SEAM566D01

Operation & Maintenance Manual

KOMATSU

HD320,325-3

DUMP TRUCK

SERIAL NUMBERS
HD320 -2501 and up
HD325 -1501

FOREWORD

Thank you for purchasing this Komatsu machine.

This manual describes procedures for operation, handling, lubrication, maintenance, checking, and adjustment. It will help the operator realize peak performance through effective, economical and safe machine operation.

- Please read this manual carefully BEFORE operating the machine.
- Please continue studying this manual until proper operation is completely reinforced into personal habit.

★ Operation, inspection, and maintenance should be carefully carried out, and the safety must be given the first priority. Safety precautions are indicated with ⚠ marks in this manual.

BREAKING IN YOUR NEW MACHINE

Operate your dump truck gently for the first* 100 hours (refer to service meter) or so to break in all moving parts. The machine has been fully inspected and adjusted before shipment.

If you operate it up to the limit of its capacity during the break-in period, its potential of performance will be prematurely reduced. Use special care for the following points.

- After starting, idle the engine, until the water temperature and oil pressure gauges indicate to the green range. An engine which is not fully broken in will have its operating life reduced if it is operated under load while the oil temperature is low.
  Warm-up is also important after the break-in period.
- Avoid heavy-duty works and high-speed travelling.
- Avoid sudden starts and stops, abrupt acceleration and turning.
- During the first *250 hours, the services noted below are required together with periodical maintenance.
  i) Replace all oil and the hydraulic oil filter element.
  ii) Check the valve clearance.
  iii) Check the torque of injector adjustment screws and retighten the injector mounting bolts.
  (Refer to EVERY 1,000 HOURS SERVICE and EVERY 2,000 HOURS SERVICE.)

* **Hours of operation are indicated by the service meter.**

CONTENTS

OPERATION

MAINTENANCE

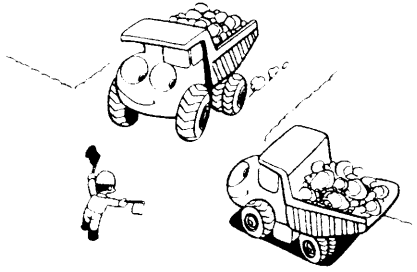
SAFETY HINTS · · · ⚠

GENERAL

- Wear well-fitting hard hat, safety shoes and working clothes. Never wear loose or unbuttoned clothes as they may catch on protruding parts of machine. Never wear clothes covered in oil.
  If the nature of the work so requires, wear protective goggles or mask, ear plugs or other protection.
- Accidents or injuries are liable to occur when the operator is careless or inattentive. It is most important to bear safe operation in mind at all times.
- Do not overwork or drive after drinking. Take care of your health. Driving while unfit can lead to mistakes in judgement in emergencies.
- Never allow more than the permitted number of persons to ride on the machine.
- Learn the prohibitions, precautions and rules about work procedures in the job site. Make every effort to prevent accidents by always following these and always bearing safety in mind.
- If there should be an accident or fire or any other such unexpected mishap, deal with it quickly, using the nearest apparatus. In addition, it is necessary to prevent any secondary mishaps. It is also important to know the emergency contact system.
- Learn beforehand the locations and method of use of emergency equipment such as first aid boxes, fire extinguishers or other fire-fighting equipment.
- Learn how to use the control devices, gauges and warning devices. Be sure you understand the meaning of the caution plates and other signs. Remember the check points and checking method for engine oil, fuel, cooling water and hydraulic oil levels. Always know the dimensions and capacity of your machine.
- Fuel, oil and anti-freeze are dangerous. Never smoke or light matches when handling fuel, oil, grease or anti-freeze. Do not handle these substances near any fire or flame. When selecting a place for storing them, take care to choose a place away from where fire is used.
- Exhaust gas is dangerous. When running the engine for long periods in a poorly ventilated area, there is a danger of gas poisoning, so open the windows or doors to ensure a good supply of fresh air.
- When operating inside a building always be sure of the clearances of the ceiling, entrances, aisles, etc. and the load limit of the floor.

BEFORE STARTING OPERATION

- Examine the lay of the land and the kind of soil at the site to determine the dangerous points and the best method of operation. Proceed with the work only after making safety arrangements about the dangeous points. Avoid operating near cliffs or deep gullies. Be particularly careful of the edge of cliffs, falling rocks or landslides.
- Always carry out inspection and maintenance correctly. Check for leakage of fuel, lubricant or hydraulic oil, and for loose, broken or missing parts.
  If there are any such problems always correct them. Never use the machine without correcting all problems.
  Use repaired machines only after receiving permission from the serviceman in charge of the repair.
- Adjust the operator's seat until it is in the most comfortable position for operating.
- When getting on or off the machine, use the handrail and step provided. Do not jump up or down from the machine.
- Learn about the safety devices on your own machine and about how to use them. Confirm that they are correctly attached in the prescribed position.
- Before starting the engine, confirm that all control levers are in "NEUTRAL" or "HOLD".
- To ensure the safety of workers near the machine, always signal or sound the horn to warn them before starting the engine, moving the machine or turning.
  Be particularly careful to check that the rear is clear before backing the machine.
- Do not leave parts or tools lying around in the vicinity of or on the floor of the operator's compartment. Keep everything in its proper place, to avoid any hindrance while driving.
- Wipe off thoroughly any grease, oil or mud on the step, handrail, floor or control levers. Failure to do this may cause you to slip.
- Check the level of the fuel, lubricants and cooling water. Do not smoke or use naked flames when checking. Extinguish cigarettes before checking or refilling. Check that the radiator cap and all oil filler caps or plugs are firmly tightened.
- When there is a leader, fix standard signals and always follow these signals when operating. Learn the signs and rules used in the job site and always follow them.

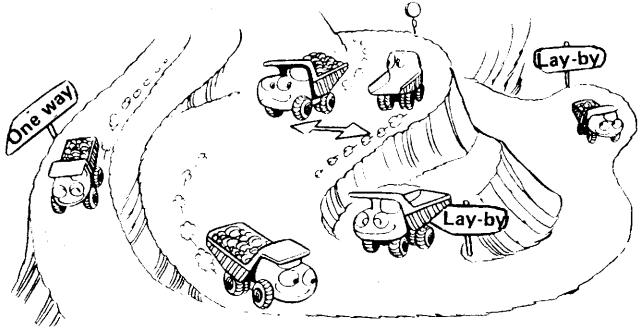


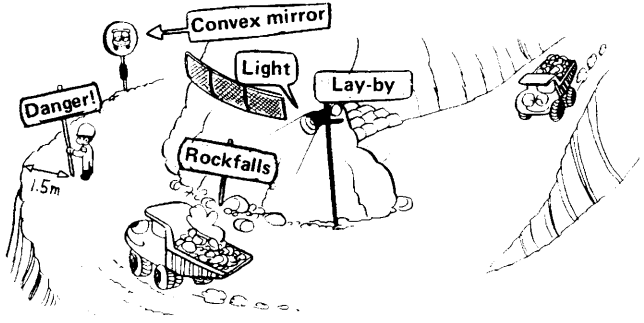
ARRANGEMENTS BEFORE STARTING OPERATIONS

PLANNING AND CONSTRUCTION OF HAUL ROADS

Maintenance of haul roads in the job site is of utmost importance, not only for safety but also for reduction of cycle time.

- As far as possible, roads should be for one-way traffic.
- Where it is impossible to make one-way roads, the road should have ample width to allow trucks to pass each other easily.
- Where it is impossible to make the road wide enough, lay-bys should be constructed at frequent intervals.
- Roads must always be constructed to allow loaded trucks to pass on the inside (away from the edge).
- Place convex mirrors at blind curves or places with poor visibility.
- Place warning signs at least 1.5 meters in from soft road shoulders or from places where there is danger of subsidence.
- To allow night driving, it is important to install lighting or reflectors.
- Gradients should be kept to within about 10%. In case of brake failure, down-hill slopes should be provided with lay-bys.





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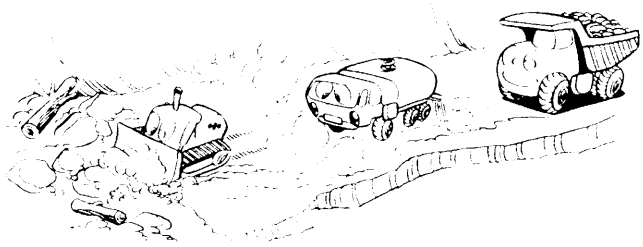
MAKE THE HAUL ROAD LEVEL

When hauling, always drive at a speed suited to the road conditions. For this reason, maintenance of the haul road is essential for both safety and improvement of efficiency. Especially after heavy rain, remember that conditions may have changed from those before the rain.

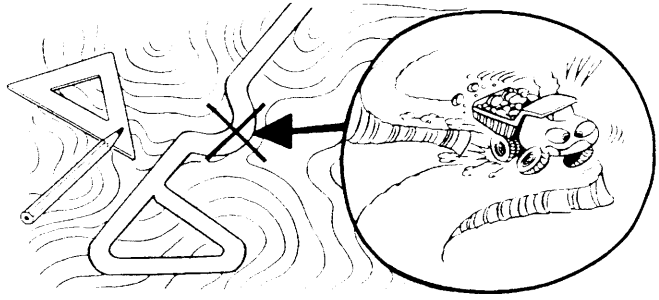
- Fill in holes, remove bumps, and correct any tilting of the road to one side. Strengthen the road and correct sagging shoulders. Remove rocks, trees or other obstacles.
- The best method is to use bulldozers or motor graders occasionally to maintain the haul road surface.
- Dust can reduce visibility, so it is important to use a sprinkler periodically to keep the dust down.



MAKE THE HAUL ROAD AS STRAIGHT AS POSSIBLE

For both safety and efficiency it is important to make as many straight stretches as possible. Especially in the central area where the truck is traveling at high speed, the radius of curves should be made as large as possible. Avoid tight S-bends as they are particularly dangerous. The radius of the curve should be at least 12 to 15 meters. When maintaining a winding haul road, pay attention to the following points:

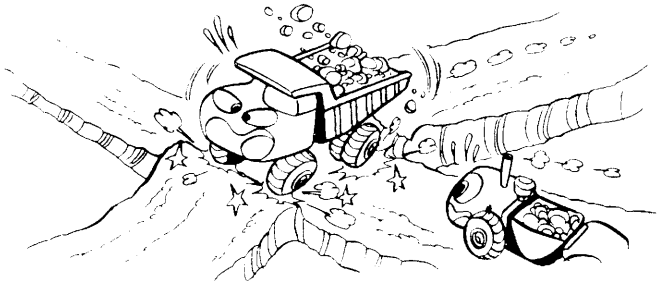
- Turning radius – large enough to have room to spare
- Road width – larger than for straight roads
- Outer edge – slightly higher than inside
- Outer shoulder – much stronger than for other roads.



CROSSROADS OR SLOPING ROADS ARE DANGEROUS

As far as possible, avoid having the haul road intersect another road. Particularly on slopes, if the roads intersect at an angle, a ramp is formed, and at high speed, this causes heavy rolling which is dangerous.

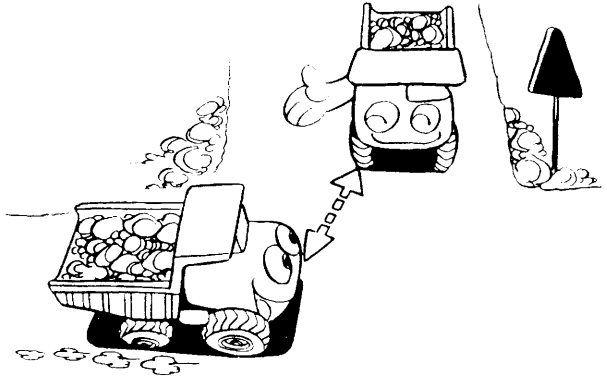
Also, when a truck is driven across an unlevelled slope, there is danger of the truck tilting and overturning. Therefore cut out a level haul road across the slope.



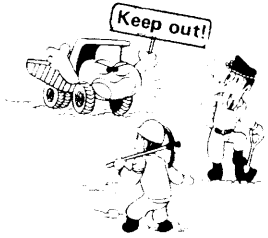
OPERATION

DURING OPERATION

- Proceed with the operation steadily step by step. Always aim at unhurried and harmonious safe operation. Dazzling high speed operation may look efficient, but it does not continue for long. It causes breakdowns, in addition to being dangerous, and in the long run is not effective.
- When stopping at crossing, to avoid collisions with other vehicles, keep your distance and confirm who has priority.

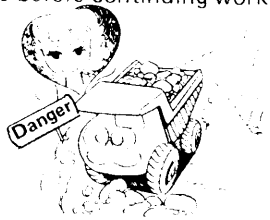


- If there is no one giving instructions during operations, there is danger of being hit by dump trucks. In such places, all persons not concerned with the operation should be kept out of the operating area.



- When driving, sit in the operator's seat correctly so that the truck can be operated properly.
  During while not sitting in the operator's seat, or driving while standing are dangerous.

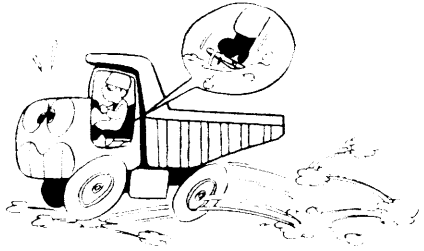
- Always concentrate. It is extremely dangerous to allow yourself to be distracted or to think of other things when operating a machine. Always pay attention to your driving, and to your surroundings. In dangerous places, or where there is restricted visibility, it is important to get down from the machine and confirm whether it is safe before continuing work.



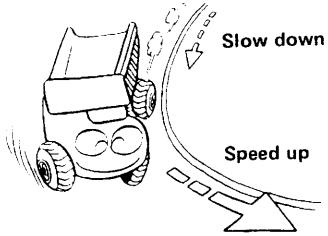
- Never drive off the road, or in places which you consider dangerous or outside the range of your skill.

- The machine should always be operated at a speed where it can be correctly controlled. The following are dangerous:
  - ★ **Speeding**
  - ★ **Snaking**
  - ★ **Coasting**

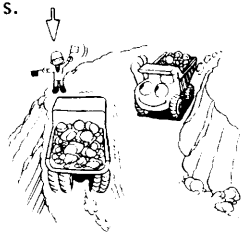
- As far as possible sudden stopping or sudden starting should be avoided except in emergencies. Be careful to avoid repeated stamping on the brakes.



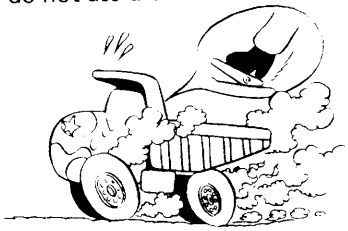
- Before entering curves, slow down. Increase speed when coming out of the curve. If you enter the curve without slowing down, or while braking, the rear wheels may go over the shoulder or the truck may skid. This is very dangerous.



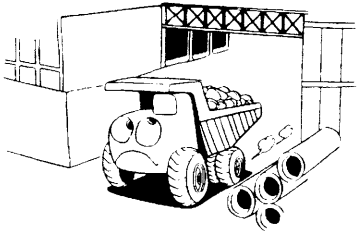
- When there is a danger of going over the edge on road shoulders, on slopes or when passing other vehicles, use a leader and follow his signals.



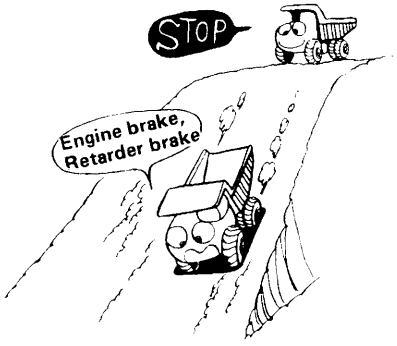
- If you attempt to control the speed of your truck by pressing lightly on the brake pedal, this may cause breakdowns coming from overheating of the brakes (fading or separation of the lining). This can be the cause of unexpected accidents, so do not use the brakes in this way.



- Where visibility is bad, such as at corners, or when entering or leaving a narrow road, slow down and sound the horn.



- **Travelling downhill**
  Never overrun the engine. Before starting to descend downhill slopes, stop and check that the brakes are working. It is dangerous to use only the brake pedal to control speed on a long downhill slope. In such a case see the Operation & Maintenance Manual for instructions on how to use the retarder. Then, descend the hill using the engine and retarder to brake the machine.

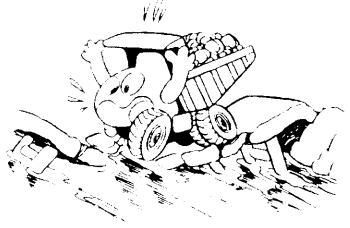


- Take care not to overload the dump body. Overloading not only shortens the service life of the truck, but also overheats the tires, causing them to burst.

- When the dump truck is loaded with soil, its center of gravity is higher than when unloaded. It therefore is easily affected by the road surface. Failure to remember this can be the cause of overturning or other accidents.

- When driving through puddles, water may get into the wheel brakes. Pay careful attention to this point as it drastically lowers the efficiency of the brakes. In such a case, before driving on, apply the brakes to heat up the brake lining to some extent and this will dry them out.

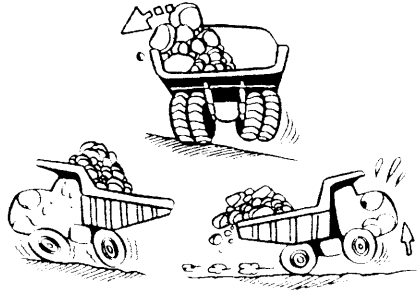
- Before crossing bridges, confirm that the bridge is strong enough to take the weight of the dump truck.



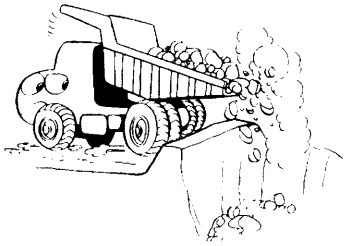
- **Loading**

  Be sure to load the dump truck evenly. If the weight is greater on one side, there is danger of losing control of the steering wheel or overturning.

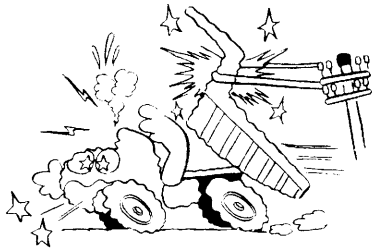
  If the load is too far forward, the steering becomes heavy. If it is too far back, the front wheels tend to leave the ground when going uphill.



- When backing to dump a load, be careful not to back too far. Place blocks or build a small ridge to stop the wheels at the dumping point.



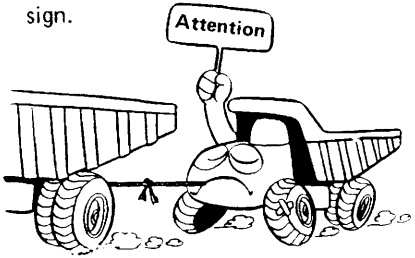
- Never drive with the dump body raised. Always lower the body before moving.



- When continuing operations after rain, remember that conditions may have changed from those before the rain, so proceed with caution. Be particularly careful when approaching the shoulder of the road or cliffs, as they may have been loosened by the rain.

- Always consider the weight of the machine when driving on roads in snow or rain, or on muddy or soft terrain. Be careful to avoid the tires slipping or sinking into the ground.

- When towing a broken-down machine, first check that the brakes are working properly, then connect the machine with a suitable tow-rope or cable. When towing on roads, always follow traffic regulations and attach a correct warning sign.



- After earthquakes, confirm that the ground is still firm; after blasting, confirm that there are no unexploded charges remaining.
  Follow signals or the leader's instructions.

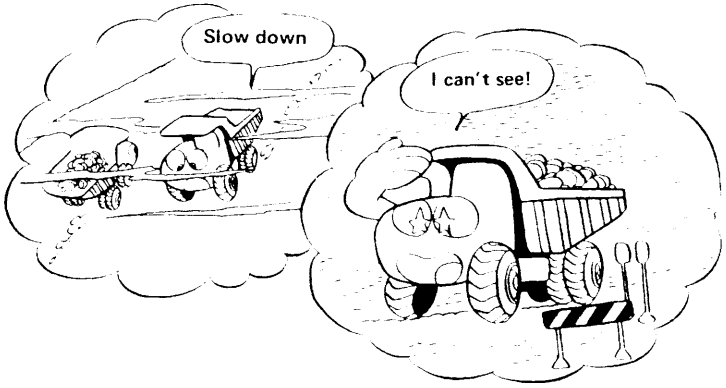
- When visibility is poor, keep a greater distance from the machine in front and drive at a lower speed. When visibility drops below safety level, stop work and wait for the visibility to improve.

This table shows the relation between visibility and travelling speed.

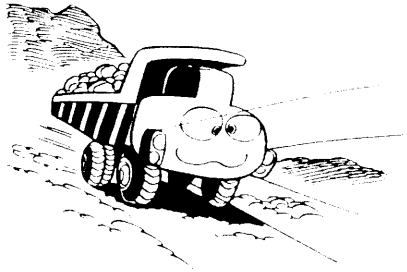
Forward visibility	Travelling speed (max.)
20m.	15km/h
40m.	30km/h
60m.	40km/h

★ Safe speed (km/h) ≒
Forward visibility (m) x 0.7

★ Use a sprinkler when necessary to keep the dust down and maintain good visibility.

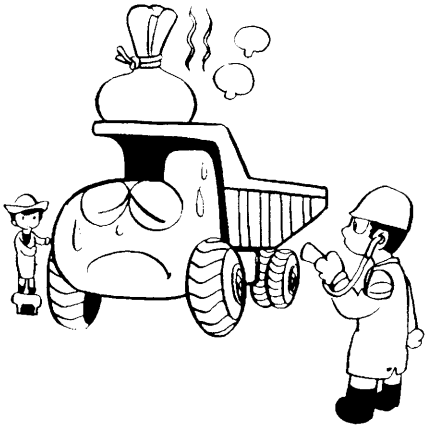


- Always use lights when driving at night or in tunnels, etc. Always dip your lights when meeting an oncoming vehicle.



★ At night it is very easy to make mistakes in estimating the distance and height of objects and land.
★ When driving in fog, mist or smoke, where visibility is poor, drive safely, following the precautions and instructions given in traffic regulations.

- The machine condition can be judged from many factors. Changes in the gauges, sound, vibration, exhaust gas color or response of the control levers can indicate the occurrence of some disorder. If any disorder occurs, park the machine immediately in a safe place and take appropriate action. Be especially careful in the case of fuel leaks as there is danger of fire.



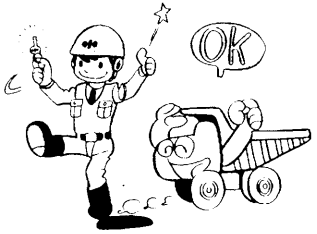
AFTER OPERATION

Stopping the machine

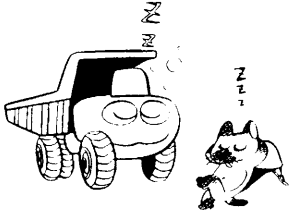
- Apply the brake lock.
- Return the gear shift lever to NEUTRAL.
- Never fail to lower the dump body.

Stopping the engine

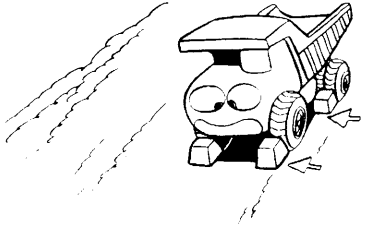
- Run the engine at low idling to cool the engine slowly. Then stop the engine.
- Remove the key from the starting switch.



- When parking the machine, park it in a safe place outside the working area, or in the specified place.
  The following factors should be considered when choosing a parking place: it should be on flat, firm ground where there is no danger of rockfalls, landslides or floods. If the machine has to be parked on the road, always follow traffic regulations.

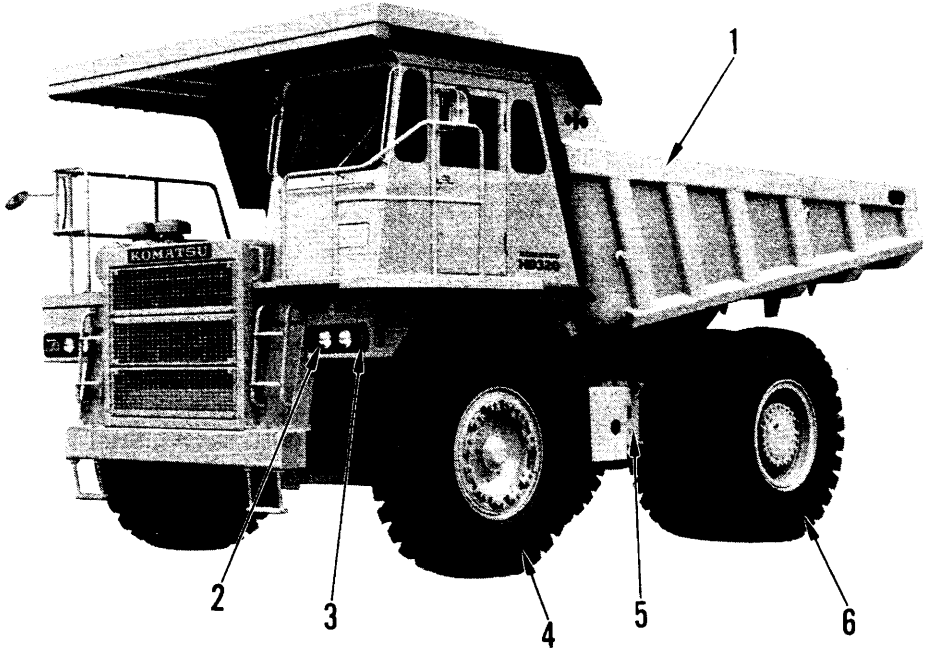


- When the machine has to be parked on a slope, chocks must always be placed under the wheels.



