

No. OW-648DE

TCM[®]

**OPERATION &
MAINTENANCE MANUAL**

WHEEL LOADER

(Serial No. 03101 and after) ***L20-B***



It is the responsibility of the Operator & Supervisor to read and understand this manual.

Protect the earth and be kind to your loader.

TCM CORPORATION

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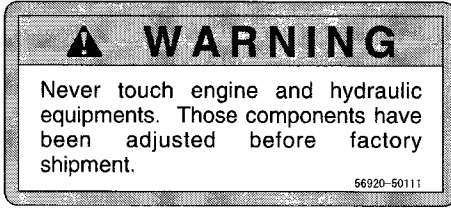
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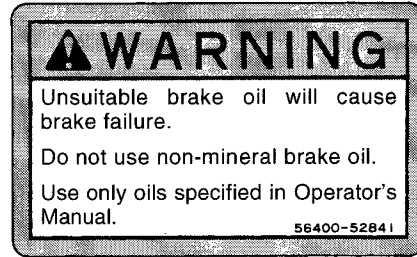
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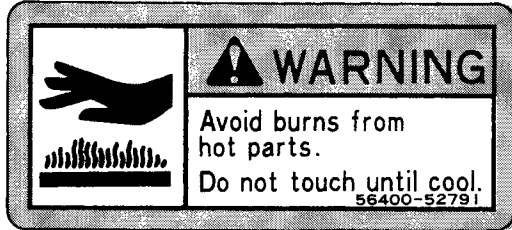
① Left Side of Seat Mount



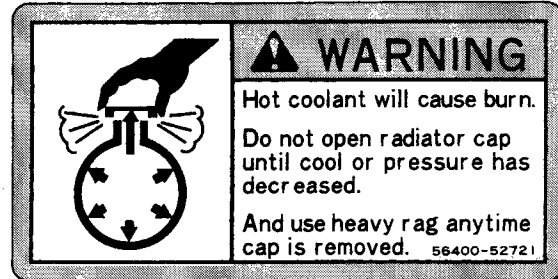
② Left Inside of Engine Room



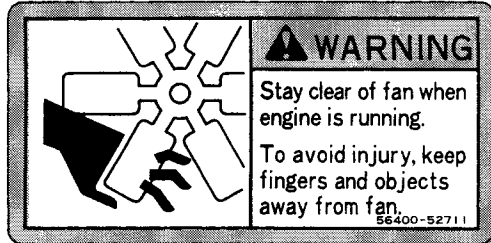
③ Engine Hood (near muffler tail pipe), Side Panel (right/left)



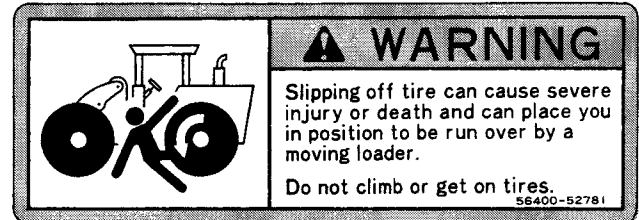
④ Engine Hood (near radiator cap)



⑤ Top of Grill Support (right/left)



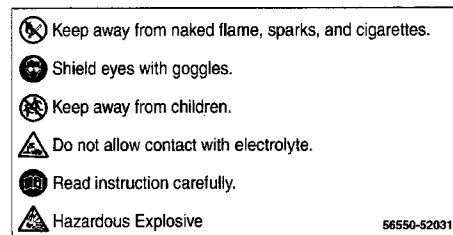
⑥ Grill Support (right/left), Front Fender (right/left)



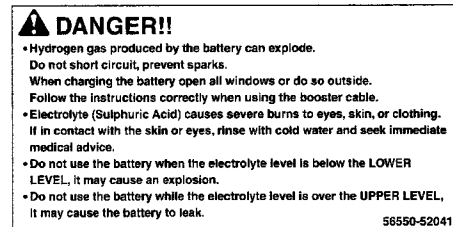
⑦ Inside of Battery Box Cover (right/left)

