

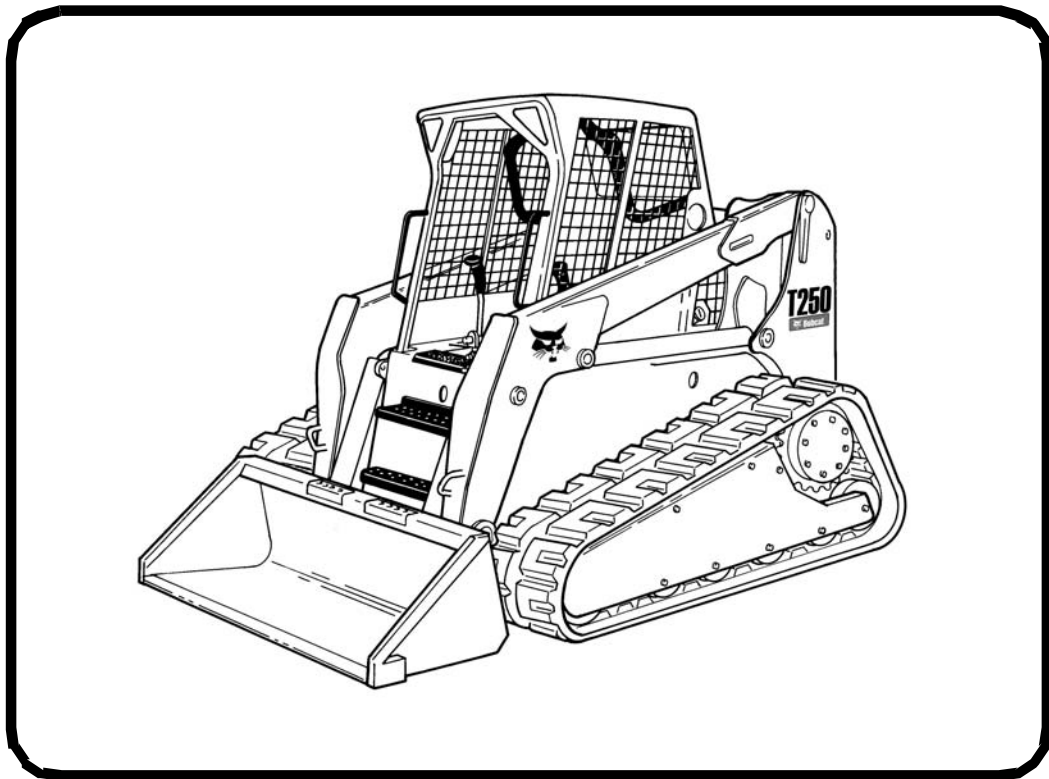


Bobcat®

Service Manual

T250 Compact Track Loader

S/N A5GS20001 & Above
S/N A5GT20001 & Above



**EQUIPPED WITH
BOBCAT INTERLOCK
CONTROL SYSTEM (BICS™)**



CLICK HERE TO **DOWNLOAD** THE COMPLETE MANUAL

- Thank you very much for reading the preview of the manual.
- You can download the complete manual from: www.heydownloads.com by clicking the link below



- Please note: If there is no response to CLICKING the link, please download this PDF first and then click on it.

CLICK HERE TO **DOWNLOAD** THE COMPLETE MANUAL

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.

SI SSL-1008 SM

SAFETY & MAINTENANCE (CONT'D)

SPARK ARRESTER MUFFLER	10-150-1
Cleaning Procedure	10-150-1
STOPPING THE ENGINE AND LEAVING THE LOADER	10-180-1
Procedure	10-180-1
TOWING THE LOADER	10-50-1
Procedure	10-50-1
TRANSPORTING THE LOADER ON A TRAILER	10-40-1
Fastening	10-40-1
Loading And Unloading	10-40-1

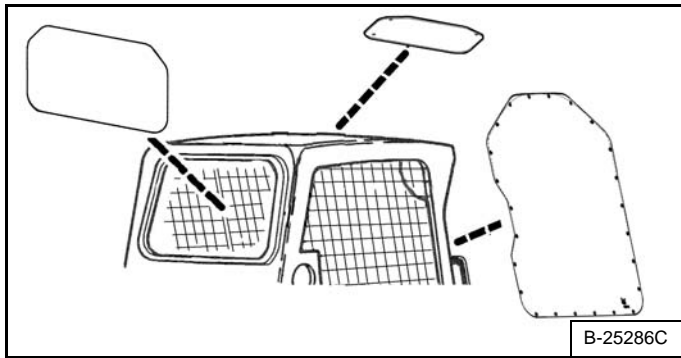
TIGHTEN ALL HARDWARE PER SIZE TO GRADE 5 TORQUE (SEE STANDARD TORQUE SPECIFICATIONS FOR BOLTS, SECTION SPEC-01) UNLESS OTHERWISE SPECIFIED.

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

OPERATOR CAB (CONT'D)

Forestry Door And Window Kit

Figure 10-30-9



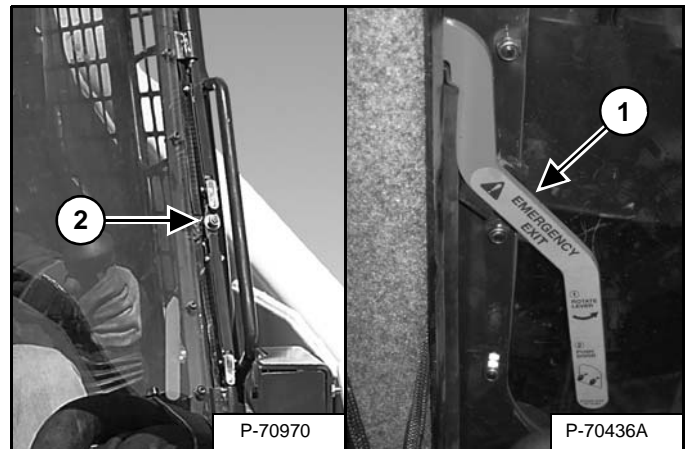
Must be used with Forestry Applications Kit to prevent flying debris and objects from entering the loader. Kit includes 19,05 mm (0.75 inch) thick laminated polycarbonete front door, top and rear windows [Figure 10-30-9].

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

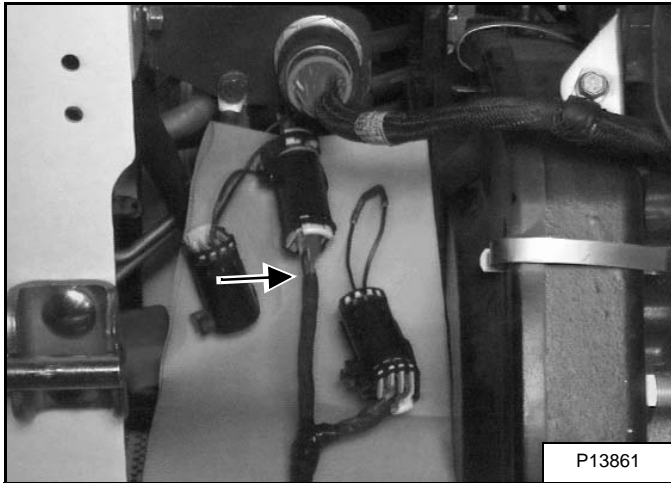


- Inspect the emergency exit lever (Item 1), linkages and hardware (Item 2) [Figure 10-30-10] for loose or damaged parts.
- Repair or replace if necessary.

REMOTE START TOOL KIT-MEL1563 (CONT'D)

Remote Start Procedure (Cont'd)

Figure 10-60-12



Connect the remote start tool to the engine harness connector [Figure 10-60-12].

NOTE: The key switch on the right-hand side operator panel must be in the off position or the Remote Start Kit will not operate.

WARNING

UNAUTHORIZED AND UNEXPECTED ENGINE STARTUP CAN CAUSE SERIOUS INJURY OR DEATH

With the 7-pin connector plugged into the machine and Remote Start Tool Key Switch in the OFF position, the engine can be started from the operator panel inside the cab.

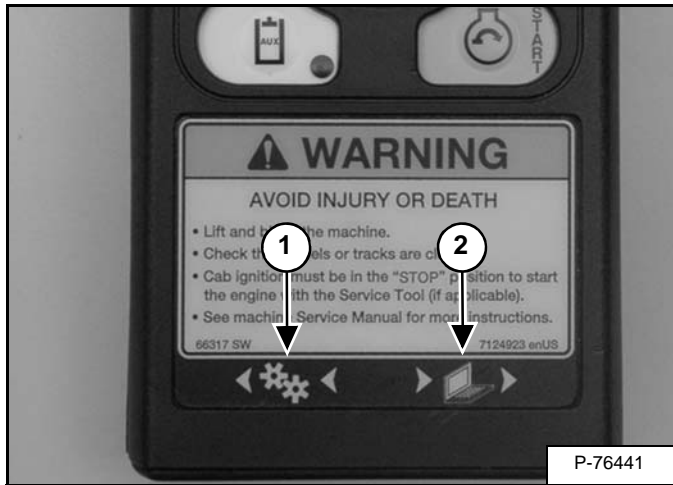
- Place the key switch of the Remote Start Tool in the RUN position to disconnect the operator panel from the start circuit.
- Remove the operator panel key (key switch), lock the keypad with a unique password (keyless) or otherwise disable the starter before working in the engine area.

W-2457-1110

REMOTE START TOOL (SERVICE TOOL) KIT - 7003031 (CONT'D)

Remote Start Procedure (Cont'd)

Figure 10-61-13

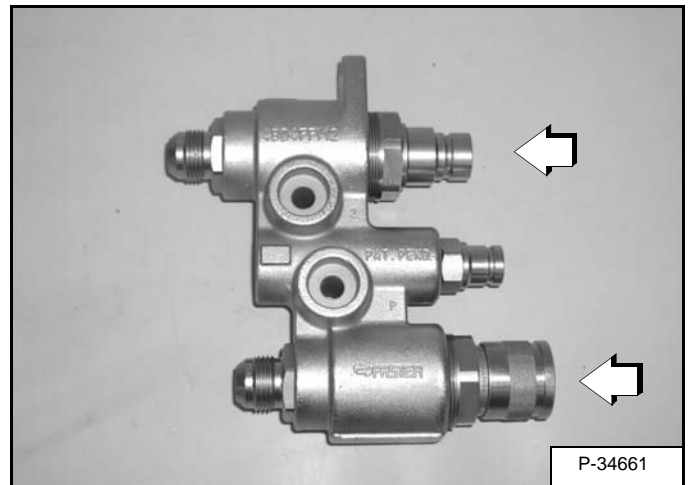


The gear icon with the left facing arrows (Item 1) [Figure 10-61-13] will illuminate and blink when the RUN key is pressed and the loader is communicating with the service tool.

The computer icon with the right facing arrows (Item 2) [Figure 10-61-13] will illuminate and blink when the Remote Start Tool (Service Tool) is transmitting data to and from the computer.

NOTE: To relieve the pressure at the rear or secondary front auxiliary, (if equipped) press the RUN button on the remote start tool. Then press the auxiliary (AUX) hydraulics button on the remote start tool and move the AUXILIARY Hydraulic Switch on the center console to the right and left several times.

Figure 10-61-14



Push the couplers on the front auxiliary block toward the block and hold for five seconds to release the front auxiliary pressure [Figure 10-61-14].

FUEL SYSTEM

Fuel Specifications

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

The following is one suggested blending guideline which should prevent fuel gelling during cold temperatures:

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

At a minimum, Low Sulfur (500 ppm sulfur) Diesel Fuel must be used in this machine:

The following fuels may also be used in this machine:

- Ultra Low Sulfur (15 ppm sulfur) Diesel Fuel.
- Biodiesel Blend Fuel - Must contain no more than five percent biodiesel mixed with low sulfur or ultra low sulfur petroleum based diesel. This is commonly marketed as B5 blended diesel fuel. B5 blended diesel fuel must meet ASTM D975 (US Standard) or EN590 (EU Standard) specifications.

Biodiesel Blend Fuel

Biodiesel blend fuel has unique qualities that should be considered before using in this machine:

- Cold weather conditions can lead to plugged fuel system components and hard starting.
- Biodiesel blend fuel is an excellent medium for microbial growth and contamination which can cause corrosion and plugging of fuel system components.
- Use of biodiesel blend fuel may result in premature failure of fuel system components, such as plugged fuel filters and deteriorated fuel lines.
- Shorter maintenance intervals may be required, such as cleaning the fuel system and replacing fuel filters and fuel lines.
- Using biodiesel blended fuels containing more than five percent biodiesel can affect engine life and cause deterioration of hoses, tubelines, injectors, injector pump and seals.

Apply the following guidelines if biodiesel blend fuel is used:

- Ensure the fuel tank is as full as possible at all times to prevent moisture from collecting in the fuel tank.
- Ensure that the fuel tank cap is securely tightened.
- Biodiesel blend fuel can damage painted surfaces, remove all spilled fuel from painted surfaces immediately.
- Drain all water from the fuel filter daily before operating the machine.
- Do not exceed engine oil change interval. Extended oil change intervals can cause engine damage.
- Before vehicle storage; drain the fuel tank, refill with 100% petroleum diesel fuel, add fuel stabilizer and run the engine for at least 30 minutes.

NOTE: Biodiesel blend fuel does not have long term stability and should not be stored for more than three months.

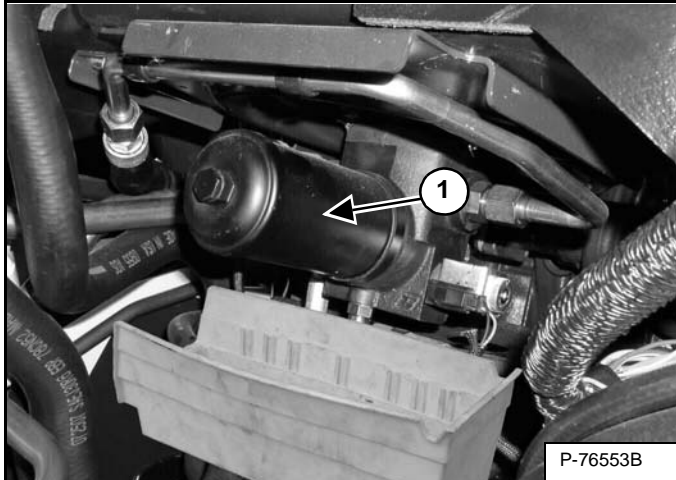
HYDRAULIC / HYDROSTATIC SYSTEM (CONT'D)

Removing And Replacing Hydraulic Charge Filter

The charge filter is located under the cab. For the correct service interval (See SERVICE SCHEDULE on Page 10-70-1.)

Raise the operator cab. (See Raising on Page 10-30-2.)

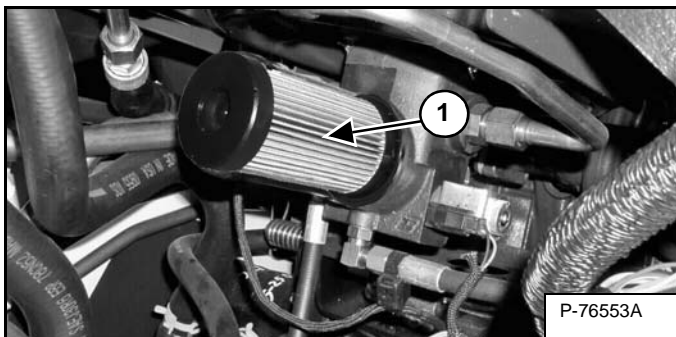
Figure 10-120-11



Place a suitable container below the filter housing and remove the filter housing (Item 1) [Figure 10-120-11].

Recycle or dispose of used fluid in an environmentally safe manner.

Figure 10-120-12



Remove and discard the filter element (Item 1) [Figure 10-120-12].

Clean the surface of the filter housing and the filter base where they contact the filter element seal.

Put clean oil on the seal of the new filter element. Install the element on the filter base. Install and tighten the filter housing to 47 - 54 N•m (35 - 40 ft-lb) torque.

Lower the operator cab. (See Lowering on Page 10-30-3.) Start the engine and operate the loader.

! WARNING

AVOID INJURY OR DEATH

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

W-2103-0508

! 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.

W-2072-0807

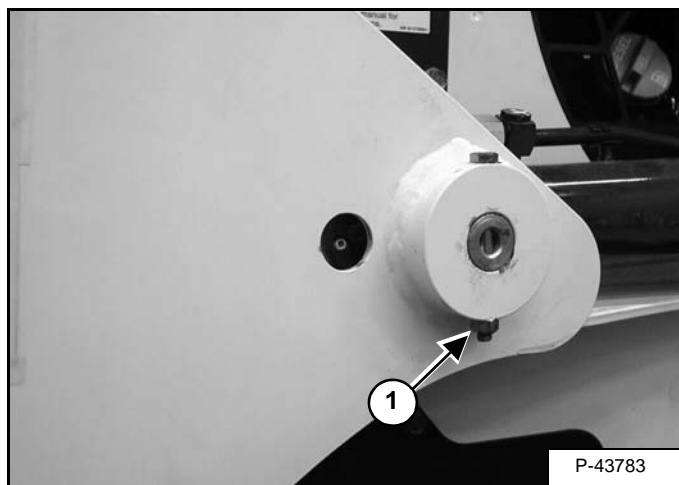
Start the engine and operate the loader. Stop the engine and check for leaks at the filter.

Check the fluid level in the reservoir and add as needed. (See Checking And Adding Fluid on Page 10-120-1)

PIVOT PINS

Inspection And Maintenance

Figure 10-160-1



All lift arm and cylinder pivots have a large pin held in position with a retainer bolt and lock nut (Item 1) **[Figure 10-160-1]**.

Check that the lock nuts are tightened to 48 - 54 N•m (35 - 40 ft-lb) torque.

HYDRAULIC SYSTEM

HYDRAULIC SYSTEM

BOB-TACH (POWER) BLOCK	20-130-1
Description	20-130-1
Disassembly And Assembly	20-130-3
Removal And Installation	20-130-1
BUCKET POSITION VALVE	20-110-1
Description	20-110-1
Disassembly And Assembly	20-110-4
Removal And Installation	20-110-3
Solenoid Removal And Installation	20-110-2
Solenoid Testing	20-110-3
CYLINDER (BOB-TACH)	20-22-1
Assembly	20-22-5
Disassembly	20-22-4
Parts Identification	20-22-3
Removal And Installation	20-22-2
Testing	20-22-1
CYLINDER (LIFT)	20-20-1
Assembly	20-20-7
Disassembly	20-20-5
Parts Identification	20-20-4
Removal And Installation	20-20-2
Testing	20-20-1
CYLINDER (TILT)	20-21-1
Assembly	20-21-8
Base End Pivot Pin Removal And Installation	20-21-4
Disassembly	20-21-6
Parts Identification	20-21-5
Removal And Installation	20-21-2
Testing	20-21-1
FRONT AUXILIARY HYDRAULIC COUPLER BLOCK	20-140-1
Description	20-140-1
Disassembly And Assembly	20-140-2
Removal And Installation	20-140-1

Continued On Next Page

HYDRAULIC/HYDROSTATIC SCHEMATIC WITH SJC OPTION T250 (S/N A5GS20001 AND ABOVE) (S/N A5GT20001 AND ABOVE)

(PRINTED MARCH 2008)
V-1182legend

LEGEND

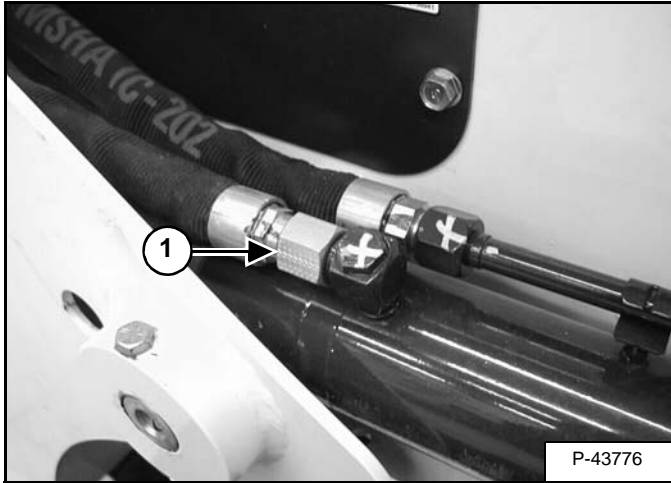
- | | | | |
|--|---|---|---|
| <p>① RESERVOIR:
Capacity 18.8 qt. (17,8 L)</p> <p>② SPRING LOADED FILTER BY-PASS VALVE: 45-55 PSI (3,1-3,8 bar)</p> <p>③ DIFFERENTIAL PRESSURE SWITCH:
36-44 PSI (2,5-3,0 bar)
Normally Closed</p> <p>④ DRIVE MOTOR SHUTTLE VALVE</p> <p>⑤ RELIEF/REPLENISHING VALVE - HIGH PRESSURE: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

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

CYLINDER (LIFT)

Testing

Figure 20-20-1



Lower the lift arms. Stop the engine. Raise the seat bar.

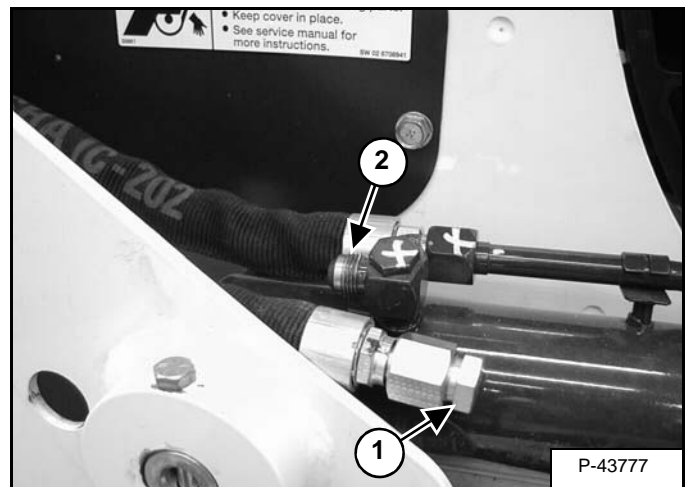
WARNING

Hydraulic fluid escaping under pressure can have sufficient force to enter a person's body by penetrating the skin. This can cause serious injury and possible death if proper medical treatment by a physician familiar with this injury is not received immediately.

W-2145-0290

Check only one cylinder at a time. Disconnect the hose (Item 1) [Figure 20-20-1] which goes to the base end of the lift cylinder.

Figure 20-20-2



Install a cap (Item 1) [Figure 20-20-2] in the hose and tighten.

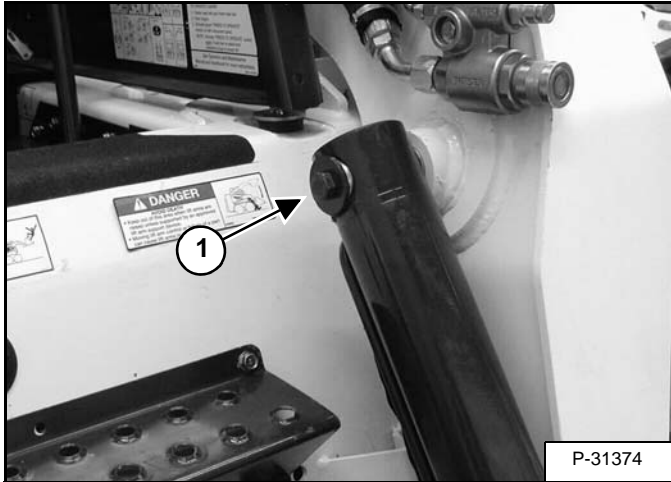
Engage the parking brake. Lower the seat bar. Start the engine and push the top (toe) of the lift pedal.

If there is any leakage from the fitting on the cylinder (Item 2) [Figure 20-20-2]. Remove the lift cylinder for repair. Repeat the procedure to check the other lift cylinder.

CYLINDER (TILT) (CONT'D)

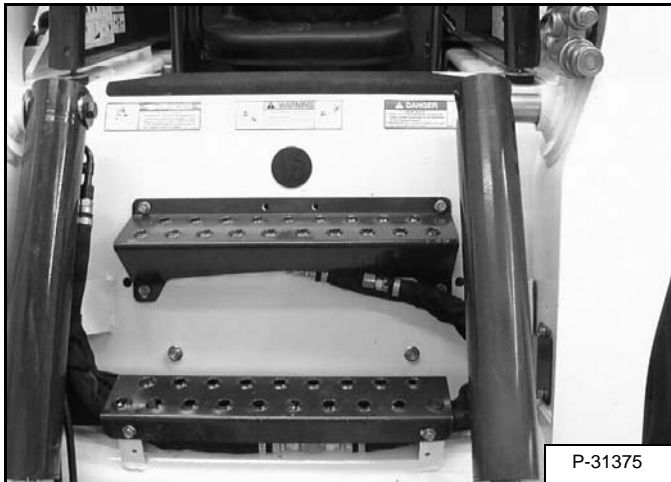
Removal And Installation (Cont'd)

Figure 20-21-7



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

Figure 20-21-8

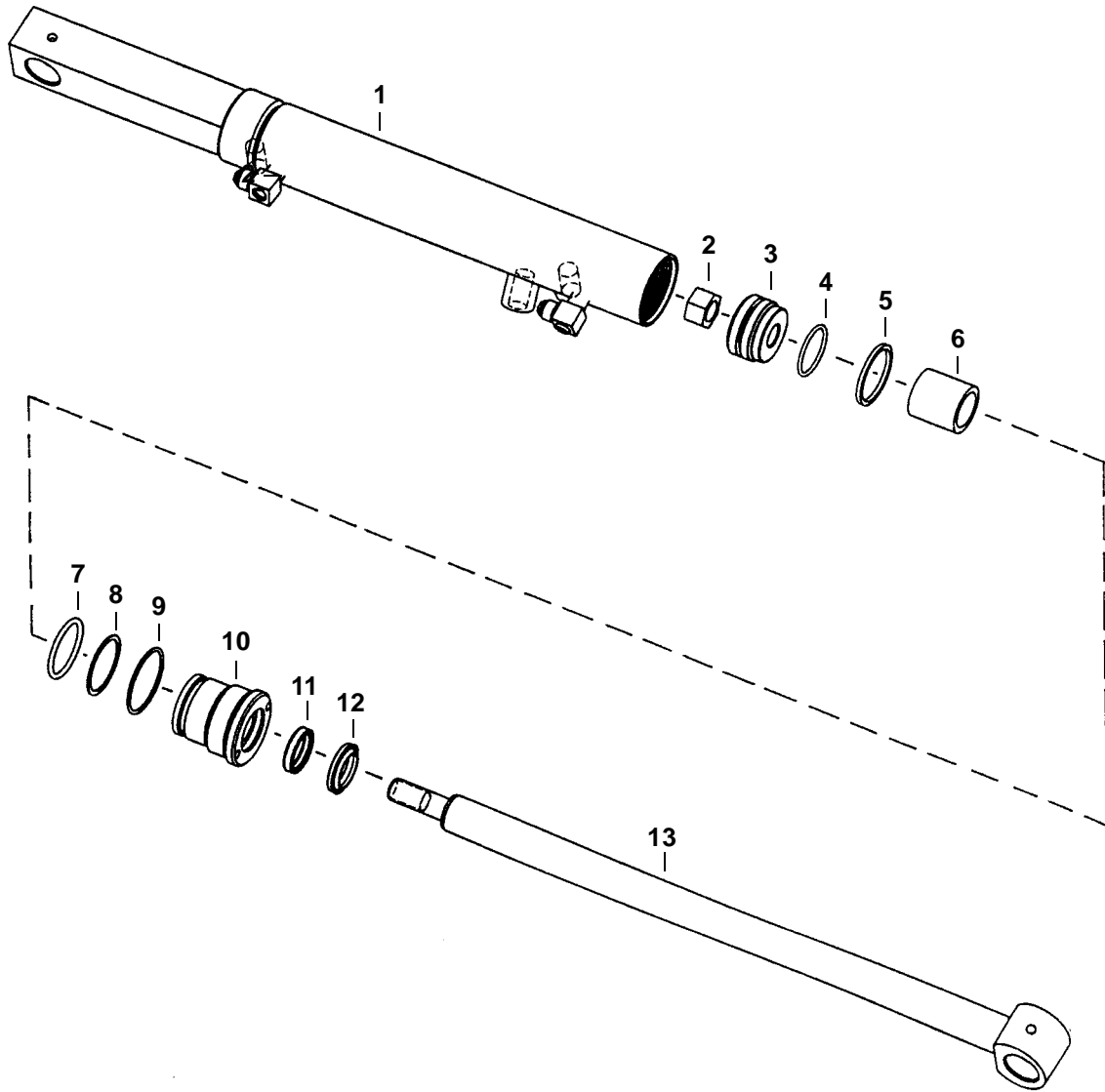


Slide the cylinder from the base pin and remove the tilt cylinder from the loader [Figure 20-21-8].

CYLINDER (BOB-TACH) (CONT'D)

Parts Identification

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



B-16207

MAIN RELIEF VALVE (CONT'D)

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 10-30-2.)

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].

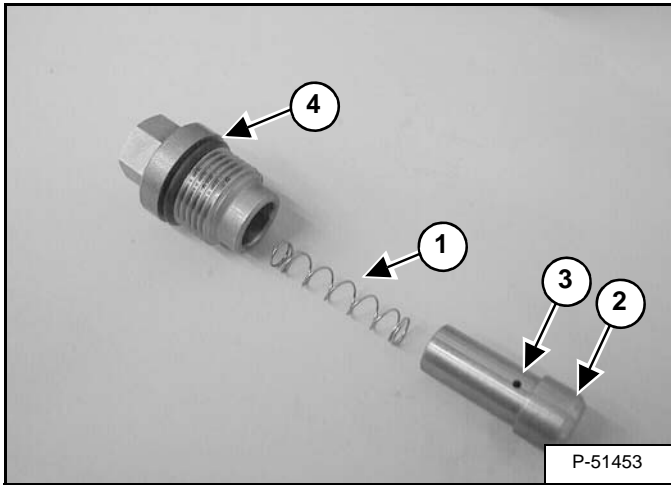
Installation: Tighten the main relief valve to 47 - 54 N•m (35 - 40 ft-lb) torque.

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

HYDRAULIC CONTROL VALVE (STANDARD) (CONT'D)

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

Figure 20-40-24



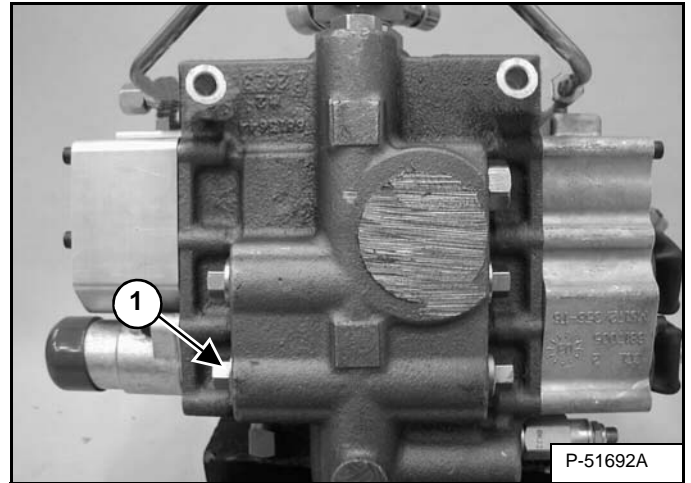
Remove the spring (Item 1) and poppet (Item 2) [Figure 20-40-24].

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 52 - 61 N•m (38 - 45 ft-lb) torque.

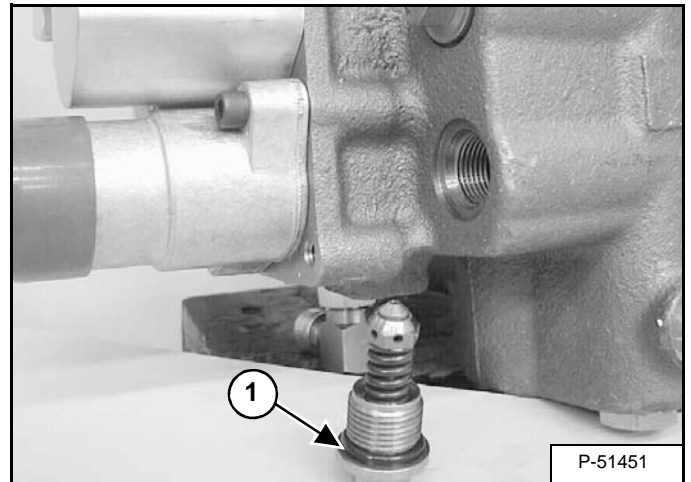
Port Relief / Anti-Cavitation Valve Removal And Installation (Lift, Base End)

Figure 20-40-25



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

Figure 20-40-26



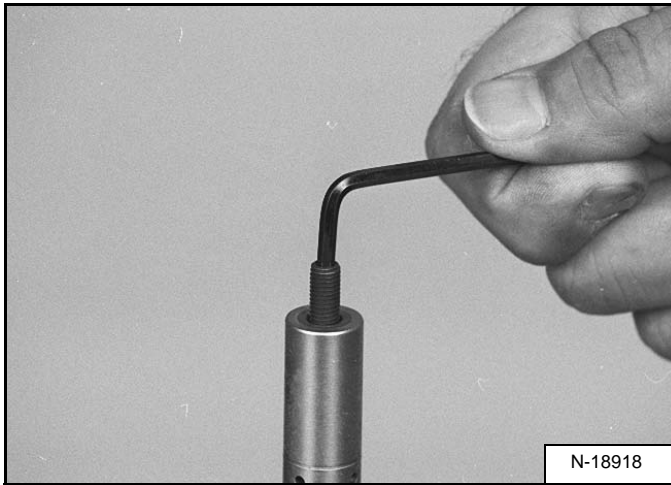
Replace the O-ring (Item 1) [Figure 20-40-26] before installation.

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

HYDRAULIC CONTROL VALVE (STANDARD) (CONT'D)

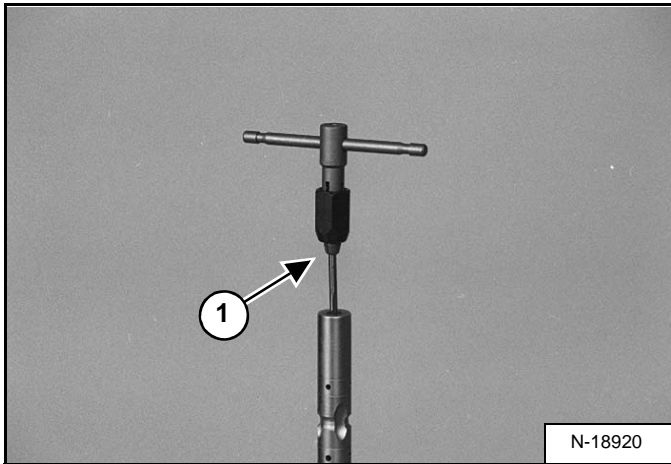
Lift Spool And Detent Removal And Installation (Cont'd)

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 1,6 mm (1/16 in) drill.

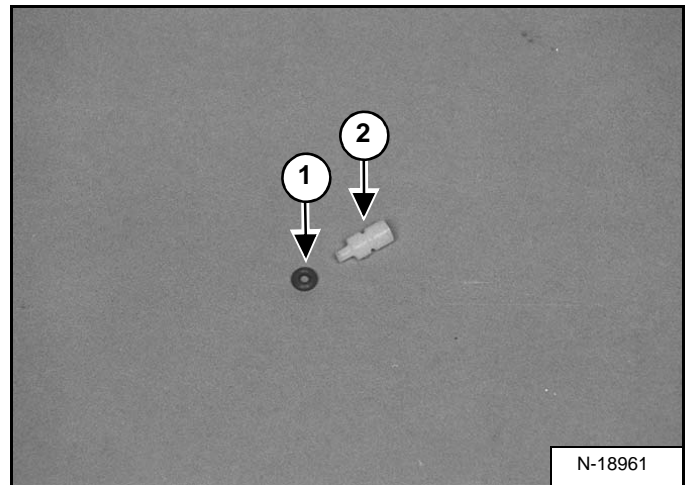
Drill a hole all the way through the plug using a 2,8 mm (7/64 in) tap drill

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.

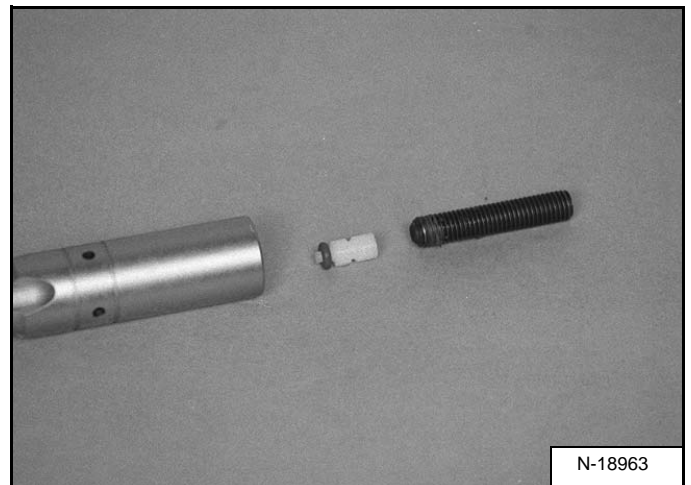
Figure 20-40-62



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

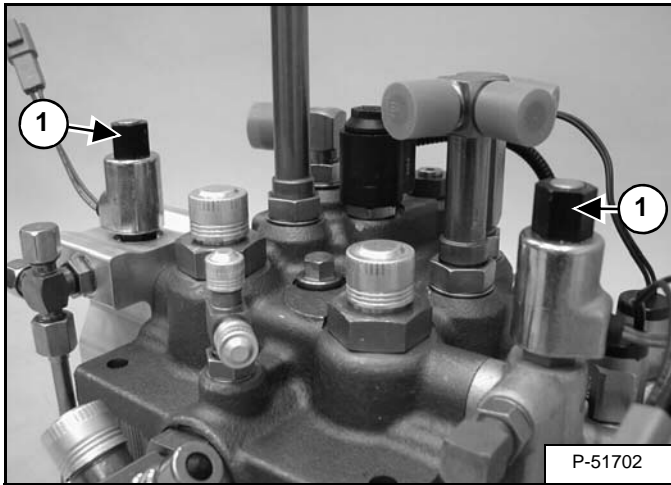


Install the plastic plug and O-ring in the spool [Figure 20-40-63].

