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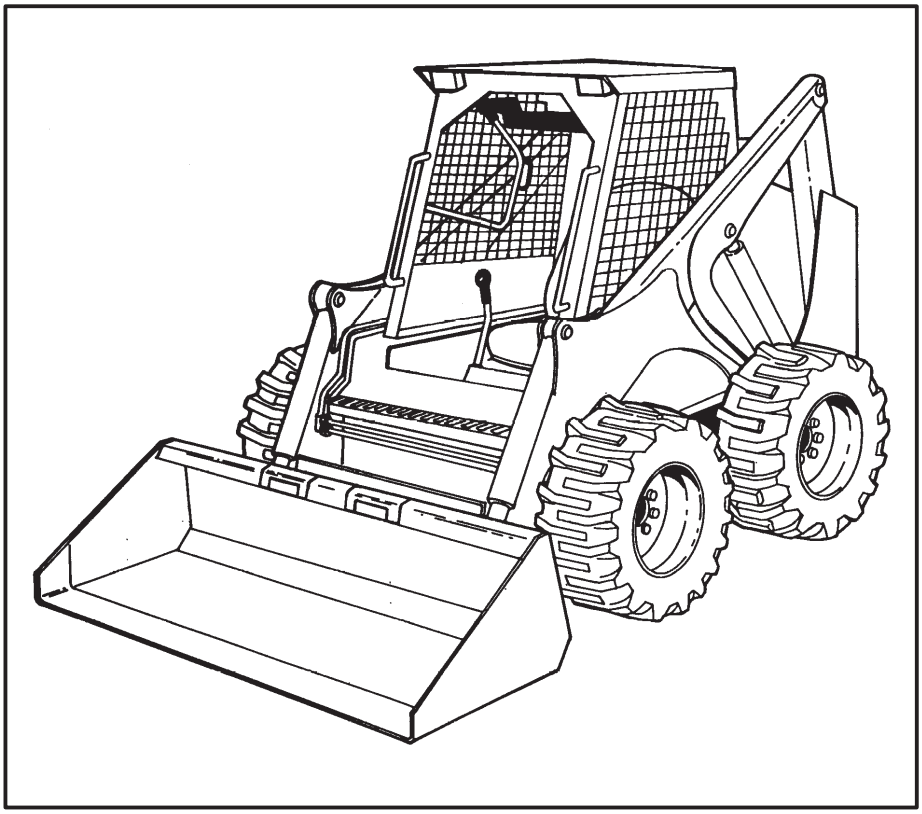
873

Service Manual

(S/N 514115001 & Above)
(S/N 514213001 & Above)



EQUIPPED WITH BOBCAT INTERLOCK CONTROL SYSTEM (BICS™)

Dealer Copy -- Not for Resale

6900382 (10*. /)

Printed in U.S.A.

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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. Failure to follow instructions can cause injury or death.

W–2003–1298

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 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.

TRANSPORTING THE LOADER

Procedure

WARNING

Adequately designed ramps of sufficient strength are needed to support the weight of the machine when loading onto a transport vehicle. Wood ramps can break and cause personal injury.

W–2058–0494

A loader with an empty bucket or no attachment must be loaded backward onto the transport vehicle **[A]**.

The rear of the trailer must be blocked or supported **[A]** when loading or unloading the loader to prevent the front end of the trailer from raising up.

Be sure the transport and towing vehicles are of adequate size and capacity.

Use the following procedure to fasten the Bobcat loader to the transport vehicle to prevent the loader from moving during sudden stops or when going up or down slopes **[B]**.

Lower the bucket or attachment to the floor. Stop the engine. Engage the parking brake. Install chains at the front and rear loader tie down positions (Inset) **[B]**. Fasten each end of the chain to the transport vehicle and tighten the chain with a chain tightener.

The Inset **[B]** shows the decal with attachment points for towing and tie down.

TOWING THE LOADER

Procedure

To prevent damage to the loaders hydrostatic system, the loader must be towed only a short distance at slow speed. (Example: Moving the loader onto a transport vehicle.)

The towing chain (or cable) must be rated at 1–1/2 times the weight of the loader (See *SPECIFICATIONS*, Page 9–1).

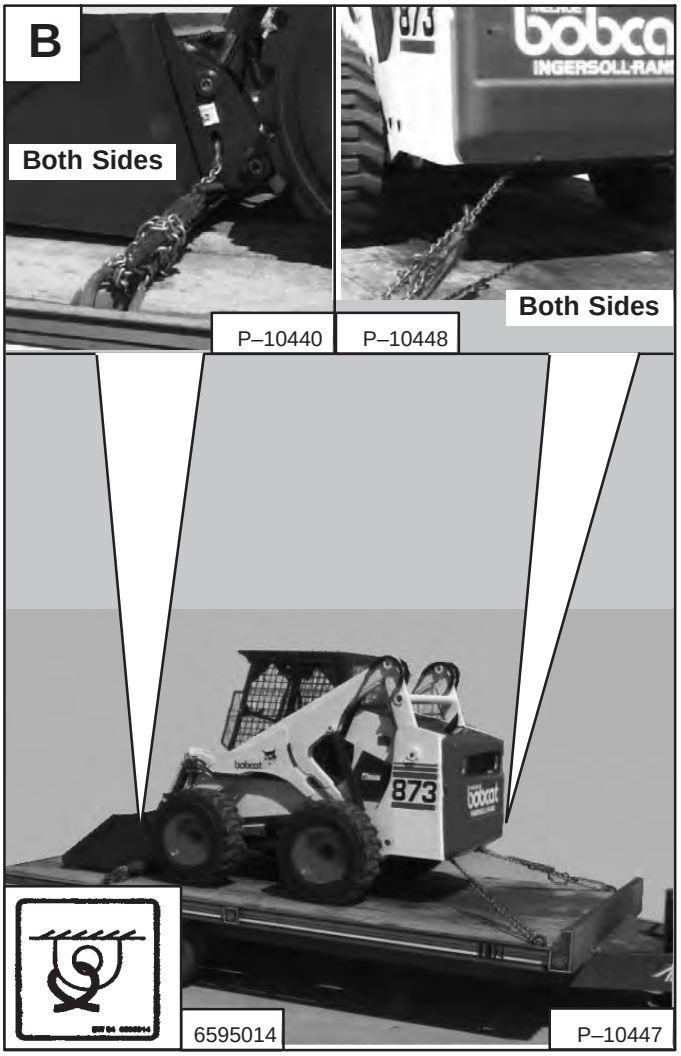
- Turn the key switch to ON and press the Traction Lock Override button.
- Tow the Bobcat at 2 MPH (3,2 km/hr.) or less for not more than 25 feet (7,6 meters).

If the electrical system is not functioning part of the brake system must be disassembled to move the loader. See *Traction Lock* removal and installation procedure. (See Page 8–1.)

STOPPING THE BOBCAT LOADER

Procedure

When the steering levers are moved to the neutral position, the hydrostatic transmission will act as a *service brake* and stop the loader.



IMPORTANT

Do not push or pull the machine at more than 2 MPH (3,2 km/h) or for a distance of more than 25 feet (7,6 meters) with the towing tool in place.

I–2017–0389

FUEL SYSTEM

Fuel Specifications

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

The following is one suggested blending guideline which should prevent fuel gelling problems:

Temp. F° (C°)	No. 2	No.1
+15°(9°)	100%	0%
Down to –20° (–29°)	50%	50%
Below –20° (29°)	0%	100%

We recommend an operator contact their fuel supplier for local recommendations.

Filling The Fuel Tank

⚠ WARNING

Stop and cool the engine before adding fuel. NO SMOKING! Failure to obey warnings can cause an explosion or fire.

W–2063–0887

Remove the fuel fill cap (Item 1) **[A]**.

Use a clean, approved safety container to add fuel of the correct specifications. Add fuel only in an area that has free movement of air and no open flames or sparks. NO SMOKING! **[B]**.

Install and tighten the fuel fill cap **[A]**.

Fuel Filter

See the *SERVICE SCHEDULE* Page 1–3 for the recommended service interval when to remove the water from the fuel filter.

Loosen the drain (Item 1) **[C]** at the bottom of the filter element to drain any water from the filter.

See the *SERVICE SCHEDULE* Page 1–3 for the recommended service interval when to replace the fuel filter.

To replace the fuel filter element, use a filter wrench to remove the filter element **[C]**.

Clean the area around the filter housing. Put oil on the seal of the new filter element. Install the fuel filter, and hand tighten. Remove the air from the fuel system.

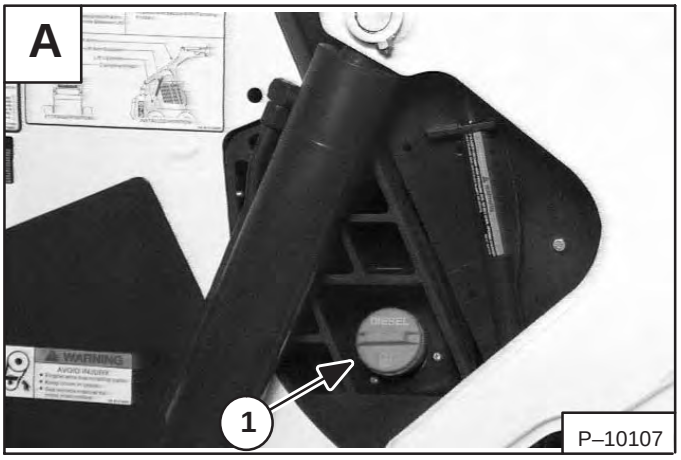
Removing Air From The Fuel System

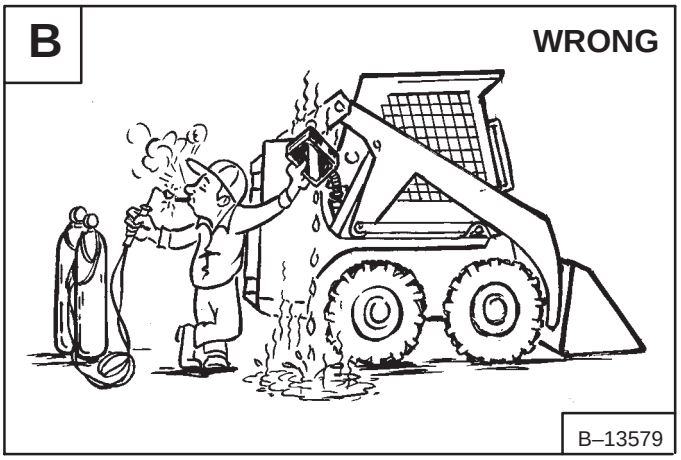
After replacing the fuel filter element or when the fuel tank has run out of fuel, the air must be removed from the fuel system prior to starting the engine.

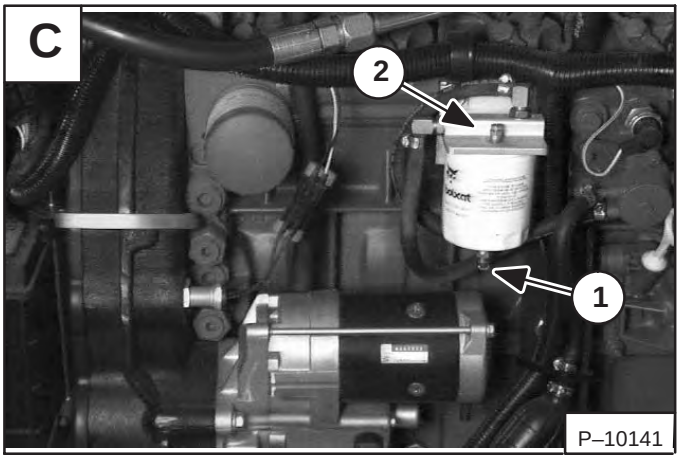
Loosen the air vent plug (Item 2) **[C]** at the top of the fuel filter.

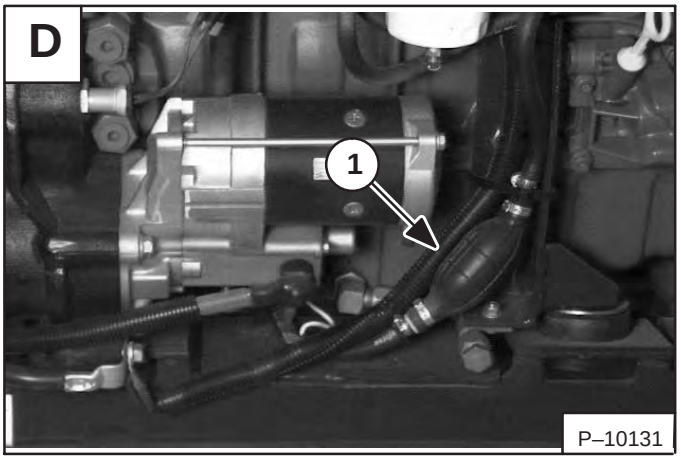
Operate the hand pump (priming bulb) (Item 1) **[D]** until the fuel flows from the air vent plug with not air bubbles.

Tighten the air vent plug.



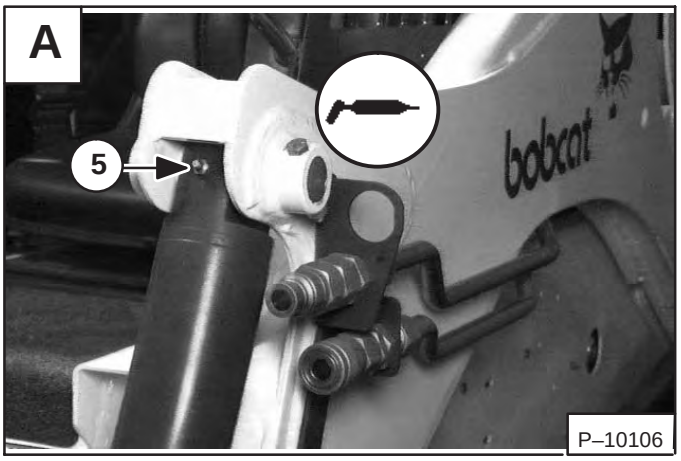




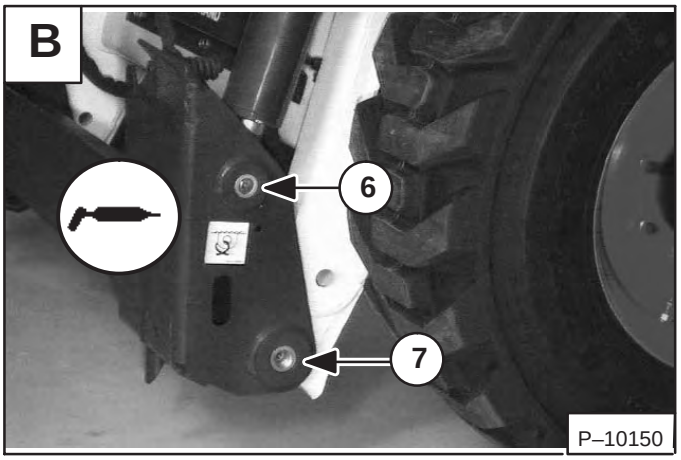


Procedure (Cont'd)

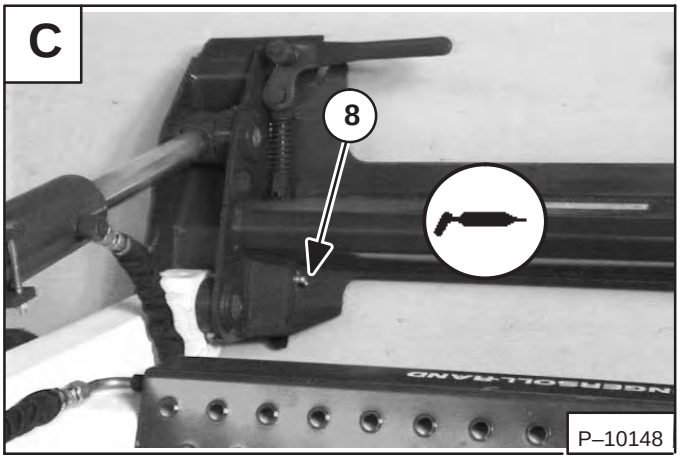
5. Base End Tilt Cylinder (Both Sides) **[A]**.



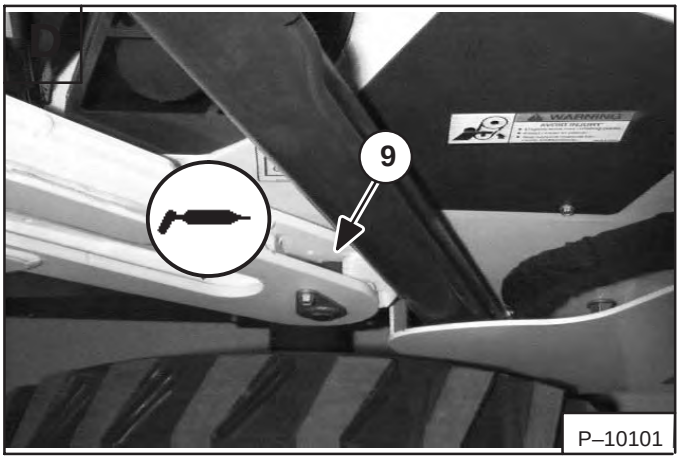
6. Rod End Tilt Cylinder (Both Sides) **[B]**.
7. Bob–Tach Pivot Pin (Both Sides) **[B]**.



8. Bob–Tach Wedge (Both Sides) **[C]**.



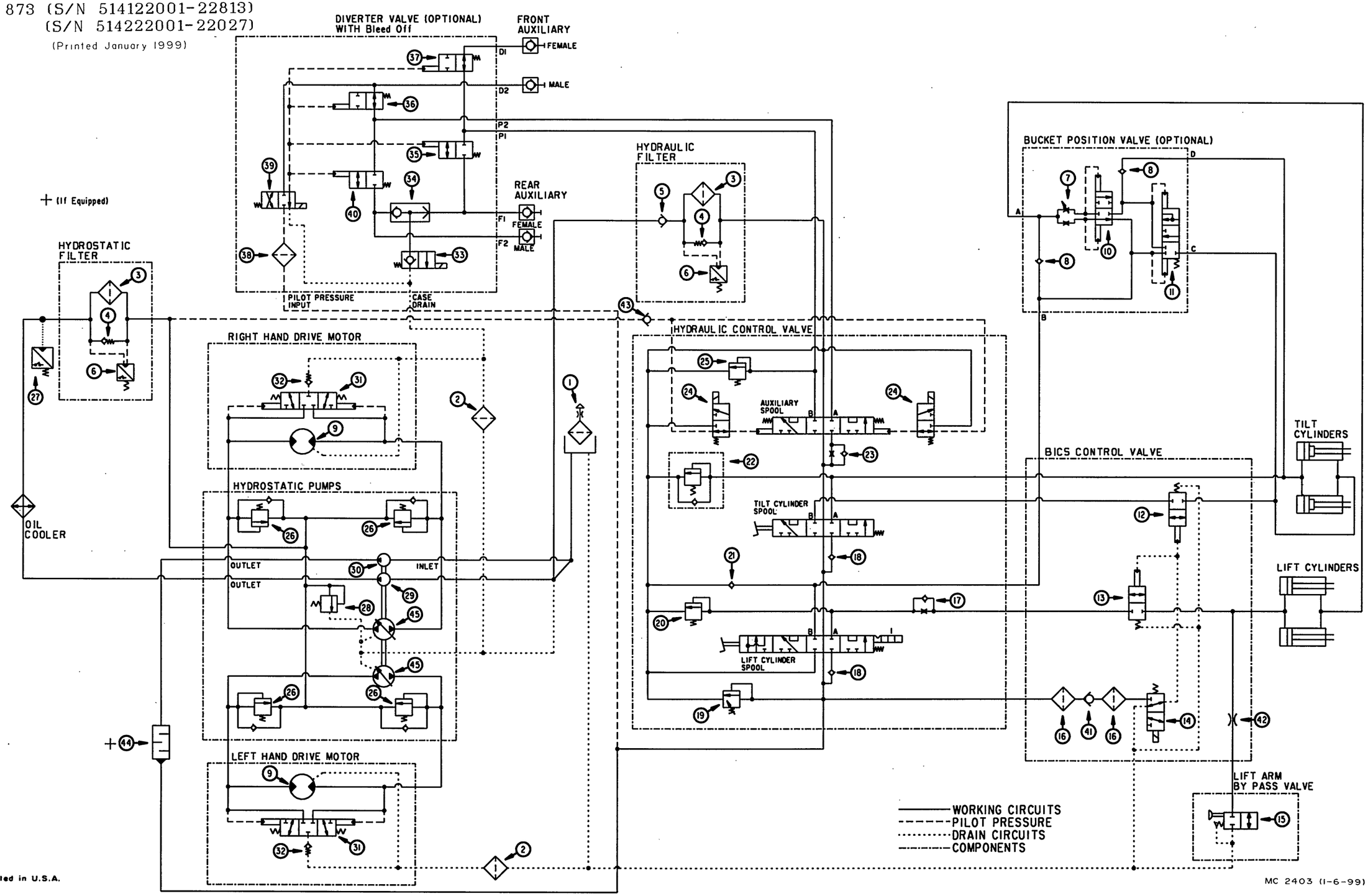
9. Stabilizer Bar (Both Sides) **[D]**.



HYDRAULIC/HYDROSTATIC SCHEMATIC

873 (S/N 514122001-22813)
(S/N 514222001-22027)

(Printed January 1999)



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GLOSSARY OF HYDRAULIC/HYDROSTATIC SYMBOLS FOR LOADERS

SYMBOL DESCRIPTION

FLOW LINES and CONNECTIONS

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

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

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

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

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

CONNECTED JUNCTION OF OIL LINES (Flow Line Connection)

OIL LINES CROSSING (NOT Connected)

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

SYMBOL DESCRIPTION

BASIC and MISCELLANEOUS SYMBOLS

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

VARIABLE ADJUSTMENT RESTRICTION - Regulated or Variable Restriction

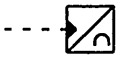
TEMPERATURE CONTROL - (indication of temperature)

TEMPERATURE INDICATOR - (temperature measurement - thermometer)

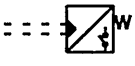
FILTER (strainer or screen) - For fluid conditioning

VENTED AND FILTERED RESERVOIR (reservoir open to atmosphere)

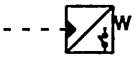
OIL COOLER (heat exchanger) - The arrows in the diamond indicate the extraction of heat (heat dissipation)



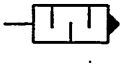
PRESSURE SENSOR - Varies electric signal with pressure



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



PRESSURE SWITCH - Switch activates when pressure reaches specified level

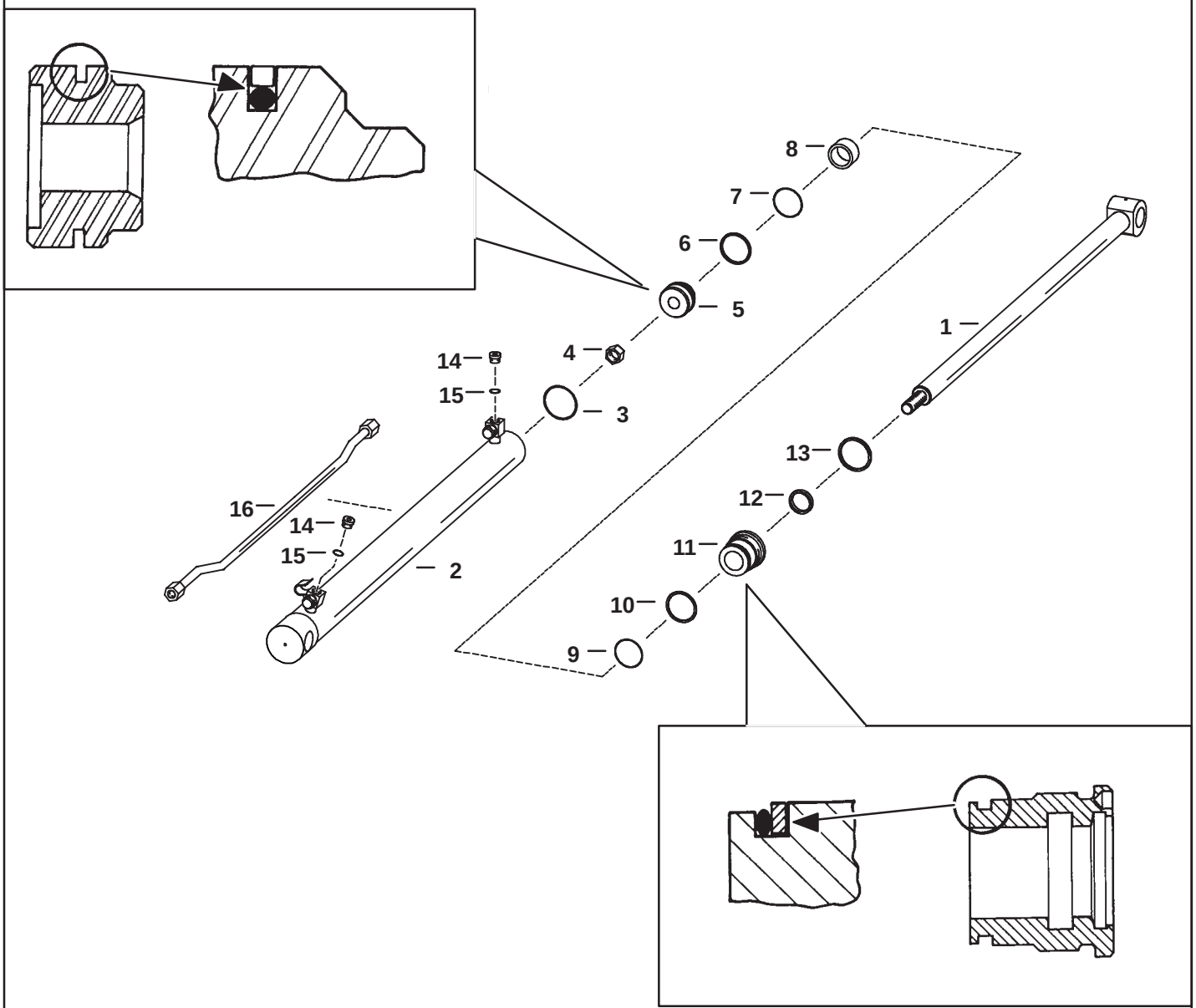


MUFFLER (silencer) - Reduces noise

HYDRAULIC CYLINDER

Lift Cylinder Identification

1. Tube
2. O–ring
3. Plug
4. Case
5. O–ring
6. Nut
7. Piston
8. Ring
9. O–ring
10. Spacer
11. O–ring
12. Seal
13. Head
14. Seal
15. Seal
16. Rod



MAIN RELIEF VALVE (S/N 514119999 & Below; 514219999 & Below) (Cont'd)

Adjustment

If the pressure is not correct, adjust the main relief valve. Remove the end cap (Item 1) **[A]**.

Turn the adjusting screw in or out until the pressure is correct.

NOTE: If the correct pressure can not be reached, replace the main relief valve. Check the pressure setting of the new relief valve.

