Operation & Maintenance Manual

VEAM270101

WA90-5

WHEEL LOADER

SERIAL NUMBERS H50051 AND UP

⚠ DANGER

Incorrect operation and maintenance of this machine may be hazardous and cause injuries. The operator and maintenance personnel must read this manual before commencing operation or maintenance. Keep this manual within reach at all times and ensure that operating personnel read it at regular intervals.

NOTE

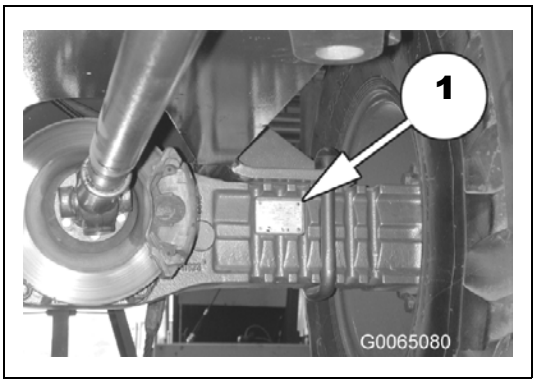
Komatsu has had the operating and maintenance instructions translated into all the languages of the European Union. Should you require a copy in another language please inquire at your local dealer's.

Printed in Europe 11-06

KOMATSU

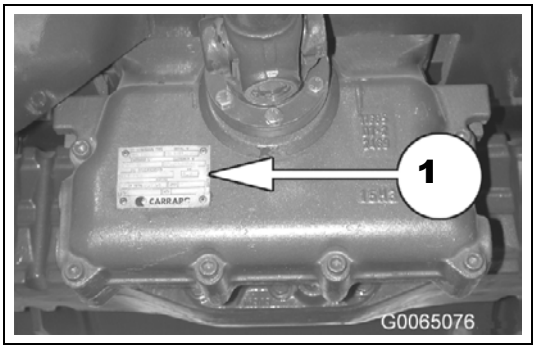
1.4.3. Axle serial no. plate

This plate is located on the right of front axle and on the left of rear axle (1).



1.4.4. Transmission serial no. plate

This plate is located in travel direction front, above the transmission output (1).



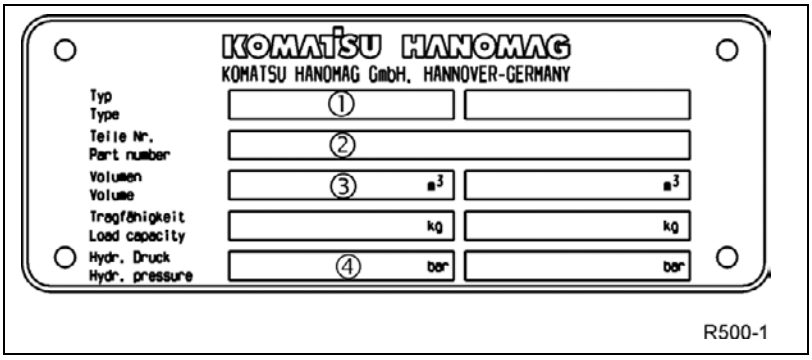
1.4.5. ROPS/FOPS-Cab serial no. plate

This plate is located on the right inside cab on the rear beam (1).

1.7. CE-conforming equipment

1.7.1. CE-conforming equipment – part 1

CE-conforming equipment					
	1	2	3	4	–
	Type	Part No.	Volume m^3	Hydr. pressure bar	Weight kg
Bucket	WA90-5	42W-70-22020	1,05	---	355
		42W-70-22030	1,05	---	376,5
		42W-70-22080	1,60	---	461
		42W-70-22061	0,90	250	

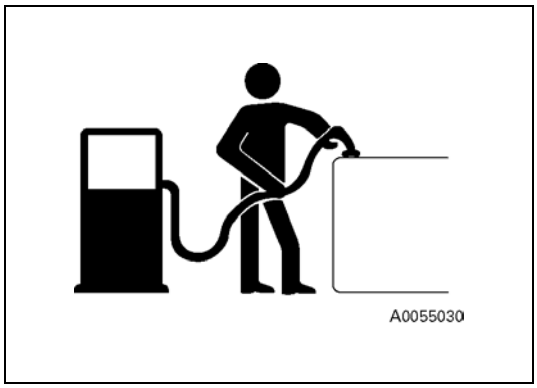


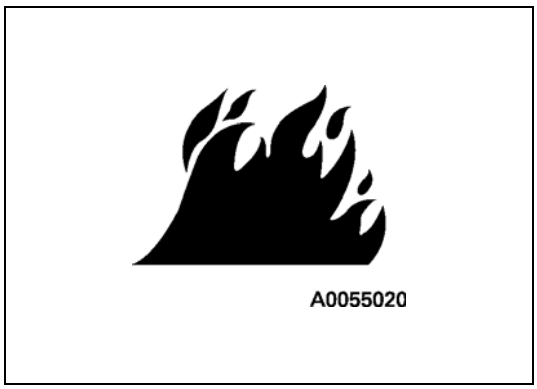
2.1.7. Mounting and dismounting

- Do not jump on or off the machine. Do not mount on or dismount from a moving machine.
- Always use the handle bars and tread steps for mounting or dismounting the machine. Do not hold onto the control levers while mounting and dismounting.
- To ensure safe hold, hold the handle bar with one hand and stand on the tread steps with both feet. Optionally, stand on the tread steps with one foot and hold the handle bars with both hands.

2.1.8. Fire prevention and fire fighting

- Fuel, oil, and antifreezing compound are highly inflammable and could cause a fire.
- Do not approach inflammable material with naked light.
- Prior to refuelling, switch off the engine and stop smoking.
- Refuelling and refilling of oil are to be performed in sufficiently ventilated places.
- Store oil and fuel in special places appropriate for this purpose. Ensure that unauthorised persons do not have access to these places.
- Tightly close all cover caps.
- Check the fuel system, the lubrication system, and the hydraulic system for leaks. Have leaks repaired. Remove any excess oil, fuel, or other inflammable substances.
- Carefully and completely remove wooden chippings, leaves, paper, and other highly inflammable materials that may have collected in the engine compartment, since they could cause a fire.
- Do not operate the machine in the vicinity of naked light.





