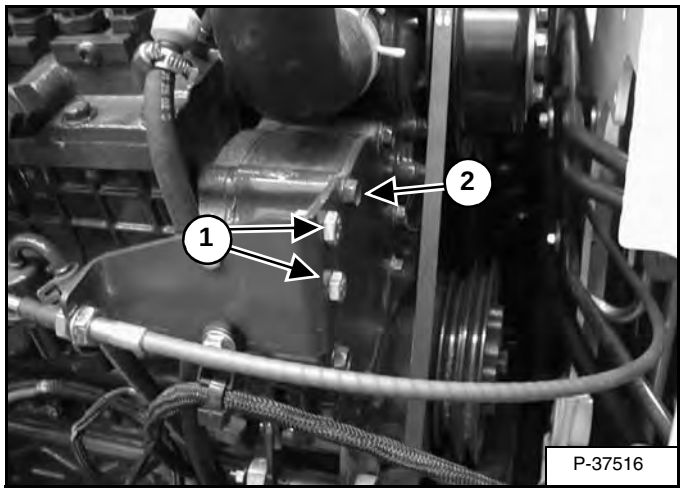
Install the valve spring **[Figure 70-90-38]** with its small-pitch end downward (at the head side).

Wash the valve stem and valve guide hole, and apply engine oil sufficiently.

After installing the valve spring collets, lightly tap the stem to assure proper fit with a plastic hammer.

Engine Timing (TDC)

Figure 70-90-39

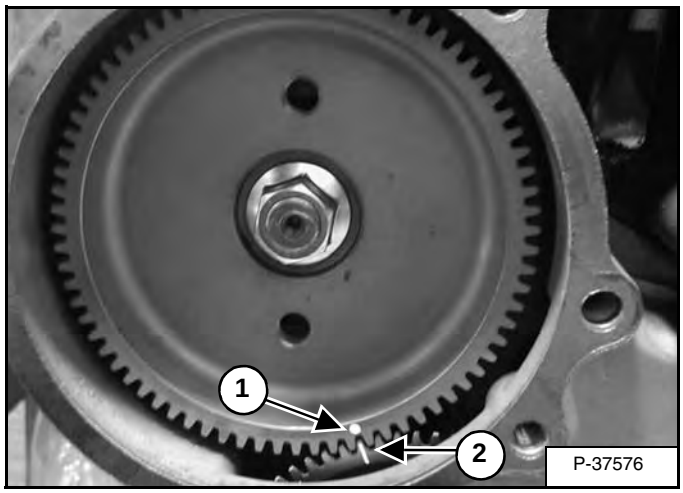


Remove the two bolts (Item 1) **[Figure 70-90-39]** from the throttle linkage mount and the injection pump gear cover.

Remove the six remaining mount bolts (Item 2) **[Figure 70-90-39]** from the injection pump gear cover.

Remove the injection pump gear cover from the engine.

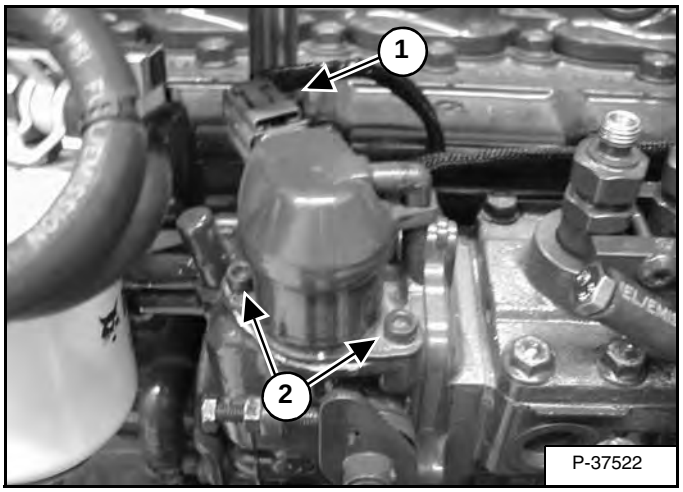
Figure 70-90-40



Rotate the engine, until the timing mark on the injection pump fuel cam gear (Item 1) is meshed with the idler gear (Item 2) **[Figure 70-90-40]**.

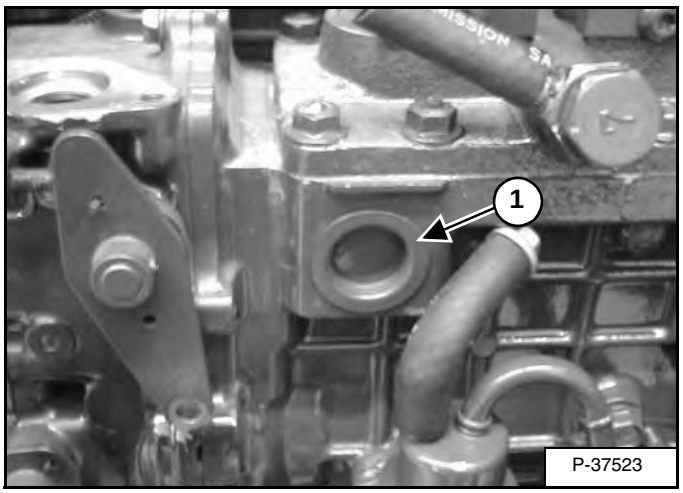
Injection Pump Removal and Installation (Cont'd)

Figure 70-90-75



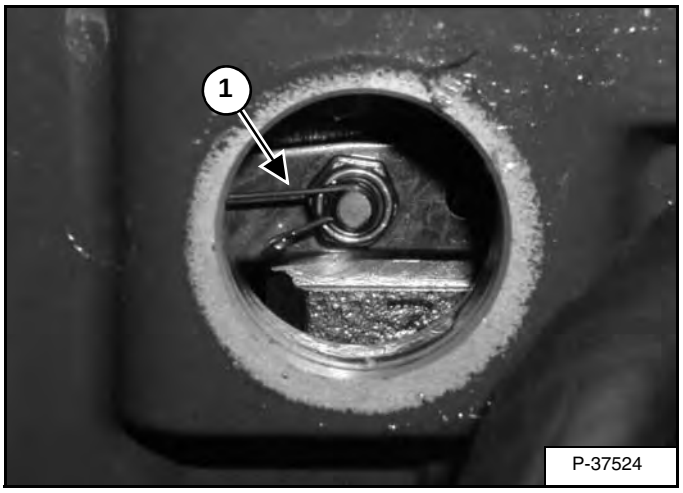
Disconnect the electrical connector (Item 1) from the fuel stop solenoid. Then remove the two mounting bolts (Item 2) **[Figure 70-90-75]** from the fuel stop solenoid. Remove the solenoid from the engine.

