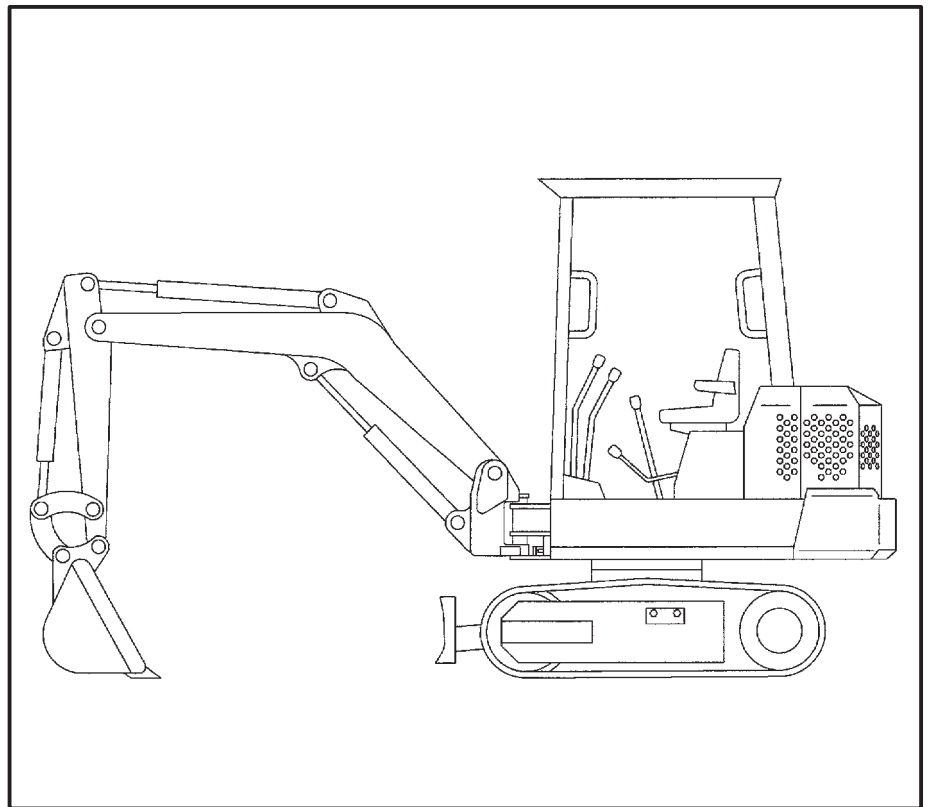


# X 225

## Excavator

### Service Manual

(S/N 508311001–508311999)



**MELROE**  
**INGERSOLL-RAND**

6720347 (11–89)

Printed in U.S.A.



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# MAINTENANCE SAFETY



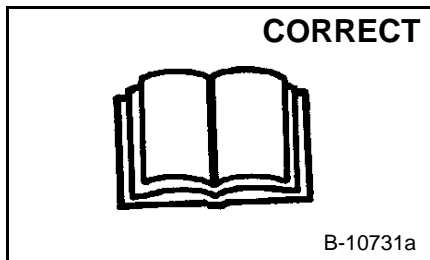
## WARNING

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

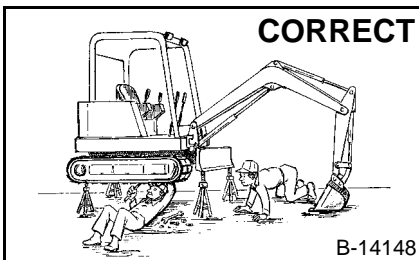


**Safety Alert Symbol:** This symbol with a warning statement, means: "Warning, be alert! Your safety is involved!" Carefully read the message that follows.



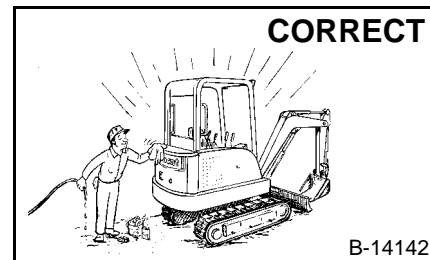
B-10731a

- ⚠ Never service the Bobcat Hydraulic Excavator without instructions.