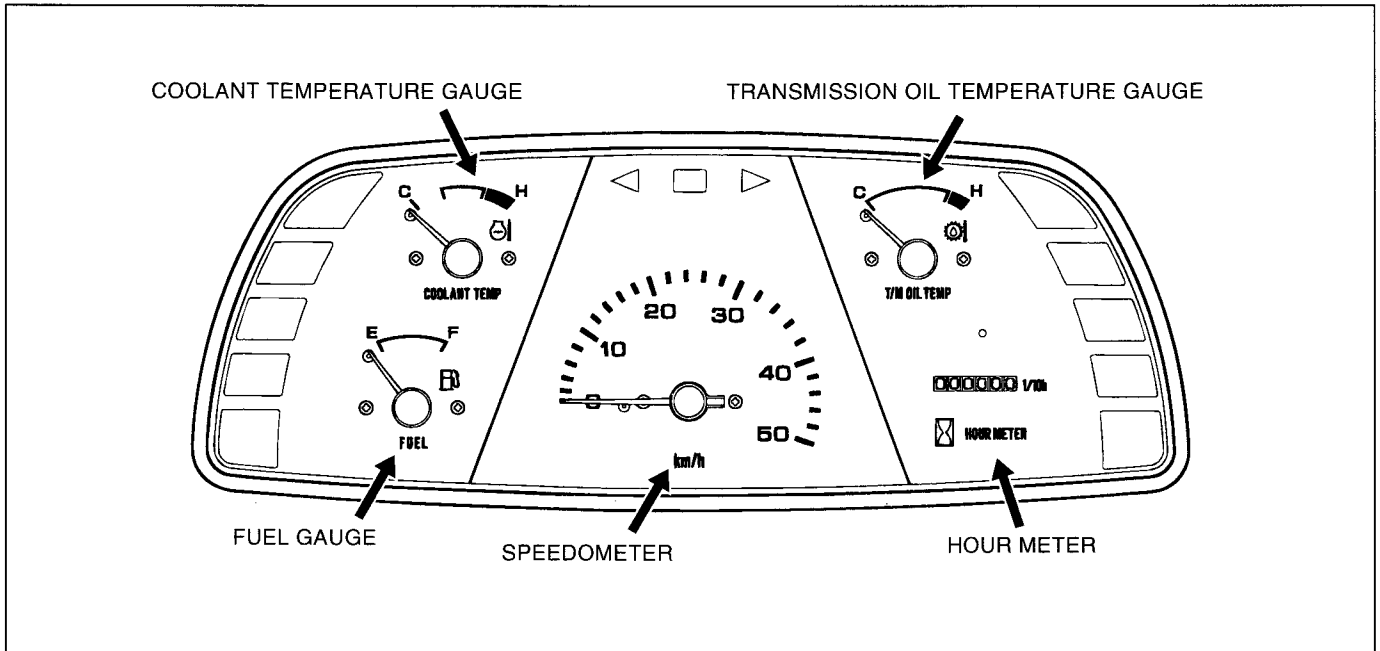


⑧ Side Face of Battery (R & L)



⑨ Side Face of Battery (R & L)





METERS

 **Coolant Temp**

This gauge indicates the engine coolant temperature.

CAUTION

When the pointer indicates “H” mark (red area), it means the engine is overheated. Stop the operation, let the engine run at low rpm and wait for it to cool down.

 **Fuel**

This gauge indicates the level of the fuel in the fuel tank. “F” means that the tank is “full”; “E” means the tank is “empty.” If the pointer comes close to the “E” mark, add fuel as soon as possible.

km/h: Speedometer

This indicates the traveling speed of the loader.

 **T/M Oil Temp**

This gauge indicates the oil temperature of the torque converter and transmission circuit.

CAUTION

When the pointer indicates “H” mark (red area), it means the engine is overheated. Stop the operation, let the engine run at low rpm and wait for it to cool down.

 **Hour Meter**

The hour meter registers total time the loader has operated.

Note that the right-most column indicates figures in 1/10 hour unit. For example, if the figure 8 is displayed in this column, it means 8/10 x 60 (minutes) = 48 minutes. The second column from the right most indicates working time of the engine in hours.

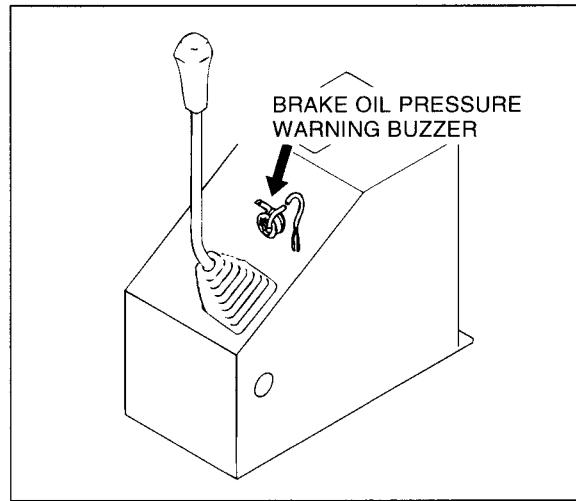
Use the hours recorded for planned maintenance. When you call the dealer about any trouble, let him know the reading on the hour meter for quicker response.

BRAKE OIL PRESSURE WARNING BUZZER

⚠ WARNING

If the brake oil pressure warning buzzer sounds, stop the operation, place the shift lever in neutral, apply the parking brake, and lower the bucket on the ground. Let the engine run at medium rpm and wait until the buzzer stops sounding.

The buzzer sounds and monitor light comes on when the brake oil pressure in the accumulator drops below the specified value.



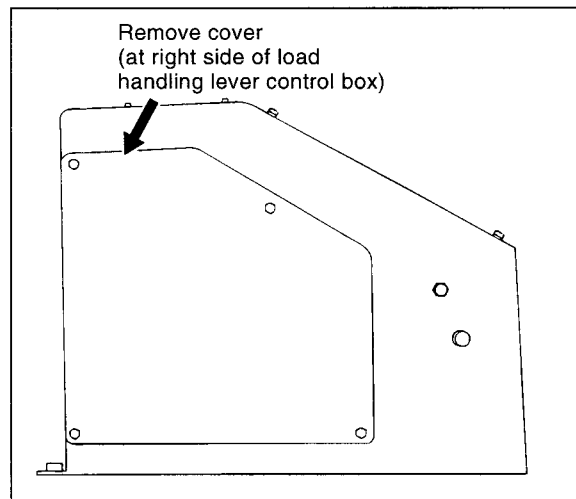
FUSES

⚠ WARNING

If any fuse is blown out, turn the starter switch off and check the cause and troubleshoot properly before replacing the fuse with a new one of the same capacity.