Loading

- Proceed as follows to fill embankments, to backfill ditches, or to deposit earth over the edge of a hill:

  1. First, dump a heap of earth in front of the hill.

  2. Fill the bucket with earth again and drive the machine into the heap of earth. Dump the bucket contents behind the first heap of earth.

- The load is relieved very suddenly when the heap of earth is pushed over the edge of the hill or when the machine reaches the edge of the hill. If this happens, the driving speed may suddenly increase. For this reason, drive particularly slowly and carefully at these points.

- If possible, perform all load operations with a following wind to protect yourself against dust and impaired vision.

- Avoid sudden starts, turns, or stops when the bucket is full.

Good Vision

- When working in dark areas, switch on the working lights of the machine and provide additional lighting for the working area.

- If vision is impaired, e.g. due to mist, snow, or rain, interrupt work and wait until vision has improved to such an extent that safe work is ensured again.

Working on snow

- When working on snow or ice-covered surfaces, there is danger of the machine starting to skid even at a very flat angle. For this reason, drive slowly and avoid sudden starts, turns, or stops.

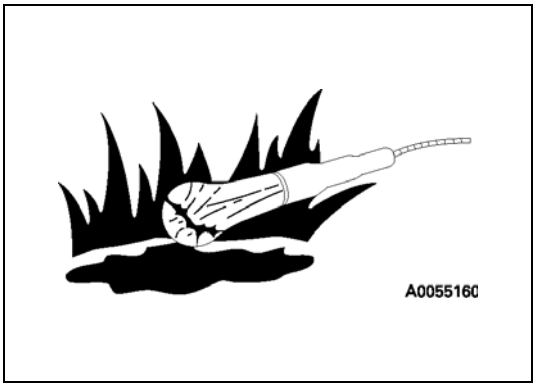
- Very often snow hides the edges of roads and other objects. For this reason, proceed very carefully when removing snow.

- When driving on hill flanks covered with snow do not brake abruptly to stop the machine. To stop the machine, lower the bucket onto the ground.

- The load may vary considerably, depending on the structure of the snow. For this reason, reduce the load and pay attention that the machine does not start to skid.

Use of lighting

Always use explosion-proof lighting when checking fuel, oil, coolant, or battery acid.

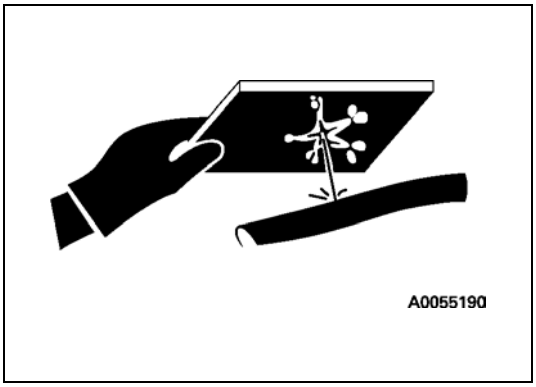


High-pressure hoses

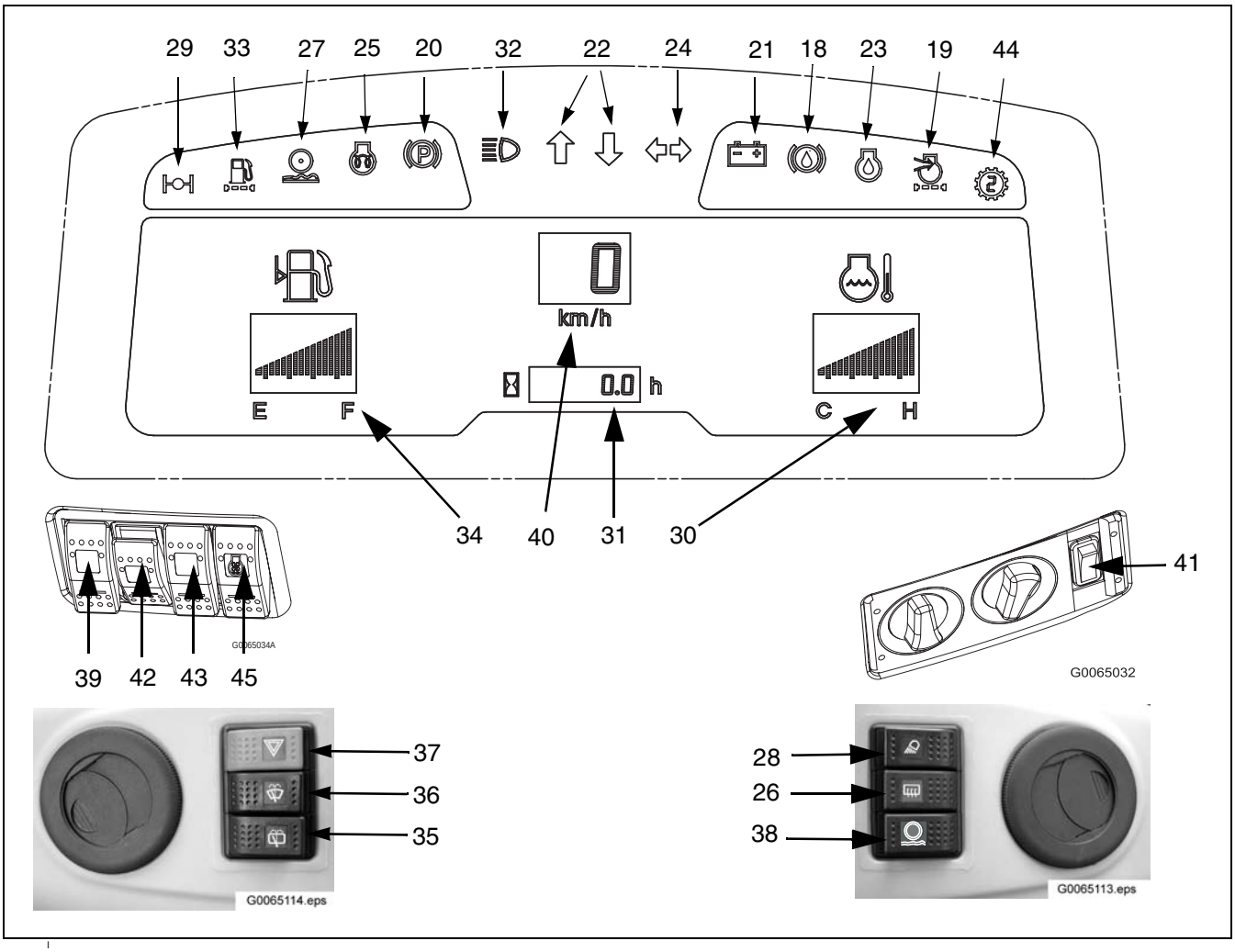
- Neither bend high-pressure hoses nor hit them with hard objects. Do not use piping or hoses with fissures, cracks, or bends, since they may burst during operation.
- Immediately replace any loose or damaged fuel or oil hoses. Leaking fuel or oil involves danger of fire and slipping.
- Replace all hoses every six years at the latest.

