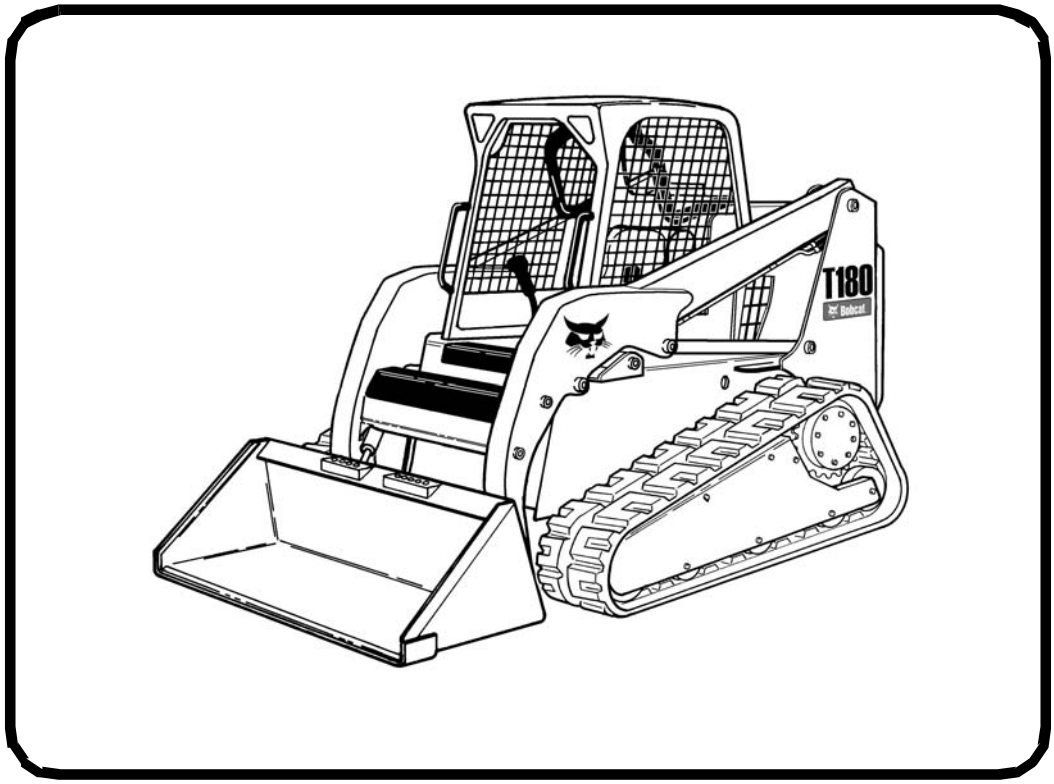
Bobcat®

Service Manual
T180 Compact Track Loader

S/N 531460001 & Above
S/N 531560001 & Above



EQUIPPED WITH
BOBCAT INTERLOCK
CONTROL SYSTEM (BICS™)

6987042 (11-10)

Printed in U.S.A.

SAFETY INSTRUCTIONS

Safety Alert Symbol

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

WARNING

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

W-2003-0903

IMPORTANT

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

I-2019-0284

DANGER

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

D-1002-1107

WARNING

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

W-2044-1107

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

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

LIFTING AND BLOCKING THE LOADER

Procedure

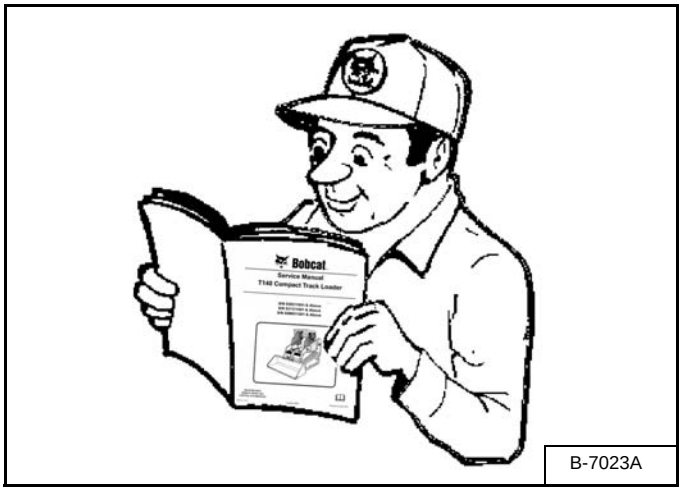
⚠ WARNING

AVOID INJURY OR DEATH

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

W-2003-0807

Figure 10-10-1



B-7023A

⚠ WARNING

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

W-2017-0286

Figure 10-10-2

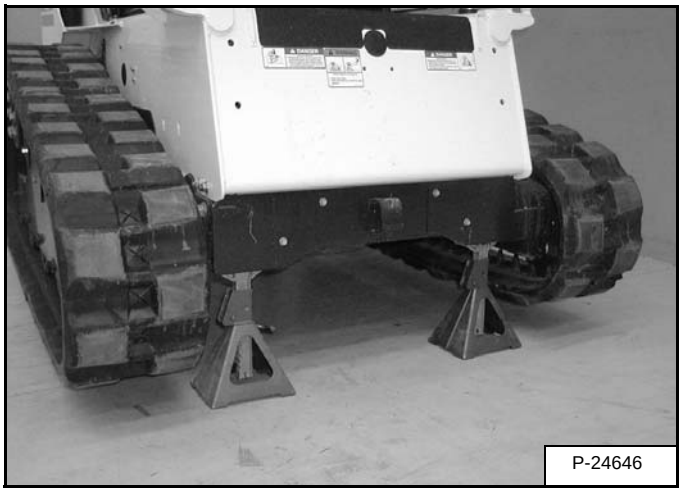
P-31849A

Always park the loader on a level surface.

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

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

Figure 10-10-3



P-24646

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

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

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

TOWING THE LOADER

Procedure

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

- The loader can be lifted onto a transport vehicle.

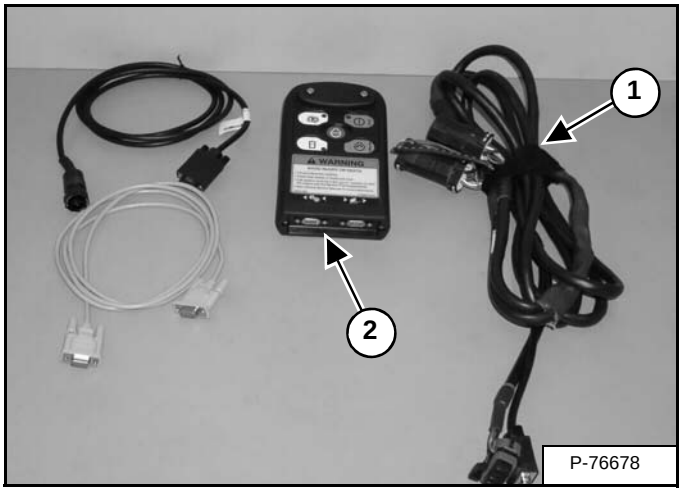
- The loader can be skidded a short distance to move for service (EXAMPLE: Move onto a transport vehicle.) without damage to the hydrostatic system. (The tracks will not turn.) There might be slight wear to the tracks when the loader is skidded.

The towing chain (or cable) must be rated at one and one-half times the weight of the loader. (See Performance on Page SPEC-10-2).

REMOTE START TOOL (SERVICE TOOL) KIT - 6689779 (CONT'D)

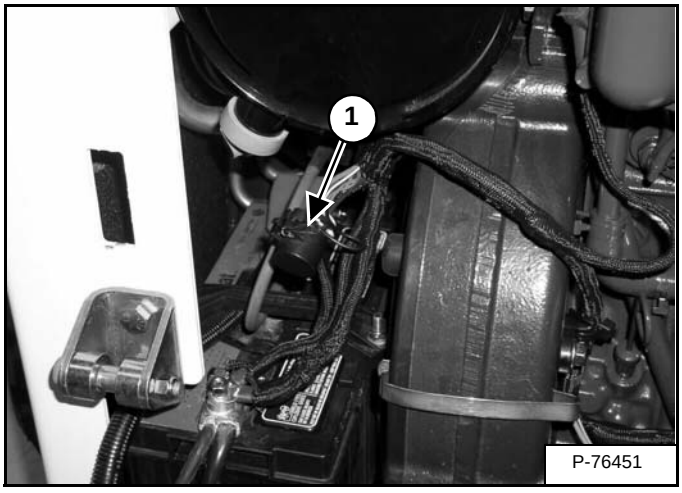
Loader Service Tool Harness - 6689747

Figure 10-61-18



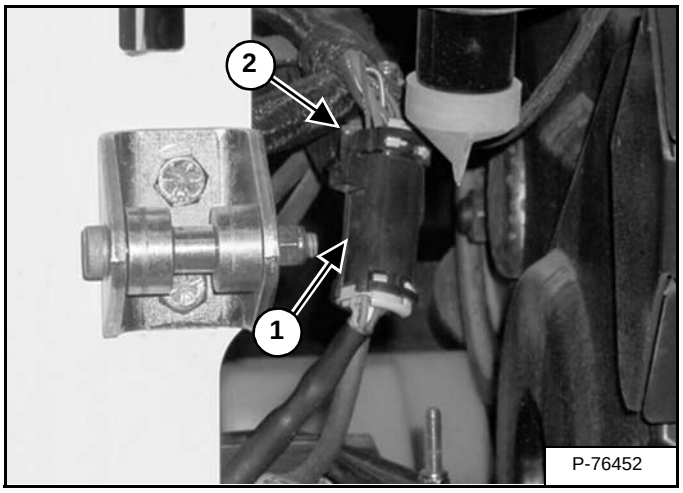
The loader service tool harness (Item 1) **[Figure 10-61-18]** is used to connect the remote start tool (service tool) (Item 2) **[Figure 10-61-18]** to the electrical system on the loader.

Figure 10-61-19



Loaders without an attachment control harness, remove the loader harness cap (Item 1) **[Figure 10-61-19]** and connect the Loader Service Tool Harness from the Remote Start Tool (Service Tool).

Figure 10-61-20



Loaders with an attachment control harness (7 pin or 14 pin), the attachment harness (Item 1) must be disconnected from the loader harness (Item 2) **[Figure 10-61-20]**.

When the remote start procedure is completed, replace the loader connector cap (Item 1) **[Figure 10-61-19]** or reconnect the attachment control harness to the loader harness **[Figure 10-61-20]**.

ENGINE COOLING SYSTEM

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

⚠ 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.**

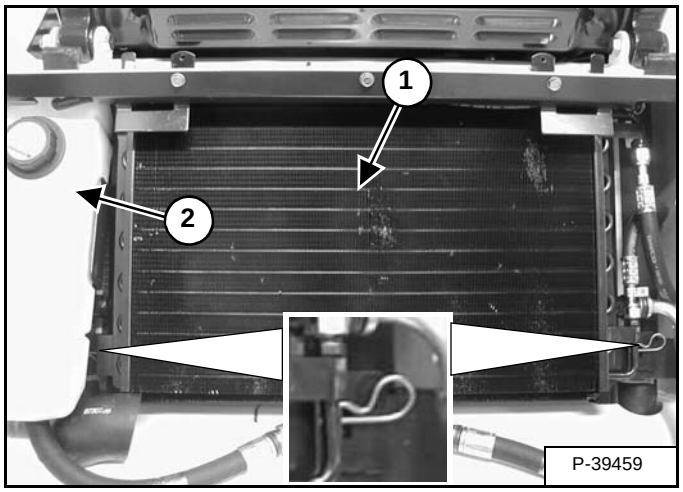
W-2019-0907

Cleaning

Open the rear door. (See REAR DOOR on Page 50-70-1.)

Remove the rear grill. (See REAR GRILL on Page 50-60-1.)

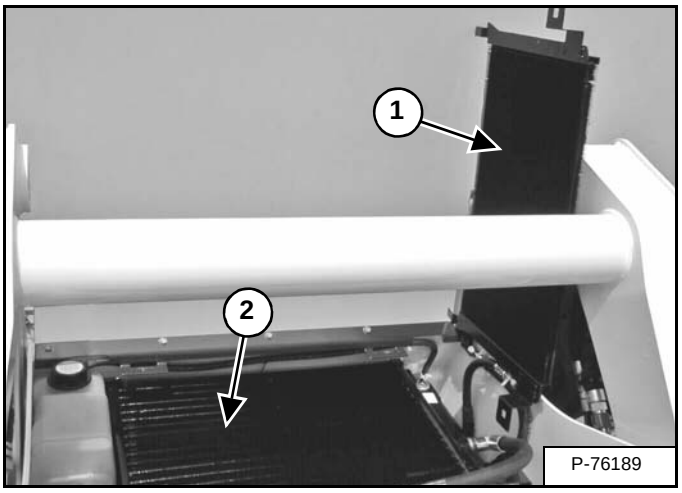
Figure 10-90-1



Use low air pressure or water pressure to clean the top of the air conditioning condenser (Item 1) **[Figure 10-90-1]**, if equipped.

Raise the overflow tank (Item 2) slightly and remove the two fasteners (Inset) **[Figure 10-90-1]**.

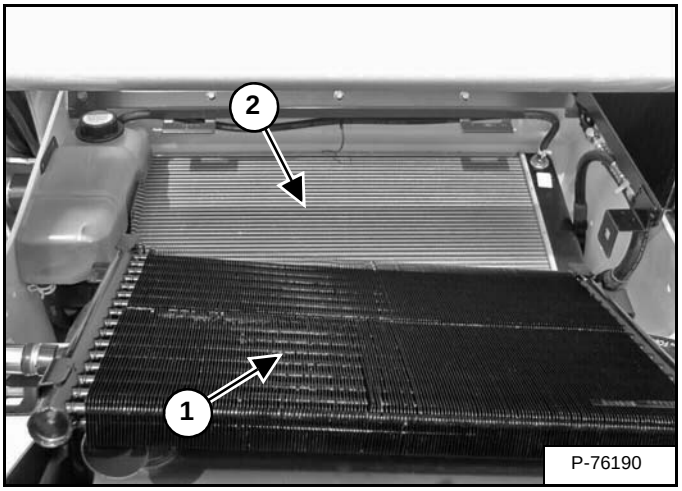
Figure 10-90-2



NOTE: Be careful when raising and lowering the air conditioning condenser so that the air conditioning condenser does not fall on the oil cooler and damage the fins.

Raise the air conditioning condenser (Item 1) and use low air pressure or water pressure to clean the top of the oil cooler (Item 2) **[Figure 10-90-2]**.

Figure 10-90-3



NOTE: Be careful when raising and lowering the oil cooler so that the oil cooler does not fall on the radiator and damage the fins.

Raise the oil cooler (Item 1) and use low air pressure or water pressure to clean the top of the radiator (Item 2) **[Figure 10-90-3]**.

Lower the oil cooler.

Lower the air conditioning condenser, if equipped.

Install the fasteners and lower the overflow tank. Check the cooling system for leaks.

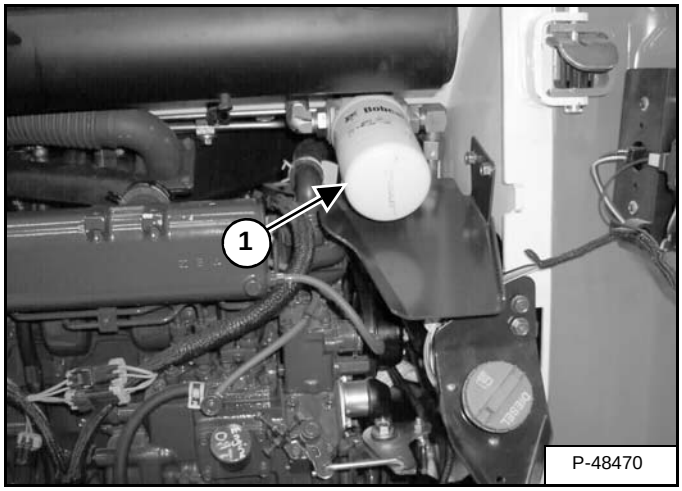
Install the rear grill and close the rear door.

Removing And Replacing Hydraulic / Hydrostatic Filter

For the correct service interval (See SERVICE SCHEDULE on Page 10-70-1.)

Open the rear door.

Figure 10-120-5



Remove the filter (Item 1) **[Figure 10-120-5]**.

Clean the surface of the filter housing where the filter seal contacts the housing.

Put clean oil on the seal of the new filter element. Install and hand tighten the filter element.

⚠ 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

Close the rear door.

Start the engine and operate the loader hydraulic controls.

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.)

SPARK ARRESTOR MUFFLER

Cleaning Procedure

Use the correct service interval for cleaning the spark arrestor muffler. (See SERVICE SCHEDULE on Page 10-70-1.)

Do not operate the loader with a defective exhaust system.

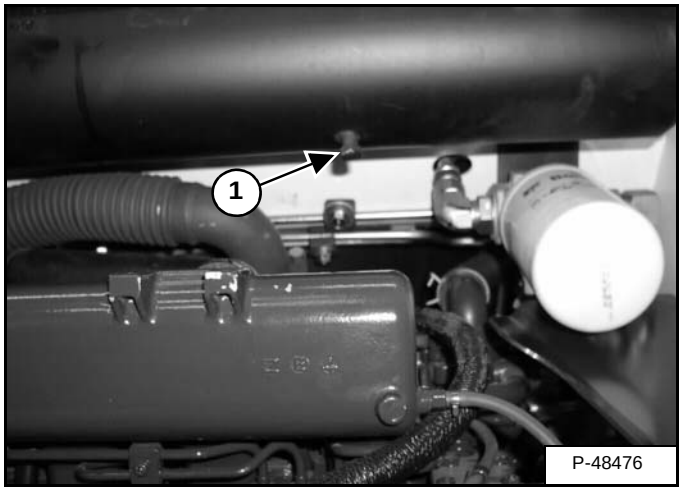
IMPORTANT

Replaced by I-2284.

I-2022

Stop the engine and open the rear door.

Figure 10-150-1



Remove the plug (Item 1) **[Figure 10-150-1]** from the bottom of the muffler.

⚠ WARNING

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

W-2006-1209

Start the engine and run for about 10 seconds while a second person, wearing safety goggles, holds a piece of wood over the outlet of the muffler.

This will force contaminants out through the cleanout hole.

Stop the engine.

Install and tighten the plug.

Close the rear door.

⚠ WARNING

AVOID INJURY OR DEATH

When an engine is running in an enclosed area, fresh air must be added to avoid concentration of exhaust fumes. If the engine is stationary, vent the exhaust outside. Exhaust fumes contain odorless, invisible gases which can kill without warning.

W-2050-0807

⚠ WARNING

Stop engine and allow the muffler to cool before cleaning the spark chamber. Wear safety goggles. Failure to obey can cause serious injury.

W-2011-1285

⚠ WARNING

Never use machine in atmosphere with explosive dust or gases or where exhaust can contact flammable material. Failure to obey warnings can cause injury or death.

W-2068-1285

HYDRAULIC SYSTEM (CONT'D)

Continued On Next Page

Glossary Of Hydraulic / Hydrostatic Symbols

SYMBOL DESCRIPTION

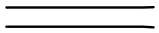
FLOW LINES and CONNECTIONS

WORKING CIRCUITS - Continuous, Solid Line - Working (Main) Line, Return Line (line conducting fluid from working devices to the reservoir) and Feed line (main line conductor).

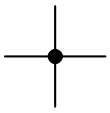
PILOT PRESSURE - Dashed Line - Pilot Line (Line which conducts control fluid).

DRAIN CIRCUITS - Dotted Line - Drain Line (drain or bleed line - line conducting fluid from a component housing to the reservoir.

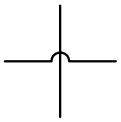
COMPONENTS - Long Chain Line - Enclosure outline for several components assembled in one unit.



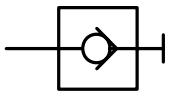
MECHANICAL CONNECTIONS - Double Line (Shaft, Lever, Piston Rod).



CONNECTED JUNCTION OF OIL LINES (Flow Line Connection).



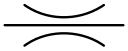
OIL LINES CROSSING (NOT Connected).



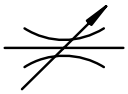
COUPLER - Quick - Acting Coupling (uncoupled, closed by non-return valve).

SYMBOL DESCRIPTION

BASIC and MISCELLANEOUS SYMBOLS

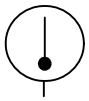


RESTRICTION - Line with Fixed Restriction - Affected by Viscosity (property of resistance to flowing fluid).

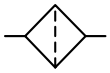


VARIABLE ADJUSTMENT RESTRICTION - Regulated or Variable Restriction.

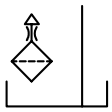
TEMPERATURE CONTROL - (Indication of temperature).



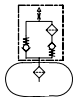
TEMPERATURE INDICATOR - (temperature measurement - thermometer).



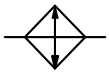
FILTER (strainer or screen) - For fluid conditioning.



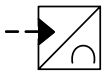
VENTED AND FILTERED RESERVOIR (reservoir open to atmosphere).



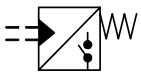
PRESSURIZED, VENTED AND FiLTERED RESERVOIR (Reservoir uses a pressured cap).



OIL COOLER (heat exchanger) - The arrows in the diamond indicate the extraction of heat (heat dissipation).

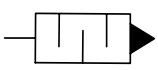


PRESSURE SENSOR - Varies electric signal with pressure.



DIFFERENTIAL PRESSURE SWITCH - Switch activates when pressure difference reaches specified level.

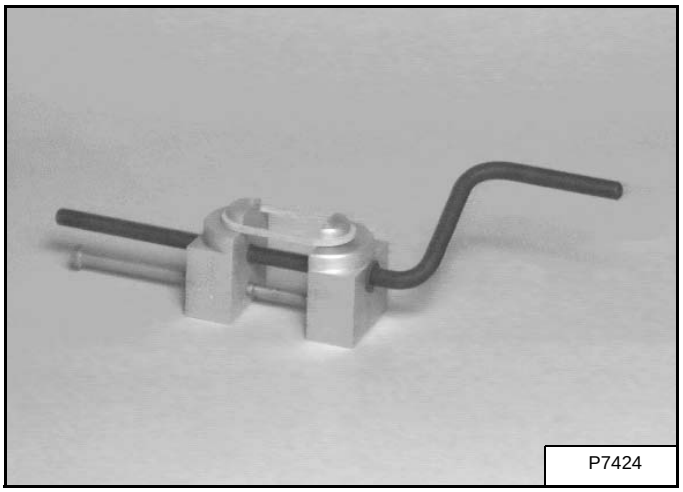
PRESSURE SWITCH - Switch activates when pressure reaches specified level.



MUFFLER (silencer) - Reduces noise.

Disassembly And Assembly (Cont'd)

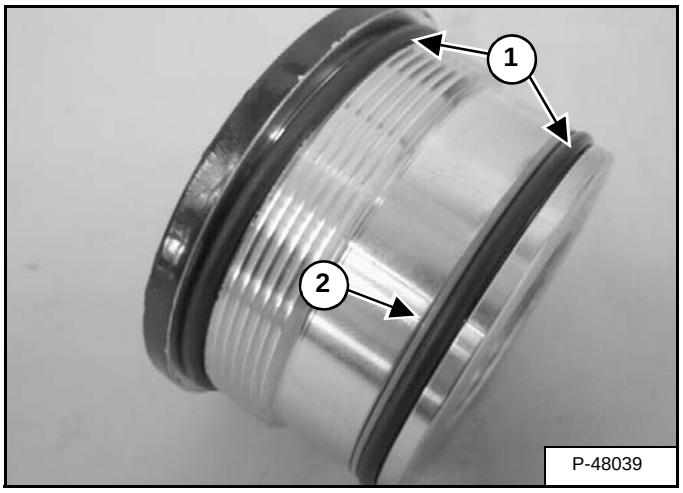
Figure 20-20-10



Assembly: Install the new seal on the tool and slowly stretch it until it fits the piston **[Figure 20-20-10]**. Allow the seal to stretch for 30 seconds before installing it on the piston.

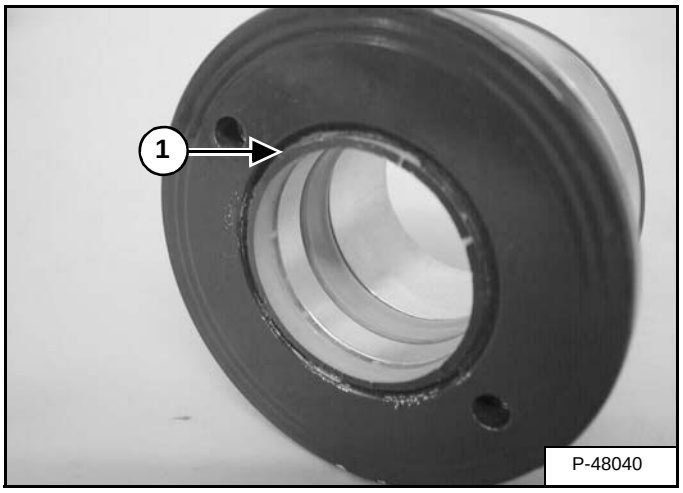
Once the seal is installed on the piston, a piston ring compressor can be used on the piston for 3 minutes to compress the seal into place.

Figure 20-20-11



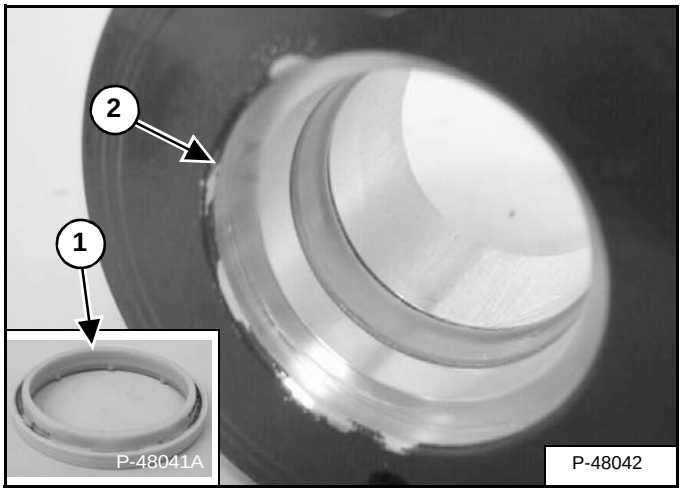
Remove the two O-rings (Item 1) and the back-up washer (Item 2) **[Figure 20-20-11]** from the cylinder head.

Figure 20-20-12



Remove the wiper seal (Item 1) **[Figure 20-20-12]** from the cylinder head.

Figure 20-20-13



Install the wiper seal, with the wiper side of the seal (Item 1), toward the outside of the head (Item 2) **[Figure 20-20-13]**.

CYLINDER (BOB-TACH)

Testing

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

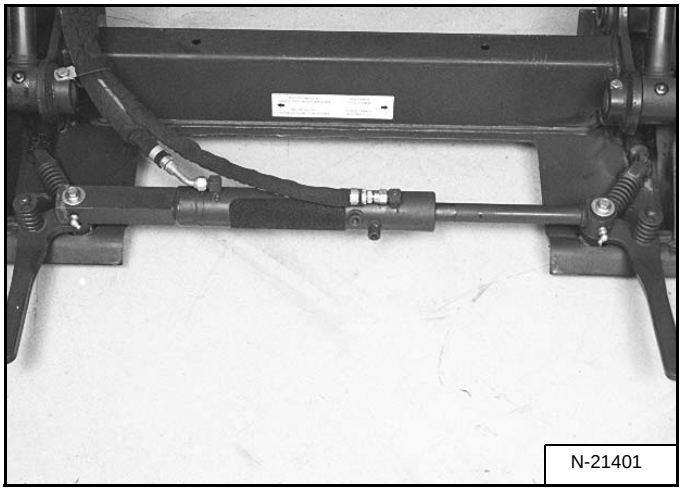
WARNING

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.

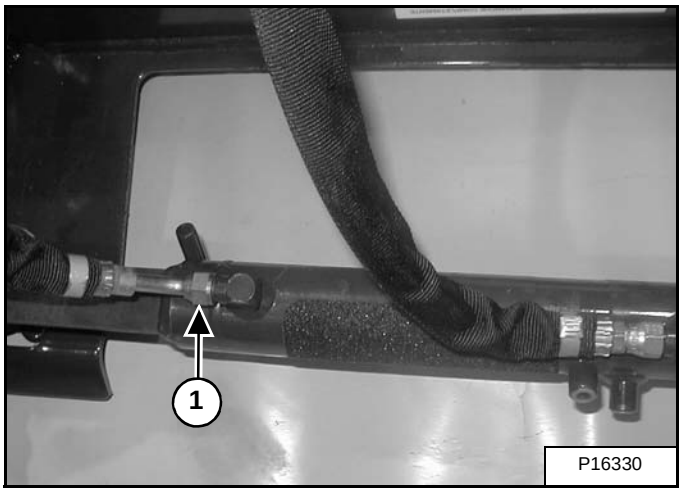
W-2072-0807

Figure 20-22-1



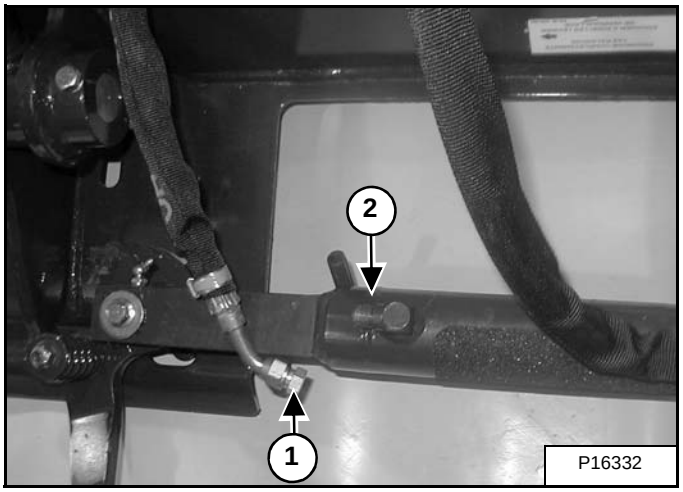
Tilt the Bob-Tach forward, so it is parallel to the floor **[Figure 20-22-1]**.

Figure 20-22-2



Disconnect the hose (Item 1) **[Figure 20-22-2]** from the Bob-Tach cylinder base end port.

Figure 20-22-3



Install a plug in the hose (Item 1) **[Figure 20-22-3]** and tighten.

Engage the parking brake. Lower the seat bar. Start the engine.

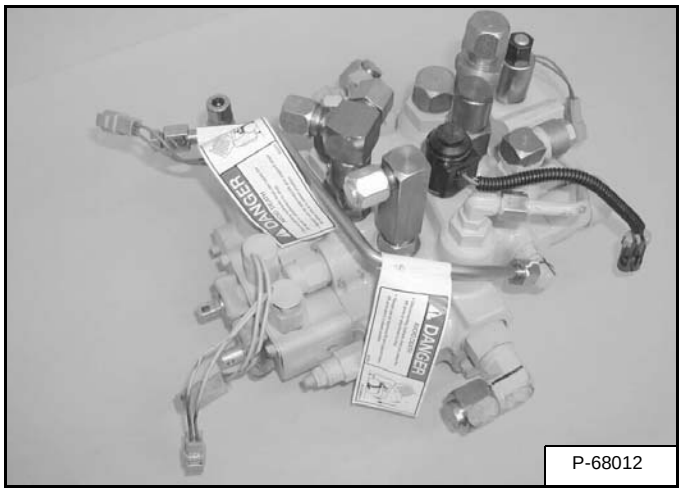
Push and hold the BOB-TACH “WEDGES UP” Switch (Front Accessory Panel).

If there is any leakage from the base end cylinder port (Item 2) **[Figure 20-22-3]**, remove the Bob-Tach cylinder for repair.

HYDRAULIC CONTROL VALVE (STANDARD)

Description

Figure 20-40-1



The hydraulic control valve is located inside the main frame on the right hand side, below the operators cab.

The hydraulic control valve **[Figure 20-40-1]** is the hydraulic component that uses spools to direct the flow of hydraulic fluid to the lift, tilt and auxiliary functions.

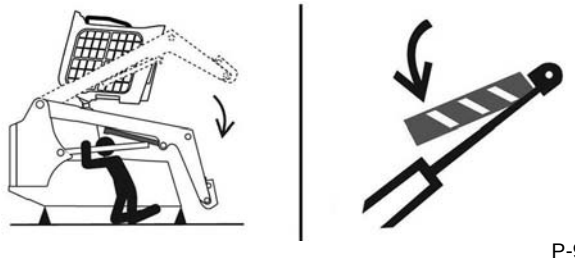
The lift and tilt functions are operated using mechanical linkages to connect the foot pedals to the lift and tilt spools.

The auxiliary function is operated by pilot pressure. There is one solenoid located by each side of the spool. Only one solenoid at a time is activated by the switch on the right side control handle/lever. The activated solenoid sends pilot pressure oil to one side of the spool and forces the spool to shift.

The hydraulic control valve contains a main relief valve which is adjustable.

Removal And Installation

DANGER



P-90328

AVOID DEATH

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

D-1009-0409

WARNING

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

W-2059-0598

IMPORTANT

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

I-2003-0888

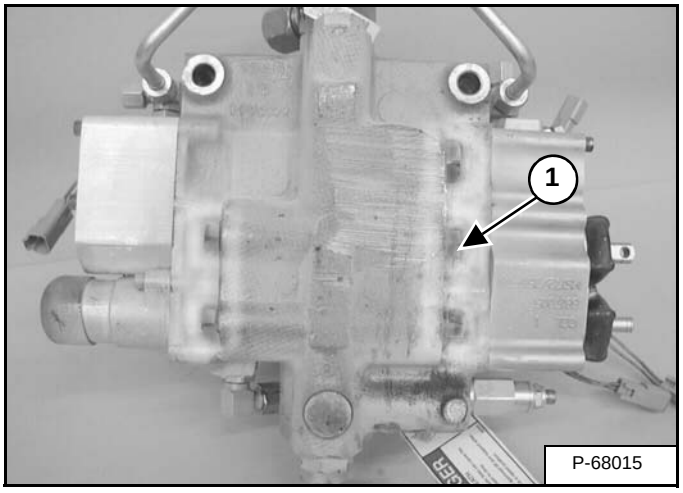
Lift and block the loader. (See Procedure on Page 10-10-1.)

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

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

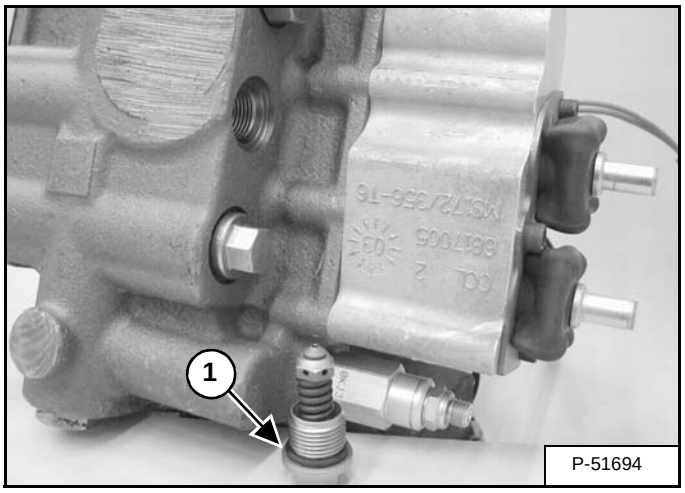
Port Relief / Anti-Cavitation Valve Removal And Installation (Tilt, Rod End)

Figure 20-40-33



Remove the tilt port relief/anti cavitation valve (Item 1) **[Figure 20-40-33]** from the rod end of the tilt section.

Figure 20-40-34

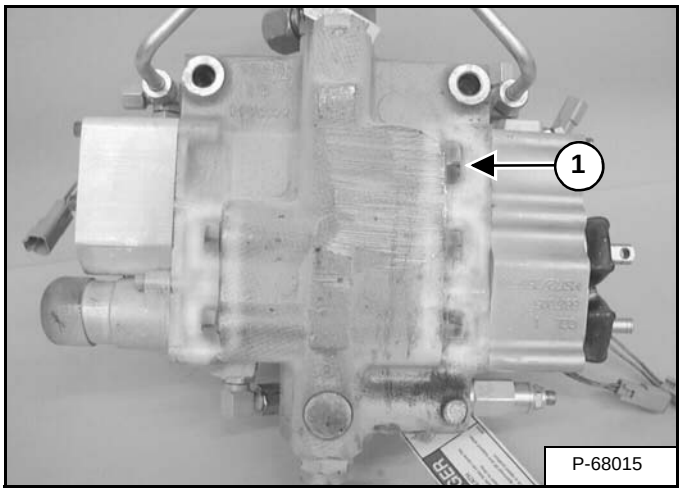


Replace the O-ring (Item 1) **[Figure 20-40-34]** before installation.

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

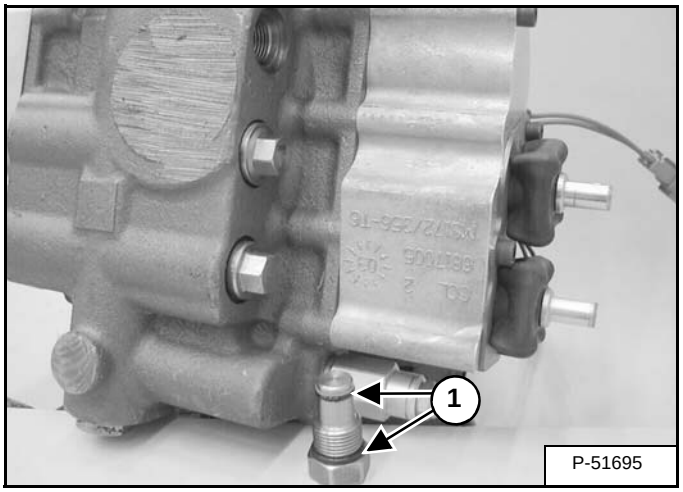
Port Relief Valve Removal And Installation

Figure 20-40-35



Remove the port relief plug (Item 1) **[Figure 20-40-35]** from the auxiliary circuit of the control valve.

