CEAM002302

Operation & Maintenance Manual

WA120-3
WA120L-3

WHEEL LOADER

SERIAL NUMBERS WA120-3L -A30001 and up
WA120L-3 -54001 - 54103

June 2002

MAINTENANCE

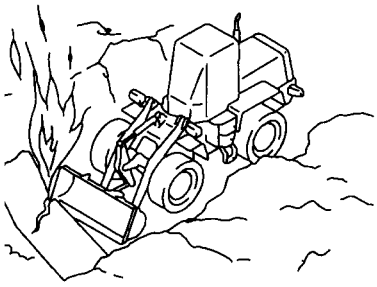
7. PRECAUTIONS DURING OPERATION

7.1 BEFORE STARTING ENGINE

(Also see “12.1 WALK AROUND CHECK”)

SAFETY AT WORKSITE

- Before entering the operator's compartment, walk completely around the machine and clear the area of personnel and obstructions.
- Before starting the engine, thoroughly check the area for any unusual conditions that could be dangerous.
- Before starting the engine, examine the terrain and soil conditions of the worksite. Determine the best and safest method of operation.
- If you need to operate on a street, protect pedestrians and cars by designating a person for worksite traffic duty or by installing barriers around the worksite.
- If water lines, gas lines, telephone lines, and high-voltage electrical lines may be buried under the worksite, contact each utility and identify their locations. Be careful not to sever or cut any of these lines.
- Check the depth and flow of water before operating in water or crossing a river. NEVER be in water which is in excess of the permissible water depth.
  Permissible water depth ➔ See "12.18 PRECAUTIONS FOR OPERATION".



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FIRE PREVENTION

- Carry out the following checks before starting the engine at the beginning of the day’s work.
  Failure to carry out these checks may lead to serious injury or damage.
- Completely remove all wood chips, leaves, grass, paper and other flammable materials accumulated in the engine compartment and around the battery. Check fuel, lubrication, and hydraulic system for leaks, and a have any leaks repaired. Wipe up any excess oil, fuel or other flammable fluids. Return all containers to their proper place,.
- Check for damage to the electrical wiring.
- Be sure a fire extinguisher is present and check the method of using it.
- Do not operate the machine near any fire or flame.

WALK AROUND CHECK

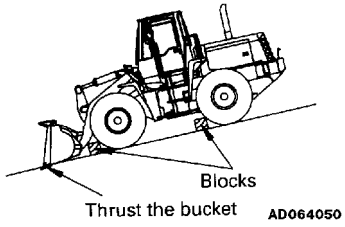
- Check that the coolant level, fuel level and oil level in the engine oil pan.
- Check for clogging of the air cleaner
  Check points ➔See “12.1 WALK AROUND CHECK”.

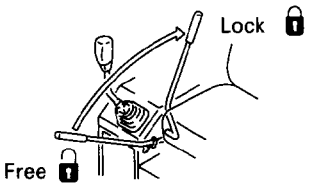
WORKING ON LOOSE GROUND

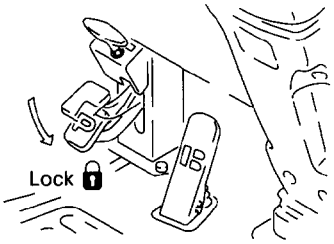
- Do not operate the machine on soft ground. It is difficult to get the machine out again.
- Avoid operating your machine too close to the edge of cliffs, overhangs, and deep ditches. If these areas collapse your machine could fall or tip over and result in serious injury or death.
  Remember that the soil after heavy rain, blasting, or earthquakes is weakened in these areas.
- Earth laid on the ground and the soil near ditches are loose. It can collapse under the weight or vibration of your machine and cause your machine to tip over.
- Install the head guard (FOPS) if working in areas where there is danger of falling rocks and dirt.
- Install the ROPS and wear the seat belt when working in areas where there is danger of falling rocks or of the machine turning over.

PARKING THE MACHINE

- Park on level ground where there is no danger of failing rocks or landslides, or of flooding if the land is low, and lower the work equipment to the ground.
- If the machine must be parked on a slope, block the wheels to prevent the machine from moving, then dig the work equipment into the ground.
- When parking on public roads, provide fences, signs, such as flags, or lights, on the machine to warn passerby to be careful. Be sure that the flags, and fences do not obstruct traffic.
  Parking procedure ➔ See "12.18 PARKING MACHINE".
- When leaving the machine, lower the work equipment completely to the ground, set the safety lock to the LOCK position and parking brake pedal to the LOCK position, stop the engine, and use the key to lock all the equipment. Always take the key with you.
  Work equipment posture ➔ See "12.18 PARKING MACHINE".
  Places to lock ➔ See "12.24 LOCKING".







⚠ WARNING: For reasons of safety, always follow these safety precautions.

KEEP WORK PLACE CLEAN AND TIDY

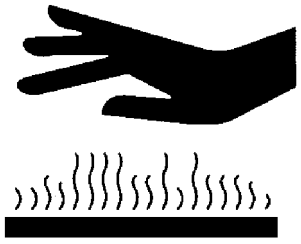
Do not leave hammers or other tools lying around in the work place. Wipe up all grease, oil, or other substances that will cause you to slip. Always keep the work place clean and tidy to enable you to carry out operations safely. If the work place is not kept clean and tidy, there is danger that you will trip, slip, or fall over and injure yourself.

