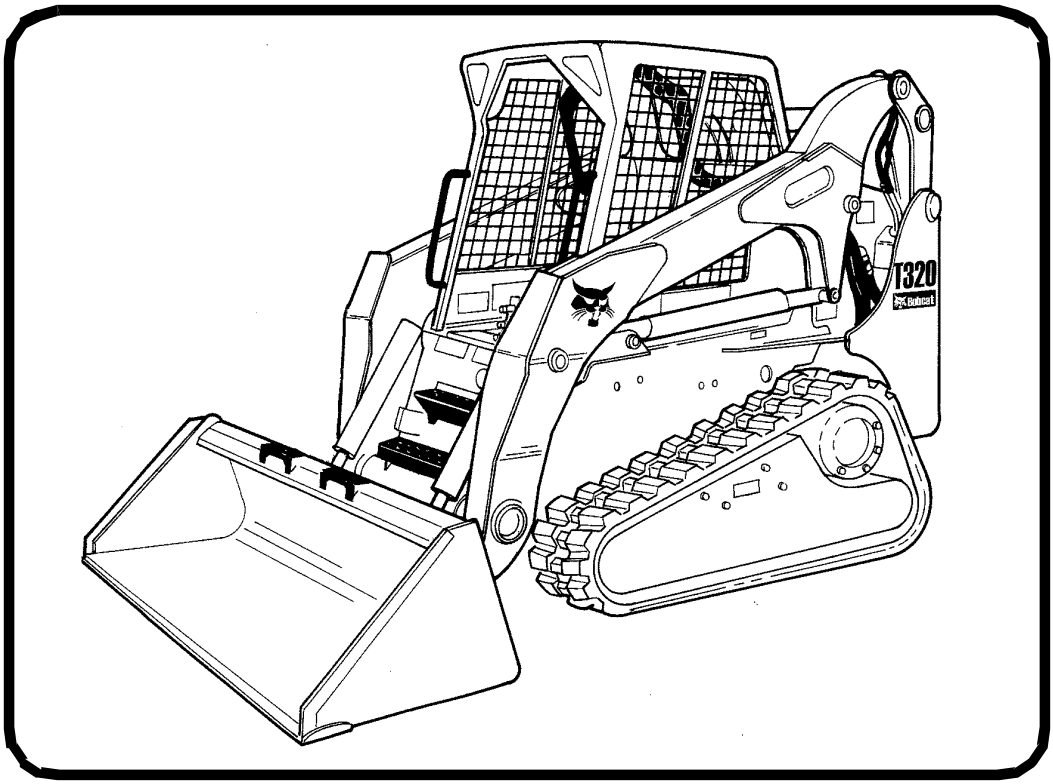
Bobcat®

Service Manual
T320 Compact Track Loader

S/N A7MP11001 - A7MP59999



EQUIPPED WITH
BOBCAT INTERLOCK
CONTROL SYSTEM (BICS™)

6986558 (3-09)

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Bobcat®

HYDRAULIC / HYDROSTATIC SYSTEM

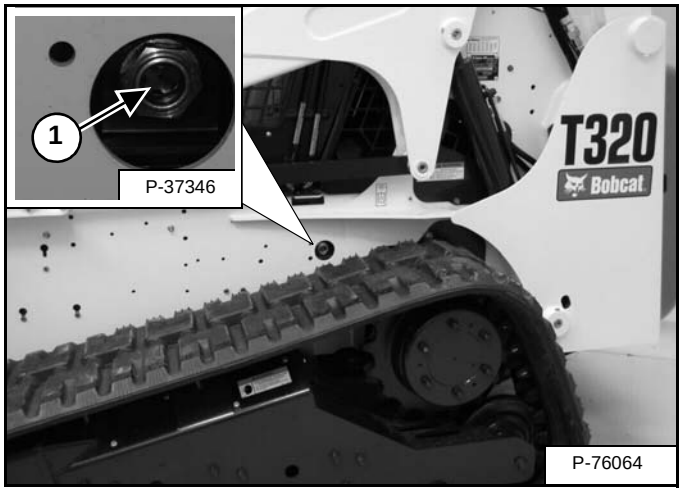
Checking And Adding Fluid

Use only recommended fluid in the hydraulic system. (See Hydraulic System on Page SPEC-10-5)

Put the loader on a level surface, lower the lift arms and tilt the Bob-Tach fully back.

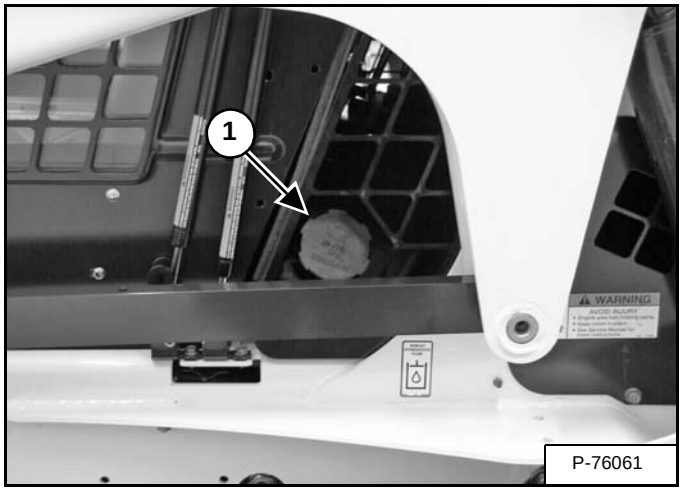
Stop the engine.

Figure 10-120-1



Check the fluid level in sight gauge (Item 1) **[Figure 10-120-1]**.

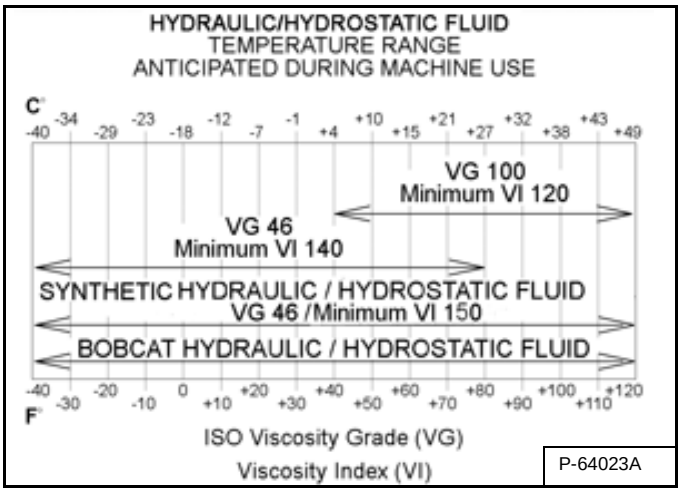
Figure 10-120-2



Remove the fill / breather cap (Item 1) **[Figure 10-120-2]**.

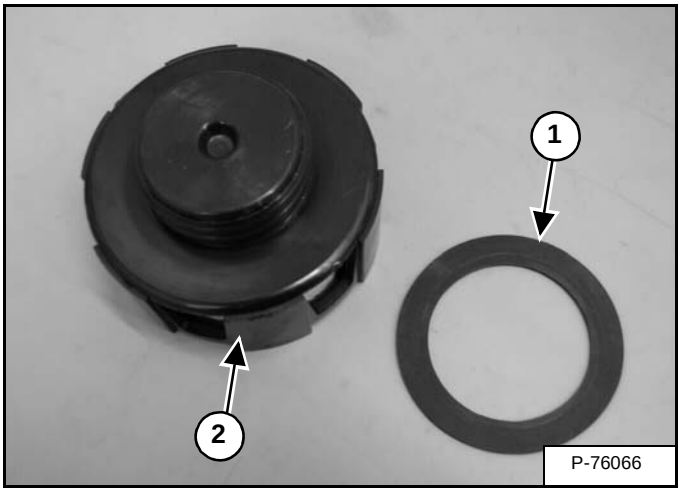
Hydraulic / Hydrostatic Fluid Chart

Figure 10-120-3



Add the correct hydraulic / hydrostatic fluid **[Figure 10-120-3]** as needed to bring the level to the center of the sight gauge.

Figure 10-120-4

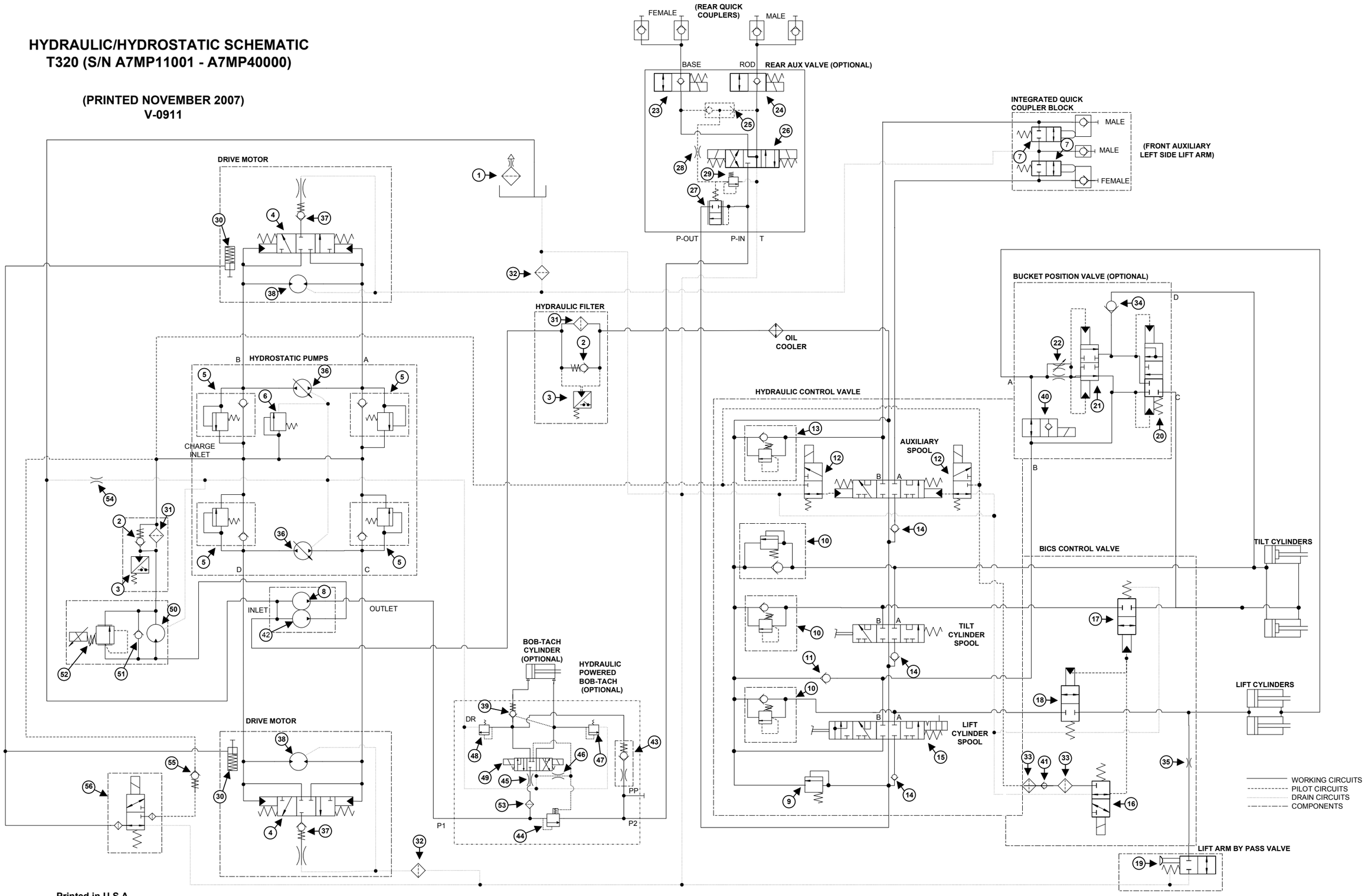


Before installing the fill / breather cap, make sure the rubber gasket (item 1) is installed on the cap (Item 2) **[Figure 10-120-4]**.

Install the fill / breather cap (Item 1) **[Figure 10-120-2]**.

HYDRAULIC/HYDROSTATIC SCHEMATIC
T320 (S/N A7MP11001 - A7MP40000)

(PRINTED NOVEMBER 2007)
V-0911



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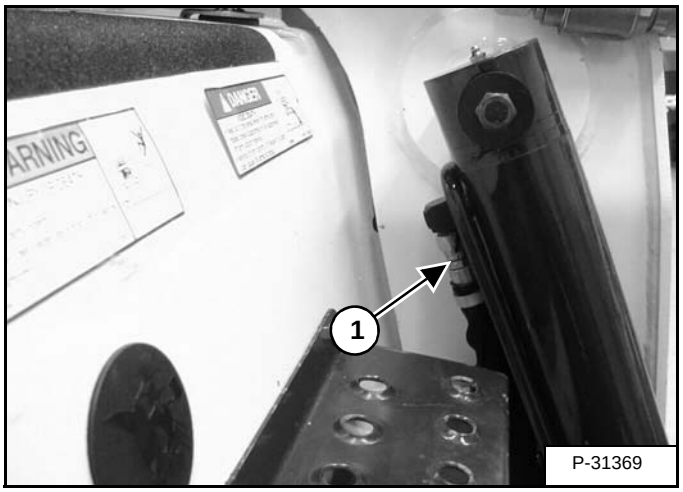
CYLINDER (TILT)

Testing

Figure 20-21-1



Remove the attachment. Roll the Bob-Tach fully back. Stop the engine. Raise the seat bar.

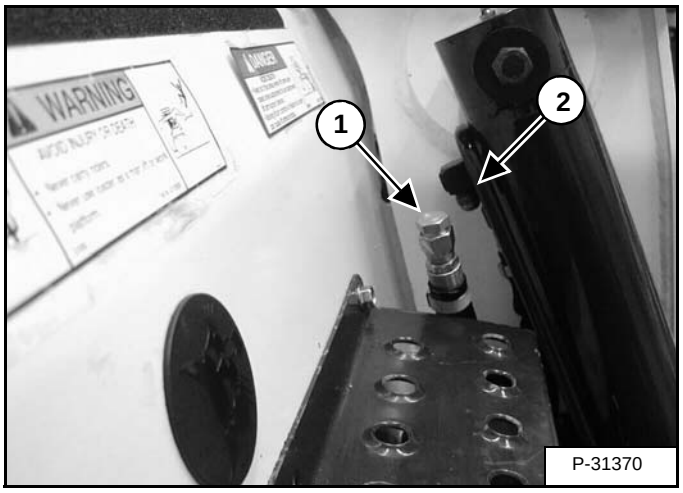
⚠ WARNING

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

W-2145-0290

Disconnect the hose (Item 1) **[Figure 20-21-1]** which goes to the base end of the tilt cylinder.

Figure 20-21-2



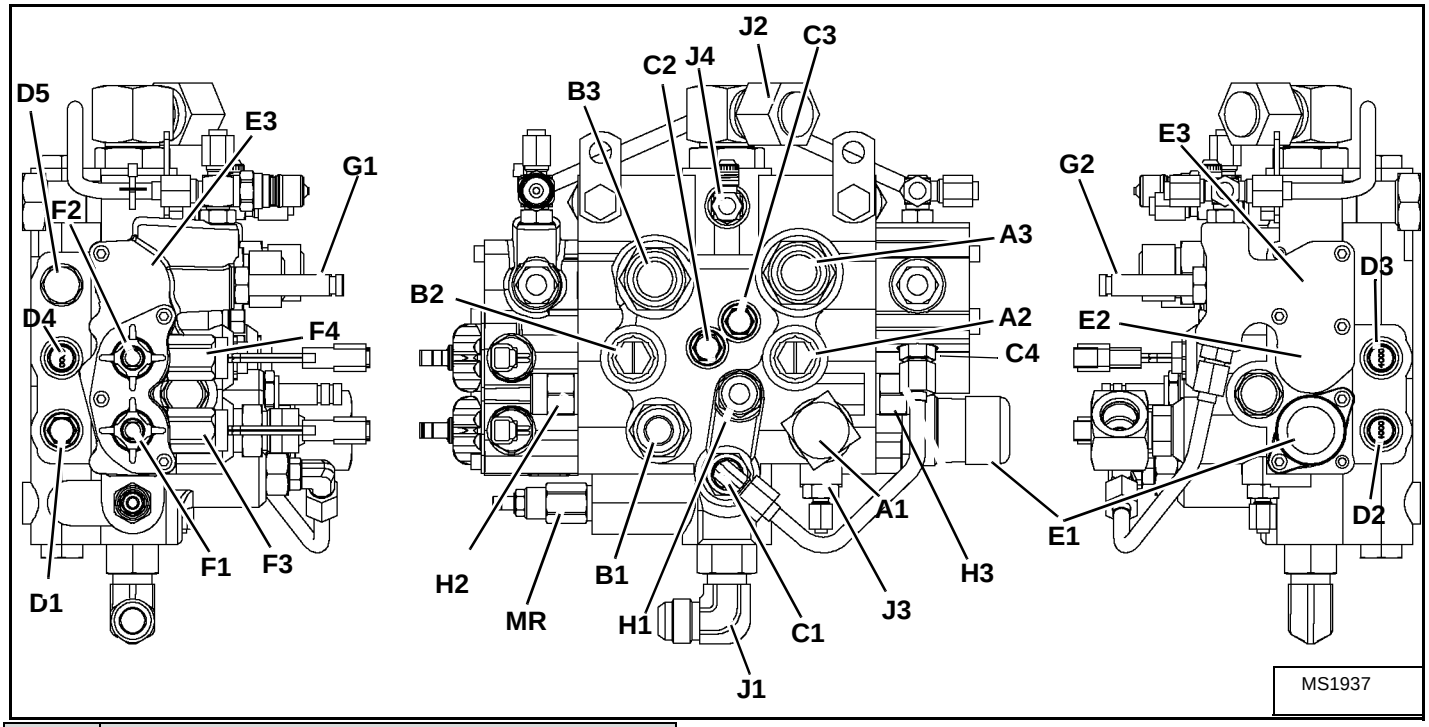
Install a cap (Item 1) **[Figure 20-21-2]** in the hydraulic hose and tighten.

Engage the parking brake. Lower the seat bar. Start the engine and push the bottom (heel) of the tilt pedal. If there is leakage from the open port on the cylinder (Item 2) **[Figure 20-21-2]**, remove the tilt cylinder for repair.

Repeat procedure to check the other tilt cylinder.

Identification Chart

Figure 20-40-13



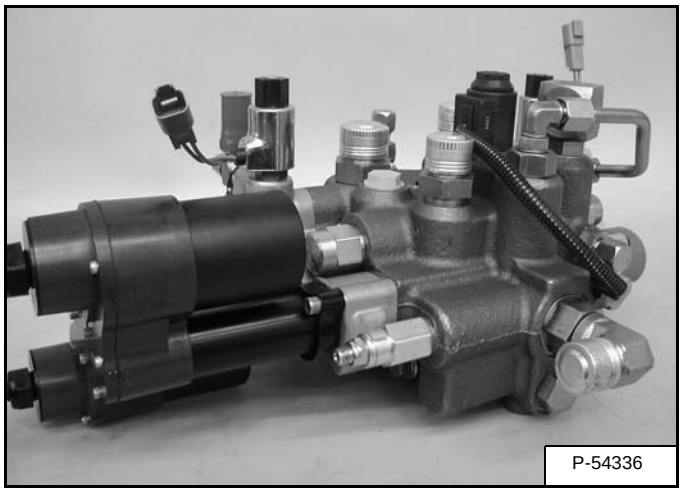
ITEM	T320 LOADER
A1	Lift Cylinder Base End
A2	Tilt Cylinder Base End
A3	Auxiliary Hydraulic Rod End
B1	Lift Cylinder Rod End
B2	Tilt Cylinder Rod End
B3	Auxiliary Hydraulics Base End
C1	Load Check
C2	Load Check Valve Tilt Function
C3	Load Check Valve Auxiliary Function
C4	Check Valve
D1	Anti-Cavitation Valve Lift (Rod End)
D2	Port Relief/Anti-Cavitation Valve – 4000 PSI Lift (Base End)
D3	Port Relief/Anti-Cavitation Valve – 4000 PSI Tilt (Base End)
D4	Port Relief/Anti-Cavitation Valve – 4000 PSI Tilt (Rod End)
D5	Port Relief/Anti-Cavitation Valve (Auxiliary) 3500 PSI (Optional)

ITEM	T320 LOADER
E1	Lift Spool Detent
E2	Tilt Spool Centering Spring
E3	Auxiliary Spool/Centering Springs
F1	LIft Spool
F2	Tilt Spool
F3	Lift Spool Lock Solenoid
F4	Tilt Spool Lock Solenoid
G1	Auxiliary Solenoid Stem
G2	Auxiliary Solenoid Stem
H1	BICS Solenoid
H2	BICS Lock Valve (Tilt)
H3	BICS Lock Valve (Lift)
J1	Inlet Fluid Flow (From Pump)
J2	Outlet Fluid Flow (Return to Tank)
J3	Lift Arm Bypass Orifice
J4	Drain (Case)
MR	Main Relief Valve – 3300 PSI

HYDRAULIC CONTROL VALVE (ACS) OR (SJC)

Description

Figure 20-41-1



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

The hydraulic control valve **[Figure 20-41-1]** is the hydraulic component that uses spools to direct the flow of hydraulic fluid to the lift, tilt and auxiliary functions.

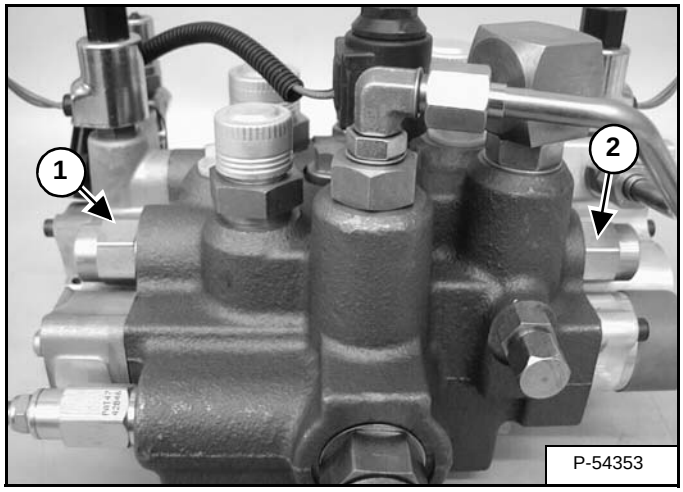
The lift and tilt functions in the ACS or the SJC hydraulic control valve are operated using electronic control handle/levers or foot pedals that send an electronic signal to the electronic actuators to move the lift and tilt spools in the control valve.

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 also contains a main relief valve which is adjustable.

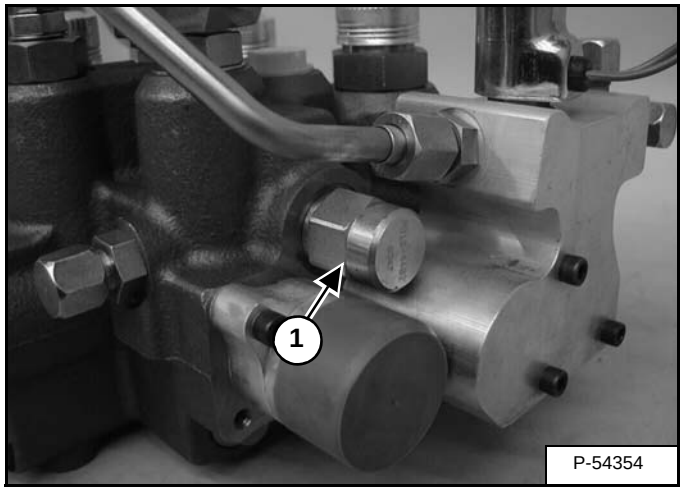
Lock Valve Removal And Installation

Figure 20-41-94



Locate the two BICS lock valves, (Item 1) is for the tilt circuit and (Item 2) **[Figure 20-41-94]** is for the lift circuit.

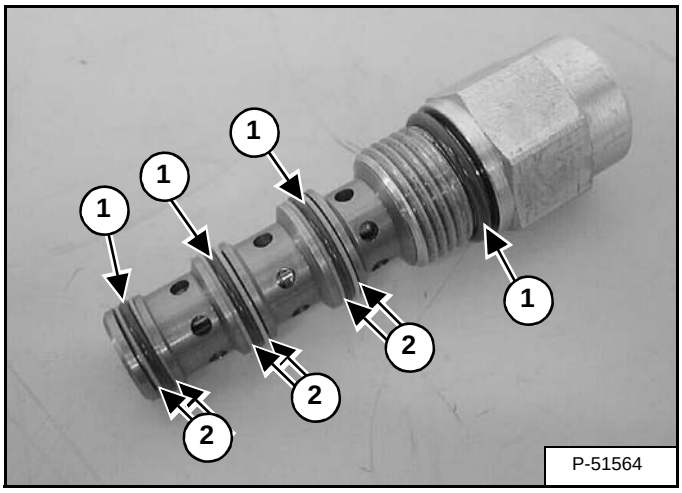
Figure 20-41-95



Remove the lift lock valve (Item 1) **[Figure 20-41-95]** from the back of the control valve.

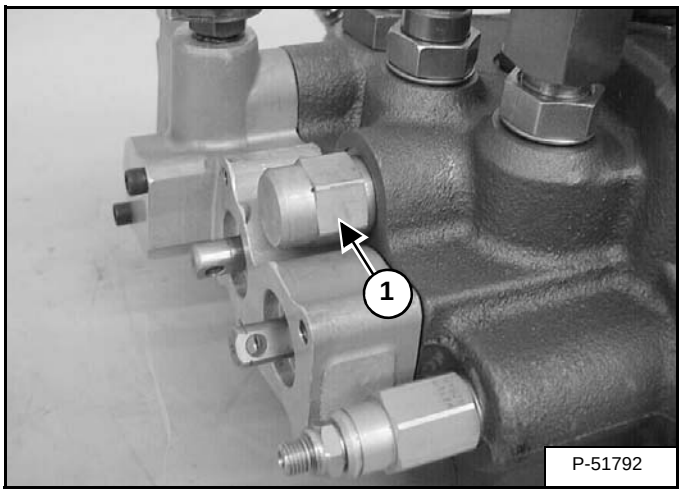
Installation: Lightly lubricate the lock valve O-rings and tighten to 20 - 24 ft.-lb. (27 - 33 N•m) torque.

Figure 20-41-96



Remove the O-rings (Item 1) and back-up rings (Item 2) **[Figure 20-41-96]** from the lift lock valve, and replace with new.

Figure 20-41-97

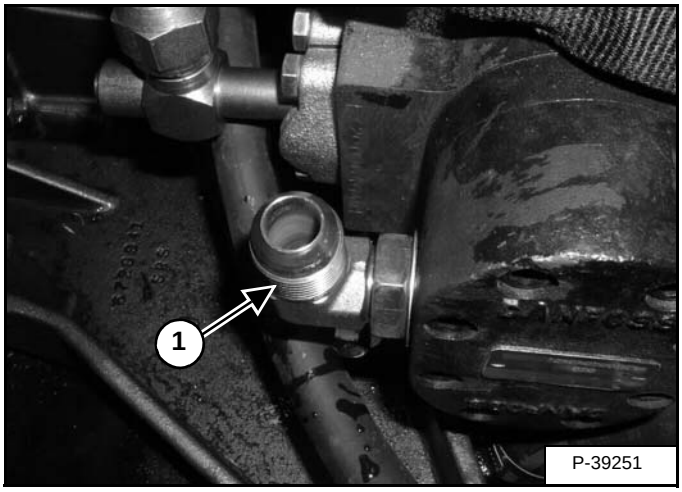


Remove the tilt lock valve (Item 1) **[Figure 20-41-97]** from the back of the control valve.

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

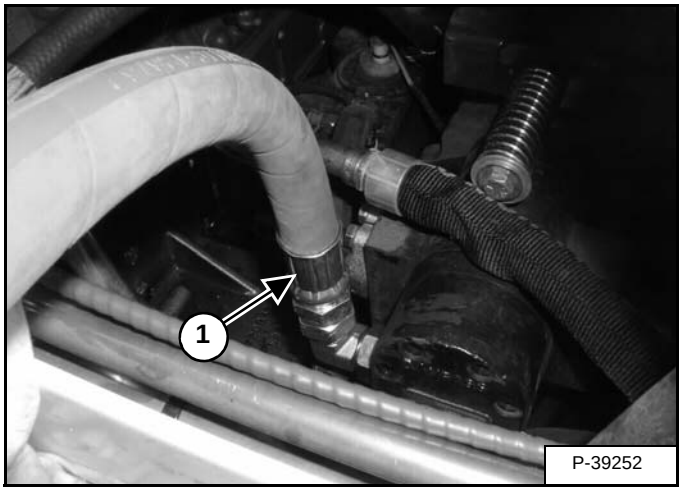
Direct Pump Test (Charge Section) (Cont'd)

Figure 20-61-34



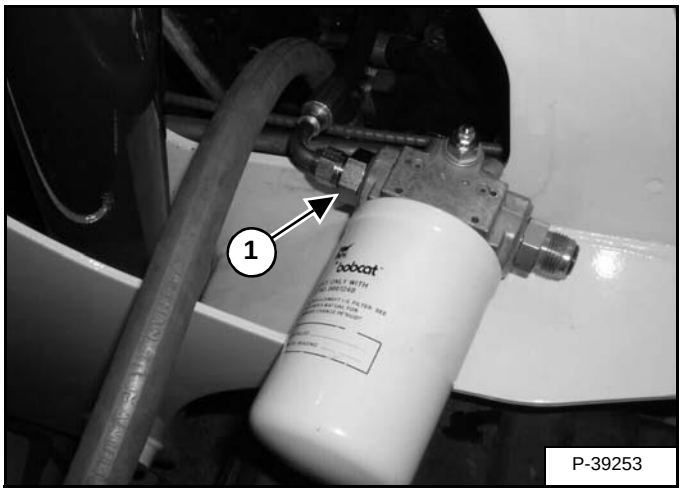
Install the elbow fitting 17KB 1212 (Item 1) **[Figure 20-61-34]** into the OUTLET of the charge pump.

Figure 20-61-35



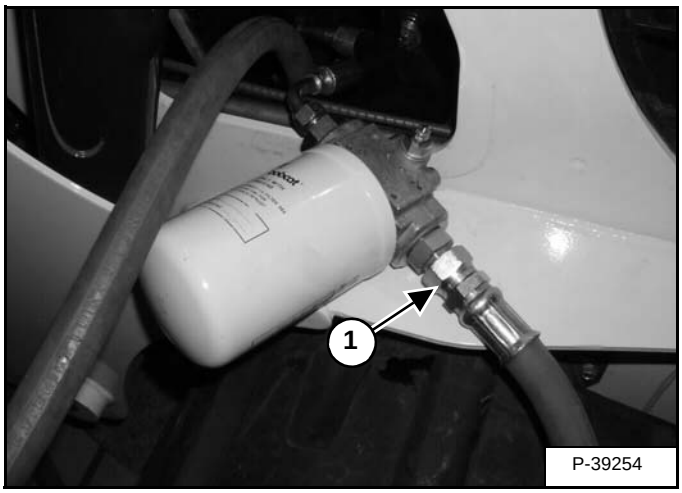
Connect the Inlet hose from the hydraulic tester (Item 1) **[Figure 20-61-35]** to the OUTLET fitting of the charge pump.

Figure 20-61-36



Connect the outlet fitting on the hydraulic filter (Item 1) **[Figure 20-61-36]** to the hose that was remove from the charge pump and routes to the back side of the hydrostatic pump.

Figure 20-61-37



Connect the outlet hose on the hydraulic tester (Item 1) **[Figure 20-61-37]** to the inlet fitting on the hydraulic filter assembly.

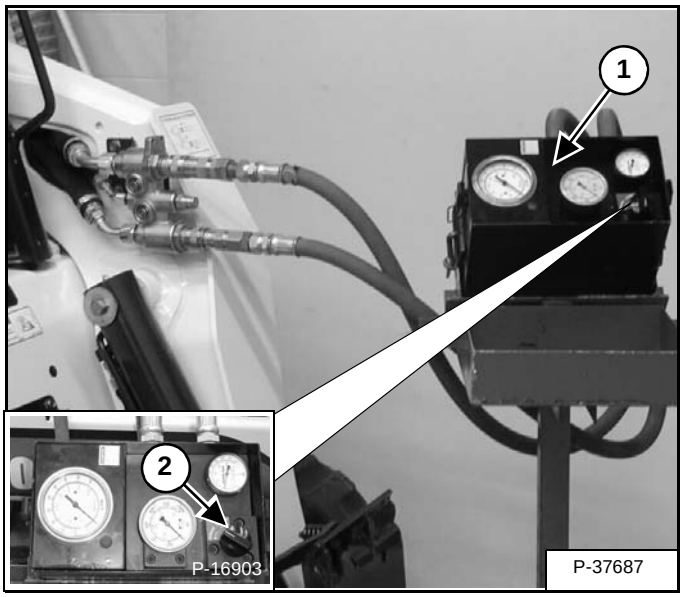
HYDRAULIC PUMP (SJC) (HIGH FLOW) (CONT'D)

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 20-71-86



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

Install a hydraulic tester (Item 1) **[Figure 20-71-86]** 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 3675 PSI.***

Turn the restrictor control (Item 2) **[Figure 20-71-86]** on the tester counterclockwise to obtain free flow, the flow should be approximately 20 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 20-71-86]** counterclockwise to free flow. Shut the front auxiliary hydraulics off.

If flow and pressure specs are not obtained, go to the Direct Pump Testing (Standard Section). If flow and pressure specs are obtained continue on to the next paragraph.

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

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

NOTE: ***DO NOT EXCEED 3675 PSI.***

Turn the restrictor control (Item 2) **[Figure 20-71-86]** on the tester counterclockwise, to obtain free flow, the flow should be approximately 20 GPM. Press the High Flow button. The flow should increase to 37 GPM. Start turning the restrictor clockwise, causing more restriction on the flow. The GPM should drop off slightly until the pressure reaches approximately 3100 PSI. At approximately 3100 PSI the flow should start decreasing rapidly until the pressure reaches 3250-3350 PSI. At 3250-3350 PSI the flow should be at 0 GPM. Turn the restrictor control (Item 2) **[Figure 20-71-86]** counterclockwise to free flow. Shut the front auxiliary hydraulics off.

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

If the flow and pressure were not obtained, go to the Direct Pump Testing (High Flow Section) (See Direct Pump Test (High Flow Section) on Page 20-71-9.)

*Refer to See Hydraulic System on Page SPEC-10-5 for system relief pressure and full RPM.

BUCKET POSITION VALVE

Description

The Bucket Position Valve is an option that allows the loader to meter the lift and tilt circuits. The metering of the lift and tilt circuits allows the operator to hold the attachment at the same angle from the ground to maximum lift height without using the tilt function.

The bucket position valve is located below the operators cab on the right side of the hydraulic fluid reservoir.

See Hydraulic Schematic for more circuit information.

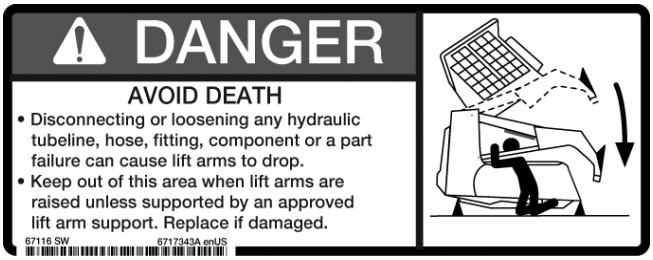
Removal And Installation

IMPORTANT

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

I-2003-0888

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



WARNING

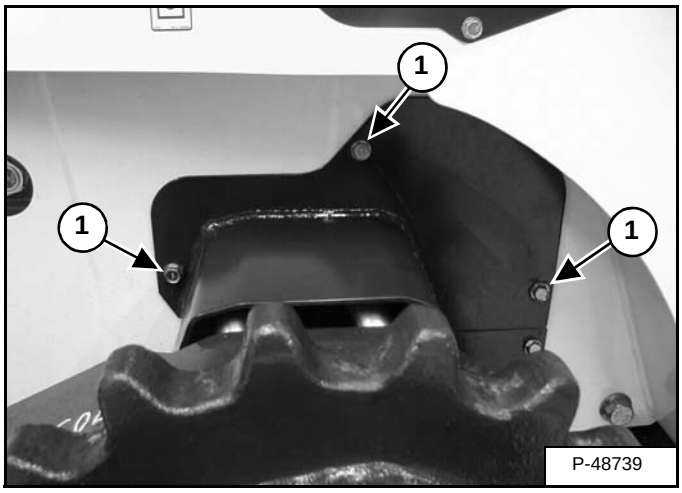
Never work on a machine with the lift arms up unless the lift arms are secured by an approved lift arm support device. Failure to use an approved lift arm support device can allow the lift arms or attachment to fall and cause injury or death.

W-2059-0598

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

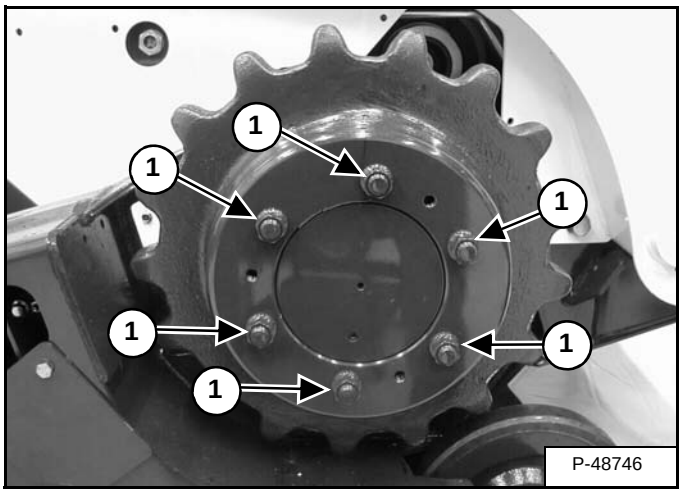
Remove the track. (See Track Removal And Installation on Page 40-20-4.)

Figure 30-20-2



Remove the three mounting bolts (Item 1) **[Figure 30-20-2]** from the access cover and remove the cover from the loader.

Figure 30-20-3



Loosen the six mounting bolts (Item 1) **[Figure 30-20-3]** and remove the drive sprocket from the motor.

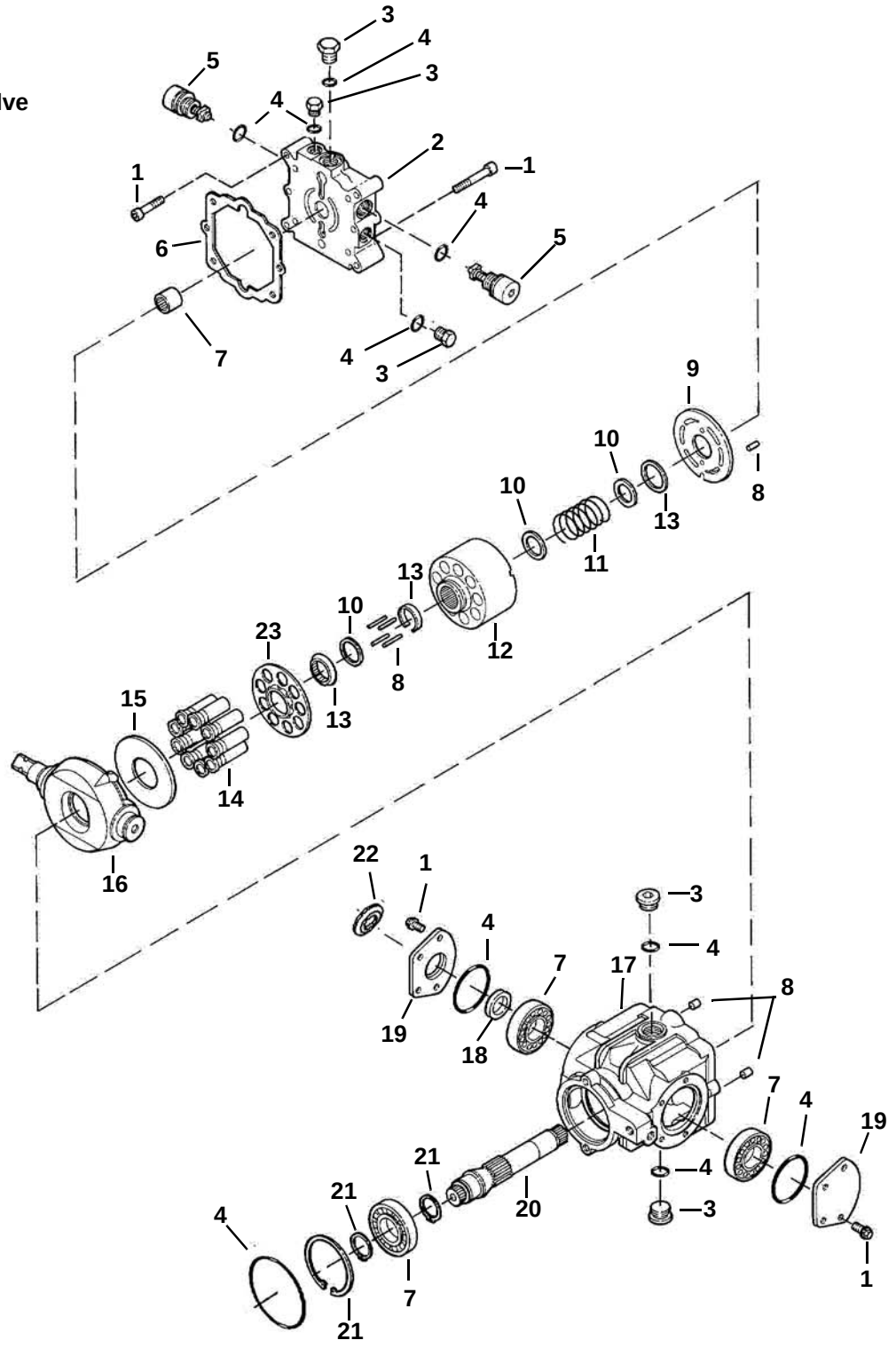
Installation: Tighten the mount bolts to 190 - 215 ft.-lb. (260 - 290 N•m) torque.

