

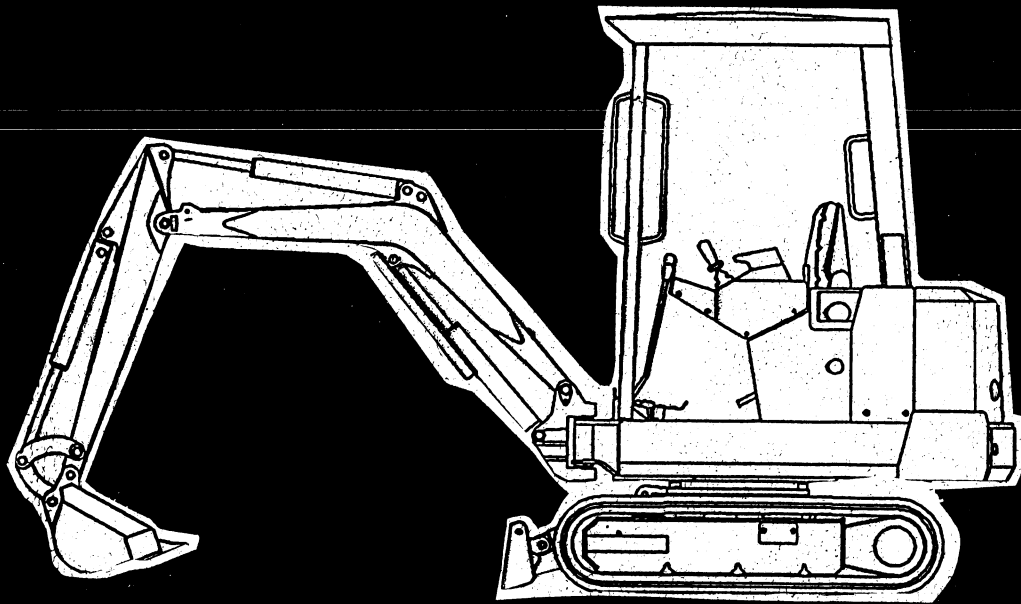


bobcat

220

S/N 15001 & Above

SERVICE MANUAL



MAINTENANCE SAFETY



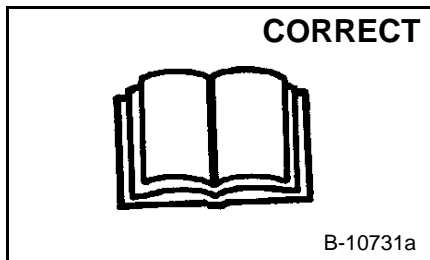
WARNING

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

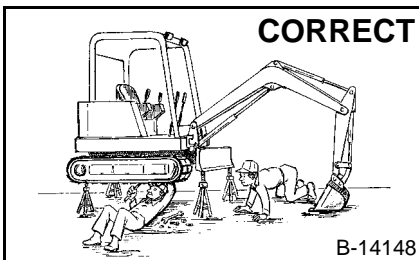


Safety Alert Symbol: This symbol with a warning statement, means: "Warning, be alert! Your safety is involved!" Carefully read the message that follows.



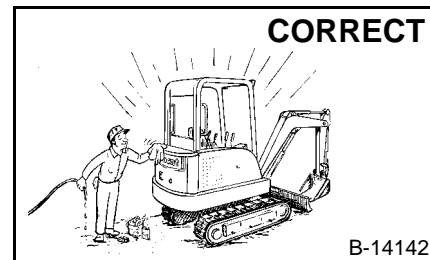
B-10731a

- ⚠ Never service the Bobcat Hydraulic Excavator without instructions.



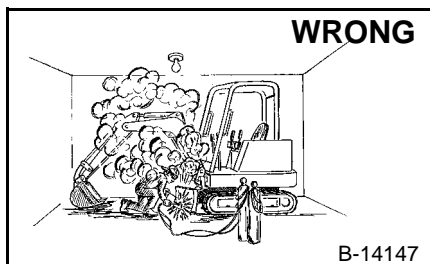
B-14148

- ⚠ 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.