Handling high-pressure oil

- Always take into account that the hydraulic lines are subjected to high pressure.
- Do not top up oil, drain oil, or perform maintenance or inspection measures unless the work unit is completely lowered and the system is depressurised.
- If oil comes out under high pressure, this involves danger of an oil jet penetrating the skin or getting into the eyes. For this reason, always wear safety goggles and thick safety gloves, and use a piece of cardboard or wood when checking for oil leaks.
- If you have been hit by an oil jet, immediately go and see a doctor and explain what has happened.

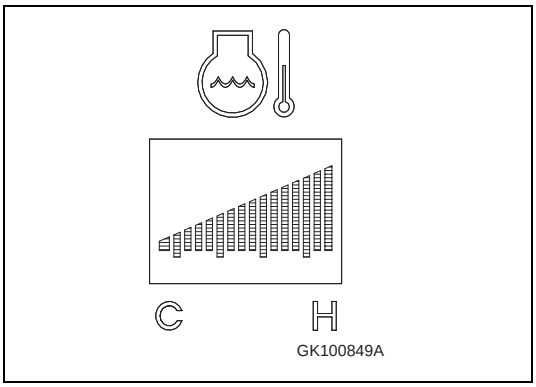


Switches, controls and warning lights



18	Brake fluid reservoir warning light	32	High beam control lamp
19	Air filter warning light	33	Warning light: Water separator
20	Parking brake control lamp	34	Fuel gauge
21	Charging current warning light	35	Wiper and washer system switch (rear window)
22	Direction indicator switch control lamp	36	Wiper and washer system switch (windscreen)
23	Engine oil pressure warning light	37	Hazard warning lights switch and control lamp
24	Flasher signal control lamp	38	E.C.S.S. switch with control lamp– option
25	Intake air pre-heater control lamp	39	Warning beacon switch with control lamp – option
26	Heated rear window control lamp	40	Meter display pilot lamp
27	E.C.S.S. control lamp – option	41	Air conditioning switch with control lamp– option
28	Working lights switch and control lamp	42	Control lamp in the switch of the 3rd control circuit - Optional
29	Switch and control lamp differential lock 100%	43	Control lamp in Sprayer switch - Optional
30	Coolant temperature indicator	44	Control lamp: Speed range 2
31	Operating hour meter	45	Switch with fan reversal control lamp

3. Temperaturanzeige Kühlmittel



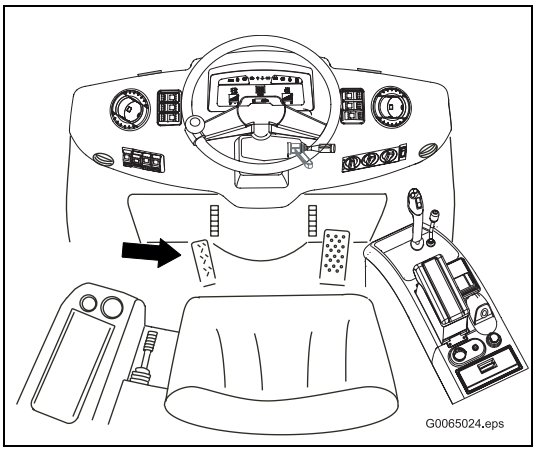
If you set the start switch to position 'I', the temperature display shows the temperature of the coolant.

- The background lights up in green if the coolant temperature is normal.
- The background lights up red when the coolant temperature is too high. The acoustic warning signal sounds.

Eliminate the malfunction as described in Chapter "4.6. Other troubles" on page 4-10.

- If only the two bars on the right of the temperature display are lit, there is no electrical contact with the temperature sensor.

1. Brake pedal

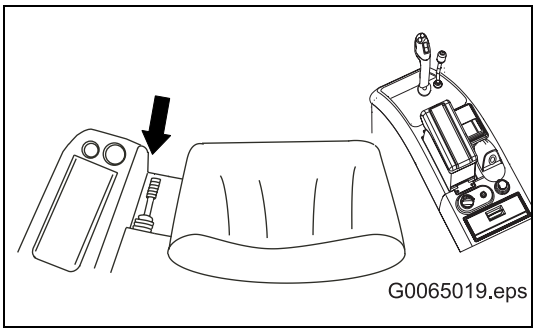


WARNING

- **If you are driving downhill, let the engine run and use the braking effect of the engine. If required, brake additionally using the brake pedal.**
- **Danger of accidents due to unintentional braking!**
- **Do not use the brake pedal as a foot rest.**

The brake is operated via a combined brake/inch pedal. The inching exerts an additional braking effect on the hydrostatic drive system.

2. Parking brake

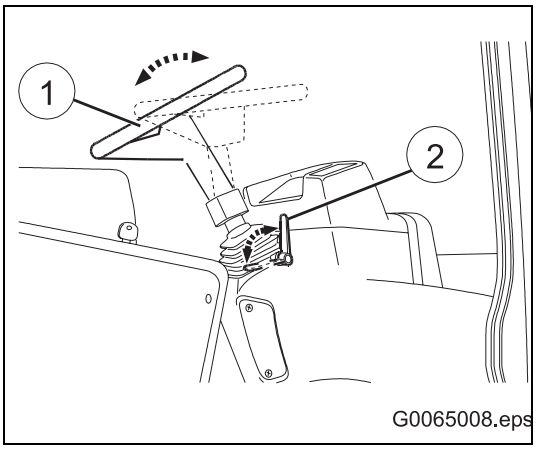


As soon as you pull the parking brake lever from its normal position, the braking action comes into effect. If the start switch is set to the 'I' operating position, the parking brake warning light lights up in the instrument panel. The machine will drive again, if you reloosen the parking brake.

