

1.3.4 RUNNING-IN

Every machine is scrupulously adjusted and tested before delivery.

A new machine, however, must be used carefully for the first 100 hours, in order to ensure proper running-in of the various components.

If the machine is subjected to excessive work load at the beginning of operation, its potential productivity and its functionality will be shortly and untimely reduced.

Every new machine must be used carefully, paying special attention to the following instructions:

- After the start, let the engine idle for 5 minutes, in such a way as to warm it up gradually before actual operation.
- Avoid operating the machine with the limit loads allowed or at high speed.
- Avoid abrupt starts or accelerations, useless sudden decelerations and abrupt reversals.

SYNTHETIC BIODEGRADABLE OIL TYPE HEES

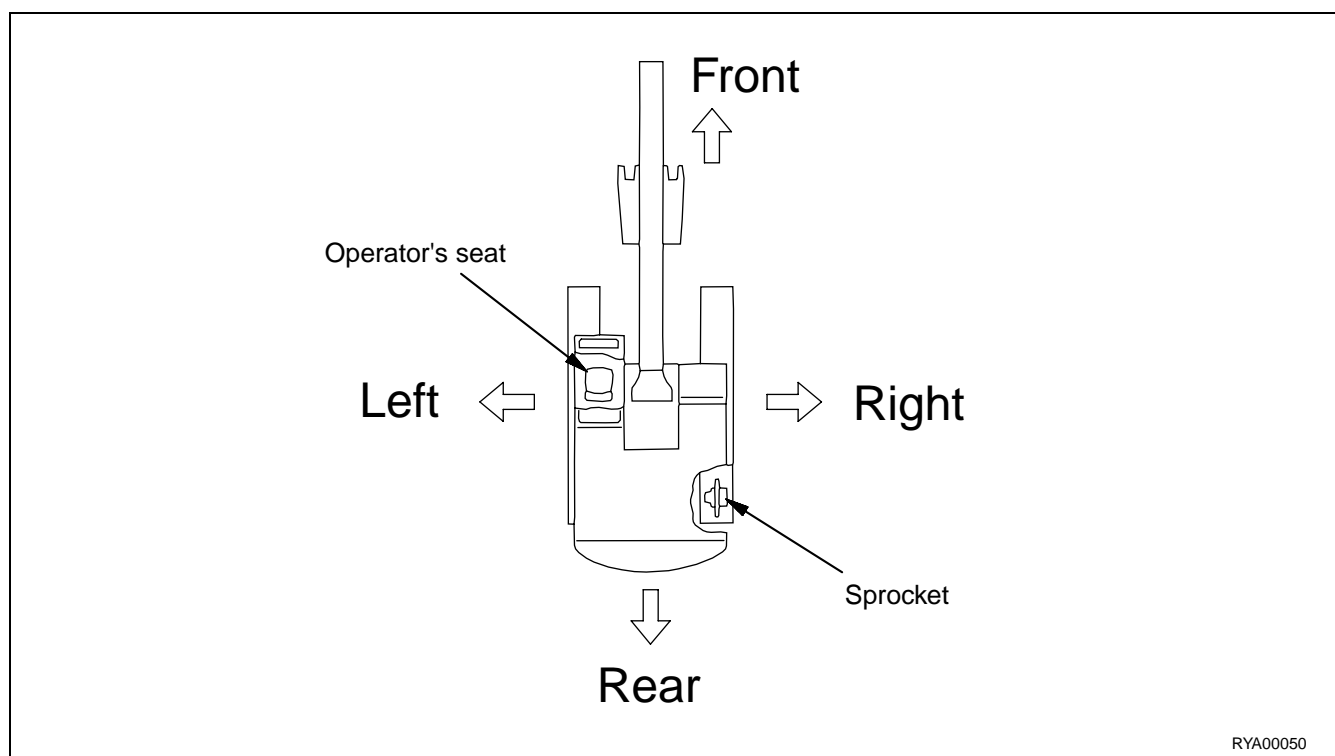
For machines in which synthetic biodegradable oil type HEES is used, perform the following operations in addition to the standard maintenance operations:

- After the first 50 hours of operation, change the hydraulic circuit drain filter.
- After the first 500 hours of operation, change the hydraulic circuit oil.

IMPORTANT

- **When changing the oil filters (cartridges), check their inner part to make sure that there are no deposits.**
If considerable deposits are observed, find out what may have caused them before starting the machine.
- The number of operating hours is indicated by the hour meter.