GENERAL LOCATIONS

HD320-3



1. Dump body
2. Head lamp
3. Side clearance lamp /Turn signal lamp

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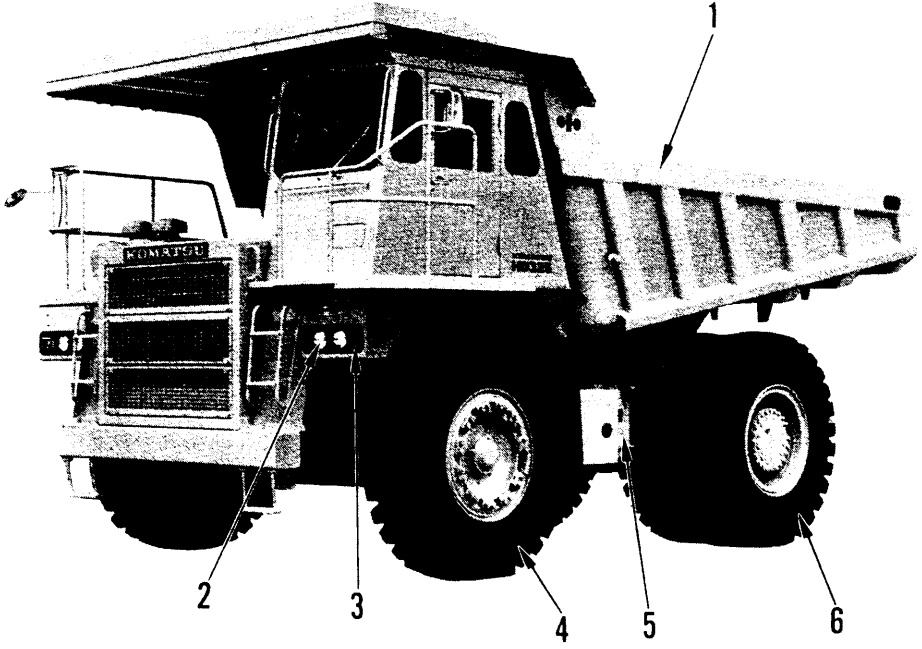
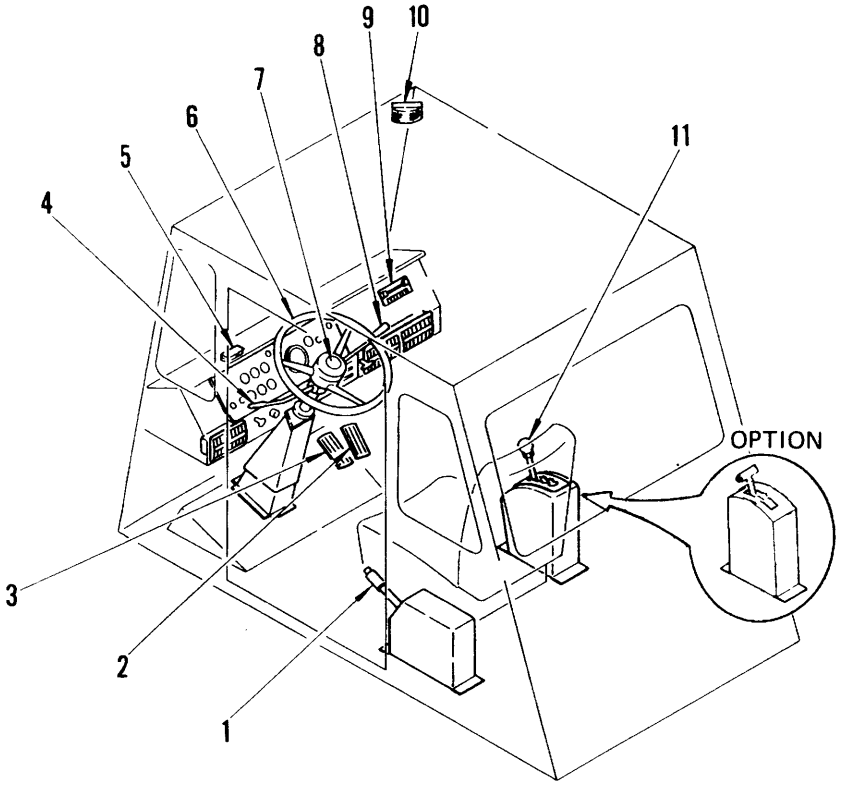


4. Front wheel
5. Hydraulic tank
6. Rear wheel

OPERATOR'S COMPARTMENT



1. Dump lever
2. Accelerator pedal
3. Brake pedal
4. Turn signal and dimmer switch
5. Ash tray
6. Steering wheel
7. Horn button
8. Retarder control lever
9. Radio
10. Central warning lamp (red)
11. Gear shift lever

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12. Wiper switch
13. Lamp switch
14. Service meter
15. Engine oil pressure gauge
16. Air pressure gauge
17. Pilot lamp for turn signal (Green)
18. Pilot lamp for head lamp (Blue)
19. Speedometer
20. Ammeter
21. Parking brake valve lever
22. Pilot lamp for lock-up
23. Pilot lamp for retarder (Orange)
24. Pilot lamp for coolant level (Red)
25. Pilot lamp for parking brake (Red)
26. Pilot lamp for transmission filter (Red)
27. Pilot lamp for hydraulic oil filter (Red)
28. Starting switch
29. Quick start knob
30. Car heater switch
31. Tachometer
32. Retarder oil temperature gauge
33. Engine water temperature gauge
34. Cigarette lighter
35. Torque converter oil temperature gauge

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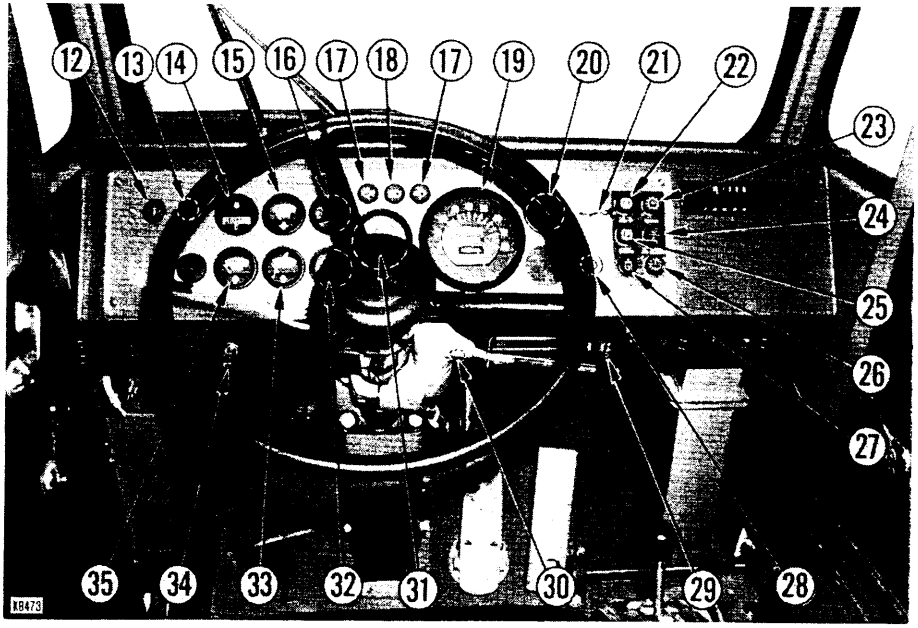

12. Emergency brake valve lever (Option)
13. Wiper switch
14. Lamp switch
15. Service meter
16. Engine oil pressure gauge

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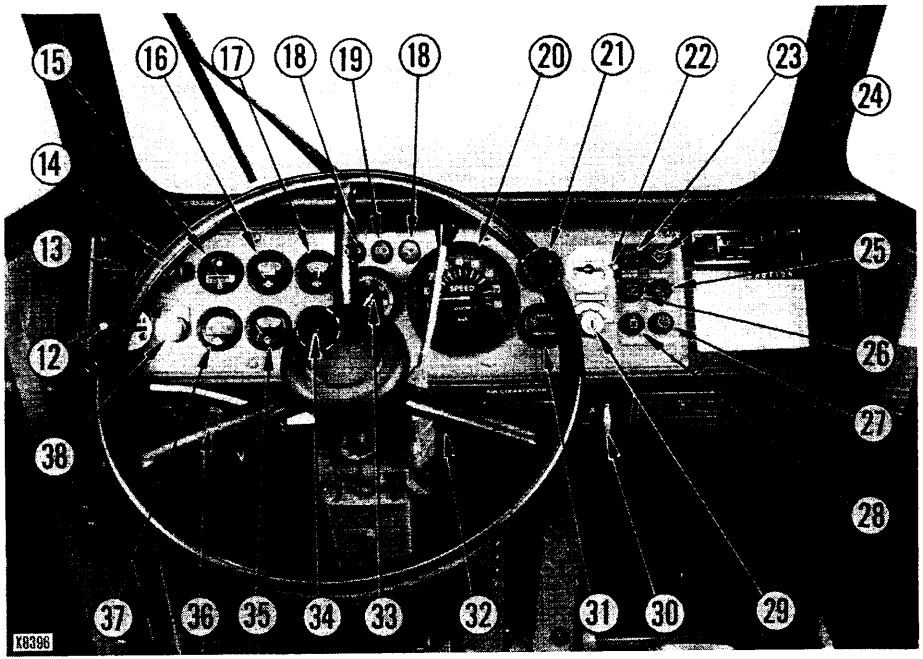
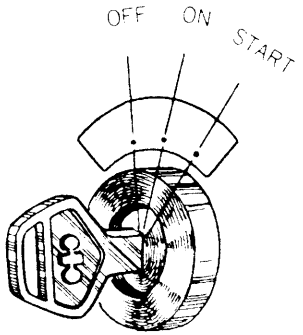


17. Air pressure gauge
18. Pilot lamp for turn signal (Green)
19. Pilot lamp for head lamp (Blue)
20. Speedometer
21. Ammeter
22. Parking brake valve lever
23. Pilot lamp for kick-down (Green)
24. Pilot lamp for retarder (Orange)
25. Pilot lamp for coolant level (Red)
26. Pilot lamp for parking brake (Red)
27. Pilot lamp for transmission filter (Red)
28. Pilot lamp for hydraulic oil filter (Red)
29. Starting switch
30. Quick start knob
31. Shift indicator
32. Air conditioner switch
33. Tachometer
34. Retarder oil temperature gauge
35. Engine water temperature gauge
36. Cigarette lighter
37. Torque converter oil temperature gauge
38. Emergency steering switch

INSTRUMENTS AND CONTROLS

STARTING SWITCH



OFF

Key can be inserted and pulled out at this position and the switches of all the electric systems are set to off and the engine is stopped.

ON

When this position (ON) is reached by rotating clockwise for one step, the charging circuit and the lamp circuit are electrified.

This position (ON) shall be held after the engine is started.

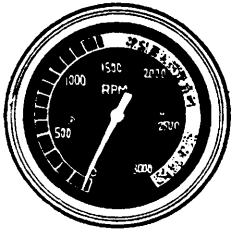
START

Starting motor starts revolution by rotating the switch clockwise further for one step. And the engine is started.

The key will be automatically restored to the position ON by releasing your hand.

★ Be sure to use the starting key to start the engine.

TACHOMETER



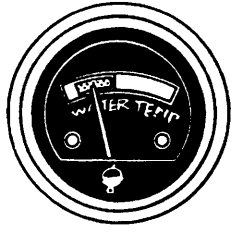
The tachometer indicates the engine speed in revolutions per minute. When the pointer enters the red range, it indicates that the engine is over running. The tachometer should not be allowed to enter the red range by braking the running speed.

When the engine speed reaches 2500 rpm, the retarder brake works automatically to reduce engine speed and slow down the machine. Do not use this function unless absolutely necessary.

ENGINE OIL PRESSURE GAUGE

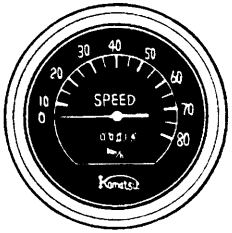
- Oil pressure is normal if the gauge pointer stays in the green range during engine running.
- Immediately after the engine starts, the pointer may deflect beyond the green range. In this case, extend the warm-up running of the engine until the pointer comes into the green range.

ENGINE WATER TEMPERATURE GAUGE



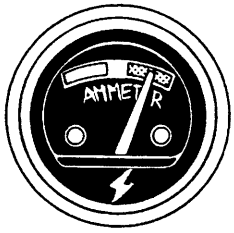
- Water temperature is normal if the pointer stays in the green range during running of the engine.
- After starting the engine, warm up the engine sufficiently until the pointer comes into green range.
- If the pointer deflects beyond the green range to red range during driving of the truck, reduce the engine speed to low-idling speed and maintain this until the pointer returns to green range.

SPEEDOMETER



The speedometer indicates the truck running speed in kilometer per hour. An odometer is built in the speedometer.

AMMETER



- Deflection of the pointer in green range indicates battery charging.
- Deflection of the pointer in red range indicates battery discharging.
- The battery charging circuit is normal, if the pointer shows the green range during engine operation.

TORQUE CONVERTER OIL TEMPERATURE GAUGE

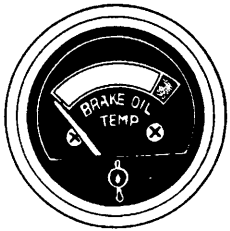
- When the pointer of the temperature gauge shows the green range, the oil temperature is normal.
- When the pointer enters the red range, stop the truck immediately, and then keep the gear shift lever at neutral position, and run the engine at 2000 rpm until the oil temperature drops to the normal value.

AIR PRESSURE GAUGE

- During operation, this should normally register in the green range.
- If the green range is not reached, the central warning lamp will light red and a buzzer will sound. When this happens, stop operation and keep the engine speed raised until the pointer enters the green range.
- If the air pressure falls further (to below 4.2 kg/cm^2), the parking brake will be automatically applied, when it will be more lower (2.2 kg/cm^2), the emergency brake will apply automatically. To release the brake, raise the air pressure.

★ Do not operate the machine before the parking brake is released.

RETARDER OIL TEMPERATURE GAUGE



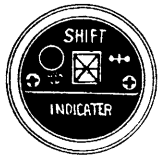
- During operation, the pointer should normally register in the green range.
- If the red range is reached, stop operation and keep the engine idling at 2,000 rpm with the gear shift lever in neutral until the oil temperature falls.

SERVICE METER

- Indicates the total machine operation hours. When the engine is running, a current flows to advance the meter reading even if the machine is not moving.

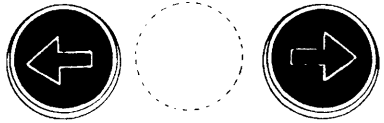
★ When the engine is running, the meter indicator turns to show that the meter is operating.

SHIFT INDICATOR (ON MACHINE WITH AUTOMATIC TRANSMISSION)



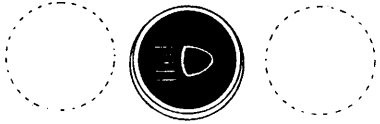
- Indicates what gear the transmission is in. When the lock-up clutch is applied, the lock-up lamp (green) in the meter lights up to show direct drive travel. The lamp on the lower right side indicates the operation of the speed sensor.

PILOT LAMP FOR TURN SIGNAL (GREEN)



- This pilot lamp flashes when the turn signal switch is operated.

PILOT LAMP FOR HEAD LAMP (BLUE)



- This pilot lamp comes on when the head lamp is on high beam.

PILOT LAMP FOR KICK-DOWN (GREEN)

This pilot lamp comes on when the machine is in kickdown.

This machine is provided with kick-down memory. When the accelerator pedal is depressed beyond the full level, the kickdown operates and this pilot lamp comes on. Because of the kickdown memory, the lamp stays on even after the pedal returns below the full level. The lamp will go off after the pedal returns much further.

PILOT LAMP FOR RETARDER (ORANGE)

This pilot lamp lights up when the retarder brake is on.

PILOT LAMP FOR PARKING BRAKE (RED)

This pilot lamp lights up when the parking brake is applied by operation of the parking brake valve lever.

COOLANT LEVEL WARNING LAMP (RED)

This lamp lights up to warn of an abnormal drop of the coolant level in the radiator.

When this lamp lights up, stop the engine, correct the problem, and add water.

HYDRAULIC OIL FILTER WARNING LAMP (RED)

This lamp lights up to warn of a clogged element in the hydraulic oil filter.

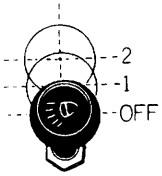
If this lamp lights (when the oil is warm in high idle), stop the engine. Replace the hydraulic oil filter element.

TRAMSMISSION FILTER WARNING LAMP (RED)

This lamp lights up when the torque converter or transmission filter elements are clogged.

If this lamp lights up (when the oil is warm in high idle), stop the engine. Replace the two transmission filter elements.

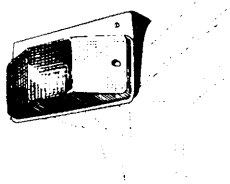
LAMP SWITCH



When the lamp switch is put in the "1" position, the side clearance lamp, instrument lamps and tail lamps are lighted.

In the "2" position, the head lamps are lighted, with the aforementioned lamps kept lighted.

CENTRAL WARNING LAMP (RED)



In case any abnormality occurs, this warning lamp lights and warning buzzer sounds. Then, immediately stop machine and check the causes.

i) **Air pressure is lower than the specified value;**
   Check the air leakage point.
   After the repair, wait for the rise of air pressure.

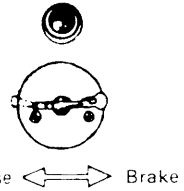
ii) **Retarder oil temperature exceeds the allowable limit;**
Stop machine and wait for the lowering of the temperature under idling the engine at 2,000 rpm.

iii) **Gear shift lever is placed in any speed range other than NEUTRAL position during parking brake is applied;**
Release parking brake.

iv) **Gear shift lever is placed in any speed range other than NEUTRAL and the dump lever in a position other than FLOAT;**
Shift the dump lever to the FLOAT position.

v) **When the coolant level in the radiator drops because of leakage or some other reason;**
Correct the trouble which caused the level drop and add water.

PARKING BRAKE VALVE LEVER



When the parking brake lever is put in the "BRAKE" position, parking brake will be applied to the wheels. Simultaneously, the parking lamp is lighted in red.

In case of gear shift lever is placed in any position other than NEUTRAL while parking brake is applied, central warning lamp lights and buzzer sounds.

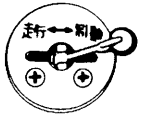
So, immediately release parking brake.

If the brake air pressure drops to 4.2 kg/cm^2 or less, the parking brake is automatically applied. For the releasing method of the emergency braking force, refer to the section RELEASING PROCEDURE OF PARKING BRAKE.

★ Unless in case of emergency, stop the machine completely before setting parking brake lever in BRAKE position.

⚠ **Apply parking brake whenever parking machine.**

EMERGENCY BRAKE VALVE LEVER (OPTION)



When this lever is placed in the brake position, the emergency brake is applied.

When it is placed in the travel position, the emergency brake is released to allow the machine to travel.

If the pressure in the main air reservoir drops below 2.2 kg/cm^2 because of air leakage or other compressor or air circuit trouble, the emergency relay valve operates the emergency brake to automatically stop the machine.

Cautions for Handling

Do not run the machine if the pressure of the main air reservoir drops below 2.2 kg/cm^2 to apply the emergency brake.

Traveling with a locked brake will burn up the lining.

★ The central warning lamp lights up and the warning buzzer sounds while the emergency brake is applied.

★ If some trouble in the air system causes the emergency brake to be applied, see the section "Emergency Brake".

EMERGENCY STEERING SWITCH (OPTION)

The emergency steering system provides temporary electrical steering when ordinary steering becomes impossible because the engine is stopped or because there is a fault in the steering pump.

The emergency steering system becomes operable when the emergency steering switch on the instrument panel is pressed.

Placing the switch in ON starts the electric pump with the current from the battery, and thereby makes steering possible.

Cautions for Operation

1. Do not use continuously for more than 3 minutes. (It is not designed for continuous operation.)
2. The travel speed shall be 5 km/h or less.
3. Turn off the switch immediately after stopping the machine.

★ Although the emergency steering system is used only in an emergency, inspect the system every day so that it is always ready for operation.

When the emergency steering system is in operation, the loaded body can be raised by dump control.

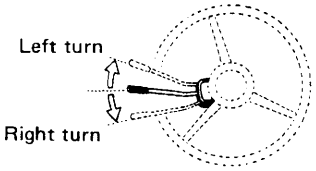
This function can also be used to look for the cause of failure.

Inspection Method

Place the switch in ON when the machine is not loaded, and make sure that the steering wheel can be operated for 20 seconds (with the engine stopped).

! Do not use emergency steering continuously for more than 3 minutes.

TURN SIGNAL SWITCH



The turn signal switch lever, which is also used as the dimmer switch lever, is used when the truck changes its travelling direction.

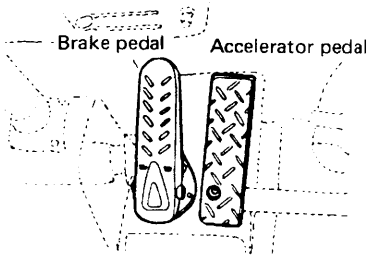
When turning to the left, the switch lever is moved toward the operator. When turning to the right, the handle is moved forward. With the aforementioned operation, the respective turn signal lamp starts to blink. Simultaneously, the signal pilot lamp on the instrument panel starts to blink.

DIMMER SWITCH

The dimmer switch lever is also used as the turn signal switch lever. The purpose of this switch is to change the head lamp beams to upper and lower. When the switch lever is lifted upward, the head lights are changed to upper beams. When the lever is pushed downward, the head lights are changed to lower beams.

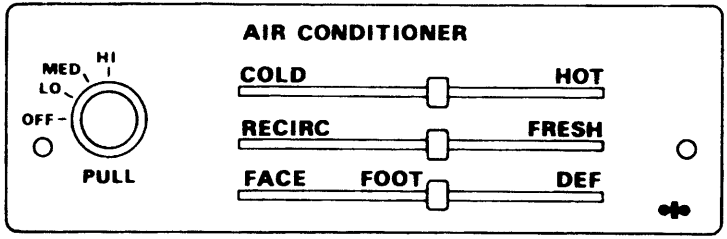
When the head lamp is switched to high beam, the pilot lamp for the head lamp lights up.

BRAKE AND ACCELERATOR PEDALS



Pedals are the accelerator, brake pedals from right to left.

AIR CONDITIONER SWITCH LEVERS (OPTION)



The flow rate of the fan air can be changed by turning the switch.

OFF: Off
LO: Low
MED: Medium
HI: High

Pulling the switch operates the air conditioner.

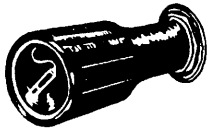
The lever has the following adjustments:

Top lever:
Adjusts temperature of blown air
COLD – low temperature
HOT – high temperature

Middle lever:
Adjusts method of air intake
RECIRC – recirculates interior air
FRESH – introduces fresh open air

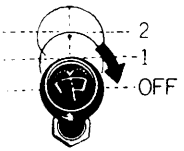
Bottom lever:
Adjusts direction of blown air
FACE – face
FOOT – foot
DEF – defrosts the glass

CIGARETTE LIGHTER



Depress the knob and wait for several seconds until it is returned automatically to its original position. Then the lighter is ready to use.

WINDSHIELD WIPER AND WASHER SWITCHES

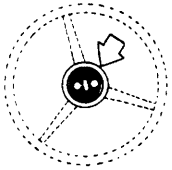


The windshield wiper starts to operate at low speed, when the switch is put in the "1" position.

The wiper moves quickly when the switch is moved to the "2" position.

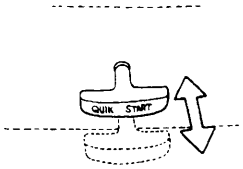
When the switch is turned clockwise until it stops, the switch changes its function to the windshield washer switch and causes solvent to be sprayed on the front wind shield.

HORN BUTTON



Depress the center of the steering wheel to actuate the horn.

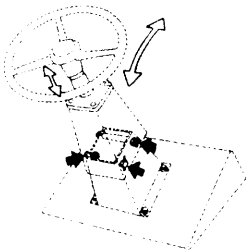
QUICK-START KNOB



When starting the engine in cold weather, pull the knob out to spray ether in the intake manifold.

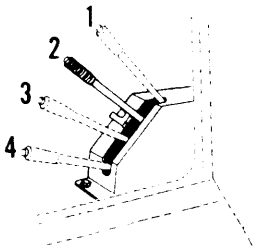
★ The knob is provided for only the cold-weather starting of the engine. (Refer to section STARTING ENGINE IN COLD WEATHER.)

TILT HANDLE



By loosening 3 bolts, the steering wheel can be moved in the direction of the arrow. Fix the steering wheel firmly at the best position for operation.

DUMP LEVER



The dump lever is provided to shift the dump body position.
Lever position:

1. RAISE
2. HOLD
   The dump body is kept held where it is.
3. LOWER
4. FLOAT

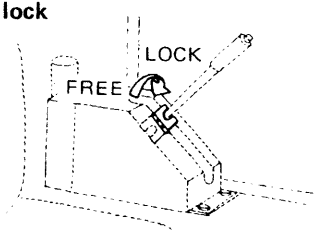
★ Push the button at the tip end of the lever to move the dump lever from the float position.

★ See the section on DUMP BODY OPERATION for details.

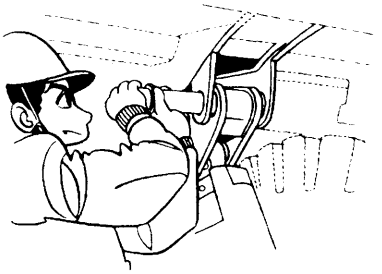
⚠ **Lever should be set in FLOAT position whenever driving.**

⚠ **When checking machine with dump body kept raised, always lock the dump lever at HOLD position with safety pin.**

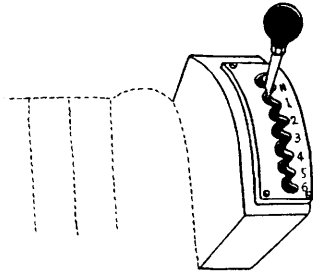
Safety lock



Safety pin



GEAR SHIFT LEVER (MANUAL)



The lever allows the operator most optimum selection of the six forward and one reverse speeds. The lever is also provided with a lock-up button switch. Place the lever in the NEUTRAL position before turning the starting switch key to START. The starting motor will not rotate as long as the lever is left in any speed position.

★ When parking the truck on a slope, the parking brake should be applied, since the engine cannot be utilized as a brake. This is due to the fact that the engine is not connected directly to the propeller shaft, no matter which position the gear shift lever is in.

★ Apply the parking brake for locking the wheels without fail.

AUTO-LOCK-UP SYSTEM

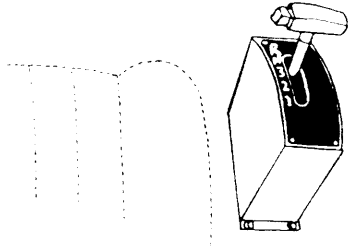
The revolutions of the transmission input shaft are detected electrically, and the torque converter lock-up clutch works automatically to enable efficient direct drive at 1500 rpm or more. The lock-up lamp lights up when the lock-up clutch operates.

When the speed drops below 1100 rpm, the torque converter lock-up clutch disconnects automatically to enable the torque converter to function, and the lock-up lamp goes off.

If the gear shift lever is placed at a position other than N with the parking brake locked, the central warning lamp lights up and the alarm buzzer sounds.

Placing the gear shift lever at a position other than N with the dump lever at a position other than float lights up the central warning lamp and sounds the alarm buzzer.

AUTOMATIC GEAR SHIFT LEVER (OPTION)



This lever shifts the transmission according to traveling conditions.

Position 3:

For ordinary traveling. The torque converter will automatically adjust the traveling speed, shifting gears from second speed to sixth as necessary. The maximum traveling speed is 65 km/h at this setting.

Position 2:

Select this position when road conditions are not suitable for high-speed traveling.

The torque converter will automatically adjust the traveling speed shifting gears between second speed and fourth. The maximum traveling speed is 30 km/h at this position.

Position 1:

Select this position to travel on soft ground or start up a slope with load. The torque converter selects the first-speed range; the maximum traveling speed is 9 km/h.

Position R:

Set the lever at this position to back up the truck. The torque converter intervenes to adjust the power flow.

Position N:

This is neutral. When starting the engine, be sure to shift the lever to this position.

★ Stop the truck completely before reversing the direction of travel.

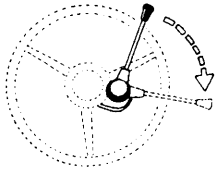
If the engine is started with this lever at a position other than N, the gear position can not be shifted unless the lever is once returned to N.

If the gear shift lever is placed at a position other than N with the parking brake locked, the central warning lamp lights up and the alarm buzzer sounds.

Placing the gear shift lever at a position other than N with the dump lever at a position other than float lights up the central warning lamp and sounds the alarm buzzer.

★ If the gear shift lever should be moved back to N by mistake while the truck is traveling, stop the truck and move the lever to the desired speed position. Then, start the truck again. Otherwise, the truck might overrun.

RETARDER CONTROL LEVER



When the retarder control lever is pulled toward the operator, an oil cooled multi-disc type brake, also used as a rear brake, is applied and retarder pilot lamp turns on. The amount of braking force is proportional to the amount of lever movement toward the operator. The braking force will be released and retarder pilot lamp turns off when the lever is pushed forward.

The braking ability of a retarder brake can be checked simply in the following manner.

On flat ground, pull the retarder control lever all the way toward the operator and place the gear shift lever in F2 position. Then, increase the engine revolutions little by little up to 1150 rpm. If the truck does not start off even at 1150 rpm (by stall), the retarder brake performance can be rated as satisfactory.

When the retarder oil temperature rises and its gauge indicator enters red range so that warning lamp lights (an alarm buzzer also sounds), slow down or stop the truck.

Then keep the gear shift lever at neutral position and run the engine at 2000 rpm until the gauge indicator returns to the green range.

⚠ **Do not use retarder as for parking brake.**

DUST INDICATOR

This device indicates clogging of air cleaner element. When red piston appears in the transparent part of this indicator, element is clogged.
Immediately clean element. After cleaning, push indicator button to return red piston to original position.

OPERATOR'S SEAT

Set operator's seat as follows for maximum comfort.

Backward-and-Forward Adjustment

Set the seat in the desired position by moving lever (1) to right, then release the lever.

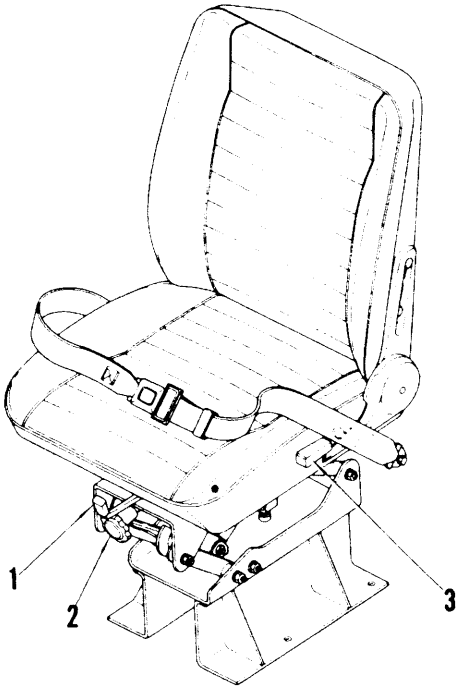
The seat can be adjusted forward or backward 140 mm in 8 steps.

Seat Up and Down Adjustment

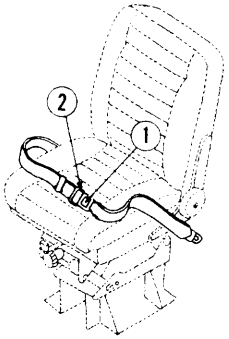
Turn knob (2). Match operator's weight to the scale (50 to 100 kg) for optimum seat adjustment.

Reclining Adjustment

Move lever (3) upward, set the back of the seat at the desired position, and release the lever. The seat can be adjusted backward at 32 positions in a range of 62°, and forward at a single position at a 62° angle. A pocket is provided on the rear side of the back of the seat.

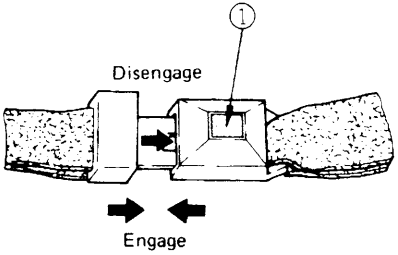


SAFETY BELT (how to use it)



⚠ **Before using seat belt, make sure that no unusual conditions are observed in the belt fittings and the belt itself.**

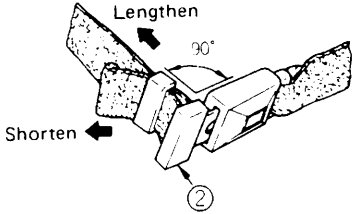
1. Sit in the seat and adjust the seat so that the operator's back could come into close contact with the back rest with the parking brake valve lever kept on.
2. Make sure that the belt is not kinked at all and engage the buckle and the mating plate positively with each other until they give a clicking sound.