Removal And Installation

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

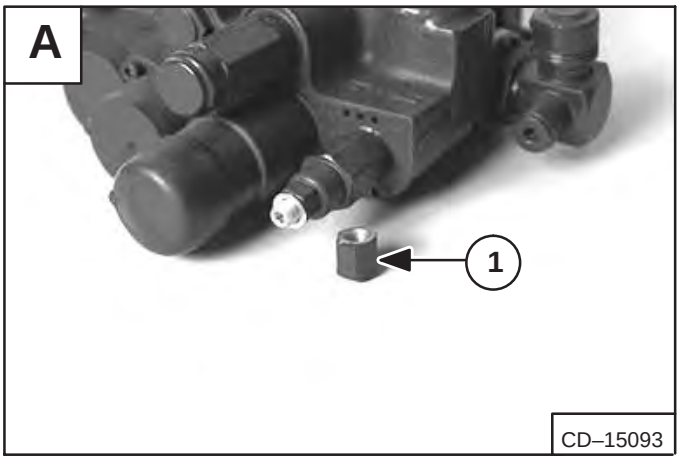
IMPORTANT

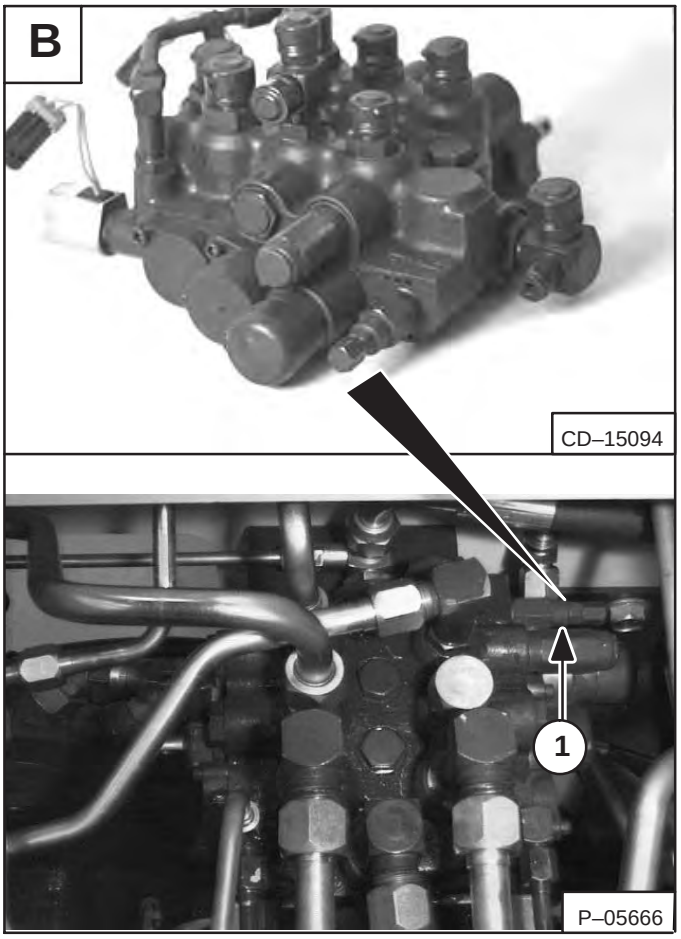
When making repairs on hydrostatic and hydraulic systems, clean the work area before disassembly and keep all parts clean. Always use caps and plugs on hoses, tubelines and ports to keep dirt out. Dirt can quickly damage the system.

I–2003–0284

The main relief valve (Item 1) **[B]** is located at the right rear of the control valve.

Clean the area around the control valve.





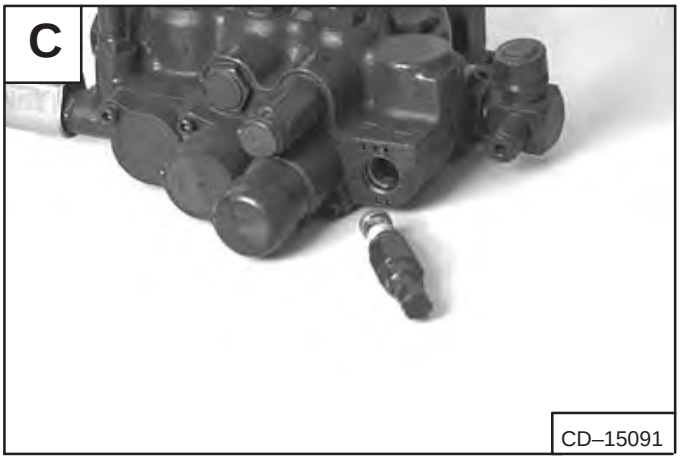
Loosen and remove the main relief valve **[C]**.

***Installation*:** Tighten the main relief valve to 35–40 ft.–lbs. (47–54 Nm) torque.

Remove the O–rings and back–up washers.

Clean the main relief valve in clean solvent. Use air pressure to dry the valve.

Install new O–rings and back–up washers. Install the main relief valve and tighten **[B]**. Check the pressure again. (See Page 2–18 or 2–19.)



HYDRAULIC CONTROL VALVE (S/N 514122001 & Above; 514222001 & Above) (Cont'd)

Disassembly and Assembly

Remove the BICS valve assembly from the control valve. (See Page 2–26.)

Remove the four large O–rings (Item 1) **[A]** and small O–ring (Item 2) **[A]**. Always replace these O–rings before installing the BICS valve assembly.

The anti–cavitation valve, port relief valves and plugs are at different locations in the control valve. Refer to Control Valve Identification Chart for the correct location of the parts. (See Page 2–30.)

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

Mark each valve section, spool and related parts so that they will be returned to its original valve section during assembly.

Use bolts to fasten the control valve to a work bench for easier disassembly and assembly procedures.

Load Check Valve

Loosen the load check valve plug (Item 1) **[B]**.

Installation: Always use new O–ring. tighten the plug to 35–40 ft.–lbs. (47–54 Nm) torque.

Remove the load check plug (Item 1) **[C]**.

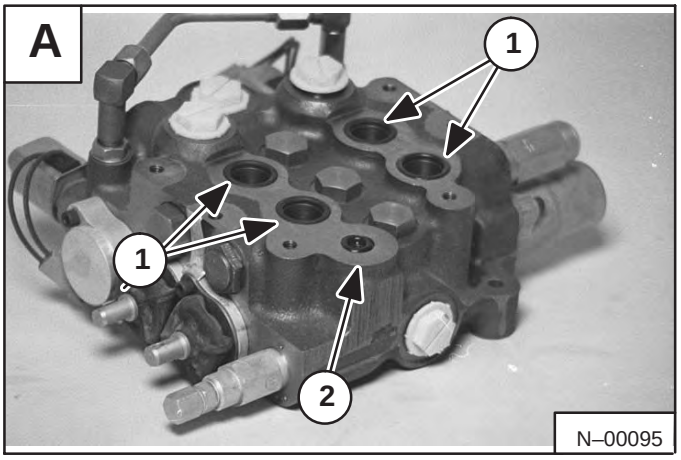
Remove the spring (Item 2) **[C]** and poppet (Item 3) **[C]**.

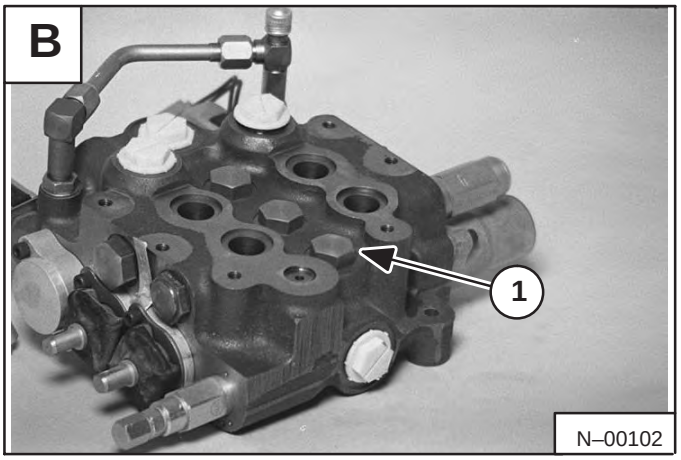
The auxiliary section (Item 4) **[C]** uses an orifice load check poppet.

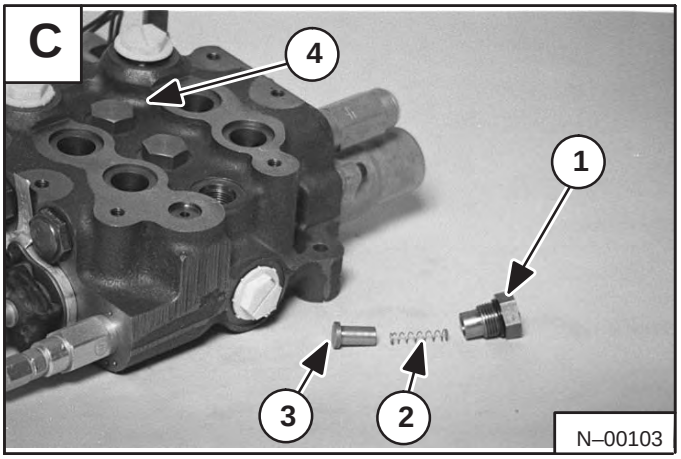
Lift Base End Restrictor

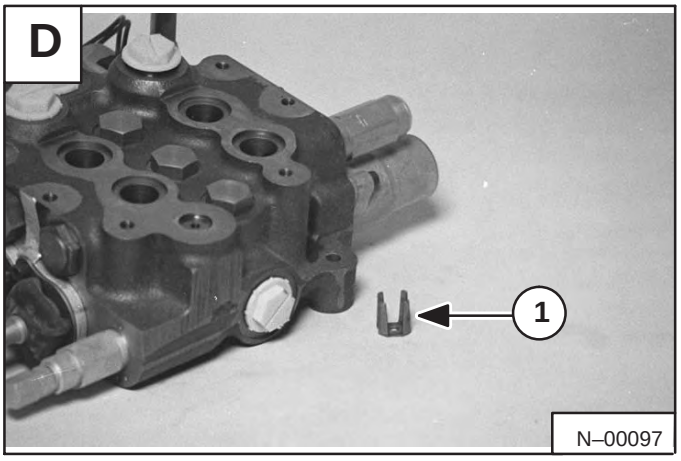
Remove the restrictor (Item 1) **[D]** from the lift section base end port.

Check for damage and replace as needed.







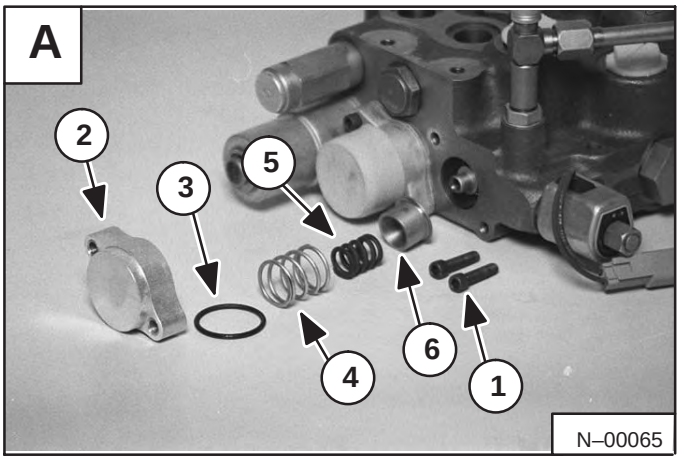


HYDRAULIC CONTROL VALVE (S/N 514122001 & Above; 514222001 & Above) (Cont'd)

Auxiliary Spool

Remove the end cap screws (Item 1) **[A]** & **[B]**.

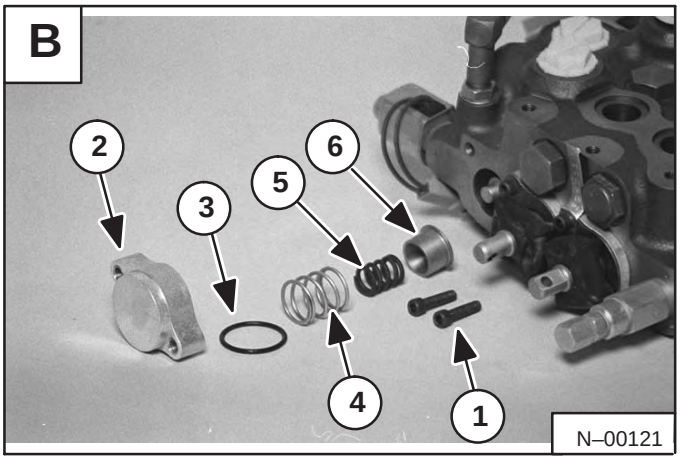
Installation: Tighten the screws to 90–100 in.–lbs. (10,2–11,3 Nm) torque.



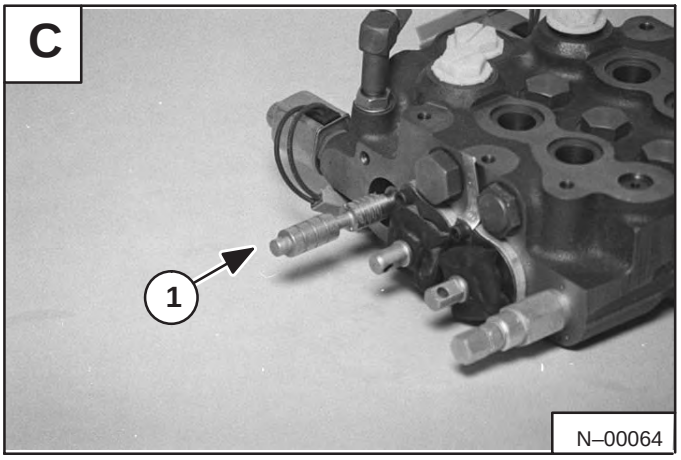
Remove the end cap (Item 2) **[A]** & **[B]**, O–ring (Item 3) **[A]** & **[B]**.

Remove the large spring (Item 4) **[A]** & **[B]** and small spring (Item 5) **[A]** & **[B]**.

Remove the spring retainer (Item 6) **[A]** & **[B]**.



Remove the auxiliary spool (Item 1) **[C]**.

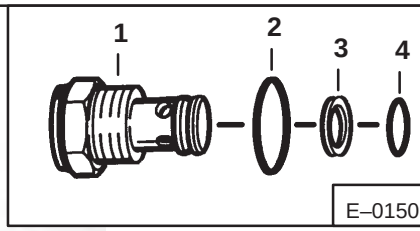


HYDRAULIC CONTROL VALVE (S/N 514119999 & Below; 514219999 & Below) (Cont'd)

Anti–Cavitation Valve (Cont'd)

Remove the O–rings and back–up washer from the anti–cavitation valve **[A]**.

A



E–01509

1. Anti–Cavitation Valve
2. O–ring
3. Back–up Washer
4. O–ring

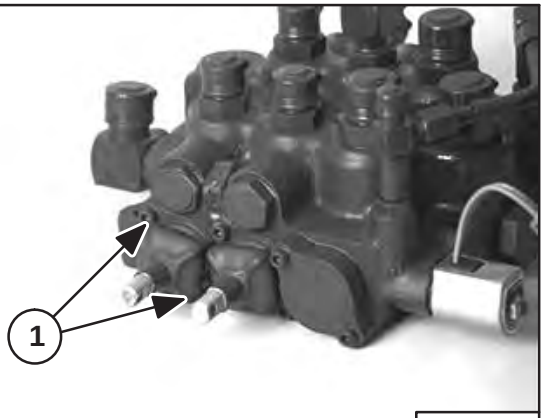
CD–15097

Rubber Boot

Loosen the two screws (Item 1) **[B]** on the rubber boot retainer.

Assembly: Tighten the screws to 90–100 in.–lbs. (10,2–11,3 Nm) torque.

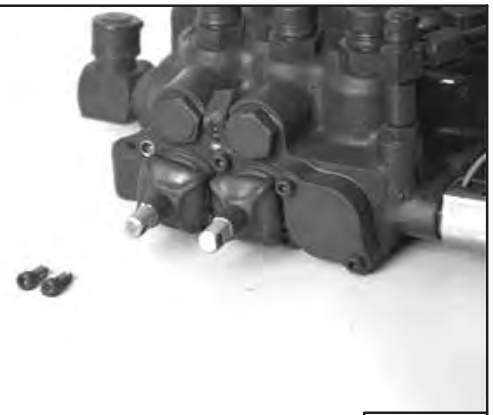
B



CD–15100

Remove the screws **[C]**.

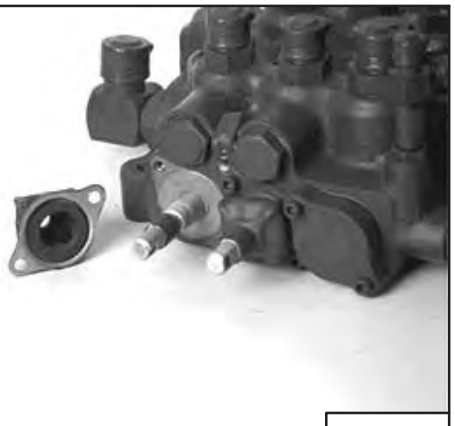
C



CD–15101

Remove the rubber boot and retainer **[D]**.

D



CD–15102

HYDRAULIC CONTROL VALVE (S/N 514119999 & Below; 514219999 & Below) (Cont'd)

Spool Seal Installation

To install new spool seals when the centering spring (tilt spool) or the detent assembly (lift spool) are not removed from the spool, use the following procedure:

Check the seal surface area (in the control valve) for rust, corrosion, scratches, etc. Correct any irregularities before continuing.

Put plastic material (Example: saran–wrap) on the valve spool **[A]**.

Put clean oil on the spool seal. Install the spool seal (Item 1) **[A]** on the spool being careful not to damage the seal on the sharp edges.

Remove the plastic material.

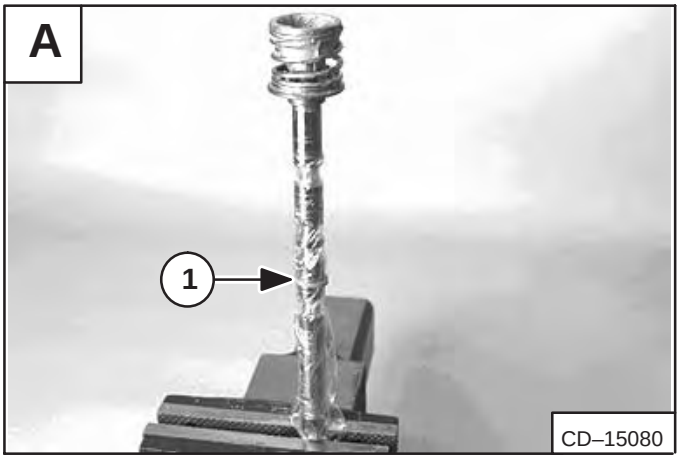
Install the spool into the control valve.

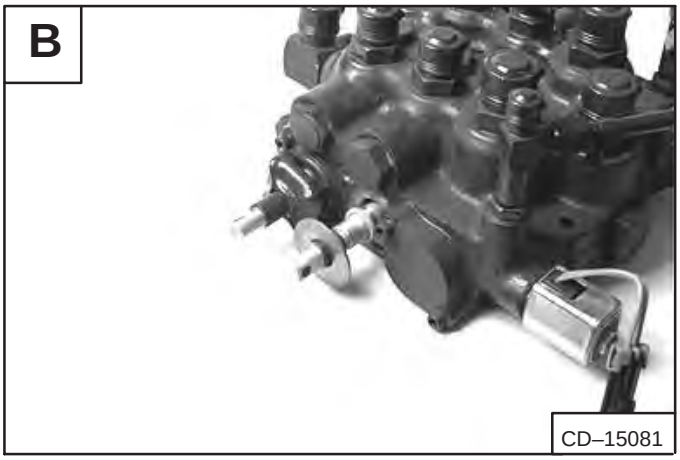
Slide the linkage end spool seal over the rubber boot groove **[B]**.

Be careful not to damage the spool seal.

Install the back–up washer **[B]**.

Continue assembling the control valve.

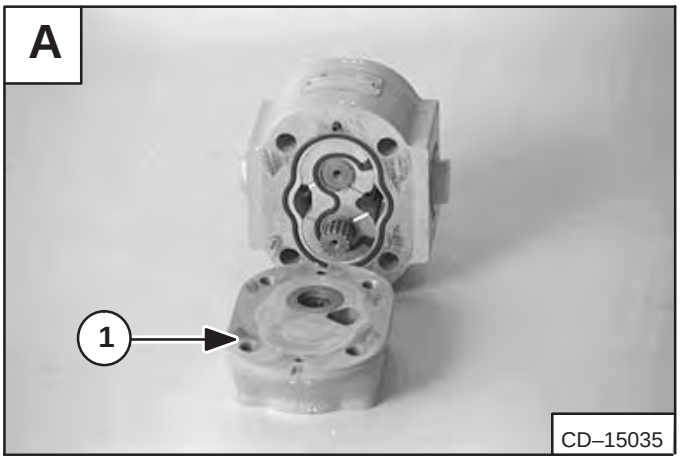




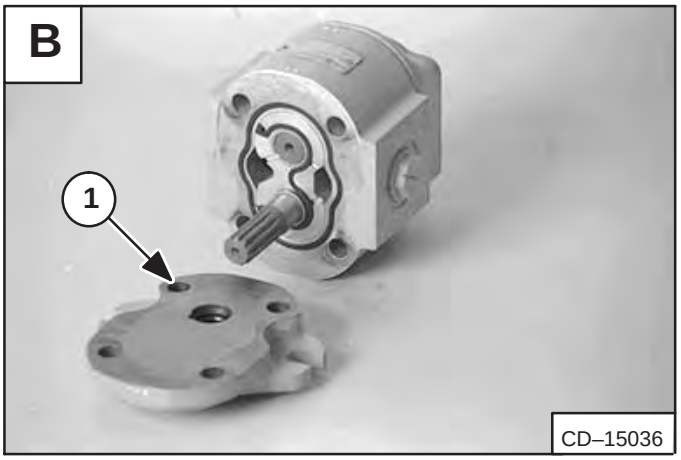
HYDRAULIC PUMP (Double Gear) (Cont'd)

Assembly (Cont'd)

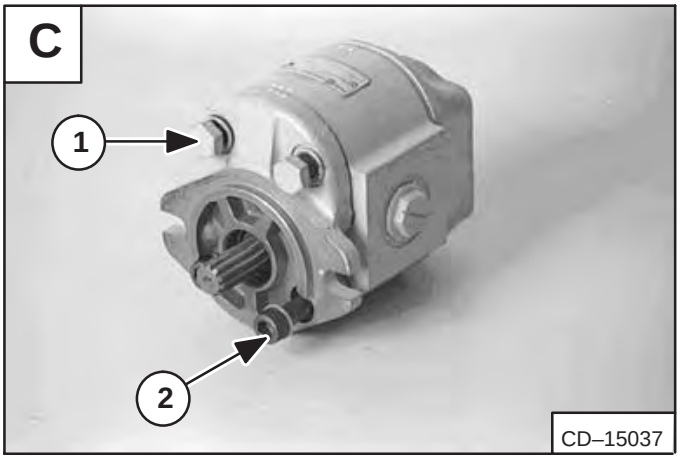
Install the center housing (Item 1) **[A]** on the large pump housing.



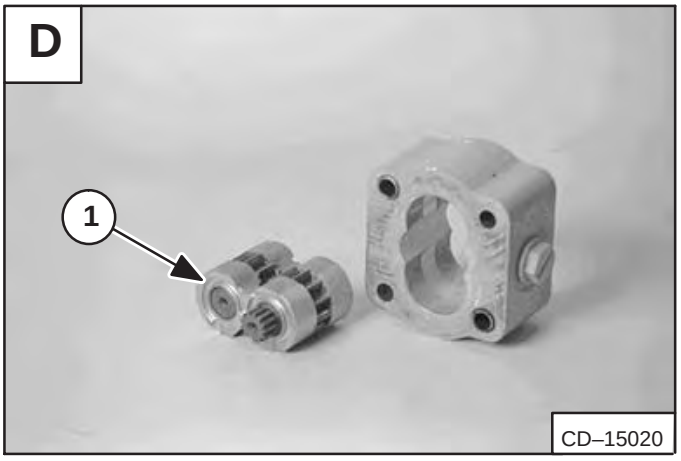
Install the mounting flange housing (Item 1) **[B]** on the large pump housing.



Install the hex head bolts (Item 1) **[C]** and allen head bolts (Item 2) **[C]**. Finger tighten only.



Install the drive and idler gears into the bearing housing (Item 1) **[D]**.



HYDRAULIC FLUID RESERVOIR

Draining The Fluid Reservoir

Remove the side cover from the loader frame.

Pull the reservoir drain hose (Item 1) **[A]** out of the side of the loader frame.

Remove the hose end cap and drain fluid into a container **[A]**.

⚠ 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.

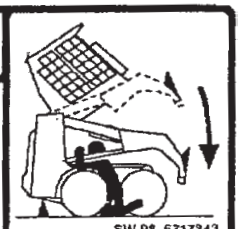
W–2103–1285

⚠ DANGER

AVOID DEATH

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

53145



SW 98 6717343

Removal And Installation

All S/N Loaders

Raise the lift arms and install an approved lift arm support device. (See Page 1–1.)

⚠ WARNING

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

W–2059–0598

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

Drain the fluid from the reservoir **[A]**.

Remove the front panel/steering lever assembly. (See Page 3–1.)

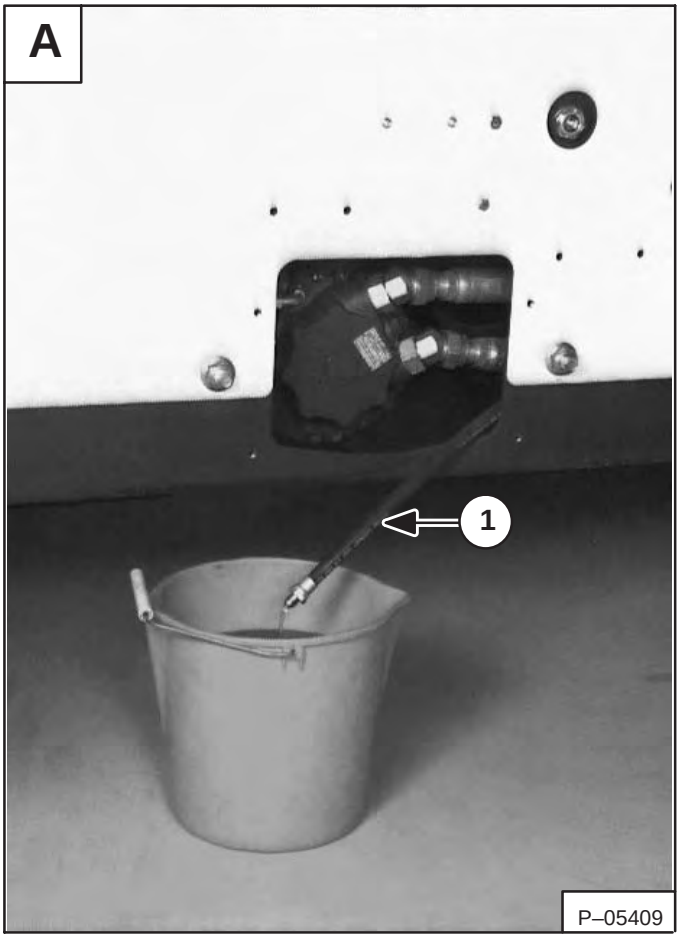
Remove the lift lock linkage (Item 1) **[B]**.