Figure 70-90-76



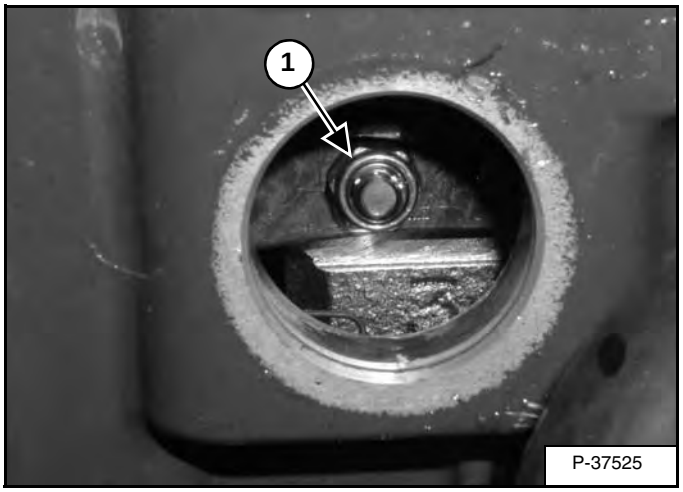
Remove the sight cover (Item 1) **[Figure 70-90-76]** from the injection pump unit.

Figure 70-90-77



Disconnect the starter spring hook (Item 1) **[Figure 70-90-77]**. *(Be careful to not deform the starter spring.)*

Figure 70-90-78

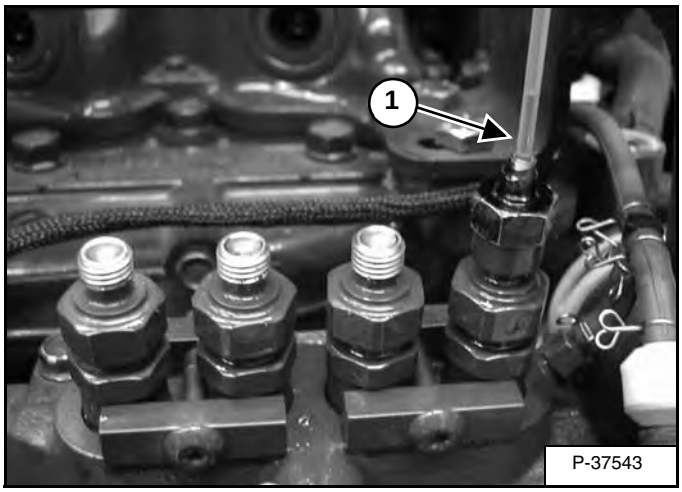


Remove the control rod nut (Item 1) **[Figure 70-90-78]**. *(Be careful not to drop the control rod nut.)*

Installation: Tighten the control rod nut to 24-36 in.-lb. (3-4 N•m) torque.

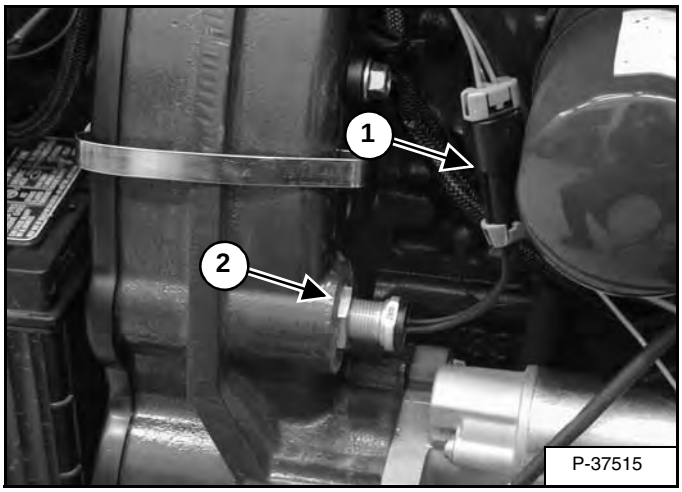
Injection Pump Timing (Cont'd)

Figure 70-90-116



Install a short plastic tube (Item 1) **[Figure 70-90-116]** in the number one cylinder port of the injection pump. The tube should fit securely and point upward.

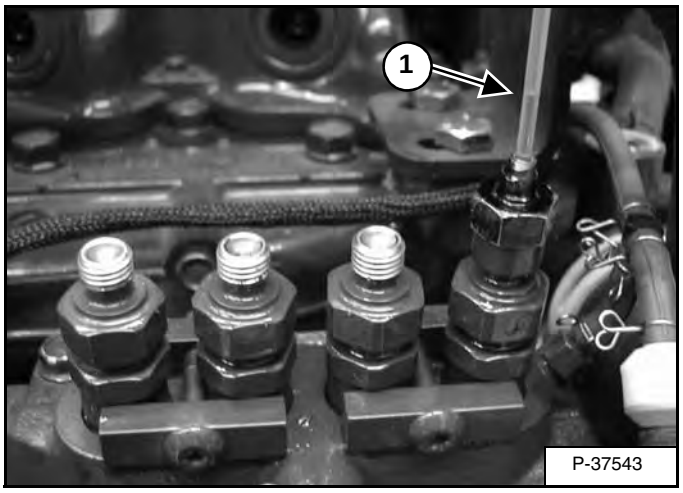
Figure 70-90-117



Disconnect the wiring connector (Item 1) **[Figure 70-90-117]** from the engine speed control sensor.