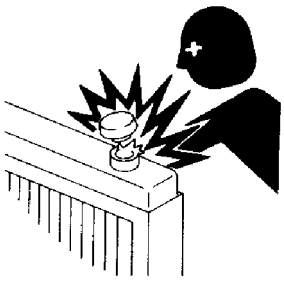
APPOINT A LEADER WHEN WORKING WITH OTHERS

When repairing the machine or when removing and installing the work equipment, appoint a leader and follow his instructions during the operation.
When working with others, misunderstandings between workers can lead to serious accidents.

RADIATOR WATER LEVEL

- When checking the radiator coolant level, stop the engine, and wait for the engine and radiator to cool down. Check the coolant level in the sub-tank. Under normal conditions, do not open the radiator cap.
- If there is no sub-tank, the radiator cap must be removed, always do as follows.
- Wait for the radiator coolant temperature to go down before checking the coolant level. (When checking if the coolant temperature has gone down, put your hand near the engine or radiator and check the air temperature. Be careful not to actually touch the radiator or engine.)
- Slowly loosen the radiator cap to release the internal pressure before removing the cap, and remove the radiator cap slowly.
- When adding coolant, add coolant through the sub-tank.

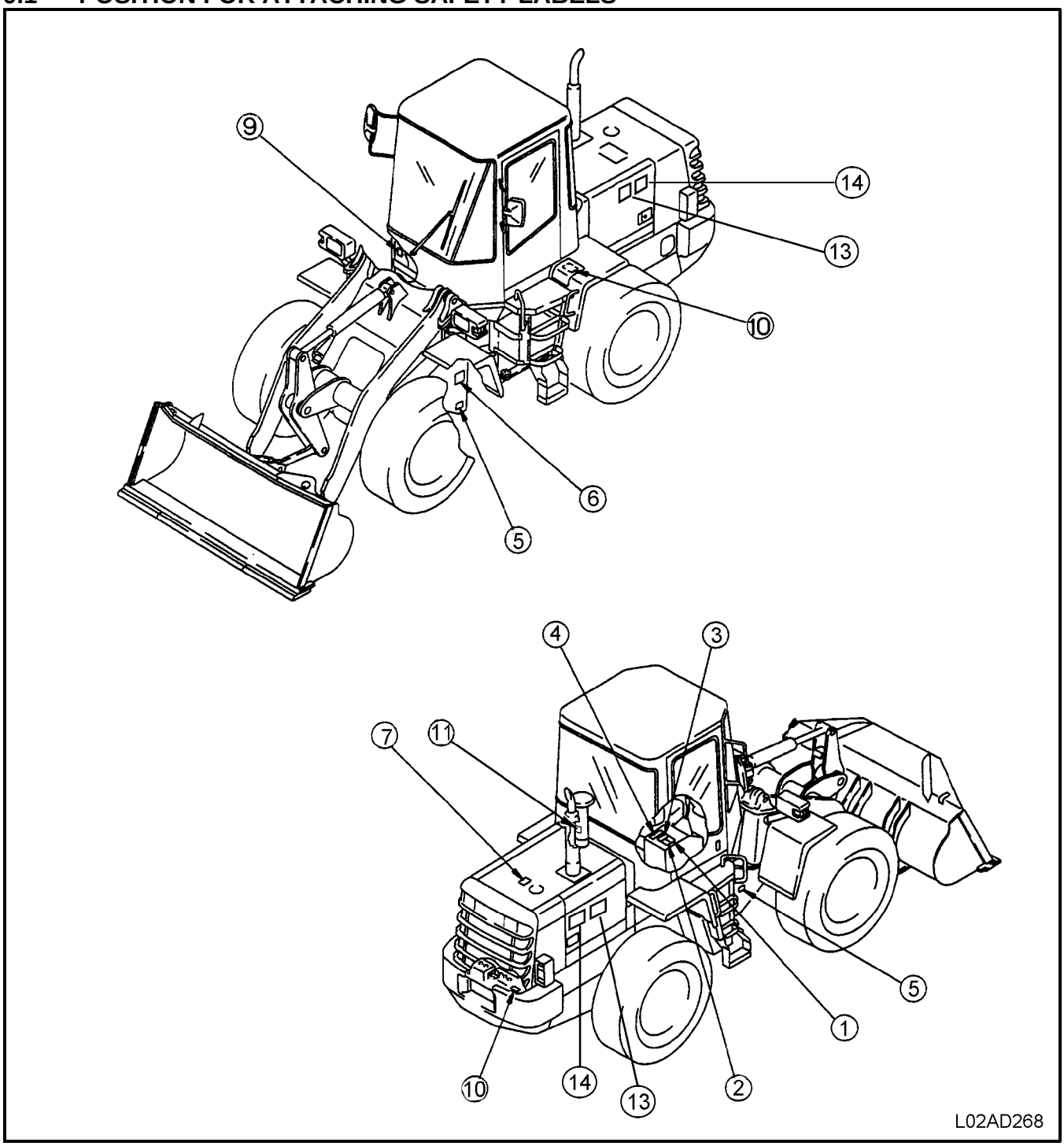




9. POSITION FOR ATTACHING SAFETY LABELS

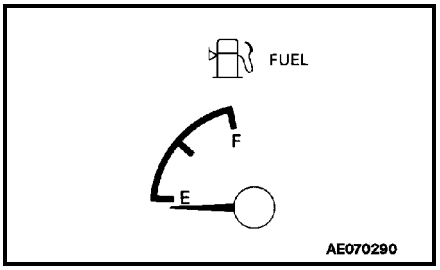
Always keep these labels clean. If they are lost or damaged, attach them again or replace them with a new label. There are other labels in addition to the safety labels listed as follows, so handle them in the same way. Safety labels may be available in languages other than English. To find out what labels are available, contact your local distributor.

