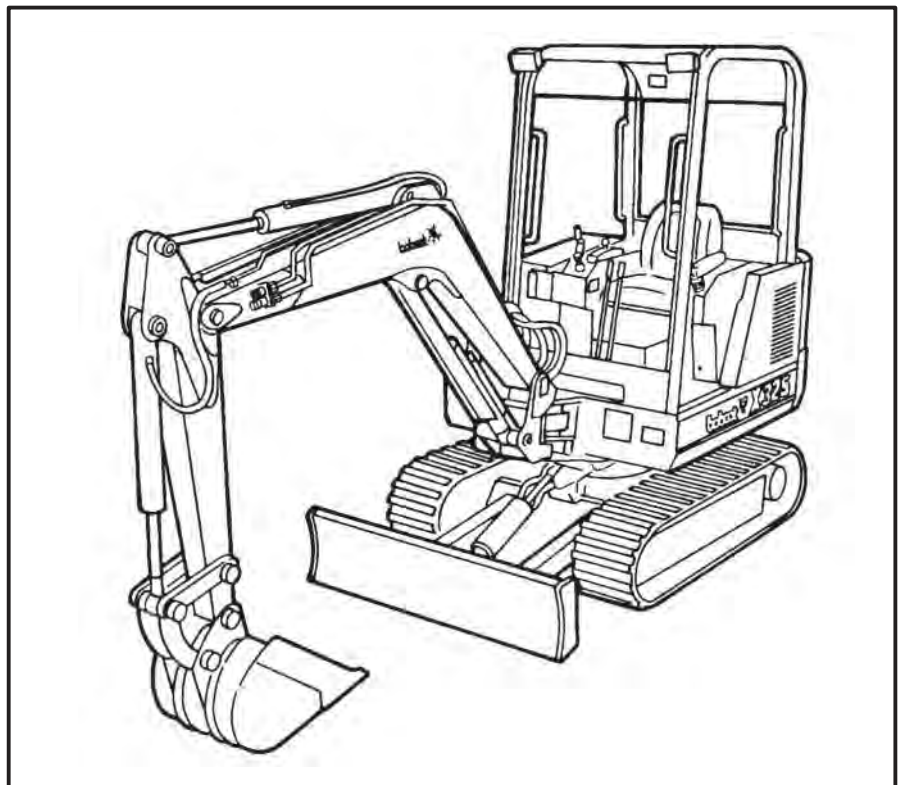


# X 325

## Excavator

### Service Manual

(S/N 514011001 – 514012999)



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

6724480 (11-95)

1 of 435

Printed in U.S.A.



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# MAINTENANCE SAFETY



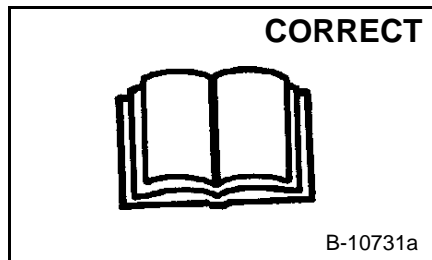
## WARNING

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

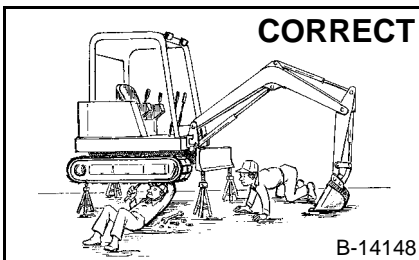


**Safety Alert Symbol:** This symbol with a warning statement, means: "Warning, be alert! Your safety is involved!" Carefully read the message that follows.



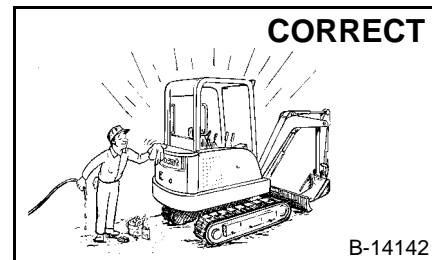
B-10731a

- ⚠ Never service the Bobcat Hydraulic Excavator without instructions.



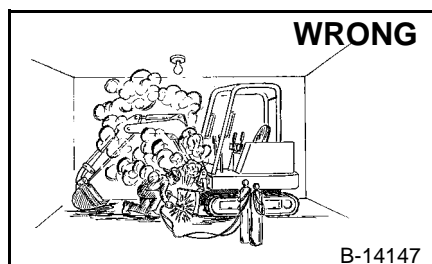
B-14148

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



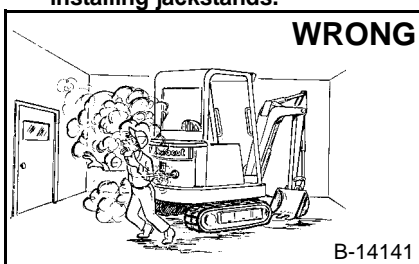
B-14142

- ⚠ Cleaning and maintenance are required daily.



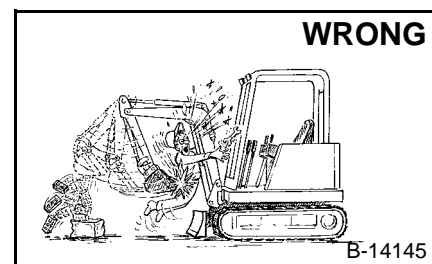
B-14147

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



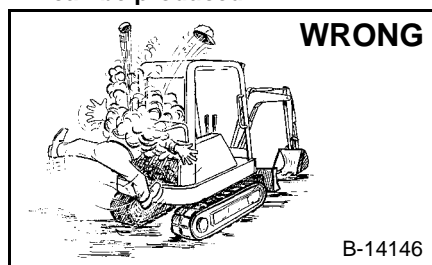
B-14141

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



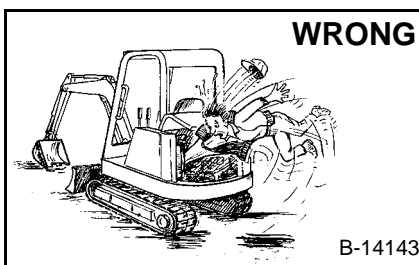
B-14145

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



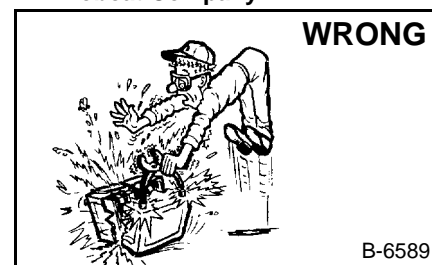
B-14146

- ⚠ 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.



**Bobcat®**

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**PREVENTIVE  
MAINTENANCE**

**HYDRAULIC  
SYSTEM**

**DRIVE  
SYSTEM**

**UPPER WORKS  
& SWING  
SECTION**

**MAIN FRAME  
& TRACKS**

**ELECTRICAL  
SYSTEM**

**ENGINE  
SERVICE**

**SPECIFICATIONS**



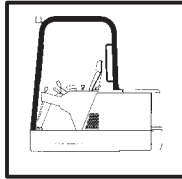


# FOREWORD

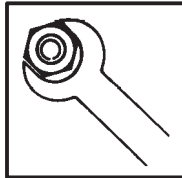
This manual is for the Bobcat hydraulic excavator mechanic. It provides necessary servicing and adjustment procedures for the hydraulic excavator and its component parts and systems. Refer to the Operation & Maintenance Manual for operating instructions, starting procedure, daily checks, etc.

