

Operation & Maintenance Manual

SEAM020E0106

PW150-1

HYDRAULIC EXCAVATOR



SERIAL NUMBERS 1001 and up

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KOMATSU

FOREWORD

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

- Please read this manual carefully BEFORE operating the machine.
- Please continue studying this manual until proper operation is completely reinforced into personal habit.
- This manual describes the basic techniques. Skill is performed as the operator or anyone get the correct knowledge and performance of the machine.
- Operation, inspection, and maintenance should be carefully carried out and the safety must be given the first priority. Safety precautions are indicated with  marks and technical precautions with  marks in this manual. The safety information contained in this manual is intended only to supplement safety codes, insurance requirements, local laws, rules and regulations.
- Some photographs and illustration pictures are different from your machine as technical improvement is continuously reflected on it. Revision to up-to-date manual's content is performed in later editions.
- This operation & maintenance manual may contain attachments and optional equipment that are not available in your area. Please consult your local Komatsu distributor for those items you may require. Materials and specifications are subject to change without notice.


BREAKING IN YOUR NEW MACHINE

Each machine is carefully adjusted and tested before shipment. However, a few running-in procedures are to be followed during the first 100 hours to break in the various parts.

If a machine is subjected to an unusually load at the end of operation stage, the character of performance will prematurely deteriorate and the service life will be reduced. A new machine must be operated with care, particularly with regard to the following items:

- After starting the engine, allow the engine warm up prior to return operation.
- Avoid operation with heavy loads or at high speeds.
- ◆ Sudden starting or acceleration unnecessarily through braking and sharp turning should be avoided.
- If the machine is to be used without water, do not add water to the radiator. Use the cooling system with distilled or demineralized water. The system should be flushed with cooling water.
- ◆ When making the oil filter assembly and engine, check the oil level frequently and then, if heavily polluted, check for possible causes before starting operation.
- ★ Hours of operation are limited by the service meter.

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SAFETY HINTS - - -

OPERATION

GENERAL

- Wear well-fitting helmet, safety shoes and working clothes. If the nature of the work requires safety, wear protective goggles or mask, thick gloves, ear plugs or other protection.
- Accidents or injuries are liable to occur when the operator is careless or slack. It is most important to bear safe operation in mind at all times.
- Take care of your health. Do not operate when tired, or after drinking.
- Learn the prohibitions, cautions and rules about work procedures in the work site. When there is a leader, fix standard signals and always follow these signals when operating.
- If there should be an accident or fire or any other such unexpected mishap, deal with it quickly, using the nearest apparatus. Learn beforehand the locations of the first aid boxes and fire extinguishers and how to use them. It is also important to know the emergency contact system.
- 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. Such safety devices include:
 - ◆ Protective-Devices
 - ◆ Seat Belts
- 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.

- Read the Operation and Maintenance Manual carefully. Learn how to use the control devices, gauges and warning devices. Be sure you understand the meaning of the caution plates. Remember the check points and checking method for engine oil, fuel, cooling water and hydraulic oil levels.
- When operating inside a building always be sure of the clearance of the ceiling, entrances, aisles, etc. and the load limit of the floor.
- Never allow other person than the operator to ride on the machine during operation.

BEFORE STARTING OPERATION

- Examine the lay of the land and the kind of soil at the work site to determine the dangerous points and the best method of operation. Proceed with the work only after making safety arrangements about the dangerous points.
- Inspect leakages from the fuel, lubricating and hydraulic systems. Repair any fuel or oil leakage, and wipe off all dirt or oil. Check that the shoe bolts are not loose, and that no other parts are damaged or missing. Machines having such faults should not be operated.
- When getting on or off the machine, use the handrail provided. Do not jump up or down from the machine.
- Do not leave parts or tools lying around in the vicinity of or on the floor of the operator's cab. Keep everything in its proper place.
- Wipe off thoroughly any grease or oil from the handbar, 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 gush cigarettes before checking or replenishing. Check that the radiator cap and earthed filler caps or plugs are firmly tightened.
- Adjust the operator's seat height to the most comfortable position for operating. Always sit in the seat while operating. Do not operate the machine from any other position.

- To ensure the safety of workers near the machine, always sound the horn or warn them before starting the engine and moving the machine. Be very, very careful to check that the rear is clear before leaving the machine.
- Combustible materials such as pieces of wood, cardboard, and pieces of paper may ignite if, as a result, the inside of the engine room is heated from:
- ◆ Before starting the engine, run from that side so that the levers are in **NEUTRAL**.

AFTER STARTING THE ENGINE

- Confirm that all gauges and warning devices are functioning correctly and that the gauge readings are within the prescribed ranges.
- Check the play and noise of each joint.
- Make sure the work components are such that they are loaded correctly.
- Before operating the forward or reverse levers, make sure that the forward or reverse levers are lowered or raised slowly. If the machine is going far up or down the slope for the first or second time in the reverse or forward, do that when the engine speed is 1000-1200 rpm.
- Move the machine slowly and slowly to carefully to the engine or gears to confirm that they are not making any unusual noises.
- Check the operation of the machine to confirm that it is functioning normally.
- If these tests reveal anything wrong, however slight it may be, contact the manufacturer of the machine to get the machine fixed only after obtaining his permission.

DURING OPERATION

- Maintain the bucket at a height of 40 to 50 cm above the ground so that it can be quickly lowered to the ground and the machine stopped in an emergency.
- Always operate slowly in crowded places. On busy roads or in narrow places, give way to loaded vehicles.
- Do not allow unauthorized persons into the work area.
- Before reversing or turning, ensure that there is nobody in the vicinity. Also be careful of obstacles.
- When operating on slopes, as far as possible avoid turning the machine on a slope. They cause the machine to roll over or slip sideways.
- When operating the machine along a road, retract the work equipment to improve machine stability. As far as possible proceed along a flat road.
- The machine should always be operated at a speed where it can be correctly controlled. Never do the following:
 - 1) Speeding
 - 2) Sudden starting, sudden braking, sudden turning
 - 3) Snaking
 - 4) Coasting
- When operating on uneven ground or in places where there are obstacles, remember the following points:
 - ★ Operate at as low a speed as possible and avoid sudden changes in direction.
 - ★ Whenever possible, avoid traveling over large rocks, fallen trees, tree stumps and other such obstacles. Either use the work equipment to remove them or travel round them.
- The machine's 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 a fuel leak as there is danger of fire.

- The work area should be made as flat as possible. If the work area is flat, operation is made much easier and this reduces operator fatigue.
- Always concentrate. It is extremely dangerous to allow yourself to be distracted or to think of other things when operating a machine. 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.
- Be careful of those around you, and always confirm that there is no person or obstacle in the way before moving or turning the machine.
- When using the work equipment, be sure to keep your eyes on it all the time. Failure to do this may result in an accident.
- When passing through a narrow space, be careful of the side and overhead clearances. Take special care not to touch any obstacles on either side or overhead. If necessary, have someone outside the machine call out instructions.
- After earthquakes, confirm that the ground is soil firm. After blasting, confirm that there are no unexploded charges remaining.
- When working on river embankments or other places made of piled soil, there is the danger that the weight or vibration of the machine may cause the machine to sink into the piled soil, so be extremely careful when operating in such places.
- When continuing operations after rain, remember that conditions will have changed from those before the rain started, 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.

- Check the load limits of bridges before crossing.
- When working in water or marshy ground, be careful of the following:
 - ★ When working on soft ground, place thick boards on the ground to prevent the machine sinking. Place the boards horizontally and arrange them as neatly as possible.
- When operating in water or when crossing shallows, first check the bed soil condition and the depth and flow speed of water, then proceed, taking care not to go beyond the permitted depth.
 - ★ First check the water depth, the firmness of the ground and the strength of the current. Do not enter if the water exceeds the permissible depth (up to the wheel rim).
- When operating in fog, mist or smoke, where visibility is bad, be especially careful to find out whether operation is safe. When visibility drops below safety level, stop work until work for the visibility is improved.
- When operating at night, remember the following points:
 - ★ Be sure to arrange an adequate lighting system.
 - ★ At night it is very easy to make mistakes in assuming the distance and height of objects and and.
- Be very careful not to touch electrical wires. Always bear in mind that there is a possibility of receiving an electric shock.
 - ★ Wear rubber or leather safety shoes.
 - ★ Fasten safety harness when working on the site to ensure that operator is not exposed to the risk of electric shock.

- Do not undercut the machine, unless absolutely necessary. If necessary, always take care to prevent the machine falling.
- When operating at the edge of a cliff or on the shoulder of a road, remember the following points:
 - When operating in a place where there is danger of the machine falling over the side, be doubly careful. Do not approach the edge of the cliff or road shoulder by mistake.
- If you suspect that there are buried facilities (water or gas pipes, etc.) at the work site, check with the companies responsible for looking after such facilities and also try a different method of excavation. Then, after confirming the existence and location of such facilities, carefully carry out excavation work.

- Take care not to swing the bucket against the sides of trenches or curb trucks. Load the truck from the rear.

PARKING

- 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 a slope, it should be parked facing directly up or down the slope, and chocks should be placed under the tracks. When the machine is facing downhill, lower the bucket so that it cuts slightly into the ground to further increase the safety.

- When parking the machine, return the work equipment levers to neutral, apply the brake lock, lower the bucket to the ground and put all safety levers in the lock position. Switch off the engine and remove the key.
- Before leaving the machine, carry out the following:
 - ★ Apply the swing lock.
 - ★ Lower the bucket to the ground.
 - ★ Put the work equipment lever in neutral and lock it.
 - ★ Stop the engine and remove the key to prevent other people using the machine.
 - ★ Lock the cab.

GENERAL LOCATIONS AND SPECIFICATIONS

- | | |
|--------------------|------------------|
| 1. Bucket | 5. Lower boom |
| 2. Bucket cylinder | 7. Boom cylinder |
| 3. Arm | 8. Front wheel |
| 4. Arm cylinder | 9. Rear wheel |
| 5. Upper boom | 10. Dozer gear |

OPERATING WEIGHT 15500 kg

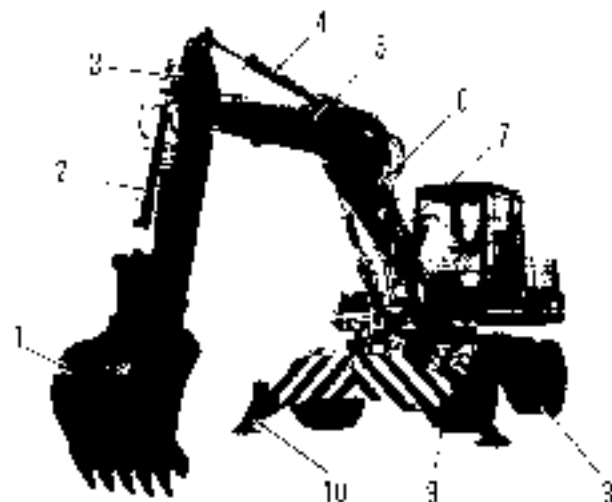
PERFORMANCE

- Bucket capacity (SAB) 0.62 m³
- Bucket capacity (KLEB) 0.55 m³
- Travel speed

Forward	Max. 20.0 km/h
Reverse	Max. 20.0 km/h
- Swing speed 11.0 rpm

ENGINE

- Model Komatsu 6D95L diesel engine
- Flywheel horsepower (at 2400 rpm) 87 HP

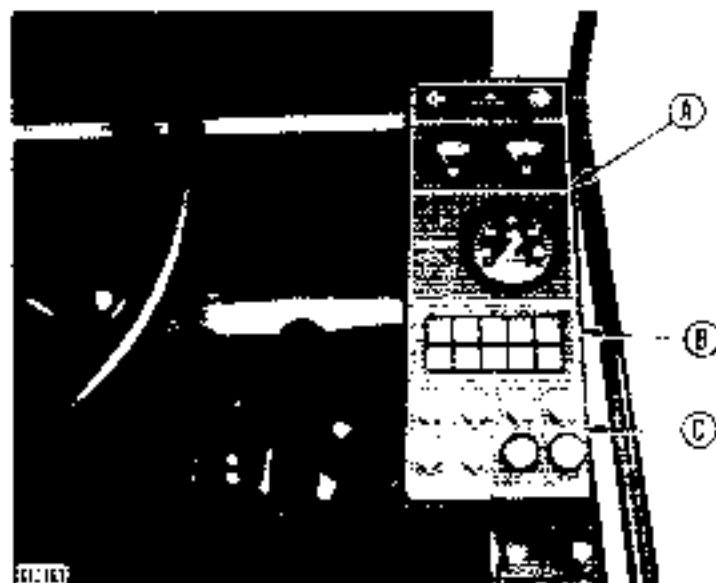


Note: Specifications may change without notice.

INSTRUMENTS AND CONTROLS

MONITOR PANEL

This monitor system consists of meter group A, monitor group B, and switch group C.



A : METER GROUP

This group includes the air pressure gauge, engine water temperature gauge, tachometer and pilot lamps.

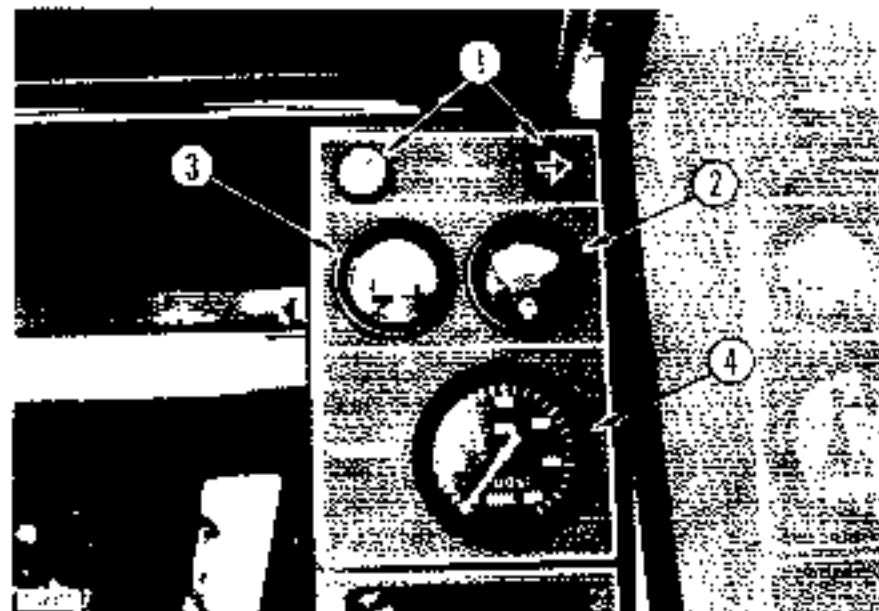
B : MONITOR GROUP

This group includes the monitor lamps which light while the indicated items are working normally and monitor lamps which indicate abnormalities.

C : SWITCH GROUP

This group includes the lamp switch, windshield wiper switch and cab heater switch.

A: METER GROUP



1. TURN SIGNAL PILOT LAMP



This lamp flashes in synchronization with the turn signal lamp.

2. ENGINE WATER TEMPERATURE GAUGE



This gauge indicates operating water temperature.

When indicator is in the green range during operation, water temperature is normal.

If indicator moves from green into red range during operation, run the engine at low idling speed and temperature goes down.

3. AIR PRESSURE GAUGE



This gauge indicates air pressure in the air tank.

When indicator is in the green range during operation, the air pressure is normal. If the indicator stays below the green range during operation, it indicates the air tank pressure is low and the air tank pressure monitor alarm should come on and the warning buzzer should sound. If this change is stop the machine and increase engine speed until indicator moves into the green range.

4. TACHOMETER AND SERVICE METER

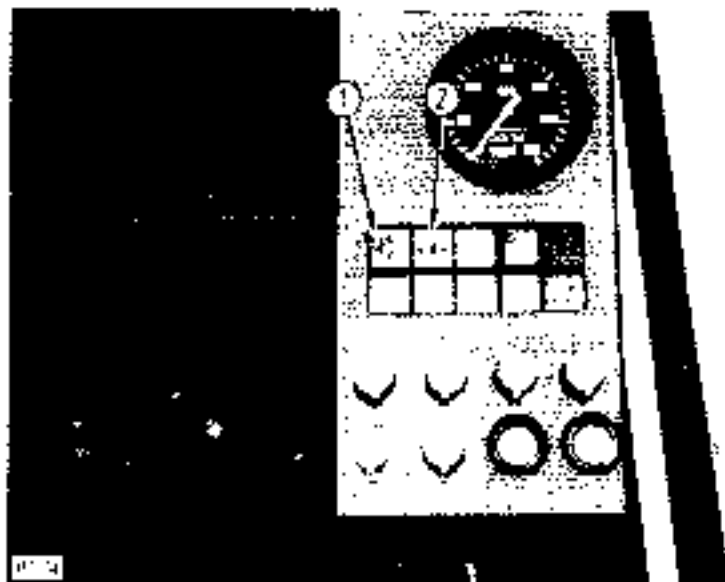


This meter has a tachometer to indicate engine revolutions per minute and a service meter.

Refer to the section "SERVICE METER".

B: MONITOR GROUP

1. HYDRAULIC TANK PRESSURE MONITOR



This monitor indicates an abnormality of air pressure in the hydraulic tank.

When the starting switch key is turned to ON position, the lamp lights. Then as the hydraulic tank pressure increases, the lamp goes out. After starting up, an engine should be run at low idling speed until the lamp goes out.

PRESSURE CONTROL

If the pressure is low, set the pressure to 0.6 kg/cm² by rotating the regulator handle above the oil tank. If the pressure is too high, rotate the regulator handle in the "Pressure low" direction and bleed air from the hydraulic tank by loosening the cap.

Then, tighten the cap, and make sure that the pressure is stable and the pressure gauge reading of the regulator is less than 0.6 kg/cm². Further, set the pressure to 0.6 kg/cm² again by rotating the regulator handle. In this case, the working equipment should be in the position shown below. Adjust the hydraulic oil temperature to approx. 50 °C.

2. ENGINE OIL PRESSURE MONITOR

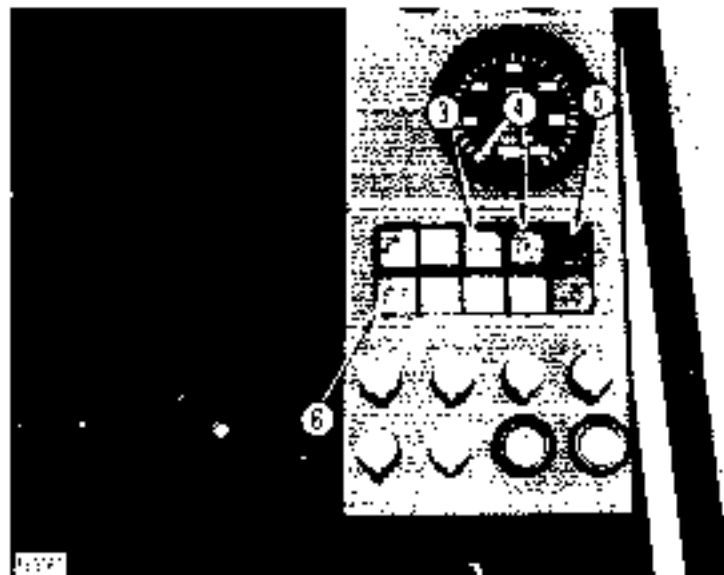


This monitor indicates a low engine oil pressure.