(SJC equipped machines only) Disconnect and remove the speed sensor (SJC). (See Removal And Installation on Page 60-80-3.)

NOTE: Speed sensor removal is recommended to prevent damage while removing the hydrostatic motor from the track carriage.

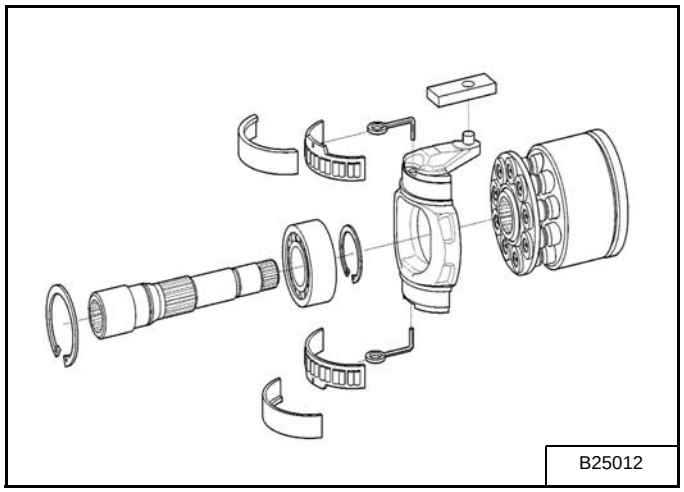
Parts Identification (Right Half)

Ref.	Description
1.	Bolt
2.	End Cap
3.	Plug
4.	O-ring
5.	Replenishing/High Pressure Relief Valve
6.	Gasket
7.	Bearing
8.	Pin
9.	Valve Plate
10.	Washer
11.	Spring
12.	Block
13.	Retainer
14.	Piston Assembly
15.	Wear Plate
16.	Swash Plate
17.	Housing
18.	Seal
19.	Cover
20.	Shaft
21.	Snap Ring
22.	Dust Seal
23.	Piston Retainer



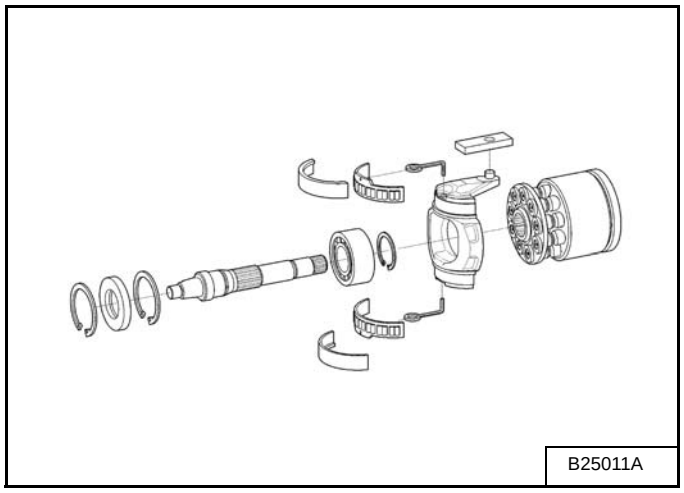
Disassembly And Assembly (Cont'd)

Figure 30-41-41



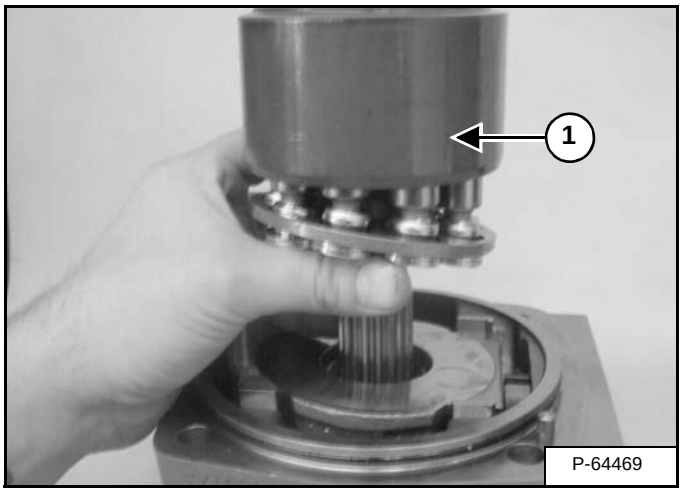
Right Side Rotating Group **[Figure 30-41-41]**.

Figure 30-41-42



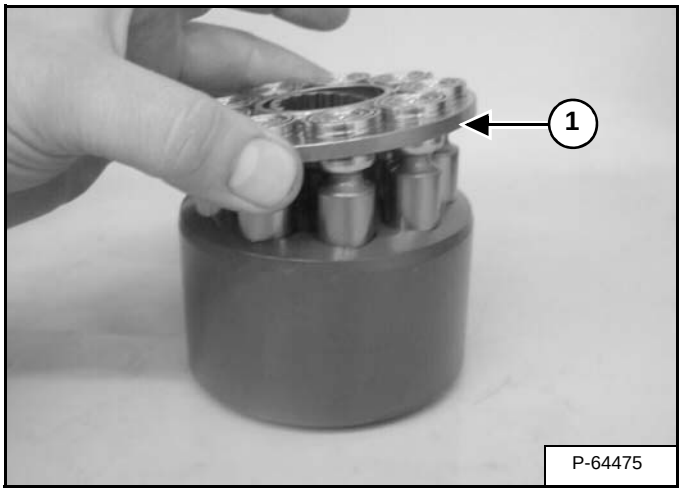
Left Side Rotating Group **[Figure 30-41-42]**.

Figure 30-41-43



Remove the piston assembly (Item 1) **[Figure 30-41-43]**.

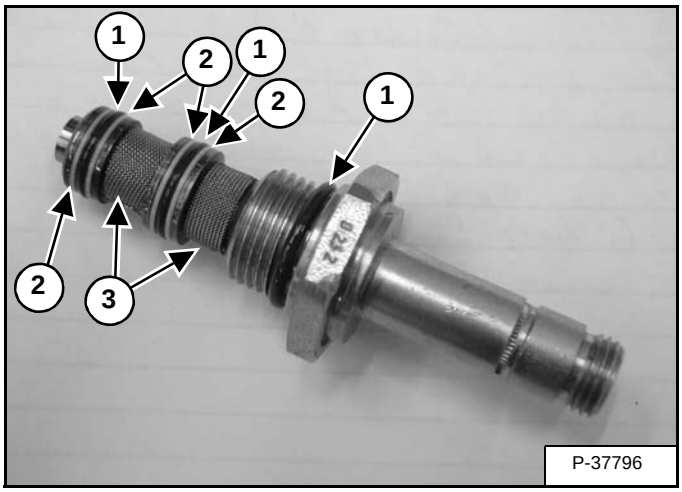
Figure 30-41-44



Remove the pistons (Item 1) **[Figure 30-41-44]** from the rotating block.

Block Disassembly And Assembly (Cont'd)

Figure 40-10-7



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

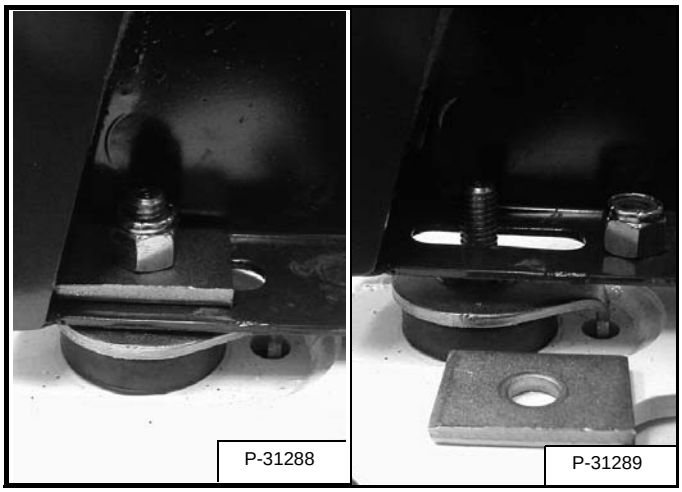
Check the screens (Item 3) **[Figure 40-10-7]** and clean with solvent.

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

SEAT BAR (CONT'D)

Removal And Installation (Cont'd)

Figure 50-10-3



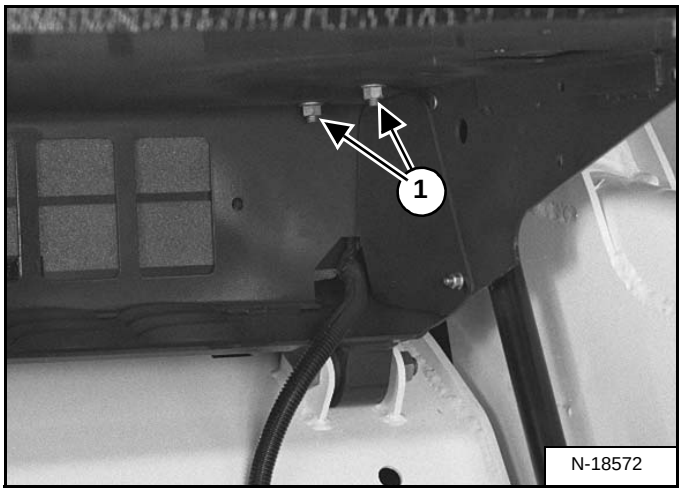
Loosen the nut (both sides) at the front corner of the operator cab **[Figure 50-10-3]**.

Remove the nuts and plates **[Figure 50-10-3]** (both sides).

Figure 50-10-4

Lift on the grab handle and bottom of the operator cab slowly until the cab is all the way up and the latching mechanism engages **[Figure 50-10-4]**.

Figure 50-10-5

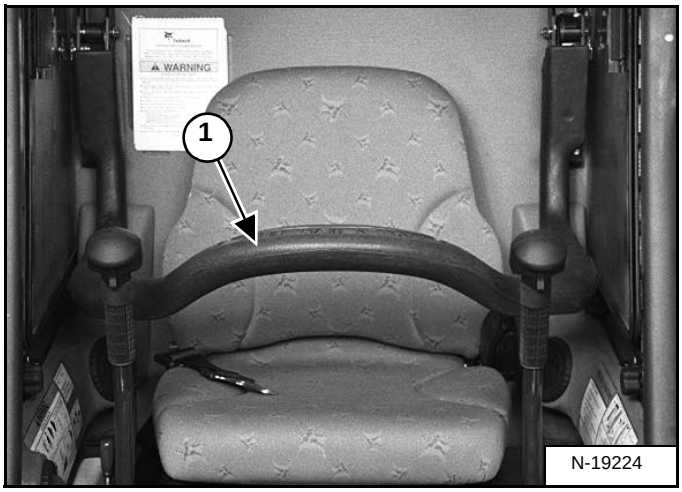


Remove the seat bar mounting nuts (Item 1) **[Figure 50-10-5]** (both sides).

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

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

Figure 50-10-6

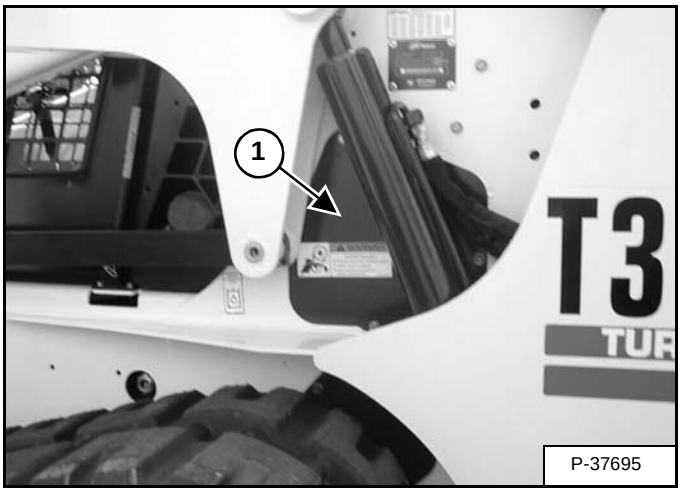


Remove the seat bar (Item 1) **[Figure 50-10-6]** from the operator cab.

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

Removal And Installation

Figure 50-50-9



WARNING

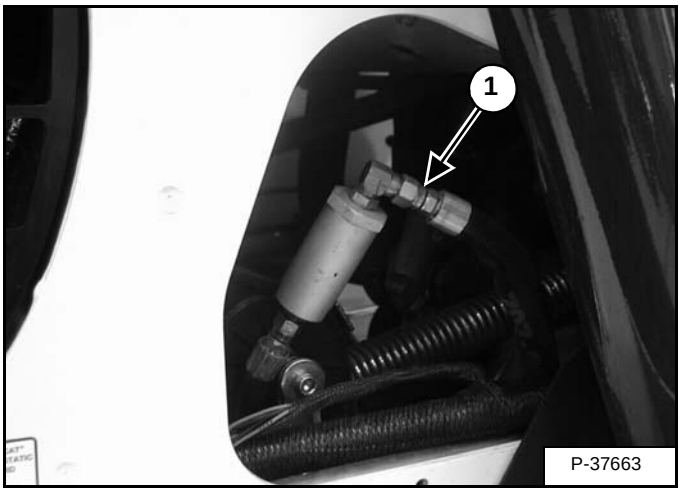
Lift arms must be fully lowered before removing the stabilizer link pins. Even with the approved lift arm support installed, the lift arms and links can suddenly move if both link pins are removed with the lift arms raised.

W-2358-0999

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

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

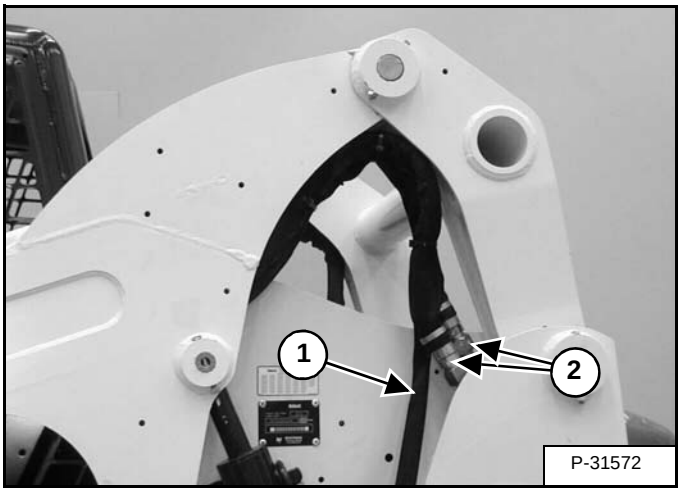
Figure 50-50-10



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

Cap and plug the hose and filter fittings.

Figure 50-50-11



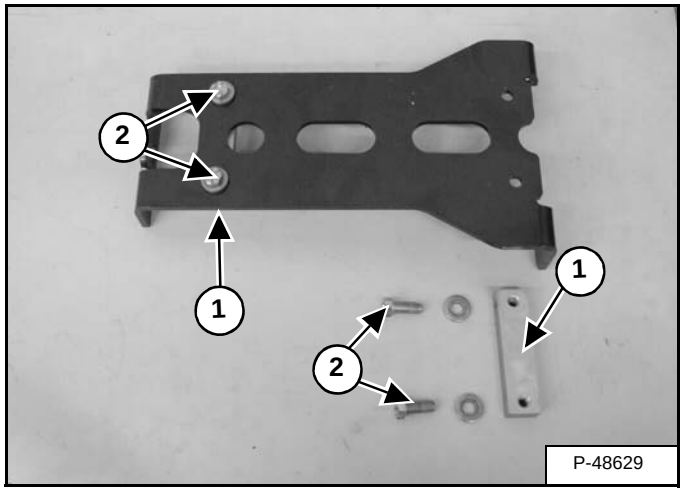
Pull the hose (Item 1) **[Figure 50-50-11]** up and out of the upright to allow for lift arm removal.

Mark the auxiliary hydraulic hoses and tubelines for proper installation.

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

Linkage Removal And Installation (Cont'd)

Figure 50-100-17



Check the wear on the centering blocks (Item 1) **[Figure 50-100-17]**.

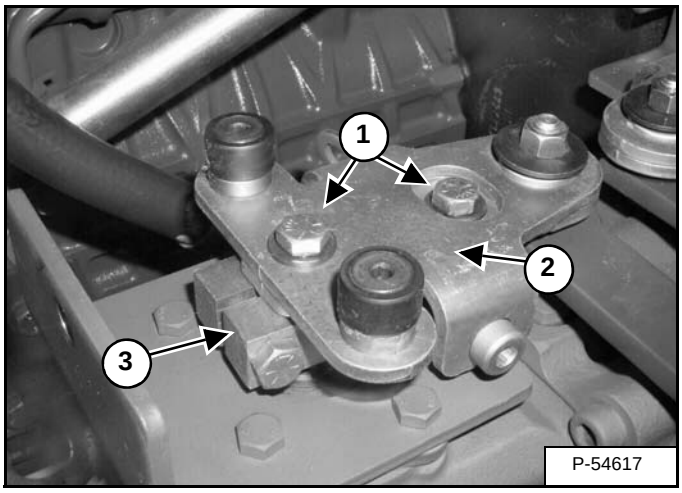
If the centering blocks need replacement, remove the bolts (Item 2) **[Figure 50-100-17]**. Remove the centering blocks.

Installation: Tighten the centering block bolts to 35 - 40 ft.-lb. (47,5 - 54,2 N•m) torque.

NOTE: The washers go between the bolts and the centering plate.

NOTE: If the centering blocks are worn, they can be removed and rotated 180 degrees and reinstalled.

Figure 50-100-18

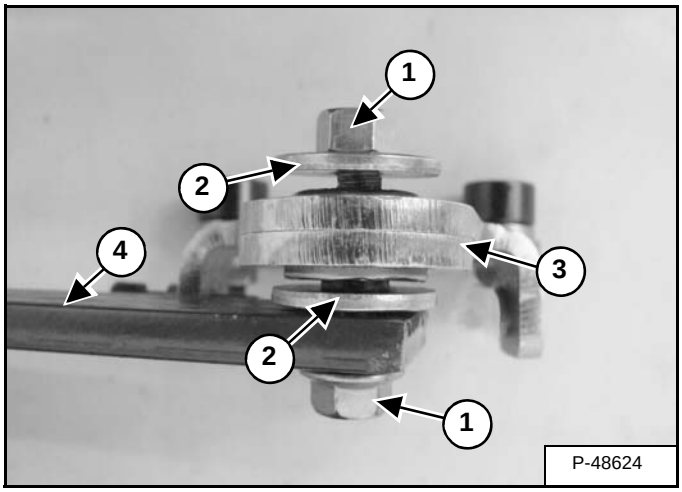


Remove the bolts and washers (Item 1) **[Figure 50-100-18]** from the pintle.

Installation: Tighten the bolts to 35 - 40 ft.-lb. (47,5 - 54,2 N•m) torque.

Remove the pintle arm (Item 2) from the pintle base (Item 3) **[Figure 50-100-18]**.

Figure 50-100-19



Remove the bolt and nut (Item 1) **[Figure 50-100-19]**.

Inspect the washers (Item 2), pintle arm (Item 3) and the steering control lever (Item 4) for damage and replace as needed **[Figure 50-100-19]**.

NOTE: The washers (Item 2) [Figure 50-100-19] are hardened, and should only be replaced through Bobcat Parts.

CONTROL PANEL (S/N A7MP11204 & BELOW) (SJC)

Description

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

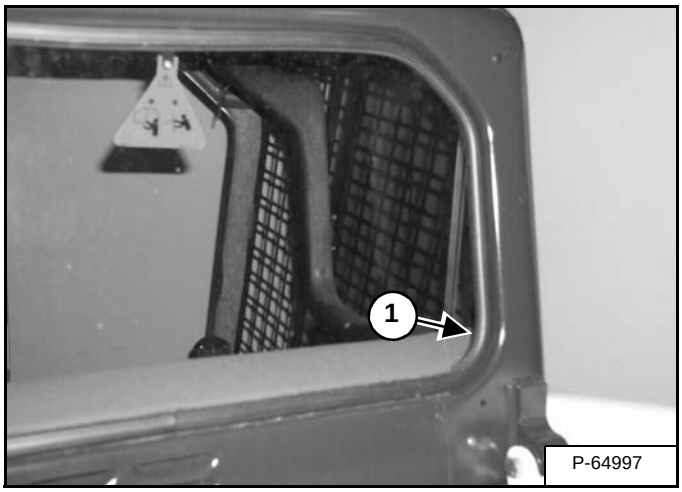
The control panel is connected to the lower main frame and wraps around the operator seat.

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

WINDOW (REAR) (CONT'D)

Installation (Cont'd)

Figure 50-130-4



Apply liquid soap in the rubber molding (Item 1) **[Figure 50-130-4]** to make installation easier.

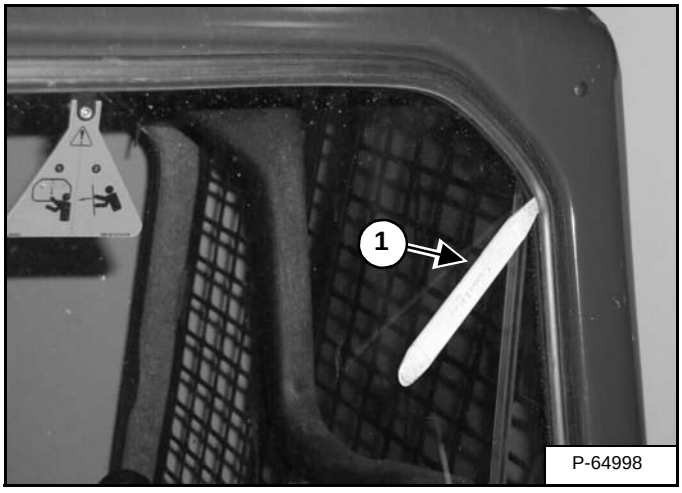
Install the window from the outside of the operator cab.

Install a lower corner of the rear window into the corner of the molding. **[Figure 50-130-4]**.

Align the other lower corner of the window in the molding.

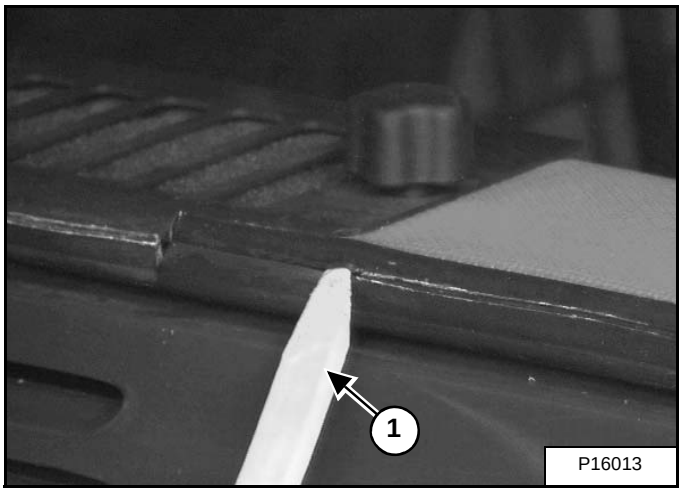
Work the window downward until the window is fully seated in the lower portion of the molding.

Figure 50-130-5



Use a plastic stick (Item 1) **[Figure 50-130-5]** under the molding lip to guide the window into the molding groove.

Figure 50-130-6

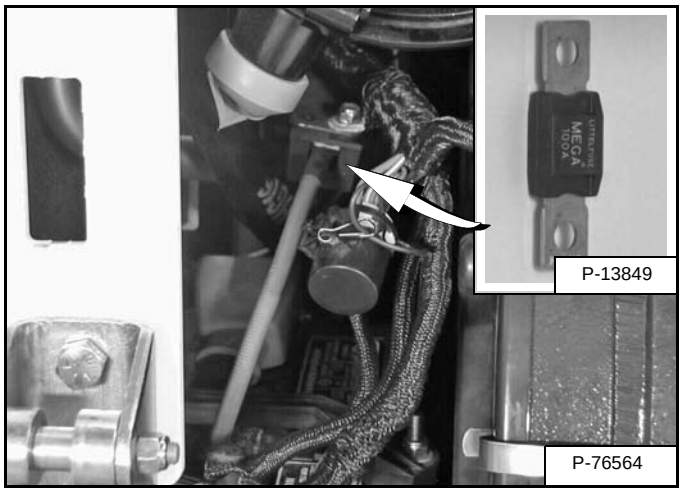


Use the plastic stick (Item 1) **[Figure 50-130-6]** to position the locking tab into the groove to secure the window in the molding.

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

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 operator 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.


Bobcat®

SEAT BAR SENSOR

Description

The seat bar sensor is part of the BICS system. The seat bar sensor sends a signal that indicates whether the seat bar is in the down or up position.

The sensor is located on the left side of seat bar.


Bobcat®

Troubleshooting (Standard And ACS)

The following troubleshooting chart is provided for assistance in locating and correcting problems which are most common. Many of the recommended procedures must be done by authorized Bobcat Service Personnel only.

⚠ 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.

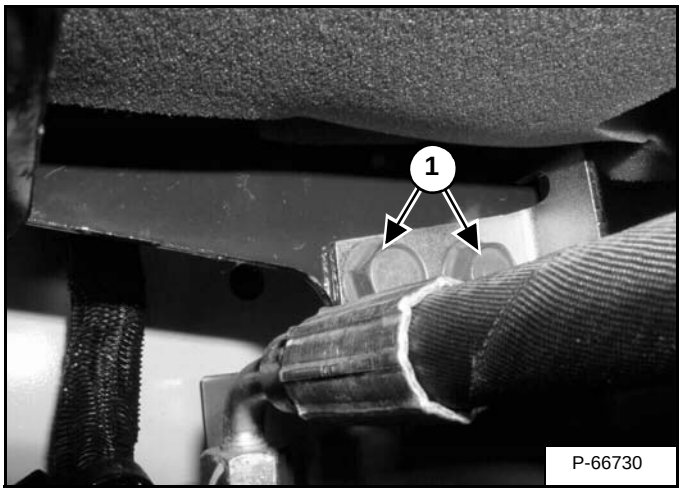
W-2003-0807

PROBLEM	CAUSE
Back-up alarm will not sound when the operator moves both steering levers in the reverse position.	1, 2, 3, 4, 5, 6, 7
Back-up alarm sounds when steering levers in neutral / forward position.	2, 6, 7

KEY TO CORRECT THE CAUSE
1. The ground connection is not making a good contact.
2. The back-up alarm switches are damaged.
3. The alarm is damaged.
4. The alarm or back-up switch wires are disconnected.
5. Check the fuses.
6. The wiring is damaged.
7. The back-up alarm switches need adjusting.

Cable Removal And Installation

Figure 70-20-4



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

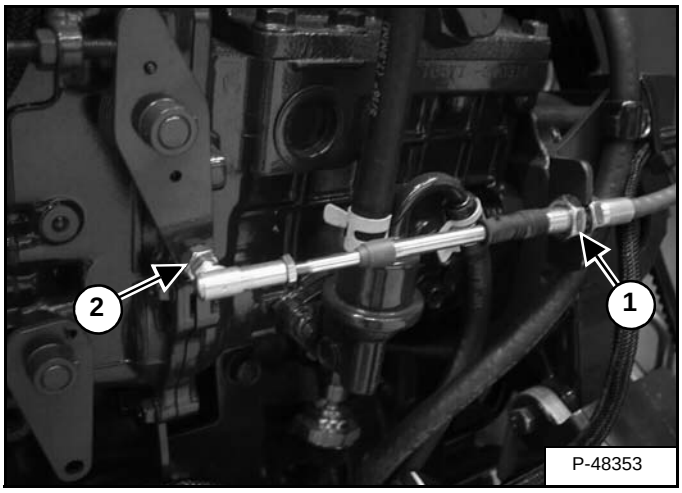
Raise the operator cab. (See Raising on Page 10-30-1.)

Remove the speed control lever. (See Removal And Installation on Page 70-20-1.)

Remove the two bolts (Item 1) **[Figure 70-20-4]** from the clamp that secures the cable.

Open the rear door.

Figure 70-20-5



Loosen the jam nut (Item 1) **[Figure 70-20-5]** from the speed control cable.

Remove the nut (Item 2) **[Figure 70-20-5]**, and disconnect the cable from the linkage.

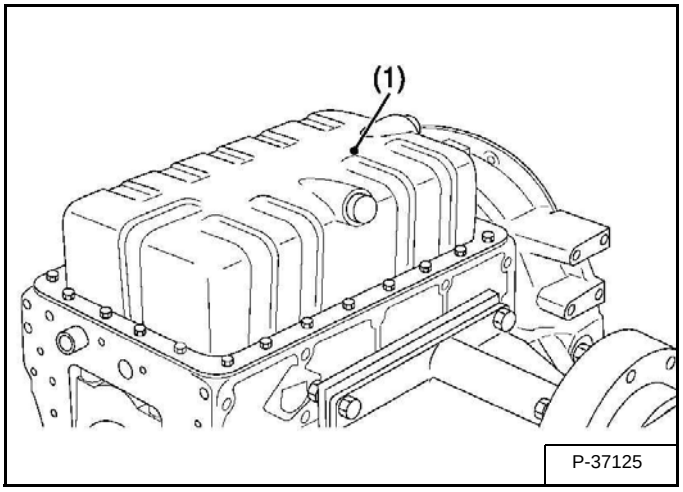
Remove the cable.

LUBRICATION SYSTEM

Oil Pan Removal And Installation

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

Figure 70-60-1



Unscrew the oil pan mounting screws and remove the oil pan (Item 1) **[Figure 70-60-1]**.

Figure 70-60-2

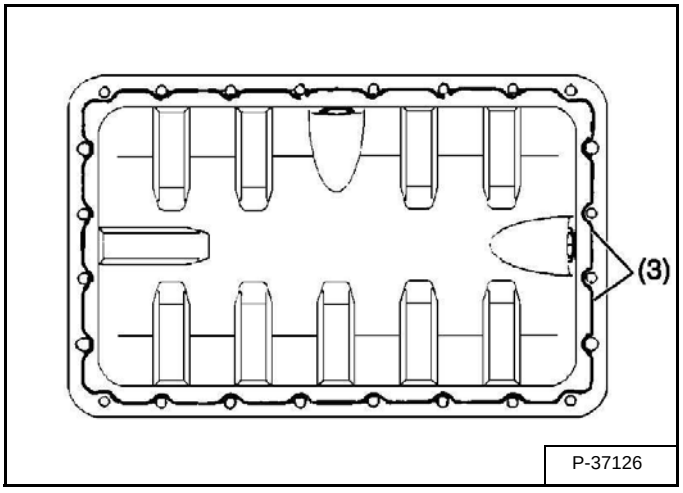
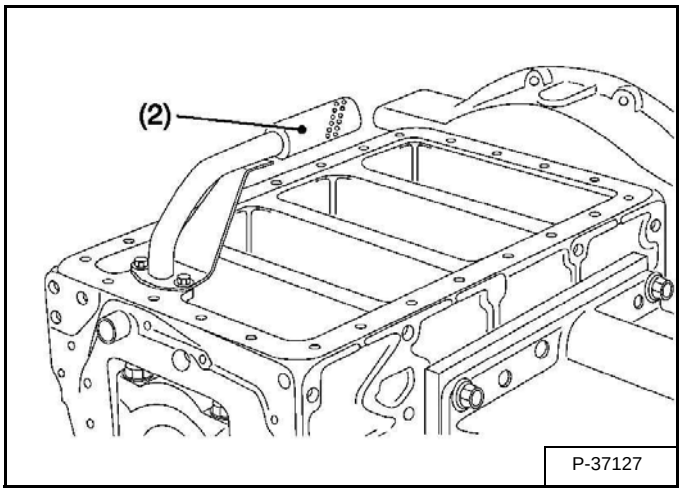


Figure 70-60-3



Unscrew the oil strainer mounting screw, and remove the oil strainer (Item 2) **[Figure 70-60-3]**.

Install the oil strainer, using care not to damage the O-ring.

Apply liquid gasket to the oil pan (Item 3) **[Figure 70-60-2]**.

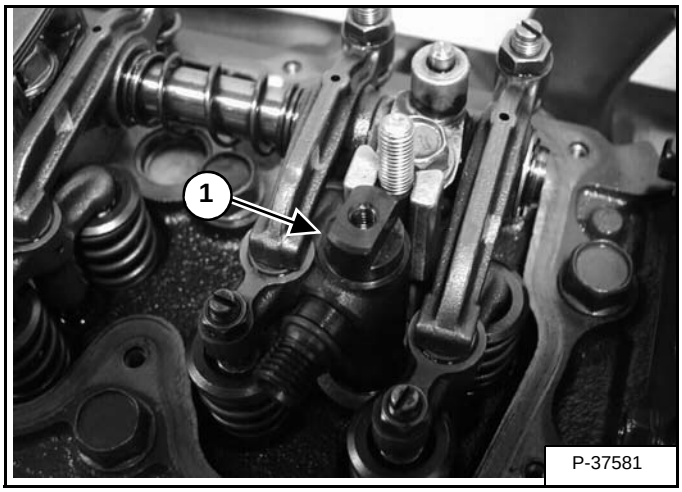
Confirm that the liquid gasket coating surface is free of water, dust and oil in order to maintain sealing effect.

Carefully apply the adhesive evenly.

NOTE: When mounting the adhesive-applied parts, take care to fit them to the mating parts.
Assemble the adhesive-applied parts within ten minutes.
To avoid uneven tightening, tighten mounting screws in diagonal order from the center.
After cleaning the oil strainer, install it.
Attach the oil pan with its central drain plug facing toward the air suction side.

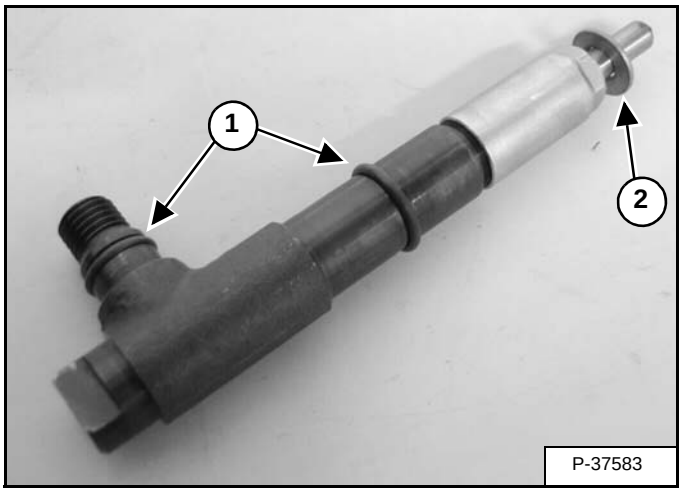
Fuel Injector Removal and Installation (Cont'd)

Figure 70-70-81



Remove the injector nozzle (Item 1) **[Figure 70-70-81]** from the engine.

Figure 70-70-82

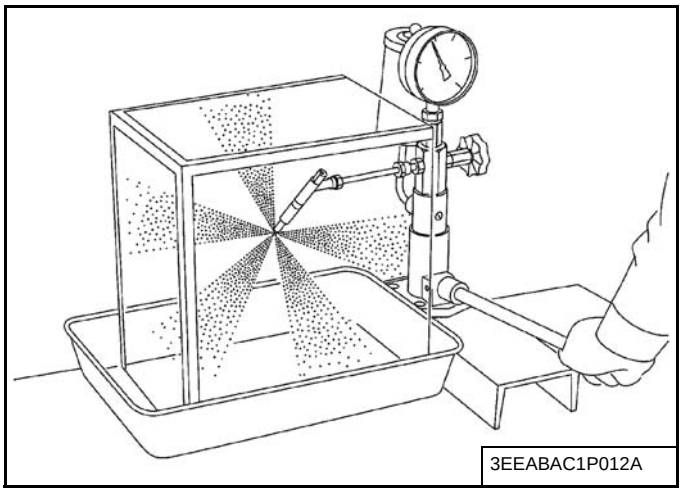


Check the injector nozzle O-rings (Item 1) and nozzle washer (Item 2) **[Figure 70-70-82]**.

Always replace the injector O-rings and washer before installation.

Fuel Injector Nozzle Pressure - Checking

Figure 70-70-83



Set the injection nozzle to the nozzle tester (Code No.: 07909-31361).

Slowly move the tester handle to measure the pressure at which fuel begins jetting out from the nozzle.

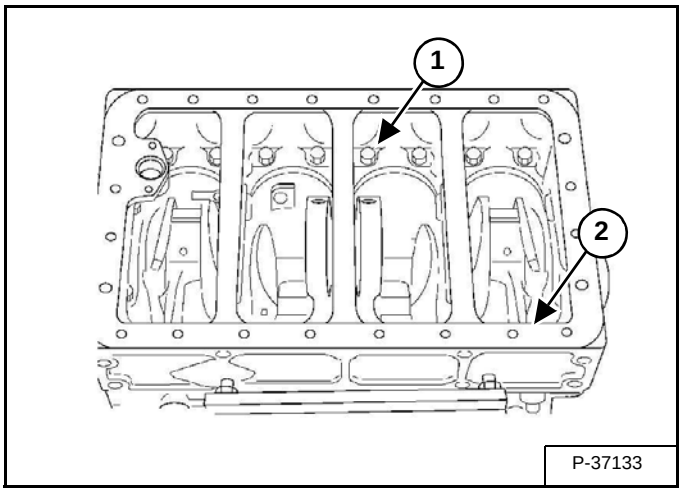
If the measurement is not within the factory specifications, replace the injection nozzle assembly or repair at Denso service shop.

NOTE: Injection nozzle gasket must be replaced when the injection nozzle is removed for checking.