NOTE

You cannot start the machine with the parking brake being applied. If you set the driving direction switch to the 'F' position (forward driving) or 'R' (reversing) with the parking brake still being applied, the alarm buzzer will sound.

3. Steering column adjustment



The lever (2) for adjusting the steering column (1) position permits to incline the steering column smoothly in two directions (front or back). The adjustment range is 125 mm.

Proceed as described in chapter "Adjusting the steering column" on page 3-43

3.3. Operation

3.3.1. Pre-start checks

Visual inspection

WARNING

Danger of fire! Oil or fuel leaking out or accumulated combustible materials may catch fire at hot parts of the machine, e.g. the exhaust!
Prior to starting the machine, check the oil and fuel lines for leaks and immediately repair any leaks. Store combustible material in a safe place.

Before you start the engine

Check that there are no loose nuts or screws lying around the machine. Check that neither oil, nor fuel nor coolant are leaking out. Check the condition of the work unit and the hydraulic system. Check that there are no loose cables and accumulated dirt. Remove accumulated dirt and eliminate faults.

Before starting working with the machine

Perform daily the following measures:

1. **Check work unit**

   Check work unit, cylinder, connecting rods, and hoses for cracks, premature wear and tear, and play. Repair damaged parts.

2. **Remove dirt and dust**

   Check the area around the engine and the radiator for accumulated dirt or dust. Additionally check whether combustible material has accumulated near the battery or near hot parts of the machine, e.g. the exhaust. Remove completely any accumulated dirt or dust.

3. **Check for leakage of water or oil around engine**

   Check that there is no oil leakage from the engine or water leakage from the cooling system. If any abnormality is found, repair it.

4. **Check the gear unit, axles, hydraulic tank and hoses and the connecting points**

   Check whether oil is leaking out of the gear unit, axles, hydraulic tank and hoses, and connecting points. Repair damaged parts.

5. **Check brake hoses**

   Check that there is no oil leaking out at the brake hoses. Repair damaged parts.

Adjusting the rear-view mirrors

Sit down on the driver's seat and adjust the rear-view mirrors to their required positions. You should be able to view the traffic coming from behind without having to change your seating position.

Putting on the safety belt

⚠ WARNING

- **Danger of injury! A damaged safety belt, a safety belt that has been stretched in an accident, or a safety belt the belt fixings or fastening screws of which have not been mounted correctly will not protect you sufficiently in case of accident!**
- **Replace the safety belt, if it is damaged, or if the machine has been involved in an accident. Check that the belt fixings and fastening screws are in perfect condition, before you put on the safety belt.**
- **If you have not put on the safety belt and are involved in an accident, this may lead to severe injuries!**
- **Put on the safety belt, before you start work and do not take it off during work. Put on the safety belt in such a way that it is not twisted and fits tightly.**

The machine is provided with a lap belt which automatically retracts. When pulled slowly, automatic belts ensure full freedom of action, but block immediately, if you suddenly brake or accelerate, or if you drive downhill or take corners.

Putting on the safety belt

1. Sit down on the driver's seat.
2. Slowly and continuously pull out the belt.
3. Insert the lock tongue into the lock socket until the lock engages.
4. Then, pull the belt to check whether or not the lock tongue is fully engaged.

NOTE

The belt cannot be pulled out unless it is completely wound up.

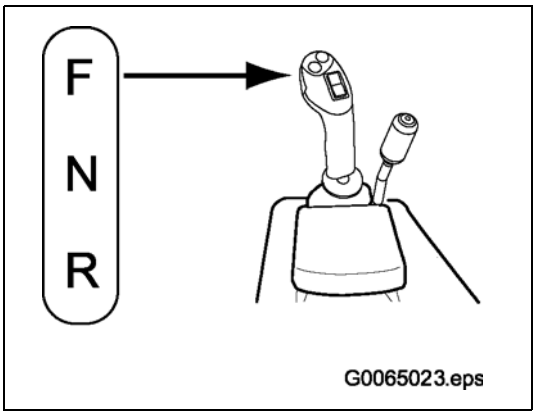
Taking off the safety belt

Press the orange button to release the lock of the safety belt and allow the belt to wind up.

3.3.7. Stopping the machine

Avoid abrupt stopping. Proceed as follows, if you want to stop the machine:

1. Release the accelerator pedal and press down the brake pedal.
2. Set the drive direction switch into its neutral position 'N'.
3. Apply the parking brake.
4. Lower the work unit onto the ground.

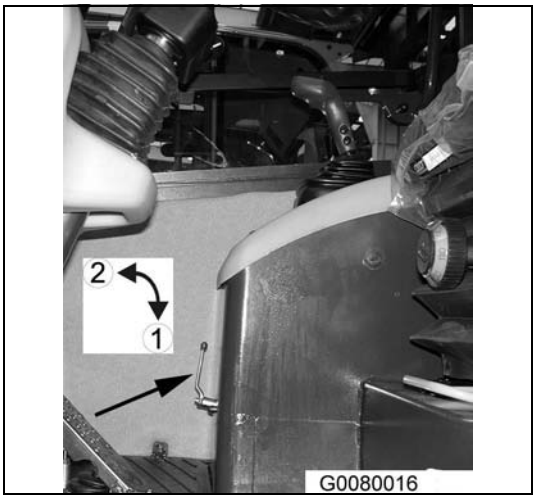


⚠ WARNING

- **Unintentional activation of the multifunctional-lever or moving of the equipment may lead to accidents!**
- **Before you leave the cab, turn the locking lever for the work hydraulic system into position '1'. As a result, the work hydraulic system is blocked.**

5. Protect the work hydraulic system against unintentional activation by turning the locking lever of the work hydraulic system into position '1'..

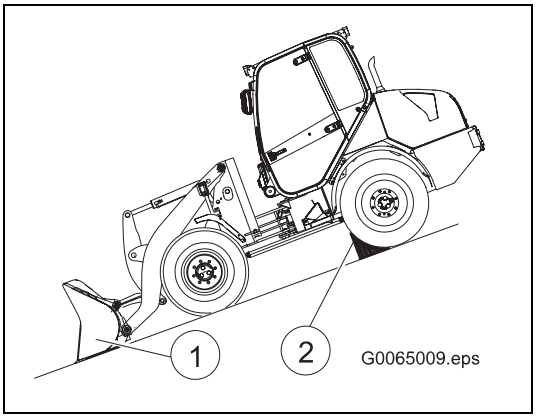
   Position 1 = working hydraulics locked
   Position 2 = working hydraulics released



Parking the machine on a slope

Whenever possible, stop the machine on level ground.

