Operation & Maintenance Manual

UEAM000602

PC130-6K
PC150LGP-6K

HYDRAULIC EXCAVATOR

SERIAL NUMBER
PC130-6K - K30001 and up
PC150LGP-6K - K35001 and up

WARNING

Unsafe use of this machine may cause serious injury or death. Operators and maintenance personnel must read this manual before operating or maintaining this machine. This manual should be kept inside the cab for reference and periodically reviewed by all personel who will come into contact with the machine.

KOMATSU

1. FOREWORD

This manual provides rules and guidelines which will help you use this machine safely and effectively. Keep this manual handy and have all personnel read it periodically. If this manual has been lost or has become dirty and cannot be read, request a replacement manual from Komatsu or your Komatsu distributor.

If you sell the machine, be sure to give this manual to the new owners.

Continuing improvements in the design of this machine can lead to changes in detail which may not be reflected in this manual. Consult Komatsu or your Komatsu distributor for the latest available information for your machine of for questions regarding information in this manual.

WARNING

- **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 require.**
- **This machine complies with EC directive (89/392/EEC).**
  Machines complying with this directive display the CE mark.
- **Improper operation and maintenance of this machine can be hazardous and could result in serious injury or death.**
- **Operators and maintenance personnel should read this manual thoroughly before beginning operation or maintenance.**
- **Some actions involved in operation and maintenance of the machine can cause a serious accident, if they are not done in a manner described in this manual.**
- **The procedures and precautions given in this manual apply only to intended uses of the machine. If you use your machine for any unintended uses that are not specifically prohibited, you must be sure that it is safe for you and others. In no event should you or others engage in prohibited uses or actions as described in this manual.**
- **Komatsu delivers machines that comply with alle applicable regulations and standards of the country to which it has beed shipped. If this machine has been purchased in another country of purchased from someone in another country, it may lack certain safety devices and specifi-cations that are necessary for use in your country. If there is any question about whether your product complies with the applicable standards and regulations of your country, consult Komatsu or your Komatsu distributor before operating the machine.**
- **The description of safety is given in SAFETY INFORMATION on page 0-2 and in SAFETY from page 1-1.**

2. SAFETY INFORMATION

2.1 SAFETY MESSAGES

Most accidents are caused by the failure to follow fundamental rules for the operation and maintenance of machines.

To avoid accidents, read, understand and follow all precautions and warmings in this manual and on the machine before performing operation and maintenance.

To identify hazards on the machine pictorial decals are used (see POSITION FOR ATTACHING SAFETY LABELS)

RED WARNING TRIANGLE - **This is used on safety labels where there is a high probability of serious injury or death if the hazard is not avoided. These safety messages or labels usually describe precautions that must be taken to avoid the hazard. Failure to avoid this hazard may also result in serious damage to the machine.**

ORANGE WARNING TRIANGLE - **This is used on safety labels where there is a potentially dangerous situation which could result in serious injury or death if the hazard is not avoided. These safety messages or labels usually describe precautions that must be taken to avoid the hazard. Failure to avoid this hazard may also result in serious damage of the machine**

YELLOW SAFETY TRIANGLE - **This is used on safety labels for hazards which could result in minor or moderate injury if the hazard is not avoided. This word might also be used for a hazard where the only result could be damage to the machine.**

NOTICE - **This word is used for precautions that must be taken to avoid actions which could shorten the life of the machine.**

Safety precautions are described in SAFETY from page 1-1.

Komatsu cannot predict every circumstance that might involve a potential hazard in operation and maintenance. Therefore that safety message in this manual and on the machine may not include all possible safety precautions. If any procedures or actions not specifically recommended or allowed in this manual are used, you must be sure that you and others can do such procedures and actions safely and without damaging the machine. If you are unsure about the safety of some procedures, contact Komatsu or your Komatsu distributor.

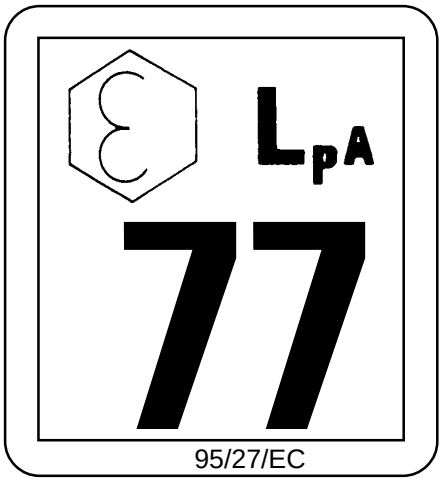
NOTICE:
The PC150LGP has been designed specifically for low ground pressure applications.
Under no circumstances should this machine be used for heavy duty/demolition purposes. If you are unsure of the suitability of the machine to your particular application, please contact Komatsu or your Komatsu distributor.

2.2 NOISE

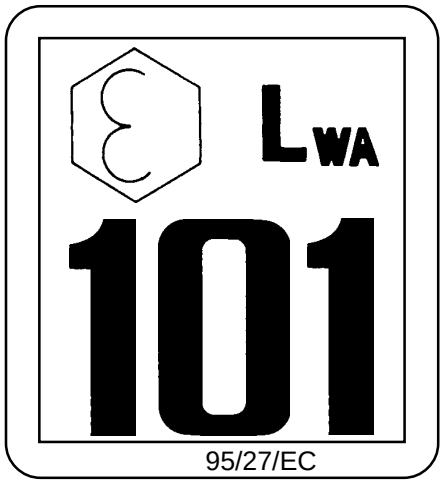
PC130-6K + PC150LGP-6K

Valid until 31 december 2001

Operator ears noise value
(Sound pressure level)



Ambient noise value
(Sound power level)



Noise level indicated is the guaranteed value as specified in the directive 86/662/EEC, as amended by 95/27/EC.

Valid as of 1 January 2002

- Sound pressure level at the operator's station, measured according to ISO6395 (Dynamic test method, simulated working cycle)

- Sound power level emitted. This is the guaranteed value as specified in European directive 2000/14/EC.

2.3 VIBRATION

The weighted root mean square acceleration value to which the operator's arms are subjected does not exceed 2.5 m/s^2
The weighted root mean square acceleration value to which the operator's body is subjected does not exceed 0.5 m/s^2

These results were obtained by accelerometers during trench digging.

3. INTRODUCTION

3.1 INTENDED USE

This Komatsu HYDRAULIC EXCAVATOR is designed to be used mainly for the following work:
- Digging work
- Smoothing work
- Ditching work
- Loading work

See the section "12.15 WORK POSSIBLE USING HYDRAULIC EXCAVATOR" for further details.

3.2 FEATURES

- This Komatsu HYDRAULIC EXCAVATOR is equipped with various controls based on an advanced electronics system.
  - The monitor panel greatly facilitates daily maintenance and self-diagnosis.
  - Working mode, active mode and travel speed are selectable.
  - Digging and lifting force can be increased by light-touch control.
    (For details, see operaton section).
- Adjustable wrist control levers make operations smooth and easy.
- Fresh filtered air heater assures comfortable operaton.
- Low noise level and smart urban-style design and coloring.
- Superb operating performance provided by powerful engine and high-performance hydraulic pumps.
- Low fuel consumption controlled by an electronic control system provides an environment-friendly machine.

3.3 BREAKING IN THE MACHINE

Your Komatsu machine has been thoroughly adjusted and tested before shipment.

However, operating the machine under severe conditions at the beginning can adversely affect the performance and shorten the life of the machine.

Be sure to break in the machine for the initial 100 hours (as indicated by the service meter).

During breaking in:
- Idle the engine for 5 minutes after starting it up.
- Avoid operation with heavy loads or at high speeds.
- Avoid sudden starts, sudded acceleration, sudden steering and sudded stops except in cases of emergency.

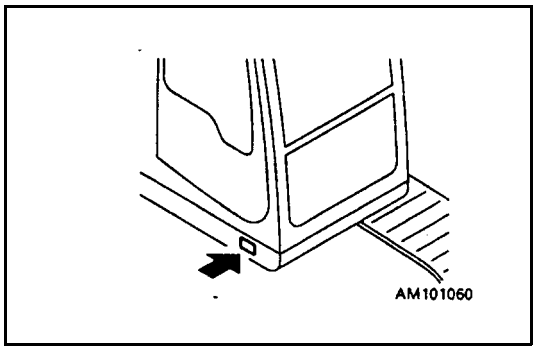
The precautions given in this manual for operating, maintenance and safety procedures are only those that apply when this product is used for the specific purpose. If the machine is used for a purpose that is not listed in this manual, Komatsu cannot bear any responsibility for safety. Alle consideration of safety in such operations is the responsibility of the user.

Operations that are prohibited in this manual must never be carried out under any circumstances.

4. LOCATION OF PLATES, TABLES TO ENTER SERIAL NO. AND DISTRIBUTOR

MACHINE SERIAL NO. PLATE POSITION

On the front bottom right of the operator's cab



ENGINE SERIAL NO. PLATE POSITION

On the upper side of the engine cylinder head cover.

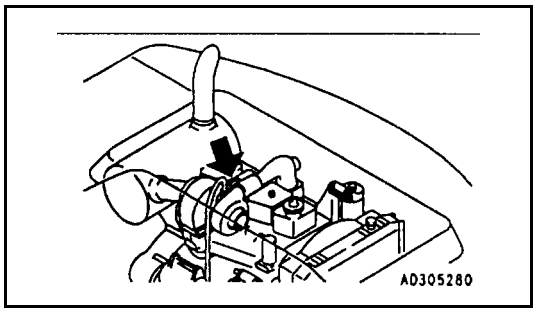
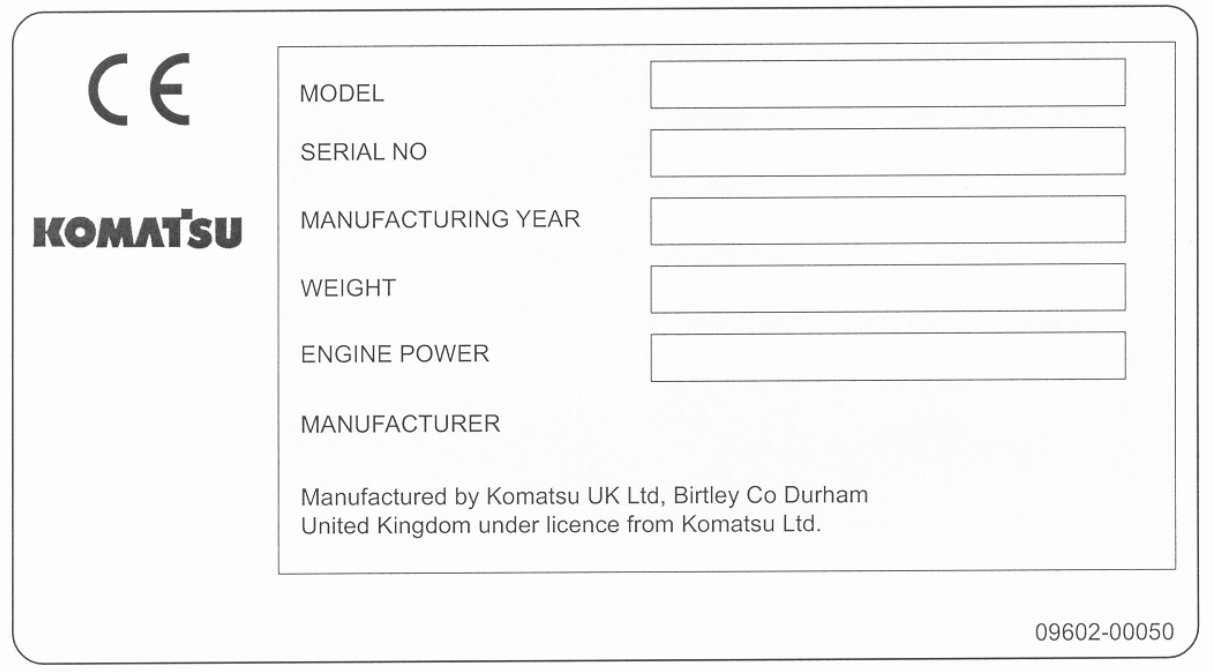


TABLE TO ENTER SERIAL NO. AND DISTRIBUTOR

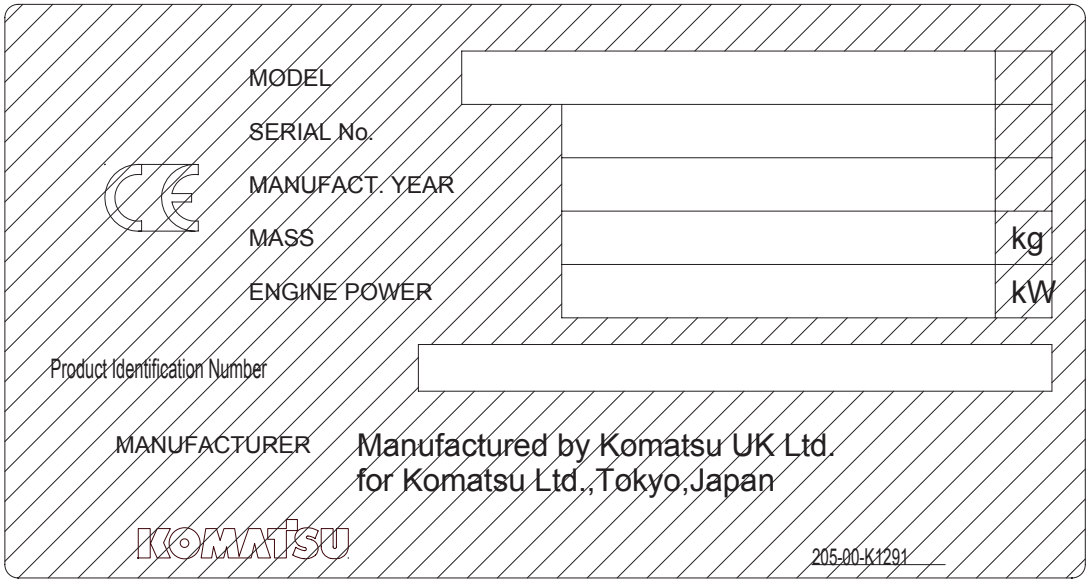
Machine serial No.
Engine serial No.
Product Identification Number :
Manufacturers name: KOMATSU UK Ltd. Address: Durham Road Birtley Chester-Le street County Durham DH32QX United Kingdom Distributor Address Phone

MACHINE SERIAL PLATE.

Valid until 31 December 2003



Valid as of 1 January 2004



5. CONTENTS

MAINTENANCE

SPECIFICATIONS

OPTIONS AND ATTACHMENTS

SAFETY

WARNING

Read and follow all safety precautions. Failure to do so may result in serious injury or death.

This safety section also contains precautions for optional equipment and attachments.

6 GENERAL PRECAUTIONS

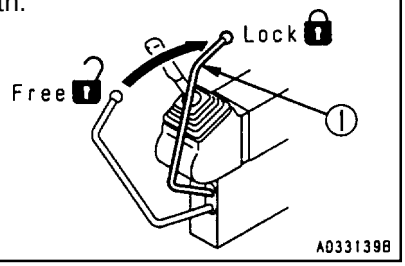
⚠ WARNING: for reasons of safety, always follow these safety precautions.

SAFETY RULES

- Only trained and authorised personnel can operate and maintain the machine.
- Follow all safety rules, precautions and instructions when operating or performing maintenance on the machine.
- Do not operate the machine of you are not feeling well, or if you are taking medicine which will make you sleepy, or if you have been drinking. Operating in such condition will adversely affect your judgement and may lead to an accident.
- When working with another operator of with a person on worksite traffic duty, be sure that all personnel understand all hand signals that are to be used.
- Always follow all rules related to safety.

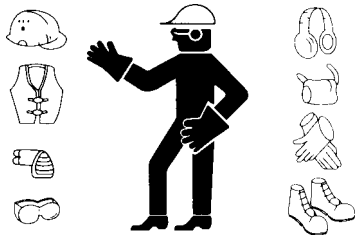
SAFETY FEATURES

- Be sure that all guards and covers are in their proper position. Have guards and covers repaired if damaged.
- Use safety features such as safety lock levers ① properly.
- Never remove any safety features. Always keep them in good operating condition.
  Safety lock lever → see "12.17 PARKING MACHINE".
- Improper use of safety features could result in serious bodily injury or death.



CLOTHING AND PERSONAL PROTECTIVE ITEMS

- Avoid loose clothing, jewelery, and loose long hair. They can catch on controls or in moving parts and cause injury or death.
- Also, do not wear oily clothes, because they are flammable.
- Wear a hard hat, safety glasses, safety shoes, mask or gloves wehn operating or maintaining the machine. Always wear safety goggles, hard hat and heavy gloves if your job involves scattering metal chips or minute materials particularly when driving pins with a hammer and when cleaning the air cleaner element with compressed air. Check also that there is no one near the machine.
- Check that all protective equipment functions properly before using.

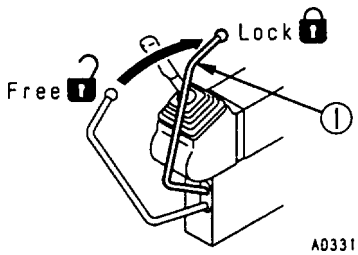


UNAUTHORIZED MODIFICATION

Any modification made without authorization from Komatsu can create hazards. Before making a modification, consult your Komatsu distributor. Komatsu will not be responsible for any injury or damage caused by any unauthorized modification.

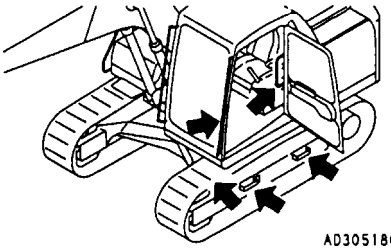
ALWAYS APPLY LOCK WHEN LEAVING OPERATOR'S SEAT

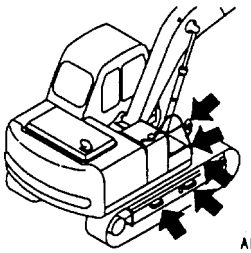
- When standing up from the operator's seat, always place the safety lock levers ① securely in the LOCK position. If you accidentally touch the levers when they are not locked, the work equipment may suddenly move and cause serious injury or damage.
- When leaving the machine, lower the blade and ripper completely to the ground, set the safety lock levers ① to the LOCK position, then stop the engine. Use the key to lock alle the equipment.
  Always remove the key and take it with you.
  Work equipment posture → see "12.17 PARKING MACHINE".
  Locking → see "12.21 LOCKING"

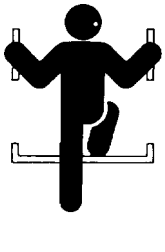


MOUNTING AND DISMOUNTING

- Never jump on or off the machine. Never get on or off a moving machine.
- When getting on or off the machine, always face the machine and use the handrails and steps.
- Never hold any control levers or lock levers when getting on or off the machine.
- To ensure safety, always maintain three-point contact (both feet and one hand, or both hands and one foot) with the handrails and steps to ensure that you support yourself.
- If there is anyu oil, grase, or mud on the handrails or steps, wipe it off immediately. Always keep these parts clean. Repair any damage and tighten any loose bolts.
- When getting on or off the machine, or when moving along the top of the track, if you hold the handrail inside the door when moving on top of the track shoe, and the door lock is not locked securely, the door may move and cause you to fall.
  Always lock the door securely.
  Method of locking door → see "11.6 DOOR LOCK"



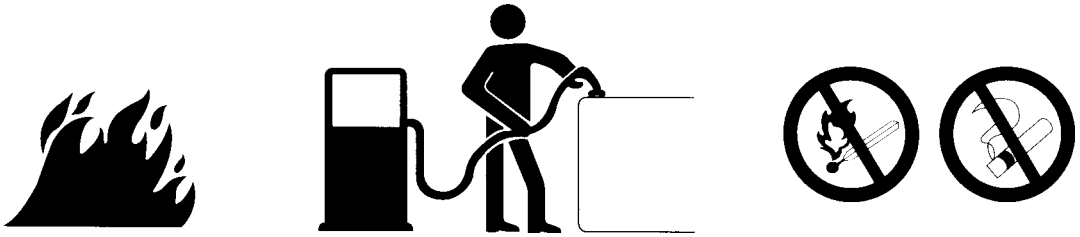




FIRE PREVENTION FOR FUEL AND OIL

Fuel, oil, and antifreeze can be ignited by a flame. Fuel is particularly flammable and can be hazardous. Always observe the following:

- Keep any flame or lighted cigarette away form flammable fluids.
- Stop the engine and do not smoke when refueling
- Tighten all fuel and oil caps securely
- Use well-ventilated areas for adding or storing oil and fuel.
- Keep oil and fuel in the determined place and do not allow unauthorized persons to enter.

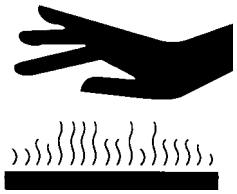


PRECAUTIONS WHEN HANDLING AT HIGH TEMPERATURE

- Immediately after operations are stopped, the engine oil and hydraulic oil are at high temperature and are still under pressure. Attempting to remove the cap, drain the oil or water, or replace the filters may lead to serious burns. Always wait for the temperature to go down, and follow the specified procedures when carrying out these operations.

- To prevent hot water from spurting out, stop the engine, wait for the water to cool, then loosen the cap slowly to relieve the pressure before removing the cap.
  (When checking if the water temperature has gone down, put your hand near the front face of the radiator and check the air temperature. Be careful not to touch the radiator).

- To prevent hot oil from spurting out, stop the engine, wait for the oil to cool, then loosen the cap slowly to relieve the pressure before removing the cap.
  (When checking if the oil temperature has gone down, put your hand near the front face of the hydraulic tank and check the air temperature. Be careful not to touch the hydraulic tank).



ASBESTOS DUST HAZARD PREVENTION

Asbestos dust can be hazardous to your health if it is inhaled.
Komatsu does not use asbestos in its products, but if you handle materials containing asbestos fibers, follow the guidelines given below:

- Never use compressed air for cleaning.
- Use water to keep down the dust when cleaning
- If there is danger that there may be asbestos dust in the air, operate the machine from an upwind position whenever possible.
- Use an approved respirator if necessary.

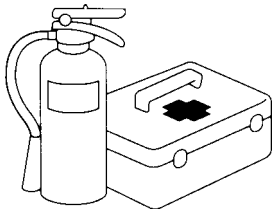
CRUSHING OR CUTTING PREVENTION

Do not enter, or put your hand or arm or any other part of your body between movable parts such as the work equipment and cylinders, or between the machine and work equipment.
If the work equipment is operated, the clearance will change and this may lead to serious damage or personel injury.
If it is necessary to go between movable parts, always lock the levers and be sure that the work equipment cannot move. For details, **see "8. PRECAUTIONS FOR MAINTENANCE".**

FIRE EXTINGUISHER AND FIRST AID KIT

Always follow the precautions below to prepare for acton if any injury or fire should occur.

- Be sure that fire extinguishers have been provided and read the labels to ensure that you know how to use them.
- Provide a first aid kit at the storage point. Carry out periodic checks and add to the contents if necessary.
- Know what to do in the event of a fire or injury.
- Decide which phone numbers of persons (doctor, ambulance, fire station etc.) to contact in case of an emergency. Post these contact numbers in specified places and make sure that all personnel know the numbers and correct contact procedures.



PROTECTION AGAINST FALLING OR FLYING OBJECTS

If there is any danger of falling or flying objects hitting the operator, install protective guards in place to protect the operator as required for each particular situation.

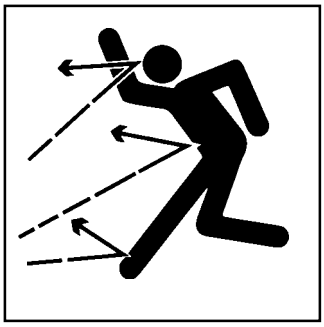
- For work with breakers, install a front guard on the windshield. Also, place a laminate coating sheet over the windshield.
- For demolition of shear workk, install a front guard on the windshield and a top guard on the cab. Also, place a laminate coating sheet over the windshield.
- For work in mines, quarries, demolition, tunnels or other places where there is danger of falling rocks, put FOPS (falling object protective structure) in place. Also, place a laminate coating sheet over the windshield.

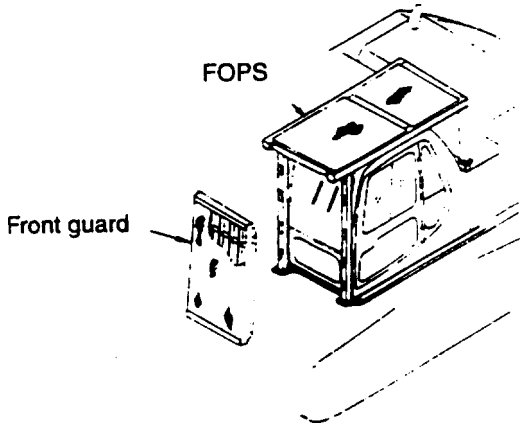
The above comments are made with regards to typical working conditions. By all means you should put on other guards if required by conditions at your particular site.
For details of safety guards, please contact your Komatsu distributor.

Also, even for other types of work, if there is any danger of being hit by falling or flying objects or of objects entering the operator's cab, select and install a guard that matches the working conditions.

Be sure to close the front window before commencing work.

When carrying out the above operations, make sure to keep all persons other than the operator outside that range of falling or flying objects. Be particularly sure to maintain a proper distance when carrying out shear operations



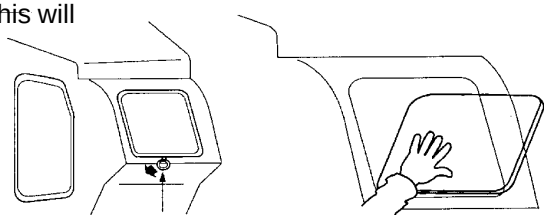


PRECAUTIONS FOR ATTACHMENTS

- When installing and using an optional attachment, read the instruction manual for the attachment and the information related to attachments in this manual.
- Do not use attachments that are not authorized by Komatsu or your Komatsu distributor. Use of unauthorized attachments could create a safety problem and adversely affect the proper operation and useful lif of the machine.
- Any injuries, accidents, product failures resulting from the use of unauthorized attachments will not be the responsibility of Komatsu.

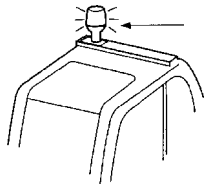
ERMERGENCY EXIT

- When exit by normal means is prevented in an emergency you can get out through the emergency exit (rear window).
- Pull the ring at the bottom of the window and remove strip. This will allow you to push out the glass.



ROTATING BEACON (OPTION)

- When the machine is operated on or beside a road, a rotating beacon is required to avoid a traffic accident
- Contact your Komatsu distributor to install a beacon lamp.



ELECTROMAGNETIC INTERFERENCE

When this machine is operating close to a source of high electromagnetic interference, such as a radar station, some abnormal phenomena may be observed.

- The display on the monitor panel may behave erratically
- The warning buzzer may sound

These effects do not signify a malfunction and the machine will return to normal as soon as the source of interference is removed.

VENTILATION FOR ENCLOSED AREAS

Exhaust fumes from the engine can kill.

- If it is necessary to start the engine within an enclosed area, or you handle fuel, flushing oil, or paint, open the doors and windows to ensure that you provide adequate ventilation to prevent gas poisoning.
- If opening the doors and windows still does not provide adequate ventilation, set up fans.

PRECAUTIONS WITH CAB GLASS

If by mistake the cab glass on the work equipment side should crack, there is danger of direct contact between the operator's body and the work equipment. This is extremely dangerous.
If the glass is cracked, stop operations immediately and replace the glass.

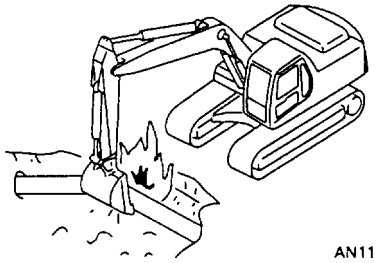
7. PRECAUTIONS DURING OPERATION

⚠ WARNING: Failure to follow these safety precautions may lead to a serious accident.

7.1 BEFORE STARTING ENGINE

SAFETY AT WORKSITE

- Before starting operations, thoroughly ckeck the area for any unusual conditions that could be dangerous.
- Check the terrain and condition of the ground at the worksite, and determine the best and safest method of operation.
- Make the ground surface as hard and horizontal as possible before carrying out operations.
  If the jobsite is dusty, spray water before starting operations.
- If you need to operate on a road, protect pedestrians and cars by designating a person for worksite traffic duty or by installing fences and putting up NO ENTRY signs around the worksite.
- If water lines, gas lines, or high-voltage electrical lines may be buried under the worksite, contact each utility and identify their locations. Be careful not to sever of damage any of these lines.
- Check the ground condition and the depth and flow of water before operating in water or crossing a river. NEVER be in water which is in excess of the permissible water depth.
  Permissible water depth → see "12.12 PRECAUTIONS FOR OPERATION"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CHECKS BEFORE STARTING ENGINE

Carry out the following checks before starting the engine at the beginning of the days work.
Failure to carry out these checks may lead to serious injury or damage.

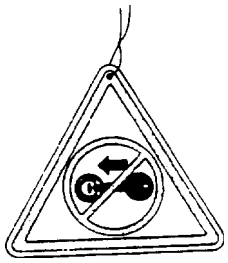
- Completely remove all flammable materials accumulated around the engine and battery, returm all fuel containers to teir propeer place, remove all parts and tools from the operator's compartment, and remove any dirt from the mirrors, handrails, and steps.
  Walk-around checks → see "12.1.1 WALK AROUND CHECK".
- check the coolant level, fuel level, and oil level in the hydraulic tank, check for clogging of the air cleaner, and check the electric wiring.
  Checks before starting → see "12.1.2 CHECK BEFORE STARTING"
- Adjust the operator's seat to a positions where it is easy to carry out operations, and check for wear or damage to the seat belt and seat belt mounting equipment.
  Adjusting operator's seat → see "12.1.3 ADJUSTING BEFORE STARTING OPERATION".
- Check that the gauges work properly, and check that the control levers are all at the NEUTRAL position.
  Method of checking operation of gauges
  → see "12.1.4 OPERATIONS AND CHECKS BEFORE STARTING ENGINE".
- If any of the mirrors are broken, replace them with new ones.
- When removing and installing the mirrors for replacement or transportation - see "13.3 PRECAUTIONS FOR TRANSPORTATION".
- Check that the mirrors and window glass provide a clear view.

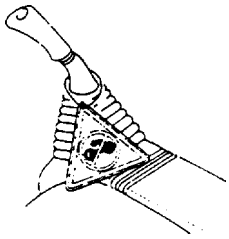
If the above inspections show any abnormality, carry out repairs immediately.

⚠ WARNING: for reasons of safety, always follow these safety precautions.

WHEN STARTING ENGINE

- Walk around your machine again just before mounting it, and check for people and objects that might be in the way.
- Never start the engine if a warning tag has been attached to the work equipment control lever.
- When starting the engine, sound the horn as an alert.
- Start and operate the machine only while seated.
- An additional worker may ride in the machine only when sitting in the passenger seat, if fitted. Do not allow anyone to ride on the machine body.
- Do not short circuit the starting motor circuit to start the engine. It is not only dangerous, but will also cause damage to the equipment.





7.2 AFTER STARTING ENGINE

CHECKS AFTER STARTING ENGINE

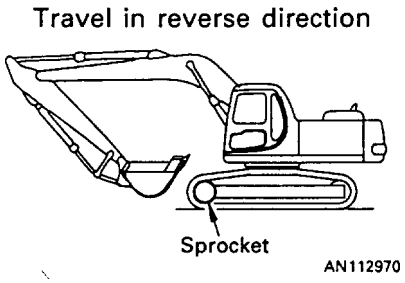
Failure to carry out the checks properly after starting the engine will lead to delays in discovery of abnormalities, and this may lead to serious injury or damage to the machine.
When carrying out the checks, use a wide area where there are no obstructions. Do not allow anyone near the machine.

- Check the operation of the gauges and equipment, and check the operation of the blade, ripper, brakes, travel system, and steering system.
- Checks for any abnormality in the sound of the machine, vibration, heat, smell, or gauges; check also that there is no leakage of air, oil, or fuel.
- If any abnormality is found, carry out repair immediately.
  If the machine is used when it is not in proper condition, it may lead to serious injury or damage to the machine.

PRECAUTIONS WHEN STARTING OFF

Check the direction of the track frame before operating the travel lever.

- When the sprocket is at the front, the operaton of the travel lever is reversed, so operate the machine carefully.
  Method of steering machine → see "12.4 MOVING MACHINE OFF".
  Before moving the machine off, check again that there are no persons or obstacles in the surrounding area.
- When moving the machine off, sound the horn to warn people in the surrounding area.
- Always sit in the operator's seat when driving the machine.
- Always close the door of the operator' cab and check that the door is locked in position securely.



CHECK WHEN CHANGING DIRECTION

To prevent serious injury or death, always do the following before moving the machine or doing the levelling work.

- Before changing between forward and reverse, reduce speed and stop the machine.
- Before operating the machine, sound the horn to warn people in the area.
- Check that there is no one near the machine. Be particularly careful to check behind the machine.
- When operating in areas that may be hazardous or have poor visibility, designate a person to direct worksite traffic.
- Ensure that no unauthorized person can come within the direction of turning or direction of travel.

Always be sure to carry out the above precautions even when the machine is equipped with a backup alarm and mirrors.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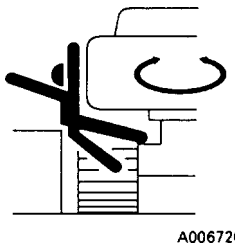
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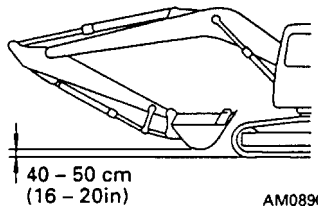
PRECAUTIONS WHEN TRAVELLING

- Never turn the key in the starting switch to the OFF position when travelling.
  It is dangerous if the engine stops when the machine is travelling, because it becomes impossible to operate the steering.
- It is dangerous to look around you when operating. Always concentrate on your work.
- It is dangerous to drive too fast, or to start suddenly, stop suddenly, turn sharply or zigzag.
- If you find any abnormality in the machine during operation (noise, vibration, smell, incorrect gauges, air leakage, oil leakage, etc.) move the machine immediately to a safe place and look for the cause.
- Set the work equipment to a height of 40 - 50 cm from the ground level and travel on level ground.
- When travelling do not operate the work equipment control levers. If the work equipment control levers have to be operated, never operate them suddenly.
- Do not operate the steering suddenly. The work equipment may hit the ground surface and cause the machine to lose its balance, or may damage the machine or structures in the area.
- When travelling on rough ground, travel at low speed, and avoid sudden changes in direction.
- Avoid travelling over obstacles as far as possible. If the machine has to travel over an obstacle, keep the work equipment as close to the ground as possible and travel at low speed. Never travel over obstacles which make the machine tilt strongly (10° or more).
- When travelling or carrying out operations, always keep your distance from other machines or structures to avoid coming into contact with them.
- NEVER be in water which is in excess of the permissible water depth.
  Permissible water depth → see "12.12 PRECAUTIONS FOR OPERATON".
- When passing over bridges or structures on private land, check first that the structure is strong enough to support the mass of the machine. When travelling on public roads, check first with the relevant authorities and follow their instructions.

Travel posture



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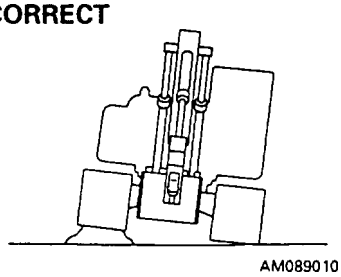
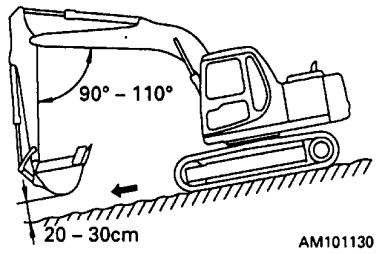


TRAVELLING ON SLOPES

- Travelling on slopes could result in the machine tipping over or slipping to the side.
- When travelling on slopes, keep the blade approximately 20 - 30 cm above the ground. In case of emergency, quickly lower the bucket to the ground to help the machine to stop.
- Do not turn on slopes or travel across slopes. Always go down to a flat place to perform these operations.
  Method of travelling on slopes → **See "12.13 PRECAUTIONS WHEN TRAVELLING UP OR DOWN HILLS".**
- Do not travel on grass, fallen leaves or wet steel plates. Even slight slopes may cause the machine to slip to the side, so travel at low speed and make sure that the machine is always travelling directly up or down the slope.
- If the engine stops on a slope, place the travel lever at the neutral position and lower the bucket to the ground. Do not operate the steering. There is danger that the machine will turn under its own weight.



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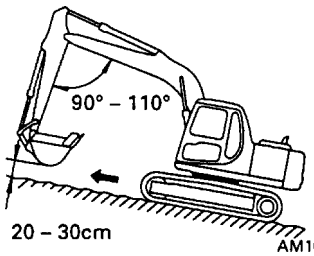

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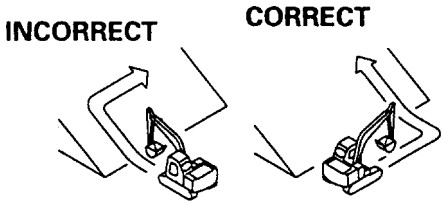

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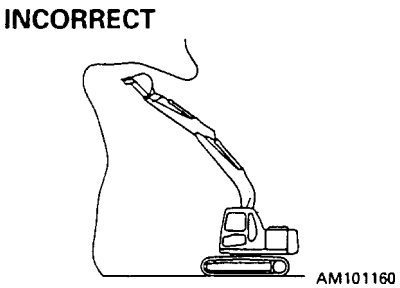
PROHIBITED OPERATIONS

- Do not dig the work face under an overhang. This may cause the overhang to collapse and fall on top of the machine.
- Do not carry out deep digging under the front of the machine. The ground under the machine may collapse and cause the machine to fall. Take emergencies into consideration and set with the travel motor at the rear and the track (undercarriage) at right angles to the road shoulder before digging to enable the machine to move back quickly. If the ground under the machine collapses and there is no time to drive in reverse, do not suddenly raise the arm and boom. In some cases, it may in fact be safer to lower the arm and boom.
- Do not swing the work equipment to the side when it is carrying a heavy load. The stability to the side is less than the stability to the front, so there is danger that the machine may turn over.
- Limits on use.
  To prevent accidents caused by breakage of the work equipment or tipping over of the machine under excessive load, do not use the machine in excess of its capacity. Always be sure to keep within the maximum specified load and safe angle determined for the structure.



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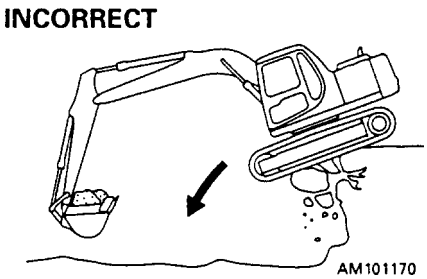

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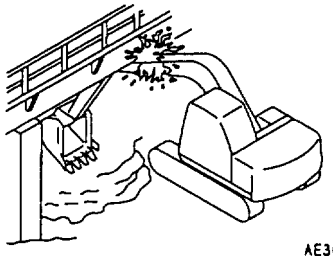
PRECAUTIONS WHEN OPERATING

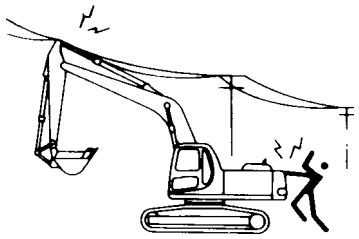
- Be careful not to approach too close to the edge of cliffs.
- Carry out only work that is specified as the purpose of the machine.
  Carrying out other operations will cause breakdowns.
  Specified operations → See "WORK POSSIBLE USING HYDRAULIC EXCAVATOR".
- Do the following to ensure good visibility.
  - When operating in dark places, turn on the working lamps and front lamps, and install lighting at the job site if necessary.
  - Do not carry out operations in fog, mist, snow or heavy rain or other conditions where the visibility is poor. Wait for the weather to clear so that visibility is sufficient to carry out work.
- Always do as follows to prevent the work equipment from hitting other objects.
  - When operating in tunnels, under bridges, under electric wires, or other places where the height is limited, be extremely careful not to let the bucket, boom, or arm hit anything.
  - To prevent accidents caused by hitting other objects, always operate the machine at a speed which is safe for operation, particularly in confined spaces, indoors, and in places where there are other machines.
  - Never pass the bucket over the head of any worker or over the operator's cab on a dump truck.



DO NOT GO CLOSE TO HIGH-VOLTAGE CABLES

- Do not let the machine touch overhead electric cables. Even going close to high-voltage cables can cause electric shock. Always maintain the safe distance given below between the machine and the elctric cable.
- To prevent accidents, always do as follows.
  - On job sites where there is danger that the machine may touck the electric cables, consult the electricity company before starting operations to check that the actions determined by the relevant laws and regulations have been taken.
  - Wear rubber shoes and gloves. Lay a rubber sheet on top of the operator's seat, and be careful not to touch the chassis with any exposed part of your body.
  - Use a signalman to give worning if the machine approaches too close to the electric cables.
  - If the work equipment should touch the electric cable,the operator should not leave the operator's compartment.
  - when carrying out operations near high voltage cables, do not let anyone come close to the machine.
  - Check with the electricity company about the voltage of the cables before starting operations.

	Voltage	Min. safety distance
Low voltage	100 • 200 V	2 m
	6.600 V	2 m
Very high voltage	22.000 V	3 m
	66.000 V	4 m
	154.000 V	5 m
	187.000 V	6 m
	275.000 V	7 m
	500.000 V	11 m



OPERATE CAREFULLY ON SNOW

- When working ons now or icy roads, even a slight slope may cause the machine to slip to the side, so always travel at low speed and avoid sudden starting, stopping, or turning. There is danger of slipping particularly on uphill or downhill slopes.
- With frozen road surfaces, the ground becomes soft when the temperature rises, so the travel conditions become unstable. In such cases be extremely careful when travelling.
- When there has been heavy snow, the road shoulder and objects placed beside the road are buried in the snow and cannot be seen, so always carry out operations carefully.
  When travelling on snow-covered slopes, never apply the brakes suddenly. Reduce the speed and use the engine as a brake while applying the foot brake intermittently (depress the brake intermittently several times). If necessary, lower the bucket to the ground to stop the machine.
- The load varies greatly according to the characteristics of the snow, so adjust the load accordingly and be careful not to let the machine slip.

WORKING ON LOOSE GROUND

- Do not operate the machine on soft ground. It is difficult to get the machine out again.
- Avoid operating your machine too close to the edge of cliffs, overhangs, and deep ditches. If these areas collapse under the mass or vibration of your machine it could fall or tip over and this could result in serious injury or death. Remember that the soil after heavy rain, blasting or earthquakes is weakened in these areas.
- Earth laid on the ground and the soil near ditches is loose. It can collapse under the mass or vibration of your machine and cause your machine to tip over.
- Install the head guard (FOPS) when working in areas where there is danger of falling stones.
- Install the ROPS and wear the seat belt when working in areas where there is danger of falling rocks or of the machine turning over.

PRECAUTIONS WHEN WORKING ON SLOPES

- When working on slopes, there is danger that the machine may lose its balance and turn over when the swing or work equipment are operated. Always carry out these operations carefully.
- Do not swing the work equipment from the uphill side to the downhill side when the bucket is loaded. This operation is dangerous.
- If the machine has te be used on a slope, pile the soil to make a platform that will keep the machine as horizontal as possible.
  Piled soil on slope → See "12.13 PRECAUTIONS WHEN TRAVELLING UP OR DOWN HILLS".

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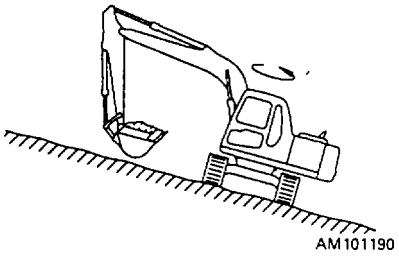

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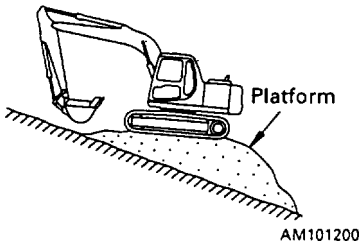
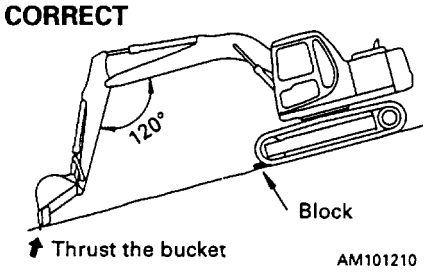
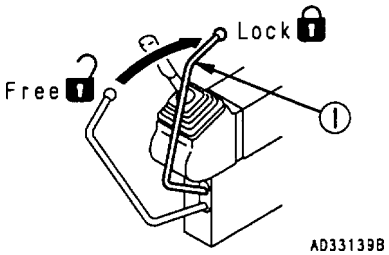


PARKING MACHINE

- Park the machine on level ground where there is no danger of falling rocks or landslides, or of flooding if the land is low, and lower the work equipment to the ground.
- If it is necessary to park the machine on a slope, set blocks under the tracks to prevent the machine from moving, then dig the work equipment into the ground.
- After stopping the engine, operate the right work equipment control lever several times to the RAISE and LOWER positions te release the remaining pressure in the hydraulic circuit.
- When parking on public roads, provide fences, signs, flags or lights and put up any other necessary signs to ensure that passing traffic can see the machine clearly, and park the machine so that the machine, flags and fences do not obstruct traffic.
  Parking procedure → See "12.17 PARKING MACHINE".
- When leaving the machine, set the safety lock lever ① to the LOCK position, stop the engine, and use the key to lock all the equipment. Always remove the key and take it with you.
  Work equipment posture → See 12.17 PARKING MACHINE".
  Locks → See "12.21 LOCKING".
- Always close the door of the operator's compartment.





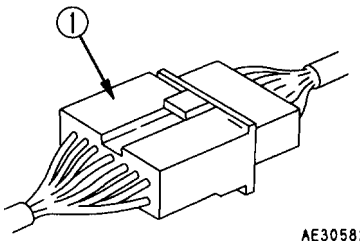
PRECAUTIONS IN COLD AREAS

- After completing operations, remove all water, snow, or mud stuck to the wiring harness, connector ①, switches, or sensors, and cover these parts.
  If the water freezes, it will cause malfunctions of the machine when it is next used, which may lead to unexpected accidents.

- Carry out the warming-up operation thoroughly. If the machine is not thoroughly warmed up before the control levers are operated, the reaction of the machine will be slow, and this may lead to unexpected accidents.

- Operate the control levers to relieve the hydraulic pressure (raise to above the set pressure for the hydraulic circuit and release the oil to the hydraulic tank) to warm up the oil in the hydraulic circuit. This ensures good response from the machine and prevents malfunctions.

- If the battery electrolyte is frozen, do not charge the battery of start the engine with a different power source. There is danger that this will ignite the battery.
  When charging or starting the engine with a different power source, melt the battery electrolyte and check for leakage of battery electrolyte before starting.
  Battery charge rate → See "COLD WEATHER OPERATION".



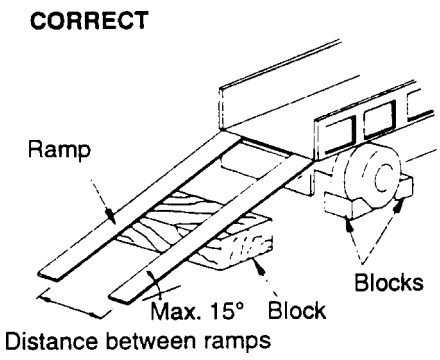
7.3 TRANSPORTATION

LOADING AND UNLOADING

- Loading and unloading the machine always involves potential hazards. EXTREME CAUTION SHOULD BE USED.
  When loading or unloading the machine, run the engine at low idling and travel at low speed.
- Perform loading and unloading on firm, level ground only. Maintain a safe distance from the edge of a road.
- ALWAYS block the wheels of the hauling vehicle and place blocks under both ramps before loading and unloading.
- ALWAYS use ramps of adequate strenght. Be sure the ramps are wide and long enough to provide a safe loading slope.
- Be sure that the ramps are securely positioned and fastened, and that the two sides are at the same level as one another.
- Be sure the ramp surface is clean and free of grease, oil, ice and loose materials. Remove dirt from the machine tracks.
- NEVER correct your steering on the ramps. If necessary drive away from the ramps and climb again.
- Swing the upper structure with extreme care on the trailer to avoid a possible accident caused by body instability.

. After loading, block the machine tracks and secure the machine with tie-downs.

Loading and unloading → **See "13 TRANSPORTATION"**
Tie-downs → **See "13 TRANSPORTATION"**



SHIPPING

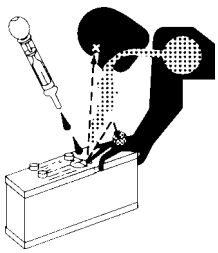
- When shipping the machine on a hauling vehicle, obey all state and local laws governing the weight, width, and length of a load. Also obey all applicable traffic regulations.
- Determine the shipping route while taking into account the width, height and weight of the load.

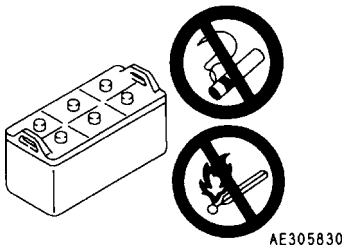
7.4 BATTERY

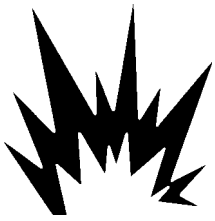
BATTERY HAZARD PREVENTION

Battery electrolyte contains sulphuric acid, and batteries generate hydrogen gas, so mistaken handling can lead to serious injury or fire. For this reason, always observe the following precautions.

- Never bring any lighted cigarette or flama near the battery.
- When working with batteries, ALWAYS war safety glasses and rubber gloves.
- If you spill acid on your clothes or skin, immediately flush the area with large amounts of water.
- Battery acid could cause blindness if splashed into the eyes. If acid gets into your eyes flush them immediately with large quantities of water and see a doctor at once.
- If you accidentally drink electrolyte, drink a large quantity of water or milk, beaten egg or vegetable oil. Call a doctor or poison prevention center immediately.
- Before working with batteries, stop the engine and turn the starting switch to the OFF position.
- Avoid short-circuiting the battery terminals (between the positive ⊕ terminal and negative ⊖ terminal) through accidental contact with metal objects such as tools.
- When installing the battery, connect the positive ⊕ terminal first, and when removing the battery, disconnect the negative ⊖ terminal (ground side) first.
- When removing or installing, check which is the positive ⊕ terminal and negative - terminal, and tighten the nuts securely.
  If the battery electrolyte is near the LOWER LEVEL, add distilled water. Do not add distilled water above the UPPER LEVEL.
- When cleaning the top surface of the battery, wipe it with a damp cloth. Never use gasoline, thinner or any other organic solvent or cleaning agent.
- Tighten the battery caps securely.
- If the battery electrolyte is frozen, do not charge the battery of start the engine with a different power source. There is danger that this will ignite the battery.
  When charging or starting the engine with a different power source, melt the battery electrolyte and check for leakage of battery electrolyte before starting.
- Always remove the battery from the chassis before charging it





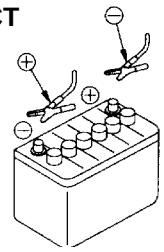


STARTING WITH BOOSTER CABLES

If any mistake is made in the method of connecting the booster cables, it may cause a fire, so always do as follows.

- Carry out the starting operation with two workers (with one worker sitting in the operator's seat).
- When starting from another machine, do not allow the two machines to touch.
- When connecting the booster cables, turn the starting switch OFF for both the normal machine and problem machine.
- Be sure to connect the positive ⊕ cable first when installing the booster cables. Disconnect the ground or negative ⊖ cable first when removing them.
- The final ground connection is the connection of the ground to the engine block of the problem machine. However, this will cause sparks, so be sure to connect it as far as possible from the battery.
  Starting procedure when using booster cables → See "16.5 IF BATTERY IS DISCHARGED".
- When removing the booster cables, be careful not to let the booster cable clips touch each other or to let the clips touch the machine.

INCORRECT



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CHARGING BATTERY

If the battery is handled incorrectly when it is being charged, there is danger that the battery may explode, so follow the instructions in HANDLING BATTERY and in the instruction manual for the charger, and always observe the following precautions.

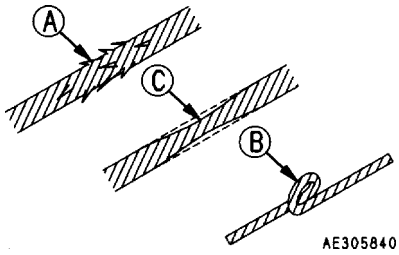
- Carry out the charging in a well-ventilated place, and remove the battery caps. This disperses the hydrogen gas and prevents explosion.
- Set the voltage on the cherger to match the voltage on the battery to be charged. If the voltage setting is wrong, it will cause the charger to overheat and catch fire, and this may lead to an explosion.
  Connect the positive ⊕ charging clip off the charger to the positive ⊕ terminal of the battery, then connect the negative ⊖ charging clip tot the negative ⊖ terminal of the battery. Be sure to tighten both terminals securely.
- If the battery charge is less than 1/10 of the rated charge, and high speed charging is carried out, set to a value below the rated capacity of the battery.
  If there is an excessive flow of charging current, it may cause leakage or evaporation of the electrolyte, which may catch fire and explode.

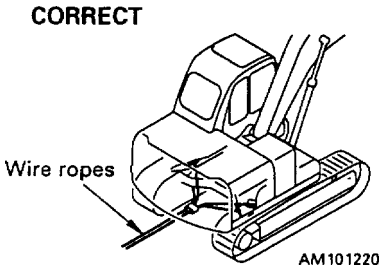
INCORRECT

7.5 TOWING

WHEN TOWING

- Injury or death could result if a disabled machine is towed incorrectly or if there is a mistake in the selection of the wire rope, so always do as follows.
- Do not tow in a different way from the method given in the section "16.2 METHOD OF TOWING MACHINE".
- Always wear leather gloves when handling wire rope.
- When carrying out the preparation for towing with another worker, agree on signals before starting the operation.
- If the engine on the problem machine will not start of there is a failure in the brake system, please contact your Komatsu distributor for repairs.
- It is dangerous to tow a machine on a slope, so choose a place where there is a gradual slope. If there is no place with a gradual slope, carry out work to make the slope as small as possible.
- If a problem machine is towed by another machine, ALWAYS use a wire rope with a sufficient towing capacity for the weight of the problem machine.
- Do not uwe a wire rope which has cut strands Ⓐ, kinks Ⓑ, or reduced diameter Ⓒ.





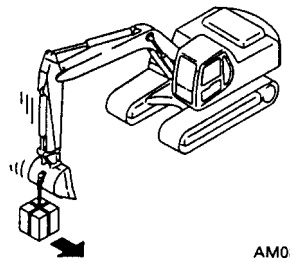
7.6 BUCKET WITH HOOK

PRECAUTIONS WHEN INSTALLING, OPERATING BUCKET WITH HOOK

Using a hydraulic excavator to raise loads is permitted under the following special conditions. These conditions must be followed strictly.

- The specified hook must be installed to the bucket. For details, please consult your Komatsu distributor.
- When the special hook is installed, additional checks before starting and periodic checks, toghether with recording and storing of the periodic checks are required.
- When carrying out operations with a lifted load, set the machine on firm flat ground in a safe place and install the wire securely to the lifting hook.
- Lifting work is prohibited except for the main purpose. Never raise or lower people in this way.
- Do not allow anyonde inside the operating radius.
- When carrying out lifting work, determine the method and order of operations and signals to be used. Appoint a leader and follow his directions.
- Wear leather gloves when handling the wire rope. Use only wire rope which fulfils the specified standards.
- Run the engine at low speed when carrying out the lifting work.
- Do not leave the operator's seat when the load is raised.
- It is dangerous to use the work equipment to pull loads in or to the side or to carry out work that exceeds the capacity of the work equipment. Do not carry out such operations.
- Do not travel with a raised load.
- Depending on the operating posture of the work equipment, there is danger that the wire rope or ring may slip from the hook, so always pay attention to the angle of the hook to prevent the wire or ring from coming off.

INCORRECT



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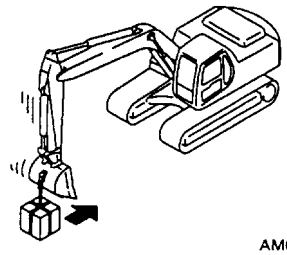

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8. PRECAUTIONS FOR MAINTENANCE

⚠ WARNING: Failure to follow these safety precautions may lead to a serious accident.

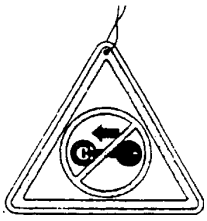
8.1 BEFORE CARRYING OUT MAINTENANCE

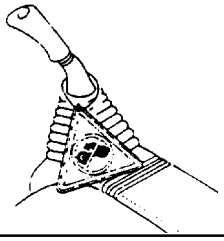
NOTIFICATION OF FAILURE

Carrying out maintenance not described in the Komatsu operation and maintenance manual may lead to unexpected failures.
Please contact your Komatsu distributor for repairs.

WARNING TAG

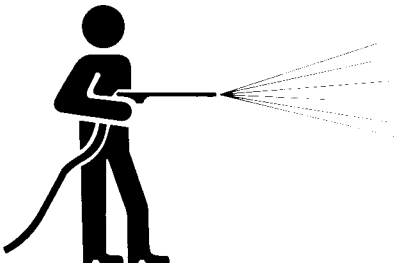
- ALWAYS attach the "DO NOT OPERATE" warning tag to the work equipment control lever in the operator's cab to alert others that you are working on the machine. Attach additional warning tags around the machine if necessary.
- If others start the engine, or touch or operate the work equipment controle lever while you are performing service or maintenance, you could suffer serious injury or death.
- These tags are available from your Komatsu distributor (Part no. 20E-00-K1340)

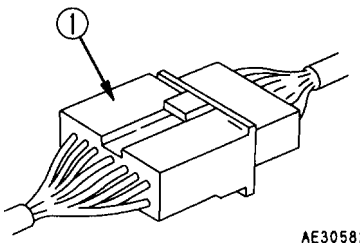




CLEAN BEFORE INSPECTION AND MAINTENANCE

- Clean the machine before carrying out inspection and maintenance. This will ensure that dirt does not get into the machine and will also ensure that maintenance can be carried out safely.
- If inspection and maintenance are carried out with the machine still direty, ti will be difficult to find the location of problems, and there is also the danger that you will get dirty or mud in your eyes, and that you will slip and injure yourself.
- When washing the machine, always do as follows.
  - Wear non-slip shoes to prevent yourself from slipping on the wet surface.
  - When using high-pressure steam to wash the machine, always wear protective clothing. This will protect you from being hit by high-pressure water, and cutting your skin or getting mud or dust into your eyes.
  - Do not spray water directly on to the electrical system (sensors, connectors) ①. If water gets into the electrical system, there is danger that it will cause defective operation and malfunction.





KEEP WORK PLACE CLEAN AND TIDY

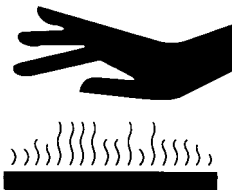
Do not leave hammers or other tools lying around inthe work place. Wipe up all grease, oil, or other substances that will cause you to slip. Always keep the work place clean and tidy to enable you to carry out operations safely.
If the work place is not kept clean and tidy, there is danger that you will trip, slip or fall over and injure yourself.

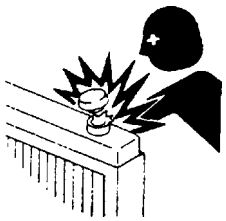
APPOINT LEADER WHEN WORKING WITH OTHERS

When repairing the machine or when removing and installing the work equipment, appoint a leader and follow his instructions during the operation.
When working with others, misunderstanding between workers can lead to serious accidents.

RADIATOR WATER LEVEL

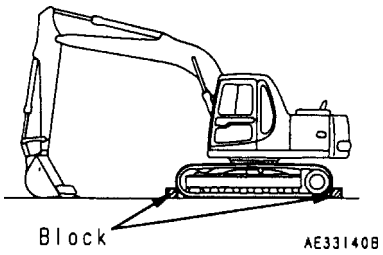
- When inspecting the radiator water level, stop the engine and wait for the engine and radiator to cool down. Check the water level in the sub-tank. Under normal conditions, do not open the radiator cap.
- If there is no sub-tank, or the radiator cap must be removed, always do as follows.
- Wait for the radiator water temperature to go down before checking the water level. (When checking if the water temperature has gone down, put your hand near the engine or radiator and check the air temperature. Be careful not to touch the radiator or the engine).
- Release the internal pressure before removing the radiator cap, and remove the radiator cap slowly.

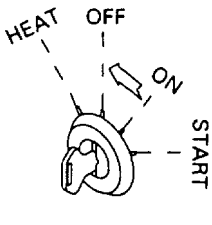


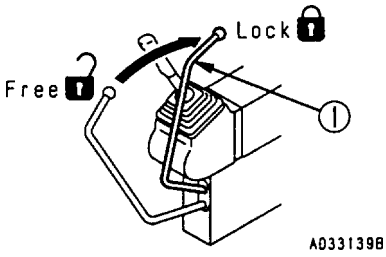


STOP ENGINE BEFORE CARRYING OUT INSPECTION AND MAINTENANCE

- When carrying out inspection and maintenance, park the machine on level ground where there is no danger of falling rocks or land slides, or of flooding if the land is low, then lower the work equipment to the ground and stop the engine.
- Operate the right work equipment control lever several times to the RAISE and LOWER positions to release the remaining pressure in the hydraulic circuit, then set safety lock lever ① to the LOCK position.
- Put blocks under the track to prevent the machine from moving.
- The worker carrying out the maintenance should be extremely careful not to touch or get caught in the moving parts.

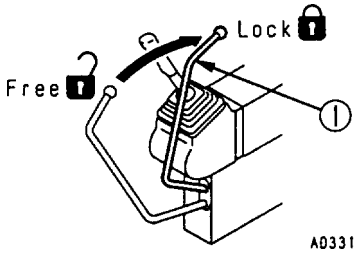


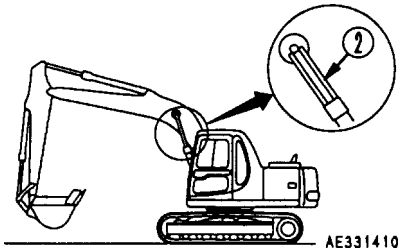




SAFETY DEVICES FOR WORK EQUIPMENT

When carrying out inspection and maintenance with the work equipment raised, fit stand (2) securely to the boom to prevent the work equipment from coming down.
Place the work equipment control levers at HOLD, and set safety lock lever ① to the LOCK position.





PROPER TOOLS

Use only tools suited to the task. Using damaged, low quality, faulty or makeshift tools could cause personal injury.
Broken pieces of chisels or hammers could fly into your eyes and blind you.
Tools → See "21.1 INTRODUCTION OF NECESSARY TOOLS".

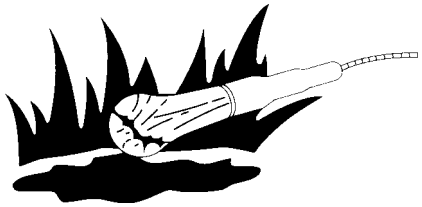
PERIODIC REPLACEMENT OF SAFETY CRITICAL PARTS

Hoses and other parts of the fuel, hydraulic and brake system are critical parts for ensuring safety, so they must be replaced periodically.
Replacement of safety critical parts requires skill, so please ask your Komatsu distributor to carry out replacement.

- Replace these components periodically with new ones, regardless of whether or not they appear to be defective.
  These components deteriorate over time, and can cause fire because of oil leakage or failure in the work equipment system.
- Replace or repair any such components if any defect is found, even though they have not reached the time specified
  Replacement of safety critical parts → See 22. PERIODIC REPLACEMENT OF SAFETY CRITICAL PARTS".

USE OF LIGHTING

- When checking fuel, oil, or battery electrolyte, always use lighting with anti-explosion specifications. If such lighting equipment is not used, there is danger of explosion.
- If work is carried out in dark places without installing lighting, there is danger of injury, so always install proper lighting.
- Even if it is dark, do not use a lighter or flame instead of lighting. There is danger of starting a fire and if the battery gas ignites it may cause an explosion.
- When using the machine as the power supply for the lighting, follow the instructions in this Operation and Maintenance Manual.



PREVENTION OF FIRE

There is danger of the fuel and battery gas catching fire during maintenance, so always follow the precautions below when carrying out maintenance.

- Store fuel, oil, grease and other flammable materials away from flame.
- Use non-flammable materials as the flushing oil for cleaning parts. Do not use diesel oil or gasoline. There is danger that they will catch fire.
- Never smoke when carrying out inspection or maintenance. Always smoke in the prescribed place.
- When checking fuel, oil, or battery electrolyte, always use lighting with anti-explosion specifications. Never use lighters of matches as lighting.
- When carrying out grinding or welding operations on the chassis, remove any inflammable materials to a safe place.
- Be sure that a fire extinguisher is present at the inspection and maintenance point.

8.2 DURING MAINTENANCE

PERSONNEL

Only authorized personnel can service and repair the machine. Do not allow unauthorized personnel into the area. If necessary employ an observer.
Extra precaution should be used when grinding, welding and using a sledge-hammer.