Injection pressure	Factory spec.	1st stage	2702 - 2845 PSI (186,3 - 196,1 bar)

Crankshaft And Bearings Removal (Cont'd)

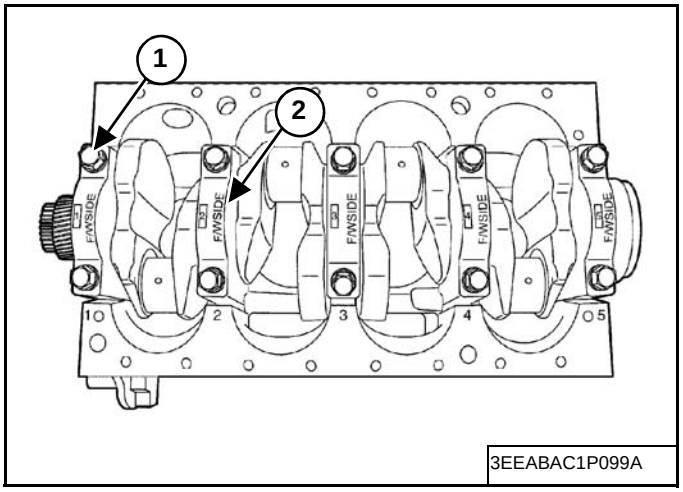
Figure 70-90-24



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

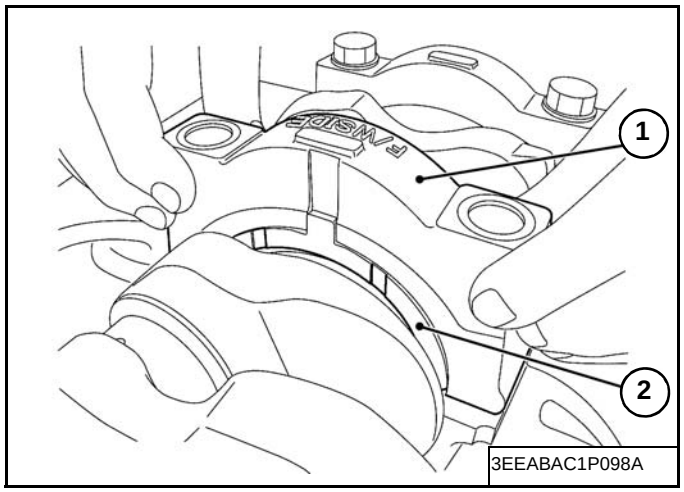
Remove the crankcase 2 (Item 2) **[Figure 70-90-24]**.

Figure 70-90-25



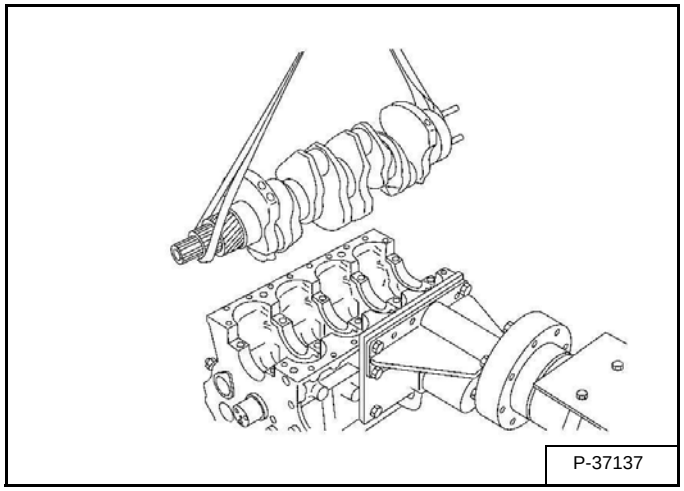
Remove the bolts (Item 1) and the bearing cases (Item 2) **[Figure 70-90-25]** from crankcase 1.

Figure 70-90-26



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

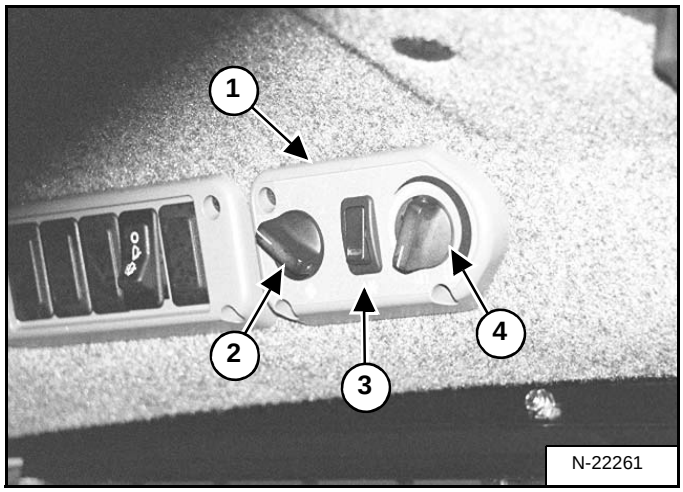
Figure 70-90-27



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

Components (Cont'd)

Figure 80-10-9



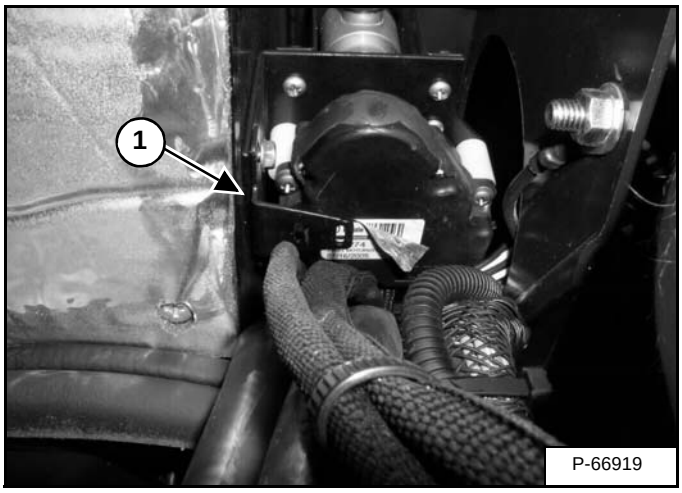
Control Panel: The panel (Item 1) **[Figure 80-10-9]** has three separate components.

Fan Switch: This is a four position rotary switch (Item 2) **[Figure 80-10-9]**. When the fan switch is in the off position the A/C will not engage, but the heat valve will operate, as it is controlled by the ignition power.

A/C Switch: The rocker switch (Item 3) **[Figure 80-10-9]** will be illuminated when the A/C is engaged.

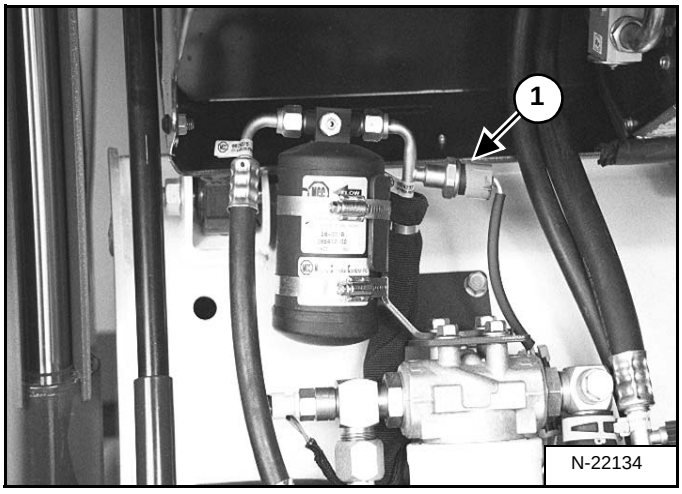
Potentiometer: The potentiometer (Item 4) **[Figure 80-10-9]** controls the Heat Valve from fully Off to fully On. This can be used in conjunction with the A/C for defrost of the windows and temperature control.

Figure 80-10-10



Heater Valve: The heater valve (Item 1) **[Figure 80-10-10]** is used to control the amount of engine coolant that flows to the heater coil.

Figure 80-10-11



Pressure Switch: The pressure switch (Item 1) **[Figure 80-10-11]** will disengage the compressor clutch at high pressure readings over 384 PSI. (2647 kPa) on the high side, or at very low pressure of 28 PSI (193 kPa) or less on the high side, which indicates loss of refrigerant.

SYSTEM CHARGING AND RECLAMATION

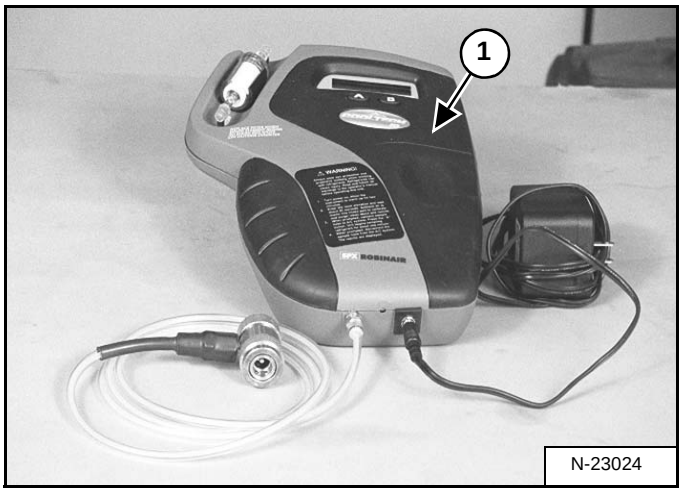
Refrigerant Identification

⚠ WARNING

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

W-2371-0500

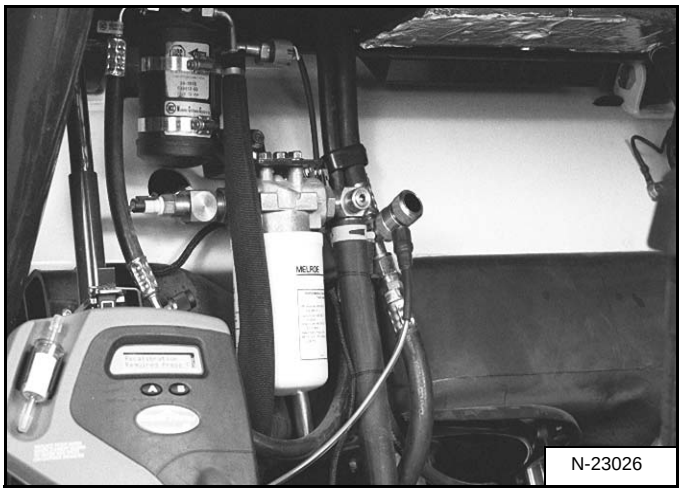
Figure 80-40-1



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

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

Figure 80-40-2



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

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

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

Connect the Refrigerant Identifier to its power source.

Follow the steps displayed on the refrigerant identifier screen.

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

Disconnect the refrigerant identifier from the loader A/C.

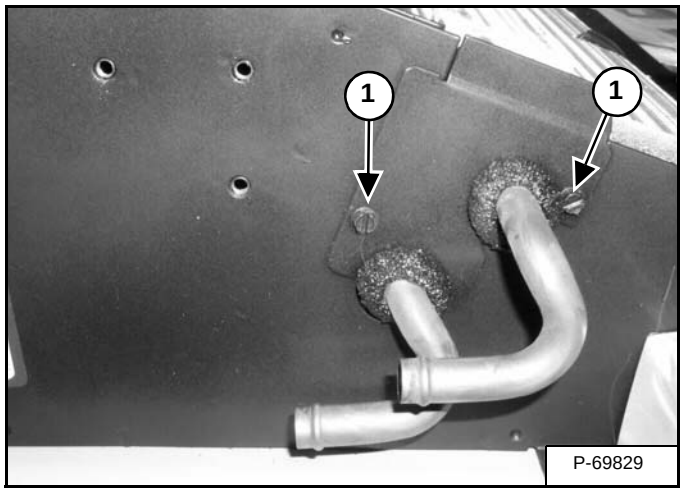
If the refrigerant is dangerous or flammable, it must be evacuated from the A/C system into a separate container and properly and safely disposed of.

If R134a is found, evacuate the system.

HEATER COIL (CONT'D)

Removal And Installation With A/C (Cont'd)

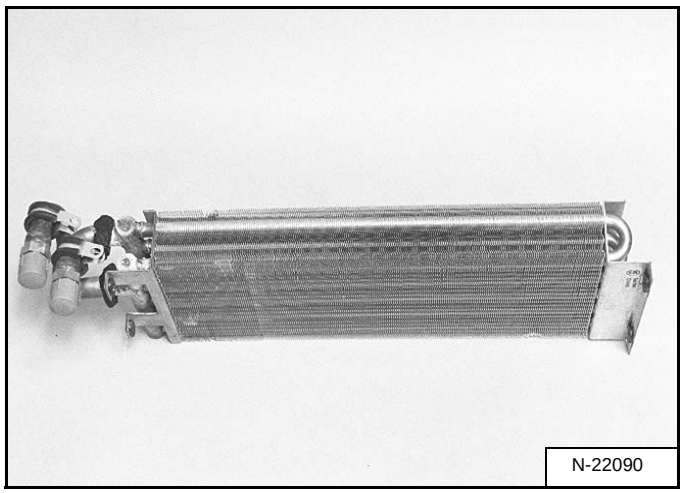
Figure 80-120-4



Remove the mount bolts (Item 1) **[Figure 80-120-4]** and remove the mount plate from the end of the unit.

Remove the heater coil from the unit.

Figure 80-120-5



The heater coil **[Figure 80-120-5]** can be cleaned with low air or water pressure.

If the heater coil needs replacement it must be replaced as complete unit.

Bobcat

SERVICE MANUAL REVISION

ROUTE TO ATTENTION	
PARTS MANAGER	☐
SERVICE MANAGER	X
SALES MANAGER	☐

NOTICE **Insert This Sheet With The Below Listed Manual For Future Reference.**

Revision No: **T320 - 3**
Date: **17 September 2007**
Product: **Bobcat Loader**
Model: **T320**
Manual No: **6986558 (9-07)**

The following Sections are a revision to the above Service Manual.

COVER
ALPHABETICAL INDEX

10-01
10-61 ADDED
10-70

30-40

50-01
50-140 ADDED

70-10

Printed in U.S.A.


Bobcat®

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

Remote Start Procedure

⚠ WARNING

UNAUTHORIZED AND UNEXPECTED ENGINE STARTUP CAN CAUSE SERIOUS INJURY OR DEATH

With the 7-pin connector plugged into the machine and Remote Start Tool RUN button not illuminated, the engine can be started from the operator panel inside the cab.

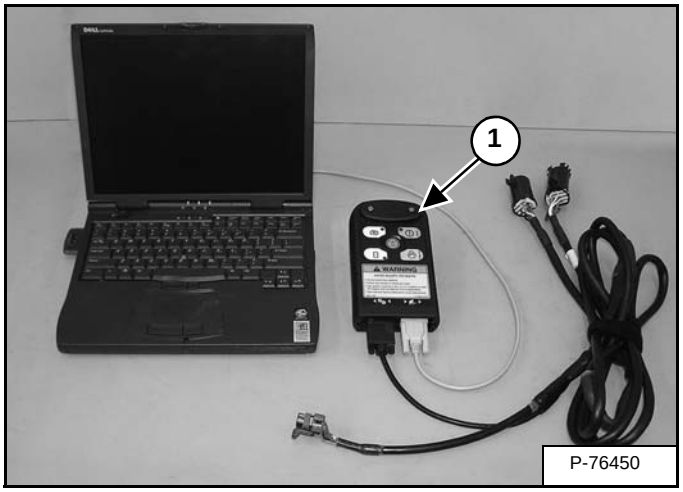
- **Press the RUN button of the Remote Start Tool to disconnect the operator panel from the start circuit.**
- **Remove the operator panel key (key switch), lock the keypad with a unique password (keyless) or otherwise disable the starter before working in the engine area.**

W-2661-1110

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

7003031: Remote Start Tool (Service Tool) Kit

Figure 10-61-8



The Remote Start Tool (Service Tool) (Item 1) **[Figure 10-61-8]** is required when the operator cab is in the raised position for service and the service technician needs to turn on the loader or start the engine. Example: adjusting the steering linkage.

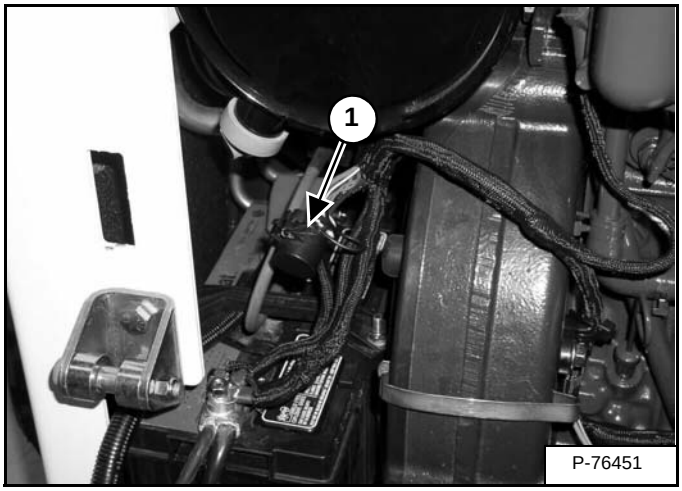
Lift and block the loader.

Raise the lift arms (if required by the procedure) and install an approved lift arm support device.

Raise the operator cab (if required by the procedure).

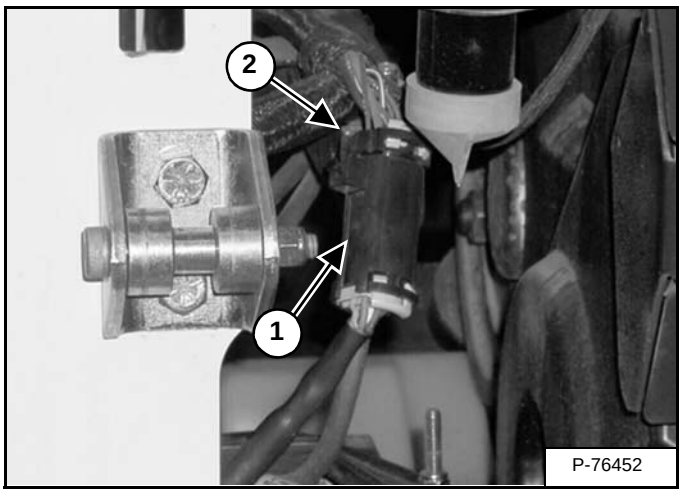
Open the rear door of the loader.

Figure 10-61-9



Loaders without an attachment control harness, remove the loader harness cap (Item 1) **[Figure 10-61-9]** and connect the Loader Service Tool Harness from the Remote Start Tool (Service Tool).

Figure 10-61-10

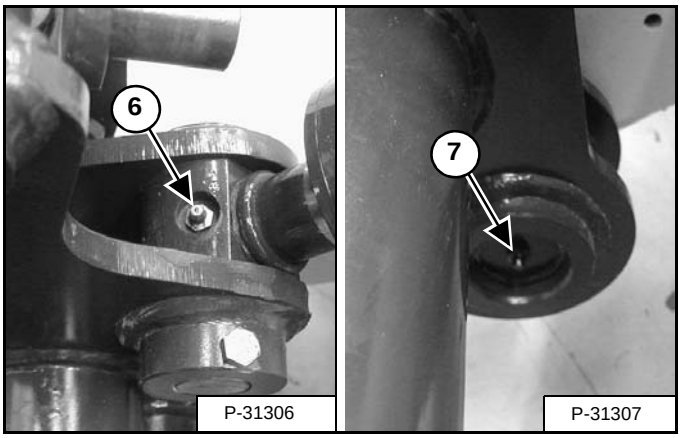


Loaders with an attachment control harness (7 pin or 14 pin), the attachment harness (Item 1) must be disconnected from the loader harness (Item 2) **[Figure 10-61-10]**.

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

Lubrication Locations (Cont'd)

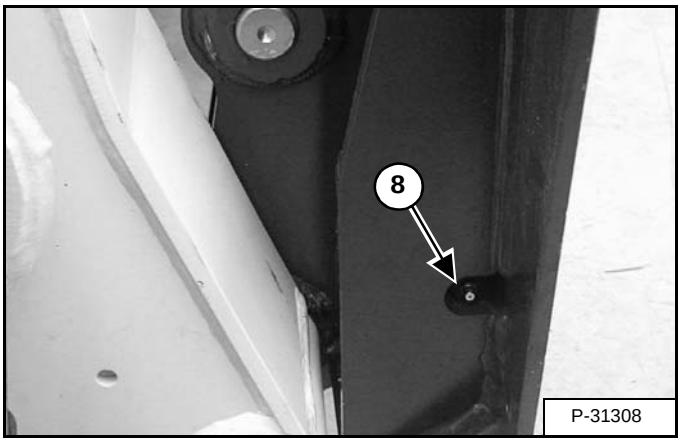
Figure 10-140-5



6. Rod End Tilt Cylinder (Both Sides) (2) **[Figure 10-140-5]**.

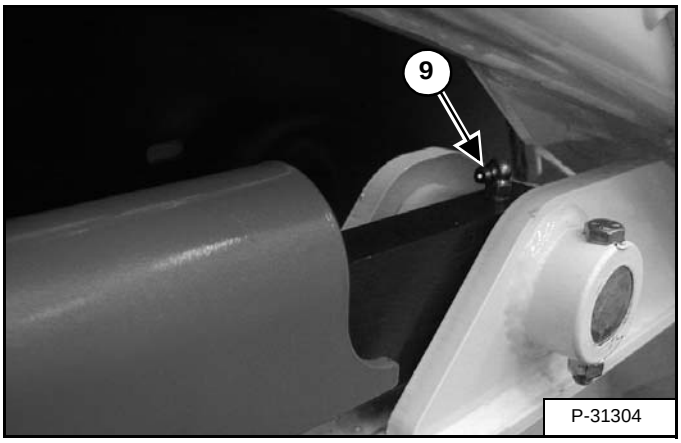
7. Bob-Tach Pivot Pin (Both Sides) (2) **[Figure 10-140-5]**.

Figure 10-140-6



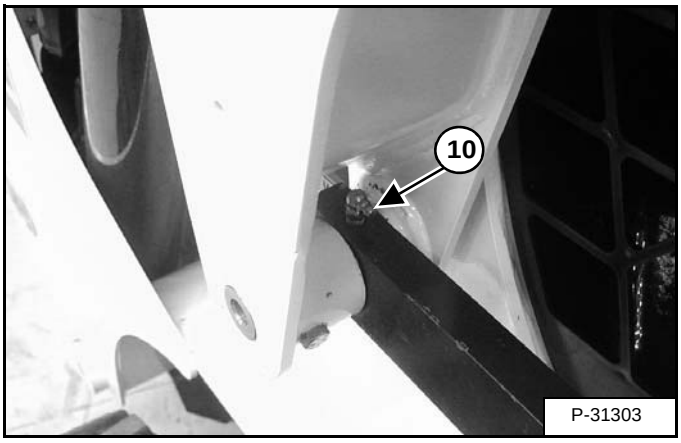
8. Bob-Tach Wedge (Both Sides) (2) **[Figure 10-140-6]**.

Figure 10-140-7



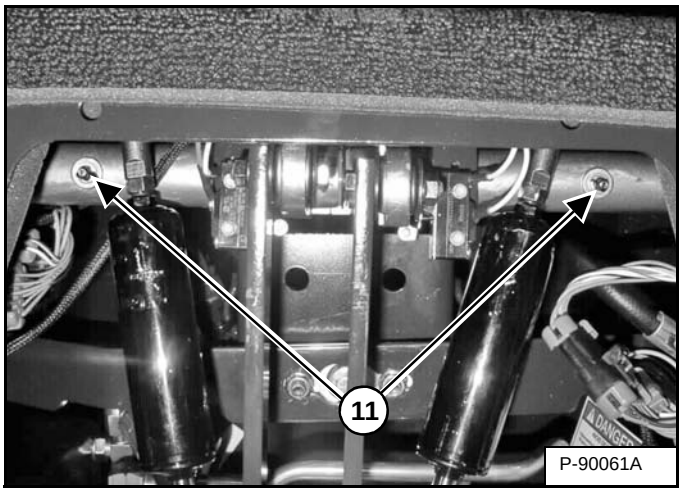
9. Control Link - Rear (Both Sides) (2) **[Figure 10-140-7]**.

Figure 10-140-8



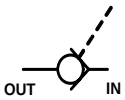
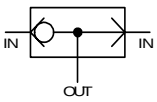
10. Control Link - Front (Both Sides) (2) **[Figure 10-140-8]**.

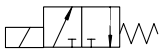
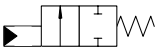
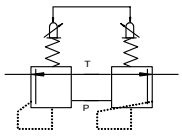
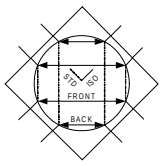
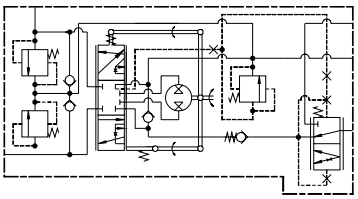
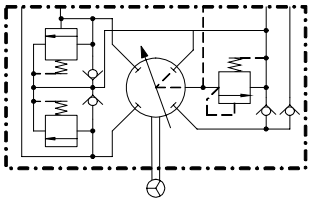
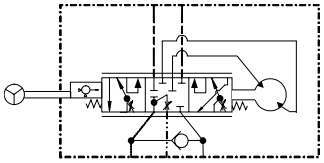
Figure 10-140-9



11. **250 Hours:** Steering Lever Shaft (2) **[Figure 10-140-9]**.

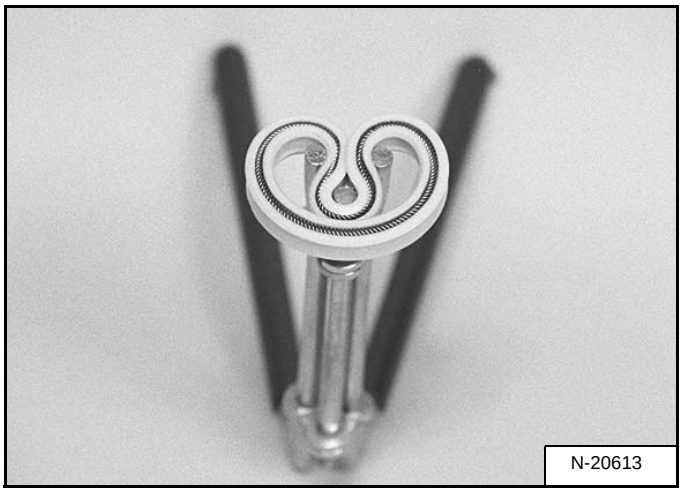
Glossary Of Hydraulic / Hydrostatic Symbols (Cont'd)

SYMBOL	DESCRIPTION
NON-RETURN VALVE, SHUTTLE VALVE: Valve which allows free flow in one direction only.	
	NON-RETURN VALVE (Check Valve) - Used as Replenishing Valve, Lock Check Valve or Anticavitation Valve - Opens if the Inlet pressure is higher than the Outlet pressure. Often contains internal spring which has NO significant pressure value.
	SPRING LOADED VALVE (bypass Valve) - Opens if the Inlet pressure is greater than the Outlet pressure plus the spring pressure.
	PILOT CONTROLLED NON-RETURN VALVE- It is possible to open the valve by pilot pressure.
	SHUTTLE VALVE - The Inlet port connected to the higher pressure is automatically connected to the Outlet port while the other Inlet port is closed.

SYMBOL	DESCRIPTION
DIRECTIONAL CONTROL VALVE: Valve providing for the opening (fully or restricted) or the closing of one or more flow paths (represented by several squares).	
	TWO PORTS and CLOSED FLOW PATHS
	SOLENOID ACTIVATED DIRECTIONAL CONTROL VALVE (Two Position) - controlled by an electric solenoid (with return spring).
	PILOT ACTIVATED DIRECTIONAL CONTROL VALVE (Two Position) - controlled by pressure (with return spring).
	MANUALLY ACTIVATED DIRECTION CONTROL VALVE (Variable Position) Joystick Controlled, variable pressure to shift the pilot activated directional control valve spool.
	MANUALLY ACTIVATED FLOW CONTROL VALVE (Two Position) allows for changing pilot flow to control switching joystick functions for STD / ISO Control (Excavators Only).
	STEERING CONTROL VALVE (Variable Position) - Used for controlling the hydraulic flow for the steering cylinders in relationship to the amount the steering wheel is rotated.
	
	

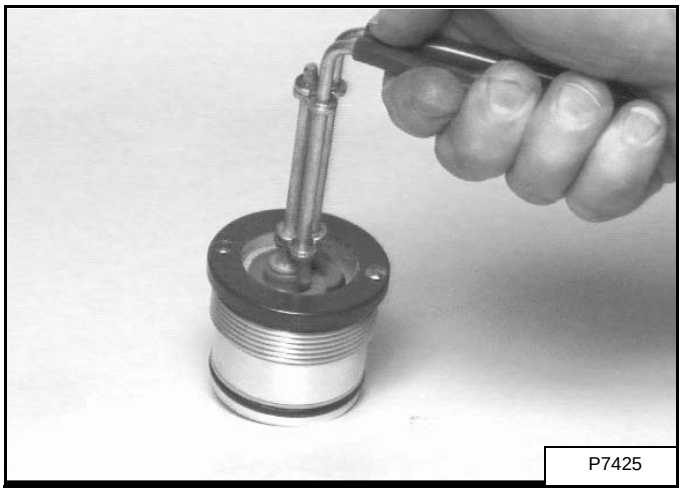
Assembly (Cont'd)

Figure 20-22-13



Rotate the handles to collapse the rod seal **[Figure 20-22-13]**.

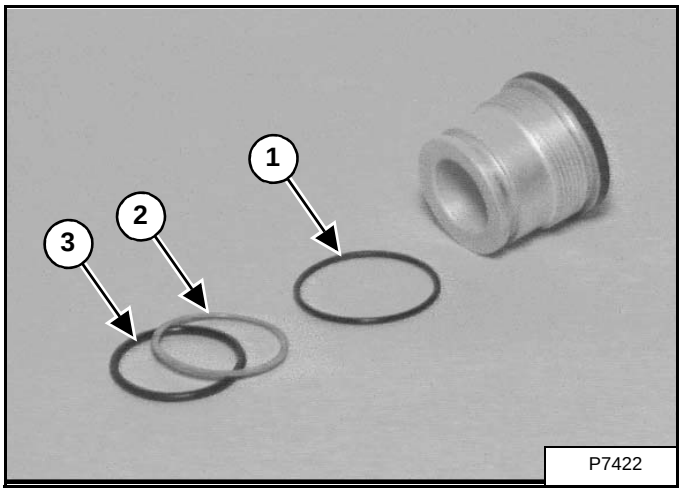
Figure 20-22-14



Install the rod seal in the head **[Figure 20-22-14]**.

Install the wiper seal with the wiper toward the outside of the head.

Figure 20-22-15

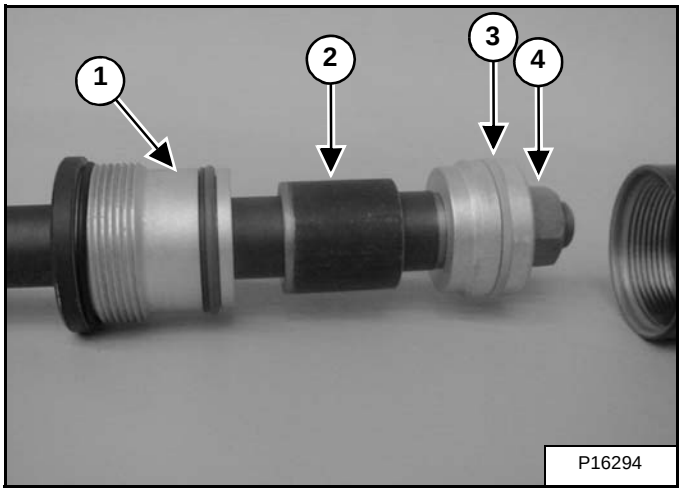


Install the thin O-ring (Item 1) **[Figure 20-22-15]**.

Install the back-up washer (Item 2) and thick O-ring (Item 3) **[Figure 20-22-15]** into the groove on the head.

NOTE: Clean and dry the threads before installing the nut. Install the new nut from the seal kit.

Figure 20-22-16



Install the head (Item 1), and spacer (Item 2) **[Figure 20-22-16]**.

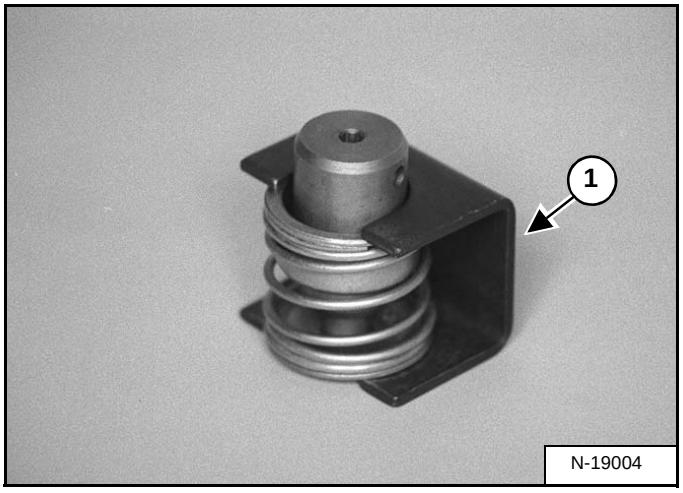
Install the piston (Item 3) **[Figure 20-22-16]**.

Grease the piston where the nut contacts the piston. do not get grease on the threads. Install the new nut (Item 4) **[Figure 20-22-16]**.

Tighten the nut to 90 ft.-lb. (122 N•m) torque.

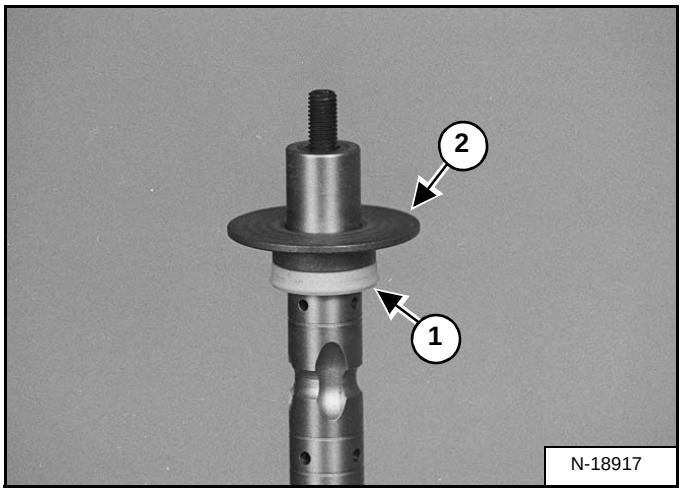
Lift Spool And Detent Removal And Installation (Cont'd)

Figure 20-40-68



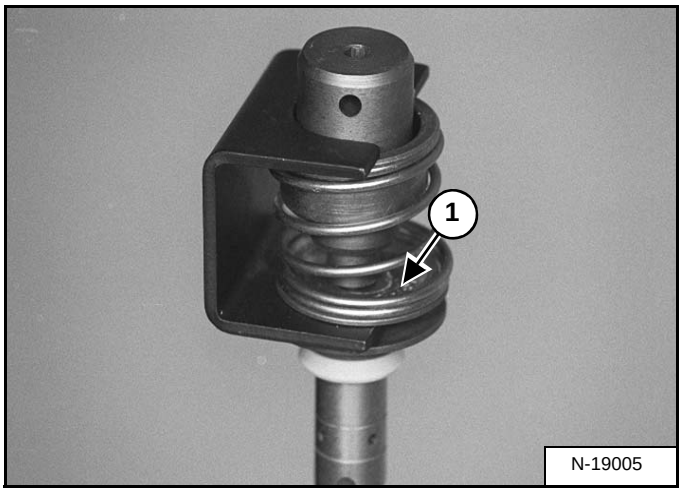
Install the spring tool (Item 1) **[Figure 20-40-68]** over the washer, spring, collar and detent adapter.

Figure 20-40-69



Install the spool seal (Item 1) and back-up washer (Item 2) **[Figure 20-40-69]**.

Figure 20-40-70



Install the spring assembly to the lift spool hand tight **[Figure 20-40-70]**.

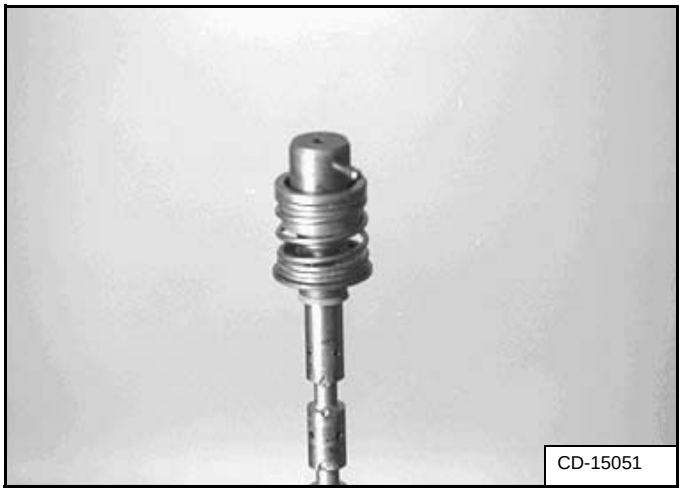
Remove the spring tool.

Check the alignment of the detent adapter and the washer.

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

NOTE: The adapter must fit in the center of the washer (Item 1) [Figure 20-40-70].

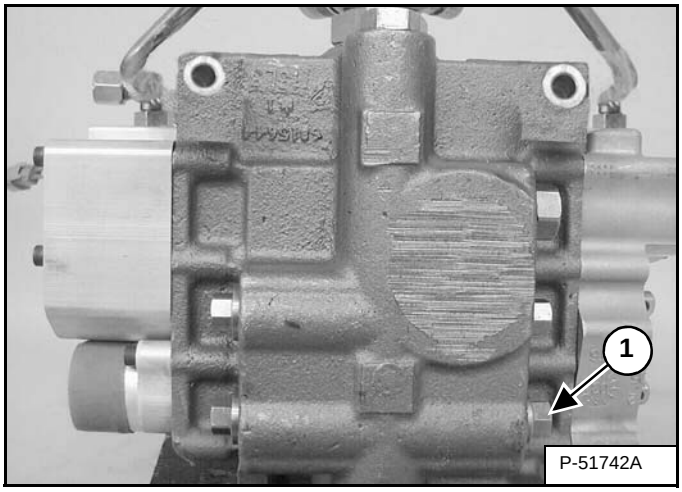
Figure 20-40-71



Install the detent balls and spring **[Figure 20-40-71]**.

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

Figure 20-41-35



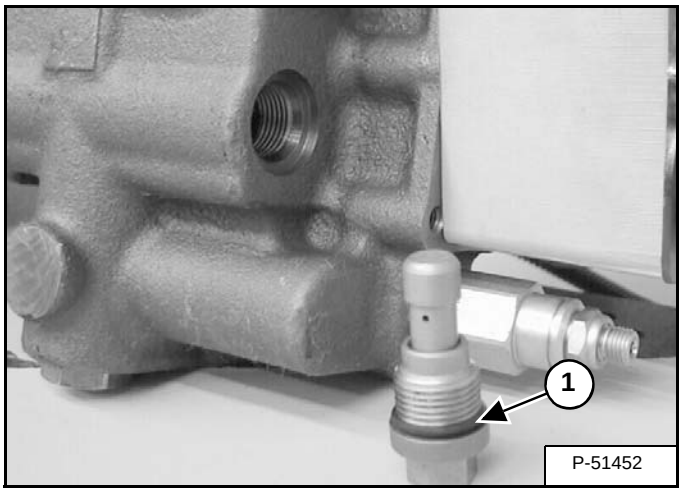
At the back side of the control valve, remove the lift section anti-cavitation valve (Item 1) **[Figure 20-41-35]**.

IMPORTANT

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

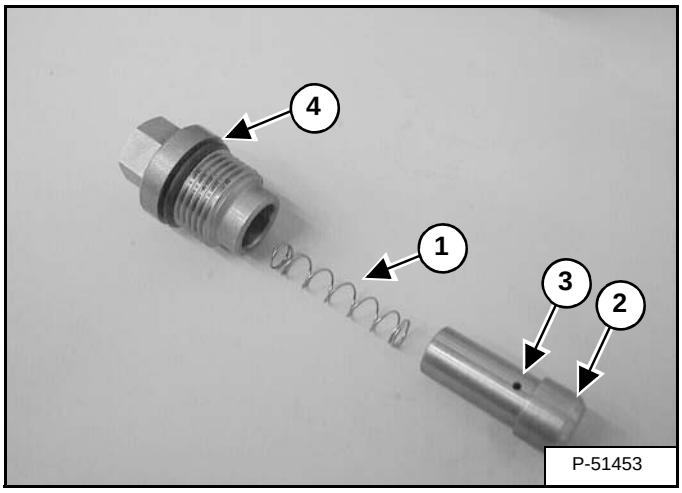
I-2003-0888

Figure 20-41-36



Always use new O-ring (Item 1) **[Figure 20-41-36]** on the anti-cavitation valve plug.

Figure 20-41-37



Remove the spring (Item 1) and poppet (Item 2) **[Figure 20-41-37]**.

Check the orifice (Item 3) **[Figure 20-41-37]** in the poppet to be sure it is not plugged.