HYDRAULIC CONTROL VALVE (STANDARD) (CONT'D)

Auxiliary Solenoid Removal And Installation (S/N A5GS34999 & Below And A5GT34999 & Below)

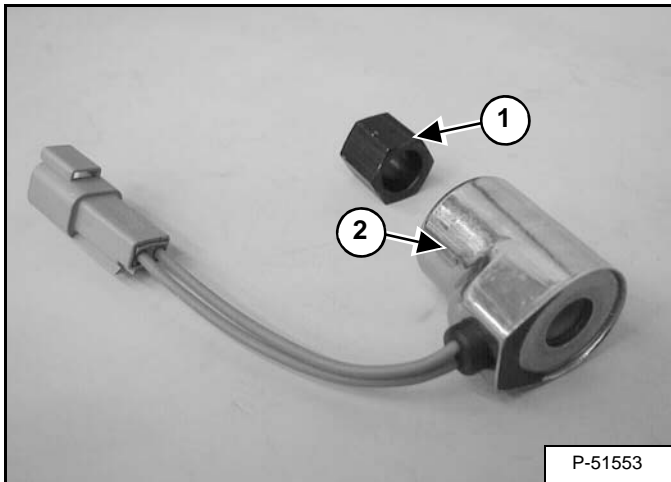
Figure 20-40-97



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

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

Figure 20-40-98

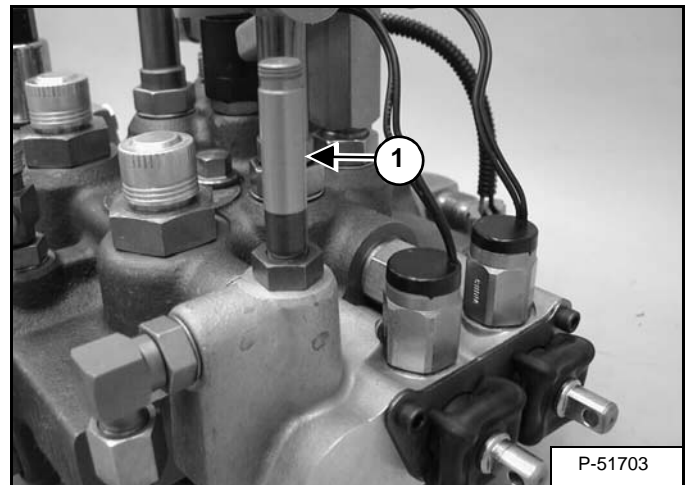


Remove the nut (Item 1) and solenoid coil (Item 2) [Figure 20-40-98].

Use an ohmmeter to measure the solenoid coil resistance.

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

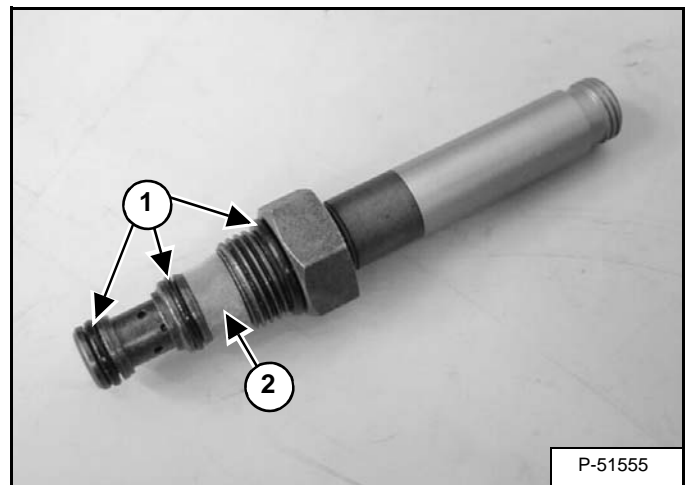
Figure 20-40-99



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

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

Figure 20-40-100



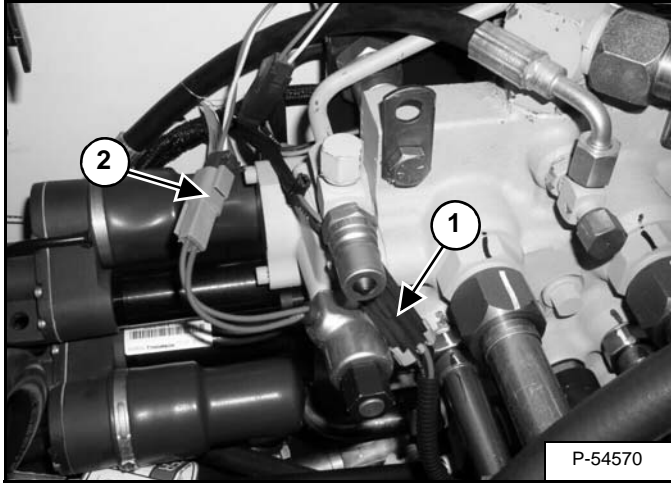
Remove the O-rings (Item 1) [Figure 20-40-100] from the solenoid stem.

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

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

Removal And Installation (Cont'd)

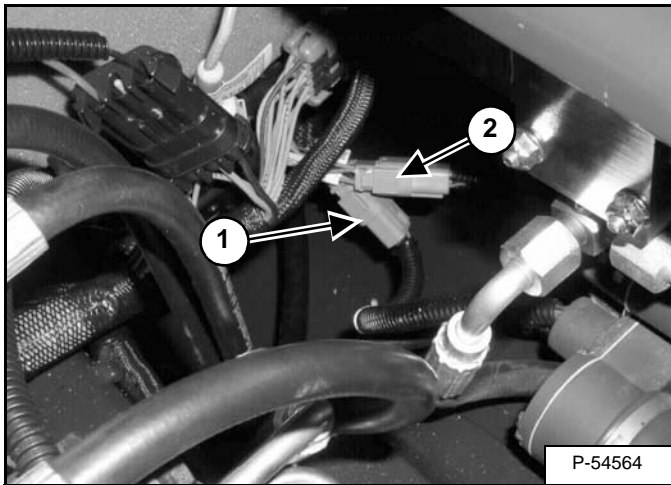
Figure 20-41-5



Mark the two wire connectors for proper installation.

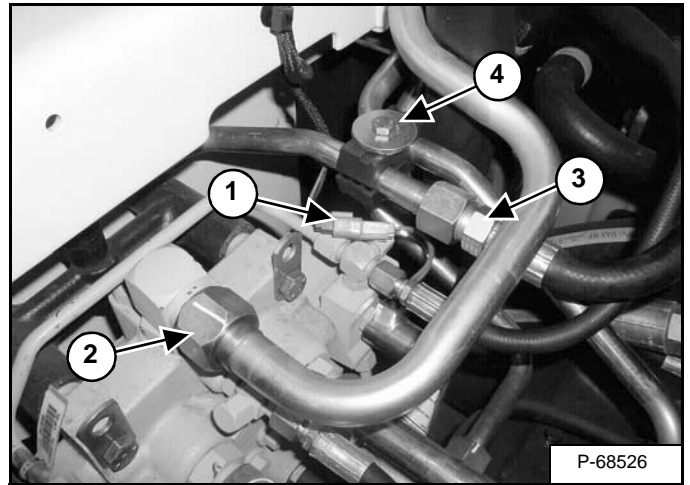
Disconnect the wire harness connector (Item 1) from the BICS™ valve solenoid and (Item 2) from auxiliary valve solenoid [Figure 20-41-5].

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



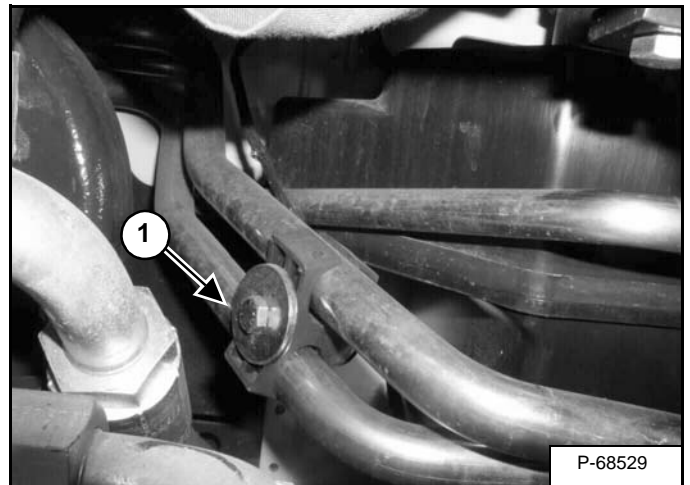
Disconnect the harness connector (Item 1) [Figure 20-41-7] from the auxiliary valve solenoid.

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



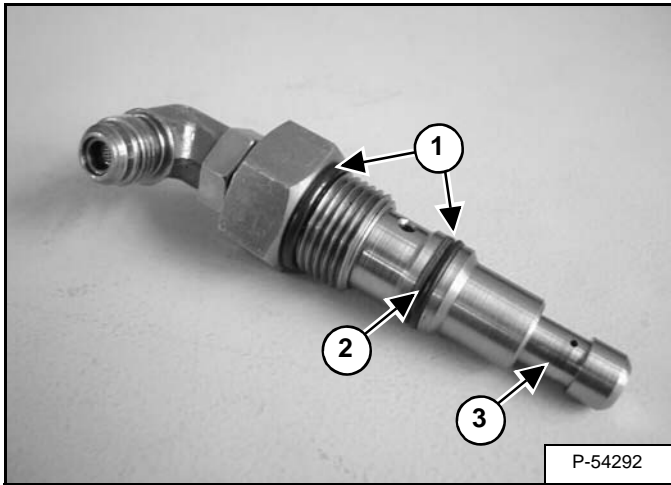
Remove the tubeline clamp (Item 1) [Figure 20-41-8] located on the auxiliary tubelines between the hydraulic reservoir and the hydrostatic pump.

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

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

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

Figure 20-41-32

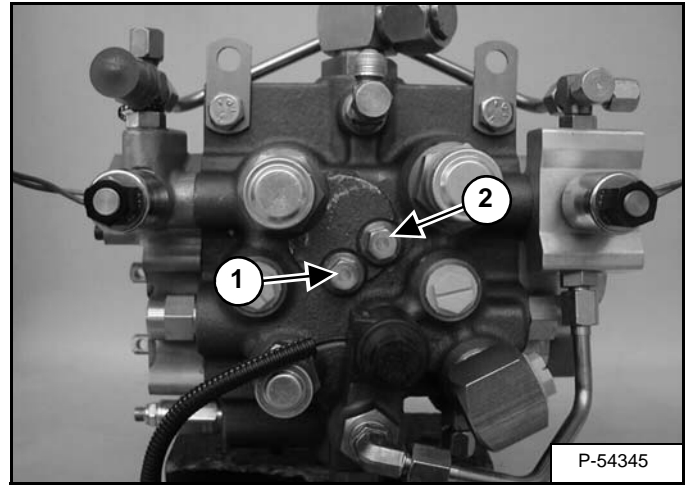


Remove and install new O-rings (Item 1) and back-up ring (Item 2) [Figure 20-41-32].

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

Load Check Valve Removal And Installation (Tilt And Auxiliary)

Figure 20-41-33

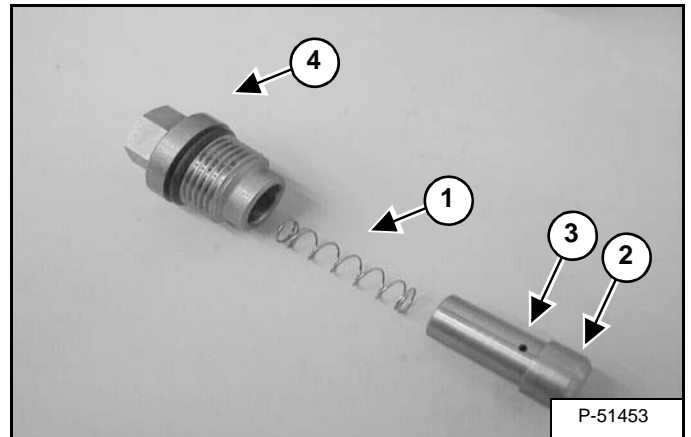


At the front side of the control valve locate the tilt section load check valve (Item 1) [Figure 20-41-33].

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].

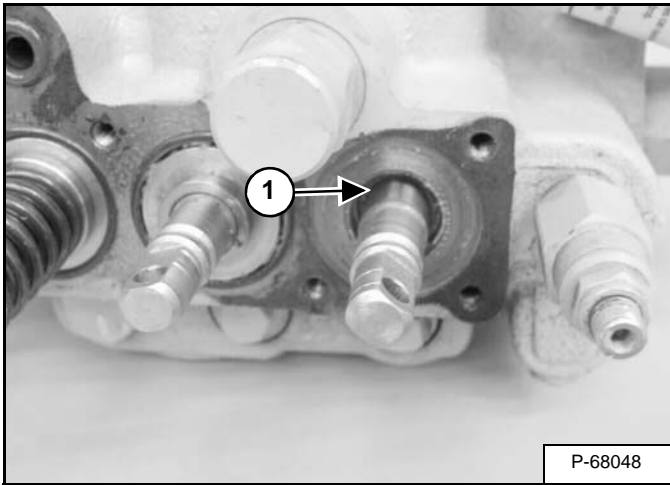
Check the orifice (Item 3) [Figure 20-41-34] in the poppet to be sure it is not plugged.

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 52 - 61 N•m (38 - 45 ft-lb) torque.

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

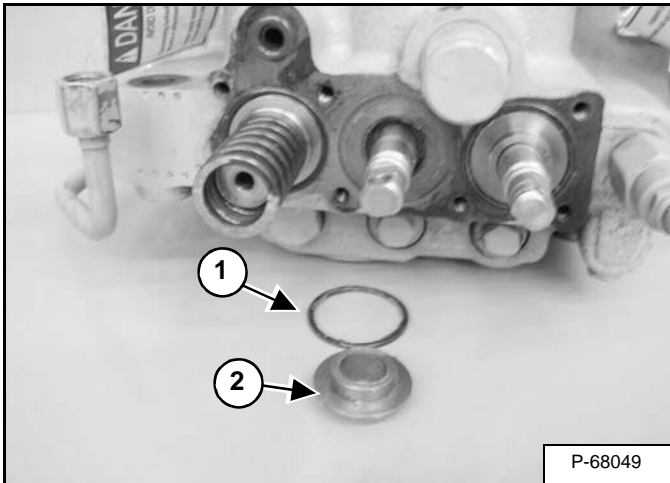
Lift Spool And Detent Removal And Installation (Cont'd)

Figure 20-41-69



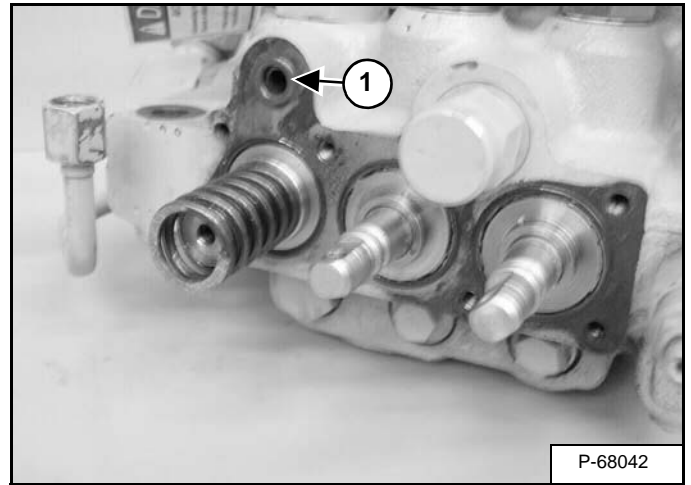
Install the spool seal (Item 1) [Figure 20-41-69] on the linkage end of the valve.

Figure 20-41-70



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

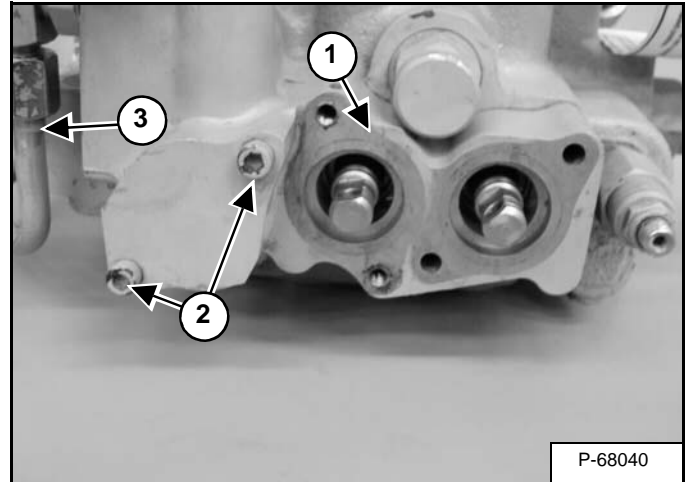
Figure 20-41-71



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 10,2 - 11,3 N•m (90 - 100 in-lb) torque.

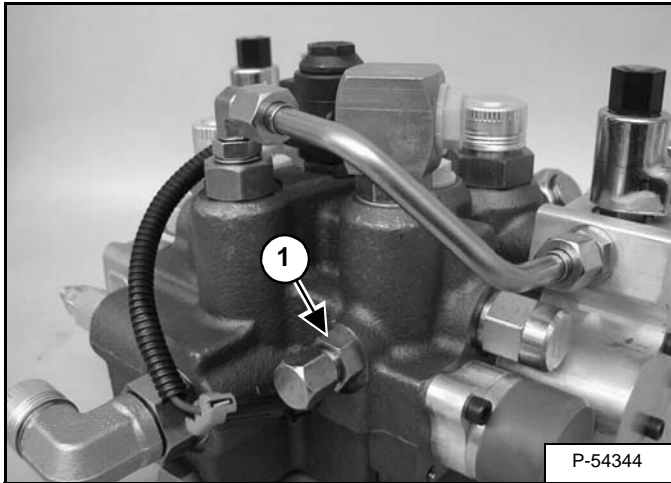
Connect the tubeline (Item 3) [Figure 20-41-72] to the end cap block.

Install the lift and tilt actuators to the control valve.

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

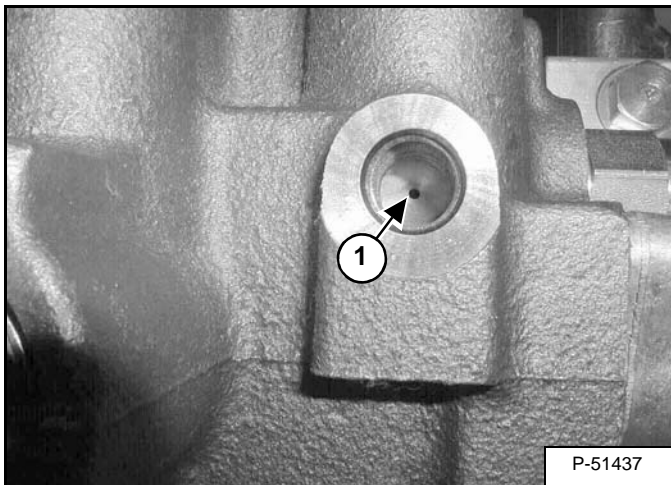
Lift Arm Bypass Orifice Removal And Installation

Figure 20-41-102



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

Figure 20-41-103

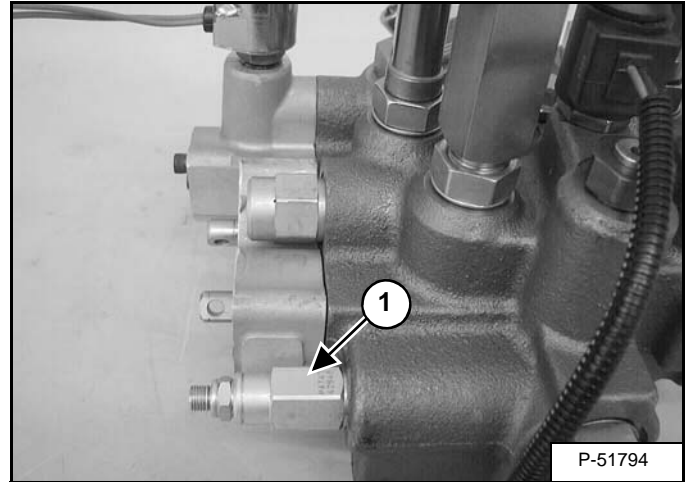


Check the lift arm bypass orifice (Item 1) [Figure 20-41-103].

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

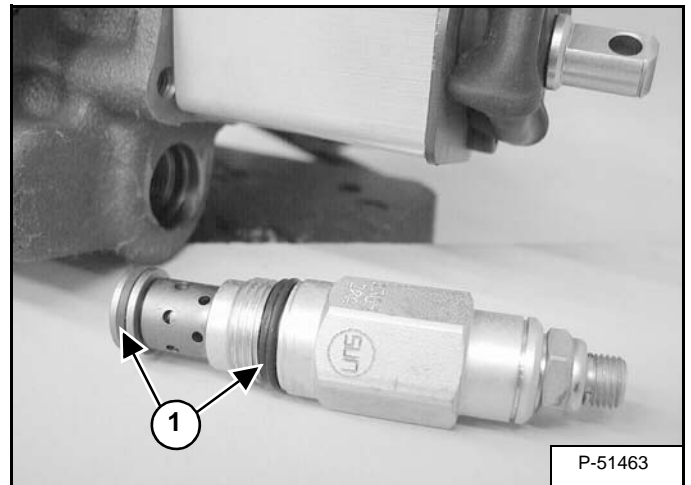
Main Relief Valve Removal And Installation

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 52 - 61 N•m (38 - 45 ft-lb) torque.

HYDRAULIC PUMP (STANDARD) (CONT'D)

Direct Pump Test (Charge Section)

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

- MEL1563 or 7003031 - Remote Start Tool
- MEL10003 - In-Line Hydraulic Tester
- MEL10006 - Flow Meter Fitting 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

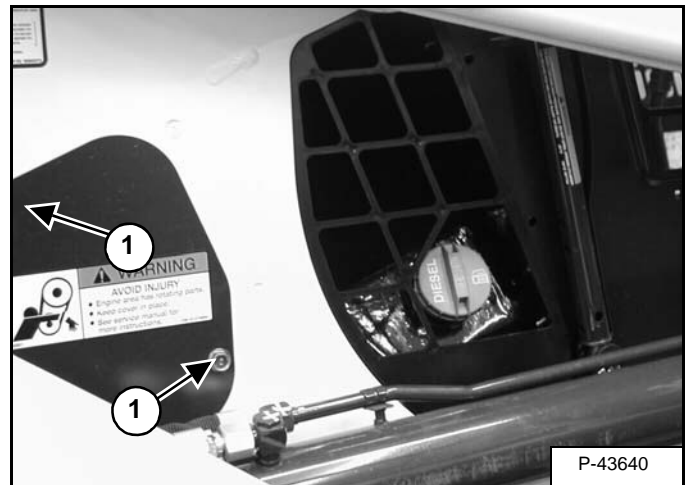
NOTE: The fluid from the charge pump must be filtered after it passes through the Hydraulic Tester, to prevent any contamination to the Hydrostatic Pumps.

Raise the operator cab. (See Raising on Page 10-30-2.)

Open the rear door of the loader.

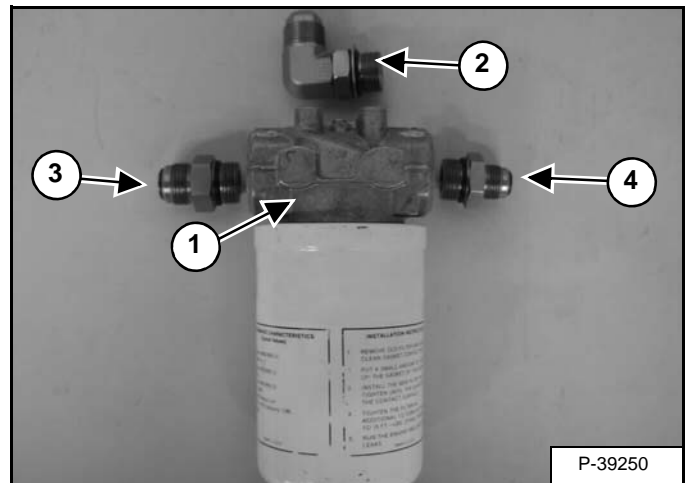
Connect the remote start tool. (See REMOTE START TOOL KIT-MEL1563 on Page 10-60-1.)

Figure 20-60-5



Remove the 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 - In-Line Hydraulic Tester
MEL10006 - Flow Meter Fitting Kit

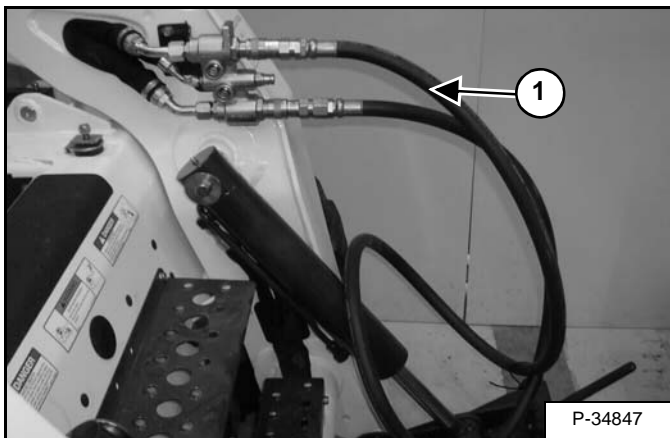
WARNING

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.)

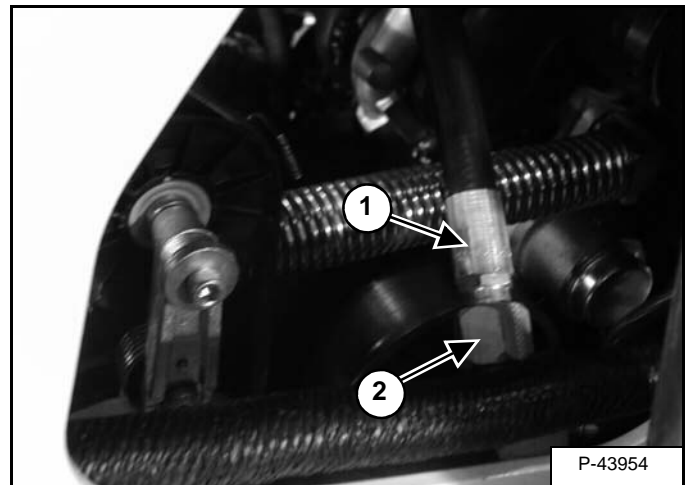
WARNING

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 10-30-2.)

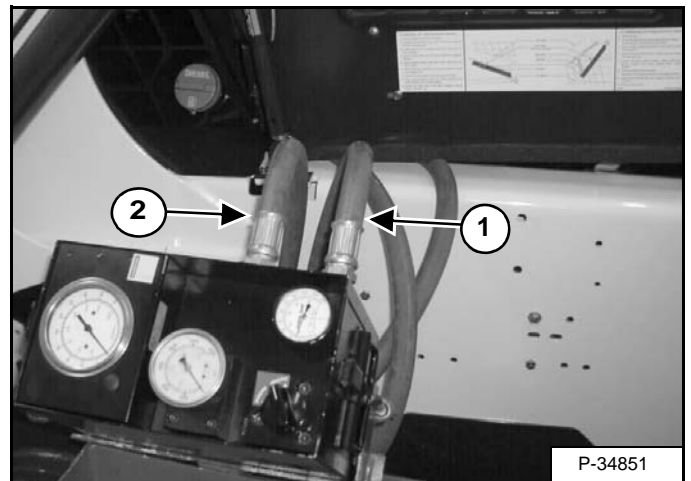
Figure 20-61-21



Remove the left side access cover.

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

Figure 20-61-22



NOTE: When testing the hydraulic flow of a machine hoses must be at least 19,05 mm (0.75 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 189,3 L/min (50 U.S. 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.

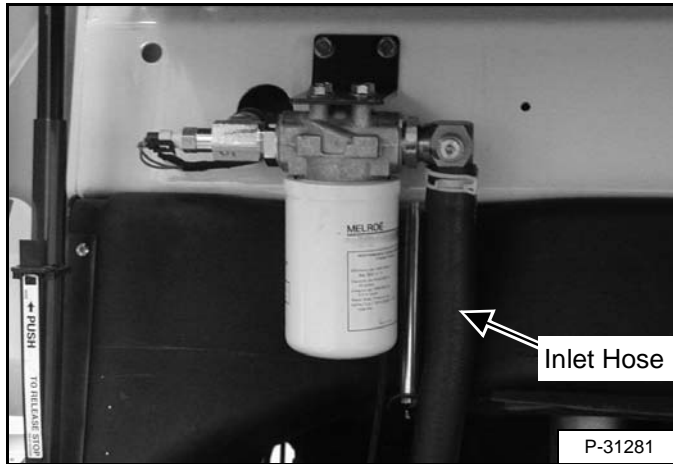
The hydraulic gear pump is a combination of gear pumps that provide hydraulic flow to several hydraulic systems.

HYDRAULIC PUMP (SJC) (CONT'D)

Hydraulic Pump Startup

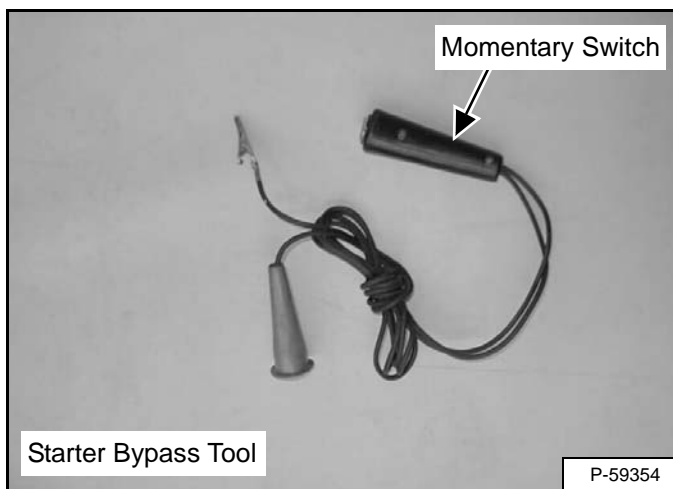
NOTE: This procedure to prevent a dry start up of the hydraulic pump.

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].

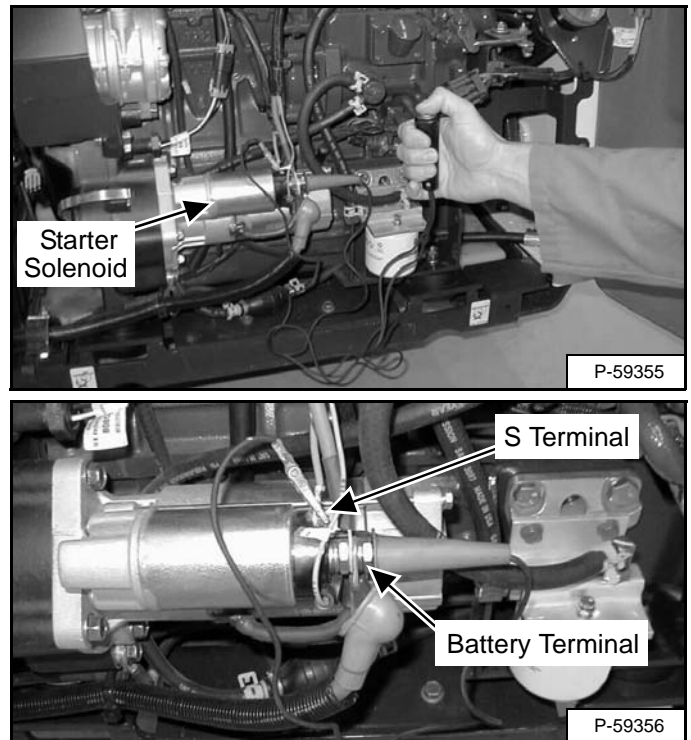
Figure 20-70-21



[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.

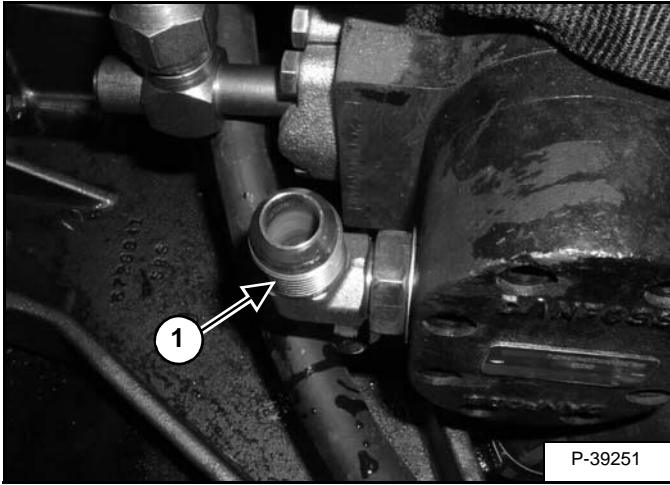
After operating the engine at low idle, Remove the lift arm support device and fully raise and lower the loader lift arms several times or until air is purged from the system. **Avoid running over the relief valve setting at the end of cylinder stroke.**

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

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

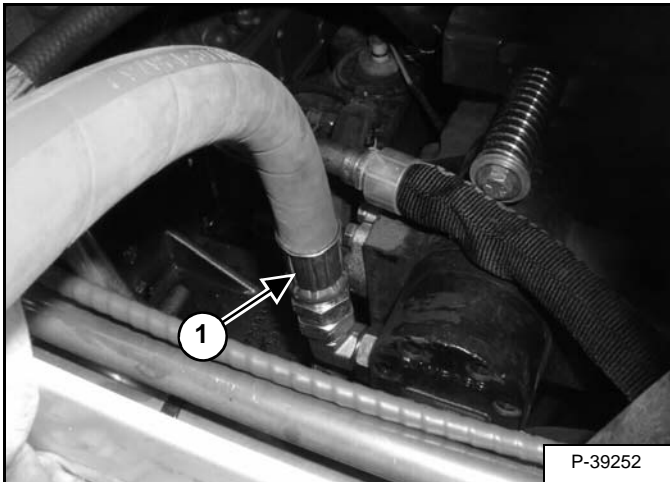
Direct Pump Test (Charge Section) (Cont'd)

Figure 20-71-11



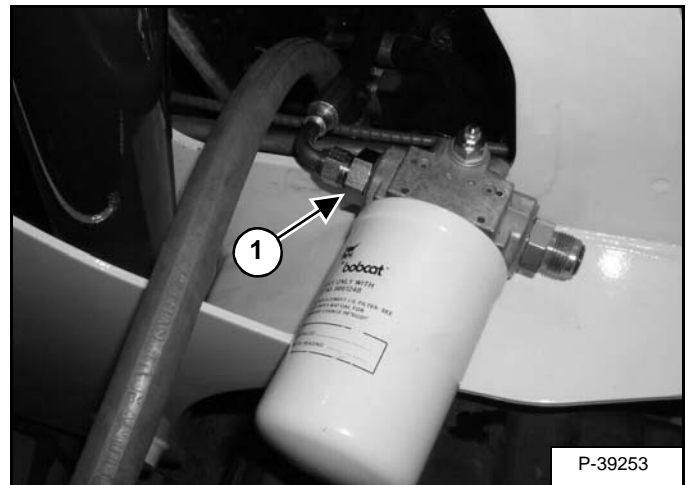
Install the elbow fitting 17KB 1212 (Item 1) [Figure 20-71-11] into the OUTLET of the charge pump.

Figure 20-71-12



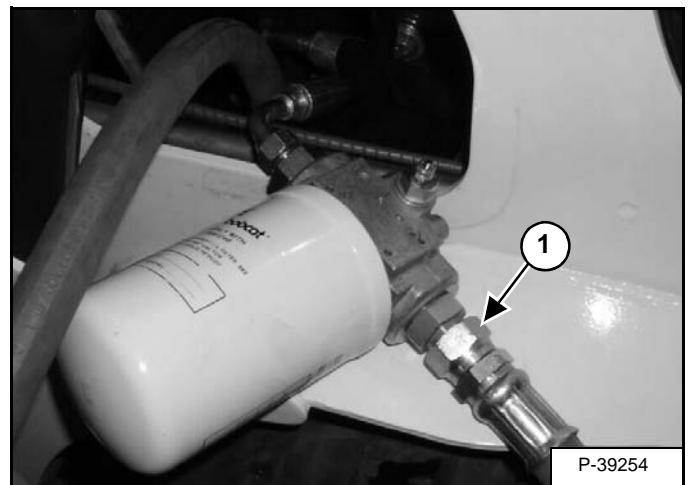
Connect the Inlet hose from the hydraulic tester (Item 1) [Figure 20-71-12] to the OUTLET fitting of the charge pump.

Figure 20-71-13



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

Figure 20-71-14



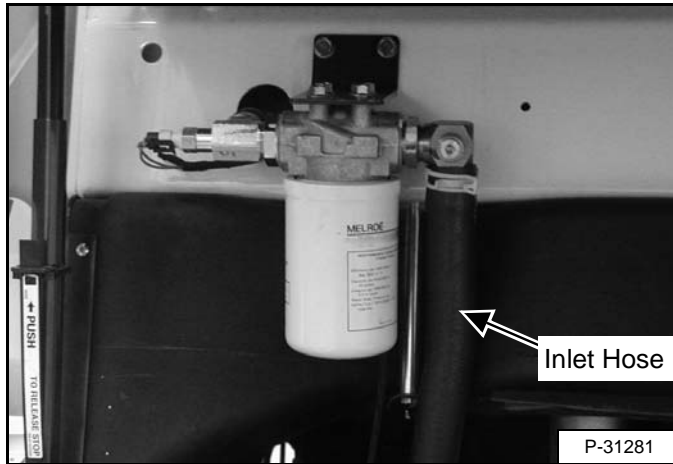
Connect the outlet hose on the hydraulic tester (Item 1) [Figure 20-71-14] to the inlet fitting on the hydraulic filter assembly.