ATTACHMENTS

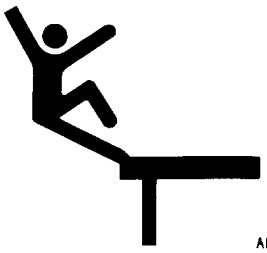
- Appoint a leader before starting removal or installation operations for attachments.
- Do not allow anyone other than the workers close to the machine or attachment.
- Place attachments that have been removed from the machine in a safe place so that they do not fall. Put a fence around the attachments and set up No Entry signs to prevent unauthorized persons from coming close.

WORK UNDER THE MACHINE

- Stop the machine on firm, level ground and always lower all work equipment to the ground before performing service or repairs under the machine.
- Always block the track shoes securely.
- It is extremely dangerous to work under the machine if the track shoes are off the ground and the machine is supported only by the work equipment. Never work under the machine if the machine is poorly supported.

WORK ON TOP OF THE MACHINE

- When carrying out maintenance on top of the machine, make sure that the footholds are clean and free of obstructions, and follow the precautions below to prevent yourself from falling.
  - Do not spill oil or grease.
  - Do not leave tools lying around.
  - Mind your step when you are walking.
- Never jump down from the machine. When getting on or off the machine, always use the steps and handrails, and maintain three-point contact (both feet and one hand or both hands and one foot) at all times.
- Use protective equipment if necessary.



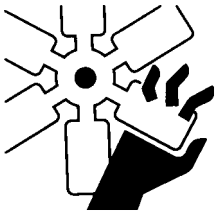
LOCKING INSPECTION COVERS

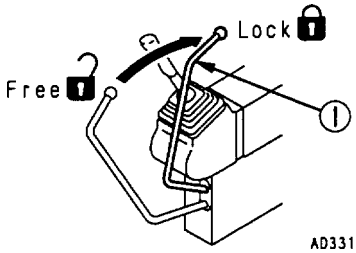
When carrying out maintenance with the inspecton cover open, lock it securely with a lock bar. If maintenance is carried out with the inspection cover open and not locked in position, it may close suddenly if knocked or blown by the wind, and may cause injury to the operator.

MAINTENANCE WITH THE ENGINE RUNNING

To prevent injury, do not carry out maintenance with the engine running. If maintenance must be carried out with the engine running, carry out the operation with at least two workers and do as follows.

- One worker must always sit in the operator's seat and be ready to stop the engine at any time.
  All workers must maintain contact with the other workers.
- When carrying out operations near rotating parts there is danger of being caught in the parts, so be extremely careful.
- When cleaning inside the radiator, set safety lock lever ① to the LOCK position to prevent the work equipment from moving.
- Do not touch any control levers. If any control lever must be operated, always give a signal to the other workers to warn them to move to a safe place.
- Never touch the fan blade or fan belt with any tool or any part of your body. There is danger of serious injury.



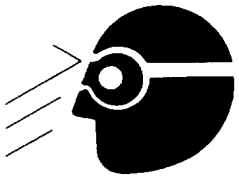


DO NOT DROP TOOLS OR PARTS INSIDE MACHINE

- When opening the inspection window or tank oil filler to carry out inspection, be careful not to drop any nuts, bolts, or tools inside the machine.
  If such parts are dropped into the machine, it will cause breakage of the machine, mistaken operation and other failures. If you drop any part into the machine, always be sure to remove it from the machine.
- When carrying out inspection, do not carry any unnecessary tools or parts in your pocket.

PRECAUTIONS WHEN USING HAMMER

When using a hammer, always wear safety glasses, safety helmet, and other protective clothing, and put a brass bar between the hammer and the part being hammered.
If hard metal parts such as pins, edges, teeth, or bearings are hit with a hammer, there is danger that broken pieces might fly into your eyes and cause injury.



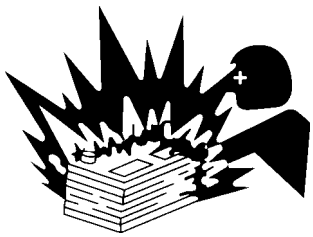
REPAIR WELDING

Welding operations must always be carried out by a qualified welder and in a place equipped with a proper equipment. Gas is generated and there is danger of fire or electrocution when carrying out welding, so never allow any unqualified personnel to carry out welding.
The qualified welder must follow the precautions given below.

- Disconnect the battery terminals to prevent explosion of the battery.
- Remove the paint from the place being welded to prevent gas from being generated.
- If hydraulic equipment or piping, or places close to these are heated, flammable vapor of spray will be generated and there is danger of this catching fire, so avoid applying heat to such places.
- If heat is applied directly to rubber hoses or piping under pressure, they may suddenly burst, so cover them with fireproof sheeting.
- Always wear protective clothing.
- Ensure that there is good ventilation.
- Clear up any flammable materials, and make sure that there is a fire extinguisher at the workplace.

PRECAUTIONS WITH BATTERY.

When repairing the electrical system or when carrying out electrical welding, remove the negative - terminal of the battery to stop the flow of current.
Handling battery → See "16.6 IF BATTERY IS DISCHARGED".



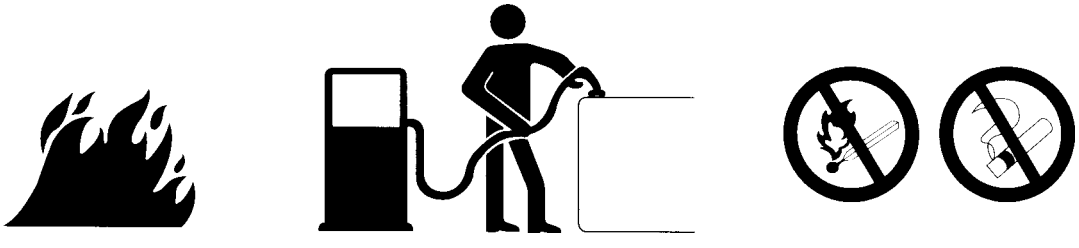
WHEN ABNORMALITY IS LOCATED

- If any abnormality is found during inspection, always carry out repairs. In particular, if the machine is used when there is any abnormality in the brakes or work equipment systems, it may lead to serious accidents.
- Depending on the type of failure, please contact your Komatsu distributor for repairs.

RULES TO FOLLOW WHEN ADDING FUEL OR OIL

If any flame is brought close to fuel or oil, there is danger that it will catch fire, so always follow the precautions below.

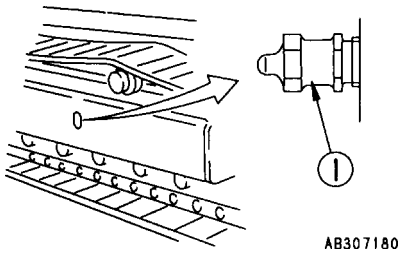
- Stop the engine when adding fuel or oil.
- Do not smoke.
- Spilled fuel and oil may cause you to slip, so always wipe it up immediately.
- Always tighten the cap of the fuel and oil fillers securely.
- Always add fuel and oil in a well-ventilated place.

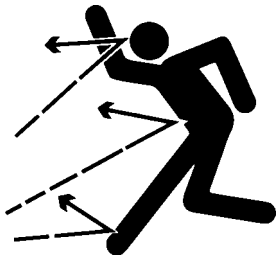


PRECAUTIONS WHEN USING HIGH-PRESSURE GREASE TO ADJUST TRACK TENSION

- Grease is pumped into the track tension adjustment system under high pressure.
  If the specified procedure for maintenance is not followed when making adjustment, valve ① may fly out and cause damage or personal injury.
- When loosening grease drain valve ① never loosen it more than one turn.
- Never put your face, hands, feet or any other part of your body directly in front of any grease drain valve.

Adjusting track tension → See 24.2 WHEN REQUIRED".





HANDLING HIGH PRESSURE HOSES

- If oil or fuel leaks from high-pressure hoses, it may cause fire or defective operation, which may lead to personal injury or damage. If any damaged hoses or loose bolts are found, stop work and contact your Komatsu distributor for repairs.
- Replacing high-pressure hoses requires a high level of skill, and the torque is determined according to the type of hose and size, so please do not carry out replacement yourself. Ask your Komatsu distributor to carry out replacement.

PRECAUTIONS WITH HIGH-PRESSURE OIL

When inspecting or replacing high-pressure piping or hoses, always check that the pressure in the hydraulic circuit has been released. If the circuit is still under pressure, it will lead to serious injury or damage, so always do as follows.

- For details of the method of releasing the pressure - **see "8.1 BEFORE CARRYING OUT MAINTENANCE, STOP ENGINE BEFORE CARRYING OUT INSPECTION AND MAINTENANCE"**. Never carry out inspection or replacement before releasing the pressure completely.
- Wear safety glasses and leather gloves.
- If there is any leakage from the piping or hoses, the piping, hoses and the surrounding area will be wet, so check for cracks in the piping and hoses and for swelling in the hoses.
  If it is difficult to locate the leakage, always please contact your Komatsu distributor for repairs.
- If you are hit by a jet of high-pressure oil, consult a doctor immediately for medical attention.

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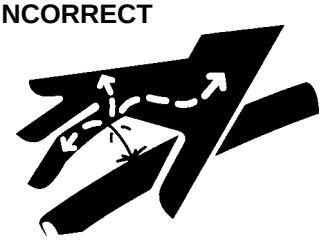

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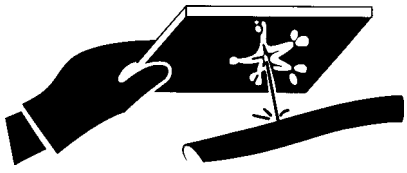
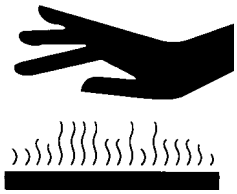


PRECAUTIONS WHEN CARRYING OUT MAINTENANCE AT HIGH TEMPERATURE

Immediately after stopping operations, the engine coolant, oil at all parts, the exhaust manifold, and the muffler are at high temperature.
In this condition, if the cap is removed, or the oil is drained,or the filters are replaced, this may result in burns or other injuries. Wait for the temperature to go down, then carry out the inspection and maintenance in accordance with the procedures given in this manual.

Cleaning inside of cooling system → See "24.2 WHEN REQUIRED".
Checking coolant level, oil level in hydraulic tank → See "24.3 CHECK BEFORE STARTING".
Checking lubricating oil level, adding oil → See 24.3-7 PERIODIC MAINTENANCE".
Changing oil, replacing filters → See 24.5-10 "PERIODIC MAINTENANCE".



CHECKS AFTER INSPECTION AND MAINTENANCE

Failure to carry out inspection and maintenance fully, or failure to check the functions of various maintenance locations may cause unexpected problems and may even lead to personal injury or damage, so always do as follows.

- Checks when engine is stopped
  - Have all the inspection and maintenance locations been checked?
  - Have all the inspection and maintenance items been carried out correctly?
  - Have any tools or parts dropped into the machine? It is particularly dangerous if they get caught in the lever linkage.
  - Has water and oil leakage been repaired? Have bolts been tightened?

- Checks when engine is running
  For details of checks when the engine is running - **See 8.2 DURING MAINTENANCE, MAINTENANCE WITH ENGINE RUNNING**", and be extremely careful to ensure safety.

- Do the inspection and maintenance locations work normally?

- Is there any oil leakage when the engine speed is raised and load is applied to the hydraulic system?

WASTE MATERIALS

To prevent pollution, particularly in places where people or animals are living, always follow the procedures given below.

- Never dump waste oil in a sewer system, rivers etc.

- Always put oil drained from your machine in containers. Never drain oil directly onto the ground.

- Obey appropriate laws and regulations when disposing of harmful objects such as oil, fuel, coolant, solvent, filters and batteries.

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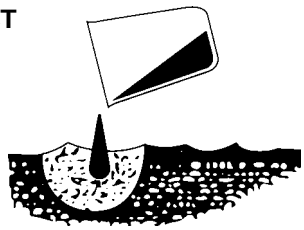


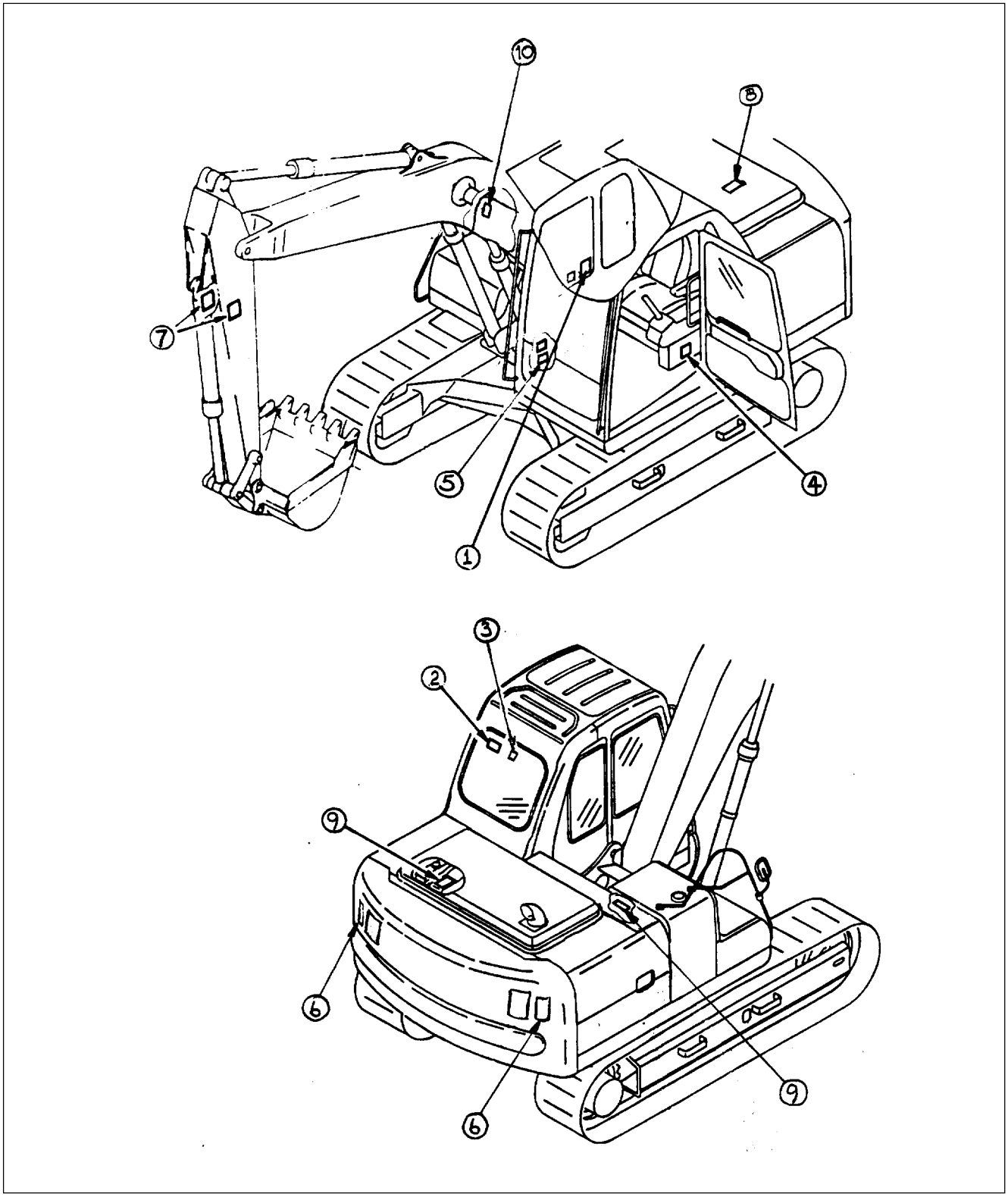
9. POSITION FOR ATTACHING SAFETY LABELS

Always keep these labels clean. If they are lost or damaged, attach them again or replace them with a new label.

There are other labels in addition to the safety labels listed as follows, so handle them in the same way.

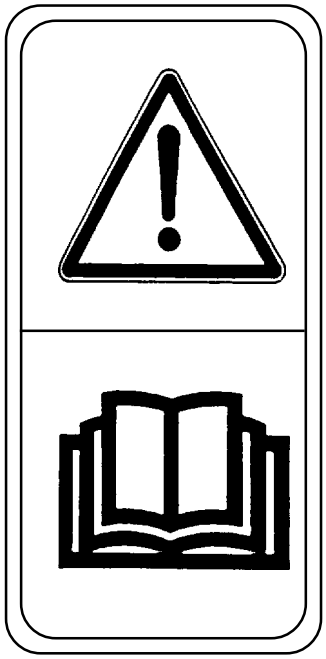
Safety labels are available from your Komatsu distributor.

POSITION FOR ATTACHING SAFETY LABELS

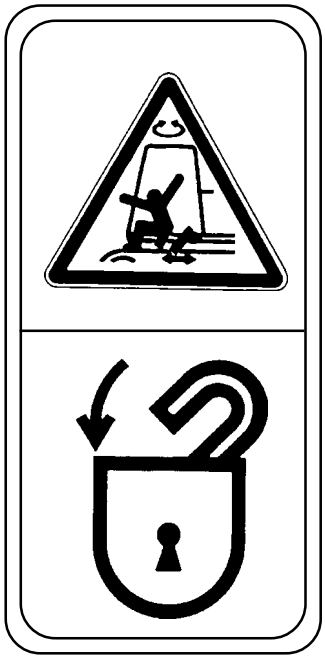


1. Warnings for operation, inspection and maintenance

1. 20E-00-K1170



- Improper operation and maintenance can cause serious injury or death
- Read the manual and labels before operation and maintenance. Follow instructions and warnings in manual and in labels on machine.
- Keep the manual in machine cab near operator. If this manual is lost, please contact your Komatsu distributor for a replacement.

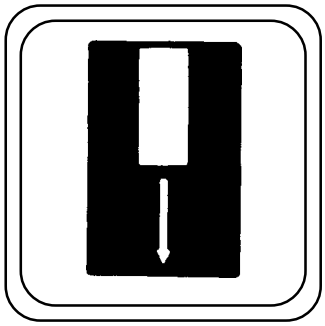


- Always apply lock when leaving operator's seat.

2. 20E-00-K1230
Warnings when opening front window

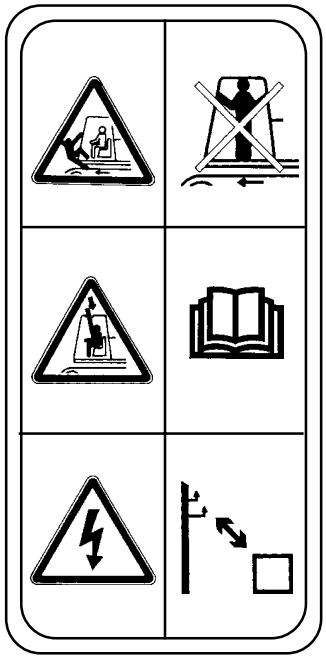
- When raising window, lock it in place with lock pins on both sides.
- Falling window can cause injury.

3. 20Y-00-K2220



- Emergency exit
- Read operation manual before operation

4. 20E-00-K1130

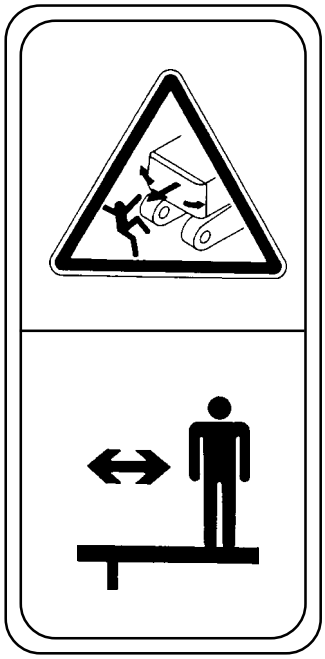


WARNING -
No passengers.
No passengers allowed to ride on machine while it is moving.

WARNING - DANGER OF FALLING OBJECTS
Do not operate where a danger of falling objects exists.
Consult your dealer for fitting of FOPS protection.

HAZARDOUS -
Voltage hazard
Serious injury or death can occur if machine or attachments are not kept safe distance away from electric lines.

6. 20E-00-K1150



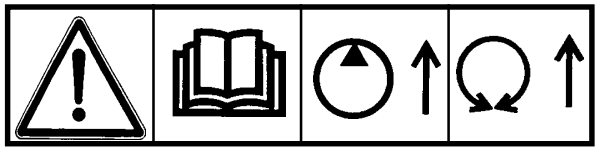
Keeping out of moving area.

To prevent SEVERE INJURY or DEATH do the following before moving machine or its attachments:

- Sound horn to alert people nearby.
- Be sure no one is on or near machine or in the swing area.
- Rotate cab for full view of travel path if it can be done safely.
- Use spotter if view is obstructed.

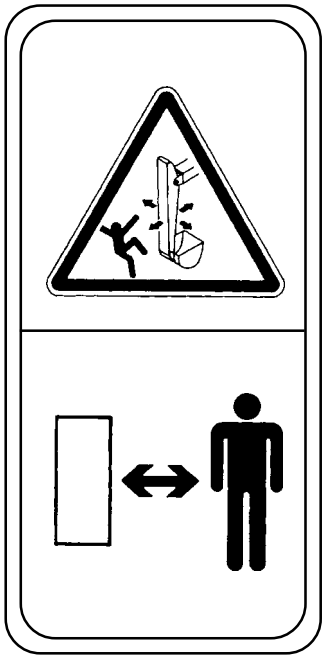
Always follow the above.

5. 20E-00-K1280

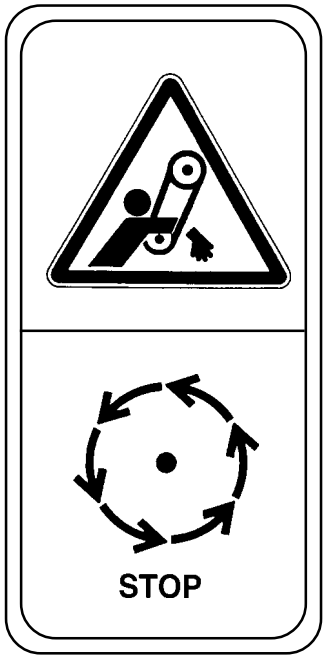


Pump control override switch and swing lock override switch.
Read operation manual before operation.

7. 20E-00-K1140



8. 20E-00-K1310

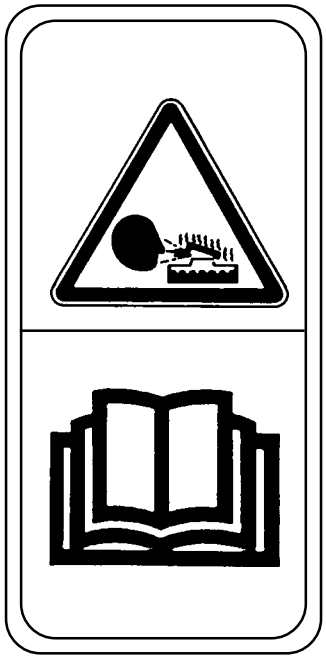


- Improper operation and maintenance can cause serious injury or death
- Read the manual and labels before operation and maintenance. Follow instructions and warnings in manual and in labels on machine.
- Keep the manual in machine cab near operator. If this manual is lost, please contact your Komatsu distributor for a replacement.

10. 20E-00-K1110

- Warning for falling from upper structure.
- Keep away from sides of machine.
- Keep off counter-weight.
- Do not ride on machine when it is moving.

9. 20E-00-K1190
Warning for high temperature coolant and oil



Hot water and oil hazard

To prevent hot water and oil from spurting out:

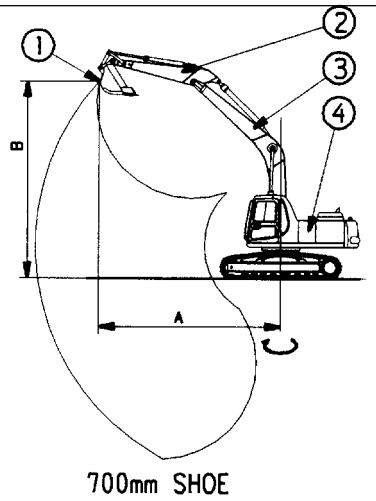
- Turn engine off
- Allow water to cool.
- Slowly loosen cap to relieve pressure before removing.
- Read operation manual before operation.

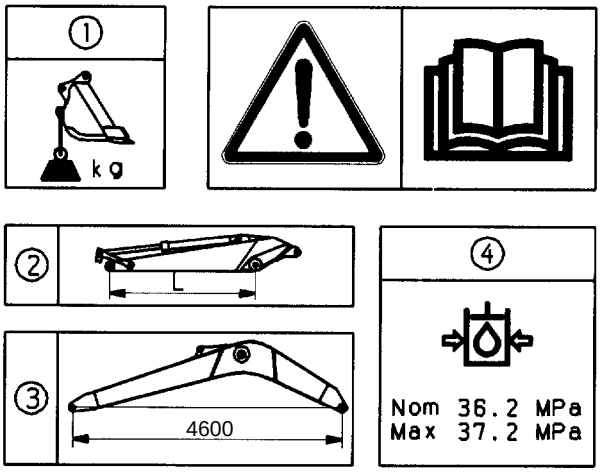
9.1 LIFTING CAPACITIES

One piece boom.

Arm lengths as stated. When removing bucket, linkage or cylinder lifting capacities can be increased by their respective weights.

PC130-6K





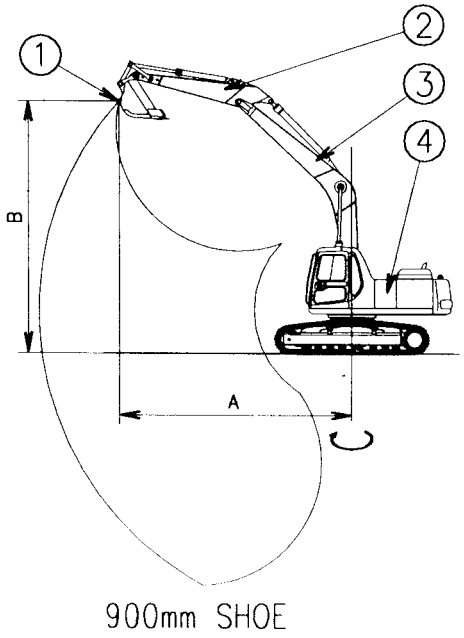
PC130-6k

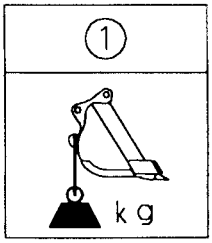
L	A / B	kg											
		MAX		7.0m		6.0m		4.5m		3.0m		1.5m	
													
3.0m	6.0m	•1500	•1500			•2350	2250						
	4.5m	•1350	•1350	2100	1650	•2750	2250						
	3.0m	•1350	1350	2050	1650	2750	2200	•3450	•3450				
	1.5m	•1450	1250	2000	1550	2600	2050	4250	3300	•6850	6250		
	0.0m	•1600	1250	1900	1500	2500	1950	3950	3050	7950	5650		
	-1.5m	1750	1350	1900	1450	2400	1850	3800	2900	7700	5450	•3850	•3850
	-3.0m	2150	1850			2400	1850	3800	2900	7750	5500	•6400	•6400
	-4.5m	•3150	2450					3900	3000	•6400	5650	•10250	•10250
2.5m	6.0m	•1800	•1800										
	4.5m	•1700	•1700			2800	2250	•3150	•3150				
	3.0m	•1700	1550	2050	1650	2750	2200	•3950	3550	•5150	•5150		
	1.5m	•1800	1450	2000	1800	2650	2100	4200	3300	•7850	6150		
	0.0m	1850	1450	1950	1550	2550	2000	3900	3000	•7550	5700		
	-1.5m	2050	1800			2500	1950	3900	3000	7900	5600	•4400	•4400
	-3.0m	2600	2050					3850	2950	7950	5700	•7600	•7600
	-4.5m	•3300	•3300							•5400	•5400		
2.1m	6.0m	•2250	•2250					•3350	•3350				
	4.5m	•2050	2000			2750	2200	•3500	•3500				
	3.0m	•2050	1700			2700	2150	•4300	3450	•5900	•5900		
	1.5m	2000	1550	2000	1600	2600	2050	4150	3250	8350	6000		
	0.0m	2000	1600			2500	2000	3950	3050	•6800	5650		
	-1.5m	2250	1800			2500	1950	3900	3000	7900	5600	•4750	•4750
	-3.0m	2950	2350					3900	3000	•7400	5750	•8800	•8800
	-4.5m												

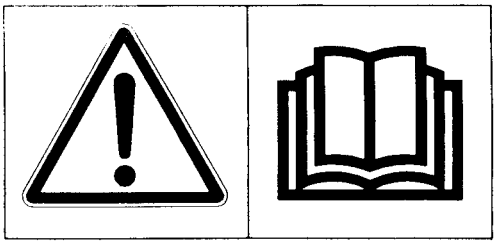
One piece boom.

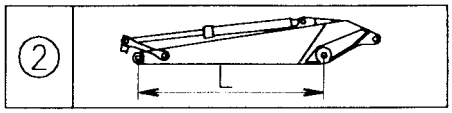
Arm lengths as stated. When removing bucket, linkage or cylinder lifting capacities can be increased by their respective weights.

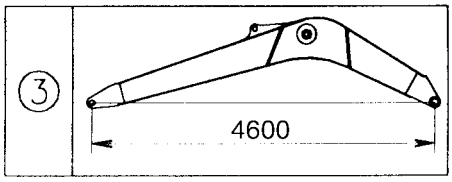
PC150LGP-6K

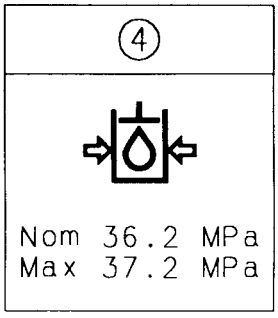












PC150LGP-6K

L	A / B	kg MAX		7.0m		6.0m		4.5m		3.0m		1.5m	
3.0m	6.0m	*1600	*1600			*2650	*2650						
	4.5m	*1500	*1500	*2400	2350	*2900	*2900						
	3.0m	*1500	*1500	*3100	2350	*3250	3000	*3700	*3700				
	1.5m	*1550	*1550	*3350	2250	*3750	2900	*4750	4500	*7300	*7300		
	0.0m	*1750	*1750	3300	2200	*4150	2750	*5600	4250	*8500	8050		
	-1.5m	*2050	2050	3250	2150	4100	2700	*5900	4100	*9200	7850	*4250	*4250
	-3.0m	*2700	2500			*3850	2700	*5550	4100	*8400	7850	*6850	*6850
	-4.5m	*3250	*3250					*4000	*4000	*6250	*6250		
2.5m	6.0m	*1900	*1900										
	4.5m	*1800	*1800			*3300	3100	*3350	*3350				
	3.0m	*1800	*1800	*2950	2350	*3600	3050	*4200	*4200	*5600	*5600		
	1.5m	*1900	*1900	3400	2300	*4050	2950	*5250	4500	*8250	*8250		
	0.0m	*2150	*2150	3350	2250	4250	2850	*5950	4300	*7750	*7750		
	-1.5m	*2600	2400			4200	2800	*6050	4250	*9200	8050	*4850	*4850
	-3.0m	*3650	3000					*5350	4250	*8000	*8000	*8150	*8150
	-4.5m												
2.1m	6.0m	*2350	*2350					*3500	*3500				
	4.5m	*2200	*2200			*3550	3050	*3750	*3750				
	3.0m	*2200	*2200			*3850	3000	*4550	*4550	*6400	*6400		
	1.5m	*2300	2300	*2650	2300	*4200	2900	*5500	4500	*8150	*8150		
	0.0m	*2650	2350			4250	2850	*6050	4300	*7200	*7200		
	-1.5m	*3250	2650			4250	2850	*6000	4250	*8950	8100	*5300	*5300
	-3.0m	*3850	3400					*5000	4300	*7400	*7400	*9450	*9450
	-4.5m												

OVERLOAD CAUTION

This machine is equipped with an overload caution system which give a visual warning (on monitor) and an audible warning when lifting a load close to the lift capacity of the machine. For operation of this system refer to section 12.22

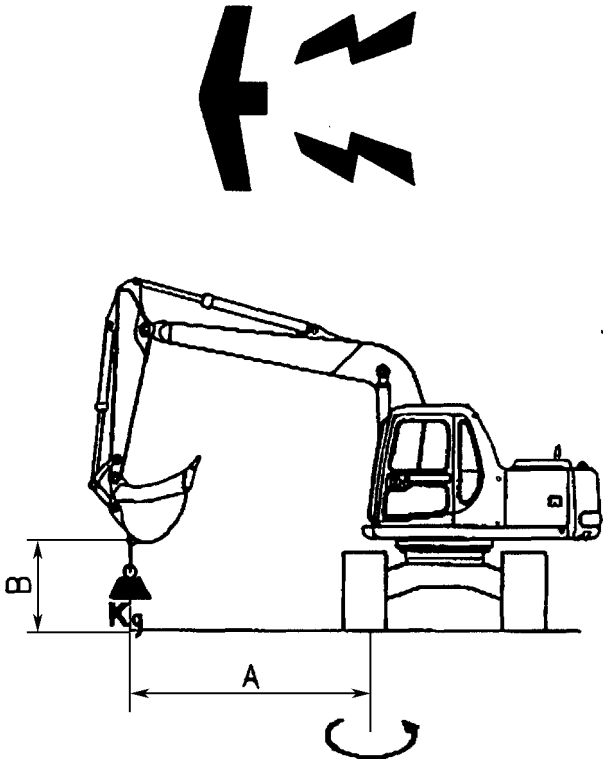
A decal inside the operator's cab shows the loads at which the caution warning is given for various work equipment positions.

Due to the simple nature of this system the overload warning is given at a lower load than actually allowable (see full lift capacity charts on previous page).

If lifting to the full capacity of the machine is required it is necessary to fit a full overload caution system (with work equipment position sensing) to the machine.

Decal showing lifting loads at overload warning.

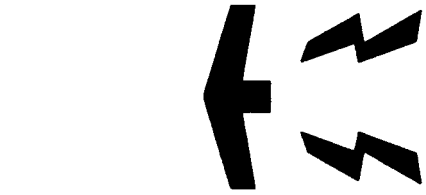
PC130-6K

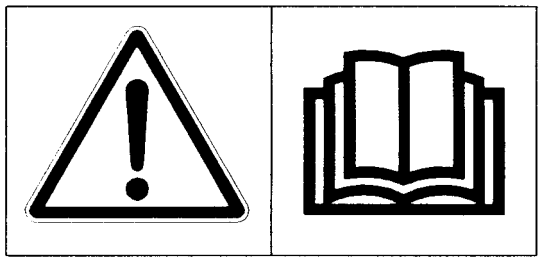


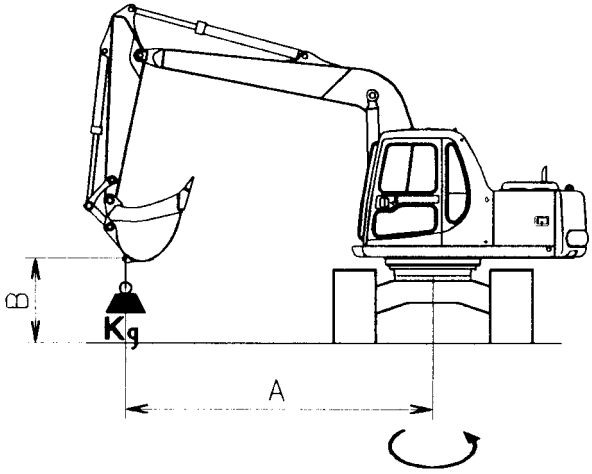
B \ A	6.0m	4.5m	3.0m
4.5m	950	1050	
3.0m	1150	1450	2250
1.5m	1350	1800	3050
0.0m	1350	1850	3350

20E-00-K1670

PC150LGP-6K







A / B	6.0m	4.5m	3.0m
4.5m	1200		
3.0m	1400	1750	
1.5m	1700	2300	3900
0.0m	1900	2700	4750

21P-00-K1920

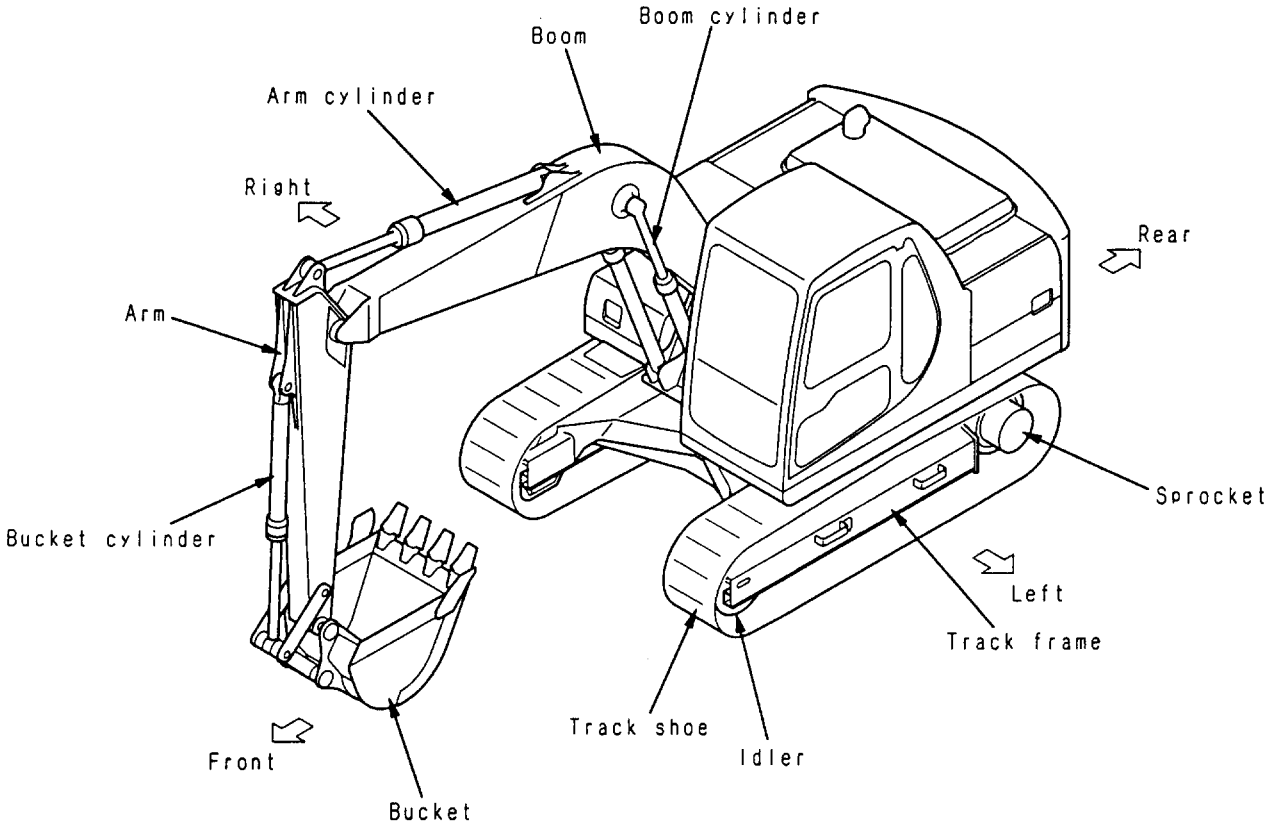
MEMO

OPERATION

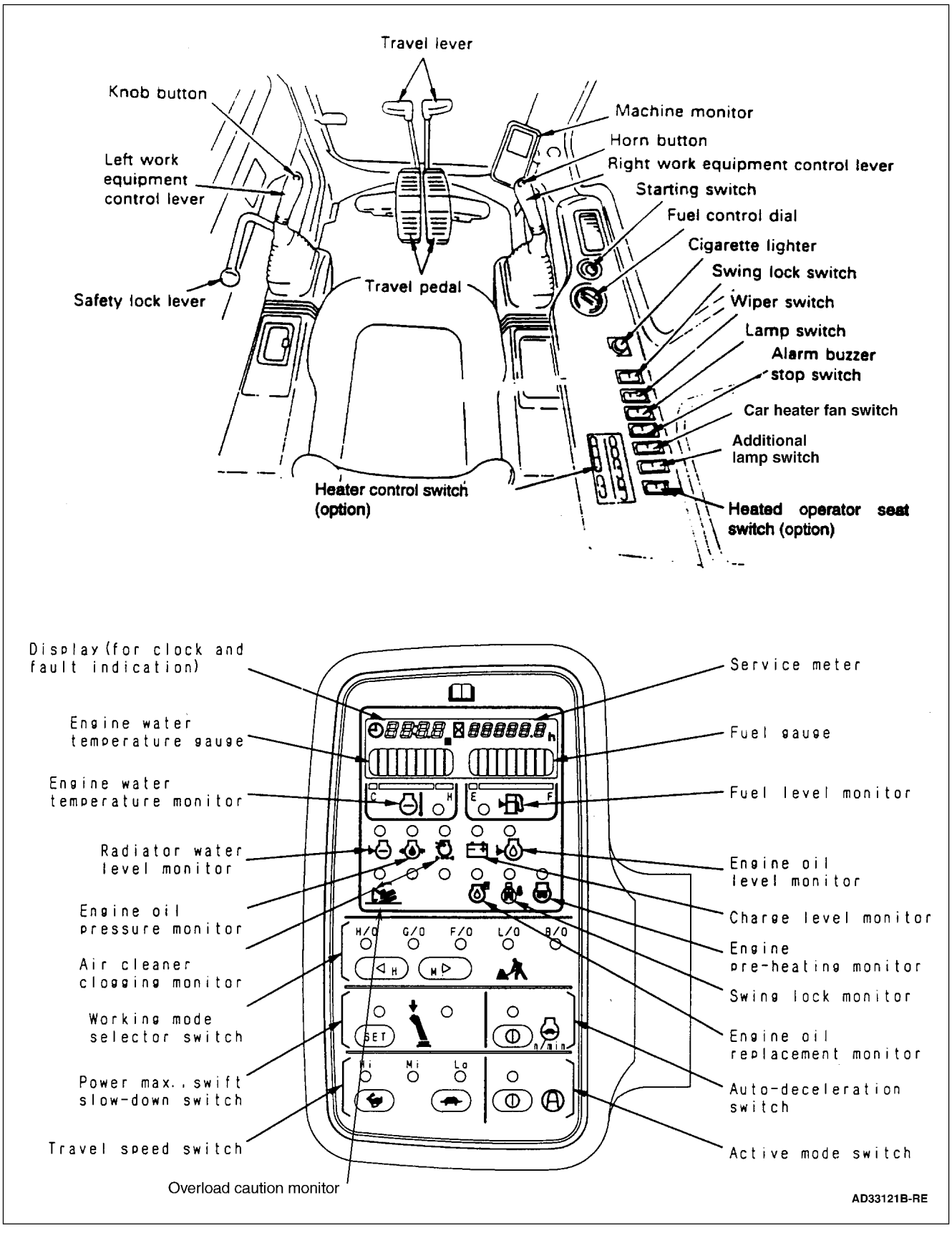
10. GENERAL VIEW

10.1 GENERAL VIEW OF MACHINE

If directions are indicated in this section, they refer to the directions shown by the arrows in the diagram below.



10.2 GENERAL VIEW OF CONTROLS AND GAUGES

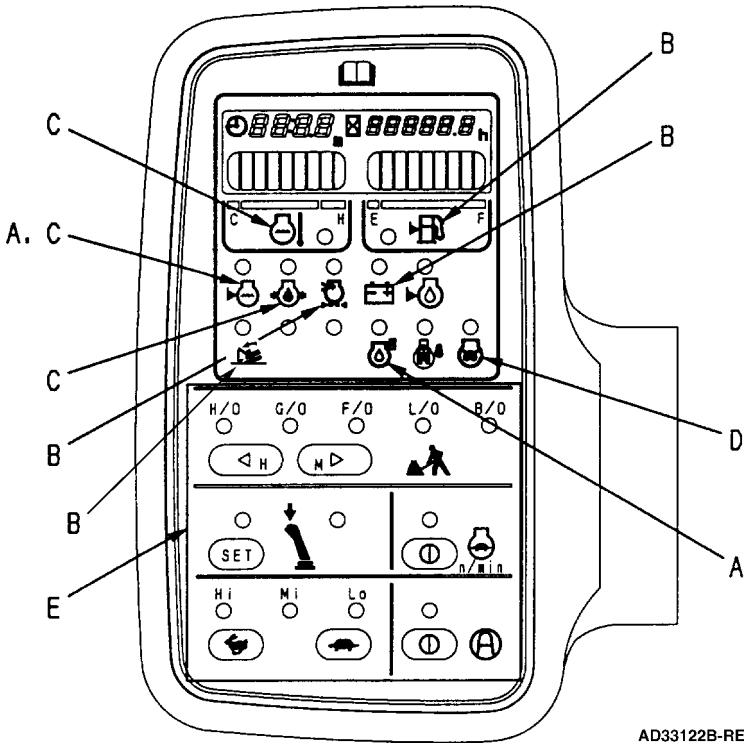


11. EXPLANATION OF COMPONENTS

The following is an explanation of the devices neede for operating the machine.

To carry out suitable operations correctly and safely, it is important to understand fully the methods of operating the equipment and the meaning of the displays.

11.1 MACHINE MONITOR



A. BASIC CHECK ITEMS (11.1.1)

This displays the basic items that should be checked before starting the engine.

If there is any abnormality, the appropriate monitor lamp will flash.

NOTICE

When carrying out checks before starting, do not simply rely on the monitor. Always refer to the periodic maintenance items or "12. OPERATION" to carry out the checks.

B. CAUTION ITEMS (11.1.2)

CAUTION

If these monitor items flash, check and repair the appropriate location as soon as possible.

These are items which need to be observed while the engine is running. If any abnormality occurs, items which need to be repaired as soon as possible are displayed.

If there is any abnormality, the appropriate monitor lamp will flash to indicate the location of the abnormality.

C. EMERGENCY STOP ITEMS (11.1.3)

CAUTION

If these monitor items flash stop operations immediately, then check and repair the appropriate location.

These are items which need to be observed while the engine is running. If any abnormality occurs, items which need to be repaired immediately are displayed.

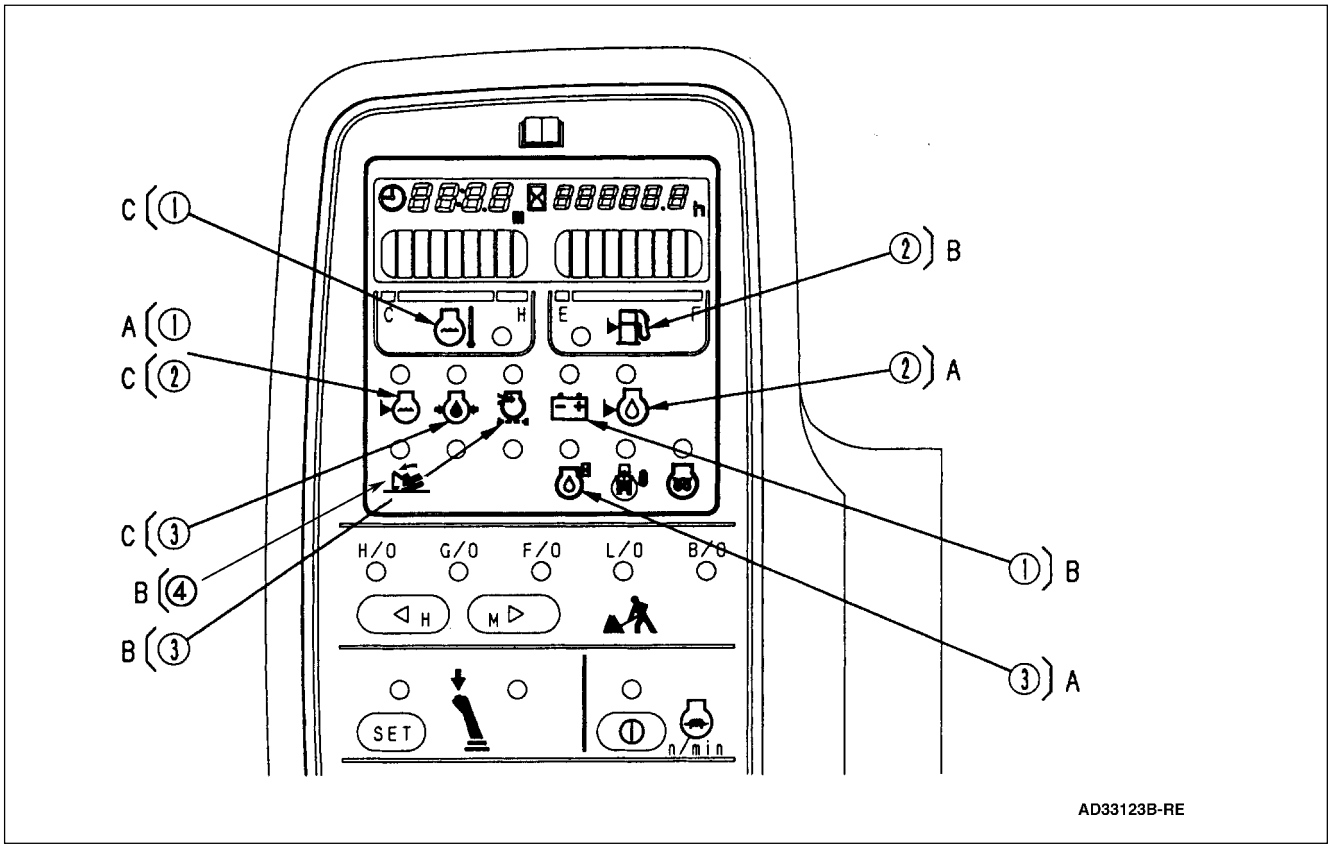
Ifthere is any abnormality, the appropriate monitor lamp will flash to indicate the location of the abnormality and the buzzer will sound.

D. METER DISPLAY PORTION (11.1.4)

This portion consists of pre-heating monitor, swing lock monitor, engine water temperature gauge, fuel gauge and display.

E. SWITCHES (11.1.5)

The switches are used for setting clock time and for selecting working mode, active mode and travel speed.



11.1.1 A: BASIC CHECK ITEMS

NOTICE

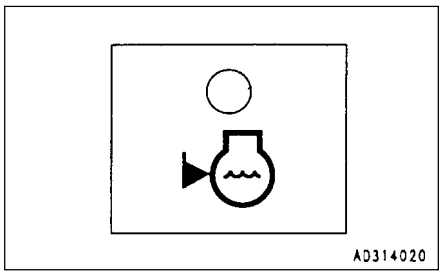
Do not rely on the "BASIC CHECK ITEMS" only for the check before starting.

Always refer to the periodic maintenance items or "12. OPERATION" to carry out the checks.

1. RADIATOR WATER LEVEL

This warns that the radiator cooling water level is too low.

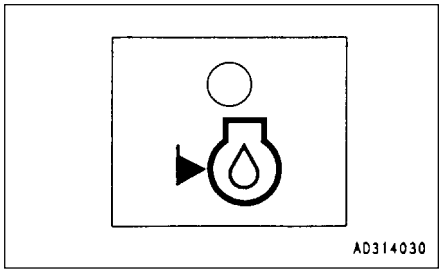
If the monitor lamp flashes, check the cooling water level in the radiator and reserve tank and add water.



2. ENGINE OIL LEVEL

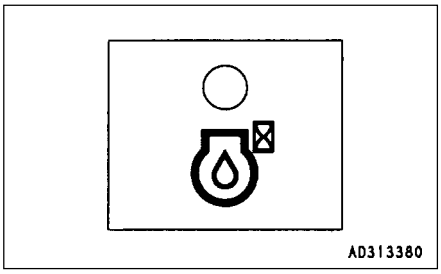
This warns that the oil level in the engine oil pan is too low.

If the monitor lamp flashes, check the oil level in the engine oil pan, and add oil.



3. REPLACEMENT OF ENGINE OIL (or only set machines)

If the set time (125, 250, 500H) passes after the engine oil is replaced, this lamp lights up. At this time, replace the engine oil.



11.1.2 B: CAUTION ITEMS

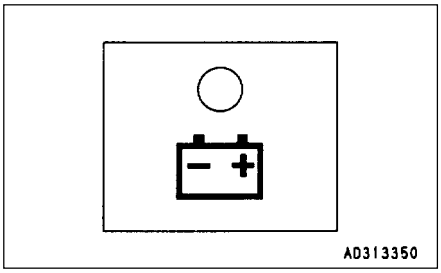
CAUTION

If the caution monitor lamp flashes, repair the problem as soon as possible.

1. CHARGE LEVEL

This monitor indicates an abnormality in the charging system while the engine is running.

If the monitor lamp flashes, check the V-belt tension. If any abnormality is found, see "16.7 OTHER TROUBLE"

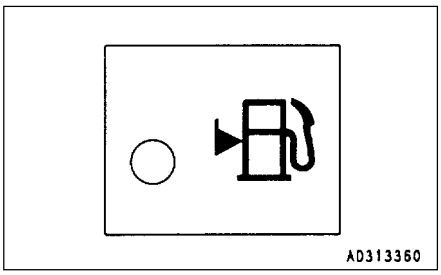


REMARK

While the starting switch is ON, the lamp will remain lit and will go off once the engine is started.

2. FUEL LEVEL

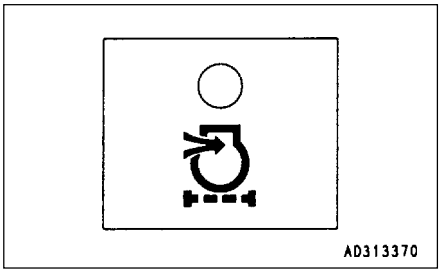
If the fuel drops below 25 liters the lamp will flash. Top up the fuel before this.



3. AIR CLEANER CLOGGING

This warns that the air cleaner is clogged.

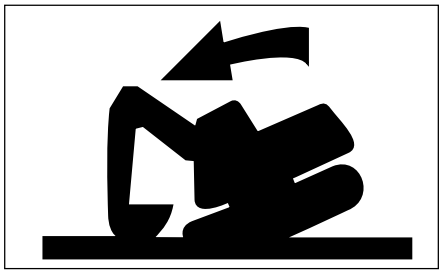
If the monitor lamp flashes, stop the engine then inspect and clean the air cleaner.



4. OVERLOAD CAUTION (When lifting)

This warns that the machine is close to tipping due to the load (an audible warning is also given), if the warning is given lower the load. Refer to the lifting capacity chart for safe load.

This function is operated by an additional switch positioned in the tool case. Refer to section 12.22.



11.1.3 C: EMERGENCY STOP ITEMS

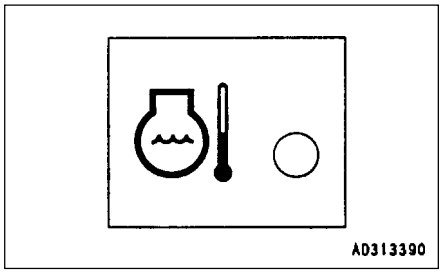
CAUTION

If any monitor lamp flashes, stop the engine or run it at low idling and take the following action.

1. ENGINE WATER TEMPERATURE

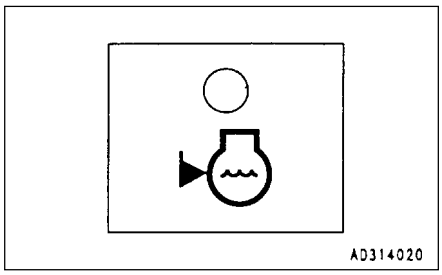
If the temperature of the engine cooling water becomes abnormally high, the monitor lamp flashes and the overheat prevention system is automatically actuated to reduce the engine speed.

Stop operations and run the engine at low idling until the engine water temperature gauge enters the green range.



2. RADIATOR WATER LEVEL

If the radiator water level drops, the monitor lamp flashes. Stop the engine, check the radiator water level and add water if necessary.

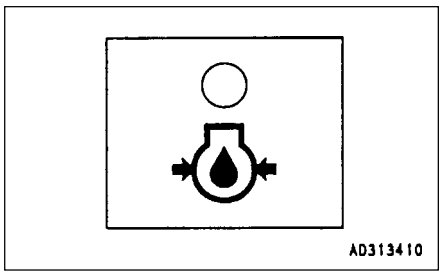


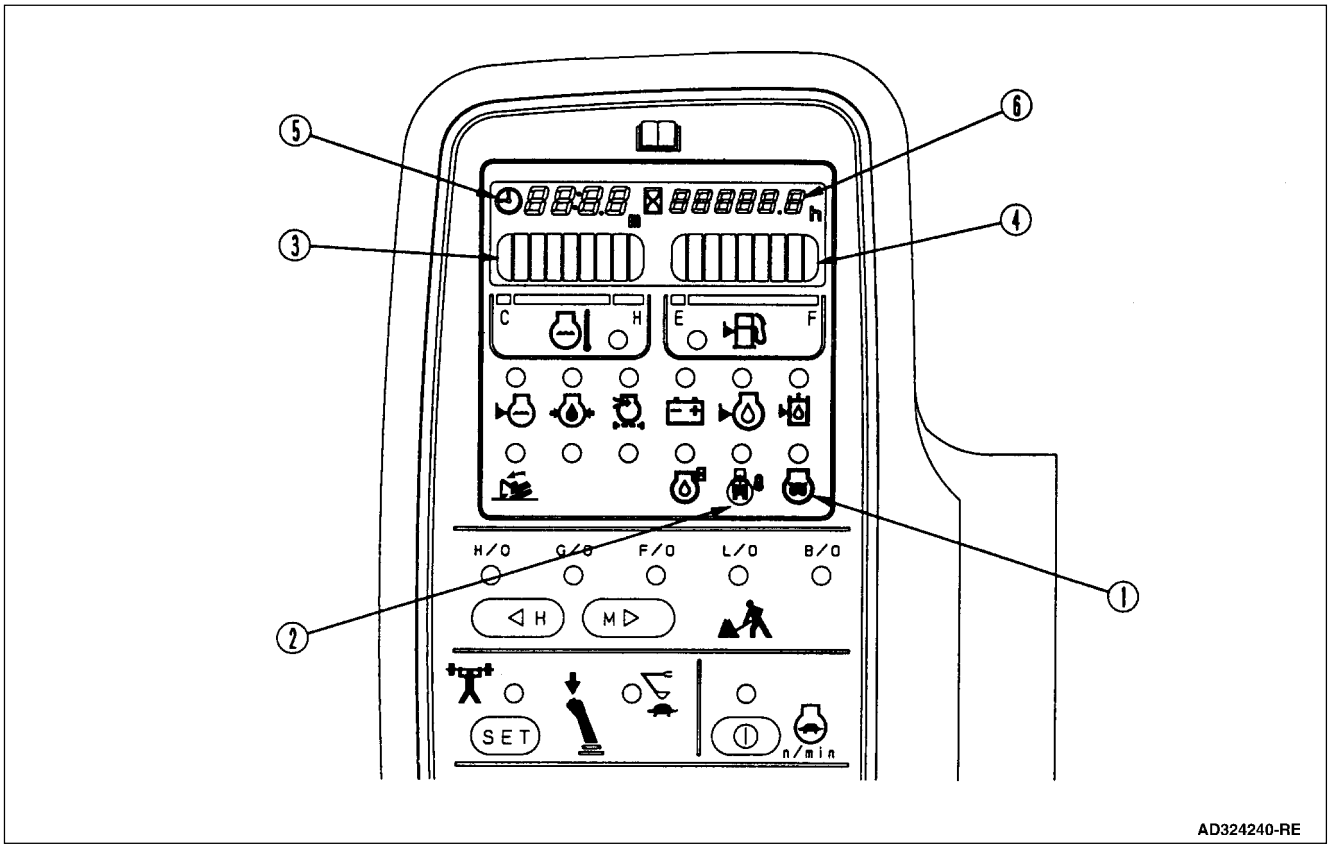
3. ENGINE OIL PRESSURE

If the engine oil pressure drops below the normal pressure, the monitor lamp flashes. At this item, stop the engine and inspect it according to "16.7 OTHER TROUBLE".

REMARK

While the starting switch is ON, the lamp remains lit and goes off once the engine is started. When the engine starts the buzzer may sound for a short time, however, this does not indicate a fault.





11.1.4 D: METER DISPLAY PORTION

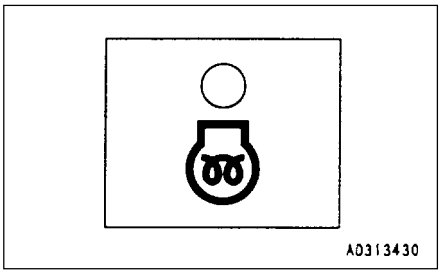
PILOT DISPLAY

When the starting switch is ON, the pilot display lights up when the display items are functioning.

1. ENGINE PRE-HEATING MONITOR

This monitor lamp indicates the pre-heating time required when starting the engine at an ambient temperature below 0°C.

The monitor lamp lights when the starting switch is turned to HEAT position and flashes after about 30 seconds to show that the pre-heating is completed. (The monitor lamp will go off after about 10 seconds).



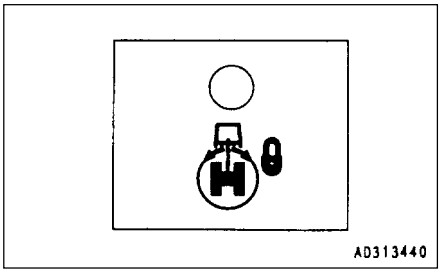
2. SWING LOCK MONITOR

This informs the operator that the swing lock is being actuated.

Actuated: Lights up

When the swing lock switch is turned ON (ACTUATED), the monitor lamp lights up.

When the swing lock override switch is turned on, this monitor lamp flashes.

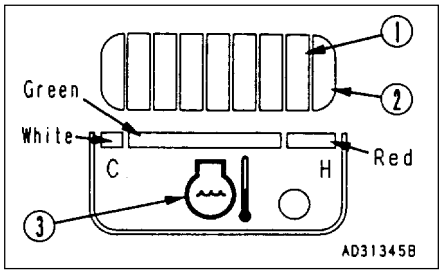


REMARK

A disc brake is installed in the swing motor to mechanically stop motor rotation.

The brake is always applied while the swing lock is actuated.

METERS



3. ENGINE WATER TEMPERATURE GAUGE

This gauge indicates the engine cooling water temperature.

If the temperature is normal during operation, the green range will light up.

If the red range lights up during operation, the overheat prevention system will be actuated.

The overheat prevention system acts as follows.

Red range ① lights up:

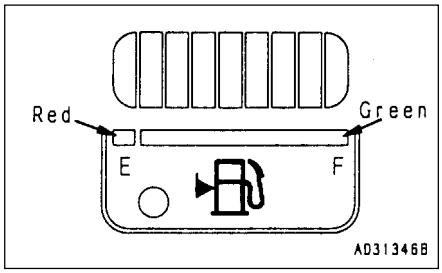
Engine water temperature monitor ③ flashes

Red range ② lights up:

Engine speed is lowered further to low idling, engine water temperature monitor ③ flashes and alarm buzzer sounds at the same time.

The overheat prevention system is actuated until the temperature enters the green range.

When red range ② lights, if the engine water temperature is reduced andthe fuel control dial is turned to the low idling position, the display wil be cancelled.



4. FUEL GAUGE

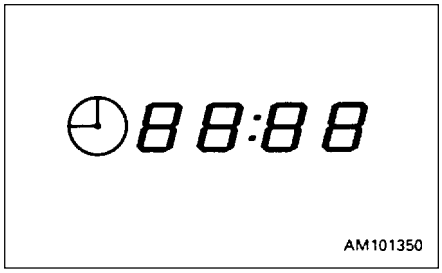
This gauge indicates the amount of fuel in the fuel tank.

If the fuel level is normal during operation, the green range will light up.

If only the red range lights up during operation there is less than 25 liters of fuel remaining in the tank so check and add fuel.

After the starting switch is turned ON, the correct level may not be displayed for a moment, but this does not indicate any abnormality.

When stopping the engine turn the starting switch ON and check that the monitor lamps on items A, B, C and D and the meters light up.

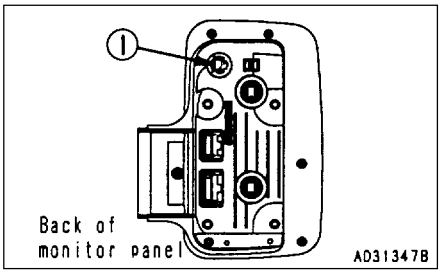


5. DISPLAY

This normally displays the clock time. If any error occurs, it indicates error information while the starting switch is ON.

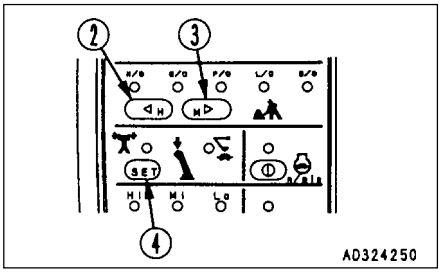
Manual setting

1. When the time is displayed depress clock switch ① for 2.5 sec or more.
2. "🕘" flashes.
3. Pressing H switch ② increases hours and pressing M switch ③ increases minutes. If switch ② or ③ is pressed for 2.5 seconds or more, hours or minutes increase continuously.
4. When the correct time is reached, press clock switch ①. This completes clock setting.



Correct time setting

1. When the time is displayed, depress the clock switch for 2.5 sec or more.
2. "🕘" flashes.
3. When SET switch ④ is pressed, the hour is rounded off for 0 to 14 minutes and rounded up for 45 to 59 minutes.
   (Examples) 10:14 becomes 10:00 (rounded off)
   10:45 becomes 11:00 (rounded up)
   When SET switch ④ is pressed at the time signal or standard clock, the correct time is obtained.
4. When the correct time is reached, press clock switch ①. This completes clock setting.