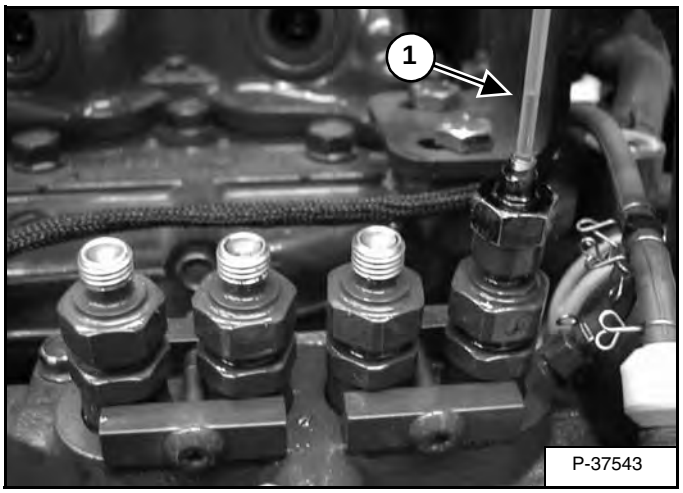
Remove the speed sensor (Item 2) **[Figure 70-90-117]** from the engine.

Figure 70-90-118



Turn the engine counterclockwise (viewed from flywheel end) until the fuel partially fills the plastic tube (Item 1) **[Figure 70-90-118]**.

Figure 70-90-119



After there is fuel rise seen in the plastic tube, rotate the engine back (clockwise) at least 90 degrees.

Slowly rotate the engine counterclockwise (viewed from flywheel end) and stop turning when the fuel begins to rise in the plastic tube (Item 1) **[Figure 70-90-119]**.

Crankcase No. 1 And No. 2 Disassembly And Assembly

Figure 70-90-149

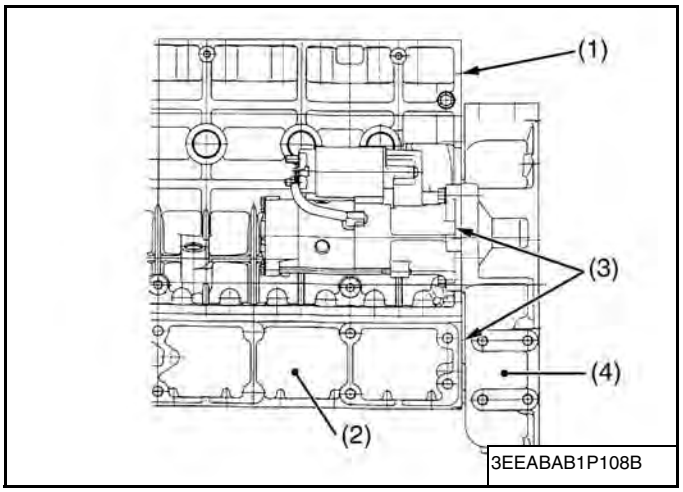
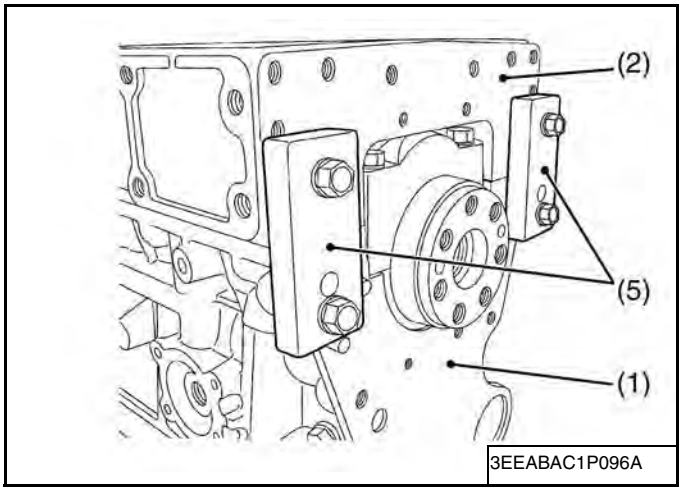


Figure 70-90-150



Match the crankcase 1 (Item 1)and crankcase 2 (Item 2), **[Figure 70-90-149]** referring to the flywheel's contoured face.

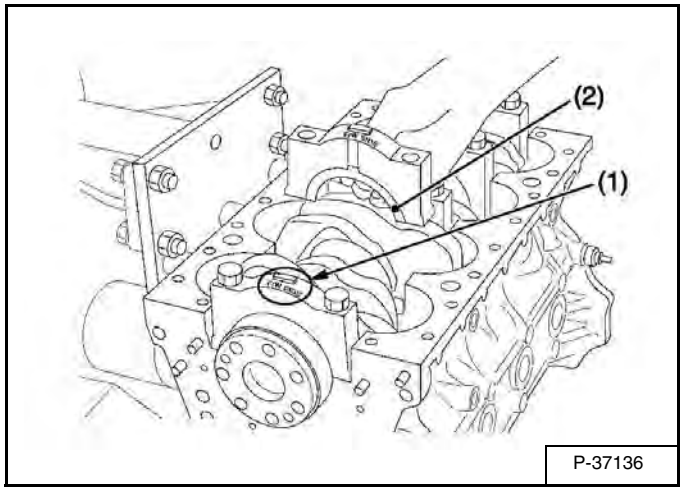
Tighten the crankcase 2 mounting bolts loosely.