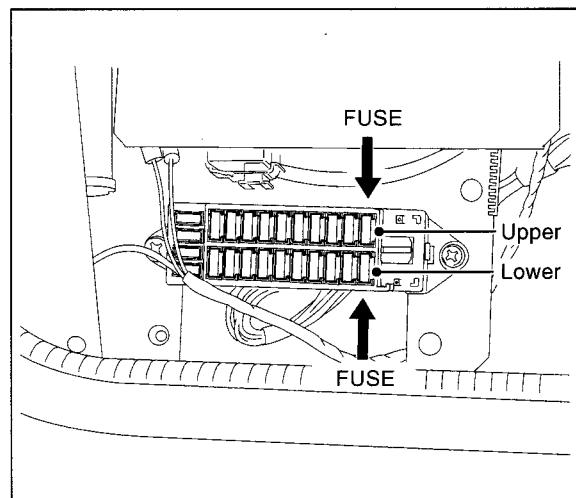
Fuses serve as a safety device for the electric system, preventing excessive current from flowing in the circuit. The fuses have different capacities depending on the circuits they serve. When replacing them with new ones, use the same capacity.

The fuse box is located inside the load handling lever control box.

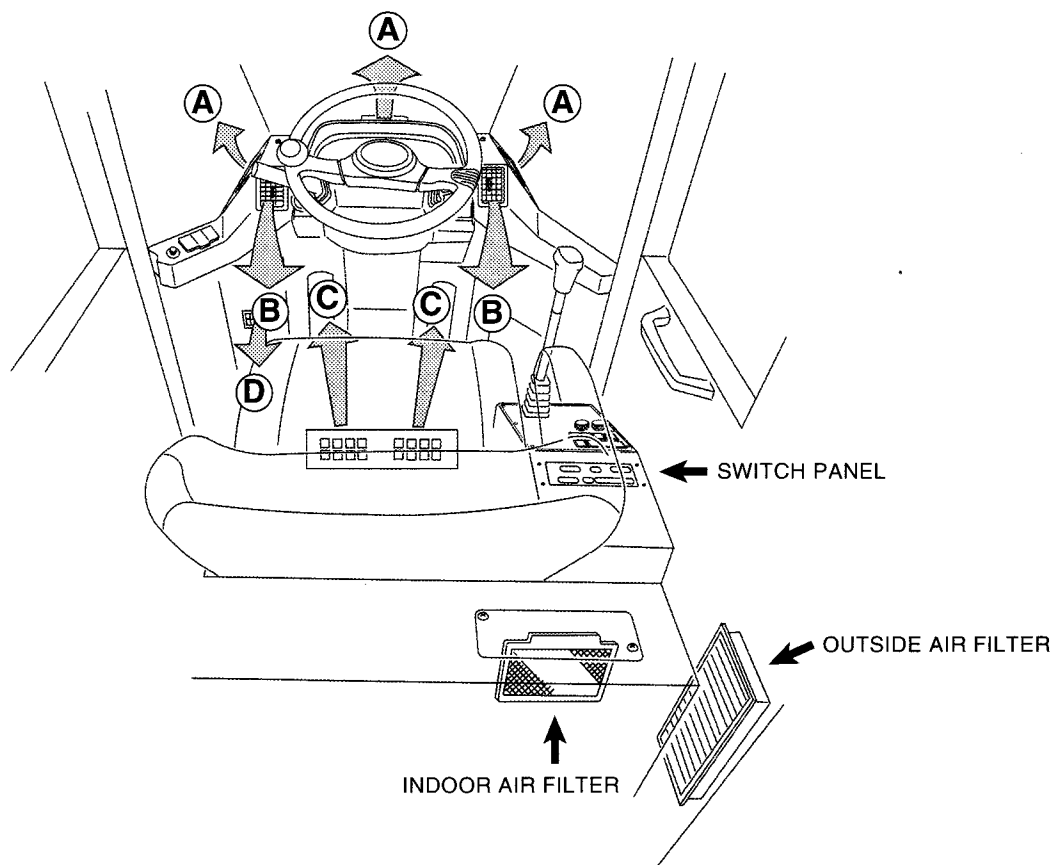


Applicable circuits

| Lower, left to right | Upper, left to right |
|--|--|
| 10A Not used | 15A Not used |
| 10A Rear work light | 10A Not used |
| 5A Air conditioner control power | 5A Room lamp, clock (radio) |
| 20A Blower motor power supply | 5A Neutral (transmission) |
| 15A Air conditioner condenser, compressor power supply | 5A Not used |
| 15A Front wiper, washer | 15A Head light |
| 10A Rear wiper, washer | 10A Turn signal, brake light, back-up lamp |
| 10A Radio | 5A Transmission solenoid |
| 15A Front work light | 5A Monitor power supply |
| 15A Option | 10A Horn, bucket leveler |