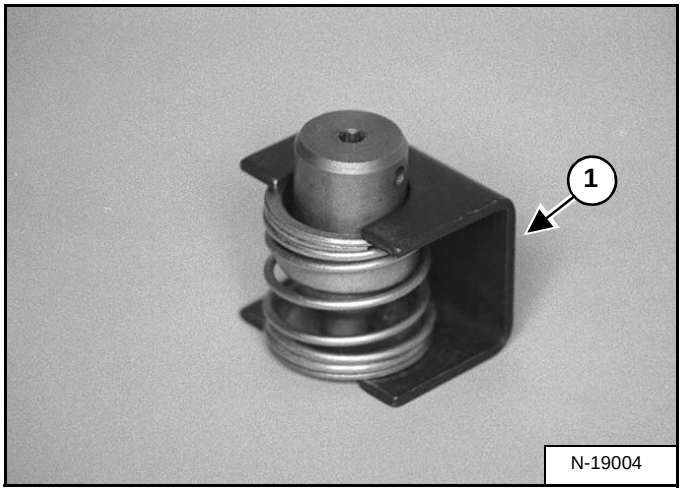
Figure 20-40-36



Installation: Always use new O-rings (Item 1) **[Figure 20-40-36]**. Tighten to 38 - 45 ft.-lb. (52 - 61 N•m) torque.

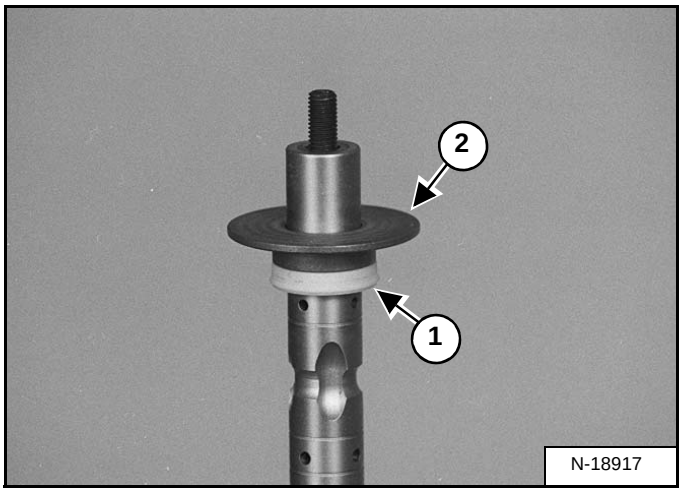
Lift Spool And Detent Removal And Installation (Cont'd)

Figure 20-40-72



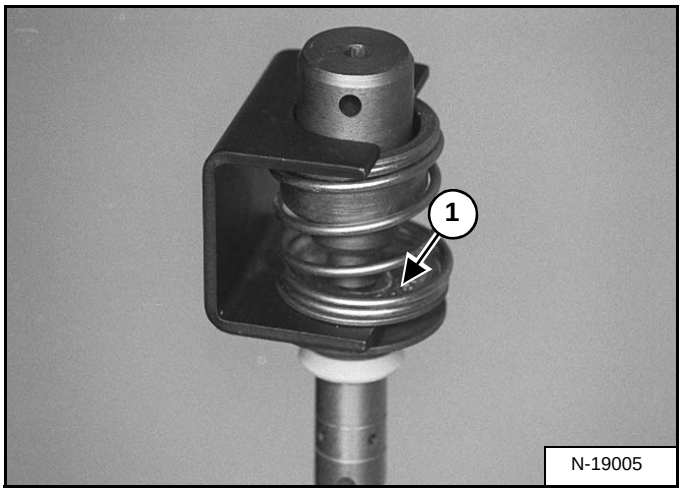
Install the spring tool (Item 1) **[Figure 20-40-72]** over the washer, spring, collar and detent adapter.

Figure 20-40-73



Install the spool seal (Item 1) and back-up washer (Item 2) **[Figure 20-40-73]**.

Figure 20-40-74



Install the spring assembly to the lift spool hand tight **[Figure 20-40-74]**.

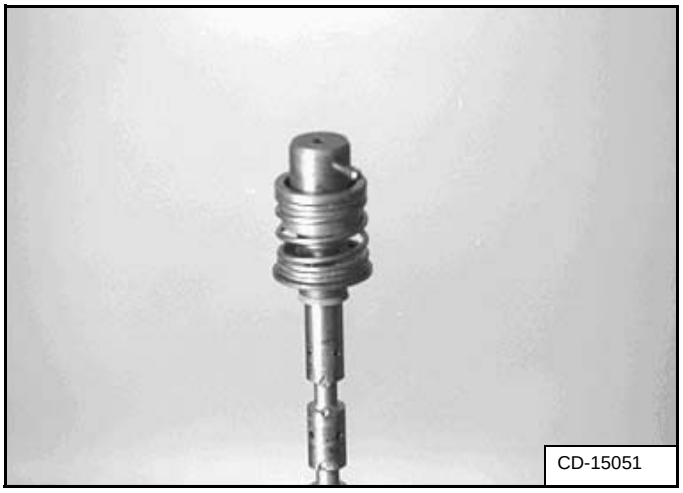
Remove the spring tool.

Check the alignment of the detent adapter and the washer.

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

NOTE: The adapter must fit in the center of the washer (Item 1) [Figure 20-40-74].

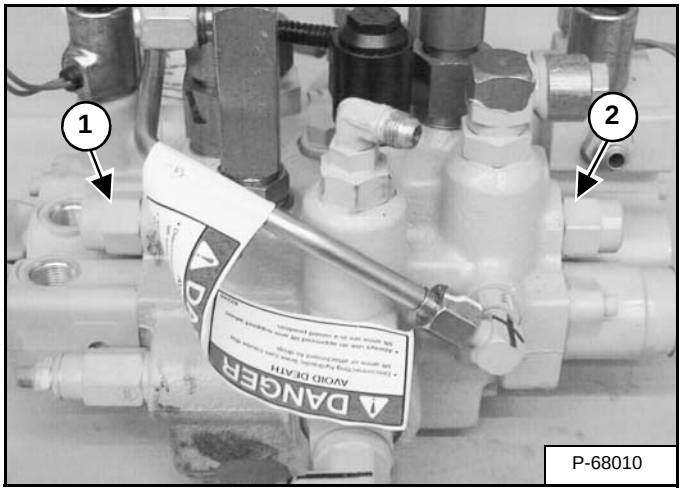
Figure 20-40-75



Install the detent balls and spring **[Figure 20-40-75]**.

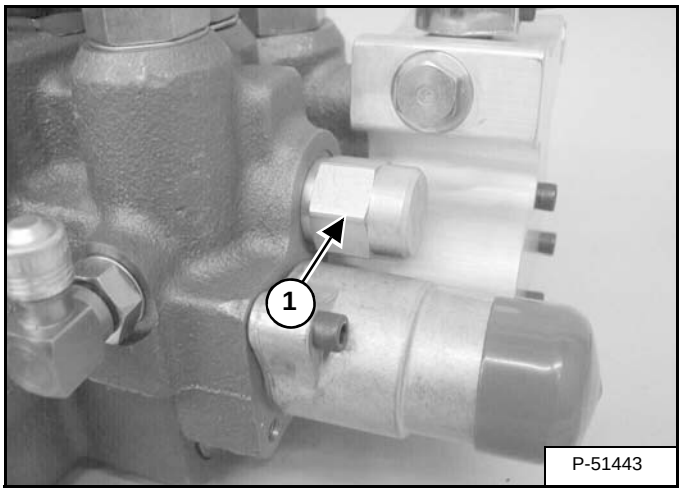
Lock Valve Removal And Installation

Figure 20-40-109



Locate the two BICS lock valves, (Item 1) is for the tilt circuit and (Item 2) **[Figure 20-40-109]** is for the lift circuit.

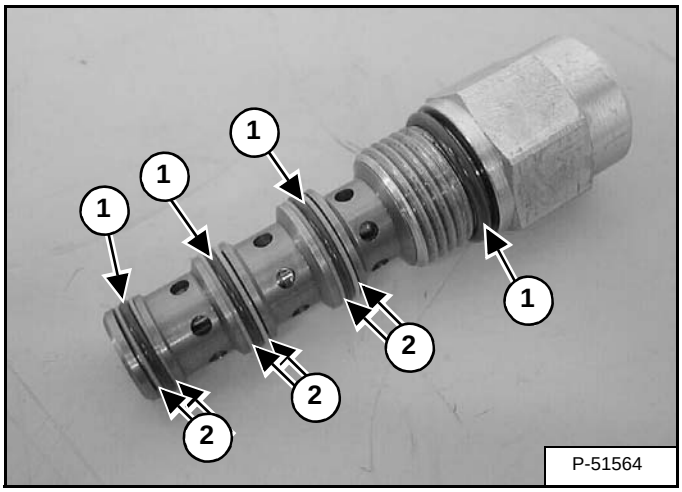
Figure 20-40-110



Remove the lift lock valve (Item 1) **[Figure 20-40-110]** from the back of the control valve.

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

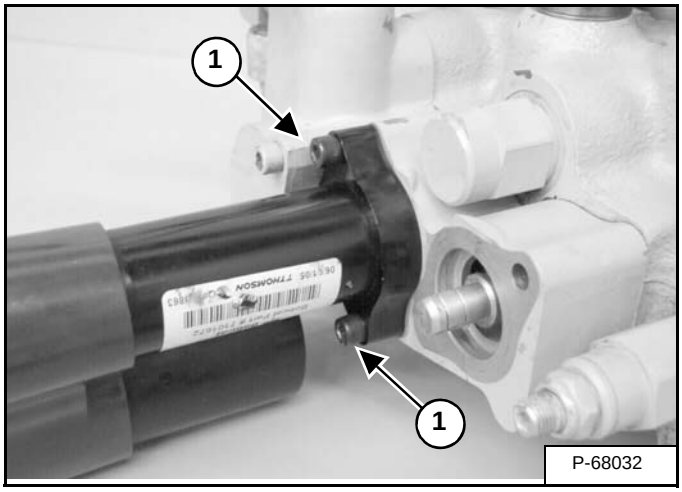
Figure 20-40-111



Remove the O-rings (Item 1) and back-up rings (Item 2) **[Figure 20-40-111]** from the lift lock valve, and replace with new.

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

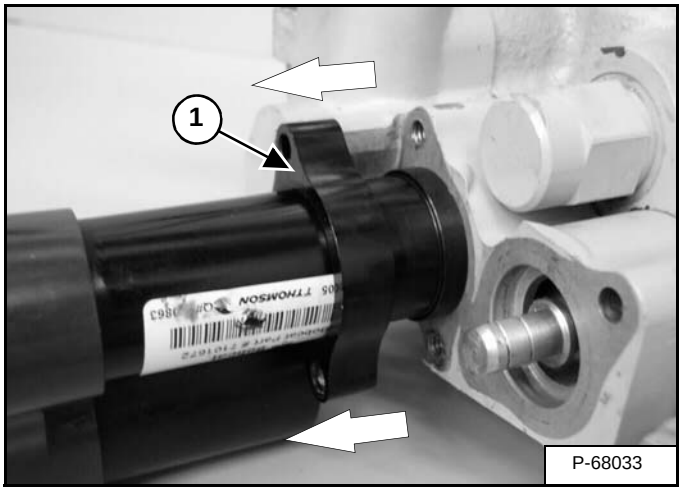
Figure 20-41-21



Remove the two mount bolts (Item 1) **[Figure 20-41-21]** from the tilt actuator.

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

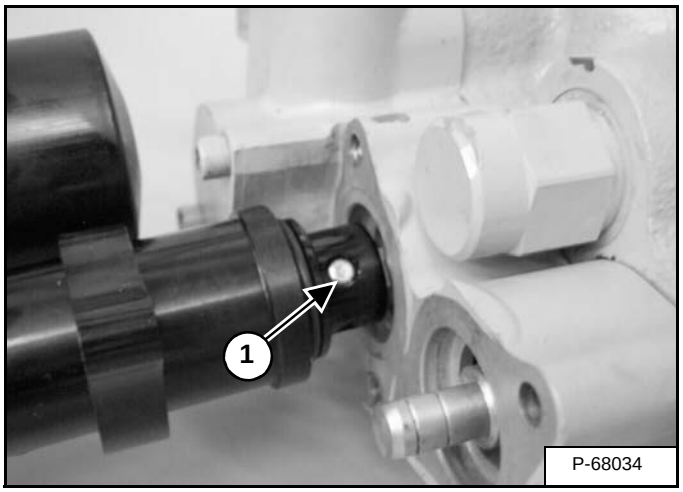
Figure 20-41-22



Slide the actuator mount bracket (Item 1) **[Figure 20-41-22]** away from the control valve.

Pull the actuator away from the control valve **[Figure 20-41-22]**.

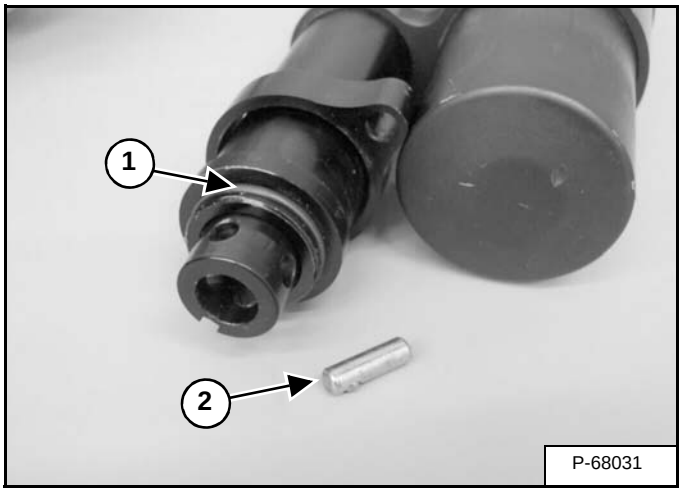
Figure 20-41-23



Using a drift pin and a hammer, remove the actuator linkage pin (Item 1) **[Figure 20-41-23]** from the actuator and the tilt spool.

Remove the actuator and linkage pin from the valve.

Figure 20-41-24



Inspect the O-ring (Item 1) **[Figure 20-41-24]** on the nose of the actuator, and replace as needed.

Check the linkage pin (Item 2) **[Figure 20-41-24]** and replace as needed.

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

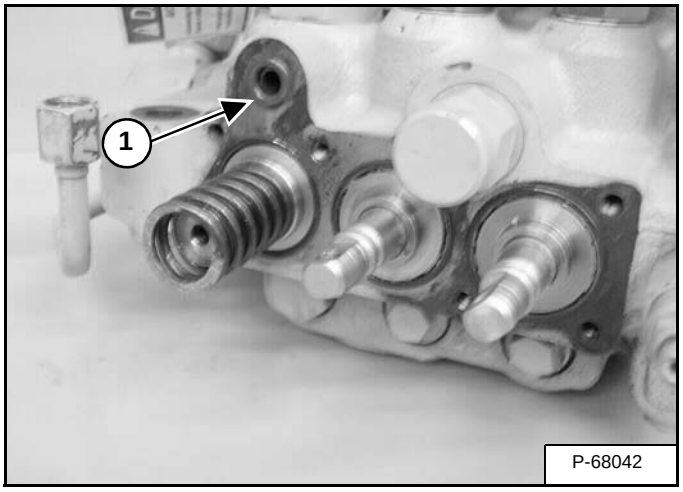
Lift Spool And Detent Removal And Installation

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

MEL 1285 - Spring Tool

Remove the end cap block from the control valve.

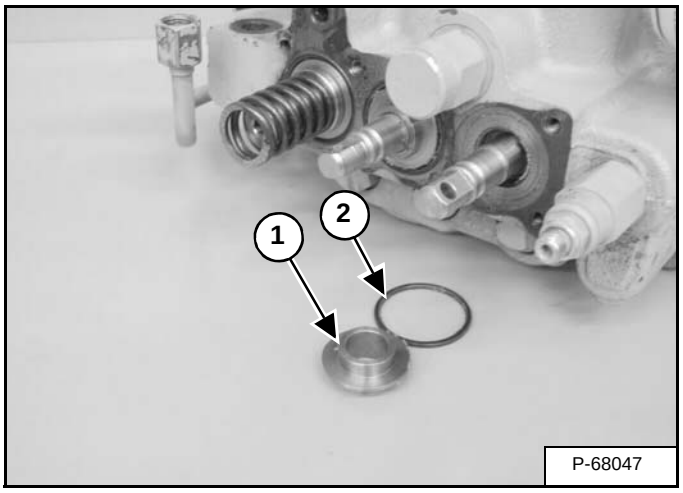
Figure 20-41-53



Remove the O-ring (Item 1) **[Figure 20-41-53]**.

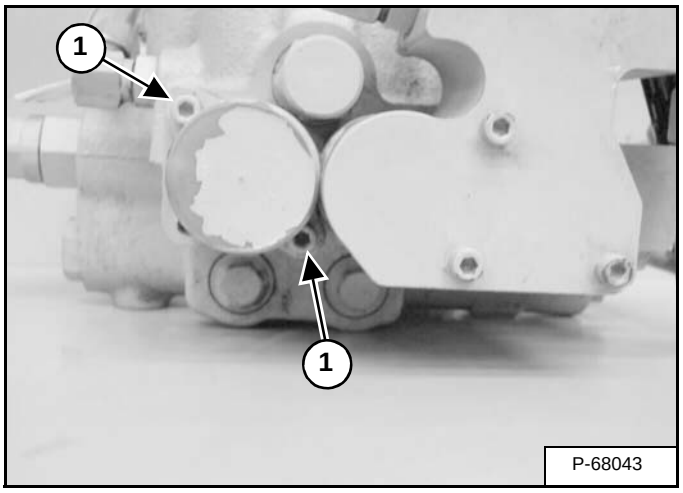
Installation: Replace the O-ring, and lubricate lightly with oil before installation of the end cap block.

Figure 20-41-54



Remove the spacer (Item 1) and O-ring (Item 2) **[Figure 20-41-54]** from the lift spool.

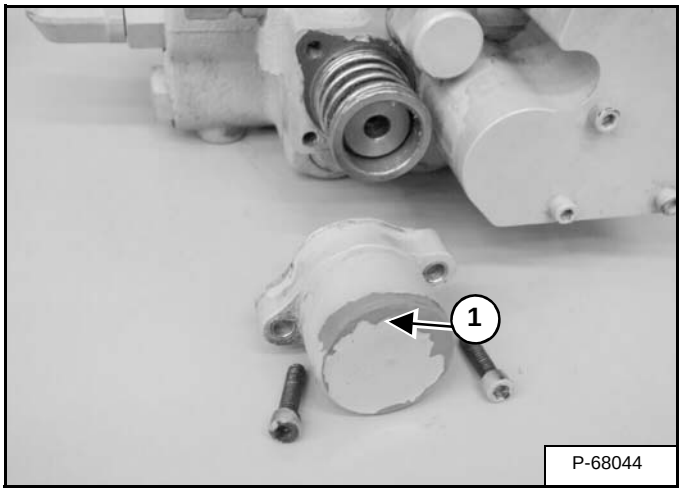
Figure 20-41-55



Remove the two screws (Item 1) **[Figure 20-41-55]** from the lift spool end cap.

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

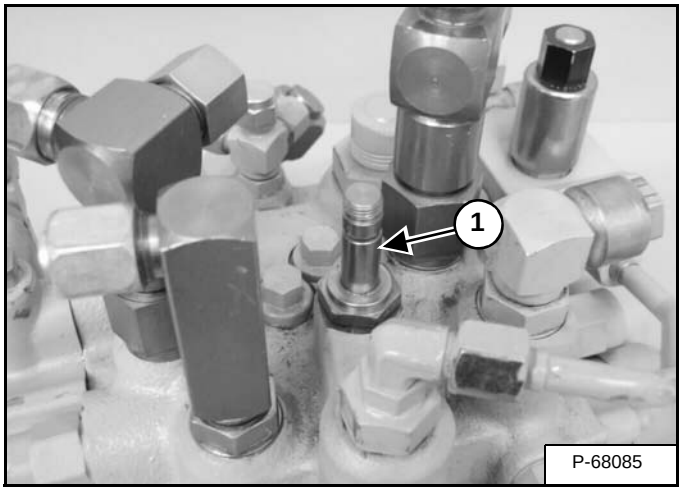
Figure 20-41-56



Remove the lift spool end cap (Item 1) **[Figure 20-41-56]** from the control valve.

Solenoid Removal And Installation (Cont'd)

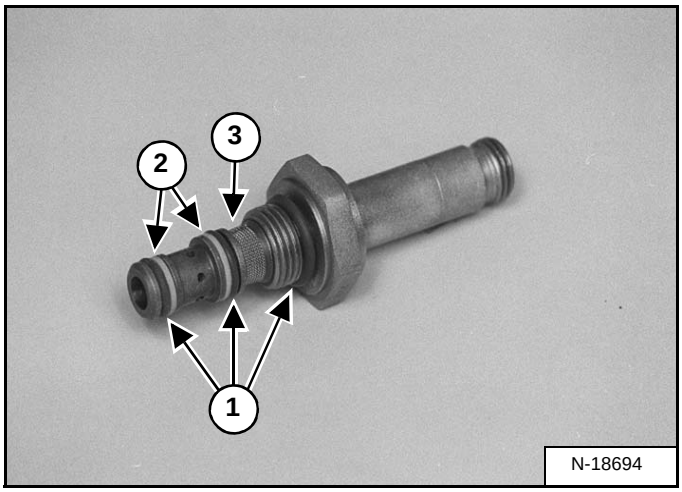
Figure 20-41-92



Remove the solenoid stem (Item 1) **[Figure 20-41-92]**.

Installation: Lubricate the O-rings and tighten the stem to 20 - 24 ft.-lb. (27 - 33 N•m) torque.

Figure 20-41-93



Remove the O-rings (Item 1) and back-up rings (Item 2) **[Figure 20-41-93]** from the stem.

Clean all parts in solvent and dry with compressed air.

Inspect all parts for wear and replace any showing excessive wear.

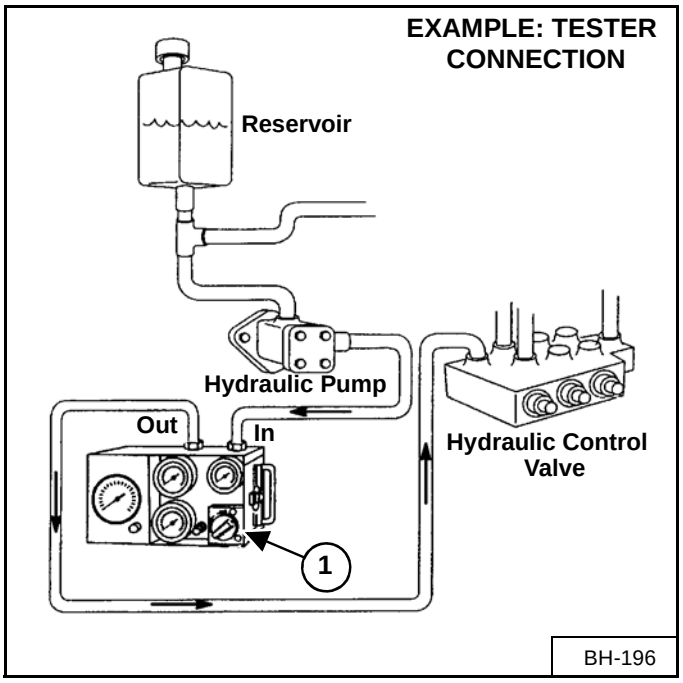
NOTE: The screen (Item 3) [Figure 20-41-93] may be cleaned with solvent. If it is torn or worn it needs to be replaced.

Use only new O-rings and apply oil to all O-rings and back-up rings before installation.

Install new O-rings (Item 1) **[Figure 20-41-91]** & **[Figure 20-41-93]** and new back-up rings (Item 2) **[Figure 20-41-93]** on the solenoid stem.

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

Figure 20-60-4



Sample tester connection shown **[Figure 20-60-4]**.

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

Warm the fluid to 140° F (60° C) by turning the restrictor control (Item 1) **[Figure 20-60-4]** on the tester to about 1000 PSI (6895 kPa). DO NOT exceed system relief pressure. Open the restrictor control and record the free flow (GPM) at full RPM*.

Push the maximum/variable flow switch (on the remote start tool) to engage the front auxiliary hydraulics, the light will come ON. Push the button (on the right control lever) for fluid flow to the quick coupler (fluid pressure will go over main relief). Record the highest pressure (PSI) and flow (GPM). The high pressure flow must be at least 80% of free flow.

$$\% = \frac{\text{HIGH PRESSURE FLOW (GPM)}}{\text{FREE FLOW (GPM)}} \times 100$$

A low percentage may indicate a failed pump.

*Refer to (See Hydraulic System on Page SPEC-10-4.) for system relief pressure and full RPM.

Disassembly And Assembly (Cont'd)

Figure 20-60-27

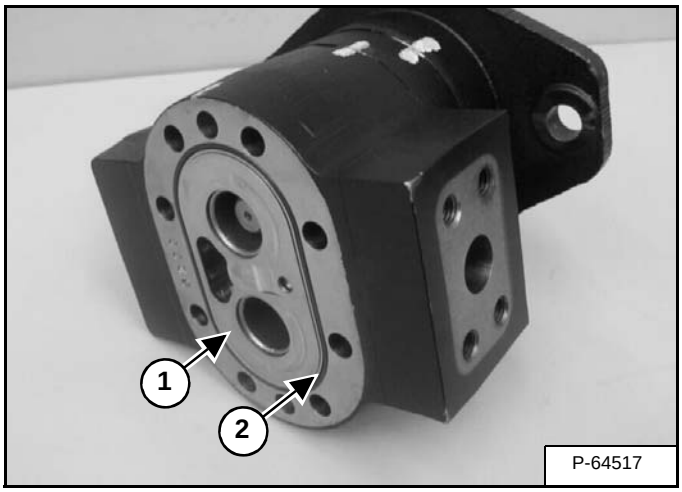
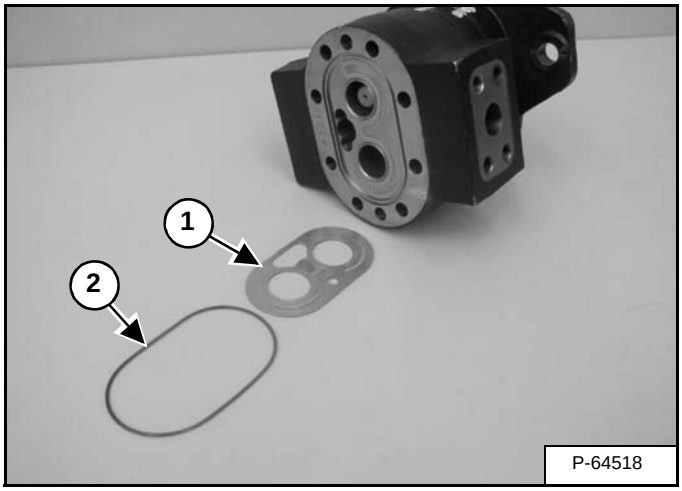


Figure 20-60-28



Remove the wear plate (Item 1) and O-ring (Item 2) **[Figure 20-60-27]** & **[Figure 20-60-28]** from the pump center section. Inspect for damage and replace as needed.

NOTE: Position wear plate (Item 1) [Figure 20-60-28] inlets and traps as shown with bronze side toward gears.

Figure 20-60-29

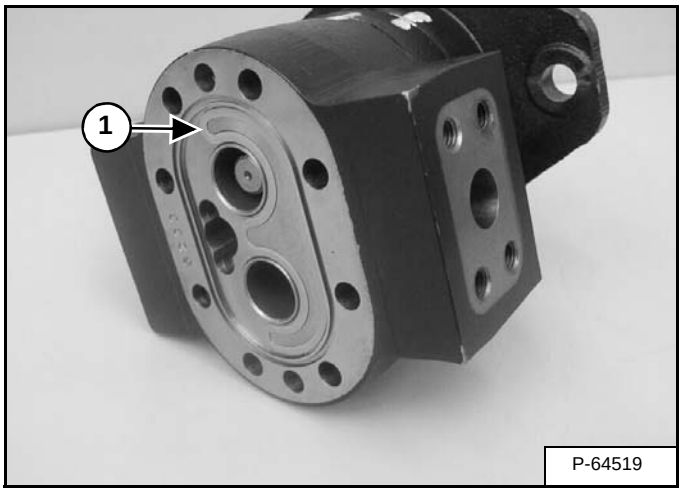
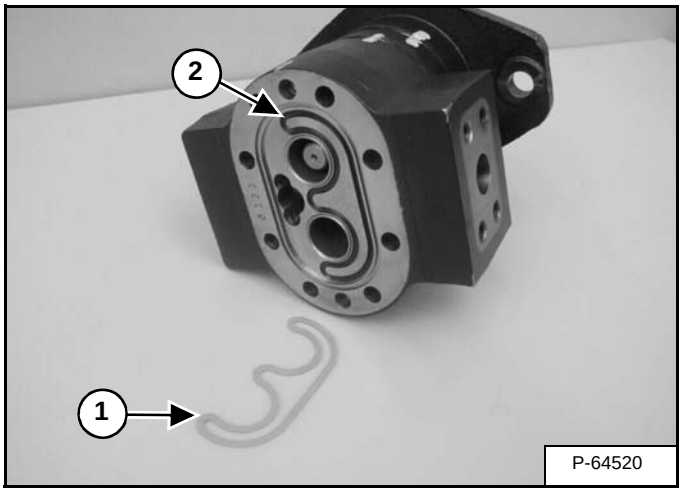


Figure 20-60-30

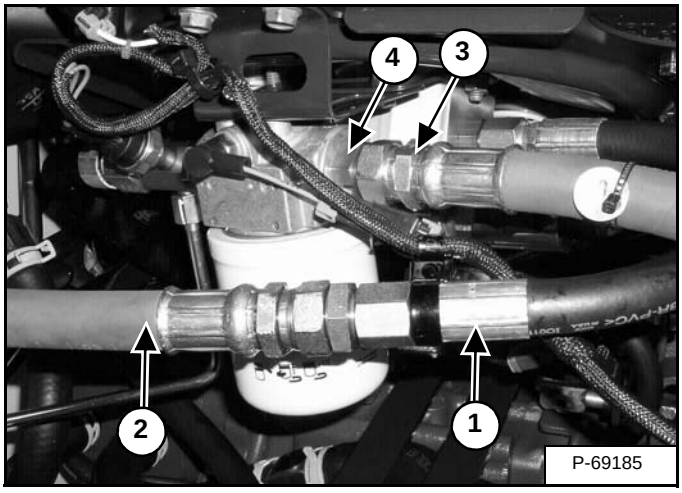


Remove the load seal (Item 1) **[Figure 20-60-29]** & **[Figure 20-60-30]**. Inspect for damage and replace as needed.

Remove the pre-load seal (Item 2) **[Figure 20-60-30]**.

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

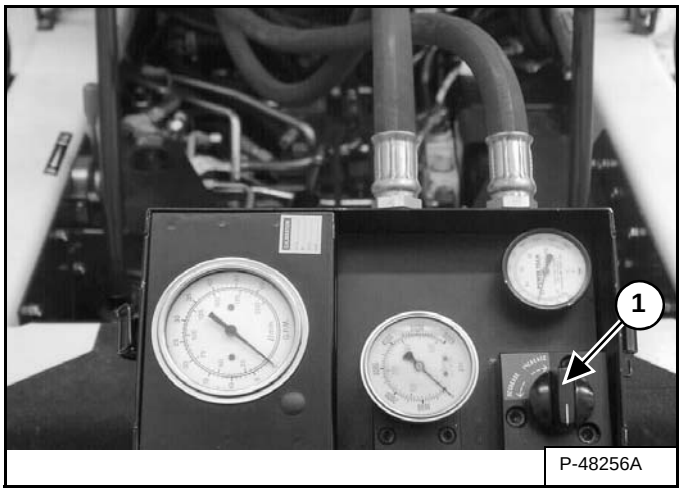
Figure 20-61-53



Connect the filter inlet hose (Item 1) to the inlet side of the tester (Item 2) **[Figure 20-61-53]**.

Connect the OUTLET hose (Item 3) from the hydraulic tester to the inlet fitting (Item 4) of the charge filter **[Figure 20-61-53]**.

Figure 20-61-54



Be sure all connections are tight and that the hoses are not touching any moving parts before starting the loader **[Figure 20-61-54]**.

IMPORTANT

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

I-2024-0284

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

Warm the fluid to 140° F (60° C) by turning the restrictor control (Item 1) **[Figure 20-61-54]** on the tester to about 600 PSI (41,4 bar). DO NOT exceed **1200 PSI** (82,7 bar). Open the restrictor control and record the free flow (GPM) at full RPM*.

Turn the restrictor down to system operating pressure approximately 1000 PSI (69 bar). **DO NOT EXCEED 1200 PSI** (82,7 bar). Refer to Hydraulic Schematics for flow. The high pressure flow must be at least 80% of free flow.

$$\% = \frac{\text{HIGH PRESSURE FLOW (GPM)}}{\text{FREE FLOW (GPM)}} \times 100$$

A low percentage may indicate a failed pump.

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

Disassembly And Assembly (Cont'd)

Figure 20-61-77

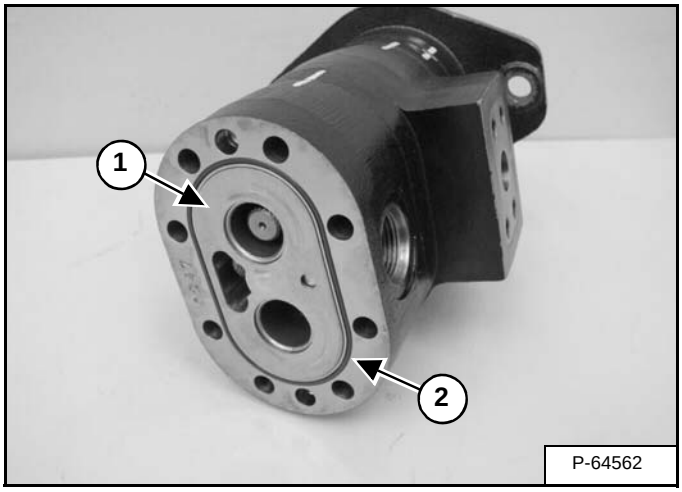
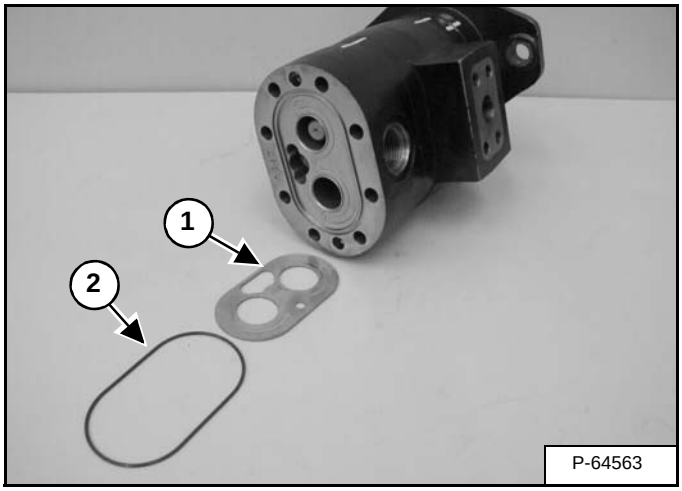


Figure 20-61-78



Remove the wear plate (Item 1) and O-ring (Item 2) **[Figure 20-61-77]** & **[Figure 20-61-78]** from the charge center section. Inspect for damage and replace as needed.

NOTE: Position wear plate (Item 1) [Figure 20-61-78] inlets and traps as shown with bronze side toward gears.

Figure 20-61-79

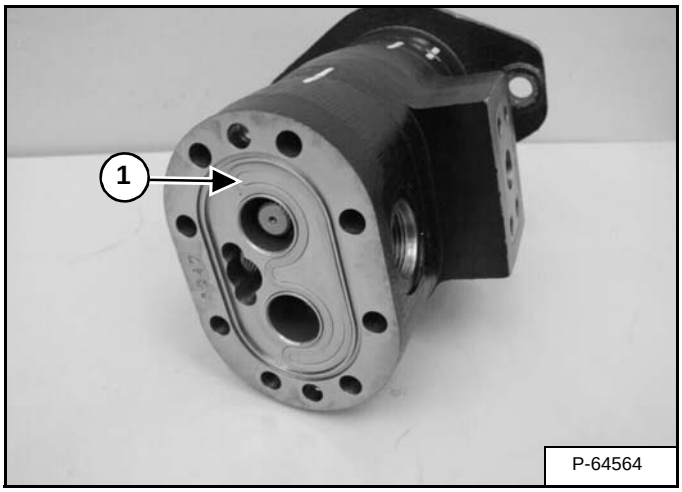
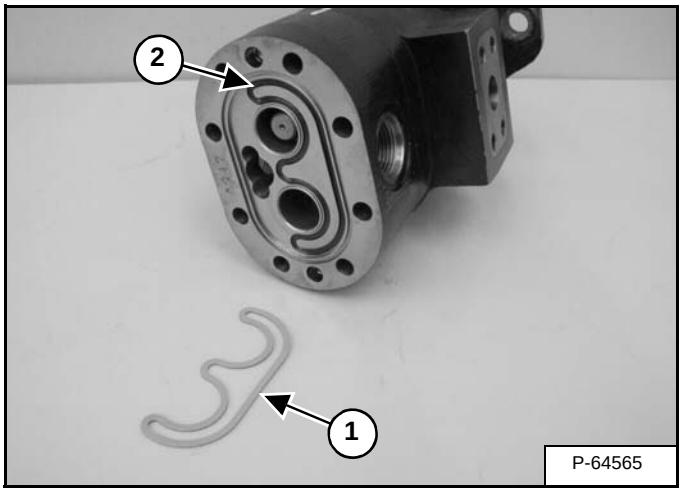


Figure 20-61-80



Remove the load seal (Item 1) **[Figure 20-61-79]** & **[Figure 20-61-80]**. Inspect for damage and replace as needed.