When the starting switch is returned to ON position, the lamp lights.

Normally, the lamp is not during operation. If it comes on during operation, the oil pressure has dropped. In such a case, immediately stop the engine and check the cause of the trouble.

3. AIR TANK PRESSURE MONITOR



This monitor indicates a low air pressure in the air tank.

When the starting switch key is turned to ON position, the lamp lights.

Normally the lamp is out during operation. After starting up, an engine should be run at low idling speed until the lamp goes out.

4. SWING MECHANICAL BRAKE PILOT LAMP



Swing brake releasing switch is at AUTO position;

The pilot lamp will light when the swing mechanical brake is applied.

Swing brake releasing switch is at RELEASE position.

The pilot lamp goes out.

5. WORKING LAMP MONITOR



This monitor lamp lights while the working lamp is lit with the starting switch/key ON.

6. CHARGE MONITOR



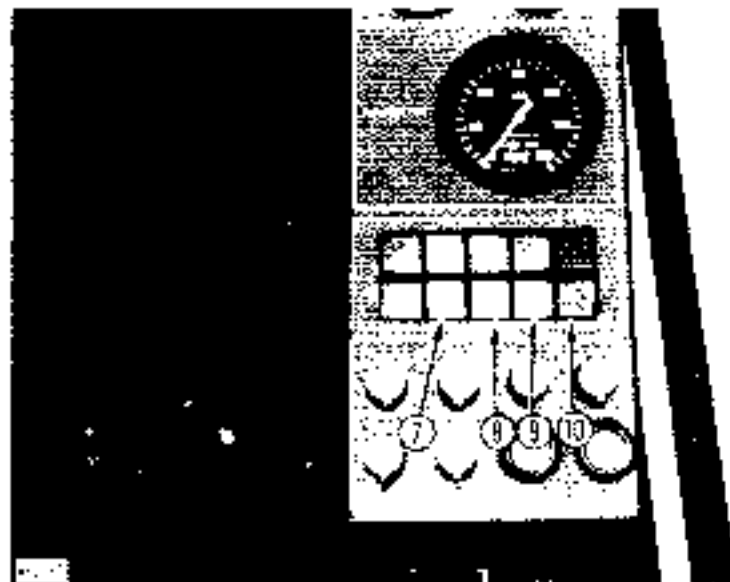
This monitor indicates an abnormality in the charging system.

Normally, the lamp comes on when the starting switch key is turned to ON position and gradually goes out as the engine speed increases.

7. FUEL MONITOR



This monitor indicates that there is less than 50 liters of fuel in the fuel tank. When this lamp lights, check the fuel gauge and fill the tank with fuel.

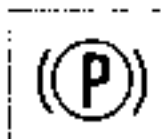


8. HAZARD LAMP MONITOR



This lamp lights when the hazard lamp is turned on.

9. PARKING BRAKE MONITOR



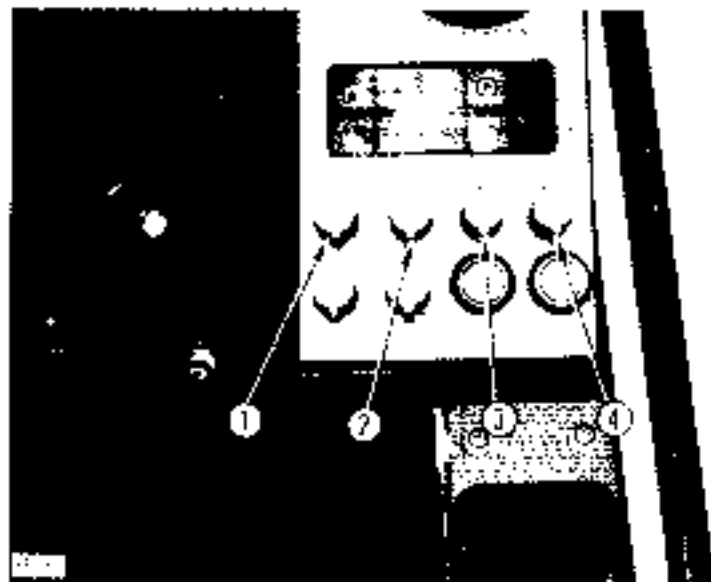
This lamp lights when the parking brake is applied with the starting switch key ON.

10. SUSPENSION LOCK MONITOR



This lamp lights when the suspension is locked.

C: SWITCH GROUP



**1. WORKING LAMP/
PARKING LAMP SWITCH**



This switch is used to turn on the working lamp and parking lamp. The master lamps of these lamps also light.

WORKING

Working lamp lights

PARKING

Parking lamp lights

- Turn off these lamps when travelling on public roads

2. CAB HEATER SWITCH



This switch is used to heat the operator's compartment.

You can set the flow of warm air to two levels.

L - Low level

H - High level

- ★ Since the compartment is warmed by the engine cooling water, the heater can be used only while the cooling water is warm.

3. LAMP SWITCH



This switch is used to turn on the head lamps, side clearance lamps, tail lamp, license plate lamp, and instrument panel lamp.

Position I:

Side clearance lamps, tail lamps, license plate lamp, and instrument panel lamp only.

Position II:

All of the above lamps plus the head lamps light.

4. WINDSHIELD WIPER SWITCH

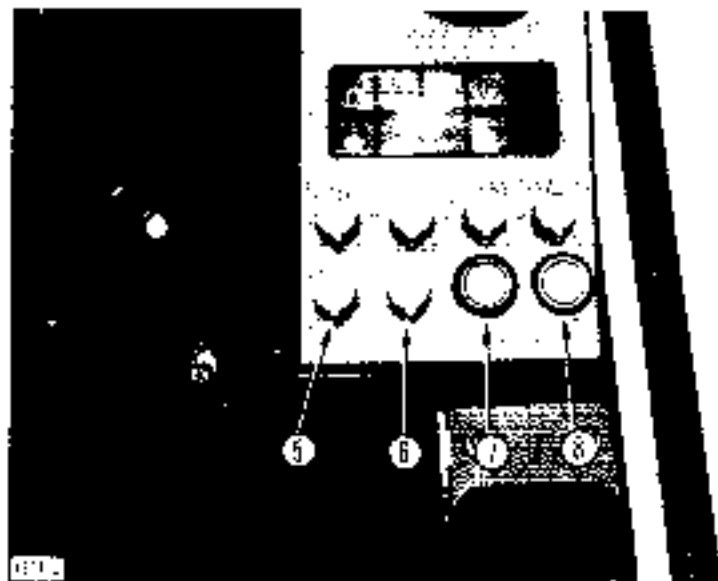


This switch is used to operate the front windshield wiper and to spray the detergent.

ON - Wiper operates

W - Detergent fluid is sprayed

5 ARM/OUTRIGGER SELECTOR SWITCH



This switch is used when operating the arm and outriggers
ON - Outriggers can be operated
OFF - Arm can be operated

6. BUCKET SPEED SWITCH



This switch is used to change the speed of the bucket.

HIGH – Fast bucket speed

LOW – Normal bucket speed

- ★ Turn this switch to HIGH position for excavating work with bucket only.

7. CIGARETTE LIGHTER



This is used to light cigarettes.

To use, push the lighter in. After a few seconds it will spring back. At that time, remove the lighter and light your cigarette.

8. HAZARD LAMP SWITCH



This switch is used in case of an emergency.

ON – Hazard lamp flash

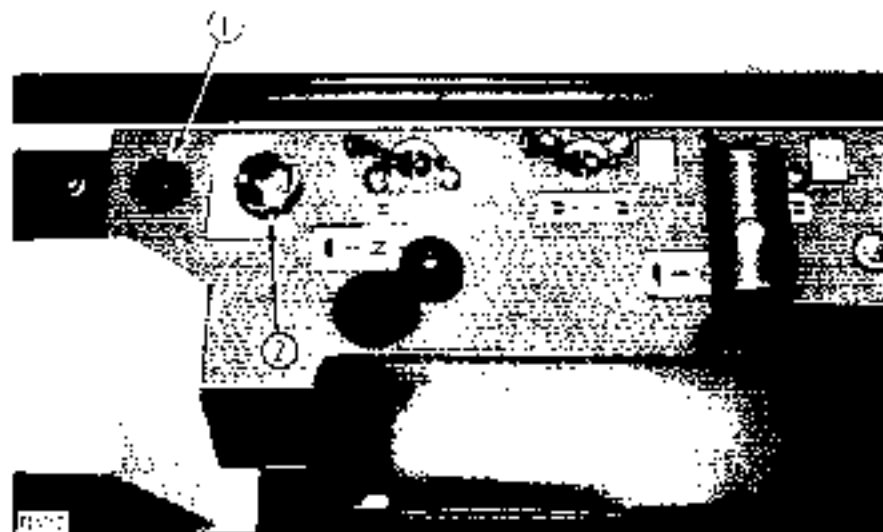
- ★ The left and right turn signal lamps at the front and rear of the machine flash.

SWITCHES AND LAMP

1. HEATER SIGNAL



This signal is red heated after the starting switch is turned to HEAT, thus indicating the electrical intake air heater is heated.



2. STARTING SWITCH



OFF

Key insertion withdrawn position. None of electrical circuits activate.

ON

Charging and lamp circuits activate. Keep key at ON after starting.

START

At this key position, the starting motor will crank the engine. Release key immediately after starting.

HEAT

Use this position when starting in cold weather.

Release the key to allow it to return automatically to OFF and then, without delay, turn it to START.

- ★ When starting, be sure to use the starting key.

3. ROOM LAMP SWITCH



When this switch is moved to the position, room lamp will light.



4. HORN SWITCHES



These switches, one located on the steering wheel and the other on the RH control lever of the working equipment, are used to sound the horn.

5. TURN SIGNAL LEVER



This lever is used to activate the turn signal lamps.

When making a left turn:

 Pull the lever.

When making a right turn:

 Push the lever.

★ When the lever is operated, the turn signal pilot lamp and lights.



6 SWING MECHANICAL BRAKE RELEASING SWITCH



Auto:

The swing mechanical brake will start working about 5 seconds after the swing control lever is shifted to neutral position.

Release

Use this position when you want to release the swing mechanical brake in case of a trouble in the electrical system.

LEVERS AND PEDALS

1. SUSPENSION LOCK LEVER



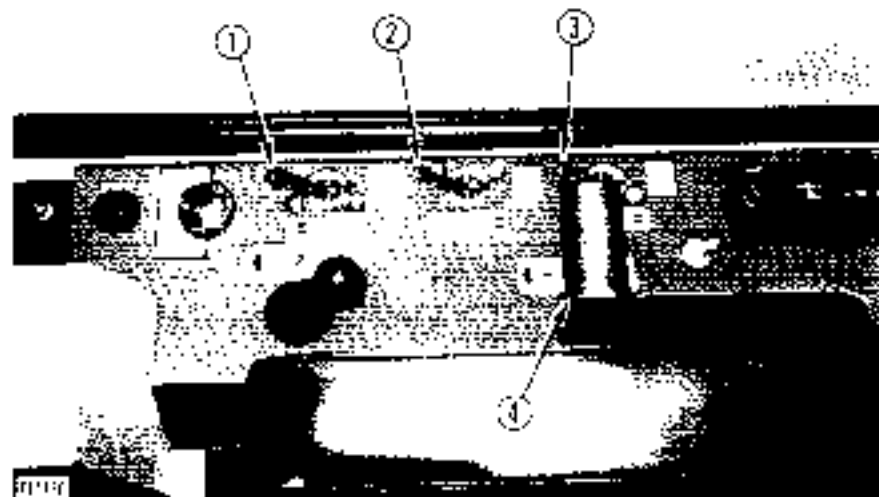
This lever is used to lock the suspension

- 1 Lock
- 2 Free

▼ When the machine is traveling normally, the suspension should be activated

During work operations, the suspension should be locked

* When the suspension is locked, the suspension lock monitor lamp lights.



2. BRAKE LOCK LEVER

This lever is used to lock the wheels when digging.

- 1 Lock
 - 2 Free
- ★ Set this lever to the free position when the machine is traveling.

⚠ Do not use the brake lock lever as a parking brake.

3. PARKING BRAKE LEVER

The lever is used to apply the parking brake.

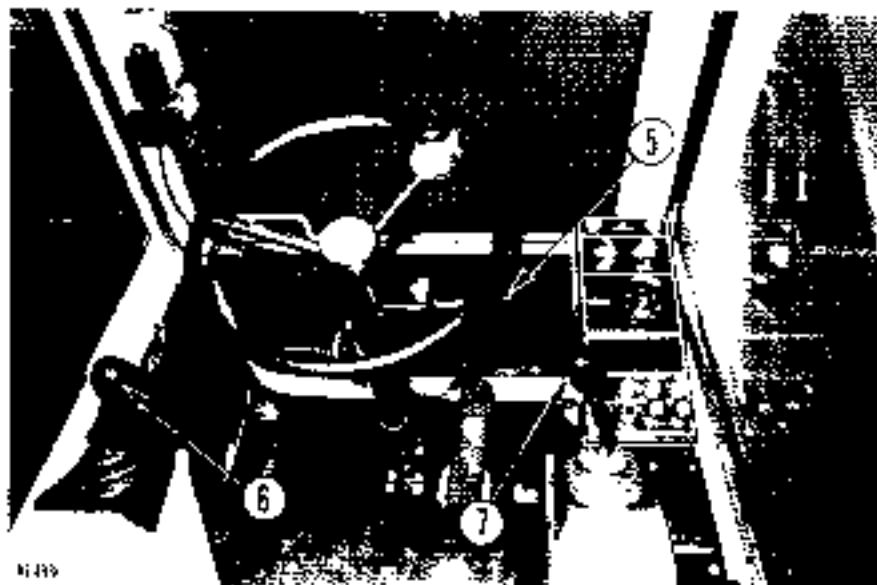
- 1 Lock
- 2 Free

⚠ When leaving the machine after it is parked, be sure to apply the parking brake.

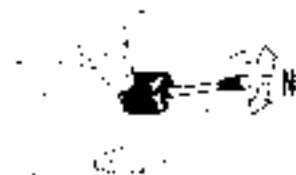
4. FUEL CONTROL LEVER

This lever is used to control the engine speed and output.

- 1 Engine stop position
Push the lever fully.
- 2 Low idling position
Pull the lever from engine stop position (1) until you feel the operating force falls off.
- 3 High idling position
Pull the lever from low idling position (2) fully.




5. FORWARD/REVERSE LEVER



This lever is used to set the machine into forward drive or backward drive.

- 1. Forward
- 2. Reverse

★ To change the position of this lever from N to F or R, press it DOWN.

 Do not operate this lever while the machine is traveling.

6. LEFT WORKING EQUIPMENT CONTROL LEVER

(arm/swing control lever)



N Neutral

When the lever is in this position the upper works, the arm and outrigger will be retained in the position in which they stop.

Arm operation

- A Arm moves out
- B Arm moves in

Swing operation

- C Upper works swings to the right
- D Upper works swings to the left
- When operating the arm and swinging the upper works, turn off the Arm Outrigger selector switch.

(Also used as the outrigger control lever)



Outrigger operation

- A Extending
- B Retracting

- When operating the outriggers, turn on the Arm Outrigger selector switch.

7. RIGHT WORKING EQUIPMENT LEVER

(boom/bucket control lever)



N Neutral

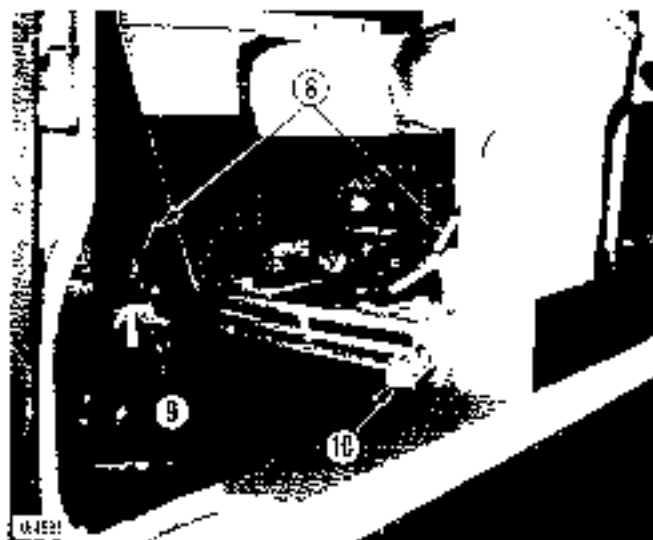
When the lever is in this position the boom and the bucket will be retained in the position in which they stop.

Boom operation

- 1 Boom raises
- 2 Boom lowers

Bucket operation

- 3 Bucket dumps
- 4 Bucket curls



B. SAFETY LEVER

(for working equipment levers)



The safety lever is used to lock the working equipment levers.

- ⚠** When stopping the machine or leaving the machine, be sure to lower the bucket to the ground, then operate the lever to lock the left and right working equipment levers.

9. SWING LOCK LEVER



When this lever is placed to the lock position, the upper work is locked. Swing lock lever into the lock position during tracing of machine.

- ✘ This lever must be in the lock position after the upper works is parallel with the track frame.

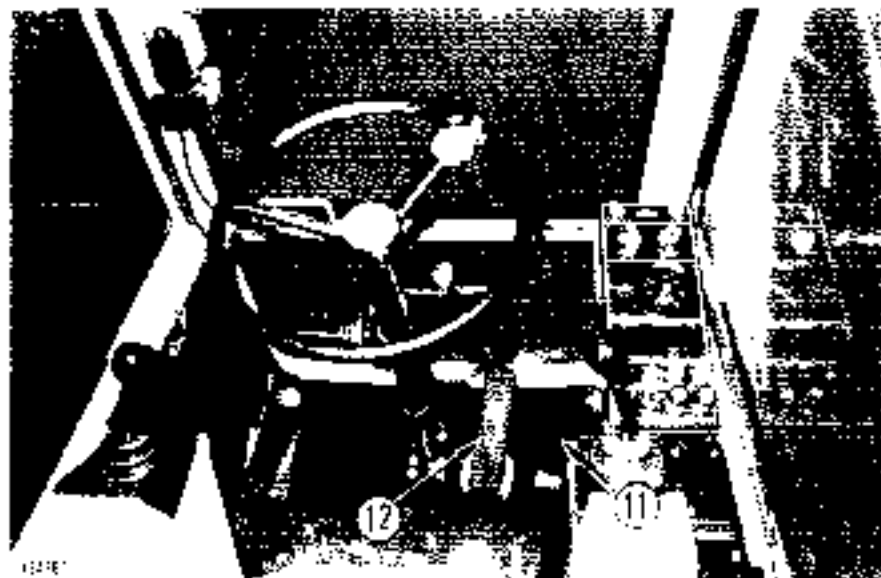
⚠ Do not attempt to rotate the upper works when the swing lock lever is in the lock position.

10. PEDAL FOR TILTING BACK THE LEFT CONTROL BOX



Use this pedal to tilt back the LH control box. When this pedal is pressed, the control box can be tilted back towards the rear. When the control box is put back in its ordinary position, it will lock into the correct position, making it possible to control the work equipment.

⚠ When operating this pedal, lock the safety lever for the LH working equipment.



11 TRAVELING PEDAL



When this pedal is depressed the machine will start off.

