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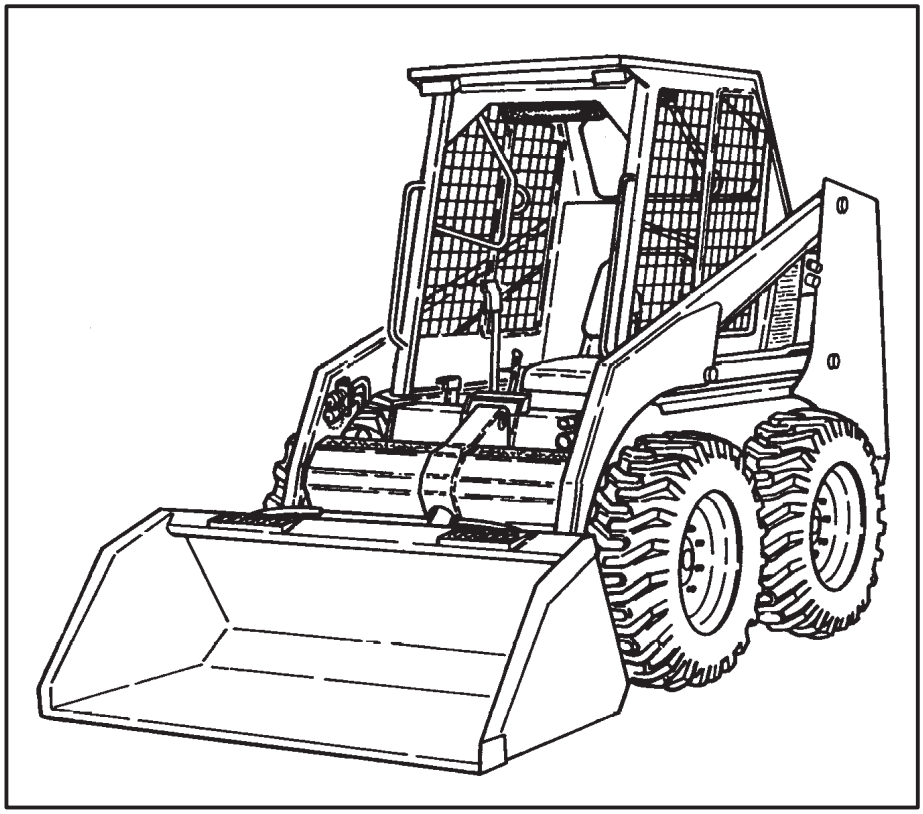
Service Manual

(S/N 508411001–508417999)
(S/N 509711001–509717999)
(S/N 510250001 & Above)
(S/N 510375001 & Above)
(S/N 512815001–512815999)
(S/N 510125001 & Above)
(S/N 512311001 & Above)



MELROE
INGERSOLL-RAND

6720755 (6–99) Printed in U.S.A.

SAFETY INSTRUCTIONS

WARNING

Instructions are necessary before operating or servicing machine. Read and understand the Operation & Maintenance Manual, 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–2003–0299

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

- The Delivery Report is used to assure that complete instructions have been given to the new owner and that the machine is in safe operating condition.
- The Operation & Maintenance Manual delivered with the loader gives operating information as well as routine maintenance and service procedures. It is a part of the loader and must stay with the machine when it is sold. Replacement Operation & Maintenance Manuals can be ordered from your Bobcat loader dealer.
- The loader has machine signs (decals) which instruct on the safe operation and care. The signs and their locations are shown in the Operation & Maintenance Manual. Replacement signs are available from your Bobcat loader dealer.
- The loader has a plastic Operator's Handbook fastened to the operator cab. Its brief instructions are convenient to the operator. The Handbook is available from your dealer in an English edition or one of many other languages. See your Bobcat dealer for more information on translated versions.
- The EMI Safety Manual (available in Spanish) delivered with the loader gives general safety information.
- The Service Manual and Parts Manual are available from your dealer for use by mechanics to do shop–type service and repair work.
- The Skid–Steer Loader Operator Training Course is available through your local dealer. This course is intended to provide rules and practices for correct operation of the Bobcat loader. The course is available in English and Spanish version.
- The Service Safety Training Course is available from your Bobcat dealer. This course provides information for safe and correct service procedures for Bobcat Skid–Steer loaders.
- The Bobcat Skid–Steer Loader Safety Video is available from your Bobcat Dealer.

WARNING

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

W–2044–1285

IMPORTANT

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

I–2019–0284

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

LIFT ARM SUPPORT DEVICE

⚠ WARNING

Never work on a machine with the lift arms up unless the lift arms are secured by a 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–2059–0991

Engaging the Lift Arm Support Device

Maintenance and service work can be done with the lift arms lowered.

If the lift arms must be raised for service, use the following procedure:

Put jackstands under the rear corners of the loader.

Disconnect the spring (Item 1) **[A]** from the lift arm support device retaining pin (Item 2) **[A]**. Hold onto the lift arm support device and remove the retaining pin.

Lower the lift arm support device on top of the lift cylinder. Hook the free end of the spring (Item 1) **[B]** to the lift arm support device so there will be no interference with the support device engagement.

With the operator in the seat, seat belt fastened and seat bar lowered, start the engine.

Raise the lift arms, until the lift arm support device drops onto the lift cylinder rod **[C]**.

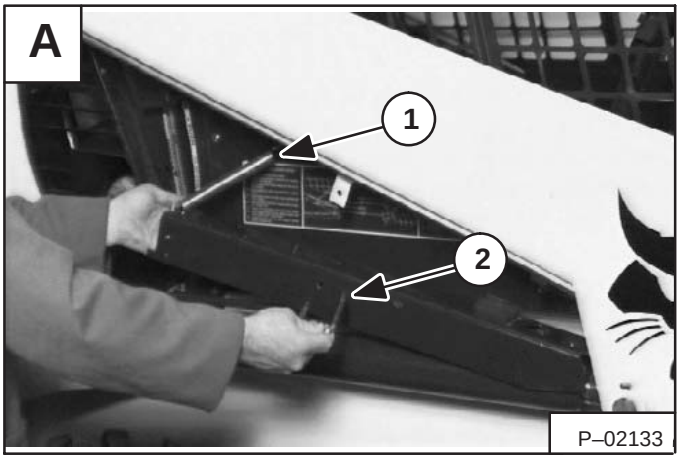
Lower the lift arms slowly until the support device is held between the lift arm and the lift cylinder. Stop the engine. Raise the seat and move pedals until both pedals lock.

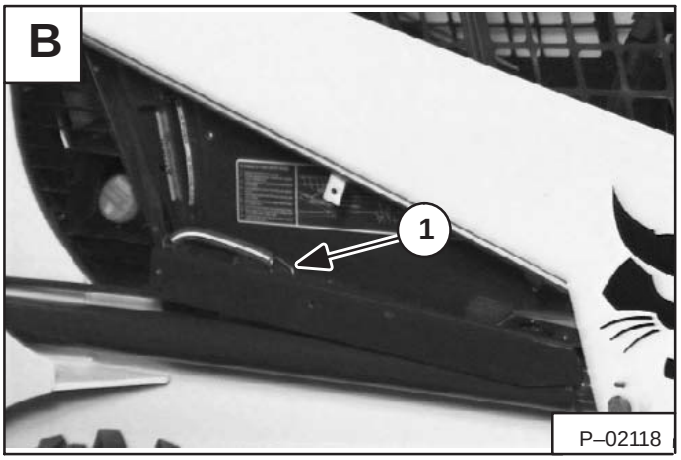
Install pin (Item 1) **[C]** into the rear of the lift arm support device below the cylinder rod.

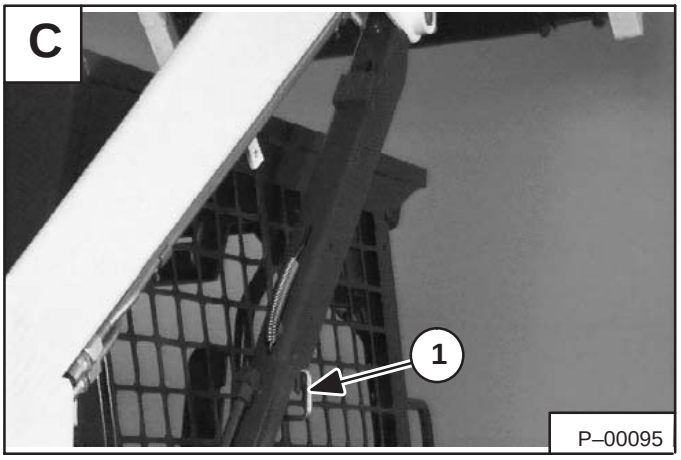
⚠ WARNING

Service lift arm support device if damaged or if parts are missing. Using a damaged lift arm support or with missing parts can cause lift arms to drop causing injury or death.

W–2271–1197







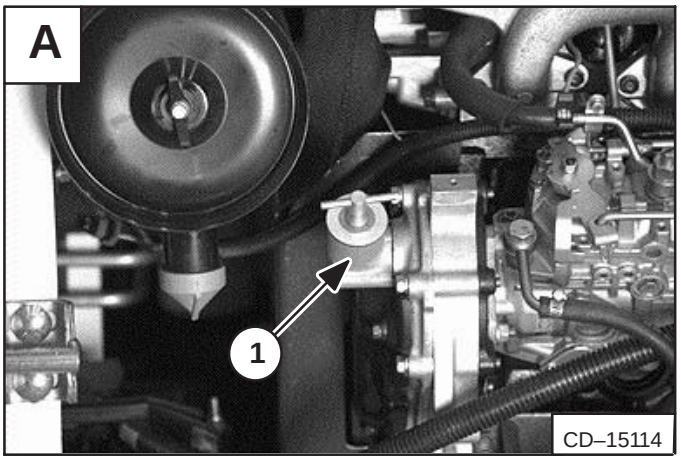
ENGINE LUBRICATION SYSTEM (Cont'd)

Replacing Oil And Filter (Cont'd)

Remove the oil filler cap (Item 1) **[A]**.

Put 8 qts. (7,6 L) of oil in the engine. (See Oil Chart, Page 1–16.)

Start the engine and let it run for several minutes. Stop the engine. Check for leaks at the oil filter. Add oil as needed if it is not at the top mark on the dipstick.



⚠ WARNING

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

W–2103–1285

LUBRICATING THE LOADER

Procedure

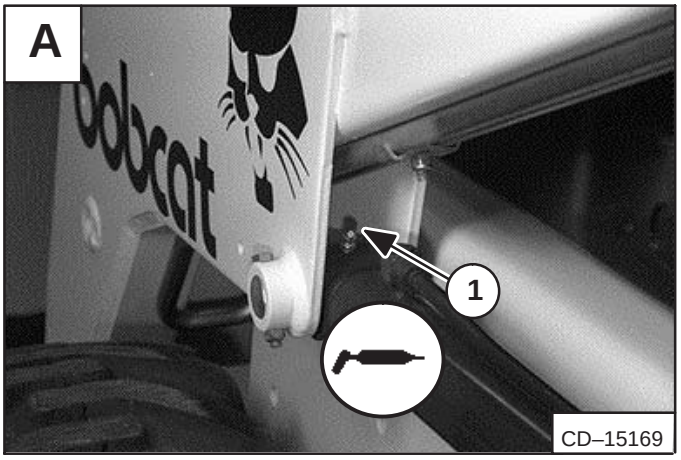
Lubricate the loader as specified in the *SERVICE SCHEDULE*, Page 1–3 for the best performance of the loader.

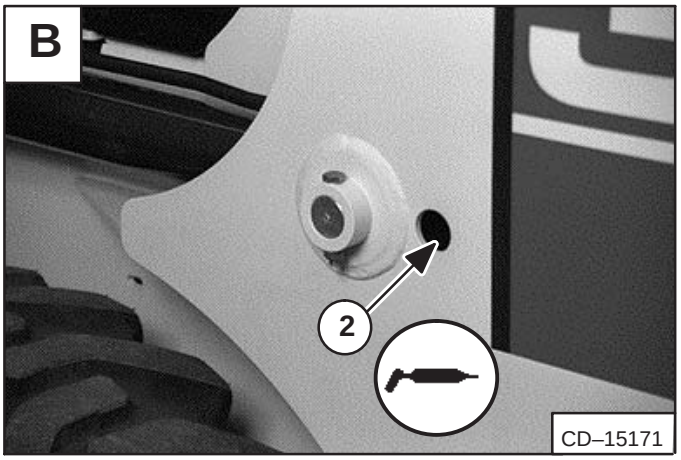
Record the operating hours each time you lubricate the Bobcat loader.

Always use a good quality lithium based multi–purpose grease when you lubricate the loader. Apply the lubricant until extra grease shows.

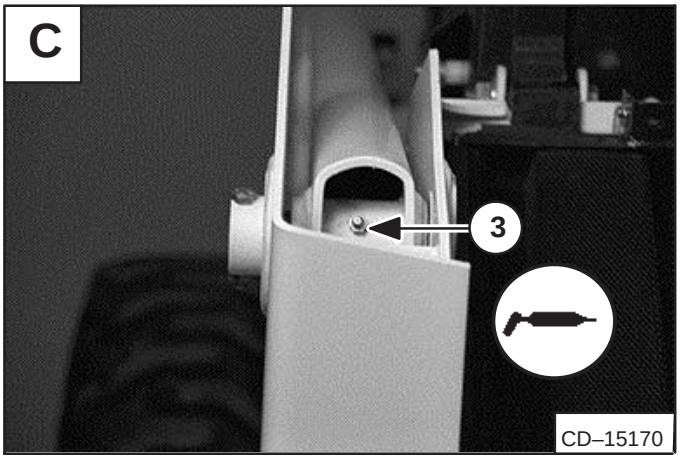
Lubricate the following locations on the loader:

1. Rod End Lift Cylinder (Both Sides) **[A]**.
2. Base End Lift Cylinder (Both Sides) **[B]**.

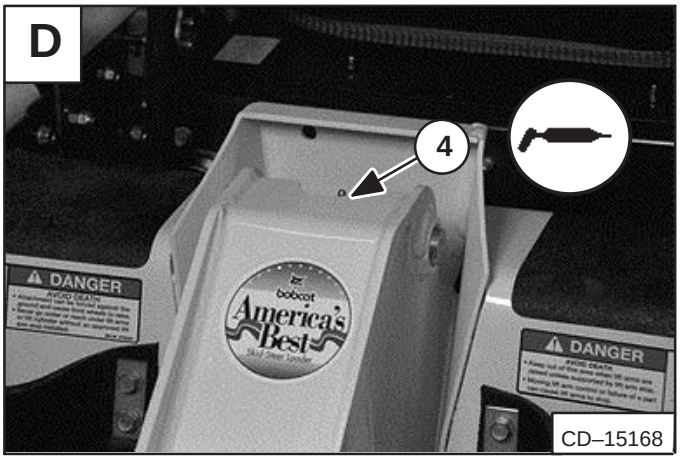




3. Lift Arm Pivot Pin (Both Sides) **[C]**.



4. Base End Tilt Cylinder **[D]**.



HYDRAULIC / HYDROSTATIC SYSTEM OPERATIONS

To Be Used With

HYDRAULIC / HYDROSTATIC FLOW CHART

For Model

853H

Chart #6720956 (Printed March 2003)