AIR CONDITIONING SYSTEM CONFIGURATION



Discharge opening selector switch

| | |
|--|---------|
| | Ⓐ, Ⓑ, Ⓓ |
| | Ⓒ |

Note:

- Discharge openings are represented by symbols.
- For loaders with an optional rear defroster, when the  switch is pressed, the air comes out of the opening Ⓒ and the rear defroster. You cannot operate both the front and the rear defrosters at the same time.
- The condenser and receiver are located at the step section at the right side of the loader.

BREAK-IN PERIOD

Our wheel loaders have been subjected to careful inspection and thorough running-in before shipping. We, however, recommend that you operate the loader under light conditions for the first stage of operation.

The loader should be operated especially for the first stage of operation (for initial 100 hours of operation) following the requirements given below:

- Be sure to perform preoperational checks EVERY DAY.
- Always warm up the loader sufficiently before putting it to work irrespective of the seasons.
- Do not run the engine at high rpm without a load, especially while the engine is cold.

 Avoid sudden stops, starts or turns.

MEASURES TO BE TAKEN IN AN EMERGENCY

If engine stalls during traveling

Brake system: The brakes can be applied by pressing the brake pedal thanks to the oil pressure stored in the accumulator. If the engine stalls during traveling, move to an out-of-traffic area and park. Do not pump the brake pedal at this time; otherwise the brake oil pressure will be used up, thus causing the brakes to fail.

If the brakes cannot be applied by pressing the brake pedal, push the parking brake "ON" switch.

Steering system: The steering wheel becomes hard to turn due to an inoperative hydraulic system.

If the engine stalls during traveling, park the loader in an out-of-traffic area and check the cause of the trouble.

For complicated trouble, contact your authorized dealer.

Allowable water depth

The water depth is an important factor to take into consideration when the loader is working in swampy areas. Do not enter water whose depth exceeds the loader's minimum ground clearance height or is high enough to wet the bottom of the axle housing.

As a rule of thumb, the allowable water depth is about 400 mm (15.7 in). This means that the loader should not be used in a river.

Observe the following conditions:

- Check the water depth in advance when crossing across a river.
- Use the same precautions before crossing across a swampy area.
- Do not enter rivers whose river bed is steep or whose flow is rapid.

CAUTION

Avoid use of the loader in salt water. Salt water will cause the development of rust to shorten the life of the loader.

After working in a swampy area, carefully wash the loader and apply anti-rust coatings.

Battery is discharged

WARNING

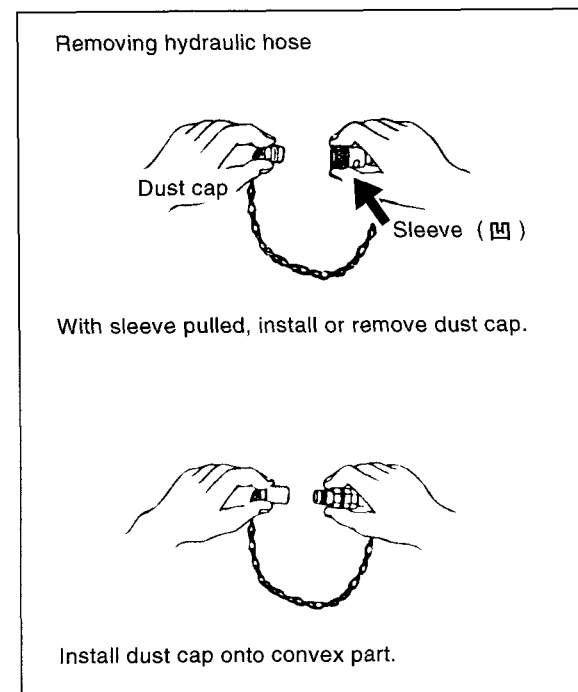
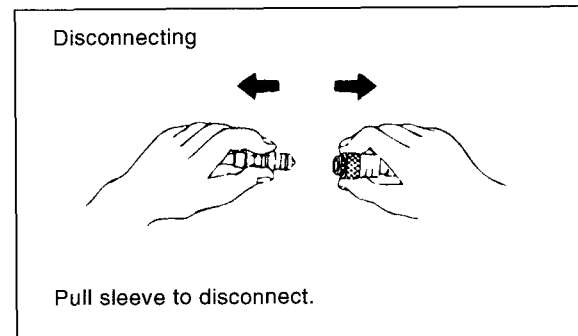
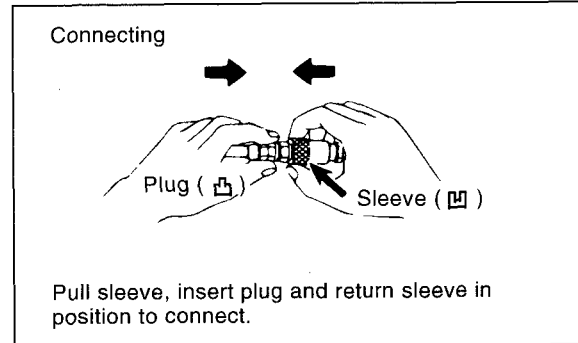
- Batteries give off explosive gases. Do not smoke. Keep flame and sparks away.
- Take care when using metallic tools. If a metallic tool is placed between the positive terminal and the engine block or the loader body, sparks may develop, causing explosion or fire hazards.
- If battery electrolyte comes in contact with the skin or the eyes, it will cause a burn or blindness. Wear safety glasses, rubber gloves and apron.
- If electrolyte comes in contact with the skin or gets in the eye, flush repeatedly with cold water and seek medical attention.
- Make sure to shut off the engine and turn off the starter switch before working on the battery.

