# Operation & Maintenance Manual

SEAM007905T


# D575A-2

## SUPER DOZER

SERIAL NUMBERS D575A-10042 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 near the machine for reference and periodically reviewed by all personnel who will come into contact with it.**

**NOTICE**

Komatsu has Operation & Maintenance Manuals written in some other languages. If a foreign language manual is necessary, contact your local distributor for availability.

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 can not 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 of your machine or for questions regarding information in this manual.

This manual may contain attachments and optional equipment that are not available in your area. Consult Komatsu or your Komatsu distributor for those items you may require.

**⚠ WARNING**

- **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.**
  **Keep this manual in a readily available place near the machine (on machines with cab, there is a door pocket to hold the manual), and have all personnel involved in working on the machine read the manual periodically.**
- **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 all applicable regulations and standards of the country to which it has been shipped. If this machine has been purchased in another country or purchased from someone in another country, it may lack certain safety devices and specifications 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 0-4 and in SAFETY from page 1-1.**

**CALIFORNIA**

**Proposition 65 Warning**

**Diesel engine exhaust and some of its constituents are known to the State of California to cause cancer, birth defects, and other reproductive harm.**

**CALIFORNIA**

**Proposition 65 Warning**

Battery posts, terminals and related accessories contain lead and lead compounds, chemicals known to the State of California to cause cancer and birth defects or other reproductive harm.

**Wash hands after handling.**

## EMISSION CONTROL WARRANTY

### EMISSION CONTROL WARRANTY STATEMENT (APPLIES TO CANADA ONLY)

**1. Products Warranted**

Komatsu America International Company, Komatsu Mining Systems Inc. and Komatsu Utility Corporation (collectively "Komatsu") produce and/or market products under brand names of Komatsu, Dresser, Dressta, Haulpak and Galion. This emissions warranty applies to new engines bearing the Komatsu name installed in these products and used in Canada in machines designed for industrial off-highway use. This warranty applies only to these engines produced on or after January 1, 2000. This warranty will be administered by Komatsu distribution in Canada.

**2. Coverage**

Komatsu warrants to the ultimate purchaser and each subsequent purchaser that the engine is designed, built and equipped so as to conform, at the time of sale by Komatsu, with all U.S. Federal emission regulations applicable at the time of manufacture and that it is free from defects in workmanship or material which would cause it not to meet these regulations within five years or 3,000 hours of operation, whichever occurs first, as measured from the date of delivery of the engine to the ultimate purchaser.

**3. Limitations**

Failures, other than those resulting from defects in materials or workmanship, are not covered by this warranty. Komatsu is not responsible for failures or damage resulting from what Komatsu determines to be abuse or neglect, including, but not limited to: operation without adequate coolant or lubricants; over fueling; over speeding; lack of maintenance of lubricating, cooling or intake systems; improper storage, starting, warm-up, run-in or shutdown practices; unauthorized modifications of the engine. Komatsu is also not responsible for failures caused by incorrect fuel or by water, dirt or other contaminants in the fuel. Komatsu is not responsible for non-engine repairs, "downtime" expense, related damage, fines, all business costs or other losses resulting from a warrantable failure.

**KOMATSU IS NOT RESPONSIBLE FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES.**

This warranty, together with the express commercial warranties, are the sole warranties of Komatsu. **THERE ARE NO OTHER WARRANTIES, EXPRESS OR IMPLIED, OR OF MERCHANTABILITY OR FITNESS FOR A PARTICUALR PURPOSE.**

## GARANTIE SUR LE CONTRÔLE DES ÉMISSIONS

### ÉNONCÉ DE GARANTIE SUR LE CONTRÔLE DES ÉMISSIONS (APPLICABLE AU CANADA SEULEMENT):

**1. Produits garantis:**

Komatsu America International Company, Komatsu Mining Systems Inc. et Komatsu Utility Corporation (collectivement Komatsu) produisent et/ou font la mise en marché de produits portant les noms de marque Komatsu, Dresser, Dressta, Haulpak et Galion. Cette garantie sur les émissions s'applique à tous les nouveaux moteurs portant le nom Komatsu, installés dans ces produits et utilisés au Canada dans des machines conçues pour utilisation industrielle non-routière. Cette garantie s'applique seulement sur les moteurs produits à partir du 1er Janvier 2000. Cette garantie sera administrée par la distribution de Komatsu au Canada.

**2. Couverture:**

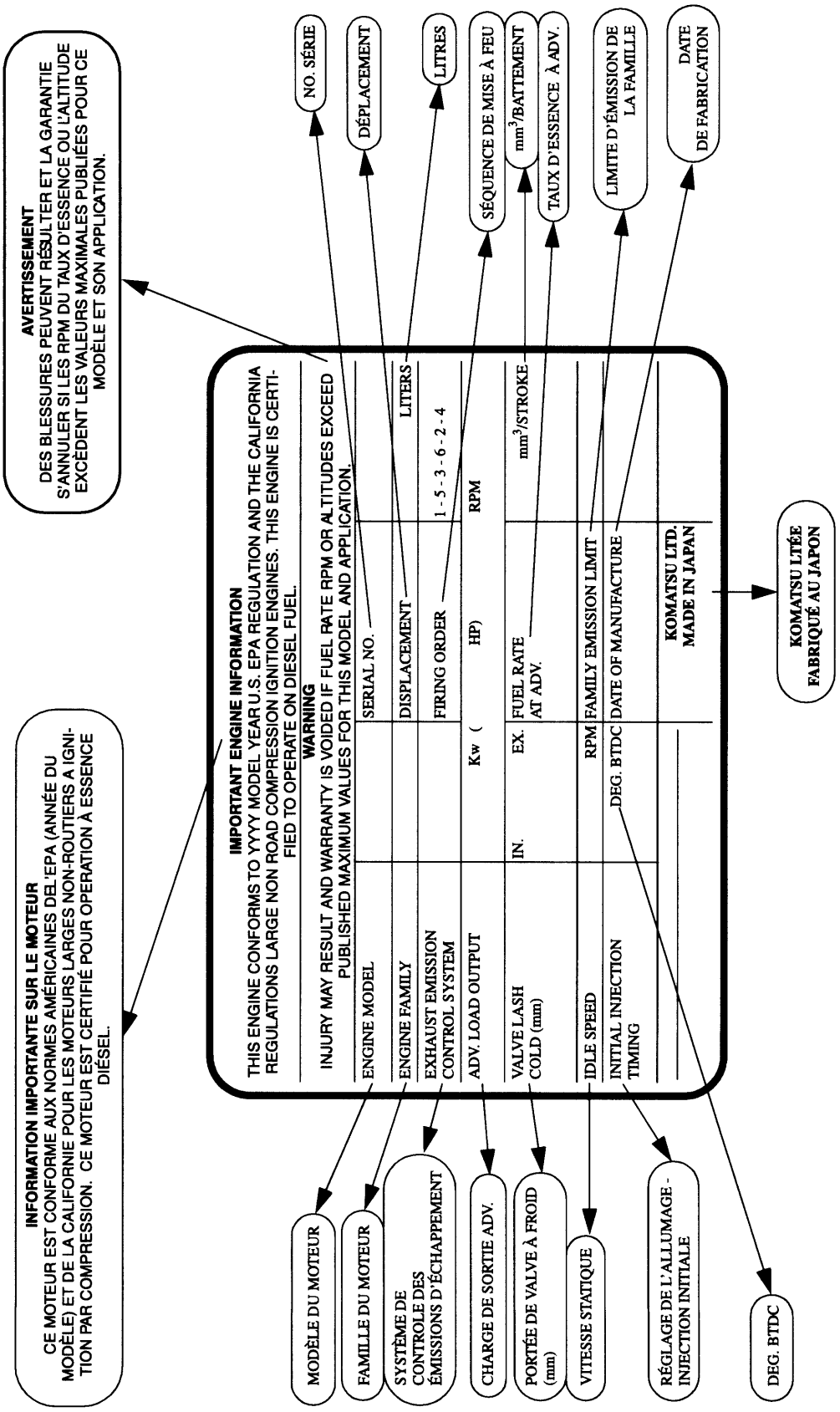
Komatsu garantit à l'acheteur ultime et chaque acheteur subséquent que le moteur est conçu, construit et équipé en toute conformité, au moment de la vente par Komatsu, avec toutes les Réglementations fédérales américaines sur les émissions applicables au moment de la fabrication et qu'il est exempt de défauts de construction ou de matériaux qui auraient pour effet de contrevenir à ces réglementations en dedans de 5 ans ou 3000 heures d'opération, mesuré à partir de la date de livraison du moteur au client ultime.

**3. Limitations:**

Les bris, autres que ceux résultant de défauts de matériaux ou de construction, ne sont pas couverts par cette Garantie. Komatsu n'est pas responsable pour bris ou dommages résultant de ce que Komatsu détermine comme étant de l'abus ou négligence, incluant mais ne se limitant pas à: l'opération sans lubrifiants ou agent refroidissants adéquats; la suralimentation d'essence; la survitesse; le manque d'entretien des systèmes de lubrification, de refroidissement ou d'entrée; de pratiques non-propices d'entreposage, de mise en marche, de réchauffement, de conditionnement ou d'arrêt; les modifications non-autorisées du moteur. De plus, Komatsu n'est pas responsable de bris causés par de l'essence inadéquate ou de l'eau, des saletés ou autres contaminants dans l'essence. Komatsu n'est pas responsable des réparations non-reliées au moteur, des dépenses encourues suite aux temps d'arrêts, des dommages relatifs, amendes, et de tout autre coût d'affaires ou autres pertes résultant d'un bris couvert par la garantie.

**KOMATSU N'EST PAS RESPONSABLE DES INCIDENTS OU DOMMAGES CONSÉQUENTS.**

Cette garantie, ainsi que les garanties expresses commerciales, sont les seules garanties de Komatsu. **IL N'Y A AUCUNE AUTRE GARANTIE, EXPRESSE OU SOUS-ENTENDUE, MARCHANDABLE OU PROPICE A UNE UTILISATION PARTICULIÈRE.**




ENGINE DATAPLATE - ENGLISH / FRENCH

# 2. SAFETY INFORMATION

Most accidents are caused by the failure to follow fundamental safety rules for the operation and maintenance of machines. To avoid accidents, read, understand and follow all precautions and warnings in this manual and on the machine before performing operation and maintenance.

To identify safety messages in this manual and on machine labels, the following signal words are used.

**⚠ DANGER** – **This word is used on safety messages and 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.**

**⚠ WARNING** – **This word is used on safety messages and 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 to the machine.**

**⚠ CAUTION** – **This word is used on safety messages and safety labels for hazards which could result in minor or moderate injury if the hazard is not avoided. This word might also be word for hazards 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 the safety messages 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 your Komatsu distributor.

# 3. INTRODUCTION

## 3.1 INTENDED USE

This Komatsu BULLDOZER is designed to be used mainly for the following work.
- Dozing
- Cutting into hard or frozen ground or ditching
- Felling trees, removing stumps

## 3.2 FEATURES

- Largest bulldozer in the world
- Uses the Komatsu exclusive flexible undercarriage
  - ○ Reduction of impact shock to undercarriage
  - ○ Improvement in the ride for the operator
- Use of a P.P.C. control method to reduce the operating force for the work equipment control levers
- Service platform to make inspection and maintenance easier
- Spacious cab with large front glass

## 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 machine life.

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, sudden acceleration, sudden steering and sudden stops except in cases of emergency.

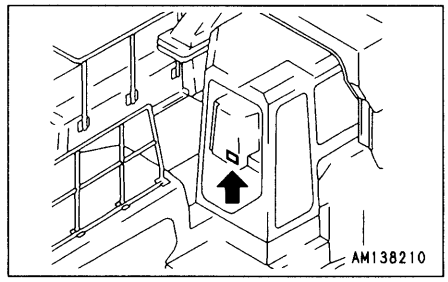
The precautions given in this manual for operating, maintenance, and safety procedures are only those that apply when this product is used for the specified purpose. If the machine is used for a purpose that is not listed in this manual, Komatsu cannot bear any responsibility for safety. All consideration 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, TABLE TO ENTER SERIAL NO. AND DISTRIBUTOR

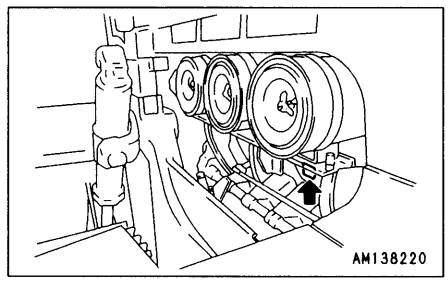
## 4.1 MACHINE SERIAL NO. PLATE POSITION

This is at the front bottom right of the operator's seat.




## 4.2 ENGINE SERIAL NO. PLATE POSITION

This is on the left side air intake manifold.




## 4.3 TABLE TO ENTER SERIAL NO. AND DISTRIBUTOR

| |
|---|
| Machine serial No.: |
| Engine serial No.: |
| Distributor name:<br><br>Address: Phone:<br><br>Service personnel for your machine: |

**REMARKS**

# 5. CONTENTS



## SAFETY



## OPERATION

## MAINTENANCE



## SPECIFICATIONS



## OPTIONS, 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

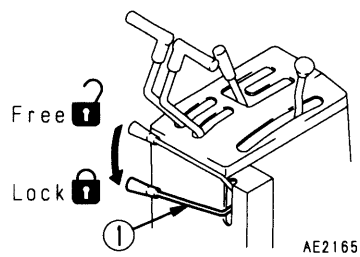
⚠ WARNING: For reasons of safety, always follow these safety precautions.

## SAFETY RULES

- Only trained and authorized 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 if 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 a condition will adversely affect your judgement and may lead to an accident.
- When working with another operator or 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.

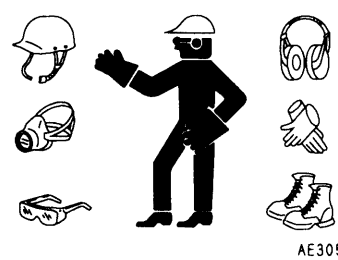
## SAFETY FEATURES

- 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 and the seat belt properly.
- Never remove any safety features. Always keep them in good operating condition.
  **Safety lock lever → See "12.13 PARKING MACHINE".**
  **Seat belt → See "27. USING SEAT BELT".**
- Improper use of safety features could result in serious bodily injury or death.




## CLOTHING AND PERSONAL PROTECTIVE ITEMS

- Avoid loose clothing, jewelry, and loose long hair. They can catch on controls or in moving parts and cause serious injury or death.
- Also, do not wear oily clothes, because they are flammable.
- Wear a hard hat, safety glasses, safety shoes, mask or gloves when 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.

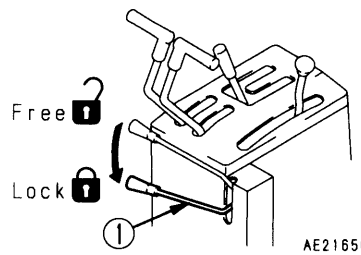



## UNAUTHORIZED MODIFICATION

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.

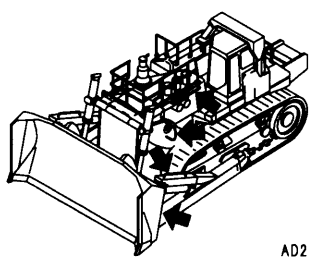
## ALWAYS APPLY LOCK WHEN LEAVING OPERATOR'S SEAT

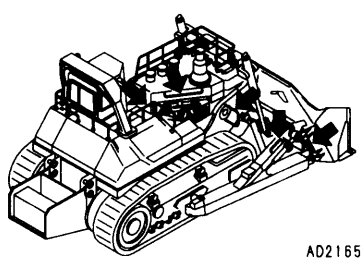
- When standing up from the operator's seat, always place the safety lock levers ① securely in the LOCK position. If you accidentally touch the levers when they are not locked, the work equipment may suddenly move and cause serious injury or damage.
- When leaving the machine, lower the blade and ripper completely to the ground, set the safety lock levers ① to the LOCK position, then stop the engine. Use the key to lock all the equipment. Always remove the key and take it with you.
  **Work equipment posture → See "12.13 PARKING MACHINE".**
  **Locking → See "12.17 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 any oil, grease, or mud on the handrails or steps, wipe it off immediately. Always keep these parts clean. Repair any damage and tighten any loose bolts.




## 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 from 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.

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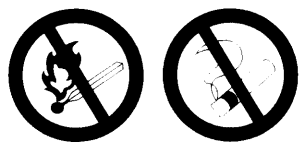

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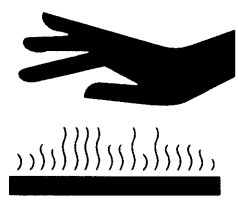
## PRECAUTIONS WHEN HANDLING AT HIGH TEMPERATURE

- 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.)



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## 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.

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## 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 personal 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".**

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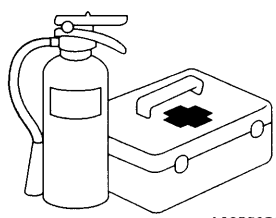
## FIRE EXTINGUISHER AND FIRST AID KIT

Always follow the precautions below to prepare for action 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 the 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.



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## PRECAUTIONS FOR ROPS

- Do not operate machine with ROPS removed if equipped.
- The ROPS is installed to protect the operator if the machine should overturn. It is designed not only to take the load when the machine overturns, but also to absorb the impact energy.
- The Komatsu ROPS fulfills all worldwide regulations and standards, but if any unauthorized modification is carried out on it, or if it is damaged when the machine overturns, its strength will be reduced and it will not be able to provide its original capacity. It will be able to provide this capacity only if modifications and repairs are carried out in the specified way.
- When carrying out modification or repairs, always consult your Komatsu distributor first.
- Even when the ROPS is installed, if you do not fasten your seat belt securely, it cannot protect your properly. Always fasten your seat belt when operating the machine.
  **Seat belts → See "27. USING SEAT BELT."**

## PRECAUTIONS FOR ATTACHMENTS

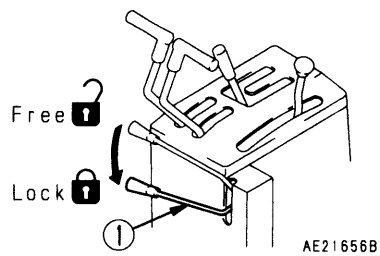
- When installing and using an optional attachment, read the instruction manual for the attachment and the information related to attachments in this manual.
- Do not use attachments that are not authorized by Komatsu or your Komatsu distributor. Use of unauthorized attachments could create a safety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

## MACHINES WITH ACCUMULATOR

On machines equipped with an accumulator, for a short time after the engine is stopped, if the work equipment control lever is moved to the LOWER position, the work equipment will move down under its own weight.
After stopping the engine, always place the safety lock in the LOCK position.

When releasing the pressure inside the work equipment circuit on machines equipped with an accumulator, follow the procedure given in the inspection and maintenance section.
**Method of releasing pressure → See "13. HANDLING ACCUMULATOR".**

The accumulator is filled with high-pressure nitrogen gas, and it is extremely dangerous if it is handled in the wrong way. Always observe the following precautions.
- Never make any hole in the accumulator or expose it to flame or fire.
- Do not weld any boss to the accumulator.
- When carrying out disassembly or maintenance of the accumulator, or when disposing of the accumulator, it is necessary to release the gas from the accumulator. A special air bleed valve is necessary for this operation, so please contact your Komatsu distributor.
  **Gas in accumulator → See "13. HANDLING ACCUMULATOR".**




## 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.

# 7. PRECAUTIONS DURING OPERATION

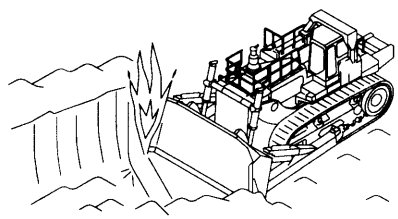
⚠ WARNING: For reasons of safety, always follow these safety precautions.

## 7.1 BEFORE STARTING ENGINE

### SAFETY AT WORKSITE

- Before starting operations, thoroughly check 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 or 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 "12.11 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, return all fuel containers to their proper 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 position 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 ADJUST OPERATOR'S SEAT".**

  **Seat belt → See "27. USING SEAT BELT".**

- 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".**

- Check that the mirrors and window glass provide a clear view.

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

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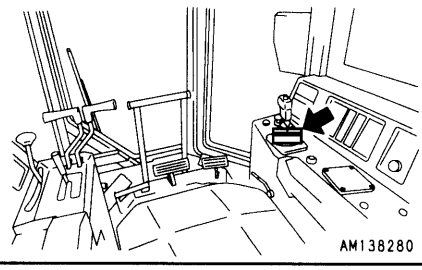
## WHEN STARTING ENGINE

- 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 blade 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. 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

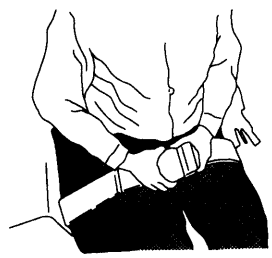
### CHECKS AFTER STARTING ENGINE

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, 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 repairs immediately.
  If the machine is used when it is not improper condition, it may lead to serious injury or damage to the machine.

### PRECAUTIONS WHEN STARTING 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.
- Fasten your seat belt securely.
- The operator must not let any other person sit anywhere except in the assistant's seat.
- Check that the travel alarm (option) works properly.
- Always close the door of the operator's cab and check that the door is locked in position securely.



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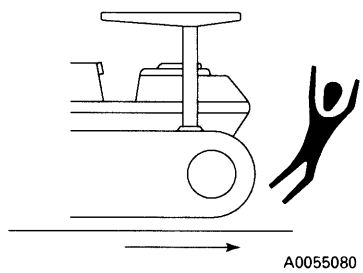
### PRECAUTIONS WHEN MOVING FORWARD OR BACKWARD

To prevent serious injury or death, always do the following before moving the machine or doing the leveling 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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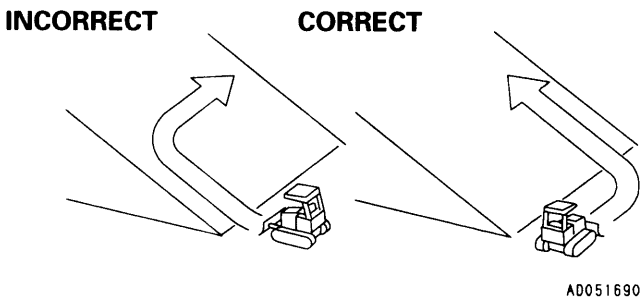
## PRECAUTIONS WHEN TRAVELING

- Never turn the key in the starting switch to the OFF position when traveling.
  It is dangerous if the engine stops when the machine is traveling, 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 (16 – 20 in) from the ground level and travel on level ground.
- When traveling, 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 traveling on rough ground, travel at low speed, and avoid sudden changes in direction.
- Avoid traveling 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 traveling 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 "12.11 PRECAUTIONS FOR OPERATION".**
- 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 traveling on public roads, check first with the relevant authorities and follow their instructions.

## TRAVELING ON SLOPES

- Traveling on slopes could result in the machine tipping over or slipping to the side.
- When traveling on slopes, keep the work equipment approximately 20 – 30 cm (8 – 12 in) 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 traveling on slopes → See "12.12 PRECAUTIONS WHEN TRAVELING 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 traveling 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.




## 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 "12.10 PROHIBITED OPERATIONS WITH A SUPER-DOZER".**
- 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 jobsite 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.
  - 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.

## 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 electric cable.
- To prevent accidents, always do as follows.
  - On jobsites where there is danger that the machine may touch 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 warning 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

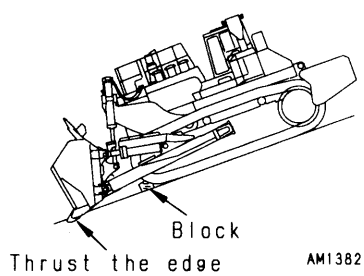
- When working on snow or icy roads, even a slight slope may cause the machine to slip to the side, so always travel at low speed and avoid sudden starting, stopping, or turning. There is danger of slipping particularly on uphill or downhill slopes.
- With frozen road surfaces, the ground becomes soft when the temperature rises, so the travel conditions become unstable. In such cases be extremely careful when traveling.
- 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 traveling 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.

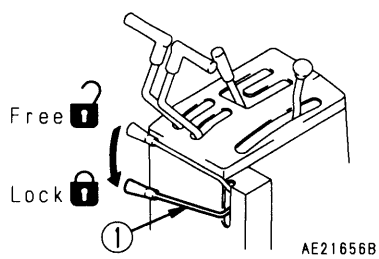
## WORKING ON LOOSE GROUND

- 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.

## 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 blade control lever several times to the RAISE and LOWER positions to 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 "12.13 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 "12.13 PARKING MACHINE".**
  **Locks → See "12.17 LOCKING".**
- Always close the door of the operator's compartment.



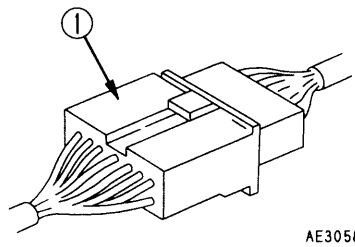
## PRECAUTIONS IN COLD AREAS

- 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 or 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 "14. COLD WEATHER OPERATION".**



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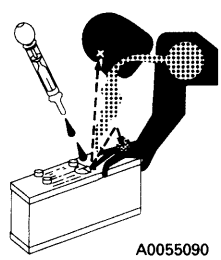
## 7.3 BATTERY

### 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 flame near the battery.
- When working with batteries, ALWAYS wear 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 or 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.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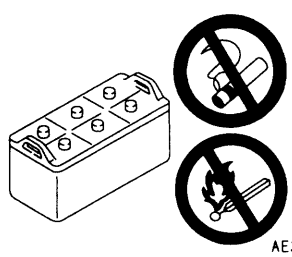
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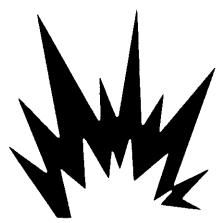
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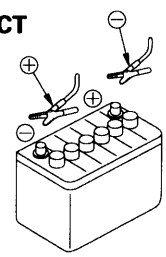
## STARTING WITH BOOSTER CABLES

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 "16.4 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.

- Do not use or charge the battery if the battery electrolyte level is below the LOWER LEVEL line. This may cause an explosion. Always check the battery electrolyte level periodically and add distilled water to bring the electrolyte level to the UPPER LEVEL line.
- 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 charger 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 of the charger to the positive ⊕ terminal of the battery, then connect the negative ⊖ charging clip to 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**

A0055110

## 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

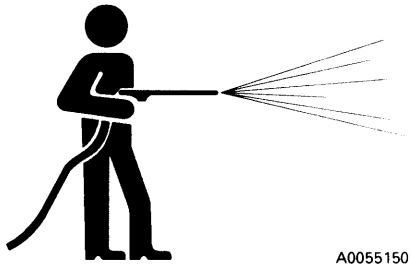
- ALWAYS attach the "DO NOT OPERATE" warning tag to the blade control lever in the operator's cab to alert others that you are working on the machine. Attach additional warning tags around the machine if necessary.
- If others start the engine, or touch or operate the blade control lever while you are performing service or maintenance, you could suffer serious injury or death.

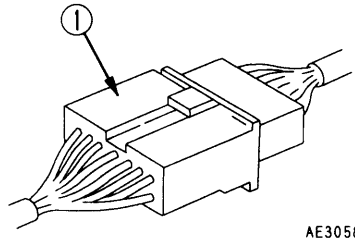
Warning tag Part No. 09963-03000



### 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 dirty, it 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 in the work place. Wipe up all grease, oil, or other substances that will cause you to slip. Always keep the work place clean the 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, misunderstandings 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 engine.)
- Release the internal pressure before removing the radiator cap, and remove the radiator cap slowly.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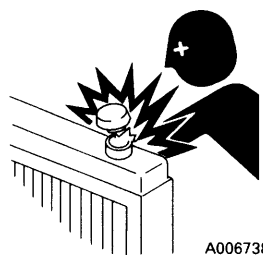
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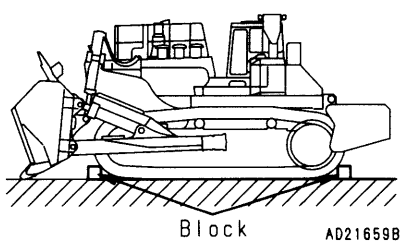
## STOP ENGINE BEFORE CARRYING OUT INSPECTION AND MAINTENANCE

- 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 blade 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.



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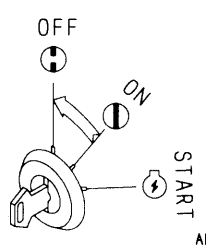

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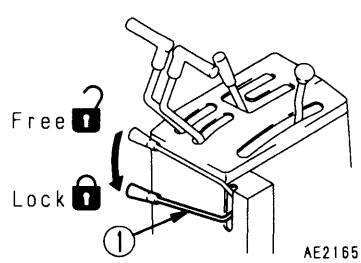

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## SAFETY DEVICES FOR WORK EQUIPMENT

When carrying out inspection and maintenance with the work equipment raised, fit stand 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.


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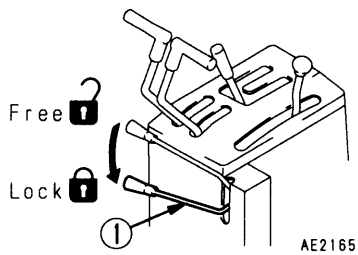

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## PROPER TOOLS

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".**


A0055120

## 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.

A0055160

## 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 or matches as lighting.
- When carrying out grinding or welding operations on the chassis, remove any flammable materials to a safe place.
- Be sure that a fire extinguisher is present at the inspection and maintenance point.

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## 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.

A0055130

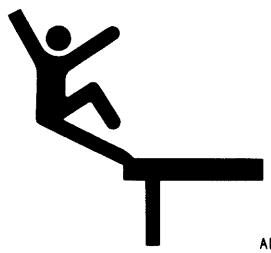
### WORK UNDER THE MACHINE

- 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.

A0055140

### WORK ON TOP OF 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.



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## LOCKING INSPECTION COVERS

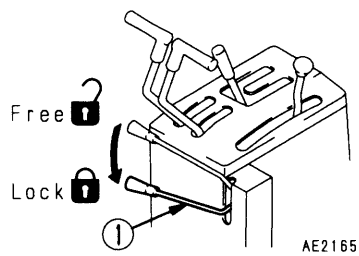
When carrying out maintenance with the inspection cover open, lock it securely with a lock bar. If maintenance is carried out with the inspection cover open and not locked in position, it may close suddenly if knocked or blown by the wind, and may cause injury to the operator.

## MAINTENANCE WITH 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.


A0055210



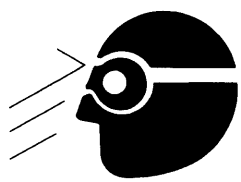
AE21656B

## 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.


AE305880

## REPAIR WELDING

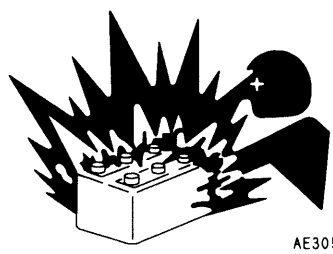
Welding operations must always be carried out by a qualified welder and in a place equipped with a proper equipment. Gas is generated, and there is danger of fire or electrocution when carrying out welding, so never allow any unqualified personnel to carry out welding.
The qualified welder must follow 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 or 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 "16.4 IF BATTERY IS DISCHARGED".**



AE305890

## 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 accident.
- Depending on the type of failure, please contact your Komatsu distributor for repairs.

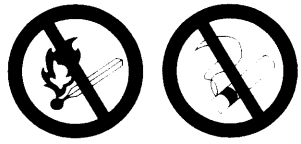
## RULES TO FOLLOW WHEN ADDING FUEL OR OIL

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.

A0055020

A0055030

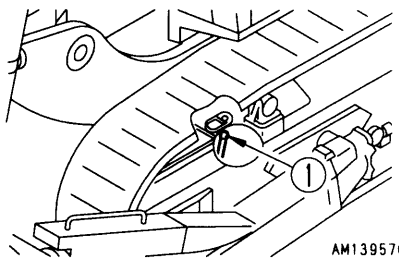


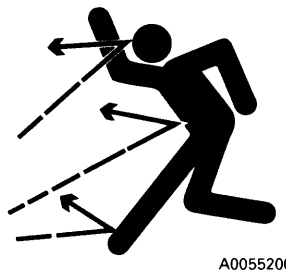
A0055040

## 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, plug ① may fly out and cause damage or personal injury.
- When loosening grease drain plug 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 "24.3 WHEN REQUIRED".**





A0055200

## 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

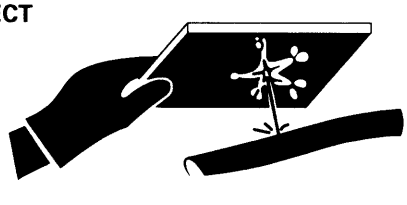
When inspecting or replacing high-pressure piping or hoses, always check that the pressure in the hydraulic circuit has been released. If the circuit is still under pressure, it will lead to serious injury or damage, so always do as follows.

- 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.

**INCORRECT**


A0055180

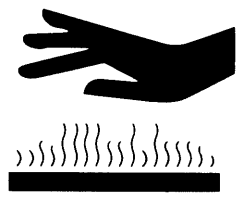
**CORRECT**


A0055190

## 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 injury. 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 "24.3 WHEN REQUIRED".**
**Checking coolant level, oil level in hydraulic tank → see "24.4 CHECK BEFORE STARTING".**
**Checking lubricating oil level, adding oil → see "24.5-10 PERIODIC MAINTENANCE".**
**Changing oil, replacing filters → see "24.7-10 PERIODIC MAINTENANCE".**



A0055050

## CHECKS AFTER INSPECTION AND MAINTENANCE

Failure to carry out inspection and maintenance fully, or failure to check the function 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 inside 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

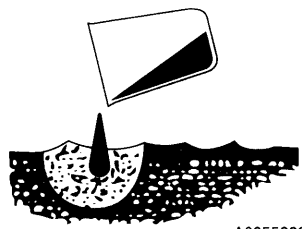
To prevent pollution, particularly in places where people or animals are living, always follow the procedures given below.

- 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.

**INCORRECT**



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# 9. POSITION FOR ATTACHING SAFETY LABELS

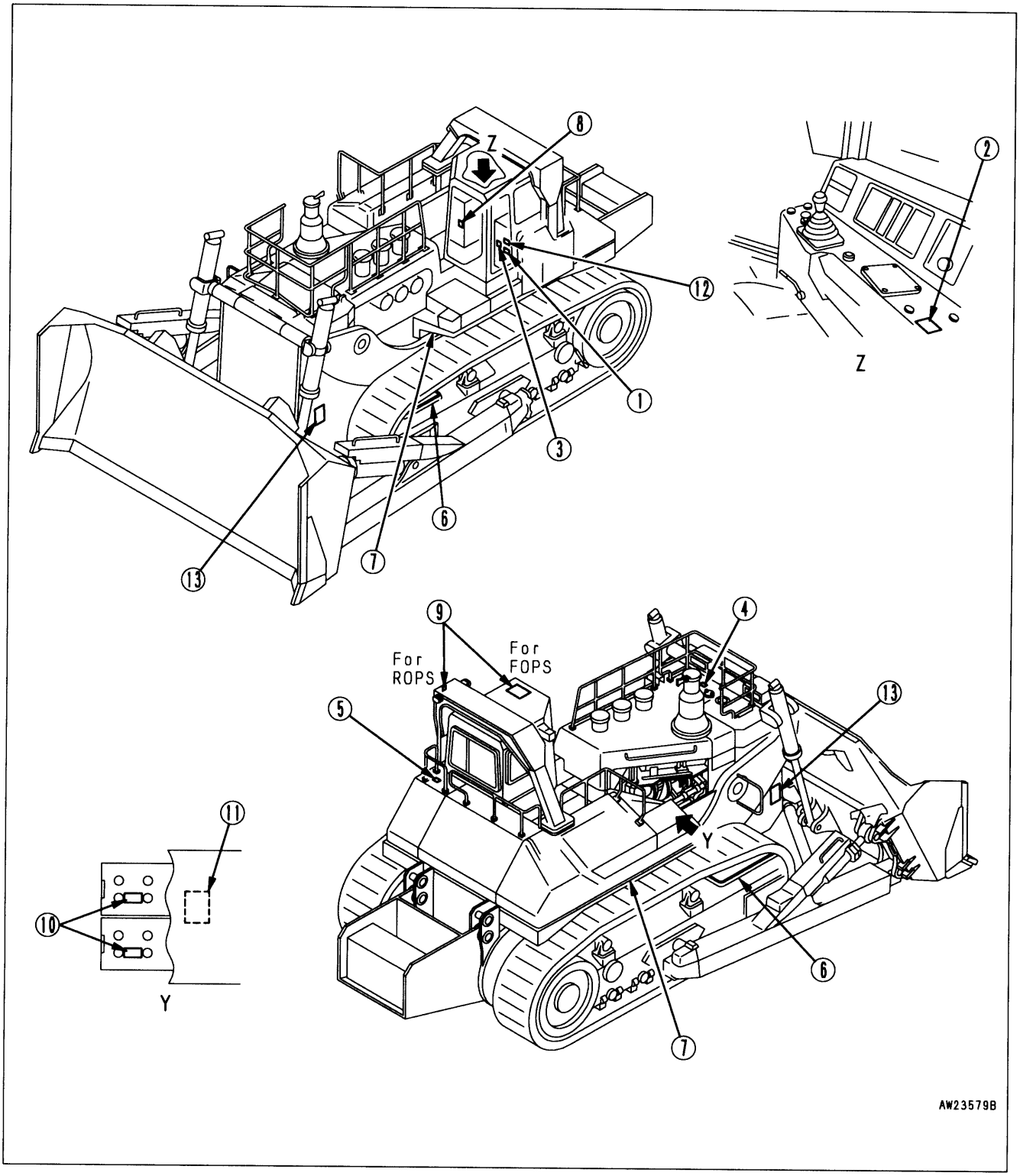
Always keep these labels clean. If they are lost or damage, attach them again or replace them with a new label.

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

Safety labels may be available in languages other than English.

To find out what labels are available, contact your Komatsu distributor.

