

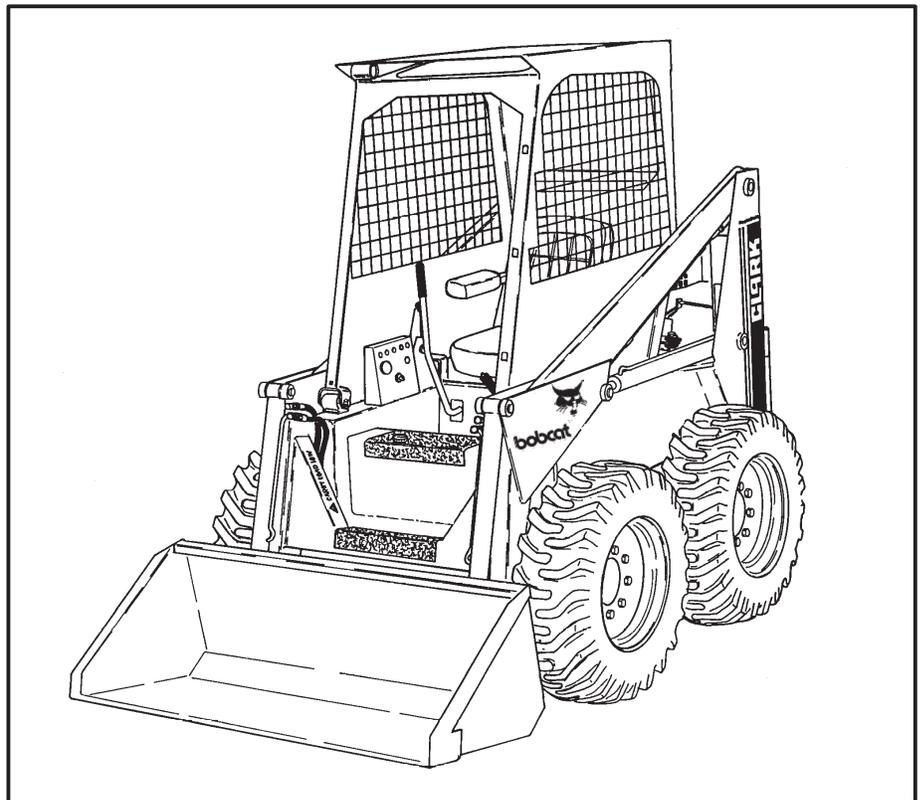
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# Service Manual



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



Product: Bobcat 825 Skid Steer Loader Service Repair Workshop Manual  
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# MAINTENANCE SAFETY



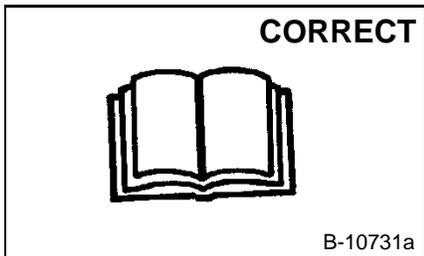
## WARNING

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.

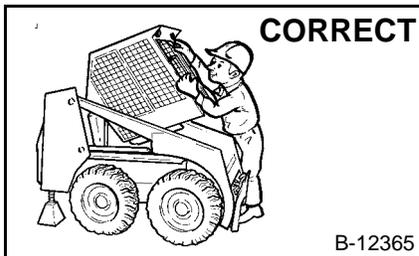
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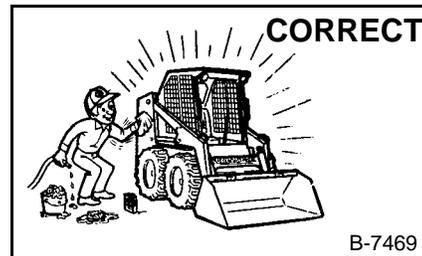
**Safety Alert Symbol:** This symbol with a warning statement, means: "Warning, be alert! Your safety is involved!" Carefully read the message that follows.



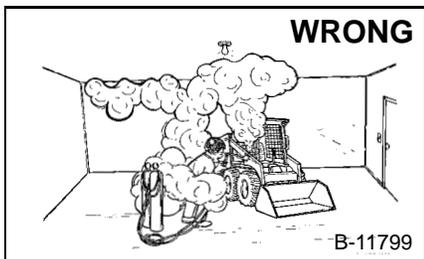
Never service the Bobcat Skid-Steer Loader without instructions.



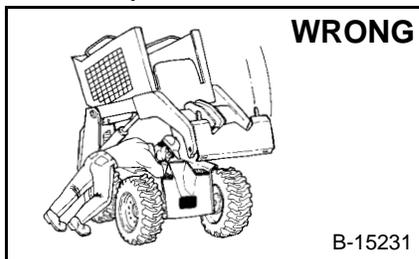
Use the correct procedure to lift or lower operator cab.



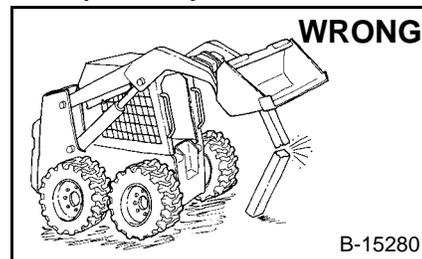
Cleaning and maintenance are required daily.



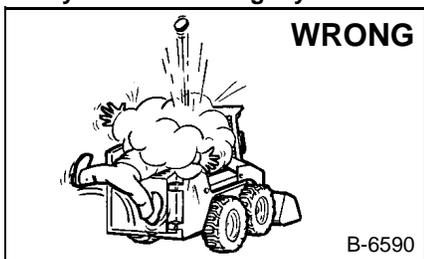
- Have good ventilation when welding or grinding painted parts.
- Wear dust mask when grinding painted parts. Toxic dust and gas can be produced.
- Avoid exhaust fume leaks which can kill without warning. Exhaust system must be tightly sealed.



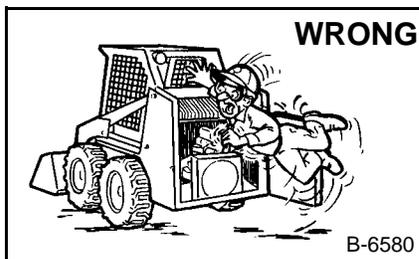
Disconnecting or loosening any hydraulic tubeline, hose, fitting, component or a part failure can cause lift arms to drop. Do not go under lift arms when raised unless supported by an approved lift arm support device. Replace it if damaged.



- Never work on loader with lift arms up unless lift arms are held by an approved lift arm support device. Replace if damaged.
- Never modify equipment or add attachments not approved by Bobcat Company.



- Stop, cool and clean engine of flammable materials before checking fluids.
- Never service or adjust loader 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.



- 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 loader.



- 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®**

## FORWARD

This manual provides instruction for proper routine service and adjustment of the Bobcat, and detailed overhaul instructions of the power train, loader hydraulic/hydrostatic system and general mainframe components.

Refer to the Owner's Manual for general operating instructions (Starting Procedure, Daily Checks, Bucket Operation, Minor Maintenance, etc.).

A general inspection of the following items should be made whenever the machine has undergone service or repair:

1. Check hydraulic fluid level, engine oil level and fuel supply.
2. Inspect for any sign of fuel, oil or hydraulic fluid leaks.
3. Lubricate the machine.
4. Check battery condition, electrolyte level and cables.
5. Inspect air cleaner system for damage or leaks. Check element and make replacement, if necessary.
6. Check alternator drive belt for condition and tension.
7. Check for loose drive chains by lifting the rear of the machine and turning the rear wheels by hand.
8. Check tires for wear and pressure.
9. Check the Bob-Tach attachment for condition. Inspect the wedges for damage or wear.
10. Inspect safety items for condition (ROPS Guard, Seat Belt, Safety Treads, Lights, etc.).
11. Make a visual inspection for loose or broken parts or connections.
12. Operate the loader; checking all functions.

Advise the owner if any of the above items are in need of repair.

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**PREVENTIVE  
MAINTENANCE**

**HYDRAULIC  
SYSTEM**

**HYDROSTATIC  
DRIVE SYSTEM**

**MECHANICAL  
TRANSMISSION**

**MAIN  
FRAME**

**ELECTRICAL  
SYSTEM**

**ENGINE  
SERVICE**

**SPECIFICATIONS**

**ALPHABETICAL  
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## PREVENTIVE MAINTENANCE

## PREVENTIVE MAINTENANCE

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## INTRODUCTION

### 1-1.1 Symbols

#### **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 [A].

W-2003-0797

#### **IMPORTANT**

This notice identifies procedures which must be followed to avoid damage to the machine.

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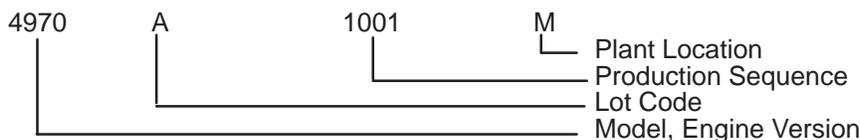
### 1-1.2 Serial Number Identification

It is important to make correct reference to the serial number of the loader when making repairs or ordering parts. Early or later made models (identification made either by Lot or serial number group) sometimes use different parts, or it may be necessary to use a different procedure in doing a specific job.

### 1-1.3 Loader Serial Number

The loader serial number plate location is on the left upright in the engine compartment (Fig. 1-1). Two types of serial numbers are used. Early loaders use a serial number with a lot code and a four number production sequence. Later machines use a five number production sequence.

The serial number is made up as follows for early loaders.



The serial number is made up as follows for later loaders.

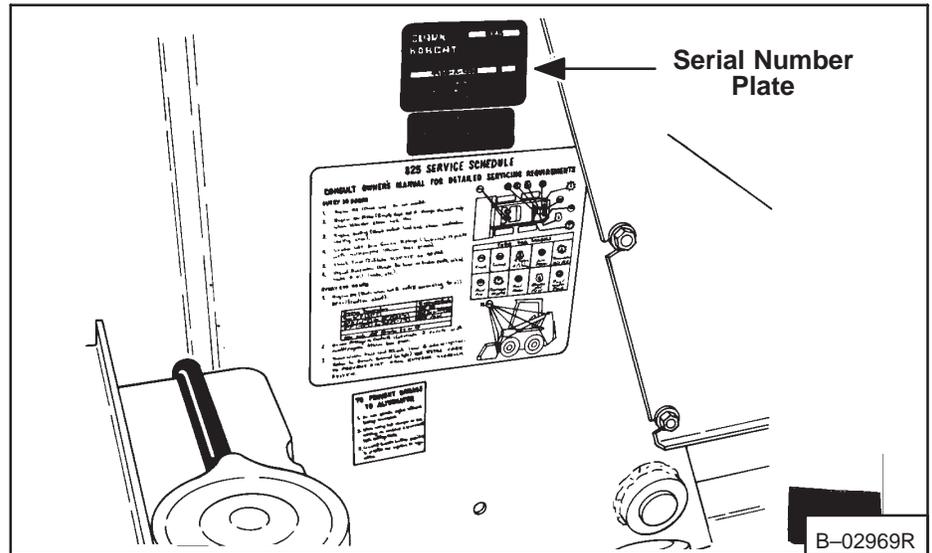
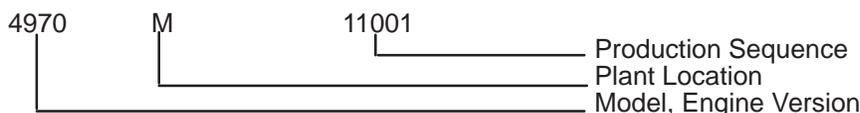


Fig. 1-1 Loader Serial Number Plate

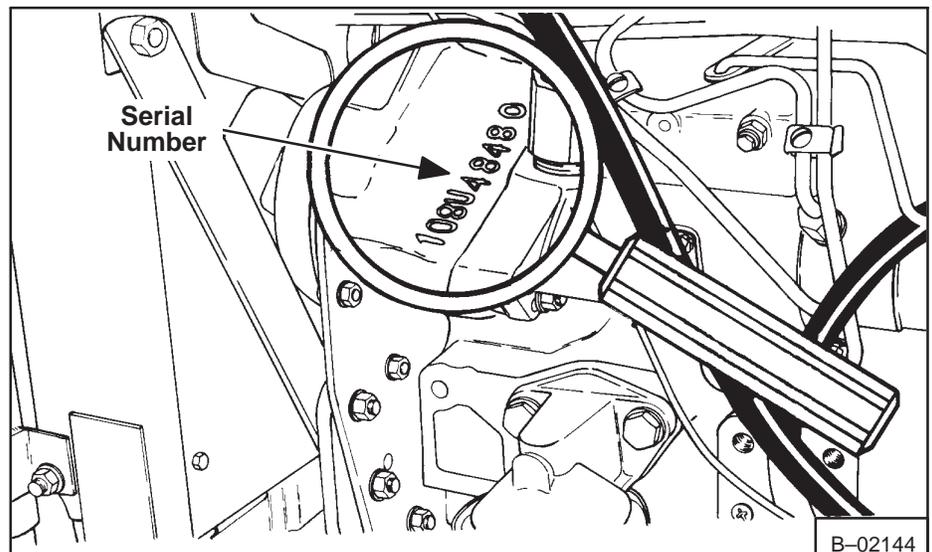


Fig. 1-2 Engine Serial Number Plate

### 1-1.4 Engine Serial Number

The location of the engine serial number is on the fuel injector pump adaptor (Fig. 1-2).