If the machine has a fault, error information appears while the starting switch is ON. The monitor flashes and displays all error informations sequentially.

Monitor indications	Error mode
E02	TVC valve system error
E03	Swing brake system error
E05	Governor system error
CALL	Non-operating error

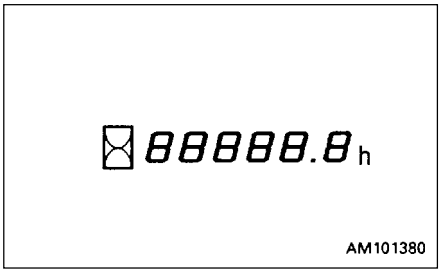
If any of these monitors flash, see "16.7.4 ELECTRONIC CONTROL SYSTEM".

6. SERVICE METER

This meter shows the total operation hours of the machine.

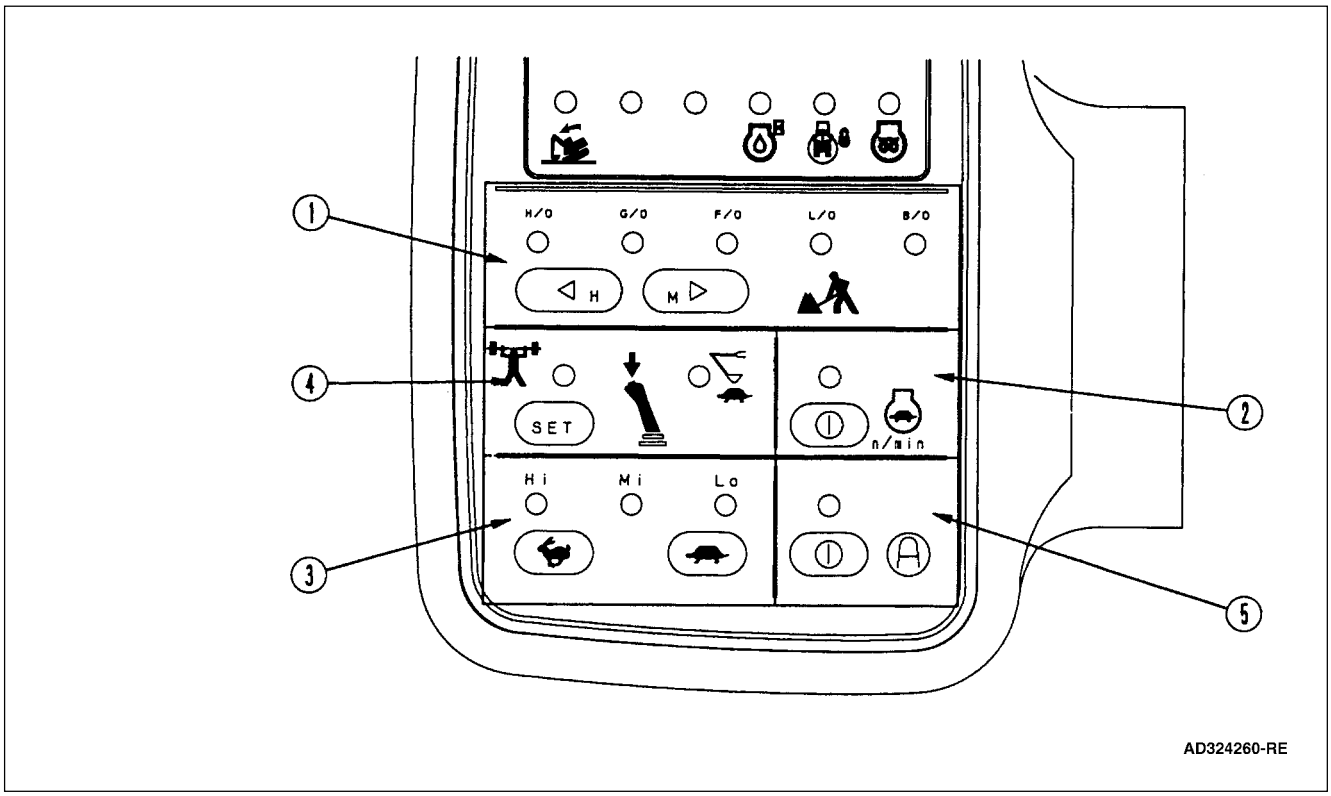
Set the periodic maintenance intervals using this display.

The service meter advances while the engine is running - even if the machine is not travelling.



The meter will advance by 1 for each hour of operation regardless of the engine speed.

11.1.5 E: SWITCHES



1. WORKING MODE SELECTOR SWITCH (Basic switch)

This switch is used to set the movement of power for the work euipment. By selecting the mode to match the working conditions, it is possible to carry out operations more easily.

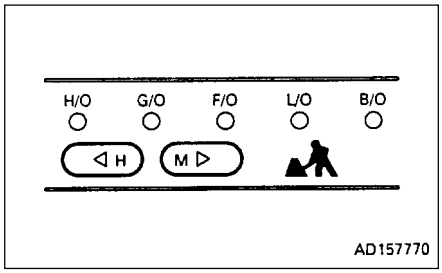
H.O. (heavy-duty operation mode) lights up:
This is used for heavy-duty work.

G.O. (general operation mode)lights up:
This is used for ordinary work.

F.O. (finishing operation mode) lights up:
This is used for levelling or grading work.

L.O. (lifting operation mode) lights up:
This is used for fine control operations.

B.O. (breaker operation mode) lights up:
This is used for breaker work.



When starting the engine, G.O. (general operation) mode is automatically selected. Each time the switch is pressed, the mode selection changes.

NOTICE

When the breaker is used, never select the H.O. (heavy-duty operation) mode.

REMARK

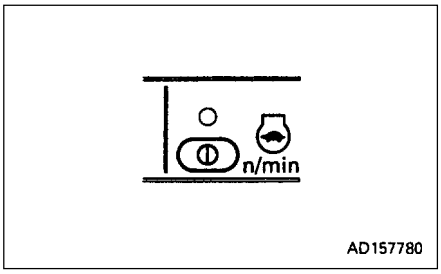
H switch is also used for setting "hours" in the clock and M switch for setting "minutes". See 11.1.4-5 DISPLAY.

2. AUTO-DECELERATION SWITCH (Selection switch)

This switch acts to activate the function that automatically lowers the engine speed and reduces fuel consumption when the control lever is at neutral.

ON lights up: Auto-deceleration is actuated
Off: Auto-deceleration is cancelled

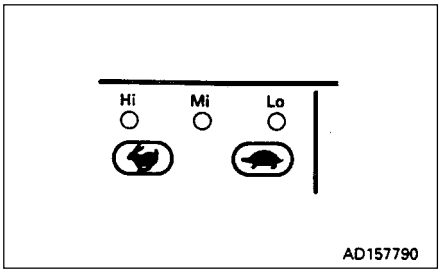
Each time the switch is pressed, the auto-deceleration is actuated or cancelled.



3. TRAVEL SPEED SWITCH

WARNING

If the Hi-Lo switch is operated when the machine is travelling, the machine may deviate even when travelling in a straight line. To prevent this, always stop the machine before operating the travel speed switch.



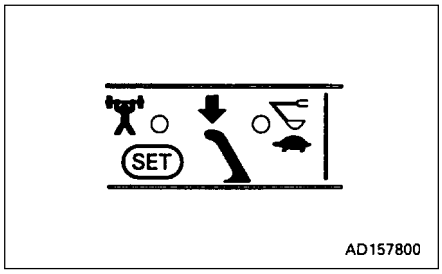
This is used to select the three travel speeds.
Lo lights up: Low speed travel
Mi lights up: Mid range speed travel
Hi lights up: High speed travel

When the engine is started, the travel speed is automatically st to Lo.

When travelling in Hi, the travel speed is automatically switched to middle speed travel (Mi) to match the travel surface on soft ground or when travelling uphill, so there is no need to operate this switch.
The monitor indication keeps lamp Hi lighted.

4. POWER MAX./SWIFT SLOW-DOWN SWITCH

During operations, the digging power can be increased and the speed reduced by a one-touch operation of the knob button (single click while pushing).



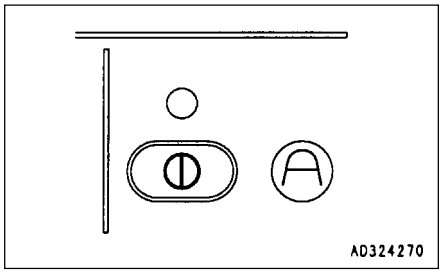
Power max. (power up) lights up:
When the working mode is heavy-duty and general operation modeonly, the power can be increased approx. 30% (genral operation mode) and the set pressure can be increased approx. 9% (heavy-duty operation mode and general operatonmode) while the knob button is being pressed. Even if the knob button continues to be pressed, the increase in power finishes after approx. 8.5 sec.

Swift slow-down (speed down) lights up:
When the working mode is heavy-duty operation and general operation mode only, the speed is reduced approx. 35% for heavy-duty operation mode and approx. 25% for general operation mode, and the set pressure is increased approx. 9% for heavy-duty operation mode and general operation mode.

When the engine is strated, the power max. lamp lights up. Each time the set switch is pressed, the mode is switched.

5. ACTIVE MODE SWITCH (SELECTOR SWITCH)

The active mode is effective for quick levelling operations of deep digging and loading operations.



ON lights up: Active mode ON
ON goes out: Active mode cancelled

The ON lamp is off when the engine is started.

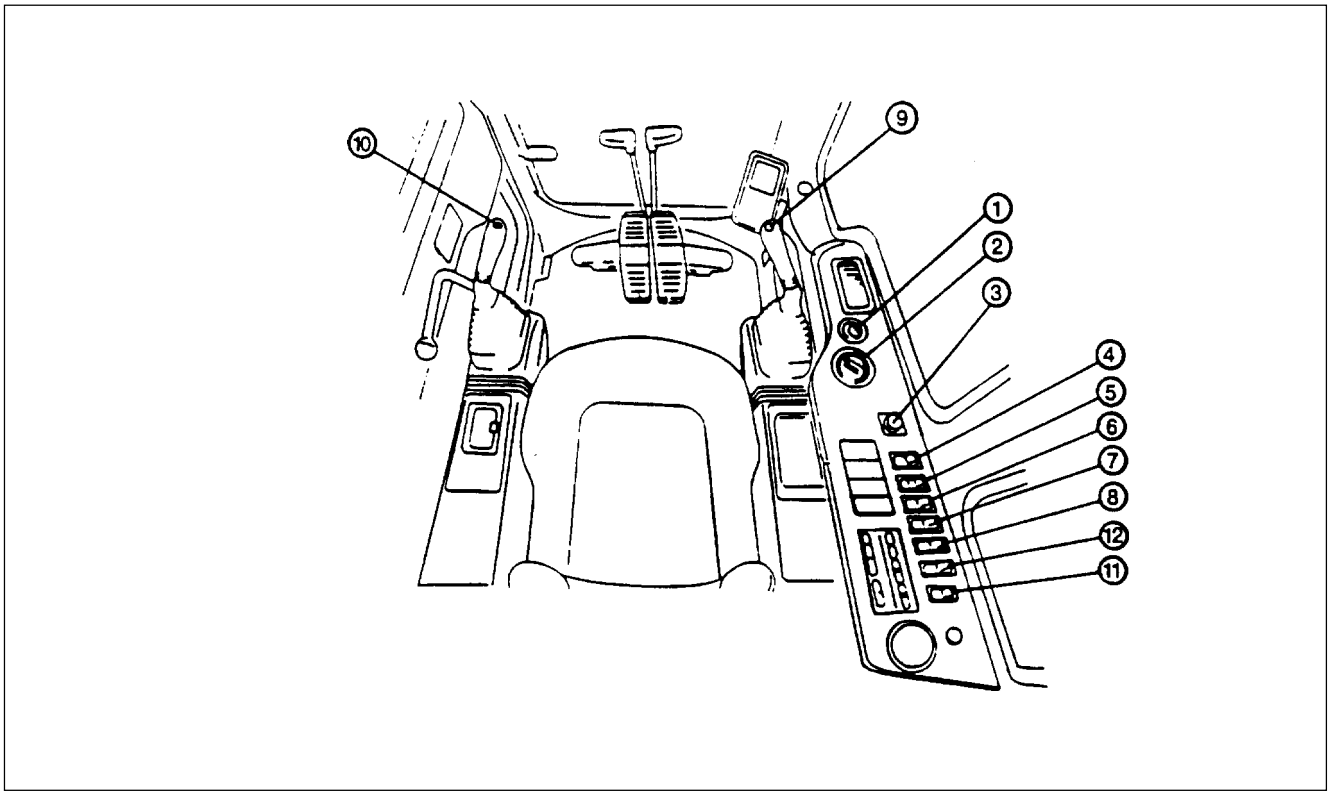
If it is turned ON (lights up), ti is possible to enter the active mode from any working mode.

Even when it is turned ON (lights up), the working mode display does not change. When the lamp goes out, the system returns to the original working mode.

NOTICE

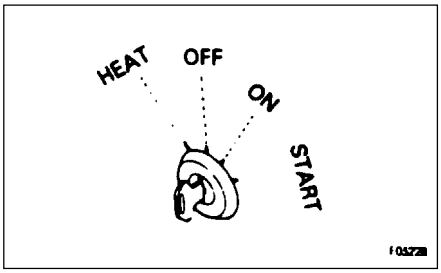
When using the breaker, do not set to the active mode.

11.2 SWITCHES



1. STARTING SWITCH

This switch is used to start or stop the engine.



OFF position

The key can be inserted or withdrawn. Except for the cab lamp, radio (if fitted) and clock, the switches for the electric system are all turned off and the engine is stopped.

ON position

Electric current flows in the charging and lamp circuits.

Keep the starting switch key at the ON position while the engine is running.

START position

This is the engine-start position. Keep the key at this position during cranking. Immediately after starting the engine, release the key which will automatically return to the ON position.

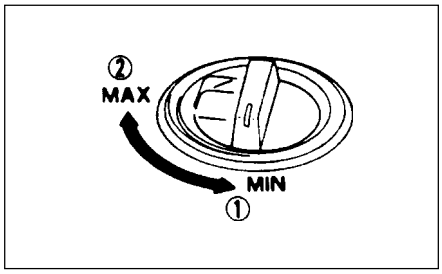
HEAT (preheat) position

When starting the engine in winter, set the key to this position. When the key is set to the HEAT position, the pre-heating monitor lights up. Keep the key at this position until the monitor lamp goes off. Immediately after the pre-heating monitor goes off, release the key. The key automatically returns to the OFF position. Then, start the engine by turning the key to the START position.

2. FUEL CONTROL DIAL
(WITH AUTO-DECELERATION MECHANISM)

This adjusts the engine speed and output.

① Low idling (MIN): Turned fully to the left
② Full speed (MAX): Turned fully to the right

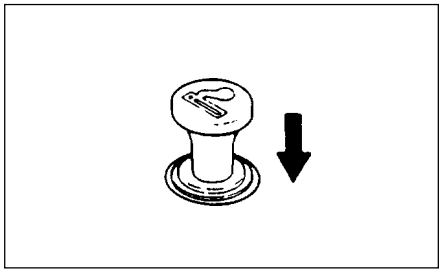


3. CIGARETTE LIGHTER

This is used to light cigarettes. To use, push the lighter in. After a few seconds it will spring back.

Pull out the lighter and light your cigarett.

Nothing may be connected to the cigarette lighter without the prior persmission of an authorised Komatsu distributor.



4. SWING LOCK SWITCH

⚠ WARNING

- **When the machine is travelling under its own power, or when the swing is not being operated, always set the switch to the ON (ACTUATED) position.**
- **On a slope, the work equipment may swing to the down side even if the swing lock switch is located at the ON position. Be careful concerning this point.**

This switch is used to lock the upper structure so that it cannot swing.

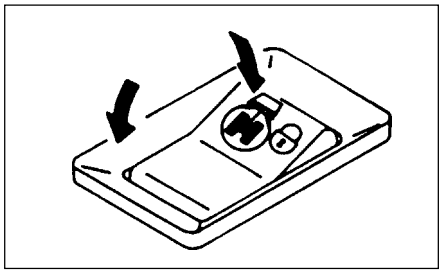
ON position (actuated):

The swing lock is always applied, and the upper structure will not swing even if the swing is operated. In this condition, the swing lock lamp lights up.

OFF position (cancelled):

The swing lock is applied only when the swing control lever is at neutral; when the swing control lever is operated it is cancelled.

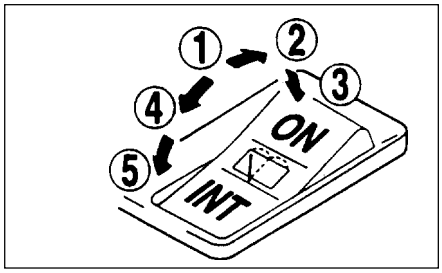
The swing lock is actuated approx. 4 seconds after the swing lever is placed in neutral.



5. WIPER SWITCH

This switch actuates the front window wiper.

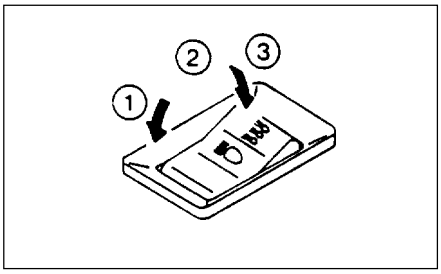
① OFF: the wiper stops
② ON: the wiper moves continuously
③ Window washer fluid is sprayed out: when the switch is released, it returns to ②.
④ ON: the wiper moves intermittently.
⑤ Window washer fluid is sprayed out: when the switch is released, it returns to ④.



6. LAMP SWITCH

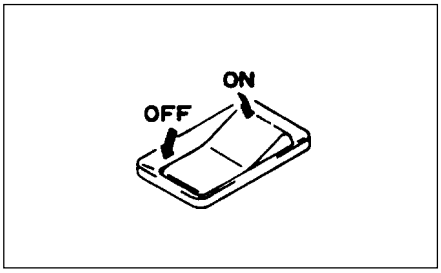
This switch turns on the working lamps and monitor illumination

① OFF
② Standard work lamps
③ Standard and additional work lamps (if fitted)



7. ALARM BUZZER STOP SWITCH

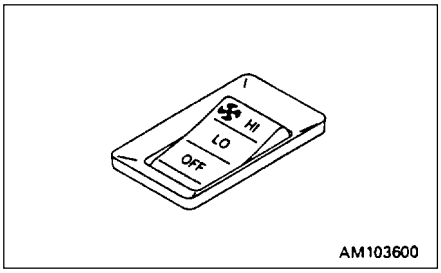
This is used to stop the alarm buzzer when it has sounded to warn of some abnormality in the EMERGENCY STOP ITEMS while the engine is running.



8. CAR HEATER FAN SWITCH

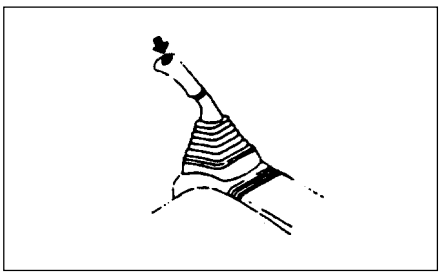
This adjusts air-flow in 2 steps.

Hi: strong
Lo: weak
OFF: car heater turned off.



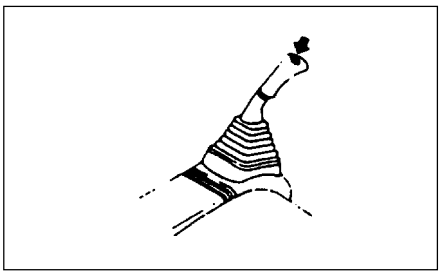
9. HORN BUTTON

When the button at the tip of the right work equipment control lever is pressed, the horn will sound.



10. KNOB BUTTON

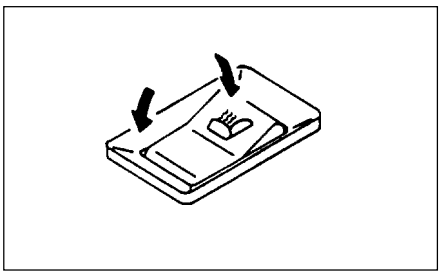
The button at the tip of the left work equipment control lever is used to actuate the power max./swift slow-down functions. Press the button once (single click) and keep it depressed. In the heavy-duty and general operation modes the power max. function actuates for max. 8.5 seconds and the swift slow-down function actuates while the button is depressed.



11. HEATED OPERATION SEAT SWITCH (if fitted)

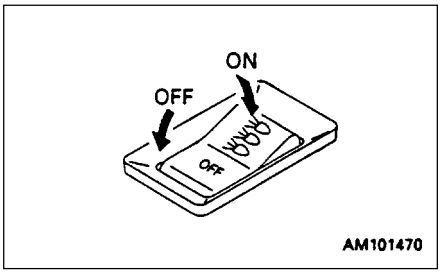
This switch is used to switch on the heated seat.

OFF: seat not heated
ON: seat heated



12. ADDITIONAL LAMP SWITCH

This switch is provided to turn on an additional lamp on the cab front top. Setting to OFF turns the switch off.

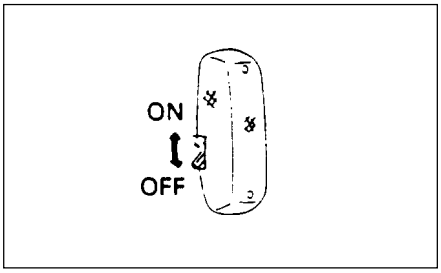


13. CAB LAMP SWITCH

This lights up the cab lamp.

ON position: lights up.

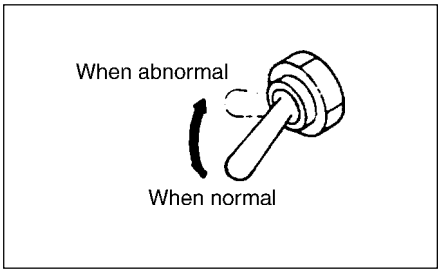
The cab lamp can be turned on even when the starting switch is at the OFF position, so be careful not to leave it on by mistake.



14. PUMP CONTROL OVERRIDE SWITCH

When normal: Switch is down

When abnormal: When the monitor display shows E02 (TVC valve system error), it is possible to carry out operation when this switch is moved up. The pump control override switch is designed to allow operations to be carried out for a short period when there is an abnormality in the pump control system (TVC valve system error). The abnormality must be repaired immediately.

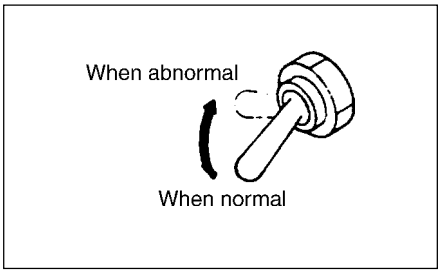


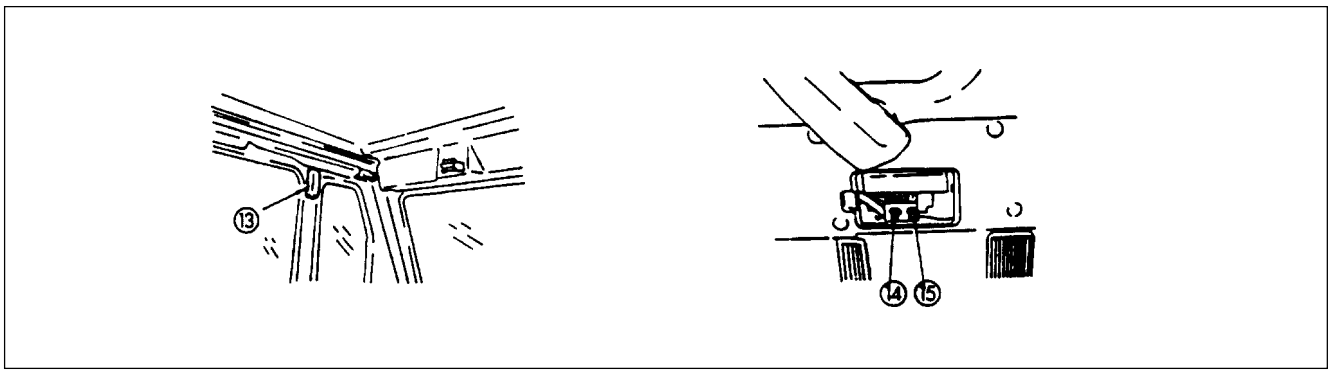
15. SWING LOCK OVERRIDE SWITCH

When normal: switch is down

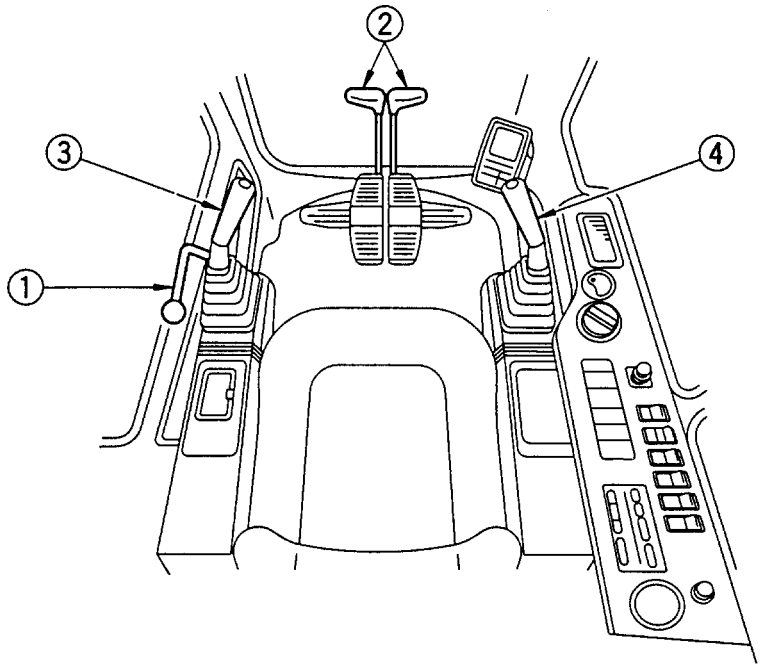
When abnormal: when the monitor display shows E03 (swing brake system error), the brake is cancelled and it becomes possible to swing the upper structure when this switch is moved up, so normal operations can be carried out. However, the swing brake remains cancelled.

The swing lock override switch is designed to allow operations to be carried out for a short period when there is an abnormality in the swing brake electrical system (swing brake system error). The abnormality must be repaired immediately.





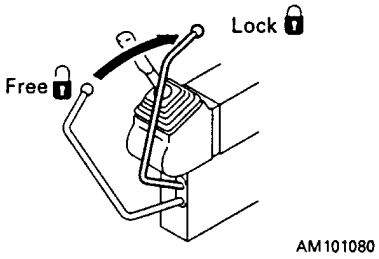
11.3 CONTROL LEVERS, PEDALS



1. SAFETY LOCK LEVER

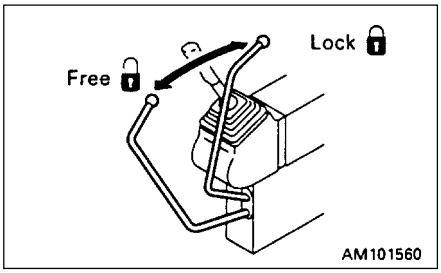
⚠ WARNING

- **When leaving the operator's compartment, set the safety lock lever securely to the LOCK position. If the control levers are not locked, and they are touched by mistake, this may lead to a serious accident.**
  If the safety lock lever is not placed securely in the LOCK position, the control levers may not be properly locked. Check that the situation is as shown in the diagram.
- **When the safety lock lever is raised, take care not to touch the work equipment control lever. If the safety lock lever is not properly locked at the upper position, the work equipment and swing will move, creating a potentially dangerous situation.**
- **When the safety lock lever is lowered, take care not to touch the work equipment control lever.**

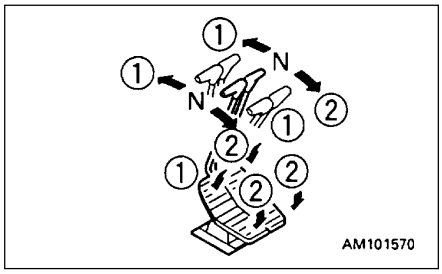


This lever locks the work equipment, swing, travel and attachment controls.

This lock lever is a hydraulic lock, so even if it is in the lock position, the work equipment control lever and travel lever will move, but the work equipment, travel motor and swing motor will not work.



2. TRAVEL LEVERS (WITH PEDAL, AUTO DECELERATION MECHANISM)



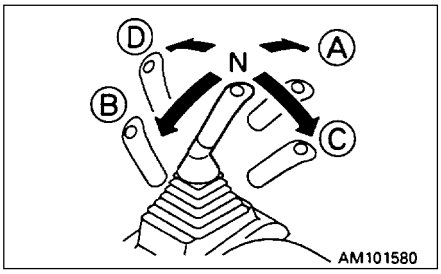
⚠ WARNING

- **Do not put your foot on the pedal unless the machine is travelling. If you leave your foot on the pedal and press it by mistake, the machine will move suddenly, and this may lead to a serious accident.**
- **With the track frame facing to the rear, the machine will move in the reverse direction by forward travelling and in the forward direction by reverse travelling.**
  When the travel lever is used, check to see if the track frame is facing forward or backward. (If the sprocket is located to the rear, the track frame is facing forward).

① FORWARD:
The lever is pushed forward
(the pedal is angled forward)
② REVERSE:
The lever is pulled back
(The pedal is angled back)
N (Neutral): The machine stops

( ): This indicates operation of the pedal.

3. LEFT WORK EQUIPMENT CONTROL LEVER (with auto deceleration device)



WARNING

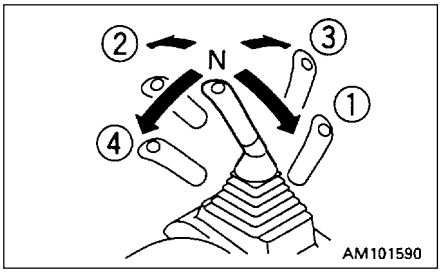
If any lever is operated when in the deceleration range, the engine speed will suddenly increase, so be careful when operating the levers.

This lever is used to operate the arm and upper structure.

Arm operation		Swing operation	
Ⓐ	Arm OUT	Ⓒ	Swing to the right
Ⓑ	Arm IN	Ⓓ	Swing to the left
N	(Neutral)		

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

4. RIGHT WORK EQUIPMENT CONTROL LEVER (with auto-deceleration device)



WARNING

If any lever is operated when in the deceleration range, the engine speed will suddenly increase, so be careful when operating the levers.

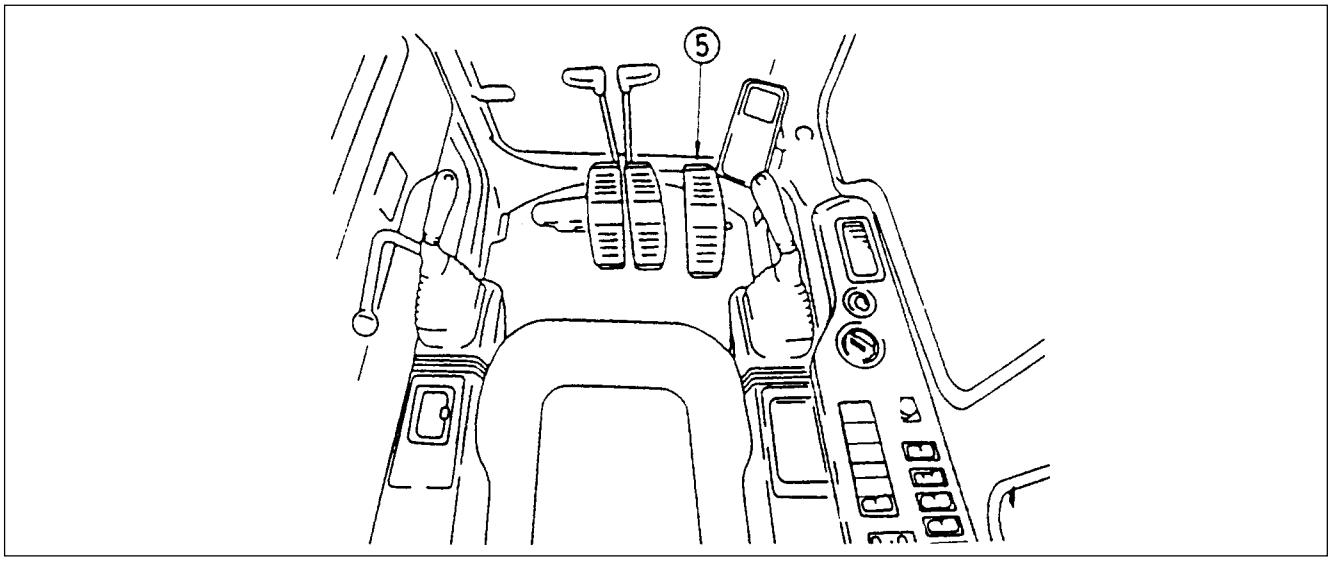
This lever is used to operate the boom and bucket

Boom operation		Bucket operation	
①	RAISE	③	DUMP
②	LOWER	④	CURL
N	(Neutral)		

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

For levers 2, 3 and 4 the engine speed changes as follows because of the auto-deceleration mechanism.

- When the travel lever and work equipment control levers are at neutral, even if the fuel control dial is above the mid-range postion, the engine speed will drop to a mid-range speed.
  If any of the levers are operated, the engine speed will rise to the speed set by the fuel control dial.
- If all control levers are set to neutral, the engine speed will drop by approx. 100 rpm, and after approx 4 seconds, the engine speed will drop to the deceleration speed (approx. 1400 rpm).



5. ATTACHMENT CONTROL PEDAL

WARNING

Do not put your foot on the pedal except when operating the pedal. If resting your foot on the pedal during operation and it is depressed by accident the attachment may move suddenly and cause serious damage or injury.

When breaker is installed

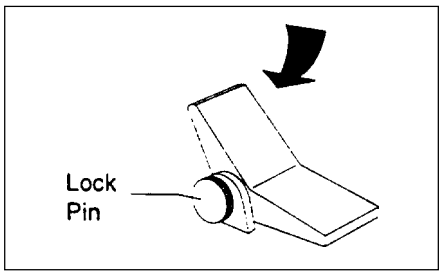
- When the front part of the pedal is depressed, the breaker is actuated.
- Screw lock pin into hol in pedal to lock (Pedal is disabled. Unscrew completely to unlock).
- Set the working mode to the breaker (B.O.) and unlock pedal.

When general attachment is installed:

- When the pedal is depressed, the attachment is actuated.
- Unlock the pedal to operate

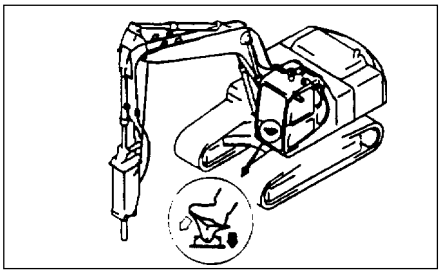
When no attachment is fitted or when attachment operation is not required:

- Lock pedal using lock pin.



HYDRAULIC OIL FLOW

When the front of the pedal is depressed, the oil flows to the left piping for the work equipment; when the rear of the pedal is depressed the oil flows to the right piping for the work equipment. (When the breaker is installed, only the front pedal is used).



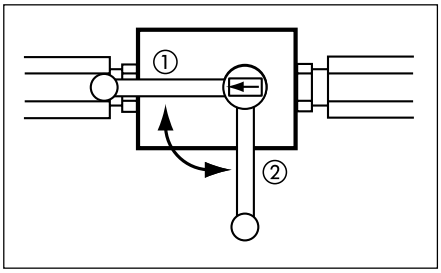
6. BREAKER, GENERAL ATTACHMENT (CRUSHER ETC.) SELECTOR VALVE

SELECTOR VALVE

This switches the flow of the hydraulic oil.

Position ①: When breaker is used

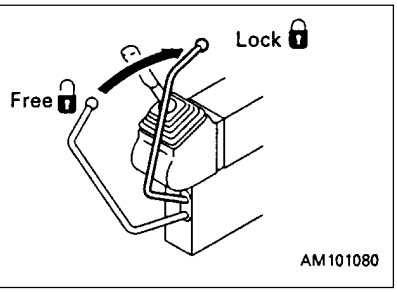
Position ②: When general attachment is used (crusher etc.)



11.4 CEILING WINDOW

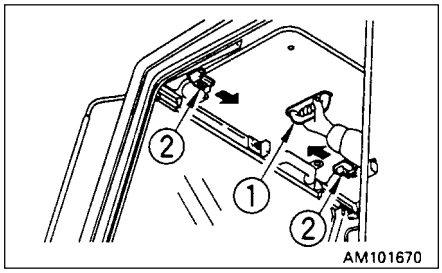
WARNING

When leaving the operator's compartment, set the safety lock lever securely to the LOCK position.
If the control levers are not locked and they are touched by mistake, this may lead to a serious accident.



When opening

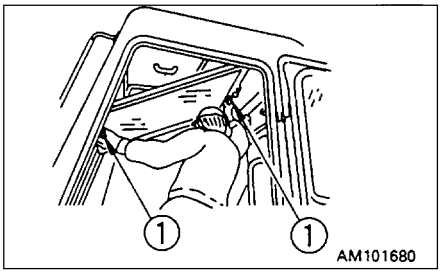
1. Lock the safety lock lever securely.
2. Check for any ceiling window movement by pulling lock ② located on both sides, then push up and open the ceiling window grasping grip ①



When closing

Close the ceiling window grasping grip ① and lock it with lock ②. If the lock cannot be applied, open and close the ceiling window again.

11.5 FRONT WINDOW

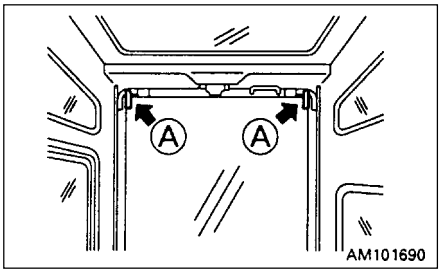


WARNING

When opening the front window, always hold grip ① firmly with both hands and pull up. If you use only one hand, your hand may slip and get caught.

It is possible to store (pull up) the front window (top) in the roof of the operator's compartment.

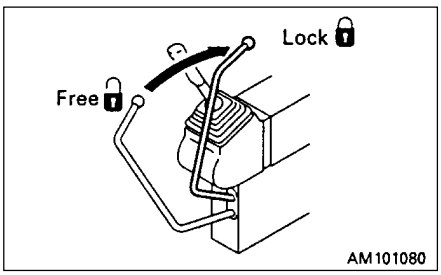
When opening



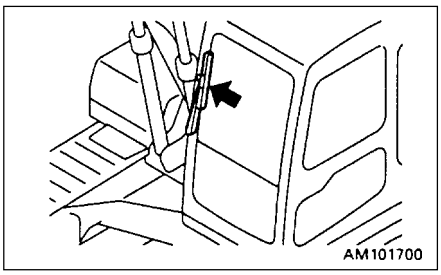
WARNING

When the front window is open, there is danger that it will fall, so always lock it with left and right lock pins Ⓐ.

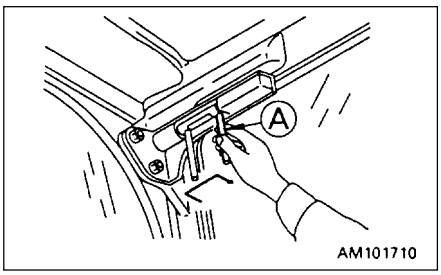
1. Place the work equipment on flat ground and stop the engine.



2. Securely lock the safety lock lever

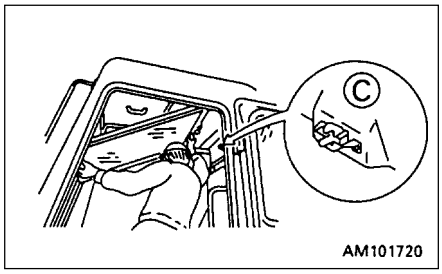


3. Confirm that the wiper is stored inside the right frame.

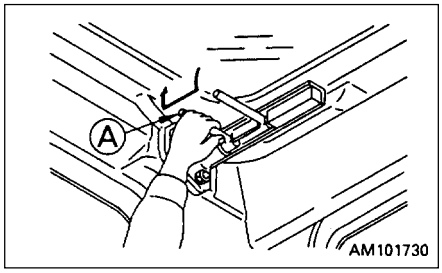


4. Pull lock pins Ⓐ at the top left and right sides of the front window to the inside to release the lock

5. From the inside of the operator's cab, hold the bottom grip with the left hand and the top grip with the right hand, pull up the window, and push it in fully until it is locked by catch Ⓒ



6. Lock with lock pins Ⓐ on the left and right sides.

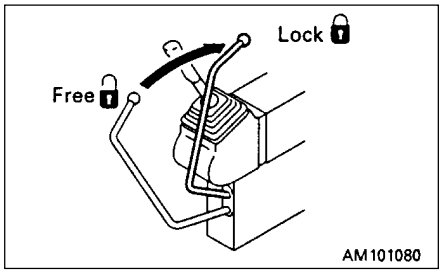


When closing

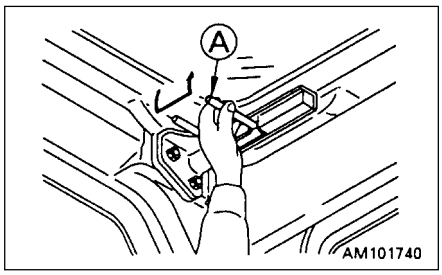
WARNING

When closing the window, lower it slowly and be careful not to get your hand caught.

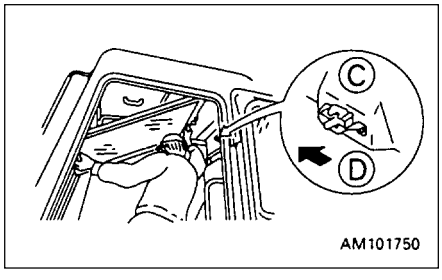
1. Place the work equipment on a flat ground and stop the engine.
2. Securely lock the safety lock lever.



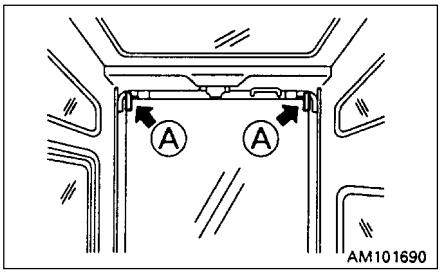
3. Release the lock pin Ⓐ



4 Hold the grip at the bottom of the front window with your left hand and the grip at the top with your right hand, release the lock of catch Ⓒ with your right thumb, then pull the top grip slowly and lower the front window. When releasing the lock of catch Ⓒ, push release lever Ⓒ in the direction of the arrow to release the lock.

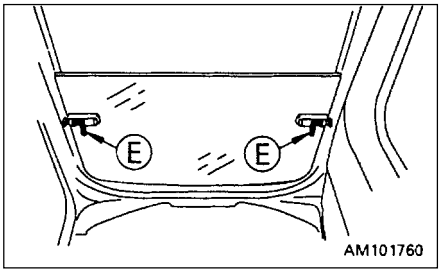


5. Lock securely with lock pins Ⓐ at the left and right sides.

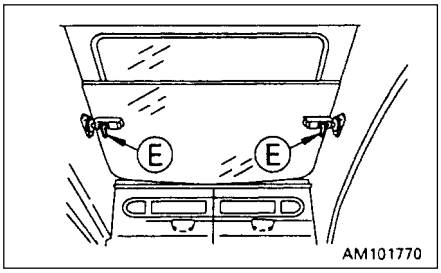


Removing front window (bottom)

With the front window open, remove lock pins Ⓔ and the bottom part of the front window can be removed.



Store the removed bottom part of the front window at the rear of the operator's cab and lock with lock pins Ⓔ.



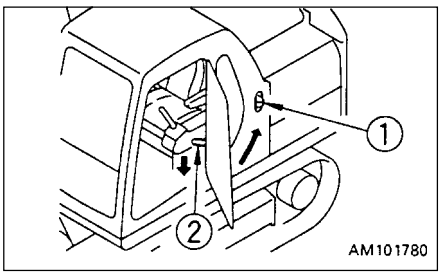
11.6 DOOR LOCK

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

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

2. To release the lock press knob ② down at the left side of the operator's seat to release the catch.

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



11.7 CAP, COVER WITH LOCK

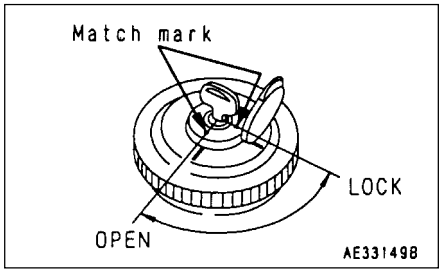
The fuel filler, operator's cab, engine hood, battery box cover, right side door and left side door of the machine body are fitted with locks.

Use the starting switch key to lock or unlock these places.

11.7.1 METHOD OF OPENING AND CLOSING CAP WITH LOCK

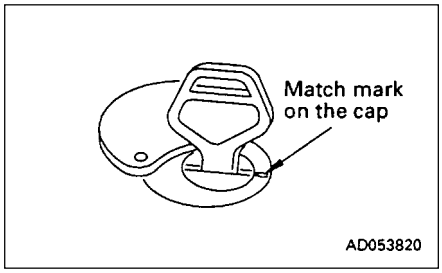
To open the cap

1. Insert the key ibnto the cap.
2. Turn the key clockwise, align the match mark on the cap with the rotor groove, then remove the cap.

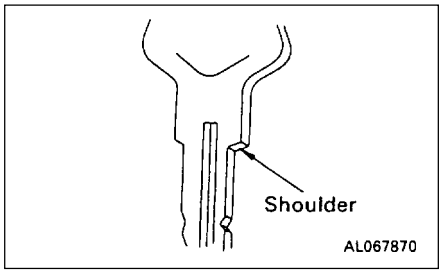


To lock the cap

1. Turn the cap into place.
2. Turn the key and take the key out.



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



11.7.2 METHOD OF OPENING AND CLOSING COVER WITH LOCK (cover with lock)

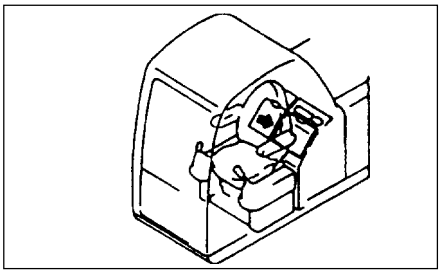
To open the cover (locked cover)

1. Insert the key.
2. Turn it counterclockwise and open the cover by pulling the cover grip.

To lock the cover

1. Close the cover and insert the key.
2. Turn the key clockwise and take the key out.

11.8 LUGGAGE TRAY



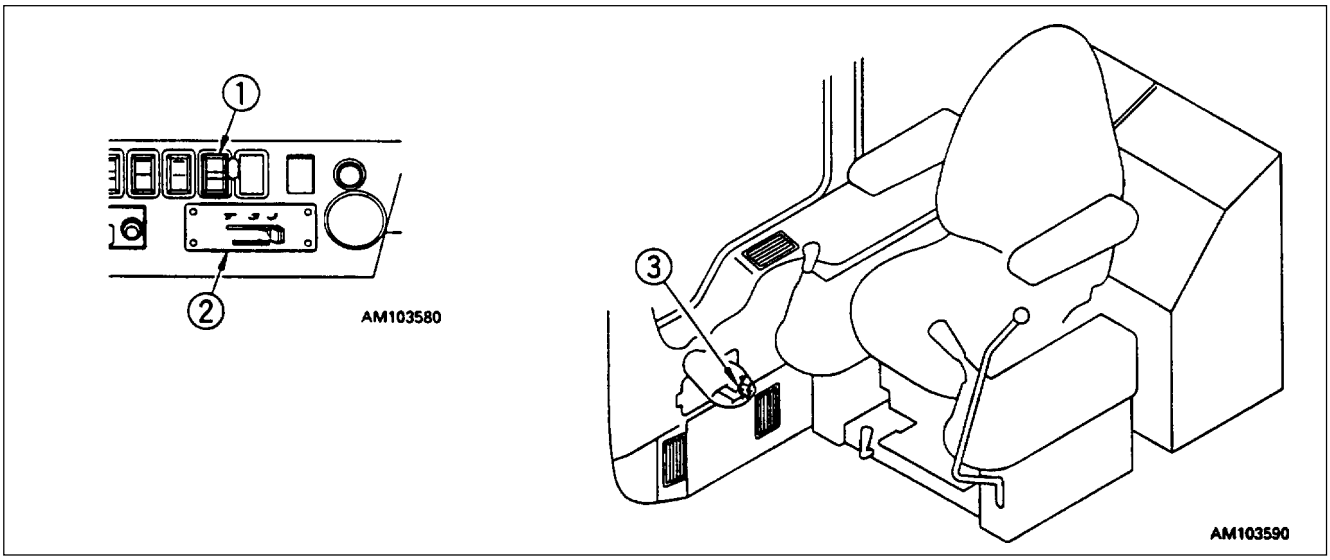
This tray is located to the rear of the operator's seat. Always keep the operation & maintenance manual in this box for easy reading access.

11.9 ASHTRAY

This is on the side of the operator's seat. Always make sure that you extinguish the cigarette before closing the lid.

11.10 CAB HEATER

11.10.1 VIEW OF CONTROLS

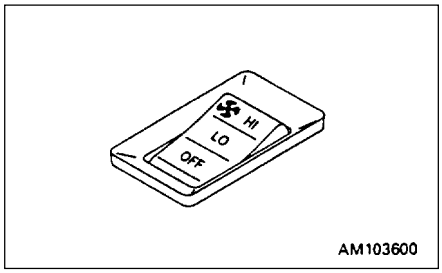


The car heater utilizes the water heated by the engine. Use the car heater when the engine coolant is warmed.

1. CAR HEATER FAN SWITCH

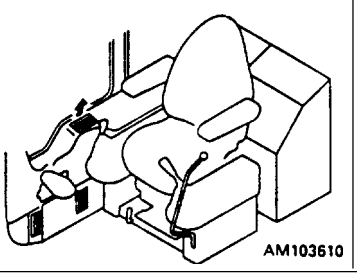
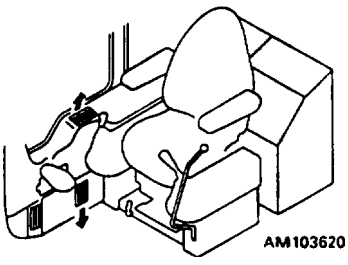
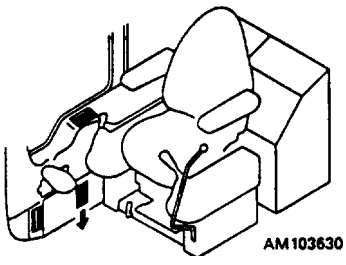
This adjusts air-flow in 2 steps.

Hi: strong
Lo: Weak
OFF: car heater turned off



2. AIR OUTLET CHANGE-OVER LEVER

The air outlet is selectable according to the purpose.

Purpose	To upper portion of operator	To upper and foot portions of operator	To foot portion of operator
Lever position			
Air outlet	 AM103610	 AM103620	 AM103630

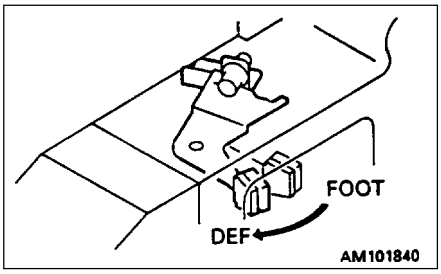
3. DEFROSTER CHANGE-OVER LEVER

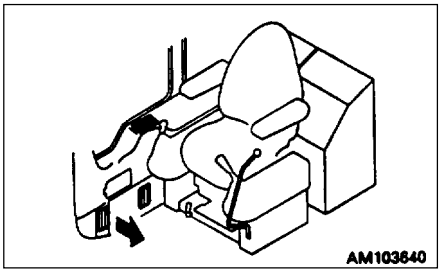
This lever is used to eliminate condensation produced in winter or the rainy season etc.

Change-over lever forward: defroster

Change-over lever backward: to operator's feet

Defroster is available when using the air outlet change-over lever in or



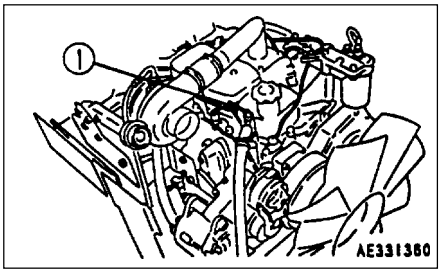


11.10.2 PREPARING CAR HEATER

If the ambient temperature drops, use the cab heater.

When using the cab heater, turn valve ① on the water pump counterclockwise to open it.

When leaving the cab heater unused for a long time, turn valve ① clockwise to close it.



REMARK

On machines equipped with the air conditioner system always open valve ①.

11.11 CAB RADIO (OPTION)

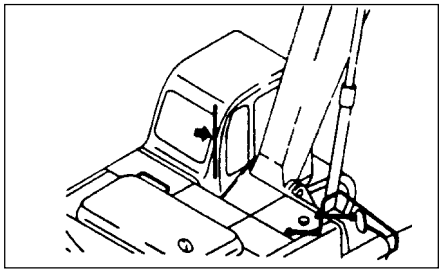
Refer to the separate operation manual for radio cassette.

Note

Ensure radio is switched off when leaving the machine for long periods to prevent draining of battery charge.

Antenna

If the reception is weak or generates noise, extend the antenna. If the reception is too strong, adjust the sensitivity by retracting the antenna.



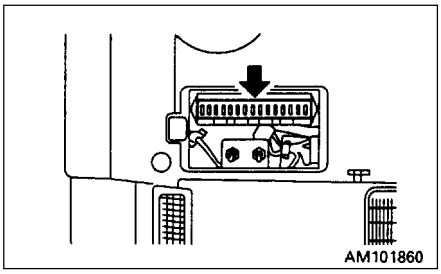
NOTICE

When transporting the machine or parking it in a garage, always fully retract the antenna to avoid the possibility of breakage.

11.11.1 PRECAUTION OF USE

- To ensure safe operation, adjust the volume level so that external noise is still audible.
- Ensure no water is splashed over the speaker case or cab radio to prevent malfunction.
- Never use solution such as benzine or thinners to clean the dial or buttons. These should be wiped with a dry, soft cloth. (Use a cloth dipping in alcohol for very dirty surfaces).
- At battery replacement, all the memory pre-set with the pre-set buttons will be cleared. Perform pre-setting again.

11.12 FUSE



NOTICE

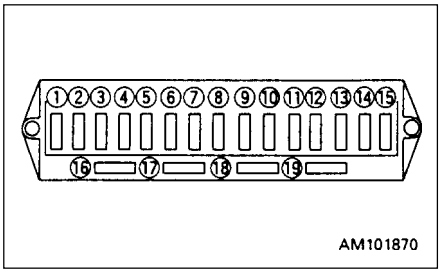
Before replacing a fuse, be sure to turn off the starting switch.

The fuses protect the electrical equipment and wiring from burning out.

If the fuse becomes corroded, or white powder can be seen, or the fuse is loose in the fuse holder, replace the fuse.

Replace a fuse with another of the same capacity.

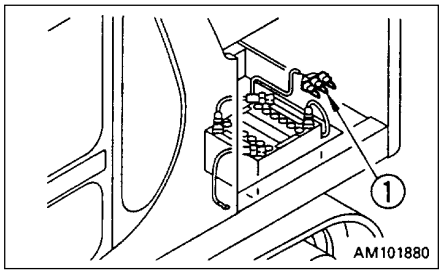
Fuse capacity and name of circuit



No	Fuse capacity	Name of circuit
①	10 A	Pump controller, Solenoid valve
②	10 A	Engine governor controller
③	20 A	Air conditioner (motor)
④	10 A	Right head lamp, working lamp
⑤	10 A	Radio, Cigarette lighter, Air conditioner panel, Heater, Window washer, Left knob button
⑥	10 A	Horn
⑦	15 A	Wiper controller
⑧	15 A	Head lamp, Rear working lamp
⑨	10 A	-
⑩	10 A	Key switch signal
⑪	10 A	Spare
⑫	10 A	Spare
⑬	10 A	Alarm buzzer, Monitor
⑭	10 A	Battery relay, Ribbon heater, Start signal
⑮	10 A	Cab lamp, Radio (back up)
⑯	10 A	Spare fuse
⑰	10 A	Spare fuse
⑱	15 A	Spare fuse
⑲	20 A	Spare fuse

11.13 FUSIBLE LINK

If the starting motor will not rotate when the starting switch is turned ON, a possible cause is disconnection of wire-type fusible link (1). Open the battery room door on the left side of the machine body to inspect the fusible link and, if necessary, replace it

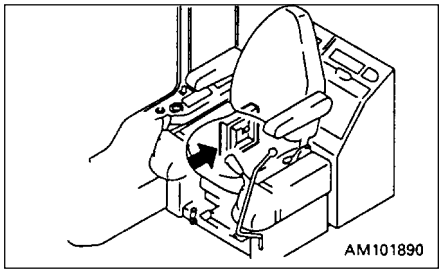


REMARK

A fusible link refers to the large-sized fuse wiring installed in the high current flow portion of the circuit to protect electrical components and wiring from burning, similarly to an ordinary fuse.

11.14 CONTROLLERS

Governor pump controller is provided

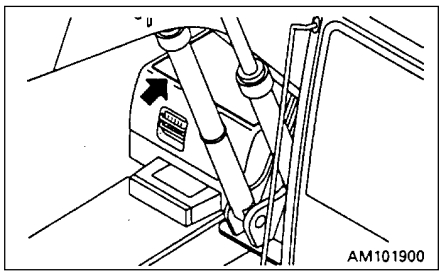


NOTICE

- **Never splash or spill water, mud or drink over the controllers as this may cause a fault.**
- **If a fault occurs in the controller, do not attempt repair but consult your Komatsu distributor.**

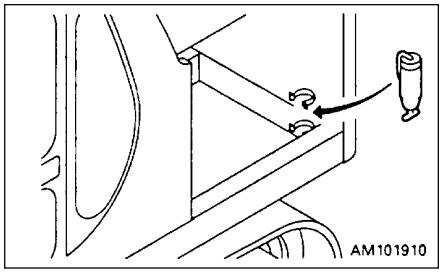
11.15 TOOL BOX

This is used for keeping the tools.

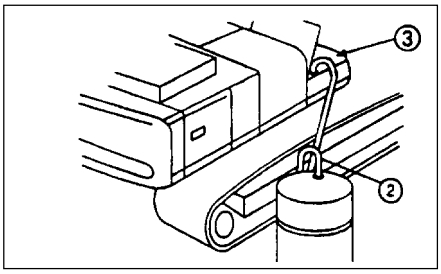


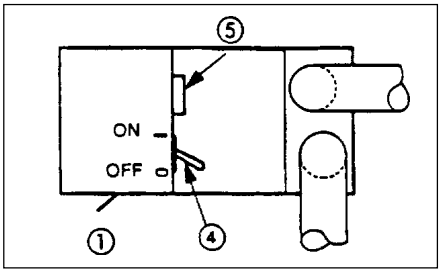
11.16 GREASE PUMP HOLDER

This is inside the battery room door on the left side of the machine. Fit the grease pump to the holder when it is not being used.



11.17 REFUELLING PUMP (Option)





WARNING

Do not bring fire or sparks near the fuel

1. When the machine is operated on sites with no fuel container and pump, the machine may be refuelled using the refuelling pump ① (if fitted) from fuel barrels.
   The refuelling pump is located in the tool box at the front right hand side of the machine.
2. Place the fuel hose ② which is stored in tray ③ into the fuel barrel placed next to the machine.
3. Switch on refuelling pump using switch ④ on the pump assembly when adding fuel, never let the fuel overflow. This may cause fires.

NOTES

- This pump is protected by fuse ⑤. If pump fails to function check fuse (10 A).
- Ensure strainer on hose end is clean.

12.OPERATION

12.1 CHECK BEFORE STARTING ENGINE

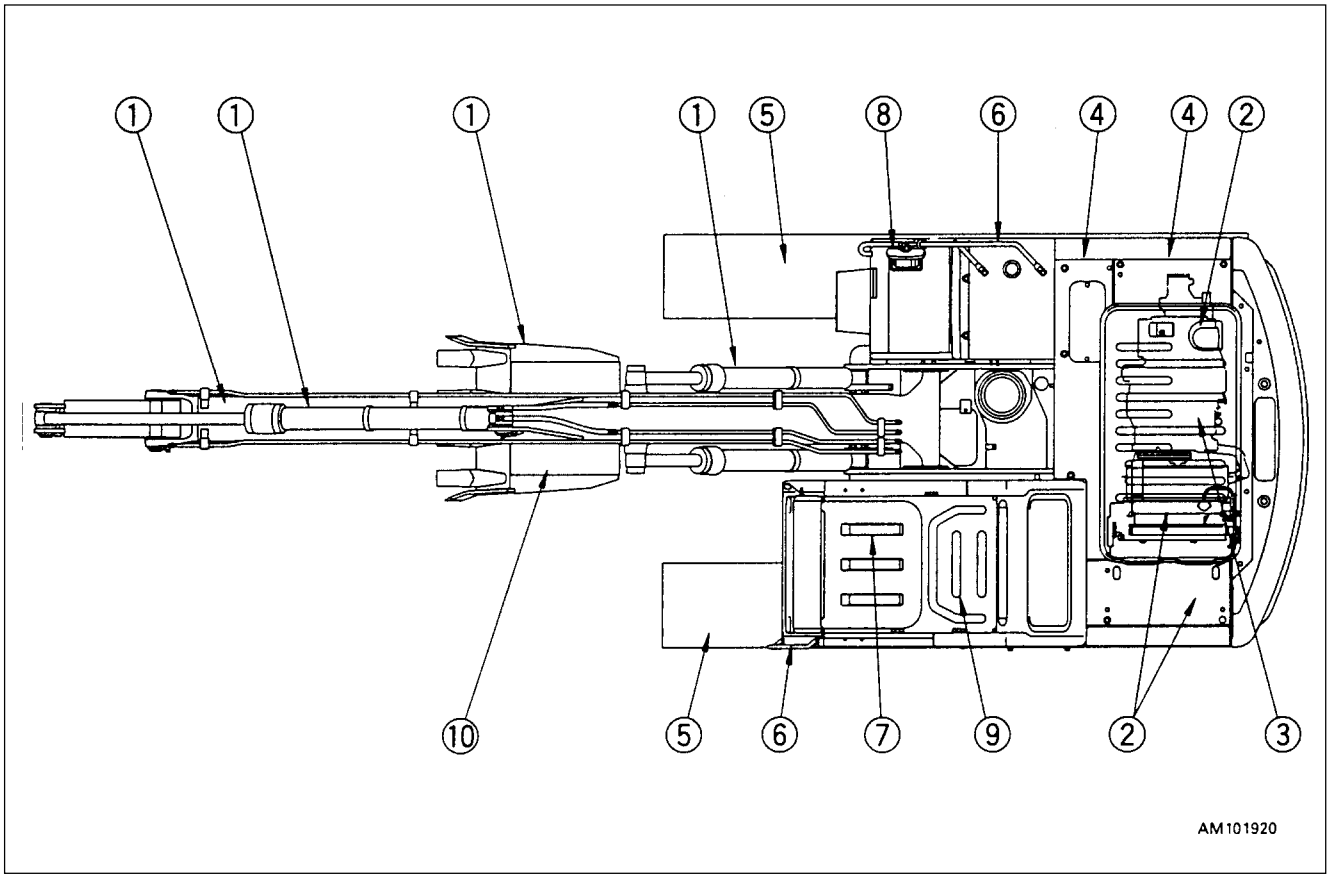
12.1.1 WALK-AROUND CHECK

WARNING

Leakage of oil or fuel, or accumulation of flammable material around high temperature parts, such as the engine muffler may cause fire.
Check carefully, and if any abnormality is found, repair it or contact your Komatsu distributor.

Before starting the engine, look around the machine and under the machine to check for loose nuts or bolts 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.

Always carry out the items in this section before starting the engine each day.



1. Check for damage, wear, play in work equipment, cylinders, linkage, hoses.
Check that there are no cracks, excessive wear, or play in the work equipment, cylinders, linkage, or hoses. If any abnormality is found, repair it.

2. **Remove dirt and dust from around engine, battery radiator**
   Check if there is any dirt or dust accumulated around the engine or radiator. Check also is there is any flammable material (dead leaves, twigs, grass etc.) accumulated around the battery or high temperature engine parts, such as the engine muffler or turbocharger. Remove all such dirt or flammable material.

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

4. **Check for oil leakage from hydraulic equipment, hydraulic tank, hoses, joints**
   Check that there is no oil leakage. If any abnormality is found, repair the place where the oil is leaking.

5. **Check the undercarriage (track, sprocket, idler, guard) for damage, wear, loose bolts, or leakage from oil from rollers**

6. **Check for damage to handrail, loose bolts**
   Repair any damage and tighten any loose.

7. **Check for damage to gauges, monitor, loose bolts**
   Check that there is no damage to the gauges an monitor in the operator's cab. If any abnormality is found, replace the parts. Clean off any dirt on the surface.

8. **Clean rear view mirror, check for damage**
   Check that there is no damage to the rear view mirror. If it is damaged, replace it with a new mirror. Clean the surface of the mirror and adjust the angle so that the view to the rear can be seen from the operator's seat.