## 9.1 POSITION FOR ATTACHING SAFETY LABELS



1. Warning before operating machine (09651-03001)

**⚠ WARNING**

**Improper operation and maintenance can cause serious injury or death.**

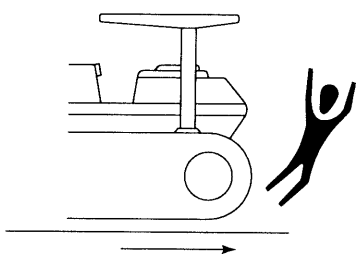
**Read manual and labels before operation and maintenance. Follow instructions and warnings in manual and in labels on machine.**

**Keep manual in machine cab near operator.**
**Contact Komatsu distributor for a replacement manual.**

09651-03001

2. Warning before moving in reverse (09802-13000)

**⚠ WARNING**



**To prevents SEVERE INJURY or DEATH, do the following before moving machine or its attachments:**
- **Honk horn to alert people nearby.**
- **Be sure no one is on or near machine.**
- **Use spotter if view is obstructed.**

**Follow above even if machine equipped with back-up alarm and mirrors.**

09802-13000

3. Warning for leaving operator's seat (09654-33001)

**⚠ WARNING**

**To avoid hitting unlocked operation levers, before standing up from operator's seat, do the following:**
- **Move steering and directional lever neutral and move SAFETY LOCK LEVER (located left of seat) to LOCK position.**
- **Lower equipment to ground and move SAFETY LOCK LEVER (located right of seat) to LOCK position.**

**Sudden and unwanted machine movement can cause serious injury or death.**

09654-33001

4. Warning for hot water hazard (09668-03001)

**⚠ WARNING**

**Hot water hazard.**

**To prevent hot water from spurting out:**
- **Turn engine off.**
- **Allow water to cool.**
- **Slowly loosen cap to relieve pressure before removing.**

09668-03001

5. Warning for hot oil hazard
(09653-03001)

**⚠ WARNING**

**Hot oil hazard.**

**To prevent hot oil from spurting out:**
- **Turn engine off.**
- **Allow oil to cool.**
- **Slowly loosen cap to relieve pressure before removing.**

09653-03001

6. Warning for adjusting track tension
(19M-98-21820)
Safety label is attached on the back side of the inspection cover of the track frame.

**⚠ WARNING**

Compressed spring, lubricator and grease are under hazardous high pressure and can cause serious injury or death.
- When adjusting track tension only turn lubricator ONE TURN. Turning lubricator further could cause lubricator and grease to fly off and hurt you. See manual for adjustment instructions.
- When loosening track shoe. If it does not loosen after turning lubricator ONE TURN ask Komatsu dealer or distributor to disassemble.

19M-98-21820

7. Warning for handling accumulator
(09659-53000)

**⚠ WARNING** Explosion hazard
- Keep away from flame
- Do not weld or drill

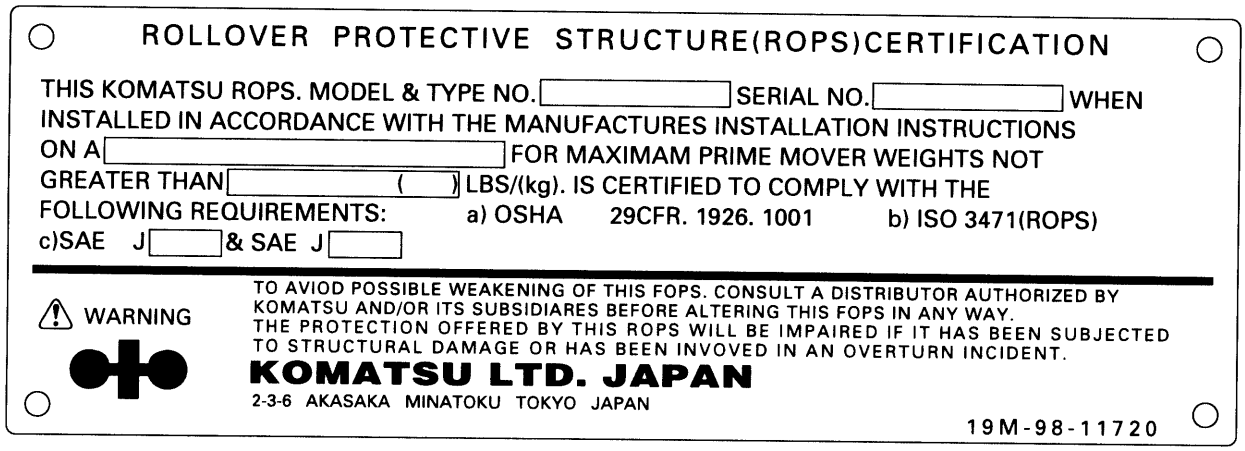
09659-53000

8. Warning for use of seat belt
(195-98-12940)

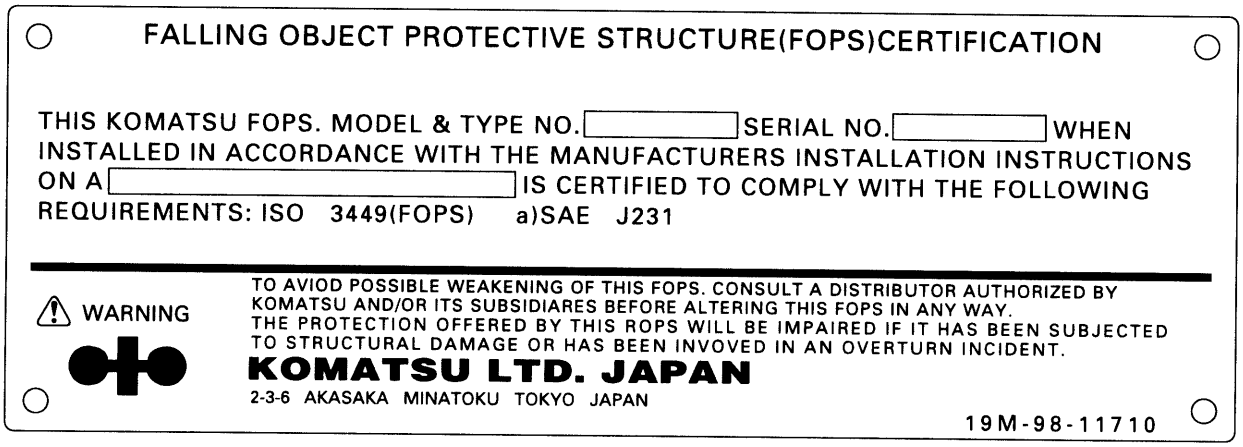
**CAUTION**
- ALWAYS USE SEAT BELT WHEN OPERATING MACHINE.
- ALWAYS CHECK CONDITION OF THE SEAT BELT, THE CONNECTING BRACKETS AND THE TIGHTENING BOLTS.
- ADJUST SEAT TO ALLOW FULL BRAKE PEDAL TRAVEL WITH OPERATOR'S BACK AGAINST SEAT BACK.
- AFTER ADJUSTING THE HEIGHT, FORE AND AFT POSITIONS OF THE SEAT, TIGHTEN THE TETHER BELT BEFORE SITTING IN THE SEAT.

195-98-12940

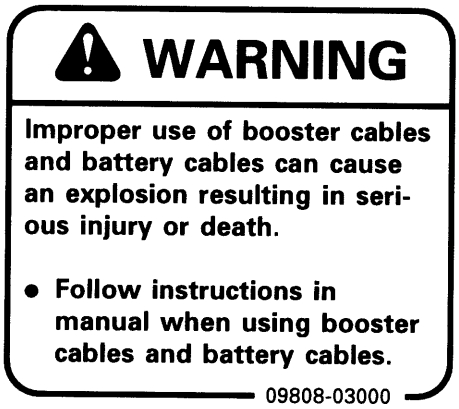
9. Warning for ROPS
(19M-98-11720)



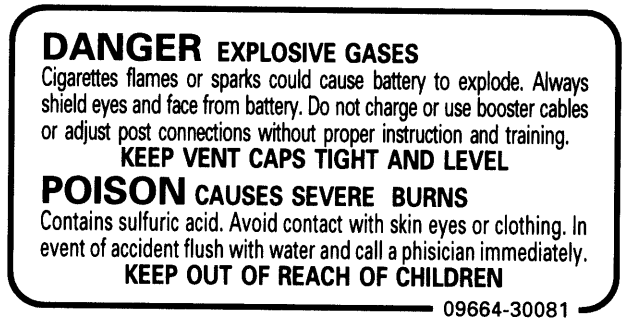

9. Warning for FOPS
(19M-98-11710)




10. Warning for battery cable
(09808-03000)




11. Warning for battery
(09664-30081)



12. Caution for engine running
(09667-03001)


13. Caution for approach when machine moving
(09812-03000)


## 9.2 CONTENT AND USE OF WARNING PLATES

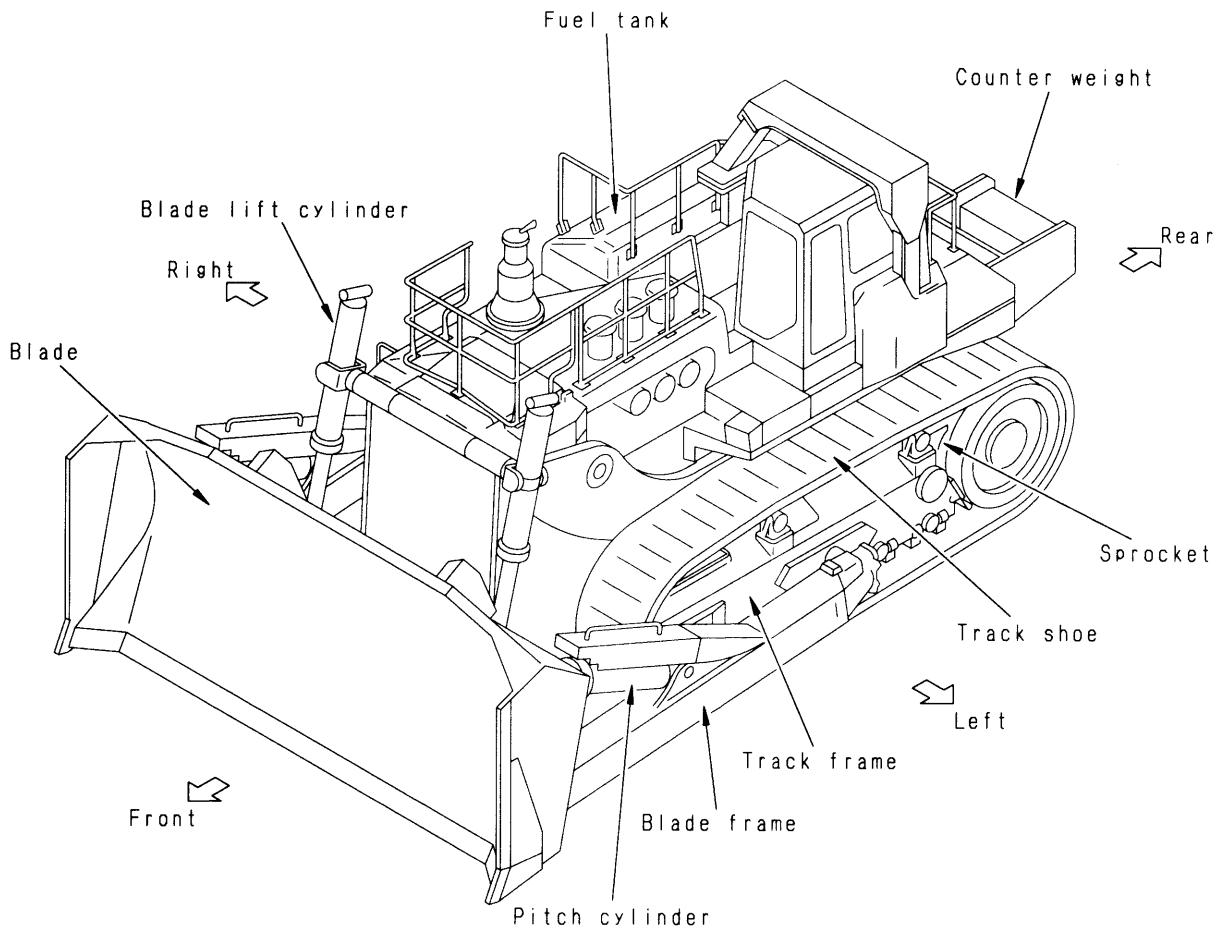
1. Warning to prevent operation during maintenance
(09963-03000)
Hang this warning plate on the controls in the operator's compartment.

# OPERATION

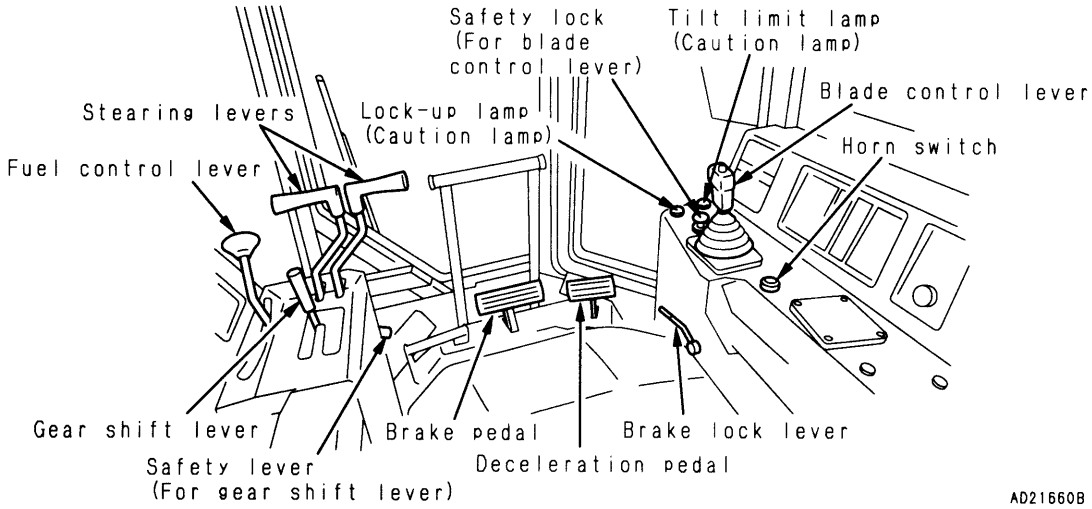
# 10. GENERAL VIEW

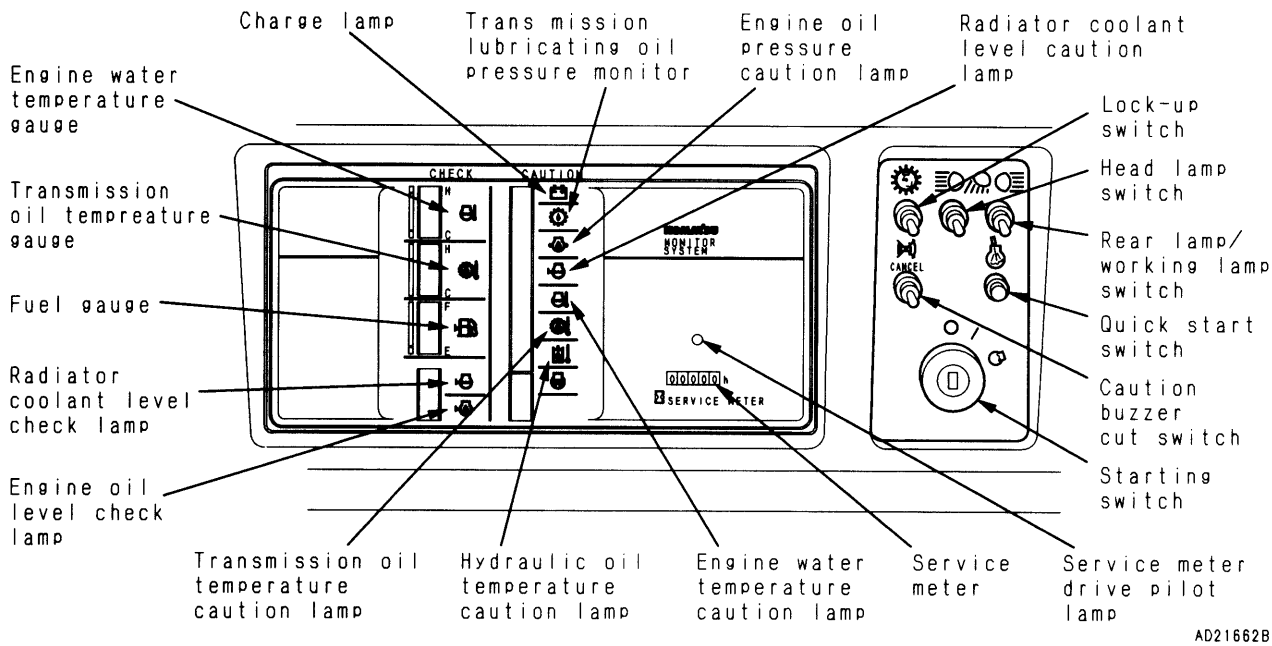
## 10.1 GENERAL VIEW OF MACHINE

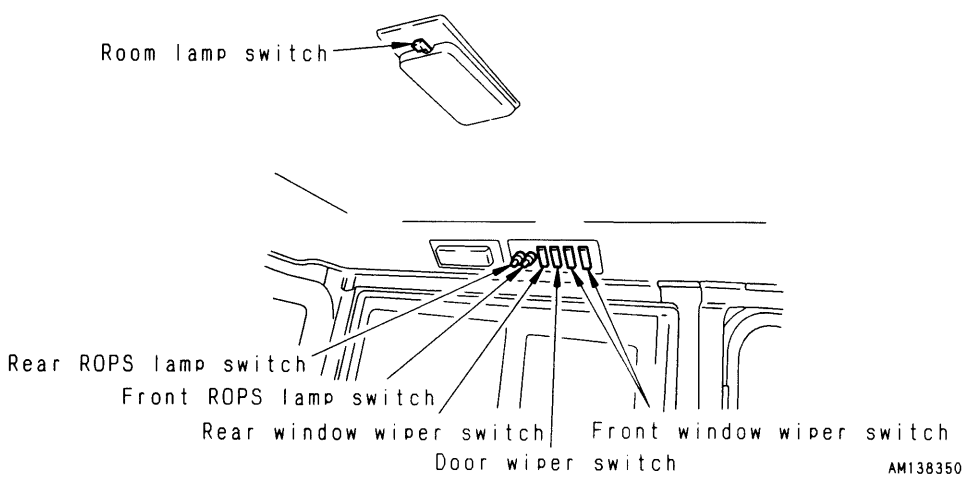
If directions are indicated in this section, they refer to the directions shown by the arrows in the diagram below.



## 10.2 GENERAL VIEW OF CONTROLS AND GAUGES



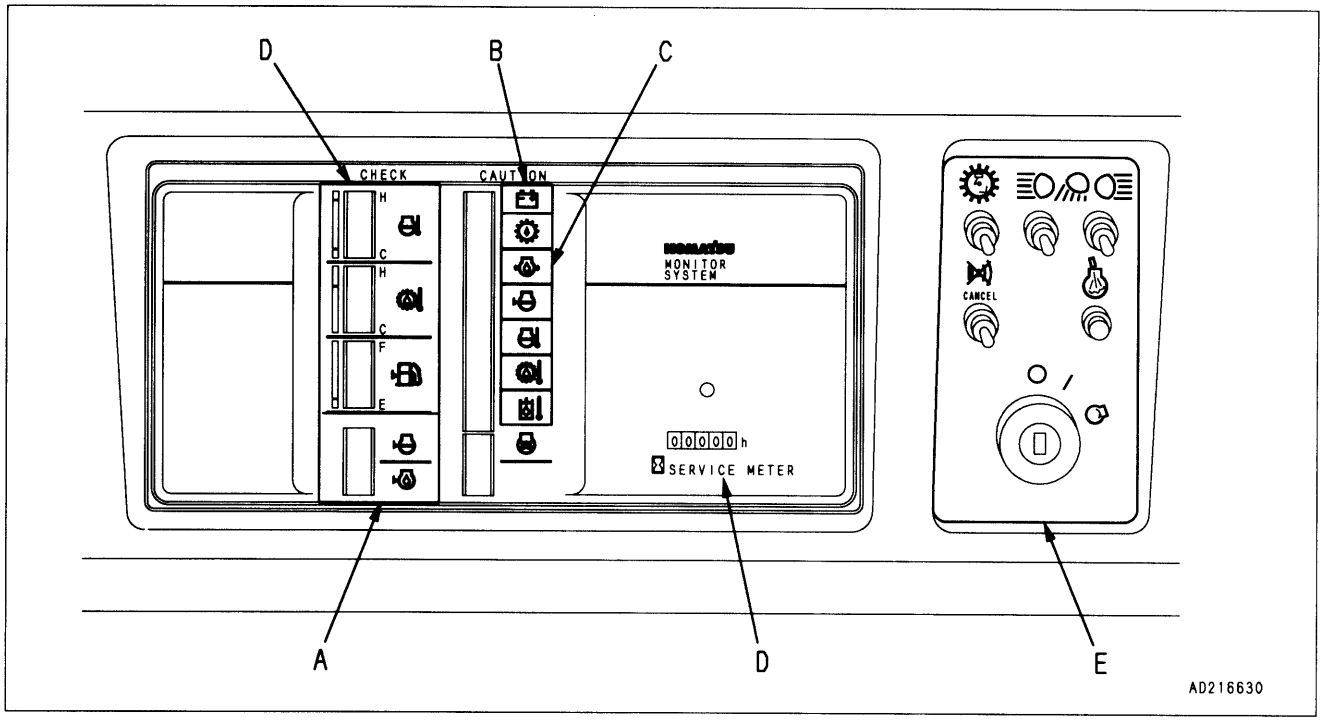



# 11. EXPLANATION OF COMPONENTS

The following is an explanation of the devices needed 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 meanings of the displays.

## 11.1 MONITOR PANEL




Ⓐ **CHECK MONITOR GROUP (11.1.1)**
**(Check items before starting)**

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

Check the location where the monitor lamp is flashing, and carry out the checks before starting.

When the engine is started, these monitor lamps will go off even if there are abnormalities.

**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.**

### Ⓑ CAUTION MONITOR GROUP (11.1.2)
**(Caution items)**

**⚠ WARNING**

**If any monitor lamp flashes, repair it immediately.**

If the abnormality occurs while the engine is running, the appropriate monitor lamp will flash to indicate the abnormality.

Even if the monitor lamp flashes, the machine can operate, but it should be repaired as soon as possible.

### Ⓒ CAUTION MONITOR GROUP (11.1.3)
**(Emergency caution items)**

**⚠ WARNING**

**If any monitor lamp flashes, stop the work, and repair it immediately.**

If any abnormality occurs while the engine is running, the appropriate monitor lamp will flash and the alarm buzzer will sound intermittently at the same time.

Even if the monitor lamp flashes, the machine can operate, but it should be repaired as soon as possible.

### Ⓓ METER GROUP (11.1.4)
This group consists of engine water temperature gauge, power train oil temperature gauge, fuel gauge and service meter.

### Ⓔ SWITCH GROUP (11.1.5)
This group consists of starting switch, lamp switches, quick start switch, lock-up switch and caution buzzer cut switch.

**Functional check of the machine monitor system**

When the starting switch is turned ON before starting the engine, the monitor lamps flash for 3 seconds, the panel lamp lights for 4 seconds, and the alarm buzzer sounds for 2 seconds.

- If any monitor lamp does not light up, there is probably a broken bulb or disconnection in the monitor, so ask your Komatsu distributor to inspect it.
- The monitor system cannot be checked for breakage until 30 seconds after the engine has been stopped.

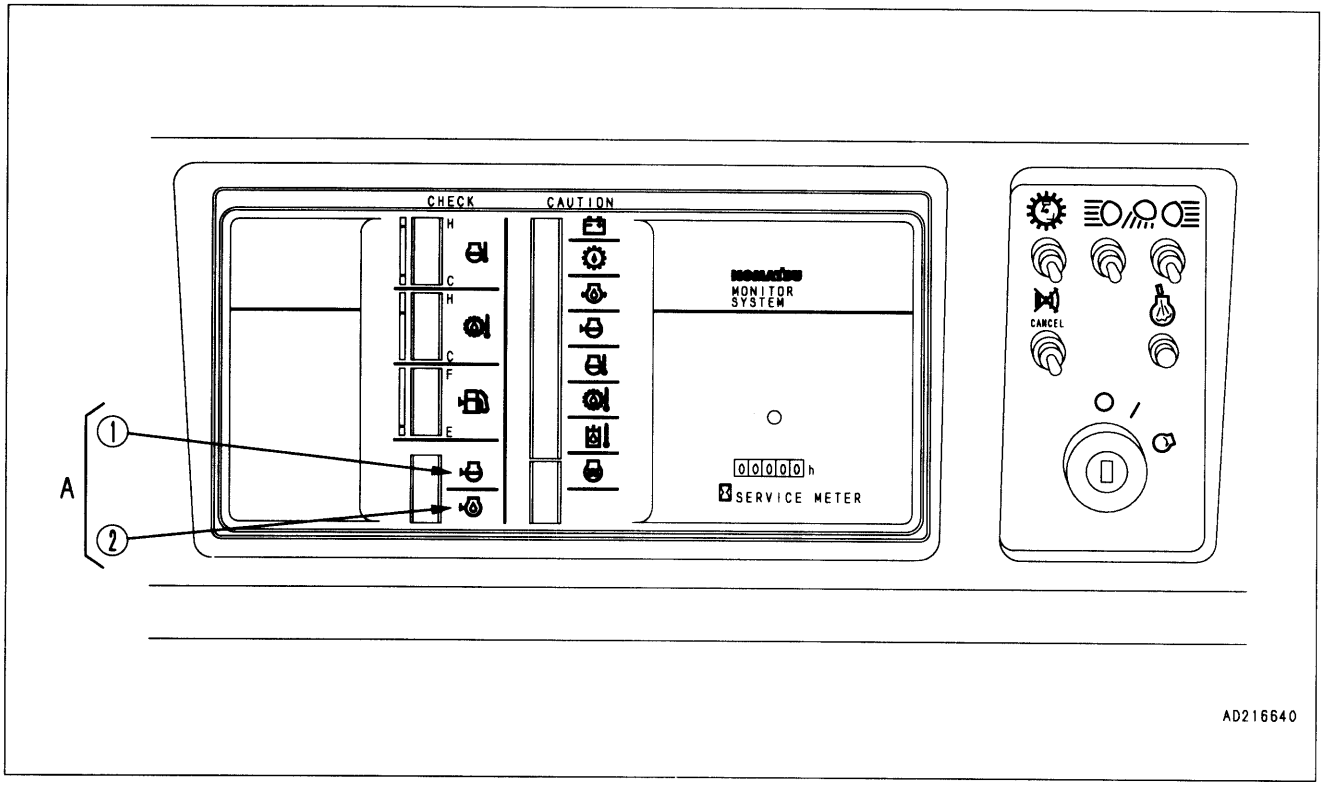
## 11.1.1 A: CHECK MONITOR GROUP (Check items before starting)

**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.**

**Park the machine on level ground and check the monitor lamps.**

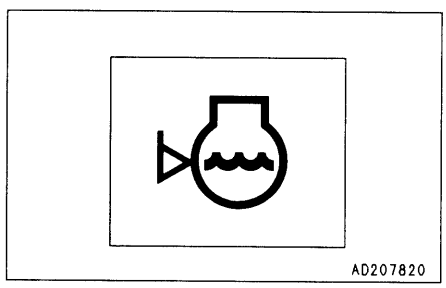
**Confirm that these monitor lamps light for about 3 seconds after the starting switch is turned to ON. If any monitor lamp does not light, ask your Komatsu distributor to inspect it.**




### 1. RADIATOR COOLANT LEVEL MONITOR

This monitor indicates a low radiator coolant level.

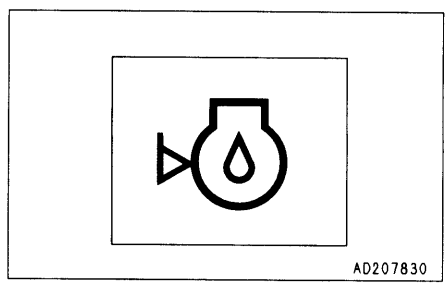
If the monitor lamp flashes, check the coolant level and add water as required.




### 2. ENGINE OIL LEVEL MONITOR

This monitor indicates a low oil level in the engine oil pan.

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



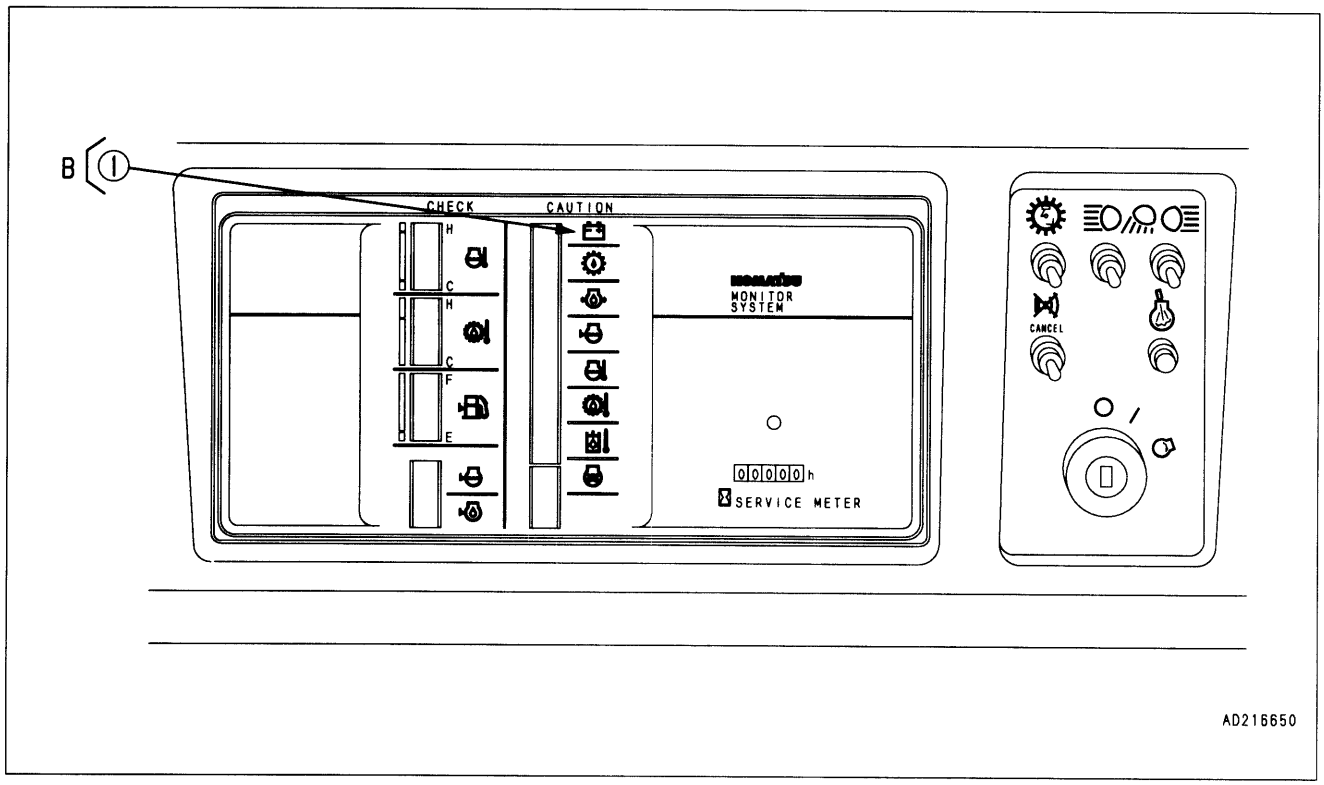
## 11.1.2 B: CAUTION MONITOR GROUP (Caution items)

**⚠ CAUTION**

**If this monitor lamp flashes, repair it immediately.**

**NOTICE**

**Park the machine on level ground and check the monitor lamps. Confirm that these monitor lamps light for about 3 seconds after the starting switch is turned to ON. If any monitor lamp does not light, ask your Komatsu distributor to inspect it.**

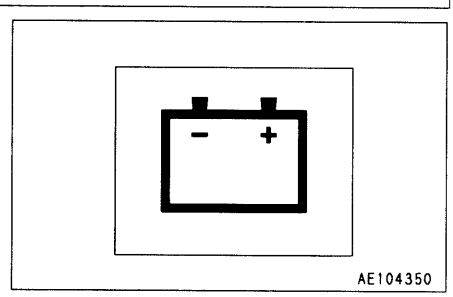



AD216650

### 1. CHARGE MONITOR

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

If the monitor lamp flashes, stop the engine and check the V-belt tension. If any abnormality is found, see "16. TROUBLESHOOTING."




AE104350

**REMARK**

This monitor lamp lights, when the starting switch is turned to ON immediately after the engine is started or immediately before the engine is stopped. It does not indicate an abnormality.

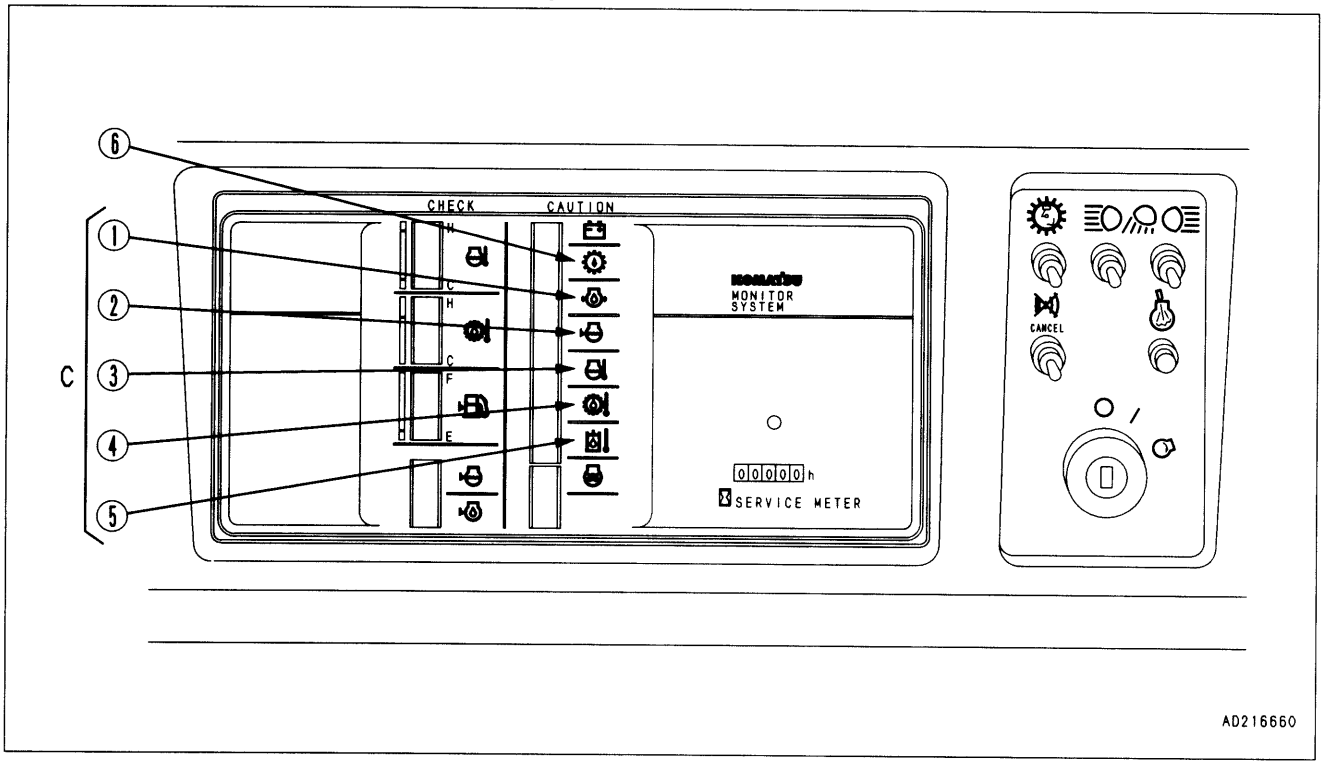
## 11.1.3 C: CAUTION MONITOR GROUP (Emergency caution items)

**⚠ CAUTION**

**If any monitor lamp flashes, stop the engine or run it at a low idling speed, and repair it immediately.**

**NOTICE**

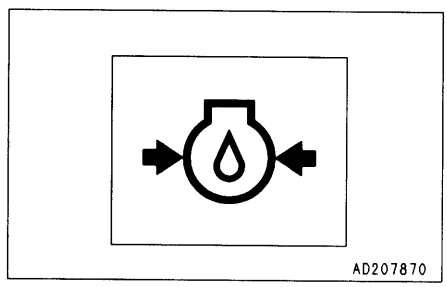
**Park the machine on level ground and check the monitor lamps. Confirm that these monitor lamps light for about 3 seconds after the starting switch is turned to ON. If any monitor lamp does not light, ask your Komatsu distributor to inspect it.**




### 1. ENGINE OIL PRESSURE MONITOR

This monitor indicates a low engine oil pressure.

If the monitor lamp flashes, stop the engine and check it immediately.



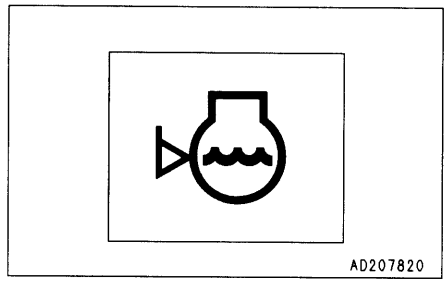

**REMARK**

This monitor lamp flashes and the alarm buzzer sounds, when the starting switch is turned to ON immediately after the engine is started or immediately before the engine is stopped. It does not indicate an abnormality.

**2. RADIATOR COOLANT LEVEL MONITOR**

This monitor indicates a low radiator coolant level.

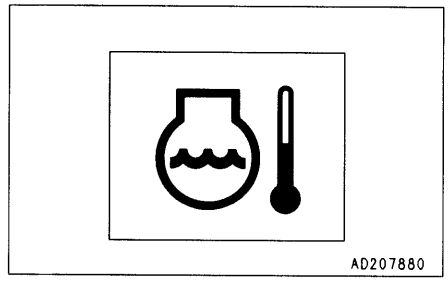
When the monitor lamp flashes, stop the engine, check the coolant level and add water as required.




**3. ENGINE COOLING WATER TEMPERATURE MONITOR**

This monitor indicates a rise in the cooling water temperature.

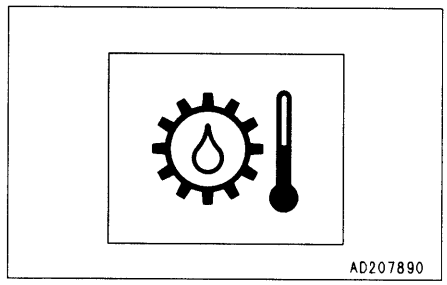
When the monitor lamp flashes, run the engine at the low idling speed until the green range of the engine water temperature gauge lights.




**4. POWER TRAIN OIL TEMPERATURE MONITOR**

This monitor indicates a rise in the oil temperature of the torque converter outlet.

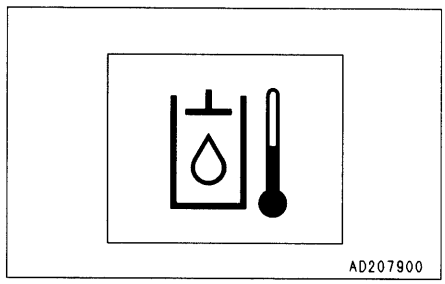
When the monitor lamp flashes, run the engine at the low idling speed until the green range of the power train oil temperature gauge lights.




**5. HYDRAULIC OIL TEMPERATURE MONITOR**

This monitor indicates a rise in the hydraulic oil temperature.