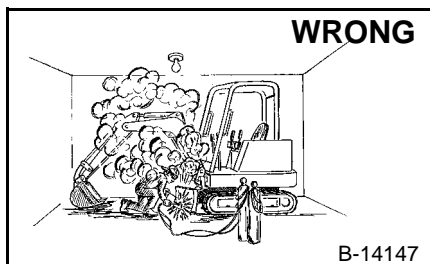
B-14148

- ⚠ Use the correct procedure to lift and support the excavator.
- ⚠ Always lift the blade fully before installing jackstands.



B-14142

- ⚠ Cleaning and maintenance are required daily.



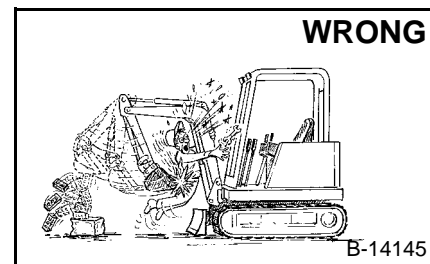
B-14147

- ⚠ Have good ventilation when welding or grinding painted parts.
- ⚠ Wear dust mask when grinding painted parts. Toxic dust and gas can be produced.



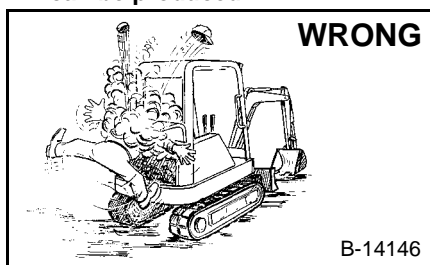
B-14141

- ⚠ Vent exhaust to outside when engine must be run for service.
- ⚠ Exhaust system must be tightly sealed. Exhaust Fumes can kill without warning.



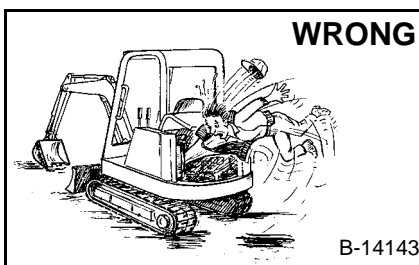
B-14145

- ⚠ Always lower the bucket and blade to the ground before doing any maintenance.
- ⚠ Never modify equipment or add attachments not approved by Bobcat Company.



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.



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.



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.

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**PREVENTIVE  
MAINTENANCE**

**HYDRAULIC  
SYSTEM**

**DRIVE  
SECTION**

**UPPER WORKS  
& SWING  
SECTION**

**MAIN FRAME  
& TRACKS**

**ELECTRICAL  
SYSTEM**

**ENGINE  
SERVICE**

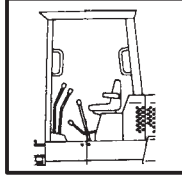
**TECHNICAL  
DATA**

# FOREWORD

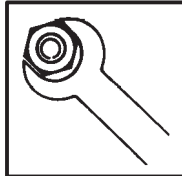
This manual is for the Bobcat hydraulic excavator mechanic. It provides necessary servicing and adjustment procedures for the hydraulic excavator and its component parts and systems. Refer to the Operation & Maintenance Manual for operating instructions, starting procedure, daily checks, etc.

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

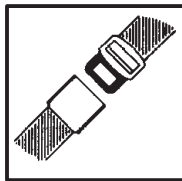
1. Check that the operator canopy is in good condition and is not modified.



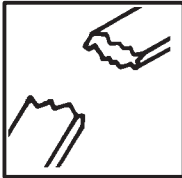
2. Check that the operating canopy mounting hardware is tightened and is Melroe approved.



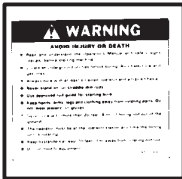
3. The seat belt must be correctly installed, functional and in good condition.



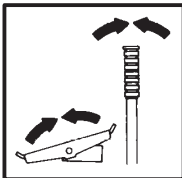
4. Inspect for loose or broken parts or connections.