9. **Seat belt and mounting clamps**
   Check that there is no abnormality in the seat belt or mounting clamps. If there is any damage, replace with new parts.

10. **Check bucket with hook for damage**
    Check the hook, catcher and hook foot for damage. If damage is found, contact your Komatsu distributor for repair.

12.1.2 CHECK BEFORE STARTING

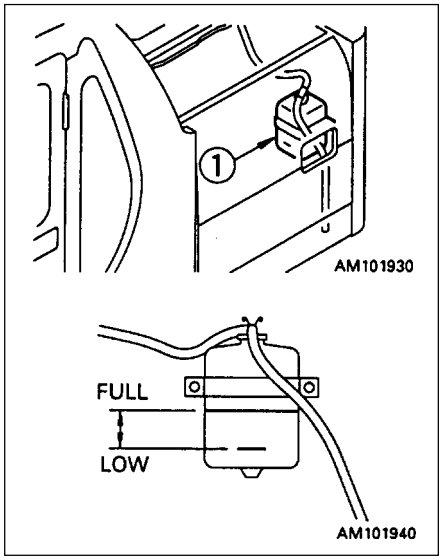
Always carry out the items in this section before starting the engine each day.

CHECK COOLANT LEVEL, ADD WATER

⚠ WARNING

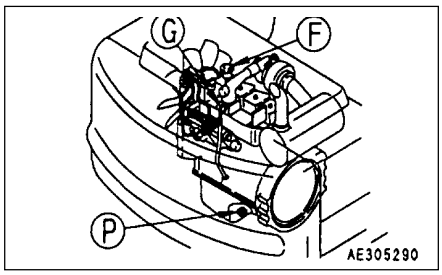
Do not open the radiator cap unless necessary. When checking the coolant, always check the radiator reserve tank when the engine is cold.

1. Open the battery room door on the left side of the machine and check that the cooling water level is between the FULL and LOW marks on radiator reserve tank ① (shown in the diagram on the right). If the water level is low, add water through the water filler of reserve tank ① to the FULL level.
2. After adding water, tighten the cap securely.
3. If the reserve tank becomes empty, first inspect for water leaks and then fill the radiator and the reserve tank with water.

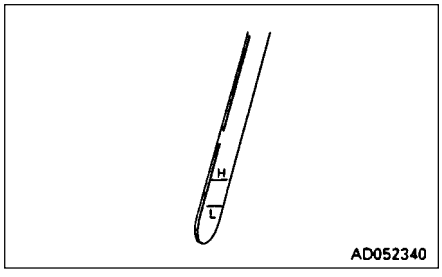


CHECK OIL LEVEL IN ENGINE OIL PAN, ADD OIL

1. Open the engine hood
2. Remove dipstick Ⓖ and wipe the oil off with a cloth
3. Insert dipstick Ⓖ fully in the oil filler pipe, then take it out again.



4. The oil level should be between the H and L marks on dipstick Ⓖ. If the oil level is below L mark, add engine oil through oil filler Ⓕ.



NOTICE

For details of the oil to use, see "20. USE OF FUEL, COOLANT AND LUBRICANTS ACCORDING TO AMBIENT TEMPERATURE".

5. If the oil is above the H mark, drain the excess engine oil from drain valve Ⓟ, and check the oil level again.

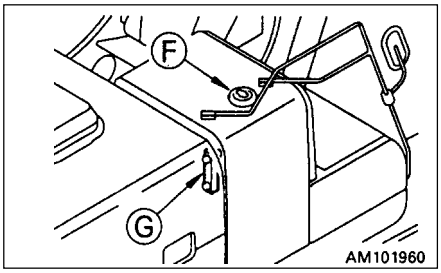
6. If the oil level is correct, tighten the oil filler cap securely and close the engine hood.

REMARK

When checking the oil level after the engine has been operated, wait for at least 15 minutes after stopping the engine before checking.

If the machine is at an angle, make it horizontal before checking.

CHECK FUEL LEVEL ADD FUEL



⚠WARNING

When adding fuel, never let the fuel overflow. This may cause a fire. If spilling fuel, thoroughly clean up any spillage.

1. Open the pump room door on the right side of the machine and use sight gauge Ⓖ on the rear face of the fuel tank to check that the tank is full.

2. If the fuel level is not within the sight gauge, add fuel through filler port Ⓕ while watching sight gauge Ⓖ.

   Fuel capacity 240 liters

NOTICE

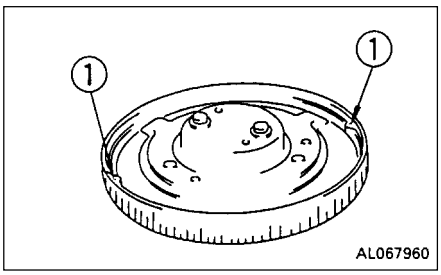
For details of the fuel to use, see "20. USE OF FUEL, COOLANT AND LUBRICANTS ACCORDING TO AMBIENT TEMPERATURE".

3. After adding fuel, tighten the cap securely.

REMARK

If breather hole (1) on the cap is clogged, the pressure in the dank will drop and fuel will not flow.

Clean the hole from time to time.

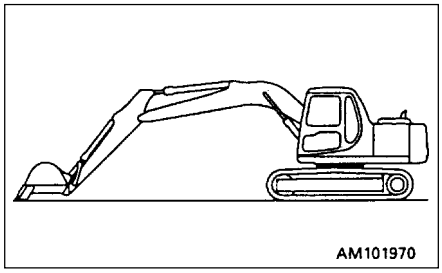


CHECK OIL LEVEL IN HYDRAULIC TANK, ADD OIL

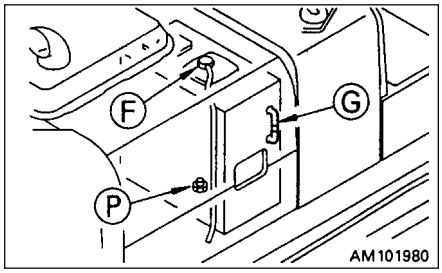
⚠ WARNING

- **When removing the oil filler cap, oil may spurt out, so turn the cap slowly to release the internal pressure before removing the cap.**
- **If oil has been added to above the H mark, stop the engine and wait for the hydraulic oil to cool down, then drain the excess oil from the drain plug Ⓟ.**

1. If the work equipment is not in the condition shown in the diagram on the right, start the engine, run the engine at low speed, retract the arm and bucket cylinders, then lower the boom, set the bucket teeth in contact with the ground and stop the engine.



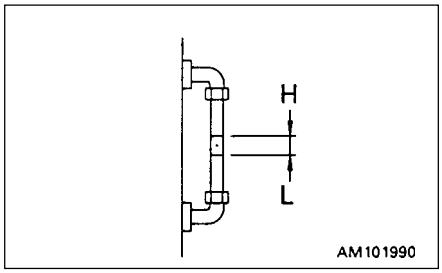
2. Open the pump room door on the right side of the machien. Check sight gauge Ⓖ. The oil level is normal if between the H and L marks.



NOTICE

Do not add oil if the level is above the H line. This will damage the hydraulic equipment and cause the oil to spurt out.

3. If the level is below the L mark, remove the upper cover of the hydraulic tank and add oil through oil filler .



NOTICE

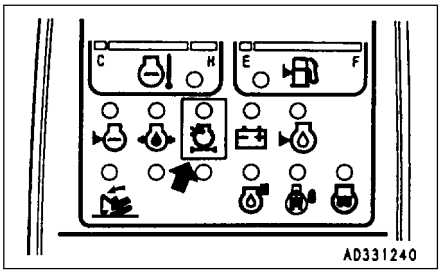
For details of the oil to use, see "20. USE OF FUEL, COOLANT AND LUBRICANTS ACCORDING TO AMBIENT TEMPERATURE".

REMARK

The oil level will vary depending upon the oil temperature. Accordingly, use the following as a guide:

- Before operation: around L level
  (Oil temperature 10 to 30°C)
- Normal operation: around H level
  (Oil temperature 50 to 80°C)

CHECK AIR CLEANER FOR CLOGGING



1. Confirm that the air cleaner clogging monitor does not flash.

2. If it flashes, immediately clean or replace the element.

For details of the method of cleaning the element, see "24.2.1 CHECK, CLEAN AND REPLACE AIR CLEANER ELEMENT"

CHECK ELECTRIC WIRINGS

⚠ WARNING

- **If the fuse blows frequently, or there are traces of shortcircuiting in the electric wiring, always locate and repair the cause.**
- **Accumulation of flammable material (dead leaves, twigs, grass etc.) around the battery may cause fire, so always check and remove such material.**
- **Keep the top surface of the battery clean and check the breather hole in the battery cap. If it is clogged with dirt or dust, wash the battery cap to clear the breather hole.**

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.

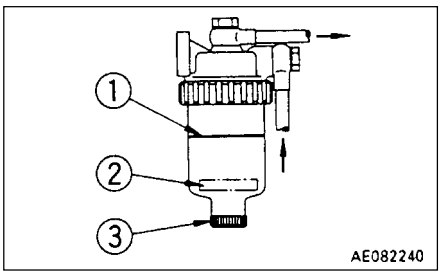
- Battery
- Starting motor
- Alternator

Please contact your Komatsu distributor for investigation and correction of the cause.

When carrying out walk-around checks or checks before starting, always check if there is any accumulation of flammable material around the battery, and remove such flammable material.

An optional net is prepared to be fitted to the vent of the top outer cover of the battery to prevent combustible material from entering the battery.

CHECK FOR WATER AND SEDIMENT IN WATER SEPARATOR, DRAIN WATER



The water separator separates water mixed in the fuel. If float ② is at or above red line ①, drain the water according to the following procedure:

1. Loosen drain plug ③ and drain the accumulated water until the float reaches the bottom.

2. Tighten drain plug ③.

3. If the air is sucked into fuel line when draining the water, be sure to bleed air in the same manner as for the fuel filter. See "24.7 EVERY 500 HOURS SERVICE".

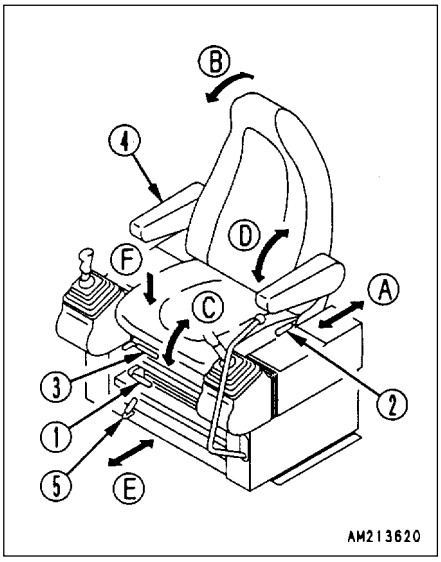
CHECK FUNCTION OF HORN

1. Turn the starting switch to the ON position.

2. Confirm that the horn sounds without delay when the horn button is pressed. If the horn does not sound, ask your Komatsu distributor for repair.

12.1.3 ADJUSTING BEFORE STARTING OPERATION

ADJUSTING OPERATOR'S SEAT (rigid seat specification)



WARNING

- **Adjust the seat position at the beginning of each shift or when operators change.**
- **Adjust the seat so that the travel pedal can be depressed all the way with the operator's back against the backrest.**

Ⓐ **fore-and-aft adjustment of seat**

Pull lever ① up. After the seat is set to the desired position, release the lever.

Adjustable distance: 100 mm in 5 steps.

Ⓑ **Adjustment of reclining seat**

Pull lever ② up. After the seat back is set to the optimum position for easy operation, release the lever.

NOTICE

The amount of reclining for the seat is greatest when the seat is moved forward, and becomes smaller as the seat is moved to the rear. For this reason, when moving the seat to the rear, set the seat back to the upright position.

Pull lever ② up. After the seat back is set to the optimum position for easy operation, release the lever.

Sit with your back against the seat back when adjusting. If your back is not touching the seat back, the seat back may suddenly move forward.

Ⓒ **Adjustment of seat tilting angle**

1. Forward tilting
   Pull lever ③ up to release locking. Adjust the angle at the front of the seat. After the seat is set to the optimum position for easy operation, release the lever and then lock it.

2. Backward tilting
   Push down lever ③ to release locking. Adjust the angle at the rear of the seat. After the seat is set to the optimum position for easy operation, release the lever then lock it.

3. Seat height adjustment
   By a combination of steps 1 and 2, the seat can be moved up and down.

First use the rear tilt operation to adjust the rear of the seat, then use the front tilt operation to set the seat horizontal.

Adjustable height: 65 mm.

Ⓓ Armrest angle adjustment

When armrest ④ is lifted, locking is applied at each 8° setting. When it is fully sprung up, locking is released. Adjustable armrest angle: 32° (in 4 steps)

REMARK

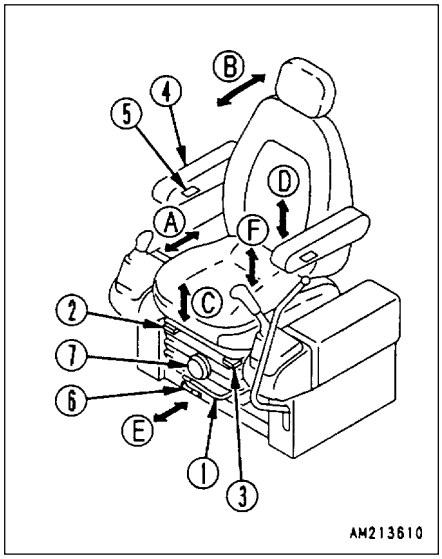
If the back seat is tilted back and forth without raising armrest ④ it will spring up automatically.

Ⓔ Fore-and-aft adjustment of whole seat

After lever ⑤ is pulled up and the seat is set to the desired position, release the lever. In this case the operator's seat, left and right levers and safety lock lever will slide together.

Adjustable fore-and-aft movement: 120 mm (4.7 in).

ADJUSTING OPERATOR'S SEAT (Seat with suspension)



WARNING

- **Adjust the seat position at the beginning of each shift or when operators change.**
- **Adjust the seat so that the travel pedal can be depressed all the way with the operator's back against the backrest.**

Ⓐ Fore-and-aft adjustment of seat

Pull lever ① up. After the seat is set to the desired position, release the lever.

Adjustable distance: 100 mm (3.9 in) in 10 steps.

Ⓑ Adjustment of reclining seat

NOTICE

The amount of reclining for the seat is greatest when the seat is moved forward, and becomes smaller as the seat is moved to the rear. For this reason, when moving the seat to the rear, set the seat back to the upright position.

Pull lever ② up. After the seat back is set to the optimum position for easy operation, release the lever.

Sit with your back against the seat back when adjusting. If your back is not touching the seat back, the seat back may suddenly move forward.

Ⓒ Adjusting seat tilt

1. Forward tilt

Push lever ③ down and adjust the angle at the front of the seat. (4 stages)

1. To raise the angle at the front of the seat, keep the lever pushed down and apply your weight to the rear of the seat.
2. To lower the angle at the front of the seat, keep the lever pushed down and apply your weight to the front of the seat.

2. Rear tilt
   Pull lever ③ up and adjust the angle at the rear of the seat. (4 stages)
   1. To raise the angle at the rear of the seat, keep the lever pulled up and stand up slightly to remove your weight from the seat.
   2. To lower the angle at the rear of the seat, keep the lever pulled up and apply your weight to the rear of the seat.

   Amount of tilt: Up 13°, down 13°

3. Seat height adjustment
   By a combination of steps 1 and 2, the seat can be moved up and down. After the desired height is set by forward/backward tilting, bring the seat to the horizontal position by reverse-tilting and fix it.
   Adjustable height: 60 mm (2.4 in)

Ⓓ Adjusting armrest angle

Armrest ④ can be made to spring up by hand to an angle of approx. 90°.

In addition, by turning the bottom ⑤ of the armrest by hand it is possible to make fine vertical adjustments of the armrest angle.

Armrest adjustment angle: 25°

REMARK

If the back seat is tilted back and forth without raising armrest ④, it will spring up automatically.

Ⓔ Fore-and-af adjustment of whole seat

After lever ⑥ is pulled up and the seat is set to the desired position, release the lever. In this case the operator's seat, left and right levers and safety lock lever will slide together.

Adjustable fore-and-aft movement: 120 mm (4.7 in).

Ⓕ Suspension adjustment

When knob ⑦ is turned clockwise, the suspension becomes harder and when turned counterclockwise, softer. Adjust the dial so that the suspension best matching the operator's weight is selected.

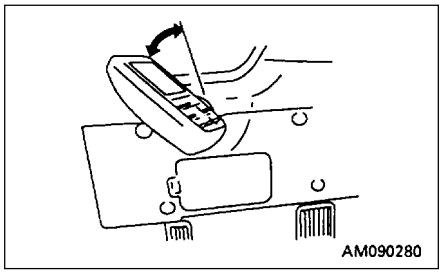
REMARK

To obtain the optimum adjustment, turn the knob so that the indicator of the weight display (kg) in the transparent portion of knob ⑦ is the same as the operator's weight.

ADJUSTMENT OF MONITOR PANEL ANGLE

Turn the monitor panel so that the operator can view the monitor with ease. When adjusting the angle, the panel should be set to the desired position using both hands. The panel is automatically locked at that position.

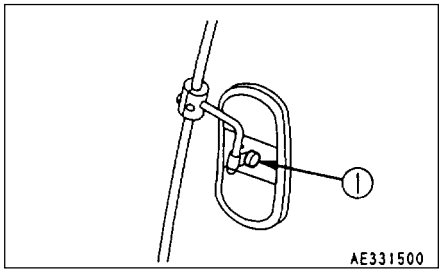
Amount of adjustment: 30° (stepless)



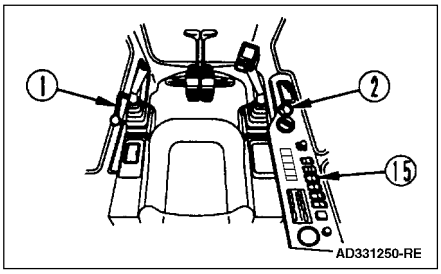
ADJUSTMENT OF MIRRORS

Loosen nut ① of each mirror and adjust the mirror angle at which you can see the reflected view most easily from the operator's seat.

In particular, adjust the mirrors so that you can see persons on both left and right sides of the rear end of the machine.



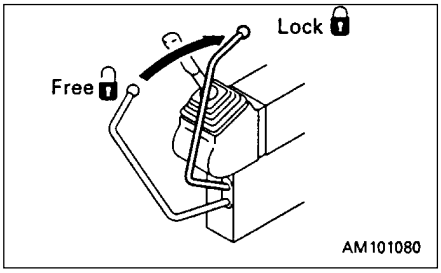
12.1.5 OPERATIONS AND CHECKS BEFORE STARTING ENGINE



⚠ WARNING

If the control lever is touched by accident, the work equipment or the machine may move suddenly. When leaving the operator's compartment, always set the safety lock lever securely to the LOCK position.

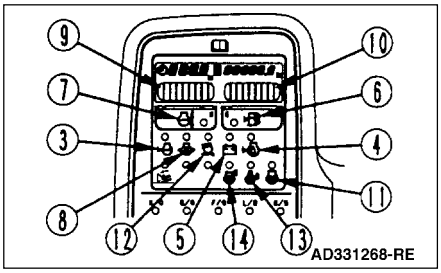
1. Check that safety lock lever ① is at the LOCK position.



2. Check the position of each lever.

Set the control lever to the neutral position.
When starting the engine, never touch the knob button.

3. Insert the key in starting switch ②, turn the key to the ON position, then carry out the following checks.

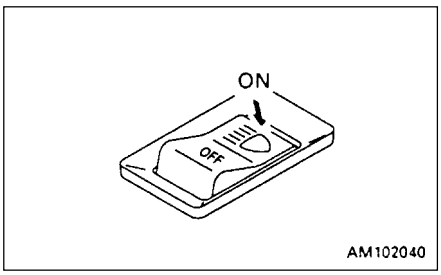


(1) The buzzer will sound for approx. 1 sec. and the following monitors and gauges will light up for approx. 3 sec.
- Radiator water level monitor ③
- Engine oil level monitor ④
- Charge level monitor ⑤
- Fuel level monitor ⑥
- Engine water temperature monitor ⑦
- Engine oil pressure monitor ⑧
- Engine water temperature gauge ⑨
- Fuel gauge ⑩
- Engine pre-heating monitor ⑪
- Air cleaner clogging monitor ⑫
- Swing lock monitor ⑬
- Replacement of engine oil monitor ⑭

If the monitors or gauges do not light up or the buzzer does not sound, there is probably a broken bulb or disconnection in the monitor wiring, so contact your Komatsu distributor for repairs.

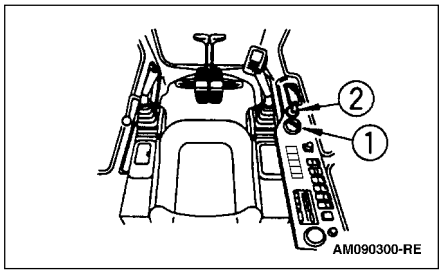
After approx. 3 sec. the following gauges will remain on and the other monitors will go out.
- Engine water temperature gauge ⑨
- Fuel gauge ⑩

(2) Press lamp switch ⑮ to turn on the head lamps.



If the lamps do not light up, there is probably a broken bulb or disconnection in the wiring, so contact your Komatsu distributor for repairs.

12.2 STARTING ENGINE



12.2.1 NORMAL STARTING

⚠ WARNING

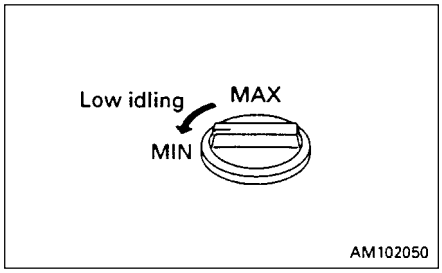
Check that there are no persons or obstacles in the surrounding area, then sound the horn and start the engine.

NOTICE

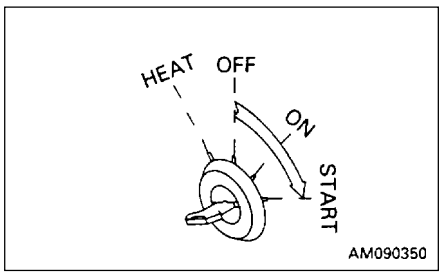
Do not keep the starting motor rotating continuously for more than 20 seconds.

If the engine will not start, wait for at least 2 minutes before trying to start the engine again.

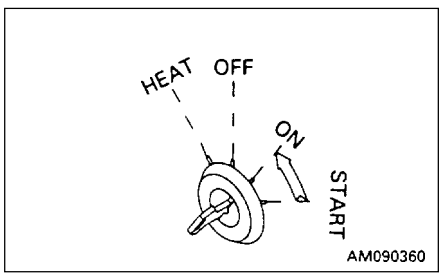
1. Set fuel control dial ① at the low idling (MIN) position.



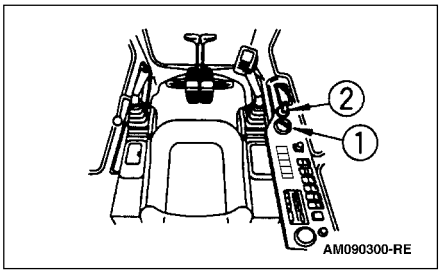
2. Turn the key in starting switch ② to the START position. The engine will start.



3. When the engine starts, release the key in starting switch ②. The key will return automatically to the ON position.



12.2.2 STARTING IN COLD WEATHER



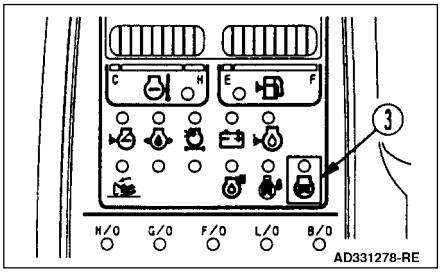
WARNING

- **Check that there are no persons or obstacles in the surrounding area, then sound the horn and start the engine.**
- **Never use starting aid fluids as they may cause explosions.**

NOTICE

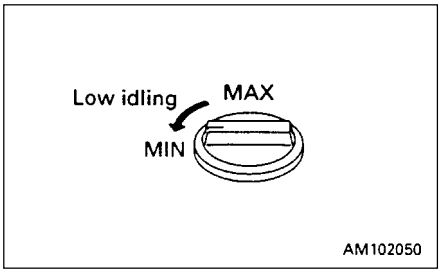
Do not keep the starting motor rotating continuously for more than 20 seconds.

If the engine fails to start, repeat steps from 2 and after waiting for about 2 minutes.

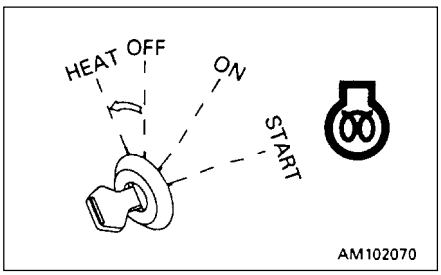


When starting in low temperatures, do as follows.

1. Set fuel control dial ① at the low idling (MIN) position.



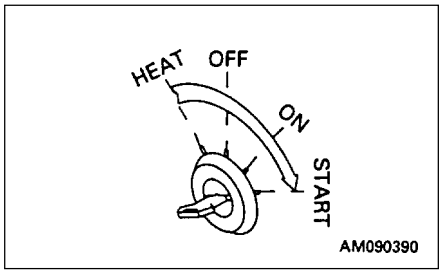
2. Hold the key in starting switch ② at the HEAT position, and check that preheating monitor ③ lights up.
   After about 30 seconds, preheating monitor lamp ③ will flash for about 10 seconds to indicate that preheating is finished.



REMARK

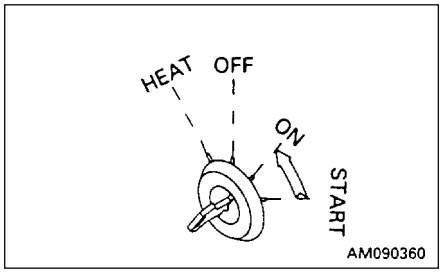
The monitor and gauge also light up when the key is at the HEAT position, but this does not indicate any abnormality.

3. When preheating monitor ③ flashes, turn the key in starting switch ② to the START position to start the engine.



Ambient temperature	Preheating time
Above 0°C (32°F)	-
0°C to -10°C (32 to 14°F)	20 seconds
-10°C to -20°C (14 to -4°F)	30 seconds

4. When the engine starts, release the key in starting switch ②. The key will return automatically to the ON position.



12.3 OPERATIONS AND CHECKS AFTER STARTING ENGINE

⚠WARNING

- **Emergency stop**
  If there has been any abnormal actuation or trouble, turn the starting switch key to the OFF position. The electrical system and engine will stop. Then contact your Komatsu distributor for inspection.

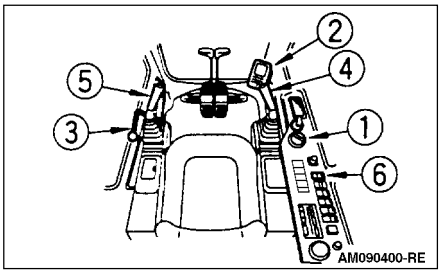
- **If the work equipment is operated without warming the machine up sufficiently, the response of the work equipment to the movement of the control lever will be slow, and the work equipment may not move as the operator desires, so always carry out the warming-up operation. Particularly in cold areas, be sure to carry out the warming-up operation fully.**

12.3.1 WHEN NORMAL

NOTICE

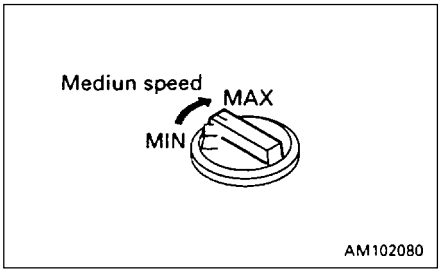
- **When the hydraulic oil is at a low temperature, do not carry out operations or move the levers suddenly. Always carry out the warming-up operation. This will help to extend the machine life.**

- **Do not suddenly accelerate the engine before the warming-up operation is completed.**
  Do not run the engine at low idling or high idling continuously for more than 20 minutes. This will cause leakage of oil form the turbocharger oil supply piping.
  If it is necessary to run the engine at idling, apply a load from time to time or run the engine at mid-range speed.

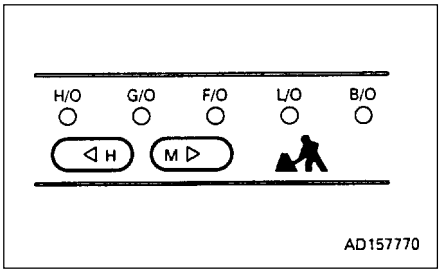


After starting the engine, do not immediately start operations. First, carry out the following operations and checks.

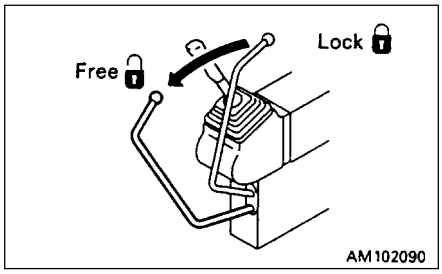
1. Turn fuel control dial ① to the center position between LOW IDLING (MIN) and HIGH IDLING (MAX) and run the engine at medium speed for about 5 minutes with no load.



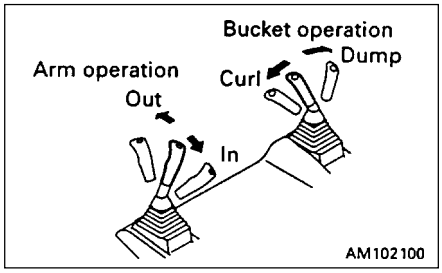
2. While running the engine at medium speed, press working mode switch ② until the heavy-duty operation mode lamp is turned on.



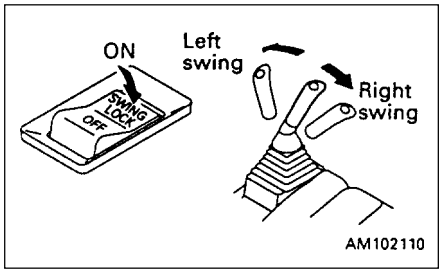
3. Set the safety lock lever ③ to the FREE position and raise the bucket from the ground.



4. Operate bucket control lever ④ and arm control lever ⑤ slowly to move the bucket cylinder and arm cylinder to the end of the stroke.



5. Carry out bucket and arm operation for 5 minutes at full stroke, alternating between bucket operation and arm operation at 30 seconds intervals.
   If the swing lock switch ⑥ is set to the ON (actuated) position and swing control lever ⑦ is operated at full stroke, oil temperaturerise can be increased earlier.



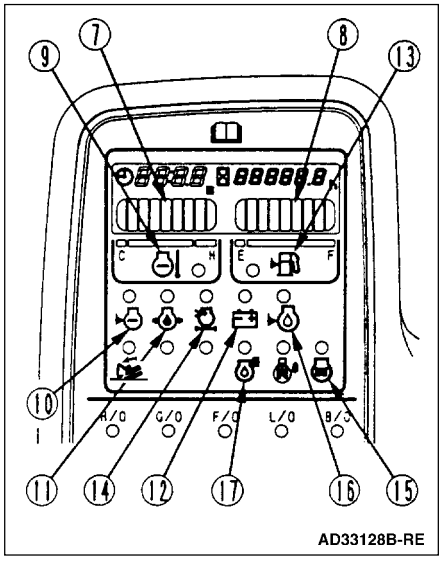
NOTICE

When the work equipment is retracted, take care that it does not interfere with the machine body or ground.

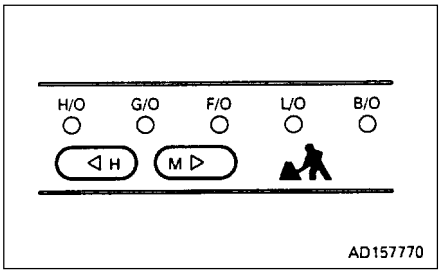
6. After carrying out the warming-up operation, check that each gauge and monitor lamp is in the following condition.

- Engine water temperature gauge ⑦: Inside green range
- Fuel gauge ⑧: Inside green range
- Engine water temperature monitor ⑨: OUT
- Radiator water level monitor ⑩: OUT
- Engine oil pressure monitor ⑪: OUT
- Charge level monitor ⑫: OUT
- Fuel level monitor ⑬: OUT
- Air cleaner clogging monitor ⑭: OUT
- Engine pre-heating monitor ⑮: OUT
- Engine oil level monitor ⑯: OUT
- Replacement of engine oil monitor ⑰: OUT

7. Check that there is no abnormal exhaust gas color, noise or vibration. If any abnormality is found, repair it.



8. Press working mode switch ② on the monitor panel until the lamp of the mode to be used lights up.



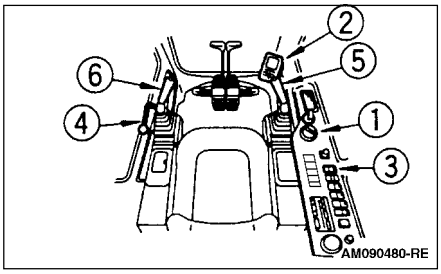
12.3.2 IN COLD AREAS (AUTOMATIC WARMING-UP OPERATION)

When starting the engine in cold areas, carry out the automatic warming up operation after starting the engine.

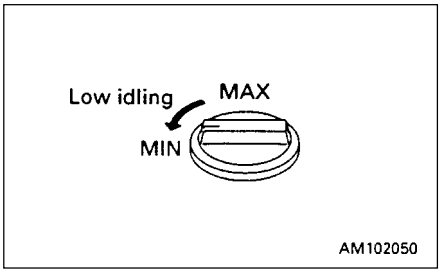
When the engine is started,if the engine water temperature is low (below 30°C), the warming up operation is carried out automatically.
The automatic warming-up operation is cancelled if the engine water temperature reaches the specified temperature (30°C) or if the warming-up operation is continued for 10 minutes. If the engine water temperature or hydraulic oil temperature are low after the automatic warming-up operation, warm the engine up further as follows.

NOTICE

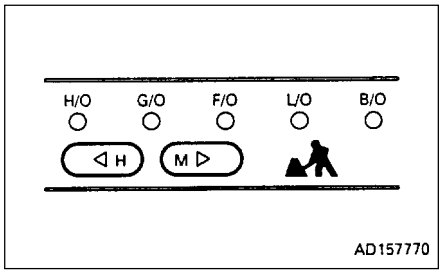
- **When the hydraulic oil is at a low temperature, do not carry out operations or move the levers suddenly. Always carry out the warming-up operation. This will help to extend the machine life.**
- **Do not suddenly accelerate the engine before the warming-up operation is completed.**
- **Do not run the engine at low idling or high idling continuously for more than 20 minutes. This will cause leakage of oil form the turbocharger oil supply piping.**
  If it is necessary to run the engine at idling, apply a load from time to time or run the engine at mid-range speed.



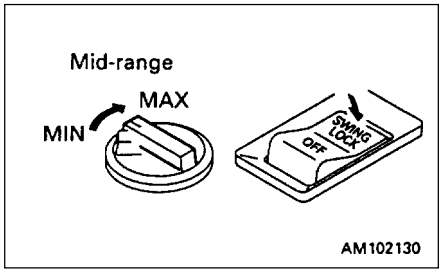
1. Keep fuel control dial ① at the low idling (MIN) position and carry out the automatic warming-up operation.



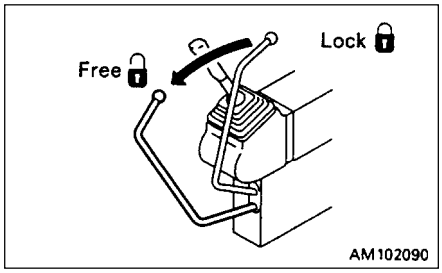
2. When the automatic warming-up operation is completed, press working mode switch ② on the monitor panel until the heavy-duty operation mode lamp lights up.



3. Turn fuel control dial ① to the mid-range speed position and turn swing lock switch ③ ON.

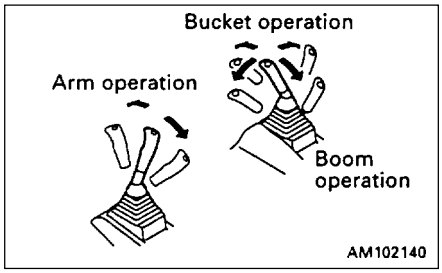


4. Set safety lock lever ④ to the FREE position and raise the bucket from the ground.



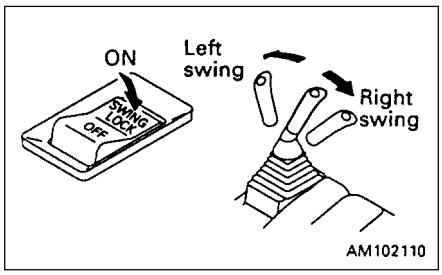
5. Operate boom and bucket control lever ⑤ and arm control lever ⑥ slowly to operate the boom cylinder, bucket cylinder and arm cylinder to the end of the stroke.

6. Operate the boom and arm slowly at the same time, and repeat this for 30 seconds.
   Next, repeat the same operation with the bucket and swing for 30 seconds. Operate both fully in turn for 5 minutes.



REMARK

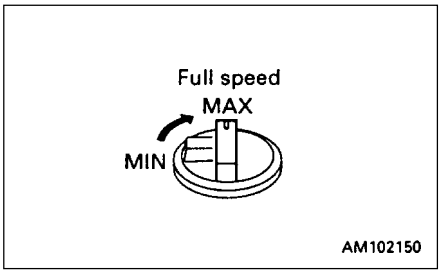
Turn swing lock switch ③ ON (ACTUATED) and operate the lever to make the oil temperature rise more quickly.



NOTICE

When pulling the work equipment, be careful not to let it hit the chassis or the ground.

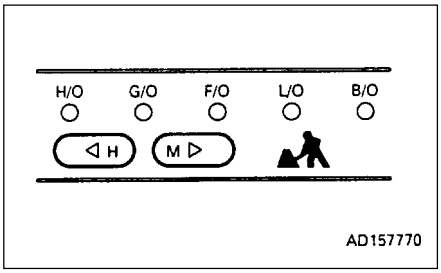
7. Turn fuel control dial ① to the full speed (MAX) position,then repeat the following operations ① to ③ for 5 minutes.



(1) Operate the boom and arm together and repeat this for 30 seconds.
(2) Operate the bucket and swing together and repeat this for 30 seconds.
(3) Operate the boom, arm and bucket slowly to move the cylinders to the end of their stroke, the return to the original posture.

8. Carry out the following operation slowly 3 to 5 times continuously to complete the warming-up operation.
   - Boom operation RAISE ⟷ LOWER
   - Arm operation IN ⟷ OUT
   - Bucket operation CURL ⟷ DUMP
   - Swing operation LEFT ⟷ RIGHT
   - Travel (lo) operation FORWARD ⟷ REVERSE

9. Use working mode switch ② on the monitor panel to switch to the working mode to be used.

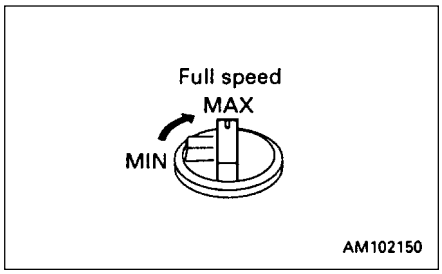


NOTICE

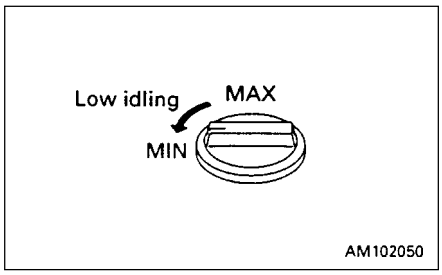
Cancelling automatic warming-up operation.

If it becomes necessary in an emergency to lower the engine speed to low idling, cancel the automatic warming-up operation as follows.

1. Turn fuel control dial ① to the full speed (MAX) position and hold it for 3 seconds



2. When fuel control dial ① is returned to the low idling (MIN) position, the engine speed will drop.

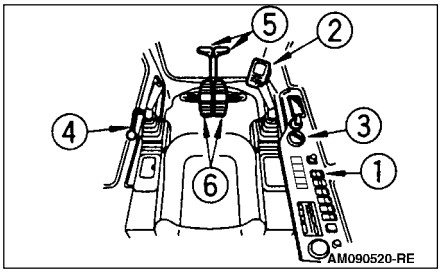


12.4 MOVING MACHINE OFF

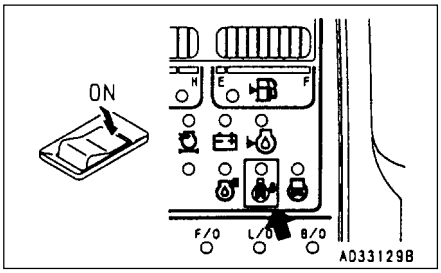
12.4.1 MOVING MACHINE FORWARD

⚠ WARNING

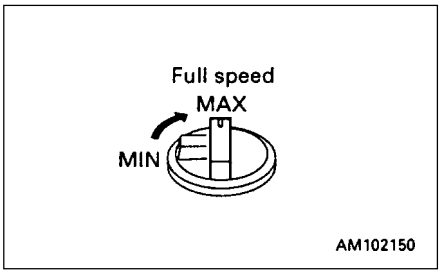
- **Before operating the travel levers, check the direction of the track frame. If the sprocket is at the front, the operation of the travel levers is reversed.**
- **When moving off, check that the area around the machine is safe, and sound the horn before moving.**
- **Clear all personnel from the machine and the area.**
- **Clear all obstacles from the path of the machine.**
- **If the lever is moved inside the deceleration range, engine speed will rise suddenly. Operate the levers carefully.**



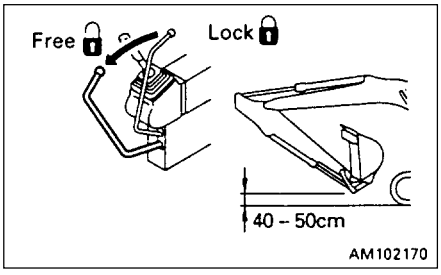
1. Set swing lock switch ① to the ON (actuated) position and conform that swing lock monitor lamp ② lights up.



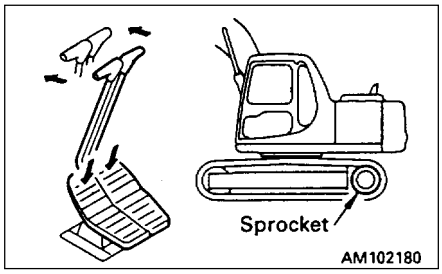
2. Turn fuel control dial ③ towards the high idling position to increase the engine speed.



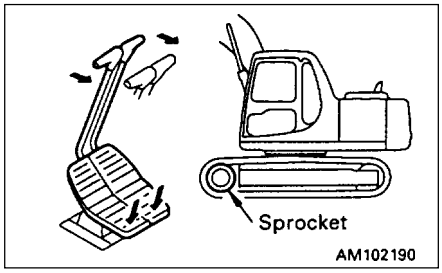
3. Set safety lock lever ④ in the FREE position, fold the work equipment, and raise it 40 - 50 cm from the ground.



4. Operate right and left travel levers ⑤ or right and left travel pedals ⑥ as follows.



- **When the sprocket is at the rear of the machine**
  Push levers ⑤ forward slowly or depress the front part of pedals ⑥ slowly to move the machine off.

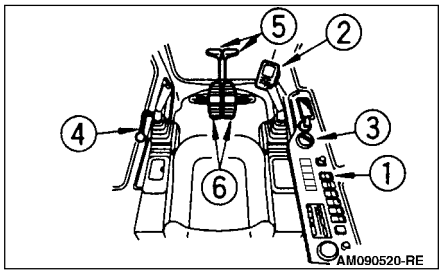


- **When the sprocket is at the front of the machine**
  Pull levers ⑤ backward slowly or depress the rear part of pedals ⑥ slowly to move the machine off.

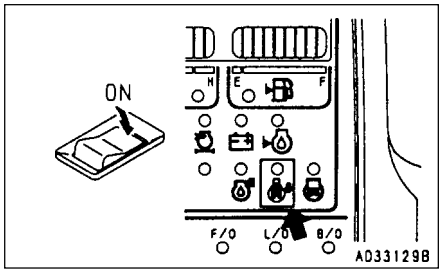
12.4.2 MOVING MACHINE BACKWARD

WARNING

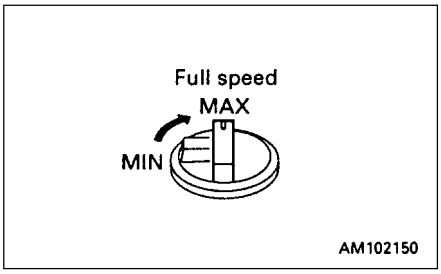
- **Before operating the travel levers, check the direction of the track frame. If the sprocket is at the front, the operation of the travel levers is reversed.**
- **When moving off, check that the area around the machine is safe, and sound the horn before moving.**
- **Clear all personnel from the machine and the area.**
- **Clear all obstacles from the path of the machine.**
- **Use extreme care when reversing the machine. Note there is a blind spot behind the machine.**
- **If the lever is moved inside the deceleration range, engine speed will rise suddenly. Operate the levers carefully.**



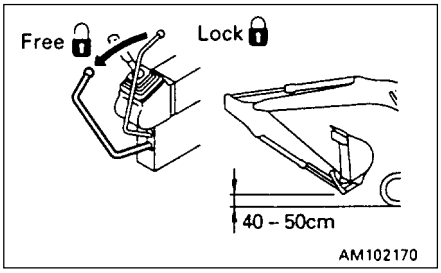
1. Set swing lock switch ① to the ON (actuated) position and conform that swing lock monitor lamp ② lights up.



2. Turn fuel control dial ③ towards the full speed (MAX) position to increase the engine speed.

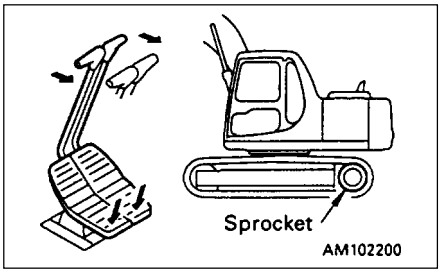


3. Set safety lock lever ④ in the FREE position, fold the work equipment, and raise it 40 - 50 cm from the ground.

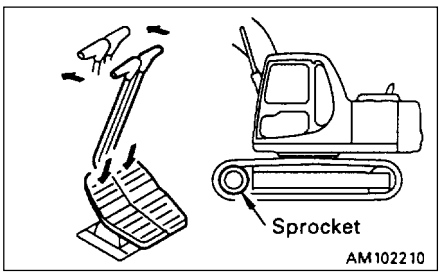


4. Operate right and left travel levers ⑤ or right and left travel pedals ⑥ as follows.

- **When the sprocket is at the rear of the machine**
  Push levers ⑤ backward slowly or depress the rear part of pedals ⑥ slowly to move the machine off.



- **When the sprocket is at the front of the machine**
  Pull levers ⑤ forward slowly or depress the front part of pedals ⑥ slowly to move the machine off.



12.5 STEERING MACHINE

12.5.1 STEERING (CHANGING DIRECTION)

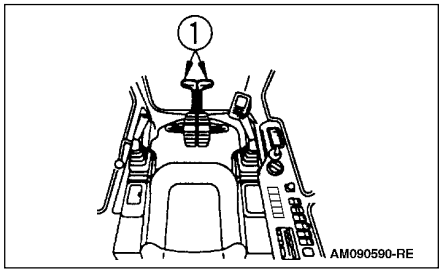
⚠ WARNING

Before operating the travel levers, check the position of the sprocket. If the sprocket is at the front, the operation of the travel levers is reversed.

Use the travel levers to change direction.

Avoid sudden changes of direction as far as possible. In particular, when carrying out counter-rotation (spin turn), stop the machine first before turning.

Operate the two travel levers ① as follows



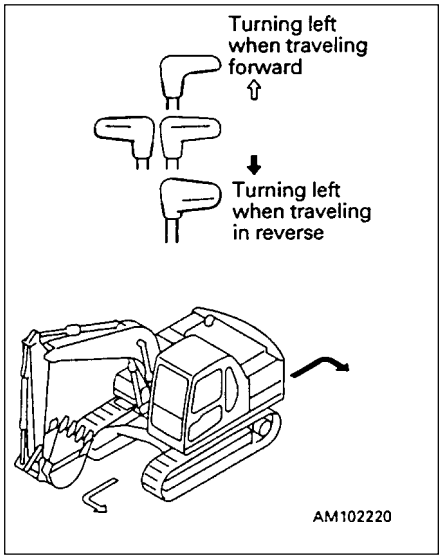
Changing direction of machine when stopped

When turning to the left:

Push the right travel lever forward to travel left when travelling forward; and pull it back to turn left when travelling in reverse.

REMARK

When truning to the right, operate the left travel lever in the same way.



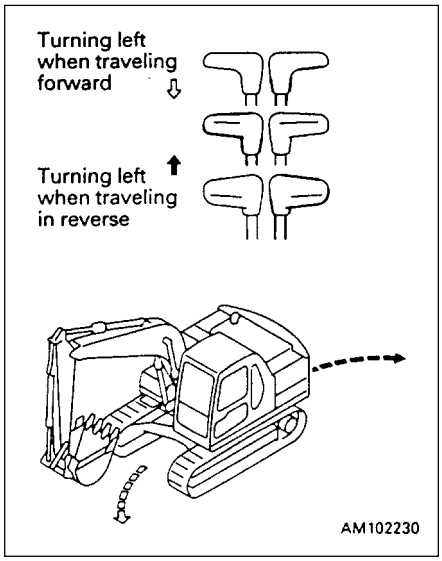
Steering when travelling (left and right travel levers both operated in same direction)

When turning to the left:

If the left travel lever is returned to the neutral position, the machine will turn to the left.

REMARK

When turning to the right, operate the right travel lever in the same way.

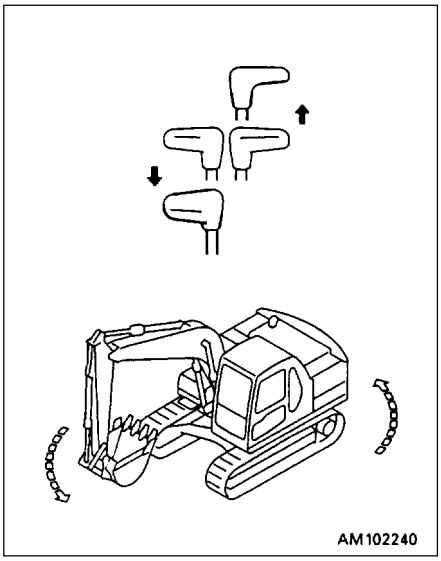


When making counter-rotation turn (spin turn)

When turning left using counter-rotation, pull the left travel lever back and push the right travel lever forward.

REMARK

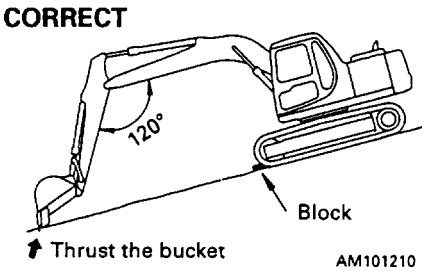
When turning right using counter-rotation, pull the right travel lever back and push the left travel lever forward.

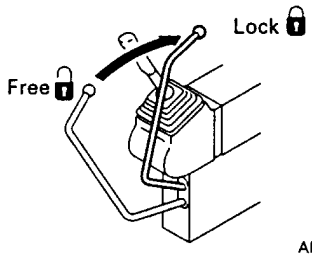


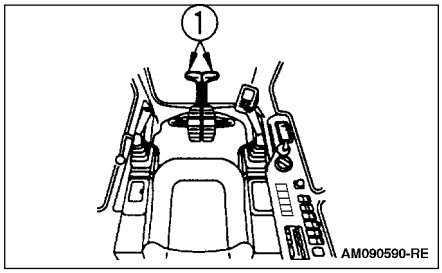
12.6 STOPPING MACHINE

WARNING

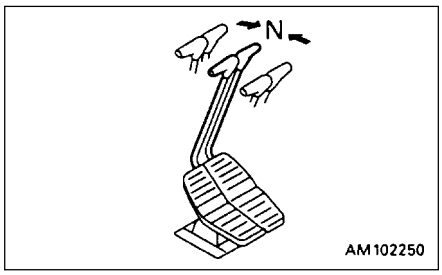
- **Avoid stopping suddenly. Give yourself ample room when stopping.**
- **When stopping the machine, select flat hard ground and avoid dangerous places. If it is unavoidably necessary to park the machine on a slope, insert blocks underneath the the track shoes. As an additional safety measure, thrust the bucket into the ground.**
- **If the control lever is touched by accident, the work equipment or the machine may move suddenly, and this may lead to a serious accident. Before leaving the operator's compartment, always set the safety lock lever securely to the lock position.**







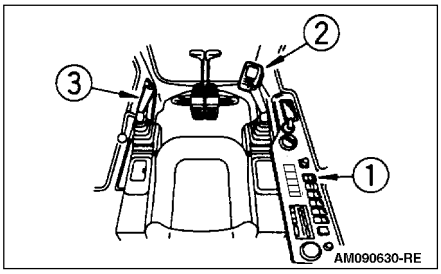
1. Put the left and right travel levers ① in the neutral position, then stop the machine.



12.7 SWINGING

WARNING

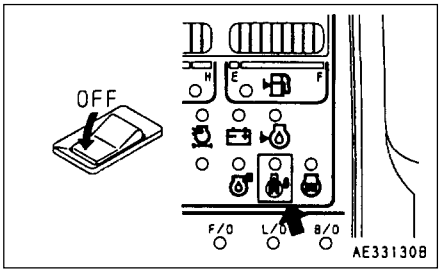
When operating the swing, check that the area around the machine is safe.



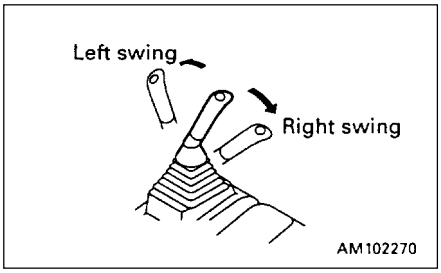
1. Before operating the swing, turn swing lock switch ① OFF (CANCELLED).

NOTICE

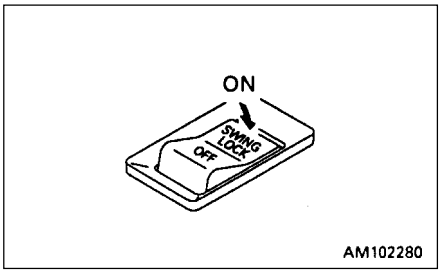
Check that swing lock monitor ② goes out at the same time.



2. Operate left work equipment control lever ③ to swing the upper structure.



3. When not operating the swing, turn swing lock switch ① ON (ACTUATED).



12.8 OPERATION OF WORK EQUIPMENT

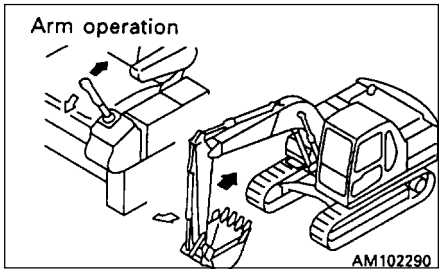
⚠ WARNING

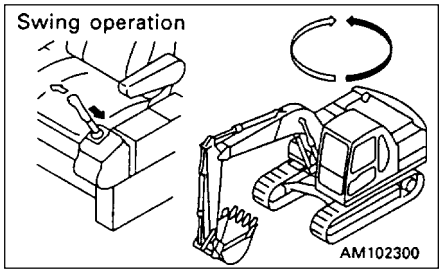
If any lever is operated when in the deceleration range, the engine speed will suddenly increase, so be careful when operating the levers.

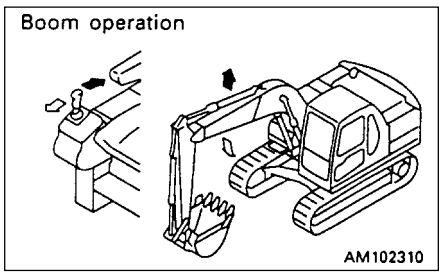
The work equipment is operated by the left and right work equipment control levers. The left work equipment control lever operates the arm and swing, and the right work equipment control lever operates the boom and bucket.

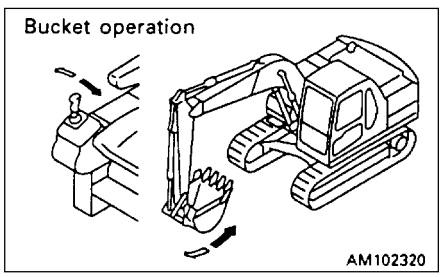
The movements of the lever and work equipment are as shown in the diagrams on the right. When the levers are released, they automatically return to the neutral position and the work equipment is held in place.

- If the work equipment control lever is returned to the neutral position when the machine is stopped, even if the fuel control dial is set to FULL, the auto-deceleration mechanism will act to reduce the engine speed to a mid-range speed.









12.9 WORKING MODE SELECTION

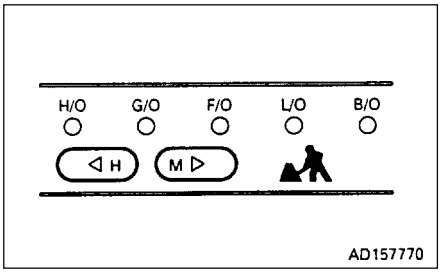
WORKING MODE

The mode selectro switches can be used to switch the mode to match the conditions and purpose of work, thereby enabling efficient operation.

Use the following precedures to make the most effective use of each mode.

When the starting switch is turned ON, the working mode is set to general operation mode (G.O.), so normal work can be carried out without needing to set the mode.

Set the most effective mode according to the type of work using working mode selector switch.



Working mode	Applicable work	Power max. (power up)		Switch slow-down (speed down)	
		Power	Set pressure	Speed	Set pressure
Heavy-duty operation mode (H.O.)	Large amount of digging and loading in a short time	-	9% up	35% down	9% up
General operation mode (G.O.)	Normal digging and loading operation	30% up	9% up	25% down	9% up
Finishing operation mode (F.O.)	Finishing, levelling and general hauling operation	-		-	
Lifting operation mode (L.O.)	Positioning etc.	-		-	
Breaker operation mode (B.O.)	Breaker operation	-		-	

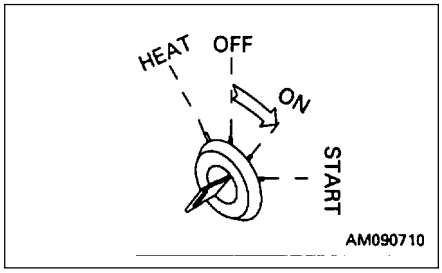
NOTICE

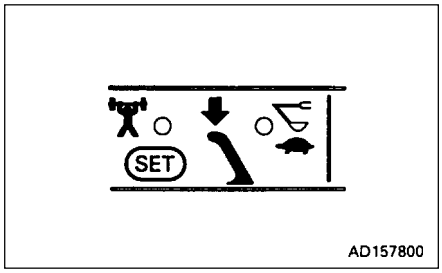
Never carry out breaker operation in heavy-duty operation mode (H.O.) as this may result in breakage of hydraulic equipment.

POWER MAX./SWIFT SLOW-DOWN

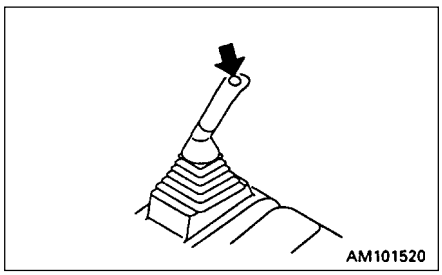
During operation, power up/speed down of work equipment can be performed by on-touch. Use this function effectively in combination with working mode.

1. When starting switch is turned ON, the power up lamp turns on. When SET switch is pressed once, the speed down lamp turns on and the power up lamp goes out, and when pressed again, the opposite occurs.





2. When the left knob button is depressed once (single click) and kept depressed, power keeps increasing while depressed. However, power up automatically completes after 8.5 seconds.

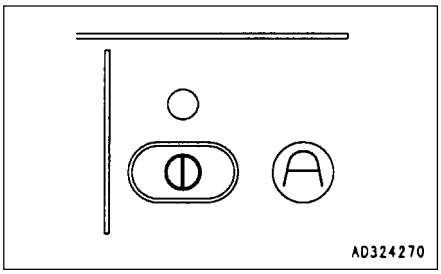


12.10 HANDLING ACTIVE MODE

Make full use of the active mode to match the purpose and conditions of the opeeration in order to carry out operations effectively and efficiently.

The active mode selector switch can be turned ON (lights up) in order to provide quick levelling operations and effective deep digging and loading operations.

ON lights up: Active mode ON
ON goes out: Active mode cancelled



The ON lamp is off when the engine is started.

If it is turned ON (lights up), it is possible to enter the active mode from any working mode.

Even when it is turned ON (lights up), the working mode display does not change. When the lamp goes out, the system returns to the original working mode.

Mode	Effective operation	Advantages for operation
Active mode	Digging and loading	The boom lowering speed is increased, so the cycle time for deep digging operations is reduced.
	Levelling	By increasing the arm IN speed and the pomp response, the speed of rough levelling (light loads) is increased.

NOTICE

There is danger that the hydraulic equipment may be broken if breaker operations are carried out in the active mode, so never use the active mode for breaker operations.

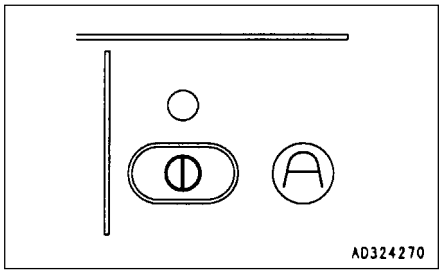
REMARK

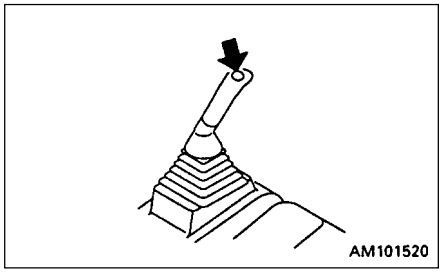
- Use the active mode with the fuel control dial turned to the MAX position. If it is not at the MAX position, it will be impossible to achieve a suitable increase in the work equipment speed.
- The active mode includes a load detection function. If a heavy load is applied, the engine speed will drop 100 - 200 rpm to inform the operator that there is a heavy load, but the work equipment power will not drop. (In the active mode or when travelling, the load detection function is actuated.)
- Active power function
  When finishing ground quickly with heavy loads or digging deep and loading, use the active power-up function according to the following procedures.

1. Turn on the active mode selector switch (lights up).

2. While in this condition, press and hold the knob switch of the left-hand work equipment lever once (single click).

3. Since the machine returns to the normal active mode in 8.5 seconds after the switch is pressed, use the active power-up mode effectively for heavy and quick work.





Mode	Suitable work	Advantages on work
Active power-up function	Digging and loading (Heavy load)	Since engine speed is increased, cycle time of deep scraping work is shortened.
	Rock raising (Heavy load)	Since digging force of arm and bucket is increased, working speed is increased.
	Finishing operation (Heavy load)	Since engine speed is increased, rough scraping speed is increased.

○ The load sensing function is installed to the active mode. If the machine is set to the active power-up mode, however, the load sensing function is turned off and the engine speed is increased to increase the speed of the work equipment.

12.11 PROHIBITIONS FOR OPERATION

WARNING

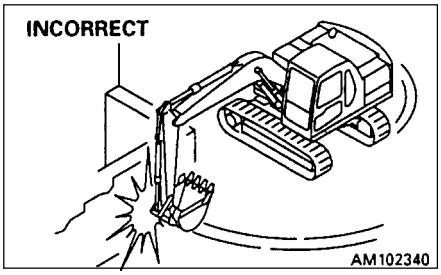
- **If it is necessary to operate the work equipment control lever when the machine is travelling, stop the machine before operating the work equipment control lever.**
- **If the lever is moved inside the deceleration range, engine speed will suddenly rise. Operate the levers carefully.**
- **Never operate the machine on a rock bed (hard or soft rock).**

Prohibited operations using swing force

Do not use the swing force to compact soil or break earth mounds or walls.

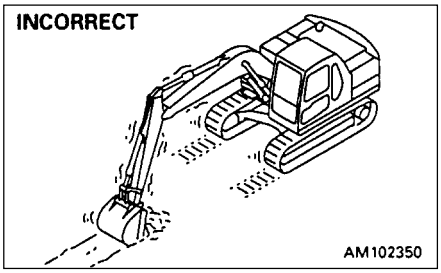
When swinging, do not dig the bucket teeth into the soil.

These operations will damage the work equipment.



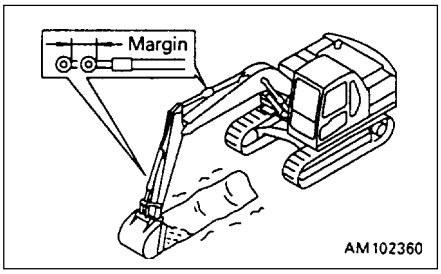
Prohibited operations using travel force

Do not leave the bucket dug into the ground and use the travel force to excavate. This will bring excessive force to bear on the rear of the machine



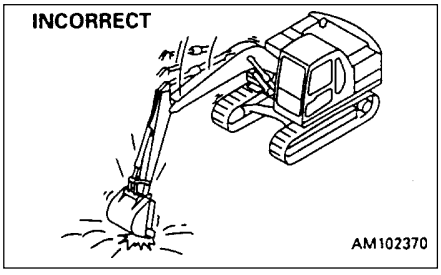
Precautions when operating hydraulic cylinders to end of stroke

If the cylinder is operated to the end of its stroke during operations, force will be brought to bear on the stopper inside the cylinder, and this will reduce the life of the machine. To prevent this, always leave a small safety margin when operating the cylinders.