Remove the pre-load seal (Item 2) **[Figure 20-61-80]**.

HYDRAULIC PUMP (SJC)

Description

The hydraulic gear pump is attached to the end of the hydrostatic pumps and is 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.

The hydraulic gear pump has a dedicated charge pump. This supplies flow to the hydraulic fan motor and charge pressure to the hydrostatic pump.

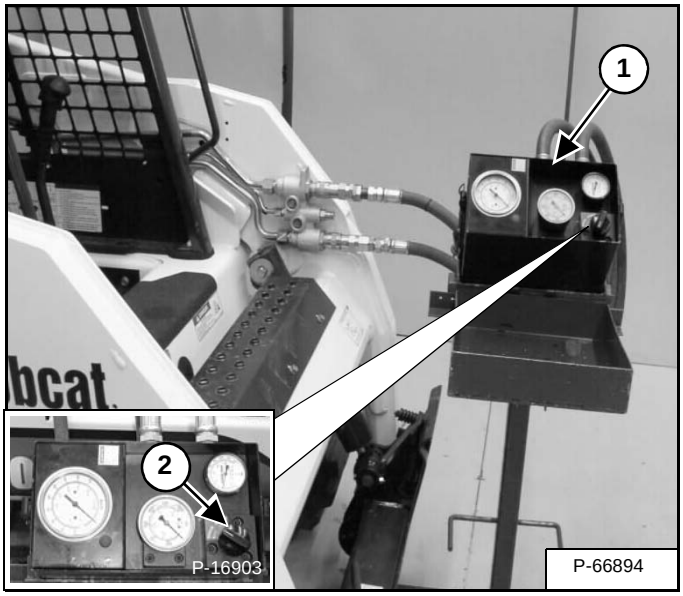
A seal kit is available to service the hydraulic pump. If any of the main components of the pump are damaged, the entire pump must be replaced.

Pump Test At Quick Couplers

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

MEL10003 - In-Line Hydraulic Tester
MEL10006 - Flow Meter Fitting Kit

Figure 20-70-111



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

Install a hydraulic tester (Item 1) **[Figure 20-70-111]** onto the front auxiliary quick couplers.

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

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

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

NOTE: *DO NOT EXCEED 3300 PSI.*

Turn the restrictor control (Item 2) **[Figure 20-70-111]** on the tester counterclockwise to obtain free flow, the flow should be approximately 16 - 17 GPM. Start turning the restrictor clockwise, causing more restriction on the flow. The GPM should drop off slightly until the pressure reaches approximately 2800 PSI. At approximately 2800 PSI the flow should start decreasing rapidly until the pressure reaches 3250 - 3300 PSI. At 3250 - 3300 PSI the flow should be at 0 GPM. Turn the restrictor (Item 2) **[Figure 20-70-111]** counterclockwise to free flow. Shut the front auxiliary hydraulics off.

If flow and pressure specs are not obtained, go to Direct Pump Testing. (See Direct Pump Test (Standard Section) on Page 20-70-2.)

*Refer to (See Hydraulic System on Page SPEC-10-4.) for system relief pressure and full RPM.

Disassembly And Assembly (Cont'd)

Figure 20-70-129

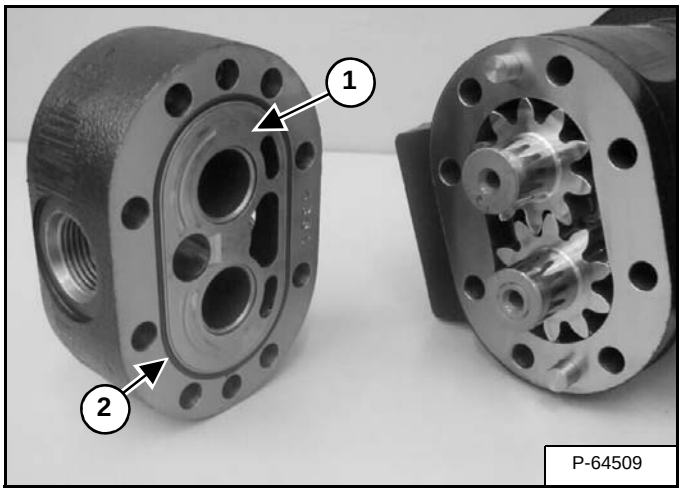
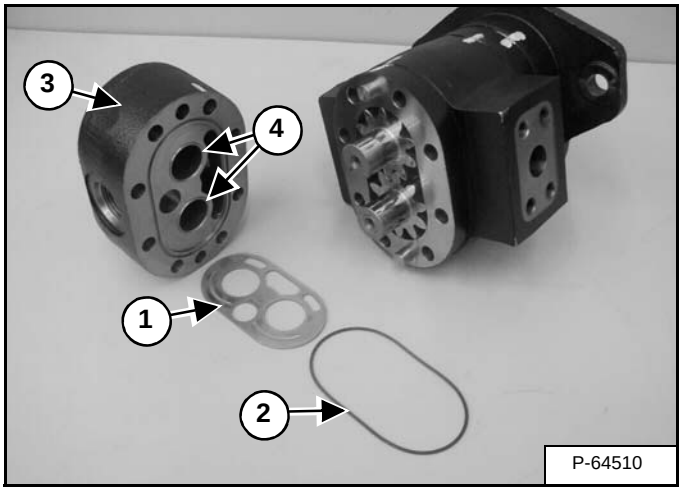


Figure 20-70-130



Remove the wear plate (Item 1) and section seal (Item 2) **[Figure 20-70-129]** & **[Figure 20-70-130]** from the pump end section.

NOTE: Position wear plate (Item 1) [Figure 20-70-130] inlets and traps as shown with bronze side toward gears.

NOTE: Inspect the pump end section (Item 3) [Figure 20-70-130] and bushings (Item 4) [Figure 20-70-130]. If excessive wear or damage is visible, the pump must be replaced.

Figure 20-70-131

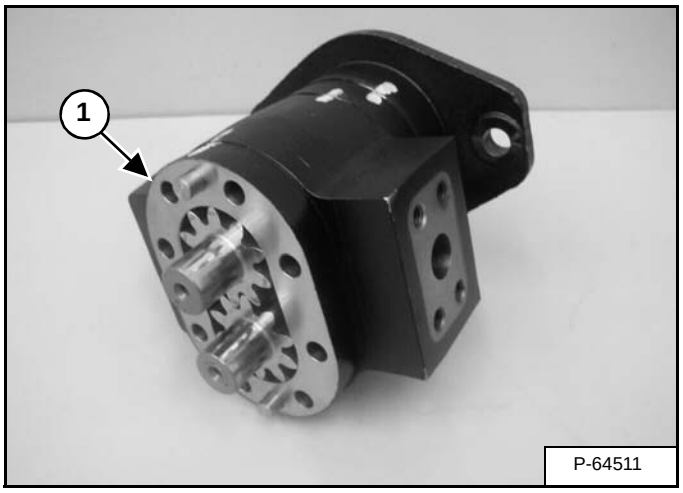
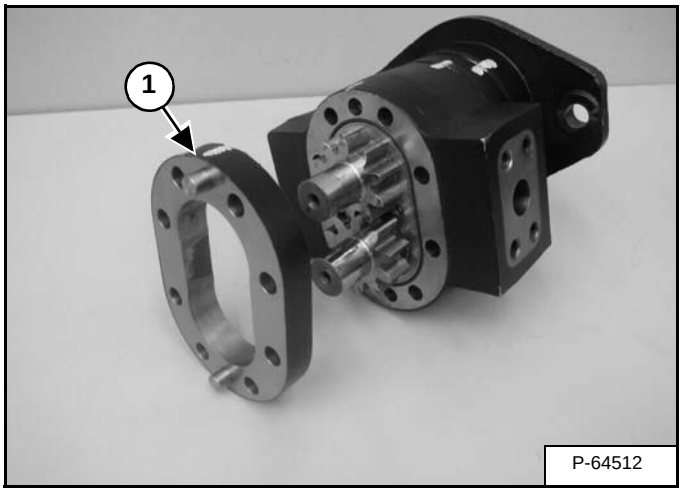


Figure 20-70-132

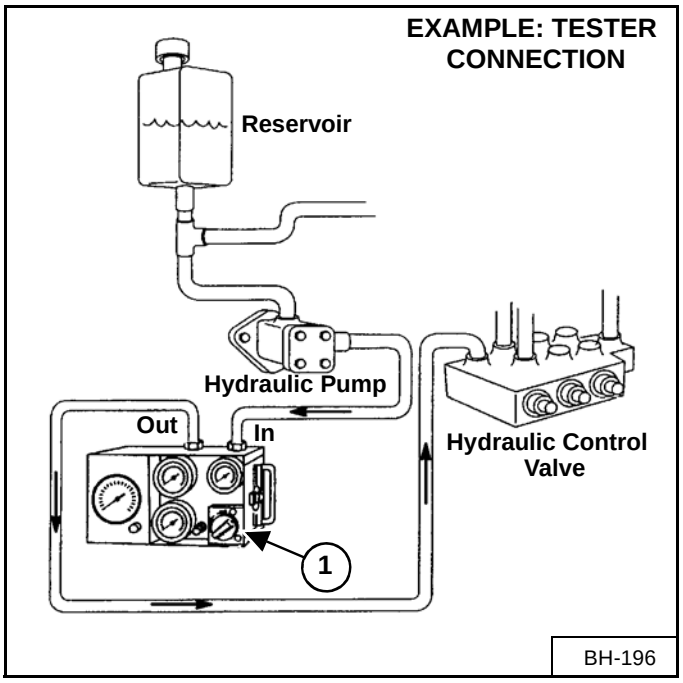


Remove the charge pump section (Item 1) **[Figure 20-70-131]** & **[Figure 20-70-132]** from the pump center section.

NOTE: Inspect the pump section (Item 1) [Figure 20-70-132]. If excessive wear or damage is visible, the pump must be replaced.

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

Figure 20-71-160



Sample tester connection shown **[Figure 20-71-160]**.

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

Warm the fluid to 140° F (60° C) by turning the restrictor control (Item 1) **[Figure 20-71-160]** on the tester to about 1000 PSI (6895 kPa). DO NOT exceed system relief pressure. Open the restrictor control and record the free flow (GPM) at full RPM*.

Push the maximum/variable flow switch (on the remote start tool) to engage the front auxiliary hydraulics, the light will come ON. Push the button (on the right control lever) for fluid flow to the quick coupler (fluid pressure will go over main relief). Record the highest pressure (PSI) and flow (GPM). The high pressure flow must be at least 80% of free flow.

$$\% = \frac{\text{HIGH PRESSURE FLOW (GPM)}}{\text{FREE FLOW (GPM)}} \times 100$$

A low percentage may indicate a failed pump.

*Refer to (See Hydraulic System on Page SPEC-10-4.) for system relief pressure and full RPM.

Disassembly And Assembly (Cont'd)

Figure 20-71-180

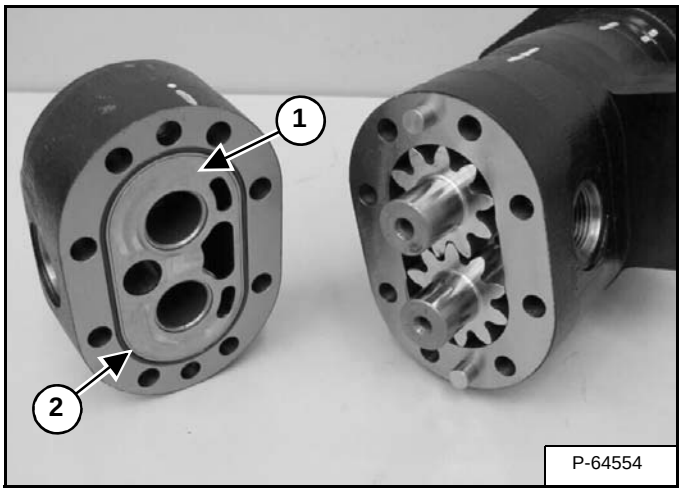
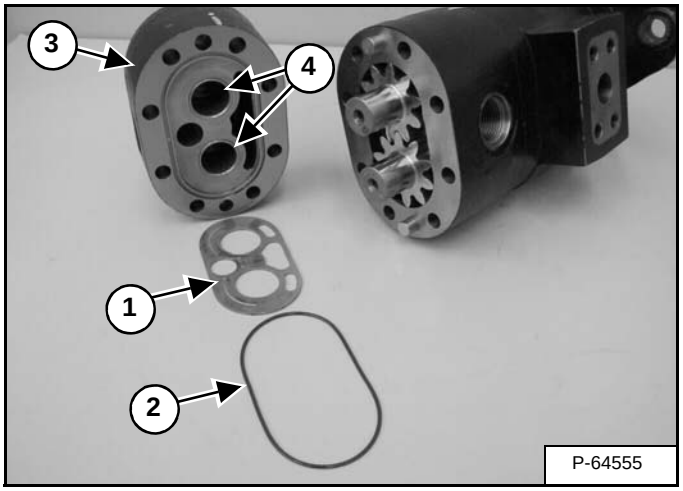


Figure 20-71-181



Remove the wear plate (Item 1) and O-ring (Item 2) **[Figure 20-71-180]** & **[Figure 20-71-181]** from the high flow end section.

NOTE: Position wear plate (Item 1) [Figure 20-71-181] inlets and traps as shown with bronze side toward gears.

NOTE: Inspect the high flow end section (Item 3) and bushings (Item 4) [Figure 20-71-181]. If excessive wear or damage is visible, the pump must be replaced.

Figure 20-71-182

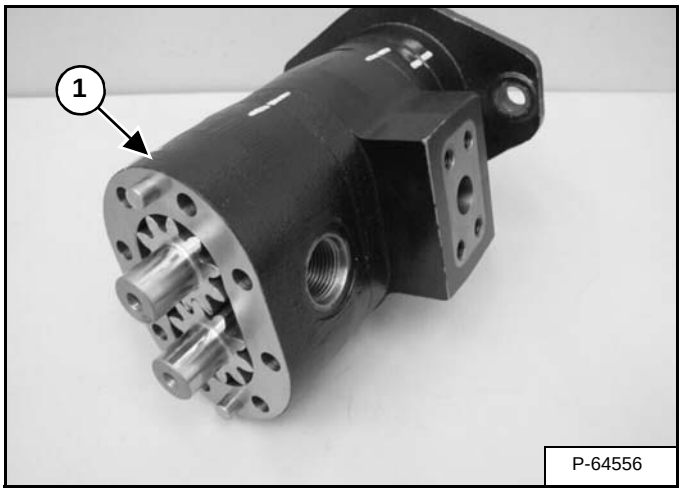
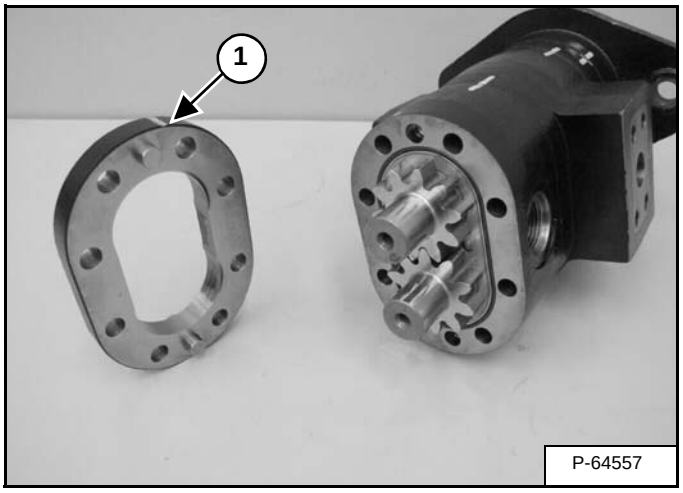


Figure 20-71-183

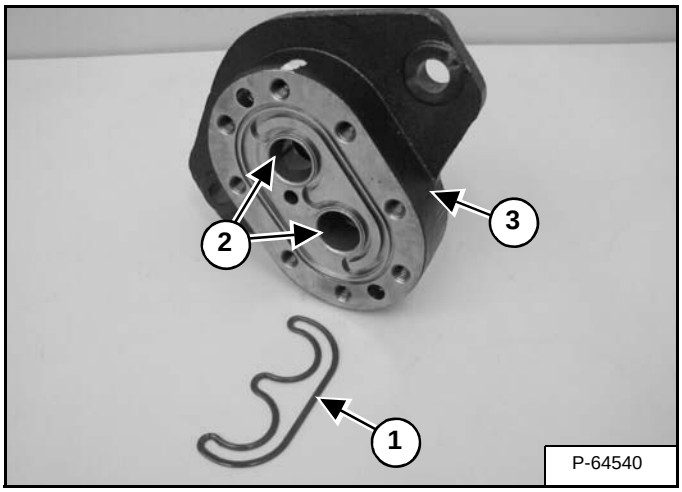


Remove the high flow pump section (Item 1) **[Figure 20-71-182]** & **[Figure 20-71-183]** from the charge center section.

NOTE: Inspect the high flow pump section (Item 1) [Figure 20-71-183]. If excessive wear or damage is visible, the pump must be replaced.

Disassembly And Assembly (Cont'd)

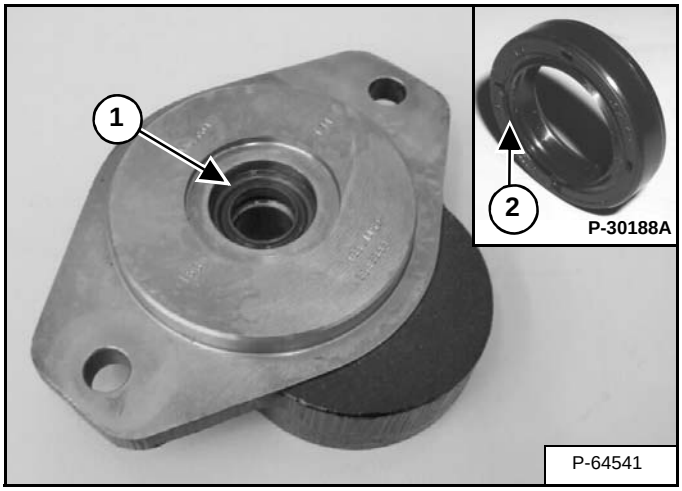
Figure 20-71-220



Inspect the pre-load seal (Item 1) **[Figure 20-71-220]** for damage and replace as needed.

NOTE: Inspect the pump flange section (Item 2) and bushings (Item 3) [Figure 20-71-220]. If excessive wear or damage is visible, the pump must be replaced.

Figure 20-71-221



Remove the shaft seal (Item 1) **[Figure 20-71-221]** from the pump flange section.

Installation: The shaft seal flush surface (Item 2) **[Figure 20-71-221]** must be facing out away from the pump.

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, with the cooling fan, around the passages cooling the oil.

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

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.

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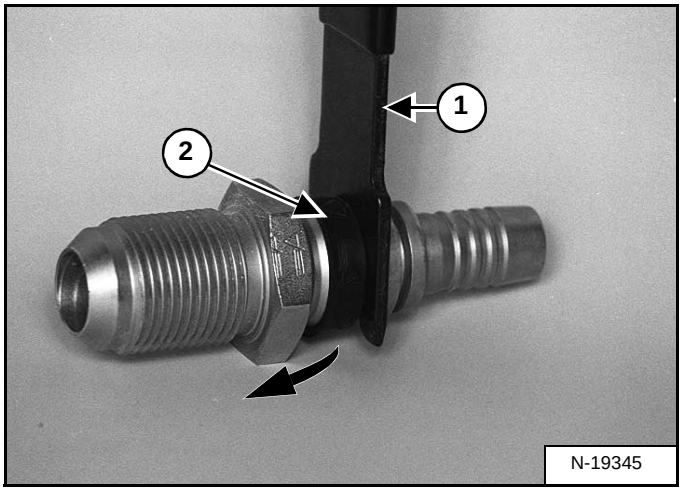
Remove the rear grill from the loader. (See Removal And Installation on Page 50-60-1.)

Figure 20-100-1



Install tool MEL 1558 (Item 1) to outside of rubber sleeve (Item 2) **[Figure 20-100-1]**.

Figure 20-100-2

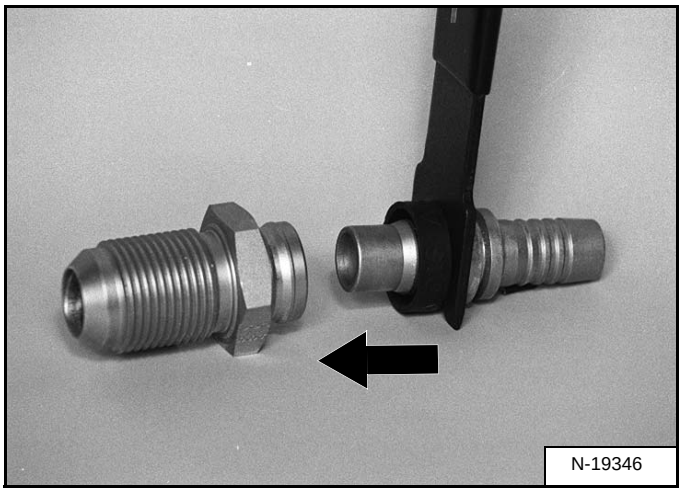
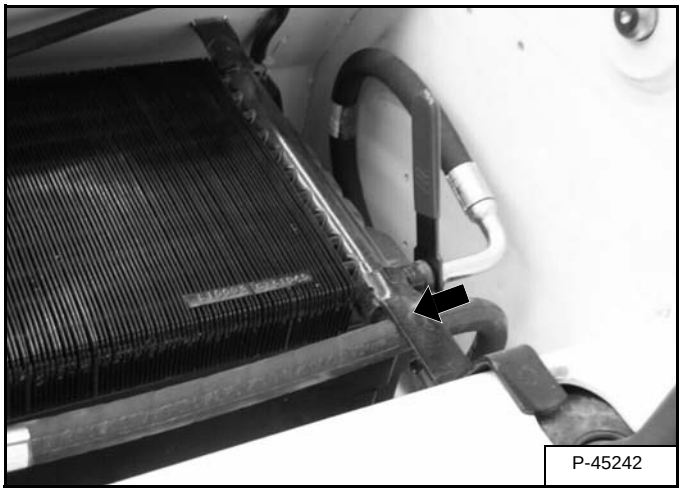


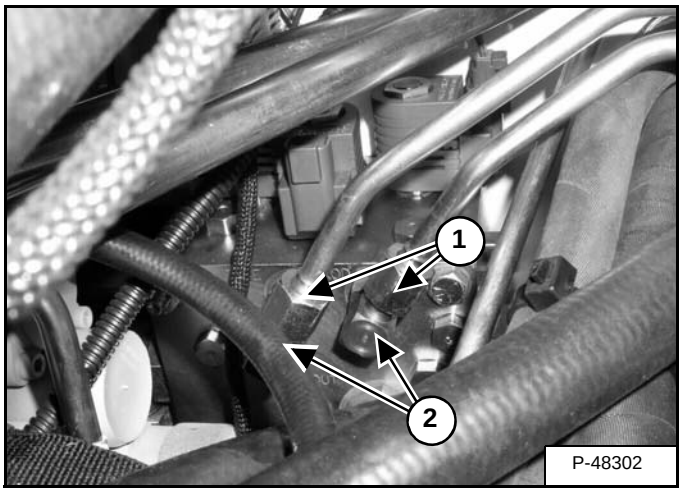
Figure 20-100-3



Slide the rubber sleeve in toward the radiator. The connector will release **[Figure 20-100-2]** & **[Figure 20-100-3]**.

Removal And Installation (Cont'd)

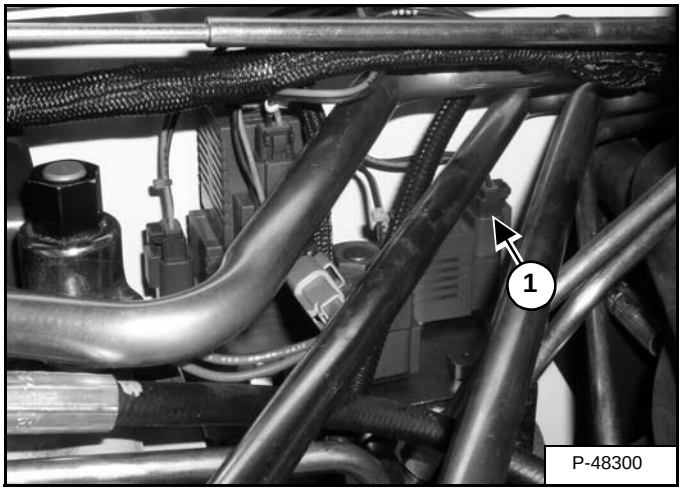
Figure 20-120-2



Disconnect the base and rod end tubelines (Item 1) **[Figure 20-120-2]**.

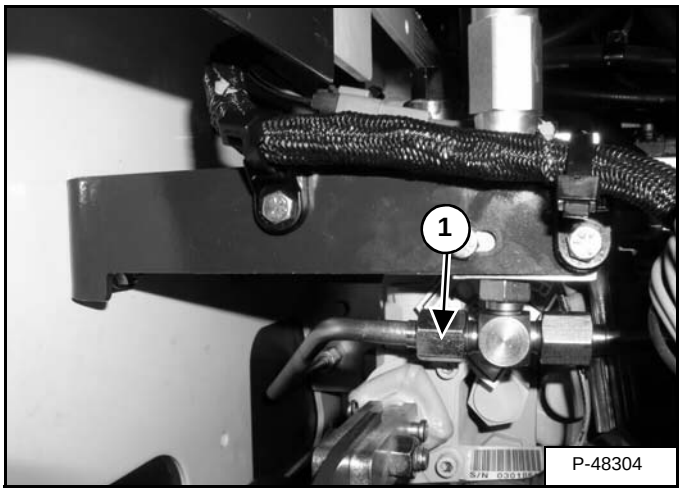
Remove the fittings (Item 2) **[Figure 20-120-2]** from the valve.

Figure 20-120-3



Disconnect the four solenoid connectors (Item 1) **[Figure 20-120-3]** from the rear auxiliary valve.

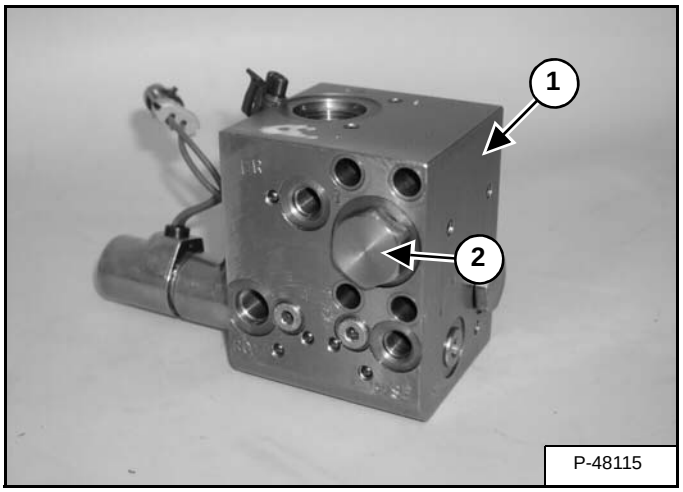
Figure 20-120-4



Disconnect the drain tubeline (Item 1) **[Figure 20-120-4]** from the lift arm by pass valve.

Disassembly And Assembly

Figure 20-130-5



Clean the block (Item 1) **[Figure 20-130-5]** to remove dirt before disassembly. Block ports are labeled for correct assembly.

Remove the plug (Item 2) **[Figure 20-130-5]**.

Assembly: Tighten the plug to 25 - 30 ft.-lb. (34 - 40,6 N•m) torque.

IMPORTANT

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

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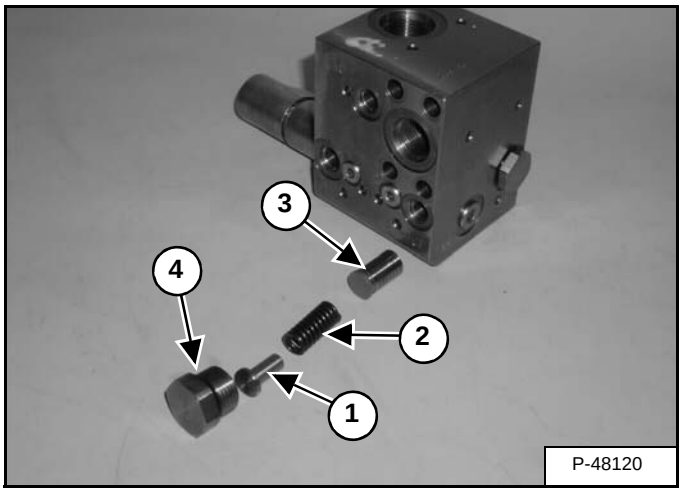
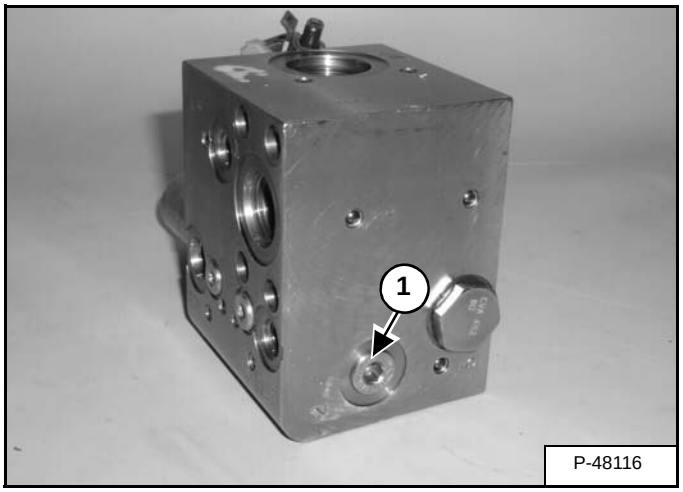
Figure 20-130-6



Remove the spring guide (Item 1), spring (Item 2) and the spool (Item 3) **[Figure 20-130-6]**.

Check the O-ring (Item 4) **[Figure 20-130-6]** on the plug and replace as needed.

Figure 20-130-7



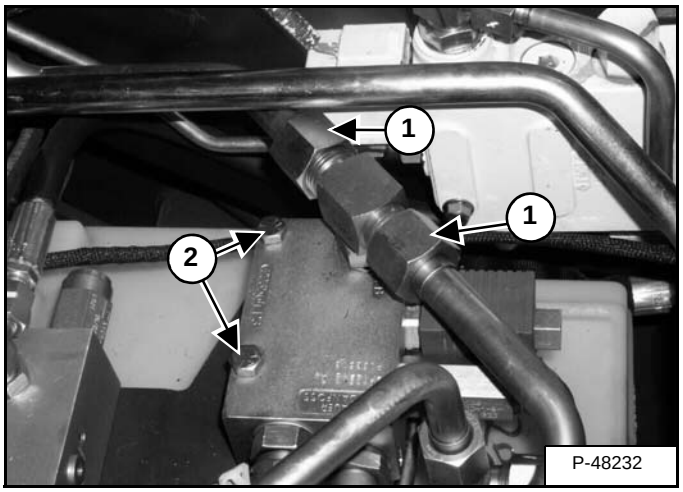
NOTE: This plug is a zero leak plug and should not be removed. If removed damage may occur and the plug and O-ring must be replaced.

Do not remove the plug (Item 1) **[Figure 20-130-7]**.

Assembly: Tighten the plug to 12 - 14 ft.-lb. (16,3 - 19 N•m) torque.

Removal And Installation (Cont'd)

Figure 20-150-10



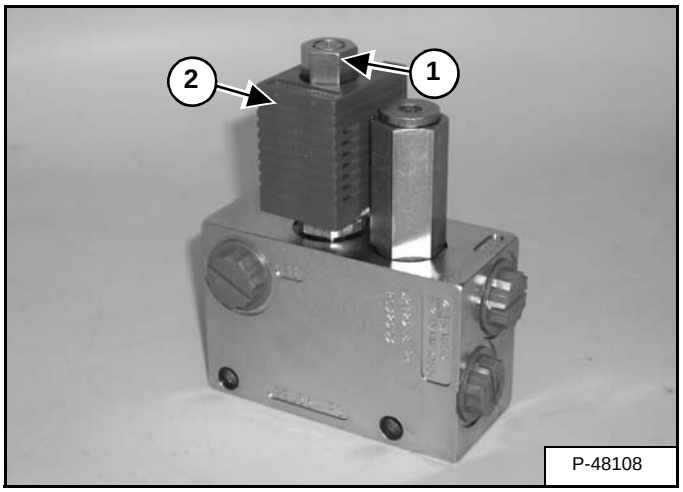
Disconnect and cap the tubelines (Item 1) **[Figure 20-150-10]** to the tilt cylinders.

Remove the two mounting bolts (Item 2) **[Figure 20-150-10]**.

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

Disassembly And Assembly

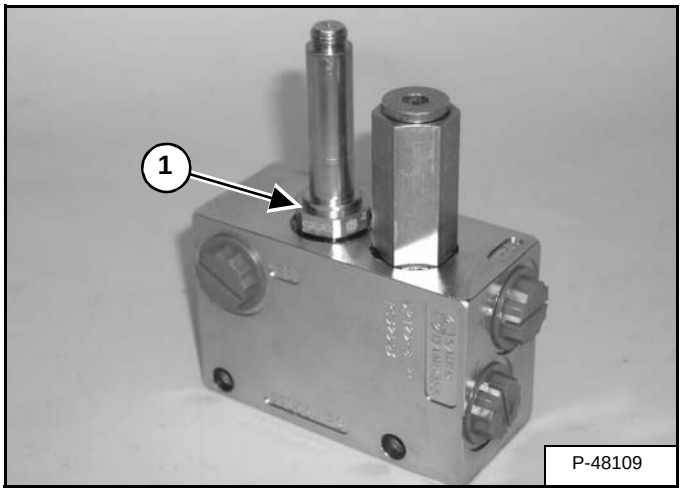
Figure 20-150-11



Remove the solenoid nut (Item 1) and solenoid (Item 2) **[Figure 20-150-11]** from the solenoid valve.

Assembly: Tighten to 4 - 6 ft.-lb. (5 - 8 N•m) torque.

Figure 20-150-12

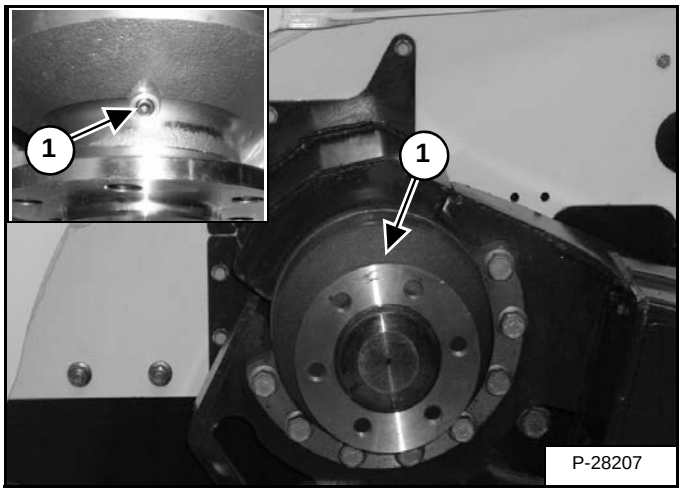


Remove the solenoid valve (Item 1) **[Figure 20-150-12]** from the valve.

Assembly: Tighten to 30 - 35 ft.-lb. (41 - 47 N•m) torque.

Removing And Replacing Oil (Cont'd)

Figure 30-20-3



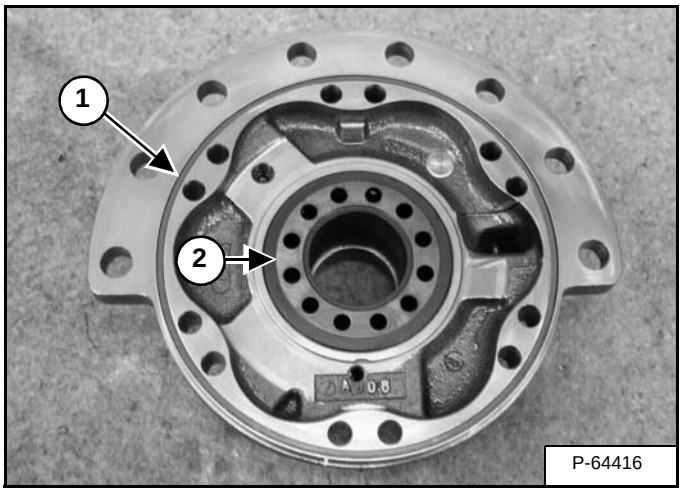
Install the bottom plug into the motor.

Remove the top plug (Item 1) **[Figure 30-20-3]** from the motor.

Fill the motor with 1.5 oz. (45 ml) of high performance synthetic oil, Bobcat p/n 6682546. The motor will be approximately 1/2 to 2/3 full.