- ⚠** Before depressing the pedal, confirm whether the chassis is facing front or rear.
- ⚠** Do not place your foot on this pedal unless necessary.

12. BRAKE PEDAL



This pedal applies the front and rear wheel brakes.

⚠ Do not rest your foot on the pedal unless necessary.



13. HIGH/LOW SPEED LEVER

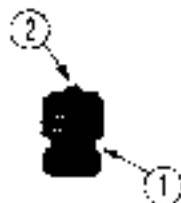


This lever is used to change the speed of the machine.

- 1 - High speed (H) ←
- 2 - Low speed (L) →

- ★ Before changing the position of this lever, depress the brake pedal to stop the machine and set the Forward/Reverse lever to N (Neutral).
- ★ When towing the machine, set this lever to position N.

DUST INDICATOR



This device indicates clogging of the air cleaner element. When red piston (1) appears in the transparent part of this indicator, the element is clogged. Immediately clean element.

After cleaning, push indicator button (2) to return red piston to original position.

Dust indicator is on air cleaner bracket on engine hood.

DOOR LOCK



Use the door lock to fix the door in position after opening it.

The door will become fixed in place when it is pressed against catch (1).

To release the door, pull knob (2) on the left side of the operator's seat so as to remove the lock.

• When fixing the door, fix it firmly to the catch.

CEILING WINDOW



Ceiling window is opened by releasing the lock in the direction of the arrow and pushing the handle.

• When opening or closing the ceiling window, grasp the handle.

FRONT WINDSHIELD



It is possible to put up the front windshield flush with the ceiling of the cab.

- ▶ Before opening or closing the windshield, be sure to lower the working equipment with the machine on level ground, stop the engine and lock the left and right working equipment levers.

OPENING SEQUENCE

1. When lock pins (A) at the left and right of the top of the front windshield are pulled to the inside, the lock will be removed.
2. Disconnect the wiring of the wiper motor at socket (B).
3. Grip the lower handle with the left hand and the upper handle with the right hand from the inside of the operator's cab, then put up the windshield and push it firmly against latch (C).

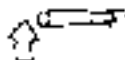
4. Then, after checking that the windshield is properly locked, be sure to return it with left and right lock pins (A).



CLOSING SEQUENCE

1. Free left and right lock pins (A)
2. To release the lock from catch (C), move release lever (D) in the direction of the arrow. (When releasing the lock, grasp the handle at the lower part of the front windshield with the left hand and the upper part of the windshield with the right hand, then carefully lower the front windshield.)
3. Be sure to retain the windshield with left and right lock pins (A)
4. Connect the wiring of the wiper motor at socket (B)

ENGINE HOOD LOCK



Pull the lever to release the lock and open the engine hood.

Push down the engine hood stably to be locked.



OVERLOAD WARNING LAMP



This lamp comes on when there is danger of a machine falling over because of a heavy load.

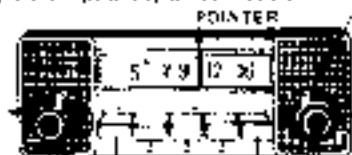
If the lamp lights, immediately lower the load to the ground or bring the arm in towards the machine. At this time, make sure that the lamp goes out.

- ★ See PRECAUTIONS FOR HANDLING THE OVERLOAD WARNING DEVICE.

OPERATING THE RADIO

TUNING KNOB

Turn this knob to select the station that you wish to listen to. The station number is shown on the dial. The pointer indicates the present station. The radio will tune itself to the selected station.



STATION SELECTOR BUTTONS
(5 buttons)

Press these buttons to select the station to be broadcast.

TOUCH CONTROL

Use this knob to adjust the tone of the broadcast. If you turn to the right, the high tones will be emphasized and when you turn to the left, the low tones will be emphasized, resulting in a rich program.

POWER SWITCH AND VOLUME CONTROL

Press the power switch to turn the radio on. When the radio is on, turn the volume control knob to adjust the volume.

How to set station selector buttons

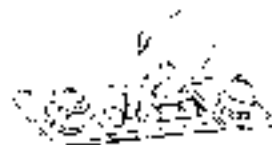
Set the station selector buttons to the desired stations as shown in the following figure.



- 1 Pull back the button corresponding to the station to be preselected



- 2 Turn the station selector knob until the pointer is in front of the desired station. Carefully tune in so that noise disappears and the broadcast is heard plainly.



- 3 Carefully push back the button with the fingertip until it clicks into place.
- 4 When setting the tuning selector to a strong station, shorten the antenna to reduce the input as far as possible before carrying out alignment.

Precautions when using radio

- To prevent possible breakdown, keep water well away from the speaker case and interior of the radio. In particular, close the window during rain or when washing the machine.
- Do not wipe the dial plate or knobs with benzene or paint thinners etc. Always use a dry soft cloth. If the radio is particularly dirty, soak the cloth in alcohol.
- Do not disassemble the radio.

Trouble shooting guide

No sound

- Turn the SW VOL knob to the right and press it two or three times.

Sound quality is poor

Reception is noisy

- Return using the station selector knob. If the problem disappears, reset the tuning button.
- Try lengthening the antenna to its full extent.

OPERATOR'S SEAT**Forward-backward adjustment**

Move lever (1) to the left, move the seat to the best position and release the lever.

The seat can be moved forward or backward over 160 mm in 8 steps.

Seat cushion adjustment

Sit in the operator's seat, turn knob (2) counterclockwise to increase the strength of suspension to match body weight, and vice versa.

Back-rest adjustment

Push lever (4) in the direction of the arrow, move the back-rest to the desired position and release the lever.

Height adjustment

Turn knob (3) counterclockwise to lower the seat, and vice versa.

The seat can be adjusted within a range of 100 mm.

FUSE BOX

The fuses protect the electric devices and wiring from burning out. If any fuse is rusted or coated with white powder, replace it.

**Fuse box (II)**

To open fuse box cover (1), push in the direction of arrow A and pull out spare fuse box side (2) in the direction of arrow B.

Fuse box (III)

Loosen bolt (3) and remove cover (4).

Fuse arrangement and circuit**Fuse Box III****Fuse box (II)**

- ★ Replace a fuse with another of the same capacity.

⚠ Before replacing a fuse, be sure to turn off the starting switch.

Fuse box (II)

No.	Terminal mark	Fuse capacity	Circuit	Remark
1	7	30A	Bucket speed, main Cabin light, side light Head lamp Rear clearance lamp, indicator and stop	
2	1	40A	Cab heater, Radio Cigarette lighter	
3	8	20A	Horn, Wiper	
4	3	10A		
5	5	10A	Turn signal lamp Control lamp Back light Forward, reverse speed for stack up button	
6	10	10A	Water temperature gauge Main oil lamp buzzer	

Fuse box (III)

No.	Terminal mark	Fuse capacity	Circuit	Remark
1	-	20A	-	
2	11	10A	Working lamp Parking lamp	
3	6	10A		
4	12	10A	Hazard lamp Horn amp	

LOCKING CAP

A locking cap is available as an optional radiator cap, fuel tank cap or hydraulic tank cap. Open and close locking caps as follows:

1. To open the cap

1) Insert the key into the cap

- ★ Insert the key as far as it will go. If the key is turned before it is inserted all this way, it may break.

2) Turn the key counterclockwise and bring the rotor groove in line with the aligning mark on the cap. Turn the cap slowly until a "clicking" sound is made. This releases the lock and allows the cap to be opened.

2. To lock the cap

1) Turn the cap into place

- #### 2) Turn the key clockwise and take the key out

- ★ When the cap is locked against vandalism, it rotates freely.

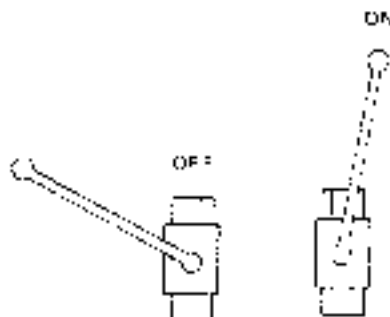


PRECAUTIONS FOR HANDLING THE OVERLOAD WARNING DEVICE

- ★ Excavators are provided with this device to prevent them from tipping over while lifting loads.



- 1 When lifting loads
 - 1) Remove bolt (1) fastening the lever of the pressure switch and put roller (2) of the lever against cam (3).
 - 2) Shift valve lever (4) to ON so that the hydraulic pressure of the bottom sides of the boom cylinders can be directed to the pressure switch.



- 2 When not lifting loads

When the machine is performing any kind of operation other than lifting loads, shift valve lever (4) to OFF and fasten the pressure switch lever with the bolt to prolong the life of the pressure switch.

- ★ Remove valve lever (4) and the bolt and keep them in a safe place when they are not in use.
- ★ When an adjustment is required, contact your Komatsu distributor and have him make the adjustment.

CHECK BEFORE STARTING

Pre-operation checks forestall machine trouble. Never neglect them.

a. WALK AROUND CHECK

Look around the machine and under the machine to check for basal oil or leaks, collection of dirt, or leakage of oil, fuel, or coolant, and check the condition of the work equipment and hydraulic system. Check also for loose wiring, play, and collection of dust at places which reach high temperatures.

1. Check for oil leak at high pressure hose, high pressure hose joints and hydraulic cylinder seal.
2. Check tightness of battery terminals.
3. Check radiator for water leak.
4. Check tightness of air cleaner mounting bolt.
5. Check around the engine for water and oil leaks.
6. Check tire for wear or damage.

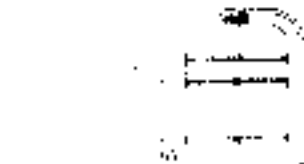
b. CHECK AND REFILL COOLANT



Fig. 1

1. Open the engine hood and check the coolant level in radiator (1) is within the range shown above.
 2. Bend through hole (2) if level is too low.
- ➔ If the volume of coolant added is more than usual, check for possible water leakage.

(1)



When removing the cap, release radiator pressure little by little by loosening cap slowly, then remove cap.

c. CHECK OIL LEVEL IN ENGINE OIL PAN



- 1 Use the dipstick (G) to check the oil level.
 - 2 The oil level should be between mark L and H. If necessary, add oil at the oil filler (F).
- ★ The type of lubricant used depends on the ambient temperature. Select according to the table "FUEL, COOLANT AND LUBRICANTS".
 - ★ When checking the oil level, park the machine on a level surface, stop the engine and wait for 15 minutes before checking.

d. CHECK FUEL LEVEL

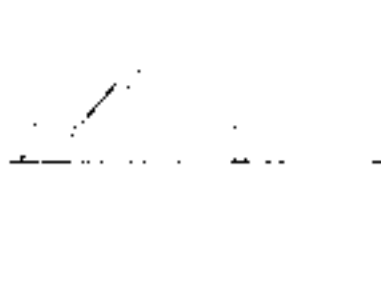


- 1 Check the fuel level using sight gauge (G) on the side face of the tank.
- 2 Upon completion of work, pour in additional fuel from filler (F) until the fuel tank is full.



- ★ If breather hole (F) in the cap is blocked up, fuel flow to the engine may stop. Accordingly, clean it from time to time.
- ★ Fuel capacity: 240 l.
- ★ When adding fuel, never let the fuel overflow. This may cause a fire.

B. CHECK OIL LEVEL IN HYDRAULIC TANK



1. Run the engine at low speed, retract the arm and bucket cylinder, lower the boom until the tips of the teeth touch the ground and then stop the engine.
2. Move each operation lever (for working equipment and travel) to its full travel to release the internal pressure.



3. If the level of hydraulic oil is not between top H and bottom L lines of sight gauge (G), pour in additional engine oil from filler (F).
 - ★ The type of lubricant used depends on the ambient temperature. Select according to the table "FUEL, COOLANT AND LUBRICANTS".
 - ★ Do not pour in additional oil if the level is above the top line H of the sight gauge.

- ★ This oil level will vary depending upon the oil temperature. Accordingly, use the following as a guide:
 - i) When the oil temperature is close to the ambient temperature (10 to 30°C), the level will be close to bottom line L on the sight gauge.
 - ii) When the oil temperature is the normal operating temperature (50 to 80°C), the level will be close to top line H on the sight gauge.

f. CHECK AND REFILL OF OIL IN BRAKE FLUID TANK



Check if the brake fluid surface is below the level line marked on the tank. Add brake fluid through filler (f), if necessary.

- * Use caution to prevent the mixing of the mineral oil with the brake fluid when refilling.
- * The special vessel must be used only for refilling the brake fluid.

g. DRAIN WATER FROM AIR TANK



Open the drain valve (g) on the air tank underside and drain water out of the tank.

- * In cold weather operation or when a machine is to be operated after long storage, the tank should be drained after starting up the engine.

h. DRAIN WATER FROM AIR FILTER



- 1 Open the engine hood.
- 2 Loosen the screw (h) on the underside of the filter and drain water from the filter.

i. CHECK DUST INDICATOR



When an cleaner element is clogged, the red piston of dust indicator (1) reaches service level and gets locked.

In that case, consult dealer referring to the section "WHEEL REPAIRS".

After clearing element, push button to return red piston.

j. CHECK TIRES FOR AIR PRESSURE AND DAMAGE

Check the air pressure before starting work when they are cold.

- ★ Standard air pressure
Front : 2.75 kg/cm²
Rear : 3.75 kg/cm²
- ★ Inspect tire surfaces for cuts, holes, low, sticking mats or pieces of metal that might lead to puncture.

k. CHECK WHEEL BRAKE

If it does not work well, adjust referring to the "ADJUSTMENT" section.

l. CHECK ELECTRICAL WIRING

Check for damage of the fuse and any sign of disconnection or short circuit in the electric wiring. Check also for loose terminals and tighten any loose parts.

Check the following points carefully.

- Battery
- Starting motor
- Alternator



If the fuse is damaged or there is any sign of shortcircuiting in the electric wiring, always investigate the cause and correct it.

- ★ Please contact your Komatsu dealer for investigation and correction of the cause.

m CHECK PARKING BRAKE

If it does not work well, adjust, referring to the ADJUSTMENT section.

n CHECK THAT ALL LAMPS AND INSTRUMENTS WORK PROPERLY

o CHECK THAT REAR VIEW MIRRORS ARE WELL ADJUSTED

p CHECK HORN AND WIPER

q CHECK EXHAUST GAS COLOR AND EXHAUST SOUND.

r CHECK DOOR LOCK.

s CHECK PART WHICH WAS UNUSUAL ON THE PREVIOUS DAY.

t LUBRICATE CLAMSHELL BUCKET



Apply grease to the grease fitting shown by the arrows. (12 points)

u CHECK FOR SEDIMENT AND WATER IN THE WATER SEPARATOR



The water separator separates water mixed in the fuel. If float (2) is off or inoperative (1), drain the water. For draining procedure, see section "WHEN REQUIRED".

★ Even if a water separator is installed, be sure to check the fuel tank to remove water and sediment in the fuel.

OPERATING YOUR MACHINE

BEFORE STARTING THE ENGINE



- 1 Carry out an initial inspection. (For details of the inspection see CHECK BEFORE STARTING.)
- 2 Put the forward-reverse lever (1) in N (neutral) position.



- 3 Put the left and right working equipment levers (2) in neutral and check that safety levers (3) are locked.



- * The engine will not start while the forward-reverse lever (1) is in any position other than N (neutral).

TO START THE ENGINE



1 Pull the fuel control lever (1) a little towards you from the low idling position.



2 Turn starting switch key (2) to START and start the engine.



3 Release starting switch key (2), and the key will return automatically to ON.



Special starting

When starting after running out of fuel, fill with fuel, then fill the fuel filter cartridge with fuel and bleed the air from the fuel system before starting.

Refer to FUEL FILTER in every 500 hours service

- ★ Do not leave the key in START for more than 20 seconds
- ★ If engine will not start, repeat the starting procedure after about 2 minutes
- ★ To start engine in cold weather, refer to "COLD WEATHER OPERATION"
- ★ When the starting switch key is turned to ON, the air tank pressure warning buzzer will sound and the charge monitor amp, air pressure monitor lamp, engine oil pressure monitor lamp and hydraulic tank pressure monitor lamp light. Then, several seconds after the engine is started up, the buzzer will cease sounding and each monitor lamp will go out. While the buzzer is sounding or the monitor lamps are on, do not start off the machine.

CHECKS AFTER STARTING

After starting make the following checks:



1. Pull the fuel control lever (1) and run the engine at medium speed. Then run the engine at no load for about 5 minutes.



2. Leaving the bucket control lever (2) in the parking position, idle the engine for about 5 minutes to warm up the hydraulic oil.



3. After warm-up run at ramp or 5th gear (progress warning) slowly for proper operation.
 - Caution to run the engine at light load and if the engine water temperature gauge indicates hot's within the green range.

4. Check if the control panel shows normal values or there is any other malfunction or indication.
 - Avoid idling by accelerating the engine and the revolution of water pump.
 - The hydraulic oil temperature should ideally be within the range 50 to 80 °C. If the machine is operated at 100% load, the oil temperature to 20 °C (see 11) to the machine will be exceeded.
 - Do not work at low engine rpm (working for more than 20 minutes). If it is necessary to run the engine at idling, apply a load for 10 min. to 10% to raise the engine speed to 1000 rpm.

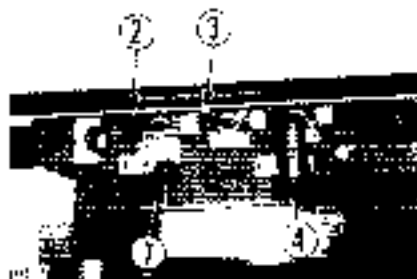
TO MOVE THE MACHINE OFF



- 1 Put swing lock lever (1) in the lock position by pushing the lever down.



- 2 Put suspension lock lever (2) and brake lock lever (3) in their free position.



3. Pull fuel control lever (4) and raise the engine speed



4. Free safety levers (6) of left and right working equipment lever (5), move the working equipment in and raise it to a height of about 40 to 50 cm

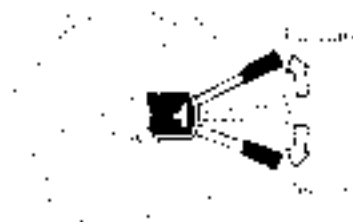


5. Put the high-low lever (7) in a high speed position.



- When driving in mud or on rough ground, or when traveling up or down steep slopes, select a speed position which matches the road conditions.

6. Move the forward-reverse lever (8) to F (forward) or R (reverse).



7. Put parking brake lever in free position and check that the parking brake monitor lamp (9) has gone out



8. Depress the traveling pedal (10) and the machine will start off

- While the engine is running, if the air tank pressure warning buzzer sounds continuously, the air pressure monitor lamp lights, or the air pressure gauge indicator stays in the red range, the braking effect is worsened. Check and repair the air piping system.
- ★ Before changing the direction of travel, release the traveling pedal and depress the brake pedal to stop the machine.
- ★ When traveling the machine on a road, set the machine to traveling posture.

- ⚠ Before operating the Forward/Reverse lever and depressing the traveling pedal, check the direction of the chassis.
- ⚠ If the traveling pedal is depressed with the fuel control lever fully opened, the machine will start abruptly.
- ⚠ When traveling the machine on a road, raise the outriggers and insert the lock pins to prevent them from falling.