1.3.5 POSITIONS AND DIRECTIONS OF THE MACHINE



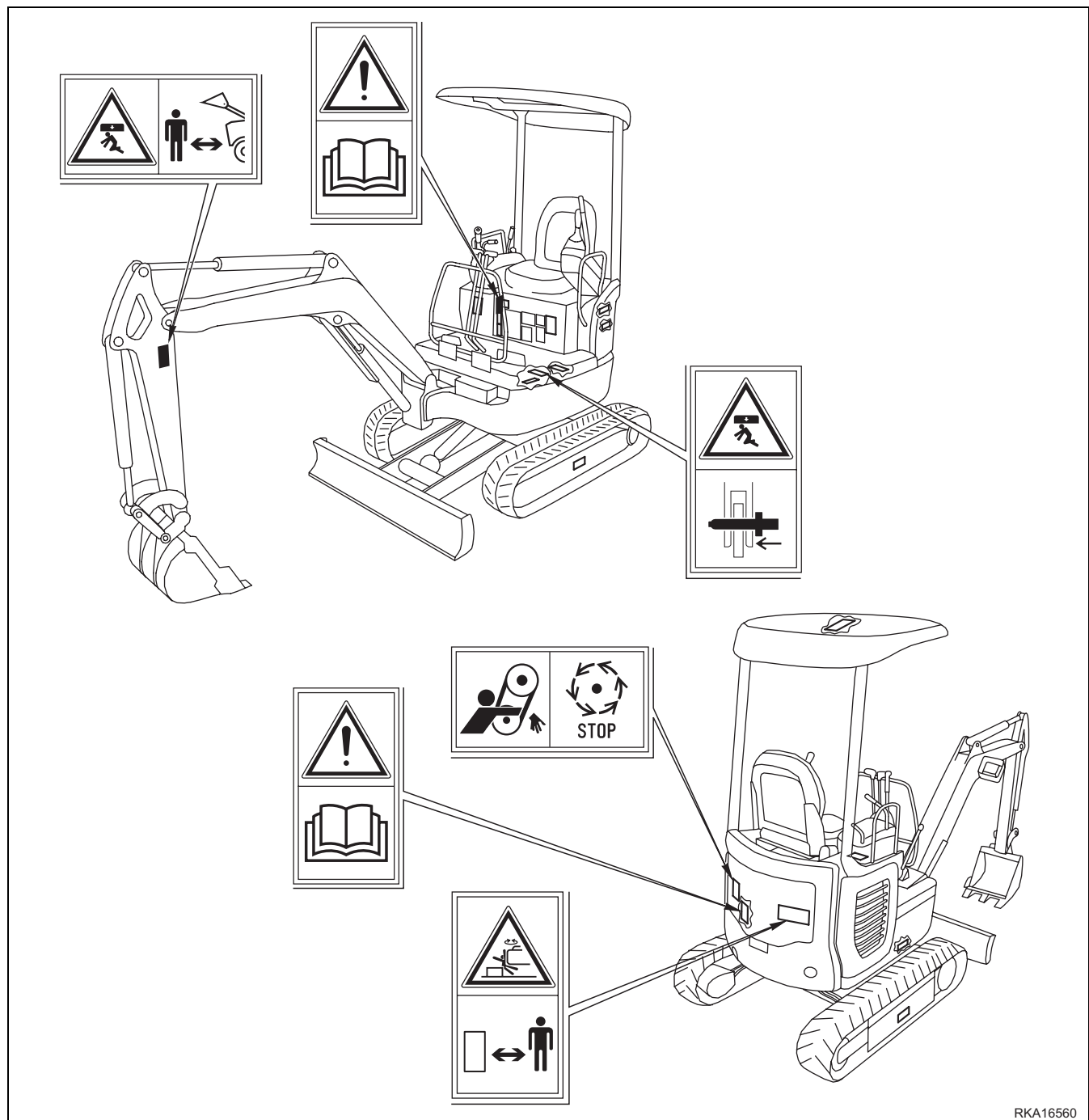
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In this manual, the terms front/forward, rear/backward, left, and right refer to the travel direction as seen from the operator seat when it is facing the front and the sprocket is at the rear of the machine.

2.1 SAFETY, NOISE AND VIBRATION 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, ask for new ones to Komatsu or to your Komatsu Dealer.
- In case of replacement of a component provided with a safety plate, make sure that such a plate is applied also to the new part.
- The machine can be provided with other plates in addition to those indicated below; keep also to the instructions given in the additional plates, in any case.



2.2.7 PREVENTING FIRES DUE TO FUEL AND OIL

Fuel, oil and some types of antifreeze can easily ignite if they get in contact with a flame. Fuel is flammable and therefore very dangerous.

- Keep any naked flame away from flammable fluids.
- Stop the engine and do not smoke when refuelling.
- Refuel and add oil only after stopping the engine and in well ventilated places.
- Refuel and add oil in a well delimited area and do not allow unauthorized persons to approach.
- 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.
- After refuelling or adding oil, tighten the fuel or oil cap securely.
- Do not fill the tank completely, in order to leave room for the fuel to expand.
- In case some fuel is spilled, wipe it up immediately.



2.2.8 PREVENTING BURNS

- If the engine coolant, the engine oil and the hydraulic oil are hot, use heavy cloths and wear gloves, heavy clothing and safety goggles before carrying out any check or touching the hot parts.
- Before checking the coolant level, stop the engine and let the fluid cool down.
If a check is necessary due to the overheating of the engine, slowly loosen the radiator cap to release any residual pressure before removing it. The hot fluid that spurts out may cause serious burns.
- Before checking the engine oil and hydraulic circuit oil levels, stop the engine and let the oil cool down. The hot oil that can be sprayed out of the tank may cause serious burns.



2.4.9 PREVENTING ELECTROCUTION

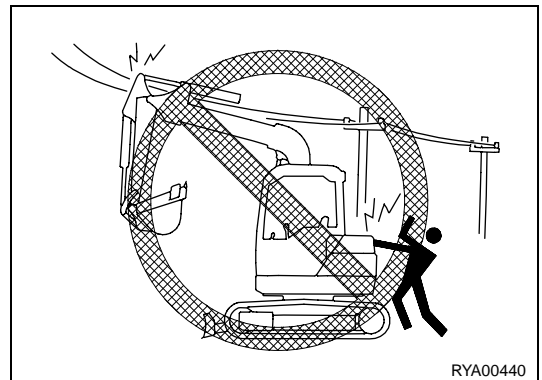
- Digging operations near overhead electric lines are extremely dangerous and they may also cause death due to electrocution; for this reason, when working near overhead electric lines always respect the minimum safety distances prescribed by the competent authorities and by the accident-prevention rules in force.
- As far as underground long-distance lines are concerned, the minimum distance depends on the covering of the ducts in which the cables are laid.
- The basic safety precautions to be taken to prevent this risk are the following:
 - 1 - Wear shoes with thick rubber or leather soles.
 - 2 - Request the aid of another person who can warn you if the machine gets too close to the electric line.
 - 3 - Operate at low speed.
 - 4 - Get acquainted with the behaviour rules to be followed in case of electrocution.
 - 5 - Keep the phone number of the electricity company and of the nearest first aid station at hand.
- If the work equipment gets accidentally entangled in the cables, the operator must not leave the cab until the electricity company has insulated the line.
- When carrying out this kind of operations, warn everyone standing in the work area to keep a safety distance from the machine and the work equipment.
- Ask the electricity company in advance the voltage of the cables and the minimum safety distance.