Disassembly And Assembly (Cont'd)

Figure 30-20-25

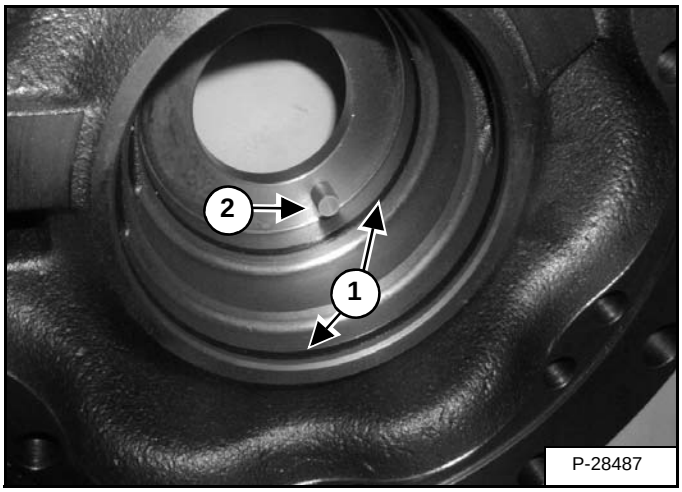


Remove and replace the O-ring (Item 1) **[Figure 30-20-25]**.

Remove the distributor (Item 2) **[Figure 30-20-25]** from the rear housing.

Assembly: Install the distributor (Item 2) **[Figure 30-20-25]** by using the alignment pin (Item 2) **[Figure 30-20-26]**.

Figure 30-20-26

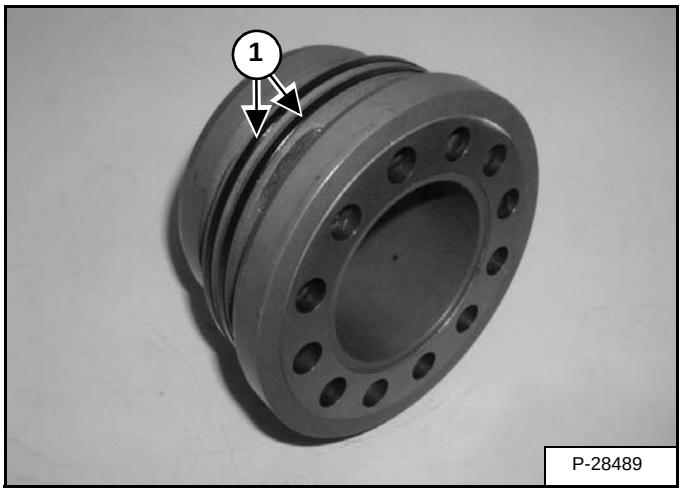


Remove and replace the two seals and back-up O-rings (Item 1) **[Figure 30-20-26]** on the rear housing.

Assembly: Apply a slight amount of oil to the O-rings and seals (Item 1) **[Figure 30-20-26]**

Remove and inspect the alignment pin (Item 2) **[Figure 30-20-26]**.

Figure 30-20-27

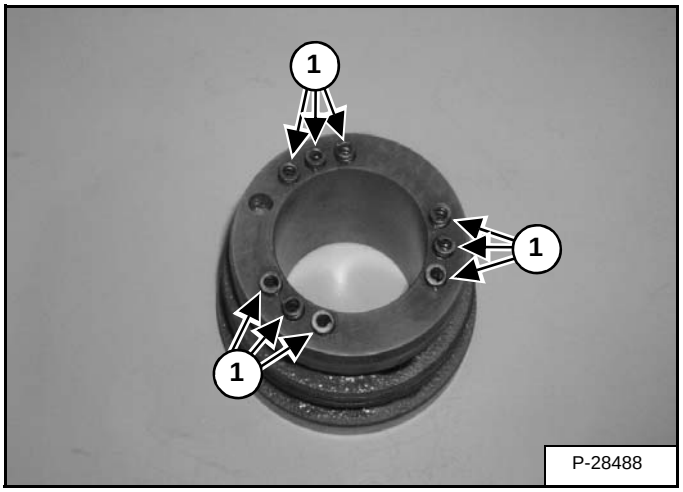


Remove and replace the two seals (Item 1) **[Figure 30-20-27]** and the back-up O-rings under the seals on the distributor.

Assembly: Apply a slight amount of oil to the O-rings and seals (Item 1) **[Figure 30-20-27]**

Check the distributor surfaces for scratches.

Figure 30-20-28



Remove and inspect the nine springs (Item 1) **[Figure 30-20-28]** from the distributor. Replace as necessary.

Adjusting (Cont'd)

SJC Machines

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.

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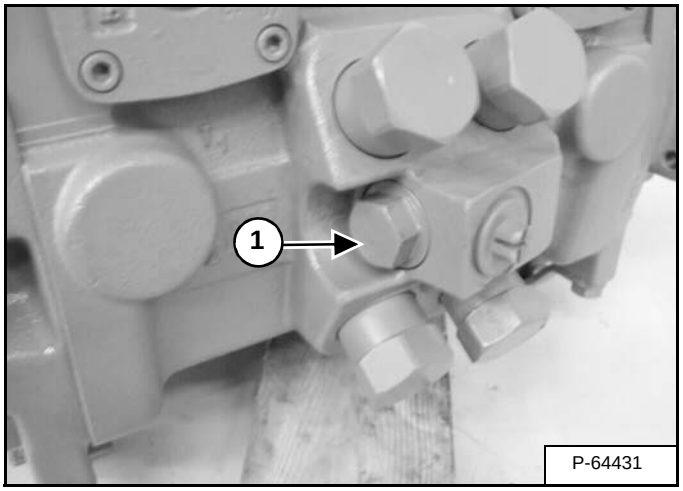
Figure 30-30-9

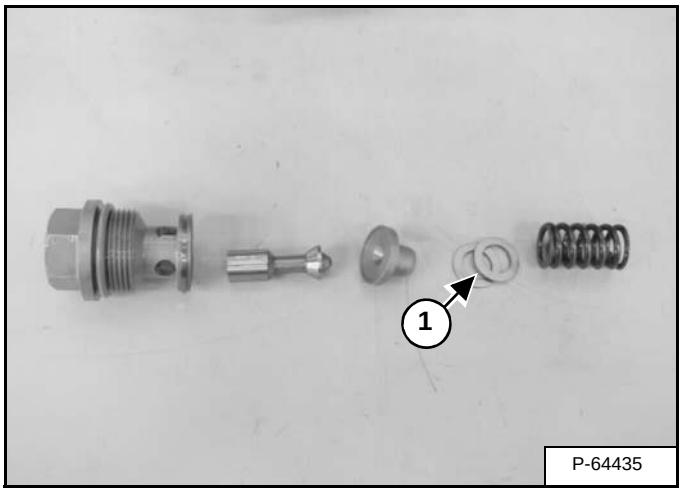


If the charge pressure is not correct remove the charge relief valve (Item 1) **[Figure 30-30-9]**.

NOTE: The pump has been removed for photo clarity. The charge pressure relief valve is located on the engine side of the hydrostatic pump when installed in the loader.

Assembly: Always use a new O-ring. Tighten the plug to 30 - 50 ft.-lb. (41 - 68 N•m) torque.

Figure 30-30-10



Check the poppet and spring for wear or damage.

Inspect the seat inside the hydrostatic pump case for wear or damage.

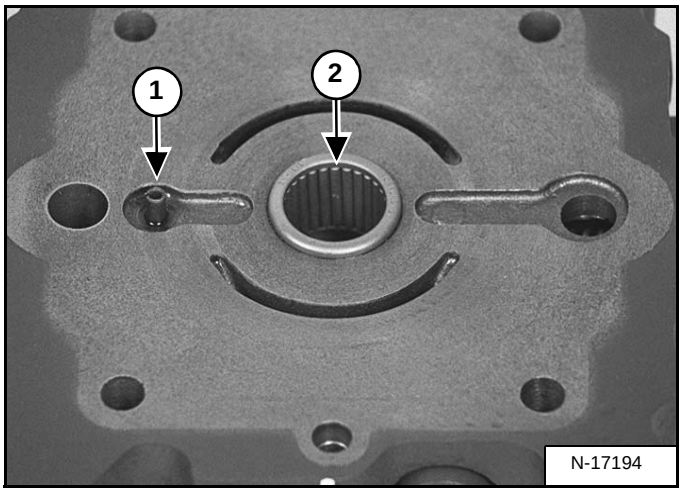
There are several different thickness of shims (Item 1) **[Figure 30-30-10]** used to adjust the charge pressure.

NOTE: 1.0 mm shim (Item 1) [Figure 30-30-10] = 43.5 PSI (3 bar) in pressure change. Adding shims increases charge pressure. Removing shims decreases charge pressure.

The charge pressure should be set at **335 - 385 PSI** (23,1 - 26,5 bar).

Disassembly (Cont'd)

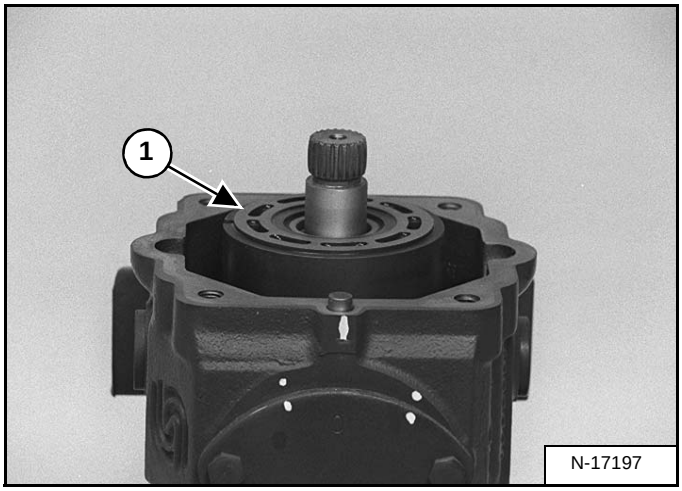
Figure 30-40-11



Check the valve plate locating pin (Item 1) **[Figure 30-40-11]** for wear and replace if needed.

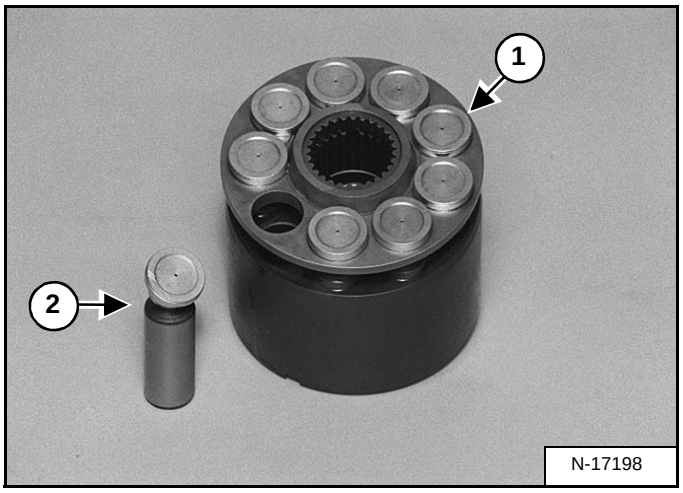
Check the needle bearing (Item 2) **[Figure 30-40-11]** for wear and replace if needed.

Figure 30-40-12



Remove the rotating group (Item 1) **[Figure 30-40-12]** from the pump.

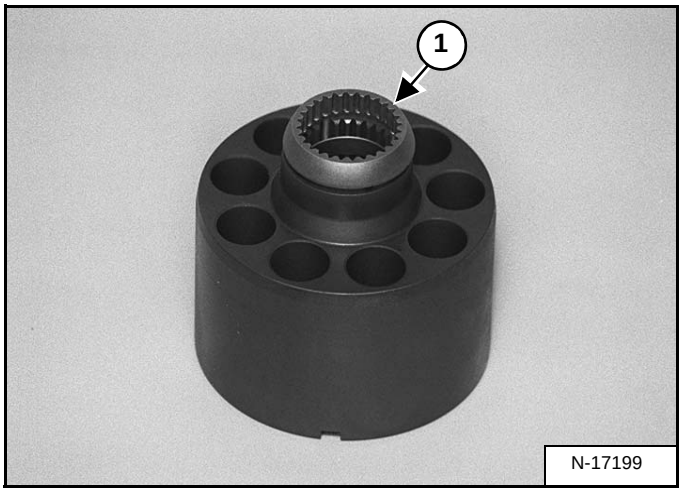
Figure 30-40-13



Remove the slipper guide and pistons (Item 1) **[Figure 30-40-13]** from the cylinder block.

Check all the pistons (Item 2) **[Figure 30-40-13]** for wear and replace the rotating group as needed.

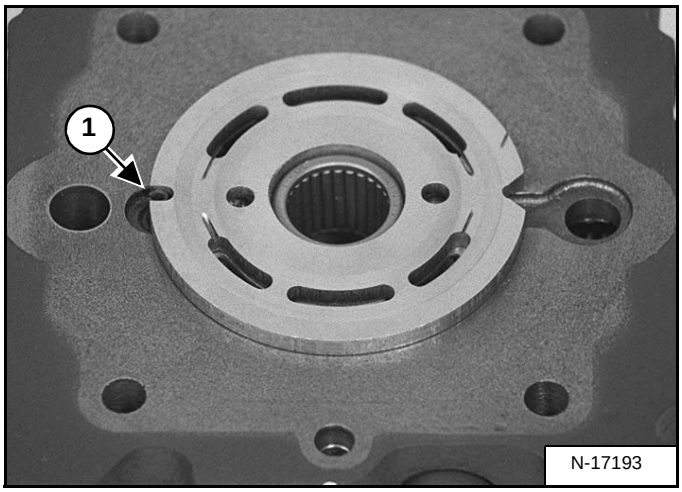
Figure 30-40-14



Remove the ball guide retainer (Item 1) **[Figure 30-40-14]** from the cylinder block.

Assembly (Cont'd)

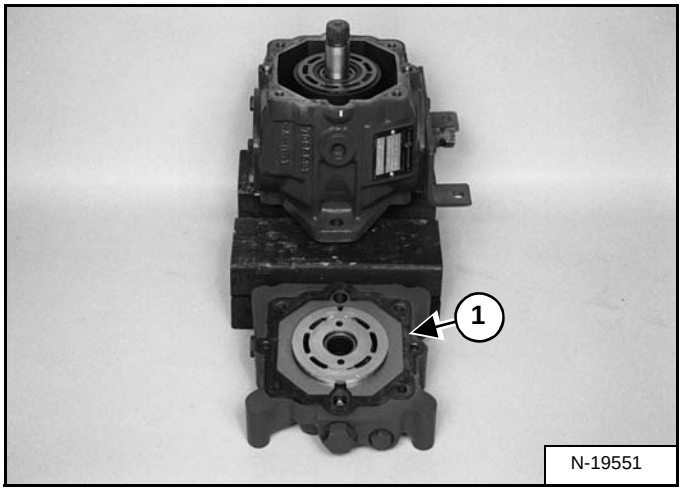
Figure 30-40-50



Coat the backside of the valve plate with petroleum jelly to hold it in position and install the valve plate onto the charge pump, bronze face up **[Figure 30-40-50]**.

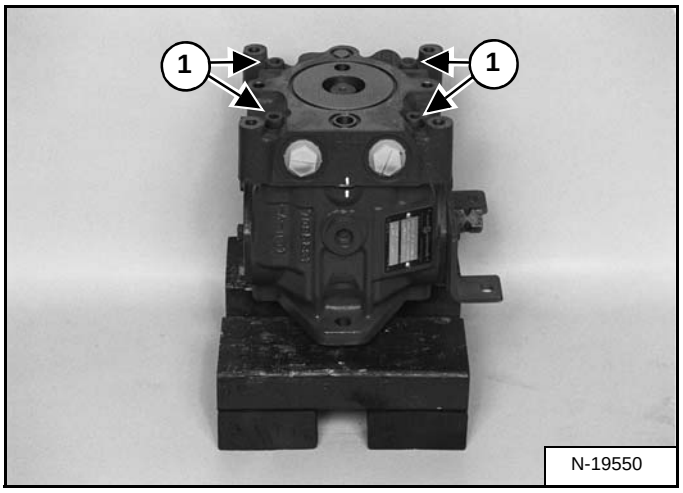
The notch (Item 1) **[Figure 30-40-50]** on the valve plate must engage the locating pin.

Figure 30-40-51



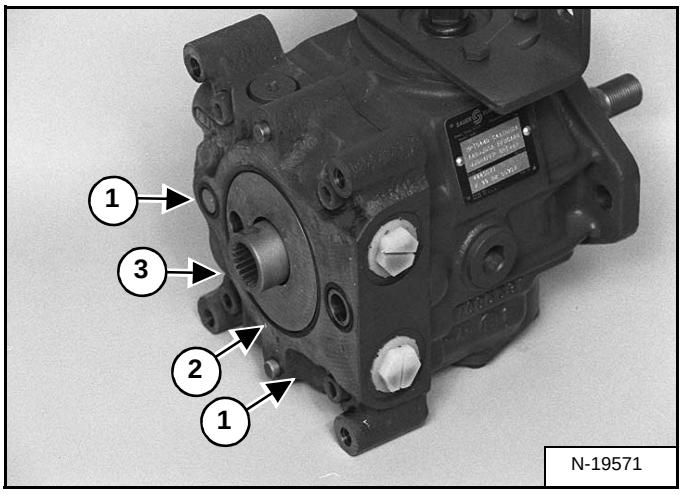
Coat a new end cap gasket (Item 1) **[Figure 30-40-51]** with petroleum jelly and install onto the end cap.

Figure 30-40-52



Install the valve plate and end cap on the pump housing. Tighten the bolts (Item 1) **[Figure 30-40-52]** to 35 - 45 ft.-lb. (47 - 61 N•m) torque.

Figure 30-40-53



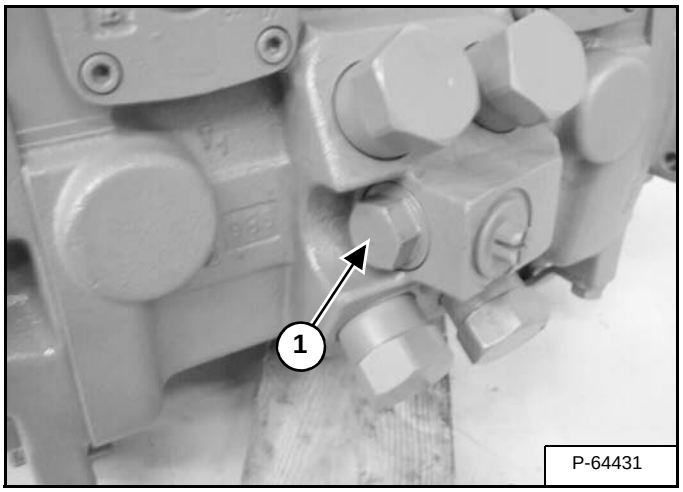
Install the two small O-rings (Item 1) **[Figure 30-40-53]**.

Install the large new O-ring (Item 2) **[Figure 30-40-53]**.

Install the pump coupler (Item 3) **[Figure 30-40-53]**.

Charge Relief Valve

Figure 30-41-19

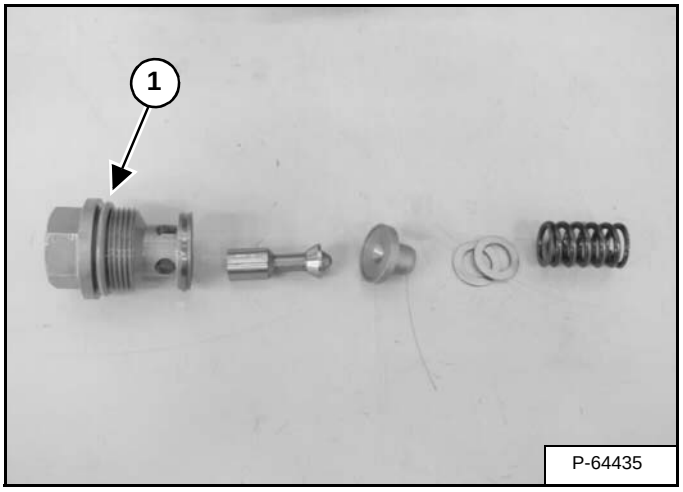


The charge relief valve (Item 1) **[Figure 30-41-19]** is located on the back of the hydrostatic pump.

Remove the charge relief valve.

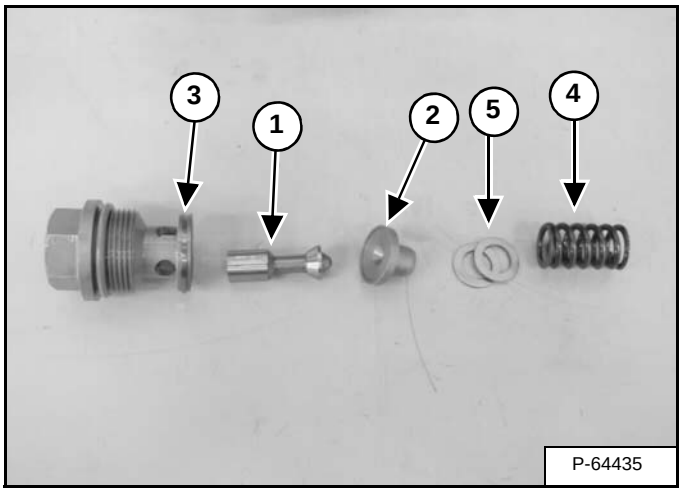
Assembly: Tighten charge relief valve to 52 ft.-lb. (70 N•m) torque.

Figure 30-41-20



Check and replace the O-ring (Item 1) **[Figure 30-41-20]**.

Figure 30-41-21



Inspect the poppet (Item 1) and the mating seat (Item 2) **[Figure 30-41-21]** for damage or foreign material. Ensure the poppet moves freely in it's bore.

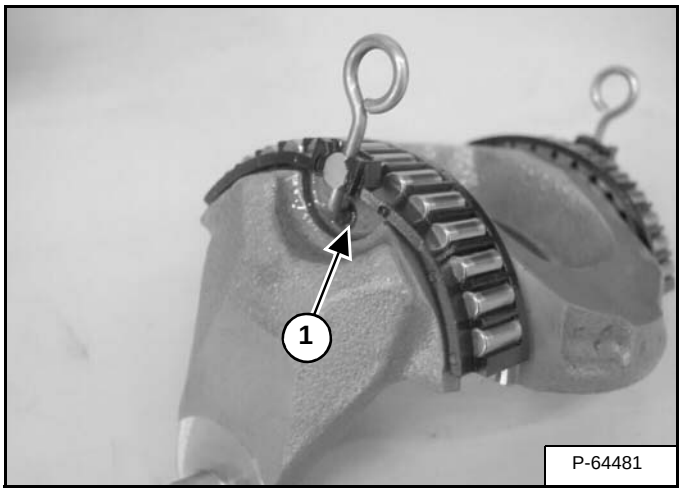
Inspect the sealing ring (Item 3) **[Figure 30-41-21]** and the mating seat in the pump housing for damage or foreign material.

Inspect the spring (Item 4) and the charge relief valve shims (Item 5) **[Figure 30-41-21]**.

NOTE: 1.0 mm shim (Item 5) [Figure 30-41-21] = 43.5 PSI (3 bar) in pressure change. Adding shims increases charge pressure. Removing shims decreases charge pressure.

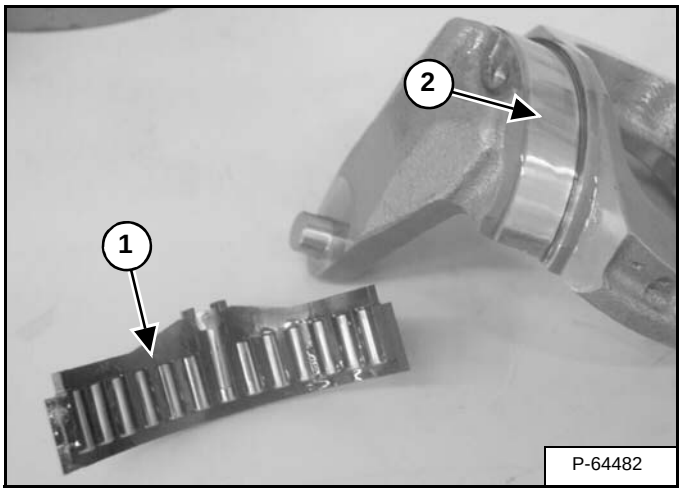
Disassembly And Assembly (Cont'd)

Figure 30-41-53



Assembly: Ensure bearing pins are in the holes of the swash plate (Item 1) **[Figure 30-41-53]**.

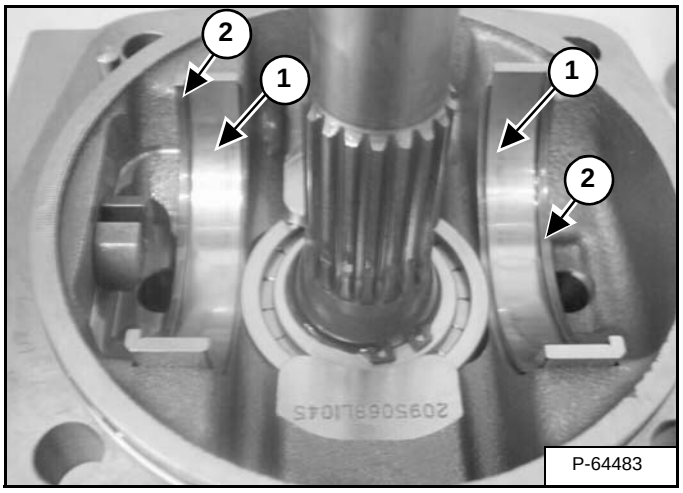
Figure 30-41-54



Remove the shell bearing (Item 1) **[Figure 30-41-54]**.

Inspect individual roller bearings and machined surfaces (Item 2) **[Figure 30-41-54]** on swash plate.

Figure 30-41-55



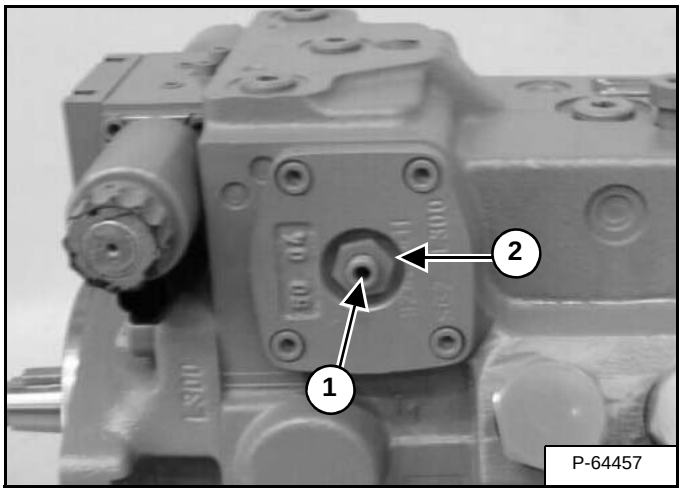
Remove the shell bearing races (Item 1) **[Figure 30-41-55]**.

Assembly: Note shell bearing races have an edge (Item 2) **[Figure 30-41-55]** on them. The edges face towards the outside of the endcap housing

Inspect bearing surfaces for scratches or scoring.

Mechanical Neutral Adjustment (Cont'd)

Figure 30-41-88



While holding the adjustment screw (Item 1) in position, tighten the lock nut (Item 2) **[Figure 30-41-88]** to 22 ft.-lb. (30 N•m) torque.

Shut loader OFF.

Remove the hydraulic hose from the X1 and X2 ports on the pump. Install the plugs and tighten to 18 ft.-lb. (25 N•m) torque.

Remove the pressure gauges from the MA and MB ports on the pump. Install the plugs and tighten to 18 ft.-lb. (25 N•m) torque.

NOTE: The Hydraulic Controller Neutral Adjustment must be performed whenever the Mechanical Neutral Adjustment is done. (See Hydraulic Controller Neutral Adjustment on Page 30-41-29.)

Hydraulic Controller Neutral Adjustment

The hydraulic controller neutral adjustment, aligns the pump swash plate and the control spool so that a zero angle control setting provides a zero degree swash plate setting. This adjustment should be performed whenever any part of the control or swash plate mechanisms are adjusted or removed or after the pump mechanical neutral setting is adjusted. Ensure the pump mechanical neutral setting is correct before performing hydraulic controller neutral adjustments.

NOTE: Procedure is shown for the left side hydraulic controller. Procedure is the same for the right side hydraulic controller, except you disconnect the electrical connectors for the right side hydraulic controller and connect pressure gauges in the X1 and X2 ports on the right side of the pump.

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

⚠ 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

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

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

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

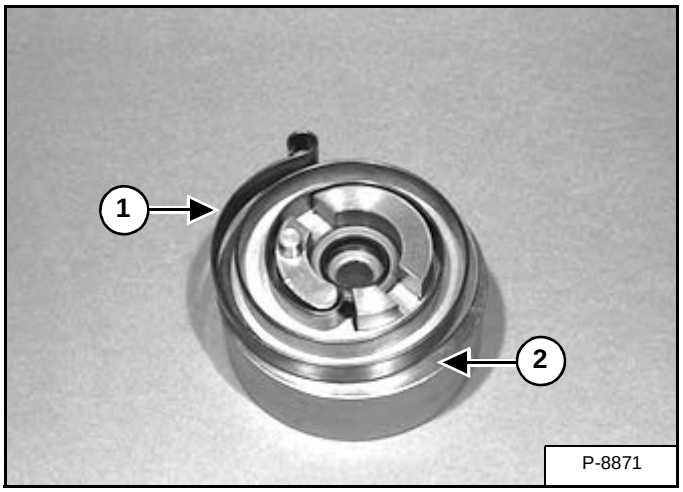
⚠ WARNING

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

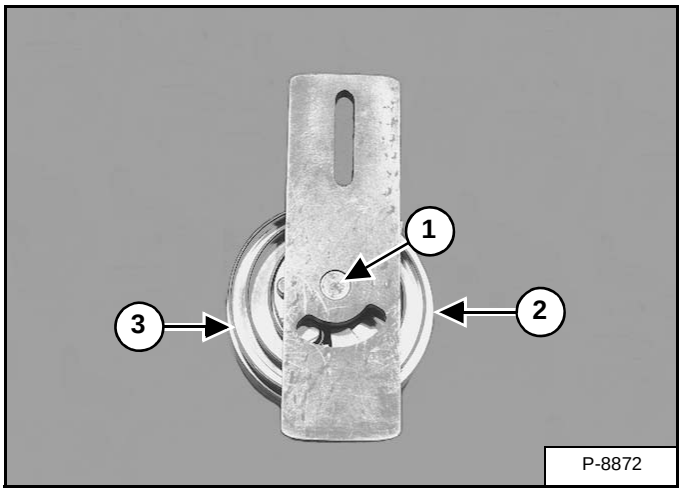
Tensioner Pulley Assembly

Figure 30-50-14



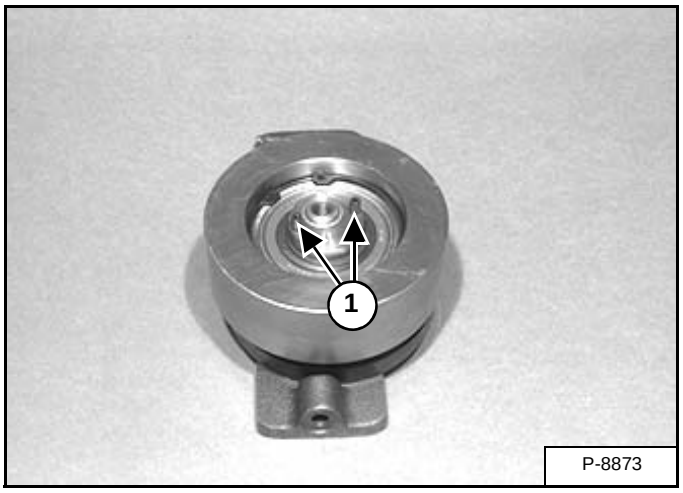
Install the spring (Item 1) on the pulley (Item 2) **[Figure 30-50-14]** as shown.

Figure 30-50-15



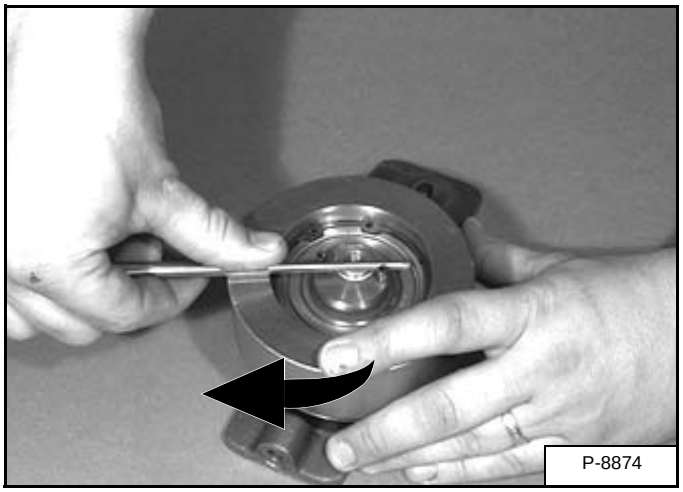
Install the shaft from the bracket assembly (Item 1) into the pulley assembly (Item 2) and align the spring (Item 3) **[Figure 30-50-15]** over the alignment pin on the bracket.

Figure 30-50-16



Turn the pulley assembly over and install the two pins (Item 1) **[Figure 30-50-16]** into the hub.

Figure 30-50-17

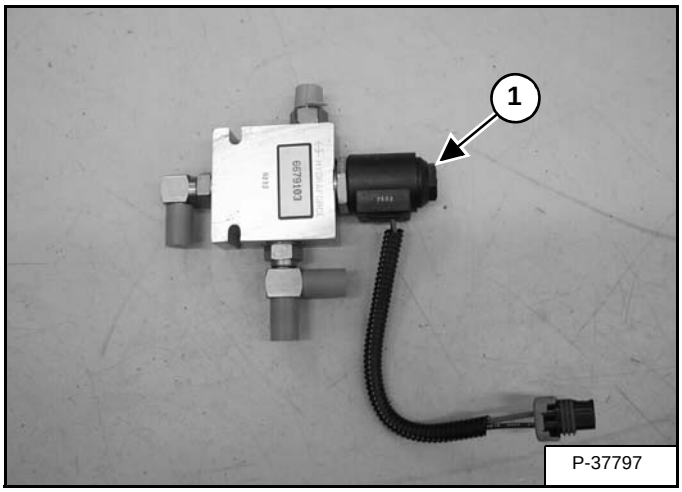


Install a punch as shown and turn clockwise while applying down pressure on the pulley.

Turn until the pulley snaps down into place; this procedure winds the spring and retains the end of the spring in proper location **[Figure 30-50-17]**.

Block Disassembly And Assembly

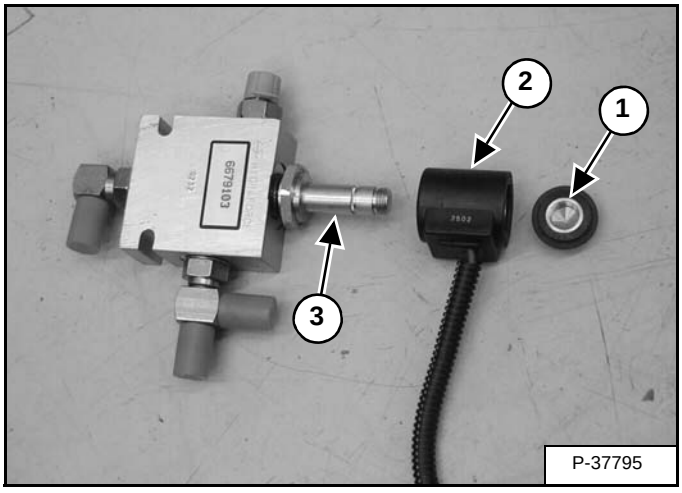
Figure 40-10-8



Loosen the electrical brake solenoid nut (Item 1) **[Figure 40-10-8]**.

Assembly: Tighten the solenoid nut 4 - 5 ft.-lb. (5,4 - 6,8 N•m) torque.

Figure 40-10-9

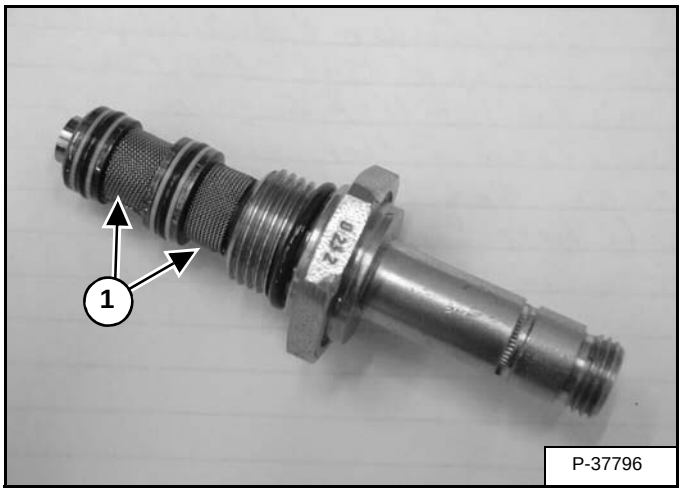


Remove the solenoid nut (Item 1) and solenoid coil (Item 2) **[Figure 40-10-9]**.

Remove the solenoid valve (Item 3) **[Figure 40-10-9]** from the block.