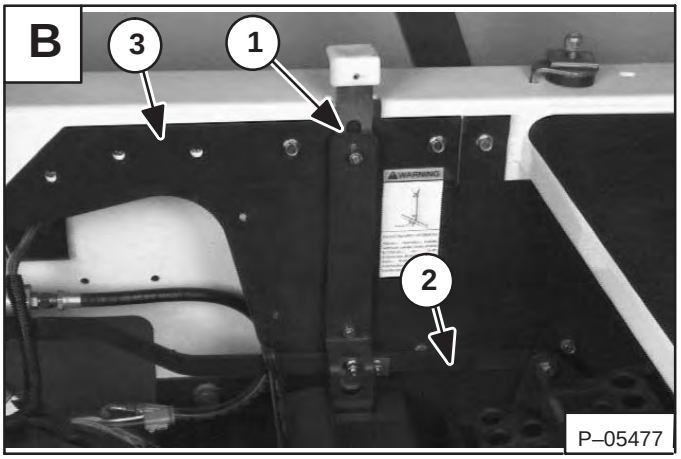
Disconnect the lift linkage (Item 2) **[B]** from the crossmember and pedal. Remove the lift linkage.

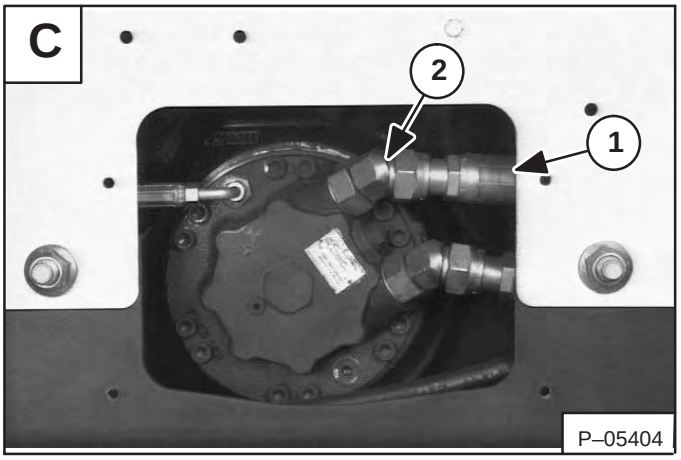
Remove the side panel (Item 3) **[B]**.

Disconnect the hydrostatic high pressure hose (Item 1) **[C]**.

Remove the hose fitting (Item 2) **[C]**.



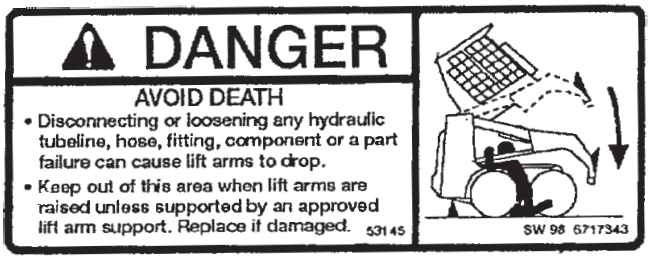




HYDRAULIC/HYDROSTATIC FILTER HOUSING

Removal And Installation

S/N 514122814 & Above; 514222028 & Above



WARNING

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

W–2059–0598

Raise the lift arms and install an approved lift arm support device. (See Page 1–1.)

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

Disconnect the hose clamp (Item 1) **[A]** and remove the hydraulic hose.

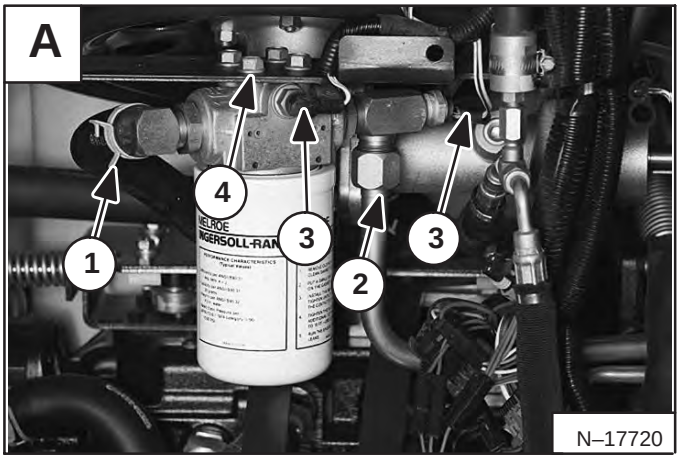
Disconnect the large tubeline (Item 2) **[A]**.

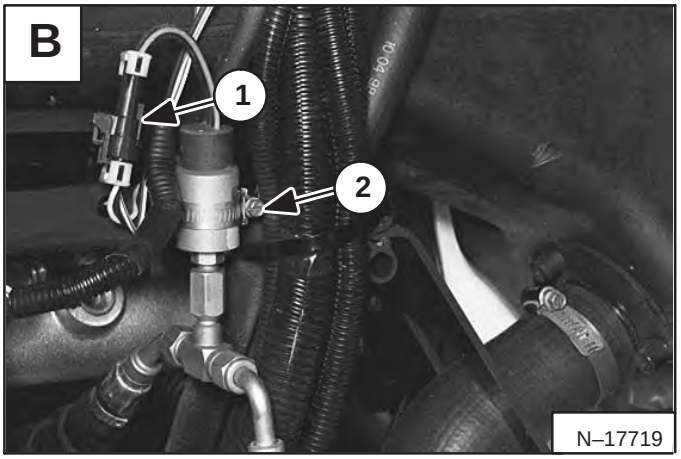
Disconnect the electrical wires (Item 3) **[A]** from the filter block and the filter sender.

Remove the four mounting bolts (Item 4) **[A]**.

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

Remove the filter housing/assembly from the loader.





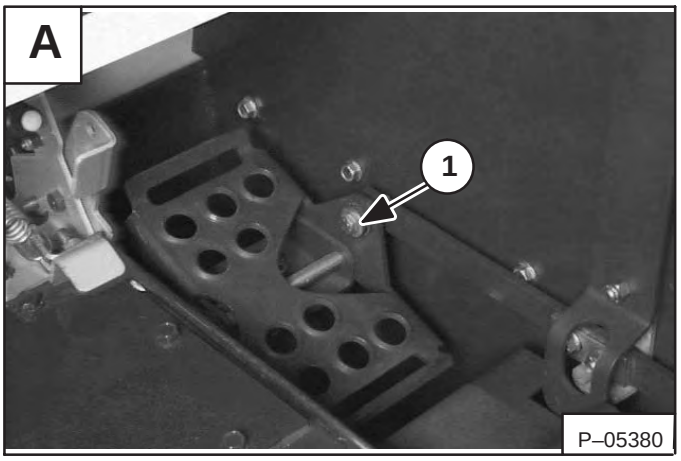
CONTROL PEDALS

Removal And Installation

Remove the bolt and nut (Item 1) **[A]** from the pedal linkage.

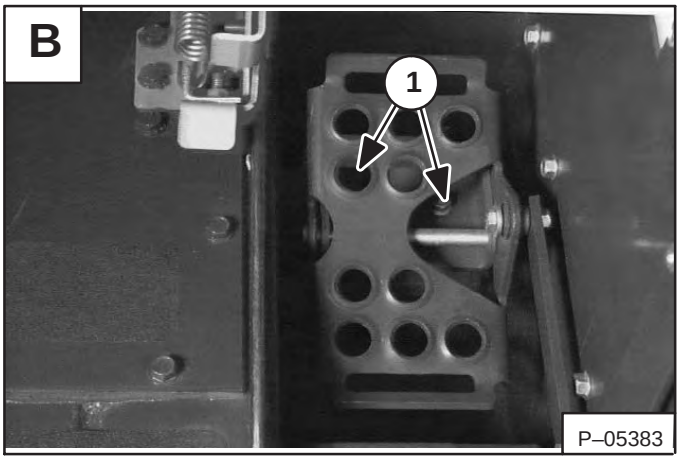
Installation: Tighten the bolt and nut to 21–25 ft.–lbs. (28–34 Nm) torque.

Check the rubber bushing in the pedal for wear and replace as needed.



Remove the two mounting bolts (Item 1) **[B]**.

Remove the pedal assembly from the loader.



Pedal Adjustment

After installing the pedal, adjust the pedal so that there is clearance under the rear of the pedal and the valve spool must travel full stroke without hitting the floor panel.

⚠ WARNING

AVOID INJURY OR DEATH

Adjust locking tabs on pedal control linkage so that lift and tilt control pedals are locked in neutral when the seat bar is up.

W–2104–1285

NOTE: See Page 2–92 for correct procedure to adjust the pedal interlock linkage.

STEERING LEVERS (514122814 & Above; 514222028 & Above)

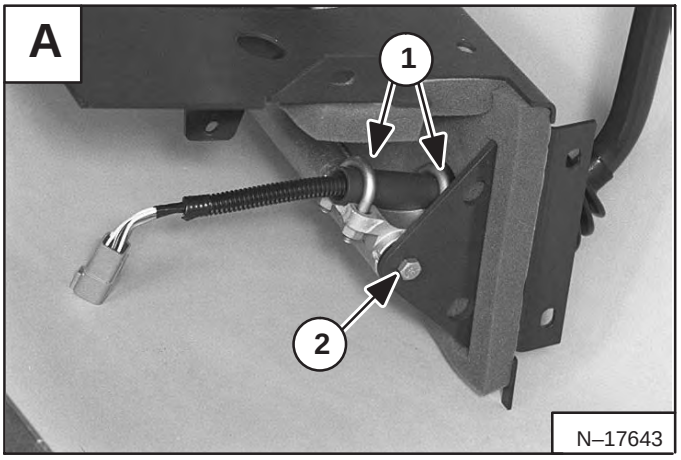
Removal And Installation

Loosen both U–bolts (Item 1) **[A]** at the steering lever (both sides).

Remove the steering cross shaft mounting bolts (Item 2) **[A]** (both sides).

Installation: Tighten the mounting bolts to 180–200 in.–lbs. (21–23 Nm) torque.

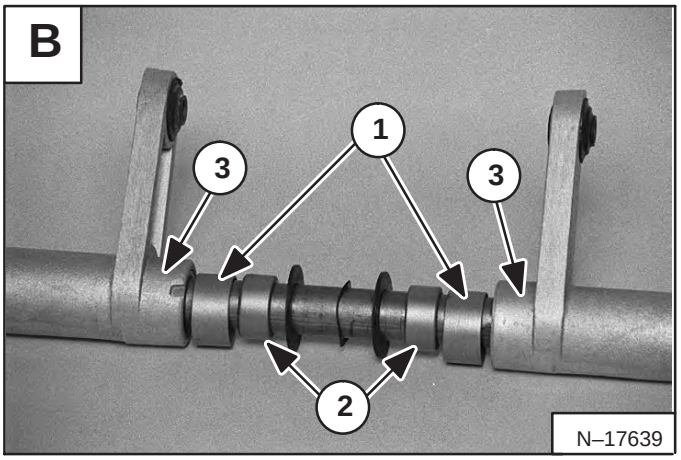
Remove the steering cross shaft from the control panel.



Disassembly And Assembly

Disassemble the right and left steering shafts from the cross shaft assembly.

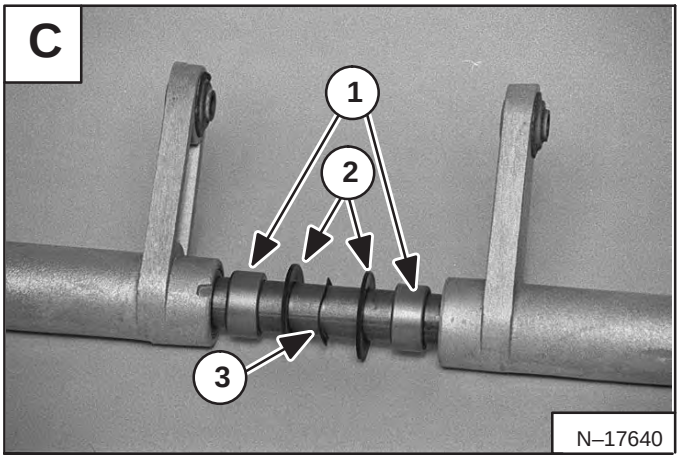
NOTE: Some loaders may have a sleeve (Item 1) [B] between the bearing (Item 2) [B] and the bell crank (Item3) [B].



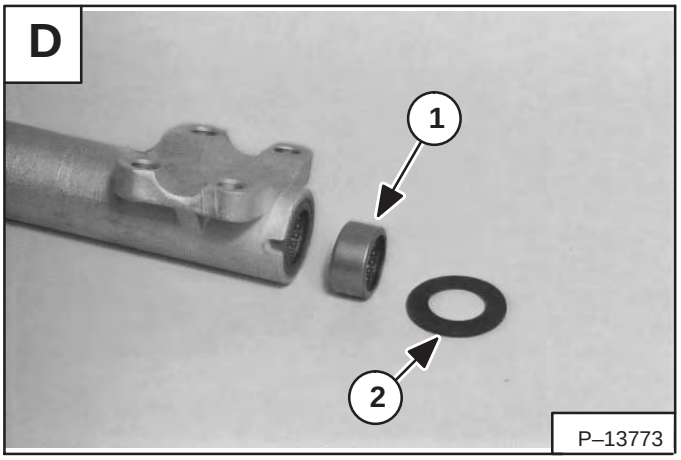
Check the bearings (Item 1) **[C]** for wear and replace as needed.

Check the fiber washers (Item 2) **[C]** for wear and replace as needed.

Replace the wave washer (Item 3) **[C]** if worn.



Check the end bearing (Item 1) **[D]** and fiber washer (Item 2) **[D]** and replace as needed.



STEERING LINKAGE (S/N 514122814 & Above; 514222028 & Above) (Cont'd)

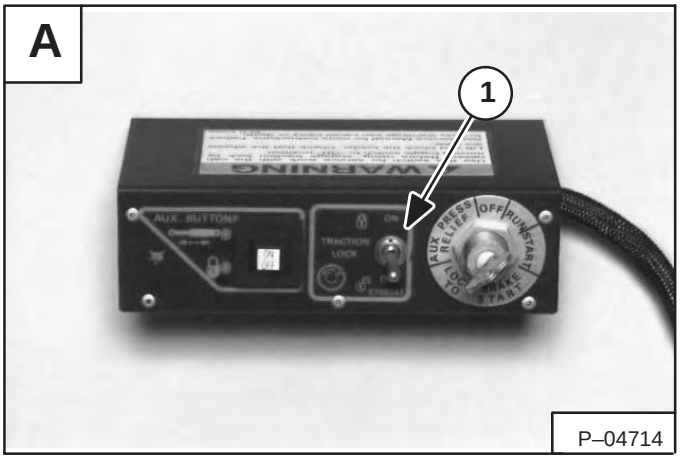
Steering Linkage Adjustment (Cont'd)

Move the traction lock override switch (Item 1) **[A]** to the OFF position so the traction function is unlocked. The wheels are now able to turn.

Move the left hand steering lever until the tires do not turn (neutral position).

Move the left side centering block to the left until it contacts both pintle cams and the steering lever is still in the neutral position.

Tighten the bolts to 25–28 ft.–lbs. (34–38 Nm) torque.

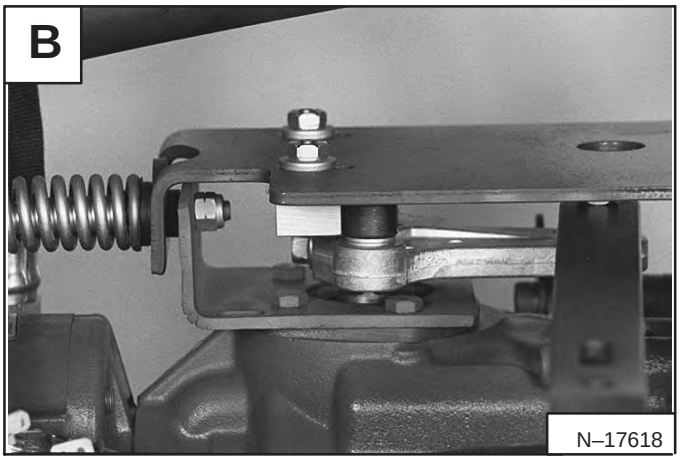


Adjust the right side centering block **[B]**.

Move the right side steering lever until the tires do not turn (neutral position).

Move the right side centering block to the left until it contacts both pintle cams and the steering lever is still in the neutral position **[B]**.

Tighten the bolts to 25–28 ft.–lbs. (34–38 Nm) torque.

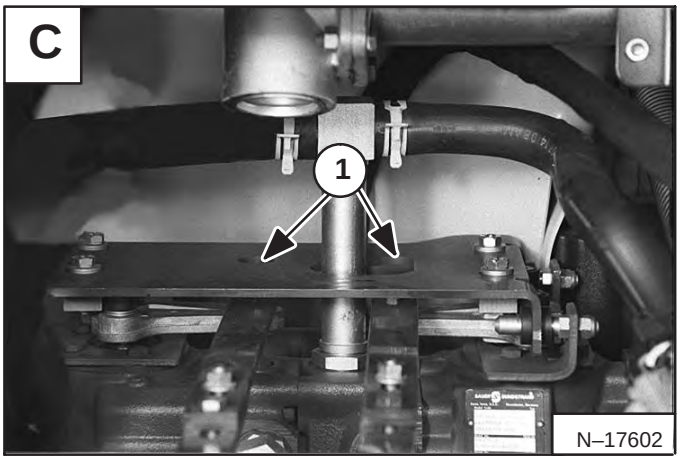


Test both levers by moving them backward and forward and letting them return to neutral by the return spring force.

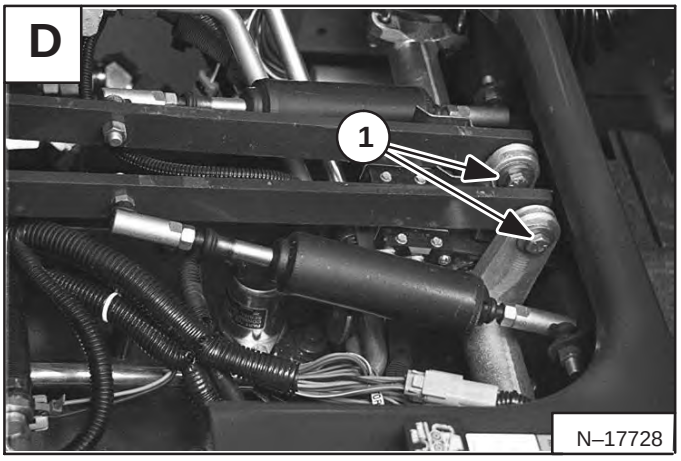
If the levers do not return to neutral and the tires do not come to a complete stop, repeat the adjustment procedure again.

Stop the engine.

Tighten the two linkage bar bolts to 11–13 ft.–lbs. (15–17 Nm) torque, then tighten the two nuts to 21–25 ft.–lbs. (28–33 Nm) torque at the pintle levers (Items 1) **[C]**.



Tighten the two linkage bar bolts to 11–13 ft.–lbs. (15–17 Nm) torque, then tighten the two nuts to 21–25 ft.–lbs. (28–33 Nm) torque at the steering cross shaft (Item 1) **[D]**.



STEERING LINKAGE (514122814 & Below; 514222028 & Below) (Cont'd)

Steering Linkage Adjustment (Cont'd)

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

MEL1531 – Service Shield
MEL1429A – Remote Start Switch

Connect the remote start switch to the engine harness. (See Page 1–1.)

Rotate the fan drive tension pulley forward and remove the fan belt from the hydrostatic pump pulley and fan gearbox pulley.

Position the fan belt up and away from the work area. the belt will remain disconnected while neutral is adjusted.

Rotate the fan drive pulley forward and install the shield (Item 1) **[A]** (MEL1531). The inside edge of the shield must rest on the top of the engine/pump mount forward and behind tension pulley. The outside edge must rest on the loader mainframe. The tab on the shield must be inside the mainframe.

Loosen the four bolts (Item 1) **[B]** holding the two centering blocks. Move the right side centering block to the right as far as possible.

NOTE: Bolt holes are slotted for pintle arm centering adjustment.

Adjust the left side centering block first **[C]**.

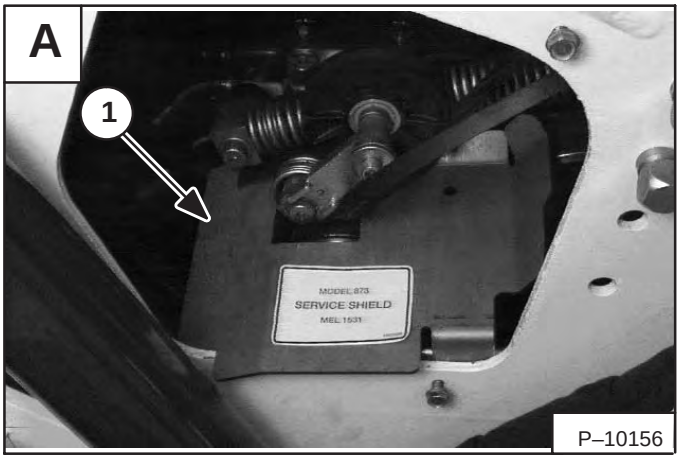
Start the engine and run at high RPM.

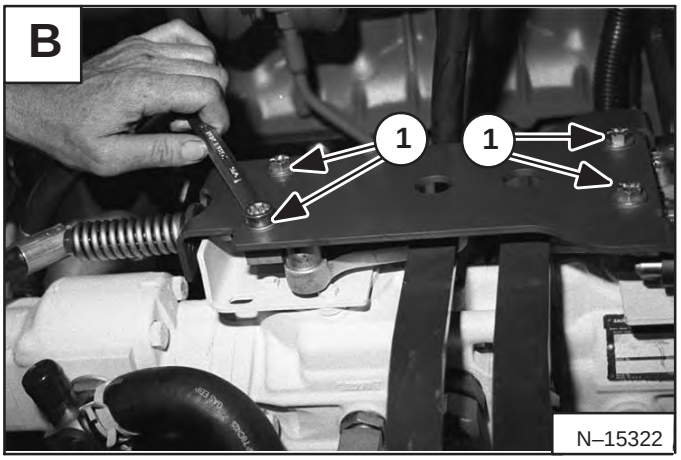
Move the traction lock override switch (Item 1) **[D]** to the OFF position so the traction function is unlocked. The wheels are now able to turn.

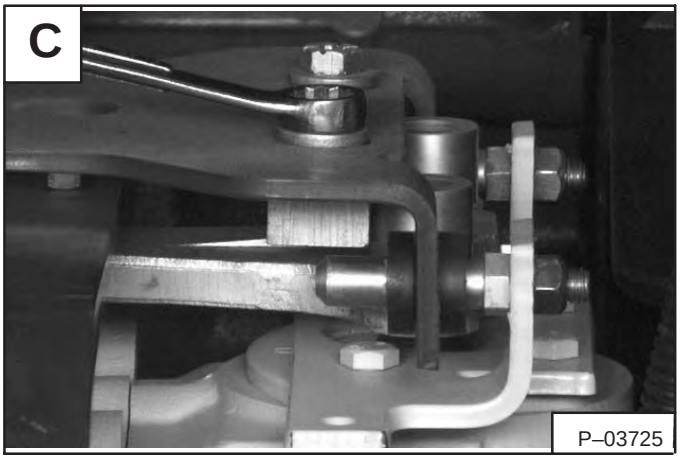
Move the left hand steering lever until the tires do not turn (neutral position).

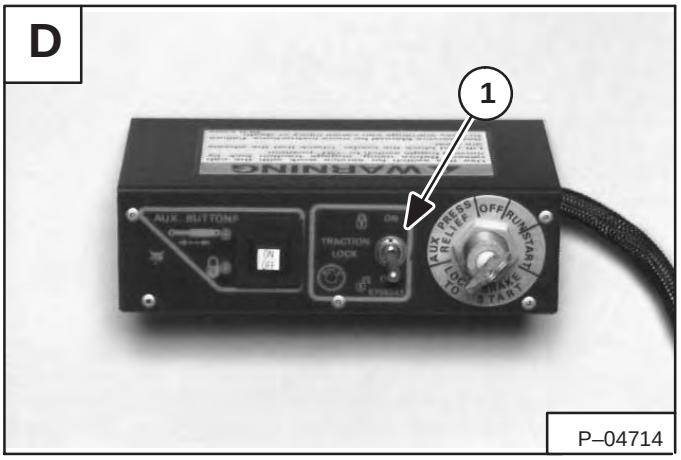
Move the left side centering block to the left until it contacts both pintle cams and the steering lever is still in the neutral position **[C]**.

Tighten the bolts to 25–28 ft.–lbs. (34–38 Nm) torque.









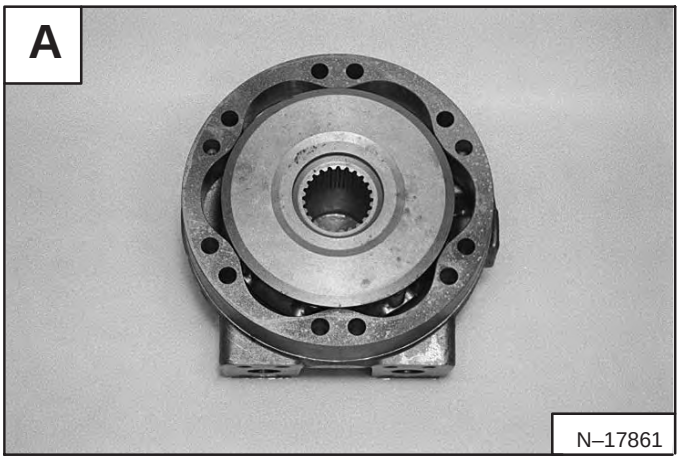
HYDROSTATIC MOTOR (S/N 514122306 & Above; 514223902 & Above) (Cont'd)

Assembly (Cont'd)

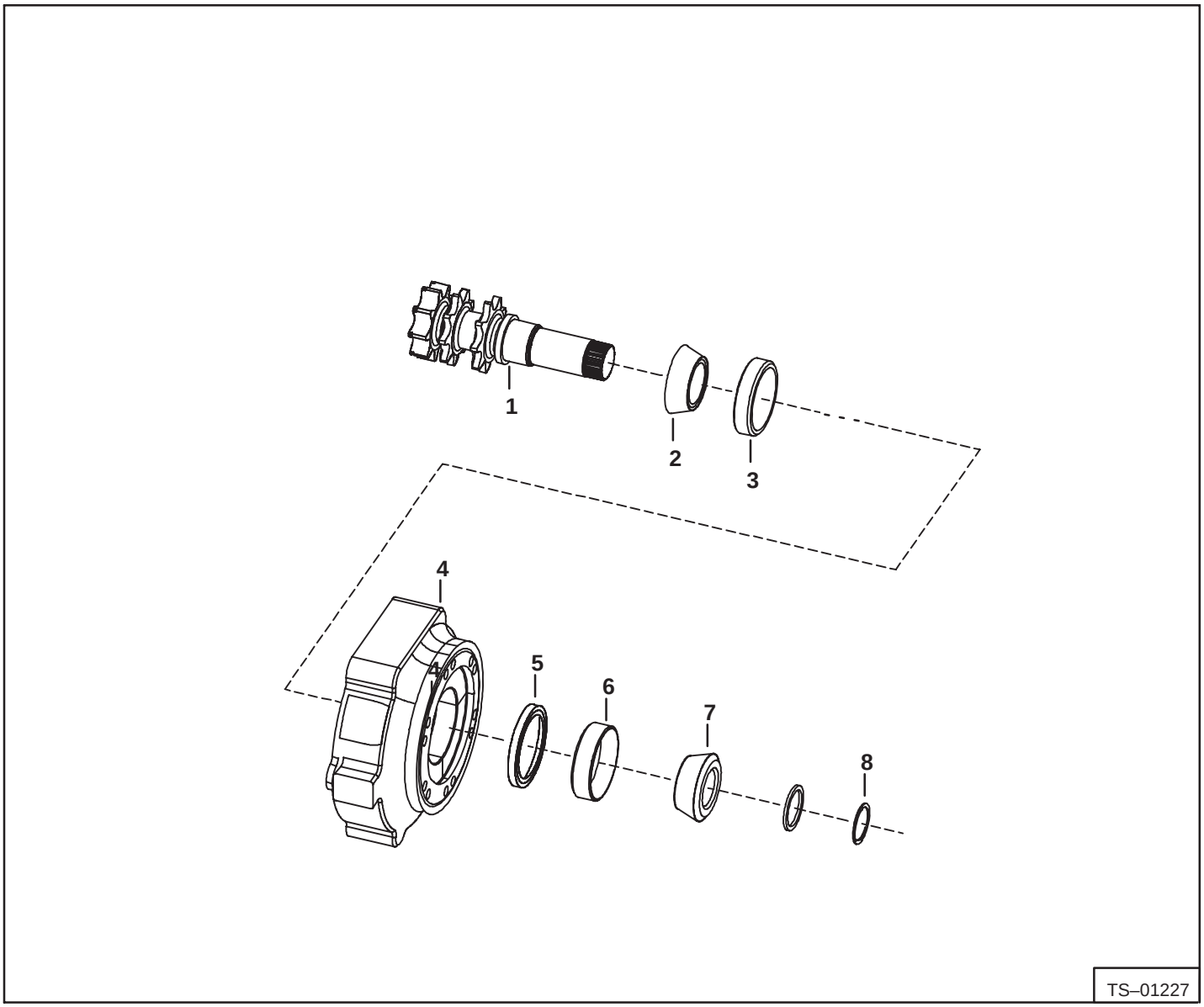
Install the piston/roller section (Item 1) **[D]** in the motor.

