Bobcat®

Service Manual

L28

Small Articulated Loader

S/N: B4LD11001 & Above

7389400enUS (11-20) (B)

Printed in USA

T4-B

Safety Alert Symbol

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

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

IMPORTANT

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

I-2019-0284

DANGER

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

D-1002-1107

WARNING

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

W-2044-1107

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

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

The dealer and owner / operator review the recommended uses of the product when delivered. If the owner / operator will be using the machine for a different application(s) he or she must ask the dealer for recommendations on the new use.

LIFT ARM SUPPORT

Lift Arm Support Description

DANGER

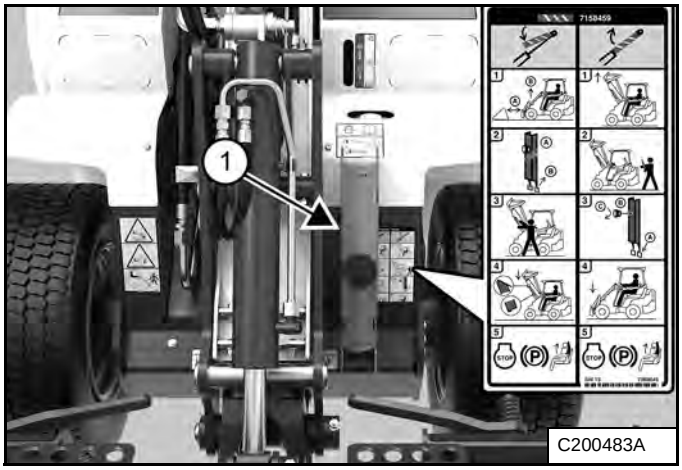
CRUSHING HAZARD

Failure to use an approved lift arm support device or using a damaged lift arm support can allow the lift arm or attachment to fall and cause serious injury or death.

- **Never work on machine with the lift arm up unless the lift arm is secured by an approved lift arm support.**
- **Service or replace lift arm support device if damaged or if parts are missing.**

D-1047

Figure 10-20-1



The lift arm support (Item 1) **[Figure 10-20-1]** is used to support the lift arm while working on a machine with the lift arm up.

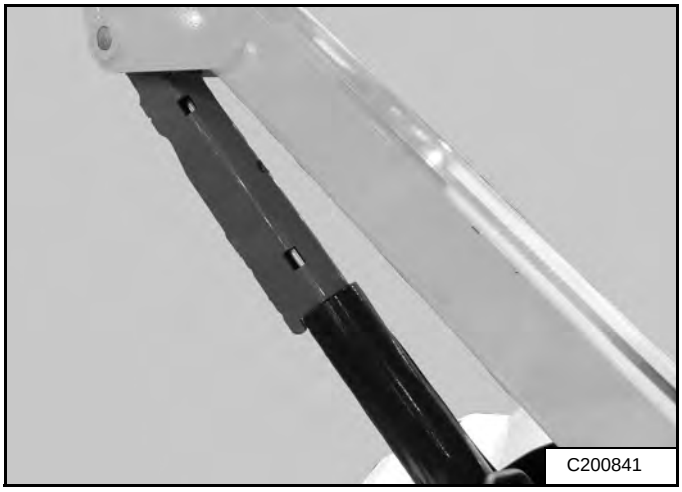
A decal (Inset) located directly behind the lift arm support provides instructions for installing and removing the lift arm support.

The procedures are described in more detail on the following pages, (See Installing Lift Arm Support on Page 10-20-1.)

Installing Lift Arm Support

1. Remove the attachment from the machine.
2. Remove the lift arm support (Item 1) **[Figure 10-20-1]** from the storage position.
3. Start the engine and raise the lift arms all the way up.
4. Exit the cab. (See Stopping The Engine And Leaving The Machine on Page 10-180-1.)

Figure 10-20-2



5. Install the lift arm support over the rod end of the lift cylinder **[Figure 10-20-2]**.

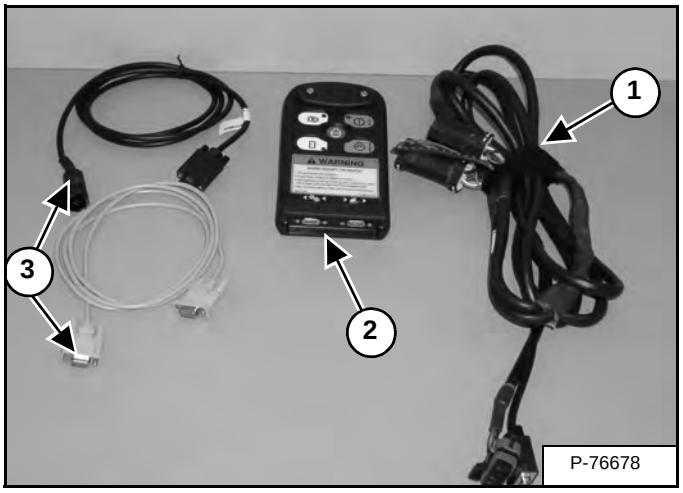
The lift arm support must be tight against the cylinder rod.

6. Enter the machine.
7. Restart the machine.
8. Fully lower the lift arm down and stop the engine.

REMOTE START TOOL (SERVICE TOOL) KIT - 7217666 (CONT'D)

Service Tool Harness - 6689747

Figure 10-60-3



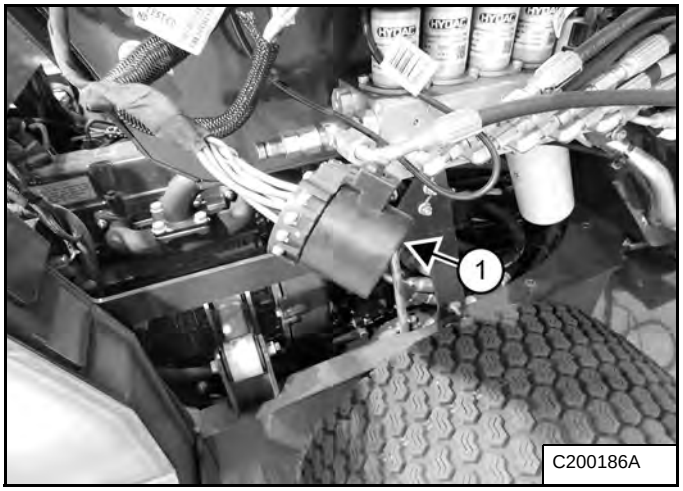
The Service Tool Harness (Item 1) **[Figure 10-60-3]** is used to connect the Remote Start Tool (Item 2) **[Figure 10-60-3]** to the electrical system on the small articulated loader.

The Service Tool Harness Communicator (Item 3) **[Figure 10-60-3]** is used to connect the Remote Start Tool to the Service PC.

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

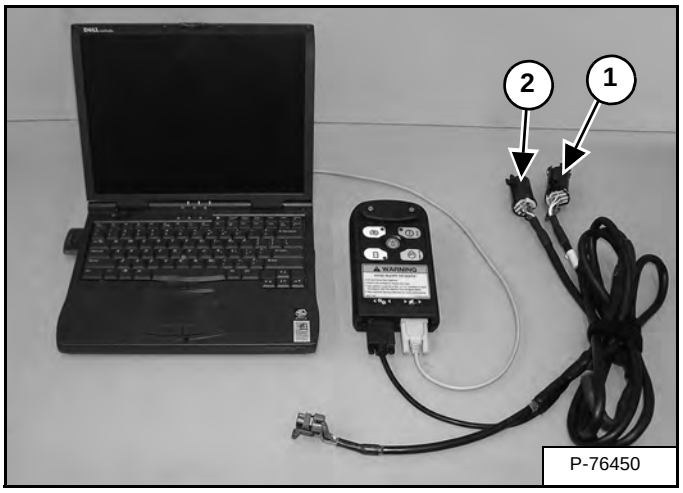
1. Remove the right corner cover. (See Removing And Installing Right Corner Cover on Page 40-66-1.)

Figure 10-60-4



2. Remove the plug (Item 1) **[Figure 10-60-4]** from the small articulated loader harness connector.

Figure 10-60-5



NOTE: The Remote Start Tool (Service Tool) connection harness has two connectors (Item 1) and (Item 2). The main connector (Item 1) [Figure 10-60-5] is always used for connection to the small articulated loader harness.

The second connector (Item 2) [Figure 10-60-5] is not used for small articulated loader applications. This connector has a cap attached to it to prevent damage or corrosion when not in use.

3. Connect the Remote Start Tool connector (Item 1) **[Figure 10-60-5]** to the small articulated loader harness connector.

NOTE: The Key Switch or Keyless Instrument Panel must be in the OFF position or the Remote Start Tool (Service Tool) will not operate.

Replacing Coolant

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

⚠ WARNING

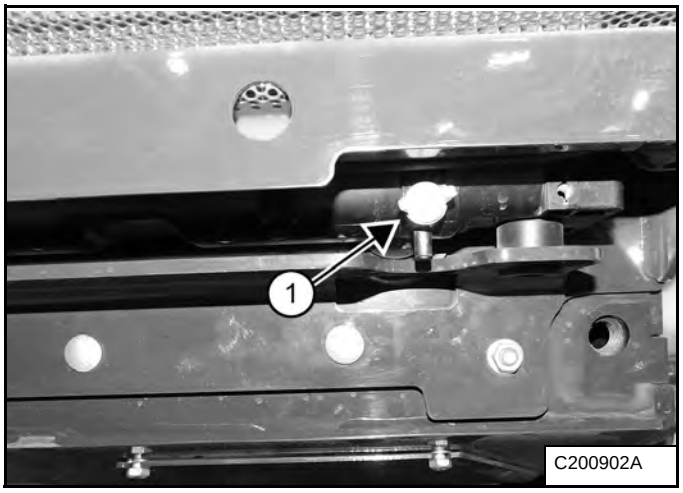
AVOID BURNS

Do not remove radiator cap when the engine is hot. You can be seriously burned.

W-2070-1203

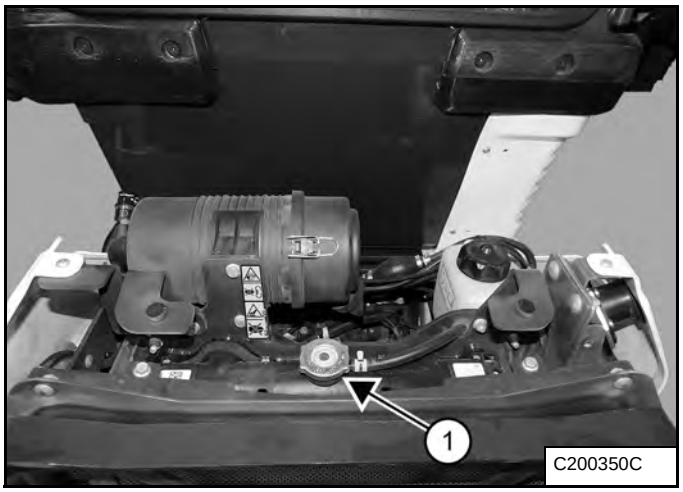
1. Stop the engine.
2. Remove the counterweight. (See Removing And Installing Counterweight on Page 40-70-1.)

Figure 10-90-4



3. Turn the valve (Item 1) **[Figure 10-90-4]** counterclockwise to drain the coolant into a container.

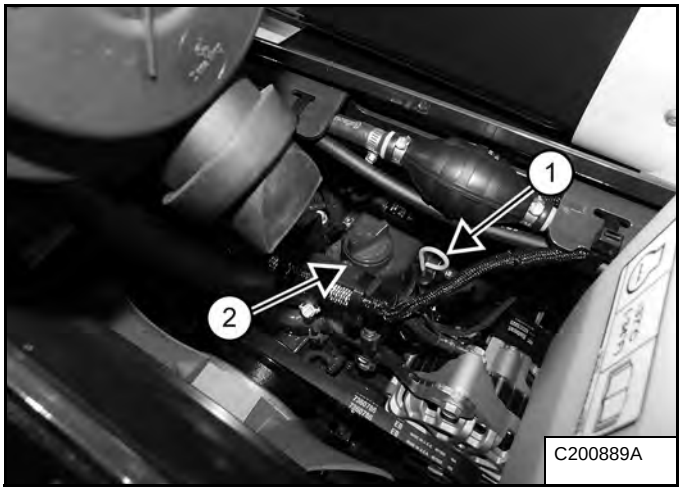
Figure 10-90-5



4. Remove the radiator cap (Item 1) **[Figure 10-90-5]** to drain the coolant faster.
5. Turn valve (Item 1) **[Figure 10-90-4]** clockwise to close the drain.
6. Remove the right rear cover. (See Removing And Installing Rear Cover on Page 40-60-1.)

Removing And Replacing Oil And Filter (Cont'd)

Figure 10-110-5



11. Remove the oil fill cap (Item 2) **[Figure 10-110-5]**.

12. Put oil into the engine and replace the oil fill cap. Do not overfill. (See Capacities Specifications on Page SPEC-10-7.)

13. Start the engine and allow to operate for several minutes.

⚠ WARNING

AVOID INJURY OR DEATH

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

W-2072-0807

14. Stop the engine and check for leaks at the filter.

15. Remove the dipstick (Item 1) **[Figure 10-110-5]** and check for oil level.

16. Add oil as needed if oil level is not at the top mark on the dipstick. Install the dipstick.

17. Install the rear cover.

⚠ 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.

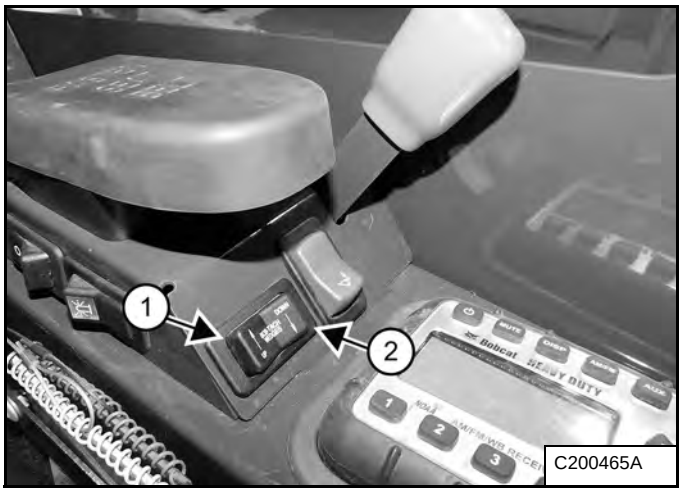
W-2103-0508

18. Install the access cover and mounting bolts.

BOB-TACH (POWER)

Inspecting And Maintaining Power Bob-Tach

Figure 10-140-1



1. Push and hold the Bob-Tach attachment mounting (Item 1) **[Figure 10-140-1]** until the wedges are fully raised.

The levers and wedges must not move freely.

2. Push and hold the Bob-Tach attachment mounting wedges down switch until the wedges are fully lowered.

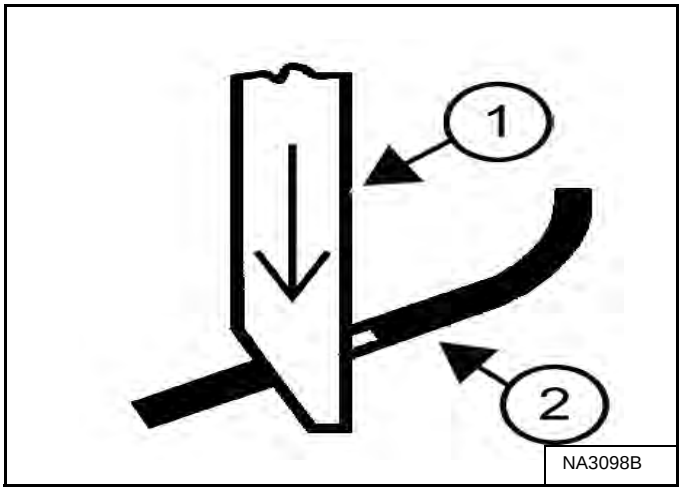
The levers and wedges must move freely.

⚠ WARNING

Bob-Tach wedges must extend through the holes in attachment. Lever(s) must be fully down and locked. Failure to secure wedges can allow attachment to come off and cause injury or death.

W-2102-0497

Figure 10-140-2

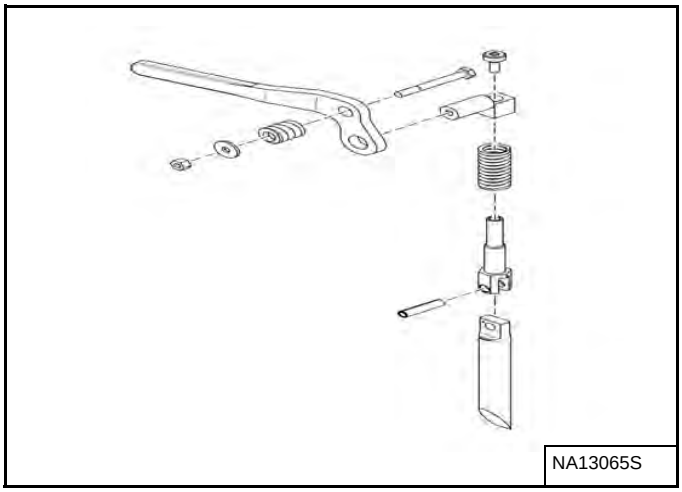


3. Check that the wedges (Item 1) **[Figure 10-140-1]** extend through the holes in the attachment mounting frame.

4. Check that the spring loaded wedges (Item 1) must contact the lower edge of the holes in the attachment mounting frame (Item 2) **[Figure 10-140-1]**.

If the wedges do not contact the lower edge of the holes, the attachment will be loose and can come off the Bob-Tach attachment mounting system.

Figure 10-140-3



5. Inspect the mounting frame on the attachment and Bob-Tach attachment mounting system, linkages, and wedges for excessive wear or damage. Replace any parts that are damaged, bent or missing. Keep all fasteners tight.

6. Look for cracked welds.

Contact your dealer for repair or replacement parts.

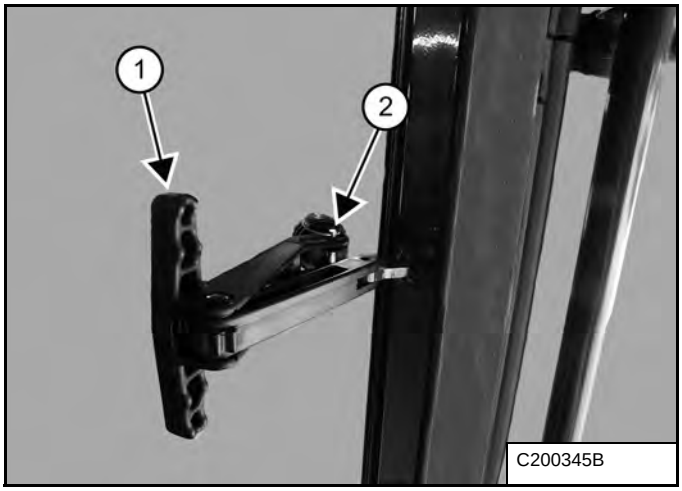
7. Lubricate the wedges. (See Lubricating Grease Fittings on Page 10-150-1.)

EMERGENCY EXIT

Performing An Emergency Exit

The right window provides an emergency exit from the machine.

Figure 10-190-1



1. Unlatch the window by pulling on the handle (Item 1) **[Figure 10-190-1]**.
2. Remove the pin (Item 2) **[Figure 10-190-1]**.
3. Push the window until it is fully open.
4. Safely exit the machine.

