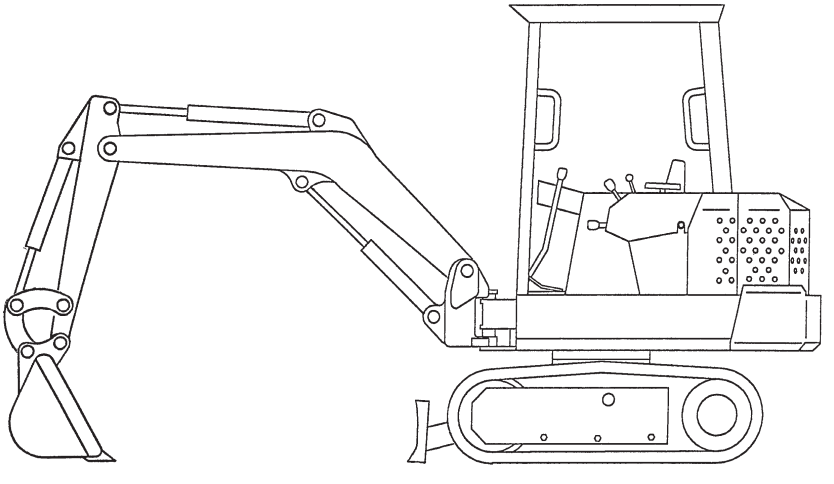
X 225

Excavator

Service Manual

(S/N 508312000 & Above)



MELROE
INGERSOLL-RAND

bobcat®

6720874 (1–91)

Printed in U.S.A.

MAINTENANCE SAFETY

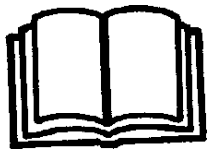
⚠ WARNING

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

W-2003-0903

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

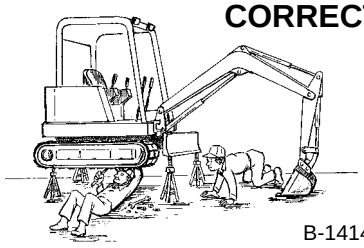
CORRECT



B-10731a

Never service the Bobcat Hydraulic Excavator without instructions.

CORRECT

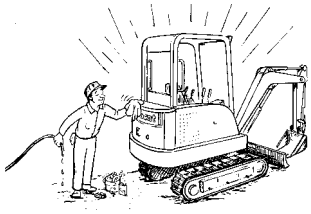


B-14148

Use the correct procedure to lift and support the excavator.

Always lift the blade fully before installing jackstands.

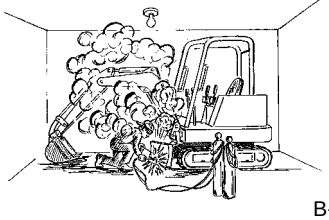
CORRECT



B-14142

Cleaning and maintenance are required daily.

WRONG

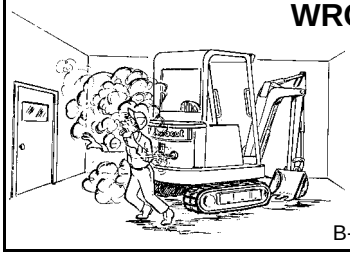


B-14147

Have good ventilation when welding or grinding painted parts.

Wear dust mask when grinding painted parts. Toxic dust and gas can be produced.

WRONG

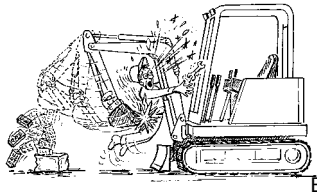


B-14141

Vent exhaust to outside when engine must be run for service.

Exhaust system must be tightly sealed. Exhaust Fumes can kill without warning.

WRONG

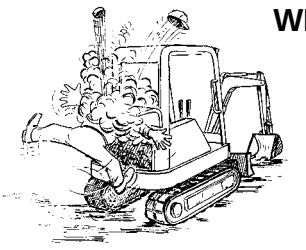


B-14145

Always lower the bucket and blade to the ground before doing any maintenance.

Never modify equipment or add attachments not approved by Bobcat Company.

WRONG



B-14146

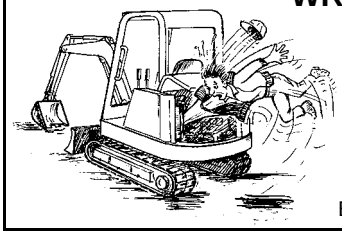
Stop, cool and clean engine of flammable materials before checking fluids.

Never service or adjust machine with the engine running unless instructed to do so in the manual.

Avoid contact with leaking hydraulic fluid or diesel fuel under pressure. It can penetrate the skin or eyes.

Never fill fuel tank with engine running, while smoking or when near open flame.

WRONG



B-14143

Keep body, jewelry and clothing away from moving parts, electrical contact, hot parts and exhaust.

Wear eye protection to guard from battery acid, compressed springs, fluids under pressure and flying debris when engines are running or tools are used. Use eye protection approved for type of welding.

Keep rear door closed except for service. Close and latch door before operating the excavator.

WRONG

B-6589

Lead-acid batteries produce flammable and explosive gases.

Keep arcs, sparks, flames and lighted tobacco away from batteries.

Batteries contain acid which burns eyes or skin on contact. Wear protective clothing. If acid contacts body, flush well with water. For eye contact flush well and get immediate medical attention.

Maintenance procedures which are given in the Operation & Maintenance Manual can be performed by the owner/operator without any specific technical training. Maintenance procedures which are **not** in the Operation & Maintenance Manual must be performed **ONLY BY QUALIFIED BOBCAT SERVICE PERSONNEL. Always use genuine Bobcat replacement parts.** The Service Safety Training Course is available from your Bobcat dealer.

MSW20-0805

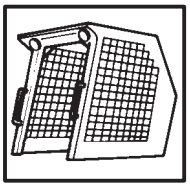
CONTENTS

FOREWORD

This manual is for the Bobcat hydraulic excavator mechanic. It provides necessary servicing and adjustment procedures for the hydraulic excavator and its component parts and systems. Refer to the Operation & Maintenance Manual for operating instructions, starting procedure, daily checks, etc.

A general inspection of the following items must be made after the hydraulic excavator has had service or repair:

1. Check that the ROPS/FOPS (Including sidescreens) is in good condition and is not modified.



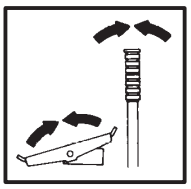
2. Check that ROPS mounting hardware is tightened and is Melroe approved.

3. The seat belt must be correctly installed, functional and in good condition.

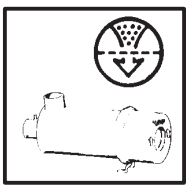
4. Inspect for loose or broken parts or connections.

5. Machine signs must be legible and in the correct location.

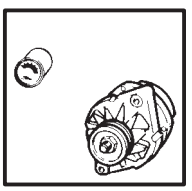
6. Steering levers, control levers and foot pedals must return to neutral. Check that foot pedals lock and control lever locks are in working condition.



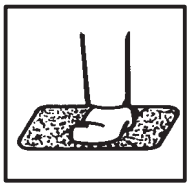
7. Inspect the air cleaner for damage or leaks. Check the condition of the element.



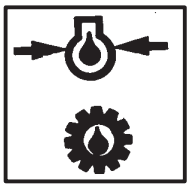
8. Check the electrical charging system.



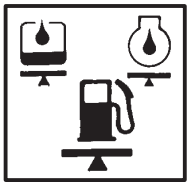
9. Safety treads must in good condition.