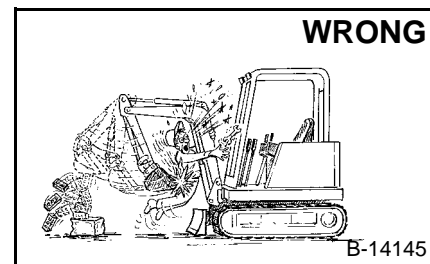
B-14147

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



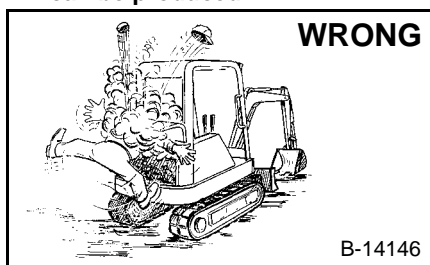
B-14141

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



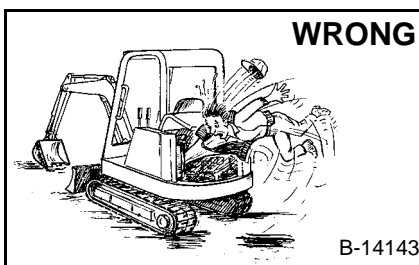
B-14145

- ⚠ 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.

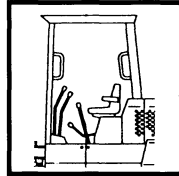
Maintenance procedures which are given in the Operation & Maintenance Manual can be performed by the owner/operator without any specific technical training. Maintenance procedures which are **not** in the Operation & Maintenance Manual must be performed **ONLY BY QUALIFIED BOBCAT SERVICE PERSONNEL**.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

FOREWORD

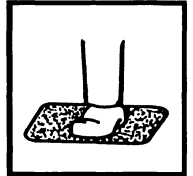
This manual is for the Bobcat hydraulic excavator mechanic. It provides necessary servicing and adjustment procedures for the hydraulic excavator and its component parts and systems. Refer to the Operation & Maintenance Manual for operating instructions, starting procedure, daily checks, etc.

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

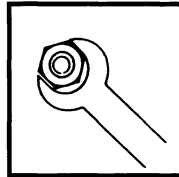
1. Check that the operator canopy is in good condition and is not modified.



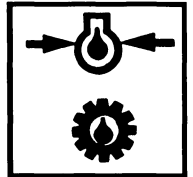
9. Safety treads must be in good condition.



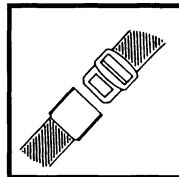
2. Check that operating canopy mounting hardware is tightened and is Melroe approved.



10. Check for correct function of indicator lamps.



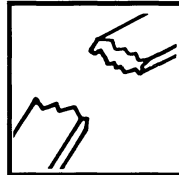
3. The seat belt must be correctly installed, functional and in good condition.



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



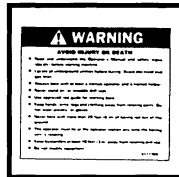
4. Inspect for loose or broken parts or connections.



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



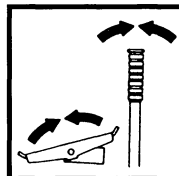
5. Machine signs must be legible and in the correct location.



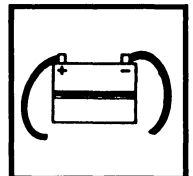
13. Lubricate the hydraulic excavator.



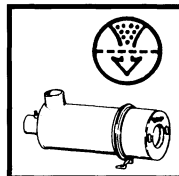
6. Steering levers, control levers and foot pedal must return to neutral.



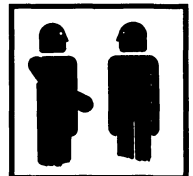
14. Check the condition of the battery and cables.



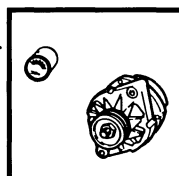
7. Inspect the air cleaner for damage or leaks. Check the condition of the element.



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



8. Check the electrical charging system.



CONTENTS

SAFETY INSTRUCTIONS.....	i
SERIAL NUMBER LOCATIONS.....	ii
DELIVERY REPORT.....	ii
HYDRAULIC EXCAVATOR IDENTIFICATION.....	iii
PREVENTIVE MAINTENANCE.....	1-1
HYDRAULIC SECTION.....	2-1
DRIVE SECTION.....	3-1
UPPER WORKS & SWING SECTION.....	4-1
MAIN FRAME & TRACKS.....	5-1
ELECTRICAL SYSTEM.....	6-1
ENGINE SERVICE.....	7-1
TECHNICAL DATA.....	8-1