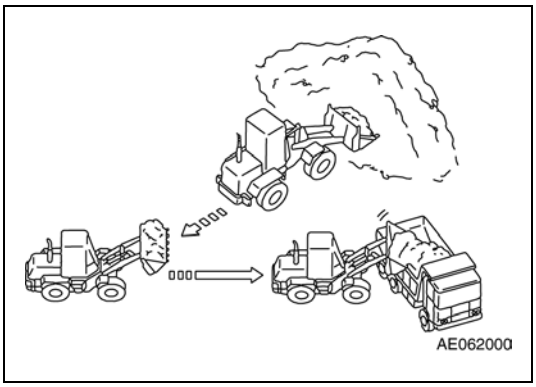
- If you have to park the machine on a slope, it is required that you park it in such a way that the front section (work unit) points downhill.
- Lower the work unit onto the ground.
- Block the wheels with wheel chocks (1).



V-shaped loading

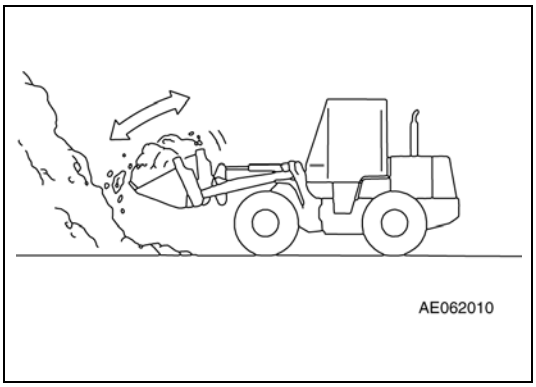
Position the dump truck in such a way that the angle between the dump and the dump truck is approx. 60°. Fill the bucket and shake it. This leads to a better distribution of the cargo in the bucket and prevents that material falls down to the back. Drive the machine backwards from the heap and align the machine with the dump truck. Raise the bucket to its maximum height. Drive up forward to the dump truck and unload the material.

If you keep the turning angle of the machine as small as possible, the work will be more efficiently.



Piling up material

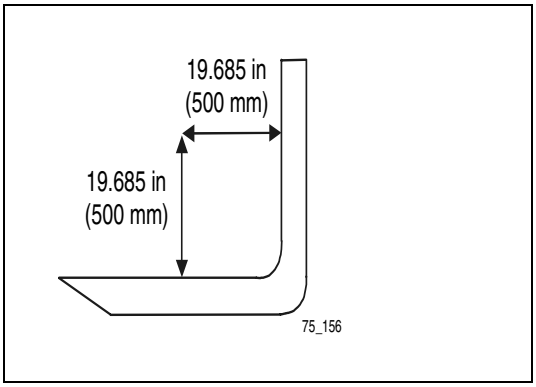
Do not position the bucket in its maximum tip-in or dumping position while piling up material. Instead, use the required mining angle. The rear counterweight must not touch the ground.



Working with the forklift truck attachment

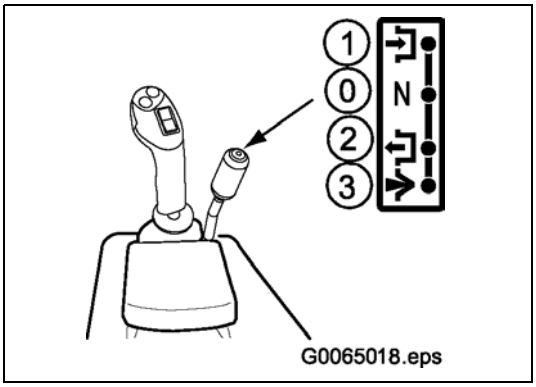
Operations with an forklift truck attachment on a wheel loader differ from operations with the bucket or a forklift truck. Take into account the following notes and the instructions indicated in the chapter "2.1. General safety measures" on page 2-2.

- Do not take up loads which are so high that you cannot see onto the route.
- Hold the fork tines of the forklift truck attachment as horizontal as possible when you take up the load.
- During the ride, hold the load as low as possible in order to have free sight onto the route.
- Always drive slowly (speed range 1) with the load.
- The boom performs a semicircular stroke while performing the lifting movement. Raise the boom only immediately in front of the place at which you want unload to the height at which you want to unload. In such a way, you prevent that you damage the load while lifting it.
- Hold the forklift truck attachment as horizontal as possible while piling up.

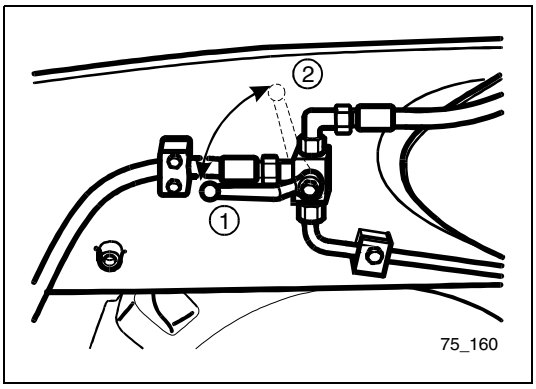


Removing the multi-purpose bucket

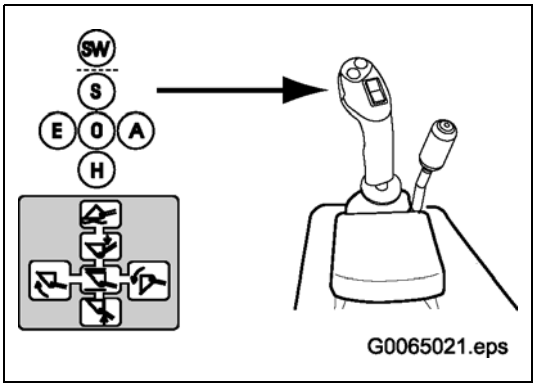
1. Lower the multi-purpose bucket onto level ground.
2. Switch off the engine.
3. Set the control lever for special equipment first to position ‘1’ and then to position ‘2’ (figure G0065018.eps).



