WEAM002900

Operation & Maintenance Manual

PC95R-2

HYDRAULIC EXCAVATOR

SERIAL NUMBERS **PC95R-2 -21D5200001** and up

It is our policy to improve our products whenever it is possible and practical to do so. We reserve the right to make changes or add improvements at any time without incurring any obligation to install such changes on products sold previously.

Due to this continuous program of research and development, periodic revisions may be made to this publication. It is recommended that customers contact their distributor for information on the latest revision.

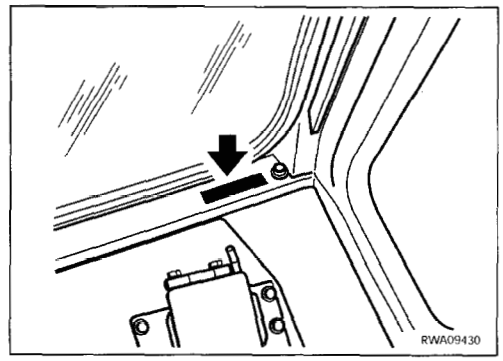
April 2000

1.4.5 SWING REDUCTION GEAR SERIAL NUMBER

The serial number of the swing reduction gear is stamped on the plate positioned on the side of the reduction gear body.

1.4.6 CAB SERIAL NUMBER

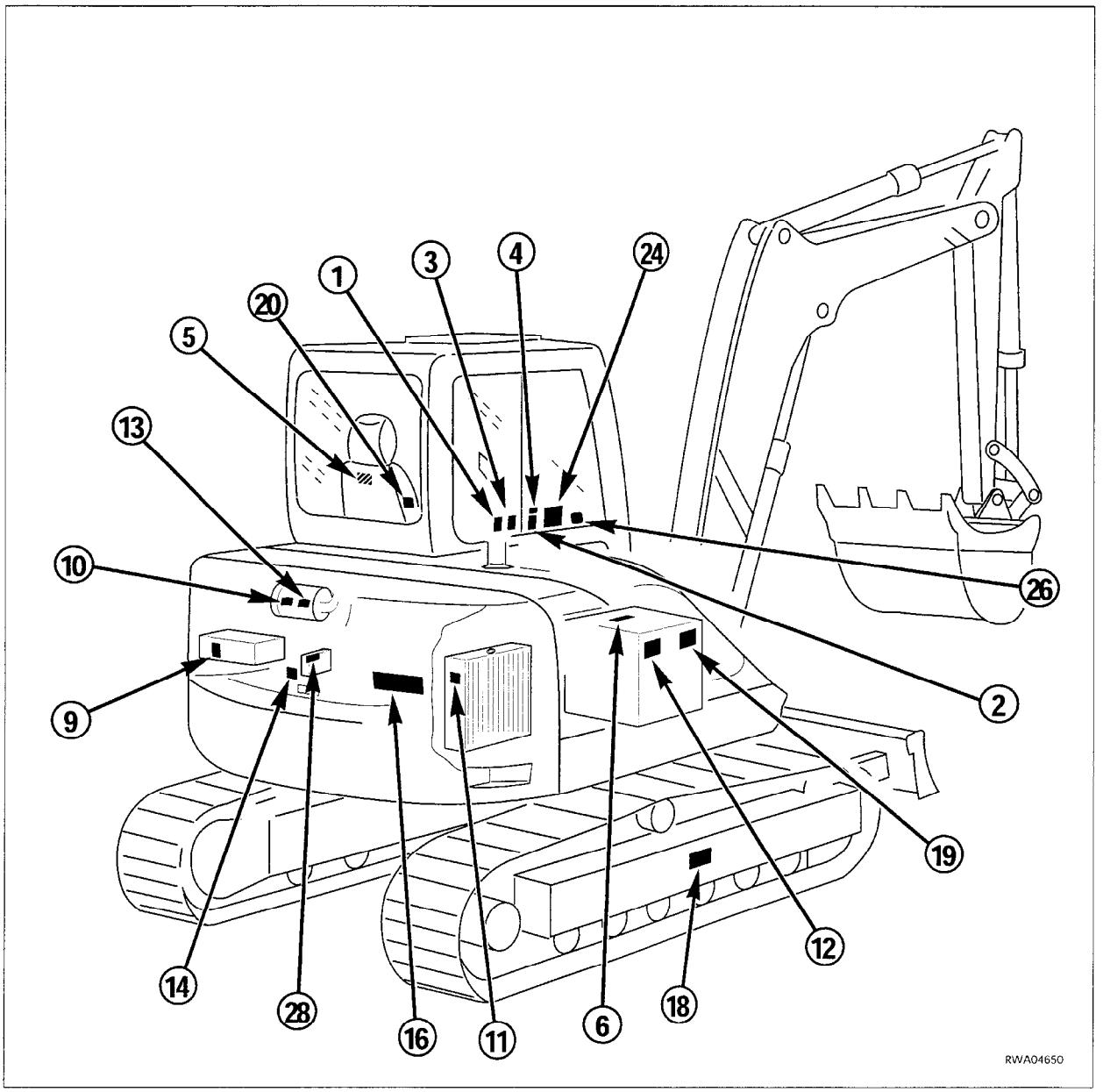
The cab serial number is stamped on the plate positioned on the right side of the front base cross member.



2.1 SAFETY PLATES

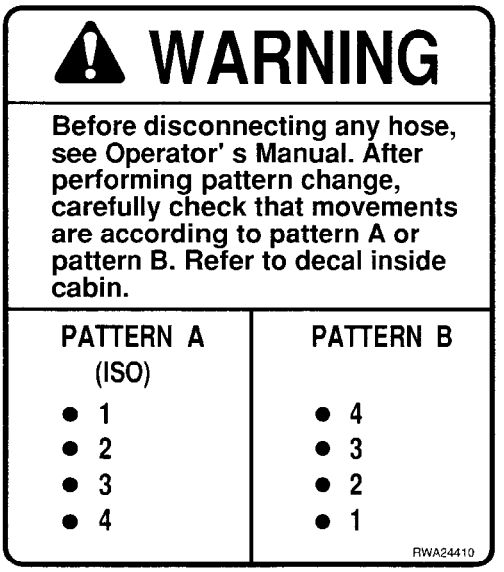
2.1.1 POSITION OF THE SAFETY PLATES

- The safety plates must always be legible and in good conditions; for this reason, if they are dirty with dust, oil or grease, it is necessary to clean them with a solution made of water and detergent.
  Do not use fuel, petrol or solvents.
- If the plates are damaged, they must be replace before operation of the product is resumed.
  Contact your Komatsu Dealer for replacement labels.
- In case of replacement of a component provided with a safety plate, make sure that this plate is applied also on the replaced component.
- The machine can be provided with other plates in addition to those indicated below; which must be followed for safe operation.