**PREVENTIVE
MAINTENANCE**

**HYDRAULIC
SECTION**

**DRIVE
SECTION**

**UPPER WORK &
SWING SECTION**

**MAIN FRAME
& TRACKS**

**ELECTRICAL
SYSTEM**

**ENGINE
SERVICE**

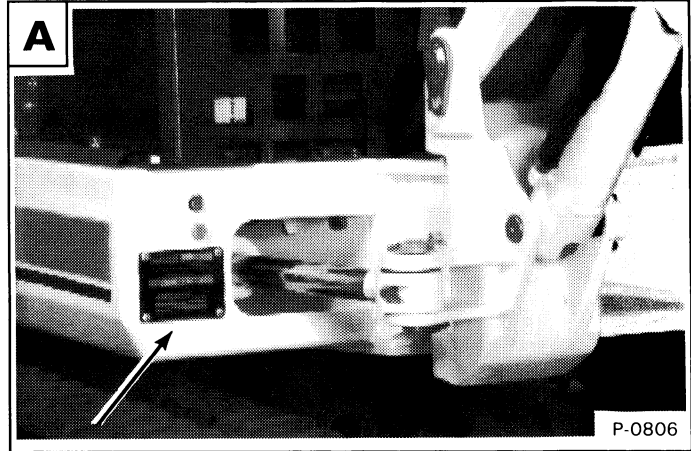
**TECHNICAL
DATA**

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

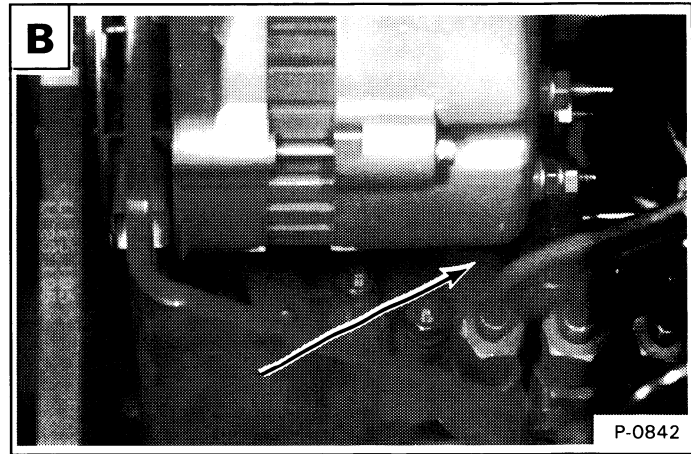
The excavator serial number is on the right front side of the machine frame **A**.



P-0806

ENGINE SERIAL NUMBER

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



P-0842

DELIVERY REPORT

All Delivery Report items must be explained to the owner/operator by the dealer. The dealer is to fill out the form and the owner/operator signs the form to indicate his understanding **C**.

C

				EXCAVATOR DELIVERY REPORT	
Model No.	Serial No.	Model No.	Serial No.	Dealer Name	Address
City	State	City	State	Operator Name	Address
Customer Name	Address	Operator Name	Address	Application	Operator's Signature
Company Name	City	City	State	Operator's Signature	Date
Address	City	City	State	Dealer Representative Signature	Date
City	State	City	State	Dealer Representative Signature	Date