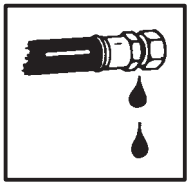
10. Check for correct function of indicator lamps (Optional on some models).



11. Check hydraulic fluid level, engine oil level and fuel supply.

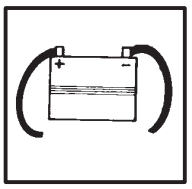


12. Inspect for fuel, oil or hydraulic fluid leaks.

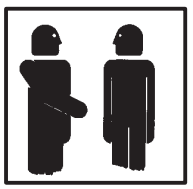


13. Lubricate the loader.

14. Check the condition of the battery and cables.



Recommend to the owner that all necessary corrections be made before the machine is returned to service.



SAFETY INSTRUCTIONS

⚠ WARNING

Instructions are necessary before operating or servicing machine. Read 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–2003–1289

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 Excavator dealer.
- The excavator 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 Excavator dealer.
- The CIMA Safety Manual delivered with the excavator gives information for safe operating and standard signals.
- The Service Manual and Parts Manual are available from your dealer for use by mechanics to do shop–type service and repair work.

⚠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

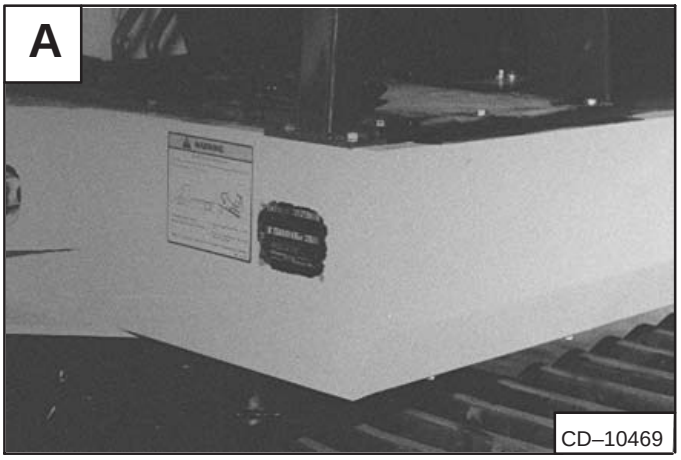
Safety Alert Symbol: This Safety Symbol is used for important safety messages. When you see this symbol follow the safety message to avoid personal injury or death.

SERIAL NUMBER LOCATIONS

Always use the serial number of the loader when requesting service information or when ordering parts. Early or later models (identification made by serial number) may use different parts, or it may be necessary to use a different procedure in doing a specific service operation.

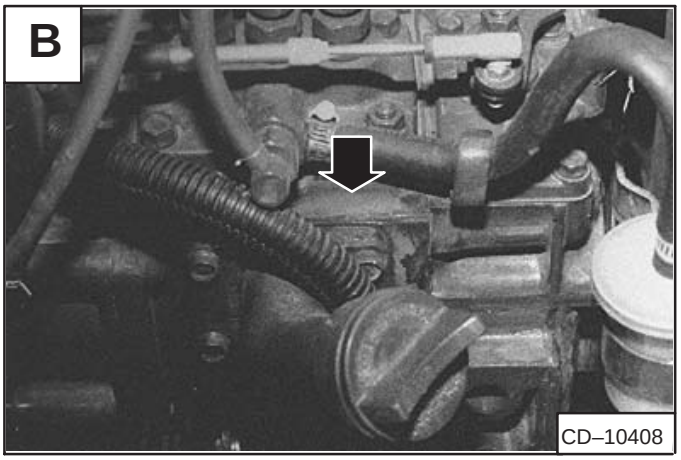
HYDRAULIC EXCAVATOR SERIAL NUMBER

The excavator serial number is on the front of the machine frame, to the left of the boom **[A]**.



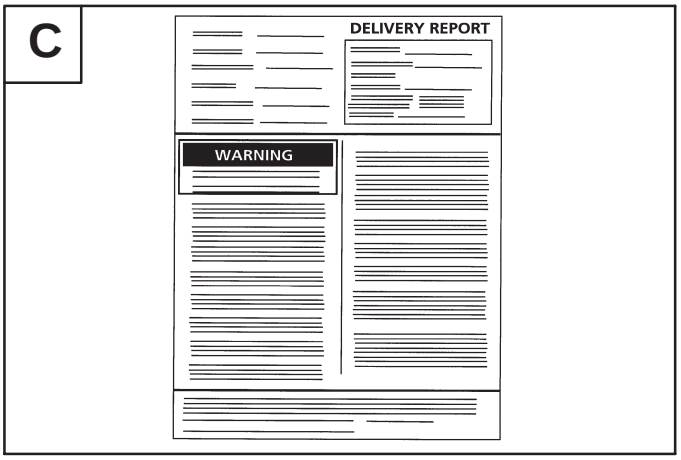
ENGINE SERIAL NUMBER

The engine serial number is located on the engine block, near the fuel injection pump **[B]**.