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

Hydraulic Pump Startup

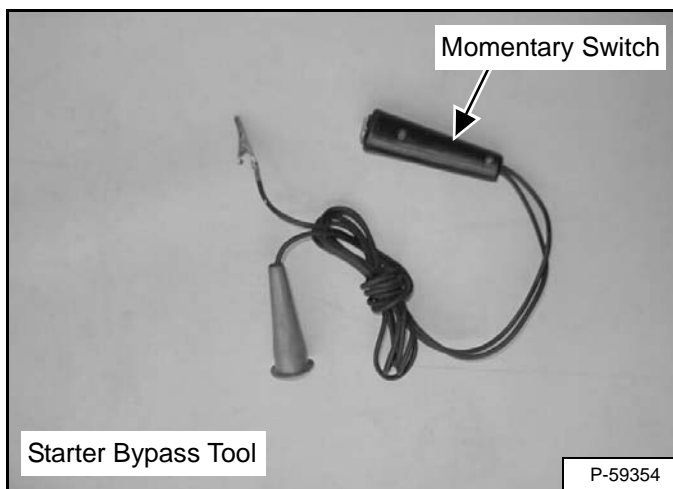
NOTE: This procedure to prevent a dry start up of the hydraulic pump.

Figure 20-71-35



Disconnect the pump inlet hose connection at the filter head. Fill the pump inlet and hose completely with hydraulic fluid. Reconnect the hose [Figure 20-71-35].

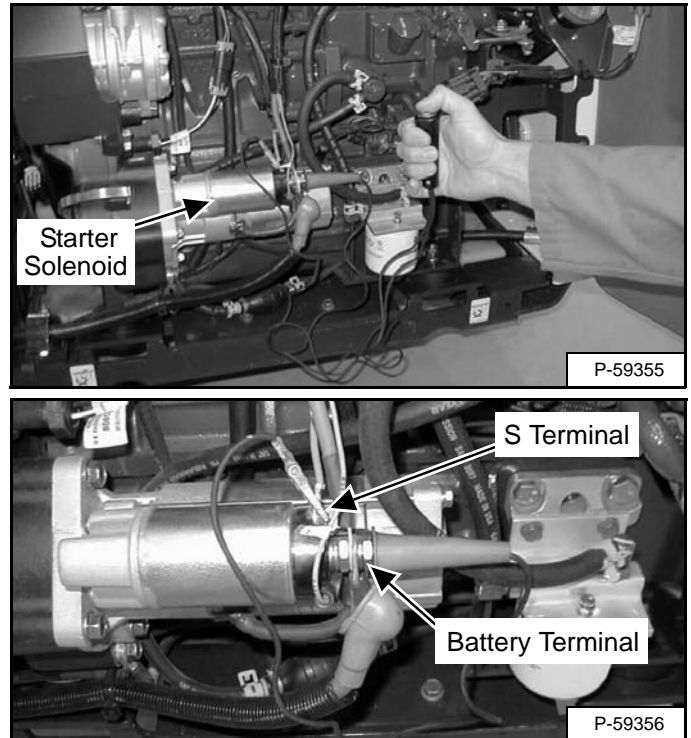
Figure 20-71-36



[Figure 20-71-36] 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 20-71-37



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 20-71-37].

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.

OIL COOLER

Description

The oil cooler is used to cool the loaders hydraulic and hydrostatic oil. Oil passages are coiled into a heat exchanger. Air is forced around the passages cooling the oil.

The oil cooler is located underneath the rear grille between the A/C condenser (if equipped) and the radiator.

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

! WARNING

AVOID INJURY OR DEATH

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

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

W-2019-0907

Removal And Installation

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

Two different style supply hoses are used on the coolant tank. One style is a straight hose and routes from the bottom of the coolant tank and continues under the oil cooler bracket. The other style is a curved hose and routes over the top of the oil cooler bracket.

Figure 20-100-1

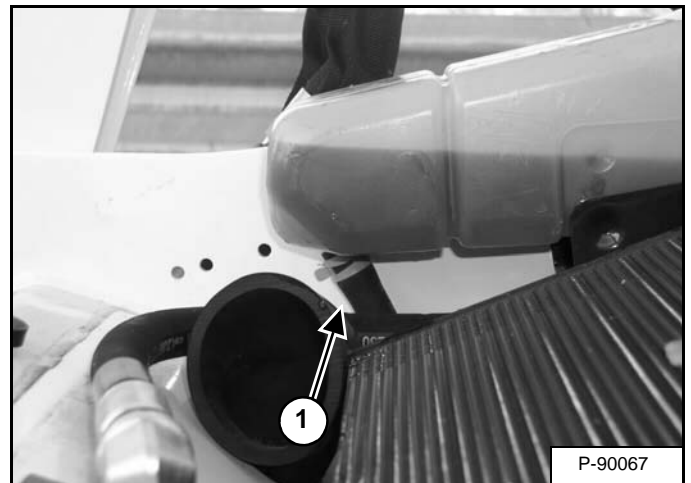
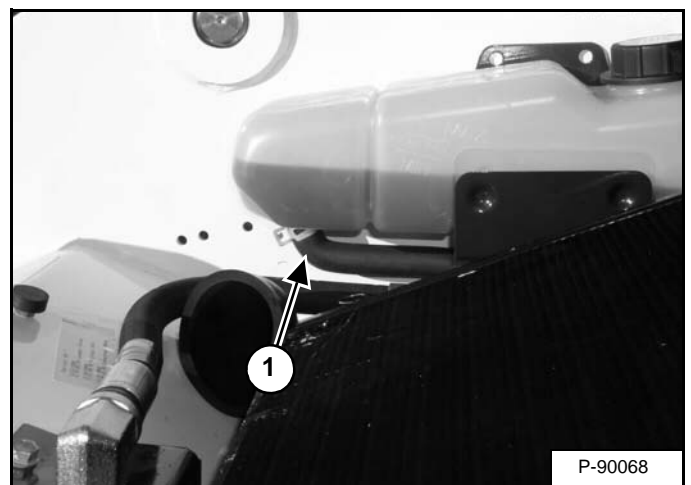


Figure 20-100-2



If the coolant tank has a straight hose (Item 1) [Figure 20-100-1] underneath the coolant tank see [Figure 20-100-3] and [Figure 20-100-4].

If the coolant tank has a curved hose (Item 1) [Figure 20-100-2] underneath the coolant tank see [Figure 20-100-5] and [Figure 20-100-6].

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.

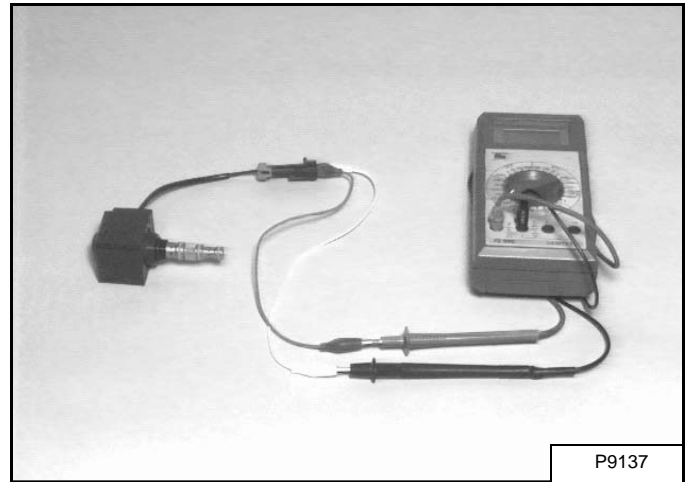
The right side auxiliaries are located on the inside of the right side lift arm at the front of the machine.

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

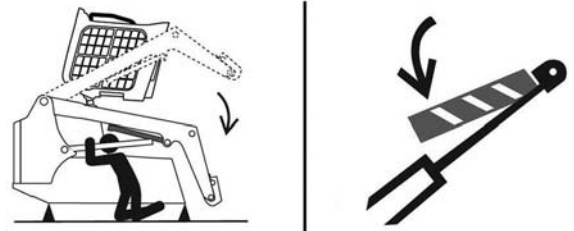
Removal And Installation

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

CASE DRAIN FILTER	30-60-1
Description	30-60-1
Disassembly And Assembly	30-60-1
CHARGE PRESSURE	30-30-1
Adjusting	30-30-4
Description	30-30-1
Sender Removal And Installation	30-30-3
Testing	30-30-1
DRIVE BELT	30-50-1
Adjusting	30-50-2
Belt Removal And Installation	30-50-2
Description	30-50-1
Shield Removal And Installation	30-50-1
Tensioner Pulley Disassembly And Assembly	30-50-4
Tensioner Pulley Removal And Installation	30-50-3
Tensioner Pulley Tension Spring Disassembly And Assembly	30-50-5
Tensioner Pulley Tension Spring Removal And Installation	30-50-5
HYDROSTATIC DRIVE MOTOR	30-20-1
Description	30-20-1
Disassembly And Assembly	30-20-6
Parts Identification	30-20-4
Removal And Installation	30-20-2
Removing And Replacing Oil	30-20-1
HYDROSTATIC PUMP	30-40-1
Assembly	30-40-15
Description	30-40-1
Disassembly	30-40-8
Hydrostatic Pump Startup	30-40-4
Parts Identification (Left Half)	30-40-6
Parts Identification (Right Half)	30-40-7
Removal And Installation	30-40-2
Replenishing / High Pressure Relief Valve Removal And Installation	30-40-5

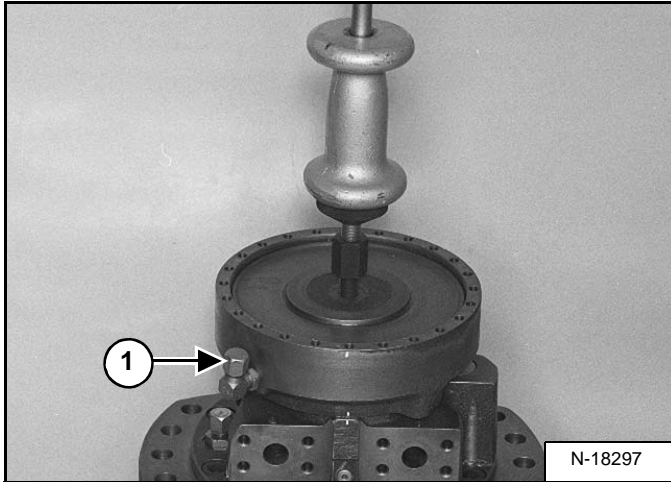
HYDROSTATIC SYSTEM

Continued On Next Page

HYDROSTATIC DRIVE MOTOR (CONT'D)

Disassembly And Assembly (Cont'd)

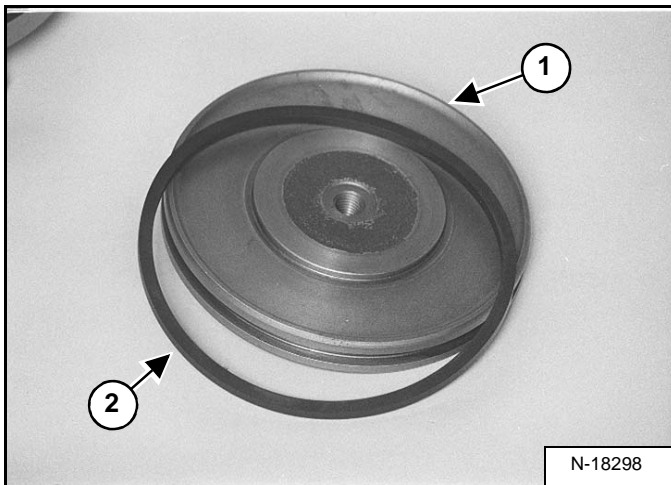
Figure 30-20-10



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

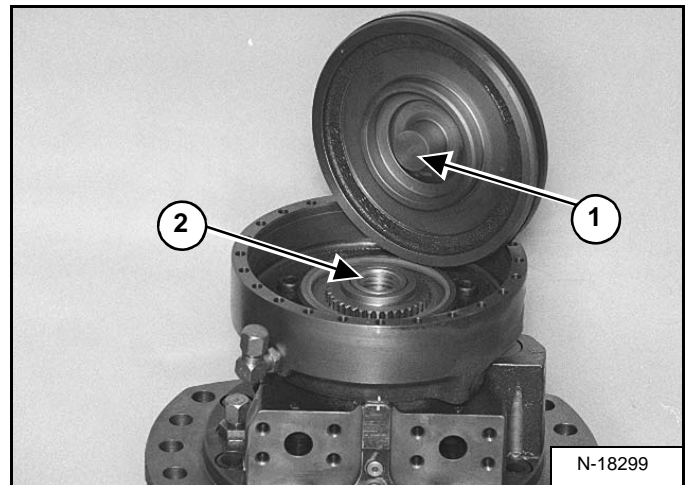


Check the brake piston (Item 1) [Figure 30-20-11] for damage including the surface that contacts the brake shaft.

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



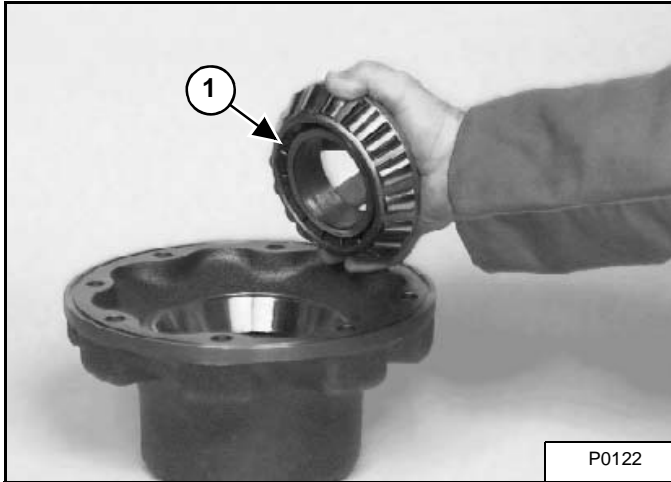
Check the piston surface (Item 1) and the bushing surface (Item 2) [Figure 30-20-12] in the brake shaft.

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.

HYDROSTATIC DRIVE MOTOR (CONT'D)

Disassembly And Assembly (Cont'd)

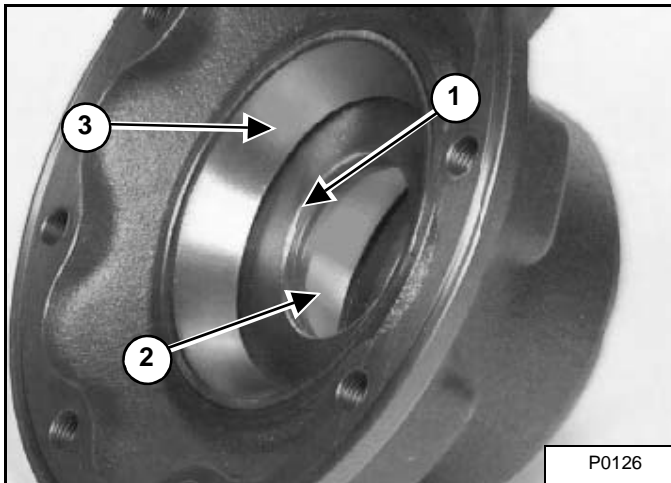
Figure 30-20-48



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

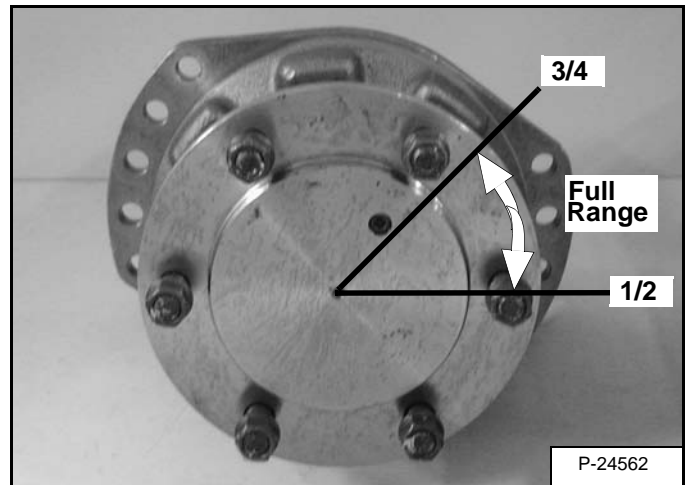


Remove the shaft seal (Item 1) [Figure 30-20-49].

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.

HYDROSTATIC PUMP (CONT'D)

Removal And Installation (Cont'd)

Figure 30-40-5

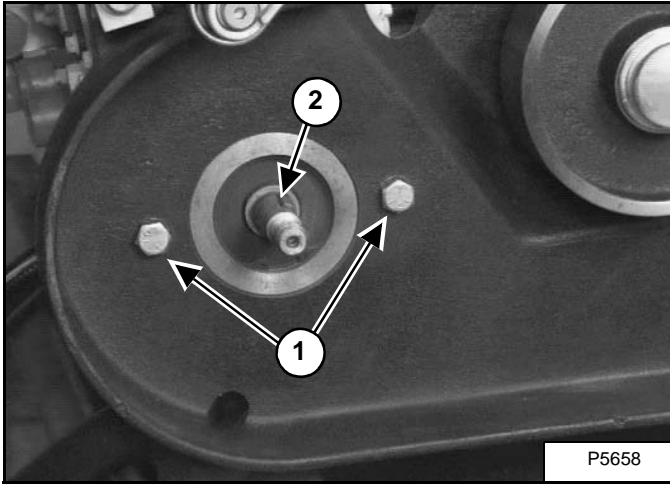
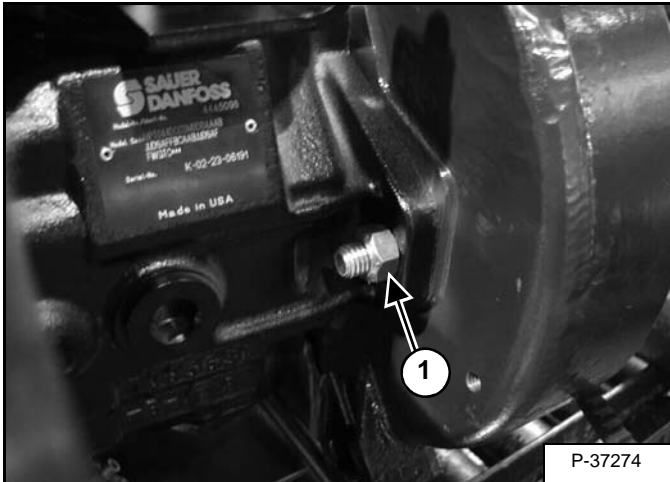


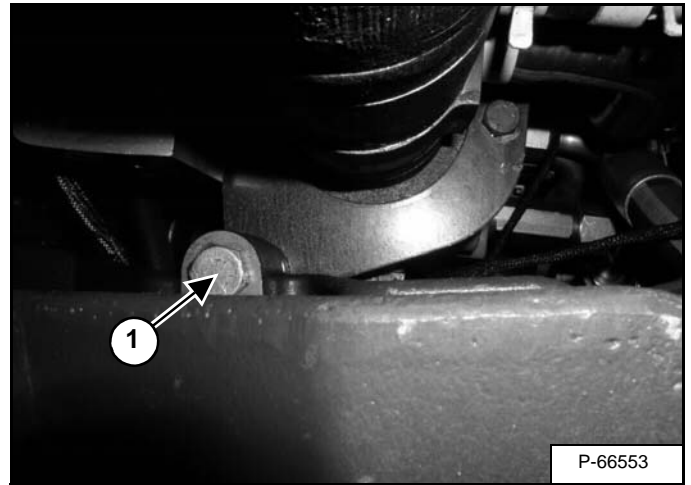
Figure 30-40-6



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 88 - 95 N•m (65 - 70 ft-lb) torque. Make sure the key (Item 2) [Figure 30-40-5] is installed.

Figure 30-40-7



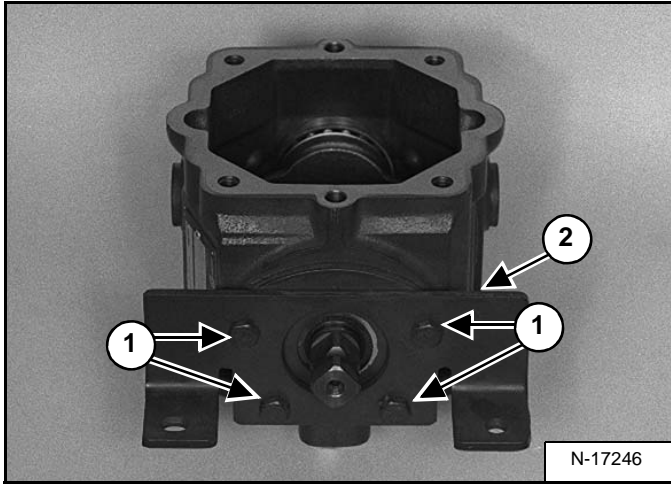
Remove the mounting bolt (Item 1) [Figure 30-40-7] at the hydraulic pump end of the pump.

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

HYDROSTATIC PUMP (CONT'D)

Disassembly (Cont'd)

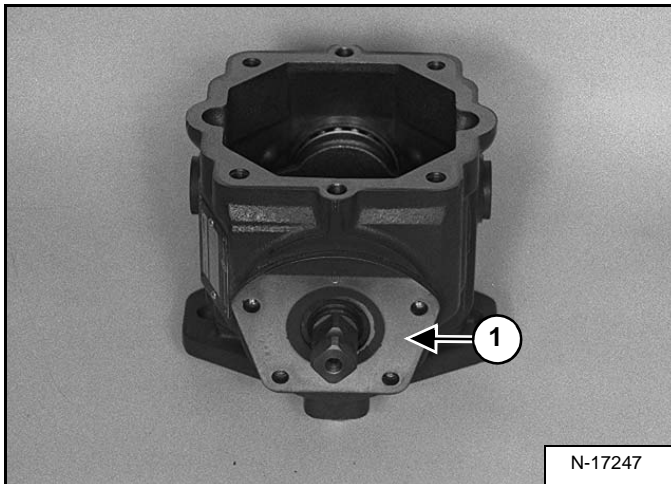
Figure 30-40-30



Inspect the dust seal on the pintle shaft.

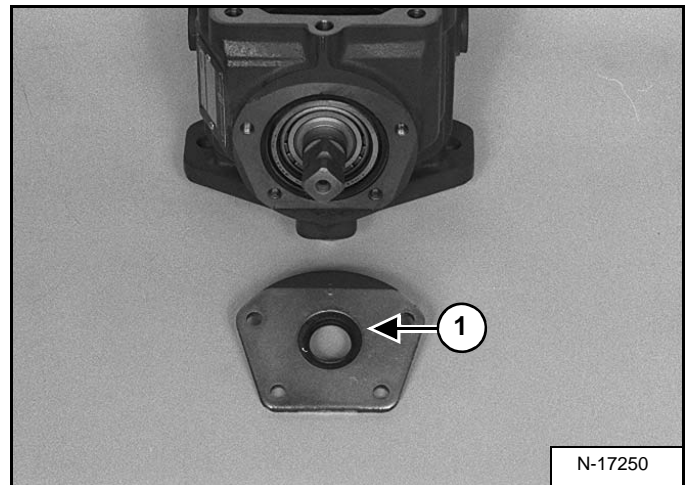
Remove the four mount bolts (Item 1) from the pump housing and remove the linkage bracket (Item 2) [Figure 30-40-30].

Figure 30-40-31



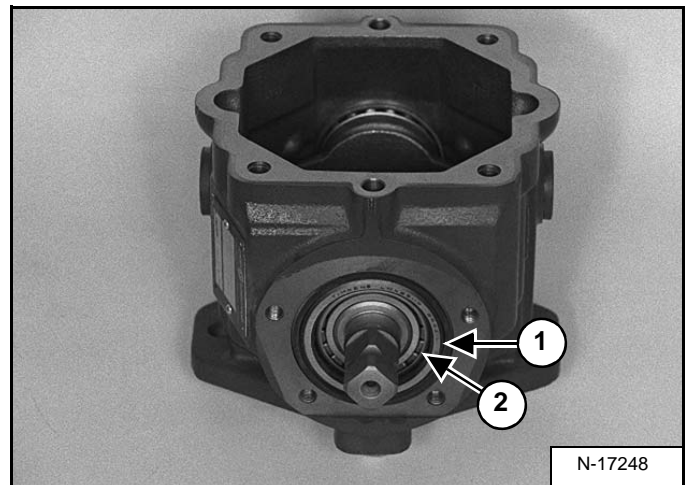
Remove the upper trunnion cover (Item 1) [Figure 30-40-31].

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

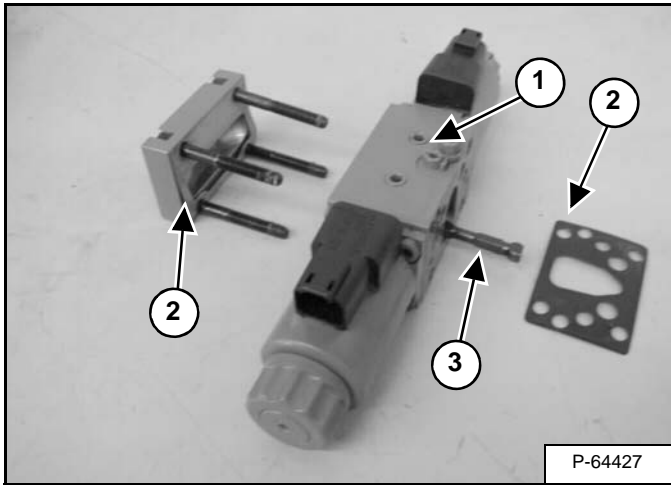


Remove the O-ring (Item 1) and bearing race (Item 2) [Figure 30-40-33] from the pump housing.

HYDROSTATIC PUMP (SJC) (S/N A5GS20001 - A5GS35021 AND A5GT20001 - A5GT35001) (CONT'D)

Hydraulic Controller Removal And Installation (Cont'd)

Figure 30-41-5

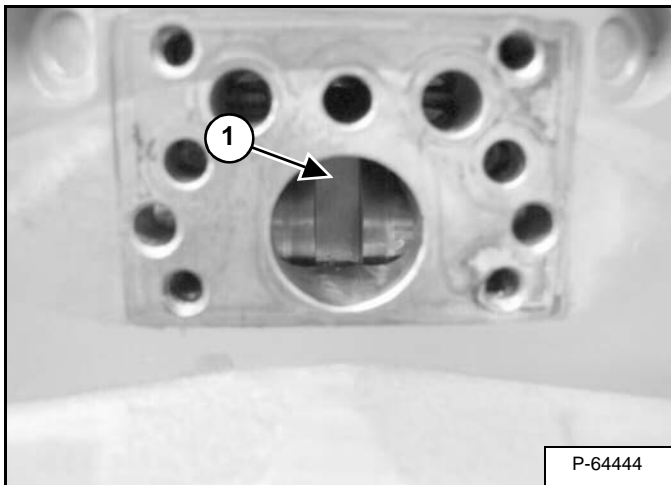


Remove the controller (Item 1) [Figure 30-41-5] from the pump.

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

Installation:

Figure 30-41-6

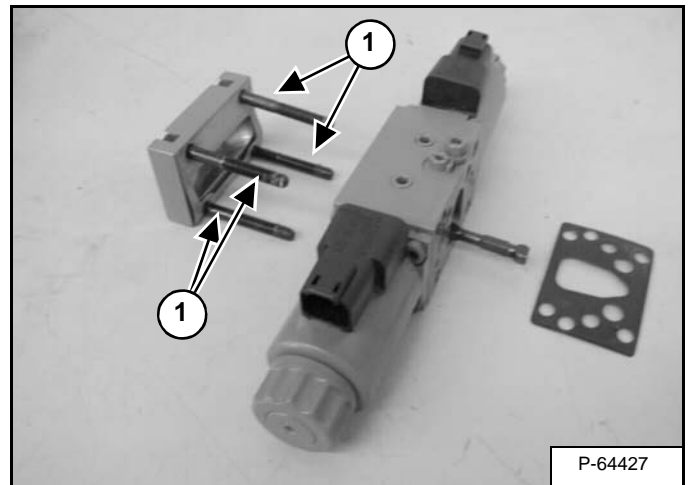


Be sure the feedback lever (Item 3) [Figure 30-41-5] is in the center of the servo piston groove (Item 1) [Figure 30-41-6].

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.

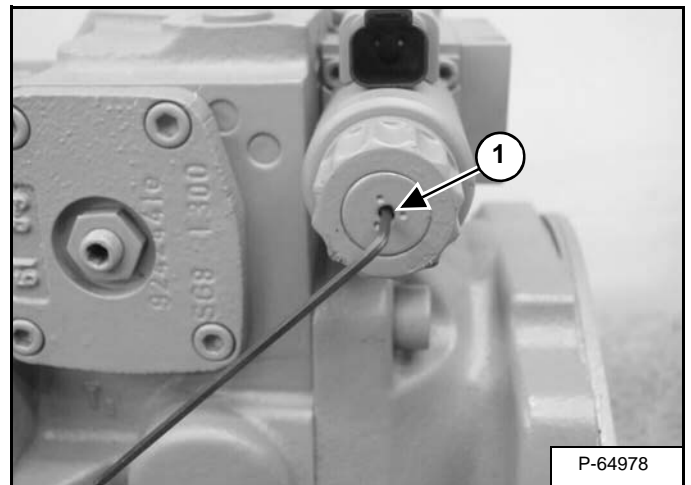
Figure 30-41-7



Alternately tighten bolts (Item 1) [Figure 30-41-7] to 10,4 N•m (7.7 ft-lb) 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



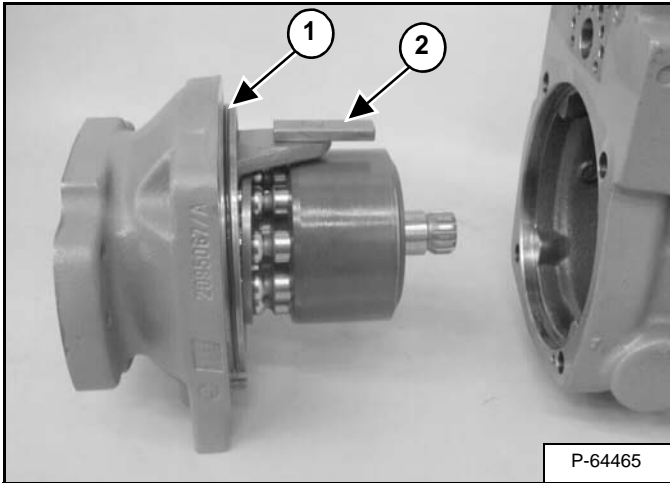
With the engine running and the loader on jack stands: Bleed the trapped air in the controller by loosening the small set screw (Item 1) [Figure 30-41-8] a maximum of 2 turns. Leave the screw loose until oil comes dripping out of the set screw. Tighten set screw to 2 N•m (18 in-lb) torque.

Repeat the bleeding procedure for all of the solenoids.

HYDROSTATIC PUMP (SJC) (S/N A5GS20001 - A5GS35021 AND A5GT20001 - A5GT35001) (CONT'D)

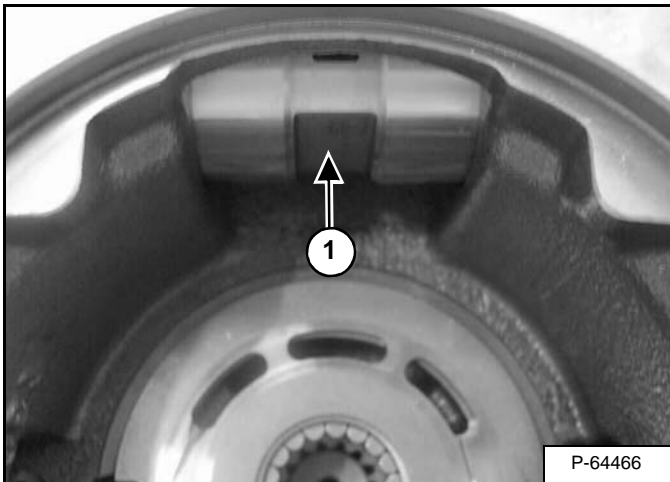
Disassembly And Assembly (Cont'd)

Figure 30-41-32



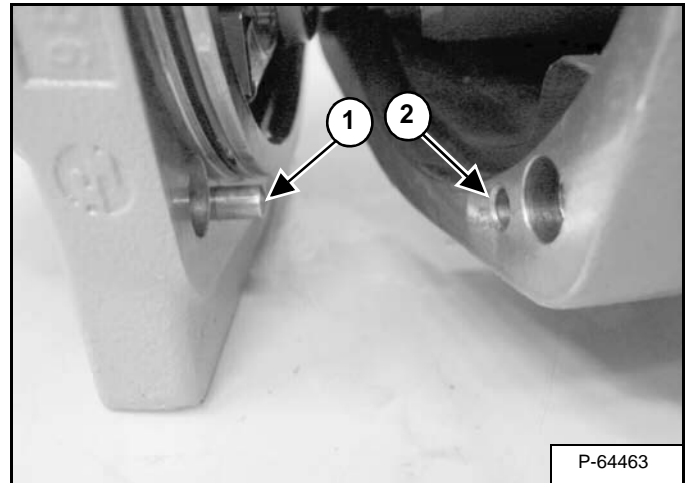
Replace O-ring (Item 1) [Figure 30-41-32].

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.

HYDROSTATIC PUMP (SJC) (S/N A5GS20001 - A5GS35021 AND A5GT20001 - A5GT35001) (CONT'D)

Disassembly And Assembly (Cont'd)

Figure 30-41-67

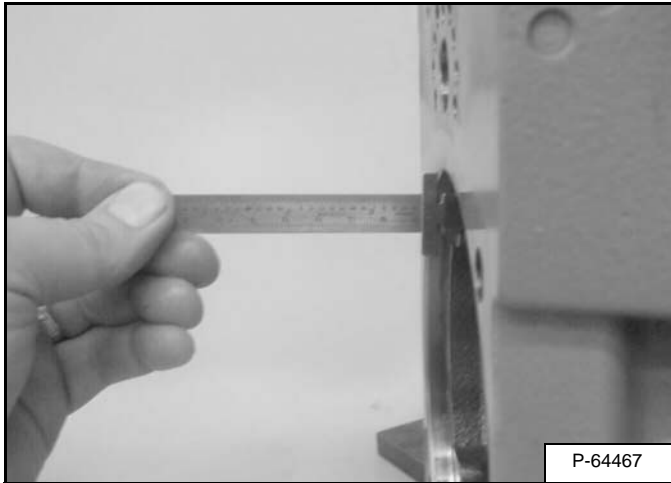
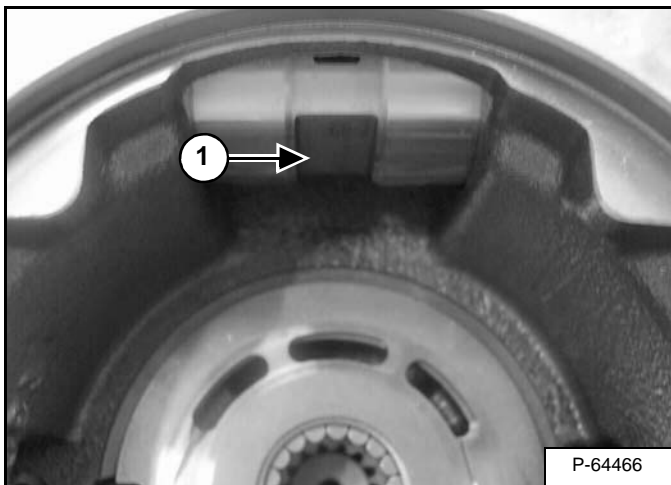
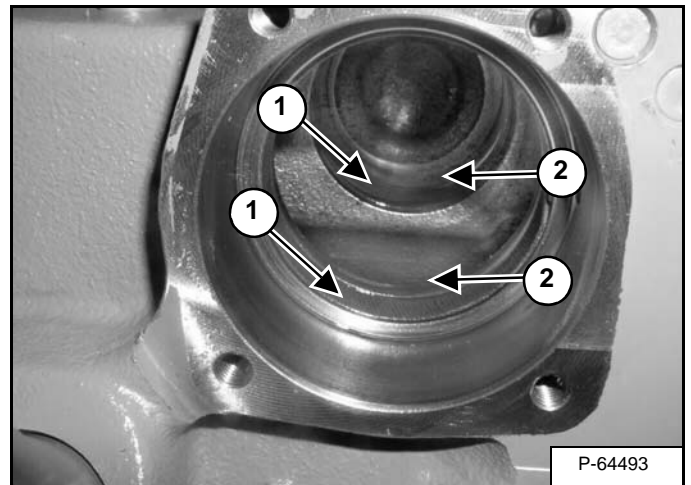


Figure 30-41-68



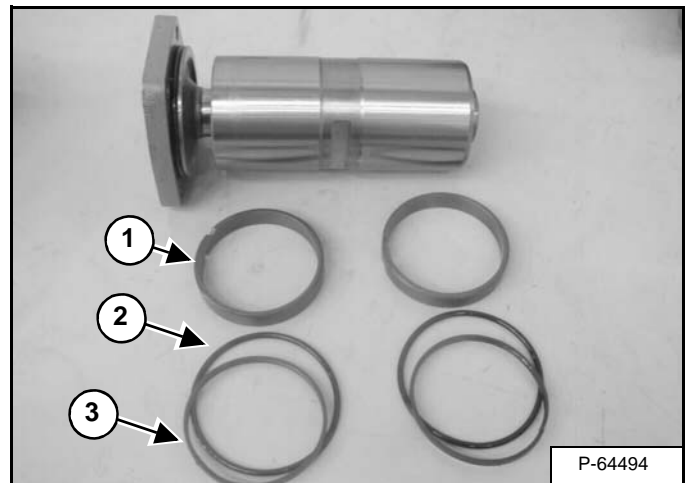
Assembly: Align the servo piston so the guide slot (Item 1) [Figure 30-41-68] is parallel to the driveshaft centerline. Measure with a straight-edge [Figure 30-41-67].