4. Turn the change-over lever for the supplementary control circuit to position ‘2’ until it reaches the limit stop (figure 75_160).
5. Disconnect the multi-purpose bucket hoses from the quick couplings.
6. Restart the engine.
7. Unlock the quick-change unit by setting the control lever for special equipment into position ‘1’ (fig. G0065018.eps).



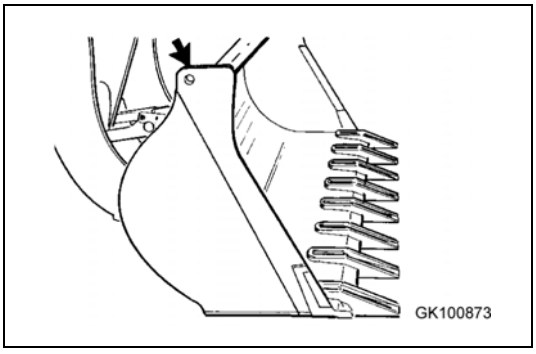
8. Set the quick-change unit into the dumping position ‘A’ (fig. G0065021.eps) using the multi-function lever, until the quick-change unit is unhooked of the work unit's pickup hooks.
9. Make sure that nobody is behind the machine and drive the machine away from the work unit.



Level indicator for the bucket

On both sides of the bucket the upper edges (see arrow) are arranged in parallel to the bucket edge and can be used as a level indicator for the bucket.

You can recognise the position of the cutting edge of the bucket from the driver’s seat with the help of the level indicators.



3.5.2. Precautions after completion of work

Realise the following actions to make sure that the machine can be started the next time without problems:

- Remove mud and water from the car body. This prevents that sealings are damaged due to freezing.
- Park the machine on hard and dry ground. If this is not possible, you must park the machine on wooden planks. The planks prevent that the wheels are freezing to the ground.
- Drain off collected water from the fuel system.
- The battery capacity drops clearly at low temperatures. Therefore, dismount the battery in frost periods and store it in a warm place. Re-install it the next morning, before starting to work.

3.5.3. After the cold season

If the weather becomes warmer, you must fill up the prescribed fuel and use oils with prescribed viscosities (see chapter "5.3. Lubricants, fuels and filling capacities" on page 5-18.

4.3. For insufficient braking effect

4.3.1. Checking the service brake

Drive the machine at a speed of 20 km/h on a dry flat concrete road surface, and check whether the stopping distance is less than 5 m.

NOTE

All repairs conducted on the braking system must be conducted at a Komatsu workshop.

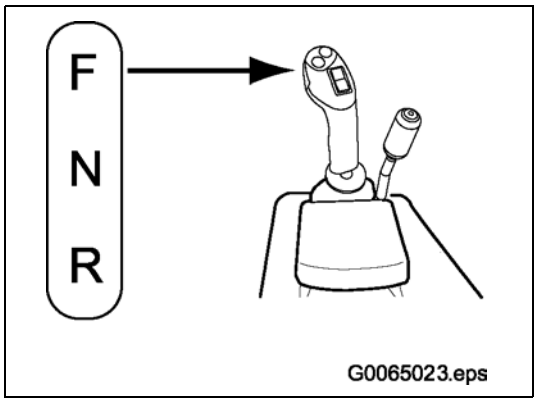
4.3.2. Checking the parking brake function

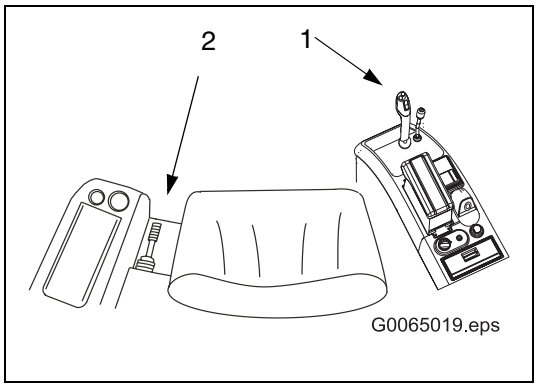
1. Start the engine, set the machine to straight driving, and drive the machine with an empty bucket up a gradient of 25%.
2. Stop the machine with the service brake and do not release your foot again to keep the service brake applied.
3. Lower the bucket.
4. Set the driving direction switch (1) to its neutral position 'N'.
5. Switch off the engine.
6. Apply the parking brake (2) and slowly release the pedal of the service brake.

   The machine must stand still.

NOTE

All repairs conducted on the braking system must be conducted at a Komatsu workshop.





Welding instructions

- Turn off the engine start switch (OFF position).
- Disconnect the negative terminal on the battery.
- Do not apply more than 200V continuously.
- Connect grounding cable within 1 m from the area to be welded.
- No seals or bearings may be between the area to be welded and the grounding point.
- Never weld any pipe or tube containing fuel or oil.
- Keep a safety distance of min. 1 m between the area to be welded and the battery.

Fire prevention

Use nonflammable cleaners or light oil for cleaning parts. Keep flame or cigarette light away from light oil.

Clamp faces

When O rings or gaskets are removed, clean the clamp faces and replace the O rings and gaskets with new ones. Be sure to fit O rings and gaskets during re-assembly!

Objects in your pockets

Keep your pockets free of loose objects which can fall out and drop into the machine (especially when bending over the machine).

Tyres check

When working in rocky areas, check the tyres for damage and for looseness, flaws, wear and tear. Re-tighten loose bolts and nuts.

Precautions when washing the machine

- Place the machine on a plane, even surface.
- Lower the work equipment to the ground.
- Apply the parking brake.
- Lock the wheels using support wedges to prevent the machine from rolling away.

Proceed the following general measures, if you want to clean the machine:

- Never spray steam or water directly on the radiator.
- Do not allow water to get on any electrical component.

5.5. Periodical replacement of safety-critical parts

To ensure trouble-free operation of the machine, the user of the machine must always carry out periodic maintenance. In addition, to maintain safety standards, the user should also periodically replace all safety related parts, which are particularly closely connected to safety and fire prevention.