Installing and removing hydraulic hose

If your loader is equipped with a hydraulic attachment, it is necessary to install and remove the hydraulic hose when drawing hydraulic power from the loader.

Installing and removing

- **⚠ WARNING:** Set the parking brake and shut off the engine. Operate the attachment control lever a few times to release the pressure from the piping.
- **⚠ CAUTION:** Clean dust and dirt from the hydraulic hose connections.
- Connect the hydraulic hose of the loader side with the hydraulic hose of the attachment.
- Start the engine. Operate the attachment control lever slowly to move the attachment, to make sure there is no oil leak from the connections.
- After removing the hydraulic attachment, connect the hydraulic hoses of the attachment to each other. Dust cap the hose ends of the loader body side to prevent dirt from entering the circuit.



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GROUND DIGGING (Digging on a level surface)

Adjust the forward tilt of the bucket according to the hardness of the ground.

⚠ CAUTION

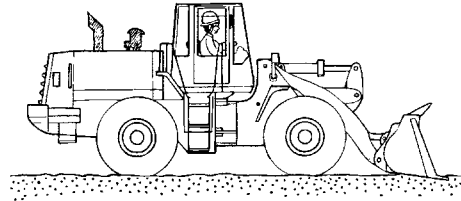
Usually tilt the bucket forward by 0 to 10°. Too large a forward tilt of the bucket will apply heavy burden on the bucket and booms, resulting in a defective load handling system.

- Drive slowly forward and penetrate the bucket cutting edge into the ground 10 to 30 cm (0.3 to 1 ft). When the bucket is filled, tilt back the bucket while raising the booms.
- Drive forward to dig the ground while adjusting the digging depth properly with care not to have uneven load in the bucket.
- Using the above procedure, dig the ground little by little. Don't rush.

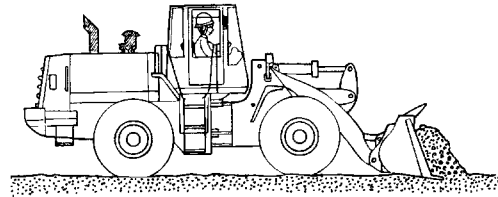
⚠ CAUTION

With the bucket or the fork attachment tilted forward more than 10°, do not apply excessive force on the cutting edge or the fork tips. Failure to do so may cause cracked or defective bucket or forks.

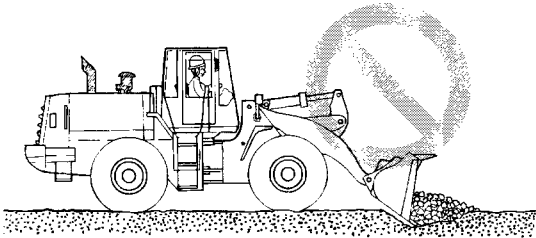
Lower bucket on the ground and tilt it forward a little.



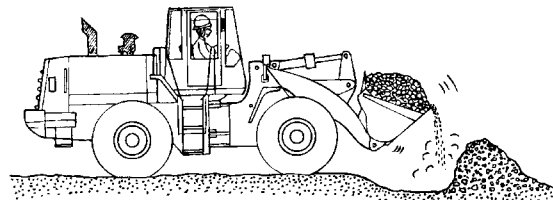
Drive forward in 2nd gear. Press down-shift switch when you want to dig and penetrate into ground, with the bucket edge.



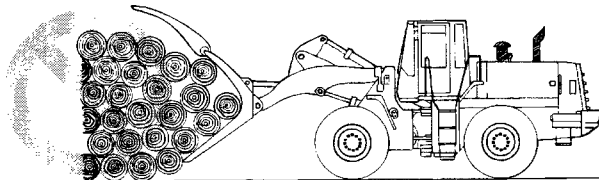
Bucket tilted forward more than 10°



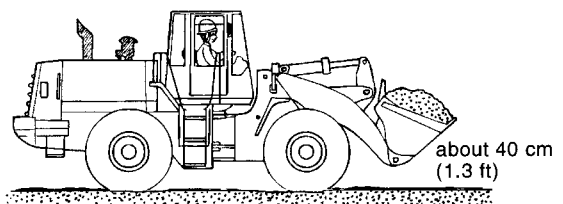
Raise booms while rolling back bucket.