3. How to disengage the buckle and the mating plate
   Depress button (1) in the buckle, and the buckle and the mating plate will disengage.

The belt length can be adjusted in the following manner.

1. Shortening the belt
   Pull the free end of the buckle body or of the mating plate.



2. Lengthening the belt
   Pull the belt on the fixed side of the buckle (2) or on the mating plate holding the belt at right angles the buckle or the mating plate.

⚠ **To avoid accidents do not put on the belt while the truck is running.**

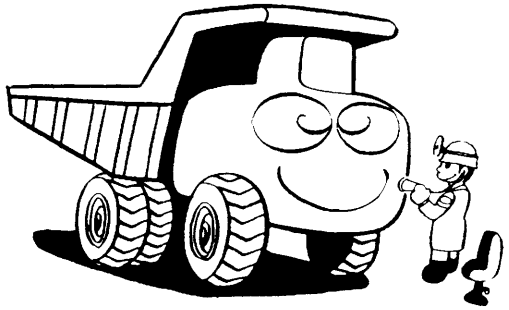
★ Check bolts on attachment hardware or fittings secured to the chassis for looseness. Retighten bolts, if necessary.

★ If the outer surface of the seat belt is marred or nappy or if the hardware is damaged or deformed, replace the belt immediately.

CHECK BEFORE STARTING

The check before starting shall never be neglected as troubles are prevented beforehand by the check.

a. Walk around machine body and check whether there is any trace of leakage of oil or water. In particular, joint of high pressure hose, hydraulic cylinder, joint of air hose, radiator, and a air tank should be paid special attention.
   In case leakage is found, inspect the leaking location and stop the leakage. When leakage is not stopped, you are begged to request repair to Komatsu distributor.
b. Inspect tightening of nuts and bolts on every section. When loosened ones are found, apply increased tightening. In particular, attachment positions of air cleaner, muffler, turbocharger, engine, transmission, leaf spring, hub nut, and propeller shaft should be paid special attention.
c. Inspect disconnection and shortcircuit of electric wirings, and loosened terminal connections should be paid special attention.

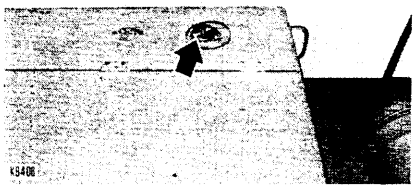


d. CHECK COOLING WATER LEVEL

Park machine on flat ground, remove cap and confirm that radiator is filled with cooling water up to the prescribed level. If insufficient, refill water.

★ After replenishing the radiator, run the engine at low-idling for 4 or 5 minutes. Then, check the water level again.

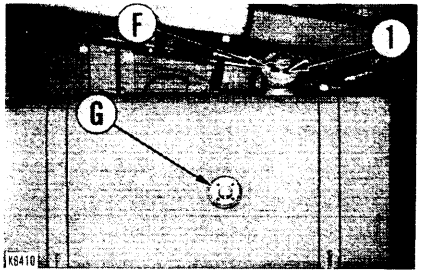
⚠ **When the water temperature is high, turn the cap slowly to release the inside pressure before removing it.**



e. CHECK FUEL LEVEL

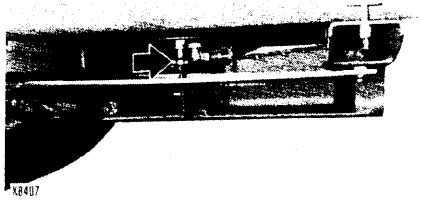
Check fuel level with fuel gauge or sight gauge (G). At the end of a day's job, be sure to refill fuel from filler (F) so that fuel tank will be filled.

A clogged fuel tank cap breather (1) may lead to interruption of fuel feeding. It is recommended to clean it periodically.



f. DRAIN WATER AND SEDIMENT FROM FUEL TANK

Open drain valves of fuel tank to drain accumulated water and sediment.



g. CHECK AND CORRECT OIL LEVEL IN ENGINE OIL PAN

HD320

Check oil level with dipstick (G) and, if necessary, refill oil through oil filler (F).

★ Above 0°C: Use engine oil CLASS-CD SAE30.
Below 10°C: Use engine oil CLASS-CD SAE10W.

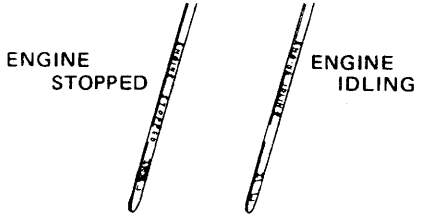
When checking oil level, STOP ENGINE. If it is necessary to check oil level during low-idling of engine, the following precautions should be observed strictly:

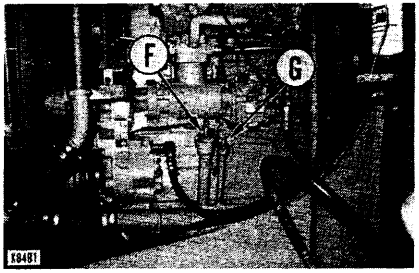
i) Check that both engine oil pressure and water temperature gauge indicators are in green range.
ii) Remove oil filler cap.
iii) Read oil level gauge on the surface marked "ENGINE IDLING".

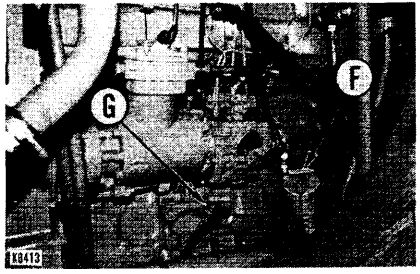
HD325

Use dipstick (G) to check the oil level. If necessary, add oil from oil filler (F).

★ Above 0°C: Use engine oil CLASS-CD SAE30.
Below 10°C: Use engine oil CLASS-CD SAE10W.







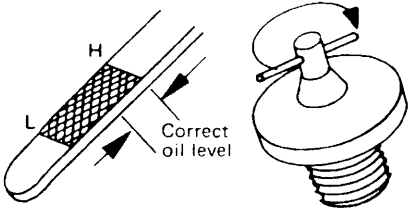
★ Stop the engine and wait at least 15 minutes to check the oil level.
★ After checking the oil level, securely tighten the handles of the caps (F) and (G).

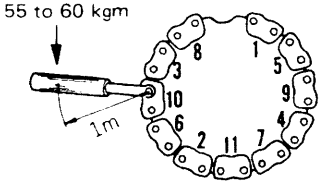
h. CHECK AND RETIGHTEN HUB NUTS

Check hub nuts for looseness. Retighten loose hub nuts in a criss-cross as shown below. Tighten three or four times to the specified torque 55 to 60 kgm.

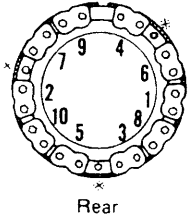
Tighten carrier mounting bolts (3 points with ⁘ marks) by 55 to 60kgm in case of rear wheels after hub nuts are tightened.

★ In case of disassembly or assembly such as replacing tires, drive machine about five kilometers after hub nuts are tightened and retighten them when their contacting parts get to contact well. Since particularly rear wheels have more contacting parts than front wheels and contacts get hardly smooth, repeat retightening for about 50 hours after tires are installed.





Tightening order



i. CHECK OIL LEVEL IN TRANSMISSION CASE

(for torque converter, transmission and brake cooling)

Check oil level at static condition before starting the engine.

Check the oil level before starting the engine. Check oil gauge (G). If oil is low, open the cover and add engine oil through oil filler (F).

★ Above 0°C: Use engine oil CLASS-CD SAE30.
Below 10°C: Use engine oil CLASS-CD SAE10W.

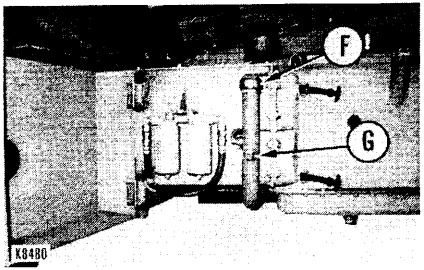
To inspect the oil gauge after the engine has been running, stop the engine and wait for 15 minutes.

j. DRAIN WATER FROM AIR RESERVOIR

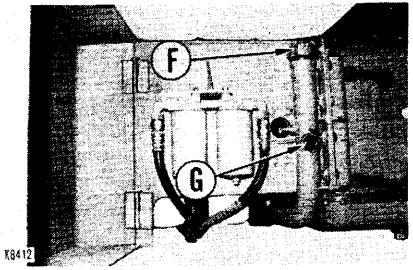
Open the drain valves shown by arrow marks, and drain water from the air reservoir.

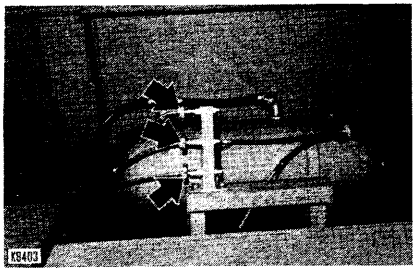
★ Water mixed in the air reservoir may freeze in cold regions. To prevent this, the water should be completely drained immediately after the daily operation while the air reservoir is still hot. To prevent the air system from freezing, an alcohol injector can be provided on the air system by option.

HD320



HD325





k. CHECK OIL LEVEL IN HYDRAULIC TANK

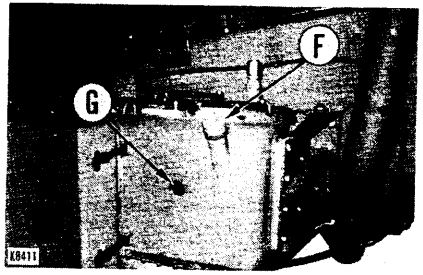
Confirm that the dump body is lowred in place.

Check the oil level before starting the engine. Check oil gauge (G). If oil is low, add engine oil through oil filier (F).

★ If the oil level is seen through the gauge, the tank is filled property.

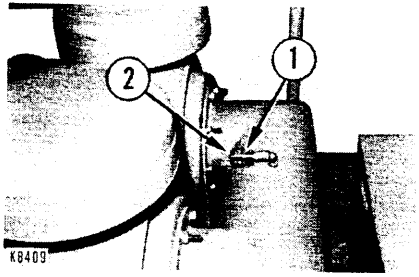
★ Use CLASS-CD SAE10W engine oil for all seasons.

⚠ **When removing cap, turn it slowly to relieve the internal pressure.**



l. CHECK DUST INDICATOR

When the air cleaner elements are clogged, the red-colored pistons of the dust indicators (1) reach the service level and are locked automatically. To prevent clogging, the elements should be cleaned as often. For the cleaning method of the elements, refer to the section WHEN REQUIRED.



Upon completion of cleaning the elements, depress the button (2) and return the red pistons to the original position.

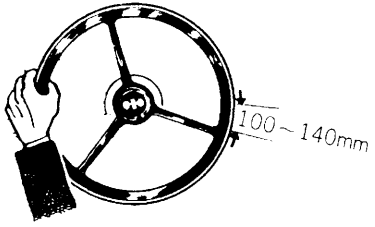
m. CHECK TIRES FOR PROPER AIR PRESSURE AND DAMAGE

Check for air pressure before daily operation while the tires are still cold. At the same time, carefully check the tires for slight wounds and abrasion, nails or metalic fragments which are possible to be the cause of a puncture.

Standard air pressure
(tire 18.00-25-32): 5.75 kg/cm^2
(tire 18.00-33-28): 5.0 kg/cm^2
(tire 18.00-33-32): 5.75 kg/cm^2

n. CHECK STEERING WHEEL FOR PROPER PLAY

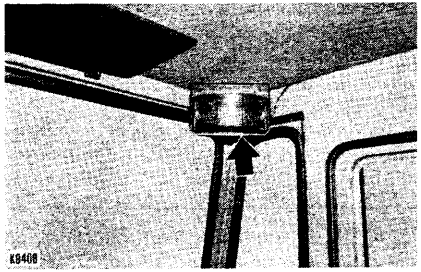
The standard is 100 to 140mm when engine is stopped. If not, refer to the section ADJUSTMENT.



o. CHECK CENTRAL WARNING LAMP

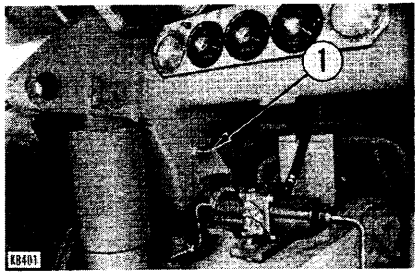
Perform following checks to find the mal-function of buzzer or bulb.

- Stop engine, place starting switch and parking brake valve lever in ON, and gear shift lever in any position other than NEUTRAL.
  If the lamp lights, it is normal.
- Place starting switch key in ON when air pressure is below the specified value.
  If the lamp lights and the buzzer sounds, they are normal.



p. DRAIN WATER FROM EMERGENCY BRAKE TANK (OPTION)

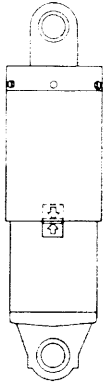
Open the drain valve (1) of the emergency brake tank and drain the water in the tank.



q. CHECK SUSPENSION CYLINDER LENGTH

See if the bottom end of the suspension cover is within the proper range on the label when the machine is on level ground without load.

This also applies to the front suspension cylinder. If out of the proper range, adjust the length according to the procedure in the shop manual.



CHECK THE FOLLOWING AFTER STARTING ENGINE:

r. CHECK FOR EMERGENCY STEERING (OPTION)

Turn on the emergency steering switch and see if the steering wheel can be operated for 20 seconds. Carry out this inspection at rest condition of the engine.

s. ARE REAR VIEW MIRRORS AND UNDER MIRROR INSTALLED AT A CORRECT ANGLE?

See if the directions of the rear-view mirror and under-view mirror are proper. If necessary, adjust them.

t. IS FOOT BRAKE APPLIED EFFECTIVELY?

Refer to the section ADJUSTMENT for repair.

u. IS RETRADER CONTROL LEVER APPLIED EFFECTIVELY?

v. IS PARKING BRAKE APPLIED EFFECTIVELY?

w. IS STEERING FUNCTION NORMAL?

Refer to "ADJUSTMENT" for the adjustment.

x. ARE HORN, TURN SIGNAL LAMPS AND OTHER LAMPS OPERATING CORRECTLY?

y. ARE INSTRUMENTS AND GAUGES OPERATING PROPERLY?

z. ARE EXHAUST EMISSION AND NOISE NORMAL?

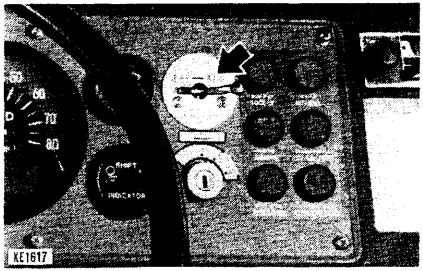
OPERATING YOUR MACHINE

ENGINE OPERATION

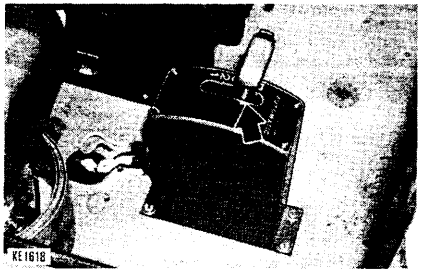
BEFORE STARTING ENGINE

Perform pre-operation checks referring to the section "CHECK BEFORE STARTING".

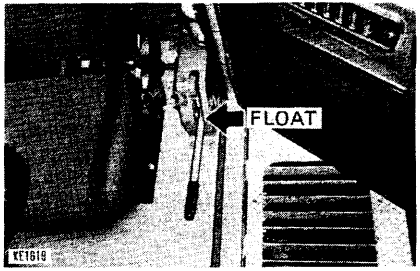
1. Parking brake valve lever should be placed in "BRAKE" position.



2. Gear shift lever should be put in "NEUTRAL" position.

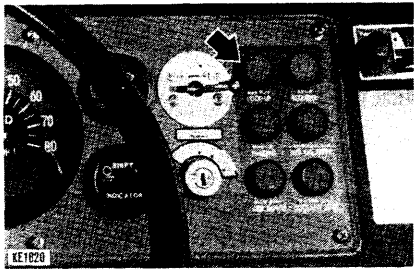


3. Dump lever should be put in "FLOAT" position.

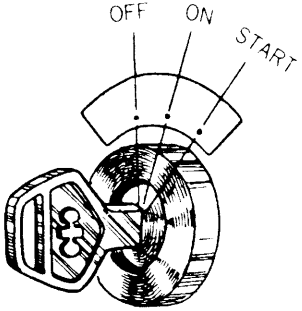


- **Automatic:**
  As long as gear shift lever is left in any speed position other than "NEUTRAL", you can not start machine traveling but engine will start. So once return gear shift lever to "NEUTRAL" position and then shift it to desired position.
- **Manual:**
  When the shift lever is in any speed position other than "NEUTRAL", the engine will not start.

4. Turn starting switch key to ON position and confirm that lock-up lamp if off (torque converter drive range).



STARTING THE ENGINE



1. Insert starting switch key, turn it to START, and engine starts.
2. Release switch key, and it returns to ON automatically. Keep key in this position.

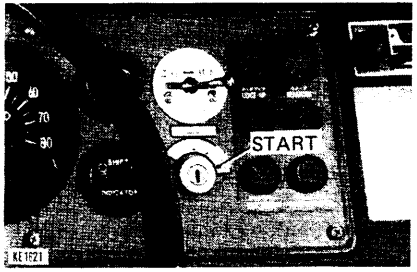
★ When starting, run engine and confirm the deflection of oil pressure gauge pointer.

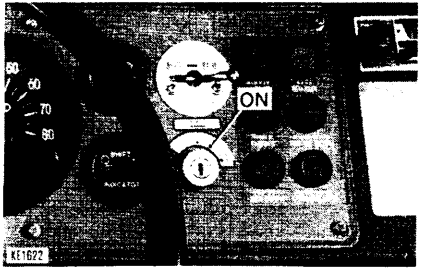
★ To protect starting motor and battery from damage,
- Do not keep the starting switch key at START for more than 20 seconds, and
- When engine fails to start, leave a two-minute interval before attempting to start engine again.

★ Using wrong fuel (cetane number, etc.) may cause difficulties with starting even at normal temperatures. If such cases, follow procedure for COLD WEATHER OPERATION.

★ When starting switch is turned to ON or START position, central warning lamp lights to indicate warning system works normally.

★ To start engine in cold weather, refer to the section "COLD WEATHER OPERATION".





CHECK AFTER ENGINE STARTS

After engine starts, do not attempt to operate truck immediately, but be careful to observe the followings:

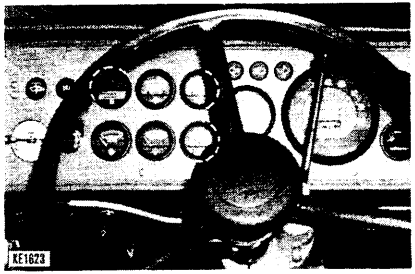
1. Keep engine running at an low-idling speed until engine oil pressure gauge indicator enters green range, indicating the sufficient circulation of lubricating oil around various engine parts.
2. Keep engine running at medium speed under no load for approx. 5 minutes.
3. Keep engine running under light load until water temperature gauge pointer enters green range, do not attempt to operate the truck immediately. The pointer of the air pressure gauge indicates in green range, and central warning lamp and buzzer turn off.

- This is called warm-up run.
  (For HD325)
  Immediately after starting a cold engine, oil pressure gauge indicator may swing beyond green range. In this case, wait for indicator to come back down into green range and then continue warm-up running.

★ Do not accelerate rapidly during warm-up run.

★ If it is necessary to continue warm-up run for more than 20 minutes, for the pointer of the engine temperature gauge swings into green range, run the engine occasionally with medium speed. In case atmospheric temperature is below 10°C, attach radiator curtain (optional part).

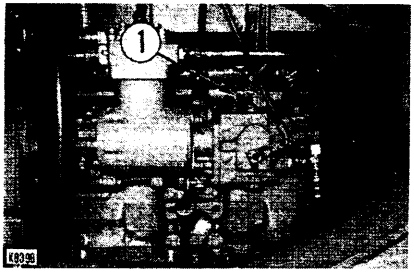
4. Once engine has been heated up to the operating temperature, check the gauges (oil pressure gauge, water temperature gauge, air pressure gauge, and ammeter).



5. Check exhaust color, any strange noise or vibration.
6. Check leakage of lubricanting oil, coolant or fuel.

SPECIAL STARTS

- **Starting when the shut-off valve's electrical circuit is defective:**
  Screw in knob (1) of the shut-off valve to open the valve and start the engine.
  When the engine is started in this manner, loosen and remove knob (1) to stop it.



- **Restarting after the starting switch has been turned off:**
  If the starting switch has been accidently turned off, follow the starting procedure after the engine has come to a complete stop, otherwise it will not restart.

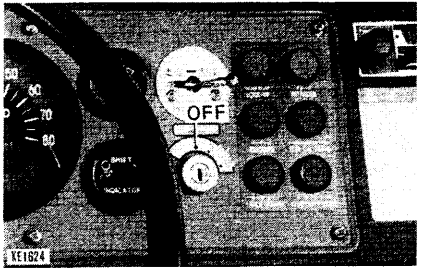
- **Starting after fuel has been refilled:**
  After refueling, remove the fuel filter cartridge and fill it with fuel.
  ★ When engine stalls, restart the engine after a 10 to 20 seconds interval. Then, the engine will be started up easily.

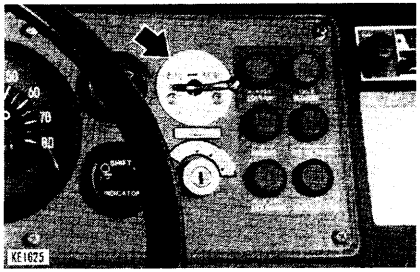
STOPPING ENGINE

Keep engine idling at low-idling speed for 5 to 10 minutes to cool down the hot engine gradually. Then, stop engine by turning starting switch key to OFF.

★ If a hot engine should be stopped without necessary lapse of time for cooling, various parts in engine may be considerably shortened for their life. Abrupt stop of engine, therefore, should be avoided unless in the case of emergency stop.

★ Be sure to apply parking brake when leaving machine.

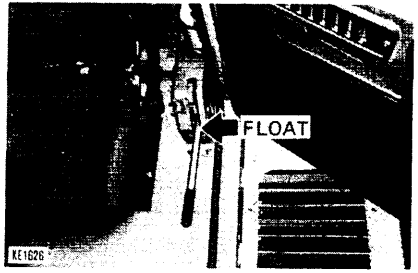




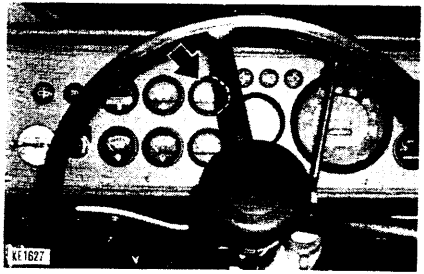
STARTING TRUCK

1. Fasten the seat belt.

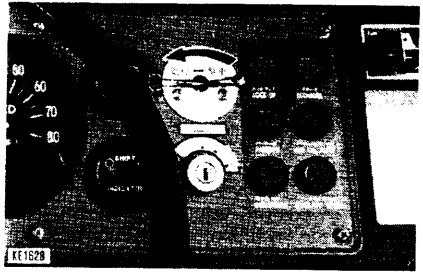
2. Confirm that the dump lever is in the "FLOAT" position.



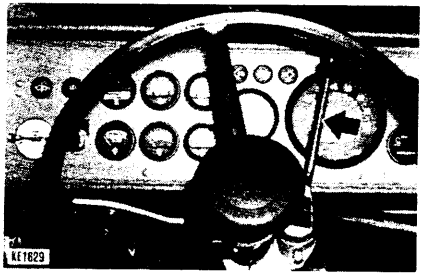
3. Confirm that the pointer of the air pressure gauge is in the green range.



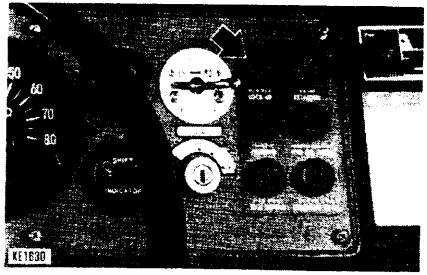
4. Then, put the parking brake valve lever in the "RELEASE" position.



5. Push the retarder control lever forward to confirm that the brake is completely released.



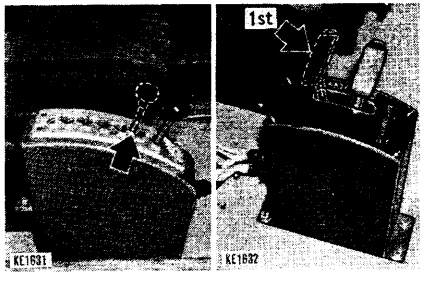
6. Turn the lock-up switch OFF. (The lock-up pilot lamp will go out.)



7. Blow the alarm horn and check that the surroundings of the truck is clear of any persons or objects.

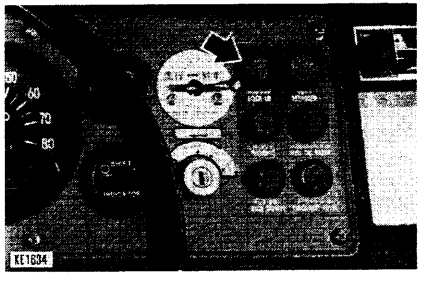
8. Place the gear shift lever into the 1st speed, depress the accelerator pedal, and the truck will start. (Be sure to start with the gear shift lever placed in the 1st speed position.)

(Manual) **(Automatic)**



9. Depress the accelerator pedal.

10. After starting, immediately turn on lock-up switch. Then confirm that lock-up pilot lamp is lit, and perform direct drive.



⚠ **Placing the gear shift lever at a position other than N with the dump lever at a position other than float causes the central warning lamp to light up and the alarm buzzer to sound.**

Auto switch (Option)

- Depress the button at the head of the lever to shift the lever (except between N and 3).
- When reversing the direction of travel, stop the truck completely, then proceed in the opposite direction.

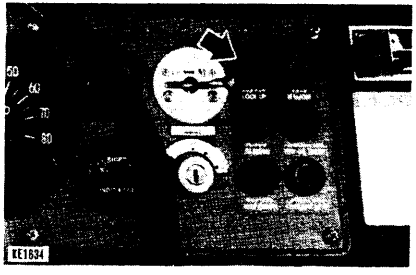
★ For each gear shift lever position, see the gear shift lever explanation in the components and their functions section.

TRAVELLING

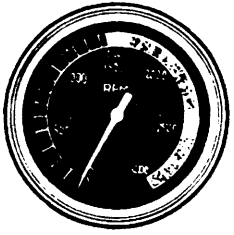
The truck travelling speed should be changed while lock-up switch is kept in ON position.

- Shift-up
  When the truck is accelerated after starting, the lock-up clutch automatically engages, transferring the transmission to direct drive. As the truck is accelerated more, the transmission will automatically shift up.

- Shift-down
  As you remove your foot from the accelerator pedal, the truck begins decelerating and the transmission automatically shifts down.
- Kick-down
  When climbing a hill, it is possible to press the accelerator pedal to the kick-down position in order to forcibly hold back the auto shift-up, and travel either in the current speed position or the shifted down position.
  It is not necessary to keep the accelerator pedal firmly depressed because the kickdown memory is provided.
  The pilot lamp for the kick-down lights up when kick-down is operating.
  Releasing the accelerator pedal will return the machine to normal and the kick-down lamp will go off.



TACHOMETER



MACHINE WITH MANUAL TRANSMISSION

Shift up (Increasing the traveling speed.)

- Gear shift lever should be shifted up so as to keep up with traveling speed, with accelerator pedal kept depressed.

★ High efficiency driving is obtained by keeping truck in direct drive with indicator of tachometer kept in green range.)

Shift-down (Slowdown)

Be sure to shift down machine stage by stage.

Shifting down by two stages or more must be avoided.

- When running speed of truck lowers and tachometer indicator reaches shift-down marking on gauge, shift down gear shift lever.
- When it is required to shift down to slow down machine speed when going downhill, depress foot brake and reduce engine speed down to shift-down marking or below.

★ An automatic lock-up system is provided. See the gear shift lever explanation in the INSTRUMENTS AND CONTROLS section.

★ **Down shift inhibit**

This function prevents engine over-run caused by erroneous shift down operation.

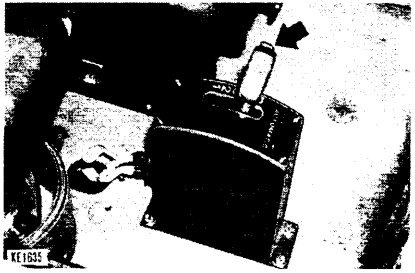
★ **Over run prevent mechanism**

If the machine is accelerated beyond its maximum speed for any gear position when going down a slope, the overrun prevent mechanism operates the retarder to brake the machine.

MACHINE WITH AUTOMATIC TRANSMISSION (OPTION)

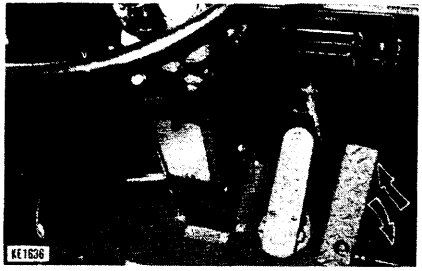
CHANGING TRAVELING SPEED

- Depress the button at the head of the lever to shift the lever (except between N and 3).