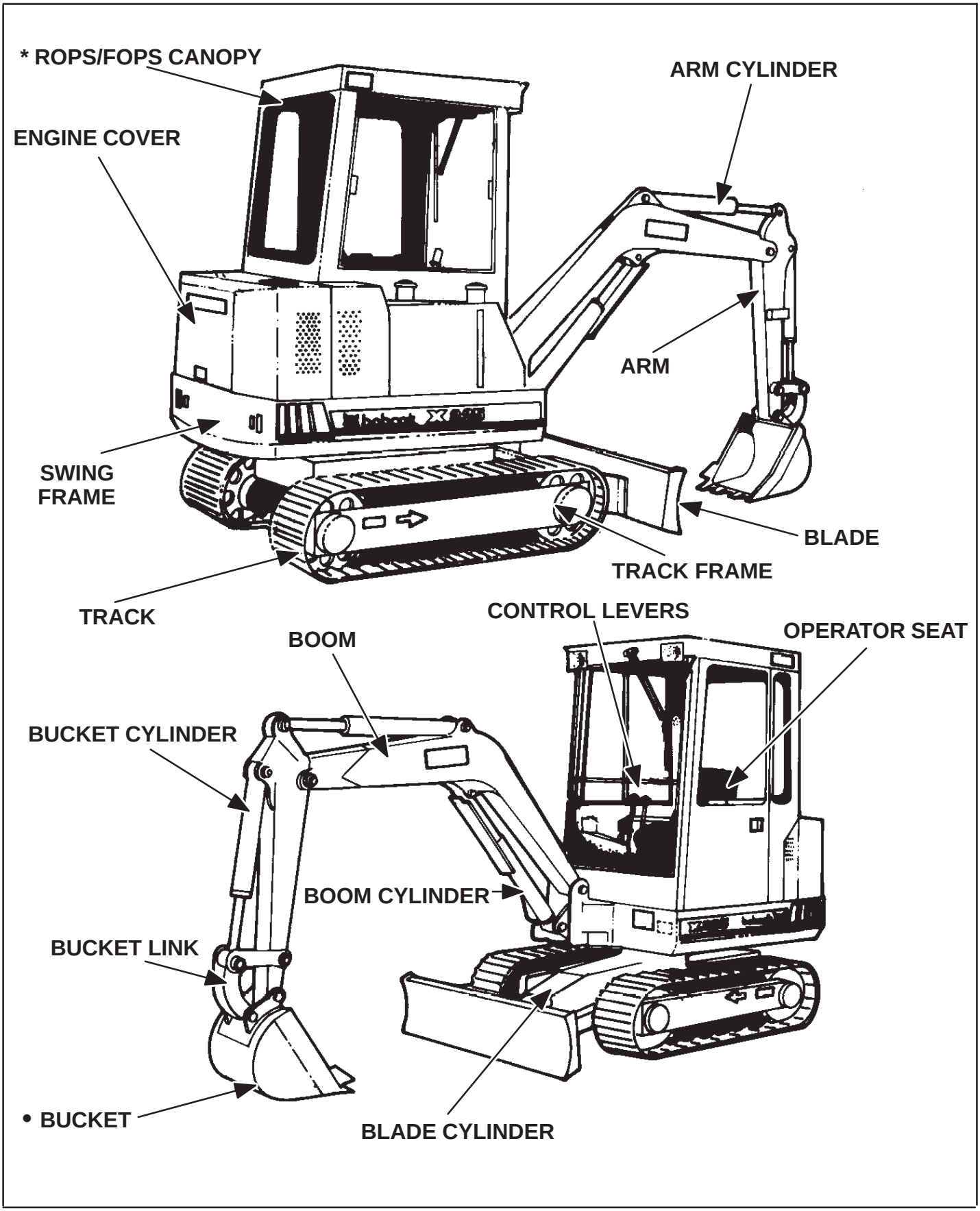


DELIVERY REPORT

The Delivery Report must be filled out by the dealer and signed by the owner or operator when the Bobcat loader is delivered. The form contents must be explained to the owner. Make sure it is filled out completely **[C]**.



HYDRAULIC EXCAVATOR IDENTIFICATION



* ROPS, FOPS – Roller–Over Protective Structure, Falling Object Protective Structure, per SAE J1040 and SAE J1043. The bobcat Excavator is base–equipped with a standard canopy as shown.

• Factory option bucket

PREVENTIVE MAINTENANCE

SERVICE SCHEDULE

Maintenance work must be done at regular intervals. Failure to do so will result in excessive wear and early failures. The service schedule is a guide for correct maintenance of the Hydraulic Excavator.

⚠ WARNING

Instructions are necessary before operating or servicing machine. Read 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–2003–0797

SERVICE SCHEDULE		HOURS					
ITEM	**SERVICE REQUIRED**	**8–10**	**50**	**100**	**250**	**500**	**■ 1000**
Engine Air Cleaner	Empty the dust cup. Replace the filter element only when the red ring shows in the indicator window. Check for leaks and damaged components.	■					
Engine Oil	Check the oil level & add oil as needed.	■					
Engine Coolant System	Check coolant level in recovery tank.	■					
Indicator Lights	Check for correct operation.	■					
Operator Cab	Check the fastening bolts, nuts, & condition of cab.	■					
Seat Belt	Check the condition & that fasteners are tight.	■					
Safety Signs (Decals)	Check for damaged signs (decals) replace as needed.	■					
Tracks	Check & adjust tension.	■					
Hydraulic Reservoir	Check fluid level.	■					
All Machinery Pivot Points	Lubricate 20 grease fittings.	■					
Fuel Tank/Fuel Filter	Drain water and sediment from fuel tank/filter.		■				
Swing Circle	Lubricate two grease fittings.		■				
Swing Pinion	Lubricate one grease fitting.		■				
Alternator Belt	Check & adjust tension.		*	■			
Engine Oil & Filter	Replace oil & filter element.		*		■		
Final Drive Case	Check fluid level & add oil as needed.				■		
Hydraulic Filter	Replace filter element.		*		■		
Fuel Filters	Replace filter elements.				■		
Battery	Check & clean cable ends & check electrolyte level.				■		
Cooling System	Clean the radiator fins.					■	
Alternator & Starter	Check the condition.					■	
Engine Valve Clearance	Check and adjust valve clearance.				**	■	
Cooling System	Drain, flush & add new coolant to the cooling system.						■
Hydraulic Tank	Change the fluid, clean fill neck strainer.						■
Final Drive Case	Change the oil.				**		■

*** After the first 50 hours of machine operation do the following:**
- **Check the condition of the alternator belt**
- **Replace the hydraulic filter**
- **Replace the engine oil and filter**

**** After the first 250 hours of machine operation do the following:**
- **Change oil in final drive case**
- **Check and adjust engine valve clearance**

■ Or every 12 months.

ENGINE COVER

Procedure

⚠ WARNING

AVOID INJURY

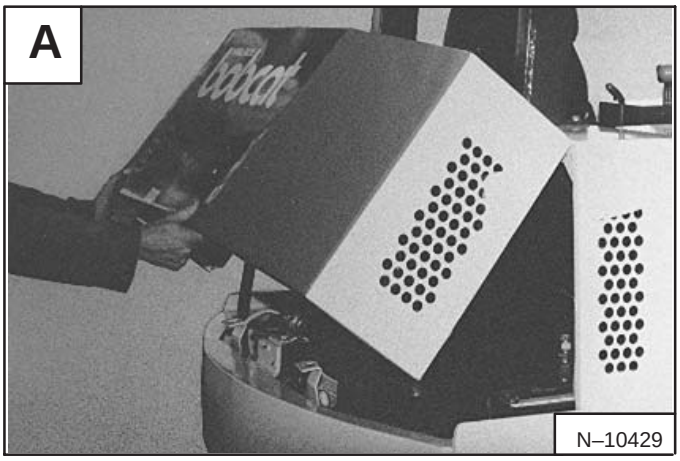
Never service or adjust the machine when the engine is running unless instructed to do so in this manual.

W–2012–0290

Keep the engine cover closed when operating the machine.

W–2141–0189

Open the engine cover to service the engine. Pull on the latch and lift the engine cover up until it is fully raised **[A]**



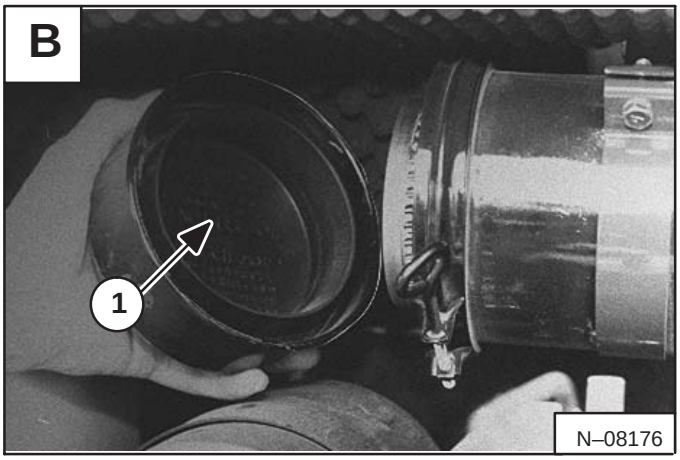
AIR CLEANER SERVICE

Replacing the Filter Element

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

Replace the filter element when the red ring shows in the window of the condition indicator.

NOTE: Push the button on the condition indicator and start the engine. If the red ring does not show, do not replace the filter element.



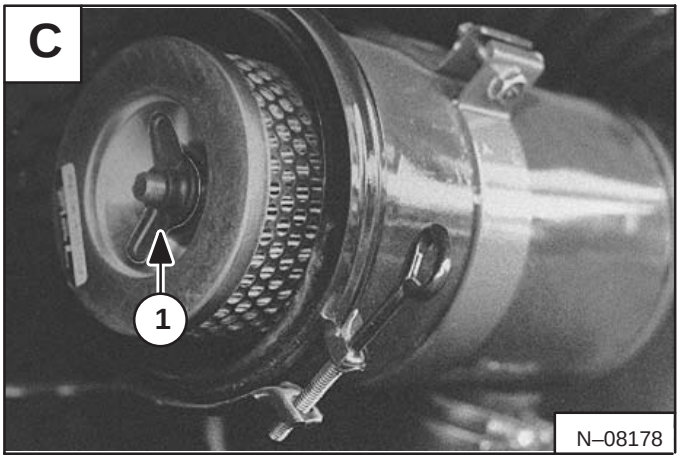
Service the air cleaner as follows:

Loosen the clamp on the dust cup.