Gathering lumber



Roll back bucket fully. Keep the bucket at minimum ground clearance height when moving.



MAINTENANCE



MAINTENANCE

| | |
|--------------------------------------|----|
| SAFE SERVICING AND MAINTENANCE | 88 |
| LOCATIONS OF FILLER PORTS | 92 |
| GREASE FITTING LOCATIONS | 93 |
| ENGINE COMPARTMENT | 94 |

This Manual uses the following safety alert symbols. When you see those symbols in the text, follow the safety message to avoid personal injury or death.

DANGER

Failure to follow the instructions in the message will cause a serious accident or death.

WARNING

Failure to follow the instructions in the message might cause a serious accident or death.

CAUTION

Failure to follow the instructions in the message may cause personal injury or damage to the loader.

PERIODIC INSPECTION LIST

| Services required | See page |
|--|-----------------|
| 50 HRS. | |
| Change engine oil. (initial 50 hrs. only) | 106 |
| Change engine oil filter (initial 50 hrs. only) | 106 |
| Check battery electrolyte level | 107 |
| Check electric wiring and fuses | 107 |
| Check hydraulic oil tank for level | 107 |
| 100 HRS. | |
| Grease center hinge pins (upper and lower) | 108 |
| Grease load handling system pins | 108 |
| Grease axle support pins | 108 |
| Grease steering cylinder pins | 108 |
| Clean air conditioner filter | 108 |
| 250 HRS. | |
| Change engine oil | 109 |
| Change engine oil filter (excluding partial oil filter) | 109 |
| Check fan belts for tension | 109 |
| Check battery electrolyte for specific gravity | 109 |
| Grease center bearings | 110 |
| Grease propeller shafts | 110 |
| Change torque converter and transmission oil and filter (in-line filter) (initial 250 hrs. only) | 110 |
| Change axle oil (initial 250 hrs. only) | 111 |
| 500 HRS. | |
| Drain off foreign matter from fuel tank | 113 |
| Change partial oil filter | 113 |
| Check injection nozzle (pressure and spray pattern) | 113 |
| Retighten wheel bolts | 113 |
| Clean axle housing air breather | 114 |
| Change torque converter and transmission filter (in-line filter) | 114 |

| Services required | See page |
|--|-----------------|
| 1000 HRS. | |
| Change fuel filter | 115 |
| Clean joint bolt strainer, (feed pump or water sedimentor section) | 116 |
| Adjust valve clearance | 116 |
| Measure compression pressure | 116 |
| Check starter and alternator for wear | 116 |
| Change brake oil | 116 |
| Change torque converter and transmission oil and clean transmission screen | 116 |
| Clean torque converter air breather | 117 |
| Change hydraulic oil tank return filter | 117 |
| Grease brake pedal | 118 |
| Check load handling system for cracks or damage | 118 |
| Check reversible cutting edge for wear | 118 |
| 2000 HRS. | |
| Change coolant (LLC) "2000 hours or one year whichever comes first" | 119 |
| Check accumulator for operation, gas leaks, looseness or damage (service brake) "2000 hours or one year whichever comes first" | 120 |
| Change axle oil | 120 |
| Change hydraulic oil | 120 |
| Check brake disk for wear (service and parking brakes) | 120 |
| Loaders with cab (one year) | |
| Check door lock for operation | 121 |
| Check windshield wiper for operation | 121 |
| Check window washer liquid for spray condition | 121 |
| 4000 HRS. | |
| Change engine water pump grease | 121 |

Check battery electrolyte level

The battery electrolyte level should be between the UPPER and LOWER marks on the side face of the battery case.

⚠ WARNING

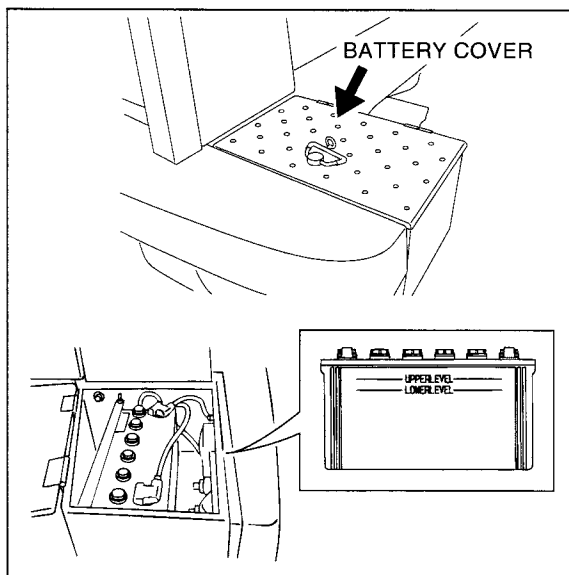
Do not use open flame to check the battery electrolyte level. Also do not smoke since explosive gases are released from the battery. The battery electrolyte is sulfuric acid, which causes severe burns or blindness.

Do not get in eyes, on skin or clothing. In case of contact, flush immediately with fresh water (tap water). If anyone swallows electrolyte accidentally, let him drink a copious amount of water immediately and send for a doctor.