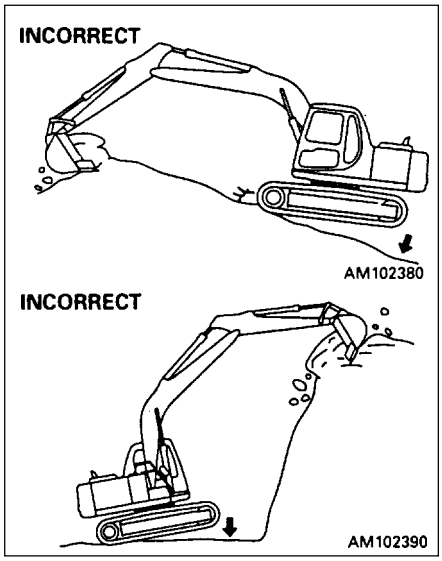
Prohibited operations using dropping force of bucket

Do not use the dropping force of the bucket as a pickaxe, breaker, or pile driver. This will bring excessive force to bear on the rear of the machine, and will not only damage the machine but is also dangerous.



Prohibited operations using dropping force of machine

Do not use the dropping force of the machine for digging

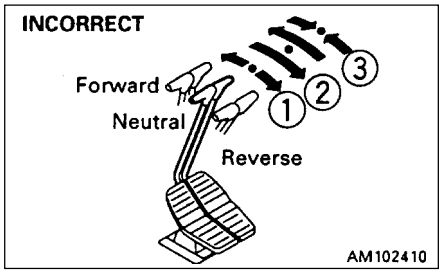


Digging rocky ground

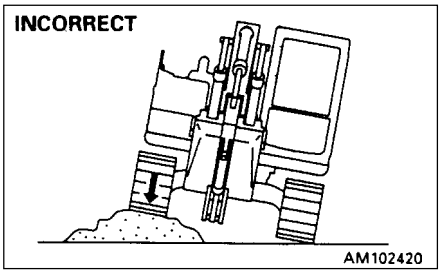
It is better to excavate hard rocky ground after breaking it up by some other means. This will not only reduce damage to the machine but make for better economy.

Sudden lever shifting during Hi-speed travel prohibited

① Never carry out sudden lever shifting as this may cause sudden starting.
② Avoid sudden lever shifting from forward to reverse (or vice versa).
③ Avoid sudden lever shifting change such as sudden stopping from near top speed (lever release operation).

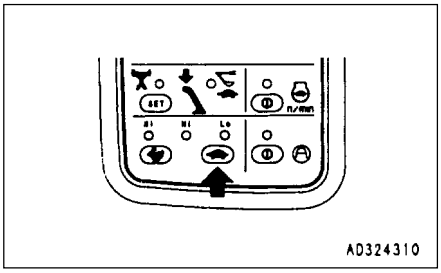


12.12 PRECAUTIONS FOR OPERATION



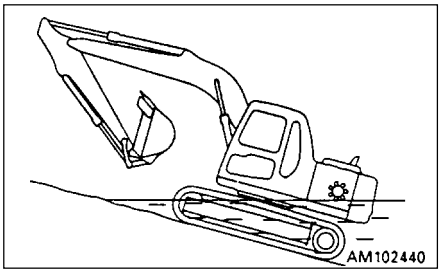
PRECAUTIONS WHEN TRAVELLING

When travelling over obstacles such as boulders or tree stumps, the machine (in particular, the undercarriage) is subjected to a large shock, so reduce the travel speed and travel over the obstacle at the center of the tracks. As far as possible, remove such obstacles or avoid travelling over them.



PRECAUTIONS AT Hi-SPEED TRAVEL

On uneven roadbeds such as rock beds or uneven roads with large locks, travel at Mi of Lo speed. When Hi-speed travelling, set the idler in the forward direction.

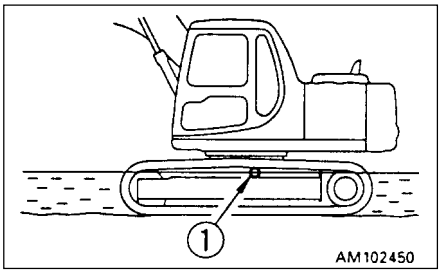


PERMISSIBLE WATER DEPTH

NOTICE

When driving the machine out of water, if the angle of the machine exceeds 15°, the rear of the upper structure will go under water, and water will be thrown up by the radiator fan. This may cause the fan to break.

Be extremely careful when driving the machine out of water.



Do not immerse the machine in water by more than the permissible depth (under center of carrier roller ①).

In addition, for parts that have been immersed in water for a long time, pump in grease until the old grease comes out from the bearings. (Around the bucket pins).

SPECIAL TRACK SHOES

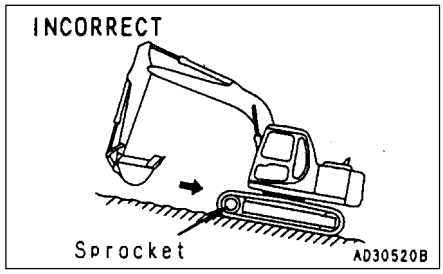
Since the wide shoes (600mm (2ft), 700mm (2ft 4 in), 750mm (2ft 6in)) and the swamp shoe are special shoes for soft ground, do not use them on rocky ground, sand and gravel, unfinished ground where there are cobbles, or even on soft ground if there is blasted rock, roots, etc. present.

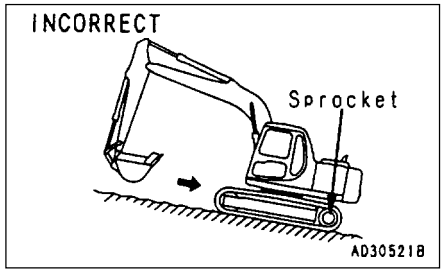
For selection of the shoes, see "29.3 SELECTION OF TRACK SHOE" in the volume of OPTIONAL PARTS AND ATTACHMENTS.

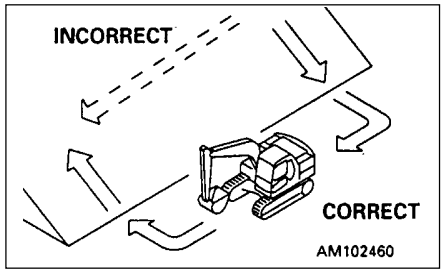
12.13 PRECAUTIONS WHEN TRAVELLING UP OF DOWN HILLS

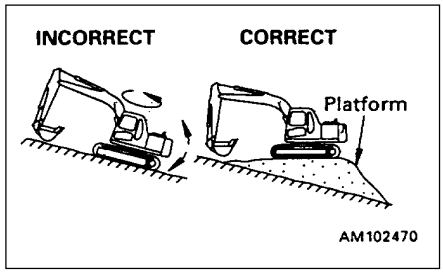
⚠ WARNING

- **When travelling, raise the bucket approx. 20 - 30 cm from the ground.**
  Do not travel downhill in reverse
- **When travelling over ridges or other obstacles, keep work equipment close to the ground and travel slowly.**
- **It is dangerous to turn on slopes or to travel across slopes. Always go down to a flat place to perform these operations. It may be longer, but it wil ensure safety.**
- **If the machine starts to slide or loses stability, lower the bucket immediately and brake the machine.**
- **Turning or operating the work equipment when working on slopes may cause the machine to lose its balance and turn over, so avoid such operations. It is particularly dangerous to swing downhill when the bucket is loaded.**
  If such operations have to be carried out, pile soil to make platform on the slope so that the machine can be kept horizontal when operating.
- **Do not travel on slopes of over 30° as there is danger that the machine may overturn.**

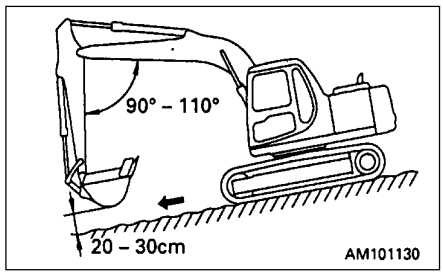




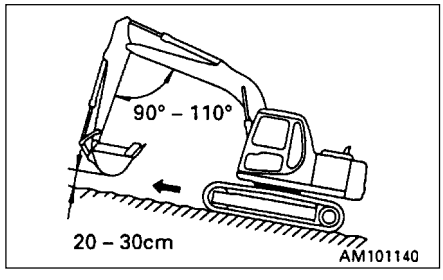




1. When travelling down steep hills, use the travel lever and fuel control lever to keep the travel speed low.
   When travelling down slopes of more than 15°, set the work equipment in the posture shown in the figure on the right, and lower the engine speed.



2. When travelling up a steep hill of more than 15°, set the work equipment in the posture shown in the diagram on the right.



Braking when travelling downhill

To brake the machine during downhill runs, put the travel lever in the neutral position. This will cause the brake to be automatically applied.

If shoes slip

When travelling uphill, if the shoes slip or it is impossible to travel uphill using the force of the track only it is possible to use the pulling force of the arm to help the machine travel uphill.

If engine stops

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

Precautions on slopes

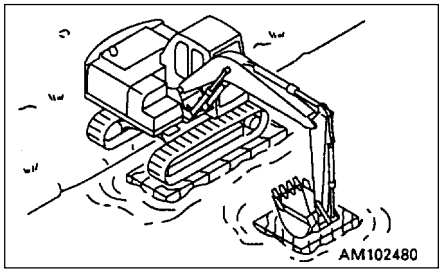
- If the engine stops when the machine is on a slope, never use the left work equipment control lever to carry out swing operations. The upper structure will swing under its own weight.
- Do not open or close the door of the cab if the machine is on a slope. This may cause a sudden change in the operating force. Always keep the door locked.

12.14 HOW TO ESCAPE FROM MUD

Always operate carefully to avoid getting stuck in mud. If the machine does get stuck in mud, use the follwoing procedures to get the machine out.

12.14.1 WHEN ONE SIDE IS STUCK

When only one side is stuck in mud, use the bucket to raise the track, then lay boards or logs and drive the machine out. If necessary, put a board under the bucket also.



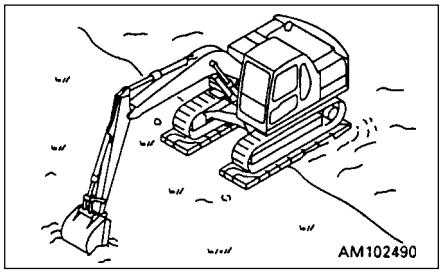
NOTICE

When using the boom or arm to raise the machine, always have the bottom of the bucket in contact with the ground. (Never push with the teeth). The angle between the boom and arm should be 90° to 110°.

The same applies when using the inverting bucket.

12.14.2 WHEN BOTH SIDES ARE STUCK

When the tracks on both sides are stuck in the mud and the machine will not move, lay boards as explained above, and dig the bucket into the ground in front. Then pull in the arm as in normal digging operations an put the travel levers in the FORWARD position to pull the machine out.



12.15 WORK POSSIBLE USING HYDRAULIC EXCAVATOR

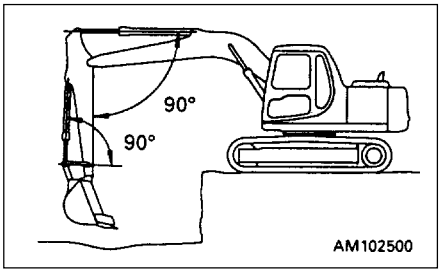
In addition to the following, it is possible to further increase the range of applications by using various attachments.

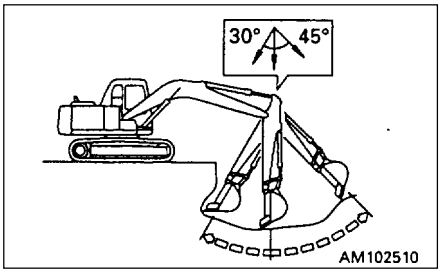
12.15.1 BACKHOE WORK

When condition of the machine is as shown in the diagram at right, each cylinder's maximum pushing excavation force is obtained when the bucket cylinder and link, arm cylinder and arm are at 90°.

The range for excavating with the arm is from a 45° angle away from the machine to a 30° toward the machine.

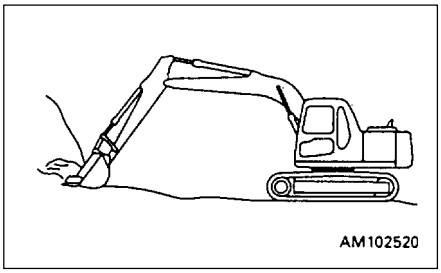
There may be some differences depending on the excavation depth, but try to use within the above range rather than going all the way to the extreme end of the cylinder stroke.





12.15.2 SHOVEL WORK

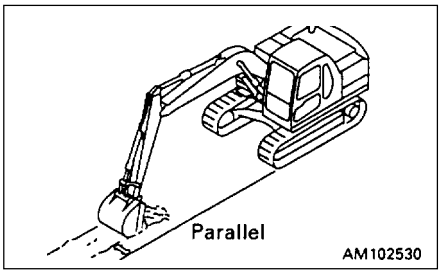
A shovel is suitable for excavating at a positon higher than the machine. Shovel work is performed by attaching the bucket in the reverse direction.



12.15.3 DITCHING WORK

Ditching work can be performed efficiently by attaching a bucket to match the width of the ditch and then setting the tracks parallel to the line of the ditch to be excavated.

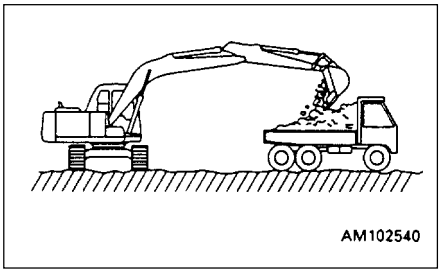
To excavate a wide ditch, first dig out both sides and then finally remove the center portion.



12.15.4 LOADING WORK

In places where the swing angle is small, work efficiency can be enhanced by locating the dump truck in a place easily visible to the operator.

Loading is easier and capacity greater if you begin from the front of the dump truck body than if loading is done from the side.



12.16 REPLACEMENT AND INVERSION OF BUCKET

⚠ WARNING

- **When knocking the pin in with a hammer, metal particles may fly and cause serious injury, particularly if they get into your eyes. When carrying out this operation always wear goggles, helmet, gloves and other protective equipment.**
- **When the bucket is removed, place it in a stable condition.**

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.

12.16.1 REPLACEMENT

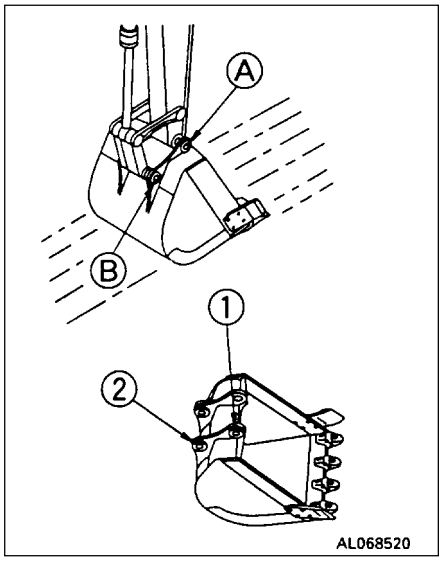
1. Place the bucket in contact with a flat surface.

REMARK

When removing the pins, place the bucket so that it is in light contact with the ground.

If the bucket is lowered strongly to the ground, the resistance will be increased an it will be difficult to remove the pins.

2. Remove the stopper bolts and nuts, then remove pins Ⓐ and Ⓑ, and remove the bucket



NOTICE

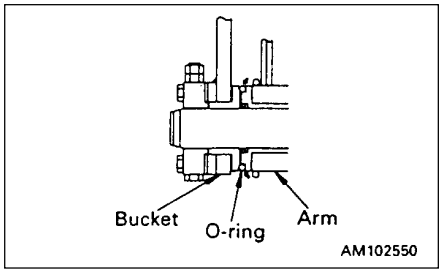
After removing the pins, make sure that they do not become contaminated with sand or mud and that the seals of bushing on both sides do not become damaged.

3. Align the arm with holes ① and the link with holes ②, then coat with grease and install pins Ⓐ and Ⓑ.

REMARK

When installing the bucket, the O-rings are easily damaged, so fit the O-rings on the boss of the arm end as shown in the diagram.

When knocking the pin, move the O-ring down to the regular groove.



4. Install the stopper bolts and nuts for each pin, then grease the pin.

12.16.2 INVERSION

1. Place the bucket in contact with a flat surface.

REMARK

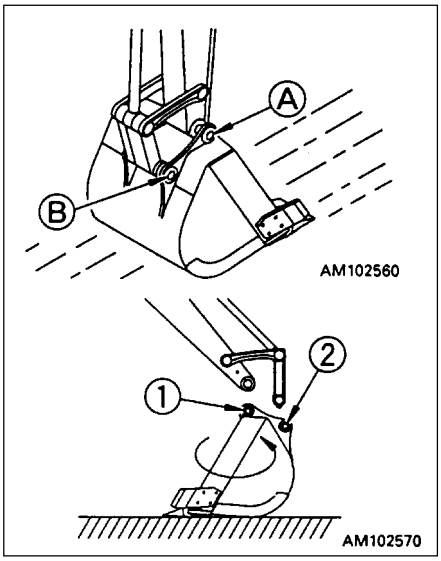
When removing the pins, place the bucket so that it is in light contact with the ground.

If the bucket is lowered strongly to the ground, the resistance will be increased an it will be difficult to remove the pins.

2. Remove the stopper bolts and nuts, then remove pins Ⓐ and Ⓑ, and remove the bucket

NOTICE

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. Install bucket inversely.
   After the bucket is inversed, correct the inclination and direction of the retaining pin holes ① and ② and stabilize the bucket securely.

4. Align the arm with holes ① and the link with holes ②, then coat with grease and install pins Ⓐ and Ⓑ.

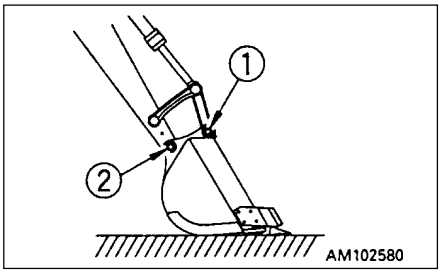
REMARK

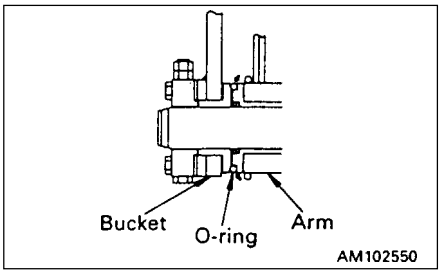
Install the O-rings into retaining hole ① of the arm and bucket.

When installing the bucket, the O-rings are easily damaged, so fit the O-rings on the boss of the arm end as shown in the diagram.

When knocking the pin, move the O-ring down to the regular groove.

5. Install the stopper bolts and nuts for each pin, then grease the pin.

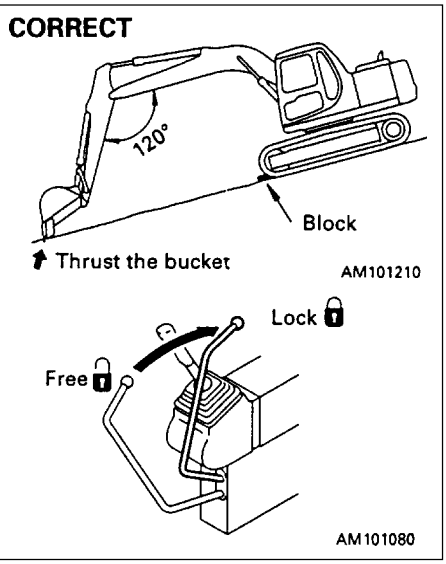


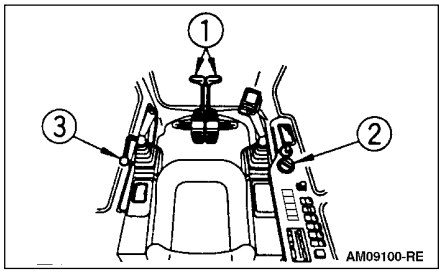


12.17 PARKING MACHINE

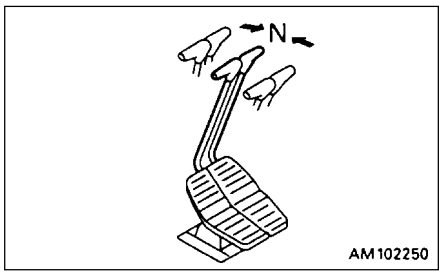
WARNING

- **Avoid stopping suddenly. Give yourself ample room when stopping.**
- **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 track shoes.**
  As an additional safety measure, thrust the bucket into the ground.
- **If the control lever is touched by accident, the work equipment of the machine may move suddenly, and this may lead to a serious accident. Before leaving the operator's compartment, always set the safety lock lever securely to LOCK position.**

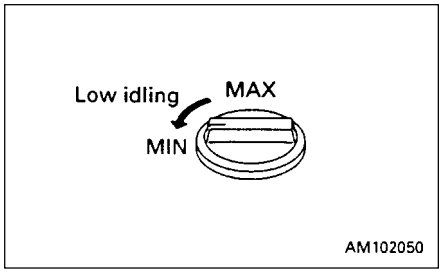




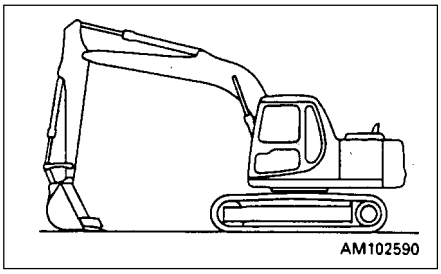
1. Put left and right travel levers ① in the neutral position.
   The machine stops.



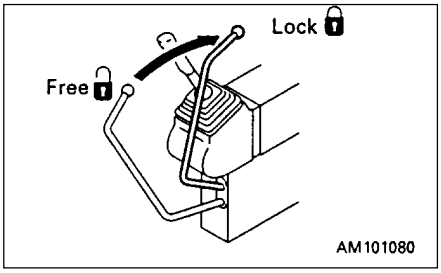
2. Turn fuel control dial ② to lower the engine speed to low idling.



3. Lower the bucket horizontally until the bottom touches the ground.

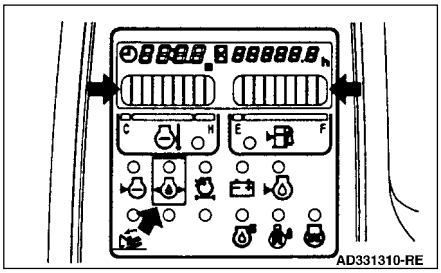


4. Set safety lock lever ③ in the LOCK position.



12.18 CHECK AFTER FINISHING WORK

Check the engine water temperature, engine oil pressure and fuel level on the monitor.



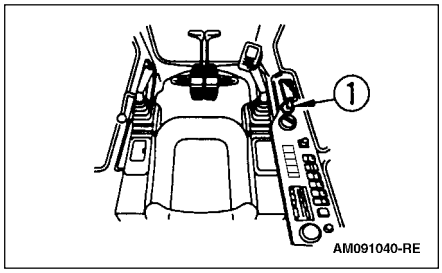
12.19 STOPPING ENGINE

NOTICE

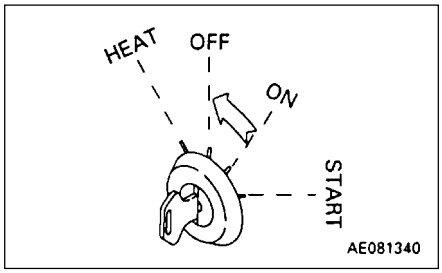
If the engine is abruptly stopped before it has cooled down, engine life may be greatly shortened. Consequently, do not abruptly stop the engine apart from an emergency.

In particular, if the engine has overheated, do not abruptly stop it but run it at medium speed to allow it to cool gradually, then stop it.

1. Run the engine at low idling speed for about 5 mintues to allow it to gradually cool down.



2. Turn the key in starting switch ① to the OFF position and stop the engine.
3. Remove the key form starting switch ①



12.20 CHECK AFTER STOPPING ENGINE

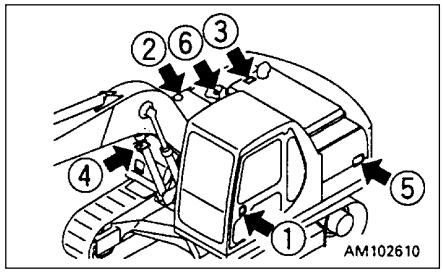
1. Walk around the machine and check the work equipment, paintwork, and undercarriage, and check also for leakage of oil or water, if any abnormalities are found, repair them.

2. Fill the fuel tank.

3. Check the engine compartment for paper and debris. Clean out any paper and debris to avoid a fire hazard.

4. Remove any mud stuck to the undercarriage.

12.21 LOCKING



Always lock the following places
① Door of operator's cab
Always remember to close the window.
② Fuel tank filler port
③ Engine hood
④ Tool box cover
⑤ Battery room door (left side of machine)
⑥ Pump room door (right side of machine)

REMARK

Use the starting switch key to open and close all these places.

12.22 OVERLOAD WARNING DEVICE

Excavators are provided with this device to warn the operator about tipping over while lifting loads. A buzzer will sound when the machine is in Lo mode and the machine nears its lifting capacity.

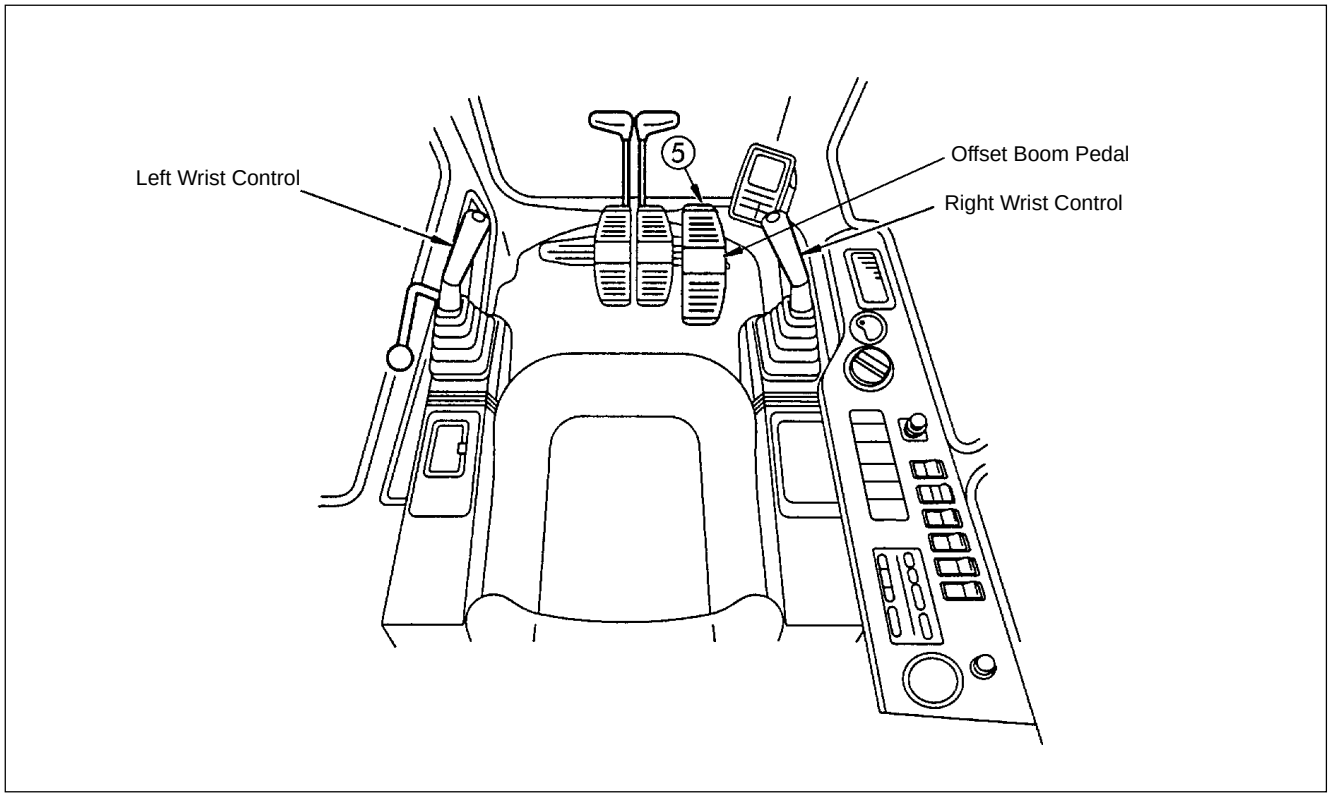
NOTE:

1. Only conduct lifting operations in Lo mode as the overload warning system is only active in this mode.

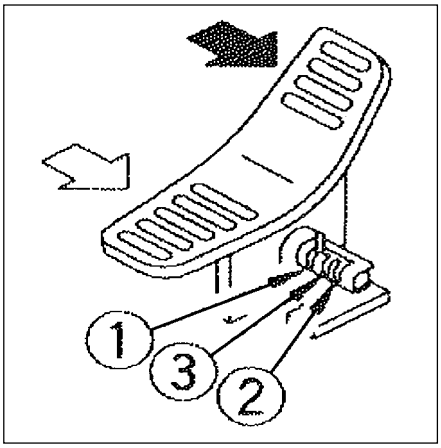
2. Ensure "Active" mode is not selected when in Lo mode as this will cancel the overload warning system.

12.23 OFFSET BOOM

Please refer to Operation and Maintenance Manual of PC130-6K before operating the machine.



- **Offset boom Control Pedal**



When the pedal is depressed the offset boom is actuated.

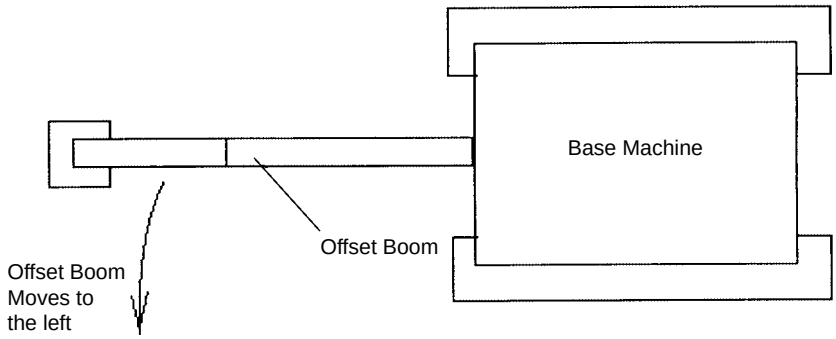
The positions of the lock pin are as follows:

① LOCK

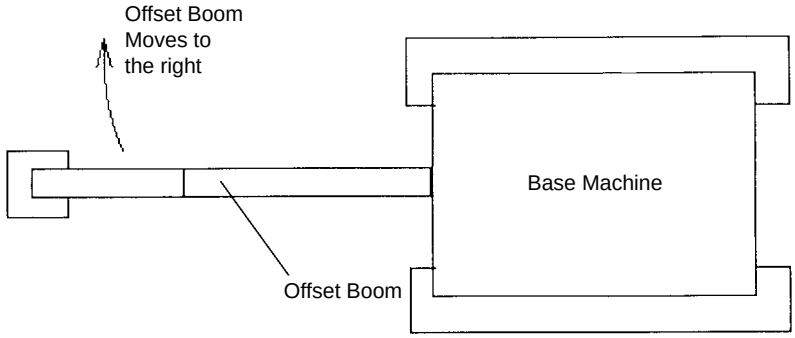
② Do Not Use this position.
(This position is used for other attachments with large oil flows)

③ Engage this position when using the offset boom.

- When the front of the pedal is depressed the offset cylinder extends causing the offset boom to move to the left.



- When the rear of the pedal is depressed the offset cylinder retracts causing the offset boom to move to the right.



The function of the left and right wrist control levers is as described in the operation and Maintenance manual for PC130-6K.

⚠ CAUTION

Please ensure that the offset boom is in the straight position for lifting operations.

13. TRANSPORTATION

When transporting the machine, observe all related laws and regulations, and be careful to assure safety.

13.1 LOADING, UNLOADING WORK

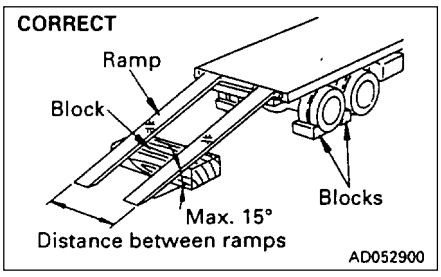
⚠ WARNING

- **Loading or unloading the machine can be a dangerous operation, so be particularly careful.**
  When loading or unloading the machine, run the engine at low idling and travel at low speed.
- **Make sure the ramp has sufficient width, length and thickness to enable the machine to be safely loaded and unloaded.**
  If the ramp sags appreciably, reinforce it with blocks etc.
- **When loading and unloading the machine, park the trailer on a flat firm roadbed. Keep a fairly long distance between the road shoulder and the machine.**
- **Remove the mud from the undercarriage to prevent the machine from slipping to the side on slopes.**
  Be sure the ramp surface is clean and free of grease, oil, ice and loose materials.
- **Never change the direction of travel when on the ramps. If it is necessary to change direcion, drive off the ramps and correct the direction, then drive on to the ramps again.**
- **When turning the machine on the trailer, the machine's footing is unstable, so carry out the operation slowly.**
- **Always check that the door on the cap is locked, regardless of whether it is open or closed**
  Do not open or close the door on ramps or on a platform.
  This may cause a sudden change in the operation force.
- **When loading or unloading the machine with the automatic warming-up operation mode, if the automatic mode is released, the speed may change suddenly. Avoid loading or unloading during automatic warming-up operation.**

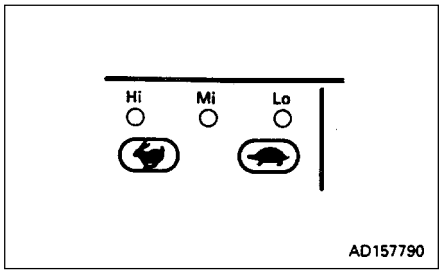
When loading or unloading, always use ramps or a platform and carry out the operations as follows.

1. Properly apply the brakes on the trailer and insert blocks beneath the tires to ensure that it does not move. Then fix the ramps in line with the centers of the trailer and the machine. Be sure that the two sides are at the same level as one another.

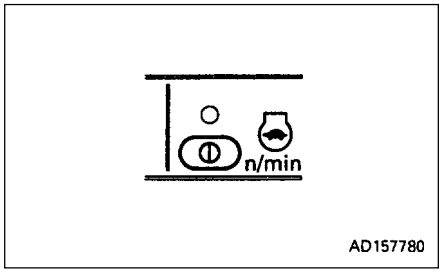
   Make the angle of the ramps a maximum of 15°.
   Set the distance between the ramps to match the center of the tracks.



2. Set the travel speed switch to the Lo position

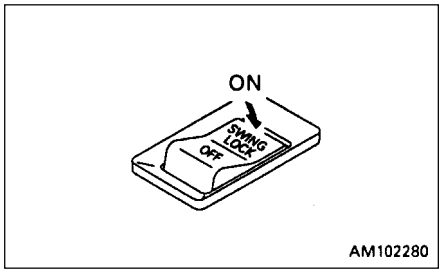


3. Turn the auto-deceleration switch OFF, and return the fuel control dial to reduce the engine speed.



4. Turn the swing lock switch ON to apply the swing lock.

5. Set in the direction of the ramps, lower the work equipment as far as possible without letting it hit the trailer, thn travel slowly to load or unload the machine.



When on the ramps, do not operate any lever other than the trael lever.

6. Load the machine correctly in the specified position on the trailer.

REMARK

When the work equipment is installed, load the machine from the front; when the work equipment is not installed, load the machine from the rear.

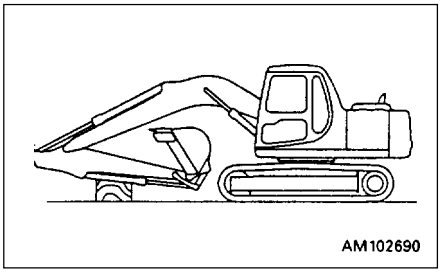
13.2 PRECAUTIONS FOR LOADING

⚠ WARNING

When loading the machine, park the trailer on a flat firm roadbed. Keep a fairly long distance between the road shoulder and the machine.

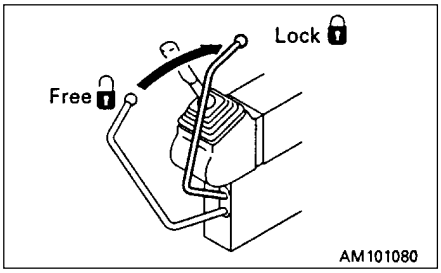
After loading to the specified position, secure the machine as follows.

1. Fully extend the bucket and arm cylinders, then slowly lower the boom.

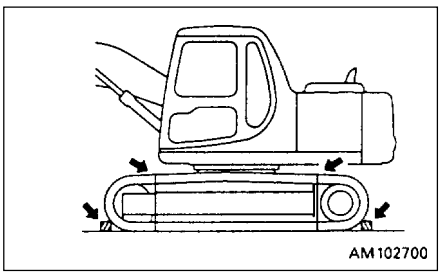


2. Stop the engine and remove the key from the starting switch.

3. Lock all the control levers securely with the safety lock lever.



4. When transporting the machine, place rectangular timber underneath the front and rear track shoes to prevent the machine from moving about. Also, hold it down with chains or rope. Be particularly careful to ensure that the machine does not slip sideways.



NOTICE

When transporting the machine, place rectangular timper under one end of the bucket cylinder to prevent it touching the ground, thereby saving it from possible damage.

13.3 PRECAUTIONS FOR TRANSPORTATION

⚠ WARNING

- **Determine the route for transporting the machine by taking into account the width, height and weight of the machine.**
- **Always check that the door on the cab is closed and locked before transporting the machine.**

Obey all state and local laws governing the weight, width and length of a load. Observe all regulations governing wide loads.

13.4 LIFTING THE MACHINE

How to lift a machine

Personnel who perform lifting using a crane must be qualified

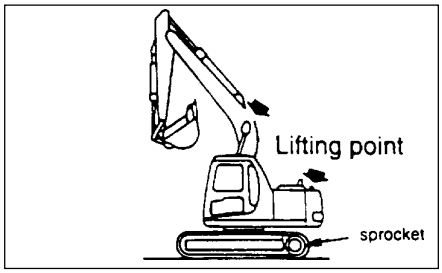
⚠ PRECAUTION

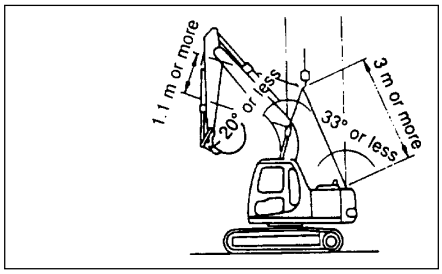
Contact your distributor to get an instruction of lifting a machine. Some parts are required and availabl as optional parts.

⚠ WARNING

- **Do not lift a machine with personnel in it.**
- **The rope used for lifting must have sufficient strength to withstand the weight of this machine.**
- **The machine must not be in a position other than that shown in the following procedure when lifting a vehicle. Otherwise, the machine may be unbalanced.**

Before lifting the machine, place the machine on a flat horizontal surface and follow the procedure shown below





1) Set the machine to the position shown in the figure on the right by fully extending all cylinders. (Boom at its highest point, arm and bucket fully retracted).

2) Set the safety lock lever in the lock position.

3) Switch the engine off and confirm any loose objects are placed in the storage compartment behind the operator's seat.

4) Make sure the front windshield is closed and securely locked.

5) Get out of the machine, close the cab door and lock it.

6) Close and lock left and right hand machine cab doors, battery compartment and engine hood.

7) Attach the correct strength lifting shackles to the lifting hooks on the Boom and Counterweight.

8) Hang the wire rope.
NOTE: The wire rope length(s) and angles must be as shown in the figure on the right.

9) On commencement of lifting
Take up slack in the rope and check for work equipment movement, (due to possibl hydraulic drift) adjust lifting hook position, if required, to maintain rope length(s) and angles as shown in the figure on the right.

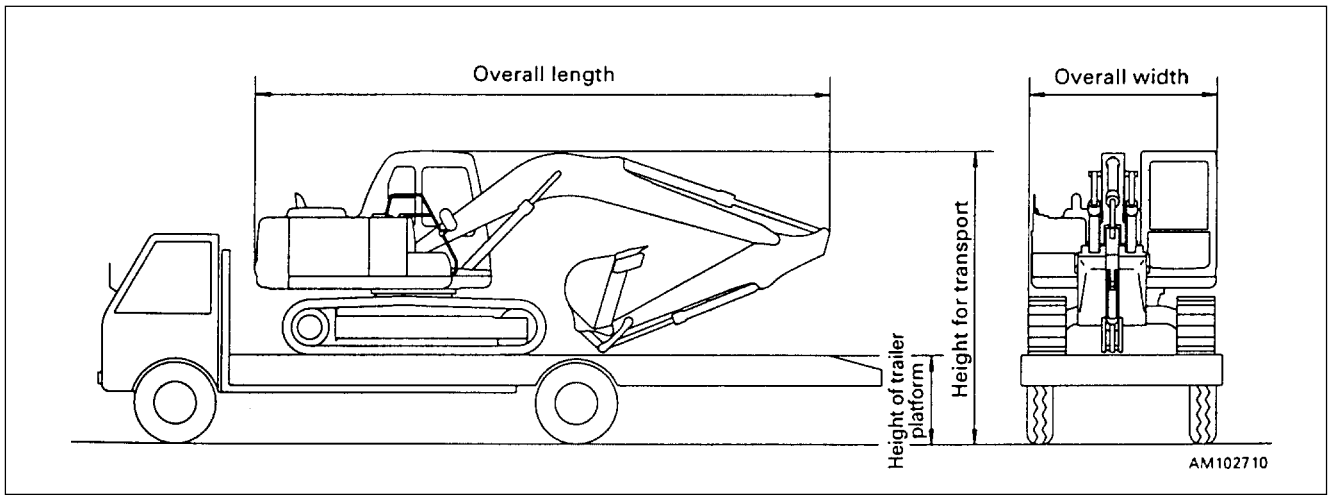
10) Lift until the machine leaves the ground. At this point stop lifting and check the balance of the machine.

11) If the machine is unstable lower and adjust rope and lifting hook position.

12) Repeat steps 10) and 11) until machine stability is achieved then slowly commence lifting operation.

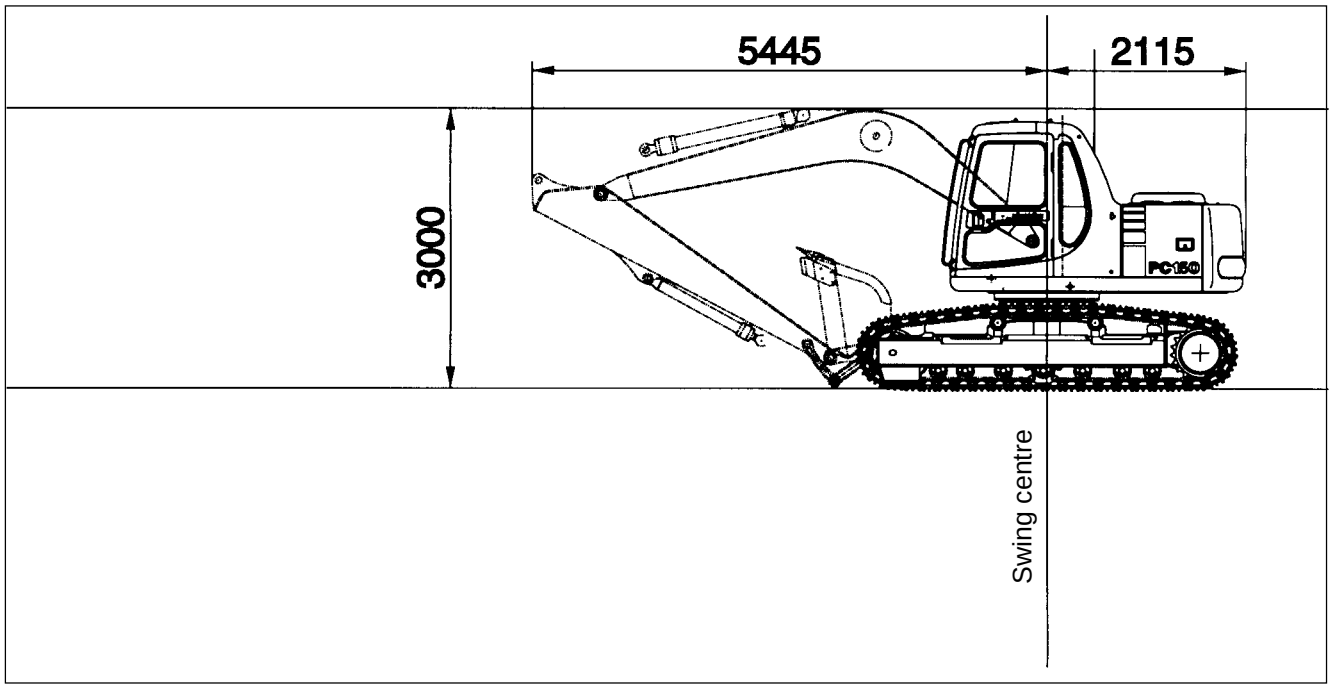
Model	Specification	Overall length (mm)	Overall width (mm)	Overall height	Weight	Shoe width (mm)
PC130	General civil engineering	7595	2760	2715	12250 kg	500
	Wide shoe	7595	2760	2715	12620 kg	700
	Long arm	7510	2760	3075	12400 kg	500

Height for transport = Overall height + height of trailer platform



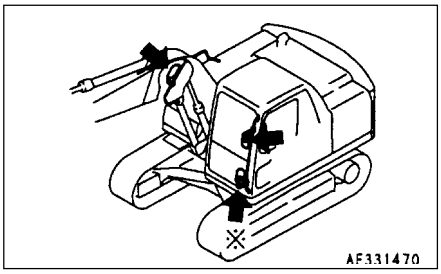
Model	Overall length (mm)	Overall width (mm)	Overall height	Weight	Shoe width (mm)
PC150LGP-6K	7595	3080	3075	15470 kg	900

PC150-6K low ground pressure transport dimensions with 3.0 m arm



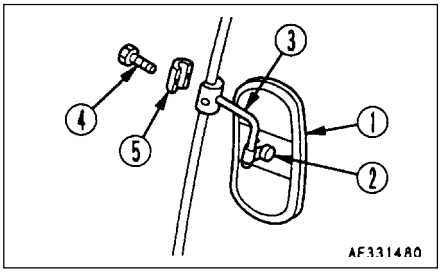
REMOVAL AND INSTALLATION OF MIRRORS

Mirrors are installed to the positionsshown at right (The onemarked with ※ optional). When removing and installing them for replacement or transportation, observe the following procedures.



Removal

1. Loosen nut ② of mirror ①, and remove mirror ① from support ③.
2. Loosen bolt ④, and remove supprot ③ and clamp ⑤ from the handrail.



Installation

1. Install support ③ and clamp ⑤ to the handrail, then secure it with bolt ④.
2. Install mirror ① to support ③, then tighten nut ②.

14. COLD WEATHER OPERATION

14.1 PRECAUTIONS FOR LOW TEMPERATURE

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

14.1.1 FUEL AND LUBRICANTS

Change to fuel and oil with low viscosity for all components. For details of the specified viscosity, see "20. USE OF FUEL, COOLANT AND LUBRICANTS ACCORDING TO AMBIENT TEMPERATURE".

14.1.2 COOLANT

⚠ WARNING

Keep antifreeze fluid away from an open flame. Never smoke when using antifreeze.

NOTICE

- **Never use methanol, ethanol or propanol based antifreeze.**
- **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.**

For details of the antifreeze mixture when changing the coolant, see "24.2 WHEN REQUIRED".

Use a Permanent Antifreeze (ethylene glycol mixed with corrosion inhibitor, antifoam 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 O-A-548D

REMARK

Where no permanent antifreeze is available, an ethylene glycol antifreeze without corrosion inhibitor may be used only for the cold 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.

14.1.3 BATTERY

WARNING

- **To avoid gas explosions, do not bring fire or sparks near the battery.**
- **Battery electrolyte is dangerous. If it gets in your eyes or on your skin, wash it off with large amounts of water and consult a doctor.**

When the ambient temperature drops, the capacity of the battery will also drop. If the battery charge ratio is low, the battery electrolyte may freeze. Maintain the battery charge as close as possible to 100%, and insulate it against cold temperature so that the machine can be started easily the next morning.

REMARK

Measure the specific gravity and calculate the rate of charge from the following conversion table.

Temp. of fluid / Rate of charge	20°C (68°F)	0°C (32°F)	-10°C (14°F)	-20°C (-4°F)
100%	1.28	1.29	1.30	1.31
90%	1.26	1.27	1.28	1.29
80%	1.24	1.25	1.26	1.27
75%	1.23	1.24	1.25	1.26

14.2 PRECAUTIONS AFTER COMPLETION OF WORK

To prevent mud, water, or the undercarriage from freezing and making it impossible for the machine to move on the following morning, always observe the following precautions.

- Mud and water on the machine body should be completely removed. This is to prevent damage to the seal caused by mud or dirt getting inside the seal with frozen drops of water.

- Park the machine on hard, dry ground. If this is impossible, park the machine on wooden board. The boards help protect the tracks from being freezed in soil and the machine can start next morning.

- Open the drain valve and drain any water collected in the fuel system to prevent if from freezing.

- As the battery capacity drops markedly in low temperatures, cover the battery or remove it from the machine, keep it in a warm place, and install it again the next morning.

- If electrolyte level is found low, add distilled water in the morning before beginning work. Do not add the water after the day's work so as to prevent fluid in the battery from freezing in the night.

14.3 AFTER COLD WEATHER

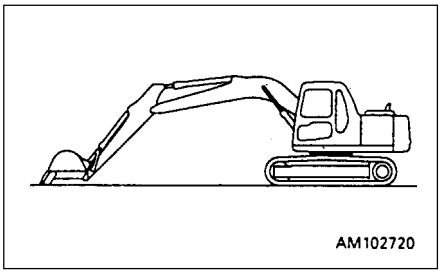
When season changes and the weather becomes warmer, do as follows.

- Replace the fuel and oil for all parts with oil of the viscosity specified. For details, see "20. USE OF FUEL, COOLANT AND LUBRICANTS ACCORDING TO AMBIENT TEMPERATURE".

- If for any reason permanent antifreeze cannot be used, and an ethyl glycol base antifreeze (winter, one season type) is used instead, or if no antifreeze is used, drain the cooling system completely, then clean out the inside of the cooling system thoroughly, and fill with fresh water.

15. LONG-TERM STORAGE

15.1 BEFORE STORAGE



NOTICE

To protect the cylinder rod when the machine is not being used, set the work equipment in the posture shown in the diagram. (This prevents rusting of the cylinder rod)

When putting the machine in storage for a long time, do as follows.

- Wash and clean each part, then store the machine indoors. If you must keep the machine outdoors, place it on a level place where it will not be subjected to floods and other natural disasters, and keep it covered.
- Completely fill the fuel tank, lubricate and change the oil before storage.
- Apply a thin coat of grease to metal surface of the hydraulic piston rods.
- Disconnect the negative terminals of the battery and cover it, or remove it from the machine and store it separately.
- If the ambient temperature is expected to drop below 0°C, always add antifreeze to the cooling water.
- Lock each control lever and pedal with the lock lever and pedal lock.
- Set the stop valve to the "lock" position on machines ready for attachments. Install the blind plugs to the elbows.
- Set the selector valve to the "Crusher and general attachment" position on machines ready for attachments.

15.2 DURING STORAGE

WARNING

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

Operate the engine and move the machine for a short distance once a month so that a new film of oil will be coated over movable parts and component surfaces. At the same time, also charge the battery.

Also carry out cooler operation in the case of machines equipped with an air conditioner.

15.3 AFTER STORAGE

NOTICE

If the machine is stored without carrying out the monthly rust prevention operation, request your Komatsu distributor for service.

Carry out the following procedure when taking the machine out of long-term storage.

- Wipe off the grease from the hydraulic cylinder rods.
- Add oil and grease to all places.

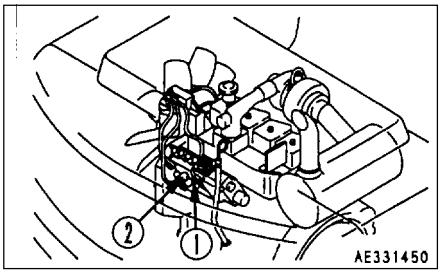
15.4 STARTING MACHINE AFTER LONG-TERM STORAGE

When starting the machine after a long-term storage, first cancel the automatic warming-up function as follows.

1. Turn the starting switch key to the ON position.
2. Turn the fuel control dial from the low idling (MIN) position to the full (MAX) position, hold it there for 3 seconds, then return it to the low idling (MIN) position and start the engine.

16. TROUBLESHOOTING

16.1 WHEN MACHINE RUNS OUT OF FUEL

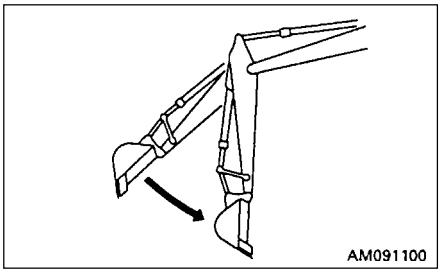


If the machine has run out of fuel, add fuel then bleed the air from the system before starting the engine.

PROCEDURE FOR BLEEDING AIR

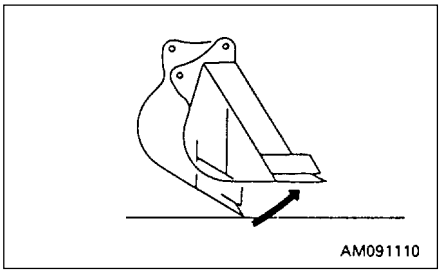
1. Loosen joint bolt ①
2. Loosen the knob of feed pump ②, and move it up and down until clear fuel containing no bubbles flows out through joint bolt ①.
3. Tighten joint bolt ①

16.2 PHENOMENA THAT ARE NO FAILURES



Note that the following phenomena are not failures:

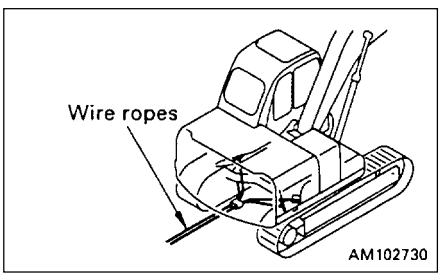
1. When the arm is pulled in, the speed of movement will drop momentarily when the arm is more or less vertical.



2. The arm speed will drop momentarily when the bucket teeth are more or less horizontal.
3. When starting or stopping the swing, noise will be emitted from the brake valve.
4. When going down a steep slope at low speed, a noise will be emitted from the travel motor.

16.3 METHOD OF TOWING MACHINE

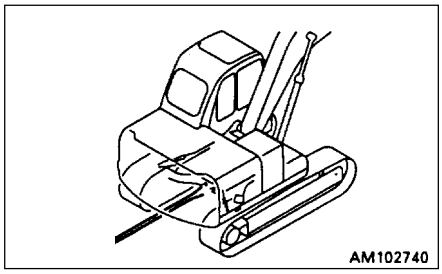
When towing the machine, use a wire rope that has ample strength for the weight of the machine that is being towed.



If the machine sinks in the mud and cannot get out under its own power, or if the drawbar pull of the excavator is being used to tow a heavy object, use a wire rope as shown in the diagram on the right. Place pieces of wood between wire ropes and body to prevent damage to ropes and body.

At this time, never use the hook for light-weight towing.

16.4 USING METHOD FOR LIGHT-WEIGHT TOWING HOOK



WARNING

- **The shackle must always be used.**
- **Hold the rope level and direct it straight to the track frame**
- **Move the machine slowly in the Lo mode.**

The track frame has been equipped with a hook to pass the shackle for towing light objects.

16.5 PRECAUTIONS ON PARTICULAR JOBSITES

1. When carrying out digging operations in water, if the work equipment mounting pin goes into the water, carry out greasing every time the operation is carried out.

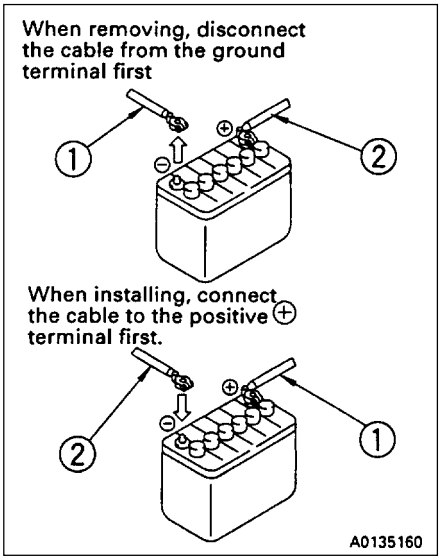
2. For heavy-duty operations and deep digging, carry out greasing of the work equipment mounting pins every time before operation.

After greasing, operate the boom, arm and bucket several times, then grease again.

16.6 IF BATTERY IS DISCHARGED

WARNING

- **When checking or handling the battery, stop the engine and turn the starting switch key to the OFF position before starting.**
- **The battery generates hydrogen gas, so there is danger of explosion. Do not bring lighted cigarettes near the battery,or do anything that will cause sparks.**
- **Battery electrolyte is dilute sulphuric acid, and it will attack your clothes and skin. If it gets on your clothes or on your skin, wash it immediately off with large amounts of water. If it gets in your eyes, wash it out with fresh water and consult a doctor.**
- **When handling battery, always wear protective goggles.**
- **When removing the battery, first disconnect the cable from the ground (normally, from the negative ⊖ terminal). When installing, install the positive ⊕ terminal first. If a tool touches the cable connecting the positive terminal and the chassis, there is danger that it will cause sparks.**
- **If the terminals are loose, there is danger that the defective contact may generate sparks that will cause an explosion. When installing the terminals, install them tightly.**
- **When removing of installing, check which is the positive ⊕ terminal and negative ⊖ terminal.**



16.6.1 REMOVING AND INSTALLING BATTERY

- Before removing the battery, remove the ground cable (normally connected to the negative ⊖ terminal). If any tool touches between the positive terminal and the chassis, there is danger of sparks being generated. Loosen the nut of the terminal and remove the wires from the battery.
- When installing the battery, connect the ground cable last.
  Insert the hole of the terminal on the battery and tighten the nut.
- Tightening torque:
  Tightening battery terminal:9.8 - 14.7 N.m
  (1.0 - 1.5 kgf.m)

16.6.2 PRECAUTIONS FOR CHARGING BATTERY

CHARGING BATTERY WHEN MOUNTED ON MACHINE

- Before charging, disconnect the cable from th negative ⊖ terminal of the battery. Otherwise an unusual high voltage will damage the alternator.

- While charging the battery, remove all battery plugs for satisfactory ventilation.
  To avoid gasexplosions, do not bring fire or sparks near the battery.

- If the electrolyte temperature exceeds 45°C, stop charging for a while.

- Turn off the charging as soon as the battery is charging.
  Overcharging the battery may cause the following:

1. Overcharging the battery
2. Decreasing the quantity of electrolyte
3. Damaging the electrode plate

- Do not mix the cables (positive ⊕ to negative ⊖ or negative ⊖ to positive ⊕, as it will damage the alternator.

- When performing any service to the battery besides checking the elecrolyte level or measuring the specific gravity, disconnect cables from the battery.

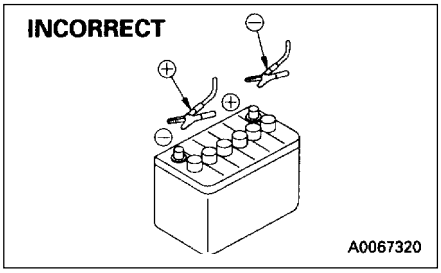
16.6.3 STARTING ENGINE WITH BOOSTER CABLE

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

Precautions when connecting and disconnecting booster cable

⚠ WARNING

- **When connecting the cables, never contact the positive ⊕ and negative ⊖ terminals.**
- **When starting the engine with a booster cable, always wear safety glasses.**
- **Be careful not to let the normal machine and problem machine contact each other. This prevents sparks from generating near the battery which could ignite the hydrogen gas given off by the battery. If hydrogen gas explodes, it could cause serious injury.**
- **Make sure that there is no mistake in the booster cable connections. The final connection is to the revolving frame, but sparks will be generated when this is done, so connect to a place as far as possible from the battery. (However, avoid connecting the cable to the work equipment, as conduction is poor.)**
- **Use care when removing the cables from the machine that has been started. Do not allow the cable ends to contact each other or the machine, to avoid hydrogen explosion.**



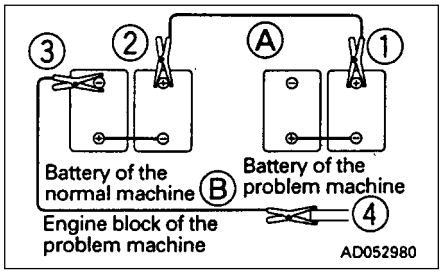
NOTICE

- **The size of the booster cable and clip should be suitable for the battery size.**
- **The battery of the normal machine must be the same capacity as that of the engine to be started.**
- **Check the cables and clips for damage or corrosion.**
- **Make sure that the cables and clips are firmly connected.**

Connecting the booster cables

Keep the starting switch at the OFF position.

Connect the booster cable as follows, in the order of the numbers marked in the diagram.



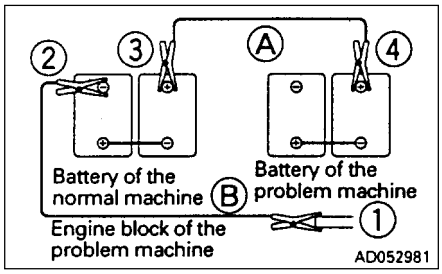
1. Make sure that the starting switches of the normal machine and problem machine are both at the OFF position.
2. Connect one clip of booster cable Ⓐ to the positive ⊕ terminal of the problem machine.
3. Connect the other clip of booster cable Ⓐ to the positive ⊕ terminal of the normal machine.
4. Connect one clip of booster cable Ⓑ to the negative ⊖ terminal of the normal machine.
5. Connect the other clip of booster cable Ⓑ to the engine block of the problem machine.

Starting the engine

1. Make sure the clips are firmly connected to the battery terminals.
2. Start the engine of the normal machine and keep it to run at high idling speed.
3. Turn the starting switch of the problem machine to the START position and start the engine. If the engine does not start at first, try again after 2 minutes or so.

Disconnecting the booster cables

After the engine has started, disconnect the booster cables in the reverse of the order in which they were connected.



1. Remove one clip of booster cable Ⓑ from the engine block of the problem machine.
2. Remove the other clip of booster cable Ⓑ from the negative ⊖ terminal of the normal machine.
3. Remove one clip of booster cable Ⓐ from the posititve ⊕ terminal of the normal machine.
4. Remove the other clip of booster cable Ⓐ from the positive ⊕ terminal of the problem machine.

16.7 OTHER TROUBLE

16.7.1 ELECTRICAL SYSTEM

- ( ): Always contact your Komatsu distributor when dealing with these items.
- In cases of abnormalities or causes which are not listed below, please contact your Komatsu distributor for repairs.

Problem	Main causes	Remedy
Lamp does not glow brightly even when the engine runs at high speed Lamp flickers while engine is running	• Defective wiring • Defective adjustment of fan belt tension	(• Check, repair loose terminals, disconnections) • Adjust fan belt tension For details, see EVERY 1000 HOURS SERVICE
Charge level monitor does not go out even when engine is running	• Defective alternator • Defective wiring	(• Replace) (• Check, repair)
Abnormal noise is generated from alternator	• Defective alternator	(• Replace)
Starting motor does not turn when starting switch is turned to ON	• Defective wiring • Insufficient battery charge	(• Check, repair) • Charge
Pinion of starting motor keeps going in and out	• Insufficient battery charge	• Charge
Starting motor turns engine sluggishly	• Insufficient battery charge • Defective starting motor	• Charge (• Replace)
Starting motor disengages before engine starts	• Defective wiring • Insufficient battery charge	(• Check, repair) • Charge
Pre-heating monitor does not light	• Defective wiring • Defective heater relay • Defective monitor	(• Check, repair) (• Replace) (• Replace)
Oil pressure monitor does not light up when engine is stopped (starting switch is at ON position)	• Defective monitor • Defective caution lamp switch	(• Replace) (• Replace)
Outside of electrical heater is not warm when touched by hand	• Defective wiring • Disconnectionin electric heater • Defective operation of heater relay switch	(• Check, repari) (• Replace) (• Replace)

16.7.2 CHASSIS

- ( ): Always contact your Komatsu distributor when dealing with these items.
- In cases of abnormalities or causes which are not listed below, please contact your Komatsu distributor for repairs.