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 A5GS35022 & ABOVE AND A5GT35002 & 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.

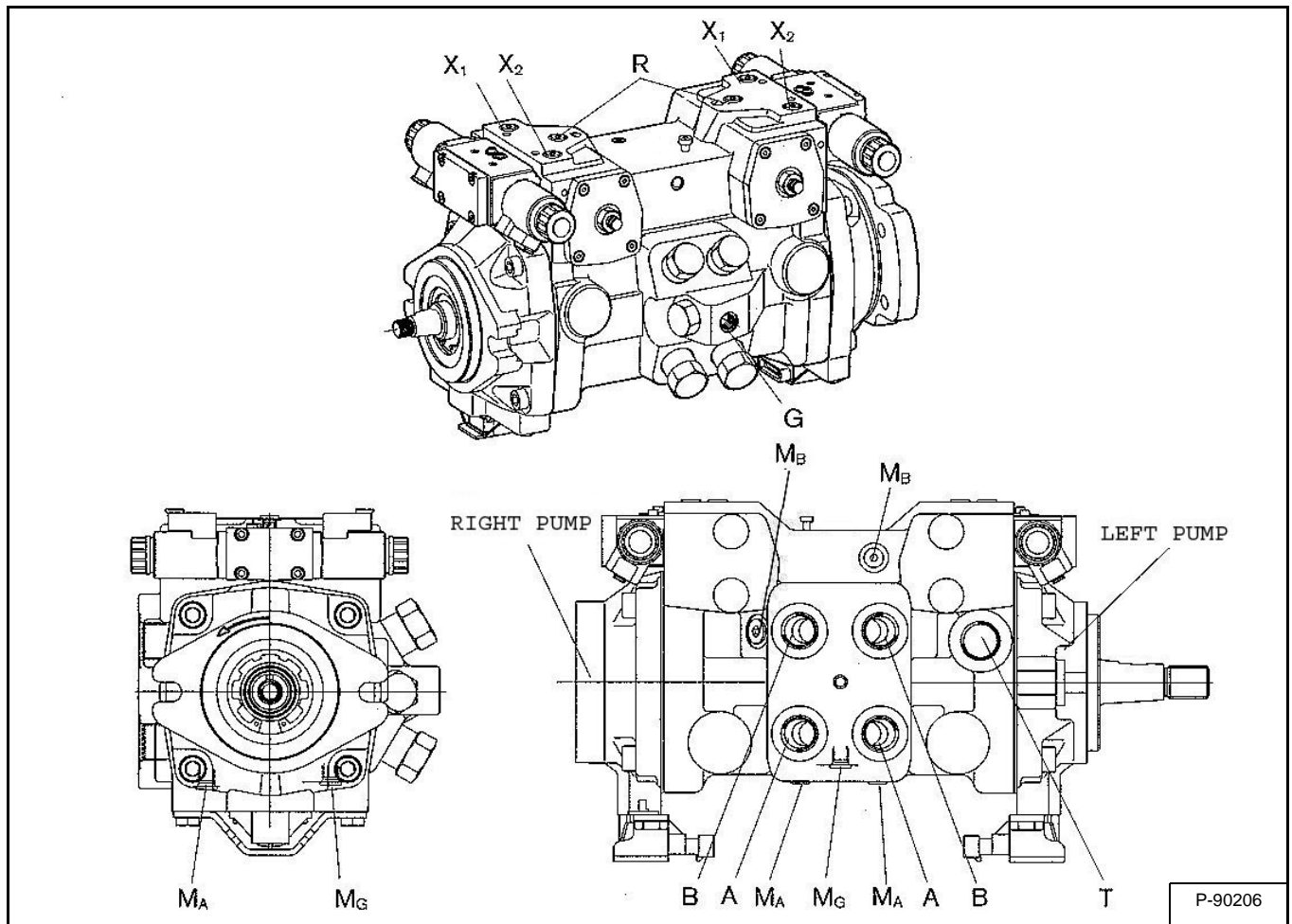
The hydraulic controllers are fed charge pressure from an external charge pump. 12 volt electrical solenoids shift a spool in the hydraulic controller that directs flow to a servo piston.

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

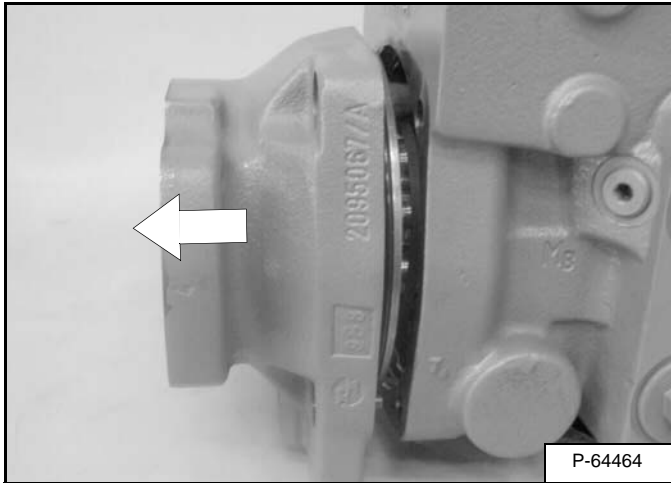


- A,B** Service Line Ports (High Pressure Outlet Ports to Drive Motors)
- T** Case Drain Port
- MA** Operating Pressure of "A" Port
- MB** Operating Pressure of "B" Port
- R** Air Bleed Port
- X1,X2** Control Pressure Gauge Port
- G** Charge Pressure Inlet Port
- MG** Gauge Port For Charge Pressure

HYDROSTATIC PUMP (SJC) (S/N A5GS35022 & ABOVE AND A5GT35002 & ABOVE) (CONT'D)

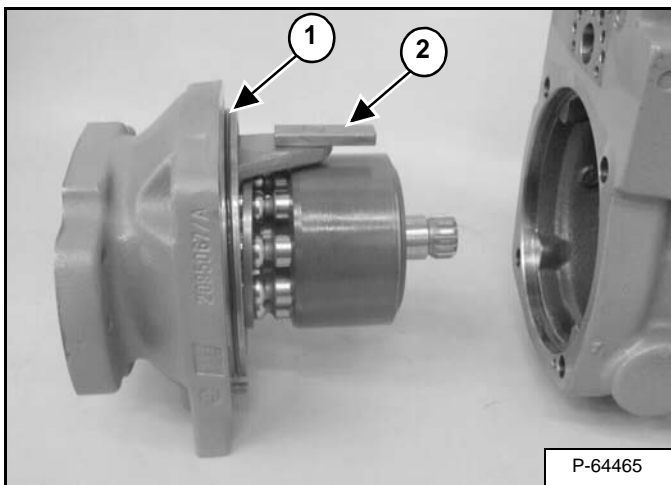
Disassembly And Assembly (Cont'd)

Figure 30-42-26



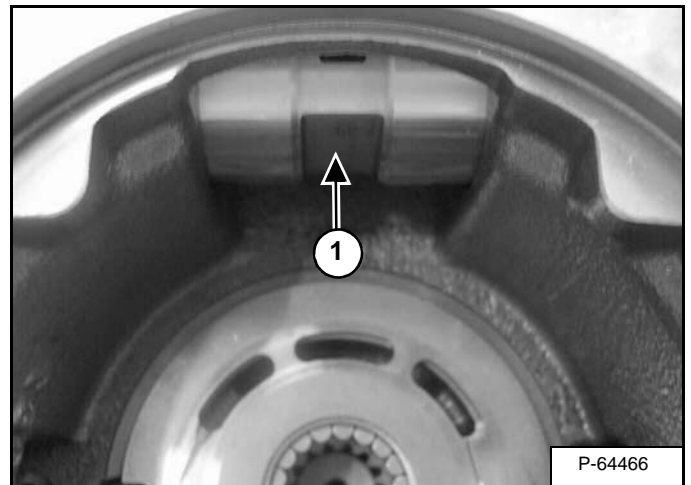
Pull the end housings from the case housing [Figure 30-42-26].

Figure 30-42-27



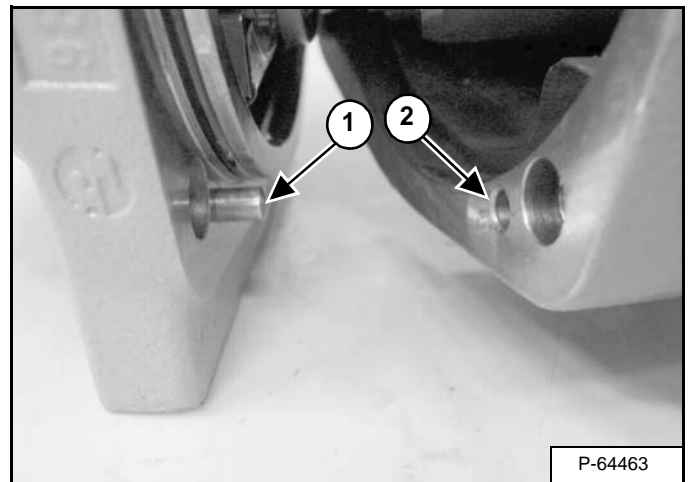
Replace O-ring (Item 1) [Figure 30-42-27].

Figure 30-42-28



Ensure servo follower (Item 2) [Figure 30-42-27] is swung out for proper engagement with the notch in the servo piston (Item 1) [Figure 30-42-28].

Figure 30-42-29

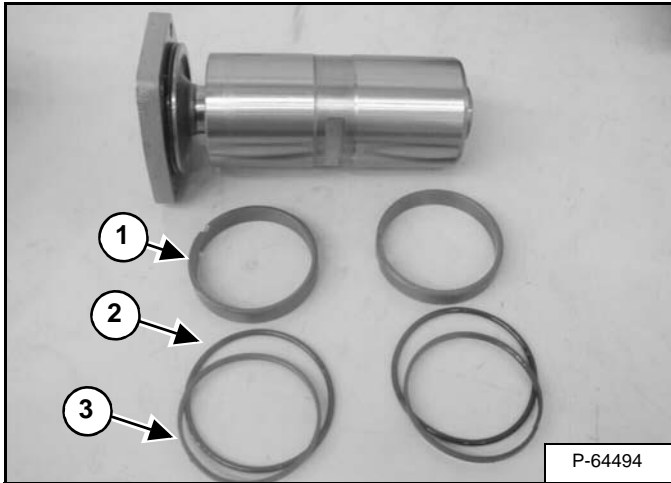


Assembly: Ensure dowel pin (Item 1) is aligned with hole in case housing (Item 2) [Figure 30-42-29] before tightening screws.

HYDROSTATIC PUMP (SJC) (S/N A5GS35022 & ABOVE AND A5GT35002 & ABOVE) (CONT'D)

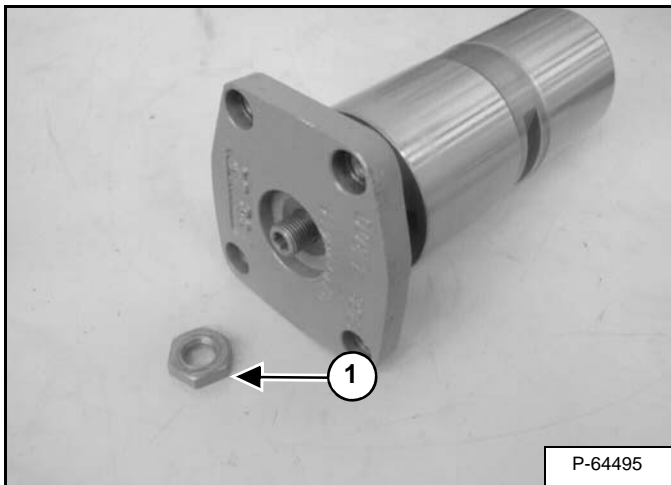
Disassembly And Assembly (Cont'd)

Figure 30-42-64



Each servo has a pair of bushings (Item 1), O-rings (Item 2) and square-cut seals (Item 3) [Figure 30-42-64].

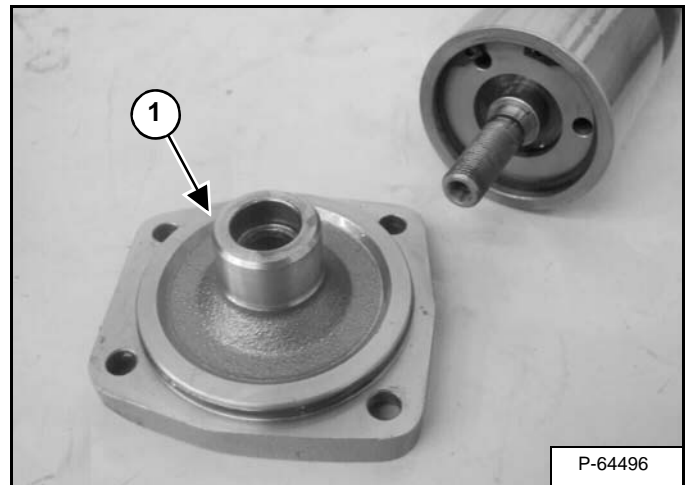
Figure 30-42-65



Remove the lock nut (Item 1) [Figure 30-42-65] from the servo piston.

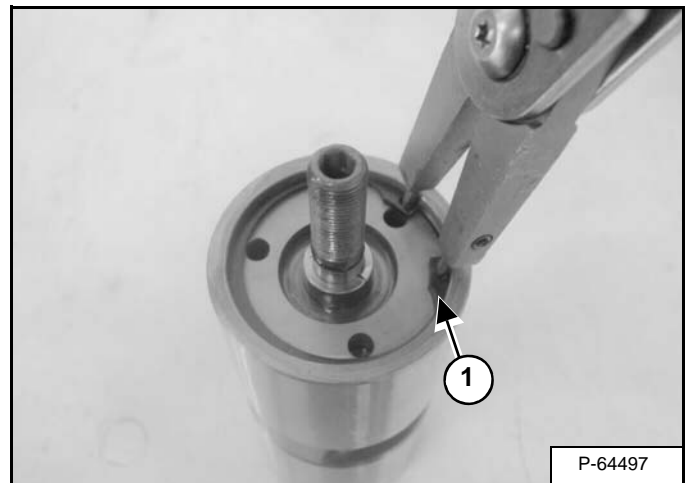
Assembly: Tighten lock nut to 30 N•m (22 ft-lb) torque.

Figure 30-42-66



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

Figure 30-42-67

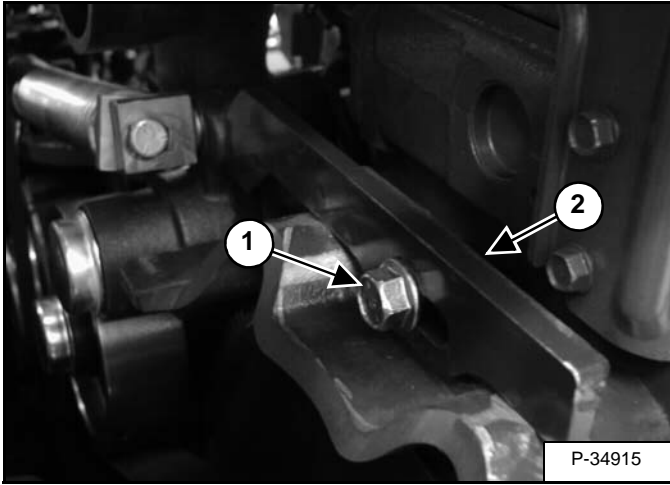


Remove snap ring (Item 1) [Figure 30-42-67] from the servo piston.

DRIVE BELT (CONT'D)

Tensioner Pulley Removal And Installation

Figure 30-50-6



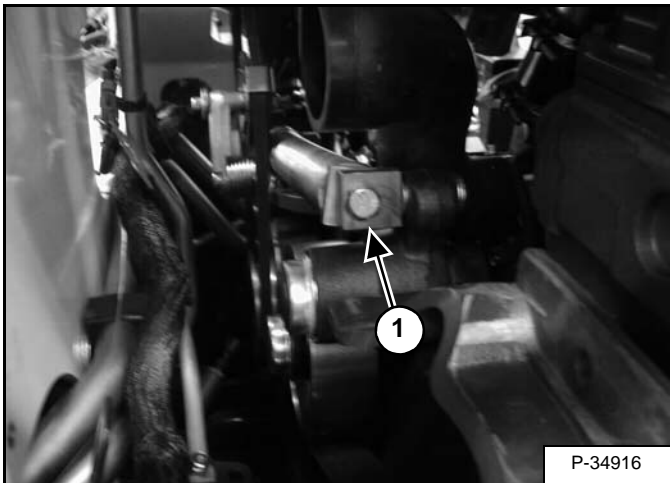
Remove the belt shield. (See Shield Removal And Installation on Page 30-50-1.)

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

Remove the stop mounting bolt (Item 1) [Figure 30-50-6].

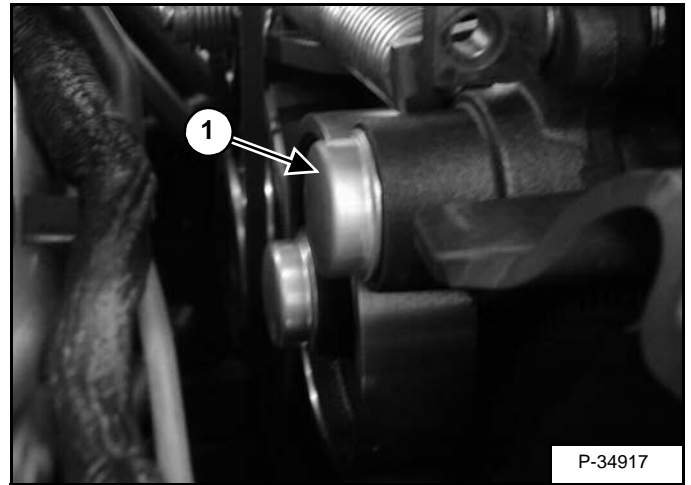
Remove the stop (Item 2) [Figure 30-50-6].

Figure 30-50-7



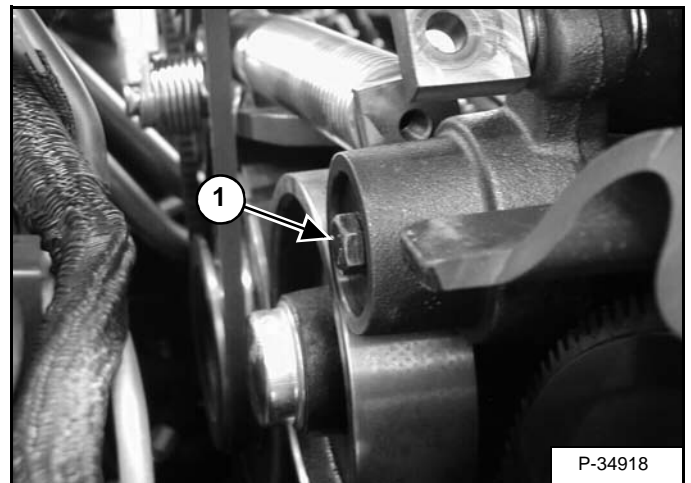
Remove the spring tension bolt (Item 1) [Figure 30-50-7].

Figure 30-50-8



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

Figure 30-50-9

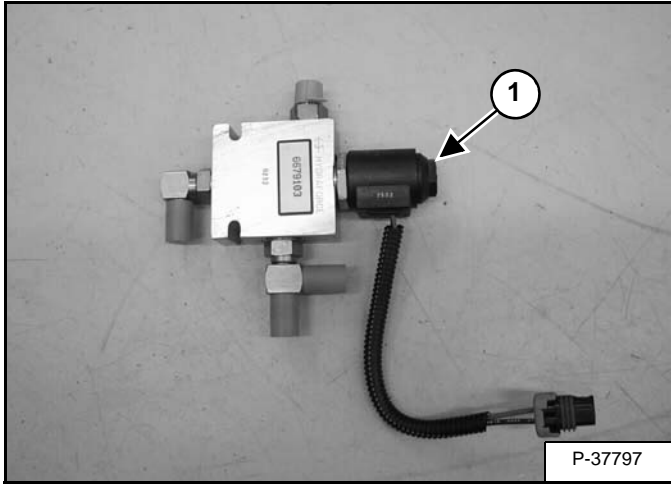


Remove the mounting bolt (Item 1) [Figure 30-50-9] from the tension pulley arm.

BRAKE (CONT'D)

Block Disassembly And Assembly

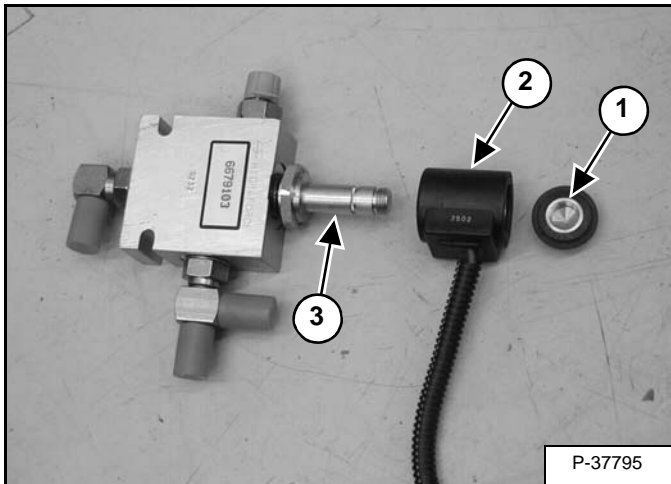
Figure 40-10-5



Loosen the electrical brake solenoid nut (Item 1) [Figure 40-10-5].

Assembly: Tighten the solenoids nut to 1,02 - 1,36 N•m (9 - 12 in-lb) torque.

Figure 40-10-6

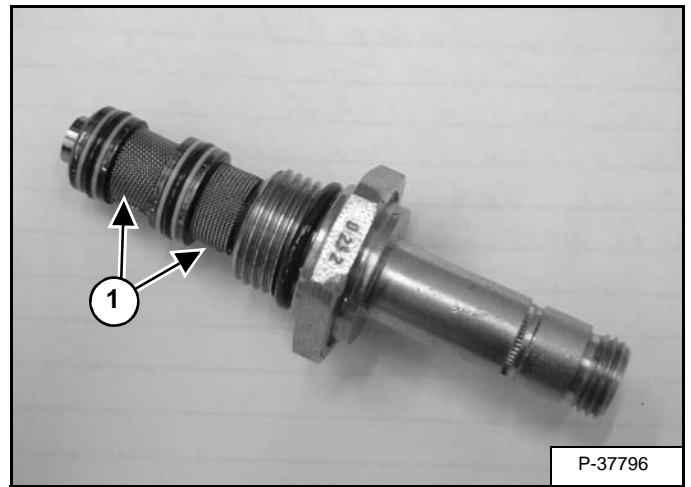


Remove the solenoid nut (Item 1) and solenoid coil (Item 2) [Figure 40-10-6].

Installation: Tighten the solenoid nut 5,4 - 6,8 N•m (48 - 60 in-lb) torque.

Remove the solenoid valve (Item 3) [Figure 40-10-6] from the block.

Figure 40-10-7



Inspect the O-rings and back-up washer on the solenoid valve and replace as needed [Figure 40-10-7].

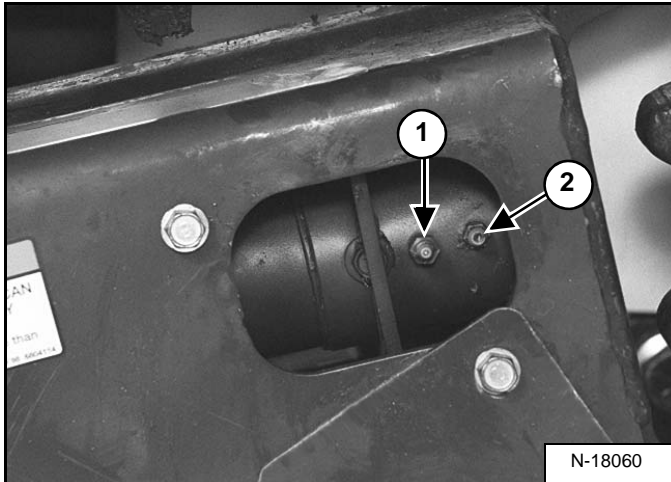
Check the screens (Item 1) [Figure 40-10-7] and clean with solvent.

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

**TRACK UNDERCARRIAGE (SOLID-MOUNTED)
(RUBBER TRACK) (S/N A5GS20261 & BELOW AND
A5GT20079 & BELOW) (CONT'D)**

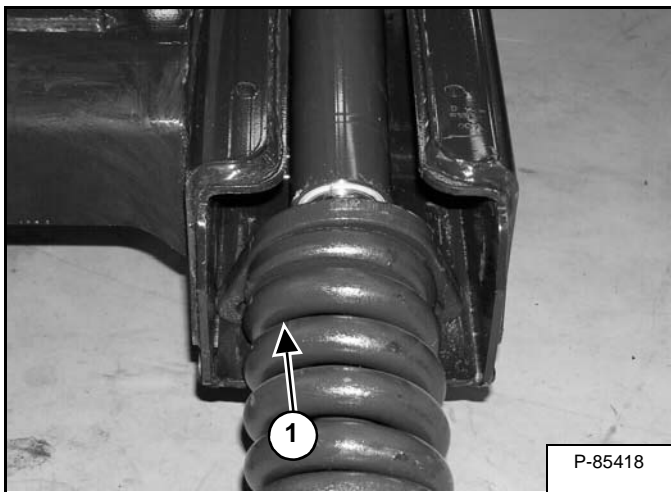
**Idler (Front) Removal And Installation (S/N
A5GS20168 & Above And A5GT20065 & Above)
(Cont'd)**

Figure 40-20-20



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

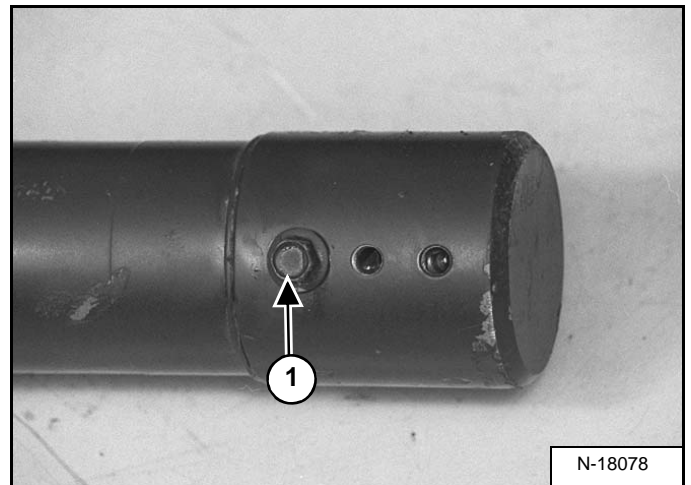
Figure 40-20-21



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

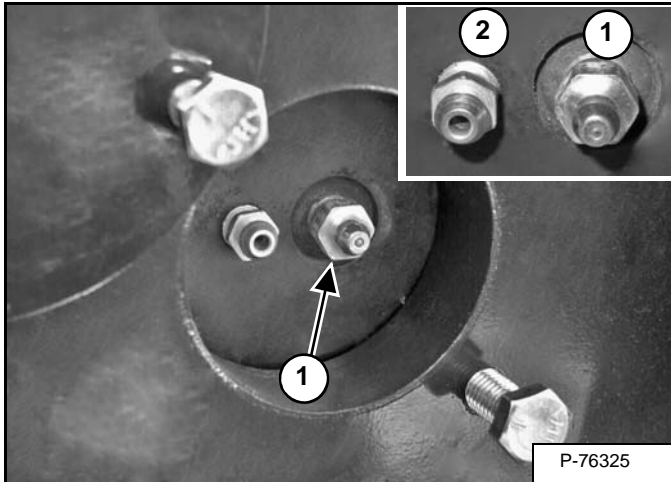


NOTE: When installing the track tensioner, verify the grease fitting holes and alignment bolt (Item 1) [Figure 40-20-22] are pointed to the outside of the track housing.

**TRACK UNDERCARRIAGE (SOLID-MOUNTED)
(RUBBER TRACK) (S/N A5GS20262 & ABOVE AND
A5GT20080 & ABOVE) (CONT'D)**

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 adjustment 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

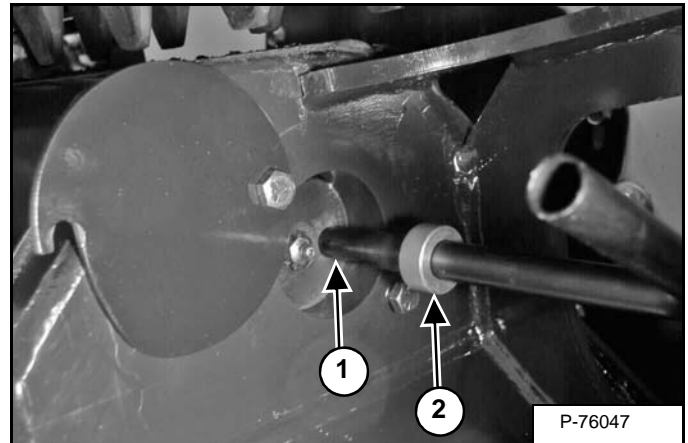


**HIGH PRESSURE GREASE CAN
CAUSE SERIOUS INJURY**

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

W-2781-0109

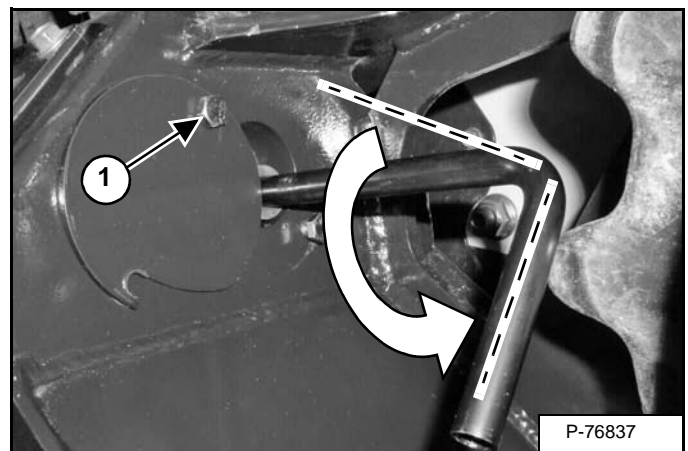
Figure 40-21-7



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 90° 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 UNDERCARRIAGE (SOLID-MOUNTED)
(RUBBER TRACK) (S/N A5GS20262 & ABOVE AND
A5GT20080 & ABOVE) (CONT'D)**

Track Housing Removal And Installation

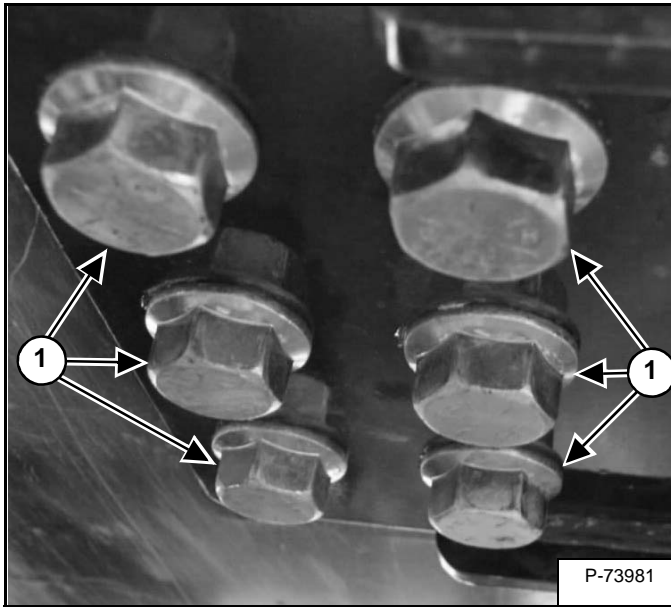
NOTE: Jackstands used when removing the track must not interfere with track housing removal.

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.)

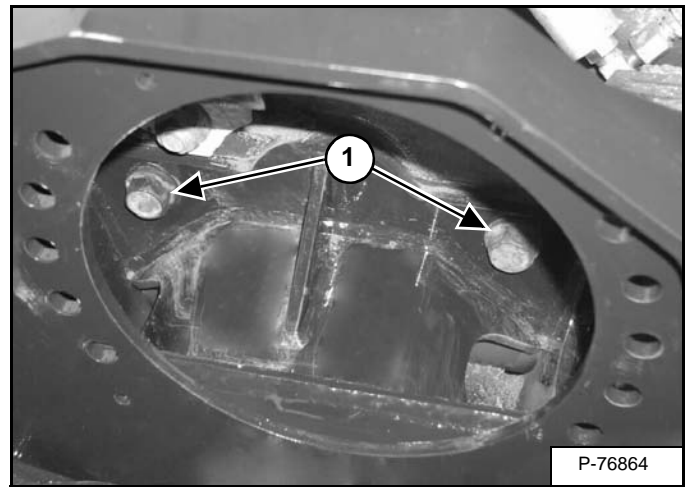
Support the track housing.

Figure 40-21-28



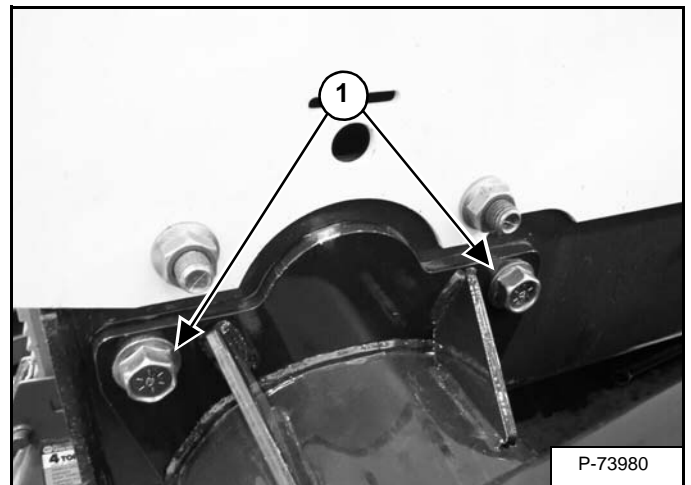
Remove the six mount bolts (Item 1) [Figure 40-21-28] from the bottom track housing mount plate. (At the front and rear of the loader.)

Figure 40-21-29



At the rear of the loader remove the two mount bolts (Item 1) [Figure 40-21-29].

Figure 40-21-30



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

Remove the track housing from the loader.

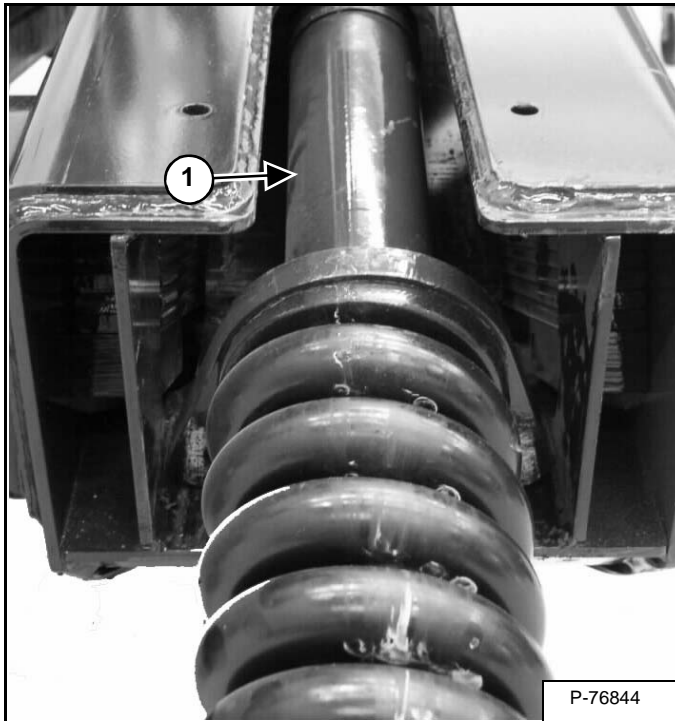
Installation: Tighten the 16 mount bolts to 410 - 450 N•m (300 - 330 ft-lb) torque.

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

**TRACK UNDERCARRIAGE (ROLLER SUSPENSION)
(RUBBER TRACK) (CONT'D)**

**Idler (Front) Removal And Installation (S/N
A5GS20085 & Above And A5GT20051 & Above)**

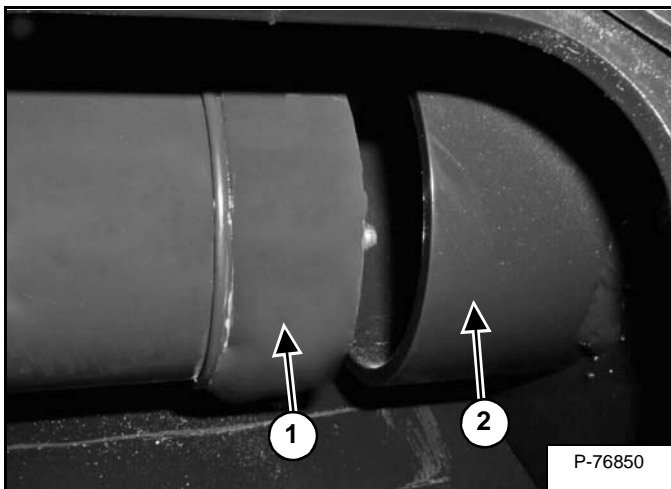
Figure 40-22-21



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

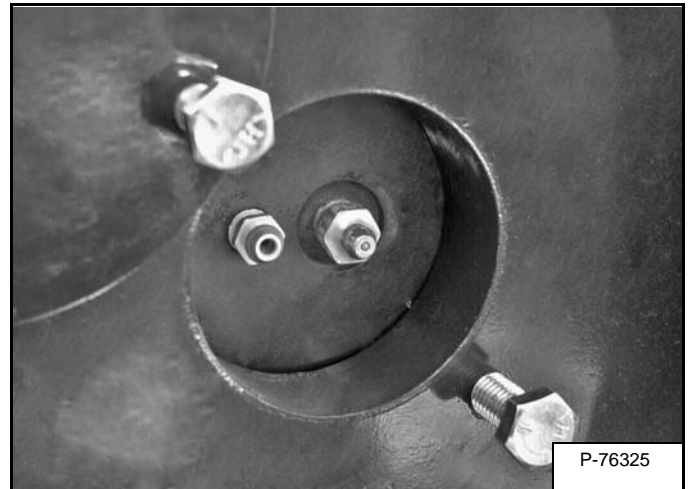
Installation: Track tensioner must be oriented as shown in [Figure 40-22-21] before sliding it into the track housing.