<p>WARNING</p> <p>The following items are not covered by the warranty of the machine or operator. The dealer is to explain these items to the operator before the machine is delivered to the operator.</p> <p>1. Explanatory material, Owner's Manual, Safety Manual and Operator's Manual, parts and accessories.</p> <p>2. Advice given to the operator in the manual, the operator training by the dealer, the dealer's representative, and the operator's understanding of all requirements and responsibilities of the operator.</p> <p>3. Explanatory material, Safety, Sign, Electrical, Operator's Manual and Safety Manual.</p> <p>4. Explanatory material, Safety, Sign, Electrical, Operator's Manual and Safety Manual.</p> <p>5. Explanatory material, Safety, Sign, Electrical, Operator's Manual and Safety Manual.</p> <p>6. Explanatory material, Safety, Sign, Electrical, Operator's Manual and Safety Manual.</p> <p>7. 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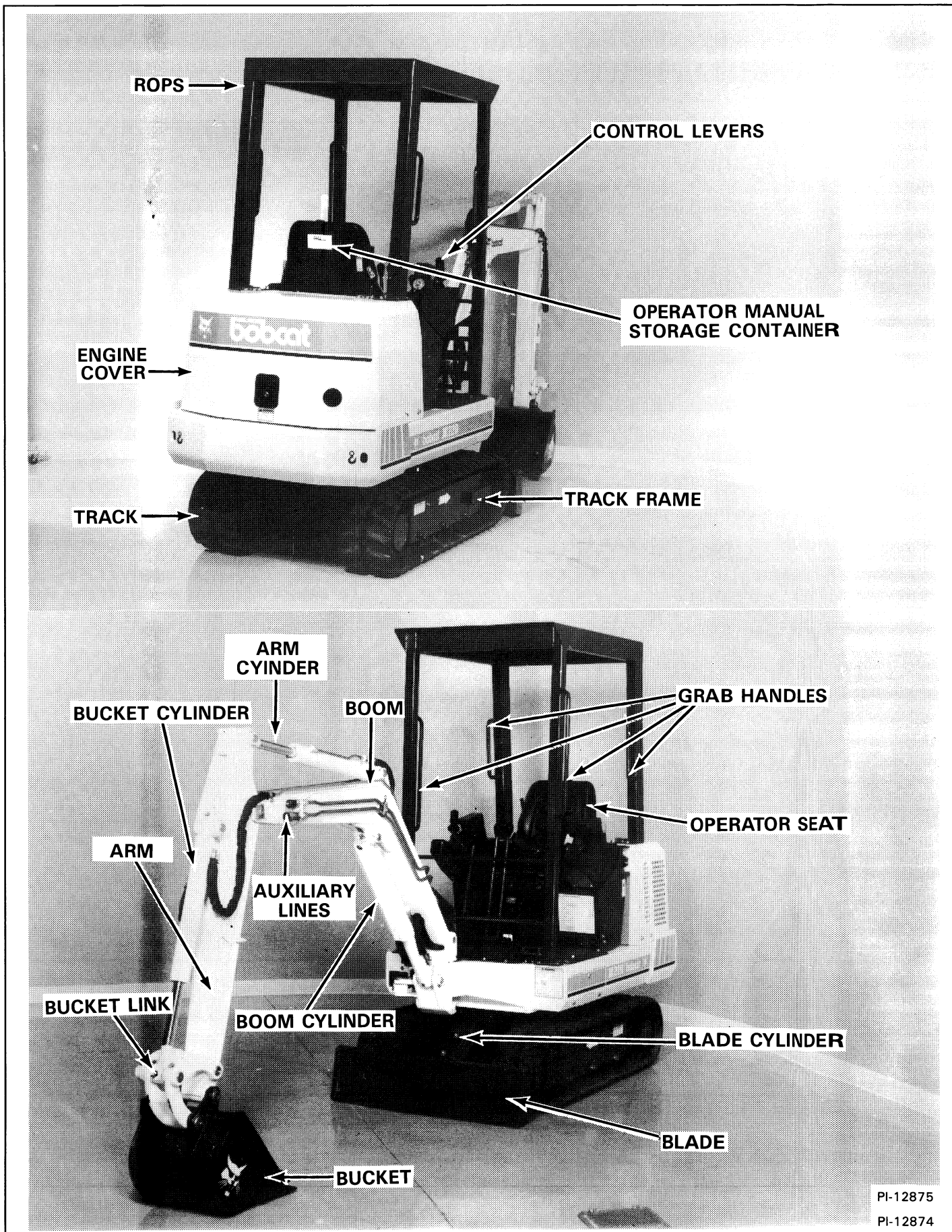
The above delivery information has been explained to the operator and understood the operation and maintenance of this machine. I also acknowledge the operator's conditions and limitations as outlined in the operator's manual.

Operator Signature: _____ Date: _____

Dealer Representative Signature: _____ Date: _____

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HYDRAULIC EXCAVATOR IDENTIFICATION



PI-12875
PI-12874

PREVENTIVE MAINTENANCE

	Page Number
AIR CLEANER SERVICE	1-2
COOLING SYSTEM	
Coolant Level	1-6
Coolant Replacement	1-6
ENGINE COVER	1-2
ENGINE LUBRICATION SYSTEM	
Engine Oil and Filter Replacement	1-5
FUEL SYSTEM	
Fuel Filter	1-4
Fuel System Service	1-3
Removing Air From the Fuel System	1-4
HYDRAULIC SYSTEM	
Checking and Adding Fluid	1-7
Diagnostic Couplers	1-7
Hydraulic Reservoir	1-8
Replacement of the Hydraulic Filter	1-8
LUBRICATION OF THE HYDRAULIC EXCAVATOR	
Procedure	1-10
SERVICE SCHEDULE	
Chart	1-1
USING A BOOSTER BATTERY (JUMP STARTING)	
Procedure	1-9