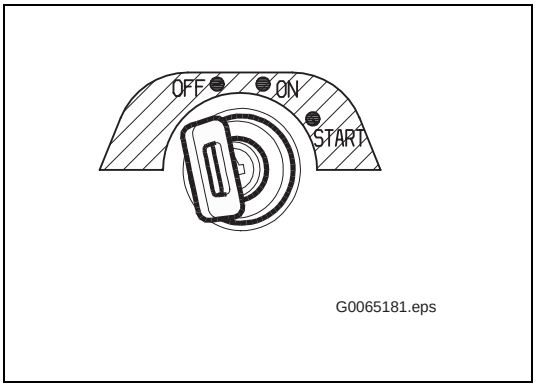
- The standard service life under normal conditions should not exceed 6 years.
- Hoses must be replaced as soon as the following damage is noticeable:
  - damage to the outer layer through to the intermediate layer,
  - brittleness in the outer layer,
  - distortions in pressurised or unpressurised state not conforming with the original shape of the installed hose,
  - leakages,
  - damage to the hose fittings or to the connection between fittings and hose,
  - storage damage (the shelf life of the hose should not exceed 2 years).

When replacing the hoses, always replace the O-rings, gaskets, and other such parts at the same time.

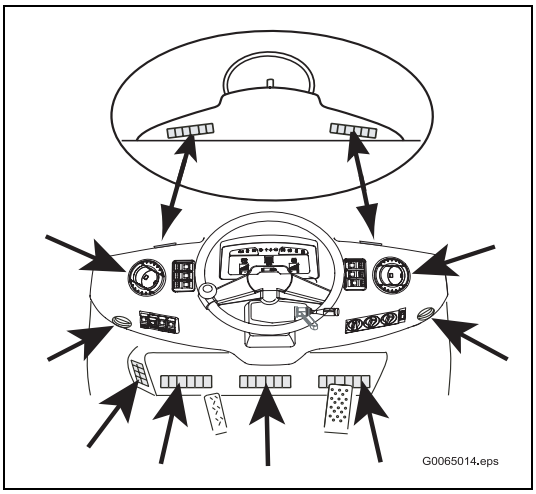
Ask your Komatsu distributor to replace the safety critical parts.

Heater/air conditioning – checking rate of air flow

1. Turn start switch to position 'ON'.



2. Open all air circulation nozzles and air outlet nozzles (see arrows).
3. Switch blower on.
4. Check whether sufficient air flows out of the air outlet nozzles.
5. If insufficient air is coming out of the jets, either the filter fleece in the heating/air conditioning unit is dirty and will have to be cleaned or replaced or the condenser in the air conditioning system is dirty and will have to be cleaned; see "Heater/air conditioning – cleaning/replacing filter fleece" on page 5-56.



Miscellaneous tests before starting work

- Check that the lighting equipment operates correctly; check it for dirt and damage.
- Check the measuring instruments.
- Check both the horn and the reversing warning horn.
- Check both clearance and operation of the steering wheel.
- Check the function of the rear-view mirror; check it for dirt and damage.

Lubrication of work unit

Lubricating points of the work unit

DANGER

- **If you perform maintenance operations at a machine which is not properly parked and secured, severe accidents may occur!**
- **Park the machine on firm, level ground and secure it before starting the maintenance operations.**

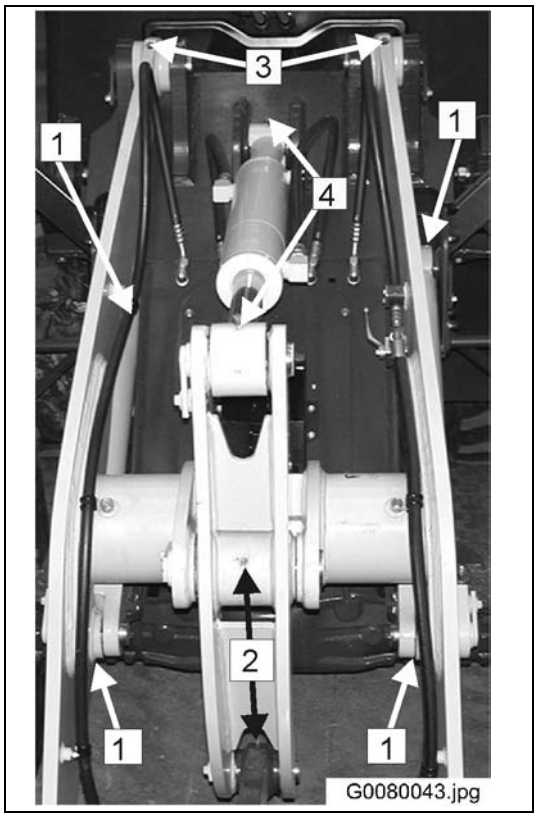
1. Park and secure machine for the maintenance operations as described in chapter "5.1. Maintenance guide" on page 5-2.
2. Clean the grease nipples which are indicated by the arrows.
3. Use a grease gun to press sufficient grease into the grease nipples.

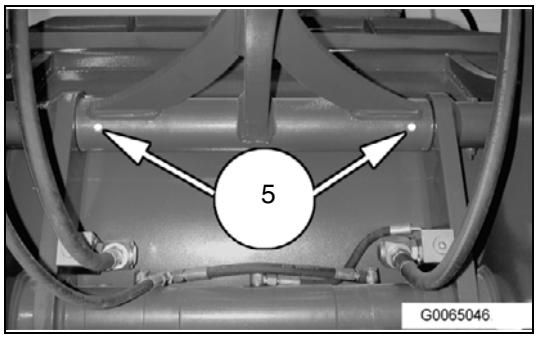
(1)	Lifting cylinder right and left side	(4 locations)
(2)	Rocker arm	(2 locations)
(3)	Boom	(2 locations)
(4)	Tipping cylinder	(2 locations)
(5)	Quick-change unit	(2 locations)
(6)	Clamshell bucket	(6 locations)

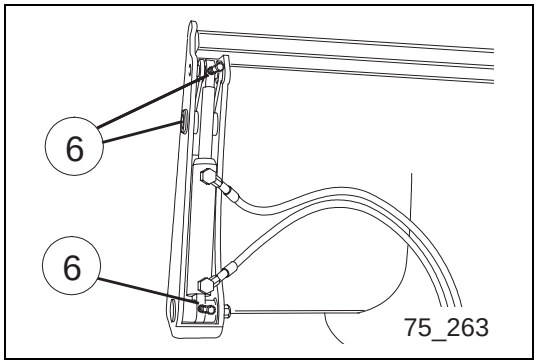
4. Remove the old grease which is extruding at the bearings.

NOTE

If you operate in humid conditions or in a salty environment, you must reduce the lubricating intervals.