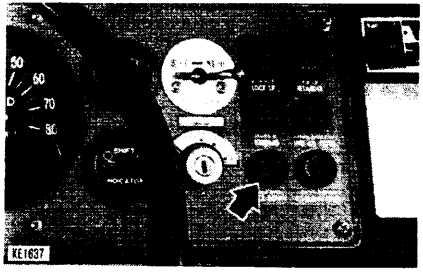


- When reversing the direction of travel, stop the truck completely, then proceed in the opposite direction.

- Upshifting
  When the truck is accelerated after starting, the lock-up clutch automatically engages, transferring the transmission to direct drive. As the truck is accelerated more, the transmission will automatically shift up.
- Downshifting
  As you remove your foot from the accelerator pedal, the truck begins decelerating and the transmission automatically shifts down.

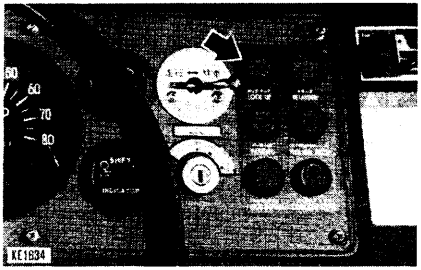


- Kick-down
  When the engine revolution has fallen during an uphill climb, sharply depress the accelerator pedal to the floor and the transmission will quickly shift to a lower speed.

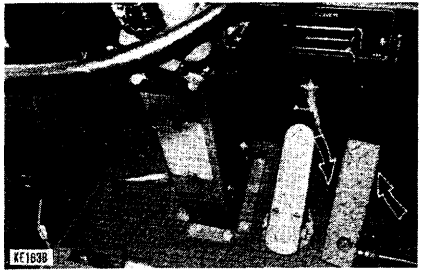


STOPPING TRUCK

1. Turn the lock-up switch OFF (the lock-up pilot lamp will go out).

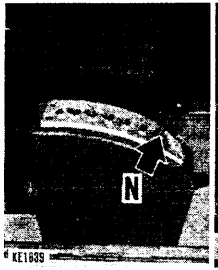


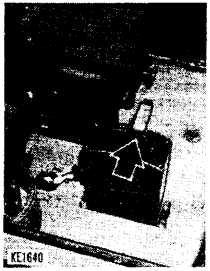
2. Release your foot from the accelerator pedal and depress the brake pedal to stop the truck.



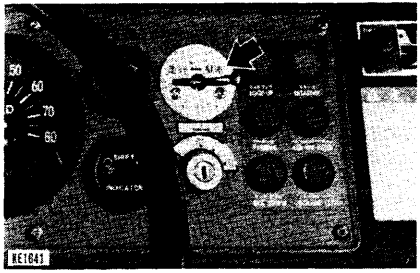
3. Move the gear shift lever to the "NEUTRAL" position.

(Manual) **(Automatic)**





4. Put the parking brake switch in the "PARKING" position.



DRIVING ON A CURVE

Return the accelerator pedal before a curve and shift down as low as possible, and then depress the accelerator pedal again. Do not turn corners at high speed.

PARKING

1. After stopping the machine, place the gear shift lever at N.
2. Place the parking brake lever at the park position to lock the parking brake.
3. When leaving the machine after parking, take the starting key with you to prevent operation by other persons.

BACKING-UP

When the truck has come to a complete stop, move the gear shift lever to R and back the truck slowly, carefully watching the rear.

DOWNHILL TRAVELING

When traveling downhill, maintain a safe speed according to road conditions: consider the road surface, degree of curves and road width.

Follow the instructions noted below.

1) Before entering a downhill grade, slow the truck to a safe speed. Descend, keeping the engine revolutions at 1,550 to 2,300 rpm and operating the retarder control lever so that the retarder oil temperature gauge pointer points to the green range. Avoid use of the foot brake except in an emergency. Continued use will lead to overheating of the front brake.

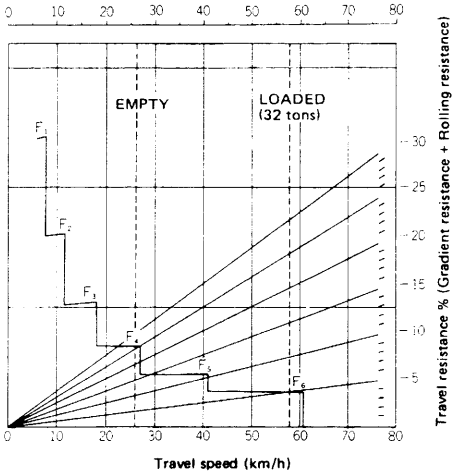
2) The maximum permissible traveling speed on a downhill path is determined by the distance and grade of the path (see the diagram at the right). Do not exceed this limit, otherwise the retarder brake will be damaged, and an exceedingly dangerous situation may result. The maximum permissible descending speed has been basically determined from the performance of the retarder brake. On work sites, speed limits for descending slopes can be set lower than the maximum ones, in accordance with actual conditions.

3) Retarder brake performance curves are shown at the right and on the next page.
[For downhill distances (continuous) of . . . . 450, 600, 900 and 1500m]

● **Brake performance (length of slope: continuous)**

Gross weight (kg x 1000)

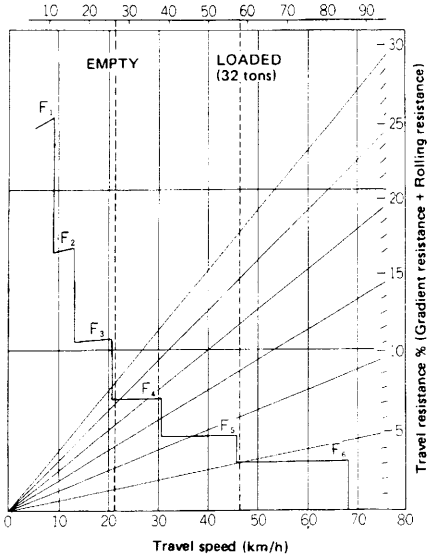
HD320



● **Brake performance (length of slope: continuous)**

Gross weight (kg x 1000)

HD325

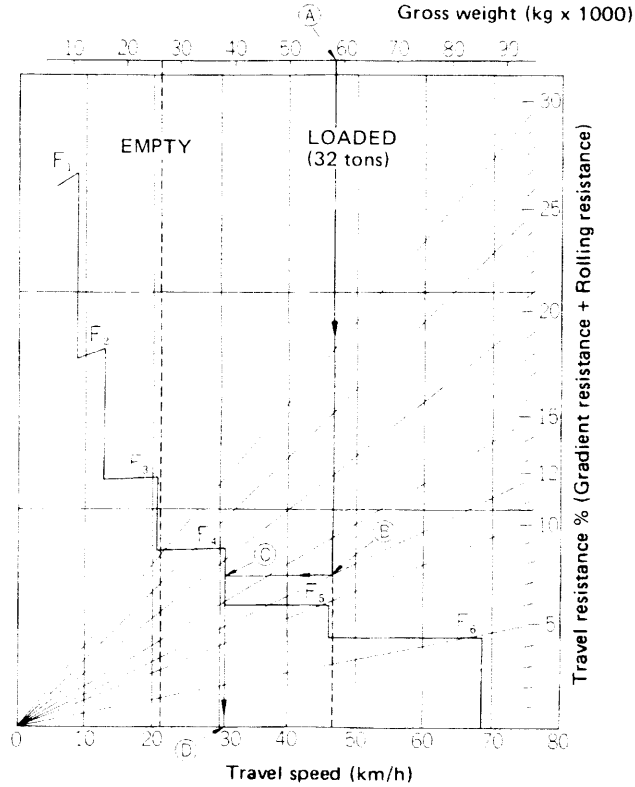


4) How to use the graph

The maximum allowable travel speed and the gear can be determined from the brake performance curve as shown in the following example where the downhill distance is 1500m, the travel resistance is minus 12% (gradient resistance is minus 14% and rolling resistance 2%) and the haul load is 32 tons.

Draw a vertical line from point **A** (machine gross weight) to intersect the slanted line representing travel resistance (Connect the dashed line.). The intersection of these two lines is point **B**. Next draw a horizontal line from point **B** to intersect the performance curve. Finally draw a vertical line through this intersection point **C**, to obtain point **D**. Point **D** represents the maximum allowable speed (31km/H) and the gear (F3).

- **Brake performance (length of slope: 1500m)**



5) If the retarder has become ineffective while braking on a downhill run, release the retarder completely by moving the retarder control lever back, then apply it again.
The cause is oil leakage in the brake system. This causes the piston to travel up to the end of the stroke in th rear brake chamber. If the retarder is kept applied at that time, the rear brake will not work when you depress the brake pedal. If the retarder remains inactive when you pull the control lever again, release the retarder completely and stop the truck with the brake pedal and parking brake. Request repair to your Komatsu distributor.

6) **Engine over-run protective device**
When the machine exceeds safety speed during downhill traveling, protective device works to operate retarder and brakes the machine.

⚠ **INSTRUCTION FOR OPERATION OF RETARDER**

When the retarder oil temperature gauge pointer enters the red range (central warning lamp lights and alarm buzzer sounds simultaneously), slow down the machine speed.

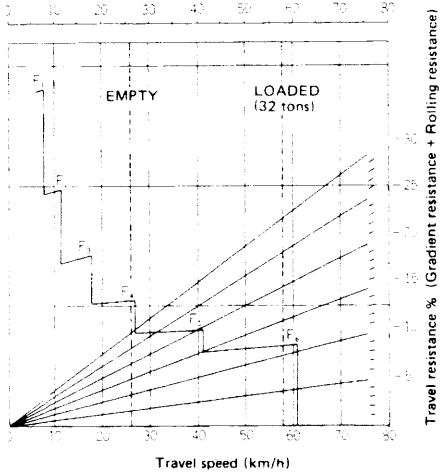
★ If the gauge pointer remains beyond green range, stop the machine immediately. Keep the engine running at 2000 rpm until the pointer return to the green range.

★ Apply the retarder brake lever slowly to avoid large impact or tire slippage.

- **Brake performance (length of slope: 450m)**

Gross weight (kg x 1000)

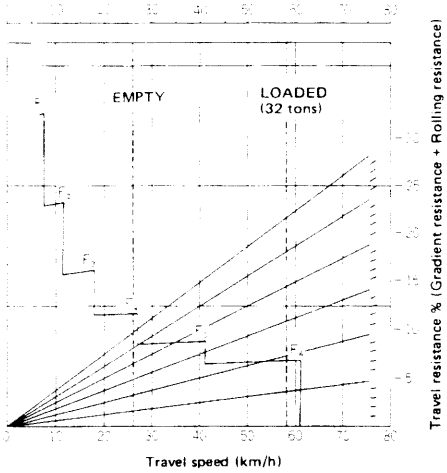
HD320



- **Brake performance (length of slope: 600m)**

Gross weight (kg x 1000)

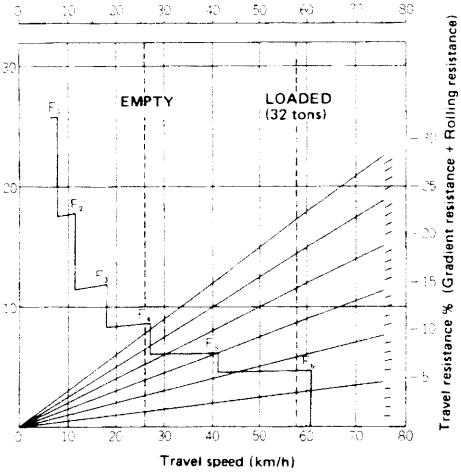
HD320



- **Brake performance (length of slope: 900m)**

Gross weight (kg x 1000)

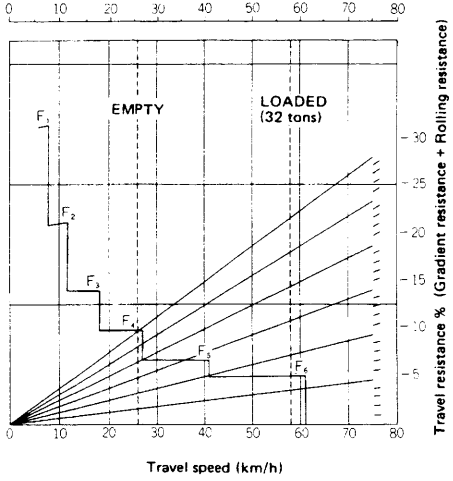
HD320



- **Brake performance (length of slope: 1500m)**

Gross weight (kg x 1000)

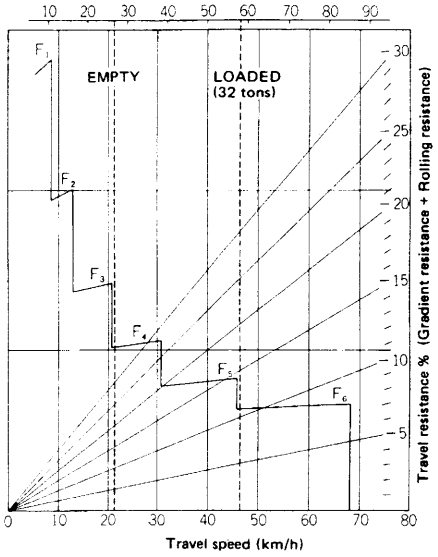
HD320



- **Brake performance (length of slope: 450m)**

Gross weight (kg x 1000)

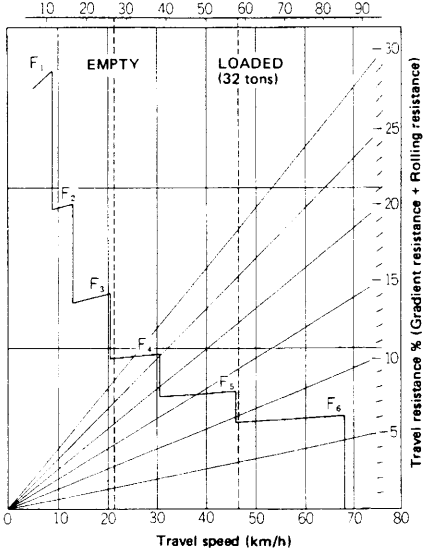
HD325



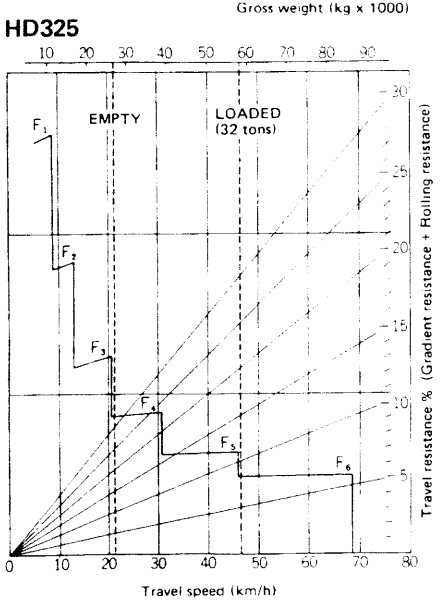
- **Brake performance (length of slope: 600m)**

Gross weight (kg x 1000)

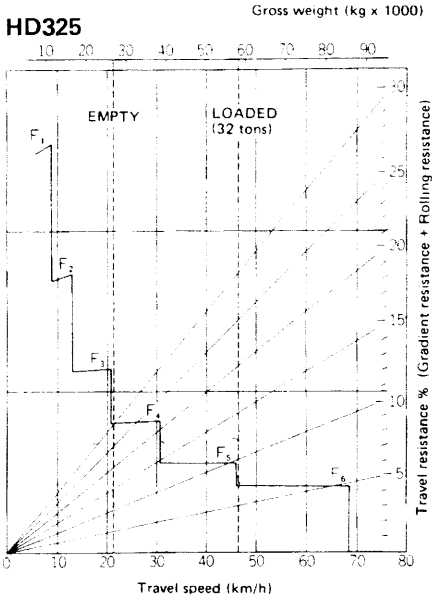
HD325



● **Brake performance (length of slope: 900m)**



● **Brake performance (length of slope: 1500m)**



⚠OPERATION INSTRUCTIONS

★ If the pointer of the retarder oil temperature gauge does not return to the green range even after shifting down, immediately stop the machine and keep the engine running at a medium speed (2000 rpm).

★ The retarder must operate gradually. Rapid braking not only causes a big shock but also causes tires to slip and other dangers.

★ Do not turn corners at high speed. Turning the steering wheel while braking is very dangerous because tires will slip.

⚠**The load should be dumped in accordance with the instructions of the signal man.**

- When travelling on roads with puddles, the brake mechanism may be soaked with water. This causes the efficiency of the front brake to drop extremely. When this happens, apply braking force several times to the front wheels to burn the brake lining slightly. This helps to dry the brake mechanism.
- When the pointer of the torque converter oil temperature gauge is in the red range, stop the truck immediately. In so doing, the engine should be kept operated at a speed of 2,000 rpm, with the gear shift lever put in the "NEUTRAL" position, until the pointer returns to the green range.
- When travelling in rain or snow or on muddy or silty road, pay special attention to prevent the truck from slipping or being mired in mud. It should be kept in mind that the truck should be operated in consideration of the loaded conditions when travelling on such roads.
- When the engine stops during running of the truck, stop the truck immediately. Move the gear shift lever to NEUTRAL and start the engine.

★ When running dowhill, the truck can be slowed down sooner than in normal deceleration by manipulating the retarder control lever.
The truck can be driven without moving the gear shift lever specially to a higher speed position.

EMERGENCY STOP

In an emergency, such as fault of the service brake, emergency stop the machine as described below:

1) Pull the retarder brake fully.
2) Actuate the emergency brake. (OP)
3) Apply the parking brake.

⚠ **Immediately place chocks under tires when the machine stops.**

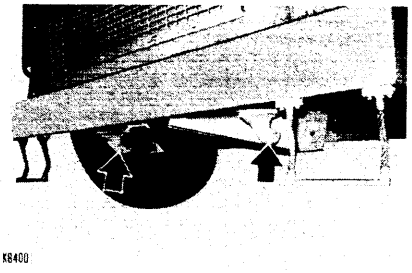
★ Determine the cause and repair on the spot as much as possible.

INSTRUCTIONS FOR TOWING THE TRUCK

If towing is the sole means to convey a machine, it must be made, giving full attention to the following.

1) When the engine is in operation;
   Be sure to keep the engine running and be ready for steering and braking. (Take full care that the brake never work in the case of the defective air circuit.)

2) When the engine is out of operation;
   Never haul the machine over 800m. If the towing distance surpasses that limit, be sure to remove the propeller shaft between the transmission and the differential case.



★ The towing speed must be within 8km/h.
★ The hook for towing a machine is installed under the front frame.
★ The emergency steering is available as an option, which is designed to facilitate steering in towing when the engine is out of operation.

3) When air pressure in air reservoir abnormally drops due to leakage from air circuit, parking brake and emergency brake (Option) operate. When towing machine, release both brakes.

HANDLING THE TIRES

REGARDING T. KM. P. H (TON-KM-PER-HOUR RATING)

The tires used on construction machinery are required to operate under very severe operation conditions; the tires used on buses, automobiles and ordinary trucks cannot withstand the same conditions. To satisfy the strenuous application requirements, construction machinery tires must be manufactured with sufficient strength OR tires tend to produce more heat in the rubber material during operation than ordinary tires. If OR tires are used continuously with the vessel excessively loaded and at a travelling speed beyond the specified speed, the internal temperature exceeds the maximum allowable temperature. The temperature rise softens the rubber material, thus resulting in heat separation.

In order to operate vehicles safely, the Ton-Km-Per-Hour Rating (T. Km. P. H.) is provided as a standard.

Reference: T. Km. P. H. rating-to-maximum continuous driving speed

Tire	T.Km. P.H rating for each ambient temperature				Allowable maximum continuous running speed (km/h) for each temperature				
	16°C	27°C	38°C	49°C		16°C	27°C	38°C	49°C
Sizes: 18.00-25-32PR Standard (HD320) Construction: CR Code No. (TRA): E4	178	167	155	154	Empty (Front wheel basis)	27	25	23	22
					Laden (Rear wheel basis)	18	17	16	14
Sizes: 18.00-33-28PR Standard (HD325) Construction: CR Code No. (TRA): E3	226	212	197	182	Empty (Front wheel basis)	30	28	26	24
					Laden (Rear wheel basis)	22	21	18	17
Sizes: 18.00-33-32PR (Option) Construction: CR Code No. (TRA): E4	200	188	175	162	Empty (Front wheel basis)	27	26	24	22
					Laden (Rear wheel basis)	20	19	17	16
Sizes: 18.00-33-32PR (Option) Construction: CR Code No. (TRA): E3	226	212	197	182	Empty (Front wheel basis)	30	28	26	24
					Laden (Rear wheel basis)	22	21	18	17

As T. Km. P. H values in the above table vary more or less with tire manufacturers, if machine is driven at around speed of the above table, consult your Komatsu distributor.

If the T. Km. P. H. value in actual operation exceeds the T. Km. P. H. value inherent to the tire, tire trouble often occurs. To prevent this:

1) The T. Km. P. H. value in actual operation conditions should be reduced to the value inherent to the tire.
2) The existing tires should be replaced with those of which the T. Km. P. H. value is higher.

Calculation method of actual T.Km.P.H. value:

Actual T.Km.P.H.

= mean load per tire x average traveling speed per day

Average speed

$$= \frac{\text{turnaround distance} \times \text{turnaround frequencies for one day}}{\text{total operation hour for one day}}$$

Mean load

$$= \frac{\text{weight when not loaded} + \text{wiehgt when loaded}}{2}$$

★ The total operation hour for one day includes the operator's break time and the time during which the truck is not in operation.

⚠ **Defective tires as shown in 1) to 6) below should be replaced with new tires for safe operation:**

1) Tires with cuts, broken or excessively deformed bead wire.
2) Excessively worn tires in which the carcass ply (excluding breaker) is exposed along 1/4 the circumference.
3) Tires whose carcass is damaged more than 1/3 the tire width.
4) Tires with ply separation
5) Tires with radial cracks which reach the carcass.
6) Aged, deformed or abnormally damaged tires

INSTRUCTIONS WHEN TRAVELING OVER A LONG DISTANCE

When the truck travels continuously over a long distance at high speed, the tires produce extreme heat. This may cause the tires to be worn. To prevent this, the following instructions should be observed:

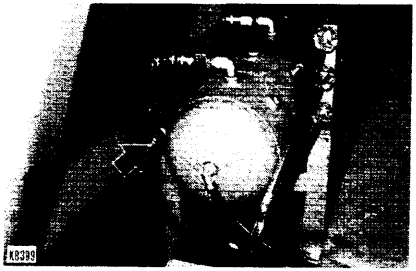
- The truck should be operated without load or with the minimum load.
- The tire inflation pressure should be checked and adjusted to 5.75 kg/cm^2, when the tires are still cold before operation. (18.00-33-28PR. 5.0 kg/cm^2).
- The tire inflation pressure should not be reduced during operation.
- The truck should be operated in either one of the following two traveling conditions:
  1) When the maximum traveling speed is 30 km/h or less, the truck should be stopped for at least one hour after every 50 km to cool the tires.
  2) When the maximum traveling speed is 40 km/h, and the truck should be stopped for at least 70 minutes after every 50 km.
- The truck should not be operated with the tires filled with water or dry-ballast.

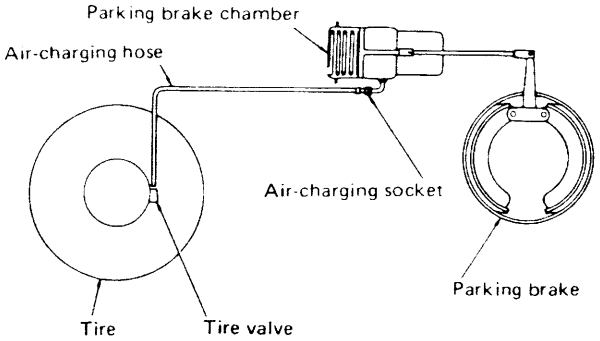
RELEASING PROCEDURE OF PARKING BRAKE

1) Remove the air-charging socket from the dry reservoir.
2) Disconnect the air hose from the parking brake chamber, and then install the air-charging socket to the fitting where the air hose has been disconnected.
3) Connect one end of a tire air charging hose (09288-10011) to the socket. (The hose can be connected to the socket in one touch.)
4. Press the other end of the hose against the tire valve to supply air from the brake chamber.
   With the above procedure, the parking brake is released.
5) When the parking brake is released, remove the air charge hose. The air in the parking brake chamber will not be discharged because it is protected by the air charge socket. Immediately move the machine to a safe place by traction.

⚠ **When releasing the parking brake on a slope, put chocks against the tires.**

★ Special care should be paid when towing the truck by an other vehicle, referring to "Instruction for towing the truck."





EMERGENCY BRAKE (OPTION For HD320)

When air pressure in the main air reservoir drops below 2.2kg/cm^2 because of trouble in the air compressor, or air supply circuit, or from an air leak, the relay emergency valve operates, then the emergency brake engages and automatically brakes the machine.

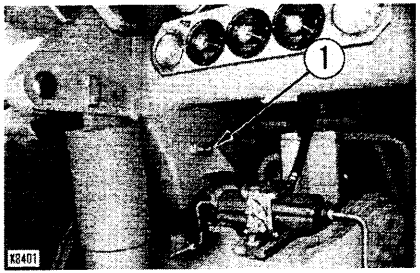
Handling Cautions:

Be careful not to start the machine travelling when air pressure in the main reservoir drops below 2.2kg/cm^2 and the emergency brake is operating. If the machine travels even with the brake on, the brake disc will burn because of the drag on the brake.

★ While emergency brake is applied, warning lamp lights and buzzer sounds.

Releasing procedure of emergency brake

After preparing for towing the truck, open drain cock (1) of emergency brake tanks to bleed air pressure.



⚠ **Stop machine completely and bleed air from emergency system.**

Check before starting

Start engine and drain water from emergency air reservoir and main air reservoir.

★ During cold weather, drain water after the day's work has ended to prevent freezing.

Periodic maintenance

(Every 2000 hours or every year)
Disassemble the emergency valve and clean it. Replace worn and damaged parts for new ones.

Replace all rubber parts, etc. with new ones from the service kit.
Kit parts No. 567-35-01100

DUMP BODY OPERATION

Operate the dump body in the following way:

1) Move the gear shift lever to neutral and the parking brake switch to PARK.
2) Move the dump lever to RAISE and the dump body will begin tilting.
   If you remove your hand from the lever at that time, the lever remains at RAISE and the dump body continues moving.
3) The tilting speed varies proportionally with the speed of engine revolution.
4) As the dump body reaches a predetermined "kickout" position, the dump lever automatically returns to HOLD and the dump body remains stationary there.
5) To tilt the dump body even more, move the dump lever to RAISE (the lever is not locked at raise.)
   If you remove your hand from the lever, it again returns to HOLD and the dump body remains stationary.
6) As you move the dump lever to LOWER, the dump body begins to descend. If you reset the dump lever to FLOAT while the dump body is coming down, it will fall by its own weight. (The lever is locked at FLOAT.)

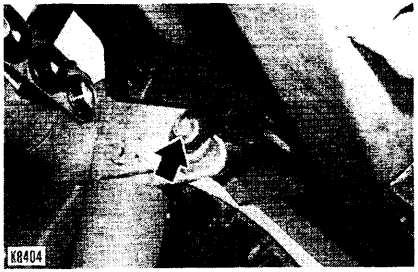
★ During travel, be sure to place the dump lever at FLOAT (whether loaded with cargo or not) to protect the hydraulic devices and main frame from needless load.

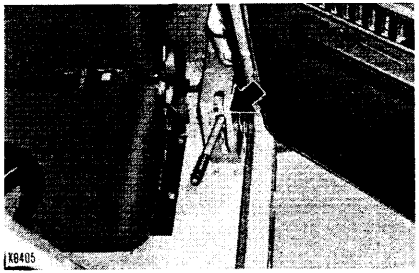
★ Placing the gear shift lever at a position other than N with the dump lever at a position other than float causes the central warning lamp to light up and the alarm buzzer to sound.

⚠ **When making inspections with the dump body raised, be sure to use a safety pin and lock the lever in HOLD position.**

⚠ **Reduce the dumping speed when dumping large rocks.**

⚠ **Do not load material while the dump body is tilted.**





INSTRUCTION FOR LOADED MATERIALS

When loading a large mass of rocks with a large size loader, dump body may be deformed partially. To prevent this, dump body should be reinforced by plates for the following application conditions.

1. Loaded material: Rocks
2. Rock size:
   Length of one side more than 1.3m
   Volume more than $2.2m^3$
3. Weight per rock: 5000 kg or more
4. For those trucks used for iron ore, dump body should be reinforced regardless of the operation conditions.

★ When loading large rocks, dump body should be loaded first with soil or sand then loaded with rocks. This loading manner can prevent dump body from being damaged or deformed.

Read the section "SAFETY HINTS" carefully for loading method.

PERIODIC MAINTENANCE

Proper lubrication and maintenance assure trouble-free operation and long machine life. Time and money spent for scheduled periodic maintenance will be amply compensated by prolonged machine operation and reduced operating cost.