### 1-1.5 Pre-Delivery Inspection

The purpose of the pre-delivery inspection is to make sure that the loader is in correct operating condition when it comes to the dealer and before delivery to the customer.

The pre-delivery inspection also lets the factory know when something is wrong with the loader so that the action can be taken to prevent the problem from happening in the future.

All items on the inspection form (Fig. 1-3) must be completed according to specification in this manual.

One copy of the completed form is to be mailed to the attention of Quality Control, Melroe Division.

**30 HOUR OPERATIONAL & SERVICE INSPECTION**

**IMPORTANT** - This inspection is to be performed with components and maintenance done.

(1) Mark items below indicating actual service.

(2) Mark items which needed work. Report any defects immediately (attach necessary sheets with this form).

Refer To Loader Service Manual For Specifications & Details.

**SERVICE INSPECTION**

**WARNING** - Operator must be in seat with seat belt fastened while operating, adjusting or while loader with engine running.

- Inspect level ground and lubricate as necessary.
- Inspect air let system and correction Service as necessary.
- Inspect engine cooling system. Clean or repair as necessary.
- Change engine oil and filter.
- Tighten cylinder head nuts or bolts to correct torque and adjust valve (Timing, Intake and Exhaust adjusted).
- Adjust valve clearance (AR Davis Engines, Optional 20-200).
- Check high and low engine idle speed (Adjust to specification).
- Check hydraulic and/or charcoal reservoir for correct level.
- Change hydraulic oil filter(s).
- Inspect all hoses for proper operation. Repair or adjust as necessary.
- Inspect Bobcat for leaks, loose connections, loose electrical and damaged parts.
- Inspect all electrical accessories (lights, horn, etc.) for proper operation. Check battery lights and ammeter or voltmeter, as applicable.
- Check area for proper reflector alignment.
- Check wheel nuts or bolts for correct torque.
- Check main frame to weight frame sets.

Let the manufacturer's repairing parts not repaired during inspection or other comments:

Owner Name \_\_\_\_\_ Dealer Name \_\_\_\_\_  
 Address \_\_\_\_\_ City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_  
 City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

Owner/Operator Signature \_\_\_\_\_ Service Representative Signature \_\_\_\_\_

The owner or to be given a copy of this form, the dealer keeps a copy and the third copy must be mailed to the Melroe Service Department. No warranty claims will be processed unless the machine is over 90 hours, unless the form is on file with the Melroe Service Department.

81432-1 (10-80) MAIL TO CLARK EQUIPMENT, MELROE DIVISION, SERVICE DEPARTMENT Printed in U.S.A.

\*Fig. 1-3 Pre-Delivery Inspection Form

### 1-1.6 30 Hour Inspection

The 30-hour inspection must be completed soon after the first 30 hours of operation.

The purpose of the 30-hour inspection is:

1. For adjustment and inspection after first work period
2. To correct wrong maintenance and operating methods.
3. For demonstration of correct service procedures to customer.

All items on the 30-hour inspection form (Fig. 1-4) must be completed by the mechanic according to specification in this manual.

When the 30 hour inspection has been completed, the form must be signed by the mechanic that completed the inspection, dealer person and owner or operator.

One copy of the completed form is for the owner of the loader. Another copy is to be sent to the attention of Service Department, Melroe Division. The remainder copy is for the dealer.

**BOBCAT LOADER PRE-DELIVERY INSPECTION**

**IMPORTANT** - This inspection is to be performed with components and maintenance done.

(1) Mark items below indicating actual service.

(2) Mark items which needed work. Report any defects immediately (attach necessary sheets with this form).

Refer To Loader Service Manual For Procedure And For Specifications.

Mark Appropriate Box.

**YES NO GENERAL AND VISUAL**

Is Bobcat equipped as ordered?

Did Bobcat arrive without any shipping damage?

Are delivery package or acceptable condition?

Do the delivery package contain the below?

1. One or Manual
2. Operator's Report
3. 30-Hour Inspection Form
4. Shop Manual

Were all nuts and bolts tightened properly?

Were all fluids and hoses checked properly and secured?

Were tires and chains (if any) checked and set to correct condition?

Check the seat and back seat and safety light.

Was the seat quality acceptable on this Bobcat?

Are all safety parts checked and secured?

AGPS Bobcat Back Tarpaulin Tarpaulin Frame Engine Compartment

Check the engine speed properly?

Is the Bobcat correct?

**ELECTRICAL**

Are all warning lights and signals operational?

Does the horn function?

Is battery in good condition and connections tight?

Is working harness tested correctly and all connections correct?

**WARNING** - Loader must be used only as recommended in the operator's manual. Do not operate loader in conditions which are hazardous to the operator or others.

**ENGINE**

Are fuel and air filters checked and replaced?

Do intake, exhaust, governor and other engine components function properly?

Are alternator, generator and other belts engaged and adjusted correctly?

Is engine oil level correct?

Are all connections to the air cleaner tightened properly?

**LUBRICATION AND FLUID LEVELS**

Is engine oil level checked and adjusted to 3/4"?

Is engine oil level checked and adjusted to 3/4"?

Is the hydraulic fluid level checked?

Is the hydraulic fluid level checked?

How should this form be returned to you in this inspection?

Please comment on NO answers and other items which are not correct.

**INSPECTION PERFORMED BY:**

If repair, repair and required, correct quality or warranty claim to consideration.

81432-1 (10-80) MAIL TO CLARK EQUIPMENT, MELROE DIVISION, SERVICE DEPARTMENT Printed in U.S.A.

Fig. 1-4 30 Hour Inspection Form

## SERVICE SCHEDULE

Maintenance work must be done at regular intervals. Failure to do so will result in damage to the Bobcat loader or the engine. The *SERVICE SCHEDULE* is a guide for correct maintenance of the Bobcat loader. DO NOT change this *SERVICE SCHEDULE* unless you increase the frequency of service when the Bobcat loader is operated in very hot, cold, dusty or corrosive conditions.



# WARNING

Never go under or reach under lift arms or a lift cylinder without an approved lift arm stop installed, or you could be crushed.

W-2060-0887

SERVICE SCHEDULE		HOURS					
ITEM	SERVICE REQUIRED	8-10	50	100	200	500	1000
Engine Oil	Check the oil and add oil as needed.						
Engine Air Cleaner	Check the condition indicator. Make inspection of the air cleaner system. Replace the element when the red ring shows in the indicator window.						
Engine Cooling System	Make inspection and clean the radiator as necessary. Check the coolant level and add coolant if level is low.						
Tires	Check tires for damage and for correct air pressure.						
Seat Belt, Operator Guard & Seat Bar	Check the condition of the seat belt. Check the operator guard fastening bolts to make sure they are tight. Check the seat bar for correct operation.						
Safety Signs (Decals)	Check for damaged decals. Replace any decals that are not in the correct location.						
All Pivot Pins	Add grease to all the fittings.						
Hydraulic Fluid	Check fluid level and add recommended fluid as needed.						
Water Filter	Remove the trapped water.						
Wheel Nuts	Tighten wheel nuts to 120 ft.-lbs. (163 Nm) torque (Check every 8 hours for the first 20 hours).						
Engine Oil and Filter	Change oil and filter.						
Transmission Fluid	Check fluid level and add fluid as needed.						
Battery	Check the battery cables and the water level.						
Control Pedals and Steering Linkage	Check both for correct operation. Make repairs and adjustments as needed.						
Bob-Tach	Check the locking levers and wedges for their condition and correct operation.						
Brake	Check the brake for correct operation. Make adjustment as needed.						
Drive Belt (Alternator & Water Pump)	Check condition and tension of the belt.						
Drive Chains	Raise the loader and check the tension in the chains.						
Hydraulic Tubes & Hoses	Inspect for damage and leaks and replace as needed.						
Spark Arrestor Muffler	Empty spark chamber.						
Fluid Filter (25 Micron)	Replace the filter element.						
Fluid Filter (10 Micron [External])	Replace the filter element.						
Final Fuel Filter	Replace the filter element. Remove air from the system.						
Transmission Fluid Reservoir	Remove condensation, check level and add as needed.						
U-Joint (Hydrostatic & Engine)	Add grease to the fittings (3)						
Seat Bar	Lubricate the detent mechanism.						
Transmission Fluid Reservoir	Drain the reservoir and fill with the correct fluid.						
Transmission Fluid Filter (10 Micron [Internal])	Replace the filter element.						

**NOTE:** Check the torque of the cylinder head bolts during the 30 hour inspection. Adjust valve tappets after making torque adjustment.

### 1-3 REAR GRILL

The rear grill is opened by pulling forward and up on the rubber fastener (Fig. 1-5). Lift up the engine cover, pull up on the handle to release the grill. Pull the grill open (Fig. 1-6).

### 1-4 TILTING THE OPERATOR GUARD

The ROPS (Roll Over Protective Structure) can be tilted, when desired to make more space when servicing the Bobcat.

To tilt the Operator Guard (S/N 19126 & Below):

1. Remove the retaining nuts at the left and right rear corners of the ROPS (Fig. 1-7).
2. Move the *Cab Tilt* switch (Fig. 1-8) up to tilt the ROPS forward (Fig. 1-9).

**NOTE: Always install the retaining nuts after ROPS is lowered and before operating Bobcat.**

To tilt the Operator Guard (S/N 19127 & Above):

1. Stop the loader on a level surface.
2. Put the lift arms all the way down or hold the lift arms up with a LIFT ARM STOP. The LIFT ARM STOP must be installed by a second person while the operator is in the operator seat.
3. Stop the engine, engage the parking brake.
4. Remove the nuts on each side of the operator guard at the rear corners (Fig. 1-7).
5. The hex bolt for the mechanical tilt is located on the right side of the loader between the wheels (Fig. 1-8A). Use a ratchet and socket (Fig. 1-8a) and tilt the operator guard into the full forward position (Fig. 1-9).