9.1 POSITION FOR ATTACHING SAFETY LABELS



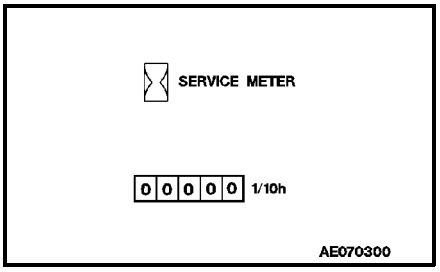
3. FUEL GAUGE

This gauge indicates the amount of fuel in the fuel tank.
E: Tank is EMPTY
F: Tank is FUEL
If the fuel gauge indicates E during operation, check and supply fuel.



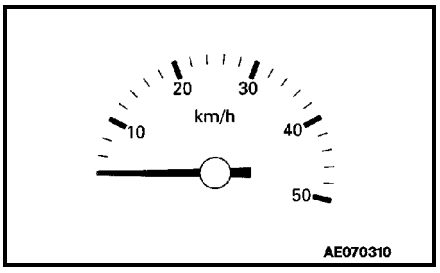
4. SERVICE METER

This meter shows the total operation hours of the machine.
The service meter advances while the engine is running - even if the machine is not traveling.
While the engine is running a green pilot lamp on the service meter flashes to shows the service meter advances.
The services meter advances by 1 when the engine is operated for one hour, regardless of the engine speed.



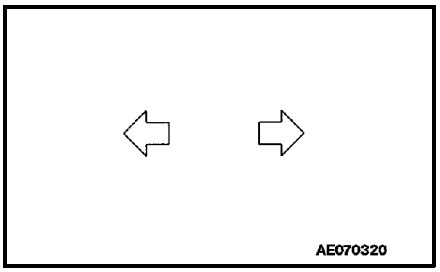
5. SPEEDOMETER

This meter indicates the travel speed of the machine.



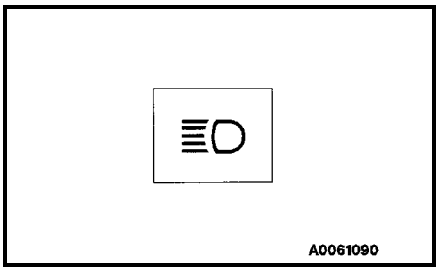
6. TURN SIGNAL PILOT LAMP

When the turn signal lamp flashes, the pilot lamp also flashes.



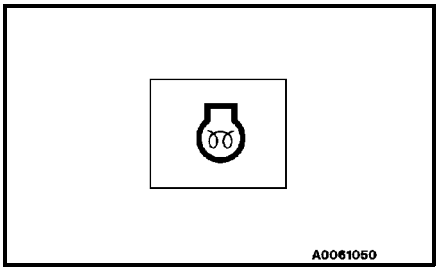
7. HIGH BEAM PILOT LAMP

This lamp lights up when head lamp is at high beam.



8. PREHEATING PILOT LAMP

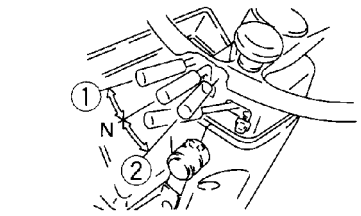
This informs the operator that the air intake heater is heated.
This lamp lights up when the starting switch is turned to the ON position, on condition that ambient temperature is below 0°C (-18°F), and goes out when the preheating is completed.
The time that it remains lit up differs according to the coolant temperature when the engine is started.



2. DIRECTIONAL LEVER

This lever is used to change the direction of travel of the machine.
The engine can not be started if the directional lever is not at **N** (neutral).

Position (1): Forward
Position **N**: Neutral
Position (2): Reverse



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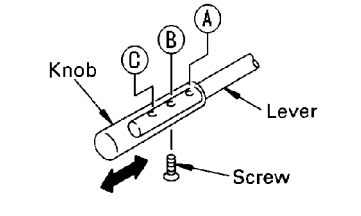
REMARKS

The length of the lever can be adjusted to 3 stages (positions **A, B, C**). To adjust the length, remove the screw at the bottom of the lever knob, slide the knob to the desired position, then tighten the screw again.
(The lever is installed to position **B** when it is shipped from the factory.)



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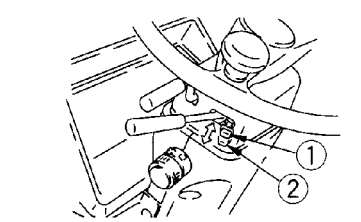
3. SPEED CONTROL LEVER STOPPER

This stopper prevents the speed control lever from entering the 3rd position when working.