Printable Version Click Here

HYDRAULIC/HYDROSTATIC SCHEMATIC
NO OPTIONS
L28 S/N B4LD11001 AND ABOVE
S/N B4Y611001 AND ABOVE

(PRINTED NOVEMBER 2020)
V-1716 legend

LEGEND

1. HYDRAULIC RESERVOIR: Pressurized with Fill Strainer
   Reservoir Capacity (at Site Gauge) . . . . .10,2 L (2.7 U.S. gal)
   System Capacity. . .20,8 L (5.5 U.S. gal)
2. PRESSURIZED BREATHER/FILL CAP with FILTER:
   40 kPa (0,4 bar) (6 psi) - Outlet
   4 kPa (0,04 bar) (0.6 psi) - Inlet
3. SIGHT GAUGE
4. HYDRAULIC FILTER ELEMENT
   15 Micron
5. FILTER BY-PASS: 344 kPa (3,44 bar)(50 psi)
6. PRESSURE SWITCH
7. TEMPERATURE SENSOR
8. FACTORY FILL PORT / DIAGNOSTIC COUPLER (4)
9. HYDRAULIC COOLER
10. REAR DRIVE MOTOR (2)
11. SPRING APPLIED PRESSURE RELEASE BRAKE (SAPR)
12. FRONT DRIVE MOTOR (2)
13. FRONT AUXILIARY MANUAL PRESSURE BLEED-OFF VALVE
14. PORT RELIEF VALVE (With Anti-Cavitation Valve) - (Secondary Auxiliary) (2)
    32500 kPa (325 bar)(4714 psi)
15. SOLENOID ACTIVATED DIRECTIONAL CONTROL VALVE
16. ORIFICE: 0,8 mm (0.031 in)
17. ORBITAL HYDRAULIC BIDIRECTIONAL STEERING PUMP
18. STEERING CONTROL SPOOL
19. SHOCK RELIEF VALVE (2): 20000-22000 kPa (200-220 bar) (2900-3190 psi)
20. RELIEF VALVE 14000-14500 kPa (140-145 bar) (2030-2103 psi)
21. CHECK VALVE
22. VARIABLE CAPACITY DISPLACEMENT BIDIRECTIONAL HYDROSTATIC PUMP
23. CHARGE PUMP - Gear: 21,8 L/min (5.7 U.S. gpm) at High Engine Idle
24. SERVO PISTON SWASH PLATE
25. PORT RELIEF ANTICAVITATION VALVE (2): 35000 kPa (350 bar) (5100 psi)
26. RELIEF VALVE
27. PILOT ACTIVATED DIRECTIONAL CONTROL VALVE
28. CHARGE RELIEF VALVE: 2500 kPa (25 bar) (363 psi)
29. ORIFICE (2): 0,8 mm (0.031 in)
30. ORIFICE: 2,2 mm (0.087 in)
31. CHARGE PRESSURE TRANSDUCER
32. COLD WEATHER BY-PASS CHECK VALVE: 345 kPa (3,45 bar) (50 psi)
33. ROADING LIGHTS PRESSURE SWITCH (OPTION)
34. BACK UP ALARM PRESSURE SWITCH
35. ORIFICE: 0,8 mm (0.031 in)
36. FILTER
37. ORIFICE: 0,8 mm (0.031 in)
38. PUMP MARGIN SPOOL
39. IMPLEMENT PUMP - Gear:
    45,8 L/min (12.1 U.S. gpm)
40. ORIFICE: 0,75 mm (0.03 in)
41. RELIEF VALVE:
    14000 kPa (140 bar) (2030 psi)
42. RELIEF VALVE - Main:
    20000 kPa (200 bar) (2900 psi)
43. LIFT CYLINDER SPOOL - MADE TO RESTRICT FLOW DURING BOOM DOWN BUT NOT DURING BOOM UP
44. PORT RELIEF VALVE (With Anti-Cavitation Valve) (3): 28500-31000 kPa (285-310 bar) (4136-4496 psi)
45. PORT RELIEF VALVE (With Anti-Cavitation Valve): 14000-15400 kPa (140-154 bar) (2030-2233 psi)
46. PORT RELIEF VALVE (With Anti-Cavitation Valve): 31500-34000 kPa (315-340 bar) (4571-4931 psi)
47. PORT RELIEF VALVE (With Anti-Cavitation Valve) (2): 20500-22300 kPa (205-223 bar) (2975-3227 psi)
48. SOLENOID ACTIVATED DIRECTIONAL CONTROL VALVE - Telescopic Arm
49. SOLENOID ACTIVATED DIRECTIONAL CONTROL VALVE - Telescopic Boom
50. SOLENOID ACTIVATED DIRECTIONAL CONTROL VALVE - Male Coupler
51. SOLENOID ACTIVATED DIRECTIONAL CONTROL VALVE - Female Coupler
52. SOLENOID ACTIVATED DIRECTIONAL CONTROL VALVE - Brake
53. SOLENOID ACTIVATED DIRECTIONAL CONTROL VALVE - Travel
54. FILTER (4)
55. SOLENOID ACTIVATED FLOW CONTROL VALVE
56. PILOT ACTIVATED FLOW CONTROL VALVE
57. ORIFICE: 2,5 mm (0.098 in)
58. CHECK VALVE
59. ORIFICE: 1,3 mm (0.051 in)
60. FLOW DIVIDER

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

LIFT CYLINDER

Testing Lift Cylinder

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

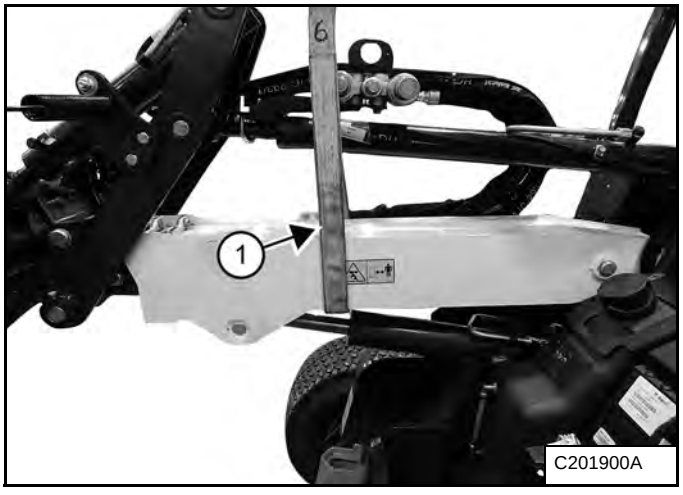
IMPORTANT

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

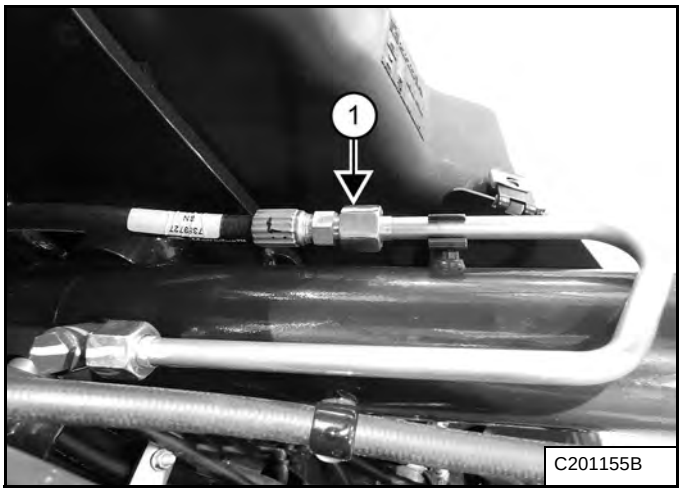
1. Remove the attachment.
2. Place the lift arm in the horizontal position.

Figure 20-20-1



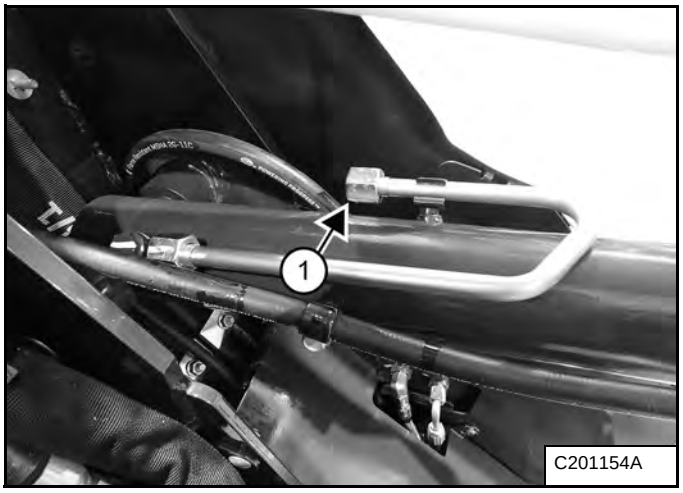
3. Support the lift arm using a strap (Item 1) **[Figure 20-20-1]**.

Figure 20-20-2



4. Remove and cap the base end hose (Item 1) **[Figure 20-20-2]**.
5. Engage the parking brake. Lower the armrest. Start the engine.
6. Operate the controls that lower the lift arm.

Figure 20-20-3



7. If there is any oil leakage from the base end fitting (Item 1) **[Figure 20-20-3]**, remove the cylinder for repair or replacement. (See Removing And Installing Lift Cylinder on Page 20-20-2.)

TILT CYLINDER

Testing Tilt Cylinder

⚠ 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 doctor familiar with this injury is not received immediately.

W-2145-EN-0210

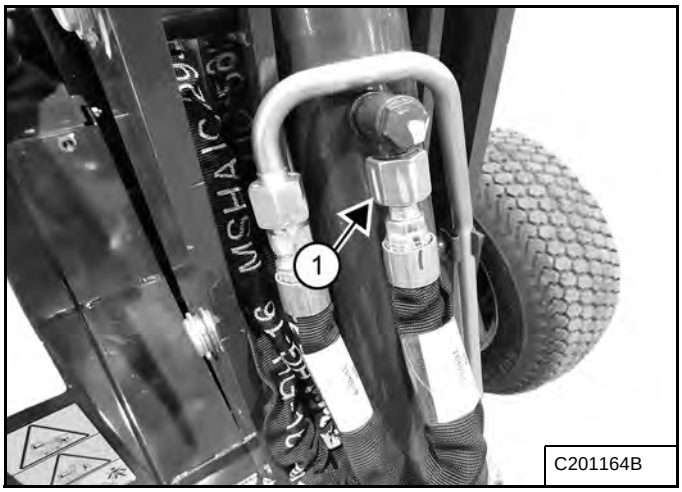
IMPORTANT

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

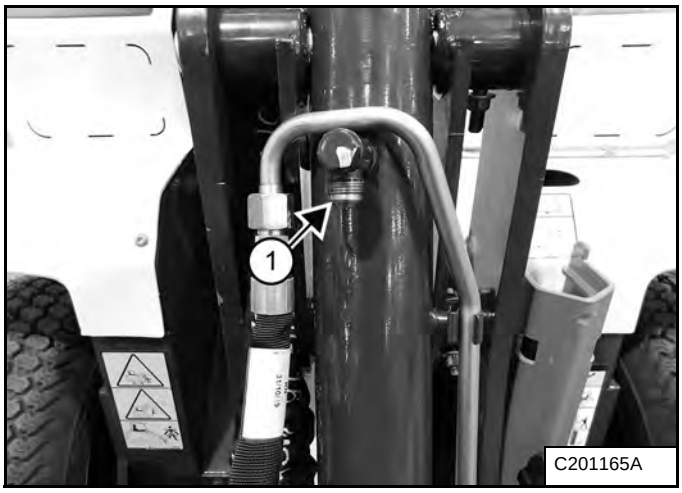
1. Remove the attachment. Roll the Bob-Tach attachment mounting system fully back. Stop the engine.

Figure 20-21-1



2. Remove and cap the hose from the base end fitting (Item 1) **[Figure 20-21-1]**.

Figure 20-21-2



3. Lower the armrest, start the machine, press the operate switch, then press the parking brake switch.

4. Operate the controls to roll back the Bob-Tach attachment mounting system.

5. If there is any oil leakage from the base end fitting (Item 1) **[Figure 20-21-2]**, remove the cylinder for repair or replacement. (See Removing And Installing Tilt Cylinder on Page 20-21-2.)

LEVELING CYLINDER

Testing Leveling Cylinder

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 doctor familiar with this injury is not received immediately.

W-2145-EN-0210

IMPORTANT

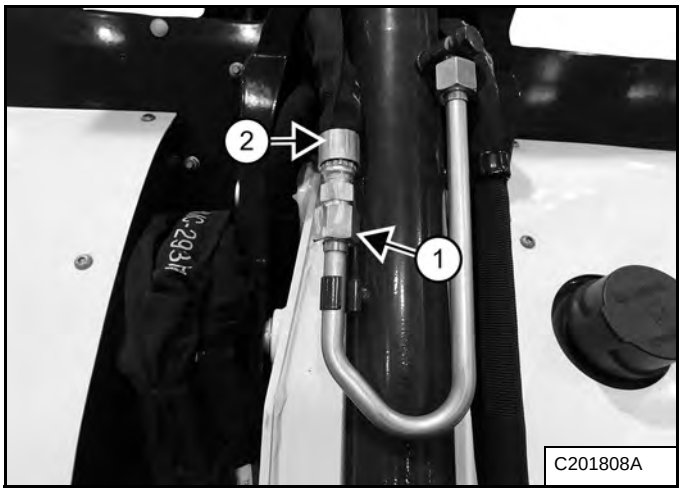
When repairing hydrostatic and hydraulic systems, clean the work area before disassembly and keep all parts clean. Always use caps and plugs on hoses, tubelines and ports to keep dirt out. Dirt can quickly damage the system.

I-2003-0888

1. Remove the front auxiliary coupler. (See Removing And Installing Coupler Block on Page 20-150-1.)

2. Retract the telescopic cylinder and lower lift arm to the resting position.

Figure 20-22-1



3. Disconnect the hose from the leveling cylinder base end fitting (Item 1) **[Figure 20-22-1]**.

4. Install a cap on the hose (Item 2) **[Figure 20-22-1]** and tighten.

5. Lower the armrest. Start the engine. Push the operate switch. Press the parking brake switch. Use the left switch on the joystick to retract the leveling cylinder.

If there is any leakage from the base end fitting, remove the cylinder for repair or replacement. (See Removing And Installing Leveling Cylinder on Page 20-22-2.)

TELESCOPIC CYLINDER

Testing Telescopic Cylinder

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

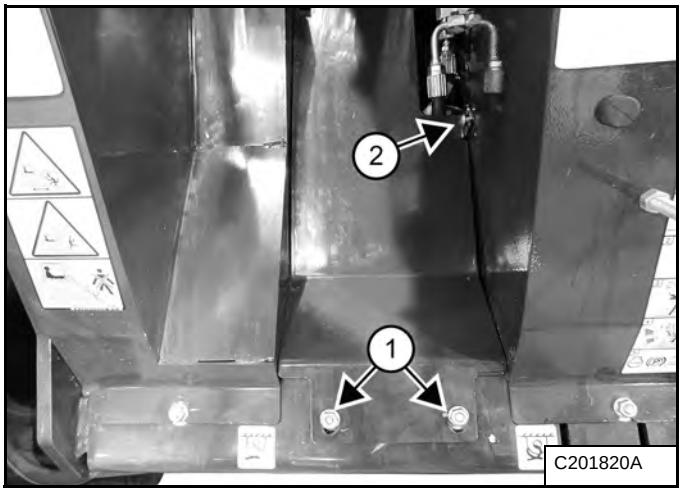
IMPORTANT

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

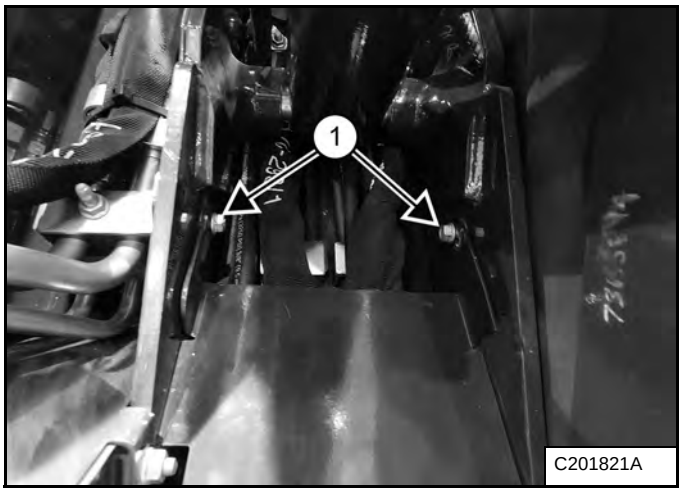
1. Remove the attachment. Place and support the lift arm in a horizontal position. Fully retract the telescopic cylinder. Stop the engine.

Figure 20-23-1



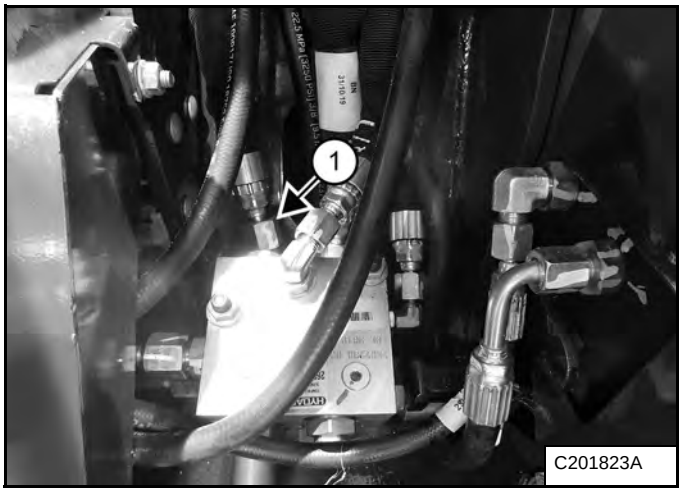
2. Remove the two nuts (Item 1) and screw (Item 2) **[Figure 20-23-1]**.

Figure 20-23-2



3. Remove the two nuts (Item 1) and plate (Item 2) **[Figure 20-23-2]**.

Figure 20-23-3



4. Remove the base end hose (Item 1) **[Figure 20-23-2]** and cap telescopic manifold.

5. Lower the armrest. Start the engine. Retract the telescopic cylinder.

If there is any leakage from the base end hose of the cylinder remove the cylinder for repair or replacement.

STEERING CYLINDER

Testing Steering Cylinder

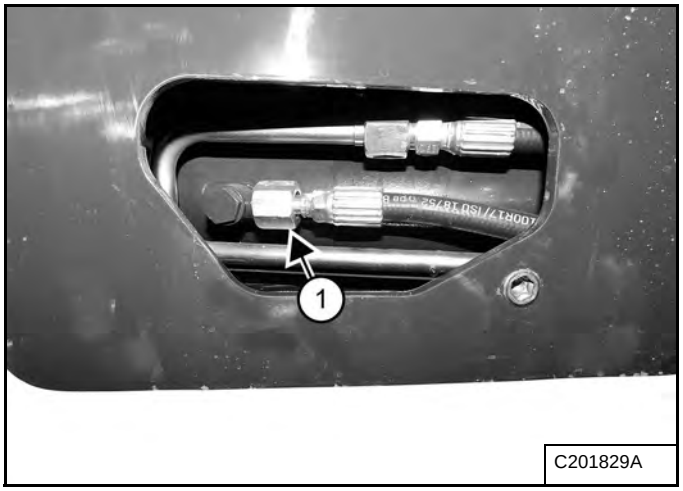
1. Lower the work group to the ground.

2. Remove the door (if equipped).

3. Fully articulate the machine to the left. Stop the engine.

4. Remove the right front cover. (See Removing And Installing Right Front Cover on Page 40-65-1.)

Figure 20-24-1



Remove the rod end hose (Item 1) **[Figure 20-24-1]** and cap the hose.

Lower the armrest, start the machine, press the operate switch, then press the parking brake switch.

Turn the steering wheel to the left.

If there is any oil leakage from the rod end fitting, remove the cylinder for repair or replacement. (See Removing And Installing Steering Cylinder on Page 20-24-2.)

MAIN RELIEF VALVE

Main Relief Valve Description

The main relief valves limit the hydraulic system pressure by opening at a certain pressure and allowing the hydraulic oil to flow back to the hydraulic reservoir. (See Hydraulic / Hydrostatic Schematic for proper pressure).

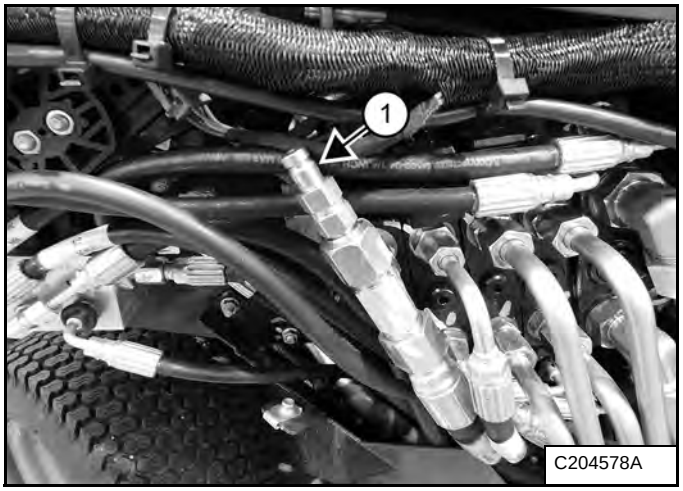
The main relief valves are located on the hydraulic control valve.

Testing Main Relief Valve

1. Lift and block the machine. (See Lifting And Blocking Procedure on Page 10-10-1.)

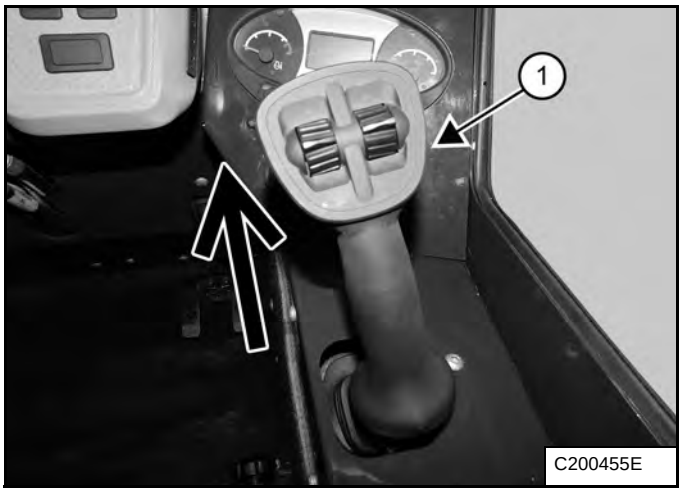
2. Remove the right front cover. (See Removing And Installing Right Front Cover on Page 40-65-1.)

Figure 20-30-1



3. Install a pressure gauge onto the diagnostic port (Item 1) **[Figure 20-30-1]**. The diagnostic port is located at the main control valve.

Figure 20-30-2



4. Start and warm the engine to operating temperature.

5. Move the engine speed control to high idle and move the joystick handle (Item 1) **[Figure 20-30-2]** forward until the (lift, tilt, leveling, telescoping, auxiliary, and Power Bob-Tach attachment mounting system) main relief valve opens.

Check the pressure gauge connected to the diagnostic port.

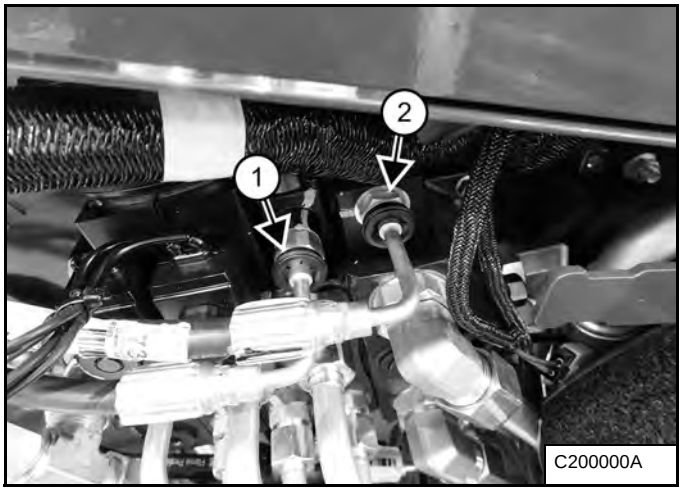
Record the pressure and refer to the hydraulic schematics for the correct pressure for the model and serial number of your machine.