SERVICE SCHEDULE

Maintenance work must be done at regular intervals. Failure to do so may result in excessive 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 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-2003-1089

SERVICE SCHEDULE		HOURS					
ITEM	SERVICE REQUIRED	8-10	50	100	250	500	1000
Engine Air Cleaner	Check & empty dust cup as required.	■					
Engine Oil	Check the oil level and 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 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 22 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.		■				
Engine Oil & Filter	Replace oil & filter element.			■			
Alternator Belt	Check & adjust tension.			■			
Hydraulic Filter	Replace filter element.				■		
Fuel Filter	Replace filter element.				■		
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.						■
Case Drain Return Screen	Clean the screen with solvent.						■
Final Drive Case	Change the gear lube.						■

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

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

ENGINE COVER



WARNING

AVOID INJURY OR DEATH

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

W-2012-1285

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

See the Service Schedule (Page 1–1) for the correct service interval.

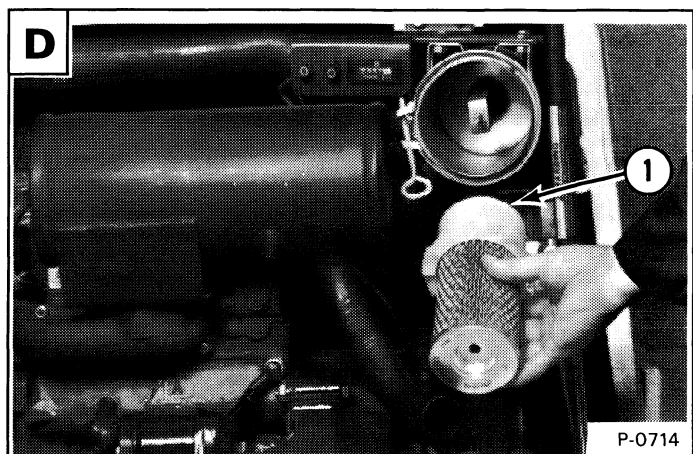
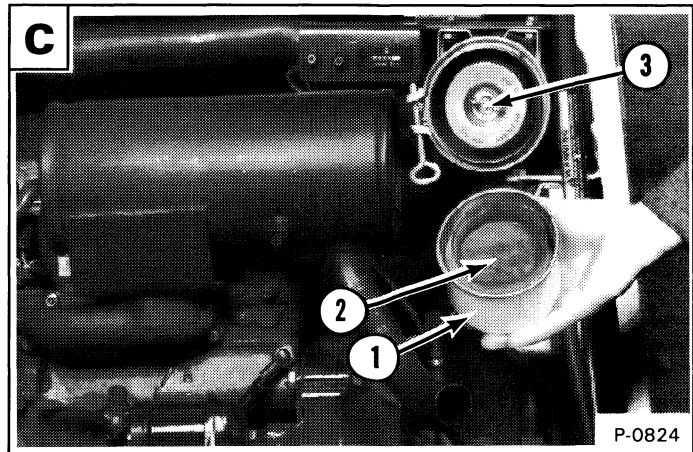
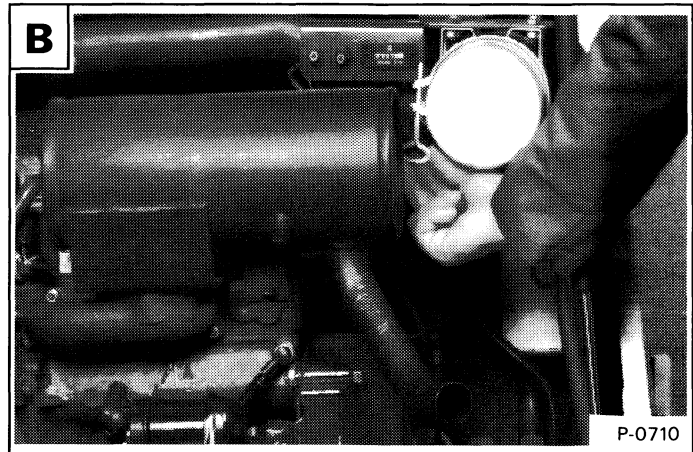
Service the air cleaner as follows:

Daily Check:

1. Loosen the clamp on the air cleaner **B**.
2. Remove the cover (Item 1) and the dust cup (Item 2) **C**. Empty the dust cup. Visually inspect the filter element. Do Not remove the element unless plugged and replacement is necessary.