When the monitor lamp flashes, stop the machine and run the engine at the low idling speed until oil temperature falls.

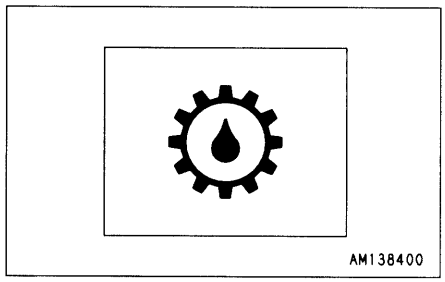



**6. TORQUE FLOW TRANSMISSION LUBRICATING OIL PRESSURE MONITOR**

This monitor warns torque flow transmission lubricating oil pressure drop.

When the monitor lamp flashes, stop the engine and check the oil pressure.

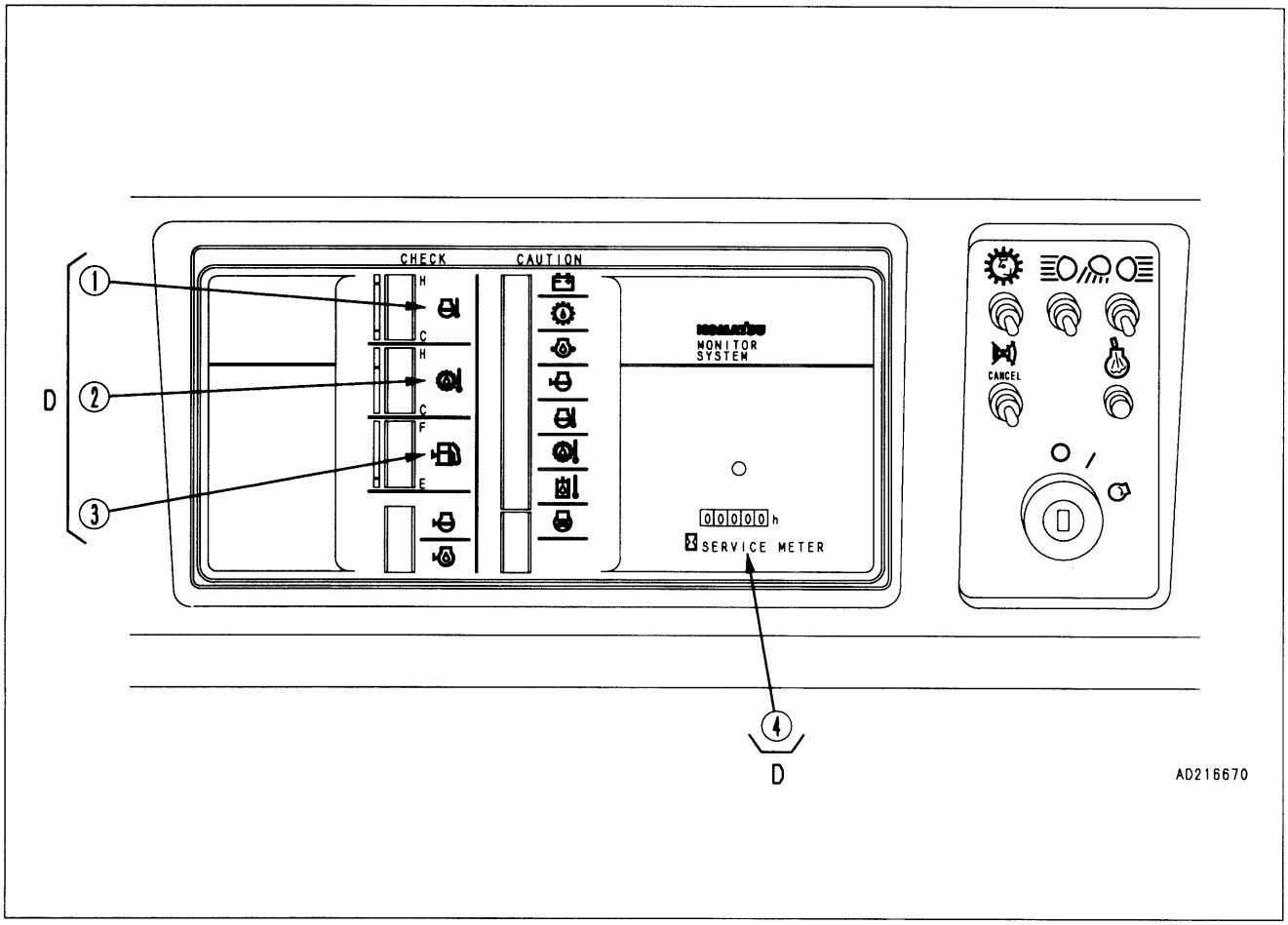
Cautioning buzzer shall not be activated.



## 11.1.4 D: METER GROUP

**NOTICE**

**While the engine is at rest, turn the starting switch ON to see if meter lamps ①, ② and ③ and the monitor lamp all come on. If they do not light, ask your Komatsu distributor to inspect them.**

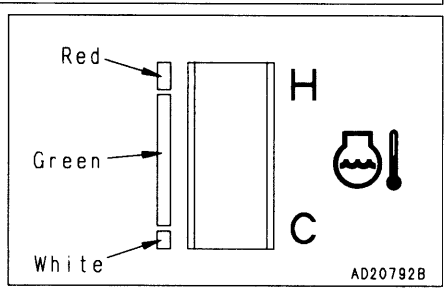



### 1. ENGINE COOLING WATER TEMPERATURE GAUGE

This gauge indicates the temperature of the cooling water. If the temperature is normal during operation, the green range will light.

If the red range lights up during operation, move the fuel control lever to lower the engine speed to approx. 3/4 of the full speed, and run until the water temperature enters the green range.

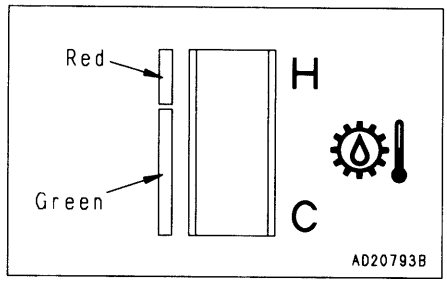
If the engine cooling water temperature enters the red range, and the engine water temperature monitor flashes and the alarm buzzer sounds, stop the machine and run at low idling until the water temperature enters the green range.




**NOTICE**

**If the water temperature gauge often enters the red range, check the radiator for clogging.**

## 2. POWER TRAIN OIL TEMPERATURE GAUGE




This gauge indicates the oil temperature of the torque converter outlet. If the temperature is normal during operation, the green range will light.

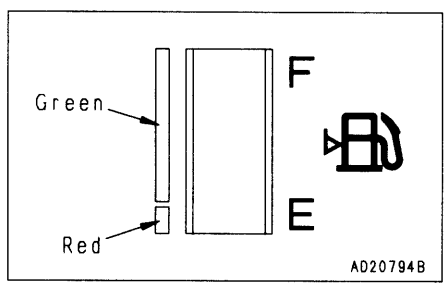
If the red range lights up during operation, move the fuel control lever to lower the engine speed to approx. 3/4 of the full speed, reduce the load and run until the oil temperature enters the green range.

If the power train oil temperature enters the red range, and the power train oil temperature monitor flashes and the alarm buzzer sounds, stop the machine and run at low idling until the oil temperature enters the green range.

**NOTICE**

**If the power train oil temperature gauge often enters the red range, we recommend you to lower the travel speed one range (for example, F2 → F1) to reduce the load on the power train when operating.**

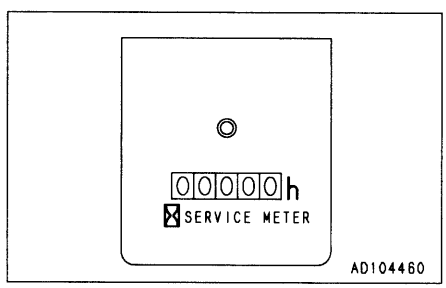
## 3. FUEL GAUGE




This gauge indicates the amount of fuel in the fuel tank. If there is enough fuel in the tank while the engine is running, the green range lights. If the red range lights, there is less than 300 ℓ (79.2 US gal, 66.0 UK gal) of fuel in the tank.

When the red range lights, add fuel.

## 4. SERVICE METER



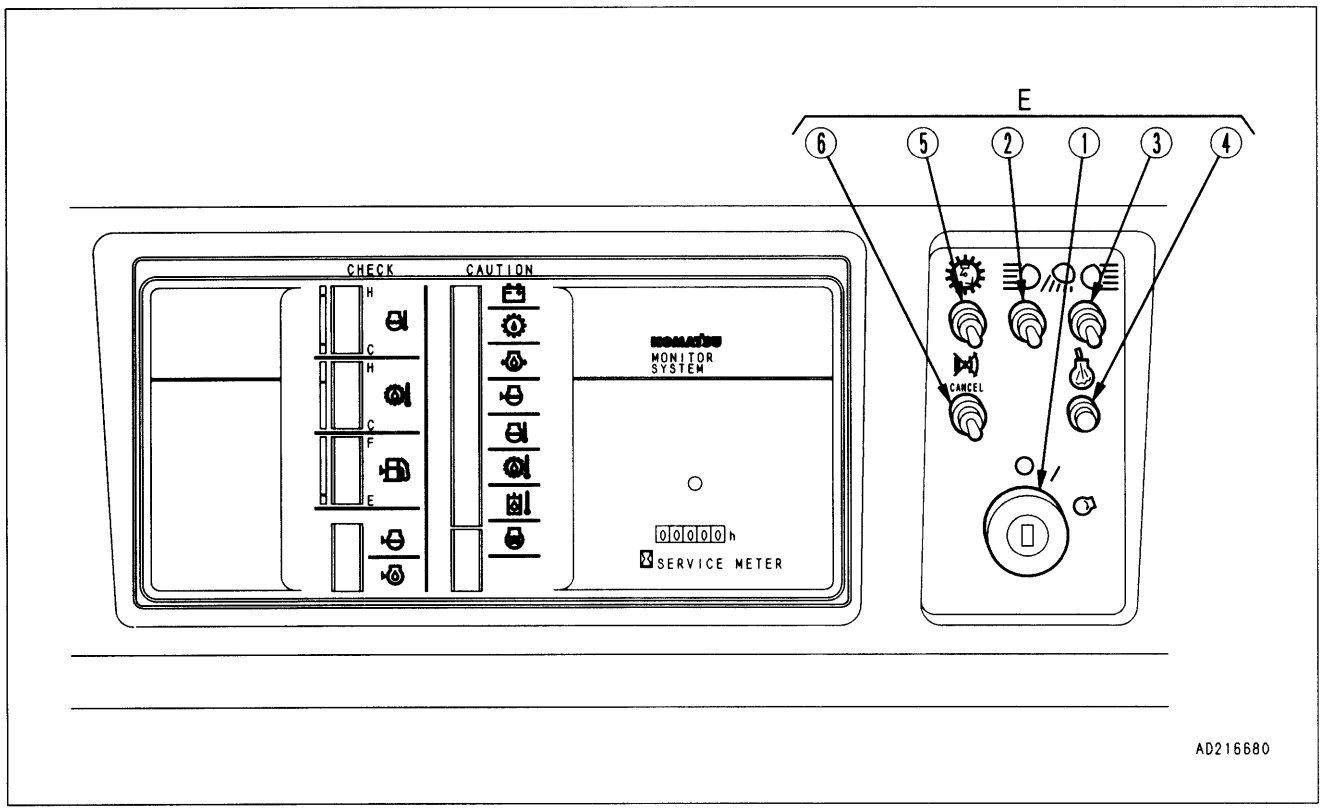

This meter shows the total operation hours of the machine. The service meter advances while the engine is running – even if the machine is not traveling.

Set the periodic maintenance intervals using this display.

When the engine is running, the green pilot lamp at the top of the meters flashes to indicate that the meter is advancing.

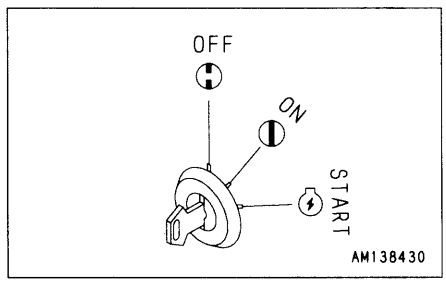
Meter will advance by 1 for each hour of operation regardless of the engine speed.

## 11.1.5 E: SWITCHES




**1. STARTING SWITCH**

This switch is used to start the engine.




**OFF**

Key insertion-withdrawal position. None of electrical circuits activate.

**ON**

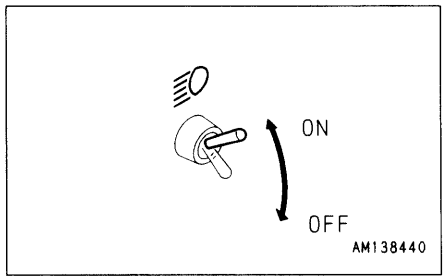
Charging and electric device circuits activate. Keep key at ON after starting.

**START**

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

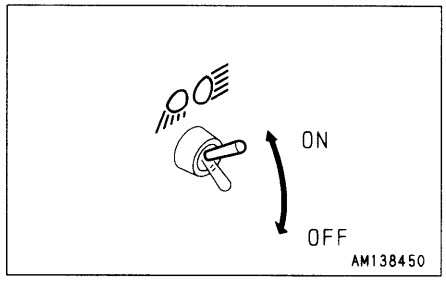
**2. HEAD LAMP SWITCH**

This switches on the head lamps and the panel lamp.



### 3. REAR LAMP/WORKING LAMP SWITCH

This switches on the rear lamp, the working lamps in front of L.H. and R.H. fenders and the panel lamp.




### 4. QUICK START SWITCH

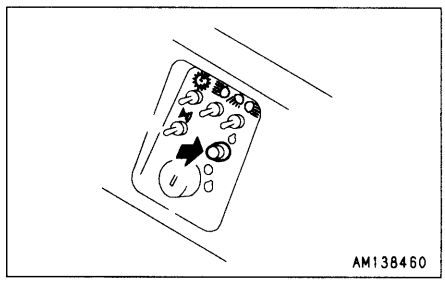
**⚠ CAUTION**

**Do not use this switch except in case of cold weather operation.**

This is used when starting in cold areas.

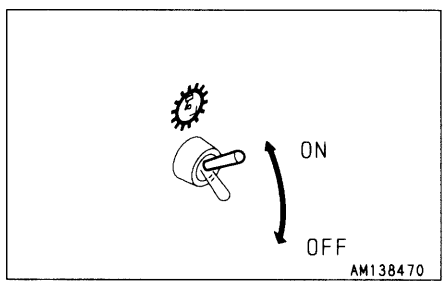
When the switch is pressed and then released, ether is sprayed into the intake manifold.

For details of the method of operation, see "12.2.2 STARTING IN COLD WEATHER".



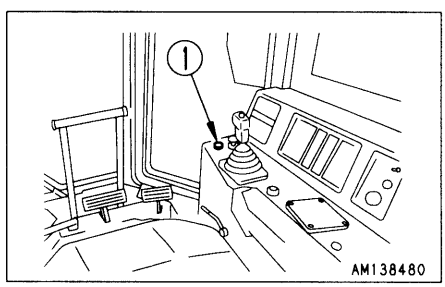

### 5. LOCK UP SWITCH

Always keep the lock up switch at ON position during operation. Nevertheless, it should be turned OFF when lock up is deemed unnecessary because of frequent decelerations while making earth shoving work on a rock bedded ground.



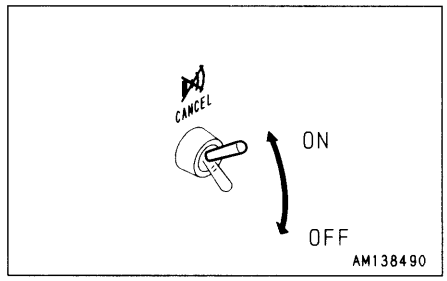

**REMARK**

Lock up lamp ① (green) located in front of the blade control lever lights during the course of lock up operation. The lamp flashes when an abnormality occurs in the lock up circuit.



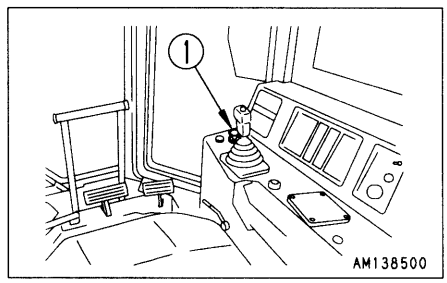
## 6. CAUTION BUZZER CUT SWITCH

The caution buzzer is activated in cases of paragraphs 1 through 5 of Clause "11.1.3 C CAUTION MONITOR GROUP" or when a failure occurs with the electronics system. Use this switch when stopping the buzzer sound.

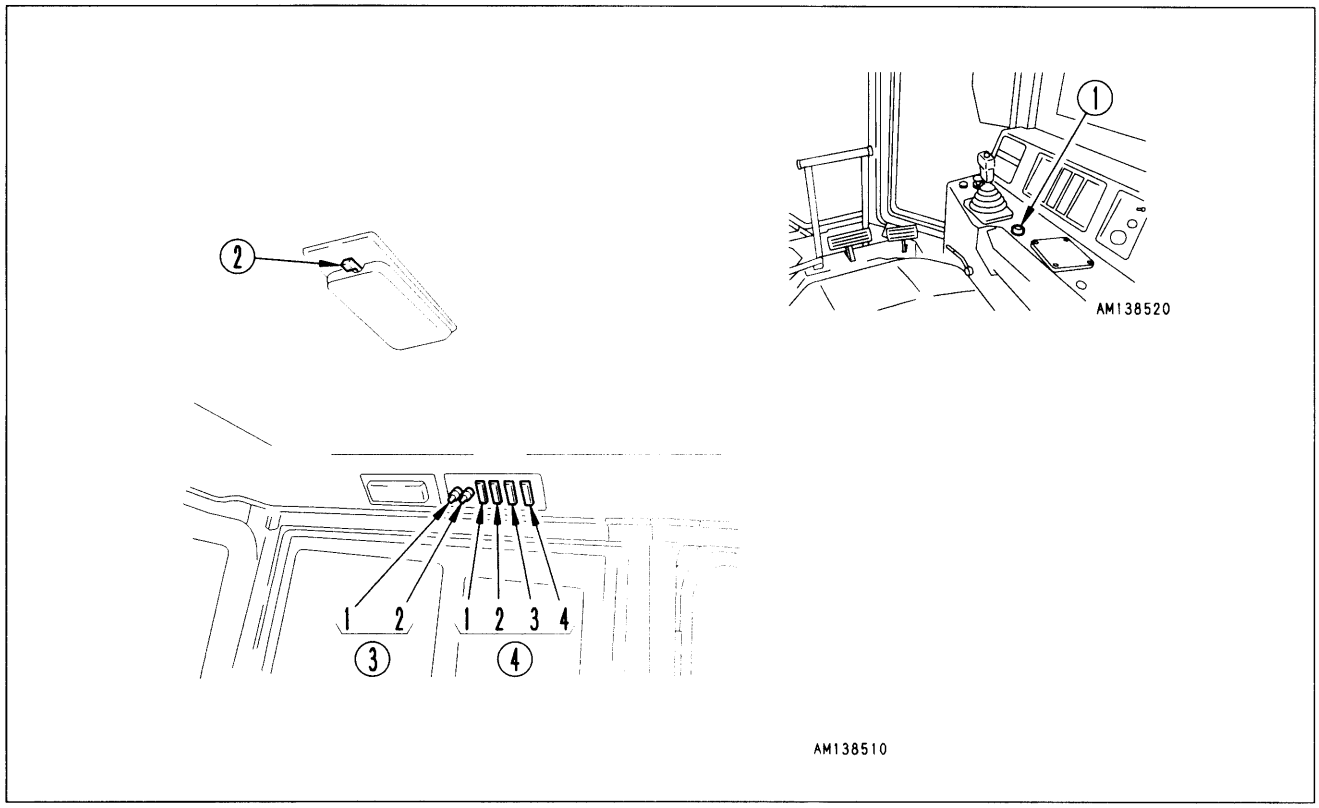



**REMARK**

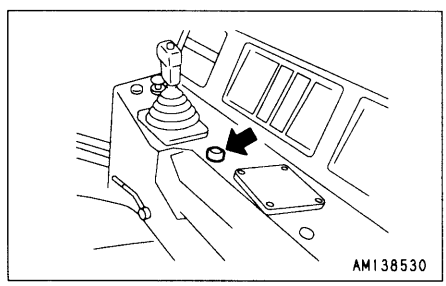
- Tilt limit lamp ① (yellow) flashes while the caution buzzer is sounding and it turns out when the buzzer sound stops.
- If the tilt limiting device operates normally, the tilt limit lamp ① (yellow) lights up. Tilt in the opposite direction, and the lamp goes off.



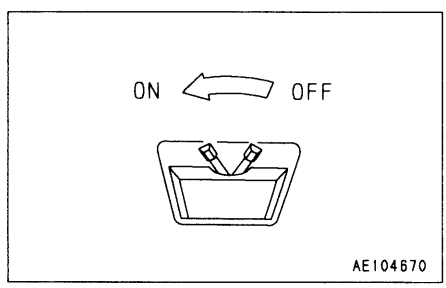
## 11.2 SWITCHES



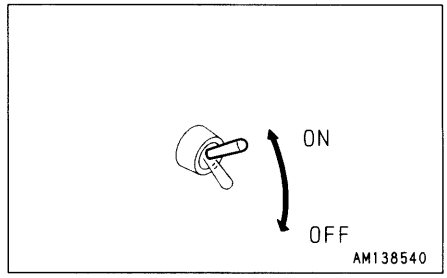

**1. HORN SWITCH**
When this switch is pressed, the horn will sound.




**2. ROOM LAMP SWITCH**
This lights up the room lamp.
ON position: Lamp lights up
OFF position: Lamp is out




**3. LAMP SWITCHES**
This lights up the following lamps at ON position.
① Rear lamp on the ROPS and ripper lamp
② Front lamp on the ROPS



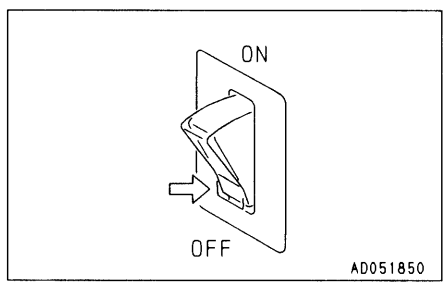
**4. WIPER SWITCH**

This activates the wipers.
The wiper switches are as follows.

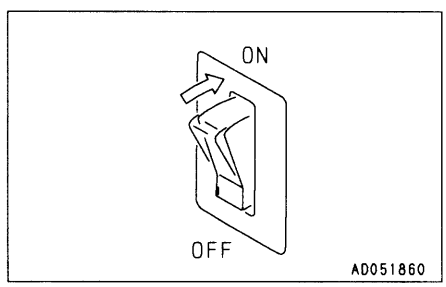
① Rear window wiper
② Door wiper
③ Front window wiper
④ Front window wiper

This is also used as the window washer switch.
The switch is operated as follows.

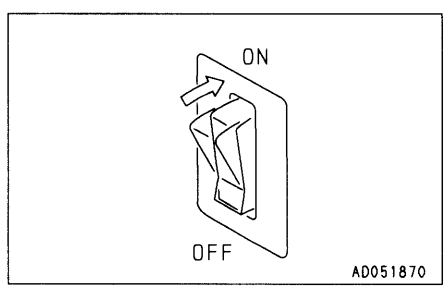
- Window washer only
  Keep the switch pressed to the OFF position to spray out water.



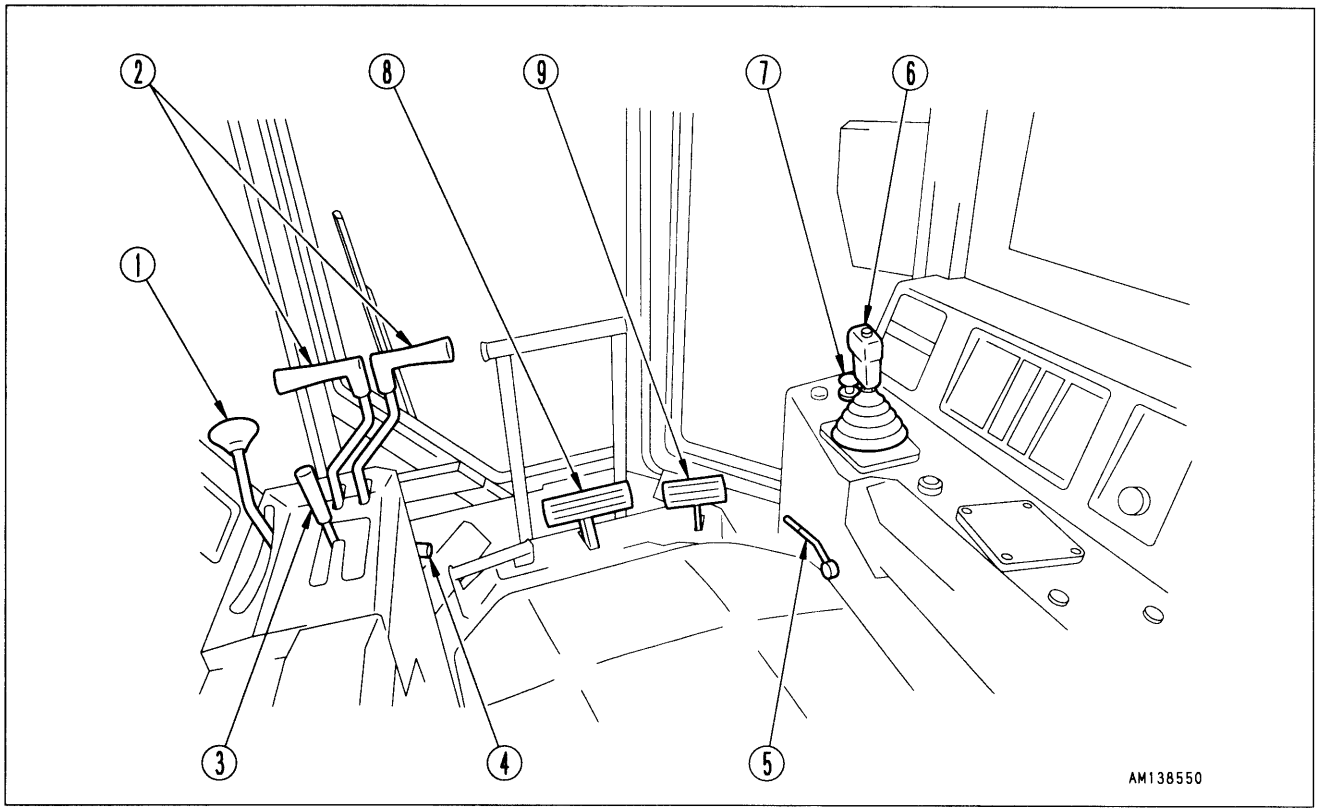

- Wiper only
  If this is switched on, the wiper will start.




- Wiper and window washer
  If this is kept pressed to the ON position while the wiper is working, water will be sprayed out.

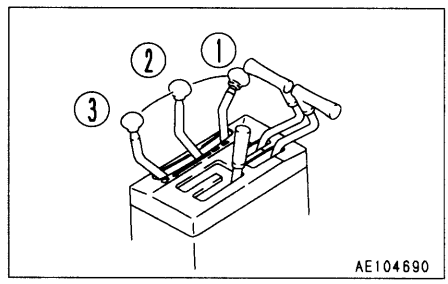


## 11.3 CONTROL LEVERS AND PEDALS




**1. FUEL CONTROL LEVER**

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

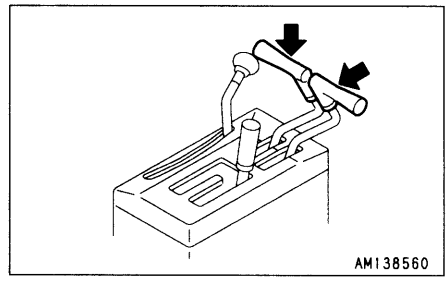



① Engine stop position:
Push the lever fully.
② Low idling position:
Pull the lever from engine stop position ① until you feel the operating force falls off.
③ Full speed position:
Pull the lever fully from low idling position ②.

**2. STEERING LEVER**

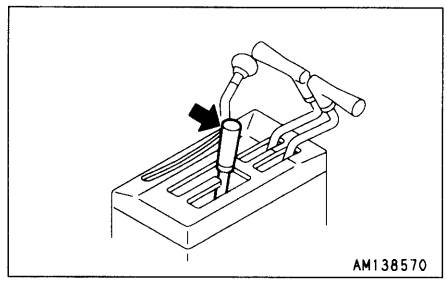
This lever is use to steer the machine. If the lever is moved partially in the direction of turn, the machine, the steering clutch is disengaged and the machine turns gradually.

If the lever is moved more, the steering brake is applied and the machine will turn on the spot.



### 3. GEAR SHIFT LEVER

This lever changes the transmission gear range. Three-speed forward and three-speed reverse travel can easily be selected by simply shifting the gear shift lever to any desired speed position.



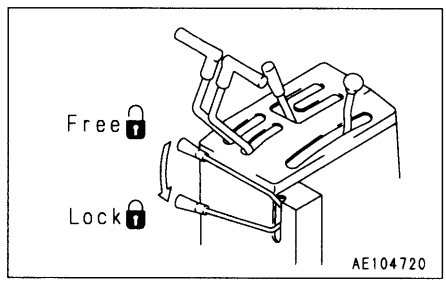

**REMARK**

Place the gear shift lever in the neutral position before starting the engine.

### 4. SAFETY LEVER (For gear shift lever)

**⚠ WARNING**

- **When leaving the operator's compartment, set the safety lever securely to the LOCK position. If the gear shift lever is not locked, and it is touched by mistake, this may lead to a serious accident.**
- **If the safety lever is not placed securely in the LOCK position, the control lever may not be properly locked.**



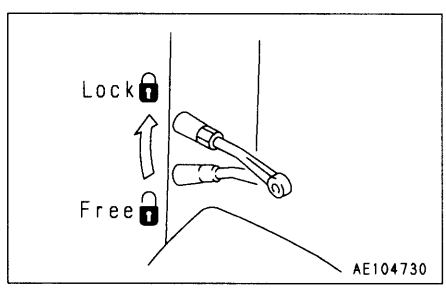

This is the locking device of the gear shift lever.

Set the gear shift lever in neutral and set the safety lever to LOCK.

### 5. BRAKE LOCK LEVER

**⚠ WARNING**

**Whenever the machine is parked, set the brake lock lever to the LOCK position without fail.**

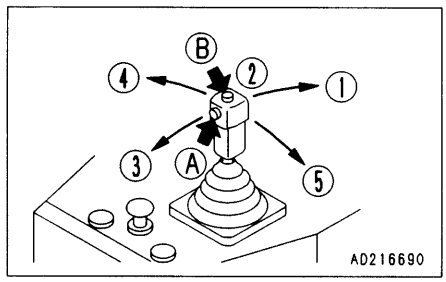



This device is used to lock the brake pedal when parking.

Depress the brake pedal, both when applying the lock and when releasing the lock.

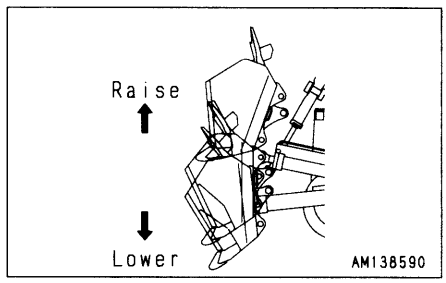
## 6. BLADE CONTROL LEVER

This carries out the blade lift and pitch operations.



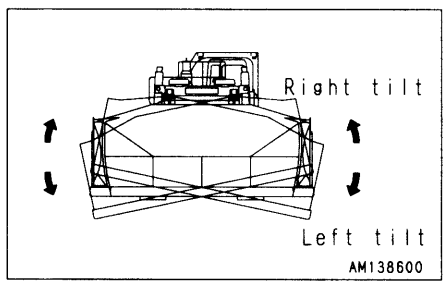

**Lifting control**

① RAISE : ( )
② HOLD : ( )
Blade is stopped and held in this position.
③ LOWER : ( )




**Tilting control**

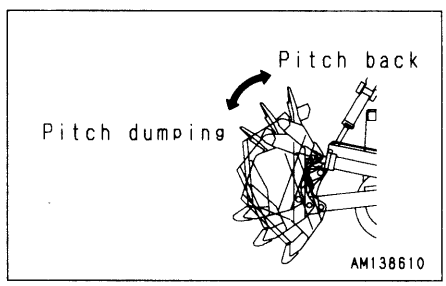
④ RIGHT TILT : ( )
⑤ LEFT TILT : ( )




**Pitch control**

Ⓐ Pitch dumping ( )
Pitch dumping continues while pitch dumping button Ⓐ is being pressed ②.

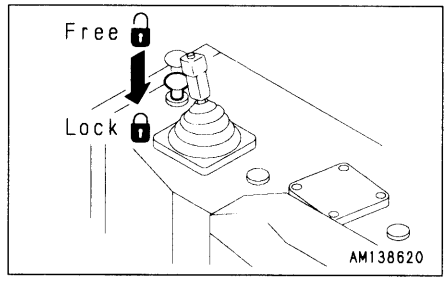
Ⓑ Pitch back ( )
Pitch back movement continues while pitch back button Ⓑ is being pressed ②.




**REMARK**

- After finishing earth shoving operation, shifting the gear shift lever to reverse (R) and a full-stroke upward activation of the blade control lever, or clicking the pitch back button just once, automatically resets the equipment to the excavation mode. (Automatic resetting to the excavation mode).
- The blade angle can be freely selected for better excavation performance and for more efficient soil rolling, depending on the soil condition and the topography.
- Do not try to activate a tilting operation when the blade is at the top end or at the low end.

## 7. SAFETY LOCK (For blade control lever)



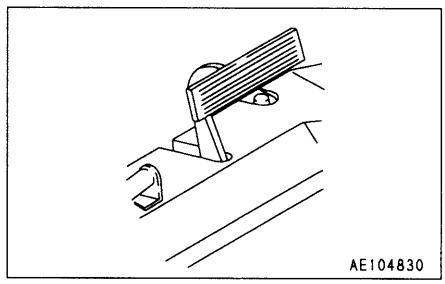

**⚠ WARNING**

- **When leaving the operator's compartment, set the safety lock securely to the LOCK position. If the control lever is not locked, and it is touched by mistake, this may lead to a serious accident.**
- **If the safety lock is not placed securely in the LOCK position, the control lever may not be properly locked. Check that the situation is as shown in the diagram.**
- **When parking or servicing the machine, be sure to lower the blade and set the safety lock in the LOCK position.**

This is the locking device of blade control lever.

The safety lock works to lock any of the lifting operation (up and down), tilting operation (left and right) and pitching operation (forward and back).

## 8. BRAKE PEDAL

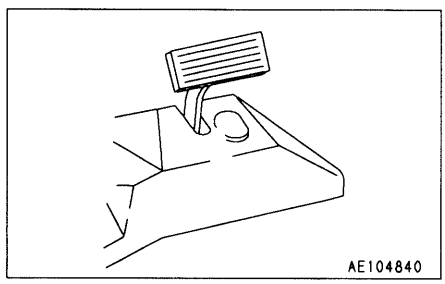



**⚠ WARNING**

**Do not place your foot on this pedal unnecessarily.**

Depress the pedal to apply the right and left brakes.

## 9. DECELERATION PEDAL

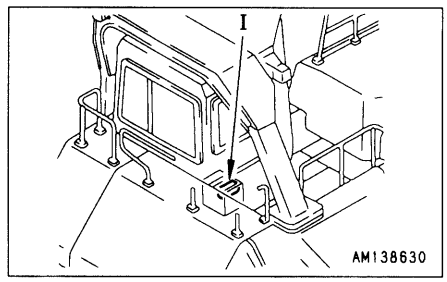


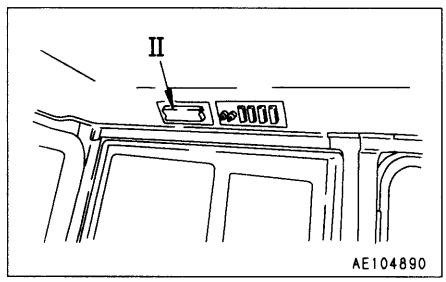

**⚠ WARNING**

- **Do not place your foot on this pedal unnecessarily.**
- **When passing over the top of a hill or when a load is dumped over a cliff, the load is suddenly reduced, so there is danger that the travel speed will also increase suddenly. To prevent this, depress the decelerator pedal to reduce the travel speed.**

This pedal is used when reducing the engine speed.
When switching between forward and reverse, or when stopping the machine, use this pedal to reduce speed.

## 11.4 FUSE BOX




**NOTICE**

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

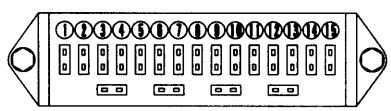
The fuses protect the electrical equipment and wiring from burning out.

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.

### 11.4.1 FUSE CAPACITY AND CIRCUIT NAME

Fuse box I

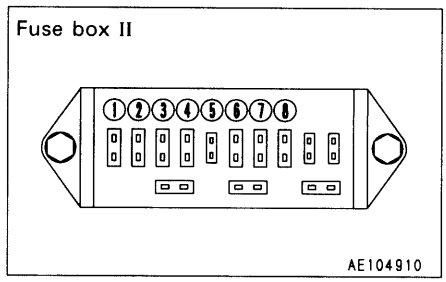



**Fuse box I**

| No. | Fuse capacity | Circuit |
|---|---|---|
| ① | 20 A | Starting switch |
| ② | 20 A | Starting switch |
| ③ | 20 A | Head lamp |
| ④ | 20 A | Head lamp |
| ⑤ | 20 A | Rear lamp |
| ⑥ | 20 A | Rear lamp |
| ⑦ | 20 A | Pin-puller, Horn, Monitor |
| ⑧ | 20 A | Alarm buzzer |
| ⑨ | 20 A | Rear ROPS lamp |
| ⑩ | 20 A | Rear ROPS lamp |
| ⑪ | 20 A | Front ROPS lamp |
| ⑫ | 20 A | Front ROPS lamp |
| ⑬ | 20 A | Cab power |
| ⑭ | 20 A | Cab power |

**Fuse box II**

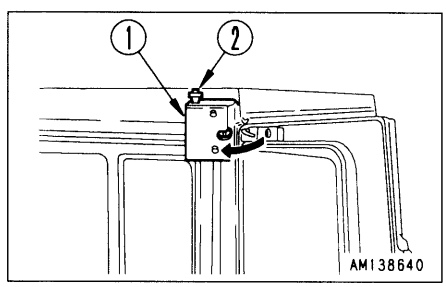
| No. | Fuse capacity | Circuit |
|---|---|---|
| ① | 10 A | Front upper window wiper |
| ② | 10 A | Rear window wiper |
| ③ | 10 A | Front lower window wiper |
| ④ | 10 A | Door wiper |
| ⑤ | – | – |
| ⑥ | 10 A | Room lamp |
| ⑦ | 10 A | Cigarette lighter |
| ⑧ | 10 A | Car stereo |




## 11.5 DOOR LOCK

This lock is used to lock the door in position when it is opened.