Install the motor on the loader and tighten the mount bolts to 110 ft.–lbs. (149,2 Nm) torque.

NOTE: Before operating the hydrostatic motor, make sure it is full of oil. There are several methods to fill the motor with oil; (1) with the case drain hose disconnected, fill the motor with oil through the case drain port; (2) with the case drain hose disconnected, BICS™ brake locked, engine running, stroke the steering lever until oil comes out of the case drain port.



Parts Identification



Ref.	Description
1.	SHAFT
2.	BEARING
3.	RACE
4.	HOUSING
5.	SEAL (2)
6.	RACE
7.	BEARING
8.	SNAP RING

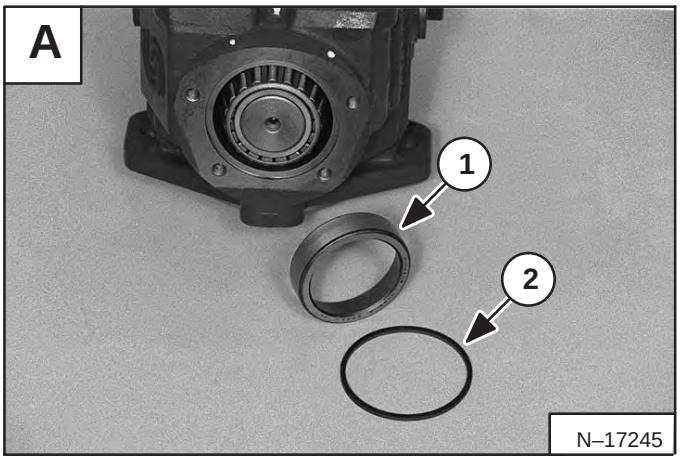
Parts Identification (Left Half) (Cont'd)

Ref.	Description	Ref.	Description
1.	SNAP RING	34	WASHER
2	WASHER	35	SPRING
3	SEAL	36	WASHER
4	SNAP RING	37	WASHER
5	SNAP RING	38	VALVE PLATE
6	BEARING	39	PIN
7	SNAP RING	40	GASKET
8	KEY	41	BEARING
9	SHAFT	42	PLUG
10	HOUSING	43	POPPET
11	PLUG	44	SPRING
12	O–RING	45	SHIM
13	BEARING	46	O–RING
14	SEAL	47	PLUG
15	O–RING	48	PLUG
16	COVER	49	O–RING
17	BOLT	50	O–RING
18	PIN	51	O–RING
19	O–RING	52	RELIEF VALVE
20	PLUG	53	PLUG
21	BEARING	54	PIN
22	O–RING	55	O–RINGS
23	PLATE	56	PIN
24	BOLT	57	GEROTOR
25	SWASH PLATE	58	SPACER
26	WEAR PLATE	59	O–RING
27	PISTON ASSEMBLY	60	O–RING
28	PISTON RETAINER	61	PIN
29	RETAINER	62	COUPLER
30	WASHER	63	BOLT
31	PIN	64	O–RING
32	RETAINER	65	O–RING
33	BLOCK	66	RELIEF VALVE

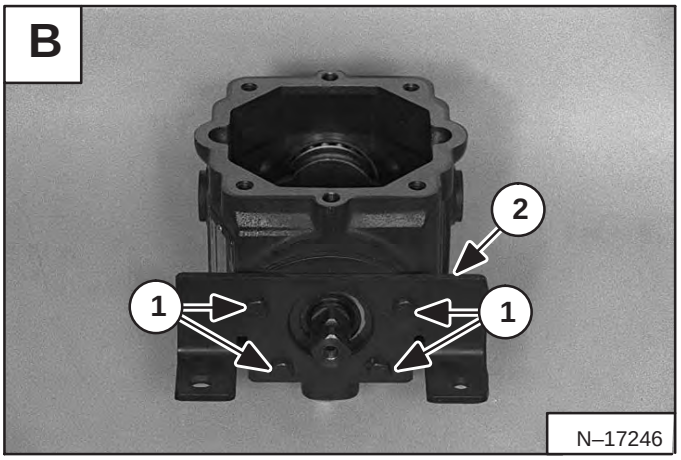
HYDROSTATIC PUMP (S/N 514122814 & Above; 514222028 & Above) (Cont'd)

Disassembly (Cont'd)

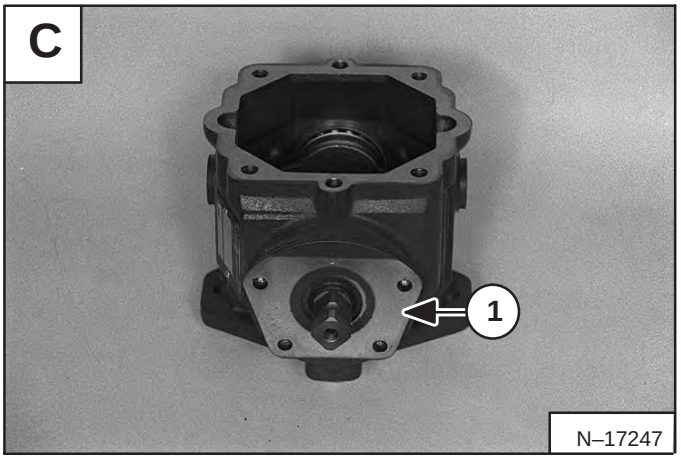
Check the bearing race (Item 1) **[A]** and O–ring (Item 2) **[A]** for wear and replace as needed.



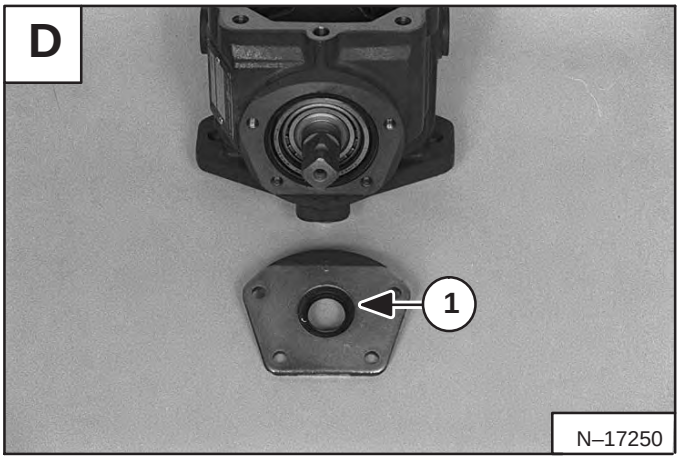
Remove the four mount bolts (Item 1) **[B]** from the pump housing and remove the steering bracket (Item 2) **[B]**.



Remove the upper trunnion cover (Item 1) **[C]**.



Inspect the seal (Item 1) **[D]** in the upper trunnion cover and replace if needed.

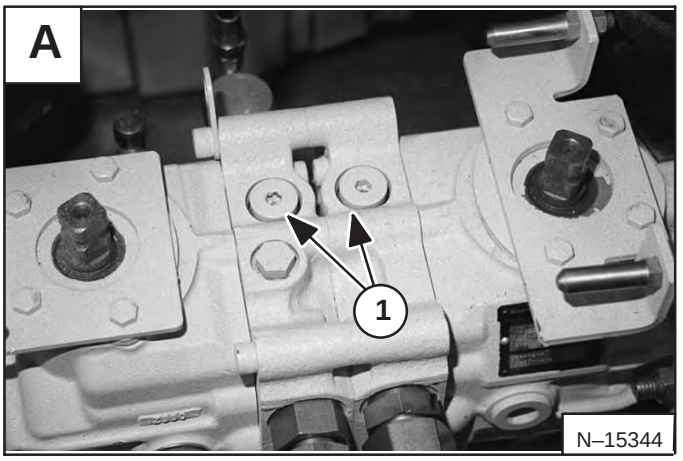


HYDROSTATIC PUMP (S/N 514122813 & Below; 514222027 & Below) (Cont'd)

Replenishing/High Pressure Relief Valve

There are four replenishing/high pressure relief valves (Item 1) **[A]** in the hydrostatic pump assembly. Two are located at the top of the pumps and two at the bottom of the pumps.

See Page 3–4 for valve function.

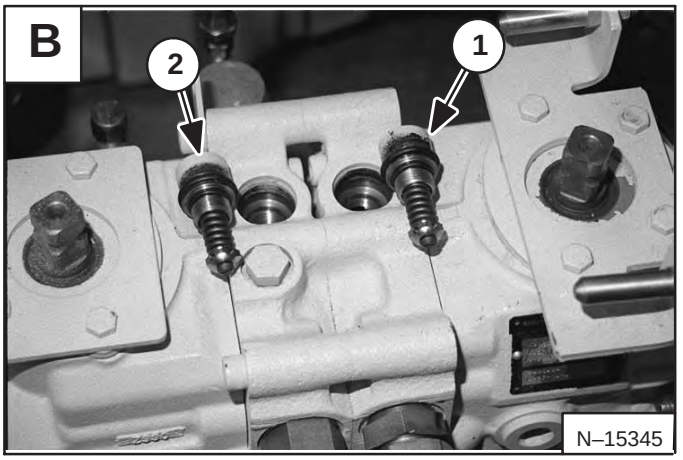


Remove the plug, spring and high pressure relief valve (Items 1 & 2) **[B]** from the pump.

Check for damage and replace as needed.

If the high pressure relief valve must be replaced, it must be replaced as a complete unit.

The pressure setting for a new high pressure relief valve is 4350 PSI (29993 kPa).



HYDROSTATIC PUMP (S/N 514122813 & Below; 514222027 & Below) (Cont'd)

Inspection (Cont'd)

NOTE: DO NOT use sandpaper or a file to remove scratches.

Check each piston in its bore. The piston must move freely **[A]**.

Check each piston shoe for wear or scratches.

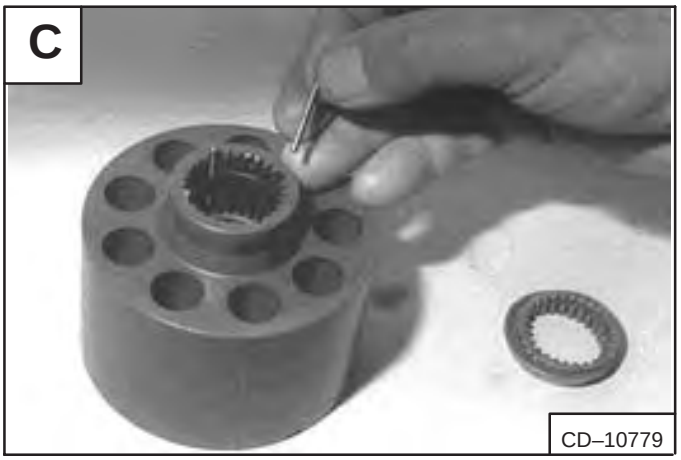
Inspect the spherical washer for wear or damage **[B]**.

Check the pins for wear and all are the same length **[C]**.

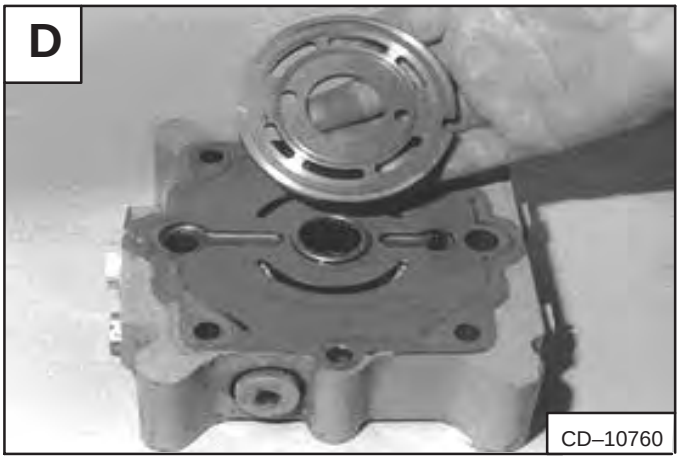
If there is any defect in the rotating group, the complete unit must be replaced.

Check the shaft splines for damage.

Replace the defective parts as needed.



Check the brass valve plate on both sides for damage and replace if worn or damaged **[D]**.



DRIVE BELT

Adjusting The Drive Belt

The drive belt idler arm stop is located on the left side of the engine block **[A]**.

Loosen the two bolts (Item 1) **[A]** and slide the stop (Item 2) **[A]** against the idler arm. Tighten the bolts.

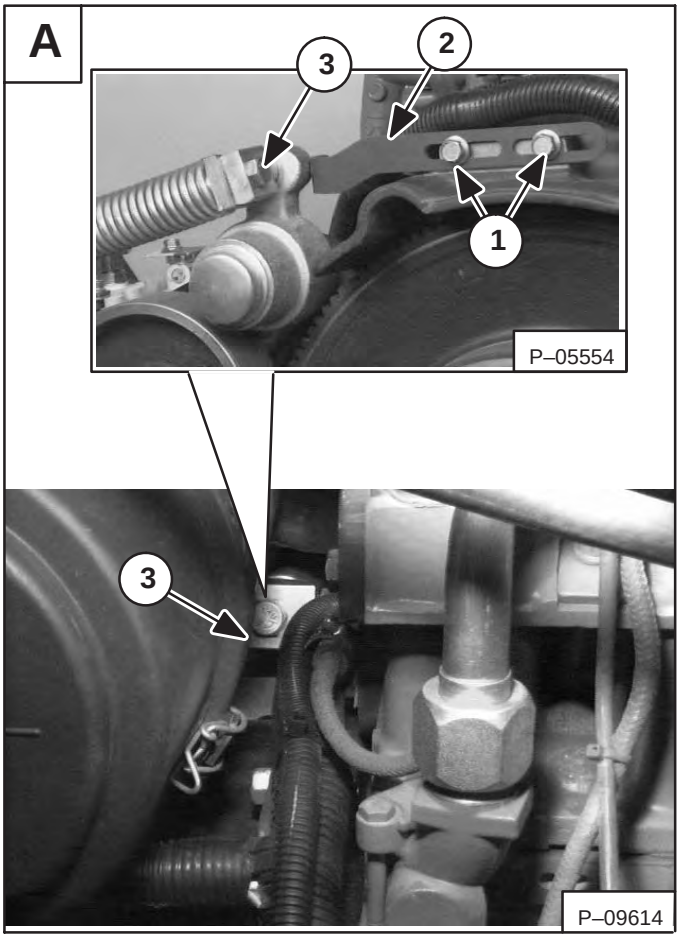
There is no adjustment for the spring, just make sure the spring bolt (Item 3) **[A]** is tight.

Replacing The Drive Belt

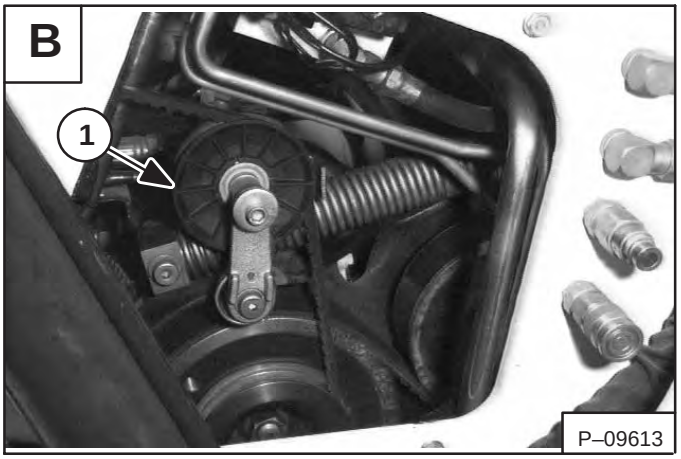
Remove the belt shield. (See Page 3–98.)

Loosen the two stop mounting bolts (Item 1) **[A]**.

Loosen the spring tension bolt (Item 3) **[A]**.

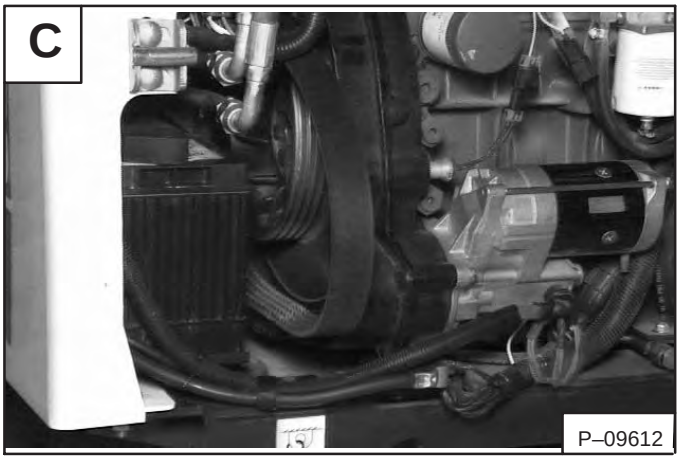


Remove the fan drive belt from the tension pulley (Item 1) **[B]**.



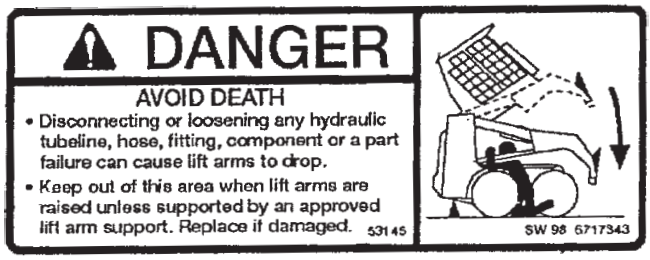
Remove the drive belt from the hydrostatic pump pulley and flywheel pulley **[C]**.

Remove the drive belt **[C]**.



BRAKE DISC

Removal And Installation



Raise the lift arms and install an approved lift arm support device. (See Page 1–1.)

WARNING

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

W–2059–0598

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

Disconnect the wiring connector (Item 1) **[A]** at the traction lock solenoid.

Remove the traction lock solenoid (Item 2) **[A]**. (See Page 8–1.)

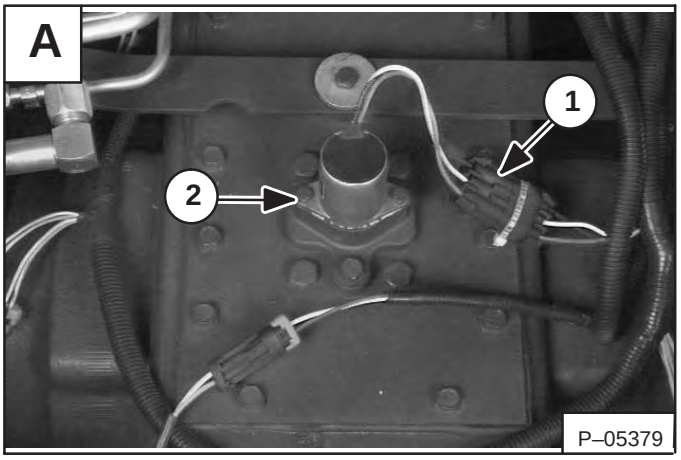
Remove the bolt and nut (Item 1) **[B]** to disconnect the lift linkage from crossmember.

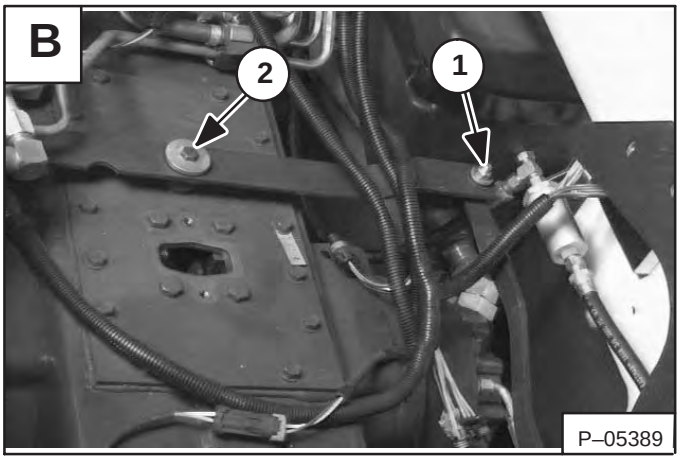
Remove the crossmember bolt (Item 2) **[B]**.

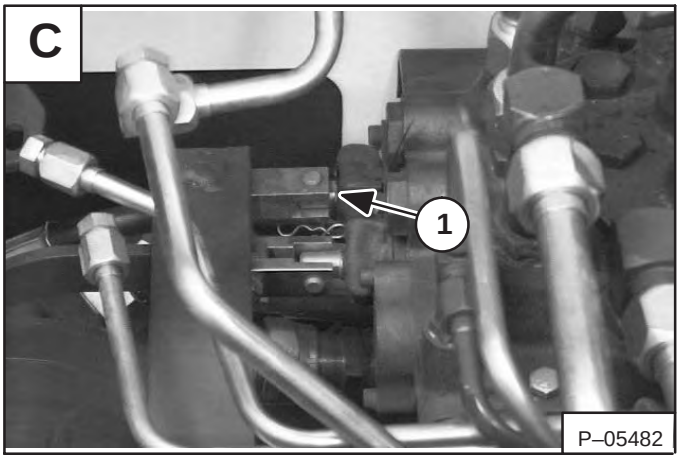
Disconnect the crossmember from the control valve lift spool (Item 1) **[C]**.

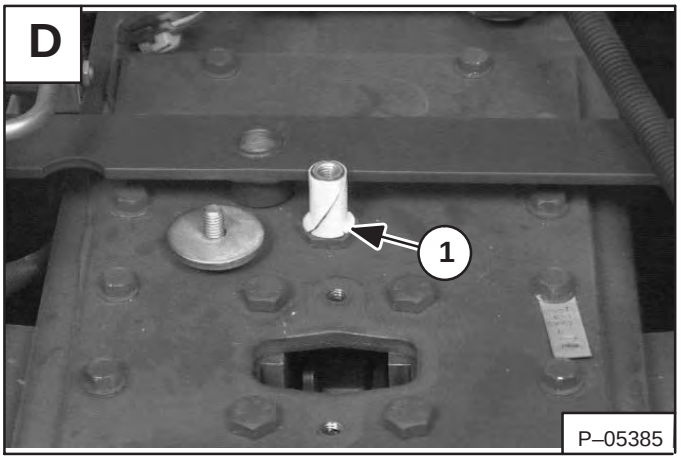
Remove the crossmember from the pivot **[D]**.

Installation: Check the nylon bushing (Item 1) **[D]** for wear and replace as needed.









AXLE, BEARINGS AND SPROCKET

Removal And Installation (Cont'd)

Early Model Loaders

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

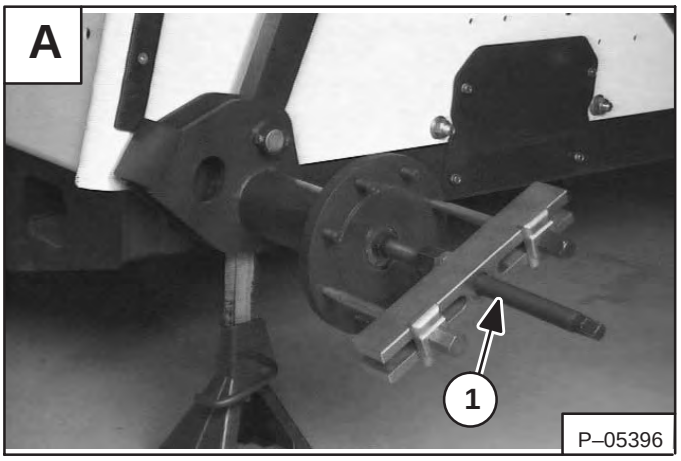
⚠ WARNING

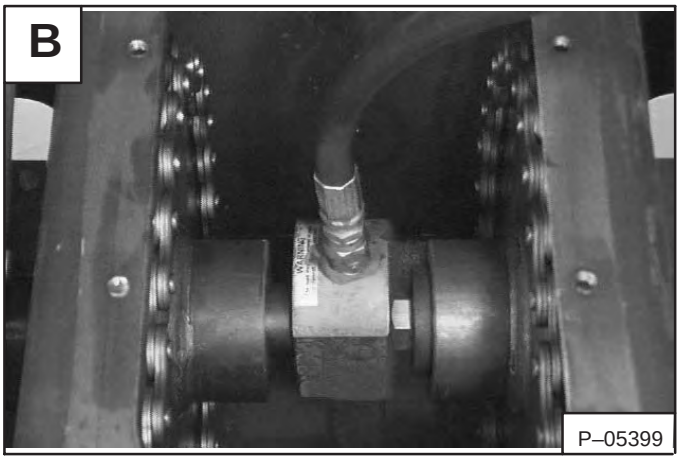
NEVER STAND IN–LINE OF THE HUB WHEN REMOVING A HUB FROM AN AXLE. The hub has a tapered fit on the axle end and can come off the axle with great force and cause serious injury.

W–2186–0395

Remove the hub from the axle.

Install a Port–a–Power ram between the two sprockets **[B]**.