Remove the dust cup **[B]**.

Remove the rubber cap (Item 1) **[B]** to clean the dust cup.

Remove the wing nut (Item 1) **[C]**.



Remove the filter element **[D]**.

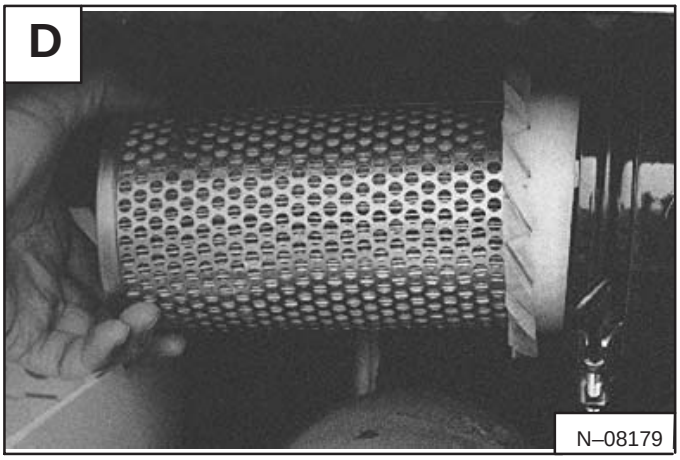
Check the air cleaner housing for damage.

Install a new filter element. Install and tighten the wing nut.

Install the dust cap so the arrow points up.

Check that all the air cleaner hose clamps are tight.

Push the button on the condition indicator so the red ring does not show.



FUEL SYSTEM

Fuel Specifications

Use Number 2 diesel fuel in the engine. During very cold temperatures, Number 1 fuel can be used.

⚠ WARNING

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

W–2063–0887

Fuel System Service

The fuel level in the tank is indicated by the fuel gauge (Item 1) **[A]** when the engine is running.

Use the key to un–lock the fuel fill door.

Turn the fill cap to remove it **[B]**.

NOTE: The fuel fill strainer can be removed for cleaning [C]. Make sure it is installed before adding fuel to the tank.

Use a clean, approved safety container to add fuel to the tank.

Add fuel only in an area that has a free movement of air and no open flames or sparks. NO SMOKING!

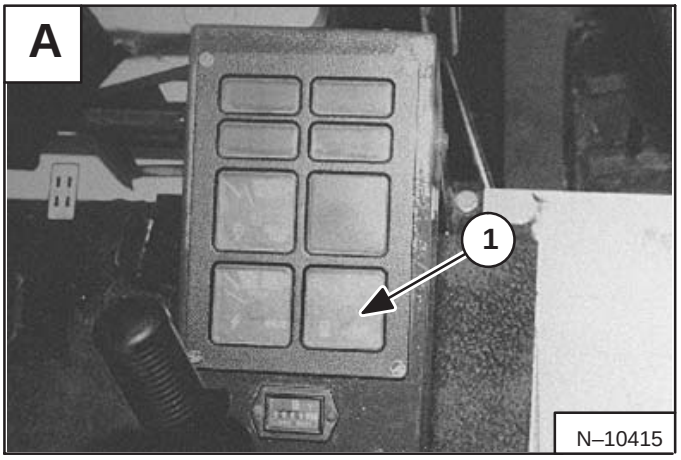
After the tank is full, install and tighten the fuel fill cap.

⚠ 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.

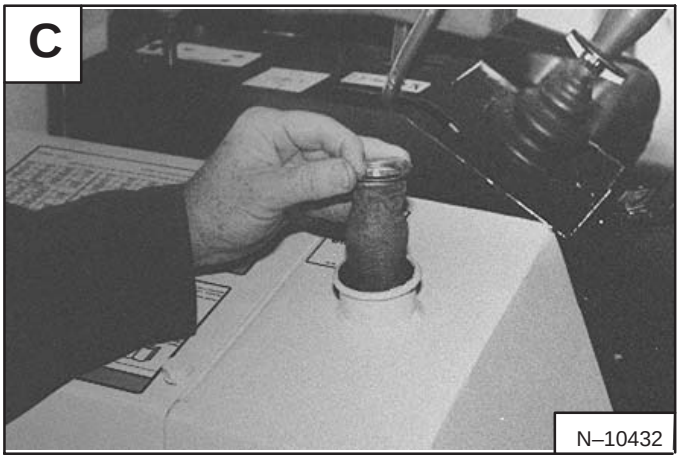
W–2103–1285

A



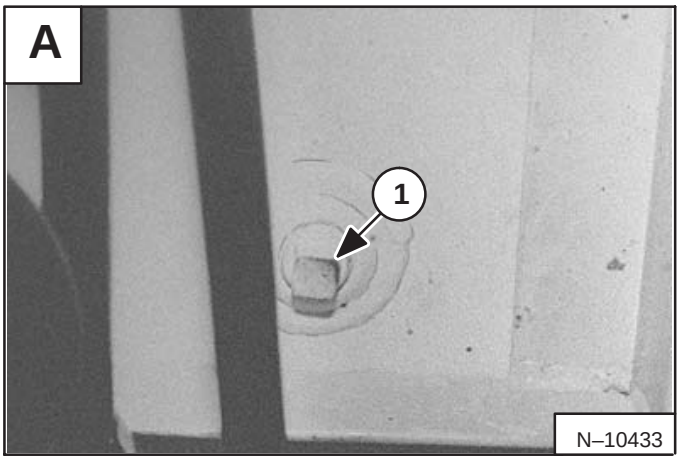
B

C



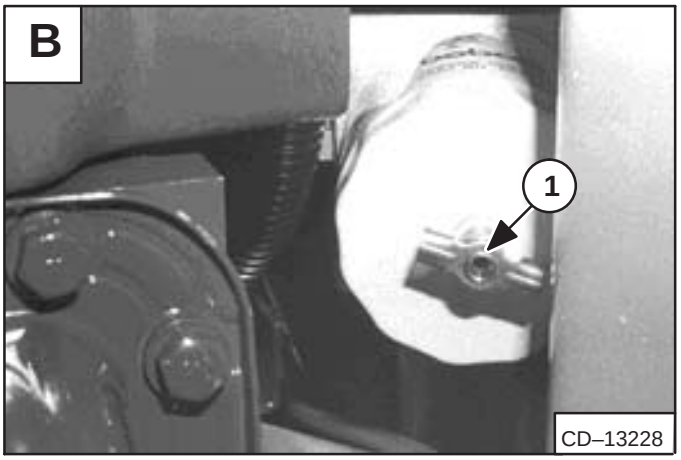
Fuel System Service (Cont'd)

To remove the water and sediment from the fuel tank, remove the drain plug (Item 1) **[A]** on the bottom of the tank.



Fuel Filters
(S/N 12648 & Above)

To remove the water from the fuel filter element, open the drain valve (Item 1) **[B]** at the bottom of the fuel filter element. When fuel, free of water emerges from the drain valve, close the drain valve.