1. When the door is forced against catcher ①, the door will be locked in position.
2. To release the door, push knob ② above the catcher. The catcher will unlock the door.




**NOTICE**

**When locking the door in positon, be sure to force it firmly against the catcher.**

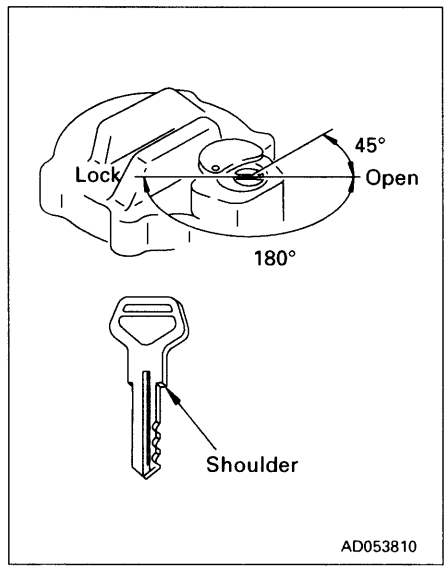
## 11.6 CAP WITH LOCK

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

**To open the cap**

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

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

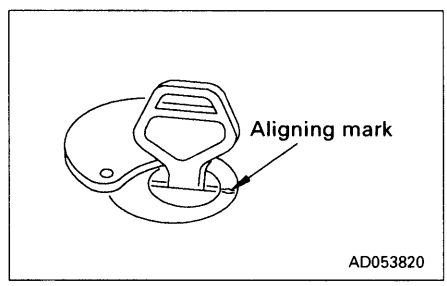



**To lock the cap**

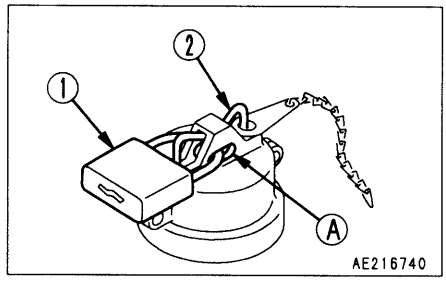
1. Turn the cap into place.
2. Turn the key clockwise and take the key out.

**REMARK**

When the cap is locked (against vandalism), it rotates freely.



## 11.7 HANDLING OF ENGINE OIL FILLER CAP




Open and close the engine oil filler cap according to the following procedure.

**To open the cap**

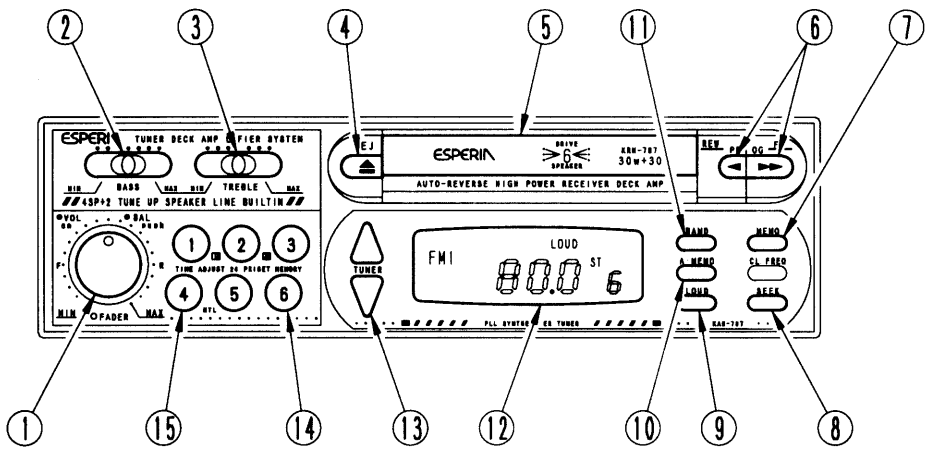
1. Remove the padlock ① from hole Ⓐ.
2. Push handle ② in the lower side and turn it counterclockwise until it stops.
3. Pull up handle ②, then return it (turn it clockwise).
4. Repeat 2 – 3 above until the cap is removed.

**To lock the cap**

1. Return the cap to the oil filler, and push handle ② in the lower side and turn it clockwise until it stops.
2. Pull up handle ②, then return it (turn it counterclockwise).
3. When the play of the cap is eliminated, install the padlock ①.

# 11.8 OPERATING THE CAR STEREO (MACHINES EQUIPPED WITH CAB, CAR RADIO)

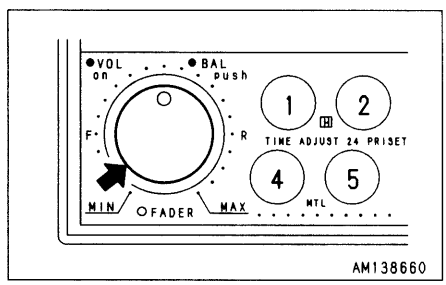
## 11.8.1 EXPLANATION OF COMPONENTS




**1. POWER SWITCH/VOLUME CONTROL/BALANCE CONTROL KNOB**

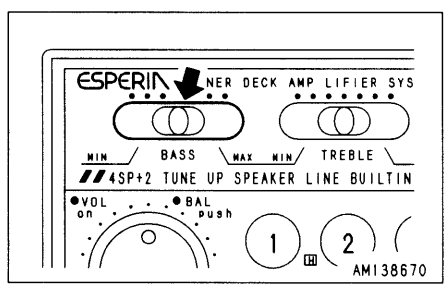
Turn this knob clockwise. The "click" sound indicates that the power supply is turned on. Further turning increases the speaker volume.

For balance control, depress the knob while turning it to left or right and regulate the sound balance between the left and right speakers.



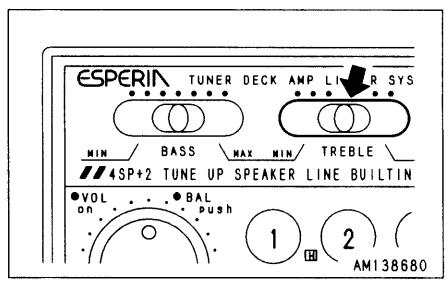

**2. BASS CONTROL SLIDE-KNOB**

Slide this knob to the right to increases the bass sound and to the left to decrease the base.

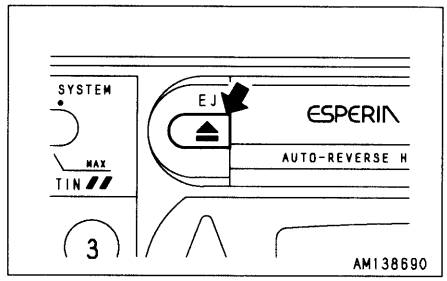



**3. TREBLE CONTROL SLIDE-KNOB**

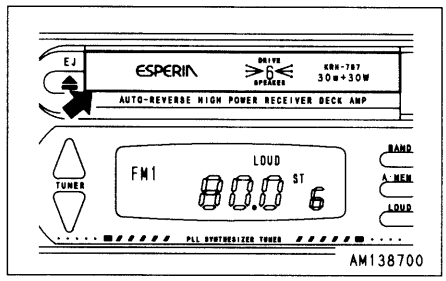
Slide this knob to the right to enhance high frequency sound and to the left to suppress high frequency sound.



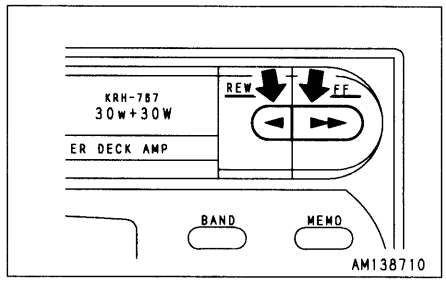
**4. EJECT BUTTON**
Push this button to eject the cassette tape.



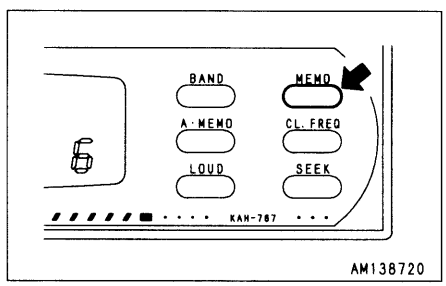

**5. CASSETTE DOOR**
Insert cassette tape with the exposed magnetic tape side facing to the right.



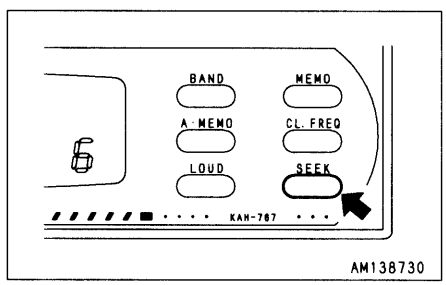

**6. FAST-FORWARD/REWIND/PROGRAM CHANGEOVER KNOB**
To fast-forward the tape, push the button matching the direction of program indication and to rewind, push the other button. To stop fast-forwarding or rewinding, lightly press the button which is not locked to cancel the operation. The system will then start playing the tape again normally. To change the program, press the fast-forward and rewind buttons simultaneously. The direction of tape feed will reverse.



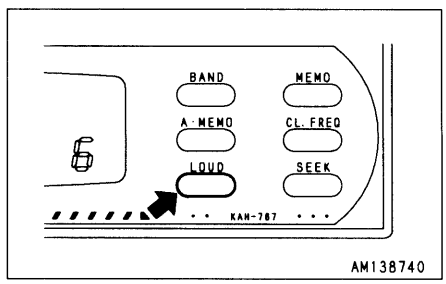

**7. MEMORY SWITCH**
Press this button to preset the frequencies of desired stations. (ME flashes.)




**8. SEEK**
When the SEEK button is pressed, the system automatically searches for a receivable station, and automatically stops searching once a station is picked up.

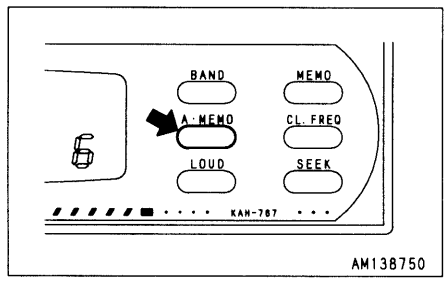



**9. LOUD BUTTON**
This switch is used to operate the system at a lower sound volume but with enhanced bass and treble sound. ("LOUD" indication appears on the display.)



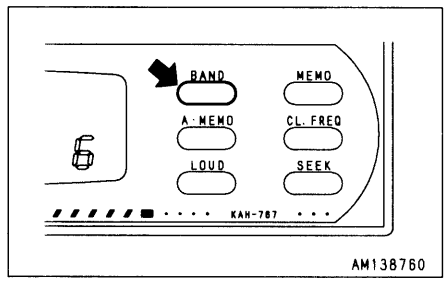
**10. AUTO-MEMORY**

When the "A.MEMO" button is pressed, the system tunes itself to stations receivable in the area in which the machine is currently located, one after another, and memorizes the frequencies in its preset memory, all automatically.



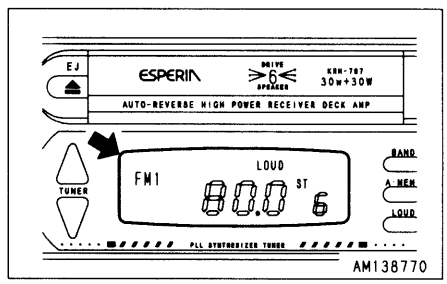

**11. FM/MW(AM) BAND SELECT SWITCH**

Pressing the "BAND" switch changes over between FM1, FM2, FM3 and MW(AM) bands. The display indicates the receiving band name and frequency.



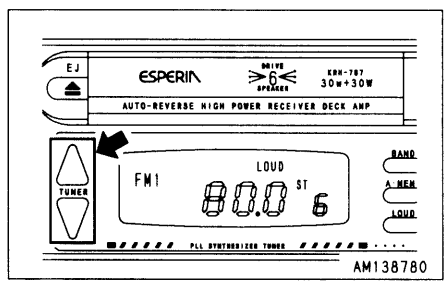

**12. DISPLAY**

The display indicates the receiving frequency when receiving a radio broadcast or the current operation mode.



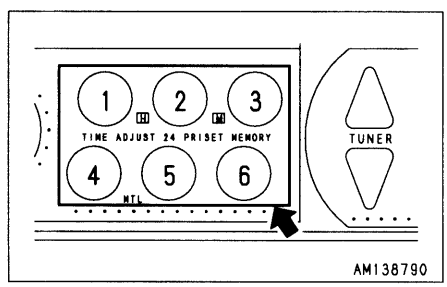

**13. TURN SWITCH (MANUAL TURNING)**

Pressing the ▲-shaped TUNER button raises the receiving frequency by 9 KHz in AM an by 0.1 MHz in FM for each press. Pressing the ▼-shaped TUNER button lowers the receiving frequency similarly. Pressing either of these buttons continuously shifts the receiving frequency continuously.



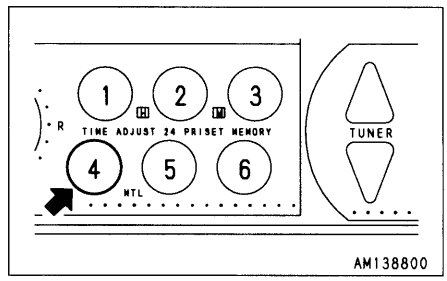

**14. PRESET SWITCH KEYS**

One station each in the FM1, FM2, FM3 and MW(AM) bands, respectively, can be preset for each of these preset keys. (Refer to the section "Presetting to selected stations".)




**15. METAL SWTICH**

Press the "MTL" ④ button before playing a metallic tape. "MTL" indication appears on the display.



## 11.8.2 METHOD OF USE

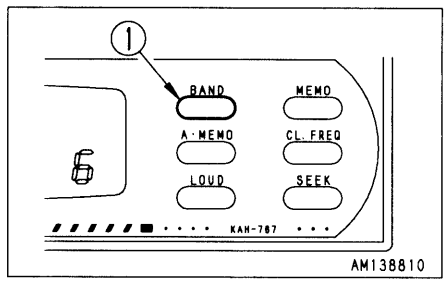
**When receiving radio broadcasts**

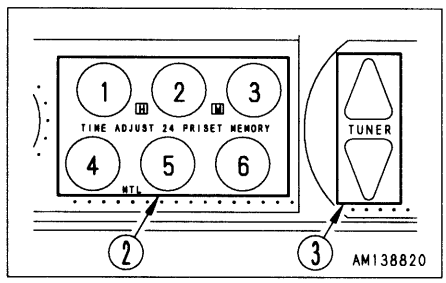
1. Turn ON the ignition key or turn it to the ACC position before turning on the system power switch.

2. Select either AM or FM band with FM/AM selector switch ①.

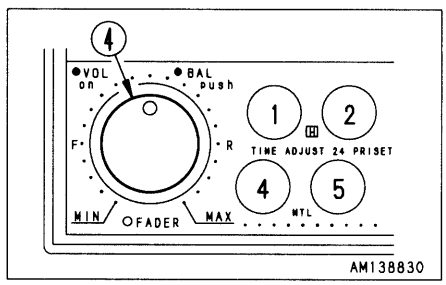
3. Tune to the desired station using presetting switches ② or manual tuner switches ③.

4. Adjust the volume, the balance between left and right speakers and the sound quality to your choice using the respective buttons.



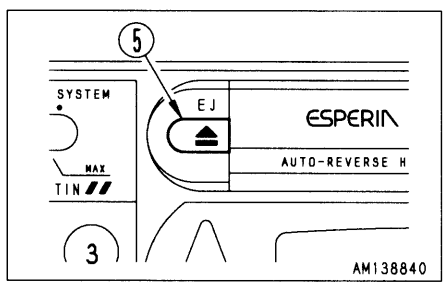




5. When turning off the radio, turn VOL knob ④ counter-clockwise until a click is heard.



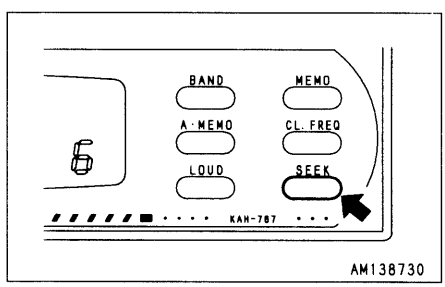

**REMARK**

- When changing over to radio while listening to a cassette tape, press EJECT button ⑤ to stop the tape and the system will automatically change over to radio.
- Simply insert a tape to change over to cassette tape mode while listening to the radio.



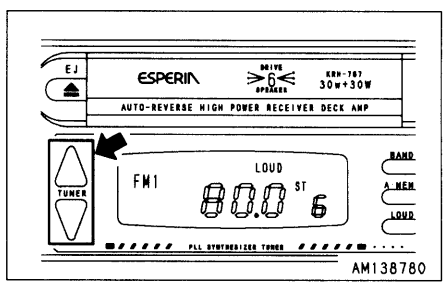

**Automatic tuning with SEEK button**

Pressing the "SEEK" button shifts the receiving frequency in the higher frequency direction before automatically stopping at a position where a station is picked up.



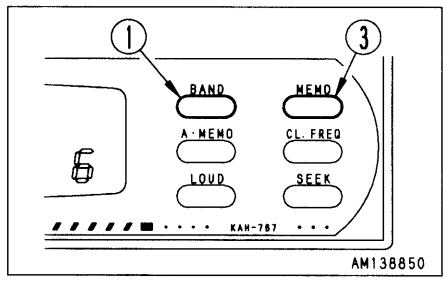

**Manual tuning**

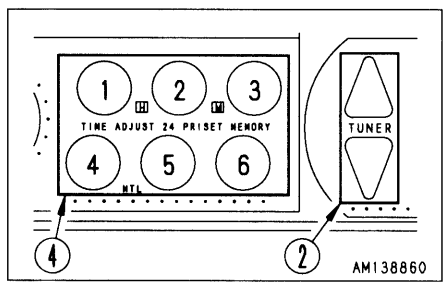
Pressing the "TUNER" ▲ button brings up the tuning point at 10 kHz intervals in the AM range or at 0.1 MHz intervals in the FM range. While, pressing the "TUNER" ▼ button brings down the tuning point at 10 kHz intervals in the AM range or at 0.1 MHz intervals in the FM range.
When either of these buttons is depressed continuously, the tuning point can be brought up or down continuously.



**Automatic selection between monaural and stereo receiving modes**
When the FM stereo broadcasting waves currently being received are too weak for normal receiving (such as receiving a long distance from the broadcasting station or in mountain areas) the system automatically shifts from stereo to monaural mode to suppress disturbing noise. It automatically returns to stereo mode when the intensity of the radio wave being received recovers.

**Presetting to selected stations**
When listening to a preset station, select either of the AM, FM1, FM2, FM3 bands using FM/AM select switch ①, then simply press the number key corresponding to the preset selected station.
The system can memorize 6 stations in AM band and 18 stations in FM bands (FM1: 6 stations, FM2: 6 stations and FM3: 6 stations).




Presetting procedures:
1. If the system is playing a cassette tape, press the eject button to stop the tape.

2. Tune to the desired station for presetting:
   First, select either of the MW(AM), FM1, FM2 or FM3 bands before tuning to the frequency of the desired station using TUNING buttons ②.

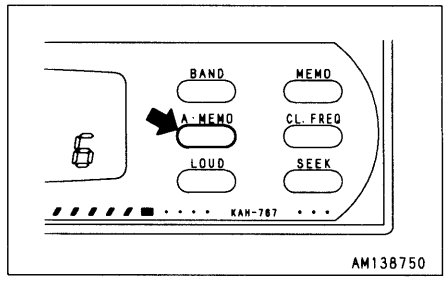
3. Press MEMO switch ③.

4. While "MEMO" is flashing, press preset key ④ of the channel number into which you want to memorize the preset station. (The preset channel and frequency will be indicated. This concludes presetting.)

5. Repeat the above procedure Steps 2 to 4 to preset to other desired stations.

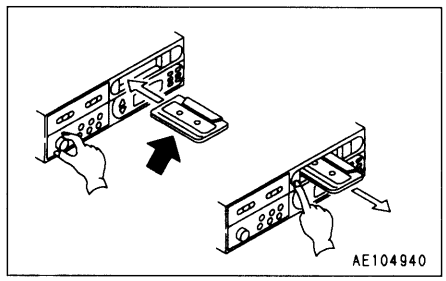
**REMARK**
- To change the station in a preset key number, repeat above procedure Steps 2 to 4, as well.
- If the main power supply is interrupted, such as when exchanging machine battery, all presettings will be erased. Repeat the presetting procedure in such case.

**Auto memory**
When the "A.MEMO" button is pressed, the system tunes itself to stations receivable in the area where the machine is currently located, one after another, and memorizes the frequencies in its preset-memory, all automatically.



**Memory backup battery**
When pressing a preset key fails to tune into the programmed station, repeat the presetting procedure after operating the vehicle for a day. If, however, the memory is still defective the next day, the service life of the backup battery is likely over, unless an imperfect contact or wire breakage is found. In this case, replace with a new backup battery. (Part number of the backup battery: 195-Z11-3940 battery)

**When playing a cassette tape**

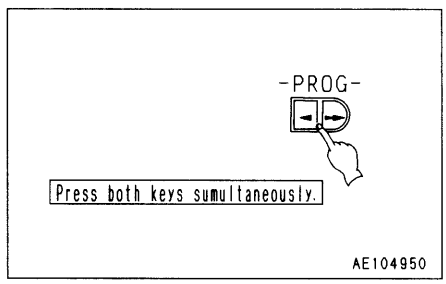



1. Turn ON the ignition key or turn it to the ACC position before turning on the power switch of the stereo system.

2. Insert your cassette tape through the cassette opening in the direction with the exposed tape to the right. The tape will start playing automatically. When the tape running direction indication is ▶, the upper channel of the tape is being played and when ◀ is indicated, the lower channel is being played.
   When the tape ends in one direction, the system automatically reverses the tape and plays the other side.

3. To stop the tape, press the eject button to eject it and the system will automatically change over to radio.

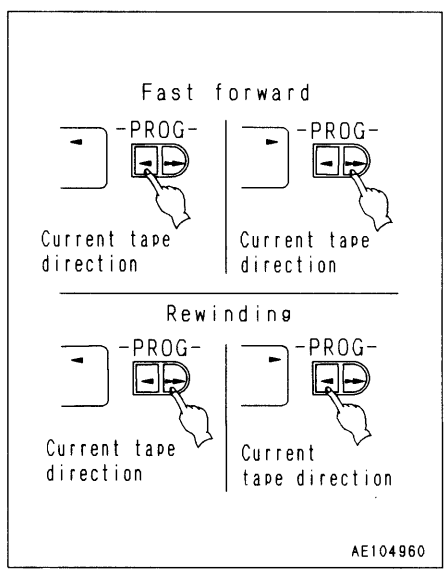
**When changing tape channels**
Lightly press both the PROG ◀| and |▶▶ keys simultaneously while the tape is being played.




**Fast-forwarding and rewinding**
1. To fast-forward a tape during playing, fully press either the ◀| or |▶▶ keys according to the current tape-feed direction to lock the key. To reverse the tape direction, fully press the opposite-direction key to lock it.

2. To stop fast-forwarding or rewinding, lightly touch the unlocked key.

3. This frees the locked key and normal playing resumes.



## 11.8.3 SPECIFICATIONS

**Tape**

| | |
|---|---|
| Applicable cassette tape: | Phillips-tape |
| Track system: | 4 track, 2-channel stereo |
| Tape speed: | 4.75 cm/sec |
| Fast-forwarding and rewinding time: | 185 sec (for a C-60 cassette) |
| Wow and flutter: | 0.15% (WEMS) |
| S/N ratio: | 55 dB |

**Radio**

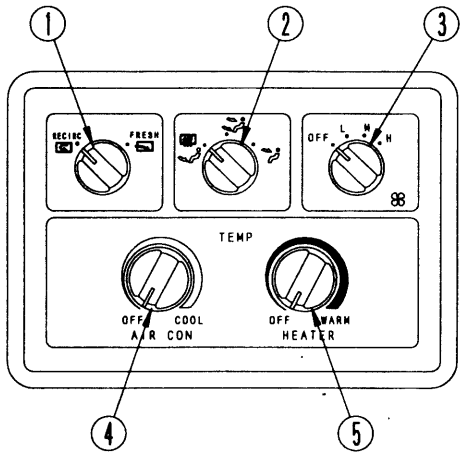
| | |
|---|---|
| Receiving sensitivity: | FM: 3 μv (30 dB S/N)<br>AM: 10 μv (max.) |
| S/N ratio: | FM: 62 dB<br>AM: 45 dB |

**Common to tape and radio**

| | |
|---|---|
| Frequency response: | (40 – 12,500 Hz.) |
| Max. output: | 30 W + 30 W |
| Output impedance: | (4 ohms x 2) or (8 ohms x 4) |
| Current consumption: | 5 A |
| Power source: | DC 12 V – 24 V |
| Polarity: | Negative grounding |
| Dimensions: | 178(W) x 50(H) x 150(D) mm. |
| Weight: | 1.4 kg. |

- The appearance and specifications are subject to change without prior notice for improvement purposes.

# 11.9 OPERATING THE AIR CONDITIONER



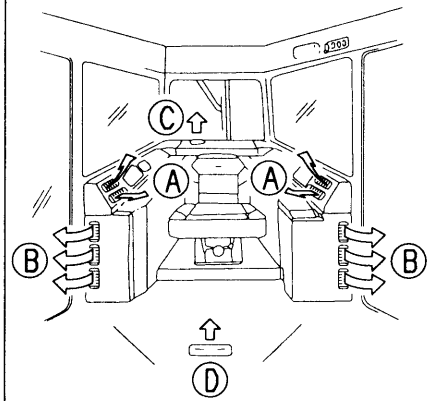

AE104970

## 11.9.1 CONTROL PANEL

### 1. INSIDE – OUTSIDE AIR SELECTOR SWITCH

Use this switch to change over the intake vents when heating or cooling the cab.

- Inside air (RECIRC ⊏)
  Air is inhaled from inside the cab.
  (Generally used for cooling the inside of the cab.)
- Outside air (FRESH ⊐ )
  Air is inhaled from outside the cab.
  (Generally used for ventilating and heating the inside of the cab.)




AM138870

### 2. VENT SELECTOR SWITCH

| Position of knob | Air outlet | Application |
|---|---|---|
| | DEF<br>FOOT<br>Ⓑ Ⓒ Ⓓ | Mainly for heating |
| | FACE<br>FOOT<br>Ⓐ Ⓑ Ⓒ Ⓓ | Mainly for ventilation |
| | FACE<br>Ⓐ | Mainly for cooling |

### 3. BLOWER SWITCH

This switch is used not only to control the flow of air in cooling and heating, but also as the main switch.

- The air flow is controlled in three ranges, High, Medium, and Low.
- When the switch is turned OFF, the power line is disconnected and the air conditioner stops.

### 4. COOLER TEMPERATURE CONTROL SWITCH

This switch controls the air temperature in the cooling operation and is also used as the cooler switch.

- The farther this switch is turned clockwise, the lower the temperature of the air coming out of the vent.
- When the switch is OFF, the cooler switch will go off and the cooling function will stop.

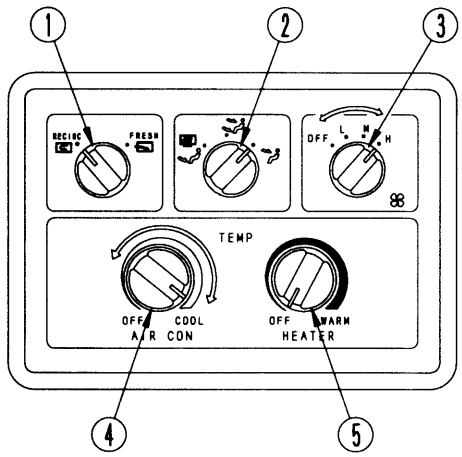
### 5. HEATER TEMPERATURE CONTROL SWITCH

This switch controls the air temperature in the heating operation.

- The farther this switch is turned clockwise, the higher the temperature of the air coming out of the vent.
- When the switch is in OFF, the water valve will be closed and the heating function will stop.

## 11.8.2 COOLING OPERATION

- **Control switches**




AE104990

**Ordinary cooling**

When control switches are used as shown, fresh cool air will be supplied into the cab.

- Set switches ①, ②, and ⑤ in the positions shown.
- Set switches ③ and ④ in the desired positions.

**Ventilation and cooling**

When the air in the cab gets dirty, move Inside-Outside air changeover switch ① to the outside air (FRESH ⊡) position to let outside air into the cab.

The other switches are used in the same manner as in ordinary cooling.

**REMARK**

If ventilation cooling is used for many hours, the cooling effect may not be sufficient. When the cab has been sufficiently ventilated, move Inside-Outside air selector switch ① back to the inside air (RECIRC ⊏) position.

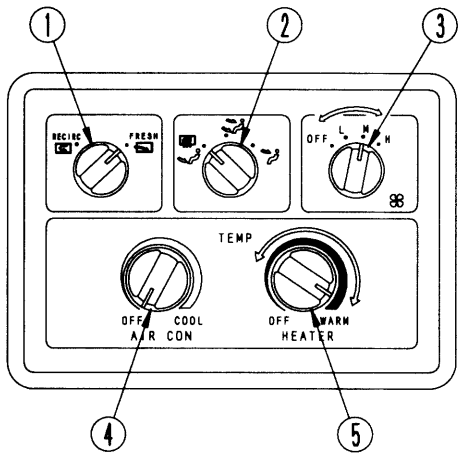
**REMARK**

- New Freon R134a is used as the refrigerant.
- The tightening torque for the air conditioner gas piping thread is as follows.
- Quantity of refrigerant: 900 g

| Thread size | Tightening torque Nm (kgm) |
|---|---|
| Discharge 22 x 1.5 | 19.6 – 24.5 (2 – 2.5) |
| Liquid 16 x 1.5 | 11.8 – 14.7 (1.2 – 1.5) |
| Suction 24 x 1.5 | 29.4 – 34.3 (3 – 3.5) |

## 11.9.3 HEATING OPERATION

- **Control panel**




AE105000

**Ordinary heating**

When the control switches are used as shown, warm air is supplied into the cab.

- Set switches ①, ②, and ④ in the positions shown.
- Set switches ③ and ⑤ in the desired positions.

**Dehumidifying heating**

When cooler temperature control knob ④ is placed in "COOL", dehumidified air will be supplied. The other switches are used in the same manner as in ordinary heating.

**REMARK**

When dehumidifying heating is used when the air in the cab is humid (in spring, autumn, or rainy weather, for example), the cab will be heated comfortably without clouding up the windows.

## 11.9.4 PRECAUTIONS FOR USING AIR CONDITIONER

**When cooling, change the air occasionally.**

- When smoking and using the cooler, the eyes may begin to hurt. If this happens, use cooling at "OUTSIDE" for a short time to clear out smoke in the cab.
- When using the air conditioner for a long period, move the knob to RECIRC. + OUTSIDE once every hour to change the air.

**Be careful not to overcool the cab.**

- The cab should feel cool when entering there from outside (5°C or 6°C (9°F or 11°F) lower than the outside temperature). It is not good for the health to have the temperature in the cab too low. Always give careful consideration to temperature regulation.

**When using the cooler, make sure the hot water circuit is completely stopped.**

- If hot water is circulating in the heater, it is like having a hot water bottle in the cab.
  Always make sure the heater temperature knob is at the OFF position.
- When not using the heater for a long period, fully close the hot water outlet and inlet valves at the engine water manifold and the engine oil cooler.

## 11.9.5 CHECK DURING OFF-SEASON

When the air conditioner is not being used, run the compressor at low speed for a few minutes every week to avoid loss of oil. (Run the engine at low speed with the cooler temperature control knob at LOW COOL.)

**REMARK**

In cold weather, do not run the compressor suddenly at high speed. This may cause failure in the compressor. When the temperature is below 2 to 6.5°C (36 to 44°F), the low pressure cut-off switch functions to stop the compressor from running even when the cooler temperature control switch is turned on.

## 11.9.6 PROCEDURE FOR REPLACING RECEIVER

Replace the receiver once every two years.

After replacing the receiver, add compressor oil. Turn the receiver at an angle and measure the oil remaining inside the receiver, then add the same amount of oil (Denso Oil 6) to fill the receiver.

**REMARK**

Depending on the condition of use, the replacement interval may be shorter.

**REMARK**

If the receiver is used when the desiccant has exceeded the water absorption limit, the refrigerant circuit may become clogged and cause failure of the compressor.

**Precautions when replacing receiver**

- If the receiver is left for more than 15 minutes with the blind cover removed, the moisture in the air will be absorbed, and this will reduce the life of the desiccant. If you remove the blind cover, connect the piping quickly, evacuate the system and fill with refrigerant.
- When removing the refrigerant from the refrigerant circuit, release it gradually from the low pressure side to prevent oil from flowing out.

## 11.9.7 CLEANING AIR FILTER

If the air filter for the FRESH or RECIRC air intake becomes clogged, the cooling or heating capacity will drop. To prevent this, clean the air filter with compressed air once a week.

For details of the cleaning method, see "24.2 WHEN REQUIRED".

## 11.9.8 CLEANING AIR FILTER

If the air filter for the FRESH or RECIRC air intake becomes clogged, the cooling or heating capacity will drop. To prevent this, clean the air filter with compressed air once a week.

For details of the cleaning method, see "24.2 WHEN REQUIRED".

## 11.9.9 CHECK TENSION OF COMPRESSOR BELT AND VOLUME OF REFRIGERANT (GAS)

If the compressor belt is loose or there is a lack of refrigerant, the cooling performance will be poor.

For details of the maintenance method, see "24.2 WHEN REQUIRED".

# 12. OPERATION

## 12.1 CHECK BEFORE STARTING ENGINE

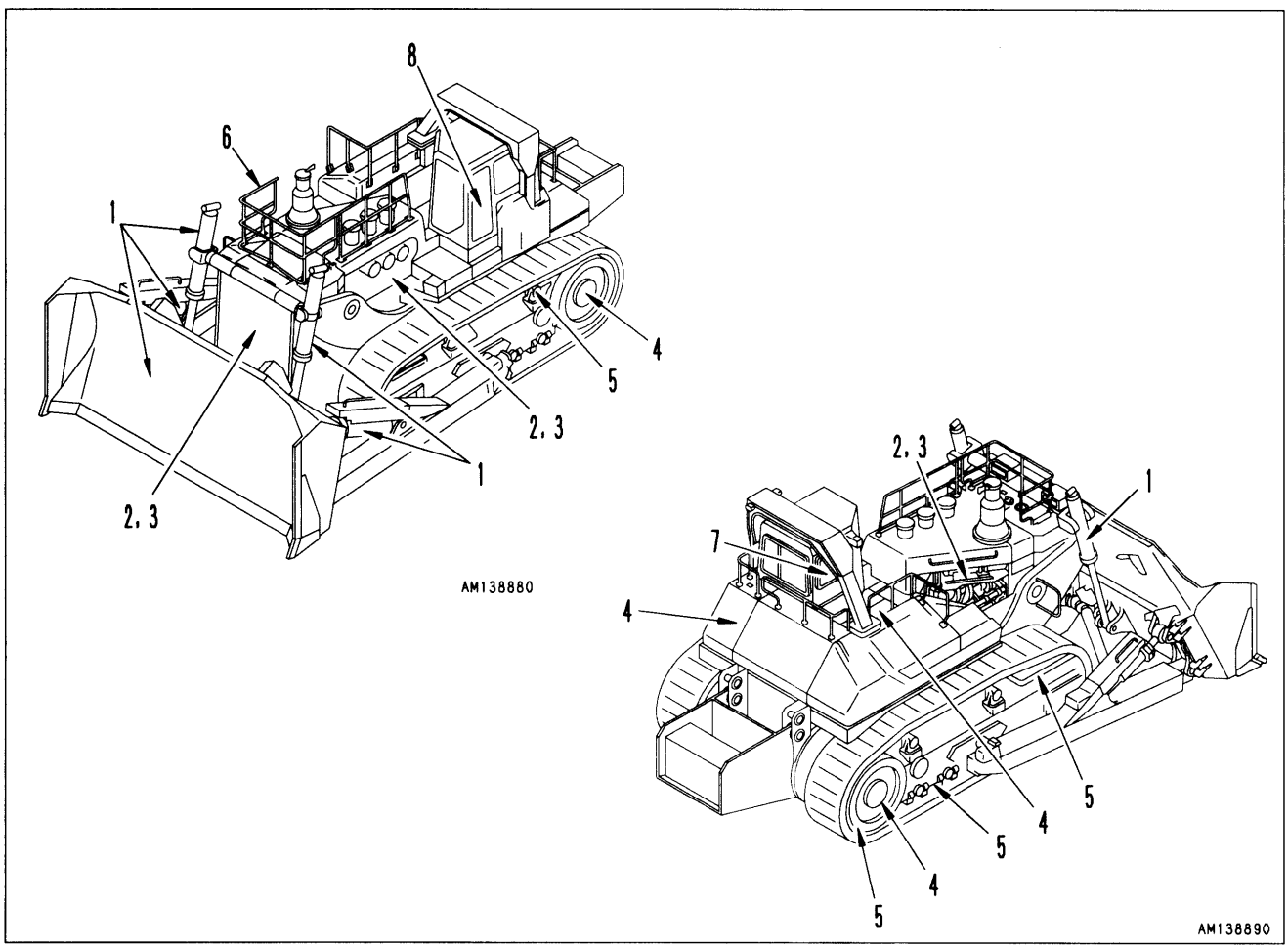
### 12.1.1 WALK-AROUND CHECK

**⚠ WARNING**

- **Leakage of oil or fuel, or accumulation of flammable material around high temperature parts, such as the engine muffler or turbocharger, 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 nut 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 if 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 of oil from power train case, final drive case, hydraulic tank, hose, joints**
   Check that there is no oil leakage. If any abnormality is found, repair the place where the oil is leaking.
   Check for leakage of oil from the undercover. Check the ground for traces of oil leakage.

5. **Check the undercarriage (track, sprocket, idler, guard) for damage, wear, loose bolts, or leakage of oil from rollers**
   If any damage, wear, or oil leakage is found, repair the problem and tighten the bolts.

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

7. **Check for damage to gauges, lamps on instrument panel, loose bolts**
   Check that there is no damage to the panel, gauges and lamps. If any abnormality is found, replace the parts. Clean off any dirt on the surface.

8. **Check for damage to 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.

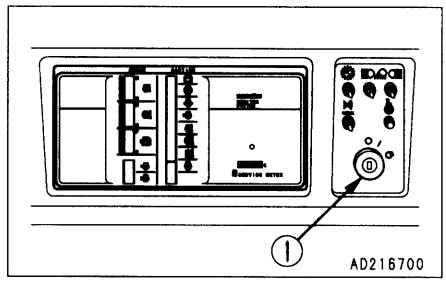
## 12.1.2 CHECK BEFORE STARTING

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

### CHECK MACHINE MONITOR

1. Turn starting switch ① to the ON position.

2. Check that all monitor lamps and gauges light up for 3 seconds and the alarm buzzer sounds for about 2 seconds.




### REMARK

If the lamps do not light up, there may be a failure or disconnection in the monitor, so please contact your Komatsu distributor.