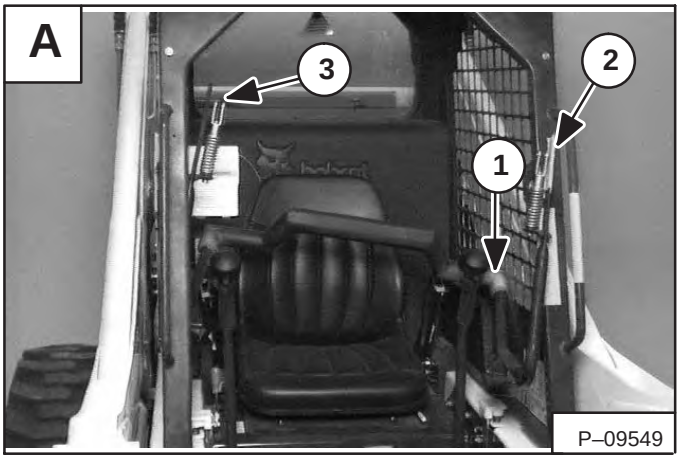


SEAT BAR (Cont'd)

Removal And Installation (Cont'd)

Position the seat bar in the recess on the left side of the cab (Item 1) **[D]**. Position the left side pivot end of the seat bar between the cab and the grab handle (Item 2) **[A]**.

Lift straight up on the right side (Item 3) **[A]** of the seat bar.



Continue to lift on the right side of the seat bar and allow the left side of the seat bar to rotate between the cab and the grab handle (Item 1) **[B]**.

Lift the right side of the seat bar until it clears the right side screen of the cab **[C]**.

Remove the left side of the seat bar pivot from between the cab and grab handle and remove the seat bar from the cab **[D]**.

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

CLICK HERE TO **DOWNLOAD** THE COMPLETE MANUAL

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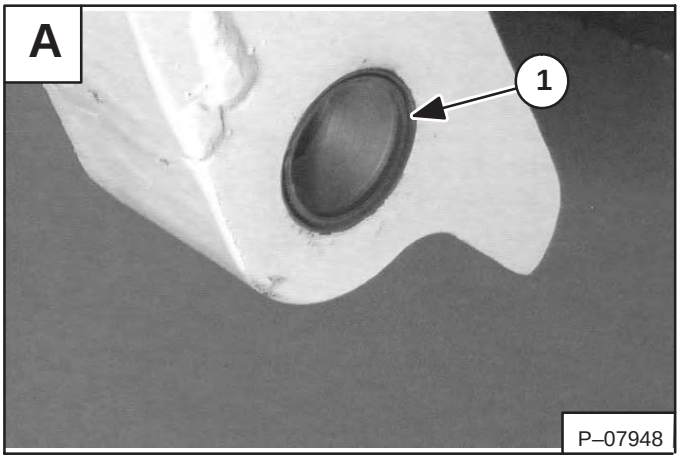
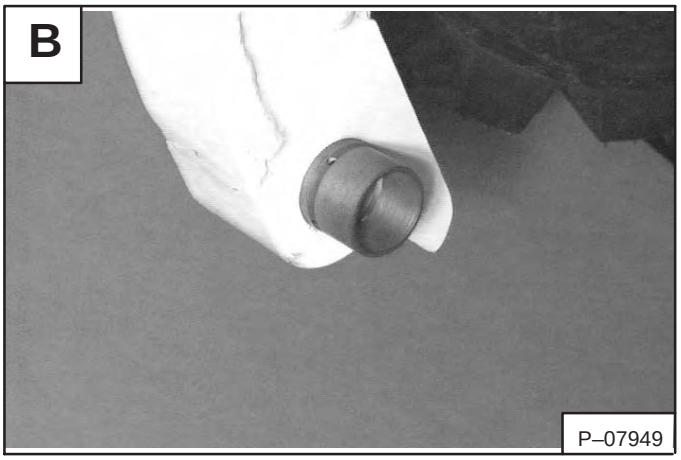
Pivot Pin Bushing And Seal Replacement

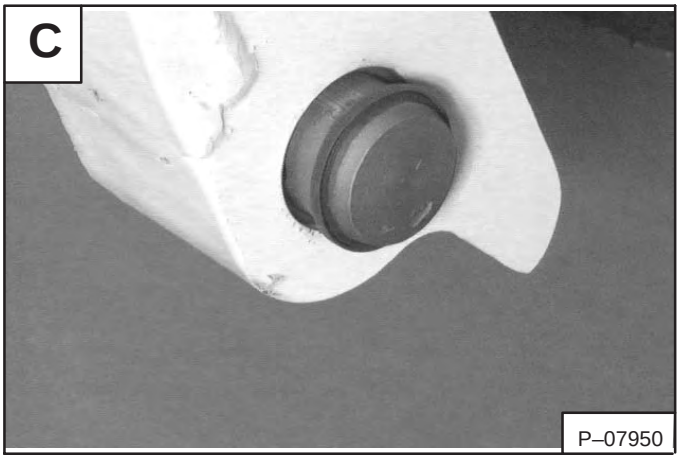
Use a seal pick to remove seals (Item 1) **[A]** on both sides of pivot bushing.



Remove and replace bushing with a driver tool and hammer **[B]**.



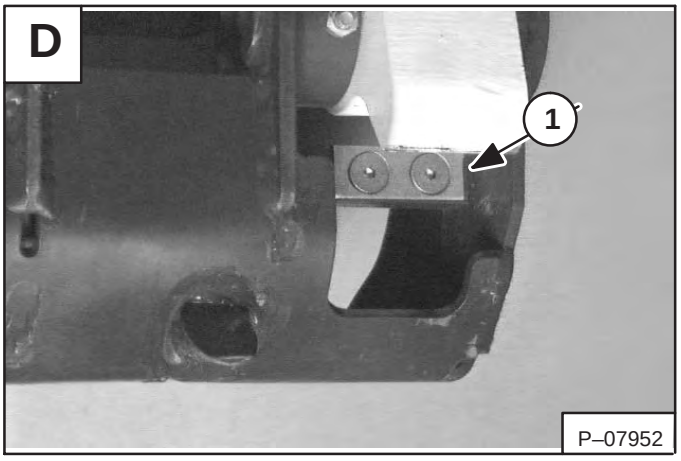
Use a driver to install new seals. The pivot pin can be used to locate seal **[C]**.



Bob–Tach Stop

Remove and replace the Bob–Tach stop (Item 1) **[D]** (both sides) if worn or damaged.

NOTE: The Bob–Tach stop (Item 1) [D] must contact the lift arm at the same time the tilt cylinder reaches full extension. Use available shims to adjust the Bob–Tach stop and tilt cylinder sequence as closely as possible.



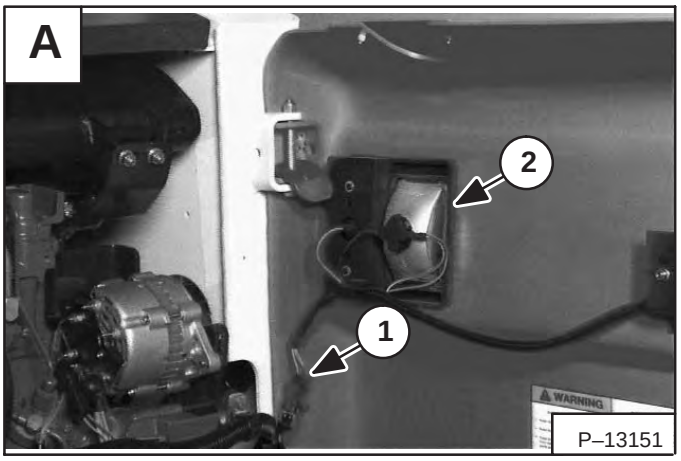
REAR DOOR (ONE PIECE)

Removal And Installation

Open the rear door.

Disconnect the light harness connector (Item 1) **[A]** from the engine harness.

Remove the light bulbs from the light housing and remove the light housing (Item 2) **[A]** from the rear door (both sides).



Install a nylon sling (Item 1) **[B]** through the holes for the light housings.

Connect a chain hoist (Item 2) **[B]** to the nylon sling.

WIRING SCHEMATIC CONTENTS
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DOMESTIC

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(Printed January 1999)

873 BOSS - WIRING SCHEMATIC
514115001-16780
(Printed January 1999)

873 WITHOUT BOSS - WIRING SCHEMATIC
514116781-22813
(Printed January 1999)

873 BOSS - WIRING SCHEMATIC
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873 WITHOUT BOSS - WIRING SCHEMATIC
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873 BOSS - WIRING SCHEMATIC
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OPTIONS

873 - WIRING SCHEMATIC
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OPTIONS
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REFER TO SECTION 10 FOR ADVANCED HAND CONTROL OPTIONS WIRING SCHEMATICS

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 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. Failure to follow instructions can cause injury or death.

W–2003–1298

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.

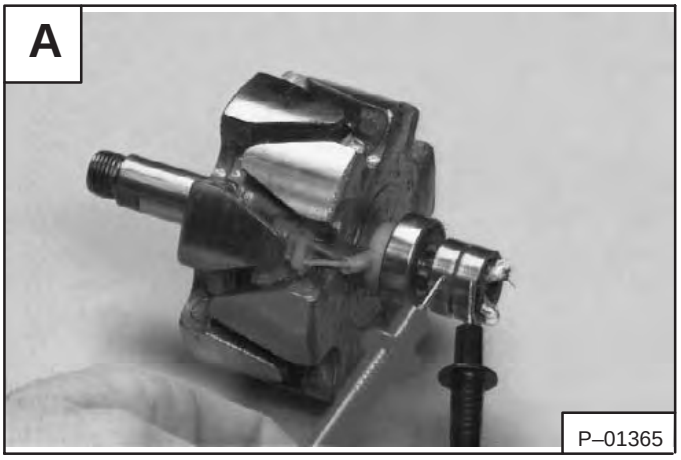
ALTERNATOR (Cont'd)

Rotor Continuity Test

Touch the probes to the slip rings **[A]**.

The ohmmeter should read between 3.0–33.0 ohms.

If there is no continuity replace the rotor.

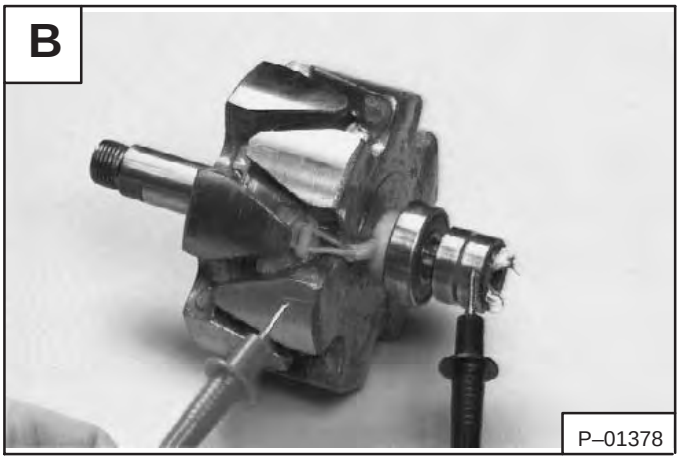


Rotor Ground Test

Touch one probe to one of the slip rings and the other probe to the rotor shaft **[B]**.

There should be no continuity.

Replace the rotor if there is continuity.



Rectifier Continuity (Diode) Test

NOTE: In the diode tests there should be continuity in one direction only. If the diode being tested shows no continuity or continuity in both directions, replace the rectifier assembly.

Touch the probes to the terminals of each diode and read the meter **[C]**.

Reverse the probes to check the diode in the other direction.

There should be continuity in one direction only.

Touch one probe to the diode and the other probe to the connected heat sink and read the meter **[D]**.

Reverse the probes to check the diode in the other direction.

There should be continuity in one direction only.

STARTER (Cont'd)

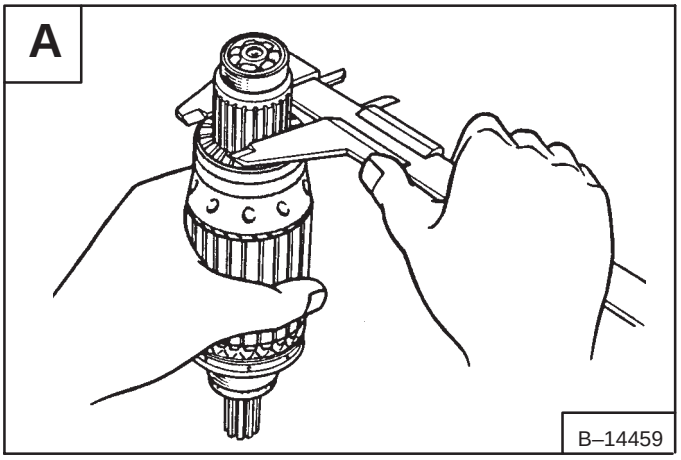
Inspection And Repair (Cont'd)

ARMATURE (Cont'd)

Measure the commutator outer diameter **[A]**.

Service Limit – 1.38 inches (35 mm)

If it is worn, replace the armature.

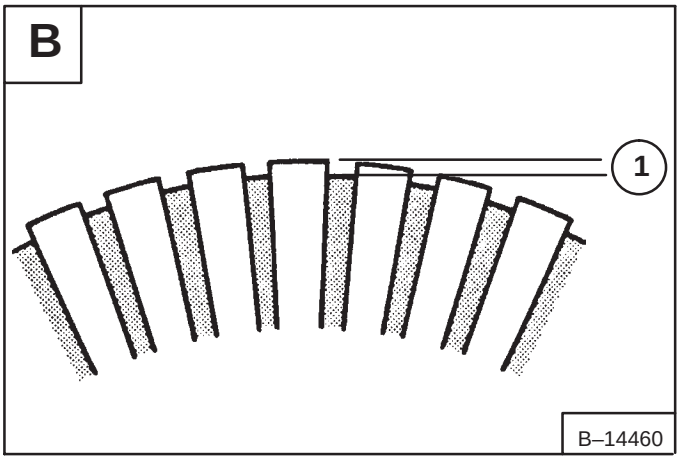


Measure the segment mica depth (Item 1) **[B]**.

Service Limit – 0.008 inches (0,2 mm)

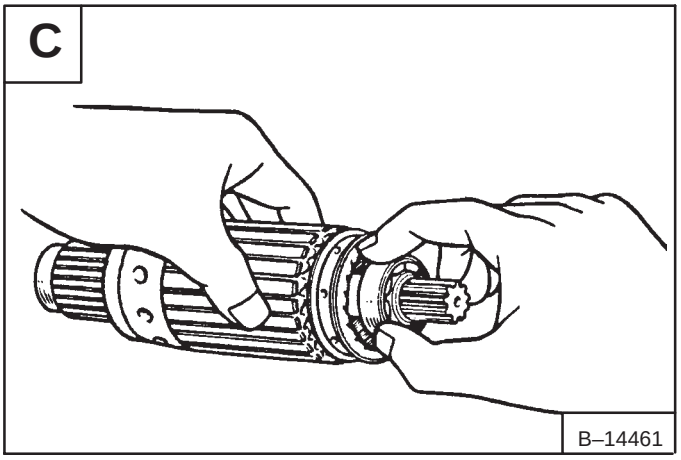
If it is worn, undercut the segment mica.

Check the commutator surface for burned spots which usually indicates an open–circuit, and correct it using #400 sand paper.

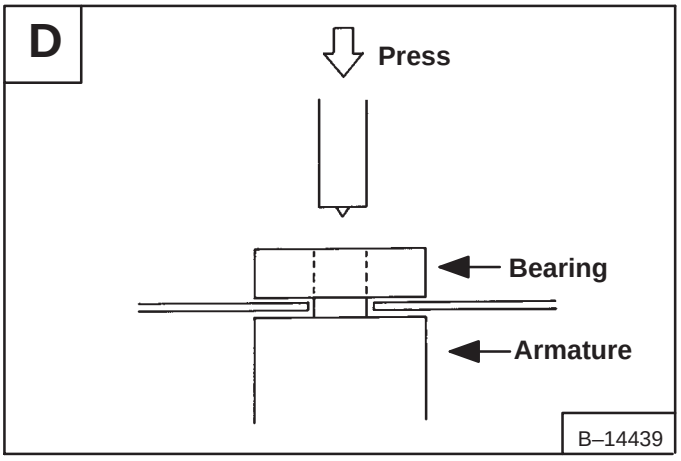


Check the bearings for wear and damage **[C]**.

If the bearings are worn or damaged, they should be replaced.



Use a press as shown in **[D]**, replace the worn or damaged bearing(s).



ENGINE SPEED CONTROL (Cont'd)

Speed Control Cable

Raise the lift arm and install an approved lift arm support device. (See Page 1–1.)

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

Remove the speed control lever assembly. (See Page 7–4.)

NOTE: The front panel/steering levers are shown removed for photo clarity.

Remove the u–bolt (Item 1) **[A]** from the cable.

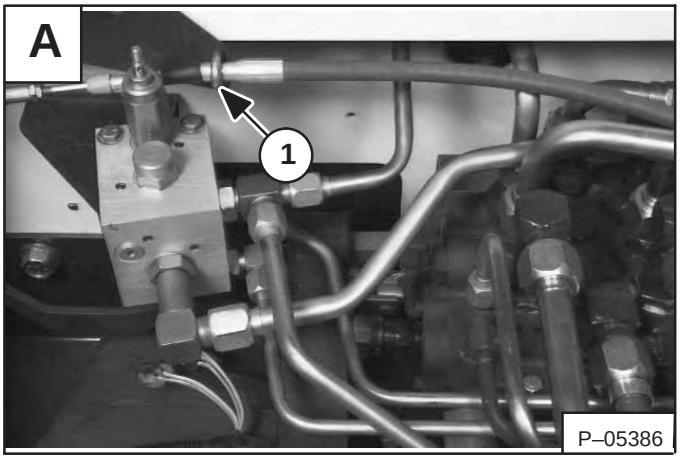
Open the rear door.

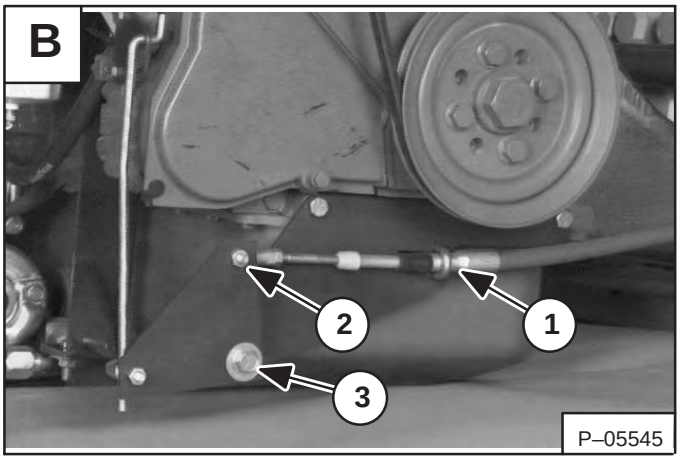
NOTE: Engine is shown removed from loader for photo clarity.

Remove the u–bolt (Item 1) **[B]** from the cable.

Remove the nut (Item 2) **[B]** to disconnect the cable from the linkage.

Remove the speed control cable.





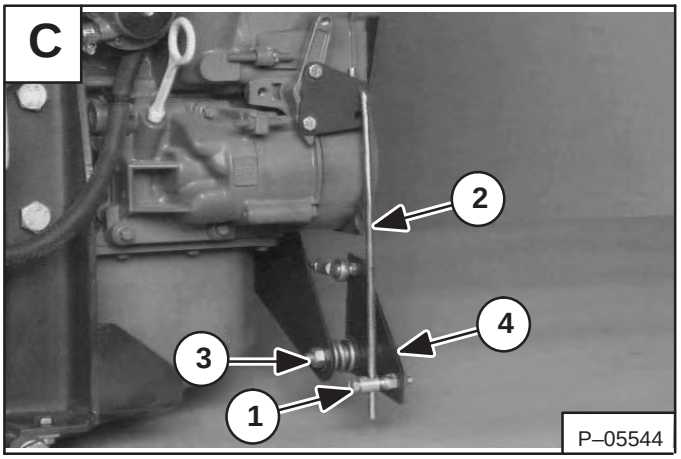
Speed Control Linkage

Loosen the bolt (Item 1) **[C]** to remove the linkage rod (Item 2) **[C]**.

Disconnect the cable nut (Item 2) **[C]**.

Remove the nut (Item 3) **[C]** from the pivot bolt (Item 3) **[B]**.

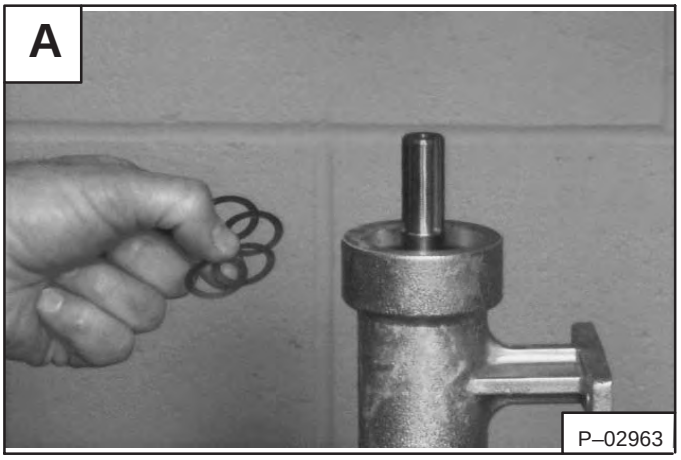
Remove the linkage (Item 4) **[C]** and spring.



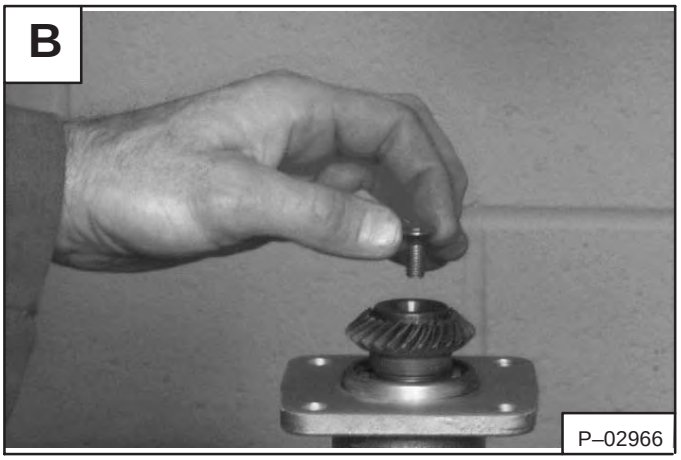
FAN GEARBOX (Cont'd)

Disassembly (Cont'd)

Remove the small shims **[A]**.

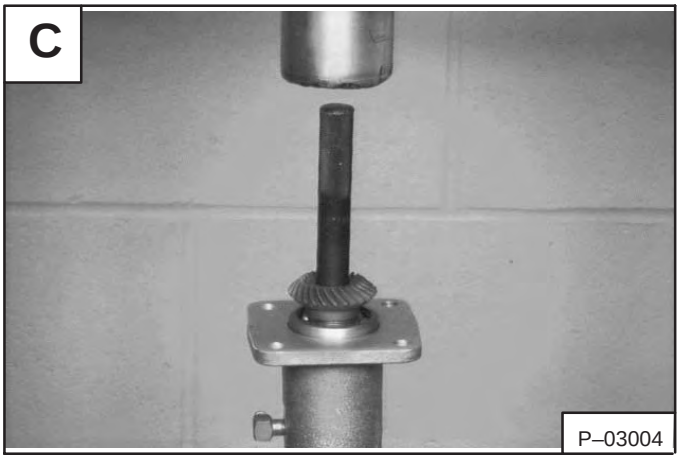


Remove the screw and washer from the shaft **[B]**.

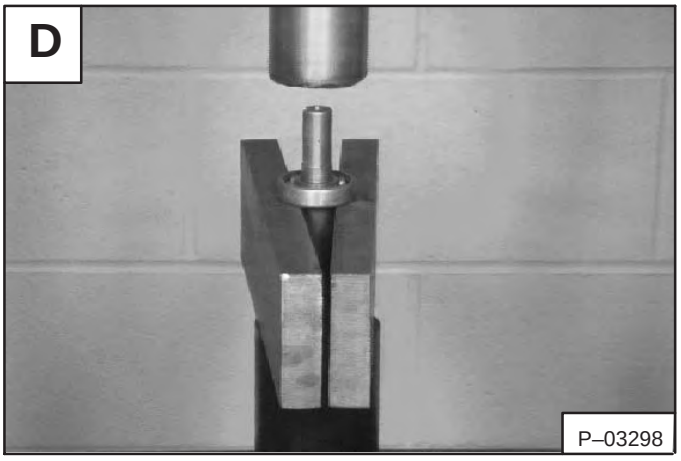


Support the lower flange and press the shaft from the bearing **[C]**.

NOTE: The gear and the other bearing (pulley end) will be removed with the shaft.



Support the bearing and press the shaft from the bearing **[D]**.

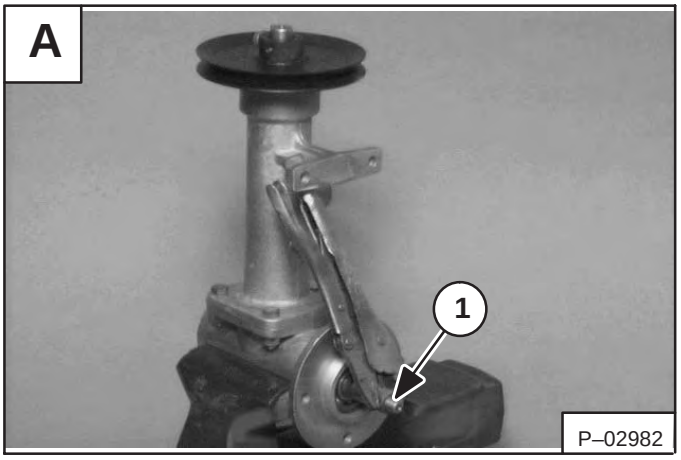


FAN GEARBOX (Cont'd)

Checking Backlash (Cont'd)

Put the fan nut (Item 1) **[A]** on the shaft and tighten snugly.

Install a locking pliers on the fan nut and support the handle against the long housing **[A]**.



Using a magnetic based dial indicator mounted on a bench vise, touch the dial stem on the bolt (Item 1) **[B]**.

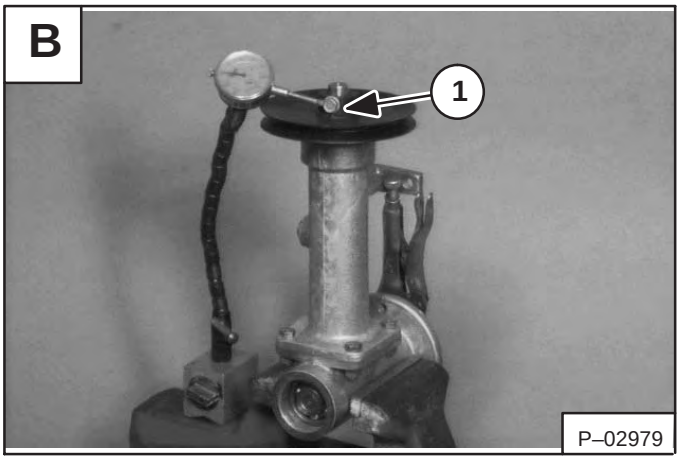
Hold the locking pliers against the long housing and rotate the pulley back and forth to read the dial gauge **[B]**.

If the backlash is GREATER than 0.008 inch (0,203 mm), do the following:

1. Remove a square shim(s) (if present) between the two housings.
2. Remove a large shim(s) from the tapered end of the short shaft and add a small shim(s) of the same thickness between the bearing and the gear on the screw end of the shaft.

If the backlash is LESS than 0.005 inch (0,127 mm) do the following:

1. Add a square shim(s) between the two housings.
2. Remove a small shim(s) between the bearing and the gear on the screw end of the short shaft and add a large shim(s) of the same thickness between the snap ring and the bearing on the tapered end of the shaft.