**NOTE: DO NOT exceed 50 ft-lbs. (68 Nm) torque on the hex bolt used to raise or lower the operator guard.**

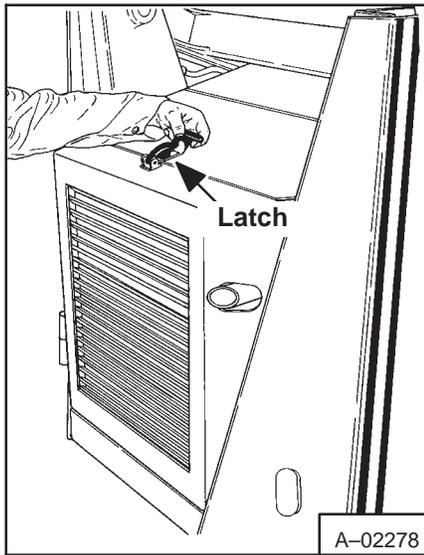


Fig. 1-5 Releasing Engine Cover Fastener

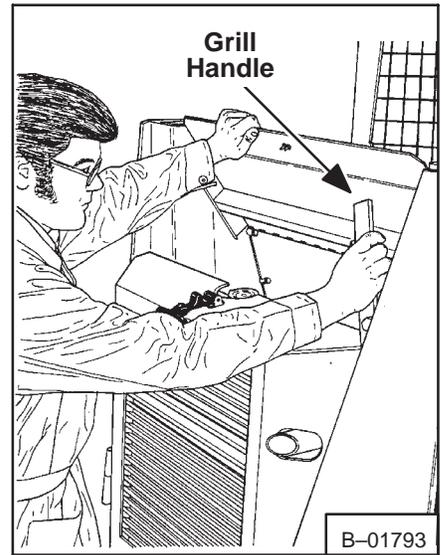


Fig. 1-6 Opening Rear Grill

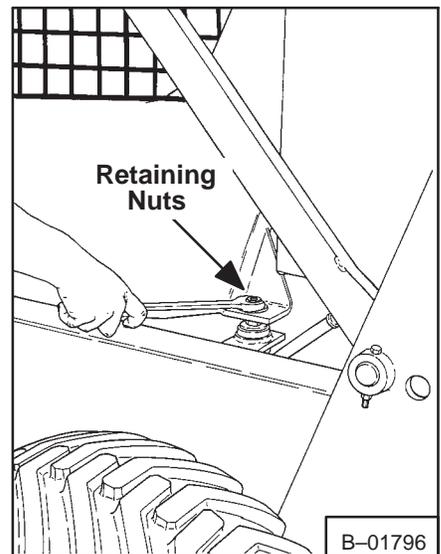


Fig. 1-7 ROPS Retaining Nuts

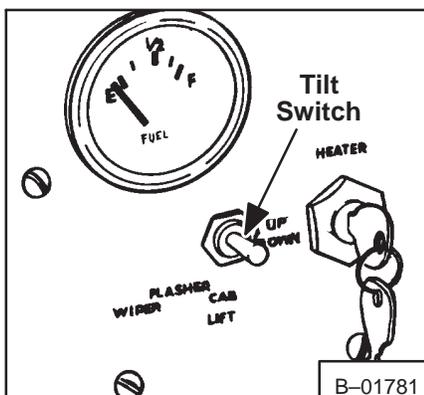


Fig. 1-8 Cab Tilt Switch

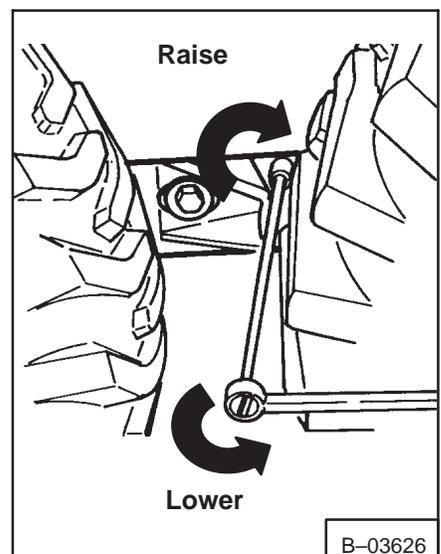


Fig. 1-8a Lifting The Operator Guard



To lower the operator guard, use the above procedure in the reverse order.

### 1-4.1 ROPS Tilt Motor

To seal out water from the ROPS tilt motor, clean the area (Fig. 1-9a, Item 1). Seal electric wire opening the R.T.V. (Room Temperature Vulcanizing) type compound.

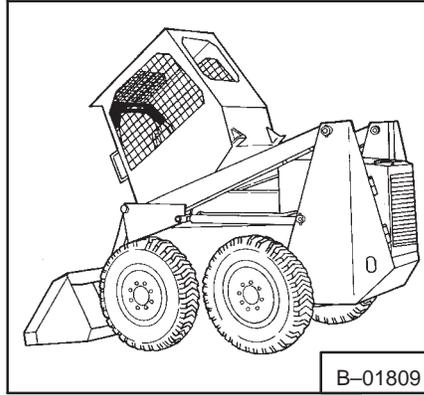


Fig. 1-9 Tilting The ROPS

## 1-5 ENGINE MAINTENANCE

### 1-5.1 Engine Oil

1. Check oil level every eight hours of operation.
2. On new machine check the oil level every four hours during the first 50 hours of operation.
3. Oil level must always be kept between the *Min* and *Max* marks on the dipstick (Fig. 1-10 & 1-11).

### 1-5.2 Specifications

Use good quality detergent motor oil that meets the API service classifications. (See Chart.)

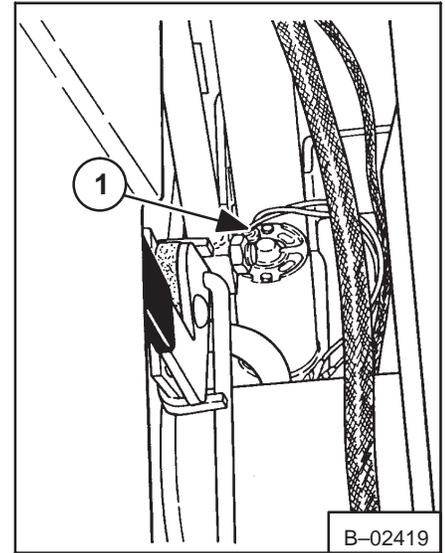


Fig. 1-9a ROPS Tilt Motor

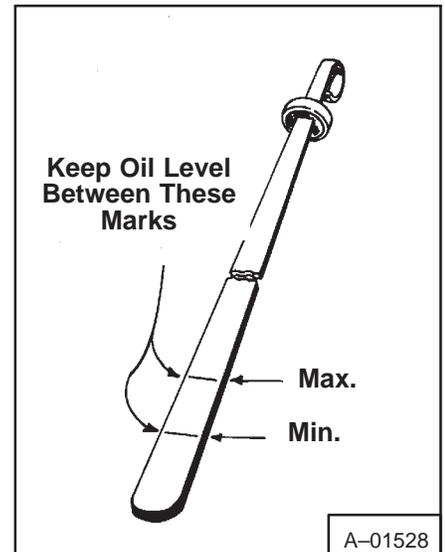


Fig. 1-10 Dipstick

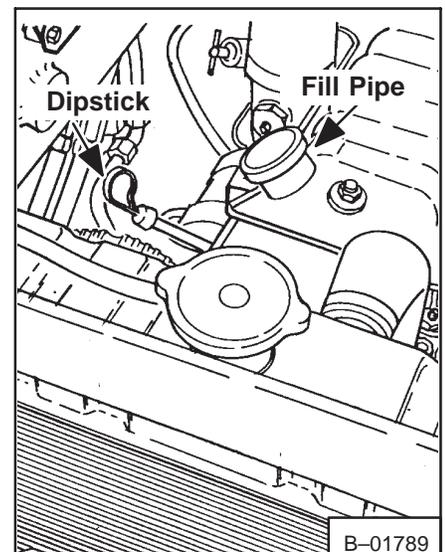
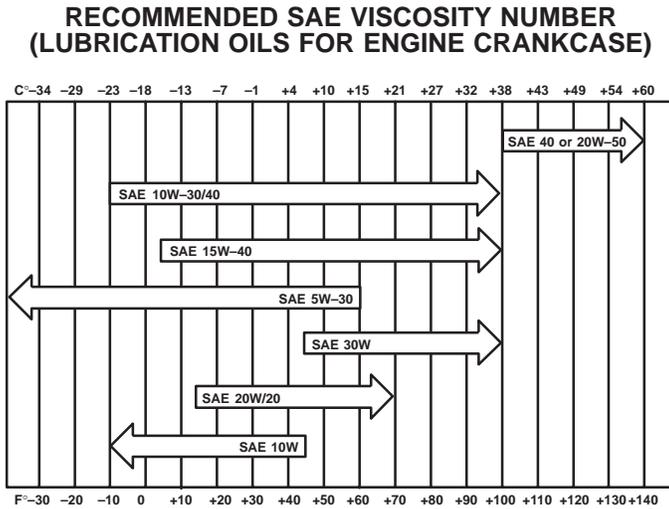


Fig. 1-11 Engine Oil Dipstick/Fill Locations



**NOTE: Do not use synthetic lubricating oils.**

Use oil of correct SAE viscosity for expected temperature conditions at the time of starting, not for the highest temperature expected during the working day.



**TEMPERATURE RANGE ANTICIPATED BEFORE NEXT OIL CHANGE  
(GASOLINE: USE API CLASSIFICATION SE or SF)  
(DIESEL: USE API CLASSIFICATION CC or CD)**

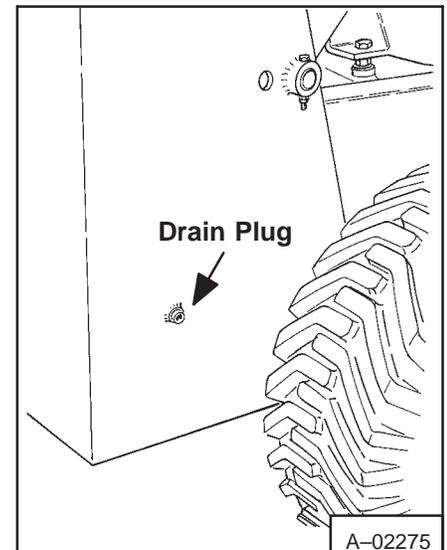
## 1-6 ENGINE OIL AND FILTER REPLACEMENT

Engine oil and filter require replacement after every 50 hours of operation. To remove the engine oil, remove the plug at the outside of the upright on the right side of the loader (Fig. 1-12). Remove oil when the engine is hot and allow it to flow for at least five minutes. Install the plug and fill with 4-1/2 quarts of oil of correct specifications (See Chart).

Replacement of oil filter element. (Allow warm engine to set for a few minutes before removing the oil to prevent spillage when the filter element is removed).

1. Use a filter wrench to remove the *spin-on* filter element from the lower right hand side of engine.
2. Clean the filter head thoroughly, removing all oil, sludge, dirt, etc.
3. Put oil on seal and turn new element on to filter head. Tighten the element until hand tight.

Start the engine and run it for a few minutes, and check for leaks at the filter. Stop the engine, check the oil level and add oil if necessary. Fill to the full mark on the dipstick. Do not overfill, as this causes oil foaming, oil consumption, high engine temperature and oil leaks at the engine seals.



**Fig. 1-12** Engine Oil Drain Plug

## 1-7 ENGINE AIR INLET SYSTEM (AIR CLEANER)

Correct maintenance of air inlet system is necessary for long engine life. A small leak in the system can destroy an engine in a few minutes. Set up a schedule for inspection and follow it regularly. To service the filter, follow these steps:

1. Empty dust cap daily or as necessary to keep it from becoming full (Fig. 1-13). Install dust cap with arrows up.
2. Make replacement of the filter cartridge (element) only when the red ring shows in the sight window of the condition indicator (Fig. 1-14).
3. Before installing the new cartridge, wipe all foreign material from the filter housing.
4. Install clean cartridge carefully to be sure of good seal. Be sure that the cartridge gasket is in good condition and the new plastic washer is correctly installed under the wing nut. Tighten the wing nut by hand (Fig. 1-15).
5. Press the reset button on the condition indicator to reset the red ring.

Air cleaners must be inspected regularly for leaks or damage. A damaged air cleaner can badly effect the performance of an engine.

The following air cleaner service procedures can be taken when the engine is to be serviced in the field:

1. Check all connections for tightness, making sure that the air cleaner outlet pipe and air inlet hose are complete.
2. If the air cleaner has been damaged, check all connections immediately. Check the internal cartridge seal areas. Make replacement of the air cleaner body if necessary.
3. In the case of leakage, if adjustment does not correct the trouble, make replacement of the necessary parts, hoses, or gaskets.

**NOTE:** The seal surface of the filter element must seal correctly or dust will enter the engine causing engine failure.