Filter Replacement:

3. Remove the wing nut (Item 3) **C**.
4. Remove the filter element **D**.
5. Check the air cleaner housing for damage.
6. Wipe the canister clean with a clean cloth. Do Not use compressed air.
7. Check the seal (Item 1) **D**.
8. Install a new air filter element. Install and tighten the wing nut.
9. Install the dust cup and cover so the arrow points up.
10. Check that all the air cleaner hose clamps are tight.



FUEL SYSTEM

Use Number 2 diesel fuel in the engine. When the temperature goes below 14°F (-10C), 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) when the ignition key is in the "ON" position **A**.

NOTE: When the fuel level reaches the 1/8 fuel setting, the low fuel light (Item 2) will come "ON" to alert the operator of this condition **A**.

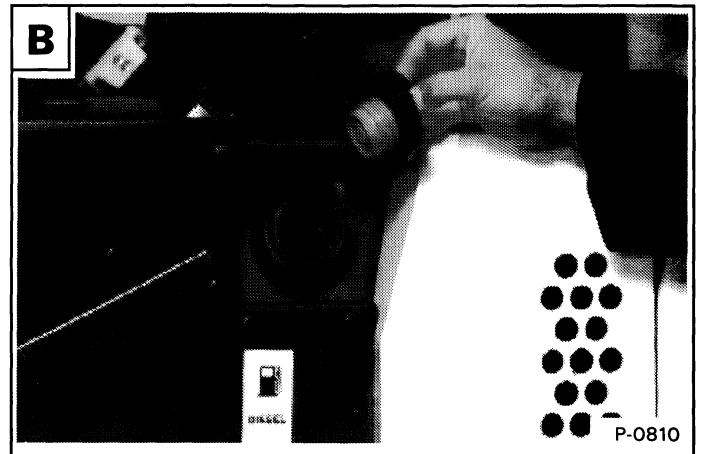
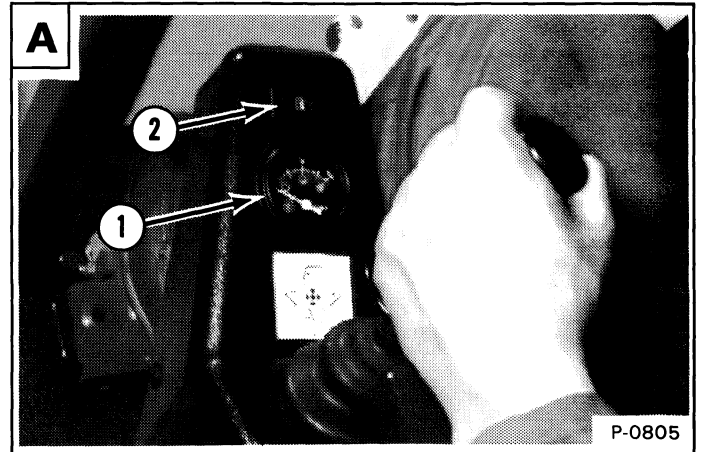
Use the key to un-lock the fuel fill cap **B**.

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

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

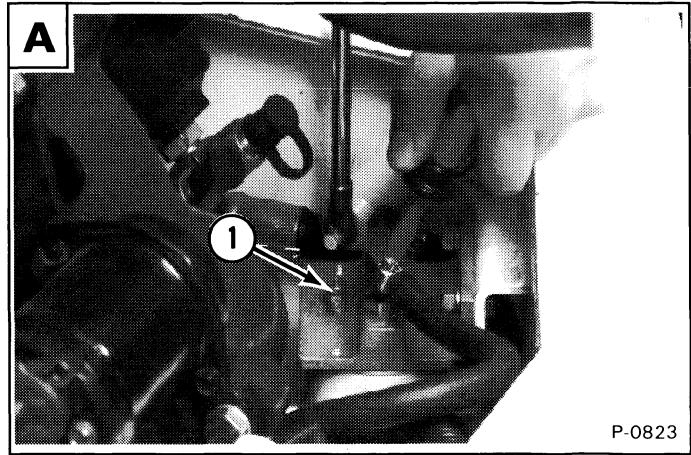
Always clean up spilled fuel or oil. Keep heat, flames, sparks or lighted tobacco away from fuel and oil. Failure to use care around combustibles can cause explosion or fire which can result in injury or death.