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

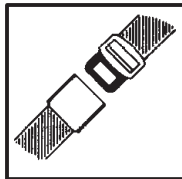
1. Check that the ROPS/TOPS/FOGS is in good condition and is not modified.



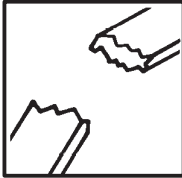
2. Check that ROPS/TOPS mounting hardware is tightened and is Melroe approved.



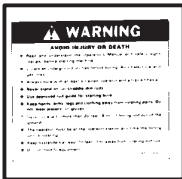
3. The seat belt must be correctly installed, functional and in good condition.



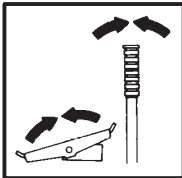
4. Inspect for loose or broken parts or connections.



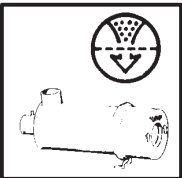
5. Machine signs must be legible and in the correct location.



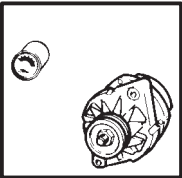
6. Steering levers, control levers and foot pedals must return to neutral. Check that foot pedals lock and control lever locks are in working condition.



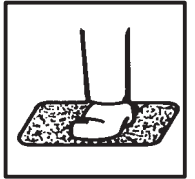
7. Inspect the air cleaner for damage or leaks. Check the condition of the element.



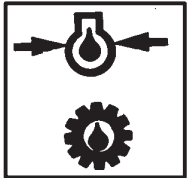
8. Check the electrical charging system.



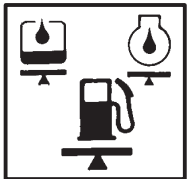
9. Safety treads must in good condition.



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



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



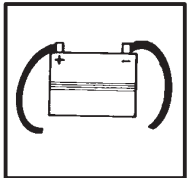
12. Inspect for fuel, oil or hydraulic fluid leaks.



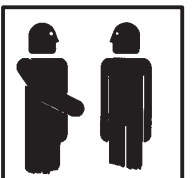
13. Lubricate the excavator.



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

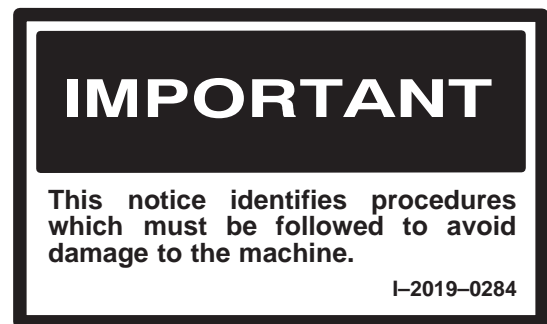
# **WARNING**

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-2003-0797

The following publications provide information on the safe use and maintenance of the excavator 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 excavator gives operating information as well as routine maintenance and service procedures. It is a part of the excavator 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.



**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.**

- Wear tight fitting clothing and any other required safety apparel when operating or servicing the excavator.
- Wear safety glasses when maintaining or servicing the excavator.
- Exhaust gases can kill, vent engine exhaust outdoors.
- Know where fire extinguishers and first aid kits are located and how to use them.
- Do not use the Bobcat excavator where exhaust, arcs, sparks or hot components can contact flammable material, explosive dust or gases.
- Check fuel and hydraulic tubes, hoses and fittings for damage and leakage. Never use open flame or bare skin to check for leaks. Tighten or replace any parts that show leakage. Always clean fluid spills. Do not use gasoline or diesel fuel for cleaning parts. Use commercial nonflammable solvents.
- Do not use ether or starting fluids on an engine that has glow plugs. These starting aids can explode and injure you.
- Clean the excavator before doing any welding. Remove both battery cables (negative (-) cable first). Cover rubber hoses, battery and all other flammable parts. Keep a fire extinguisher near the excavator when welding.
- Have good ventilation when welding or grinding painted parts. Wear a dust mask when grinding painted parts. Toxic dust or gas can be produced.
- Stop the engine and let it cool before adding fuel. **NO SMOKING!**

