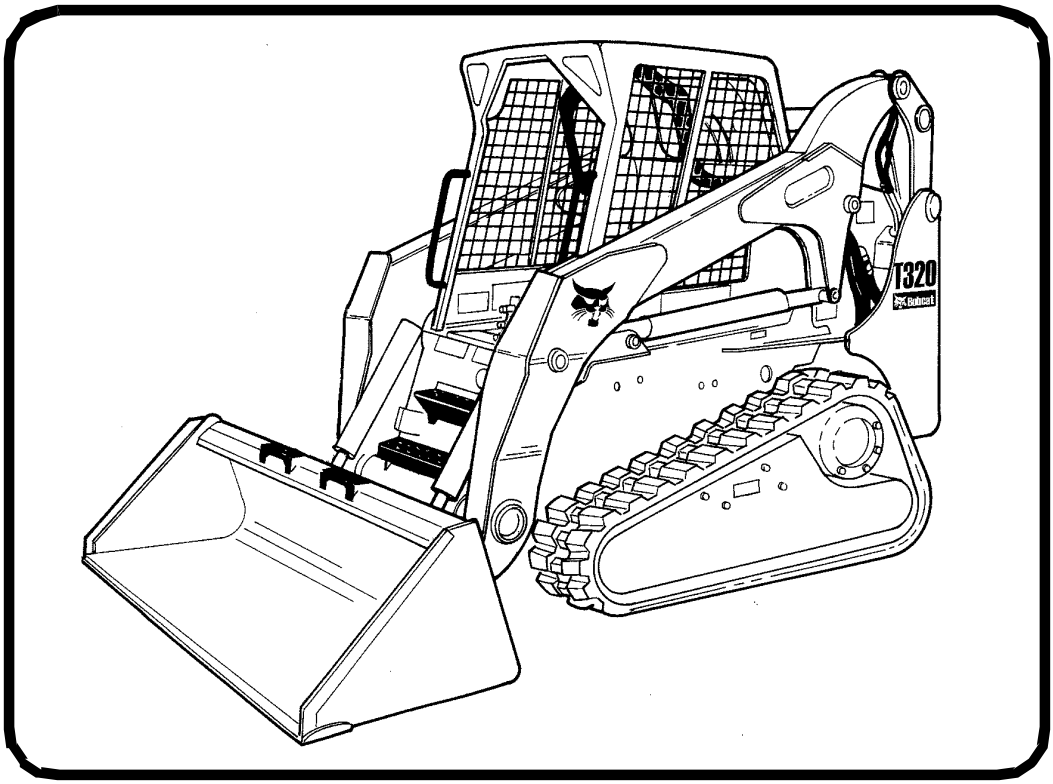
Bobcat®

Service Manual
T320 Compact Track Loader

S/N A7MP60001 & Above
S/N AAKZ11001 & Above



EQUIPPED WITH
BOBCAT INTERLOCK
CONTROL SYSTEM (BICS™)

6987046 (5-11)

Printed in U.S.A.

SAFETY INSTRUCTIONS

Safety Alert Symbol

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

WARNING

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

W-2003-0903

IMPORTANT

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

I-2019-0284

DANGER

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

D-1002-1107

WARNING

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

W-2044-1107

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

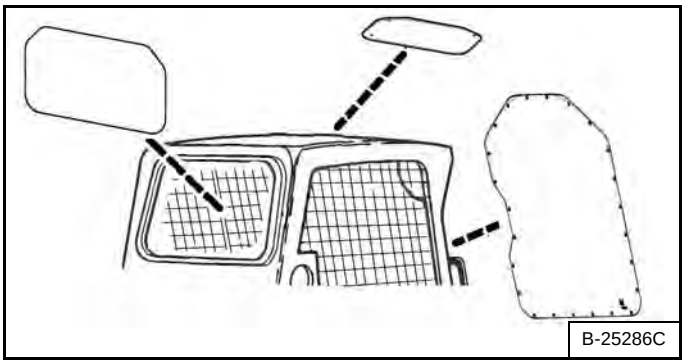
- The Delivery Report is used to assure that complete instructions have been given to the new owner and that the machine is in safe operating condition.
- The Operation & Maintenance Manual delivered with the machine or attachment contains operating information as well as routine maintenance and service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

TIGHTEN ALL HARDWARE PER SIZE TO GRADE 5 (SEE STANDARD TORQUE SPECIFICATIONS FOR BOLTS, SPEC-01 SECTION) TORQUE UNLESS OTHERWISE SPECIFIED.

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

Forestry Door And Window Kit

Figure 10-30-9



Must be used with Forestry Applications Kit to prevent flying debris and objects from entering the loader. Kit includes 3/4 inch thick laminated polycarbonate front door, top and rear windows **[Figure 10-30-9]**.

Forestry Door And Window Kit Inspection And Maintenance

- Inspect for cracks or damage. Replace if required.
- Order P/N 7140090 if door is damaged and needs to be replaced.
- Pre-rinse with water to remove gritty materials.
- Wash with a mild household detergent and warm water.
- Use a sponge or soft cloth. Rinse well with water and dry with a clean soft cloth or rubber squeegee.
- Do not use abrasive or highly alkaline cleaners.
- Do not clean with metal blades or scrapers.

Forestry Door Emergency Exit

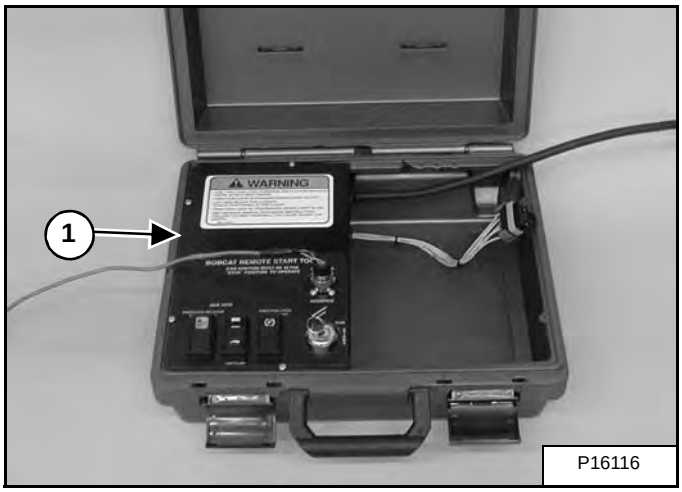
Figure 10-30-10

- Inspect the emergency exit lever (Item 1), linkages and hardware (Item 2) **[Figure 10-30-10]** for loose or damaged parts.
- Repair or replace if necessary.

REMOTE START TOOL KIT-MEL1563 (CONT'D)

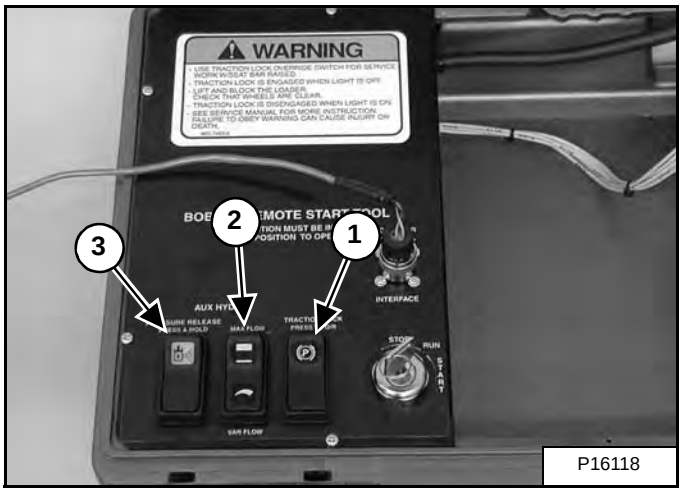
Remote Start Procedure (Cont'd)

Figure 10-60-13



The remote start tool (Item 1) **[Figure 10-60-13]** has three rocker switches.

Figure 10-60-14



The traction lock switch (Item 1) **[Figure 10-60-14]** is used to turn traction lock on or off. Push the switch to the override position. The switch will illuminate to indicate traction lock OVERRIDE, in this position the wheels are able to turn.

The maximum flow / variable flow switch (Item 2) **[Figure 10-60-14]** is used to activate the auxiliary hydraulics. Pressing the switch once will activate variable flow. Pressing the switch again will activate maximum flow. The switch will illuminate to indicate which flow rate is active. Pressing the switch a third time will turn the flow OFF. The switch is used when checking pressures and flow rate.

The auxiliary pressure release (Item 3) **[Figure 10-60-14]** is used to release hydraulic pressure to the front and / or rear auxiliary couplers. To release pressure; push and hold the switch for three seconds.

NOTE: With the engine running; pushing and holding the pressure release switch will cause the engine to stop in three seconds. To relieve the pressure; continue to press the switch after the engine has stopped.

WARNING

AVOID INJURY OR DEATH

- **Use traction lock override switch for service work with seat bar raised.**
- **Traction lock is engaged when light is OFF.**
- **Lift and block the loader. Check that wheels are clear.**
- **Traction lock is disengaged when light is ON.**
- **See Service Manual for more instruction.**

W-2785-0209

SERVICE SCHEDULE

Chart

Maintenance work must be done at regular intervals. Failure to do so will result in excessive wear and early failures. The service schedule is a guide for correct maintenance of the Bobcat loader.

⚠ WARNING

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SERVICE SCHEDULE		HOURS					
ITEM	SERVICE REQUIRED	8-10	50	100	■ 250	■ 500	■ 1000
Engine Oil	Check the oil level and add as needed. Do not overfill.						
Engine Air Filter and Air System	Check display panel. Service only when required. Check for leaks and damaged components.						
Engine Cooling System	Clean debris from oil cooler, radiator and grille. Check coolant level COLD and add premixed coolant as needed.						
Fuel Filter	Remove the trapped water.						
Lift Arms, Cylinders, Bob-Tach Pivot Pins and Wedges	Lubricate with multi-purpose lithium based grease.						
Seat Bar, Control Interlocks, Seat Belt, Seat Belt Retractors	Check the condition of seat belt. Clean or replace seat belt retractors as needed. Check the seat bar and control interlocks for correct operation. Clean dirt and debris from moving parts.						
Bobcat Interlock Control Systems (BICS™)	Check for correct function. Lift and Tilt functions MUST NOT operate with seat bar raised. See details in this Manual.						
Front Horn / Back-up Alarm	Check for proper function.						
Safety Signs and Safety Treads	Check for damaged signs (decals) and safety treads. Replace any signs or safety treads that are damaged or worn.						
Operator Cab	Check the fastening bolts, washers and nuts. Check the condition of the cab.						
Indicators and Lights	Check for correct operation of all indicators and lights.						
Heater and A/C Filters (If Equipped)	Clean or replace filters as needed.						
Hydraulic Fluid, Hoses and Tubelines	Check fluid level and add as needed. Check for damage and leaks. Repair or replace as needed.						
Tracks	Check for damaged or worn tracks and correct tension.	❑					
Track Sprocket Nuts	Check torque. Tighten as needed. See procedure in this manual.						
Parking Brake, Foot Pedals, Hand Controls and Steering Levers or Joysticks	Check for correct operation. Repair or adjust as needed.						
Spark Arrester Muffler	Clean the spark chamber.						
Battery	Check cables, connections and electrolyte level. Add distilled water as needed.						
Steering Lever Pivots	Grease fittings.						
Fuel Filter	Replace filter element.						
Engine / Hydro. Drive Belt	Check for wear or damage. Check idler arm stop.		▲				
Drive Belts (Alternator, air conditioning, water pump)	Check condition and tension. Adjust or replace as needed.						
Bobcat Interlock Control System (BICS™)	Check the function of the lift arm bypass control.						
Engine Oil and Filter	Replace oil and filter.		▲	✶			
Hydraulic / Hydrostatic Filter, Charge Filter, Reservoir Breather	Replace the hydraulic / hydrostatic filter, charge filter, and the reservoir breather.		●				
Hydrostatic Drive Motor	Replace oil with high performance synthetic oil P/N 7003026.						
Hydraulic Reservoir	Replace the fluid.						
Case Drain Filters	Replace the filters.		▲				
Engine Valves	Adjust the engine valves.					❍	
Coolant	Replace the coolant	Every 2 years					

■ **Or every 12 months.**
▲ **Perform at first 50 hours, then as scheduled.**
❑ **Check every 8 - 10 hours for the first 24 hours, then at 50 hour intervals.**
● **Replace the hydraulic / hydrostatic filter element after the first 50 hours, then when service code [M0217] is displayed or as scheduled.**
✶ **Change oil and filter every 100 hours when operating under severe conditions.**
❍ **Perform at first 500 hours, then as scheduled.**

Removing Air From The Fuel System

After replacing the filter element or when the fuel tank has run out of fuel, the air must be removed from the fuel system before starting the engine.

⚠ WARNING

AVOID INJURY OR DEATH

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

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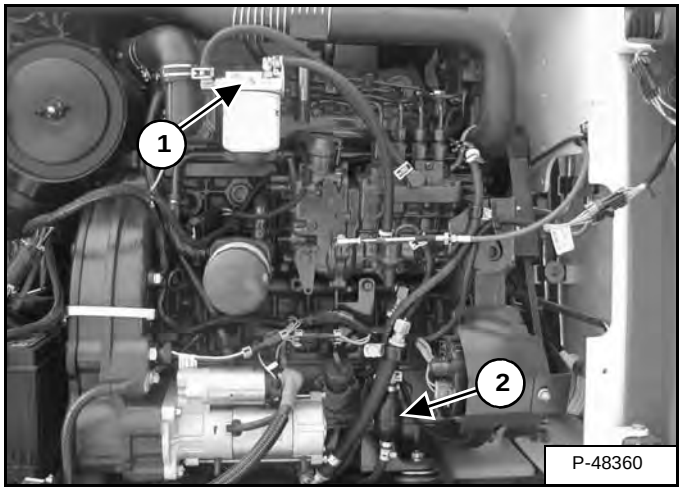
Figure 10-100-4



Open the vent (Item 1) **[Figure 10-100-4]** on the fuel filter housing.

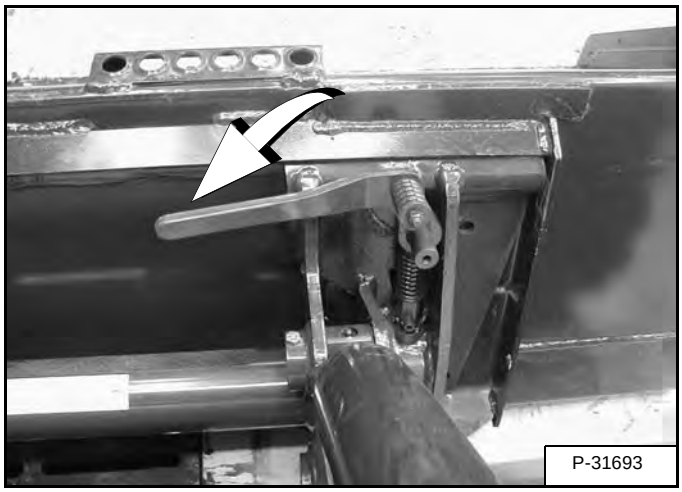
Squeeze the hand pump (priming bulb) (Item 2) **[Figure 10-100-4]** until fuel flows from the vent with no air bubbles.

Close the vent (Item 1) **[Figure 10-100-4]**.

BOB-TACH (HAND LEVER)

Inspection And Maintenance

Figure 10-130-1



Move the Bob-Tach levers down to engage the wedges **[Figure 10-130-1]**.

The levers and wedges must move freely.

⚠ WARNING

AVOID INJURY OR DEATH

The Bob-Tach wedges must extend through the holes in the attachment mounting frame. Levers must be fully down and locked. Failure to secure wedges can allow attachment to come off.

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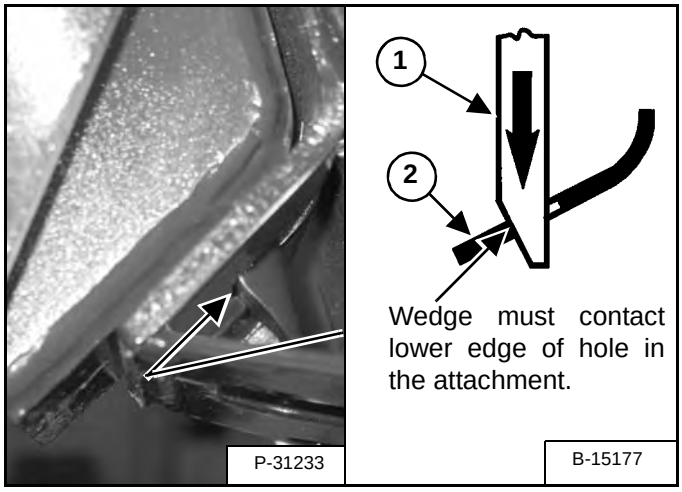
Figure 10-130-2

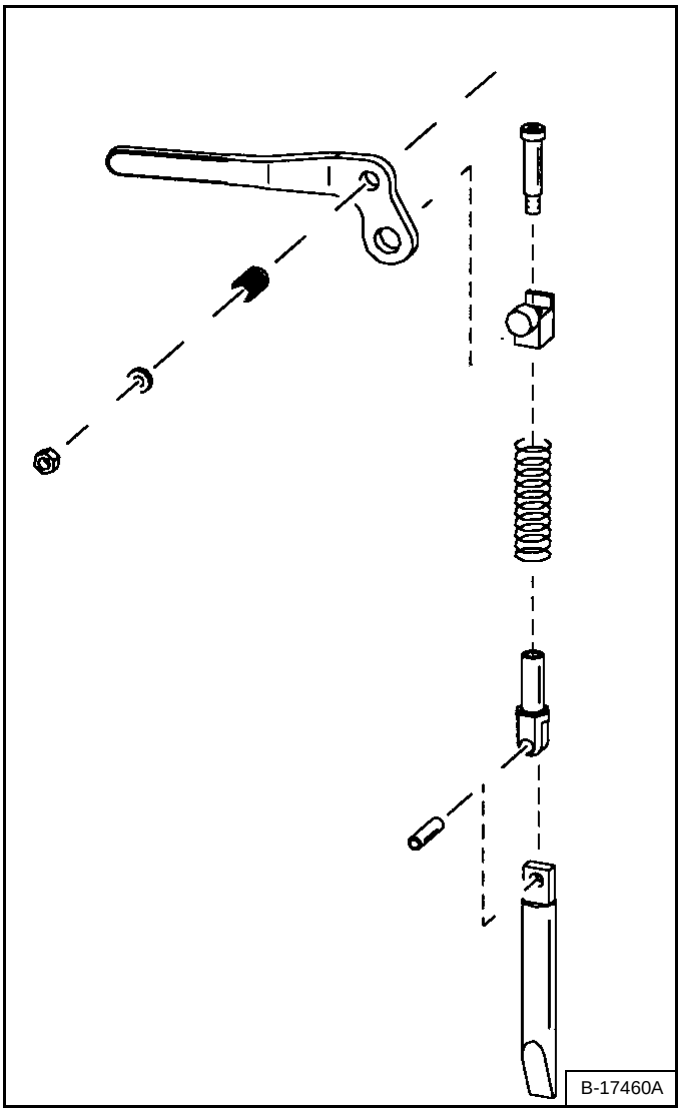


The wedges (Item 1) **[Figure 10-130-2]** must extend through the holes in the attachment mounting frame.

The spring loaded wedge (Item 1) must contact the lower edge of the hole in the attachment (Item 2) **[Figure 10-130-2]**.

If the wedges do not contact the lower edge of the holes **[Figure 10-130-2]**, the attachment will be loose and can come off the Bob-Tach.

Figure 10-130-3



Inspect the mounting frame on the attachment and Bob-Tach, linkages and wedges for excessive wear or damage **[Figure 10-130-3]**. Replace any parts that are damaged, bent or missing. Keep all fasteners tight.

Look for cracked welds. Contact your Bobcat dealer for repair or replacement parts.

Lubricate the wedges. (See SERVICE SCHEDULE on Page 10-70-1) (See LUBRICATING THE LOADER on Page 10-140-1.)

LOADER STORAGE AND RETURN TO SERVICE

Storage

Sometimes it may be necessary to store your Bobcat Loader for an extended period of time. Below is a list of items to perform before storage.

- Thoroughly clean the loader including the engine compartment.
- Lubricate the loader.
- Replace worn or damaged parts.
- Park the loader in a dry protected shelter.
- Lower the lift arms all the way and put the bucket flat on the ground.
- Put blocks under the frame to remove weight from the tracks.
- Put grease on any exposed cylinder rods.
- Put fuel stabilizer in the fuel tank and run the engine a few minutes to circulate the stabilizer to the pump and fuel injectors.

  If biodiesel blend fuel has been used, perform the following:

  Drain the fuel tank, refill with 100% petroleum diesel fuel, add fuel stabilizer and run the engine for at least 30 minutes.
- Drain and flush the cooling system. Refill with premixed coolant.
- Replace all fluids and filters (engine, hydraulic / hydrostatic).
- Replace air cleaner, heater and air conditioning filters.
- Put all controls in neutral position.
- Remove the battery. Be sure the electrolyte level is correct then charge the battery. Store it in a cool dry place above freezing temperatures and charge it periodically during storage.
- Cover the exhaust pipe opening.
- Tag the machine to indicate that it is in storage condition.

Return To Service

After the Bobcat Loader has been in storage, it is necessary to follow a list of items to return the loader to service.

- Check the engine and hydraulic oil levels; check coolant level.
- Install a fully charged battery.
- Remove grease from exposed cylinder rods.
- Check all belt tensions.
- Be sure all shields and guards are in place.
- Lubricate the loader.
- Check track condition and remove blocks from under frame.
- Remove cover from exhaust pipe opening.
- Start the engine and let run for a few minutes while observing the instrument panels and systems for correct operation.
- Operate machine, check for correct function.
- Stop the engine and check for leaks. Repair as needed.

HYDRAULIC SYSTEM (CONT'D)

Continued On Next Page

HYDRAULIC/HYDROSTATIC SCHEMATIC
WITH SJC AND HIGH FLOW OPTION
T320 (S/N A7MP60001 AND ABOVE)
(S/N AAKZ60001 AND ABOVE)

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(PRINTED MARCH 2008)
V-1191legend

LEGEND

1. RESERVOIR:
   Capacity . . . . . 18.8 qt. (17,8 L)
   System Capacity . 52 qt. (49,2 L)
2. SPRING LOADED FILTER BY-PASS VALVE: 45-55 PSI (3,1-3,8 bar)
3. DIFFERENTIAL PRESSURE SWITCH: 36-44 PSI (2,5-3,0 bar) Normally Closed
4. DRIVE MOTOR SHUTTLE VALVE
5. RELIEF/REPLENISHING VALVE - HIGH PRESSURE: 5075 PSI (350 bar)
6. RELIEF VALVE - CHARGE INLET: 360 PSI (24,8 bar) at High Engine Idle With 140 degrees F. (60 degrees C.) Fluid
7. FRONT AUXILIARY MANUAL PRESSURE BLEED-OFF VALVE
8. HYDRAULIC PUMP . . . . . Gear Type 21.2 GPM (80,2 L/min.) at High Engine Idle
9. RELIEF VALVE - MAIN: 3250-3350 PSI (224-231 bar) at Front Quick Couplers
10. PORT RELIEF/ANTICAVITATION VALVE 4000 PSI (276 bar)
11. ANTICAVITATION VALVE
12. SOLENOID ACTIVATED DIRECTIONAL CONTROL VALVE - AUXILIARY
13. PORT RELIEF/ANTICAVITATION VALVE: . . . . . (Optional) 3500 PSI (241,3 bar)
14. LOAD CHECK VALVE
15. LIFT CYLINDER SPOOL - MADE TO RESTRICT FLOW DURING BOOM DOWN BUT NOT DURING BOOM UP
16. SOLENOID ACTIVATED DIRECTIONAL CONTROL VALVE - BICS CONTROL
17. PILOTED ACTIVATED DIRECTIONAL CONTROL VALVE - TILT CONTROL
18. PILOTED ACTIVATED DIRECTIONAL CONTROL VALVE - LIFT CONTROL
19. PULL BUTTON ACTIVATED DIRECTIONAL CONTROL VALVE - LIFT ARM BY-PASS
20. PILOTED ACTIVATED DIRECTIONAL CONTROL VALVE - UNLOADING SPOOL
21. PILOTED ACTIVATED DIRECTIONAL CONTROL VALVE - FLOW CONTROL SPOOL
22. FLOW DIVIDER ADJUSTMENT VALVE
23. SOLENOID ACTIVATED DIRECTIONAL CONTROL VALVE - BASE
24. SOLENOID ACTIVATED DIRECTIONAL CONTROL VALVE - ROD
25. LOAD SHUTTLE VALVE - BLEED OFF
26. SOLENOID ACTIVATED DIRECTIONAL CONTROL VALVE - TWO COIL
27. PILOT ACTIVATED DIRECTIONAL CONTROL VALVE - REAR AUXILIARY
28. RESTRICTOR - 0.031 inch (0,8 mm)
29. RELIEF VALVE: 3300 PSI (228 bar)
30. HYDRAULIC BRAKE - SPRING APPLIED - PRESSURE RELEASE
31. FILTER - HYDRAULIC (CANISTER)
32. FILTER - CASE DRAIN (SINTERED BRONZE)
33. FILTER - BICS CONTROL VALVE (SCREEN)
34. CHECK VALVE - BUCKET POSITION VALVE
35. RESTRICTION
36. VARIABLE CAPACITY DISPLACEMENT BI-DIRECTIONAL HYDROSTATIC PUMP
37. SHUTTLE RELIEF VALVE (Not Adjustable - Factory Set) 65 PSI (4,5 bar)
38. FIXED CAPACITY DISPLACEMENT BI-DIRECTIONAL HYDROSTATIC MOTOR
39. CHECK VALVE - With 80 PSI (5,5 bar) Spring
40. SOLENOID ACTIVATED DIRECTIONAL CONTROL VALVE - BUCKET POSITION VALVE (ON/OFF)
41. CHECK VALVE - BICS CONTROL VALVE
42. RESTRICTION - 0.343 inch (8,7 mm)
43. FILTER - Bob-Tach Valve
44. PILOT ACTIVATED DIRECTIONAL CONTROL VALVE - HYDRAULIC POWERED BOB-TACH
45. RESTRICTION - 0.089 inch (2,26 mm)
46. RESTRICTION - 0.025 inch (0,6 mm)
47. RELIEF VALVE - 2000 PSI (137 bar)
48. RELIEF VALVE - 1200 PSI (83 bar)
49. SOLENOID ACTIVATED DIRECTIONAL CONTROL VALVE (TWO COIL)
50. RELIEF VALVE - 3675 PSI (253 bar)
51. DUMP VALVE - (ON/OFF)
52. CHECK VALVE
53. AUXILIARY HYDRAULIC PUMP - 15.8 GPM (59,9 L/min) at High Engine Idle
54. CHECK VALVE - With 300 PSI (20,7 bar) Spring with 0.016 inch (0,40 mm) orifice
55. SOLENOID ACTIVATED CONTROL VALVE - FORWARD/REVERSE
56. SERVO PISTON -Swash Plate
57. POSITION SENSOR -Swash Plate
58. CHARGE PRESSURE SENSOR
59. CHARGE PUMP - 14.2 GPM (53,7 L/min) at High Engine Idle
60. FIXED CAPACITY DISPLACEMENT HYDRAULIC MOTOR
61. ANTICAVITATION VALVE
62. PROPORTIONAL RELIEF VALVE – (Fan Speed Regulator): 1566 - 1784 PSI (108 - 123 bar)
63. CHECK VALVE
64. SOLENOID ACTIVATED DIRECTIONAL CONTROL VALVE - BRAKE
65. FILTER - HYDRAULIC
66. SPRING LOADED FILTER BY-PASS VALVE: 75-83 PSI (5,2-5,7 bar)

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

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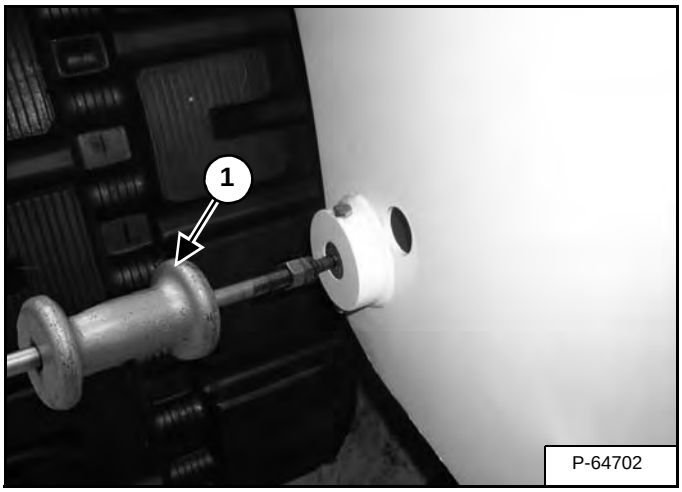
Removal And Installation (Cont'd)

Figure 20-20-7



Install a slide hammer (Item 1) **[Figure 20-20-7]** and remove the base end pivot pin.

Remove the lift cylinder.

⚠ WARNING

AVOID INJURY OR DEATH

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

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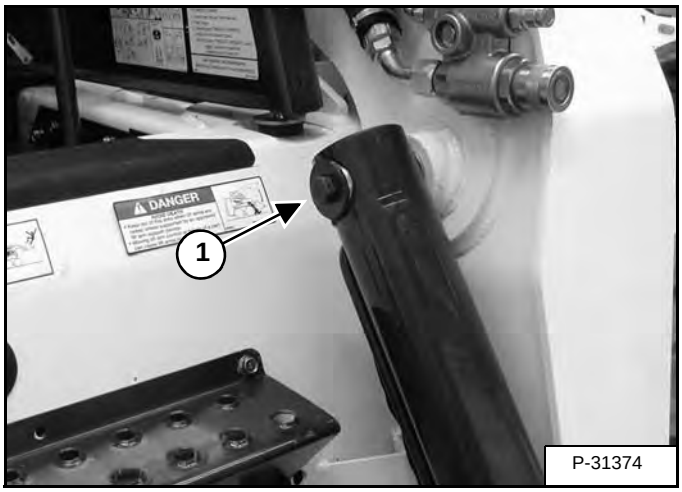
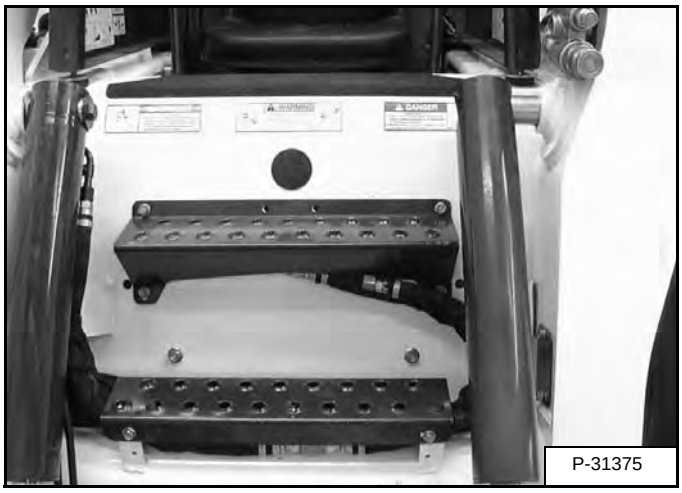
Removal And Installation (Cont'd)

Figure 20-21-7



Remove the base end pivot bolt and washer (Item 1) **[Figure 20-21-7]**.

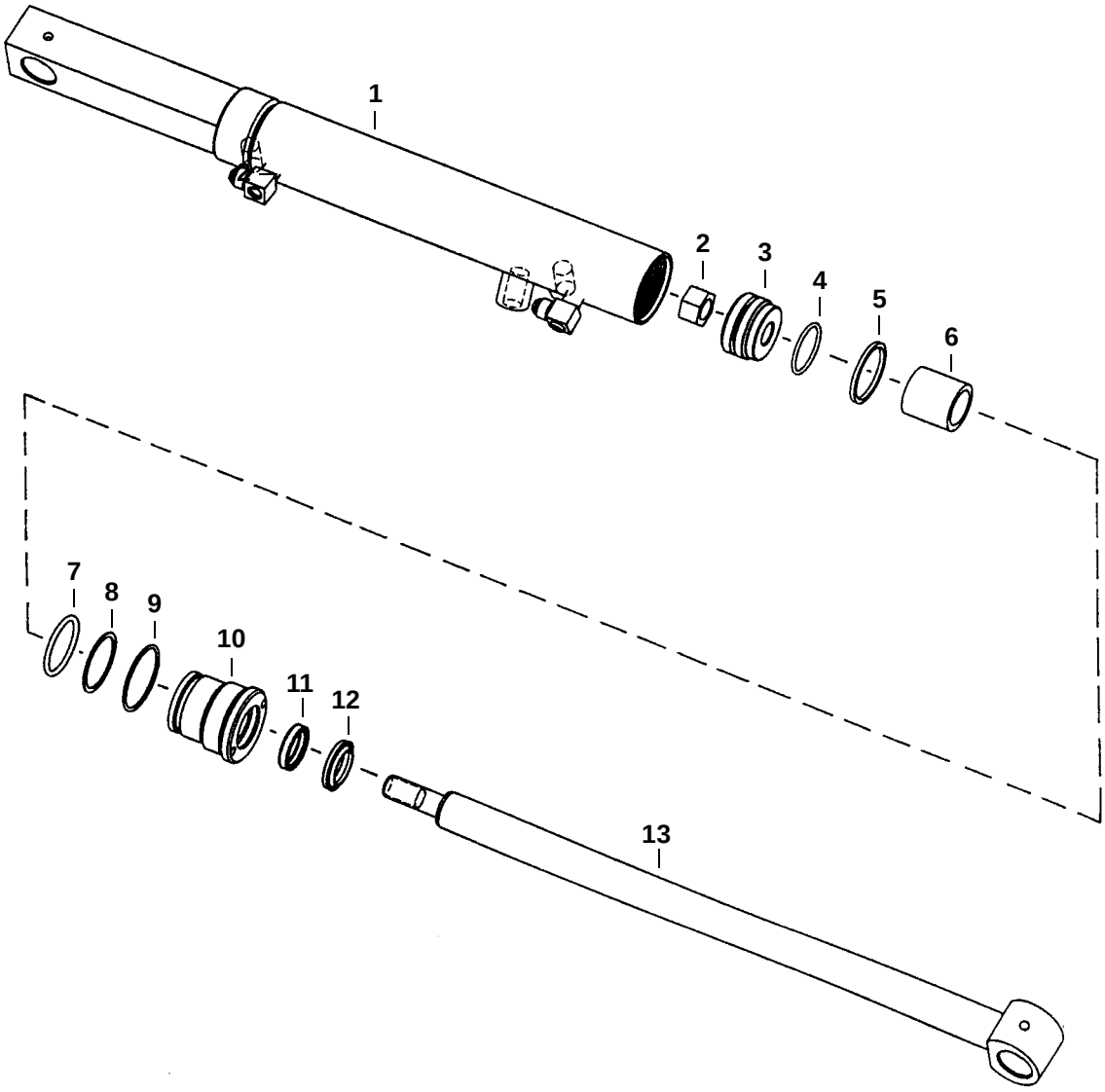
Figure 20-21-8



Slide the cylinder from the base pin and remove the tilt cylinder from the loader **[Figure 20-21-8]**.

Parts Identification

1. Cylinder
2. Nut
3. Piston
4. O-ring
5. Ring
6. Spacer
7. O-ring
8. Ring
9. O-ring
10. Head
11. Seal
12. Seal
13. Rod



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Removal And Installation

IMPORTANT

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

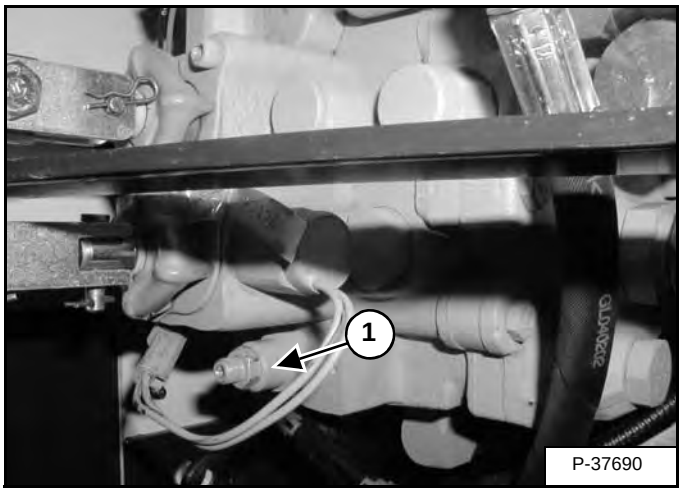
I-2003-0888

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

Clean the area around the control valve.

NOTE: This procedure is for standard loaders, loaders equipped with ACS option and loaders equipped with SJC option. The main relief valve is located in the same place on all of the loaders.

Figure 20-30-6



NOTE: The right side motor cover if removed may provide better access to the main relief valve on some machines.

The main relief valve (Item 1) **[Figure 20-30-6]** is located at the lower front of the control valve below the lift and tilt spool connections.

Loosen and remove the main relief valve (Item 1) **[Figure 20-30-6]**.

Figure 20-30-7

Remove the O-rings and back-up washers from the main relief valve **[Figure 20-30-7]**.

Clean the main relief valve in clean solvent. Use air pressure to dry the valve.

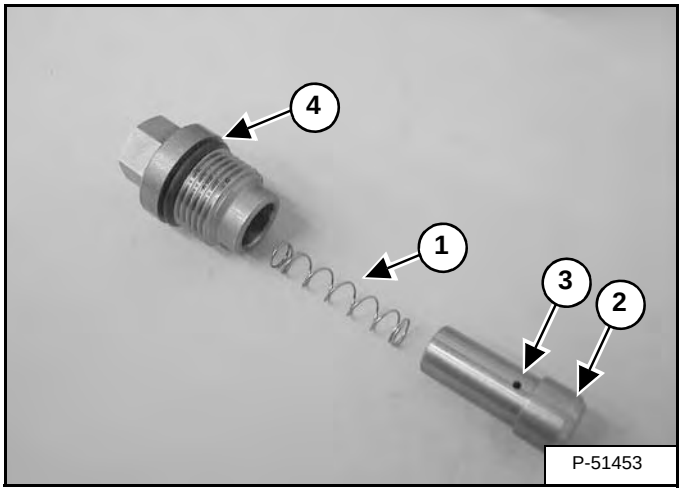
Install new O-rings and back-up washers. Install the main relief valve and tighten **[Figure 20-30-7]**.

Installation: Tighten the main relief valve to 35 - 40 ft.-lb. (47 - 54 N•m) torque.

Check the pressure again. (See Testing on Page 20-30-2.)

Anti-Cavitation Valve Removal And Installation (Lift, Rod End) (Cont'd)

Figure 20-40-24



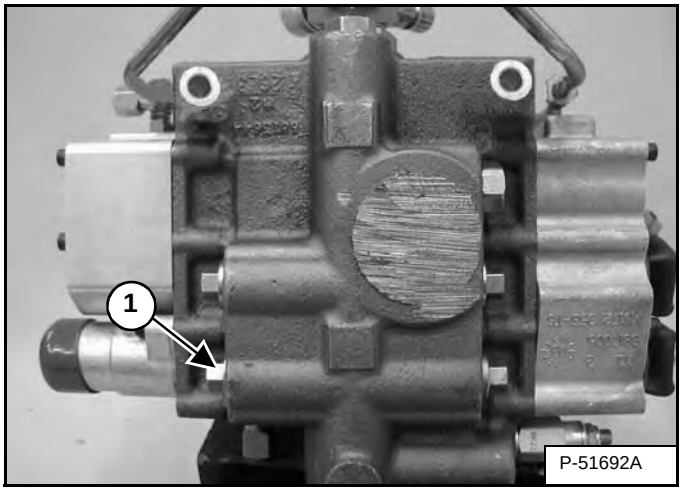
Remove the spring (Item 1) and poppet (Item 2) **[Figure 20-40-24]**.

Check the orifice (Item 3) **[Figure 20-40-24]** in the poppet to be sure it is not plugged.

Installation: Install a new O-ring (Item 4) **[Figure 20-40-24]** on the plug and lightly lubricate with oil before installing. Tighten the plug to 38 - 45 ft.-lb. (52 - 61 N•m) torque.

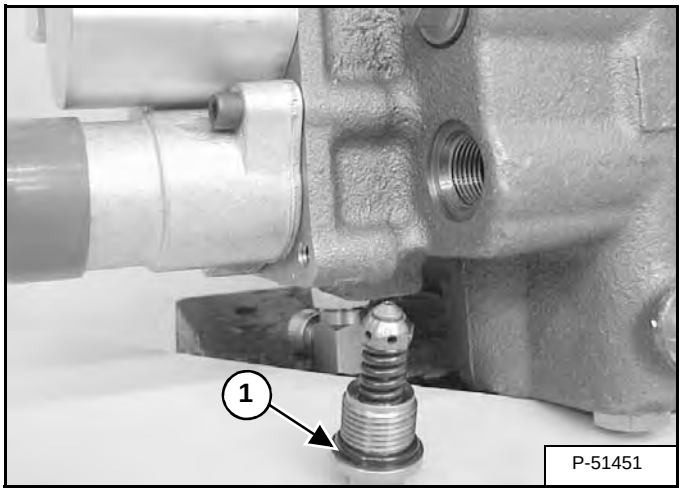
Port Relief / Anti-Cavitation Valve Removal And Installation (Lift, Base End)

Figure 20-40-25



Loosen the lift circuit port relief / anti-cavitation valve (Item 1) **[Figure 20-40-25]**.

Figure 20-40-26

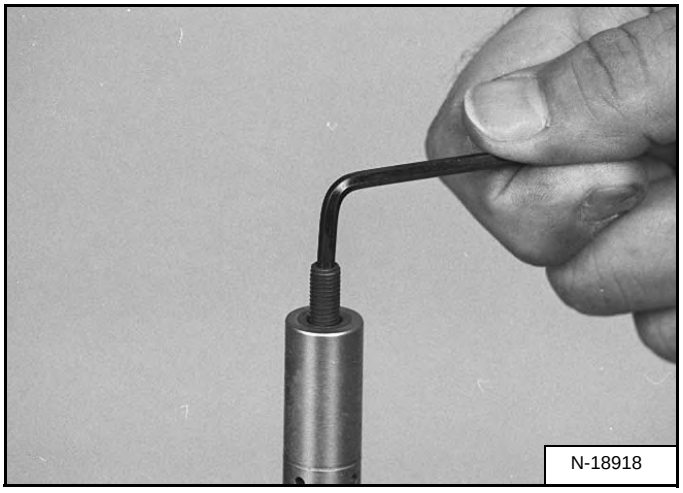


Replace the O-ring (Item 1) **[Figure 20-40-26]** before installation.

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

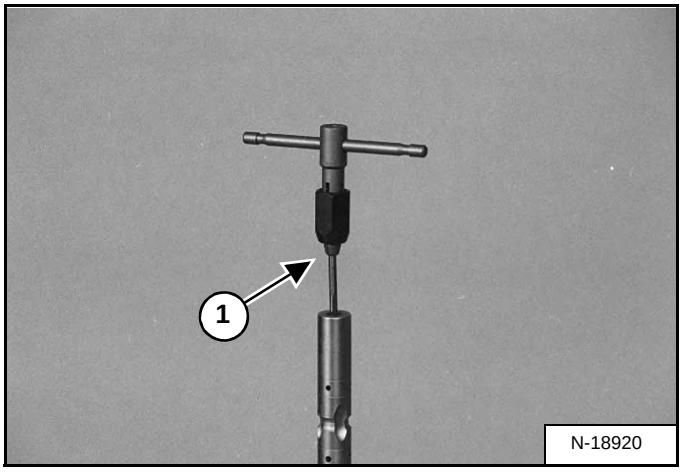
Lift Spool And Detent Removal And Installation (Cont'd)

Figure 20-40-60



Remove the stud from the end of the spool **[Figure 20-40-60]**.

Figure 20-40-61



Removal of the plastic plug:

Make a center point in the plug using a 1/16 in. drill.

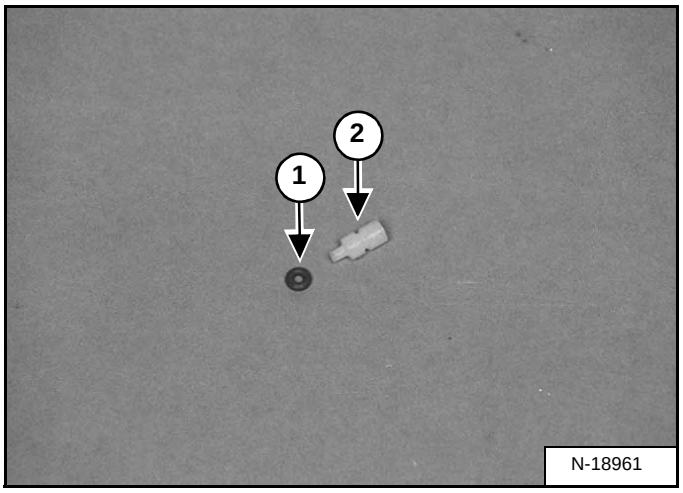
Drill a hole all the way through the plug using a 7/64 in. tap drill

Turn a 6-32 tap (Item 1) **[Figure 20-40-61]** into the plug. Pull the tap and plug out of the spool. Be careful, do not break the tap.