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

Figure 40-10-10



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

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

Idler (Front) Removal And Installation (Cont'd)

⚠ WARNING

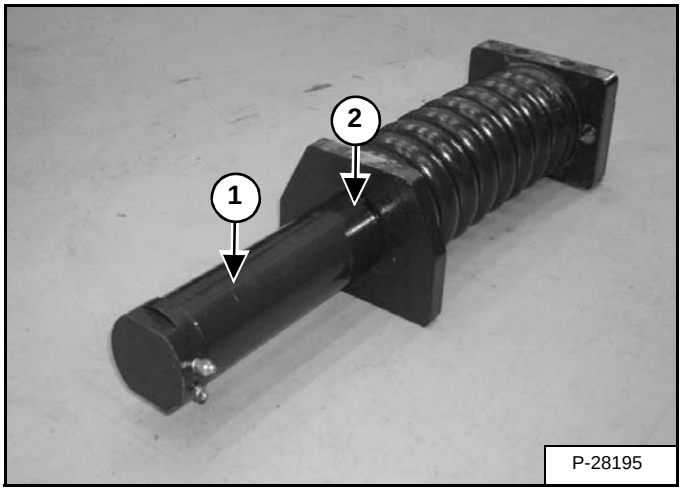
P-62574

AVOID INJURY OR DEATH

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

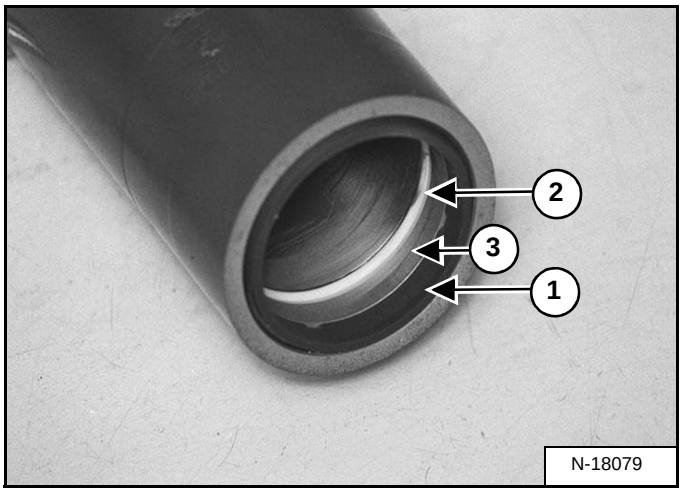
W-2617-1004

Figure 40-20-22



Remove the cylinder (Item 1) **[Figure 40-20-22]** from the shaft.

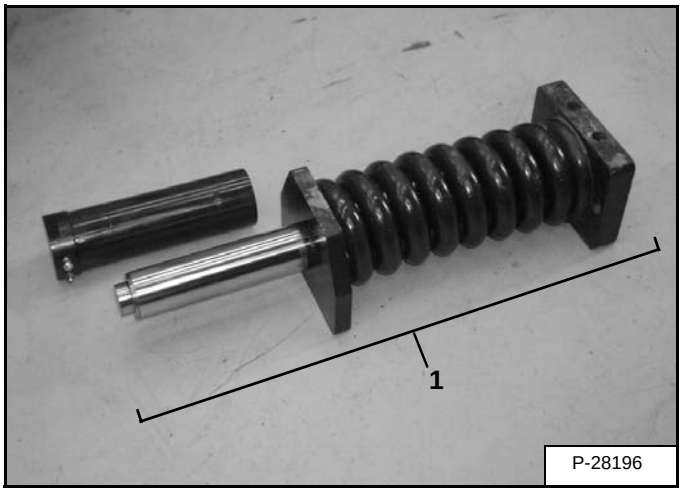
Figure 40-20-23



Remove the wiper seal (Item 1), O-ring (Item 2) and back-up ring (Item 3) from the cylinder **[Figure 40-20-23]**.

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

Figure 40-20-24



NOTE: The grease cylinder (Item 1) must be completely retracted against the spring assembly block (Item 2) [Figure 40-20-22] before adding grease, to prevent air from being trapped in the grease cylinder.

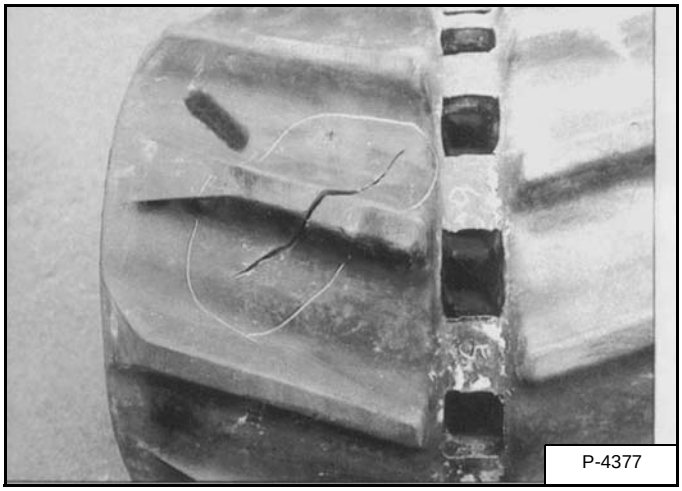
DO NOT DISASSEMBLE OR REPAIR THE COIL SPRING ASSEMBLY. THE COMPRESSION FORCE OF THE SPRING EXCEEDS 10,000 lb.

The coil spring assembly (Item 1) **[Figure 40-20-24]** is only sold as a complete unit from Bobcat Parts.

Track Damage Identification (Cont'd)

Cuts On The Lug Side Rubber

Figure 40-20-45



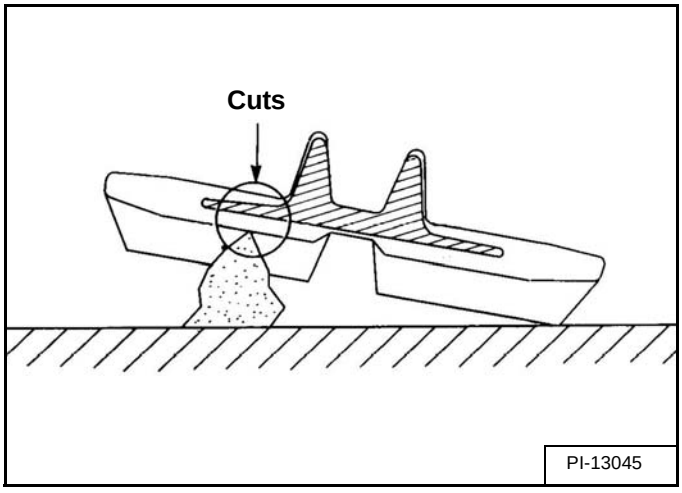
Damage:

Cuts on the lug side rubber often occurs as one of the most typical failure modes **[Figure 40-20-45]**.

Replacement:

When a cut on the lug side rubber reaches the embedded steel cords, it should be immediately repaired with cold vulcanization rubber.

Figure 40-20-46



Causes of the damage:

When rubber tracks drive over projections or sharp stones in the fields, the concentrated forces applied cause cuts on the lug side rubber surface. In case of making turns on projections, the lug side rubber surface will have an even higher chance to be cut. If the cuts run through the embedded steel cords, it might result in the steel cords' breakage due to their corrosion. It is highly recommended to repair the cuts with cold vulcanization rubber as soon as they are observed **[Figure 40-20-46]**.

Prevention:

Machine operators are requested to drive with great attention to the ground's surface especially in terrains of the following type:

Construction sites

Demolition sites

Paths covered with rocks and wood

Concrete ridges

Stumpy fields

When operating on terrains as mentioned above, high speed, quick turns and overloading should be avoided.

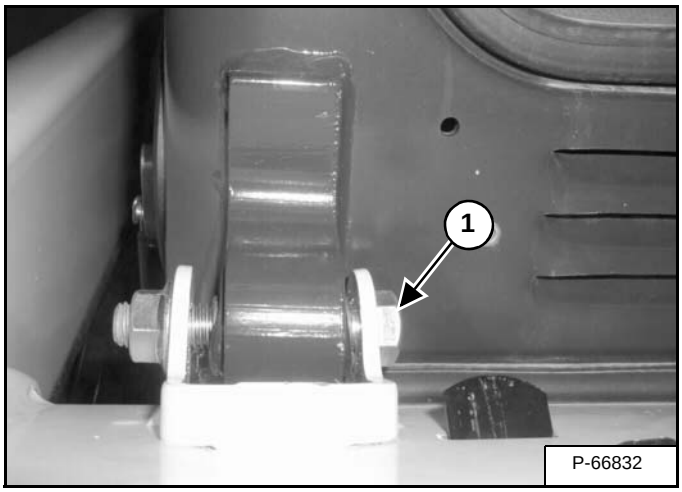
MAIN FRAME (CONT'D)

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.

Removal And Installation (Cont'd)

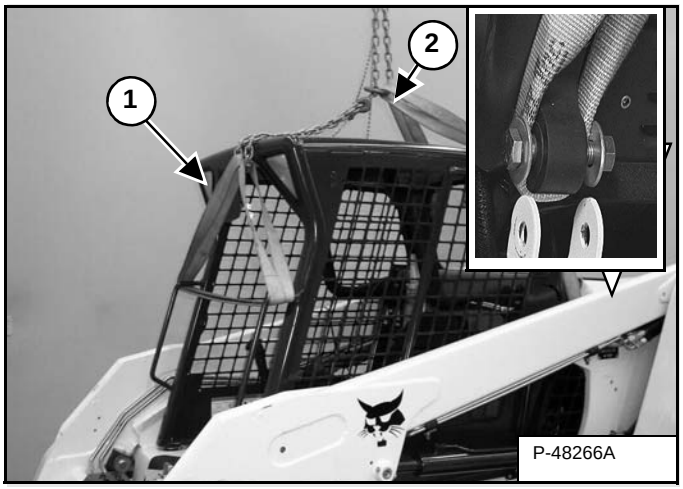
Figure 50-20-14



Remove the rear mounting bolt (Item 1) **[Figure 50-20-14]** (both sides) and nut from the operator cab.

Installation: Tighten the bolt and nut to 25 - 35 ft.-lb. (34 - 47 N•m) torque.

Figure 50-20-15



Connect the slings (Items 1 & 2) **[Figure 50-20-15]** to a chain hoist.

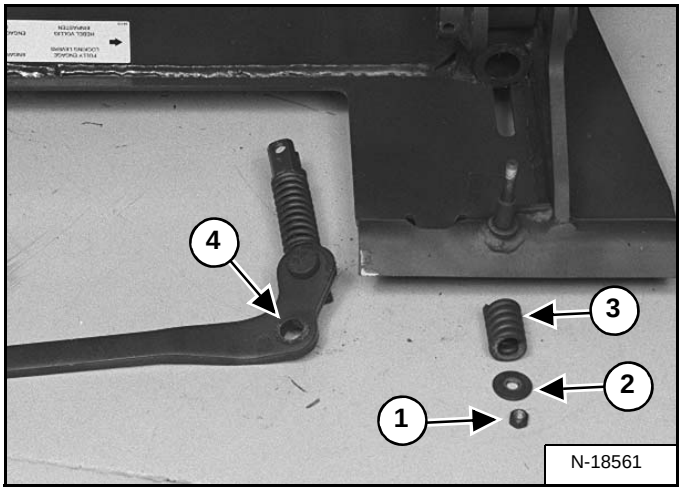
Lift the operator cab up and forward.

Remove the operator cab from the loader.

Reverse the above procedure to install the operator cab.

Lever And Wedge Disassembly And Assembly (Cont'd)

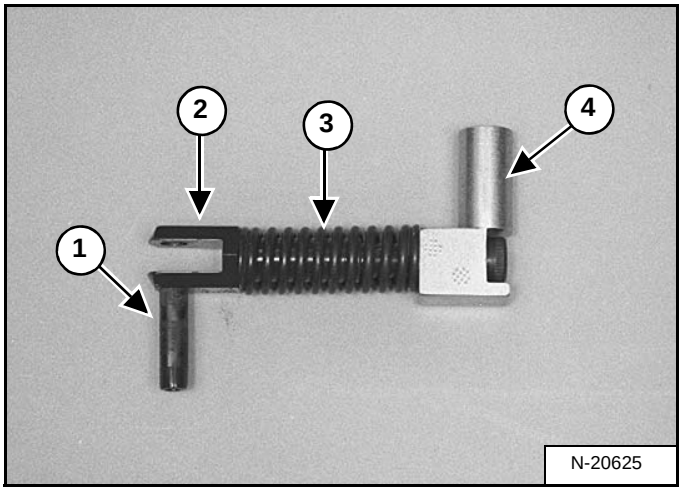
Figure 50-40-8



Remove the lever mounting nut (Item 1), washer (Item 2), spring (Item 3) and lever (Item 4) **[Figure 50-40-8]**.

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

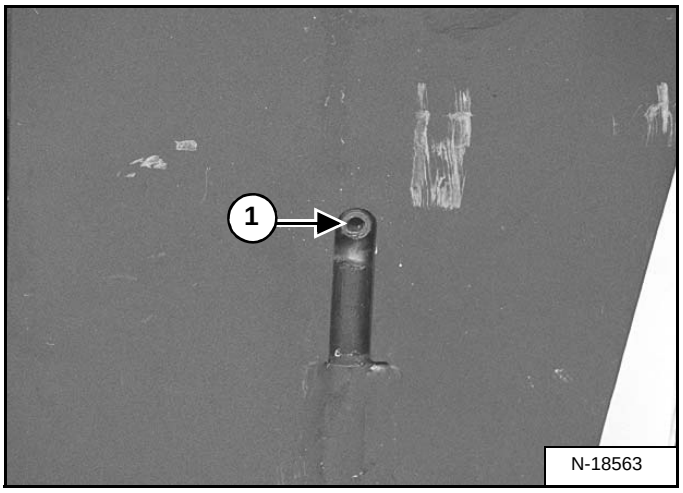
Figure 50-40-9



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

Remove the bolt and replace the damaged parts as needed.

Figure 50-40-10



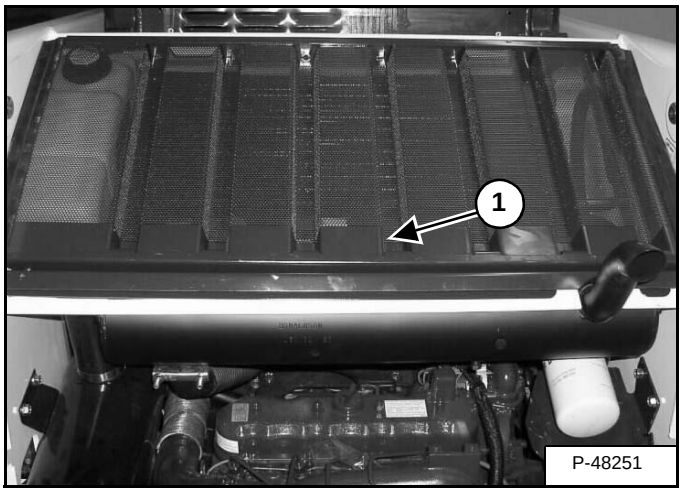
Use a punch and hammer to drive the roll pin (Item 1) **[Figure 50-40-10]** flush with the face of the Bob-Tach.

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

REAR GRILL

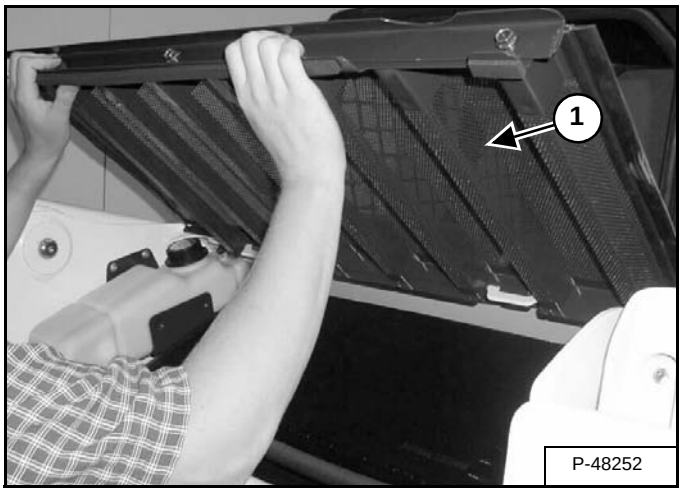
Removal And Installation

Figure 50-60-1



Open the rear door.

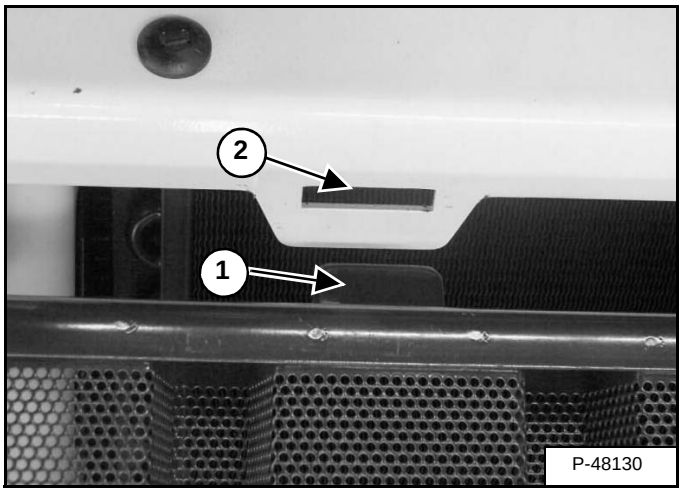
Figure 50-60-2



Lift up on the rear grill (Item 1) **[Figure 50-60-1]** and **[Figure 50-60-2]**.

Lift the grill away from the loader.

Figure 50-60-3

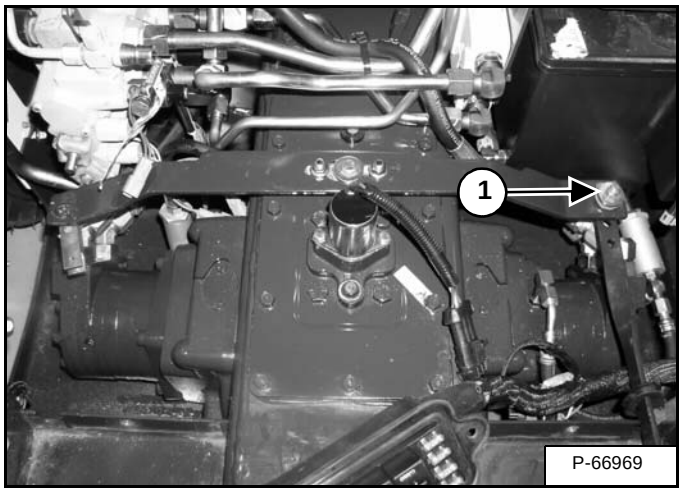


Installation: Line up the tab (Item 1) on the grill with the slot (Item 2) **[Figure 50-60-3]** on the loader mainframe. Insert the tab fully and then push down.

Reverse the removal procedure to install the grill.

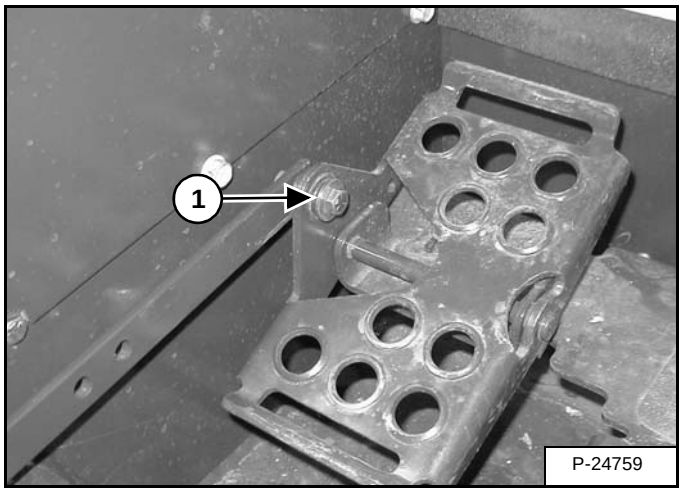
Linkage Removal And Installation (Cont'd)

Figure 50-90-6



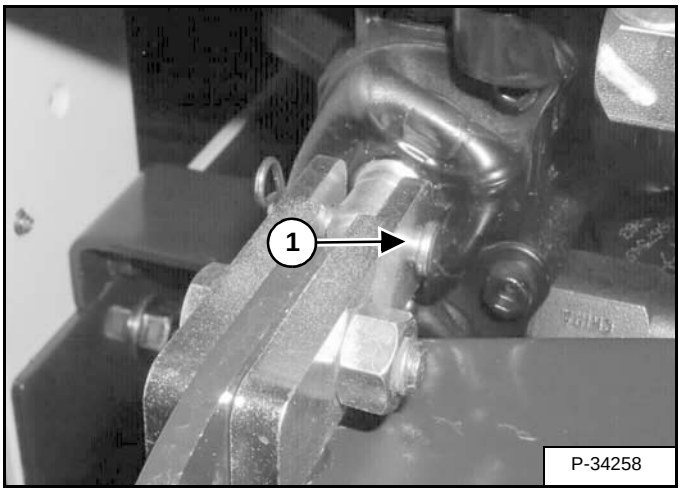
Remove the bolt and nut (Item 1) **[Figure 50-90-6]** to disconnect the lift foot pedal linkage from the crossbar linkage.

Figure 50-90-7



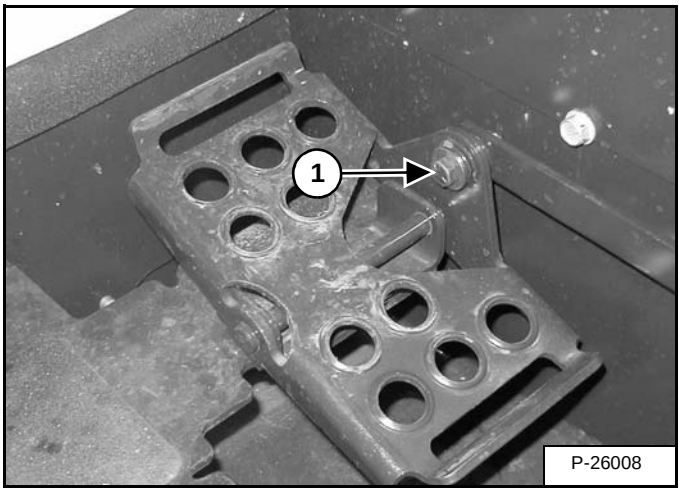
Remove the bolt and nut (Item 1) **[Figure 50-90-7]** to disconnect the lift foot pedal.

Figure 50-90-8



Remove the hairpin clip and cross-pin (Item 1) **[Figure 50-90-8]** from the control valve tilt spool.

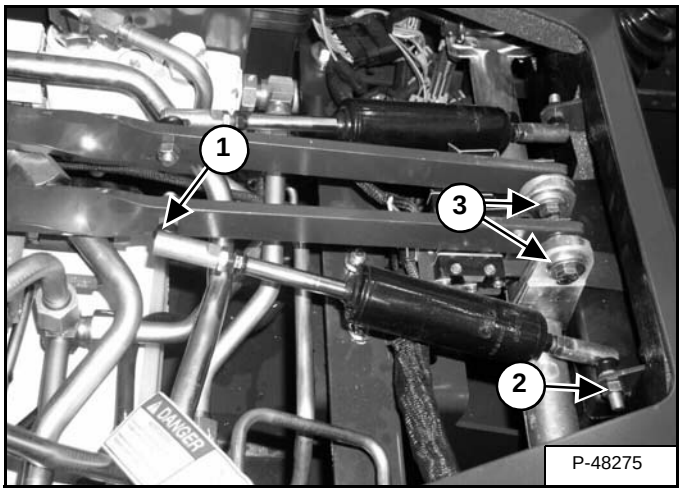
Figure 50-90-9



Remove the bolt and nut (Item 1) **[Figure 50-90-9]** to disconnect the lift foot pedal.

Shock Removal And Installation

Figure 50-100-10



Remove the mounting nut (Item 1) **[Figure 50-100-10]** from the end of the shock connected to the steering linkage.

Remove the mounting nut (Item 2) **[Figure 50-100-10]** from the other end of the shock connected to the bracket on the control panel.

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

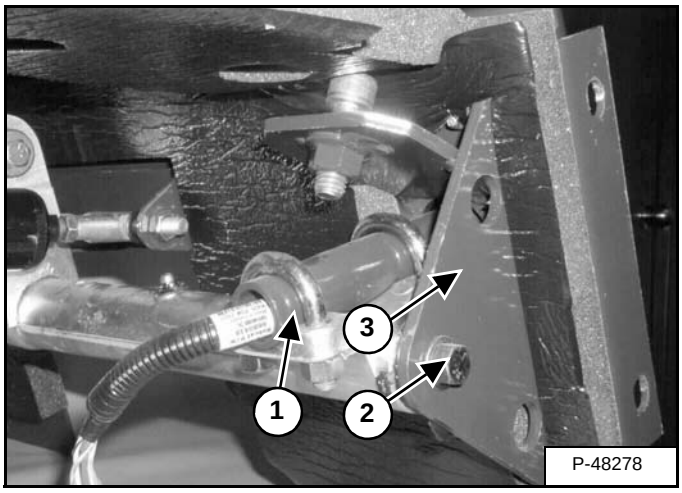
Shaft Removal And Installation

NOTE: The steering shaft can be removed without removing the control panel from the loader. Photo [Figure 50-100-11] shows the control panel removed for clarity purpose only.

Remove the steering linkage mounting bolts (Item 3) **[Figure 50-100-10]**.

Remove the steering shock mounting nuts (Item 2) **[Figure 50-100-10]**.

Figure 50-100-11



Remove Control Handle Lever (Item 1) **[Figure 50-100-11]**. (See Lever Removal And Installation on Page 50-110-1.)

Remove the steering shaft pivot bolt (Item 2) **[Figure 50-100-11]** from both sides of the control panel.

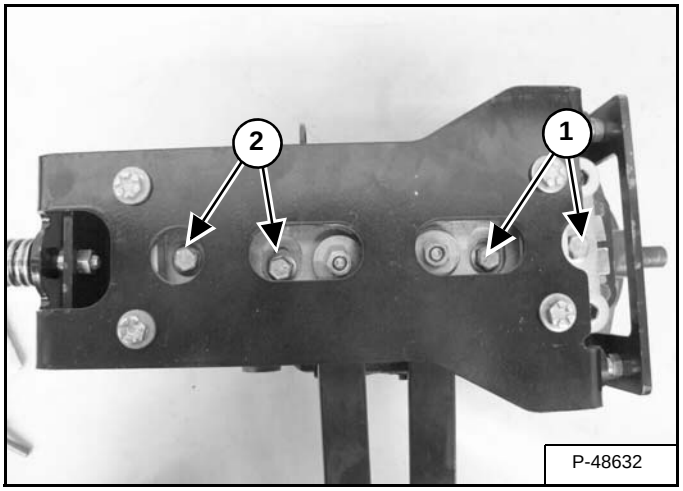
Installation: Tighten the pivot bolts to 25 - 28 ft.-lb. (34 - 38 N•m) torque.

Remove the steering shaft from the control panel.

Linkage Neutral (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.

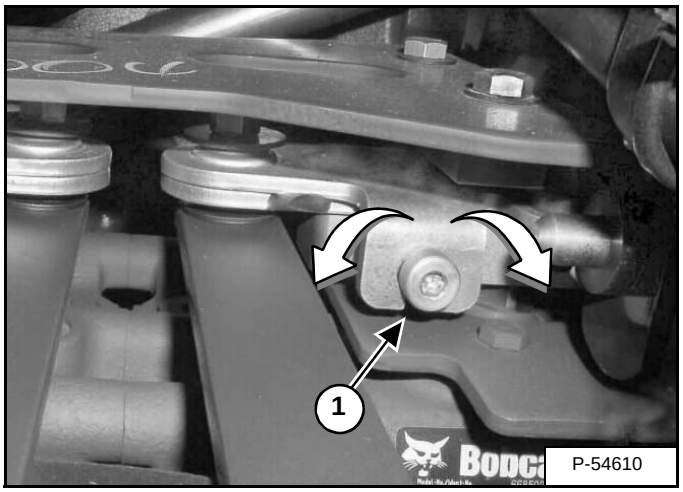
Figure 50-100-34



Loosen the left pump pintle adjustment lock bolts (Item 1). (The right pump pintle adjustment lock bolts are (Item 2) **[Figure 50-100-34]**.) 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 50-100-35



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 50-100-35]** counterclockwise until forward creep is seen.

Turn the adjustment screw (Item 1) **[Figure 50-100-35]** 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.

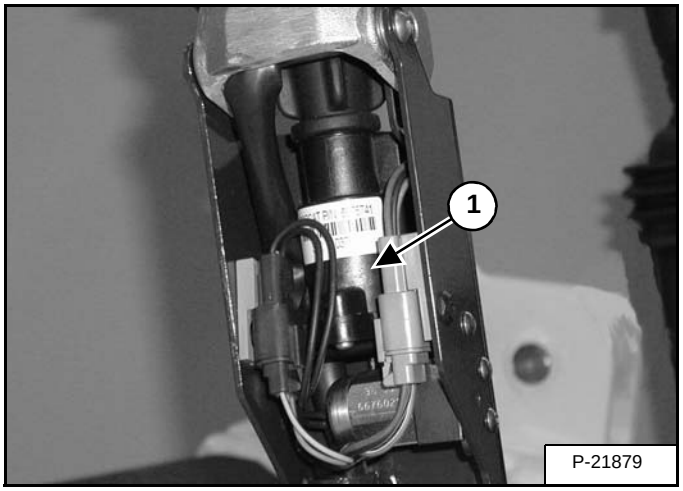
CONTROL HANDLE / LEVER (ACS)

Description

The control handles/levers are used to control the forward and reverse travel and the lift and tilt functions.The lift and tilt functions can be controlled by handle sensors (Item 1) **[Figure 50-111-1]** that are located in the base of the control handle/levers.

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

Figure 50-111-1

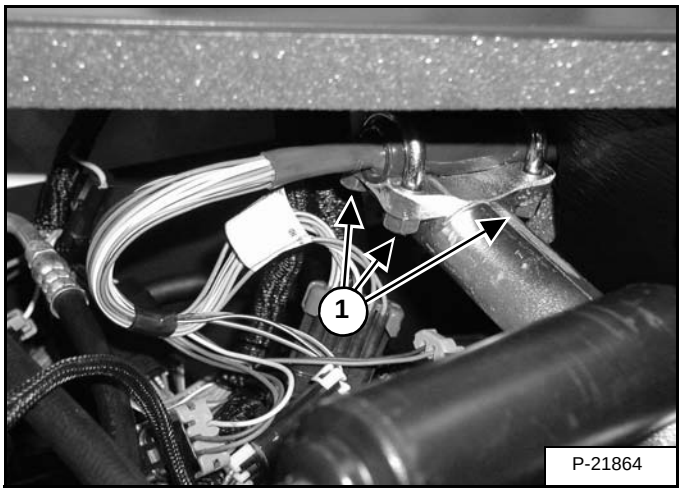


Handle Sensor (Item 1) **[Figure 50-111-1]**.

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

Handle Sensor Removal And Installation

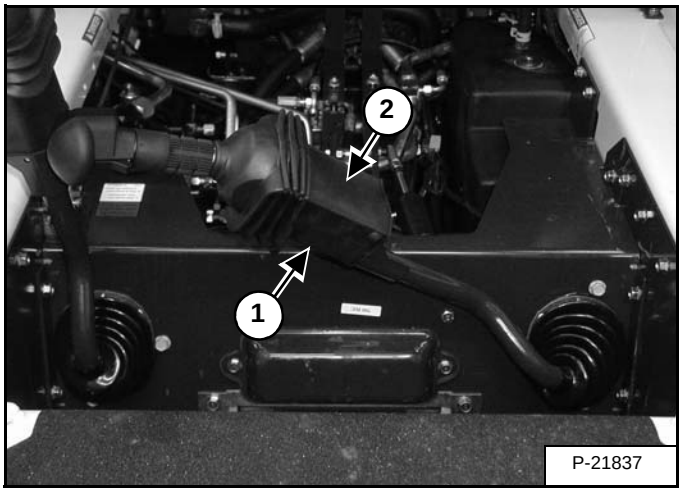
Figure 50-111-2



Loosen the nuts (Item 1) **[Figure 50-111-2]**.

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

Figure 50-111-3

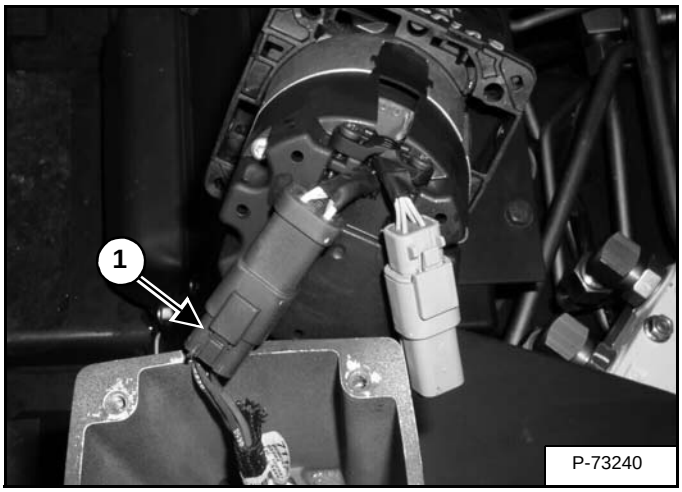


Tilt the control handle (Item 1) **[Figure 50-111-3]** to the center of the loader.

Lift the boot cover (Item 2) **[Figure 50-111-3]**.

Joystick Removal And Installation (Cont'd)

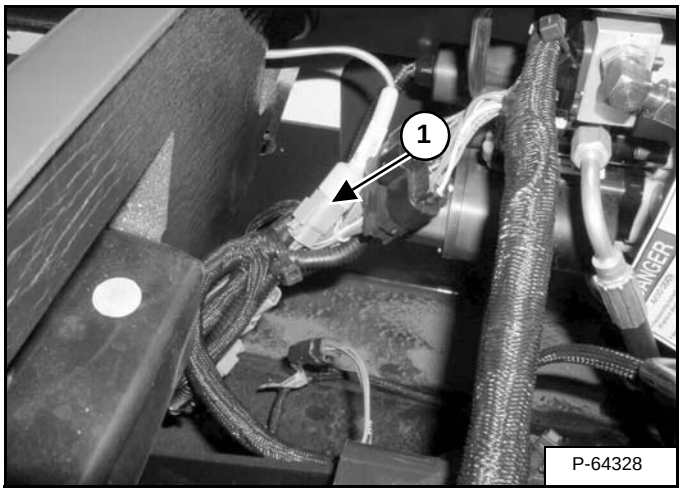
Figure 50-112-7



Disconnect the joystick connector (Item 1) **[Figure 50-112-7]** from the harness connector.

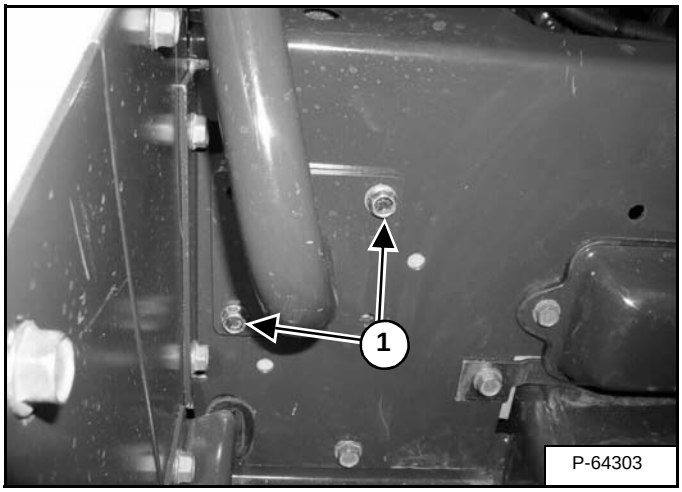
Joystick Mount Removal And Installation

Figure 50-112-8



Disconnect the joystick wiring harness connectors (Item 1) on both the right and left hand joysticks **[Figure 50-112-8]**.

Figure 50-112-9



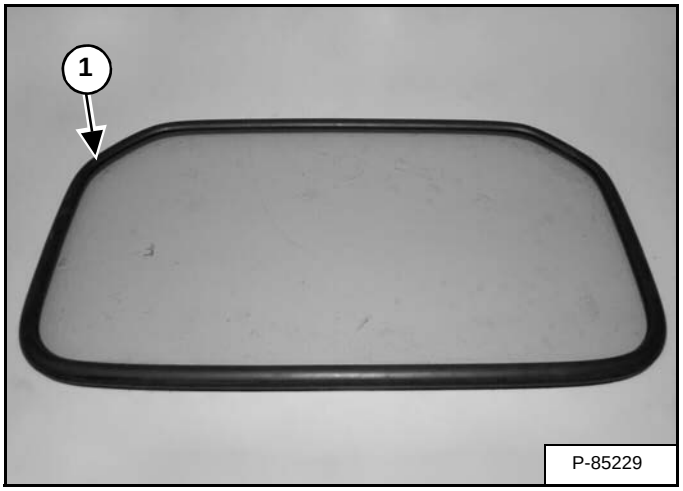
Remove the two control lever mounting bolts (Item 1) **[Figure 50-112-9]**.

The mounting bolts are secured with lock-nuts on the back of the control panel. Once removed, they need to be replaced with new.