CHART LEGEND

1. **RESERVOIR,** Cap.: . . 15.5 Qts. (14,7 L)
2. **BREATHER,** . . . . . 5 Micron
3. **FILL CAP**
4. **SCREEN,** . . . . . 60 Mesh
5. **REAR AUXILIARY QUICK COUPLERS (OPTIONAL)**
6. **CHECK VALVE,** . . . . . 225-290 PSI (1551-2000 kPa)
7. **HYDROSTATIC MOTOR**
8. **PORT RELIEF VALVE (OPTIONAL)** 2550-2600 PSI (17582-17927 kPa)
9. **FRONT AUXILIARY VALVE**
10. **OPEN CHECK PILOT VALVE (OPTIONAL)** 30 PSI (207 kPa)
11. **ELECTRICAL VALVE SOLENOIDS**
12. **RELIEF VALVE (HIGH FLOW)** 3250-3350 PSI (22409-23098 kPa) @ 18 GPM (68,1 L/min.)
13. **ELECTRICAL SELECTIVE VALVE**
14. **CHECK VALVE**
15. **CASE DRAIN COUPLER**
16. **FRONT AUXILIARY QUICK COUPLERS**
17. **HIGH FLOW QUICK COUPLERS**
18. **SIDE SHIFT QUICK COUPLERS**
19. **TILT CYLINDER**
20. **LIFT CYLINDER**
21. **BUCKET POSITION VALVE**
22. **FLOW ADJUSTMENT VALVE**
23. **FLOW CONTROL SPOOL**
24. **CHECK VALVE**
25. **UN-LOADING SPOOL/PRESS. RELIEF VALVE**
26. **CONTROL VALVE POWER-BEYOND OUTLET**
27. **AUXILIARY ELECTRICAL SOLENOIDS**
28. **ANTI-CAVITATION VALVE**
29. **HYDRAULIC CONTROL VALVE**
30. **LOAD CHECK VALVE (2)**
31. **RESTRICTOR**
32. **RELIEF VALVE (HIGH FLOW)** 3250-3350 PSI (22409-23098 kPa)
33. **PORT RELIEF,** . 3500 PSI (24132 kPa)
34. **ELECTRICAL SOLENOID VALVE**
35. **MAIN RELIEF VALVE,** . . 2550-2600 PSI (17582-17927 kPa)
36. **HYDRAULIC FILTER,** . . . . . #4 Media
37. **CHECK VALVE,** . . . . . 1 PSI (7 kPa)
38. **DIFFERENTIAL PRESSURE SWITCH** (Normally Closed) 36-44 PSI (248-303 kPa)
39. **BY-PASS VALVE,** . . . . . 44-55 PSI (310-379 kPa)
40. **CHARGE FILTER,** . . . . . #4Media
41. **FLUID TEMPERATURE SENSOR**
42. **LOCK VALVE (OPTIONAL)**
43. **PORT BLOCK**
44. **COLD OIL BY-PASS VALVE,** . . . 85 PSI (586 kPa)
45. **HYDROSTATIC PUMP**
46. **DISPLACEMENT CONTROL VALVE**
47. **CHARGE PRESSURE SENSOR**
48. **CHARGE RELIEF VALVE** 100° F. (38° C.) Fluid @ Full RPM Neutral 310-330 PSI (2137-2275 kPa) Stroked 300-320 PSI (2069-2206 kPa)
49. **HIGH PRESSURE RELIEF/REPLENISHING VALVE,** . . . . . 5000 PSI (34475 kPa)
50. **CHARGE PUMP,** 11.0 GPM (41,6 L/min.)
51. **TOW VALVES**
52. **HYDRAULIC PUMP,** . . . @ 2750 RPM @ 1150 PSI (7929 kPa)
    a. 18.0 GPM (68,1 L/min.)
    b. 6.0 GPM (22,7 L/min.)
53. **OIL COOLER**

HYDRAULIC/HYDROSTATIC SCHEMATIC
853 (S/N 508415216-17999)
(S/N 510126792 AND ABOVE)
(S/N 510250692 AND ABOVE)
(S/N 512811001-15999)

(Printed June 1999)
MC2397LU

LEGEND

1. RESERVOIR:
   C apacity . . . 15.5 Qts (14,7 L)
2. SPRING LOADED FILTER BYPASS VALVE: 45-55 PSI (311-379 kPa)
3. DIFFERENTIAL PRESSURE SWITCH:
   36-44 PSI (248-303 kPa)
   853 PLUS - Normally Closed
   853 BASE - Normally Closed
4. CHECK VALVE - FILTER
5. FLOW DIVIDER ADJUSTMENT VALVE
6. PILOT ACTIVATED DIRECTIONAL CONTROL VALVE - FLOW CONTROL SPOOL
7. PILOT ACTIVATED DIRECTIONAL CONTROL VALVE - UNLOADING SPOOL
8. PILOT ACTIVATED DIRECTIONAL CONTROL VALVE - FOR REAR AUXILIARY - NORMALLY OPEN ("D2")
9. RELIEF VALVE - PORT: (OPTIONAL)
   3100 PSI (21371 kPa)
10. SOLENOID ACTIVATED DIRECTIONAL CONTROL VALVE - AUXILIARY (OPTIONAL)
11. CHECK VALVE - BUCKET POSITION VALVE
12. RELIEF/ANTICAVITATION VALVE - PORT (TILT BASE END):
    2500 PSI (17238 kPa)
13. RELIEF VALVE - PORT:
    3500 PSI (24132 kPa)
14. LOAD CHECK VALVE
15. ONE WAY RESTRICTOR VALVE
16. RELIEF VALVE - MAIN:
    2550-2600 PSI (17582-17927 kPa)
    at Front Quick Couplers
17. SHUTTLE RELIEF VALVE:
    225-290 PSI (1551-2000 kPa)
18. DRIVE MOTOR SHUTTLE VALVE
19. TOW VALVE
20. RELIEF/REPLENISHING VALVE - HIGH PRESSURE:
    STANDARD . 4350 PSI (29990 kPa)
    OPTIONAL . 5000 PSI (34475 kPa)
21. DISPLACEMENT CONTROL VALVE
22. CHARGE PUMP . . . . 11.0 GPM (41,6 L./M in.) at 2850 RPM
23. HYDRAULIC PUMP
    18.0 GPM (68,1 L/min.)
    at 2750 RPM
24. FILTER
25. RELIEF VALVE - CHARGE:
    140°F. (60°C.) Fluid at Full RPM
    Neutral . . . . 310-330 PSI
    (2137-2275 kPa)
    Stroked . . . . 3O0-320 PSI
    (2069-2206 kPa)
26. MUFFLER (If Equipped)
27. CHARGE PRESSURE SENSOR
28. FLUID TEMPERATURE SENSOR
29. PILOT ACTIVATED DIRECTIONAL CONTROL VALVE - FOR REAR AUXILIARY - NORMALLY OPEN ("D1")
30. SOLENOID ACTIVATED DIRECTIONAL CONTROL VALVE - FRONT AUXILIARY (OPTIONAL ON 853 BASE)
31. PILOT ACTIVATED DIRECTIONAL CONTROL VALVE - FOR REAR AUXILIARY - NORMALLY CLOSED ("P1" and "F1")
32. FILTER
33. SOLENOID ACTIVATED DIRECTIONAL CONTROL VALVE
34. FILTER - HYDROSTATIC (CANISTER)
35. PILOT ACTIVATED DIRECTIONAL CONTROL VALVE - FOR REAR AUXILIARY - NORMALLY CLOSED ("P2" and "F2")
36. FILTER - HYDRAULIC (CANISTER)
37. FILTER
38. FIXED CAPACITY DISPLACEMENT BIDIRECTIONAL HYDROSTATIC MOTOR
39. ANTICAVITATION VALVE

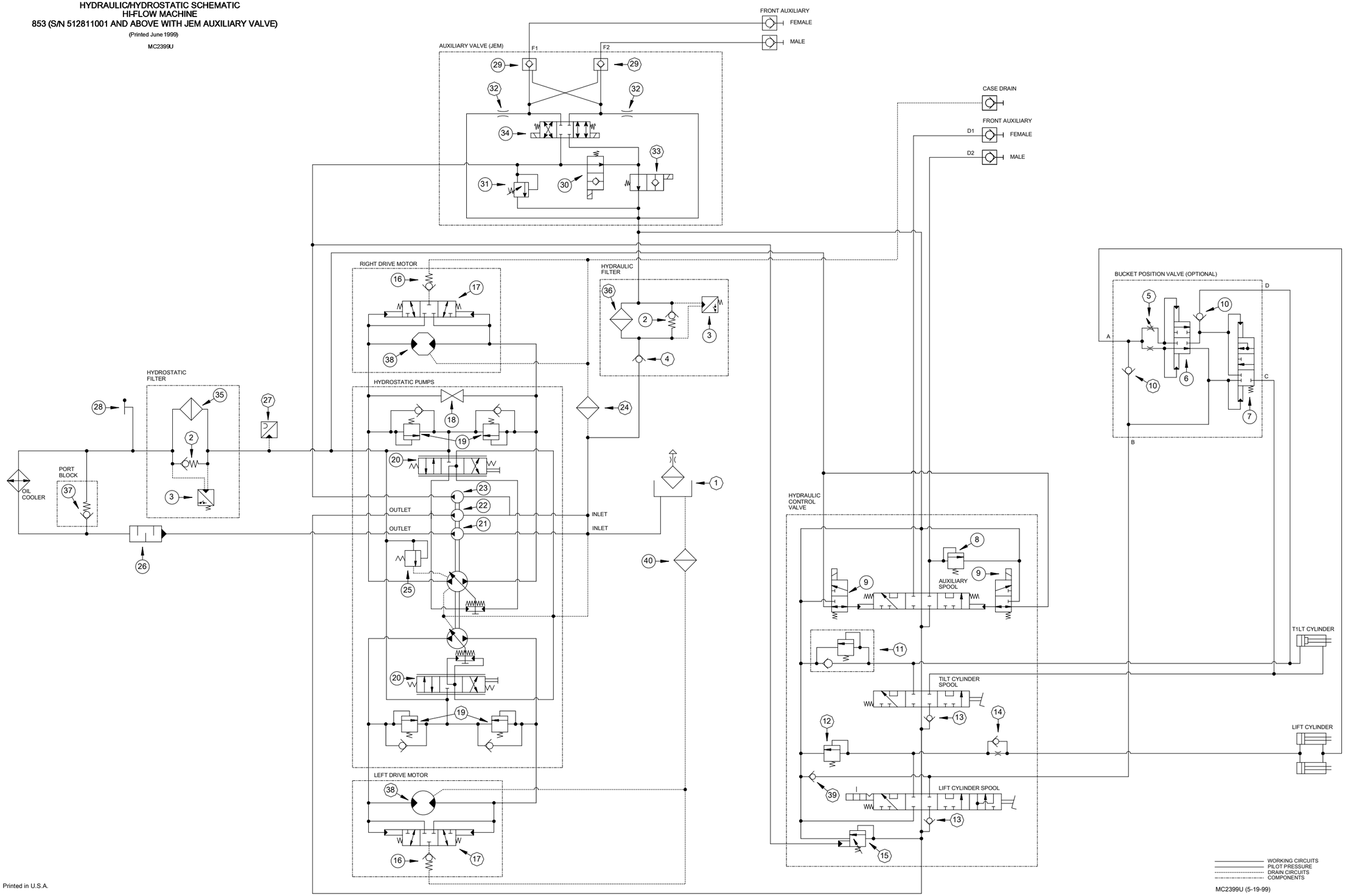
NOTE: Unless otherwise specified, springs have NO significant pressure value.

Printed in U.S.A.

HYDRAULIC/HYDROSTATIC SCHEMATIC
HI-FLOW MACHINE
853 (S/N 512811001 AND ABOVE WITH JEM AUXILIARY VALVE)

(Printed June 1999)

MC2399U



Printed in U.S.A.

MC2399U (5-19-99)

HYDRAULIC CYLINDERS (Cont'd)

Disassembly

Use the following tools to disassemble the cylinder:

MEL1074 – O–ring Seal Hook
Spanner Wrench

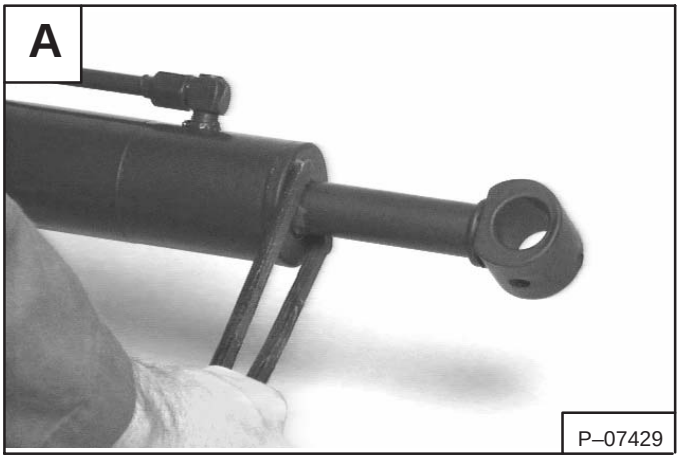
The lift and tilt cylinders internal components are similar, the differences are listed below:

Tilt rod diameter is larger.
Piston relief area is slightly different.
No spacer in the tilt cylinder.

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

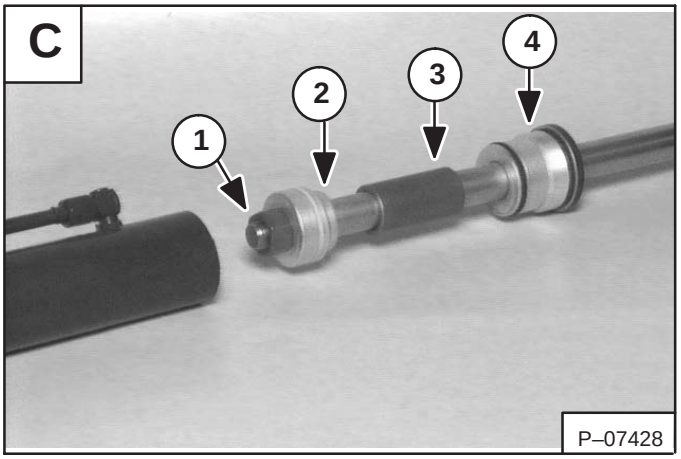
Put the base end of the cylinder in a vise.

Use a spanner wrench to loosen the head **[A]** & **[B]**.



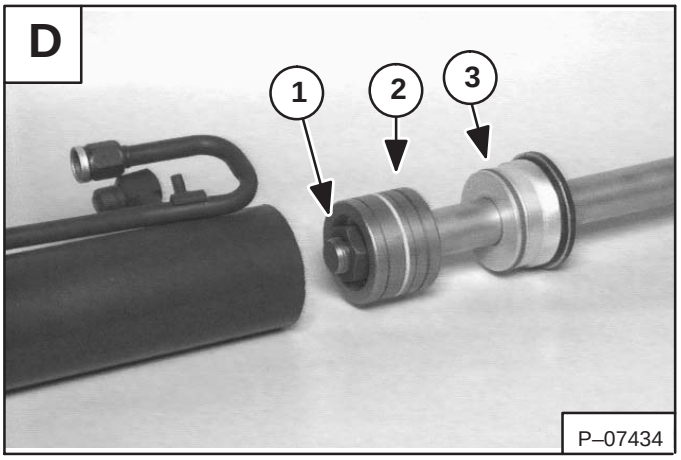
Lift Cylinder: Remove the head and the rod assembly from the cylinder **[C].** Put the rod end in a vise.

Lift Cylinder: Remove the nut (Item 1) **[C]**, piston (Item 2) **[C]**, spacer (Item 3) **[C]** (if so equipped) and head (Item 4) **[C]**.



Tilt Cylinder: Remove the head and rod assembly from the cylinder **[D]**. Put the rod end in a vise.

Tilt Cylinder: Remove the nut (Item 1) **[D]**, piston (Item 2) **[D]** and head (Item 3) **[D]**.



DUAL PRESSURE MAIN RELIEF VALVE (S/N 512811001 & Above) W/Select Valve (JEM) (Cont'd)

Checking The High Setting (Cont'd)

Install the hose (Item 1) **[A]** on the secondary auxiliary quick couplers as shown.

NOTE: The hose loop (Item 1) [A] (with .070 inch orifice), provides restriction and pilot pressure necessary to shift the dual stage main relief valve to the high pressure setting.

⚠ WARNING

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

W–2006–0284

Start the engine and run at low idle RPM. Increase the engine speed to full RPM. Push the mode switch (Item 1) **[B]** twice (on the instrument panel) to engage the front auxiliary hydraulics *detent*, the lights (Items 2 & 3) **[B]** will come ON.

NOTE: The High Horsepower switch should be in the OFF position.

Push the button (Item 1) **[C]** to engage the *detent* position to the front auxiliary quick couplers.

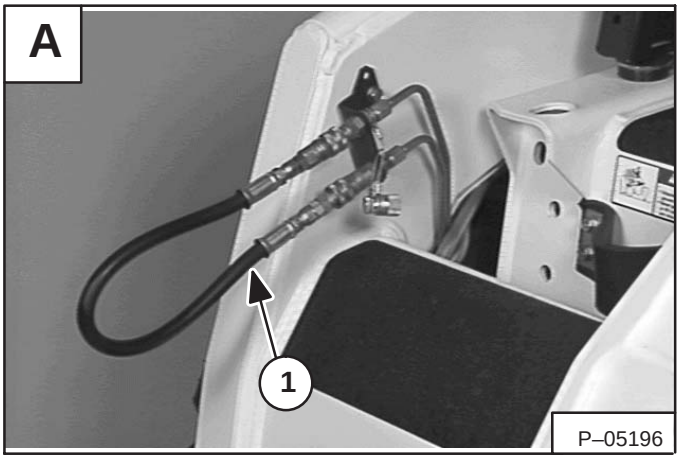
Push and hold the button (Item 2) **[C]** for fluid flow through the secondary auxiliary couplers and hose loop.

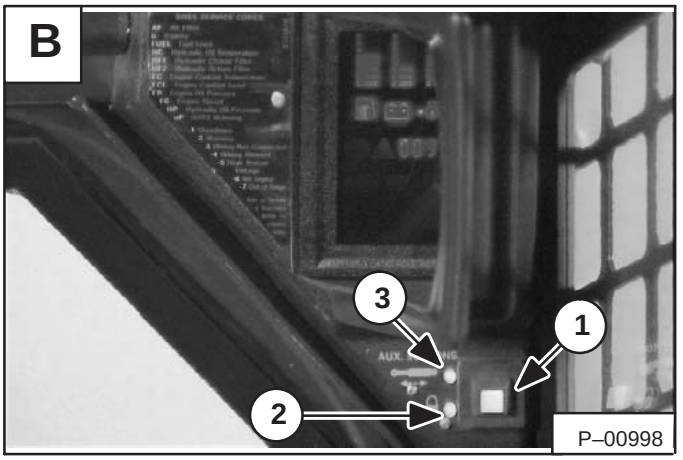
Watch the flow meter on the hydraulic tester to be sure the flow is correct.