Clean all the debris from inside the spool bore.

NOTE: DO NOT USE Loctite® ON THE STUD THREADS.

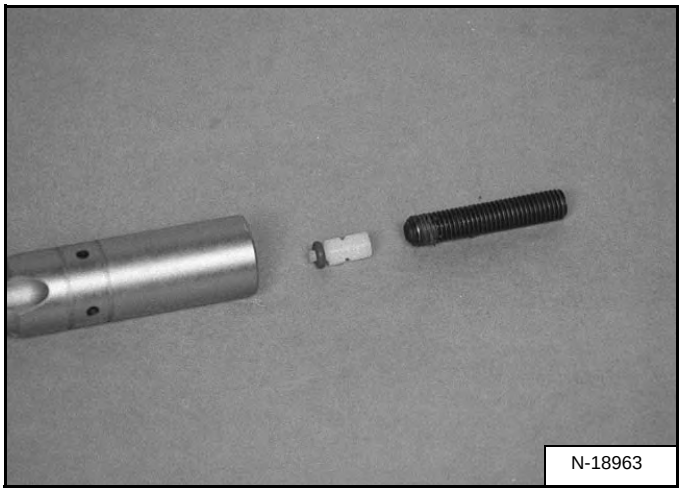
Figure 20-40-62



Install the O-ring (Item 1) over the nipple on the plastic plug (Item 2) **[Figure 20-40-62]**.

NOTE: Check the O-ring for damage. The lift spool will have an internal leak if there is damage to this O-ring. Always replace the O-ring and recheck the lift spool before the control valve is replaced.

Figure 20-40-63

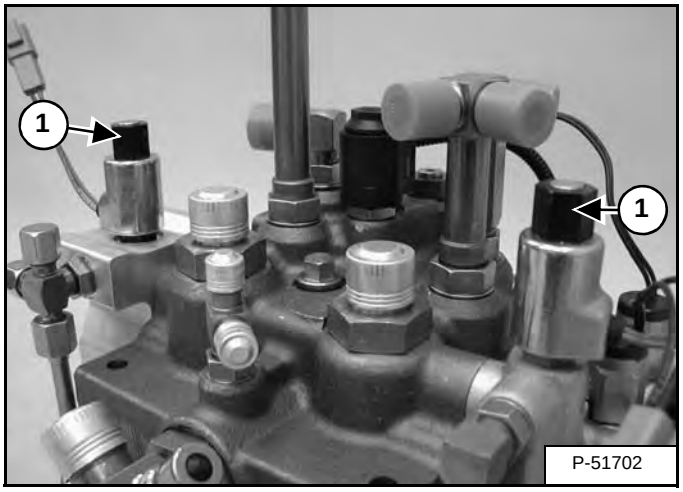


Install the plastic plug and O-ring in the spool **[Figure 20-40-63]**.

HYDRAULIC CONTROL VALVE (STANDARD) (CONT'D)

Auxiliary Solenoid Removal And Installation (S/N A7MP62999 & Below And AAKZ34999 & Below)

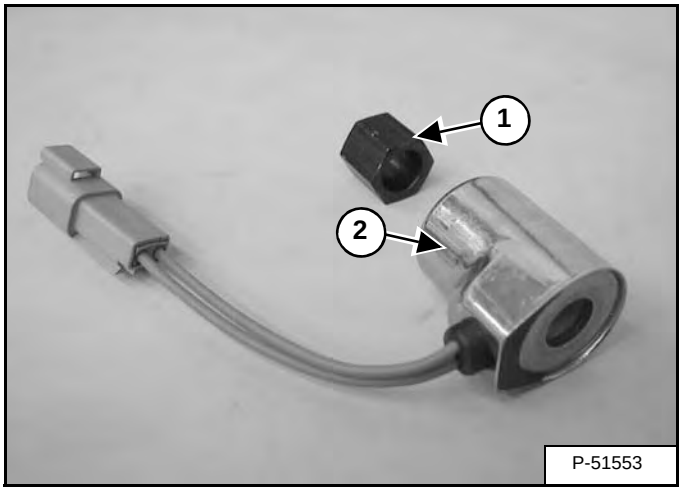
Figure 20-40-97



Remove the nut (Item 1) **[Figure 20-40-97]** from both solenoids.

Installation: Tighten the nut to 48 - 72 in.-lb. (5 - 8 N•m) torque.

Figure 20-40-98

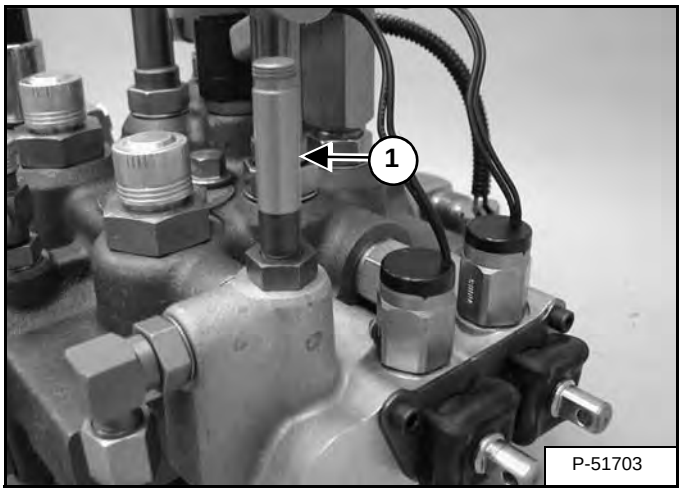


Remove the nut (Item 1) and solenoid coil (Item 2) **[Figure 20-40-98]**.

Use an ohmmeter to measure the solenoid coil resistance.

The correct resistance for the coil is 4.9 ± 0.25 ohm.

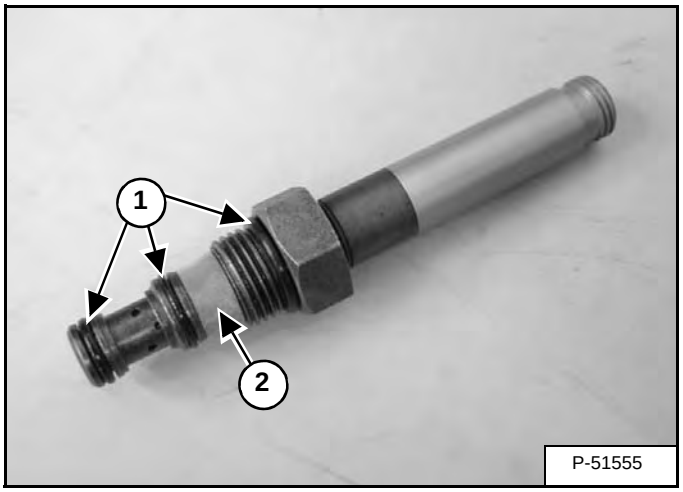
Figure 20-40-99



Remove the solenoid stem (Item 1) **[Figure 20-40-99]**.

Installation: Tighten the stem to 10 - 14 ft.-lb. (14 - 19 N•m) torque.

Figure 20-40-100



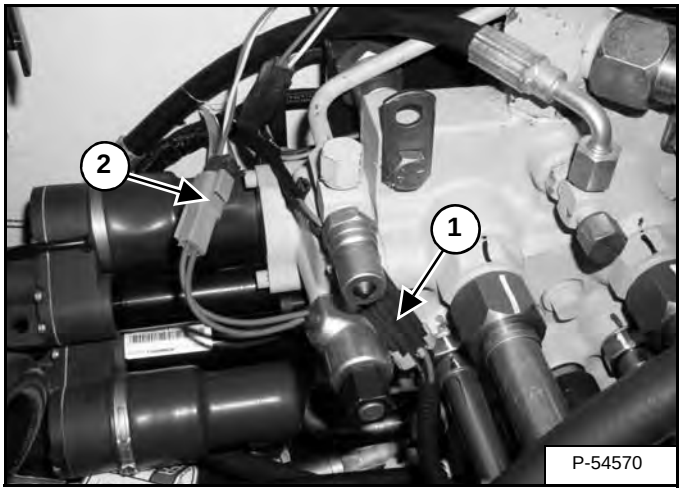
Remove the O-rings (Item 1) **[Figure 20-40-100]** from the solenoid stem.

Check and clean the screen (Item 2) **[Figure 20-40-100]**.

HYDRAULIC CONTROL VALVE (ACS) OR (SJC) (CONT'D)

Removal And Installation (Cont'd)

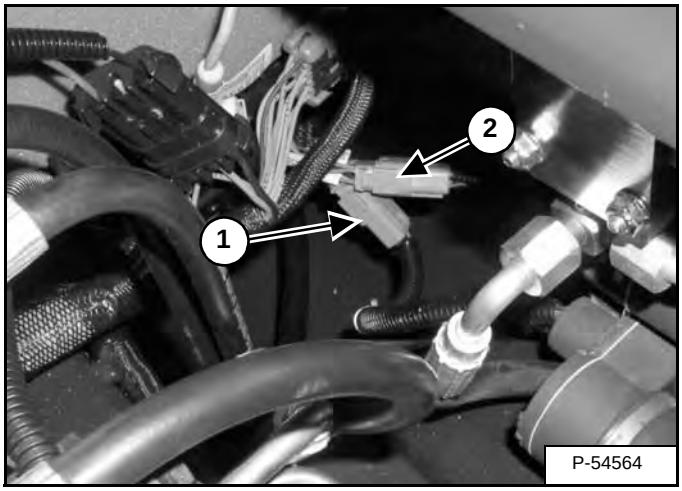
Figure 20-41-5



Mark the two wire connectors for proper installation.

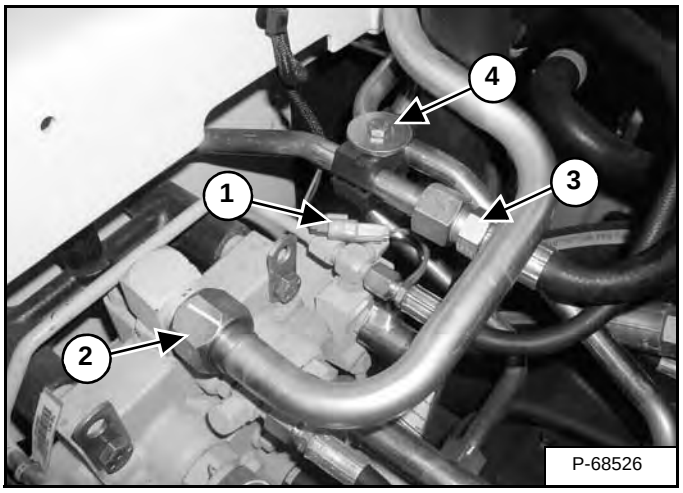
Disconnect the wire harness connector (Item 1) from the BICS™ valve solenoid and (Item 2) from auxiliary valve solenoid **[Figure 20-41-5]**.

Figure 20-41-6



Disconnect the lift and tilt actuator electrical connectors (Item 1) and (Item 2) **[Figure 20-41-6]** from the control valve.

Figure 20-41-7



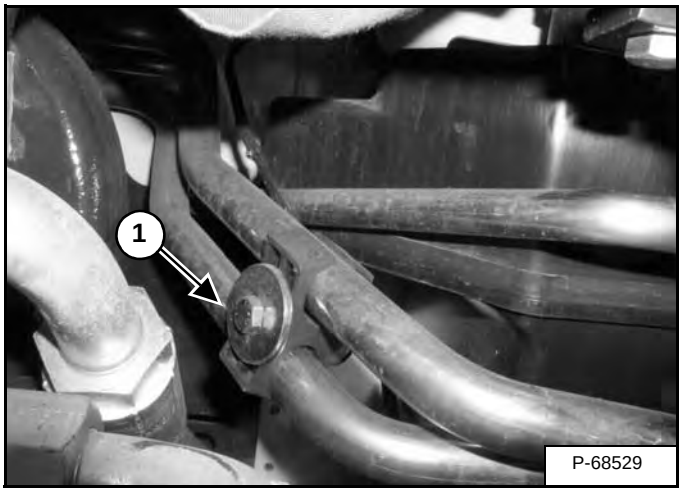
Disconnect the harness connector (Item 1) **[Figure 20-41-7]** from the auxiliary valve solenoid.

Disconnect the tubeline (Item 2) **[Figure 20-41-7]** that goes from the control valve to the hydraulic cooler.

Disconnect the hose (Item 3) **[Figure 20-41-7]** that goes from the gear pump to the control valve.

Remove the tubeline clamp (Item 4) **[Figure 20-41-7]**.

Figure 20-41-8

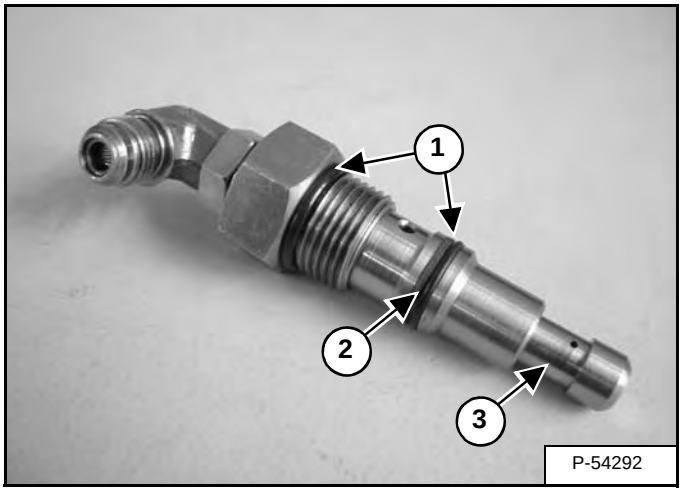


Remove the tubeline clamp (Item 1) **[Figure 20-41-8]** located on the auxiliary tubelines between the hydraulic reservoir and the hydrostatic pump.

Removing this clamp will allow more movement in the auxiliary tubelines for removing the control valve from the loader.

Lift Load Check Valve Removal And Installation (Cont'd)

Figure 20-41-32

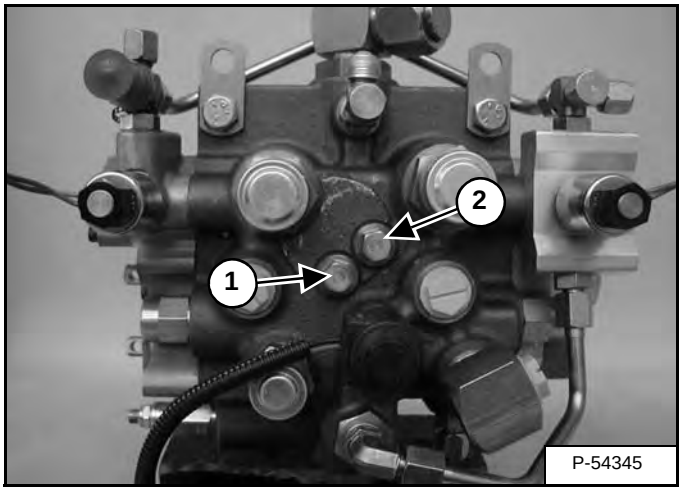


Remove and install new O-rings (Item 1) and back-up ring (Item 2) **[Figure 20-41-32]**.

Check the load check valve (Item 3) **[Figure 20-41-32]**.

Load Check Valve Removal And Installation (Tilt And Auxiliary)

Figure 20-41-33

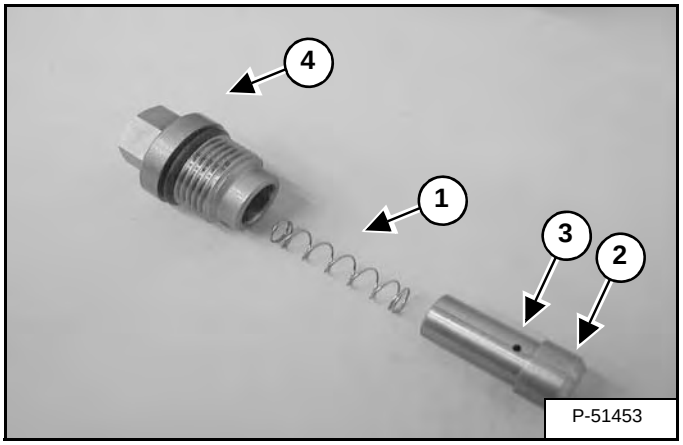


At the front side of the control valve locate the tilt section load check valve (Item 1) **[Figure 20-41-33]**.

At the front side of the control valve locate the auxiliary section load check valve (Item 2) **[Figure 20-41-33]**.

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

Figure 20-41-34



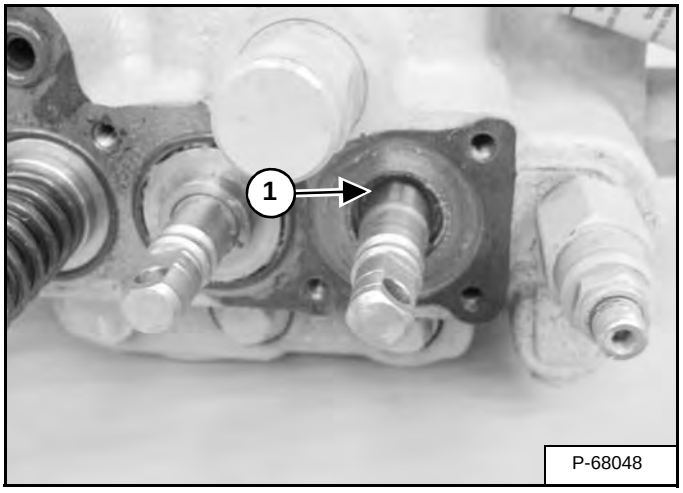
Remove the spring (Item 1) and poppet (Item 2) **[Figure 20-41-34]**.

Check the orifice (Item 3) **[Figure 20-41-34]** in the poppet to be sure it is not plugged.

Installation: Install a new O-ring (Item 4) **[Figure 20-41-34]** on the plug and lightly lubricate with oil before installing. Tighten the plug to 38 - 45 ft.-lb. (52 - 61 N•m) torque.

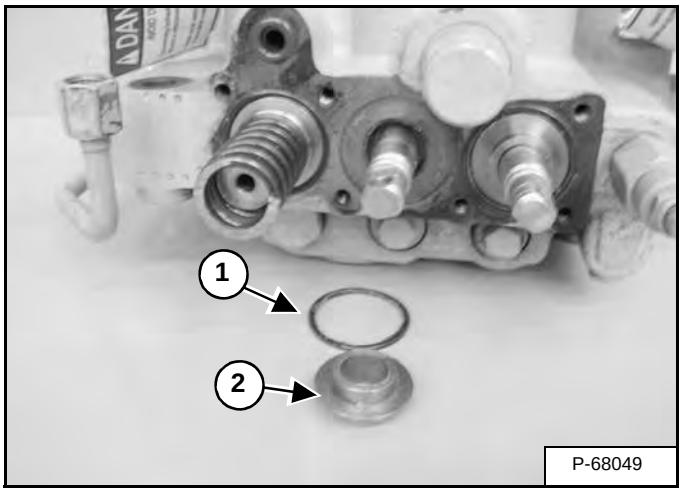
Lift Spool And Detent Removal And Installation (Cont'd)

Figure 20-41-69



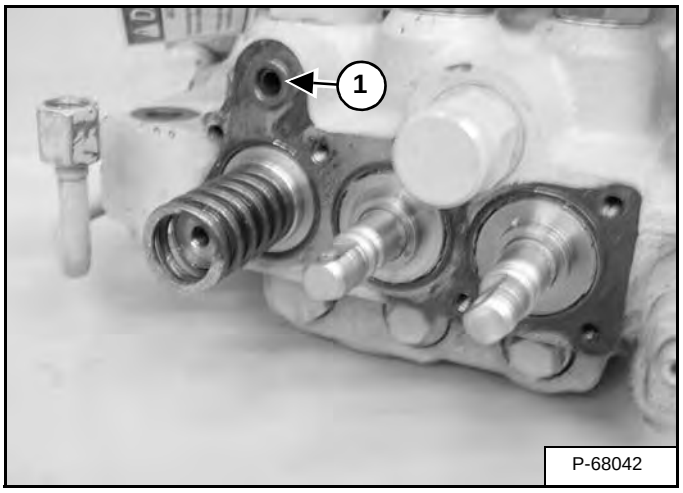
Install the spool seal (Item 1) **[Figure 20-41-69]** on the linkage end of the valve.

Figure 20-41-70



Install the O-ring (Item 1) and bushing (Item 2) **[Figure 20-41-70]** on the lift spool.

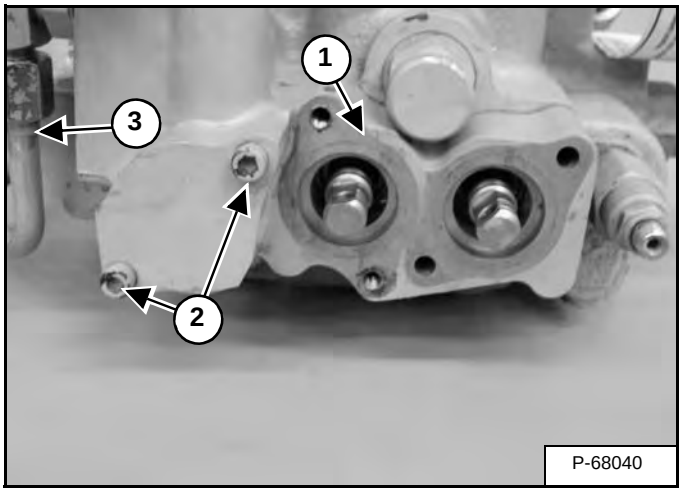
Figure 20-41-71



Install the O-ring (Item 1) **[Figure 20-41-71]** on the control valve.

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

Figure 20-41-72



Install the end cap block (Item 1) and the two mount bolts (Item 2) **[Figure 20-41-72]**.

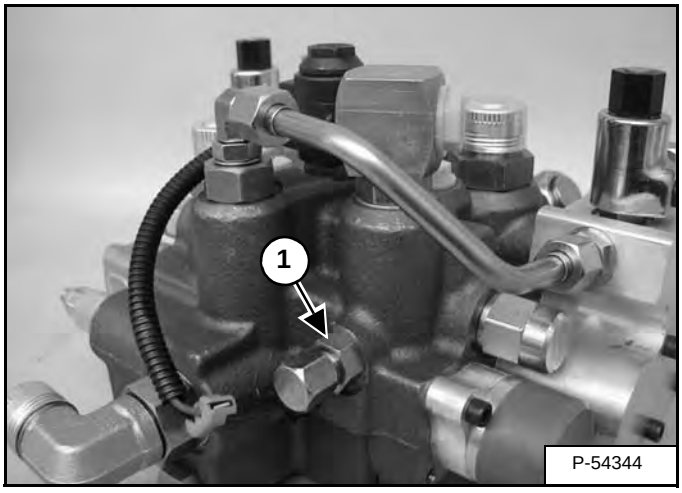
Installation: Tighten the screws to 90 - 100 in.-lb. (10,2 - 11,3 N•m) torque.

Connect the tubeline (Item 3) **[Figure 20-41-72]** to the end cap block.

Install the lift and tilt actuators to the control valve.

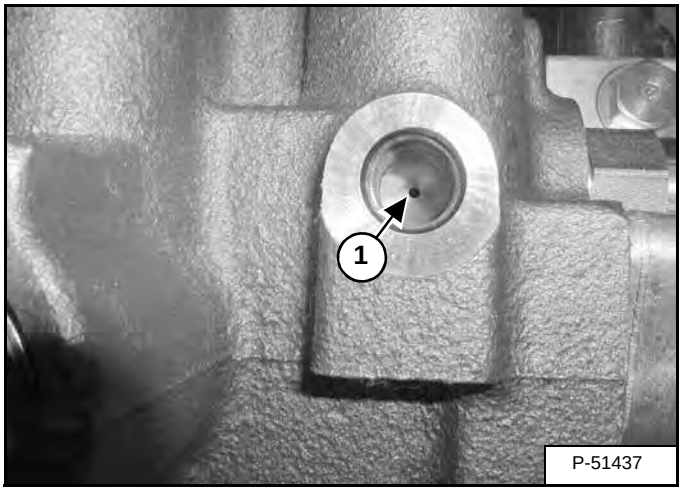
Lift Arm Bypass Orifice Removal And Installation

Figure 20-41-102



Remove the fitting (Item 1) **[Figure 20-41-102]** from the valve.

Figure 20-41-103

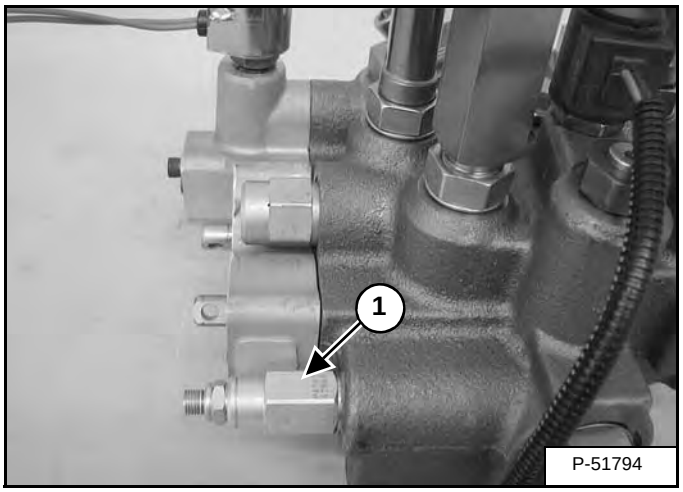


Check the lift arm bypass orifice (Item 1) **[Figure 20-41-103]**.

NOTE: This orifice is not removable from the valve casting.

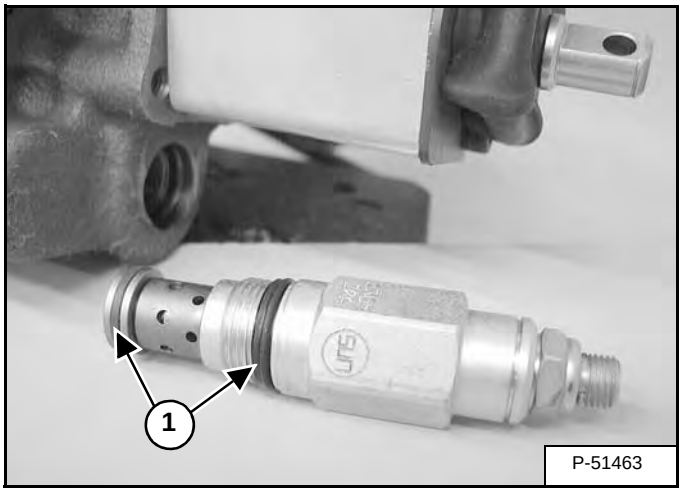
Main Relief Valve Removal And Installation

Figure 20-41-104



Remove the main relief valve (Item 1) **[Figure 20-41-104]**.

Figure 20-41-105



Remove the O-rings from the main relief valve (Item 1) **[Figure 20-41-105]**.

Installation: Always use new O-rings. Tighten to 38 - 45 ft.-lb. (52 - 61 N•m) torque.

Direct Pump Test (Charge Section)

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

MEL1563 or 7003031 - Remote Start Tool
MEL10003 - Hydraulic Tester
MEL10006 - Hydraulic Test Kit
6661247 - Filter Assembly
17 KB 1212 - Elbow Fitting
15 KB 1212 - Straight Fitting
15 KB 0812 - Reducer Fitting

⚠ 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.)

Raise the lift arms and install an approved lift arm support device. (See Installing 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

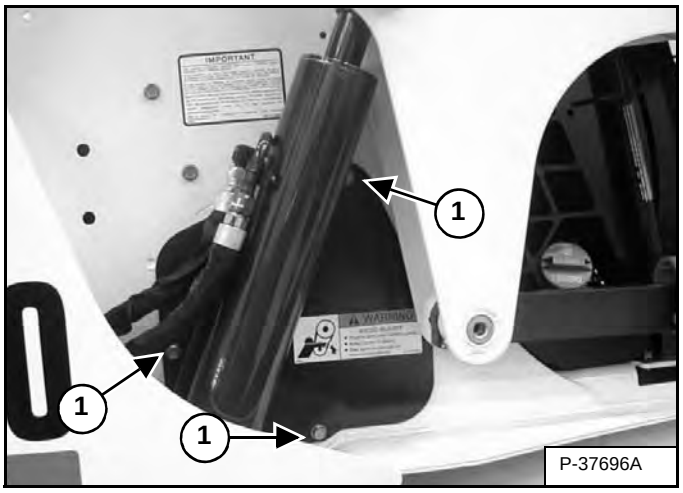
NOTE: The fluid from the charge pump must be filtered after it passes through the Hydraulic Tester, to prevent any contamination to the Hydrostatic Pumps.

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

Open the rear door of the loader.

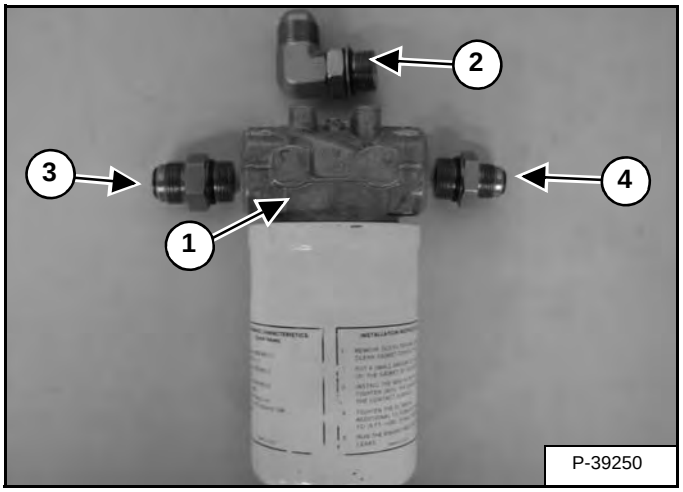
Connect the remote start tool. (See REMOTE START TOOL KIT-MEL1563 on Page 10-60-1.) or (See REMOTE START TOOL (SERVICE TOOL) KIT - 7003031 on Page 10-61-1.)

Figure 20-60-5



Remove the three mount bolts (Item 1) **[Figure 20-60-5]** from the right side access panel. Remove the panel.

Figure 20-60-6



Assemble the filter assembly (Item 1), elbow fitting (Item 2), straight fitting (Item 3) and the reducer fitting (Item 4) **[Figure 20-60-6]**.

HYDRAULIC PUMP (STANDARD) (HIGH FLOW)

Description

The hydraulic gear pump is attached to the end of the hydrostatic pumps and are located on the right side of the loader between the hydraulic control valve and the engine.

The hydraulic gear pump is a combination of gear pumps that provide hydraulic flow to several hydraulic systems.

HYDRAULIC PUMP (STANDARD) (HIGH FLOW) (CONT'D)

High Flow Relief Valve Adjustment

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

MEL10003 - Hydraulic Tester
MEL10006 - Hydraulic Test Kit

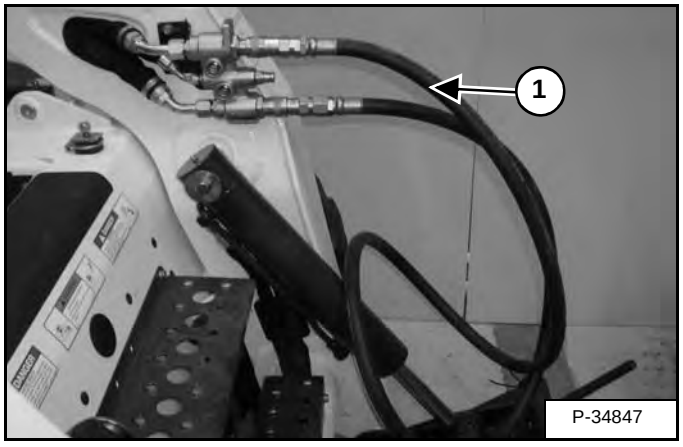
⚠ WARNING

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 20-61-20



Install a jumper hose (Item 1) **[Figure 20-61-20]** onto the front auxiliary quick couplers.

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

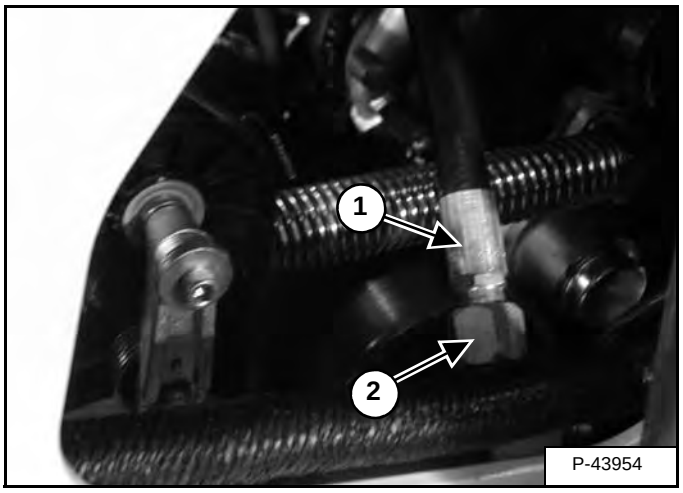
⚠ WARNING

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 on Page 10-30-1.)

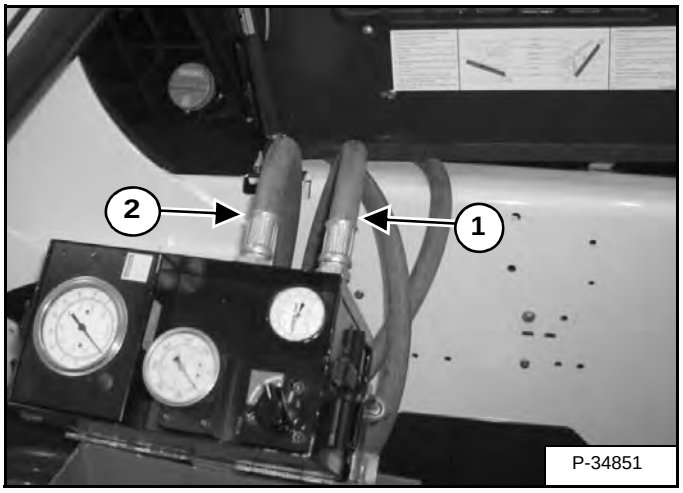
Figure 20-61-21



Remove the left side access cover.

Disconnect the high flow pump OUTLET hose (Item 1) **[Figure 20-61-21]** from the fitting (Item 2) **[Figure 20-61-21]** on the tube line.

Figure 20-61-22



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 20-61-22]** from the tester to the OUTLET hose (Item 1) **[Figure 20-61-21]** of the pump. Connect the OUTLET hose (Item 2) **[Figure 20-61-22]** from the tester to the tube line (Item 2) **[Figure 20-61-21]**.

Lower the cab down.

HYDRAULIC PUMP (SJC)

Description

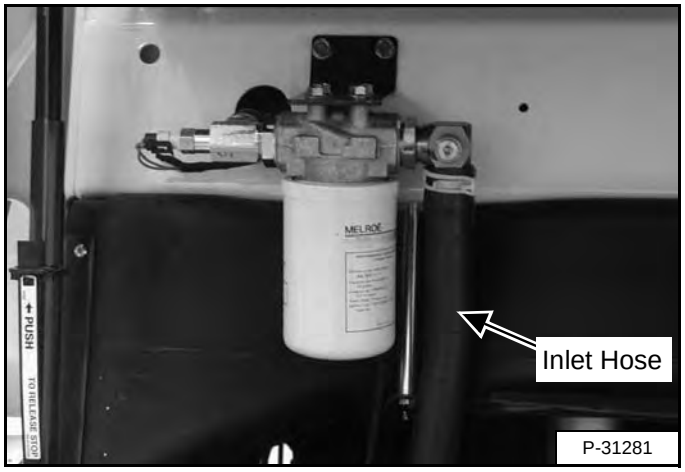
The hydraulic gear pump is attached to the end of the hydrostatic pumps and are located on the right side of the loader between the hydraulic control valve and the engine.

The hydraulic gear pump is a combination of gear pumps that provide hydraulic flow to several hydraulic systems.

Hydraulic Pump Startup

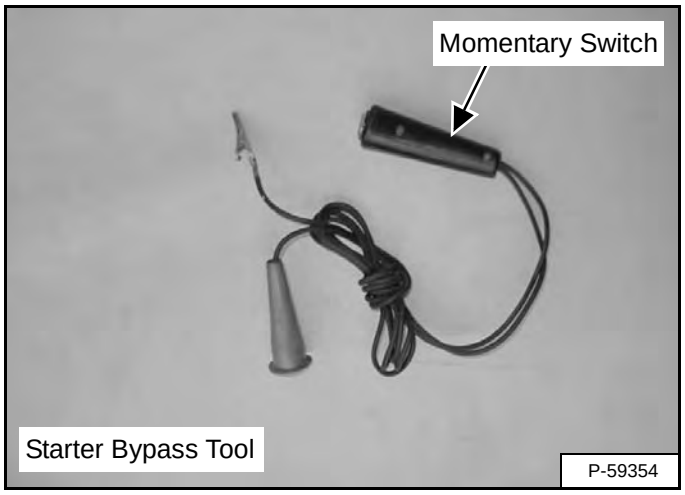
NOTE: This procedure to prevent a dry start up of the hydraulic pump.

Figure 20-70-20



Disconnect the pump inlet hose connection at the filter head. Fill the pump inlet and hose completely with hydraulic fluid. Reconnect the hose **[Figure 20-70-20]**.

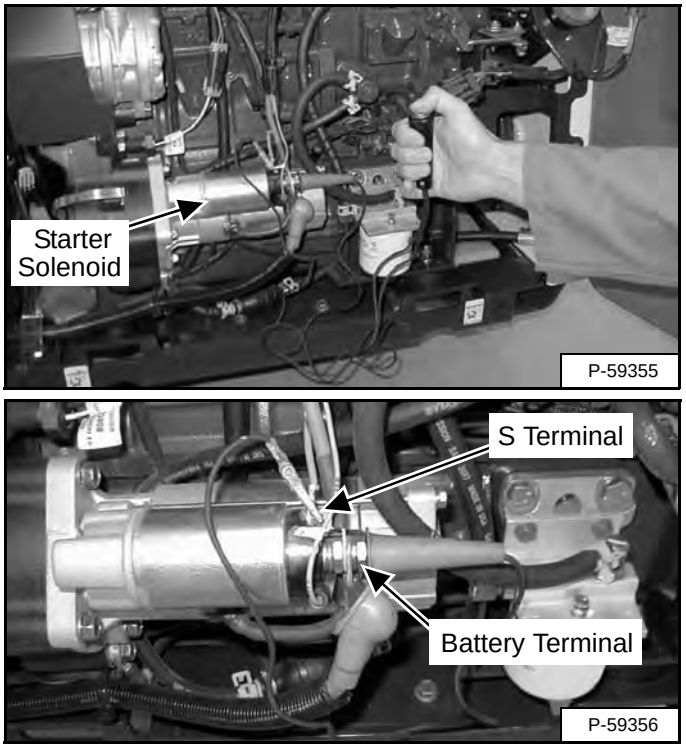
Figure 20-70-21



[Figure 20-70-21] To crank the engine without starting, the machine key switch can be bypassed. Obtain a starter bypass tool from a local source which can be used as a universal connection to remotely crank the engine without starting.

The starter bypass tool consists of two wires, each with a clamp. The momentary switch, when depressed, will allow current to pass through the circuit.

Figure 20-70-22



Connect the starter bypass tool to the starter solenoid battery terminal and S terminal. Crank the engine for 15 seconds, then stop for at least 30 seconds. Again, crank the engine for 15 seconds. Remove the starter bypass tool **[Figure 20-70-22]**.

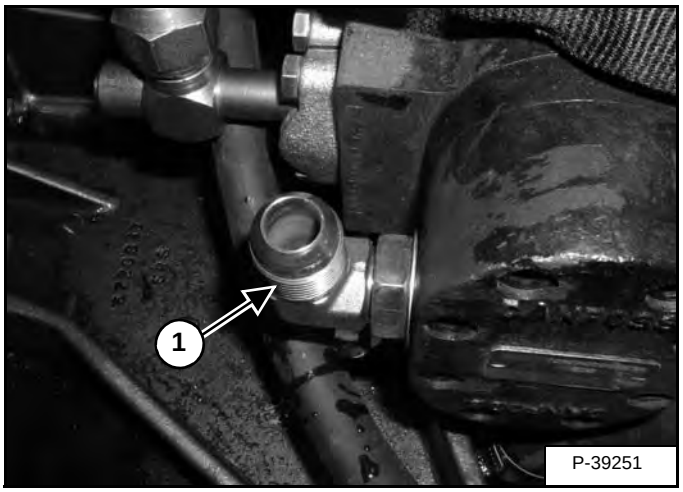
Start the loader from the operators cab and run the engine at low idle for 1 - 2 minutes without operating the hydraulics.

After operating the engine at low idle, Remove the lift arm support device and fully raise and lower the loader lift arms several times or until air is purged from the system. ***Avoid running over the relief valve setting at the end of cylinder stroke.***

With the loader parked on a level surface and lift arms down, check and fill the hydraulic reservoir as required. Check for hydraulic leaks.

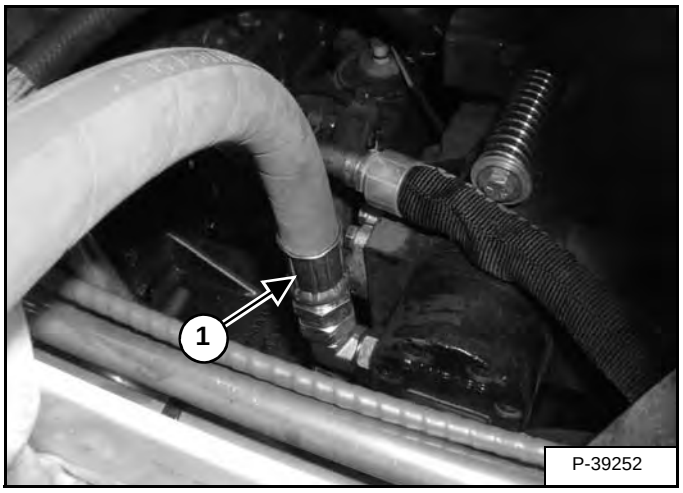
Direct Pump Test (Charge Section) (Cont'd)

Figure 20-71-11



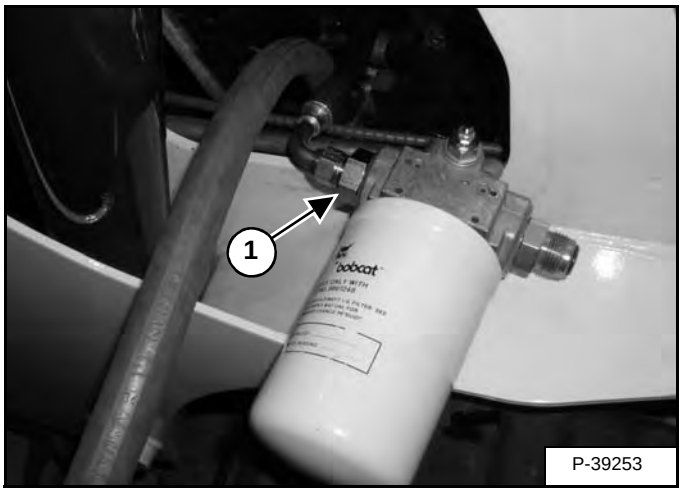
Install the elbow fitting 17KB 1212 (Item 1) **[Figure 20-71-11]** into the OUTLET of the charge pump.

Figure 20-71-12



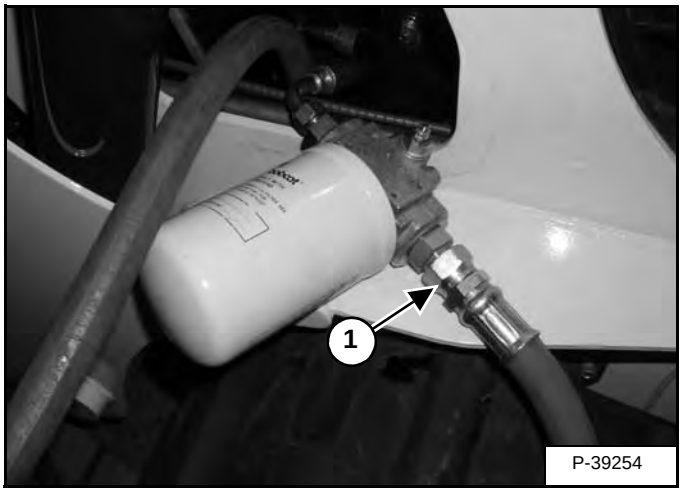
Connect the Inlet hose from the hydraulic tester (Item 1) **[Figure 20-71-12]** to the OUTLET fitting of the charge pump.

Figure 20-71-13



Connect the outlet fitting on the hydraulic filter (Item 1) **[Figure 20-71-13]** to the hose that was remove from the charge pump and routes to the back side of the hydrostatic pump.