Tighten up the jig (Item 5) **[Figure 70-90-150]** to the specified torque same as the flywheel housing screw (Item 4) **[Figure 70-90-149]**. This helps to minimize the level difference between the crankcase 1 and the crankcase 2 (at the flywheel side) Possible gap must be 0.05 mm or smaller (Item 3) **[Figure 70-90-149]**.

Tightening torque	Crankcase 2 mounting screw	49.0 to 55.9 N•m 5.0 to 5.7 kgf·m 36.2 to 41.3 ft.-lb.
	Flywheel housing screw	77.5 to 90.2 N•m 7.9 to 9.2 kgf·m 57.1 to 66.5 ft.-lb.

Crankshaft Disassembly And Assembly

Figure 70-90-151

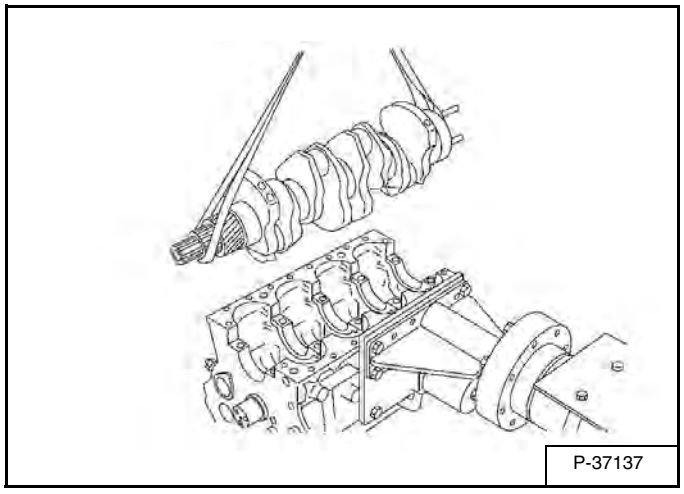


Remove the main bearing case.

Remove the crankshaft.

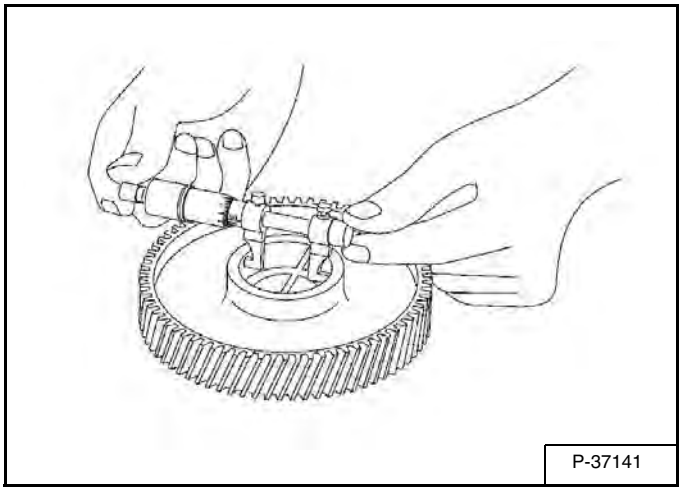
Reassemble the main bearing case having the same number as the one engraved on the crankcase, and set the casting mark "F / W SIDE" (Item 1) **[Figure 70-90-151]** on the main bearing case facing towards the flywheel side.

Figure 70-90-152



Oil Clearance Between Idler Gear Shaft And Idler Gearing Bushing (Cont'd)

Figure 70-90-179



Measure the idle gear bushings I.D. with an inside micrometer, and calculate the oil clearance **[Figure 70-90-179]**.

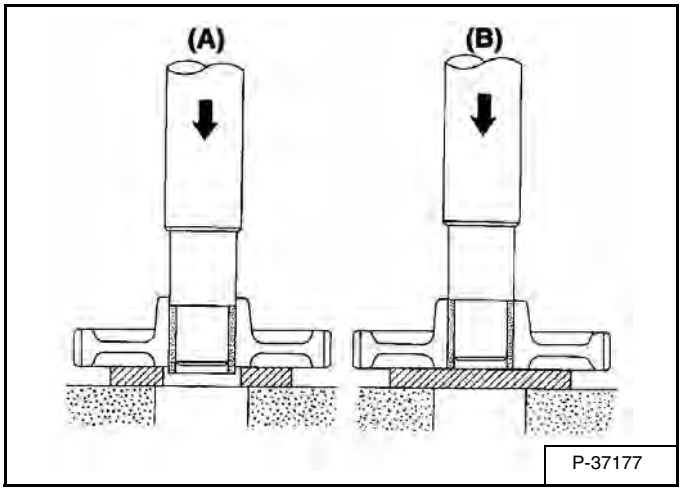
If the oil clearance exceeds the allowable limit, replace the bushing.

Clearance between idle gear shaft and idle gear bushing	Factory spec.	0.050 to 0.091 mm 0.0020 to 0.0036 in.
	Allowable limit	0.10 mm 0.0039 in.

Idle gear bushing I.D.	Factory spec.	45.025 to 45.050 mm 1.7726 to 1.7736 in.
Idle gear shaft O.D.	Factory spec.	44.959 to 44.945 mm 1.7700 to 1.7707 in.

Replacing Idler Gear Bushing

Figure 70-90-180



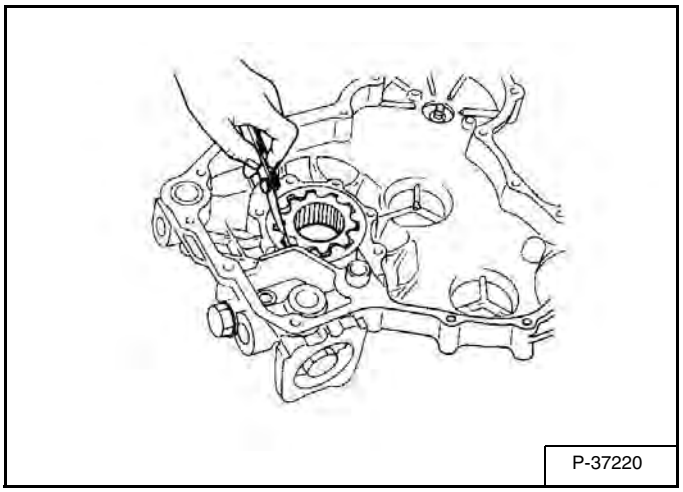
Using an idle gear bushing replacing tool, press out the used bushing. (See Engine Tools Identification Chart on Page -1.)