4. Inspect the intake manifold gasket for damage or looseness which can cause dirty air to enter the engine.

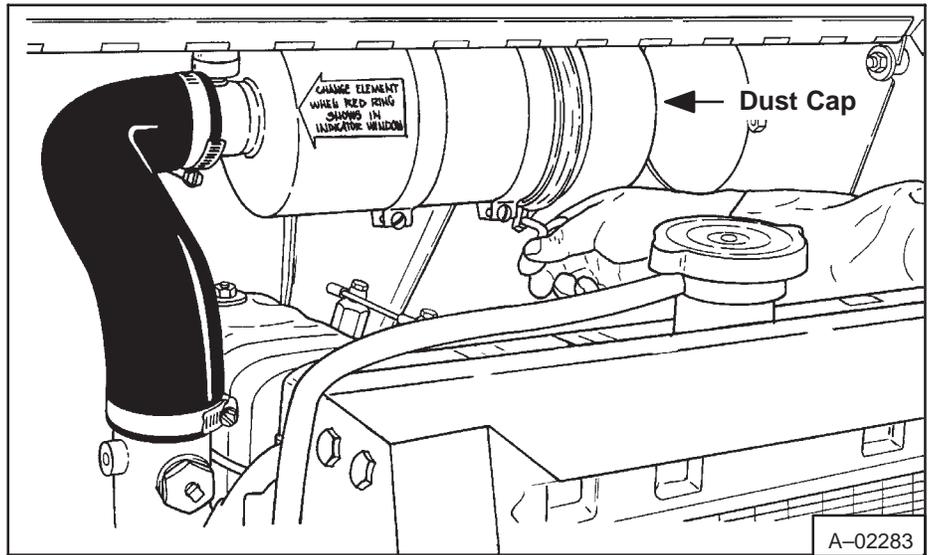


Fig. 1-13 Removing Dust Cap

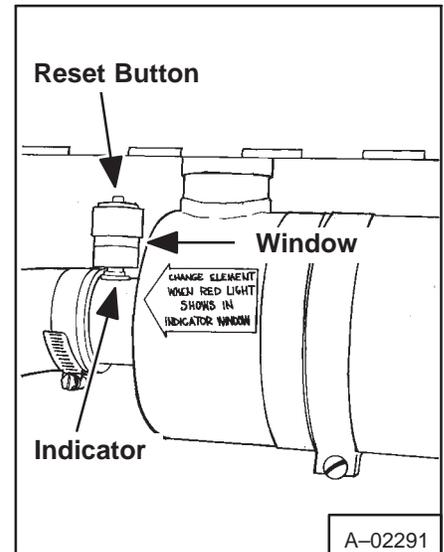


Fig. 1-14 Condition Indicator

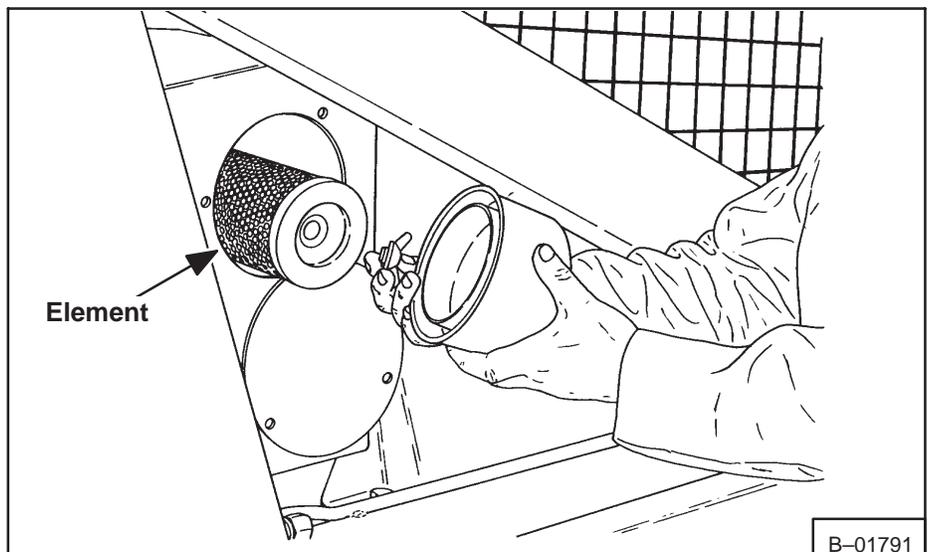


Fig. 1-15 Removing Air Cleaner Element

## 1-8 ENGINE COOLING SYSTEM

Correct coolant level must be kept to cool the engine or overheating will result. Check the coolant level in the radiator daily and fill to 2.0 inches below the filler neck when level is low (Fig. 1-16). Remove radiator cap carefully, after engine has cooled. The cooling system is under pressure. The pressure rating of the cap is 7 PSI. During freezing temperatures, a correct mixture of Ethylene Glycol and water must be used to protect coolant from freezing. The capacity of the cooling system is 10 U.S. quarts (9.46 liters).

The radiator grill area must be kept free from debris for good cooling. Use an air or water pressure nozzle and blow from the outside to remove foreign material. Remove the oil cooler if necessary to remove debris deposits between the engine radiator and oil cooler (Fig. 1-17).



## 1-9 FAN BELT ADJUSTMENT

Loose fan belt will result in unnecessary wear of the belt. If adjustment is over-tight, the bearings in the water pump and generator will be overloaded. If the tension is under-tight, the engine can overheat due to loss of belt drive at the water pump pulley. A loose belt can also cause low charging rate of the generator.

Adjustment of the fan belt:

1. Loosen the generator adjustment lever bolt (Fig. 1-18, Item 1).
2. Loosen the generator bracket fastening bolt above the generator (Item 2).
3. Move the generator towards or away from the engine to either loosen or tighten the belt. Make adjustment of belt tension to give 0.375 inch of play at the middle point between the pulleys (Item 3).
4. When belt tension is correct, tighten the adjustment bolt and fastening bolt.

## 1-10 FLUSHING THE COOLING SYSTEM

Regularly, at least once each year, the complete cooling system must be flushed and filled with clean coolant and conditioner. When flushing the system, back flushing has the most effect. Remove the top and bottom radiator hoses and flush through the bottom hose connection and out through the top of the radiator. To flush the engine, first remove the thermostat. Flush the engine in through the top hose connection and out through the bottom connection. Install a new gasket when installing the thermostat housing.

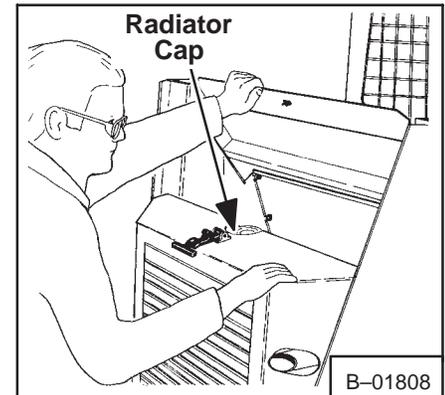


Fig. 1-16 Checking Radiator Level

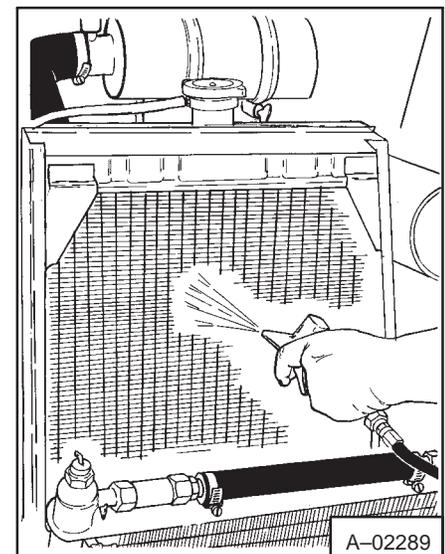


Fig. 1-17 Cleaning Engine Radiator

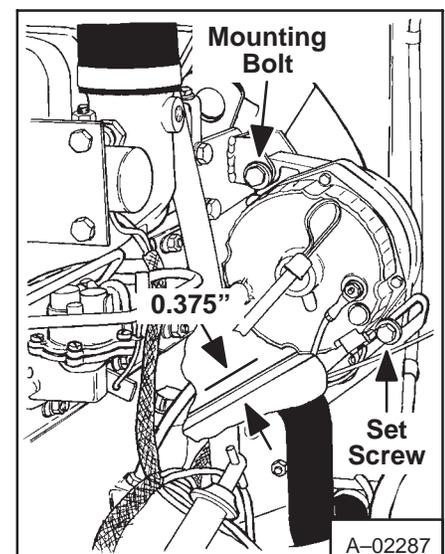


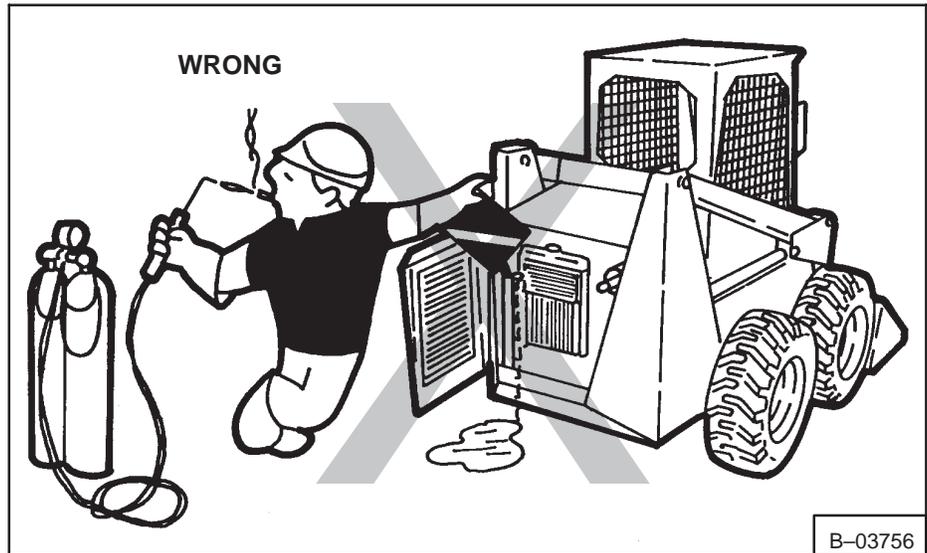
Fig. 1-18 Adjusting Fan Belt

## 1-11 FUEL SYSTEM

### **! WARNING**

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

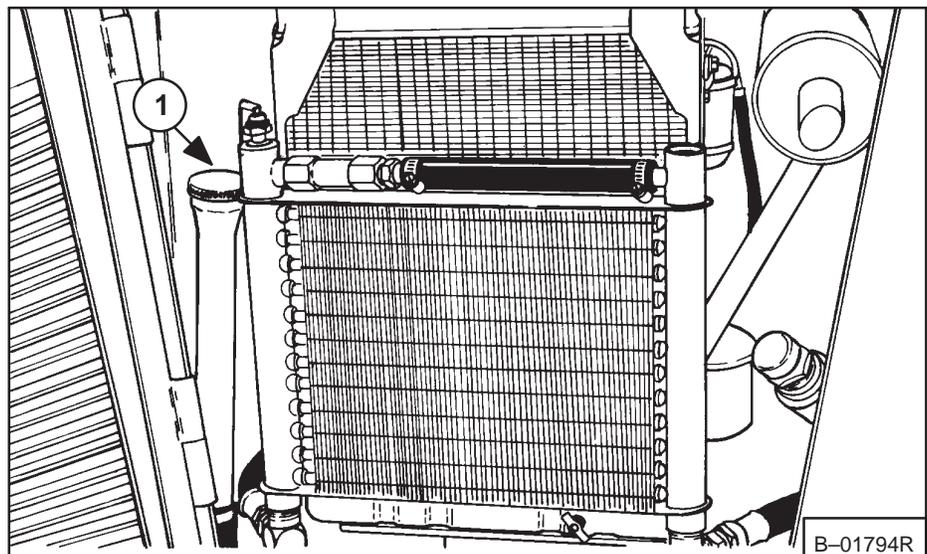
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**Fig. 1-19** Fuel Fill Warning

The fuel fill pipe is located at the rear of the Bobcat to the left of the engine (Fig. 1-20, Item 1).

1. Use a clean, approved safety container to add fuel.
2. The key switch must be off and the engine must be cool.
3. Add fuel only in an area that has a free movement of air and no open flames or sparks. **NO SMOKING** (Fig. 1-19).
4. Use only clean fuel of the correct specifications.
5. Tighten the cap on the fuel tank (Fig. 1-20, Item 1).