DANGER

- **The minimum distances from overhead lines can vary in the different countries, according to the climate and to the humidity percentage in the air. Indicatively, the distances indicated in the following table should be respected.**

Cable voltage	Min. safety distance
1.0 kV (distribution line)	5 m
6.6 kV (2–3 insulators)	5,2 m
33 kV (min. 3 insulators)	5,5 m
66 kV (min. 6 insulators)	6 m
154 kV (min. 10 insulators)	8 m
275 kV (min. 19 insulators)	10 m



2.4.10 VISIBILITY

- Switch on the work lights as soon as visibility decreases.
- If visibility is reduced due to mist, smoke or heavy rain, stop the machine in a safe position and wait for the weather to improve until visibility becomes acceptable.

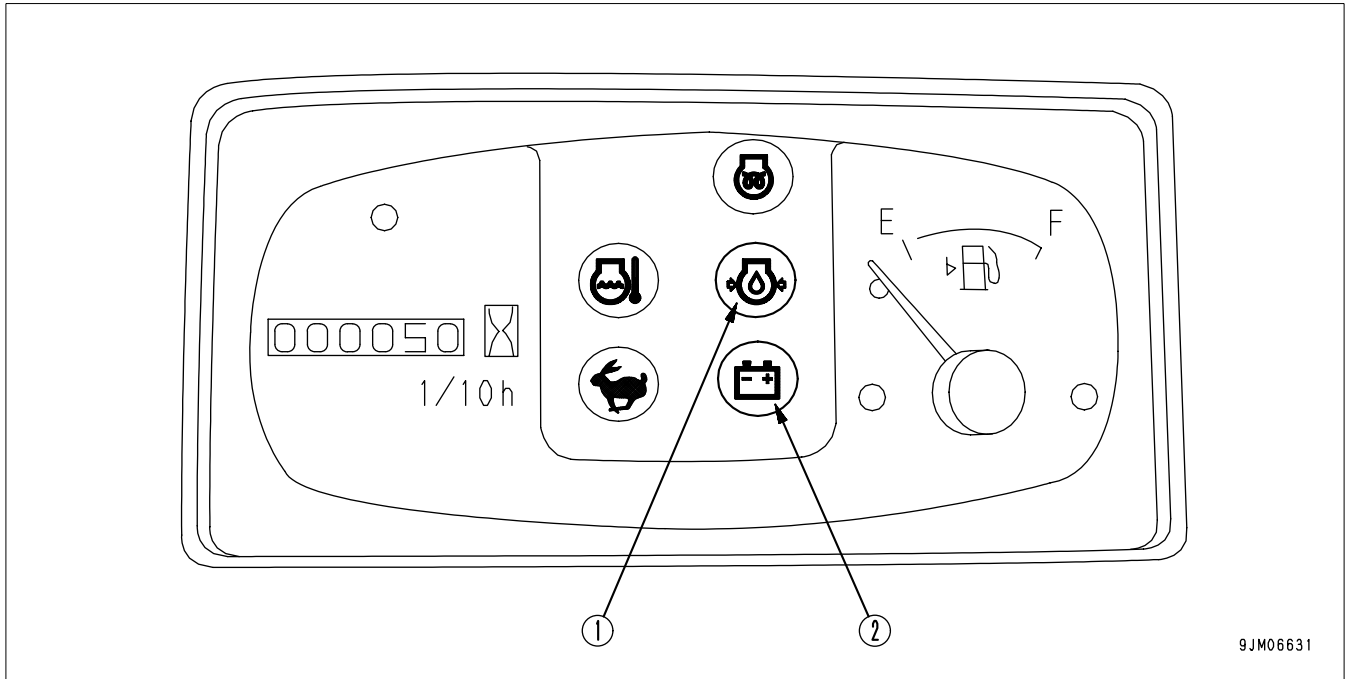
2.4.11 WORKING ON ICY OR SNOW-COVERED SURFACES

- If the ground is icy or covered with snow, even a slight slope may cause the machine to slip sideways, therefore it is advisable to move at low speed and to avoid abrupt starts, stops or turns.
- When it has snowed heavily, the road shoulders and any obstacle are buried in the snow and are not visible, therefore proceed with care when clearing the snow.

3.2.1.1 EMERGENCY WARNING LIGHTS

CAUTION

- If a warning light does not go out or comes on when the engine is running, stop the machine immediately and try to find the cause of the failure.



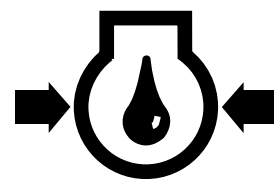
(1) Engine oil pressure warning light

(2) Battery charge level warning light

1. Engine oil pressure warning light

This warning light comes on, together with the acoustic alarm, when the engine is not running and the starting circuit is operated, and goes out as soon as the engine lubrication circuit is pressurized.

If it does not go out or comes on when the engine is running, stop the machine immediately and try to find the cause of the failure, see ("3.7.6 OTHER TROUBLES").



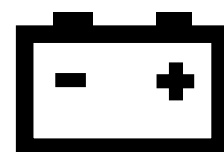
RWA07130

2. Charge level warning light

This warning light comes on, together with the acoustic alarm, when the starting circuit is energized and goes out when the engine exceeds the idling speed; if this warning light remains on even when the engine is running at the normal operating speed, this means that the alternator is not working and the battery is not charged correctly.