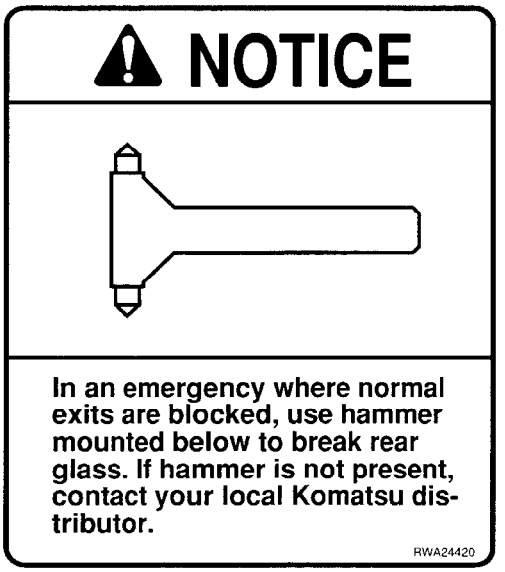
19.

- Pattern change warning



20.

- Emergency exit



2.2 GENERAL PRECAUTIONS

2.2.1 GENERAL SAFETY RULES

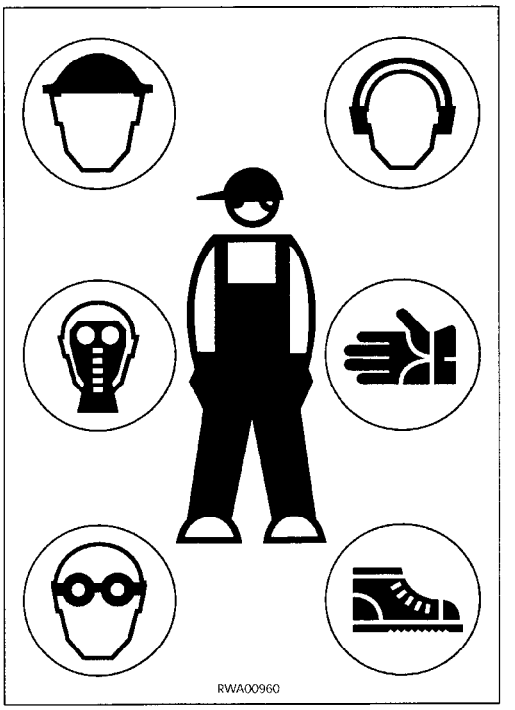
- Only trained and authorized personnel can use the machine and perform maintenance operations.
- Follow all the safety rules, precautions and instructions when using the machine or performing maintenance operations.
- When working with other operators or when the work site is often occupied by other operators, make sure that everyone knows and understands all the agreed signals and, in any case, that everyone works in such a way as to be able to see the machine and to be visible to the operator.

2.2.2 SAFETY DEVICES AND GUARDS

- Make sure that all the guards and covers are in the correct position. Have guards and covers changed or repaired if damaged. Neither use the machine without guards, nor remove the guards when the engine is running.
- Always use the proper safety devices to lock the machine when parking and fasten the safety belt.
- For the safety devices, see "3.1 SAFETY LOCKS".
- For the safety belt, see "3.5.6 SAFETY BELT".
- Do not remove the safety devices and always keep them in good operating conditions.
- Improper use of the safety devices may result in serious injuries or even death.

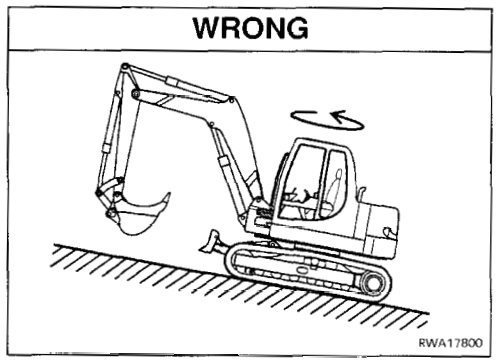
2.2.3 CLOTHING AND PERSONAL PROTECTION ITEMS

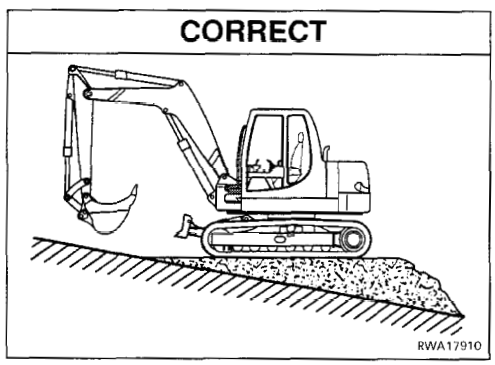
- Do not wear large or loose clothes, rings and watches and do not approach the machine with loose long hair, since they can get entagled in the moving parts of the machine and cause serious injuries and damage.
  Avoid also wearing clothes dirty with oil or fuel, since they are flammable.
- Wear a hard hat, goggles, safety shoes, mask, gloves and headphones when operating the machine or performing maintenance operations.
- Always wear safety goggles, a hard hat and heavy gloves if your job involves scattering metal chips or minute materials; these precautions are particularly useful when driving the equipment connection pins with a hammer and when blowing compressed air into the air filter and the radiator to clean them.
  During these operations, make also sure that no one is standing or working near the machine without the necessary protections.
- When working for 8 hours with a noise level exceeding 90 dBA, it is necessary to use headphones or ear plugs and to be particularly careful, especially at the end of the work shift.



2.4.6 WORKING ON SLOPES

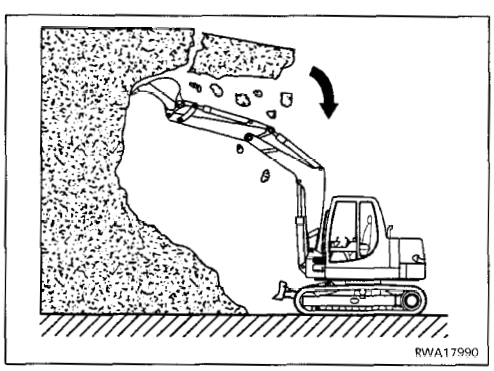
- When working on slopes, if possible avoid rotating the upper structure, since the machine may lose balance and overturn.
  It is particularly dangerous to swing on slopes when the bucket is full.
  If these operations must be long, accumulate soil in such a way as to create a horizontal platform on which the machine can be positioned.