Figure 20-71-14

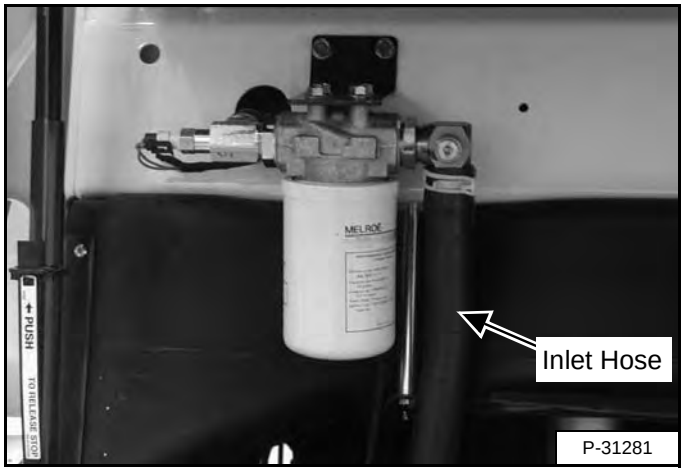


Connect the outlet hose on the hydraulic tester (Item 1) **[Figure 20-71-14]** to the inlet fitting on the hydraulic filter assembly.

Hydraulic Pump Startup

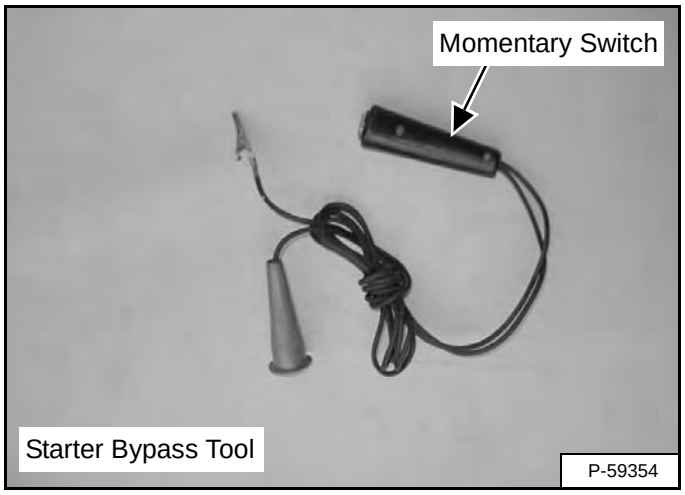
NOTE: This procedure to prevent a dry start up of the hydraulic pump.

Figure 20-71-37



Disconnect the pump inlet hose connection at the filter head. Fill the pump inlet and hose completely with hydraulic fluid. Reconnect the hose **[Figure 20-71-37]**.

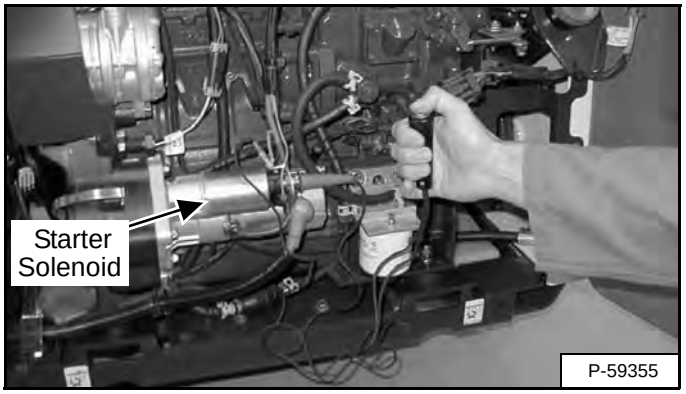
Figure 20-71-38

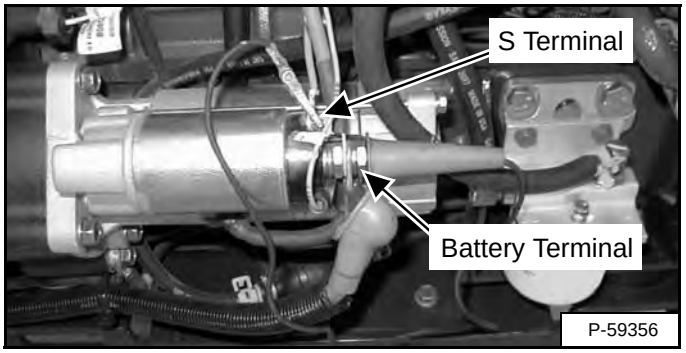


[Figure 20-71-38] To crank the engine without starting, the machine key switch can be bypassed. Obtain a starter bypass tool from a local source which can be used as a universal connection to remotely crank the engine without starting.

The starter bypass tool consists of two wires, each with a clamp. The momentary switch, when depressed, will allow current to pass through the circuit.

Figure 20-71-39





Connect the starter bypass tool to the starter solenoid battery terminal and S terminal. Crank the engine for 15 seconds, then stop for at least 30 seconds. Again, crank the engine for 15 seconds. Remove the starter bypass tool **[Figure 20-71-39]**.

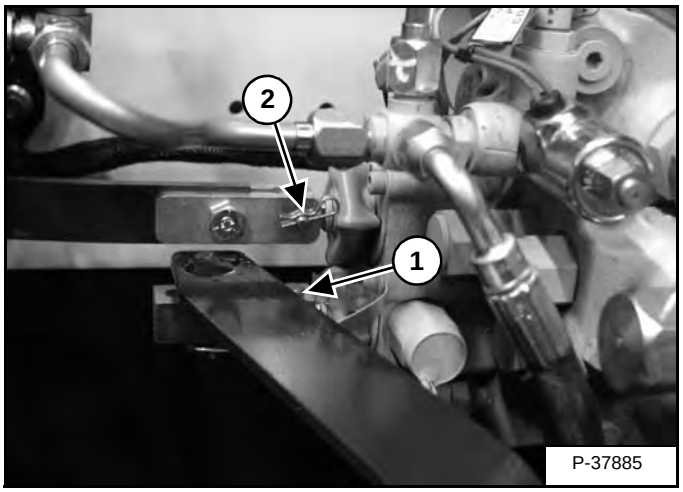
Start the loader from the operators cab and run the engine at low idle for 1 - 2 minutes without operating the hydraulics.

After operating the engine at low idle, Remove the lift arm support device and fully raise and lower the loader lift arms several times or until air is purged from the system. ***Avoid running over the relief valve setting at the end of cylinder stroke.***

With the loader parked on a level surface and lift arms down, check and fill the hydraulic reservoir as required. Check for hydraulic leaks.

Removal And Installation (Cont'd)

Figure 20-90-6

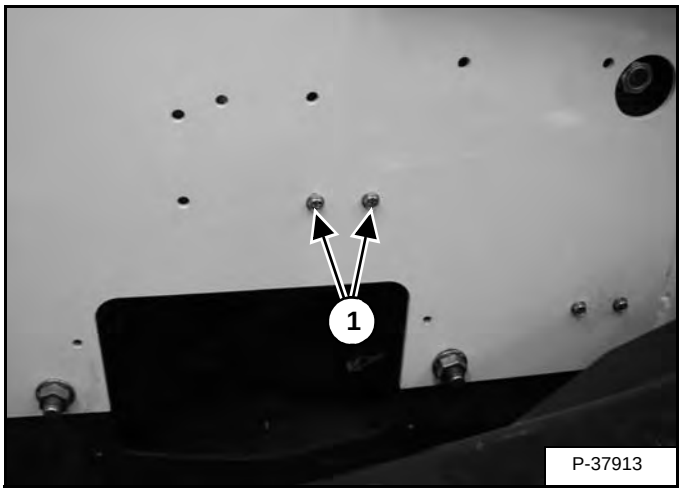


Remove the linkage pin (Item 1) **[Figure 20-90-6]** from the tilt linkage bar, and remove the linkage bar from the control valve lift spool.

Remove the hairpin clip from the crossmember pin.

Remove the crossmember and lift linkage bar from the pivot, and the loader.

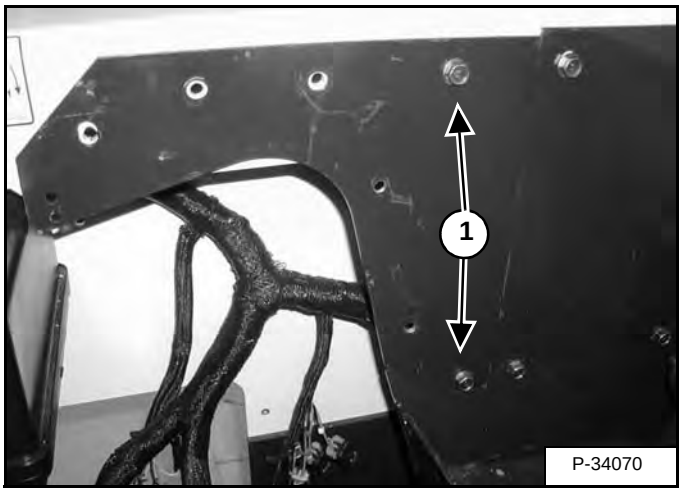
Figure 20-90-7



At the left fender, remove the two mount bolts (Item 1) **[Figure 20-90-7]** from the front reservoir mount bracket.

Remove the mount bracket from the loader.

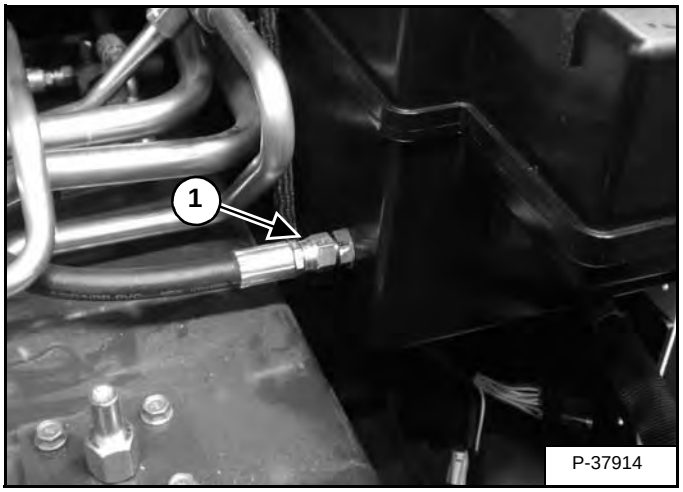
Figure 20-90-8



Remove the two mount bolts (Item 1) **[Figure 20-90-8]** from the side panel.

Remove the side panel from the loader.

Figure 20-90-9



Disconnect the hose (Item 1) **[Figure 20-90-9]** from the reservoir.

REAR AUXILIARY DIVERTER VALVE

Description

The rear auxiliary diverter valve is an optional valve that diverts oil from the front auxiliary circuit to two sets of rear auxiliary couplers or the right side auxiliaries. The couplers are used for rear mounted attachments.The right side auxiliaries are used for older attachments.

The rear couplers are located, one set on each side of the rear frame uprights.

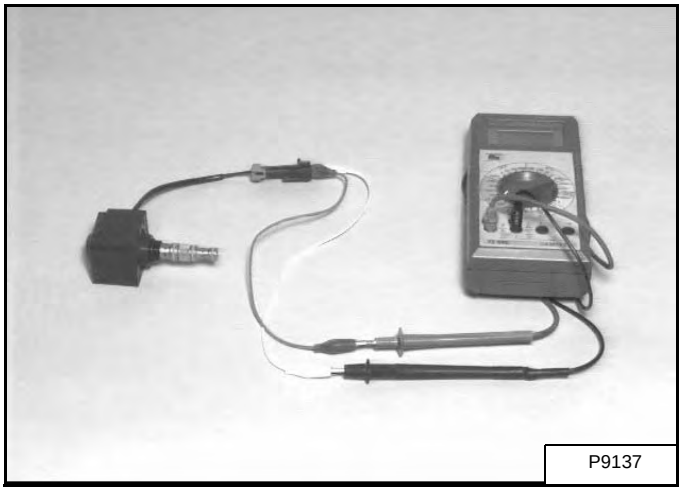
The right side auxiliaries are located on the inside of the right side lift arm at the front of the machine.

The rear auxiliary valve is located on the right side of the machine behind the blower housing. The valve is accessed by removing the panel on the right side of the machine.

See Hydraulic Schematic for more circuit information.

Solenoid Testing

Figure 20-120-1



Use a test meter to measure coil resistance **[Figure 20-120-1]**. Coil wires do not have polarity. Correct resistance is 8.6 - 9.5 ohm.

Replace the test meter with 12 volt power. You can see and hear the spool shift.

BOB-TACH (POWER) BLOCK

Description

The power Bob-Tach block is an option that allows the operator to hydraulically control the Bob-Tach levers for mounting and dismounting the attachments.

The power Bob-Tach is operated by a switch on the front console.

The power Bob-Tach block is mounted on the right side of the machine in front of the engine on the backside of the hydraulic pump.

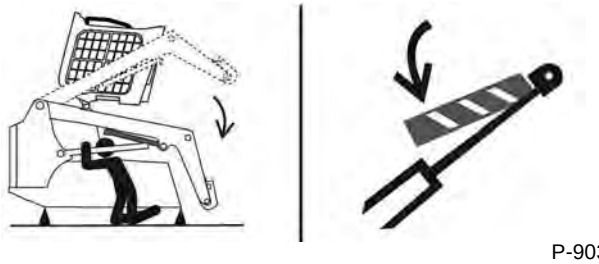
Removal And Installation

WARNING

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

W-2059-0598

DANGER



P-90328

AVOID DEATH

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

D-1009-0409

IMPORTANT

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

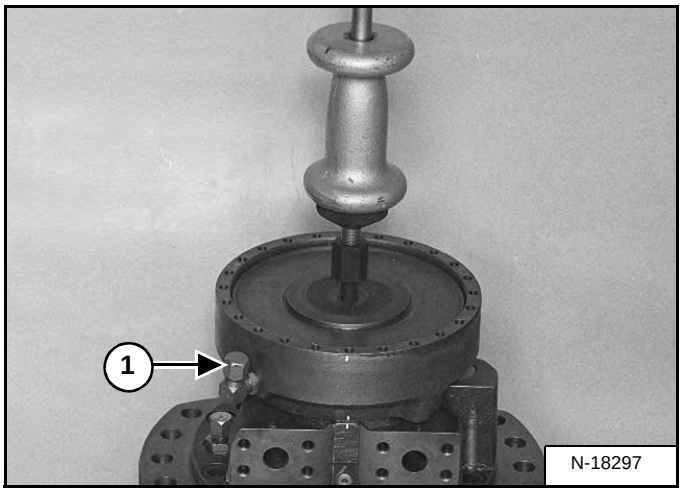
I-2003-0888

HYDROSTATIC SYSTEM

Continued On Next Page

Disassembly And Assembly (Cont'd)

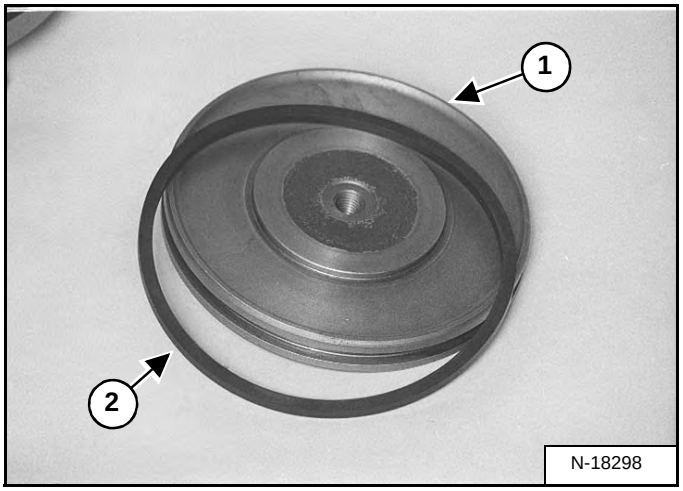
Figure 30-20-10



Remove the piston from the brake housing **[Figure 30-20-10]**.

NOTE: The use of air pressure through the brake line connection (Item 1) [Figure 30-20-10] will aid in piston removal.

Figure 30-20-11

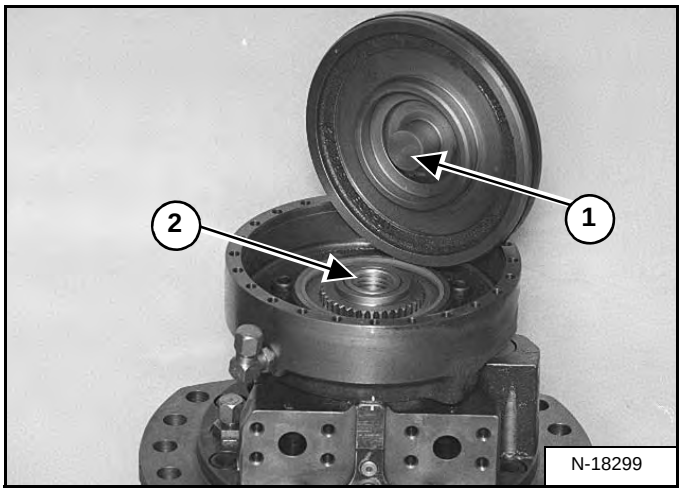


Check the brake piston (Item 1) **[Figure 30-20-11]** for damage including the surface that contacts the brake shaft.

Replace the seal (Item 2) **[Figure 30-20-11]**.

Assembly: Apply oil to the seal (Item 2) **[Figure 30-20-11]** for added protection when installing the brake piston.

Figure 30-20-12

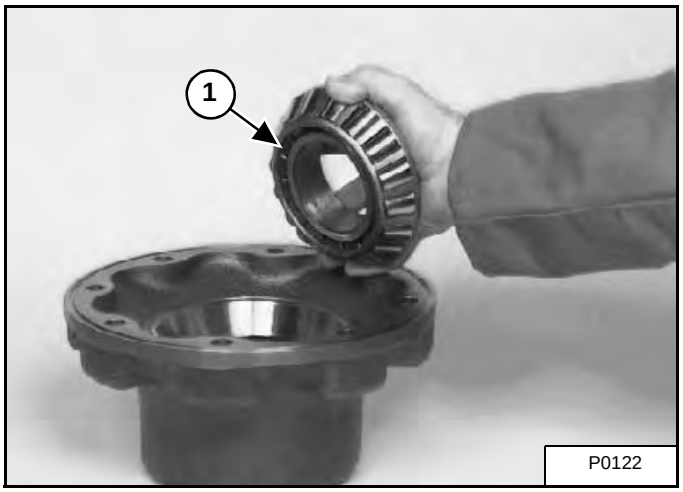


Check the piston surface (Item 1) and the bushing surface (Item 2) **[Figure 30-20-12]** in the brake shaft.

NOTE: The bushing (Item 2) [Figure 30-20-12] can be replaced in the brake shaft. When the bushing is replaced, install the bushing flush with the top of the brake shaft.

Disassembly And Assembly (Cont'd)

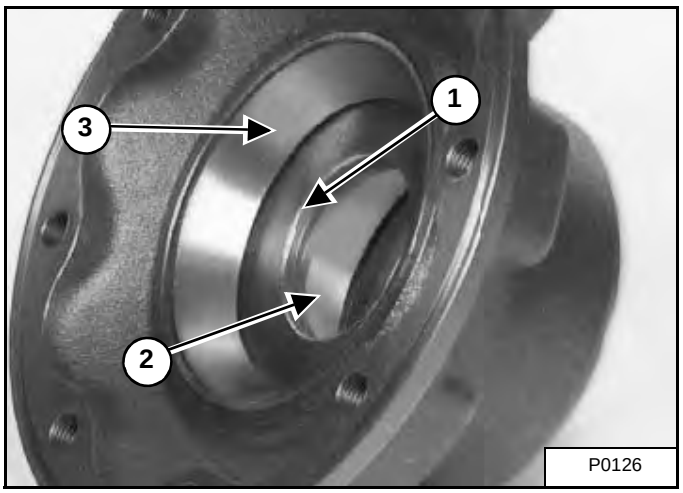
Figure 30-20-48



Remove and inspect the bearing (Item 1) **[Figure 30-20-48]** located in the front housing.

Replace the bearing if worn or damaged.

Figure 30-20-49

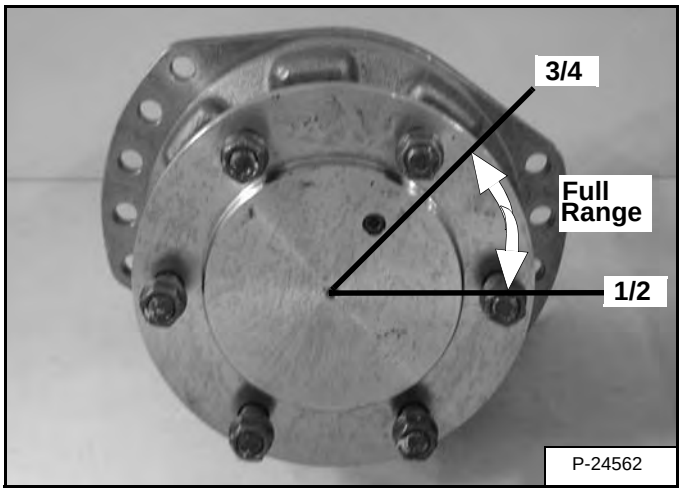


Remove the shaft seal (Item 1) **[Figure 30-20-49]**.

Replace the outer O-ring and inner shaft seal (Item 2) **[Figure 30-20-49]**.

Remove the bearing cup (Item 3) **[Figure 30-20-49]** if it needs replacement.

Figure 30-20-50



Fill housing with synthetic Mobilgear SHC XMP 150 to **[Figure 30-20-50]** 1/2 to 3/4 full.

Removal And Installation (Cont'd)

Figure 30-40-5

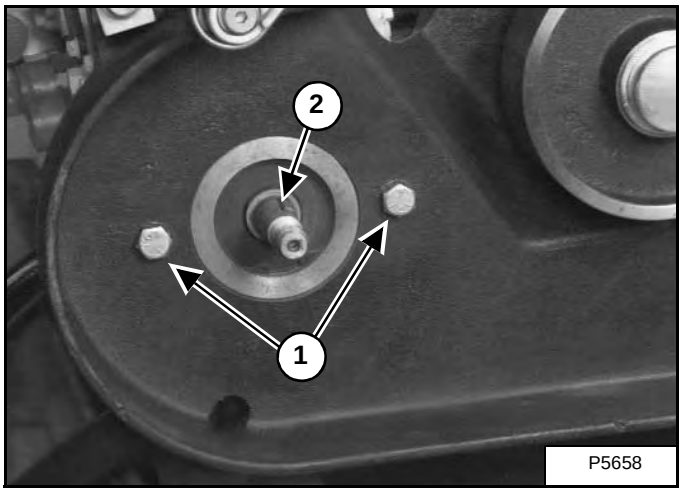
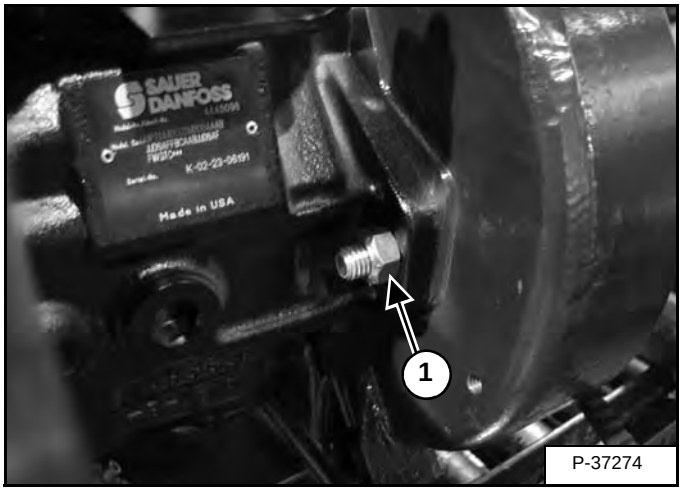


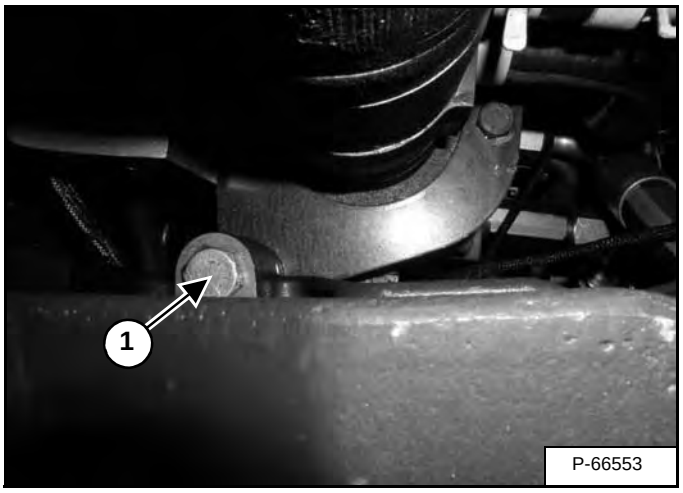
Figure 30-40-6



Remove the two mounting bolts (Item 1) **[Figure 30-40-5]** and nuts (Item 1) **[Figure 30-40-6]**.

Installation: Tighten the mounting bolts and nuts to 65 - 70 ft.-lb. (88 - 95 N•m) torque. Make sure the key (Item 2) **[Figure 30-40-5]** is installed.

Figure 30-40-7

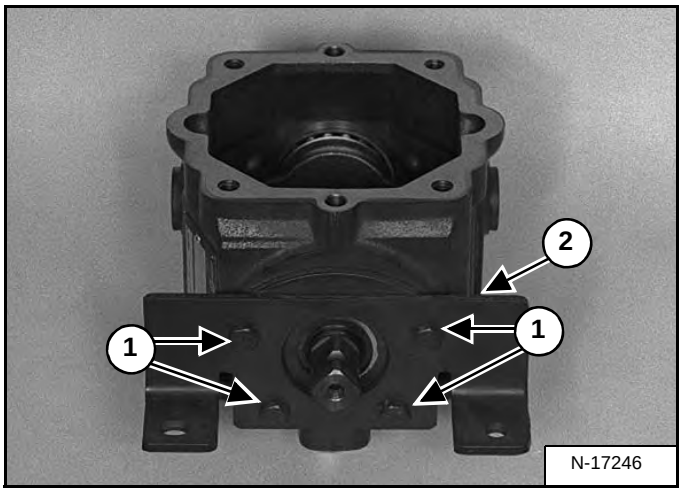


Remove the mounting bolt (Item 1) **[Figure 30-40-7]** at the hydraulic pump end of the pump.

Remove the hydrostatic pump from the mounting bracket and drive belt housing.

Disassembly (Cont'd)

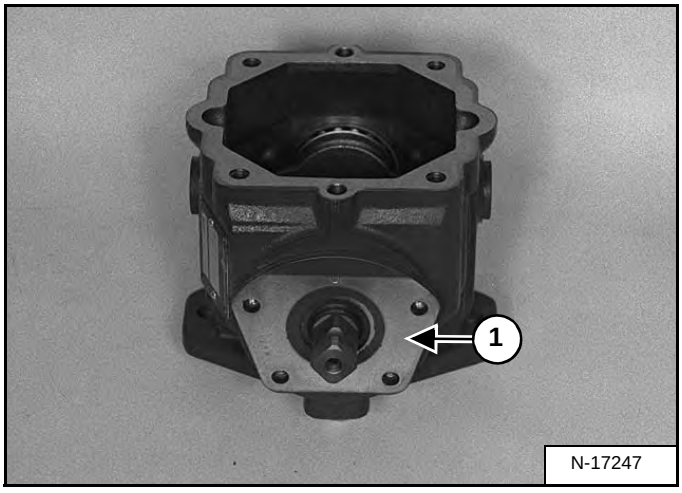
Figure 30-40-30



Inspect the dust seal on the pintle shaft.

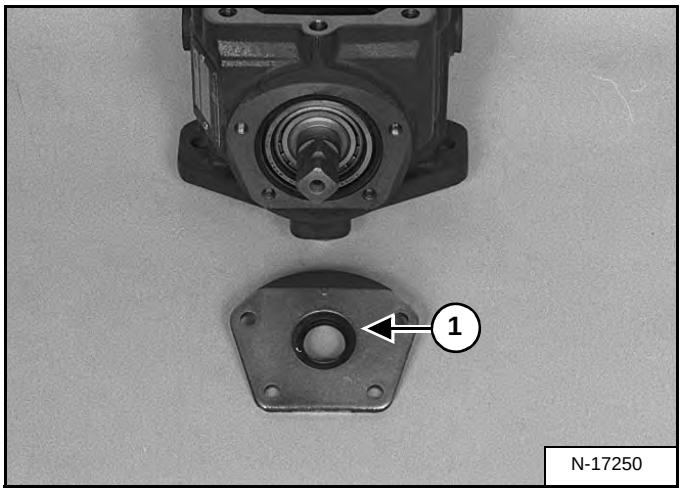
Remove the four mount bolts (Item 1) from the pump housing and remove the linkage bracket (Item 2) **[Figure 30-40-30]**.

Figure 30-40-31



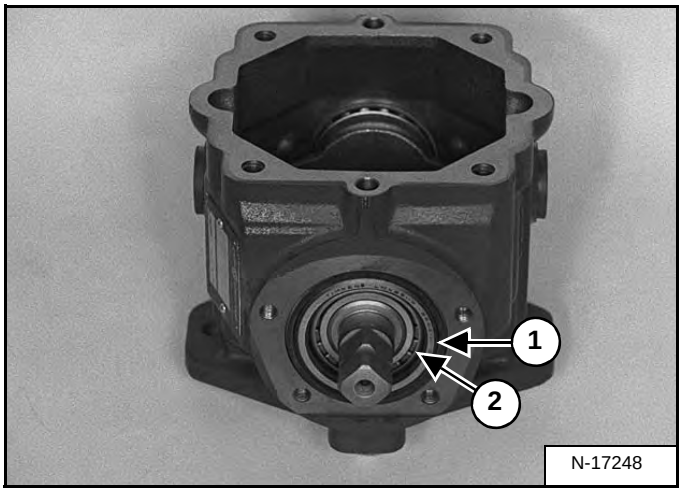
Remove the upper trunnion cover (Item 1) **[Figure 30-40-31]**.

Figure 30-40-32



Inspect the seal (Item 1) **[Figure 30-40-32]** in the upper trunnion cover and replace if needed.

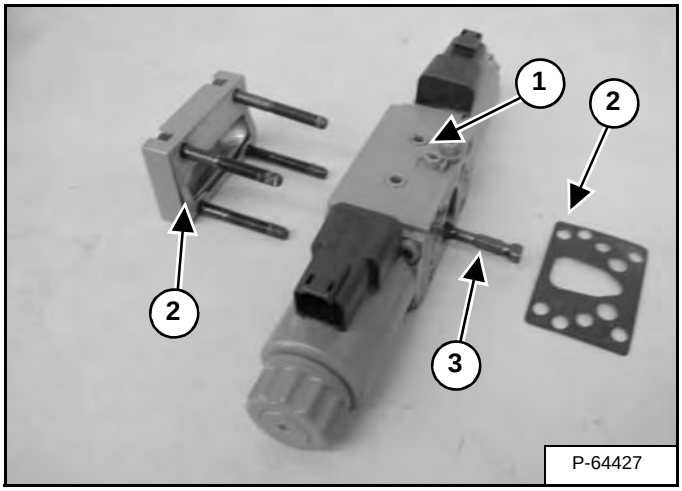
Figure 30-40-33



Remove the O-ring (Item 1) and bearing race (Item 2) **[Figure 30-40-33]** from the pump housing.

Hydraulic Controller Removal And Installation (Cont'd)

Figure 30-41-5

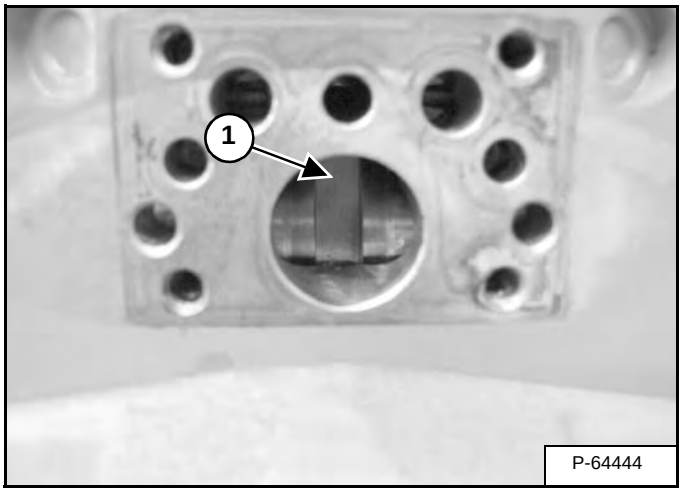


Remove the controller (Item 1) **[Figure 30-41-5]** from the pump.

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

Installation:

Figure 30-41-6

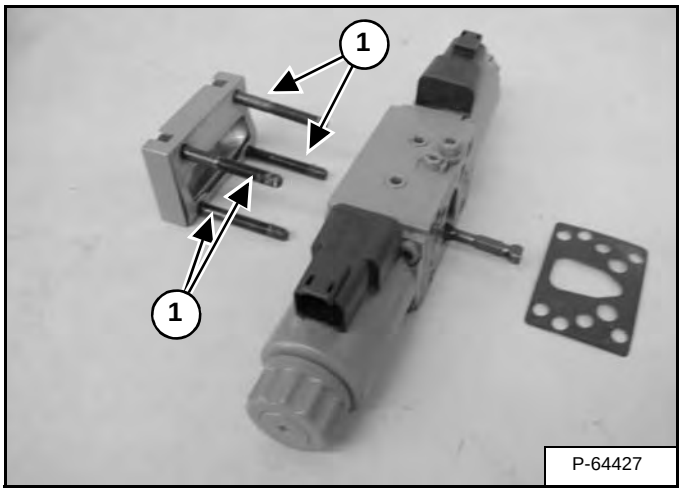


Be sure the feedback lever (Item 3) **[Figure 30-41-5]** is in the center of the servo piston groove (Item 1) **[Figure 30-41-6]**.

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

Be sure the pump surface is clean.

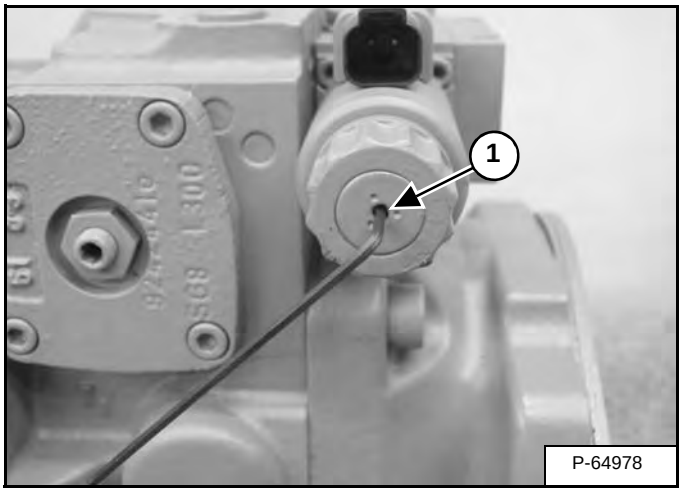
Figure 30-41-7



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

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

Figure 30-41-8

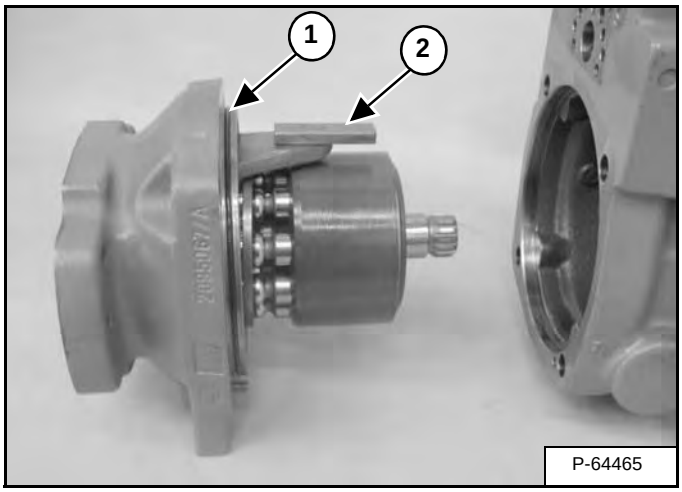


With the engine running and the loader on jack stands: Bleed the trapped air in the controller by loosening the small set screw (Item 1) **[Figure 30-41-8]** a maximum of 2 turns. Leave the screw loose until oil comes dripping out of the set screw. Tighten set screw to 18 in.-lb. (2 N•m) torque.

Repeat the bleeding procedure for all of the solenoids.

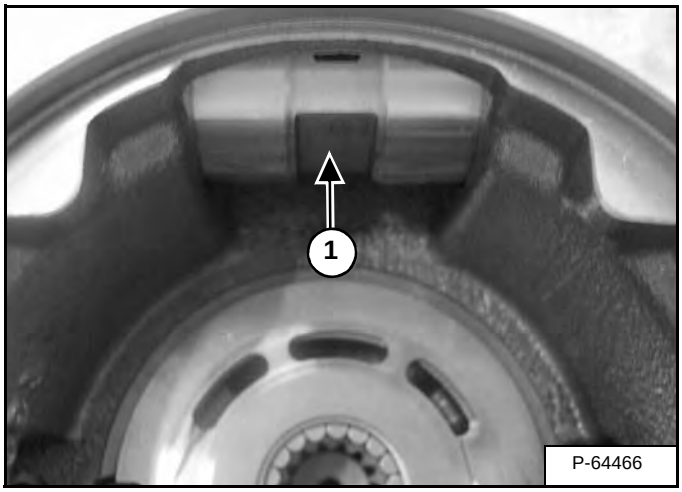
Disassembly And Assembly (Cont'd)

Figure 30-41-32



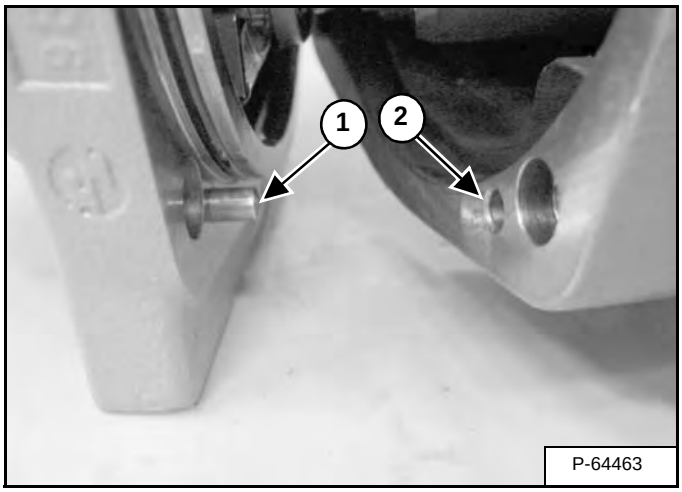
Replace O-ring (Item 1) **[Figure 30-41-32]**.

Figure 30-41-33



Ensure servo follower (Item 2) **[Figure 30-41-32]** is swung out for proper engagement with the notch in the servo piston (Item 1) **[Figure 30-41-33]**.

Figure 30-41-34



Assembly: Ensure dowel pin (Item 1) is aligned with hole in case housing (Item 2) **[Figure 30-41-34]** before tightening screws.

Disassembly And Assembly (Cont'd)

Figure 30-41-67

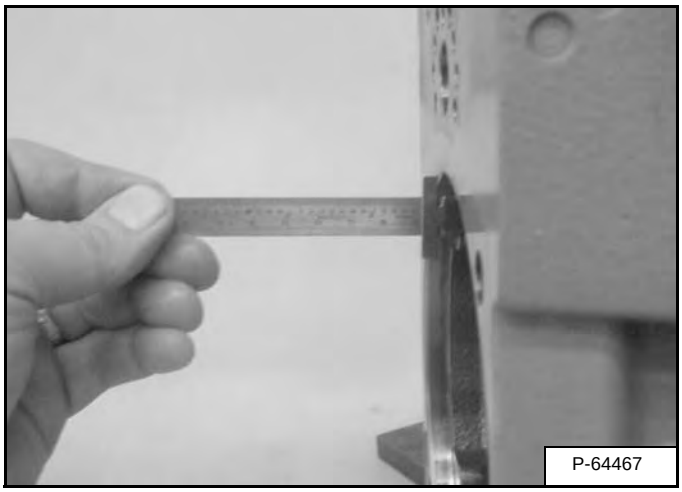
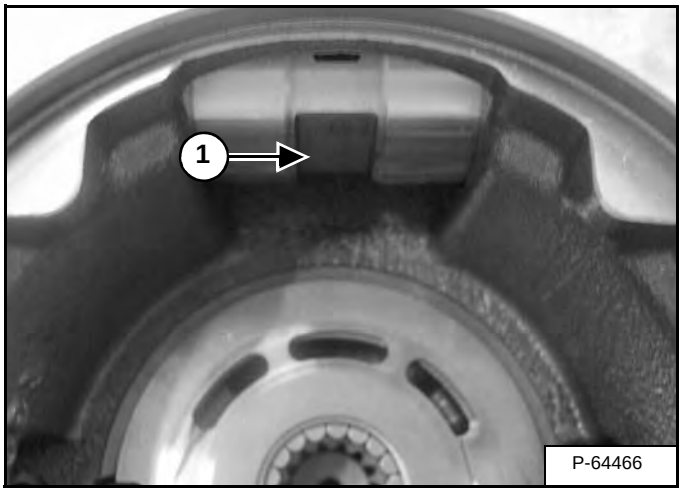
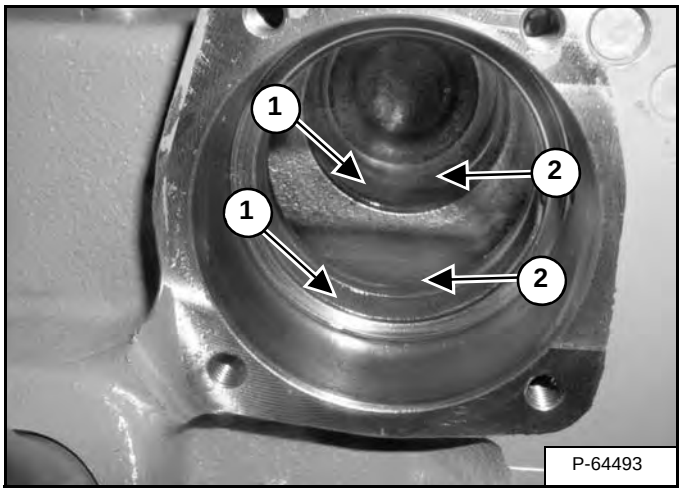


Figure 30-41-68



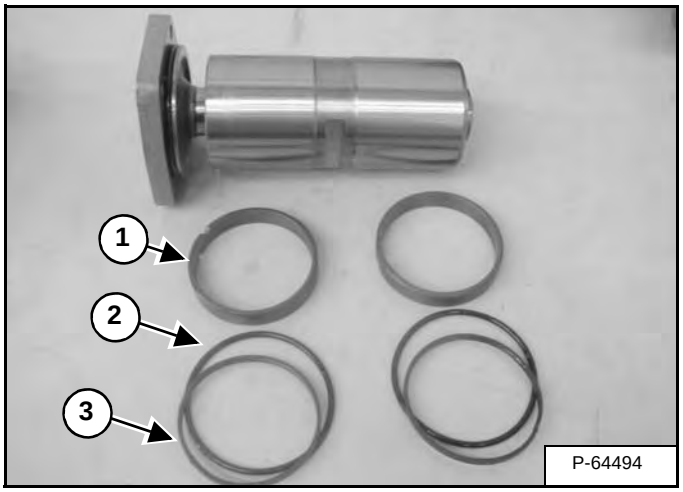
Assembly: Align the servo piston so the guide slot (Item 1) **[Figure 30-41-68]** is parallel to the driveshaft centerline. Measure with a straight-edge **[Figure 30-41-67]**.

Figure 30-41-69



Remove the bushings (Item 1), seals and O-rings (Item 2) **[Figure 30-41-69]** from the pump housing.

Figure 30-41-70



Each servo has a pair of bushings (Item 1), O-rings (Item 2) and square-cut seals (Item 3) **[Figure 30-41-70]**.

HYDROSTATIC PUMP (SJC) (S/N A7MP62126 & ABOVE AND AAKZ35001 & ABOVE)

Description

The SJC hydrostatic pump is a fully proportional dual piston pump in one pump casing. The endcaps are removable to gain access to the rotating assemblies.