If the relief pressure is not correct, stop the engine and remove the main relief valve.

NOTE: If the correct pressure cannot be reached, replace the main relief valve. Install and check the new main relief for correct pressure setting.

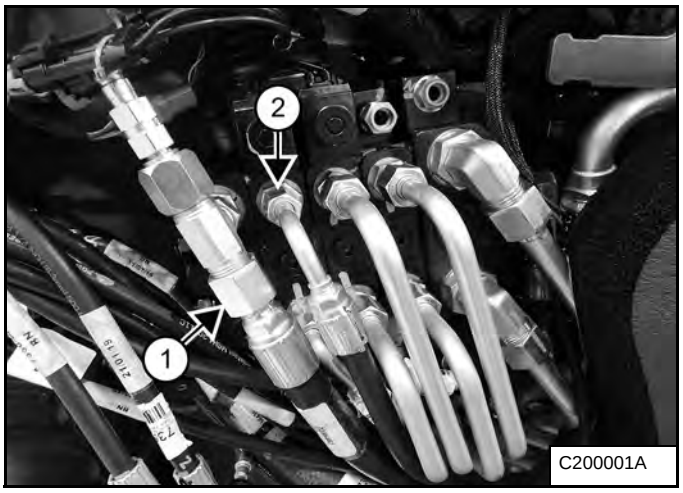
Removing And Installing Hydraulic Control Valve (Cont'd)

Figure 20-40-2



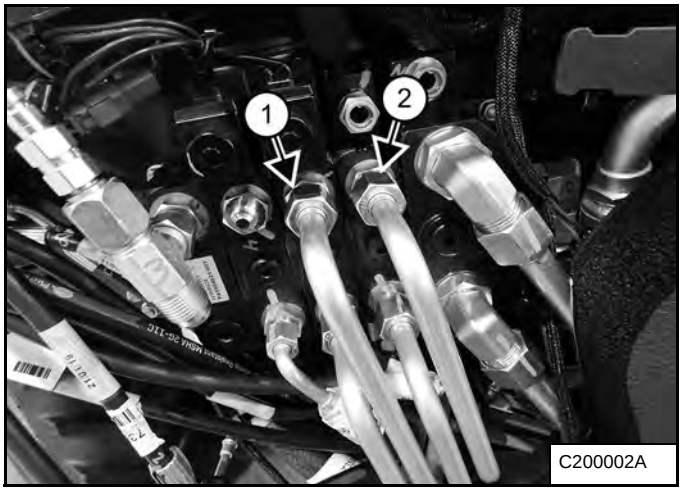
5. Remove the telescoping pilot port hose (Item 1) and auxiliary pilot port (Item 2) **[Figure 20-40-2]** from the control valve.

Figure 20-40-3



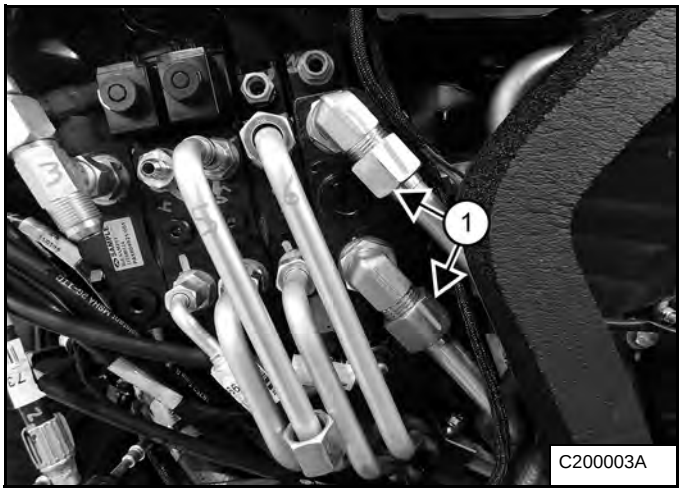
6. Remove the inlet hose (Item 1) and lift rod end hose (Item 2) **[Figure 20-40-3]** from the control valve.

Figure 20-40-4



7. Remove the tilt rod end tubeline (Item 1) and the telescoping rod end tubeline (Item 2) **[Figure 20-40-4]** from the control valve.

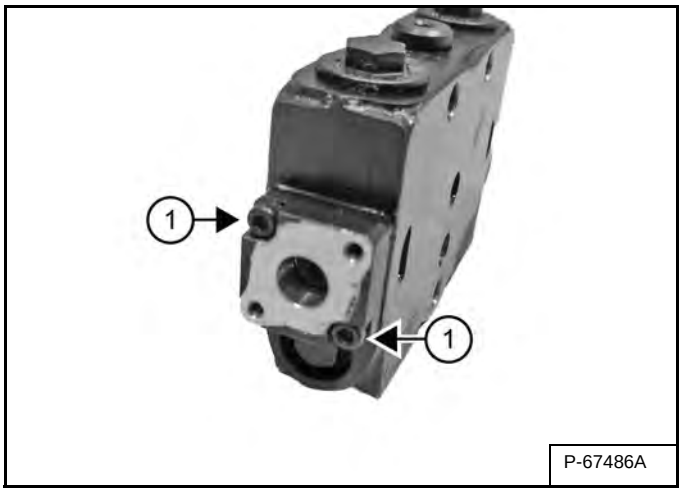
Figure 20-40-5



8. Remove the auxiliary tubelines (Item 1) **[Figure 20-40-5]** from the control valve.

Disassembling And Assembling Lift Valve Section (Cont'd)

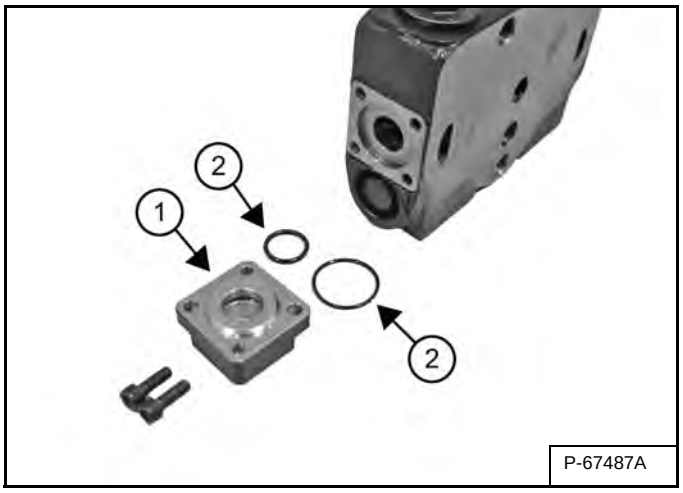
Figure 20-40-34



12. Remove the two screws (Item 1) **[Figure 20-40-34]** from the spacer block.

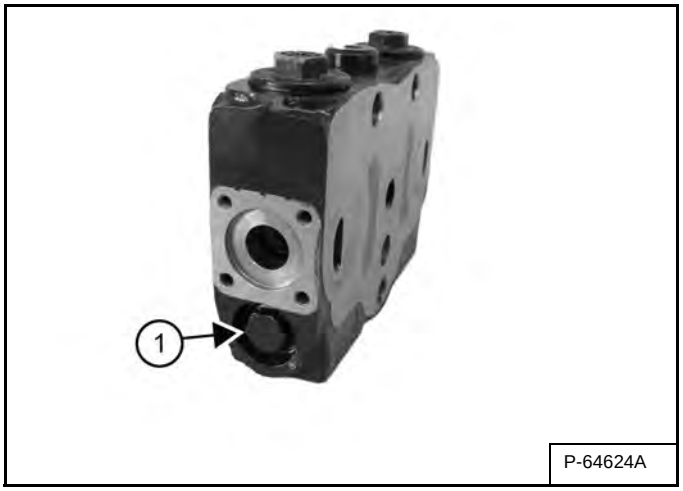
When installing, tighten the screws to 6,6 N•m (4.8 ft-lb) torque.

Figure 20-40-35



13. Remove the spacer block (Item 1) and O-rings (Item 2) **[Figure 20-40-35]**.

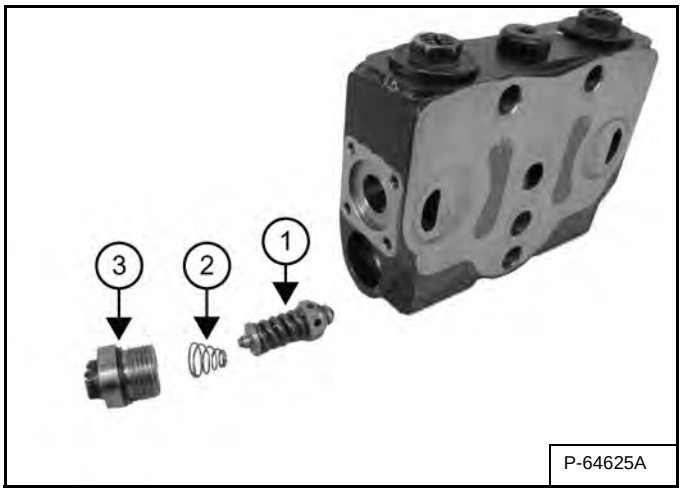
Figure 20-40-36



14. Remove the port relief / anti-cavitation valve cap (Item 1) **[Figure 20-40-36]** from the lift valve section.

When installing, tighten the cap to 24 N•m (17.7 ft-lb) torque.

Figure 20-40-37



15. Remove the port relief / anti-cavitation valve (Item 1), spring (Item 2) and O-ring (Item 3) **[Figure 20-40-37]**.

Disassembling And Assembling Telescopic Valve Section (Cont'd)

Figure 20-40-69

14. Inspect the check valve (Item 1) for free movement and remove the O-ring (Item 2) **[Figure 20-40-69]**.

15. Clean all parts in solvent and dry with compressed air.

16. Inspect all parts for wear or damage. Replace any worn or damaged parts.

Always install new seals and O-rings. Lubricate all seals and O-rings with clean hydraulic fluid before installation.

PILOT MANIFOLD

Pilot Manifold Description

The pilot manifold houses solenoids which control hydraulic flow to several component functions.

The pilot manifold is located under the cover on the right side of the machine.

Removing And Installing Pilot Manifold

NOTE: Dealer disassembly of the component(s) shown here may not be recommended under Bobcat's "Do Not Disassemble Policy", found in the Warranty Policy and Procedure Manual or by clicking here. Please click here to check the list of affected part numbers in IRW before proceeding. This only affects machines sold in the US and Canada.

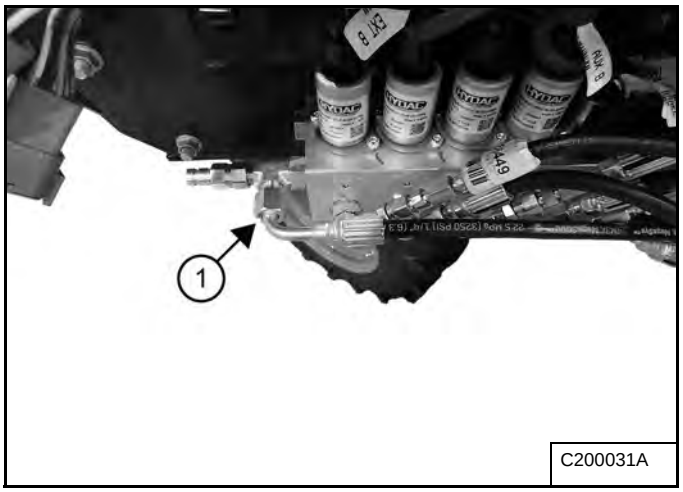
IMPORTANT

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

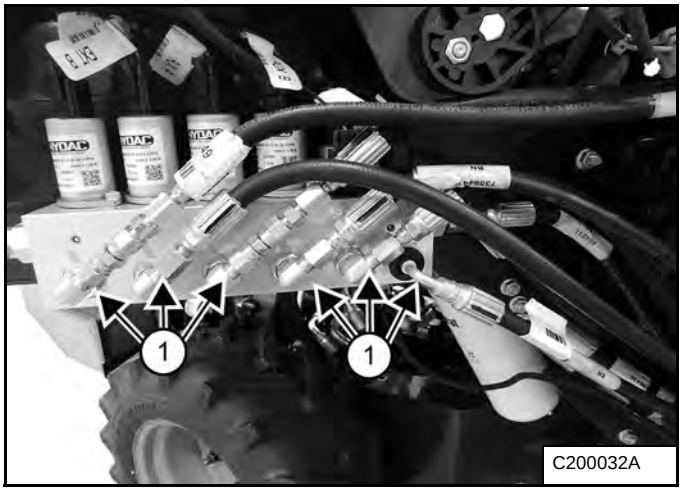
1. Remove the right front cover. (See Removing And Installing Right Front Cover on Page 40-65-1.)

Figure 20-50-1



2. Remove the charge pressure hose (Item 1) **[Figure 20-50-1]** from the pilot manifold.

Figure 20-50-2



3. Mark and remove the six hoses (Item 1) **[Figure 20-50-2]** on the side of the pilot manifold.

Removing And Installing Implement Pump

NOTE: Dealer disassembly of the component(s) shown here may not be recommended under Bobcat's "Do Not Disassemble Policy", found in the Warranty Policy and Procedure Manual or by clicking here. Please click here to check the list of affected part numbers in IRW before proceeding. This only affects machines sold in the US and Canada.

1. Remove the rear cover. (See Removing And Installing Rear Cover on Page 40-60-1.)

2. Remove the right rear cover. (See Removing And Installing Right Rear Cover on Page 40-61-1.)

3. Remove the left rear cover. (See Removing And Installing Left Rear Cover on Page 40-62-1.)

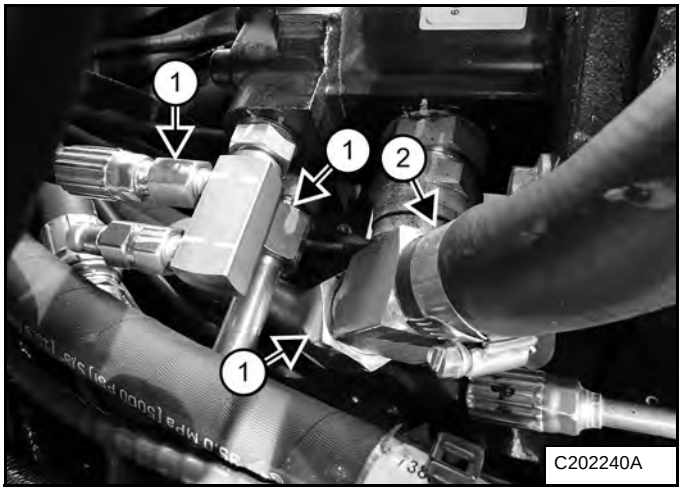
4. Remove the center cover. (See Removing And Installing Center Cover on Page 40-63-1.)

5. Remove the pump cover. (See Removing And Installing Pump Cover on Page 40-64-1.)

6. Fully articulate the machine to the left.

7. Drain the hydraulic system. (See Replacing Hydraulic Fluid on Page 10-120-2.)

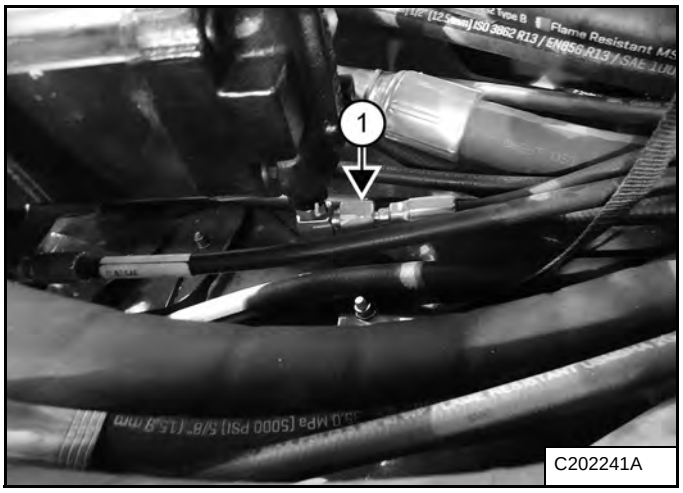
Figure 20-70-4



8. Remove the three hoses (Item 1) **[Figure 20-70-4]** from the pump.

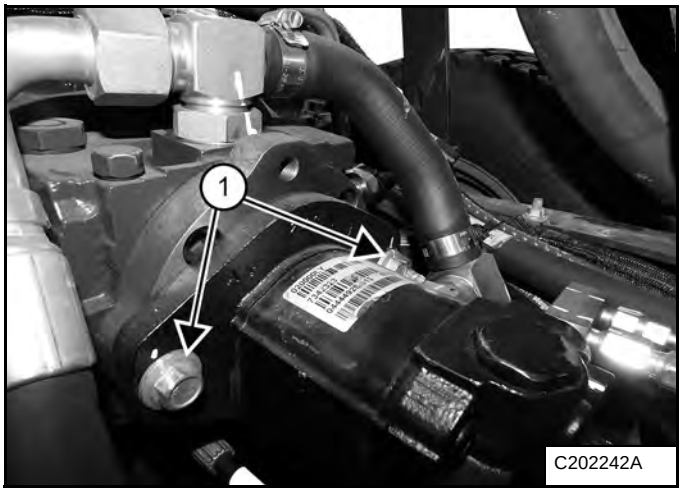
9. Loosen and remove the hose (Item 2) **[Figure 20-70-4]**.

Figure 20-70-5



10. Remove the output hose (Item 1) **[Figure 20-70-5]** from the pump.

Figure 20-70-6

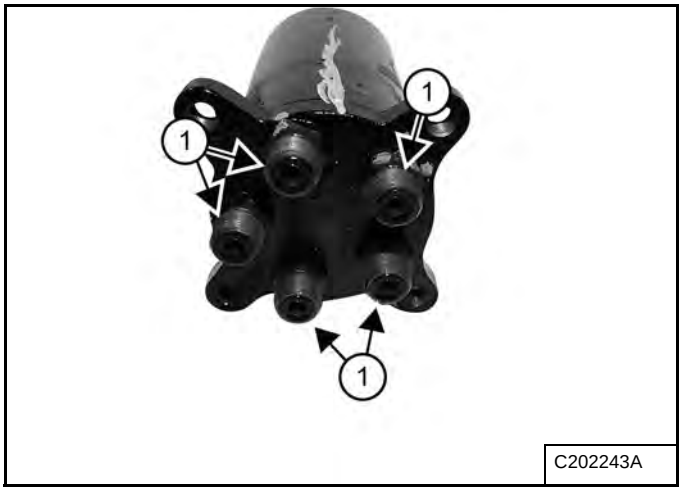


11. Remove the mounting bolts (Item 1) **[Figure 20-70-6]** and implement pump.

When installing tighten the mounting bolts to 75 - 82 N•m (55 - 60 ft-lb) torque.

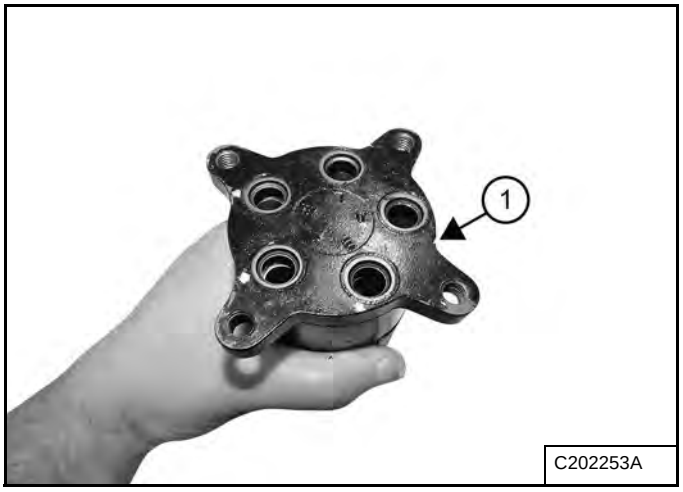
Disassembling And Assembling Steering Control Unit

Figure 20-80-4



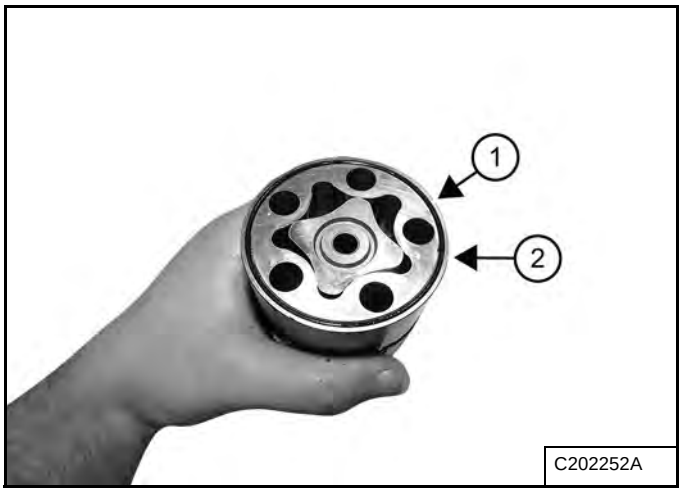
1. Remove the five fittings (Item 1) **[Figure 20-80-4]**.