## 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. Example: 514011001

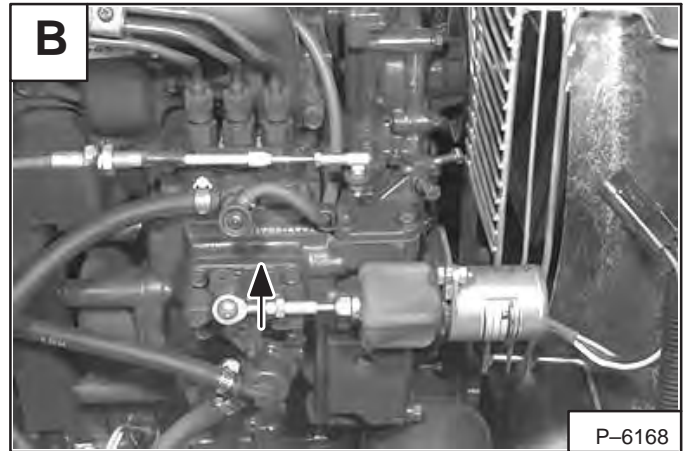
### HYDRAULIC EXCAVATOR SERIAL NUMBER

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

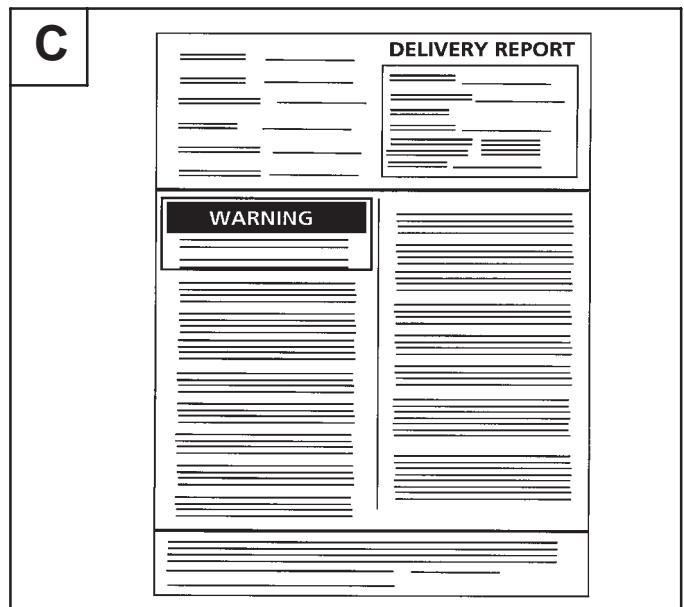
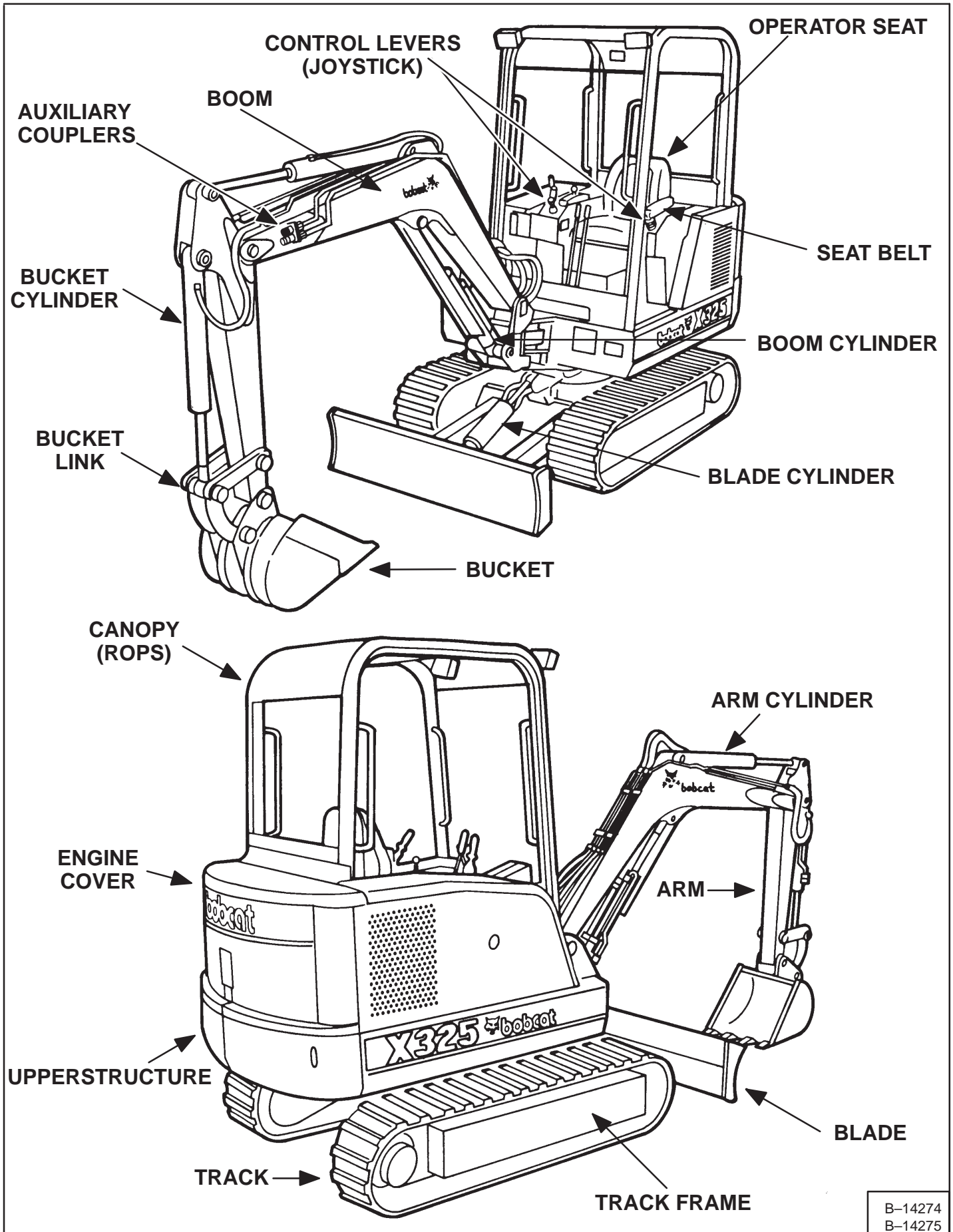


Image C shows a form titled 'DELIVERY REPORT'. The form is divided into several sections. At the top right, there is a section titled 'DELIVERY REPORT' with several lines of text. Below this, there is a section titled 'WARNING' with a black background and white text. The rest of the form consists of several large sections of horizontal lines for text entry. A small white box with the letter 'C' is in the top left corner.

# HYDRAULIC EXCAVATOR IDENTIFICATION



B-14274  
B-14275



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## 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 manual 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            | 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 and 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/canopy.  |       |    |     |     |     |      |
| Seat Belt                     | Check the condition & that fasteners are tight.  |       |    |     |     |     |      |
| Safety Signs (Decals)         | Check for damaged signs (decals) replace as needed.  |       |    |     |     |     |      |
| Tracks                        | Check & adjust tension.  |       |    |     |     |     |      |
| All Machinery Pivot Points    | Lubricate 23 grease fittings.  |       |    |     |     |     |      |
| Hyd. Fluid, Hoses & Tubelines | Check fluid level & add as needed. Check for damage & leaks. Repair & replace as needed.                                 |       |    |     |     |     |      |
| Fuel Tank/Fuel Filter         | Drain water and sediment from fuel tank/fuel filter.   |       |    |     |     |     |      |
| Swing Circle                  | Lubricate two grease fittings.   |       |    |     |     |     |      |
| Swing Pinion                  | Lubricate one grease fitting.  |       |    |     |     |     |      |
| Spark Arrester Muffler        | Clean spark chamber.   |       |    |     |     |     |      |
| Alternator/Fan Belt           | Check & adjust tension.  |       | *  |     |     |     |      |
| Engine Oil & Filter           | Replace oil & filter element.  |       | *  |     |     |     |      |
| Final Drive Case              | Check fluid level & add oil as needed.   |       |    |     |     |     |      |
| Fuel Filters                  | Replace filter elements.   |       |    |     |     |     |      |
| Battery                       | Check & clean cable ends & check electrolyte level.  |       |    |     |     |     |      |
| Engine Valve Clearance        | Check and adjust as needed.  |       |    |     |     |     |      |
| Return Line Screen            | Clean screen with solvent, dry with air pressure (if equipped).  |       |    | **  |     |     |      |
| Hydraulic Filter              | Replace filter element.  |       |    | **  |     |     |      |
| Cooling System                | Clean the radiator fins.   |       |    |     |     |     |      |
| Case Drain Filter             | Clean filter with solvent, dry with air pressure.  |       |    | **  |     |     |      |
| Alternator & Starter          | Check the condition.   |       |    |     |     |     |      |
| 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.  |       |    | **  |     |     |      |
| Cab Heater Air Filter         | Clean filter with air pressure.  |       |    |     |     |     |      |

\* After the first 50 hours of machine operation do the following:

- Check the condition of alternator/fan belt.
- Change the engine oil and filter.

\*\* After the first 100 hours of machine operation do the following procedures:

- Replace the hydraulic fluid filter.
- Change oil in final drive case.
- Clean the case drain filter.
- Clean the return line screen

■ Or Every 12 Months



## LIFTING AND BLOCKING THE EXCAVATOR

### Procedure



## 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-2003-1089



## WARNING

Put jackstands under the blade and track frame before running the engine for service. Failure to use jackstands can allow the machine to fall or move and cause injury or death.

W-2017-0286



Always park the machine on a level surface.

Raise the machine using the boom and arm [A].

Fully raise the blade and install jackstands under the blade [A] and track frame [B].

Lower the boom until all the machine weight is on the jackstands.

Repeat the procedure for the other side.

Stop the engine.

## TRANSPORTING THE HYDRAULIC EXCAVATOR

### Procedure

Make sure the parking brakes on the transport vehicle are engaged and wheels are blocked.

Align the ramps with the center of the transport vehicle. Secure the ramps to the truck bed and be sure ramp angle does not exceed 15 degrees.