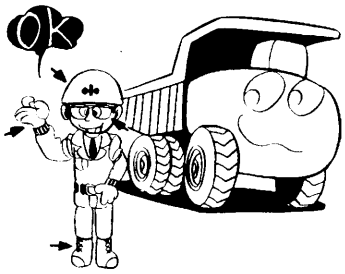
All hourly figures given in the following descriptions are based on service meter readings. In practice, however, it is recommended to rearrange all of them into units of days, weeks and months to make the maintenance schedule more convenient. Under rough job site or operating conditions, it is necessary to somewhat shorten the maintenance intervals stated in this manual.

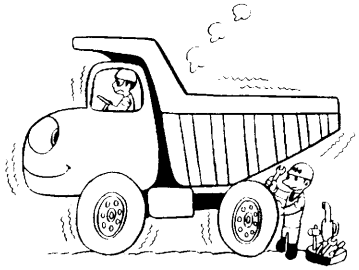
PRECAUTIONS FOR MAINTENANCE

⚠ For safety when carrying out maintenance.

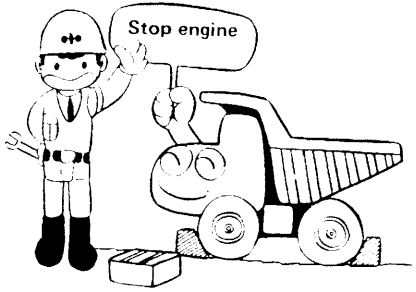
Even simple operations, if carried out carelessly, can be the cause of injuries. At least the following points should be followed, but safety should always be borne in mind when carrying out any operation.

- Wear a well-fitting hard hat, safety shoes and working clothes. If the nature of the work so requires, wear protective goggles, gloves or other protection.
  Never wear loose or unbuttoned clothes as they may catch on protruding parts of the machine. Never wear clothes covered in oil.
- Unless you have special instructions to the contrary, maintenance should always be carried out with the engine stopped. If maintenance is carried out with the engine running, there must be two men present: one sitting in the operator's seat and the other one performing the maintenance. Both should confirm the operation is safe.
- The body should always be lowered before carrying out any maintenance. However, if the nature of the maintenance requires the dump body to be raised for inspection or maintenance, always use the safety pin, and lock the dump lever in the HOLD position.

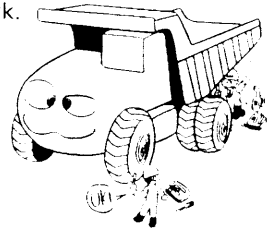




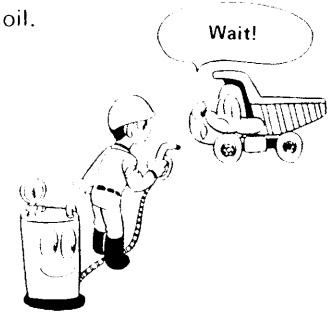
- Park the machine on firm, flat ground and lower the dump body. Stop the engine, return the gear shift lever to NEUTRAL and apply the parking brake before carrying out the maintenance.



- When working with others, choose a group leader, decide the work procedure and work according to the leader's instructions. Check with the others before doing anything. Do not move any part without warning and do not perform any maintenance beyond the agreed work.



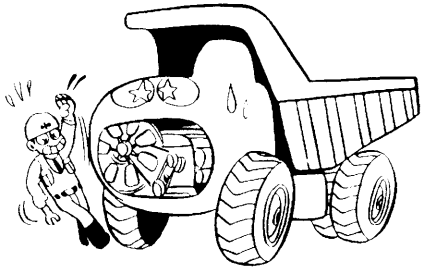
- Always stop the engine before washing the machine or charging oil.



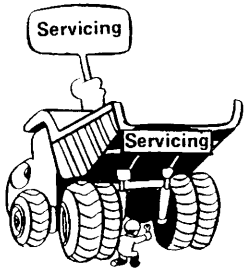
- **Flames should never be used instead of lamps.**
  Never use a naked flame to check leaks or the level of oil, fuel, antifreeze or electrolyte.

- **Highly inflammable gas is given off by batteries.**
  Do not smoke, make sparks or bring naked flames near the battery. Never check whether the battery is charged by striking the terminal with metal.
  During charging, gas is given off. To prevent it from collecting, make sure there is good ventilation. In addition, do not allow sparks or flames near the battery. Never smoke or allow naked flames near when handling fuel or oil.

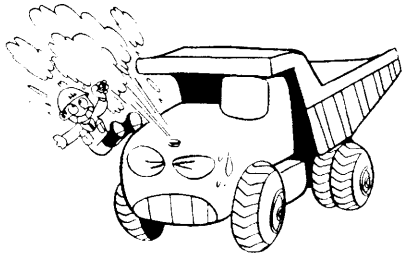
- Never inspect the fan belt or attempt any maintenance when the engine is running.
  Always stop the engine before carrying out maintenance on this or other moving parts, or near any moving parts.



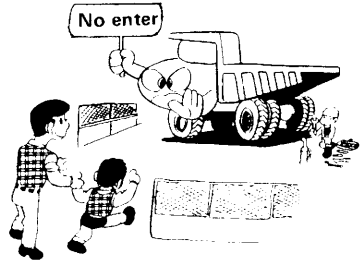
- When working under the machine, hang a caution sign in the operator's compartment, and if necessary, also put signs around the machine.



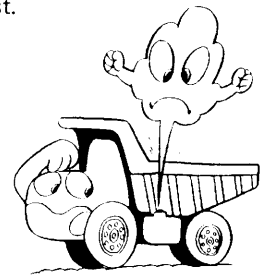
- Do not remove the radiator cap when the water is hot. There is danger that boiling water may spurt out. First release the internal pressure before removing the cap.



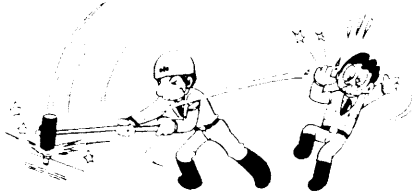
- When carrying out maintenance, pay careful attention to persons in the vicinity. In particular, do not allow anyone to approach the machine unnecessarily.



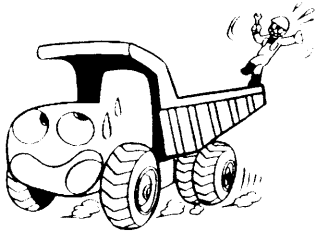
- Always remember that the hydraulic oil circuit is under pressure. When filling or draining the oil tank or carrying out inspection and maintenance, release the pressure first.



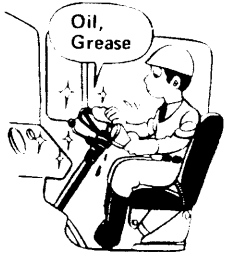
- When carrying out maintenance, pay careful attention to other workers and persons in the vicinity. Care is particularly needed when grinding, welding, or swinging a sledge hammer.



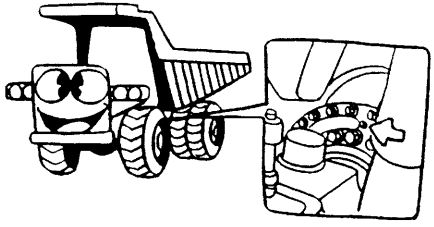
- When working on top of the machine, be careful not to lose your balance and fall. Arrange things beforehand so that no one starts the engine or moves the machine by mistake.



- Immediately remove any oil or grease on the floor of the operator's compartment, or on the handrail. It is very dangerous if someone slips on floor plates.



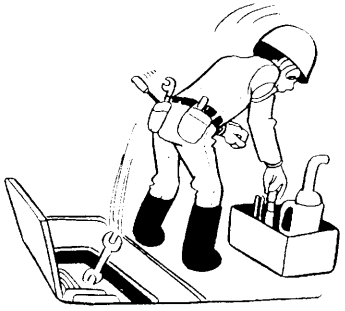
- If air gets into the hydraulic brake line, the brakes will not work properly. In such cases bleed all the air from the circuit. If the air pressure in the air brake line drops, the brakes will not work.
  Check for leaks in the air circuit, and if any faults are found, repair them.

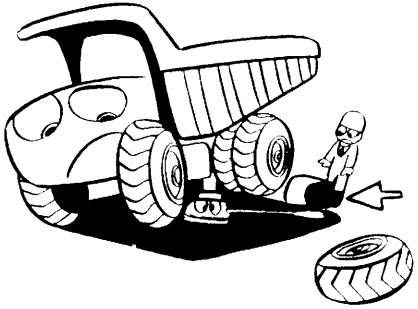


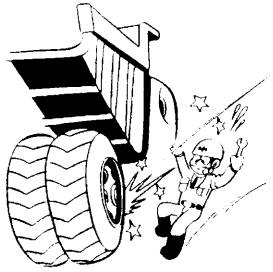
- When leaning over to inspect cases, there is a risk of dropping things in. Before removing the covers to inspect such cases, empty everying from your pockets. Be particularly careful to remove wrenches and nuts.

Precautions when changing tires

- Always block the wheels on the opposite side before jacking up the machine.
  After jacking up the machine, always insert blocks under the machine to prevent it from falling.
- Do not loosen or remove any part excpet those needed to be removed when taking off the tire. The tire is under high pressure, so it is extremely dangerous to loosen anything carelessly. In particular, repair of tires should be left to the tire manufacture's dealer.







GENERAL POINTS TO BE BORNE IN MIND WHEN CARRYING OUT MAINTENANCE

- Thoroughly wash the machine. In particular, be careful to clean the filler caps, grease fittings and the area around the dipsticks. Be careful not to let any dirt or dust into the system.
- When replacing parts, always use the genuine Komatsu parts specified in the Parts Book.
- Always use the grades of grease and oil recommended by Komatsu. Choose the viscosity specified for the ambient temperature.
- Always use pure oil or grease, and be sure to use clean containers, to prevent any dirt from getting in.
- When checking or changing the oil, do it in a place free of dust, and prevent any dirt from getting into the oil.
- Before draining the oil, warm it up to a temperature of 30 to 40°C.
- Be particularly careful when removing the radiator cap or the hydraulic oil tank filler cap.
- After replacing or cleaning the oil, filter element or strainer, bleed the air from the circuit.
- When the strainer is located in the oil filler, the strainer must not be removed while adding oil.
- There should be neither too much nor too little lubricant. When adding oil or checking the oil level, check that the oil is at the correct level.
- After greasing up, always wipe off the old grease that was forced out.
- When changing the oil or filter, check the drained oil and filter for any signs of excessive metal particles or other foreign materials.
- When removing parts containing O-rings, gaskets or seals, clean the mounting surface and replace with new sealing parts.
- Special measuring apparatus is needed for testing hydraulic pressure. When carrying out other difficult maintenance work, carrying them out carelessly can cause unexpected accidents. If you consider the maintenance is too difficult, always request your Komatsu distributor to carry out it.

MAINTENANCE TABLE

No.	ITEM	SERVICE	PAGE
	CHECK BEFORE STARTING		
a	Oil, water and air	Check leakage	42
b	Nuts and bolts	Check and retighten	42
c	Electric wirings	Check and retighten	42
d	Cooling water	Check and supply	43
e	Fuel	Check and supply	43
f	Fuel tank	Drain water and sediments	43
g	Engine oil pan	Check and supply oil	44
h	Hub nuts	Check and retighten	45
i	Transmission case	Check and supply oil	46
j	Air reservoir	Drain water	46
k	Hydraulic tank	Check and supply oil	47
l	Dust indicator	Check	47
m	Tires	Check air pressure and damage	48
n	Steering wheel	Check play	48

No.	ITEM	SERVICE	PAGE
o	Central warning lamp	Check	48
p	Emergency brake tank (Option HD320)	Drain water	48
q	Suspension cylinder	Check and adjust	49
r	Emergency steering (Option HD320)	Check	49
s	Rear view and under mirrors	Check	49
t	Foot brake	Check function	49
u	Retarder control brake	Check function	49
v	Parking brake	Check function	49
w	Steering	Check function	49
x	Horn, turn signal and other lamps	Check	49
y	Gauges	Check	49
z	Exhaust emission and noise	Check	49

★ **For new machine, change all oil and hydraulic filter element, retighten injector mounting bolt and check engine valve clearance after the first 250 hours operation.**

No.	ITEM	SERVICE	PAGE
	EVERY 50 HOURS SERVICE		
a	Greasing		98
-1	Dump body hinge pin	Greasing 2 points	98
-2	Rear suspension cylinder	Greasing 4 points	98
-3	Rear axle support	Greasing 8 points	98
-4	Hoist cylinder pin	Greasing 4 points	98
-5	Front steering cylinder pin	Greasing 8 points	99
-6	Steering linkage	Greasing 7 points	99
b	Battery	Check electrolyte level	100
c	Front brake	Check clearance	100
	EVERY 250 HOURS SERVICE		
a	Greasing		101
-1	Propeller shaft	Greasing 5 points	101

No.	ITEM	SERVICE	PAGE
-2	Output shaft	Greasing 2 points	101
b	Check oil level		102
-1	Final drive case	Check and supply	102
-2	Differential case	Check and supply	102
c	Fuel filter	Replace cartridge	103
d	Engine oil pan and full-flow filter	Change oil and replace element	104
e	By-pass filter	Replace element	106
f	Corrosion resistor	Replace cartridge	106
g	Breathers		107
-1	Differential case	Clean	107
-2	Hydraulic tank	Clean	108
-3	Transmission	Clean	108
-4	Engine crankcase (HD325 only)	Clean breathers	108
h	Radiator fin	Clean	109
i	Parking brake	Check clearance	109

No.	ITEM	SERVICE	PAGE
	(EVERY 250 HOURS SERVICE)		
j	Belt tension	Check	110
-1	Fan belt (HD320 only)	Check tension	110
-2	Water pump belt (HD320 only)	Check tension	110
-3	Alternator belt	Check tension	111
k	Propeller shaft	Check	112
	EVERY 500 HOURS SERVICE		
a	Steering follow-up linkage	Greasing 3 points	113
b	Ether spray	Check	113
c	Hydraulic oil filter element	Replace	114
d	Transmission filter element	Replace	114

No.	ITEM	SERVICE	PAGE
	EVERY 1000 HOURS SERVICE		
a	Greasing		115
-1	Transmission mount	Greasing 1 point	115
-2	Accelerator control linkage	Greasing 2 points	115
-3	Steering column	Greasing 3 points	115
-4	Dump control linkage	Greasing 3 points	115
-5	Transmission control linkage (HD320 only)	Greasing 3 points	115
b	Change oil		116
-1	Hydraulic tank (initial 250 hours)	Change oil	116
-2	Transmission case (initial 250 hours)	Change oil	116
-3	Final drive cases (initial 250 hours)	Change oil	117
-4	Differential case	Change oil	117
c	Steering gear box	Check and supply oil	118
d	Transmission case	Clean strainer	118
e	Rear brake	Check wear	118

No.	ITEM	SERVICE	PAGE
	EVERY 2000 HOURS SERVICE		
a	Turbocharger blower impeller (HD320)	Clean	120
b	Alternator and starting motor	Check	120
c	Emergency relay valve	Clean	120
d	Component parts for safety	Replace	120
e	Injector mounting bolts	Retighten mounting bolts	120
f	Injector adjustment screw	Check and adjust torque	120
g	Injector	Check	120
h	Engine valve clearance	Check	120
	EVERY 4000 HOURS SERVICE		
a	Turbocharger	Check rotor play	121
b	Turbocharger	Check mounting parts	122
c	Vibration damper	Check	122
d	PT pump AFC	Check and replace bellows	123

No.	ITEM	SERVICE	PAGE
e	Turbocharger (HD325)	Clean blower impeller (HD325)	123
f	Water pump	Check and greasing	123
g	Component parts for safety	Replace	124
h	Intake and exhaust manifold	Retighten nuts and bolts	124
i	Injector	Check and clean and adjust	124
j	PT pump	Check and calibration	124
k	PT pump	Replace filter screen and magnet	124
l	Air compressor	Check and adjust	124
m	Crankshaft	Check end play	124
n	Oil cooler	Clean	124

No.	ITEM	SERVICE	PAGE
	WHEN REQUIRED		
a	Air cleaner inner and outer elements	Check, clean and replace when required	125
b	Cooling system	Change cooling water and clean twice a year	128
c	Wheel brake screw	Change grease	131

PERIODIC REPLACEMENT OF COMPONENT PARTS FOR SAFETY

To ensure safety in the machine traveling and dump body operation, the users of Komatsu dump trucks are requested to perform periodic maintenance of their own trucks securely. In addition to this, special care should be paid about the necessity of periodic replacement of the parts listed right.

Fabricated in the safety devices these parts are liable to change in quality with a long lapse of time. They are also worn or fatigued gradually during continuous use of them. However, since it is somewhat difficult to determine accurately the progress of change in quality, wear or fatigue of them, waver will exist in judgement whether some parts come to a time to be replaced or not. Necessary replacement of used-up parts may be neglected even by the periodic inspection of the vehicle. Therefore, these parts are necessary to be replaced periodically even if they do not show any faulty symptom at that time. Of course a part found out for any abnormality should be repaired or replaced, irrespective of the time it has been used.

It must be noted that this recommendation to the replacement of parts for the safety devices is not concerned in guaranteed period of time given to them.

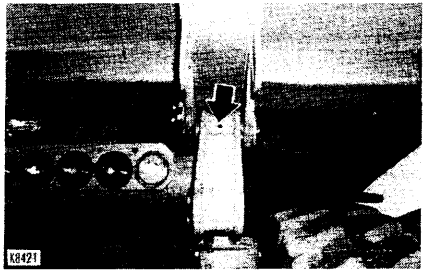
	Parts to be regularly replaced	Replacement interval	Remarks
1	Air governor parts	Every 2000 hours, or one year	Replace with service kit
2	Brake valve parts	Every 2000 hours, or one year	Replace with service kit
3	Retarder control valve parts	Every 2000 hours, or one year	Replace with service kit
4	Parking brake valve parts	Every 2000 hours, or one year	Replace with service kit
5	Emergency brake valve parts	Every 2000 hours, or one year	Replace with service kit
6	Relay valve parts	Every 2000 hours, or one year	Replace with service kit
7	Emergency relay valve parts	Every 2000 hours, or one year	Replace with service kit
8	Quick release valve part	Every 2000 hours, or one year	Replace with service kit
9	Front brake chamber parts	Every 2000 hours, or one year	Replace with service kit
10	Rear brake chamber parts	Every 2000 hours, or one year	Replace with service kit
11	Parking brake chamber parts	Every 2000 hours, or one year	Replace with service kit
12	Rubber hoses of brake	Every 4000 hours, or two years	Replace assembly

EVERY 50 HOURS SERVICE

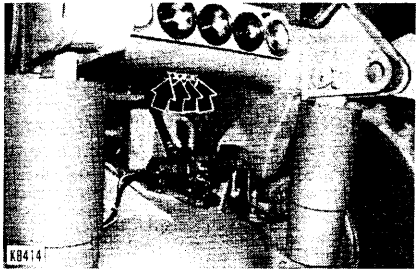
a. GREASE THE FOLLOWING PARTS

Grease at each grease fitting shown by arrows:

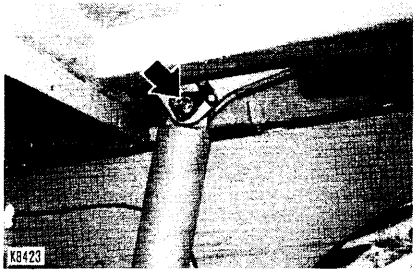
1. Dump body hinge pin (2 points)



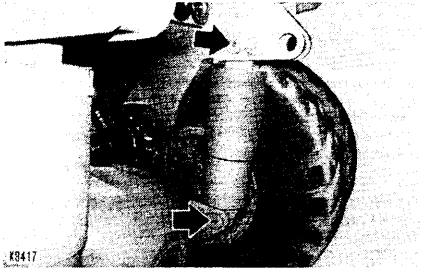
3. Rear axle support (8 points)

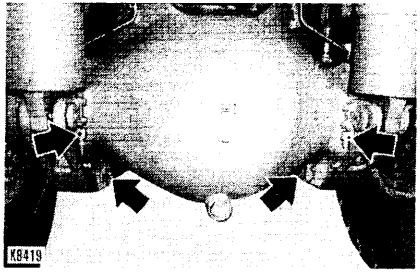


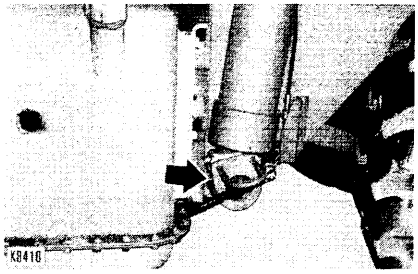
4. Hoist cylinder pin (4 points)



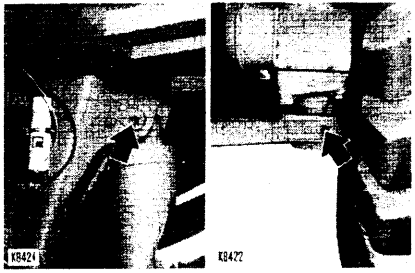
2. Rear suspension cylinder (4 points)



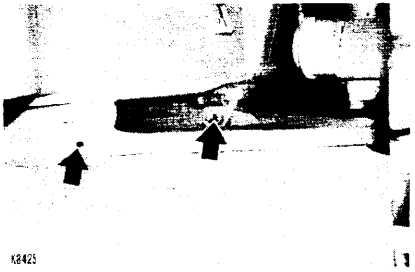


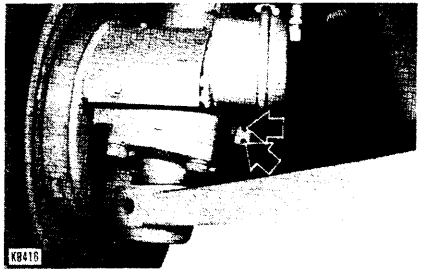


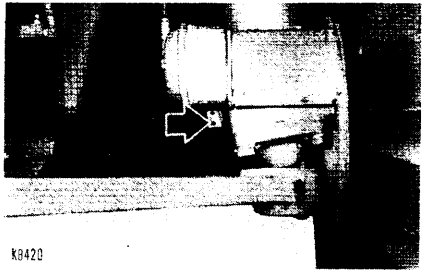
5. Front suspension cylinder (8 points)



6. Steering linkage (7 points)





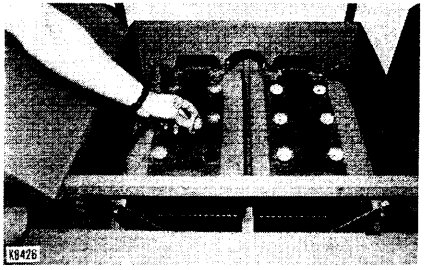


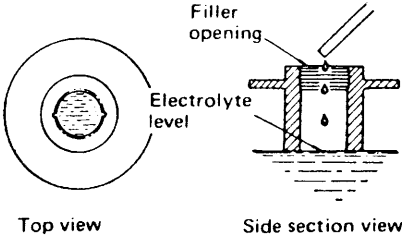
b. ELECTROLYTE LEVEL IN BATTERY

If necessary, add distilled water to maintain the electrolyte level at 10 to 12 mm above the top of the electrode plates. If any electrolyte spilt from the battery, have it replenished with dilute sulfuric acid of the correct specific gravity by the nearest battery shop.

Clean the air vent in the battery cap when checking the electrolyte level.

★ Take care not to pour acid through a metallic funnel.

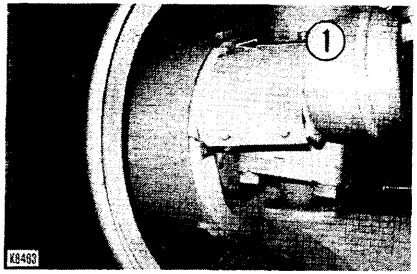




c. FRONT BRAKE

Remove lower back plate (1) and push the lining with a screwdriver. With the lower lining and drum in close contact, measure the clearance between the drum and lining. Adjust if the clearance is 1.2 mm or more.

★ For the adjusting procedure, refer to the section ADJUSTMENT.



EVERY 250 HOURS SERVICE

★ The maintenance for every 50 hours should be carried out at the same time.

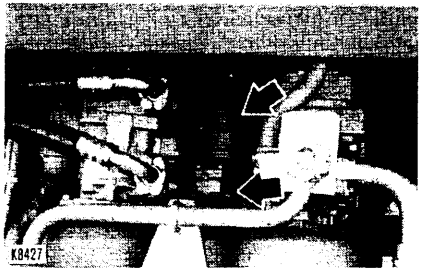
After the first 250 hours of operation of a new machine, carry out the following maintenance in addition to the normal maintenance:

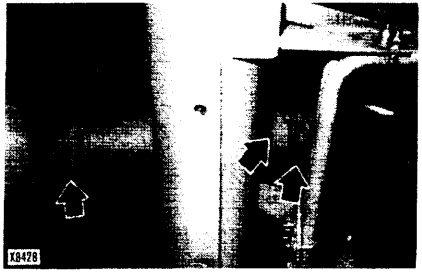
1. Replace hydraulic oil filter element.
2. Change oil (hydraulic oil tank, transmission case, differential case and final drive case).
3. Inspect and adjust tightening torque of injector adjusting screw.
4. Inspect and adjust engine valve clearance.

For these items of maintenance from the second time and on, see 1000 hours maintenance and 2000 hours maintenance.

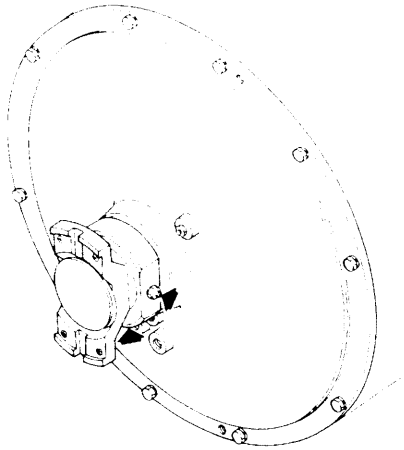
a. GREASE THE FOLLOWING PART

1. Propeller shaft (5 points)





2. Output shaft (2 points)



b. CHECK AND CORRECT OIL LEVEL

1. Final drive case

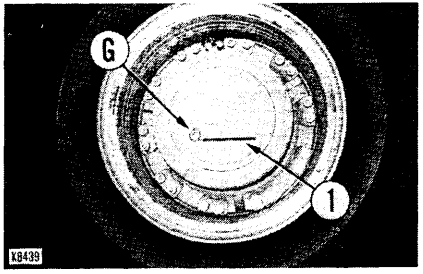
Stop the truck so that the cast line (1) comes into horizontal. Remove the plug (G) and check for the oil level. If the oil level is not near the lower edge of the plug hole, add engine oil through the same plug hole.

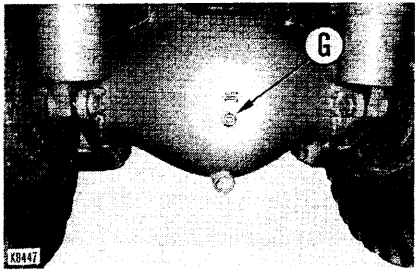
★ Use CLASS-CD SAE10W engine oil for all seasons.

2. Differential case

Check the oil level at check plug hole (G). If oil is not seen just below the plug hole edge, add oil through the same plug hole.

★ Use CLASS-CD SAE30 engine oil for all seasons.





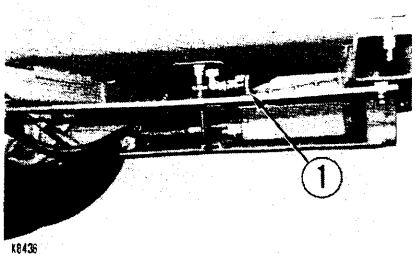
c. FUEL FILTER

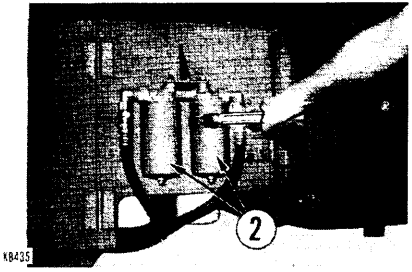
Close fuel tank cock (1) and turn cartridge (2) to the left to remove.

Then fill fuel in the new cartridge and install.

★ Screw in the new cartridge 1/2 to 3/4 turn after the head has come into contact with the seal surface.

★ Install it by hand.

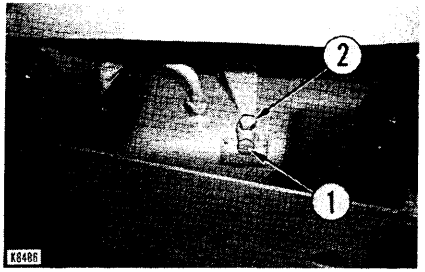




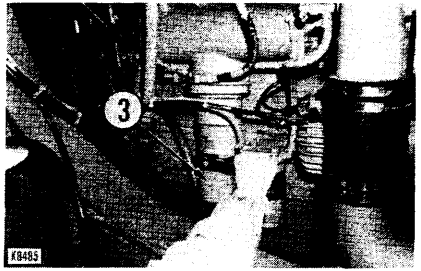
d. ENGINE OIL PAN, AND FULL-FLOW FILTER CARTRIDGE

HD320:

1. Remove the cover on the bottom side of the body, remove inside drain plug (1) and loosen drain cock (2) to drain the oil. After draining, tighten drain cock (2) and drain plug (1). Also drain oil from the drain plug of the by-pass filter.