IMPORTANT

- If the warning light remains off when the ignition key is turned to position ON, this means that the alternator is faulty or broken.



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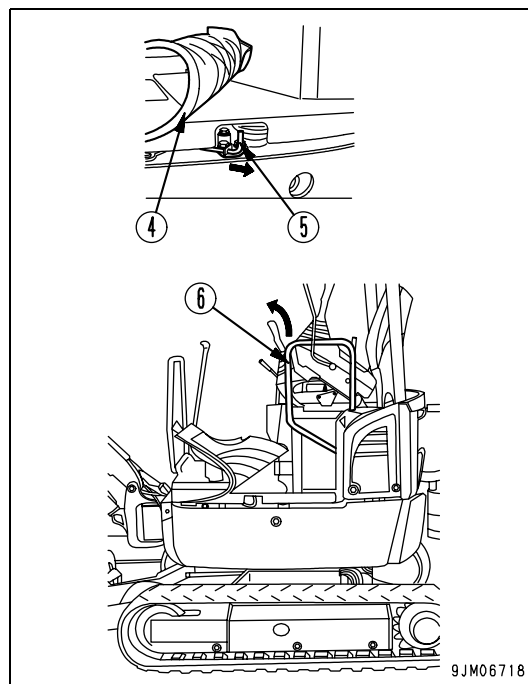
7. Raise the mat (4), pull the cab floor release lever (5) in the direction indicated by the arrow and at the same time push the handle (6) upwards in the direction indicated by the arrow (approx. 45°).

IMPORTANT

- If the cab floor does not tilt, pull the handle (6) downwards and repeat the procedure described above.
- When tilting or closing the cab floor, be extremely careful, and keep away from the area under the cab floor.

NOTE

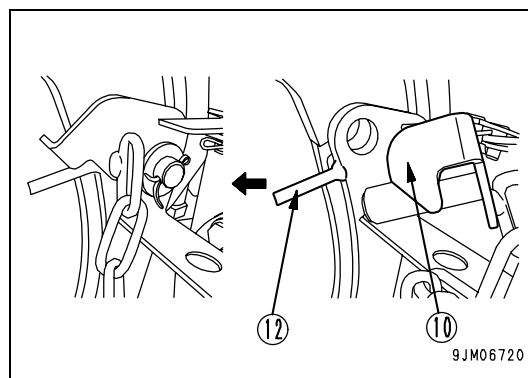
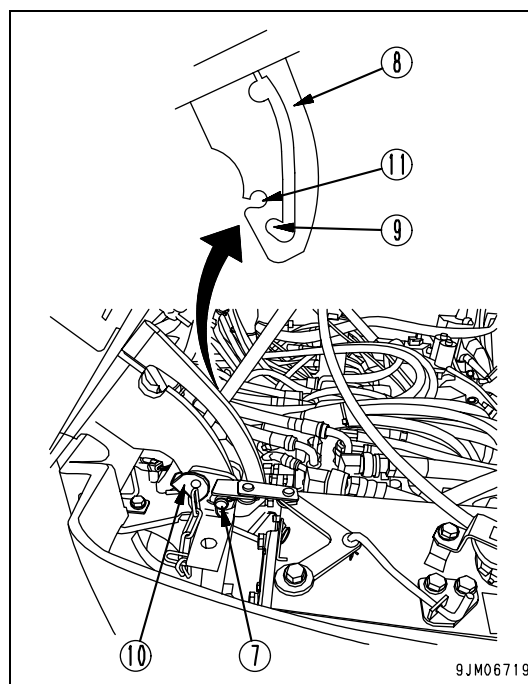
- The cab floor tilts thanks to the operation of a gas cylinder, so when the ambient temperature is low, the operating effort increases.



8. After tilting the floor open, make sure that the locking pin (7) is inserted in the groove (9) of the locking plate (8).
9. Insert the safety pin (10) into the hole (11) from the outside.
10. Turn until the coupling at the end of the safety pin (10) is completely engaged with the pin (12).

NOTE

- Make sure that the safety pin (10) is correctly engaged with the pin (12).



3.3.1.3 ADJUSTMENTS

WARNING

- Adjust the position of the seat before starting work or when taking the place of another operator.
- Adjust the seat so that the control levers and the switches can be easily used by the operator seated with his back against the backrest.

ADJUSTING THE SEAT

(A) Longitudinal adjustment

Shift the lever (1) to the right and make the seat slide on the guides; once the desired position has been found, release the lever and make small movements with the seat to make sure that the retainer pin is correctly engaged in its seat.

Adjust the position of the seat according to the type of job to be performed. For example, when carrying out deep digging operations, make the seat slide forward to improve visibility on the lower area in front of the machine.

(B) Inclination

Turn the handwheel (2) positioned behind the seat and adjust the backrest, choosing a comfortable position for the job at hand. To incline the backrest forward, turn the handwheel (2) clockwise, to incline it backward, turn the handwheel counterclockwise.

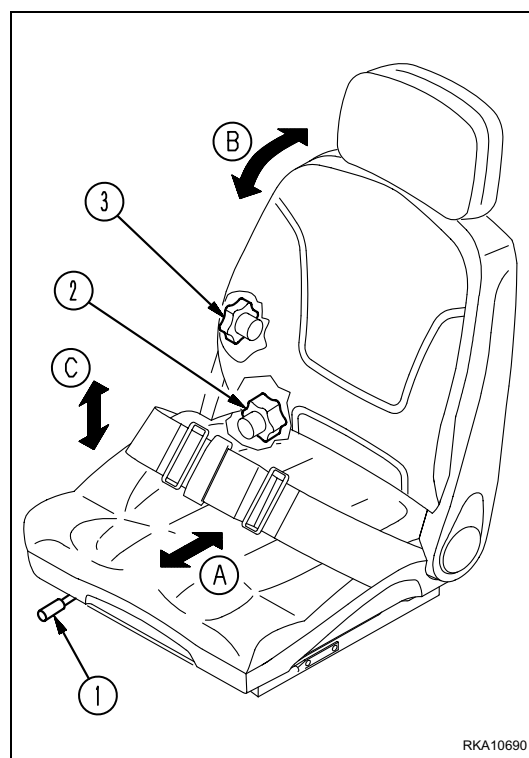
During the adjustment operations, remain seated with the back against the backrest.