**Fig. 1-20** Fuel Fill Pipe Location

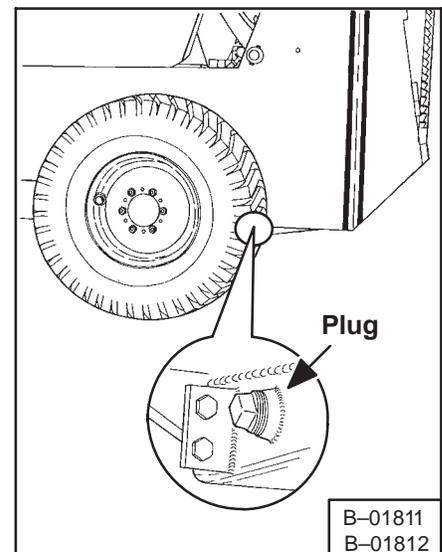
## 1-12 FUEL SPECIFICATIONS

The diesel engine uses clean No. 2 diesel fuel (At extreme low temperatures, No. 1 diesel fuel). The steel fuel tank capacity is about 30 gallons and the plastic fuel tank capacity is 16 gallons.

### 1-12.1 Water In The Fuel Tank

To prevent water from getting into the fuel tank:

1. Keep the filler cap in place.
2. Always fuel after machine has been stopped. (Water can increase overnight in an empty fuel tank).
3. Regularly remove the fuel tank plug (Fig. 1-21), and remove water.



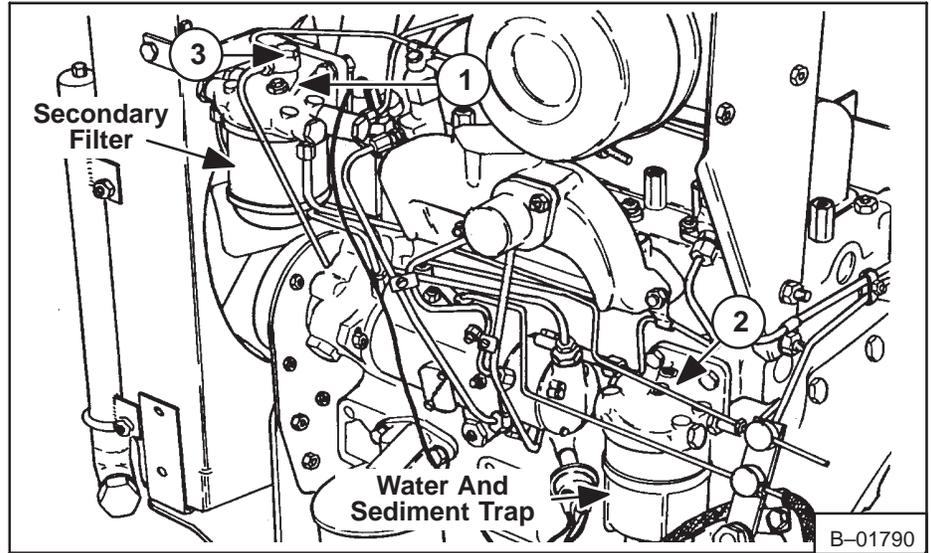
**Fig. 1-21** Fuel Tank Drain

## 1-13 TO SERVICE THE FUEL SYSTEM

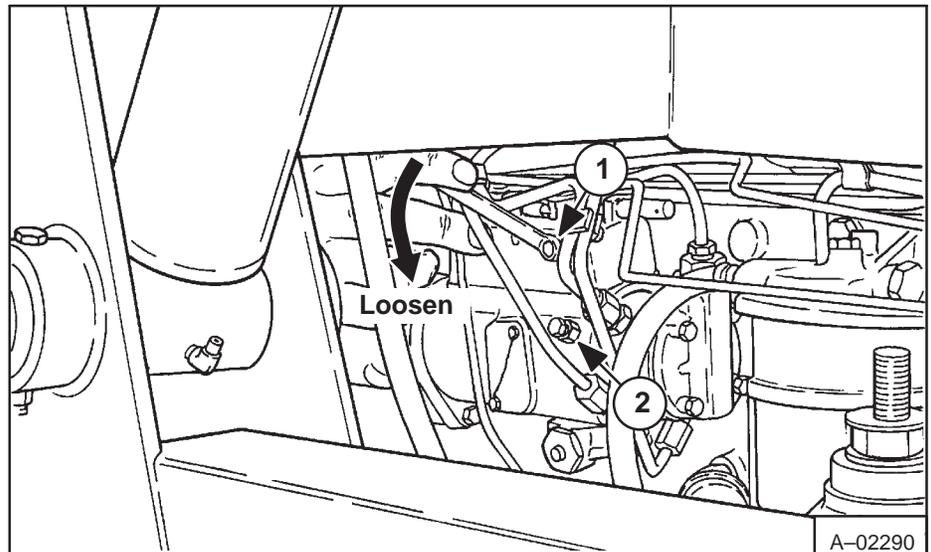
The engine is equipped with two fuel filters; a filter which holds water and a secondary filter (Fig. 1-22). The filter element (Fig. 1-22, Item 1) must be replaced every 250 hours of operation. Clean the water filter (sediment bowl) (Fig. 1-22, Item 2) at regular intervals (See *SERVICE SCHEDULE*).

To replace the filter element:

1. Clean the area around the filter housing.
2. Remove the bolt at the top of the final filter (Fig. 1-22, Item 3).
3. Remove the element and the O-ring.
4. Lubricate and install a new O-ring.
5. Install the new filter element in position and install the bolt. Do not over-tighten the bolt.
6. After the new filter is installed, the air must be removed from the fuel system.



**Fig. 1-22** Fuel Filters (Primary And Secondary)

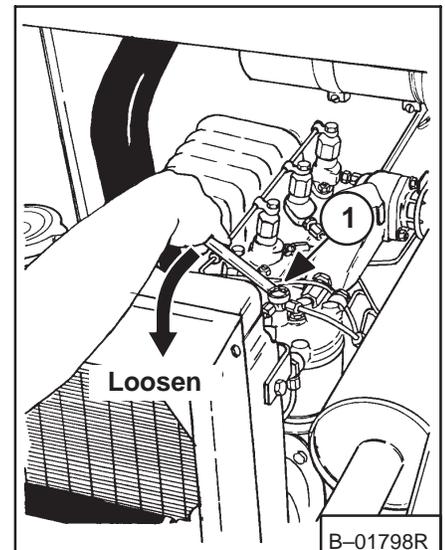


**Fig. 1-23** Venting Injection Pump

## 1-14 REMOVE THE AIR FROM THE FUEL SYSTEM

To remove the air from the fuel system, use the following procedure:

1. Loosen the plug at the top of the injector pump housing (Fig. 1-23, Item 1).
2. Loosen the plug at the side of the injector pump housing (Fig. 1-23, Item 2).
3. Loosen the bolt (Fig. 1-24, Item 1) on the top of the final fuel filter.

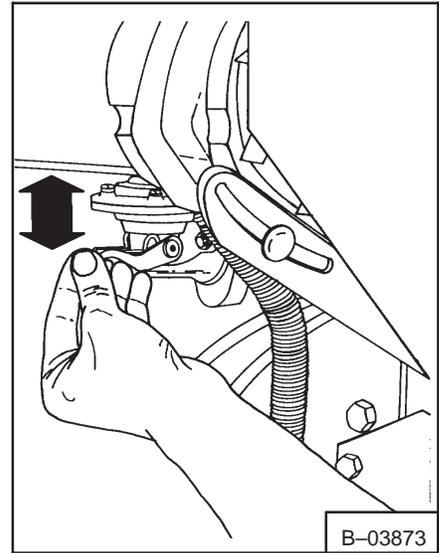


**Fig. 1-24** Fuel Filter Bolt

- Operate the lever on the fuel lift pump (Fig. 1-25) pushing the fuel and air through the vent plugs.

**NOTE: If the lift pump will not pump fuel, rotate the engine a small amount.**

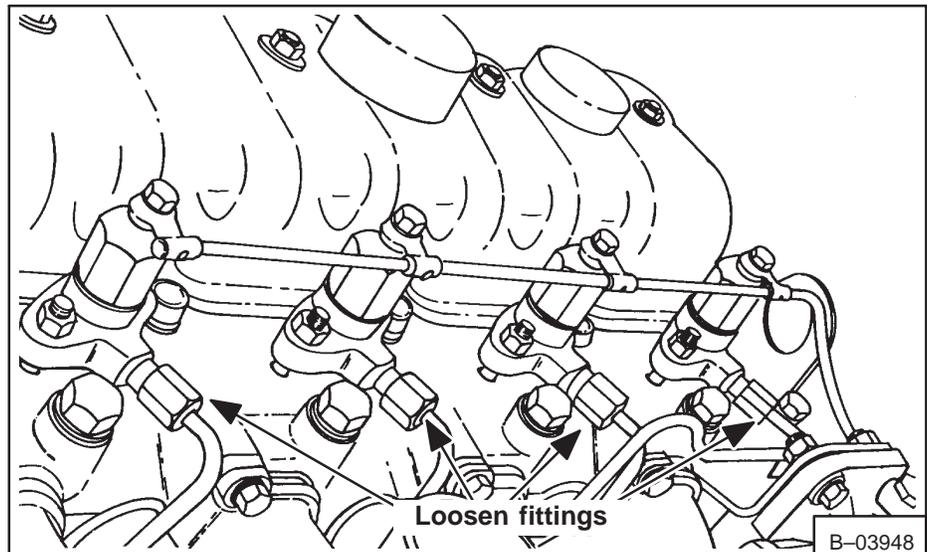
- When solid flow of fuel flows from the vent plugs (no air bubbles), tighten all the vent plugs in the following order:
  - Final fuel filter bolt (Fig. 1-24, Item 1).
  - Injector pump housing side plug (Fig. 1-23, Item 2).
  - Injector pump housing top plug (Fig. 1-23, Item 1).
- Loosen the fittings on the high pressure lines of the injectors (Fig. 1-26).



**Fig. 1-25** Fuel Lift Pump

- Move the throttle to half open position. Turn the engine with the starter until no air bubbles show at the fittings of the injectors. Tighten all the high pressure fittings.

- Tighten the two injector line fittings and start the engine.
- If the engine does not run smoothly, try loosening each injector fuel line fitting a little with engine idling, to release any air still in the injector lines.



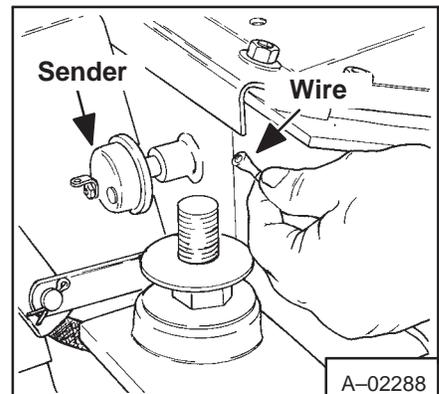
**Fig. 1-26** Loosening Injector Fitting

## 1-15 ELECTRICAL SYSTEM MAINTENANCE

### 1-15.1 Electrical System

The Bobcat is equipped with a 12 volt generator charging system. Maximum output is 22 Amp. Service Electrical System as follows:

- Check battery electrolyte level and fill as needed with distilled water.
- Check battery cables for corrosion. Remove acid corrosion with soda and water solution. Cover connections with grease to prevent corrosion deposit.
- Check alternator drive belt tension. Adjust for 0.375 inch play at the middle point between pulleys (Fig. 1-18).
- Check the condition of the wiring to the warning indicators (Alt., Trans-Hot, Trans-Fit, Eng-Hot and Eng-Oil). Check the Trans-Hot and Eng-Hot indicators regularly to see if they are in working condition. The Trans-Hot sender switch is located at the top of the oil cooler and the Eng-Hot sender switch is located on the engine head beside the thermostat housing. To check these warning indicators, turn the ignition switch at the dash panel to ON, remove the wire from the sender switch and put it against the frame. The indicator must light when the wire is in contact with frame (Fig. 1-27). The other warning lights must always light up whenever the ignition switch is turned on and go out after the engine has started. Warning lights that still have light while engine is running are an indication of a malfunction in the system. If this happens, stop the engine immediately and troubleshoot.