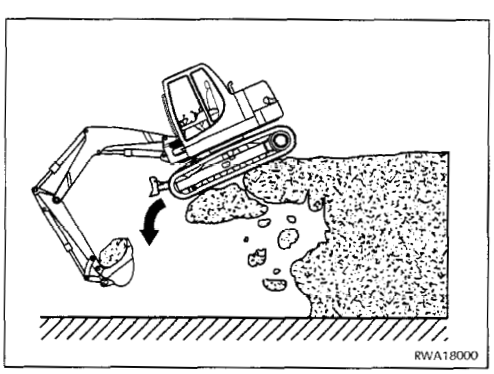




2.4.7 UNAUTHORIZED OPERATIONS

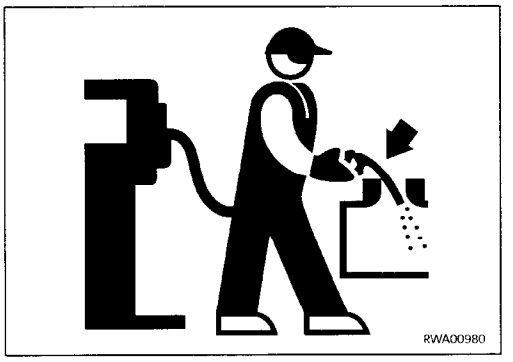
- Do not dig under overhangs.
  The protruding surface, in fact, may collapse on the machine.
- Do not dig too deeply under the front part of the machine, since the ground may collapse and cause the machine to fall down.





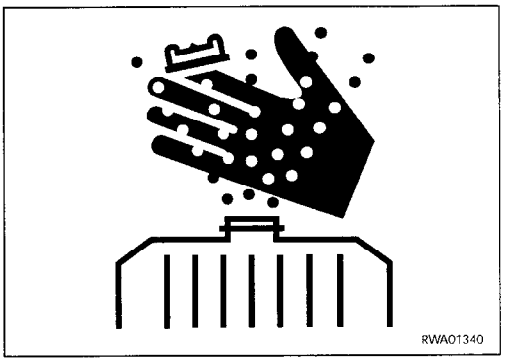
2.8.10 RULES FOR REFUELLING AND ADDING OIL

- Keep away from naked flames while refuelling or adding oil.
- Spilled fuel or oil make the ground slippery and may cause accidents; clean any dirty area immediately and carefully.
- Always tighten the fuel tank and the hydraulic circuit oil safety caps securely.
- Do not use fuel to clean any part of the machine that is dirty with oil or dust.
- Always top up the fuel and oil tanks in properly ventilated areas and refrain from smoking.
- When refuelling, hold the fuel gun firmly and keep it constantly in contact with the filler until you have finished, in order to avoid sparks due to static electricity.
- Do not fill the tank completely, in order to leave room for the fuel to expand.



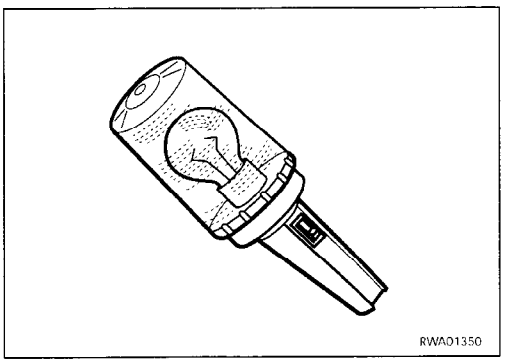
2.8.11 CHECKING THE COOLANT LEVEL IN THE RADIATOR

- Let the engine and the radiator cool down before checking the coolant level.
- If it is necessary to remove the cap with hot engine, wear suitable clothes and protections and loosen the cap slowly, in order to release the pressure gradually.

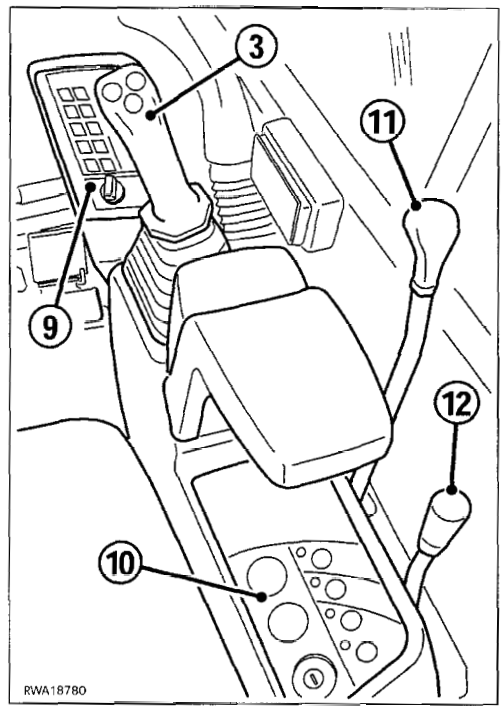


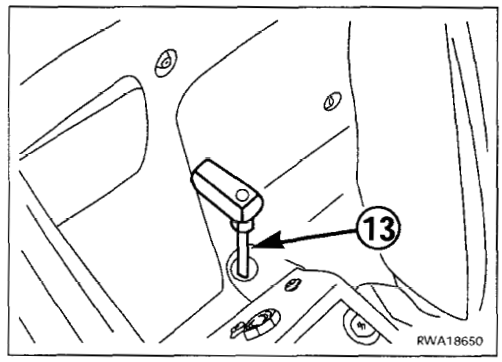
2.8.12 USING LAMPS

- Use only homologated explosion-proof lamps to check fuel, oil, coolant or battery electrolyte levels.
  Unsuitable lamps can cause fires or explosions.