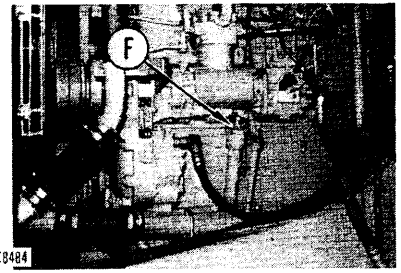
2. Use the attached tool to remove full-flow filter cartridge element (3) by turning it counterclockwise. Clean the dirt and unfiltered oil from the filter base, and install a new filter element coated with engine oil (or thin grease) on the packing surface. For installation, manually tighten about 2/3 turn after the packing surface comes into contact with the seal surface. (Do not tighten too much.)



3. After replacing the element, add the specified amount of new engine oil through oil filler (F).
   Idle the engine a while after adding oil, and check that the oil level is at H.

★ Refill capacity (oil pan capacity): 25ℓ

★ Avobe 0°C: Use engine oil CLASS-CD SAE30.
Below 10°C: Use engine oil CLASS-CD SAE10W.



HD325:

Remove drain valve cap (P) and insert the tip of oil drain tube for draining.

★ Drain oil in bypass filter and full-flow filter at this time.

★ Above 0°C: Use engine oil CLASS-CD SAE30.
Below 10°C: Use engine oil CLASS-CD SAE 10W.

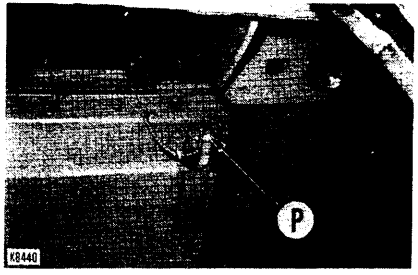
★ Refill capacity (oil pan capacity): 35ℓ

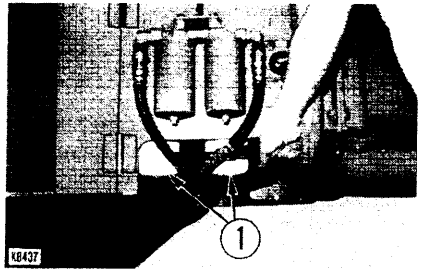
Replace the full-flow filter cartridge (1) when changing engine oil. Turn the cartridge counterclockwise to remove; install a new cartridge filled with oil.

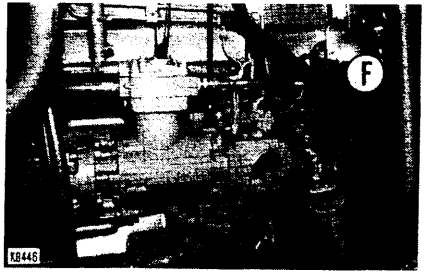
★ Screw in the cartridge 1/2 to 3/4 turn after the head has come into contact with the seal surface.

★ Install by hand—do not use any tool.

★ Use a genuine Komatsu cartridge.







e. BY-PASS FILTER ELEMENT

The by-pass filter element should be replaced when the oil in the engine oil pan is changed.

Drain the oil through the drain plug hole (5). Loosen the center bolt (2), then remove the band (3) and cover (4). Loosen the upper support and remove the element. Wipe off the oil and dirt remaining in the filter case, then install a new element. Upon completion of the above, reinstall the cover on the filter, and fill the case with the specified engine oil. It should be kept in mind that the cover O-ring is also to be replaced when replacing the filter element.

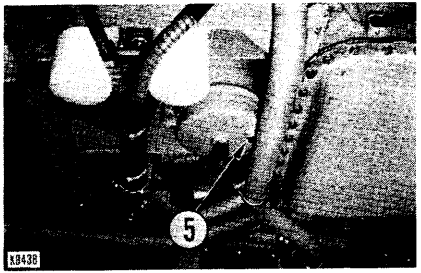
★ The orifice plug at the oil outlet (bottom of case) should be thoroughly cleaned with compressed air.

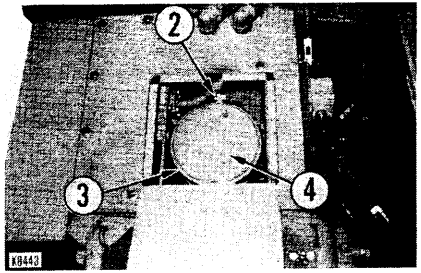
★ Use only the genuine Komatsu element.

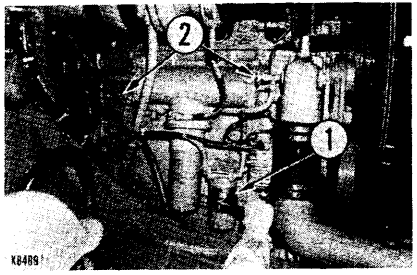
f. CORROSION RESISTOR CARTRIDGE

HD320:

Tighten two valves (2) on the corrosion resistor piping. Turn the cartridge type corrosion resistor (1) and remove it, and then install the new cartridge. Upon completion of the replacement, open the valves (2).







Screw in new cartridges by hand until the seals contact the filter heads, then turn them additional 1/2 to 3/4 turn with the wrench. Open the valves after replacement.

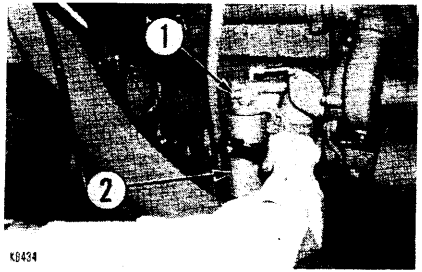
- ★ When changing cooling water at the same time, use a precharge cartridge and DCA-4 Pack or six bottled DCA-4 in the cooling water.
- ★ When supplying a great amount of cooling water, use DCA-4, a pack per 15ℓ of cooling water.
- ★ Use genuine Komatsu cartridge.

HD325:

Turn cock (1) to the OFF position and turn cartridge type corrosion resistor (2) to replace with new one.

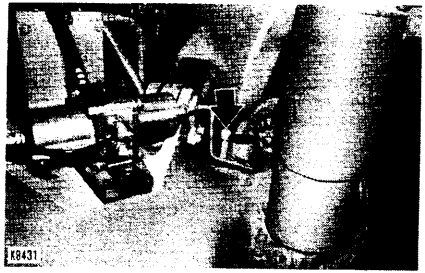
Screw in the new cartridge 1/2 to 3/4 turn after the head has come into contact with the seal surface.

After replacement, turn cock (1) to the "ON" position.

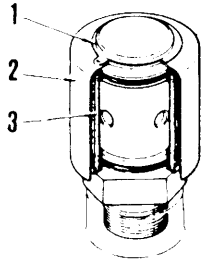


g. BREATHERS

1. Differential case breather
   Remove the breather, and eliminate dirt and sludge in the breather with clean solvent.

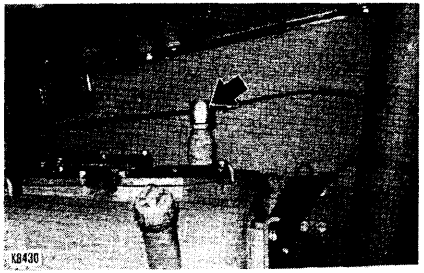


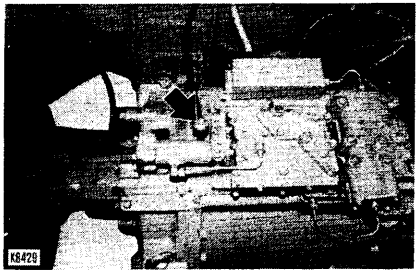
2. Hydraulic tank breather
   Remove the breather snap ring (1). Remove the cover (2), and clean the element (3).
   If extremely dirt, replace it.

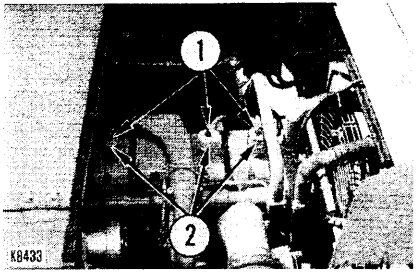


3. Transmission breather
   Remove the breather and rinse out dirt with clean light oil.

4. Engine crankcase breathers (HD325 only)
   Loosen wing nut (1) of the breathers on engine head cover, and remove cover (2), gasket, and the element,
   Wash the removed element, parts and case with light oil.
   Dry the cleaned element with air, dip it into engine oil, and reinstall it.







h. RADIATOR FINS

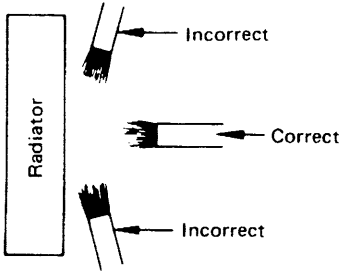
If the radiator fins are clogged with mud, etc., blow with compressed air. Ateam or water may be used for this purpose.

★ Check rubber hoses for cracks or brittleness and, if necessary, replace. Check hose clamps for looseness and, if necessary, retighten.

Air pressure should be less than 10kg/cm^2 and steam pressure is less than 4kg/cm^2.

Never touch the nozzle of the air or steam to the radiator fins.

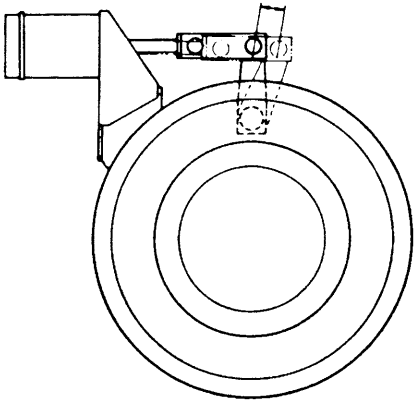
★ Be sure to keep the air or steam nozzle perpendicular to the radiator.



i. PARKING BRAKE LEVER TRAVEL

Check the parking brake lever for proper travel. If any travel exceeding 30mm is found, adjust the brake.

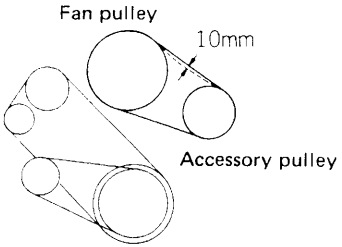
★ Refer to "ADJUSTMENT" section.



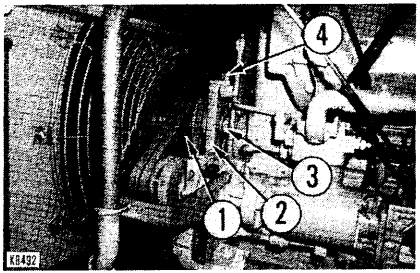
j. CHECK AND ADJUST BELT TENSION

1. Fan belt (HD320 only)

The tension of the fan belt is correct if the belt deflects 10mm when the middle point between the fan pulley and the accessory pulley is depressed with the thumb (6kg force).



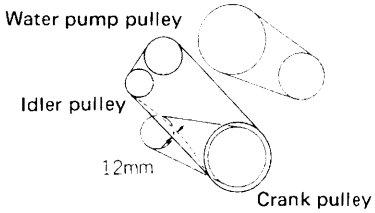
To adjust, loosen nuts (3) fastening fan pulley (1) to fan bracket (2), and turn in or out adjust bolt (4). Turn bolt (4) in to raise the fan pulley, so that the belt is tightened. After tightening nuts (3) to set the belt to the adjusted tension, loosen bolt (4) a half turn.

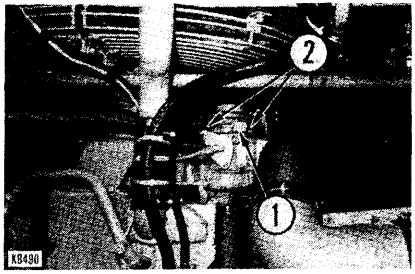


2. Water pump belt (HD320 only)

Belt tension is normal if a deflection of 12 mm is obtained by applying a finger force (about 6 kg) midway between the water pump pulley (1) and the crank pulley (2).

To adjust, loosen bolts (3) fixing idler pulley, and move idler pulley.





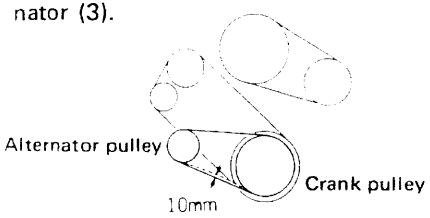
3. Alternator belt

Belt tension is normal if a defection 10 mm is obtained by applying a finger force (about 6 kg) midway between alternator pulley (1) and the crank pulley (2).

Adjustment

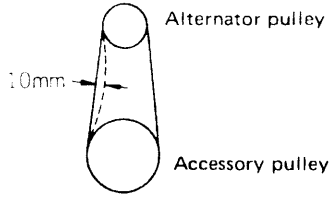
HD320:

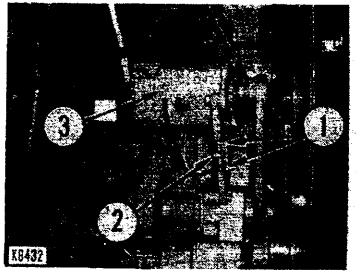
To adjust loosen bolts (1) fixing alternator, and fastening bolt (2) under alternator. Then, move the alternator (3).



HD325:

To adjust, loosen lock nut (1), turn turnbuckle (2) and shift alternator (3). After adjustment, securely tighten lock nut (1).





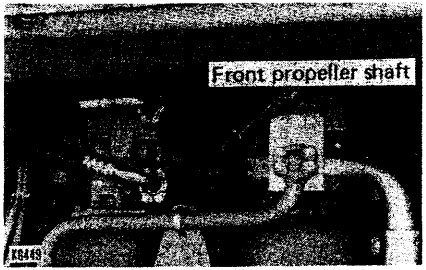
★ Check each pulley for damage and worn V-groove and each belt for wear. Carefully check for V-belt contacting with the bottom of V-groove.

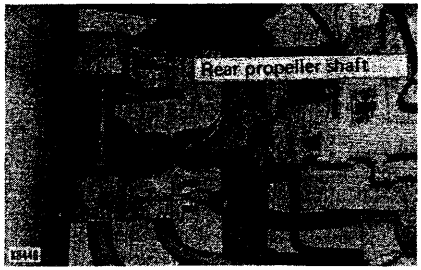
★ Replace a belt when it is stretched so that no allowance for adjustment remains or when it is scratched or cracked.

★ When the belts are replaced, idle the engine for one hour. Then, check and readjust the belt tension, as required.

k. PROPELLER SHAFT

Check the propeller shaft for any abnormality such as loose joints, worn splines or bearing, unusual vibration of the shaft, etc. If any, have the shaft serviced by a Komatsu distributor.



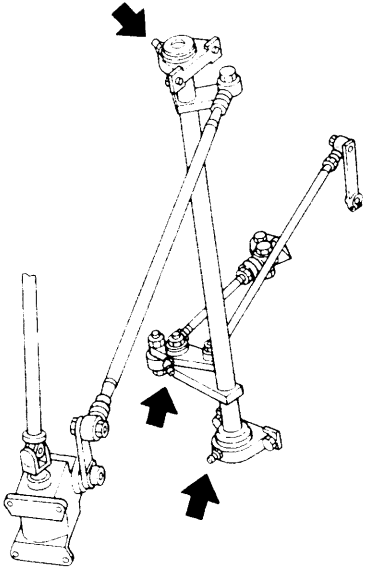


EVERY 500 HOURS SERVICE

a. GREASE THE FOLLOWING PART

Grease at each grease fitting shown by arrows:

- Steering follow-up linkage(3 points)

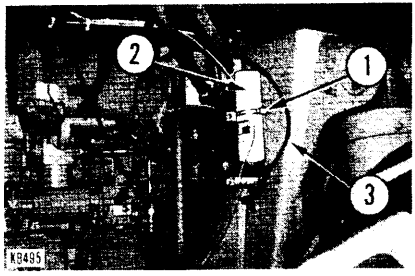


b. ETHER SPRAY

1. Loosen wing nuts (1) and remove fuel cylinder (2). Check the control cable and the valve for proper function by trying to pump the quick start knob.

★ Before removing the fuel cylinder, clean the valve inlet port to prevent dust and dirt from entering the valve.

HD320



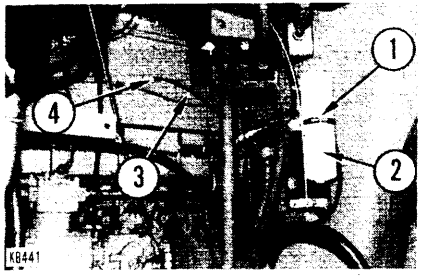
★ **The maintenance for every 50 and 250 hours should be carried out at the same time.**

2. Remove tube (3) from atomizer (4) and remove the atomizer from the air intake pipe. Connect the tube (3) and the atomizer again, and check that each orifice in the atomizer sprays ether properly.

⚠ **Keep the spray far from open fires during checking.**

★ Do not abuse the ether spray unless it is needed to help easy starting of the engine in cold weather.
Refer to "STARTING ENGINE IN COLD WEATHER".

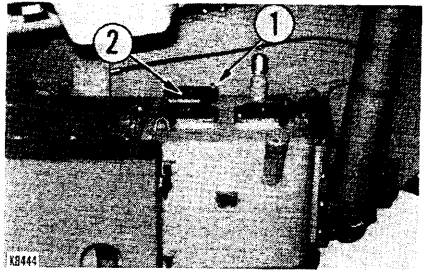
HD325



c. HYDRAULIC FILTER ELEMENT

Remove bolt (1), cover (2) and the element. Clean interior of the case and the removed parts and install new element.

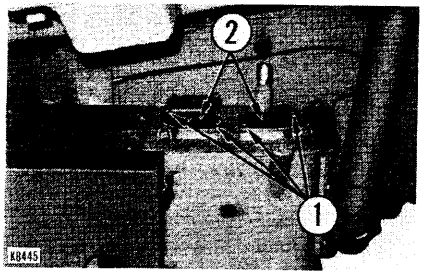
Replace the O-ring at the same time. If the hydraulic oil filter warning lamp lights up when the oil is warm with the engine in high idle, immediately replace the element.



d. TRANSMISSION FILTER ELEMENT

Remove bolt (1), cover (2) and the element. Clean interior of the case and the removed parts and install new element.

Replace O-rings in the two elements at the same time. If the transmission oil filter warning lamp lights up when the oil is warm with the engine in high idle, immediately replace the elements.

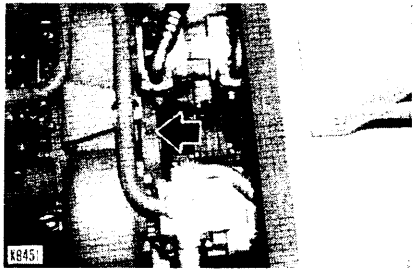


EVERY 1000 HOURS SERVICE

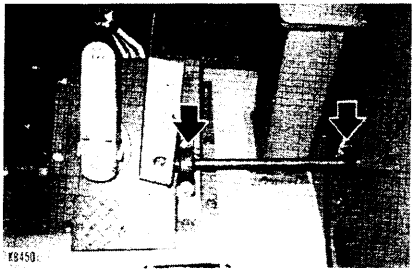
a. GREASE THE FOLLOWING PART

Grease each grease fitting shown by arrow

1. Transmission mount (1 point)

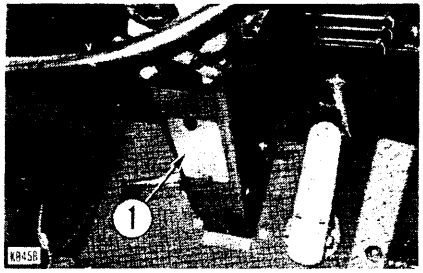


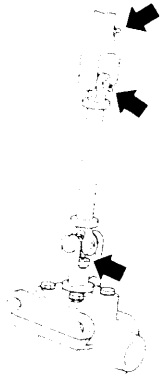
2. Accelerator control linkage (2 points)



3. Steering column (3 points)

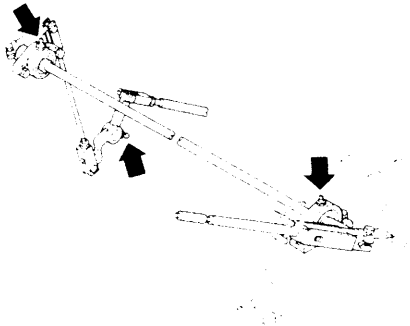
Loosen bolt, remove cover (1) and apply grease.



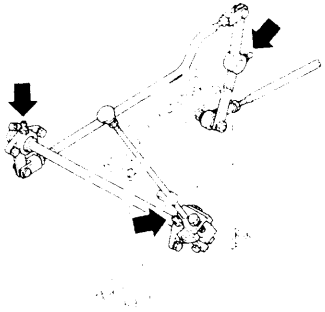


★ **The maintenance for every 50, 250 and 500 hours should be carried out at the same time.**

4. Dump control linkage (3 points)



5. Transmission control linkage (HD320 only) (3 points)



b. CHANGE OIL IN THE FOLLOWING UNITS:

★ **Change oil every 1000 hours or 10000 km whichever comes earlier.**

1. Hydraulic tank

Lower the dump body, stop the engine, and wait for lowering of oil temperature. Remove drain plug (P) to drain the hydraulic tank. Then, refill the tank with fresh engine oil through the oil filler (F).

⚠ **When removing the cap, turn it slowly to relieve pressure.**

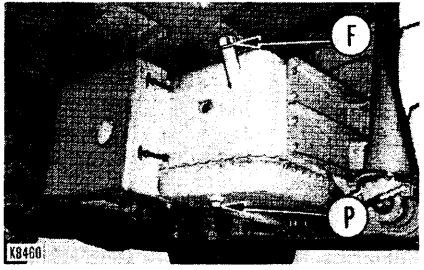
★ Use CLASS-CD SAE10W engine oil for all seasons.

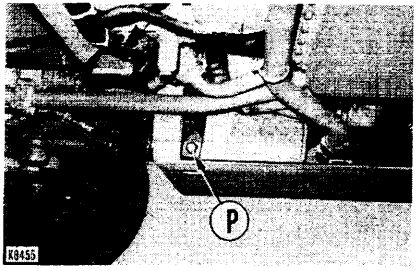
★ Refill capacity: 105ℓ

★ See "CHECK BEFORE STARTING" for the refilling procedure.

2. Transmission case

Drain oil through the drain plug (P). Clean the transmission oil strainer, and replace the oil filter element. Then, fill the transmission case with the specified amount of oil through oil filler (F).





★ Above 0°C: Use engine oil CLASS-CD SAE30.
Below 10°C: Use engine oil CLASS-CD SAE10W.
★ Refill capacity: 95ℓ
★ For the lubrication procedure, refer to "Check before starting."

3. Final drive case

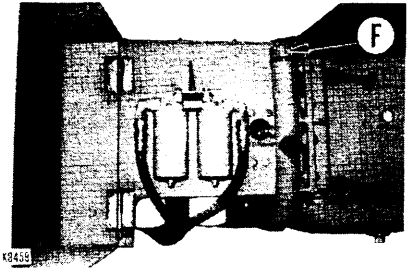
Park the truck so that cast line (1) becomes horizontal. Remove the wheel clamp (2) and drain plug (P) to drain the case. Then, refill the case with fresh engine oil through the oil filler (G).

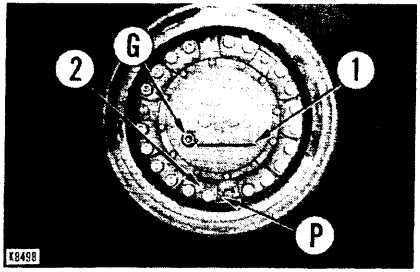
★ Use CLASS-CD SAE30 engine oil for all seasons.
★ Oil capacity: 13ℓ for each case.
★ See "EVERY 250 HOURS SERVICE" for the refilling procedure.

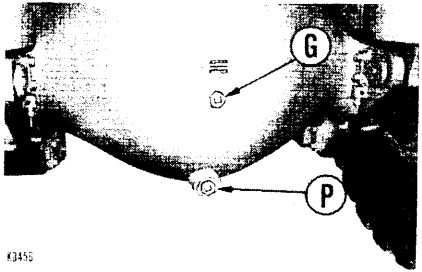
4. Differential case

Remove the drain plug (P), then drain oil through the plug hole. Fill the differential case with the specified oil through the oil filler (G).

★ Use CLASS-CD SAE30 engine oil for all seasons.
★ For the lubrication procedure, refer to "EVERY 250 HOURS SERVICE"
★ Oil capacity: 45ℓ



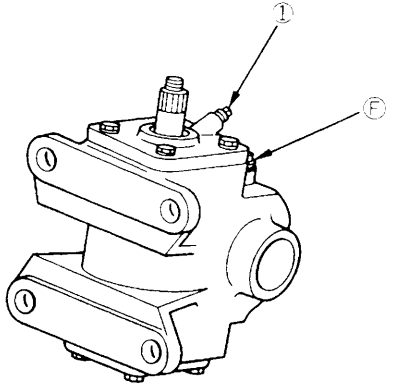




c. STEERING GEAR BOX

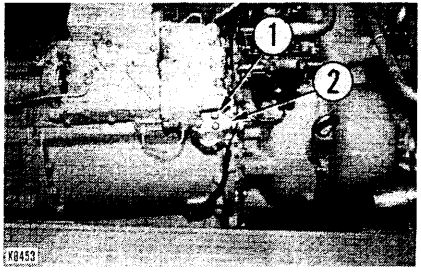
Remove oil filler (F) and check the oil level. If oil is not seen just below the plug hole, remove air bleeding plug (1) and add oil through filler (F).

★ Use SAE30 engine oil for all seasons.



d. TRANSMISSION OIL STRAINER

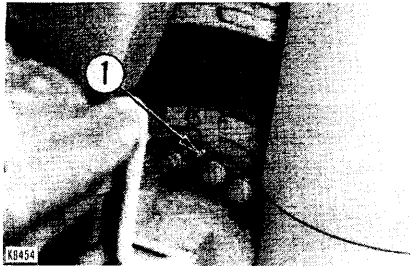
The strainer should be cleaned simultaneously when the element is replaced after changing oil. Remove the bolt (1) at the left side of the transmission case. Remove the cover (2) then remove the strainer and magnet. Upon completion of cleaning the strainer and magnet, reinstall them.



e. REAR BRAKE WEAR

1. Shift parking brake lever to PARKING and secure fool brake does not work.
2. Remove air bleeding valve (1) of rear brake and insert disc wear gauge (P/N 566-98-41120) in to the air bleeding valve.

⚠ **Check rear brake for wear when the brake oil temperature is below 60°C and the engine is stopped.**

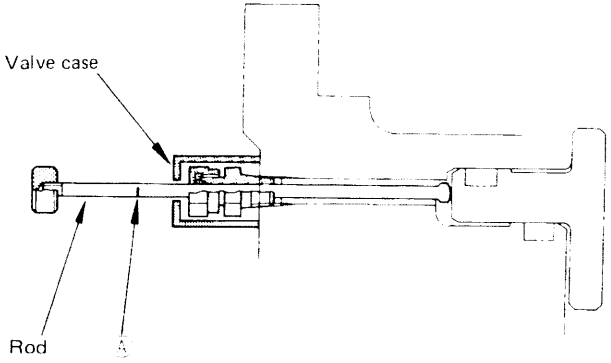


3. Turn starting switch to "ON", check air pressure gauge pointer indicates in green range.
   When air pressure is low, turn the engine as to keep 2000 rpm till the air pressure gauge indicates in the green range, then, turn off the starting key to "OFF".
   At same time, pull retarder control lever to full stroke and push the wear gauge in till in contacts to top face of piston (See illustration below)

4. When mark (A) shown on the gauge passes through in the valve case, this means wear of disc is in the limit of wear.
   In such a case, contact to your Komatsu distributor for maintenance.

5. The above procedures should be done to the another rear brake.

★ After finish the wear check, bleed air out completly. (Refer to AIR BLEED, page 133.)



EVERY 2000 HOURS SERVICE

a. TURBOCHRGER BLOWER IMPELLER (HD320)

Excessive carbon or oil sludge adhering to turbocharger blower impeller may deteriorate normal performance of turbocharger and may sometimes damage it.

Contact Komatsu distributor or clean in the following procedure.

1. Remove blower housing and air intake manifold.
2. Wash impeller using light oil. Do not use wire brushes or the like to prevent damage to impeller surface.

b. ALTERNATOR AND STARTING MOTOR

If the carbon brushes are worn, contact your Komatsu distributor for replacement. If the alternator and starting motor are disassembled carelessly, the moistureproof construction may be lost. To prevent this, it is recommended to request a specialist to perform disassembly.

★ If the truck is required to operate at night and to consume large amount of electricity for the lighting system, request your Komatsu distributor to accomplish the maintenance at intervals of 1,000 hours.

★ The maintenance for every 50, 250, 500 and 1000 hours should be carried out at the same time.

c. CLEAN EMERGENCY RELAY VALVE

d. COMPONENT PARTS FOR SAFETY

Refer to "PERIODIC REPLACEMENT OF COMPONENT PARTS FOR SAFETY" page 97.

e. RETIGHTEN INJECTOR MOUNTING BOLTS

f. CHECK AND ADJUST INJECTOR ADJUST SCREW TORQUE (HD320)

g. CHECK INJECTOR

h. CHECK AND ADJUST ENGINE VALVE CLEARANCES

Since all works in itmes f. g. and h require special tools designed for exclusive use, contact your Komatsu distributor for servicing.

EVERY 4000 HOURS SERVICE

a. TURBOCHARGER ROTOR PLAY

Check the turbocharger rotor plays by the following procedure. If necessary, consult a Komatsu distributor for servicing.