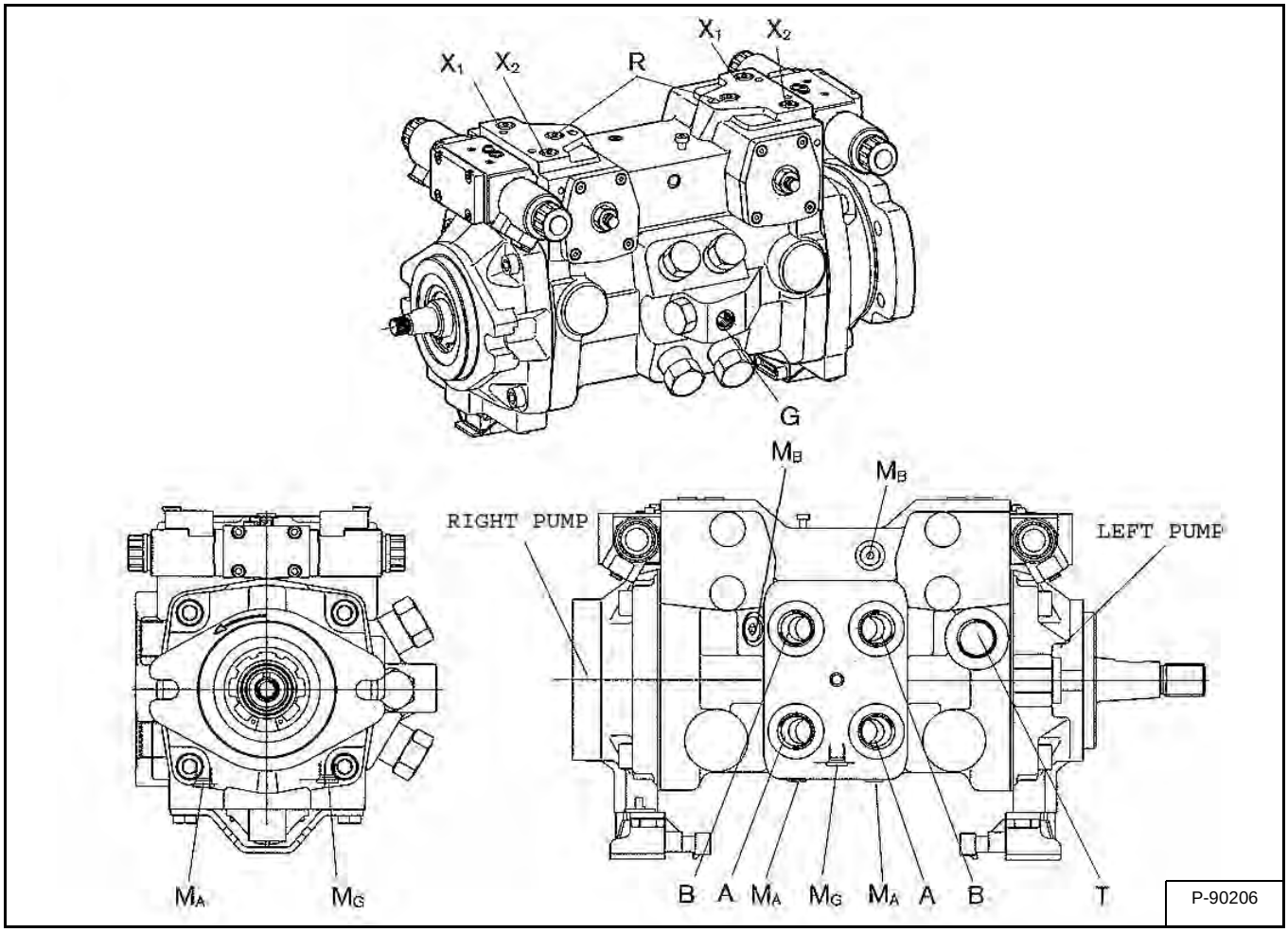
The hydraulic controllers are fed charge pressure from an external charge pump. 12 volt electrical solenoids shift a spool in the hydraulic controller that directs flow to a servo piston.

The servo piston strokes the swash plate in the rotating group. The rotating group generates flow to the A or B ports on the hydrostatic pump. The flow from the A and B ports is sent to the hydrostatic drive motors where forward or reverse drive motor rotation is obtained.

There are swash plate angle sensors on the bottom of the pump that monitor swash plate movement.

Ports are labeled on the hydrostatic pump casting.

Figure 30-42-1



A,B Service Line Ports (High Pressure Outlet Ports to Drive Motors)

T Case Drain Port

M_A Operating Pressure of “A” Port

M_B Operating Pressure of “B” Port

R Air Bleed Port

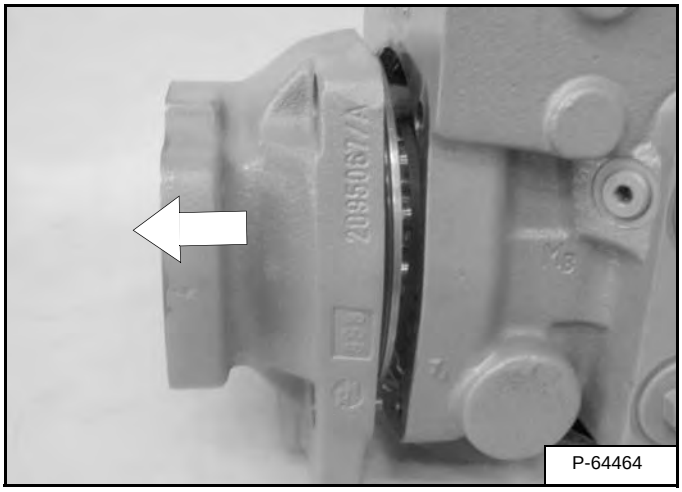
X_1,X_2 Control Pressure Gauge Port

G Charge Pressure Inlet Port

M_G Gauge Port For Charge Pressure

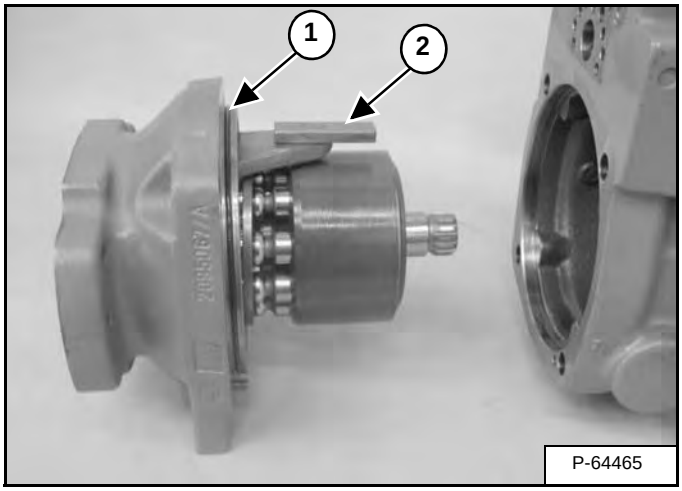
Disassembly And Assembly (Cont'd)

Figure 30-42-27



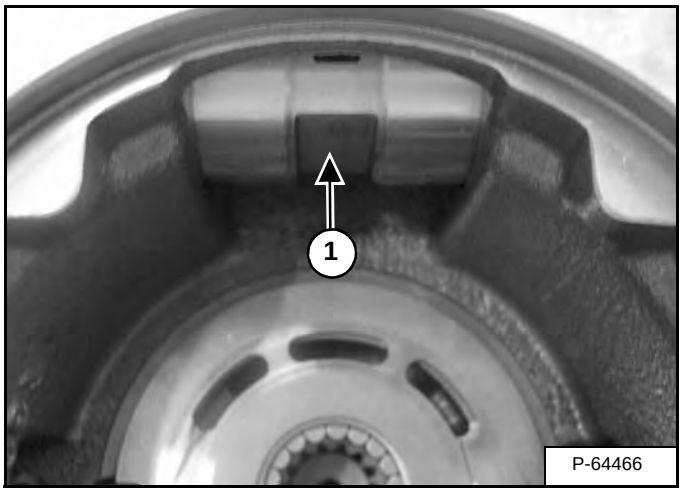
Pull the end housings from the case housing **[Figure 30-42-27]**.

Figure 30-42-28



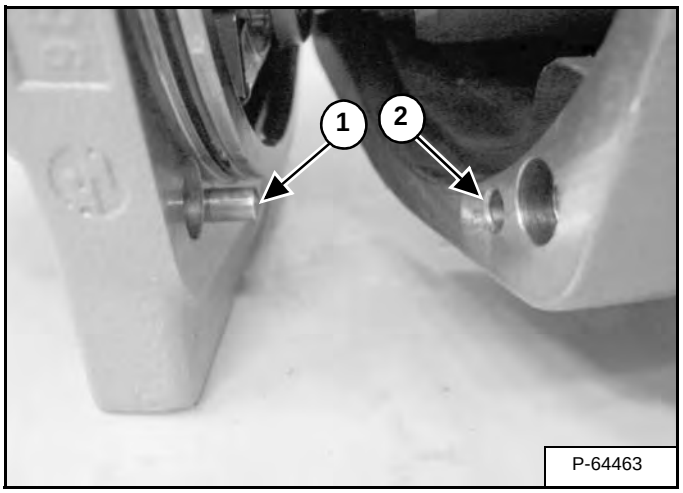
Replace O-ring (Item 1) **[Figure 30-42-28]**.

Figure 30-42-29



Ensure servo follower (Item 2) **[Figure 30-42-28]** is swung out for proper engagement with the notch in the servo piston (Item 1) **[Figure 30-42-29]**.

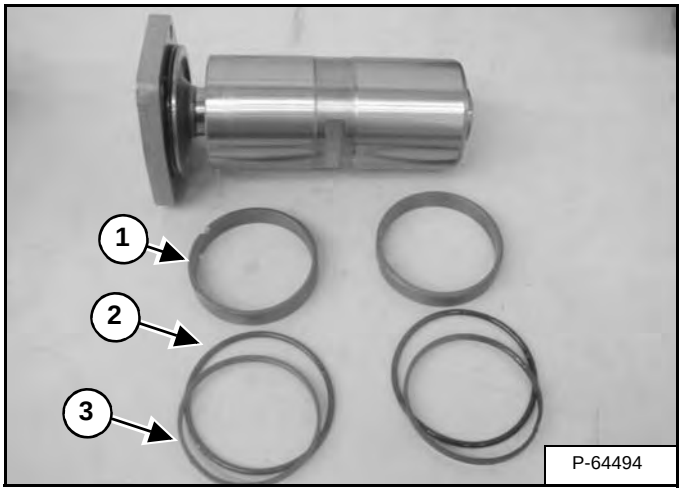
Figure 30-42-30



Assembly: Ensure dowel pin (Item 1) is aligned with hole in case housing (Item 2) **[Figure 30-42-30]** before tightening screws.

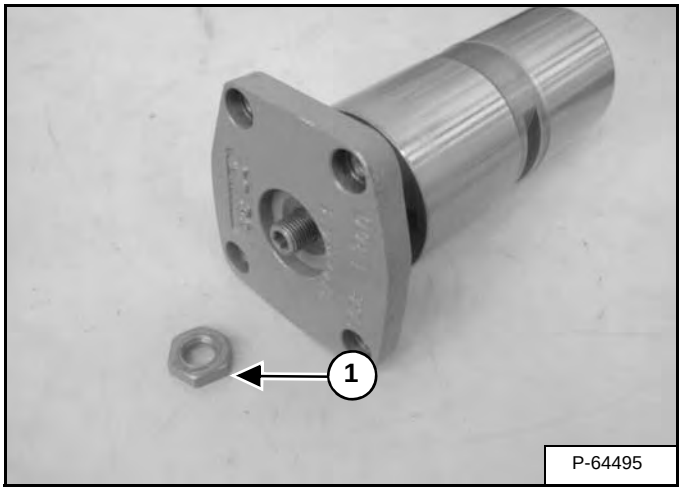
Disassembly And Assembly (Cont'd)

Figure 30-42-65



Each servo has a pair of bushings (Item 1), O-rings (Item 2) and square-cut seals (Item 3) **[Figure 30-42-65]**.

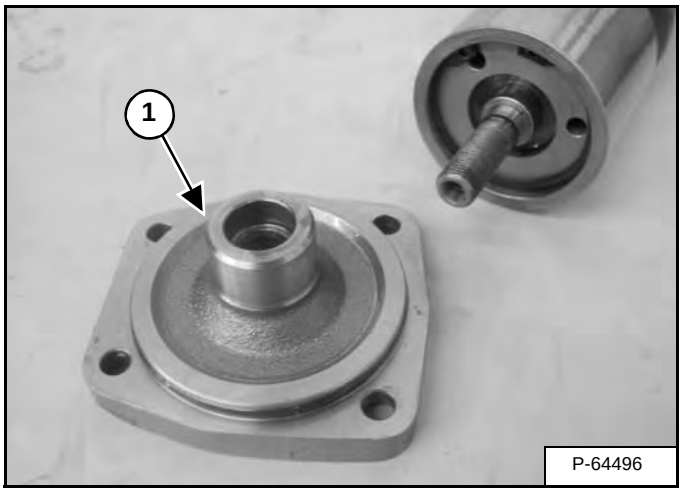
Figure 30-42-66



Remove the lock nut (Item 1) **[Figure 30-42-66]** from the servo piston.

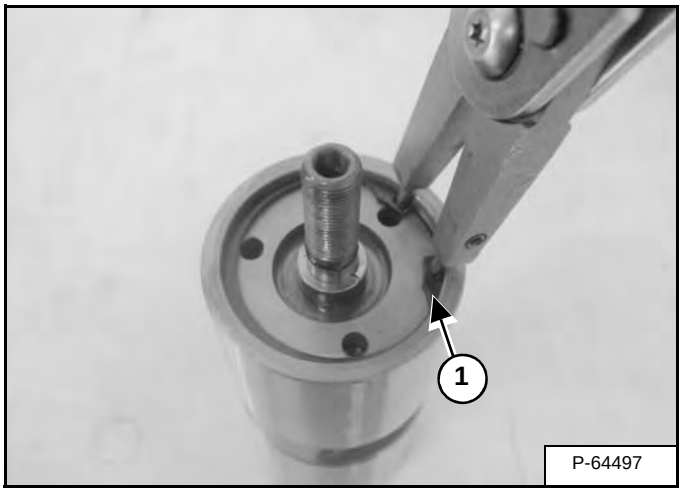
Assembly: Tighten lock nut to 22 ft.-lb. (30 N•m) torque.

Figure 30-42-67



Remove the servo cover (Item 1) **[Figure 30-42-67]** from the servo piston.

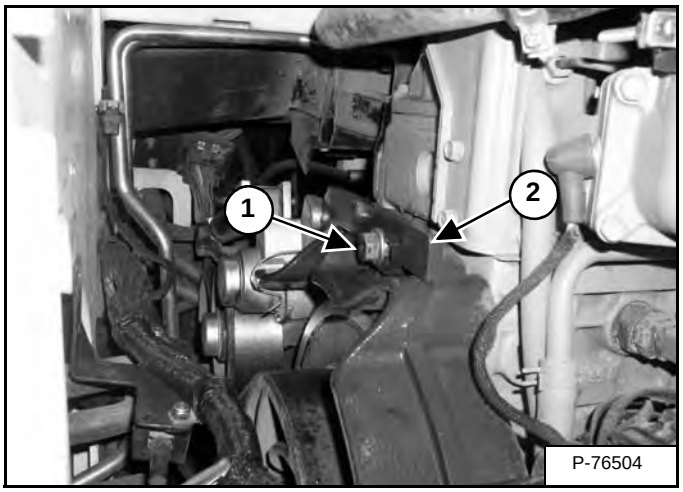
Figure 30-42-68



Remove snap ring (Item 1) **[Figure 30-42-68]** from the servo piston.

Tensioner Pulley Removal And Installation

Figure 30-50-7



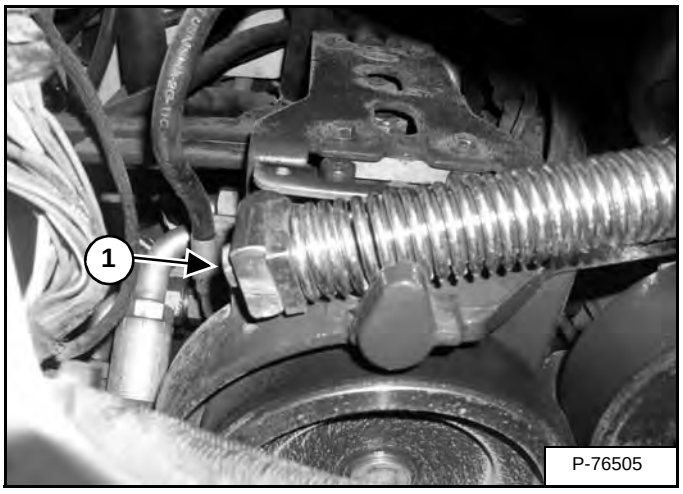
Remove the belt shield. (See Shield Removal And Installation on Page 30-50-1.)

Remove the engine air cleaner. (See Housing Removal And Installation on Page 70-40-1.)

Remove the stop mounting bolt (Item 1) **[Figure 30-50-7]**.

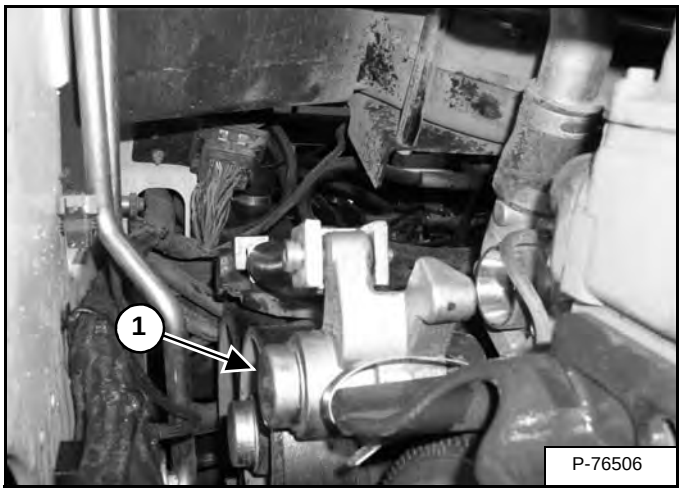
Remove the stop (Item 2) **[Figure 30-50-7]**.

Figure 30-50-8



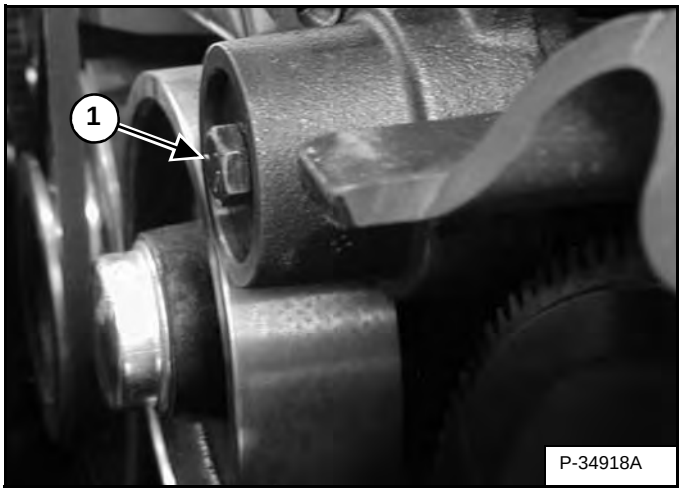
Remove the spring tension bolt (Item 1) **[Figure 30-50-8]**.

Figure 30-50-9



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

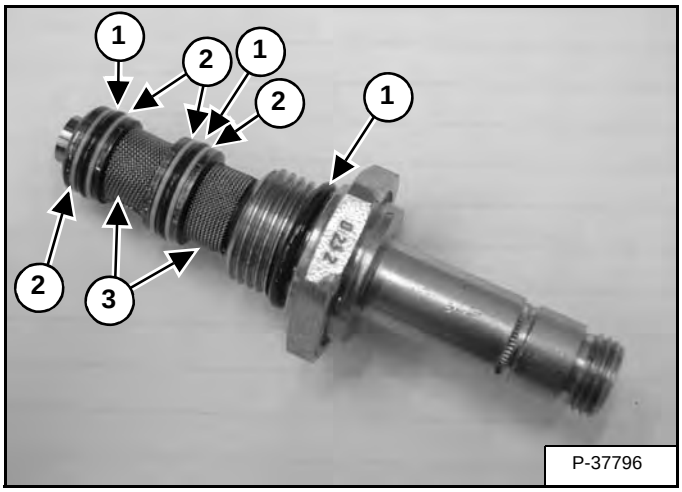
Figure 30-50-10



Remove the mounting bolt (Item 1) **[Figure 30-50-10]** from the tension pulley arm.

Block Disassembly And Assembly (Cont'd)

Figure 40-10-7



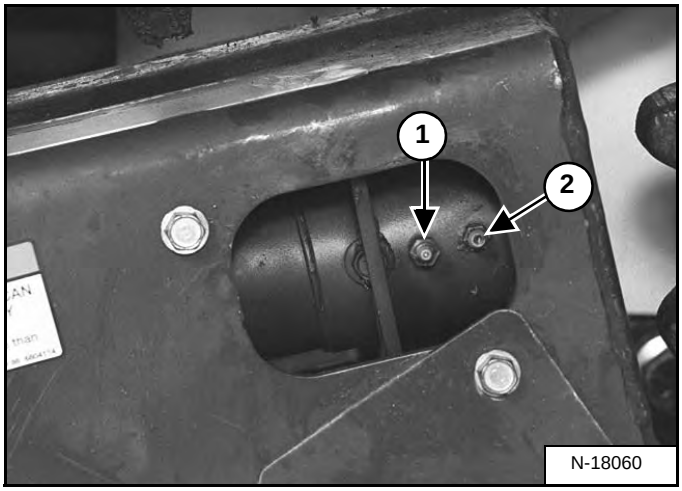
Inspect the O-rings (Item 1) and back-up washer (Item 2) on the solenoid valve and replace as needed **[Figure 40-10-7]**.

Check the screens (Item 3) **[Figure 40-10-7]** and clean with solvent.

Assembly: Tighten the solenoid valve to 16 - 20 ft.-lb. (21,7 - 27,1 N•m) torque.

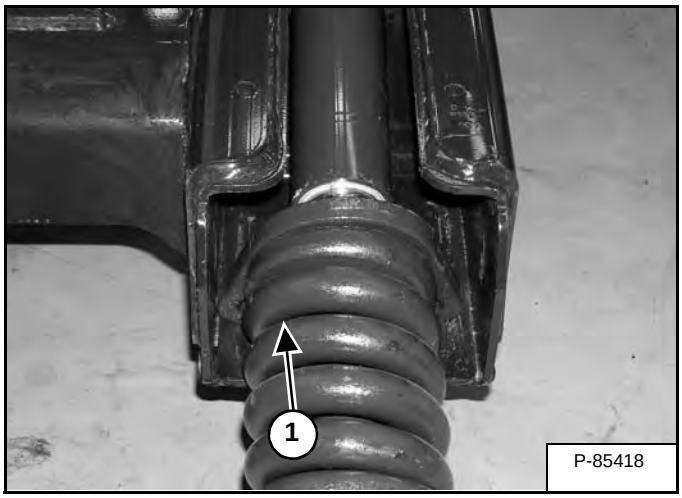
Idler (Front) Removal And Installation (S/N A7MP60284 & Above And AAKZ11028 & Above) (Cont'd)

Figure 40-20-20



Remove the grease fitting (Item 1) and bleed fitting (Item 2) **[Figure 40-20-20]** to prevent damage during removal.

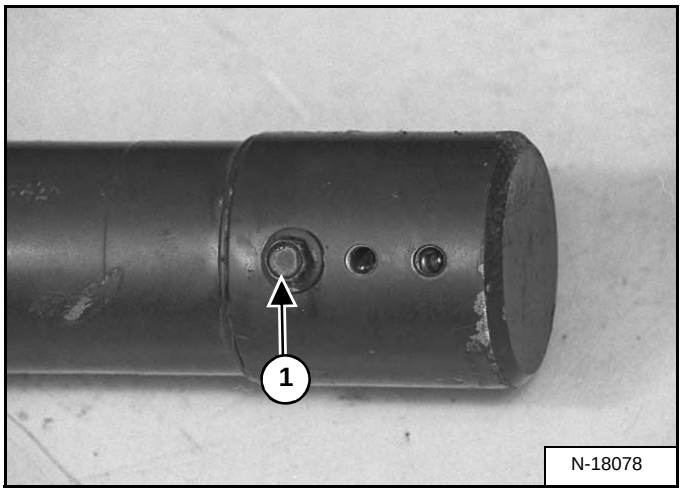
Figure 40-20-21



Slide the track tensioner (Item 1) **[Figure 40-20-21]** out of the track housing.

Installation: track tensioner must be oriented as shown in **[Figure 40-20-21]** before sliding it into the track housing.

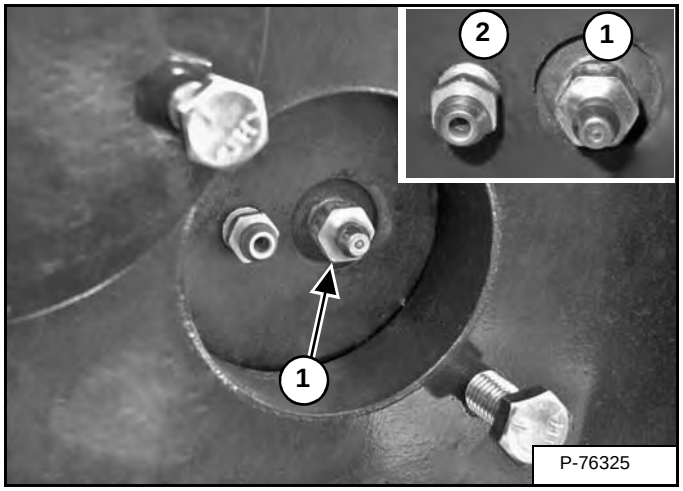
Figure 40-20-22



NOTE: When installing the track tensioner, verify the grease fitting holes and alignment bolt (Item 1) [Figure 40-20-22] are pointed to the outside of the track housing.

Adjusting Tension

Figure 40-21-6



Loosen the access cover bolts and pivot the access cover open **[Figure 40-21-6]**.

NOTE: Fittings may be oriented differently than shown. You MUST select the correct fitting for the task required. The grease fitting (Item 1) is used to add grease. The bleed fitting (Item 2) [Figure 40-21-6] is used to remove grease.

Increase Track Tension

Add grease to the grease fitting (Item 1) **[Figure 40-21-6]** until the track adjustment is correct **[Figure 40-21-4]** and **[Figure 40-21-5]**.

NOTE: Do not remove grease fitting unless pressure is released using the bleed fitting. (See [Figure 40-21-7] on Page 40-21-3)

NOTE: If replacement is necessary, always replace grease fitting (Item 1) [Figure 40-21-6] with genuine Bobcat Parts. The grease fitting is a special fitting designed for high pressure.

Decrease Track Tension

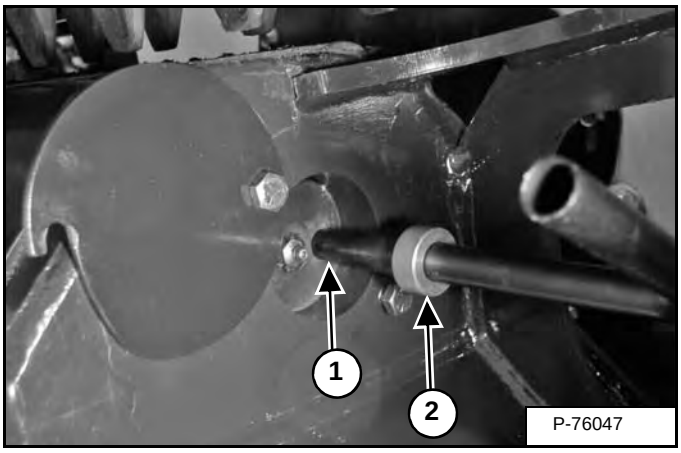
⚠ WARNING

HIGH PRESSURE GREASE CAN CAUSE SERIOUS INJURY

- **Do not loosen grease fitting.**
- **Do not loosen bleed fitting more than 1 - 1/2 turns.**

W-2781-0109

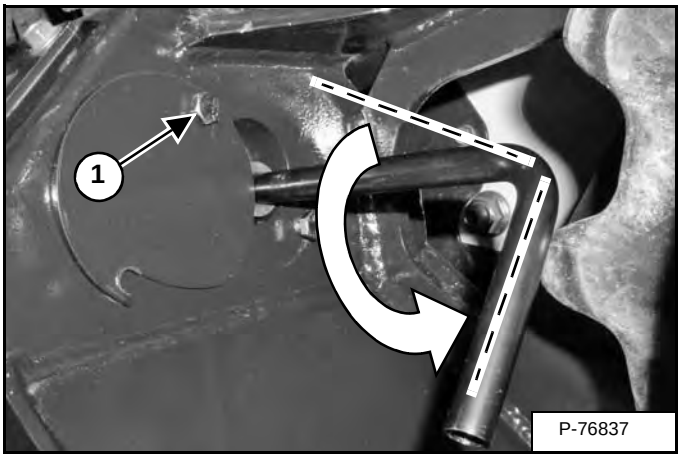
Figure 40-21-7



Pressure must be released from the grease cylinder to decrease track tension.

Install the bleed tool (MEL-1560) on the bleed fitting (Item 1), adjust and tighten the collar (Item 2) **[Figure 40-21-7]** to fit behind the edge of the access cover.

Figure 40-21-8



Tighten the access cover bolt (Item 1) **[Figure 40-21-8]** to secure the tool.

Turn the tool 1/4 turn counterclockwise and let the grease flow into a container. Release pressure **[Figure 40-21-8]** until the track adjustment is correct **[Figure 40-21-4]** and **[Figure 40-21-5]**.

Tighten the bleed fitting. Pivot the access cover closed and tighten the access cover bolts.

Raise the loader. Remove the jackstands.

Repeat the procedure for the other track.

Dispose of grease in an environmentally safe manner.

Track Housing Removal And Installation

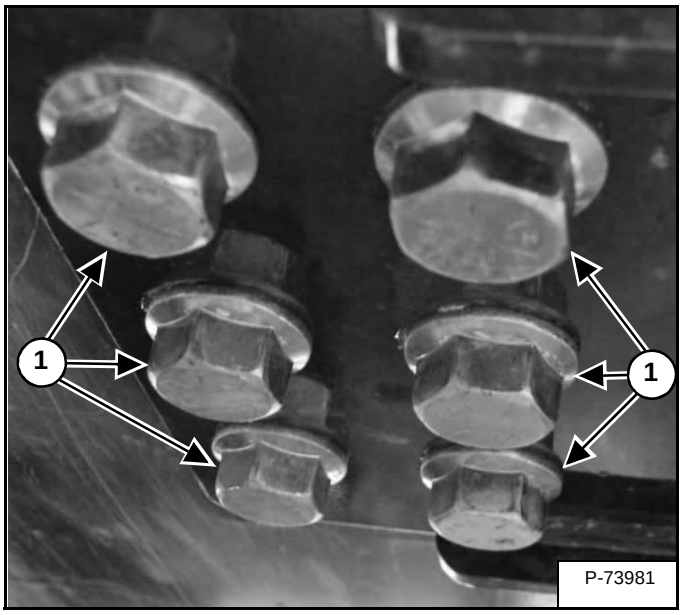
NOTE: Jackstands used when removing the track must not interfere with track housing removal.

Remove the track from the loader. (See Track Removal And Installation on Page 40-21-4.)

Remove the hydrostatic motor from the track housing. (See Removal And Installation on Page 30-20-2.)

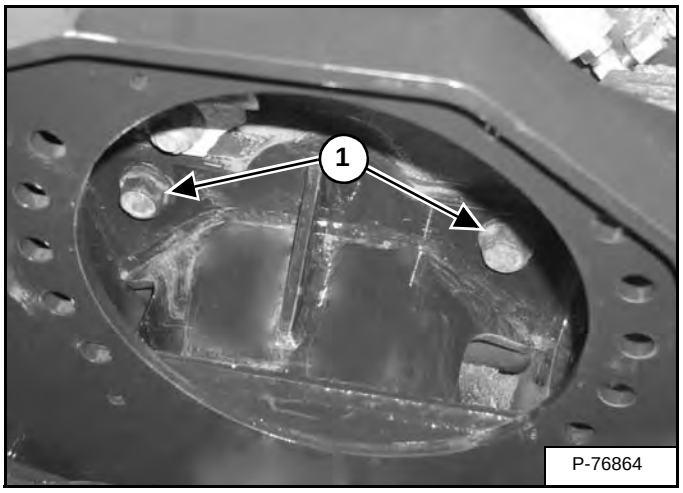
Support the track housing.

Figure 40-21-29



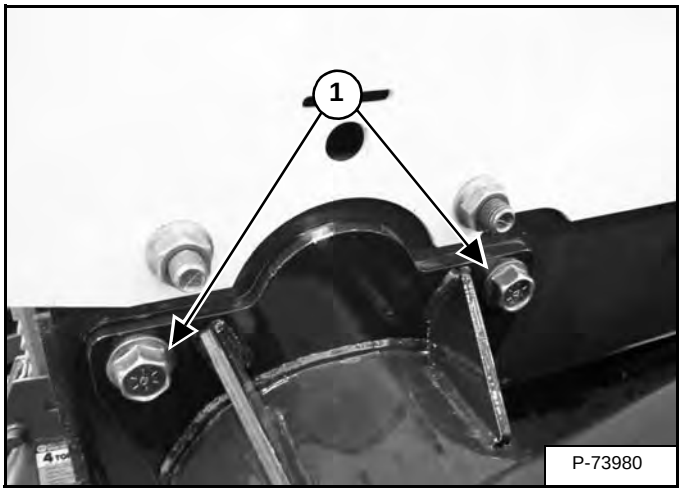
Remove the six mount bolts (Item 1) **[Figure 40-21-29]** from the bottom track housing mount plate. (At the front and rear of the loader.)

Figure 40-21-30



At the rear of the loader remove the two mount bolts (Item 1) **[Figure 40-21-30]**.

Figure 40-21-31



At the front of the loader remove the two mount bolts (Item 1) **[Figure 40-21-31]**.

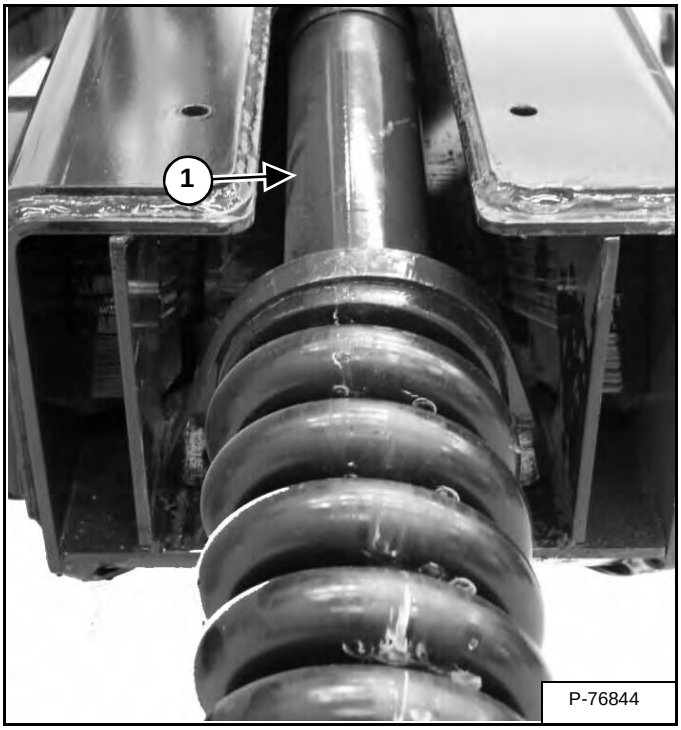
Remove the track housing from the loader.

Installation: Tighten the 16 mount bolts to 300 - 330 ft.-lb. (410 - 450 N•m) torque.

NOTE: The four mount bolts on the side are longer than the 12 mount bolts on the bottom.

Idler (Front) Removal And Installation (S/N A7MP60164 & Above And AAKZ11008 & Above)

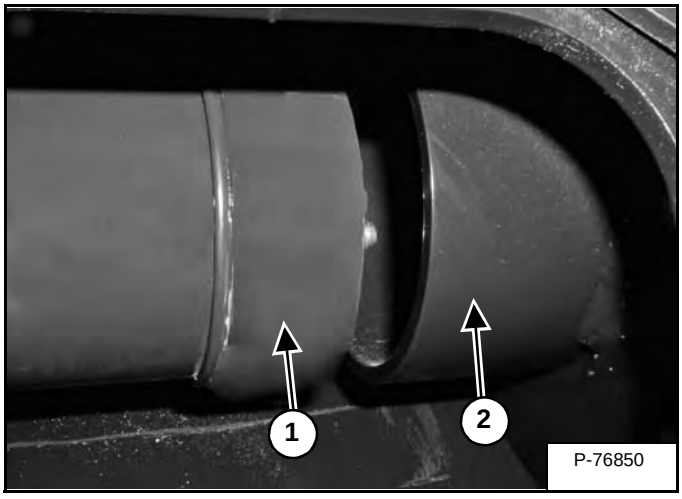
Figure 40-22-21



Slide the track tensioner (Item 1) **[Figure 40-22-21]** out of the track housing.

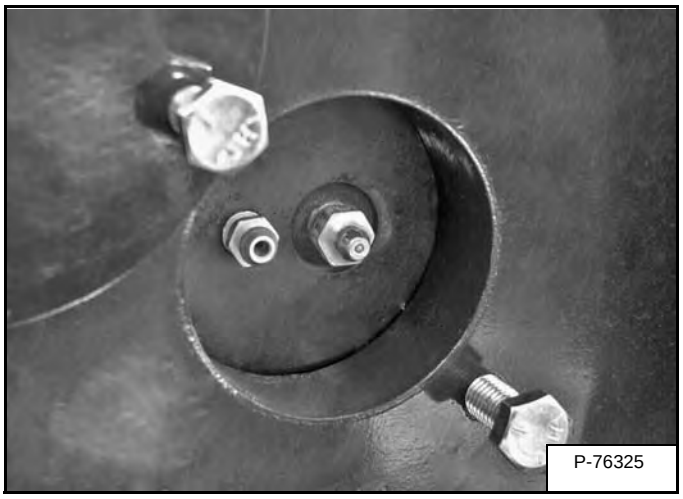
Installation: Track tensioner must be oriented as shown in **[Figure 40-22-21]** before sliding it into the track housing.

Figure 40-22-22



Installation: Track tensioner (Item 1) must slide into the guide tube (Item 2) **[Figure 40-22-22]**.

Figure 40-22-23

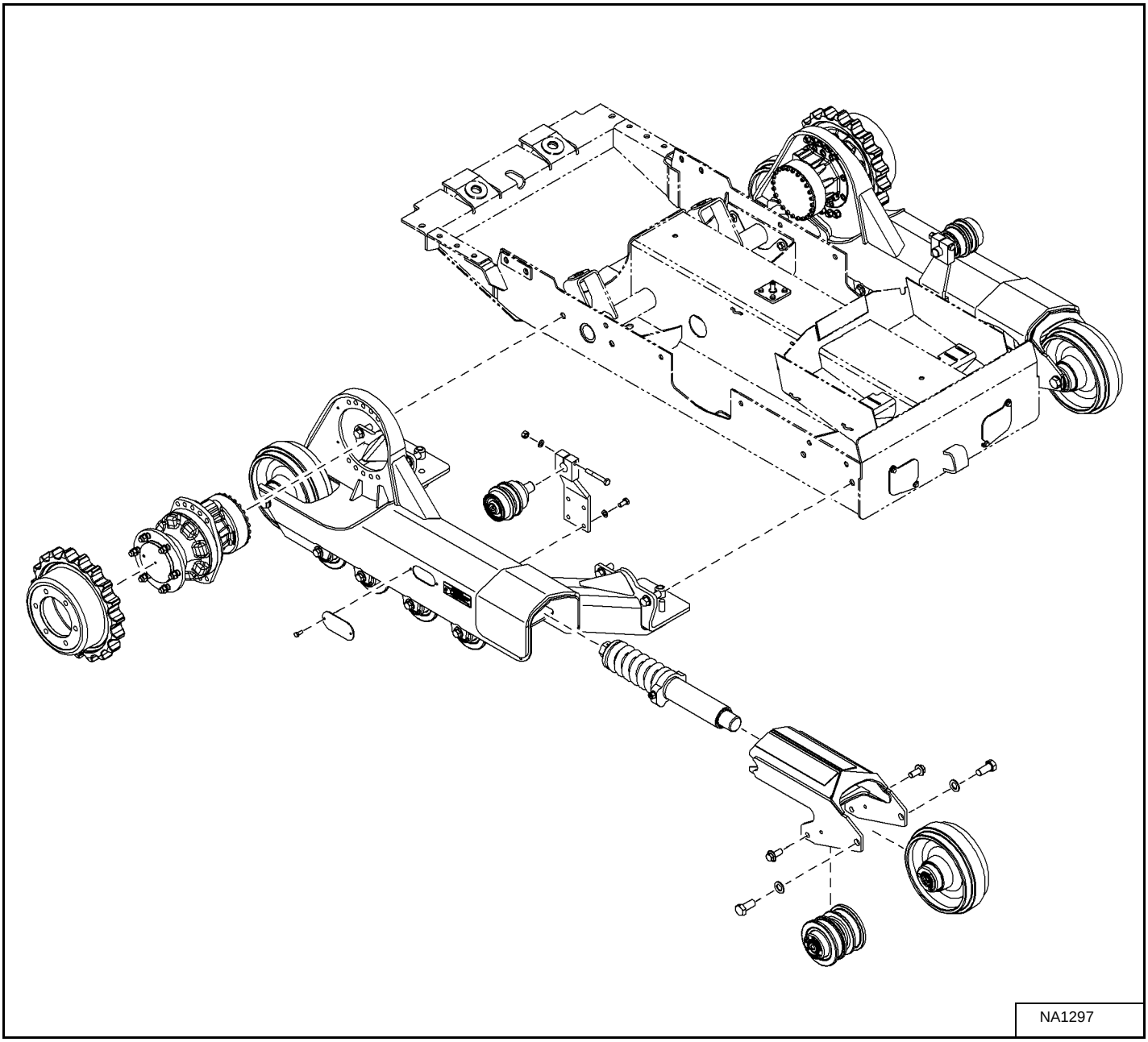


Installation: Track tensioner must be seated properly against the end of the track housing **[Figure 40-22-23]**.

TRACK UNDERCARRIAGE (STEEL TRACK)

Description

Figure 40-23-1



The track carriage consists of front and rear idlers, rollers, the track, track tensioner, the drive sprocket and the track housing **[Figure 40-23-1]**.

Track Tensioner Disassembly And Assembly (Cont'd)

⚠ WARNING

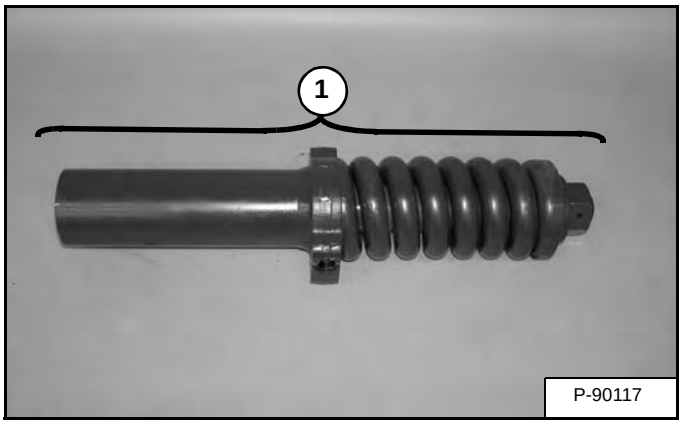
P-62574

AVOID INJURY OR DEATH

- **Spring loaded components under pressure can cause serious injury or death.**
- **Do not disassemble the coil spring assembly.**

W-2617-1004

Figure 40-23-31



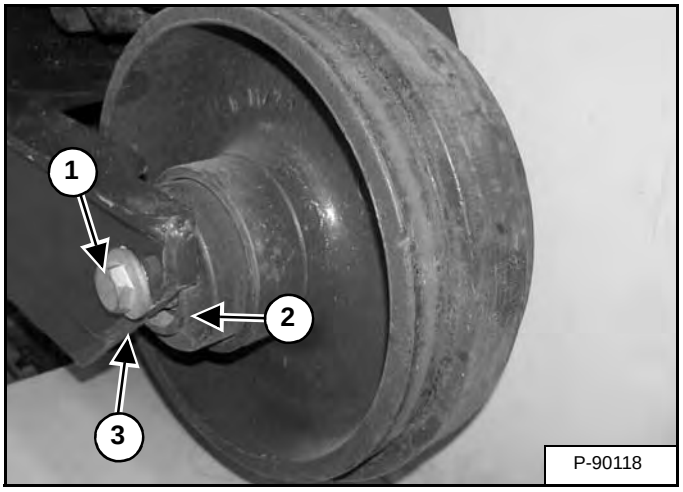
DO NOT DISASSEMBLE OR REPAIR THE COIL SPRING ASSEMBLY. THE COMPRESSION FORCE OF THE SPRING EXCEEDS 14,000 lb.

NOTE: The coil spring assembly (Item 1) [Figure 40-23-31] is only sold as a complete assembly from Bobcat Parts.

Idler (Rear) Removal And Installation

Remove the track. (See Track Removal on Page 40-23-4.)

Figure 40-23-32



Remove the two mount bolts and washers (Item 1) **[Figure 40-23-32]** from both sides.

Remove the rear idler from the loader.

Installation: Align the notched idler (Item 2) with the contour in the track housing (Item 3) **[Figure 40-23-32]**.

Align the holes in the housing with the holes in the shaft.

Installation: Apply Loctite® #243 or equivalent thread locker to the bolts. Install the bolts and tighten to 840 - 940 ft.-lb. (1140 - 1275 N•m) torque.