(C) Suspension

The suspension can be adjusted by turning the handwheel (3) positioned on the right side of the backrest until finding the ideal degree of suspension for the operator.

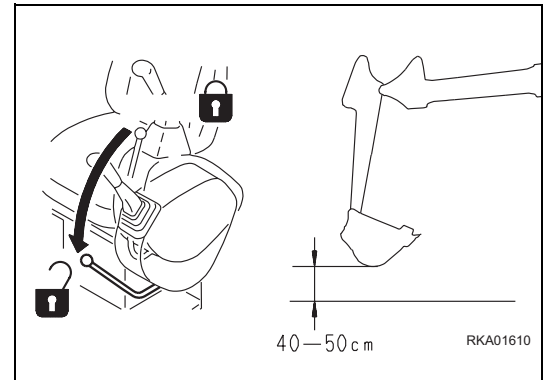
Turn the handwheel clockwise to obtain a softer suspension (sign – on the handwheel plate), turn the handwheel counterclockwise to stiffen the suspension (sign + on the handwheel plate).

When working on uneven surfaces, adjust the seat to a harder setting.

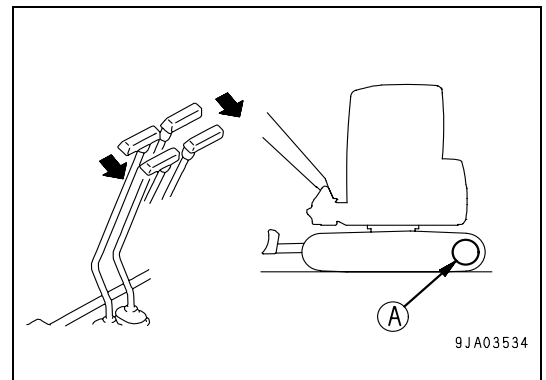


3.3.5.3 MOVING THE MACHINE IN REVERSE

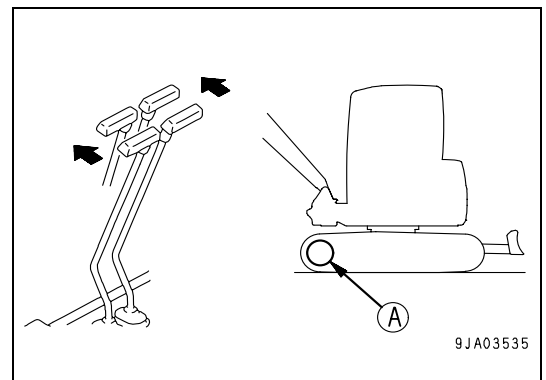
1. Shift the safety lever (2) to the “free” position (F), then raise the work equipment 40-50 cm from the ground.
2. Lift the blade.
3. Operate both travel levers (3) as explained below.



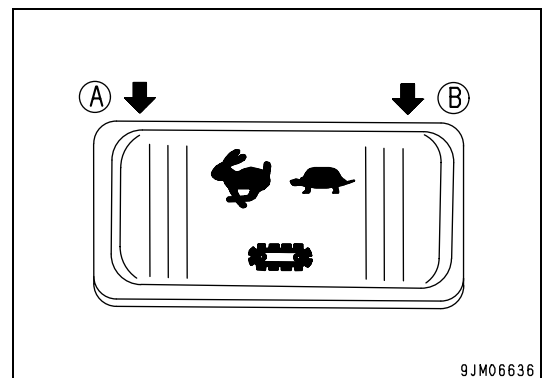
- When the sprocket (A) is at the rear of the machine, pull the levers (3) slowly backward to start moving in reverse.



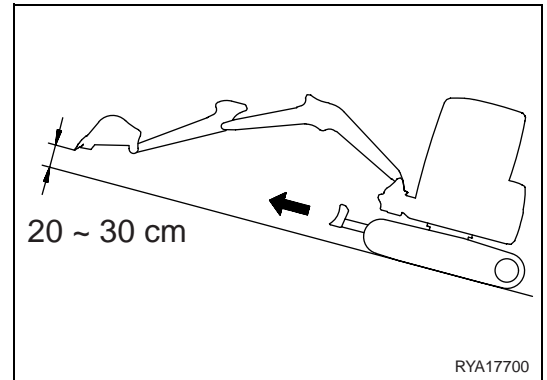
- When the sprocket (A) is at the front of the machine, push the levers (3) slowly forward to start moving in reverse.



4. Change the travel speed by proceeding as follows.
 - Press the travel speed selection switch (4) to change over from high (A) to low (B) speed and vice versa. The changeover from high to low speed or vice versa takes place whenever the switch is pressed.



2. When travelling uphill on a slope whose inclination exceeds 15°, position the work equipment as shown in the diagram on the right.



BRAKING WHEN TRAVELLING DOWNHILL

To brake when travelling downhill, shift the travel levers to the neutral position. This will automatically engage the brakes.

WHEN THE ENGINE STOPS ON A SLOPE

If the engine stops when the machine is travelling uphill, shift the travel levers to the neutral position, lower the bucket to the ground, stop the machine, then start the engine again.

PRECAUTIONS TO BE TAKEN ON SLOPES

If the engine stops when the machine is on a slope, do not use the left work equipment control lever to swing the turret. The turret will swing due to its own weight.