To check the rotor plays, remove the air cleaner intake pipe and the muffler, and proceed as follows:

HD320:

1. Remove the blower housing and move the rotor in the axial direction to check for its axial play. The play should be less than 0.18 mm.
2. Leaving the blower housing removed, push the turbine shaft end in the radial directions to check for the play of the blower impeller boss. The play should be less than 0.6 mm.
3. Install the blower housing. Push the blower impeller in the radial directions, and check the clearance between the blower housing and the blower impeller with a thickness gauge. Take the clearance readings at four points equally spaced around the impeller. All four readings should be larger than 0.2 mm.

★ The maintenance for every 50, 250, 500, 1000 and 2000 hours should be carried out at the same time.

HD325:

1. Remove the blower housing and move the rotor in the axial direction to check for its axial play. The play should be less than 0.10 to 0.23 mm.
2. Leaving the blower housing removed, push the turbine shaft end in the radial direction to check for the play of blower impeller boss. The play should be less than 0.08 to 0.18 mm.

★ If any play or clearance exceeds the specified limit, have the turbocharger repaired by a Komatsu distributor.

★ If the rotor is excessively dirty or soiled with carbon, or if there is an evidence of oil leakage caused by any trouble of the turbocharger, have the turbocharger repaired by a Komatsu distributor.

b. TURBOCHARGER
VARIOUS FASTENERS

Any leaky joint connecting to the engine exhaust pipe will cause a lowering of oil pressure, resulting in seizing of bearings. Periodically inspect all joints for looseness and, if necessary, retighten.

HD320:

Tightening torque for the turbine and blower casing clamping bolts:
1.0 to 1.5 kgm

Tightening torque for exhaust pipe connecting bolts: 9.5 to 12.5 kgm

HD325:

Tightening torque for blower housing and center housing mounting V-band nuts: 0.811 to 1.0 kgm

Tightening torque for center housing and turbine housing mounting bolts: 1.2 to 1.3 kgm

Tightening torque for turbocharger mounting bolts: 3.04 to 3.87 kgm

Tightening torque for exhaust coupling mounting bolts:
1.5 to 3.5 kgm

c. VIBRATION DAMPER

Check decrease of damper fluid, dent or out-of-flat. If there is any abnormality, contact Komatsu distributor for repair.

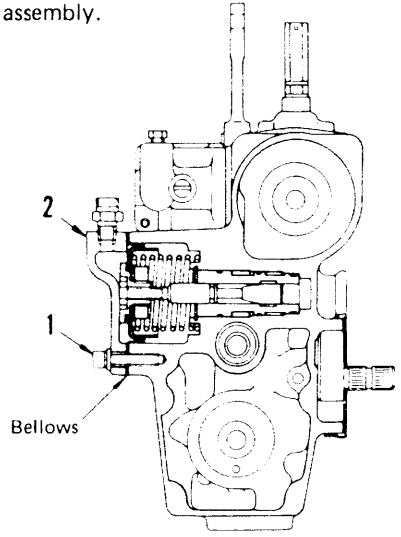
(Rubber damper)

Hub and damper have engraved marks that indicate whether they are in position or not.

If the marks are not in line or the rubber placed between hub and damper is damaged, request that they be checked by your Komatsu distributor.

d. REPLACE PT PUMP AFC BELLOWS

After removing the tube connecting the intake manifold, remove bolt (1) and cover (2) and replace the bellows together with the plunger assembly with a new bellows and plunger assembly.



e. TURBOCHARGER BLOWER IMPELLER (HD325)

Excessive carbon or oil sludge adhering to turbocharger blower impeller may deteriorate normal performance of turbocharger and may sometimes damage it.

1. Remove blower housing and air intake manifold.
   Wash impeller using light oil. Do not use wire brushes or the like to prevent damage to impeller surface.
2. Contact Komatsu distributor for adjustment.

f. WATER PUMP

Check the water pump for play in the pulley, grease leakage and water leakage. If a fault is detected, ask Komatsu distributor to disassemble and repair or replace.

g. REPLACEMENT OF COMPONENT PARTS FOR SAFETY

Refer to "PERIODIC REPLACEMENT OF COMPONENT PARTS FOR SAFETY", page 97.

h. RETIGHTEN INTAKE AND EXHAUST MANIFOLD MOUNTING NUTS AND BOLTS

i. CHECK, CLEAN AND CALIBRATION FOR INJECTOR

j. CHECK, CLEAN AND CALIBRATION FOR PT PUMP

k. REPLACE PT PUMP FILTER SCREEN AND MAGNET

l. CHECK AIR COMPRESSOR

m. CHECK CRANKSHAFT END PLAY

n. CLEAN OIL COOLER

Since all works above-mentioned (d, e, i, j, l, m and n) requires special tools, contact Komatsu distributor for repair.

WHEN REQUIRED

a. CHECKING, CLEANING AND REPLACING AIR CLEANER ELEMENT

Checking

Whenever the red piston in the dust indicator (1) appears, clean the air cleaner element. Stop the engine when cleaning the element.

Cleaning or replacing outer element

1. Loosen wing bolt (3) and remove band (4) and cover (5).
2. Clean the air cleaner body interior and the removed cover.
3. Clean and inspect the element. (See the next page for cleaning procedure.) Install the cleaned element.
4. Push the dust indicator reset button (2) to return the red piston to the original position.

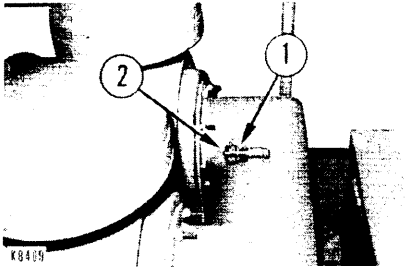
★ When the dust indicator red piston appears soon even after installing the cleaned outer element, replace both the inner and outer elements.

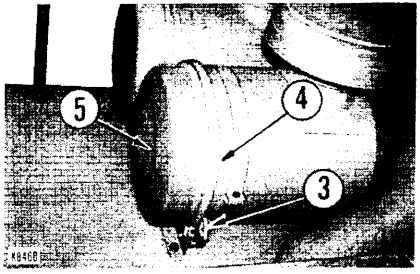
★ Replace the outer element which has been cleaned 6 times repeatedly. Replace the inner element at the same time.

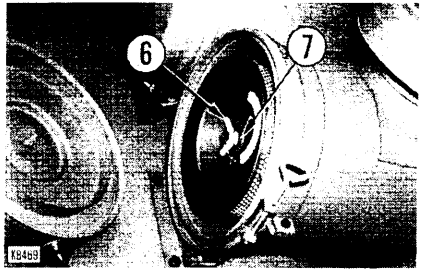
★ Replace inner and outer elements once a year even though the outer element is cleaned less than 6 times.

★ Check nuts of the inner element for looseness, and retighten them if necessary.

★ If seal washer (7) or wing nut (6) are damaged, replace them.







Replacing inner element

1. First remove the cover and the outer element, and then remove the inner element.
2. Cover the air inlet port.
3. Clean the air cleaner body interior. Remove the cover from the air inlet port.
4. Fit a new inner element to the connector and tighten it with nuts.
5. Install the outer element and the cover. Push the dust indicator reset button.

NOTE: Always replace the inner element. Do not attempt to reuse by cleaning.

⚠ **When cleaning or replacing the air cleaner element, do not start the engine.**

Cleaning outer element

With compressed air

Direct dry compressed air (less than 7kg/cm^2) to element from inside along its folds, then direct it from outside along its folds and again from inside, and check element.

⚠ **When using compressed air, wear safety glasses and other things required to maintain safety.**

The following methods require spare parts.

With water

Dash city water (less than 3kg/cm^2) on element from inside along folds, then from outside and again from inside. Dry and check it.

If heavily contaminated, carry out the following steps:

1) Dissolve 300 g of the detergent into 20ℓ of water (full capacity of an oil can).
2) Immerse the element for 15 minutes.
3) After rinsing, wash dirt off with clean water.
4) Inspect the element after drying it. Dry with a fan or in shade.

With cleaning agent

For removing oils and fats as well as carbon etc. attached on the element, the element may be cleaned in lukewarm solution of mild detergent, then rinsed in clean water and left to drip dry.

★ Drying can be speeded up by blowing dried compressed air (less than 7kg/cm^2) from the inside to the outside of the element.
Never attempt to heat the element.

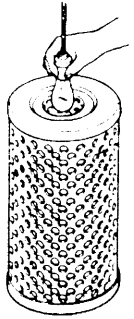
★ Using warm water (about 40°C) instead of soapy water may also be effective.

★ If small holes or thinner parts are found on element when it is checked with an electric bulb after cleaning and drying, replace the element.

★ If element is usable, wrap it and store it in dry place.

★ Do not use element whose folds or gasket or seal are damaged.

★ When cleaning element, do not hit it or beat it against something.



b. CHANGE COOLING WATER (Half-annually when anti-freeze is filled in autumn and drained in spring.)

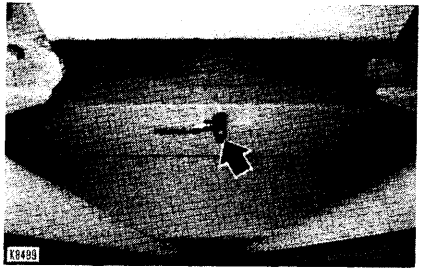
Draining and refilling procedure

1. After stopping engine, tighten corrosion resistor valve and remove water filler cap of radiator.
2. Open drain cocks (cylinder block, water pump and radiator) to drain water in radiator completely.
3. After draining, clean with normal wash. Cleaning must be carried out according to each cleaning method as indicated with brand.
4. After cleaning, drain water completely. Close drain cock and then supply water (ex. city water) through water filler.
5. When water reaches at water filler, operate engine with low idling. Open drain cock and continue to supply water until clean water comes out.
6. When the water becomes clean completly, tighten drain cock, but continue to supply water. When water reaches over flow pipe, stop to supply water temporary.
7. Replace corrosion resistor element (or cartridge) and open valves (2 points).
8. Then after opening valve, operate engine for first 5 minutes with low idling and for next 5 minutes with high idling to let out mixing air in cooling water. (In case of this operation water filler cap must be removed.)
9. After 3 minutes to stop engine, refill water until water reaches over flow pipe and tighten water filler cap.

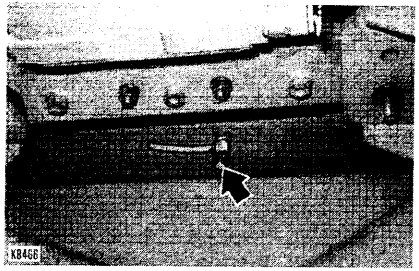
★ When changing water, machine must be placed horizontally.

★ Replace corrosion resistor (or cartridge) without fail.

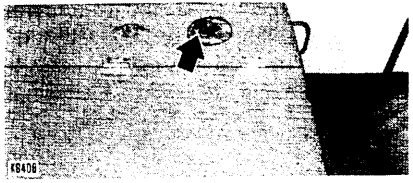
Drain cock (HD320)



(HD325)



Water filler



- Flushing the radiator
  Disconnect upper and lower hoses, and firmly tighten the radiator cap. Fit hose connectors to upper and lower hose joints. Connect the flush gun nozzle to the lower hose connector and fill radiator with water. After filling, gradually increase the air pressure to prevent damage to the radiator core. Stop the air, refill the radiator with water, and apply air pressure. Repeat these steps until clean water comes out of the radiator.

★ Do not apply too much air pressure when flushing the water, as it may burst or damage the radiator core.

- Flushing the cylinder block
  Remove the thermostat from the housing. Fill the cylinder block with water and flush the water out from the lower opening under air pressure.
  Repeat these steps until clean water comes out of the cylinder block.

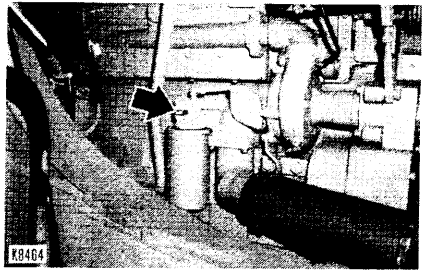
⚠ **Do not remove the cap when the water is hot. When removing the cap after water has cooled down, slowly turn the cap to release the internal pressure.**

★ When changing cooling water, replace corrosion resistor cartridge at the same time.

Corrosion resistor cartridge

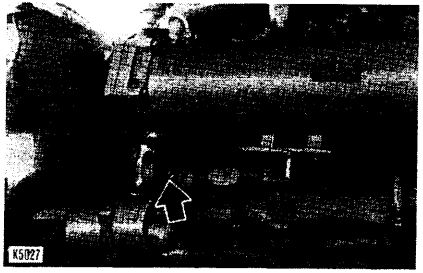
HD320:

HD325:

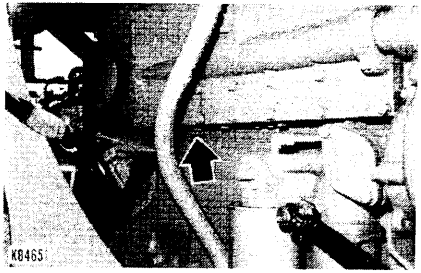


Drain cock (cylinder block)

HD320

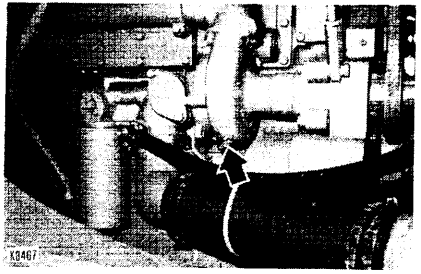


HD325



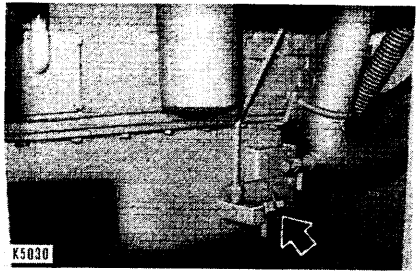
Drain cock (water pump)

HD325



Drain cock (oil cooler)

HD320



c. WHEEL BRAKE SCREW

When replacing the brake lining, always exchange the grease at the wheel brake screw at the same time.

Do not use another kind of grease, as poor braking or other defects may result.

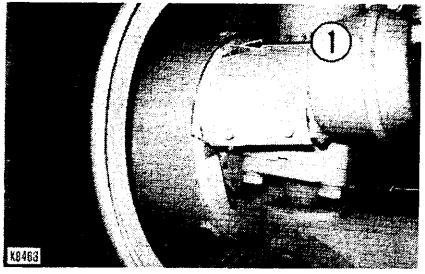
Specified grease: Molytherm 265
Part No.: 565-98-12770

★ Ask a specified service shop to exchange the grease.

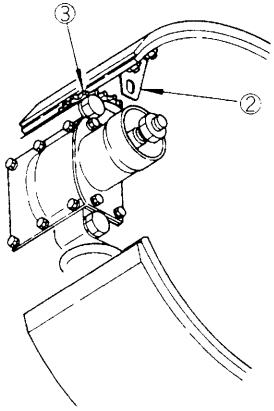
ADJUSTMENT

ADJUSTMENT OF FRONT BRAKE

To adjust, remove the upper side back plate (1), turn in adjuster wheel (3) using a screwdriver as a lever and the hole in guide (2) as a fulcrum until both the upper and lower halves of the drum come into close contact with the lining. Then, turn back the adjuster wheel by 7 or 8 clicks, and the standard clearance will be obtained.



★ The adjuster wheel (3) is provided with right-hand threaded screw. Turning the adjuster wheel in the direction shown by the arrow mark (on the upper half of back plate for the rear wheel or on the lower half of back plate for the front wheel) will cause clearance to decrease.



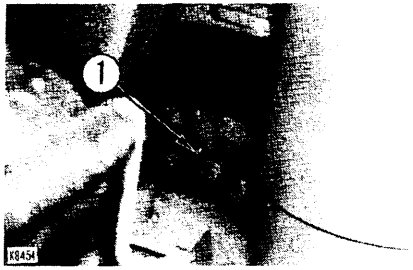
★ When replacing the brake lining, always exchange the grease at the wheel brake screw at the same time.

BLEEDING AIR FROM REAR BRAKE

a) Loosen the air vent plug (1) and depress the brake pedal. Close the plug, then release the brake pedal.

b) The above procedure should be repeated until air bubbles are completely expelled through the plug hole. Then close the plug tightly.

★ Service at the same time with "1000 hours service for disc wear check".

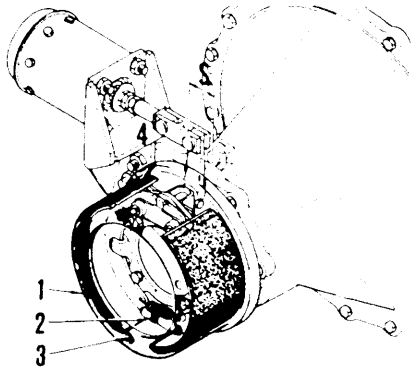


ADJUSTMENT OF PARKING BRAKE

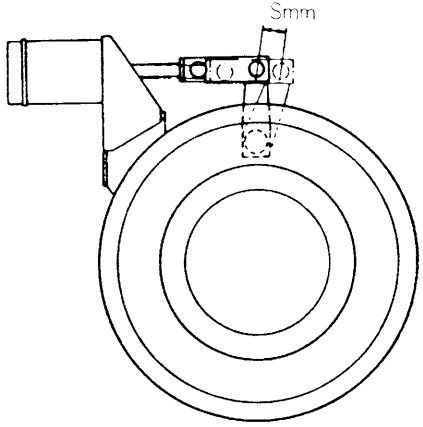
The adjustment shall be made as follows:

Rotate the drum (1) so that the adjustment hole (3) of the drum (1) positions on the adjuster wheel (2).

Next turn the adjuster wheel (2) with a screwdriver through the adjustment hole (3) so that the lining comes close to the drum (1); then return the adjuster wheel by 25 teeth to get the standard clearance of 0.5mm.

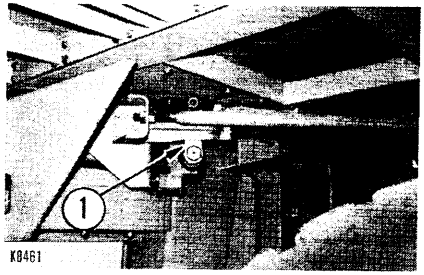


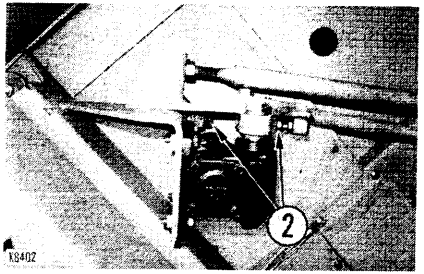
In this case the travel S of the brake lever is below 30 mm; when it exceeds 30 mm, it is necessary to change the lining or inspect the parking brake link assembly. Therefore, you should request this of your Komatsu distributor.



ADJUSTMENT OF THE TURNING RADIUS

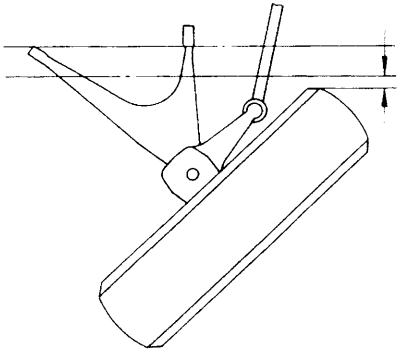
Turning radius of the truck can be set to the specified value by adjusting the length of the stopper bolts (2) of the pitman arm (1).



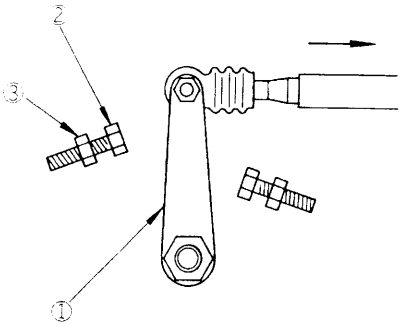


To adjust, proceed as follows:

1. Start the engine and manipulate the steering wheel so that the truck wheels are arranged in the forward traveling direction. Check that the pitman arm (1) is directed in perpendicular to the ground surface.
2. Turn the steering wheel to the right (or left) until the clearance between the top of the tire and the frame becomes in the range as follows.
   (tire 18.00-25): 180 ~ 240 mm
   (tire 18.00-33): 100 ~ 160 mm
   Stop the engine.



3. Turn the stopper bolt (2) out until it comes into contact with the pitman arm (1) and set in that position with lock nut (3). Similarly, set the other stopper bolt on the opposite side.



CHECK SUSPENSION CYLINDERS.

During operation, the following abnormalities may be noticed: the truck bounces greatly, the suspension cylinder is shortened and hits against the stopper, or the operator senses an excessive bouncing caused by unlevel ground surfaces. When these troubles are noticed, stop the truck immediately, and unload.

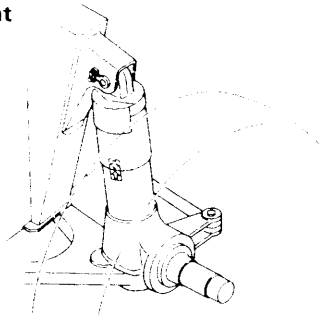
★ Check the cylinder length in the before-operation inspection.

1. Check for cylinder length

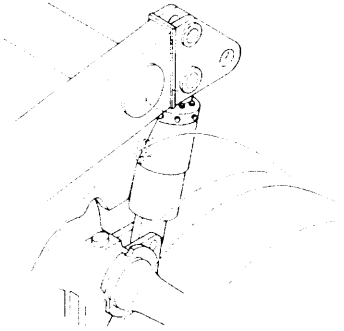
See if the bottom end of the suspension cover is within the proper range with the machine on level ground without load.

★ The suspension cylinder is filled with highly pressurized nitrogen gas and oil. The replacement and adjustment of the gas and oil should be accomplished by specialists, with special tools utilized. Additionally, danger is always associated with the replacement and adjustment.
It is, therefore, recommended a Komatsu distributor be contacted whenever the above procedure is to be accomplished.

Front



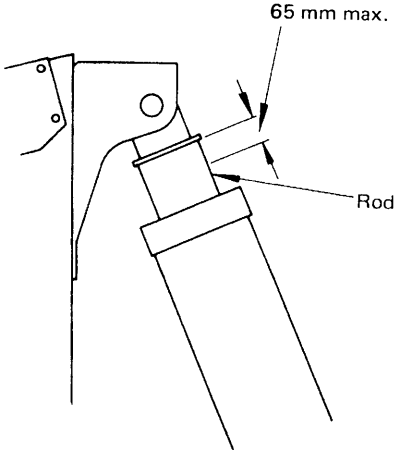
Rear



2. Check for cylinder oil amount

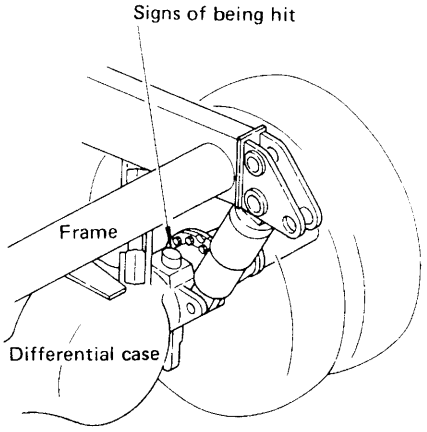
a. Front

If oil is short, the distance from the top of the slinding trace (glossy surface) of plated surface of rod to rod head shoulder becomes less than 65 mm.



b. Rear

If oil is short, signs of being hit are found on differential case and stopper.



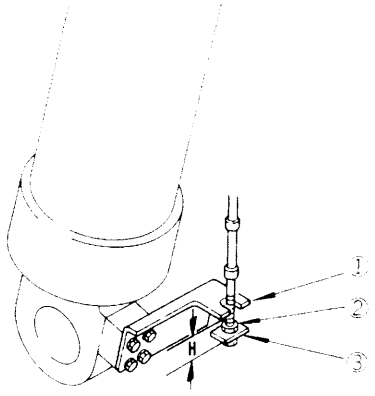
★ The suspension cylinder is filled with high-pressure nitrogen gas and oil. Adjustment and repair (such as filling oil) require special tools. Request service to your Komatsu distributor.

ADJUSTMENT OF DUMP BODY POSITIONER

The positioner is provided for automatic and shock-free stopping of the dump body when the dump body reaches any preset height (or turning angle).

To adjust the positioner, raise the dump body to the desired height and stop the engine. Loosen lock nut (3) and adjust (2) until it comes to contact with bracket (1). Tighten with the lock nut. Start the engine and move the dump lever to DUMP and check that the lever returns automatically to HOLD when the dump body reaches to the desired height (dump body turning angle).

★ If the clearance "H" shown in the figure exceeds 26 mm when the dump body is lowered, the hoist cylinder piston rod reaches its stroke end before the positioner works.



ADJUSTMENT OF STEERING WHEEL PLAY

The steerng wheel play is normal if it is in the range from 100 to 140mm measured along the wheel. If necessary, adjust as follows:

★ When adjusting, stop the engine.

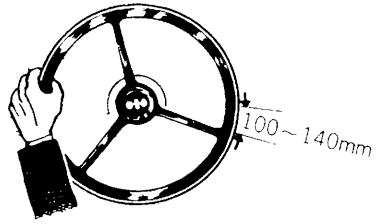
ADJUSTMENT

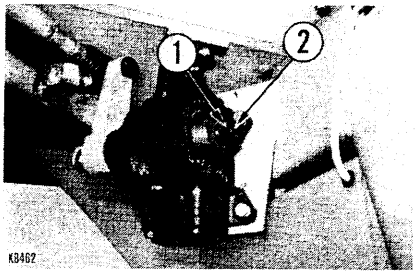
i) Keep the front wheel in the straight travelling position.

ii) Loosen the steering gear case lock nut (1) and adjust the play by turning the adjusting screw (2). Screw in the adjusting screw (2) and the play will be reduced. Return the screw, and the play will be increased.

iii) When the standard play is obtained, tighten the lock nut (1).

★ If the correct play cannot be obtained by the above procedures, consult your Komatsu distributor.





ADJUSTMENT OF BACK-UP ALARM VOLUME

Three degrees of back-up alarm volume can be selected according to the work area.

Changing method

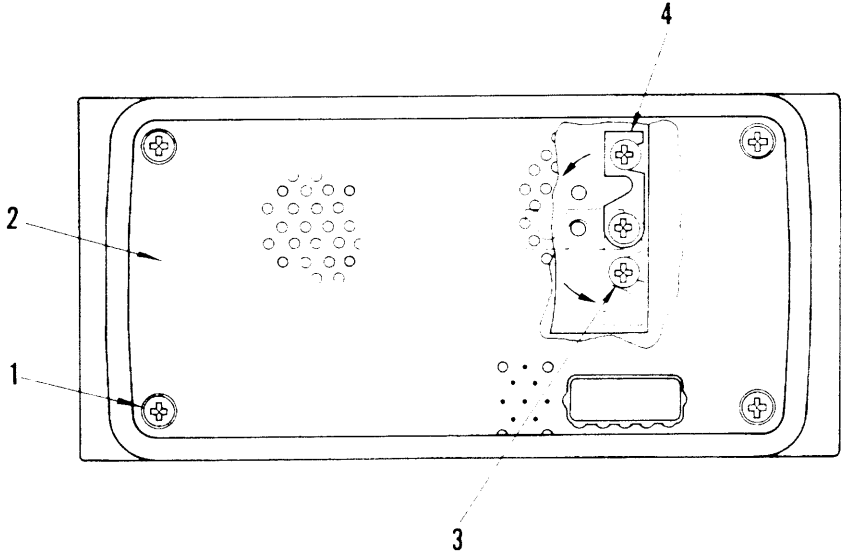
Loosen screw (1), remove cover (2), and you can find variable bridge. Three screws (3) indicate H, L and M respectively.

H: Maximum, 112 ± 4dB
Connect the bridge (4) to L and H.

L: Minimum, 97 ± 4dB
Connect one end of bridge (4) to L and the other end is set free.

M: Medium, 107 ± 4dB
Connect the bridge (4) to L and M.

Back-up alarm block circuit



WEAR PARTS

Wearing parts such as filter element should be replaced at the time of periodic service operation or before the service limit.

Assure replacement of wearing parts and use this machine effectively and economically.

Use excellent genuine Komatus products for parts to be replaced.

Item		Description	Quantity	Replacement Interval
Full-flow filter		Cartridge	HD320:1 HD325:2	Every 250 hours
By-pass filter		Element	1	Every 250 hours
Corrosion resistor		Cartridge ass'y	1	Every 250 hours or when cooling water is changed.
Fuel filter		Cartridge	2	Every 250 hours
Transmission oil filter		Element	2	Every 500 hours
Hydraulic filter		Element	1	Every 500 hours
Air cleaner	Inner and outer	Element ass'y	1	When required
	Outer	Element ass'y	1	

TROUBLE SHOOTING GUIDE

This guide is not intended to cover every conditions, however many of the more common possibilities are listed.

ENGINE

Oil pressure gauge pointer will not return to zero "O" when the engine is shut down.
- Defective oil pressure gauge.

Oil pressure gauge pointer fluctuates abnormally.
- Insufficient oil in oil pan.

Oil pressure gauge pointer stays within the red range (left) on dial.
- Insufficient oil in oil pan.
- Oil leakage due to damaged piping, loose piping joints or connections.
- Defective oil pressure gauge.
- Oil leaks from full-flow oil filter.

Oil pressure gauge pointer stays within the red range (right) on dial.
- Oil of too high viscosity.
- Defective oil pressure gauge.