Figure 20-80-5



2. Remove the flange (Item 1) **[Figure 20-80-5]**.

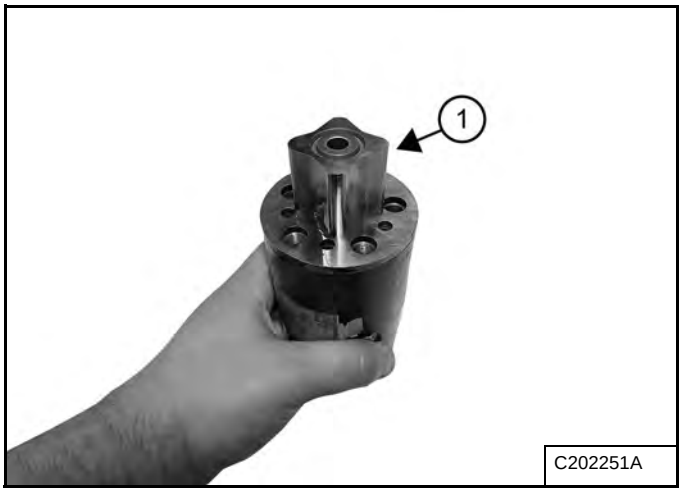
Figure 20-80-6



3. Remove the O-ring (Item 1) **[Figure 20-80-6]** from both sides of the cam.

4. Remove the cam (Item 2) **[Figure 20-80-6]**.

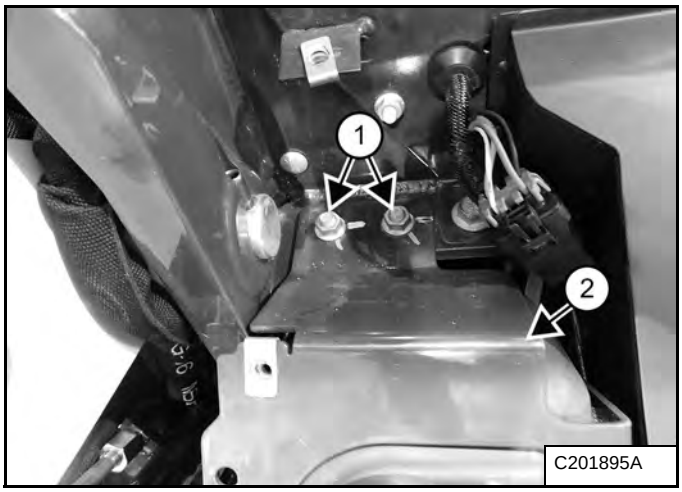
Figure 20-80-7



5. Remove the cam gearwheel (Item 1) **[Figure 20-80-7]**.

Removing And Installing Hydraulic Fluid Reservoir (Cont'd)

Figure 20-110-7



11. Remove the two nuts (Item 1) and bracket (Item 2) **[Figure 20-110-7]**.

12. Remove the hydraulic reservoir.

POWER BOB-TACH BLOCK

Power Bob-Tach Description

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

The Power Bob-Tach attachment mounting system is operated by a switch located on the side console.

The Power Bob-Tach attachment mounting system block is located under the oil cooler.

Removing And Installing Power Bob-Tach

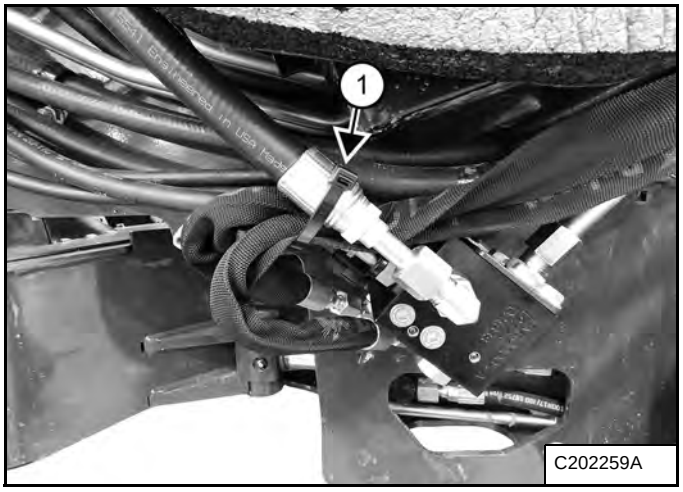
IMPORTANT

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

1. Remove the right front cover.

Figure 20-140-1

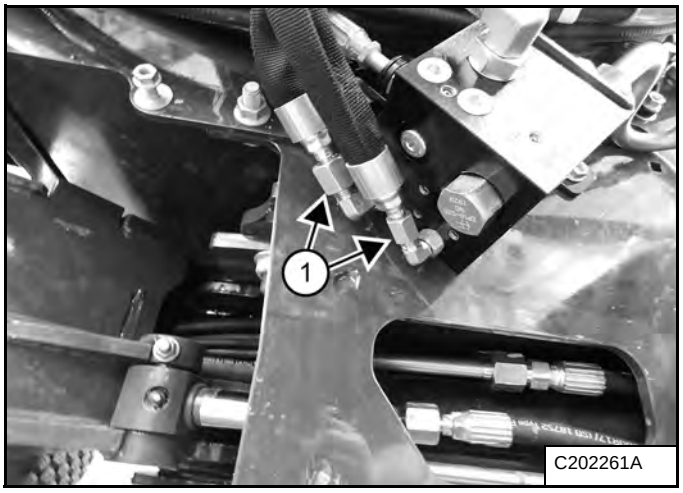


2. Cut the tie strap (Item 1) **[Figure 20-140-1]**.

Figure 20-140-2

3. Remove the hose (Item 1) **[Figure 20-140-2]**.

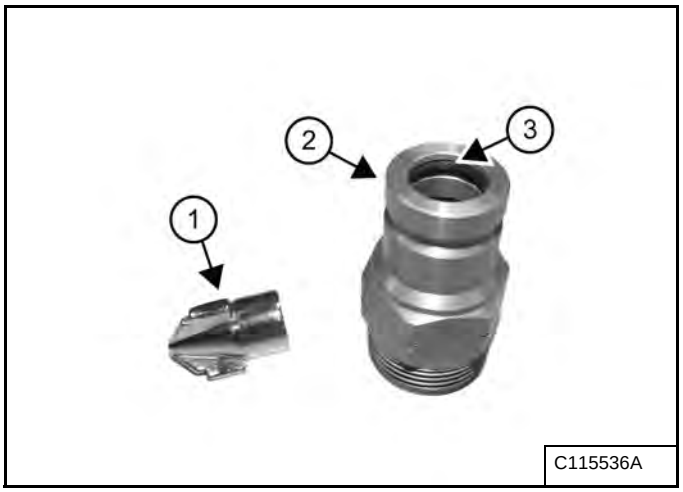
Figure 20-140-3



4. Remove the two hoses (Item 1) **[Figure 20-140-3]**.

Disassembling And Assembling Coupler Block (Cont'd)

Figure 20-150-7

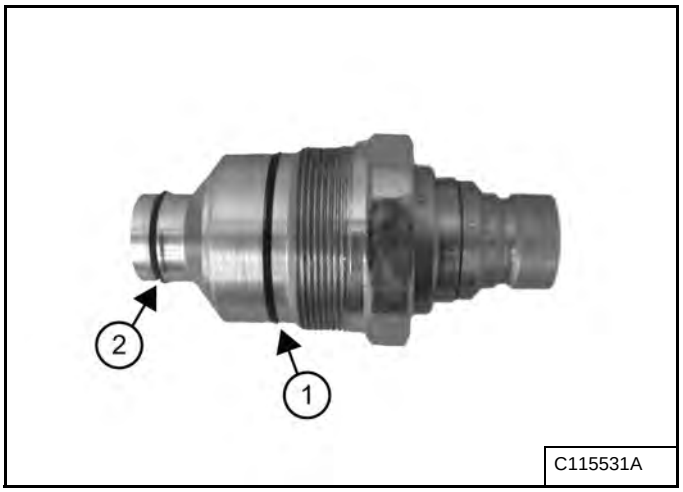


6. Remove the pintle (Item 1) from the case drain coupler (Item 2) **[Figure 20-150-7]**.

7. Inspect the pintle (Item 1), the case drain coupler (Item 2) and seal (Item 3) **[Figure 20-150-7]**.

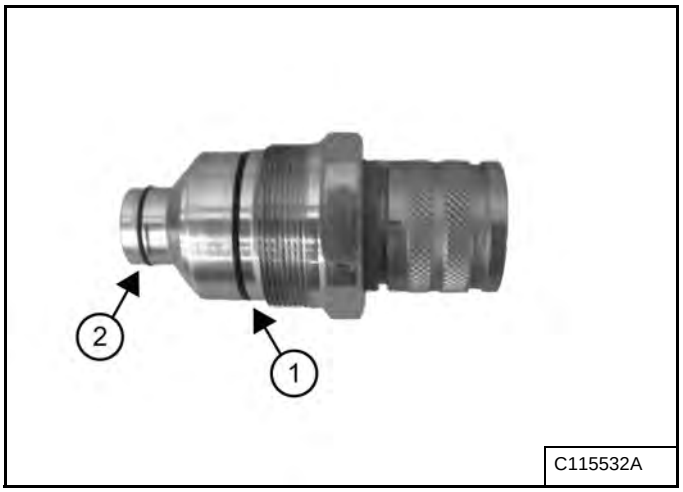
8. Replace the case drain coupler (Item 2) **[Figure 20-150-7]** as an assembly if any parts are damaged.

Figure 20-150-8



9. Inspect the O-ring (Item 1) and seal (Item 2) **[Figure 20-150-8]**. Replace the coupler if damaged.

Figure 20-150-9



10. Inspect the O-ring (Item 1) and seal (Item 2) **[Figure 20-150-9]**. Replace the coupler if damaged.

When installing lightly lubricate the O-ring and seal with oil before installation.

TRACTION ASSIST

Traction Assist Description

The Traction Assist is an option that enables the operator to hydraulically lock the left and right hydrostatic motors at equal speeds.

The Traction Assist is an electronically activated valve ran by a momentary press and hold switch is the operator enclosure to avoid heat build up.

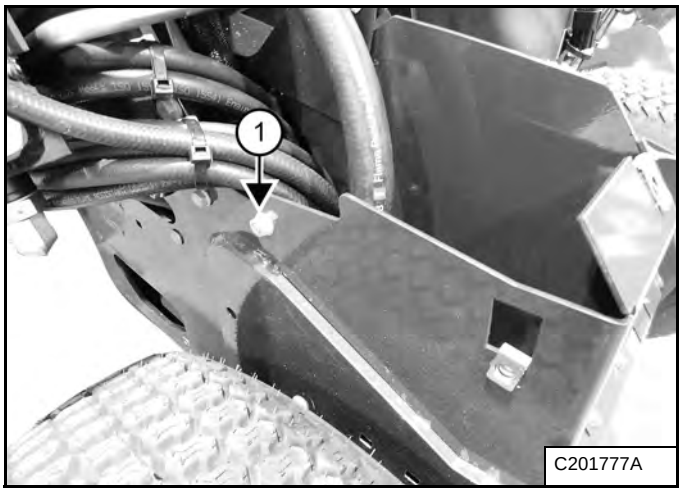
The Traction Assist is located in the front frame between the front hydrostatic motors.

Removing And Installing Traction Assists

NOTE: Dealer disassembly of the component(s) shown here may not be recommended under Bobcat's "Do Not Disassemble Policy", found in the Warranty Policy and Procedure Manual or by clicking here. Please click here to check the list of affected part numbers in IRW before proceeding. This only affects machines sold in the US and Canada.

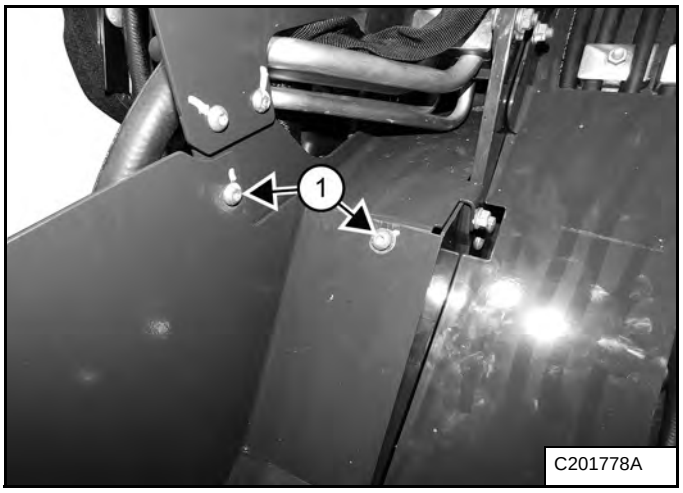
1. Raise the lift arm and install lift arm support.
2. Remove the left front cover. (See Removing And Installing Left Front Cover on Page 40-67-1.)
3. Remove the right front cover. (See Removing And Installing Right Front Cover on Page 40-65-1.)
4. Drain the hydraulic reservoir. (See Replacing Hydraulic Fluid on Page 10-120-2.)

Figure 20-170-1



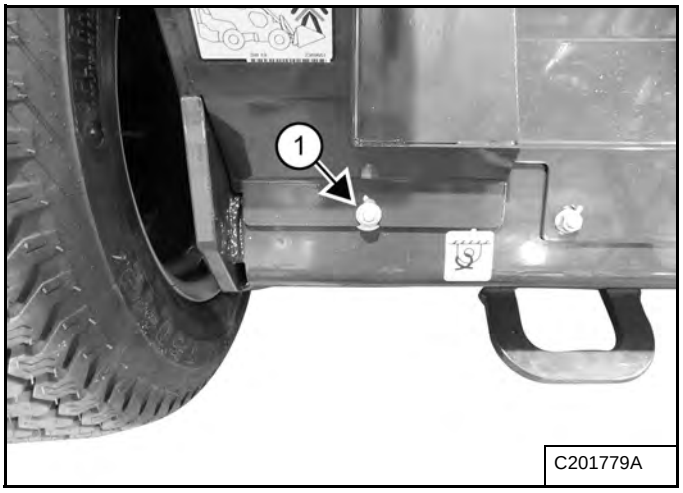
5. Remove the nut (Item 1) **[Figure 20-170-1]**.

Figure 20-170-2



6. Remove the two screws (Item 1) **[Figure 20-170-2]**.

Figure 20-170-3

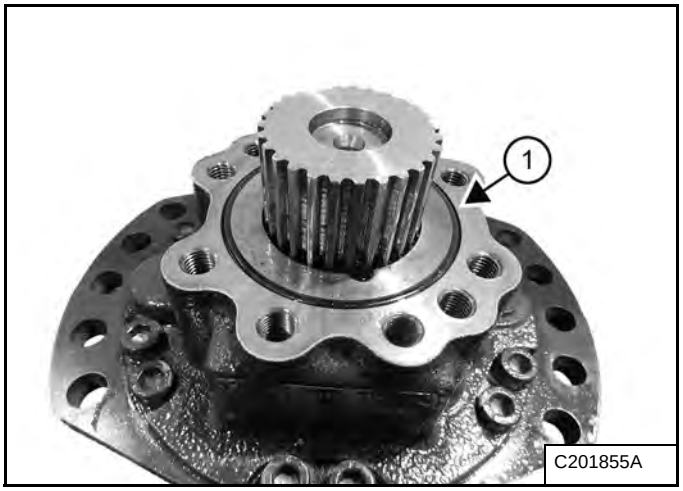


7. Remove the nut (Item 1) **[Figure 20-170-3]**.

HYDROSTATIC SYSTEM

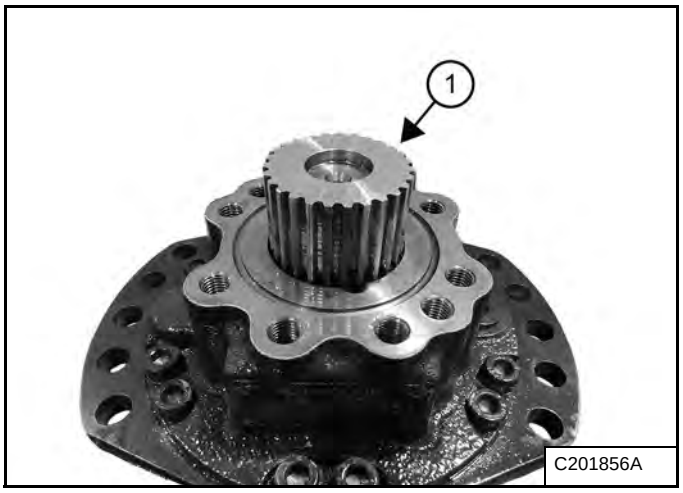
Disassembling Hydrostatic Motor (SAPR Brake) (Cont'd)

Figure 30-20-17



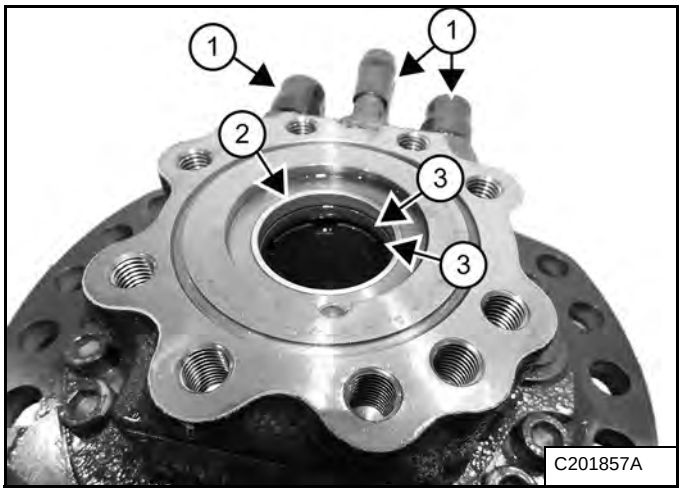
9. Remove the O-ring (Item 1) **[Figure 30-20-17]**.

Figure 30-20-18



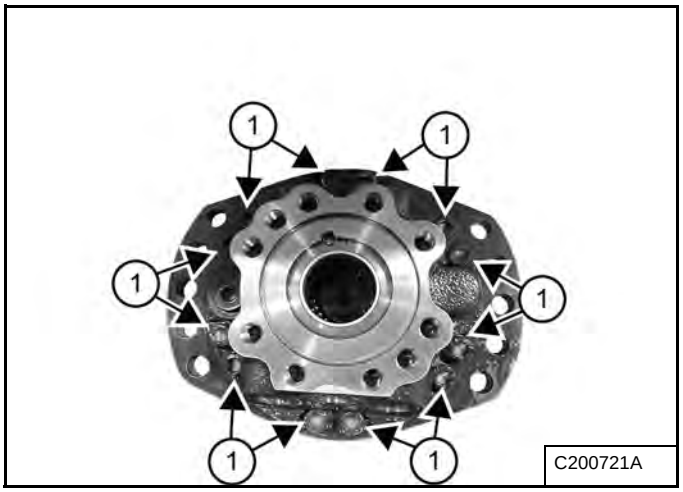
10. Remove the shaft (Item 1) **[Figure 30-20-18]** from the hydrostatic motor.

Figure 30-20-19



11. Remove the fittings (Item 1), bushing (Item 2) and seals (Item 3) **[Figure 30-20-19]** from the cover.

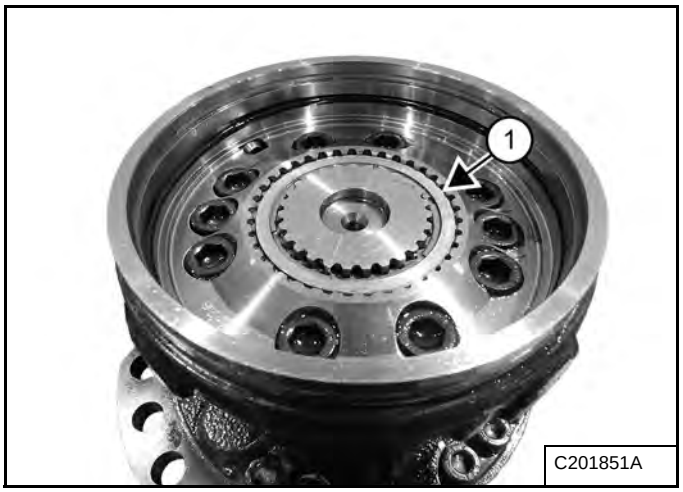
Figure 30-20-20



12. Remove the 12 bolts (Item 1) and flange (Item 2) **[Figure 30-20-20]**.

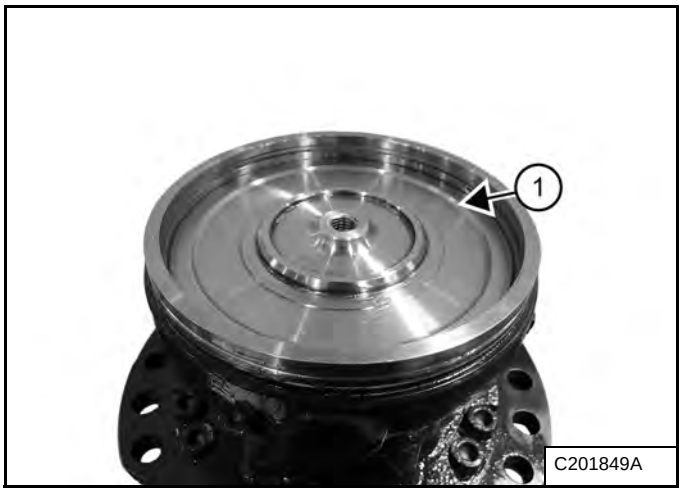
Assembling Hydrostatic Motor (SAPR Brake) (Cont'd)

Figure 30-20-54



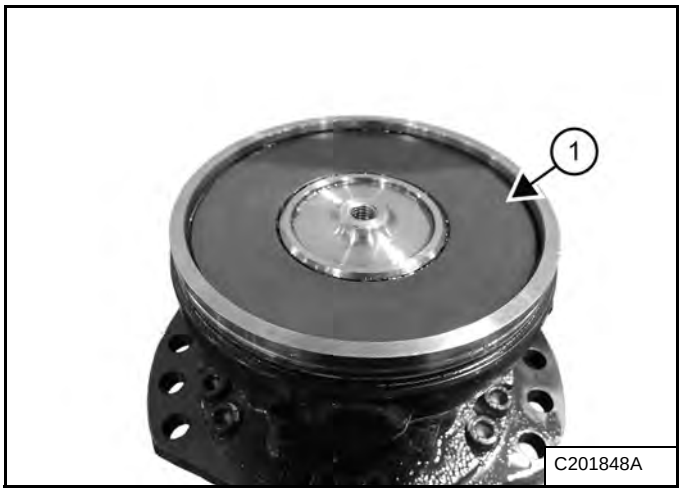
22. Install the shims (Item 1) **[Figure 30-20-54]**.