Problem	Main causes	Remedy
Speed of travel, swing, boom, arm, bucket is slow	• Lack of hydraulic oil	• Add oil to specified level, see CHECK BEFORE STARTING
Pump generates abnormal noise	• Clogged element in hydraulic tank strainer	• Clean, see EVERY 2000 HOURS SERVICE
Excessive rise in hydraulic oil temperature	• Loose fan belt • Dirty oil cooler • Lack of hydraulic oil	• Adjust fan belt tension, see EVERY 250 HOURS SERVICE • Clean, see EVERY 500 HOURS SERVICE • Add oil to specified level, see CHECK BEFORE STARTING
Track comes off	• Track too loose	• Adjust track tension, see WHEN REQUIRED
Abnormal wear of sprocket		
Bucket rises slowly, does not rise	• Lack of hydraulic oil	• Add oil to specified level, see CHECK BEFORE STARTING

16.7.3 ENGINE

- ( ): Always contact your Komatsu distributor when dealing with these items.
- In cases of abnormalities or causes which are not listed below, please contact your Komatsu distributor for repairs.

Problem	Main causes	Remedy
Engine oil pressure monitor lights up	• Engine oil pan oil level is low (sucking in air) • Clogged oil filter cartridge • Defective tightening of oil pipe joint, oil leakage from damaged part • Defective engine oil pressure sensor	• Add oil to specified level, see CHECK BEFORE STARTING • Replace cartridge, see EVERY 250 HOURS SERVICE (• Check, repair) (• Replace sensor)
Steam is emitted from top part of radiator (pressure valve)	• Cooling water level low, water leakage • Loosen fan belt • Dirt or scale accumulated in cooling system • Clogged radiator fin or damaged fin • Defectie thermostat • Loose radiator filler cap (high altitude operation • Defective water level sensor	• Add cooling water, repair, see CHECK BEFORE STARTING • Adjust fan belt tension, see EVERY 1000 HOURS SERVICE • Change cooling water, clean inside of cooling system, see WHEN REQUIRED • Clean or repair. see EVERY 500 HOURS SERVICE (• Replace thermostat) • Tighten cap or replace packing (• Replace sensor)
Radiator water level monitor lights up		
Engine does not start when starting motor is turned	• Lack of fuel • Air in fuel system • Defective fuel injection pump or nozzle • Starting motor cranks engine sluggishly • Preheating monitor does not light up • Defective compression ° Defective valve clearance	• Add fuel, see CHECK BEFORE STARTING • Repair place where air is sucked in, see EVERY 500 HOURS SERVICE (• Replace pump or nozzle) See ELECTRICAL SYSTEM (° Adjust valve clearance)

ENGINE (cont'd) (16.7.3)

Problem	Main causes	Remedy
Exhaust gas is white or blue	• Too much oil in oil pan • Improper fuel	• Add oil to specified level, see CHECK BEFORE STARTING • Change to specified fuel
Exhaust gas occasionally turns black	• Clogged air cleaner element • Defective nozzle • Defective compression • Defective turbocharger	• Clean or replace, see WHEN REQUIRED (• Replace nozzle) (• See defective compression above) • Clean or replace turbocharger
Combustion noise occasionally makes breathing sound	• Defective nozzle	(• Replace nozzle)
Abnormal noise generated (combustion or mechanical)	• Low grade fuel being used • Overheating • Damage inside muffler • Excessive valve clearance	• Change to specified fuel • Refer to "Radiator water level monitor lights up" as above (• Replace muffler) (• Adjust valve clearance)

16.7.4 ELECTRONIC CONTROL SYSTEM

If any error code appearts on the machine monitor display (normally displays TIME), follow the countermeasure table as shown below in the self-diagnosis.

Machine monitor trouble display

Monitor display	Error mode	Countermeasure
E02	TVC valve system error	If the pump override switch is set to the ON position, operation can be carried out. However, immediately have the TVC valve system inspectd by your Komatsu distributor. (✶)
E03	Swing brake system error	Set the swing override switch to the ON position to release the brake. If applying the swing brake, manually operate the swing brake using the swing holding brake switch. In this case, immediately have the swing brake system inspected by your Komatsu distributor. (✶)
E05	Governor system error	Governor will not execute the control function. Manually operate the governor-lever. To fix the governor lever at the full stroke position, use the retaining bolt holes on bracket. In this case, immediately have the governor system inspected by your Komatsu distributor.
CALL	Error indicating that operation cannot be continued.	Place the machine in a safe posture, then have it inspected immediately by your Komatsu distributor.
In the case where the monitor will not display error codes and work equipment operation and swing operation cannot be carried out		Have the machine inspected immediately by your Komatsu distributor.

(✶)For detail of operating the pump override switch and the swing override switch, refer to "11.2 SWITCHES".

MEMO

MAINTENANCE

17. GUIDES TO MAINTENANCE

Do not carry out any inspection and maintenence operation that is not given in this manual.

Perform maintenance work on hard, flat ground.

Check service meter:
Check the service meter reading every day to see if the time has come for necessary maintenance to be carried out.

Komatsu genuine replacement parts:
Use Komatsu genuine parts specified in the Parts Book as replacement parts.

Komatsu genuine oils:
Use Komatsu genuine oils and grease. Choose oils and grease with proper viscosities specified for ambient temperature.

Always use clean washer fluid:
Use automobile window washer fluid and be careful not to let any dirt get into it.

Always use clean oil and grease:
Use clean oil and grease. Also, keep containers of the oil and grease clean. Keep foreign materials away from oil and grease.

Keeping the machine clean:
Always keep the machine clean. This makes it easier to find parts causing problems. Keep in particular grease fittings, breathers and oil level gauges clean and avoid foreign matters from getting in them.

Be careful of hot water and oil:
Draining hot oils and coolants and removing their filters immediately after the engine stops are hazardous. Allow the engine to cool.
If the oil has to be drained when it is cold, warm up the oil to a suitable temperature (approx. 20 - 40°C) before draining it.

Checking foreign materials in drained oil and on filter:
After oil is changed or filters are replaced, check the oil and filters for metallic particles and foreign materials. If large quantities of metallic particles or foreign materials are found, consult your Komatsu distributor.

Fuel strainer:
If your machine is equipped with a fuel strainer, do not remove it while fueling.

Oil change:
Check or change oils in places where dust is scarce to keep foreign materials away from oils.

Warning tag:
Attach the warning tag to the starting switch or other appropriate control lever to avoid someone who is not aware of the circumstances from starting the engine.

Obey precautions
During the operation, always obey the precautions on the safety label attached to the machine.

Welding instructions
- Turn off the engine starting switch
- Do not apply more than 200 V continuously
- Connect grounding cable within 1 m from the area to be welded.
- Avoid seals or bearings from being between the area to be welded and the position of grounding point.
- Do not use the area around the work equipment pins or the hydraulic cylinders as the grounding point.

Fire prevention:
Use non-flammable cleaner or light oil for cleaning parts. Keep flame or cigarette light away from light oil

Clamp face:
When O-rings or gaskets are removed, clean the clamp faces and replace the O-rings and gaskets with new ones. Be sure to fit O-rings and gaskets when assembling.

Objects in your pockets:
Keep your pockets free of loose objects which can fall out and drop into the machinery; especially when you work on the machinery while bending over it.

Checking undercarriage:
When working in rocky areas, check for damage to the undercarriage and for looseness, flaws, wear and damage in bolts and nuts. Loosen the track tension a little when working in such areas.

Precautions when washing the machine:
- Never spray steam or water directly on the connectors and mechatronics parts.
- Do not allow water to get on the monitors and controllers inside the operator's cab.
- Never spray steam or water directly at the radiator or oil cooler portions.

Pre- and post-work checks:
Before starting work in mud, rain, snow or at seashore, check plugs and valves for tightness.
Wash the machine immediately after the work to protect components from rusting.
Lubricate components more frequently than usual. Be sure to lubricate work equipment pins daily if they are submerged in water.
Dusty worksite:
When working at dusty worksites, do as follows:
- Inspect the air cleaner clogging monitor to see whether the air cleaner is blocked up. Clean the air cleaner at shorter intervals than specified.
- Clean the radiator more frequently to avoid clogging.
- Clean and replace the fuel filter frequently.
- Clean electrical components, especially the starting motor and alternator, to avoid accumulation of dust.

Avoid mixing oil:
Never mix oils of different brands. If you have only oil which is a different brand from the one that is used in the machine, do not add it but replce all the oil.

18. OUTLINES OF SERVICE

- Use Komatsu genuine parts for replacement.
- When changing or adding oil, do not use a different type of oil.
- Unless otherwise specified, the oil and coolant used at the time of shipment from the factory are as shown in the table below.

Item	Kind of fluid
Engine oil pan	SAE 15W-40 API classification CD
Swing machinery case Final drie case PTO gear case	SAE 30 API classification CE
Hydraulic tank	SAE 10W API classificationCD
Fuel tank	ASTM D975 No. 2 (However, ASTM D975 No. 1 is used for the winter season, October to March)
Radiator	Komatsu Super Coolant (AF-ACL) 41% added to water

18.1 OUTLINE OF OIL, FUEL, COOLANT

18.1.1 OIL

- Oil is used in the engine and work equipment under extremely severe conditions (high temperature, high pressure), and it deteriorates with use.
  Always use oil that matches the grade and temperature for use given in the Operation and Maintenance Manual. Even if the oil is not dirty, always replace the oil after the specified interval.
- Oil corresponds to blood in the human body, so always be careful when handling it to prevent any impurities (water, metal particles, dirt etc.) from getting in.
  The majority of problems with machine are caused by the entrance of such impurities.
  Take particular care not to let any impurities get in when storing or adding oil
- Never mix oils of different grades or brands.
- Always add the specified amount of oil
  Having too much oil or too little oil are both causes for problems.
- If the oil in the work equipment is not clear, there is probably water or air getting into the circuit.
  In such cases, please contact your Komatsu distributor.
- When changing the oil always replace the related filters at the same time.
- We recommend you to have an analysis made of the oil periodically to check the condition of the machine. For those who wish to use this service, please contact your Komatsu distributor.

18.1.2 FUEL

- The fuel pump is a precision instrument, and if fuel containing water or dirt is used, it cannot work properly.
- Be extremely careful not to let impurities get in when storing or adding fuel.
- Always use the fuel specified in the Operation and Maintenance Manual.
  Fuel may congeal depending on the temperature when it is used (particularly in low temperature below -15°C), so it is necessary to change to a fuel that matches the temperature.
- To prevent the moisture in the air from condensing and forming water inside the fuel tank, always fill the fuel tank after completing the day's work.
- Before starting the engine, or when 10 minutes have passed after adding fuel, drain the sediment and water from the fuel tank.
- If the engine runs out of fuel, or if the filters have been replaced, it is necessary to bleed the air from the circuit.

18.1.3 COOLANT

- River water contains large amounts of calcium and other impurities, so if it is used, scale will stick to the engine and radiator, and this will cause defective heat exchange and overheating.
  Do not use water that is not suitable for drinking.
- When using anti-freeze, always observe the precautions given in the Operation and Maintenance Manual.
- Komatsumachines are supplied with Komatsu original anti-freeze in the coolant when the machine is shipped. This anti-freeze is effective in preventing corrosion of the cooling system.
  The anti-freeze can be used continuously for two years or 4000 hours. Therefore, it can be used as it is even in hot areas.
- Anti-freeze is inflammable, so be extremely careful not to expose it to flame or fire.
- The proportion of anti-freeze to water differs according to the ambient temperature.
  For details of the mixing proportions, see 24.2.2 CLEAN INSIDE OF COOLING SYSTEM".
- If the engine overheats, wait for the engine to cool before adding coolant.
- If the coolant level is low, it will cause overheating and will also cause problems with corrosion from the air in the coolant.

18.1.4 GREASE

- Grease is used to prevent twisting and noise at the joints.
- The nipples not included in the maintenance section are nipples for overhaul, so they do not need grease. If any part becomes stiff after being used for long time, add grease.
- Always wipe off all of the old grease that is pushed out when greasing. Be particularly careful to wipe off the old grease in places where sand or dirt sticking in the grease would cause wear of the rotating parts.

18.1.5 STORING OIL AND FUEL

- Keep indoors to prevent any water, dirt, or other impurities from getting in.
- When keeping drum cans for a long period, put the drum on its side so that the filler port of the drum can is at the side. (To prevent moisture from being sucked in).

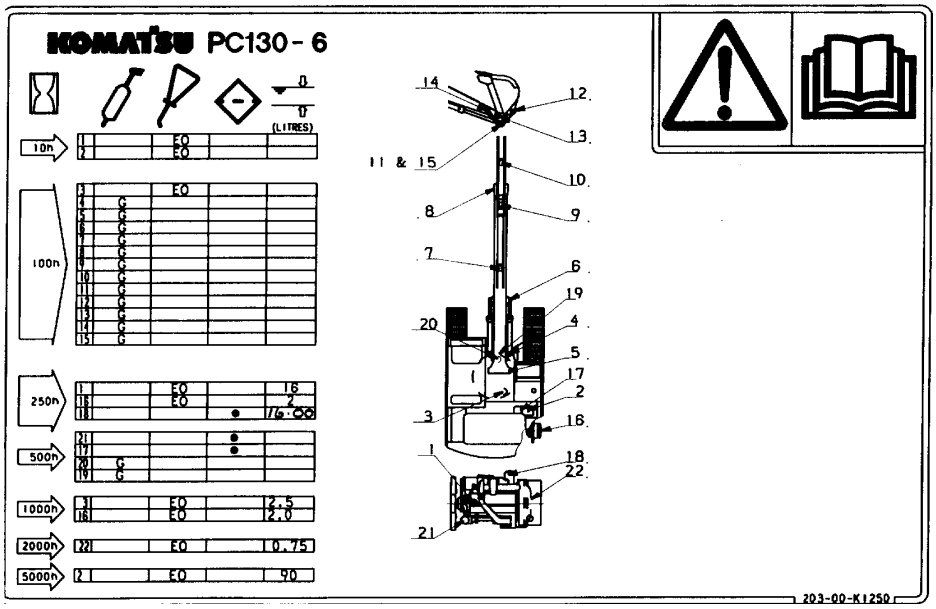
If drum cans have to be stored outside, cover them with a waterproof sheet or take other measures to protect them.

- To prevent any change in quality during long-term storage, be sure to use in the order of the first in - first out (use the oldest oil of fuel first).

18.1.6 FILTERS

- Filters are extremely important safety parts. They prevent impurities in the fuel and air circuits from entering important equipment and causing problems.
  Replace all filters periodically. For details, see the Operation and Maintenance Manual.
  However, when working in severe conditions, it is necessary to consider replacing the filters at shorter intervals according to the oil and fuel (sulfur content) being used.
- Never try to clean the filters (cartidge type) and use them again. Always replace with new filters.
- When replacing oil filters, check it any metal particles are stuck to the old filter. If any metal particles are found, please contact your Komatsu distributor.
- Do not open packs of spare filters until just before they are to be used.
- Always use Komatsu genuine filters

18.1.7 EXPLANATION OF LUBRICATION CHART DECAL



Interval of service

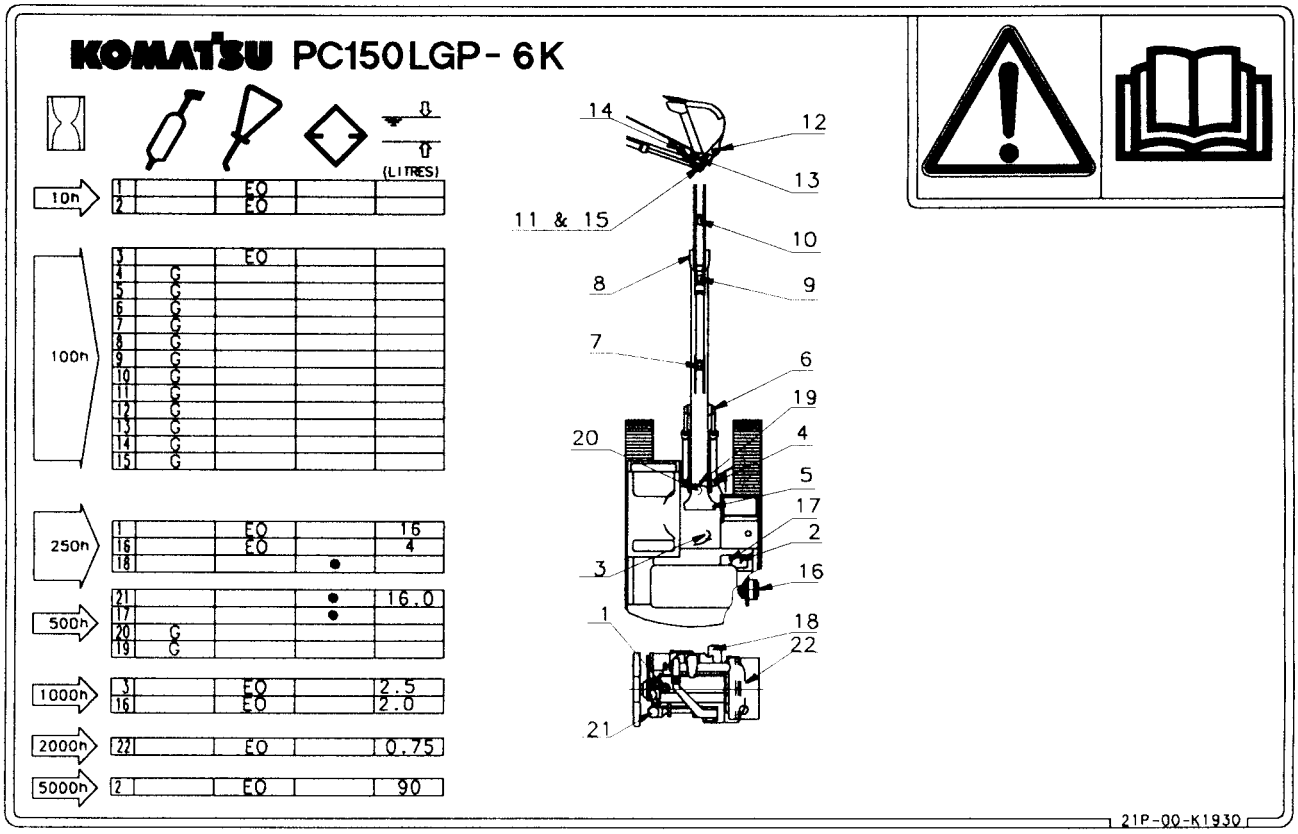
Lubrication by greasing (G)

Check oil level/ change oil (EO)

change filter (•)

Amount of oil required at change (litres)

(LITRES)



KEY TO LUBRICATION POINTS

1.	Engine oil	:	Check level
		:	Change oil
2.	Hydraulic oil	:	Check level
		:	Change oil
3.	Swing machinery oil	:	Check level
		:	Change oil
4.	Boom cylinder foot pin	:	Grease
5.	Boom foot pin	:	Grease
6.	Boom cylinder rod end	:	Grease
7.	Arm cylinder foot pin	:	Grease
8.	Boom arm coupling pin	:	Grease
9.	Arm cylinder rod end	:	Grease
10.	Bucket cylinder foot pin	:	Grease
11.	Bucket cylinder rod end	:	Grease
12.	Bucket link coupling pin	:	Grease
13.	Arm-bucket coupling pin	:	Grease
14.	Arm link coupling pin	:	Grease
15.	Link coupling pin	:	Grease
16.	Final drive oil	:	Check level
		:	Change oil
17.	Hydraulic filter	:	Change filter
18.	Engine oil	:	Change filter
19.	Swing circle	:	Lubricate
20.	Swing pinion	:	Lubricate
21.	Fuel filter	:	Change filter
22.	PTO	:	Change oil

18.2 OUTLINE OF ELECTRIC SYSTEM

- If the wiring gets wet or the insulation is damaged, the electric system leaks and this could result in hazardous malfunction of the machine.
- Service relating to the elctric system are (1) check of fan belt tension, (2) check of damage or war in the fan belt and (3) check of battery fluid level.
- Never remove or disassemble any electric components installed in the machine.
- Never install any electric components other than these specified by Komatsu.
- Be careful to keep the electric system free of water when washing the machine or when it rains.
- Since the controller for the control system may cause malfunction due to external wave interference, before installing a radio receiver and a walkie-talkie or citizen band, consult your Komatsu distributor.
- When working on the seashore, carefully clean the electric system to prevent corrosion.
- When installing a car cooler or any other electrical equipment, connect it to an independent power source connector. The optional power source must never be connected to the fuse, starting switch or battery relay.

18.3 OUTLINE OF HYDRAULIC SYSTEM

- During operation and immediately after operation is ended, the temperature of the hydraulic system still remains high.
  In addition, high hydraulic pressure is applied to the system. Take care when inspecting and maintaining the hydraulic system.
  - ○ Stop the machine on level ground, lower the bucket to the ground, then set so that there is no pressure applied to the cylinder circuit.
  - ○ Always stop the engine.
  - ○ Immediately after operations, the hydraulic oil and lubricating oil are at high temperature and high pressure, so wait for the oil temperature to go down before starting maintenance.
    Even when the temperature goes doen, the circuit may still be under internal pressure, so when loosening the plug or screw, or the hose joint, do not stand in front of the part. Loosen it slowly to release the internal pressure before removing it.
  - ○ When carrying out inspection or maintenance of the hydraulic circuit, always bleed the air from the hydraulic tank to remove the internal pressure.

- Periodic maintenance includes the inspection of the hydraulic oil level, replacement of the filter and refilling of hydraulic oil.

- When the high pressure hose etc. is removed, check the O-ring for damage. If necessary, replace it.

- After the hydraulic filter element and strainer are cleaned or replaced, or after the hydraulic system is repaired or replaced or the hydraulic piping is removed, bleed air from the hydraulic circuit.

- The accumulator is charged with high-pressure nitrogen gas. Incorrect handling may be dangerous. For the handling procedure, see "30.4 Handling accumulator".

19. WEAR PARTS LIST

Wear parts such as the filter element, bucket teeth etc. are to be replaced at the time of periodic maintenance or before their abrasion limits.

The wear parts should be changed correctly in order to use the machine economically.

For part change, Komatsu genuine parts of excellent quality should be used.

When ordering parts, please check the part number in the parts book.

The parts in parentheses are to be replaced at the same time.

Item	Part No.	Part name	Q'ty	Replacement frequency
Engine oil filter	600-211-5241	Cartridge	1	Every 250 hours service
Fuel filter	600-311-8221	Cartridge	1	Every 500 hours service
Hydraulic oil filter	203-60-61230 (07000-05155)	Element (O-ring)	1 (1)	Every 500 hours service
Additional fuel filter	600-311-9121	Cartridge	1	Every 500 hours service
Air cleaner	600-181-6050	Double element	1	-
Additional filter for breaker	203-973-5820	Element (incl. O-ring)	1 (1)	-
Electrical intake air heater	6136-11-4820	Gasket	2	-
Bucket		Vertical pin type		-
	205-70-74272	Tooth	4	
	(205-70-74281)	(Pin)	(4)	
	(205-70-74291)	(Lock)	(4)	
	202-70-63161	Side cutter (left)	1	-
	202-70-63171	Side cutter (right)	1	
	(208-32-11231)	(Bolt)	(8)	
	(01803-02228)	(Nut)	(8)	
		Horizontal pin type		-
	205-70-19570	Tooth	4	
	(09244-02496)	(Pin)	(4)	

20. USE OF FUEL, COOLANT AND LUBRICANTS ACCORDING TO AMBIENT TEMPERATURE

PROPER SELECTION OF FUEL, COOLANT AND LUBRICANTS

RESERVOIR	KIND OF FLUID	AMBIENT TEMPERATURE -40 -22 -4 14 32 50 68 86 104 122°F -40 -30 -20 -10 0 10 20 30 40 50°C	CAPACITY	
			Specified	Refill
Engine oil pan	Engine oil	SAE 15W-40 SAE 10W-30 SAE 30W SAE 10W Synthetic SAE 5W-30	17.5/	17/
Swing machinery case			2.5/	2.5/
PC130-6K Final drive case (each)			2.5/	2.5/
PC150LGP-6K Final drive case (each)		SAE 30W	4.0/	4.0/
PTO gear case			0.75/	0.75/
Hydraulic system		SAE 10W SAE 10W-30 SAE 15W-40	140/	90/
Fuel tank	Diesel fuel	ASTM D975 No. 2 ※	240/	-
Cooling system	Water	Add antifreeze	18.2/	-

※ **ASTM D975 No. 1**

REMARK
- When fuel sulphur content is less than 0.5% change oil in the oil pan every periodic maintenance hours described in this manual.

Change oil according to the following table if fuel sulphur content is above 0.5%.

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

- When starting the engine in an atmospheric temperature of lower than 0°C, be sure to use engine oil of SAE 10W, SAE 10W-30 and SAE 15W-40, even though an atmospheric temperature goes up to 10°C or more or less in the day time.

- Use API classification CD, CE or CF-4 as engine oil and if API classification CC, reduce the engine oil change interval to half.

- There is no problem if single grade oil is mixed with multigrade oil (SAE 10W-30, 15W-40), but be sure to add single grade oil that matches the temperature in the table.

- We recommend Komatsu genuine oil which has been specifically formulated and approved for use in engine and hydraulic work equipment applications.

Specified capacity: Total amount of oil including oil for components and oil in piping.
Refill capacity: Amount of oil neededto refill system during normal inspection and maintenance.

ASTM: American Society of Testing and Material
SAE: Society of Automotive Engineers
API: American Petroleum Institute

SPECTRUM XXX
KOMATSU GENUINE LUBRICANTS

TYPE	CLASS	VISCOSITY	REF.NO.
Engine oil	CF - 4	SAE15W - 40	**EO - 1540**
	CF - 4	SAE10W - 30	**EO - 1030**
TRANSMISSION OIL	CD	SAE10W	**TO - 10**
& GEAR BOX OIL	CD	SAE10W	**STO - 10 HEAVY DUTY**
	CD	SAE30	**TO - 30**
	CD	SAE50	**TO - 50**
HYDRAULIC OIL	CD	SAE10W	**HO - 10**
BIO HYDRAULIC OIL		SAE10W	**BO - 10**
GREASE			**LG - N2**
BIO GREASE			**BIO - R2**
ANTI FREEZE			**AF - 03**
BIO ANTI FREEZE			**BIO - AF - 0**

No.	Supplier	**Engine oil (CD, CE or CF-4)** SAE10W, 30, 40 10W30, 15W40 (The 15W40 oil marked * is CE)	**Gear Oil (GL-4 or GL5)** SAE80, 90, 140	**Grease (Lithium-Base)** NLGI No. 2	**Anti-freeze coolant (Ethylene Glycol Base) Permanent type**
1	KOMATSU	EO10-CD EO30-CD EO10-30CD EO15-40CD	GO90 GO140	G2-LI G2-LI-S	AF-ACL AF-PTL AF-PT (Winter, one season type)
2	AGIP	Diesel sigma S super dieselmultigrade *Sigma turbo	Rotra MP	GR MU/EP	-
3	AMOCO	*Amoco 300	Multi-purpose gear oil	RYKON premium grease	-
4	ARCO	*Arcofleet S3 plus	Arco HD gear oil	Litholine HEP 2 Arco EP moly D	-
5	BP	Vanellus C3	Gear oil EP Hypogear EP	Energrease LS-EP2	Antifreeze
6	CALTEX	*RPM delo 400 RPM delo 450	Universal thuban Universal thuban EP	Marfak all purpose 2 ultra-duty grease 2	AF engine coolant
7	CASTROL	*Turbomax *RX super CRD	EP EPX Hypoy Hypoy B Hypoy C	MS3 Spheerol EPL2	Anti-freeze
8	CHERON	*Delo 400	Universal gear	Ultra-duty grease 2	-
9	CONOCO	*Fleet motor oil	Universal gear lubricant	Super-sta grease	-
10	ELF	Multiperformance 3C Performance 3C	-	Tranself EP Tranself EP type 2	Glacelf
11	EXXON(ESSO)	Essolube D3 *Essolube XD-3 *Essolube XD-3 Extra *Esso heavy duty Exxon heavy duty	Gear oil GP Gear oil GX	Beacon EP2	All season coolant
12	GULF	Super duty motor oil *Super duty plus	Multi-purpose gear lubricant	Gulfcrown EP2 Gulfcrown EP special	Antifreeze and coolant
13	MOBIL	Delvac 1300 *Delvac super 10W-30, 15W-40	Mobilube GX Mobilube HD	Mobilux EP2 Mobilgrease 77 Mobilgrease special	-

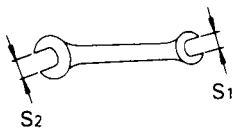
No.	Supplier	**Engine oil (CD, CE or CF-4)** SAE10W, 30, 40 10W30, 15W40 (The 15W40 oil marked * is CE)	**Gear Oil (GL-4 or GL5)** SAE80, 90, 140	**Grease (Lithium-Base)** NLGI No. 2	**Anti-freeze coolant (Ethylene Glycol Base) Permanent type**
14	PENNZOIL	*Supreme duty fleet motor oil	Multi-prupose 4092 Multi-purpose 4140	Multi-purpose white grease 705 707L White -bearing grease	Anti-freeze and summer coolant
15	PETROFINA	Fina kappa TD	FINA potonic N FINA potonic NE	FINA marson EPL2	FINA tamidor
16	SHELL	Rimula X	Spirax EP Spirax heavy duty	Alvania EP grease	-
17	SUN	-	Sunoco GL5 gear oil	Sunoco ultra prestige 2 EP Sun prestige 742	Sunoco antifreeze and summer coolant
18	TEXACO	*Ursa super plus Ursa premium	Multigear	Multifak EP2 Starplex 2	Code 2055 startex antifreeze coolant
19	TOTAL	Rubia S *Rubia X	Total EP Total transmission TM	Multis EP2	antigel/antifreeze
20	UNION	Guardol	MP gear lube LS	Unoba EP	-
21	VEEDOL	*Turbostar *Diesel star MDC	Multigear Multigear B Multigear C	-	Antifreeze

21. STANDARD TIGHTENING TORQUES FOR BOLTS AND NUTS

21.1 INTRODUCTION OF NECESSARY TOOLS

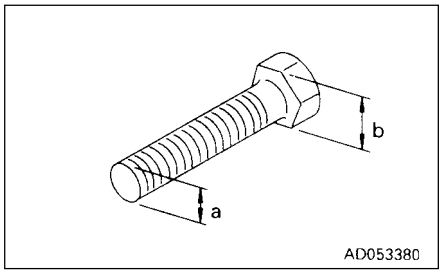
The following tools are needed when carrying out maintenance.

No	Name of tool	Part no.	Remarks
1	Wrench		Applicable width across flats (S_1 - S_2)
		09002-01417	14mm - 17mm
		09002-01922	19mm - 22mm
		09002-02427	24mm - 27mm
		09002-03032	30mm - 32mm
2	Screwdriver	09033-00190	Interchangeable flat-head and cross-head type
3	Socket		Applicable width across flats
		09021-01219	12mm
		09021-1725	17mm
		09021-01928	19mm
		09021-02233	22mm
		09021-02436	24mm
		09021-02739	27mm
4	Hammer	09039-00150	For replacement of bucket tooth
5	Hexagon wrench	09007-01040	Applicable width across flats 10mm
		09007-00936	Applicable width across flats 8mm
6	Filter wrench	09019-10080	For fuel filter cartridge
7	Filter wrench	09019-10093	For engine oil filter cartridge
8	Grease pump	07952-70002	For greasing work
9	Grease cartridge	07950-90403	(Lithium base grease, 400 g)
10	Handle	09023-00300	For turning socket
		09024-00300	
11	Pry bar	09055-10390	For removing soil from undercarriage



If any of the above tools are broken, please order them from your Komatsu distributor.

21.2 TORQUE LIST



Unless otherwise specified, tighten the metric bolts and nuts to the torque shown in the table.

The tightening torque is determined by the width across the flats b of the nut and bolt.

If it is necessary to replace any nut or bolt, always use a Komatsu genuine part of the same size as the part that was replaced.

Nm (Newton meter): 1Nm ≒ 0.1kgf.m
≒ 0.74lb.ft

Thread diameter of bolt (mm) (a)	Width across flat (mm) (b)			
		N.m	kgf.m	lb.ft
6	10	13.2 ± 1.4	1.35 ± 0.15	9.73 ± 1.03
8	13	31.4 ± 2.9	3.2 ± 0.3	23.2 ± 2.1
10	17	65.7 ± 6.8	6.7 ± 0.7	48.5 ± 5.0
12	19	112 ± 9.8	11.5 ± 1.0	82.6 ± 7.2
14	22	177 ± 19	18.0 ± 2.0	131 ± 14
16	24	279 ± 29	28.5 ± 3	206 ± 21
18	27	383 ± 39	39 ± 3	282 ± 29
20	30	549 ± 58	56 ± 6	405 ± 43
22	32	745 ± 78	76 ± 8	549 ± 58
24	36	927 ± 98	94.5 ± 10	684 ± 72
27	41	1320 ± 140	135 ± 15	973 ± 100
30	46	1720 ± 190	175 ± 20	1270 ± 140
33	50	2210 ± 240	225 ± 25	1630 ± 180
36	55	2750 ± 290	280 ± 30	2030 ± 210
39	60	3280 ± 340	335 ± 35	2420 ± 250

NOTICE

When tightening panels or other parts having tightening fixtures made of plastic, be careful not to use excessive tightening torque: doing so will damage the plastic parts.

22. PERIODIC REPLACEMENT OF SAFETY CRITICAL PARTS

To ensure safety at all times when operating or driving the machine, the user of the machine must always carry out periodic maintenance. In addition, to further improve safety, the user should also carry out periodic replacement of the parts given in the table. These parts are particularly closely connected to safety and fire prevention.

With these parts, the material changes as time passes, or they easily wear or deteriorate. However, it is difficult to judge the condition of the parts simply by periodic maintenance, so they should always be replaced after a fixed time has passed, regardless of their condition. This is necessary to ensure that they always maintain their function completely.

However, if these parts show any abnormality before the replacement interval has passed,they should be repaired or replaced immediately.

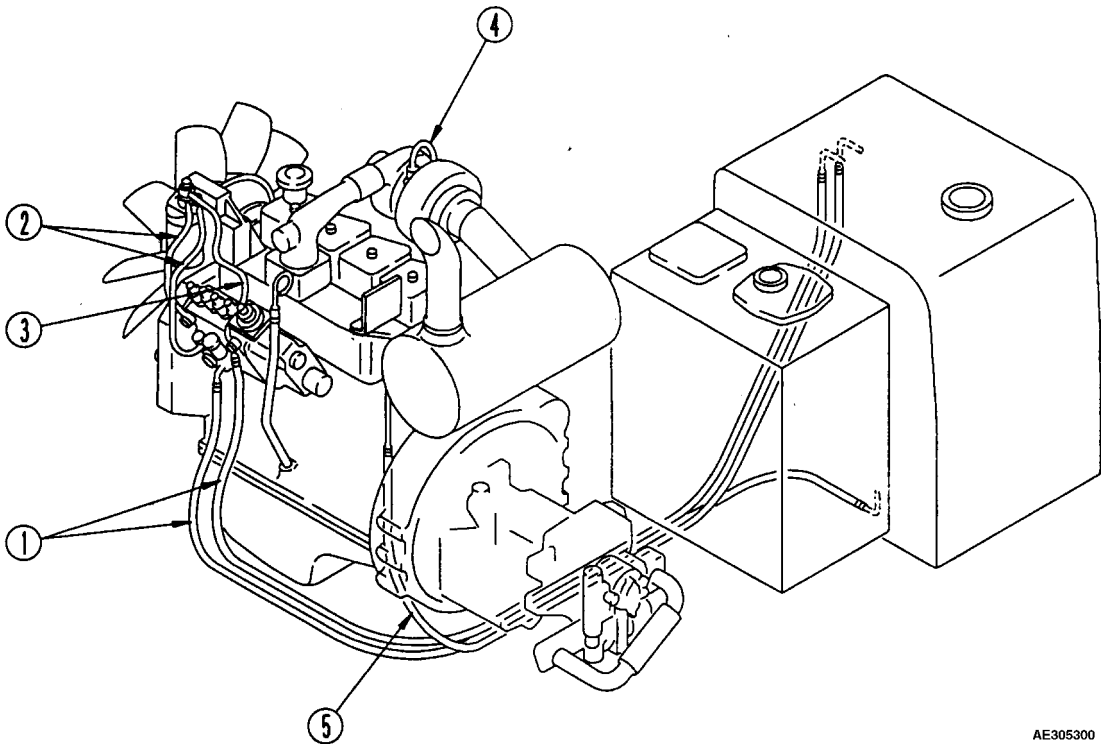
If the hose clamps show any deterioration, such as deformation or cracking, replace the clamps at the same time as the hoses.

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

Ask your Komatsu distributor to replace the safety critical parts.

SAFETY CRITICAL PARTS

No.	Safety critical parts for periodic replacement	Q'ty	Replacement interval
1	Fuel hose (fuel tank - injection pump)	2	Every 2 years or 4000 hours whichever comes sooner
2	Fuel hose (injection pump - fuel filter)	2	
3	Fuel hose (fuel filter air bleeding - injection pump)	1	
4	Turbocharger lubricating hose	1	
5	Spill hose (nozzle - fuel tank)	1	
6	Hydraulic hose (main pump delivery)	1	
7	Work equipment hose (boom cylinder inlet)	4	
8	Work equipment hose (bucket cylinder line - boom foot section)	2	
9	work equipment hose (bucket cylinder inlet)	2	
10	work equipment hose (arm cylinder line - boom foot section)	2	
11	Work equipment hose (arm cylinder inlet)	2	
12	Additional attachment line hose (boom foot section)	2	
13	Additional attachment line hose (boom top section)	2	
14	Swing line hose (swing motor inlet)	2	
15	Main suction hose	1	
16	Gear pump suction hose	1	
17	Heater hose	2	
18	Water separator (case, O-ring, plug)	1	



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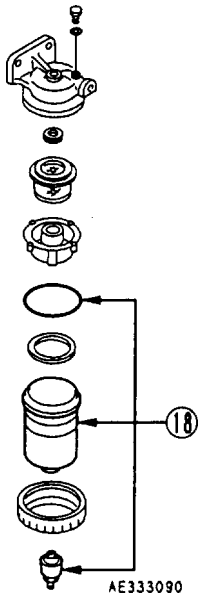

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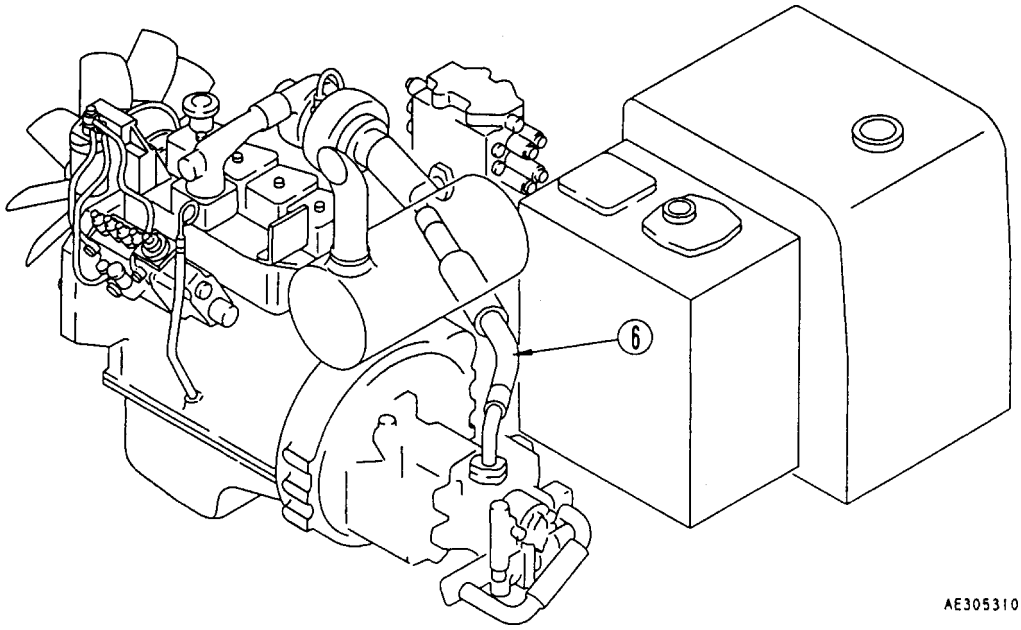

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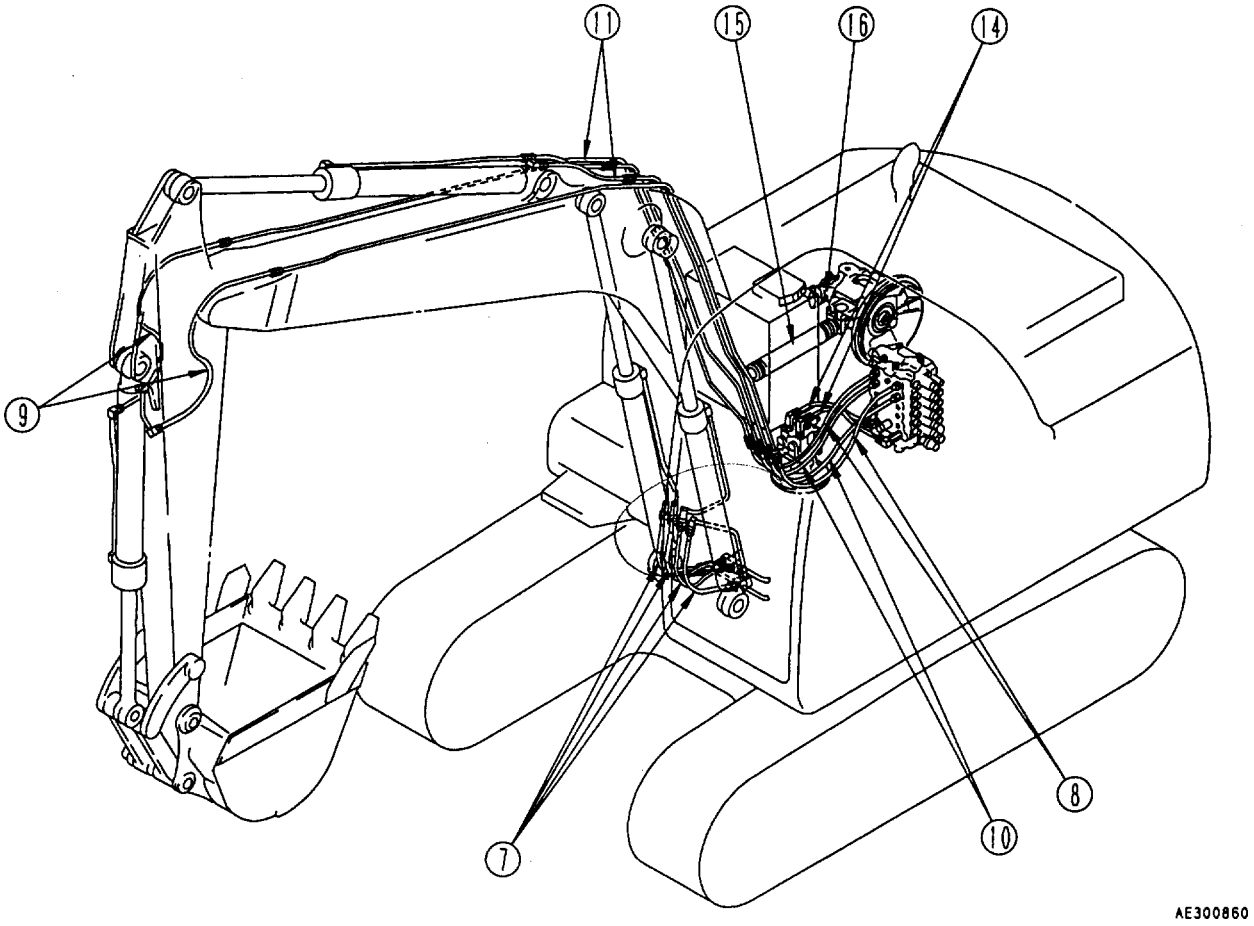

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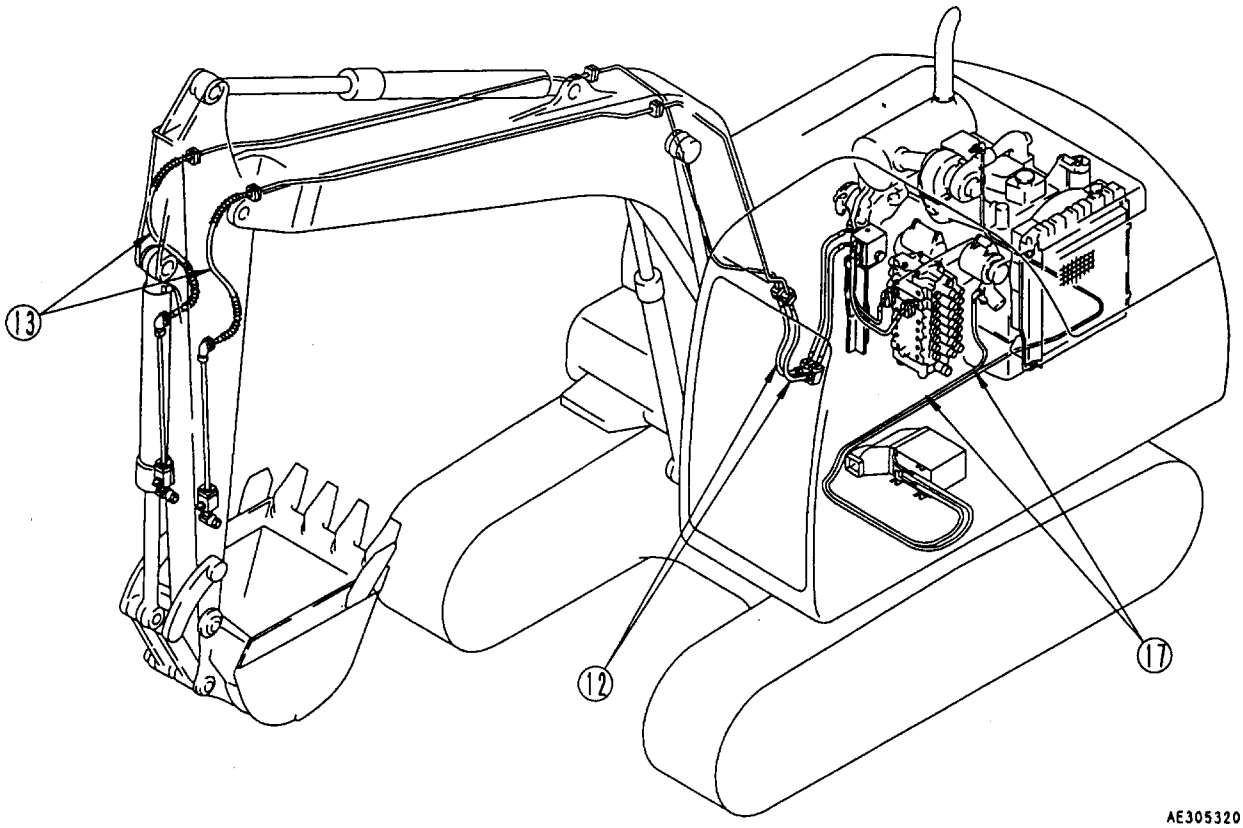

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23. MAINTENANCE SCHEDULE CHART

23.1 MAINTENANCE SCHEDULE CHART

SERVICE ITEM	PAGE
INITIAL 250 HOURS SERVICE (only after the first 250 hours)	
Replace fuel filter cartridge and additional fuel filter cartridge (machines equipped with additonal fuel filter	3-24
Check engine valve clearance, adjust	3-24
WHEN REQUIRED	
Check, clean and replace air cleaner element	3-25
Clean inside of cooling system	3-27
Check and tighten track shoe bolts (machines equipped with metal shoes)	3-31
Check and adjust track tension (machines equipped with metal shoes)	3-32
Check electrical intake air heater	3-34
Replace bucket teeth (vertical pin type)	3-35
Replace bucket teeth (horizontal pin type)	3-38
Adjust bucket clearance	3-39
Check window washer fluid level, add fluid	3-40
CHECK BEFORE STARTING	
Check coolant level, add water	3-41
Check fuel level, add fuel	3-42
Check oil level in hydraulic tank, add oil	3-43
Check air cleaner for clogging	3-44
Check electric wirings	3-44
Check function of horn	3-45
EVERY 50 HOURS SERVICE	
Drain water and sediment from fuel tank	3-46
EVERY 100 HOURS SERVICE	
Lubricating	3-47
• Boom cylinder foot pin (2 points)	3-47
• Boom foot pin (2 points)	3-47
• Boom cylinder rod end (2 points)	3-47

SERVICE ITEM	PAGE
EVERY 2000 HOURS SERVICE	
Check oil level in PTO gear case, add oil	3-63
Clean hydraulic tank strainer	3-64
Clean, check turbocharger	3-64
Check alternator, starting motor	3-64
Check engine valve clearance, adjust	3-64
EVERY 4000 HOURS SERVICE	
Check water pump	3-65
EVERY 5000 HOURS SERVICE	
Change oil in hydraulic tank	3-66

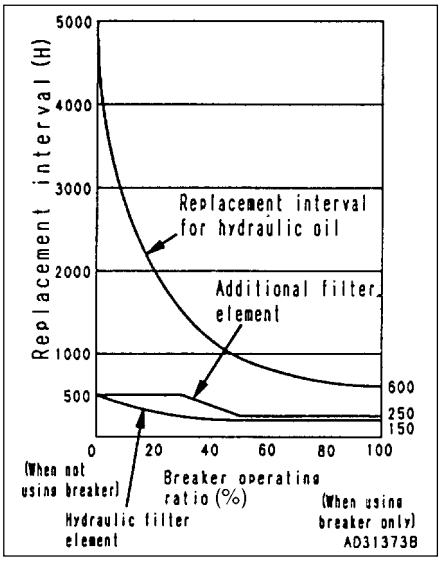
23.2 MAINTENANCE INTERVAL WHEN USING HYDRAULIC BREAKER

For machines equipped with a hydraulic breaker, the hydraulic oil deteriorates faster than for normal bucket digging operations, so set the maintenance intervals as follows.

- **Replacing hydraulic filter element**
  On new machines, replace the element after the first 100 to 150 hours, then carry out further replacement of the element according to the table on the right.

- **Changing oil in hydraulic tank**
  Change the oil according to the table on the right.

- **Replacing additional filter element for breaker**
  Use a guideline of 250 hours for use of the breaker (operating ratio for the breaker: 50% or more), and replace the element according to the table on the right.



24. SERVICE PROCEDURE

24.1 INITIAL 250 HOURS SERVICE

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

- **REPLACE FUEL FILTER CARTRIDGE AND ADDITIONAL FUEL FILTER CARTRIDGE (MACHINES EQUIPPED WITH ADDITIONAL FUEL FILTER)**

- **CHECK ENGINE VALVE CLEARANCE, ADJUST**

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

24.2 WHEN REQUIRED

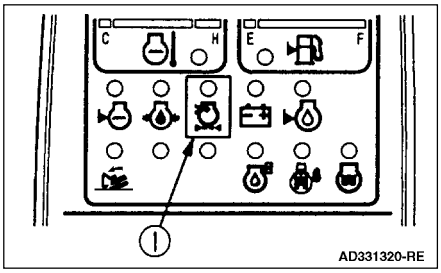
24.2.1 CHECK, CLEAN AND REPLACE AIR CLEANER ELEMENT

WARNING

- **Never clean or replace the air cleaner element with the engine running.**
- **When using pressured air to clean the element, wear safety glasses or goggles to protect the eyes.**

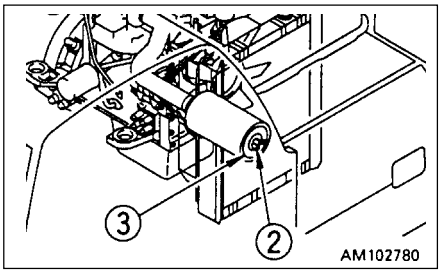
Checking

If air cleaner clogging monitor ① flashes, clean the air cleaner element



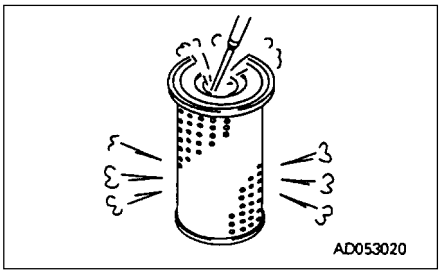
Cleaning the element

1. Open the battery room door on the left side of the machine, remove wing nut ② and take out outer element ③.
   To prevent entry of dirt and dust, cover the air connector side of the rear end of the air cleaner with a clean cloth and adhesive tape.

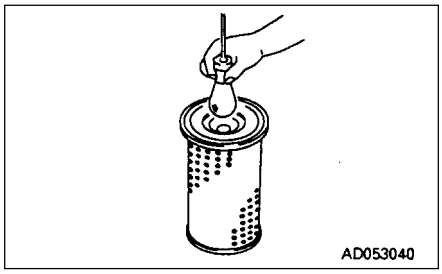


2. Clean interior of the air cleaner body interior and the cover.

3. Direct dry compressed air (less than 700 kPa (7kg/cm^2)), to outer element ③ from inside along its folds, then direct it from outside along its folds and again from inside.
   (1) Remove one seal from the element whenever the element has been cleaned.
   (2) Replace the outer element which has been cleaned 6 times repeatedly or used throughout a year. Replace the inner element at the same time.
   (3) Replace both inner and outer element when the monitor lamp ① flashes soon after installing the cleaned element even though it has not been cleaned 6 times.
   (4) Check inner element mounting nuts ⑤ for looseness and, if necessary, retighten.
   (5) Replace seal washer ④ or mounting nuts ⑤ with new parts if they are broken.



4. If small holes or thinner parts are found on the element when it is checked with abn electric bulb after cleaning, replace the element.



NOTICE

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

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

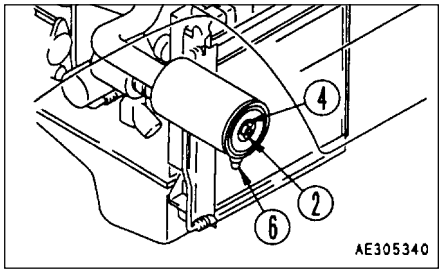
Wrap up unused elements and store them in a dry area.

5. Remove the cloth and tape used for cover in step 1.

6. Install the cleaned element and fix it with the wing nut.

7. Replace seal washer ④ or wing nut ② with new parts if they are broken.

8. Remove evacuator valve ⑥ and clean with compressed air.
After cleaning install it.



Replacing inner element

1. First remove the outer element, and then remove the inner element.

2. To prevent dust from getting in, use a clean cloth or tape to cover the air connector (outlet side).

3. Clean the air cleaner body interior, then remove the cover installed in step 2.

4. Fit a new inner element to the connector and tighten it with nuts.
Do not clean and reinstall an inner element.

5. Install a new element and fix it with wing nut ②.

24.2.2 CLEAN INSIDE OF COOLING SYSTEM

WARNING

- **Soon after the engine has been stopped, the coolant is hot and can cause personal injury. Allow the engine to cool before draining water.**
- **Since cleaning is performed while the engine is running, it is very dangerous to enter the rear side of the machine as the machine may suddenly start moving. If the under cover is left removed, it may interfere with the fan. While the engine is running, never enter the rear side of the machine.**
- **Never remove the radiator cap when the engine is at operating temperature. At operating temperature, the coolant is under pressure. Steam blowing up from the radiator could cause personal injury. Allow the engine to cool until the radiator filler cap is cool enough to touch with your hand.**
  Remove the filler cap slowly to allow pressure to be relieved.

- Clean the inside of the cooling system, change the coolant and replace the corrosion resistor according to the table below.

Kind of coolant	Cleaning inside of cooling system and changing coolant	Replacing corrosion resistor
Permanent type antifreeze (All season type)	Every year (automn) or every 2000 hours whichever comes first	Every 1000 hours and when cleaning the inside of the cooling system and when changing coolant.
Non permanenent type antifreeze containing ethylene glycol (Winter, one season type)	Every 6 months (spring, automn) (Drain antifreeze in spring, add antifreeze in autumn)	
When not using antifreeze	Every 6 months or every 1000 hours whichever comes first	

- Stop the machine on level ground when cleaning or changing the coolant.
- Use a permanent type of antifreeze.
  If, for some reason, it is impossible to use permanent type antifreeze, use an antifreeze containing ethylene glycol.

- When deciding the ratio of antifreeze to water, check the lowest temperature in the past, and decide from the mixing rate table given below.
  It is actually better to estimate a temperature about 10°C lower when deciding the mixing rate.

Mixing rate of water and antifreeze

Min. atmospheric temperature	°C	-5	-10	-15	-20	-25	-30
	°F	23	14	5	-4	-13	-22
Amount of antifreeze	*l*	4.2	5.5	6.5	7.4	8.3	9.1
	US gal	1.11	1.45	1.72	1.95	2.19	2.40
	UK gal	0.92	1.21	1.43	1.63	1.83	2.00
Amount of water	*l*	14.0	12.7	11.7	10.8	9.9	9.1
	US gal	3.70	3.35	3.09	2.85	2.61	2.40
	UK gal	3.08	2.79	2.57	2.38	2.18	2.00

WARNING

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

- Use city water for the cooling water.
  If river water, well water or other such water supply must be used, contact your Komatsu distributor.
- We recommend use of an antifreeze density gauge to control the mixing proportions.

WARNING

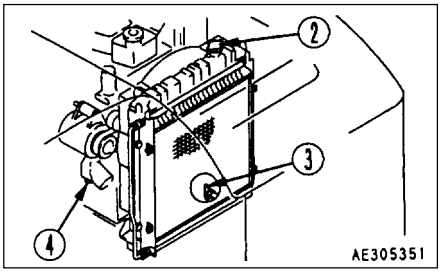
- **When removing drain plug, avoid pouring coolant on your self.**

- Prepare a container to catch drained coolant: Min. 18.2 *l* capacity.

2. Turn radiator cap ② slowly to remove it.

3. Remove the undercover, then set a container to catch the coolant under drain valve ③ and drain plug ④. Open drain valve ③ at the bottom of the radiator to drain the water. Remove drain plug ④ in the cylinder block when draining the water.

4. After draining the water, close drain valve ③ and drain plug ④, and fill with city water.



5. Open drain valve ③ and drain plug ④, run the engine at low idling, and flush water through the system for 10 minutes.

   When doing this, adjust the speed of filling and draining thewater so that the radiator is always full.
   While flushing water through the system, watch carefully that the water inlet hose does not come out of the radiator water filler.

6. After flushing, stop the engine, open drain valve ③ and drain plug ④, then close it again after all the water has drained out.

7. After draining the water, clean with a flushing agent.
   We recommend use of a Komatsu genuine cleaning agent. For details of the cleaning method, see the instructions given with the cleaning agent.

8. After cleaning, open drain valve ③ and drain plug ④ to drain all the cooling water, then close them and fill slowly with clean water.

9. When the water comes up to near the water filler port, open drain valve ③ and drain plug ④, run the engine at low idling, and continue to run water through the system until clean colorless water comes out.

   When doing this, adjust the speed of filling and draining the water so that the radiator is always full.

10. When the water is completely clean, stop the engine, close drain valve ③, wrap the drain plug with seal tape, then close drain plug ④

11. Replace the corrosion resistor cartridge and open valves ①.
    For details of replacement of the corrosion resistor, see "24.8 EVERY 1000 HOURS SERVICE "

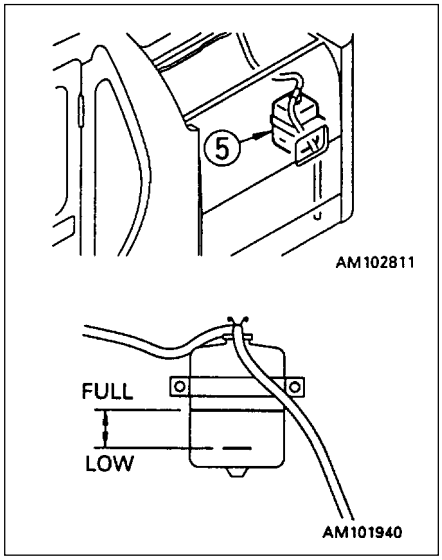
12. Install the undercover.

13. Add cooling water until it overflows from the water filler.

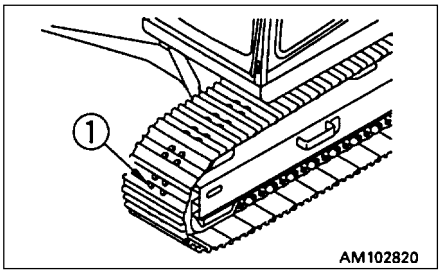
14. To remove the air in the cooling water, run for five minutes at low idling, then for another five minutes at high idling.
    When doing this, leave radiator cap ② off.

15. After draining off the cooling water of reserve tank ⑤, clean the inside of the reserve tank and refill the water between FULL and LOW level.

16. Stop the engine, wait for about three minutes, add cooling water up to near the radiator water filler port, then tighten cap ②.



24.2.3 CHECK AND TIGHTEN TRACK SHOE BOLTS (MACHINE EQUIPPED WITH METAL SHOES)



If the machine is used with track shoe bolts (1) loose, they will break, so tighten anyu loose bolts immediately.

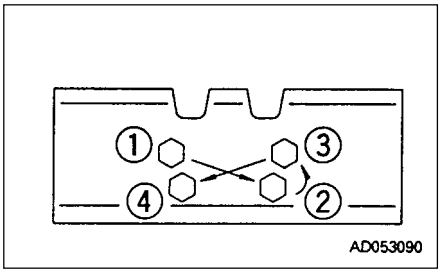
Mehtod for tightening

1. First tighten to a tightening torque of 196 ± 20 Nm (20 ± 2 kgm) then check that the nut and shoe are in close contact with the link contact surface.

2. After checking, tighten a further 120° ± 10°.

Order for tightening

Tighten the bolts in the order shown in the diagram on the right. After tightening, check that the nut and shoe are in close contact with the link mating surface.



24.2.4 CHECK AND ADJUST TRACK TENSION (MACHINES EQUIPPED WITH METAL SHOES)

⚠ WARNING

Carry out this operation with two workers. The operator must move the machine in accordance with the signals from the other worker. The track tension is checked with the chassis raised, so it is extremely dangerous if the machine is lowered by mistake during the inspection. Never move the machine while anyone is carrying out measurements.

The wear of pins and bushings on the undercarriage will vary with the working conditions and soil properties. It is thus necessary to continually inspect the track tension so as to maintain the standard tension.

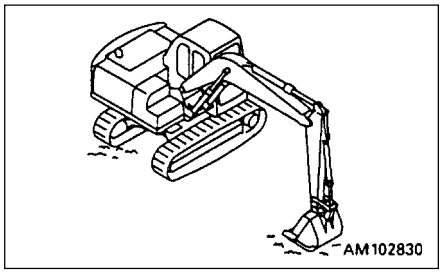
Carry out the check and adjustment under the same conditons as when operating (on jobsites where the track becomes clogged with mud, measure with the track clogged with mud).

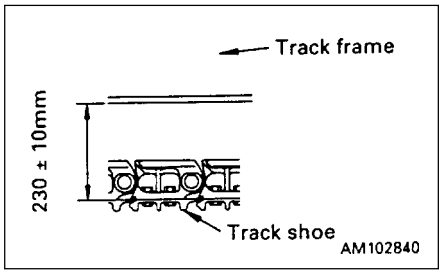
Inpsection

1. Raise the chassis with the coom and arm.
   When doing this, operate the levers slowly.
2. Measure the clearance between the bottom of the track frame and the top of the track shoe at a position that is safe even if the chassis should come down.

Standard clearance: 230 ± 10 mm

Places to measure
PC130: 4th track roller from sprocket



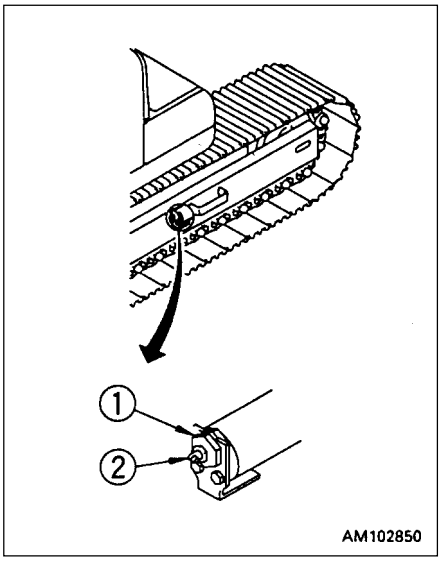


If the track tension is not at the standard value, adjust it in the following manner.

Adjustment

WARNING

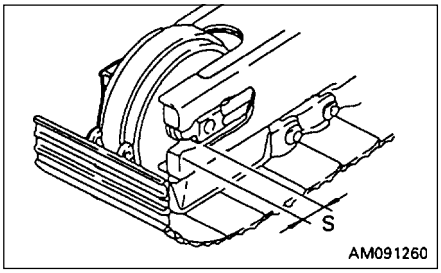
Grease inside the adjusting mechanism is under high pressure. Grease coming from lubricator ① under pressure can penetrate the body causing injury or death. For this reason, do not loosen lubricator ① more than one turn. Do not loosen any part other than lubricator ①. Futhermore, do not bring your face in front of the lubricator ①.
If the track tension is not relieved by this procedure, please contact your Komatsu distributor.