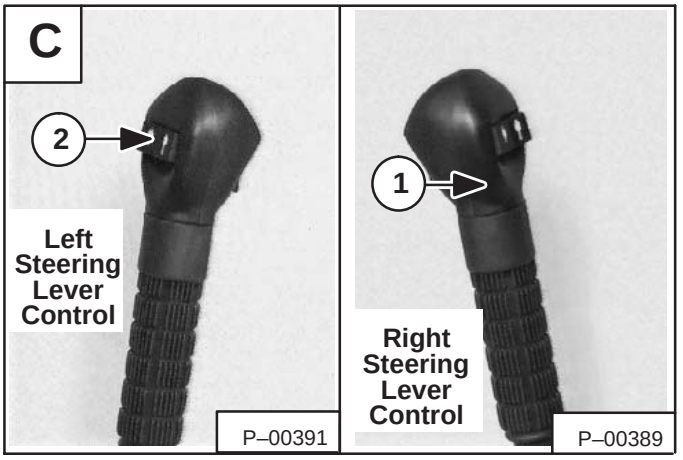
There should be approximately 18.0 GPM (68,1 L/min.) free flow. Turn the restrictor control on the tester, until the main relief valve opens. The correct pressure for the main relief is 3000 PSI (20685 kPa).

Release the button (Item 2) **[C]** and push the button (Item 1) **[C]** to disengage the *detent* position to the front auxiliary quick couplers.

If the relief pressure is not correct, stop the engine. Replace or adjust the main relief valve. (See Page 2–27.)







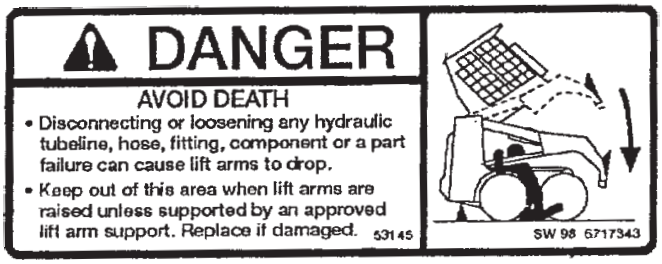
HYDRAULIC FILTER HOUSING

Removal And Installation

⚠ WARNING

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

W–2059–0598

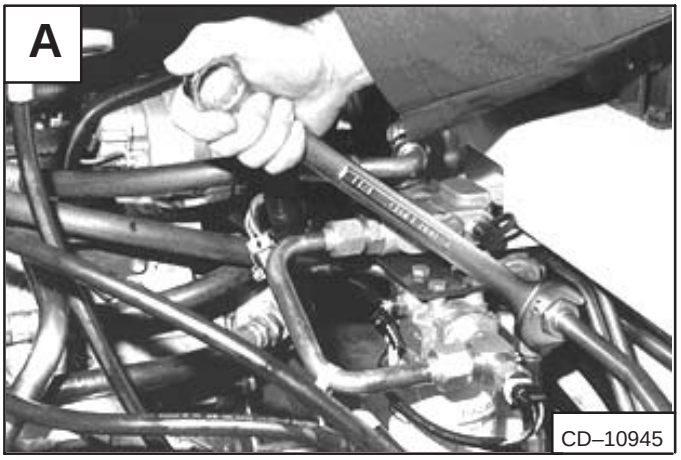


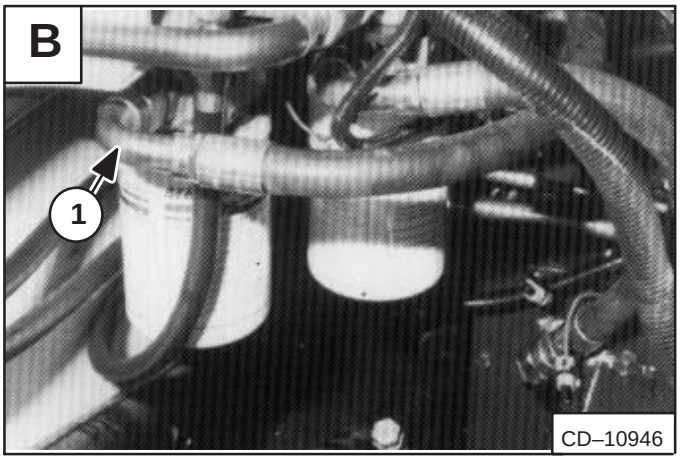
Disconnect the tubelines from the inlet of the hydraulic filter **[A]**.

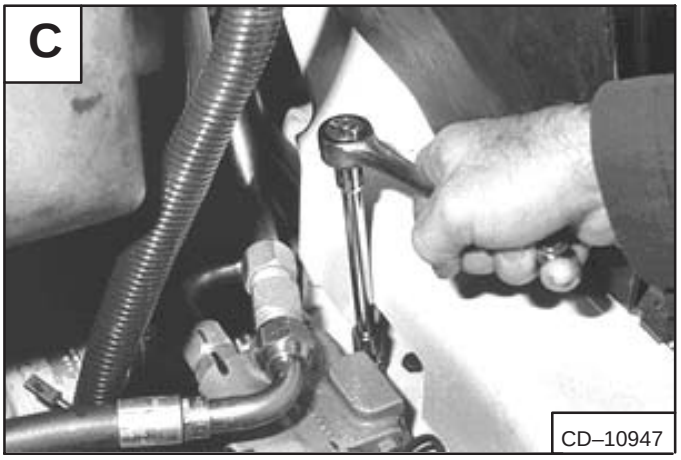
Disconnect the hose (Item 1) **[B]** from the outlet of the filter.

Remove the two mounting bolts and remove the hydraulic filter and housing **[C]**.

Installation: Tighten the mounting bolts to 25 ft.–lbs. (34 Nm) torque.







HYDROSTATIC SYSTEM

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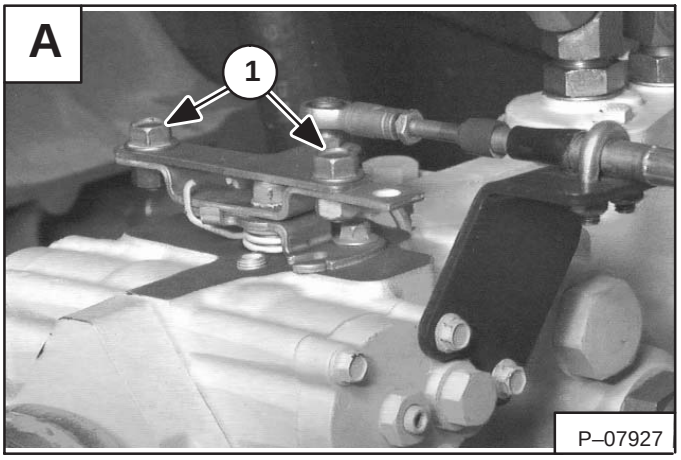
STEERING LEVERS (Cont'd)

Adjusting The Wheel RPM Forward Compared To Reverse Travel

Read this adjustment completely to become familiar with the procedure before beginning the adjustment.

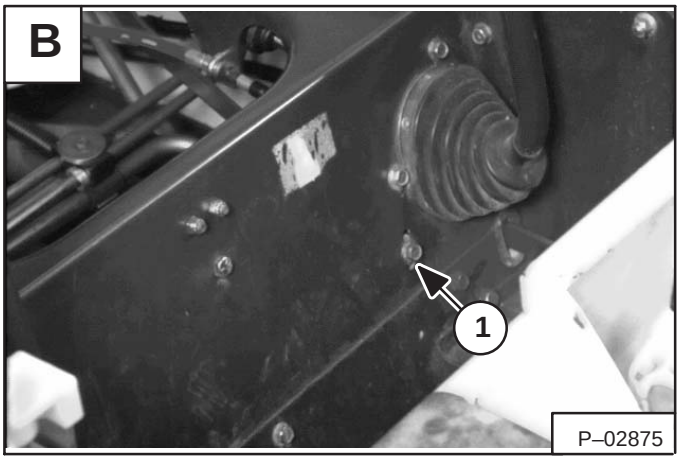
NOTE: This procedure adjusts the position of the steering levers in the panel when in neutral. Levers centered in steering panel give equal travel forward compared to reverse.

1. Disconnect the two bolts of the pintle links (both sides) (Item 1) **[A]**.



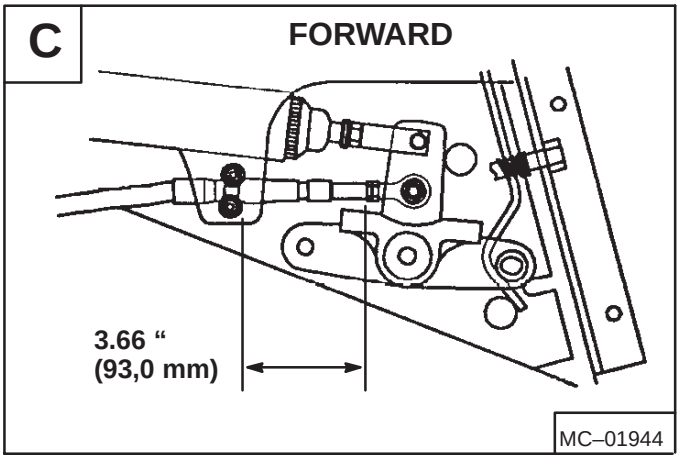
2. Fully lower steering lever stop and tighten (both sides) (Item 1) **[B]**.

NOTE: Before measuring, move the steering lever a small amount to be sure the cam is in the detent pocket with no freeplay.



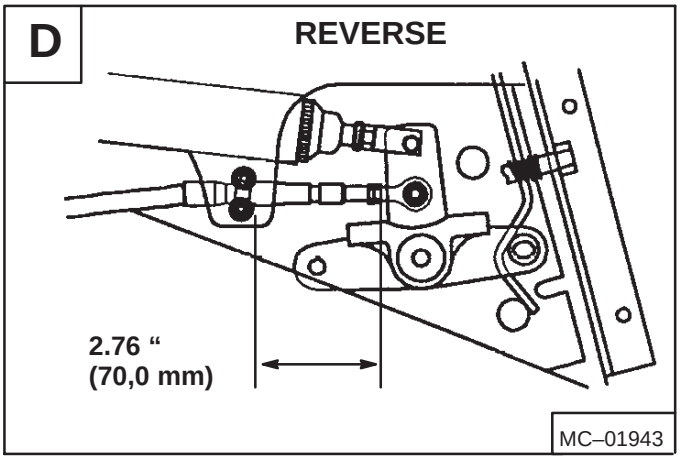
3. Move the lever to full forward, measure the distance from the U–bolt to the lock nut. Record this measurement **[C]**.

   EXAMPLE ONLY: 3.66 inch (82,0 mm)



4. Move the lever to full reverse, measure the distance from the U–bolt to the lock nut. Make a record of this measurement **[D]**.

   EXAMPLE ONLY: 2.76 inch (70,0 mm)



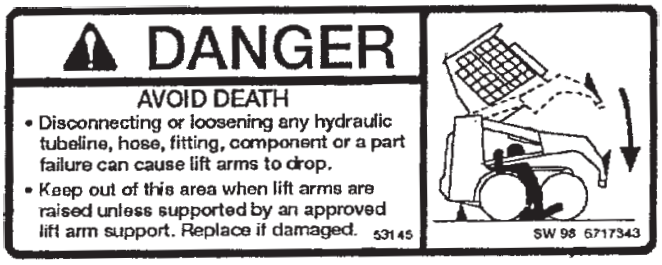
COLD OIL BY–PASS VALVE

Removal And Installation

⚠ WARNING

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

W–2059–0598



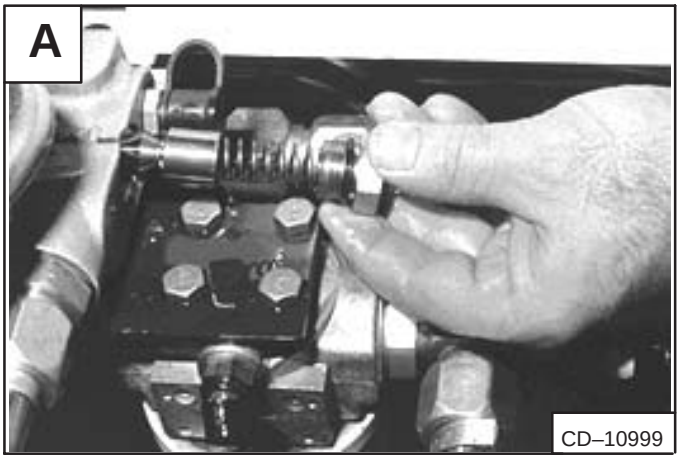
Remove the cold oil by–pass valve plug, spring and poppet to check for damage **[A]**.

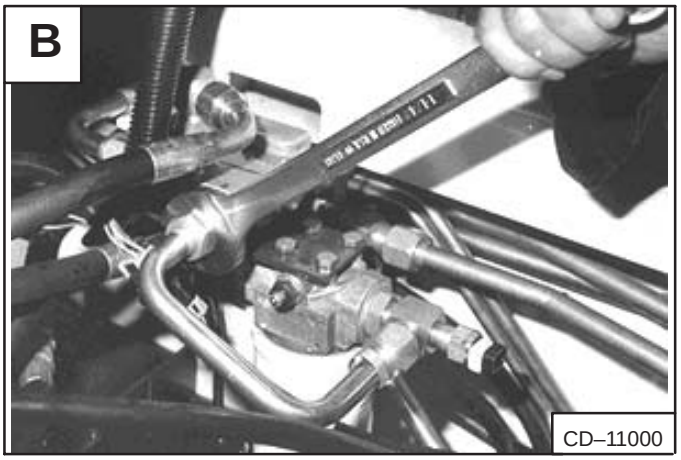
Replace the plug, spring and poppet if necessary.

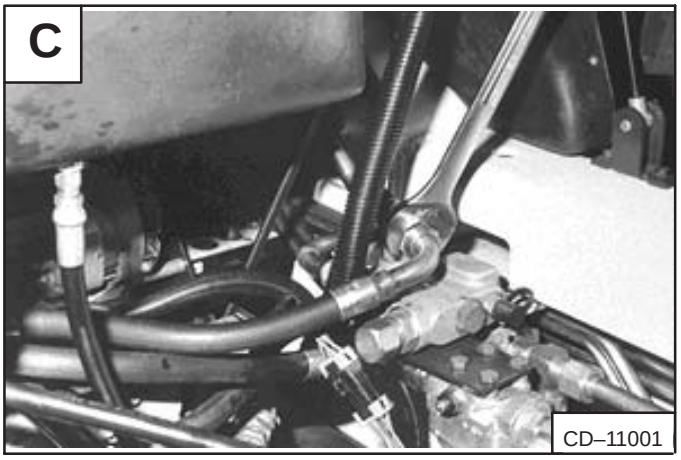
Disconnect the cold oil by–pass valve outlet tubeline **[B]**.

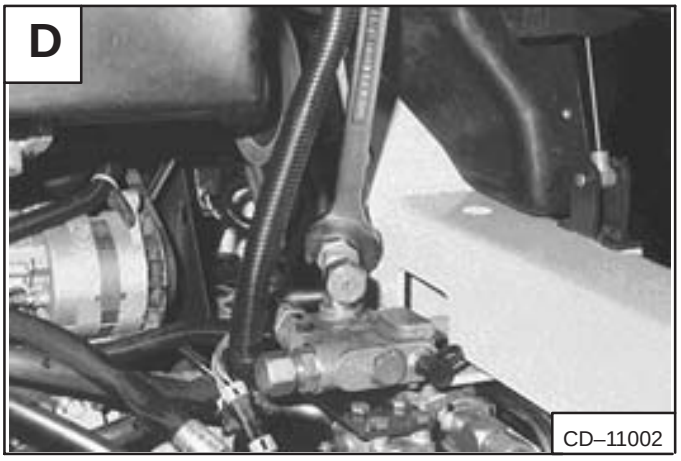
Disconnect the charge pump outlet hose from the tee on the by–pass valve **[C]**.

Disconnect the oil cooler inlet tubeline from the tee fitting **[D]**.