Use metal loading ramps and slip resistant surface.

Make sure the ramps are the correct length and width, and can support the weight of the machine.

Determine the direction of the track movement before moving the machine (blade forward). Engage the swing lock pin to lock the upperstructure.

Move the machine forward onto the transport vehicle [A].

Do not change direction of the machine while it is on the ramps.

After loading the machine, position the arm and bucket as shown [B].

Lower the boom.

Stop the engine and remove the key.

Use the following procedure to fasten the Excavator to the transport vehicle:

1. Put blocks under the front and rear of the track shoes.
2. Fasten hold down chains to the front corners of the blade and to the tie down loop at the track frame to prevent it from moving when going up or down slopes, or during sudden stops [C] & [D].
3. Use chain binders to tighten the chains and then safely tie the chain binder levers to prevent loosening.

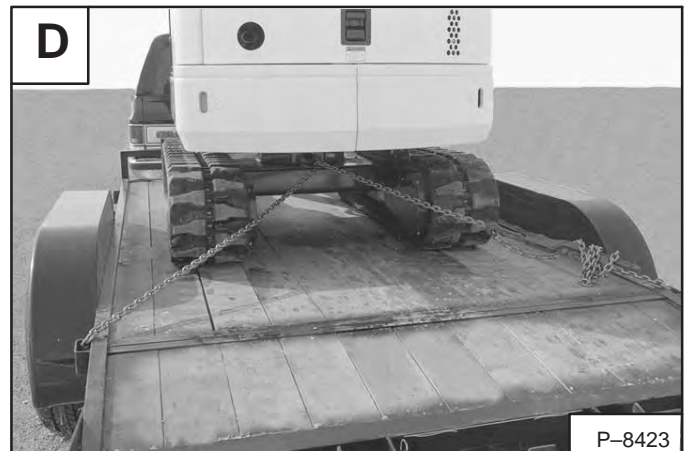
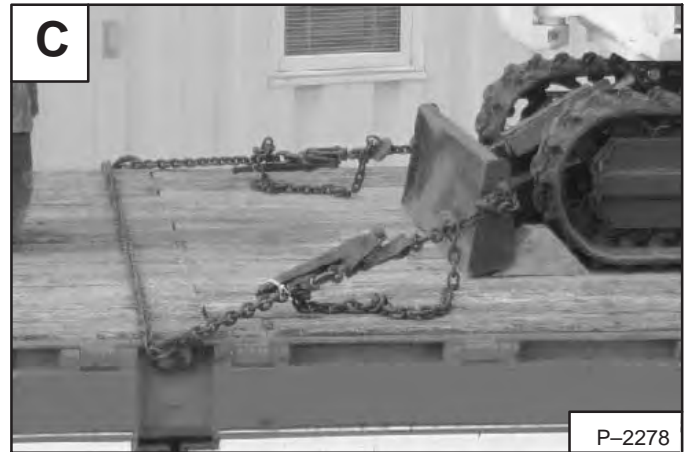
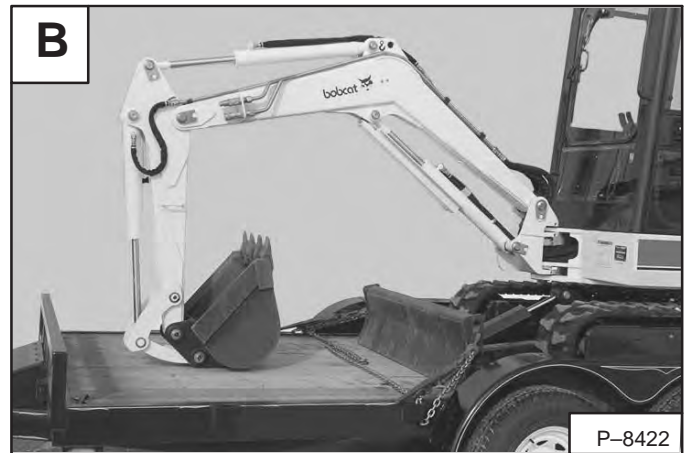
When transporting the machine, observe the rules, motor vehicle laws and vehicle limit ordinances. Use a transport and towing vehicle of adequate length and capacity.



## WARNING

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

W-2058-0887



## 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 1-3 for the correct service interval.

Replace the filter element when the red ring shows in the window of the condition indicator (Item 1) [B].

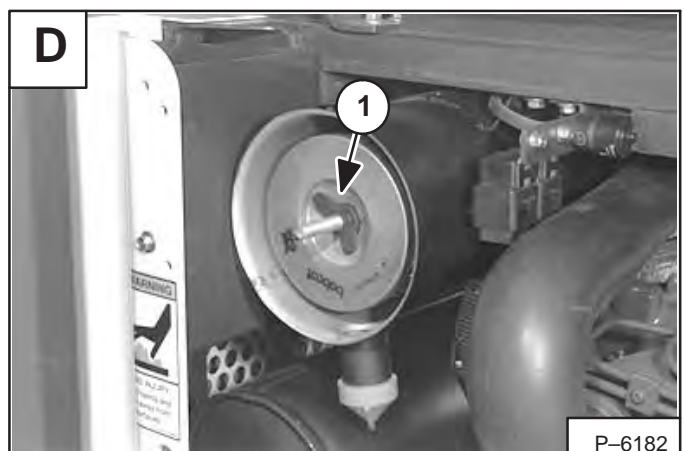
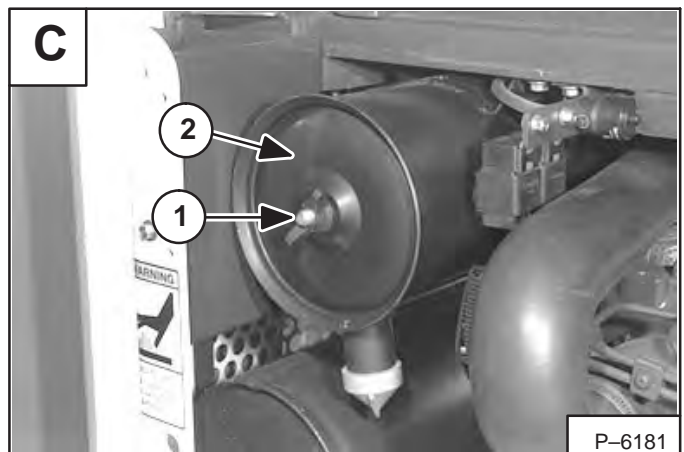
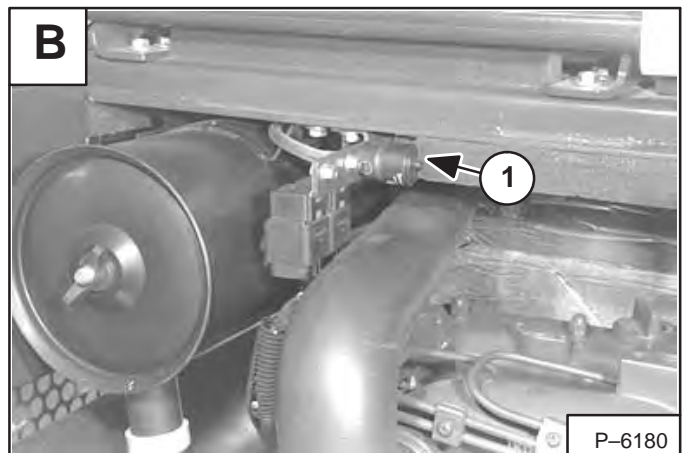
**NOTE:** Push the button on the condition indicator, start the engine and run the engine at high idle. If the red ring does not show, do not replace the filter element.