Figure 30-20-55



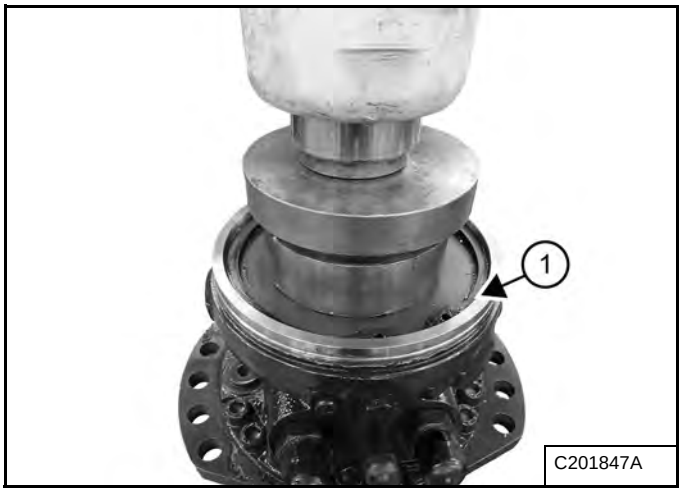
23. Install the plate (Item 1) **[Figure 30-20-55]** by tapping with a rubber mallet.

Figure 30-20-56



24. Install the washer spring (Item 1) **[Figure 30-20-56]**.

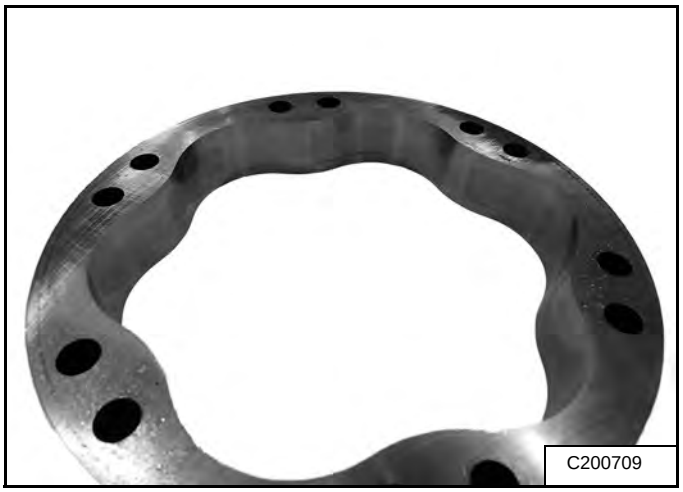
Figure 30-20-57



25. Use a press install the snap ring (Item 1) **[Figure 30-20-57]** onto the hydrostatic motor.

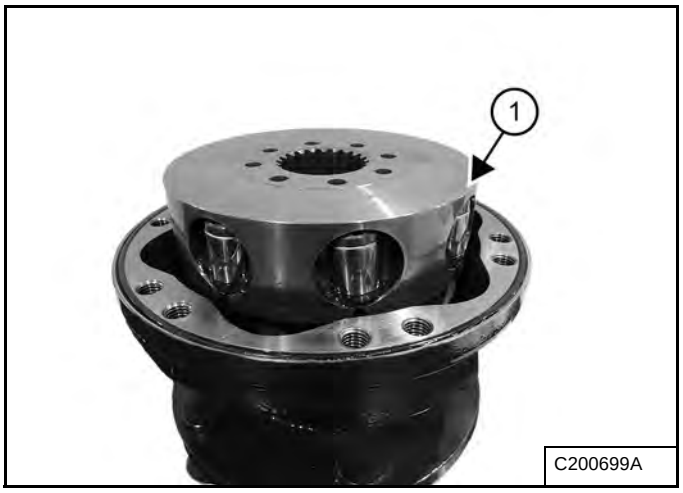
Disassembling Hydrostatic Motor (Cont'd)

Figure 30-30-25



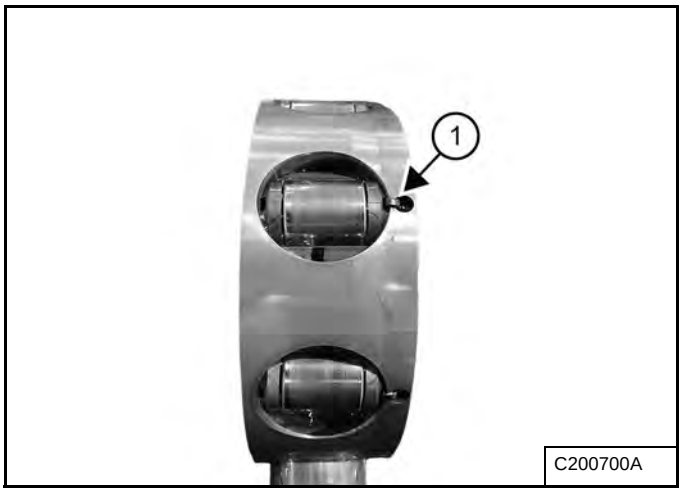
9. Inspect the cam for wear and damage.

Figure 30-30-26



10. Remove the rotary group (Item 1) **[Figure 30-30-26]**.

Figure 30-30-27



11. Remove the retaining clip (Item 1) **[Figure 30-30-27]** from the rotary group.

12. Use low air pressure and remove the roller / piston assembly (Item 2) **[Figure 30-30-27]** from the rotary group.

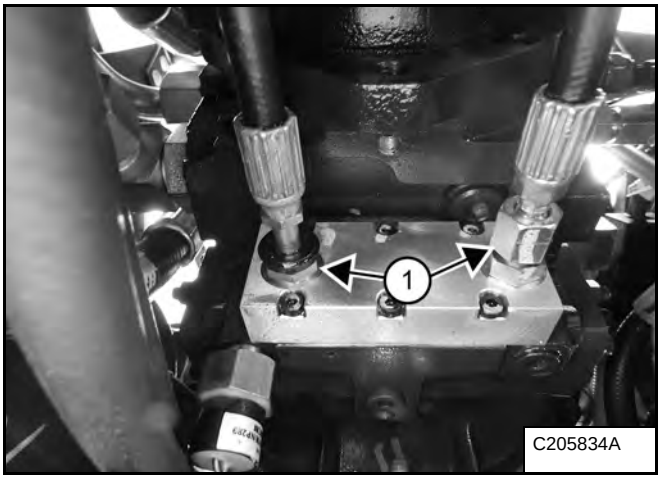
NOTE: Soak the roller / piston assembly (Item 2) [Figure 30-30-27] in oil and put all roller / piston assemblies back in the original bore.

NOTE: The roller / piston assembly (Item 2) [Figure 30-30-27] is not a serviceable part.

Removing And Installing Hydrostatic Pump (Cont'd)

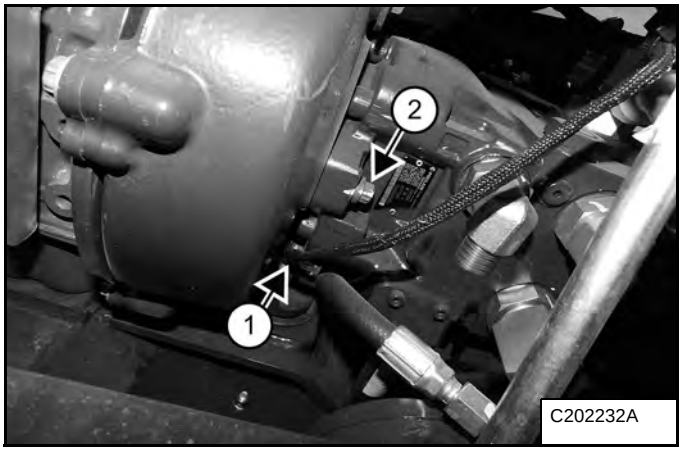
Later Models

Figure 30-40-7



15. Remove the two hose (Item 1) **[Figure 30-40-7]**.

Figure 30-40-8



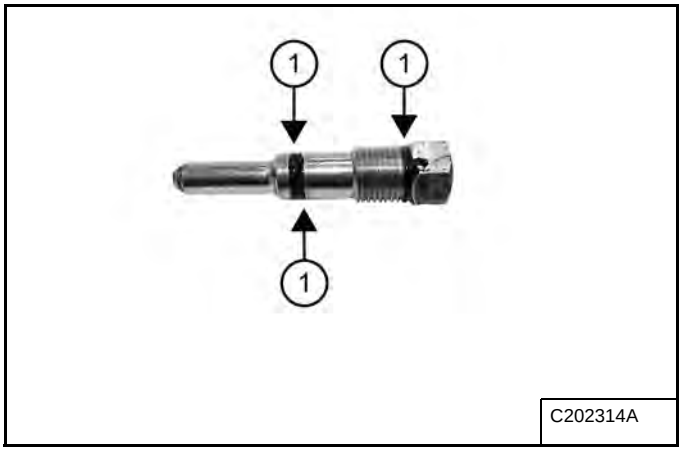
16. Disconnect the connector (Item 1) and remove the mounting bolts (Item 2) **[Figure 30-40-8]** from both sides of the pump.

17. Remove the pump.

When installing, tighten the bolts to 123 - 149 N•m (91 - 110 ft-lb) torque.

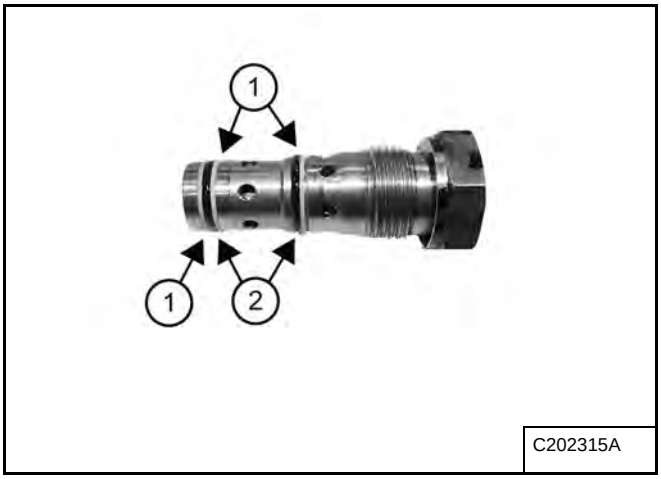
Disassembling And Assembling Hydrostatic Pump (Cont'd)

Figure 30-40-41



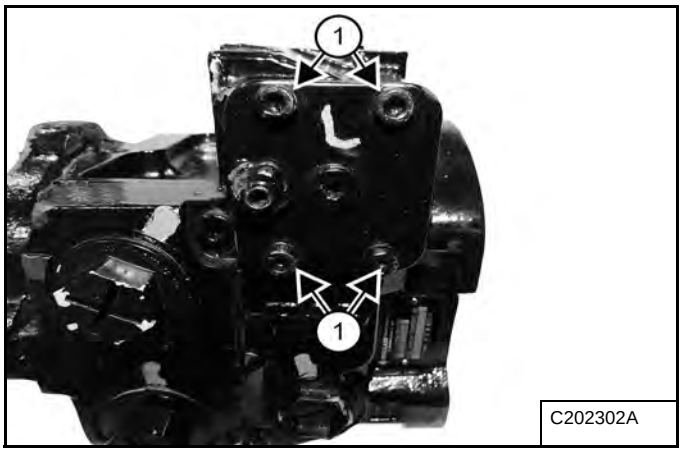
37. Remove plug (Item 2) **[Figure 30-40-39]** and replace the O-rings (Item 1) **[Figure 30-40-41]** from the pump.

Figure 30-40-42



38. Remove the valve (Item 3) **[Figure 30-40-39]** and remove the back-up rings (Item1) and O-rings (Item 2) **[Figure 30-40-42]**.

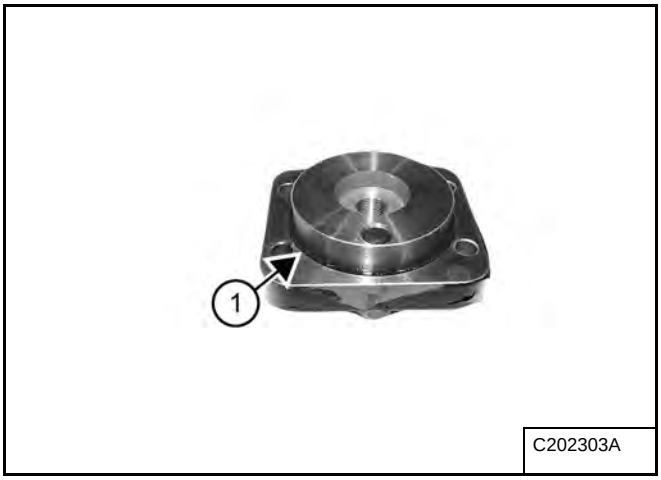
Figure 30-40-43



39. Remove the four bolts (Item 1) **[Figure 30-40-43]** and cover.

When installing, tighten bolts to 10,4 N•m (7.7 ft-lb) torque.

Figure 30-40-44



40. Remove the O-ring (Item 1) **[Figure 30-40-44]**.

ENCLOSURE

Removing And Installing Enclosure

1. Remove the right front cover. (See Removing And Installing Right Front Cover on Page 40-65-1.)

2. Remove the right corner cover. (See Removing And Installing Right Corner Cover on Page 40-66-1.)

3. Remove the left front cover. (See Removing And Installing Left Front Cover on Page 40-67-1.)

4. Remove the rear window (if equipped). (See Removing And Installing Rear Window on Page 40-10-7.)

5. Remove the side window (if equipped). (See Removing And Installing Side Window on Page 40-10-7.)

6. Remove the door (if equipped). (See Removing And Installing Door on Page 40-10-8.)

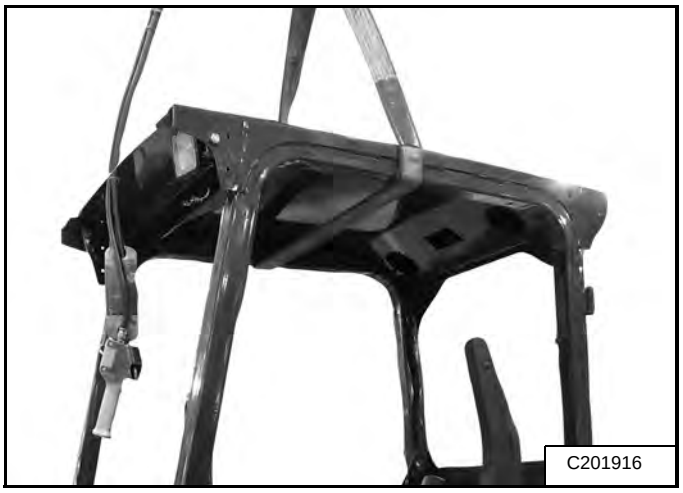
7. Remove the steering wheel. (See Removing And Installing Steering Wheel on Page 40-10-10.)

8. Remove the dash cover (if equipped). (See Removing And Installing Dash Cover on Page 40-10-9.)

9. Remove the heater unit (if equipped). (See Removing And Installing Heater Unit on Page 70-30-1.)

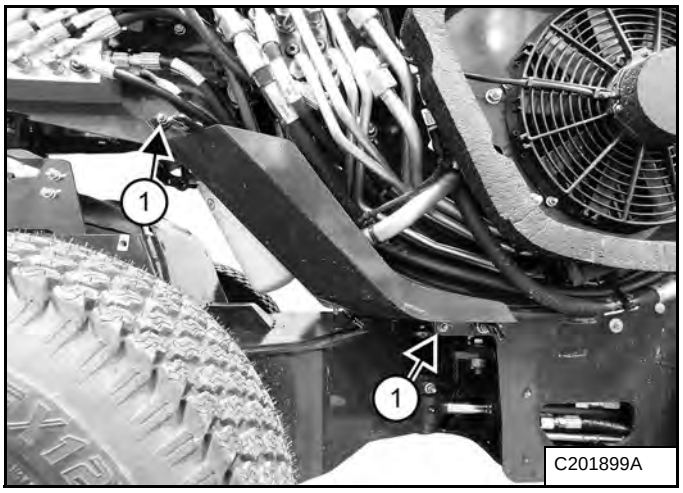
10. Remove the floor panel. (See Removing And Installing Floor Panel on Page 40-10-11.)

Figure 40-10-1



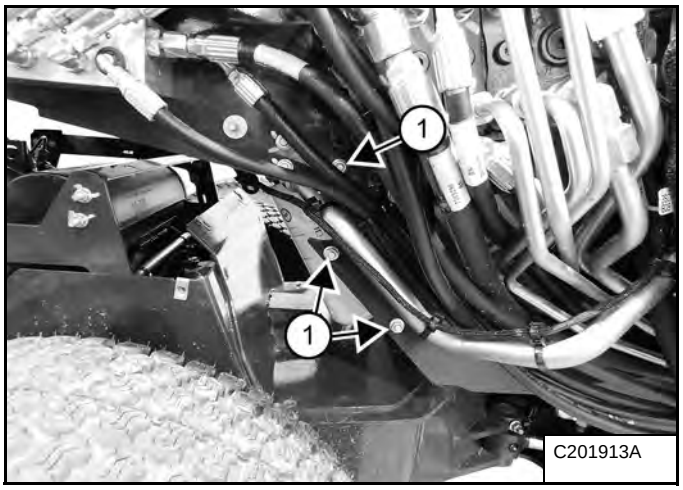
11. Use a strap to support the enclosure **[Figure 40-10-1]**.

Figure 40-10-2



12. Remove the two nuts (Item 1) and the shield **[Figure 40-10-2]**.

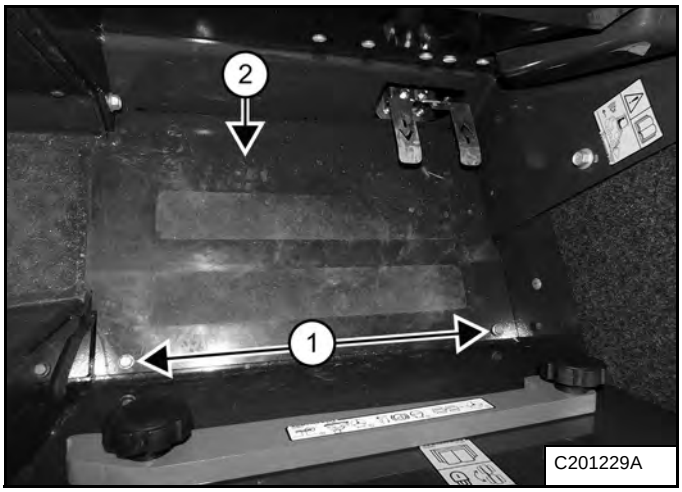
Figure 40-10-3



13. Remove the three bolts / nuts (Item 1) **[Figure 40-10-3]**.

Removing And Installing Floor Panel

Figure 40-10-36



Remove the two bolts (Item 1) **[Figure 40-10-36]**.

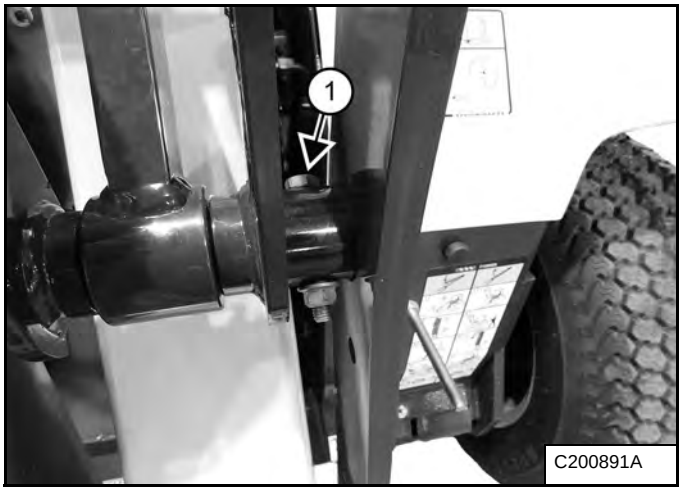
Remove the floor panel (Item 2) **[Figure 40-10-36]**.

PIVOT LINK

Removing And Installing Pivot Link

1. Remove the tilt cylinder. (See Removing And Installing Tilt Cylinder on Page 20-21-2.)

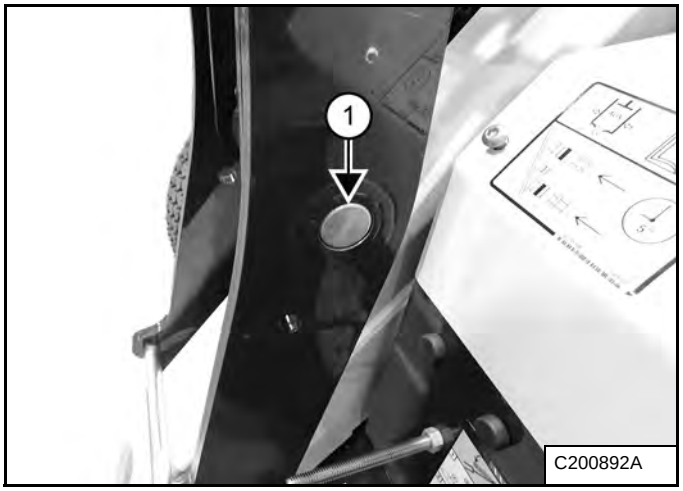
Figure 40-30-1



2. Remove the retaining bolt (Item 1) **[Figure 40-30-1]**.

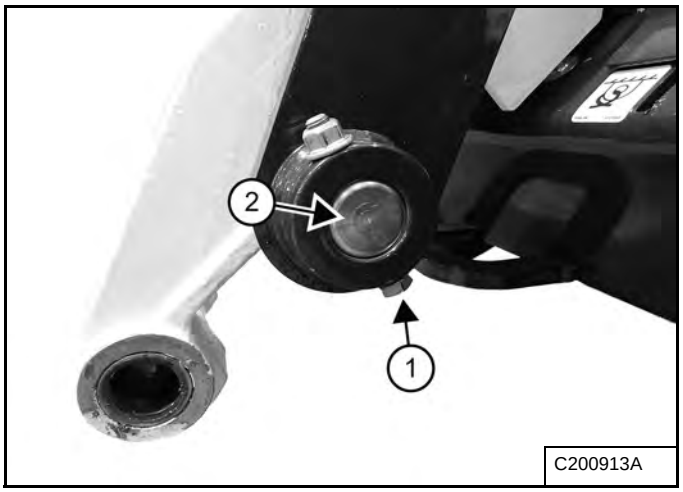
When installing, tighten the bolt / nut until there are two threads between the nut and bushing.