ENGINE LUBRICATION SYSTEM

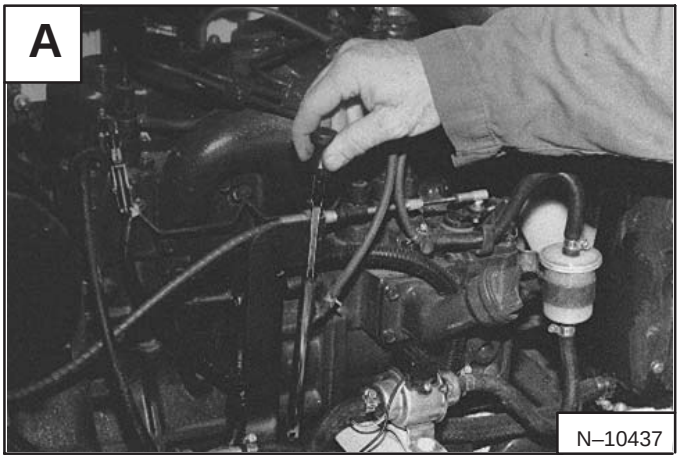
Checking the Engine Oil

Check the engine oil every day.

Stop the engine. Open the engine cover.

Remove the dipstick **[A]**.

Use a good quality motor oil that meets API Service Clarification of CE or CD. (See *FUEL, COOLANT AND LUBRICANTS* Page 8–8.)



Engine Oil and Filter Replacement

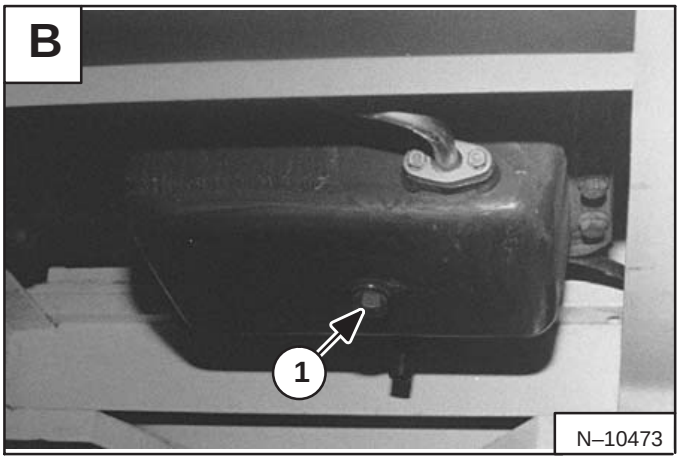
See the *SERVICE SCHEDULE* Page 1–1 for the correct service interval.

Use the following procedure to change the oil and filter:

Run the engine until it is at operating temperature.

Turn the swing frame so the engine oil can drain between the tracks. Stop the engine.

Remove the drain plug (Item 1) **[B]**. Drain the oil into a container.

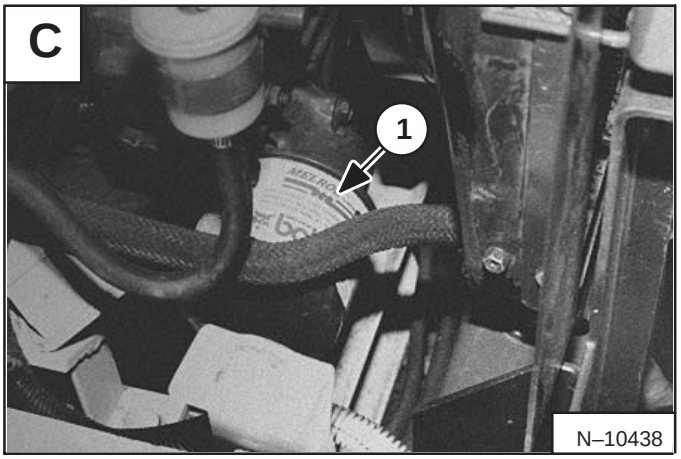


Remove the oil filter (Item 1) **[C]**, using a filter wrench.

Clean the filter housing surface. Put clean oil on the filter gasket. Install the new filter and hand tighten only.

Install and tighten the oil drain plug.

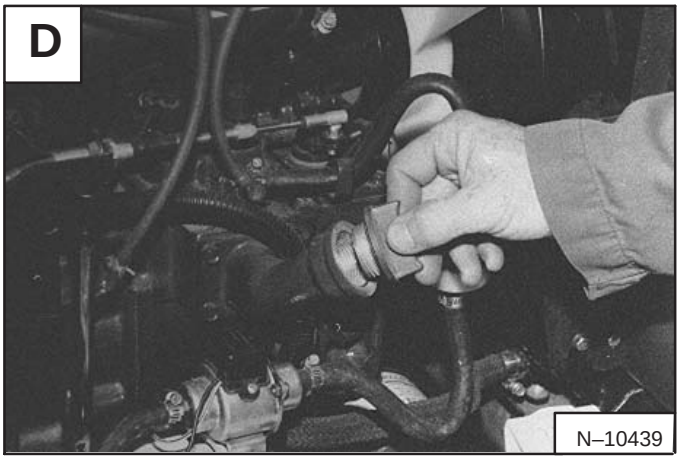
NOTE: Use only a Melroe approved oil filter. A non approved filter may not be of the quality needed to last 250 hours of engine operation, and could cause engine damage. See your Parts Manual or Microfiche for the correct part number of the oil filter.



Remove the oil fill cap **[D]**. Put oil into the engine. (See *FUEL, COOLANT AND LUBRICANTS* Page 8–8.)

Start the engine and let it run for several minutes. Stop the engine. Check for leaks at the oil filter.

Check the oil level and add oil as needed to bring it to the *top* mark on the dipstick.

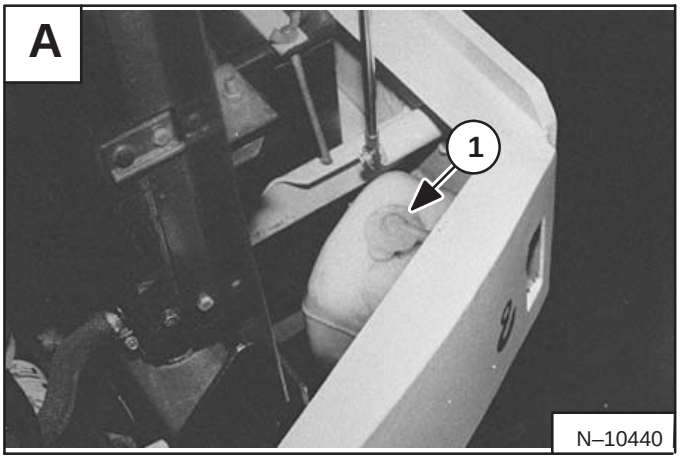


COOLING SYSTEM

Coolant Level

When the engine is cool, the coolant level in the recovery tank (Item 1) **[A]** must be half full.

If the coolant level is low, add pre–mixed coolant (50% water and 50% ethylene glycol) to the recovery tank.