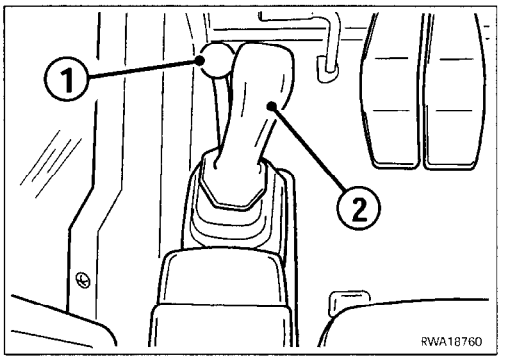
9 - Instrument panel
10 - Switch panel
11 - Blade control
12 - Accelerator control
13 - Rotation locking pin

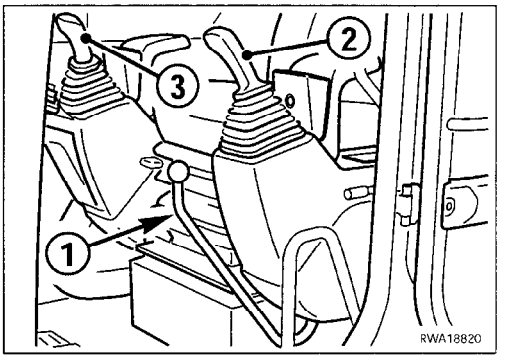


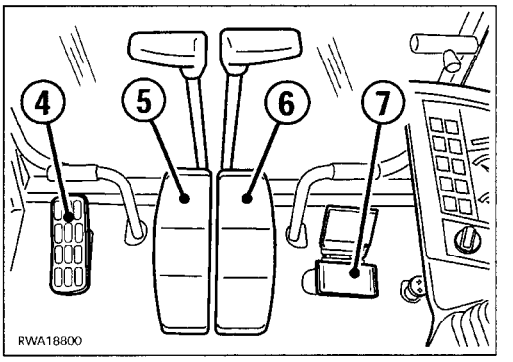


3.3.2 MACHINE CONTROLS

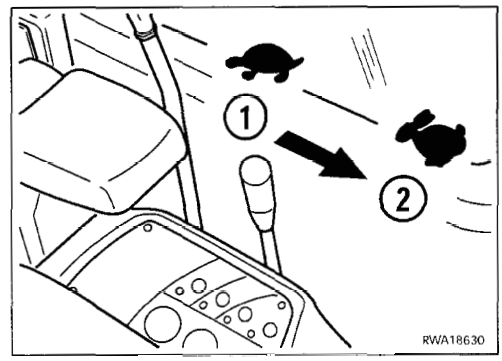
1 - Safety device control lever
2 - Left equipment control lever
3 - Right equipment control lever
4 - Two-piece boom control pedal
5 - Left travel and steering control lever
6 - Right travel and steering control lever
7 - Boom swing control pedal







9 - HAND ACCELERATOR

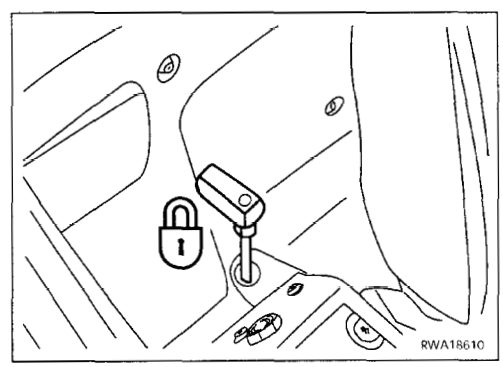


This lever serves to adjust the speed and power of the engine.

- Idling position (1):
  push the lever completely forward.
- Maximum speed position (2):
  pull the lever completely backward.

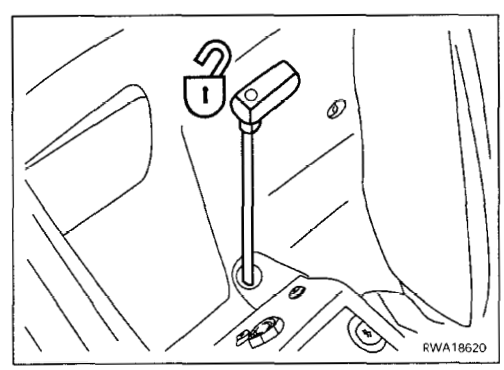
Use the accelerator lever with care, especially when the machine is under strain or is working in difficult conditions. Avoid useless accelerations, in order to reduce consumption and extend the life of both the engine and the machine.

10 - UPPER STRUCTURE ROTATION LOCKING LEVER



DANGER

- **During travel and transport of the machine the rotation locking lever must be shifted to the lock position; shift the lever to the lock position after rotating the upper structure so that it is parallel to the undercarriage.**
- **During travel, make sure that the upper structure is directed towards the blade; if the upper structure is rotated by 180°, the controls are inverted.**

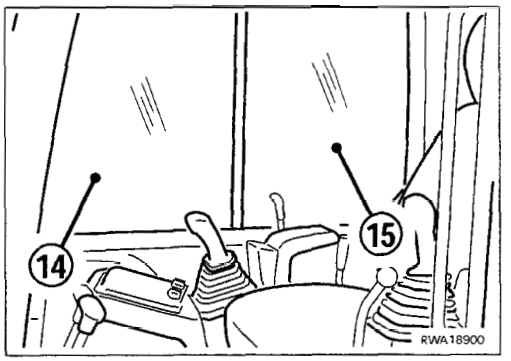


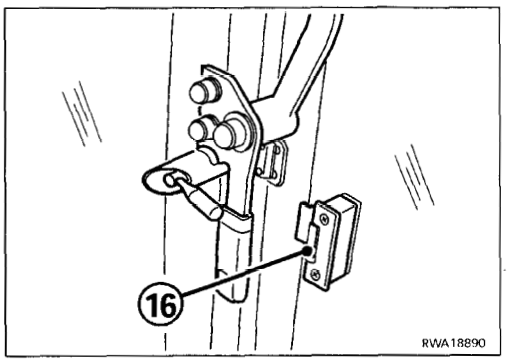
When the lever is in the lock position, it prevents the rotation of the upper structure.
To release the upper structure from the mechanical constraint, raise the lever and set it to the unlock position.

IMPORTANT

- **Do not rotate the upper structure when the lever is in the lock position.**

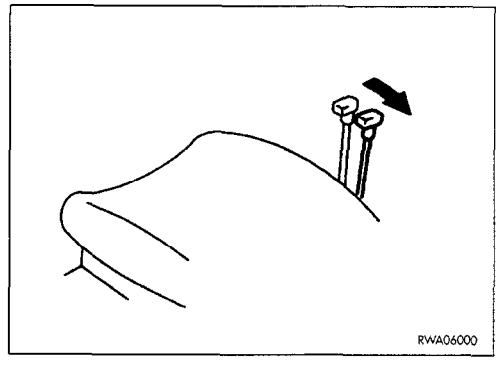
- The side windows (14) and (15) positioned on the right side of the cab can be opened by sliding them; press the handle (16) and pull it.