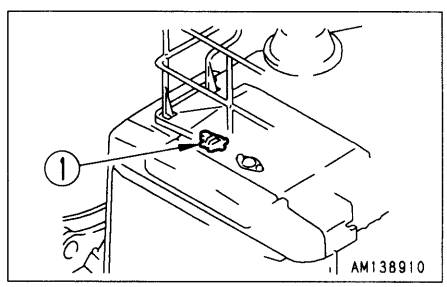
### NOTICE

**When carrying out the checks before starting, do not relay only on the monitor. Always carry out all the items listed for the following check and maintenance.**

### CHECK COOLANT LEVEL, ADD WATER

**⚠ WARNING**

**Do not remove cap ① while cooling water is hot. Hot water may spout out.**
**When removing cap ①, wait until the water temperature goes down and release radiator pressure little by little by loosening caps slowly, then remove the cap.**

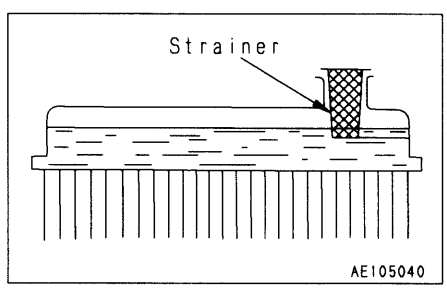



1. Remove radiator cap ① and check that coolant is above the bottom of the strainer as shown in the diagram. If necessary, add water through filler of radiator cap ①.

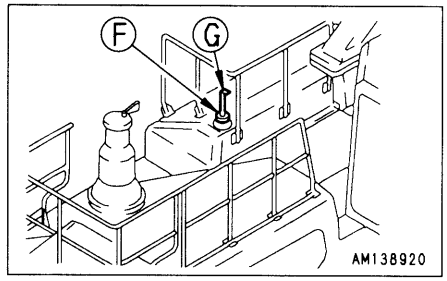
2. Check that there is no abnormality, such as oil in the coolant.

3. After adding water, tighten the cap securely.

4. If the volume of coolant added is more than usual, check for possible water leakage.



## CHECK FUEL LEVEL, ADD FUEL




**⚠ WARNING**

**When adding fuel, never let the fuel overflow. This may cause a fire.**

1. Removed the cap and check the fuel level using fuel gauge Ⓖ.

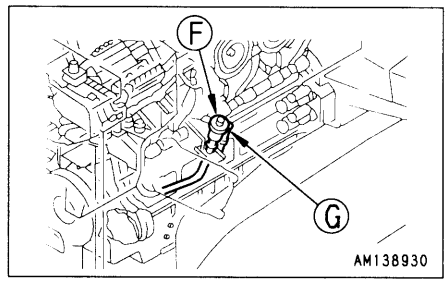
2. After completing work, fill the fuel tank through oil filler port Ⓕ.
   For details of the oil to use, see "20. USE OF FUEL, COOLANT AND LUBRICANTS ACCORDING TO AMBIENT TEMPERATURE".

3. After adding fuel, tighten the cap securely.
   Fuel capacity: 2100 ℓ (554 US gal, 462 UK gal)

**REMARK**

When dozing on a grade, make sure there is plenty of oil in the tank so that the engine fuel line does not becomes aerated.

## CHECK OIL LEVEL IN ENGINE OIL PAN, ADD OIL

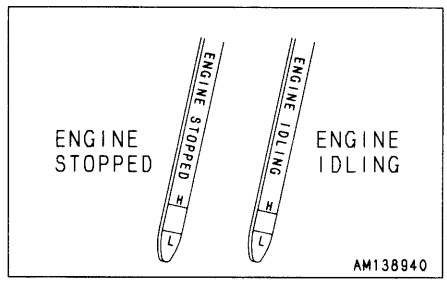



1. Open the engine side cover on the left side of the chassis.

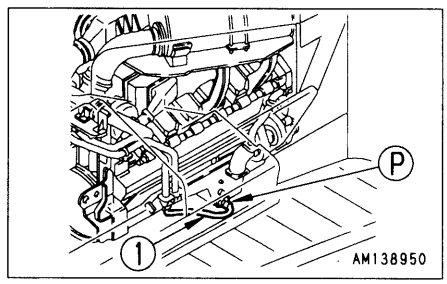
2. Remove dipstick Ⓖ and wipe the oil off with a cloth.

3. Insert dipstick Ⓖ fully in the oil filler pipe, then take it out again.

4. Use the ENGINE STOPPED side of dipstick Ⓖ and check that the oil level is between the H and L marks.
   If the oil is below the L mark, pull the dipstick out and add engine oil through oil filler port Ⓕ.
   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, pull hose ① outside the chassis, drain the excess oil from drain valve Ⓟ, then check the oil level again.




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

**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.

**REMARK**

The dipstick is marked with the levels for ENGINE STOPPED on one side and ENGINE IDLING on the other side.
It is also possible to check the oil level with the engine idling, but be sure to remember the following points.

- Check that the engine water temperature gauge shows green range.
- Read the dipstick on its reverse side marked with "ENGINE IDLING".

**CHECK OIL LEVEL IN POWER TRAIN CASE (INCL. TRANSMISSION, TORQUE CONVERTER AND BEVEL GEAR CASES), ADD OIL**

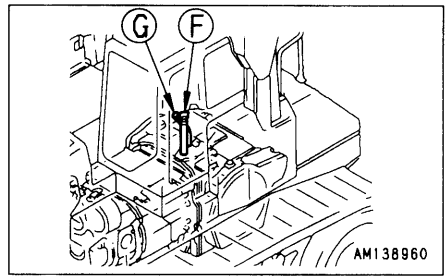
1. Remove dipstick Ⓖ, and wipe the oil off with a cloth.

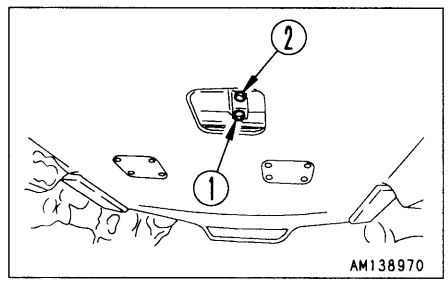
2. Insert dipstick Ⓖ fully in the oil filler pipe, then take it out again.

3. The oil level should be between the H and L marks on dipstick Ⓖ.
   If the oil level is below the L mark, add engine oil through oil filler Ⓕ.
   For details of the oil to use, see "20. USE OF FUEL, COOLANT AND LUBRICANTS ACCORDING TO AMBIENT TEMPERATURE".

4. If the oil is above the H mark, remove drain plug ①, loosen drain valve ② to drain the excess oil, then check the oil level again.

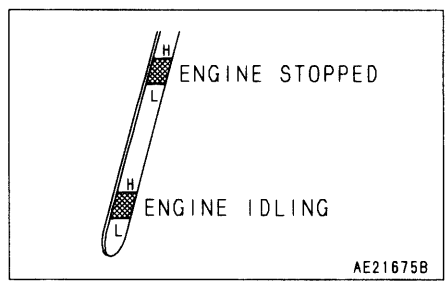
5. If the oil level is correct, tighten the oil filler cap securely.




**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.
- It is also possible to check the oil level with the engine idling.

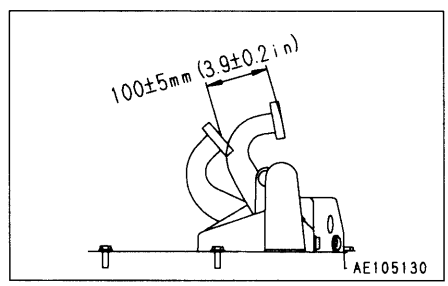



**CHECK BRAKE PEDAL TRAVEL**

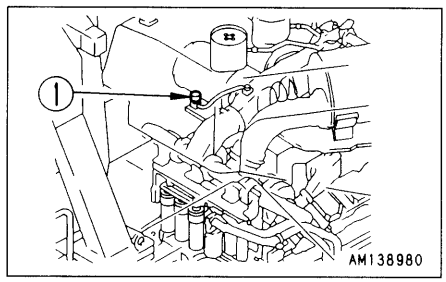
1. Depress the brake pedal all the way until it stops.

2. The distance of travel at the center of the pedal (position in the diagram on the right) should be 100 ± 5 mm (3.9 ± 0.2 in).

3. When this value exceeds the specified range, or the brake fails to work, please contact your Komatsu distributor for adjustment.



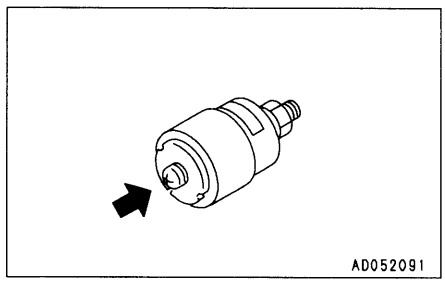
### CHECK DUST INDICATOR




1. Check that the red piston has not appeared in the transparent portion of dust indicator ①.

2. If the red piston has appeared, clean or replace the element immediately.
   For details of the method of cleaning the element, see "24.2 WHEN REQUIRED".

3. After checking, cleaning, and replacing, press the knob of dust indicator ① to return the red piston to its original position.




### CHECK ELECTRIC WIRING

**⚠ WARNING**

- **If fuses are frequently blown or if there are traces of short circuit on the electrical wiring, locate the cause and carry out repair.**
- **Accumulation of flammable material (dead leaves, twigs, grass, etc.) around the battery may cause fire, so always check and remove such material.**

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

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.

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

### CHECK THAT LAMPS LIGHT UP

Turn the head lamp switch and the rear lamp switch to the ON position and check that the head lamps and rear lamps light up.

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.

**CHECK HORN SOUND**

**CHECK BACKUP ALARM SOUND**

**CHECK SEAT BELT FOR WEAR OR DAMAGE**

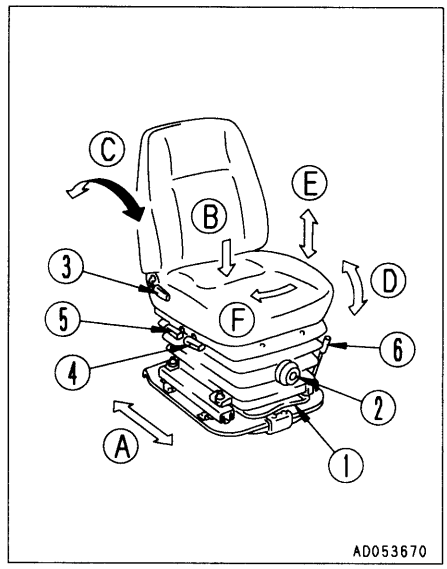
Check the belt and mounting clamps, and if they are worn or damaged, replace the seat belt.

## 12.1.3 ADJUSTMENT BEFORE OPERATION

### OPERATOR'S SEAT

**⚠ WARNING**

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




Ⓐ Fore-aft adjustment of seat
Move lever ① to the right set the seat to a position where it is easy to operate, then release the lever.
Fore-aft adjustment: 160 mm (6.3 in) (8 stages)

Ⓑ Weight adjustment of seat
Turn knob ② under the seat to match the weight adjustment scale with your own weight.
The weight can be adjusted within a range of 50 – 120 kg (110.3 – 117.8 lb)

**REMARK**

If you want to make the seat softer, turn the weight adjustment to a lower weight; if you want to make the seat harder, adjust to a higher weight.

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

Ⓒ Adjusting reclining angle

**NOTICE**

**When reclining the seat back to the rear, check the space behind, and adjust to a suitable position.**

Pull lever ③, set the seatback to a position where it is easy to operate, then release the lever.

Ⓓ SEAT ANGLE

1. When lever ④ is pulled up, it is possible to adjust the angle of the seat front. (5 stages)
   1. To raise the seat front, keep the lever pulled up and apply your weight to the seat backrest.
   2. To lower the seat front, keep the lever pulled up and apply your weight to the seat front.

2. When lever ⑤ is pulled up, it is possible to adjust the angle of the seat back. (5 stages)
   1. To raise the seat back, keep the lever pulled up and stand up slightly.
   2. To lower the seat back, keep the lever pulled up and apply your weight to the seat back.

Ⓔ ADJUSTING VERTICAL HEIGHT OF SEAT
Pull up levers ④ and ⑤ in turn and adjust the angle. After adjusting, release the levers and lock them.
(Vertical adjustment amount: 5 stages, 60 mm)

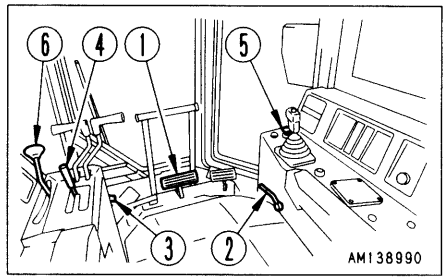
Ⓕ SEAT ADJUSTING DIRECTION
Move lever ⑥ back to release the lock, then turn the seat to the right by hand. It is possible to change the direction of the seat to the 15° position.
After changing the angle of the seat, return the lever securely and lock it in position.

- Adjusting the seat angle to the right is done to make it easier to carry out ripper operations or scraper towing operations.

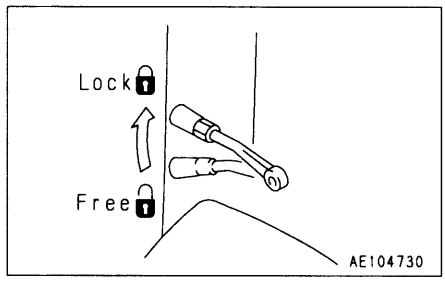
## 12.1.4 OPERATIONS AND CHECKS BEFORE STARTING ENGINE

**⚠ WARNING**

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



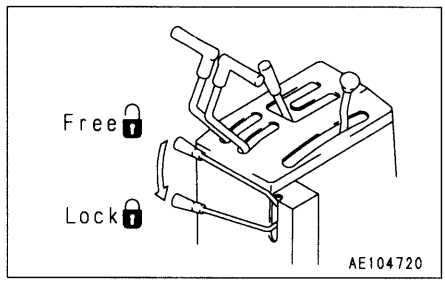

1. Is brake pedal ① locked with brake lock lever ②?



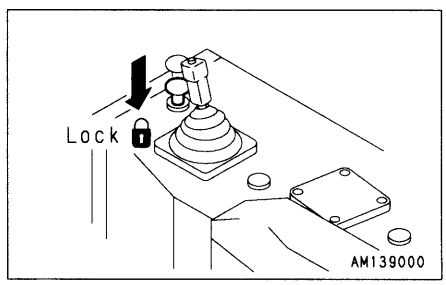

2. Is gear shift lever ④ in N (neutral) position and locked with safety lever ③?

**REMARK**

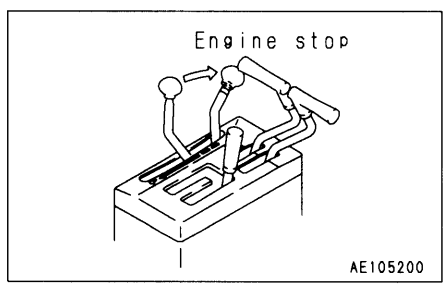
If the gear shift lever is not at the neutral position, the starting motor will not turn even when the starting switch is turned to the START position.



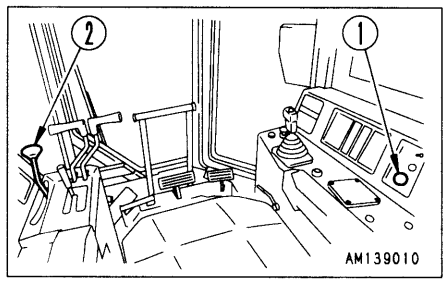

3. Is the blade lowered on the ground?
   And is safety lock ⑤ for blade control lever in the LOCK position?




4. Is fuel control lever ⑥ in the engine stop position?



## 12.2 STARTING ENGINE




### 12.2.1 NORMAL STARTING

**⚠ WARNING**

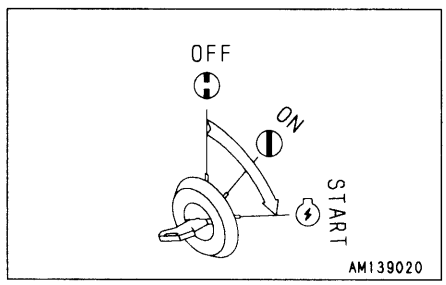
**Check that there are no persons or obstacles in the surrounding area, then sound the horn and start the engine.**

**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.**

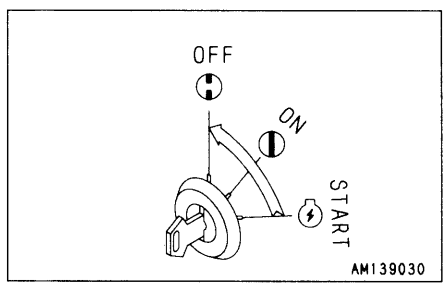
1. Push fuel control lever ② to the STOP position, then turn the key of starting switch ① to the START position and run the engine for 5 to 10 seconds.



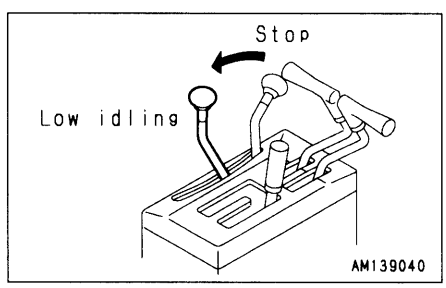

**REMARK**

When starting the engine, turn it with the starting motor to supply lubricating oil to each engine part.

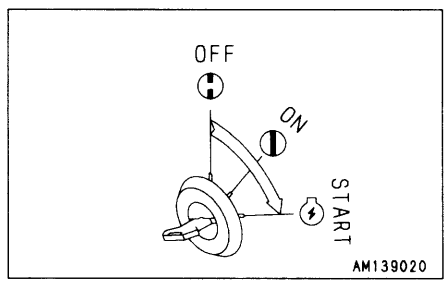
2. Then return the key of starting switch ① to the OFF position.



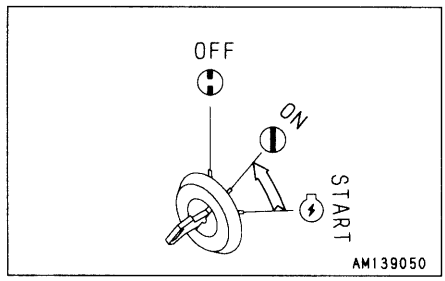

3. Pull fuel control lever ② a little toward you from the low idling position.




4. Turn the key of starting switch ① to the START position.

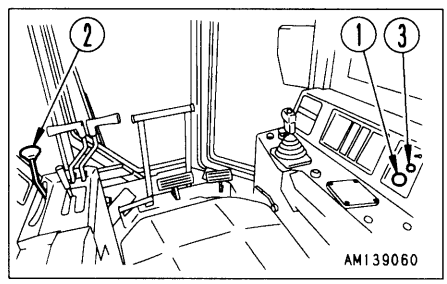


5. When engine is started, release the key of starting switch ① and the key will return automatically to ON.




## 12.2.2 STARTING IN COLD WEATHER

When starting in low temperatures, do as follows.




**⚠ WARNING**

**Precautions when handling ether**

- **Never bring any flame close to the ether.**
- **After using, do not throw the cylinder into a fire or make holes in it.**
- **Do not keep the ether cylinder in a place at a temperature of more than 40°C (104°F)**
- **Do not touch or inhale the ether gas.**
- **Do not bring the ether cylinder into the operator's compartment.**
- **Keep the cylinder out of the reach of children.**
- **When not using the ether cylinder, such as in the summer, remove it from the machine.**
- **If the ambient temperature goes below –25°C (–13°F), remove the ether cylinder from the machine until the machine is started again, and keep it in storage at room temperature.**

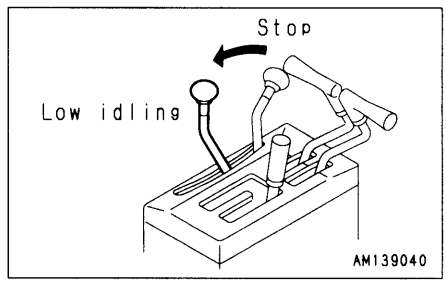
**⚠ WARNING**

- **During normal operation, do not operate the ether spray under any circumstances.**
- **Do not spray more ether than is necessary. If too much ether is sprayed, there will be an explosion.**

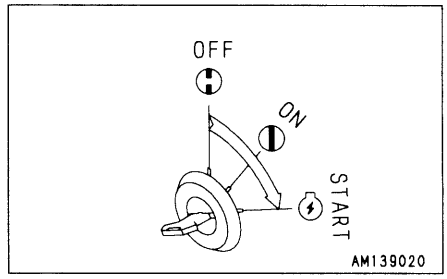
**NOTICE**

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

**If the engine fails to start, repeat steps 2 and 3 after waiting for about 2 minutes.**



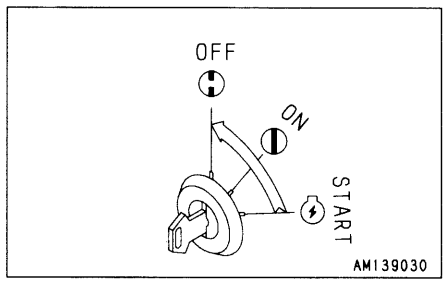

1. Turn fuel lever ② to the STOP position, then turn the key of starting switch ① to the START position and run the engine for 5 to 10 seconds.



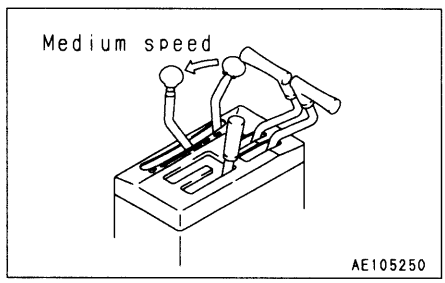

**REMARK**

When starting the engine, turn it with the starting motor to supply lubricating oil to each engine part.

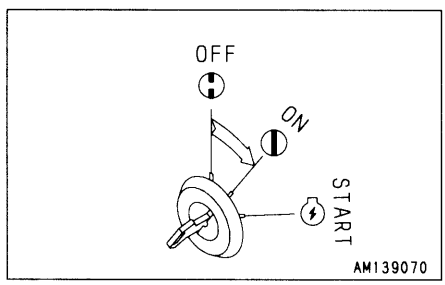
2. Then return the key of starting switch to the OFF position.



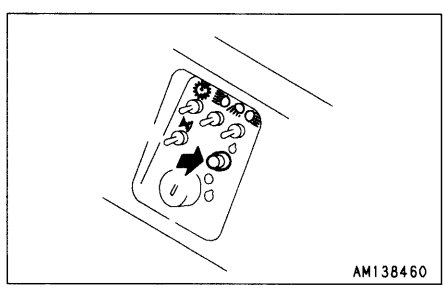

3. Pull fuel control lever ② to the center position between LOW IDLING and HIGH IDLING.



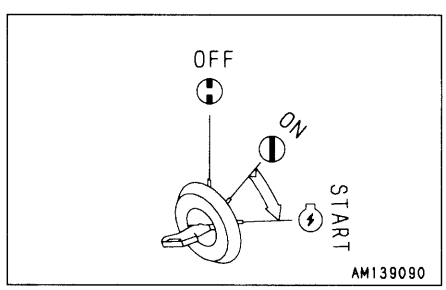

4. Turn the key of starting switch ① to the ON position.




5. Keep quick start switch ③ dpressed and wait for 2 – 3 seconds.



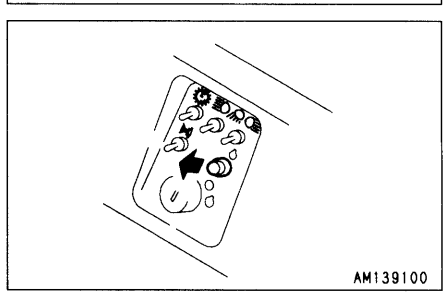

6. Turn the key of starting switch ① to the START position to crank the engine.



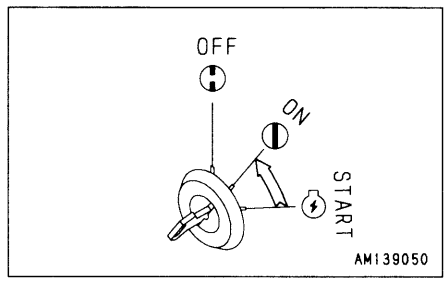

7. While cranking the engine, release quick start switch ③ and start the engine.

**REMARK**

When starting, and cranking the starting motor, the caution monitor lamp may flash, but if it goes out after the engine start, there is no abnormality.



8. When the engine starts, return the key of starting switch ① to the ON position. (Release the key and it will return automatically.)

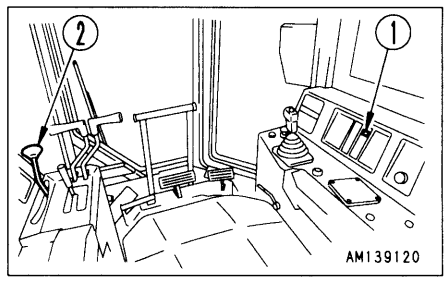



9. When the engine rotation stabilizes, move to low idling, and then carry out the warming-up operation.

**REMARK**

- If the engine speed does not increase, repeat the pushing operation of the quick start switch 2 – 3 times while cranking.
- After starting, if the engine speed drops and the engine is about to stop, operate the quick start switch to spray ether. When doing this, adjust the number of times of operating the spray so that the engine does not rise too far.
- If the engine does not start with the above operation, wait for approx. 2 minutes and repeat Steps 4 – 7.

## 12.3 OPERATIONS AND CHECKS AFTER STARTING ENGINE



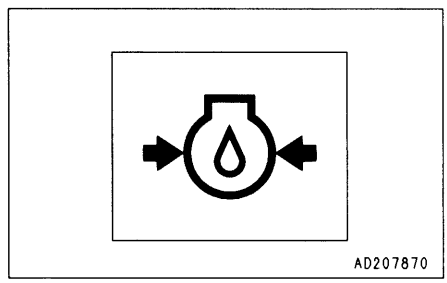

After starting the engine, do not immediately start operations. First, carry out the following operations and checks.

**NOTICE**

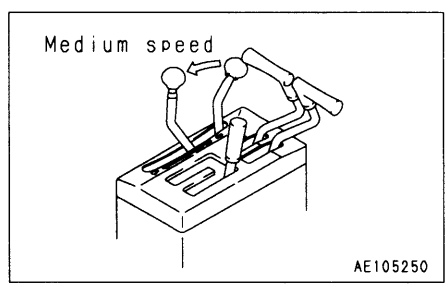
**Avoid abrupt acceleration until warm-up run is completed.**

**Do not run the engine at low idling or high idling for more than 20 minutes. If it is necessary to run the engine at idling, apply a load or run at a medium speed from time to time.**

1. Run the engine at low idling speeds and make sure engine oil pressure monitor lamp ① goes off.



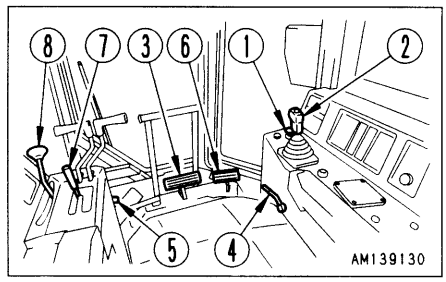

2. Pull fuel control lever ② and run the engine at a medium speed. Then run the engine at no load for about 5 minutes.




3. After warm-up run is completed, check gauges and monitor lamps for proper operation.
   Continue to run the engine at light load until the green range of the engine water temperature gauge lights.
   If the engine oil pressure monitor lamp starts flashing and the buzzer starts sounds intermittently, immediately stop the engine and check for the cause of trouble.

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

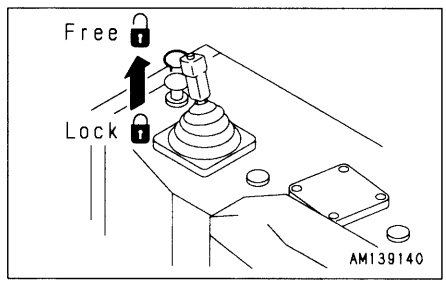
## 12.4 MOVING MACHINE



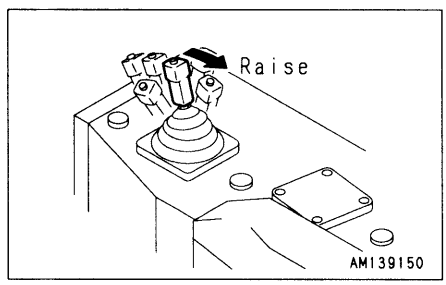

**⚠ WARNING**

- **When moving machine, 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 an blind spot behind the machine.**
- **When starting on slopes, always keep brake pedal ③ depressed even after releasing brake lock lever ④.**
- **When starting on steep slopes, set fuel control lever ⑧ to the full speed position, depress brake pedal ③ and deceleration pedal ⑥. Then set gear shift lever ⑦ in 1st, and slowly release the deceleration pedal and brake pedal at the same time to allow the machine to start.**

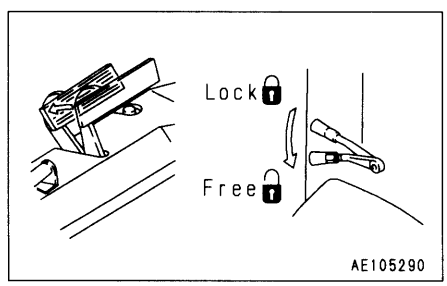
1. Unlock the blade control lever with safety lock ①.



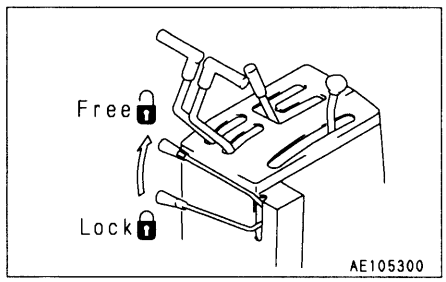

2. Put blade control lever ② in the RAISE position to raise the blade 40 – 50 cm (15.8 – 19.7 in) off the ground.



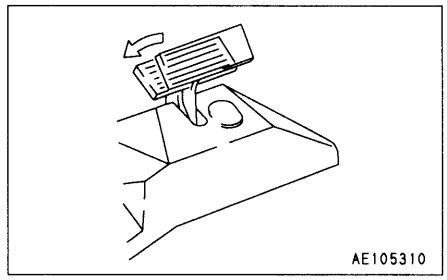

3. Depress brake pedal ③, place brake lock lever ④ in FREE, and return the brake pedal to home position.



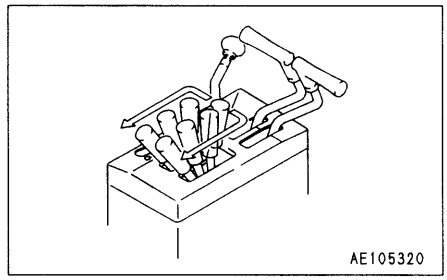

4. Unlock the gear shift lever with safety lever ⑤.



5. Depress decelerator pedal ⑥ to decrease engine speed so the machine can start off without jerking.



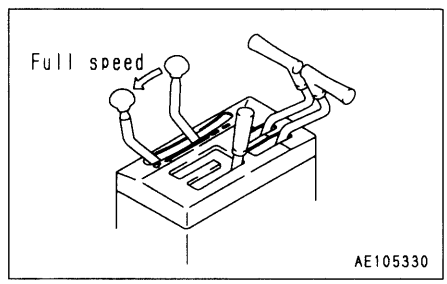

6. Shift gear shift lever ⑦ in a desired position and start the machine.




7. Pull fuel control lever ⑧ to increase engine speed.

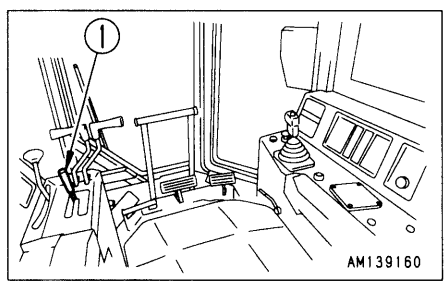
**REMARK**

If you are depressing the brake pedal, release the brake pedal slowly at the same time.

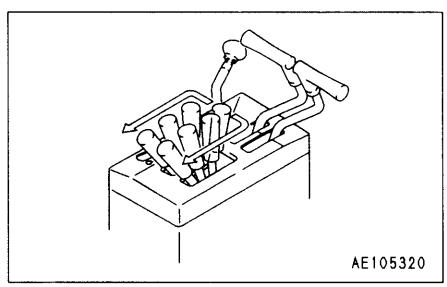



## 12.5 SHIFTING GEAR

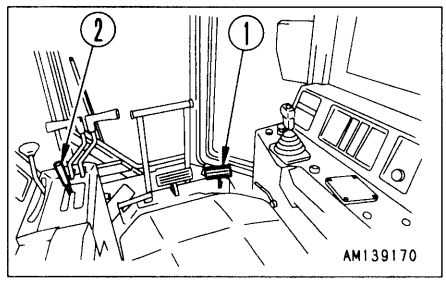
There is no need to stop machine to shift gear.




Set gear shift lever ① in the desired position to shift gear.



## 12.6 SHIFTING BETWEEN FORWARD AND REVERSE



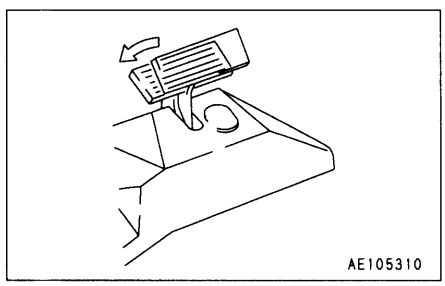

**⚠ WARNING**

**When switching between FORWARD and REVERSE, check first that the direction of travel is safe.**

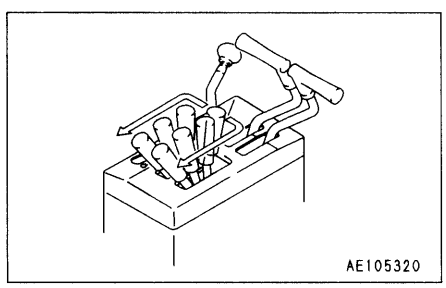
**⚠ CAUTION**

**There is no need to stop the machine even when switching between FORWARD and REVERSE.**
**To increase safety, operator comfort, and the life of the transmission, leave the engine running at full speed, and always depress the decelerator pedal to lower the engine speed.**

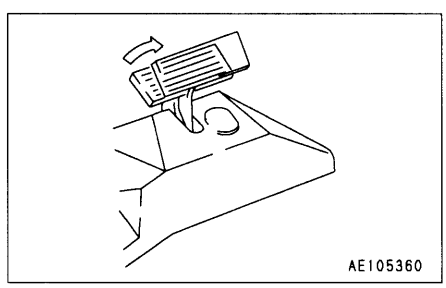
1. Depress decelerator pedal ① and reduce the engine speed.




2. Shift gear shift lever ② to the desired position.




3. Release decelerator pedal ① to raise the engine speed.




**REMARK**

When the gear shift lever is placed in REVERSE, the REVERSE warning buzzer will sound.

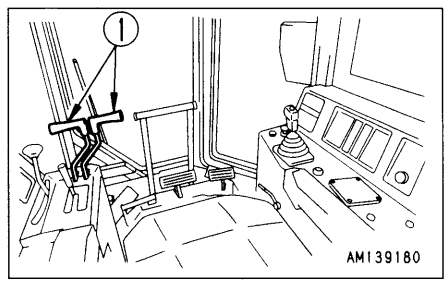
## 12.7 STEERING MACHINE

**⚠ WARNING**

- **Avoid as much as possible turning the machine on a slope. The machine will tend to slip sideways. Particular care should be taken on soft or clay land.**
- **Never make a pivot turn at high speed.**

### 12.7.1 NORMAL TURNING

To make a turn while traveling, pull steering lever ① on the side in which you would like to turn.



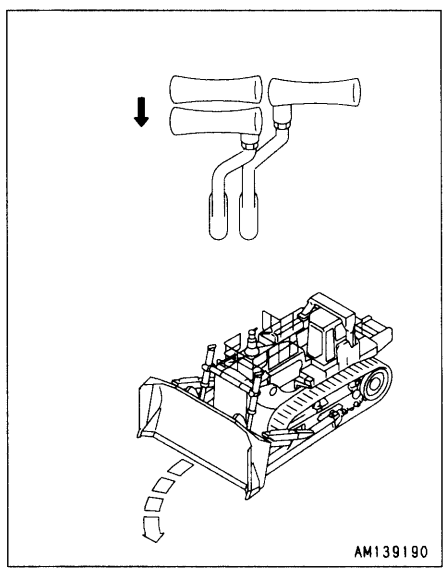

- **Turning gradually to left while traveling forward**

Pull the L.H. steering lever halfway (to the detent). The steering clutch will be disengaged, allowing the machine to make a gradual left turn.

**REMARK**

To make a gradual right turn, manipulate the R.H. steering lever in the same manner as described above.

Do the same when traveling in reverse.



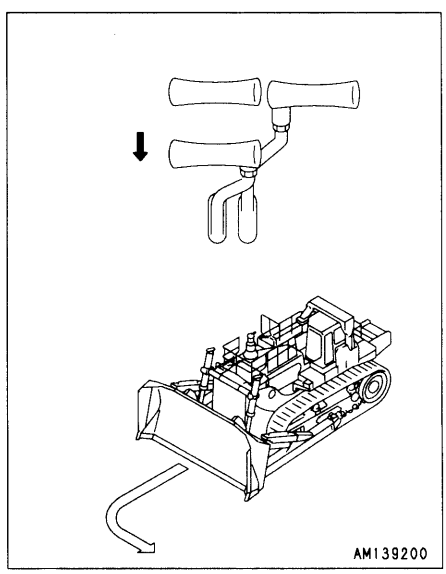

- **Making sharp turns to left while traveling forward**

Pull the L.H. steering lever all the way backward. The steering clutch will be disengaged and the steering brake will be applied.

**REMARK**

To make a pivot right turn, manipulate the R.H. steering lever in the same manner as described above.

Do the same when traveling in reverse.



## 12.7.2 TURNING WHILE DESCENDING A SLOPE

**⚠ WARNING**

**On steep downhill slopes where the machine may travel under its own weight, or on downhill slopes where it is being pushed by a towed machine, the machine will steer in the opposite direction, so do as follows.**

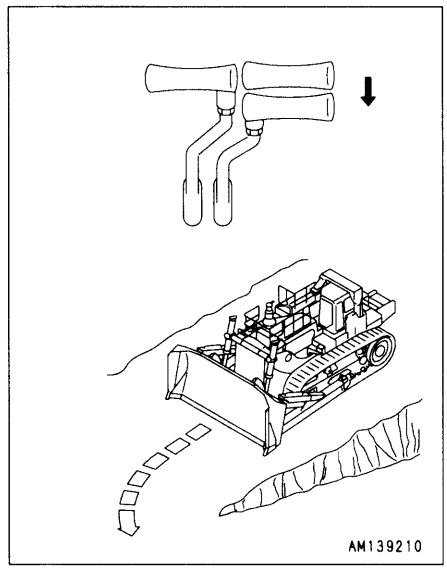
- **Making gradual turns to left while traveling forward**

Pull the R.H. steering lever halfway to its stroke end. The machine will make a gradual left turn (compensation steering).