Track Damage Identification (Cont'd)

Cracks On The Lug Side Rubber Due To Fatigue

Figure 40-30-16

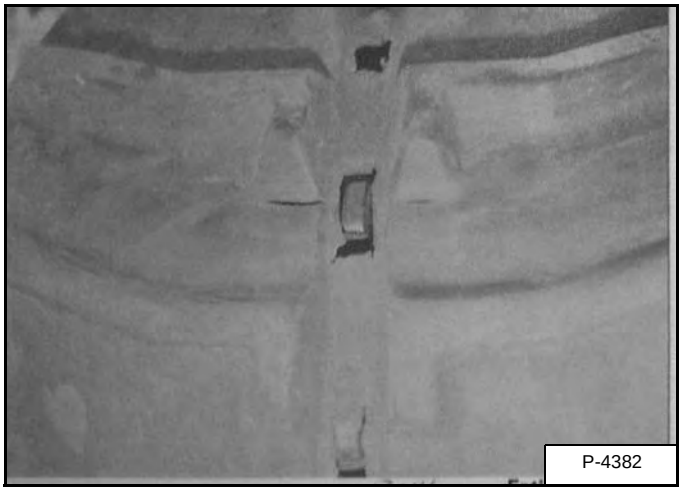
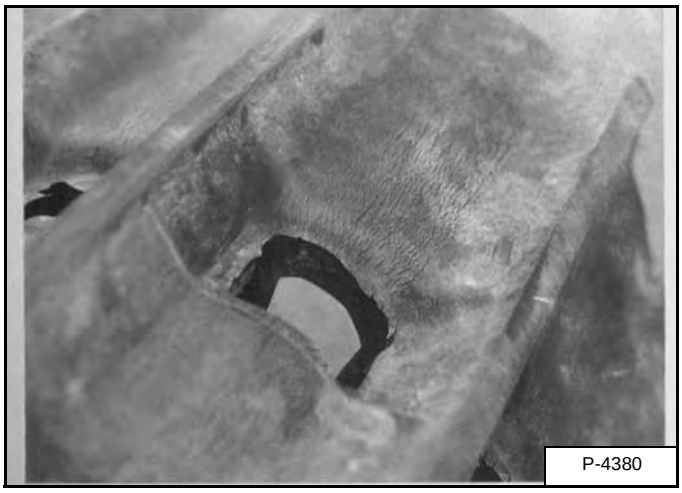


Figure 40-30-17



Damage:

Small cracks around the root of the lug as a result from operation fatigue **[Figure 40-30-16]** and **[Figure 40-30-17]**.

Replacement:

When the cracks reach so deep that they expose the steel cords, track replacement is required.

Causes of the damage:

Because of wound stress applied to rubber tracks around the undercarriage parts during operation, the fatigue especially causes cracks on the lug side rubber surface. Once the cracks occur, they gradually deteriorate with even small external cracks. Also when operating near seashores or under cold temperatures, rubber tracks are more likely to suffer from ozone cracks.

Prevention:

Rubber tracks are designed with special rubber compounds to prevent cracks due to fatigue. However, external injuries on the lug side rubber sometimes cause more chance of cracking. Machine operators should observe soil conditions when driving, so as not to cause external injuries to the lug side rubber. In order to minimize the occurrence of ozone cracks, attention should be paid to the following instructions for maintenance:

Avoid exposing stored tracks to direct sun light.

Avoid exposing stored tracks to direct rain and snow fall.

Store tracks in well ventilated warehouses.

Use the tracks at least once a month.

SEAT BAR

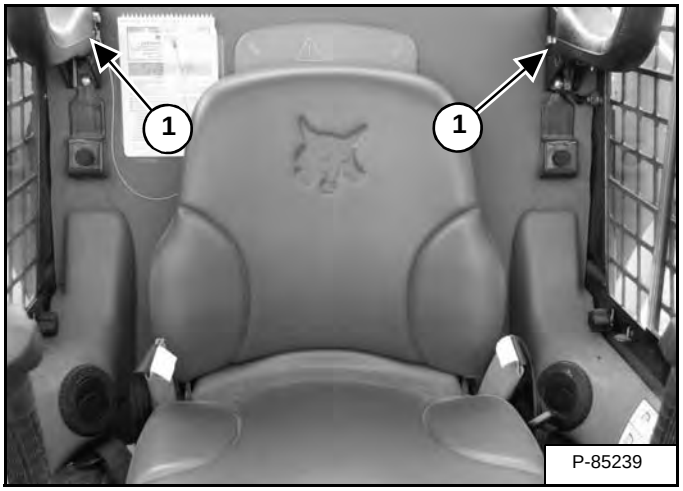
Description

The seat bar is the secondary restraint system that has a sensor that automatically stops the loader functions until the seat bar is lowered.

The seat bar is located in the operator cab.

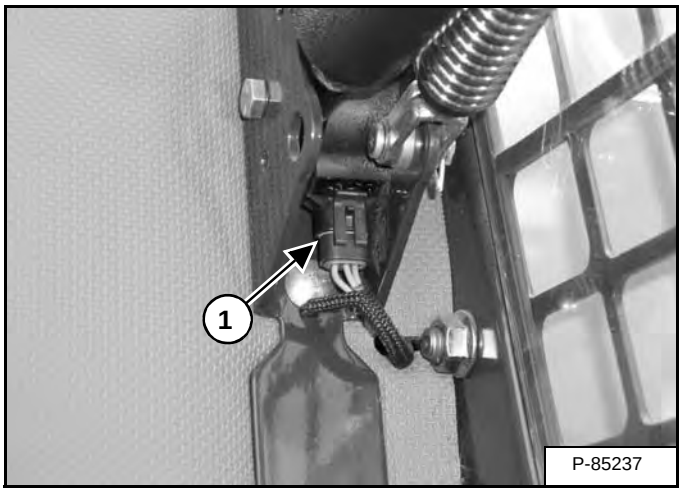
Removal And Installation

Figure 50-10-1



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

Figure 50-10-2

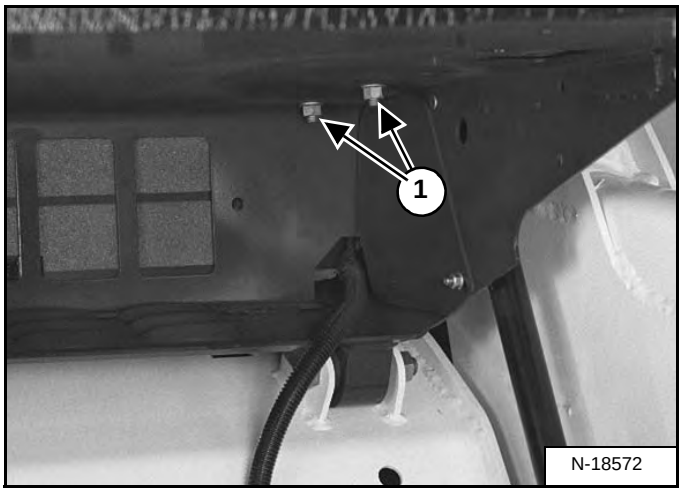


Disconnect the seat bar sensor (Item 1) **[Figure 50-10-2]** from the cab harness.

Lower the seat bar.

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

Figure 50-10-3

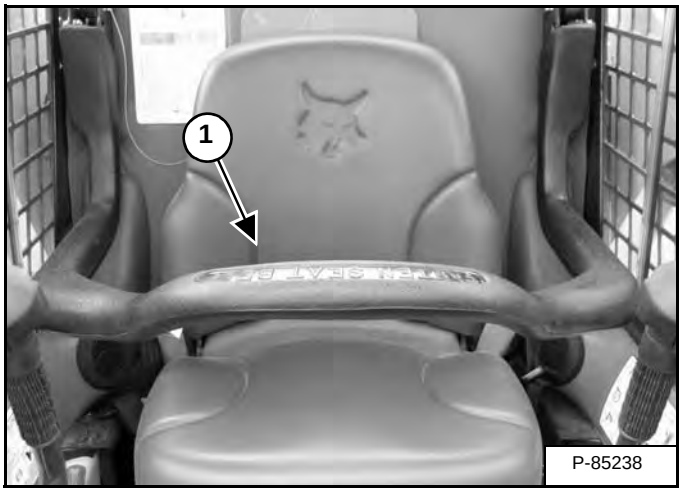


Remove the seat bar mounting nuts (Item 1) **[Figure 50-10-3]** (both sides).

Installation: Tighten the nuts to 25 - 28 ft.-lb. (33,9 - 38 N•m) torque.

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

Figure 50-10-4



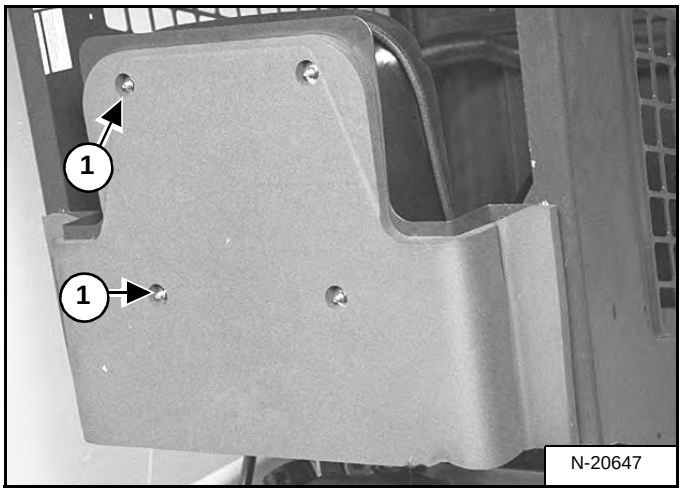
Remove the seat bar (Item 1) **[Figure 50-10-4]** from the operator cab.

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

OPERATOR SEAT (SUSPENSION)

Removal And Installation

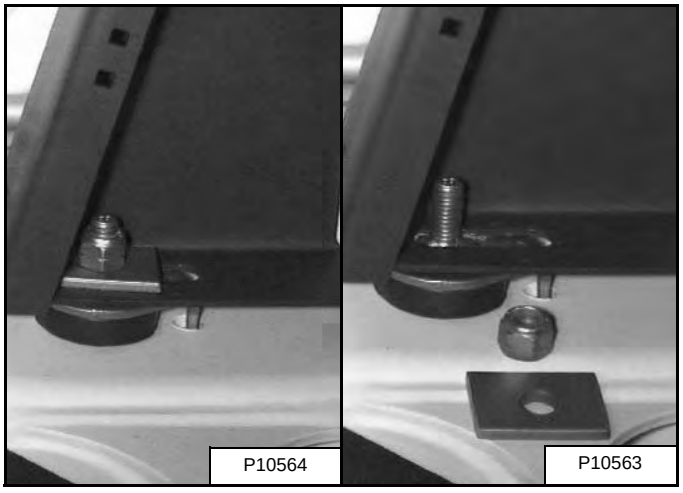
Figure 50-30-1



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

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

Figure 50-30-2

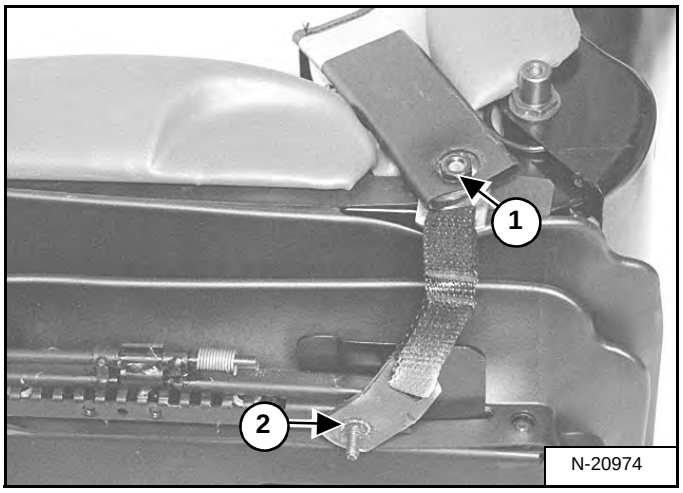


Lower the cab and install one of the mounting washer and nut **[Figure 50-30-2]**.

NOTE: With the seat removed the cab will raise.

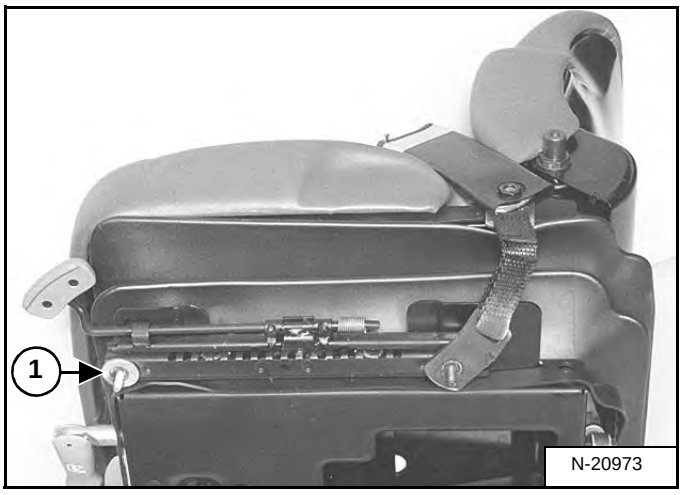
Reverse the removal procedure to install the operator seat.

Figure 50-30-3



NOTE: Assure seat tethers are securely fastened to seatbelt studs (Item 1) and seat rail studs (Item 2) [Figure 50-30-3].

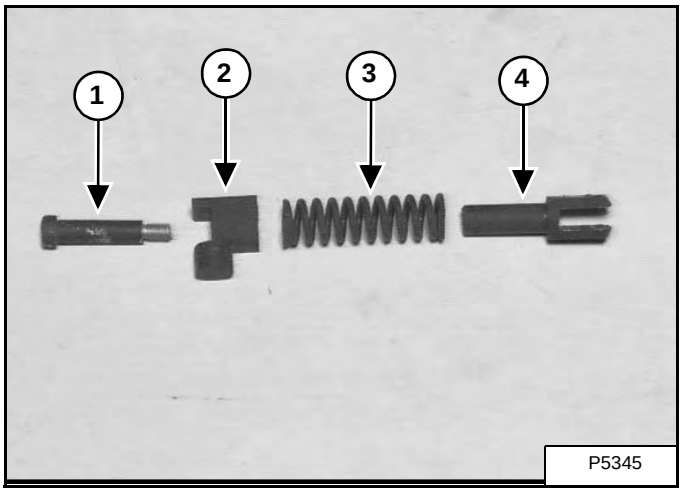
Figure 50-30-4



NOTE: Verify the front two seat rail studs have washers attached (Item 1) [Figure 50-30-4].

Lever And Wedge Disassembly And Assembly (Cont'd)

Figure 50-40-13



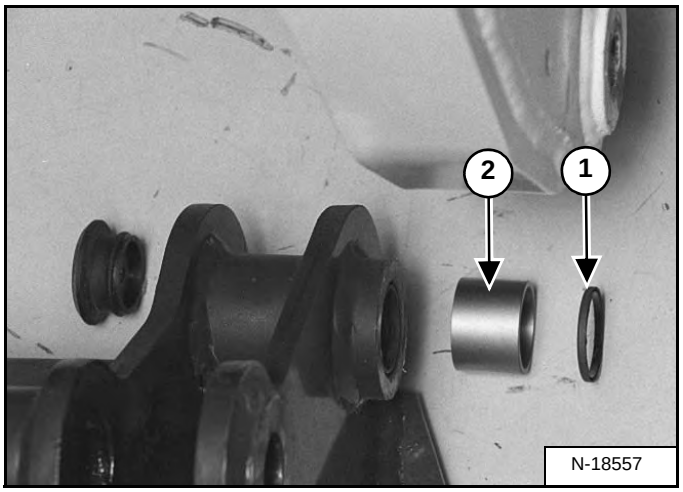
If the bolt (Item 1), handle pivot (Item 2), spring (Item 3) or clevis (Item 4) **[Figure 50-40-13]** are damaged, put the assembly in a vise.

Remove the bolt and replace the damaged parts as needed,

Reverse the removal procedure to install the Bob-Tach lever and wedge.

Pivot Pin Bushing And Seal Removal And Installation

Figure 50-40-14

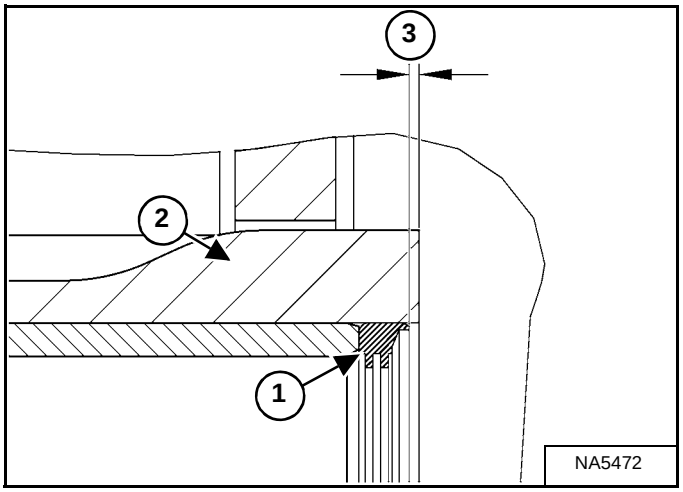


Remove the Power Bob-Tach. (See Removal And Installation on Page 50-41-1.)

Use a seal pick to remove seal (Item 1) **[Figure 50-40-14]** on the Bob-Tach.

Remove and replace bushing (Item 2) **[Figure 50-40-14]** with a driver tool and hammer.

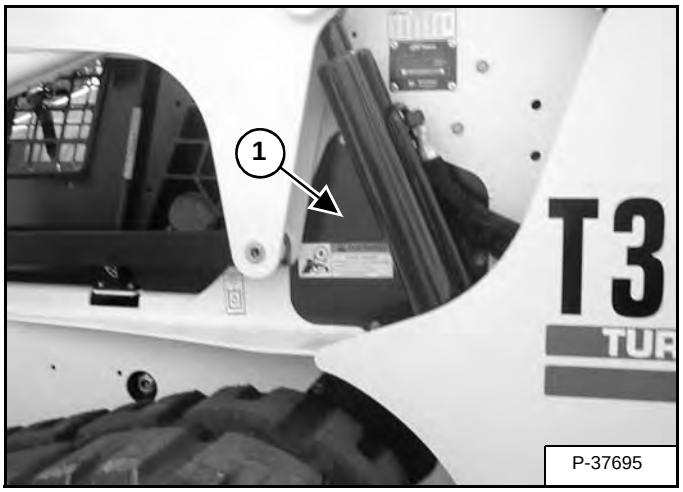
Figure 50-40-15



Installation: The seal (Item 1) needs to be seated in the Bob-Tach (Item 2) to a depth of 0.050 in (12,7 mm) (Item 3) **[Figure 50-40-15]**.

Removal And Installation

Figure 50-50-9



WARNING

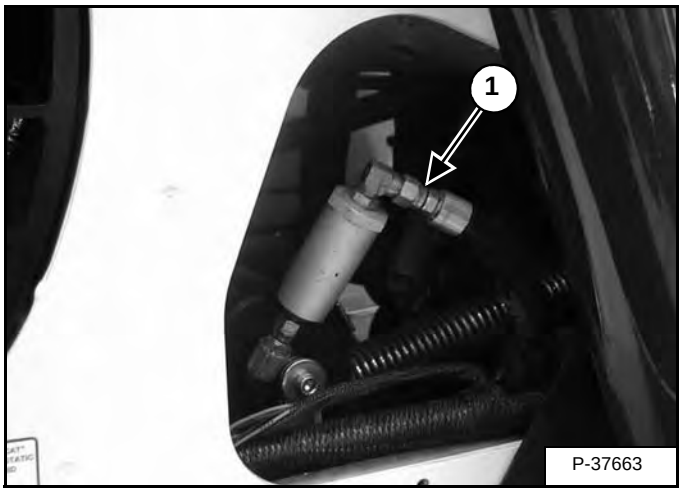
Lift arms must be fully lowered before removing the stabilizer link pins. Even with the approved lift arm support installed, the lift arms and links can suddenly move if both link pins are removed with the lift arms raised.

W-2358-0999

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

Remove the left side access panel (Item 1) **[Figure 50-50-9]**.

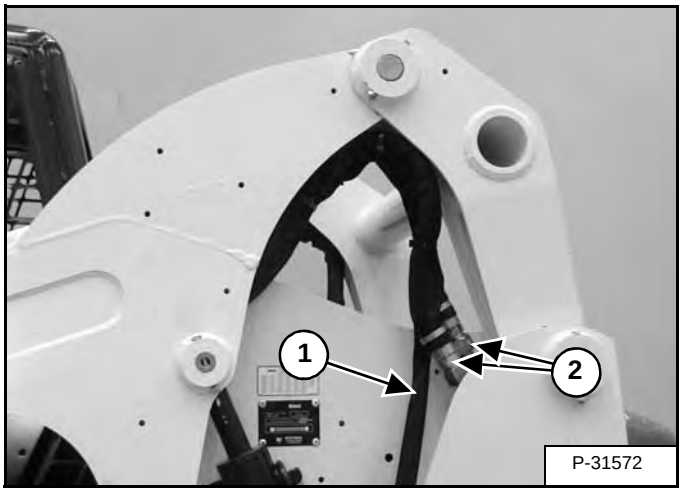
Figure 50-50-10



Disconnect the hydraulic hose (Item 1) **[Figure 50-50-10]** from the filter that goes to the case drain on the auxiliary hydraulic coupler.

Cap and plug the hose and filter fittings.

Figure 50-50-11



Pull the hose (Item 1) **[Figure 50-50-11]** up and out of the upright to allow for lift arm removal.

Mark the auxiliary hydraulic hoses and tubelines for proper installation.

Disconnect the two auxiliary hydraulic hoses (Item 2) **[Figure 50-50-11]**.

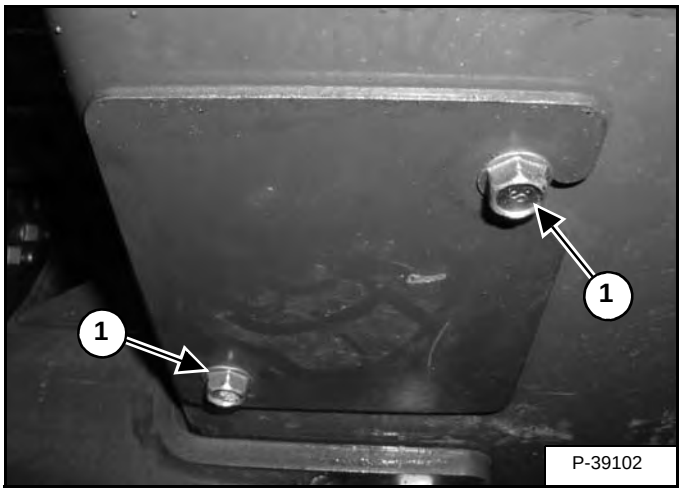
FUEL TANK

Removal And Installation

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

Remove the loader tracks. (See Track Removal And Installation on Page 40-20-4.)

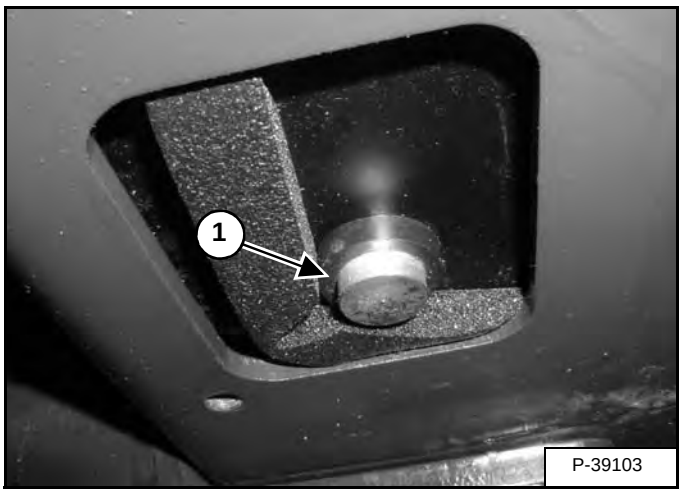
Figure 50-80-1



At the rear, left side of the lower mainframe, remove the two mount bolts (Item 1) **[Figure 50-80-1]** from the access cover.

Remove the access cover.

Figure 50-80-2

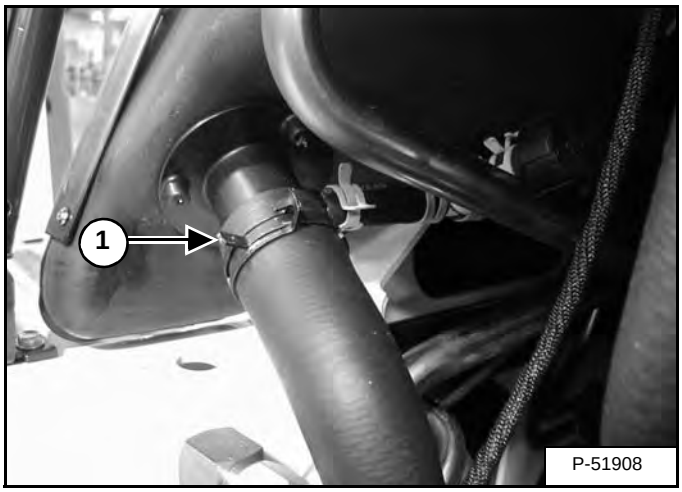


Remove the drain plug (Item 1) **[Figure 50-80-2]**.

Drain the fuel into a container.

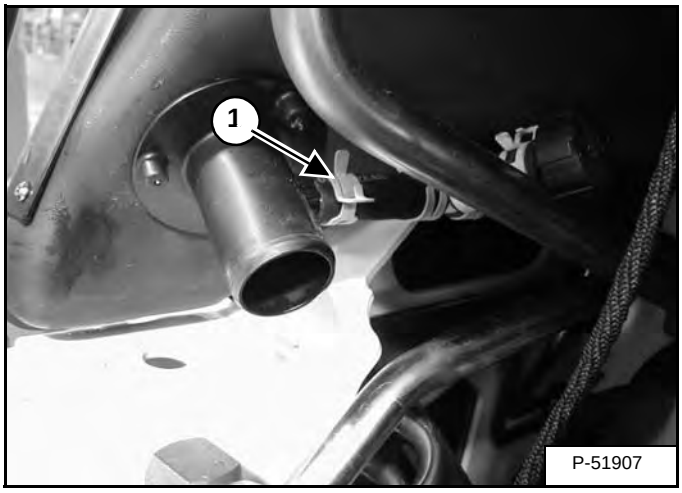
Check the drain plug and replace if necessary.

Figure 50-80-3



Disconnect the fuel fill hose (Item 1) **[Figure 50-80-3]**.

Figure 50-80-4

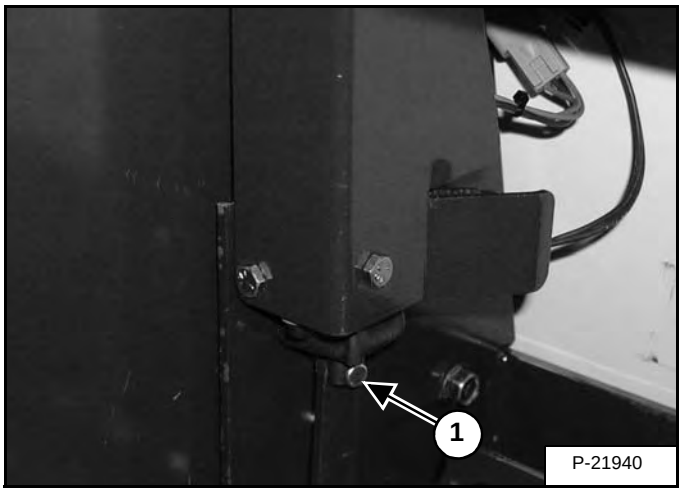


Disconnect the tank vent hose (Item 1) **[Figure 50-80-4]**.

Remove the engine / hydrostatic pump assembly from the loader. (See Engine Removal And Installation on Page 70-10-10.)

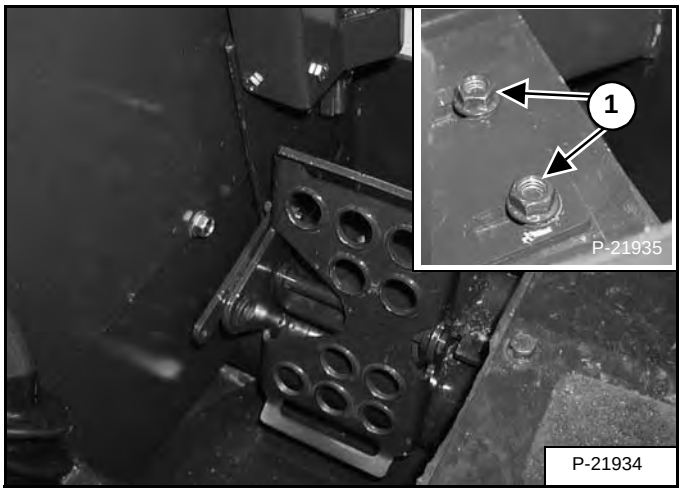
Foot Pedal Removal And Installation

Figure 50-91-5



Remove the pin (Item 1) **[Figure 50-91-5]** holding the linkage to the sensor.

Figure 50-91-6

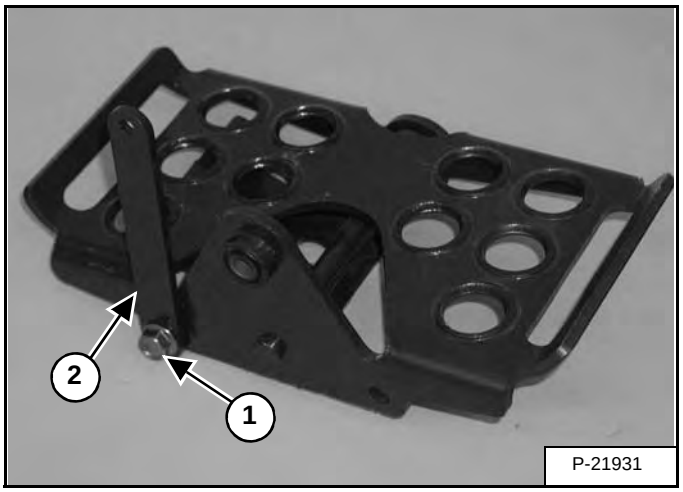


Tip the foot pedal up and remove the two nuts (Item 1) **[Figure 50-91-6]**.

Remove the foot pedal assembly.

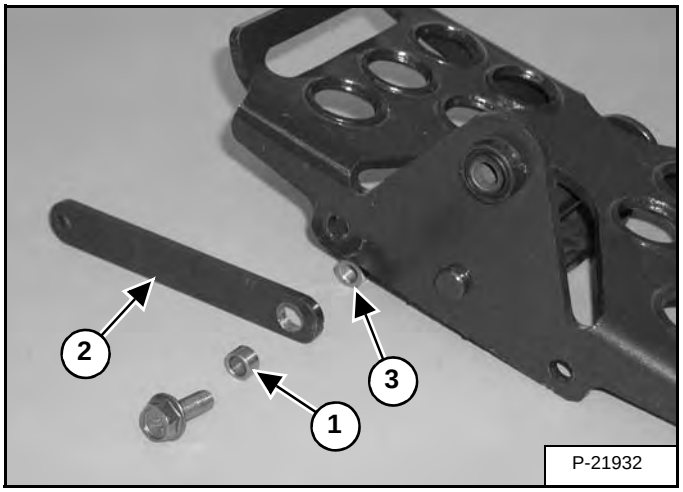
Foot Pedal Linkage Disassembly And Assembly

Figure 50-91-7



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

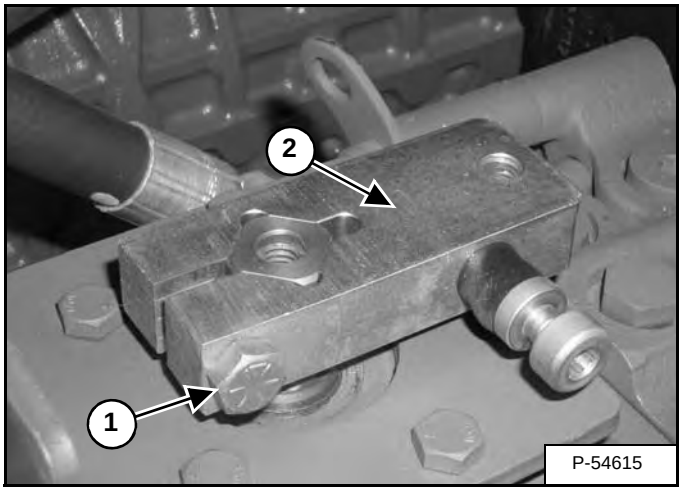
Figure 50-91-8



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

Linkage Removal And Installation (Cont'd)

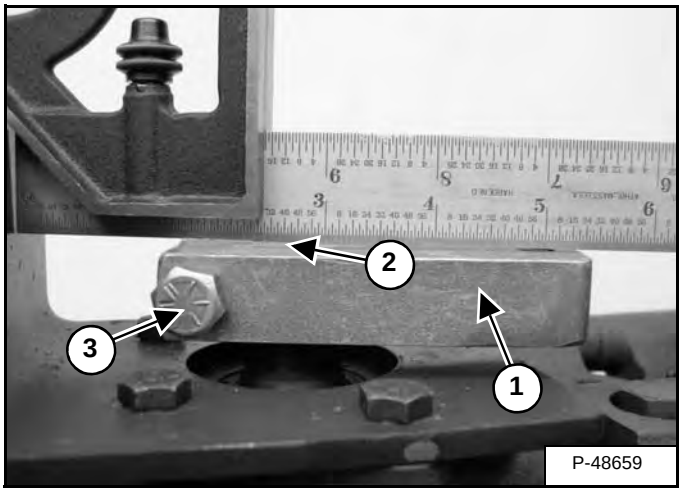
Figure 50-100-21



Loosen the bolt (Item 1) **[Figure 50-100-21]**.

Remove the pintle base (Item 2) **[Figure 50-100-21]**.

Figure 50-100-22



NOTE: When installing the pintle base (Item 1) onto the pump shaft, the cutouts on the pump shaft will not line up with the bolt (Item 3) [Figure 50-100-22].

Installation: Install the pintle base (Item 1) onto the pump shaft (Item 2) **[Figure 50-100-22]**. The top of the pintle base should be level with the top of the pump shaft. Tighten the bolts to 35 - 40 ft.-lb. (47,5 - 54,2 N•m) torque.

NOTE: After installing the linkage onto the hydrostatic pumps the linkage neutral adjusting procedure must be performed. (See Linkage Neutral (Adjusting) on Page 50-101-11.)

CONTROL PANEL (SJC)

Description

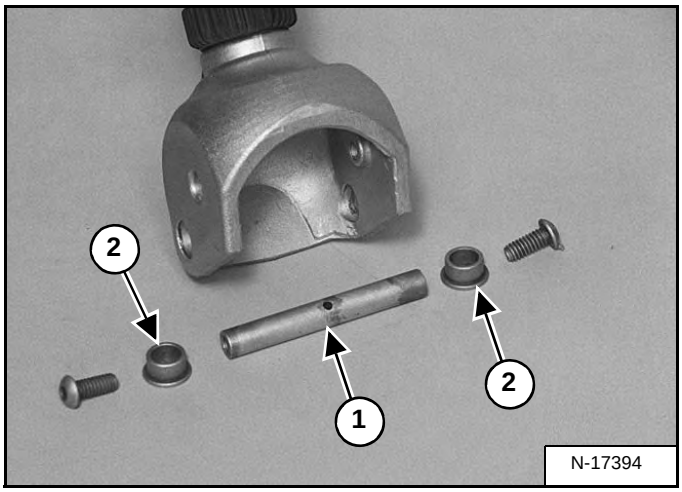
The control panel has two electronic handles that control the steering, lift and tilt functions. There is no mechanical linkages connecting to the hydrostatic pumps or the control valve.

The control panel is connected to the lower mainframe and wraps around the operator seat.

The control panel is now common between the large frame and the medium frame loaders.

Handle Disassembly And Assembly

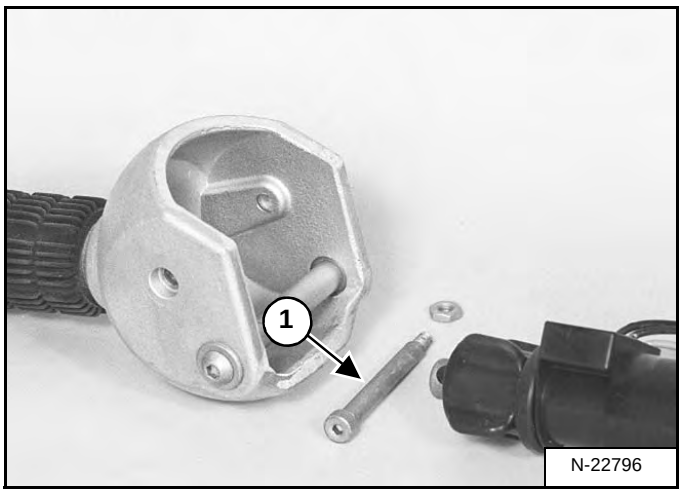
Figure 50-111-16



Remove the handle sleeve (Item 1) and bushings (Item 2) **[Figure 50-111-16]** from the handle.

Check all parts for wear and replace as needed.

Figure 50-111-17

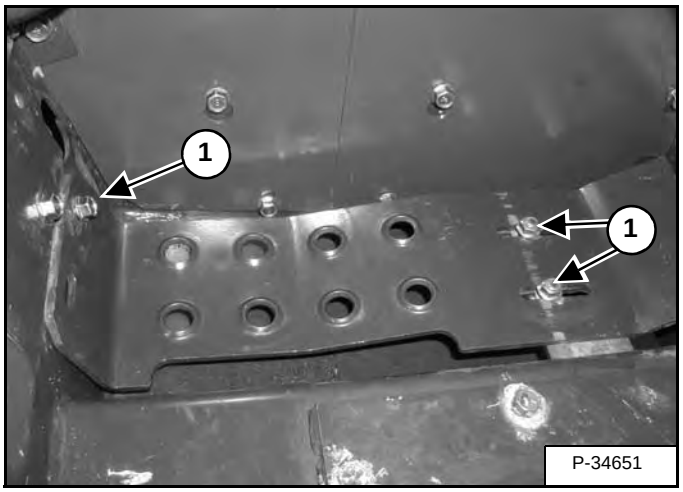


Check the mounting bolt (Item 1) **[Figure 50-111-17]** that connects the handle to the handle sensor unit for wear, replace as needed.

ACCESS PANEL (INSIDE) (SJC)

Removal And Installation (Left)

Figure 50-121-1



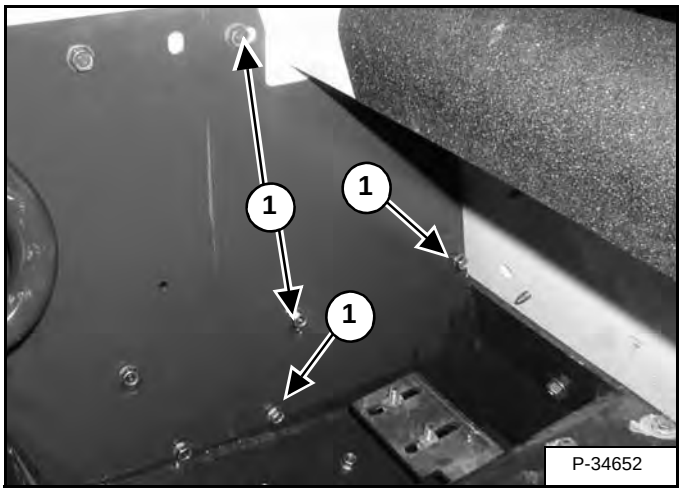
Raise the lift arms and install an approved lift arm support device. (See Installing on Page 10-20-1.)

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

Remove the three mounting bolts (Item 1) **[Figure 50-121-1]**, from the left foot rest.

Remove the foot rest from the loader.

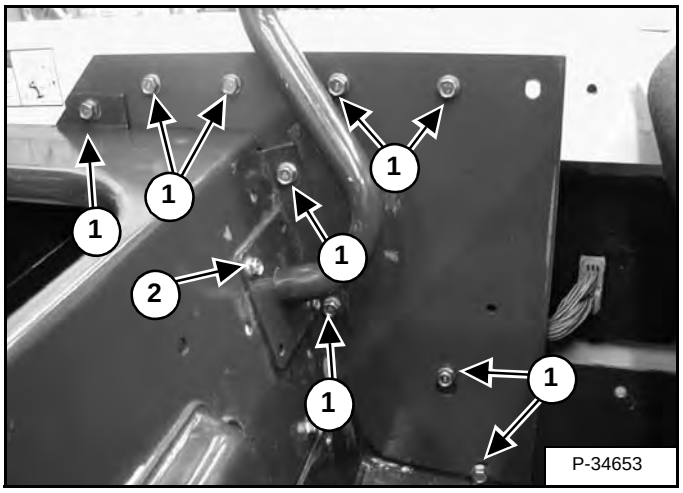
Figure 50-121-2



Remove the four mounting bolts (Item 1) **[Figure 50-121-2]**.

Remove the front access panel from the loader.

Figure 50-121-3



Remove the nine mount bolts (Item 1) **[Figure 50-121-3]**

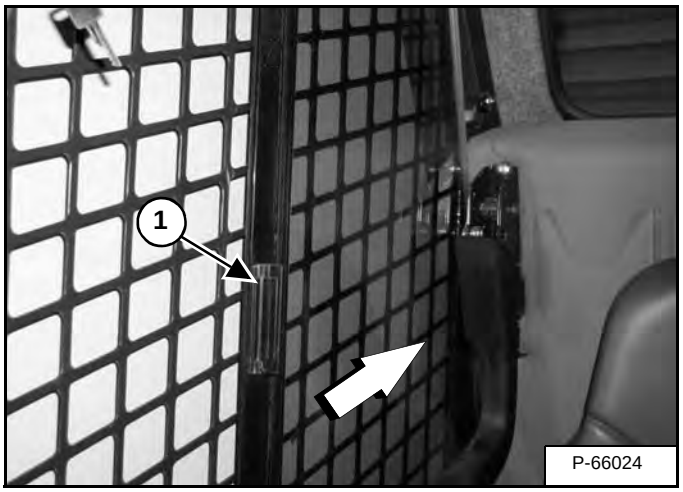
Remove the mount bolt (Item 2) **[Figure 50-121-3]** from the lever assembly. Move the lever assembly a slight amount toward the center of the loader, to allow clearance for the panel to be removed.

Remove the inside access panel from the loader.

WINDOW (SIDE)

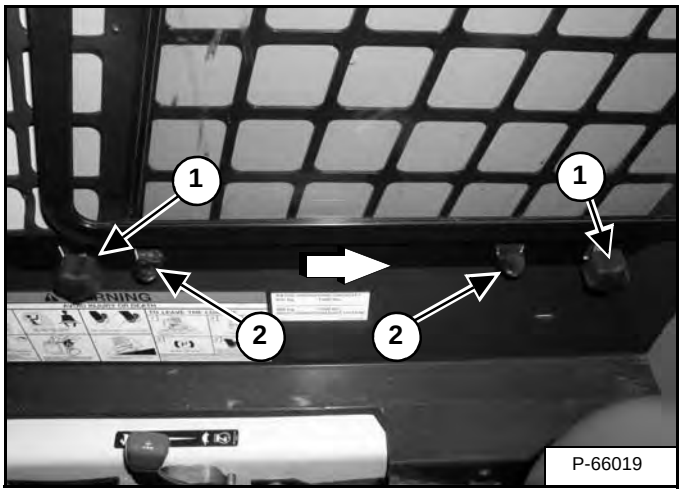
Removal And Installation

Figure 50-132-1



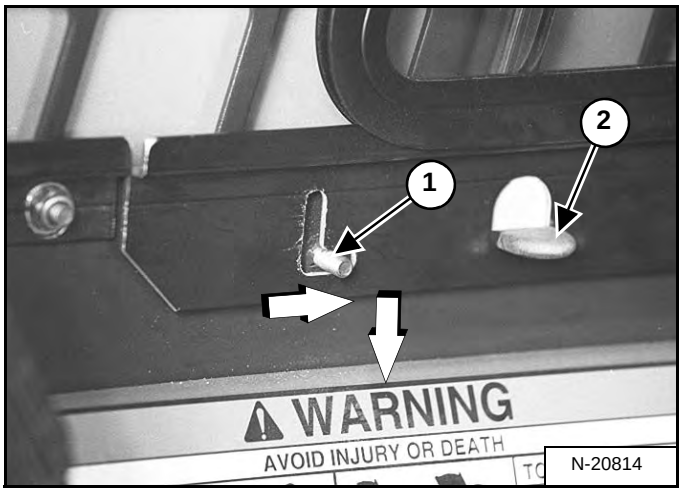
Release the latch (Item 1) **[Figure 50-132-1]** and slide the front window back towards the rear of the operator cab.

Figure 50-132-2



From inside the operator cab, loosen the knobs (Item 1) **[Figure 50-132-2]** and **[Figure 50-132-3]** on the window slide rail bolts.

Figure 50-132-3



NOTE: [Figure 50-132-3] is shown with the washer and knob removed to illustrate the direction of movement.

Move the window slide rail using the two thumb pads (Item 2) **[Figure 50-132-2]** and **[Figure 50-132-3]** towards the rear of the operator cab and then down towards the bottom of the operator cab.