STEERING



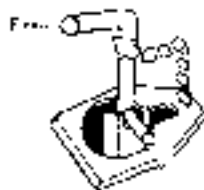
The machine can be turned by turning steering wheel (1) to the desired direction.

- ★ When operating the machine in a narrow place, its direction can be changed by raising and turning the body.
- ★ If the upper works are turned 180 degrees and the undercarriage is reversed, the machine is steered in the opposite direction of the steering wheel. Therefore, take care of the direction of the chassis.

SWINGING



1. Raise the swing lock lever (1) to unlock the upper works.
 - Before swinging the upper works, make sure that the working equipment levers have been unlocked.



2. To swing the upper works, move the left working equipment lever.
 - Do not push down the swing lock lever during swinging.

3. To lock the upper works, push down the swing lock lever (1) when the upper works and the chassis are parallel.
 - Do not move the swing lock lever if the upper works and the chassis are not parallel.



BEFORE OPERATION



- 1 Put the forward-reverse lever (1) in Neutral position.



- 3 Put the suspension lock lever (3) in the lock position.
 - * Check that suspension lock monitoring lamp (4) has come on.

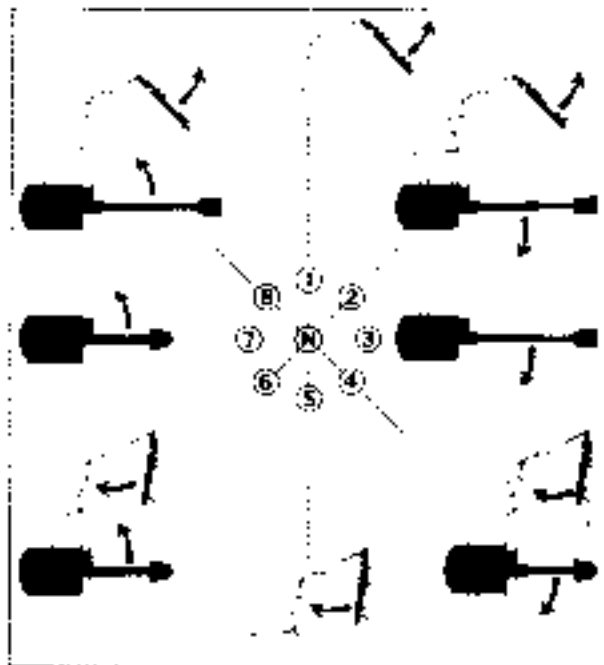


- 2 Put the brake lock lever (2) in the lock position.



- 4 Operate the left and right work equipment control levers to carry out operations.

OPERATION OF THE WORKING EQUIPMENT

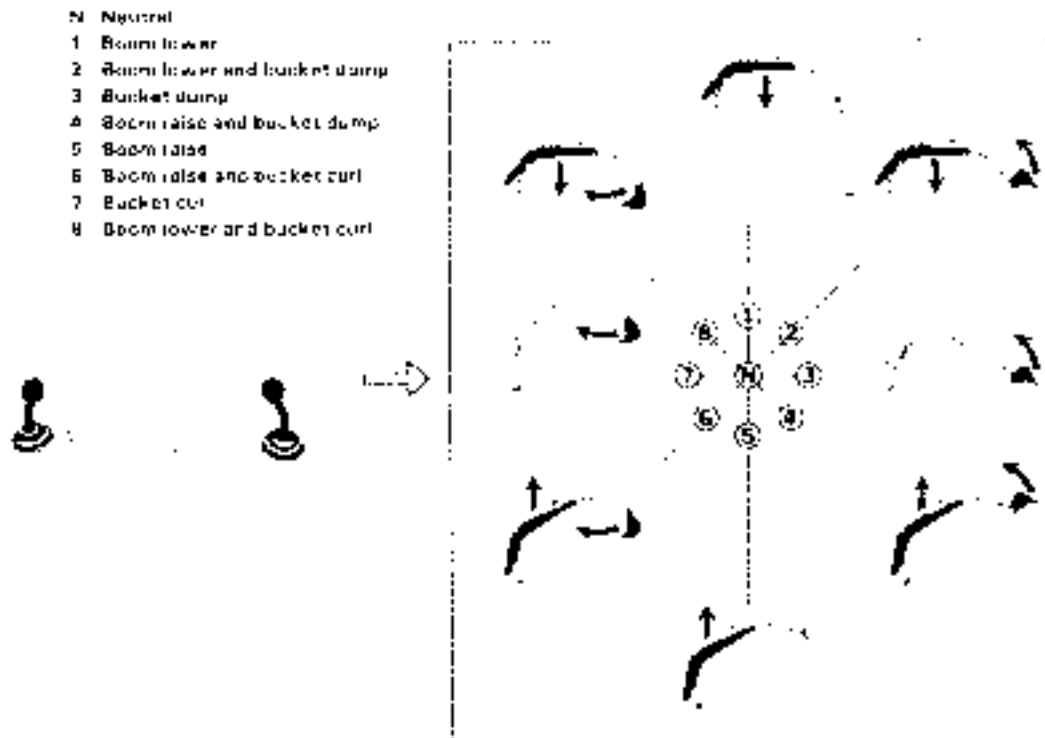


- N Neutral
- 1 Arm out
- 2 Arm out and swing right
- 3 Swing right
- 4 Arm in and swing right
- 5 Arm in
- 6 Arm in and swing left
- 7 Swing left
- 8 Arm out and swing left

The working equipment is operated by means of the left and right working equipment levers. The left lever is used to operate the arm and swing this machine, and the right lever is used to operate the boom and the bucket.

The motion of the lever and working equipment is as shown in the diagrams.

- * Before swinging the upper works, make sure that the swing lock lever has been in free



HOW TO STOP AND START ON A SLOPE

1. To start again immediately after stopping once

Stopping

- Release the traveling pedal and depress the brake pedal.

Starting

- While slowly releasing your left foot on the brake pedal, depress the traveling pedal with your right foot.

2. To start again after being stopped for a long time

Do the following in addition to the operation in item 1.

Stopping

- Set the forward reverse lever to N, then apply the parking brake.

Starting

- Put the parking brake lever in free position and start the machine.

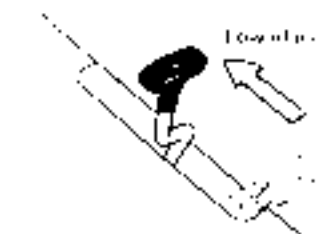
TO STOP THE MACHINE



- Put the forward-reverse lever (3) into the neutral position.



- Lower the engine speed using the fuel control lever (4).



- Release the traveling pedal (1) and depress the brake pedal (2) to stop the machine.



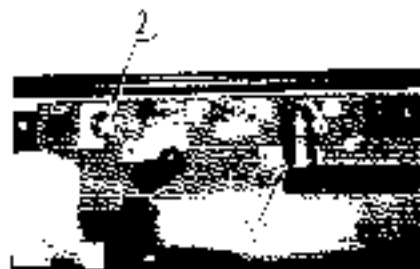
- 4 Lower the bucket horizontally until its underside touches the ground.
- 5 Lock safety levers (6) for the working equipment levers (5).



6

⚠ When stopping the machine, select flat hard ground and avoid dangerous places. If it is unavoidably necessary to park the machine on a slope, insert blocks underneath the wheels. As an additional safety measure, thrust the bucket into the ground.

TO STOP THE ENGINE



- 1 Run the engine at low idling speed for about 5 minutes to allow it to gradually cool down.
- 2 Pull fuel control lever (1) in the engine stop direction and stop the engine.



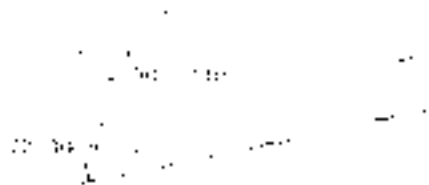
- 3 Return starting switch key (2) to the OFF position and remove it.



- If the engine is abruptly stopped before it has cooled down, engine life may be greatly shortened. Consequently, do not abruptly stop the engine apart from an emergency.
- In particular, if the engine has overheated, do not abruptly stop it but run it at medium speed to slow it to cool gradually, then stop it.

PRECAUTIONS FOR OPERATION

- Be careful not to compact the soil or damage earth mounds as a result of the swinging force.
- When swinging, do not dig the bucket teeth into the soil.
- Do not move off and excavate with the bucket leaving dirt into the ground.
- When working with the machine do not move the cylinder to the end of its stroke but leave a small safety margin.
- Do not use the cropping force of the bucket as a pickaxe, breaker or pry driver.
- Do not use the cropping force of the machine for digging.
- It is better to excavate hard rocky ground after breaking it up by some other means. This will not only reduce damage to the machine but make for better economy.
- If the machine is to travel with the suspension lift locked, move the suspension lock lever to the lock position.
 - ⚠ Do not abruptly press the brake pedal while descending a steep slope. The tires may slip.
 - ⚠ Do not drive the machine on slopes steeper than 30 degrees. The machine may tip over.
 - ⚠ Before starting to travel downhill, apply the foot brake to check that it is working correctly.
 - ⚠ When continuously climbing or descending a steep slope of more than 7 degrees, place the high-low speed lever to low speed (L) position. When continuously climbing a steep slope with the high-low speed lever put in high speed position, the machine speed decreases and it causes overheat.
- ⚠ When traveling down gradual slopes (less than 7°), apply the foot brake and keep the travel speed to around 20 km/h to ensure safety.
 - When descending a steep slope of more than 7 degrees, reduce the engine speed, set the high-low speed lever to the low speed position, and adjust the travel speed with the foot brake. When descending a slope of more than 15 degrees, set the machine to the position shown in the figure and reduce the engine speed.



- When traveling on a slippery road or on a slope, keep the bucket near to the ground at the lowest possible speed. Brake or start off smoothly to prevent transmitting shock to the chassis.
- While going uphill, braking power is applied in correspondence to the force applied to the brake pedal.
- If the engine should stop while the machine is going up a slope, depress the brake pedal. Rest the bucket on the ground and stop the machine. Move the forward/reverse lever to N (neutral) position. Then, start up the engine.

- When going down a slope, observe the maximum speed at each speed position to prevent loading the travel motors.

Speed position	1	2	3
Max speed (km/h)	10	20	30

- The following phenomena are not abnormal and do not require corrective action:
 - 1) When retracting the arm, the arm may stop momentarily if it is nearly vertical.
 - 2) When dumping with the shovel reversed, the bucket may stop momentarily when it is nearly horizontal.
 - 3) The brake valve may make a noise at the beginning and end of a swing.

- Be careful not to operate the machine into a bog. In the event that the machine goes into a bog, retract it in the following manner:
 - 1) If only one side of the machine is in the bog, push down the bucket on the same side against the ground to float the wheels. Then place logs or timber underneath the wheels to free the machine.
 - 2) If the wheels of the both sides are in the bog and slip, place logs or timber under the wheels in the manner described in 1). Then thrust the bucket into the bog in front of the machine and drag it out by bending the arm in the same manner as when excavating and putting the forward-reverse lever into the forward position.
- The arm retracting force can be controlled by the operating force of the brake pedal.

EXCAVATOR'S WORK

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

BACK HOE WORK

A back hoe is suitable for excavation at a position lower than the machine. It is possible to effectively move the arm through 90° in the direction towards the machine and 40° in the direction away from the machine, making for efficient work.

SHOVEL WORK

A shovel is suitable for excavation at a position higher than the machine. Shovel work is performed by attaching the bucket in the reverse direction.

LOADING WORK

About half of the time spent during excavating and loading work is taken up swinging. Maximum work efficiency can be attained by carrying out work in such a way that the swinging angle is kept as small as possible in accordance with the terrain.

When loading, it is better to fit the machine in the longitudinal direction of the dump truck and to load from the front of the dump truck body. This both facilitates loading and also enables a greater amount of material to be loaded as compared with starting from the side of the truck.

HANDLING THE BOOM

The boom can be adjusted for work in close quarters, excavating duffs, and for the travel position.

- Set the mounting positions of the boom connecting pins based on the drawing of the working range in the section SPECIFICATIONS.

How to remove and install pins

- Remove hose clamp (1) on the lower boom.
- Support the upper boom and put out pins (2) and (3).
- Move the upper boom to the desired position and align the hole for the pin on the upper boom with that on the lower boom.



4 Insert pins 12) and 13)

- Take care not to damage the hoses

5 Install the hose clamp.

! Depending on the mounting positions of the connecting pins, the hose may bend sharply. If so, the clamp is not necessary.

! After reinstalling the pins, slowly move the boom cylinder to the stroke ends to confirm that no excessive force is applied to the hoses of the working equipment.

! With the upper boom mounted in the shortest position and with the arm and bucket fully pulled in, if the boom is raised to the stroke end, the bucket teeth will contact the operator's compartment. Therefore, operate the boom slowly.

! When the machine is set to the traveling posture, if the boom is raised to the stroke end, the upper boom will contact the outer components. Therefore, never raise the boom all the way.



HANDLING THE DOZER BLADE

OPERATION

- 1 Set the arm blade selector switch on the panel to ON. (The same switch as arm outrigger selector.)



- 2 Move the left working equipment lever to operate the dozer blade.



⚠ When operating the arm, confirm that the selector switch is turned off.

⚠ When moving the machine, confirm that the dozer blade is raised.

- 3 After finishing work with the dozer blade, turn off the arm blade selector switch.

PRECAUTIONS FOR USING THE DOZER BLADE

1. When using the dozer blade as an outrigger

Use the dozer blade in the same way as an outrigger. However, use it only on level ground so that uneven loads will not be applied to the blade.

2. Precautions for driving on public roads

Secure the dozer blade with hook (1).

- ◆ Engage (or disengage) the hook to (from) the blade with the upper structure swung 90 degrees.

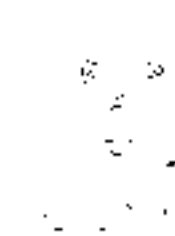
⚠ When the hook is disengaged, keep it downward. If the hook is kept upward, it will interfere with the upper structure.



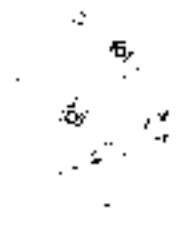
INVERSION AND REPLACEMENT OF BUCKET

Stop the machine on a firm, flat surface. When performing joint work, make clear signals to each other and work carefully for safety's sake.

Bucket inverted



Bucket reversed



Bucket replaced

- 1 Select a flat surface and stabilize the bucket.
- 2 After removing the stop nut and nut for each pin, extract pins A and B.
 - ★ After removing the pins, make sure that they do not become contaminated with sand or mud and that the seals of bushing on both sides do not become damaged.
- 3 Reverse the bucket.
 - ★ After reversing the bucket, correct the direction and inclination of mounting pin holes (1) and (2); then turn & stabilize the bucket so that it does not shake about.
- 4 Couple the arm to hole (1), then connect the link to hole (2).
 - a After mounting the arm bolt and nut for each pin, apply grease to each pin.

HANDLING THE CLAMSHELL BUCKET

This bucket is used for digging and loading in side-ditches or the confined spaces.

How to perform excavation

Carry out digging work by lowering the boom keeping the clamshell opened.

Close the bucket while raising the boom gradually.

When you begin digging and find the bucket rotating, do as follows.

Extend the bucket cylinder fully and hold; the bucket will soon stop rotating.

- ★ Make the teeth of the bucket vertical in digging.
- ★ For safety, always avoid abrupt traveling, swing and stopping.
- ★ Do not swing the bucket to crush the rock or to cut through soil.
- ★ Do not use the bucket for hammering or pulling out piles etc.
- ★ Before leaving the machine, open the bucket and lower it to the ground.
- ★ Remove the bucket from the arm when transporting the machine.

HANDLING THE TIRES

REMOVING TIRES

1. Move the forward/reverse lever to N (neutral) position and lock the clutch.
2. Move the lock-out lever to the lock position to lock all wheels.
3. Raise the chassis with the beams so that the tires are raised above the ground. Then, place wood blocks below the front and rear axles.
4. Loosen wheel nuts with a wheel wrench. (When loosening the LH and RH wheel tires, it is important to use a...

- ★ Front and rear inner wheel tires should be removed after removing the outer wheel tires in the same manner.

Standard tire pressure

- Front wheel: 5.75 sq/cm
- Rear wheel: 5.75 sq/cm

INSTALLING TIRES

1. Coat wheel pins and thread areas of nuts with oil.
 - ★ When replacing the outer or inner wheel pins, always be sure to check the inner wheel pins for weariness.
2. In installing new tires, tighten gently with the tire iron and tighten the tires to the specified torque in the order shown in the photo after placing the tires on the ground.

Tightening torque

59.5 ~ 60.0 Nm



- ★ Insert a pipe about 1 m long into a wheel wrench, and apply a force of 16 kg to the tip of the pipe to approximate standard tightening torque.
- ★ When installing the front and rear tires on wheels, the tires can be easily tilted if the tire and hub surface areas are shifted so they are not aligned with each other.

ROTATING TIRES

Tires wear differently depending on their positions. Consequently tires should be rotated periodically as shown below.



HANDLING OF BATTERY

PRECAUTIONS FOR CHARGING BATTERY

- 1 Before charging, disconnect the cable from the negative (-) terminal of the battery. Otherwise, an unusually high voltage will damage the alternator.
- 2 While charging the battery, remove all battery plugs for satisfactory ventilation. To avoid gas explosions, do not bring fire or sparks near the battery.
- 3 If the electrolyte temperature exceeds 45°C, stop charging for a while.
- 4 Turn off the charger as soon as the battery is charged. Overcharging the battery may cause followings:
 - 1) Overheating the battery
 - 2) Decreasing the quantity of electrolyte
 - 3) Damaging the electrode plate
- 5 If the electrolyte gets on your skin or clothes, immediately wash with plenty of clean water.
- 6 Do not mix up cables (positive (+) to negative (-) or negative (-) to positive (+)) as it will damage the alternator.
- 7 When inspecting or servicing a battery, be sure to stop the engine and turn the starting switch key to "OFF" position.
- 8 When performing any service to battery besides checking the electrolyte level or measuring the specific gravity, disconnect cables from the battery.

REMOVAL AND INSTALLATION OF BATTERY

- When removing battery, first disconnect the cable from the ground (normally, from the negative (-) terminal). If a tool touches a cable connecting the positive terminal and the chassis, there is danger of sparks being emitted.
- When installing battery, the ground cable should be connected to the ground terminal as the last step.

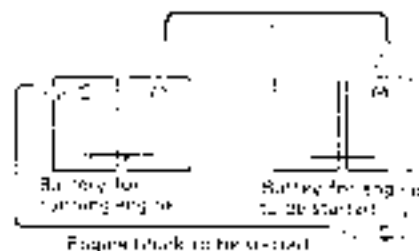
STARTING ENGINE WITH A BOOSTER CABLE

When starting up the engine with a booster cable, do as follows:

1. Before connecting the booster cable
 - 1) Size of booster cable and clip should be suitable for the battery size.
 - 2) Check cables and clips for breaks, corroded surfaces, etc.
 - 3) Make sure cables and clips are firmly secured.
 - 4) Keep the starting switch in "OFF" position.
 - 5) The battery of the running engine must be the same capacity as that of engine to be started.