(1) Steam sprouts out through the pressure valve on the radiator.
(2) Water temperature gauge pointer stays within the red range (right) on dial.
- Insufficient coolant or coolant leakage.
- Loose fan belt.
- Accumulated dust or scale in the cooling system.
- Clogged radiator fins or fins out of place.
- Defective water temperature gauge.
- Defective thermostat or its seal.
- Leaky thermostat seal.
- Loose radiator filler cap.
  (When operating at high altitude)

Water temperature gauge pointer stays in the red range (left) on dial during engine running.
- Defective thermostat.
- Defective water temperatue gauge.
- Too cooled engine

Engine fails to start.
- Insufficient fuel in fuel tank
- Air in fuel line.
- Insufficient torque of starting motor to crank up engine.
- No fuel in fuel filter

Engine emits white or blue-white exhaust gas.
- Excessive oil in oil pan
- Improper fuel use
- Oil leaks out of turbocharger piping

Engine emits black exhaust smoke
- Clogged air cleaner elements

Engine runs but operates erratically, (Hunting)
- Air leakage in fuel supply line

Engine creates knocking
- Use of improper fuel
- Overheat

ELECTRICAL CIRCUITS

Ammeter deflects widely when engine runs constantly.
Head lamps are dark when engine speed is at maximum.
Head lamps flicker when engine is running.
- Wiring is defective.
- Poor adjustment of tension for belt

Ammeter doesn't deflect when engine is running.
- Ammeter is defective.
- Wiring is defective.

Alternator is noisy.
- Alternator is defective.

Pinion emits squeaking noise when turning starting switch while engine is running.
- Wiring is defective.

Starting motor doesn't operate when turning on starting switch.
- Wiring is defective.
- Starting switch is defective.
- Batteries are discharged.
- Battery switch is defective.
- Speed control lever is not in neutral position (Manual type).

Starting motor cranks engine too slow.
- Wiring is defective.
- Batteries are not discharged enough.

Starting motor becomes disengaged just before cranking engine.
- Wiring is defective.
- Batteries are not discharged enough.

CHASSIS

Defective torque converter

- Torque converter oil pressure is excessively low.
- Torque converter is overheated.
  - Oil pipe joint is loosened. Air is in the torque converter, or oil is leaking through a damaged part.
  - Gear pump is worn or seized.
  - Transmission oil is insufficient.
  - Oil filter element in transmission case is clogged.
  - Fan belt is loosened.
  - Engine water temperature is too high.
  - Oil cooler is clogged.
  - Oil pressure is too low.
  - Amount of circulating oil is insufficient due to worn gear pump teeth.

Steering wheel is difficult to rotate.

- Steering linkage is not properly lubricated.

Brake is not applied effectively, even if brake pedal is depressed.

- Brake shoe adjustment is improper

Brake is unbalanced.

- Brake shoe adjustment is improper.
- Air leakage in brake circuit

Dump body operation speed is too low.
Responce of dump body to operation is slow.

- Gear pump is defective.
- Fluid quantity is insufficient.

Suspension is too tight.

- U packing is scratched with sand that has penetrated through a broken dust seal, and gas is leaking through the U packing.
- Gas is leaking through valve core.

(1) Machine begins to start erratically when accelerator pedal is depressed even gear shift lever is placed in NEUTRAL position.
(2) While traveling gear shift lever erratically returns to NEUTRAL position.
(3) Transmission is difficult to engage.
(4) Lock-up is difficult to engage.

- Defective shift controller, speed sensor or throtle sensor
- Mal adjustment of control linkage or actuator
- Defective fuse
- Defective lock-up valve
- Defective speed sensor
- Defective shift control lever.

COLD WEATHER OPERATION

For low temperatures, follow the instructions given below to allow the engine to start easily and prevent cooling water from freezing.

- Replace lubricants with designated low viscosity lubricants (See section FUEL AND LUBRICANTS.)
- When the ambient temperature is below −10°C, use diesel fuel ASTM D975 No. 1.
- Add antifreeze to the cooling water according to the table given below when the ambient temperature falls below 0°C.

★ **Precautions for using antifreeze**

- Use clean, soft water (example: city water) as the cooling medium.
- Check for leaks in radiator, water pump and hoses and so on.
- Before filling with the water-antifreeze solution, drain the old coolant completely and flush the inside of the radiator.

⚠ **Antifreeze is inflammable — keep it away from fire.**

Mixture ratio of antifreeze solution and water

Lowest temperature (°C)	−5	−10	−15	−20	−25
Amount of antifreeze solution (ℓ)	29	37.5	45	50	56
Amount of water (ℓ)	96	87.5	80	75	69

- **Batteries**

  As the ambient temperature drops, battery performance tends to deteriorate and the electrolytic solution may freeze if not well charged.

  Keep the charging rate nearly 100% as much as possible and keep batteries warm so that the engine will start early in the morning.

  ★ Measure the specific gravity of the electrolyte to obtain the charging rate from the table give below.

Rate of charge \ Temp. of fluid	20°C	0°C	−10°C	−20°C
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

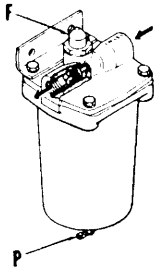
★ When the electrolyte level is low, fill with distilled water before starting work. To prevent freezing, do not fill with water after the end of the day's work.

★ **For warm weather:**

- Replace lubricants with those of designated viscosity.
- Remove the antifreeze solution entirely, flush the cooling system and fill with clean, soft water (example: city water)

- **Alcohol injector** (option)

  Air is used to operate various equipment. It is possible that moisture in the air might freeze in cold weather, leading to valve malfunction. To prevent this, methyl alcohol can be injected into the pneumatic system to lower the freezing point.



How to inject alcohol

Gradually loosen and remove filler cap (F) of the alcohol injector fitted to the air reservoir. Filler (F) has a safety valve to relieve any excess pressure remaining in the injector. Fill with 1,400 cc of methyl alcohol.

Check the alcohol injector and supply methyl alcohol every 100 service-meter hours.

In warm weather, remove methyl alcohol by loosening drain cock (P). Water will be drained at the same time.

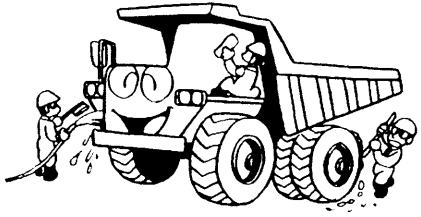
- Installation of the Radiator Curtain (Option)

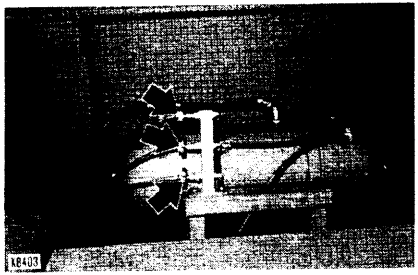
  Installation of the radiator curtain is recommended when weather is so cold that the water temperature gauge does not come into the green range.

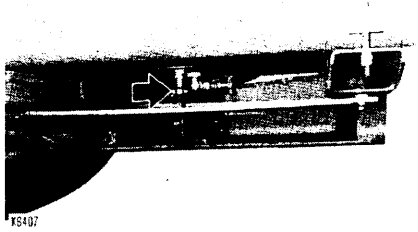
  Since the radiator curtain is adjustable for its closeness in three stages such as fully closed, opening of one-side window only and opening of both windows. Necessary adjustment, therefore, should be carried out depending on the atmospheric temperature.

Care after Daily Operation

- Thoroughly remove mud and moisture from the truck.
  Park the truck on a hard and dry ground paved with concrete, etc. This is to prevent the tires from being frozen into the ground.
- Drain water from the air reservoir and fuel system to prevent them from freezing up during overnight storage.

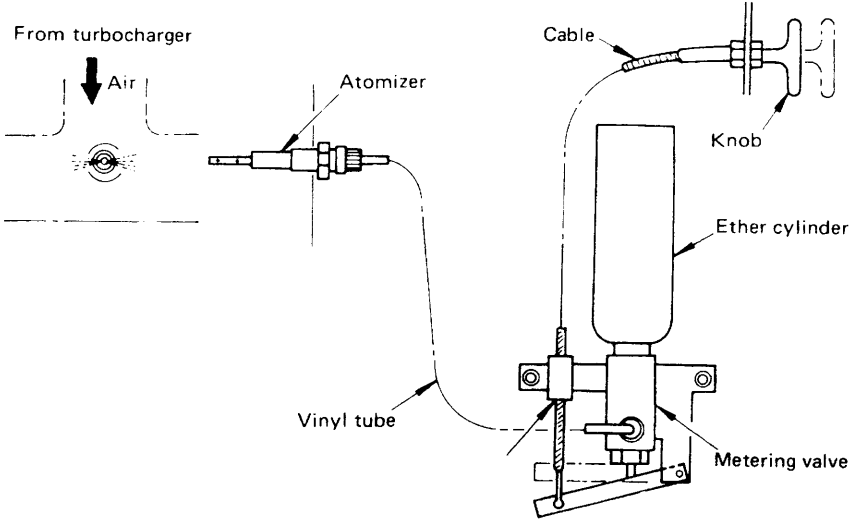






STARTING ENGINE IN COLD WEATHER

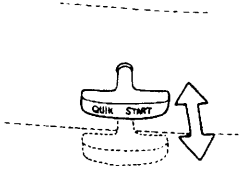
Refer to "STARTING ENGINE" section for general precautions to be observed.



Start engine as follows

1. Pull knob and wait for a few seconds before turning starting key.
2. Turn starting key to START to crank with pushing accelerator pedal down half-way.
3. Press knob for ether spray and start engine while cranking.
4. If engine fails to start, 2 minutes later repeat procedures 1 through 3.

QUICK STARTING KNOB



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5. When engine starts, return key to ON. (key returns automatically when unhanded.)
6. If engine speed is about to decrease after starting, spray ether. However don't increase engine speed more than 1,000 rpm while operating work equipment.

★ If engine does not run fast enough, repeat the knob operation a few times while cranking.
★ Refer to "CHECK AFTER ENGINE STARTS" section.
★ Never spray ether when normally travelling.
★ Avoid spraying excessive ether, which causes abnormal firing.

⚠ Carefully handle ether cylinder

- Never give cylinder access to fire.
- After used, don't throw it in fire nor drill it a hole.
- Don't store it places where the temperature may rise over 40°C.
- Don't put ether gas on the skin nor breath it in.
- Don't leave it on operator's seat.
- Don't leave it at places where children can reach.

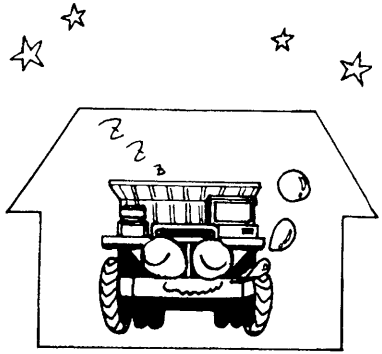
★ Remove ether cylinder when it is unnecessary in summer.
★ Never use ether together with pre-heating device for intake air.
★ When ambient temperature is below minus 25°C, keep ether cylinder at the place where the temperature is normal.

STORAGE

BEFORE STORAGE

To place the machine in storage for an extended period of time, the following measures must be taken to insure that it can be returned to duty operation with minimum of service.

- After every part is washed and dried, the machine shall be housed in a dried building. Never leave it outdoors.
  In case it is indispensable to leave it outdoors, search a flat ground and lay wood plates on the ground, and the machine shall be placed on the wood plates and covered by canvass etc.
- Completely fill fuel tank, lubricate and change oil before storage.
- Give a thin coat of grease to metal surface (hydraulic piston rods.)
- As to batteries, remove the terminals and place cover on them, or remove them from the machine and store separately.
- The gear shift lever shall be set to neutral.
- The starting switch should be put in the "OFF" position.
- Set retarder switch OFF.
- Since low pressure tire would be easily damaged, check tire pressure (5.25kg/cm^2 to 3kg/cm^2).
- When the atmospheric temperature is anticipated to drop below 0°C, always add antifreeze in the cooling water.



DURING STORAGE

- Operate the engine and move the machine for a short distance once a month so that new oil film will be generated and exhaustion of oil film in a long period will be prevented.

AFTER STORAGE

Carefully observe the following procedure when taking the machine out of long-term storage. These procedures are, however, not required for a machine which has been properly stored under cover and run for rust prevention once a month.

- Drain water from the engine oil pan and other oil reservoirs.
- Remove the rocker housing cover and fully lubricate the valves and rocker levers. Also, check the valves for correct operation.
- Before starting the engine, remove the lubricating oil inlet frange from the turbocharger and pour fresh oil through the opening. Remove connectors and hoses to expose the blower impeller. Rotate the impeller with hands so that all components in the turbocharger can be lubricated thoroughly.
- Loosen the oil pipe flange at the turbocharger oil inlet port and rotate the engine with a starting motor. If any oil is found spilled out of the loose connection, retighten the pipe flange.
- After starting, idle the engine securely to allow the lubricating oil to circulate throughout the various parts of the engine.
- Perform other "CHECK BEFORE STARTING" item.

For Engine:

- When the machine is stored more than 1 month without rust preventive operation, special caution is required for rust prevention.
  Contact to a Komatsu distributor for rust prevention or refer to Shop Manual for the engine storage.

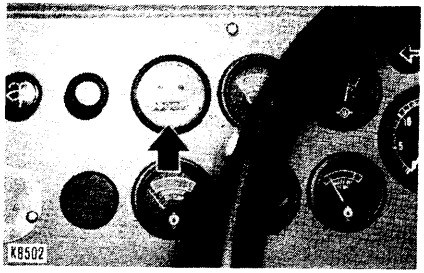
SERVICE METER

This meter indicates the integrated work hours. So, use it according to the following instructions.

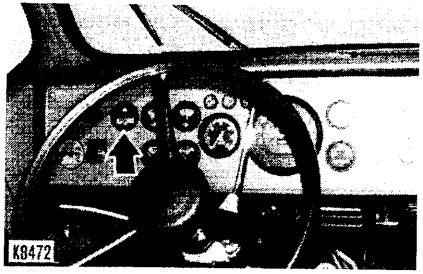
- Record the readings at the start and the end of a work, which will be a work record of the machine.
- The time for periodical maintenance is informed.
- It indicates the integrated working hours which must be informed at trouble information.

★ Meter indication
When the starting switch is put in the "ON" position, the service meter will advance one step per hour. accordingly, the service meter will keep advancing while the starting switch is in the "ON" position without reference to the engine operation.

HD320



HD325

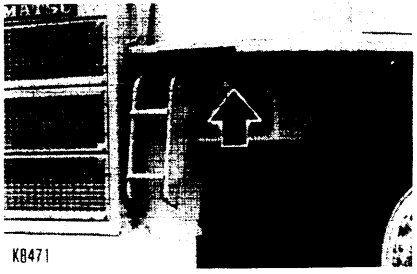


MACHINE AND ENGINE SERIAL NUMBERS

When calling for the services of a mechanic or when ordering replacement parts, be sure to give your Komatsu distributor the vehicle and engine serial numbers as well as the service meter reading mentioned before.

These numbers are stamped in the locations shown in the photos on the right.

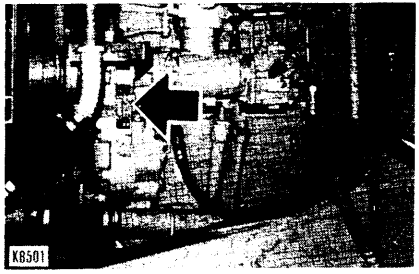
- **Location of machine serial number**



The vehicle serial number is stamped on the front-end side of the left frame.

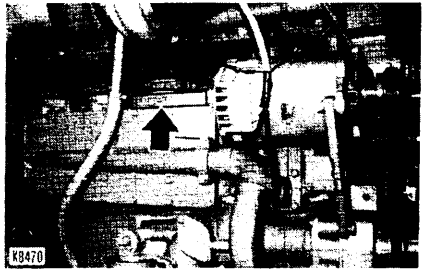
- **Location of engine serial number**

HD320



The engine serial No. is stamped on the front left side of the engine.

HD325



The engine serial No. is stamped on the rear right side of the cylinder block.

SPECIFICATIONS

HD320-3

Weight

- Overall weight
  (truck weight + max. loading capacity + 1 operator): 57805 kg
- Overall weight at the front and rear:
  (Front) (32%): 18535 kg
  (Rear) (68%): 39270 kg
- Truck weight: 25750 kg
- Truck weight at the front and rear:
  (Front) (48%): 12360 kg
  (Rear) (52%): 13390 kg
- Number of operators: one (55 kg)

Performance

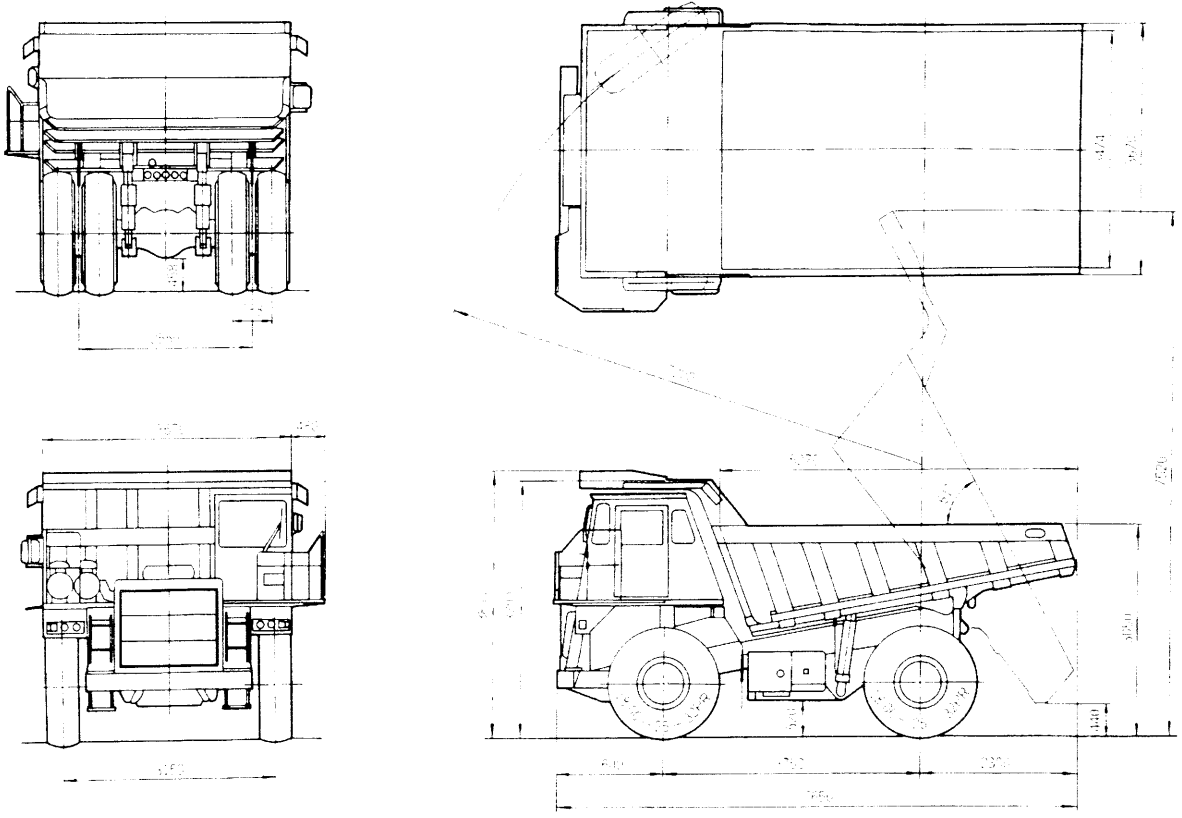
- Traveling speed:

Forward	1st	7.5 km/h
	2nd	11.3 km/h
	3rd	17.6 km/h
	4th	26.4 km/h
	5th	40.2 km/h
	6th	60.0 km/h
Rear	1st	9.3 km/h

- Max. loading capacity: 32000 kg
- Dump body capacity — Flat load: 18 m^3
  Piled load (2 : 1): 24 m^3
- Load dumping speed (at rated rpm): 10 sec.
- Min. turning radius: 7200 mm

Engine

- Model: NTA-855-C Cummins diesel engine
- Rated output (at 2300 rpm): 405 HP
- Max. torque (at 1700 rpm): 146 kgm
- Starting system (starting motor): 24V 11 kW
  Alternator 24V 42A
- Battery 12V 200Ah x 2



SPECIFICATIONS

HD325-3

Weight

- Overall weight
  (truck weight + max. loading capacity + 1 operator): 58655 kg
- Overall weight at the front and rear:
  (Front) (32%): 18805 kg
  (Rear) (68%): 39850 kg
- Truck weight: 26600 kg
- Truck weight at the front and rear:
  (Front) (48%): 12700 kg
  (Rear) (52%): 13830 kg
- Number of operators: one (55 kg)

Performance

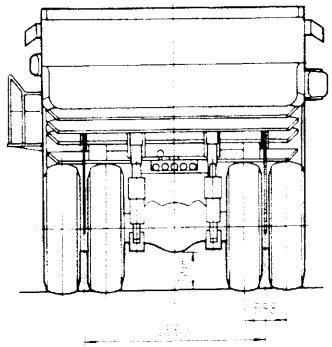
- Traveling speed:

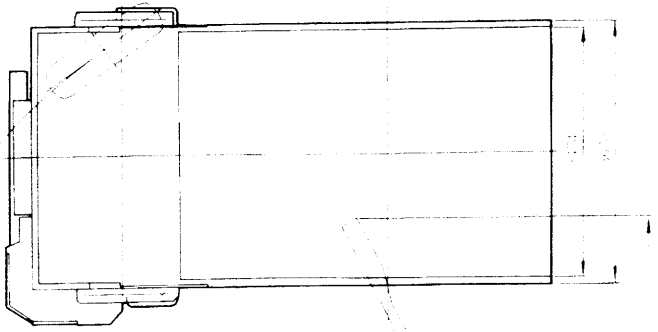
Forward	1st	8.0 km/h
	2nd	12.1 km/h
	3rd	19.0 km/h
	4th	28.1 km/h
	5th	42.5 km/h
	6th	65.0 km/h
Rear	1st	9.8 km/h

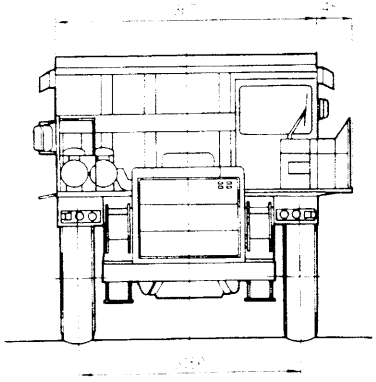
- Max. loading capacity: 32000 kg
- Dump body capacity — Flat load: 18 m^3
  Piled load (2 : 1): 24 m^3
- Load dumping speed (at 2100 rpm): 10 sec.
- Min. turning radius: 7200 mm

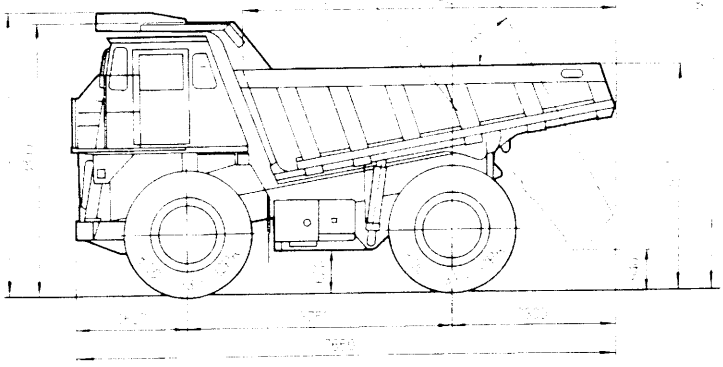
Engine

- Model: KT-1150-C diesel engine
- Rated output (at 2100 rpm): 438 HP
- Max. torque (at 1500 rpm): 187 kgm
- Starting system (starting motor): 24V 11 kW
  Alternator 24V 50A
- Battery 12V 200Ah x 2









OPTIONAL PARTS

LARGE TIRE (for HD320)

Use of the large tires is recommended when the truck runs on a soft and slippery road or when operating in a site where heating of tires is questionable.

Tire sizes: 18:00-33-32PR

DUMP BUZZER

The dump buzzer sounds when the dump body is moving upward, warning the driver and allowing safe operation of the truck, especially when there are high tension power cables above the travelling road.

CAR COOLER

The air cooler is used to cool air in the operator's cabin.

Cooling capacity:	3500 Kcal/h
Amount of cool air:	$400m^3/h$
Voltage:	24V
Weight:	26kg

TIRE CHAINS

The tire chains are used to prevent the tires from slipping in snow.

SIDE LAMP

The side lamp is used to illuminate the rear right side of the truck.

24V-80W x 2

CAR STEREO

Speaker:	5W x 2
Voltage:	24V
Weight:	5.4kg

DUMP BODY REINFORCING PLATE

When large rocks or steel are loaded, the inner face of dump body is reinforced. This reinforcement greatly improves the durability of the dump body.

Weight: 1,970kg

DUST PROOF BREATHERS

Use of the dust proof breather is recommended when the truck works in dusty area.

RADIATOR SHUTTER

Use of the radiator shutter is recommended to accelerate water temperature rise when the engine is started in cold weather.

NON-SPIN DIFF.

This reduces tire slippage and side-slip of rear tires and makes operation easier on soft surface, poor roads and snowly ground.

In addition because tire slippage is reduced the life of tires is prolonged.

AUTOMATIC CENTRALIZED LUBRICATION DEVICE

This device serves to automatically supply gear oil to each lubrication point whenever a machine travels a given (constant) distance.

FULL AUTOMATIC TRANSMISSION

This automatic transmission is prepared for easy and high efficiency operation.

EMERGENCY STEERING

When emergency steering is switched on, it drives an electric pump with battery power and steers and machine.

It is used when the engine stops during traveling, or there is an abnormality in the steering pump and it does not pump oil under pressure.

Continuous operating time:
3 minutes

EMERGENCY BRAKE

When air pressure in the main air reservoir drops below 4.2kg/cm^2 because of trouble in the air compressor, etc., the emergency brake engages and automatically brakes the machine.

Sub air reservoir capacity: 15ℓ x 2

In addition to the above, many optional parts such as rapid fuel feed device, tachograph, spare rim, spare tires, fuel tank cap lock, fog lamp, etc. are available from Komatsu.

FUEL AND LUBRICANTS

PROPER SELECTION OF FUEL AND LUBRICANTS

RESERVOIR	KIND OF FLUID	AMBIENT TEMPERATURE 14 32 50 68 86°F / −10 0 10 20 30°C	CAPACITY (ℓ) Specified	CAPACITY (ℓ) Refill
Engine oil pan	Engine oil	SAE 30	HD320: 45 HD325: 59.5	25 35
Transmission case	Engine oil	SAE 10W	165	95
Hydrulic tank	Engine oil	SAE 10W	135	105
Front suspension	Engine oil	SAE 10W	11.5 each	11.5
Rear suspension	Engine oil	SAE 10W	8 each	8
Differential case Final drive case Steering gear box	Engine oil	SAE 30	50 2 x 13 (each) 0.9	45 2 x 13 0.9
Fuel tank	Diesel fuel	ASTM D975 No. 2 ※	500	——
Cooling system	Water	Add antifreeze	125	125

※ ASTM D975 No. 1

NOTE:

(1) When fuel sulphur content is less than 0.5%, change oil in the oil pan every periodic maintenance hours described in this manual.
Change oil according to the following table if fuel sulphur content is above 0.5%.

Fuel sulphur content	Change interval of oil in engine oil pan
0.5 to 1.0%	1/2 of regular interval
Above 1.0%	1/4 of regular interval

(2) When starting the engine in an atmospheric temperature of lower than 0°C, be sure to use engine oil of SAE10W, even though an atmospheric temperature goes up to 10°C more or less in the day time.

(3) Use API classification CD as engine oil and if API classification CC, reduce the engine oil change interval to half.

SPEC. & GRADE / NAME OF SUPPLIER	ENGINE OIL	GEAR OIL	GREASE
	Class CD	Class GL-4, GL-5	
	SAE 30 SAE 10W	SAE 90 SAE 140	NLGI 2
CALTEX	RPM DELO 300 RPM DELO 400	Universal Thuban 90	Marfak All Purpose Marfak Multi-Purpose 2
CHEVRON	RPM DELO Super 3	RPM Multi-Service Gear Lubricant 90	RPM Multi-Motive Grease 2 RPM Automotive Grease Medium
TEXACO	Ursa Oil S-3 Ursa Oil LA-3	Universal Gear Lubricant EP 90	Marfak All Purpose Marfak Multi-Purpose 2
ESSO WORLD-WIDE ESSO AFFILIATES	Essolube D-3	Esso Gear Oil GP	Esso Multi-Purpose Grease Nebula EP
SHELL	Shell Rimula CT	Shell Spirax BP 90	Shell Alvania Grease EP 2
MOBIL	Mobil Mobil Delvac 1330 Delvac 1310	Mobilube H.D. 80-90	Mobilplex 47 (Mobilplex 48)
PENNZOIL	Zoildeez S-3	Penzoil M.P.P. Gear Lube 4090	Pennz Lube 310 Cha-Z-Lube 315 M.P. Lube 705
CASTROL	CRD 10, 30	Hypoy 90	
BP	BP Vanellus C-3	BP Hypo gear oil 80EP, 90EP, 140 EP	BP Energrease L2 BP Energrease LS-EP2
GULF (for sever cold districts)	Gulf Dieselube Super S-3 Motor Oil 10W	Gulf Gearlube HT75	