Clean a new idle gear bushing and idle gear bore, and apply engine oil to them.

Using an idle gear bushing replacing tool, press in a new bushing (service parts) to the specified dimension **[Figure 70-90-180]**.

Rotor Lobe Clearance

Figure 70-90-201



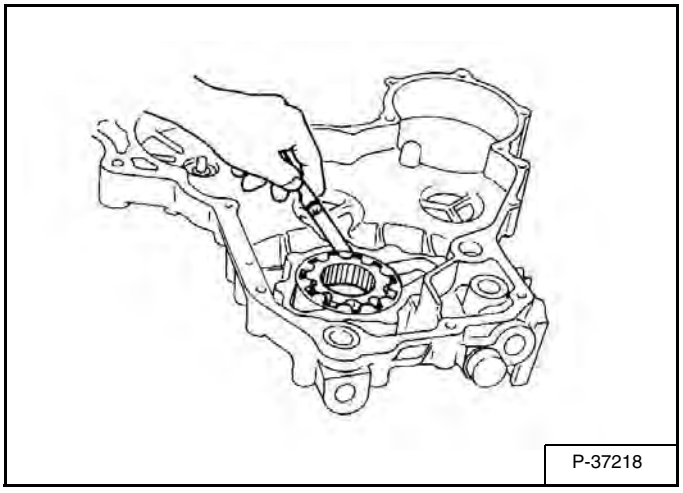
Measure the clearance between lobes of the inner rotor and the outer rotor with a feeler gauge **[Figure 70-90-201]**.

If the clearance exceeds the factory specifications, replace the oil pump rotor assembly.

Clearance between inner rotor and outer rotor	Factory spec.	0.04 to 0.16 mm 0.0016 to 0.0063 in.

Clearance Between Outer Rotor And Pump Body

Figure 70-90-202



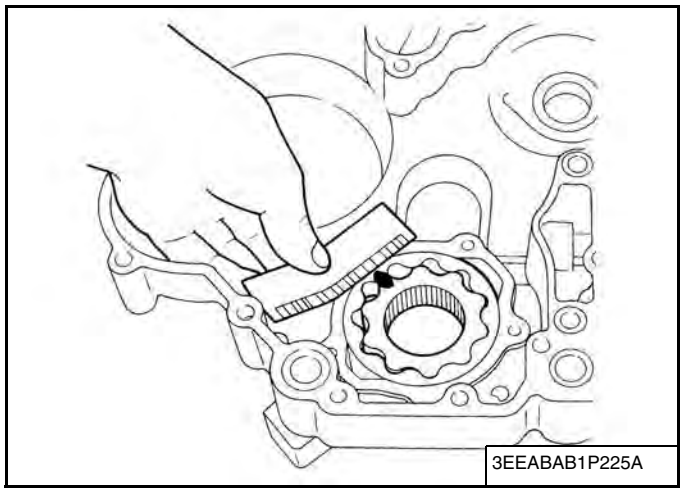
Measure the clearance between the outer rotor and the pump body with a feeler gauge **[Figure 70-90-202]**.

If the clearance exceeds the factory specifications, replace the oil pump rotor assembly.

Clearance between outer rotor and pump body	Factory spec.	0.100 to 0.184 mm 0.0039 to 0.0072 in.
	Allowable limit	0.3 mm 0.0118 in.

Clearance Between Rotor And Cover

Figure 70-90-203



Put a strip of plastigage (Code No. 07909-30241) onto the rotor face with grease **[Figure 70-90-203]**.

Install the cover and tighten the screws with the specified torque.