Position (1): Stopper actuated
Position (2): Stopper released



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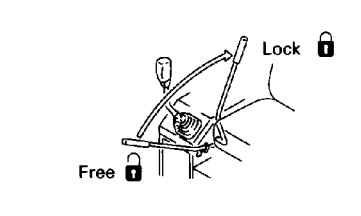
4. SAFETY LOCK LEVER

⚠ WARNING

- **When leaving the operators compartment, set the safety lock lever securely to the LOCK position. If the control levers are not locked, and they are touched by mistake, this could lead to a serious accident.**
- **If the safety lock lever is not placed securely in the LOCK position, the control levers may not be properly locked. Check that the situation is as shown in the diagram.**
- **When parking the machine or carrying out maintenance, always lower the bucket to the ground and apply the lock.**

This is used to lock the work equipment levers.
Pull the levers up to apply the lock.



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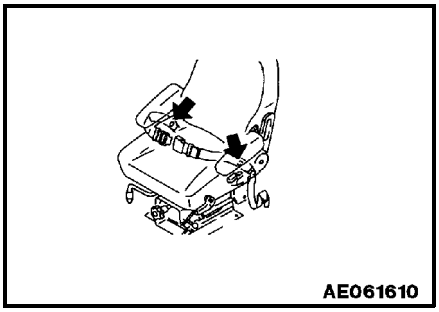
9. Check seat belt and equipment

WARNING

Even if there appears to be no abnormality with the seat belt, always replace it once every three years.

REMARKS

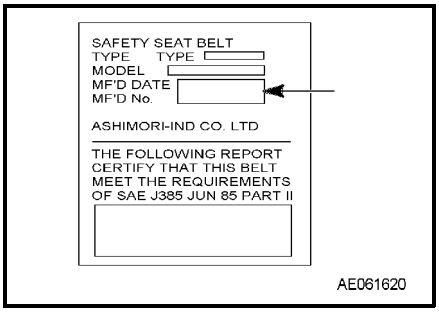
The date of manufacture of the seat belt is marked on the belt at the place indicated by the arrow in the diagram on the right.



Check that there are no loose bolts on the equipment mounting the seat belt to the machine, and tighten if necessary.

Tightening torque: 24.5 ± 4.9 N•m (2.5 ± kgm, 18.1 ± 3.6 lbf ft)

If the belt is damaged or fluff is starting to form, or if there is any damage or deformation of the seat belt holders, replace the seat belt with a new part.



10. Check for loose bolts on ROPS

Check for any loose or damaged bolts. If any loose bolts are found tighten them to 549 ± 59 N•m (56 ± 6 kgm, 405 ± 43 lbf ft)

If any bolts are damaged, replace them with genuine Komatsu bolts.

11. Clean cab window

Clean the cab window to ensure good visibility when operating the machine.

12. Check for loose air cleaner mounting bolts

Check for any loose mounting bolts and tighten if necessary.

13. Check for loose battery terminals

Tighten any loose terminals.

14. Inspect engine cooling fan

WARNING

Personal injury can result from fan blade failure. Never pull or pry the fan. This can damage the fan blade and cause failure.

See the Maintenance Schedule for inspection instructions.

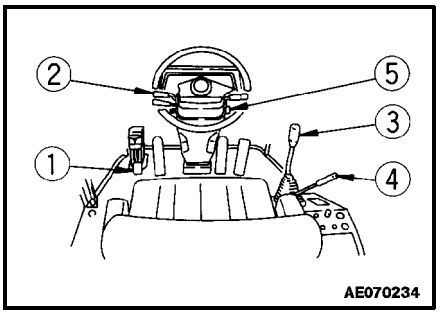
15. Check drive belt condition and tension

See the Maintenance Schedule for inspection instructions.

12.4 OPERATIONS AND CHECKS BEFORE STARTING ENGINE

WARNING

If the control levers are touched by accident, the work equipment could move suddenly. When leaving the operators compartment, always set the safety lever securely to the LOCK position. Before starting the engine, use a damp cloth to wipe off the dust accumulated on the top surface of the battery or on the starting mortar and alternator.



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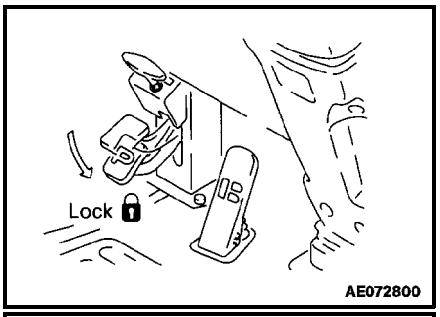
1. Check that parking brake pedal (1) is at the **LOCK** position.



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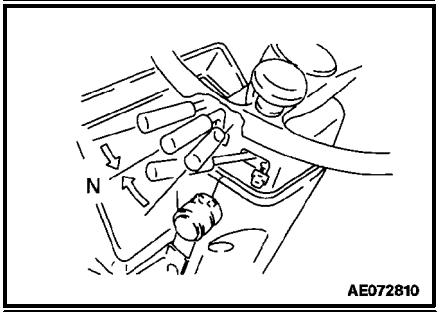
2. Check that directional lever (2) is at **N** position.
   When starting the engine , if directional lever (2) is not at the **N** position, the engine will not start.



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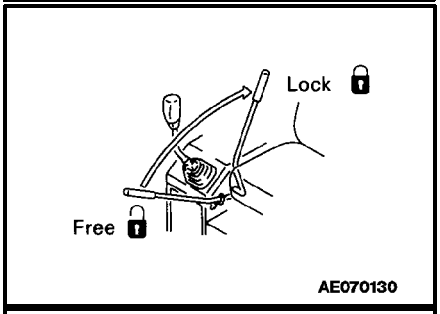
3. Lower the bucket to the ground, then check that work equipment control lever (3) is locked by safety lock (4).