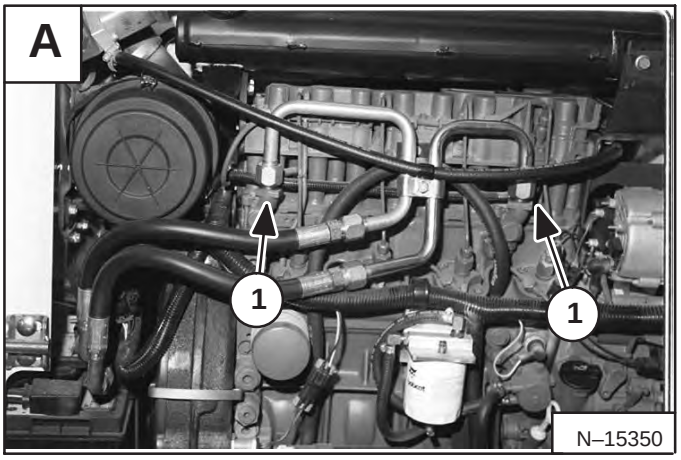
ENGINE (Cont'd)

Removal And Installation (Cont'd)

Disconnect the heater hoses (if so equipped).

Disconnect the hoses (Item 1) **[A]** at the engine and drain the oil from the oil cooler into a container.

NOTE: Measure the amount of oil removed from the oil cooler and/or engine. Add the same amount of oil to the engine oil pan when adding engine oil.

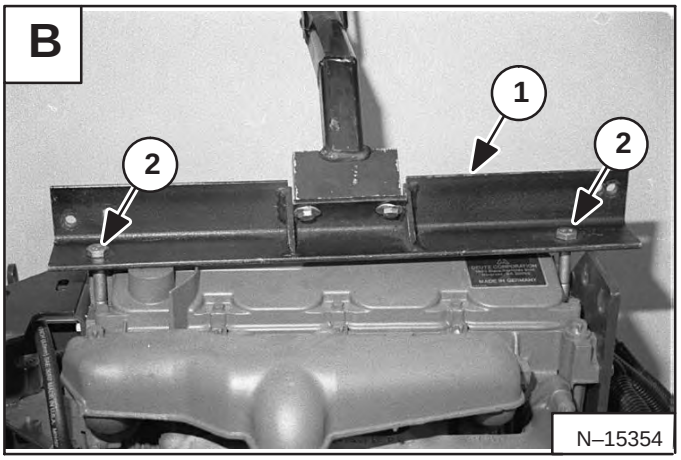


Install the engine lift bracket (Item 1) **[B]** on the engine. (See Page 7–31 for lift bracket dimensions.)

Tighten the bolts (Item 2) **[B]** until the lift bracket is held firmly against the valve cover.

NOTE: Bolts required are two 12 x 80 mm x 1.75 threads.

Using a chain hoist, lift the engine a small amount to support the engine weight.



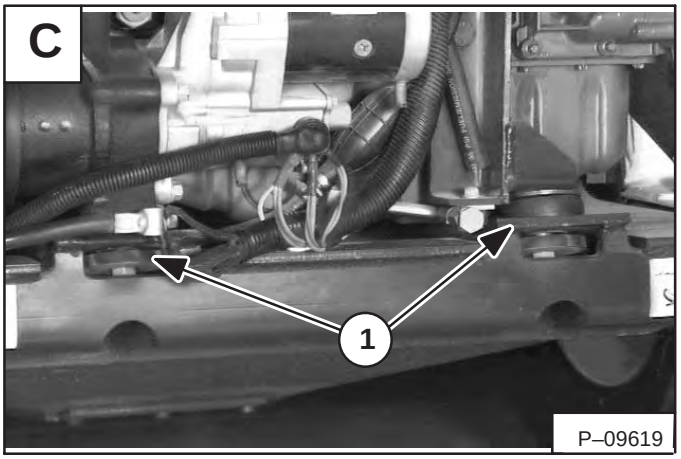
Remove the rear engine mounts (Item 1) **[C]** completely.

Remove the flywheel housing bolts. (See Page 7–36.)

Remove the bolts holding the mount between the crankcase and the hydrostatic pump. Leave the mount attached to the pump per one bolt.

Lift slowly and remove the engine from the engine compartment.

Lower the engine to the floor or work bench. Block the engine to prevent it from tipping.



⚠ WARNING

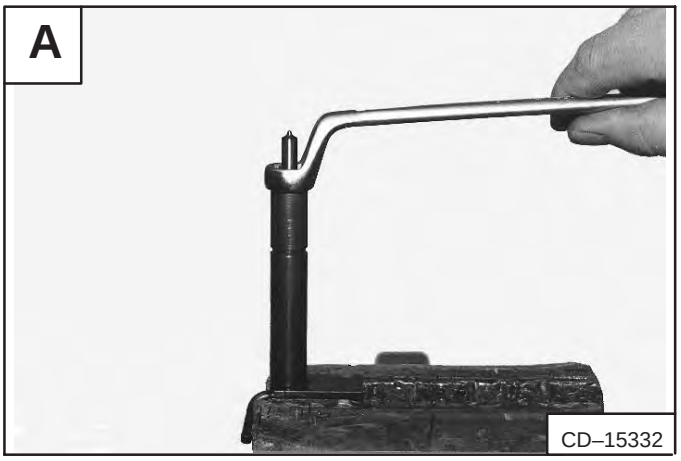
Engine can tip over. Always block and support components when setting in a work area.

W–2259–0197

FUEL INJECTOR (Cont'd)

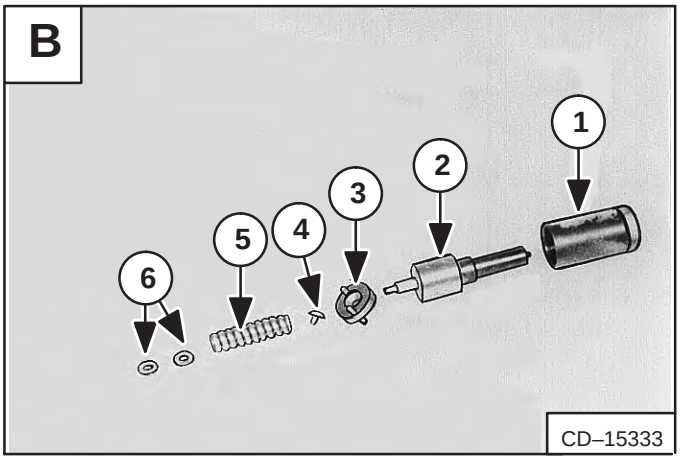
Disassembly

Remove the nozzle cap nut **[A]**.



Disassembly the parts as shown in Fig. **[B]**.

1. Nozzle Cap Nut
2. Injector Nozzle
3. Adapter
4. Thrust Pin
5. Spring
6. Shim(s)



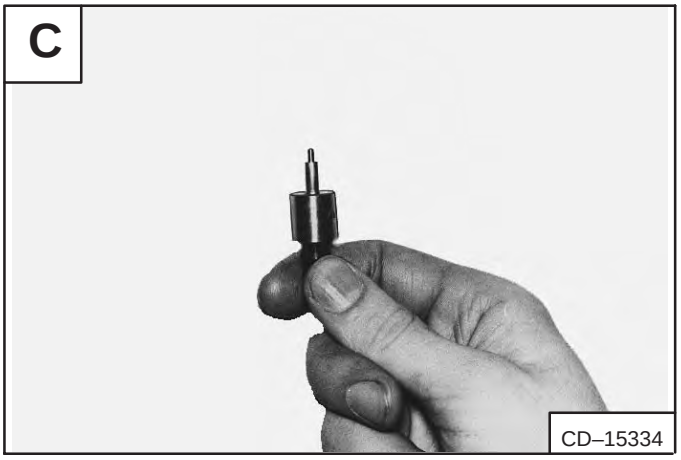
Wash all the parts in clean diesel fuel and blow dry using compressed air.

The nozzle needle and body are lapped together and can not be exchanged with other nozzle parts.

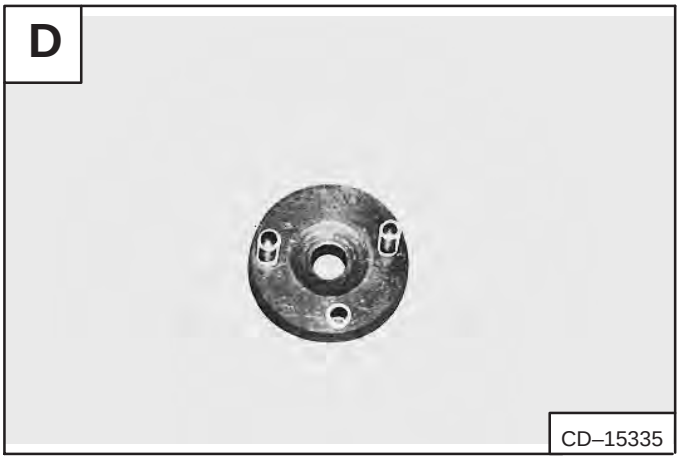
DO NOT touch the nozzle needle with your fingers.

When the nozzle body is held in the upright position, the needle should by its own weight slide slowly and smoothly on its seat **[C]**.

NOTE: If the nozzle needle does not slide smoothly, wash the injector nozzle parts again in clean diesel fuel. Blow dry with compressed air. Re–do the procedure again. Replace the injectors as needed. Wash all new injectors in clean diesel fuel before installation.



Check the seat surface of the adapter for wear. Make sure the centering pins are in place **[D]**.

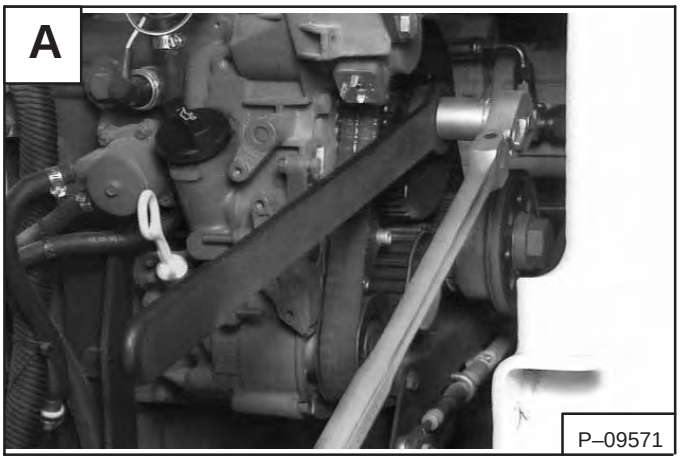


TIMING BELT (Cont'd)

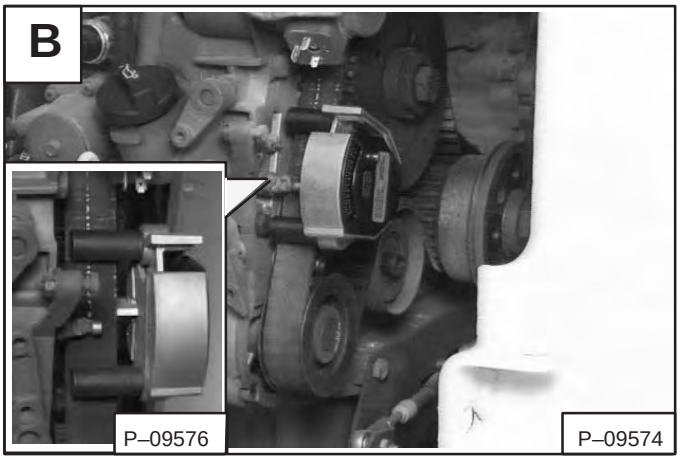
Belt Replacement In Loader (Cont'd)

Install the camshaft gear tool (Item 1) **[A]**. (See Page 7–58 for correct tool.)

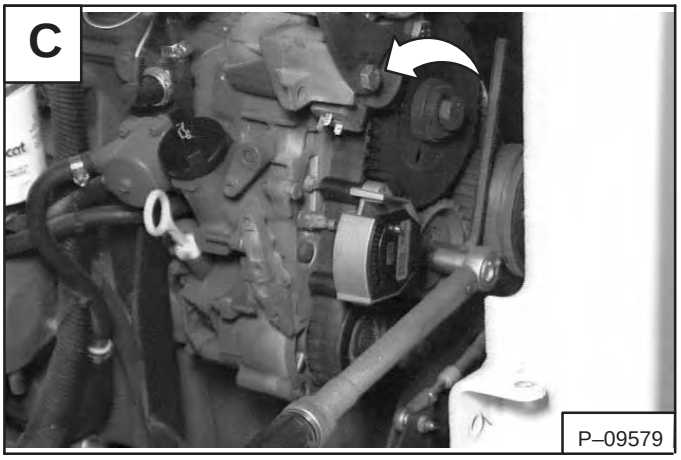
Loosen the camshaft gear **[A].**



Install the belt tension tool as shown in Figure **[B]**. (See Page 7–58 for the correct tool.)



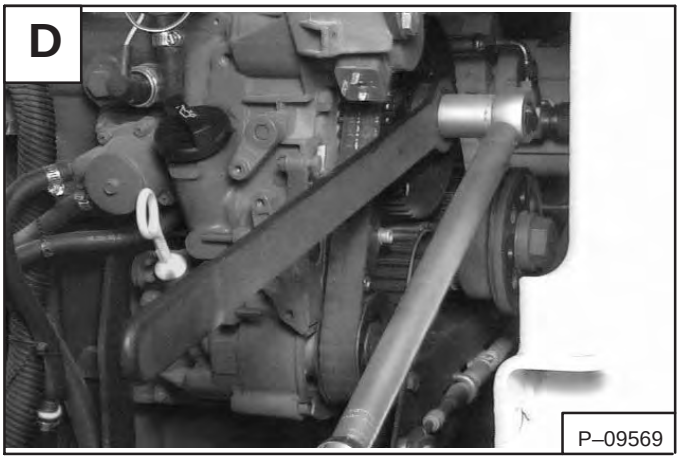
Use a hex wrench to turn the idler tension pulley in counterclockwise direction as shown in figure **[C]**. Obtain a scale reading of 3.0–3.5. Tighten the idler tension pulley mount bolt to 33 ft.–lbs. (45 Nm) torque.



Remove the belt tension tool, hex wrench and torque wrench.

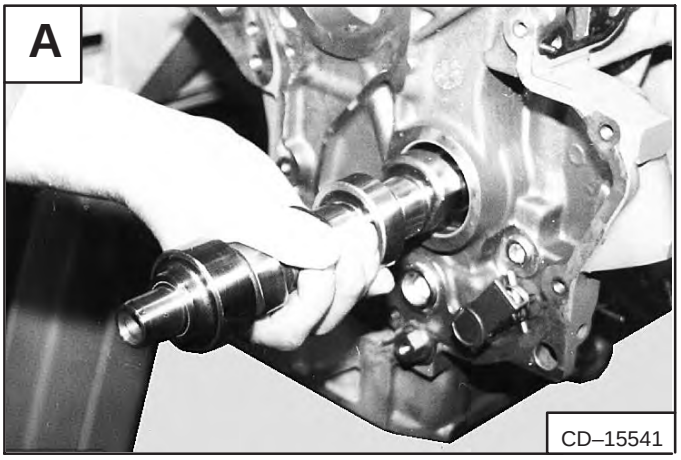
Install the camshaft gear tool.

Tighten camshaft bolt to 22 ft.–lbs. (30 Nm) torque as shown in figure **[D]**. Mark the camshaft bolt and tighten an additional 210°.

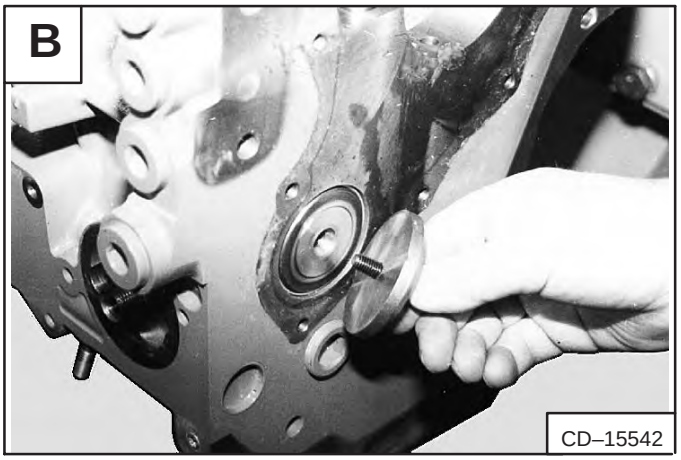


Assembly (Cont'd)

Install the camshaft **[A]**.



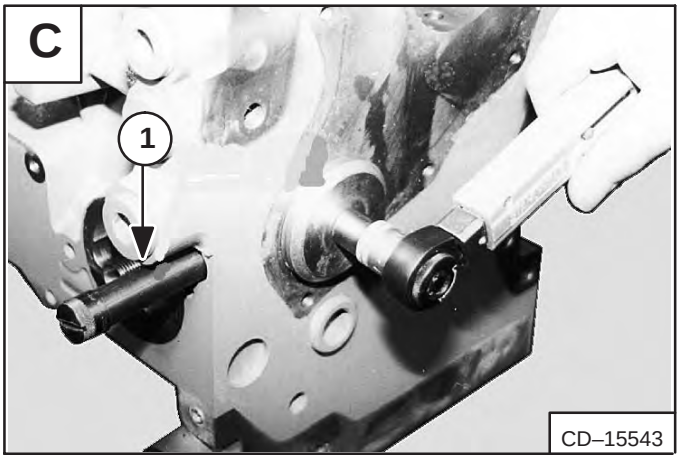
Install the thrust washer with the lubricating groove toward the crankcase **[B]**.



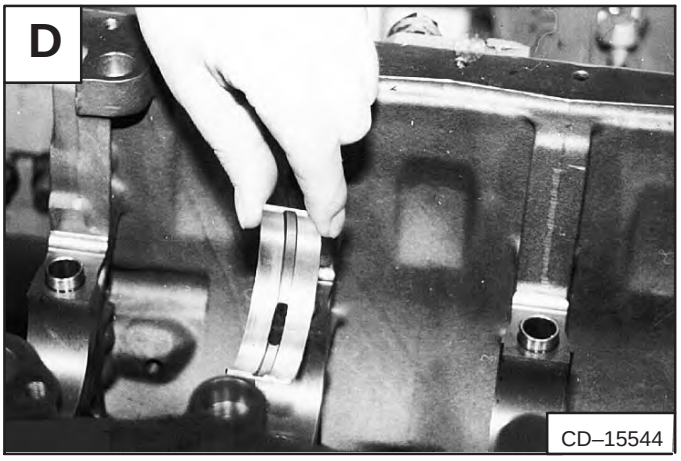
Install the camshaft timing tool (Item 1) **[C]**.

Tighten the camshaft thrust washer bolt to 15 ft.–lbs. (21 Nm) torque **[C]**.

Remove the timing tool.

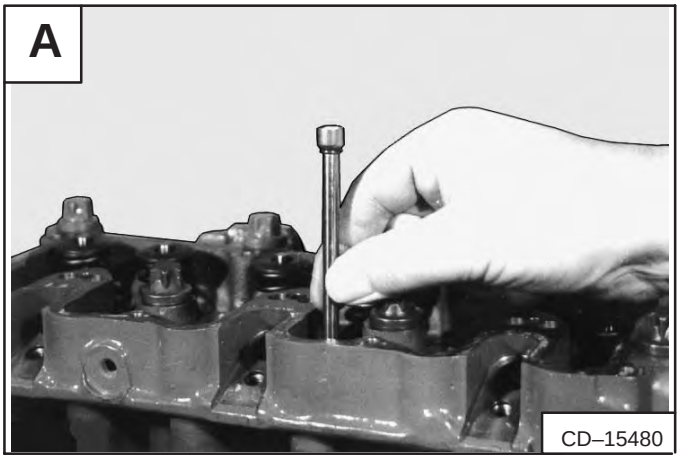


Install the upper main bearing halves **[D]**.

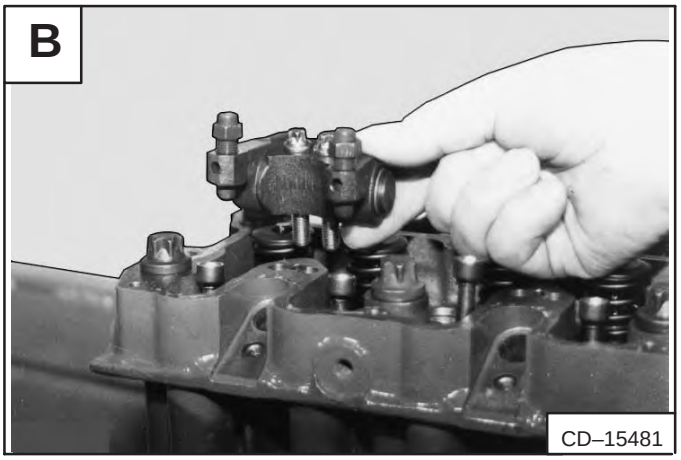


Assembly (Cont'd)

Install the push rods **[A]**.

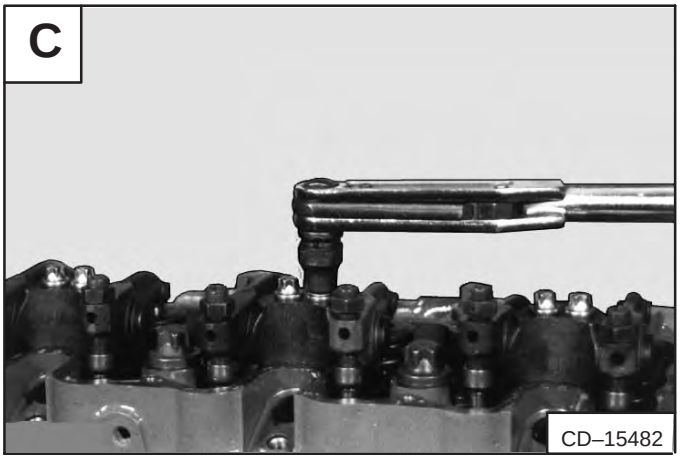


Install the rocker arms/bracket assembly **[B]**.



Tighten the rocker arm bracket bolts to 15 ft.–lbs. (21 Nm) torque **[C]**.

Set the valve clearance. (See Page 7–38.)



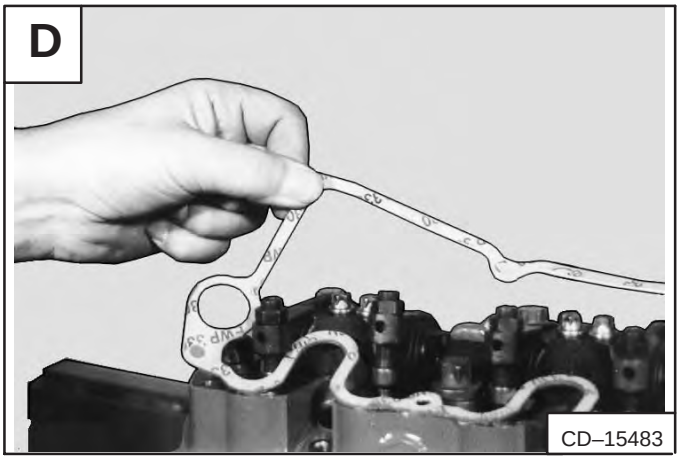
Install the valve cover gasket **[D]**. Install the valve cover. Tighten the bolts to 75 in.–lbs. (8,5 Nm) torque.

Install new intake manifold gasket.

Install the intake manifold and tighten the bolts to 15 ft.–lbs. (20 Nm) torque.

Install new exhaust manifold gaskets.

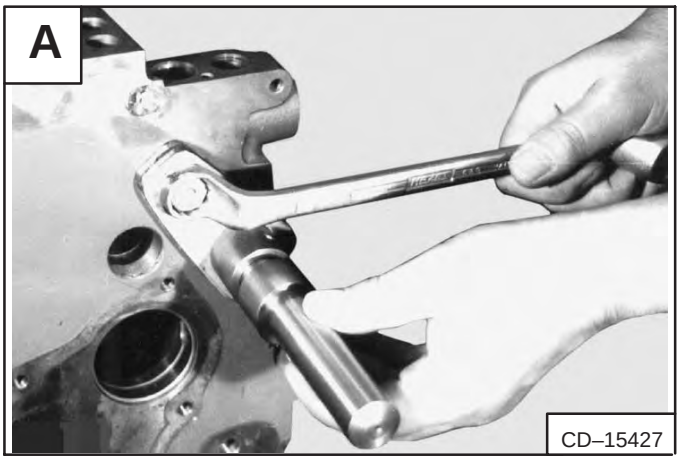
Install the exhaust manifold and tighten the bolts to 30 ft.–lbs. (40 Nm) torque.



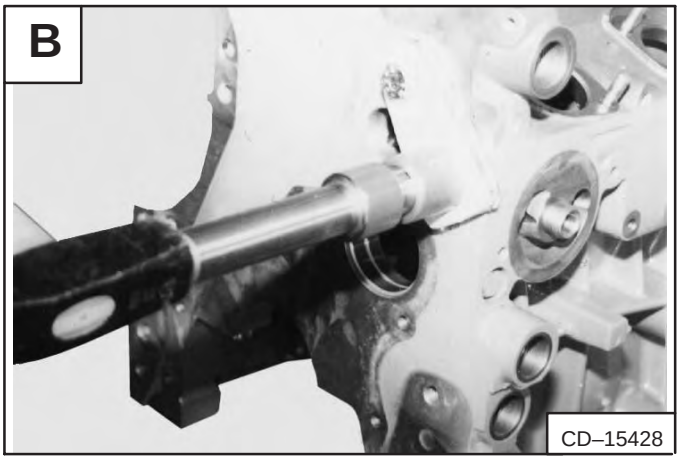
CONTROL ROD AND GUIDE BUSHING (Cont'd)

Installation (Cont'd)

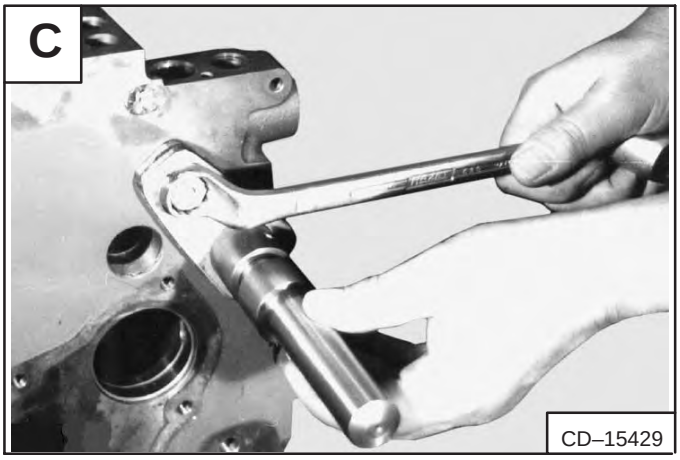
Fasten the arbor assembly and guide bushing to the engine block **[A]**.