**REMARK**

To make a gradual right turn, manipulate the L.H. steering lever in the same manner as described above.

Do the same when traveling in reverse.



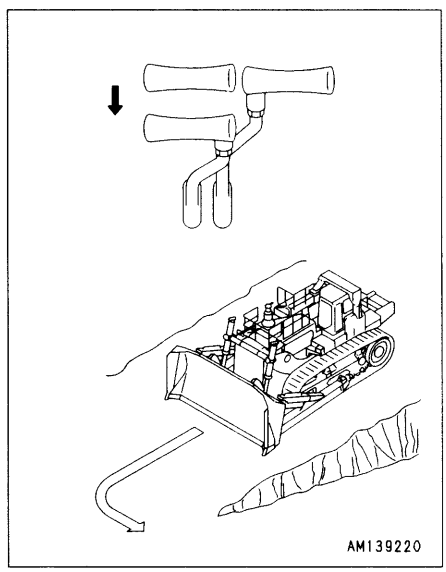

- **Making sharp turns to left while traveling forward**

Pull the L.H. steering lever all the way backward. Then, the machine will make a pivot left turn (no compensation steering).

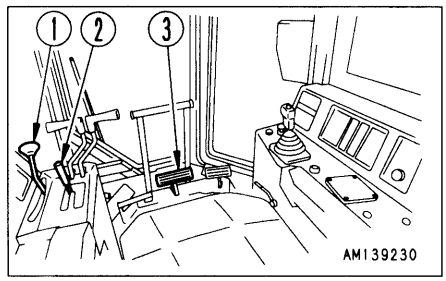
**REMARK**

To make a pivot right turn, manipulate the R.H. steering lever in the same manner as described above.

Do the same when traveling in reverse.



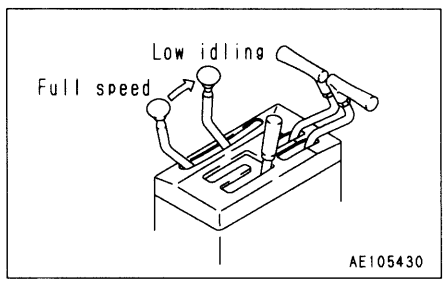
## 12.8 STOPPING MACHINE



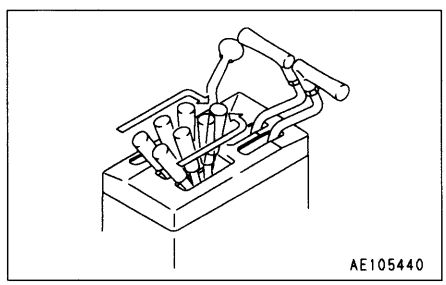

**⚠ WARNING**

- **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, place the brake lock lever in the LOCK position and insert blocks underneath the track shoes. As an additional safety measure, thrust the blade into the ground.**
- **If the blade control lever is touched by accident, the work equipment may move suddenly, and this may lead to a serious accident. Before leaving the operator's seat, always operate the safety lock to place it securely at the LOCK position.**

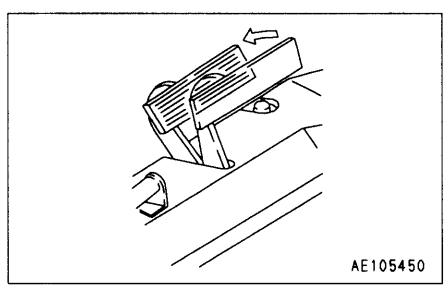
1. Lower engine speed by operating fuel control lever ①.




2. Place gear shift lever ② in N (neutral) position.




3. Depress brake pedal ③ to stop the machine.



# 12.9 PRECAUTIONS FOR OPERATION

## 12.9.1 PAY ATTENTION TO GAUGES

When the red range lights on the power train oil temperature gauge while operating, reduce load and wait for lowering of temperature.

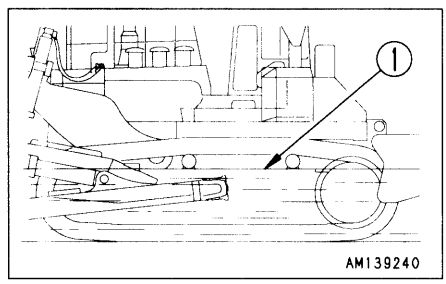
## 12.9.2 METHOD OF USING STEERING CLUTCH

If the steering clutch one side is used frequently or if many gradual turns are made with steering clutch half-engaged, the steering clutch will wear out in a short time. Design the travel road well and steer the machine properly.

## 12.9.3 PERMISSIBLE WATER DEPTH

When operating in water, always keep top surface ① of the track frame above the surface of the water.

Also, be careful that the engine cooling fan will not come in contact with water. The fan can be damaged.




## 12.9.4 PRECAUTIONS WHEN TRAVELING UP OR DOWN HILLS

**Method of using decelerator pedal**

When stepping on the decelerator pedal while going uphill, climbing ability will be reduced and the machine will stop. Furthermore, the engine sometimes will stall.

**Use engine as brake**

When going downhill, shift gear shift lever into low speed to run engine at slow speed and travel down slope using the engine as a brake.

When traveling down hills of more than 15°, shift down to 1st speed (R1 or F1).

**Braking when traveling downhill**

While descending a slope using the engine as a brake, also apply the brakes.

Failure to brake may result in overrunning, causing engine trouble.

## 12.9.5 PRECAUTIONS ON SLOPES

**Be careful of fuel level**

If the fuel level in the fuel tank becomes low when working on slopes, the engine may suck in air because of the angle of the machine or the swaying of the machine. If this makes the engine stop, so be careful not to let the fuel level in the fuel tank become too low.

**Be careful of oil level**

When operating machine on sloped areas of more than 20°, fill every place with oil to H level.

**Precautions when engine stops on slopes**

If the engine stops while working or traveling on a hill, immediately depress the brake pedal to bring the machine to a complete stop.

## 12.9.6 METHOD OF USING BRAKES

The following actions cause premature damage to the brakes, so avoid such operations.

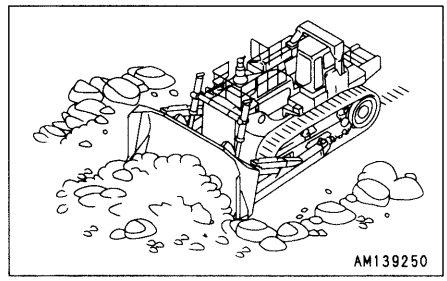
- Using emergency brake at full speed
- Using brake with engine running at full speed in first gear (F1, R1) (Machine stall condition)

**REMARK**

Always depress the decelerator pedal to lower the engine speed before actuating the brakes.

## 12.10 PROHIBITED OPERATIONS WITH A SUPER-DOZER

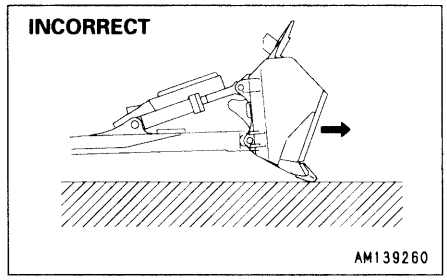
A super-dozer is suitable for a long distance soil shoving operation exceeding 50 m (164 ft) on a crushed rock surface or soft soil surface.


AM139250

**NOTICE**

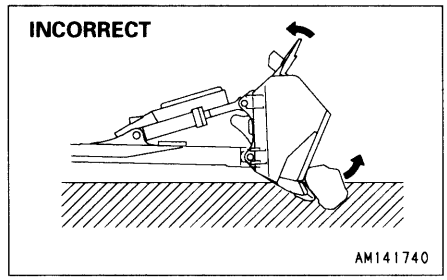
**Do not try to make the following operations.**

- Excavating operation while the equipment is in dumping posture.



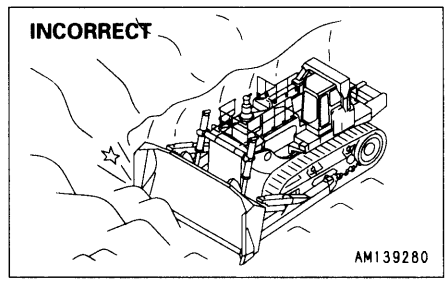
AM139260

- Rock raising operation with the pitch back status.



AM141740

- Side cutting work on a rock bedded ground.
- Rock digging and pushing operations with the side plates of the blade.

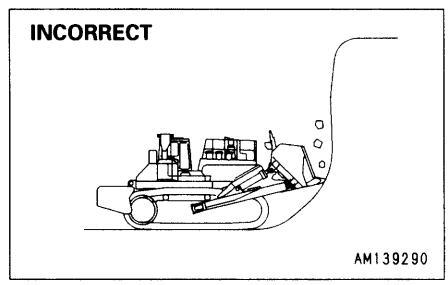


AM139280

**REMARK**

The side plates of the super-blade are installed to prevent soil from spilling during dozing operations. If they are used to dig rocks, they may be deformed.

- Scraping-up operation on rocky face of a slope.



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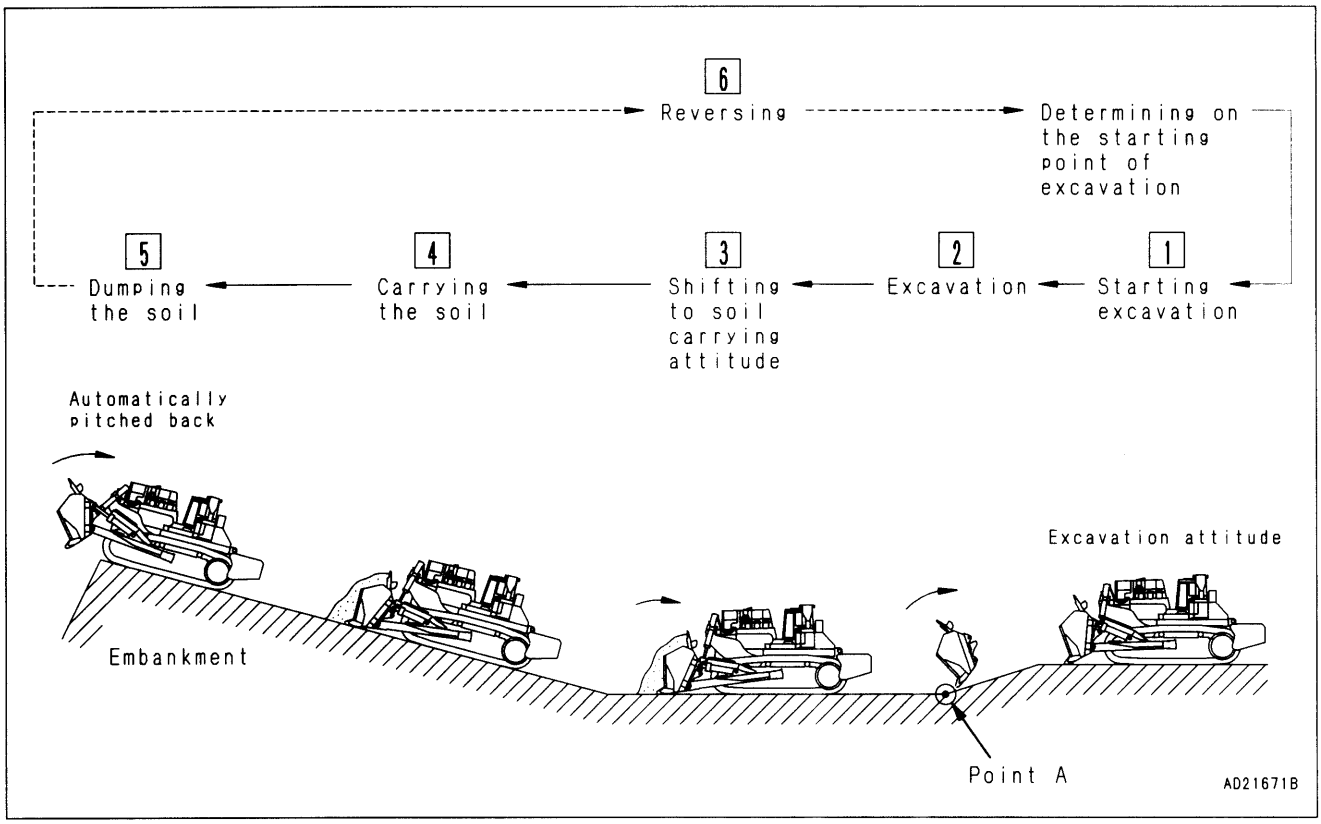
## 12.11 EFFICIENT OPERATIONS OF A SUPER-DOZER

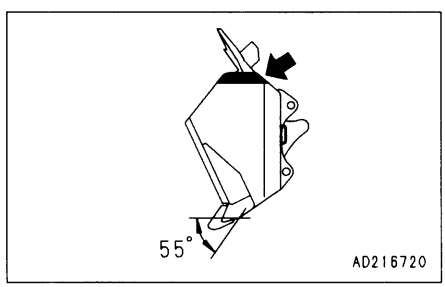



**1. Starting excavation**

**For crushed rocks**

Set the blade angle to 55° to 60° and start excavation.

If the blade does not cut into the rocks deep enough, increase the blade angle (to 60° or over), press the blade against the rocks, and restart excavation.




**For soft soil**

Set the blade to the excavation attitude of 52° to 55° and start excavation.

(When the red line onthe edge of the blade is horizontal, the blade is at 55° (if the blade GL is on the ground).)

**2. Excavation**

**For crushed rocks**

Pitch back the blade gradually to bring it to the excavation attitude (52° to 55°)before the blade reaches point A.

"Shifting to soil digging attitude."

If the blade cuts into the rocks so deep that it does not move even if an attempt is made to tilt or it, perform excavation with pitch back.

**For soft soil**

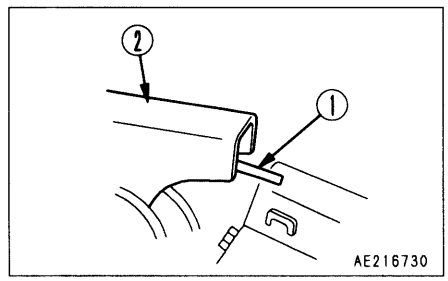
Avoid abrupt excavation so that the surface of excavation road become smooth.

**REMARK**

Abrupt pitch back applise downward force to the blade, indenting the excavation surface. This may make smooth excavation impossible. Caution must therefore be exercised.

**3. Shifting to soil carrying attitude**

When soil or rocks are visible from the top of blade (though the openings in the spill guard), pitch back the blade gradually to bring it to the soil-callying attitude.




**REMARK**

When the excess pitch back preventive stopper ① located at the right pitch cylinder is in contact with the pitch cylinder protective cover ②, the blade is in the soil-carrying attitude.

Further pitch back simply tilts the blade to the left.

**4. Carrying the soil**

When carrying the soil, adjust load so that rocks do not fall from the top of the spill guard and that the L/U is not cut off.

When pushing up the soil, make sure that the blade is fully in the soil-carrying attitude before the vehicle enters the slope.

**REMARK**

It is difficult to finish the surface of the soil-carrying road smooth if the blade angle is changed while the vehicle is on the slope in the soil-carrying section.

**5. Dumping the soil**

When dumping the soil, repeat the blade inching up operation and pitch dumping ooperation alternately.

The pitch dumping operation should be performed so as not to take back the soil or rocks; unnecessary pitch dumping should be avoided.

**6. Reversing the vehicle**

Concurrently with dumping the soil, shift the gear to R1 or R2 and raise the blade lever until the stroke end is reached.(The blade automatically returns to the excavation attitude.)

**REMARK**

The blade automatically returns to the excavation attitude only when the pitch dumping operation is performed to bring the blade to the excavation attitude. (55° or over)

**Automatic restting to the excavation mode**

System for automatically returning the blade angle to the excavation attitude.

After dozing the soil with the lever in F1 or F2 (with a load of 0.3 w or more applied), shift the transmission lever to R1 or R2 raise the blade lever until the stroke end is reached.

This automatically returns the blade to the excavation attitude. (55° when it is on the ground)

# 12.12 ADJUSTMENT OF WORK EQUIPMENT

**⚠ WARNING**

**When adjusting, it is dangerous if the work equipment is moved by mistake. Set the work equipment in a safe condition, then stop the engine and lock the work equipment securely with the safety lock.**

## 12.12.1 ADJUSTMENT OF THE TILT LIMIT

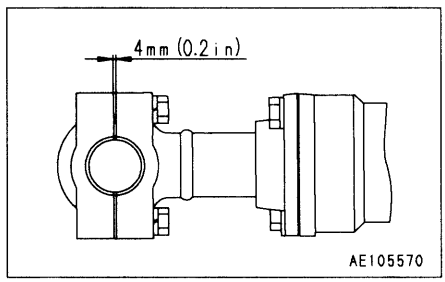
When reassembling the work equipment after detaching it from the vehicle, contact your Komatsu distributor for adjustment of the tilt limit.

### ADJUSTING SHIM IN BLADE CYLINDER CAP

Set the standard shim adjustment in the blade cylinder cap to 4 mm (0.16 in).

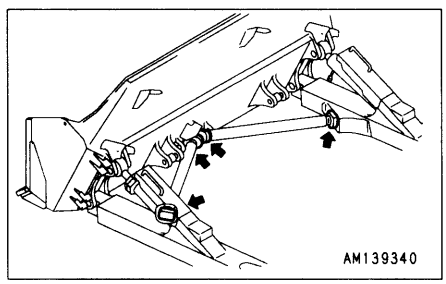
Remove shims to balance the wear of the cap and the ball at the end of the piston rod.

The proper clearance to be maintained with the shims is 0.5 to 1.0 mm (0.02 to 0.04 in).

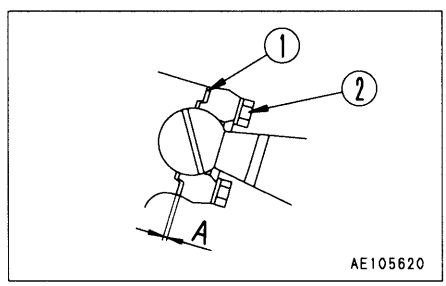



### ADJUSTING SHIM IN OBLIQUE ARM BALL JOINT

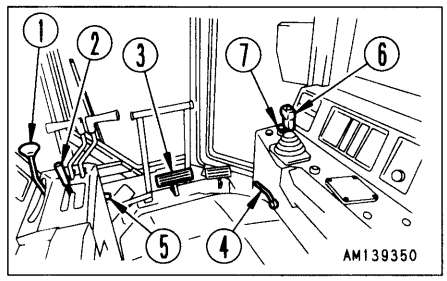
Adjust the thickness of shim so that the ball joint play (4 points) in the axial direction (shown by the arrow) does not exceed 1 mm (0.04 in).




1. Remove shim ① and tighten bolts ② to eliminate the ball joint play.
2. Measure clearance "A" and remove bolts ②.
3. Install shim ① having its thickness of "A" mm to "A + 1" mm ("A" in. to "A + 0.04" in) in place with bolts ②.
4. Confirm that ball joint can move smoothly after tightening bolts.



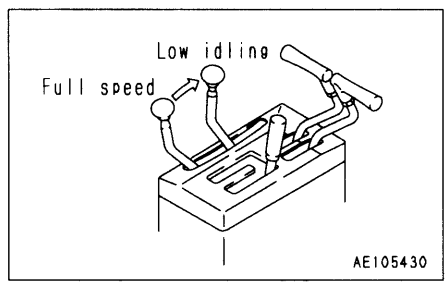
## 12.13 PARKING MACHINE



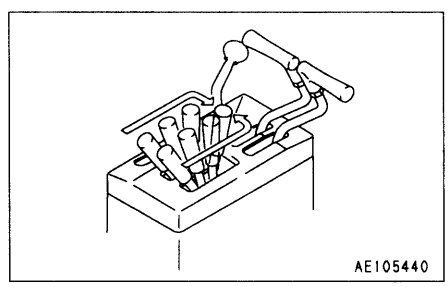

**⚠ WARNING**

- **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, place the brake lock lever in the LOCK position and insert blocks underneath the track shoes. As an additional safety measure, thrust the blade into the ground.**
- **If the blade control lever is touched by accident, the work equipment may move suddenly, and this may lead to a serious accident. Before leaving the operator's seat, always operate the safety lock to place it securely at the LOCK position.**

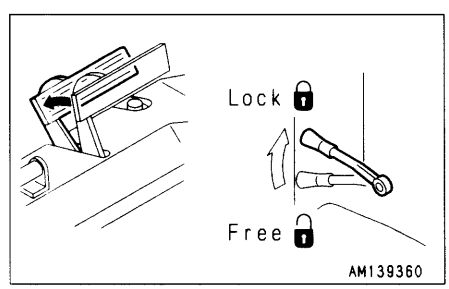
1. Lower engine speed by operating fuel control lever ①.



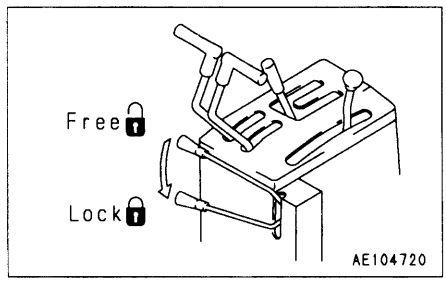

2. Place gear shift lever ② in N (neutral) position.



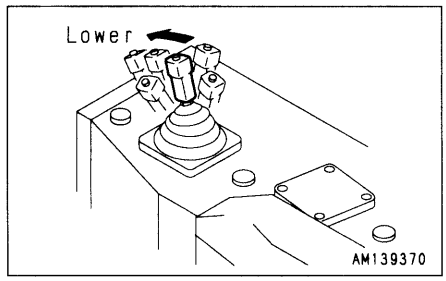

3. Depress brake pedal ③ to stop the machine and lock the brakes with brake lock lever ④.



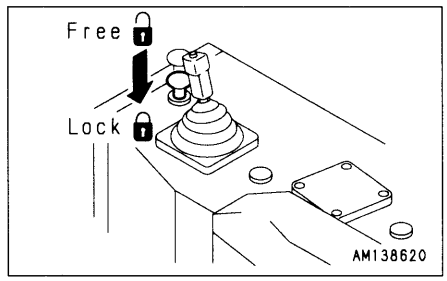

4. Lock gear shift lever with safety lever ⑤.



5. Put blade control lever ⑥ in the LOWER positions to lower blade to the ground.

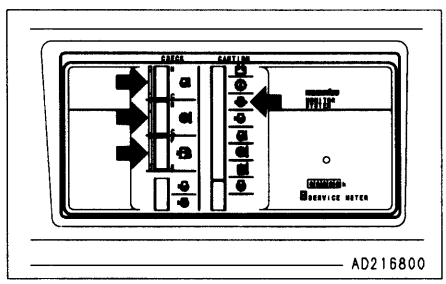



6. Lock blade control lever ⑥ with safety lock ⑦.

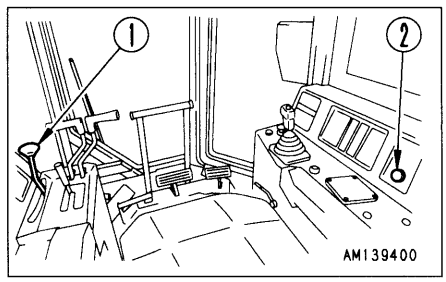



## 12.14 CHECK AFTER FINISHING WORK

1. Check the gauges and caution lamps for engine water temperature, engine oil pressure, fuel level and power train oil temperature.



## 12.15 STOPPING ENGINE

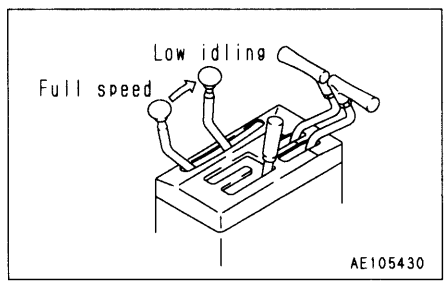



**NOTICE**

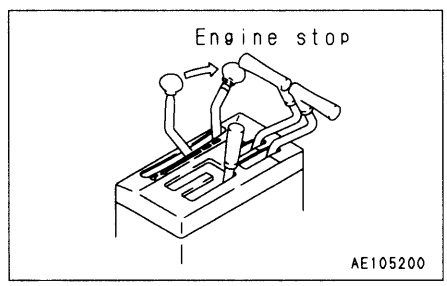
**If the engine is abruptly stopped before it has cooled down, engine life may be greatly shortened. Consequently, do not abruptly stop the engine apart from an emergency.**

**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.**

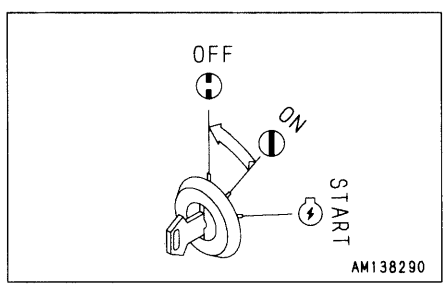
1. Place fuel control lever ① in the low idling position and run the engine at low idling speed for about 5 minutes to allow it to gradually cool down.




2. Push fuel control lever ① in the engine stop position and stop the engine.




3. Turn the key in starting switch ② to the OFF position and remove the key.



## 12.16 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.

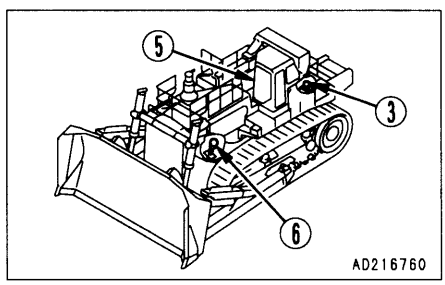
3. Check the engine compartment for paper and debris. Clean out any paper and debris to avoid a fire hazard.

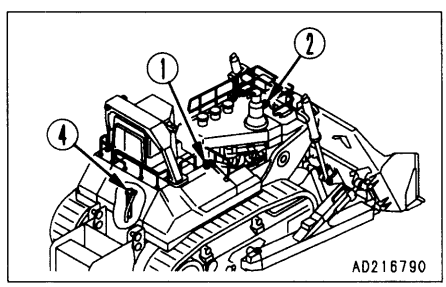
4. Remove any mud stuck to the undercarriage.

## 12.17 LOCKING

To prevent vandalism, there are locks at the following places. Places that can be locked with the starting switch key.

- Fuel tank cap ①
- Radiator cap ②
- Hydraulic tank filler cap ③
- Power train filler cap ④
- Cab door opener ⑤
  Commercially available locks can be fitted to the following places.
- Engine oil filler cap ⑥ (option)



## 12.18 TIPS FOR LONGER UNDERCARRIAGE LIFE

Undercarriage life greatly varies depending on operation method, inspection and maintenance. For most efficient operation, keep the following point in mind.

### 12.18.1 OPERATION METHOD

- Select the track shoe that best suits the type of soil to be encountered in service.
  Please consult your Komatsu distributor when selecting track shoes.

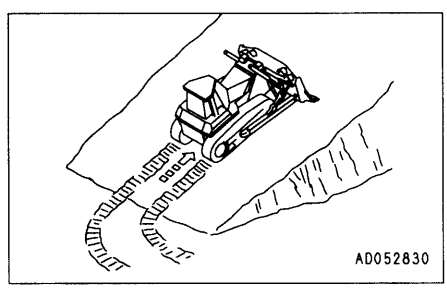
- Do not allow shoe slipping to occur during operation. If shoe slipping occurs, reduce load to the blade until slipping stops.

- Avoid sudden starts, acceleration or stops, unnecessarily high speeds and sharp turns.

- Always operate machine in a straight line whenever possible. When making turns, be careful not to allow the machine to stay to one side, so operation in both turning directions can be done properly. Make turns with the largest possible radius.

- Prior to operation, clear boulders and obstacles to prevent machine from riding over them while operating.

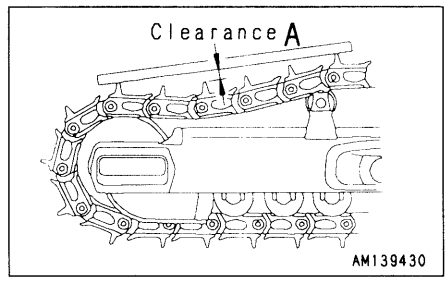
- On a slope, operate the machine parallel to the inclination of the slope. Do not operate across the slope. Also when stopping the machine on a slope, the machine should face toward the top of the slope.




- When ground inclines to left or right during digging operation, do not continue to dig with machine inclined. Move machine back to level ground and start to dig again.

- Do not force the machine to carry out work that exceeds its working capability. Such work includes cases where the idler or sprocket come off the ground when the machine meets obstacles that resist the power of the machine during dozing operations.

## 12.18.2 INSPECTION AND ADJUSTMENT




- Properly adjust track tension.
  Tension should be measured at clearance Ⓐ shown in the diagram – usually 20 to 30 mm (0.8 to 1.2 in) at this point. For rocky terrain, tighten tracks slightly. In clay or sandy areas, slightly loosen them. (For inspection and adjustment procedures, refer to "24.2 WHEN REQUIRED").

- Check idler rollers for oil leakage as well as for loose bolts and nuts. If any trouble is detected, repair immediately.

## 12.18.3 INSPECTION AND REPAIR

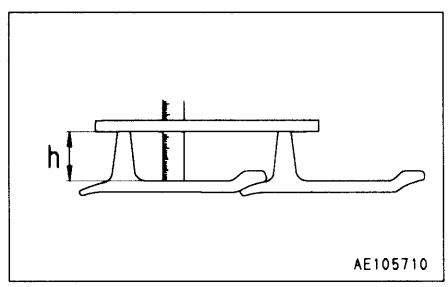
Frequent inspection and prompt repair will reduce repair costs.

The following items for inspection will serve as a guide to maintenance service of each undercarriage part. Perform periodical inspection and contact the Komatsu distributor in your area when machine has approached repairable limits and reversing limits.

### MEASURING HEIGHT OF GROUSER

After taking up slack in track shoes, measure height at center of shoe as shown below.

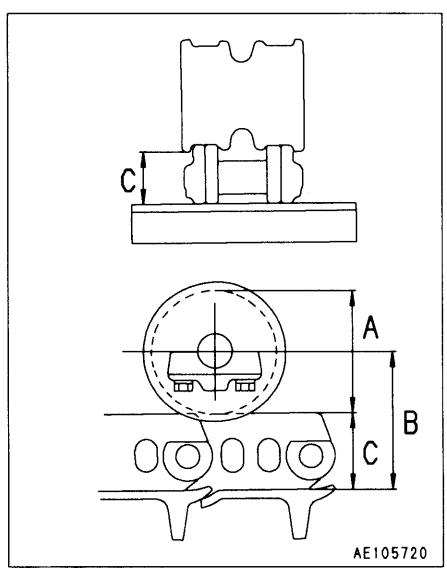
Standard height (h): 105 mm (4.1 in)
Repair limits: 30 mm (1.2 in)




### MEASURING OUTSIDE DIAMETER OF TRACK ROLLER

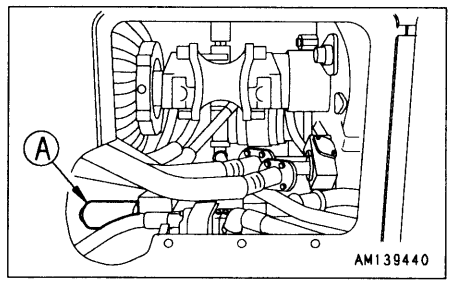
1. Measure height (size C) of link tread as shown.
2. Stop machine at position where link tread, whose size C has been measured completely, contacts roller tread. Then measure size B.
3. Calculate outside diameter of tread (size A):
   A = (B – C) x 2

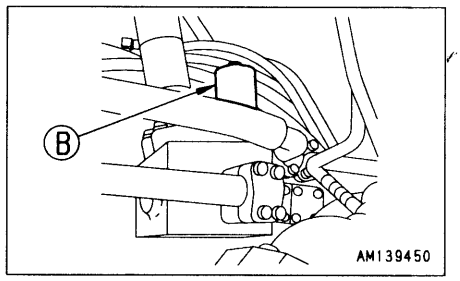
Standard size (A): 325 mm (12.8 in)
Repair limits: 289 mm (11.4 in)

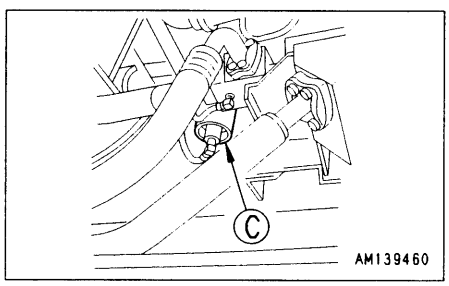


# 13. HANDLING ACCUMULATOR

The accumulators are located beside the blade valve (at 2 places) Ⓐ, Ⓑ on the RH side of the vehicle and on the side of the main frame (at 1 place) Ⓒ on the LH side of the vehicle.



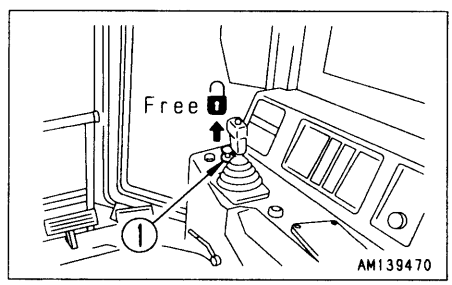

**⚠ WARNING**

**The accumulator is filled with high-pressure nitrogen gas, and it is extremely dangerous if it is handled in the wrong way. Always observe the following precautions.**

- **If there is any failure or problem with the accumulator, contact your Komatsu distributor immediately.**
- **The charging of the gas should be carried out only by a Komatsu distributor serviceman or by a person licensed to handle high-pressure gas.**
- **Do not hit or bring an accumulator charged with gas near any flame.**
- **Do not weld any piping or make any hole in the accumulator.**
- **When disposing of the accumulator, it is necessary to release the gas from the accumulator, so please contact your Komatsu distributor.**

Once a year, contact your Komatsu distributor to have the gas pressure checked.

## 13.1 RELEASING REMAINING PRESSURE IN ACCUMULATOR CIRCUIT




After stopping the engine, set safety lock ① to the FREE position, then operate each work equipment control lever 3 or 4 times to the end of its stroke. The remaining pressure will be released after one minute.

**REMARK**

Always wait for at least one minute after releasing the pressure. Never start to loosen any piping before one minute has passed.

# 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.**

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.

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

## 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.

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 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 concrete or hard ground. If this is impossible, park the machine on wooden boards.
- Open the drain valve and drain any water collected in the fuel system to prevent it 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.

## 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

When putting the machine in storage for more than one month, do as follows.

- After every part is washed and dried, the machine shall be housed in a dry building. Never leave it outdoors.
  In case it is indispensable to leave it outdoors, park the machine on the flat ground and cover it with canvas etc.

- 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 and the idler adjusting 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 work equipment control lever with the safety lock, and place the fuel control lever in the ENGINE STOP position.
  Lock the brake pedal with brake lock lever and remove the key of starting switch, use blocks to stop the machine from moving.

## 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.

- Before operating the work equipment, wipe off the grease on the hydraulic piston rod.

## 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.

# 16. TROUBLESHOOTING

## 16.1 AFTER RUNNING OUT OF FUEL

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

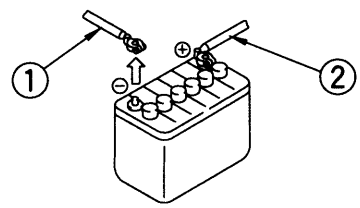
For details of bleeding the air, see "24.5 EVERY 500 HOURS SERVICE".

## 16.2 IF BATTERY IS DISCHARGED

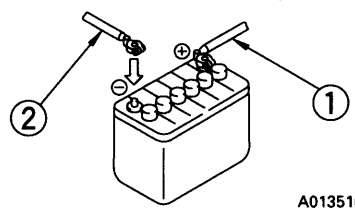
**⚠ WARNING**

- **When checking or handling the battery, stop the engine and turn the starting key to the OFF position before starting.**
- **Do not use or charge the battery if the battery electrolyte level is below the LOWER LEVEL line. This may cause an explosion. Always check the battery electrolyte level periodically and add distilled water to bring the electrolyte level to the UPPER LEVEL line.**
- **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 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, disconnect the cable from the ground terminal first.




When installing, connect the cable to the positive ⊕ terminal first.

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## 16.2.1 STARTING ENGINE WITH BOOSTER CABLE

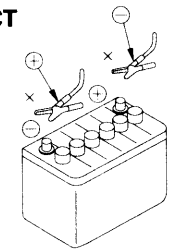
When starting the engine with a booster cable, do as follows:

### 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.**
- **Make sure that there is no mistake in the booster cable connections. The final connection is to the engine block of the problem machine, but sparks will be generated when this is done, so connect to a place as far as possible from the battery.**

**INCORRECT**



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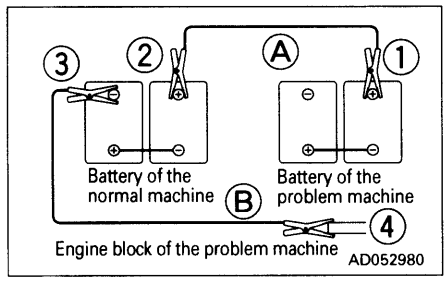
**NOTICE**

- **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.

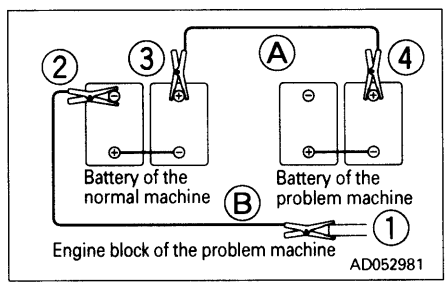
1. Make sure that the starting switches of the normal machine and problem machine are both at the OFF position.
2. Connect one clip of booster cable Ⓐ to the positive ⊕ terminal of the problem machine.
3. Connect the other clip of booster cable Ⓐ to the positive ⊕ terminal of the normal machine.
4. Connect 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 doesn't 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 positive ⊕ terminal of the normal machine.
4. Remove the other clip of booster cable Ⓐ from the positive ⊕ terminal of the problem machine.

## 16.3 OTHER TROUBLE

- (  ): 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.