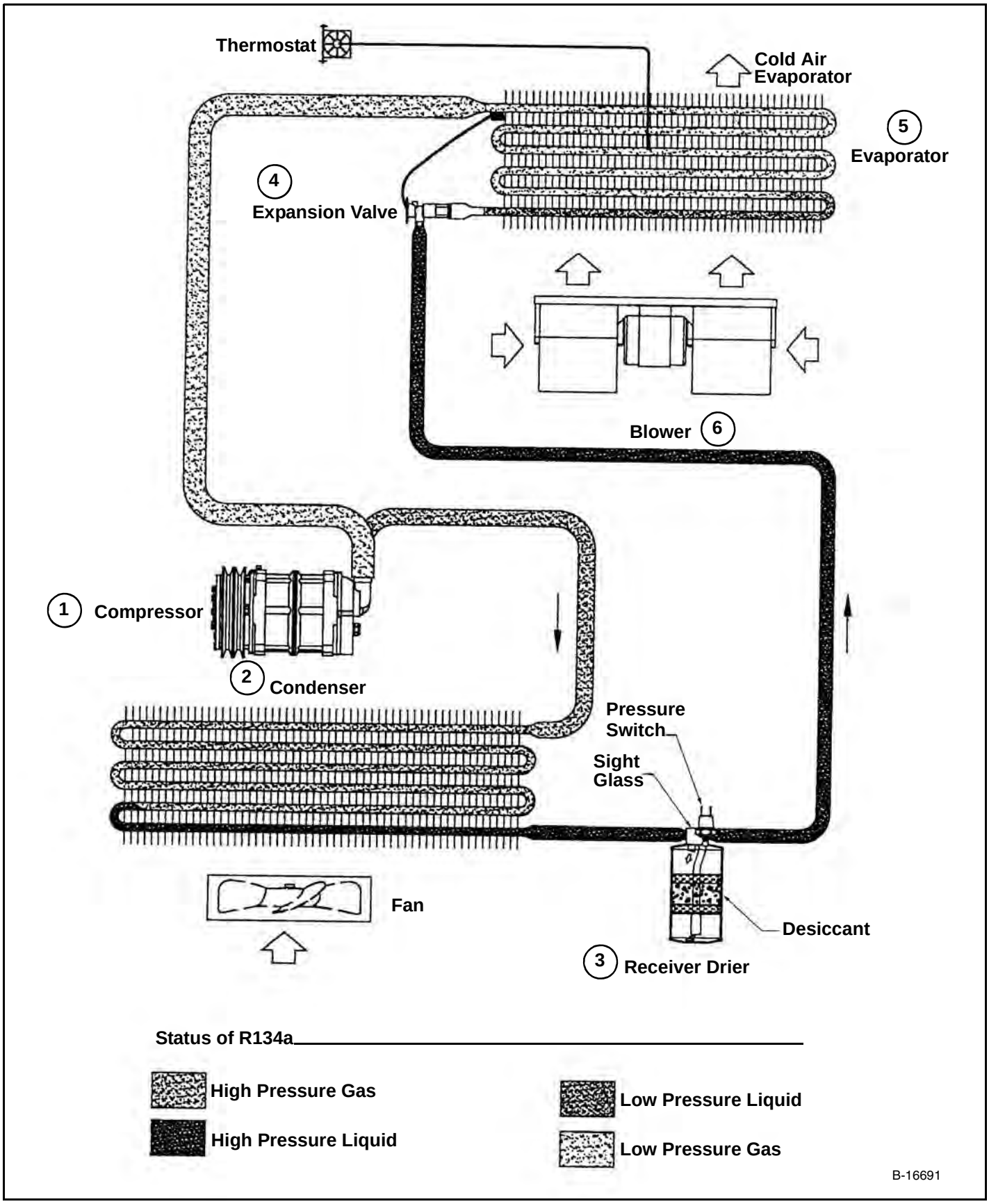
Remove the cover carefully, and measure the amount of the flattening with the scale and get the clearance.

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

Clearance between rotor and cover	Factory spec.	0.025 to 0.075 mm 0.0010 to 0.0030 in.
	Allowable limit	0.225 mm 0.0089 in.

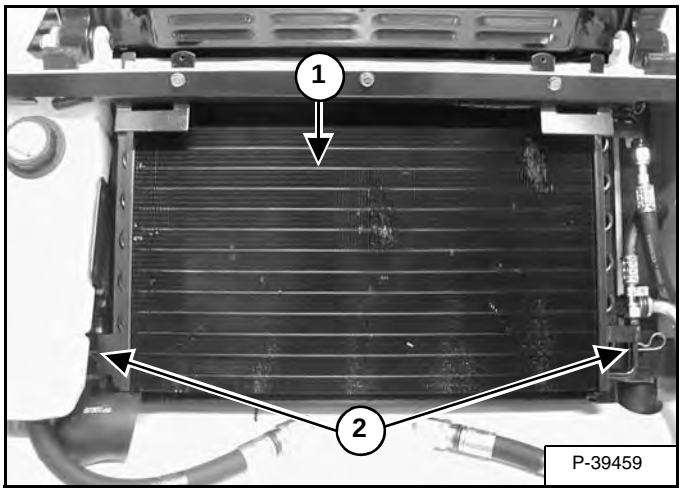
Tightening torque	Oil pump cover screw	7.9 to 9.3 N•m 0.80 to 0.95 kgf·m 5.8 to 6.9 ft.-lb.

Chart


Thermostat
Cold Air Evaporator
5
Evaporator
4
Expansion Valve
Blower
6
1
Compressor
2
Condenser
Pressure Switch
Sight Glass
Fan
Desiccant
3
Receiver Drier
Status of R134a
High Pressure Gas
High Pressure Liquid
Low Pressure Liquid
Low Pressure Gas
B-16691

Cleaning The Condenser

Figure 80-40-9



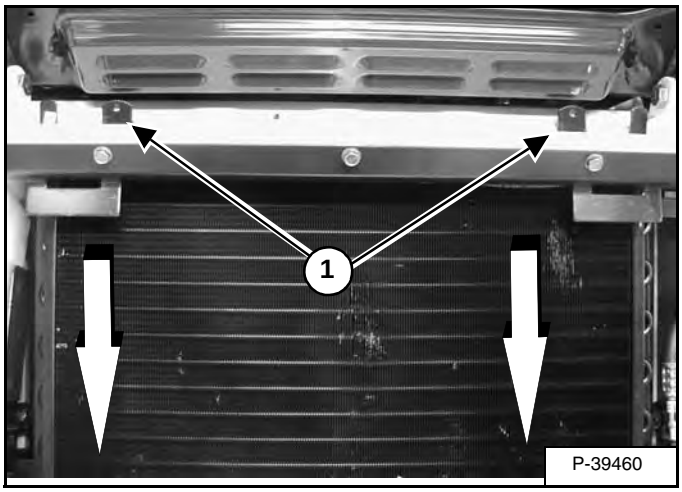
Open the rear door.

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

Check the condenser (Item 1) **[Figure 80-40-9]** for mud or dirt.