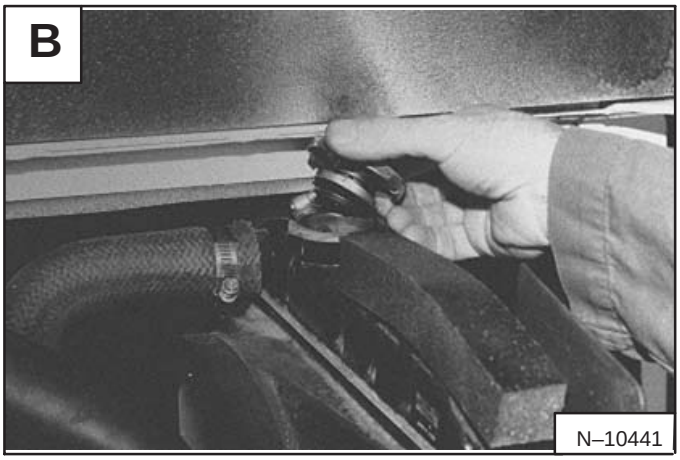
Coolant Replacement

⚠ WARNING

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

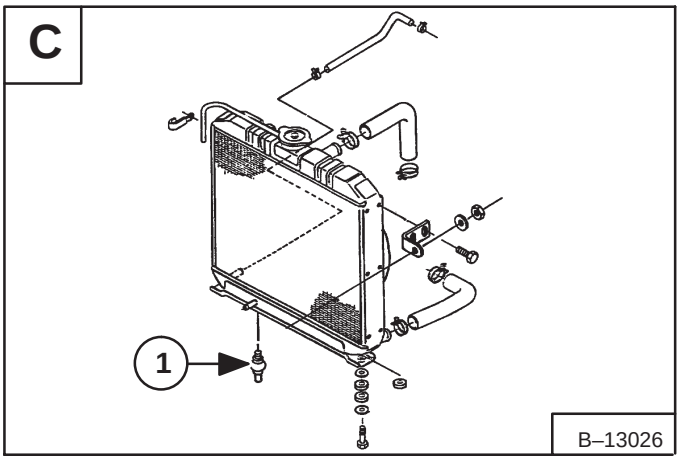
W–2070–1285

Turn the upperstructure so there is access to the engine and radiator from underneath. Stop the engine.



Loosen and remove the radiator cap **[B]**.

Open the radiator drain valve (Item 1) **[C]** at the bottom of radiator. This will drain the entire system.



Drain all the coolant from the system.

When all the coolant is removed, close the drain valve.

Pre–mix 50% water and 50% ethylene glycol in a separate container. Fill the radiator with the pre–mixed coolant until it is full. Add coolant to the recovery tank until it is half full.

Run the engine at idle speed for about 5–10 minutes to remove the air from the cooling system (leave the radiator cap off during this operation).

Stop the engine. Check the coolant level and add as needed to bring it up to the radiator the filler neck. Install the radiator cap and tighten.

HYDRAULIC SYSTEM

Checking and Adding Fluid

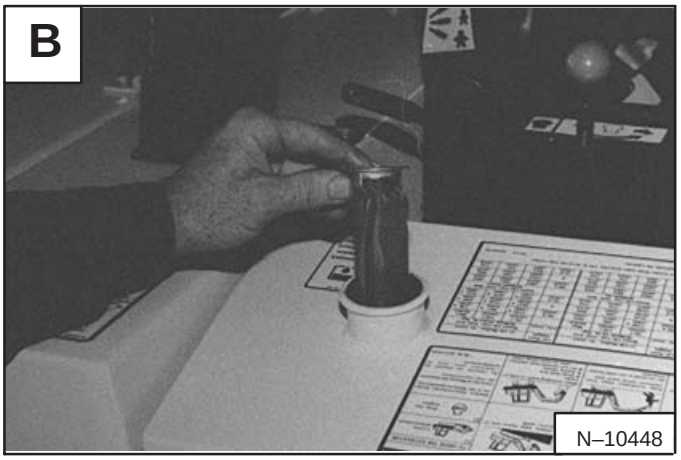
To check and add hydraulic fluid to the reservoir, use the following procedure:

Put the machine on a flat level surface.

Remove oil fill cap **[A]**.

Check the condition of the fill strainer **[B]**.

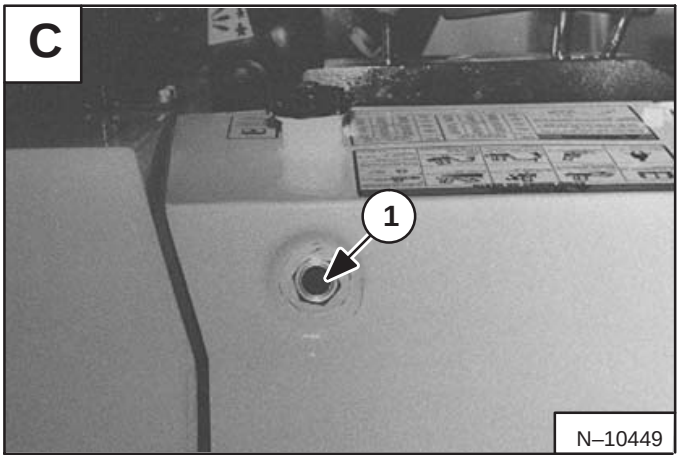
Retract the arm and bucket cylinders, put the bucket on the ground and raise the blade. Stop the engine.



Check the hydraulic fluid level, it must be visible in the sight gauge (Item 1) **[C]** located on the side of the hydraulic reservoir.

Add the correct fluid to the reservoir until it is visible in the sight gauge. (See *FUEL, COOLANT AND LUBRICANTS* Page 8–8.)

Install the reservoir cap.



Replacement of the Hydraulic Filter

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

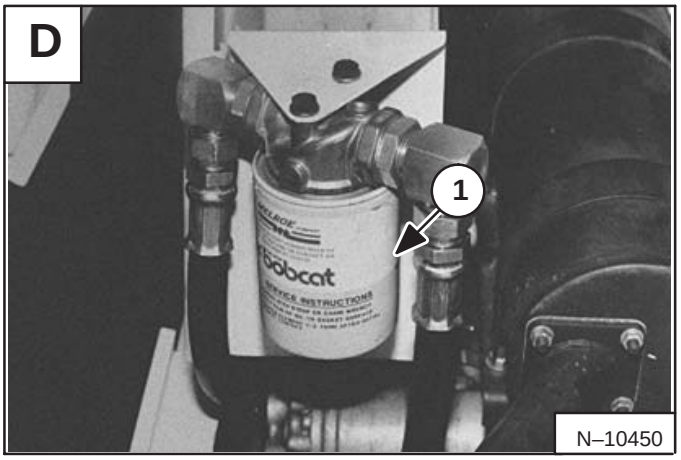
Open the engine cover.

Use a filter wrench and remove the filter element (Item 1) **[D]**.

Clean the housing where the filter gasket makes contact.

Put clean grease on the gasket. Install the new filter element and hand tighten only.

Start the engine. Run the machine through the hydraulic functions. Stop the engine. Check the fluid level at the reservoir and add as needed. Check around the filter for leaks.



HYDRAULIC SYSTEM (Cont'd)

Hydraulic Reservoir

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

Turn the upperstructure so there is clearance for the reservoir at the track frame.

Retract the arm and bucket cylinders, lower the bucket to the ground. Stop the engine.

Remove the hydraulic filter. (See Page 1–7.)

Remove the drain plug from the bottom of the reservoir **[A]**.

Clean all the parts with clean solvent and air dry them.

Replace the filter. Install the mesh screen and tighten the bolts, hose clamp and drain plug.

Add approximately 10.5 gals. (40 L) of fluid to the reservoir. (See *FUEL, COOLANT AND LUBRICANTS* Page 8–8.)

Run the machine through the hydraulic functions. Check the fluid level and add as needed.

⚠ 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.