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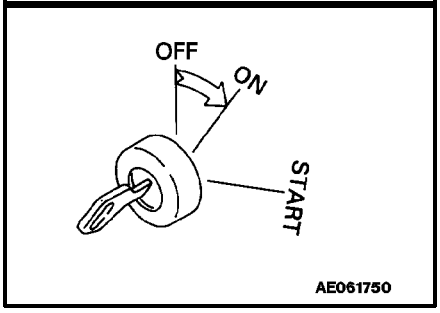
4. Insert the key in starting switch (5), turn the key to the **ON** position, and check that the pilot lamp lights up.



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12.13 WORK POSSIBLE USING WHEEL LOADER

In addition to the following, it is possible to further increase the range of applications by using various attachments.

12.13.1 DIGGING OPERATIONS WITH ROCK PILES

WARNING

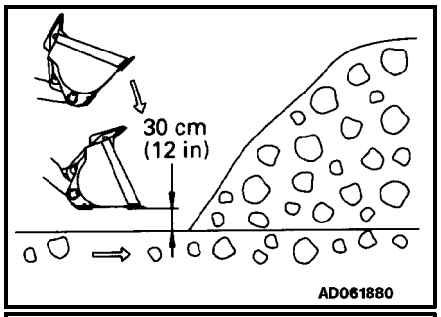
Always set the machine facing directly to the front when carrying out digging or scooping operations. Never carry out these operations with the machine articulated.

NOTICE: If the tires slip, the life of the tire will be reduced, so avoid slipping or spinning the tires when operating the machine.

When loading piled soil or blasted rock, drive the machine forward as follows to load. To prevent cutting of the tires caused by tires slipping, be careful of the following points.

- Always keep the job site flat, and remove any fallen rocks.
- When working with stockpiles, operate the machine in 1st or 2nd; when loading blasted rock operate in 1st.

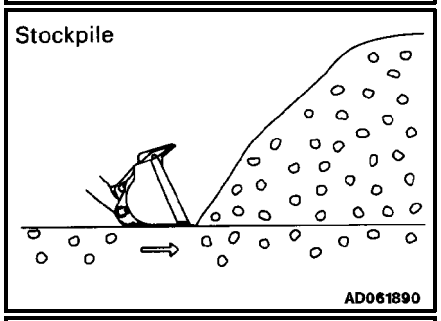
1. When driving forward and lowering the bucket, stop the bucket about 30 cm (12 in) from the ground, then lower it slowly.



REMARKS:

If the bucket hits the ground, the front wheels will raise up, and the tires will slip.

2. Shift down immediately in front of the material to be loaded.
When completing the shift down, depress the accelerator pedal at the same time and thrust the bucket into the load.

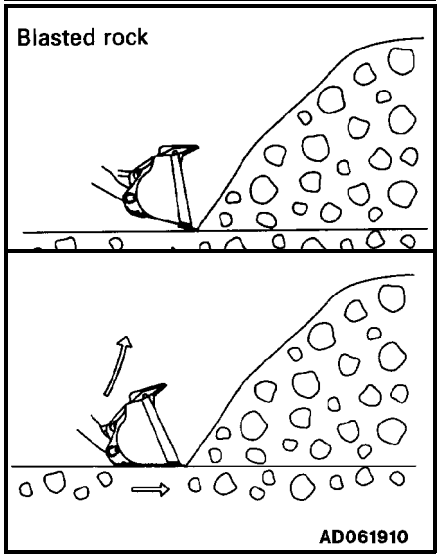


3. When the material is in a stockpile, keep the cutting edge of the bucket horizontal; when loading blasted rock have the bucket tilted slightly down.

Be careful not to get blasted rock under the bucket. This will make the front tires come off the ground and slip.

Try to keep the load in the center of the bucket, the load will be unbalanced.

4. At the same time as thrusting the bucket into the material, raise the boom to prevent the bucket from going in too far. By raising the boom, ample traction will be produced by the front tires.



12.19 CHECKS AFTER STOPPING ENGINE

1. Walk around the machine and check the work equipment, body work, and undercarriage, and check for oil and coolant leaks. If there are any leaks or abnormalities found, carry out repairs.

2. Fill the fuel tank.

3. Remove any waste paper or leaves from inside the engine compartment. They could cause a fire.

4. Remove any mud stuck to the undercarriage.

12.20 LOCKING

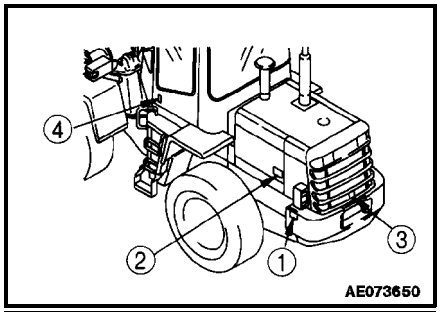
Always lock the following places.

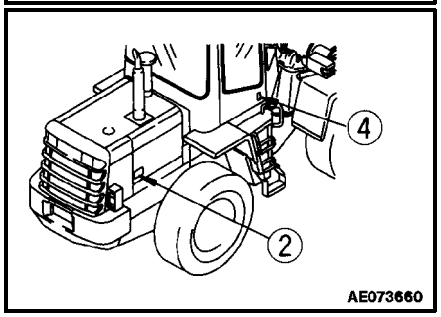
(1) Fuel tank filler cap

(2) Engine side panel (left, right)

(3) Rear grill

(4) Cab door (left, right)





REMARKS

The starting switch key is used also for locks (1),(2),(3) and (4).