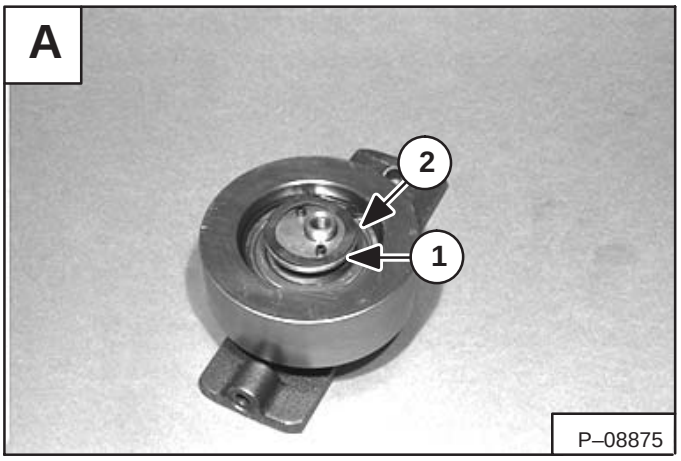




SPRING LOADED DRIVE BELT TENSIONER PULLEY (Cont'd)

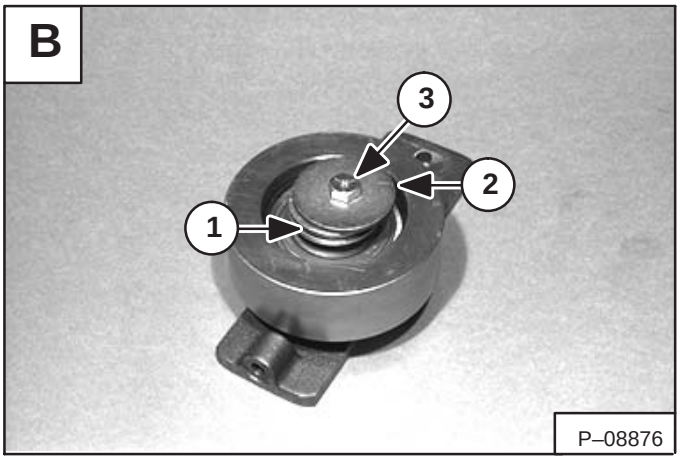
Assembly (Cont'd)

Install the first retainer washer (Item 1) **[A]** and spring washer (Item 2) **[A]** over the roll pins.



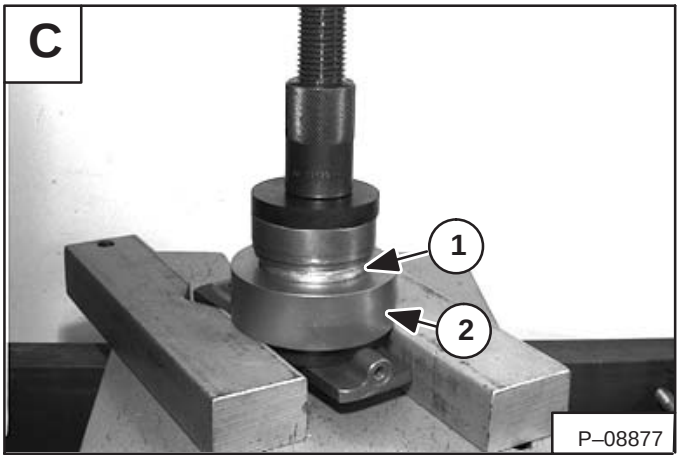
Install the second retainer washer (Item 1) **[B]**, the washer (Item 2) **[B]** and the bolt (Item 3) **[B]**. Tighten the bolt to 28–32 ft.–lbs. (38–45 Nm) torque.

Fill the grease cap 1/4 full (approximately 1/2–3/4 oz.) of grease.



Press the grease cap (Item 1) **[C]** onto the pulley assembly (Item 2) **[C]**. Press on the outer formed edge of the grease cap.

NOTE: When pressing the grease cap onto the pulley assembly, do not press down on the arrow indicator plate. Support the hub assembly so that it contacts only the hub and not the arrow indicator plate.



FIXED TENSIONER PULLEY (Cont'd)

Adjusting The Drive Belt

See the *SERVICE SCHEDULE* Page 1–1 for the service interval.

To adjust the drive belt between the engine flywheel and the hydrostatic pump pulley, use the following procedure:

Raise the operator cab. (See Page 1–1.)

Remove the belt shield. (See Page 3–26.)

Use the following tools to check the belt tension:

MEL1404 – Bar
MEL1406 – Spring Scale

1. Install the tool on the drive belt. The pin (Item 1) **[A]** must be pulled tight against the engine drive pulley.

2. Make a mark (Item 2) **[A]** on the cast flange just above the tool handle.

3. Install the spring scale on the tool handle. The line of pull (Item 3) **[A]** on the spring scale must be at approximately 90° from the tool handle.

4. Loosen bolt (Item 4) **[A]** and jam nut (Item 5) **[A]**.

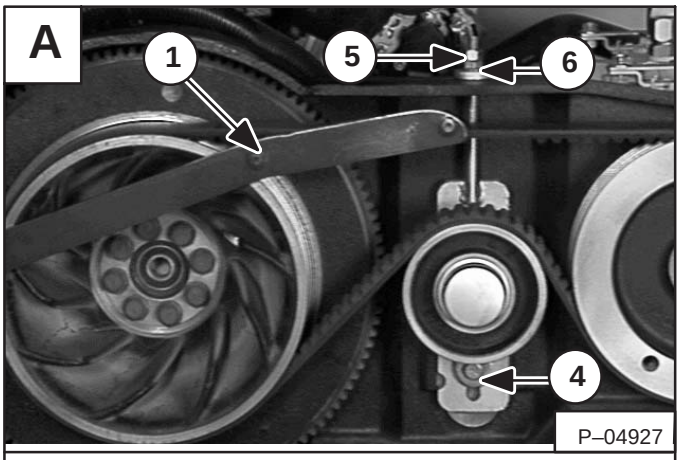
5. Tighten adjustment nut (Item 6) **[A]** to increase belt tension; loosen to decrease belt tension.

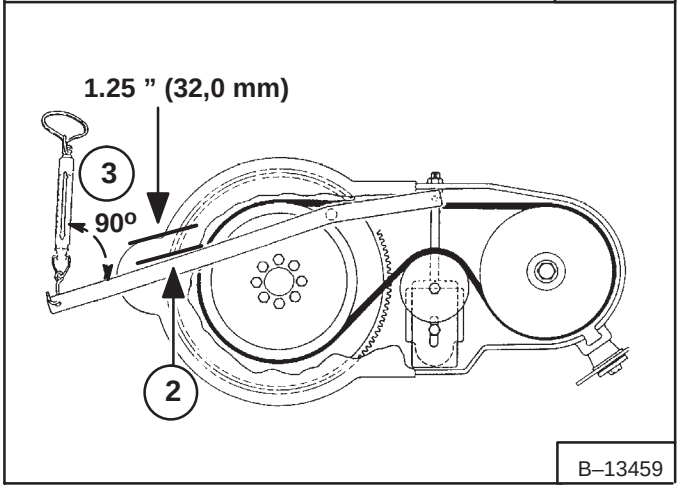
6. Tighten bolt (Item 4) **[A]** and jam nut (Item 5) **[A]**.

NEW BELT: (less than .5 hours use): With 14 lbs. (62 N) for force, the tool should move 1.25 inches (32,0 mm) (the width of the tool handle). Run the engine approximately 5 minutes and readjust the tension.

USED BELT: (more than .5 hours use): With 12 lbs. (52 N) of force, the tool should move 1.25 inches (32,0 mm) (the width of the tool handle).

Always readjust if a tension check results in a reading of less than 10 lbs. (44N) of force.





AXLE SEAL

Removal And Installation

Lift and block the loader. (See Page 1–1.)

Remove the tire/wheel assembly.

Installation: Tighten the wheel nuts to 105–115 ft.–lbs. (142–155 Nm) torque.

Remove the bolts (Item 1) **[A]** and plate.

Installation: Tighten the bolts to 175–190 ft.–lbs. (240–260 Nm) torque.

Remove the two wheel studs (Item 2) **[A]** across from each other.

Install puller (Item 1) **[B]** on the wheel hub.

⚠ WARNING

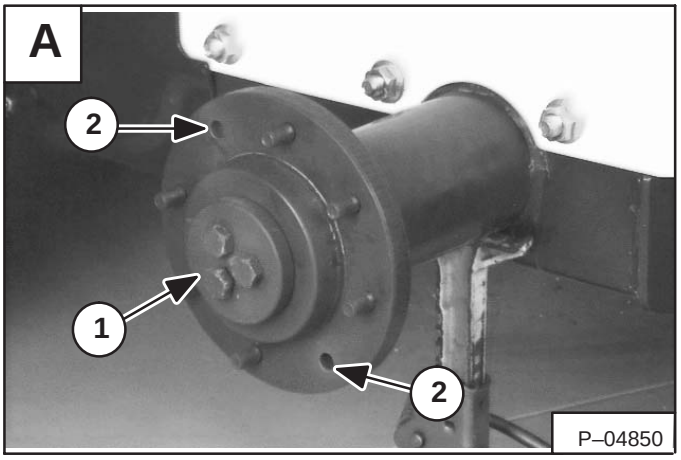
NEVER STAND IN–LINE OF THE HUB WHEN REMOVING A HUB FROM AN AXLE. The hub has a tapered fit on the axle end and can come off the axle with great force and cause serious injury.

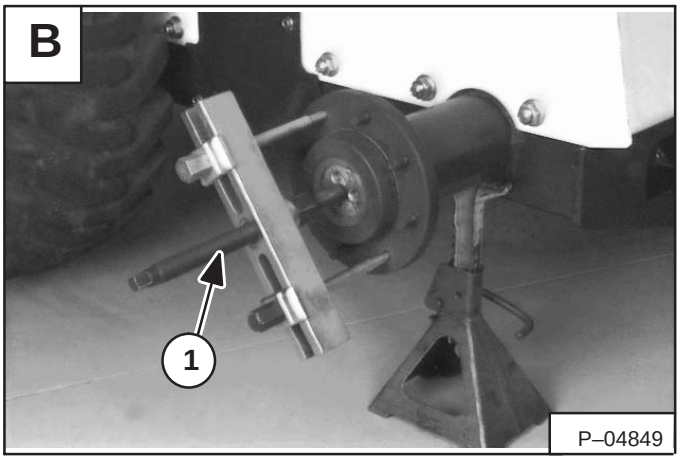
W–2186–0395

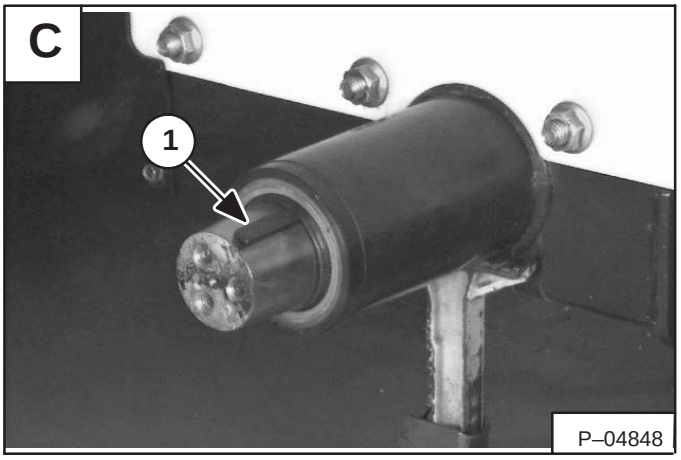
Remove the hub from the axle.

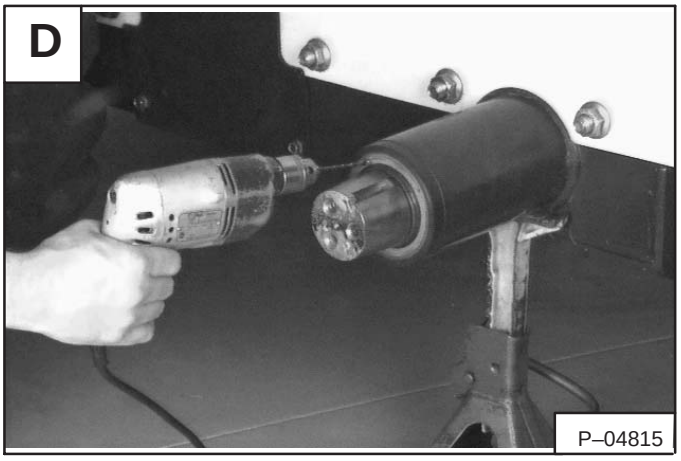
Remove the key (Item 1) **[C]** from the axle.

Drill a hole into the axle seal **[D]**.





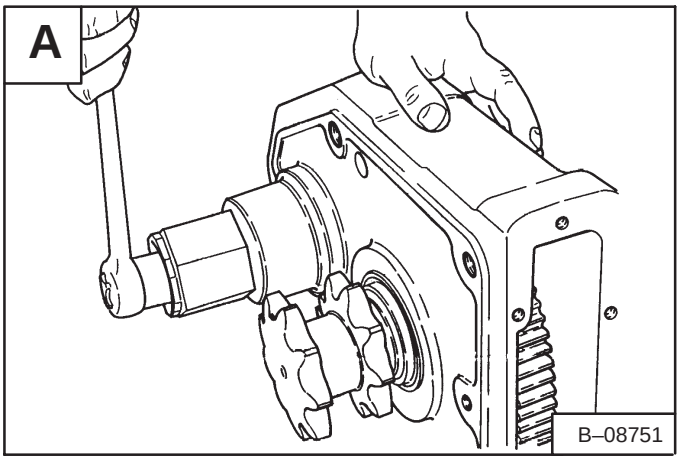




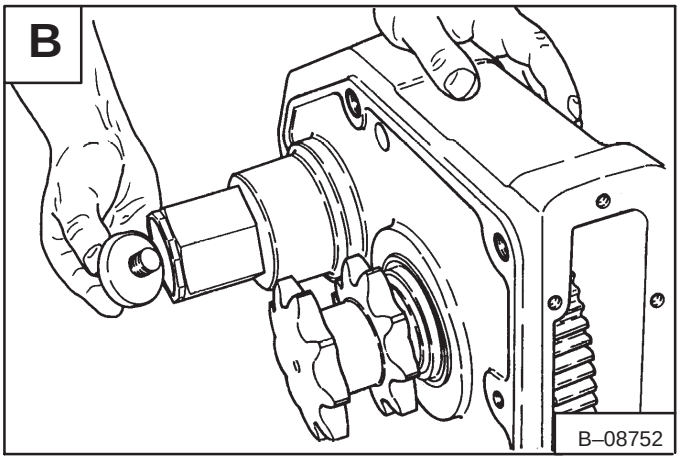
REDUCTION GEARCASE (Cont'd)

Disassembly (Cont'd)

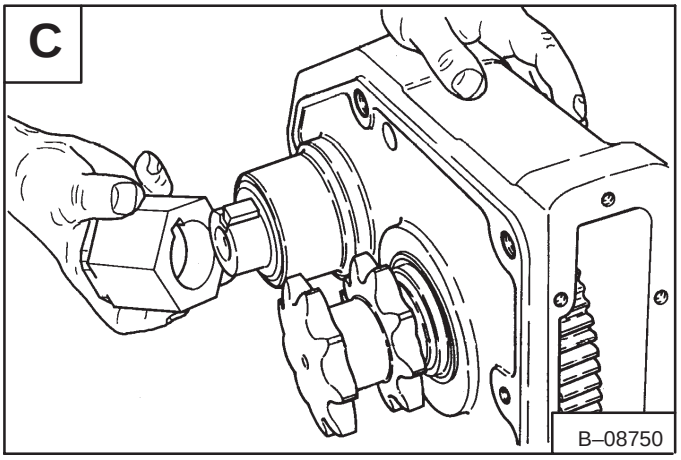
Remove the bolt from the disc hub **[A]**.



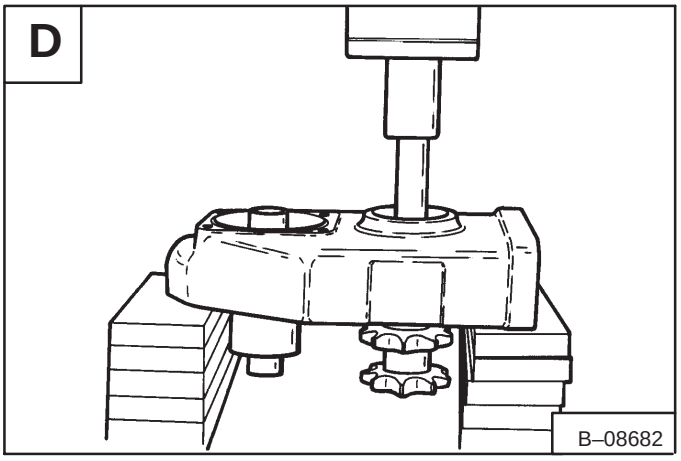
Remove the bolt and washer **[B]**.



Remove the disc hub and key **[C]**.



Put the gearcase housing in the press and remove the output shaft **[D]**.