Figure 40-30-2



3. Remove the pin (Item 1) **[Figure 40-30-2]**.

Figure 40-30-3



4. Remove the retaining bolt (Item 1) and pin (Item 2) **[Figure 40-30-3]**.

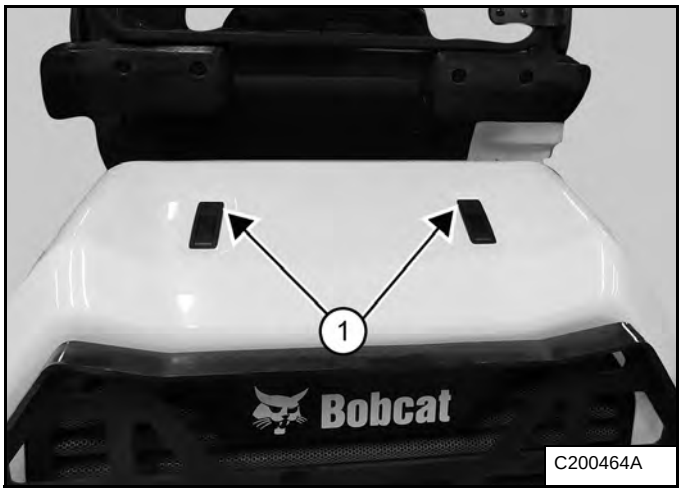
5. Remove the pivot link.

When installing, tighten the bolt / nut until there are two threads between the nut and bushing.

REAR COVER

Removing And Installing Rear Cover

Figure 40-60-1



1. Push the button on the top of the latch (Item 1) **[Figure 40-60-1]**.

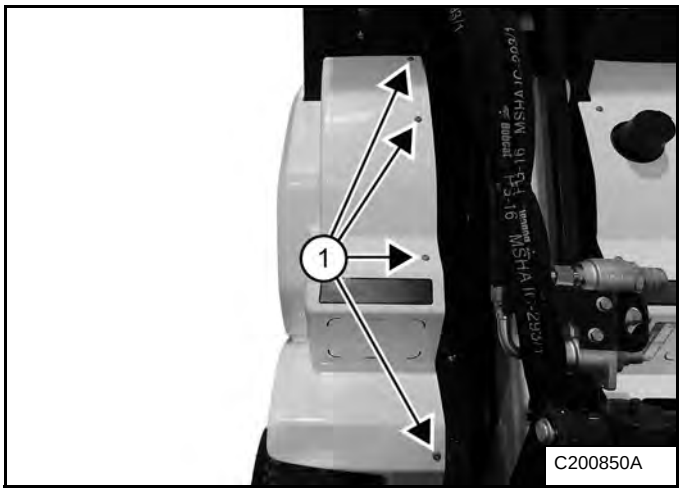
   Latches will release.

2. Use the latches to lift off the rear cover.

RIGHT FRONT COVER

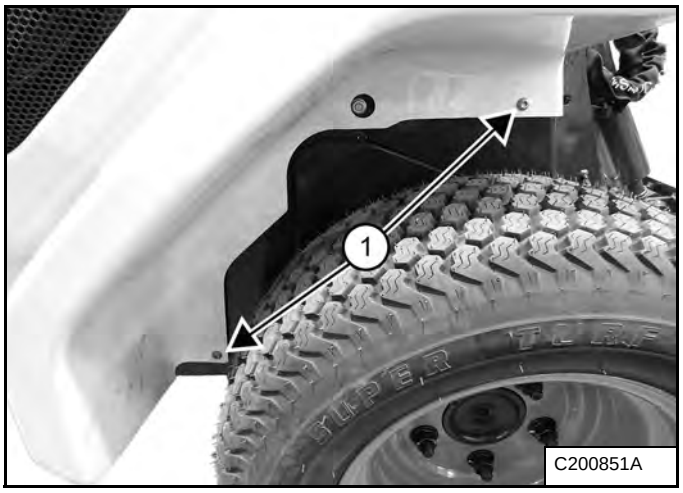
Removing And Installing Right Front Cover

Figure 40-65-1



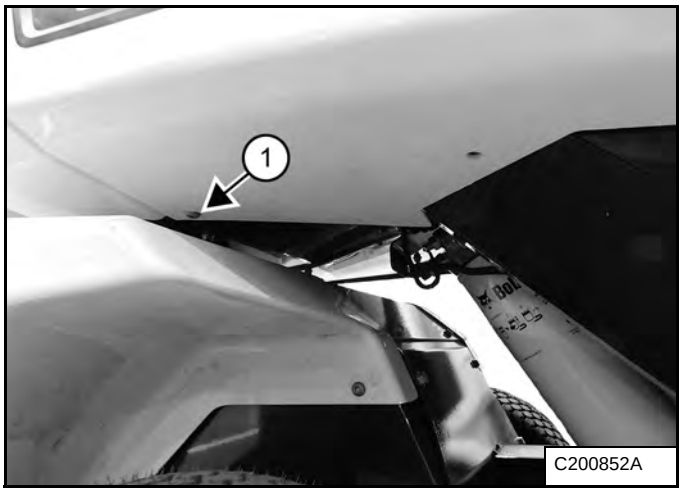
1. Remove the four bolts (Item 1) **[Figure 40-65-1]**.

Figure 40-65-2



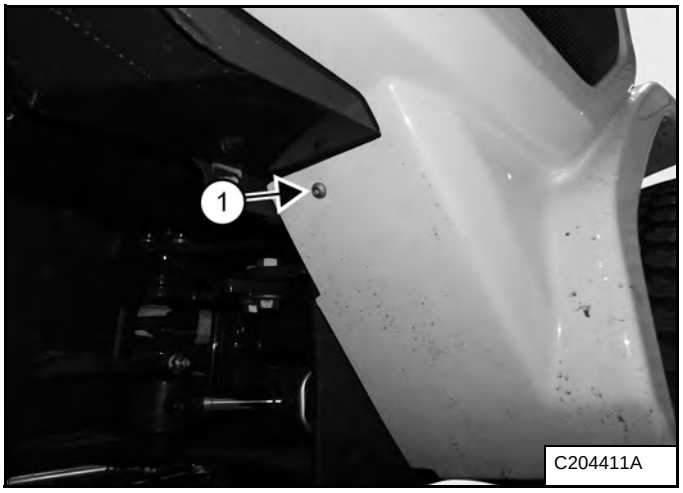
2. Remove the two bolts (Item 1) **[Figure 40-65-2]**.

Figure 40-65-3



3. Remove the two bolts (Item 1) **[Figure 40-65-3]**.

Figure 40-65-4

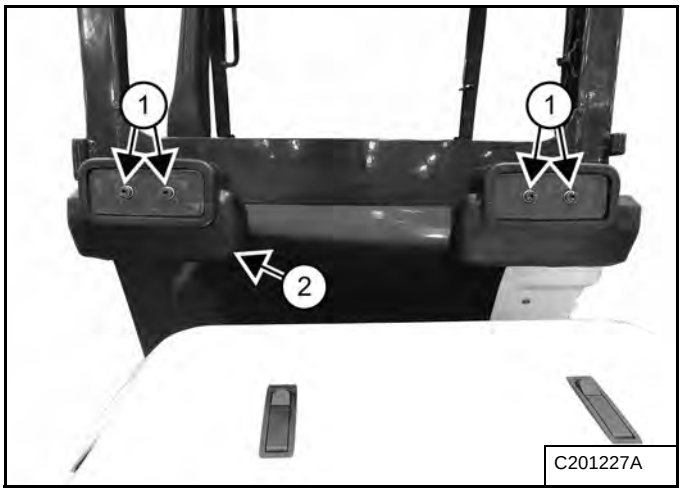


4. Remove the bolt (Item 1) **[Figure 40-65-4]**.

ENCLOSURE BUMPERS

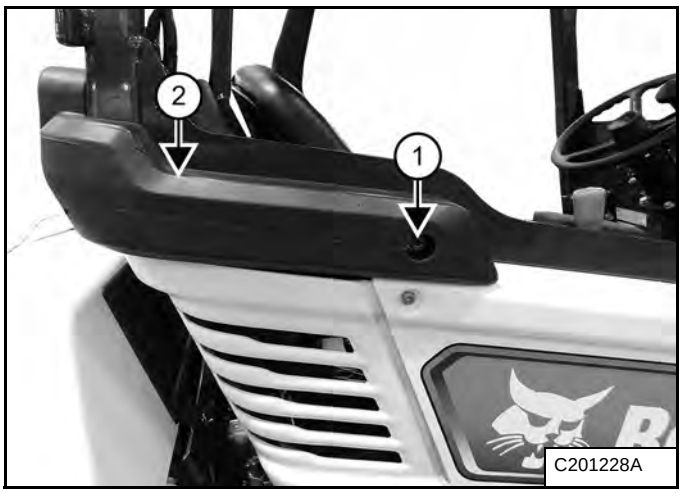
Removing And Installing Enclosure Bumpers

Figure 40-90-1

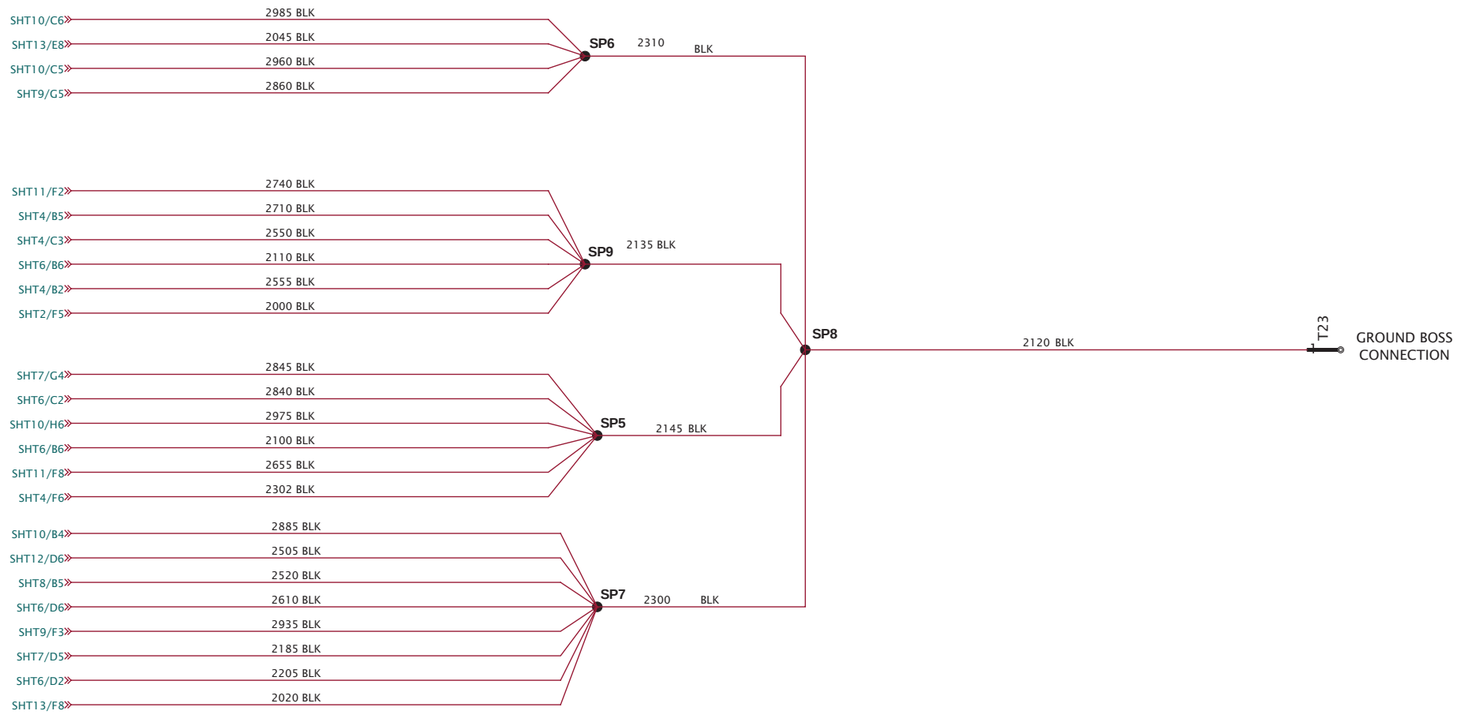


1. Remove the four bolts (Item 1) **[Figure 40-90-1]**.
2. Remove the left enclosure bumper (Item 2) **[Figure 40-90-1]**.

Figure 40-90-2



3. Remove the bolt (Item 1) **[Figure 40-90-2]**.
4. Remove the right enclosure bumper (Item 2) **[Figure 40-90-2]**.



Wiring Schematic **L28** S/N B4LD11001 & Above
Standard Machine S/N B4Y611001 & Above

Printed On November 2020
7345382 (B)
Sheet 3 of 13

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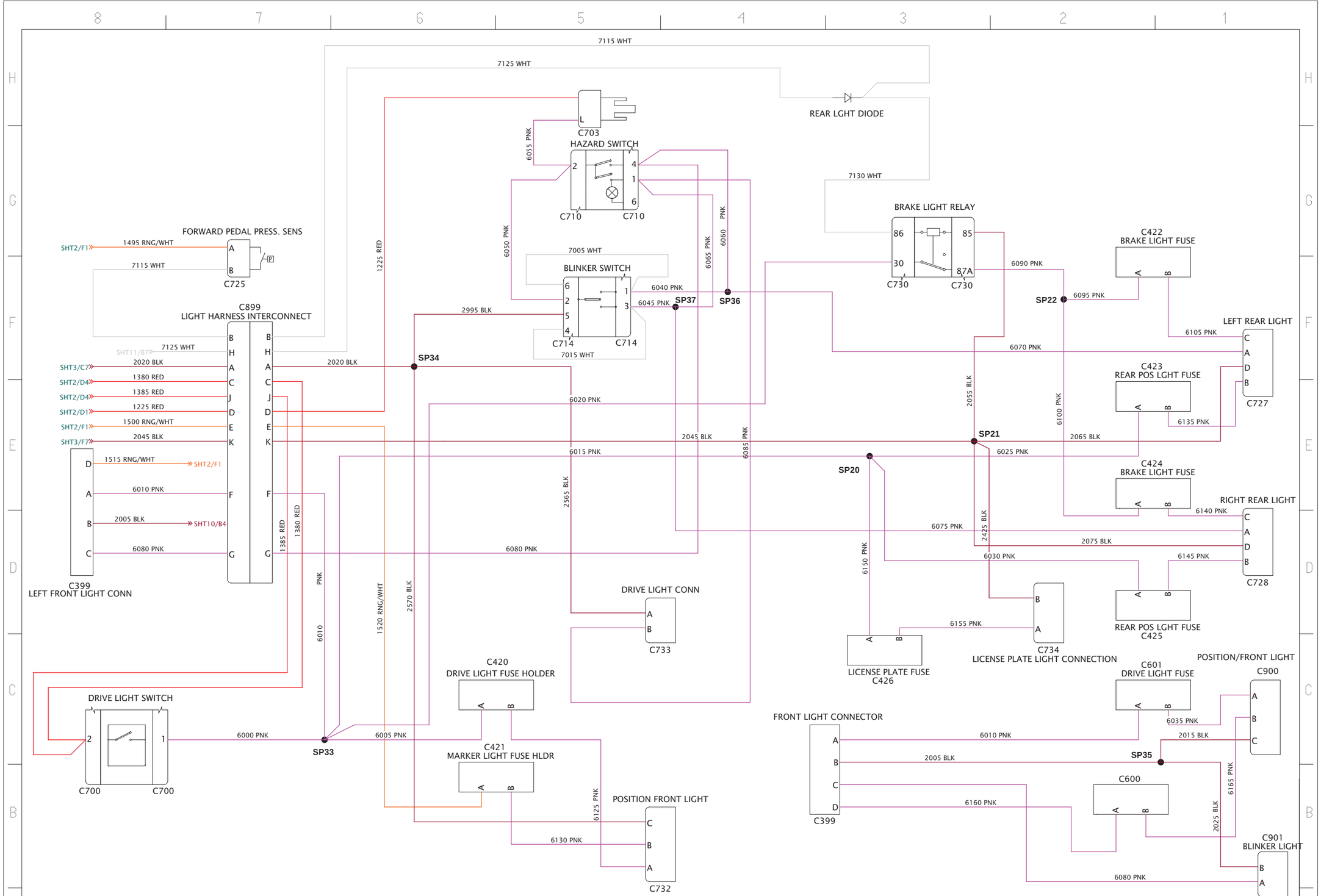


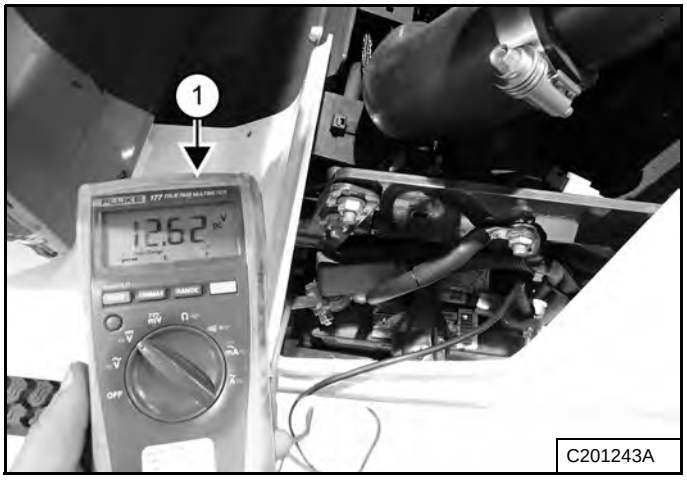
Wiring Schematic **L28** S/N B4LD11001 & Above
Standard Machine S/N B4Y611001 & Above

Printed On November 2020
7345382 (B)
Sheet 13 of 13

Printable Version Click Here

Testing Battery

Figure 50-20-2



The simplest and most common check to determine battery state of charge is to use a digital multimeter or voltmeter (Item 1) **[Figure 50-20-2]**.

A battery found below 12.4 volts must be charged to 100% charge per the battery charger's recommendation. **Allow at least 60 minutes after operating the machine or charging the battery to get an accurate reading.**

If the reading is less than 12.4 volts after the battery has been charged for several hours, see your dealer to have a more thorough battery test performed.

The freezing point of battery electrolyte is dependent on the battery state of charge. Keeping the battery voltage above 12.4 volts will help prevent batteries from freezing, even at extremely low temperatures.

If the battery freezes, the internal grid may be damaged and the case will be distorted or cracked. If this happens, dispose of the battery according to local regulations.

Charging Battery

A battery charger designed for 12 volt charging systems is recommended. Follow the battery charger manufacturer's instructions to charge the battery to 12.6 volts (100% charge). Batteries should be charged at room temperature to avoid an undercharge or overcharge condition. Never attempt to charge a frozen battery.

The following table can be used to identify the approximate amount of time required to charge a discharged battery. Allow at least 60 minutes after operating the machine or charging the battery to get an accurate reading.

BATTERY VOLTAGE	STATE OF CHARGE	CHARGER MAXIMUM RATE		
		30 Amps	20 Amps	10 Amps
12.6 V	100%	READY TO USE		
12.4 V	75%	0.9 hr.	1.3 hr.	2.5 hr.
12.2 V	50%	1.9 hr.	2.7 hr.	5.1hr.
12.0 V	25%	2.9 hr.	4.3 hr.	7.8 hr.
11.8 V	0%	4.0 hr.	5.7 hr.	10.7 hr.

NOTE: Use a good quality automatic charger to avoid battery damage from overcharging.