15. LONG TERM STORAGE

15.1 BEFORE STORAGE

When putting the machine in storage for a long time, proceed as follows.

- After every part is washed and dried, house the machine in a dry building.
  If the machine must be left outdoors, park it on well drained concrete and cover it with canvas, etc.
- Completely fill the fuel tank, lubricate, and change the oil before storage.
- Apply a thin coat of grease to the metal surface of the hydraulic piston rods.
- Disconnect the negative terminal of the batteries and cover it, or remove it from the machine and store it separately.
- If the ambient temperature is expected to drop below 0°C (32°F) then always add antifreeze to the cooling water.
- Apply the safety locks to the bucket control lever, boom control lever, and directional lever, then apply the parking brake.

15.2 DURING STORAGE

WARNING

Provide necessary ventilation if the machine is operated indoors to prevent gas poisoning.

- Operate the engine and move the machine for a short distance once a month so that a new film of oil will be coated over movable parts and component surfaces. At the same time, also charge the batteries.
- Before operating the work equipment, wipe off the grease on the hydraulic piston rod.
- For vehicles equipped with air conditioning, operate air conditioning once a month for 3-5 minutes at low idle to prevent the air compressor from seizing up from lack of lubricating oil and check the a/c gas volume twice a year.

15.3 AFTER STORAGE

NOTICE:

If the machine is stored without the monthly rust prevention operation, consult your distributor for service.

Carry out the following procedures when taking the machine out of storage.

- Wipe off the grease from the hydraulic cylinder rods
- Add oil and grease to all places.

16.4.2 CHASSIS

- ( ): Always contact your distributor when dealing with these items.
- In cases of abnormalities or causes which are not listed below, please contact your distributor for repairs.

Problem	Main causes	Remedy
TRANSMISSION		
Engine is running but machine does not move	● Parking brake is applied ● Directional lever is not shifted properly ● Lack of oil in transmission	● Release parking brake ● Shift lever properly ● Add oil to specified level. **See "WHEN REQUIRED".**
Even when the engine is running at full power, the machine only moves slowly and lacks power.	● Lack of oil in the transmission case ● Screen is clogged	● Add oil to specified level. **See "WHEN REQUIRED".** (● Disassemble and clean)
Oil overheats	● Too much oil or not enough oil ● Machine is not traveling in the correct speed range ● Torque converter is stalled for long periods ● Engine is overheating	● Add or drain oil to specified level. **See "WHEN REQUIRED".** ● Place in correct speed range ● Reduce stall time (● Check engine)
Noise generated	● Lack of oil	● Add oil to specified level. **See "WHEN REQUIRED".**
AXLE		
Noise generated	● Lack of oil	● Add oil to specified level. **See "WHEN REQUIRED".**

18.1.2 FUEL

- The fuel pump is a precision instrument, and if fuel containing water or dirt is used, it cannot work properly.
- Be extremely careful not to let impurities get in when storing or adding fuel.
- Always use the fuel specified in the Operation and Maintenance Manual.
  Fuel may congeal depending on the temperature when it is used (particularly in low temperatures below-15°C (5°F)), so it is necessary to change to a fuel that matches the temperature.
- To prevent the moisture in the air from condensing and forming water inside the fuel tank, always fill the fuel tank after completing the day's work.
- Before starting the engine, or when 10 minutes have passed after adding fuel, drain the sediment and water from the fuel tank.
- If the engine runs out of fuel, or if the filters have been replaced, it is necessary to bleed the air from the circuit.

18.1.3 COOLANT

- River water contains large amounts of calcium and other impurities, so if it is used, scale will stick to the engine and radiator. This will prevent proper heat exchange and cause overheating.
  For specific requirements of the water, See "20.3 COOLANT SPECIFICATIONS.
- When using anti-freeze, always observe the precautions given in the Operation and Maintenance Manual.
- An anti-freeze concentration greater than 68% will adversely affect freeze protection and heat transfer rates. Anti-freeze concentrations between 68% and 100% actually have a higher freezing point than a 68% anti-freeze concentration and should not be used due to reduced heat transfer rates.
- All cooling system inhibitors, including those in anti-freeze solutions, become depleted through normal operation. If the inhibitors in anti-freeze are allowed to become depleted, the anti-freeze becomes corrosive and attacks and coats the metallic surfaces of the cooling system which reduces heat transfer. Cooling system conditioners which contain these inhibitors must be added to maintain corrosion protection.
- Anti-freeze is inflammable, so be extremely careful not to expose it to flame or fire.
- The proportion of anti-freeze to water differs according to the ambient temperature.
  For details of the mixing proportions, see "20.3 COOLANT SPECIFICATIONS.
- If the engine overheats, wait for the engine to cool before adding coolant.
- If the coolant level is low, it will cause overheating and will also cause problems with corrosion from the air in the coolant.