Installation: Install a new O-ring (Item 4) **[Figure 20-41-37]** on the plug and lightly lubricate with oil before installing. Tighten the plug to 38 - 45 ft.-lb. (52 - 61 N•m) torque.

Direct Pump Test (Charge Section)

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

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

⚠ WARNING

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

W-2017-0286

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

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

⚠ WARNING

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

W-2059-0598

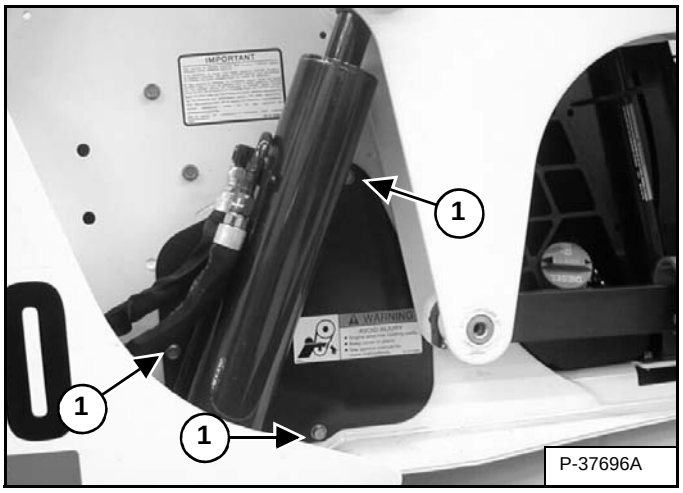
NOTE: The fluid from the charge pump must be filtered after it passes through the Hydraulic Tester, to prevent any contamination to the Hydrostatic Pumps.

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

Open the rear door of the loader.

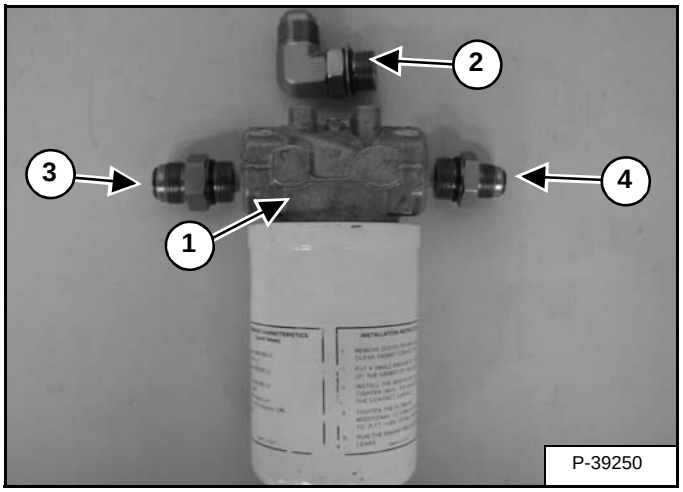
Connect the remote start tool. (See REMOTE START TOOL KIT-MEL1563 on Page 10-60-1.) or (See REMOTE START TOOL (SERVICE TOOL) KIT - 7003031 on Page 10-61-1.)

Figure 20-60-5



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

Figure 20-60-6

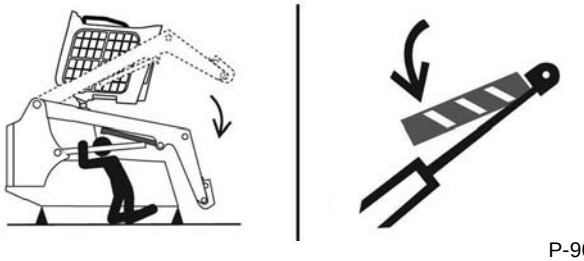


Assemble the filter assembly (Item 1), elbow fitting (Item 2), straight fitting (Item 3) and the reducer fitting (Item 4) **[Figure 20-60-6]**.


Bobcat®

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

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

Stop the engine. Raise the seat bar.

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

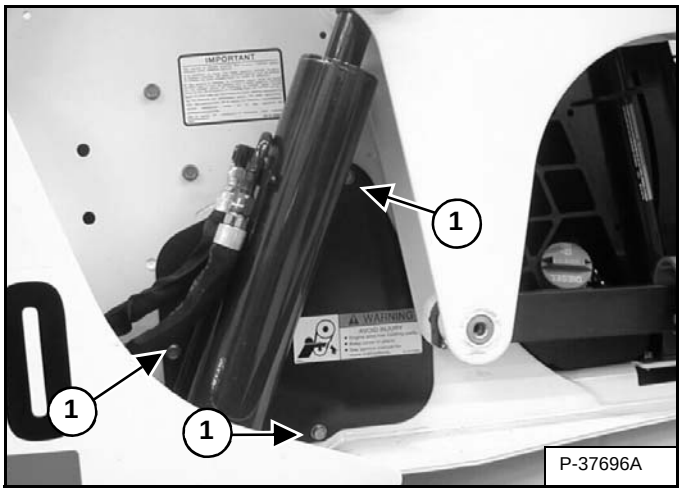
Raise the operator cab. (See Raising on Page 10-30-1.)

Drain the hydraulic fluid from the reservoir. (See Removing And Replacing Hydraulic Fluid on Page 10-120-2.) and (See Removing And Replacing Case Drain Filters on Page 10-120-4.)

Open the rear door of the loader.

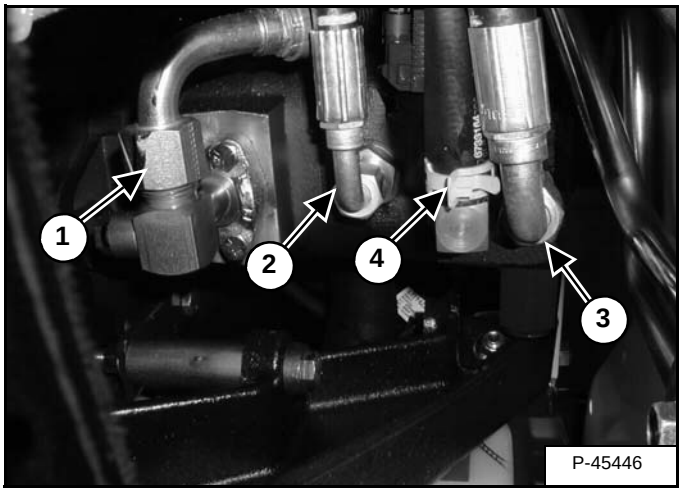
Remove the hoses from the Power Bob-Tach block. (If so equipped.) See Removal And Installation on Page 20-130-1

Figure 20-71-32



Remove the three mount bolts (Item 1) **[Figure 20-71-32]** from the right side access panel. Remove the panel.

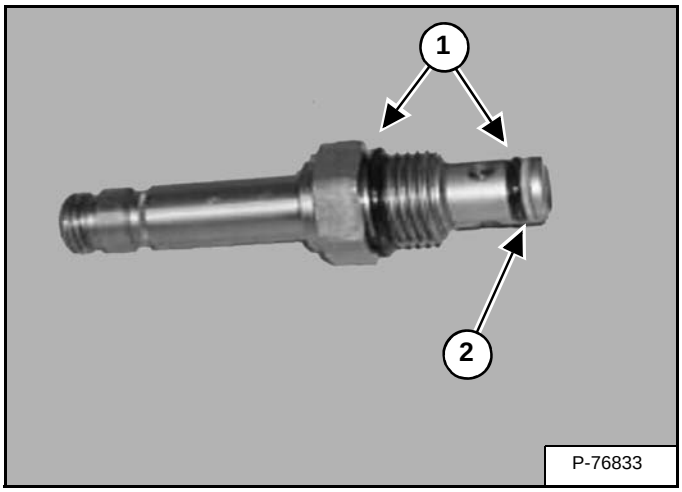
Figure 20-71-33



At the back side of the gear pump, disconnect and cap the hose from the outlet fitting (Item 1) of the standard flow pump. Disconnect and cap the hose (Item 2) from the charge pump. Disconnect and cap the hoses from the High Flow pump outlet fitting (Item 3) and the low pressure hose (Item 4) **[Figure 20-71-33]**.

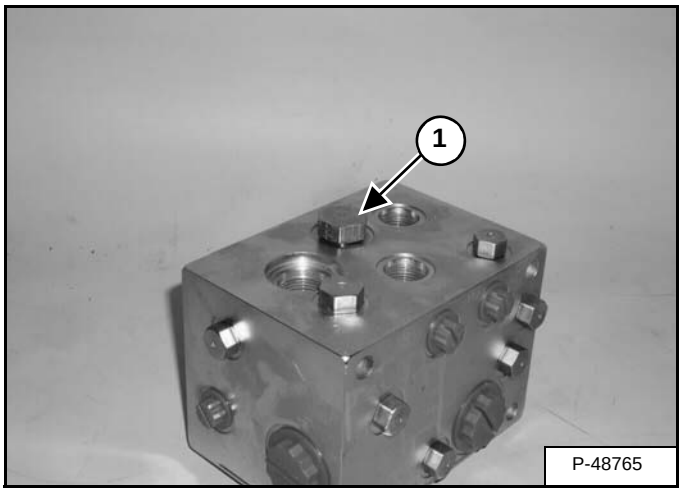
Disassembly And Assembly (Cont'd)

Figure 20-120-24



Inspect the O-rings (Item 1) and back-up washer (Item 2) **[Figure 20-120-24]**.

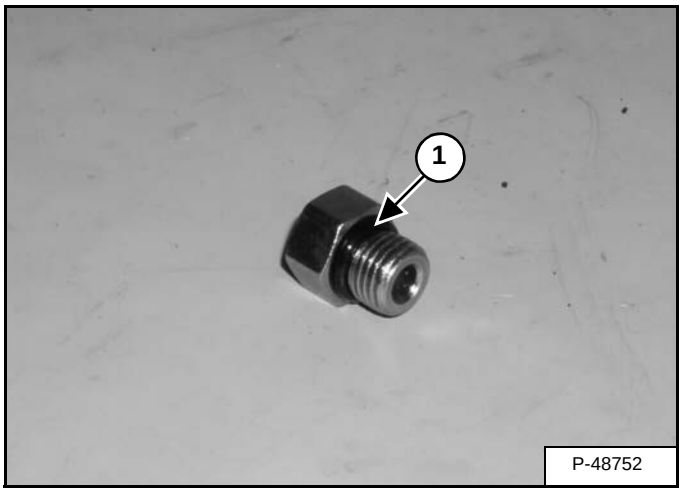
Figure 20-120-25



Remove the #8 SAE hex head plug (Item 1) **[Figure 20-120-25]**.

Assembly: Tighten the plug to 38 ft.-lb. (51,5 N•m) torque.

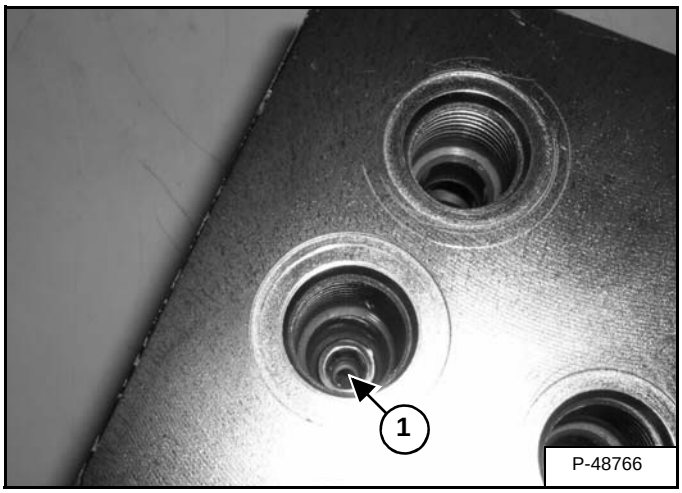
Figure 20-120-26



Inspect O-ring (Item 1) **[Figure 20-120-26]**.

Assembly: Put oil on O-ring.

Figure 20-120-27

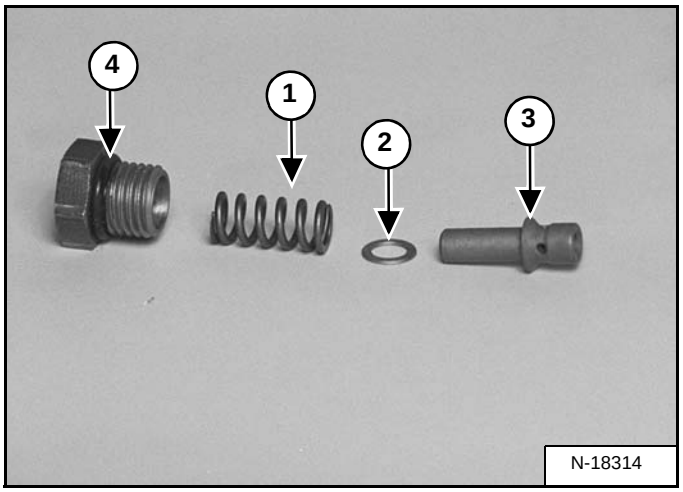


Remove and inspect the orifice (Item 1) **[Figure 20-120-27]** for dirt and debris.

Assembly: Tighten the orifice to 22 ft.-lb. (29,8 N•m) torque.

Disassembly And Assembly (Cont'd)

Figure 30-20-32

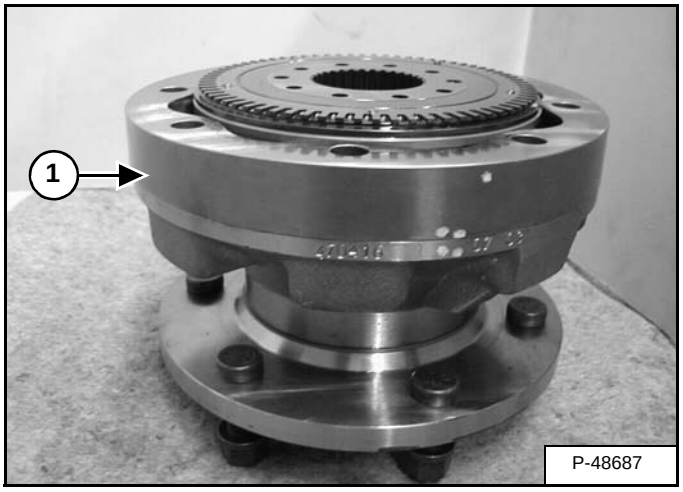


Remove the spring (Item 1) shim (Item 2) and poppet (Item 3) **[Figure 30-20-32]**.

Inspect all parts and replace as needed.

Install a new O-ring (Item 4) **[Figure 30-20-32]** on the plug before installation.

Figure 30-20-33

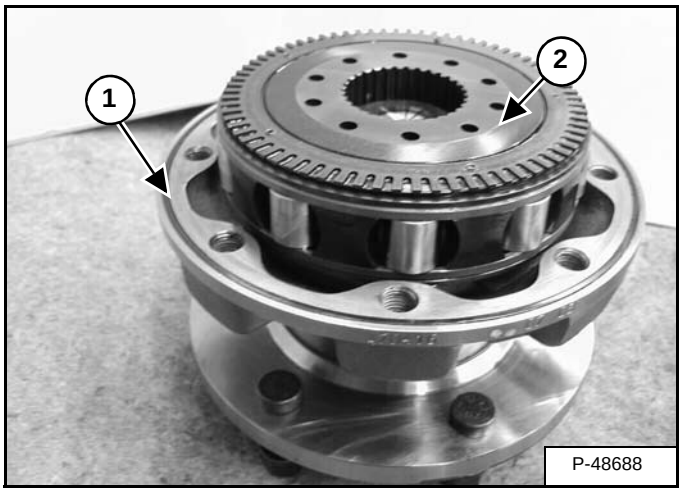


Remove the cam ring (Item 1) **[Figure 30-20-33]** from the front housing assembly.

Check the cam ring inside surface for wear and scratches.

Assembly: Align the marks (Item 2) **[Figure 30-20-33]** on the cam rings to the front housing.

Figure 30-20-34

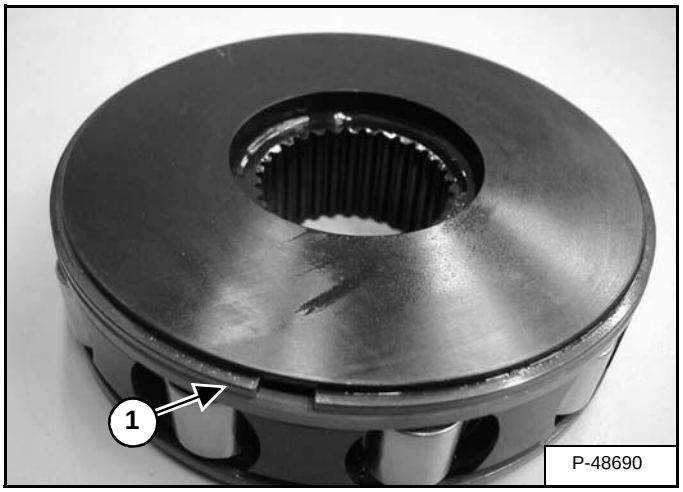


Remove and replace the O-ring (Item 1) **[Figure 30-20-34]** from the front housing assembly.

Assembly: Slightly smear the O-ring (Item 1) **[Figure 30-20-34]** with grease to hold in place.

Remove the rotating group (Item 2) **[Figure 30-20-34]** from the front housing assembly.

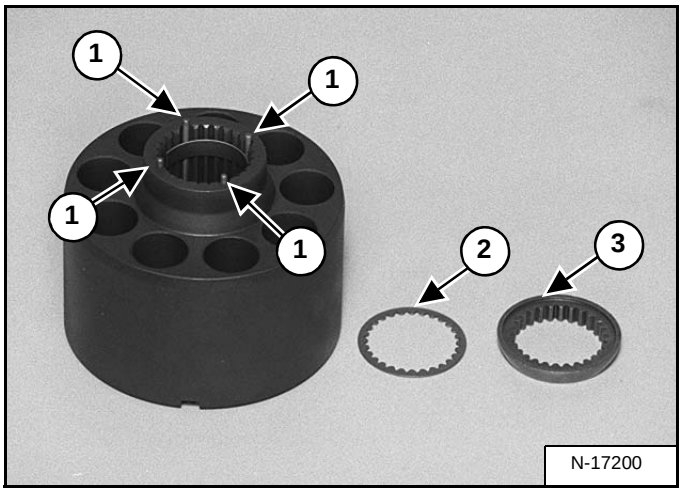
Figure 30-20-35



Remove the snap ring (Item 1) **[Figure 30-20-35]** from the bottom side of the rotating group.

Assembly (Cont'd)

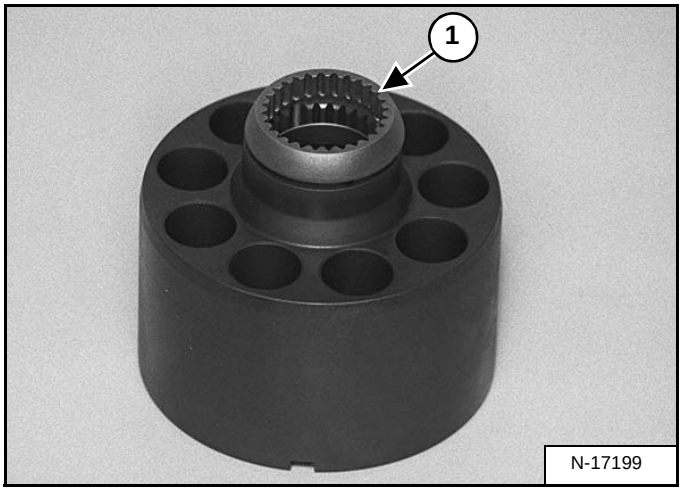
Figure 30-40-49



Install the four slipper pins (Item 1) **[Figure 30-40-49]** into the cylinder block.

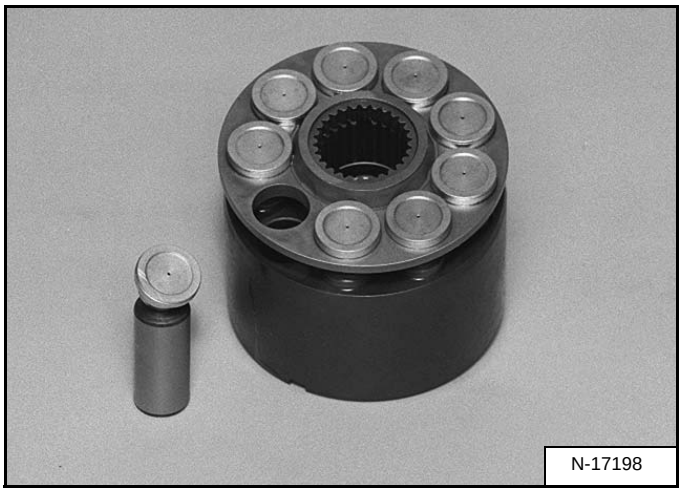
Apply a small amount of grease to the washer (Item 2) and install into the ball guide retainer (Item 3) **[Figure 30-40-49]**.

Figure 30-40-50



Install the ball guide retainer and washer (Item 1) **[Figure 30-40-50]** onto the slipper holddown pins.

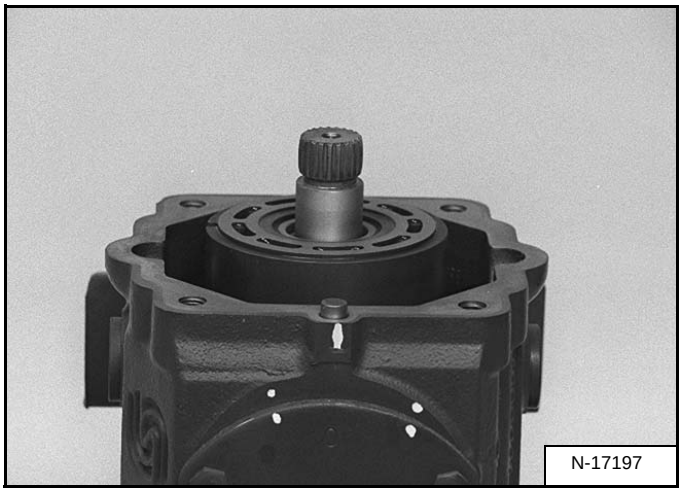
Figure 30-40-51



Assemble the piston assemblies into the slipper guide. Lubricate the pistons and cylinder block bores and insert the piston assemblies into the cylinder bores **[Figure 30-40-51]**.

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

Figure 30-40-52



Place the pump on a work surface with the end cap opening up **[Figure 30-40-52]**.

Mechanical Neutral Adjustment

The pump mechanical neutral adjustment sets the position of the servo piston and pump swash plate relative to the hydraulic controller. This procedure should be followed if the hydrostatic pump has been disassembled for servicing the servo piston and the setting has been disrupted.

Place the loader on jackstands. (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.)

Disconnect the swash plate angle sensors in the electrical harness. This prevents unwanted swash plate movement error codes from occurring during adjustments. Disconnecting the sensors does not have to be done directly at the sensor, follow the harness back to find an accessible connector to disconnect.

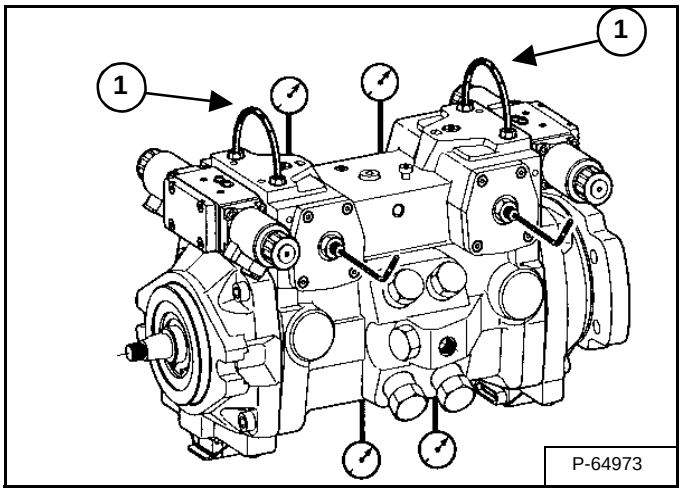
Disconnect the speed sensors located on the top of the motor carriers. This prevents uncommanded wheel movement error codes from occurring during adjustments.

⚠ 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.

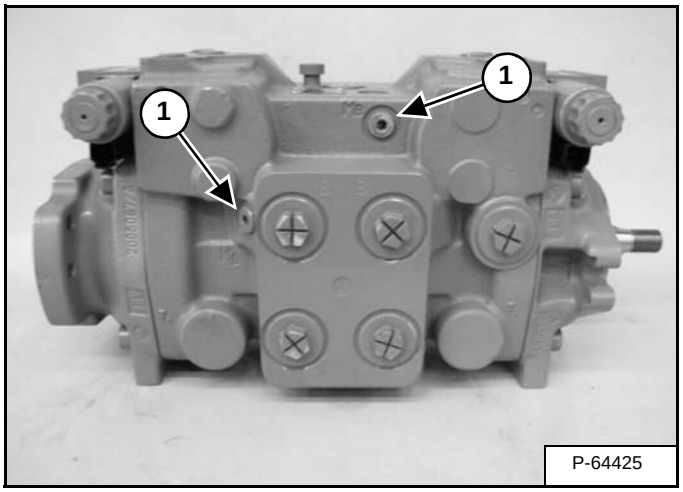
W-2145-0290

Figure 30-41-79



Connect a hydraulic hose (Item 1) **[Figure 30-41-79]** between port X1 and port X2 on each side of the hydrostatic pump, to equalize the pressures on both ends of the servo pistons.

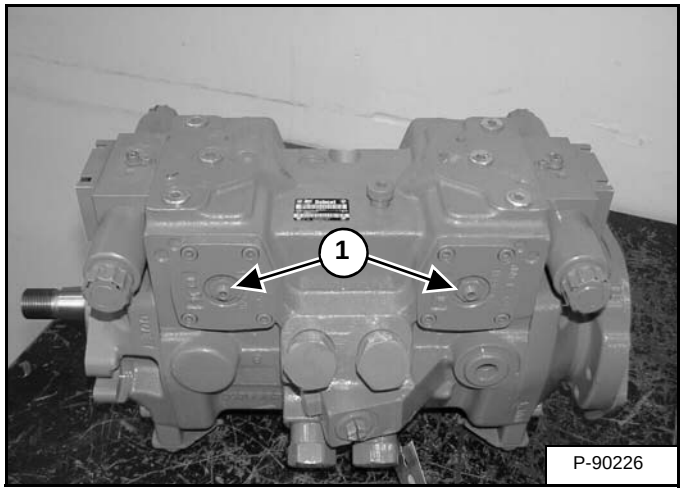
Figure 30-41-80



Remove the plugs (Item 1) **[Figure 30-41-80]** from the MB ports on the front side of the pump, and install 7500 PSI (241 bar) pressure gauges.

Mechanical Neutral Adjustment (Cont'd)

Figure 30-42-75



Loosen the pump neutral adjustment lock nut (Item 1) **[Figure 30-42-75]**.

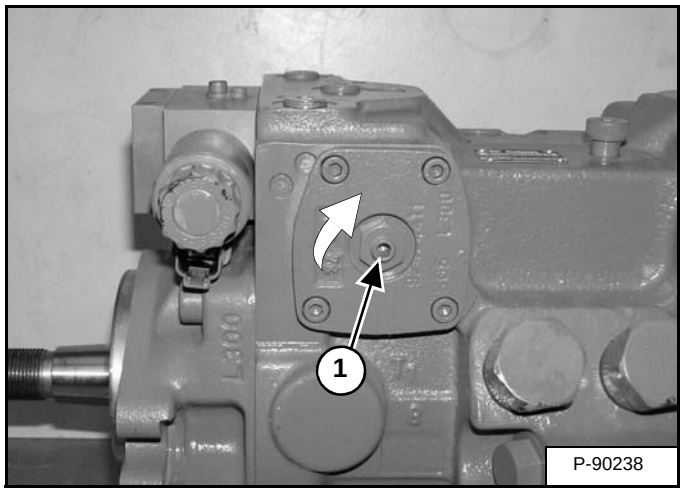
Start the loader using the remote start tool and run at idle.

⚠ WARNING

Stay clear of the loader wheels. They will turn whenever the pump is not centered.

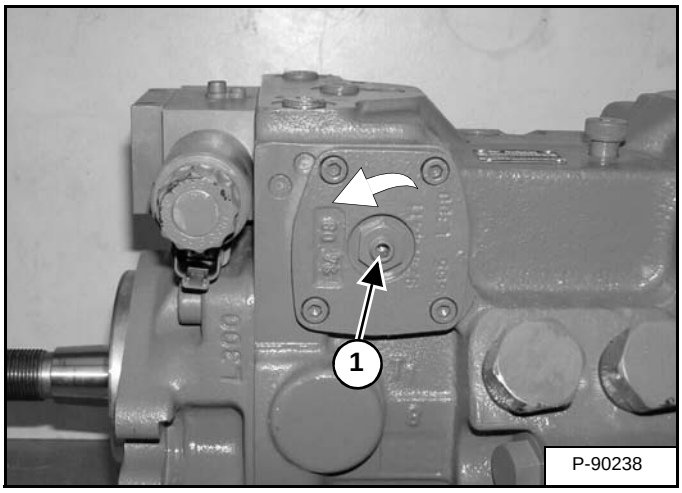
W-2276-1297

Figure 30-42-76



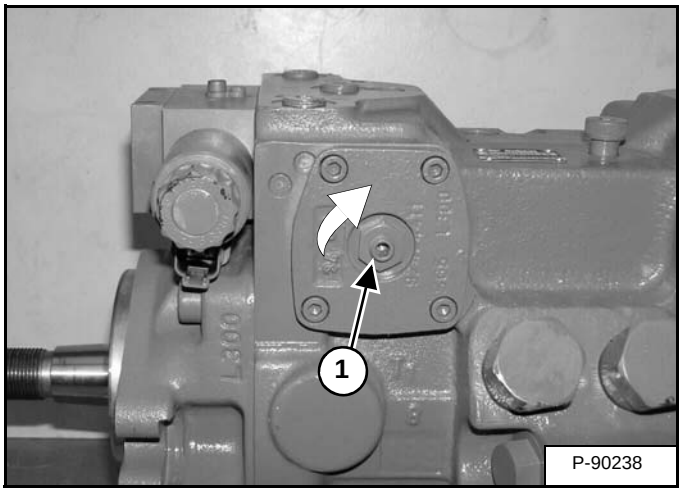
Turn the adjustment screw (Item 1) **[Figure 30-42-76]** clockwise, until one of the gauges registers an increase in system pressure. Mark the position of the adjustment screw.

Figure 30-42-77



Turn the adjustment screw (Item 1) **[Figure 30-42-77]** counterclockwise, until the other gauge registers an increase in system pressure. Mark the position of the adjustment screw.

Figure 30-42-78



Turn the adjustment screw (Item 1) **[Figure 30-42-78]** clockwise, to a position halfway between the recorded positions. The pressure gauges should read equal pressures.

Track Tensioner Disassembly And Assembly (S/N A7MP60283 & Below And AAKZ11027 & Below)

⚠ WARNING

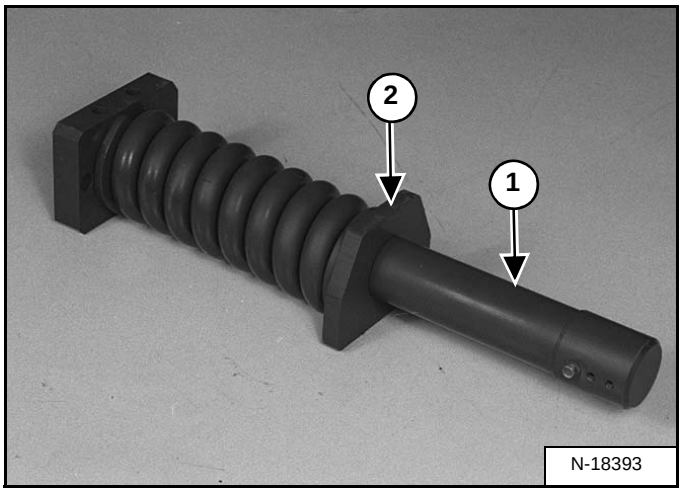
P-62574

AVOID INJURY OR DEATH

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

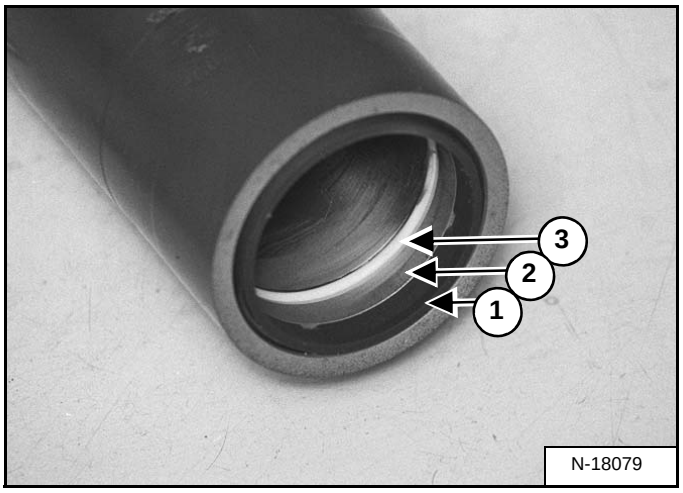
W-2617-1004

Figure 40-20-26



Remove the grease tube (Item 1) **[Figure 40-20-26]** from the coil spring assembly.

Figure 40-20-27



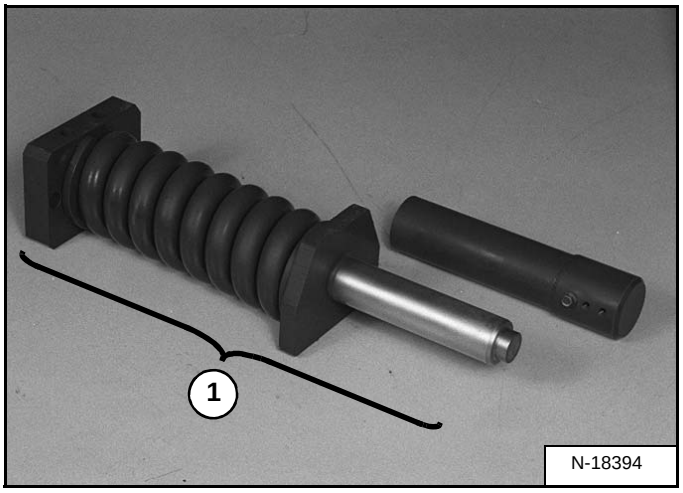
Remove the seal (Item 1), back-up ring (Item 2), and O-ring (Item 3) **[Figure 40-20-27]** from the grease tube.

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

Installation: Apply grease to area between seal and O-ring before installing.

NOTE: The grease tube (Item 1) must be completely retracted against the coil spring assembly (Item 2) [Figure 40-20-26] before adding grease, to prevent air from being trapped in the grease tube.

Figure 40-20-28



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

The coil spring assembly (Item 1) **[Figure 40-20-28]** is only sold as a complete unit from Bobcat Parts.

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

Figure 40-22-24

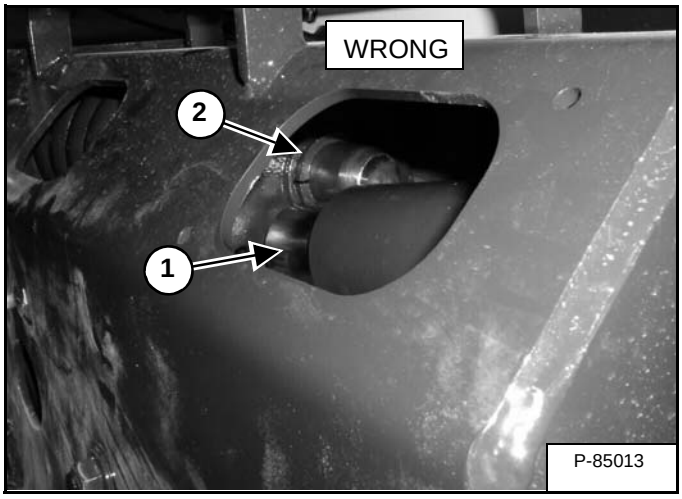
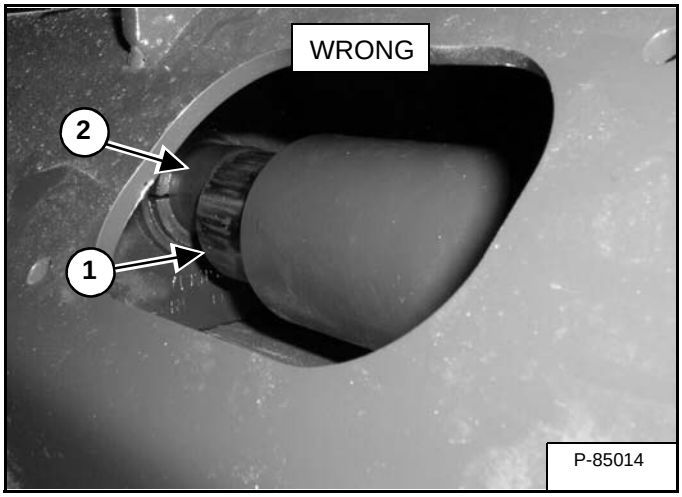
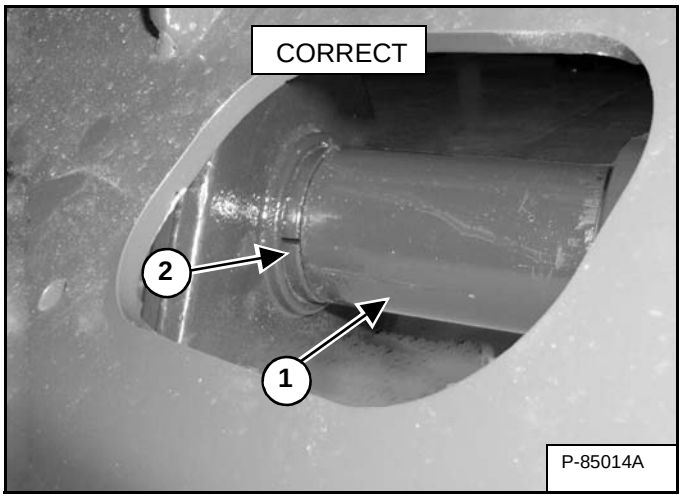


Figure 40-22-25



Installation: **[Figure 40-22-24]** and **[Figure 40-22-25]** shows the grease tube (Item 1) misaligned and not seated properly against the coil spring assembly (Item 2). **[Figure 40-22-26]** shows the grease tube (Item 1) and the coil spring assembly (Item 2) properly assembled.

Figure 40-22-26



Installation: When installing the track tensioner into the loader verify the grease tube (Item 1) is properly seated against the coil spring assembly (Item 2) **[Figure 40-22-26]**.

Track Damage Identification (Cont'd)

Cracks On The Lug Side Rubber Due To Fatigue

Figure 40-30-16

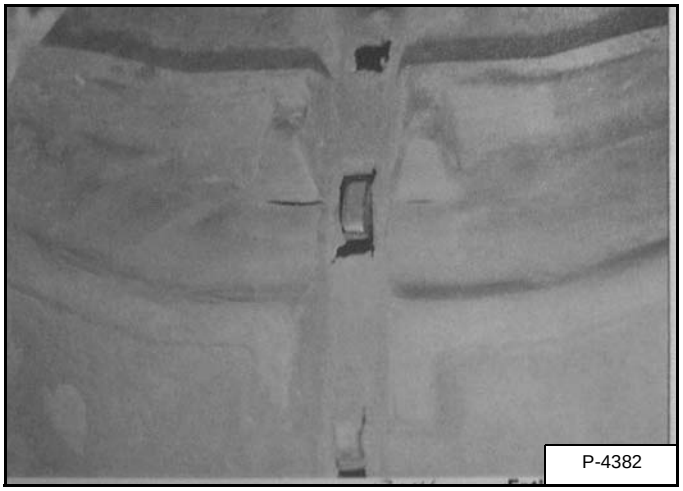
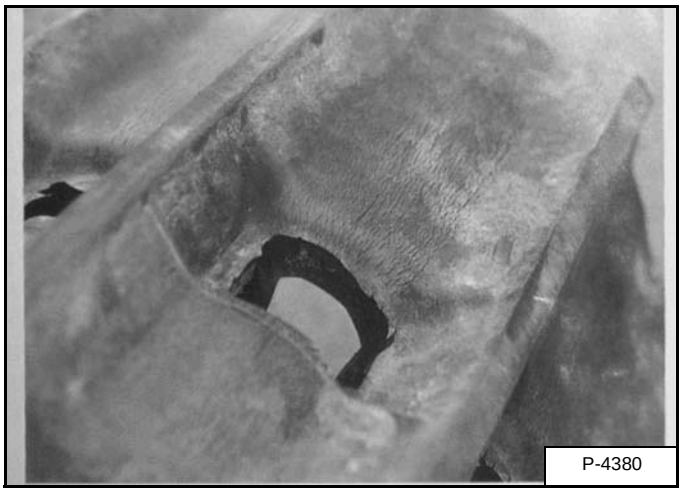


Figure 40-30-17



Damage:

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

Replacement:

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

Causes of the damage:

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

Prevention:

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

Avoid exposing stored tracks to direct sun light.