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

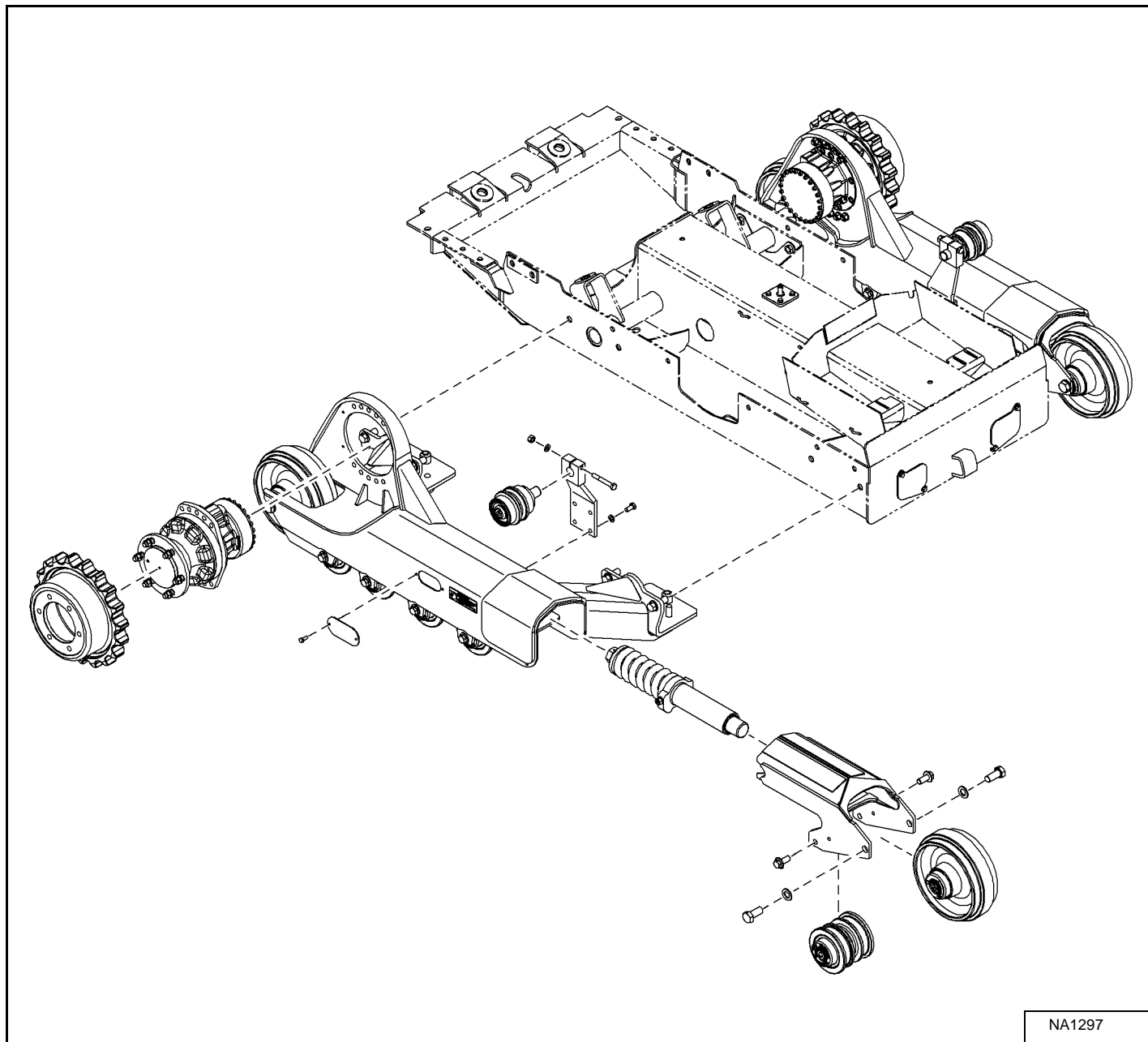


Installation: Track tensioner must be seated properly against the end of the track housing [Figure 40-22-23].

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].

CLICK HERE TO **DOWNLOAD** THE COMPLETE MANUAL

- Thank you very much for reading the preview of the manual.
- You can download the complete manual from: www.heydownloads.com by clicking the link below



- Please note: If there is no response to CLICKING the link, please download this PDF first and then click on it.

CLICK HERE TO **DOWNLOAD** THE COMPLETE MANUAL

TRACK UNDERCARRIAGE (STEEL TRACK) (CONT'D)

Track Tensioner Disassembly And Assembly (Cont'd)



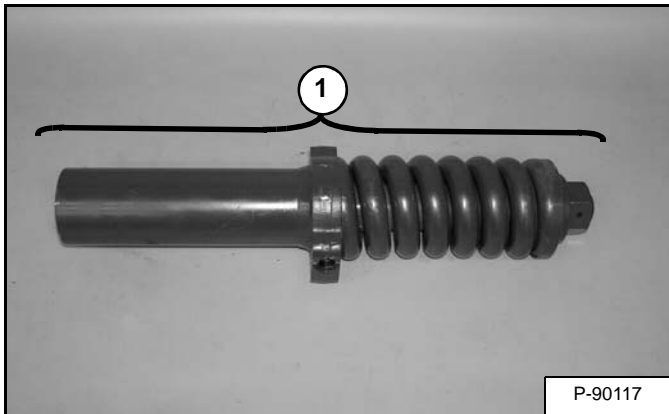
P-62574

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



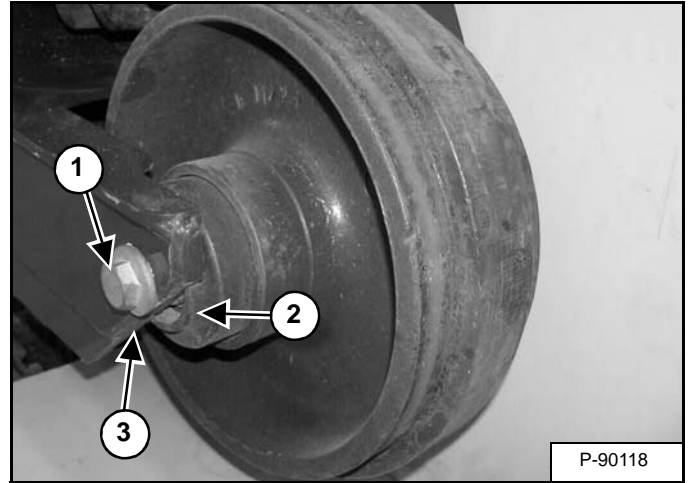
DO NOT DISASSEMBLE OR REPAIR THE COIL SPRING ASSEMBLY. THE COMPRESSION FORCE OF THE SPRING EXCEEDS 6350 kg (14,000 lb).

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 1140 - 1275 N•m (840 - 940 ft-lb) torque.

TRACK MAINTENANCE (RUBBER TRACK) (CONT'D)

Track Damage Identification (Cont'd)

Cracks On The Lug Side Rubber Due To Fatigue

Figure 40-30-16

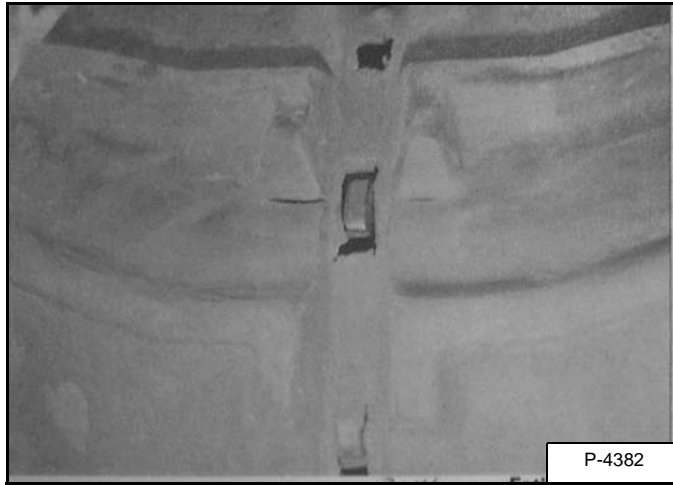
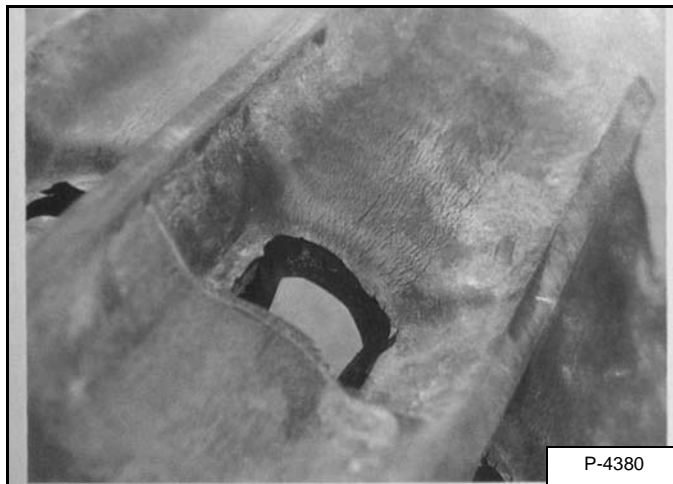


Figure 40-30-17



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

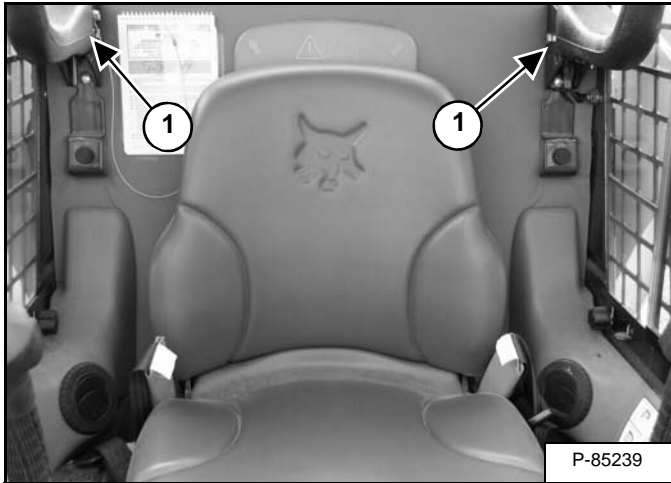
Description

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.

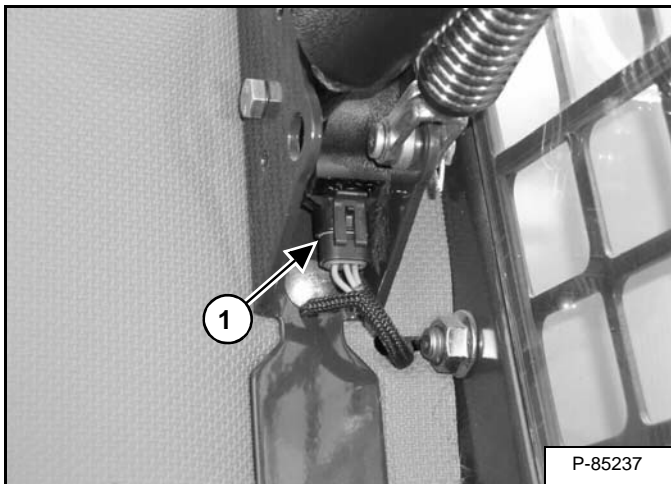
Removal And Installation

Figure 50-10-1



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

Figure 50-10-2

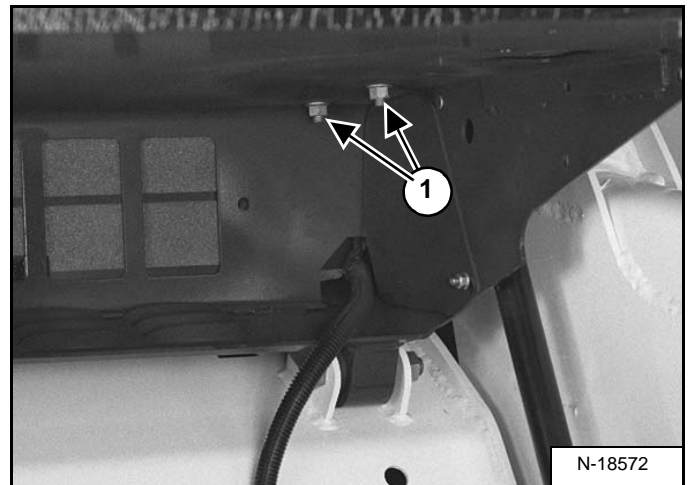


Disconnect the seat bar sensor (Item 1) [Figure 50-10-2] from the cab harness.

Lower the seat bar.

Raise the operator cab. (See Raising on Page 10-30-2.)

Figure 50-10-3



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

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

Lower the operator cab. (See Lowering on Page 10-30-3.)

Figure 50-10-4



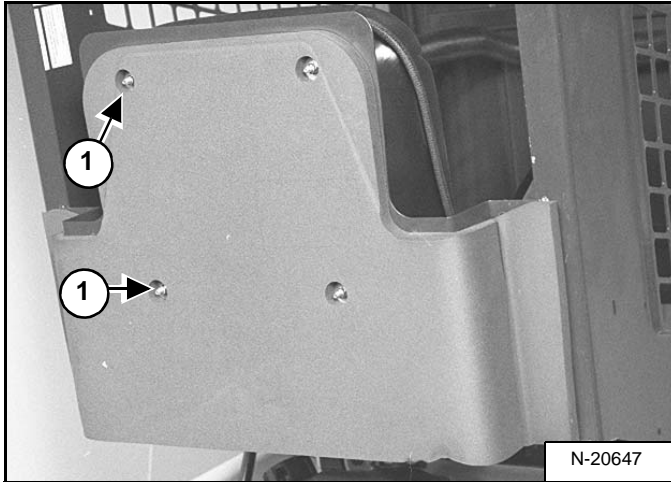
Remove the seat bar (Item 1) [Figure 50-10-4] from the operator cab.

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

OPERATOR SEAT (SUSPENSION)

Removal And Installation

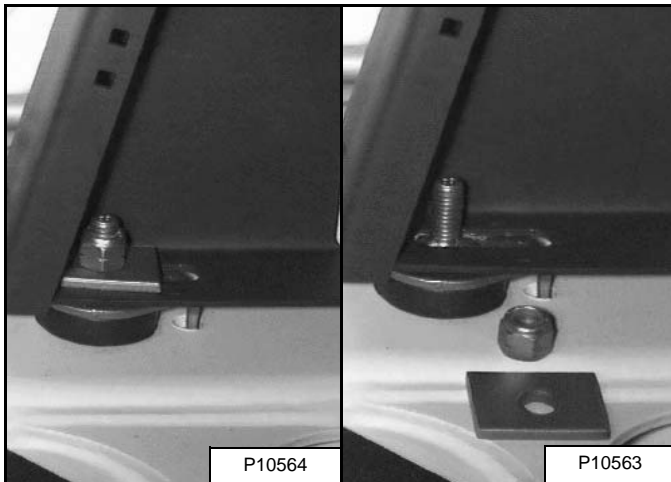
Figure 50-30-1



Raise the operator cab. (See Raising on Page 10-30-2.)

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

Figure 50-30-2

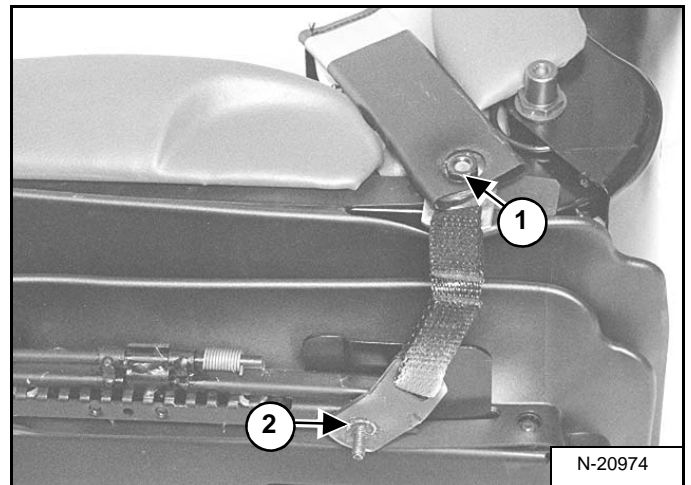


Lower the cab and install one of the mounting washer and nut [Figure 50-30-2].

NOTE: With the seat removed the cab will raise.

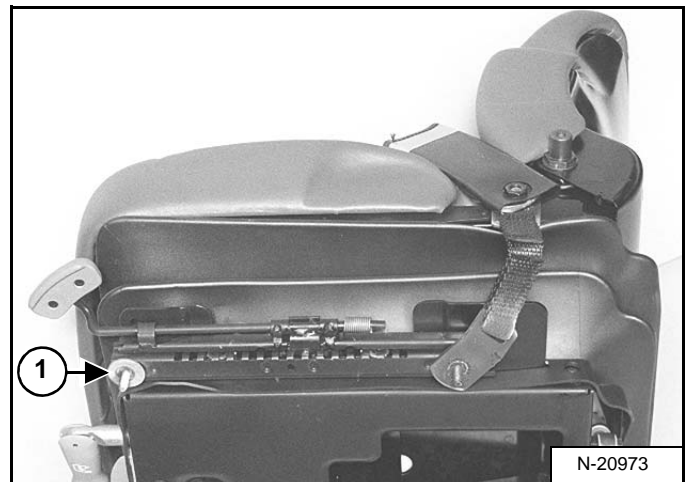
Reverse the removal procedure to install the operator seat.

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].

BOB-TACH (POWER)

Description

The Bob-Tach is the section of the loader lift arm that attachments mount to. The Power Bob-Tach option uses two hydraulically operated, spring assisted, locking wedge and lever assemblies to secure the attachment to the Bob-Tach.

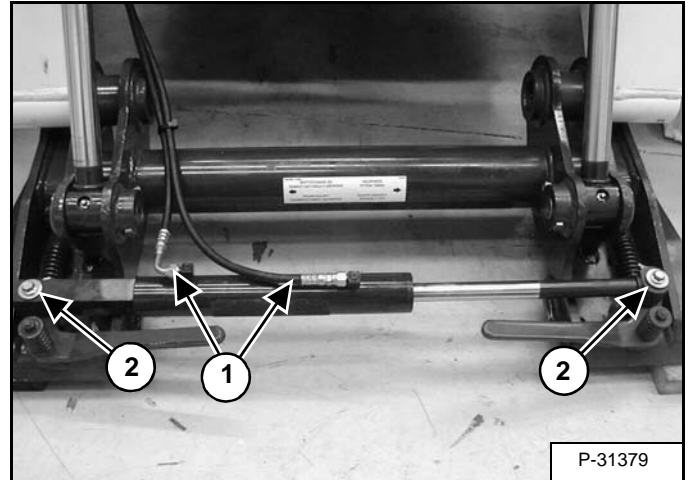
The hydraulically operated Power Bob-Tach has a hydraulic cylinder that opens and closes both wedge and lever assemblies by pressing a switch on the front accessory panel. The switch activates the Power Bob-Tach block to allow flow into or out of the hydraulic cylinder connected to the levers on the Bob-Tach.

The Power Bob-Tach block is located on the rear of the gear pump.

The Bob-Tach is located on the front of the loader connected to the loader lift arms.

Removal And Installation

Figure 50-41-1



Tilt the Bob-Tach forward, so it is parallel to the floor. Put 2x4 blocks under each side of the Bob-Tach [Figure 50-41-1].

Lower the Bob-Tach onto the blocks.

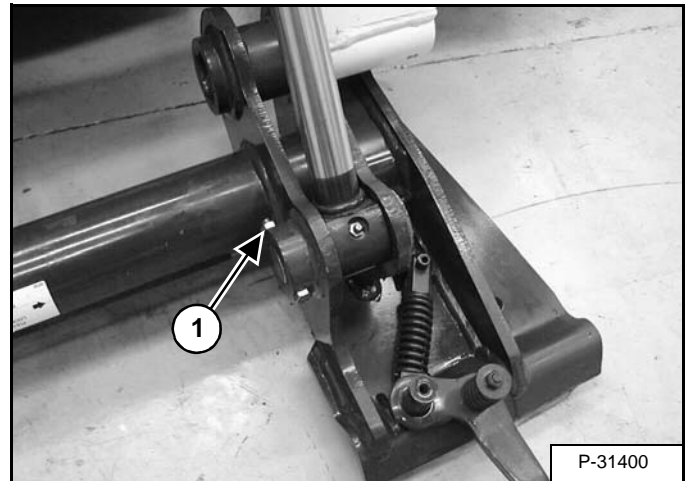
Mark the hoses (Item 1) [Figure 50-41-1] for correct installation.

Remove the hoses from the cylinder fittings.

Remove the mount bolt (Item 2) [Figure 50-41-1] from the cylinder (both ends).

Remove the cylinder from the Bob-Tach.

Figure 50-41-2

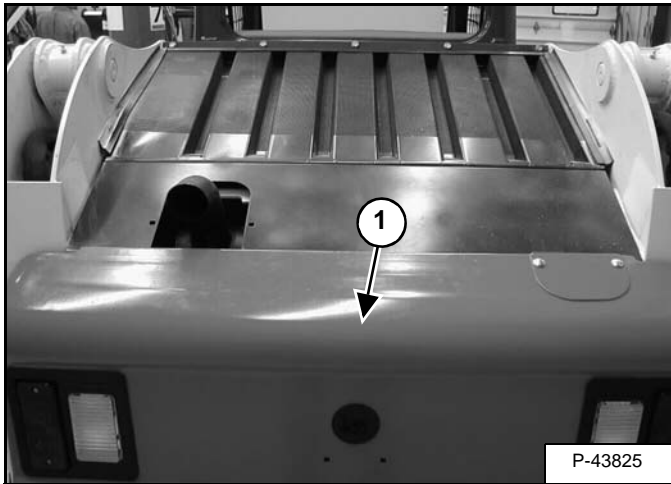


Remove the retainer nut and bolt (Item 1) [Figure 50-41-2] from the tilt cylinder rod end pin (both sides).

REAR GRILLE

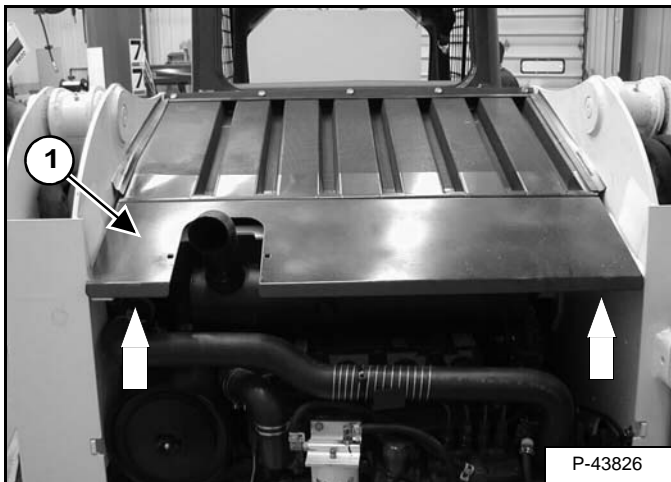
Removal And Installation

Figure 50-60-1



Open the rear door (Item 1) [Figure 50-60-1].

Figure 50-60-2



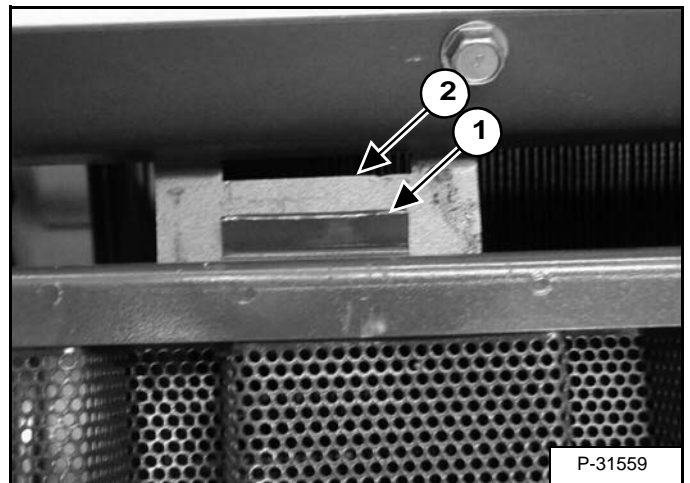
Lift the rear grille assembly (Item 1) [Figure 50-60-2] over the muffler.

Figure 50-60-3



Lift and pull the rear grille and remove it from the loader [Figure 50-60-3].

Figure 50-60-4



Installation: Insert the tab on the rear grille (Item 1) into the notch (Item 2) [Figure 50-60-4] on the loader frame. (Both sides.)

CONTROL PEDALS AND LINKAGES

Description

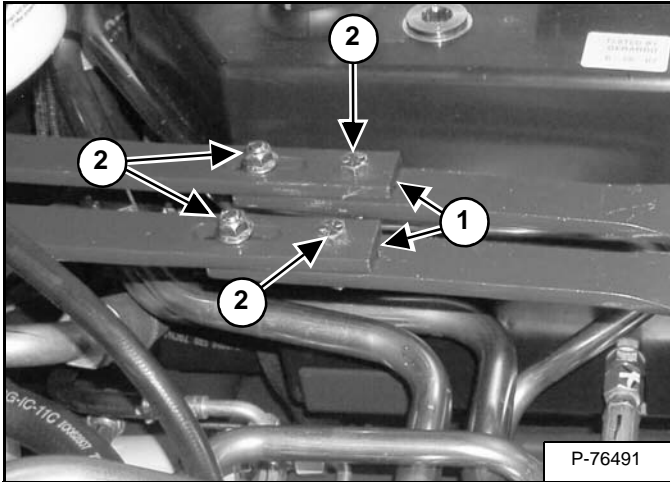
The control pedals and linkages are connected to the control valve. The control pedals will mechanically move the lift and tilt spools on the control valve.

The control pedals and linkages are located on the lower mainframe at the operators feet.

CONTROL PANEL (CONT'D)

Removal And Installation (Cont'd)

Figure 50-100-4

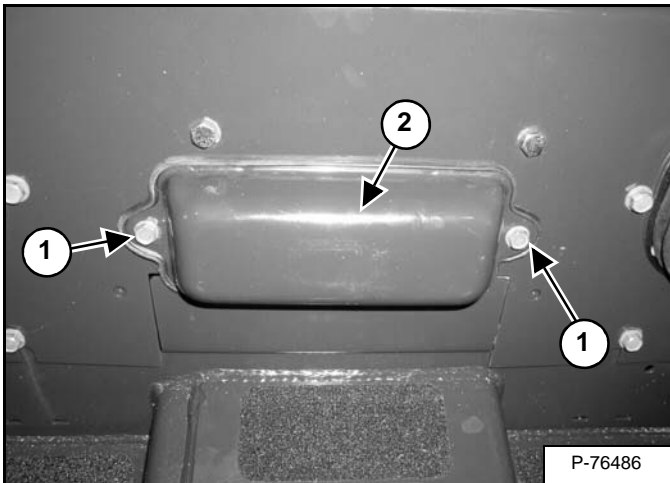


Scribe a mark across the top of the steering linkage bars (Item 1) [Figure 50-100-4] which are connected to the steering shaft on the control panel.

Remove the four steering linkage mounting bolts (Item 2) [Figure 50-100-4].

Installation: Align the marks on the steering linkage bars. Tighten the steering linkage mounting bolts to 47,5 - 54,2 N•m (35 - 40 ft-lb) torque.

Figure 50-100-5



Remove the fuse / relay mounting bolts (Item 1) [Figure 50-100-5].

Remove the fuse / relay cover (Item 2) [Figure 50-100-5].

Figure 50-100-6

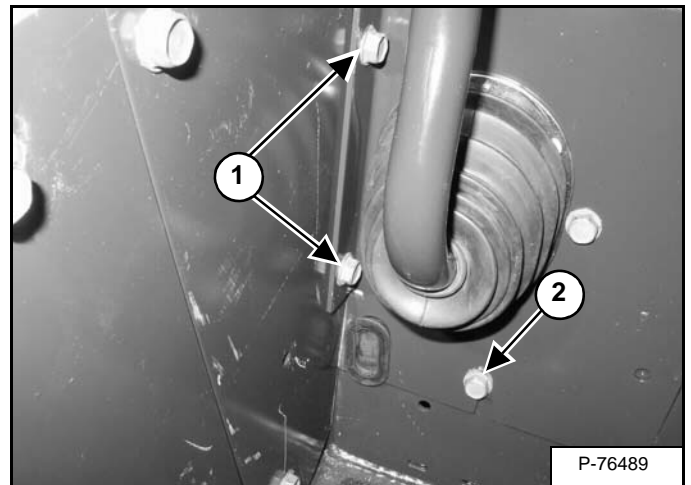
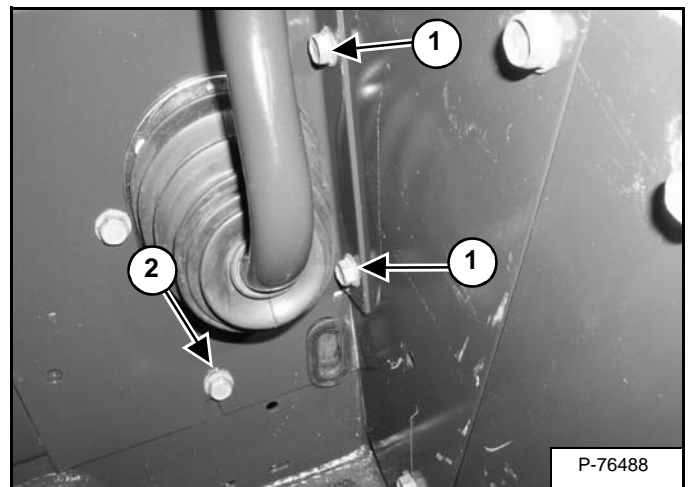


Figure 50-100-7



Remove the control panel mounting bolts (Item 1 and 2) [Figure 50-100-6] and [Figure 50-100-7] from both sides of the control panel.

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

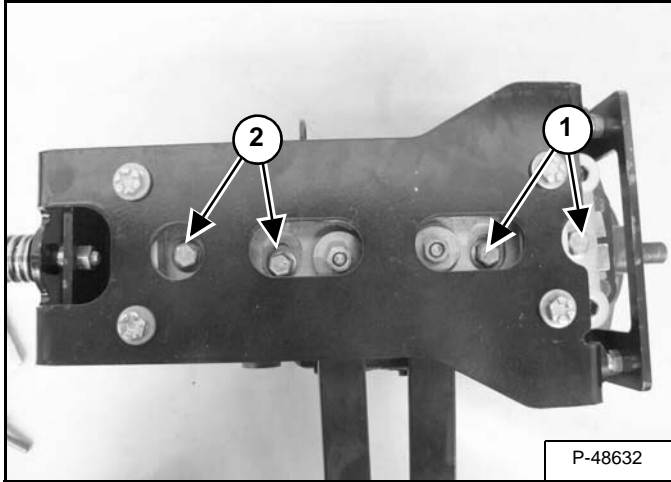
NOTE: Install the bottom bolts (Item 2) [Figure 50-100-6] and [Figure 50-100-7] through the hole in the control panel, do not install them in the slotted area.

CONTROL PANEL (CONT'D)

Linkage Neutral (Adjusting) (Cont'd)

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

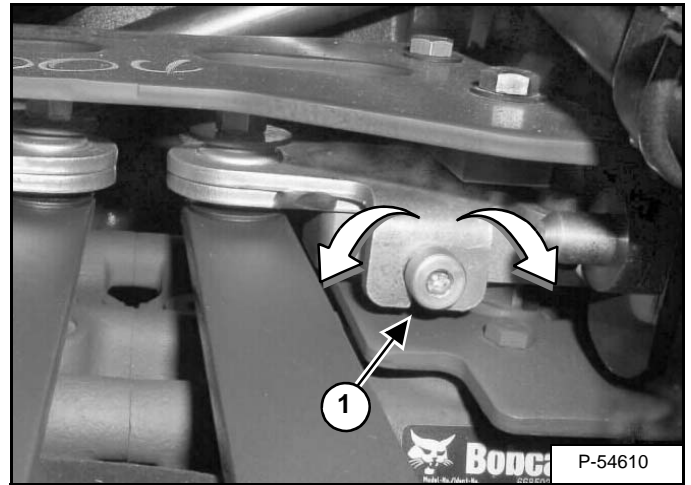
Figure 50-100-31



Loosen the left pump pintle adjustment lock bolts (Item 1). (The right pump pintle adjustment lock bolts are (Item 2) [Figure 50-100-31].) Loosen the bolts enough to allow free movement between the pintle arm and the pintle base.

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

Figure 50-100-32



Move the engine speed control to high idle.

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

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

Turn the adjustment screw (Item 1) [Figure 50-100-32] counterclockwise until forward creep is seen.

Turn the adjustment screw (Item 1) [Figure 50-100-32] counterclockwise to a point between forward and reverse where there is zero creep.

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

CONTROL HANDLE / LEVER

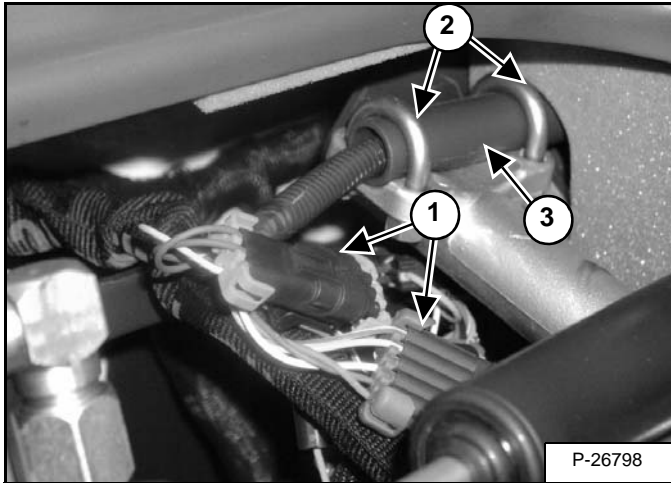
Description

The control handles / levers are used to control the forward and reverse travel.

The control handles / levers are mounted to the control panel.

Lever Removal And Installation

Figure 50-110-1



Disconnect the electrical connectors (Item 1) [Figure 50-110-1] from the control lever.

Remove the nuts from the two U-bolts (Item 2) [Figure 50-110-1] used to mount the control lever.

Remove the U-bolts from the control lever mount.

Remove the control lever (Item 3) [Figure 50-110-1] by sliding the lever through the rubber boot (Item 1) [Figure 50-110-2] on the front of the control panel.

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

CONTROL HANDLE / LEVER (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 and underneath the operator seat.

WINDOW (REAR)

Removal



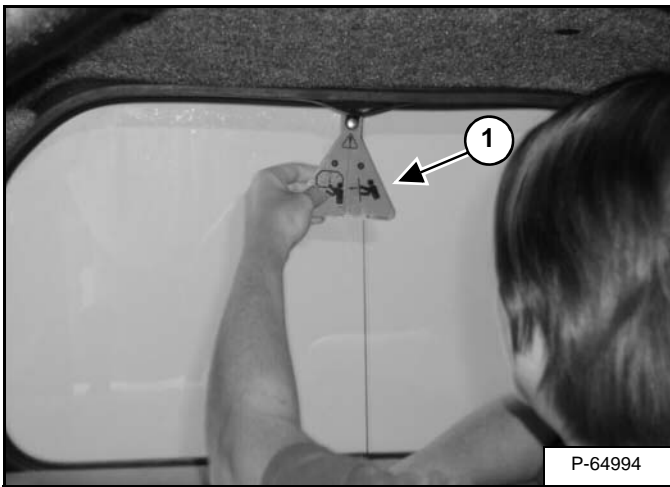
AVOID INJURY OR DEATH

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

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

W-2019-0907

Figure 50-130-1



Pull on the tag (Item 1) [Figure 50-130-1] on the rear window to remove the rubber cord.

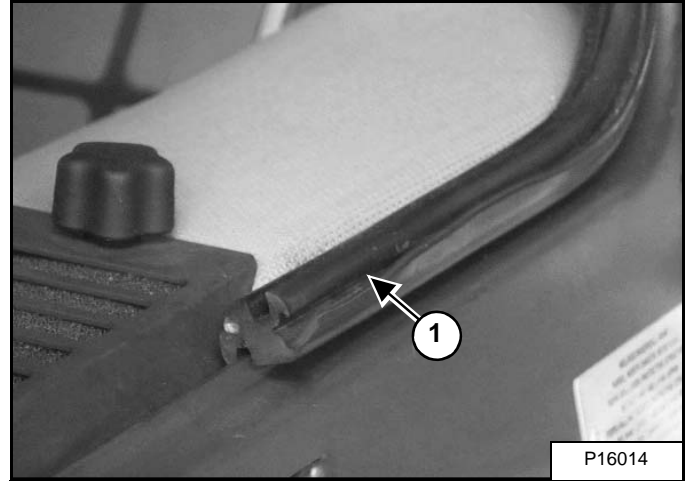
Using gloves, push the rear window out the rear of the operator cab.

NOTE: If rear window is broken, remove all glass fragments from the rubber molding before installing a new window.

Installation (Split Molding)

Clean the area before installing the rubber molding.