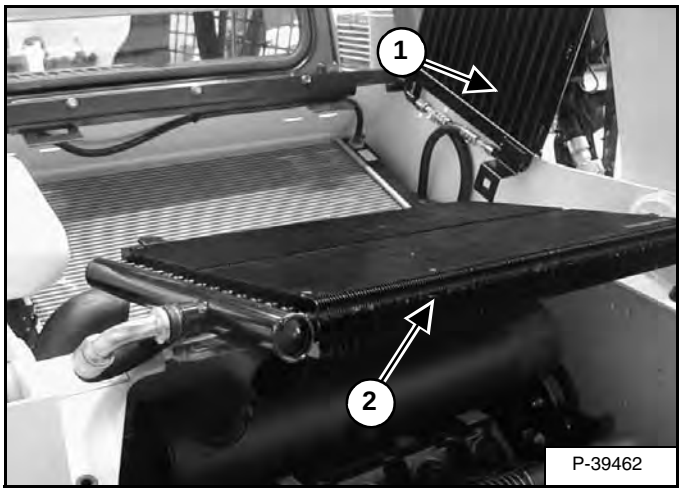
Remove the two retainer clips (Item 2) **[Figure 80-40-9]**.

Figure 80-40-10



Lift the condenser, and slide it toward the rear of the loader until the mounting tabs (Item 1) **[Figure 80-40-10]** clear the frame of the loader.

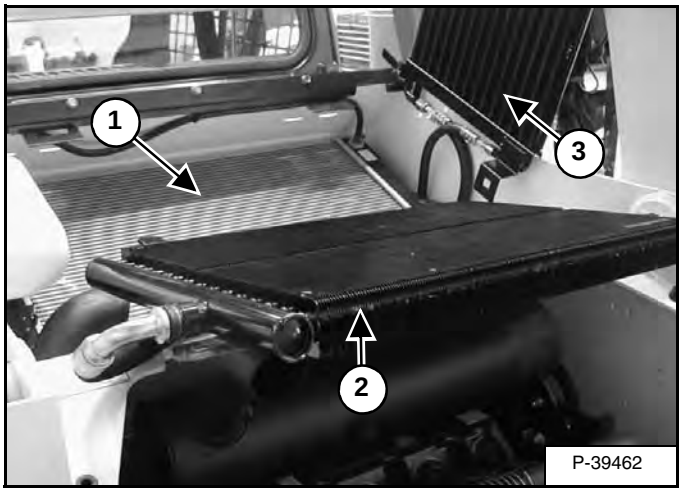
Figure 80-40-11



Rotate the condenser (Item 1) **[Figure 80-40-11]** up against the right side lift arm.

Slide the hydraulic cooler (Item 2) **[Figure 80-40-11]** toward the rear of the loader.

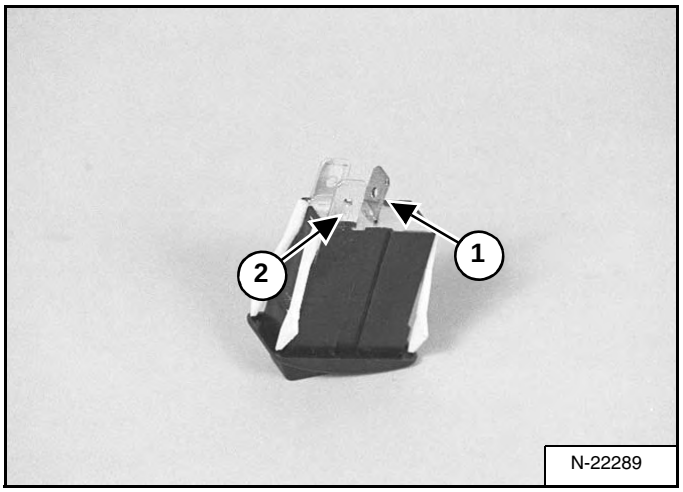
Figure 80-40-12



With water, or air, the radiator (Item 1) the oil cooler (Item 2) and the condenser (Item 3) **[Figure 80-40-12]** can be cleaned.

Checking The Electrical System (Cont'd)

Figure 80-50-28



If there is voltage at the wiring harness, check the A/C switch **[Figure 80-50-28]** for resistance.

With the switch in the OFF position there should be no resistance between any of the three terminals on the A/C switch.

With the switch in the ON position there should be resistance between terminal (Item 1) and terminal (Item 2) **[Figure 80-50-28]**.

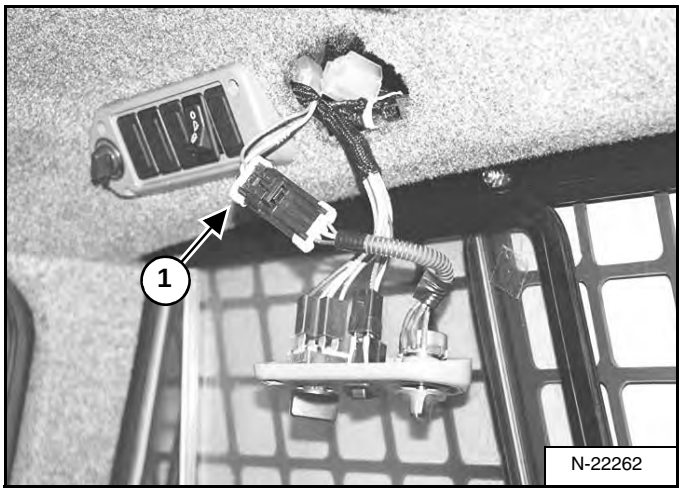
If no resistance value is found, replace the A/C switch.

If a resistance value is found, check the potentiometer.

The potentiometer will effect the A/C system and also effect the operation of the heater.

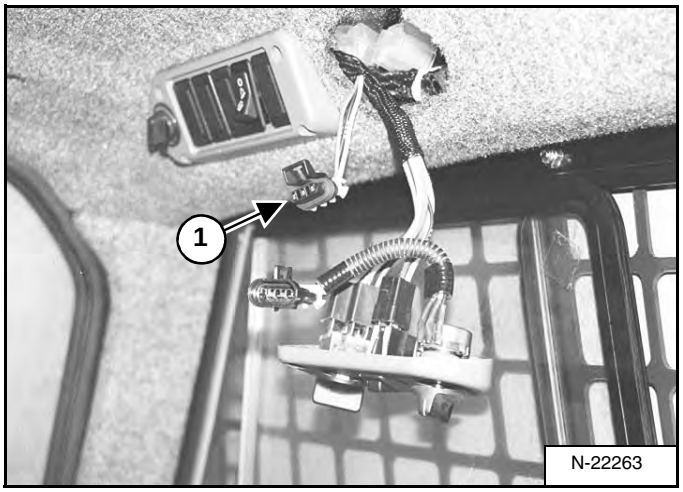
If heater valve does not open, or close, or the A/C does not work, check the potentiometer.