⚠ WARNING

BATTERY GAS CAN EXPLODE AND CAUSE SERIOUS INJURY OR DEATH

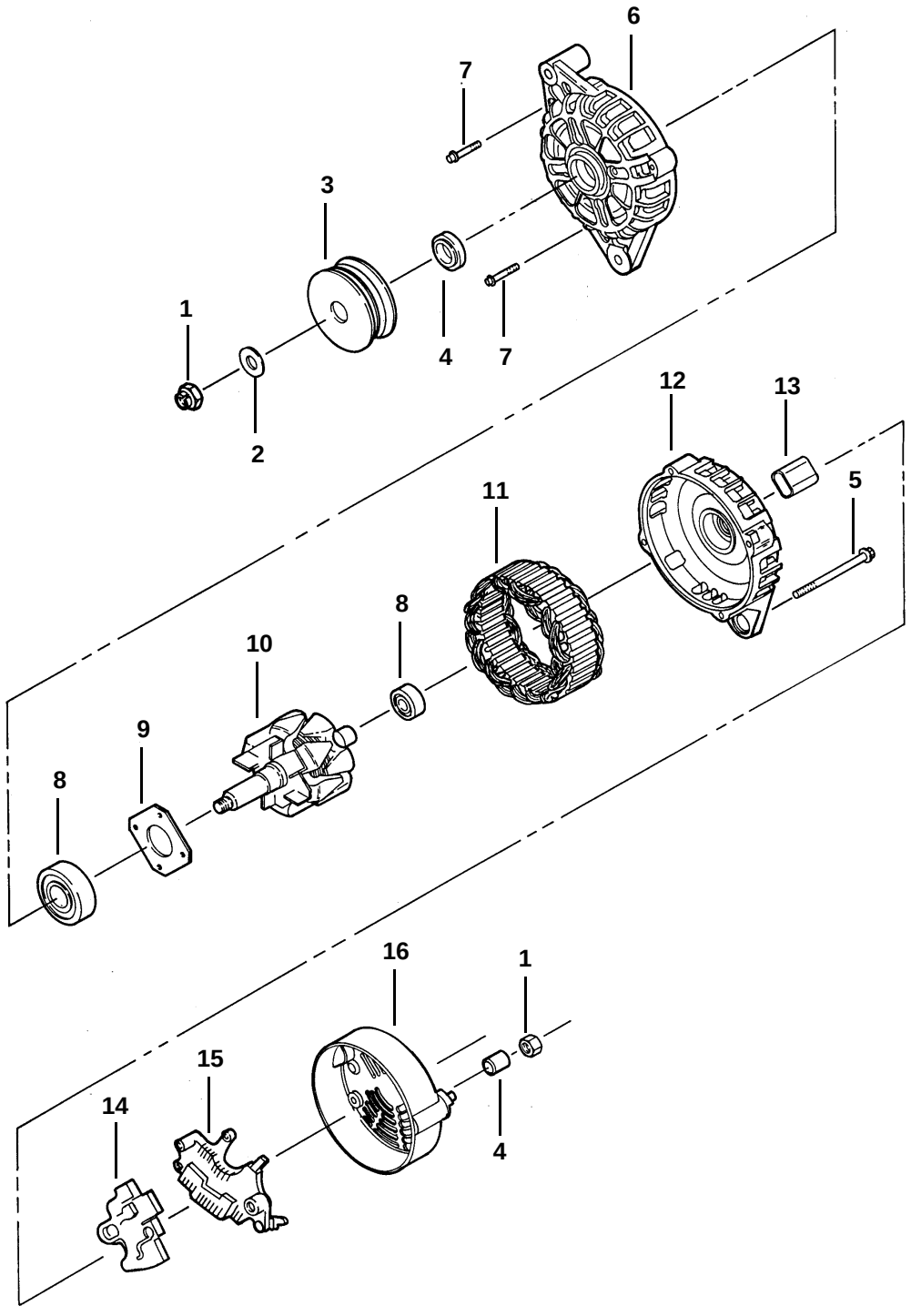
Keep arcs, sparks, flames and lighted tobacco away from batteries. When *jumping* from booster battery make final connection (negative) at machine frame.

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

W-2066-0910

Parts Identification

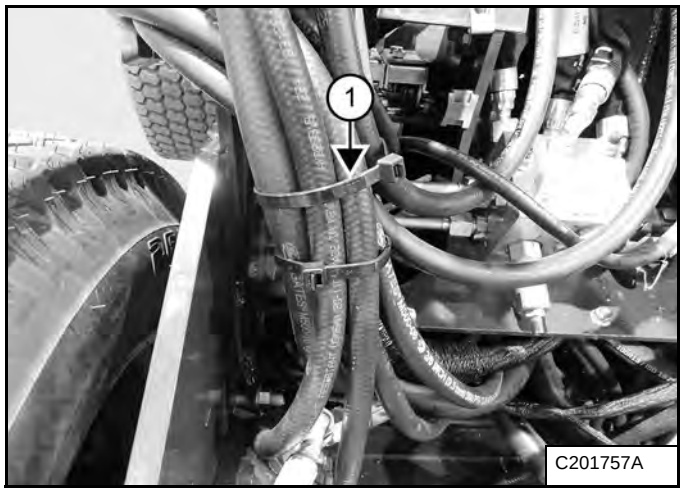
1. Nut
2. Washer
3. Pulley
4. Spacer
5. Bolt
6. Case Half
7. Bolt
8. Bearing
9. Retainer
10. Rotor
11. Stator
12. Case Half
13. Sleeve
14. Regulator
15. Rectifier
16. Cover



C-3529

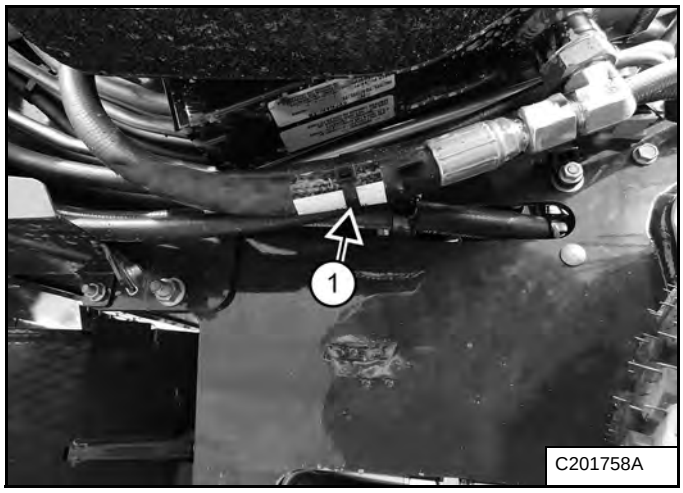
Removing And Installing Gateway Controller (Cont'd)

Figure 50-70-5



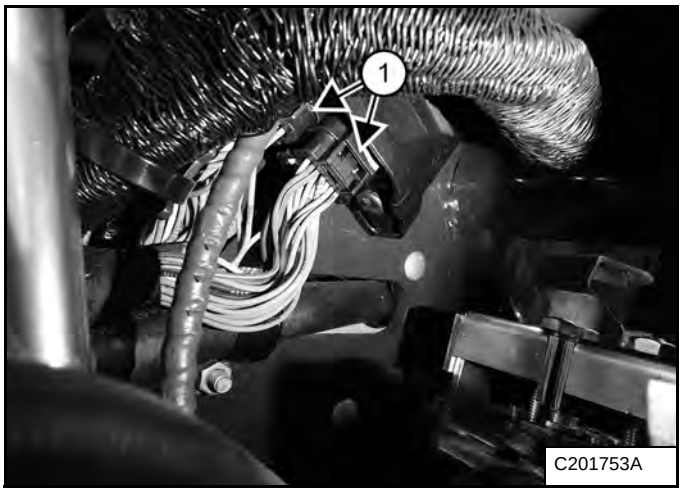
8. Cut the tie strap (Item 1) **[Figure 50-70-5]** from the hydraulic hoses.

Figure 50-70-6



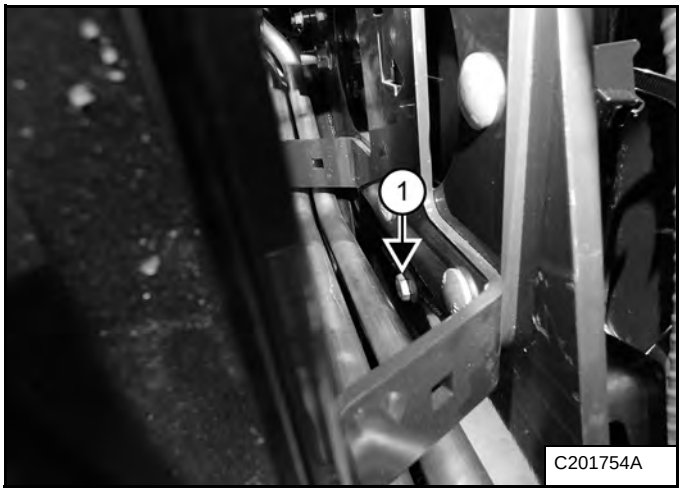
9. Cut the tie strap (Item 1) **[Figure 50-70-6]** from the hydraulic hoses.

Figure 50-70-7



10. Disconnect the two connectors (Item 1) **[Figure 50-70-7]** from the gateway controller.

Figure 50-70-8



11. Remove the bolt (Item 1) **[Figure 50-70-8]** from the gateway controller located behind the oil cooler.


Bobcat®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Troubleshooting

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.

PROBLEM	CAUSE
Slow Cranking Speed	1, 2, 3, 4
Engine Will Not Start	2, 5, 6, 7, 8, 9, 11, 12, 13, 14, 15, 16, 17, 19, 27, 28, 29
Difficult To Start	5, 7, 8, 9, 10, 11, 12, 13, 15, 16, 17, 18, 19, 20, 25, 27, 28, 29
No Power From Engine	8, 9, 10, 11, 12, 13, 15, 16, 17, 21, 22, 24, 25, 26, 28, 29
Engine Is Mis-firing	8, 9, 11, 12, 13, 15, 16, 17, 21, 22, 24, 25, 26, 28
Too Much Fuel Consumption	10, 12, 13, 15, 16, 17, 19, 20, 21, 23, 24, 25, 27, 28, 29
Black Exhaust	10, 12, 13, 15, 16, 17, 19, 20, 21, 23, 24, 25, 27, 28, 29
Blue / White Exhaust	4, 10, 15, 16, 17, 21, 23, 27, 29, 30, 50
Low Oil Pressure	4, 31, 32, 33, 34, 35, 37, 38, 39, 52
Engine Knocking	13, 15, 16, 19, 22, 24, 25, 27, 29, 31, 40, 41, 53
Engine Running Rough	7, 8, 9, 10, 11, 12, 13, 17, 18, 22, 24, 25, 26, 29, 40, 53
Vibration	12, 13, 17, 21, 22, 25, 26, 29, 40, 42, 43
High Oil Pressure	4, 33, 36
Overheating	10, 12, 13, 15, 16, 20, 21, 40, 44, 45, 46, 47, 48, 51
Too Much Crankcase Pressure	22, 27, 29, 30, 40, 49
Poor Compression	10, 16, 21, 24, 25, 27, 28, 29, 30, 41, 53
Start And Stop	9, 10, 11

KEY TO CORRECT THE CAUSE	
1. Battery Capacity Low	28. Worn Valves And Seat
2. Bad Electrical Connections	29. Broken Or Worn Piston Rings
3. Faulty Starter Motor	30. Worn Valve Stems Or Guides
4. Incorrect Grade Of Oil	31. Worn Or Damaged Bearings
5. Low Cranking Speed	32. Not Enough Oil In The Oil Pan
6. Fuel Tank Empty	33. Switch Is Defective
7. Faulty Stop Control Operation	34. Oil Pump Worn
8. Plugged Fuel Line	35. Relief Valve Is Stuck Open
9. Plugged Fuel Filter	36. Relief Valve Is Stuck Closed
10. Restriction In The Air Cleaner	37. Broken Relief Valve Spring
11. Air In The Fuel System	38. Faulty Suction Pipe
12. Faulty Fuel Injection Pump	39. Plugged Oil Filter
13. Faulty Fuel Injectors	40. Piston Seizure
14. Broken Injection Pump Drive	41. Incorrect Piston Height
15. Incorrect Injection Pump Timing	42. Faulty Engine Mounting
16. Incorrect Valve Timing	43. Incorrect Alignment Of Flywheel
17. Poor Compression	44. Faulty Thermostat
18. Plugged Fuel Tank Vent	45. Restriction In Water Jacket
19. Incorrect Grade Of Fuel	46. Loose Alternator Belt
20. Exhaust Pipe Restriction	47. Plugged Radiator
21. Cylinder Head Gasket Leaking	48. Plugged Breather Pipe
22. Over Heating	49. Plugged Breather Pipe
23. Cold Running	50. Damaged Valve Stem Oil Deflectors
24. Incorrect Tappet Adjustment	51. Coolant Level Too Low
25. Sticking Valves	52. Plugged Oil Pump Pipe Strainer
26. Incorrect High Pressure Fuel Lines	53. Broken Valve Spring
27. Worn Cylinder Bores	


Bobcat®

Removing And Installing Radiator

1. Remove the rear cover. (See Removing And Installing Rear Cover on Page 40-60-1.)

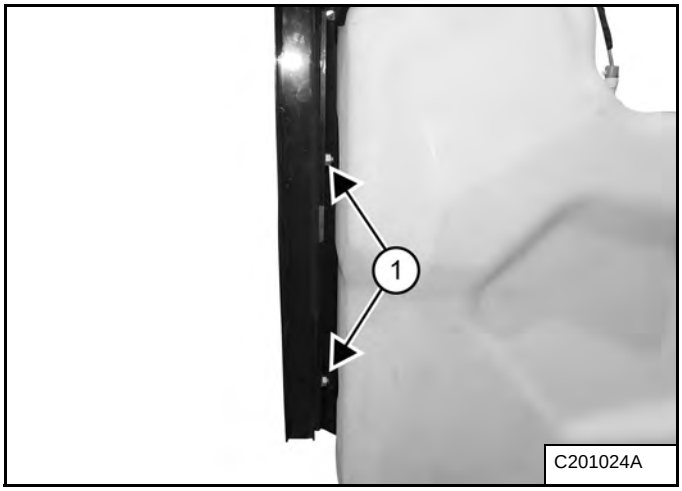
2. Remove counterweight. (See Removing And Installing Counterweight on Page 40-70-1.)

3. Remove the left rear cover. (See Removing And Installing Left Rear Cover on Page 40-62-1.)

4. Remove the right rear cover. (See Removing And Installing Right Rear Cover on Page 40-61-1.)

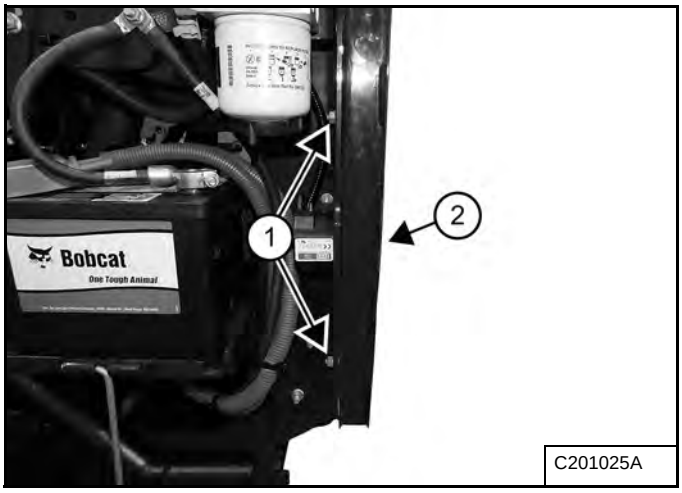
5. Remove the coolant. (See Replacing Coolant on Page 10-90-3.)

Figure 60-60-4



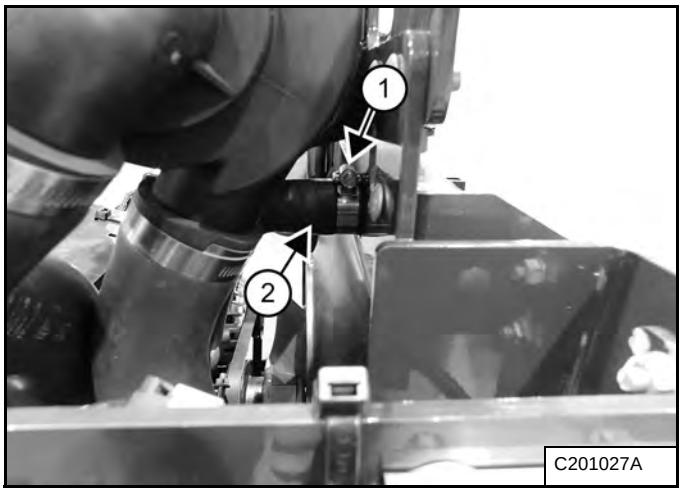
6. Remove the two mounting nuts (Item 1) **[Figure 60-60-4]**.

Figure 60-60-5



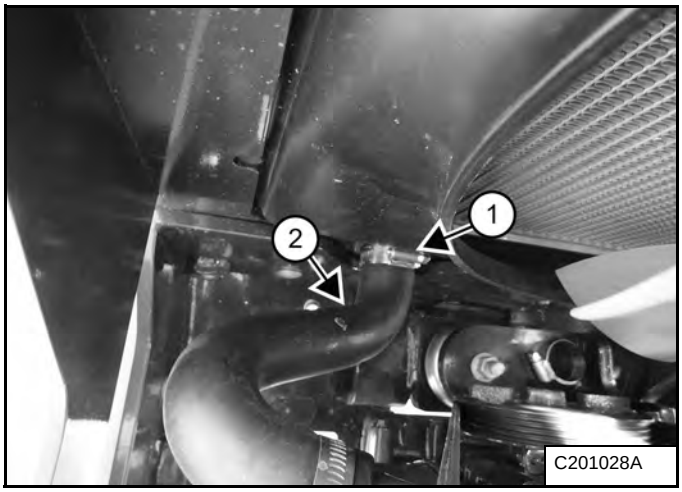
7. Remove the two mounting nuts (Item 1) and remove the grille assembly (Item 2) **[Figure 60-60-5]**.

Figure 60-60-6



8. Loosen the clamp (Item 1) and remove the top radiator hose (Item 2) **[Figure 60-60-6]**.

Figure 60-60-7

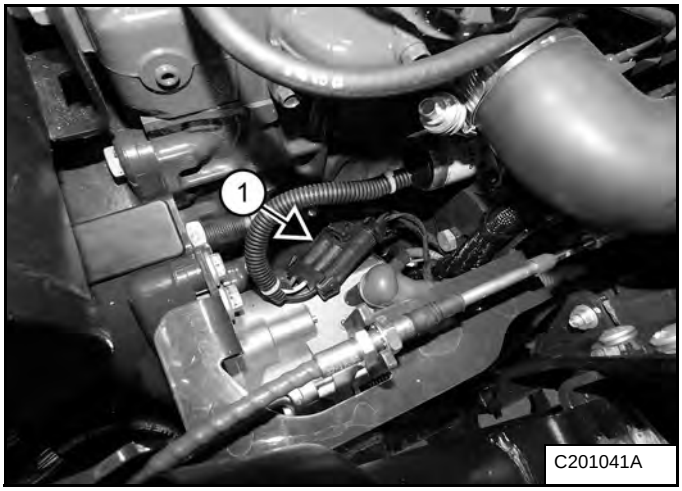


9. Loosen the clamp (Item 1) and remove the bottom radiator hose (Item 2) **[Figure 60-60-7]**.

Removing And Installing Fuel Shutoff Solenoid

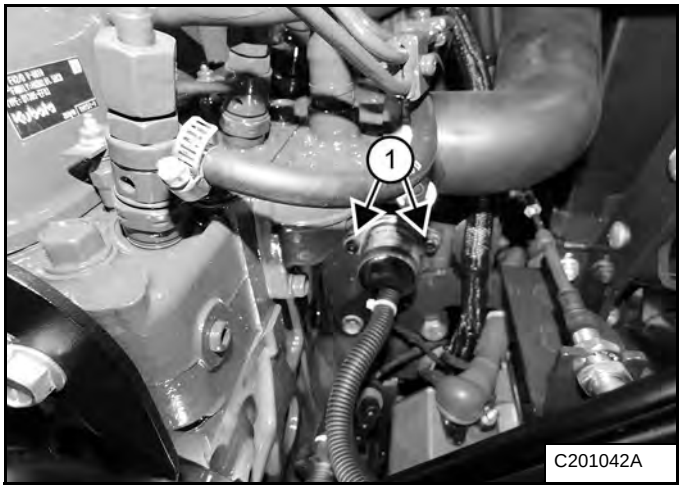
1. Disconnect the negative cable form the battery.

Figure 60-80-3



2. Disconnect the wire harness (Item 1) **[Figure 60-80-3]**.

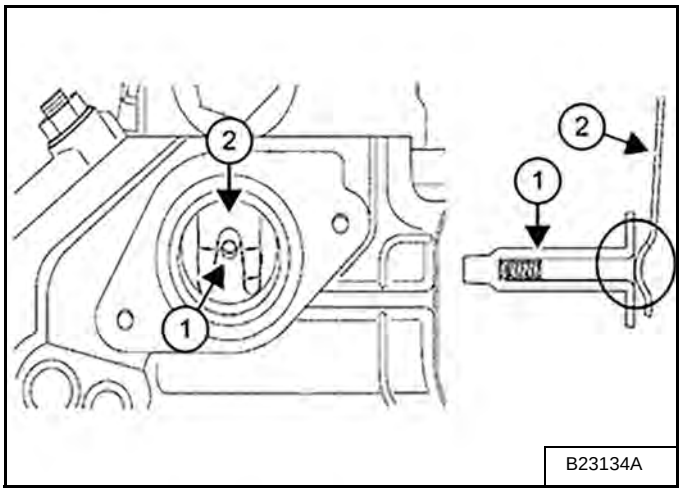
Figure 60-80-4



3. Remove the bolts (Item 1) **[Figure 60-80-4]** and solenoid.

When installing the solenoid apply liquid gasket to the mounting flange of the solenoid.

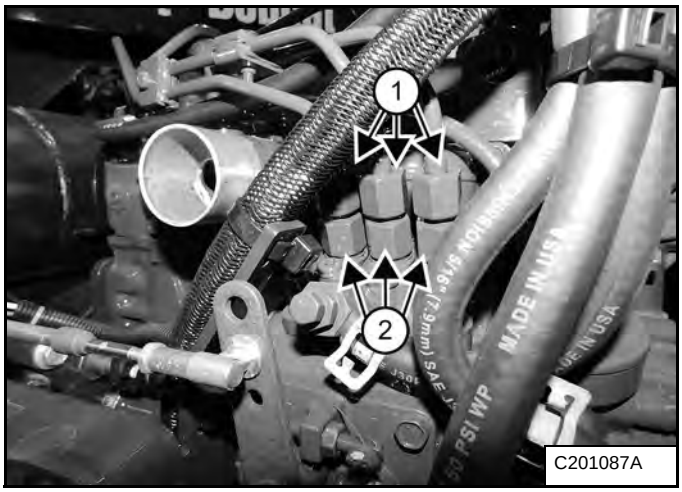
Figure 60-80-5



When installing the guide (Item 1) on the fuel shutoff solenoid must contact the boost lever (Item 2) **[Figure 60-80-5]**.