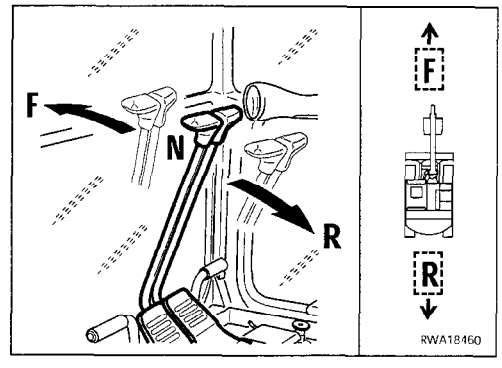


Before moving the machine, check the instruments, warm up the engine and the hydraulic system oil, make sure that the rotation lock is engaged, the safety device is released, the blade is raised and the work equipment is at least at 40-50 cm (16-20 in) from the ground; the control levers must be in neutral position.

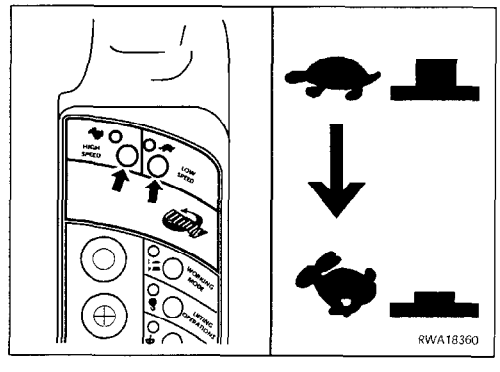
1 - Pull the accelerator lever and set the engine running at idling speed.



2 - Operate the levers (right and left) at the same time, shifting them forward to make the machine advance or backward to make it move in reverse.



3 - The travel speed can be increased by pressing the switch (1), while the normal speed is selected by pressing the switch (2).



3.10.3 BATTERY

DANGER

- **To avoid explosions due to the presence of gas, do not provoke sparks and do not use naked flames near the battery.**
- **The battery electrolyte is dangerous. If it comes in contact with the eyes or the skin, immediately rinse with plenty of water and consult a doctor immediately.**
- **To prevent the fluid from freezing, add distilled water in the morning, before starting work.**

1 - When the ambient temperature decreases, the battery capacity decreases accordingly and, if the battery charge is low, the electrolyte may freeze.
Keep the battery completely charged and insulate it to protect it from low temperatures, so that the machine can be started without problems the following day.

2 - Measure the specific weight of the fluid and check the battery charge percentage, making reference to the following table

CHARGE PERCENTAGE	FLUID TEMPERATURE			
	20°C (68°F)	0°C (32°F)	-10°C (14°F)	-20°C (-4°F)
100%	1.28	1.29	1.30	1.31
90%	1.26	1.27	1.28	1.29
80%	1.24	1.25	1.26	1.27
75%	1.23	1.24	1.25	1.26

3 - When the electrolyte level is low, add distilled water before starting work, rather than after work, in order to prevent the fluid from freezing during the night.

3.10.4 OTHER PRECAUTIONS

1 - Before using the machine in normal operating conditions, carry out some slow movements either forward and in reverse, and operate all the work equipment cylinders slowly more than once.
These operations serve to warm up and decrease the viscosity of the oil in the hydraulic circuit and the reduction gears.

3.10.5 PRECAUTIONS TO BE TAKEN AT THE END OF WORK

1 - Completely remove mud and water from the machine body.
Park the machine on firm ground; if the machine must be parked near banks or ditches, park it on wooden boards in order to distribute the weight of the machine on a larger surface.

2 - Be careful to water drops forming on the hydraulic cylinder rods: these drops must be completely removed, since if they freeze the cylinder gaskets may be damaged.
After removing the water drops, protect the rods with oil.

3 - Drain the condensate that may have formed in the tank, to prevent the water from freezing during the night.

4 - Since the battery capacity may decrease considerably at low temperatures, after work cover the battery or remove it and store it at a suitable temperature.

3.14.3.1 STARTING WITH BOOSTER CABLES

DANGER

- **When starting the engine with the aid of another machine, connect the batteries in parallel.**
- **When connecting the cables, avoid any contact between the positive cable (+) and the negative cable (-).**
- **When starting the engine with booster cables, always wear safety goggles.**
- **Take care to avoid any contact between the machine to be started and the machine used as starting aid, in order to avoid sparks and therefore the explosion of the hydrogen produced by the batteries. The explosion of the battery causes serious damage and injuries.**
- **Take care not to invert the cables and connect the earth cable (-) last, as far from the battery as possible.**
- **Remove the cables with great care; prevent the cables disconnected from the battery from touching other parts of the machine, in order to avoid the explosion of the hydrogen.**

IMPORTANT

- **The cables and pliers must be suitable for the current load that must be transferred.**
- **The battery to be used for the starting must have greater capacity or at least the same capacity as the battery of the machine to be started.**
- **Make sure that the cables and pliers are neither corroded, nor damaged.**
- **Make sure that the pliers hold the terminals firmly.**

CONNECTING THE CABLES AND STARTING THE ENGINE

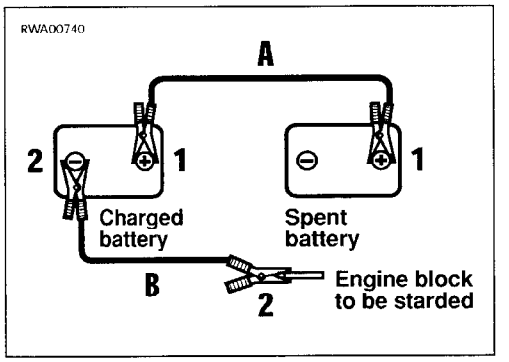
1 - Make sure that the ignition key is in position «O».

2 - Connect the positive poles (+) of the two batteries with each other (A).

3 - Connect the cable of the negative terminal (-) of the charged battery to the earth block of the machine to be started (B).

4 - Start the engine of the machine that supplies current and increase its speed.

5 - Start the engine of the machine that does not work. (See "3.6.2 STARTING THE ENGINE").

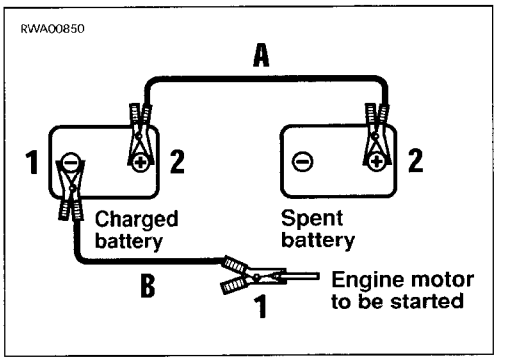


REMOVING THE CABLESI

When the engine has started, remove the cables in the reverse order with respect to their connection.

1 - Disconnect the negative cable (-) from the earth block of the engine that has been started and then from the battery (B).