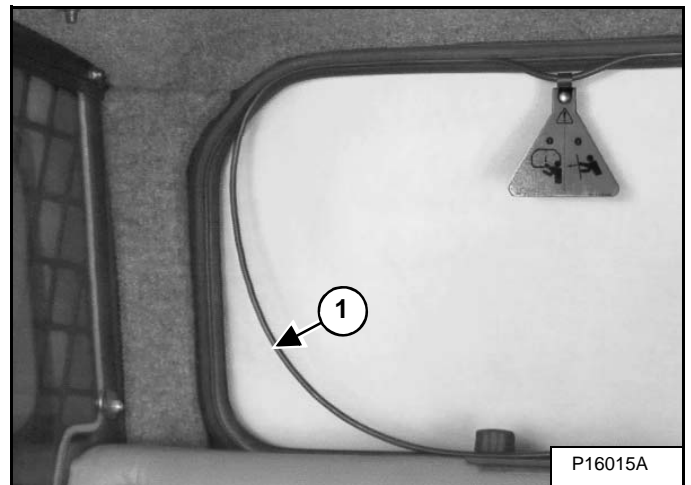
Figure 50-130-2



Install the rubber molding (Item 1) [Figure 50-130-2] around the edge of the rear opening in the operator cab.

If replacing the rubber molding (Item 1) [Figure 50-130-2] cut off the excess molding.

Figure 50-130-3



Apply liquid soap on the rubber cord to make installation easier. Install the rubber cord (Item 1) [Figure 50-130-3] into the molding on the inside of the operator cab.

Install the safety tag in the top center of the cord.

WINDOW (CAB DOOR) (CONT'D)

Installation (Standard Window) (Cont'd)

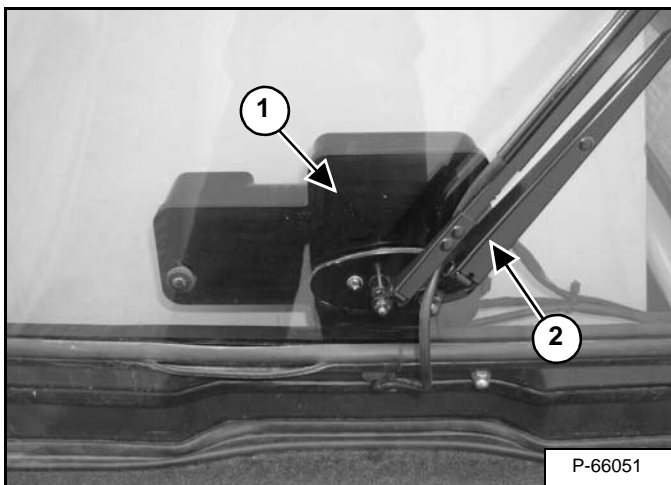
Figure 50-133-8



Use the plastic stick (Item 1) [Figure 50-133-8] to position the locking tab into the groove to secure the window in the molding.

Tapping the window corners will help seat the window in the molding.

Figure 50-133-9



Install the wiper motor (Item 1) and wiper arm assembly (Item 2) [Figure 50-133-9].

ELECTRICAL SYSTEM & ANALYSIS (CONT'D)

STARTER	60-40-1
Parts Identification	60-40-3
Removal And Installation	60-40-2
Testing	60-40-1
STEERING DRIFT COMPENSATION	60-161-1
Description	60-161-1
Operation	60-161-1
TRACTION LOCK	60-120-1
Description	60-120-1
Inspecting	60-120-3
Troubleshooting	60-120-2

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

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

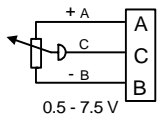
ELECTRICAL SYSTEM INFORMATION (CONT'D)

Glossary Of Electrical Symbols (Cont'd)

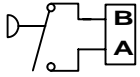
SYMBOL

DESCRIPTION

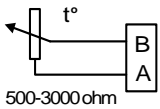
SENDERS AND SENSORS



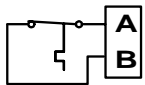
PRESSURE SENDER - Provides a variable voltage proportional to pressure. (Sender voltage rating is listed to show volts at high and low setting.)



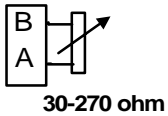
PRESSURE SWITCH - Switch opens or closes at a predetermined pressure to active a function or to turn on a warning light. (Switch is shown in the open position.)



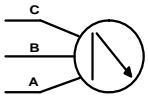
TEMPERATURE SENDER - Provides a variable resistance (ohm) signal proportional to temperature. (Sender ohm rating is listed to show ohms at high and low setting.)



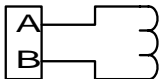
TEMPERATURE SWITCH - The switch opens or closes at a predetermined temperature to active a function or to turn on a warning light. (Switch is shown in the closed position.)



FUEL SENDER - Provides a variable resistance, based on the fuel level in the tank. (Sender ohm rating is listed to show ohms at full and empty setting.)



HALL EFFECT SENSOR - Detects linear or rotary position and provides a proportional variable voltage.



SPEED SENSOR - magnetic pickup - detects rpm.

BATTERY (CONT'D)

Using A Booster Battery (Jump Starting)

If it is necessary to use a booster battery to start the engine, BE CAREFUL! There must be one person in the operator's seat and one person to connect and disconnect the battery cables.

The key switch must be OFF or the STOP button must be pressed. The booster battery must be 12 volt.

WARNING

AVOID INJURY OR DEATH

Keep arcs, sparks, flames and lighted tobacco away from batteries. When *jumping* from booster battery make final connection (negative) at machine frame.

Do not jump start or charge a frozen or damaged battery. Warm battery to 60°F (16°C) before connecting to a charger. Unplug charger before connecting or disconnecting cables to battery. Never lean over battery while boosting, testing or charging.

Battery gas can explode and cause serious injury.

W-2066-0705

Connect the end of the first cable (Item 1) [Figure 60-20-4] to the positive (+) terminal of the booster battery. Connect the other end of the same cable (Item 2) [Figure 60-20-4] to the positive terminal on the loader starter.

Connect the end of the second cable (Item 3) [Figure 60-20-4] to the negative terminal of the booster battery. Connect the other end of the same cable (Item 4) [Figure 60-20-4] to the engine.

Keep cables away from moving parts. Start the engine.

After the engine has started, remove the ground (-) cable (Item 4) [Figure 60-20-4] first. Remove the cable from the positive terminal (Item 2) [Figure 60-20-4].

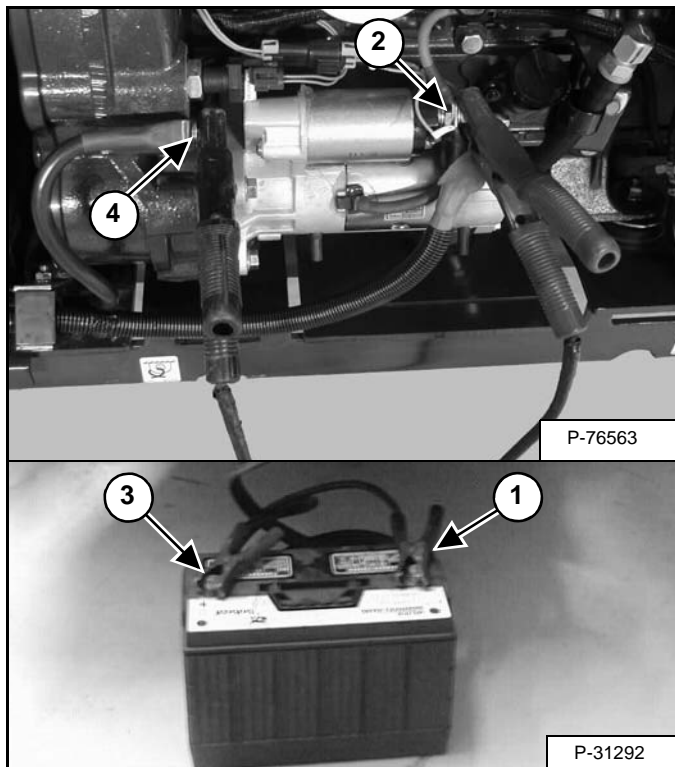
IMPORTANT

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.

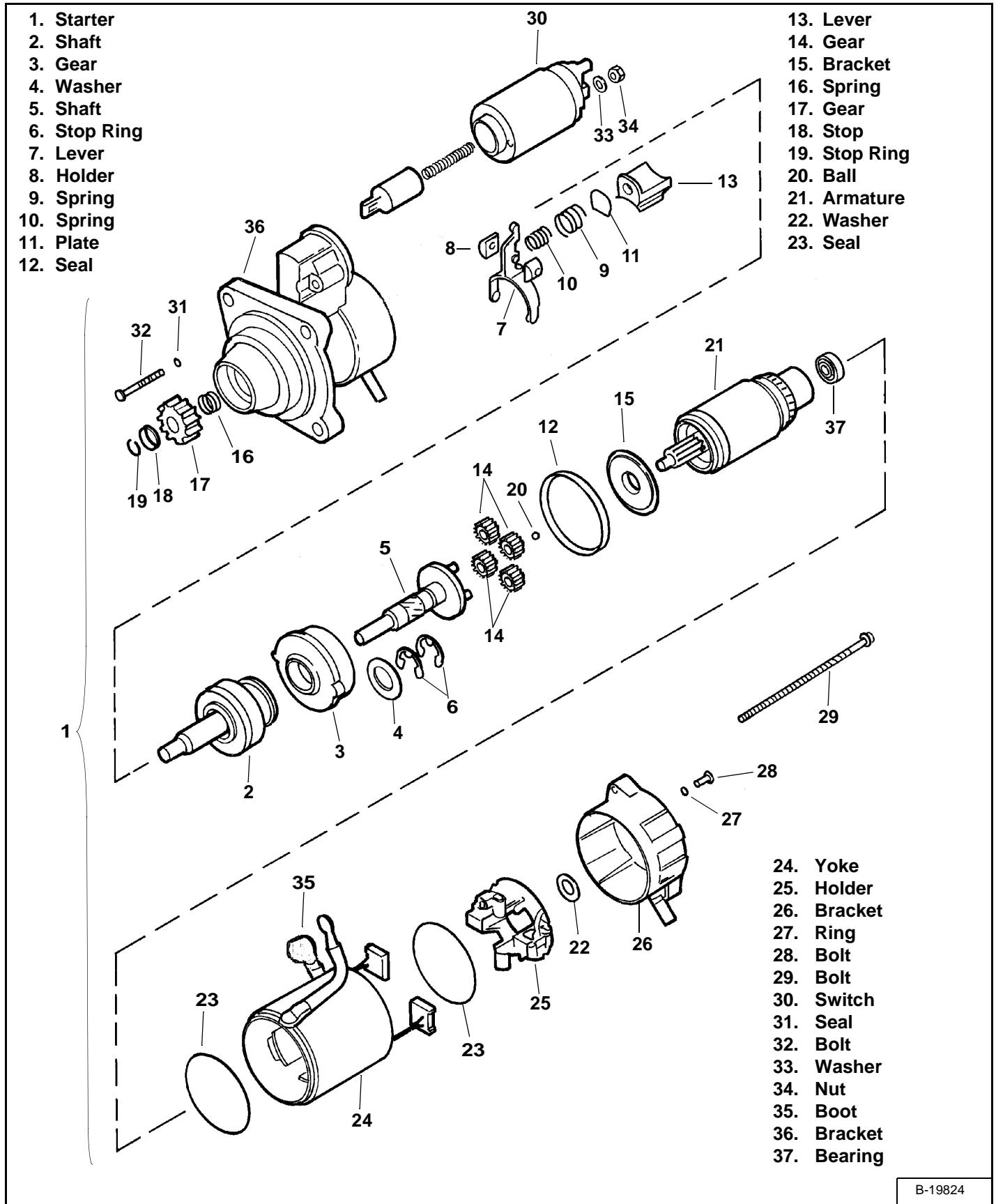
I-2023-1285

Figure 60-20-4



STARTER (CONT'D)

Parts Identification



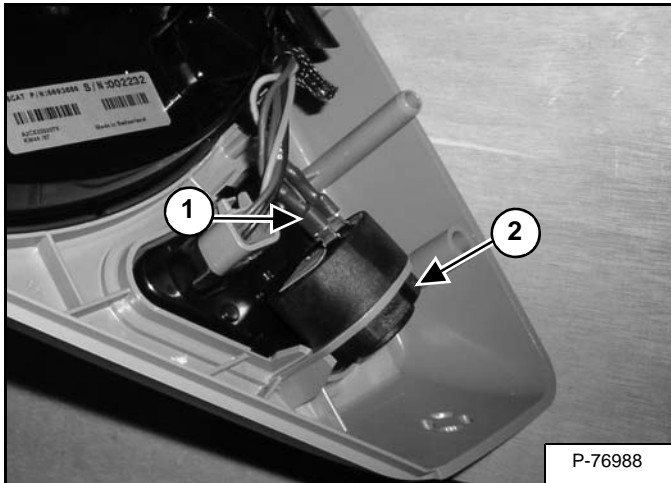
B-19824

INSTRUMENT PANELS (CONT'D)

Alarm Removal And Installation

Remove the left side instrument panel. (See Removal And Installation (Left And Right) on Page 60-50-6.)

Figure 60-50-19



Remove the two wires (Item 1) [Figure 60-50-19] from the loader alarm.

Remove the retaining nut (Item 2) [Figure 60-50-19] from the loader alarm.

Remove the alarm from the loader instrument panel.

BOBCAT CONTROLLER (GATEWAY AND AUXILIARY) (CONT'D)

Connector Identification (Cont'd)

J2B

PIN	WIRE NUMBER	COLOR	DESCRIPTION
1	OPEN	NA	NA
2	1180	RED/WHT	COMPUTER FUSE POWER OUT
3	1150	RED/WHT	COMPUTER FUSE POWER OUT
4	4450	LGN	DIVERTER SOLENOID SIGNAL
5	4440	LGN	REAR BASE SIGNAL
6	4480	LGN	FRONT / REAR AUXILIARY SIGNAL
7	4430	LGN	REAR ROD SIGNAL
8	9220	PURPLE	CAN LO 0
9	9120	PUR/WHT	CAN HI 0
10	OPEN	NA	NA
11	OPEN	NA	NA
12	OPEN	NA	NA
13	4340	LGN	FRONT BASE SOLENOID SIGNAL
14	OPEN	NA	NA
15	2550	BLACK	AUXILIARY CONTROLLER GROUND
16	2540	BLACK	AUXILIARY CONTROLLER GROUND
17	4310	LBL	RIGHT HANDLE PWM LOW
18	4320	LBL	RIGHT HANDLE PWM SIGNAL
19	4330	LGN	FRONT ROD SOLENOID SIGNAL
20	OPEN	NA	NA
21	4920	LGN	RIGHT HANDLE TRIGGER RETURN
22	1560	RNG	SWITCHED INPUT POWER
23	4300	LGN	RIGHT HANDLE PWM HIGH
24	OPEN	NA	NA
25	OPEN	NA	NA
26	4460	LGN	HIGH FLOW SOLENOID SIGNAL

SPEED SENSORS (SJC)

Description

The speed sensors are used to monitor travel speed. The speed sensor communicates to the system by sending a pulse of electricity to the SJC controller.

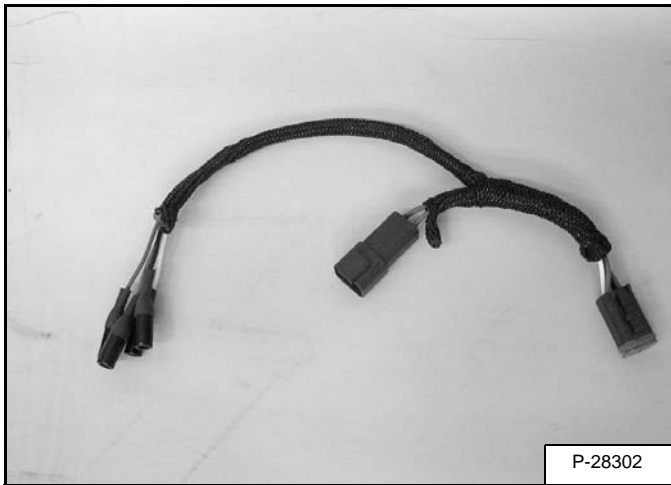
Testing

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 10-30-2.)

Connect the remote start tool to the loader. (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 60-80-1



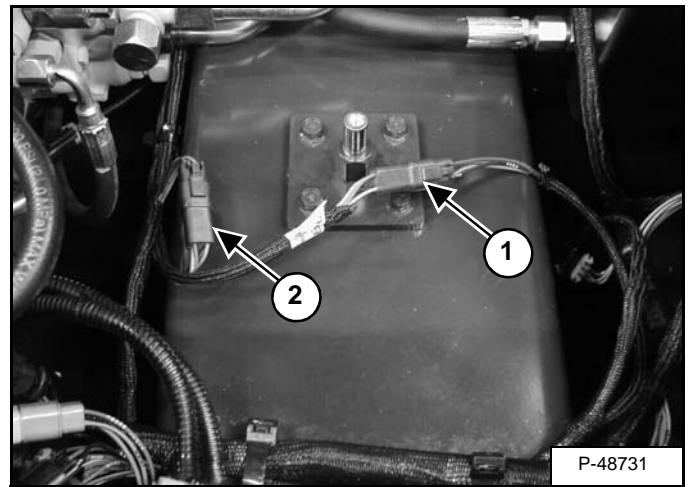
The tools listed will be needed to do the following procedure:

MEL1609-RPM Speed Sensor Test Harness **[Figure 60-80-1]**

MEL1563 or 7003031 - Remote Start Tool

Multimeter

Figure 60-80-2



Locate the electrical connector (Item 1) **[Figure 60-80-2]** for the left rpm speed sensor.

Locate the electrical connector (Item 2) **[Figure 60-80-2]** for the right rpm speed sensor.

BOBCAT INTERLOCK CONTROL SYSTEM (BICS™)

Description

The Bobcat Interlock Control System is an electronic system that is used to protect the operator. The system consists of the traction lock, seat bar sensor and the lift and tilt lockouts solenoid.

These all have indicator lights on the left panel **[Figure 60-100-1]** of the loader cab.

The Press To Operate button activates the system and allows the operator to function the loader.

TRACTION LOCK

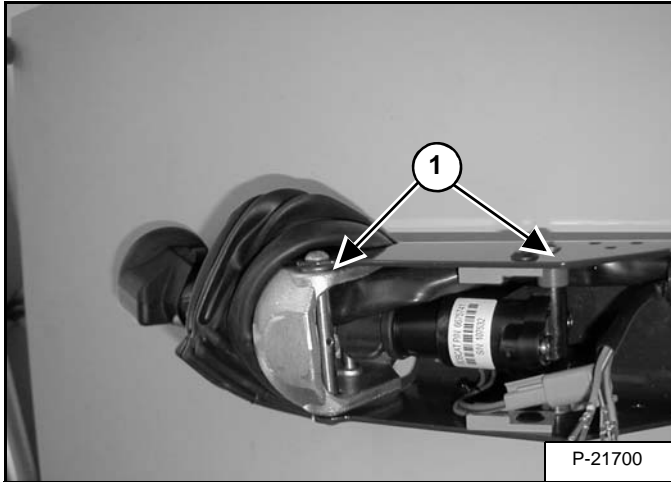
Description

The Traction Lock Control System will lock the traction drive system when the engine stops. The Traction Lock Control System is incorporated into the Bobcat Interlock Control System (BICS™).

CONTROL SYSTEM (ACS) (CONT'D)

Switch Handle Installation (Cont'd)

Figure 60-130-15

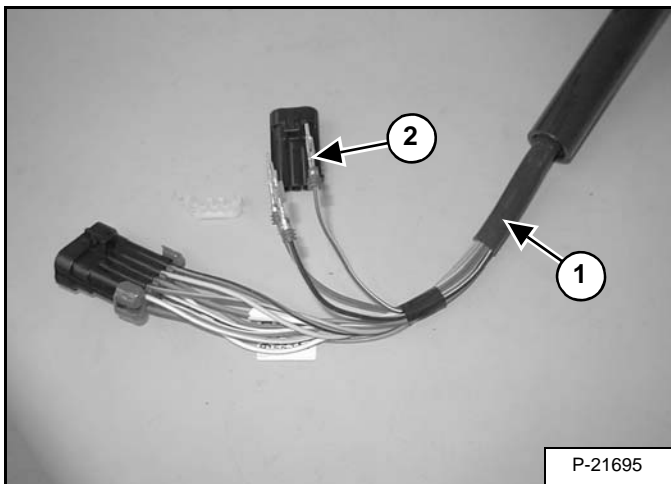


Install the new switch handle and wires from the top of the control lever.

Route wire (Item 1) [Figure 60-130-15] through the casting, along side the handle sensor and into the control lever tube.

NOTE: Do not pull the wire harness tight, allow a small amount of slack or slight bend at the handle pivot area. Verify the control handle returns to neutral position.

Figure 60-130-16



Remove tape from wires for installation and install the 6 inches of heat shrink tube (Item 1) [Figure 60-130-16] approximately 76,2 mm (3 in) into the control lever. Apply heat to the exposed heat shrink tube.

Inspect the wire terminal tabs (Item 2) [Figure 60-130-16] and re-bend tabs if necessary.

Install the wires into the connectors as listed below:

Right Switch Handle

Ten-Pin Connector

- A-Terminal - Orange
- B-Terminal - White
- C-Terminal - White/Black
- D-Terminal - White/Red
- E-Terminal - Dk. Green
- F-Terminal - White/Lt. Green
- G-Terminal - Yellow/Red
- H-Terminal - Lt. Green
- J-Terminal - Yellow
- K-Terminal - Orange/Black

Three-Pin Connector

- A-Terminal - Red/White
- B-Terminal - Black/White
- C-Terminal - Purple/White

Left Switch Handle

Ten-Pin Connector

- A-Terminal - Orange
- B-Terminal - Dk. Blue
- C-Terminal - White
- D-Terminal - Purple
- E-Terminal - Yellow/Red
- F-Terminal - Tan
- G-Terminal - Pink
- H-Terminal - Orange/Black
- J-Terminal - Blank
- K-Terminal - Blank

Three-Pin Connector

- A-Terminal - Red/White
- B-Terminal - Black/White
- C-Terminal - Purple/White

Two-Pin Connector

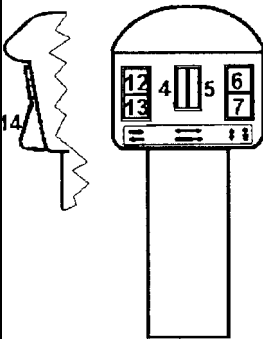
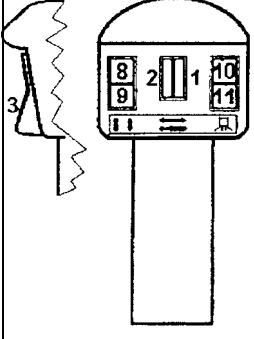
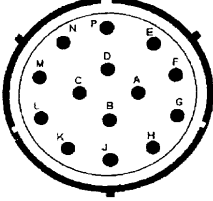
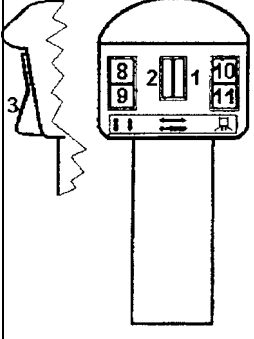
- A-Terminal - Black
- B-Terminal - Red

Five-Pin Connector

- A-Terminal - Dk. Green
- B-Terminal - Brown
- C-Terminal - Blank
- D-Terminal - Yellow
- E-Terminal - Blank

ELECTRICAL / HYDRAULIC CONTROLS (CONT'D)

Identification Chart ACD Group 2

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			
	1	1	1	1, 7	1, 7	K	 Fourteen Pin Connector Viewed from front (pin side of connector) of loader.  Jumpers K,P	
	2	2	2	2	2	K		
	3	1	1	1, 7	1, 7	K		
	4	2	2	2	2	K,A		
	5	1	1	1, 7	1, 7	K,A		
	6	-	-	-	-	K,E		
	7	-	-	-	-	K,F		
	8	-	-	-	-	K,G		
	9	-	-	-	-	K,H		
	10, 11, 12, 13, 14	-	--	--		K		

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.

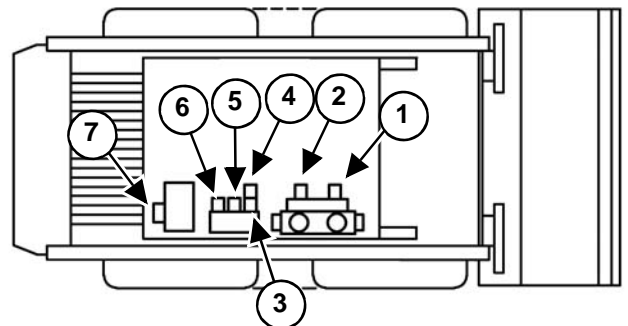
NOTE: For diagnostics and troubleshooting connect the Service PC (See SERVICE PC (LAPTOP COMPUTER) on Page 60-150-1.)

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.


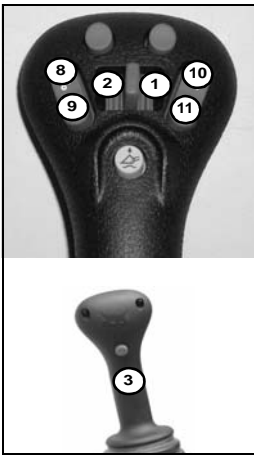


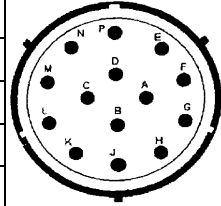
NA1891

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

ELECTRICAL / HYDRAULIC CONTROLS (SJC) (CONT'D)

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			
 P-24820A P-28316A	1	1	1	1, 7	1, 7	K	 P-24802A P-28316A	
	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		
	10, 11, 12, 13, 14	-	--	--				K



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.

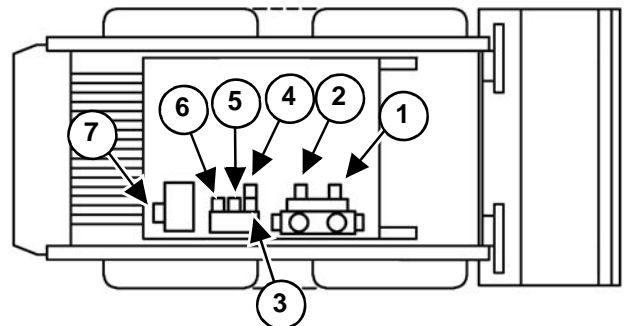
NOTE: For diagnostics and troubleshooting connect the Service PC (See SERVICE PC (LAPTOP COMPUTER) on Page 60-150-1.)

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.



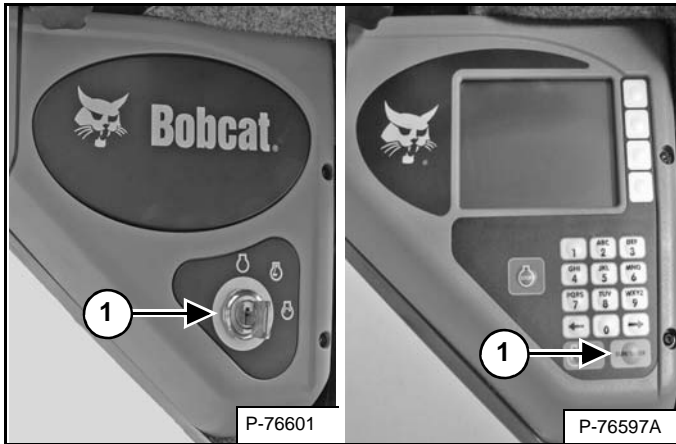
NA1891

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

CALIBRATION (CONT'D)

Lift And Tilt Calibration (SJC) (Cont'd)

Figure 60-160-5

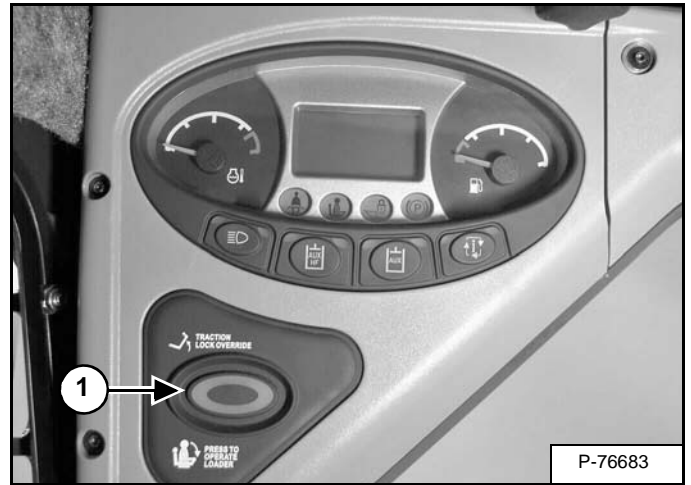


With the seat bar down, turn the ignition key ON (Deluxe Instrumentation Panel press RUN / ENTER) [Figure 60-160-5].

NOTE: Do not start the engine.

The loader Control Pattern Switch (Item 1) [Figure 60-160-3] will start flashing and will continue to flash until the calibration procedure is completed.

Figure 60-160-6



At the left panel, press the PRESS TO OPERATE Button (Item 1) [Figure 60-160-6] while holding the right joystick in position.

Release the joystick.

NOTE: During the calibration cycle, the system will beep three times. Once the calibration is complete code W3224 (Calibration Performed) will be generated.

The ACS controller will cycle the actuators.

The lift and tilt calibration is complete.

FLYWHEEL RPM SENSOR

Description

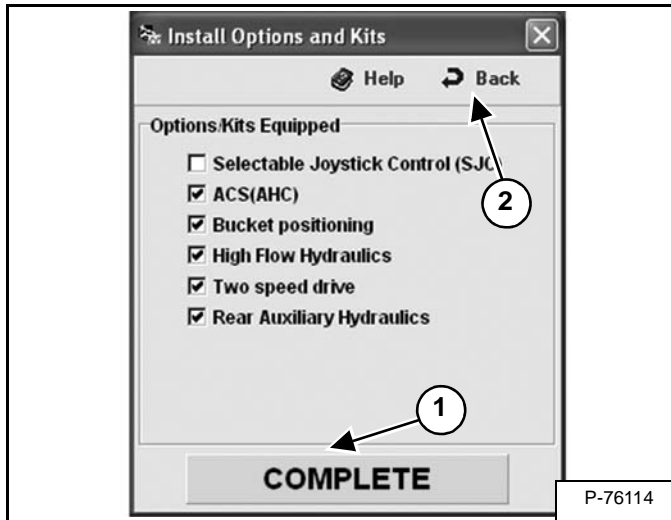
The flywheel rpm sensor has a magnet located on the end of the sensor which senses breaks between the ring gear teeth, the sensor relays this information back to the controller which registers the rpm of the engine.

The flywheel rpm sensor is located just above the starter on the left side of the engine.

MAINTENANCE CLOCK (CONT'D)

Setup (Cont'd)

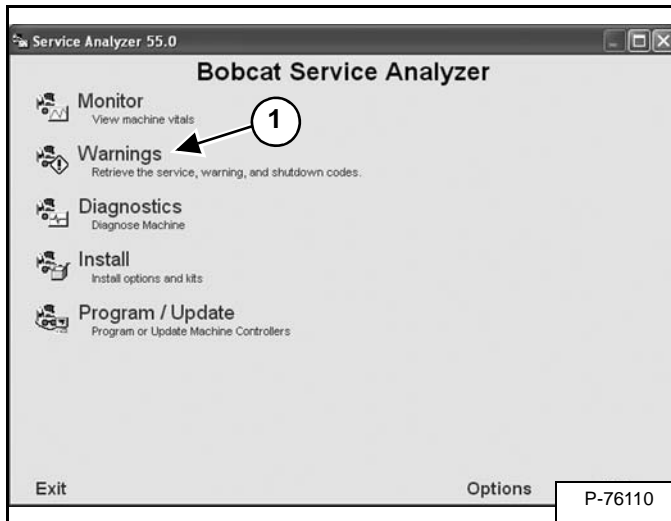
Figure 60-200-8



A green COMPLETE (Item 1) [Figure 60-200-8] message will be displayed when the dealer information has been transferred to the machine controller.

Click Back (Item 2) [Figure 60-200-8] to return to the Bobcat Service Analyzer screen.

Figure 60-200-9



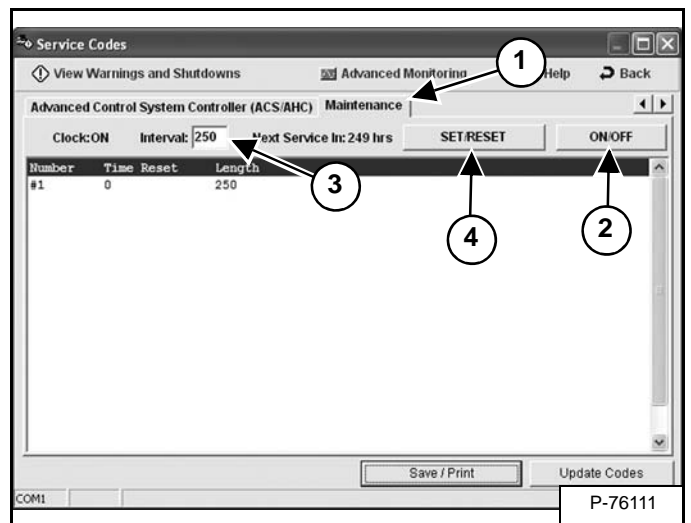
Select Warnings (Item 1) [Figure 60-200-9].

Figure 60-200-10



Click the right arrow (Item 1) [Figure 60-200-10] to scroll through the tabs.

Figure 60-200-11



Click the Maintenance tab (Item 1) [Figure 60-200-11] to view the maintenance clock screen.

Click ON / OFF (Item 2) to turn the maintenance clock on or off [Figure 60-200-11].

The default Interval (Item 3) is 250 hours, it can also be changed by placing the cursor in the box and typing the new interval. Click SET / RESET (Item 4) [Figure 60-200-11] to reset and set the maintenance clock.

ENGINE SERVICE

AIR CLEANER	70-40-1
Housing Removal And Installation	70-40-1
CAMSHAFT AND TIMING GEARS	70-100-1
Camshaft - Servicing	70-100-3
Idler Gear And Camshaft Removal And Installation	70-100-2
Idler Gear And Shaft - Servicing	70-100-5
Timing Gearcase Cover Removal And Installation	70-100-1
Timing Gears Backlash - Checking	70-100-2
CRANKSHAFT AND PISTONS	70-90-1
Cylinder Bore - Checking	70-90-7
Connecting Rod Alignment	70-90-8
Crankshaft And Bearings Installation	70-90-11
Crankshaft And Bearings Removal	70-90-9
Crankshaft And Bearings - Servicing	70-90-13
Crankshaft Gear Removal And Installation	70-90-8
Piston And Connecting Rod Removal And Installation	70-90-1
Piston And Connecting Rod - Servicing	70-90-3
CYLINDER HEAD	70-80-1
Cylinder Head Disassembly And Assembly	70-80-6
Cylinder Head Removal And Installation	70-80-4
Cylinder Head - Servicing	70-80-6
Cylinder Head Top Clearance	70-80-7
Intake Air Heater Removal And Installation	70-80-1
Intake Air Heater - Testing	70-80-1
Push Rod Alignment - Checking	70-80-14
Reconditioning The Valve And Valve Seat	70-80-10
Rocker Arm And Shaft - Checking	70-80-14
Valve Clearance Adjustment	70-80-2
Valve Guide - Checking	70-80-8
Valve Spring	70-80-12
Valve Tappets	70-80-13



Continued On Next Page

ENGINE INFORMATION (CONT'D)

Torque Values

Kubota Metric Engine Bolts

Thread Size (Dia. x Pitch)	Material		
	Head Mark 4	Head Mark 7	Head Mark 10
M5 x 0.8		4 - 5 N•m (3 - 4 ft-lb)	
M6 x 1.0		8 - 9 N•m (6 - 7 ft-lb)	8 - 12 N•m (6 - 9 ft-lb)
M8 x 1.25	8 - 12 N•m (6 - 9 ft-lb)	15 - 22 N•m (11 - 16 ft-lb)	24 - 34 N•m (18 - 25 ft-lb)
M10 x 1.25	18 - 24 N•m (13 - 18 ft-lb)	30 - 41 N•m (22 - 30 ft-lb)	49 - 68 N•m (36 - 50 ft-lb)
M12 x 1.25	30 - 41 N•m (22 - 30 ft-lb)	54 - 73 N•m (40 - 54 ft-lb)	94 - 118 N•m (69 - 87 ft-lb)
M14 x 1.5	49 - 68 N•m (36 - 50 ft-lb)	79 - 108 N•m (58 - 80 ft-lb)	157 - 186 N•m (116 - 137 ft-lb)

Tightening Torques For General Use Screws, Bolts And Nuts

Grade Nominal Diameter	Unit	Standard Screw and Bolt (4)			Special Screw and Bolt (7)		
		N·m	kgf·m	ft-lb	N·m	kgf·m	ft-lb
M6		7,9 - 9,3	0.80 - 0.95	5.8 - 6.9	9,8 - 11,3	1.00 - 1.15	7.23 - 8.32
M8		17,7 - 20,6	1.8 - 2.1	13.0 - 15.2	23,5 - 27,5	2.4 - 2.8	17.4 - 20.3
M10		39,2 - 45,1	4.0 - 4.6	28.9 - 33.3	49,0 - 55,9	5.0 - 5.7	36.2 - 41.2
M12		62,8 - 72,6	6.4 - 7.4	46.3 - 53.5	77,5 - 90,2	7.9 - 9.2	57.1 - 66.5

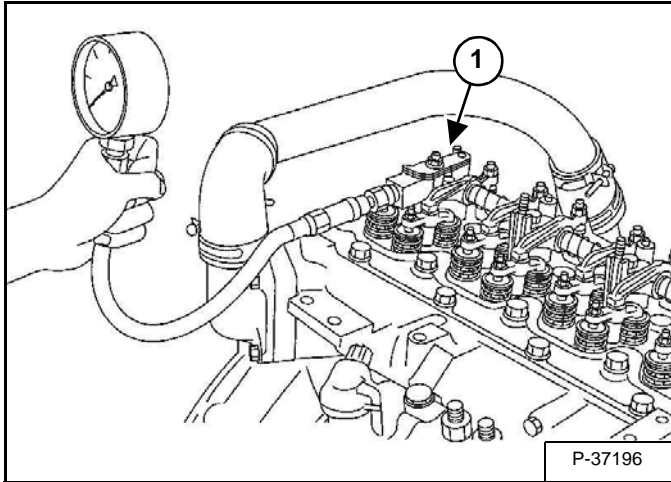
Screw and bolt material grades are shown by numbers punched on the screw and bolt heads. Prior to tightening, be sure to check out the numbers as shown below.