2. Connect the booster cables in the following manner:

- 1) Connect one clip of booster cable A to the positive (+) terminal of the engine to be started.
 - 2) Connect the other clip to the positive (+) terminal to the engine which is running.
 - 3) Connect one clip of booster cable B to the negative (-) terminal of the engine which is running.
 - 4) Connect the other clip to the engine block to be started.
- Make sure the clips are firmly connected to battery terminals. Then, start the engine.



⚠ When connecting the cables, never contact the positive (+) and negative (-) terminals.

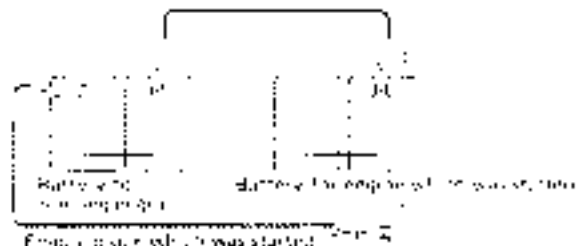
⚠ Make sure that the booster cable connections are correct. Connect the booster cable to the engine block as far as possible from the battery.

3 Starting engine

- 1) Turn the starting switch to START position and start up the engine.
- 2) If the engine doesn't start at first, try again after 2 minutes or so.

After the engine has started, the booster cables should be disconnected in the reverse order in which they were connected.

- 1) Disconnecting the booster cables:
 - 1) Disconnect the clip of booster cable B from the engine block which was started.
 - 2) Disconnect the other clip from the negative (-) terminal of the running engine.
 - 3) Disconnect the clip of booster cable A from the positive (+) terminal of the running engine.
 - 4) Disconnect the other clip from the positive (+) terminal of the engine which was started.



TRANSPORTATION

When transporting the machine, observe the various road rules, road transportation vehicle laws and vehicle limit ordinances, etc. It is a good idea to obtain a special platform for loading and unloading the machine. When it is unavoidably necessary to use a gangplank, however, at the very least observe the following for the sake of safety.

1. Properly apply the brakes on the trailer and insert blocks beneath the tires to ensure that it does not move. Then fix the gangplank in line with the centers of the trailer and the machine.
 - ★ Make sure the gangplank has sufficient width, length and thickness to enable the machine to be safely loaded and unloaded. If the gangplank sags appreciably, reinforce it with blocks, etc.
 - ★ Lock the suspension using the suspension lock lever.
 - ★ Lock the upper works using the swing lock lever.
2. Determine the direction of the gangplank. Then slowly load or unload the machine.
 - ★ Move the machine backward to get on the trailer.

⚠ Do not on any account change the direction of the machine while it is on the gangplank. To change the direction of the machine, first take it down from the gangplank.

⚠ Remove the mud from the undercarriage to prevent the machine from slipping to the side on slopes.
3. Correctly load the machine onto the specified part of the trailer. After loading the machine, fully extend the bucket and arm cylinders, then slowly lower the boom.
 - ★ When transporting the machine, place rectangular timber under one end of the bucket cylinder to prevent it touching the ground, thereby saving it from possible damage.

- 4 Apply the parking brake using the parking brake lever.

When transporting the machine, place blocks underneath the front and rear wheels to prevent the machine from moving about. Also, hold it down with chains or wire ropes. Be particularly careful to ensure that the machine does not slip sideways.

- 5 Lock the swing lock lever and apply the lock to the work equipment lever.

★ Determine the route for transporting the machine by taking into account the width, height and weight of the machine.

TRAVELING POSTURE

When traveling on the road, the work equipment should be as follows.

- The work equipment should be kept as follows.
 - Reinstall boom connecting pins, then set the boom to the traveling posture.
 - Retract the arm all the way inside.
 - Secure the bucket using the bucket fixing-link.
 - Rest the bucket on the bucket stand in front of the chassis.
- Stop the engine and move the work equipment levers to a position to make sure that the work equipment never drops under its own weight.

- Lock the work equipment levers by moving the safety lock lever to lock position. Move the swing lock lever to lock position.



- ⚠** After setting the machine to the traveling posture, confirm that its overall height is below 4000 mm and the distance between the steering wheel and the tip of the work equipment is less than 3500 mm.



- ⚠** Before starting to travel, be sure to pull in and lock the outriggers.

- ⚠** When the machine is set to the traveling posture, if the boom is raised to the stroke end, the upper boom will contact the outer components. Therefore, never raise the boom all the way.

If a machine equipped with the hook on the bucket

1. The working equipment should be fixed as follows.

1) Relocate the pin on the boom to shift the boom toward the rearmost position. For details see "HANDLING THE BOOM".

⚠ When the machine is in the travel posture, do not raise the boom all the way. Otherwise the upper boom will interfere with the machine outfittings.

2) Determine the boom angle by operating the right hand working equipment lever until plate (1) on the boom is aligned with plate (2) on the machine body, then move valve lever (3) to the LOCK side.

● FREE For working
 LOCK For traveling



3) Take wire rope (4) from the necessary spare parts hook it to hook (6) at the front of the machine and wind it around pipe (5) one turn.



4) Operate the control lever to run the bucket and to move the arm toward the machine, then hook the other end (7) of wire rope (4) to hook (8) on the bucket.



5) Operate the bucket and arm control levers in alternation to dump the bucket and to move the arm away from the machine so that the bottom face of the bucket will contact the pipe on the machine. Continue operating the levers until the wire rope is stretched without any sag.

- During this operation, operate the levers slowly and carefully.



2. Stop the engine and move the working equipment levers to all positions to make sure that the working equipment never drops under its own weight.
3. Lock the working equipment levers by moving the safety lock lever to lock position. Move the swing lock lever to lock position.

⚠ After setting the machine to the traveling posture, confirm that its overall height is below 4000 mm and the distance between the steering wheel and the tip of the working equipment is less than 3500 mm.

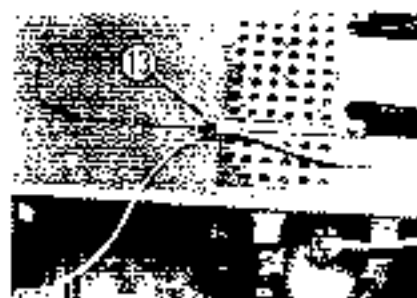
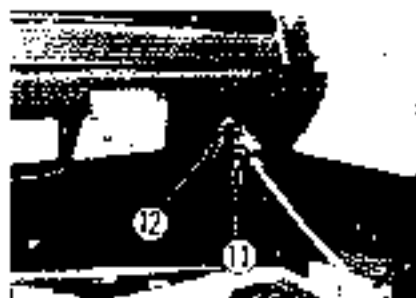
⚠ Before starting to travel, be sure to pull in and lock the outriggers.

⚠ When the machine is set to the traveling posture, if the boom is raised to the stroke and the upper boom will contact the outer components. Therefore, never raise the boom all the way.



To drive the machine at night, install marker lamps in the following manner.

1. Take the cable for marker lamps (10) from the accessory spare parts, remove wing nuts (9) at the left and right link, set the marker lamp ends of the cable on the links parallel to the links, and fasten under wing nuts (9).
2. Insert plugs (11) of the cable to receptacles (12) at the right rear of the machine.
3. Secure the cable using clip (13) on the machine body.



COLD WEATHER OPERATION

PREPARATION FOR LOW TEMPERATURE

If the temperature becomes low, it becomes difficult to start the engine and the coolant may freeze, so do as follows.

FUEL AND LUBRICANTS

Change to fuel and oil with low viscosity for all components.
For details of the specified viscosity see the TABLE OF FUEL, COOLANT AND LUBRICANTS.

COOLANT

After draining inside of the cooling system, add anti-freeze to the coolant to prevent the coolant from freezing when the machine is not being used.

- ★ For details of the antifreeze mixture when changing the coolant see **WATER REQUIRED**.


Care in using Antifreeze

Use a Permanent Antifreeze (ethylene glycol) mixed with corrosion inhibitor and foam agent, etc., meeting the standard requirements as shown below. With permanent antifreeze, no change of coolant is required for a year. If it is doubtful that an available antifreeze meets the standard requirements, ask the supplier of that antifreeze for information.

Standard requirements for permanent antifreeze

- SAE J1034
- FEDERAL STANDARD
1581A-5480

- ★ Never use methanol, ethanol, or propanol based antifreeze.
- ★ Where no permanent antifreeze is available, an ethylene glycol antifreeze without corrosion inhibitor may be used only for the sole season. In this case, clean the cooling system twice a year in spring and autumn. When refilling the cooling system, add antifreeze in autumn, but do not add any in spring.
- ★ Absolutely avoid using any water leak preventing agent irrespective of whether it is used independently or mixed with an antifreeze.
- ★ Do not mix one antifreeze with a different brand.

 **Antifreeze is flammable, so keep it away from any flame.**


BATTERY


As ambient temperature drops, battery capacity will drop, and electrolyte may sometimes freeze if battery charge is low. Maintain battery at a charge level of approx. 100% and insulate it against cold temperature so that machine can be easily started the next morning.

- ★ Measure specific gravity of fluid and absorption rate of charge from the following conversion table:

Specific Gravity	20°C (68°F)	30°C (86°F)	40°C (104°F)	50°C (122°F)
1.280	1.270	1.260	1.250	1.240
1.270	1.260	1.250	1.240	1.230
1.260	1.250	1.240	1.230	1.220
1.250	1.240	1.230	1.220	1.210

- ★ When electrolyte level is low, add distilled water in the morning before work instead of after the day's work. This is to prevent fluid from freezing at night.

 **To avoid gas explosions, do not bring fire or sparks near the battery.**

 **If the electrolyte gets on your skin or clothes, immediately wash with plenty of clean water.**

STARTING IN COLD WEATHER

For the pre- and post-starting inspection, refer to the section "OPERATING YOUR MACHINE".



Pull fuel control lever (1) a little toward you from low idling position.

Figure 6-1



- Put the starting switch key (2) in the HEAT position to red-hot heater signal (3). The preheating times are as shown below:

Ambient temperature	Preheat time
Above 0°C	15 seconds
0°C to -10°C	20 seconds
-10°C to -20°C	30 seconds




- When heater signal (3) becomes red, turn starting switch key (2) to START position to start engine.



- When the engine starts, return the key of starting switch (2) to the ON position. (The key will return automatically when released.)



- ★ If the engine does not start up under the above procedure, repeat steps 2 and 3 after waiting for about 2 minutes.
- 5. Put fuel control lever (1) in low idling position.
- ▼ Do not allow the starting motor to run continuously for more than 20 seconds. If the engine fails to start wait about 2 minutes before trying to start it again.

 **Never use starting aid fluids as they may cause explosions.**

CAUTIONS AFTER COMPLETION OF WORK

1. Mud and water on the machine body should be completely removed. Park the machine on concrete or hard ground. If this is impossible, park the machine on wooden boards. This will prevent the accessories from freezing or the undercarriage from freezing to the ground thereby preventing machine movement the next morning. Particular attention should be given to water drops collected on the surface of the hydraulic cylinder piston rods. Such droplets must be fully wiped off because if water is frozen to the rod when this cylinder is utilized, the cylinder oil seals may be damaged.
2. Drain water collected in fuel system so that such water may be frozen at night.
3. As battery capacity drops at low ambient temperature, cover the battery or remove it from the machine to be kept warm at night.

PREPARING THE CAB HEATER



If the ambient temperature drops, use the cab heater.

1. When using the cab heater, turn valves (1) on the water manifold counter-clockwise to open them.
2. When leaving the cab heater unneeded for a duration, turn valves (1) clockwise to close them.

AFTER COLD WEATHER

When weather becomes warm, perform the following without fail:

- Replace lubricating oils for various units with the oils specified for warm weather use.
- If for any reason permanent anti-freeze can not be used and an ethyl glycol base anti-freeze was used, and season 100 is used instead of 100 and freeze is used, drain the cooling system completely, then remove the inside of the cooling system thoroughly, and fill with fresh water.

PERIODIC MAINTENANCE

Proper lubrication and maintenance insure 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

SAFETY

- Wear well-fitting helmet, safety shoes and working clothes. When drilling, grinding or hammering, always wear protective goggles.
- Fuel or oil are dangerous substances. Never handle fuel, oil, grease or oily clothes in places where there is any fire or flame. As preparation in case of fire, always know the location and directions for use of fire extinguishers and other fire-fighting equipment.
- Do not handle electrical equipment while wearing wet gloves, or in wet places, as this can cause electric shock.
- During maintenance do not allow any unauthorized person to stand near the machine.
- Exhaust gas is dangerous. When working inside, be particularly careful to have good ventilation.
- Unless you have special instructions to the contrary, maintenance should always be carried out with the engine stopped. Lock the swing lock lever and also all of the safety levers. 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. In such a case, never touch any moving part.
- When working underneath the machine, place a sign to that effect on the operator's seat and, if necessary, put a similar sign in the vicinity as well.
- Do not go underneath the machine after raising it up using the boom and the arm.
- When working with others choose a group leader and work according to his instructions. Do not perform any maintenance beyond the agreed work.
- When maintenance has to be carried out with the work equipment raised, they must be securely supported by blocks.

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

Method of relieving pressure

- 1) Lower the work equipment to the ground and stop the engine after idling it for two or three minutes. Then operate the various operation levers, (work equipment control lever through their full stroke in each direction)
- 2) Gradually unscrew the cap of the hydraulic tank and leave it for a few minutes.

- 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.
- 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 while on the machine.
- Be particularly careful when removing the radiator cap. If this is done immediately after using the machine, there is a danger that boiling water may spurt out.
- Do not check the fan belt tension while the engine is running. Be sure to turn off the engine before inspecting other rotating parts and the vicinity thereof.

- Do not allow anybody other than the necessary workers to go near the machine while it is being inspected or maintained. Also, be careful of people in the vicinity. It is necessary to exercise particular care when performing grinding or welding, or when swinging a large hammer.
- Use the tool which is suitable for the maintenance work.
- Remove the minus terminal from the battery in maintaining the electrical system.
- When carrying out other difficult maintenance works, carrying them out carelessly can cause unexpected accidents. If you consider the maintenance is too difficult, always request Komatsu distributor to carry out it.

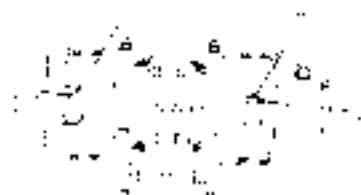
MISCELLANEOUS

- Thoroughly wash the machine, particularly the riding and greasing parts and the vicinity, to prevent the ingress of dust.
- Use genuine Komatsu replacement parts specified in the parts list.
- Use Komatsu specified oil and grease. Use oil and grease having the recommended viscosity for the particular ambient temperature.
- Use clean oil and grease and keep them in clean containers to avoid the ingress of dust.
- Inspect or replace it in a dust-free location to prevent the ingress of dirt.
- Drain off used oil after heating it to a suitable temperature (about 30 to 40 °C).
 - After replacing oil filter element or strainer, blow the air from the circuit.
 - When the strainer is located in the oil sump, the strainer must not be removed while working oil.
 - When adding oil or checking the oil level, use a stick that the oil is at the correct level. When adding oil or fuel, do not let the oil or fuel overflow.
 - If oil or water are spilled, always wipe them. Spilled oil or water may cause people to slip or fire or may cause fire. If soil is piled on top of a place where fuel has been spilled, remove the soil.
 - After greasing up, always wipe off the old grease that was forced out.
 - When changing the oil or filter, check the drainage 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.
- When washing the machine, ensure that water does not get onto the alternator.
- When working on the sea shore, check that the various plugs and valves, etc., are tightened up properly. After the completion of work, thoroughly wash the machine and carefully clean all electrical equipment to ensure that it does not corrode.
- Before working in muddy water, rain or snow, check that the various plugs, valves, are properly screwed up. Upon completion of work, wash the machine, then check the various parts of the machine for cracking, scratching, loose or missing nuts and bolts. Add oil and grease the various parts of the machine.

- When working in a dusty location, be careful of the following
 - 1) Inspect the dust indicator to see whether the air cleaner is blocked up. Clean the air cleaner as soon as it becomes dirty.
 - 2) Clean the radiator core so that it does not become blocked up.
 - 3) Clean or replace the fuel filter as soon as it becomes dirty.
 - 4) Clean the electrical equipment, particularly the starting motor and alternator, to prevent accumulation of dust.
- When working on rocky ground, be careful of damage to the undercarriage, loose nuts and bolts, cracks, wear and other damage.
- After replacing hydraulic oil and filter element, or replacing the hydraulic cylinder or the piping system for the machine, the air bleed operation is necessary. Low-idle the engine, and proceed as follows.
 - 1) Extend and contract each cylinder 4 to 5 times, taking care not allowing it to reach its stroke end (i.e., allowing it to return from a point of about 100 mm before the stroke end).
 - 2) Then, extend and contract each cylinder 2 to 4 times up to the stroke full end.
- ★ Sudden running of the engine at a high speed and allowing of the cylinder to reach the stroke end cause damage to the piston packing, etc. due to the air trapped in the cylinder.

- When the hydraulic oil or the main pump is replaced, or when the suction pipe of the pump or gear pump is removed, bleed the air according to the following procedure.
Remove drain hose (1) and (2), then fill the pump with oil through port (3) and (4).
- ★ Refill capacity: Approx. 4L

- ★ Fix the adapter of the removed drain hose to a place which is higher than the oil level in the hydraulic tank.
- ★ If the pump is not filled with oil and is driven, abnormal heat will occur and the pump will soon break down.



PERIODICAL REPLACEMENT OF SAFETY PARTS

The users of our machine should carry out periodic maintenance in order to ensure the working and operation safety. These parts, as listed in the right, which are closely connected with safety, must be replaced periodically so that the highest safety standard can be maintained.

These parts with the passage of time, have a great tendency to deteriorate in quality and to wear after deform. Furthermore, their defective condition is difficult to detect during periodic maintenance. These parts must, therefore, be replaced with new ones after a predetermined service period even though there is no apparent abnormality.

Unless without saying that every abnormality should be found, these parts must be replaced or repaired even before the predetermined period expires.

The periodical replacement is completely different from the replacement due to the claim against the guarantee by the manufacturer. So they must be treated separately.