NOTE: The top of the window should come out of the top slide rail at this time. Make sure the window is secure and does not fall. Make sure the slide rails are in alignment and the window is positioned in the top track during installation.

Remove the front side window from the operator cab.

ELECTRICAL SYSTEM & ANALYSIS

Continued On Next Page

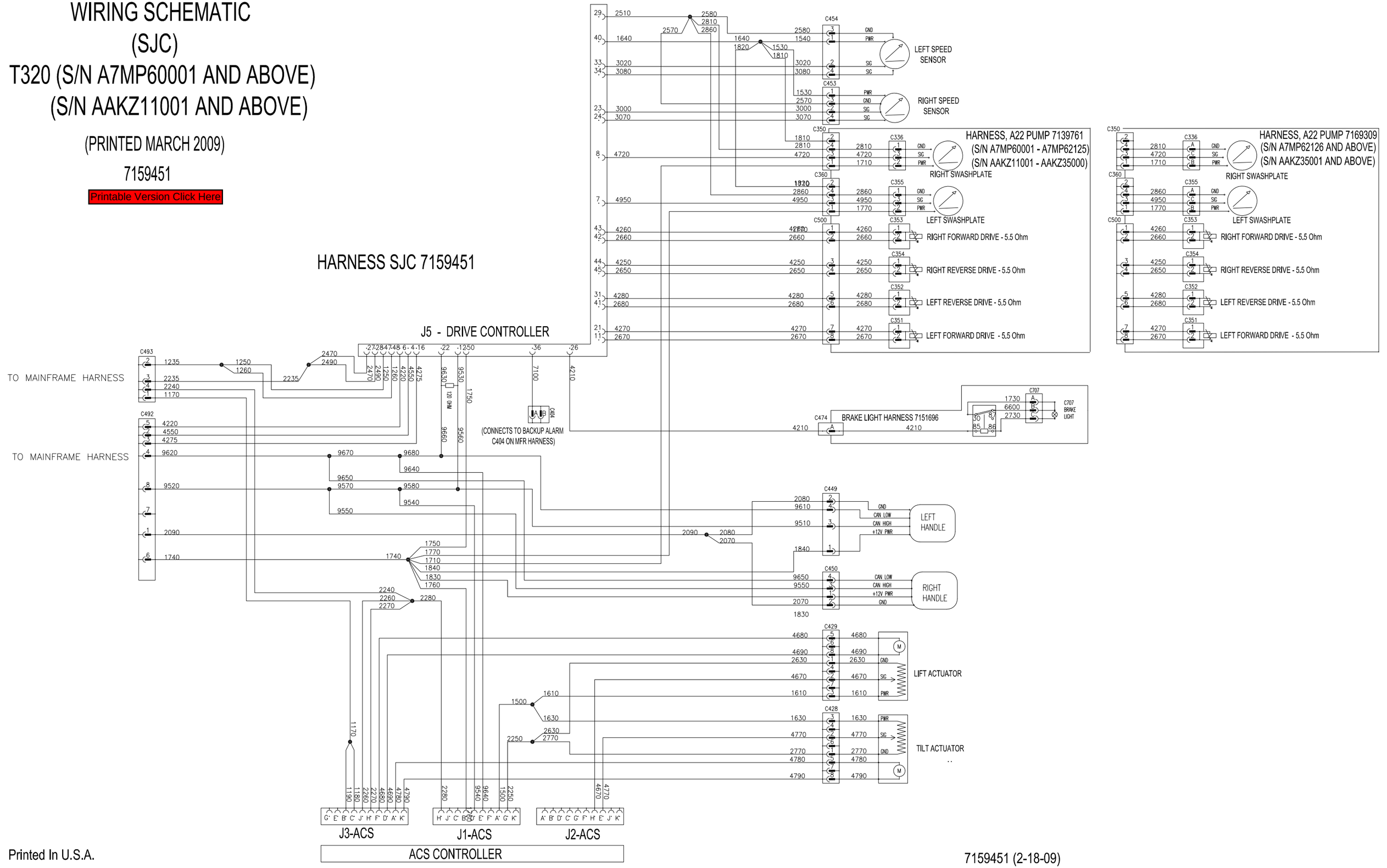
WIRING SCHEMATIC
(SJC)
T320 (S/N A7MP60001 AND ABOVE)
(S/N AAKZ11001 AND ABOVE)

(PRINTED MARCH 2009)

7159451

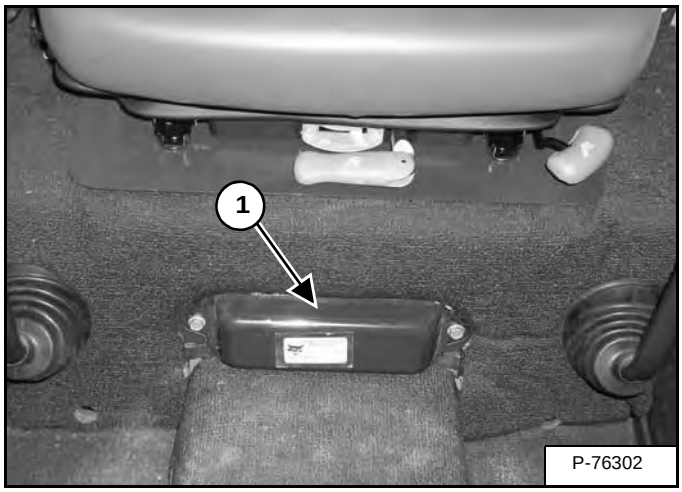
Printable Version Click Here

HARNESS SJC 7159451



Fuse And Relay Location / Identification

Figure 60-10-2



The electrical system is protected from overload by fuses and relays under the fuse panel cover (Item 1) **[Figure 60-10-2]**. A decal is inside the cover to show location and amp ratings.

Remove the cover to check or replace the fuses.

IMPORTANT

Do Not use silicone base sprays and/or sealants on harness connectors or components.

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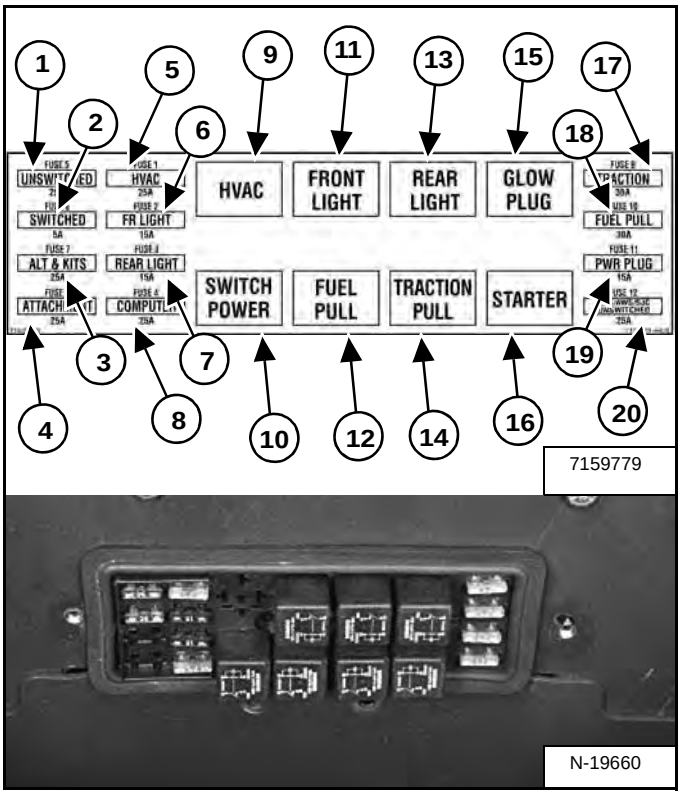
Figure 60-10-3



The location and sizes are shown below and **[Figure 60-10-3]**.

REF	DESCRIPTION	AMP	REF	DESCRIPTION	AMP
1	Unswitched Horn	25	**11**	Front & Marker Lights	R
2	ACS/AWS/SJC Switched	5	**12**	Fuel Shutoff	R
3	Alternator & Accessories Back-up Alarm	25	**13**	Rear Lights	R
4	Attachments	25	**14**	Traction	R
5	Heater & Air Conditioning	25	**15**	Glow Plugs	R
6	Front & Marker Lights	15	**16**	Starter	R
7	Rear Lights	15	**17**	Traction	30
8	Bobcat Controller	25	**18**	Fuel Shutoff	30
9	Heater & Air Conditioning	R	**19**	Power Plug	15
10	Switch Power	R	**20**	ACS/AWS/SJC Unswitched	25

R - Relay

Removal And Installation

IMPORTANT

Damage to the alternator can occur if:

- **Engine is operated with battery cables disconnected.**
- **Battery cables are connected when using a fast charger or when welding on the loader. (Remove both cables from the battery.)**
- **Extra battery cables (booster cables) are connected wrong.**

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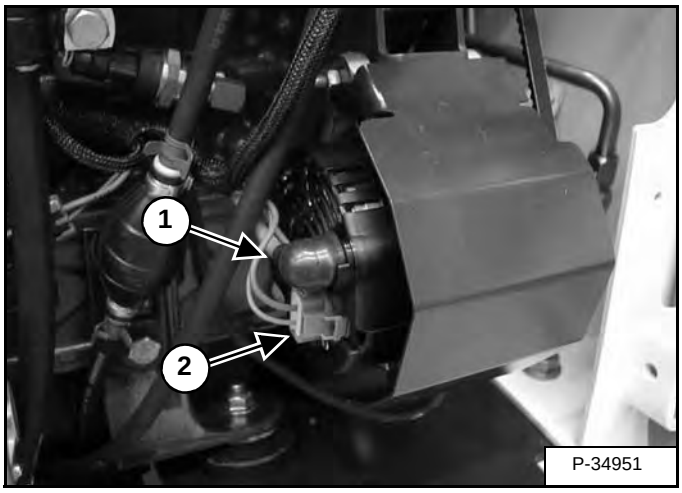
Figure 60-30-7



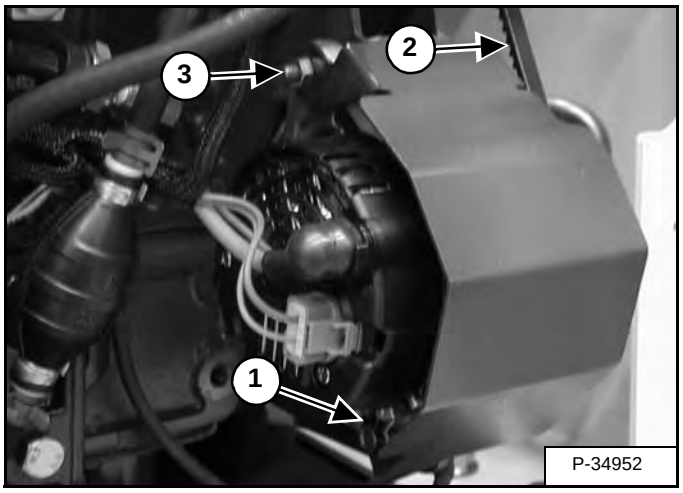
Place jackstands under the rear corners of the loader.

Disconnect the negative (-) cable from the battery.

Disconnect the red wire (Item 1) **[Figure 60-30-7]** from the alternator which comes from the battery.

Disconnect the wiring harness connector (Item 2) **[Figure 60-30-7]** from the alternator.

Figure 60-30-8



Remove the adjustment bolt (Item 1) **[Figure 60-30-8]** from the mounting bracket.

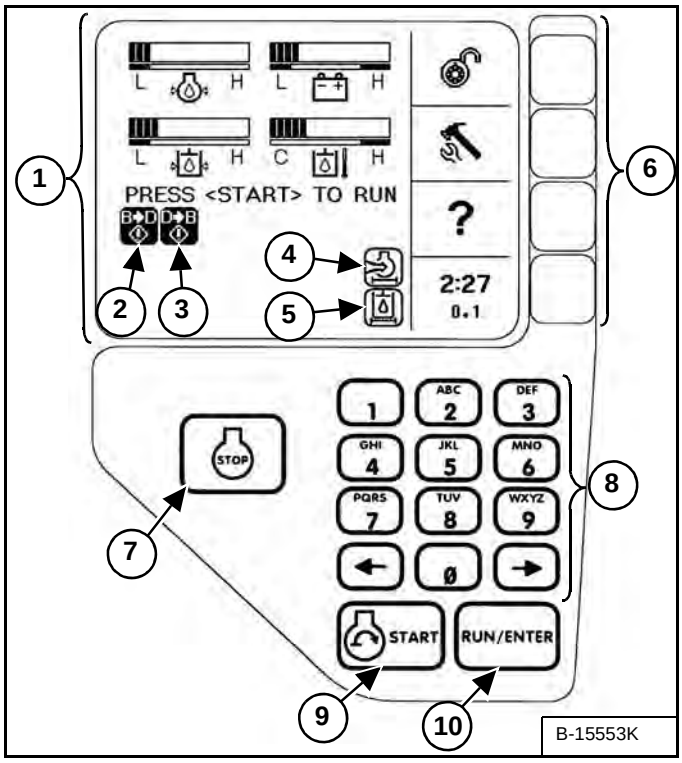
Remove the alternator belt (Item 2) **[Figure 60-30-8]** from the alternator pulley.

At the top of the alternator, remove the mounting bolt (Item 3) **[Figure 60-30-8]**.

Remove the alternator from the loader.

Deluxe Instrumentation Panel

Figure 60-50-4



This machine may be equipped with a Deluxe Instrumentation Panel **[Figure 60-50-4]**.

1. **Display Screen:** The Display Screen is where all system setup, monitoring, troubleshooting and error conditions are displayed.

2. **Bobcat Main Controller Error:** Indicates communication error between Bobcat Main Controller and Deluxe Instrumentation Panel. (See DIAGNOSTIC SERVICE CODES on Page 60-90-1.)

3. **Display Error:** Indicates communication error between instrument panel and Bobcat controller. (See DIAGNOSTIC SERVICE CODES on Page 60-90-1.)

4. **Engine Air Filter Icon:** Indicates engine air filter requires service.

5. **Hydraulic Filter Icon:** Indicates hydraulic filter requires service.

6. **Selection Buttons:** The four Selection Buttons allow you to select items from the Display Screen and scroll through screens.

7. **Stop Button:** Used to stop the engine and shut down the loader's electrical system.

8. **Keypad:** The numeric keypad has two functions:

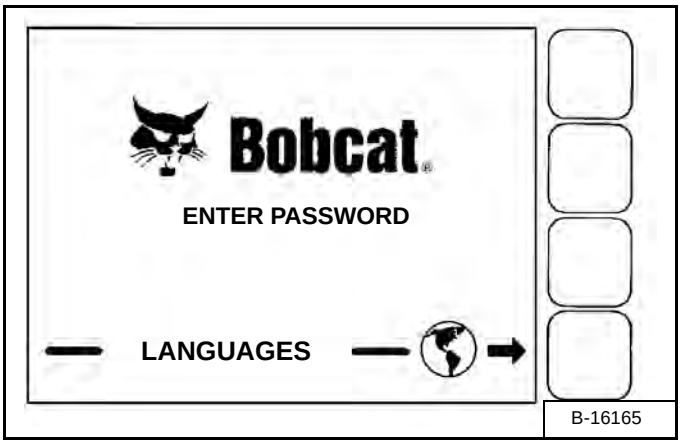
   - To enter a number code (password) to allow starting the engine.

   - To enter a number as directed for further use of the Display Screen.

9. Start Button: Used to start the engine.

10. **Run / Enter Button:** Used to turn on the loader's electrical system.

Figure 60-50-5



The first screen you will see on your new loader will be as shown in **[Figure 60-50-5]**.

When this screen is on the display you can enter the password and start the engine or change the Display Screen setup features.

NOTE: Your new loader (with Deluxe Instrumentation Panel) will have an Owner Password. Your dealer will provide you with this password. Change the password to one that you will easily remember to prevent unauthorized use of your loader. (See Changing The Owner Password on Page 60-190-1.) Keep your password in a safe place for future needs.

Change Language: Press the Selection Button at the end of the arrow **[Figure 60-50-5]** to go to the next screen. Use the Keypad to select the number of the language.

Press EXIT. The screen will return to **[Figure 60-50-5]**. You can then enter the password and start the engine.

See CONTROL PANEL SETUP for further description of screens to setup the system for your use. (See CONTROL PANEL SETUP on Page 60-180-1.)

NOTE: Pressing the EXIT key will go to the previous screen and you can continue pressing until you get to the initial (home) screen. SHORTCUT: Press the "0" (zero) key to get to the home screen immediately.

Connector Identification (Cont'd)

J1A

PIN	WIRE NUMBER	COLOR	DESCRIPTION
1	2410	BLACK	HYD LOCK VALVE SOLENOID GROUND
2	2380	BLACK	LIFT SPOOL SOLENOID GROUND
3	8110	TAN	FUEL RELAY SIGNAL
4	8000	TAN	SWITCHED POWER RELAY SIGNAL
5	6320	PINK	MRKR LIGHT PWR RELAY SIGNAL
6	8510	TAN	GLOW PLUG RELAY SIGNAL
7	8210	TAN	STARTER RELAY SIGNAL
8	4110	LGN	TRACTION LOCK RELAY SIGNAL
9	OPEN	NA	NA
10	2370	BLACK	TILT SPOOL LOCK SOLENOID GROUND
11	7023	WHITE	AC SIGNAL MONITOR
12	OPEN	NA	NA
13	4150	LGN	TRACTION LOCK RELAY FEEDBACK
14	8550	TAN	GLOW PLUG RELAY FEEDBACK
15	3600	LBL	ENGINE SPEED SENSOR SIGNAL
16	3700	LBL	AIR FILTER SENDER SIGNAL
17	6210	PINK	REAR LIGHT RELAY SIGNAL
18	2910	BLACK	HYDRAULIC FAN GROUND
19	9370	PURPLE	PTOL LED
20	9380	PURPLE	PTOL SWITCH
21	8020	TAN	SWITCHED POWER RELAY FEEDBACK
22	8250	TAN	STARTER RELAY FEEDBACK
23	3440	LBL	HYD FAN DIFF PRESS SWITCH SIGNAL
24	9360	PURPLE	START ENGINE
25	3520	LBL	ENGINE OIL PRESS SENDER POWER
26	2350	BLACK	TWO SPEED GROUND
27	2360	BLACK	TWO SPEED MAKEUP GROUND
28	6230	PINK	REAR LIGHT RELAY FEEDBACK
29	OPEN	NA	NA
30	8150	TAN	FUEL RELAY FEEDBACK
31	6330	PINK	MRKR LIGHT PWR RELAY FEEDBACK
32	3300	LBL	HYD TEMP SIGNAL
33	OPEN	NA	NA
34	3430	LBL	HYD FILTER DIFF PRESS

BOBCAT CONTROLLER (SJC) (DRIVE)

Description

The drive controller is only on loaders equipped with the SJC option. This controller processes information for the drive functions.

The drive controller is located behind the right side access panel near the operators right foot.

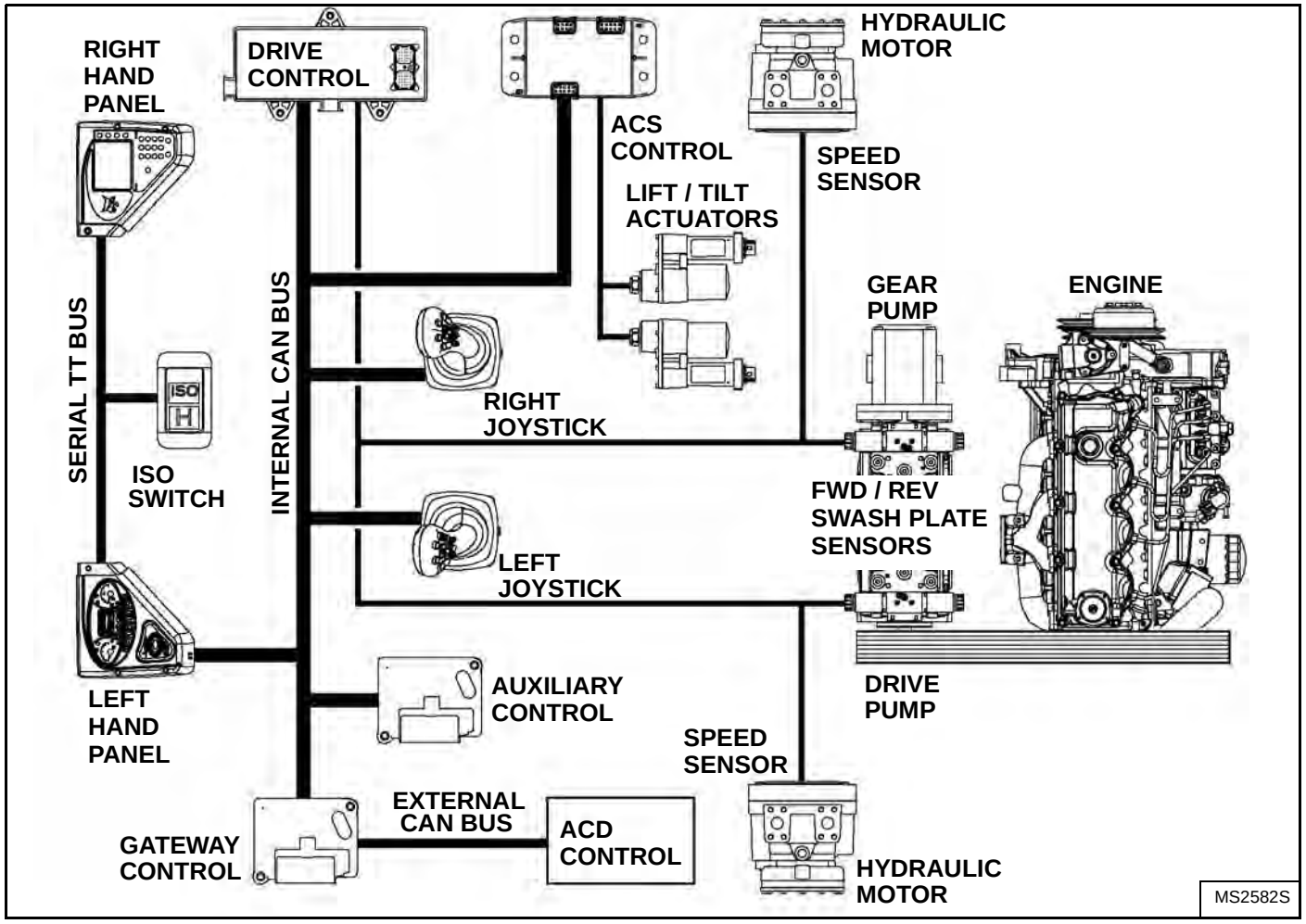
The drive controller monitors the position of the left joystick, pump swash plate angles and the output of the wheel speed sensors.

The drive controller works along with the ACS controller and communicates with the Gateway controller in an SJC system. All these controllers are capable of software upgrades.

The SJC system uses electronic joysticks to control both of the workgroups (lift and tilt) and the drive functions of the loader. The control can be switched from ISO and H-Pattern drive control layouts.

The workgroup actuators are the same used on the ACS system.

The hydrostatic drive pump is a Rexroth A22 unit. It has two electromagnetic coils on each of the two pumps to control the drive of the loader. The coils will direct the forward and reverse outputs of the pump to the drive motors. The Rexroth pump is equipped with position sensors mounted to the bottom of the swash plates to provide feedback to the controllers to sense uncommanded swash plate movement.



Service Codes List (Cont'd)

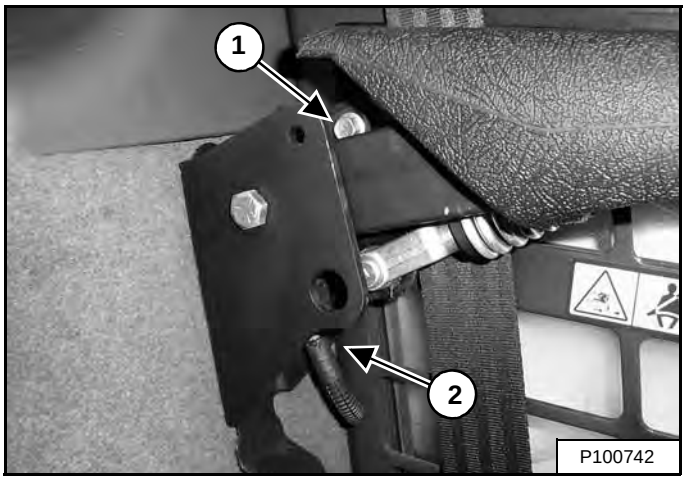
CODE	DESCRIPTION	CODE	DESCRIPTION
D7566	Back-up alarm error OFF	H2606	Front base solenoid short to ground
D7567	No communication from Gateway controller	H2607	Front base solenoid open circuit
D7568	Angle sensors not calibrated	H2632	Front base solenoid overcurrent
D7569	Battery voltage out of range high	H2705	Front rod solenoid short to battery
D7570	Interrupted power	H2706	Front rod solenoid short to ground
D7571	Battery voltage out of range low	H2707	Front rod solenoid open circuit
D7572	Drive pump not calibrated	H2732	Front rod solenoid overcurrent
D7573	Operating mode switch flipped while operating	H2805	Diverter rod solenoid short to battery
D7574	Right speed uncommanded motion	H2806	Diverter rod solenoid short to ground
D7575	Left speed uncommanded motion	H2807	Diverter rod solenoid open circuit
D7577	Left speed sensor out of range high	H2905	High-flow solenoid short to battery
D7578	Right speed sensor out of range high	H2906	High-flow solenoid short to ground
D7579	Left speed sensor out of range low	H2907	High-flow solenoid open circuit
D7580	Right speed sensor out of range low	H2932	High-flow solenoid overcurrent
D7581	Right front steer retract short to battery	H3128	Interrupted power failure
D7582	Left front steer retract short to battery	H3648	ACD multiple
D7583	Right rear steer retract short to battery	H3913	Left joystick grip no communication
D7584	Left rear steer retract short to battery	H3916	Left joystick not connected
D7585	Sensor supply 1 out of range high	H3928	Left joystick failure
D7586	Sensor supply 2 out of range high	H3948	Left joystick multiple
D7587	Software update required	H4013	Right joystick grip no communication
D7588	Switched power stuck ON	H4016	Right joystick not connected
D7591	Left Swash Sensor Reversed	H4028	Right joystick failure
D7592	Right Swash Sensor Reversed	H4048	Right joystick multiple
D7593	Right speed sensor unresponsive	H4423	Auxiliary not programmed
D7594	Left speed sensor unresponsive	H4721	Sensor supply 1 out of range high
D7595	Left speed sensor reversed	H4722	Sensor supply 1 out of range low
D7596	Right speed sensor reversed	H7314	Remote control failure
D7597	Controller programmed	H7328	Remote control no signal
D7598	In drive calibration mode	H7404	Main controller no communication
D7599	In angle calibration mode	H7604	Left hand panel no communication
H1221	Right Primary out of range high	L0102	Left panel button 1 error ON
H1222	Right Primary out of range low	L0202	Left panel button 2 error ON
H1224	Right Primary not in neutral	L0302	Left panel button 3 error ON
H1321	Left Primary out of range high	L0402	Left panel button 4 error ON
H1322	Left Primary out of range low	L7404	Left panel main controller no communication
H1324	Left Primary not in neutral	L7672	Left panel programming error
H2305	Rear base solenoid short to battery		
H2306	Rear base solenoid short to ground	M0116	Air filter not connected
H2307	Rear base solenoid open circuit	M0117	Air filter plugged
H2332	Rear base solenoid overcurrent	M0216	Hydraulic / Hydrostatic filter not connected
H2405	Rear rod solenoid short to battery	M0217	Hydraulic / Hydrostatic filter plugged
H2406	Rear rod solenoid short to ground	M0309	Battery voltage low
H2407	Rear rod solenoid open circuit	M0310	Battery voltage high
H2432	Rear rod solenoid overcurrent	M0311	Battery voltage extremely high
H2505	Rear aux relief short to battery	M0314	Battery voltage extremely low
H2506	Rear aux relief short to ground	M0322	Battery voltage out of range low
H2605	Front base solenoid short to battery	M0409	Engine oil pressure low

SEAT BAR SENSOR (CONT'D)

Removal And Installation

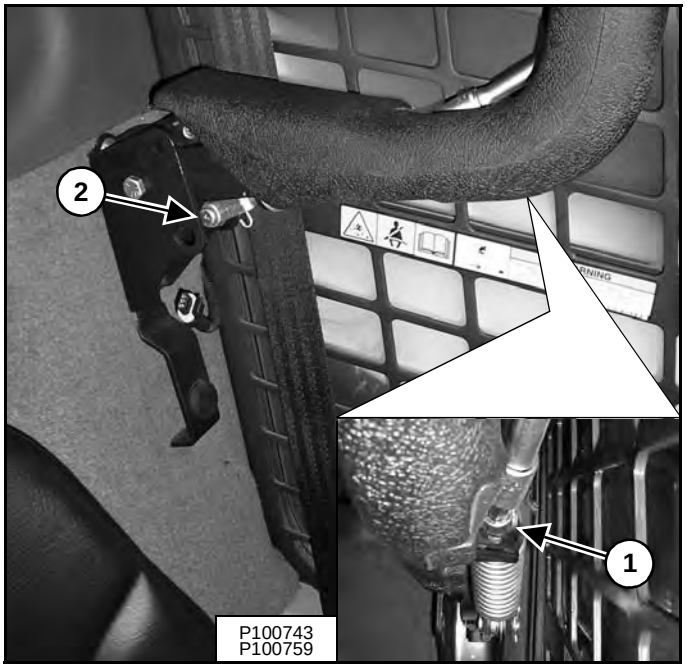
NOTE: This procedure is performed with the seat bar in the raised position and the technician in the operators seat.

Figure 60-110-5



Remove the sensor mounting bolt and nut (Item 1) **[Figure 60-110-5]**. Disconnect the sensor wiring connector (Item 2) **[Figure 60-110-5]**.

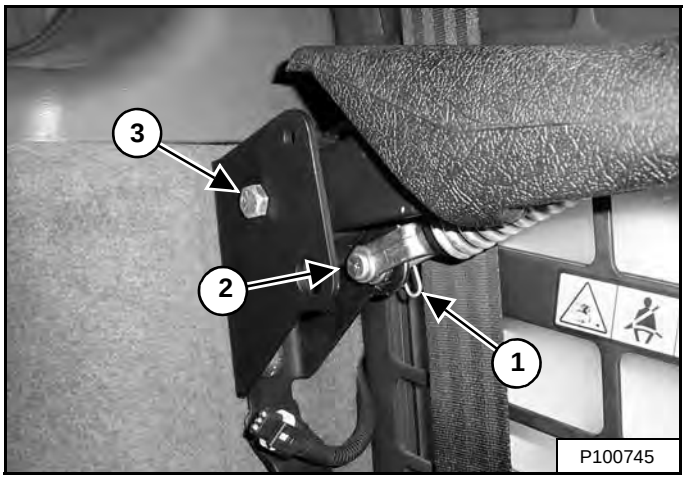
Figure 60-110-6



Tighten the clevis bolt (Item 1) until spring tension is released from the clevis pin (Item 2) **[Figure 60-110-6]**.

NOTE: Approximately 4 turns of the clevis bolt should be adequate to release the spring tension. When tension is released, the clevis pin can easily be rotated using the retaining pin.

Figure 60-110-7



Remove the retaining pin (Item 1) and clevis pin (Item 2) **[Figure 60-110-7]**. Remove the seat bar mounting bolt and nut (Item 3) **[Figure 60-110-7]**.

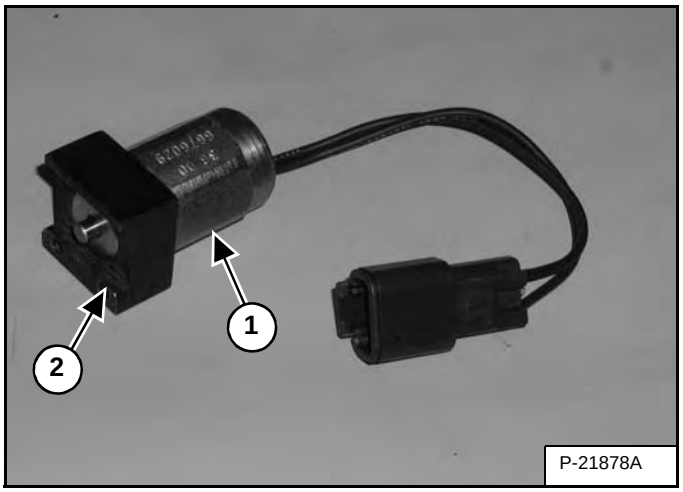
CONTROL SYSTEM (ACS)

Description

The ACS option allows the operator to quickly switch between foot and hand control modes. It uses the electric actuators to control the lift and tilt spools, foot sensors, handle sensors and a specially designed control handle.

Handle Lock Solenoid Disassembly And Assembly

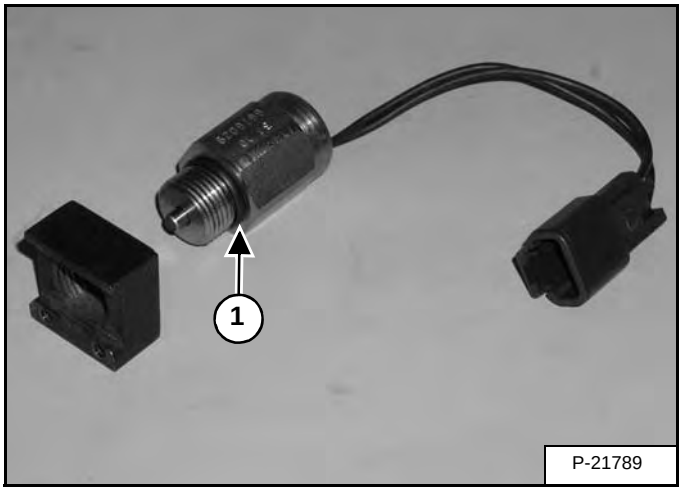
Figure 60-130-26



Remove solenoid (Item 1) from the solenoid mount (Item 2) **[Figure 60-130-26]**.

Installation: Apply a drop of oil to the solenoid threads and tighten solenoid to 35 - 40 ft.-lb. (47 - 54 N•m) lubed torque.

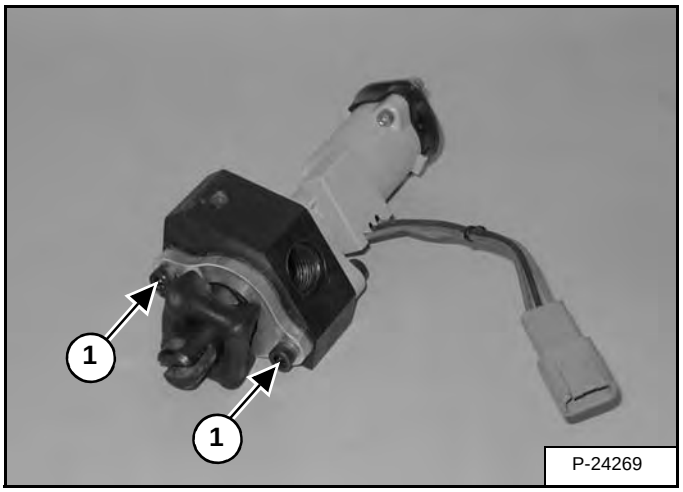
Figure 60-130-27



Check the O-ring (Item 1) **[Figure 60-130-27]** for damage. Replace as necessary.

Foot Sensor Disassembly And Assembly

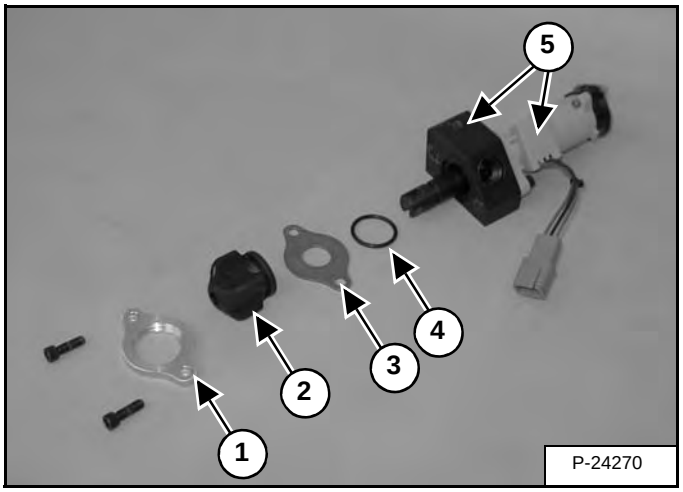
Figure 60-130-28



Remove the two bolts (Item 1) **[Figure 60-130-28]** 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 60-130-29



Remove the boot retainer (Item 1), boot (Item 2), spool stop plate (Item 3) and O-ring (Item 4) **[Figure 60-130-29]**.

NOTE: Do not disassemble the sensor assembly (Item 5) [Figure 60-130-29]. The sensor assembly is a calibrated assembly and cannot be serviced. Order through Bobcat Parts.

Identification Chart ACD Group 0

Left side Control Handle Switches	Switch Number	Solenoid Number Activated				Attachment Harness Terminal Activated	Attachment Harness Connector	RIght Side Control Handle Switches
		STD	RH	HFH	RH / HFH		Fourteen Pin Connector Viewed from front (pin side of connector) of loader.	
	1	1	1	1, 7	1,7	K		
	2	2	2	2	2	K		
	3	1	1	1, 7	1,7	K		
	4	2	3,5,6	2	3,5,6	K,A,D		
	5	1	4,5,6	1	4,5,6	K,A,C		
	6	1	4,5,6	1	4,5,6	K,E		
	7	1	4,5,6	1	4,5,6	K,F		
	8	1	4,5,6	1	4,5,6	K,G		
	9	1	4,5,6	1	4,5,6	K,H		
P-90898 P-90900	10, 11, 12, 13, 14	-	--	--		K	No Jumpers	P-90899 P-90900A

RH - Loaders with Rear Hydraulics Option.
HFH - Loaders with High Flow Hydraulics Option.
RH / HFH - Loaders with Rear Hydraulics and High Flow Hydraulics Option.
Terminal K is activated with Key switch ON.

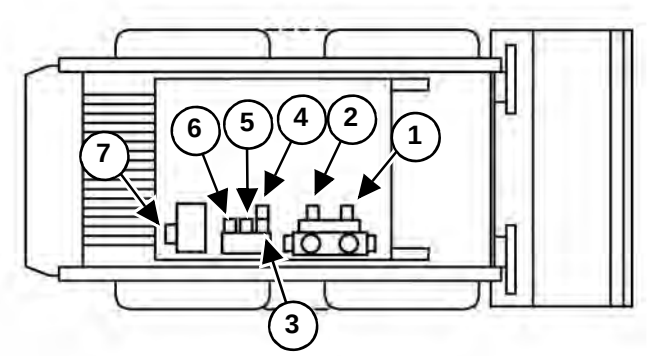
NOTE: For diagnostics and troubleshooting connect the Service PC (See SERVICE PC (LAPTOP COMPUTER) on Page 60-150-1.)

The ACD (Attachment Control Device) automatically recognizes the use of the seven or fourteen pin connector when connected.

Pressing the auxiliary hydraulics button and moving the rear auxiliary hydraulic switch to the right and left several times activates solenoid numbers 3,4,5, and 6 at the diverter valve.

Front Auxiliary Pressure Release is accomplished by manually pushing the male and female couplers in at the front auxiliary block.

The High Flow Button in the left side instrument panel must be pushed ON to activate solenoid number seven at the gear pump.



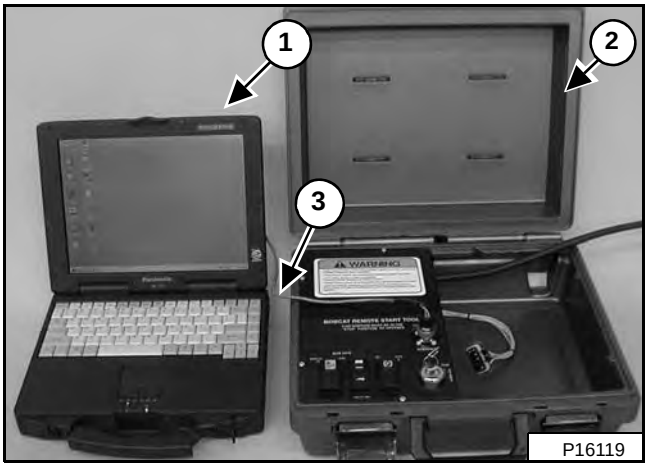
NA1891

Solenoid Number	Hydraulic Coupler	Wiring Number
1	Front Male (Rod)	4330
2	Front Female (Base)	4340
3	Diverter Rear (Rod)	4430
4	Diverter Rear (Base)	4440
5	Bleed / Lock Valve (Base)	4480
6	Bleed / Lock Valve (Rod)	4450
7	High Flow on Pump	4460

SERVICE PC (LAPTOP COMPUTER)

Connecting Remote Start Tool

Figure 60-150-1



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

MEL1563 or 7003031 - 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 diagnostics, and upgrade 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.

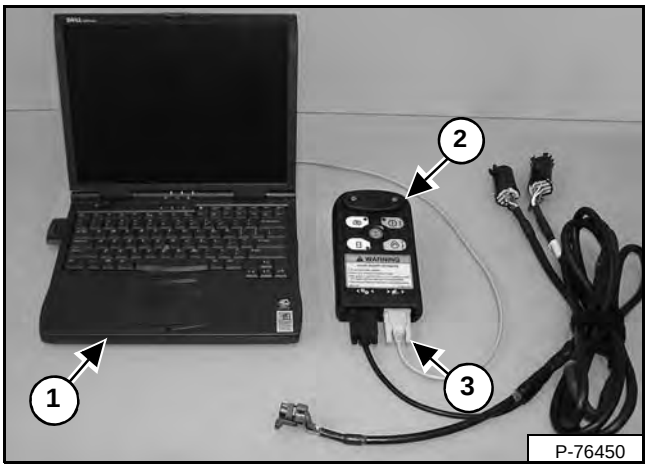
Connect the other end to the connector on the Remote Start Tool.

Connect the Remote Start Tool to the loader. (See REMOTE START TOOL KIT-MEL1563 on Page 10-60-1.)

NOTE: Refer to BobcatNET for PC requirements and the latest Service Analyzer software.

Connecting Remote Start Tool (Service Tool)

Figure 60-150-2



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

Order from Bobcat Parts P/N: 7003031 - Remote Start Tool (Service Tool) Kit

Kit Includes:

7003030 - Remote Start Tool (Service Tool)
6689747 - Loader Service Tool Harness
6689746 - Computer Service Tool Harness
6689745 - BOSS® Service Tool Harness

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

The Service PC (Item 1) with the Remote Start Tool (Service Tool) (Item 2) **[Figure 60-150-2]**. When connected to the loader, the Service PC is used to monitor, conduct diagnostics, and upgrade software.

Connect the Remote Start Tool (Service Tool) Computer Service Tool Harness (Item 3) **[Figure 60-150-2]** 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 Remote Start Tool (Service Tool).

Connect the Remote Start Tool (Service Tool) to the loader. (See REMOTE START TOOL (SERVICE TOOL) KIT - 7003031 on Page 10-61-1.)

NOTE: Refer to BobcatNET for PC requirements and the latest Service Analyzer software.

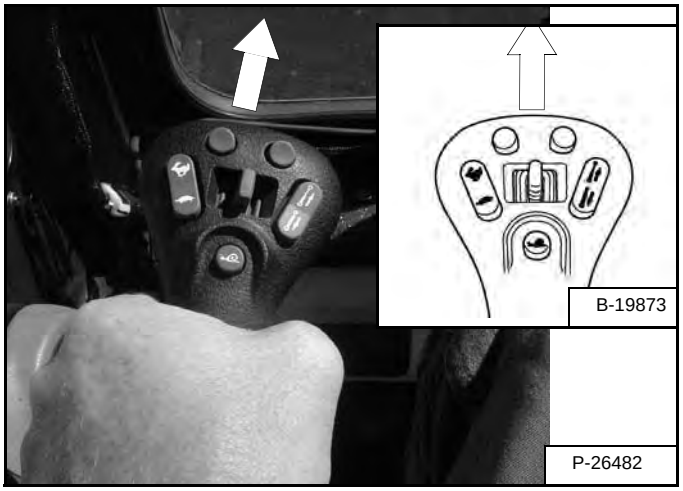
Hydrostatic Pump Calibration (SJC) (Cont'd)

⚠ 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.

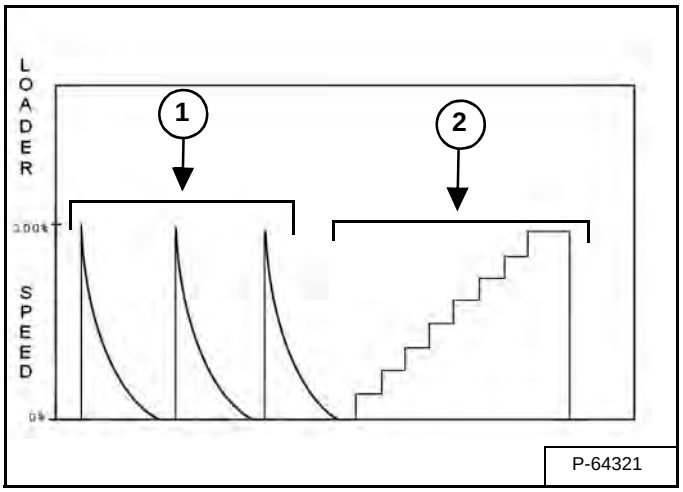
W-2017-0286

Figure 60-160-18



Move and hold the left joystick to the forward position **[Figure 60-160-18]** until the forward calibration is completed.