3.4 TRANSPORTING THE MACHINE

When transporting the machine, observe all the laws and regulations in force, paying special attention to safety.

3.4.1 TRANSPORT PROCEDURE

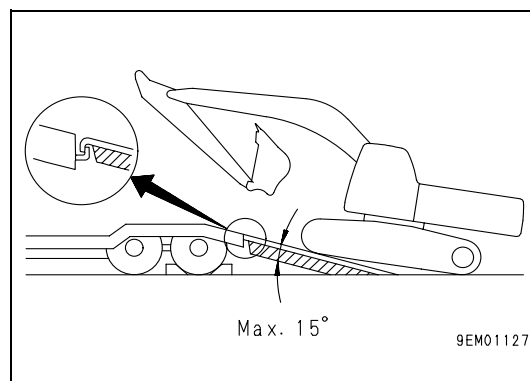
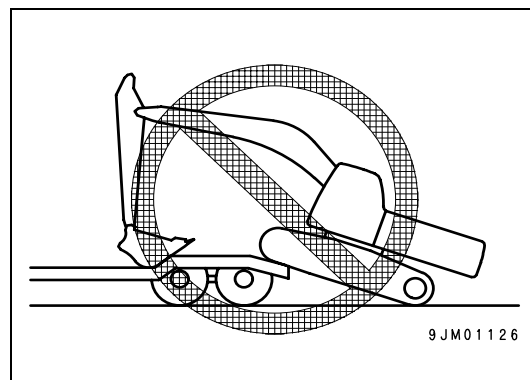
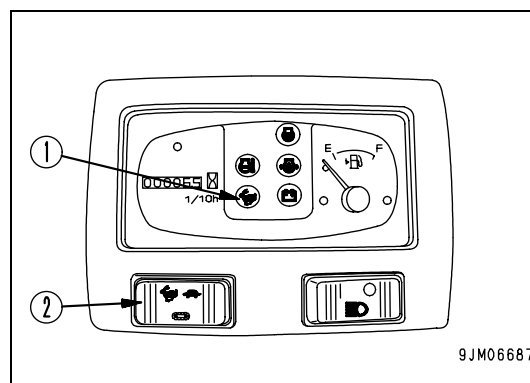
As a general rule, the machine must be transported on a trailer.

Choose the trailer according to the weight and size of the machine, as indicated in paragraph "5.1 TECHNICAL DATA". It is important to remember that the weight and transport size indicated in the technical data may vary according to the type of track, to the type of boom or to the other attachments installed on the machine.

3.4.2 LOADING AND UNLOADING THE MACHINE

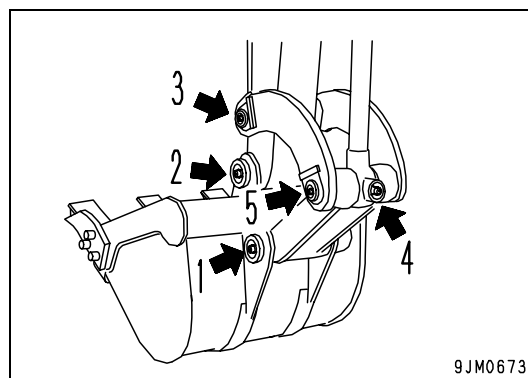
WARNING

- During loading and unloading operations, make sure that the travel speed increase warning light (1) is off and always travel at low speed.
- During loading and unloading operations, let the engine idle, reduce speed and operate the machine slowly.
- The machine must be loaded and unloaded on/from the trailer on firm and level ground. Keep a safety distance from the edge of the road.
- Use sufficiently wide, long, thick and strong ramps, and position them with a maximum inclination of 15°C. When using piled soil, compact it to prevent the inclined surface from collapsing.
- Before loading the machine, remove any trace of mud and dirt from the tracks, in such a way as to prevent the machine from slipping when it is on the ramps. Make sure that the surface of the ramps is clean and that there are no traces of water, snow, ice, grease or oil.
- Do not change direction when the machine is already on the ramps, since it may overturn. If necessary, move the machine down the ramps, find the correct direction and go up again.
- It is dangerous to use the work equipment for the loading and unloading operations, therefore avoid this type of manoeuvre.
- When the machine is on the ramps do not operate any lever apart from the travel levers.
- When the machine goes up the ramps and when it passes from the ramps to the trailer, its centre of gravity changes suddenly and it may lose stability. Therefore, proceed slowly.
- If the turret swing is operated when the machine is on the trailer, this becomes unstable, therefore it is advisable to fold the work equipment and to swing the turret slowly.
- Widen the track gauge before the loading and unloading operations.



3.7.4 PRECAUTIONS TO BE TAKEN WHEN WORKING IN PARTICULAR CONDITIONS

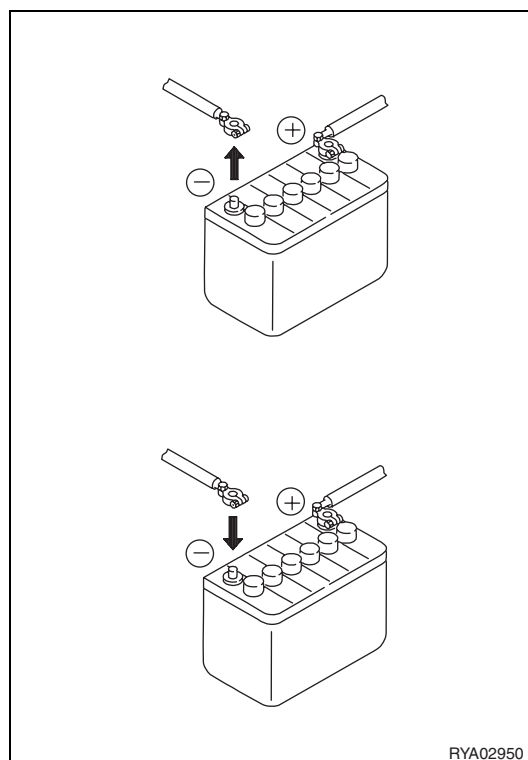
- When carrying out digging operations in water, if water gets on the pins of the work equipment, always add grease to the bucket articulations (1), (2), (3), (4) and (5) before work.
- When carrying out heavy duty digging and deep digging operations, always add grease to the bucket articulations (1), (2), (3), (4) and (5) (total: 5 points) before work.
After greasing, operate the bucket more than once, then add grease again.