Page Number

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LIFT ARMS
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OPERATOR CAB
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REAR DOOR
Bumper Removal And Installation 5–14
Door Latch And Catch Adjustment 5–14
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REAR GRILL
Removal And Installation 5–12

LIFT ARMS

Removal And Installation

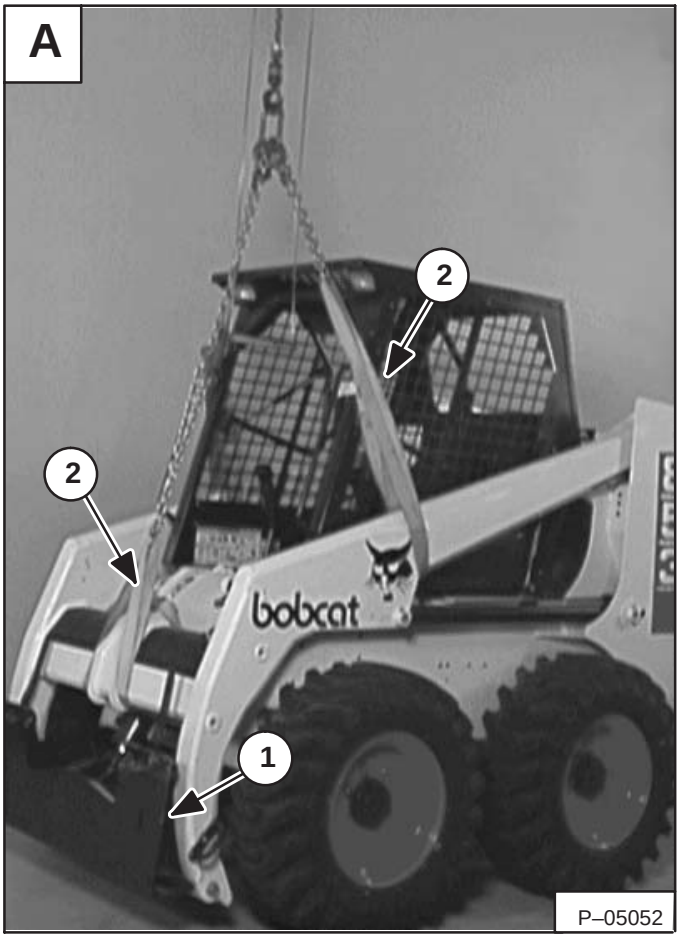
Roll the Bob–Tach (Item 1) **[A]** fully forward.

Stop the engine.

Remove the Bob–Tach (Item 1) **[A]** from the lift arms (Page 5–7).

Install the slings (Item 2) **[A]** on the lift arms.

Connect a chain hoist to the slings **[A]**.



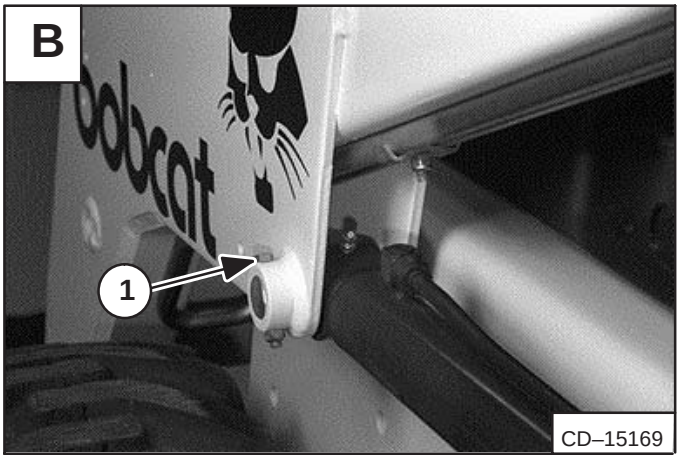
Remove the retainer bolt and nut (Item 1) **[B]** from the rod end lift cylinder pivot pin (both sides).

Installation: Tighten the retainer bolt and nut to 18–20 ft.–lbs. (24–27 Nm) torque.

Raise the lift arms with the chain hoist so there is enough clearance to remove the rod end pivot pin.

Remove the lift cylinder rod end pivot pin (both sides).

Lower the lift arms.



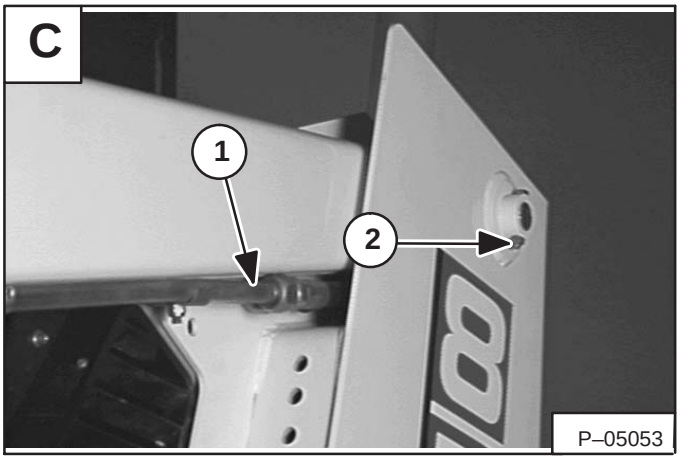
Disconnect the auxiliary hydraulic tubelines and hoses (Item 1) **[C]** if so equipped (both sides).

Remove the retainer bolt and nut (Item 2) **[C]** from the lift arm pivot pin.

Installation: Tighten the retainer bolt and nut to 18–20 ft.–lbs. (24–27 Nm) torque.

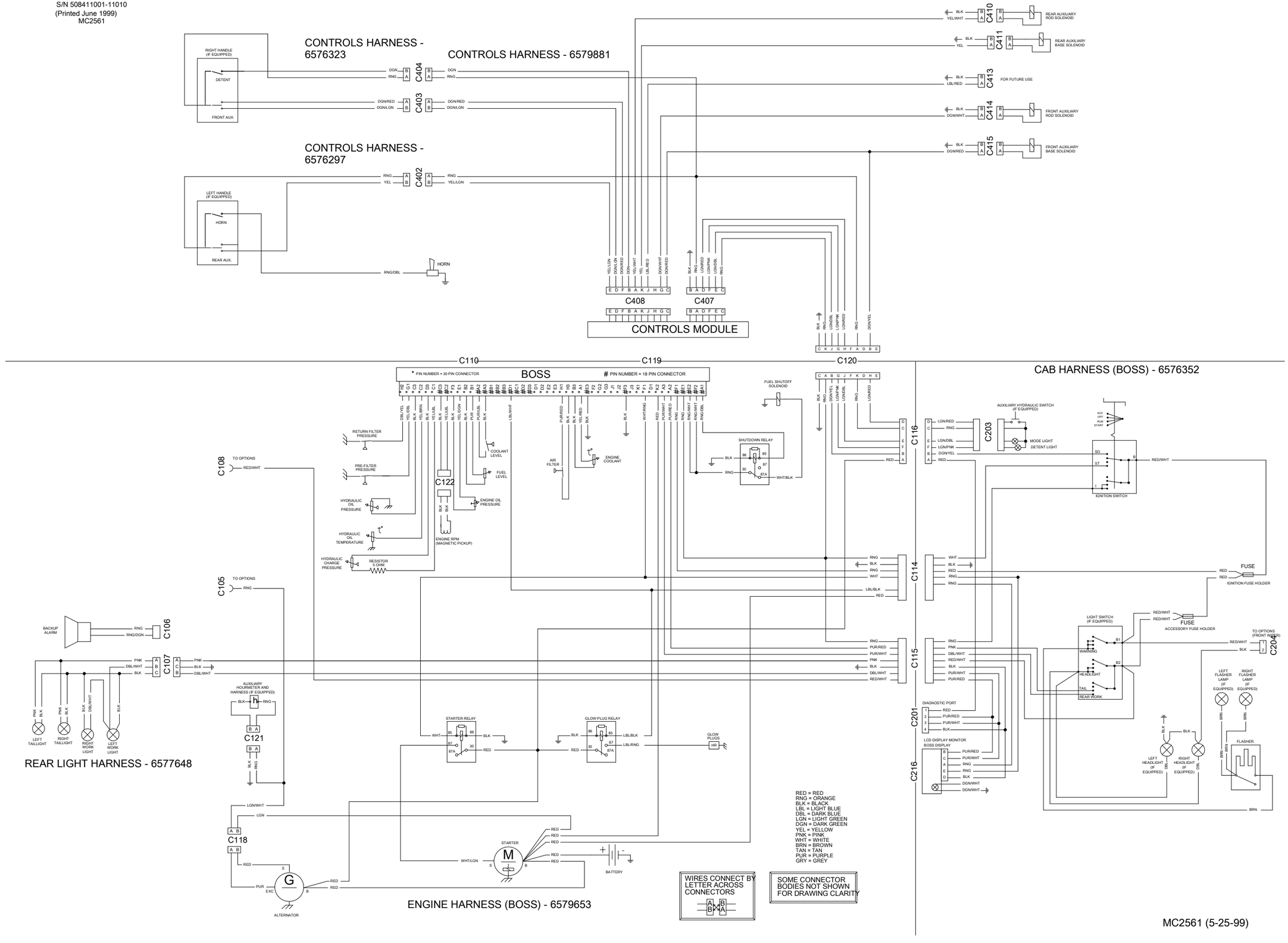
Remove the lift arm pivot pin.

Raise the lift arms with the chain hoist and remove from the loader frame.



853 BOSS - WIRING SCHEMATIC

S/N 508411001-11010
(Printed June 1999)
MC2561



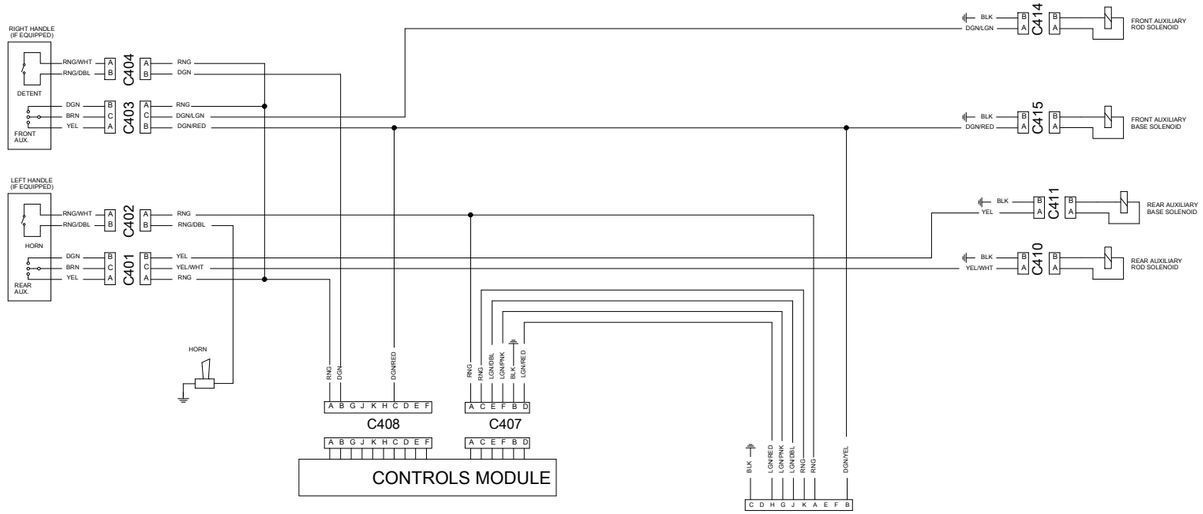
MC2561 (5-25-99)

853 BOSS - WIRING SCHEMATIC

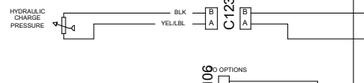
S/N 508412461-15055
S/N 509711335-15096
S/N 510250001-50161
S/N 510375001-75092

(Printed June 1999)
MC2563

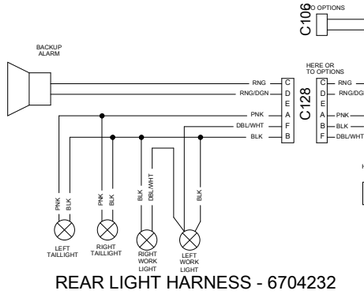
CONTROLS HARNESS - 6703878



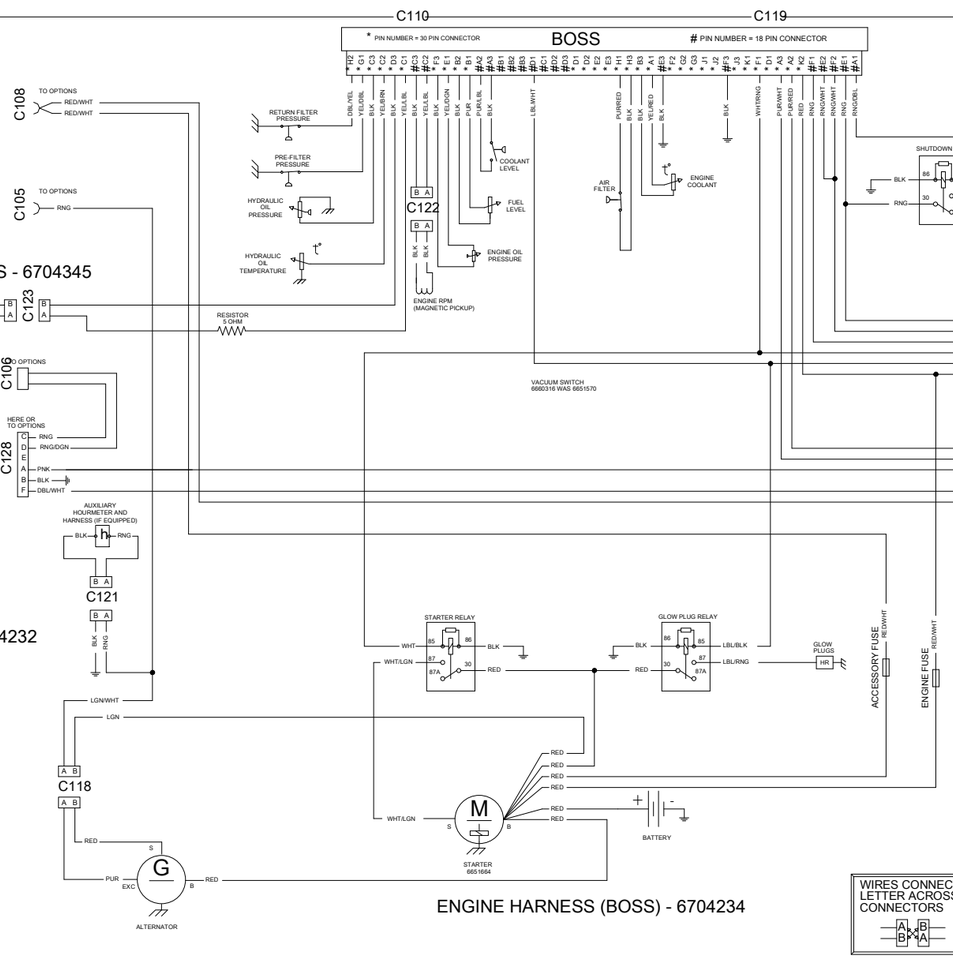
TRANSDUCER HARNESS - 6704345



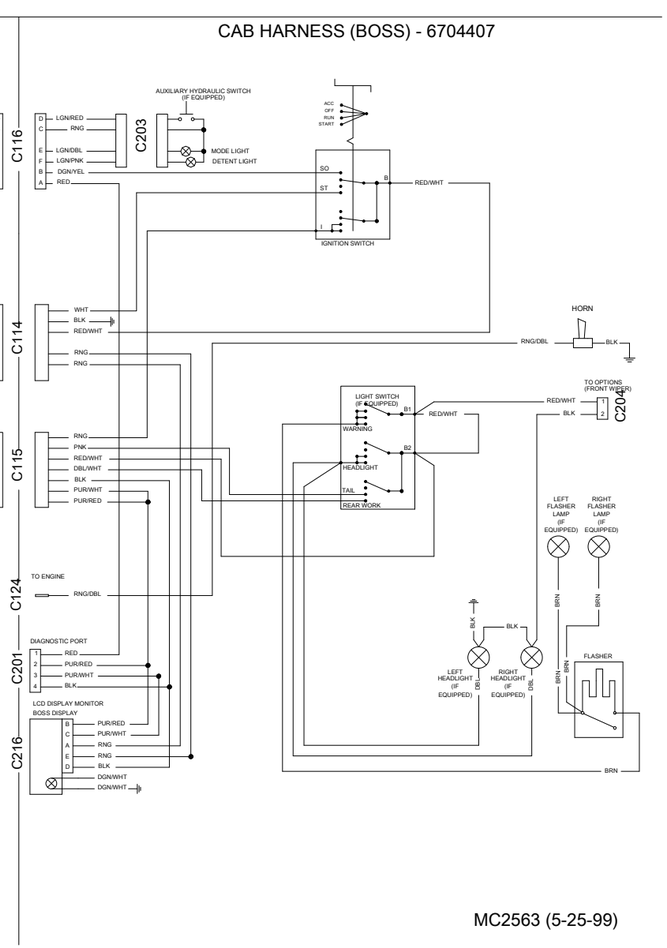
REAR LIGHT HARNESS - 6704232



ENGINE HARNESS (BOSS) - 6704234



CAB HARNESS (BOSS) - 6704407



RED = RED
RNG = ORANGE
BLK = BLACK
LBL = LIGHT BLUE
DBL = DARK BLUE
LGN = LIGHT GREEN
DGN = DARK GREEN
YEL = YELLOW
PNK = PINK
WHT = WHITE
BRN = BROWN
TAN = TAN
PUR = PURPLE
GRY = GREY