**Fig. 1-27** Grounding Sender Wire

## 1-16 HYDRAULIC SYSTEM

### 1-16.1 Hydraulic/Hydrostatic Transmission Fluid

Use Clark hydraulic/hydrostatic transmission fluid (P/N 6563328). This fluid is available at Chicago Central Parts. 10W-30 or 10W-40 SAE Motor Oil API Class SE or SF can also be used.

DO NOT use automatic transmission fluids in this loader or permanent damage to the transmission will result.

Where temperatures below zero are common, loaders must be kept in a warm building. Extra warm-up time must be used each time the loader is started during cold temperature conditions. Cold fluid will not flow easily and it makes action of the hydraulic function slower. Loss of fluid flow to the hydrostatic transmission pump (indicated by *Trans* light ON) will cause transmission damage in less than 60 seconds time.

### 1-17 CHECKING AND ADDING HYDRAULIC FLUID

The hydraulic reservoir dipstick is located at the left side of the engine (Fig. 1-28). It is important that correct fluid level be maintained at all times. Add fluid at the reservoir fill pipe or fill plug (Fig. 1-29) (See *Hydraulic/Hydrostatic Transmission Fluid*).

To check and/or add fluid:

1. Place a machine on a level surface.
2. Lower the lift arms and tilt the Bob-Tach fully back.
3. Remove the dipstick and read the fluid level.
4. If the level is below the *Add* mark, add oil and fill to the *Full* mark on the dipstick.

### 1-18 HYDRAULIC FLUID FILTERS

Three filters are used in the hydrostatic system. The first filter (25 Micron) serves as a suction filter and all oil used in the system must pass through it. The second filter (10 Micron) is installed in the return line to the pump. This filters all oil to the final filter for the hydrostatic transmission and return oil to the hydraulic pump. Both filters are located at the right side of the transmission (Fig. 1-30). They use spin-on replacement elements.

Make replacement of the filters after each 250 hours of operation, or sooner, when the (*Trans-Filt*) warning light is lit during operation. If the *Trans-Filt* light comes on during loader operation, stop the engine at once and make replacement of the return line filter (10 Micron element) first. If this fails to extinguish the warning light, then make replacement of the suction filter (25 Micron element).

A third final filter (10 Micron) is installed inside the hydraulic reservoir (transmission housing). Replace this filter every 1000 hours. You must remove the transmission cover (floor panel) to replace this filter. (See *Final Filter* page 3-10).

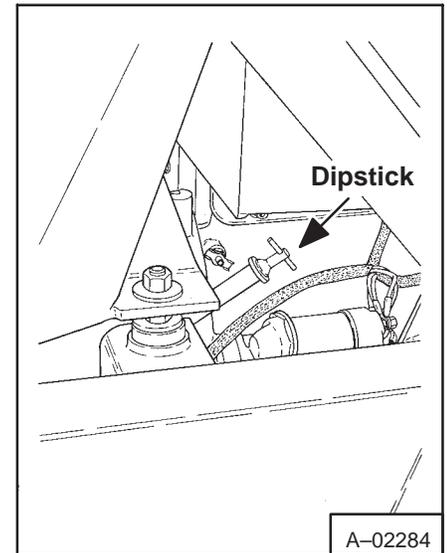


Fig. 1-28 Hydraulic Reservoir Dipstick

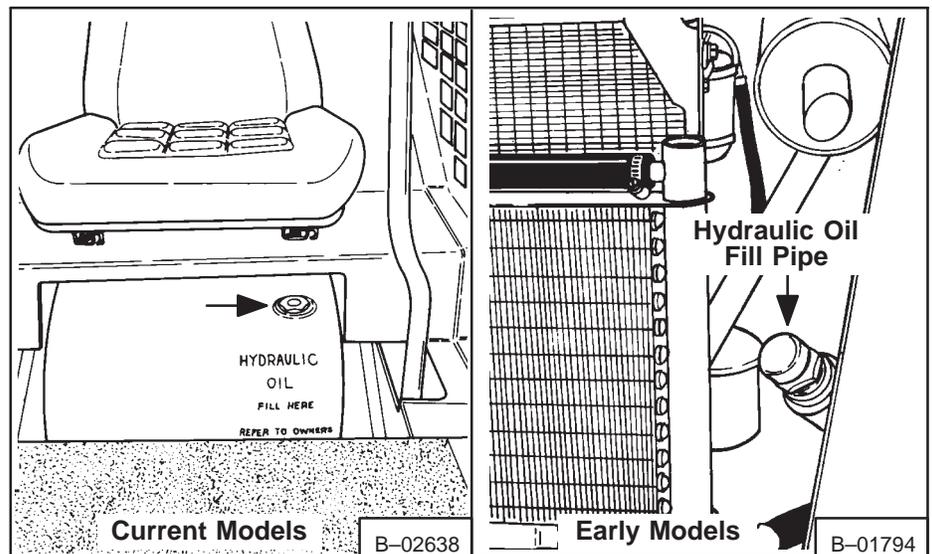


Fig. 1-29 Hydraulic Reservoir Fill

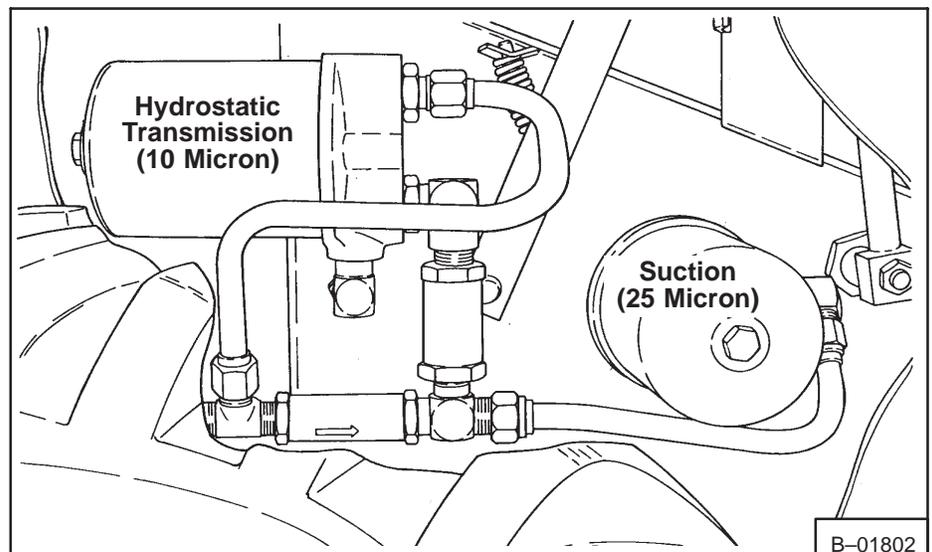
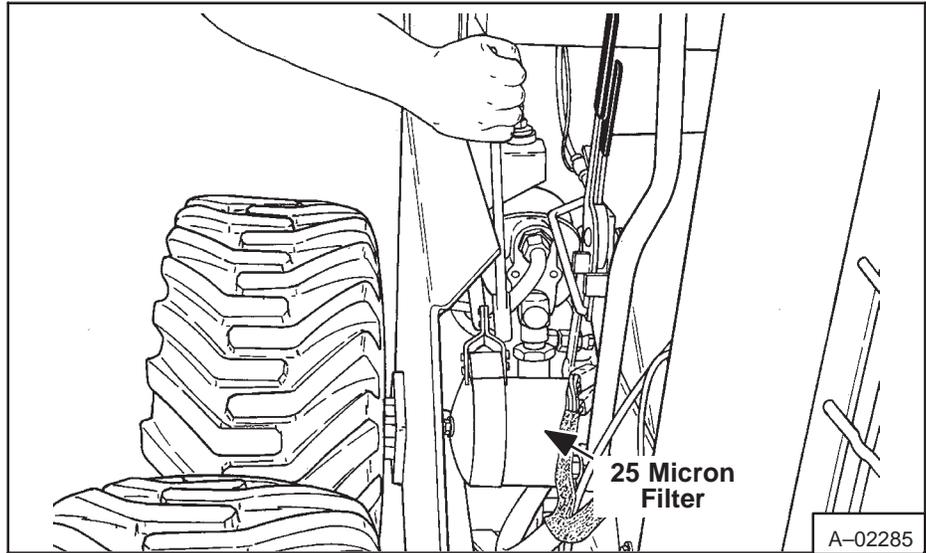


Fig. 1-30 Hydraulic And Hydrostatic Filters

### 1-18.1 Replacement Of The Suction (25 Micron) Filter (Fig. 1-31):

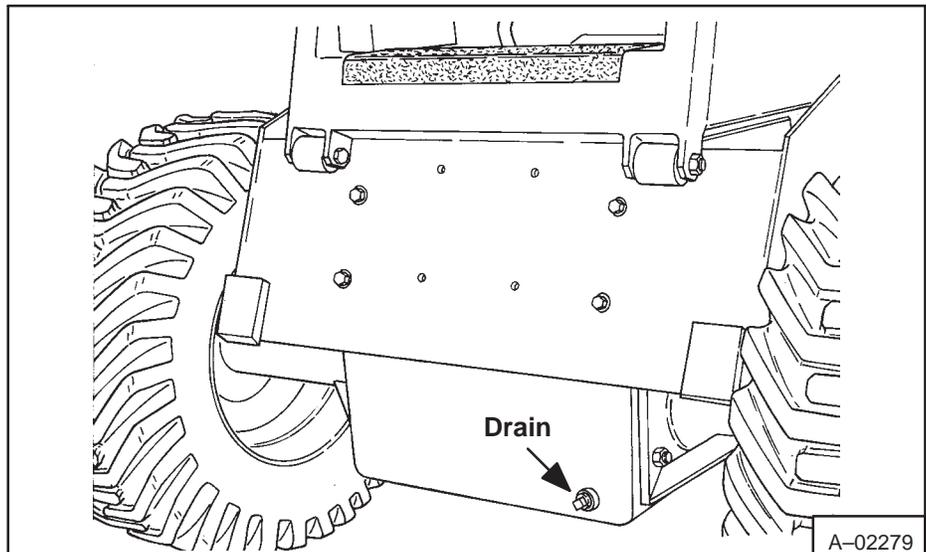
1. Tilt the ROPS forward.
2. Clean around the outside of filter base.
3. Use a strap wrench or large size filter wrench to unscrew the 25 micron filter element. (Place a reservoir under the loader to catch fluid spill.) Throw away oil element.
4. Clean the filter housing and check the seal ring for condition. Make replacement of the seal ring if it has defect. Add lubricant to the seal ring before installing filter.
5. Install the new element and turn it on until it contacts the gasket, then tighten it another 1/2 turn.
6. Lower the ROPS and start the engine and run at 1/2 throttle.
7. Run the engine until all air has been removed from the system.



**Fig. 1-31** Removing Hydraulic Filter

### 1-18.2 Replacement Of The Return Line Filter (10 Micron):

1. Tilt the ROPS forward.
2. Thoroughly clean the exterior of the filter.
3. Use a filter wrench to remove the 10 micron filter element. Throw away the old element.
4. Lower the ROPS cab, set the throttle at about 1/2 throttle, set steering controls in neutral and start the engine.
5. With the engine running, check the filter housing area for any indication of leaks.
6. Slowly move the steering levers to activate the transmission. Drive forward and backward at slow intervals. Continue to drive the loader until all indication of air is out of the system.



**Fig. 1-32** Hydraulic Reservoir Drain Plug

### 1-19 DRAINING THE FLUID RESERVOIR

A drain plug is located at the left front of the transmission case (Fig. 1-32). Make replacement of transmission fluid after every 1000 hours of loader operation. (Sooner, if it has become dirty.)

To remove fluid from the reservoir, raise the rear of the machine and remove the plug. Install the plug after letting out fluid and fill with 27 gallons of fluid. (See *Hydraulic/Hydrostatic Transmission Fluid*.)

Regularly (depending on humidity and/or temperature change) lift the rear of the loader and let stand overnight. Loosen the drain plug to allow water, if any, to run out. A large quantity of water in the sump may cause permanent damage to the hydraulic and transmission system.