### 16.3.1 ELECTRICAL SYSTEM

| Problem | Main causes | Remedy |
|---|---|---|
| Lamp does not glow brightly even when the engine runs at high speed | • Defective wiring<br>• Defective adjustment of fan belt tension | (• Check, repair loose terminals, disconnections)<br>• Adjust alternator drive belt tension For details, see EVERY 250 HOURS SERVICE |
| Lamp flickers while engine is running | | |
| Charge lamp does not go out even when engine is running | • Defective alternator<br>• Defective wiring | (• Replace)<br>(• 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<br>• Insufficient battery charge | (• Check, repair)<br>• Charge |
| Pinion of starting motor keeps going in and out | • Insufficient battery charge | • Charge |
| Starting motor turns engine sluggishly | • Insufficient battery charge<br>• Defective starting motor | • Charge<br>(• Replace) |
| Starting motor disengages before engine starts | • Defective wiring<br>• Insufficient battery charge | • (Check, repair)<br>• Charge |
| Oil pressure monitor lamp does not light up when engine is stopped (starting switch at ON position) | • Defective monitor lamp<br>• Defective wiring<br>• Defective sensor | (• Replace)<br>(• Check, repair)<br>(• Replace) |
| Charge lamp does not light up when engine is stopped (starting switch at ON position) | • Defective charge monitor<br>• Defective wiring | (• Replace)<br>(• Check, repair) |

## 16.3.2 CHASSIS

| Problem | Main causes | Remedy |
|---|---|---|
| Oil pressure in torque converter fails to rise | • Improper tightening of oil pipe, pipe joint, air leaking in or oil leaking out because of damage | (• Check, repair) |
| | • Wear, scuffing of gear pump | (• Check, replace) |
| | • Insufficient oil in transmission case | • Add oil to the specified level. For details, see CHECK BEFORE STARTING |
| | • Clogged oil filter element strainer in transmission case | • Clean. For details, see EVERY 1000 HOURS SERVICE |
| Torque converter is overheats | • Clogged radiator | (• Clean or replace) |
| | • Clogged oil cooler | (• Clean or replace) |
| | • Oil pressure too low | • Go to "Oil pressure in torque converter fails to rise" |
| | • Lack of flow of lubricant caused by wear of power train gear pump | (• Replace gear pump) |
| Torque converter oil temperature gauge does not work | • Defective oil temperature gauge | (• Replace oil temperature gauge) |
| | • Defective contact in wiring connection | (• Check, repair) |
| Lacks drawbar pull (machine does not pick up speed) | • Lack of engine horsepower | • See Engine related parts |
| | • Oil pressure in torque converter is too low | • Go to "Oil pressure in torque converter fails to rise" |
| | • Steering clutch is slipping | (• Check, repair) |
| Machine doesn't start by engaging the gear shift lever | • Lack of oil in steering clutch case | • Add oil to the specified level. For details, see CHECK BEFORE STARTING |
| | • Transmission oil pressure does not rise | • Go to "Oil pressure in torque converter fails to rise" |
| | • Steering clutch slips<br>○ Wear, scuffing of gear pump<br>○ Clogged oil strainer element in steering clutch case | (○ Check, replace)<br>○ Clean. For details, see EVERY 1000 HOURS SERVICE |
| When steering lever on one side is pulled, machine continues to travel straight forward instead of turning | • Brake is not applied on side which is pulled | (• Adjust linkage)<br>(• Check brake pressure) |
| Machine doesn't stop when brake pedal are depressed | • Defective brake adjustment | (• Adjust linkage)<br>(• Check brake pressure) |
| Track comes off | • Track is too loose | • Adjust track tension. For details, see WHEN REQUIRED. |
| Sprocket develops abnormal wear | • Track is too loose or too tight | • Adjust track tension. For details, see WHEN REQUIRED. |
| Brake rises too slowly or does not rise at all (or blade tilts too slowly) | • Lack of hydraulic oil | • Add oil to specified level. For details, see EVERY 250 HOURS SERVICE |

## 16.4.3 ENGINE

| Problem | Main causes | Remedy |
|---|---|---|
| Engine oil pressure monitor flashes when engine speed is raised after completion of warm-up | • Engine oil pan oil level is low (sucking in air)<br>• Clogged oil filter cartridge<br>• Defective tightening of oil pipe joint, oil leakage from damaged part<br>• Defective monitor | • Add oil to specified level, see CHECK BEFORE STARTING<br>• Replace cartridge, see EVERY 250 HOURS SERVICE<br>(• Check, repair)<br>(• Replace) |
| Steam is emitted from top part of radiator (pressure valve) | • Cooling water level low, water leakage<br>• Dirt or scale accumulated in cooling system<br>• Clogged radiator fin or damaged fin<br>• Defective thermostat<br>• Loose radiator filler cap (high altitude operation) | • Add cooling water, repair, see CHECK BEFORE STARTING<br>• Change cooling water, clean inside of cooling system, see WHEN REQUIRED<br>• Clean or repair, see WHEN REQUIRED<br>(• Replace thermostat)<br>• Tighten cap or replace packing |
| Engine water temperature monitor remains alight | • Defective water temperature monitor | (• Replace) |
| Engine does not start when starting motor is turned | • Lack of fuel<br>• Air in fuel system<br>• Defective fuel injection pump or nozzle<br>• Starting motor cranks engine sluggishly<br>• Defective compression<br>○ Defective valve clearance | • Add fuel, see CHECK BEFORE STARTING<br>• Repair place where air is sucked in<br>(• Replace pump or nozzle)<br>• See ELECTRICAL SYSTEM<br>(○ Adjust valve clearance) |
| Exhaust gas is white or blue | • Too much oil in oil pan<br>• Improper fuel | • Add oil to specified level, see CHECK BEFORE STARTING<br>• Change to specified fuel |
| Exhaust gas occasionally turns black | • Clogged air cleaner element<br>• Defective nozzle<br>• Defective compression<br>• Defective turbocharger | • Clean or replace, see WHEN REQUIRED<br>(• Replace nozzle)<br>(• Adjust valve clearance)<br>(• 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<br>• Overheating<br>• Damage inside muffler<br>• Excessive valve clearance | • Change to specified fuel<br>• See item "Engine water temperature monitor flashes".<br>(• Replace muffler)<br>(• Adjust valve clearance) |

# MAINTENANCE

# 17. GUIDES TO MAINTENANCE

Do not carry out any inspection and maintenance 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 any necessary maintenance to be carried out.

**Komatsu genuine replacement parts:**
Use Komatsu genuine parts specified in the parts list 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.

**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 is 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 (68 – 104°F)) before draining it.

**Checking foreign materials in drained oil:**
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 the 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 stuck to the machine.

**Welding instructions:**
- Turn off the engine starting switch.
- Do not apply more than 200 V continuously.
- Connect grounding the 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.

**Fire prevention:**
Use nonflammable cleaner or light oil for cleaning parts. Keep flame or cigarette light away from light oil.

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

**Cleaning machine:**
- Do not direct a high-pressure jet directly at the radiator.
- Do not splash water over the electrical equipment.

**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 worksites:**
When working at dusty worksites, do as follows:
- Check the air cleaner for clogging more frequently. Clean the air cleaner at shorter intervals than specified.
- Clean the radiator core 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 oils:**
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 replace 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<br>API classification CD |
| Power train oil pan (incl. transmission, torque converter and bevel gear cases)<br>Damper case | SAE 30<br>API classification CD |
| Final drive case | SAE 140<br>API classification CD |
| Hydraulic tank | SAE 10W<br>API classification CD |
| Fuel tank | ASTM D975 No. 2<br>(However, ASTM D975 No. 1 is used for the winter season (October to March)) |
| Radiator | Komatsu Super Coolant<br>(AF-ACL) 40% 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 entry 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 of 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 (below 5°F)), 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.
- Komatsu machines 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 "24.2.1 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 a 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 first in _ first out (use the oldest oil or 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 (cartridge type) and use them again. Always replace with new filters.
- When replacing oil filters, check if 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.

## 18.2 RELATING TO 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.
- Services relating to the electric system are (1) check of fan belt tension, (2) check of damage or wear 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.
- When working on the seashore, carefully clean the electric system to prevent corrosion.
- Never connect any optional power source to the fuse, starting switch, battery relay, etc.

# 19. WEAR PARTS LIST

Wear parts such as the filter element, cutting edge, 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.

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

| Item | Part No. | Part Name | Weight | Q'ty | Replacement frequency |
|---|---|---|---|---|---|
| Engine oil full flow filter | 600-211-1231 | Cartridge | 1.25 kg (2.76 lb) | 4 | Every 250 hours service |
| Engine oil by-pass filter | 600-212-1511 | Cartridge | 1.50 kg (3.31 lb) | 3 | |
| Transmission filter | 07063-01210<br>(07000-35180) | Element<br>(O-ring) | –<br>– | 1<br>(1) | Every 500 hours service |
| Transmission lubricating filter | 07063-01210<br>(07000-35180) | Element<br>(O-ring) | – | 1<br>(1) | |
| Torque converter filter | 07063-01210<br>(07000-35180) | Element<br>(O-ring) | –<br>– | 1<br>(1) | |
| Fuel filter | 600-311-7111 | Cartridge | 1.70 kg (3.75 lb) | 3 | |
| Corrosion resistor | 600-411-1171 | Cartridge | 1.90 kg (4.19 lb) | 2 | |
| Hydraulic oil filter | 07063-01210<br>(07000-05175) | Element<br>(O-ring) | –<br>– | 2<br>(2) | Every 2000 hours service |
| PPC filter | 101-60-15171<br>(07000-02075) | Element<br>(O-ring) | –<br>– | 1<br>(1) | |
| Final driver filter | 101-60-15171<br>(07000-02095) | Element<br>(O-ring) | –<br>– | 2<br>(2) | |
| Air cleaner | 6128-81-7042 | Element ass'y | 28.0 kg (61.74 lb) | 3 | – |
| | 600-181-4400 | Outer element ass'y | 6.0 kg (13.23 lb) | 3 | |
| Ether cylinder | 6710-81-4231 | Cartridge | 2.5 kg (5.51 lb) | 1 | |
| Blade | 19M-72-11241<br>19M-72-11231<br>(19M-09-13130)<br>(01643-33690)<br>(19M-09-13140)<br>19M-72-13210<br>19M-72-21260<br><br><br>19M-72-13220<br>(19M-09-11391)<br>(01643-33690)<br>(19M-09-13140) | Cutting edge<br>Cutting edge<br>(Bolt)<br>(Washer)<br>(Nut)<br>End bit (left)<br>Cutting edge<br>(for crushed rock surface application)<br>End bit (right)<br>(Bolt)<br>(Washer)<br>(Nut) | 157 kg (346 lb)<br>179 kg (395 lb)<br>–<br>–<br>–<br>178 kg (393 lb)<br>110 kg (243 lb)<br><br><br>190 kg (419 lb)<br>–<br>–<br>– | 2<br>2<br>(40)<br>(40)<br>(40)<br>1<br>2<br><br><br>1<br>(16)<br>(16)<br>(16) | |
| Car stereo | 195-Z11-3940 | Battery | – | 1 | |

**NOTICE**

**When handling parts that weight more than 20 kg (44 lb), remember that they are heavy objects, and take the necessary care.**

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

## PROPER SELECTION OF FUEL, COOLANT AND LUBRICANTS

| RESERVOIR | KIND OF FLUID | AMBIENT TEMPERATURE<br>-22 -4 14 32 50 68 86 104°F<br>-30 -20 -10 0 10 20 30 40°C | CAPACITY | |
|---|---|---|---|---|
| | | | Specified | Refill |
| Engine oil pan | Engine oil | SAE 30<br>SAE 10W<br>SAE 10W-30<br>SAE 15W-40 | 137 ℓ<br>36.2 US gal<br>30.1 UK gal | 127.5 ℓ<br>33.7 US gal<br>28.1 UK gal |
| Power train oil pan (incl. transmission, torque converter and bevel gear cases) | | SAE 30<br>SAE 10W | 490 ℓ<br>129 US gal<br>108 UK gal | 345 ℓ<br>91.1 US gal<br>75.9 UK gal |
| Damper case | | SAE 30 | 2.4 ℓ<br>0.63 US gal<br>0.53 UK gal | 2.4 ℓ<br>0.63 US gal<br>0.53 UK gal |
| Hydraulic system | | SAE 10W | 700 ℓ<br>185 US gal<br>154 UK gal | 300 ℓ<br>79.2 US gal<br>66.0 UK gal |
| Final drive case | Gear oil | SAE 140<br>SAE 85W-140<br>SAE 80 | (each)<br>160 ℓ<br>42.2 US gal<br>35.2 UK gal | (each)<br>160 ℓ<br>42.2 US gal<br>35.2 UK gal |
| Fuel tank | Diesel fuel | ASTM D975 No.2<br>※ | 2100 ℓ<br>554 US gal<br>462 UK gal | - |
| Cooling system | Water | Add antifreeze | 298 ℓ<br>78.7 US gal<br>65.6 UK gal | - |
| Gear coupling | Gear oil | JIS K 2219 2Type<br>ISO VG680 | 1.5 ℓ<br>0.4 US gal<br>0.33 UK gal | 1.5 ℓ<br>0.4 US gal<br>0.33 UK gal |

※ 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 SAE10W, SAE10W-30 and SAE15W-40, even though an atmospheric temperature goes up to 10°C more or less in the day time.

- Use API classification CD 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 (SAE10W-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 needed to refill system during normal inspection and maintenance.

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

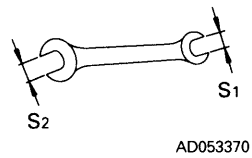
| No. | Supplier | **Engine Oil [CD or CE]** SAE10W, 30, 40 10W30, 15W40 (The 15W40 oil marked * is CE.) | **Gear Oil [GL-4 or GL-5]** SAE80, 90, 140 | **Grease [Lithium-Base]** NLGI No. 2 | **Anti-freeze Coolant [Ethylene Glycol Base] Permanent Type** |
|---|---|---|---|---|---|
| 1 | KOMATSU | EO10-CD<br>EO30-CD<br>EO10-30CD<br>EO15-40CD | GO90<br>GO140 | G2-LI<br>G2-LI-S | AF-ACL<br>AF-PTL<br>AF-PT (Winter, one season type) |
| 2 | AGIP | Diesel sigma S<br>Super dieselmulti-grade<br>*Sigma turbo | Rotra MP | GR MU/EP | - |
| 3 | AMOCO | *Amoco 300 | Multi-purpose gear oil | RYKON prenium grease | - |
| 4 | ARCO | *Arcofleet S3 plus | Arco HD gear oil | Litholine HEP 2<br>Arco EP moly D | - |
| 5 | BP | Vanellus C3 | Gear oil EP<br>Hypogear EP | Energrease LS-EP2 | Antifreeze |
| 6 | CALTEX | *RPM delo 400<br>RPM delo 450 | Universal thuban<br>Universal thuban EP | Marfak all purpose 2<br>Ultra-duty grease 2 | AF engine coolant |
| 7 | CASTROL | *Turbomax<br>*RX super<br>CRD | EP<br>EPX<br>Hypoy<br>Hypoy B<br>Hypoy C | MS3<br>Spheerol EPL2 | Anti-freeze |
| 8 | CHEVRON | *Delo 400 | Universal gear | Ultra-duty grease 2 | - |
| 9 | CONOCO | *Fleet motor oil | Universal gear lubricant | Super-sta grease | - |
| 10 | ELF | Multiperformance 3C<br>Performance 3C | - | Tranself EP<br>Tranself EP type 2 | Glacelf |
| 11 | EXXON (ESSO) | Essolube D3<br>*Essolube XD-3<br>*Essolube XD-3 Extra<br>*Esso heavy duty<br>Exxon heavy duty | Gear oil GP<br>Gear oil GX | Beacon EP2 | All season coolant |
| 12 | GULF | Super duty motor oil<br>*Super duty plus | Multi-purpose gear lubricant | Gulfcrown EP2<br>Gulfcrown EP special | Antifreeze and coolant |
| 13 | MOBIL | Delvac 1300<br>*Delvac super<br>10W-30, 15W-40 | Mobilube GX<br>Mobilube HD | Mobilux EP2<br>Mobilgrease 77<br>Mobilgrease special | - |

| No. | Supplier | **Engine Oil [CD or CE]** SAE10W, 30, 40 10W30, 15W40 (The 15W40 oil marked * is CE.) | **Gear Oil [GL-4 or GL-5]** 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-purpose 4092<br>Multi-purpose 4140 | Multi-purpose white grease 705<br>707L White – bearing grease | Anti-freeze and summer coolant |
| 15 | PETROFINA | FINA kappa TD | FINA potonic N<br>FINA potonic NE | FINA marson EPL2 | FINA tamidor |
| 16 | SHELL | Rimula X | Spirax EP<br>Spirax heavy duty | Alvania EP grease | – |
| 17 | SUN | – | Sunoco GL5 gear oil | Sunoco ultra prestige 2EP<br>Sun prestige 742 | Sunoco antifreeze and summer coolant |
| 18 | TEXACO | *Ursa super plus<br>Ursa premium | Multigear | Multifak EP2<br>Starplex 2 | Code 2055 startex antifreeze coolant |
| 19 | TOTAL | Rubia S<br>*Rubia X | Total EP<br>Total transmission TM | Multis EP2 | Antigel/antifreeze |
| 20 | UNION | *Guardol | MP gear lube LS | Unoba EP | – |
| 21 | VEEDOL | *Turbostar<br>*Diesel star<br>MDC | Multigear<br>Multigear B<br>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 set | 09000-30006 | Applicable width across flats ($S_1$ – $S_2$)<br>8 mm – 10 mm, 12 mm – 14 mm<br>13 mm – 17 mm, 19 mm – 22 mm<br>24 mm – 27 mm, 30 mm – 32 mm<br>  |
| 2 | Screwdriver | 09033-00190 | Interchangeable flat-head and cross-head type |
| 3 | Socket wrench set | 09020-10284 | Applicable width across flats<br>10 mm, 13 mm<br>14 mm, 17 mm<br>19 mm, 22 mm, 24 mm, 27 mm, 30 mm, 32 mm, 36 mm<br>Extension, Handle, Joint |
| 4 | Wrench | 09002-03641 | Applicable wide across flats 36 mm – 41 mm |
| 5 | Socket | 195-98-11590 | Applicable wide across flats 41 mm |
| 6 | Socket | 178-98-11120 | Applicable wide across flats 46 mm |
| 7 | Plier | 09036-00150 | |
| 8 | Hammer | 09039-00150 | |
| 9 | Bar | 09055-10390 | |
| 10 | Filter wrench | 09019-08035 | For filter cartridges |
| 11 | Grease pump | 07952-80002 | For greasing work |
| 12 | Nozzle | 07951-11400 | For grease pump |
| 13 | Grease cartridge | 07950-90403 | (Lithium base grease, 400 g) |
| 14 | Clearance gauge | 09054-00009 | |

If any of the above tools are broken, please order them from your Komatsu distributor.

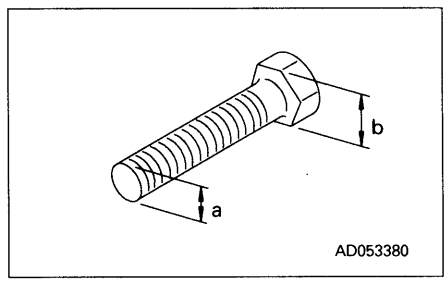
## 21.2 TORQUE LIST

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 ⓑ 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 ≒ 0.1 kgm
≒ 0.74 lbft




| Thread diameter of bolt (mm) (a) | Width across flat (mm) (b) | Ⓣ Ⓗ AD054300 | | |
|---|---|---|---|---|
| | | Nm | kgm | lbft |
| 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 passed, 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.

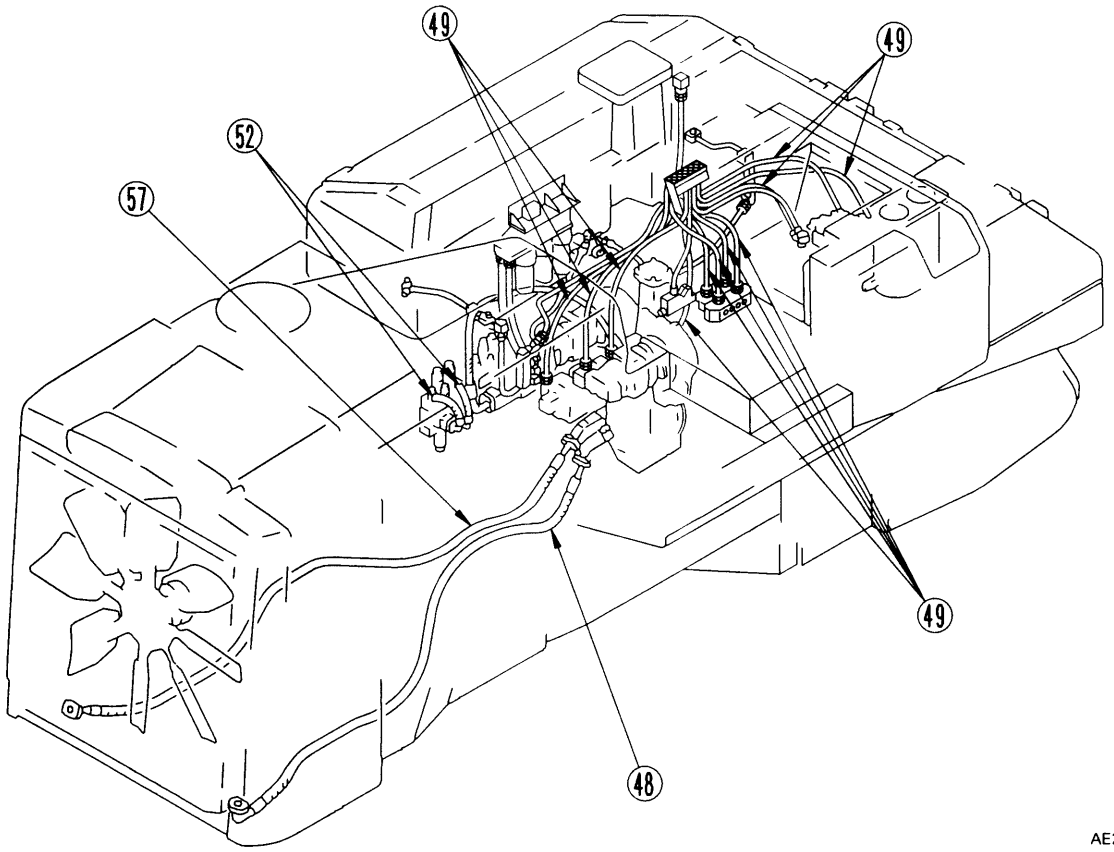
If the hose clamps show any deterioration, such as deformation or cracking, replace the clamps at the same as the hoses.

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 critical parts.

| No. | Safety critical parts for periodic replacement | Q'ty | Replacement interval |
|---|---|---|---|
| 1 | Turbocharger lubricating hose (L.H.) | 1 | Every 2 years or 4000 hours, whichever comes sooner |
| 2 | Turbocharger lubricating hose (R.H.) | 1 | |
| 3 | Injection tube No. 1 L.H | 1 | |
| 4 | Injection tube No. 2 L.H | 1 | |
| 5 | Injection tube No. 3 L.H | 1 | |
| 6 | Injection tube No. 4 L.H | 1 | |
| 7 | Injection tube No. 5 L.H | 1 | |
| 8 | Injection tube No. 6 L.H | 1 | |
| 9 | Injection tube No. 1 R.H | 1 | |
| 10 | Injection tube No. 2 R.H | 1 | |
| 11 | Injection tube No. 3 R.H | 1 | |
| 12 | Injection tube No. 4 R.H | 1 | |
| 13 | Injection tube No. 5 R.H | 1 | |
| 14 | Injection tube No. 6 R.H | 1 | |
| 15 | Clamp | 28 | |
| 16 | Clamp | 20 | |
| 17 | Supply tube (injection pump lubrication) | 1 | |
| 18 | Supply hose | 1 | |
| 19 | Drain tube | 1 | |
| 20 | Drain tube | 1 | |
| 21 | Tube L.H | 1 | |
| 22 | Tube R.H | 1 | |

| No. | Safety critical parts for periodic replacement | Q'ty | Replacement interval |
|---|---|---|---|
| 23 | Tube L.H | 1 | Every 2 years or 4000 hours, whichever comes sooner |
| 24 | Tube R.H | 1 | |
| 25 | Tube L.H | 1 | |
| 26 | Tube R.H | 1 | |
| 27 | Tube L.H | 1 | |
| 28 | Tube R.H | 1 | |
| 29 | Clamp | 1 | |
| 30 | Tube | 1 | |
| 31 | Tube | 1 | |
| 32 | Tube | 1 | |
| 33 | Tube | 1 | |
| 34 | Tube | 1 | |
| 35 | Tube | 1 | |
| 36 | Tube | 1 | |
| 37 | Tube | 1 | |
| 38 | Tube | 1 | |
| 39 | Clip | 12 | |
| 40 | Spill tube | 10 | |
| 41 | Clip | 26 | |
| 42 | Clip | 2 | |
| 43 | Clip | 1 | |
| 44 | Clip | 6 | |
| 45 | Hose (Hydraulic oil cooler - PPC relief valve) | 1 | |
| 46 | Hose (Hydraulic oil cooler - hydraulic tank) | 2 | |
| 47 | Hose (Torque converter outlet - torque converter oil cooler) | 1 | |
| 48 | Hose (Torque converter oil cooler - power train oil pan) | 1 | |
| 49 | Inspection hose assembly for power train pressure | 13 | |
| 50 | Hose (Blade valve - blade cylinder) | 8 | |
| 51 | Blade cylinder hose (outside of machine) | 4 | |
| 52 | Hose (Hydraulic pump outlet - valve) | 4 | |
| 53 | Seat belt | | Every 3 years |

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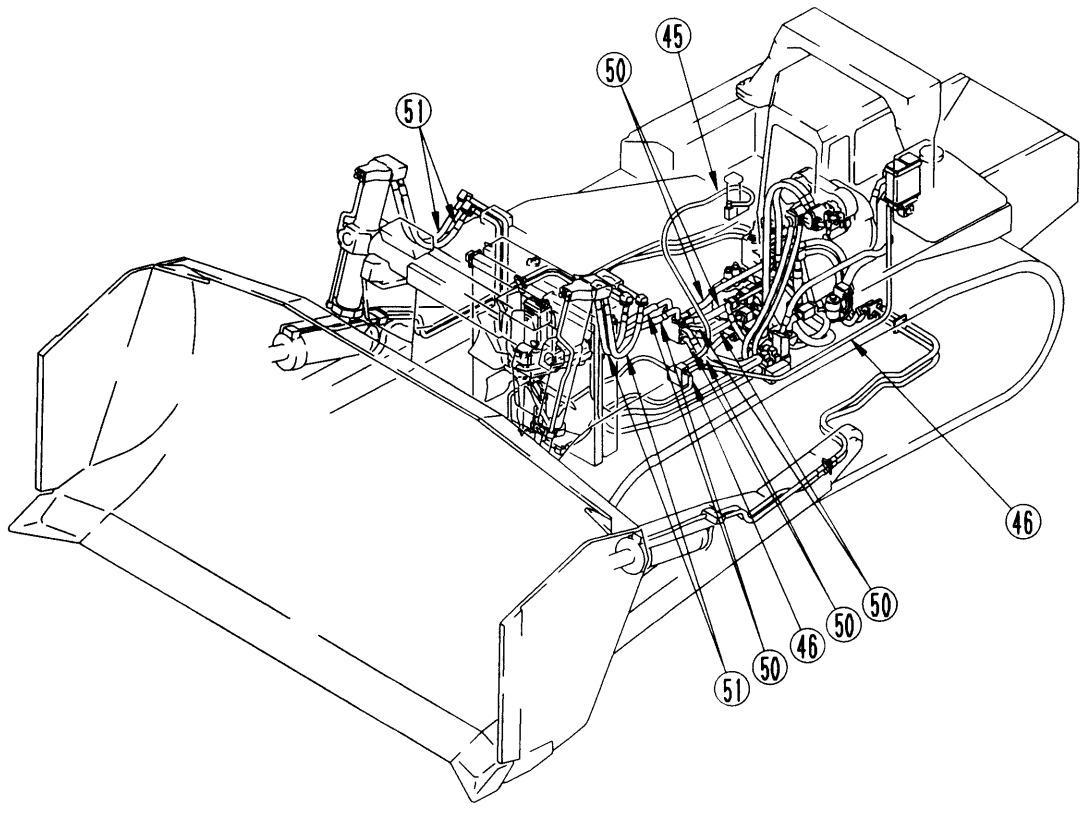


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# 23. MAINTENANCE SCHEDULE CHART

## 23.1 MAINTENANCE SCHEDULE CHART

| SERVICE ITEM | PAGE |
|---|---|
| **INITIAL 250 HOURS SERVICE (only after the first 250 hours)** | |
| Replace fuel filter cartridge | 3-50 |
| Replace transmission filter element, transmission lubricating filter element and torque converter filter element | 3-51 |
| Change oil in power train case and clean strainer (incl. transmission case, torque converter case and bevel gear case) | 3-53 |
| Change oil hydraulic tank, replace hydraulic filter element and clean strainer | 3-55 |
| Change oil in final drive case, replace filter element | 3-57 |
| Replace PPC (Proportional Pressure Control) filter element | 3-59 |
| Check engine valve clearance, adjust | 3-61 |
| **WHEN REQUIRED** | |
| Clean inside of cooling system | 3-21 |
| Check, clean and replace air cleaner element | 3-24 |
| Check track tension | 3-26 |
| Check and tighten track shoe bolts | 3-27 |
| Adjust idler clearance | 3-29 |
| Reverse and replace the end bits and cutting edges | 3-30 |
| Renewing or adjusting the fan belt | 3-32 |
| Check and clean radiator fin and oil cooler fin | 3-33 |
| Clean fuel tank strainer | 3-33 |
| Drain water and sediment in fuel tank | 3-33 |
| Check ether spray, replace ether cylinder | 3-34 |
| Clean, adjust air conditioner | 3-35 |
| Check window washer fluid level, add fluid | 3-36 |
| **CHECK BEFORE STARTING** | |
| Check machine monitor | 3-37 |
| Check coolant level, add water | 3-37 |
| Check fuel level, add fuel | 3-38 |
| Check oil level in engine oil pan, add oil | 3-38 |
| Check oil level in power train case (incl. transmission, torque converter and bevel gear cases), add oil | 3-39 |

| SERVICE ITEM | PAGE |
|---|---|
| **(CHECK BEFORE STARTING)** | |
| Check brake pedal tavel | 3-39 |
| Check dust indicator | 3-40 |
| Check electric wiring | 3-40 |
| Check that lamps light up | 3-40 |
| Check horn sound | 3-41 |
| Check backup alarm sound | 3-41 |
| Check seat belt for wear or damage | 3-41 |
| **EVERY 250 HOURS SERVICE** | |
| Lubricating | 3-42 |
| • Equalizer bar side shaft (6 places) | 3-42 |
| • Equalizer bar center shaft (1 place) | 3-42 |
| • Blade lift cylinder support shaft and yoke (6 places) | 3-42 |
| • Blade center link (1 place) | 3-42 |
| • Blade oblique arm ball joint (2 places) | 3-42 |
| • Fan bearing | 3-43 |
| Change oil in engine oil pan, replace engine oil filter cartridge | 3-44 |
| Check oil level in hydraulic tank, add oil | 3-46 |
| Check alternator drive belt tension, adjust | 3-47 |
| Check level of battery electrolyte | 3-48 |
| Check oil level in damper case, add oil | 3-49 |
| Check brake performance | 3-49 |
| **EVERY 500 HOURS SERVICE** | |
| Replace fuel filter cartridge | 3-50 |
| Replace transmission filter element, transmission lubricating filter element and torque converter oil filter element | 3-51 |
| Check oil level in final drive case, add oil | 3-51 |
| Replace corrosion resistor cartridge | 3-52 |
| Grease tension pully (1 place) and fan pully (1 place) | 3-52 |

| SERVICE ITEM | PAGE |
|---|---|
| **EVERY 1000 HOURS SERVICE** | |
| Change oil in power train case, clean strainers (incl. transmission case, torque converter case and bevel gear case) | 3-53 |
| Check, clean fuel strainer | 3-54 |
| Clean steering clutch case breather | 3-54 |
| Grease universal joint | 3-54 |
| Replace filter element of hydraulic tank breather | 3-54 |
| Check all tightening parts of turbocharger | 3-54 |
| **EVERY 2000 HOURS SERVICE** | |
| Change oil in hydraulic tank, replace hydraulic oil filter element and clean strainer | 3-55 |
| Change oil in final drive case, replace filter element | 3-57 |
| Change oil in damper case, clean breather | 3-58 |
| Replace PPC (Proportions Pressure Control) filter element | 3-59 |
| Check oil level in pivot bearing, add oil | 3-60 |
| Clean engine breather element | 3-60 |
| Check oil leakage from gear coupling | 3-60 |
| Clean, check turbocharger | 3-61 |
| Check play of turbocharger rotor | 3-61 |
| Check alternator, starting motor | 3-61 |
| Check engine valve clearance, adjust | 3-61 |
| Greasing to the fan mount spline | 3-61 |
| **EVERY 4000 HOURS SERVICE** | |
| Check water pump | 3-62 |
| Check vibration damper | 3-62 |

# 24. SERVICE PROCEDURE

## 24.1 INITIAL 250 HOURS SERVICE

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

- **REPLACE FUEL FILTER CARTRIDGE**
- **REPLACE TRANSMISSION FILTER ELEMENT, TRANSMISSION LUBRICATING FILTER ELEMENT AND TORQUE CONVERTER FILTER ELEMENT**
- **CHANGE OIL IN POWER TRAIN (INCL. TRANSMISSION CASE, TORQUE CONVERTER CASE AND BEVEL GEAR CASE) AND CLEAN STRAINER**
- **CHANGE OIL IN HYDRAULIC TANK, REPLACE HYDRAULIC FILTER ELEMENT AND CLEAN STRAINER**
- **CHANGE OIL IN FINAL DRIVE CASE, REPLACE FILTER ELEMENT**
- **REPLACE PPC (PROPORTIONAL PRESSURE CONTROL) FILTER ELEMENT**
- **CHECK ENGINE VALVE CLEARANCE, ADJUST**

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

## 24.2 WHEN REQUIRED

### 24.2.1 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.**
- **Never be under the machine with the engine running. To avoid serious injury, always stop the engine before being under 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 relieve pressure.**
- **When removing drain plug, avoid pouring coolant on yourself.**
- **Antifreeze is flammable, so keep it away from any flame.**

- Stop the machine on level ground when cleaning or changing the coolant.

- 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 (autumn) or every 2000 hours whichever comes first | Every 500 hours and when cleaning the inside of the cooling system and when changing coolant |
| Non permanent type antifreeze containing ethylene glycol (Winter, one season type) | Every 6 months (spring, autumn) (Drain antifreeze in spring, add antifreeze in autumn) | |
| When not using antifreeze | Every 6 months or every 1000 hours whichever comes first | |

- 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 (50°F) lower when deciding the mixing rate.

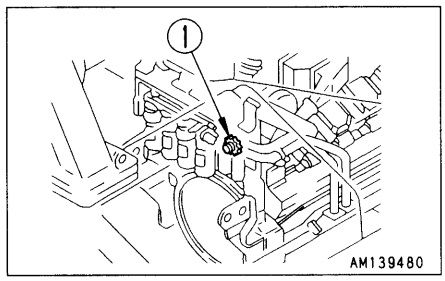
**Mixing rate of water and antifreeze**

| Min. atmospheric temperature | °C | -5 | -10 | -15 | -20 | -25 | -30 |
|---|---|---|---|---|---|---|---|
| | °F | 23 | 14 | 5 | -4 | -13 | -22 |
| Amount of antifreeze | ℓ | 69 | 89 | 107 | 122 | 137 | 149 |
| | US gal | 18.2 | 23.5 | 28.3 | 32.2 | 36.2 | 39.35 |
| | UK gal | 15.2 | 19.6 | 23.6 | 26.9 | 30.2 | 32.8 |
| Amount of water | ℓ | 229 | 209 | 191 | 176 | 161 | 149 |
| | US gal | 60.5 | 55.2 | 50.4 | 46.5 | 42.5 | 39.35 |
| | UK gal | 50.4 | 46.0 | 42.0 | 38.7 | 35.4 | 32.8 |

- We recommend use of an antifreeze density gauge to control the mixing proportions.

- Use city water for the cooling water.
  If river water, well water or other such water supply must be used, contact your Komatsu distributor.

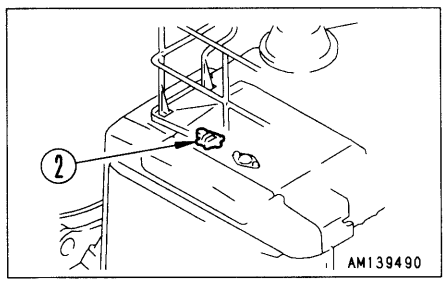
1. Stop the engine and close corrosion resistor valve ①.




2. Turn radiator cap ② slowly until it comes off.

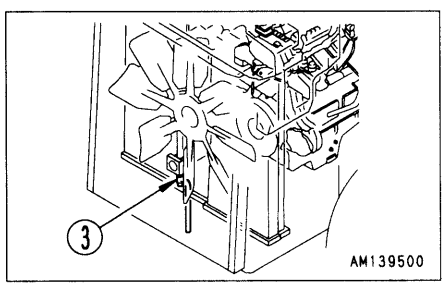
3. Set a container to catch the coolant, open drain valve ③ at the bottom of the radiator and drain plugs ④ at the both sides of cylinder block, and drain off the cooling water.

4. After draining, close up drain valve ③ and plugs ④ and pour in clean water (ex. city water) up to the vicinity of the water filler.




5. When the water reaches the vicinity of the water filler, put the engine at low idling, open drain valve ③ and plugs ④, then pass water through the cooling system for 10 minutes.
   When doing this, keep the radiator filled up to the filler with water.
   When filling with water, be careful to check that the hose supplying the water does not come out of the water filler port at the radiator cap.

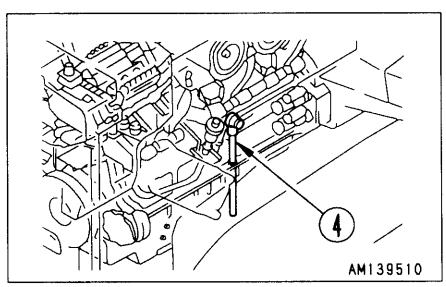
6 After washing the cooling system, stop the engine. Drain water and close drain valve ③ and plugs ④.




7. After draining off the cooling water, wash out the cooling system using commercially available detergent. Follow the instructions on the detergent container.

8. After flushing, open drain valve ③ and drain plugs ④, completely drain all the water, then close the drain valve and drain plug, and fill with city water up to near the filler port.

9. When the tank is filled to near the water filler port, open drain valve ③ and drain plugs ④, start the engine, run at low idling, and continue the flushing operation until clean water comes out.




   Adjust the amount of water flowing in and out to ensure that the radiator is always full during the flushing operation.

10. When clean water comes out, stop the engine, and close drain valve ③ and drain plug ④.

11. Replace the corrosion resistor and open valve ①.
    For details of replacement of the corrosion resistor, see "24.5 EVERY 500 HOURS SERVICE".