2 - Disconnect the positive cable (+) first from the battery used for the starting and then from the depleted battery (A).



4.2.3 NOTES REGARDING THE ELECTRICAL SYSTEM

- If the cables are wet or their insulating material is damaged, the electrical system leaks and this may result in malfunctions of the machine.
- The maintenance operations required for the electrical system are the following:
  1 - check of the alternator belt tension;
  2 - check of the alternator belt for damage or breakages;
  3 - check of the battery electrolyte level.
- Do not remove or eliminate any electric component installed on the machine and do not install any electric component with characteristics different from those specified and approved by Komatsu.
- Be careful to keep the electric system dry.
- When working on seashores or river or lake banks, protect the jack plugs from corrosion.
- Do not connect any optional device to the fuses, ignition switch, battery, relays, etc.; for the installation of any optional equipment, contact your Komatsu Dealer.
- If any electric welding operation has to be carried out, disconnect the battery and the alternator.

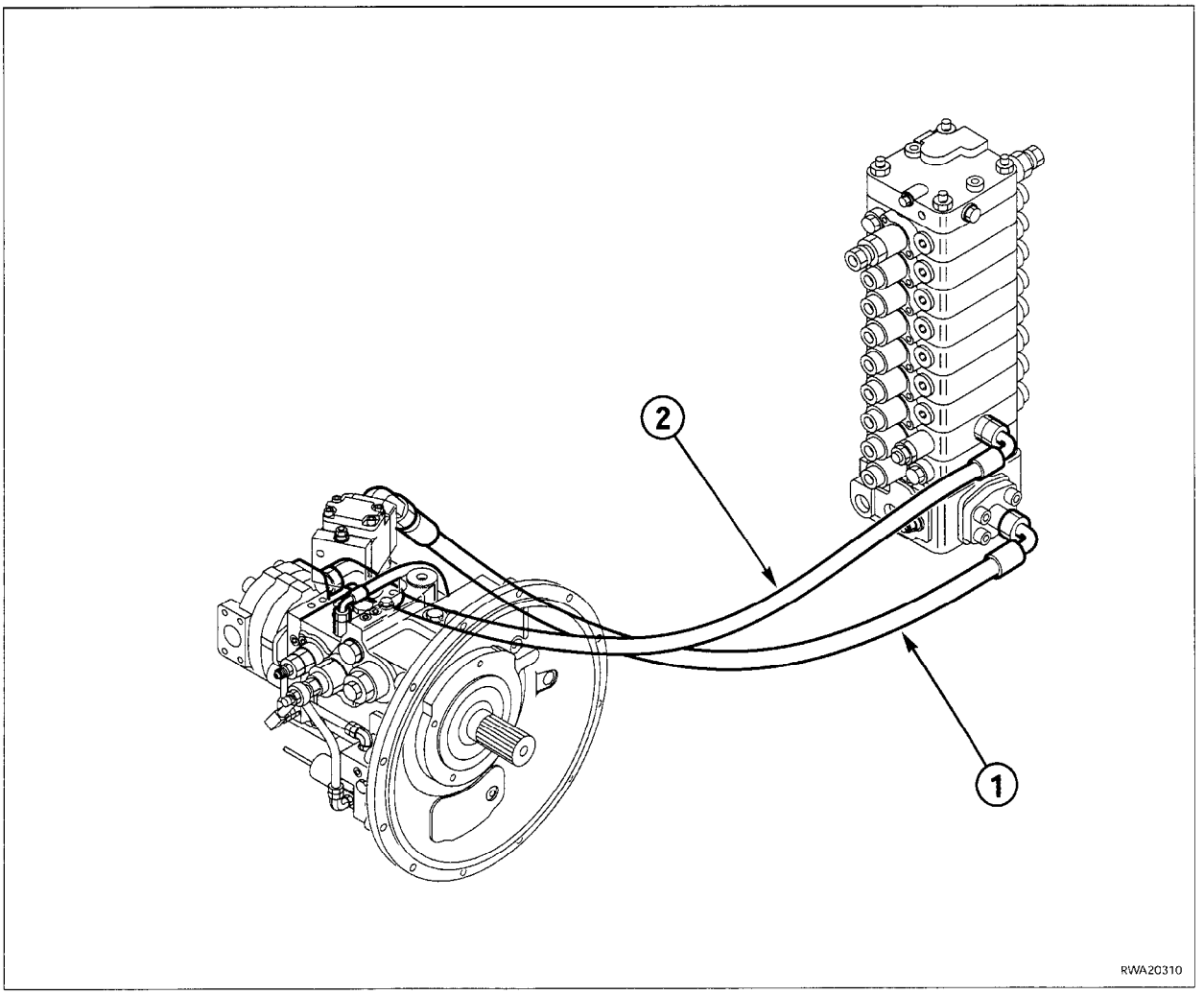
4.2.4 NOTES REGARDING LUBRICATION

- Lubrication makes the operations carried out with the machine and work equipment smoother, while preventing wear and the noise that may be produced if the articulations are dry.
  Lubrication is to be carried out with grease or oil.
- The maintenance operations required for the components that need lubricating are the following:
  1 - check of the levels;
  2 - oil change;
  3 - injection of grease through the grease nipples.
- Use only the specified lubricants, according to the ambient temperature.
- Always clean the grease nipples before injecting grease and remove any excess grease after lubrication; this cleaning operation must be performed with extreme care on the revolving parts.
- Keep the lubricants at the correct levels; excessive or insufficient quantities are to be avoided.

HYDRAULIC SYSTEM

No.	Components related to safety that periodically need changing	Q.ty	Change interval
1	Hydraulic pipe (Main pump delivery)	1	Every 2 years or 4000 hours, whichever occurs first
2	Hydraulic pipe (Secondary pump delivery)	1	
3	Hydraulic pipe (Boom cylinder)	4	
4	Hydraulic pipe (Arm cylinder)	4	
5	Hydraulic pipe (Bucket cylinder)	4	

- For the serial numbers and the quantity of the components that periodically need changing, consult the spare parts catalogue section regarding the components connected with safety and the components that must be periodically changed.
- When changing pipes, always change O-rings, gaskets and analogous components.



ADJUSTMENT

DANGER

- **The grease contained in the hydraulic cylinder is under pressure. For this reason, do not loosen the greasing valve (1) giving it more than one turn; if the valve is loosened excessively, it may be pushed out due to the grease pressure and this is very dangerous for the operator.**
  Do not loosen any other component in addition to the valve (1).
- **If you notice excessive resistance while injecting grease, *slowly move the machine forward and backward for a short* distance.**

To increase the tension, proceed as follows:

1 - Loosen the screws and remove the cover that gives access to the components to be adjusted.
Use a 13 mm spanner.