When increasing tension

Prepare a grease pump

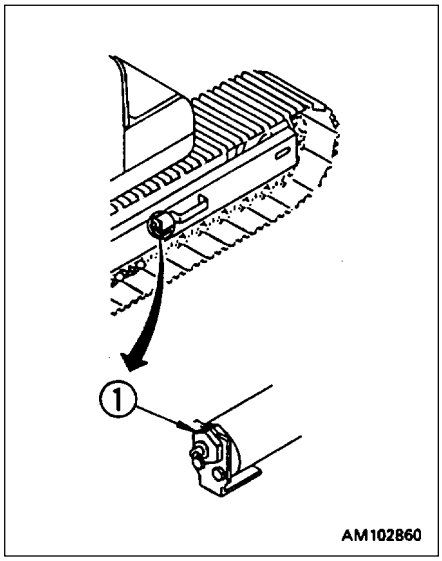
1. Pump in grease through grease fitting ② with a grease pump.
2. To check that the correct tension has been achieved, move the machine backwards and forwards.
3. Check the track tension again, and if the tension is not correct, adjust it again.
4. Continue to pump in grease until S becomes 0 mm. If the tension is still loose, the pin and bushing are excessively worn, so they must be either turned or replaced. Please contact your Komatsu distributor.



When loosening tension

WARNING

It is extremely dangerous to release the grease by any method except the procedure given below. If the track tension is not relieved by this procedure, please contact your Komatsu distributor.



1. Loosen lubricator ① gradually to release the grease.
2. Turn lubricator ① to a maximum of one turn.
3. If the grease does not come out smoothly, move the machine backwards and forwards a short distance.
4. Tighten lubricator ①.
5. To check that the correct tension has been achieved, move the machine backwards and forwards.
6. Check the track tension again, and if the tension is not correct, adjust it again.

24.2.6 CHECK ELECTRICAL INTAKE AIR HEATER

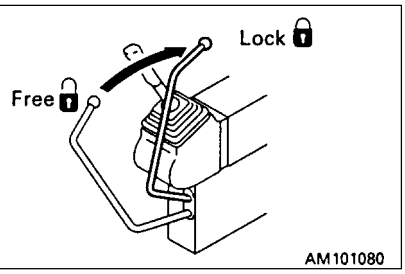
Before the start of cold season (once a year), contact your Komatsu distributor to have the electrical intake air heater repaired or checked for dirt or disconnections.

24.2.7 REPLACE BUCKET TEETH (VERTICAL PIN TYPE)

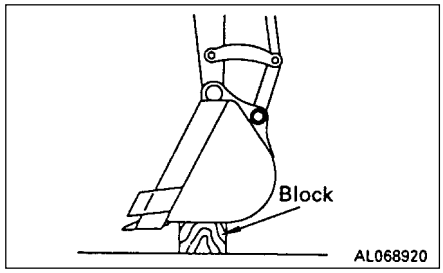
Replace the point before the adapter starts to wear.

WARNING

It is dangerous if the work equipment moves by mistake when the teeth are being replaced. Set the work equipment in a stable condition, then stop the engine and apply the locks securely to the levers.

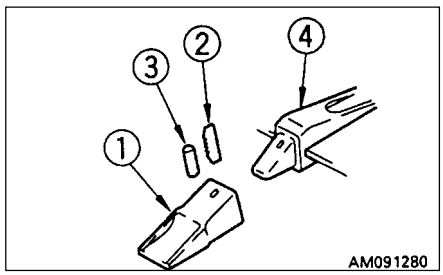


1. Set a block at the bottom face of the bucket so that it is possible to knock out the pin of tooth ①, then check that the work equipment is in a stable conditon, and lock the safety lock lever.
   Set so that the bottom face of the bucket is horizontal.



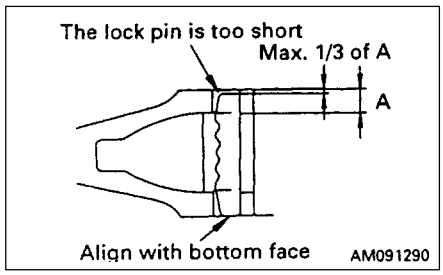
2. Use a hammer and drift to knock out lock pin ② (If the drift is set against rubber pin lock ③ when it is hit, the rubber pin lock may break. Set it against the back of the pin).

3. After removing lock pin ② and rubber pin lock ③ , check them.

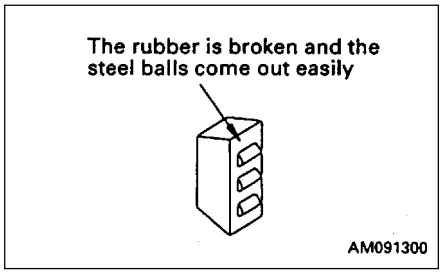


If lock pins and rubber pin locks with the following defects are used, the point may come off the bucket. Replace them with new ones.

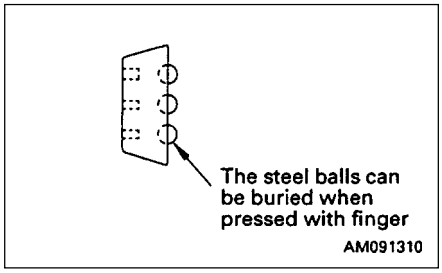
○ The lock pin is too short



○ The rubber of the rubber pin lock is torn, and the steel balls may come out.

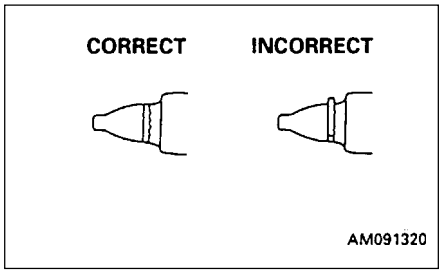


○ The steel balls can be buried when pressed with finger



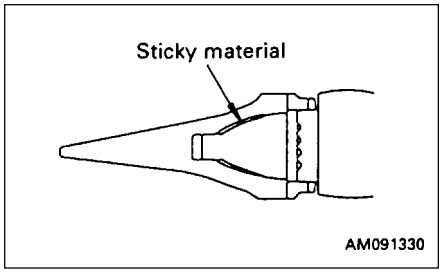
4. Clean the surface of adapter ④ and remove the soil from it with a knife.

5. Use your hand or a hammer to push rubber pin lock ③ into the hole of the adapter.
When doing this be careful that the rubber pin lock does not fly out from the adapter surface.



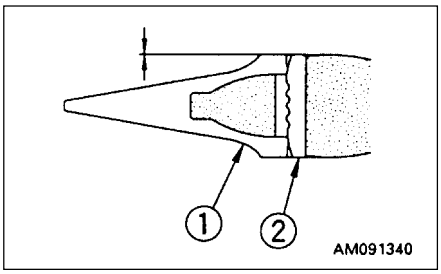
6. Clean the inside of point ①, then install it to adapter ④. If there is mud stuck to it or if there are protrusions, the point will not enter the adapter properly, and there will not be proper contact at the mating portion.

7. 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



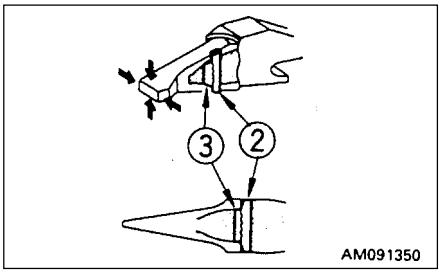
If the rear face of the hole for the pin of point ① is protruding to the front from the rear face of the pin hole for adapter ④, do not try to knock the pin in. There is something preventing point ① from entering adapter ④ fully, so remove the obstruction. When point ① enters adapter ④ fully, knock in lock pin ②.

8. 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.



9. After replacing a bucket tooth, always check the following.
   1) After the lock pin has been knocked in completely, check that it is being secured by the point and surface.
   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 ③ and lock pin ② are set as shown in the figure.



The life of the point can be lengthened and the frequency of its replacement can be reduced by turning it upside down so that it will wear evenly.

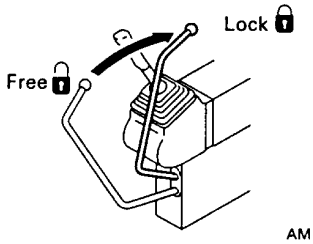
Replace the rubber pin and locking pin with new pins at the same time as replacing the point to prevent the point from falling.

24.2.8 REPLACE BUCKET TEETH (HORIZONTAL PIN TYPE)

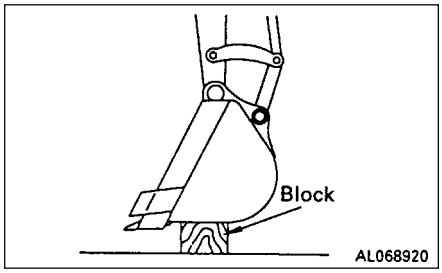
Replace the teeth before the wear reaches the adapter.

WARNING

It is dangerous if the work equipment moves by mistake when the teeth are being replaced. Set the work equipment in a stable condition, then stop the engine and apply the locks securely to the levers.



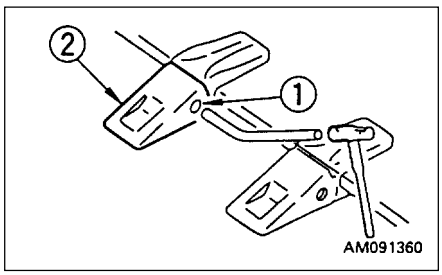
1. Set a block at the bottom face of the bucket so that it is possible to knock out the pin of tooth ①, then check that the work equipment is in a stable conditon, and lock the safety lock lever.
   Set so that the bottom face of the bucket is horizontal.



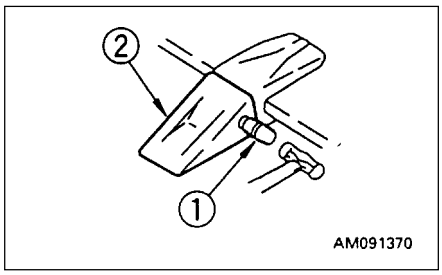
2. Place a bar on the pin head and strike the bar with a hammer to knock out pin ①. Remove tooth ②.

REMARK

Use a round bar with a smaller diameter than that of the pin.



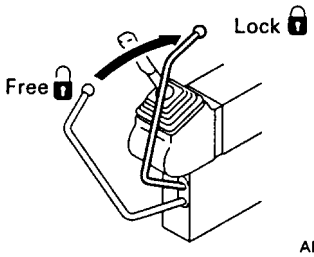
3. Clean the mounting face. Fit a new tooth ② in the adapter, push in pin ① partially by hand, then knock it with a hammer to install the tooth to the bucket.



24.2.9 ADJUST BUCKET CLEARANCE

⚠ WARNING

It is dangerous if the work equipment moves by mistake when the clearance is being adjusted.
Set the work equipment in a stable condition, then stop the engine and lock the lever securely.



1. Set the work equipment to the position shown in the diagram at right, stop the engine and set the safety lock lever to the lock position.

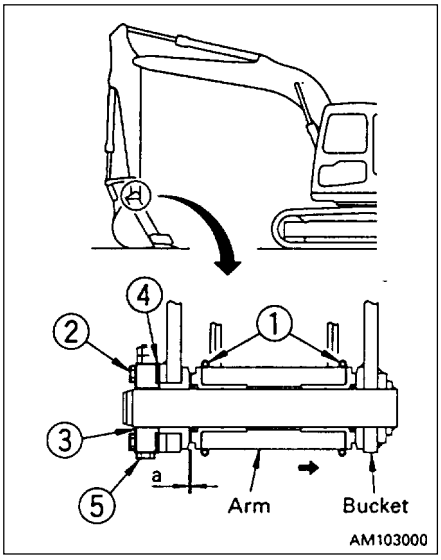
2. Shift O-ring ① of the linkage and measure the amount of play (a). Measurement is easier if you move the bucket to one side or the other so all the play can be measured in one place. (In the diagram this is on the left-hand side) Use a gap (clearance) gauge for easy and accurate measurement.

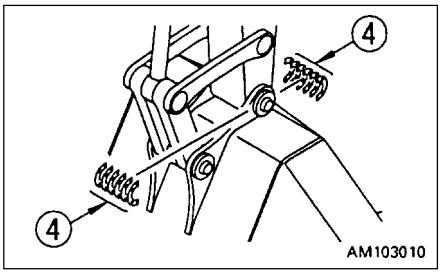
3. Loosen the four plate fixing bolts of ② and loosen plate ③. Because it uses split shims, you can carry out the operation without removing the bolts entirely.

4. Remove shim ④ corresponding to the amount of play (a) measured above.

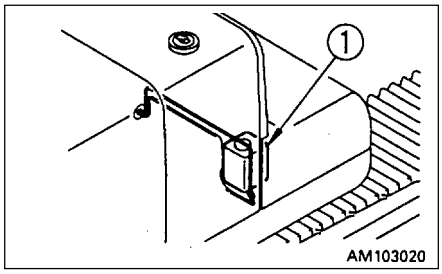
(Example)
If the play is 3mm, remove the two sets of 1.0mm shim (4 pieces) and 0.5mm (2 pieces) and the play will become 0.5mm.
Four sets of 1.0mm (8 pieces), two sets of 0.5mm (4 pieces) are installed.
Two pieces of shim makes one set.
When play (a) is smaller than one shim, do not carry out any maintenance.

5. Tighten the four bolts ②. If the bolts ② are too stiff to tighten, pull out pin stopper bolt ⑤ for easier tightening.





24.2.10 CHECK WINDOW WASHER FLUID LEVEL, ADD FLUID



If air is ejected with the window washer fluid, check the fluid level in window washer tank (1). If showing under the level, fill with automobile window washer fluid.

When adding fluid, be careful not to let dirt or dust get in.

- Mixture ratio of pure washer fluid and water.

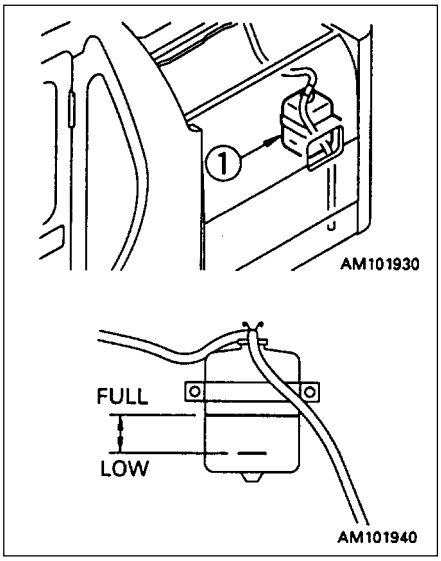
Since the ratio should be varied depending on atmospheric temperature, replenish washer fluid at the following mixture ratio, taking temperature into account.

Operation area and season	Mixture ratio	Freezing temperature
Normal	Pure washer fluid 1/3 : water 2/3	-10°C
Winter in cold region	Pure washer fluid 1/2 : water 1/2	-20°C
Winter in extremely cold region	Pure washer fluid	-30°C

Pure washer fluid comes in two types: for -10°C (for general use) and for -30°C (cold regions).
Use pure washer fluid according to operation area and season.

24.3 CHECK BEFORE STARTING

24.3.1 CHECK COOLANT LEVEL, ADD WATER



⚠ WARNING

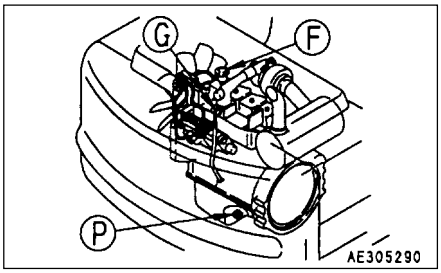
Do not open the radiator cap unless necessary. When checking the coolant, always check the radiator reserve tank when the engine is cold.

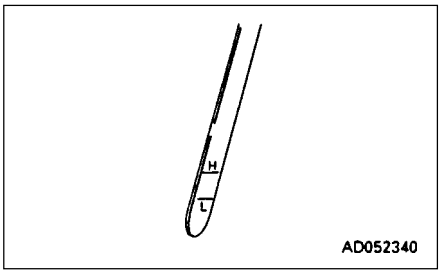
1. Open battery room door on the left side of the machine and check that the cooling water level is between the FULL and LOW marks on radiator reserve tank ① (shown in the diagram on the right).
   If the water level is low, add water through the water filler of reserve tank ① to the FULL level.

2. After adding water, tighten the cap securely.

3. If the reserve becomes empty, first inspect for water leaks and then fill the radiator and the reserve tank with water.

24.3.2 CHECK OIL LEVEL IN ENGINE OIL PAN, ADD OIL





1. Open the engine hood.

2. Remove dipstick Ⓖ and wipe the oil off with a cloth.

3. Insert dipstick Ⓖ fully in the oil filler pipe, then take it out again.

4. The oil level should be between the H and L marks on dipstick Ⓖ.
   If the oil levelis below the L mark, add engine oil through oil filler Ⓕ

NOTICE

For details of the oil to use, see "20. USE OF FUEL, COOLANT AND LUBRICANTS ACCORDING TO AMBIENT TEMPERATURE".

5. If the oil is above the H mark, drain the excess engine oil from drain valve Ⓟ, and check the oil level again.
   (In case of PC130, Ⓟ is the drain valve.)

6. If the oil level is correct, tighten the oil filler cap securely and close the engine hood.

REMARK

When checking the oil level after the engine has been operated, wait for at least 15 minutes after stopping the engine before checking.

If the machine is at an angle, make it horizontal before checking.

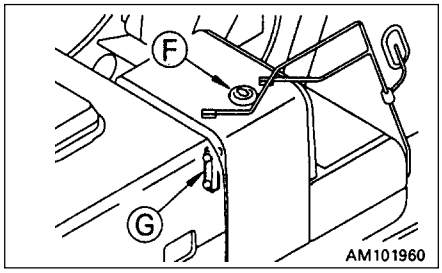
24.3.3 CHECK FUEL LEVEL, ADD FUEL

WARNING

When adding fuel, never let the fuel overflow. This may cause a fire. If spilling fuel, thoroughly clean up any spillage.

1. Open the pump room door on the right side of the machine and use sight gauge Ⓖ on the rear face of the fuel tank to check that the tank is full.

2. If the fuel level is not within the sight gauge, add fuel through filler port Ⓕ while watching sight gauge Ⓖ.



Fuel capacity 240 liters

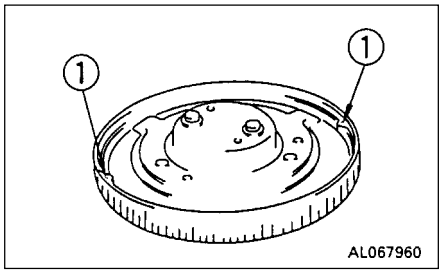
NOTICE

For details of the fuel to use, see "20. USE OF FUEL, COOLANT AND LUBRICANTS ACCORDING TO AMBIENT TEMPERATURE".

3. After adding fuel, tighten the cap securely.

REMARK

If breather hole ① on the cap is clogged, the pressure in the tank will drop and fuel will not flow. Clean the hole from time to time.

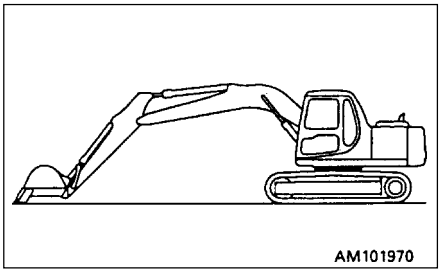


24.3.4 CHECK OIL LEVEL IN HYDRAULIC TANK, ADD OIL

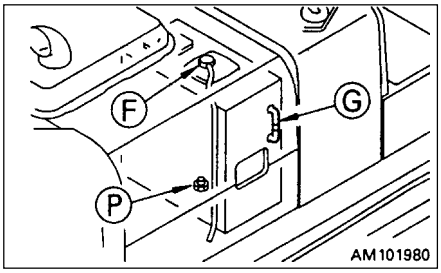
⚠ WARNING

- **When removing the oil filler cap, oil may spurt out, so turn the cap slowly to release the internal pressure before removing the cap.**
- **If oil has been added to above the H mark, stop the engine and wait for the hydraulic oil to cool down, then drain the excess oil from the drain plug Ⓟ**

1. If the work equipment is not in the condition shown in the diagram on the right, start the engine, run the engine at low speed, retract the arm and bucket cylinders, then lower the boom, set the bucket teeth in contact with the ground and stop the engine.



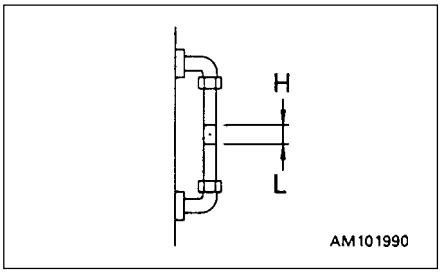
2. Open the pump room door on the right side of the machine. Check sight gauge Ⓖ. The oil level is normal if between the H and L marks.



NOTICE

Do not add oil if the level is above the H line. This will damage the hydraulic equipment and cause the oil to spurt out.

3. If the level is below the L mark, remove the upper cover of the hydraulic tank and add oil through oil filler Ⓕ



NOTICE

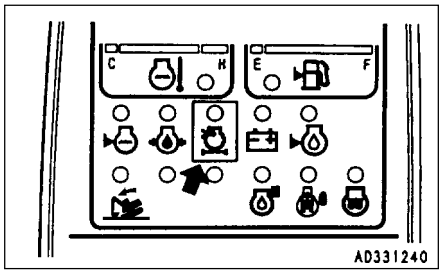
For details of the oil to use, see "20. USE OF FUEL, COOLANT AND LUBRICANTS ACCORDING TO AMBIENT TEMPERATURE".

REMARK

The oil level will vary depending upon the oil temperature. Accordingly, use the following as a guide:

- Before operation: around L level
  (Oil temperature 10 to 30°C)
- Normal operation: around H level
  (Oil temperature 50 to 80°C)

24.3.5 CHECK AIR CLEANER FOR CLOGGING



1. Confirm that the air cleaner clogging monitor does not flash.

2. If it flashes, immediately clean or replace the element.

For details of the method of cleaning the element, see "24.2.1 CHECK, CLEAN AND REPLACE AIR CLEANER ELEMENT"

24.3.6 CHECK ELECTRIC WIRINGS

⚠ WARNING

- **If the fuse blows frequently, or there are traces of shortcircuiting in the electric wiring, always locate and repair the cause.**
- **Accumulation of flammable material (dead leaves, twigs, grass etc.) around the battery may cause fire, so always check and remove such material.**
- **Keep the top surface of the battery clean and check the breather hole in the battery cap. If it is clogged with dirt or dust, wash the battery cap to clear the breather hole.**

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.

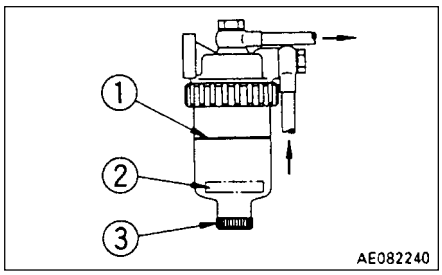
- Battery
- Starting motor
- Alternator

Please contact your Komatsu distributor for investigation and correction of the cause.

When carrying out walk-around checks or checks before starting, always check if there is any accumulation of flammable material around the battery, and remove such flammable material.

An optional net is prepared to be fitted to the vent of the top outer cover of the battery to prevent combustible material from entering the battery.

24.3.7 CHECK FOR WATER AND SEDIMENT IN WATER SEPARATOR, DRAIN WATER



The water separator separates water mixed in the fuel. If float ② is at or above red line ①, drain the water according to the following procedure:

1. Loosen drain plug ③ and drain the accumulated water until the float reaches the bottom.

2. Tighten drain plug ③.

3. If the air is sucked into fuel line when draining the water, be sure to bleed air in the same manner as for the fuel filter. See "24.7 EVERY 500 HOURS SERVICE".

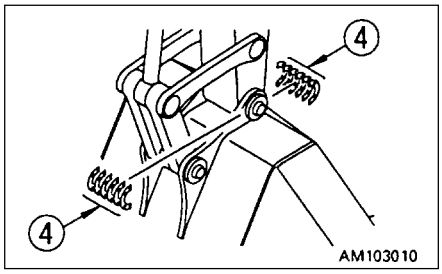
24.3.8 CHECK FUNCTION OF HORN

1. Turn the starting switch to the ON position.

2. Confirm that the horn sounds without delay when the horn button is pressed. If the horn does not sound, ask your Komatsu distributor for repair.

24.4 EVERY 50 HOURS SERVICE

24.4.1 DRAIN WATER AND SEDIMENT FROM FUEL TANK



1. Carry out this procedure before operating the machine.
2. Prepare a container to catch the fuel that is drained.
3. Open valve ① at the bottom of the tank and drain the sediment and water that has accumulated at the bottom together with fuel.
   When doing this, be careful not to get fuel on yourself.
4. When only clean fuel comes out, close drain valve ①.

NOTICE

Never use trichlene for washing the inside of the tank.

24.5 EVERY 100 HOURS SERVICE

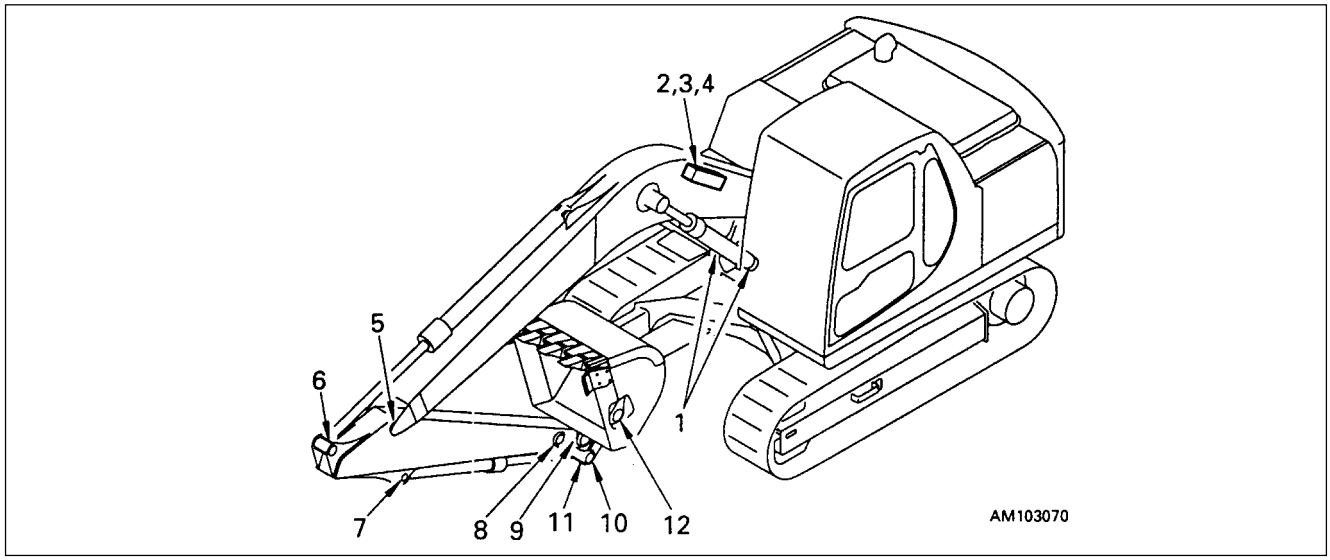
Maintenance for every 50 hours should be carried out at the same time.

24.5.1 LUBRICATING

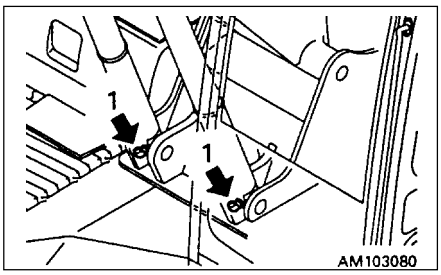
NOTICE

- **Carry out greasing of greasing point 1-7 every 10 hours for the first 100 hours on a new machine.**
- **After digging under water, be sure to supply grease to the pins which were submerged.**

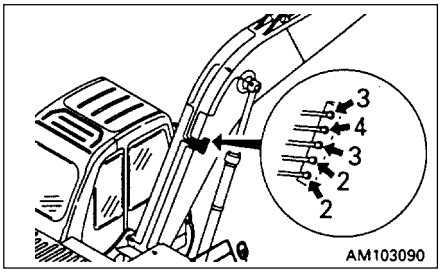
1. Set the work equipment in the greasing posture below, then lower the work equipment to the ground and stop the engine.
2. Using a grease pump, pump in grease through the grease fittings shown by arrows.
3. After greasing, wipe off any ol grease that was pushed out.



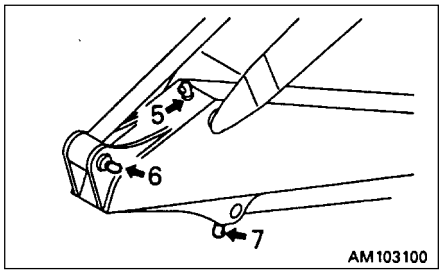
1. Boom cylinder foot pin (2 points)



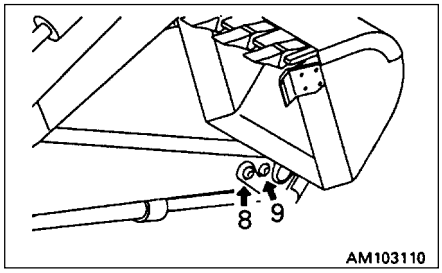
2. Boom foot pin (2 points)
3. Boom cylinder rod end (2 points)
4. Arm cylinder foot pin (1 point)



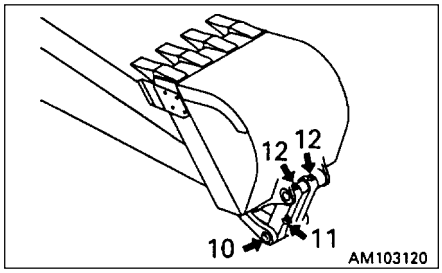
5. Boom-Arm coupling pin (1 point)
6. Arm cylinder rod end (1 point)
7. Bucket cylinder foot pin (1 point)



8. Arm-Link coupling pin (1 point)
9. Arm-Bucket coupling pin (1 point)



10. Link coupling pin (1 point)
11. Bucket cylinder rod end (1 point)
12. Bucket-Link coupling pin (2 points)



24.5.2 CHECK OIL LEVEL IN SWING MACHINERY CASE, ADD OIL

WARNING

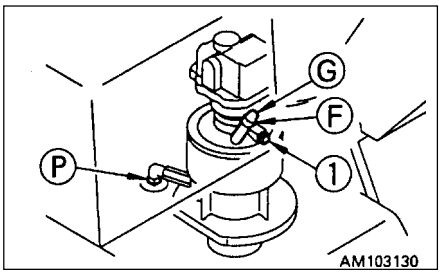
The oil is at high temperature immediately after the machine has been operated. Wait for the oil to cool down before carrying out this check.

1. Remove dipstick Ⓖ and wipe the oil from the dipstick with a cloth.

2. Insert dipstick Ⓖ fully in the guide.

3. When dipstick Ⓖ is pulled out, if the oil level is between the H and L marks of the gauge, oil level is proper.

4. If the oil does not reach the L mark on dipstick Ⓖ, add engine oil through dipstick insertion hole Ⓕ.
   When refilling, remove bleeding plug ①.



NOTICE

For details of the oil to use, see "20. USE OF FUEL, COOLANT AND LUBRICANTS ACCORDING TO AMBIENT TEMPERATURE".

5. If the oil level exceeds the H mark on the dipstick, loosen drain plug Ⓟ to drain the excess oil.

6. After checking oil level or adding oil insert the dipstick into the hole and install air bleeding plug ①.

24.6 EVERY 250 HOURS SERVICE

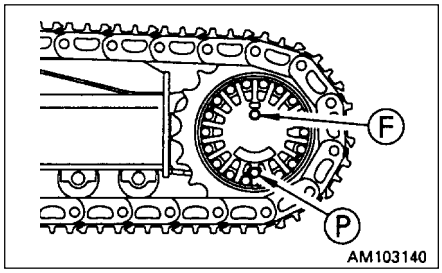
Maintenance for every 50 hours should be carried out at the same time.

24.6.1 CHECK OIL LEVEL IN FINAL DRIVE CASE, ADD OIL

⚠ WARNING

- **The oil is at high temperature immediately after the machine has been operated. Wait for the oil to cool down before starting the operation.**
- **If there is still pressure remaining inside the case, the oil or plug may fly out.**
  Loosen the plug slowly to release the pressure.

- Prepare a hexagonal wrench.



1. Set so that plug Ⓕ is at the top, with plug Ⓕ and plug Ⓟ prependicular to the ground.
2. Using a hexagonal wrench, remove plug Ⓕ and check that the oil level is within a range from the bottom of the plug hole to a point 10 mm below it.
3. If the oil level is too low, install plug Ⓕ, operate the travel levers, and drive forward or in reverse to rotate the sprocket one turn.
   Then repeat Step 2 to check again.
4. If the oil level is still too low, add engine oil through the hole in plug Ⓕ until the oil overflows,

NOTICE

For details of the oil to use, see "20. USE OF FUEL, COOLANT AND LUBRICANTS ACCORDING TO AMBIENT TEMPERATURE".

5. After checking, install plug Ⓕ.

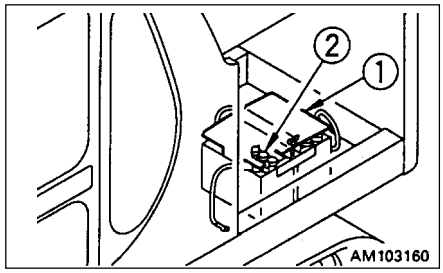
24.6.2 CHECK LEVEL OF BATTERY ELECTROLYTE

WARNING

- **To avoid gas explosion, do not bring fire or sparks near the battery.**
- **Battery electrolyte is dangerous. If it gets in your eyes or on your skin, wash it off with large amounts of water and consult a doctor.**

Carry out this check before operating the machine.

1. Open the battery room door on the left side of the machine, then remove cover ①.
2. Remove cap ②, and check that the electrolyte is at the specified level (10 to 12 mm above the plate). If the electrolyte level is low, add distilled water to the specified level.



If the battery electrolyte is spilled, have dilute sulphuric acid added.

3. Clean the air hole in the battery cap, then tighten the cap securely.

When adding distilled water in cold weather, add it before starting operations in the morning to prevent the electrolyte from freezing.

24.6.3 CHANGE OIL IN ENGINE OIL PAN, REPLACE ENGINE OIL FILTER CARTRIDGE

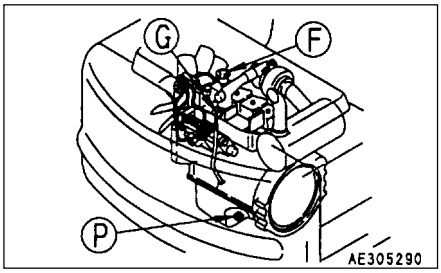
Perform this maintenance every 500 hours on machines equipped with bypass filter.

⚠ WARNING

The oil is at high temperature after the engine has been operated, so never change the oil immediately after finishing operations. Wait for the oil to cool down before changing it.

Prepare the following
- Container to catch drained oil: Min 17 ℓ capacity
- Refill capacity: 17 ℓ (4.49 US gal, 3.74 UK gal)
- Filter wrench

1. Remove the cover on the bottom of the machine.



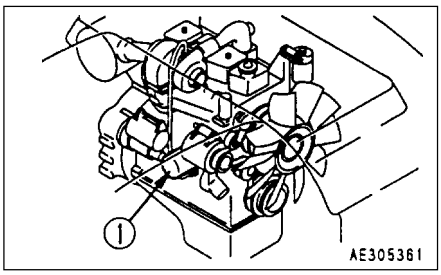
2. Place a drain container under drain valve Ⓟ located on the bottom of the machine.

3. Open drain valve Ⓟ slowly to avoid getting oil on yourself, and drain the oil.

4. Check the drained oil, and if there are excessive metal particles of foreign materials, please contact your Komatsu distributor.

5. Close drain valve Ⓟ.

6. Using a filter wrench from the top of the engine, turn filter cartridge ① to the left. A large amount of oil will come out if this is done immediately after the engine is stopped, so wait for 10 minutes before carrying out this operation.



7. Clean the filter holder and fill the new filter cartridge with clean engine oil. Apply clean engine oil (or apply grease thinly) to the packings and threads of the new filter cartridge, then install it.

REMARK

Confirm that no remnants of old packing still adhere to the filter holder as this may result in oil leakage.

8. When installing, bring the packing surface into contact with the seal surface of the filter holder, then tighten it at least a further 3/4 turn.

9. After replacing the filter cartridge, add engine oil through oil filler Ⓕ until the oil level is between the H and L marks on the dipstick Ⓖ.

NOTICE

For details of the oil to use, see "20. USE OF FUEL, COOLANT AND LUBRICANTS ACCORDING TO AMBIENT TEMPERATURE".

10. Run the engine at idling for a short time, then stop the engine, and check taht the oil levelis between the H and L marks on the dipstick. For details, see "24.3 CHECK BEFORE STARTING".

Even if the machine has not been operated for 250 hours, the oil and filter cartridge must be replaced when the machine has been operated for 6 months.
In the same way, even if the machine has not been operated for 6 months, the oil and filter cartridge must be replaced when the machine has been operated for 250 hours.

24.7 EVERY 500 HOURS SERVICE

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

24.7.1 REPLACE FUEL FILTER CARTRIDGE AND ADDITIONAL FUEL FILTER CARTRIDGE (MACHINES EQUIPPED WITH ADDITIONAL FUEL FILTER)

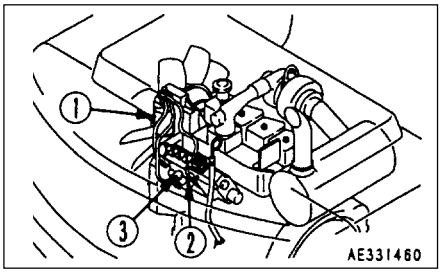
⚠ WARNING

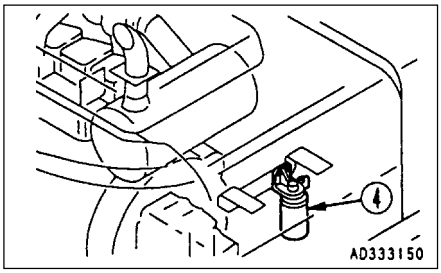
- **Engine is at high temperature immediately after the machine has been operated. Wait for engine to cool down before replacing the filter.**
- **Do not bring fire or sparks near the fuel.**

Prepare a filter wrench and a container to catch the fuel.

1. Set the container to catch the fuel under the filter cartridge.
2. Using a filter wrench, turn filter cartridge ① counterclockwise to remove it. If an additional filter is installed, turn additional filter cartridge ④ to the left.
3. Clean the filter holder, fill a new filter cartridge ① with clean fuel, coat the packing surface with engine oil, then install it to the filter holder.
4. When installing, tighten until the packing surface contacts the seal surface of the filter holder, then tighten it up 1/2 of a turn.
5. If equipped with additional fuel filter, clean the additional fuel filter holder, fill a new filter cartridge ④ with clean fuel, coat the packing surface with engine oil, then install it to the filter holder.
6. When installing, tighten until the packing surface contacts the seal surface of the filter holder, then tighten it up 2/3 of a turn.

   If the filter cartridge is tightened too far, the packing will be damaged and this will lead to leakage of fuel. If the filter cartridge is too loose, fuel will also leak from the packing, so always tighten to the correct amount.
7. After replacing the fuel filter cartridge, bleed the air.
   Bleed the air according to the following procedures.





8. Add fuel to the fuel tank until full (to FULL mark on the fuel gauge).

9. After replacing the fuel filter cartridge, loosen joint bolt ②.

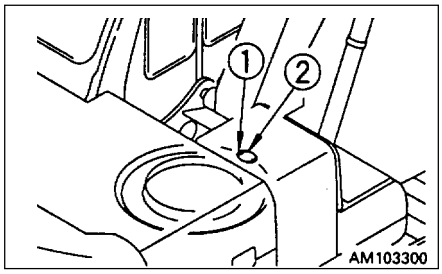
10. Loosen the knob of feed pump ③, and move it up and down until clear fuel containing no bubbles flows out through joint bolt ②.

11. Tighten joint bolt ②.
    After replacing the fuel filter cartridge, start the engine and check that there is no leakage of fuel from the filter seal surface.

REMARK

When the engine stops because of running out of fuel, also operate the feed pump according to the above procedure to bleed air.

24.7.2 CHECK SWING PINION GREASE LEVEL, ADD GREASE



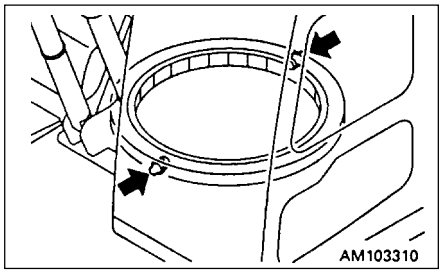
Prepare a scale.

1. Remove bolts ① (2 bolts) on the top of the revolving frame and remove cover
2. Insert a scale into the grease and check that the height of the grease in the portion where the pinion passes is at least 4 mm. Add more grease if necessary.
3. Check if the grease is milky white. If it is milky white, it is necessary to change the grease. Please contact your Komatsu distributor.;

The total amount of grease is 10 *l* (9.1 kg)).

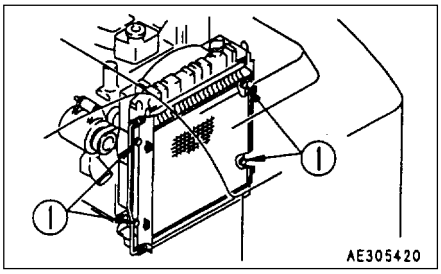
4. Install cover ② with bolts ①

24.7.3 LUBRICATE SWING CIRCLE (2 points)



1. Lower the work equipment to the ground.
2. Using a grease pump, pump in grease through the grease fittings shown by arrows.
3. After greasing, wipe off all the old grease that was pushed out.

24.7.4 CLEAN AND INSPECT RADIATOR FINS, OIL COOLER FINS AND CONDENSER FINS (ONLY FOR MACHINES EQUIPPED WITH AIR CONDITIONER)



⚠ WARNING

If compressed air, steam, or water hit your body directly, there is danger of injury. Always wear protective glasses, mask and safety shoes.

1. Open the engine hood and the battery room door on the left side of the machine.

2. When cleaning radiator fins, remove four bolts ①, fixing the oil cooler to the radiator. Tilt the oil cooler outward, then clean the radiator fins.

3. Blow off mud, dust or leaves clogging the radiator fins and oil cooler fins using compressed air.
   At the same time, clean the net in front of the oil cooler.
   Clean the condenser fins on machines equipped with the air conditioner.
   Steam or water may be used instead of compressed air.

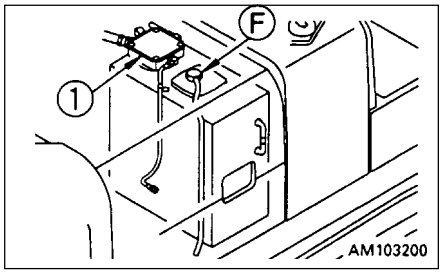
4. After cleaning, fix the oil cooler with bolts ①.

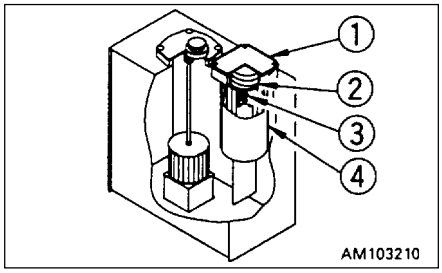
5. Check the rubber hose. Replace with a new one if the hose is found to have cracks or to be hardened by ageing.
   Further, check hose clamps for looseness.

NOTICE

To prevent damage to the fins, apply compressed air from an appropriate distance. Damaged fins may cause water leakage or overheating. In a dusty site, check the fins daily, irrespective of the maintenance interval.

24.7.5 REPLACE HYDRAULIC FILTER ELEMENT





WARNING

When removing the oil filler cap, turn it slowly to release the internal pressure before removing it.

1. Remove the cover over the hydraulic tank.
2. Remove the cap from oil filler Ⓕ, and release the internal pressure.
3. Loosen 4 bolts, then remove cover ①.
   When doing this, the cover may fly out under the force of spring ②, so hold the cover down when removing the bolts.
4. After removing spring ② and valve ③, take out element ④.
5. Clean the removed parts in diesel oil.
6. Install a new element in the place where old element ④ was installed.
7. Set valve ③ and spring ② on top of the element.
8. Set cover ① in position, push it down by hand, and install the cover with the mounting bolts.

9. Screw in the oil filler cap and install the cover.

10. To bleed air,start the engine according to "12.2 STARTING ENGINE" and run the engine at low idling for 10 minutes.

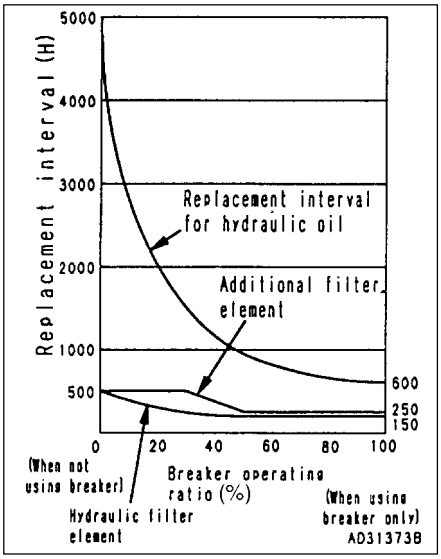
11. Stop the engine.

REMARK

Operate the machine after halting for more than 5 minutes to eleminate bubbles in the oil inside the tank.

12. Check for oil leakage and wipe off any spilled oil.

When the hydraulic breaker is installed, the hydraulic oil deteriorates earlier than in normal bucket digging work.
The first element replacement should be at 100 to 150 hours for new machines. Thereafter replace the element according to the table on the right.
Replace the additional filter element for the breaker every approx. 250 hours (when breaker operating ratio is more than 50%) according to the table on the right. (See "24.2.11 REPLACE ADDITIONAL BREAKER FILTER ELEMENT".)



24.8 EVERY 1000 HOURS SERVICE

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

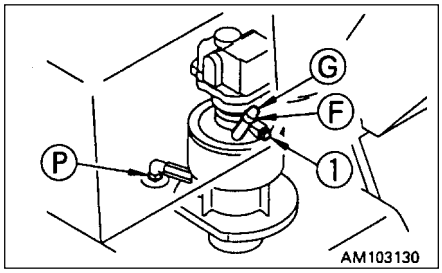
24.8.1 CHANGE OIL IN SWING MACHINERY CASE

⚠ WARNING

The oil is at high temperature immediately after the machine has been operated. Wait for the oil to cool down before carrying out maintenance.

- Container to catch drained oil: Min. 2.5 / capacity
- Refill capacity: 2.5 /

1. Set an oil container under drain plug Ⓟ under the machine body.
2. Remove drain plug Ⓟ under the body, drain the oil then tighten the drain plug again. Tightening torque of the drain plug: 98 - 185 Nm (10 - 19 kgm).
3. Remove dipstick Ⓖ and bleeding plug ①. Add the specified amount of engine oil through gauge hole Ⓕ.



NOTICE

For details of the oil to use, see "20. USE OF FUEL, COOLANT AND LUBRICANTS ACCORDING TO AMBIENT TEMPERATURE".

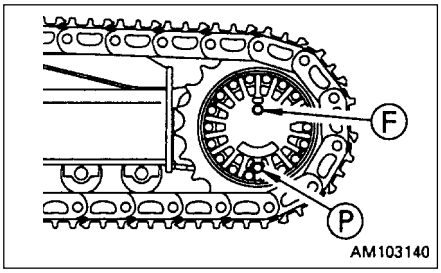
4. After refilling, install bleeding plug ①.
5. Wipe off oil on the dipstick with a cloth.
6. Insert dipstick Ⓖ into the gauge pipe thoroughly and then pull it out again.
7. When the oil level is between the H and L marks, on dipstick Ⓖ, it is normal. If the oil does not reach the L mark, add more oil through oil filter Ⓕ
8. If the oil level exceeds the H mark, drain the excess engine oil from drain plug Ⓟ, and check the oil level again.

24.8.2 CHANGE OIL IN FINAL DRIVE CASE

WARNING

- **The oil is at high temperature immediately after the machine has been operated. Wait for the oil to cool down before carrying out maintenance.**
- **If there is still pressure remaining inside the case, the oil or plug may fly out.**
  Loosen the plug slowly to release the pressure.

Prepare the following.
- Container to catch drained oil: Min. 2.5 / capacity (PC130),
  Min. 4.0 / capacity (PC150LGP)
- Refill capacity: 2.5 / (PC130),
  4.0 / (PC150LGP)
- Hexagon wrench



1. Set the machine with plug Ⓕ and plug Ⓟ perpendicular to the ground surface.
2. Set a container under plug Ⓟ to catch the oil.
3. Remove plugs Ⓟ and Ⓕ with the hexagon wrench and drain the oil.
4. Tighten plug Ⓟ.
5. Add engine oil through the hole of plug Ⓕ.

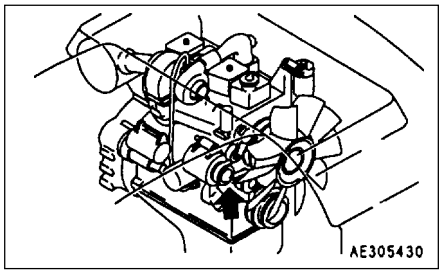
REMARK

Check the O-rings in the plugs for damage. If necessary, replace with new ones.

6. When the oil overflows from the hole of plug Ⓕ, install plug Ⓕ.

24.8.4 CHECK FAN BELT TENSION, ADJUST

Special tools are required for inspection and replacement fan belt. Contact your Komatsu distributor for inspection and replacement.



24.8.5 CHECK ALL TIGHTENING PARTS OF TURBO-CHARGER

Contact your Komatsu distributor to have the tightening portions checked.

24.8.6 CHECK PLAY OF TURBOCHARTER ROTOR

Ask Komatsu distributor to check the play of the turbocharger rotor.

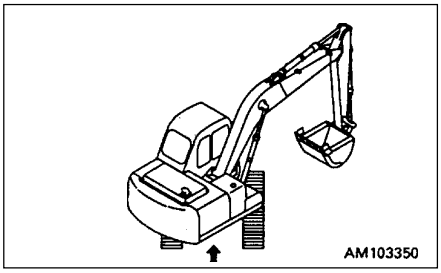
24.9 EVERY 2000 HOURS SERVICE

Maintenance for every 100, 250, 500 and 1000 hours should be carried out at the same time.

24.9.1 CHECK OIL LEVEL IN PTO GEAR CASE, ADD OIL

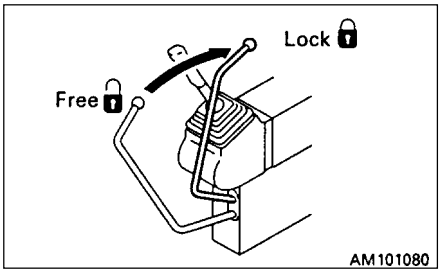
WARNING

Immediately after operations, the oil is at a high temperature. Wait for the temperature to go down before starting this operation

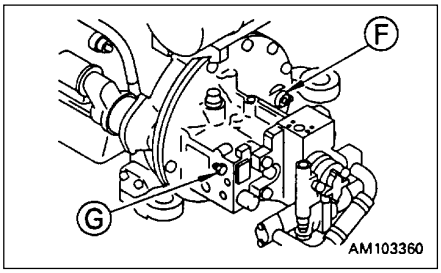


1. Swing the upper structure so that the PTO gear case is midway between the left and right tracks.

   Stop the engine and set the safety lock lever to the LOCK positon.



2. Remove the cover under the right side of the machine.



3. Remove plug Ⓖ and check that the oil level is close to the bottom edge of the plug hole. If the oil level is low, remove plug Ⓕ, and add oil through the hole of plug Ⓕ until it reaches the bottom of the hole of plug Ⓖ.

NOTICE

For details of the oil to use, see "20. USE OF FUEL, COOLANT AND LUBRICANTS ACCORDING TO AMBIENT TEMPERATURE".

4. Install plug Ⓖ and plug Ⓕ.

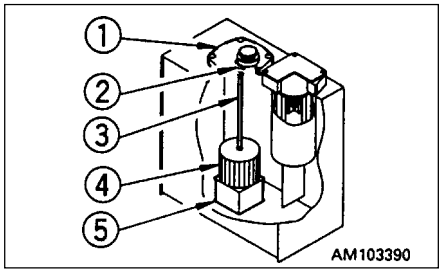
5. Install the cover.

24.9.2 CLEAN HYDRAULIC TANK STRAINER

WARNING

The oil is at high temperature immediately after the machine has been operated. Wait for the oil to cool down before cleaning the strainer. When removing the oil filler cap, turn it slowly to release the internal pressure, then remove it carefully.

1. Loosen 4 bolts, then remove cover ①
   When doing this, the cover may fly out under the force of spring ②, so push the cover down when removing the bolts.
2. Pull up the top of rod ③, and remove spring ② and strainer ④.
3. Remove the dirt stuck to strainer ④, then wash it in clean diesel oil or flushing oil
   If strainer ④ is damaged, replace it with a new one.
4. Refit strainer ④ by inserting it into tank projecting part ⑤.
5. Install cover ① with bolts.



24.9.3 CLEAN, CHECK TURBOCHARGER

Contact your Komatsu distributor for cleaning or inspection.

24.9.4 CHECK ALTERNATOR, STARTING MOTOR

The brush may be worn, or the bearing may have runout of grease,so contact your Komatsu distributor for inspection or repair. If the engine is started frequently, carry out inspection every 1000 hours.

24.9.5 CHECK ENGINE VALVE CLEARANCE, ADJUST

A special tool is required for removing and adjusting the parts, you shall request Komatsu distributor for service.

24.10 EVERY 4000 HOURS SERVICE

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

24.10.1 CHECK WATER PUMP

Check that there is oil leakage, water leakage or clogging of the drain hole. If any abnormality is found, contact your Komatsu distributor for disassembly and repair or replacement.

24.11 EVERY 5000 HOURS SERVICE

Maintenance for every 100, 250, 500 and 1000 hours should be carried out at the same time.

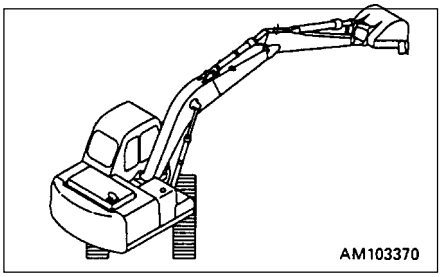
24.11.1 CHANGE OIL HYDRAULIC TANK

⚠ WARNING

The oil is at high temperature immediately after the machine has been operated. Wait for the oil to cool down before changing the oil. When removing the oil filler cap, turn it slowly to release the internal pressure, then remove it carefully.

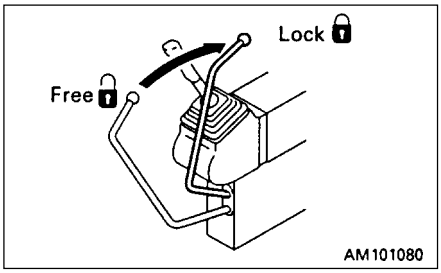
Prepare the following
- Container to catch drained oil: Min. 90 / capacity
- Refill, capacity: 90 /
- Prepare a handle for the socket wrench set.

1. Swing the upper structure so that the drain plug under the hydraulic tank comes at the middle of the left or right track.



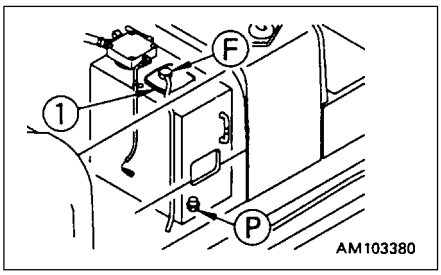
2. Retract the arm and bucket cylinders to the stroke end, then lower the boom and put the bucket teeth in contact with the ground.

3. Lock the safety lock lever and stop the engine.



4. Remove the cover over the hydraulic tank and remove the cap of oil filler Ⓕ.

5. Set the oil container under the drain plug under the machine. Using the handle, remove drain plug Ⓟ) and drain the oil. Check the O-ring installed to plug Ⓟ, and if it is damaged, replace the O-ring. After draining the oil, tighten drain plug Ⓟ
   Tightening torque: 69 ± 10 Nm (7 ± 1kgm).

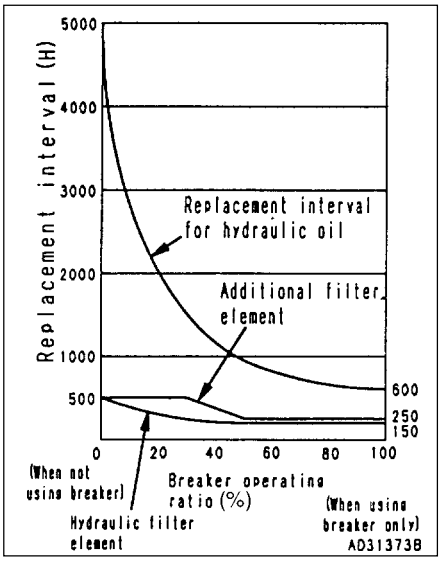


When removing drain plug Ⓟ, be careful not to get oil on yourself.

6. Add the specified amount of engine oil through oil filler port Ⓕ. Check that the oil level is between H and L on the sight gauge.

NOTICE

- **For type of oil to be used, see "20. USE OF FUEL, COOLANT AND LUBRICANTS ACCORDING TO AMBIENT TEMPERATURE".**
- **When the hydraulic breaker is installed, the hydraulic oil deteriorates earlier than in normal bucket digging work. Therefore replace the hydraulic oil according to the table at the right.**



7. After replacing hydraulic oil and cleaning or replacing filter element and strainer, bleed air from the circuit according to the following procedure.

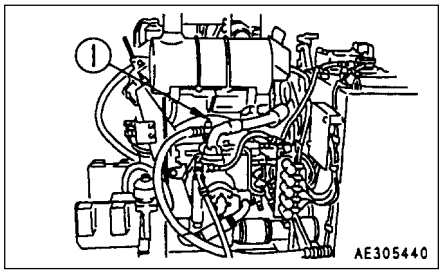
Procedure for bleeding air

Follow steps 1 to 7 to bleed air.

1. Bleeding air from pump

1. Loosen air bleeder ① installed to the drain port, and check that oil oozes out. (Completion of air bleeding).

2. After completing the air bleeding operation, tighten the air bleeder.



NOTICE

If the pump is operated without filling the pump case with hydraulic oil, abnormal heat will be generated and this may lead to premature damage of the pump.

2. Starting engine

Start the engine according to "12.2 STARTING ENGINE" keep running the engine at low idling for 10 minutes and carry out the following procedure.

3. Bleeding air from cylinders

1. Run the engine at low idling, and extend and retract each cylinder 4 - 5 times without operating it to the end of its stroke. (Stop approx. 100 mm (4 in) before the end of the stroke

2. Next, operate each cylinder to the end of each stroke 3 - 4 times.

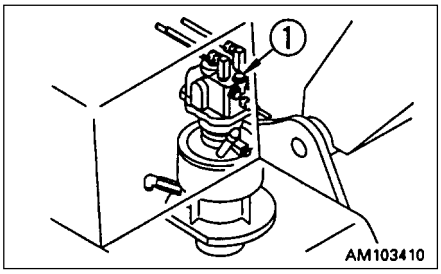
3. After this, operate each cylinder 4 - 5 times to the end of its stroke to completely bleed air.

NOTICE

If at first, the engine is run at high speed or the cylinder is operated to the end of its stroke, the air inside the cylinder may cause damage to the piston packing or other parts.

4. Bleeding air from swing motor
(only after draining oil from swing motor case)

1. Run the engine at low idling, loosen air bleeding plug ①, and check that oil oozes out from air bleeding plug ①



NOTICE
When doing this, do not operate the swing.

2. If oil does not ooze out, stop the engine, remove air bleeding plug ①, fill the motor case with hydraulic oil.

3. After completion of the air bleed operation, tighten air bleeding plug ①.

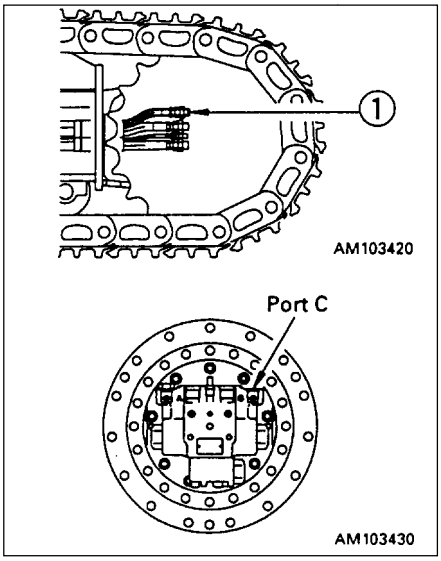
4. Run the engine at low idling, and swing 2 or more times slowly and uniformly to the left and to the right.

NOTICE
If the air is not bled from the swing motor, the bearings of the motor may be damaged.

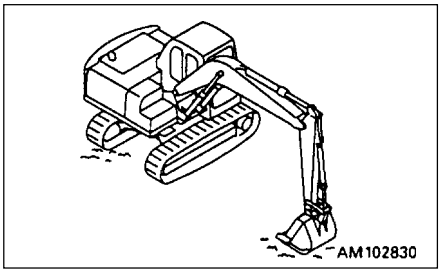
5. Bleeding air from travel motor
(only after draining oil from travel motor case)

1. Run the engine at low idling, remove hose ① from ports c, and tighten it if oil flows out.

2. Keep the engine running at low idling, and swing the work equipment 90° to bring it to the side of the track.



3. Jack up the machine until the track is raised slightly from the ground. Rotate the track under no load for 2 minutes. Repeat this procedure on both the left and right sides, and rotate the track equally both forward and in reverse.



6. Bleeding air from attachment (if installed)

For machines equipped with attachments such as the breaker, actuate the attachment pedal about 10 times to bleed the air completely from the attachment circuit while running the engine at low idling.

NOTE

If the attachment bleeding procedure is specified by the manufacturer, bleed the attachment according to such procedure.

7. Operation

1. After completion of bleeding air, stop the engine, and wait for at least 5 minutes before starting operations. In this way, the air bubbles are removed from the oil inside the hydraulic tank.