DCA4 Unit Guide

Fleetguard Part No.	DCA4 Units
DCA4 Coolant Filter	
WF-2070	2
WF-2071	4
WF-2072	6
WF-2073	8
WF-2074	12
WF-2075	15
WF-2076	23
WF-2077	0
DCA4 Liquid	
DCA60L	4 (1 Pint)
DCA80L	1760 (55 US gal)
DCA4 Powder	
DCA95	20

DCA4 Precharge and Service Filters

System Capacity		Precharge Filter (See NOTE 1)	Service Filter (See NOTE 3)
Liters	Gallons		
19-29	5-7	WF-2072	WF-2070
30-41	8-10	WF-2073	WF-2071
42-60	11-15	WF-2074	WF-2071
61-79	16-20	WF-2075	WF-2071
80-117	21-30	WF-2076	WF-2072
118-190	31-50	(See NOTE 2)	WF-2073

NOTE 1 - After draining and replacing coolant, always precharge the cooling system to maintain the DCA4 concentration between 1.0 and 2.0 units per 3.8ℓ (1 US gal).

NOTICE: When performing service which requires draining the cooling system, discard the coolant. Reusing coolant can introduce contaminates or over concentrated chemicals, resulting in premature failure of cooling system components.

NOTE 2 - To precharge cooling systems larger than 114ℓ (30 gal) do the following:

- Install appropriate service filter listed in the above table based on cooling system capacity.

  Example: 95 gal (360ℓ) cooling system capacity
  -15 Units (1) WF-2075 Filter
  80 Units

- The answer represents the additional units required to precharge the cooling system. Four bottles of powder, part number DCA95, will provide a sufficient amount of DCA4 units (80) to precharge the example cooling system.
- Install the appropriate service filter at the next and subsequent maintenance intervals.

NOTE 3 - Change the coolant filter at every engine oil and filter change interval to protect the cooling system.

Maintain a nominal concentration of 1.0 DCA4 unit per 3.8ℓ (1 US gal) of coolant in the system. Less than 0.5 unit per 3.8ℓ (1 US gal) indicates an under-concentrated coolant solution. More than 2.0 units per 3.8ℓ (1 US gal) indicates an over-concentrated coolant solution.

23. MAINTENANCE SCHEDULE CHART

23.1 MAINTENANCE SCHEDULE CHART

24.2.6 REPLACE THE BOLT-ON CUTTING EDGES

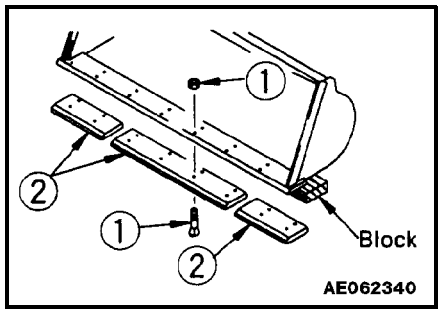
WARNING

It is extremely dangerous if the work equipment moves when performing this procedure.
Set the work equipment in a stable position, turn off the engine, then set the safety lock for the work equipment control lever securely to the LOCK position.

Turn or replace the cutting edges before the wear reaches the edge of the bucket.

1. Raise the bucket to a suitable height, then Position the bucket so that the bottom surface of the bucket is horizontal and put blocks under it to prevent it from coming down.

2 Remove nuts and bolts (1), then remove cutting edge (2).



3. Clean the mounting surface of the cutting edges.

4. Flip the cutting edges (2) over and re-assemble the end edges by placing them to the opposite side (left edge to the right side, right edge to the left side).

   If both sides of the cutting edge are worn then replace it with a new one.

NOTE: If the wear extended to the mounting surface then repair the surface before installing the cutting edge.

5. Tighten nuts and bolts (1) uniformly to prevent any gap from occurring between the bucket and the cutting edge.
   Torque for mounting bolts: 461 ± 69 N•m
   (47 ± 7 kgm, 36 ± 50 lbf ft)

6. Re-torque the mounting bolts again after operating the equipment for several hours.

24.5.3 LUBRICATING

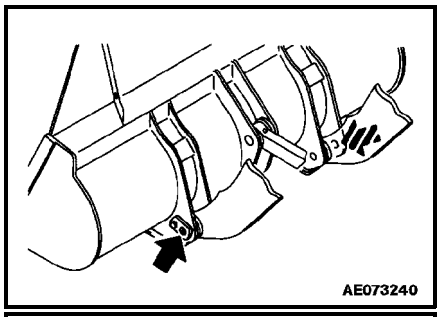
WARNING

- **Apply the parking brake, and lock the front and rear frames with the safety bar and pin.**
- **set the work equipment in a stable condition, then turn OFF the engine and apply the locks for the work equipment control levers.**

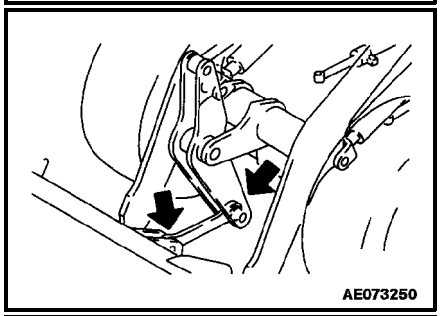
1 Use a grease pump tp pump in grease through the grease fittings marked by the arrows in the following diagrams.

2 After greasing, wipe off any old grease that was pushed out.

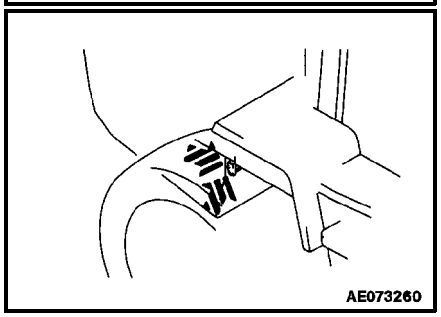
1 Bucket pin (2 places)



2 Bucket link pin (2 places)



3 Rear axle pivot pin (2 places)



24.8 EVERY 1000 HOURS SERVICE

Maintenance for every 50, 100, 250 and 500 hours should be carried out at the same time.