2 - Carefully clean the greasing valve (1) and inject grease through the grease nipple until reaching the desired tension. Use the specific greasing head provided together with the machine.
If the injection of grease is difficult, slowly move the track for a short distance.

3 - When, during the injection of grease, the idler shoe reaches the mark "S" = 25 mm (0.59 in) and the track is not sufficiently tensioned, this means that pins and bushings are excessively worn. Therefore, it is necessary to rotate or change them. For any change or repair, contact your Komatsu Dealer.

To reduce the tension, proceed as follows:

1 - After removing the cover that gives access to the components to be adjusted, gradually loosen the greasing valve (1) to let the grease out; do not give the valve more than one turn.
Use 13 and 27 mm hexagon spanners.

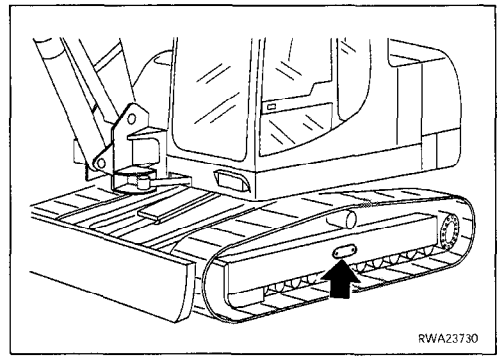
2 - If the grease does not flow out freely, move the machine slowly forward and backward for a short distance.

3 - Tighten the valve and remove any trace of grease.

4 - Move the machine forward and backward and, after stopping it, check the track tension again.

IMPORTANT

- **The wear of pins and bushings varies according to the work conditions and the characteristics of the ground on which the machine operates.**
  Therefore, it is necessary to check the track tension frequently.
- **When working on rocky or extremely uneven ground, increase the track tension in order to prevent the introduction of stones or rubble between the tracks and the sprocket; when working on soft or muddy ground, decrease the track tension, since the soil penetrates between rollers, sprocket and tracks and tends to increase it.**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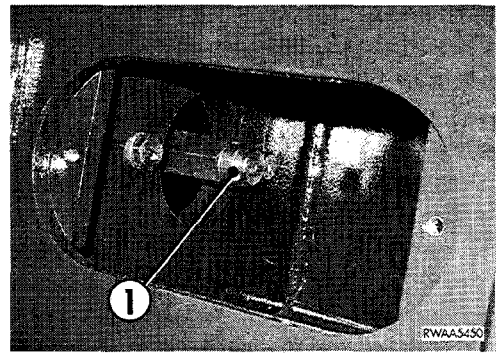

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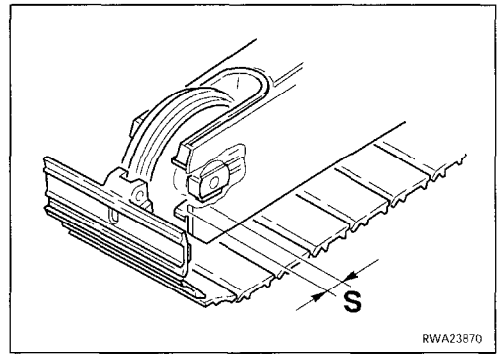
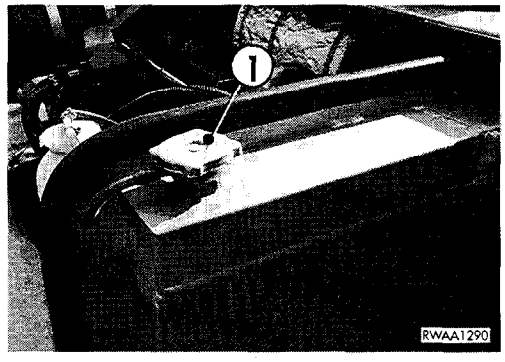


RWA23870

4.7.5 MAINTENANCE EVERY 50 HOURS OF OPERATION

4.7.5.a CHECKING THE RADIATOR FLUID LEVEL



DANGER

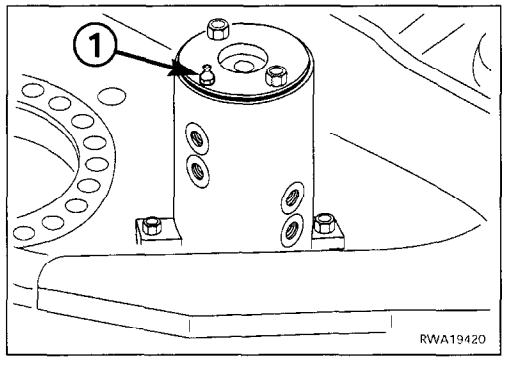
- **Carry out this check with the machine parked on a level surface and the equipment resting on the ground.**
- **Do not remove the radiator cap when the fluid is hot, since the fluid may be sprayed out violently and cause burns.**
- **Loosen the cap slowly in order to release the pressure before removing it.**

The radiator cap can be reached by opening the engine hood (see "3.5.1 ENGINE HOOD").
Remove the cap (1) and make sure that the fluid level reaches the filling hole.

IMPORTANT

- **If the fluid level in the radiator is low and the expansion tank is full of coolant, check the tightness and make sure that there are no air leaks from the coupling that connects the radiator and the expansion tank.**
  If the problem persists, contact your Komatsu Dealer.

4.7.5.b LUBRICATING THE SWING JOINT



IMPORTANT

- **Clean the grease nozzle (1) before applying the greasing pump.**
- **After lubrication, remove any excess grease.**

Lubricate the swing joint cover with the recommended grease.
(See "4.3 FUEL, COOLANT AND LUBRICANTS").

4.7.9.e CHANGING THE FUEL FILTER

DANGER

- **Change the filtering element after work, when the engine has cooled down to 40-45°C (104-113°F).**
- **When these operations are carried out, fuel may be spilled; clean the dirty areas immediately, in order to prevent any risk of slipping or fire.**
- **Oils, filters, coolants and batteries are considered special waste and must be collected and disposed of according to the anti-pollution regulations in force.**

The fuel filter and the fuel pump can be reached by opening the engine hood (See "3.5.1 ENGINE HOOD").