Figure 60-160-19



The loader speed will “ramp up” quickly (Item 1) **[Figure 60-160-19]** and slow down 3 times in a row.

The loader will then “stair step” the speed (Item 2) **[Figure 60-160-19]** until it reaches full speed and then come to a stop.

Continue to hold the left joystick in the forward position until the loader wheels or tracks come to a stop and an audible beep is heard.

Forward calibration is complete.

NOTE: If the wheels or tracks do not stop moving 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.

PASSWORD SETUP (DELUXE INSTRUMENTATION PANEL)

Password Setup is available on machines with a Deluxe Instrumentation Panel.

Password Description

All new machines with a Deluxe Instrumentation Panel arrive at Bobcat dealerships with the keypad in locked mode. This means that a password must be used to start the engine.

For security purposes, your dealer may change the password and also set it in the locked mode. Your dealer will provide you with the password.

Master Password:
A permanent, randomly selected password set at the factory which cannot be changed. This password is used for service by the Bobcat dealer if the owner password is not known; or to change the owner password.

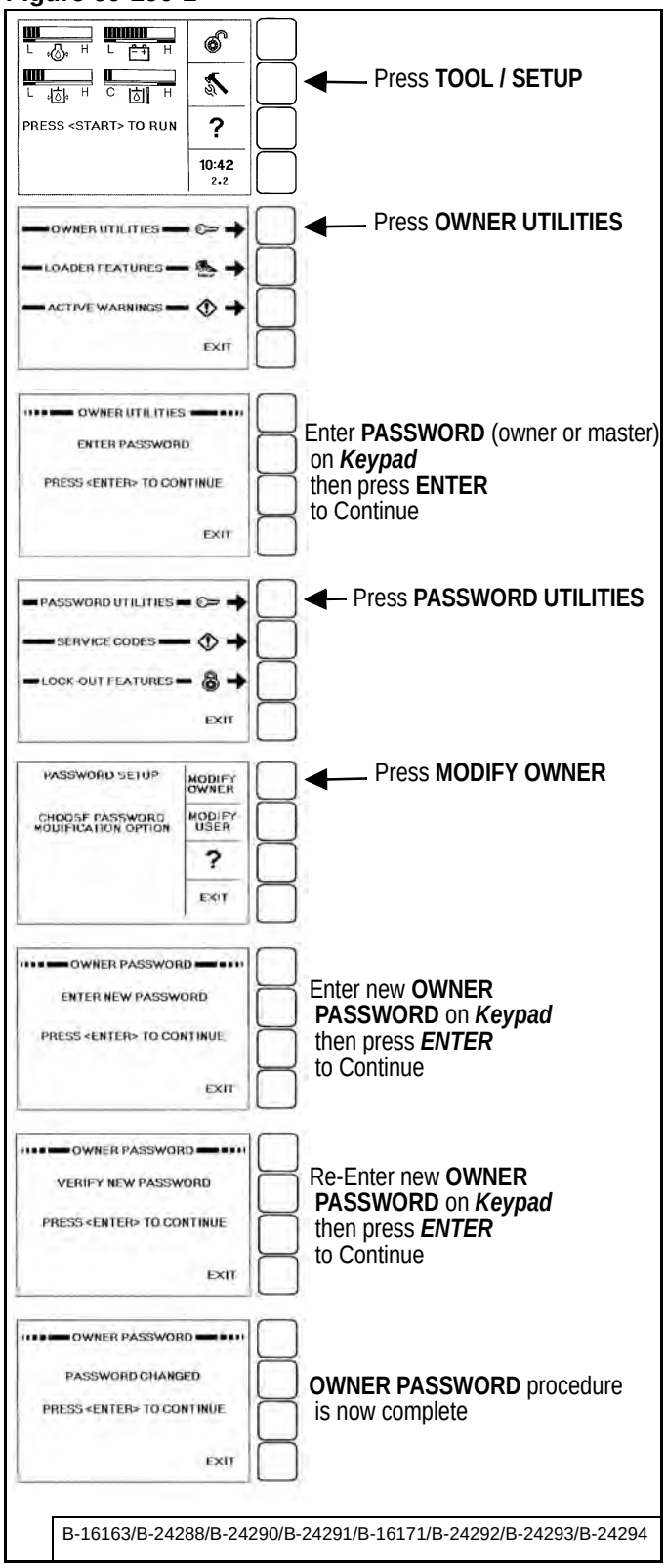
Owner Password:
Allows for full use of the loader and to setup the Deluxe Instrumentation Panel. There is only one owner password. It must be used to change the owner or user passwords. Owner should change the password as soon as possible for security of the loader.

User Password:
Allows starting and operating the loader; cannot change password or any of the other setup features.

For the procedures to change passwords (See Changing The Owner Password on Page 60-190-1.) (See Changing The User Passwords on Page 60-190-2.)

Changing The Owner Password

Figure 60-190-1



B-16163/B-24288/B-24290/B-24291/B-16171/B-24292/B-24293/B-24294

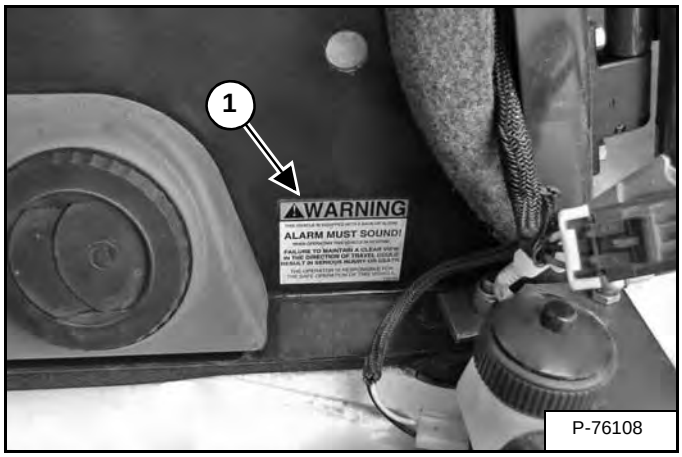
BACK-UP ALARM SYSTEM

Description

This machine may be equipped with a back-up alarm system. The back-up alarm will sound when the operator moves both steering levers or joystick(s) into the reverse position. Slight movement of the steering levers in the reverse position is required with hydrostatic transmissions, before the back-up alarm will sound.

Inspecting

Figure 60-210-1



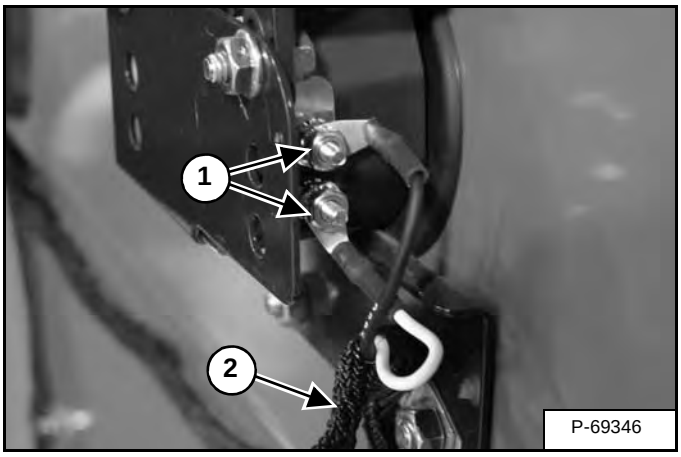
Inspect for damaged or missing back-up alarm decal (Item 1) **[Figure 60-210-1]**. Replace if required.

Sit in the seat and fasten the seat belt. Engage the parking brake. Pull the seat bar all the way down. Start the engine. Press the PRESS TO OPERATE LOADER button. Disengage the parking brake.

Move both steering levers or joystick(s) into the reverse position. The back-up alarm must sound when all wheels or both tracks are moving in reverse.

The back-up alarm is located on the inside of the rear door.

Figure 60-210-2



Inspect the back-up alarm electrical connections (Item 1) **[Figure 60-210-2]**, wire harness (Item 2) **[Figure 60-210-2]** and back-up alarm switches (if equipped) (Item 2) **[Figure 60-210-3]** for tightness and damage. Repair or replace any damaged components.

If the back-up alarm switches require adjustment, (See Adjusting Switch Position on Page 60-210-2.)

ENGINE INFORMATION

Description

The T320 has the Kubota direct injected V3800 Turbo diesel engine with a displacement of 230 cu.in. (3,8 L).

The T320 engine is rated at (SAE Net) 90.6 HP (67,6 kW) and has an open crankcase ventilation system.

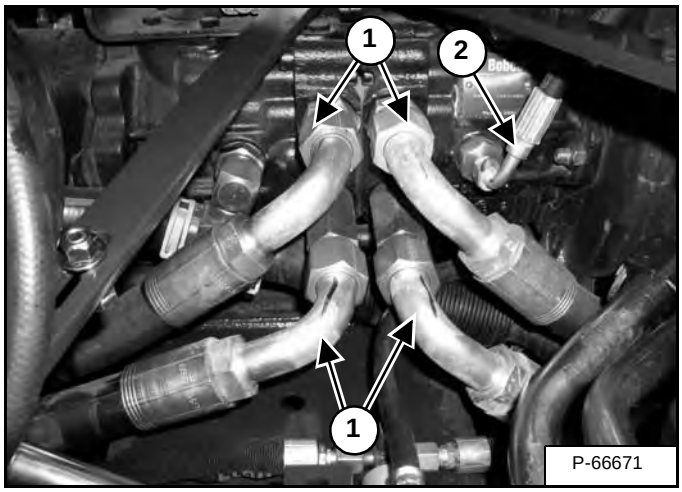
The engine has 4 cylinders and the rotation is counter-clockwise (viewed from the flywheel side). It is also equipped with an air intake heater for assisting in cold starts. Engine block heaters are also available from Bobcat Parts.

The engine serial number is stamped on the engine and is located near the injection pump. The model number is located on the valve cover. Use these numbers to obtain the correct service parts.

The engine is liquid cooled with a propylene glycol / water mixture. The cooling fan is driven by a hydraulic motor. The speed of the fan is determined by the engine coolant temperature sensor and the hydraulic / hydrostatic fluid temperature sensor.

Engine Removal And Installation (Cont'd)

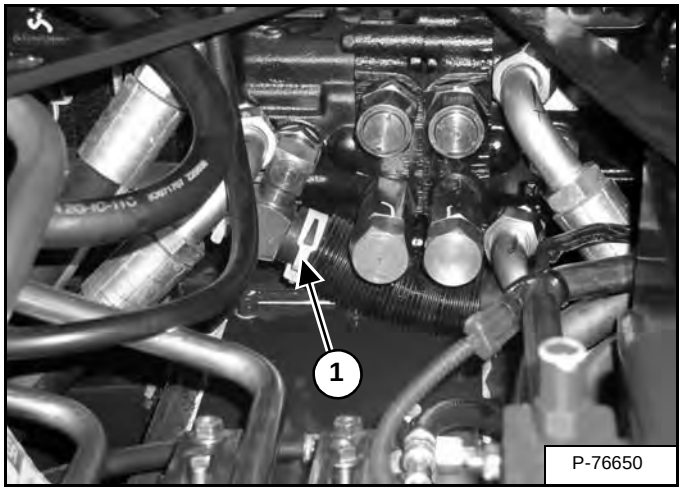
Figure 70-10-2



Disconnect and cap the four high pressure hydraulic hoses (Item 1) **[Figure 70-10-2]** from the hydrostatic pump.

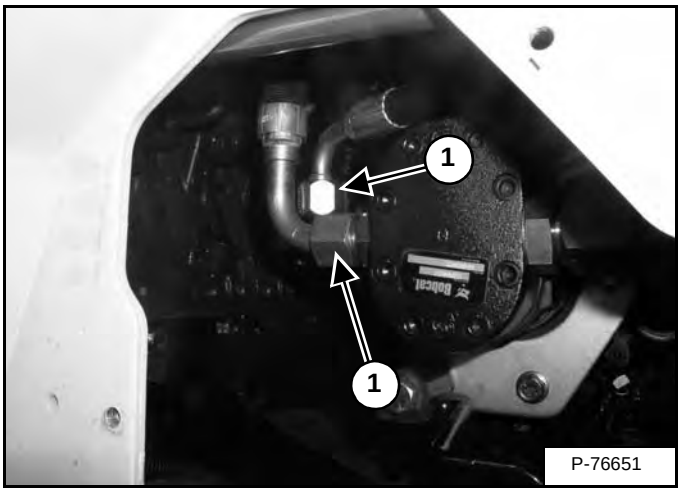
Disconnect and cap the cooling fan case drain hose (Item 2) **[Figure 70-10-2]** from the hydrostatic pump.

Figure 70-10-3



Disconnect and cap (Item 1) **[Figure 70-10-3]** the hydraulic pump supply hose.

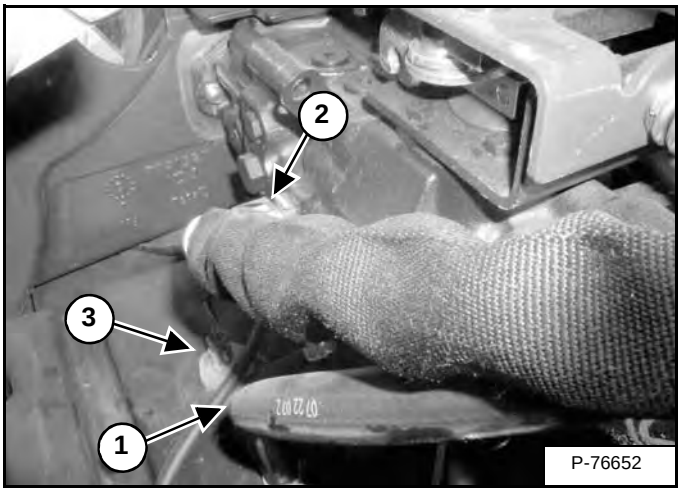
Figure 70-10-4



At the right side access hole, remove and cap all hoses (Item 1) **[Figure 70-10-4]** from the hydraulic gear pump outlet side.

NOTE: Loaders equipped with high-flow option may have additional hoses to remove from the gear pump inlet and outlet sides.

Figure 70-10-5



Disconnect and cap the fuel tank vent hose (Item 1) **[Figure 70-10-5]**.

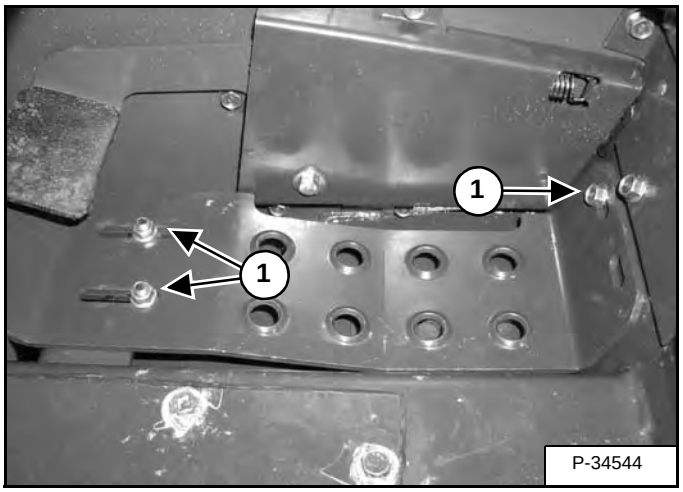
Disconnect and cap the hose (Item 2) **[Figure 70-10-5]** that comes from the fan motor.

Disconnect the fuel tank sending unit connector (Item 3) **[Figure 70-10-5]**.

ENGINE SPEED CONTROL (SJC)

Removal And Installation

Figure 70-21-1



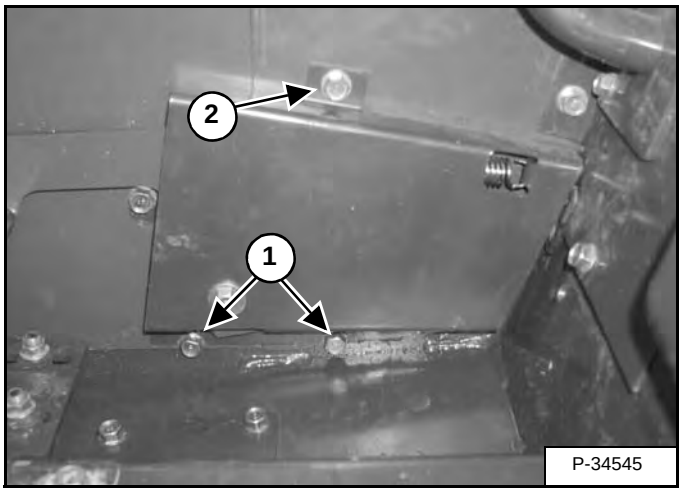
Raise the lift arms and install an approved lift arm support device. (See Installing on Page 10-20-1.)

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

Remove the three mounting bolts (Item 1) **[Figure 70-21-1]**, from the right side foot rest.

Remove the foot rest, from the loader.

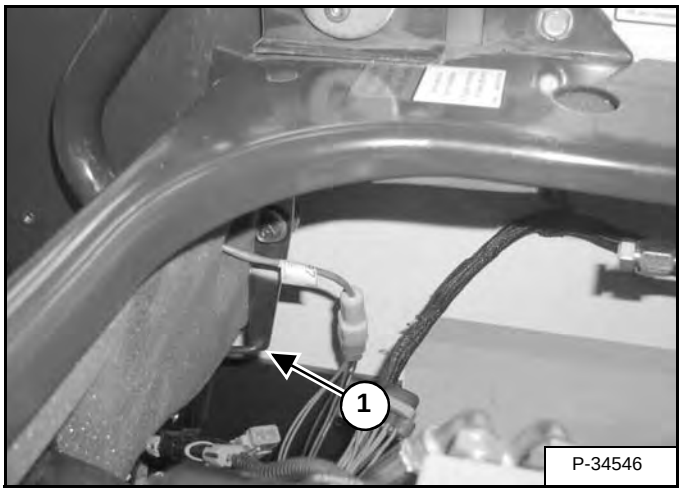
Figure 70-21-2



Loosen the two lower access panel mount bolts (Item 1) **[Figure 70-21-2]**

Remove the upper mount bolt (Item 2) **[Figure 70-21-2]**

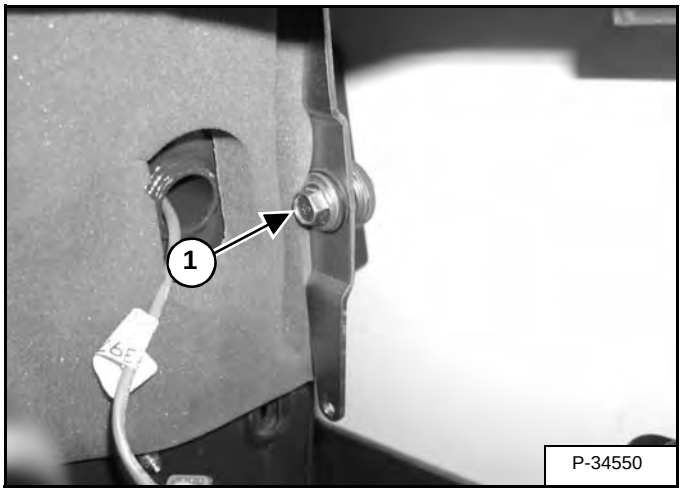
Figure 70-21-3



Disconnect the foot speed control linkage (Item 1) **[Figure 70-21-3]** from the hand control pivot arm.

Remove the foot speed control assembly from the loader.

Figure 70-21-4



Remove the bolt and nut (Item 1) **[Figure 70-21-4]** from the hand speed control pivot arm.

ENGINE COOLING SYSTEM

Radiator Removal And Installation

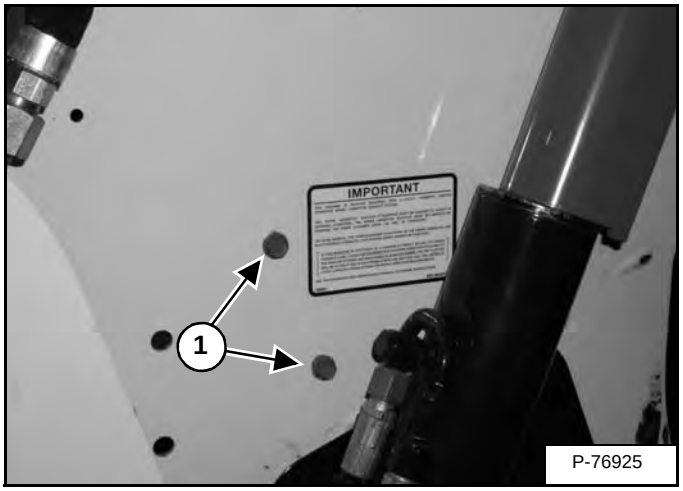
Remove the rear grille.

Remove air conditioning condenser. (If Equipped) (See Removal And Installation on Page 80-60-1.)

Drain the fluid from the radiator. (See Removing And Replacing Coolant on Page 10-90-4.)

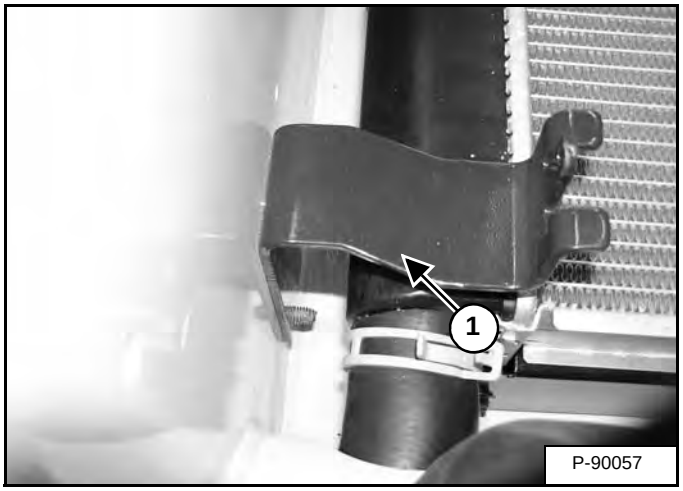
Remove the hydraulic oil cooler. (See Removal And Installation on Page 20-100-1.)

Figure 70-50-1



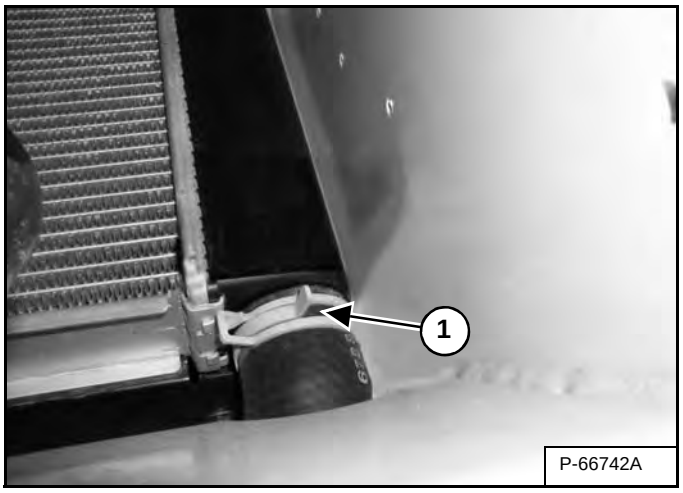
Remove the two mounting bolts (Item 1) **[Figure 70-50-1]** from the oil cooler mount bracket. (Both sides.)

Figure 70-50-2



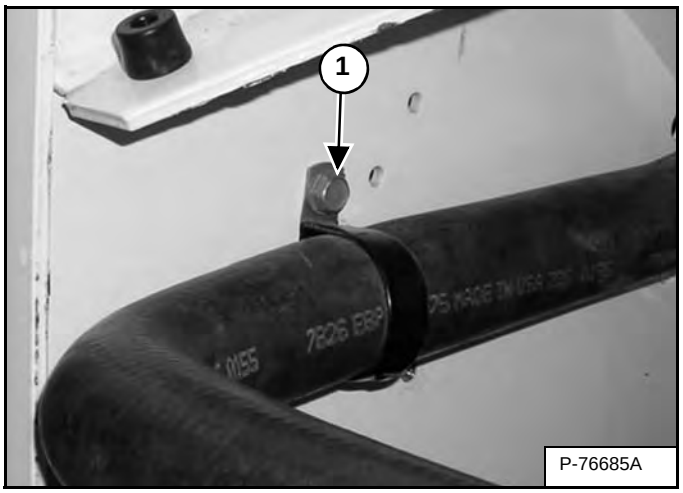
Remove the oil cooler mount bracket (Item 1) **[Figure 70-50-2]**. (Both sides.)

Figure 70-50-3



Remove the radiator hose clamp (Item 1) **[Figure 70-50-3]** and remove the right side radiator hose from the radiator.

Figure 70-50-4

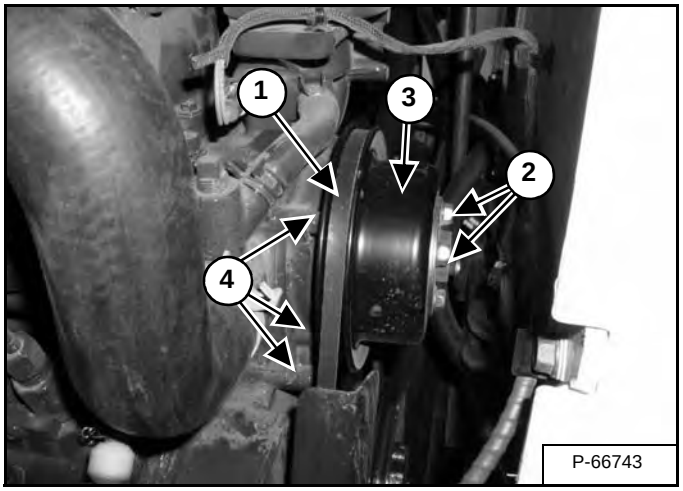


Remove the mounting bolt (Item 1) **[Figure 70-50-4]**.

Water Pump Removal And Installation

Drain the fluid from the radiator. (See Removing And Replacing Coolant on Page 10-90-4.)

Figure 70-50-35



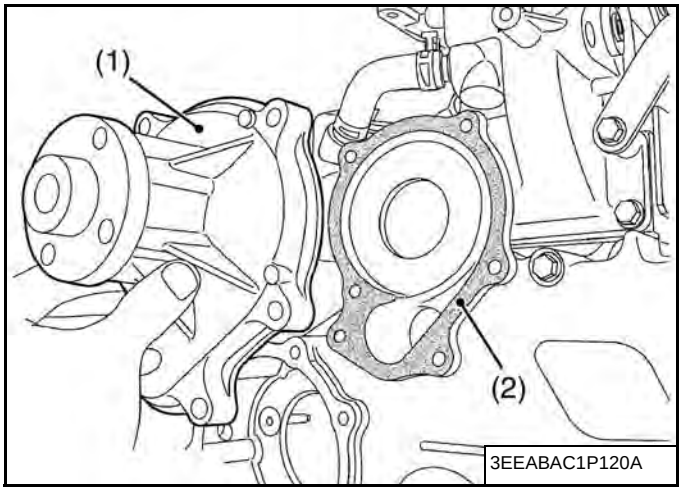
Remove the alternator belt (Item 1) **[Figure 70-50-35]**.

Remove the four bolts (Item 2) from the water pump pulley (Item 3) **[Figure 70-50-35]**.

Remove the water pump pulley (Item 3) **[Figure 70-50-35]**

Remove the six water pump bolts (Item 4) **[Figure 70-50-35]**.

Figure 70-50-36

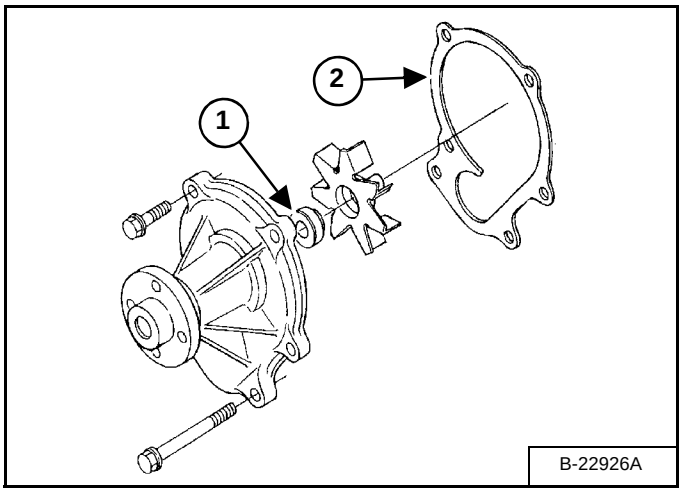


Remove the water pump (Item 1) **[Figure 70-50-36]** from the gearcase.

When mounting the water pump, use a new gasket (Item 2) **[Figure 70-50-36]**.

Water Pump Disassembly And Assembly

Figure 70-50-37

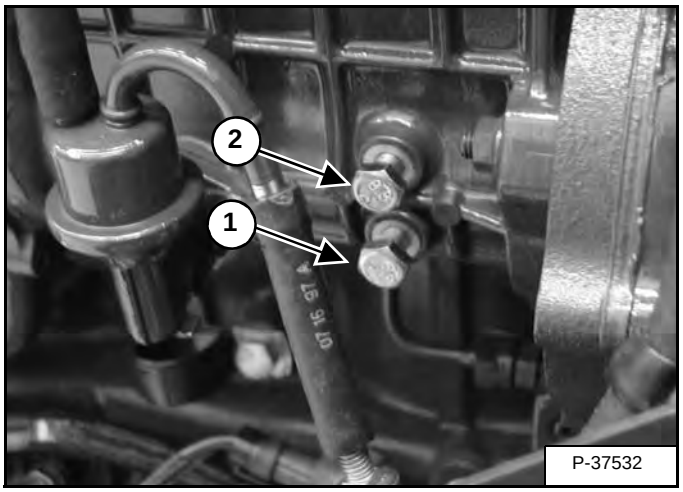


Remove the water pump assembly.

NOTE: The seal (Item 1) and the gasket (Item 2) are available for replacement parts [Figure 70-50-37].

Fuel Injection Pump Assembly Removal (Cont'd)

Figure 70-70-7

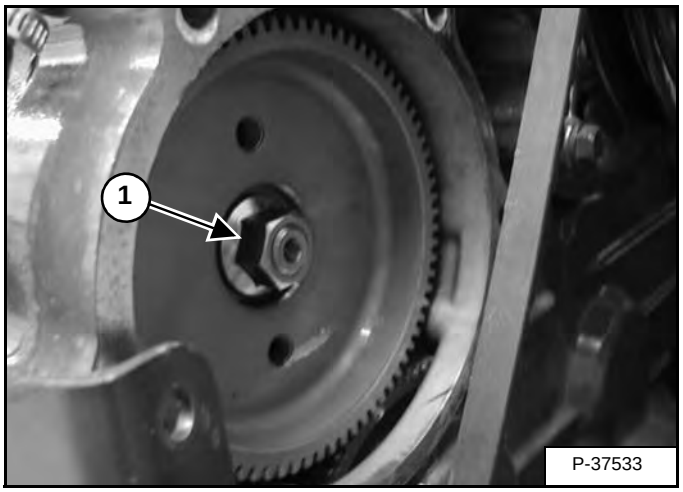


Tighten the lower fuel cam shaft lock bolt (Item 1) **[Figure 70-70-7]** until it comes into contact with the fuel camshaft.

Tighten the upper fuel cam shaft lock bolt (Item 2) **[Figure 70-70-7]** until it comes into contact with the fuel cam shaft.

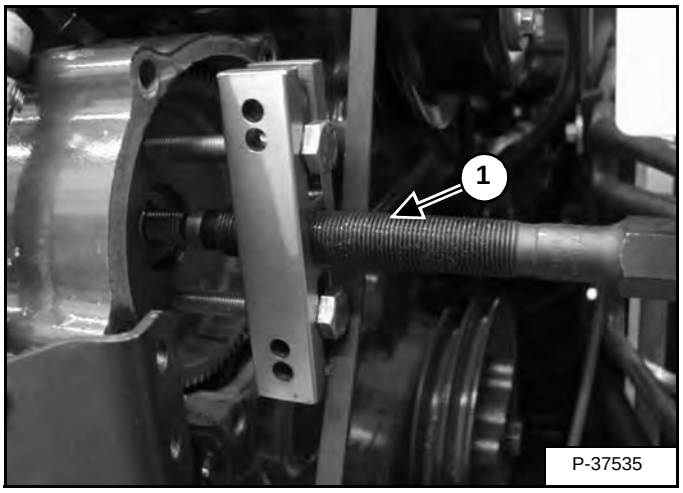
NOTE: Do not over tighten the lock bolts when they come in contact with the cam shaft.

Figure 70-70-8



Loosen the injection pump gear mounting nut three to four turns (Item 1) **[Figure 70-70-8]**.

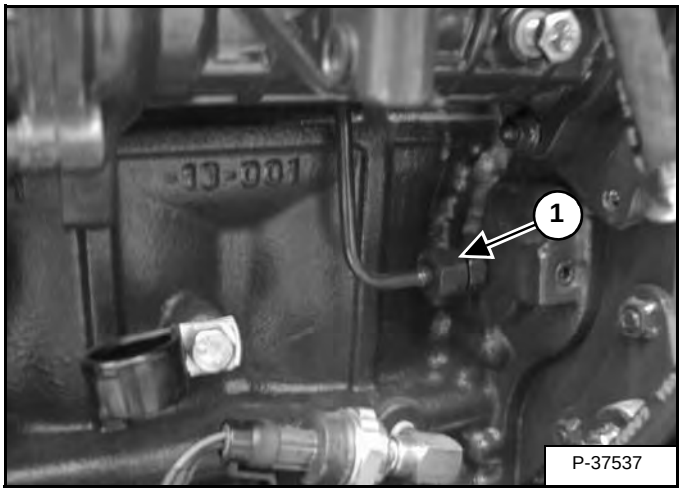
Figure 70-70-9



Install two bolts (M10 X P1.25 X L80 mm) and a gear puller (Item 1) **[Figure 70-70-9]**.

Remove the nut, gear, and key from the key way on the injection pump shaft.

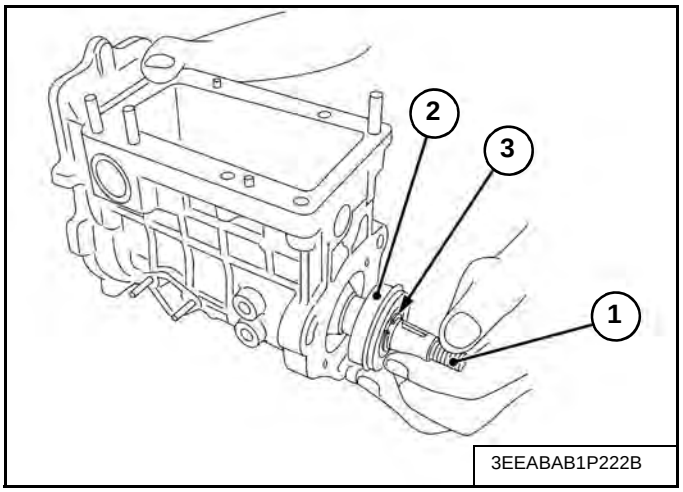
Figure 70-70-10



Disconnect the lubricating oil pipe (Item 1) **[Figure 70-70-10]**.

Fuel Camshaft Removal And Installation (Cont'd)

Figure 70-70-42



Pull out the fuel camshaft (Item 1) and bearings (Item 2) **[Figure 70-70-42]** together.

After removing the bearing's cir-clip (Item 3) **[Figure 70-70-42]**, press out the bearings.

NOTE: Do not use the fuel camshaft lock bolts, when remove the governor weight mounting nut. Otherwise, the lock bolts or injection pump housing might get damaged.

Press the bearings into the fuel camshaft.

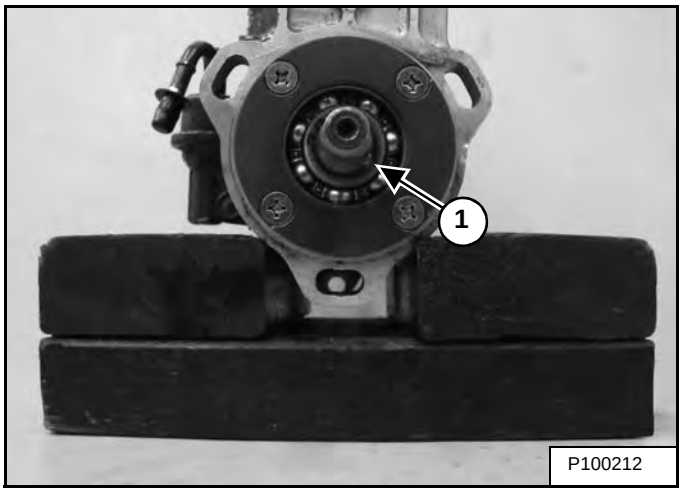
Set the cir-clip at the gear side's bearing.

Install the fuel camshaft and bearings to the injection pump housing.

Attach the fuel camshaft stopper and tighten the fuel camshaft stopper mounting screws with the specified torque.

Attach the governor weight to the fuel camshaft and tighten the governor weight mounting nut with specified torque.

Figure 70-70-43



Fix the fuel camshaft with lock bolts so the key way on the fuel camshaft (Item 1) **[Figure 70-70-43]** is facing the four o'clock position.

Install the injection pump assembly to the injection pump housing.

Attach the O-ring and the cover and tighten the cover mounting bolts.

Install the governor sleeve to the fuel camshaft.

Check the movement of the governor sleeve.

NOTE: Be careful not to damage the O-ring.

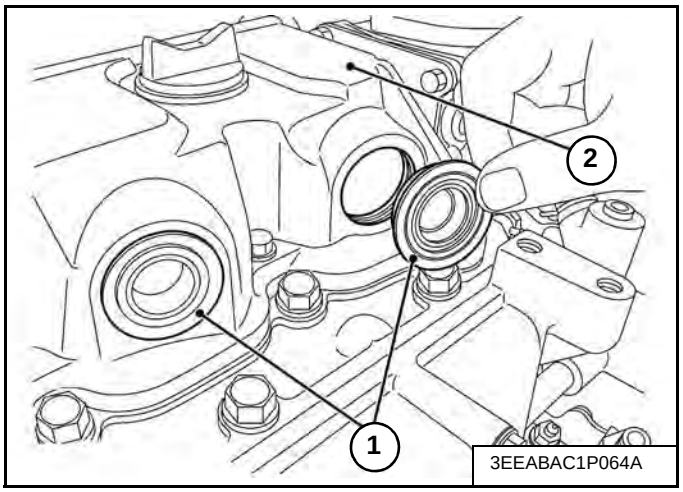
NOTE: Be careful the direction of the governor sleeve.

NOTE: When reassembling, lightly oil the parts.

Tightening torque	Fuel camshaft stopper mounting screw	5.8 - 6.9 ft.-lb. (7,9 - 9,3 N•m)
	Governor weight mounting screw	46.3 - 53.5 ft.-lb. (62,8 - 72,6 N•m)

Fuel Injector Removal And Installation

Figure 70-70-77



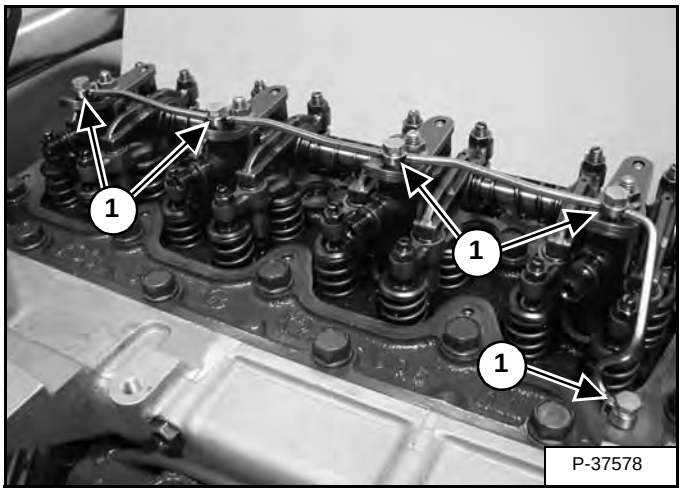
Remove the injection nozzle oil seal (Item 1) from the cylinder head cover (Item 2) **[Figure 70-70-77]**.

Installation: Install new injection nozzle oil seals.

Remove the cylinder head cover (Item 2) **[Figure 70-70-77]**.

Installation: Tighten the valve cover bolts to 1.15 - 1.66 ft.-lb. (1,6 - 2,3 N•m) torque.

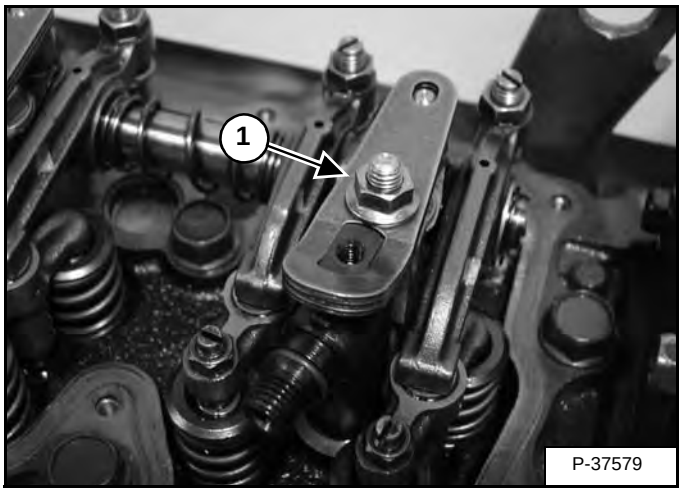
Figure 70-70-78



Remove the five over flow pipe retaining bolts (Item 1) **[Figure 70-70-78]**.

Installation: Tighten the retaining bolts to 85 - 96 in.-lb. (9,6 - 10,8 N•m) torque.

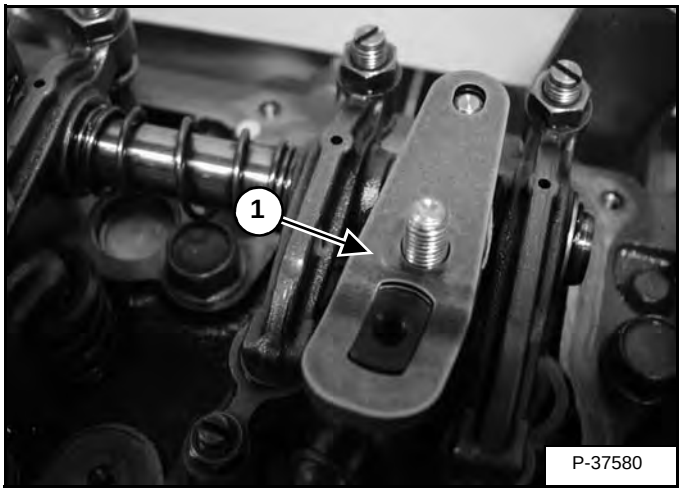
Figure 70-70-79



Remove the nut (Item 1) **[Figure 70-70-79]** from the injector nozzle holder clamp.

Installation: Tighten the injector nozzle holder clamp nut to 13 - 15 ft.-lb. (18 - 21 N•m) torque.

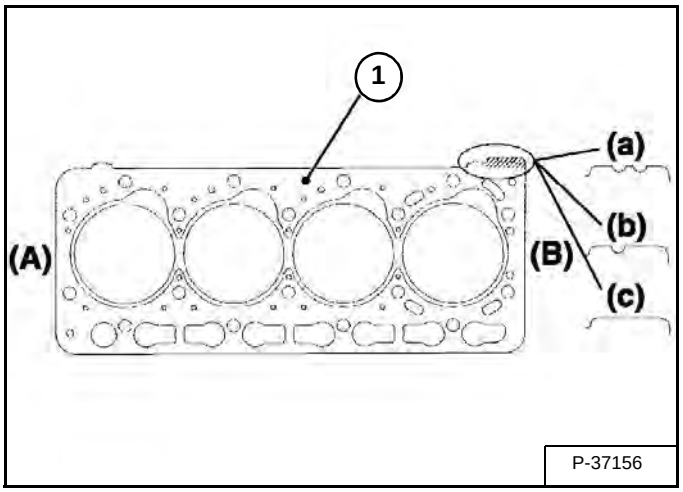
Figure 70-70-80



Remove the nozzle holder clamps (Item 1) **[Figure 70-70-80]** from the injector nozzle.

Cylinder Head Removal And Installation (Cont'd)

Figure 70-80-20



Make sure to note the notch (a), (b) or (c) of cylinder head gasket (Item 1) **[Figure 70-80-20]** in advance.

Replace the same notch (a), (b) or (c) as the original cylinder head gasket (Item 1) **[Figure 70-80-20]**.

Select the cylinder head gasket (Item 1) **[Figure 70-80-20]** thickness to meet with the top clearance when replacing the piston, piston pin bushing, connecting rod or crank pin bearing.