Removal And Installing Fuel Injector (Cont'd)

Figure 60-80-27



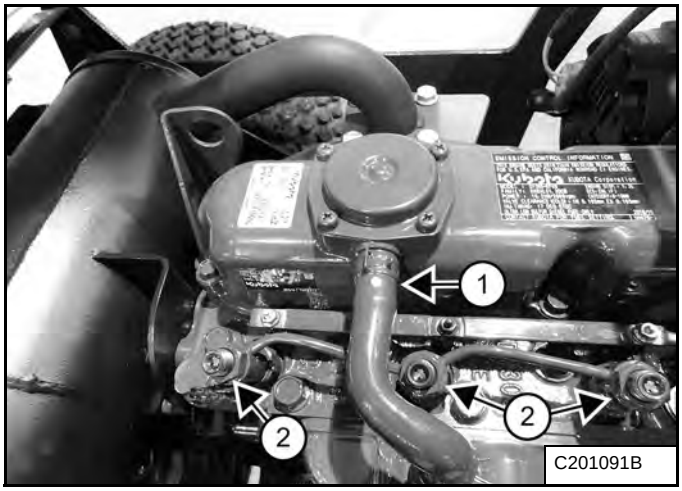
8. Disconnect the high pressure fuel lines (Item 1) **[Figure 60-80-27]** from the delivery valves.

NOTE: Hold the delivery valve holder nuts (Item 2) [Figure 60-80-27] when removing or tightening the high pressure fuel lines.

When installing tighten the high pressure fuel line nuts to 24 - 33 N•m (18 - 25 ft-lb).

9. Remove the high pressure fuel lines from the engine.

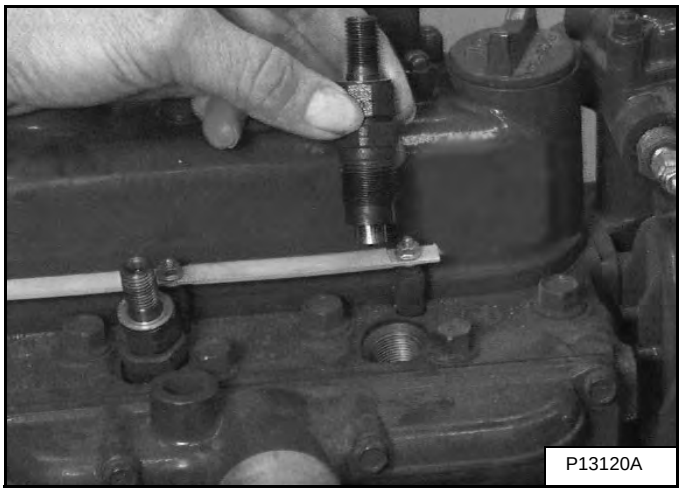
Figure 60-80-28



10. Remove the valve cover recirculation hose (Item 1), three banjo fitting nuts (Item 2) **[Figure 60-80-28]** from the fuel injector nozzles.

11. Remove the banjo fittings from the fuel injectors.

Figure 60-80-29



12. Remove the fuel injector nozzles from the engine **[Figure 60-80-29]**.

When installing tighten the injectors to 29 - 49 N•m (22 - 36 ft-lb) torque.

Removing And Installing Cylinder Head (Cont'd)

Figure 60-90-19

Gasket Size (Number)	Piston Protrusion
15	0,475 - 0,525 mm (0.0187 - 0.0207 in)
20	0,525 - 0,575 mm (0.0207 - 0.0226 in)
25	0,575 - 0,625 mm (0.0226 - 0.0246 in)
30	0,625 - 0,675 mm (0.0246 - 0.0266 in)
35	0,675 - 0,725 mm (0.0266 - 0.0285 in)

23. Select the correct gasket size (Number) from the chart **[Figure 60-90-19]** based on measured piston protrusion values.

Find the measurement of the highest piston protrusion and the lowest piston protrusion (recorded earlier) for each piston.

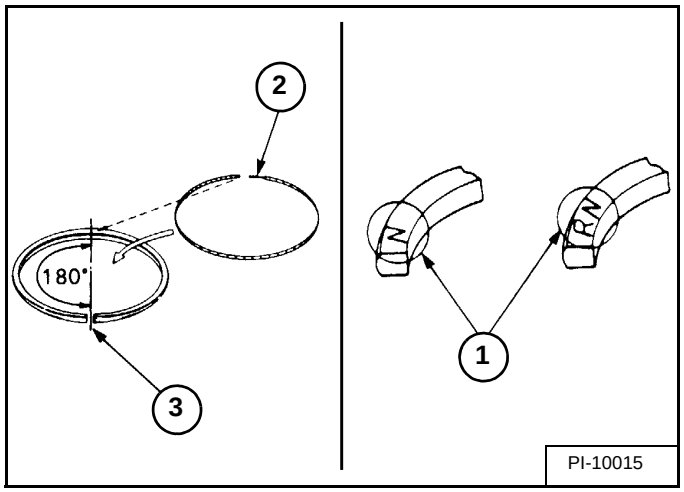
24. If the highest measurement exceeds the piston protrusion of the selected gasket, use the gasket which is one size larger. If the measurement exceeds gasket size 35, the engine must be disassembled, clearances checked, and reassembled.

If the measurement is two sizes smaller than the selected gasket or smaller than gasket size 15, the engine must be disassembled, clearances checked, and reassembled.

25. After the gasket and cylinder head have been installed, turn the crankshaft by hand to be sure there is no interference between the piston, cylinder, and valves.

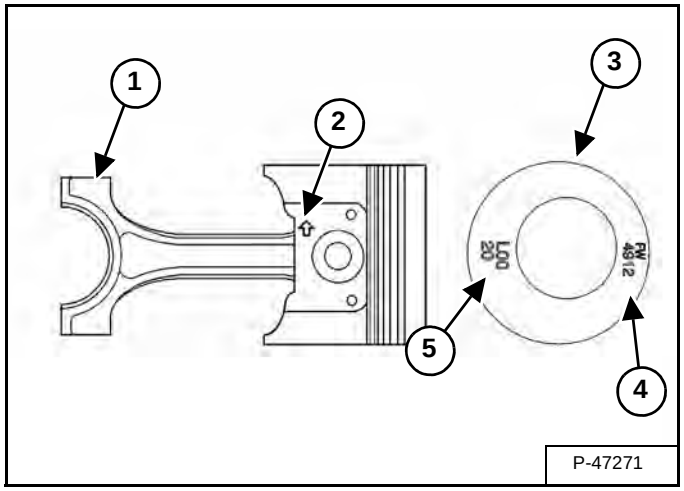
Removing And Installing Piston And Connecting Rod (Cont'd)

Figure 60-100-4



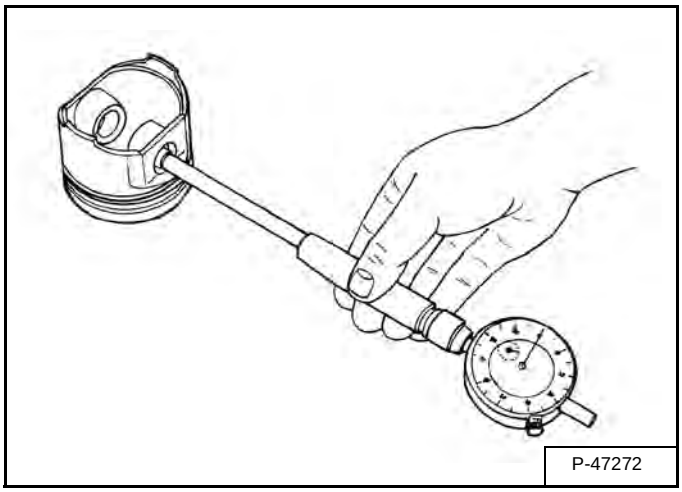
When installing new rings, assemble the ring so the mark (Item 1) near the gap faces the top of the piston. When installing the oil ring, place the expander joint (Item 2) on the opposite side of the oil ring gap (Item 3) **[Figure 60-100-4]**.

Figure 60-100-5



When reassembling, align the marks (Item 1) on the connecting rod and piston (Item 2). Heat the piston in clean engine oil to 80°C (176°F) and tap the piston pin into position. Place the piston rings so that there are gaps every 120° (Items 3, 4 and 5) **[Figure 60-100-5]** with no gap facing the piston pin in the cylinder.

Figure 60-100-6



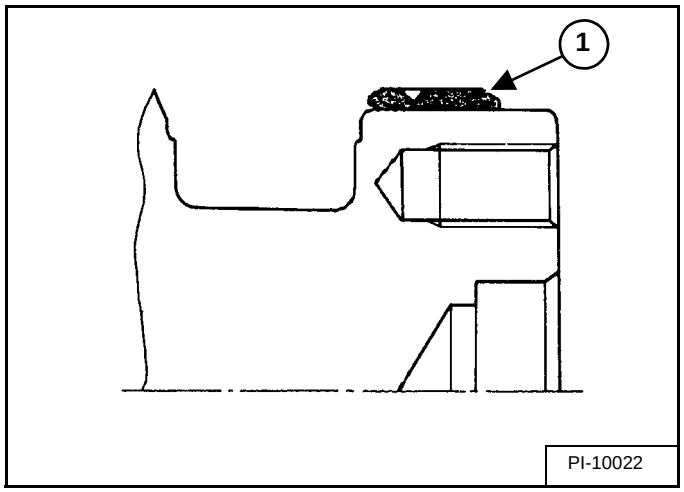
12. Measure the I.D. of the piston pin bore in both horizontal and vertical directions **[Figure 60-100-6]**.

If the measurement exceeds the allowable limit, replace the piston.

Piston Bore I.D.	22,000 - 22,013 mm (0.86615 - 0.86665 in)
Allowable Limit	22,03 mm (0.8673 in)

Servicing Crankshaft And Bearings (Cont'd)

Figure 60-100-27



6. Check the wear on the crankshaft sleeve (Item 1) **[Figure 60-100-27]**.

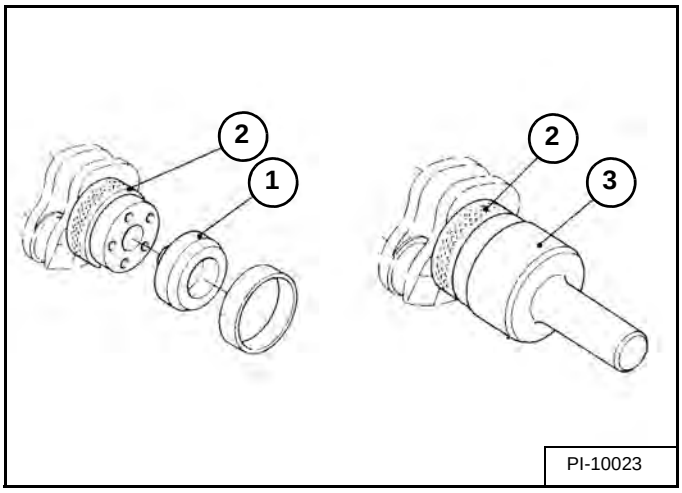
If the wear exceeds the allowable limit or the seal leaks oil, replace the sleeve.

Wear of Sleeve	0,1 mm (0.0004 in)

The special tool set will be needed to replace the crankshaft sleeve.

7. Remove the sleeve.

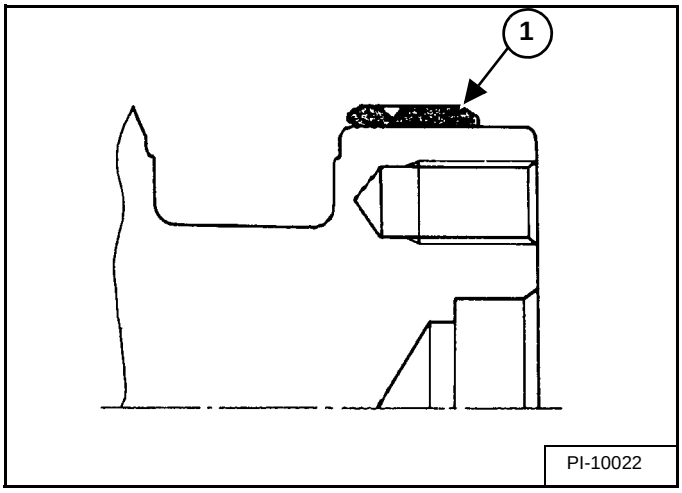
Figure 60-100-28



8. Install the sleeve guide (Item 1) and stop (Item 2) **[Figure 60-100-28]**.

9. Heat the sleeve to approximately 150 - 200°C (302 - 392°F). Install the sleeve on the crankshaft using the special driver tool (Item 3) **[Figure 60-100-28]**.

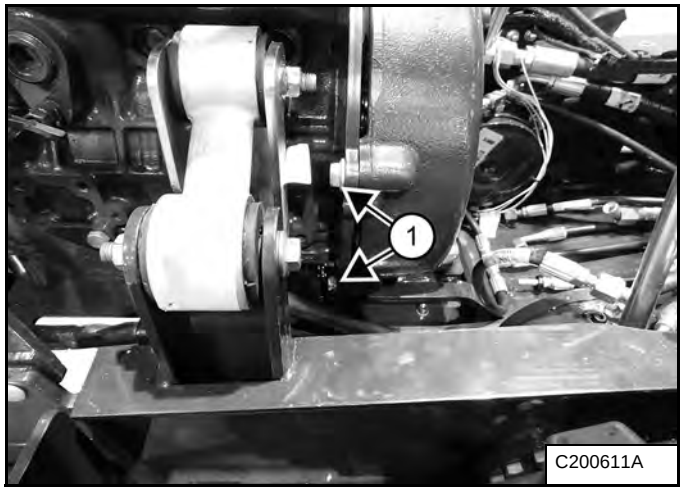
Figure 60-100-29



NOTE: The sleeve is installed with the larger chamfered surface to the front of the crankshaft (Item 1) [Figure 60-100-29].

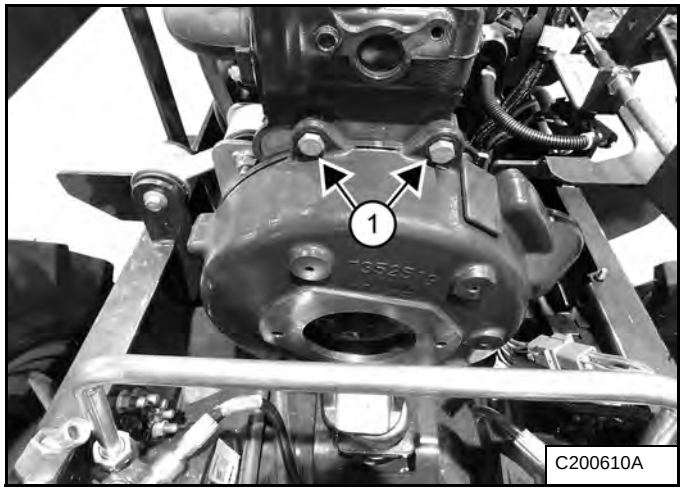
Removing And Installing Hydrostatic Pump Coupler (Cont'd)

Figure 60-120-4



13. Remove the two flywheel housing bolts (Item 1) **[Figure 60-120-4]**.

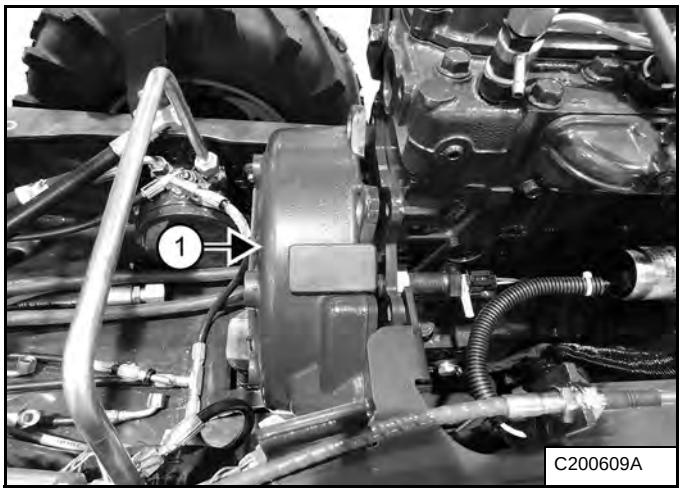
Figure 60-120-5



14. Remove the two flywheel housing bolts (Item 1) **[Figure 60-120-5]**.

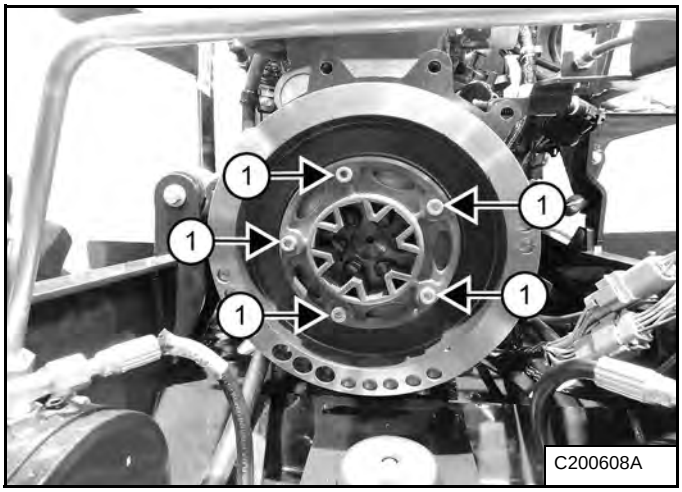
When installing, position the housing over the alignment pins and tighten the bolts to 43 - 47 N•m (32 - 35 ft-lb) torque.

Figure 60-120-6



15. Remove the flywheel housing (Item 1) **[Figure 60-120-6]** from the engine.

Figure 60-120-7



16. Remove the bolts (Item 1) **[Figure 60-120-7]** from the hydrostatic pump coupler.

When installing apply Loctite® 243 to the bolts. Tighten the bolts to 35 - 39 N•m (25 - 28 ft-lb) torque.

17. Remove the hydrostatic pump coupler.


Bobcat®

Machine Dimensions (Cont'd)

REF.	DESCRIPTION	WITH STANDARD TIRE
A1	Articulation Angle	43°
R1	Turning Radius	1985,9 mm (78.19 in)
R2	Clearance Radius	2563,8 mm (100.94 in)
RR1	Turning Radius - Carry Position - Forks - Narrow	2290,5 mm (90.18 in)
WW1	Bucket Width	1270,0 mm (50.00 in)
H	Inner Turning Radius	931,5 mm (16.67 in)
F	Max Reach	1135,0 mm (44.69 in)
G	Hinge Pin Height @ Max Reach	1108,6 mm (43.56 in)
AA2	Maximum Rollback - Fully Raised	56°
AA1	Dump Angle	40°
HH5	Overall Operating Height - Fully Raised	3107,1 mm (122.33 in)
HH4	Height To Hinge Pin - Fully Raised	2650,6 mm (104.35 in)
HH6	Dump Height	2136,4 mm (84.11 in)
HH3	Reach At Specified Height	1993,9 mm (78.50 in)
AA3	Maximum Rollback @ Ground	30°
LL1	Reach At Specified Height	868,4 mm (34.19 in)
LL3	Reach - Fully Raised	785,7 mm (30.93 in)
LL2	Overall Length	3109,0 mm (122.40 in)
L1	Length Without Attachment	2367,8 mm (93.22 in)
L3	Wheelbase	1200,0 mm (47.24 in)
L4	Rear Overhang	878,3 mm (34.58 in)
A4	Angle Of Departure	23°
A	Hitch Receiver Height	408,1 mm (16.07 in)
H1	Overall Height	1983,7 mm (78.10 in)

TORQUE SPECIFICATIONS FOR BOLTS (CONT'D)

Torque For General Metric Bolts

The following table shows standard torque specifications for bolts with zinc phosphate coating. Bolts purchased from Bobcat that have zinc phosphate coating are specified by the letter H following the part number.

THREAD NOM. DIA	PROPERTY CLASS					
	8.8		10.9		12.9	
-	N•m	ft-lb	N•m	ft-lb	N•m	ft-lb
M4	3,5 - 2,5	2.5 - 2.0	4,2 - 3,8	3.1 - 2.8	5,3 - 4,7	3.9 - 3.5
M5	6,5 - 5,5	5.0 - 4.0	8,4 - 7,6	6.2 - 5.6	9,5 - 8,5	7.0 - 6.2
M6	10,5 - 9,5	7.5 - 7.0	13,7 - 12,3	10.1 - 9.1	15,8 - 14,2	11.6 - 10.4
M7	17 - 15	12.5 - 11.0	22 - 20	16.2 - 14.7	26,3 - 23,7	19.5 - 17.5
M8	26 - 24	19 - 18	32,6 - 29,4	24.0 - 21.7	39 - 35	28.5 - 25.5
M10	47 - 43	35 - 32	63 - 57	46.5 - 42.0	79 - 71	58.5 - 52.5
M12	85 - 75	60 - 55	115 - 105	85 - 78	137 - 123	110 - 91
M14	140 - 125	100 - 90	180 - 160	133 - 118	210 - 190	155 - 140
M16	210 - 190	155 - 140	285 - 255	210 - 188	330 - 300	245 - 225
M18	290 - 260	215 - 190	385 - 345	285 - 255	460 - 420	340 - 310
M20	410 - 370	300 - 275	550 - 490	405 - 360	650 - 590	490 - 440
M22	550 - 500	400 - 370	740 - 760	545 - 560	880 - 800	650 - 590
M24	700 - 640	520 - 470	950 - 850	700 - 625	1120 - 1000	830 - 730
M27	1030 - 930	760 - 680	1370 - 1230	1000 - 900	1630 - 1470	1200 - 1100
M30	1400 - 1260	1030 - 930	1900 - 1700	1400 - 1250	2200 - 2000	1600 - 1500
M33	1900 - 1720	1400 - 1270	2500 - 2300	1850 - 1700	3100 - 2700	2300 - 2000
M36	2450 - 2200	1800 - 1620	3200 - 2900	2400 - 2200	3900 - 3500	2900 - 2600

NOTE: Use the torque value for the part having the lesser property class when a fastener and nut are used together but have a different property class.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