Avoid exposing stored tracks to direct rain and snow fall.

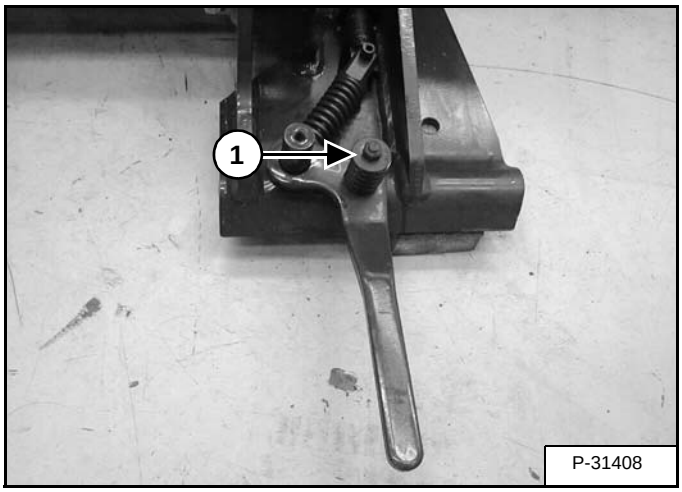
Store tracks in well ventilated warehouses.

Use the tracks at least once a month.

BOB-TACH (HAND LEVER) (CONT'D)

Lever And Wedge Disassembly And Assembly

Figure 50-40-9

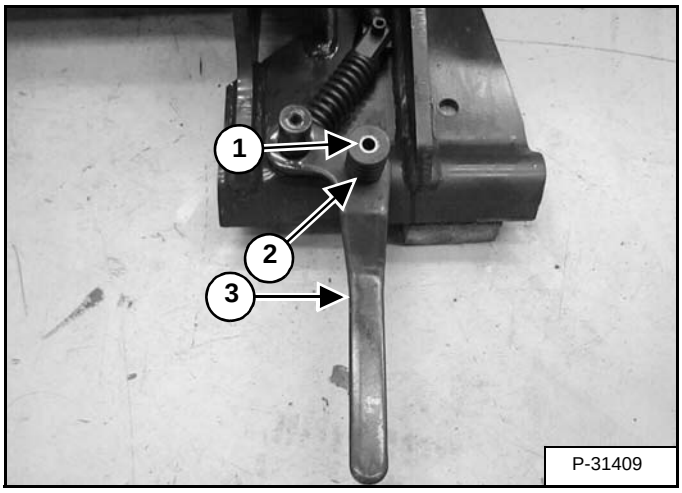


Tilt the Bob-Tach forward, so it is parallel to the floor. Put blocks (approximately 3 inches) under each side of the Bob-Tach **[Figure 50-40-9]**.

Remove the nut (Item 1) **[Figure 50-40-9]** from the Bob-Tach lever pivot bolt.

NOTE: Removal procedure is shown for the left side. Right side procedure is the same.

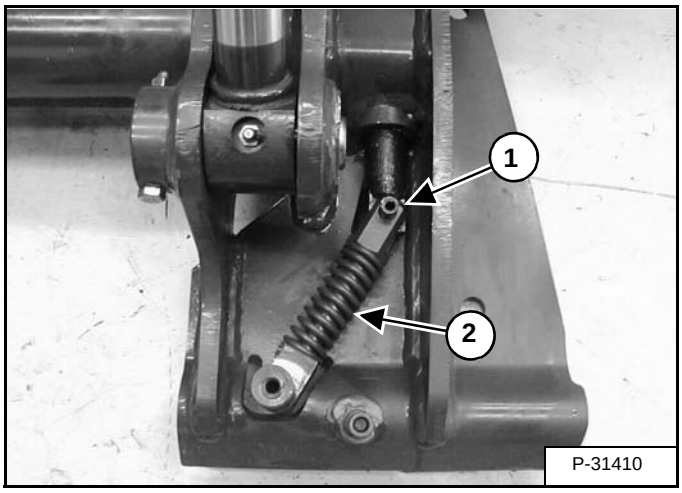
Figure 50-40-10



Remove the lever mounting washer (Item 1), spring (Item 2) and lever (Item 3) **[Figure 50-40-10]**.

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

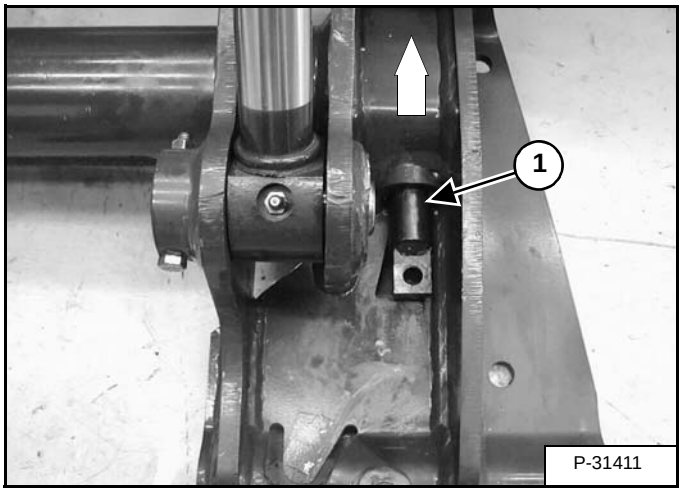
Figure 50-40-11



Use a punch and hammer, remove the roll pin (Item 1) **[Figure 50-40-11]** from the Bob-Tach wedge and spring clevis.

Remove the spring / clevis (Item 2) **[Figure 50-40-11]** assembly.

Figure 50-40-12



Remove the wedge (Item 1) **[Figure 50-40-12]** out of the bottom of the Bob-Tach.

Always replace bent or broken wedges.

CONTROL PEDALS (ACS)

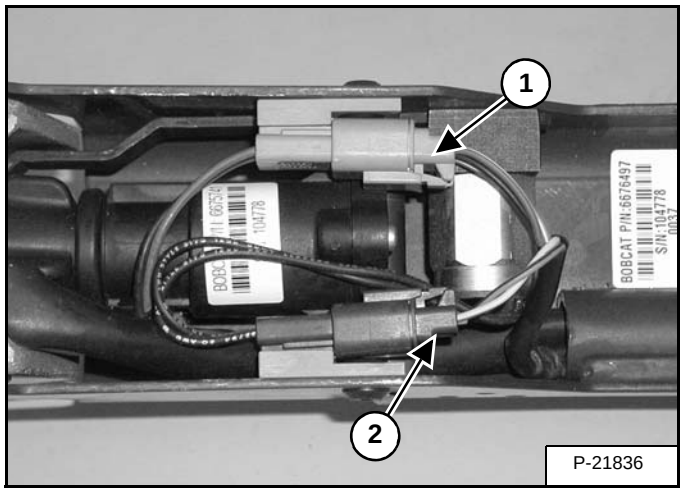
Description

The control pedals send an electronic pulse to the actuators on the control valve. The electronic pulse tells the actuators to move the lift or tilt spools on the control valve.

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

Handle Sensor Removal And Installation (Cont'd)

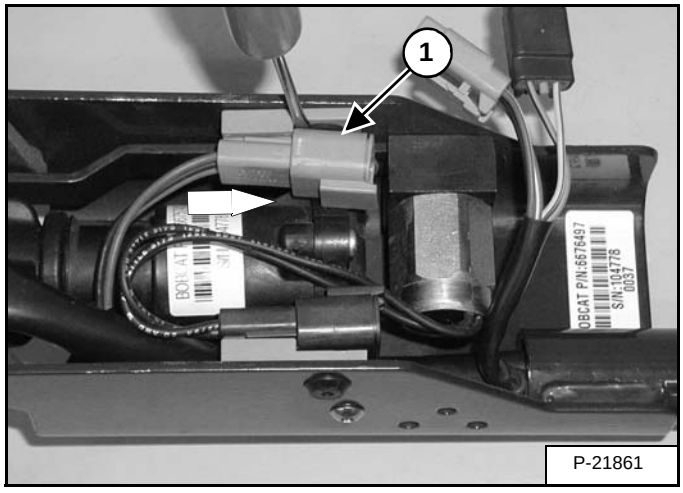
Figure 50-111-4



Disconnect the harness connector (Item 1) from the handle sensor connector.**[Figure 50-111-4]**.

Disconnect the harness connector (Item 2) **[Figure 50-111-4]** from the handle lock solenoid connector.

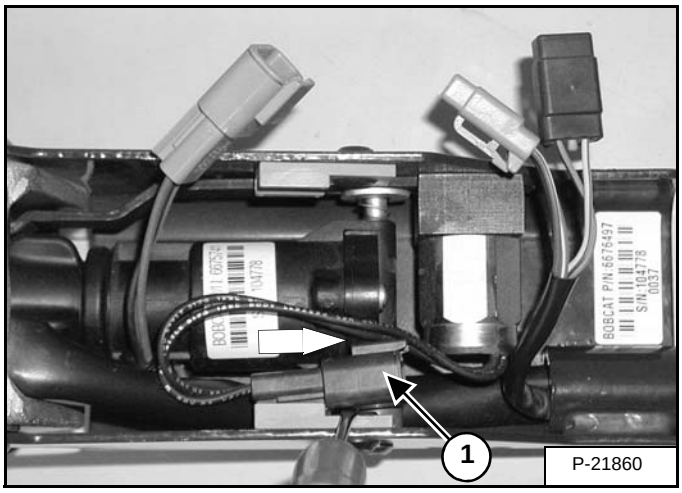
Figure 50-111-5



Remove the handle sensor connector (Item 1) **[Figure 50-111-5]** from the clip.

NOTE: Pry out with a small screwdriver and push the connector down.

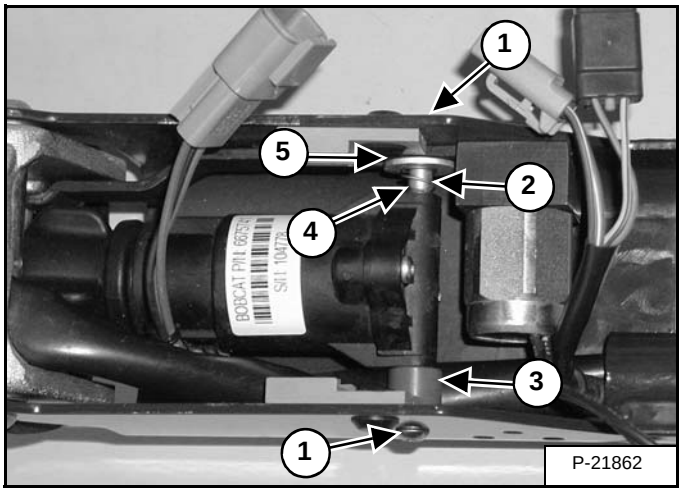
Figure 50-111-6



Remove the handle lock solenoid connector (Item 1) **[Figure 50-111-6]** from the clip.

NOTE: Pry out with a small screwdriver and push the connector down.

Figure 50-111-7



Remove one of the two mounting screws (Item 1) from the handle sensor.

Installation: Tighten screws to 32 - 38 in.-lb. (3,6 - 4,3 N•m) torque.

While removing the mounting pin (Item 2) from the handle sensor, remove the one plastic spacer (Item 3), the spring (Item 4) and washer (Item 5) **[Figure 50-111-7]**.

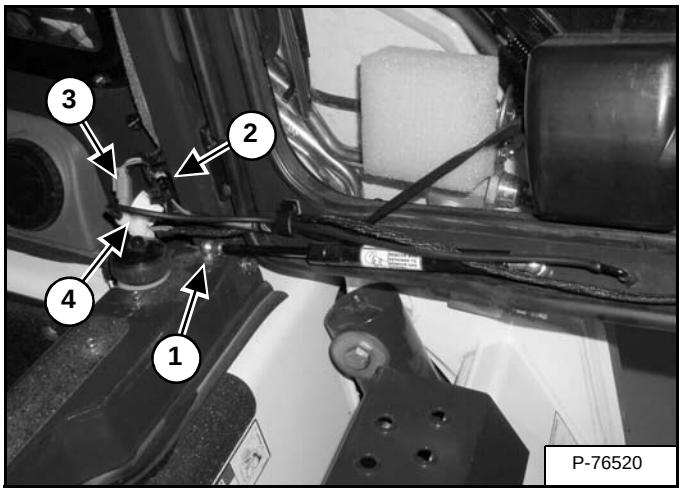
CAB DOOR

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



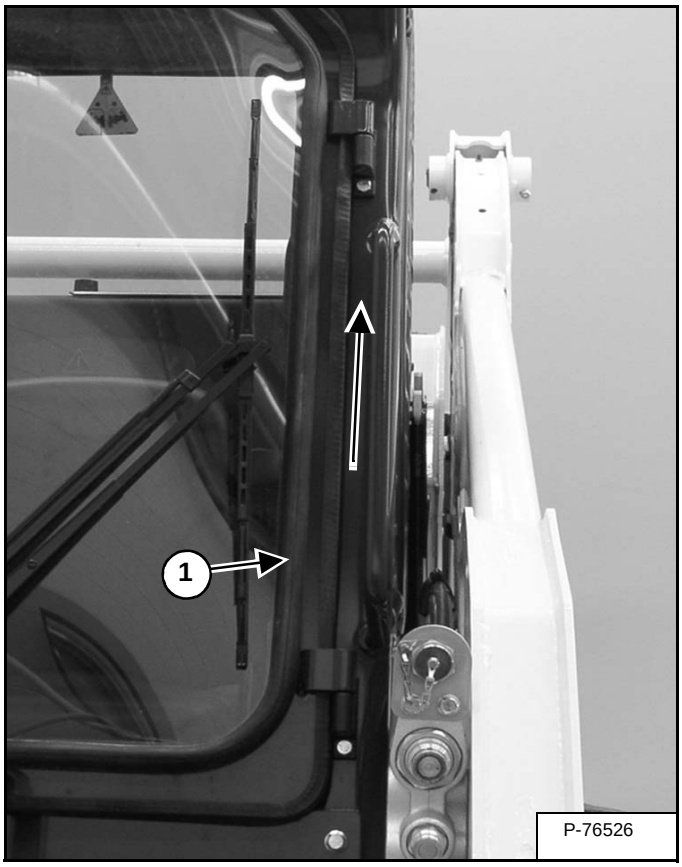
Open the cab door.

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.


Bobcat®

Connector Identification (Cont'd)

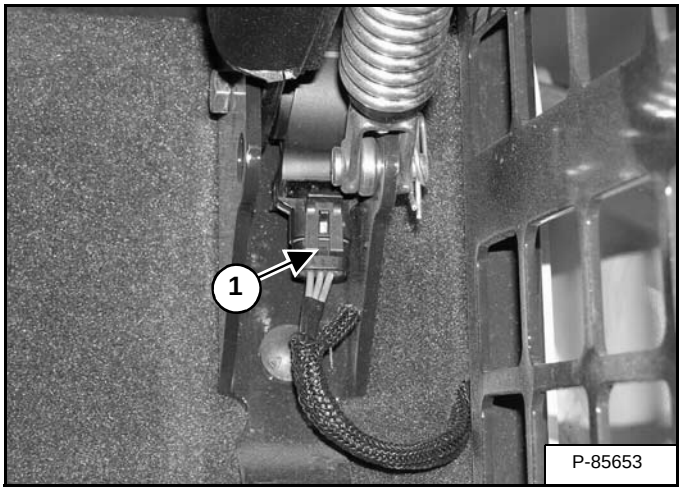
J2B

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

SEAT BAR SENSOR (CONT'D)

Bobcat Interlock Control System (BICS™) Circuit Test

Figure 60-110-13

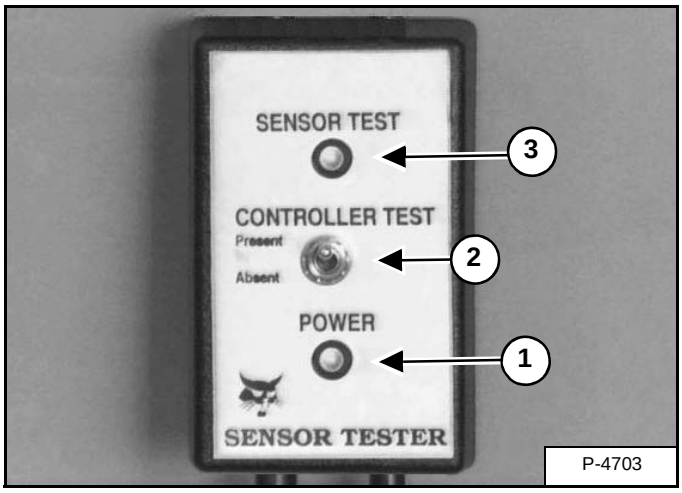


Use Sensor Tester (MEL1428) and seat bar sensor adapter (MEL1567) for the following procedure:

Connect the seat bar sensor adapter leads (MEL1567) to the sensor tester.

Disconnect the seat bar sensor connector (Item 1) **[Figure 60-110-13]**.

Figure 60-110-14



Connect Sensor Tester (Item 1) **[Figure 60-110-14]** inline to the seat bar sensor connectors.

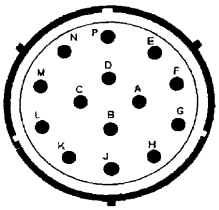
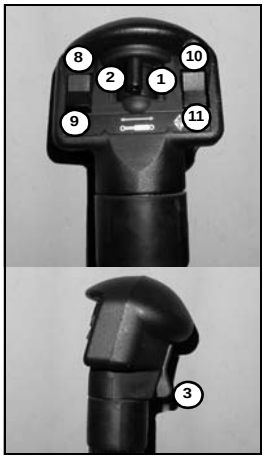
Turn the key to the ON position. **DO NOT START THE ENGINE**.

If the above test fails, there is a problem with the seat bar sensor or with the sensor harness.

When the power light is illuminated, move the toggle switch (Item 2) **[Figure 60-110-14]** on the sensor tester to the ***Present*** position.

NOTE: The sensor test light (Item 3) [Figure 60-110-14] is only activated by the seat bar. It will be off with the seat bar up or on with the seat bar down.

Identification Chart ACD Group 2

Left side Control Handle Switches	Switch Number	Solenoid Number Activated				Attachment Harness Terminal Activated	Attachment Harness Connector	RIght Side Control Handle Switches
		STD	RH	HFH	RH / HFH			
 P-90898 P-90900	1	1	1	1, 7	1,7	K	Fourteen Pin Connector Viewed from front (pin side of connector) of loader.  Jumpers K,P	 P-90899 P-90900A
	2	2	2	2	2	K		
	3	1	1	1, 7	1,7	K		
	4	2	2	2	2	K,A		
	5	1	1	1,7	1,7	K,A		
	6	-	-	-	-	K,E		
	7	-	-	-	-	K,F		
	8	-	-	-	-	K,G		
	9	-	-	-	-	K,H		
	10, 11, 12, 13, 14	-	--	--		K		

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

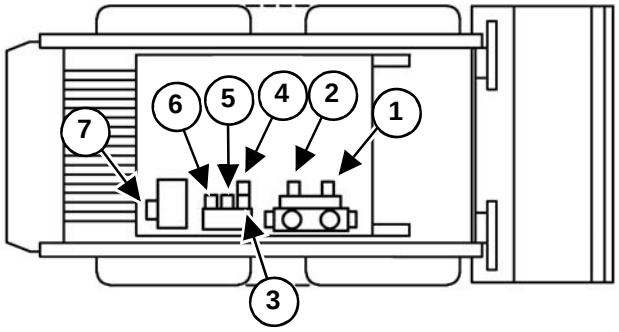
NOTE: For diagnostics and troubleshooting connect the Service PC (See SERVICE PC (LAPTOP COMPUTER) on Page 60-150-1.)

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

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

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

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



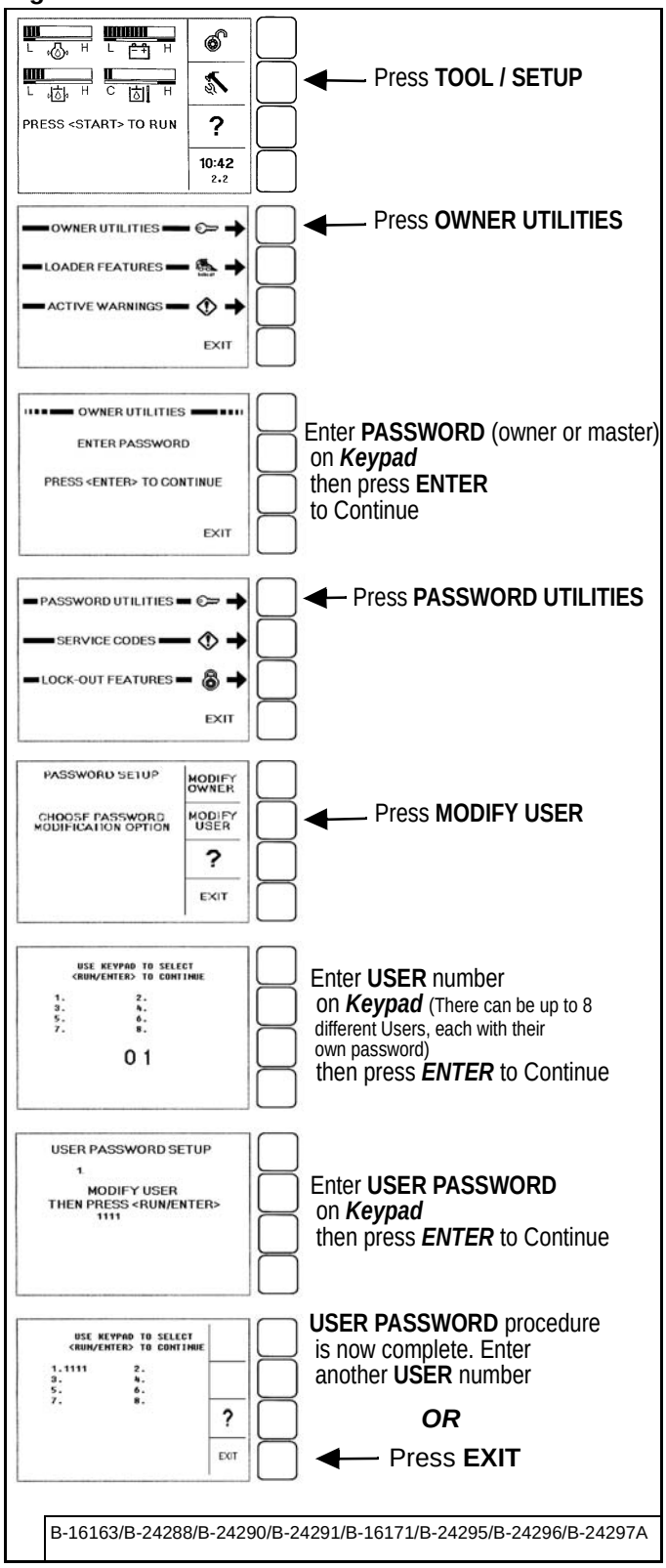
NA1891

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

PASSWORD SETUP (DELUXE INSTRUMENTATION PANEL) (CONT'D)

Changing The User Passwords

Figure 60-190-2

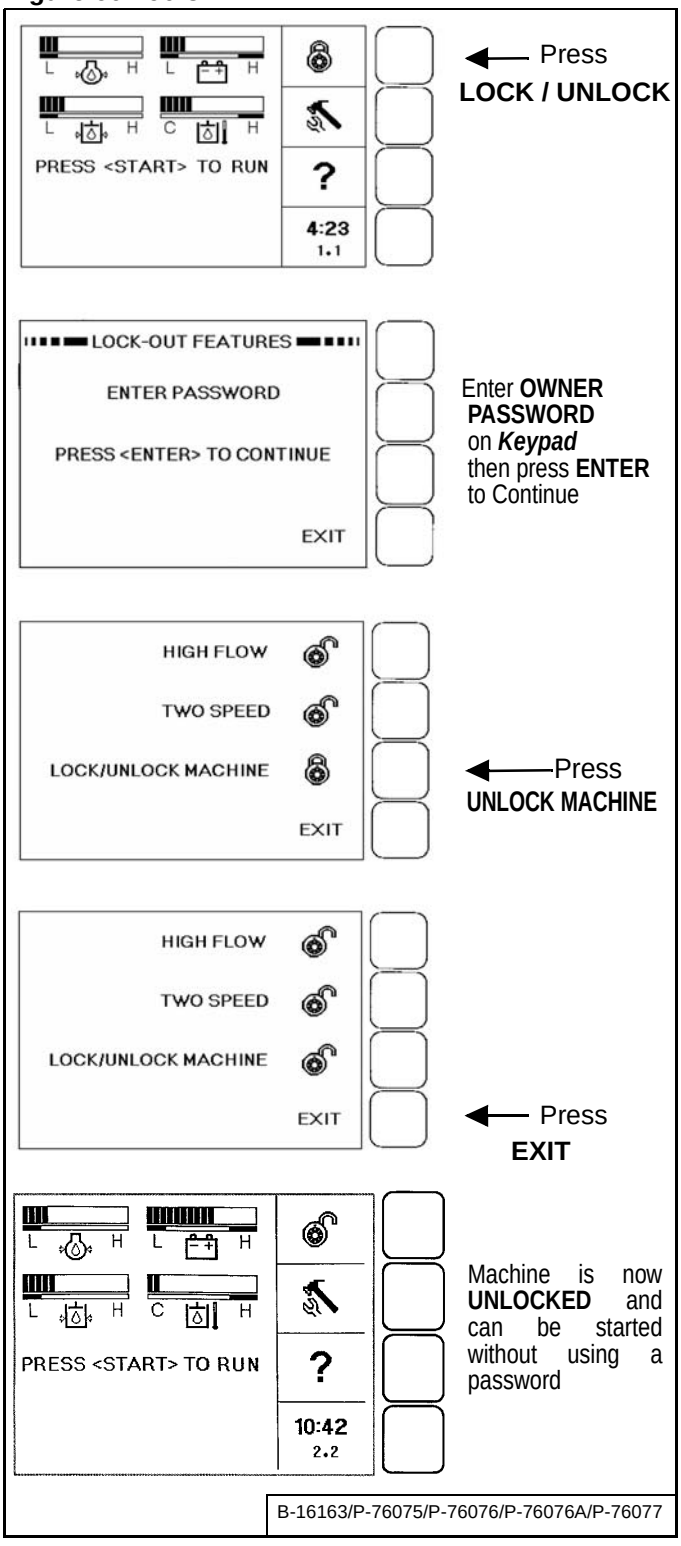


B-16163/B-24288/B-24290/B-24291/B-16171/B-24295/B-24296/B-24297A

Password Lockout Feature

This feature allows the owner to unlock the password feature so that a password does not need to be used every time the engine is started.

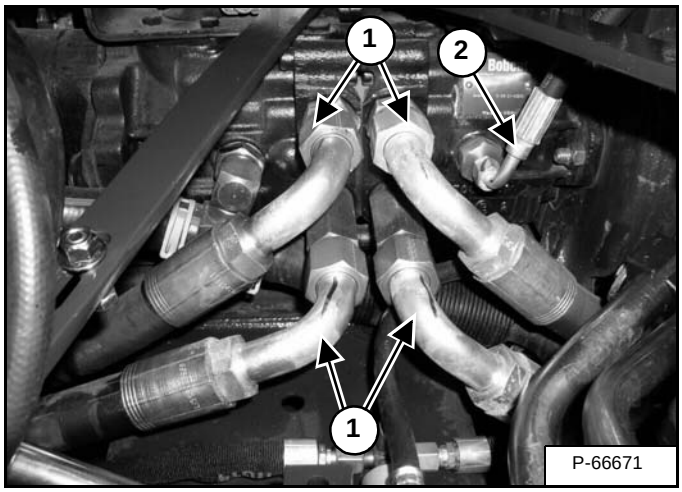
Figure 60-190-3



B-16163/P-76075/P-76076/P-76076A/P-76077

Engine Removal And Installation (Cont'd)

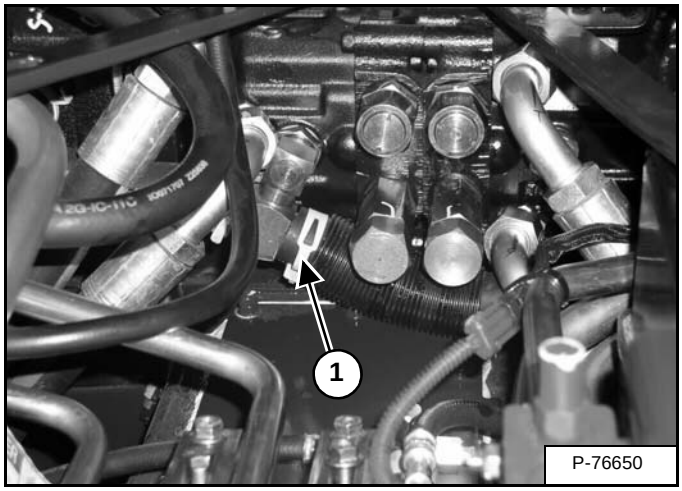
Figure 70-10-2



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

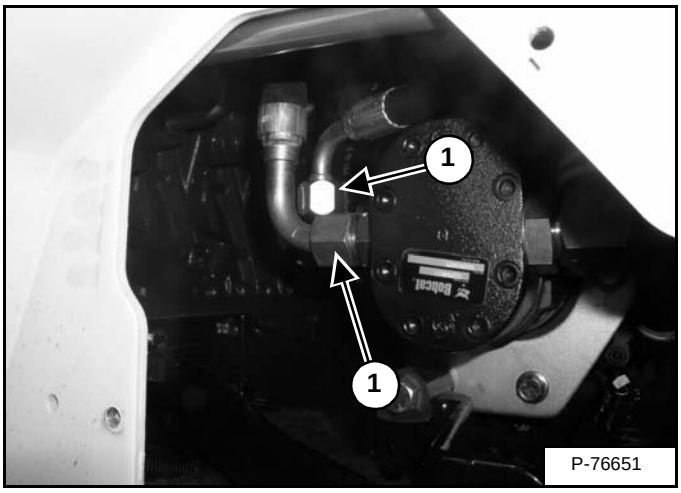
Disconnect and cap the cooling fan case drain hose (Item 2) **[Figure 70-10-2]** from the hydrostatic pump.

Figure 70-10-3



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

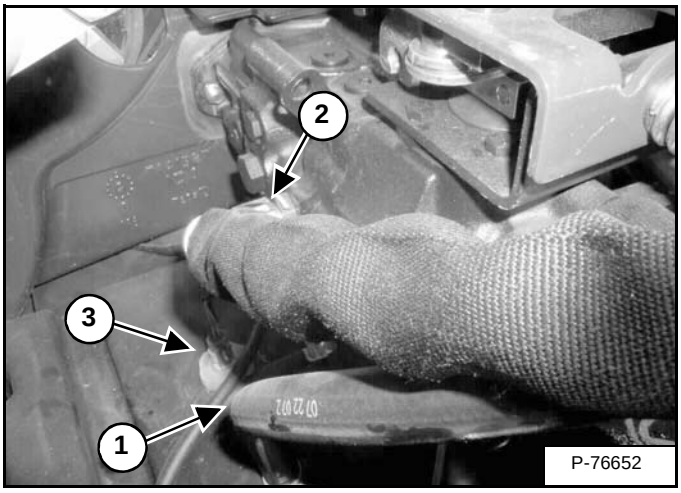
Figure 70-10-4



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

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

Figure 70-10-5



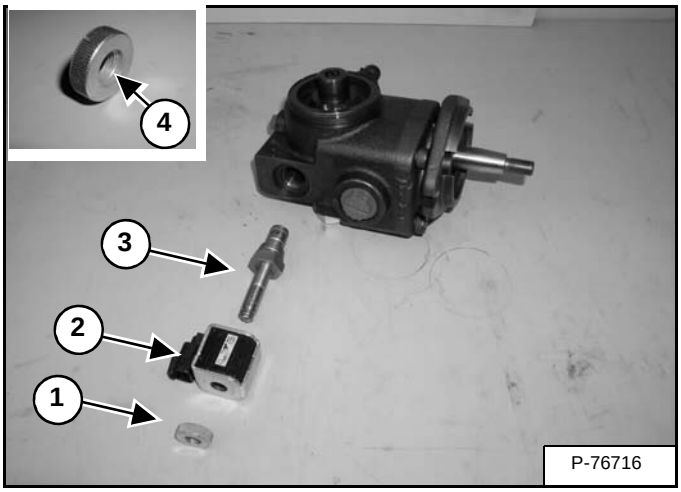
Disconnect and cap the fuel tank vent hose (Item 1) **[Figure 70-10-5]**.

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

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

Hydraulic Fan Motor Disassembly And Assembly (Cont'd)

Figure 70-50-31



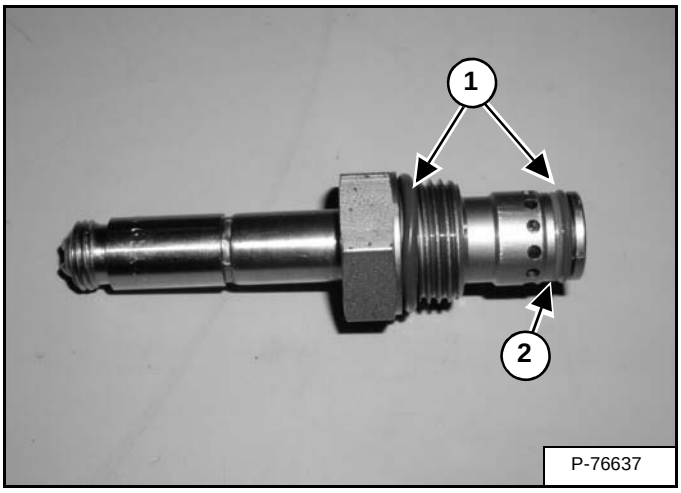
Remove coil mounting nut (Item 1), the coil (Item 2), and the coil valve stem (Item 3) **[Figure 70-50-31]**.

NOTE: Coil mounting nut must be replaced each time it is removed. Coil mounting nuts are available from Bobcat Parts.

Installation: Install coil mounting nut with the counterbored space (Item 4) **[Figure 70-50-31]** facing towards the coil and tighten securely by hand.

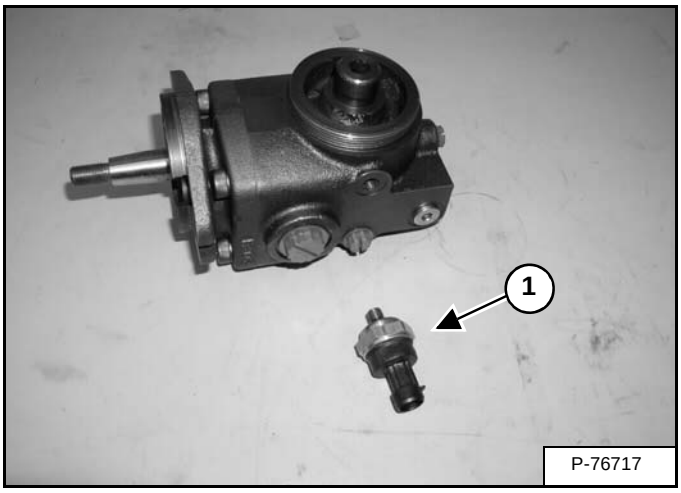
Installation: Tighten coil valve stem (Item 3) **[Figure 70-50-31]** to 21 - 25 ft.-lb. (28 - 34 N•m) torque.

Figure 70-50-32



Inspect and replace O-rings (Item 1) and back up washer (Item 2) **[Figure 70-50-32]** if necessary.

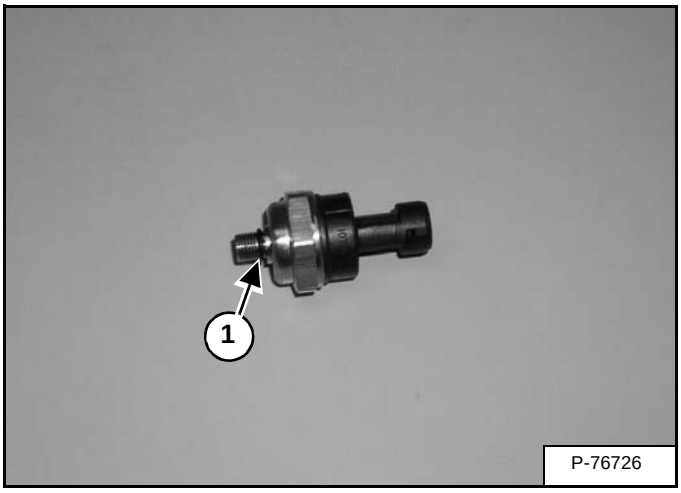
Figure 70-50-33



Remove the pressure transducer (Item 1) **[Figure 70-50-33]**.

Installation: Tighten the pressure transducer (Item 1) **[Figure 70-50-33]** to 7.4 - 8.1 ft.-lb. (10 - 10,9 N•m) torque.

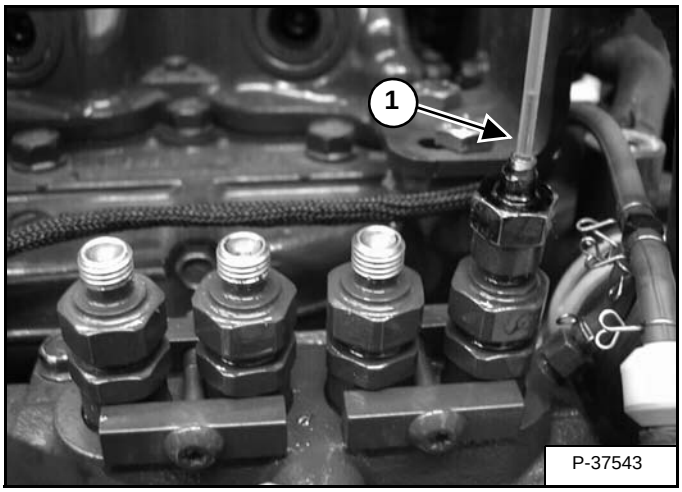
Figure 70-50-34



Inspect and replace the O-ring (Item 1) **[Figure 70-50-34]** if necessary.

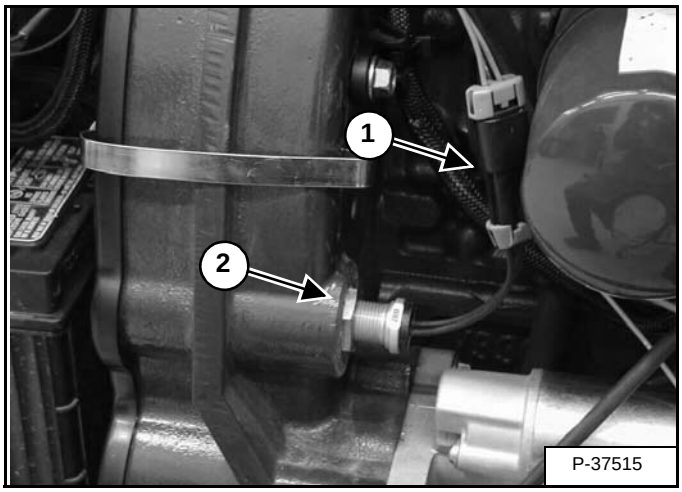
Fuel Injection Pump - Timing (Cont'd)

Figure 70-70-69



Install a short plastic tube (Item 1) **[Figure 70-70-69]** in the number one cylinder port of the injection pump. The tube should fit securely and point upward.