24.8.1 CHANGE OIL IN TRANSMISSION CASE, CLEAN STRAINER

WARNING

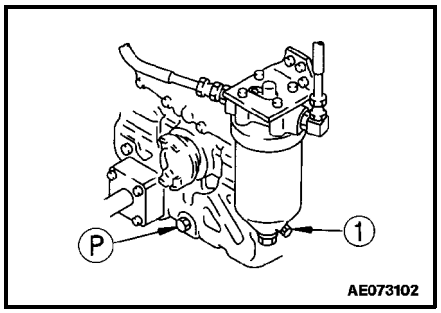
- **The oil is hot if the machine has just been operated. Wait for the oil to cool down before changing**

1. Loosen drain plug (P), pull out the plug slowly to prevent the oil spouting out. After draining out the oil, then tighten up drain plug.

   Torque to: 17.2 ± 2.5 N•m (1.75 ± 0.25 kgm, 12.7 ± 1.8 lbf ft)

2. Loosen drain plug (1) of transmission oil filter to drain oil. After draining out the oil, tighten up drain plug.

   Torque to: 107.9 ± 14.7 N•m (11 ± 1.5 kgm, 79.6 ± 10.8 lbf ft)



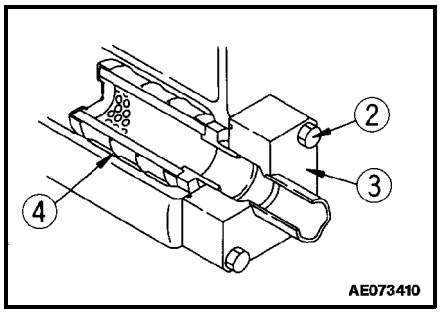
3. Remove bolts (2) and cover (3), then remove strainer (4).

4. Remove all dirt from the surface of strainer (4), then wash in clean light oil (such as diesel oil or flushing oil). If strainer (4) is damaged, replace with a new part.

5. Install strainer (4) to cover (3).

   Strainer torque: 299 ± 93.2 N•m (30.5 ± 9.5 kgm, 221 ± 68.7 lbf ft)

   Replace the O-ring of the cover with a new part, then install the cover.

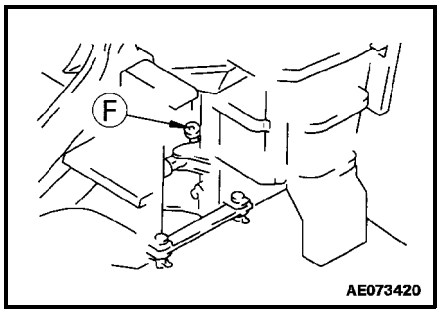


6. Pour in the specified amount of oil at oil filler (F).

   For details of the oil to use and refill capacity **see "20. USE OF FUEL, COOLANT AND LUBRICANTS ACCORDING TO AMBIENT TEMPERATURE.**

7. After refilling, check that the oil is at the specified level.

   For details, **see "24.2.2 CHECK TRANSMISSION OIL LEVEL, ADD OIL".**



8. Check for oil leak at transmission case and filter.

24.9.4 CHECK BRAKE DISC WEAR

Have your distributor check and repair brake discs.

24.9.5 CHECK ALTERNATOR

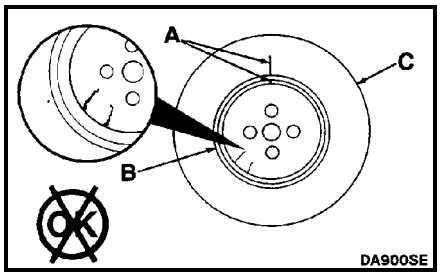
The brushes and bearings may be worn. Have your distributor inspect and repair.

24.9.6 CHECK STARTER MOTOR

The brushes and bearings may be worn. Have your distributor inspect and repair.

24.9.7 CHECK VIBRATION DAMPER

The rubber element vibration damper is located at the fan end of the engine



1. Check the index lines (A) on the vibration damper hub (B) and the inertia member (C). If the lines are more than 1.59 mm (1/16 in) out of alignment, replace the vibration damper.
   Inspect the vibration damper hub (B) for cracks. Replace the vibration damper if the hub is cracked.
2. Inspect the rubber member for deterioration. If pieces of rubber are missing or if the elastic member is more than 3.18 mm (1/8 in) below the metal surface, replace the vibration damper.
3. Look for forward movement of the vibration damper ring on the hub. Replace the vibration damper if any movement is detected.

24.9.8 REPLACE ELEMENT IN AIR COND. RECIRCULATION AIR FILTER AND FRESH AIR FILTER

Remove both the recirculation filter and the fresh air filter in the same way as when cleaning, and replace them with new parts.

For details of cleaning the recirculation air filter, **see "24.6.3 CLEAN ELEMENT IN AIR CONDITIONER RECIRCULATION FILTER".**

For details of cleaning the fresh air filter, **see "24.5.2 CLEAN ELEMENT IN AIR CONDITIONER FRESH AIR FILTER".**