Punched number	Screw and bolt material grade
None or 4	Standard screw and bolt SS400, S20C
7	Special screw and bolt S43C, S48C (Refined)

ENGINE INFORMATION (CONT'D)

Compression - Checking

Figure 70-10-22



After warming up the engine, stop it and remove the air cleaner, the muffler, high pressure pipes, cylinder head cover, overflow pipe, all nozzle holders and all nozzle gaskets.

Install a compression tester and nozzle adaptor MEL1614 for diesel engines to nozzle holder hole (Item 1) [Figure 70-10-22].

After making sure that the speed control lever is set at the stop position (Non-injection), run the engine at 200 - 300 rpm with the starter.

Read the maximum pressure. Measure the pressure more than twice.

If the measurement is below the allowable limit, apply a small amount of oil to the cylinder wall through the nozzle hole and measure the compression pressure again.

If the compression pressure increase after applying oil. check the cylinder wall and piston rings.

If the compression pressure is still less than the allowable limit, check the top clearance, valve and cylinder head.

NOTE: Check the compression pressure with the specified valve clearance.

Always use a fully charged battery for performing this test.

Variations in cylinder compression values should be under 10%.

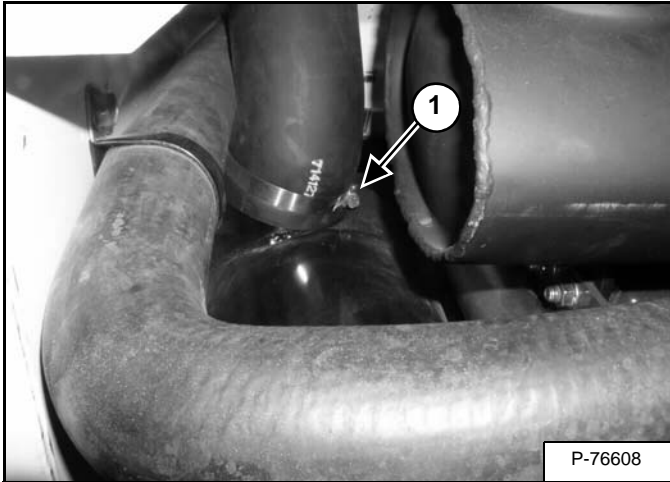
Compression pressure	Factory spec.	3475 kPa / 250 rpm (34,7 bar / 250 rpm) (504 psi / 250 rpm)
	Allowable limit	2558 kPa / 250 rpm (25,6 bar / 250 rpm) (371 psi / 250 rpm)

Tightening Torque	Nozzle holder clamp nut	18 - 20 N•m (13 - 15 ft-lb)
	Overflow pipe assembly retaining screw	9,8 - 11,2 N•m (7.24 - 8.31 ft-lb)
	Cylinder head cover screw	6,9 - 11,2 N•m (5.1 - 8.31 ft-lb)
	Injection pipe retaining nut	23 - 36 N•m (17 - 26 ft-lb)

AIR CLEANER

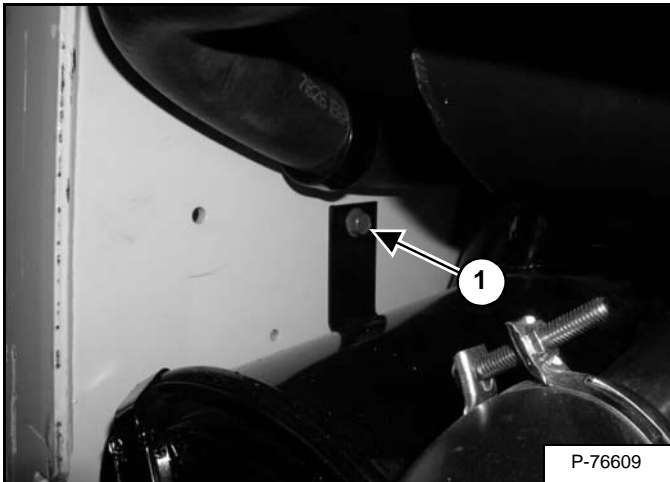
Housing Removal And Installation

Figure 70-40-1



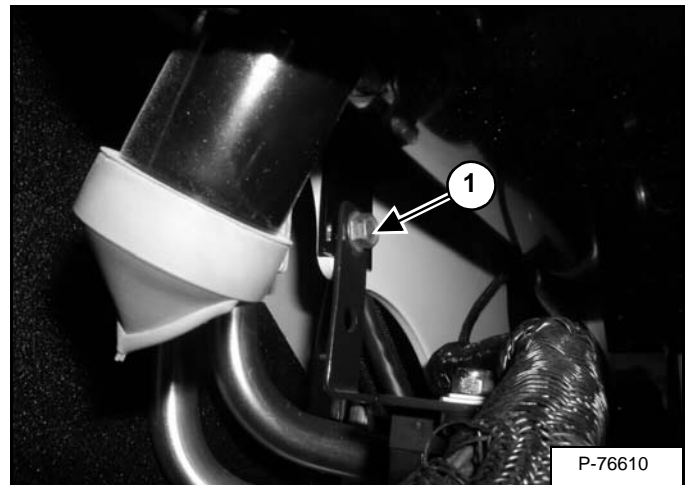
Loosen the hose clamp (Item 1) [Figure 70-40-1] and disconnect the inlet hose from the air cleaner.

Figure 70-40-2



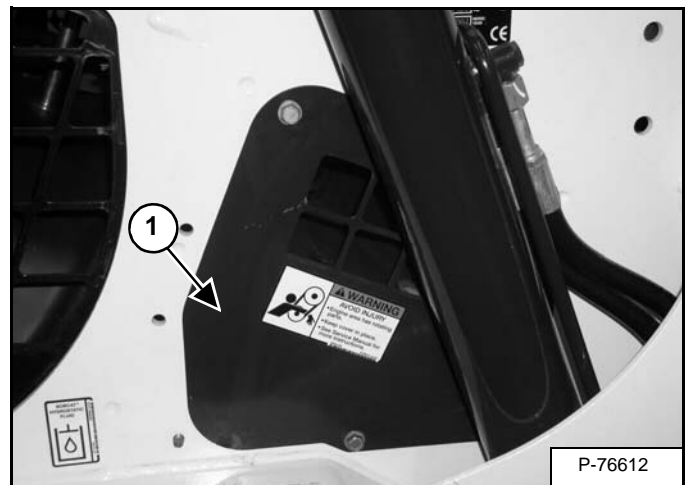
Remove the top mounting bolt (Item 1) [Figure 70-40-2] from the air cleaner mount bracket.

Figure 70-40-3



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

Figure 70-40-4

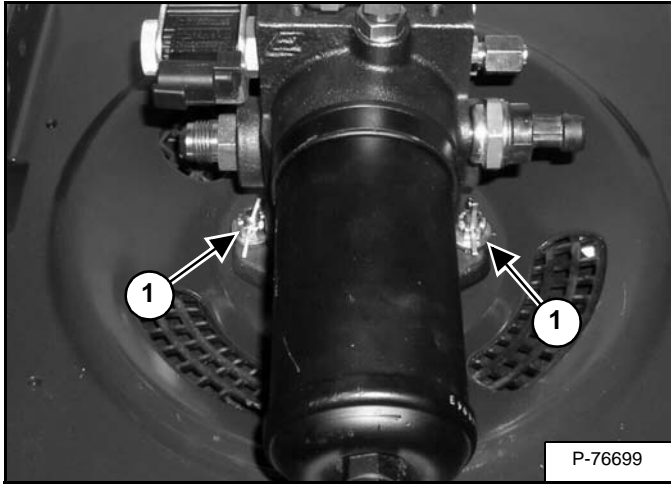


Remove the left side access panel (Item 1) [Figure 70-40-4] from the loader.

ENGINE COOLING SYSTEM (CONT'D)

Hydraulic Fan Motor Removal And Installation

Figure 70-50-27

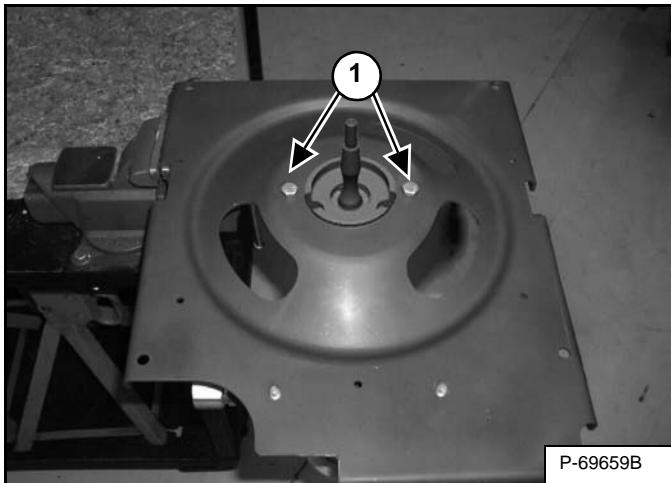


Remove and discard the two nuts and cotter pins (Item 1) [Figure 70-50-27].

Remove the two washers (Item 1) [Figure 70-50-27].

Installation: Tighten the nuts to 6,78 - 12,20 N•m (5 - 9 ft-lb) torque.

Figure 70-50-28



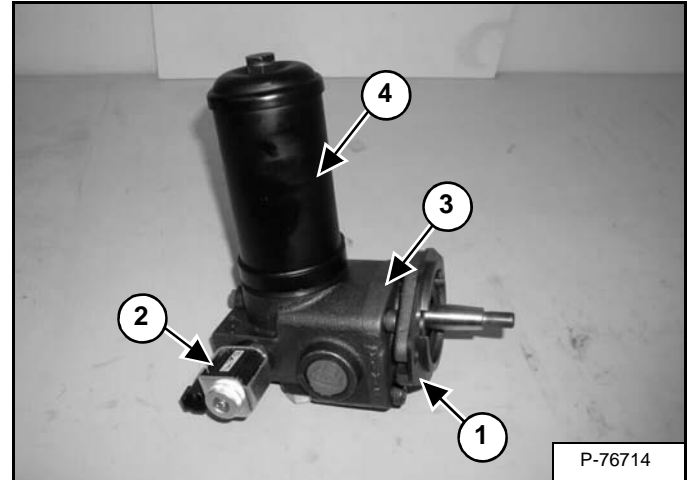
Remove and discard the two bolts (Item 1) [Figure 70-50-28] and the hydraulic fan motor from the mounting plate.

Installation: Tighten the bolts to 6,78 - 12,20 N•m (5 - 9 ft-lb) torque.

NOTE: Always install new bolts, nuts, cotter pins, and rubber gasket when installing the fan motor.

Hydraulic Fan Motor Disassembly And Assembly

Figure 70-50-29



NOTE: The mounting gasket (Item 1), proportioning valve, and proportioning valve O-rings, back up washer and coil mounting nut (Item 2) are available from Bobcat Parts. The fan motor (Item 3) [Figure 70-50-29] must be replaced as an assembly if damaged.

Remove the filter cover (Item 4) [Figure 70-50-29].

Installation: Tighten filter cover (Item 4) [Figure 70-50-29] to 47,5 - 54 N•m (35 - 40 ft-lb) torque.

Figure 70-50-30

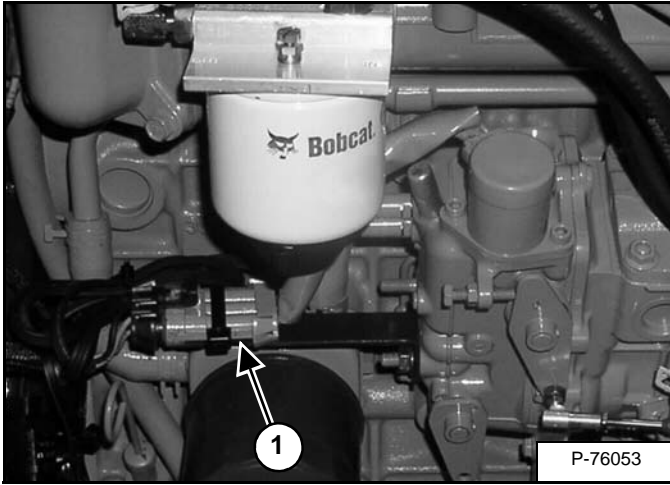


Remove the filter (Item 1) [Figure 70-50-30].

FUEL SYSTEM

Fuel Shutoff Solenoid - Checking

Figure 70-70-1



Stop the engine and open the rear door.

The fuel shutoff solenoid connector is located between the fuel filter and the oil filter.

Disconnect the fuel shutoff solenoid connector (Item 1) [Figure 70-70-1].

Use an ohmmeter to check the fuel shutoff solenoid.

Figure 70-70-2

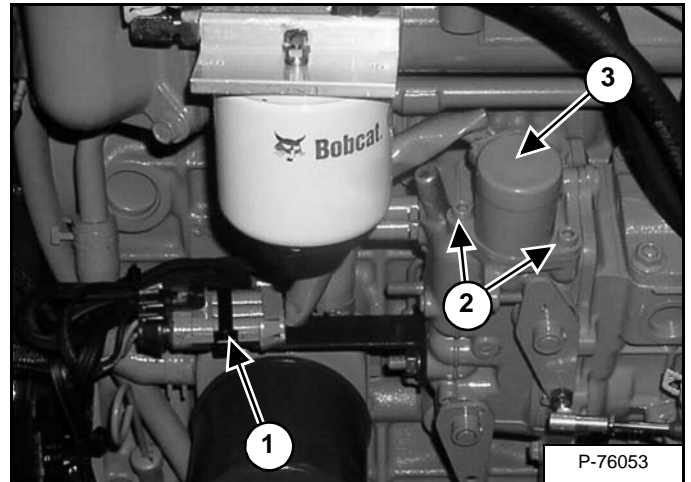


The reading between electrical connector terminal C and terminal A must be approximately 15.6 ohm [Figure 70-70-2].

The reading between electrical connector terminal C and terminal B must be approximately 0.35 - 0.40 ohm.

Fuel Shutoff Solenoid Removal And Installation

Figure 70-70-3



Stop the engine and open the rear door.

The fuel shutoff solenoid connector is located between the fuel filter and the oil filter.

Disconnect the fuel shutoff solenoid connector (Item 1) [Figure 70-70-3].

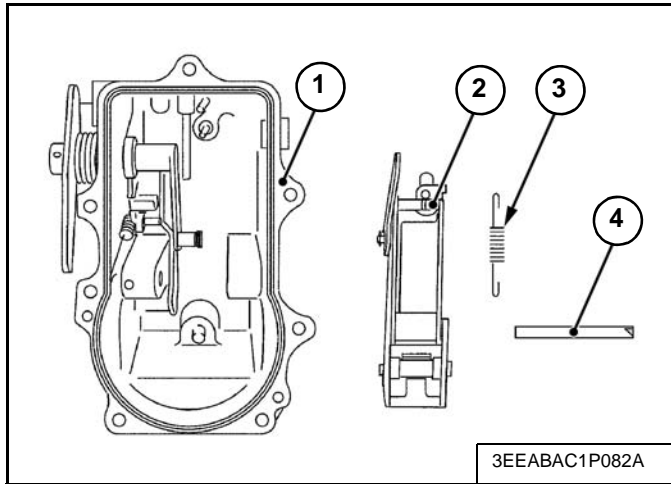
Remove the two mounting bolts (Item 2) [Figure 70-70-3] from the fuel stop solenoid.

Remove the solenoid from the injection pump (Item 3) [Figure 70-70-3].

FUEL SYSTEM (CONT'D)

Governor Disassembly And Assembly (Cont'd)

Figure 70-70-35



Remove the governor fork lever assembly from the governor housing (Item 1) [Figure 70-70-35].

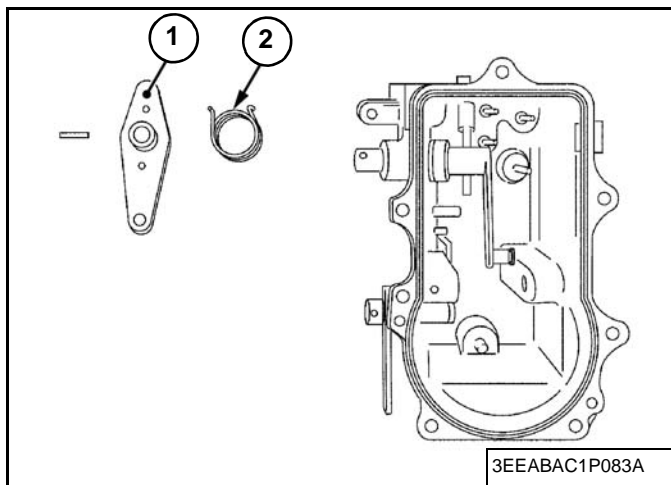
After reassembling the governor housing assembly, check the movement of the governor fork lever (Item 2), the speed control lever, stop lever, governor spring (Item 3) and governor fork lever shaft (item 4) [Figure 70-70-35].

NOTE: When reassembling lightly oil the parts.

NOTE: Be careful not to deform the start spring.

Speed Lever

Figure 70-70-36



Remove the speed control lever (Item 1) and the return spring (Item 2) [Figure 70-70-36].

Governor Fork

Figure 70-70-37

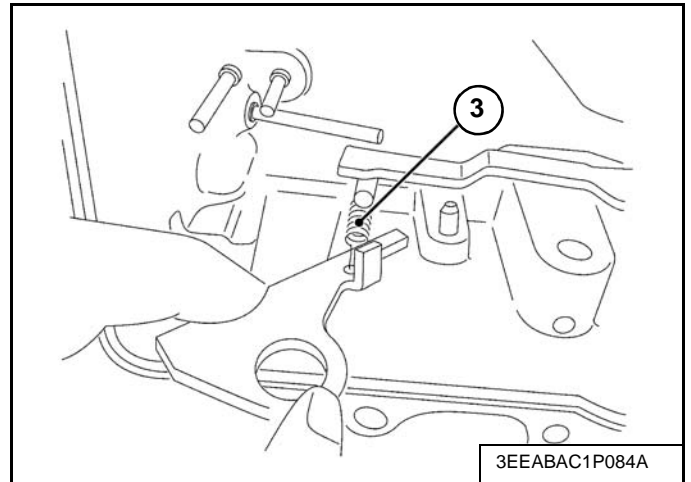
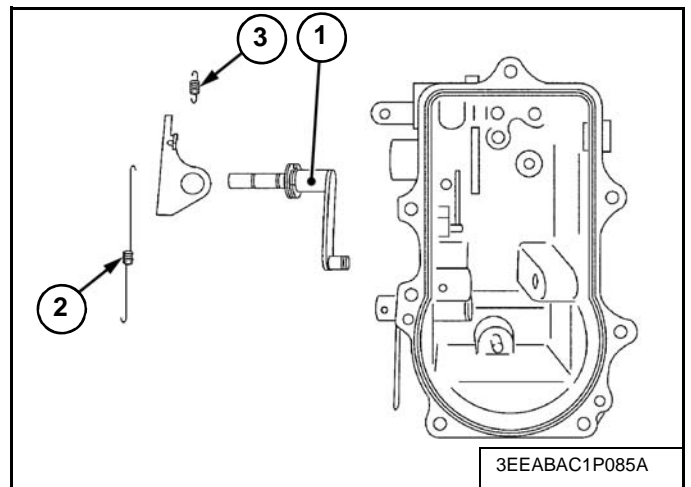


Figure 70-70-38



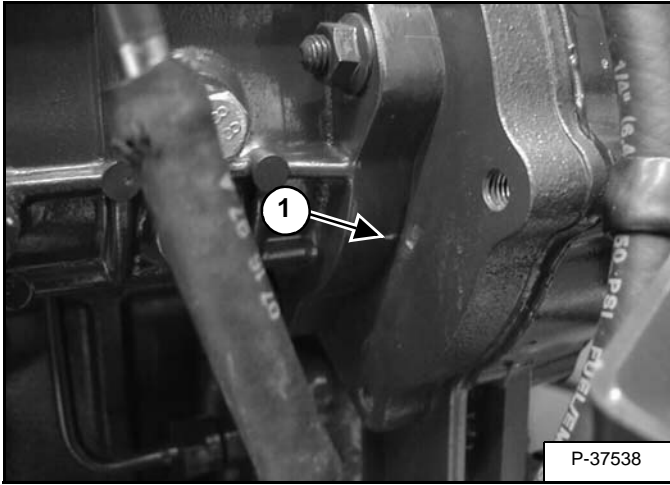
Remove the governor lever assembly (Item 1) [Figure 70-70-38] from the governor housing.

Remove the start spring (Item 2) and the stop spring (Item 3) [Figure 70-70-37] and [Figure 70-70-38].

FUEL SYSTEM (CONT'D)

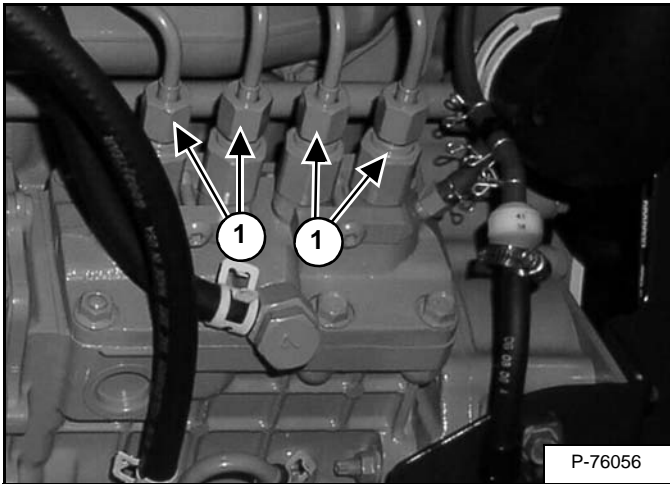
Fuel Injection Pump - Timing

Figure 70-70-67



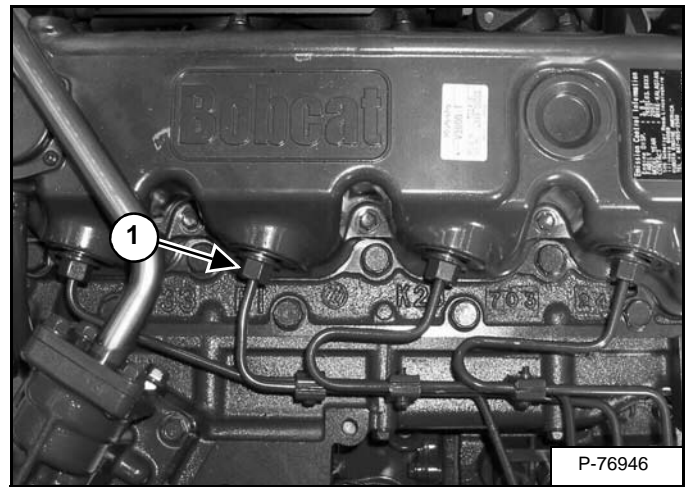
Align the timing mark on the injection pump (Item 1) [Figure 70-70-67] with the timing mark on the gearcase housing.

Figure 70-70-68



Disconnect the four injection lines (Item 1) [Figure 70-70-68] from the injection pump.

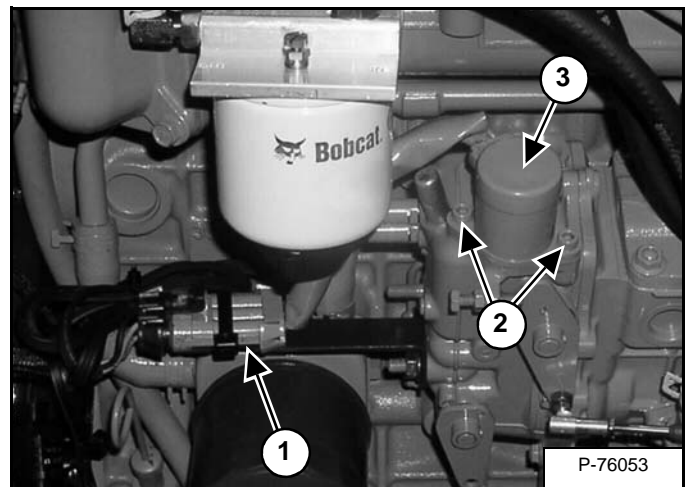
Figure 70-70-69



Disconnect the four injection lines (Item 1) [Figure 70-70-69] from the injector.

Remove the injector lines from the engine.

Figure 70-70-70



Disconnect the electrical connector (Item 1) [Figure 70-70-70] from the fuel shutoff solenoid.

Remove the two mount bolts (Item 2) [Figure 70-70-70] from the fuel shutoff solenoid.

Remove the fuel shutoff solenoid from the engine (Item 3) [Figure 70-70-70].

CYLINDER HEAD (CONT'D)

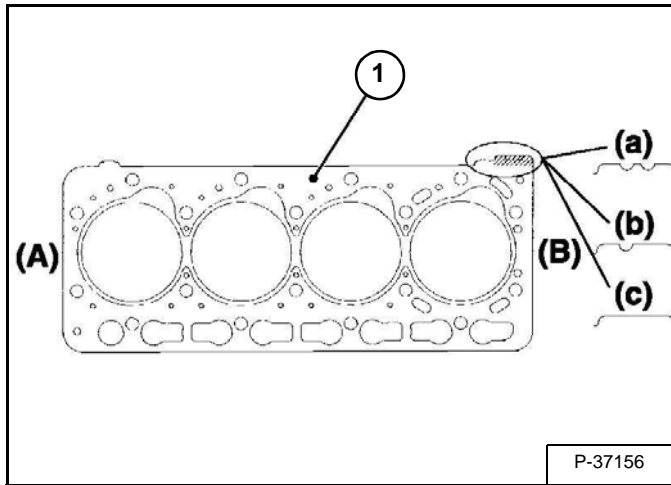
Cylinder Head Removal And Installation (Cont'd)

Remove the cylinder head gasket. (O-ring is not attached because of metal type cylinder head gasket.)

Take care handling the gasket so as not to damage it.

Be sure to adjust the valve clearance. (See Valve Clearance Adjustment on Page 70-80-2.)

Figure 70-80-15



Make sure to note the notch (a), (b) or (c) of cylinder head gasket (Item 1) [Figure 70-80-15] in advance.

Replace the same notch (a), (b) or (c) as the original cylinder head gasket (Item 1) [Figure 70-80-15].

Select the cylinder head gasket (Item 1) thickness to meet with the top clearance when replacing the piston, piston pin bushing, connecting rod or crank pin bearing.

NOTE: When replacing the piston, piston pin bushing, connecting rod or crank pin bearing, select the cylinder head gasket thickness to meet with the top clearance.

Figure 70-80-16

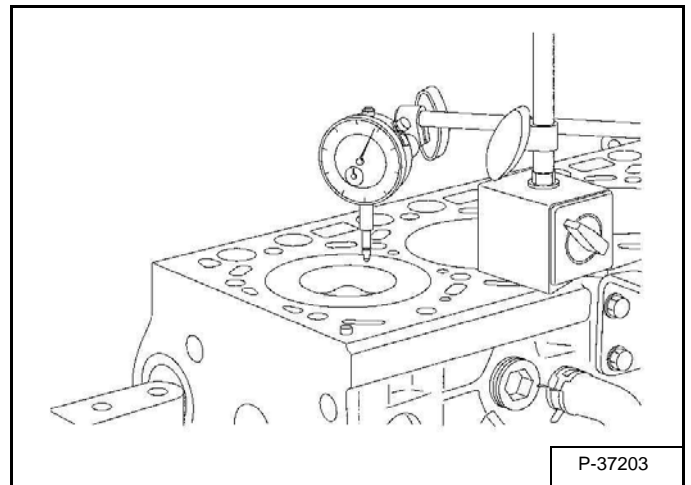
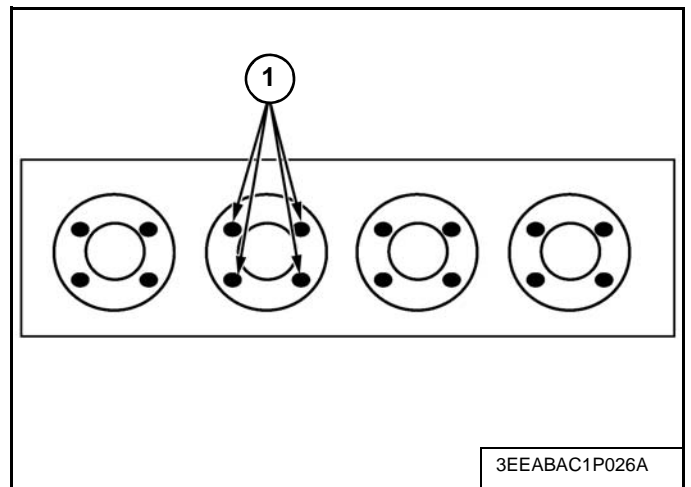


Figure 70-80-17



Measure the piston head's recessing or protrusion from the crankcase cylinder face (Item 1) [Figure 70-80-17] at four spots per each piston using the dial gauge as shown in [Figure 70-80-16] and average the four pistons.

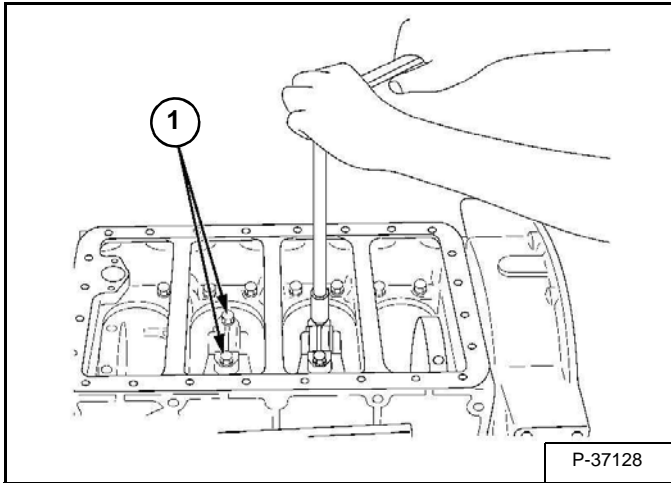
CRANKSHAFT AND PISTONS

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 70-80-4.)

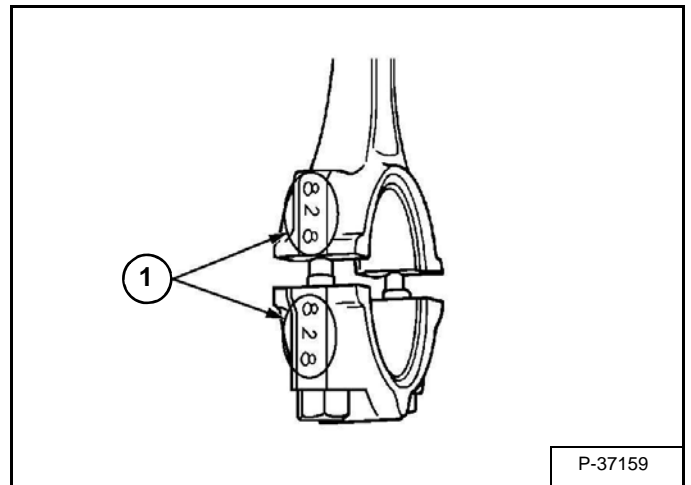
Figure 70-90-1



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.

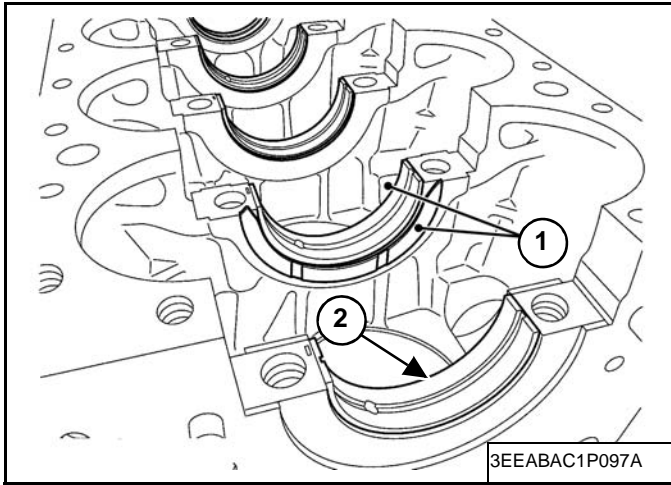
Insert the crank pin bearing.

Tightening torque	Connecting rod bolt	79 - 83 N•m (58 - 61 ft-lb)
-------------------	---------------------	--------------------------------

CRANKSHAFT AND PISTONS (CONT'D)

Crankshaft And Bearings Installation

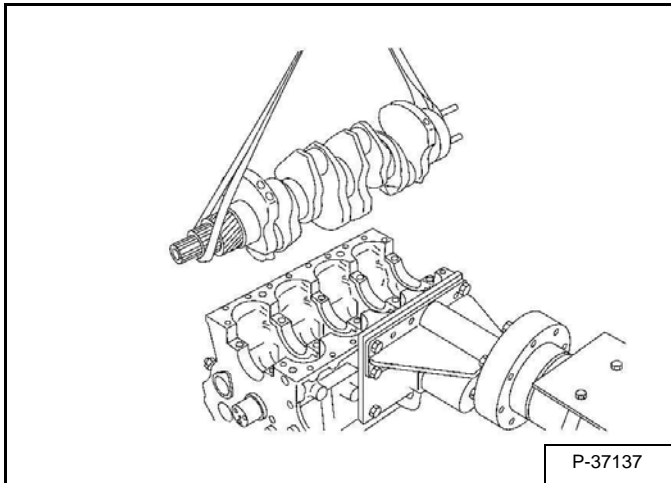
Figure 70-90-28



Install the thrust bearing (Item 1) [Figure 70-90-28] on both sides of the fourth main bearing case with the oil groove facing out.

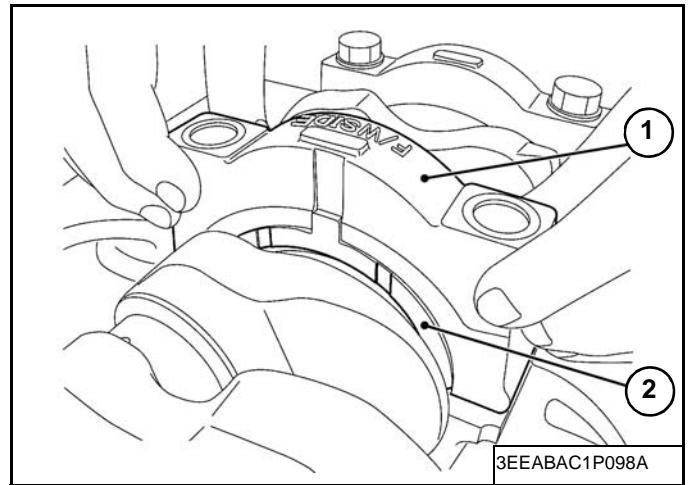
Install the main bearings (Item 2) [Figure 70-90-28].

Figure 70-90-29



Install the crankshaft [Figure 70-90-29].

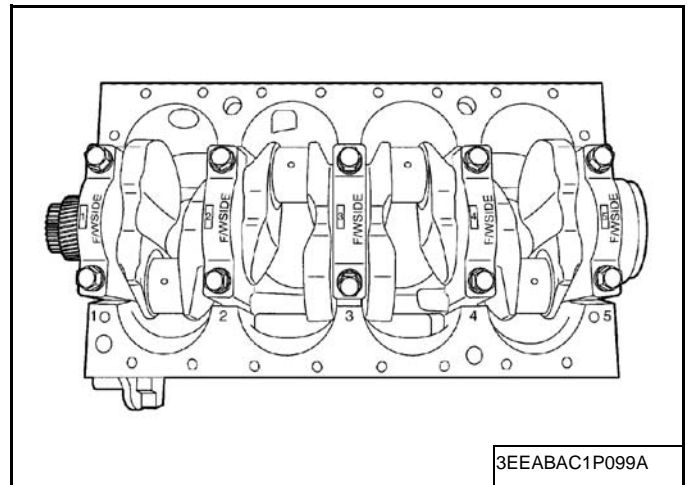
Figure 70-90-30



NOTE: Install the main bearing case having the same number as the one engraved on the crankcase, and set the casting mark “F/W SIDE” on the main bearing case towards the flywheel side.

Install the fourth bearing case (Item 1) and the thrust bearing (Item 2) [Figure 70-90-30].

Figure 70-90-31



NOTE: Install the main bearing case having the same number as the one engraved on the crankcase, and set the casting mark “F/W SIDE” on the main bearing case towards the flywheel side.

Apply oil to the bearing case screws and tighten them to the specified torque.

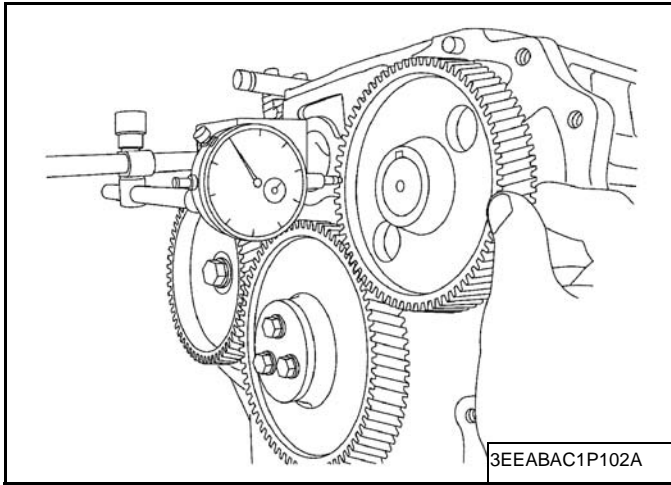
Tightening torque	Main bearing case screw	137 - 147 N•m (102 - 108 ft-lb)
-------------------	-------------------------	------------------------------------

CAMSHAFT AND TIMING GEARS (CONT'D)

Camshaft - Servicing

Side Clearance

Figure 70-100-8



Set a dial indicator with its tip on the camshaft **[Figure 70-100-8]**.