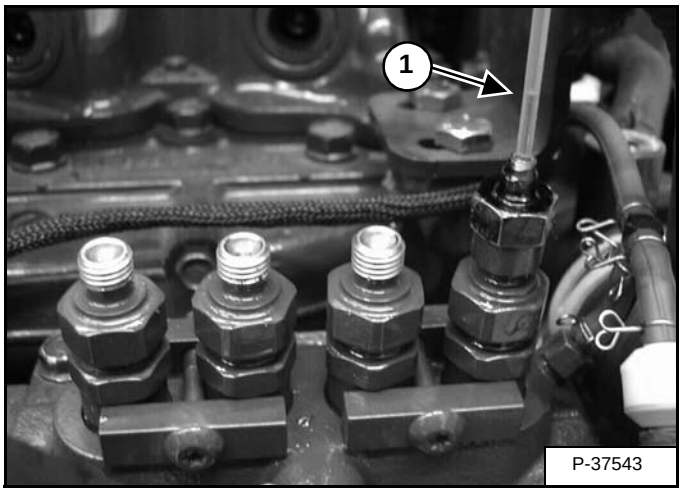
Figure 70-70-70



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

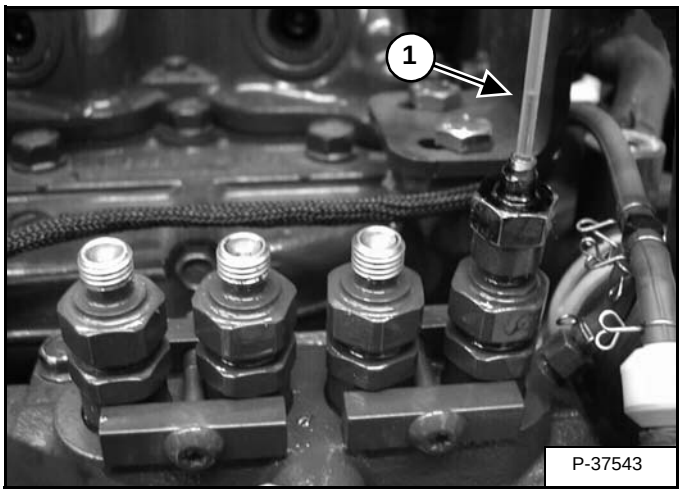
Remove the speed sensor (Item 2) **[Figure 70-70-70]** from the engine.

Figure 70-70-71



Turn the engine counterclockwise (viewed from flywheel end) until the fuel partially fills the plastic tube (Item 1) **[Figure 70-70-71]**.

Figure 70-70-72

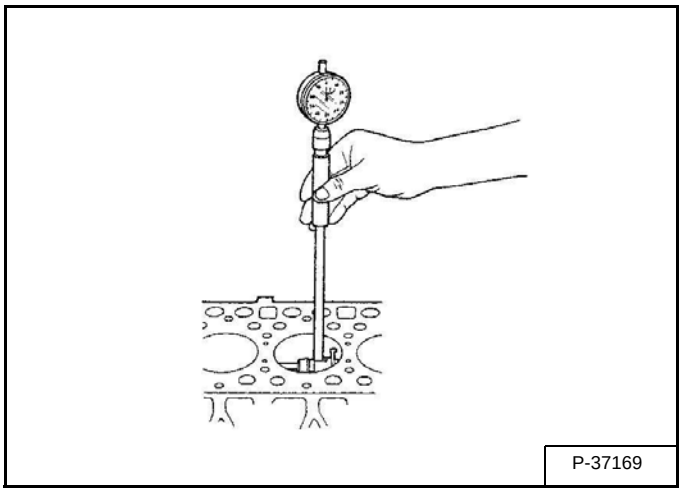


After there is fuel rise seen in the plastic tube, rotate the engine back (clockwise) at least 90 degrees.

Slowly rotate the engine counterclockwise (viewed from flywheel end) and stop turning when the fuel begins to rise in the plastic tube (Item 1) **[Figure 70-70-72]**.

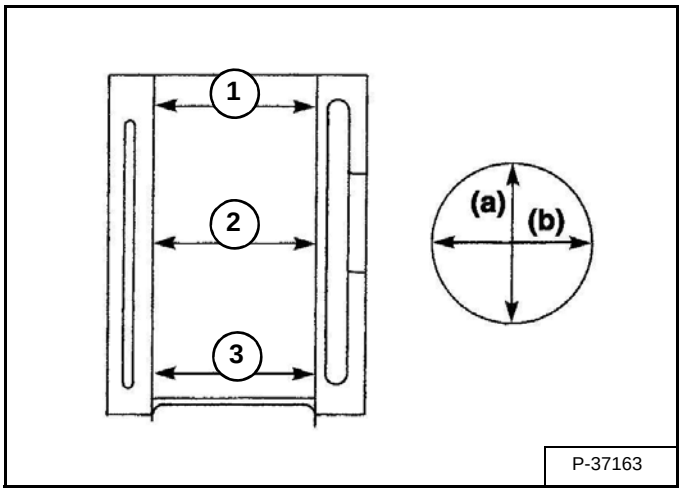
Cylinder Bore - Checking

Figure 70-90-17



Using a gauge to check the inside measurement of the cylinder bore **[Figure 70-90-17]**.

Figure 70-90-18

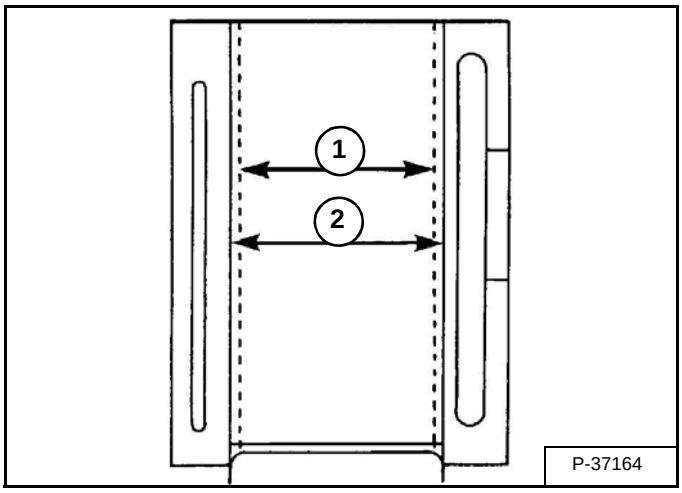


Measure the six points with a cylinder gauge to find out the maximum wear **[Figure 70-90-17]**.

NOTE: Generally, position (1) in the (a, b) direction (at about 0.79 in. (20 mm) from the top) shows the maximum wear [Figure 70-90-18]. Since position (3) at the lower part of the bore will show the minimum wear

Cylinder bore I.D.	Factory spec.	3.9370 - 3.9379 in. (100,000 - 100,022 mm)
	Allowable limit	3.9626 in. (100,15 mm)

Figure 70-90-19



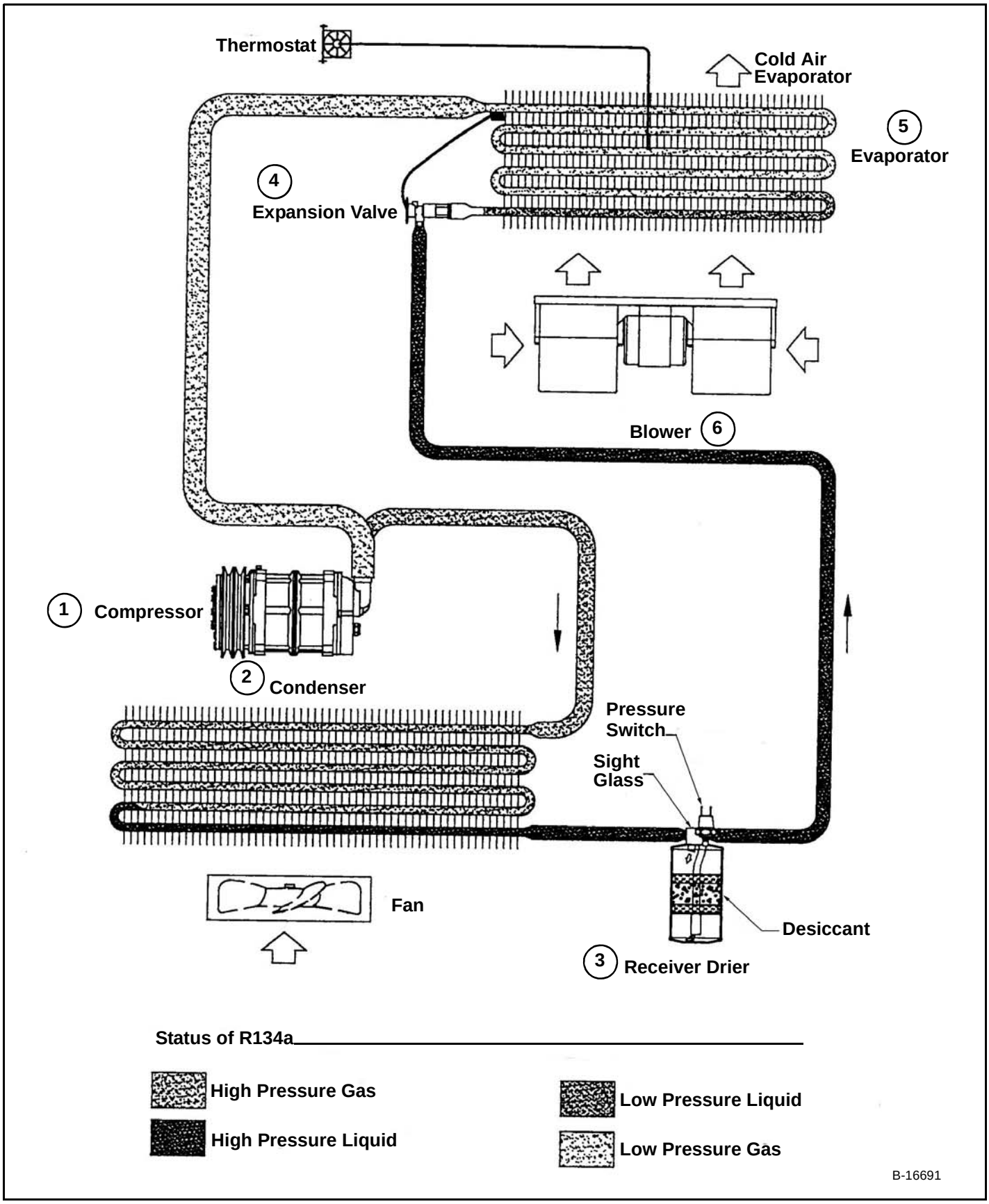
When the cylinder is worn beyond the allowable limit (Item 1), bore and hone it to the specified dimension (Item 2) **[Figure 70-90-19]**.

Cylinder I.D. (Item 2)	Oversize (+ 0.5 mm) Spec.	3.9567 - 3.9576 in. (100,500 - 100,522 mm)
Maximum wear	Allowable limit	3.9626 in. (100,65 mm)
Finishing	Hone to 0.000047 - 0.0079 in.R max. (1.2 - 2.0 µR max.)	

Replace the piston and piston rings with oversize (0.5 mm) ones.

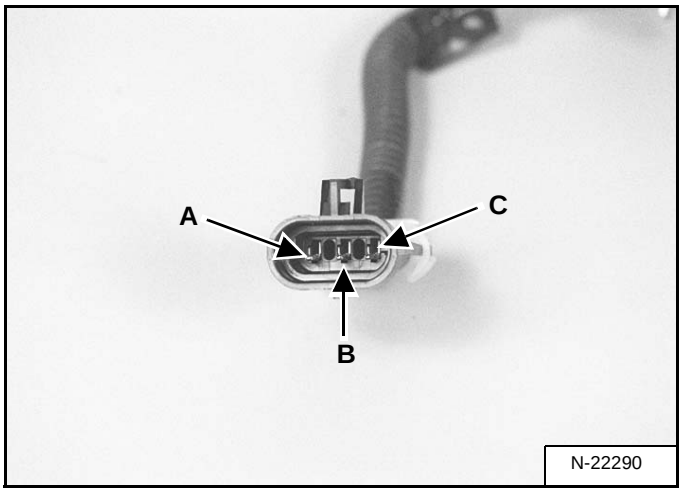
NOTE: When the oversize cylinder is worn beyond the allowable limit, replace the cylinder block with a new one.

Chart


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

Electrical System (Cont'd)

Figure 80-30-25

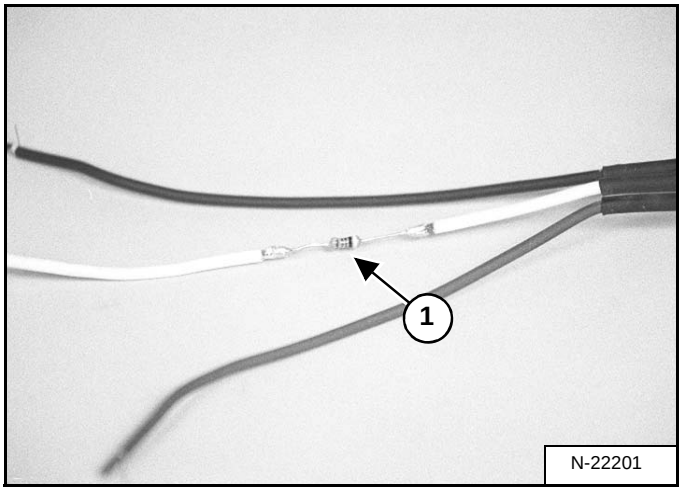


If there is voltage at the wiring harness, check the potentiometer **[Figure 80-30-25]** for resistance.

The resistance should be 10K ohm between wire pin **A** and wire pin **C** frame **[Figure 80-30-25]**.

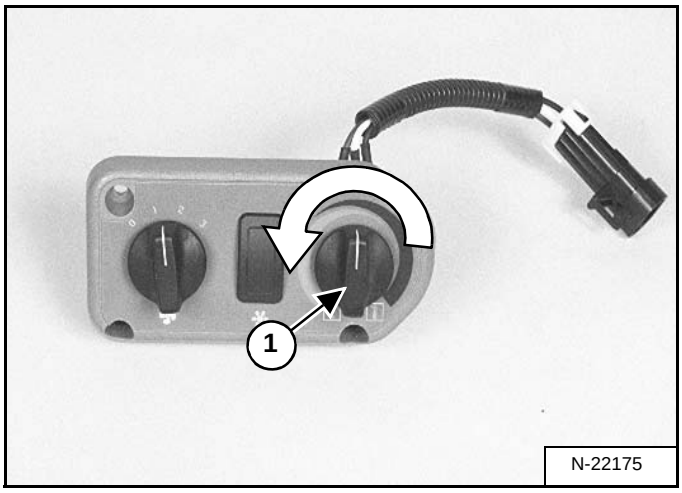
If no resistance is found replace the potentiometer.

Figure 80-30-26



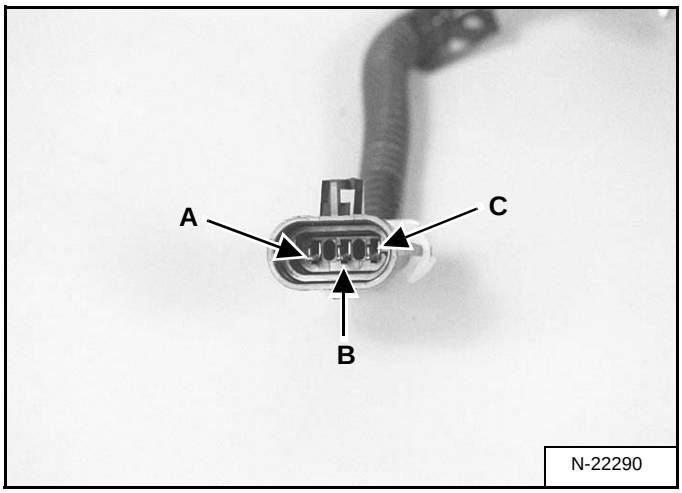
The white wire **B**, (Item 1) **[Figure 80-30-26]**, on the potentiometer, is a resister wire.

Figure 80-30-27



To check the resistance of the white wire, turn the potentiometer control (Item 1) **[Figure 80-30-27]** to the full A/C position.

Figure 80-30-28



The resistance between the wire terminal **A** and wire terminal **B** frame **[Figure 80-30-28]** should be around 49K ohm.

Check the resistance between the wire terminal **C** and wire terminal **B** frame **[Figure 80-30-28]** should be around 39K ohm.

EVAPORATOR COIL

Removal And Installation

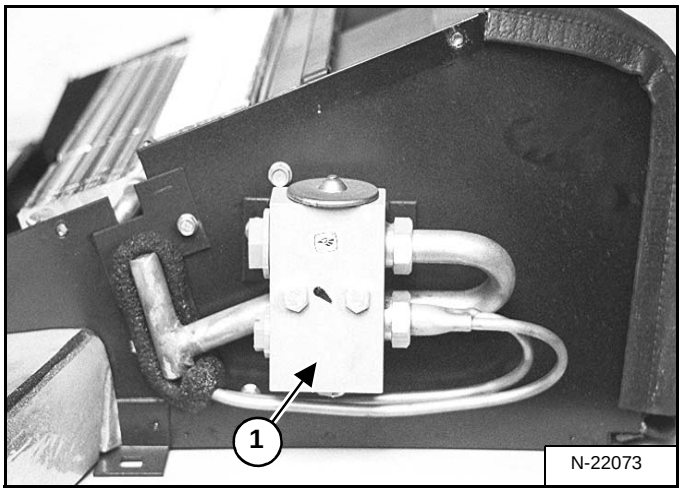
Raise the lift arms and install an approved lift arm support device. (See Installing on Page 10-20-1.)

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

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

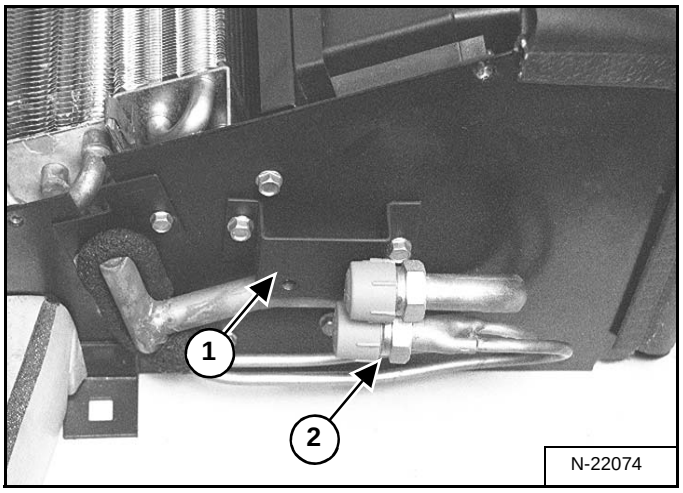
Remove the evaporator/heater unit from the back of the cab. (See Removal And Installation on Page 80-80-1.)

Figure 80-110-1



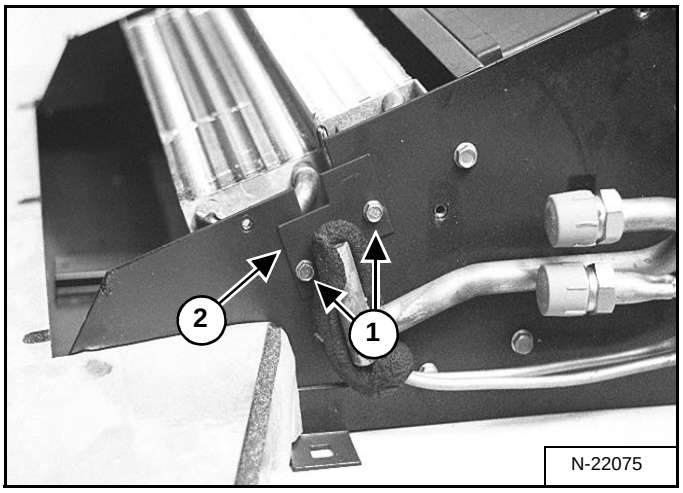
Remove the expansion valve (Item 1) **[Figure 80-110-1]** from the unit. (See Removal And Installation on Page 80-100-1.)

Figure 80-110-2



Remove the expansion valve mount bracket (Item 1) from the unit. Check the condition of the o-rings (Item 2) **[Figure 80-110-2]** during removal and installation.

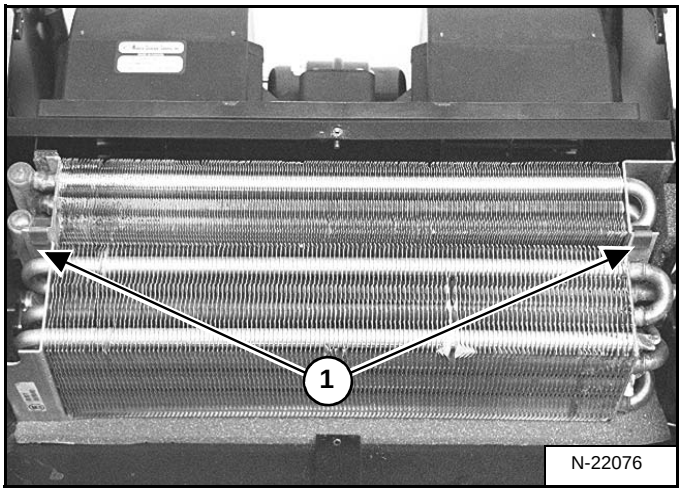
Figure 80-110-3



Remove the two mount bolts (Item 1) from the mount plate (Item 2) **[Figure 80-110-3]**.

Remove the mount plate from the unit.

Figure 80-110-4



Remove the two retaining clips (Item 1) **[Figure 80-110-4]** that connect the evaporator coil, to the heater coil.

Remove the evaporator coil from the unit.


Bobcat®

CONTENTS


Bobcat®

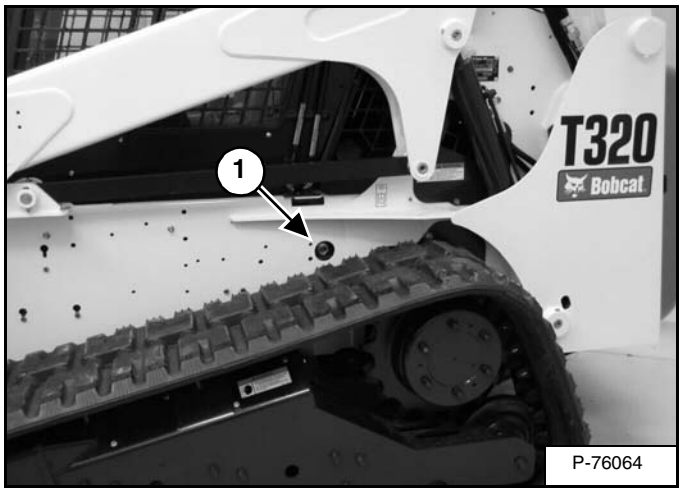
HYDRAULIC / HYDROSTATIC SYSTEM

Checking And Adding Fluid

Put the loader on a level surface, lower the lift arms and tilt the Bob-Tach fully back.

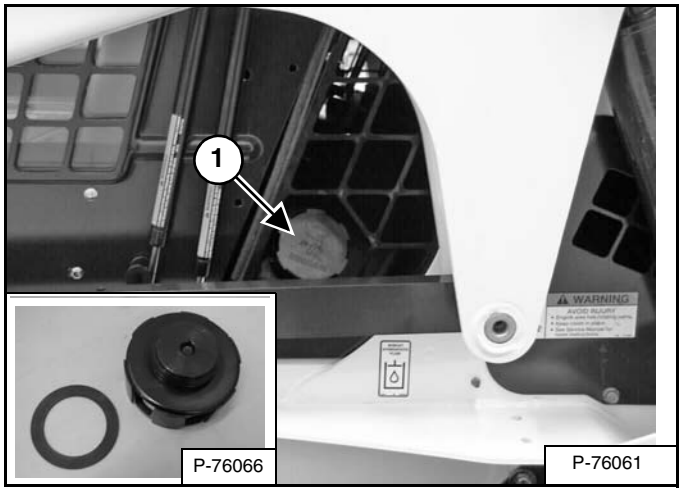
Stop the engine.

Figure 10-120-1



Check the fluid level in sight gauge (Item 1) **[Figure 10-120-1]**.

Figure 10-120-2



Remove the fill cap (Item 1) **[Figure 10-120-2]**.

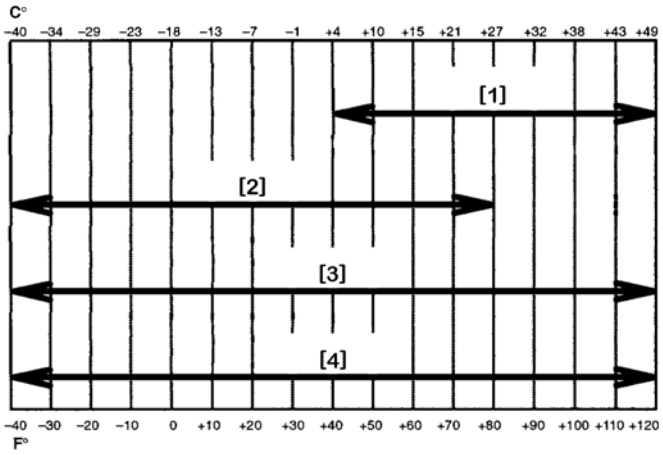
Add fluid **[Figure 10-120-3]** as needed to bring the level to the center of the sight gauge.

NOTE: Before installing the fill cap, make sure the rubber gasket is installed on fill cap (Inset) [Figure 10-120-2].

Hydraulic / Hydrostatic Fluid Chart

Figure 10-120-3

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



TEMPERATURE RANGE ANTICIPATED DURING MACHINE USE

[1]VG 100; Minimum VI 120
[2]VG 46; Minimum VI 140
[3]Synthetic Fluid; VG 46; Minimum VI 150
[4]BOBCAT Hydraulic / Hydrostatic Fluid

Use only recommended fluid in the hydraulic system **[Figure 10-120-3]**. (See Hydraulic System on Page SPEC-10-5.)

⚠ WARNING

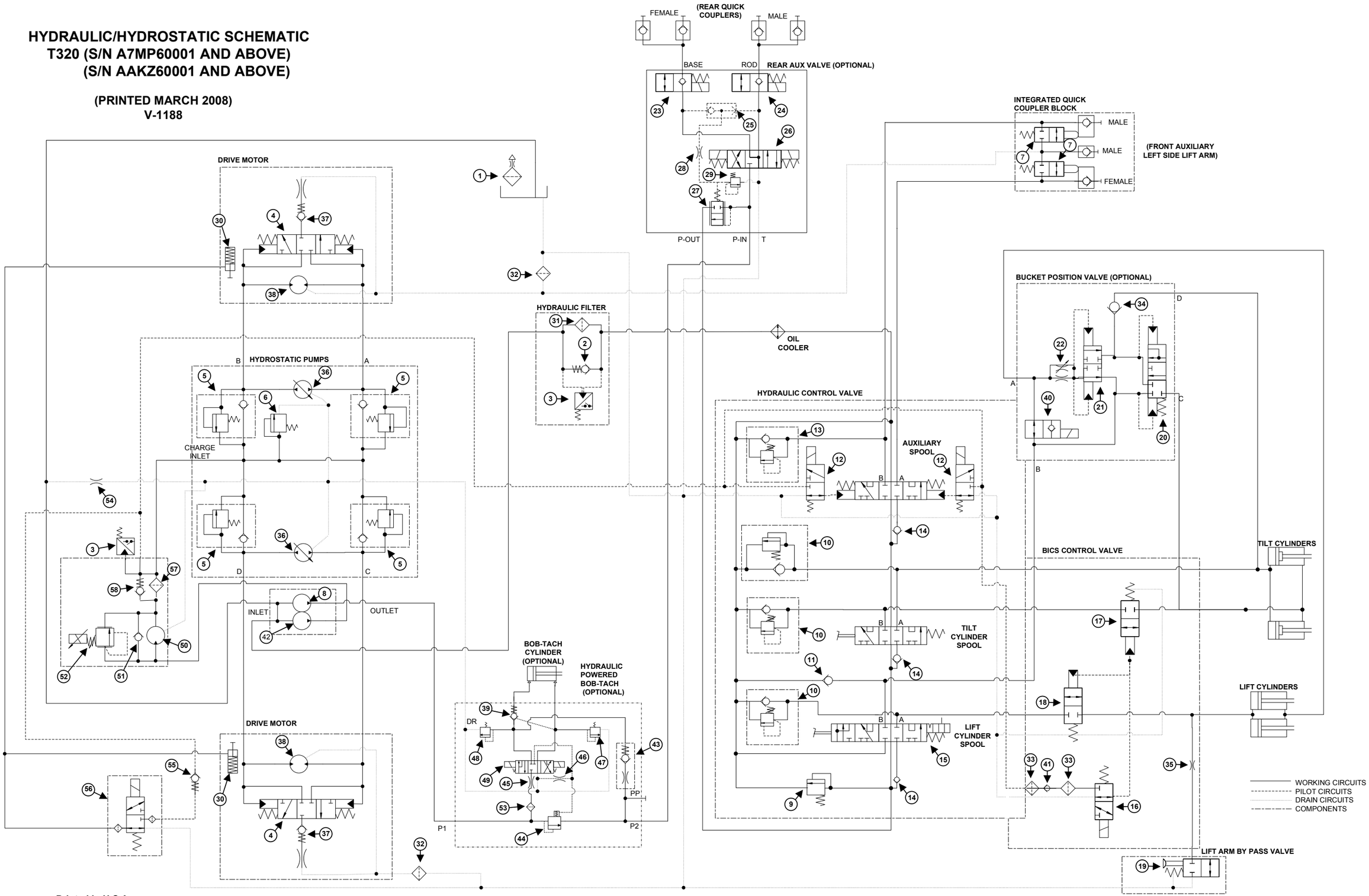
AVOID INJURY OR DEATH

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

HYDRAULIC/HYDROSTATIC SCHEMATIC
T320 (S/N A7MP60001 AND ABOVE)
(S/N AAKZ60001 AND ABOVE)

(PRINTED MARCH 2008)
V-1188

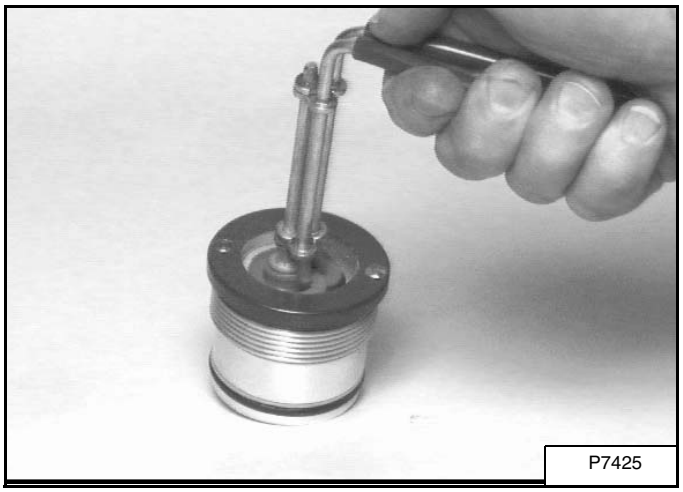


Printed in U.S.A.

V-1188 (2-28-08)

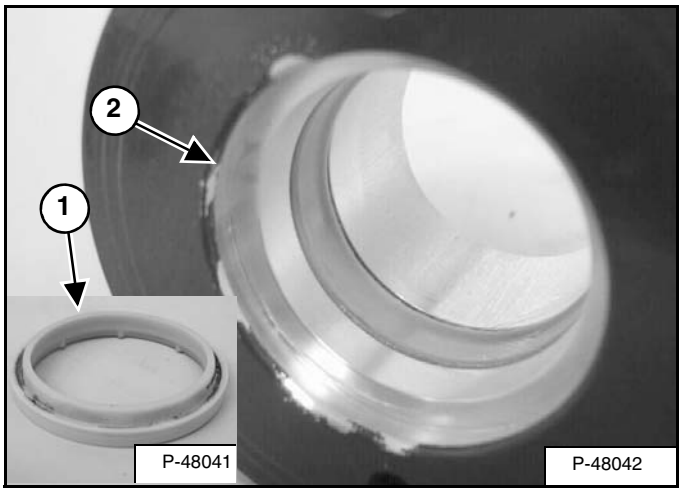
Assembly (Cont'd)

Figure 20-21-21



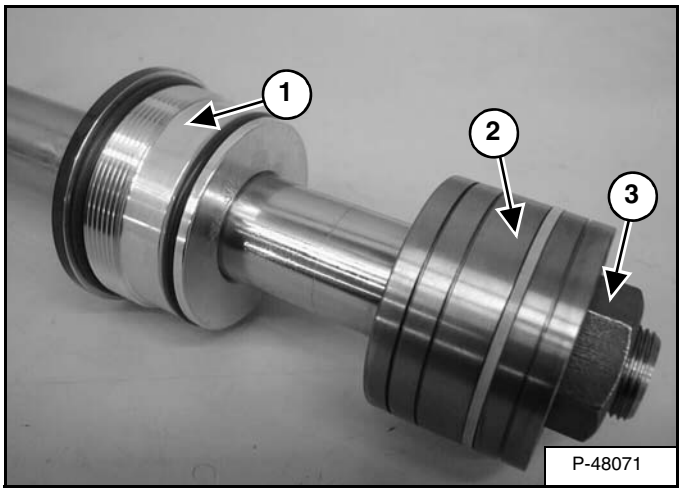
Install the rod seal in the head **[Figure 20-21-21]**.

Figure 20-21-22



Install the wiper seal, with the wiper side of the seal (Item 1) toward the outside of the head (Item 2) **[Figure 20-21-22]**.

Figure 20-21-23

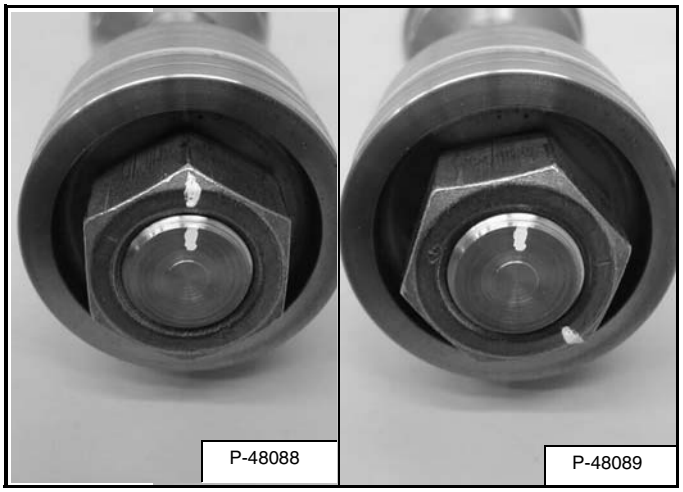


NOTE: Clean and dry the threads before installing the nut. Install the new nut from the kit.

Install the head (Item 1), piston (Item 2) and nut (Item 3) **[Figure 20-21-23]**.

Tighten the nut (Item 3) **[Figure 20-21-23]** to 100 ft.-lb. (136 N•m) torque.

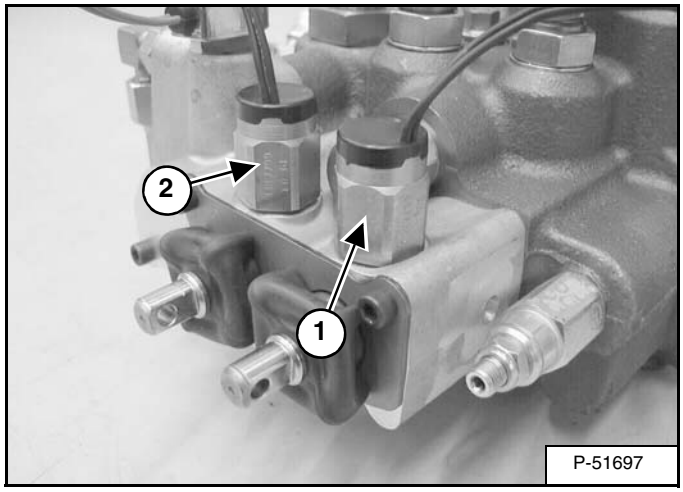
Figure 20-21-24



Mark the end of the shaft and nut **[Figure 20-21-24]**. Tighten the nut an additional 135 degrees or 2-1/4 flats **[Figure 20-21-24]**.

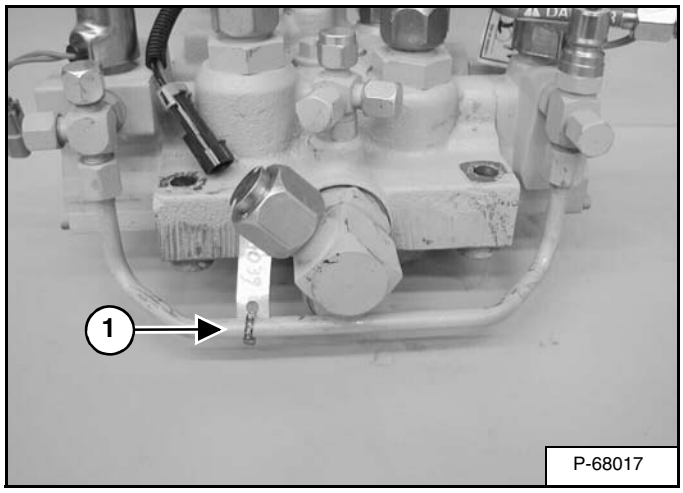
End Cap Block Removal And Installation

Figure 20-40-41



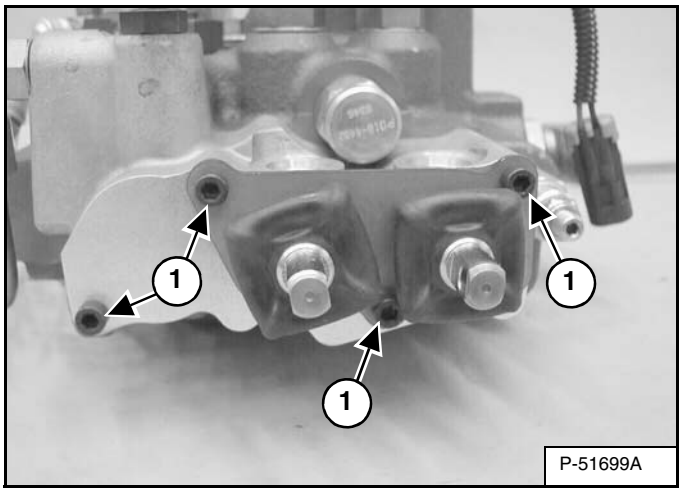
Remove the lift spool lock solenoid (Item 1) and the tilt spool lock solenoid (Item 2) **[Figure 20-40-41]** from the end cap/spool lock block.

Figure 20-40-42



Disconnect the tube line (Item 1) **[Figure 20-40-42]** from the end cap/spool lock block.

Figure 20-40-43

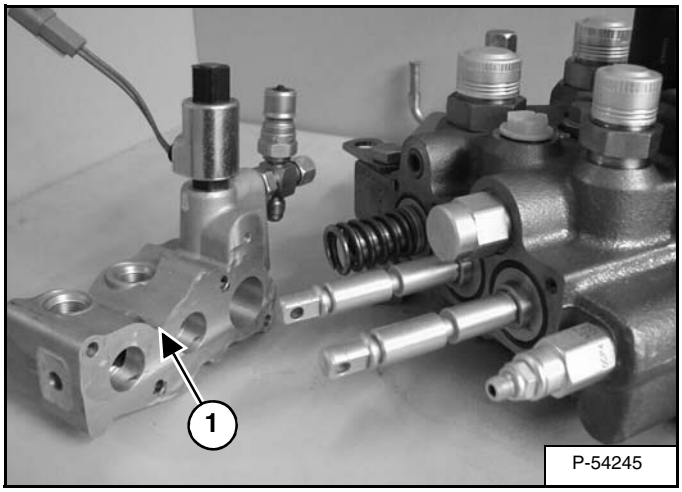


Remove the four end cap/spool lock block mount screws (Item 1) **[Figure 20-40-43]**.

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

Remove the rubber boots and retainer plate from the lift and tilt spools.

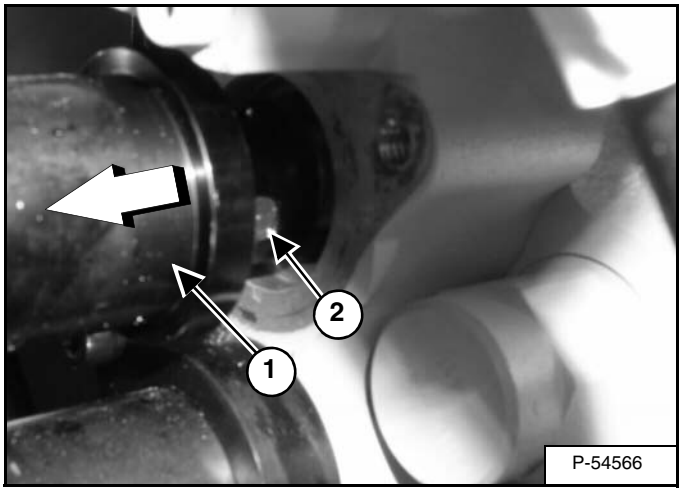
Figure 20-40-44



Remove the end cap/spool lock block (Item 1) **[Figure 20-40-44]** from the control valve.