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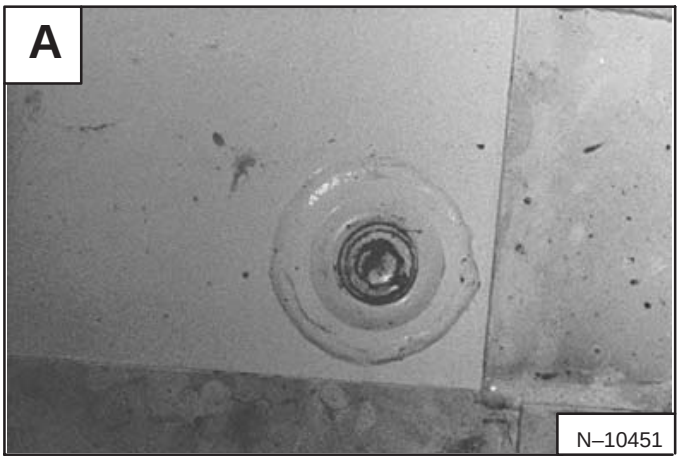

USING A BOOSTER BATTERY (Jump Starting)

Procedure

If it is necessary to use a booster battery to start the engine, BE CAREFUL!

The key switch must be in the OFF position.

The booster battery must be 12 volt.

Open the engine cover **[A]**.

Connect the end of the first cable to the positive (+) terminal of the booster battery. Connect the other end of the same cable to the starter positive (+) battery cable terminal (Item 1) **[A]** of the machine battery.

Connect the end of the second cable to the negative (–) terminal of the booster battery. Connect the other end of the same cable to the frame (Item 2) **[A]**.

NOTE: See *Cold Starting Procedure* in Operation & Maintenance Manual.

Start the engine. After the engine is running, remove the cable (Item 2) **[A]** connected to the frame first. Disconnect the cable from the machine battery (Item 1) **[A]**.

IMPORTANT

Damage to the alternator can occur if:

- **Engine is operated with battery cables disconnected.**
- **Battery cables are connected when using a fast charger or when welding on the loader (Remove both cables from the battery).**
- **Extra battery cables (booster cables) are connected wrong.**

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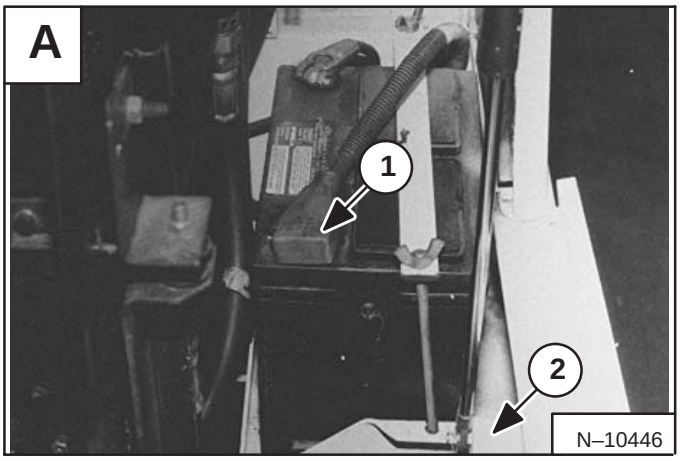


⚠ WARNING

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

Do not jump start or charge a frozen battery. Warm battery to 60°F. (16°C.) before connecting to a charger. Unplug charger before connecting or disconnecting cables to battery.

Battery gas can explode and cause serious injury.

W–2066–0490

LUBRICATION OF THE HYDRAULIC EXCAVATOR

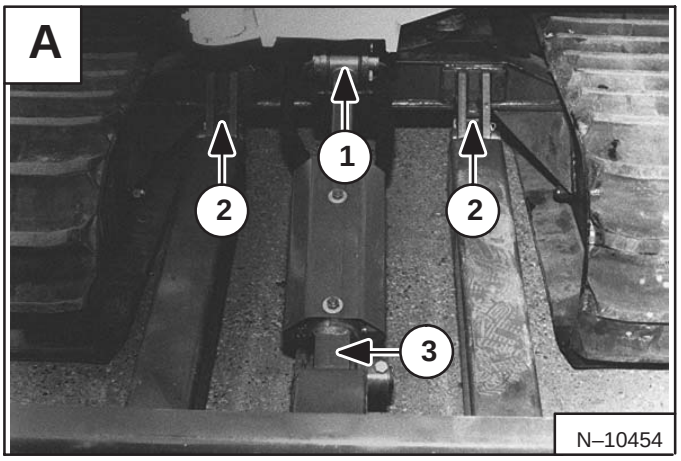
Procedure

Lubricate the Hydraulic Excavator as specified in the *SERVICE SCHEDULE* Page 1–1 for the best performance of the machine.

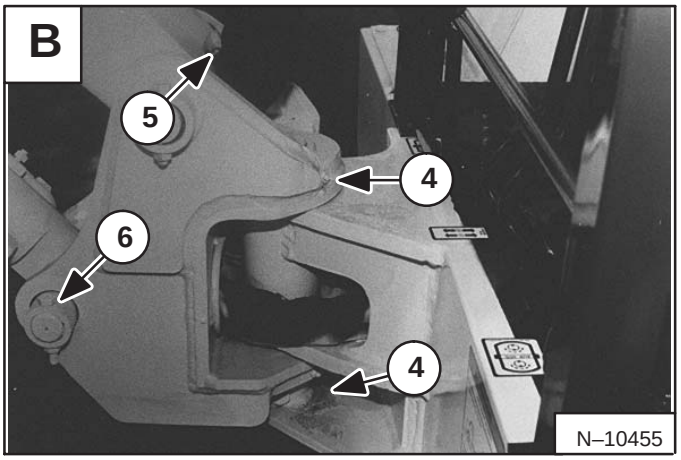
Always use a good quality lithium based multi–purpose grease when lubricated the machine. Apply the lubricant until extra grease shows.

Ref. Description (# of Fittings)

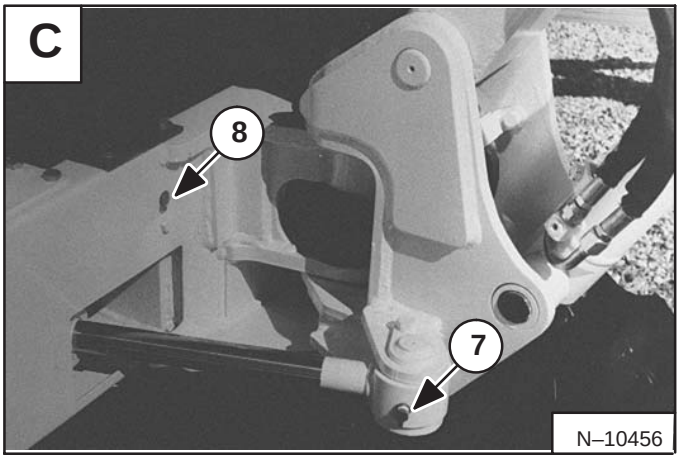
1. Blade Cylinder Rod End (1) **[A]**.
2. Blade Pivots (2) **[A]**.
3. Blade Cylinder Base End (1) **[A]**.



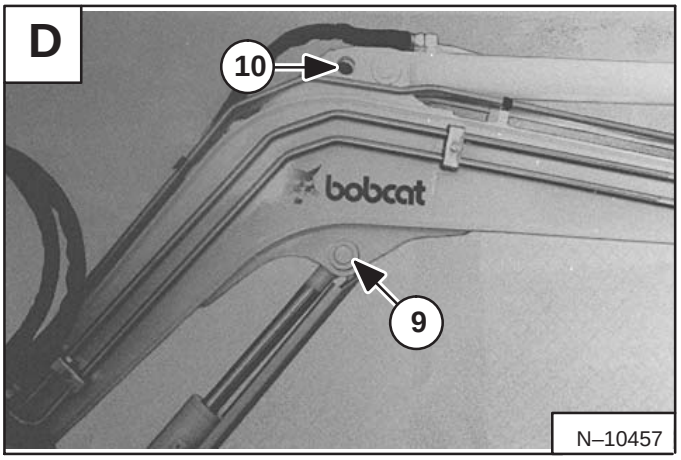
4. Boom Swing Bracket (2) **[B]**.
5. Boom Base Pivot (1) **[B]**.
6. Boom Cylinder Base End (1) **[B]**.