Service the air cleaner as follows:

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

Remove the cover (Item 2) [C].

Remove the wing nut (Item 1) [D] at the primary filter element.

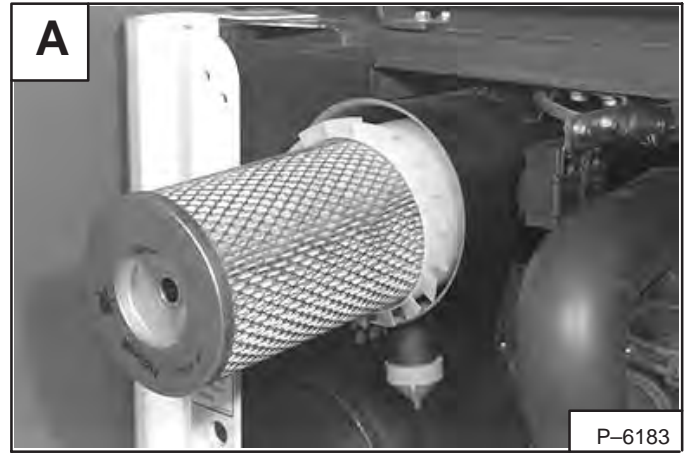


## AIR CLEANER SERVICE (Cont'd)

### Replacing the Filter Element (Cont'd)

Remove the primary filter element [A].

**NOTE:** Make sure all sealing surfaces are free of dirt and debris.

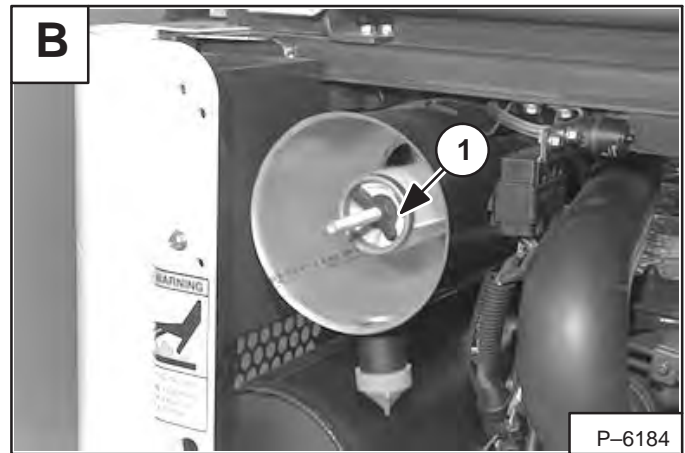


Install the new filter element and tighten the wing nut.

Install the dust cover and tighten the wing nut.

Only replace the inner filter element (Item 1) [B] under the following conditions:

- Replace the inner filter element every third time the primary filter element is replaced.
- Replace the inner filter element when the red ring still shows in the condition window after the primary filter element is replaced.





## FUEL SYSTEM

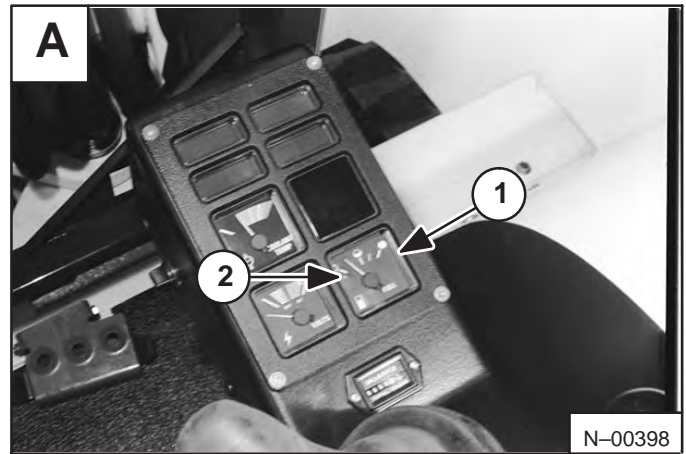
### Fuel Specifications

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

The following is 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% |

For local recommendations, the operator can contact his fuel supplier.



**! WARNING**

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

W-2063-0887

### Filling the Fuel Tank

The fuel level in the tank is indicated by the fuel gauge (Item 1) [A] when the ignition switch is ON.

**NOTE: When the fuel level reaches the 1.7 gals. (6,5 L) fuel setting, the low fuel light (Item 2) [A] will come ON to alert the operator of this condition.**

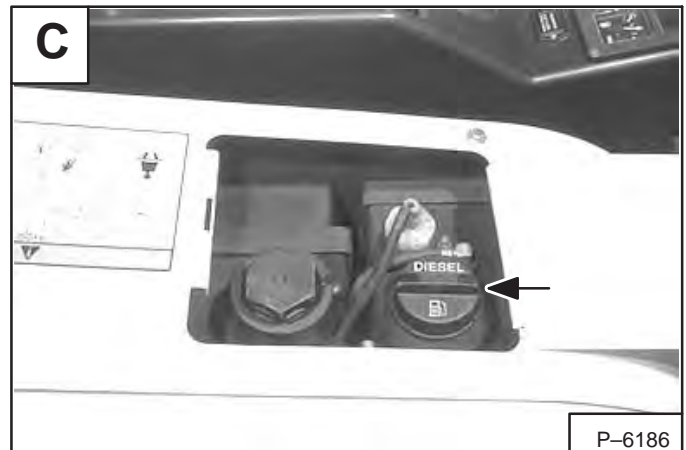
Use the key to unlock the fuel fill door (Item 1) [B].

Turn the fill cap to remove it [C].

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. Close and lock the fuel door.



**! 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)

### Fuel System Maintenance

See the Service Schedule Page 1–3 for the correct service interval.

To remove the water and sediment from the fuel tank, turn the upperstructure until the fuel tank is centered between the rear tracks.

Open the drain valve (Item 1) **[A]** at the bottom of the fuel tank.

Drain contaminated fuel into a container.

### Fuel Filter

See the Service Schedule Page 1–3 for the service interval when to replace the fuel filter.

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

Tighten the drain valve when all the water has been removed.

Remove the filter element (Item 2) **[B]**.

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 air from the fuel filter. (See Below.)