Actuator Removal And Installation (In Loader) (Cont'd)

Figure 20-41-17



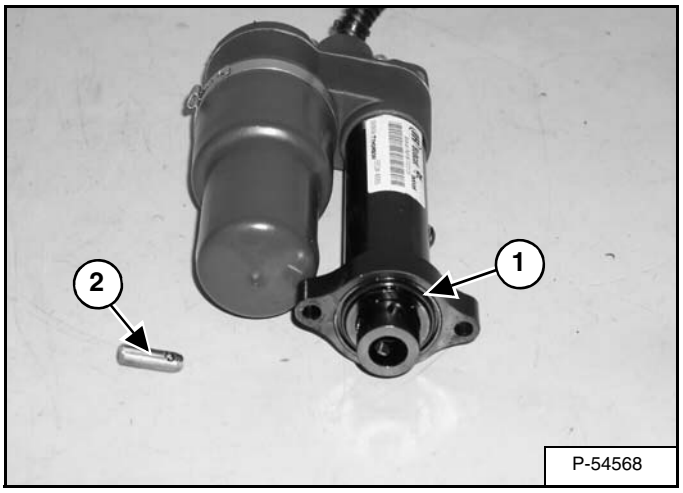
Pull the actuator (Item 1) **[Figure 20-41-17]** away from the control valve.

Use a punch to remove the actuator pin (Item 2) **[Figure 20-41-17]** from the actuator and spool.

Remove the actuator from the hydraulic control valve.

NOTE: The calibration procedure must be followed when replacing a lift or tilt actuator. (See Lift And Tilt Calibration (SJC) on Page 60-160-4.)

Figure 20-41-18



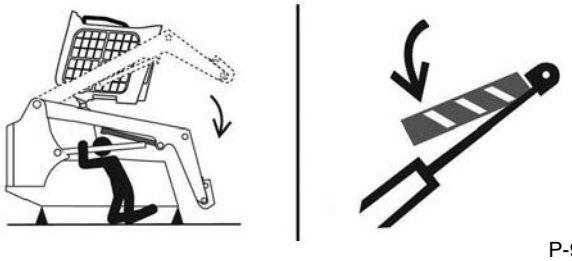
Inspect the O-ring (Item 1) **[Figure 20-41-18]** on the face of the actuator, and replace as needed.

Check the linkage pin (Item 2) **[Figure 20-41-18]** and replace as needed.

LIFT ARM BYPASS CONTROL VALVE (CONT'D)

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

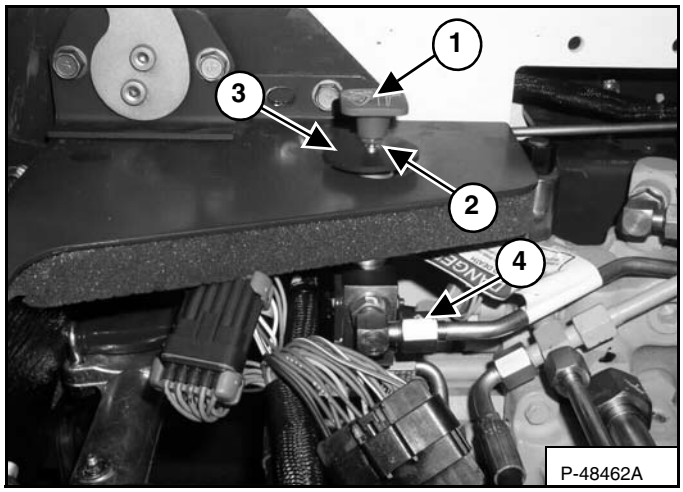
Never work on a machine with the lift arms up unless the lift arms are secured by an approved lift arm support device. Failure to use an approved lift arm support device can allow the lift arms or attachment to fall and cause injury or death.

W-2059-0598

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

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

Figure 20-50-2



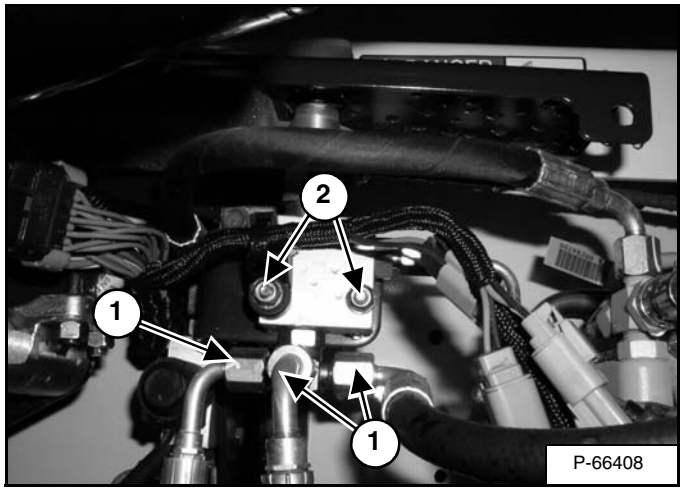
Hold the bypass control knob (Item 1) **[Figure 20-50-2]** and loosen the jam nut on the bypass valve shaft.

Remove the bypass control knob (Item 1). Remove the jam nut (Item 2) from the valve shaft **[Figure 20-50-2]**.

Remove the rubber washer (Item 3) **[Figure 20-50-2]**.

Disconnect the hydraulic hose (Item 4) **[Figure 20-50-2]**. Cap and plug the hose.

Figure 20-50-3



Disconnect the three hydraulic tubelines (Item 1) **[Figure 20-50-3]** and cap and plug the lines.

Remove the two mounting bolts (Item 2) **[Figure 20-50-3]**.

Installation: Tighten the mounting bolts to 180 - 200 in.-lb. (21 - 23 N•m) torque.

Remove the lift arm bypass valve.

High Flow Relief Valve Removal And Installation

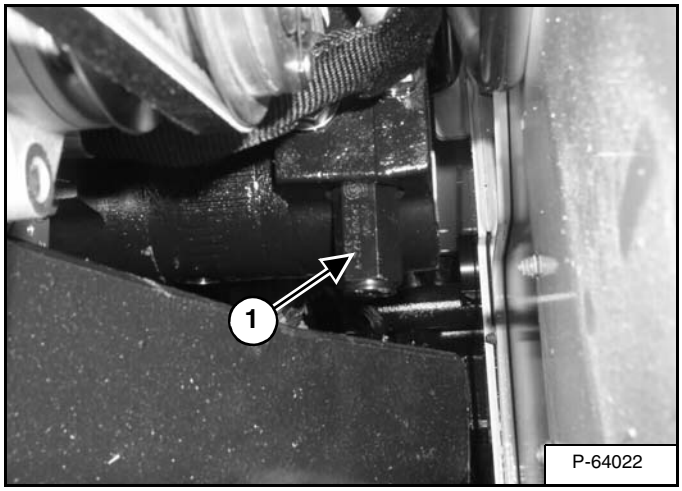
⚠ WARNING

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

W-2017-0286

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

Figure 20-61-25

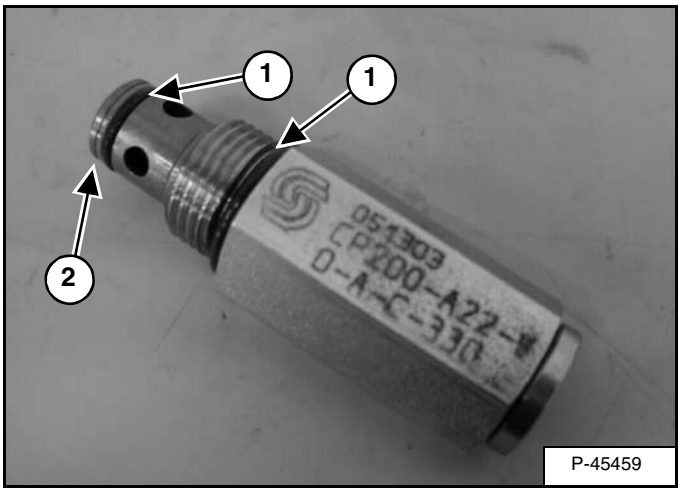


Locate the high flow relief valve through rear door along the right side of the engine.

Remove the relief valve (Item 1) **[Figure 20-61-25]** from the pump.

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

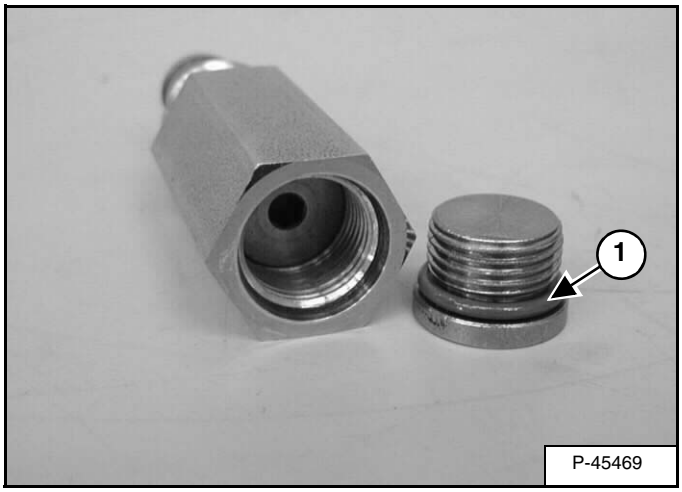
Figure 20-61-26



Inspect the relief valve and replace the two O-rings (Item 1) and washer (Item 2) **[Figure 20-61-26]**.

If the relief valve is bad, it must be replaced as a complete unit.

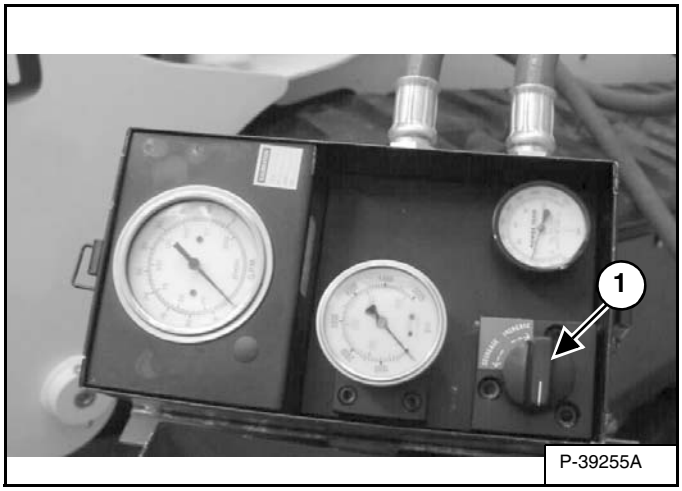
Figure 20-61-27



Inspect the O-ring (Item 1) **[Figure 20-61-27]** on the plug for damage and replace as needed.

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

Figure 20-71-15



Be sure all connections are tight and that the hoses are not touching any moving parts before starting the loader **[Figure 20-71-15]**.

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) 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.

Turn the restrictor down to system operating pressure. DO NOT EXCEED SYSTEM RELIEF PRESSURE. Refer to Hydraulic Schematics for pressure. 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-10-5 for system relief pressure and full RPM.

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

REAR AUXILIARY DIVERTER VALVE

Description

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

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

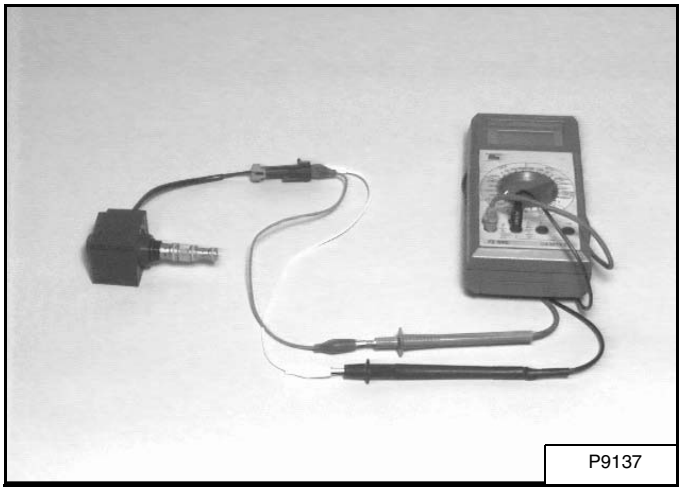
The right side auxiliaries are located on the inside of the right side lift arm at the front of the machine.

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

See Hydraulic Schematic for more circuit information.

Solenoid Testing

Figure 20-120-1

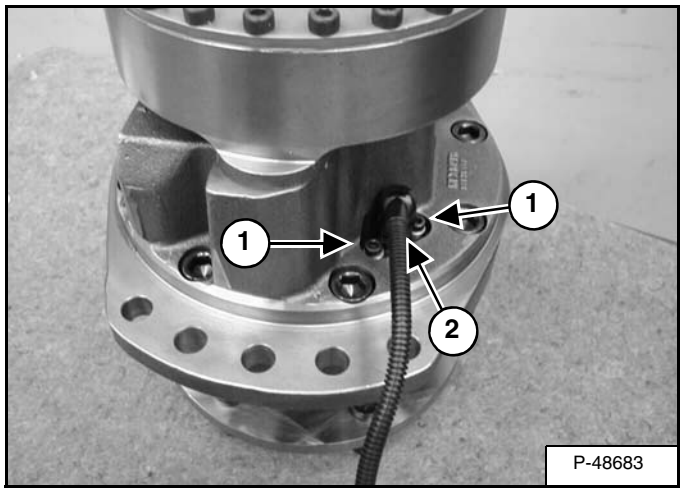


Use a test meter to measure coil resistance **[Figure 20-120-1]**. Coil wires do not have polarity. Correct resistance is 8.6 - 9.5 ohm.

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

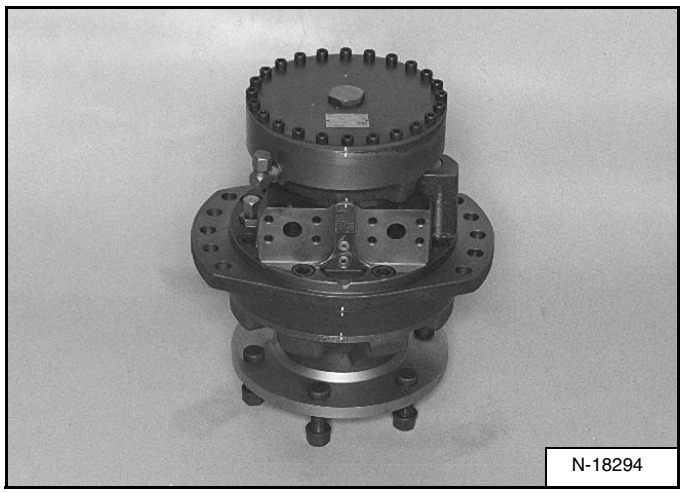
Disassembly And Assembly

Figure 30-20-6



NOTE: Motors that do not have the SJC sensor will be covered by a plate with and O-ring. The plate will need to be ordered separately when ordering a new motor from Bobcat Parts.

Figure 30-20-7

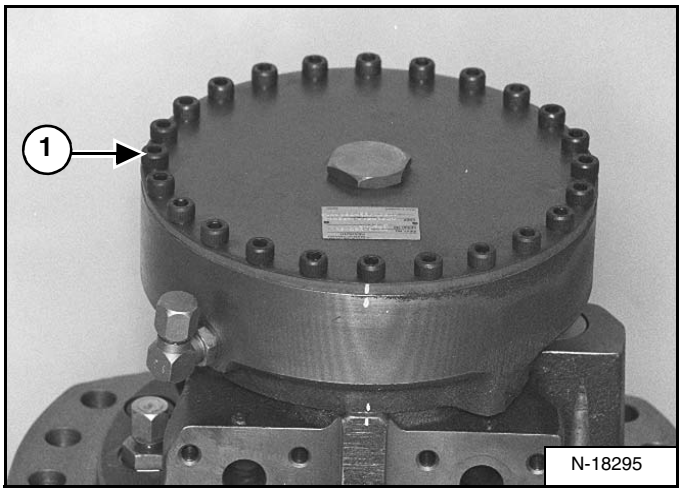


NOTE: Mark the motor, brake and motor carrier housings for proper alignment during assembly [Figure 30-20-7].

Drain the oil from the motor casing.

Check for the vendor motor serial number (Item 1) **[Figure 30-20-7]**, these serial numbers may be needed when ordering replacement parts.

Figure 30-20-8



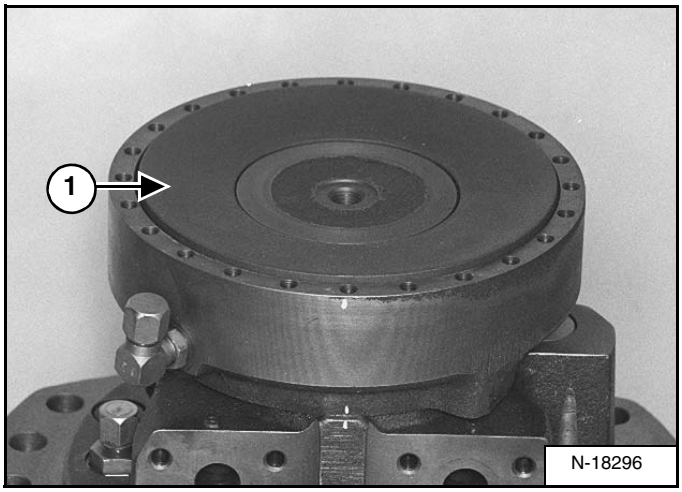
Remove the twenty four mounting bolts (Item 1) and the brake cover plate (Item 2) **[Figure 30-20-8]**.

NOTE: The bolts should be removed and/or tightened, one turn at a time to maintain equal preload on the end cap.

Assembly: Replace the gasket and end cap.

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

Figure 30-20-9



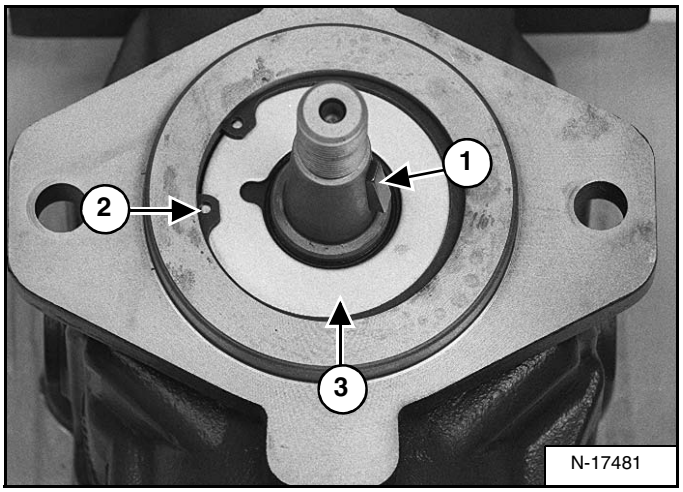
Remove the disk spring (Item 1) **[Figure 30-20-9]** from the brake housing.

NOTE: Mark the top side of the disk spring for proper installation.

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

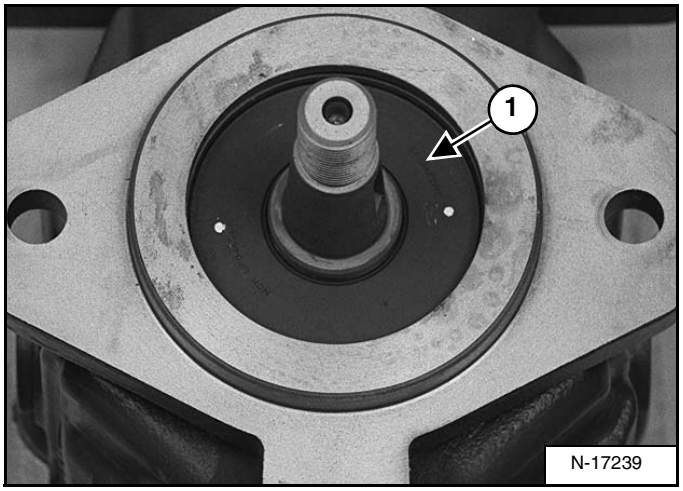
Disassembly (Cont'd)

Figure 30-40-22



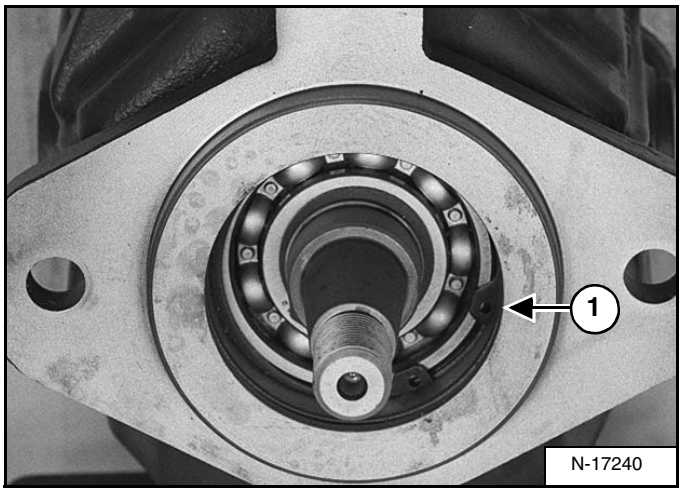
Remove the driveshaft key (Item 1) the snap ring (Item 2) and the support washer (Item 3) **[Figure 30-40-22]** from the drive shaft end of the pump.

Figure 30-40-23



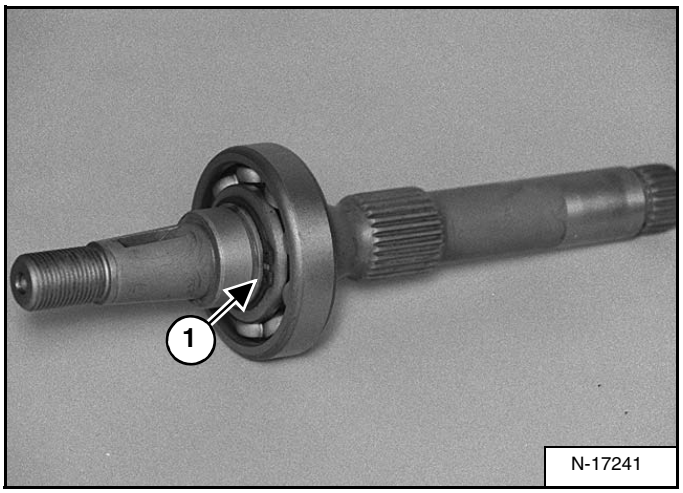
Use a seal puller and remove the seal (Item 1) **[Figure 30-40-23]** from the pump housing.

Figure 30-40-24



Remove the snap ring (Item 1) **[Figure 30-40-24]** from the pump housing and remove the driveshaft and bearing from the housing.

Figure 30-40-25

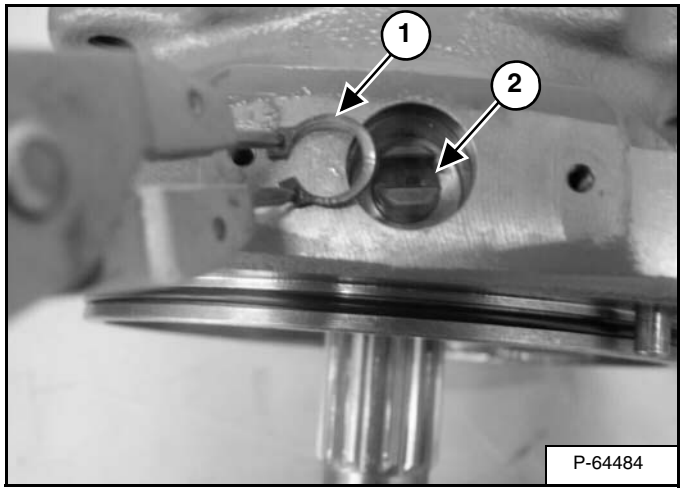


Remove the snap ring (Item 1) **[Figure 30-40-25]** from the driveshaft and remove the bearing.

Check the bearing for wear and replace if worn.

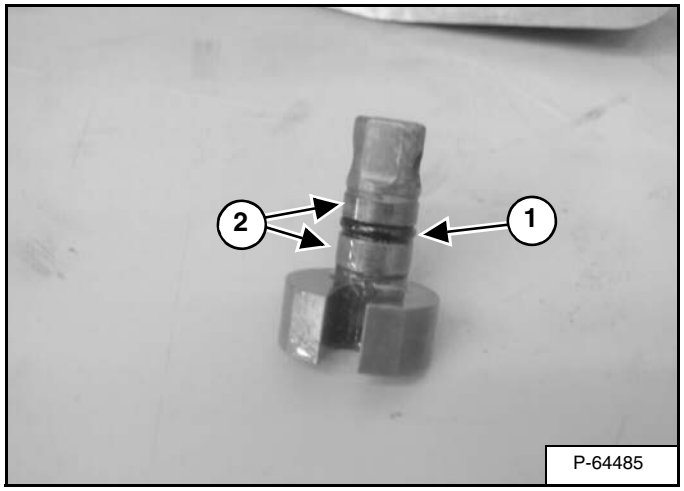
Disassembly And Assembly (Cont'd)

Figure 30-41-56



Remove the snap ring (Item 1) from the positioning pin (Item 2) **[Figure 30-41-56]**.

Figure 30-41-57



Pull the positioning pin from the end housing.

Replace O-ring (Item 1) **[Figure 30-41-57]**.

Inspect wear surfaces (Item 2) **[Figure 30-41-57]** for scratches or scoring. Ensure positioning pin can rotate smoothly in the end housing without excessive play.

Figure 30-41-58

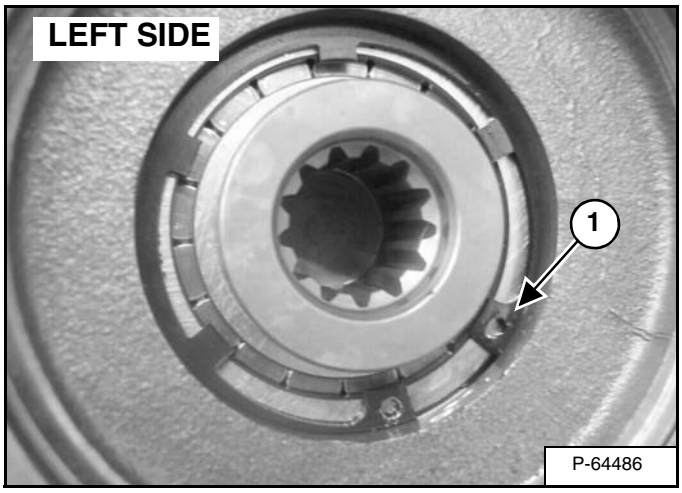
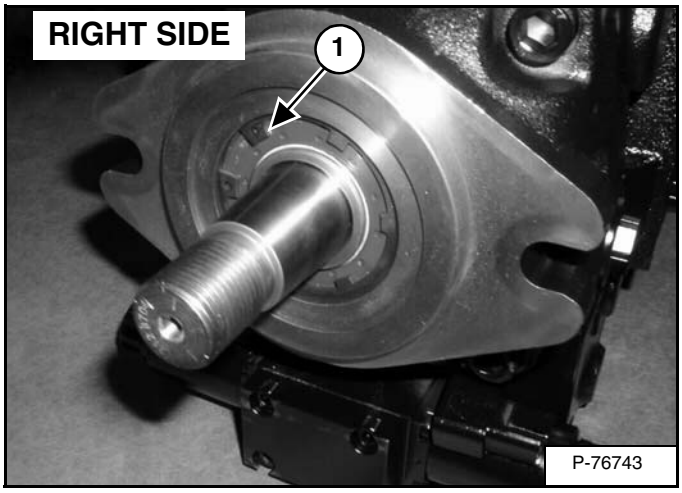


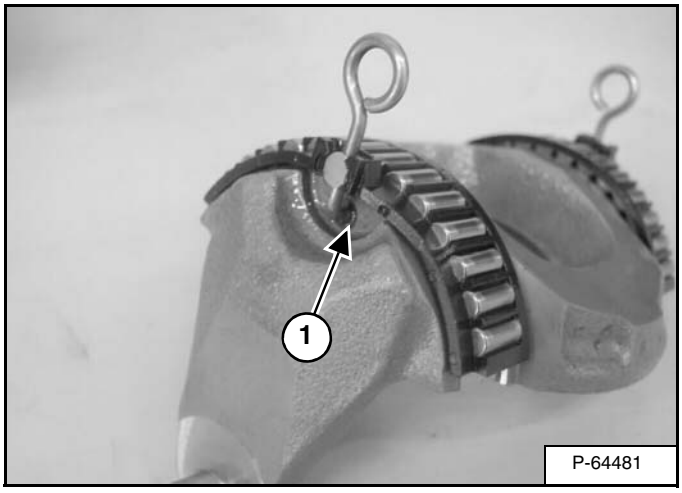
Figure 30-41-59



Remove the snap ring (Item 1) **[Figure 30-41-58]** and **[Figure 30-41-59]** from the end housing.

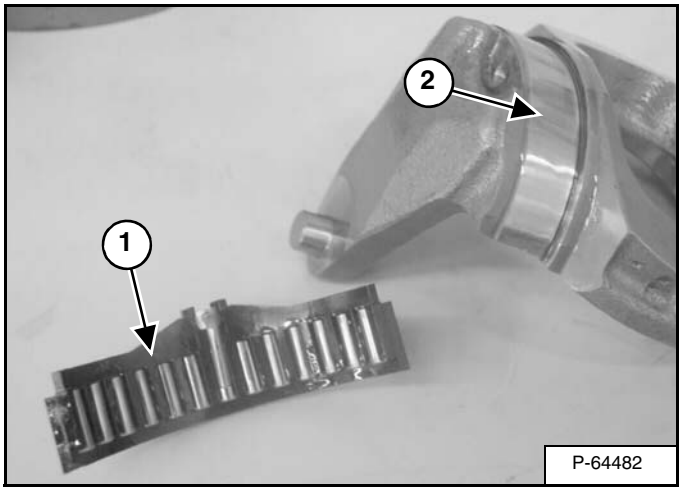
Disassembly And Assembly (Cont'd)

Figure 30-42-48



Assembly: Ensure bearing pins are in the holes of the swash plate (Item 1) **[Figure 30-42-48]**.

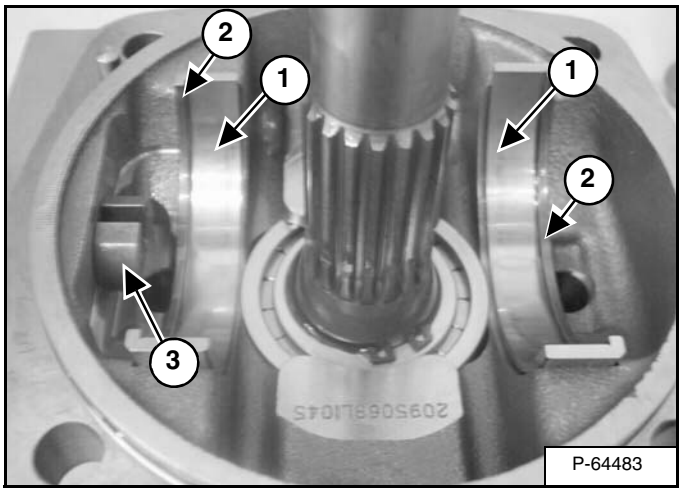
Figure 30-42-49



Remove the shell bearing (Item 1) **[Figure 30-42-49]**.

Inspect individual roller bearings and machined surfaces (Item 2) **[Figure 30-42-49]** on swash plate.

Figure 30-42-50



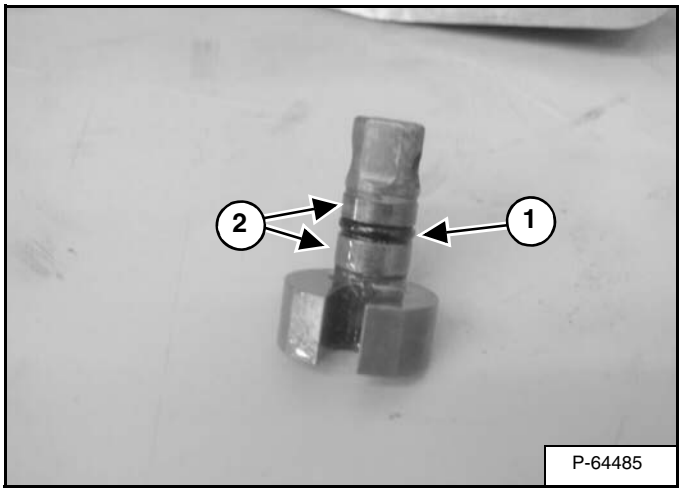
Remove the shell bearing races (Item 1) **[Figure 30-42-50]**.

Assembly: Note shell bearing races have an edge (Item 2) **[Figure 30-42-50]** on them. The edges face towards the outside of the endcap housing

Inspect bearing surfaces for scratches or scoring.

Remove the positioning pin (Item 3) **[Figure 30-42-50]**.

Figure 30-42-51

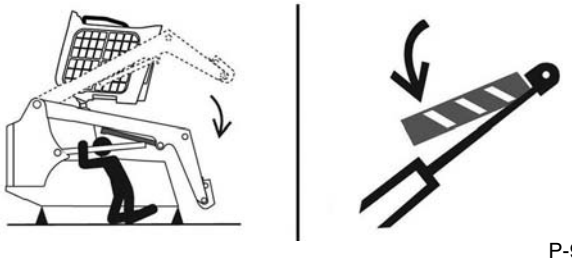


Replace O-ring (Item 1) **[Figure 30-42-51]**.

Inspect wear surfaces (Item 2) **[Figure 30-42-51]** for scratches or scoring. Ensure positioning pin can rotate smoothly in the end housing without excessive play.

Track 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

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

⚠ WARNING

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

W-2059-0598

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

Decrease the track tension. (See Adjusting Tension on Page 40-20-3.)

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

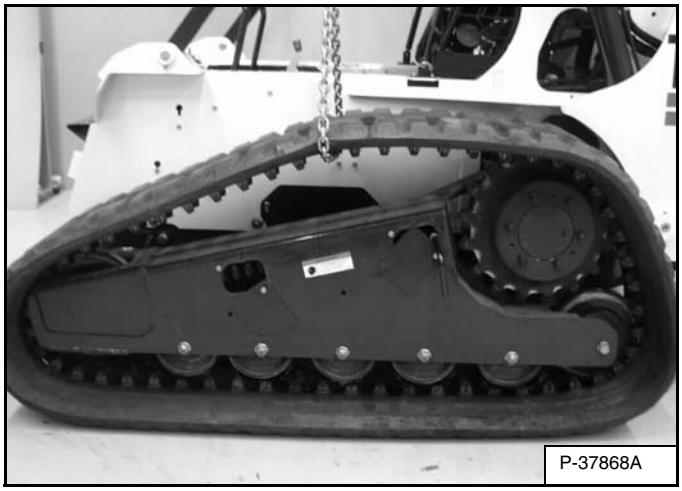
IMPORTANT

Fluid such as engine oil, hydraulic fluid, coolants, grease, etc. must be disposed of in an environmentally safe manner. Some regulations require that certain spills and leaks on the ground must be cleaned in a specific manner. See local, state and federal regulations for the correct disposal.

I-2067-0499

Turn the MEL tool / bleed fitting one more complete turn counterclockwise.

Figure 40-20-8



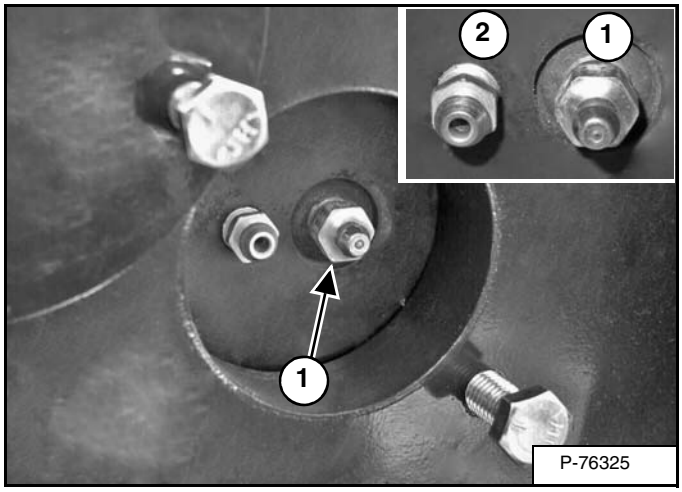
P-37868A

With a chain hoist, lift on the track moving the front idler assembly toward the rear of the track assembly until all track tension has been released **[Figure 40-20-8]**.

Tighten the bleed fitting.

Adjusting Tension

Figure 40-22-6



Loosen the access cover bolts and pivot the access cover open **[Figure 40-22-6]**.

NOTE: Fittings may be oriented differently than shown. You MUST select the correct fitting for the task required. The grease fitting (Item 1) is used to add grease. The bleed fitting (Item 2) [Figure 40-22-6] is used to remove grease.

Increase Track Tension

Add grease to the grease fitting (Item 1) **[Figure 40-22-6]** until the track adjustment is correct **[Figure 40-22-4]** and **[Figure 40-22-5]**.

NOTE: Do not remove grease fitting unless pressure is released using the bleed fitting. (See [Figure 40-22-7] on Page 40-22-3)

NOTE: If replacement is necessary, always replace grease fitting (Item 1) [Figure 40-22-6] with genuine Bobcat Parts. The grease fitting is a special fitting designed for high pressure.

Decrease Track Tension

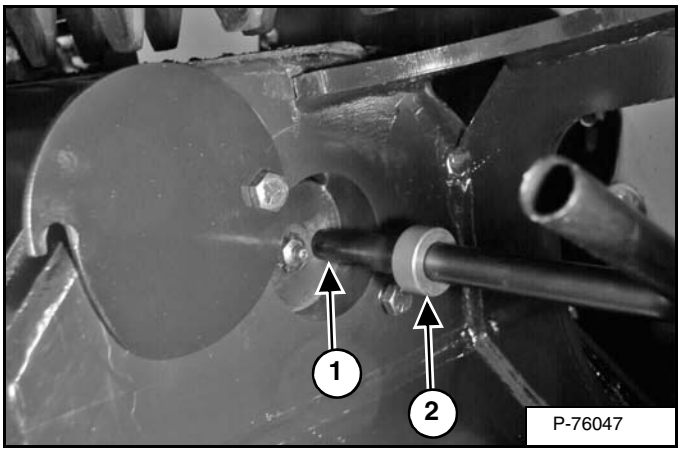
⚠ WARNING

HIGH PRESSURE GREASE CAN CAUSE SERIOUS INJURY

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

W-2781-0109

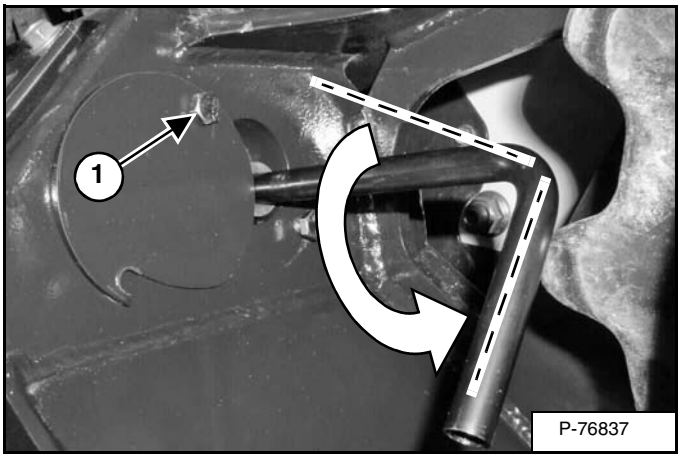
Figure 40-22-7



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

Install the bleed tool (MEL-1560) on the bleed fitting (Item 1), adjust and tighten the collar (Item 2) **[Figure 40-22-7]** to fit behind the edge of the access cover.