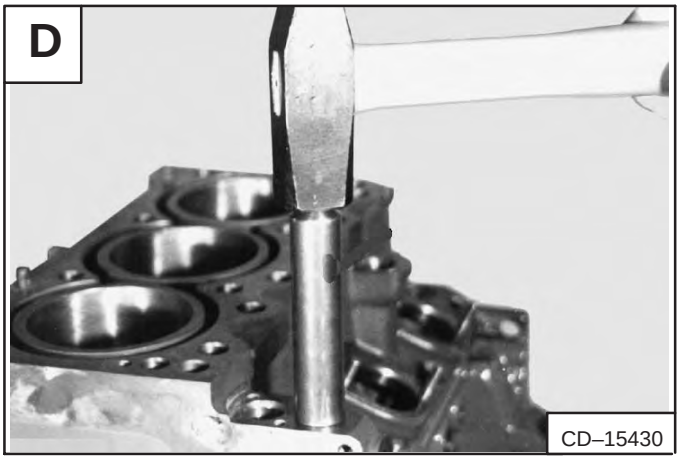
Drive in the guide bushing as far as it will go, at the flywheel end **[B]**.



Remove the arbor assembly **[C]**.



Install the new pipe in the block as far as it will go with the arbor assembly **[D]**.



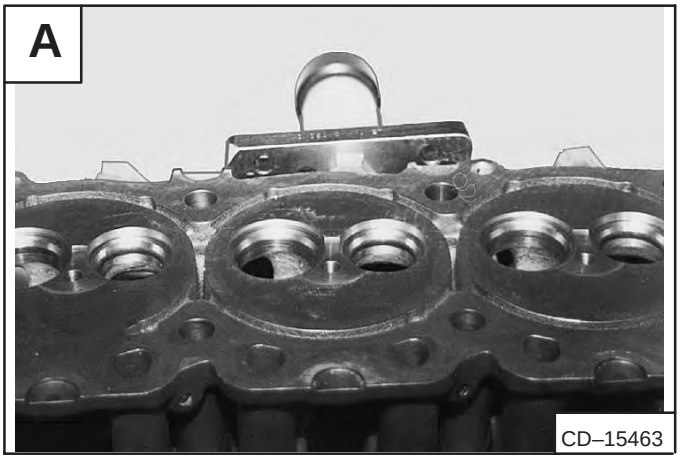
CYLINDER HEAD (Cont'd)

Checking Valve Seats

Measure the valve seat width **[A]**.

Specifications (BF4M1011):
Width . . . . . 0.067 ± 0.016 inch (1,7 ± 0,4 mm)

Specifications (BF4M1011F):
Width (Intake) . . 0.062 ± 0.016 inch (1,58 ± 0,4 mm)
(Exhaust) . 0.067 ± 0.016 inch (1,7 ± 0,4 mm)



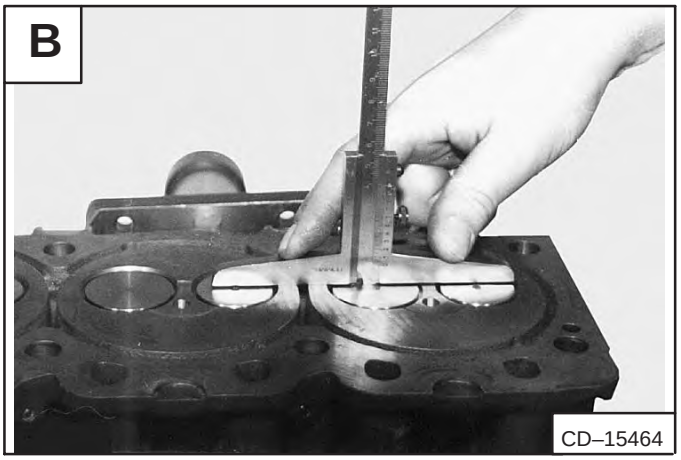
Measure the valve clearance between the valve head and cylinder head sealing surface **[B]**.

Valve penetration into cylinder head:

Specifications (BF4M1011):
Wear Limit . . . . 0.061 ± 0.005 inch (1,53 ± 0,13 mm)

Specifications (BF4M1011F):
Wear Limit . . . 0.0511 ± 0.0051 inch (1,3 ± 0,13 mm)

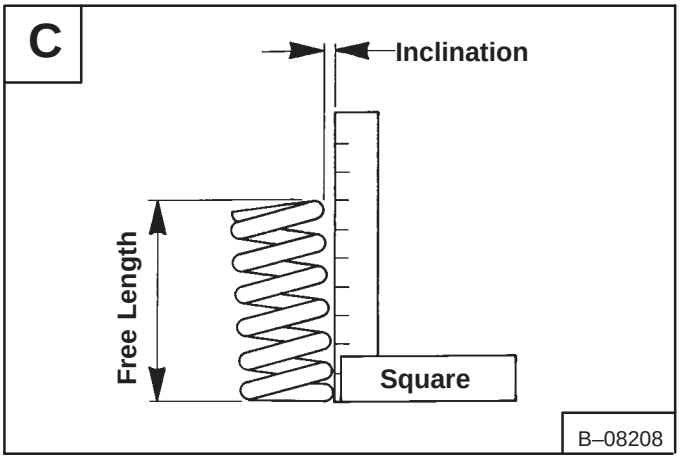
Recondition the valve seats and valve guides if worn.



Valve Spring

Measure valve spring free length **[C]**.

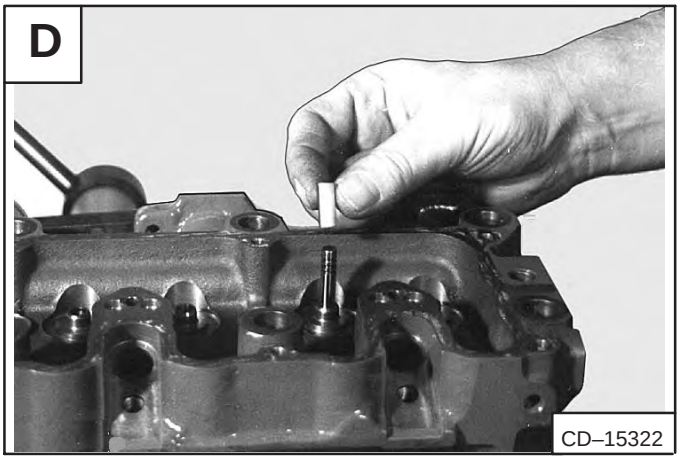
Specifications:
Valve Spring Dia. . . . . 0.132 inch (3,35 mm)
Free Length . . . . . 1.74 inch (44,3 mm)
Valve Spring Dia. . . . . 0.134 inch (3,40 mm)
Free Length . . . . . 1.547 inch (39,3 mm)
Inclination . . . . . 0.126 inch (3,2 mm)



Assembly

Install the valve into the cylinder head **[D]**.

Install the protective sleeve or masking tape on the valve stem grooves **[D]**.

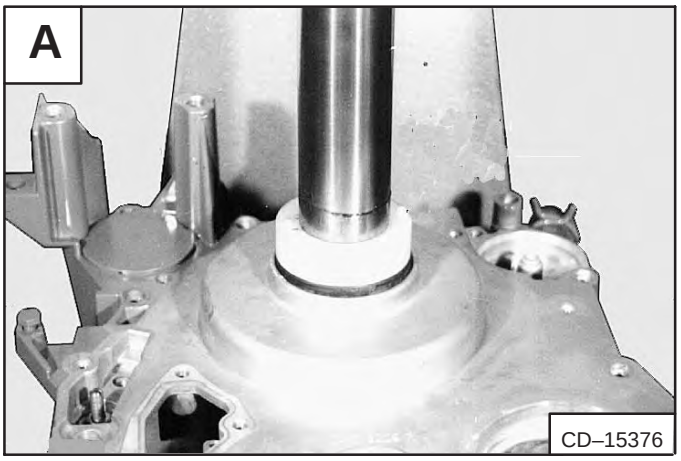


FRONT COVER (Cont'd)

Assembly (Cont'd)

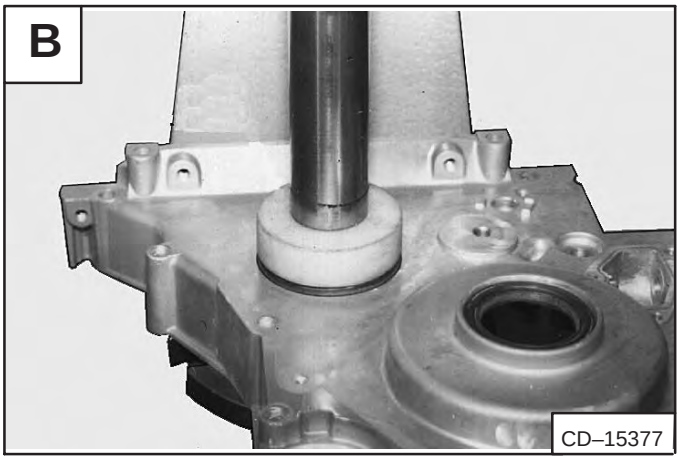
Put a light coat of oil on the camshaft seal.

Press the camshaft seal into the front cover **[A]**. (See Page 7–58, for correct tool.)



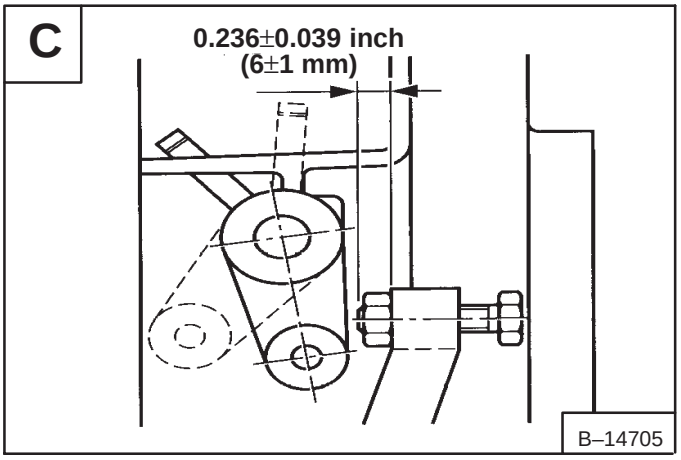
Do Not put oil on the crankshaft seal.

Press the crankshaft seal into the front cover **[B]**.



Adjust the distance of the shut–down stop screw to 0.236 ± 0.039 inch (6 ± 1 mm) **[C]**.

Tighten the lock nut to 40 in.–lbs. (4,5 Nm) torque.



TURBOCHARGER (Cont'd)

Disassembly (Cont'd)

Remove the shaft nut **[A]**.

NOTE: Use a hot air blower to heat the nut. When the nut was installed, LOCTITE #640 was used on the threads, do not bend the shaft when removing the nut.

Heat the compressor wheel to a maximum temperature of 130°F. (55°C.) using a hot air blower **[B]**.

Protect the rotor threads from overheating.

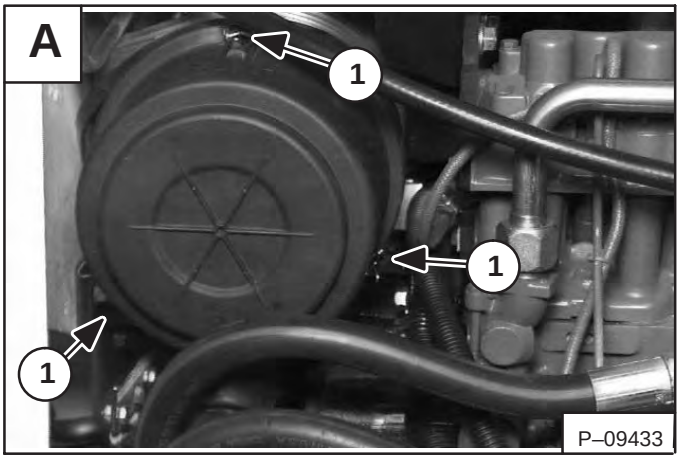
POSITIVE CRANKCASE VENTILATION SYSTEM (S/N 514115365 & Below; 514213009 & Below) (Cont'd)

Module Removal And Installation

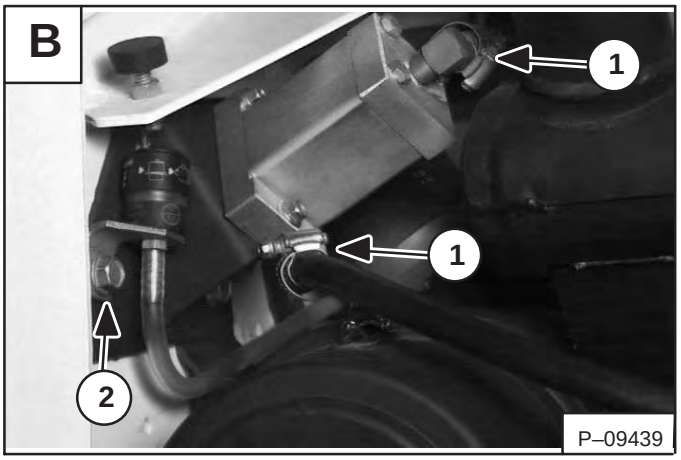
Release the three dust cover clips (Item 1) **[A]**.

Remove the dust cover.

Remove both filter elements.



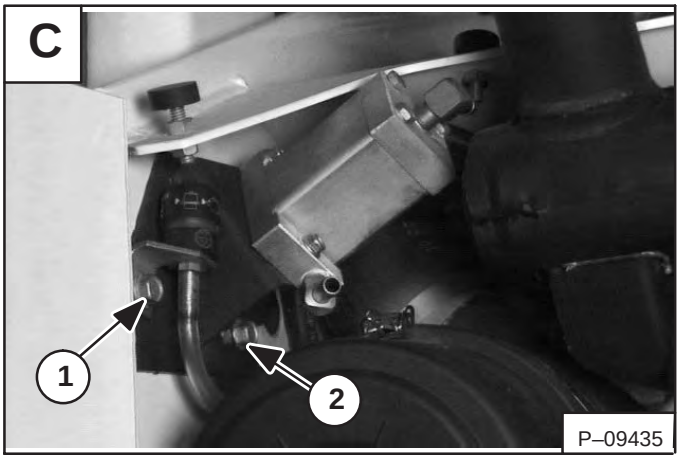
Loosen the hose clamps (Item 1) **[B]** and disconnect the hoses from module.



Loaders without BOSS: Remove the indicator bracket bolt (Item 1) **[C]**.

Loosen the bolt (Item 2) **[C]**. Slide the module rearward and remove from the loader.

NOTE: The module mounting bracket is slotted to allow removal or installation of module without removing air cleaner housing mount bolts.



Troubleshooting Guide (Cont'd)

The following troubleshooting guide is provided for assistance in locating and correcting BICS system problems It is recommended that these procedures be done by authorized Bobcat Service Personnel only.

⚠ WARNING

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

W–2004–1285

SEAT SENSOR

PROBLEM	SOLUTION #
Seat indicator light does not come ON with operator in seat.	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11
Seat indicator light stays ON when operator is out of seat.	2, 3, 6, 10, 11, 12, 13, 14
Intermittent indicator light during operation.	11, 15, 16, 17, 18

SOLUTION SUGGESTIONS

1. Check to make sure power indicator light is ON.
2. Check for debris under and around seat.
3. Look for any obstruction around seat.
4. Check to make sure seat rail lowers when weight is in seat.
5. Raise cab and check for magnet collar movement when weight is added to seat. (Magnet collar should extend approximately 3/8 inch (9,5 mm) beyond the sensor assembly with weight in the seat).
6. Use sensor tester to check operation of sensor and controller. Follow instructions on tester.
7. Check to make sure the magnet guide pin is in place.
8. Check for contamination on magnets such as metal particles or for shipping plate over magnets.
9. Check to make sure both magnets are in collar.
10. Check for binding of magnet collar or bushing with hex head on other side for binding.
11. Check for correct mounting. One spring for standard seat. Two springs for suspension seats. Thick washers should be under front seat mounting rails on both sides.
12. Check for loose hardware mounting magnet collar. Check to make sure the magnet collar bushing is threaded on all the way so it is contacting seat rail.
13. Check to make sure seat rail raises when weight is removed from the seat.
14. Raise cab and check for magnet collar movement when weight is removed from seat. (Magnet collar should extend approximately 1/8 inch (3,2 mm) beyond the sensor assembly without weight in seat).
15. With smaller operators that operate with the seat forward some mounting alterations may be required. (See solution suggestions 16, 17 and 18.)
16. Adjust suspension seat to lightest weight setting.
17. Check to make sure the seat rails move up and down freely when weight is added.
18. Add washer between the bushing and the magnet collar assembly which slides on and the seat rail. This will reduce the amount of seat travel required to activate the system. **Must check**, with seat moved all the way back, that indicator light does not stay on with operator out of seat. If light does not go out with operator out of the seat, the washer must be removed.

BOSS® DIAGNOSTIC TOOL

Procedure

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

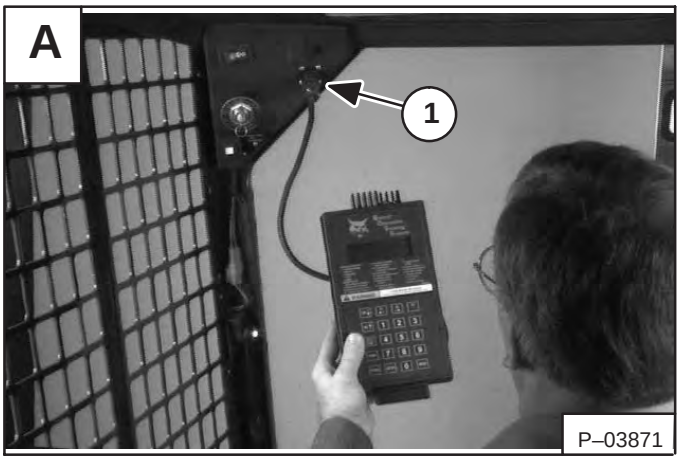
MEL1400 – Diagnostic Tool

Stop the engine.

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

Remove the dust cap from the diagnostic connector plug. Connect the diagnostic tool plug (Item 1) **[A]** into the loader connector.

Use the instructions from the BOSS Operation & Maintenance Manual to make service checks of BOSS system operating unit and other components **[A]**.

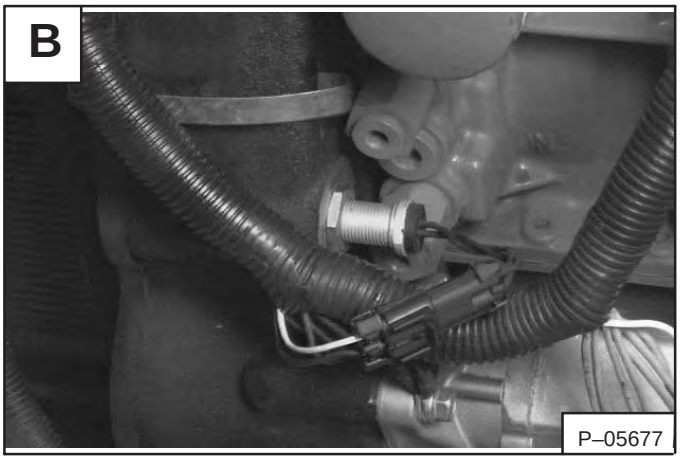


SENDER AND SENSOR

Service Checks

Use the following information when checking the senders and sensor with a volt/ohmmeter:

Components	Value
TEMPERATURE SENDER	
75° F. (24° C.)	1075 ± 60 ohms
100° F. (33° C.)	1198 ± 30 ohms
ENGINE OIL PRESSURE SENDER	
5 PSI (34 kPa)	3 ohms Max.
6 PSI (41 kPa)	5–15 ohms Min.
50 PSI (345 kPa)	34–53 ohms
100 PSI (690 kPa)	64–90 ohms
TRANSMISSION CHARGE PRESSURE SENDER	
0 PSI	0–5 ohms
400 PSI (2758 kPa)	90 ohms
FUEL SENDER	
Full	30 ohms
Empty	270 ohms



RPM SENSOR

Adjustment

Continuity Resistance of 3000–3500 ohms.

Disconnect the connector **[B]** from the engine harness.

Loosen the jam nut (Item 1) **[B]** on the RPM sensor.

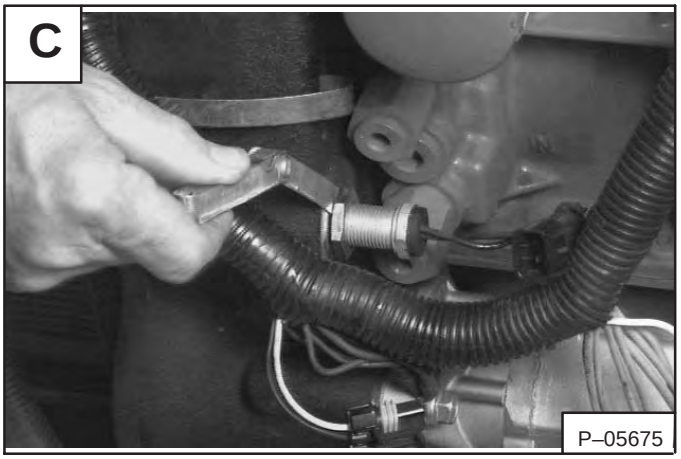
Turn the RPM sensor (Item 1) **[C]** in until it makes contact with the engine flywheel.

Turn the jam nut until it contacts the flywheel housing. The jam nut should not be tightened, it needs to turn with the RPM sensor when the sensor is turned back out for adjustment.

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

Retighten the jam nut.

NOTE: The plastic tip is used as a gauge to set a new RPM SENSOR. The plastic tip is designed to come off after the engine is started.



PWM CONTROL HANDLE

Handle Testing

The right side steering lever handle switch (Item 1) **[A]** controls the proportional flow to front auxiliary. Test the switch with a Ohm test meter.

Disconnect the handle switch harness from the controls harness. Use the chart below to test the handle switch.

	Handle Switch Position		
Test between handle wires	Full Left	Center	Full Right
White/Black & White	No Test	4.8–5.2 Ohms	No Test
White/Red & White	1.3–1.5 Ohms	2.6–2.8 Ohms	3.8–4.0 Ohms
White/Red & White/Black	3.8–4.0 Ohms	2.6–2.8 Ohms	1.3–1.5 Ohms

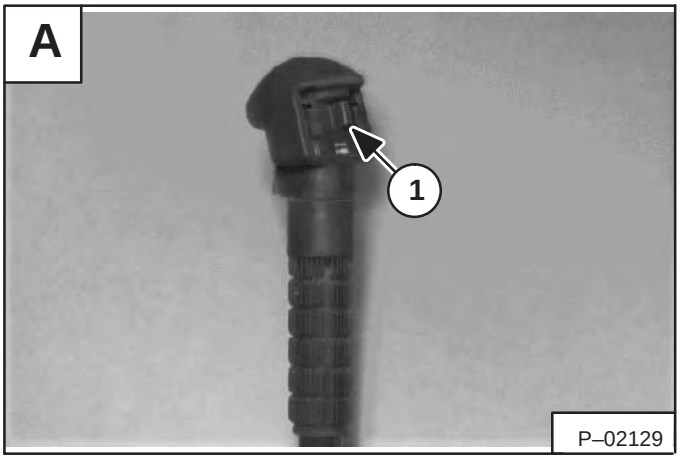
NOTE: Push the switch gradually from center to either left or right. The Ohm reading must change gradually. Replace the handle switch assembly if required.

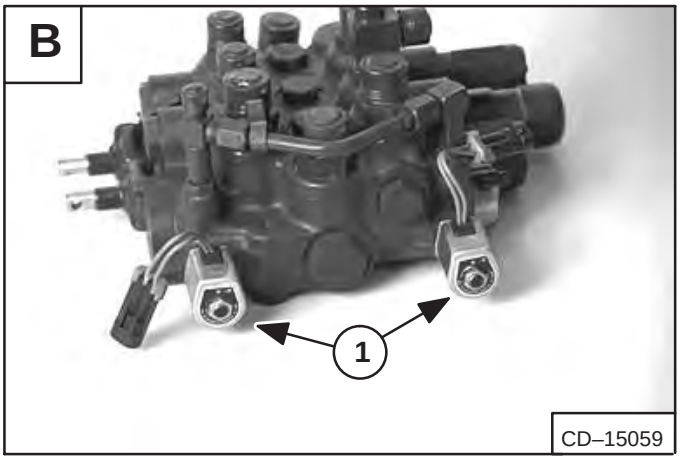
PWM ELECTRIC SOLENOID

Solenoid Coil Testing

The front auxiliary solenoid valves (Item 1) **[B]** are located in the hydraulic control valve. Test the solenoid coils with a Ohm test meter.

Disconnect the coil from the controls harness. The correct reading is 1–5 Ohms.





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

Piston and Rings

Piston Diameter	3.578 (90,93)
I.D. for Piston Pin	1.0236 + 0.0004 — 0.00016 (26,0 + 0,01 — 0,004)
Piston Pin Diameter	1.0236 – 0.0002 (26,0 – 0,005)
Piston Ring Groove – 1st	0.0787 + 0.04 — 0.0032 (2,0 + 0,10 — 0,08)
2nd	0.0787 + 0.04 — 0.0032 (2,0 + 0,10 — 0,08)
3rd	0.118 + 0.002 — 0.0008 (3,0 + 0,04 — 0,02)
Piston Ring Clearance – 1st	0.004 — 0.005 (0,09 — 0,12)
Wear Limit	0.0078 (0,2)
2nd	0.003 — 0.004 (0,07 — 0,10)
Wear Limit	0.006 (0,16)
3rd	0.0015 — 0.003 (0,04 — 0,07)
Wear Limit	0.005 (0,12)
Piston Ring Gap 1st	0.0118 — 0.019 (0,3 — 0,5)
2nd	0.0315 — 0.041 (0,8 — 1,05)
3rd	0.018 — 0.028 (0,45 — 0,7)
Bore for Piston Pin Bushing	1.14 + 0.0008 (29,0 + 0,02)
Piston Pin Bushing O.D.	1.299 + 0.004–0.002 (33,0+–0.006)
Piston Pin Bushing I.D. (pressed in)	1.81 + 0.0014–0.00098 (30,0+0,035–0,025)
Piston Pin Clearance	0.0009 — 0.0016 (0,025 — 0,04)
Wear Limit	0.0031 (0,08)

Connecting Rod

Small End Bushing	1.181+0.00013 — +0.000010 (30,0+0,0035 — +0,0025)
Wear Limit	0.003 (0,08)
Bore for Small End Bushing	1.299 +0.0008 (33,0 + 0,02)
O.D. for Small Eng Bushing	1.299 +0.0043 — +0.0028 (33,0 + 0,110 — +0.070)
Parallel Check	Tolerance over a distance of 3.937 (100) is 0.0039 (0,10)
Alignment	0.002 (0,05)
Connecting Rod Width	1.063 – 0.0023 (27,0 – 0,06)
Connecting Rod End Play	0.0078 – 0.022 (0,2 – 0,56)
Wear Limit	0.0315 (0,8)
Center Distance From Small to Large Bore	6.811 ± 0.0012 (173,0 ± 0,03)
Bore for Large End Bearing	2.303 + 0.0008 (58,5 + 0,02)
Large End Bearing Shells I.D.	2.166 — 2.167 (55,004 — 55,04)
Limit for Undersize	2.146 — 2.147 (54,504 — 54,54)
Large End Bearing Radial Clearance	0.0009 — 0.003 (0,024 — 0,078)
Wear Limit	0.005 (0,12)
Large End Bearing Width	1.008 – 0.012 (25,6 – 0,3)

Cylinder Head and Block

Cylinder Head Studs – Length	7.23 ± 0.031 (185,0 ± 0,8)
Cylinder Bore	3.583 + 0.0008 (91,0 + 0,02)
Wear Limit	0.004 (0,1)

HYDRAULIC CONNECTION SPECIFICATIONS

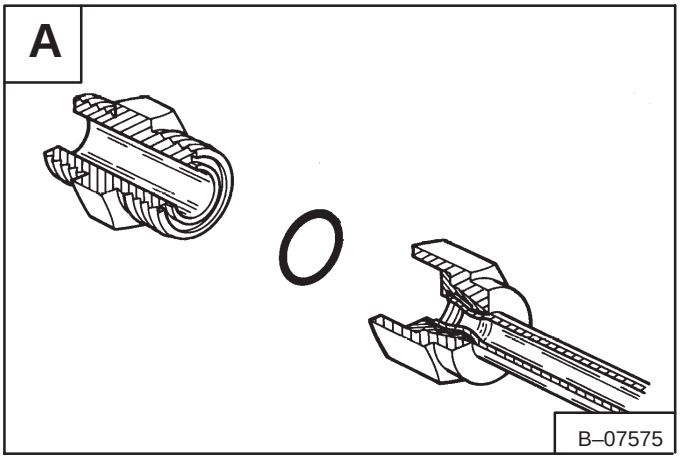
IMPORTANT

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

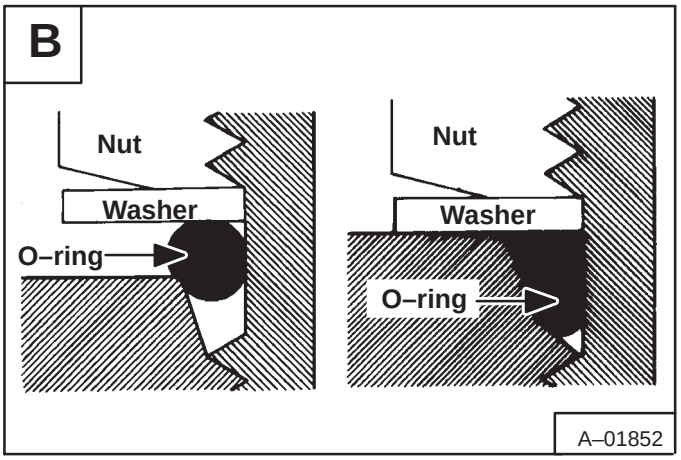
O–ring Face Seal Connection

When the fitting is tightened, you can *feel* when the fitting is tight to eliminate leakage caused by under or over torqued fittings. Use vaseline petroleum jelly to hold the O–ring in position until the fittings are assembled **[A]**.