No.	Item (component or replacement part)	Interval	Remarks
1	Brake hose (Air and oil line)	Every 1 year	
2	Air pump, hose, filter and oil filter	Every 1 year	Replace as required
3	Brake master cylinder	Every 1 year	
4	Seals (gaskets, seals)	Every 1 year	
5	Shock absorber	Every 1 year	
6	Wheel hub (brake)	Every 2 years	
7	Shock absorber	Every 2 years	
8	Rolling wheel and steering drum (steering)	Every 2 years	
9	Roller bearing (steering)	Every 2 years	
10	Roller bearing	Every 2 years	

MAINTENANCE TABLE

No.	ITEM	SERVICE	PAGE	No.	ITEM	SERVICE	PAGE
CHECK BEFORE STARTING							
a	Walk-around check		48	1	Flag safety mirror	Check	54
b	Coolant	Check and supply	48	2	Horn and wiper	Check	54
c	Engine oil pan	Check and supply	49	3	Ball joint grease and wheel bearing	Check	54
d	Fuel tank	Check and supply	50	4	Steer axle	Check	54
e	Hydraulic tank	Check and supply	51	5	Adjustment points on the front end	Check	54
f	Brake fluid tank	Check and supply	52	6	Control bracket	Lubricate 2 points	54
g	Air lines	Drain water	53	7	Wash suspension	Check	54
h	Air filter	Drain water	53	EVERY 50 HOURS SERVICE			
i	Fuel nozzles	Check	53	a	Fuel tank	Drain water and sediment	108
j	Tires	Check for pressure and damage	53	b	Lubricator	Check and supply	108
k	Wheel brace	Check	54	EVERY 100 HOURS SERVICE			
l	Wheel bearings	Check	54	1	Lubricator		109
m	Parking brake	Check	54	1	Rear cylinder free pin	Lubricate 2 points	109
n	Lenses and instruments	Check	54	2	Rear bush pins	Lubricate 2 points	109
				3	Ball joint under and end pins	Lubricate 2 points	110

No	ITEM	SERVICE	PAGE	No	ITEM	SERVICE	PAGE
4	Arm cylinder foot pin	Lubricate 1 point	110	4	Engine oil pan and filter	Change oil and replace cartridge	112
5	Bogie-Arm coupling pin	Lubricate 1 point	110	5	Swing machinery case	Change oil	112
6	Arm cylinder rod end pin	Lubricate 1 point	110	6	Differential gear case	Change oil	112
7	Bucket cylinder foot pin	Lubricate 1 point	110	7	Final drive case	Change oil	112
8	Link coupling pin	Lubricate 2 points	110	8	Transmission case	Change oil	112
9	Bucket cylinder rod end pin	Lubricate 1 point	110	9	Final drive clearance	Check and adjust	112
10	Bucket-link coupling pin	Lubricate 2 points	110	4	Lubricating		112
11	Arm-link coupling pin	Lubricate 1 point	110	1	Front axle U-joint	Lubricate 2 points	112
12	Arm-link coupling pin	Lubricate 1 point	111	2	King pin	Lubricate 4 points	112
13	Riser	Lubricate 12 points	111	3	Tie rod end pin	Lubricate 2 points	113
14	Swing machinery case	Check oil quantity	111	4	Power steering cylinder front	Lubricate 1 point	113
				5	Power steering cylinder rear end	Lubricate 1 point	113
				6	Drive shaft	Lubricate 8 points	113
				7	Center pin	Lubricate 1 point	114
				8	Out shaft	Lubricate 8 points	114
				9	Transmission case	Check and supply	115
				10	Final drive case	Check and supply	115
EVERY 250 HOURS SERVICE							
1. Fuel being checked and carbon out after the first 250 hours only for new machines.							
4	Fuel filter	Replace cartridge	112				

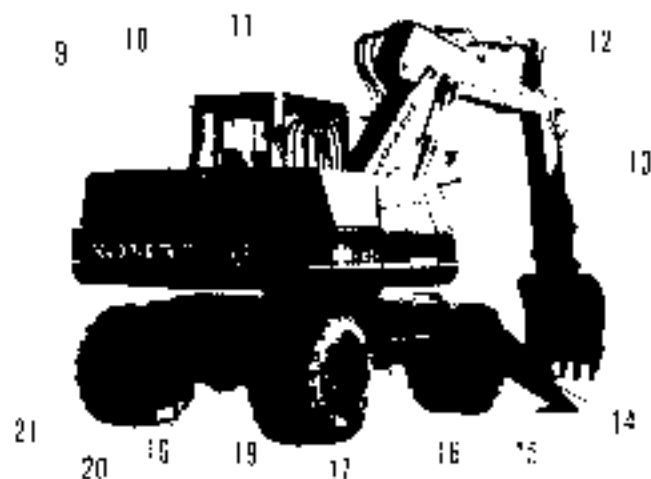
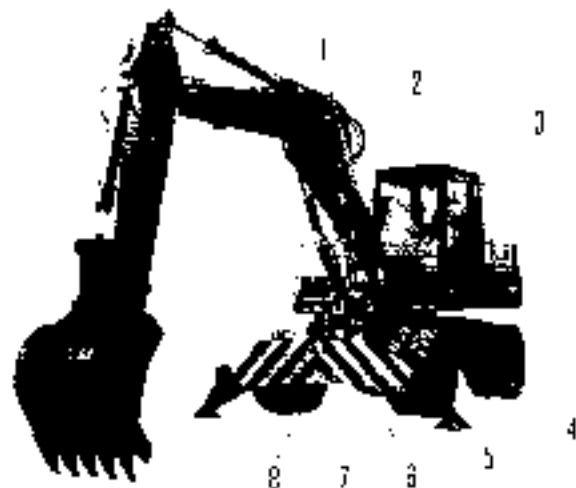
MAINTENANCE TABLE

No.	ITEM	SERVICE	PAGE
EVERY 250 HOURS SERVICE			
a	Differential gear case	Check and supply	110
a	Hydraulic filter	Replace - element	110
f	Fan belt	Check tension	118
c	Battery electrolyte	Check fluid level	119
EVERY 500 HOURS SERVICE			
a	Swing circle	Lubricate 4 points	120
b	Swing circle pinion	Lubricate with grease	120
c	Fuel filter	Replace cartridge	121
d	Logic oil service filter	Change oil and replace cartridge	122
e	Regulator fins	Clean	123
f	Brake fluid	Change oil	123
EVERY 1000 HOURS SERVICE			
a	Swing mechanism case	Change oil	124
f	Compression air	Service as required	126
EVERY 2000 HOURS SERVICE			
a	Differential gear case	Change oil	124

No.	ITEM	SERVICE	PAGE
a	Fork on wheels	Change oil	127
c	Transmission case	Change oil	127
d	Hydraulic tank	Change oil	128
e	Hydraulic tank strainer	Clean	128
f	Alternator and starting motor	Check	130
e	Engine air cleaner	Check and adjust	131
b	Hub bearing	Lubricate 4 points	131
EVERY 4000 HOURS SERVICE			
c	Air compressor	Check	135
WHEN REQUIRED			
a	Air dryer element	Check clean or replace when required	137
b	Control system	Clean	138
c	Electrical intake air filter	Check	137
d	Air filter	Check	138
e	Locket teeth	Replace	138
f	Water separator	Drain water	141

OIL FILLER AND LEVEL GAUGE POSITIONS

- | | | |
|--|--------------------------------|--|
| 1 Hydraulic tank level gauge | 9 Cooling water inlet | 17 Final drive case drain plug |
| 2 Hydraulic tank oil filler | 10 Engine oil pan oil filler | 18 Front differential gear case drain plug |
| 3 Swing machinery case level gauge | 11 Engine oil pan level gauge | 19 Front differential gear case oil filler |
| 4 Swing machinery case drain plug | 12 Fuel tank oil filler | 20 Engine oil pan drain plug |
| 5 Transmission case oil filler | 13 Fuel tank level gauge | 21 Cooling water drain valve |
| 6 Transmission case drain plug | 14 Fuel tank drain valve | |
| 7 Rear differential gear case oil filler | 15 Hydraulic tank drain plug | |
| 8 Rear differential gear case drain plug | 16 Final drive case oil filler | |



EVERY 50 HOURS SERVICE

a. FUEL TANK



Loosen valve (1) on the bottom of the tank so that the precipitation and mixed water will be drained in accompaniment with fuel.

b. LUBRICATOR CASE



1. Open the engine hood.
2. Check the oil level with gauge (2).
3. If the oil is insufficient, replenish with engine oil from hole of plug (3).

★ The type of lubricant used depends on the ambient temperature. Select according to the table "FUEL, COOLANT AND LUBRICANTS".

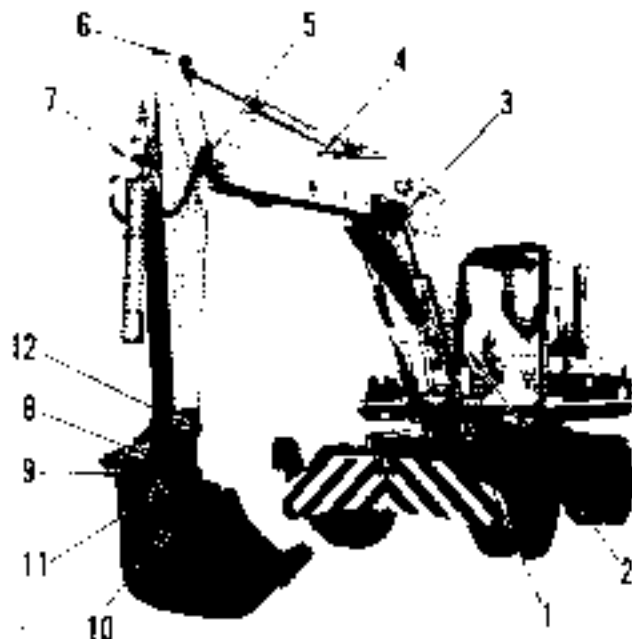
- ★ Adjust the lubricator with knob (4) so that one drop of engine oil is obtained every 30 to 50 applications of the wheel brake. This adjustment should be made after the oil is warm.

EVERY 100 HOURS SERVICE

- ★ Maintenance for every 50 hours should be carried out at the same time

a. LUBRICATING

Apply grease to the grease fittings shown by arrows



- 1 Boom cylinder foot pin 12 points



- 2 Boom foot pin 12 points



3. Bucket cylinder rod end pin (2 points)



4. Arm cylinder foot pin (11 points)



5. Bucket - Arm coupling pin (11 points)
6. Arm cylinder rod end pin (11 points)
7. Bucket cylinder foot pin (11 points)



8. Link coupling pin (2 points)
9. Bucket cylinder rod end pin (1 point)
10. Bucket - Link coupling pin (2 points)
11. Arm - bucket coupling pin (1 point)



12. Arm Link coupling pin (1 point)



13. Blade (2 points)



b. SWING MACHINERY CASE



Inspect the oil level using dipstick (G) and if insufficient pour in additional engine oil from jug or can.

- The type of lubricant used depends on the ambient temperature. Select according to the table "FUEL, COOLANT AND LUBRICANTS".

- Check that dipstick (G) is completely inserted in.
- Before supplying oil, remove air vent plug (H).
After refilling, tighten plug (H).

EVERY 250 HOURS SERVICE

* Maintenance for 50 hours should be carried out at the same time

Carry out the following maintenance only after the first 250 hours.

- FUEL FILTER, REPLACE CARTRIDGE
- ENGINE OIL PAN AND FILTER. CHANGE OIL AND REPLACE CARTRIDGE
- SWING MACHINERY CASE. CHANGE OIL
- DIFFERENTIAL GEAR CASE, CHANGE OIL
- FINAL DRIVE CASE, CHANGE OIL
- TRANSMISSION CASE. CHANGE OIL
- ENGINE VALVE CLEARANCE. CHECK AND ADJUST

For details of the method of replacing or maintaining, see the section on EVERY 500 HOURS, 1000 HOURS AND 2000 HOURS SERVICE

a LUBRICATING

Apply grease to the grease fittings shown by arrows

1. Front axle U. joint (2 points)



2. King pin (4 points)



3. The red end pin (2 points)



4. Power steering cylinder outlet (1 point)



5. Drive shaft Front (3 points)



6. Power steering cylinder red end (1 point)



Rear (3 points)



7. Center pin

:1 point



8. Outrigger

:8 points



d. DIFFERENTIAL GEAR CASE

Front



Remove plug (G) and check the oil level is just below the plug. If it is insufficient, add the gear oil from the hole.

Rear



• The type of lubricant used depends on the ambient temperature. Select according to the table "FUEL, COOLANT AND LUBRICANTS".

e. HYDRAULIC FILTER



• Open drain valve (1) below the air tank.



- 2 Gradually loosen cap (1) of the oil filler and leave it for several minutes to sufficiently relieve the air pressure in the tank.



- 3 Remove cover (2) (3), spring (4) and valve (5) to remove element (6). Clean the parts and the inside of the case, then replace it with a new one.
- ★ Be sure to use a genuine Komatsu element.

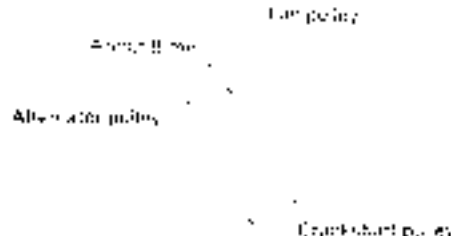
⚠ When remove cover (3), undo the bolts gradually to prevent the cover flying off under the force of spring (4).

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

4. FAN BELT



The belt tension should normally deflect by about 8 mm when pressed with the finger at a point midway between the alternator and the fan pulley (approx. 6 kg).



To adjust the belt tension, loosen nut and bolt (1) and (2) and shift alternator (3) slightly.

- ▶ Inspect each pulley for possible damage and wear of the V-groove and also check the belt for wear. In particular, check to see if the V-belt is touching the bottom of the groove.
- ▶ If the belt stretches to such an extent that adjustment is no longer possible or if the belt is slashed or cracked, replace both belts together.
- ▶ When adjusting the V-belt tension, do not push the starter core of alternator (3) directly with a bar, etc. Place a piece of wood between the alternator and the bar.

g. BATTERY ELECTROLYTE



If the electrolyte level is lower than the prescribed level (10 to 12 mm above the plates), supply distilled water.

- Should any of the acid be spilled, have it replenished by the nearest battery shop with acid of the correct specific gravity.
- When inspecting electrolyte level, clean the air hose of the battery cap (1).
- Never use metal funnel for electrolyte supply.



If the electrolyte gets on your skin or clothes, immediately wash with plenty of clean water.



To avoid gas explosions, do not bring fire or sparks near the battery.

EVERY 500 HOURS SERVICE

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

a. SWING CIRCLE



Lubricate the 4 grease fittings shown by arrows

b. SWING CIRCLE PINION



- 1 Remove bolts (1) held in the top of the revolving frame and remove cover (2)
- 2 Check with scale that grease depth is above 18 mm. If there is insufficient grease replenish it



- ★ If the grease is particularly milky due to ingress of water, etc., then remove cover (3) and remove the grease. Replace all of the grease with new grease. The total amount of grease is 8 (17.2 kg).

c FUEL FILTER



1. Using a 7/16" wrench, remove cartridge by turning it counter clockwise.
2. Fully vent the fuel system after applying relief to the gasket face.
 - ★ To vent the cartridge, place a gased line in contact with the seal line of the filter. Start 7 fast screws up the cartridge 1/2 inch at a time until fuel begins to ooze excessively.



3. After replacing cartridge, reassemble as you did in 2.
4. Insert fuel pump pin (3) and move the locking nut and sleeve to base of the fuel line screws to secure output line 2.
5. Tighten up as you did in 2.
6. Fit the fuel pump pin and sleeve (3) and insert into fuel plug (4). Block air flow to fuel pump pin and sleeve by the same procedure as described in 5. The fuel line

7. After a locked nut tightens plug, it will be over sleeve (3) and must be freed using keys (2) and (4) (5).
- ★ After replacing the cartridge, start on the engine and check for fuel leaks. Be sure to use a quantity Kirtland cartridges.

d ENGINE OIL PAN AND FILTER



1. Remove drain plug (P) drain oil. After draining, tighten the drain plug.
2. Using a filter wrench, remove cartridge. Do not touch new oil filter by touching contaminants.
3. Clean the filter base and install the new cartridge after applying gasket of oil to the gasket line.
 - ★ To lift the cartridge, raise the gasket line so that it is the top face of the filter base, then screw up the cartridge further 1/2 turn the caplet nut to tighten it up excessively.



4. After replacing the cartridge, pour in the specified quantity of engine oil from oil filter (P).
5. Make the engine for a while and start the engine. Check the oil level. For details, refer to the section CHECK BEFORE STARTING.



- ★ Refill capacity: 10.5L
- ★ The level of oil at 100°C depends on the ambient temperature. See the accompanying table (1) (1) COOLANT AND LUBRICANTS.

- Be sure to fit a genuine Komatsu cartridge.
- Replace once every 6 months, regardless of the number of hours operated.
- When supplying oil, be careful not to get oil on the interfilter.
- If filter cartridge (1) is removed immediately after stopping the engine, oil will spill. Wait at least 10 minutes after stopping the engine before replacing the filter cartridge.
- Use API category CD class oil. If CC class oil must be used, change the oil and replace the oil filter at half the usual interval (250 hours).

E. RADIATOR FINS



Clean the radiator fins clogged with mud, dust and leaves with compressed air. Steam or water may be used instead of compressed air.

- The rubber hose should be checked at the same time. If the hose is found to have cracks or to be hardened by aging, such hose should be replaced by new one. Further, increased hose clamp should also be checked.

F. BRAKE FLUID

Always contact with your Komatsu distributor for replacing the Brake Fluid.

EVERY 1000 HOURS SERVICE

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

a. SWING MACHINERY CASE



Drain the oil from plug (P) on the lower body. Then retighten it. Refill the engine oil from the oil filter (G).

- ★ The type of lubricant used depends on the ambient temperature. Select according to the table "FUEL, COOLANT AND LUBRICANTS".
- ★ Refill capacity: 5L.



- ★ For details of the method of refilling the oil, refer to the section EVERY 100 HOURS SERVICE.
- ★ Before supplying or remove a vent plug (I).
After refilling, tighten plug (I).

b. CORROSIÓN RESISTOR



1. After screwing at valve (1) on the corrosion resistor (2) remove the cartridge by turning it counter clockwise and repeat it with the next one.
2. Turn the nozzle dipper and by sealing surface comes into contact with the head. Then, tighten the cartridge about 2/3 of a turn.
3. After repeating the operation (1)

- ★ it is recommended get a new Komatsu cartridge and used.
- ★ Be careful not to screw in more than required.
- ★ when installing a new cartridge seal the sealing surface with Ultra Sealing oil.

EVERY 2000 HOURS SERVICE

- ★ Maintenance 10: every 50, 100, 250, 500 and 1000 hours should be carried out at the same time.

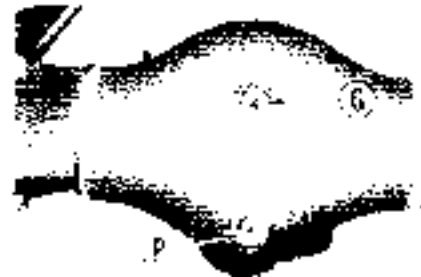
a. DIFFERENTIAL GEAR CASE

Front



Draw the oil from plug (P) on the lower body, then regenerate. Refill the gear oil from the oil filler (G).

Rear



- ★ The type of lubricant used depends on the ambient temperature. Select according to the table: LUBRICANTS AND COOLANTS

- ★ Refill capacity: 13 l (front)
14 l (rear)

- ★ For details of the method of refilling the oil, refer to the section: EVERY 250 HOURS SERVICE

b FINAL DRIVE CASE



- 1 Stop the machine with the oil level mark (F) in the horizontal position to the ground surface.
- 2 Drain the oil from drain plug (P), then tighten the plug.
- 3 Refill the gear oil from oil filler (G).

4 The type of lubricant used depends on the ambient temperature. Select according to the table "FUEL, COOLANT AND LUBRICANTS".