Figure 40-22-8



Tighten the access cover bolt (Item 1) **[Figure 40-22-8]** to secure the tool.

Turn the tool 1/4 turn counterclockwise and let the grease flow into a container. Release pressure **[Figure 40-22-8]** until the track adjustment is correct **[Figure 40-22-4]** and **[Figure 40-22-5]**.

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

Raise the loader. Remove the jackstands.

Repeat the procedure for the other track.

Dispose of grease in an environmentally safe manner.

Track Housing Removal And Installation

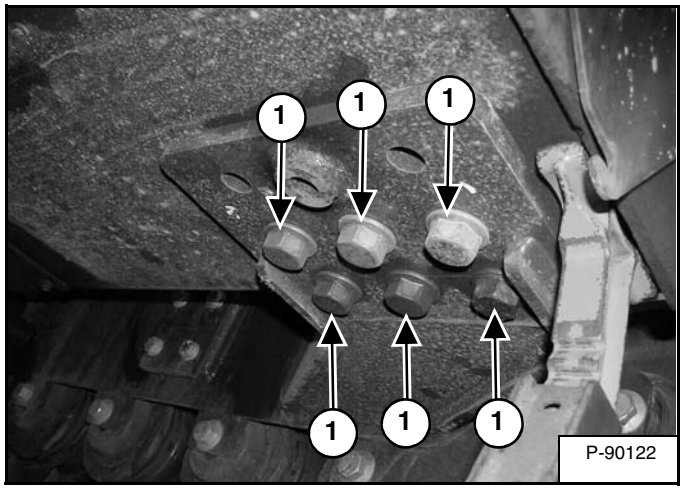
NOTE: Jackstands used when removing the track must not interfere with track housing removal.

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

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

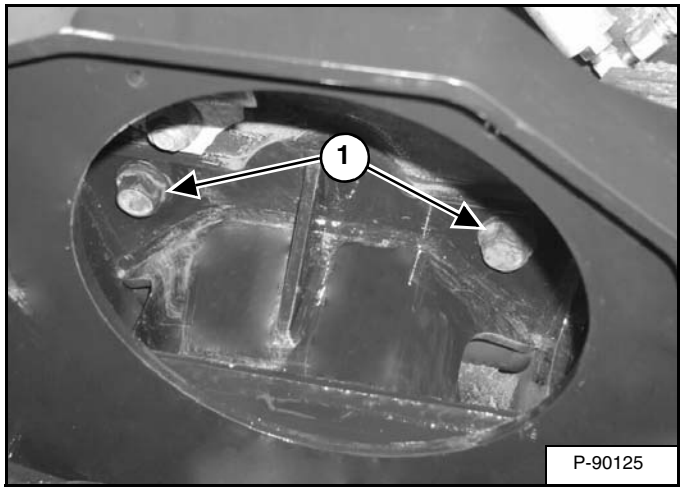
Support the track housing.

Figure 40-23-35



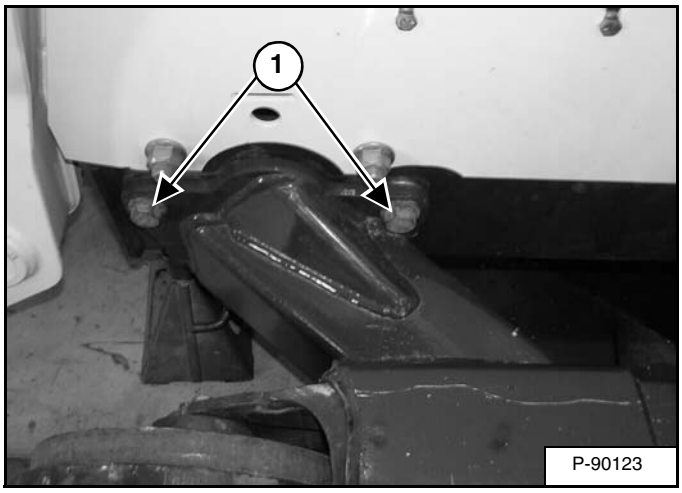
Remove the six mount bolts (Item 1) **[Figure 40-23-35]** from the bottom track housing mount plate. (At the front and rear of the loader.)

Figure 40-23-36



At the rear of the loader remove the two mount bolts (Item 1) **[Figure 40-23-36]**.

Figure 40-23-37



At the front of the loader remove the two mount bolts (Item 1) **[Figure 40-23-37]**.

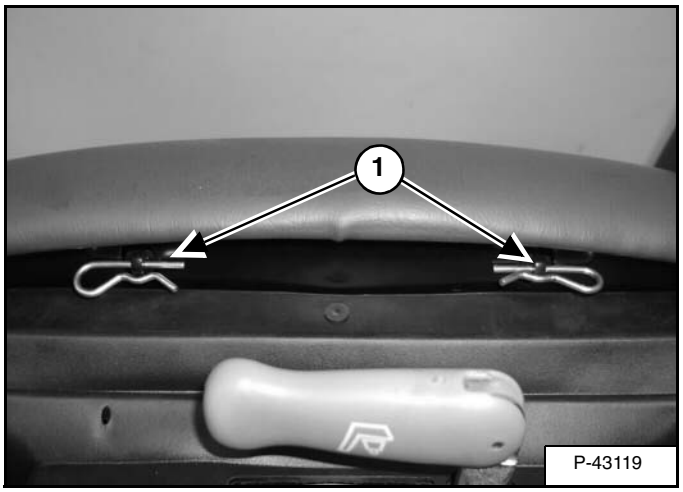
Remove the track housing from the loader.

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

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

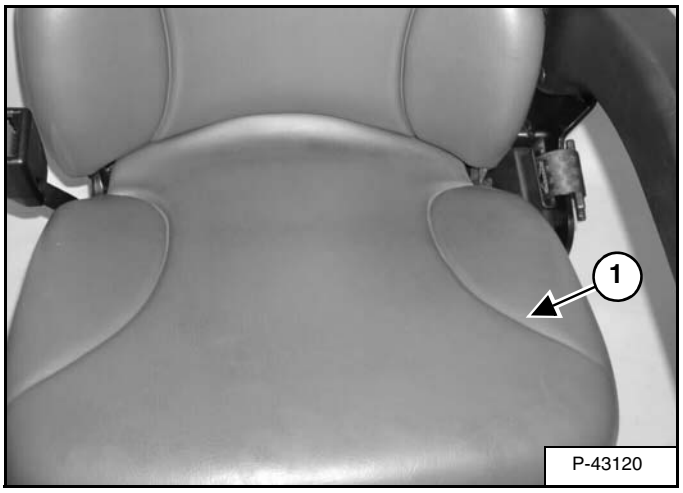
Lower Cushion Removal And Installation

Figure 50-30-7



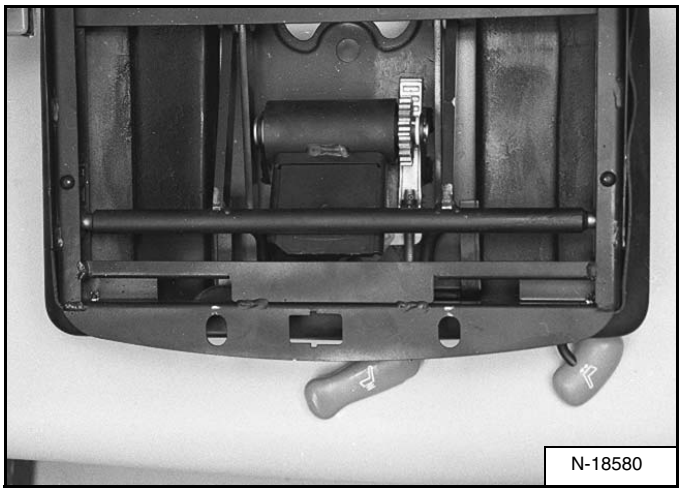
Remove the clips (Item 1) **[Figure 50-30-7]** from the seat cushion.

Figure 50-30-8



Lift and remove the seat cushion (Item 1) **[Figure 50-30-8]** from the seat frame.

Figure 50-30-9

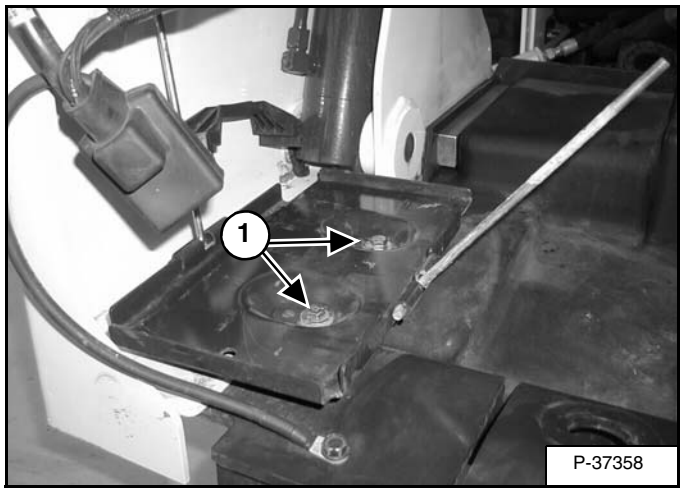


Inspect the seat ride adjustment **[Figure 50-30-9]**.

Reverse the removal procedure to install the operator seat back.

Removal And Installation (Cont'd)

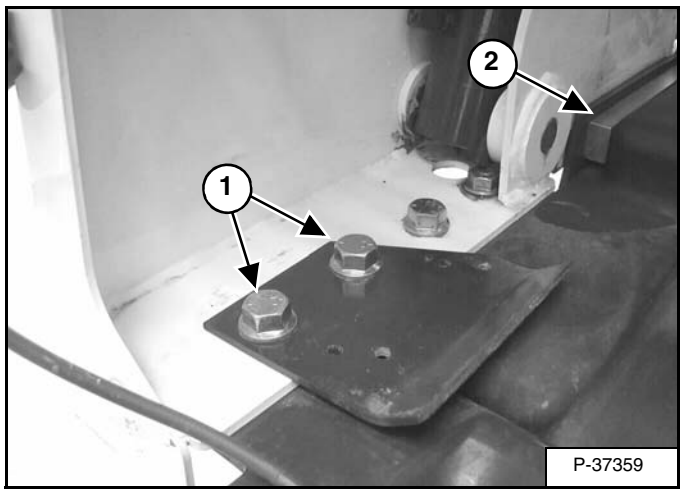
Figure 50-80-5



Remove the bolts (Item 1) **[Figure 50-80-5]** from the battery holddown plate.

Remove the holddown plate from the loader.

Figure 50-80-6



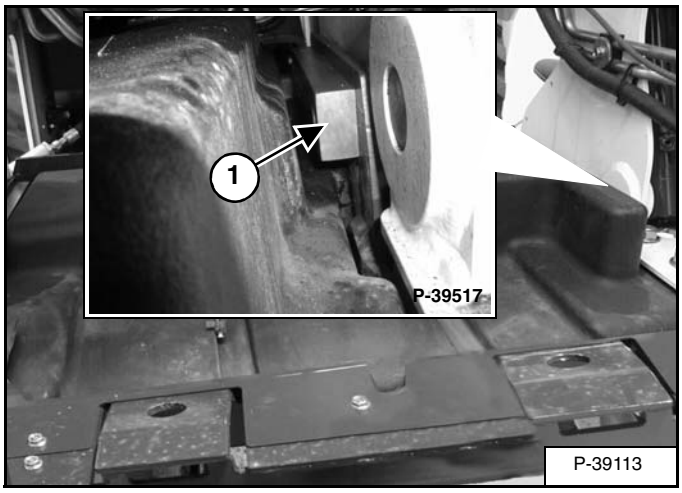
Remove the two mounting bolts (Item 1) **[Figure 50-80-6]** from the battery hold down plate mounting bracket.

Remove the mount bracket from the loader.

At the left side of the loader, remove the three mainframe mount bolts from the mounting block (Item 2) **[Figure 50-80-6]**. Remove the mount block from the loader.

Installation: Tighten the mainframe mount bolts to 300 - 330 ft.-lb. (407 - 447 N•m) torque.

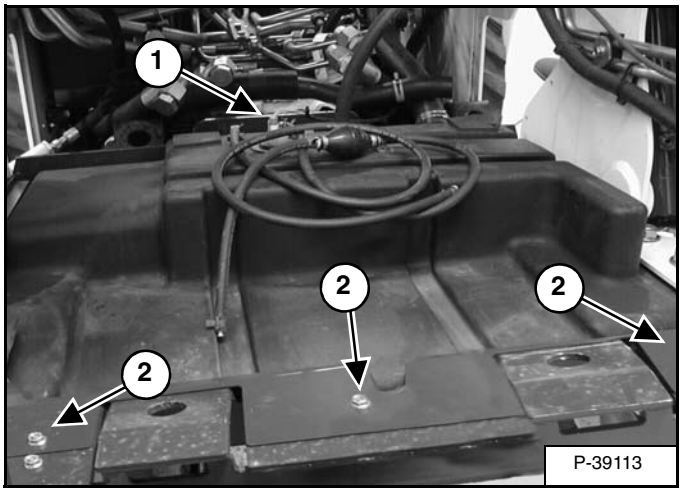
Figure 50-80-7



At the right side of the loader, remove the three mainframe mount bolts from the mounting block (Item 1) **[Figure 50-80-7]**. Remove the mount block from the loader.

Installation: Tighten the mainframe mount bolts to 300 - 330 ft.-lb. (407 - 447 N•m) torque.

Figure 50-80-8



Disconnect the wire harness connector (Item 1) **[Figure 50-80-8]** from the fuel level sender.

Remove the three mount bolts (Item 2) **[Figure 50-80-8]** from the fuel tank mount plate. Remove the mount plate.

Lift the fuel tank and remove it from the loader frame.

NOTE: When installing the fuel tank, avoid striking the tank with heavy objects to prevent damage.

CONTROL PANEL (SJC)

Description

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

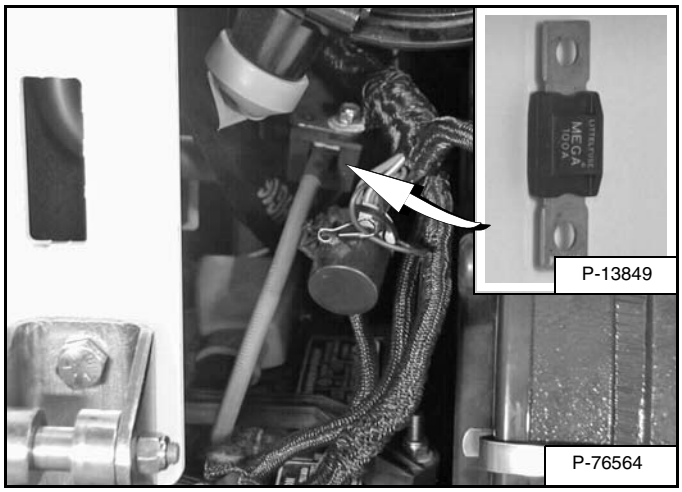
The control panel is connected to the lower mainframe and wraps around the operator seat.

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


Bobcat®

Description

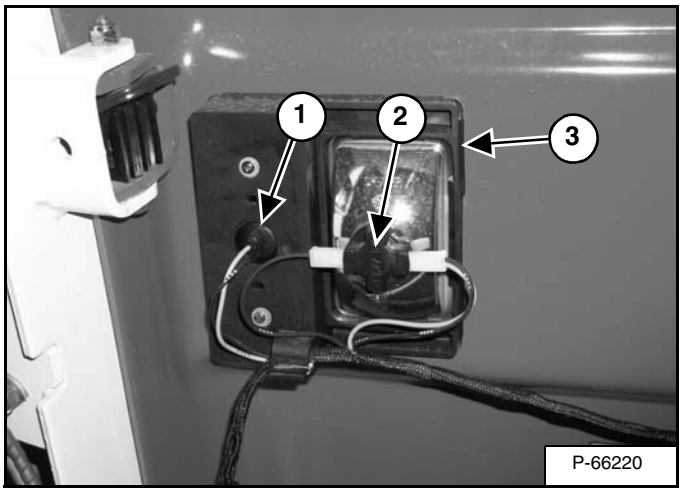
Figure 60-10-1



The loader has a 12 volt, negative ground alternator charging system. The electrical system is protected by fuses located in the operator 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.

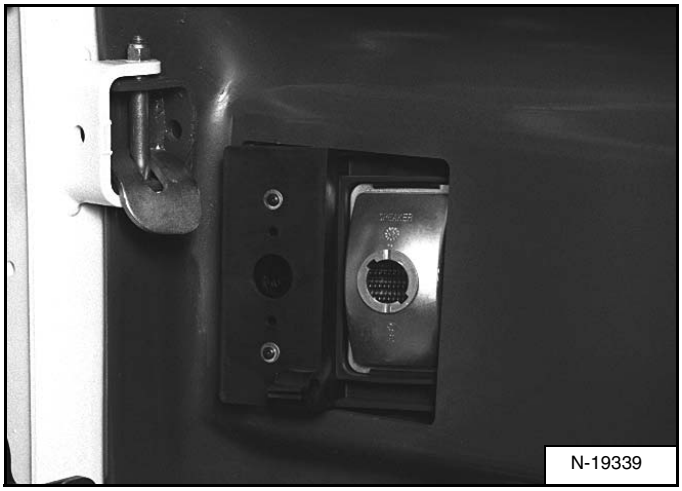
Rear Removal And Installation

Figure 60-60-4



Remove the bulb assemblies (Items 1 & 2) from the light housing (Item 3) by turning the bulb assemblies a 1/4 turn **[Figure 60-60-4]**.

Figure 60-60-5

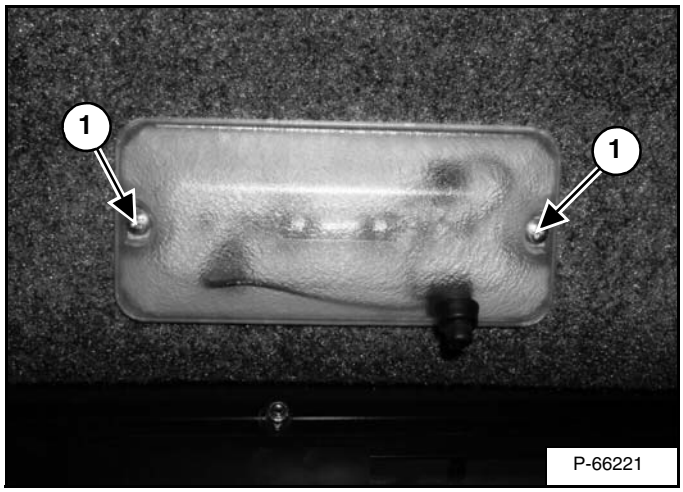


Using care press the rear light and housing from the door **[Figure 60-60-5]**.

Reverse this procedure for installation.

Cab Light Removal And Installation

Figure 60-60-6

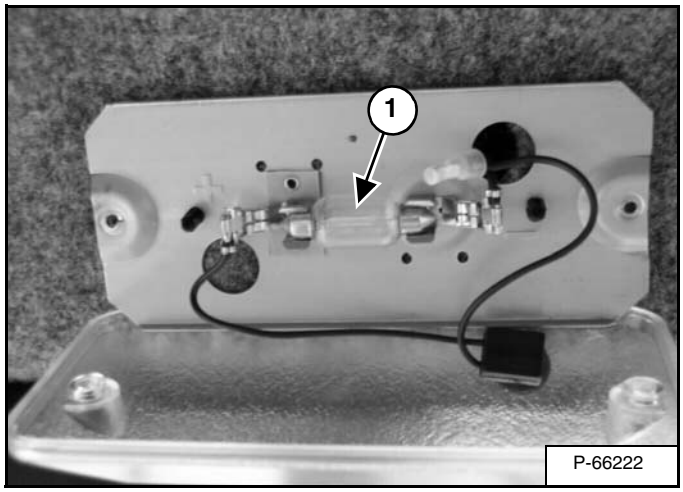


Remove the screws (Items 1) **[Figure 60-60-6]** from the light cover.

NOTE: The wires for the switch will hold the light cover. Do not pull the light cover to far away from the light housing to prevent damage to the wires.

Move the light cover to allow access to the bulb.

Figure 60-60-7



Remove and replace the bulb (Item 1) **[Figure 60-60-7]** from the light housing.

Troubleshooting

Please refer to Bobcat Advanced Troubleshooting System (B.A.T.S.) for troubleshooting information. It is recommended that these procedures be done by authorized Bobcat Service Personnel only.

⚠ WARNING

Check for correct function after adjustments, repairs or service. Failure to make correct repairs or adjustments can cause injury or death.

W-2004-1285

Identification Chart ACD Group 3

Left side Control Handle Switches	Switch Number	Solenoid Number Activated				Attachment Harness Terminal Activated	Attachment Harness Connector	RIght Side Control Handle Switches
		STD	RH	HFH	RH / HFH		Fourteen Pin Connector Viewed from front (pin side of connector) of loader.	
	1	1	1	-	-	K		
	2	2	2	-	-	K		
	3	1	1	-	-	K		
	4	-	-	-	-	K,A,D		
	5	-	-	-	-	K,A,C		
	6	-	-	-	-	K,E		
	7	-	-	-	-	K,F		
	8	-	-	-	-	K,G		
	9	-	-	-	-	K,H		
	10, 11, 12, 13, 14	-	--	--		K	Jumpers C,D	
B-16447								B-16448

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

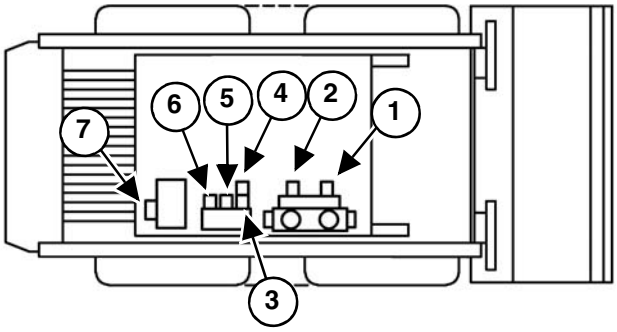
NOTE: For diagnostics and troubleshooting connect the Service PC (See SERVICE PC (LAPTOP COMPUTER) on Page 60-150-1.)

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

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

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

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



NA1891

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

FLYWHEEL RPM SENSOR

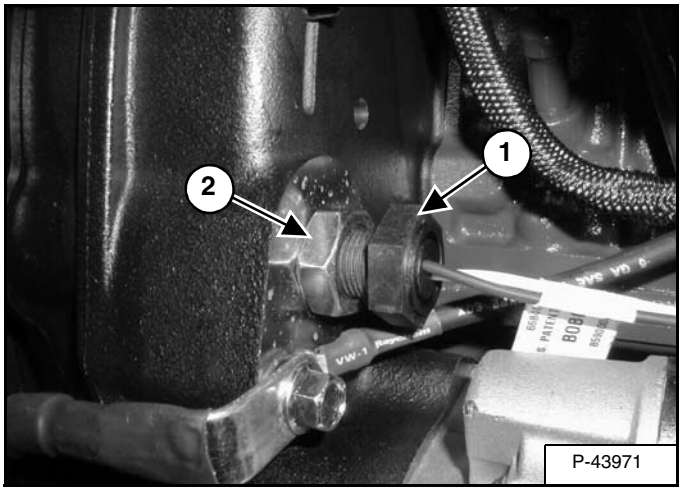
Description

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

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

Adjusting

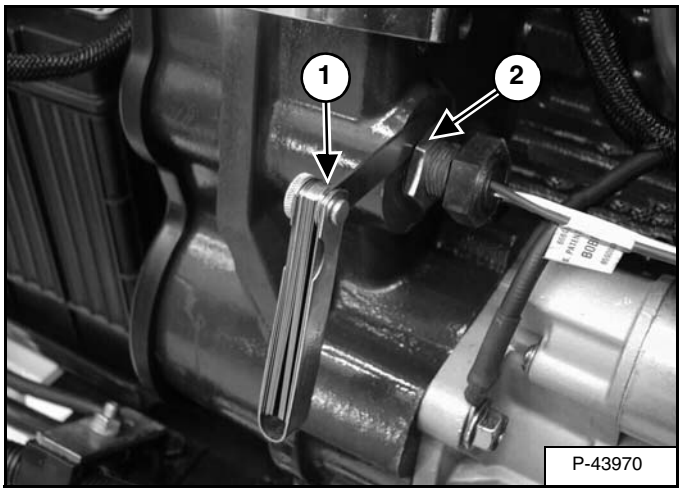
Figure 60-170-1



When reinstalling the RPM sensor, turn the RPM sensor (Item 1) **[Figure 60-170-1]** in until it makes contact with the engine flywheel.

Turn the jam nut (Item 2) **[Figure 60-170-1]** until it contacts the flywheel housing. The jam nut should not be tightened, it needs to turn with the RPM sensor when the sensor is turned back out for adjustment.

Figure 60-170-2



Turn the RPM sensor and the jam nut out from the flywheel. Set a clearance of 0.050 inch. (1,27 mm) between the jam nut and the housing with a feeler gauge (Item 1) **[Figure 60-170-2]**.

Remove the feeler gauge.

Tighten the jam nut (Item 2) **[Figure 60-170-2]** to 12 - 17 ft.-lb. (16 - 23 N•m) torque.

NOTE: New RPM sensors have a plastic tip which is used as a gauge during installation. The plastic tip is designed to come off after the engine is started.

Specifications (Cont'd)

All dimensions are given in inches. Respective metric dimensions are given in millimeters enclosed by parentheses.

Crankshaft

Crankshaft Alignment - Allowable Limit	0.00079 in. (0,02 mm)
Crankpin O.D.	2.0857 - 2.0862 in. (52,977 - 52,990 mm)
Crankshaft Journal O.D.	2.9518 - 2.9548 in. (74,977 - 74,990 mm)
Oil Clearance Between Crankshaft Journal And Crankshaft Bearing	0.0007 - 0.0024 in. (0,018 - 0,062 mm)
Allowable Limit	0.0079 in (0,20 mm)
Oil Clearance Between Crank Pin And Pin Bearing	0.0007 - 0.0020 in. (0,018 - 0,051 mm)
Allowable Limit	0.0079 in (0,20 mm)
Crankshaft Side Clearance	0.0059 - 0.0122 in. (0,015 - 0,31 mm)
Allowable Limit	0.0197 in (0,50 mm)

Oil Pump

Engine Oil Pressure - At Idle Speed	14 PSI (0,97 bar)
Allowable Limit	7 PSI (0,49 bar)
Engine Oil Pressure - At Rated Speed	28 - 56 PSI (1,96 - 3,92 bar)
Allowable Limit	21.3 PSI (1,471 bar)
Engine Oil Pressure Switch Working Pressure	5.6 - 8.4 PSI (0,39 - 0,58 bar)
Clearance Between Inner Rotor And Outer Rotor	0.0016 - 0.0063 in. (0,04 - 0,16 mm)
Allowable Limit	0.0118 in. (0,3 mm)
Clearance Between Outer Rotor And Pump Body	0.0039 - 0.0072 in. (0,100 - 0,184 mm)
Allowable Limit	0.0118 in. (0,3 mm)
Clearance Between Rotor And Cover	0.0010 - 0.0030 in. (0,025 - 0,075 mm)
Allowable Limit	0.0089 in. (0,225 mm)
Relief Valve Working Pressure	129 PSI (8,89 bar)

Thermostat

Thermostat Valve Opening Temperature	166.1° - 173.3° F (74.5° - 78.5° C)
Temperature At Which Thermostat Completely Opens	194° F (90° C)

Intake Air Heater

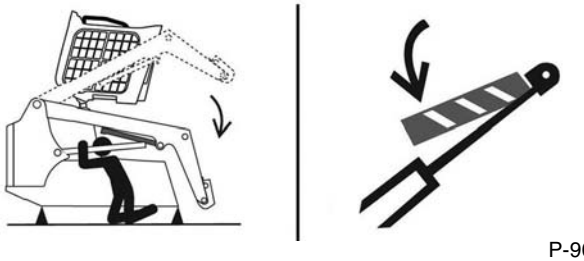
Intake Air Heater Resistance (at cold occasion)	Approximately 0.3W

Turbocharger Compressor Shaft

Axial Clearance	0.0022 - 0.0041 in. (0,057 - 0,103 mm)
Allowable Limit	0.0047 in. (0,12 mm)

Axial Fan 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

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

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

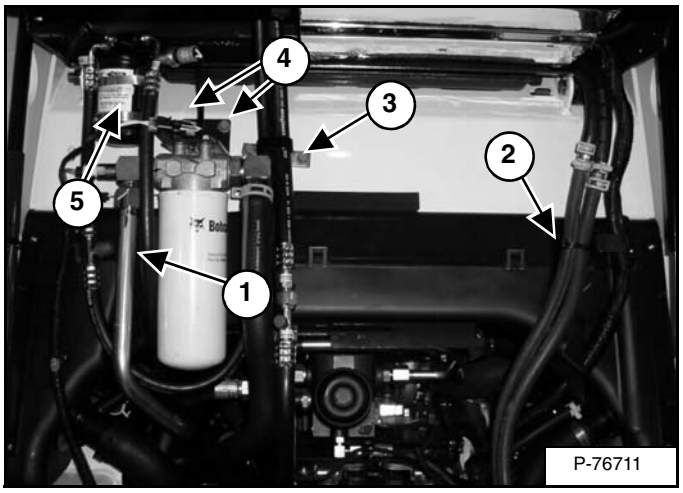
Drain the hydraulic fluid from the reservoir. (See Removing And Replacing Hydraulic Fluid on Page 10-120-2.)

IMPORTANT

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

I-2003-0888

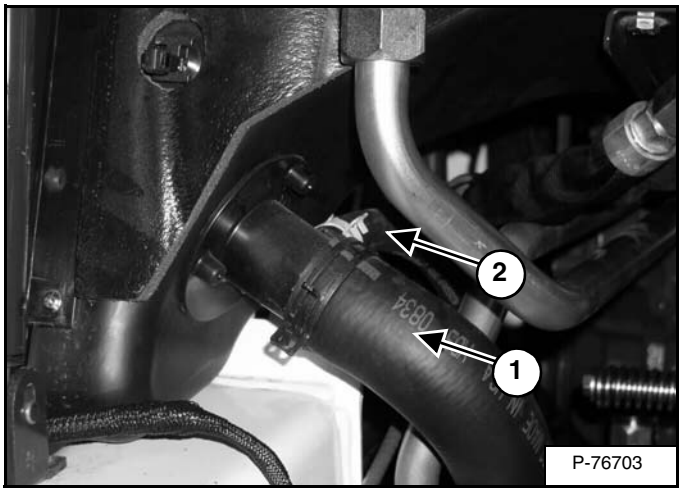
Figure 70-50-15



Remove tubeline (Item 1), the tie strap (Item 2), and the hose clamp (Item 3) **[Figure 70-50-15]**.

Remove two bolts (Item 4) and position the filter and dryer assembly (Item 5) **[Figure 70-50-15]** out of the way.

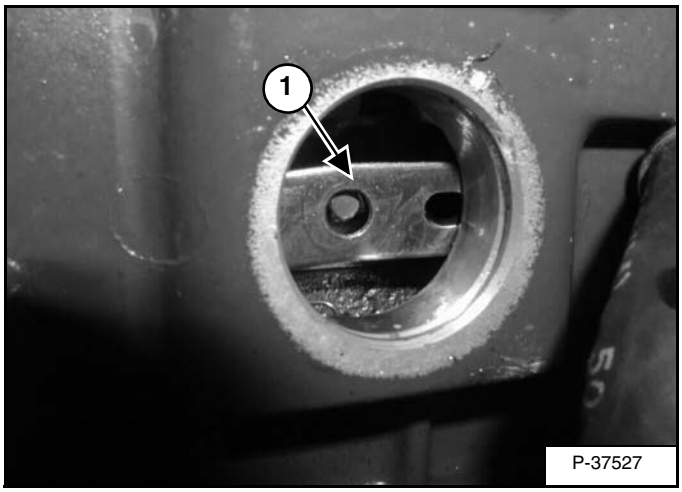
Figure 70-50-16



Remove the fuel fill hose (Item 1) and the vent hose (Item 2) **[Figure 70-50-16]**.

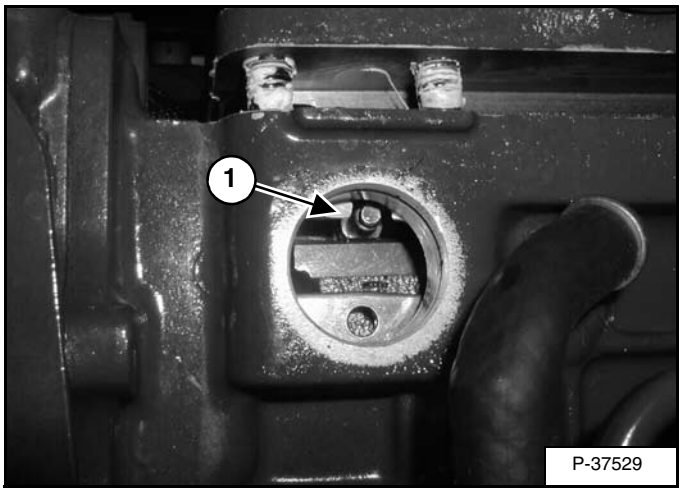
Fuel Injection Pump Removal (Cont'd)

Figure 70-70-51



With the injection pump mounting bolts and nuts loose, be sure the control rod (Item 1) **[Figure 70-70-51]** clears the pin on the injection pump.

Figure 70-70-52



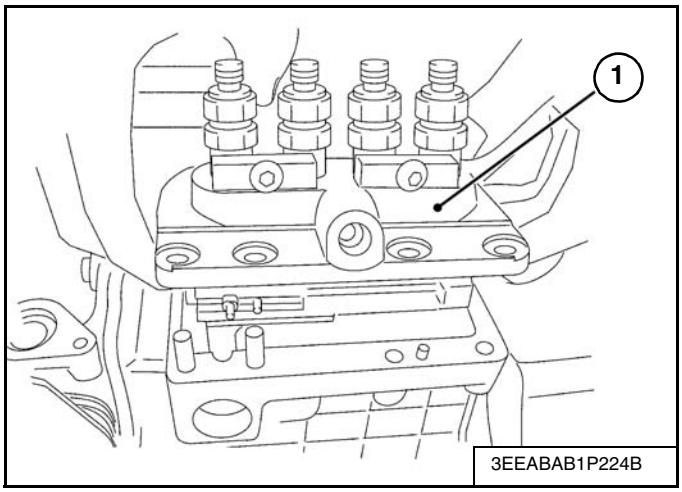
Align the pin on the injection pump (Item 1) **[Figure 70-70-52]** with the notch in the housing.

Remove the injection pump from the injection pump housing.

NOTE: When taking out the injection pump assembly, be careful not to hit it against the governor connecting rod.

Fuel Injection Pump Installation

Figure 70-70-53

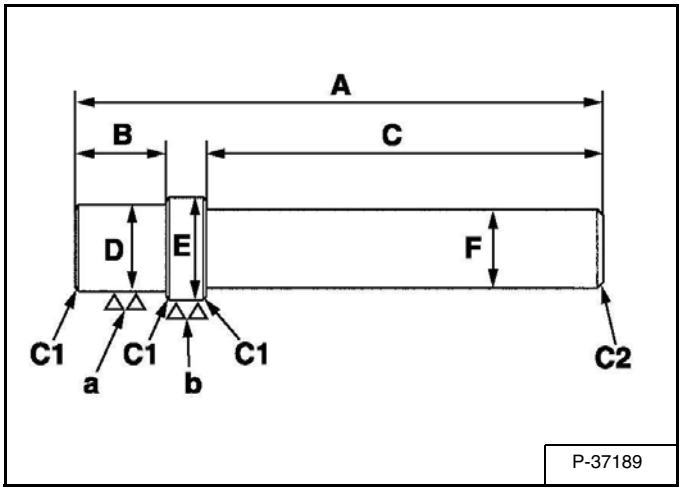


Install the injection pump assembly (Item 1) in the unit, and tighten the mounting bolts and nuts, which the injection pump assembly (Item 1) **[Figure 70-70-53]** keeps tilted.

Piston And Connecting Rod - Servicing

The Small End Bushing Replacing Tool can be made using the dimensions below. One set of dimensions is for the press out tool and one for press fit.

Figure 70-90-6



Small End Bushing Replacing Tool

Application: Use to press out and to press fit the small end bushing in the connection rod.

(Press out)

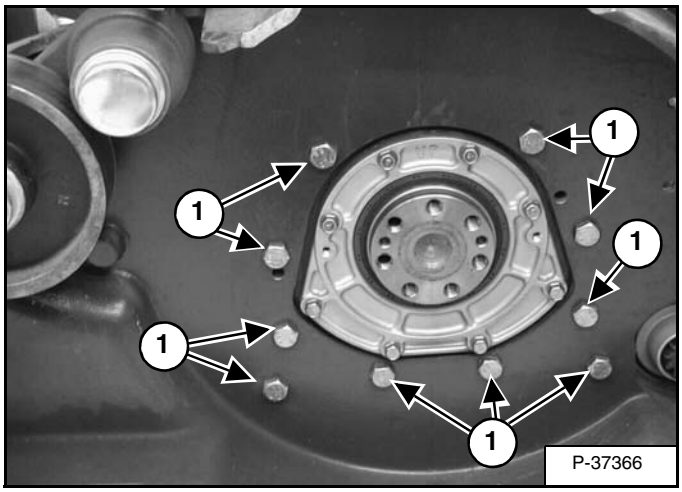
A	6.181 in. (157 mm dia.)
B	0.571 in. (14,5 mm)
C	4.7244 in. (120 mm)
D	1.1851 - 1.187 in. dia. (30,101 - 30,156 mm dia.)
E	1.3021 - 1.3031 in. dia. (33,075 - 33,100 mm dia.)
F	0.7874 in. (20 mm)
a	0.00025 in. (0,0000063 mm)
b	0.00025 in. (0,0000063 mm)
C1	Chamfer 0.039 in. (1,0 mm)
C2	Chamfer 0.079 in. (2,0 mm)

(Press fit)

A	6.181 in. (157 mm dia.)
B	0.571 in. (14,5 mm)
C	4.7244 in. (120 mm)
D	1.1851 - 1.187 in. dia. (30,101 - 30,156 mm dia.)
E	1.6535 in. dia. (42,000 mm dia.)
F	0.7874 in. (20 mm)
a	0.00025 in. (0,0000063 mm)
b	0.00025 in. (0,0000063 mm)
C1	Chamfer 0.039 in. (1,0 mm)
C2	Chamfer 0.079 in. (2,0 mm)

Housing Removal And Installation

Figure 70-120-3



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

Remove the hydrostatic pump. (See Removal And Installation on Page 30-40-2.)

Remove the belt tension pulley assembly. (See Tensioner Pulley Removal And Installation on Page 30-50-3.)

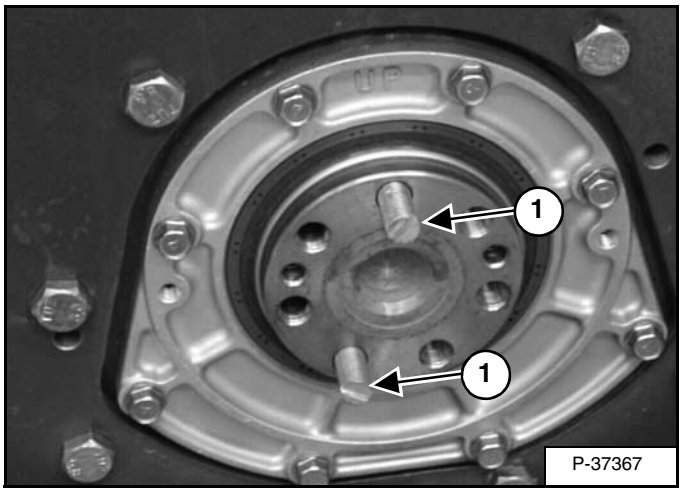
Remove the starter. (See Removal And Installation on Page 60-40-2.)

Remove the ten flywheel housing mounting bolts (Item 1) **[Figure 70-120-3]**.

Installation: Tighten the mounting bolts to 65 - 75 ft.-lb. (88,1 - 101,7 N•m) torque.

Remove the flywheel housing from the engine.

Figure 70-120-4



Installation: Install the flywheel housing on the engine.

Install two alignment studs (Item 1) **[Figure 70-120-4]** into the engine crankshaft to help align the flywheel.

The two studs are M12 x 1.25 Pitch x 76 mm (3 in.) long.