FUEL FILTER

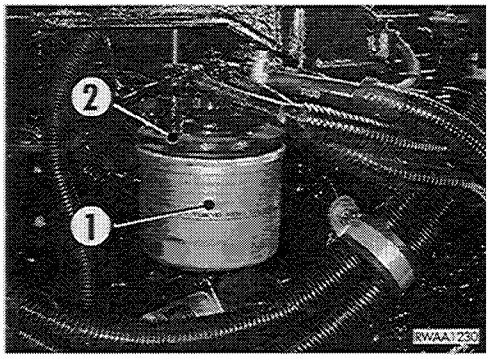
1 - Clean the outer surfaces of the unit and with the special spanner provided unscrew the used filter (1) and throw it away.

2 - Clean the inside of the head (2).

3 - Lubricate the seal of the new filter and screw thoroughly.

4 - Give another half turn by hand.

5 - Bleed the fuel supply circuit.



BLEEDING THE CIRCUIT

After filling the tank, proceed as follows:

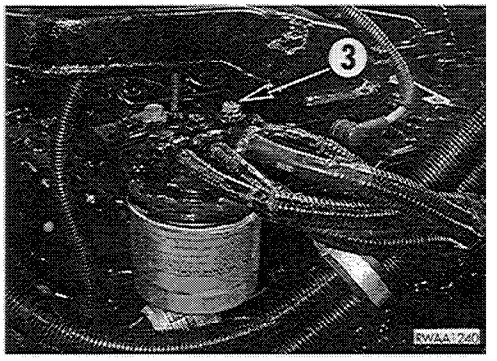
1 - Loosen the drain screw (3) of the filter holder head (2). Use a 12 mm spanner.

2 - Unscrew the knob (4) of the fuel pump (5) completely.

3 - Act on the knob (4) until fuel without any trace of air flows out of the filter head. Tighten the drain screw (3).

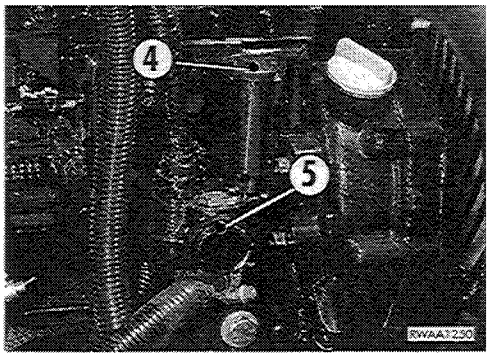
4 - Press the knob (4) and tighten it completely.

5 - Start the engine.



IMPORTANT

- **If the fuel does not flow when the fuel pump lever is operated, give one turn to the driving shaft.**
- **Do not let the starter run for more than 15 seconds. Wait at least 15 seconds before repeating the starting procedure.**
- **If the engine starts without problems and then stops or works irregularly, check if there is air in the circuit; if so, check the tightness of the fuel filter, the water separator and the fuel pump.**
- **After the fuel has run out, bleed the circuit by proceeding as described above.**



4.7.11.e CHANGING THE BALL-BEARING RING PINION LUBRICANT

DANGER

- **Oils, filters, coolants and batteries are considered special waste and must be collected and disposed of according to the anti-pollution regulations in force.**

IMPORTANT

- **Change the lubricant with the machine at rest on a level surface and at the end of work, that is, at operating temperature.**

To change the lubricant, proceed as follows:

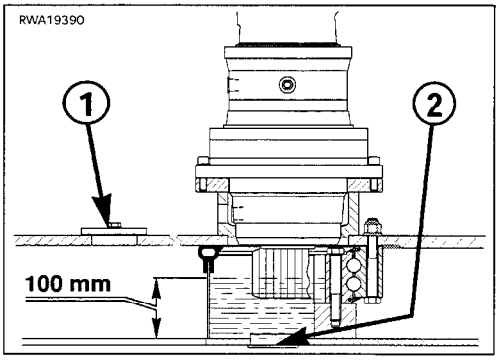
1 - Remove the inlet and inspection cover (1) and the drain plug (2) after preparing a container suitable for collecting the used grease that flows out of the drain hole. Use a 17 mm spanner.

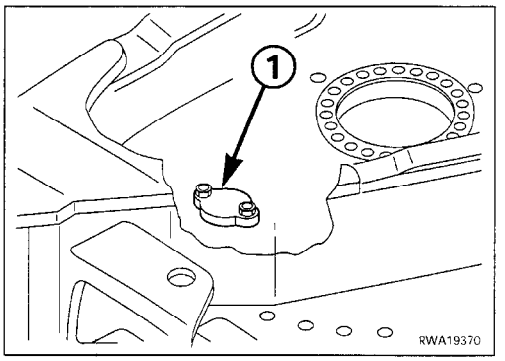
2 - Complete the removal of used grease by means of a suction pump.

3 - Put back the drain plug (2).

4 - Inject the prescribed grease (see "4.3 FUEL, COOLANT AND LUBRICANTS") through the inlet hole (1) until reaching half the height of the ball-bearing ring teeth (approximately 100 mm).

5 - Put back the inlet and inspection cover (1) and after approximately two hours of operation make sure that the lubricant level is correct.





4.7.11.f CHECKING THE ALTERNATOR AND THE STARTER

For any inspection and/or repair, contact your Komatsu Dealer.
If the engine is started frequently, the alternator and the starter should be inspected every 1000 hours of operation.

6.1.3 CHARACTERISTICS OF THE OPTIONAL EQUIPMENT

(Specific weight of the material handled = 1.8 tons/cu.m)

EQUIPMENT	MAX. WEIGHT kg (lb)	MAX. DIMENSIONS Width mm (inch)	MAX. DIMENSIONS Height mm (inch)	MAX. SAE CAPACITY cu.m (cu.yd.)	MAX. OPERATING PRESSURE bar (psi)	MAX. FLOW RATE l/min. (gpm)
Bucket	▲ 250 (551) ● 230 (507)	900 (35.4) 800 (31.5)	— —	0.34 (0.44) 0.29 (0.38)	— —	— —
Ditch-cleaning bucket	180 (396)	1500 (59)	— —	0.20 (0.26)	— —	— —
Ditch-digging bucket	250 (551)	1650 (65)	850 (33.4)	0.25 (0.32)	— —	— —
Adjustable bucket	300 (661)	1500 (59)	1000 (39.3)	0.20 (0.26)	✱ 280 (4061)	■130 (34.3)
Clamshell bucket	❑ 300 (661)	400 (15.7)	1000 (39.3)	0.20 (0.26)	✱ 280 (4061)	■130 (34.3)
Hydraulic hammer	480 (1058)	— —	1400 (55.1)	— —	✱ 280 (4061)	■130 (34.3)

▲ Assembly on monoboom

● Assembly on two-piece boom

❑ Hydraulic rotor included

✱ Hydraulic system pressure

■ System capacity