3.7.5 IF THE BATTERY IS DOWN

! WARNING

- It is dangerous to charge the battery when it is installed in the machine. Always remove it before recharge.
- Before carrying out any work on the battery, stop the engine and turn the ignition key to position OFF.
- The battery produces hydrogen, which may explode. Do not smoke and avoid producing sparks near the battery.
- The battery electrolyte is made of diluted sulphuric acid that may corrode clothes and even the skin; in case of contact with this fluid, immediately rinse the involved part with plenty of water. If the acid gets into the eyes, immediately rinse with plenty of water and consult a doctor without delay.
- When working on the battery, always wear goggles and rubber gloves.
- When removing the battery, disconnect the earth cable (-) first. When installing the battery, connect the positive terminal (+) first.
If a tool touches the positive terminal and the frame of the machine at the same time, sparks may be generated, thus causing an explosion hazard.
- Carefully tighten the connection terminals, since false contacts may generate sparks with consequent risk of explosion.
- The accumulation of oxide around the terminals causes the battery to discharge. Clean the terminals carefully and cover them with a thin film of grease before installation.



4.4 FUEL, COOLANT AND LUBRICANTS

ITEM / TANK / SYSTEM	FLUID	AMBIENT TEMPERATURE										CAPACITY (l)	
		-30 -22	-20 -4	-10 14	0 32	10 50	20 68	30 86	40 104	50°C 122°F	1st filling	Change	
Engine oil pan	OIL API CD					SAE 30						3,6	3,3
					SAE 10W								
				SAE 10W-30									
				SAE 15W-40									
Travel reduction gears						SAE 30						0,3	0,3
Hydraulic system						SAE 10W						23,8	15,2
					SAE 10W-30								
					SAE 15W-40								
Hydraulic system with biodegradable oil		• See par. “4.4.1”										23,8	15,2
Fuel tank		DIESEL OIL		★✕								19	—
					ASTM D975 N. 2								
Engine cooling system	PERMANENT COOLANT (★★)										3,1	—	
Greasing	GREASE	Lithium EP+MoS2 (NLGI 2)											

★ ASTM D975 N. 1

★★ Special permanent antifreeze, biodegradable, ethylene glycol based with corrosion inhibitor and with no silicates, borates, nitrates, phosphates and amines.

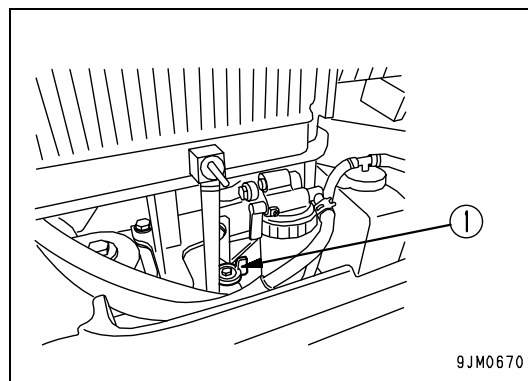
Red antifreeze suitable for aluminium radiators, diluted with water (50%) to ensure protection down to -36°C.

4.9.1.d DRAINING THE FUEL TANK

WARNING

- When draining the fuel tank, avoid spilling fuel, since this may cause fires.
- If some fuel is accidentally spilled, clean the dirty area immediately, in order to prevent it from getting slippery and to avoid fires.

1. Swing the turret so that the drain valve (1) is positioned between the tracks.
2. Open the radiator cover. For details, see paragraph "3.2.6 RADIATOR COVER".
3. Open the drain valve (1) and drain the sediments and water collected at the bottom together with the fuel. Collect fuel and sediments into a container with suitable capacity.
4. When clean fuel flows out, close the drain valve (1).



IMPORTANT

- The tank must be drained before starting the engine, with temperatures exceeding 0°C; when the temperature is below 0°C, the tank must be drained at the end of work or in any case with the machine at operating temperature, in order to prevent the condensate from freezing.
- The condensate and the impurities that may have accumulated inside the tank must be drained before refuelling.
- Never use trichloroethylene to wash the inside of the tank. Use exclusively diesel oil.

4.9.1.e CHECKING AND ADJUSTING THE STEEL TRACK TENSION

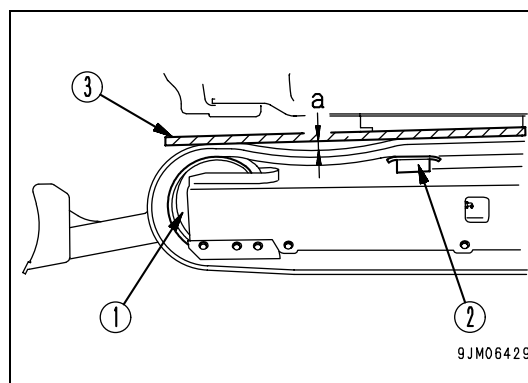
The pins and bushings of the undercarriage wear out to different degrees, depending on the work conditions and on the characteristics of the surface on which the machine works. Therefore it is necessary to check the track tension frequently and to adjust it when necessary.