WIRES CONNECT BY LETTER ACROSS CONNECTORS

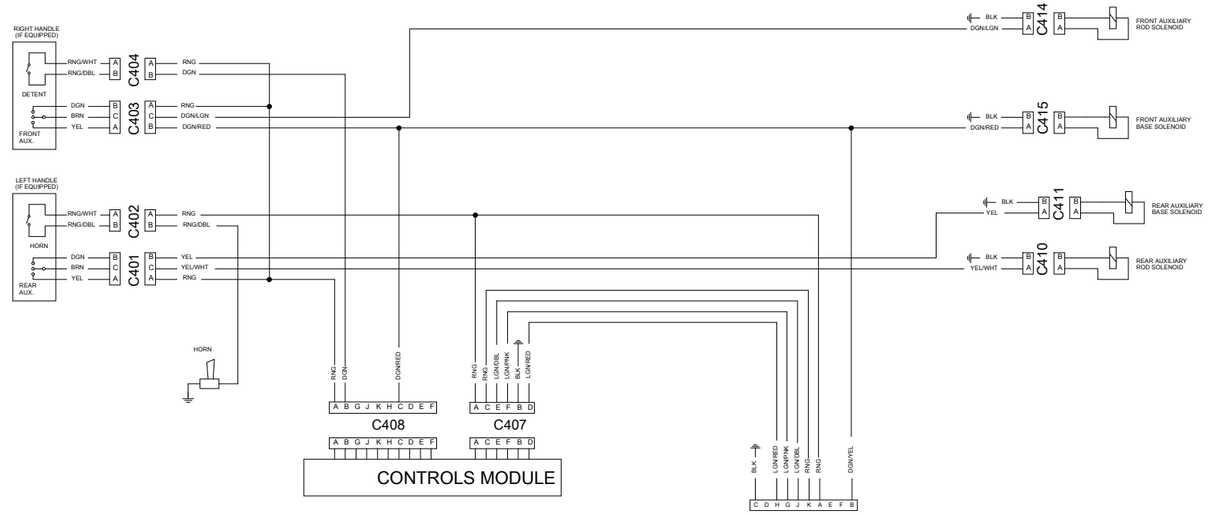
SOME CONNECTOR BODIES NOT SHOWN FOR DRAWING CLARITY

MC2563 (5-25-99)

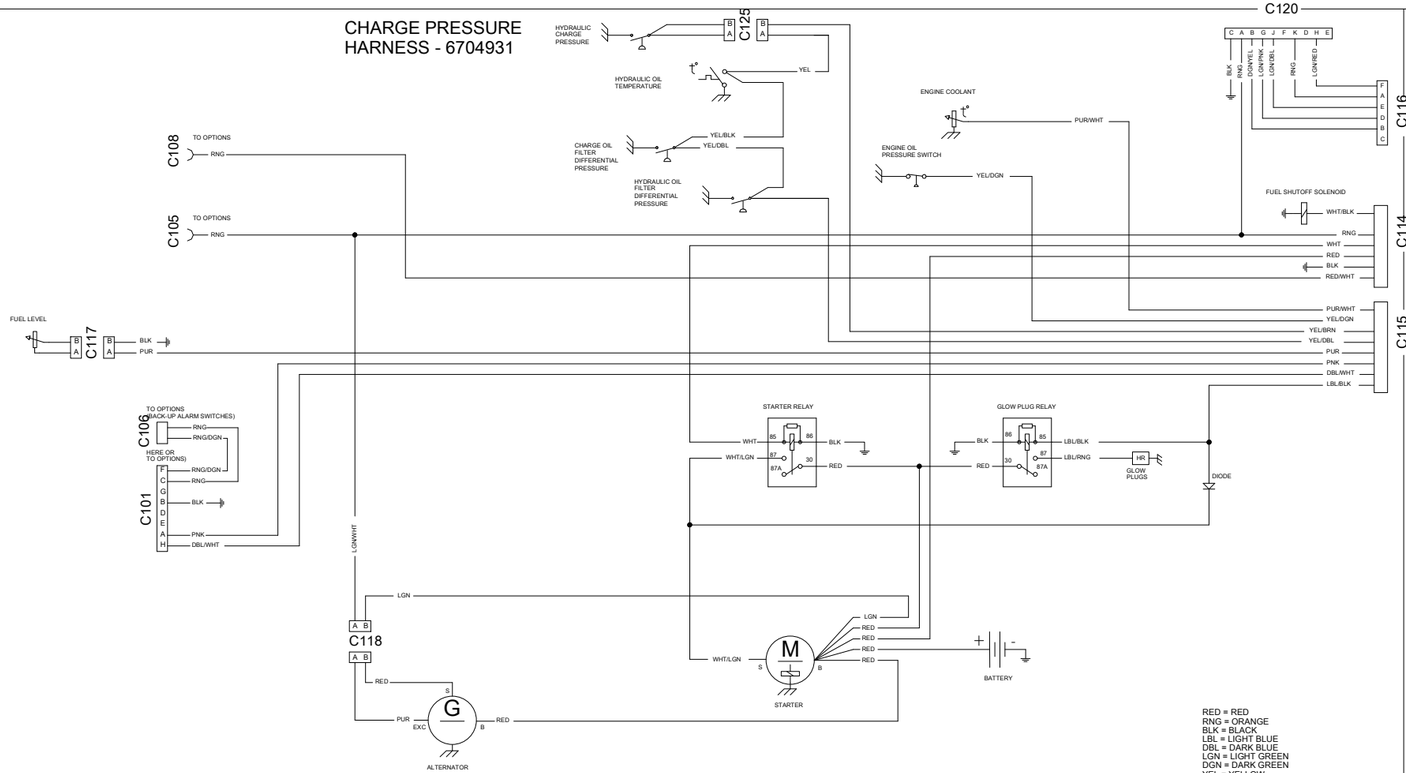
853 WITHOUT BOSS - WIRING SCHEMATIC

S/N 510125240-26110
(Printed June 1999)
MC2569

CONTROLS HARNESS - 6703878



CHARGE PRESSURE HARNESS - 6704931



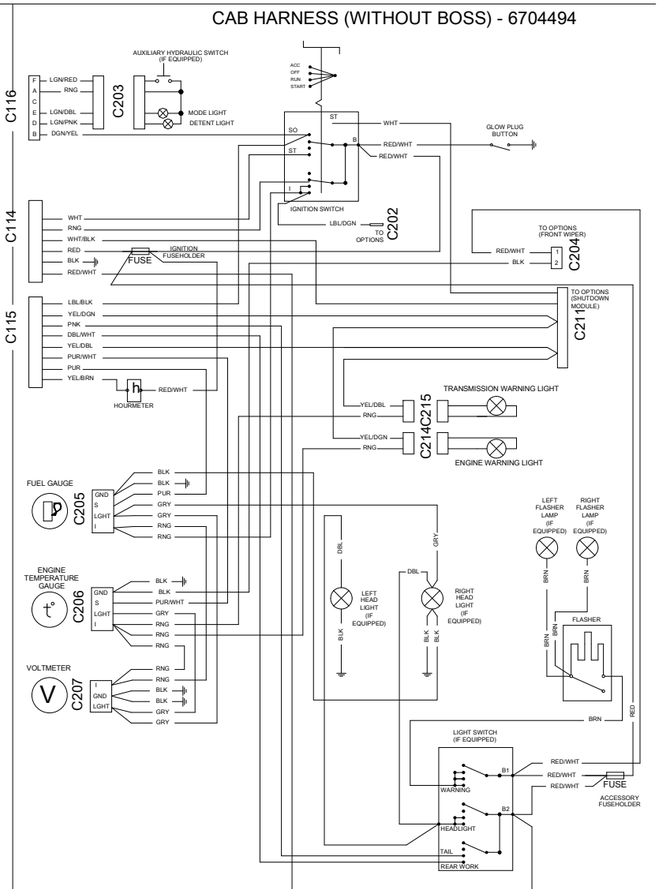
ENGINE HARNESS (WITHOUT BOSS) - 6704932 OR 6705111

RED = RED
RNG = ORANGE
BLK = BLACK
LBL = LIGHT BLUE
DBL = DARK BLUE
LGN = LIGHT GREEN
DGN = DARK GREEN
YEL = YELLOW
PNK = PINK
WHT = WHITE
BRN = BROWN
TAN = TAN
PUR = PURPLE
GRY = GREY

WIRES CONNECT BY LETTER ACROSS CONNECTORS

SOME CONNECTOR BODIES NOT SHOWN FOR DRAWING CLARITY

CAB HARNESS (WITHOUT BOSS) - 6704494



MC2569 (5-14-99)

TROUBLESHOOTING

Chart

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

⚠ WARNING

Instructions are necessary before operating or servicing machine. Read and understand the Operation & Maintenance Manuals, 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–2003–0199

PROBLEM	CAUSE
Battery will not take a charge.	2, 3, 4
Alternator will not charge.	1, 4
Starter will not turn the engine.	2, 3, 4, 6, 7, 8, 9

KEY TO CORRECT THE CAUSE

1. Alternator belt is loose or damaged.
2. Battery connections are dirty or loose.
3. Battery is damaged.
4. The cable & wire connection are not making a good contact.
5. The alternator is damaged.
6. The engine is locked.
7. The starter is damaged.
8. The wiring or the solenoid is damaged.
9. Check the fuses.

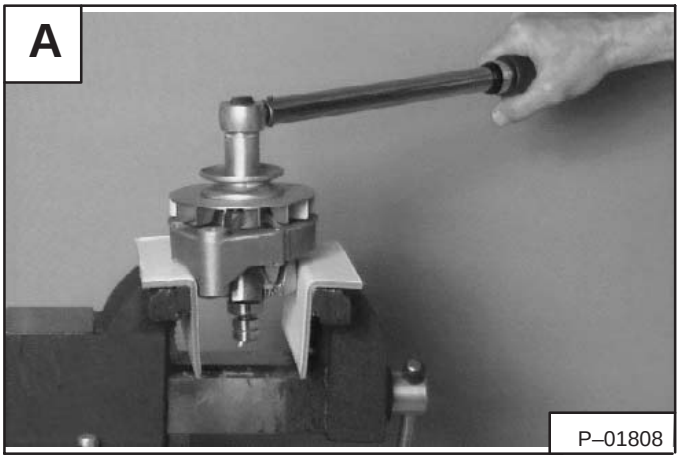
ALTERNATOR (Cont'd)

Assembly

Reverse the order of disassembly.

Place the rotor in soft jaws when tightening the shaft nut. Tighten to 50 ft.–lbs. (68 Nm) torque **[A]**.

Install the rear case half and the remaining parts.



ENGINE SERVICE

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BELT SHIELD	
Removal And Installation	7–38
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Checking	7–78
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CAMSHAFT GEAR	
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COOLANT RECOVERY TANK	
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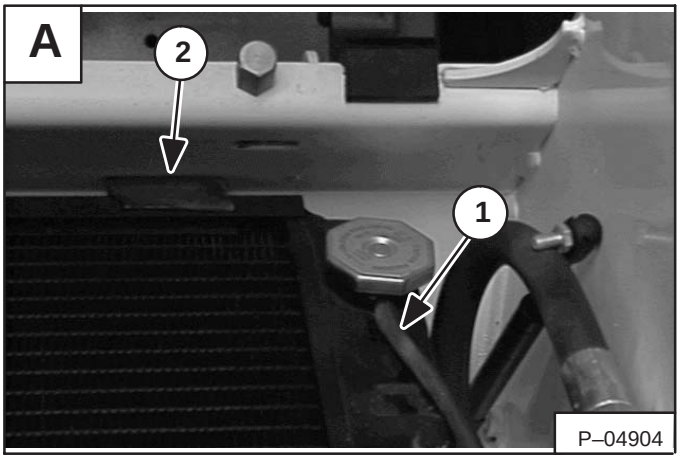
Removal And Installation	7–7
ENGINE SPEED CONTROL	
Removal And Installation	7–6

RADIATOR (Cont'd)

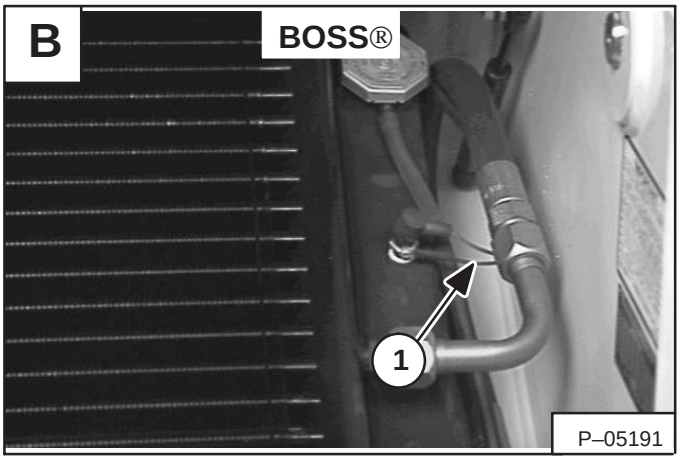
Removal And Installation (Cont'd)

Disconnect the over–fill hose (Item 1) **[A]**.

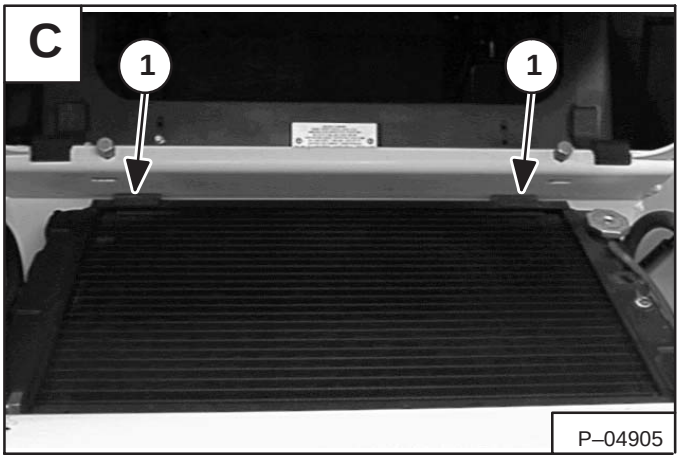


If so equipped, disconnect the wires from the water level sensor (Item 1) **[B]**.

Remove the radiator from the loader.



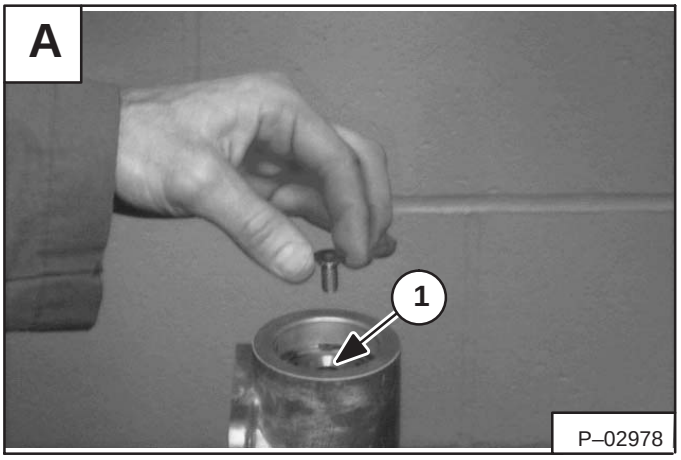
Installation: Be sure the rubber bumpers (Item 2) **[A]** are located at each side (Item 1) **[C]** before installing the radiator tabs into the loader frame.



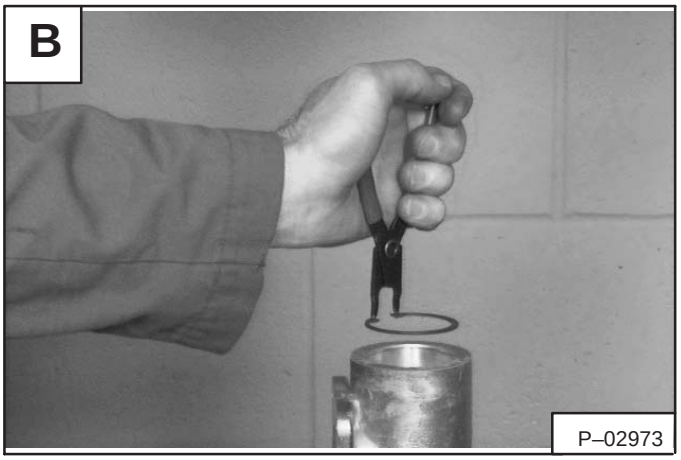
FAN GEARBOX (Cont'd)

Disassembly (Cont'd)

Remove the screw and washer (Item 1) **[A]** from the shaft.