### 1-20 LEAKS

Regular inspection must be made to find leaks at tube fittings, hose connections, lift and tilt cylinders, filters, etc. A leak in the hydraulic system must not be permitted. Even a small leak can amount to a large loss of fluid in a short period of time. Most leaks are easily repaired. Sometimes, tightening a fitting or hose clamp is all that is necessary. Do not over tighten tube fittings, as this can cause a greater leak. A tube fitting that still leaks after it has been properly tightened must be disconnected and checked for foreign particles or damaged joint. If the seat is cracked or has deep scratches, the part must have replacement made.

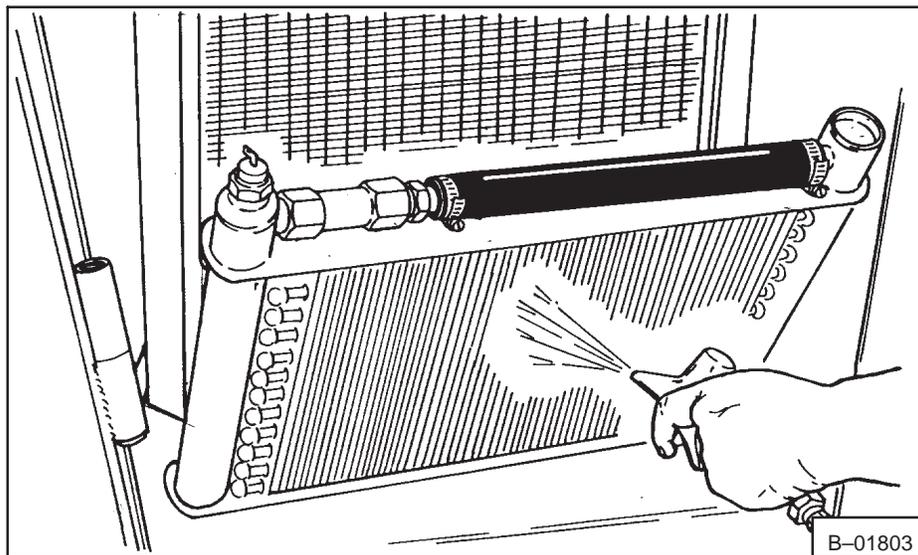


Fig. 1-33 Cleaning The Oil Cooler

### 1-21 OIL COOLER

The oil cooler, mounted at the rear of the loader, cools the transmission fluid. The grill area of the cooler must be kept clean, free of foreign material, or it will not cool correctly.

To clean the cooler:

1. Remove the cooler fastening screws and move the cooler away from the engine radiator. Do not disconnect the hose lines to the cooler.
2. Use an air nozzle or water spray and blow from the outside of the cooler (Fig. 1-33).



3. Use a thin soft (plastic or wood) rod to help remove material. Also clean the engine radiator.

A high temperature warning switch is installed at the top of the oil cooler. If the hydraulic system overheats, the switch closes and lights the *Trans-Hot* indicator on the dash panel. Be sure the wire is correctly connected to the switch.

### 1-22 CARE OF THE HYDROSTATIC TRANSMISSION

Good preventive maintenance practice is an important item in adding to the life of the transmission. When adding fluid to the reservoir, be sure that the fluid is very clean. Do not let dirt fall into the reservoir, fill pipe, and be sure to install the filler cap. Use only correct oil when filling the reservoir. (See *Transmission Fluid*, page 1-11).

### 1-22.1 Loader Start-Up

Follow these procedures when starting the loader, after servicing:

1. Be sure that the system is filled with good grade transmission fluid.
2. Follow correct engine starting procedure (See Owner's Manual).
3. Start the engine and run at 1/2 throttle.
4. Operate controls a few times for several minutes until they operate smoothly.

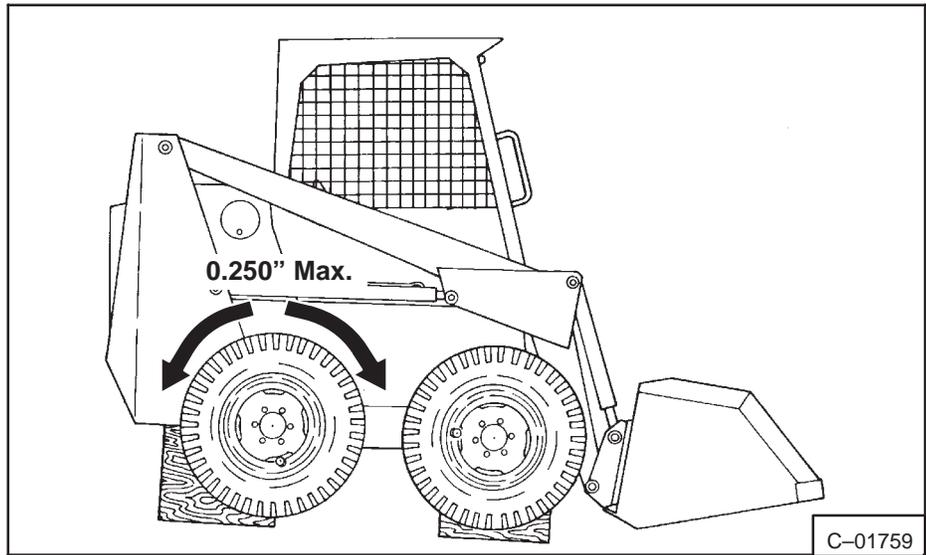


Fig. 1-34 Checking Drive Chain Freeplay

### 1-22.2 Cold Weather Start-Up

Allow additional warm-up time during low temperature conditions. Run the engine at low RPM and activate the cylinders and control valves for several minutes until the oil is warm to the touch.

### 1-23 FINAL DRIVE CHAIN

A roller chain makes the final reduction between the reduction gear housing and the loader wheels. One chain is used to drive each side of the loader.

To check chain tension:

1. Lift the Bobcat until all four wheels are off the ground.
2. Take hold of one of the wheels and *turn* it back and forth (Fig. 1-34). If there is more than 0.250 inch of free play measured at the tire tread, the chain needs adjustment. Check the free play at each side of the loader. See Section 4 for drive chain adjustment.

### 1-24 TIRES

Several types of tires are available to fit the use of the Bobcat. It is very important that the Bobcat be equipped with the correct tires for its use. The following basic tires are recommended for use indicated:

8:25 x 15 – 6 ply, standard . . . . . Standard, regular construction loading, excavation, quarry, mine

12:00 x 16.5 – 6 ply, flotation, . . . . . Flotation and traction, mud, swamp, coal mine, bar lug tread sand

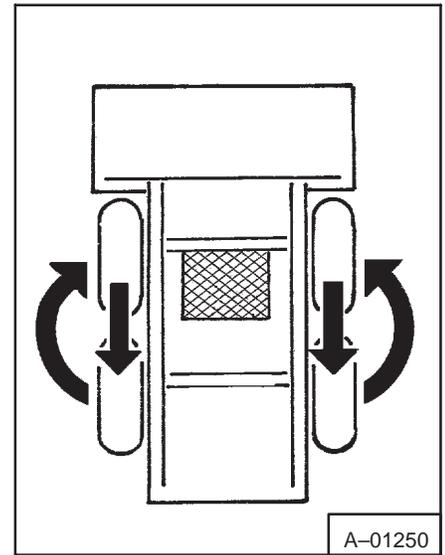
**NOTE: Do not use ballast in tires.**

### 1-25 TIRE MAINTENANCE

Correct 8:25 x 15 tire inflation is 45 PSI, maximum. If pressure is allowed to go below 45 PSI, the machine will be hard to turn and tire wear will be much greater. 12:00 x 16.5 flotation tires must also be inflated to 45 PSI.

### 1-27 TIRE ROTATION

If both rear or both front tires wear more than normal, move them to the opposite end of the machine as shown in (Fig. 1-35). This must be done as soon as the wear is noted. A large amount of wear may be caused by wrong inflation, wrong bucket size for the loader application (overloading) or by not operating loader correctly (loading bucket with front or rear wheels off the ground).



**Fig. 1-35** Tire Rotation

### 1-27 TIRE REPLACEMENT

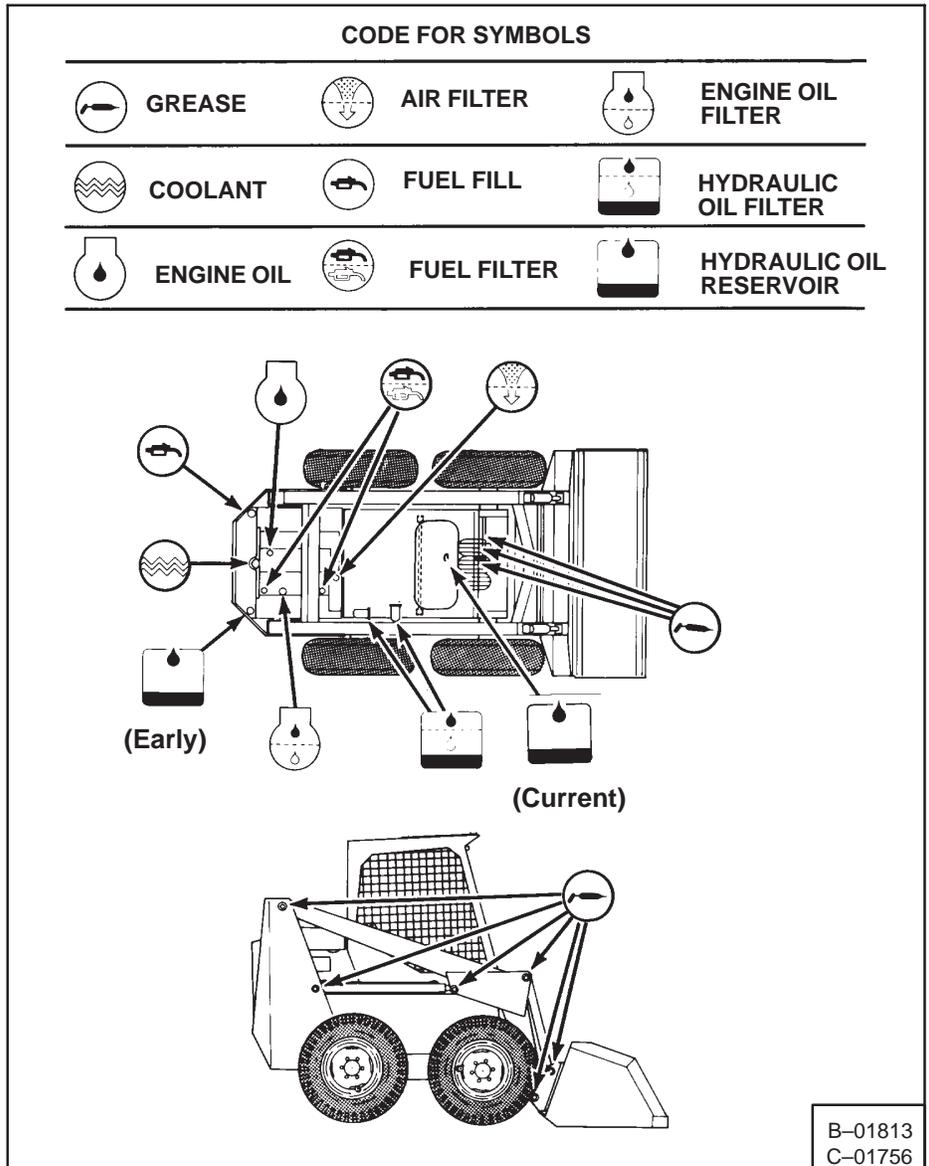
The tires on the Bobcat Loader are specially designed for it. Exchanging them with any other tire tread, or size, can result in poor loader performance. When exchanging a damaged or worn tire, it is important that the replacement tire be of the same size as the tire still on the Bobcat. Two different size tires on the same side of the machine will cause drive chain and tire wear, and loss of power. If two new tires are used for replacement of two worn ones, put both new tires on the same side.