IMPORTANT

- To carry out the check and the corresponding maintenance operation, stop the machine on firm and level ground. Check both tracks.

CHECK

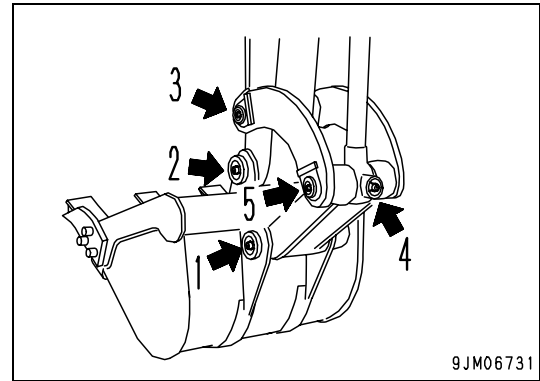
1. With the engine idling, move the machine forward of a distance corresponding to the length of the track on the ground, then lower the equipment to the ground and stop the engine.
2. Choose a perfectly flat rod (3) long enough to cover the distance between the idler roller (1) and the track sliding plate (2), then position it on the track.
3. Measure the maximum deflection between the upper surface of the track and the lower surface of the rod.
 - Standard deflection
The deflection value "a" should be included between 5 and 15 mm.



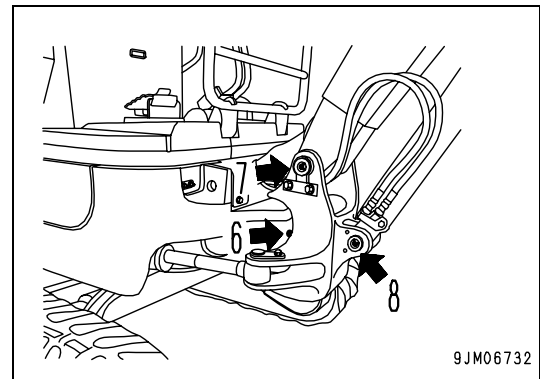
If the track tension does not correspond to the standard value, adjust it by proceeding as indicated below.

MAINTENANCE PROCEDURES

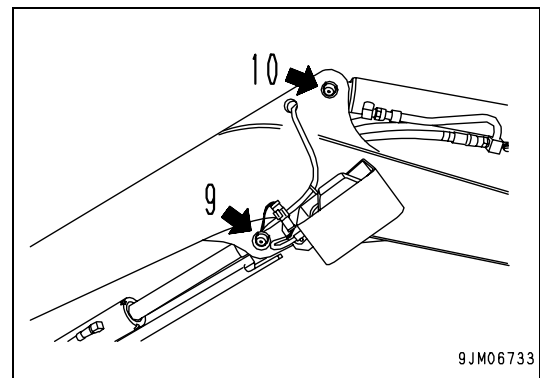
- (1) Bucket-link connection pins (1 point)
- (2) Arm–bucket connection pin (1 point)
- (3) Arm–link connection pin (1 point)
- (4) Bucket cylinder rod end (1 point)
- (5) Link connection pin (1 point)



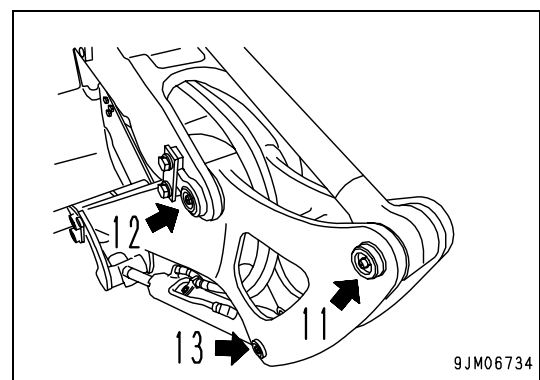
- (6) Boom swing bracket pin (1 point)
- (7) Boom base pin (1 point)
- (8) Boom cylinder base pin (1 point)



- (9) Boom cylinder rod end (1 point)
- (10) Boom cylinder base pin (1 point)



- (11) Boom cylinder rod end (1 point)
- (12) Boom–arm connection pins (1 point)
- (13) Bucket cylinder base pin (1 point)



4.9.6 MAINTENANCE EVERY 1000 HOURS OF OPERATION

Carry out these operations together with those to be performed every 500 HOURS.

4.9.6.a CHANGING THE HYDRAULIC OIL FILTER

WARNING

- To carry out this maintenance operation it is necessary to tilt the cab floor. Carefully follow the instructions given in paragraph "3.2.8 TILTING THE CAB FLOOR" or have this operation carried out by your Komatsu Dealer.
- Soon after the machine has been stopped, the hydraulic oil is very hot and may cause burns; let it cool down to 40÷45° C before changing the filter.
- The hydraulic system is under pressure; slowly loosen the filler cap to release any residual pressure.
- Oils, filters, the coolant and the battery are considered special waste and must be collected and disposed of according to the regulations in force.

CAUTION

- On machines containing synthetic biodegradable oil type HEES , this must be changed for the first time after the first 50 hours of operation and successively every 1000 hours.

The filter is positioned on the hydraulic system drain outlet and it holds the metal particles that come off the various components due to wear. The filter can be reached after tilting the cab floor (see "3.2.8 TILTING THE CAB FLOOR").

To change it, proceed as indicated below:

1. Loosen the screws (1) and remove the plate (2).
2. Slowly loosen the filler cap (F) to release any residual pressure from the tank.
3. Remove the screws (3) that hold the filter cover (4).
4. Remove the spring (5), the valve (6) and extract the cartridge (7).
5. Carefully clean the filter casing and change the cartridge (7).
6. Reassemble the whole by proceeding in the reverse order and make sure that the gasket (7) of the cover (4) is not damaged and is correctly housed in its seat.
7. Close the engine hood.