### Removing Air From the Fuel System

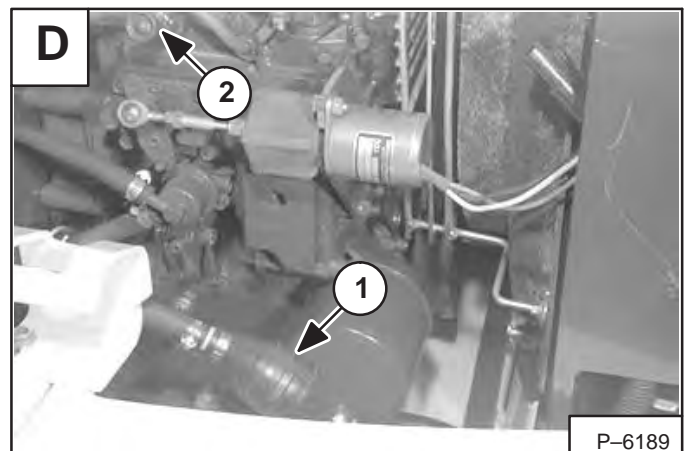
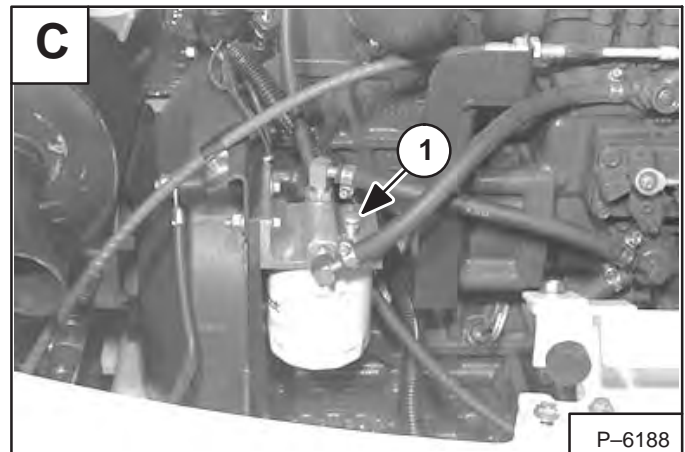
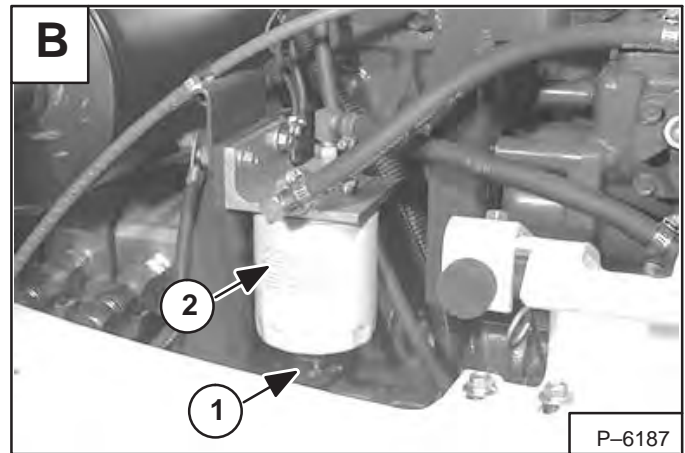
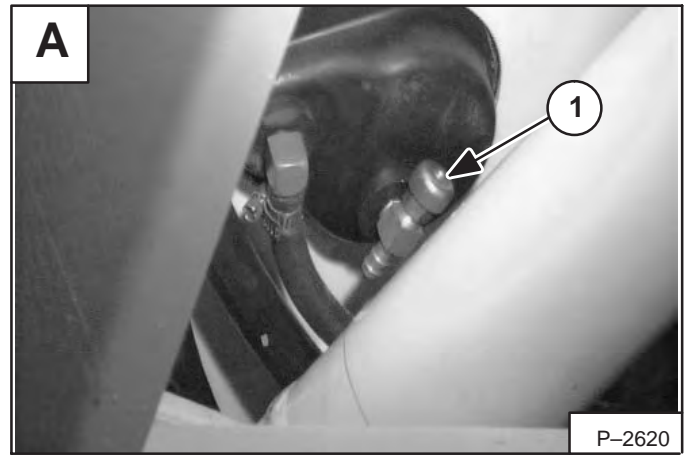
After replacing the fuel filter or when the fuel tank has run out of fuel, the air must be removed from the fuel system before starting the engine.

Open the vent (Item 1) **[C]** on the top of the fuel filter housing.

Operate the hand pump (priming bulb) (Item 1) **[D]** until the fuel flows from the vent (Item 1) **[C]** with no air bubbles.

Tighten the vent plug (Item 1) **[C]**.

Start the engine. It may be necessary to open the vent (Item 2) **[D]** at the fuel injection pump briefly until the engine runs smoothly.





## ENGINE LUBRICATION SYSTEM

### Checking Engine Oil

Check the engine oil every day.

Stop the engine. Open the engine cover. Remove the dipstick (Item 1) [A]. Keep the oil level between the marks on the dipstick.

Use a good quality motor oil that meets API Service Classification of CE. (See *Fuel, Coolant and Lubricants Chart*, Page 8-1.)

### Engine Oil and Filter Replacement

See the Service Schedule Page 1-3 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 upperstructure 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.

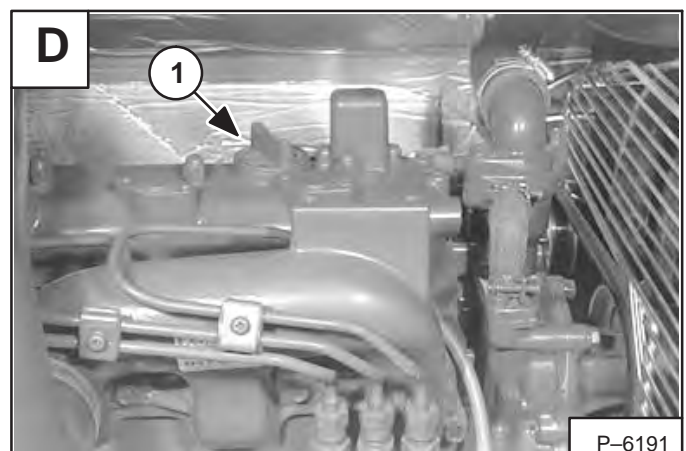
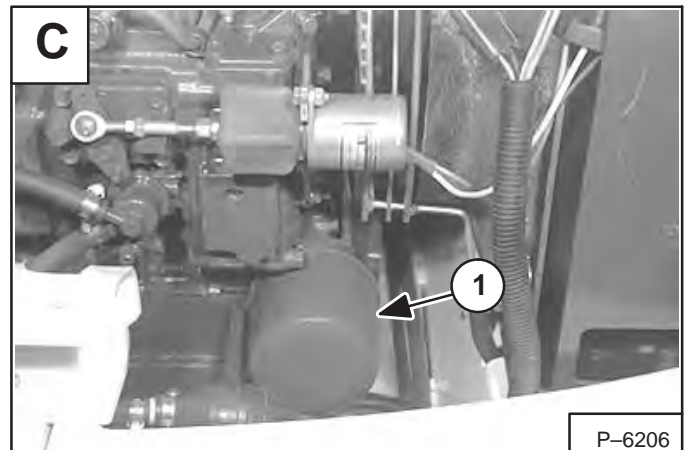
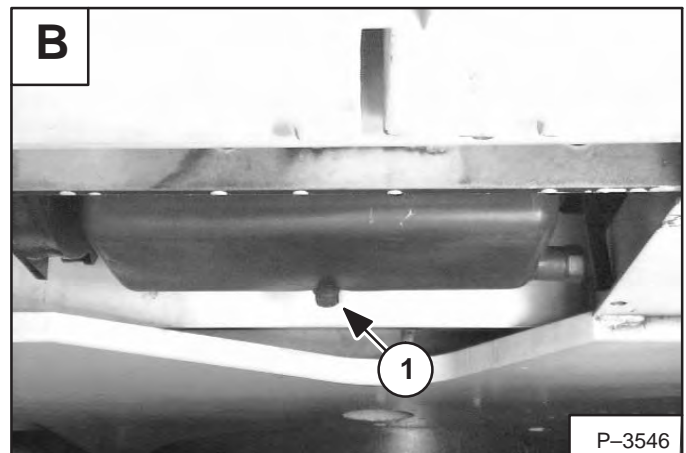
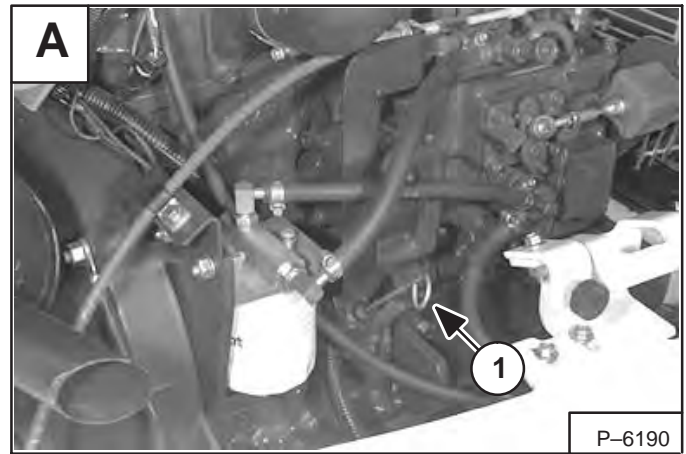
Install and tighten the oil drain plug.