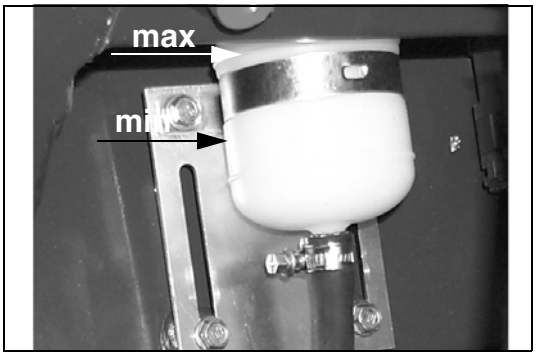


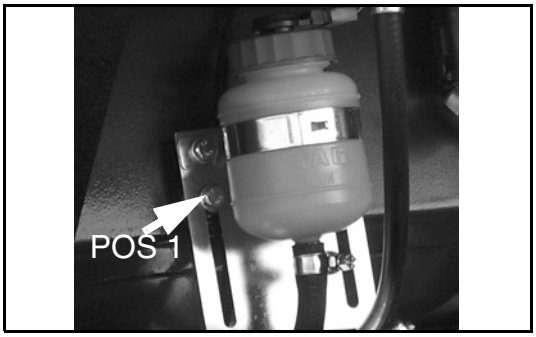




Alll repairs on the brake system must be performed by a garage which is authorised by Komatsu.

1. For maintenance operations, park and secure machine as described in chapter "5.1. Maintenance guide" on page 5-2 .
2. Check the brake fluid level at the expansion tank. The oil level must be 0.394 - 0.787 inch (10 - 20 mm) below the upper edge of the expansion tank (marking).
3. If you detect a significant oil loss, inform the responsible Komatsu dealer.
4. Check the brake discs and brake pads for wear and damage.
5. Only move the sub-tank to position (1) to refill it.





5.7.9. Maintenance every 1000 operating hours

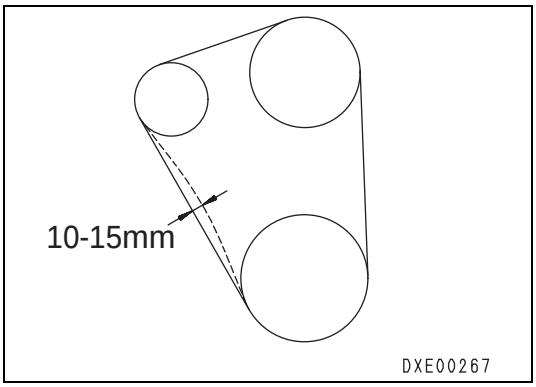
All maintenance operations to be performed after 10, 50, 100, 250 and 500 hours of operation also fall into this maintenance category.

V-Belt, generator – checking and adjusting the tension

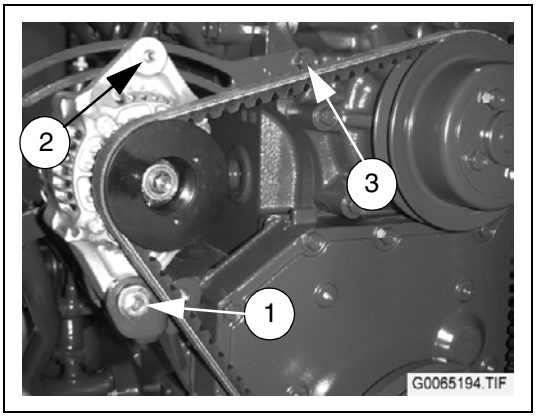
DANGER

- **There is danger of severe accidents, if you perform maintenance work at a machine that has not been parked and secured correctly!**
- **Park the machine on a solid, even surface and secure it, before you start to perform maintenance work.**
- **Danger of injuries! When the engine is in operation, there is danger of severe injuries by moving parts within the engine compartment! Do not work within the engine compartment, while the engine is in operation.**

1. Before you start maintenance work, park and secure the machine as described in the chapter "5.1Maintenance guide 5-2".
2. Press down the V-belt in the middle of the longest straight part. You should be able to press the V-belt down about 10-15 mm.
   If you can press down the V-belt more than 10-15 mm, adjust the tension as follows:



3. Loosen the fastening screw (1) at the generator.
4. Loosen the connecting screw (2) between the generator and the guide rail.
5. Loosen the fastening screw (3) at the guide rail.
6. Tilt the generator to adjust the tension of the V-belt.
7. Fasten the generator and the guide rail.
8. Check the tension of the V-belt and re-adjust it, if required.



Service Brake - Checking and refilling oil

Alll repairs on the brake system must be performed by a garage which is authorised by Komatsu.

- Changing oil.
- Checking tubes and lines.
- Check the brake discs and brake pads for wear and damage.
- Adjusting the clearance of the brake disks.

Checking and adjusting system pressures

Checking the fuel pump

Let the fuel pump be checked at a garage which is authorised by Komatsu.

Checking the fuel and coolant tubes, replacing the tubes (if required)

Have the fuel and coolant tubes checked and replaced, if required, at an authorised Komatsu garage.

Checking the water pump

Let the water pump be checked at a garage which is authorised by Komatsu

7.1. E.C.S.S-electronics

Always read this section before installing and operating the E.C.S.S-electronics as safe as possible.

7.1.1. Structure and functioning principle of the E.C.S.S-electronics

- The E.C.S.S-electronics uses the hydraulic spring effect of the hydraulic accumulator installed to the circuit at the lift cylinder base end to absorb the vibration of the chassis when the machine is travelling. This enables the machine to travel smoothly at high speed.
- The E.C.S.S-electronics consists of the E.C.S.S-electronics switch, hydraulic accumulator and solenoid valves. When the travel damper switch is turned ON, the solenoid valves open, the circuit at the lift cylinder base end is connected with the hydraulic accumulator.

7.1.2. Precautionary measures for switching on the E.C.S.S-electronics

⚠ WARNING

If the E.C.S.S. system is switched on during a journey, or when the working attachment is in raised position, it may move up or down depending upon the bucket load.
For this reason, extreme caution is advised when operating the switch.

When inspecting and servicing the machine, E.C.S.S. lower the work equipment to the ground then turn the E.C.S.S-electronics switch OFF before beginning to service.

NOTE

The E.C.S.S. system is activated when the transmission is shifted in 2nd gear and the machine is traveling at a speed higher than 5 km/h.