Figure 80-50-29



At the loader cab, disconnect the loader harness (Item 1) **[Figure 80-50-29]** from the potentiometer.

Figure 80-50-30



Check the loader harness (Item 1) **[Figure 80-50-30]** for voltage. The voltage should be 12 volts.

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

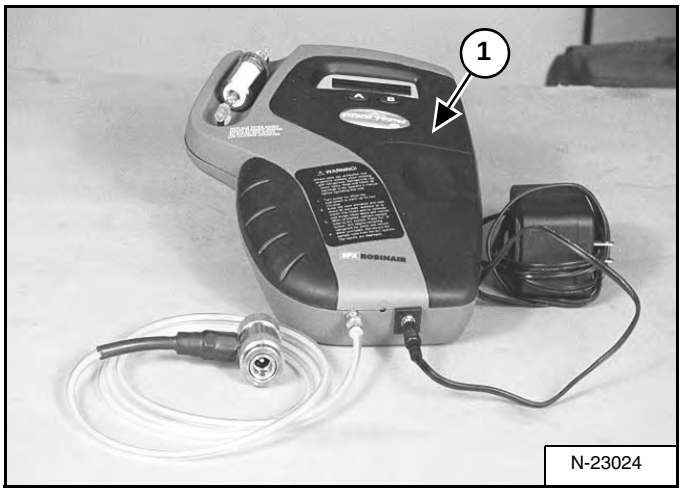
Gauge Pressure Related Troubleshooting (Cont'd)

Possible Cause	Inspection	Solution
High pressure side Too low.		
1. Low refirgerant charge.	The high side pressure will be low and bubbles may be present in sight glass on receive drier.	Repair any leaks and recharge the refrigerant to the correct level.
System pressures Equal		
1. Clutch not operating.	See magnetic clutch related topics above.	
2. Compressor not pumping.	Equal high and low pressures.	Replace compressor.

SYSTEM CHARGING AND RECLAMATION

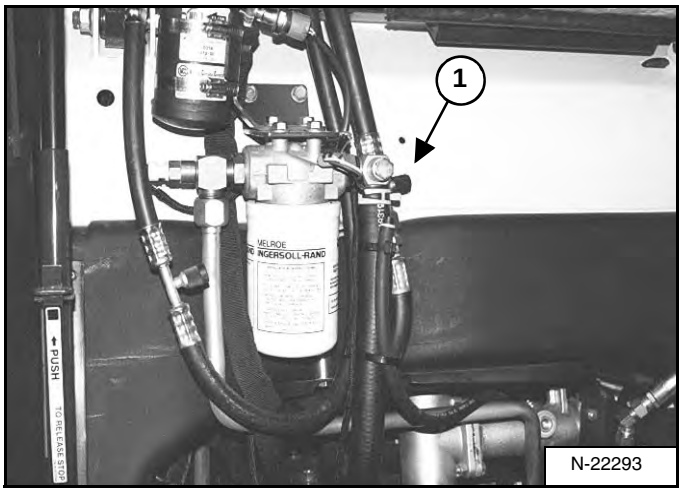
Reclamation Procedure

Figure 80-100-1



NOTE: Before reclaiming a refrigeration system, it is recommended to identify the type of refrigerant that is in the A/C system and if it is pure enough to use. The tool MEL1592, Refrigerant Identifier (Item 1) [Figure 80-100-1] will determine, the kind of refrigerant and any possible harmful or dangerous substances that may be present in the system. Thus preventing mixing of dangerous material with your reclaimed R-134a in your reclaimer, and further contamination to other A/C systems that are reclaimed and charged from your MEL1581 Recovery/Recycling/Recharging Machine.

Figure 80-100-2



Remove the p rotective cap (Item 1) **[Figure 80-100-2]** from the low pressure hose.

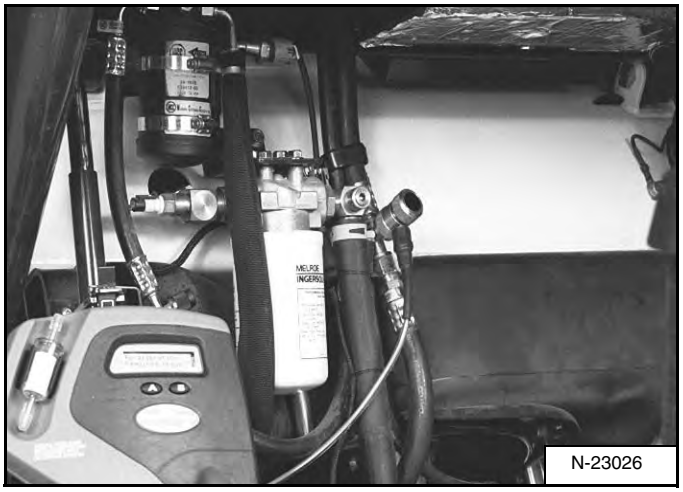
WARNING

In the event of a leakage, wear safety goggles. Escaping refrigerant can cause severe injuries to eyes. In contact with a flame, R134a refrigerant gives a toxic gas.

W-2371-0500

NOTE: This test is run with the loader engine OFF, and the A/C switch in the OFF position.

Figure 80-100-3



Connect the Refrigerant Identifier to the low pressure hose **[Figure 80-100-3]**.

Connect the Refrigerant Identifier to its power source.

Follow the steps displayed on the r efrigerant identifier screen.

Allow 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 loader 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.