⚠ WARNING

Do not use or charge the battery whose electrolyte level is below the specified value. If the battery is used in this condition, the internal components in the battery will deteriorate, resulting in a short service life or in the worst case causing an explosion.

If the electrolyte level is low, check for fluid leakage or a damaged case, before adding electrolyte to the specified level.



⚠ CAUTION

Keep the battery cases always clean; otherwise you might not see correct level.

If the level is low, add distilled water or purified water. Do not overfill. Make sure the caps are tight.

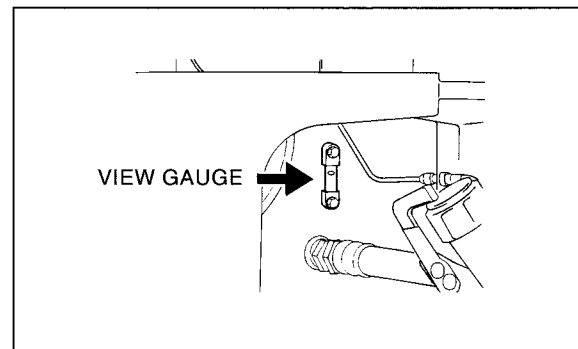
Check electrical wiring and fuses

Check wiring connections and battery terminals for looseness, wiring shields for damage, fuses for proper installation and wiring for short-circuiting. If a broken or shorted electric wire is found, check the cause and repair.

Pay special attention to the wiring of the battery, starter and alternator.

Check hydraulic oil tank for level

Shut off the engine and lower the bucket on the ground horizontally. Check the hydraulic oil tank for level with the view gauge on the side face of the tank.



The oil level should be above the middle of the view gauge.

If the oil level is low, add oil through the oil filler until the oil level is above the middle of the view gauge.

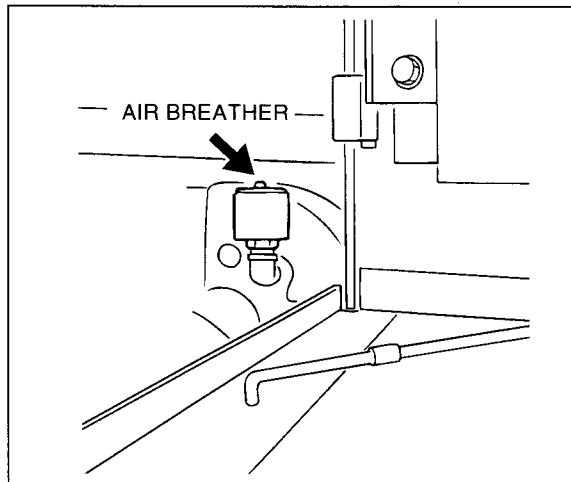
⚠ WARNING

The hydraulic oil tank is a pressure type. Slowly open the cap to allow pressure to escape. Do not overfill, observing the oil level with the view gauge.

- ① Remove the 4 fitting bolts securing the suction tube.
- ② Take out the strainer and remove dust and foreign matter. Wash it with cleaning oil. If the strainer is damaged, replace it with a new one. Whenever the strainer is replaced, replace the gasket and "O"-ring with new ones, too.
- ③ Install the strainer, "O"-ring and gasket. Tighten the suction tube fitting bolts.
- ④ Add oil through the filler port to the specified level.
Check the oil level, referring to page 102. Make sure there is no oil leakage.

Clean torque converter air breather

The air breather is located inside the side panel at the right side of the loader, at the top right of the torque converter.



- ① Wipe the air breather mounting area and areas around it clean.
- ② Cover the mounting area to prevent foreign matter from entering the system.
- ③ Clean the air breather with compressed air. If severely contaminated, wash it with cleaning fluid.

⚠ WARNING
When cleaning with compressed air, be sure to wear safety glasses.

- ④ Use care to prevent foreign matter from entering the system when reinstalling the air breather.

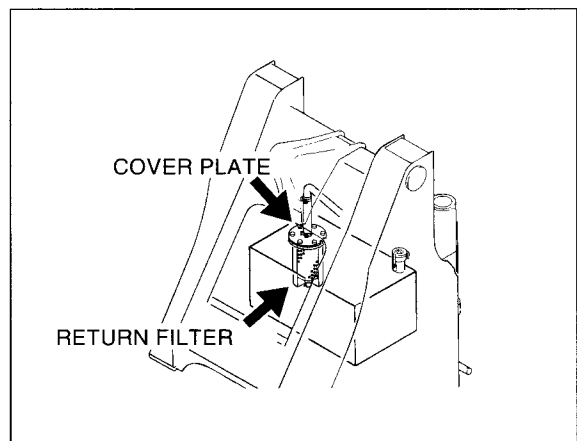
Change hydraulic oil tank return filter

⚠ WARNING

Do not try to change the return filter immediately after the engine is shut off or when the oil temperature is high; otherwise you can get your hands burned.

The return filter can easily be changed with the loader articulated (full turn) state. Make sure there is no one near the center pin before articulating the loader.

Before changing the return filter, shut off the engine, lower the bucket on the ground, apply the parking brake and block the wheels.