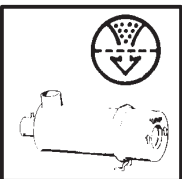
5. Machine signs must be legible and in the correct location.



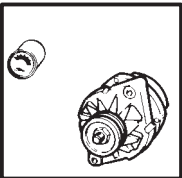
6. Steering levers, control levers and foot pedals must return to neutral. Control lock must lock controls securely.



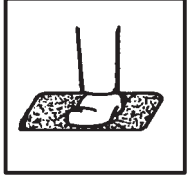
7. Inspect the air cleaner for damage or leaks. Check the condition of the element.



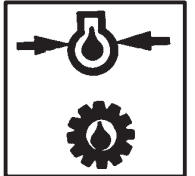
8. Check the electrical charging system.



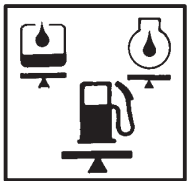
9. Safety treads must be in good condition.



10. Check for the correct function of the indicator lamps.



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



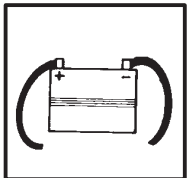
12. Inspect for fuel, oil or hydraulic leaks..



13. Lubricate the hydraulic excavator.



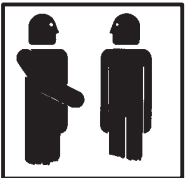
14. Check the condition of the battery and cables.



15. Check for any field modifications not completed.



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

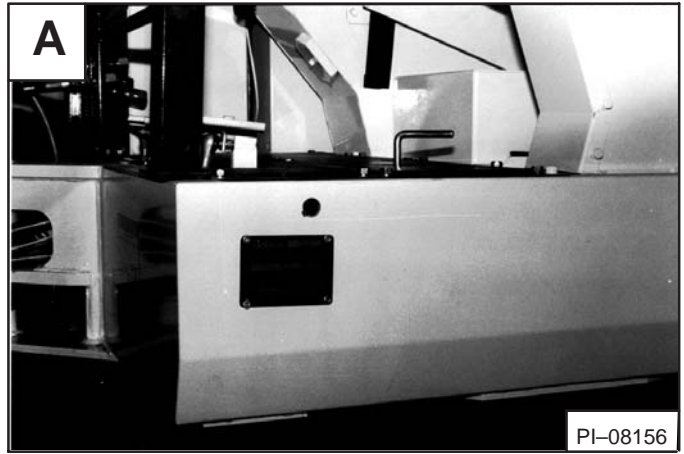


## SERIAL NUMBER LOCATIONS

Always use the serial number of the machine 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.

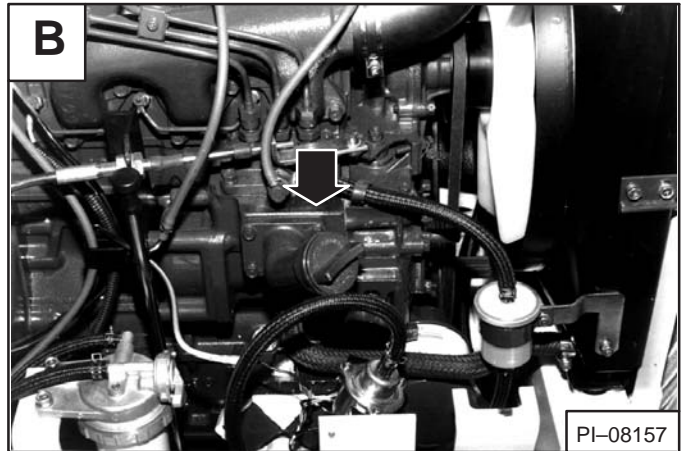
### HYDRAULIC EXCAVATOR SERIAL NUMBER

The excavator serial number is on the machine frame, at the left side near the front corner [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 explained to the owner/operator by the dealer. The dealer is to fill out the form and the owner/operator sign the form to indicate his understanding [C].