### 1-28 LUBRICATION

Refer to the *SERVICE SCHEDULE* for lubrication intervals. Figure 1-36 shows the location of grease fittings on the 825 Bobcat. There are 15 lubrication points. Use a good multipurpose lithium base grease when making lubrication of the Bobcat, and add grease until it shows. In addition to the grease fittings shown in Figure 1-36, put lubricant on the engine door hinges, engine cover hinge and engine throttle pivot. Use medium engine oil for this purpose. Also remove the seat and put grease on the seat rails to keep them working smoothly.

### 1-29 WHEEL MOUNTING NUTS

Wheel mounting nuts must be regularly checked to see that they are tight. This is most important after the first few hours of operation. Loose wheel nuts will result in wear of the stud holes and can cause loss of wheel. Correct wheel nut torque is 120 ft.-lbs. (163 Nm).



**Fig. 1-36** Lubrication Chart

B-01813  
C-01756

### 1-30 BOB-TACH

Check the Bob-Tach locking lever and wedges for wear or damage. The lever springs must compress enough to hold the levers in *over-centered* (lock) position when the levers are pushed down (Fig. 1-37, 1-38). Spring tension adjustment is possible. Check the wedges for condition and move locking levers to see that the wedges move far enough to correctly engage a bucket or attachment. Bent or broken wedges must have replacement made.

If new style Bob-Tach is to be installed on a Bobcat with old style cylinder, (Serial Number 12000 & Below) it will be necessary to cut off 0.625 inch from each end of the rod end trunnion (Fig. 1-38a).

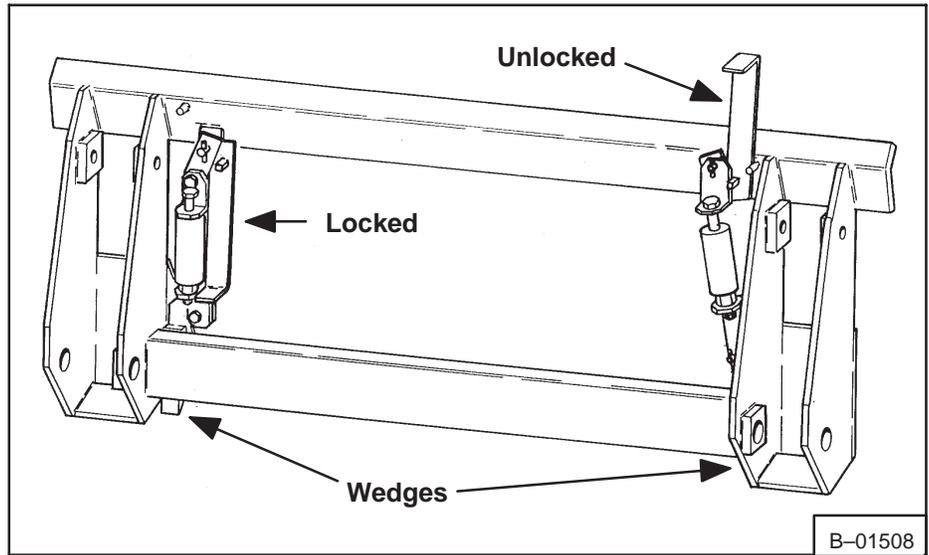


Fig. 1-37 Bob-Tach (Old Style)

### 1-31 PARK BRAKE

Adjustment of the park brake is done with the end of the lever. Make adjustment by turning the grip until the lever will go over center into the lock position (Fig. 1-39).

**NOTE:** If the brake lever hits the left steering lever install a new left hand steering lever. (See Bobcat Technical Information Bulletin Number 135), (See 3-5 *Steering Control Linkage*) for removal.

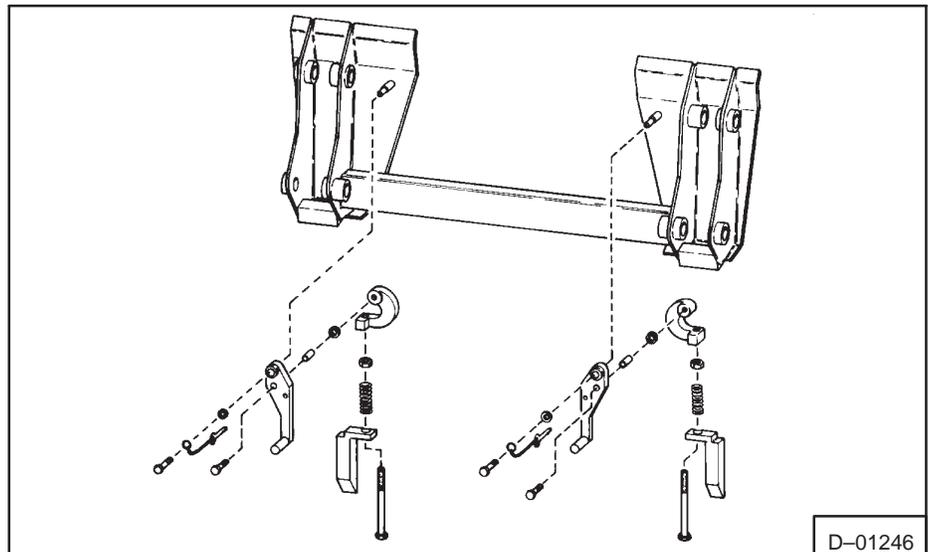


Fig. 1-38 Bob-Tach (New Style)

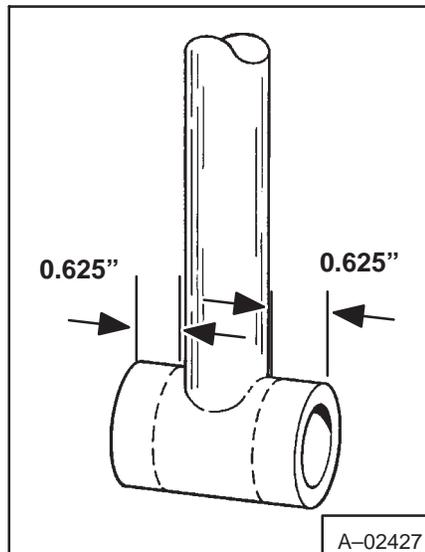


Fig.1-38a Cutting Old Style Cylinder Rod

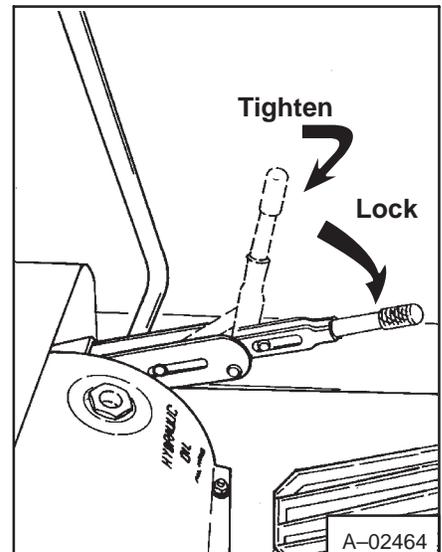


Fig.1-39 Park Brake

## HYDRAULIC SYSTEM

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CONTROL VALVE .....	2-7	2-6
GEAR PUMP .....	2-4	2-4
GEAR PUMP DISASSEMBLY .....	2-5	2-4
HYDRAULIC CYLINDERS .....	2-10	2-10
HYDRAULIC CYLINDER REPAIR .....	2-11	2-10
HYDRAULIC SYSTEM .....	2-1	2-1
HYDRAULIC SYSTEM TROUBLESHOOTING .....	2-3	2-2
INSPECT PARTS FOR WEAR .....	2-6	2-5
LIFT VALVE SPOOL .....	2-8	2-8
OIL COOLER .....	2-12	2-12
TUBELINES, HOSES, FITTINGS .....	2-2	2-1

## HYDRAULIC SYSTEM



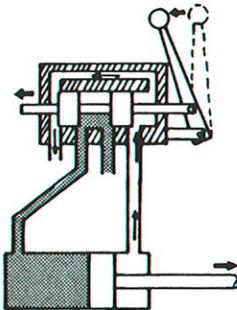
# SYSTEM OPERATIONS



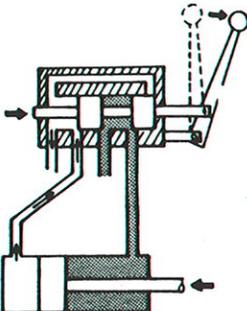
## 825 HYDRAULIC/HYDROSTATIC SYSTEM (Chart # PI-2511)



The fluid in the reservoir **1** moves into the inlet of the 25 Micron filter **2** due to the pressure differential. Fluid flows from the 25 Micron filter **2** to the inlet of the hydraulic gear pump **20**. The hydraulic pump **20** is driven by a shaft through the hydrostatic pumps **13**. The fluid goes from the hydraulic pump **20** to the hydraulic control valve **17**.



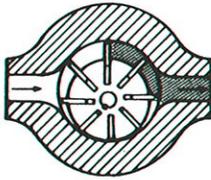
The hydraulic control valve **17** has a shim adjustable relief valve **12**. When all four (4) spools are in neutral position, the fluid goes through the control valve **17** and to the oil cooler **8**. If one (1) of the spools is activated, the fluid goes out the respective port and to either the base end, or rod end of the cylinders **18** **19**, return fluid comes from the opposite end of the cylinders **18** **19** and back to the control valve **17**. When the cylinders **18** **19** reach the end of the stroke, the fluid flow stops and causes hydraulic pressure to increase. When the pressure reaches the setting of the relief valve **12**, it will open and let the fluid by-pass the hydraulic circuit (internally) and go to the oil cooler **8**. If you let the spool go back to neutral position, then there is fluid available for the other sections. Two (2) sections of the control valve **17** can be used at the same time if the main relief valve **12** is not open. The second section of the control valve **17** has a "detent" position for "float" position. The "float" position allows free flow of fluid to and from the lift cylinders **18**. The lift section of the control valve **17** also uses a restrictor **14** to control the rate the lift arms come down.



The fluid that flows from the hydraulic control valve **17** goes to the oil cooler **8**. The oil cooler **8** has a temperature sender switch **10** which illuminates a light on the dash panel if the fluid



by-pass valve 9 which allows the flow of fluid to go around the oil cooler 8 for cold operation. The by-pass valve 9 also protects the oil cooler 8 from a sudden increase of pressure from the control valve 20. From the oil cooler 8 the fluid flows into a "tee" fitting. Normal fluid flow is through the primary 10 Micron filter 5. But if the 10 Micron filter 5 becomes plugged, the fluid flow will be restricted causing back pressure and will open the in-line filter by-pass valve 4 and the flow of fluid will go to the 25 Micron filter outlet 2.



(Chart # PI-2512, 2513)

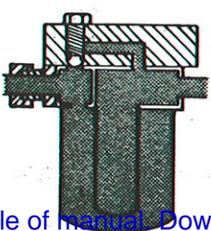
The fluid flows from the 10 Micron filter 5 goes past the restrictor valve 18 and into the secondary 10 Micron filter 5. From the secondary 10 Micron filter 5 the fluid flows into the gerotor charge pump 19. Because there is more fluid flow than is needed to supply the gerotor charge pump 19, there is back pressure and the relief valve 3 limits the amount of back pressure. Also the restrictor valve 18 will remove some of the fluid flow for cooling. If the primary 10 Micron filter 5 becomes plugged, the restrictor valve 18 will become a pick-up tube and will supply fluid for the gerotor charge pump 19 and prevent cavitation and damage to the hydrostatic system. From the gerotor charge pump 19 the fluid is forced into each hydrostatic pump 13.



There are two (2) hydrostatic pumps 13 and two (2) hydrostatic motors 6. One (1) hydrostatic pump and one (1) hydrostatic motor work together as a pair to drive on one side of the loader. The other pump and motor work as a pair to drive the opposite side of the loader.



In neutral the fluid flows through the charge check valves 15 and into the hydrostatic pumps 13 and the hydrostatic motors 6 rotating groups for cooling, lubrication and replenishing.



When the hydrostatic pumps 13 swashplates are angled in either direction the fluid flow becomes high pressure fluid and causes the check valves 15 to close. The hydrostatic pumps 13 flow is forced to the hydrostatic motors 6 and causes the hydrostatic motors 6 to turn. This flow of fluid is called "drive pressure". Low pressure fluid from the hydrostatic motors 6 returns to the hydrostatic pumps 13 to be used again.