- Refill capacity: 2.5 l (Front and rear on each side)
- For details of the method of refilling the oil, refer to the section "EVERY 250 HOURS SERVICE".

c TRANSMISSION CASE

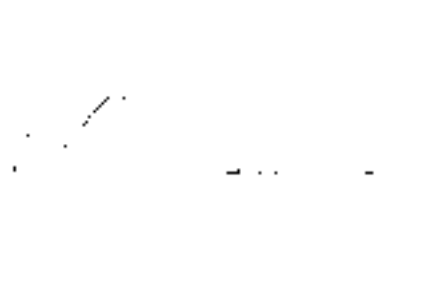


1 Drain the oil from plug (P) on the lower body, then tighten it. Refill the engine oil from oil filler (G).

2 The type of lubricant used depends on the ambient temperature. Select according to the table "FUEL, COOLANT AND LUBRICANTS".

- Refill capacity: 8 l
- For details of the method of refilling the oil, refer to the section "EVERY 250 HOURS SERVICE".

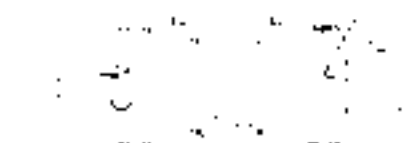
d. HYDRAULIC TANK



Retract the arm and bucket cylinder then lower the boom and put the tips of the teeth in contact with the ground.

- 2 Gradually unscrew the cap of oil filler (F) and drive it for several minutes to relieve the air pressure in the tank.
- 3 Then remove the cap and unscrew drain plug (P) to drain off the oil. After draining off the oil, tighten up drain plug (P).
- 4 Pour in the specified amount of engine oil from oil filler (F).
- 5 For the method of checking the oil level, see the CHECK BEFORE STARTING.

- ▶ The type of lubricant used depends on the ambient temperature. Select according to the table "FUEL, COOLANT AND LUBRICANTS".
- After changing oil, put the control levers in neutral position and run the engine at low idling speed for a few minutes before operation of working equipment.
- Refill capacity: 100L
- ⚠ When removing filler cap (F), take it slowly to relieve inner pressure.



When the hydraulic oil of the main pump is replaced or when the suction pipe of the pump or gear pump is removed, bleed the air according to the following procedure:

- ★ Remove drain hose (1) and (2), then fill the pump with oil through port (3) and (4).
- ★ Refill capacity: Approx. 4.5

- ★ Fix the adapter of the removed drain hose to a place which is higher than the oil level of the hydraulic tank.
- ★ If the pump is not bled with oil and is driven, abnormal heat will occur and the pump will soon break down.

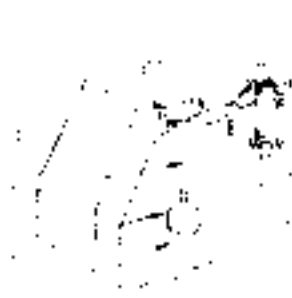
e. HYDRAULIC TANK STRAINER



- 1. Open drain valve (1) below the air tank.



2. Gradually loosen cap (2) of the oil filler and leave it for several minutes to sufficiently relieve the air pressure in the tank.



3. Remove cover (12-13) at the top of the hydraulic tank and lift up the top of rod (3). Remove spring (4) and strainer (5) and wash them. If strainer (5) is damaged, replace it with a new one. Reinstall rubber (6) by inserting it into tank properly (part 7).

! When remove cover (13), undo the bolts gradually to prevent the cover flying off under the force of spring (4).

! When removing the cap, turn it slowly to relieve inner pressure.

- * Maintenance for every 50, 100, 250, 500, 1000 and 2000 hours should be carried out at the same time

EVERY 4000 HOURS SERVICE

f ALTERNATOR AND STARTING MOTOR

Around this time, the tractor will require work and the bearing will need to be greased. Stop and ask your Komatsu distributor to carry out a special maintenance.

- * If the engine is started frequently carry out maintenance every 1000 hours.

g ENGINE VALVE CLEARANCE

As specified in the manual for adjustment, adjust the push rods, push rods, push rods and push rods of the engine.

h HUB BEARING

Ask your Komatsu distributor to grease the hub bearing 4 points (see also special procedure) as used.

a AIR COMPRESSOR

Ask your Komatsu distributor for advice.

WHEN REQUIRED

a. CHECK, CLEAN AND REPLACE AIR CLEANER ELEMENT

Checking



Whenever the red piston is dis-
 tanced (1), inspect the air
 cleaner outer element. Stop the
 engine when cleaning the element.

Cleaning or replacing outer element



1. Move the arm (2) and remove the cap (3), completely, and the outer element.
2. Clean the air cleaner body exterior and the removed cap.
3. Clean and inspect the element. (See the item "Cleaning outer element" for cleaning procedure.) Install the cleaned element.
4. Push the cap and back (see) but-
 ton to return the red piston to the
 original position.

- ★ When inspecting or cleaning the
 air cleaner, remove evacuated
 valve (4) and clean with com-
 pressed air.
- ★ Replace the outer element when
 has been cleaned 3 times, most
 only or used throughout a year.
 Replace the inner element at the
 same time.
- ★ Restore sea washers (6) at wing
 nut (6) if they are broken.



- ★ Replace both inner and outer elements when dust indicator reset step appears soon after installing the cleaned outer element even though it has not been cleaned 6 times.
- ★ Check inner element retaining nuts for looseness and 8 ends very tight.
- ★ Remove the seal from the outer element. The number of times the outer element has been cleaned can be seen by the number of times seal was

Replacing inner element

- 1 First remove the cover and the outer element, and then remove the inner element.
- 2 Place the cover over the air intake ports, prevent dust entering. Clean the air cleaner body inside, then remove the cover from the air intake part.
- 3 Fit a new inner element and tighten it with nuts.
- 4 Install the outer element and the cover. Push the dust and water reset button.

NOTE Do not attempt to reinstall a cleaned inner element.



Do not clean or replace the air cleaner element with the engine running.

Cleaning outer element

With compressed air

Direct dry compressed air (less than 7 kg/cm²) 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

Wash dry water (less than 3 kg/cm²) on element from inside along folds, then from outside and again from inside. Dry and check it.

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 7 kg/cm²) 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. CLEAN INSIDE OF COOLING SYSTEM

Clean the inside of the cooling system, change the coolant, and re-plate the condenser coils according to the label.

- ★ Stop the machine on level ground when changing or changing the coolant.
- ★ Use a permanent type antifreeze. If the same reason of compression to use permanent type antifreeze use an antifreeze concentrate only one grade.

- ★ Be sure to replace the condenser coils with a charge.
- ▼ Use city water for the cooling water. If city water well water or other soft water supply must be used, contact your Komatsu distributor.



Antifreeze is flammable, so keep it away from any flame

- Add soft water to the cooling water. When deciding the ratio of anti-freeze to water, check the lowest temperature of the part and decide from the mixing ratio table given below. It is actually better to set mixing temperature about 10°C lower than decided by the mixing ratio.

Mixing ratio of water and antifreeze

Temperature of the part (°C)	Antifreeze (L)	Water (L)
10	1	9
20	1	8
30	1	7
40	1	6
50	1	5
60	1	4
70	1	3
80	1	2
90	1	1

- ★ We recommend that permanent fluids, identify space to confirm the mix ratio proportions.

Temperature (°C)	Antifreeze (L)	Water (L)
10	1	9
20	1	8
30	1	7
40	1	6
50	1	5
60	1	4
70	1	3
80	1	2
90	1	1

Corrosion resistor



- 1 Stop the engine, close corrosion resistor valve (1).
- 2 Turn radiator cap (2) slowly until it comes off.

⚠ If the water temperature is high, do not remove the cap. This is because of the possibility of scalding water spurting out.

When removing cap, turn cap slowly to allow pressure to be relieved.

- 3 Loosen drain valve (3) at the bottom of radiator and drain plugs (4), (5) at the side of cylinder block and drain off the cooling water.

Water filler



- 4 Close up drain valve (3), and plugs (4), (5) and pour in clean water (ex. city water) up to the vicinity of the water filler.
- 5 When the water reaches the vicinity of the water filler, put on engine at low idling, open the drain valve (3) and plugs (4), (5) then pass water through the cooling system until clean water comes out from the drain valve and plugs for 10 minutes.

* When flushing, adjust the flow so that water is added at the same rate as the water is drained to keep the radiator always full.

Drain valve (bottom of radiator)



- 6 After washing the cooling system, stop the engine. Open drain valve (3) and plugs (4), (5) to drain water and close drain valve (3), and plugs (4), (5).
- 7 After draining off the cooling water, wash out the cooling system using commercially available detergent. Follow the instructions on the detergent container.
- 8 After washing the cooling system, drain off all the water, then close up drain valve and plugs, and pour in clean water (ex. city water) slowly up to the vicinity of the water filler.

Drain plug (cylinder block)



- 9 When the water reaches the vicinity of the water filler, put the engine at low idling, open the drain valve and plug (1) to pass water through the cooling system until clean water comes out from the drain valve and plugs.
- When flushing, adjust the flow so that water is added at the same rate as the water is drained to keep the radiator always full.

- 10 When the water becomes completely clean, stop the engine and close the air drain valve and plugs.
- 11 Replace the corrosion resistor cartridge and open valve (1).
- For details of replacement of the corrosion resistor, see F44P11-1000-HOURS SERVICE.
- 12 Supply water until it overflows from water filler.
- 13 Run the engine 5 minutes at low idling and then for another 5 minutes at high idling to ensure that trapped air in the cooling system leaves radiator and off during the operation.
- 14 Stop the engine and wait for about 3 minutes. Supply cooling water up to the specified level. Tighten the cap.

c CHECK ELECTRICAL INTAKE AIR HEATER



Check electrical intake air heater (1) once a year before commencing work in the cold season.

Remove electrical intake air heater (1) from the engine intake connection, and check it for possible open circuits and dirt.

When inspecting and repairing electrical intake air heater (1), replace the gasket with new one.

d. CHECK AND CLEAN AIR FILTER



As element 1 is clogged by dirt or dust, check and clean it every three months to half a year.

e. REPLACE BUCKET TEETH

Replace the point before the adapter starts to wear.

- ★ Set the bucket so that its bottom is horizontal.



- 1) Use a hammer and drift to drive out lock pin 121, which is fixing point 11 to the bucket. If the drift is struck while facing rubber pin lock 121, the rubber pin lock may break. Direct the drift to the back of the pin.

- 2) Check lock pin 121 and rubber pin lock 131 which were removed.

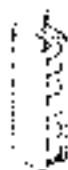
- ★ If the lock pins and rubber pin locks with the following defects are used, the point may come off the bucket. Replace them with new ones.

Check lock pin lock



- A lock pin which is too short.

Fig. 13. Rubber pin lock
for adapter (3) (1)



- ◆ A rubber pin lock, the rubber of which is broken and whose steel base comes out easily.

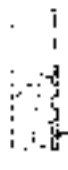


Fig. 14. Rubber pin lock
of which the steel base
can be turned by being
pressed with a finger

- ◆ A rubber pin lock, the steel base of which can be turned by being pressed with a finger.
- 3 Clean the surface of adapter (4) and remove the soil from it with a knife.



Fig. 15. Drive rubber pin lock
(1) into the hole of the
adapter (4)

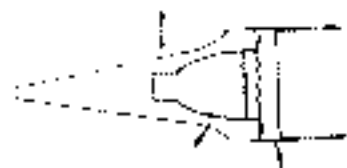
- 4 Use your hand or a hammer to drive rubber pin lock (1) into the hole of the adapter. Take care that the rubber pin lock does not project out of the adapter.
- 5 Clean the inside of point (1) and install it to adapter (4). If it is stained with soil or has projections, it will not fit to the adapter.

FIGURE 14-10

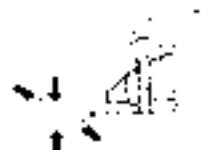


6. Fit point (1) to adapter (4), and confirm that when the pointer is pressed strongly, the rear face of the hole for the pin of the point is at the same level as the rear face of the hole for the pin of the adapter.

- ★ If the rear face of the hole for the pin of point (1) is projecting from that of adapter (4), do not drive in the pin. Instead, find out what substance is covering point (1) from fitting to adapter (4), and remove it. Then fit point (1) to adapter (4) and drive in lock pin (2).



7. Insert lock pin (2) in the hole of the point and hit it until its top is the same level as the surface of point (1).



6 After replacing a bucket tooth, confirm that it is installed securely by doing the following:

- 1) Confirm that the surface of the lock pin is secured against the point.
- 2) Lightly hit lock pin (2) in the reverse direction from which it was hit in.
- 3) Lightly hit the tip of the point from above and below, and hit its sides from right and left.
- 4) Confirm that rubber pin lock (1) and lock pin (2) are set as shown in the above figure.

- The life of the point can be long, trained, and the frequency of its replacement can be reduced by turning it upside down so that it will wear evenly.
- When replacing the point, replace the rubber pin and lock pin with new ones. This will prevent the point from falling.

I. WATER SEPARATOR



When float (21) is at or above red line (11), drain the water according to the following procedure:

- 1) Loosen drain plug (13) and drain the accumulated water until the float reaches the bottom.
- 2) Tighten drain plug (13).
- 3) If the air is sucked into fuel line when drain the water, be sure to bleed air in the same manner as for the fuel filter.
(See Fuel Filter Cartridge in EVERY 500 HOURS SERVICE section.)

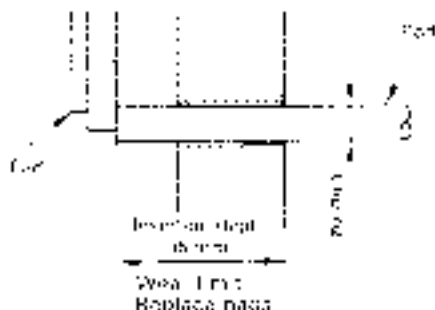
ADJUSTMENT

WHEEL BRAKES

CHECK DISC BRAKE FOR WEAR



1. Insert a bar of a diameter of 10 mm (1/2 inch) between the two wheels etc. (not perpendicular) into wear, inspect on both sides of the disc as to respect:
2. If the right side deeper within the top contacts the pads is 3) mm, the wear limit has been reached, replace the pads.



⚠ If the pads are used beyond max wear limit, poor braking will be caused which is very dangerous. As pads reaches to wear limit more frequent checks may be required.

- ★ Check all pads for wear because wear of pads is different each other. If any one pad is worn to the limit, replace all the pads on the machine or the tractor the front wheels or the four or the rear wheels.
- ★ For such conditions, operating in muddy water, washing or rain, use disc sander or sander after every day's work to prevent pads from premature wear.
- ★ You should contact your distributor for the replacement of the pad.

AIR BLEEDING OF THE BRAKE FLUID SYSTEM

Air master



- 1 Fill the brake fluid tank to the specified level. Add the fluid during the air bleeding if the surface is lower than the specified level.
- 2 Air bleeding of the air master cylinder.
 - 1 Remove cap (1) of the air bleeder of the air master, connect a vinyl pipe to the end of the bleeder, and place the other end of the pipe in a container which contains the brake fluid.

Air bleeder Front wheel



- 2 After depressing the brake pedal (repeatedly keep it depressed fully or leave the parking brake lever in BRAKE LOCK position) Loosen the vent screw (1-2 rotation) to check the flow of the brake fluid. Then, tighten the vent screw quickly.

Rear wheel

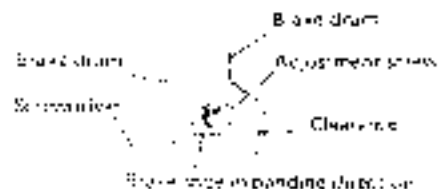


- 3 Perform air bleeding in 2) (3), and then press front and rear wheel cylinders and the air master, respectively, at the further place from the air master.

ADJUSTMENT OF PARKING BRAKE

When the parking brake becomes ineffective, adjust the brake as follows.

Adjustment



- 1 Move the machine a short distance. Turn the drive shaft to align four adjusting holes (1) on either periphery (2) and the adjuster wheel on the opposite side of the rear.
- 2 Insert a straight screwdriver in each adjusting hole (1) and rotate the adjuster wheel toward the center until it cannot be rotated. Then, rotate the wheel in the opposite direction approximately 1/2 clicks.

TROUBLE SHOOTING GUIDE

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

ELECTRICAL SYSTEM

Lamp does not glow brightly even when engine runs at high speed

Lamp flickers while engine runs

- Check for loose terminals or connections
- Adjust belt tension

Charge monitor does not go out even when engine runs at high speed.

- Replace the alternator
- Inspect and repair wiring

Unusual noise is emitted from the alternator

- Replace the alternator

Starting motor does not turn when starting switch is turned on

- Inspect and repair the wiring
- Charge the battery

The pinion of the starting motor keeps going in and out

- Charge the battery

Starting motor turns the engine sluggishly

- Charge the battery
- Replace the starting motor

The starting motor disengages before the engine starts up

- Check and repair the wiring
- Charge the battery

The heater signal does not glow red

- Check and repair wiring
- Replace the heater relay

Charge monitor does not light up when the engine is stationary (When the starting switch is in ON position)

- Replace the monitor
- Inspect and repair the wiring

Outside the electrical intake air heater is not warm when touched with the hand

- Check and repair wiring
- Repair the electrically operated heater
- Check and replace the heater relay

ENGINE

The engine oil pressure monitor flashes when engine speed is raised after completion of warm up

- Adjust the oil pump pressure
- Repair the oil pressure sensor
- Check oil quality and filter and replace if necessary
- Repair the monitor

Steam is emitted from the top part of the radiator (the pressure valve)

The pointer of the water temperature gauge is in red range on right hand side of the gauge

- Check the cooling water level in the radiator
- Adjust the thermostat
- Check the radiator fan speed
- Check the engine cooling fan
- Replace the thermostat
- Tighten the radiator hose clamps on the pocket of it
- Replace the water pump or the gauge

The pointer of the water temperature gauge is in white range on left hand side of the gauge

- Repair the water pump
- Replace the water temperature gauge

The engine does not start when the starting motor is turned over

- Check the battery
- Repair or replace the battery if necessary
- Repair the engine pressure in the cylinder
- Check the timing belt
- Check the valve timing adjustment
- Check the fuel system and the air filter

Exhaust gases is white or blue

- Check the turbocharger parts
- Repair the turbocharger

Exhaust gas occasionally turns black

- Check the air filter and replace if necessary
- Replace the turbo
- Check the engine oil level and the quality

Combustion noise occasionally changes to knocking sound

- Replace the turbo

Abnormal combustion noise or mechanical noise

- Repair the valve timing
- Check the timing belt
- Repair the turbo
- Adjust valve clearance

CHASSIS

Slow speed of travel, swing, boom, arm and bucket

- Adjust the speed control valve

Unusual noise emitted from pump

- Check the hydraulic tank strainer

Excessive oil temperature risk of hydraulic oil

- Clean the oil cooler
- Adjust the belt tension of oil fan
- Add oil to coolant level

Unusual noise emitted from transmission

- Add oil to specified level

Unusual noise emitted from front or rear axle

- Add oil to specified level

High/low gear is difficult to shift

- Check the oil passage

Unusual noise is emitted from drive shaft

- Adjust it

Steering wheels drag

- Repair the steering pump
- Repair the steering arm
- Repair the steering cylinder

Steering wheel pulls to one side

- Adjust the track chain
- Adjust the suspension spring

Braking effect is poor

- Brake air is not fully compressed
- Adjust the brake
- Check air lines for air-leakage
- Adjust it
- Replace the air lines pipes
- Check and adjust the brake pump
- Check and repair the air manifold

Rise of air pressure is not quick.

Maximum air pressure is too low.