Figure 70-80-21

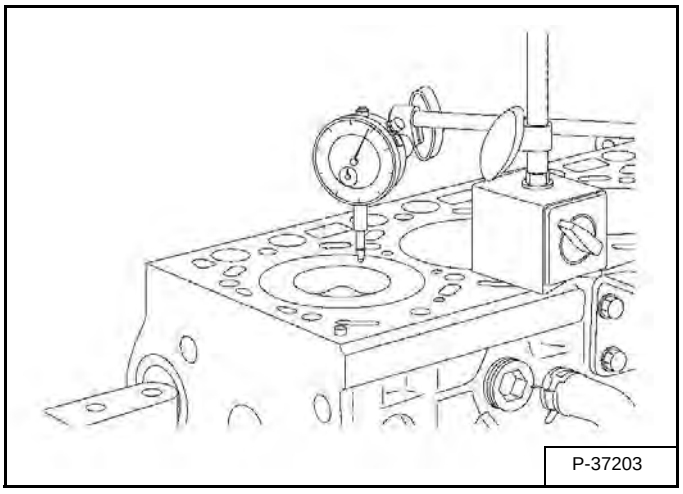
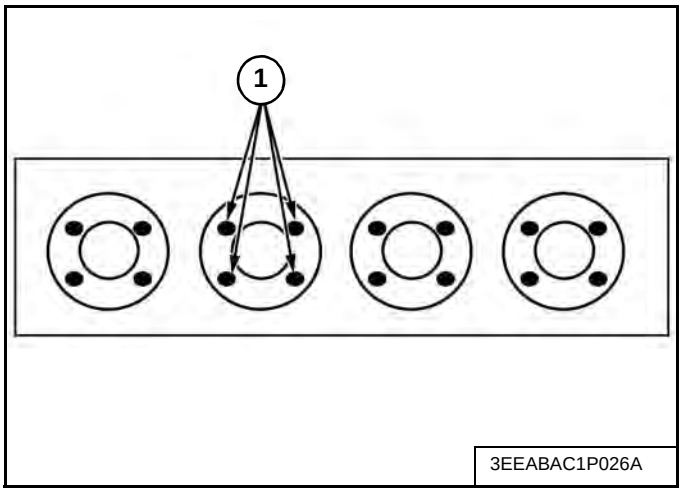


Figure 70-80-22



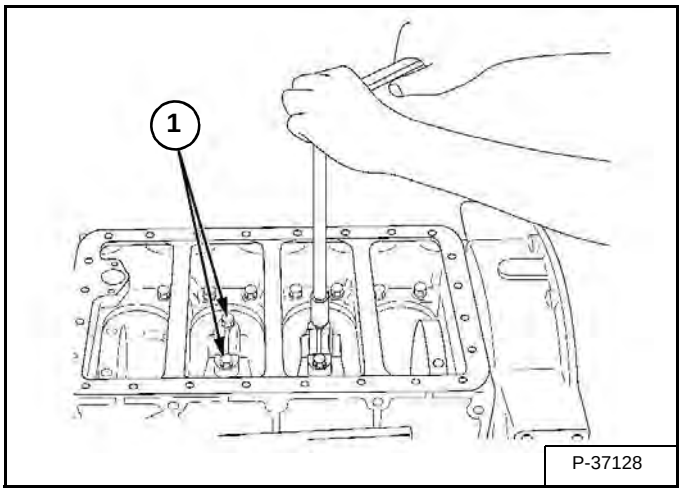
Measure the piston head's recessing or protrusion from the crankcase cylinder face four spots (Item 1) per each piston **[Figure 70-80-22]** and (average of four pistons) using the dial gauge as shown in **[Figure 70-80-21]**.

Piston And Connecting Rod Removal And Installation

Remove the oil pan. (See Oil Pan Removal And Installation on Page 70-60-1.)

Remove the cylinder head. (See Cylinder Head Removal And Installation on Page 70-80-5.)

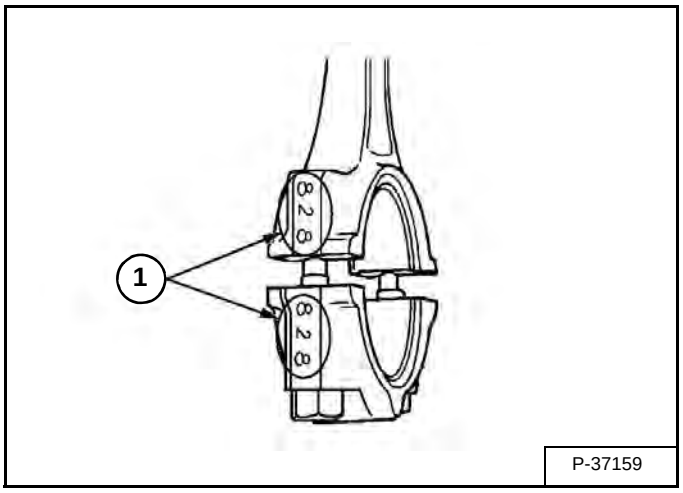
Figure 70-90-1



Remove the connecting rod bolts (Item 1) **[Figure 70-90-1]** from connecting rod cap.

Remove the connecting rod caps.

Figure 70-90-2



Align the marks (Item 1) **[Figure 70-90-2]** with each other. (Face the marks toward the injection pump.)

Apply engine oil to the connecting rod bolts and lightly screw it in by hand then tighten it to the specified torque. If the connecting rod bolts do not screw together smoothly, clean the threads. If the connecting rod bolt is still hard to screw in, replace it.

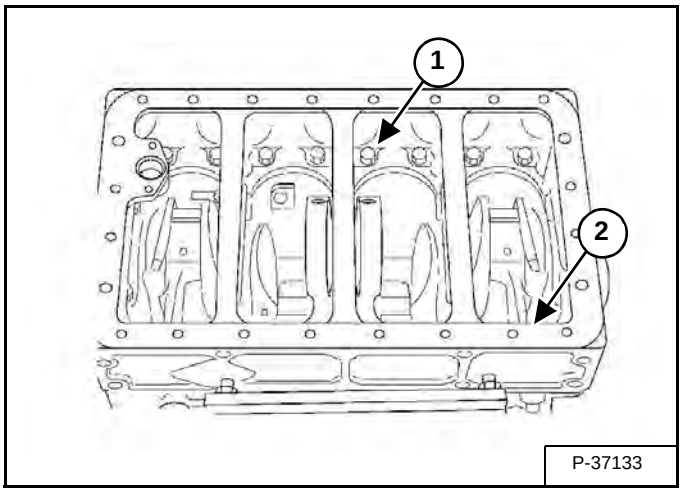
NOTE: When using the existing crank bearing, put marks on the crank pin bearing and the connecting rod in order to keep their position.

Insert the crank pin bearing.

Tightening torque	Connecting rod bolt	57.9 - 61.5 ft.-lb. (78,5 - 83,4 N•m)

Crankshaft And Bearings Removal (Cont'd)

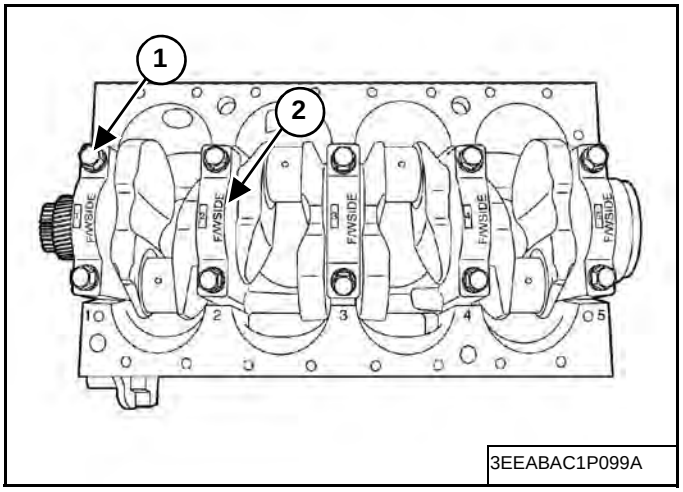
Figure 70-90-24



Remove the bolts (Item 1) that secure the crankcase 2 **[Figure 70-90-24]** to crankcase 1.

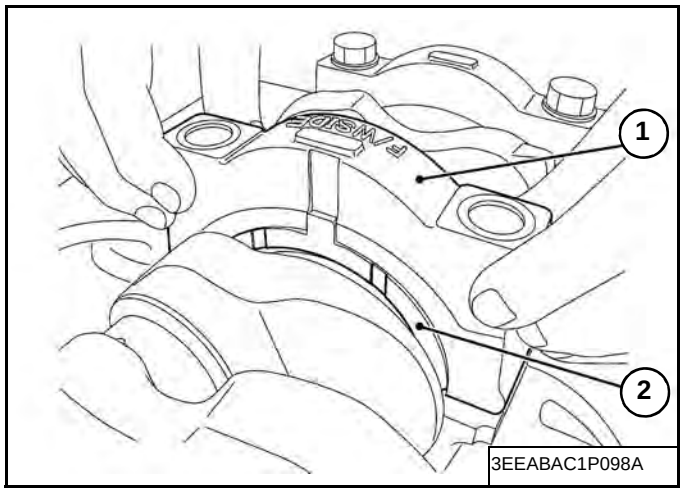
Remove the crankcase 2 (Item 2) **[Figure 70-90-24]**.

Figure 70-90-25



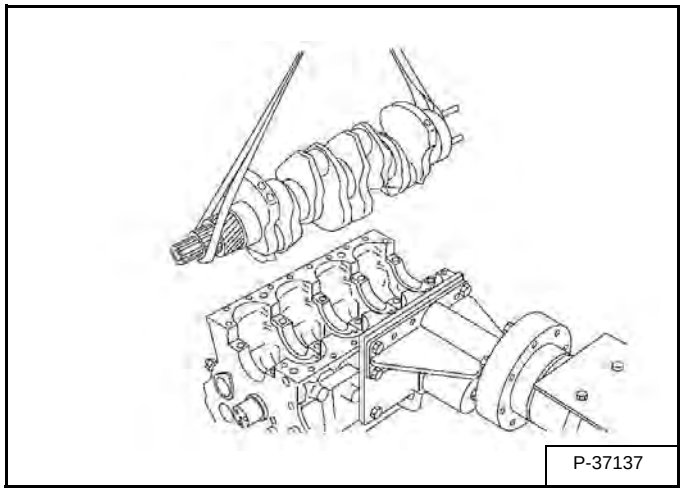
Remove the bolts (Item 1) and the bearing cases (Item 2) **[Figure 70-90-25]** from crankcase 1.

Figure 70-90-26



Remove the fourth bearing case (Item 1) and the thrust bearing (Item 2) **[Figure 70-90-26]**.

Figure 70-90-27

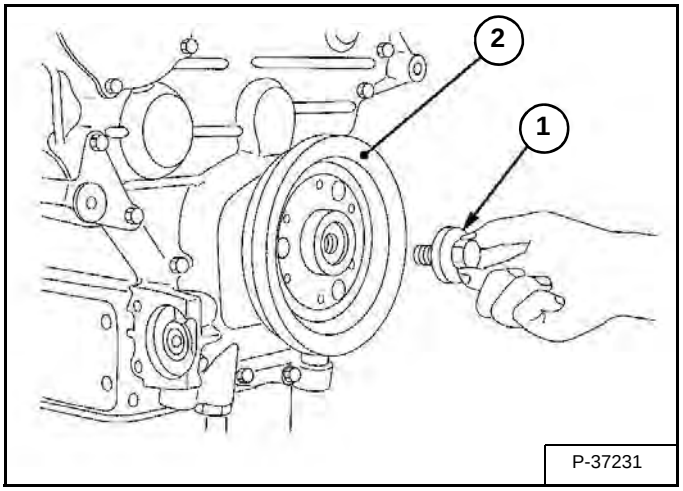


Remove the crankshaft **[Figure 70-90-27]**.

CAMSHAFT AND TIMING GEARS

Timing Gearcase Cover Removal And Installation

Figure 70-100-1



Install the engine flywheel pin.

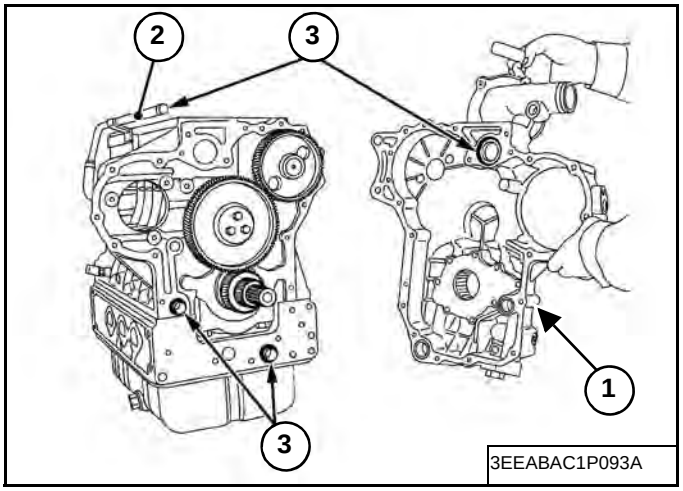
Remove the crankshaft screw (Item 1) **[Figure 70-100-1]**.

Remove the drive pulley (Item 2) **[Figure 70-100-1]**.

NOTE: Clean the crankshaft screw and the drive pulley sleeve surface thoroughly and tighten the screw securely to specified torque.

Tightening torque	Crankshaft screw	188.1 - 202.5 ft.-lb. (255,0 - 274,6 N•m)

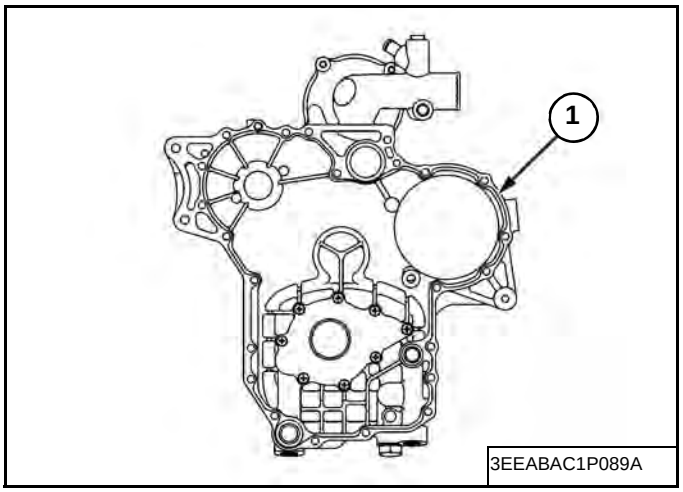
Figure 70-100-2



Remove the gearcase cover (Item 1) **[Figure 70-100-2]**.

NOTE: Use care when removing the gearcase cover not to damage the water pipe (Item 2) [Figure 70-100-2].

Figure 70-100-3



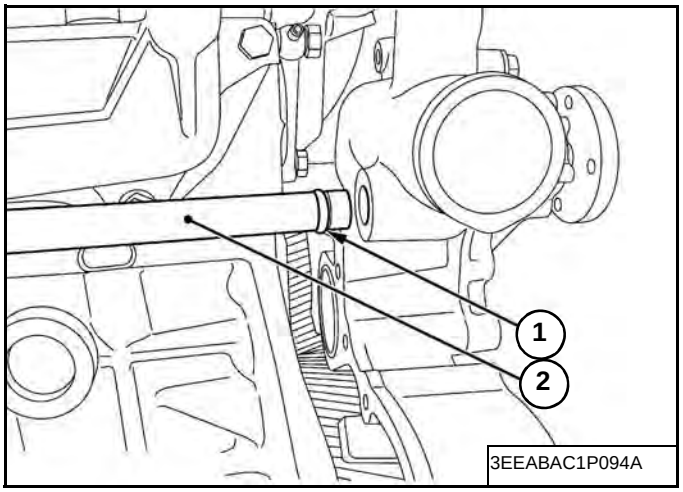
Confirm that the liquid gasket coating surface is free of water, dust and oil in order to maintain sealing effect.

Carefully apply the adhesive evenly (Item 1) **[Figure 70-100-3]**.

NOTE: Apply a liquid gasket to the gearcase cover.

NOTE: Assemble the adhesive-applied parts within the manufactures specified cure time.

Figure 70-100-4



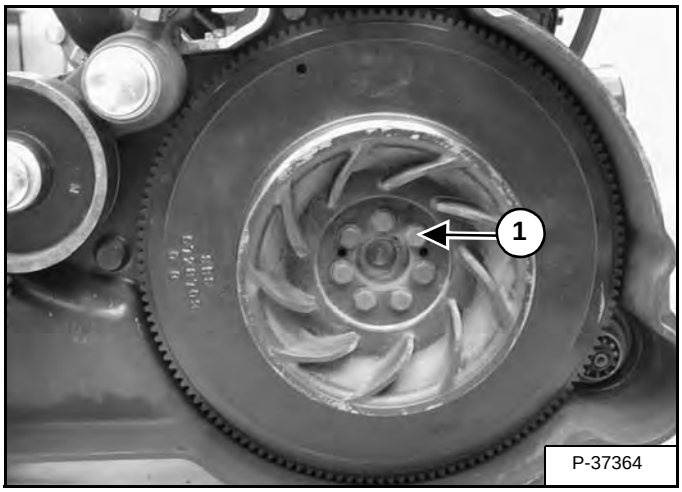
Be careful not to damage the o-ring (Item 1) and water pipe (Item 2) **[Figure 70-100-4]**.

NOTE: Use the new O-rings (Item 3) [Figure 70-100-2] when attaching gearcase cover.

FLYWHEEL AND HOUSING

Flywheel Removal And Installation

Figure 70-120-1



NOTE: To avoid damage to the RPM sensor, remove the RPM sensor before removing the flywheel.

Remove the drive belt. (See Belt Removal And Installation on Page 30-50-2.)

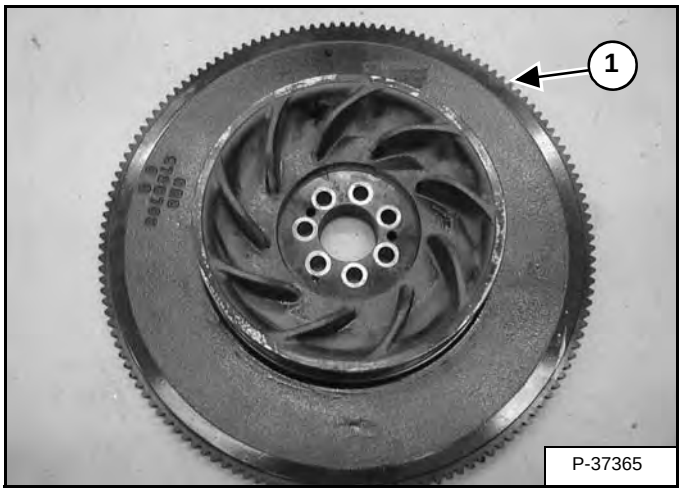
Remove the bolts (Item 1) **[Figure 70-120-1]** from the flywheel.

Installation: Lube and tighten the flywheel bolts to 72 - 80 ft.-lb. (97,6 - 108,4 N•m) torque.

Installation: There are two alignment pins on the crankshaft that are used to install the flywheel in the proper position for timing purposes.

Ring Gear Removal And Installation

Figure 70-120-2



Remove the flywheel from the engine crankshaft **[Figure 70-120-2]**.

NOTE: The lead chamfer on ring gear tooth must face the starter.

The ring gear (Item 1) **[Figure 70-120-2]** on the flywheel is an interference fit. Heat the ring gear enough to expand it and hit it with a hammer to remove it evenly.

Clean the outer surface of the flywheel to give it a smooth fit.

Clean the new ring gear and heat it to a maximum temperature of 428° F (220° C).

Fit the ring gear over the flywheel. Make sure the gear is on the seat correctly.

Safety Equipment

Figure 80-10-12

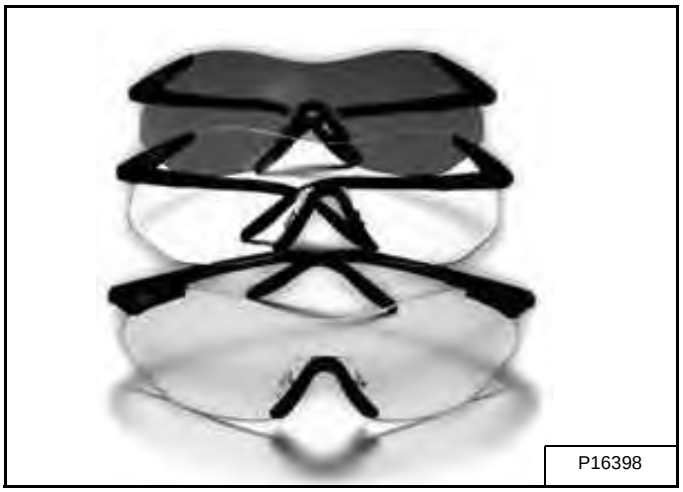


Figure 80-10-13

In servicing A/C and heater systems you will be exposed to high pressures, temperatures and several chemical hazards. Moving belts and pulleys are normal shop hazards.

In addition to exercising caution in your work, **DO WEAR SAFETY GLASSES OR A FACE SHIELD [Figure 80-10-12]** when you are using R-134a or a leak detector, adjusting service valves or the manifold gage set connectors. Safety glasses or a transparent face shield are practical safety items and one or the other is absolutely required.

⚠ WARNING

In the event of a leak, 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

R-134a inside a canister or in an A/C system is a liquid under pressure. When it escapes or releases into the air, **ITS TEMPERATURE DROPS TO 21.6 F DEGREES "INSTANTLY"**. If it spills on your skin or in your eyes you should flood the area with cool water and **SEEK MEDICAL ATTENTION FAST!** It is a good idea to wear gloves **[Figure 80-10-13]** to prevent frost bite if you should get refrigerant on your hands.

⚠ WARNING

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

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

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

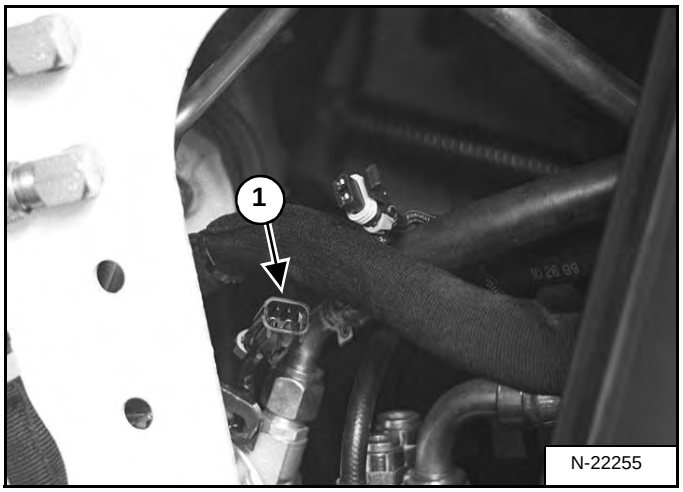
W-2373-0500

Gauge Pressure Related Troubleshooting (Cont'd)

Possible Cause	Inspection	Solution
High pressure side Too low.		
1. Low refrigerant 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.

Electrical System (Cont'd)

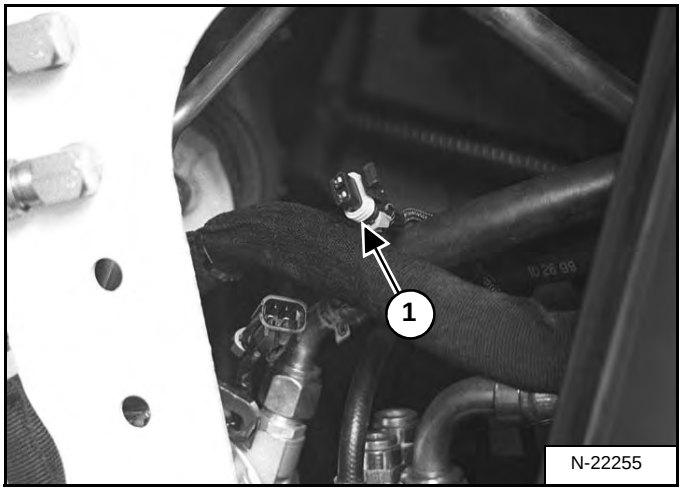
Figure 80-30-8



With a multimeter, check the resistance to the compressor clutch (Item 1) **[Figure 80-30-8]**.

If there is no resistance value, replace the compressor clutch. (See Clutch Disassembly And Assembly on Page 80-50-4.)

Figure 80-30-9



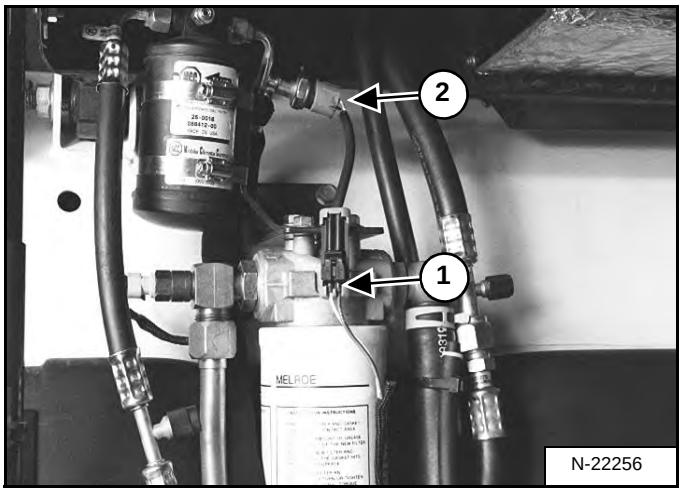
With a multimeter, check the voltage to the compressor clutch at the loader harness (Item 1) **[Figure 80-30-9]**.

The voltage reading should be around 12 volts.

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

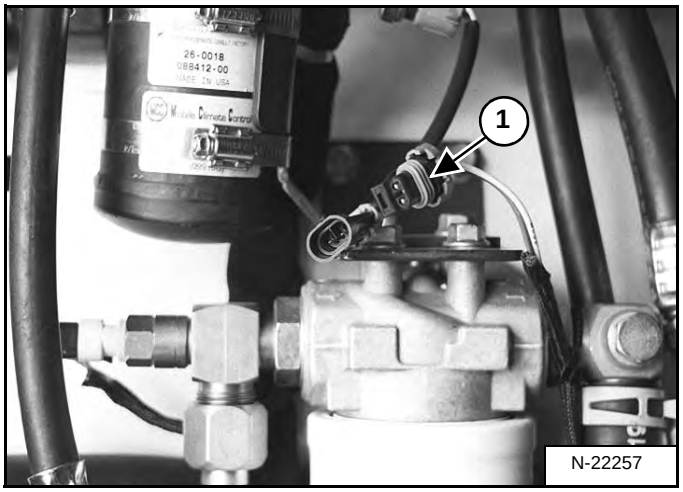
If there is power at the clutch, reconnect the wiring harness to the compressor clutch.

Figure 80-30-10



Disconnect the loader harness (Item 1) from the pressure switch (Item 2) **[Figure 80-30-10]**.

Figure 80-30-11



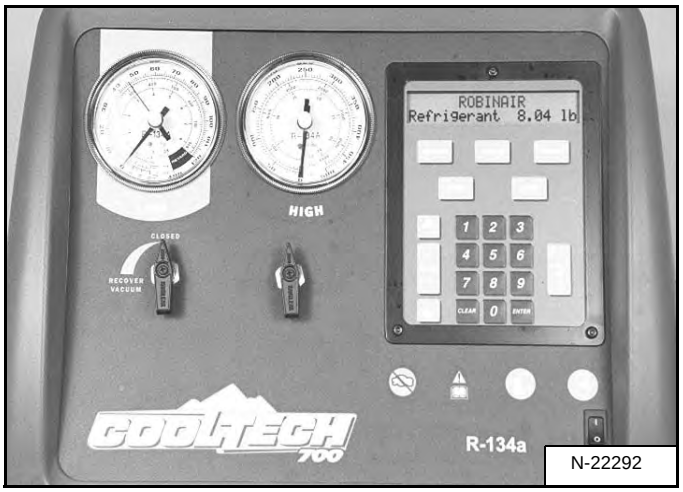
Using a multimeter check the loader wiring harness (Item 1) **[Figure 80-30-11]** for voltage.

The voltage should be around 12 volts.

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

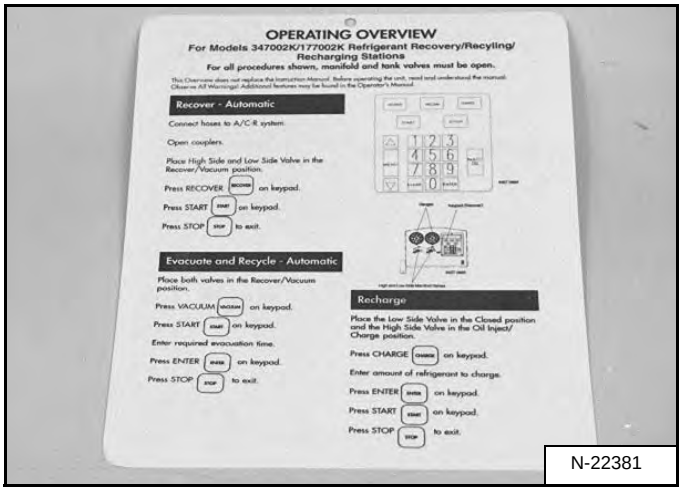
Reclamation And Charging With Recovery / Charging Unit (Cont'd)

Figure 80-40-6



Turn the reclaimer unit **[Figure 80-40-6]** to the ON position and follow the on screen instructions.

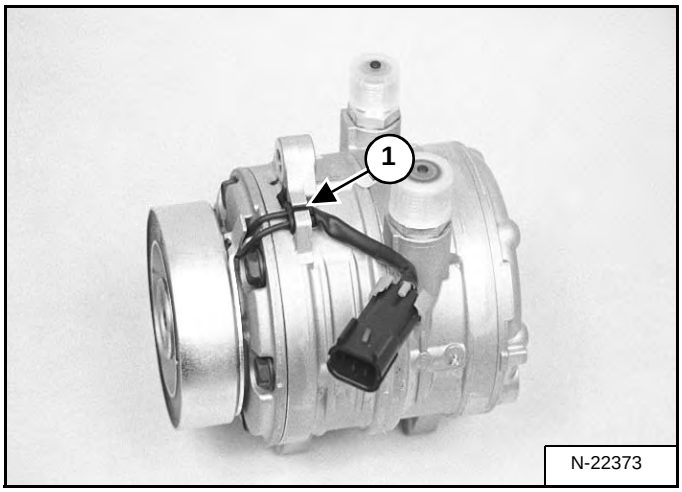
Figure 80-40-7



NOTE: The reclaimer unit, has a complete step by step set of instructions [Figure 80-40-7] to follow for reclimation and recharging of the A/C system. A trained technician should follow these instructions as they may very slightly depending on the model and brand of reclaimer used.

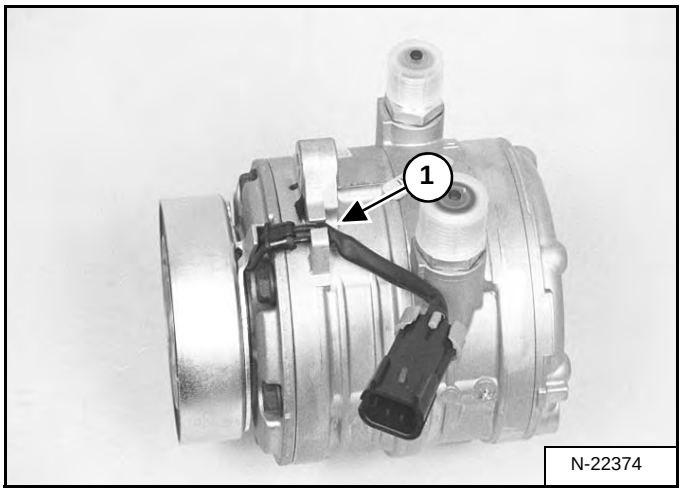
Clutch Disassembly And Assembly (Cont'd)

Figure 80-50-19



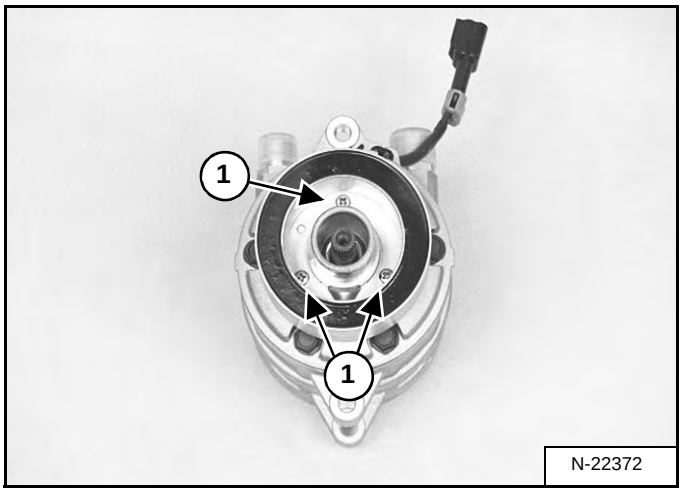
Slide the wire grommet (Item 1) **[Figure 80-50-19]** from the wire holder.

Figure 80-50-20



Remove the coil lead wire (Item 1) **[Figure 80-50-20]** from the wire holder on the compressor.

Figure 80-50-21

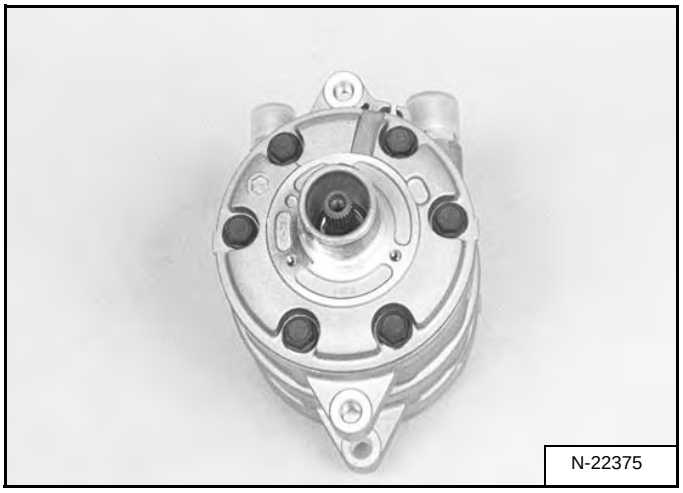


Remove the three coil mount bolts (Item 1) **[Figure 80-50-21]** from the compressor.

Installation: Tighten the mount bolts to 2.9 - 4.3 ft.-lb. (4 - 6 N•m) torque.

Remove the coil from the compressor.

Figure 80-50-22



The compressor **[Figure 80-50-22]** must be replaced as a complete unit.

THERMOSTAT

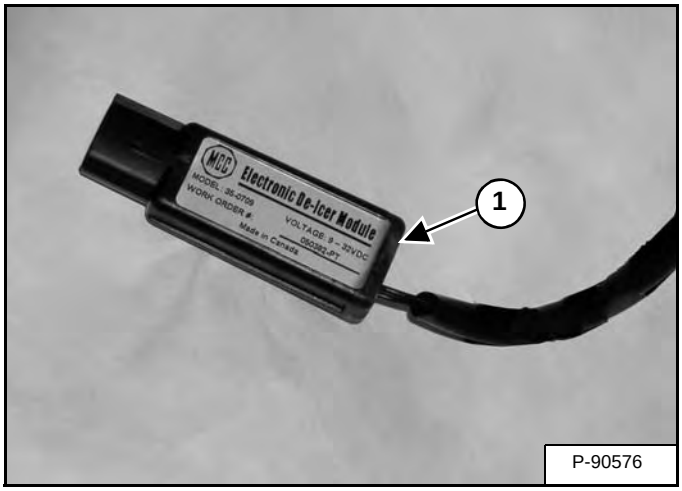
Description

The Electronic De-icing Thermostat (EDT) is a micro controller based module that measures evaporator coil temperature and cycles the compressor clutch to maintain a constant evaporator pressure. Onboard circuit protection and diagnostics are also built into the module.

NOTE: The EDT has a six second delay before start up to protect the compressor clutch.

The EDT will turn the clutch on when the evaporator coil temperature is above 35.6° F (2° C). If the EDT does not detect any malfunction, it will continue to operate and the status LED will be lit continuously. When the evaporator temperature is below 28.4° F (-2° C), the EDT will turn off the clutch and status LED.

Figure 80-90-1



When the EDT detects an open or short from the temperature sensor, the status LED (Item 1) **[Figure 80-90-1]** will blink once per second and the output signal to the clutch will be turned off. The status LED will flash two times per second when EDT detects an open circuit (current draw less than 200 mA), short circuit or over current (current draw greater than 7A) from the clutch output. The status LED will flash three times per second when the compressor clutch is shorted to ground.

NOTE: The EDT will attempt to restart every 20 seconds until the fault is repaired.

The EDT has the following protection built in:

1. Over temperature
2. Over current from clutch output
3. Voltage (Above and below operational limits or reverse voltage)
4. Short circuit protection (Output shorted to ground)
5. Temperature sensor open and short detection

MALFUNCTION	DETECTION INTERVAL	STATUS LED
Temperature sensor	Continuous	1x per second
Temperature sensor open and short detection	At A/C start up	2x per second
Compressor clutch short to battery	Continuous	3x per second

BLOWER FAN

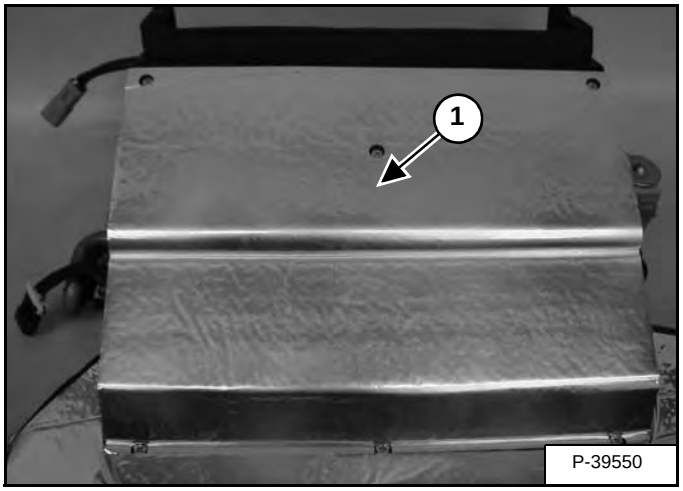
Removal And Installation

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

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

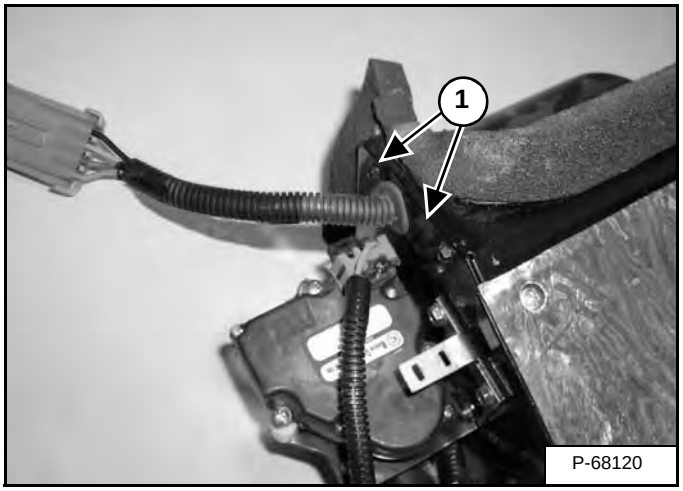
NOTE: The blower fan assembly can be removed from the evaporator / heater unit without disconnecting the heater or A/C plumbing. The unit is remove here for photo clarity.

Figure 80-130-1



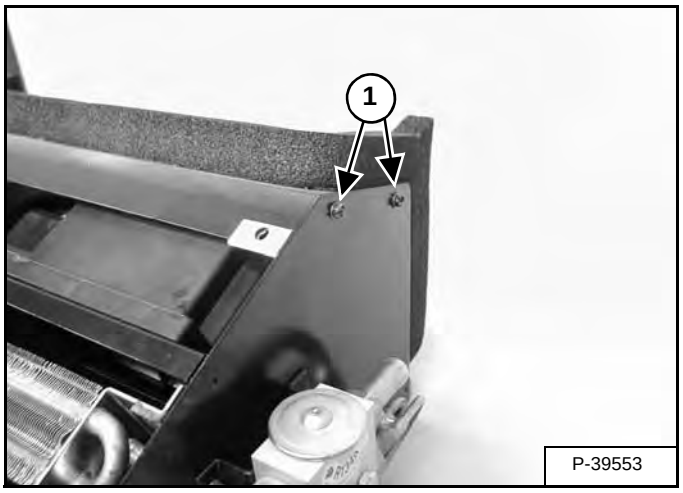
Remove the cover (Item 1) **[Figure 80-130-1]** from the evaporator / heater unit.

Figure 80-130-2



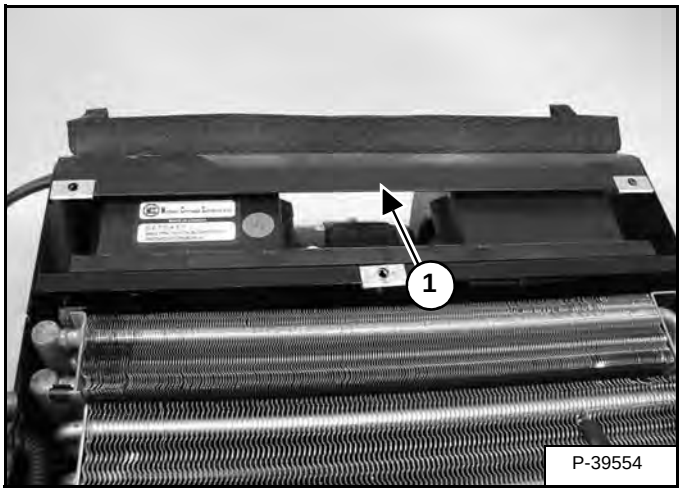
Remove the two flange mount bolts (Item 1) **[Figure 80-130-2]** from the evaporator / heater unit.

Figure 80-130-3



Remove the two flange mount bolts (Item 1) **[Figure 80-130-3]** from the evaporator / heater unit.

Figure 80-130-4



Remove the flange and attached foam (Item 1) **[Figure 80-130-4]** from the unit.

(T320) LOADER SPECIFICATIONS (CONT'D)

Hydraulic System

Pump Type	Engine driven, gear type
Pump Capacity - Standard **Without SJC** **With SJC**	 21.2 GPM (80,2 L/min.) @ 2550 Engine RPM @ 91% efficiency 21.2 GPM (80,2 L/min.) @ 2550 Engine RPM @ 91% efficiency
Pump Capacity - High Flow Option **Without SJC** **With SJC**	 37.0 GPM (140,1 L/min.) @ 2550 RPM @ 91% efficiency 37.0 GPM (140,1 L/min.) @ 2550 RPM @ 91% efficiency
System Relief at Quick Couplers **Standard Flow** **High Flow**	 3250 - 3350 PSI (224,0 - 231,0 bar) 3575 - 3675 PSI (246,5 - 253,4 bar)
Filter (Hydraulic)	Full flow replaceable, 3-micron synthetic media element
Hydraulic Cylinders	Double-acting; tilt cylinders have cushioning feature on dump and rollback
Bore Diameter: Lift Cylinder (2)	3.00 in. (76,2 mm)
Tilt Cylinder (2)	3.00 in. (76,2mm)
Rod Diameter: Lift Cylinder (2)	1.62 in. (41,1 mm)
Tilt Cylinder (2)	1.50 in. (38,1 mm)
Stroke: Lift Cylinder (2)	25.46 in. (646,7 mm)
Tilt Cylinder (2)	15.10 in. (384,0 mm)
Control Valve	3-Spool, open center type with spring detent lift float and electrically controlled auxiliary spool
Fluid Lines	SAE Standard tubelines, hoses and fittings
Fluid Type	BOBCAT FLUID, Hydraulic / Hydrostatic 6903117 - (Two-2.5 Gal.) 6903118 - (5 Gal.) 6903119 - (55 Gal.)
Hydraulic Function Time:	
Raise Lift Arms	4.3 Seconds
Lower Lift Arms	3.0 Seconds
Bucket Dump	2.7 Seconds
Bucket Rollback	2.1 Seconds

Controls

Vehicle Steering	Direction and speed controlled by two hand operated steering levers *or* optional joystick(s)
Loader Hydraulics - Lift and Tilt	Controlled by separate foot pedals or optional Advanced Control System (ACS) or optional Selectable Joystick Control (SJC)
- Front Auxiliary (Standard)	Controlled by electrical switch on Right Hand steering lever or joystick
- Rear Auxiliary (Option)	Controlled by electrical switch on Left Hand steering lever or joystick
Auxiliary Pressure Release	Pressure relieved through quick couplers. Push couplers in, hold for 5 seconds
Engine	Hand lever speed control; key-type start switch *or* optional Deluxe Instrumentation Panel and function error shutdown.
Starting Aid	Intake Air Heater automatically activated as needed by Instrument Panel
Service Brake	Two independent hydrostatic systems controlled by two hand operated steering levers *or* optional joystick(s)
Secondary Brake	One of the hydrostatic transmissions
Parking Brake (Standard)	Spring applied pressure release multi-disk brake activated by manually operated switch in front instrument panel