Straight Thread O–ring Fitting

Lubricate the O–ring before installing the fitting. Loosen the jam nut and install the fitting. Tighten the jam nut until the washer is tight against the surface **[B]**.



Tubelines And Hoses

Replace any tubelines that are bent or flattened. They will restrict flow, which will slow hydraulic action and cause heat.

Replace hoses which show signs of wear, damage or weather cracked rubber.

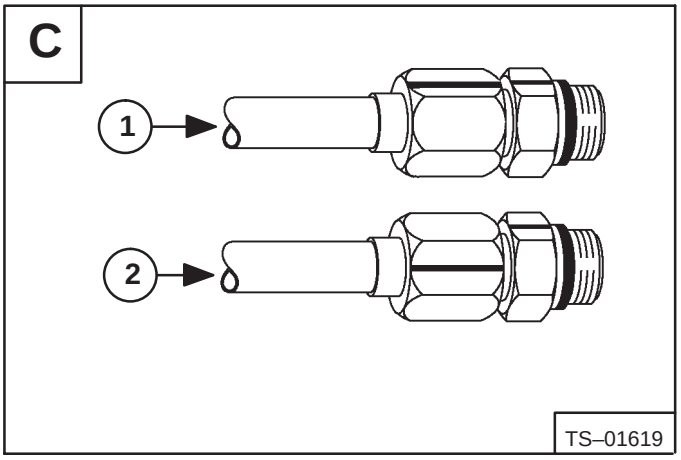
Always use two wrenches when loosening and tightening hose or tubeline fittings.

Flare Fitting

Use the following procedure to tighten the flare fitting:

Tighten the nut until it makes contact with the seat. Make a mark across the *flats* of both the male and female parts of the connection (Item 1) **[C]**.

Use the chart below to find the correct tightness needed (Item 2) **[C]**. If the fitting leaks after tightening, disconnect it and inspect the seat area for damage.



Flare Fitting Tightening Torque

Wrench Size	Tubeline Outside Diameter	Thread Size	TORQUE Ft.–lbs. (Nm)	NEW Rotate No. of Hex Flats	RE–ASSEMBLY Rotate No. of Hex Flats
5/8”	5/16”	1/2” – 20	17 (23)	2–1/2	1
11/16”	3/8”	9/16” – 18	22 (30)	2	1
7/8”	1/2”	3/4” – 16	40 (54)	2	1
1”	5/8”	7/8” – 14	60 (81)	1–1/2	1
1–1/4”	3/4”	1–1/16” – 12	84 (114)	1	3/4
1–3/8”	1”	1–5/16” – 12	118 (160)	3/4	3/4

873 WITHOUT BOSS - WIRING SCHEMATIC

WITH ADVANCED HAND CONTROL OPTION
514116781-22813
(Printed January 1999)

ADVANCED HAND CONTROLS HARNESS - 6710418

BICS CONTROLLER HARNESS - 6713932

MAINFRAME CONTROLLER HARNESS - 6712523

CAB HARNESS (WITHOUT BOSS) - 6711767

FILTER HARNESS (WITHOUT BOSS) - 6710364

REAR LIGHT HARNESS - 6714350

ENGINE HARNESS (WITHOUT BOSS) - 6715947

FUSE BLOCK

WIRES CONNECT BY LETTER ACROSS CONNECTORS

SOME CONNECTOR BODIES NOT SHOWN FOR DRAWING CLARITY

MC2444 (1-7-99)

HANDLE CONTROL UNIT TEST

Procedure

Right Handle Test With Test Harness;

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

Connect the remote start switch. (See Page 1–1.)

The test harness (MEL1555) and a digital multimeter are necessary to complete the following procedure.

Disconnect the handle control harness (Item 1) **[A]**.

Install the test harness (Item 1) **[B]**.

Move handle to the neutral position.

Turn the key to the ON position with the engine OFF.

With a digital multimeter take a voltage reading at the four prong terminal connector (Item 2) **[B]**.

The sensor supply voltage between ground, terminal ***1*** and terminal ***3*** **[C]** should be 4.3 ± 0.1 volts.

The signal voltage reading between the ground, terminal ***1*** and terminal ***2*** **[C]** should be 1.7 to 2.1 volts.

NOTE: Terminal *4* [C] is an open terminal not used at this time.

Right Handle Test Without Test Harness;

A digital multimeter is necessary to complete this test.

For the switch handle harness connector color code. (See Page 10–24.)

The test must be run at the eight pin switch handle connector (Item 1) **[A].** The wiring harness connectors must remain connected to complete this test.

Check the sensor supply voltage (4.3 ± 0.1 volts) between terminal ***G*** (Pink/Black) and terminal ***F*** (Pink/Red).

Check the signal voltage between terminal ***G*** (Pink/Black) and terminal ***H*** (Pink/Green). The voltage should be between 1.7 to 2.1 volts.

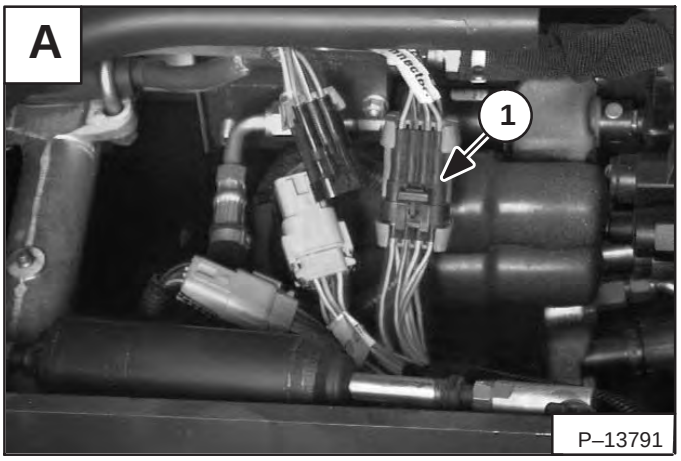
Diagnosis Results for both Tests;

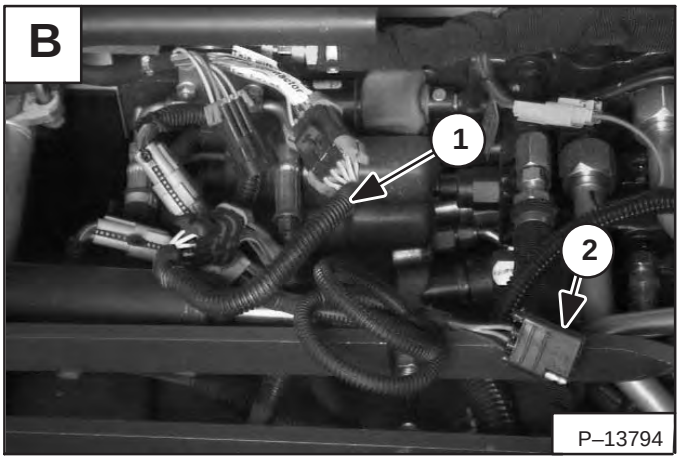
If the sensor supply voltage is 4.3 ± 0.1 volts, continue on and check the signal voltage.

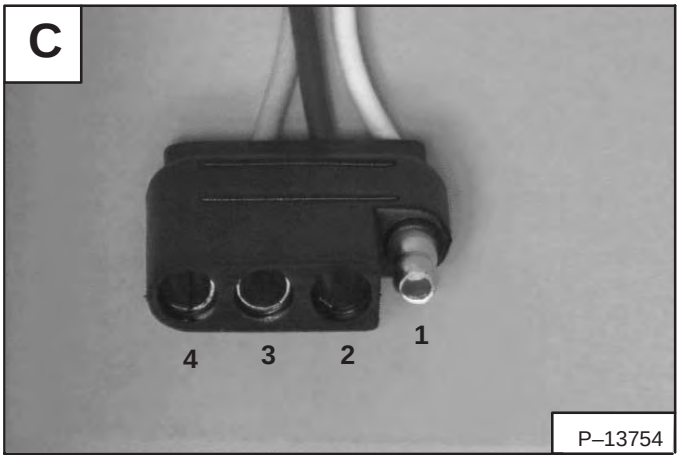
If the sensor supply voltage is less than 4.3 ± 0.1 volts or 0 volts, check the PWM fuse, check for shorts or opens in the wiring harness. If there are no apparent shorts or opens change the AHC/PWM controller. (See Page 10–15.)

If the sensor supply voltage is more than 4.3 ± 0.1 volts check for a short to a power wire in the wiring harness. If there are no apparent shorts, change the AHC/PWM controller. (See Page 10–15.)

If the signal voltage is in the range of 1.7 to 2.1 volts the system is functioning properly. The nominal voltage reading is 1.89 volts. If the signal voltage is not in the range of 1.7 to 2.1 volts change the handle controller.





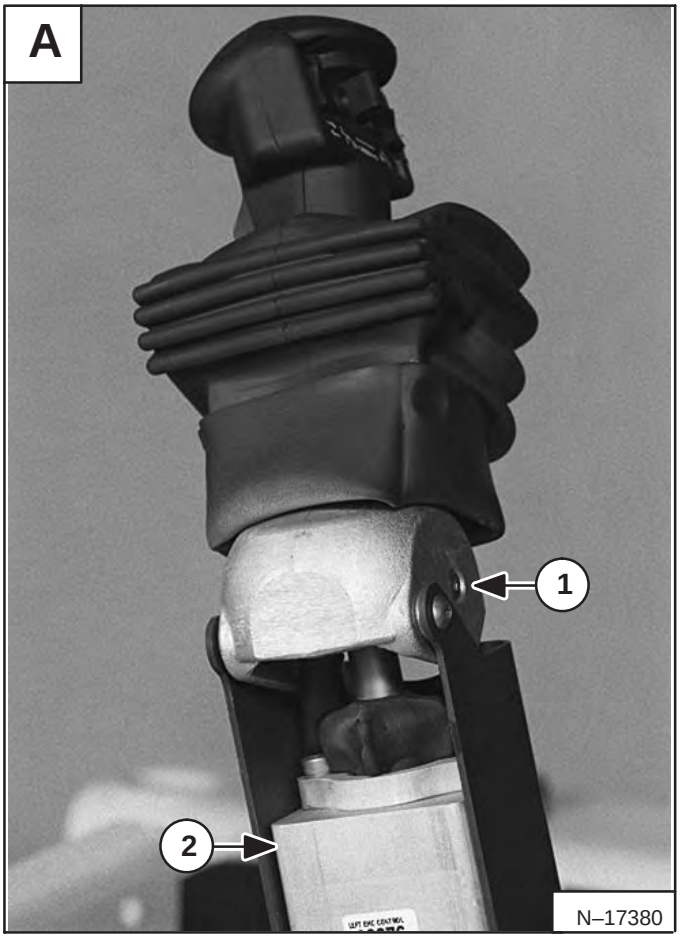


HANDLE CONTROL UNIT (Cont'd)

Removal And Installation (Cont'd)

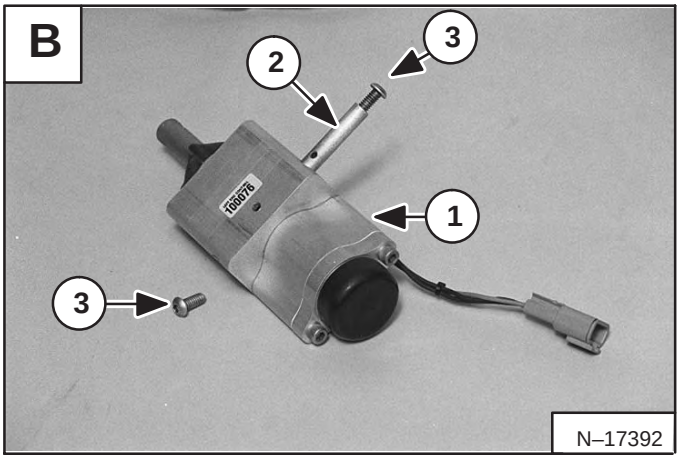
Remove the mounting bolt and nut (Item 1) **[A]** from the control handle and shaft.

Remove the control unit (Item 2) **[A]** from the control handle.

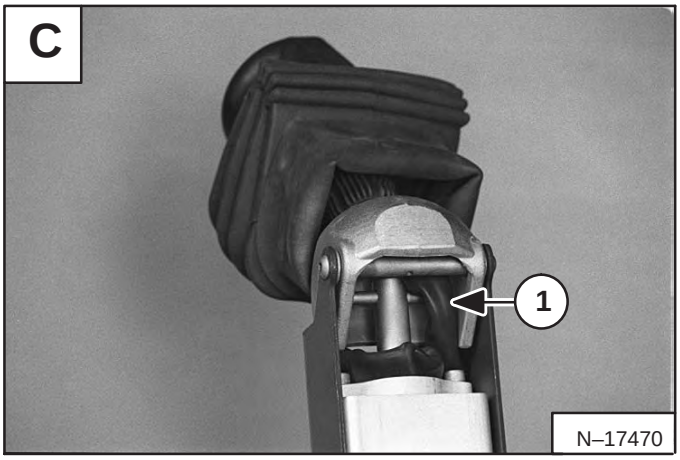


NOTE: The control unit (Item 1) [B] can only be replaced as a complete assembly.

Check the spacer (Item 2) **[B]** and screws (Item 3) **[B]** and replace as needed.



Installation: When installing the control unit into the steering handle, check the routing of the switch handle wire harness (Item 1) **[C]** to assure proper return of the control handle to neutral.



ACTUATORS (Cont'd)

Mounting Plate

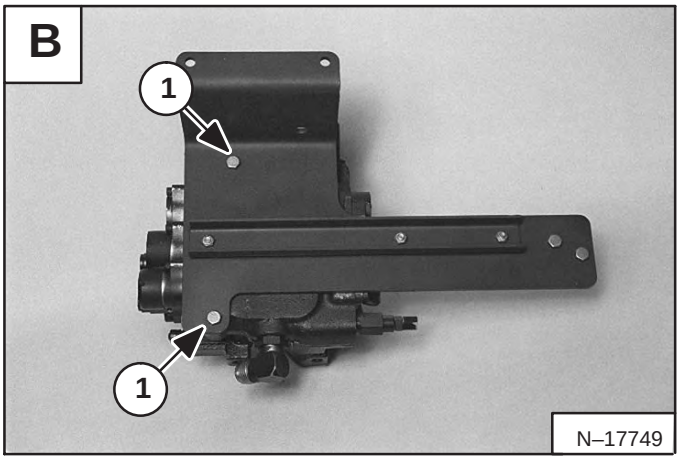
To remove and install the control valve/actuator mounting plate, use the following procedure:

Remove the actuators and actuator mounting blocking from the mounting plate. (See Page 10–29.)

Support the control valve with a chain hoist **[A]**.

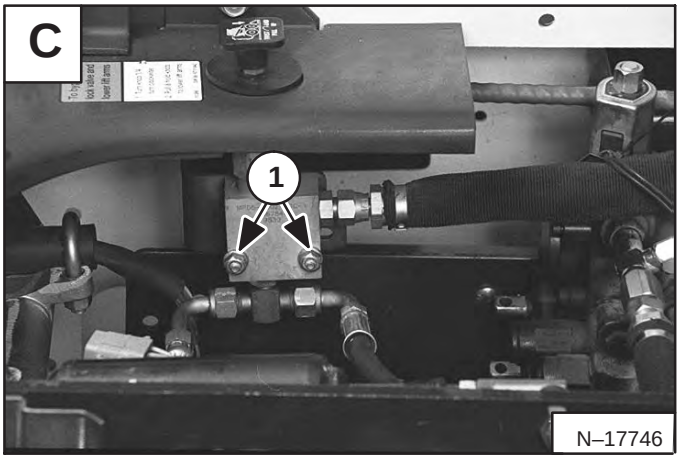
At the right side motor cover hole, remove the two control valve mounting bolts (Item 1) **[B]**.

Installation: Tighten the two 3/8 x 1–1/4 inch mounting bolts to 30 ft.–lbs. (40,7 Nm) torque.



Remove the two nuts (Item 1) **[C]** from the lift lock mounting bolts, and remove the bolts from the lift lock and the lift lock mount bracket.

Installation: Tighten the mounting bolts to 180–200 in.–lbs. (21–23 Nm) torque.



At the right fender remove the two mounting bolts (Item 1) **[D]** from the lift lock valve mounting bracket.

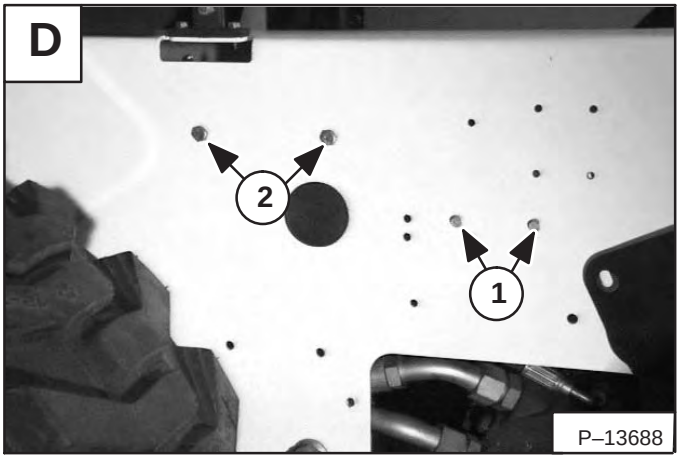
Installation: Tighten the mounting bolts to 25–30 ft.–lbs. (34–41 Nm) torque.

Remove the lift lock valve mount bracket through the right side motor cover hole.

Remove the mounting bolts (Item 2) **[D]** from the control valve/actuator mount plate.

Installation: Tighten the mounting bolts to 25–30 ft.–lbs. (34–41 Nm) torque.

Remove the control valve/actuator mounting plate through the right side motor cover hole.

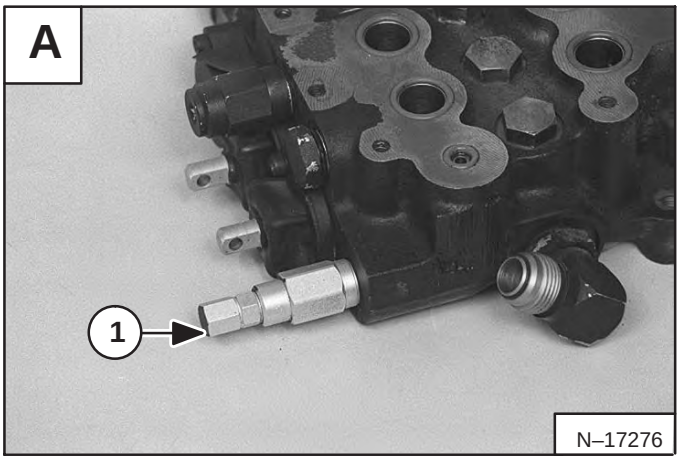


HYDRAULIC CONTROL VALVE (Cont'd)

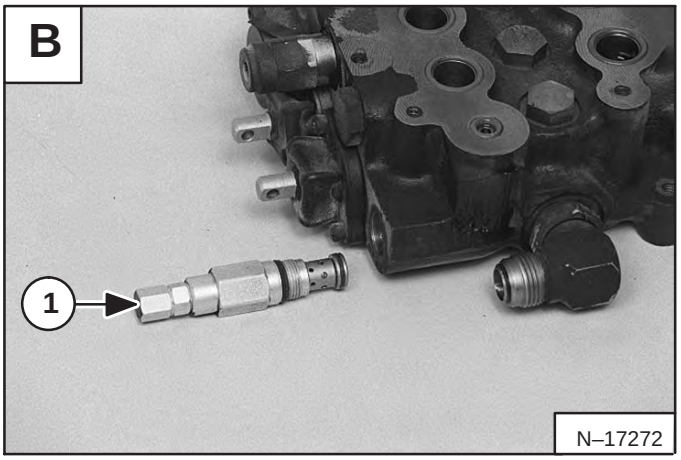
Main Relief Valve

Loosen the main relief valve (Item 1) **[A]**.

Installation: Tighten the main relief to 35–40 ft.–lbs.. (47–54 Nm) torque.



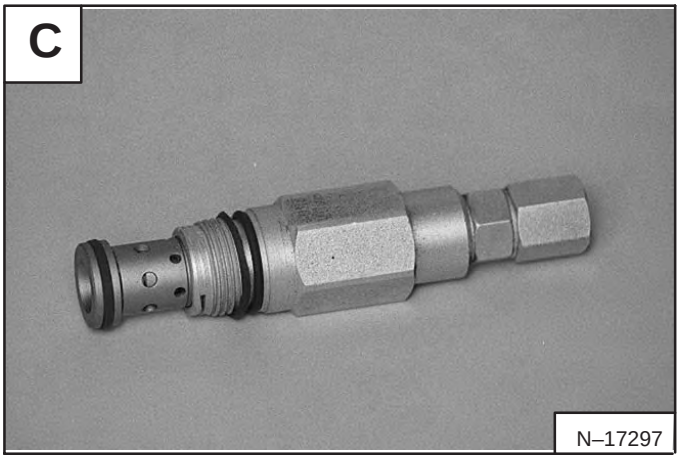
Remove the main relief valve (Item 1) **[B]** from the control valve.



Remove the O–rings, sleeve, and glide ring from the main relief valve **[C]**.

Installation*:* Always use new O–rings. sleeve, and glide ring.

NOTE: See Page 2–1 for setting the pressure at the main relief valve after the control valve is installed in the loader.

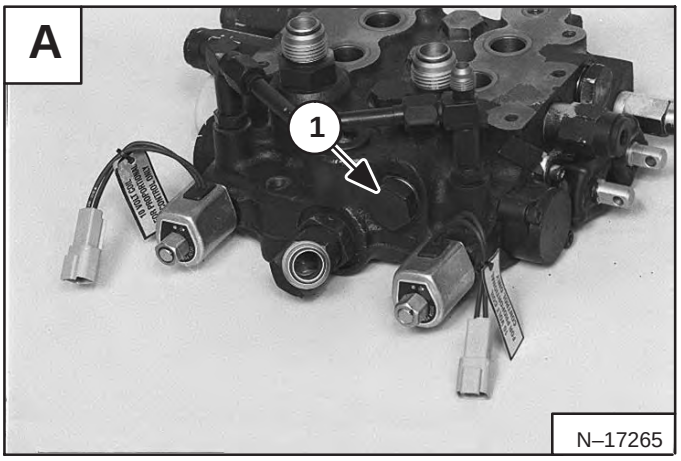


HYDRAULIC CONTROL VALVE (Cont'd)

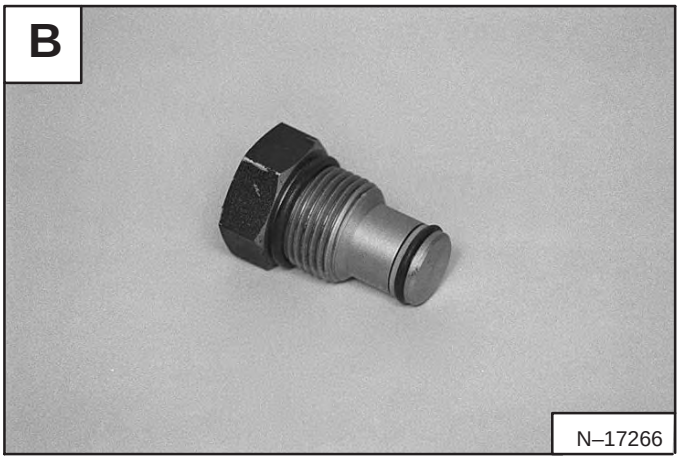
H–Port Auxiliary Section

Loosen the plug (Item 1) **[A]**.

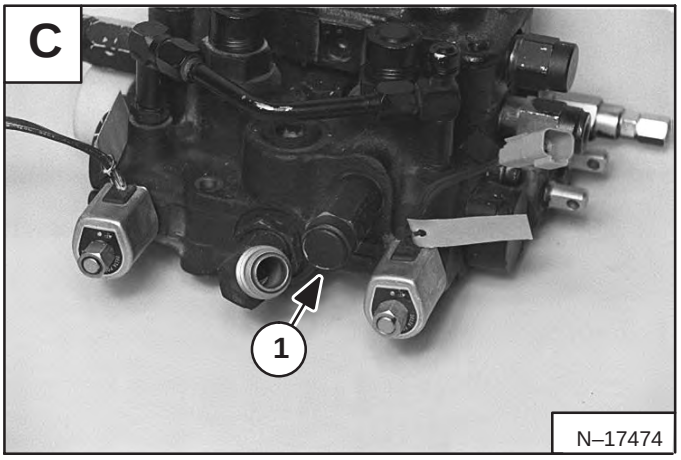
Installation: Tighten the plug to 35–40 ft.–lbs. (47–54 Nm) torque.



Remove the plug from the control valve **[B]**.



Depending on the application of the auxiliaries, the control valve may be equipped with a port relief valve (Item 1) **[C]**.



If so equipped, remove the port relief from the control valve **[D]**.

Installation: Replace the O–rings and back–up washers. Tighten the port relief valve 35–40 ft.–lbs. (47–54 Nm) torque.

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