- ① Wipe areas around the cover plate, hose and clip clean.
- ② Use an oil receiving pan and shop rag to receive oil which would spill from the filter.
- ③ Remove the clip and remove the hose from the cover plate.
- ④ Remove the bolt securing the cover plate. Remove the return filter assembly.
- ⑤ Remove the cotter pin, bolt and protector at the bottom of the filter. Replace the element with a new one.
- ⑥ Reinstall the filter assembly with care to prevent dust or foreign matter from entering the system.
- ⑦ Start the engine. Slowly operate the booms and bucket. Shut off the engine and check that there is no oil leakage. Check the hydraulic oil tank for level. See page 107.

MAINTENANCE OF COOLANT

Use cooling water containing an all-season coolant having anti-rust and anti-corrosive additives.

COOLANT

⚠ WARNING

Coolant is flammable.

Keep away open flame when handling the coolant. Do not smoke.

It is poisonous. Never drink it. If you swallowed it accidentally, induce vomiting immediately, wash your mouth, drink a lot of water.

The coolant should be stored in a proper container and securely capped. Keep out of reach of children. Make sure the container is properly marked according to all local requirements.

⚠ CAUTION

If the coolant is not available, you may use tap water alone. Do not use river water or well water for this purpose; otherwise the engine or radiator might be damaged.

When an ambient temperature below 0°C or 32°F is anticipated at starting, make sure to add antifreeze into the cooling water.

USE OF COOLANT

The concentration of the coolant in the cooling water should be more than 30 percent to prevent the freezing of the cooling water. Change the coolant every 2000 hours or every year, whichever comes first.

CONCENTRATION AND CAPACITY

Unit: liters (US gal)

| Ambient temperature at starting | | more than -10°C or 14°F | more than -25°C or -13°F | more than -40°C or -40°F |
|---------------------------------|---------|----------------------------|-----------------------------|-----------------------------|
| Concentration | | 30% | 40% | 50% |
| Ratio | Water | 21.7 (5.73) | 18.6 (4.91) | 15.5 (4.10) |
| | Coolant | 9.3 (2.46) | 12.4 (3.28) | 15.5 (4.10) |
| Capacity | | 31 (8.2) | | |

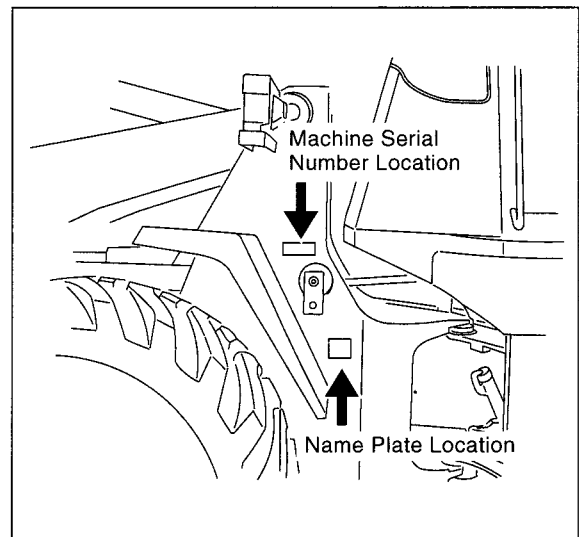
The concentration should be selected properly according to the ambient temperature at the time of starting the loader.

NAME PLATE

The name plate is located at the left side of the front frame. The name plate gives information about MODEL and SERIAL NUMBER of the loader.

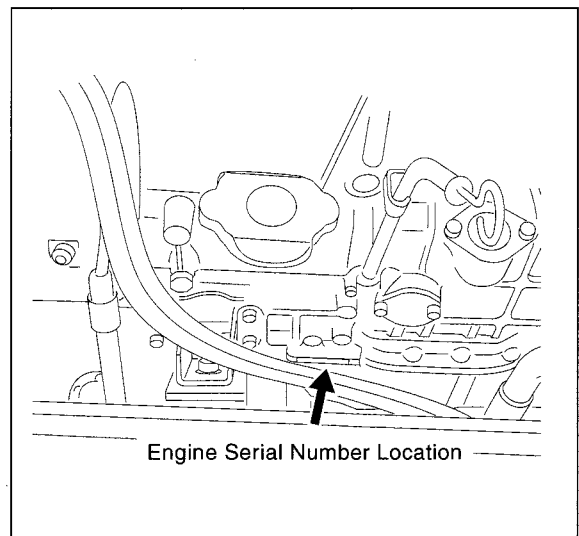
MACHINE SERIAL NUMBER

The machine serial number is imprinted on the left side of the front frame. It is an important piece of information used for registration. Use caution not to damage it.



ENGINE SERIAL NUMBER

The engine serial number is imprinted on the cylinder block under the engine oil fill port at the right side of the loader.



NOTE

Use caution not to damage the name plate and imprinted serial number.
Repair the name plate if damaged or peeled.
Do not try to modify the serial number by welding.

When ordering parts or repair is needed, give us your loader model and serial number. Write down your loader model, loader serial number, and engine serial number in the "WRITE DOWN YOUR LOADER DATE HERE" column on page 138.

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