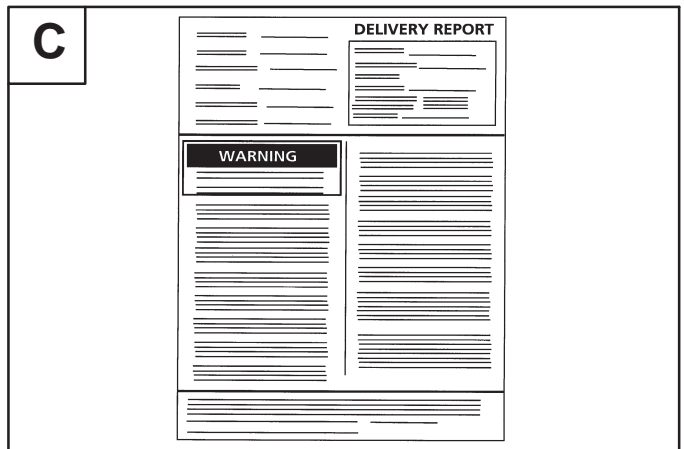
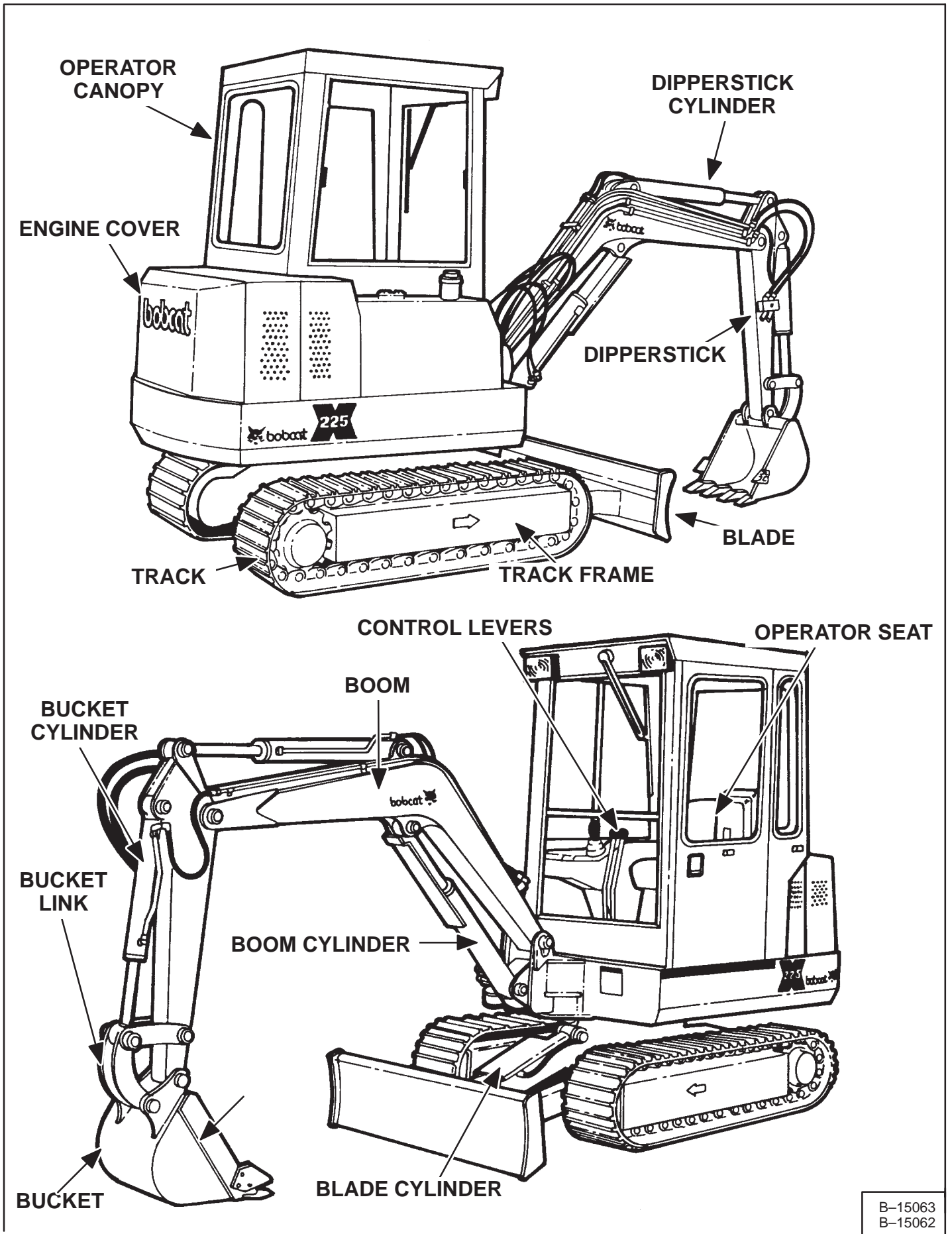