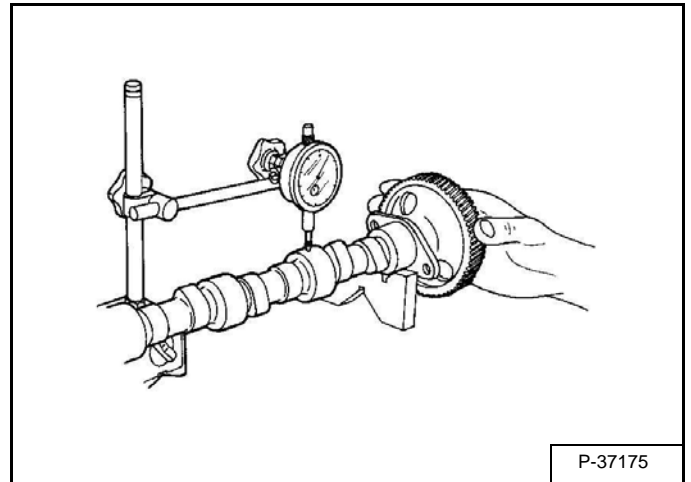
Measure the side clearance by moving the cam gear to the front and rear.

If the measurement exceeds the allowable limit, replace the camshaft stopper.

Side clearance	Factory spec.	0,07 - 0,22 mm (0.0028 - 0.0087 in)
	Allowable limit	0,03 mm (0.0118 in)

Alignment

Figure 70-100-9



Support the camshaft with V block on the surface plate and set a dial indicator with its tip on the intermediate journal at right angle **[Figure 70-100-9]**.

Rotate the camshaft on the V blocks and get the misalignment (half of the measurement).

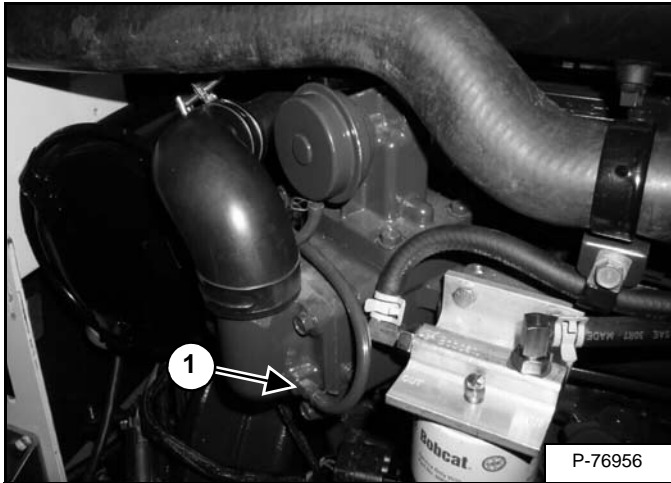
If the misalignment exceeds the allowable limit, replace the camshaft.

Camshaft alignment	Allowable limit	0,01 mm (0.00039 in)
--------------------	-----------------	-------------------------

EXHAUST GAS RECIRCULATION (EGR) SYSTEM (CONT'D)

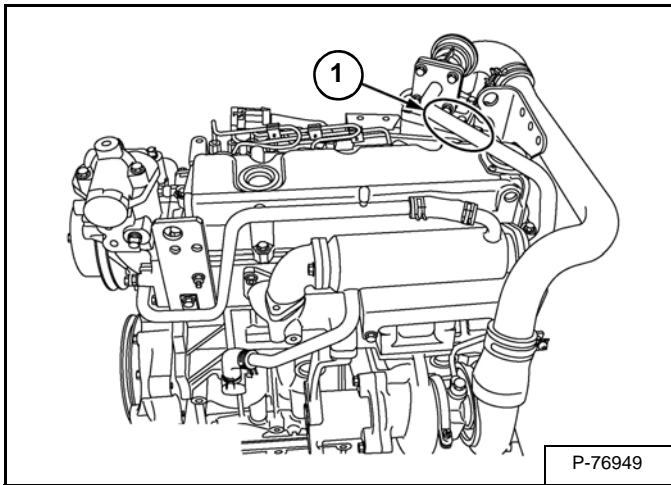
Testing (Cont'd)

Figure 70-130-3



Disconnect the boost hose (Item 1) [Figure 70-130-3] from the intake.

Figure 70-130-4



Measure the surface temperature of the EGR pipe (Item 1) [Figure 70-130-4] with an Infrared Thermometer.

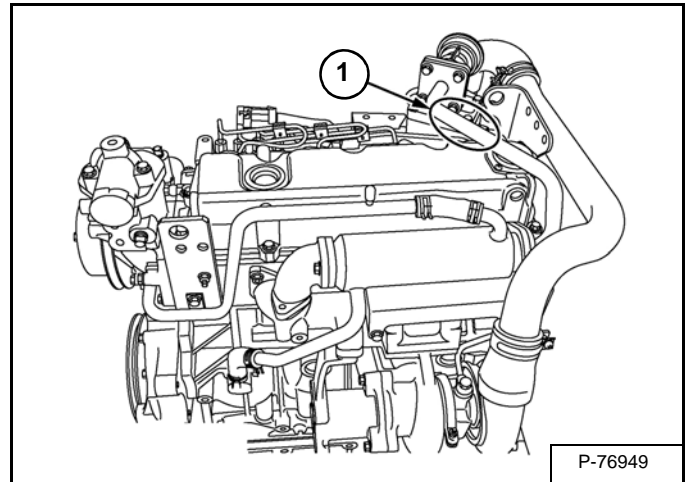
If the surface temperature of the EGR pipe declines, the thermo valve has failed.

If the surface temperature of the EGR pipe stays above 100°C (212°F), the EGR valve has failed.

Hot Engine Coolant Temperature Test

Verify the engine temperature is above 70°C (158°F), if the engine temperature is below 70°C (158°F) run the engine to bring the temperature above 70°C (158°F) then continue with the Hot Engine Coolant Temperature Test.

Figure 70-130-5

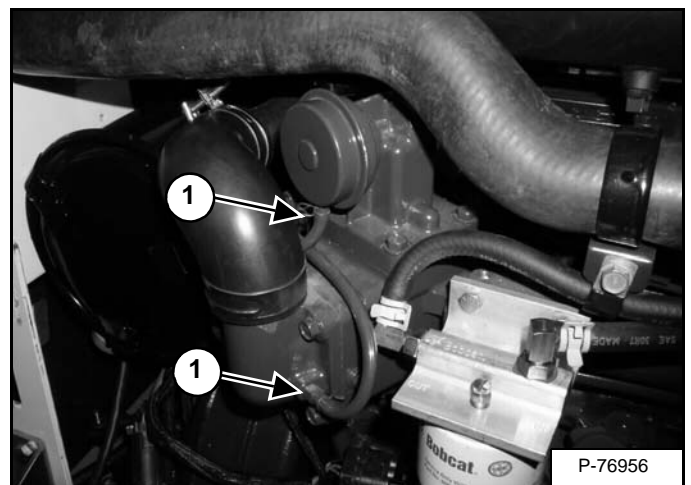


Measure the surface temperature of the EGR pipe (Item 1) [Figure 70-130-5] with an Infrared Thermometer.

With the engine coolant temperature above 70°C (158°F) and the surface temperature of the EGR pipe 100°C (212°F) or above, the EGR system is OK.

If the surface temperature of the EGR pipe is 50°C (122°F) or below continue this Hot Engine Coolant Temperature Test.

Figure 70-130-6

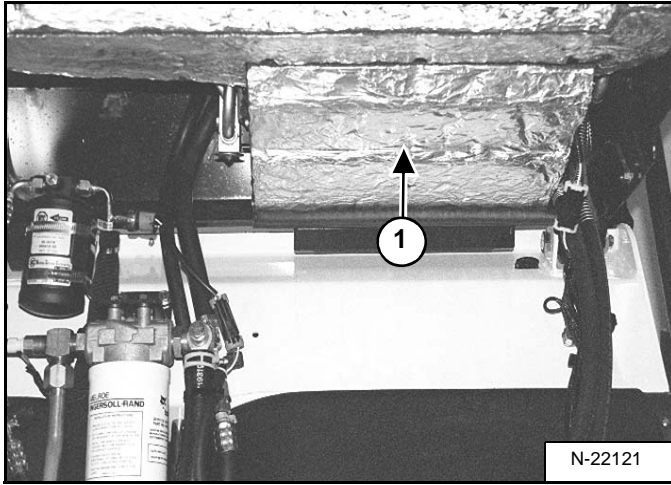


Disconnect the two hoses (Item 1) [Figure 70-130-6].

AIR CONDITIONING SYSTEM FLOW (CONT'D)

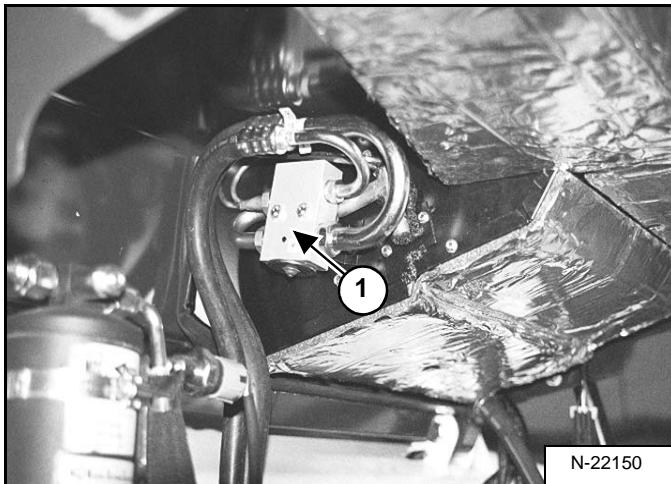
Components (Cont'd)

Figure 80-10-5



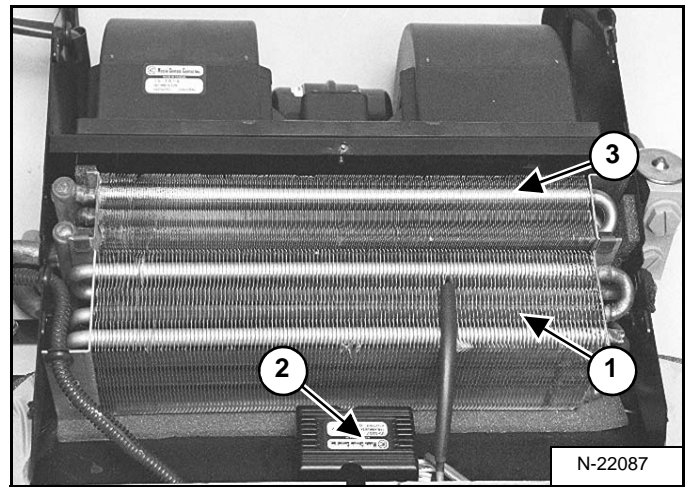
Heater / Evaporator Unit: The heater / evaporator unit (Item 1) [Figure 80-10-5] is located behind the loader cab. The unit delivers the cold air for the A/C and warm air for heat into the cab. The unit contains the blower, heat and A/C coils, thermostat and expansion valve.

Figure 80-10-6



Expansion Valve: The expansion valve (Item 1) [Figure 80-10-6] controls the amount of refrigerant entering the evaporator coil.

Figure 80-10-7

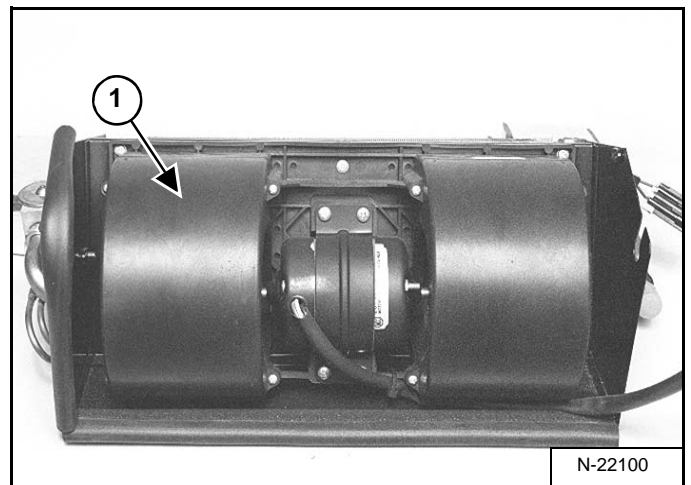


Evaporator Coil: The evaporator coil (Item 1) [Figure 80-10-7] cools and dehumidifies the air before it enters the cab.

Thermostat: The thermostat (Item 2) [Figure 80-10-7] controls the temperature of the evaporator coil.

Heater Coil: The heater coil (Item 3) [Figure 80-10-7] supplies the warm air into the cab by passing air through the coil.

Figure 80-10-8



Heater / Evaporator Blower: The blower (Item 1) [Figure 80-10-8] is used to push air through the heater and evaporator coils and into the cab.

TROUBLESHOOTING

Blower Motor Does Not Operate

Possible Cause	Inspection	Solution
1. Blown fuse.	Inspect the fuse / wiring.	Replace fuse / repair wiring.
2. Broken wiring or bad connection.	Check the fan motor ground and connectors.	Repair the wiring or connector.
3. Fan motor malfunction.	Check the lead wires from the motor with a circuit tester.	Replace Motor.
4. Resistor malfunction.	Check resistor using a circuit tester.	Replace Resistor.
5. Fan motor switch malfunction.	Check power into and out of the fan switch.	Replace Fan Switch.

Blower Motor Operates Normally, But Air Flow Is Insufficient

Possible Cause	Inspection	Solution
1. Evaporator inlet obstruction.	Check evaporator for plugging.	Remove obstruction and clean evaporator fins with air or water.
2. Air leak.	Check to make sure air hoses are properly hooked to Louvers, and air ducts.	Repair or adjust.
3. Defective thermo. switch (frozen evaporator).	Check thermostat using a circuit tester.	Replace thermostat.
4. Plugged cab filters	Check cab filter condition.	Clean or replace filters.

Insufficient Cooling Although Air Flow And Compressor Operation Are Normal

Possible Cause	Inspection	Solution
1. System low on refrigerant.	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.
2. Excessive refrigerant.	The high pressure side pressure will be high.	Use refrigerant recovery equipment to capture excess refrigerant. Charge to the correct refrigerant level.

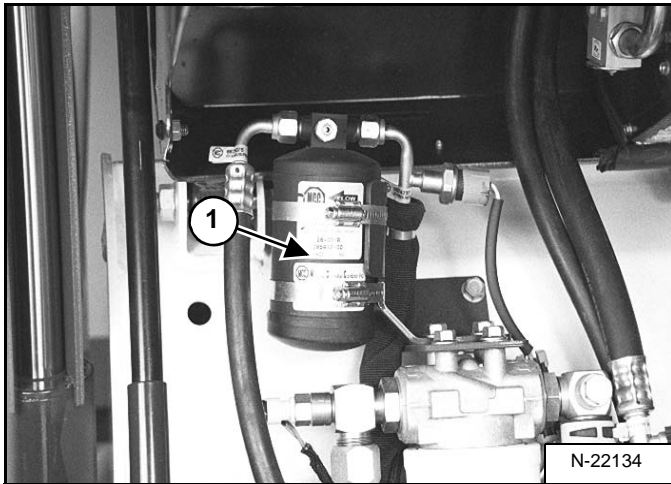
The Compressor Does Not Operate At All, Or Operates Improperly

Possible Cause	Inspection	Solution
1. Loose drive belt.	The belt is vibrating or oscillating.	Adjust tension.
2. Internal compressor malfunction.	The compressor is locked up and the belt slips.	Replace compressor.
	Magnetic clutch related	
3. Low battery voltage.	Clutch slips.	Recharge the battery.
4. Faulty coil.	Clutch slips.	Replace the magnetic clutch.
5. Oil on the clutch surface.	Clutch slips.	Replace or clean the clutch surface.
6. Open coil.	Clutch does not engage and there is no reading when a circuit tester is connected between the coil and terminals.	Replace clutch.
7. Broken wiring or poor ground.	Clutch will not engage. Inspect the ground and connections.	Repair.
8. Wiring harness components.	Test the conductance of the pressure switch, thermostat, Relay, etc.	Check operation / thermostat LED status.

TROUBLESHOOTING (CONT'D)

HVAC Repair And Leaks

Figure 80-30-3



Whenever the A/C system is opened to the atmosphere or there has been a leak in the system, the receiver / drier (Item 1) **[Figure 80-30-3]** must be changed.

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

SYSTEM CHARGING AND RECLAMATION

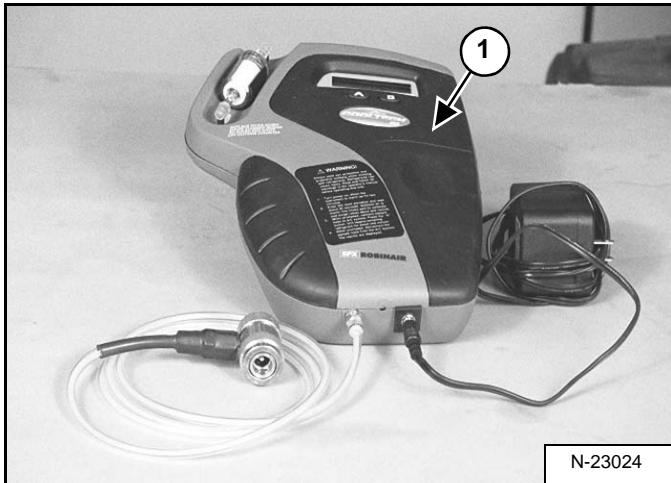
Refrigerant Identification

! 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

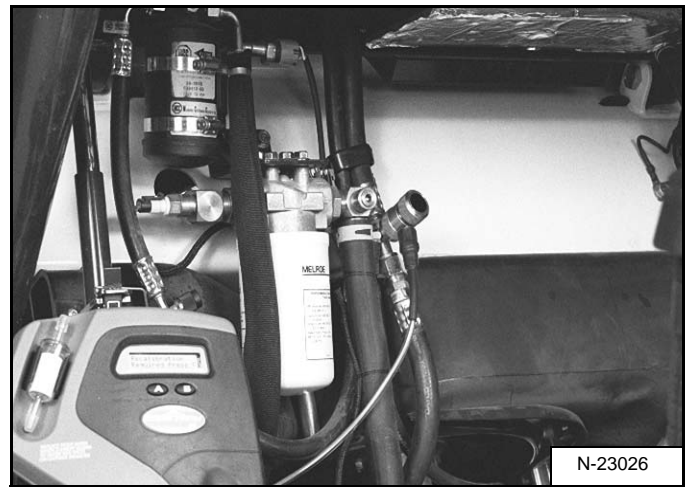
Figure 80-40-1



NOTE: It is recommended to identify the type of refrigerant that is in the A/C system and if it is pure enough to use. The tool MEL1592, Refrigerant Identifier (Item 1) [Figure 80-40-1] will determine, the kind of refrigerant and any possible harmful or dangerous substances that may be present in the system. Thus preventing mixing of dangerous material with your reclaimed R-134a in your reclaimer, and further contamination to other A/C systems that are reclaimed and charged from your MEL1581 Recovery / Recycling / Recharging Machine.

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

Figure 80-40-2



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 10-30-2.)

Connect the Refrigerant Identifier to the low pressure hose [Figure 80-40-2].

Connect the Refrigerant Identifier to its power source.

Follow the steps displayed on the refrigerant identifier screen.

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

Disconnect the refrigerant identifier from the loader A/C.

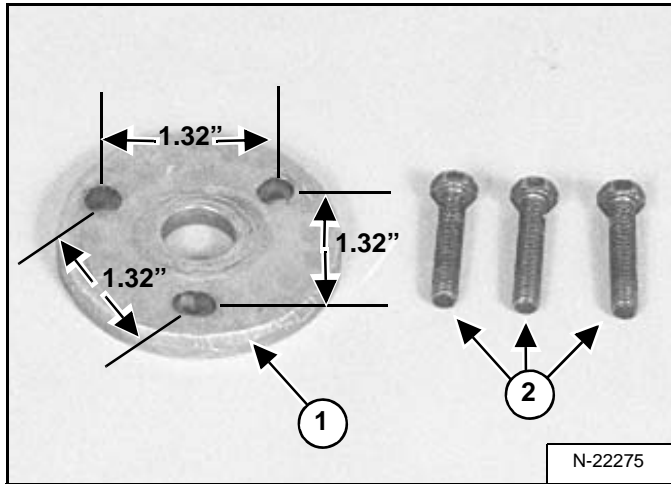
If the refrigerant is dangerous or flammable, it must be evacuated from the A/C system into a separate container and properly and safely disposed of.

If R134a is found, evacuate the system.

COMPRESSOR (CONT'D)

Clutch Disassembly And Assembly (Cont'd)

Figure 80-50-11



The armature plate puller, (Item 1) [Figure 80-50-11] can be constructed by drilling three 10 mm holes in a flat circular plate, located 33,5 mm (1.32 in) apart [Figure 80-50-11].

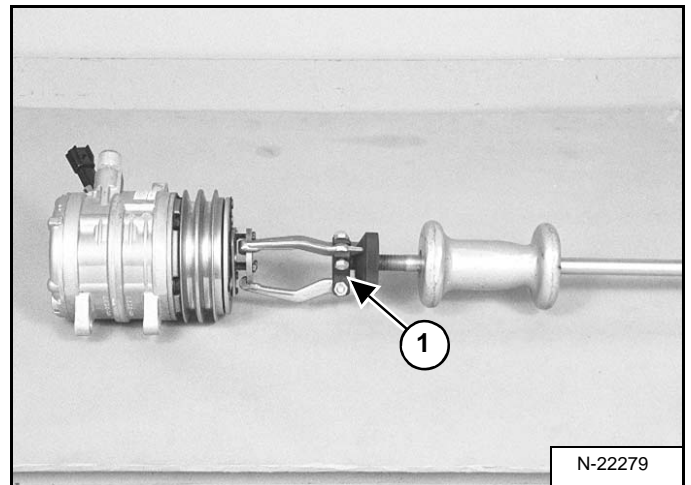
Attach the puller to the armature plate using three 8 mm bolts (Item 2) [Figure 80-50-11].

Figure 80-50-12



Turn the bolts into the three 8 mm (0,31 in) holes (Item 2) [Figure 80-50-10] on the armature plate as shown in [Figure 80-50-12].

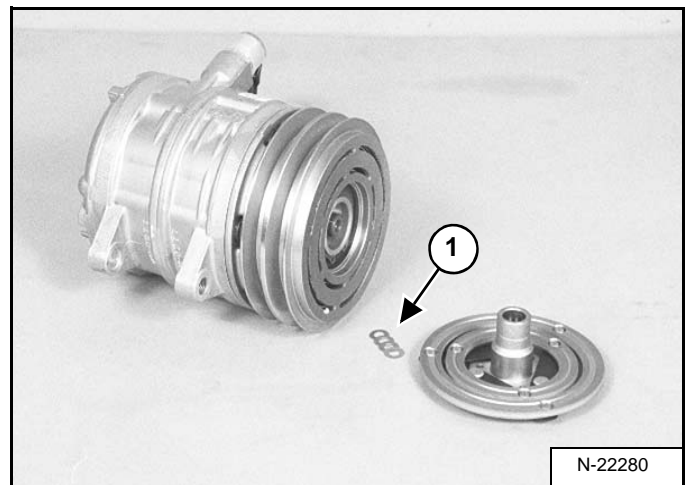
Figure 80-50-13



Attach a slide hammer puller (Item 1) [Figure 80-50-13] to the armature puller disk.

Remove the armature plate from the compressor clutch.

Figure 80-50-14



Remove the shims (Item 1) [Figure 80-50-14] from either the armature shaft or armature plate.

Installation: Insure that the clutch has the correct clearance by adding the shims (Item 1) [Figure 80-50-14].

EVAPORATOR / HEATER UNIT

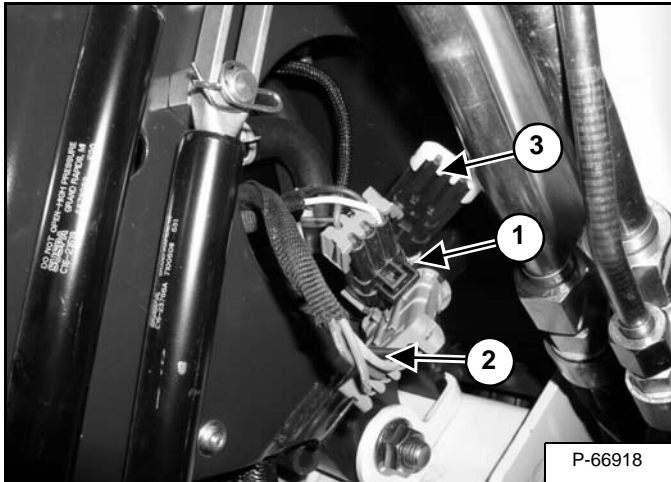
Removal And Installation

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 10-30-2.)

Evacuate the A/C system. (See Reclamation And Charging With Recovery / Charging Unit on Page 80-40-2.)

Figure 80-80-1

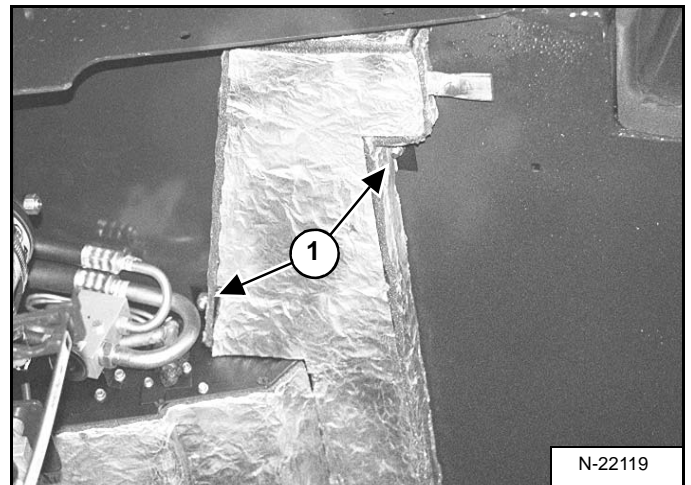


At the rear of the cab, disconnect the heater valve wiring connector (Item 1) [Figure 80-80-1].

Disconnect the blower fan wiring connector (Item 2) [Figure 80-80-1] from the loader wiring harness.

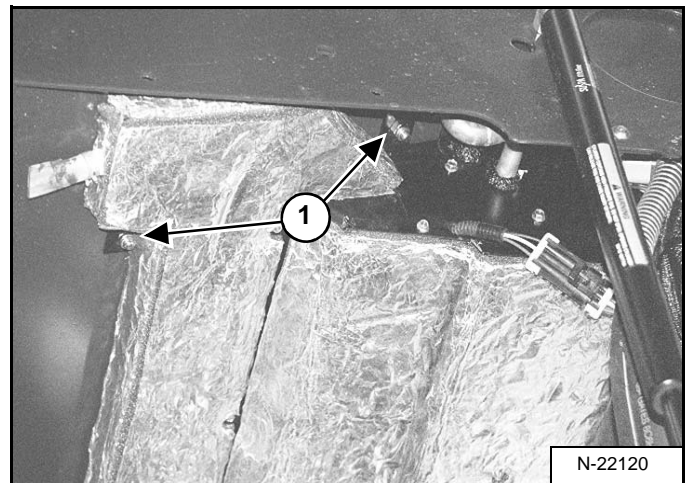
Disconnect the thermostat connector (Item 3) [Figure 80-80-1] from the loader wiring harness.

Figure 80-80-2



Remove the two mounting nuts (Item 1) [Figure 80-80-2].

Figure 80-80-3

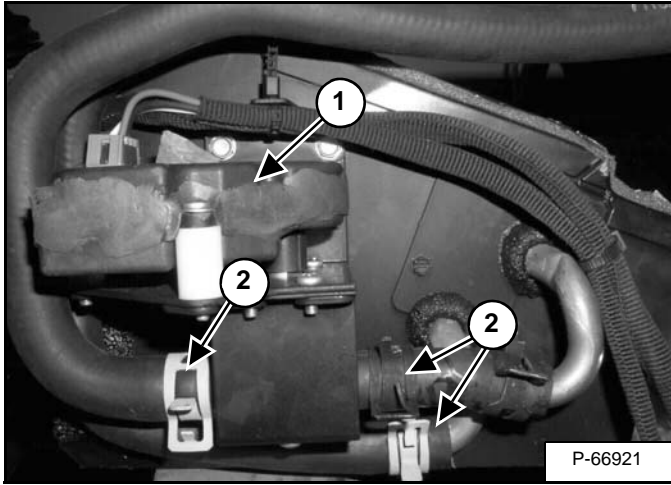


Remove the two mounting nuts (Item 1) [Figure 80-80-3].

HEATER COIL (CONT'D)

Removal And Installation Without A/C

Figure 80-120-6



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 10-30-2.)

Remove the heater unit from the back of the cab. (See Removal And Installation on Page 80-80-1.)

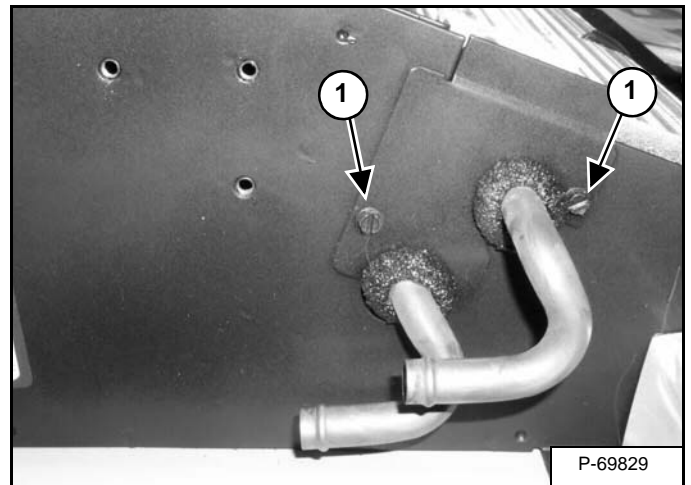
Remove the heater valve (Item 1) [Figure 80-120-6]. (See Removal And Installation on Page 80-140-1.)

Mark the heater hoses (Item 2) [Figure 80-120-6] for proper installation.

Cap the hoses and the heater coil with hydraulic caps and plugs to prevent oil loss from the system.

Remove the rear cover from the evaporator / heater unit. (See Removal And Installation on Page 80-80-1.)

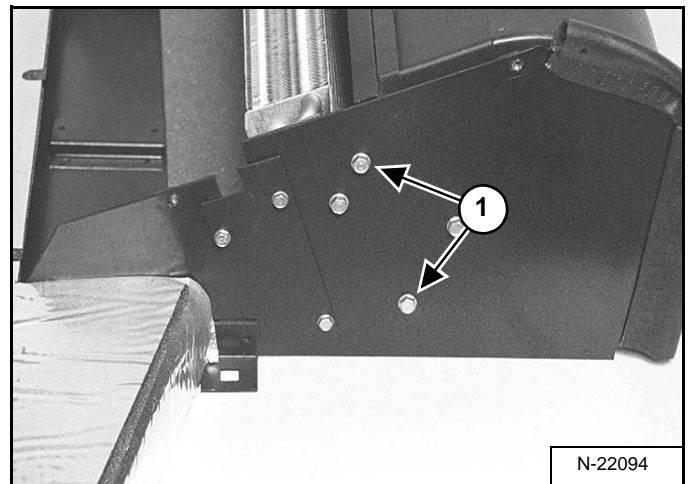
Figure 80-120-7



Remove the mount bolts (Item 1) [Figure 80-120-7] and remove the mount plate from the end of the unit.

Remove the two mount bolts (Item 2) [Figure 80-120-7] that support the heater coil tubelines to the unit.

Figure 80-120-8



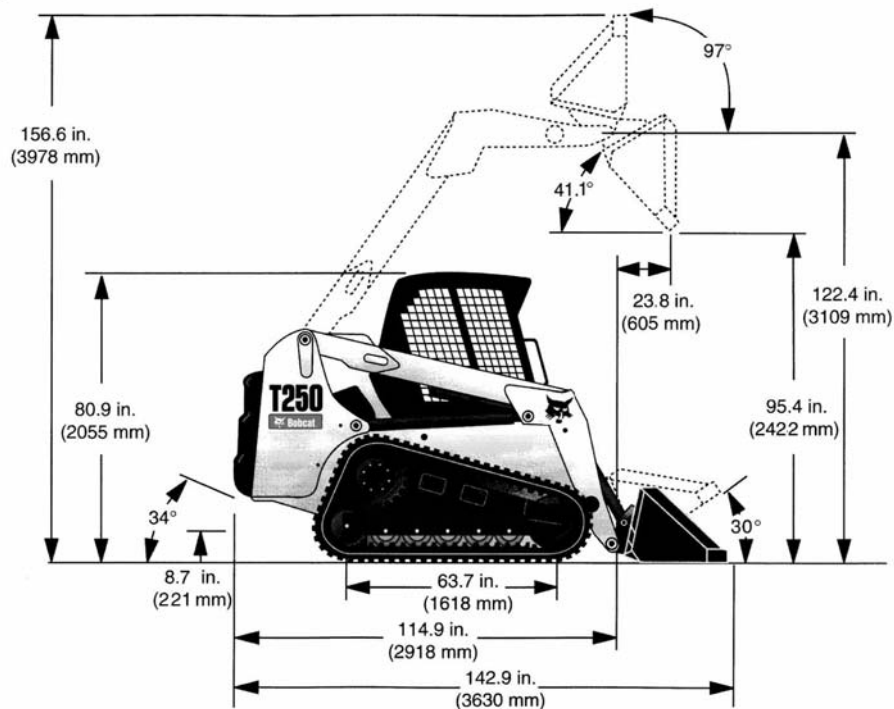
Remove the two mount bolts (Item 1) [Figure 80-120-8] from the heater coil.

Remove the heater coil from the unit.

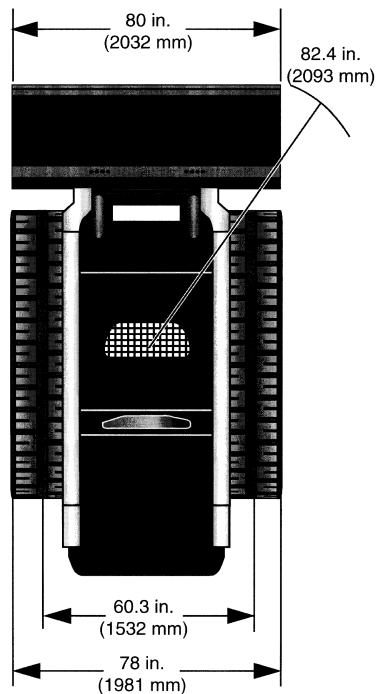
(T250) LOADER SPECIFICATIONS

Machine Dimensions

- Dimensions are given for loader equipped with standard track and 80 inch Construction And Industrial bucket and may vary with other bucket types. All dimensions are shown in inches. Respective metric dimensions are given in millimeters enclosed by parentheses.
- Where applicable, specification conform to SAE or ISO standards and are subject to change without notice.



B-22346E



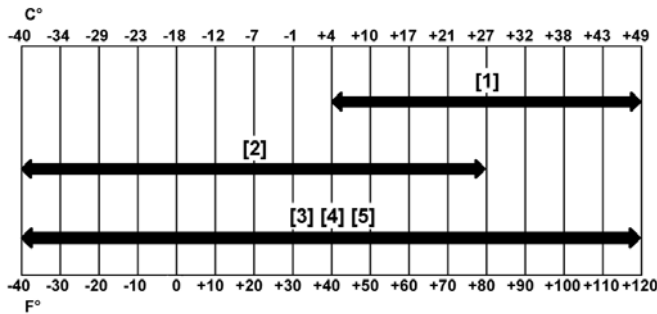
B-22347

Changes of structure or weight distribution of the loader can cause changes in control and steering response and can cause failure of the loader parts.

HYDRAULIC / HYDROSTATIC FLUID SPECIFICATIONS

Specifications

HYDRAULIC / HYDROSTATIC FLUID RECOMMENDED ISO VISCOSITY GRADE (VG) AND VISCOSITY INDEX (VI)



TEMPERATURE RANGE ANTICIPATED DURING MACHINE USE

- [1] VG 100; Minimum VI 130
- [2] VG 46; Minimum VI 150
- [3] BOBCAT All-Season Fluid
- [4] BOBCAT Synthetic Fluid
- [5] BOBCAT Biodegradable Hydraulic / Hydrostatic Fluid (Unlike biodegradable fluids that are vegetable based, Bobcat biodegradable fluid is formulated to prevent oxidation and thermal breakdown at operating temperatures.)

DO NOT use automatic transmission fluids in the loader or permanent damage to the transmission will result.

! 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.

W-2072-0807

When temperatures below -18°C (0°F) are common, the loader must be kept in a warm building. Extra warm-up time must be used each time the loader is started during cold temperature conditions. Cold fluid will not flow easily and it makes action on the hydraulic function slower. Loss of fluid flow to the hydrostatic transmission pump (indicated by TRANS light ON) can cause transmission damage in less than 60 seconds.

! WARNING

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

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

W-2027-0910

CLICK HERE TO **DOWNLOAD** THE COMPLETE MANUAL

- Thank you very much for reading the preview of the manual.
- You can download the complete manual from: www.heydownloads.com by clicking the link below



- Please note: If there is no response to CLICKING the link, please download this PDF first and then click on it.

CLICK HERE TO **DOWNLOAD** THE COMPLETE MANUAL