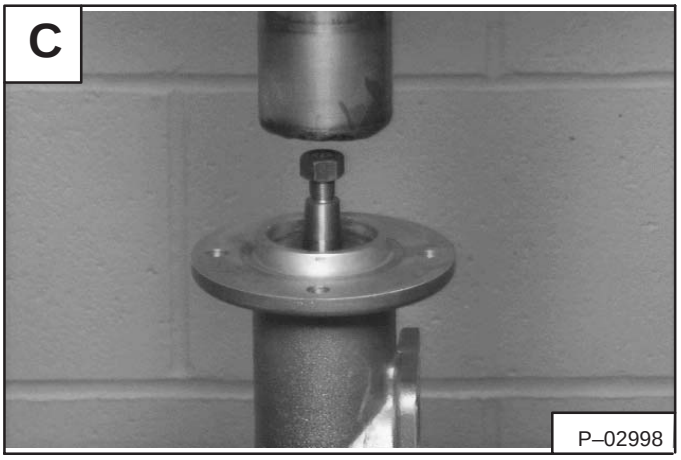


Remove the snap ring from the cap end of the housing **[B]**.

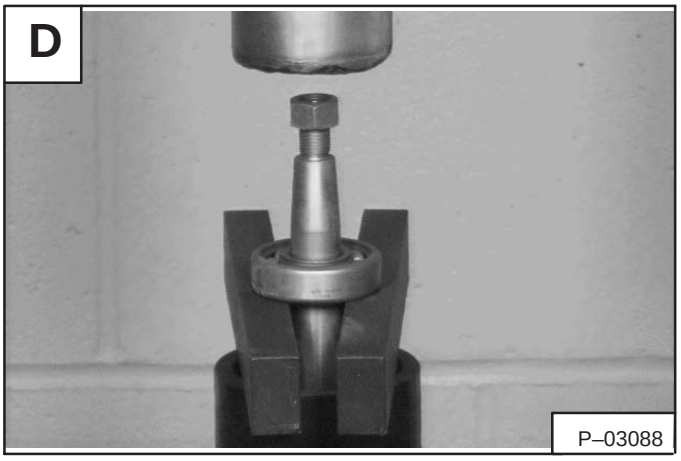


Press the shaft from the housing **[C]**.

NOTE: Both bearings may come out of the housing with the shaft. If one bearing remains in the housing, use a non metal object to tap the bearing from the housing.



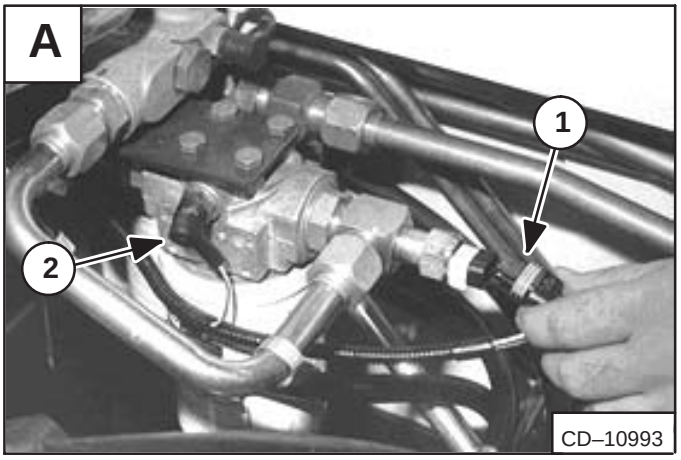
Press the bearing from the tapered end of the shaft **[D]**.



ENGINE (Cont'd)

Removal And Installation (Cont'd)

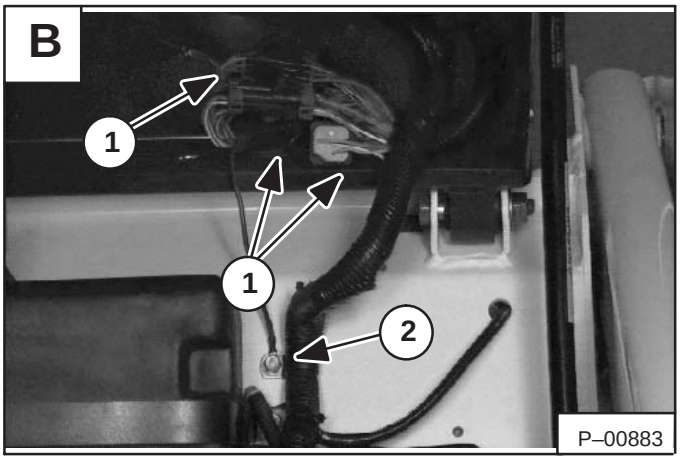
Disconnect the wires (Item 1 & 2) **[A]** at the filter.



Disconnect the electrical harness connectors (Item 1) **[B]**.

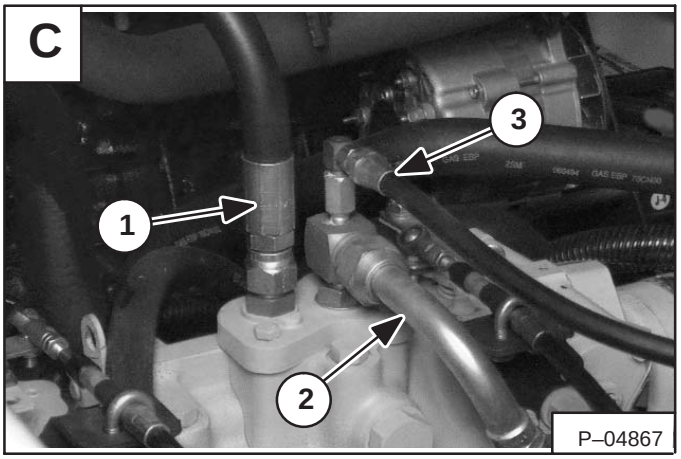
Disconnect the ground wire and harness clamp (Item 2) **[B]**.

NOTE: The electrical harness will be removed with the engine.



Disconnect the hose (Item 1) **[C]** from the oil cooler.

Disconnect the hose (Items 2 & 3) **[C]** from the hydrostatic pump.



IMPORTANT

When making repairs on 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.

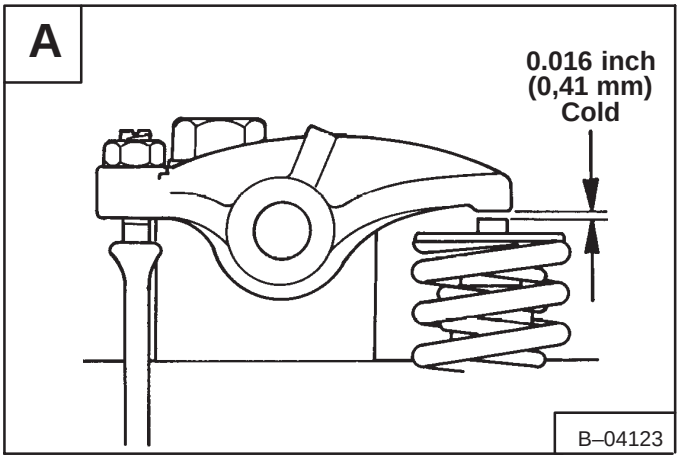
I–2003–0284

VALVE CLEARANCE

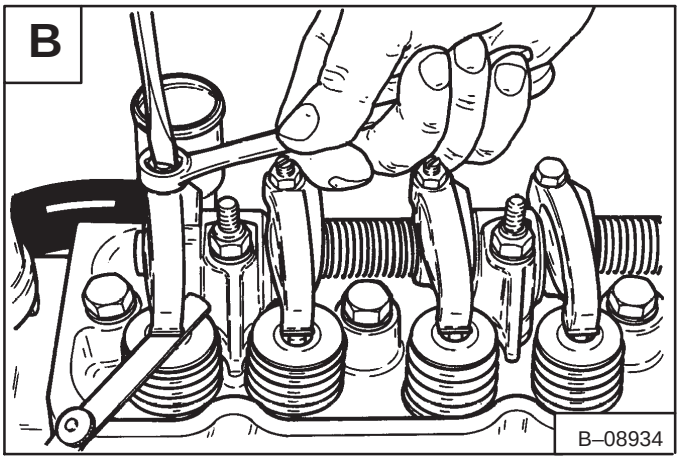
Adjustment

Make the valve clearance adjustment with engine stopped and cold.

The correct clearance is 0.016 inch (0,41 mm) with the engine cold **[A]**.



Put the correct size feeler gauge between the rocker arm and the valve stem. Turn the adjustment bolt until the clearance is correct **[B]**.



Use the following sequence to set the valve clearance:

	Front						Rear	
Cylinder No.	**1**		**2**		**3**		**4**	
Valve arrangement	I	E	I	E	I	E	I	E
Piston in No. 1 cylinder is at TDC on compression stroke	●	●	●			●		
Piston in No. 4 cylinder is at TDC on compression stroke				●	●		●	●

ENGINE COMPRESSION

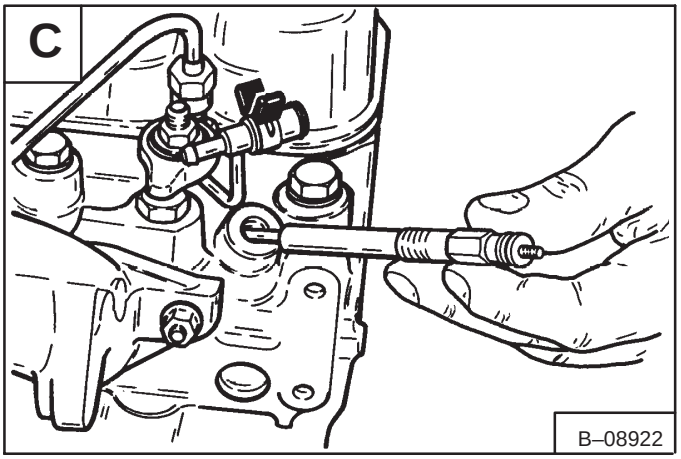
Checking

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

OEM1074 – Engine Compression Kit
MEL1268 – Compression Gauge Test Adapter

The engine must be at operating temperature.

Remove the glow plugs **[C]**. (See Page 7–40.)



Install the correct compression adapter into the cylinder head.

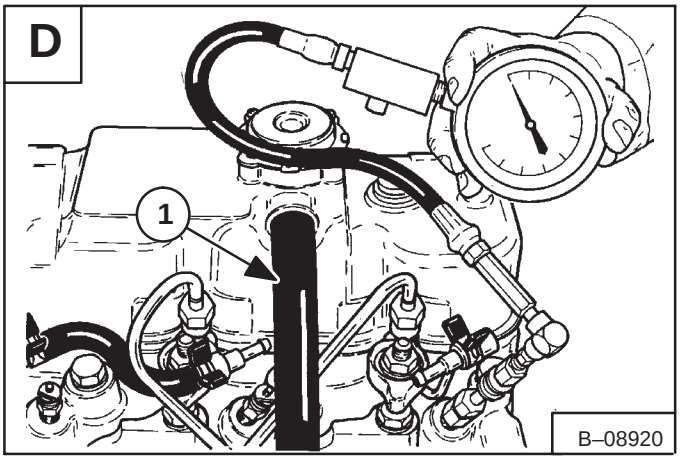
Connect the compression gauge **[D]**.

The engine must be turning at about 175 RPM.

The compression must be between 300–500 PSI (2069–3448 kPa) with no more than 50 PSI (345 kPa) difference between cylinders.

The engine has an open crankcase ventilation system.

The ventilation hose comes from the valve cover tube (Item 1) **[D]** and passes down the side of the engine block.



CYLINDER HEAD

Removal And Installation

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

MEL1267 – Cylinder Head Bolt Wrench

Clean all the debris from the cylinder head and engine.

Remove the coolant from the engine and radiator. Remove the radiator hoses.

Remove the fuel injectors and fuel tubelines. (See Page 7–48.)

Remove the valve cover nuts in the correct sequence **[A]**.

Installation: Tighten the nuts to 6–13 ft.–lbs. (8–17 Nm) torque in the correct sequence **[A]**.

Remove the rocker arm assembly bolts in the correct sequence **[B]**.

Installation: Tighten the bolts in the correct sequence to 36–43 ft.–lbs. (49–58 Nm) torque.

Remove the cylinder head bolts in the correct sequence **[C]**.

Installation: Lubricate the bolts and tighten them in two steps as listed, in the correct numerical sequence **[D]**.

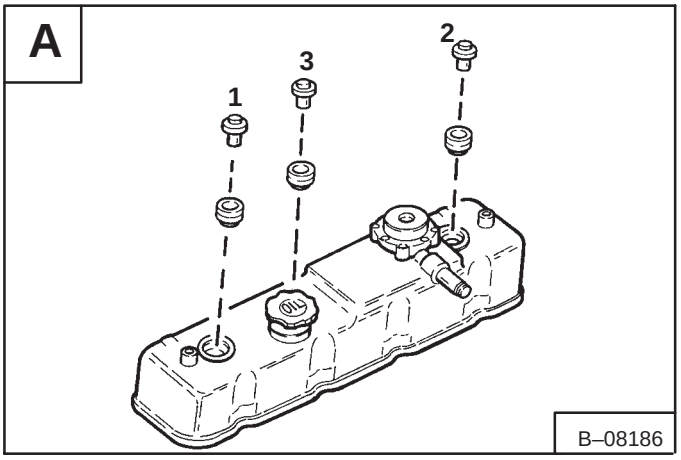
	Step 1	Step 2
New Bolts	29 ft.–lbs. (39 Nm)	59–67 ft.–lbs. (80–91 Nm)
Used Bolts	62 ft.–lbs. (83 Nm)	72–80 ft.–lbs. (97–108 Nm)

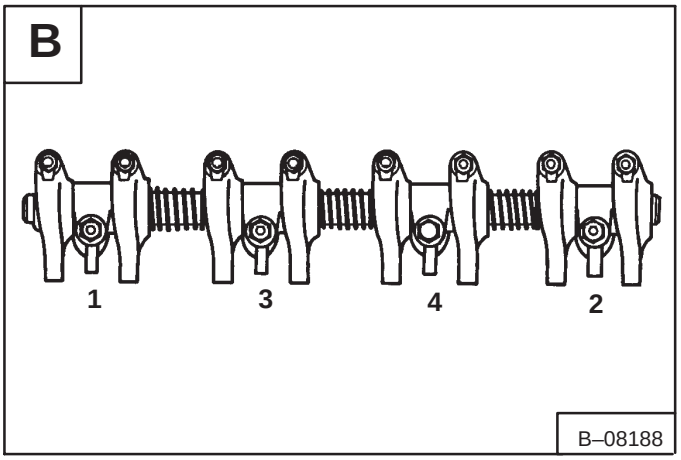
NOTE: When removing the head, do not use a sharp tool between the head and the engine block. Always put the cylinder head on a flat surface, such as wood, to prevent damage to the machined surface.

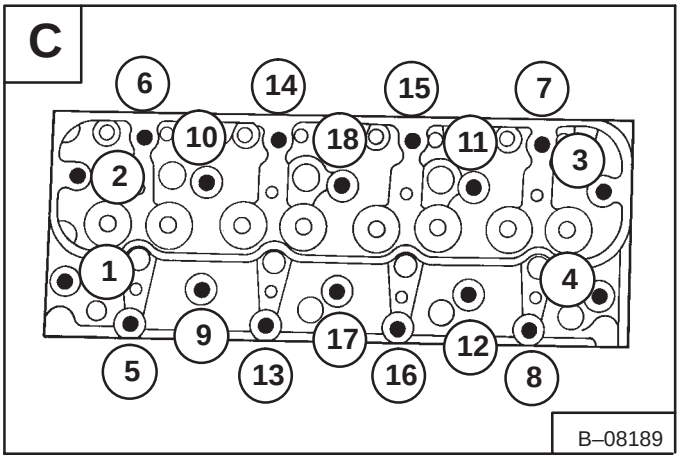
Remove the head from the engine.

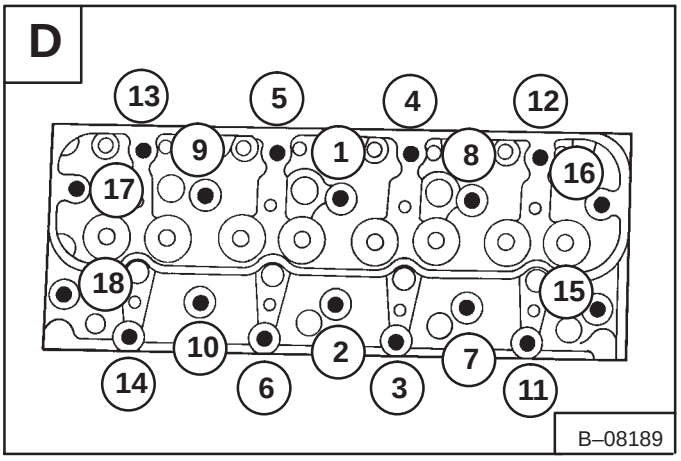
See Page 7–53 for removing and reconditioning the valves.

After the cylinder head is installed, adjust the valve clearance. (See Page 7–41.)