- Check and regulate the air compressor.
- Adjust and replace the safety valve.
- Adjust and replace the governor.
- Adjust and replace the air pressure gauge.
- Check the air leaks from the hose and joints.

Air pressure gauge indicates high position.

- Adjust and replace the air pressure gauge.
- Adjust and replace the governor.

Forward reverse transmission not shift.

Acceleration or deceleration is impossible.

- Check the air linkage.
- Check the strokes of the forward/reverse linkage.
- Check and replace the safety valve.

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 operation with minimum of service.

- After every part is washed and dried, the machine shall be housed in a dry building. Never leave it outdoors.

In case it is indispensable to leave it outdoors, lay wood plates on the ground, and park the machine on the wood plates and cover it with canvas etc.

- Completely fill fuel tank, lubricate and change oil before storage.
- Apply a thin coat of grease to metal surface (hydraulic piston rods and front idler adjusting rods).
- As to batteries, remove the terminals and cover them, or remove them from the machine and store separately.

- When the ambient temperature is anticipated to drop below 0 C, always add antifreeze in the cooling water.
- The fuel control lever shall be set to STOP position.
Each control lever shall be set to neutral position and locked.

DURING STORAGE

- Operate the engine and move the machine for a short distance once a month so that new oil film will be coated over movable parts and component surfaces.
- ▼ Before operating the work equipment, wipe off the grease on the hydraulic piston rod.



If it is unavoidably necessary to carry out rust-preventive operation while the machine is indoors, open up doors and windows to improve ventilation and prevent the gas poisoning.

AFTER STORAGE

After storage, you shall apply the following treatment before operation.

- Completely fill fuel tank and lubricate before operation.
- Wipe off the grease on the hydraulic piston rod.
- ★ If the machine to be used when the monthly rust prevention operation has not been carried out, contact your Komatsu distributor.

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 work; this is the work record of the machine.
- This record will indicate when periodical maintenance is due.
- It also indicates the integrated working hours when machine problems are encountered.
- ★ **How the meter progresses**

The service meter progresses by 1 when the engine is operated for one hour, regardless of the engine speed.

Consequently, if the engine is running, the service meter will advance even if the machine does not move.

MACHINE AND ENGINE SERIAL NUMBERS

When calling for a service of mechanic or when making replacement parts order, be sure to give Kenntan distributor the machine and engine serial numbers as well as the service meter reading before mentioned. These numbers are found on the plates shown in the photos below.

- Location of the machine serial number mark



This is seen on the bottom left of the cab.

- Location of engine serial number mark



This is seen on the upper right of the cylinder block when seen from the fan side.

NOTE

1. When the supplier of the engine is not specified, the engine shall be a Caterpillar engine with the following characteristics:
 - Charge air according to the following table of the selected engine in these rows

Engine speed (rpm)	Charge air temperature (°C)
1500-1600	12.0 (regular interval)
1800-2000	14.0 (regular interval)

- ASTM American Society of Testing and Materials
 SAF Society of Automotive Engineers
 API American Petroleum Institute

Speeded engine Total amount of work required of the engine, based on the rating

Rated engine Amount of work required to fulfil a given duty, based on the specified duty cycle

2. When starting the engine, an average of four consecutive cold starts (CF) shall be simulated at 1000 RPM, SAF mode 40 and SAF mode 50, each time at an atmospheric temperature of 5°C up to 20°C, based on the following:
 - SAF mode 40: 100% engine speed and 100% alternator (100% of the engine rated charge current) shall
 - There shall be no problem starting the engine at the maximum of 1000 RPM, 40 and 50. The starting aid sequence shall not be active, the temperature shall be 5°C to 20°C.
 - The Environmental Control panel shall not be necessary to be programmed to be active for use with the engine and hydraulic work equipment during the test.

Year	Model	Engine Oil (Oil or Oil) Capacity (with oil filter) (Imperial/US)	Grease (Lithium-Base) NLGI No. 2	Anti-Seize Compound (Engine Oil) Type
1981	4Runner	5.7 (5.7) 5.7 (5.7) 5.7 (5.7) 5.7 (5.7)	3000	3000
1982	4Runner	5.7 (5.7) 5.7 (5.7) 5.7 (5.7) 5.7 (5.7)	3000	3000
1983	4Runner	5.7 (5.7) 5.7 (5.7) 5.7 (5.7) 5.7 (5.7)	3000	3000
1984	4Runner	5.7 (5.7) 5.7 (5.7) 5.7 (5.7) 5.7 (5.7)	3000	3000
1985	4Runner	5.7 (5.7) 5.7 (5.7) 5.7 (5.7) 5.7 (5.7)	3000	3000
1986	4Runner	5.7 (5.7) 5.7 (5.7) 5.7 (5.7) 5.7 (5.7)	3000	3000
1987	4Runner	5.7 (5.7) 5.7 (5.7) 5.7 (5.7) 5.7 (5.7)	3000	3000
1988	4Runner	5.7 (5.7) 5.7 (5.7) 5.7 (5.7) 5.7 (5.7)	3000	3000
1989	4Runner	5.7 (5.7) 5.7 (5.7) 5.7 (5.7) 5.7 (5.7)	3000	3000
1990	4Runner	5.7 (5.7) 5.7 (5.7) 5.7 (5.7) 5.7 (5.7)	3000	3000
1991	4Runner	5.7 (5.7) 5.7 (5.7) 5.7 (5.7) 5.7 (5.7)	3000	3000
1992	4Runner	5.7 (5.7) 5.7 (5.7) 5.7 (5.7) 5.7 (5.7)	3000	3000
1993	4Runner	5.7 (5.7) 5.7 (5.7) 5.7 (5.7) 5.7 (5.7)	3000	3000
1994	4Runner	5.7 (5.7) 5.7 (5.7) 5.7 (5.7) 5.7 (5.7)	3000	3000
1995	4Runner	5.7 (5.7) 5.7 (5.7) 5.7 (5.7) 5.7 (5.7)	3000	3000
1996	4Runner	5.7 (5.7) 5.7 (5.7) 5.7 (5.7) 5.7 (5.7)	3000	3000
1997	4Runner	5.7 (5.7) 5.7 (5.7) 5.7 (5.7) 5.7 (5.7)	3000	3000
1998	4Runner	5.7 (5.7) 5.7 (5.7) 5.7 (5.7) 5.7 (5.7)	3000	3000
1999	4Runner	5.7 (5.7) 5.7 (5.7) 5.7 (5.7) 5.7 (5.7)	3000	3000
2000	4Runner	5.7 (5.7) 5.7 (5.7) 5.7 (5.7) 5.7 (5.7)	3000	3000
2001	4Runner	5.7 (5.7) 5.7 (5.7) 5.7 (5.7) 5.7 (5.7)	3000	3000
2002	4Runner	5.7 (5.7) 5.7 (5.7) 5.7 (5.7) 5.7 (5.7)	3000	3000
2003	4Runner	5.7 (5.7) 5.7 (5.7) 5.7 (5.7) 5.7 (5.7)	3000	3000
2004	4Runner	5.7 (5.7) 5.7 (5.7) 5.7 (5.7) 5.7 (5.7)	3000	3000
2005	4Runner	5.7 (5.7) 5.7 (5.7) 5.7 (5.7) 5.7 (5.7)	3000	3000
2006	4Runner	5.7 (5.7) 5.7 (5.7) 5.7 (5.7) 5.7 (5.7)	3000	3000
2007	4Runner	5.7 (5.7) 5.7 (5.7) 5.7 (5.7) 5.7 (5.7)	3000	3000
2008	4Runner	5.7 (5.7) 5.7 (5.7) 5.7 (5.7) 5.7 (5.7)	3000	3000
2009	4Runner	5.7 (5.7) 5.7 (5.7) 5.7 (5.7) 5.7 (5.7)	3000	3000
2010	4Runner	5.7 (5.7) 5.7 (5.7) 5.7 (5.7) 5.7 (5.7)	3000	3000
2011	4Runner	5.7 (5.7) 5.7 (5.7) 5.7 (5.7) 5.7 (5.7)	3000	3000
2012	4Runner	5.7 (5.7) 5.7 (5.7) 5.7 (5.7) 5.7 (5.7)	3000	3000
2013	4Runner	5.7 (5.7) 5.7 (5.7) 5.7 (5.7) 5.7 (5.7)	3000	3000
2014	4Runner	5.7 (5.7) 5.7 (5.7) 5.7 (5.7) 5.7 (5.7)	3000	3000
2015	4Runner	5.7 (5.7) 5.7 (5.7) 5.7 (5.7) 5.7 (5.7)	3000	3000
2016	4Runner	5.7 (5.7) 5.7 (5.7) 5.7 (5.7) 5.7 (5.7)	3000	3000
2017	4Runner	5.7 (5.7) 5.7 (5.7) 5.7 (5.7) 5.7 (5.7)	3000	3000
2018	4Runner	5.7 (5.7) 5.7 (5.7) 5.7 (5.7) 5.7 (5.7)	3000	3000
2019	4Runner	5.7 (5.7) 5.7 (5.7) 5.7 (5.7) 5.7 (5.7)	3000	3000
2020	4Runner	5.7 (5.7) 5.7 (5.7) 5.7 (5.7) 5.7 (5.7)	3000	3000
2021	4Runner	5.7 (5.7) 5.7 (5.7) 5.7 (5.7) 5.7 (5.7)	3000	3000
2022	4Runner	5.7 (5.7) 5.7 (5.7) 5.7 (5.7) 5.7 (5.7)	3000	3000

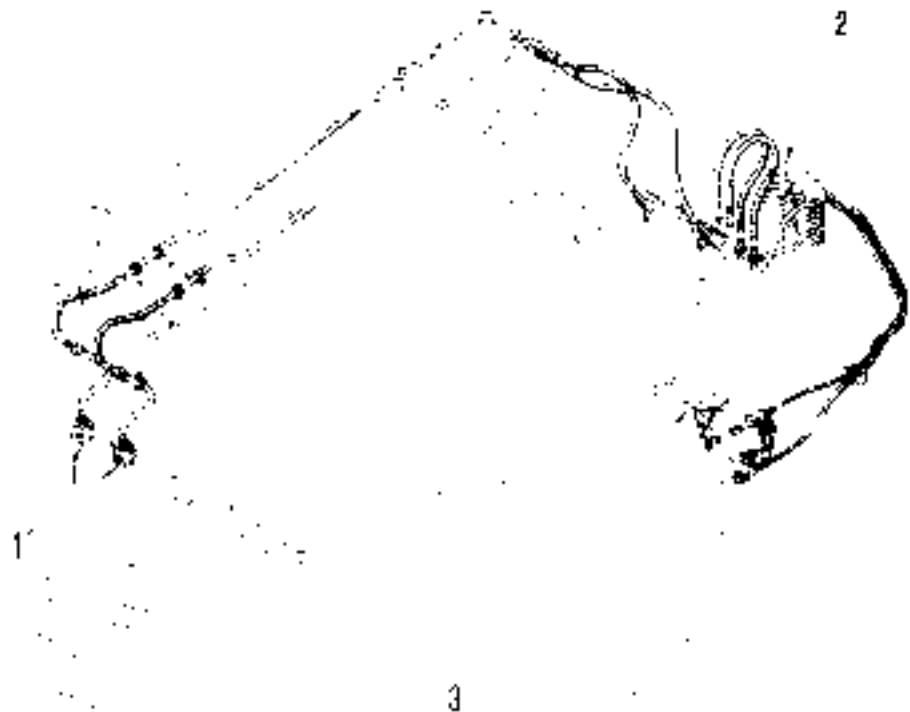
M	Application	Engine Oil ICI or GL SAE 15W-40, 17 10W-30, 5W-30 SAE 10W-60 SAE 5W-60	Grease Lithium Base NLGI No. 2	Anti-Wear Constant (Hydrex-Graint Base) Permanent Type
B	Tractor	15W-40	NLGI No. 2	
E	Tractor	15W-40 10W-30 5W-30	NLGI No. 2	
F	Excavator A Series	15W-40 10W-30 5W-30 5W-60 SAE 10W-60 SAE 5W-60	NLGI No. 2	
G	Tractor	SAE 15W-40 SAE 10W-30	NLGI No. 2 NLGI No. 3	
H	Tractor	SAE 15W-40 SAE 10W-30 SAE 5W-30	NLGI No. 2 NLGI No. 3 NLGI No. 4	

Item	Frequency	Engine Oil (CD or EE) SAE Grade (SAE J300) (10W/40 Preferred) Quantity (L) (U.S. Gallons)	Grease Lithium Base NLGI No. 2	Anti-freeze Coolant Ethylene Glycol Base Permanent Type
14	At 1000 hrs.	1.5 (4.0) (1.0) 1.0 (2.6) (1.7)	1.0 (2.6) (1.7) 1.0 (2.6) (1.7)	1.0 (2.6) (1.7) 1.0 (2.6) (1.7)
15	At 1000 hrs.	1.0 (2.6) (1.7)	1.0 (2.6) (1.7)	1.0 (2.6) (1.7)
16	At 1000 hrs.	1.0 (2.6) (1.7)	1.0 (2.6) (1.7)	1.0 (2.6) (1.7)
17	At 1000 hrs.	1.0 (2.6) (1.7)	1.0 (2.6) (1.7)	1.0 (2.6) (1.7)
18	At 1000 hrs.	1.0 (2.6) (1.7)	1.0 (2.6) (1.7)	1.0 (2.6) (1.7)
19	At 1000 hrs.	1.0 (2.6) (1.7)	1.0 (2.6) (1.7)	1.0 (2.6) (1.7)
20	At 1000 hrs.	1.0 (2.6) (1.7)	1.0 (2.6) (1.7)	1.0 (2.6) (1.7)
21	At 1000 hrs.	1.0 (2.6) (1.7)	1.0 (2.6) (1.7)	1.0 (2.6) (1.7)

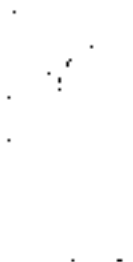
MACHINES READY FOR ATTACHMENTS

The following pages describe the sections of the machines which are ready to be mounted with attachments and which are different from the standard machines.

INSTRUMENTS AND CONTROLS



1. STOP VALVE



This valve stops the flow of hydraulic oil.

- 1 Free: The hydraulic oil flows.
- 2 Lock: The hydraulic oil is stopped.

★ Before installing or removing an attachment, turn this valve to LOCK.

2. SELECTOR VALVE



This valve changes the direction of flow of the hydraulic oil.

- 1 When a breaker is used.
- 2 When ordinary attachments (such as a lift bucket) are used.

3. CONTROL PEDAL



This pedal is used to control the attachments.

OIL PASSAGES

The operating direction of the pedal and the oil passages are related as shown below:



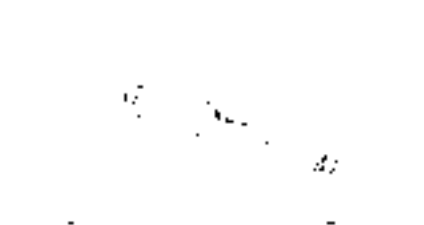
- 3 Shorten the bucket cylinder to its stroke end and confirm that there is a clearance between the link and the hose for attachments.



Operate the attachments according to the following procedure.

BREAKER

Depress the pedal in the direction of the arrow to start the breaker.



OPERATING PRECAUTIONS

- Confirm that the stop valve is set to the free position.



- Confirm that the selector valve is set to the position for the breaker.



Connect the LH pipe to IN of the breaker. If it is connected in the reverse manner, the breaker may be damaged.

- For the oil passage, see the section on hydraulic circuits on the previous page.
- For other handling precautions for the breaker, see the Instruction Manual issued by the manufacturer.

OPERATION

PEDAL STOPPER

The pedal stopper is installed to prevent the reverse operation of the control pedal.

- Set the pedal to the neutral position.
- Lengthen adjustment bolt (1) until it contacts stopper (2), then tighten lock nut (3).

Adjustment



THE TILT BUCKET AND OTHER COMMON ATTACHMENTS

When the pedal is depressed the attachments start operating.



OPERATING PRECAUTIONS

- Confirm that the stop valve is set to the free position.



- Confirm that the selector valve is set to the position for common attachments, such as the tilt bucket.

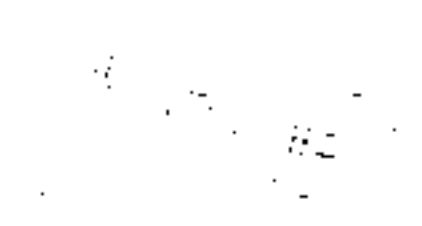


- ★ For details on the oil passages, see the section on Hydraulic Circuit.
- For other handling precautions for the attachments, see the Instruction Manuals issued by the manufacturers.

ADJUSTMENT OF PEDAL

Adjust the pedal according to the following procedure:

- 1 Loosen lock nut (1) and tighten adjustment bolt (2).



- 2 Depress pedal (3) to its stroke end, turn the adjustment bolt (4) so that contact is made with the stopper, then tighten the lock nut.



- ★ Adjust the stopper on the opposite side in the same way.

STORAGE

If the parts for attachments are not going to be used for a long time, adjust them as follows:

- Turn the stop valve to the Lock position.
- Install a blind plug and O-ring to the stop valve.
- Turn the selector valve to the position for common attachments such as the till bucket.
- Lock the pedal with the adjustment bolt.



- ★ If the pedal is operated while the breaker or other attachment is not installed, the engine may overheat.

SPECIFICATIONS

Specification of hydraulic system

- 1 Flow rate 126 L/min
- 2 Set pressure 290 kg/cm²
- 3 Set pressure of safety valve
for high pressure 305 kg/cm²
for low pressure 175 kg/cm²

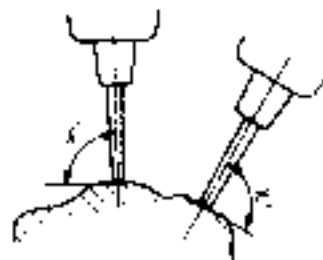
HYDRAULIC BREAKER

MAIN APPLICATION

- Stone crushing
- Demolition
- Road repair

Can be widely used for the demolition of buildings, crushing of pavement, building of tunnels, and crushing of slag, stone and rock from quarries.

- Strike the chisel while pressing it at a right angle against the surface of the object.



- Before starting to strike the chisel, raise the front of the machine about 5 cm off the ground with the chisel pressed down against the object.



- If the chisel fails to crush or pierce the object after a continued striking operation of one minute, move the striking position closer to the edge.



- Operate the bucket cylinder so that the chisel always penetrates into the object in line with the C.I. of the breaker.



- Take care to keep the chisel properly pressed against the object to ensure that the chisel does not strike without hitting the object.



OPERATIONS TO BE AVOIDED

To ensure safety and long machine service life, do not operate the machine in the manners shown below.

Sweeping and-gathering rocks with the mount portion



Moving the chisel while striking



Prying the chisel while it is penetrated into the ground



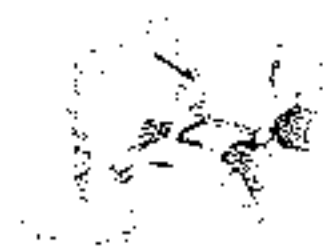
Doing work while swinging



Striking in a horizontal or vertical direction



Picking operation



Raising the machine off the ground with the breaker, while the bucket cylinder is operated close to its stroke end.