2. Check for any leakage of oil, and wipe off any oil that has been spilled.

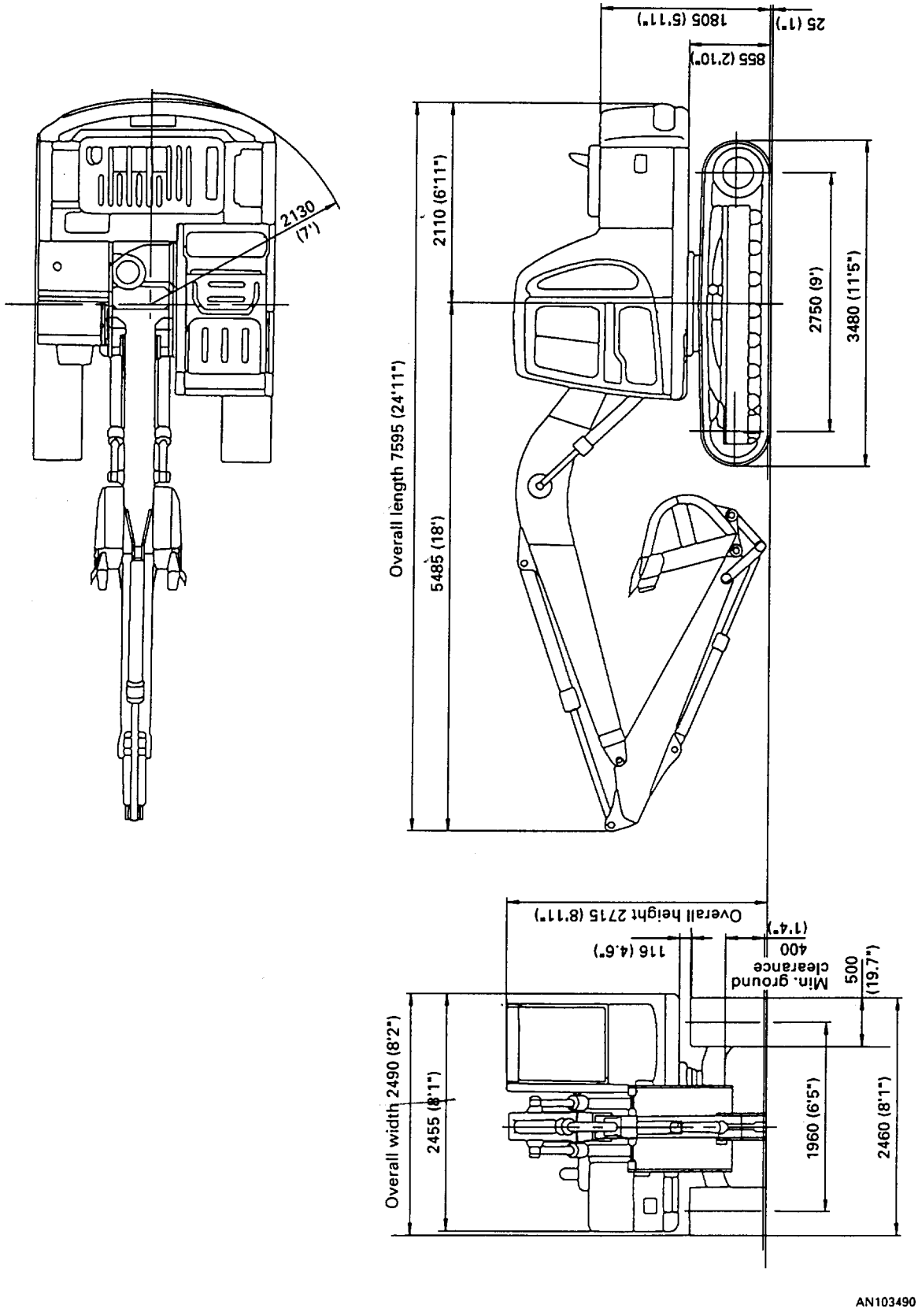
SPECIFICATIONS

25. SPECIFICATIONS

PC130-6K
PC150LGP-6K

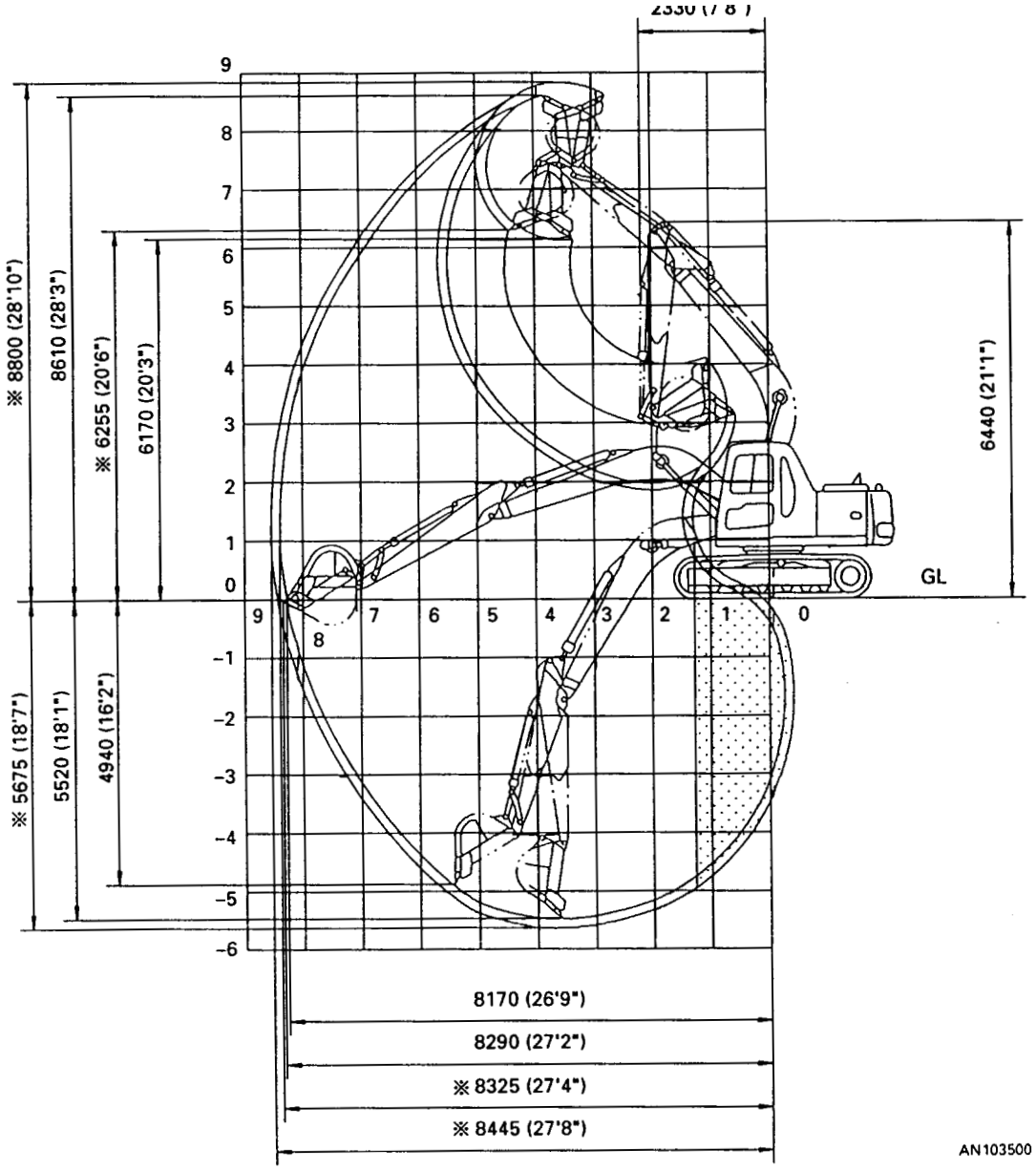
		PC130-6K	PC150LGP-6K
WEIGHT			
• Operating weight (without operater)		12250 kg	15330 kg
PERFORMANCE			
• Bucket capacity (standard bucket) SAE/CECE		0.24 ~ 0.68 m^3	0.24 ~ 0.84 m^3
• Travel speed	Low speed	2.7 km/h	2.1 km/h
	Middle speed	3.5 km/h	2.8 km/h
	High speed	5.5 km/h	4.6 km/h
• swing speed		12 rpm	
TRACK SHOE			
• Triple grouser shoe (standard)		500 mm width	800 mm width
ENGINE			
• Model		Komatsu S4D102E diesel engine	
• Flywheel horsepower		64 kW (86 HP)/2200 rpm	
• Starting moter		24 V 4.5 kW	
• Alternator		24 V 25 A	
• Battery		12 V 80 Ah x 2 pieces	

PC130-6K

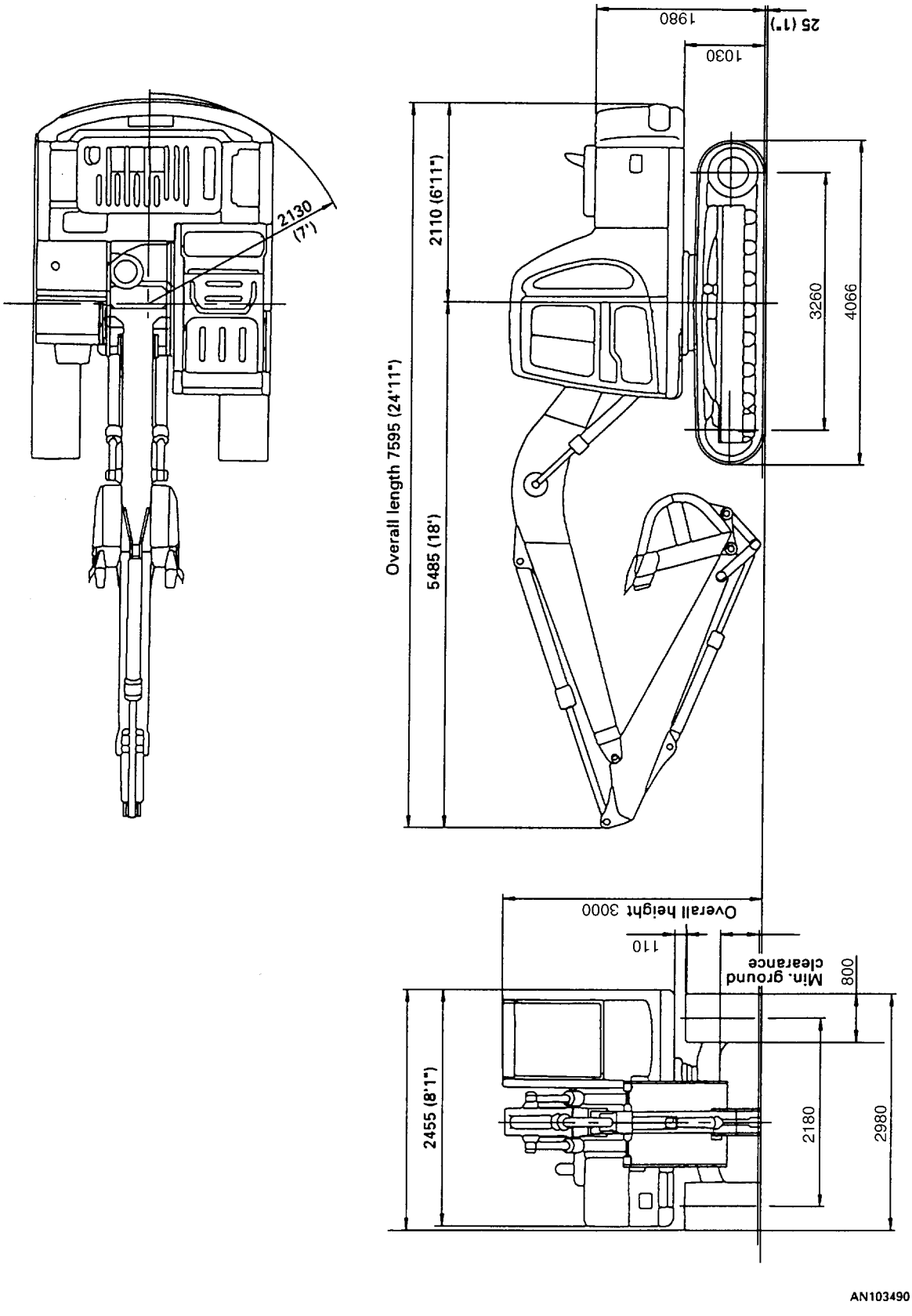

2130 (7')
1805 (5'11")
25 (1")
855 (2'10")
2110 (6'11")
2750 (9')
3480 (11'5")
Overall length 7595 (24'11")
5485 (18')
Overall height 2715 (8'11")
116 (4.6")
400 (1'4")
Min. ground clearance
500 (19.7")
Overall width 2490 (8'2")
2455 (8'1")
1960 (6'5")
2460 (8'1")
AN103490

PC130-6K

1. The mark ※ indicates the dimensions for shovel operation.
2. Never allow other person than the operater to enter the swing range (Max. swing range, Max. digging radius).



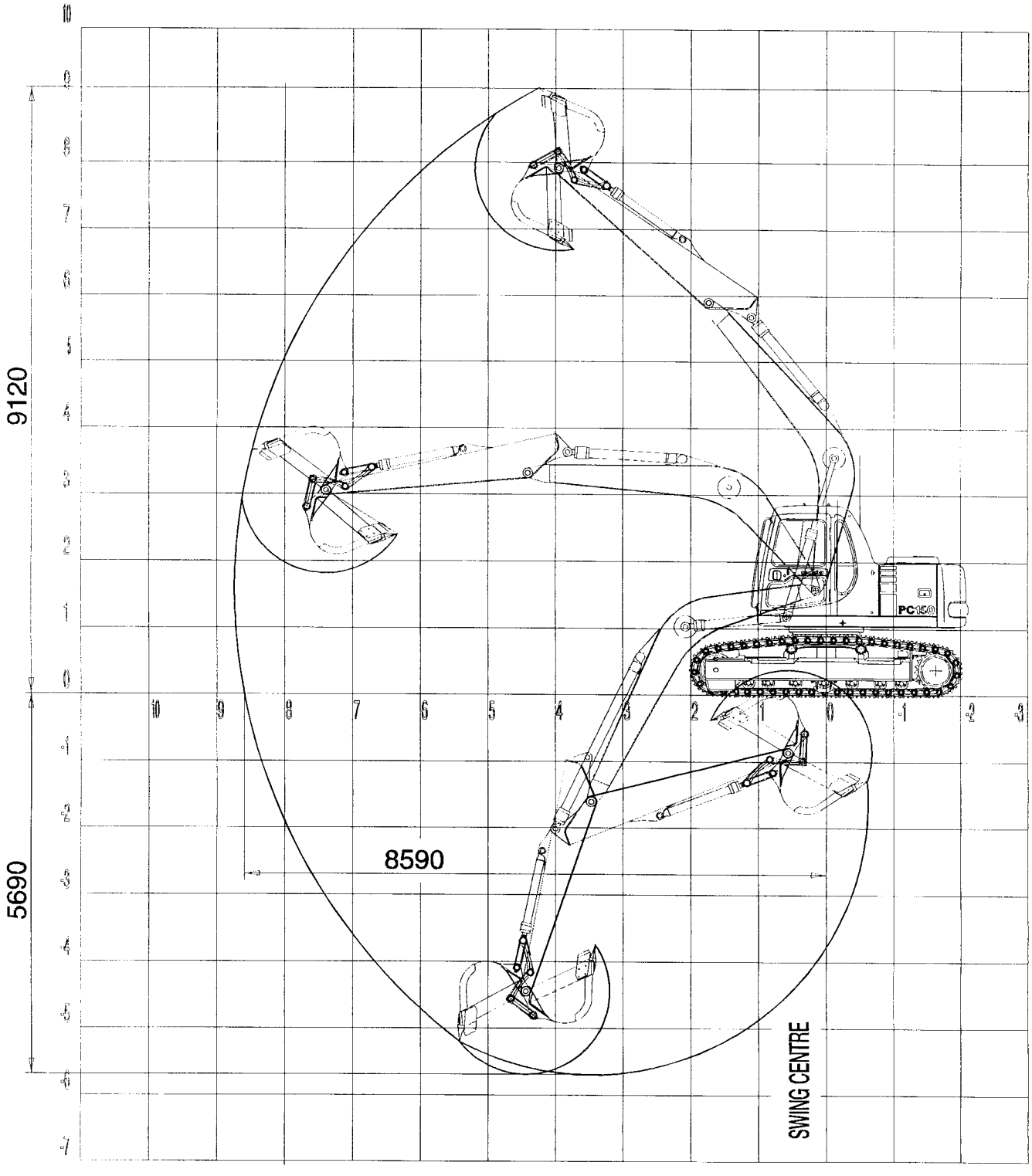
PC150LGP


2130
(7')
1980
25 (1")
1030
2110 (6'11")
Overall length 7595 (24'11")
5485 (18')
3260
4066
Overall height 3000
110
Min. ground
clearance
800
2455 (8'1")
2180
2980
AN103490

PC150LGP-6K

Never allow other person than the operater to enter the swing range
(Max. swing range, Max. digging radius).

PC150-6K LOW GROUND PRESSURE MONO-BOOM MACHINE WITH 3.0 M ARM



OPTIONS, ATTACHMENTS

26. GENERAL PRECAUTIONS

26.1 PRECAUTIONS RELATED TO SAFETY

If attachments or options other than those authorised by Komatsu are installed, this will not only affect the life of the machine, but will also cause problems with safety.

When installing attachments not listed in this Operation and Maintenance Manual, please contact your Komatsu distributor first.

If you do not contact Komatsu, we cannot accept any responsibility for any accident or failure.

⚠ WARNING

Precautions for removal and installation operations
When removing or installing attachments, obey the following precautions and take care to ensure safety during the operation.

- **Carry out the removal and installation operations on a flat, firm ground surface.**
- **When the operation is carried out by two or more workers, determine signals and follow these during the operation.**
- **When carrying heavy objects (more than 25 kg), use a crane.**
- **When removing heavy parts, always support the part before removing it.**
  When lifting such heavy parts with a crane, always pay careful attention to the posision of the center of gravity.
- **It is dangerous to carry out operations with the load kept suspended. Always set the load on a stand, and check that it is safe.**
- **When removing or installing attachments, make sure that they are in a stable condition and will not fall over.**
- **Never go under a load suspended from a crane.**
  Always stand in a position that is safe even if the load should fall.

NOTICE

Qualifications are required to operate a crane. Never allow the crane to be operated by an unqualified person.

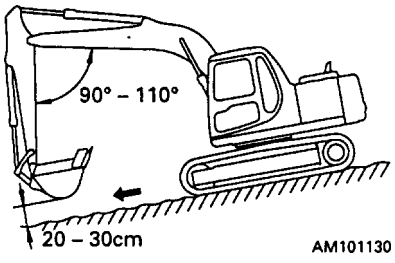
For details of the removal and installation operations, please contact your Komatsu distributor.

26.2 PRECAUTIONS WHEN INSTALLING ATTACHMENTS

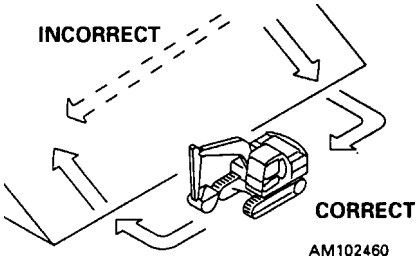
⚠ WARNING

Long work equipment reduces the stability of the chassis, so if the swing is operated on a slope, or when going down a steep hill, the machine may lose its balance and overturn.
The following operations are particularly dangerous, so never operate the machine in these ways.

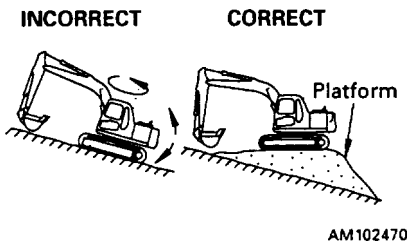
- **Going downhill with the work equipment raised**



- **Travelling across slopes**



- **Swinging the upper structure on slopes**



- **If heavy work equipment is installed, the overrun of the swing becomes greater (the distance from the point where the operator operates the control levers to stop the swing to the point where the upper structure stops completely), so there is danger of mistaking the distance and hitting something.**
  Always operate so that there is an ample margin to the stopping point.
  Furthermore, the hydraulic drift also becomes larger (when the work equipment is stopped in mid-air, it will gradually move under its own weight).

- **Always follow the correct procedure when installing the boom and arm. If the correct procedure is not followed, this may lead to serious damage or injury, so please consult your Komatsu distributor before carrying out installation.**

If long work equipment is installed, the working range will suddenly become larger, so there is danger of mistaking the distance and hitting something.
Always operate the work equipment so that there is ample space from any obstacles in the aria.

27. HANDLING BUCKET WITH HOOK

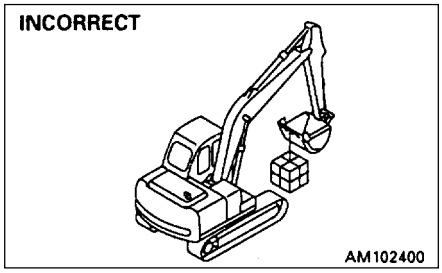
27.1 CHECKING FOR DAMAGE TO BUCKET WITH HOOK

Check that there is no damage to the hook, stopper, or hookmount. If any abnormality is found, please contact your Komatsu distributor.

27.2 PROHIBITED OPERATIONS

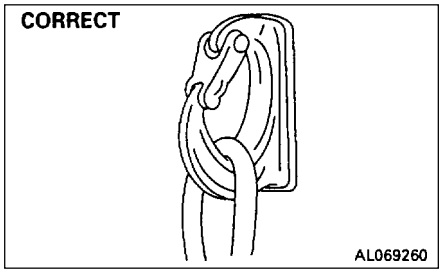
The standard work equipment must not be used for lifting loads.

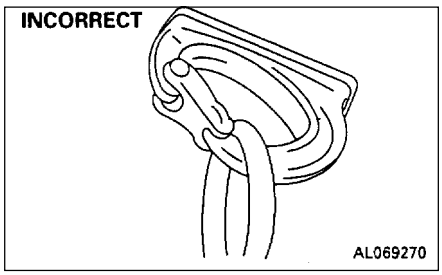
If this machine is to be used for lifting loads, it is necessary to install the special bucket with hook.



27.3 PRECAUTIONS DURING OPERATIONS

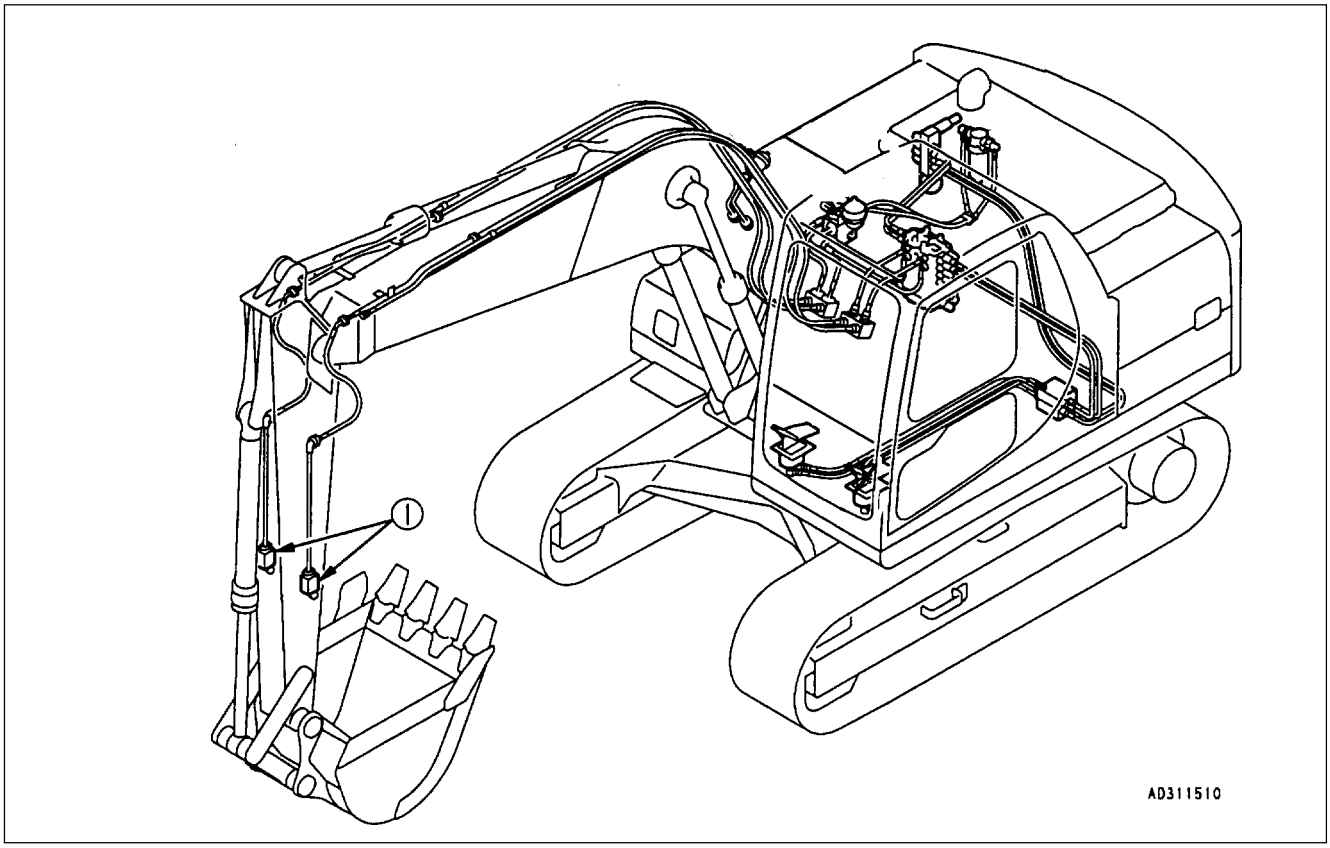
- When carrying out lifting operations, reduce the engine speed and use the lifting operation mode.
- Depending on the posture of the work equipment, there is danger that the wire or load may slip of the hook. Always be careful to maintain the correct hook angle to prevent this from happening.
- Never steer the machine while lifting a load.
- If the bucket with hook is turned and used for operations, it will hit the arm during dumping operations, so be careful when using it.
- The loads must never exceed those specified in the lifting capacity chart when carrying out lifting operations.
- If you wish to install a hook in the future, please contact your Komatsu distributor.





28. MACHINES READY FOR ATTACHMENTS

28.1 GENERAL LOCATIONS



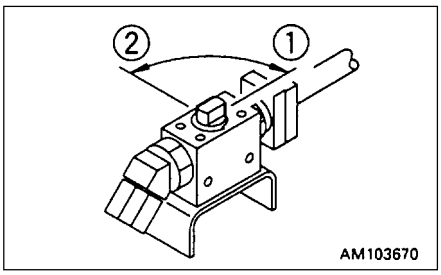
1. STOP VALVE

This valve stops the flow of the hydraulic oil.

① FREE : Hydraulic oil flows.

② LOCK : Hydraulic oil stops.

When removing or installing attachments, set this valve to the LOCK position.

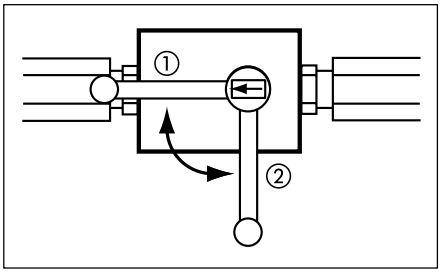


2. SELECTOR VALVE

This switches the flow of the hydraulic oil.

Position ①: When breaker is used

Position ②: When general attachment is used (crusher, etc.)



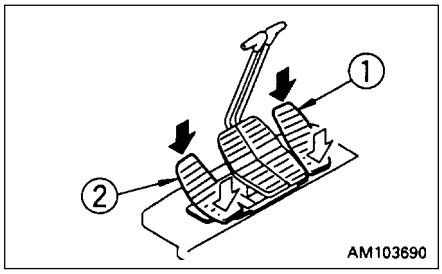
3. CONTROL PEDAL.

This is used to operate the attachment.

① Pedal for one line attachment (with auto deceleration mechanism)

② Pedal for two line attachment (with auto deceleration mechanism)

The breaker is operated with right pedal ①.



4. LOCK PIN

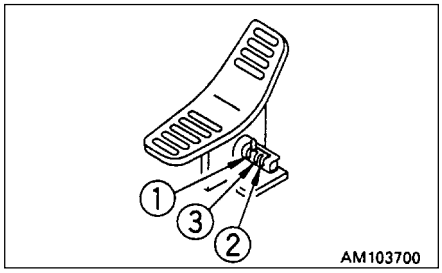
This locks the control pedal.

Position ①: Lock.

Position ②: Free (when using breaker or attachment with large oil flow, such as crusher or power ripper)

Position ③: Free (when using attachment with small oil flow, such as slide arm)

Keep the lock pin in the LOCK position except when using the attachment.



28.2 OPERATION

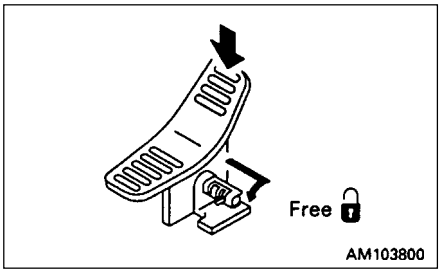
WARNING

- **Be careful when operating the pedal in the deceleration range. The engine speed will rise suddenly.**
- **Do not put your foot on the pedal except when operating the pedal. If rest your foot on the pedal during operations, and it is depressed by accident, the attachment may move suddenly and cause serious damage or injury.**

Operate the attachment as follows.

28.2.1 USING BREAKER

Set the lock pin to position (half stroke), and depress the right control pedal in the direction of the arrow to operate the breaker.

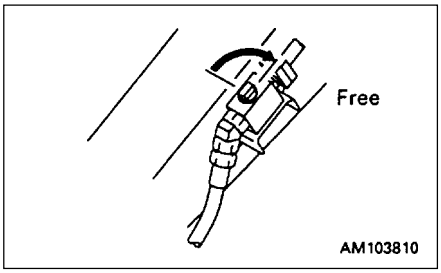


NOTICE

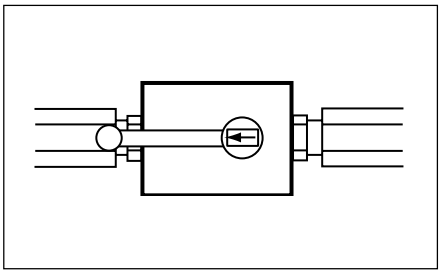
If the breaker is operated with the lock pin position (full stroke), the hydraulic equipment will be damaged or may overheat.Never operate the breaker with the lock pin in this position.

Precautions when using

- Check that the stopper valve is in the FREE position.



- Check that the selector valve is in the position for using the breaker.

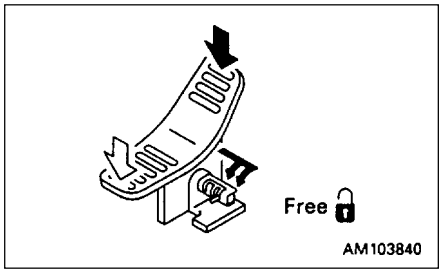


For details of the path followed by the oil, see "30.2 HYDRAULIC CIRCUIT".

- Consult with the attachment maker to decide whether it is necessary to install an accumulator for the attachment circuit.
- For details of other precautions when handling the breaker, read and use correctly the instruction manual provided by the breaker manufacturer.
- When using the breaker, the hydraulic oil deteriorates more rapidly than for normal oparations, so change the hydraulic oil and replace the element at a shorter interval.
- For details, see "23.2 MAINTENANCE INTERVAL WHEN USING HYDRAULIC BREAKER'.

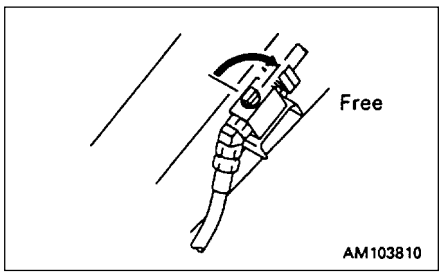
28.2.2 WHEN USING GENERAL ATTACHMENT SUCH AS CRUSHER

When the lock pin is set at the FREE position and the right pedal or left pedal (option) is depressed, the attachment is actuated.

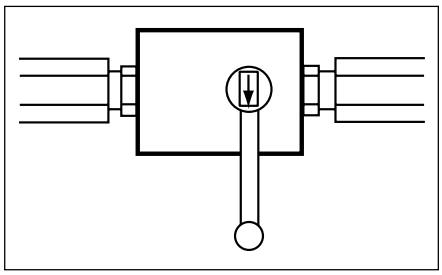


Precautions when using

- Check that the stopper valve is in the FREE position.

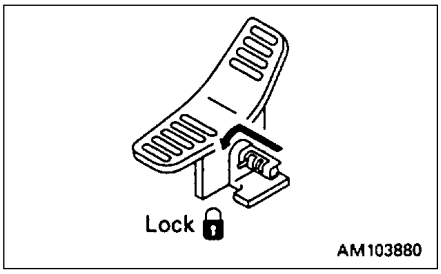


- Check that stopper bar ① for the selector valve spool is installed in the position for crushers and other general attachments.



- For details of other precautions when handling the breaker, read and use correctly the instruction manual provided by the breaker manufacturer.

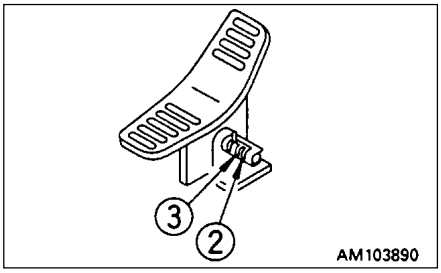
28.3 LONG TERM STORAGE



If the machine is not to be used for a long time, do as follows.

- Set the stop valve in the lock condition.
- Install a blind plug to the valve.
- Set the selector valve to the position for general attachments such as the crusher.
- Set the lock pin at the LOCK position.

If there is no breaker or general attachment installed, operating the pedal may cause overheating.



28.4 SPECIFICATIONS

Hydraulic specifications

- Oil flow

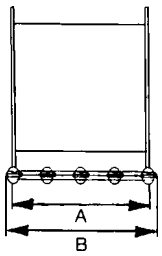
Position of lock pin	Working mode	
	Heavy-duty operation	Breaker
②	200 l /min	120 l /min
③	100 l /min	–

- Cracking pressure of safety valve
  When using breaker: 17200 kPa (175 kg/cm^2)
  When using other attachment: 24500 kPa (250 kg/cm^2)

29. INTRODUCTION OF OPTIONAL PARTS AND ATTACHMENTS

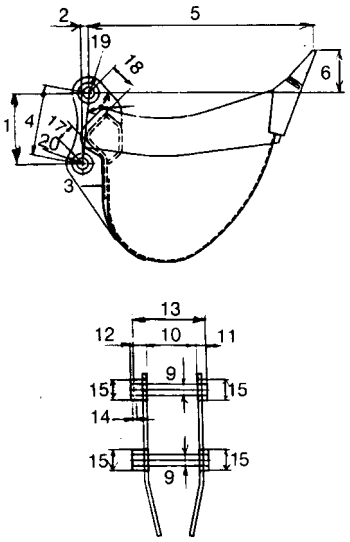
29.1 INTRODUCTION OF OPTIONAL PARTS AND ATTACHMENTS

BUCKET CAPACITIES



Width A(MM)	Width B (MM)	Capacities (ltr) SAE/CECE
450	500	235/220
500	550	275/255
550	600	315/290
600	650	350/325
650	700	390/360
700	750	430/395
750	800	470/425
800	850	510/460
850	950	590/530
900	950	590/530
950	1000	630/570
1000	1050	675/605
1050	1100	715/640
1100	1150	755/675
1150	1200	795/710
1200	1250	840/745

BUCKET PORTION



No.	
1	373
2	38
3	95.8°
4	374.9
5	1197
6	222
9	60
10	260
11	50
12	85
13	380
14	18
15	110
17	101.5
18	138
19	85
20	85

Track shoes	Triple grouser shoe width Triple grouser shoe width	700 mm (28") 600 mm (24")
Head guard	In place where there is danger of falling rocks, always install the head guard to protect the operator.	

- Various other optional parts, such as track frame center guard, arm holding valve, additional front lamps, rear lamps, and travel alarm are available, so please contact your Komatsu distributor.

29.2 ATTACHMENTS INSTALLATION COMBINATION TABLE

This table lists the combination of attachments which can be installed to the standard arm, short arm and long arm.

NOTE: When a long arm is installed, if the bucket is pulled in fully to the front of the machine it may hit the chassis; when digging at an angle, the bucket may hit the undercarriage, so be careful when carrying out these operations.

PC130-6K
BUCKET AND ARM COMBINATION

Bucket capacity (heaped)		Width		Weight (Without side cutters)	No. of teeth	Arm		
SAE, PCSA	CECE	Without side cutters	With side cutters			2.1 m	2.5 m	2.9 m
0.24	0.22	450 mm	575 mm	314 kg	3	o	o	o
0.28	0.26	550 mm	675 mm	339 kg	3	o	o	o
0.35	0.33	600 mm	775 mm	367 kg	3	o	o	o
0.47	0.43	750 mm	875 mm	419 kg	4	o	o	□
0.59	0.53	900 mm	1025 mm	469 kg	4	o	□	△
0.68	0.61	1000 mm	1125 mm	497 kg	4	□	△	-

These charts based on over-side stability with fully loaded bucket at maximum reach.
Please consult your local dealer for the bucket range available in your region.

○ Material weight up to 1,8 t/m³
□ Material weight up to 1,5 t/m³
△ Material weight up to 1,2 t/m³
- Not for use

This table lists the combination of attachments which can be installed to the standard arm, short arm and long arm.

NOTE: When a long arm is installed, if the bucket is pulled in fully to the front of the machine it may hit the chassis; when digging at an angle, the bucket may hit the undercarriage, so be careful when carrying out these operations.

PC150LGP-6K
BUCKET AND ARM COMBINATION

Bucket capacity (heaped)		Width		Weight (Without side cutters)	Arm		
SAE, PCSA	CECE	Without side cutters	With side cutters		2.1 m	2.5 m	2.9 m
0.24	0.22	450 mm	575 mm	314 kg	□	□	□
0.28	0.26	550 mm	675 mm	339 kg	□	□	□
0.35	0.33	650 mm	775 mm	367 kg	□	□	□
0.47	0.43	750 mm	875 mm	419 kg	□	□	□
0.59	0.53	900 mm	1025 mm	469 kg	□	□	□
0.68	0.61	1000 mm	1125 mm	497 kg	□	□	□
0.76	0.69	1100 mm	1225 mm	525 kg	□	□	□
0.84	0.76	1200 mm	1325 mm	563 kg	□	□	△

These charts based on over-side stability with fully loaded bucket at maximum reach.
Please consult your local dealer for the bucket range available in your region.

□ Material weight up to 1,5 t/m^3
△ Material weight up to 1,2 t/m^3
- Not for use

29.3 SELECTION OF TRACK SHOES

Select suitable track shoes to match the operating conditions.

METHOD OF SELECTING SHOES

Confirm the category from the Use column in the table below, and select the shoes from the table below that.
Categories B and C are wide shoes, so there are limitations on there use. When using these shoes, check the precautions, then investigate and study fully the conditions of use to confirm that these shoes are suitable.
When selecting the shoe width, select the narrowest shoe possible that will give the required flotation and ground pressure. If a wider shoe than necessary is used, the load on the track will increase, and this will cause the shoes to bend, links to crack, pins to break, shoe bolts to come loose, and various other problems.

Category	Use	Precautions when using
A	Rocky ground, riverbeds,normal soil	• On rough ground with large obstacles such as boulders or fallen trees, travel at low speed.
B	Normal soil, soft ground	• These shoes cannot be used on rough ground where there are large obstacles such as boulders or fallen trees. • Travel at Hi speed only on flat ground, and if it is impossible to avoid going over obstacles, shift down and travel at half speed in Lo.
C	Extremely soft ground (swampy ground)	• Use the shoes only in places where the machine sinks and it is impossible to use A or B shoes. • These shoes cannot be used on rough ground where there are large obstacles such as boulders and fallen trees. • Travel at Hi speed only on flat ground, and if it is impossible to avoid going over obstacles, shift down and travel at half speed in Lo.

	PC130-6K		PC150LGP-6K	
	Specifications	Category	Specifications	Category
Standard	500 triple grouser	A	800 triple grouser	C
Option	600 triple grouser	B	900 triple grouser	C
Option	700 triple grouser	C	1000 triple grouser	C

30. EXTENDING MACHINE SERVICE LIFE

This section describes the necessary precautions to be observed when operating a hydraulic excavator equipped with an attachment.

NOTICE

Select the attachment most suited to the machine body.

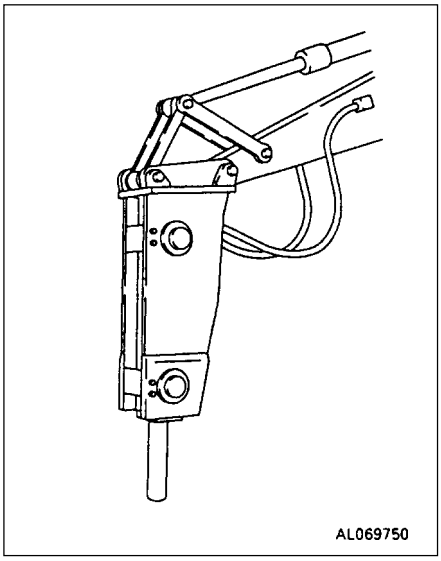
- **The machine models to which attachments can be mounted vary.For selection of attachment and machine model, consult your Komatsu distributor.**

30.1 HYDRAULIC BREAKER

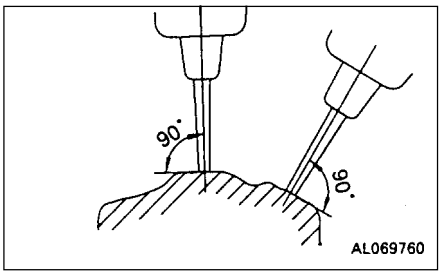
MAIN FIELDS OF APPLICATION

- ○ Crushed rock
- ○ Demolition work
- ○ Road construction

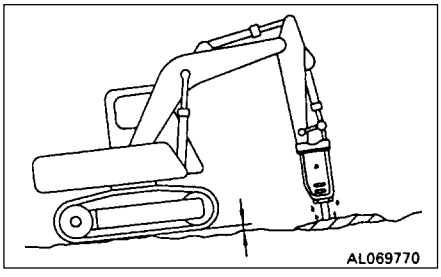
This attachment can be used for a wide range of work including demolition of buildings, breaking up of road surfaces, tunnel work, breaking up slag, rock crushing, and breaking operations in quarries.



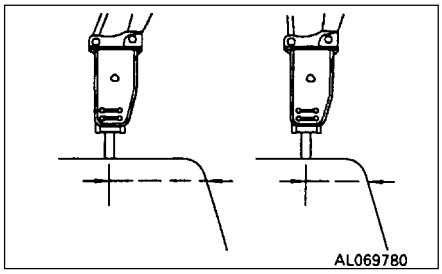
Keep the chisel pushed perpendicularly against the impact surface when carrying out breaking operations.



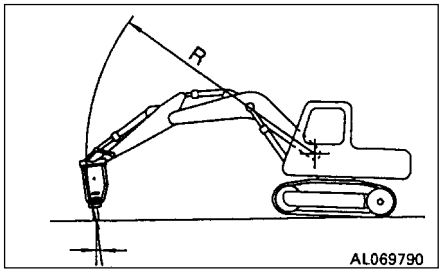
When applying impact, push the chisel against the impact surface and operate so that the chassis rises approx. 5 cm off the ground. Do not let the machine come further off the ground than is necesarry.



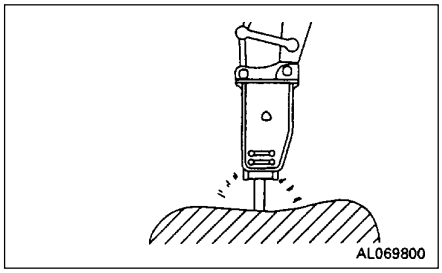
When applying continuous impact to the same surface, if the chisel does not penetrate or break the surface within 1 minute, change the point of impact and carry out breaking operations closer to the edge.



The direction of penetration of the chisel and the direction of the breaker body will gradually move out of line with each other, so always adjust the bucket cylinder to keep them aligned.



Always keep the chisel pressed against the impact surface properly to prevent using the impact force when there is no resistance.

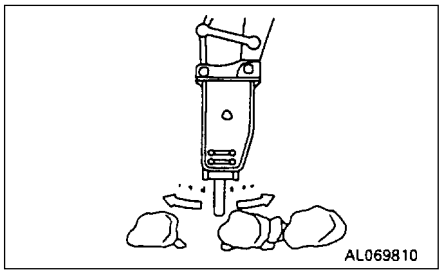


MISTAKEN METHODS OF USE

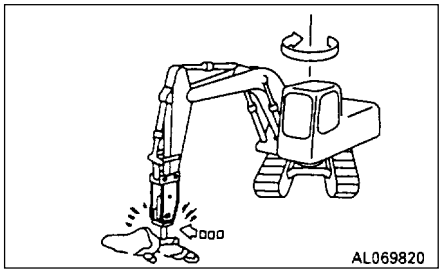
To ensure that the machine has a long life, and to ensure that operations are carried out in safety, do not operate the machine in any of the following ways.

- Do not operate the cylinder to the end of its stroke.
  Always leave approx. 5 cm to spare.

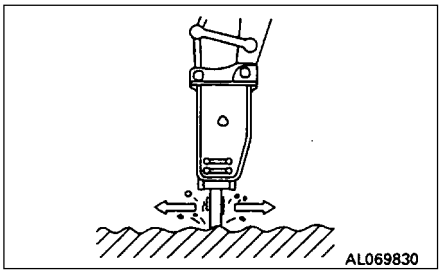
Using the mount to gather in pieces of rock



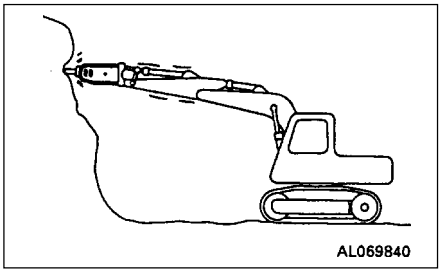
Operations using the swing force



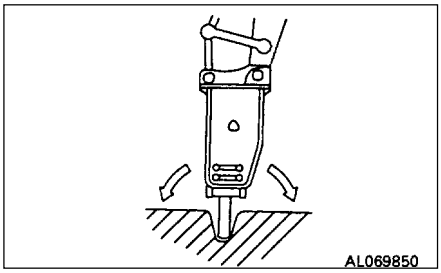
Moving the chisel while carrying out impacting operations



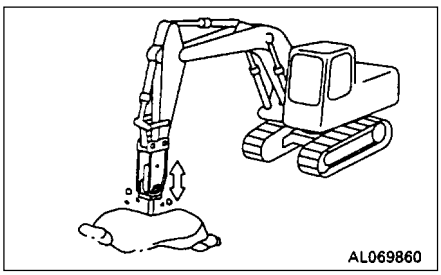
Holding the chisel horizontal or pointed up when carrying out impacting operations



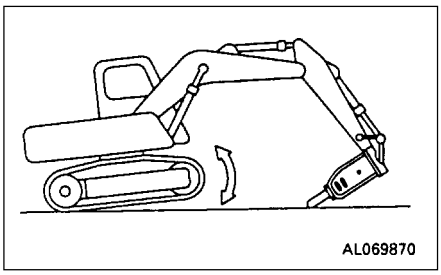
Twisting the chisel when it has penetrated the rock



Pecking operations



Extending the bucket cylinder fully and thrusting to raise the machine off the ground

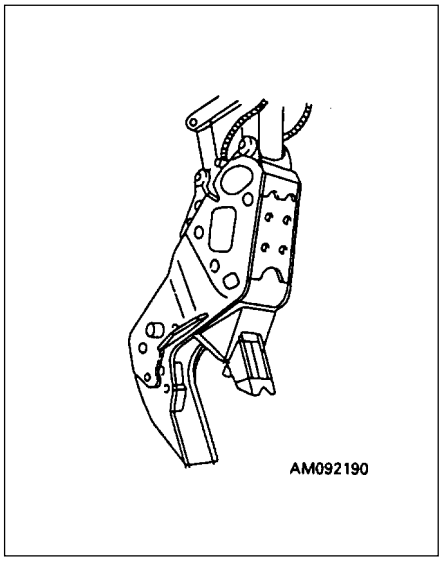


30.2 POWER RIPPER

MAIN FIELDS OF APPLICATIONS

- ○ Road repair work
- ○ Demolition work

This attachment can be used for a wide range of work including peeling of and crushing pavements roads, demolishing wooden houses and buildings, and crushing foundation and roadbeds.

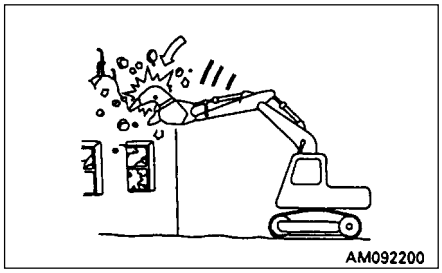


MISTAKEN METHODS OF USE

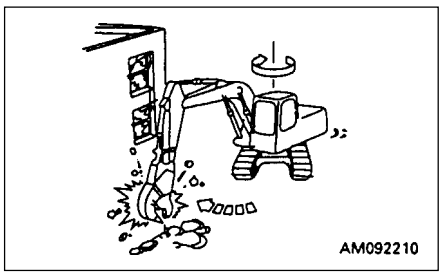
To ensure that the machine has a long life, and to ensure that operations are carried out in safety, do not operate the machine in any of the following ways.

- Do not operate the cylinder to the end of its stroke.
  Always leave approx. 5 cm to spare

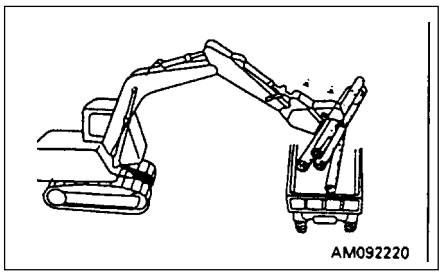
Impact operations using attachments



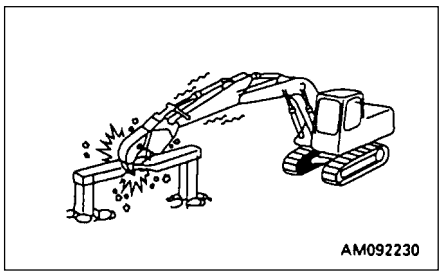
Impact operations using swing force



Overloading work equipment during lifting and loading operations



Operations using attachment to grip at an angle

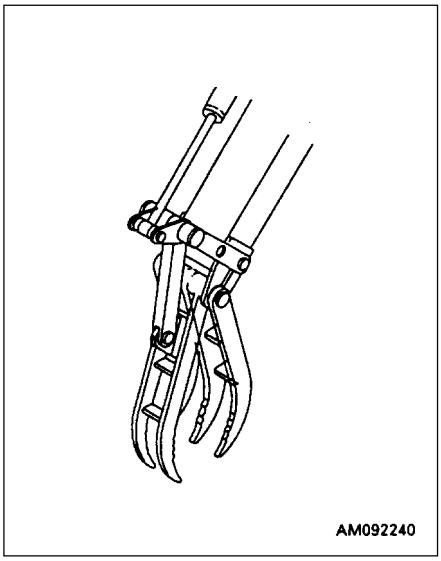


30.3 FORK GRAB

MAIN FIELDS OF APPLICATION

- ○ Disposing of industrial waste
- ○ Disposing of demolition waste

This can be used for a wide range of work including collecting or loading demolition waste materials and debris, timber, grass.

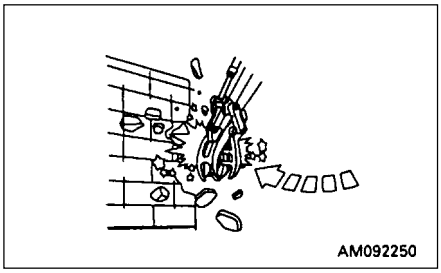

AM092240

MISTAKEN METHODS OF USE

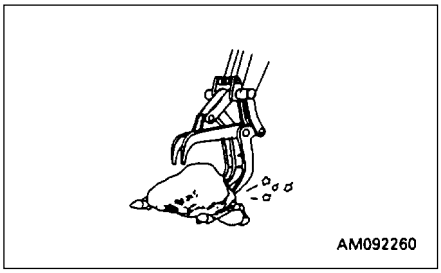
To ensure that the machine has a long life, and to ensure that operations are carried out in safety, do not operate the machine in any of the following ways.

- Do not operate the cylinder to the end of its stroke.
  Always leave approx. 5 cm to spare.

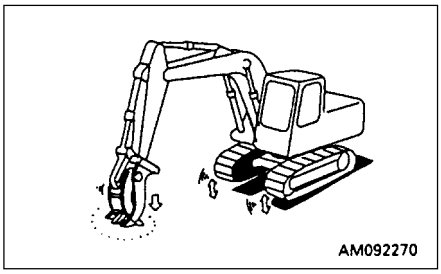
Operations using the swing force


AM092250

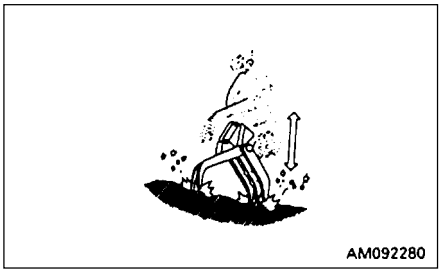
Operations using one side of work equipment


AM092260

Pushing fork into ground surface to jack up and change direction of machine


AM092270

Impact operation with no load

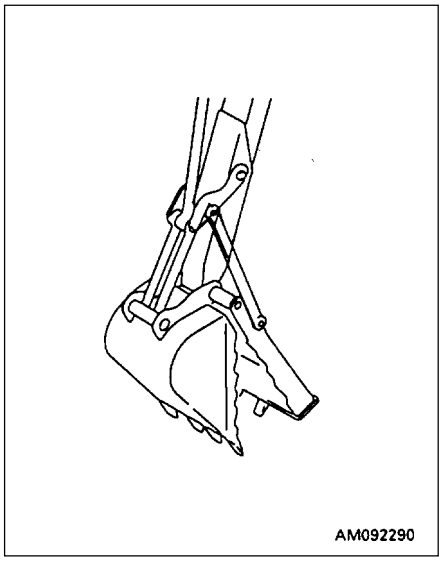

AM092280

30.4 GRAPPLE BUCKET

MAIN FIELDS OF APPLICATION

- ○ Demolition
- ○ Disposing of industrial waste

This bucket is widely used for demolition including breaking-up work, grading and digging, clean-up work after natural disasters, dumping industrial waste, and forestry work, etc.

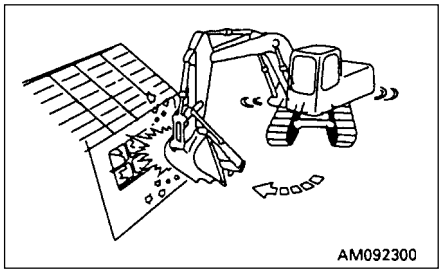


MISTAKEN METHODS OF USE

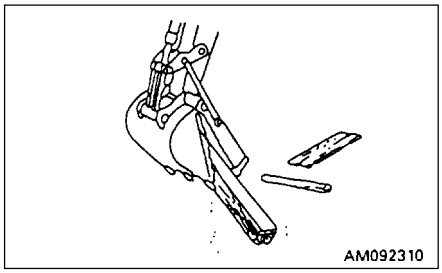
To ensure that the machine has a long life, and to ensure that operations are carried out in safety, do not operate the machine in any of the following ways.

- Do not operate the cylinder to the end of its stroke.
  Always leave approx. 5 cm to spare.

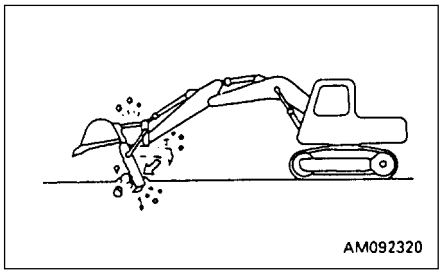
Operations using the swing force



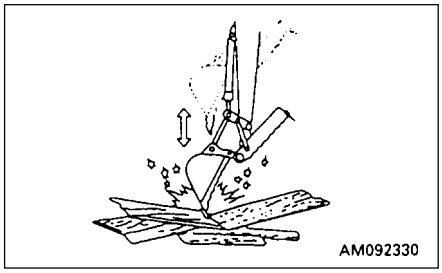
Grabbing an object using buckets on only one side



Closing the sub-bucket with the boom and arm fully extended



Impact operation with no load



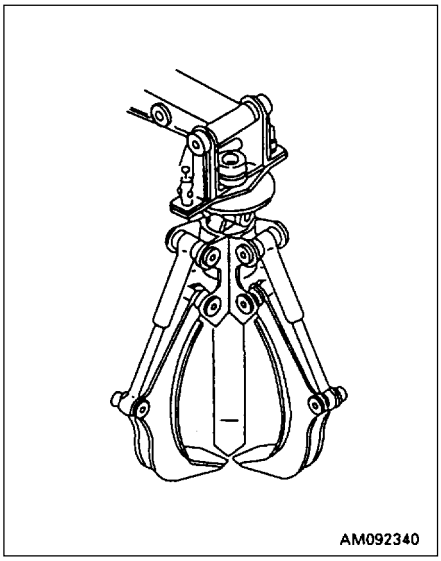
30.5 SCRAP GRAPPLE

MAIN FIELDS OF APPLICATION

○ Disposel of rock or debris

This attachment is mounted to the arm end and used to grasp rock, debris etc. by opening and closing the claws

(3 to 5) corresponding to the extension and retraction of the hydraulic cylinder.

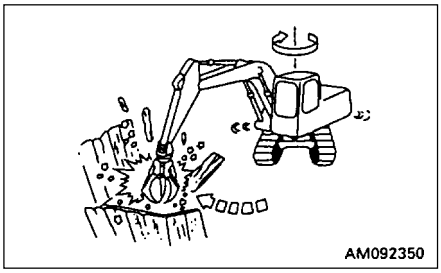


MISTAKEN METHODS OF USE

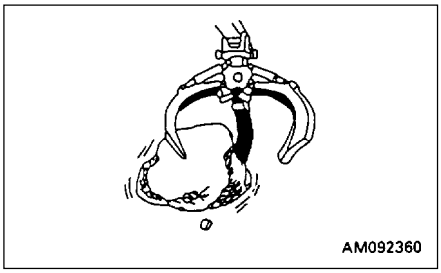
To ensure that the machine has a long life, and to ensure that operations are carried out in safety, do not operate the machine in any of the following ways.

• Do not operate the cylinder to the end of its stroke.
Always leave approx. 5 cm to spare.

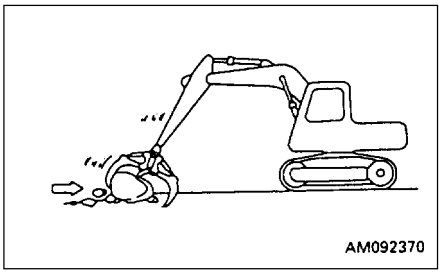
Operations using the swing force



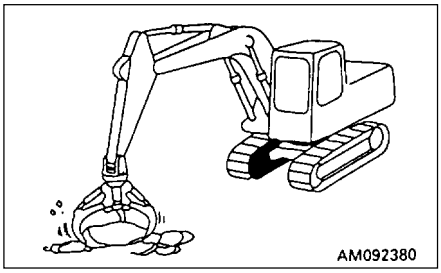
Operations using one side of work equipment



Catching and dragging with claw end



Gouging

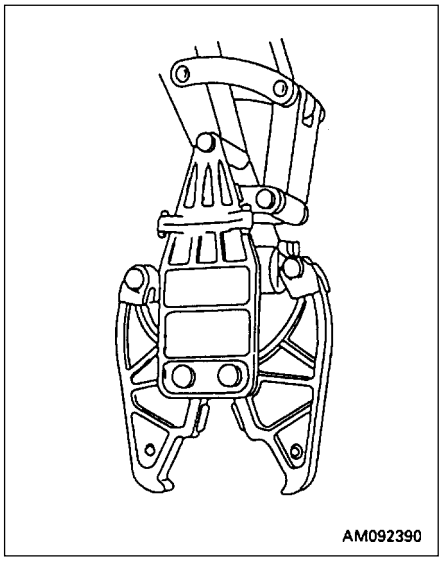


30.6 CRUSHER AND SMASHER

MAIN FIELDS OF APPLICATION

- ○ Demolition
- ○ Road repair work

This is the optimum attachment for demolition of steel frame reinforced structures, and for crushing of concrete blocks and rock, etc. The unique blade shape provides heavy crushing power.

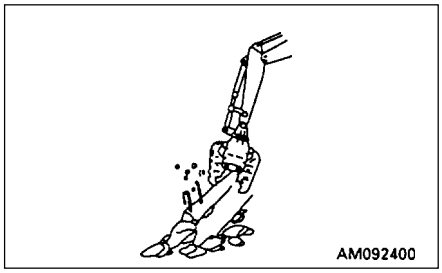


MISTAKEN METHODS OF USE

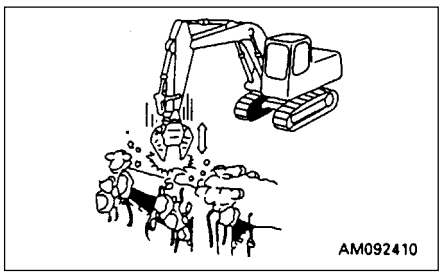
To ensure that the machine has a long life, and to ensure that operations are carried out in safety, do not operate the machine in any of the following ways.

- Do not operate the cylinder to the end of its stroke.
  Always leave approx. 5 cm to spare.

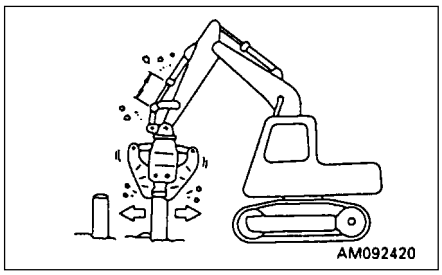
Operations using cutting tip on one side only



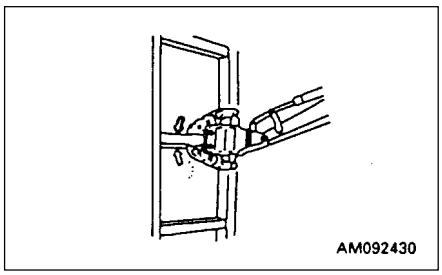
Impact operation with no load



Twisting operations at end of cylinder stroke



Sudden gripping and breaking operations

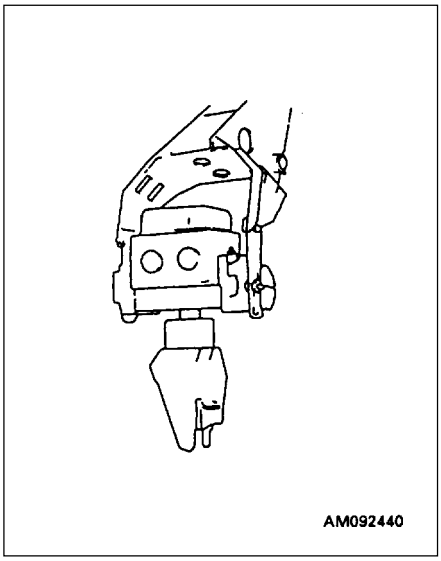


30.7 HYDRAULIC PILE DRIVER

MAIN FIELDS OF APPLICATION

- ○ Foundation work
- ○ River work
- ○ Water supply and sewerage

This is a piling machine employing the hydraulic power source of the excavator. The machine features a long arm and chuck unit movable by 360°. This facilitates operations such as driving and removing long piles, driving in piles at corners, vertical driving etc.

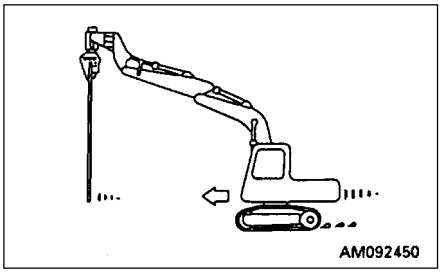

AM092440

MISTAKEN METHODS OF USE

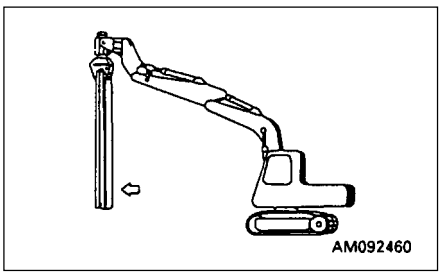
To ensure that the machine has a long life, and to ensure that operations are carried out in safety, do not operate the machine in any of the following ways.

- Do not operate the cylinder to the end of its stroke.
  Always leave approx. 5 cm to spare.

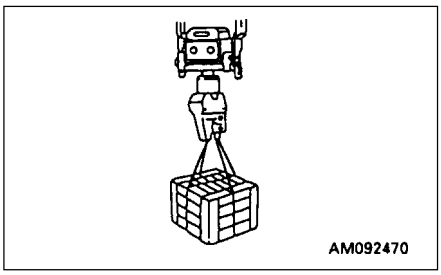
Forward or swing motion while grasping a pile.


AM092450

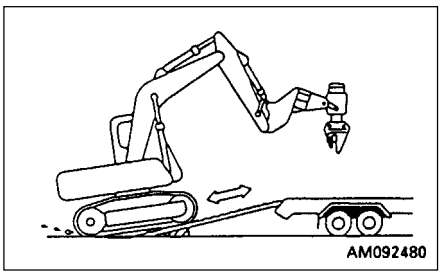
Lifting more than two piles at the same time.


AM092460

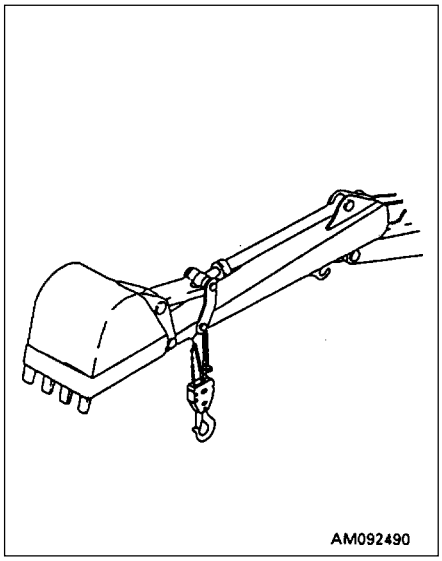
Work other than standard works.


AM092470

Loading or unloading a machine equipped with hydraulic pile driver


AM092480

30.8 HYDRAULIC EXCAVATOR WITH MULTI-PURPOSE CRANE



MAIN FIELDS OF APPLICATION

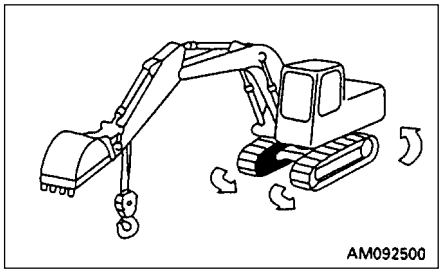
- ○ Site preparation
- ○ Water supply and sewerage
- ○ River work
- ○ Agricultural, civil engineering work

Crane operation can be carried out without removing the bucket. This machine is used for laying U section gutters and hume pipes for water supply and sewerage as well as river and canal work, agricultural, civil engineering work and site preparation.

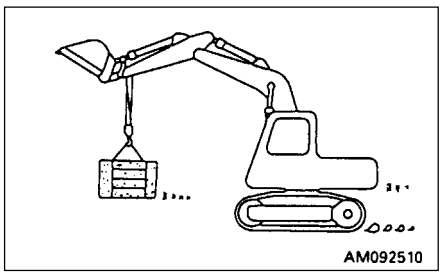
MISTAKEN METHODS OF USE

To ensure that the machine has a long life, and to ensure that operations are carried out in safety, do not operate the machine in any of the following ways.

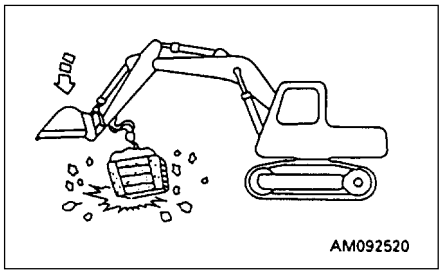
- Do not operate the cylinder to the end of its stroke.
  Always leave approx. 5 cm to spare.



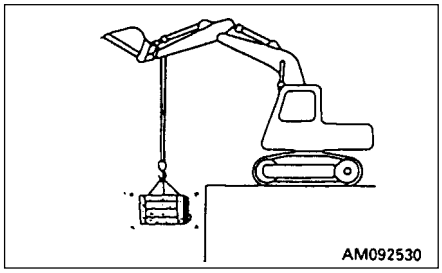
Abrupt lever operation



Travelling with a suspended load



Operating other work equipment during crane operation



Excessive lengthening of wire rope.

MEMO