Installation (Continuous Molding)

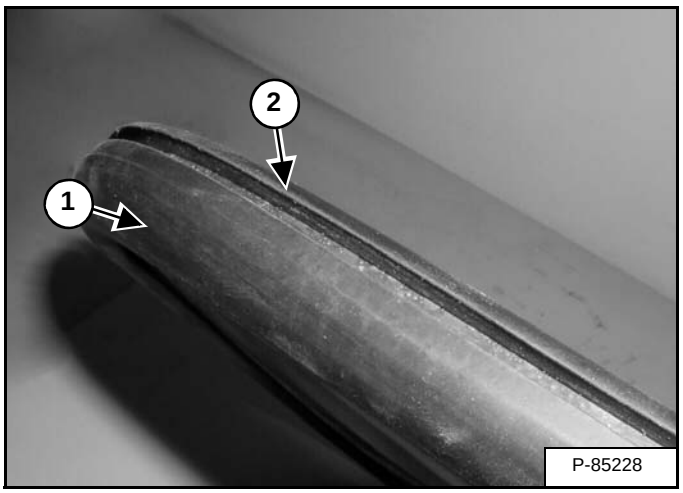
Clean the area before installing the rear window assembly.

Figure 50-130-7



Install the rubber molding (Item 1) **[Figure 50-130-7]** around the edge of the rear window.

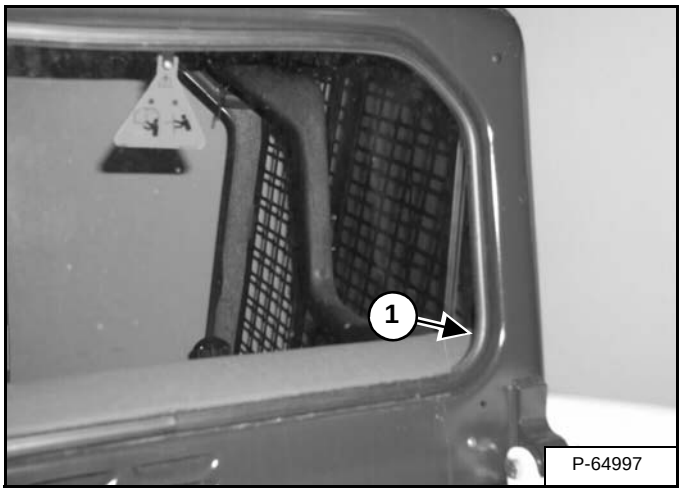
Figure 50-130-8



Apply liquid soap to the rubber molding (Item 1) **[Figure 50-130-8]** to make installation easier.

NOTE: Install the window assembly with the narrow edge (Item 2) [Figure 50-130-8] toward the inside of the loader.

Figure 50-130-9



Install the rear window assembly from the outside of the operator cab into the window frame.

Install a lower corner of the rear window assembly into the corner of the window frame (Item 1) **[Figure 50-130-9]**.

Work the window assembly downward until the window is fully seated in the lower portion of the window frame.

⚠ 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

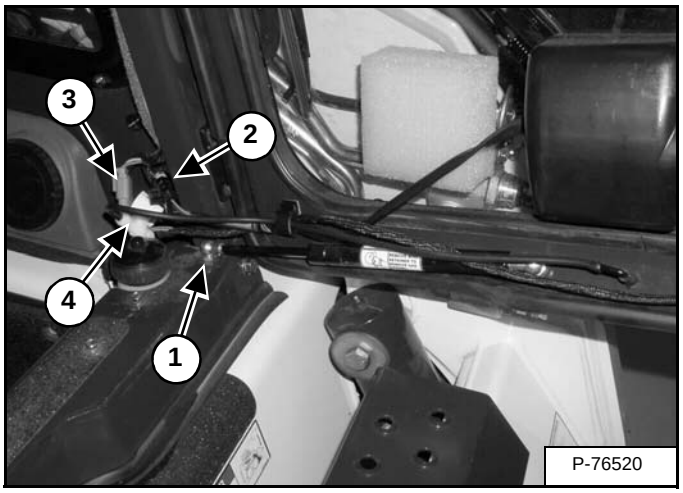
CAB DOOR

Description

The standard cab door is available as an option or dealer installed kit. The Special Application Kit Door or Forestry Door kit are available for use with certain attachments.

Removal And Installation

Figure 50-140-1



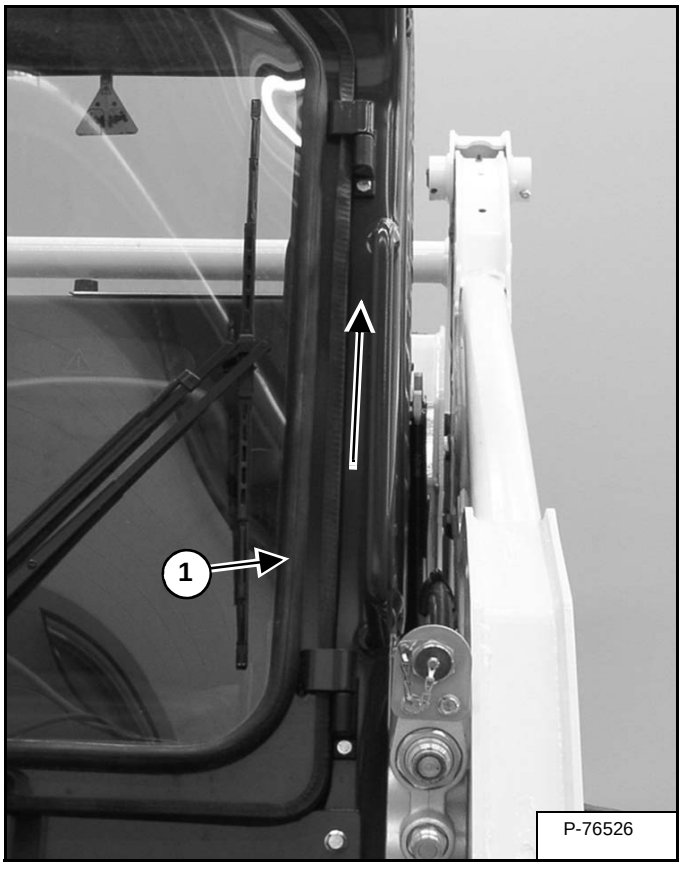
Open the cab door.

Remove the gas spring (Item 1) **[Figure 50-140-1]** from the threshold.

Disconnect the electrical harnesses (Items 2 and 3) **[Figure 50-140-1]**.

Disconnect the washer bottle hose (Item 4) **[Figure 50-140-1]**.

Figure 50-140-2



Lift the door (Item 1) **[Figure 50-140-2]** off the hinges.

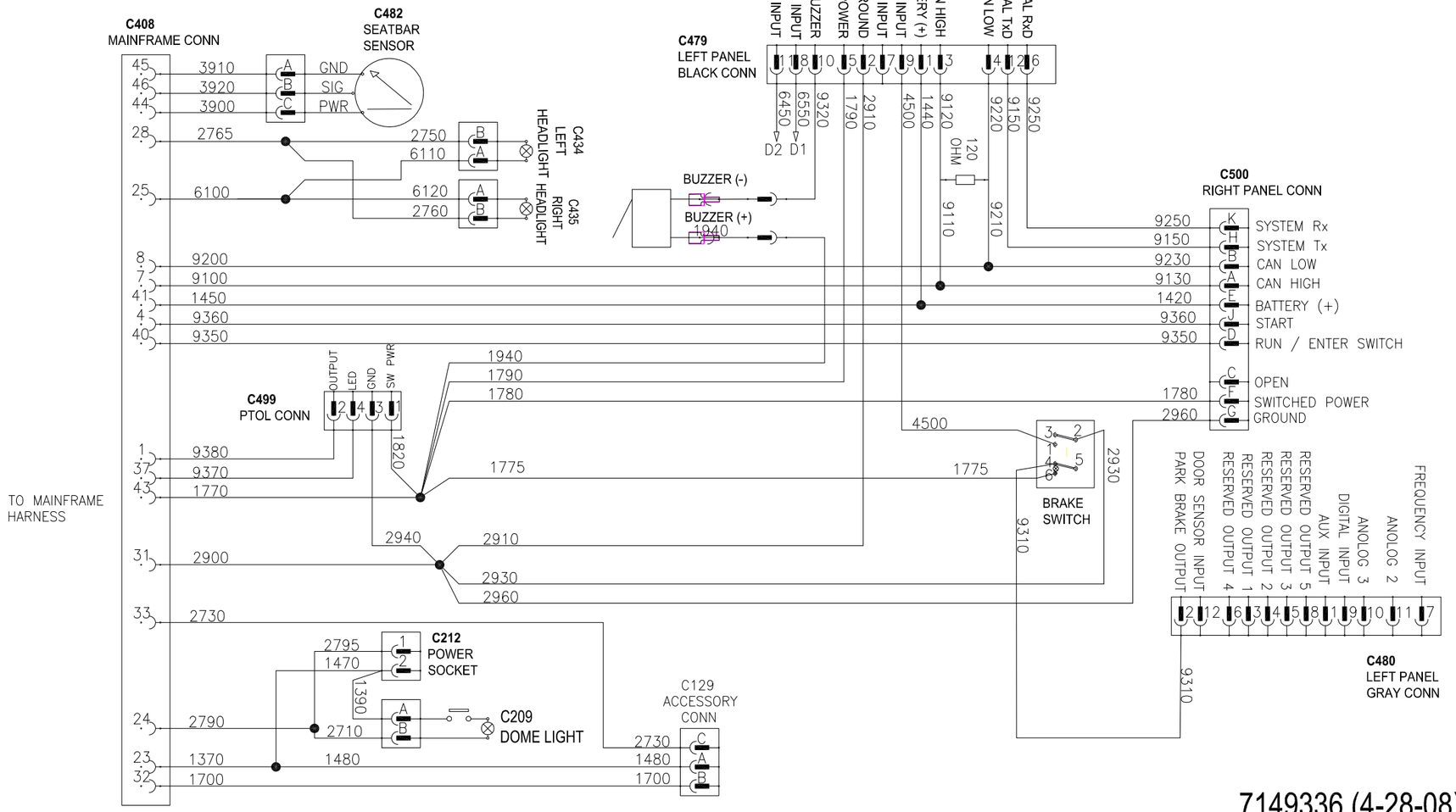
WIRING SCHEMATIC
(STANDARD CAB)
T180 (S/N 531460001 AND ABOVE)
(S/N 531560001 AND ABOVE)

(PRINTED MAY 2008)

7149336

STD CAB HARNESS 7149336

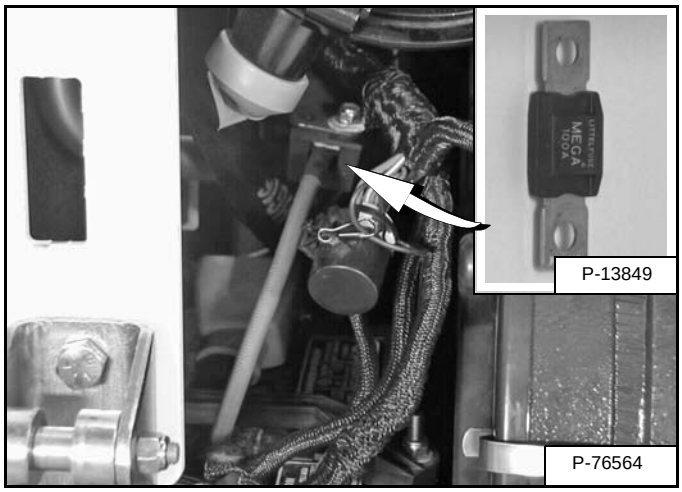
Printed In U.S.A.



7149336 (4-28-08)

Description

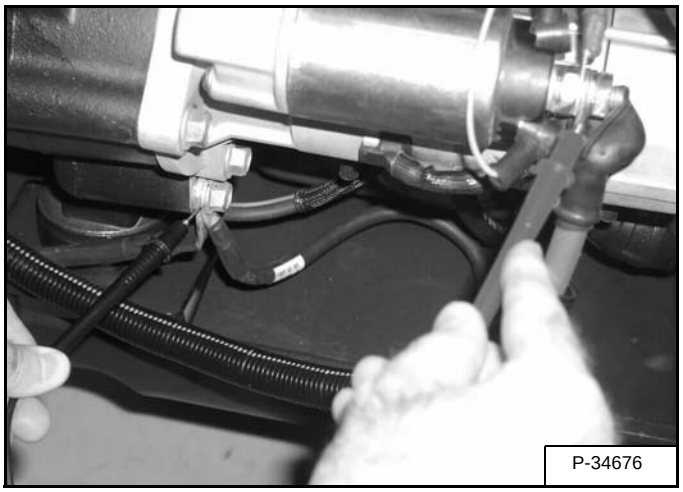
Figure 60-10-1



The loader has a 12 volt, negative ground alternator charging system. The electrical system is protected by fuses located in the cab on the steering control panel, and a 100 amp master fuse **[Figure 60-10-1]** in the engine compartment on the left side of the engine, under the air cleaner. The fuses will protect the electrical system when there is an electrical overload. The reason for the overload must be found before starting the engine again.

Alternator Voltage Testing

Figure 60-30-3



Open the rear door.

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

Turn the engine on with the remote start tool and run at idle. With a voltmeter, check the voltage between the B+ terminal and ground at the starter **[Figure 60-30-3]**.

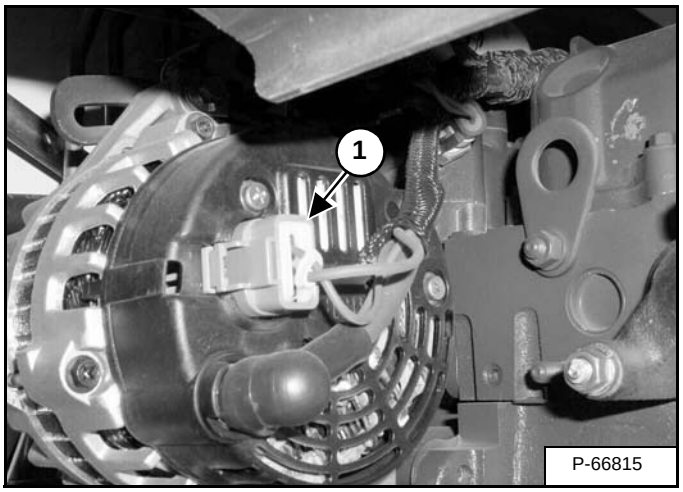
The voltage must be higher than 13.5 volts but lower than 14.7 volts at 70° F (Alternator Temperature).

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

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

Low Voltage Testing

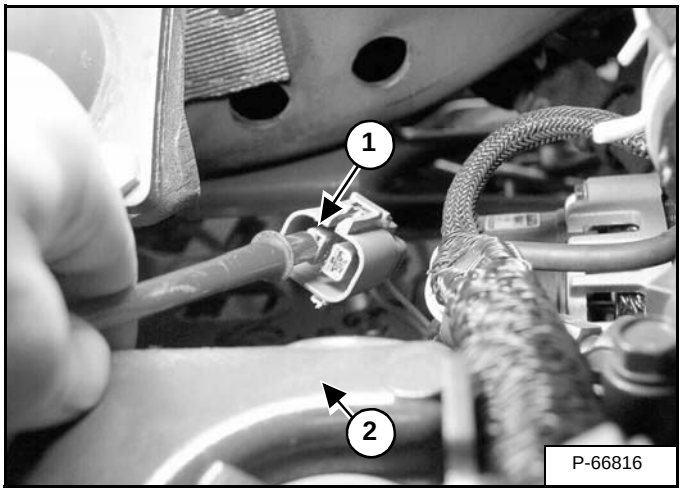
Figure 60-30-4



Turn engine OFF and remove the L & S terminal connector (Item 1) **[Figure 60-30-4]** off the alternator.

Turn the remote start tool key to the ON position.

Figure 60-30-5



Check the voltage across the "L" terminal (Item 1) and a good ground source (Item 2) **[Figure 60-30-5]**. The voltage should be what the battery voltage is. If not, check wire harness, relay and fuses. If the wire harness, relay and fuses are ok then remove alternator for replacement or repair. To repair, (See Alternator Voltage Testing on Page 60-30-3.) for further component testing.

Standard Key Panel

Figure 60-50-2

This machine may be equipped with a Standard Key Panel **[Figure 60-50-2]**.

The Standard Key Panel is used to turn the loader's electrical system on and off, and to start and stop the engine.

BOBCAT CONTROLLER (GATEWAY AND AUXILIARY)

Description

The Gateway and Auxiliary controller provide information to all other controllers. All loaders have a Gateway and Auxiliary controller.

The Gateway and Auxiliary controller are located behind the access panel near the operators left foot.

BOBCAT CONTROLLER (ACS)

Description

The ACS controller is on loaders equipped with the ACS or the SJC option. This controller processes information for the lift and tilt functions.

The ACS controller is housed in a grey colored plastic shell with black potting. The ACS controller communicates with the Bobcat Gateway Controller by CAN communication wires. The ACS controller is capable of receiving upgrades to the software.

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

SPEED SENSOR (SJC) (CONT'D)

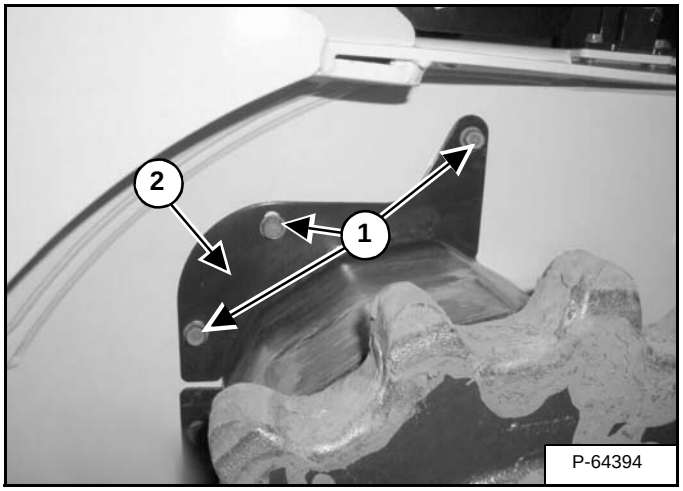
Removal And Installation

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

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

Remove the loader track/s. (See Track Removal And Installation on Page 40-20-5.)

Figure 60-80-6

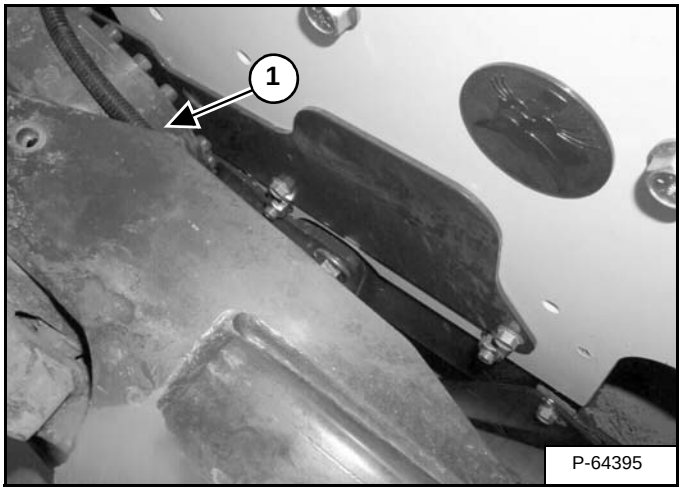


Remove the three access cover mount screws (Item 1) **[Figure 60-80-6]**.

Remove the access cover (Item 2) **[Figure 60-80-6]** from the loader.

Installation: Tighten screws to 15 - 20 ft.-lb. (20 - 27 N•m) torque.

Figure 60-80-7



At the back side of the hydrostatic motor mount (Item 1) **[Figure 60-80-7]**, locate the speed sensor access cover.

Figure 60-80-8

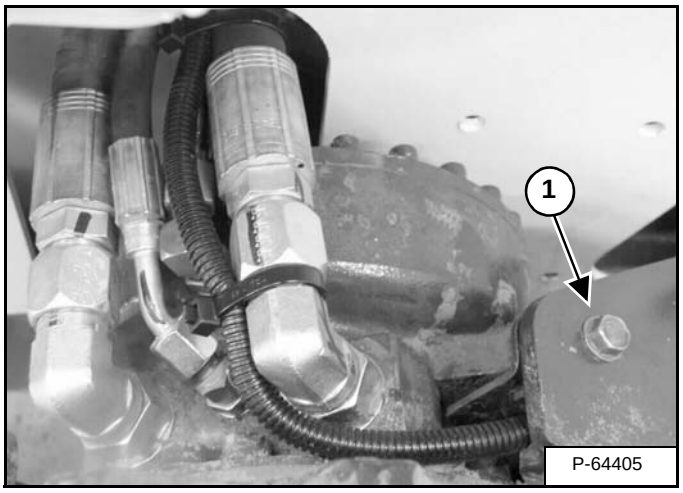
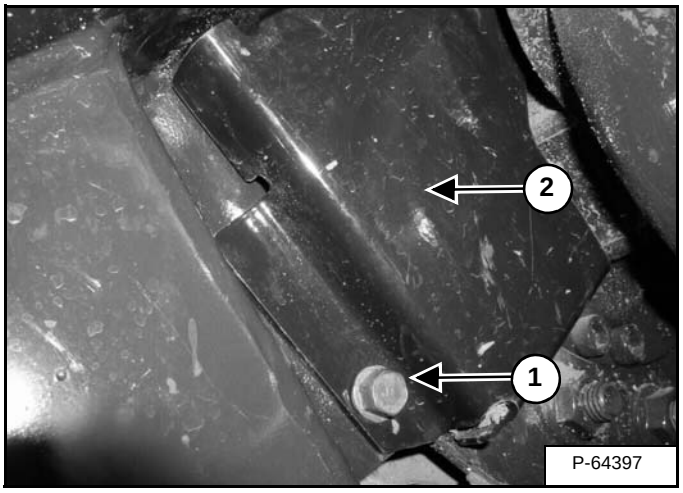


Figure 60-80-9



Remove the two access cover mount screws (Item 1) **[Figure 60-80-8]** and **[Figure 60-80-9]**.

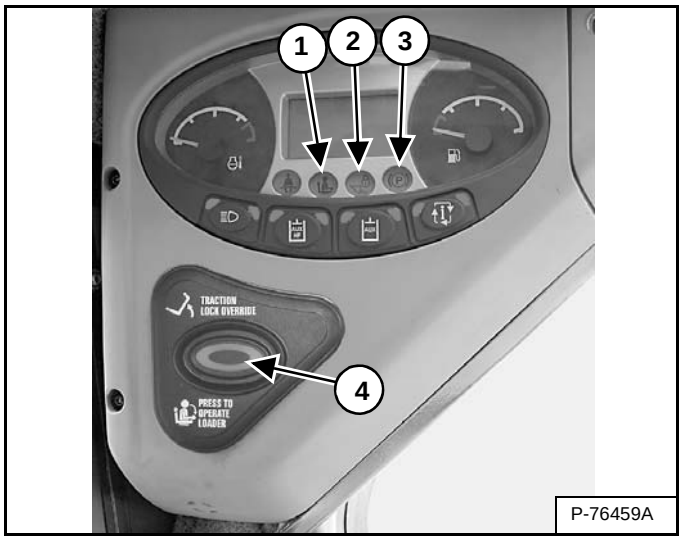
Remove the speed sensor access cover (Item 2) **[Figure 60-80-9]** from the loader.

Installation: Tighten screws to 15 - 20 ft.-lb. (20 - 27 N•m) torque.

BOBCAT INTERLOCK CONTROL SYSTEM (BICS)

Description

Figure 60-100-1



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.

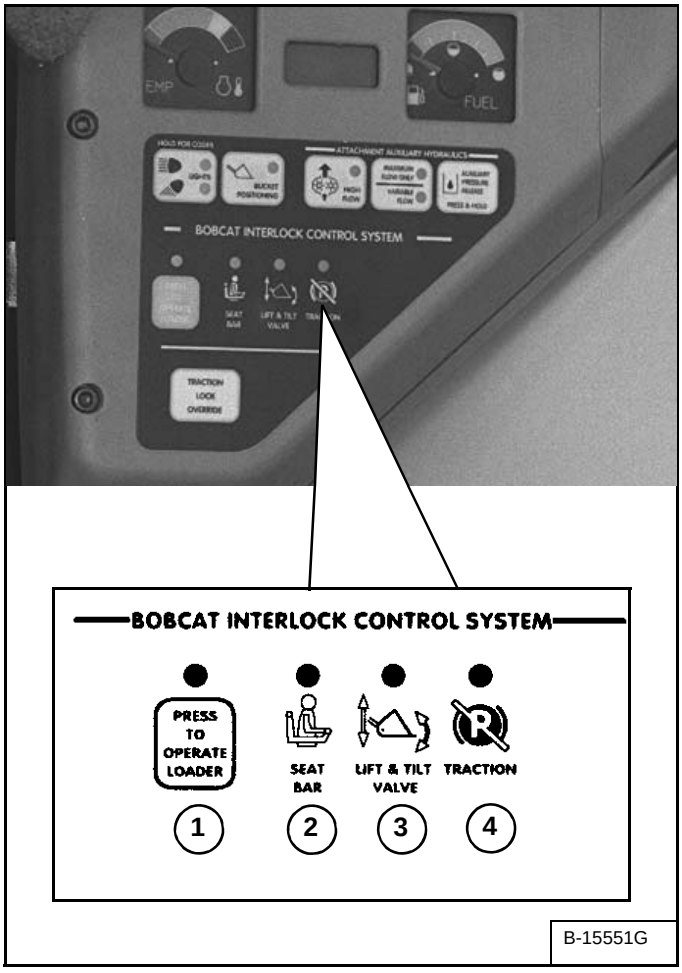
These all have indicator lights on the left panel (Items 1, 2, 3) **[Figure 60-100-1]** of the loader cab.

The Press To Operate button (Item 4) **[Figure 60-100-1]** activates the system and allows the operator to function the loader.

TRACTION LOCK

Description

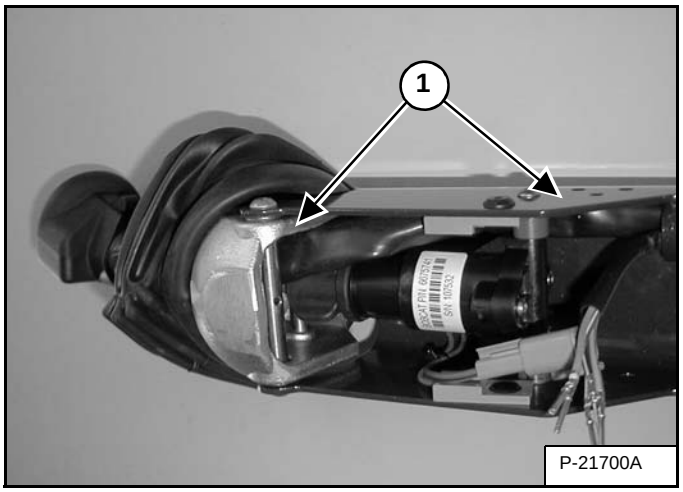
Figure 60-120-1



The Traction Lock Control System will lock the traction drive system when the engine stops. The Traction Lock Control System is incorporated into the BICS System **[Figure 60-120-1]**.

Switch Handle Installation (Cont'd)

Figure 60-130-15

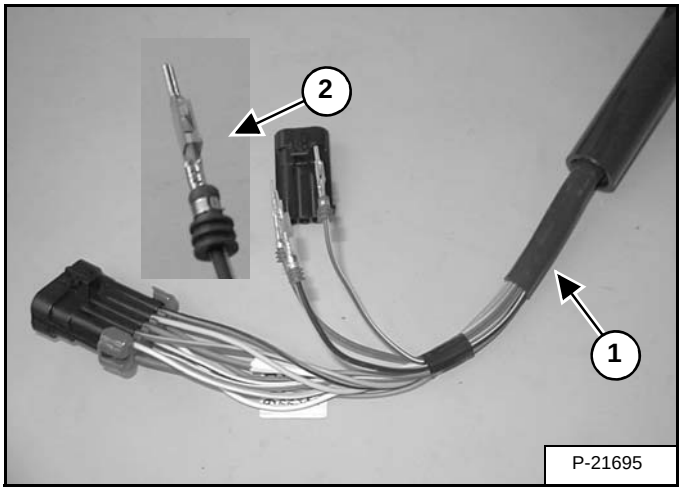


Install the new switch handle and wires from the top of the control lever.

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 in. of heat shrink tube (Item 1) **[Figure 60-130-16]** approximately 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

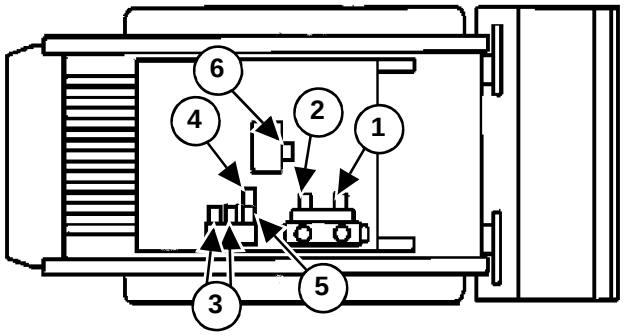
Three-Pin Connector
- A-Terminal - Red/White
- B-Terminal - Black/White
- C-Terminal - Purple/White

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

Identification Chart (Cont'd)

T180



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

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

The Hydraulic Pressure Release Button will activate solenoid number 4 at the diverter valve, shut down the loader, and bleed the rear auxiliary (If so equipped.) and also the right side front auxiliary. (If so equipped.)

The Hi-Flow Button in the left side instrument panel must be pushed ON to activate solenoid number 5 on the Hi-Flow valve.

Hydrostatic Pump Calibration (SJC)

⚠ WARNING

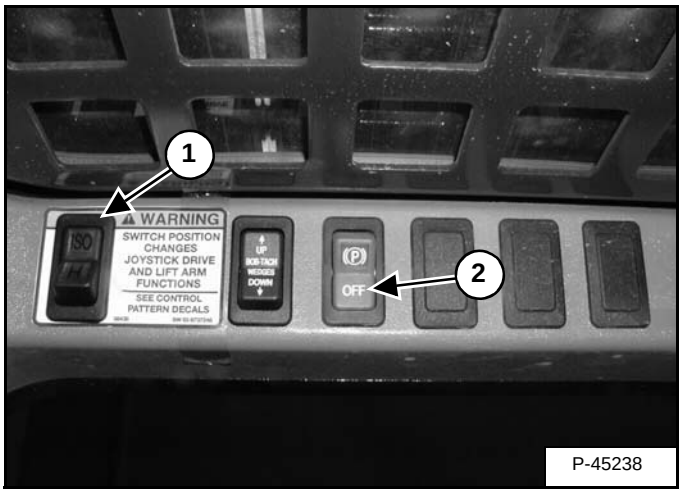
Put jackstands under the front axles and rear corners of the frame before running the engine for service. Failure to use jackstands can allow the machine to fall or move and cause injury or death.

W-2017-0286

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

Operator must be in the seat and the seat bar down.

Figure 60-160-12

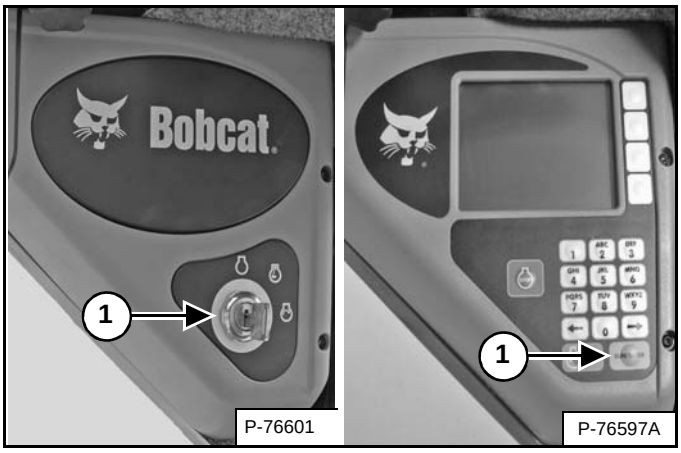


Close the cab door. (If loader is so equipped.)

Place the loader Control Pattern Switch (Item 1) **[Figure 60-160-12]** in the **ISO** position.

Verify the parking brake (Item 2) **[Figure 60-160-12]** is **OFF**.

Figure 60-160-13



With the seat bar down, turn the ignition key ON (Deluxe Instrumentation Panel press RUN/ENTER) **[Figure 60-160-13]**.

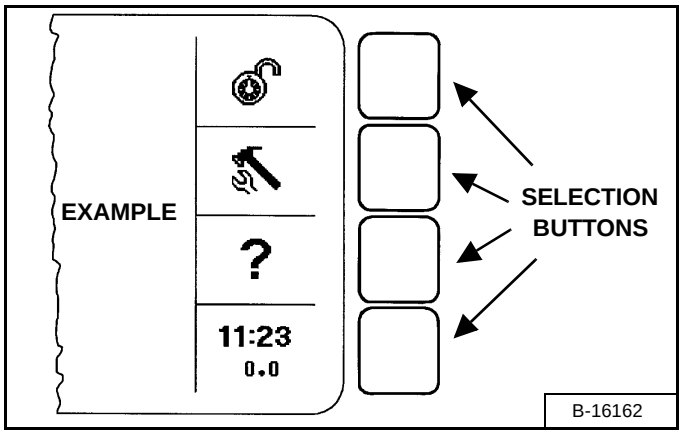
NOTE: Do not start the engine.

CONTROL PANEL SETUP

Right Panel Setup (Deluxe Instrumentation Panel)

Icon Identification

Figure 60-180-1

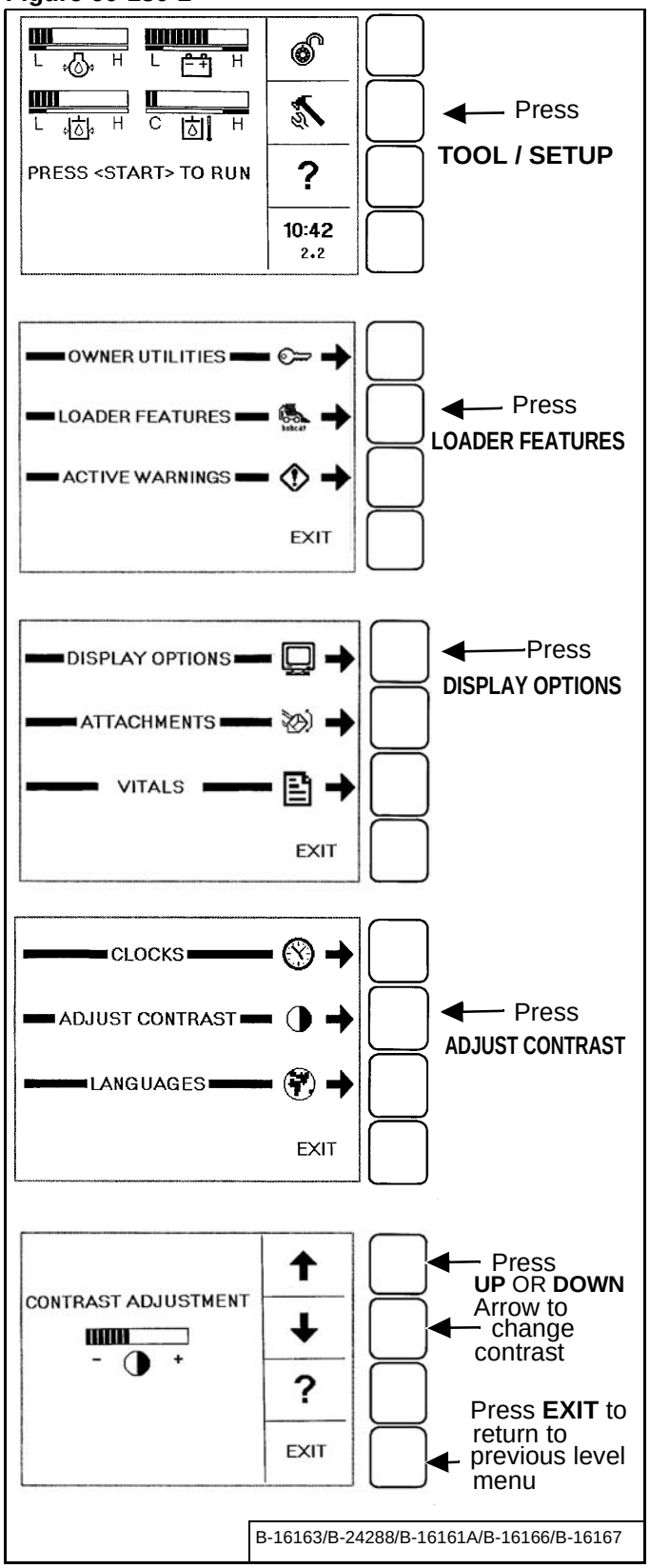


Make selection by pressing the SELECTION BUTTON adjacent to the icon **[Figure 60-180-1]**.

ICON	DESCRIPTION
	LOCK / UNLOCK: Allows machine to be locked / unlocked. You must lock machine to activate security system. When system is unlocked, the user can press RUN / ENTER then press START to begin operation. A valid password will need to be entered at startup to run a locked machine.
	TOOL / SETUP: Access system options. Use to set clock, check system warnings, select language, set passwords, etc.
?	**HELP:** Access help on current menu item.
EXIT	**EXIT** returns you to previous level menu.
11:23 0.0	**CLOCK / JOB CLOCK:** Press to clear or lock job clock; TOOL / SETUP to set time.
	UP ARROW: Goes backward one screen. **DOWN ARROW:** Goes forward one screen.
⇧ ⇩	**OUTLINE ARROWS:** No screen available (backward / forward).
	SELECTION ARROW: Use to select menu item.
NEXT	Goes to the NEXT screen in series. EXAMPLE: the next Active Warning screen.
INFO	Goes to more information about attachments.
YES / NO	Answer yes / no to current setup question.
CLEAR	Removes previously installed password.
SET	Set accepts current installed password.