Image C shows a form titled 'DELIVERY REPORT'. The form has a header section with several lines of text. Below the header is a section titled 'WARNING' with a dark background and white text. The rest of the form consists of multiple lines of text for notes or signatures. A white box with the letter 'C' is in the top-left corner.

# HYDRAULIC EXCAVATOR IDENTIFICATION



B-15063  
B-15062

# PREVENTIVE MAINTENANCE

## PREVENTIVE MAINTENANCE

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ENGINE COVER	
Procedure .....	1-2
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Procedure .....	1-9



## 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	Check & empty dust cap as required.						
Engine Oil	Check the oil level & add oil as needed.						
Engine Coolant System	Check radiator coolant level.						
Indicator Lights	Check for correct operation.						
Operator Canopy	Check the fastening bolts, nuts & condition of canopy.						
Seat Belt & Control Locks	Check the condition & that fasteners are tight.						
Safety Signs (Decals)	Check for damaged signs (decals) and safety treads						
Safety Treads	replace as needed.						
Tracks	Check and adjust tension.						
Hydraulic Reservoir	Check fluid level.						
All Machinery Pivot Pts.	Lubricate 20 grease fittings.						
Fuel Tank	Drain water & sediment from fuel tank.						
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.						
Air Cleaner	Replace the filter element.						
Cooling System	Clean the radiator fins.						
Alternator & Starter	Check the condition.						
Engine Valve Clearance	Check & adjust valve clearance.						
Cooling System	Drain, flush & add new coolant to the cooling system.						
Hydraulic Tank	Change the fluid, clean fill neck strainer & suction strainer.						
Final Drive Case	Change the oil.						

After the first 250 hours of machine operation do the following:

- Change oil in final drive case.
- Check and adjust engine valve clearance.



## ENGINE COVER

### Procedure



# WARNING

## AVOID INJURY

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

W-2012-0290



# WARNING

Keep the engine cover closed when operating the machine.

W-2141-0189

Open the engine cover to service the engine. Pull on the latches and lift the engine cover 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.

Service the air cleaner as follows:

Remove the dust cup (Item 1) [B].