W-2103-1285

FUEL SYSTEM (Cont'd)

To remove the water and sediment from the fuel tank, remove the fuel hose at the fuel filter inlet elbow **A**. Insert the end of the hose into an approved container and drain.

NOTE: If fuel will not drain, squeeze the primer bulb to start the fuel to flow.



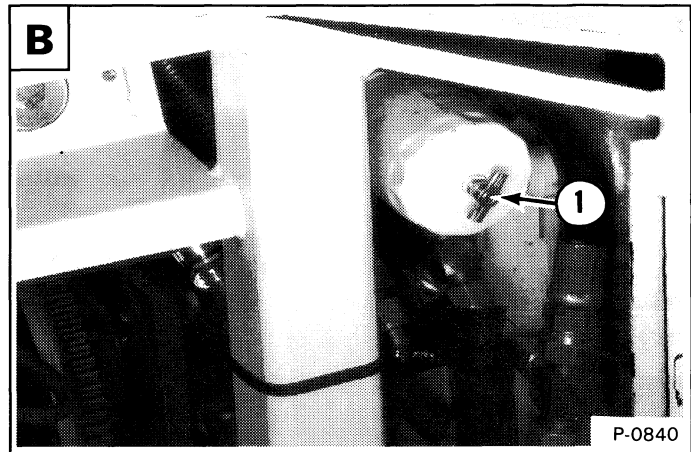
Fuel Filter

See the Service Schedule (Page 1-1) for the correct service interval.

To remove water from filter, open drain valve (Item 1) at the bottom of the fuel filter **B**.

Use a filter wrench to remove the final fuel filter **B**.

Replace the element and hand tighten only.



Removing Air From the Fuel System

After replacing the fuel filter(s) or after running out of fuel, air must be removed from the fuel system.

Open the vent screw (Item 1) on the injection pump **C**.

Open the bleed screw on the top of the fuel filter housing (Item 1) **A**.

Squeeze the primer bulb to fill the filter **D**.

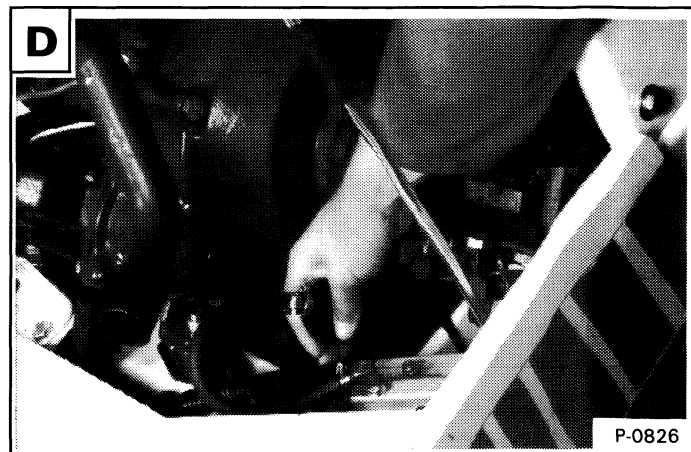
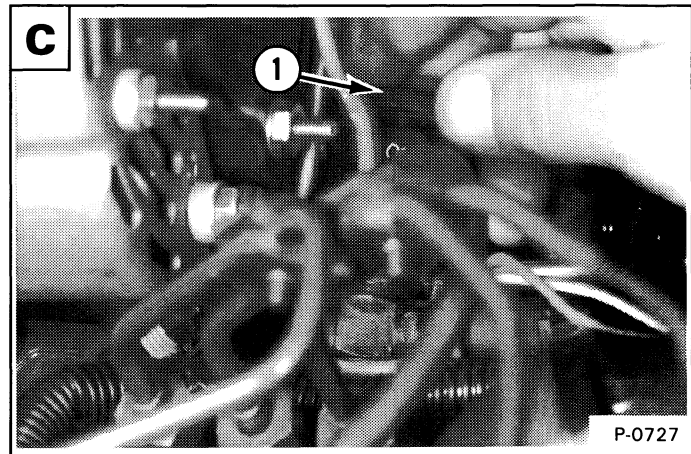
When fuel, free of air bubbles emerges from the filter housing, close the bleed screw.

Leave the vent on the injection pump open slightly.

Start the engine. When the engine runs smoothly, close the vent screw on the injection pump.