Examples

Figure 60-180-2



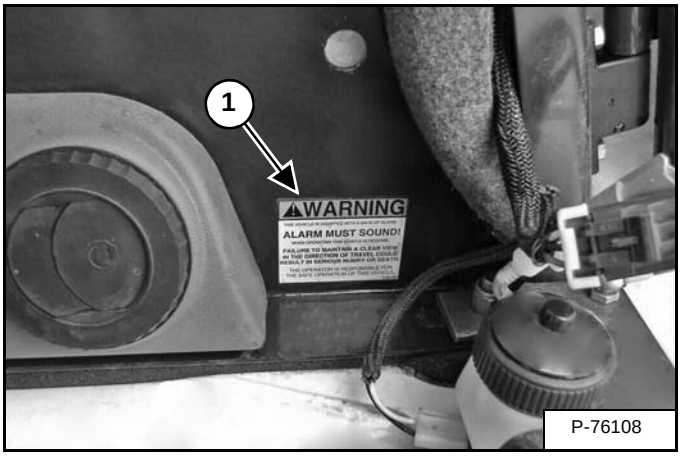
BACK-UP ALARM SYSTEM

Description

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

Inspecting

Figure 60-210-1



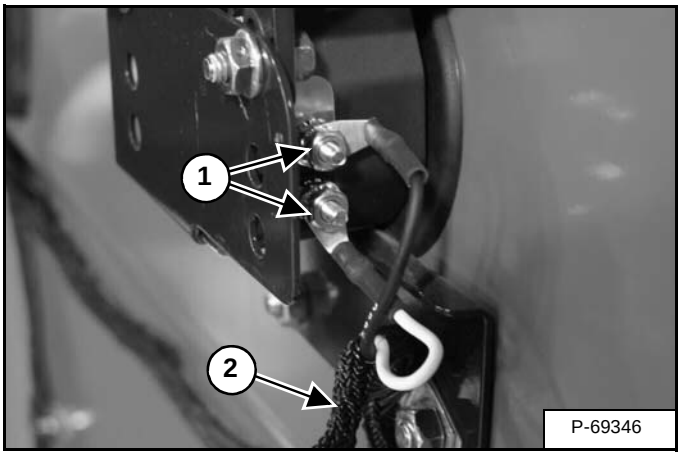
Inspect for damaged or missing back-up alarm decal (Item 1) **[Figure 60-210-1]**. Replace if required.

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

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

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

Figure 60-210-2



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

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

ENGINE INFORMATION

Description

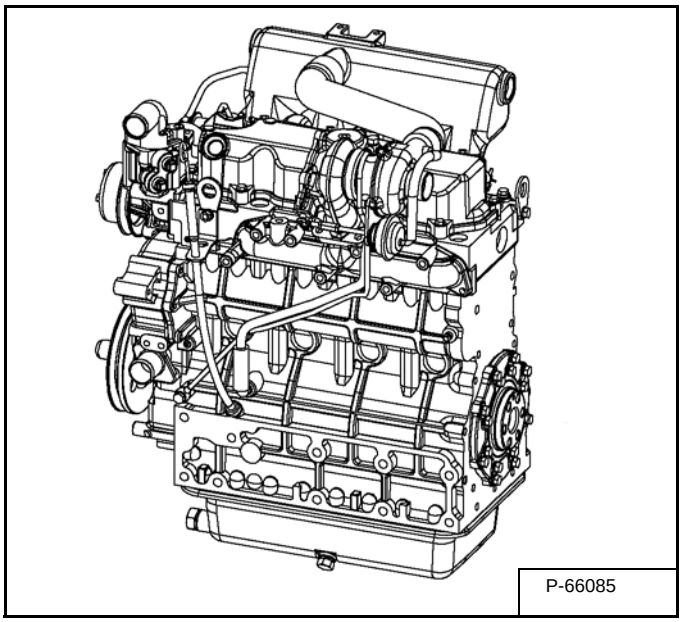
The T180 has a Kubota direct injected V2403-M-DI-T turbo diesel engine **[Figure 70-10-1]** with a displacement of 148.5 cu.in. (2,4 L). The engine is rated at an SAE Net 61 HP (45.5 kW) and has an open crankcase ventilation system.

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

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

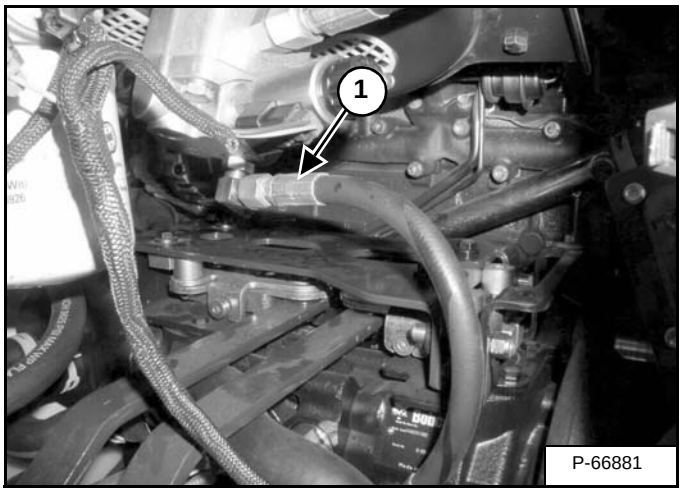
The engine is liquid cooled with a propylene glycol/water mixture in a radiator. Coolant flow is controlled by a thermostat. The cooling fan is driven by a hydraulic motor. The speed of the fan is determined by the engine coolant temperature sensor and the hydraulic/hydrostatic fluid temperature sensor.

Figure 70-10-1



Engine Removal And Installation (Cont'd)

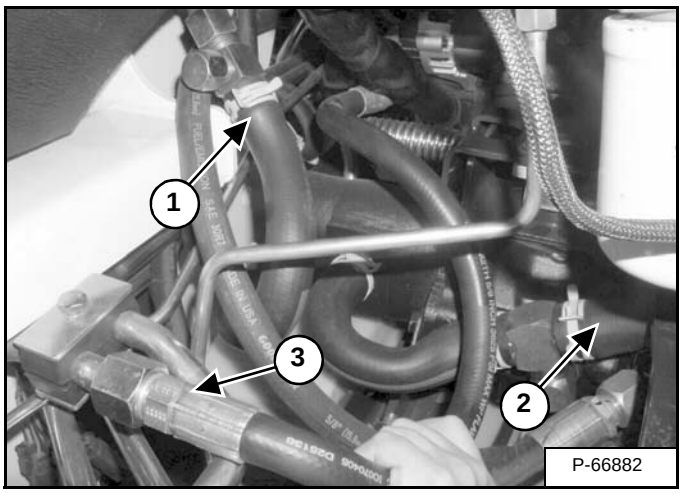
Figure 70-10-12



Disconnect drain hose (Item 1) **[Figure 70-10-12]** from the hydraulic cooling fan.

Cap or plug all hoses and fittings.

Figure 70-10-13



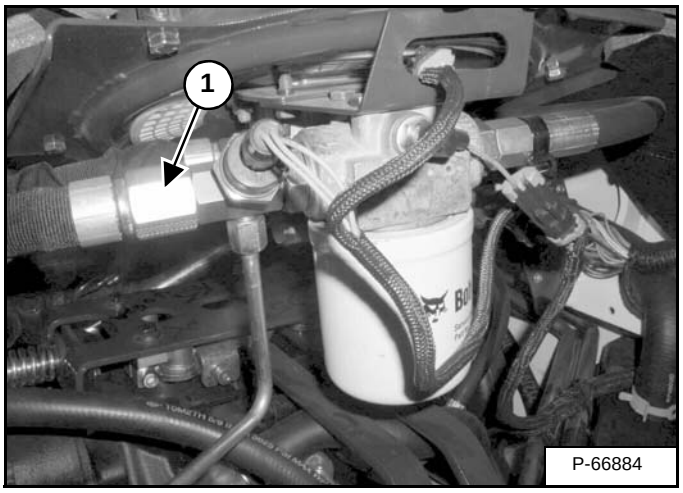
Disconnect gear pump inlet hose (Item 1) **[Figure 70-10-13]**.

Disconnect supply hose (Item 2) **[Figure 70-10-13]** from hydraulic fluid reservoir.

Disconnect gear pump outlet hose (Item 3) **[Figure 70-10-13]**.

Cap or plug all hoses and fittings.

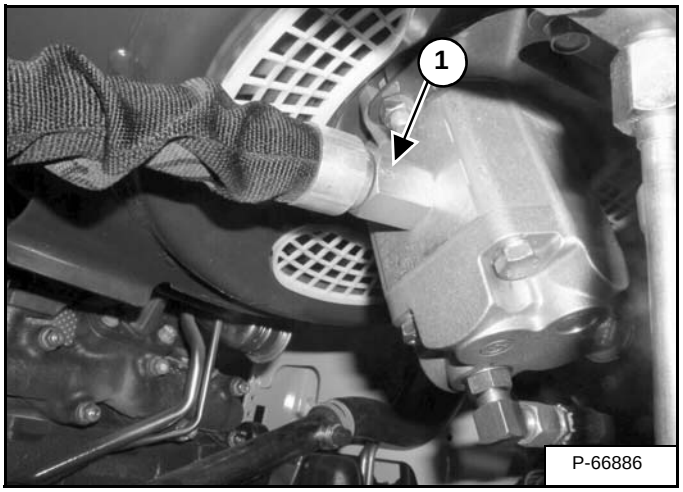
Figure 70-10-14



Mark and disconnect the charge pump/fan filter outlet hose (Item 1) **[Figure 70-10-14]**.

Cap or plug all hoses and fittings.

Figure 70-10-15

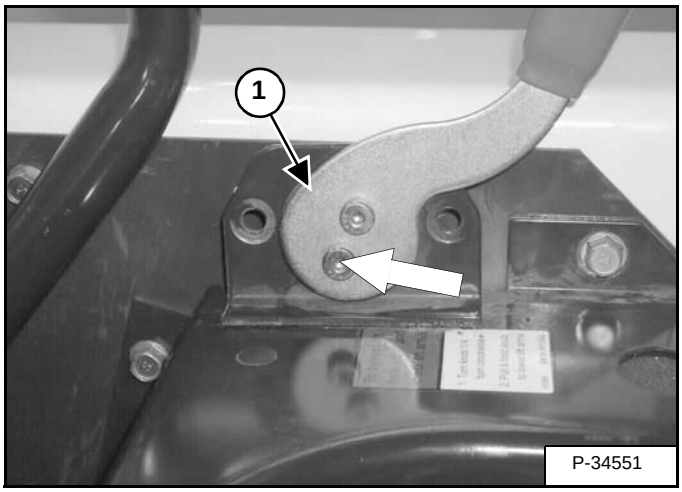


Mark and disconnect the hydraulic fan motor inlet hose (Item 1) **[Figure 70-10-15]**.

Cap or plug all hoses and fittings.

Removal And Installation (Cont'd)

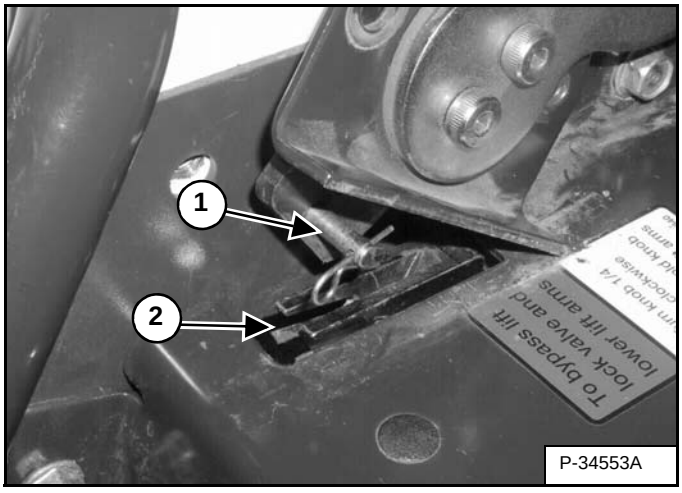
Figure 70-21-8



At the bottom side of the control panel, move the speed control linkage toward the rear of the loader.

Slide the hand speed control lever (Item 1) **[Figure 70-21-8]** forward and lift, and disconnect the assembly from the speed control cable.

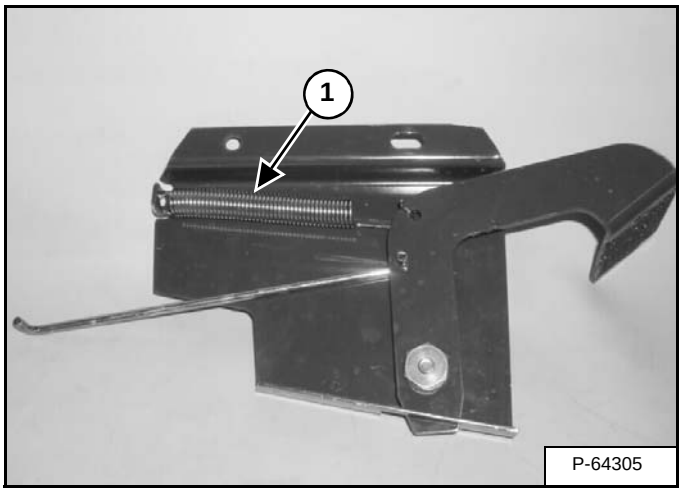
Figure 70-21-9



Installation: When installing the hand speed control to the speed control cable, be sure the speed control lever (Item 1) fits in the notch (Item 2) **[Figure 70-21-9]** of the speed control rod clevis.

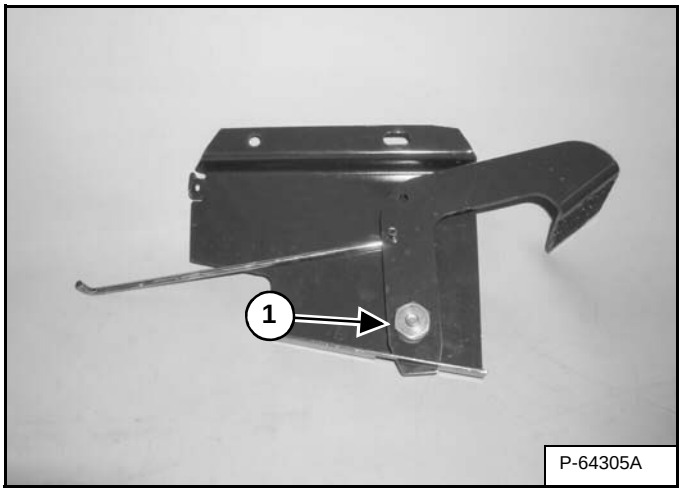
Disassembly And Assembly

Figure 70-21-10



Remove the spring (Item 1) **[Figure 70-21-10]** from the foot speed control assembly.

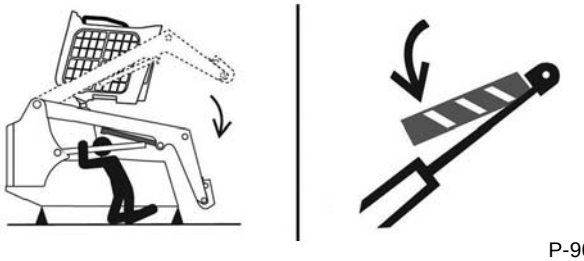
Figure 70-21-11



Remove the bushing/nut (Item 1) **[Figure 70-21-11]** from the pedal lever.

Blower Housing Removal And Installation

DANGER



P-90328

AVOID DEATH

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

D-1009-0409

WARNING

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

W-2059-0598

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.

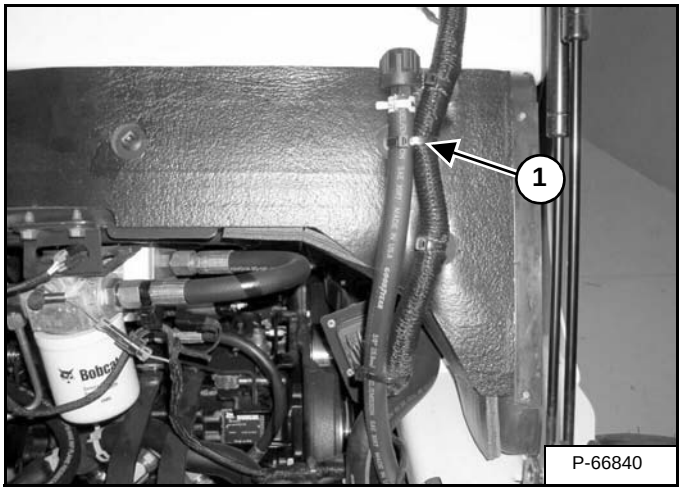
I-2003-0888

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

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

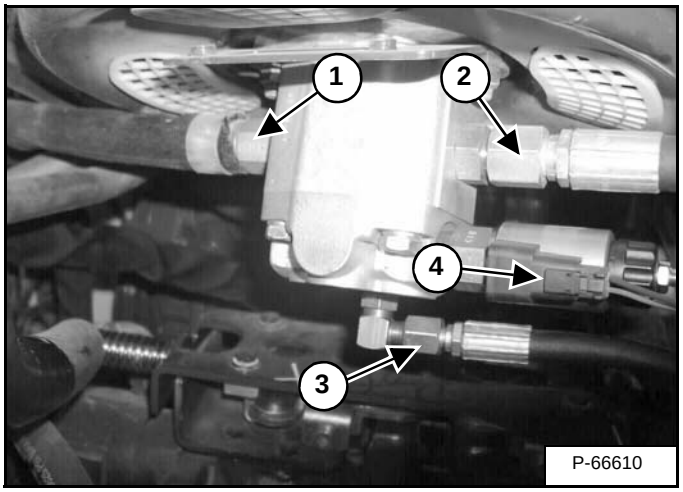
Remove the fan motor/charge pump filter housing. (See Charge Filter Housing Removal And Installation on Page 20-80-3.)

Figure 70-50-10



Remove cable ties (Item 1) **[Figure 70-50-10]** attached to blower housing.

Figure 70-50-11



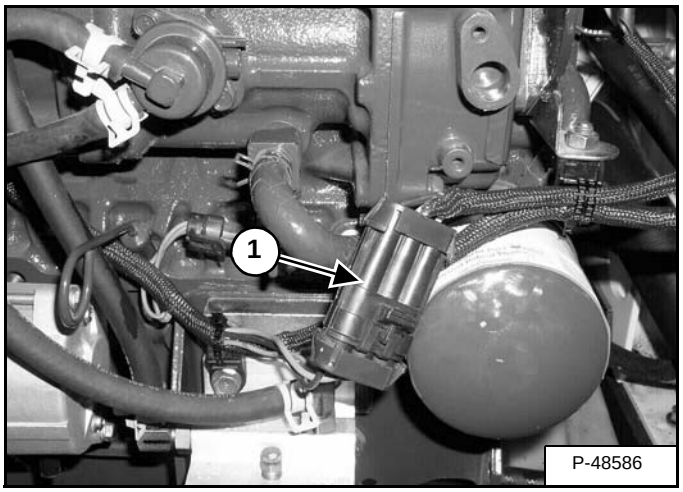
Remove the fan motor inlet hose (Item 1) and outlet hose (Item 2) **[Figure 70-50-11]**.

Remove the fan case drain hose (Item 3) **[Figure 70-50-11]**.

Disconnect the electrical connector (Item 4) **[Figure 70-50-11]**.

Fuel Shutoff Solenoid - Checking

Figure 70-70-1

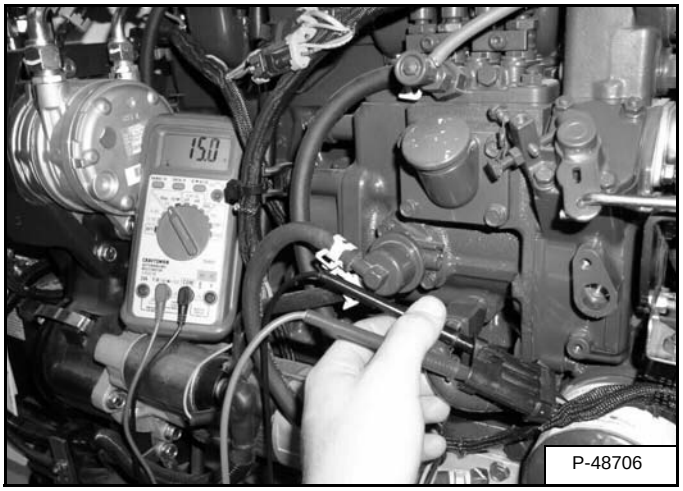


Stop the engine and open the rear door **[Figure 70-70-1]**.

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

Use an ohmmeter to check the fuel shutoff solenoid.

Figure 70-70-2

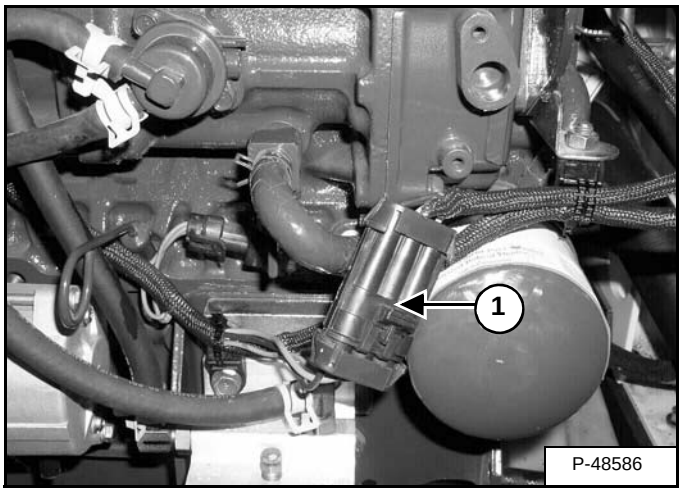


The reading between electrical connector terminal C and terminal A must be between approximately 15.6 ohm **[Figure 70-70-2]**.

The reading between electrical connector terminal C and terminal B must be between approximately 0.35 - 0.4 ohm.

Fuel Shutoff Solenoid Removal And Installation

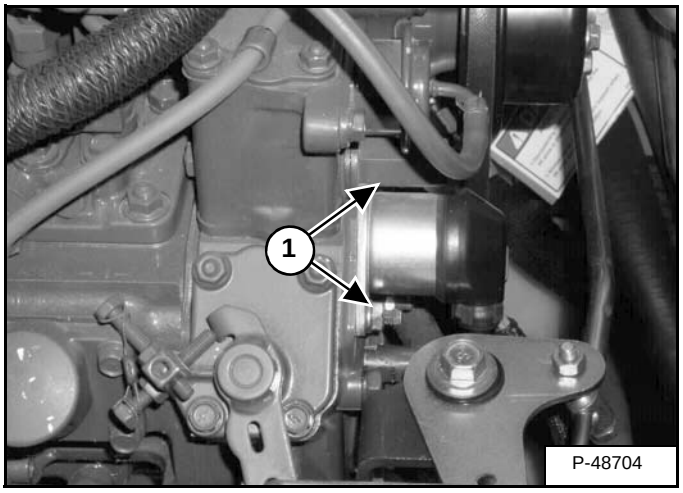
Figure 70-70-3



Stop the engine and open the rear door.

Disconnect the connector (Item 1) **[Figure 70-70-3]**.

Figure 70-70-4



Remove the mounting nuts (Item 1) **[Figure 70-70-4]** of the fuel shutoff solenoid.

Remove ground strap held on by the nuts.

Reverse the above procedure to install the fuel shutoff solenoid.

Fuel Injector Removal And Installation

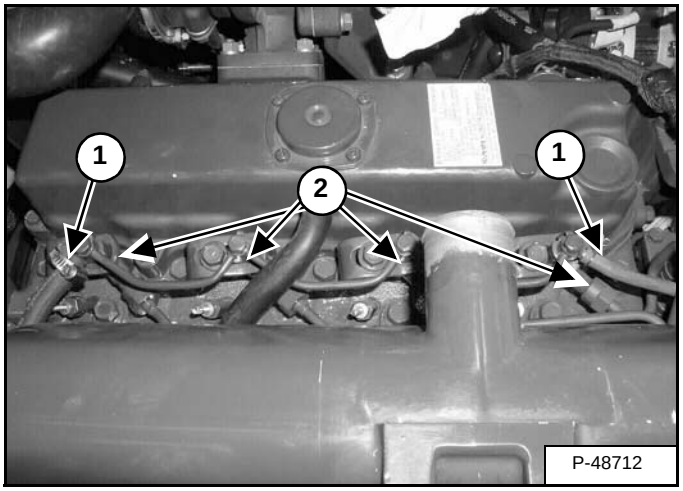
⚠ WARNING

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

Figure 70-70-25



The following are some problems caused by faulty injectors:

-Engine is hard to start or will not start
-Rough engine operation and idle
-Engine will not have full power
-Excessive exhaust smoke

Disconnect the fuel return hoses (Item 1) **[Figure 70-70-25]** from the injectors.

Disconnect the high pressure fuel lines (Item 2) **[Figure 70-70-25]** from the fuel injectors and from the injection pump.

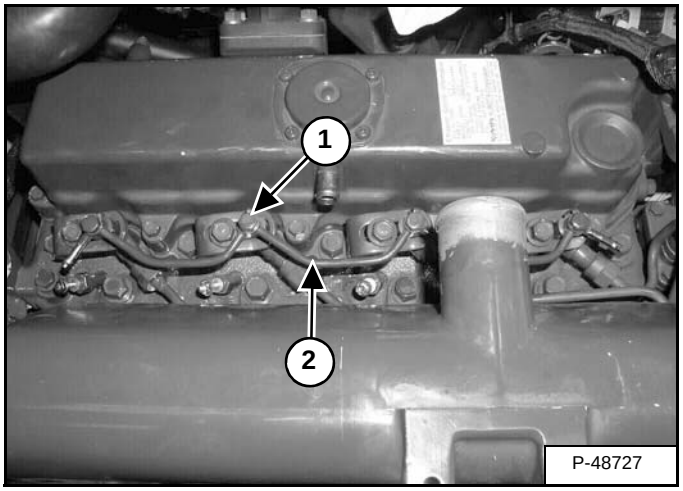
Remove the high pressure fuel lines from the engine.

IMPORTANT

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

I-2029-0289

Figure 70-70-26

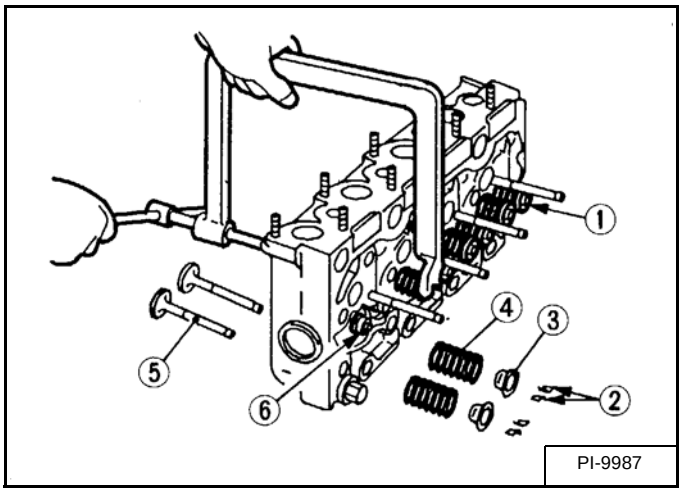


Remove the four retainer bolts from the top of the fuel injectors (Item 1) **[Figure 70-70-26]**.

Remove the fuel return tube (Item 2) **[Figure 70-70-26]** from the fuel injectors.

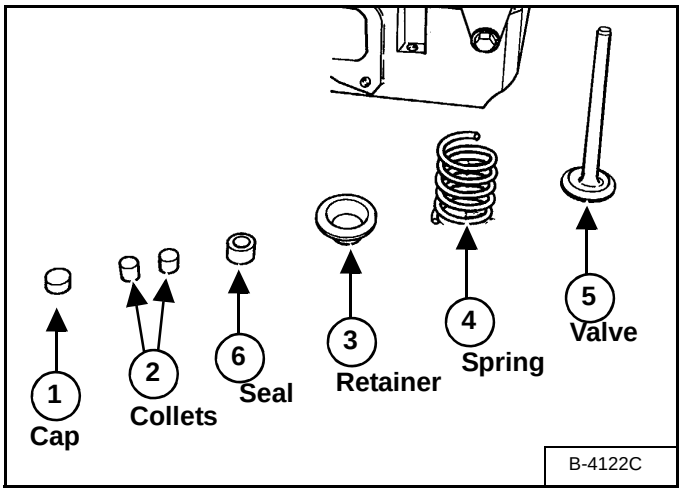
Cylinder Head Disassembly and Assembly

Figure 70-80-21



Use a valve spring compressor to compress the valve spring **[Figure 70-80-21]**.

Figure 70-80-22



Remove the valve cap (Item 1) and valve spring collet (Item 2) **[Figure 70-80-21]** & **[Figure 70-80-22]**.

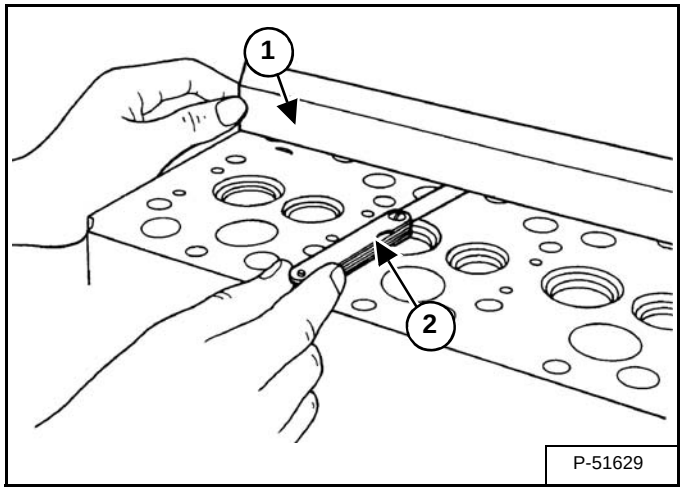
Remove the valve spring retainer (Item 3) and the spring (Item 4) **[Figure 70-80-21]** & **[Figure 70-80-22]**.

Remove the seal (Item 6) and the valve (Item 5) **[Figure 70-80-21]** & **[Figure 70-80-22]**.

Cylinder Head - Servicing

Clean the surface of the cylinder head.

Figure 70-80-23

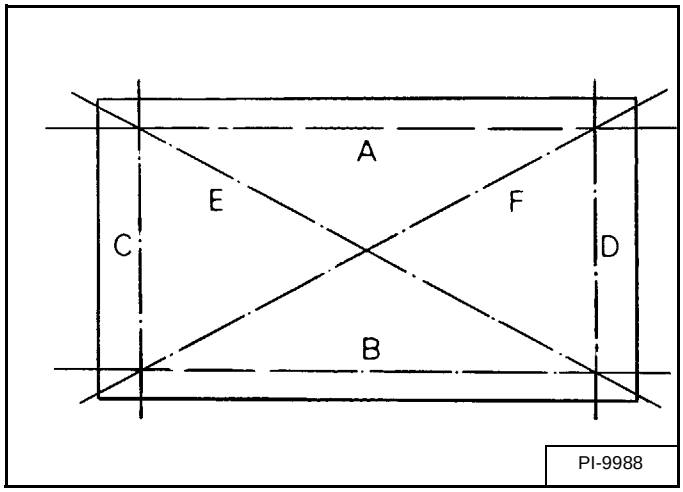


Put a straight edge (Item 1) **[Figure 70-80-23]** on the cylinder head.

NOTE: Do not put the straight edge across combustion chambers.

Put a feeler gauge (Item 2) **[Figure 70-80-23]** between the straight edge and the surface of the cylinder head.

Figure 70-80-24

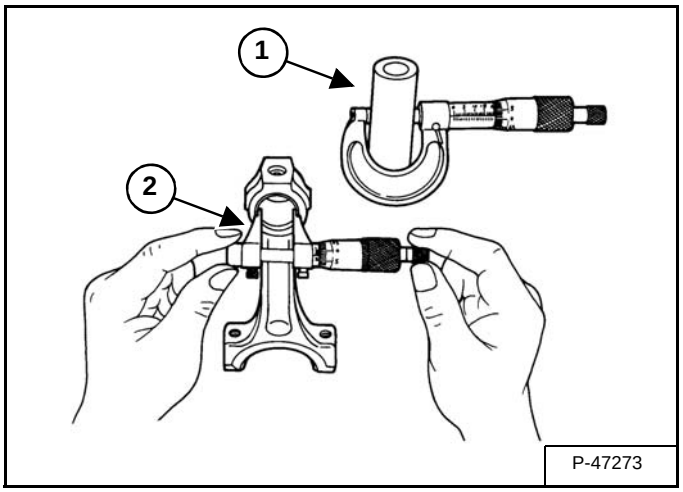


Put the straight edge on the cylinder head's four sides and two diagonal as shown in figure **[Figure 70-80-24]**.

The maximum distortion of the head surface is ± 0.002 in. (± 0,05 mm). If the measurement exceeds the specification, replace the cylinder head.

Piston And Connecting Rod - Servicing (Cont'd)

Figure 70-90-8



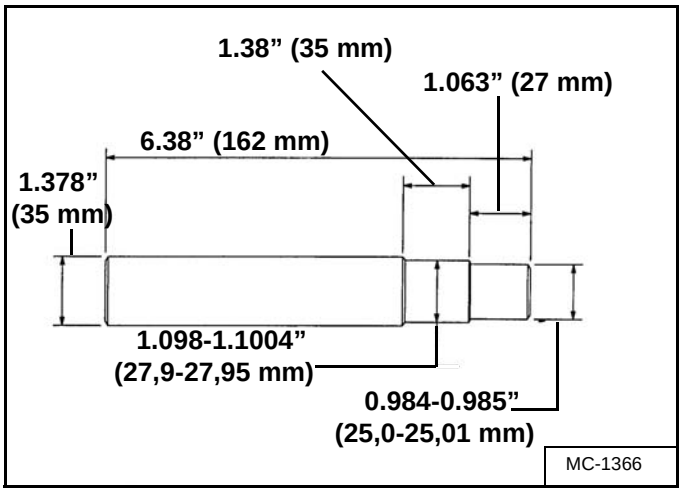
Measure the O.D. of the piston pin (Item 1) **[Figure 70-90-8]**.

Measure the I.D. of the connecting rod small end (Item 2) **[Figure 70-90-8]**.

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

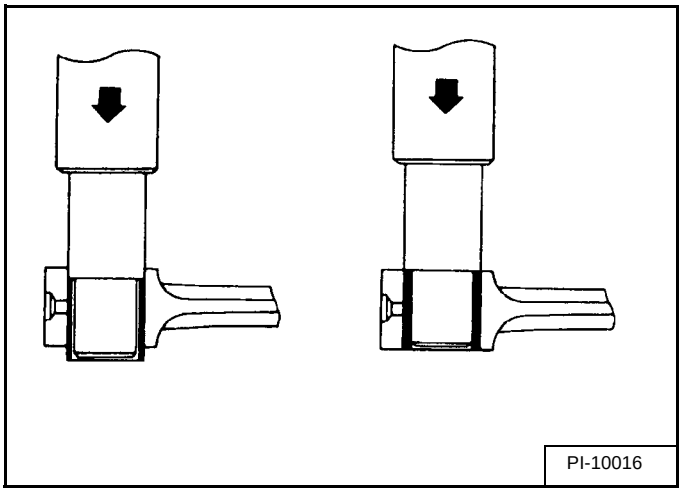
Piston Pin O.D.	0.9843 - 0.9847 in. (25,0 - 25,011 mm)
Bushing I.D.	0.9852 - 0.9858 in. (25,03 - 25,04 mm)
Oil Clearance Between Piston Pin & Bushing	0.0006 - 0.0015 in. (0,014 - 0,038 mm)
Allowable Limit	0.0059 in. (0,15 mm)

Figure 70-90-9



To replace the connecting rod small end bushing, make a driver tool as shown in figure **[Figure 70-90-9]**.

Figure 70-90-10



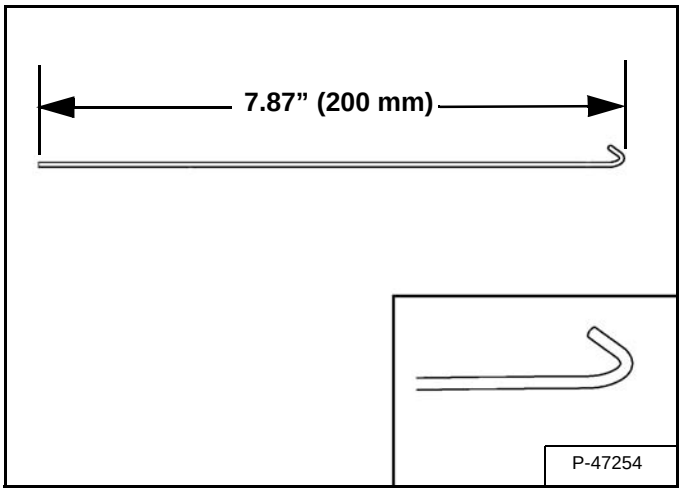
Use a press and special driver tool to remove the small end bushing **[Figure 70-90-10]**.

Installation: Clean the small end bushing and bore. Put oil on the bushing and press into the connecting rod until it is flush **[Figure 70-90-10]**.