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

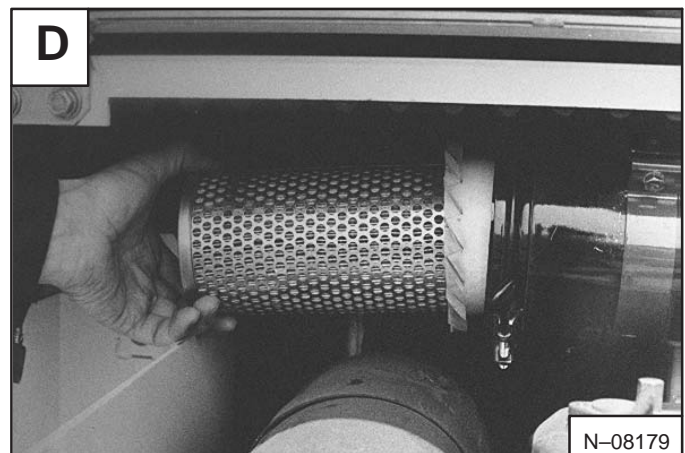
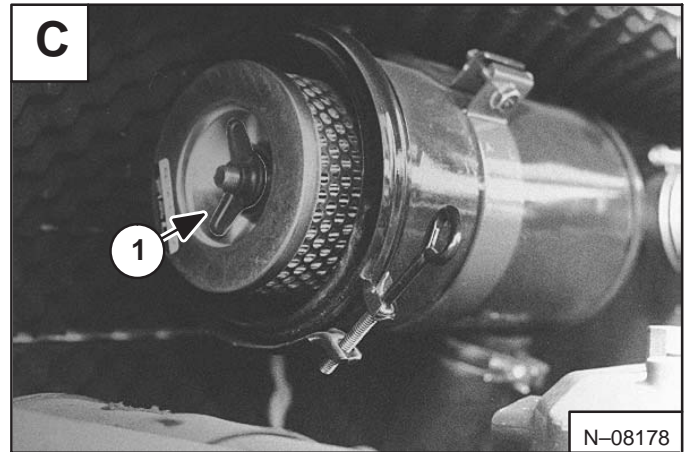
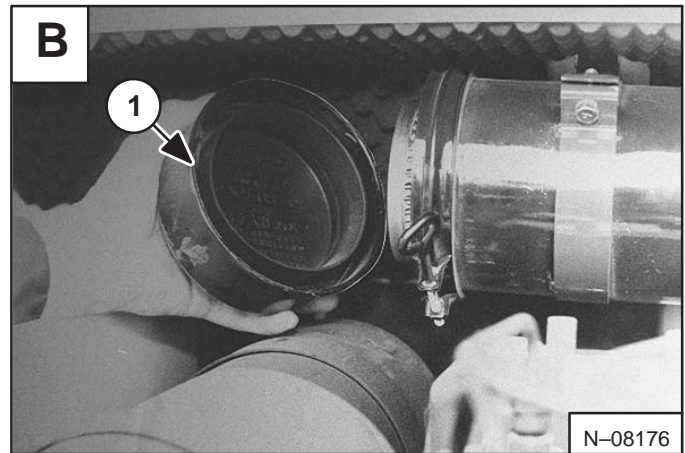
Remove the filter element [D].

Check the air cleaner housing for damage.

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

Install the dust cup so the arrow points up.

Check that the air cleaner hose clamps are tight.



## FUEL SYSTEM

### Fuel Specifications

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

### Fuel System Service

The fuel level in the tank is indicated by the fuel gauge or by the sight tube (Item 1) [A] on the side of the fuel tank.



Use the key to un-lock the fuel fill cap [B].

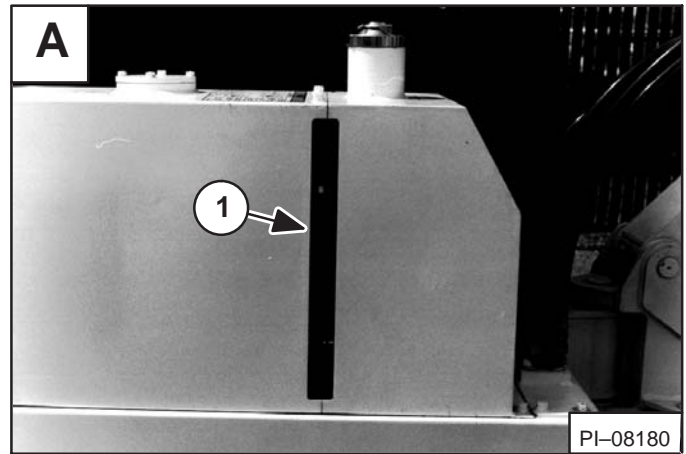
Turn the fill cap to remove it from the fuel tank [C].