NOTE: If engine fails to start after the above procedure is performed, it will be necessary to bleed the injector lines; do the following:

1. Loosen the three (3) injector line locknuts, one turn.
2. While cranking the engine and fuel emerges from the injector lines, slowly tighten the injector line lock nuts.



ENGINE LUBRICATION SYSTEM

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-CE or CD (See Fuel, Coolant and Lubricants Chart, Page 8–10).

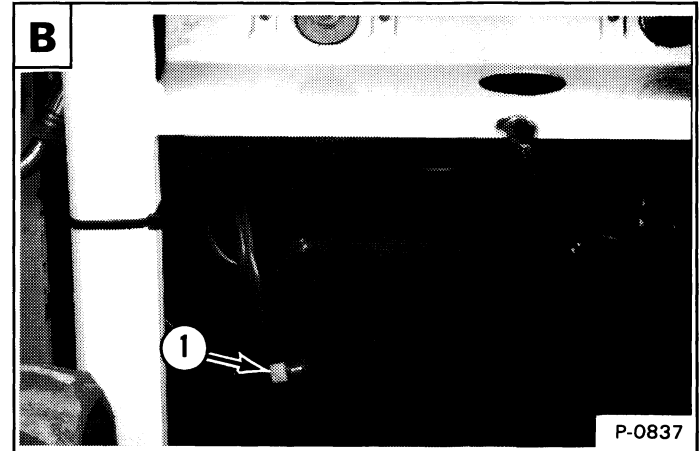


Engine Oil and Filter Replacement

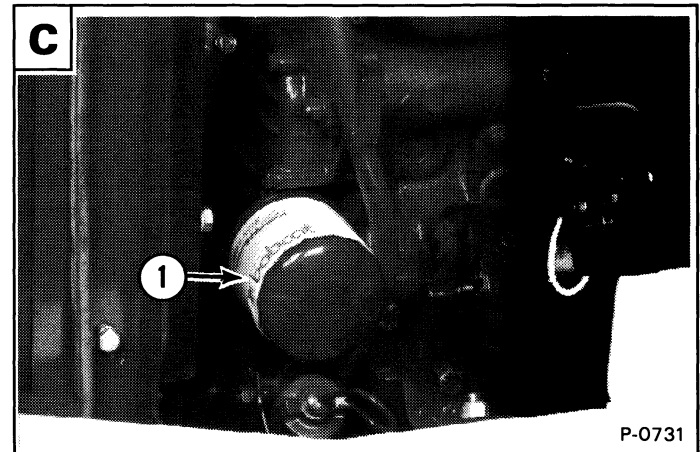
See the Service Schedule (Page 1–1) for the correct service interval.

Use the following procedure to change the oil and filter:

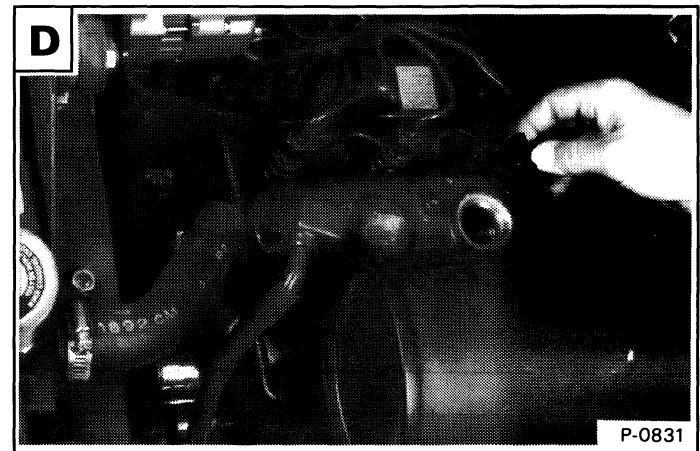
1. Run the engine until it is at operating temperature.
2. Turn the upper works so there is clearance for the engine oil drain plug. Stop the engine.
3. Remove the drain plug (Item 1) **B**. Drain the oil into a container.



4. Remove the oil filter (Item 1), using a filter wrench **C**.
5. Clean the filter housing surface. Put clean oil on the filter gasket. Install the new filter and hand tighten only.
6. Install and tighten the oil drain plug.



7. Remove the oil fill cap **D**. Put 4.5 quarts (4,3 L) of oil into the engine (See Fuel, Coolant and Lubricants Chart, Page 8–10).
8. Start the engine and let it run for several minutes. Stop the engine. Check for leaks at the oil filter.
9. Check the oil level and add oil as needed to bring it to the "top" mark on the dipstick.



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