CAMSHAFT AND TIMING GEARS

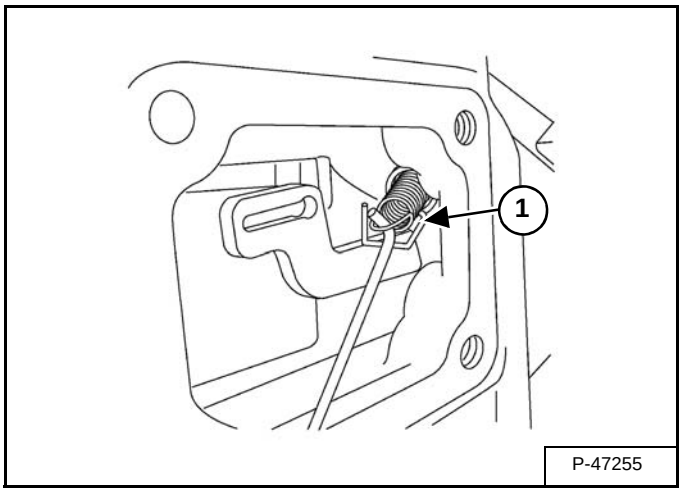
Timing Gearcase Cover Removal And Installation

Figure 70-100-1



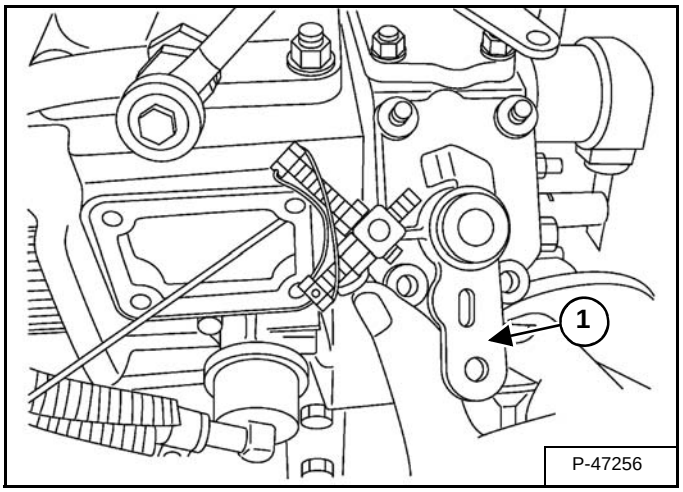
Bend a hook on the end of a 7.87 in. (200 mm) long, 0.050 in. (1.2 mm) diameter hard wire **[Figure 70-100-1]**.

Figure 70-100-2



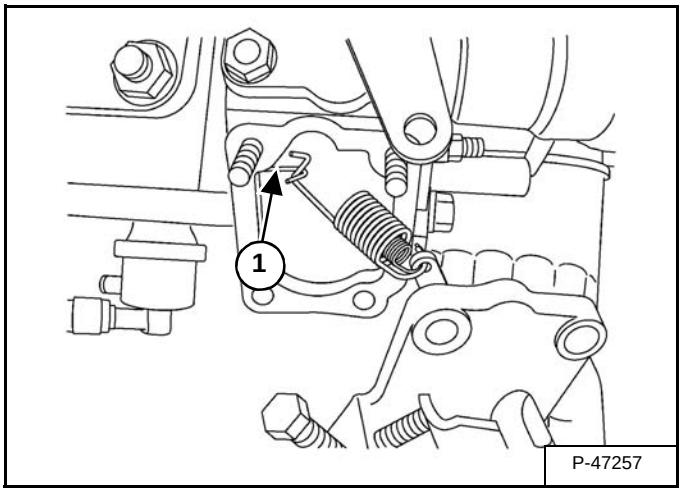
Disconnect the two governor springs (Item 1) **[Figure 70-100-2]**.

Figure 70-100-3



Remove the speed control plate (Item 1) **[Figure 70-100-3]**.

Figure 70-100-4



Remove the wire (Item 1) **[Figure 70-100-4]** from the springs.

Installation: Do not drop the governor springs into the gear case.

Remove the crankshaft pulley nut.

Installation: Tighten the nut to 101 - 116 ft.-lb. (137 - 157 N•m) torque.

FLYWHEEL AND HOUSING

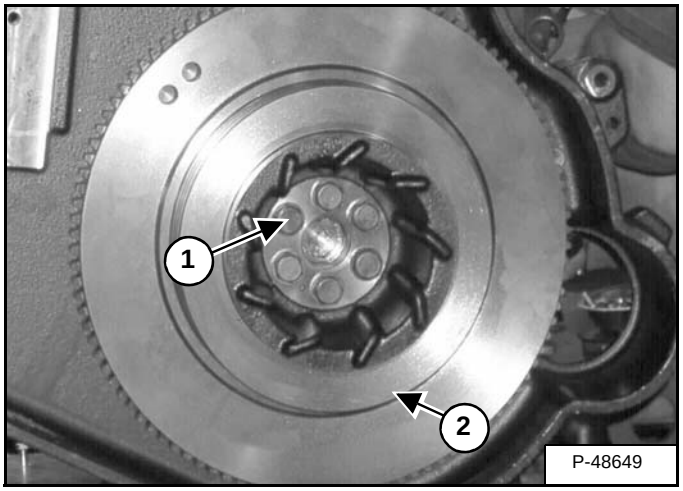
Flywheel Removal And Installation

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

Remove the drive belt. (See Belt Removal And Installation Page 30-50-3.)

Remove the drive belt tension pulley. (See Tensioner Pulley Assembly Page 30-50-7.)

Figure 70-120-1



Remove the six mounting bolts (Item 1) from the engine flywheel (Item 2) **[Figure 70-120-1]**.

Installation: Apply engine oil to the threads and seats before tightening. Tighten to 72 - 80 ft.-lb. (98 - 108 N•m) torque.

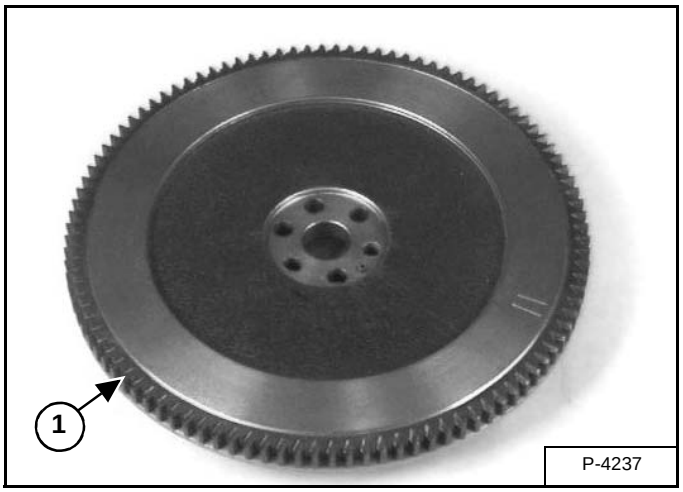
Remove the flywheel from the engine.

Installation: Be sure to align the hole in the flywheel with the pin located on the crankshaft.

Reverse the removal procedure to install the flywheel.

Ring Gear Removal And Installation

Figure 70-120-2



The ring gear (Item 1) **[Figure 70-120-2]** on the flywheel is an interference fit. Heat the ring gear enough to expand the gear. Hit the ring gear evenly around the gear to remove it from the flywheel.

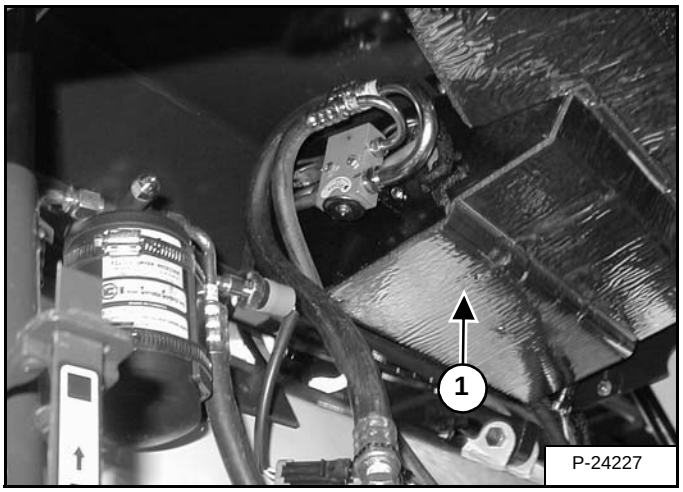
Clean the outer surface of the flywheel thoroughly so the new ring gear will fit smoothly onto the flywheel.

Clean the new ring gear and heat it to a temperature of 450° - 500° F (232° - 260° C).

Fit the ring on the flywheel and be sure the gear is seated fully.

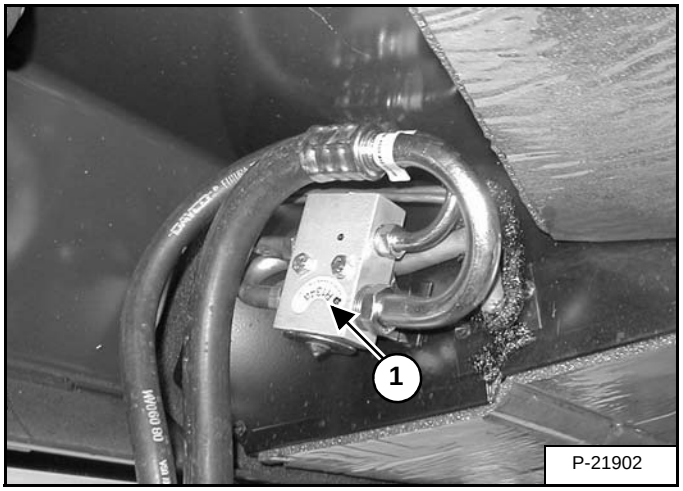
Components (Cont'd)

Figure 80-10-12



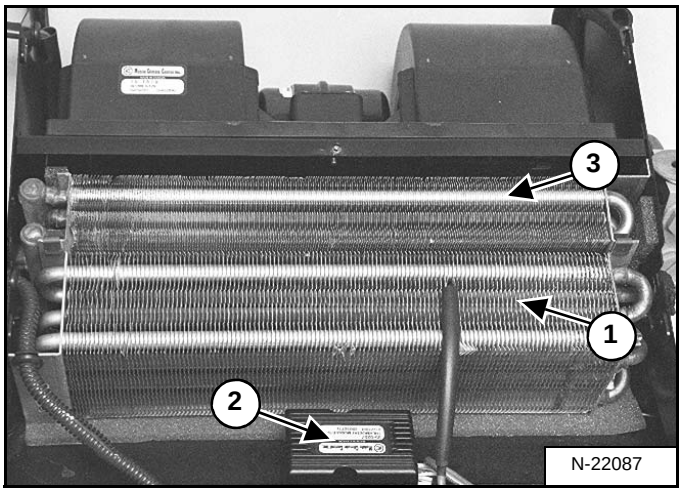
Heater/Evaporator Unit: The heater/evaporator unit (Item 1) **[Figure 80-10-12]** is located behind the loader cab. The unit delivers the cold air for the A/C and warm air for heat into the cab. The unit contains the blower, heat & A/C coils, thermostat and expansion valve.

Figure 80-10-13



Expansion Valve: The expansion valve (Item 1) **[Figure 80-10-13]** controls the amount of refrigerant entering the evaporator coil.

Figure 80-10-14

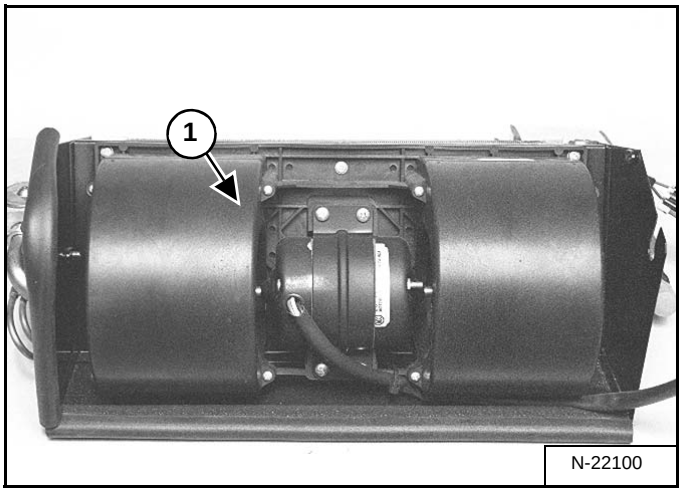


Evaporator Coil: The evaporator coil (Item 1) **[Figure 80-10-14]** cools and dehumidifies the air before it enters the cab.

Thermostat: The thermostat (Item 2) **[Figure 80-10-14]** controls the temperature of the evaporator coil.

Heater Coil: The heater coil (Item 3) **[Figure 80-10-14]** supplies the warm air into the cab by passing air through the coil.

Figure 80-10-15



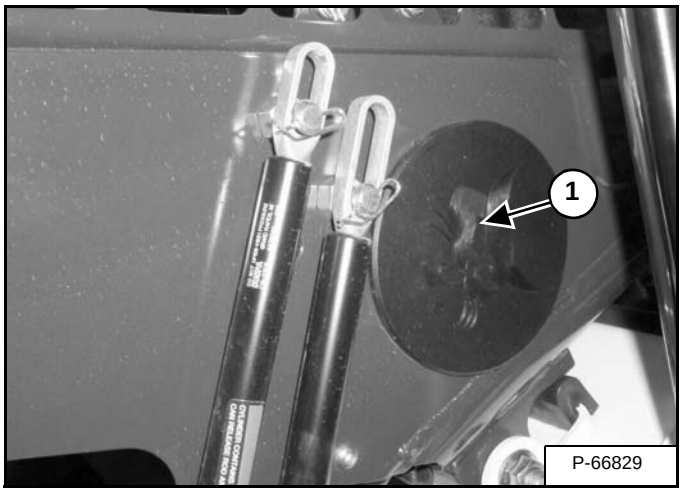
Heater/Evaporator Blower: The blower (Item 1) **[Figure 80-10-15]** is used to push air through the heater and evaporator coils and into the cab.

Gauge Pressure Related Troubleshooting (Cont'd)

Possible Cause	Inspection	Solution
System pressures equal		
1. Clutch not operating.	See magnetic clutch related topics above.	
2. Compressor not pumping.	Equal high and low pressures.	Replace compressor.

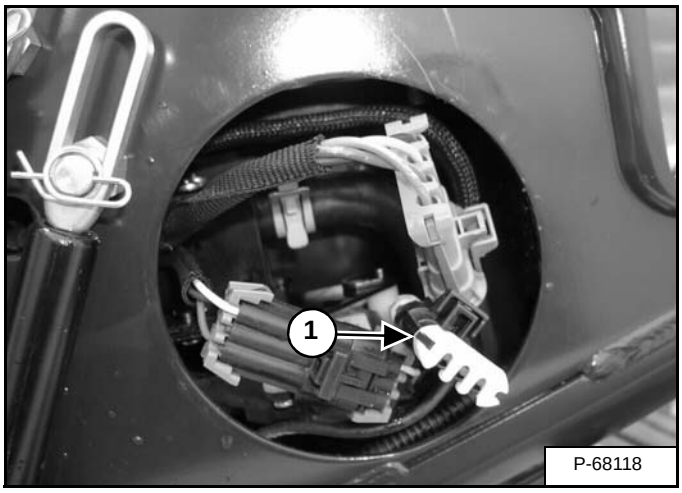
Electrical System (Cont'd)

Figure 80-30-12



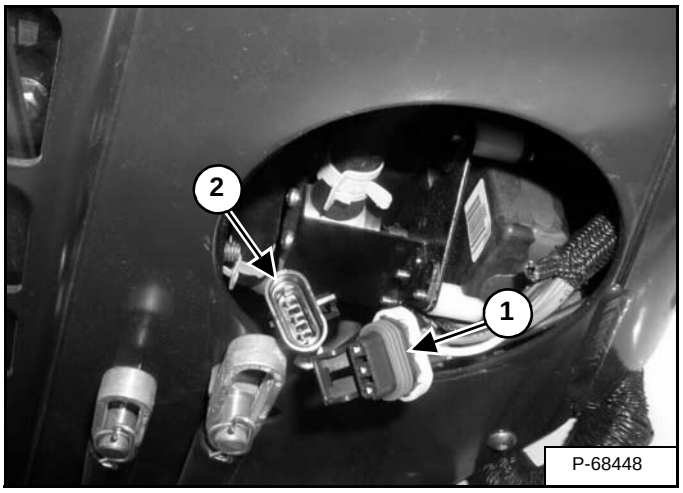
Remove the access cover (Item 1) **[Figure 80-30-12]** from the loader.

Figure 80-30-13



Disconnect the thermostat wiring connector (Item 1) **[Figure 80-30-13]** from the loader wiring harness.

Figure 80-30-14



Check the loader harness (Item 1) **[Figure 80-30-14]** for voltage. The voltage should be 12 volts.

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

If there is voltage at the wiring harness, check the thermostat (Item 2) **[Figure 80-30-14]** for resistance.

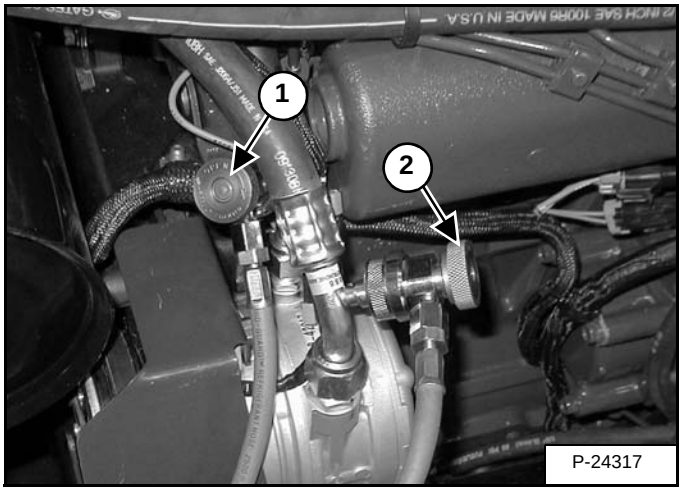
The resistance value of the thermostat should be 10 ohm at 68° F (20° C).

If there is no resistance value, replace the thermostat. (See Removal And Installation on Page 80-90-1.)

If there is a resistance value, check the blower fan.

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

Figure 80-40-6

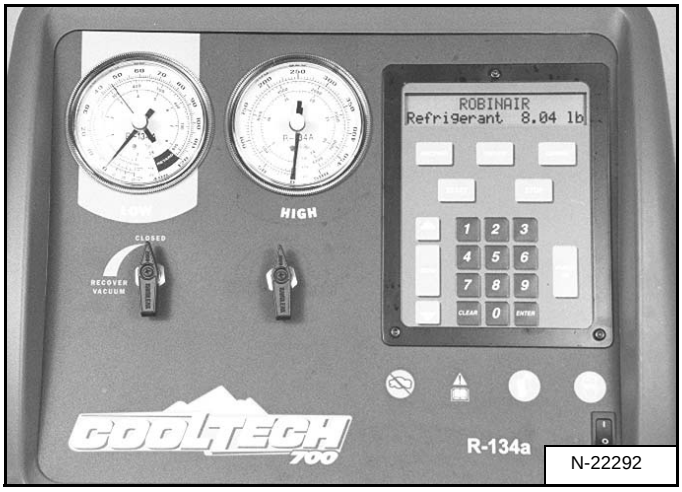


Connect the reclaimer to the loader A/C charge ports.

Connect the Red hose (Item 1) **[Figure 80-40-6]** to the high pressure port and open the valve.

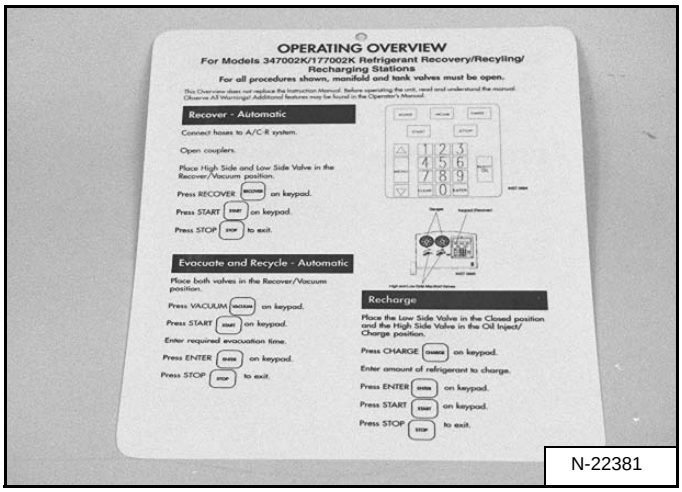
Connect the Blue hose (Item 2) **[Figure 80-40-6]** to the low pressure port and open the valve.

Figure 80-40-7



Turn the reclaimer unit **[Figure 80-40-7]** to the ON position and follow the on screen instructions.

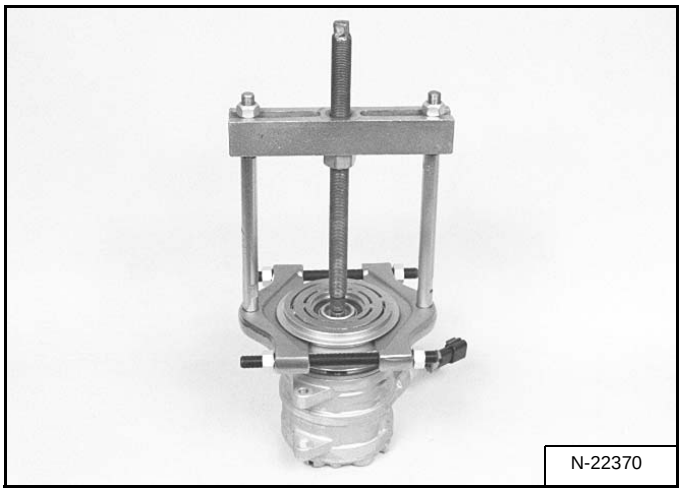
Figure 80-40-8



NOTE: The reclaimer unit, has a complete step by step set of instructions [Figure 80-40-8] to follow for reclimation and recharging of the A/C system. A trained technician should follow these instructions as they may very slightly depending on the model and brand of reclaimer used.

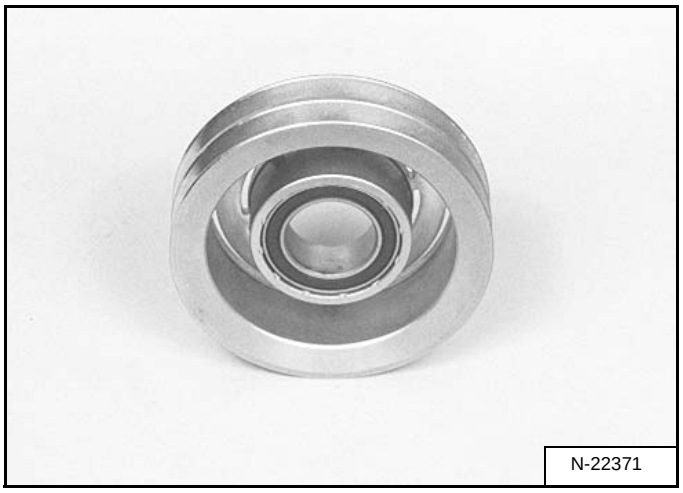
Clutch Disassembly And Assembly (Cont'd)

Figure 80-50-34



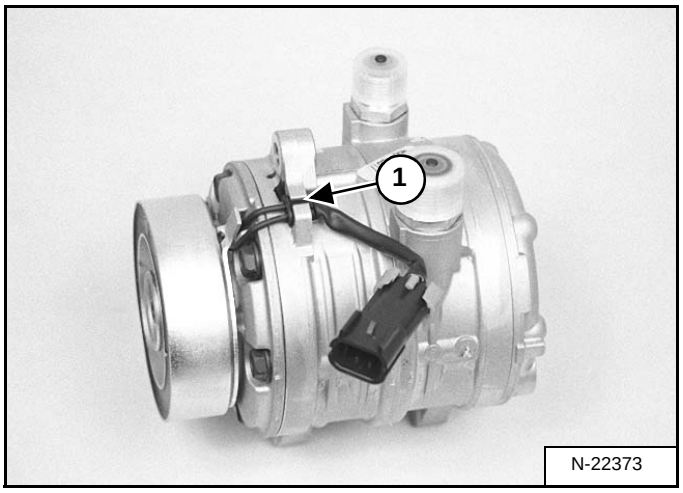
Remove the pulley from the compressor **[Figure 80-50-34]**.

Figure 80-50-35



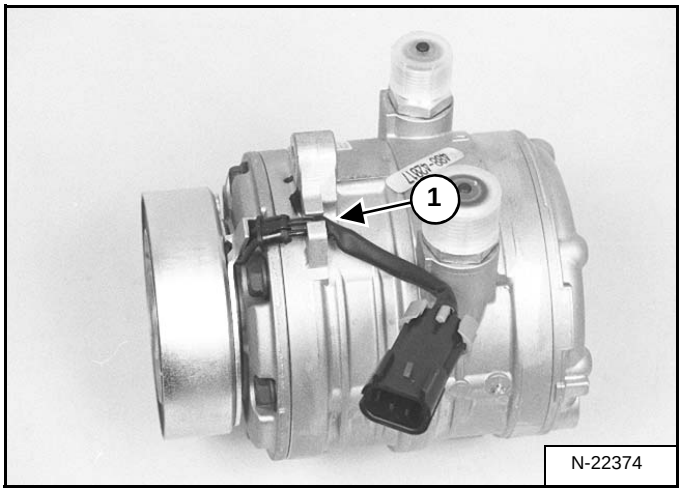
The pulley assembly and bearing **[Figure 80-50-35]** must be replaced as a complete unit.

Figure 80-50-36



Slide the wire grommet (Item 1) **[Figure 80-50-36]** from the wire holder.

Figure 80-50-37

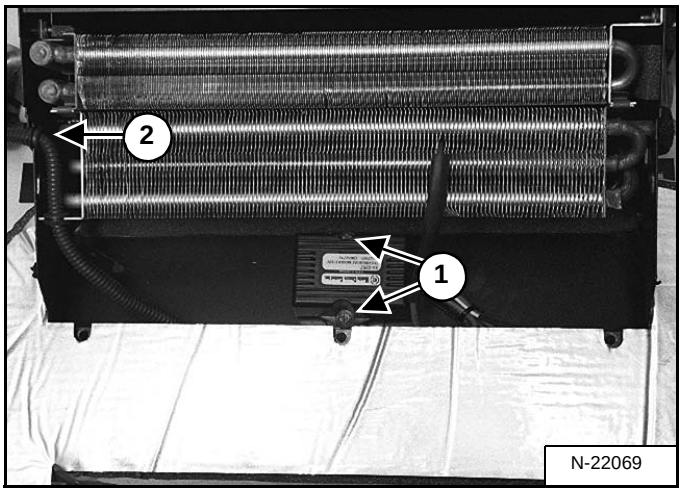


Remove the coil lead wire (Item 1) **[Figure 80-50-37]** from the wire holder on the compressor.

THERMOSTAT

Removal And Installation

Figure 80-90-1

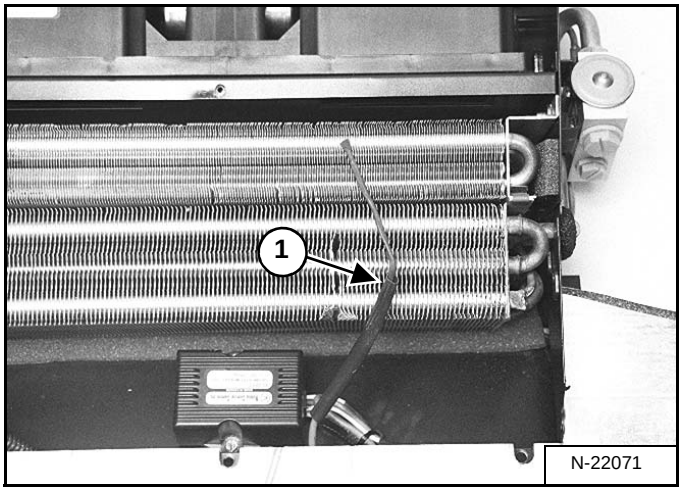


NOTE: The thermostat can be changed without evacuating the A/C system, or removing the evaporator/heater unit from the loader.

Remove the rear cover from the evaporator/heater unit. (See Evaporator / Heater Coil on Page 80-20-4.)

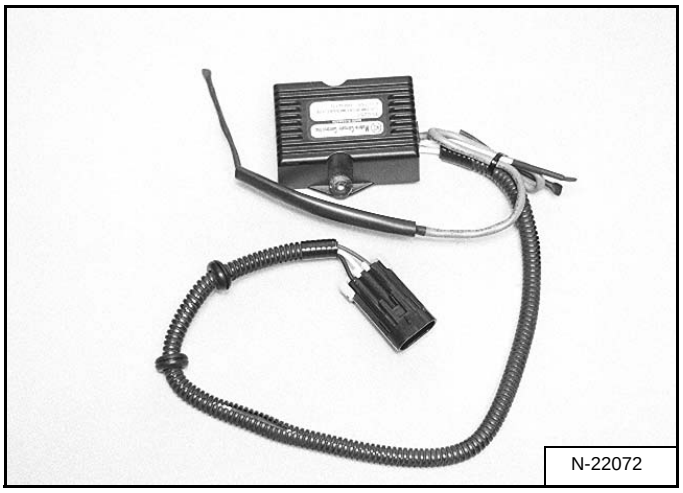
Remove the two thermostat mount bolts (Item 1), and remove the wiring harness and grommet (Item 2) **[Figure 80-90-1]** from the evaporator/heater housing.

Figure 80-90-2



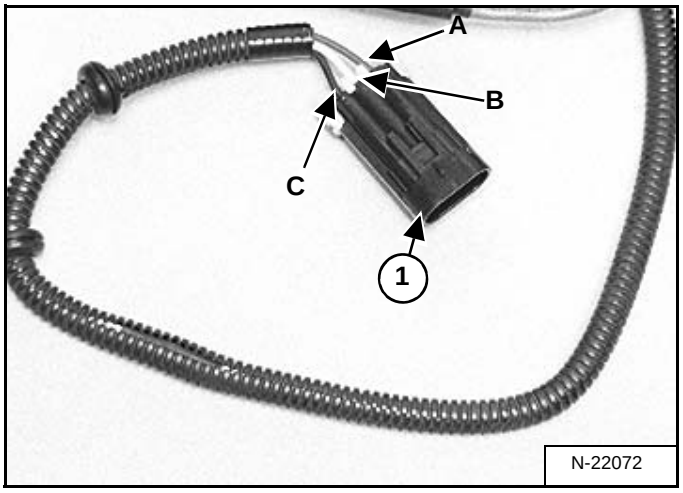
Remove the thermostat probe (Item 1) **[Figure 80-90-2]** from the A/C evaporator coil.

Figure 80-90-3



Remove the thermostat from the unit **[Figure 80-90-3]**.

Figure 80-90-4



The wire connector (Item 1) **[Figure 80-90-4]** can be changed. The wiring position and color in the connector is:

A	Blue
B	White
C	Black

BLOWER FAN

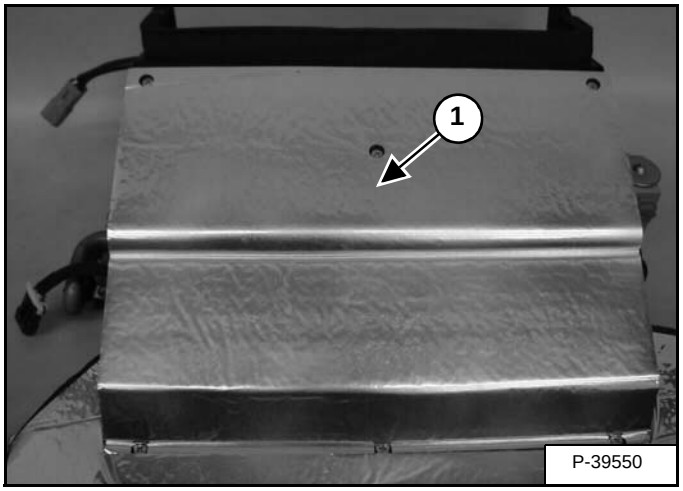
Removal And Installation

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

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

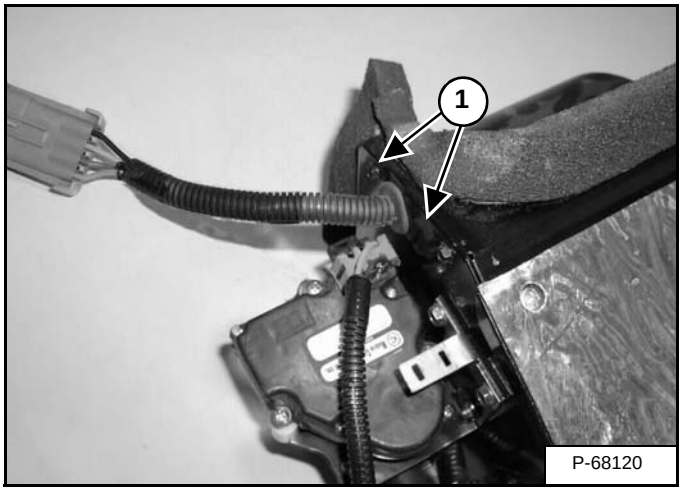
NOTE: The blower fan assembly can be removed from the evaporator/heater unit without disconnecting the heater or A/C plumbing. The unit is remove here for photo clarity.

Figure 80-130-1



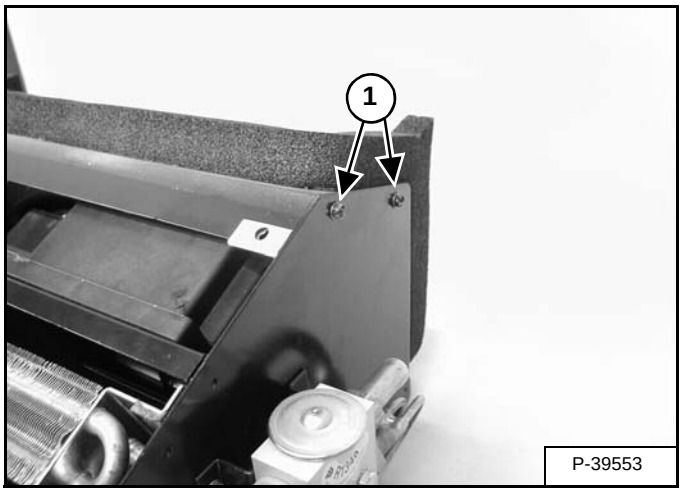
Remove the cover (Item 1) **[Figure 80-130-1]** from the evaporator/heater unit.

Figure 80-130-2



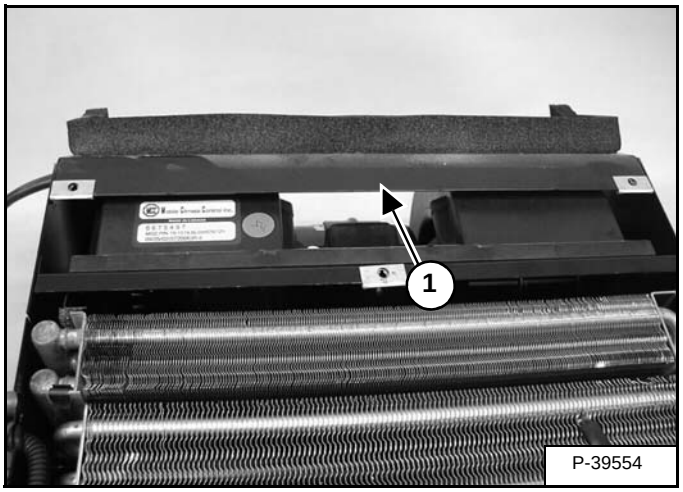
Remove the two flange mount bolts (Item 1) **[Figure 80-130-2]** from the evaporator/heater unit.

Figure 80-130-3



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

Figure 80-130-4



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

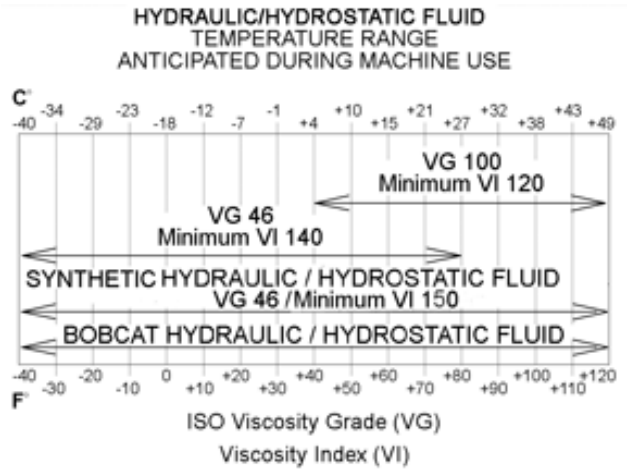
Engine

Make / Model	Kubota V2403M-DI-T
Fuel / Cooling	Diesel / Liquid
Horsepower (SAE Net)	61 HP (45,5 kW) @ 2700 RPM
Low Idle	1075 - 1225 RPM
High Idle	2760 - 2900 RPM
Torque (SAE Net)	155.6 lbf.-ft. (211 N•m) @ 1475 RPM
Number of Cylinders	4
Displacement	148.5 cu. in. (2.4 L)
Bore / Stroke	3.43 in. / 4.03 in. (87 mm /102 mm)
Lubrication	Gear Pump Pressure System with Filter
Crankcase Ventilation	Open Breathing
Air Cleaner	Dry replaceable paper cartridge with separate safety element
Ignition	Diesel - Compression
Engine Coolant	Propylene Glycol / Water Mixture
Starting Aid	Glow Plugs - Automatically activated as needed in RUN position.

HYDRAULIC / HYDROSTATIC FLUID SPECIFICATIONS

Specifications

Use Bobcat hydraulic/hydrostatic transmission fluid (P/N 6903117 - 2, 2 1/2 Gal.), (P/N 6903118 - 5 Gal.), (P/N 6903119 - 55 Gal.).



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 zero degree F (-18° C) 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 of 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