7. Boom Swing Cylinder Rod End (1) **[C]**.
8. Swing Circle Pinion (1) **[C]**.



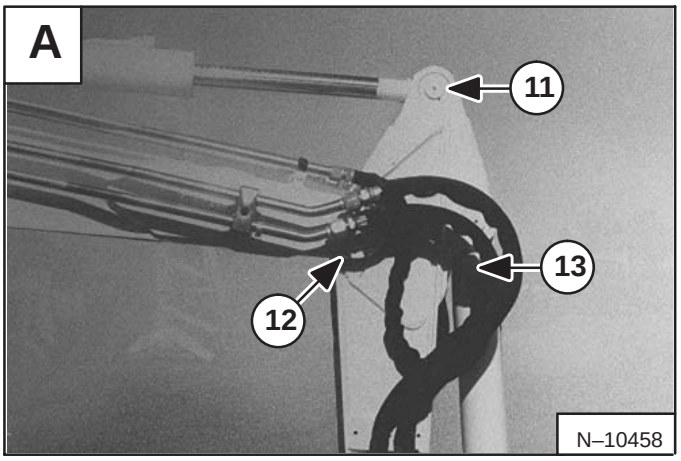
9. Boom Cylinder Rod End (1) **[D]**.
10. Arm Cylinder Base End (1) **[D]**.



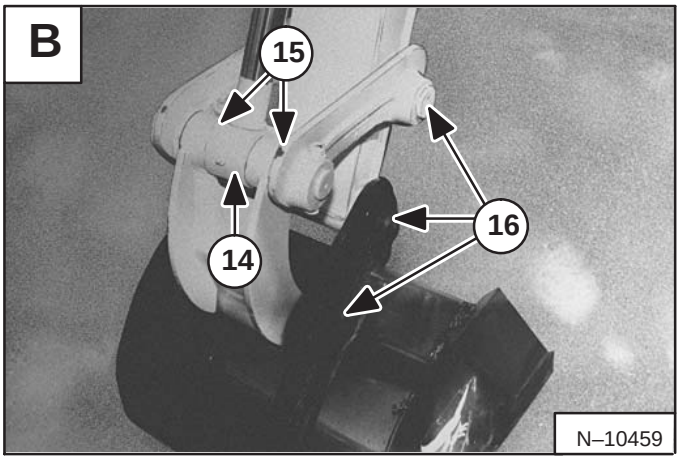
Procedure (Cont'd)

Ref. Description (# of Fittings)

11. Arm Cylinder Rod End (1) **[A]**.
12. Arm Base Pivot (1) **[A]**.
13. Bucket Cylinder Base End (1) **[A]**.

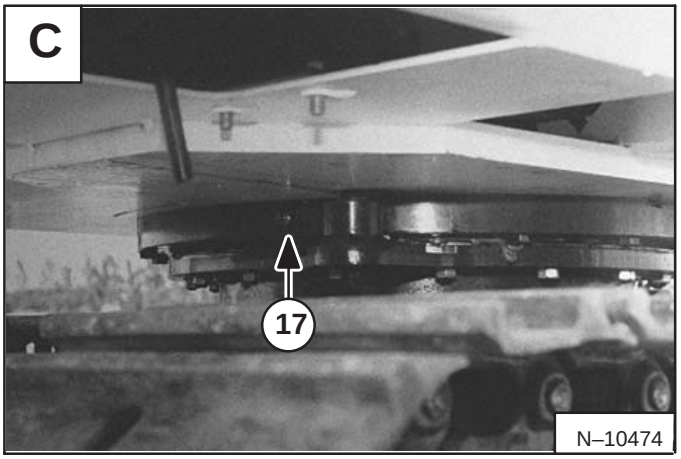


14. Bucket Cylinder Rod End (1) **[B]**.
15. Bucket Link Pivots (2) **[B]**.
16. Bucket Pivots (4) **[B]**.

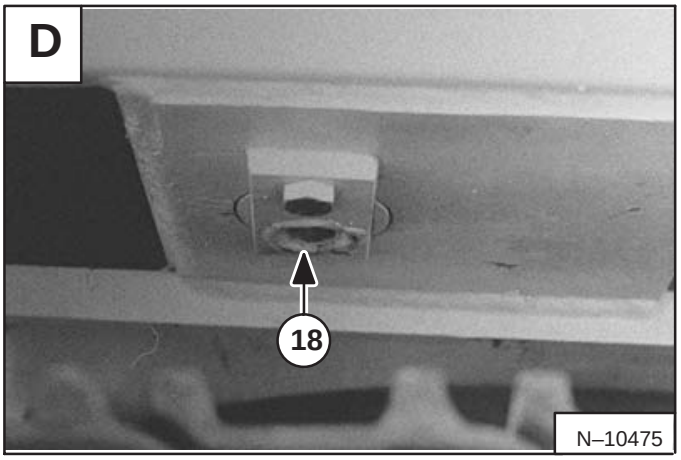


17. Swing Circle Ball Bearings (2) **[C]**.

NOTE: Do Not overgrease the ball bearings or damage to the seals could result.



18. Boom Swing Cylinder Base End (1) **[D]**. (Under the right side of upper frame.)



FINAL DRIVE CASE

Checking Oil Level

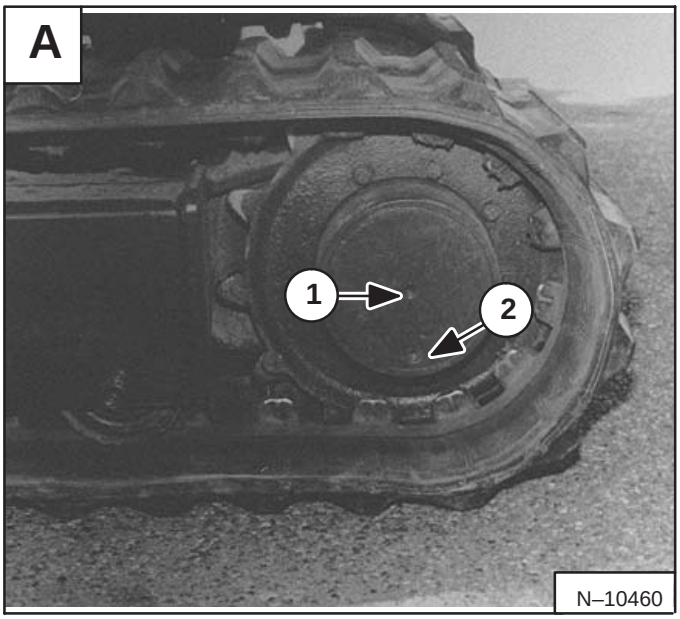
Put machine on a flat level surface with the plugs positioned as shown in figure **[A]**.

Remove the top plug (Item 1) **[A]**.

Add oil through the hole if the oil level is below the hole. (See *FUEL, COOLANT AND LUBRICANTS* Page 8–8.)

Install and tighten the plug.

Repeat the procedure for the other side.



Draining Final Drive Case

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

Put the machine on flat level surface with the plugs positioned as shown in figure **[A]**.

Remove the bottom plug (Item 2) **[A]** and top plug (Item 1) **[A]**.

After all the oil is removed, install and tighten the bottom plug.

Add .55 quarts (0,5 L) of oil to the top plug hole. Install the plug.

Repeat the procedure for the other side.

Thank you very much for your reading.

Please Click Here Then Get More Information.