**NOTE: The fuel fill strainer can be removed for cleaning. 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.



## FUEL SYSTEM (Cont'd)

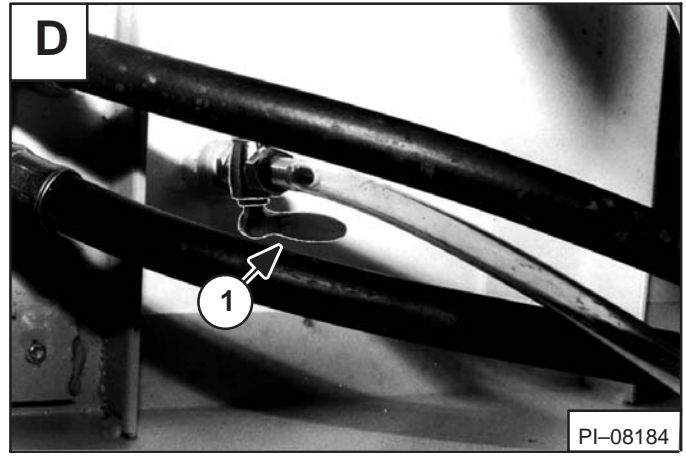
To remove the water and sediment from the fuel tank, open the drain (Item 1) [A] on the bottom of the tank.



# 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



## ENGINE LUBRICATION SYSTEM

### Checking The Engine Oil

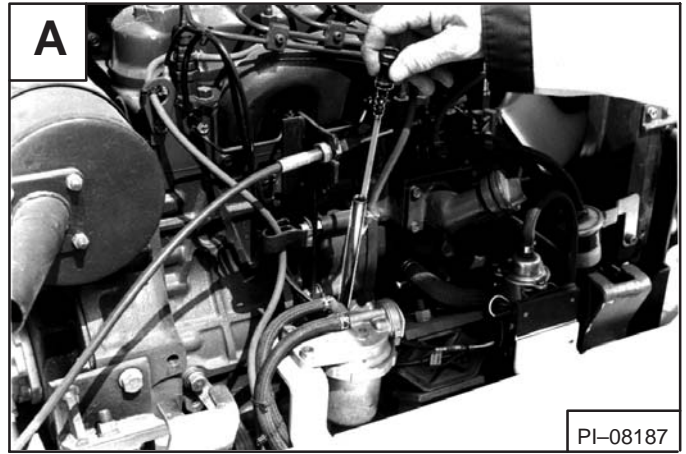
Check the engine oil every day.

Stop the engine. Open the engine cover.

Remove the dipstick **[A]**.

Keep the oil level between the marks on the dipstick.

Use a good quality motor oil that meets API Service Classification of CC or CD (See *FUEL, COOLANT AND LUBRICANTS Chart*, Page 8–1).

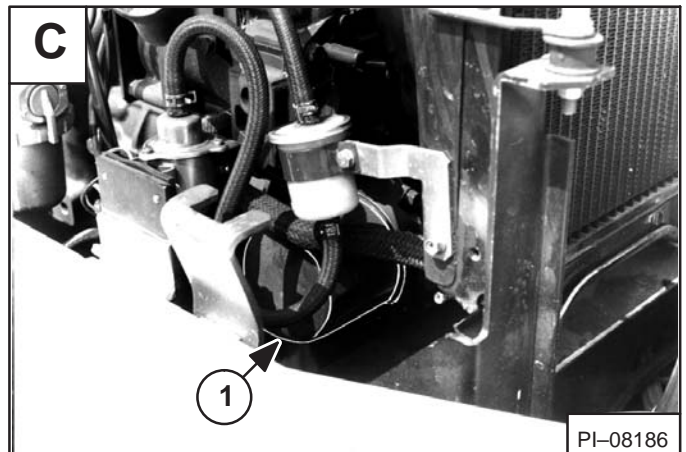
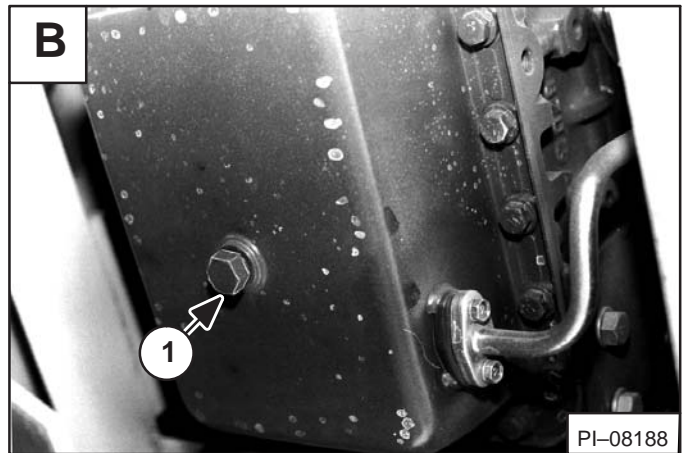