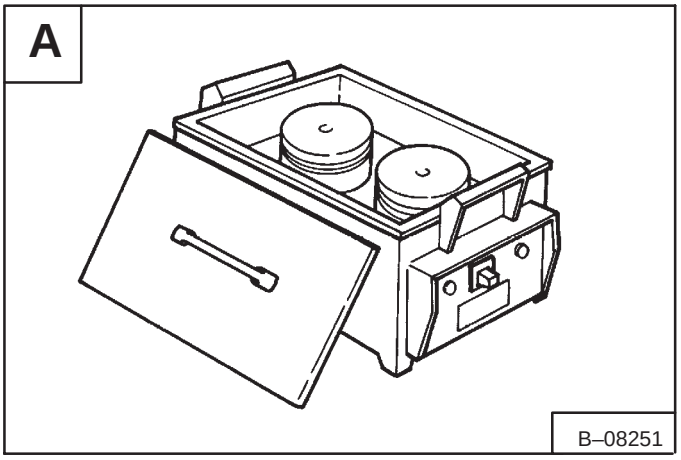




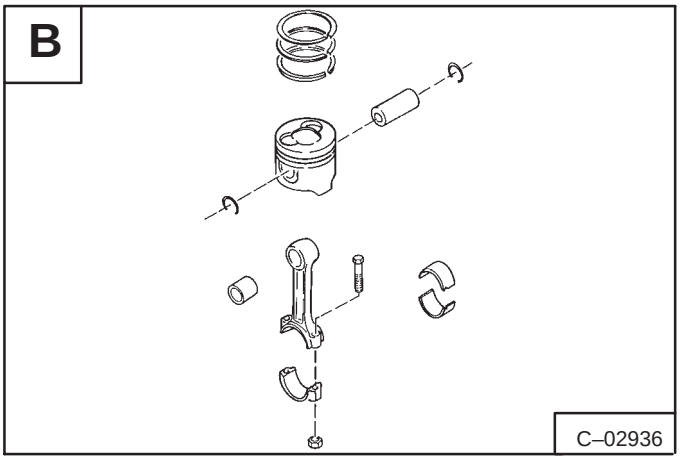
PISTON AND CONNECTING ROD (Cont'd)

Assembly

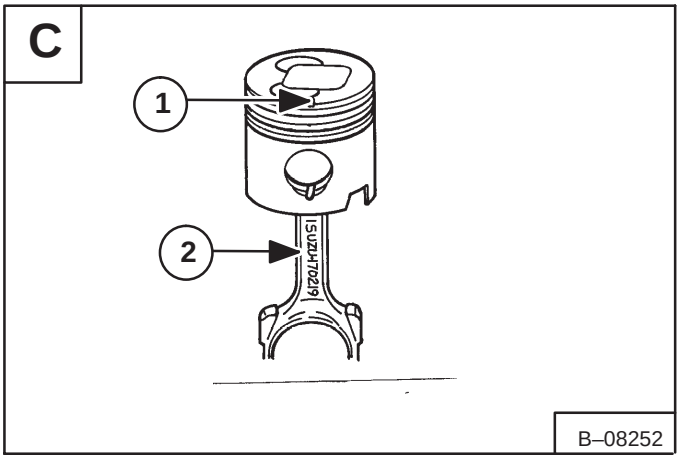
Heat the piston to about 140°F (60°C) **[A]**.



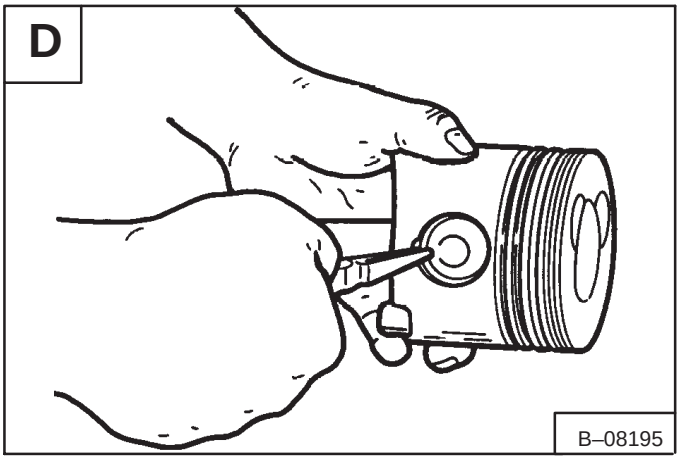
Assemble the piston and connecting rod **[B]**.



Install the piston to the connecting rod. The piston head front mark (Item 1) **[C]** and the connecting rod "ISUZU" casting mark (Item 2) **[C]** must be facing the same direction.



Install the piston pin. Install the snap rings **[D]**.



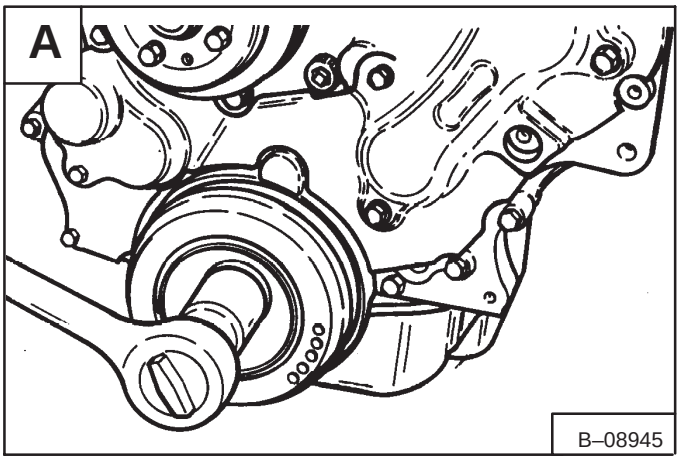
TIMING GEARCASE COVER

Removal And Installation

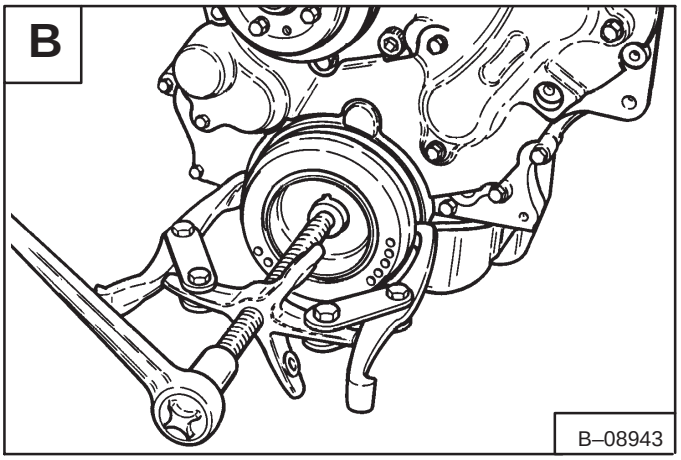
Remove the alternator and belt. (See Page 6–1.)

Remove the bolt at the crankshaft pulley **[A]**.

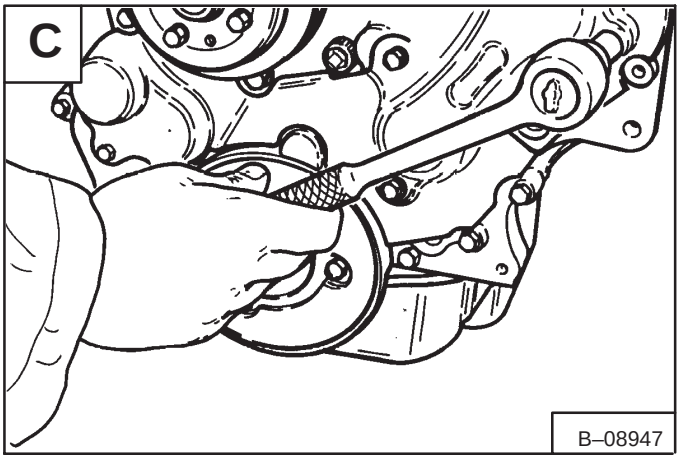
Installation: Tighten the bolt to 123–152 ft.–lbs. (167–206 Nm) torque.



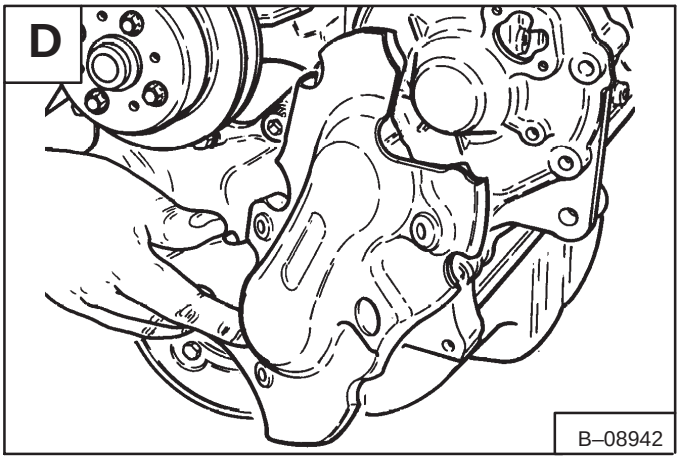
Use a puller to remove the crankshaft pulley **[B]**.



Remove the bolts which fasten the noise dampening shield to the timing case cover **[C]**.



Remove the noise dampening shield **[D]**.

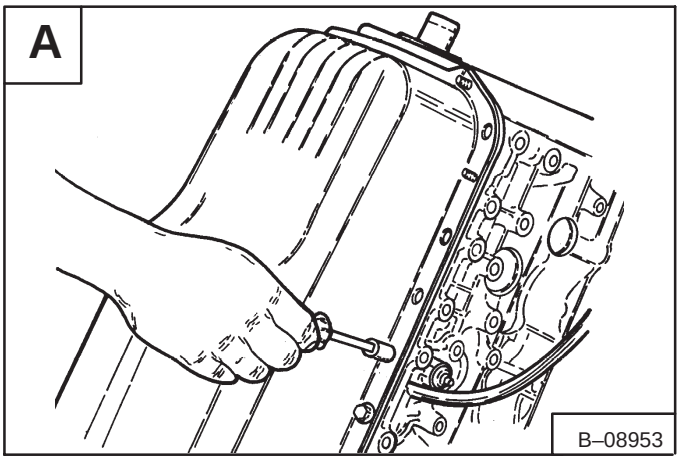


OIL PAN

Removal

Remove the oil drain plug and remove the oil.

Remove the fastening bolts and nuts from the oil pan **[A]**.

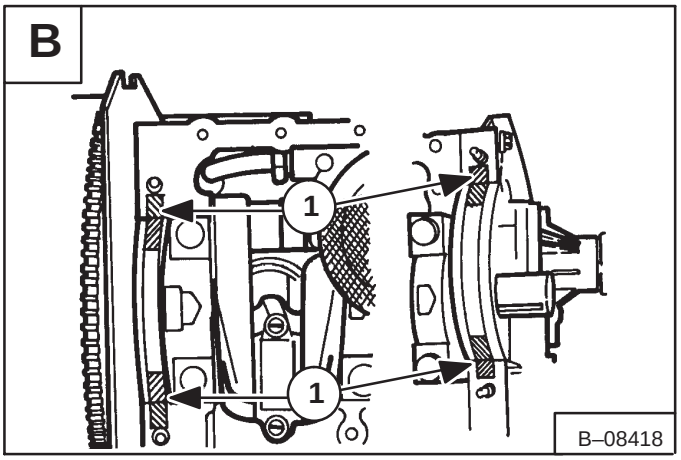


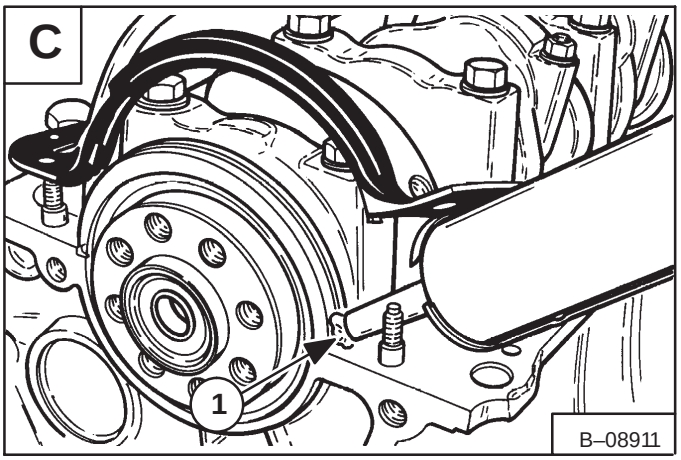
Installation

Clean the surface on the oil pan and engine block.

Put Three Bond (TB–1207B) at the front and rear main bearing caps (Item 1) **[B]** & **[C]**.

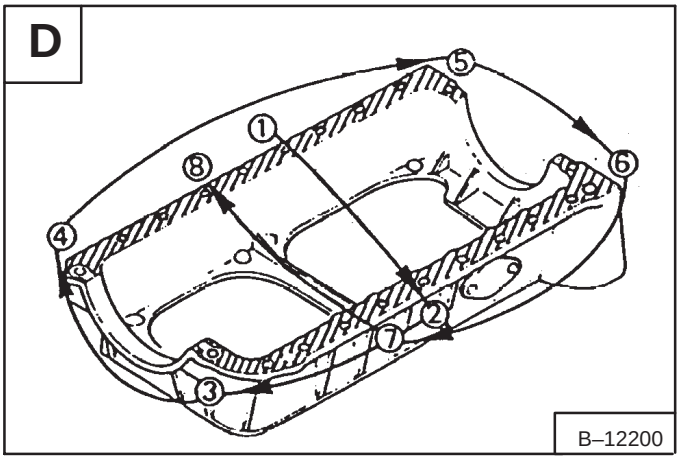
Put liquid gasket on the oil pan surface area of the engine block.





Install the oil pan. Install and tighten the bolts in the sequence shown **[D]**.

Tighten the bolts and nuts to 13–18 ft.–lbs. (19–26 Nm) torque.



SYSTEM ANALYSIS

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B.O.S.S. – Bobcat Operation Sensing System

L.C.D. – Liquid Crystal Diode

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TORQUE SPECIFICATIONS FOR BOLTS (Cont'd)

Torque For General Metric Bolts

Thread Size (Dia. x Pitch)	Material		
	Head Mark 4	Head Mark 7	Head Mark 10
M 5 x 0.8		3–4 ft.–lbs. (4–5 Nm)	
M 6 x 1.0		6–7 ft.–lbs. (8–9 Nm)	6–9 ft.–lbs. (8–12 Nm)
M 8 x 1.25	6–9 ft.–lbs. (8–12 Nm)	11–16 ft.–lbs. (15–22 Nm)	18–25 ft.–lbs. (24–34 Nm)
M 10 x 1.25	13–18 ft.–lbs. (18–24 Nm)	22–30 ft.–lbs. (30–41 Nm)	36–50 ft.–lbs. (49–68 Nm)
M 12 x 1.25	22–30 ft.–lbs. (30–41 Nm)	40–54 ft.–lbs. (54–73 Nm)	69–87 ft.–lbs. (94–118 Nm)
M 14 x 1.25	36–50 ft.–lbs. (49–68 Nm)	58–80 ft.–lbs. (79–108 Nm)	116–137 ft.–lbs. (157–186 Nm)

MELROE
INGERSOLL-RAND

bobcat®

850–002
Revision Number
10 July 1991
Date

SERVICE MANUAL REVISION

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

AFFECTING:

Product BOBCAT LOADER

Model 853

Manual No. 6720755 (2–91)

Revise your Service Manual with the enclosed page(s) as shown below.

TAKE OUT	PUT IN
1–25, 1–26	1–25 (Revised July 91), 1–26 (Revised July 91)
1–29	1–29 (Revised July 91)
HYDRAULIC/HYDROSTATIC FLOW CHART For Model 853 Chart #6720800 (Printed February 1991) CHART LEGEND	HYDRAULIC/HYDROSTATIC FLOW CHART For Model 853 Chart #6720800 (Printed July 1991) CHART LEGEND & FLUID FLOW EXPLANATION
3–7, 3–8	3–7, 3–8 (Revised July 91)
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MELROE
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bobcat®

850–007
Revision Number

30 December 1992
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SERVICE MANUAL REVISION

ROUTE TO ATTENTION

PARTS MANAGER	☐
SERVICE MANAGER	☒
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AFFECTING:

Product BOBCAT LOADER

Model 853

Manual No. 6720755 (2–91)

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TAKE OUT	PUT IN
WIRING DIAGRAM (P/N 6720958) Model 853 (S/N 11354 & Above) & 853H (Printed January 1992) 1 Of 4 Pages	WIRING DIAGRAM (P/N 6720958) Model 853 (S/N 11354 Thru 12360) & 853H (S/N 11308 & Below) (Printed December 1992) 1 Of 4 Pages
WIRING DIAGRAM (P/N 6720958) Model 853 (S/N 11354 & Above) & 853H (Printed January 1992) 2 Of 4 Pages	WIRING DIAGRAM (P/N 6720958) Model 853 (S/N 11354 Thru 12360) & 853H (S/N 11308 & Below) (Printed December 1992) 2 Of 4 Pages
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