Remove the oil fill cap (Item 1)[D]. Put 5 qts. (5,7 L) of oil into the engine. (See *Fuel, Coolant and Lubricants Chart & Capacity*, Page 8-1.)

Start the engine and let it run for several minutes.

Stop the engine. Check for leaks at the oil filter and the drain plug.

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 premixed coolant to the recovery tank. (See type of coolant information below.)

### 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 between the tracks. Stop the engine. When the engine is cool, loosen and remove the radiator cap (Item 1) [B].

Open the radiator drain valve (Item 1) [C] at bottom of radiator. Drain the coolant into a container.

Open the engine block drain valve (Item 1) [D] and drain the coolant into a container.

After all the coolant is removed, close both drain valves.

**NOTE: Remove all coolant from the coolant recovery tank (Item 1) [A] also.**

### Propylene Glycol (Factory Installed)

Add premixed coolant; 47% water and 53% propylene glycol to the recovery tank if the coolant level is low.

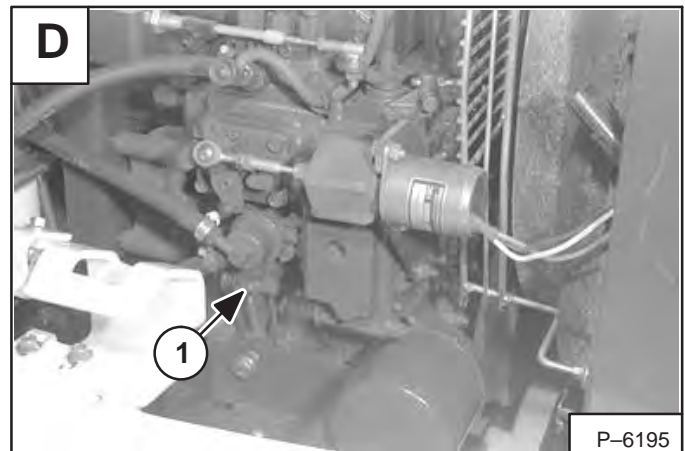
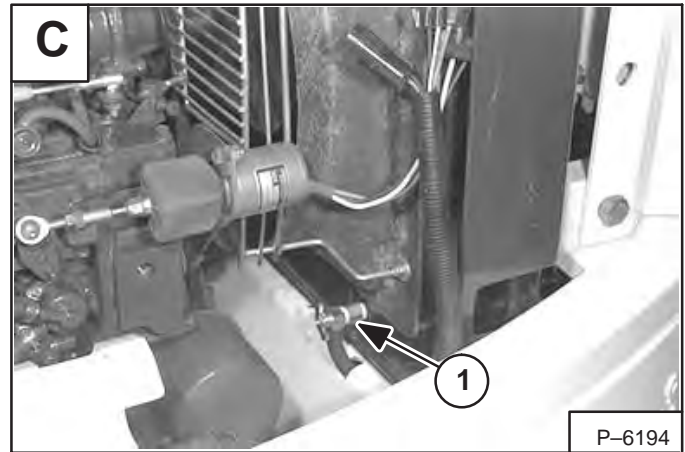
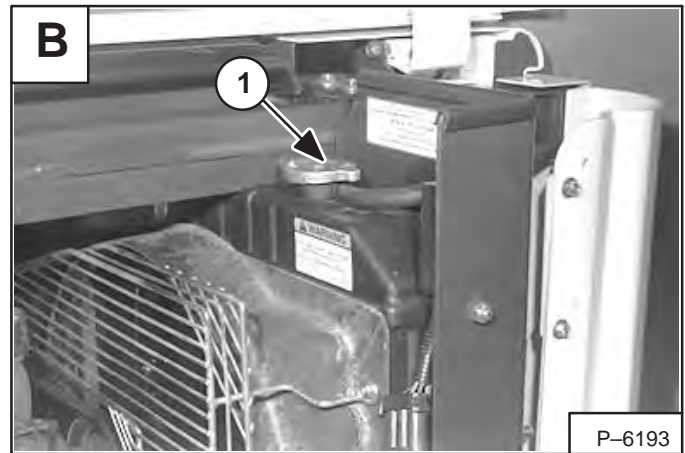
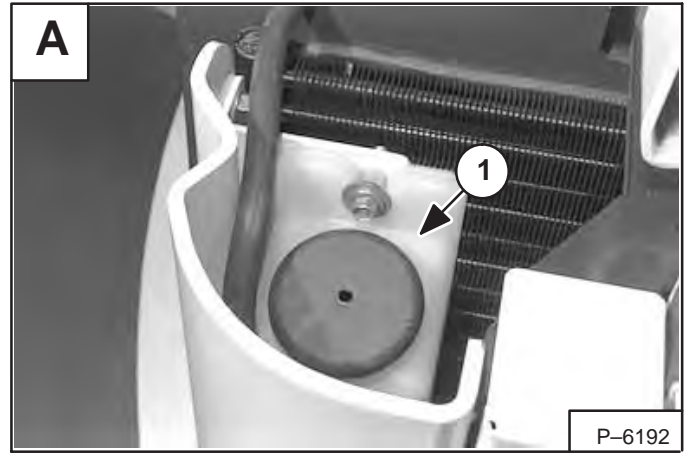
One gallon and one pint of propylene glycol mixed with one gallon of water is the correct mixture of coolant to provide a  $-34^{\circ}\text{F}$  ( $-37^{\circ}\text{C}$ ) freeze protection.

Use a refractometer to check the condition of propylene glycol in your cooling system.

Fill the radiator with the premixed 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 filler neck. Install the radiator cap and tighten.