### Engine Oil And Filter Replacement

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

Use the following procedure to change the oil and filter:

1. Run the engine until it is at operating temperature.
2. Turn the upper works so there is clearance for the engine oil drain plug. Stop the engine.
3. Remove the drain plug (Item 1) **[B]**. Drain the oil into a container.
4. Remove the oil filter (Item 1) **[C]**, using a filter wrench.
5. Clean the filter housing surface. Put clean oil on the filter gasket. Install the new filter and hand tighten only.



6. Remove the oil fill cap **[D]**. Put 6.34 quarts (6,0 L) of oil into the engine (See *FUEL, COOLANT AND LUBRICANTS Chart* Page 8–1).
7. Start the engine and let it run for several minutes. Stop the engine. Check the oil filter for leaks.
8. 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

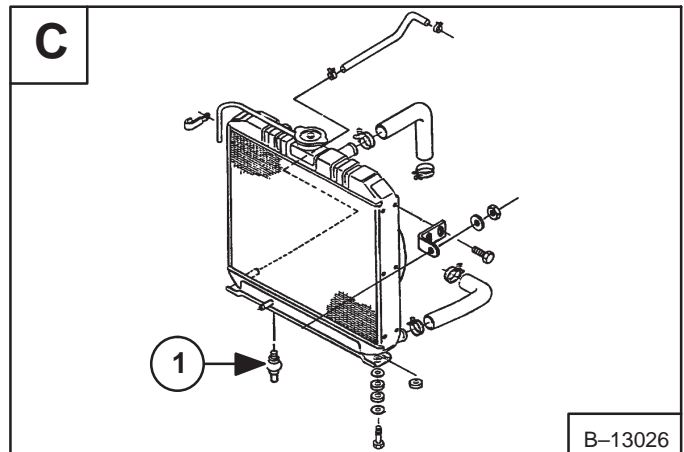
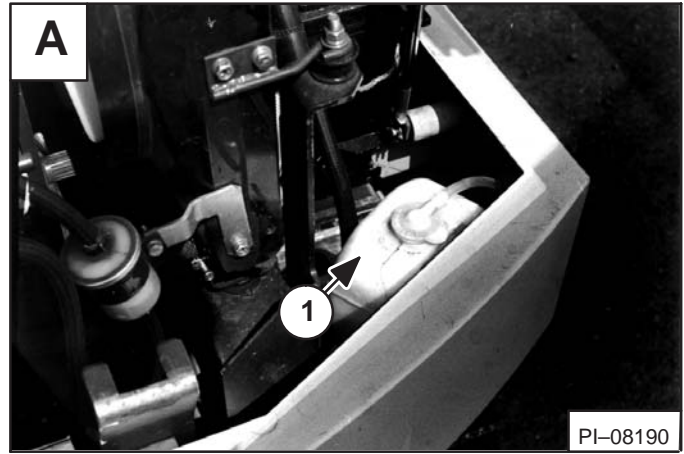


## WARNING

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

W-2070-1285

1. Turn the upper works so there is access to the engine and radiator from underneath. Stop the engine.
2. Loosen and remove the radiator cap [B].
3. Open the radiator drain valve (Item 1) [C].
4. Drain all the coolant from the system.
5. When all the coolant is removed, close the drain valve.
6. Pre-mix 50% water and 50% ethylene glycol in a separate container. Fill the radiator with pre-mixed coolant until it is full. Add coolant to the recovery tank until it is half full.
7. Run the engine at idle speed for about five to ten minutes to remove the air from the cooling system (leave the radiator cap off during this operation).
8. Stop the engine. Check the coolant level and add as needed to bring it up to the radiator filler neck. Install the radiator cap and tighten.



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