## HYDRAULIC SYSTEM

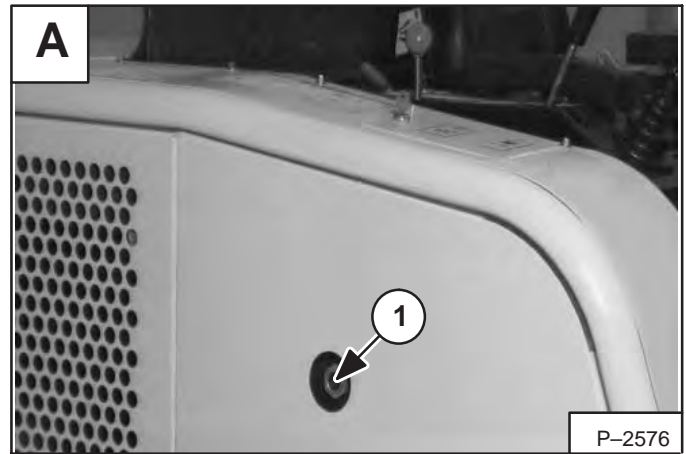
### Checking and Adding Fluid

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

Put the machine on a flat level surface.

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) **[A]** located on the side of the hydraulic reservoir.



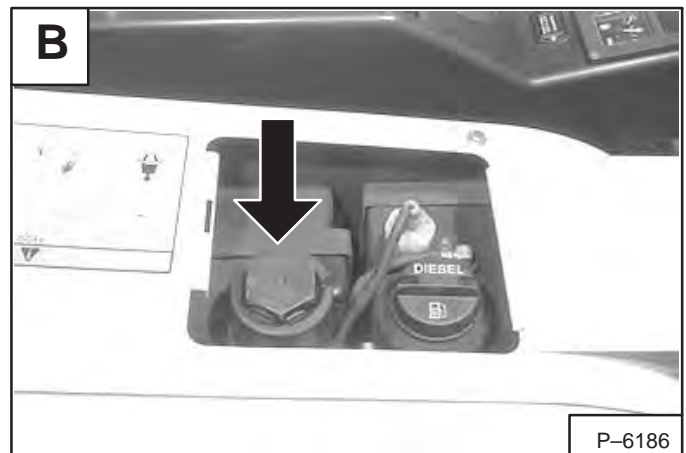
If the fluid level is not correct, open the hydraulic tank access door **[B]**.

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

Check the condition of the fill screen **[C]**. The screen must be installed in fill neck when adding oil.

Add the correct fluid to the reservoir until it is visible in the sight gauge. (See *Fuel, Coolant and Lubricants Chart*, Page 8-1.)

Install the reservoir cap and close and lock the access door.



### Return Line Filter Service

See the Service Schedule Page 1-3 for the correct service interval.

Using the ignition key, unlock and remove the right side cover.

Remove the filter cartridge (Item 1) **[D]**.

Disassemble the cartridge and clean thoroughly.

Install the filter cartridge.



### Replacement of the Hydraulic Filter

See the Service Schedule Page 1-3 for the correct service interval.

Using the ignition key, unlock and remove the right side cover.

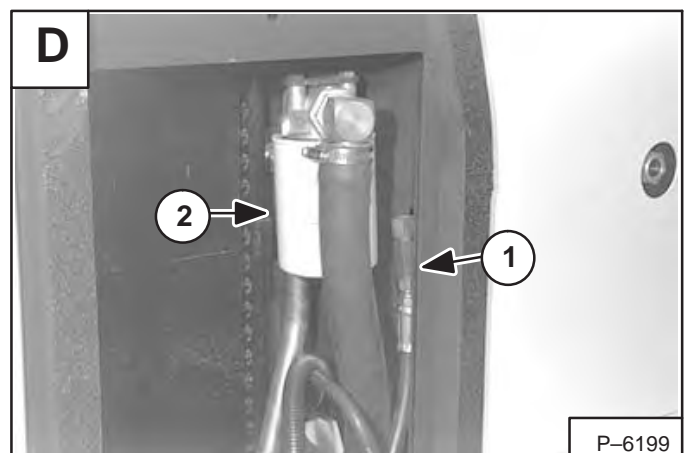
Remove the filter element (Item 2) **[D]**.

Clean the housing where the filter gasket makes contact. Put clean hydraulic fluid 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 1–3 for the correct service interval.

Move 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 1–13.)

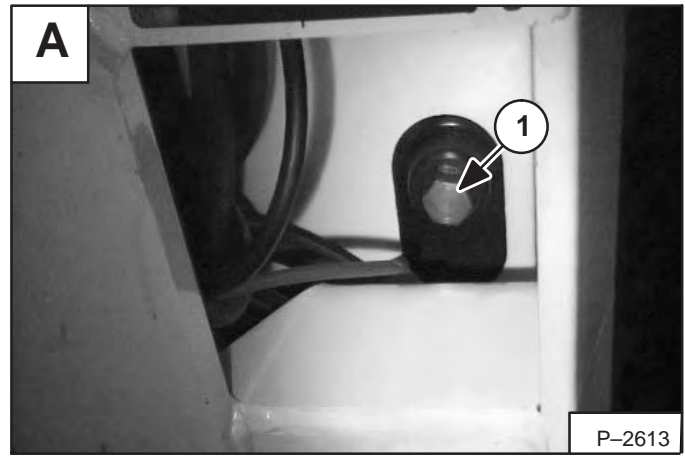
Remove the drain plug (Item 1) **[A]** from the bottom of the reservoir.

Drain the fluid into a container.

Install the drain plug.

Add approximately 9.5 gals. (36 L) of fluid to the reservoir. (See *Fuel, Coolant and Lubricants Chart*, See Page 8–1.)

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.

W-2103-1285



## USING A BOOSTER BATTERY (Jump Starting)

### Procedure

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

Make sure the swing locking lever is in the engaged position.

The key switch must be in the OFF position.

The booster battery must be 12 volt.

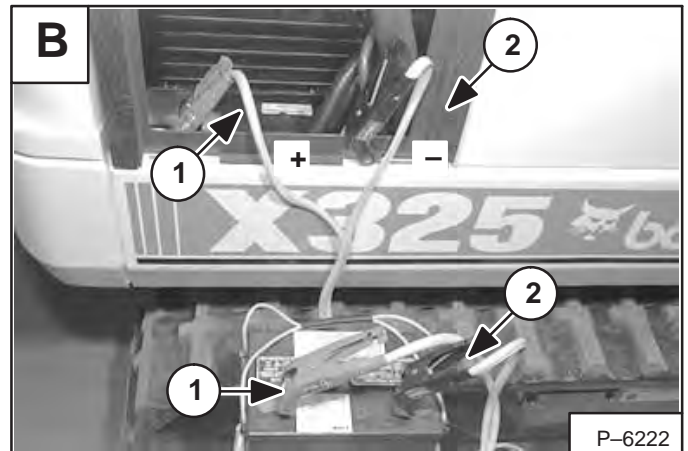
Using the ignition key, unlock and remove the right side cover.

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 positive (+) terminal (Item 1) [B] of the machine battery.

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

**NOTE: See Cold Temperature Starting Condition, Operation & Maintenance Manual.**

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



## 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.

I-2023-1285

## IMPORTANT

If jump starting the excavator from a second machine:

When jump starting the excavator from a battery installed in a second machine. Make sure that the second machine is **NOT** running while using the glow plugs. High voltage spikes from a running machine can burn out the glow plugs.

I-2060-0195

## ⚠ 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

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