12. Supply water until it overflows from the water filler.

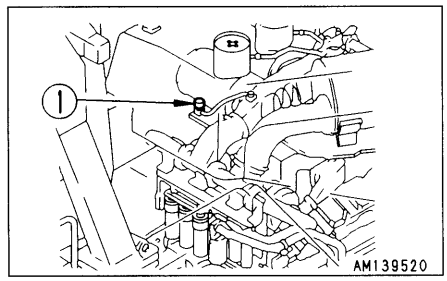
13. Run the engine and wait for about 3 minutes. Supply cooling water up to the water filler. Tighten radiator cap ②.

14. Stop the engine, wait for 3 minutes, add city water until the water level reaches near the water filler port, then tighten the cap ②.

## 24.2.2 CHECK, CLEAN AND REPLACE AIR CLEANER ELEMENT

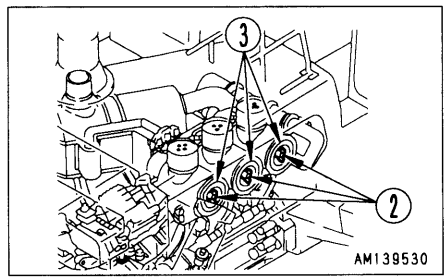
**⚠ WARNING**

- **Never clean or replace the air cleaner element with the engine running.**
- **When using pressure air to clean the element wear safety glasses or goggles to protect the eyes.**




### CHECK

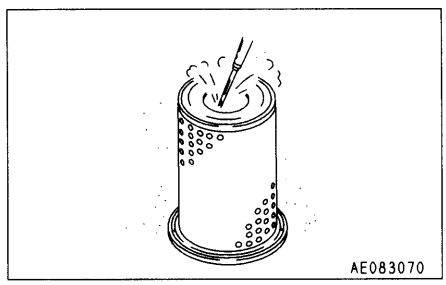
Whenever the red piston in dust indicator ① appears, clean the air cleaner element.



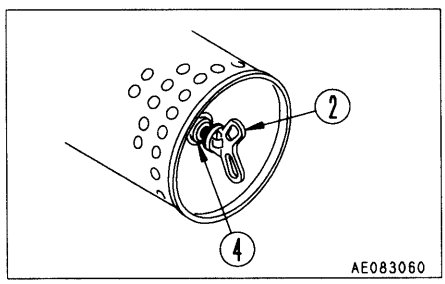

### CLEAN, REPLACE OUTER ELEMENT

1. Loosen wing nut ②, then remove the outer element ③.

2. Clean the air cleaner body interior.

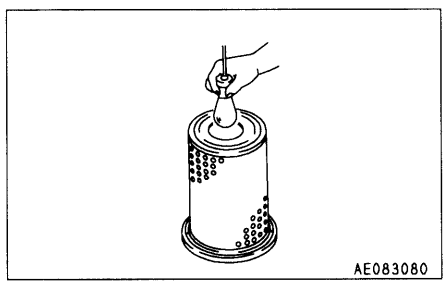



3. Direct dry compressed air (less then 700 kPa (7 kg/cm², 100 psi)) to the element from inside along its folds, then direct it from outside along its folds and again from inside.
   1) Remove one seal from the outer element. The number of times the outer element has been cleaned can be seen by the number of removed seals.
   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 the element when the dust indicator red piston appears soon after installing the cleaned outer element even though it has not been cleaned 6 times.
   4) Check inner element mounting nuts for looseness and, if necessary, retighten.
   5) Replace seal washer ④ or wing nut ② with new parts if they are broken.




### NOTICE

- **Remove the old element as gently as possible.**
- **Always clean the inside of the housing carefully.**
- **Always clean the gasket sealing surfaces of the housing.**
- **Check for uneven dirt patterns on your old element.**
- **Press your fresh gasket to see if it springs back.**
- **Make sure the gasket is seating evenly.**
- **Check connections and ducts for air tight fit.**
- **If small holes or thinner parts are found on the element when it is checked with an electric bulb after cleaning and drying, replace the element.**
- **When cleaning the element, do not hit it or beat it against something.**
- **Do not use an element whose folds or gasket or seal are damaged.**




4. Set the cleaned element.

5. Cleaning or replacing for three outer elements should be carried out at the same time.

**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 a inner element.

5. Install the outer element and the cover.

6. After replacing the element, return the red piston in the dust indicator to its original position.

## 24.2.3 CHECK TRACK TENSION

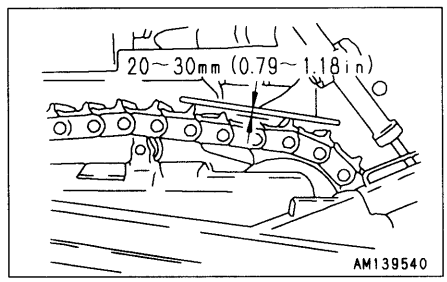
The wear of pins and bushings on the undercarriage will vary with the working conditions and soil properties. It is thus necessary to continually inspect the track tension so as to maintain the standard tension.

Carry out the check and adjustment under the same conditions as when operating (on jobsites where the track becomes clogged with mud, measure with the track clogged with mud).

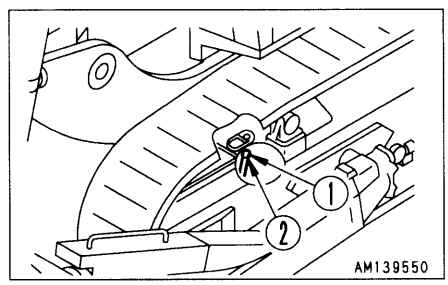
### INSPECTION

Stop the machine on level ground (stop with the transmission in FORWARD without applying the brake). Then place a straight bar on the track shoes between first carrier roller and second carrier roller as shown in the figure, and measure the clearance between the bar and the grouser at the midpoint. If the clearance is 20 – 30 mm (0.79 – 1.18 in), the tension is standard.

If the track tension is not at the standard value, adjust it in the following manner.




### ADJUSTMENT

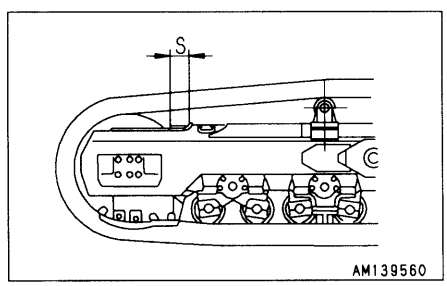



**⚠ WARNING**

**Grease inside the adjusting mechanism is under high pressure. Grease coming from plug ① under pressure can penetrate the body causing injury or death. For this reason, do not loosen plug ① more than one turn. Do not loosen any part other than plug ①. Furthermore, do not bring your face in front of the grease fitting.**
**If the track tension is not relieved by this procedure, please contact your Komatsu distributor.**

- **When increasing tension**

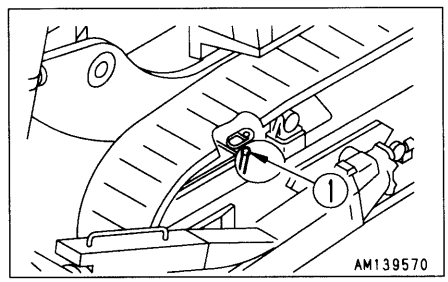
1. Remove the cover.
2. Pump in grease through grease fitting ② with a grease pump.
3. To check that the correct tension has been achieved, move the machine backwards and forwards.
4. Check the track tension again, and if the tension is not correct, adjust it again.
5. Grease may be pressurized till S will be 260 mm (10.2 in).
   In case the tension is yet loose after applying pressurized injection of grease till the abovementioned limit, it indicates that the pin bush is reduced by too much abrasion.
   So it is necessary either to turn or replace the pin and bushings.
   Consult your Komatsu distributor for repair.



- **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 plug ① gradually to release the grease.
2. Turn plug ① 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 plug 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.

## 24.2.4 CHECK AND TIGHTEN TRACK SHOE BOLTS

If the machine is used with the track shoe bolts loose, they will break, so tighten any loose bolts immediately.

- **Method for tightening (shoe bolt)**

1. First tighten to a tightening torque of 2060 ± 200 Nm (210 ± 20 kgm, 1520 ± 145 lbft)) then check that the nut and shoe are in close contact with the link contact surface.
2. After checking, tighten a further 120° ± 10°.

- **Method for tightening (master link connecting bolt)**

1. First tighten to a tightening torque of 2060 ± 200 Nm (210 ± 20 kgm, 1520 ± 145 lbft) then check that the link contact surfaces are in close contact.
2. After checking, tighten a further 180° $^{+20°}_{-0°}$.

**NOTICE**

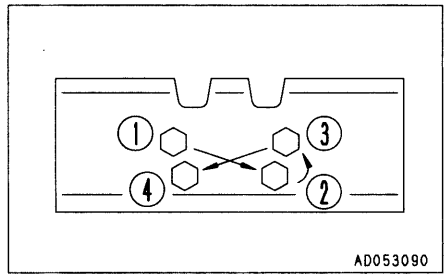
- **Do not use an impact wrench to tighten the master link connecting bolt temporarily.**
- **When installing the bolt, apply seizure preventive compound (LM-P) all over its threads. Then, remove the excessive seizure preventive compound (LM-P) frmo the end of the threads.**

**Order for tightening**

Tighten the bolts in the order shown in the diagram on the right.

①, ③ Short bolt (bolt length 178 mm (7.0 in))

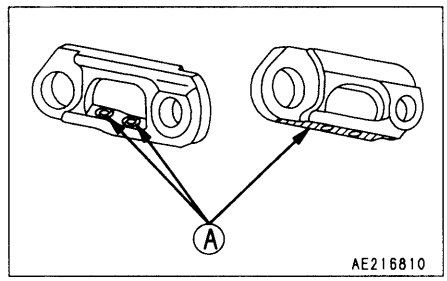
②, ④ Long bolt (bolt length 192 mm (7.6 in))



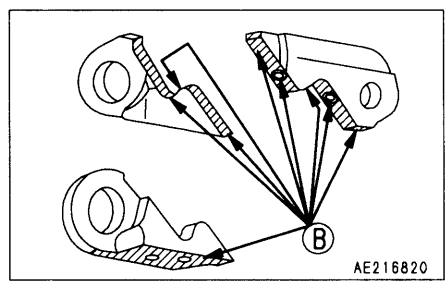

**NOTICE**

**When installing the shoe, check the hatched parts shown below for paint, rust preventive material (other then liquid type), rust, bruise, etc. If any is found, remove before tightening the shoe bolts.**

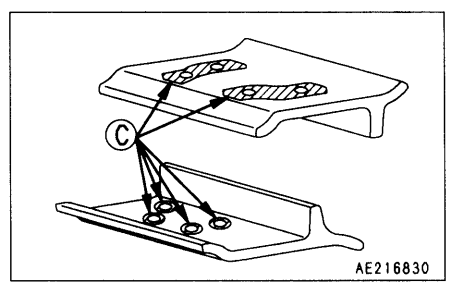
- Regular link (Both sides)
  Ⓐ Seat of nut and fitting surface shoe



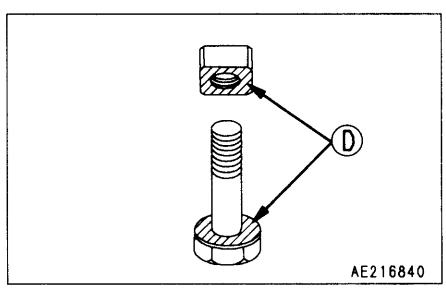

- Master link (Both sides)
  Ⓑ Fitting surface and threaded parts of master link and fitting surface of shoe



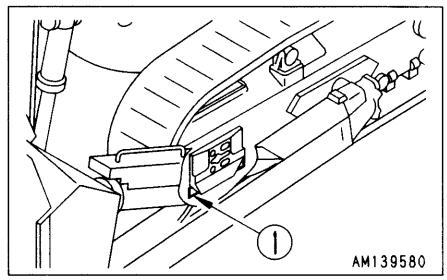

- Shoe
  Ⓒ Fitting surface of link and seat of bolt




- Shoe bolt and nut
  Ⓓ Seats



## 24.2.5 ADJUST IDLER CLEARANCE

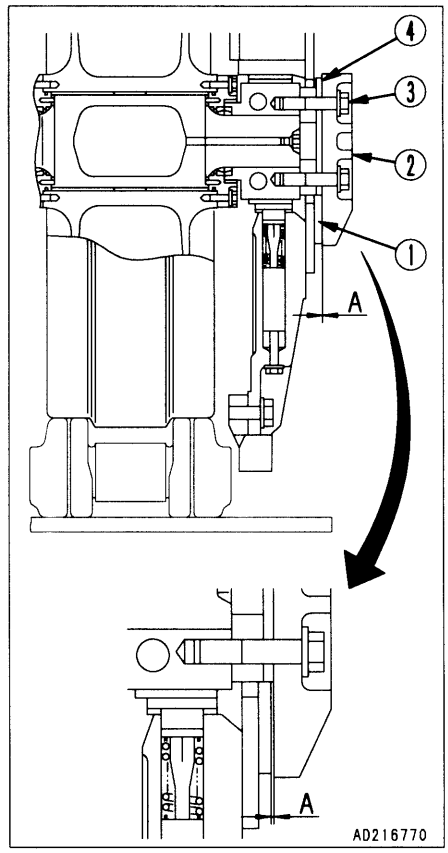



The idler moves forward and backward under external pressure. When this happens, side guide ① and guide plate ② become worn. As they become worn, there is side play in the idler, or the idler turns at an angle, causing the track to come off or resulting in uneven wear, so adjust as follows.

**Adjustment**

1. Have the vehicle travel for 7 to 8 meters (23.0 to 26.2 ft) on a level surface and shift the shift lever to the "N" (neutral) position to let the vehicle come to a stop slowly before measuring the clearance A (at 4 points, left to right, inner most end to outer most end) between the truck frame and the side guide.

2. If clearance A is more than 3 mm (0.1 in), remove bolt ③, then take out shim ④, and adjust so that the clearance on one side is less than 0.5 mm (0.02 in).




**REMARK**

There are two types of shim (thickness: 0.5 mm (0.02 in) and 1.0 mm (0.04 in)).

## 24.2.6 REVERSE AND REPLACE THE END BITS AND CUTTING EDGES

**⚠ WARNING**

**It is dangerous if the work equipment moves by mistake when the cutting edges and end bits are being reversed or replaced. Set the work equipment in a stable condition, then stop the engine and lock the blade control lever securely with the safety lock.**

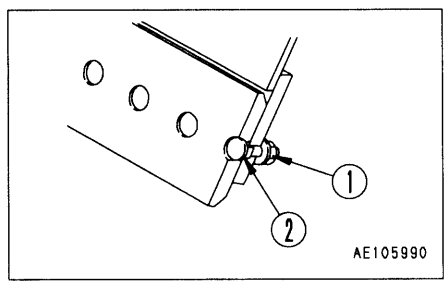
Reverse or replace the end bits and cutting edges before it is worn out to the blade end.

1. Raise the blade to a proper height and apply a block to the frame so as to prevent fall of the blade.

2. Operate the safety lever to the LOCK position.

If the cutting edge and the end bit on both sides are worn out, replace with new one.

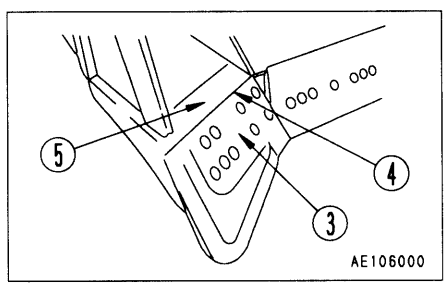
If it has been worn out up to the fitting surface, repair the fitting surface and then reverse or replace.




3. Loosen nut ① and remove bolt ②. Then remove the cutting edge and the end bit and clean the mounting surface.

4. Reverse or replace the cutting edge and the end bit when worn out.

If bolt ① and nut ② are damaged, replace them with new ones at the same time.




5. Install the edge to the blade, then tighten partially. Drop the blade three to five times on to the ground or rock to remove any play in bolt ②, then tighten it to the correct tightening torque. When installing end bit ③, put top surface ④ of the end bit in close contact with stopper ⑤, then tighten with the bolts.

   Tightening torque: 3480 ± 440 Nm (355 ± 45 kgm, 2570 ± 330 lbft)

6. After several hours of running, retighten the nuts.

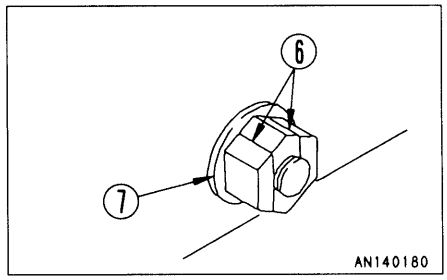
**REMARK**

The tightening operation is easier if the power wrench that has been supplied is used.

When the nut is rusted and is removed by gas cutting, cut on both sides ⑥ of the nut as shown in the diagram.

Be careful not to damage seat surface ⑦.

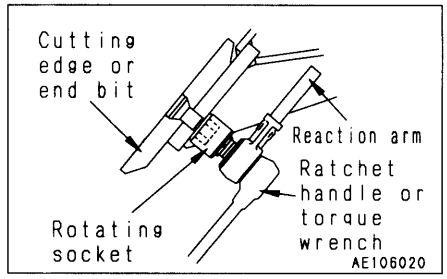
If it is damaged, repair it. Be careful not to get spatter on the mounting surface.

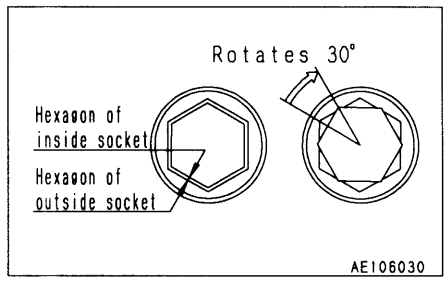


- **Method of using power wrench**

The power wrench set is equipped with a special socket. This socket is designed so that it grips the nut and prevents the wrench set from coming pull out. This means that the tightening operation can be carried out by one worker.

This socket has a double construction, and is designed so that the outside can rotate 30°. It is used as follows.




1. Align the hexagons of the inside socket and outside socket, then insert the nut that is to be tightened or loosened.
2. After inserting the nut, turn the outside socket 30° clockwise. When this is done, the outside socket will catch the notch in the nut seat surface, and the wrench will not come off.
3. Put the reaction arm in contact with the blade rib, and tighten or loosen.
4. Turn the outside socket counterclockwise, and remove the wrench.

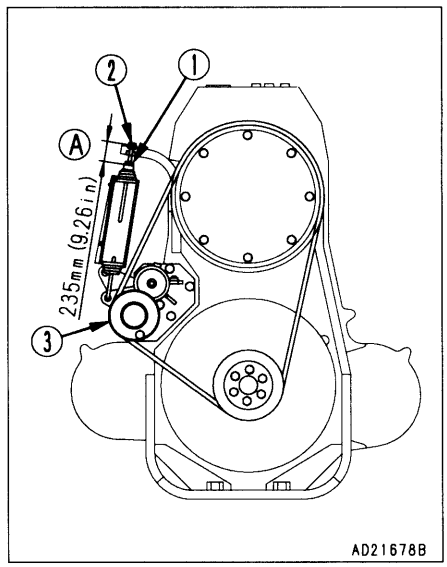
## 24.2.7 RENEWING OR ADJUSTING THE FAN BELT

**Fan belt exchange procedures**

1. Loosen locknut ① to let free the spring.

2. Loosen bolt ② to let free tension pulley ③.
   Loosen out the dimension A to 235 mm (9.26 in).

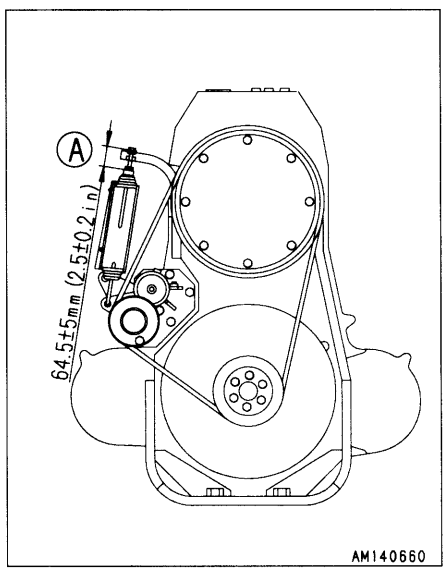
3. Push tension pulley ③ toward the arrowed direction until the V-belt comes out and renew the V-belt.
   Always renew all the 6 V-belts simultaneously.




**Adjusting the fan belt**

Fan belts are equipped with the auto-tensioner which functions to maintain the tension of the fan belts at a constant level irrespective of their elongation and, basically, no particular adjustment is necessary until the belts are broken apart. However, check if the dimension "A" is at 64.5 ± 5 mm (2.5 ± 0.2 in) and, when found otherwise, adjust the fan belt tension.

Hoisting equipment and some tools are necessary when exchanging the fan belts and contact your Komatsu distributor when renewing them.



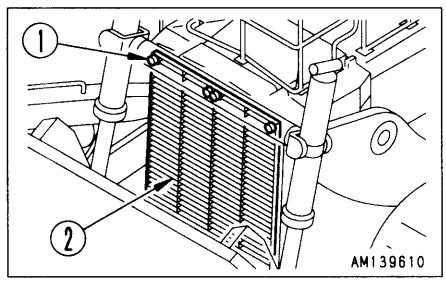
## 24.2.8 CHECK AND CLEAN RADIATOR FIN AND OIL COOLER FIN

**⚠ WARNING**

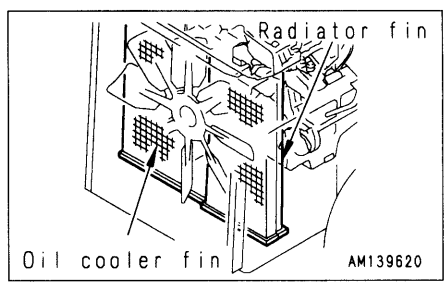
**When carrying out cleaning or inspection, always stop the engine and check that the fan is not rotating before starting.**

When the radiator fin and the oil cooler fin block with mud, dirt or leaves, clean it as follows.

1. Loosen bolts ① and open radiator grille ②.




2. Mud, dust, or leaves blocking the fin shall be blown off by compressed air. Steam or water may also be employed instead of compressed air.




**REMARK**

Check the rubber hose on this occasion and replace hose that if cracked or fragile.

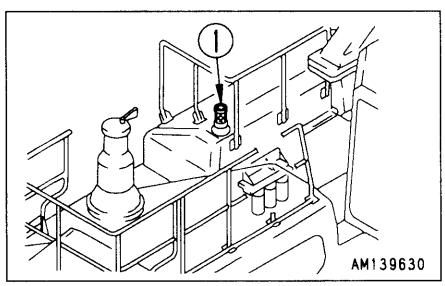
Further, also inspect loosened hose clamps.

## 24.2.9 CLEAN FUEL TANK STRAINER

Clean the strainer if there is any dirt collected in it.

Remove the filler cap of the fuel tank and take out strainer ①.

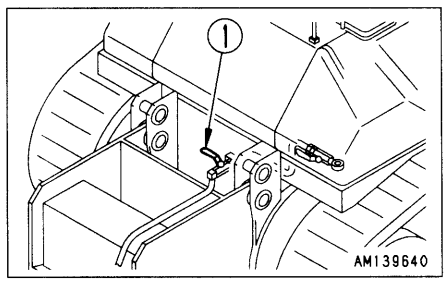
If the strainer is dirty, clean it with diesel fuel.




## 24.2.10 DRAIN WATER AND SEDIMENT IN FUEL TANK

Carry out this procedure after the machine has been at rest for a long time and after a long spell of rainy days.

Loosen valve ① at the bottom of the tank and drain sediment accumulated on the bottom together with mixed water and fuel.

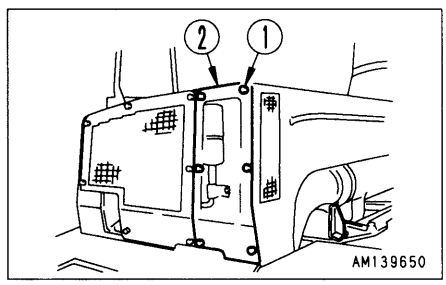


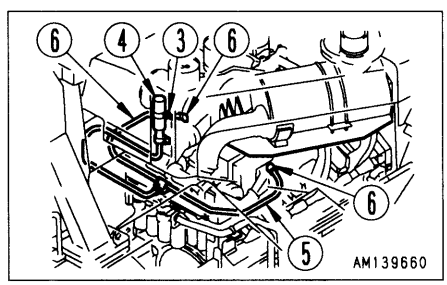
## 24.2.11 CHECK ETHER SPRAY, REPLACE ETHER CYLINDER

**⚠ WARNING**

**Never bring close to any fire or flame during the inspection. Be particularly careful of the following when handling the ether cylinder.**

- **Never bring it close to any fire or flame.**
- **Never throw any used cylinder into a fire or make any hole in it.**
- **Do not store it in a place where the temperature goes above 40°C (104°F).**
- **Do not breathe in ether gas or let it get on your body.**
- **Never keep any ether cylinder in the operator's compartment.**
- **Always keep ether cylinders out of the reach of children.**
- **In summer or other seasons when the ether cylinder is not being used, remove it from the machine.**
- **If the temperature will go below –20°C (–4°F), remove the ether cylinder from the machine and keep it at room temperature until it is needed again for starting the engine.**




1. Remove bolt ①, then remove cover ② at the rear of the engine hood.

2. Loosen wing nut ③, then remove ether cylinder ④.
   To prevent dirt or dust from entering the valve, wipe off all dirt or dust from around the inlet port of the valve before removing the ether cylinder.

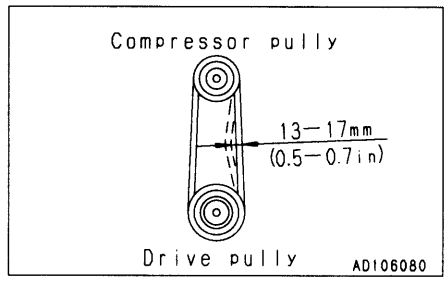
3. Operate the quick start switch and check that the control cable and valve work.

4. Remove tube ⑤ from atomizer ⑥, then remove atomizer ⑥ and connect tube ⑤ again.

5. Install the ether cylinder, push the quick start switch for 2 or 3 seconds, then release the quick start switch and check that a fire spray of ether comes out from each orifice of the atomizer.

6. After checking, assemble atomizer ⑥ and tube ⑤ to their original places. If any abnormality is found, please contact your Komatsu distributor.

## 24.2.12 CHECK, ADJUST AIR CONDITIONER




### CHECKING TENSION OF COMPRESSOR BELT

If the belt is loose, it will slip and the cooling effect will be reduced. From time to time, press a point midway between the drive pulley and compressor pulley with your finger (approx. 6 kg (13.2 lb)) and check that the tension is 13 – 17 mm (0.5 – 0.7 in).

When the belt is new, there will be initial elongation, so always adjust again after 2 or 3 days.

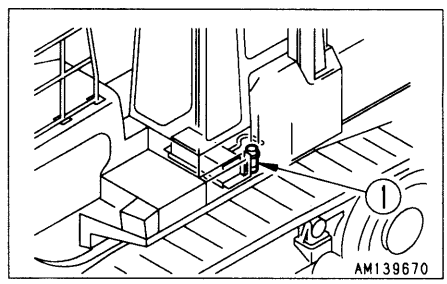
### CHECK LEVEL OF REFRIGERANT (GAS)

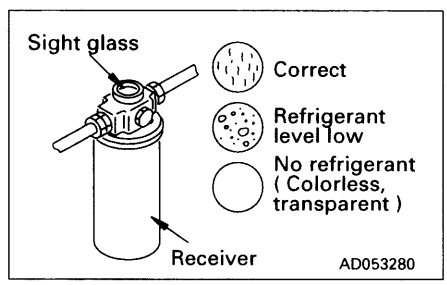
**⚠ WARNING**

**If the liquid gets into your eyes or on your hands, it may cause loss of sight or frostbite, so never loosen any part of the refrigerant circuit.**

If the level of the refrigerant (gas) is low, the cooling effect will be reduced. Run the engine at high idling, and check the flow of the refrigerant in the refrigerant circuit through the sight glass of the receiver ① when the cooler is running at high speed.

- No bubbles in refrigerant flow: Correct
- Bubbles in refrigerant flow (bubbles continuously pass through): Refrigerant level low
- Colorless, transparent: No refrigerant




**REMARK**

When there are bubbles, the refrigerant gas level is low, so contact your refrigerant dealer to have refrigerant added. If the air conditioner is run with the refrigerant gas level low, it will cause damage to the compressor.

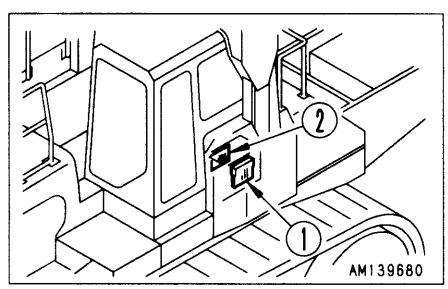
### CLEAN AIR CONDITIONER AIR FILTER

If the air conditioner air filter is clogged or there is dirt or dust in it, clean the filter.

1. Open inspection cover and remove FRESH filter ① from the holder.

2. Remove the bolt at the left side of operator's seat, then remove RECIRC filter ②.

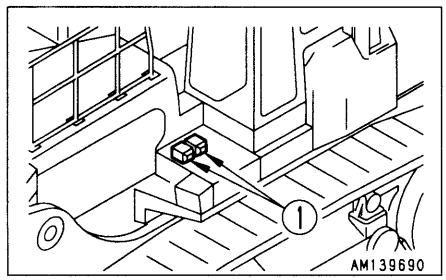
3. Clean filter ① and ② with compressed air. If there is oil stuck to the filter, or it is extremely dirty, wash it in a neutral agent. After washing it, dry it completely before installing it again.




**REMARK**

If the clogging of the filter cannot be removed by washing or using compressed air, replace the filter with a new part.

### 24.2.13 CHECK WINDOW WASHER FLUID LEVEL, ADD FLUID




If there is air in the window washer fluid, check the level and add fluid.

Open the engine side cover on the right side, check the level of the fluid in window washer tank ①, and if it is low, add automobile window washer fluid.

When adding fluid, be careful not to let dirt or dust get in.

# 24.3 CHECK BEFORE STARTING

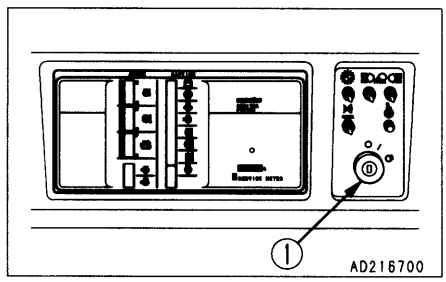
## 24.3.1 CHECK MACHINE MONITOR

1. Turn starting switch ① to the ON position.

2. Check that all monitor lamps and gauges light up for 3 seconds and the alarm buzzer sounds for about 2 seconds.

**REMARK**

If the lamps do not light up, there may be a failure or disconnection in the monitor, so please contact your Komatsu distributor.



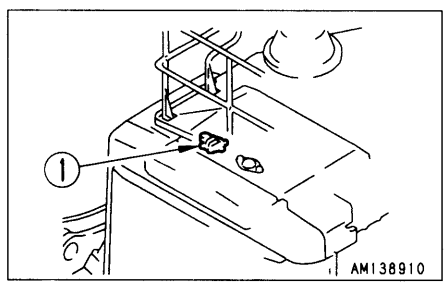

**NOTICE**

**When carrying out the checks before starting, do not relay only on the monitor. Always carry out all the items listed for the following check and maintenance.**

## 24.3.2 CHECK COOLANT LEVEL, ADD WATER

**⚠ WARNING**

**Do not remove cap ① while cooling water is hot. Hot water may spout out.**
**When removing cap ①, wait until the water temperature goes down and release radiator pressure little by little by loosening caps slowly, then remove the cap.**

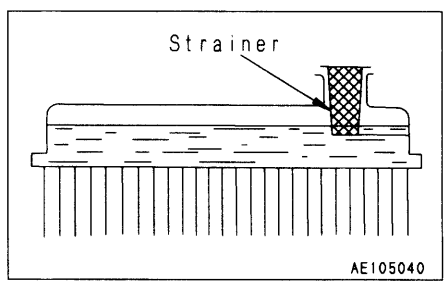



1. Remove radiator cap ① and check that coolant is above the bottom of the strainer as shown in the diagram. If necessary, add water through filler of radiator cap ①.

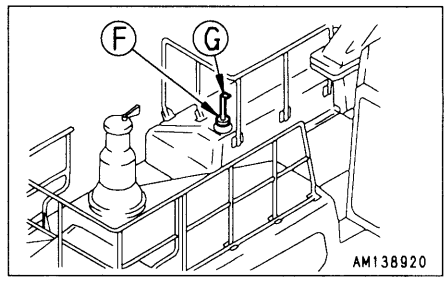
2. Check that there is no abnormality, such as oil in the coolant.

3. After adding water, tighten the cap securely.

4. If the volume of coolant added is more than usual, check for possible water leakage.



## 24.3.3 CHECK FUEL LEVEL, ADD FUEL




**⚠ WARNING**

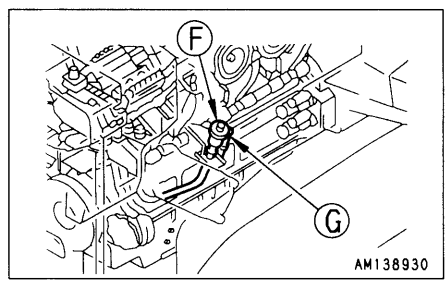
**When adding fuel, never let the fuel overflow. This may cause a fire.**

1. Removed the cap and check the fuel level using fuel gauge Ⓖ.
2. After completing work, fill the fuel tank through oil filler port Ⓕ.
   For details of the oil to use, see "20. USE OF FUEL, COOLANT AND LUBRICANTS ACCORDING TO AMBIENT TEMPERATURE".
3. After adding fuel, tighten the cap securely.
   Fuel capacity: 2100 ℓ (554 US gal, 462 UK gal)

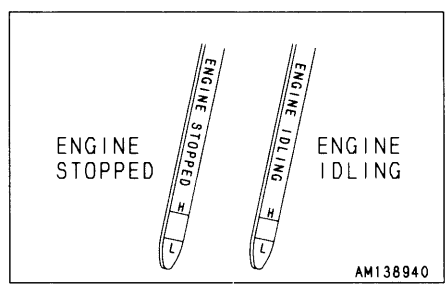
**REMARK**

When dozing on a grade, make sure there is plenty of oil in the tank so that the engine fuel line does not becomes aerated.

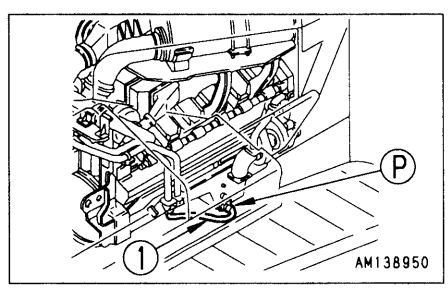
## 24.3.4 CHECK OIL LEVEL IN ENGINE OIL PAN, ADD OIL




1. Open the engine side cover on the left side of the chassis.
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. Use the ENGINE STOPPED side of dipstick Ⓖ and check that the oil level is between the H and L marks.
   If the oil is below the L mark, pull the dipstick out and add engine oil through oil filler port Ⓕ.
   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, pull hose ① outside the chassis, drain the excess oil from drain valve Ⓟ, then check the oil level again.
6. If the oil level is correct, tighten the oil filler cap securely and close the engine side cover.




**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.

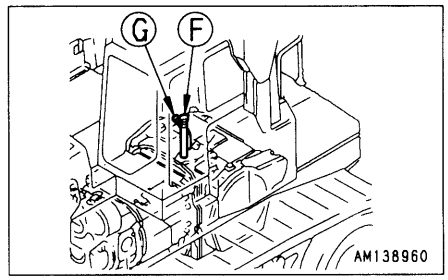
**REMARK**

The dipstick is marked with the levels for ENGINE STOPPED on one side and ENGINE IDLING on the other side.

It is also possible to check the oil level with the engine idling, but be sure to remember the following points.

- Check that the engine water temperature gauge shows green range.
- Read the dipstick on its reverse side marked with "ENGINE IDLING".

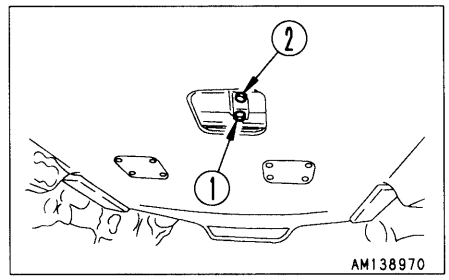
## 24.3.5 CHECK OIL LEVEL IN POWER TRAIN CASE (INCL. TRANSMISSION, TORQUE CONVERTER AND BEVEL GEAR CASES), ADD OIL




1. Remove dipstick Ⓖ, and wipe the oil off with a cloth.

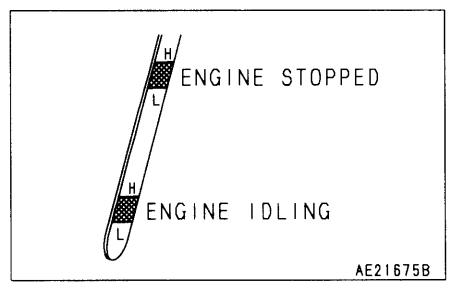
2. Insert dipstick Ⓖ fully in the oil filler pipe, then take it out again.

3. The oil level should be between the H and L marks on dipstick Ⓖ.
   If the oil level is below the L mark, add engine oil through oil filler Ⓕ.
   For details of the oil to use, see "20. USE OF FUEL, COOLANT AND LUBRICANTS ACCORDING TO AMBIENT TEMPERATURE".




4. If the oil is above the H mark, pull out hose ①, loosen drain valve ② to drain the excess oil, then check the oil level again.

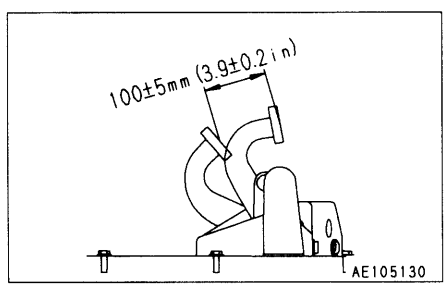
5. If the oil level is correct, tighten the oil filler cap securely.




**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.
- It is also possible to check the oil level with the engine idling.

## 24.3.6 CHECK BRAKE PEDAL TRAVEL

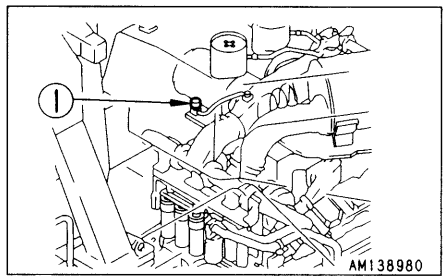



1. Depress the brake pedal all the way until it stops.

2. The distance of travel at the center of the pedal (position in the diagram on the right) should be 100 ± 5 mm (3.9 ± 0.2 in).

3. When this value exceeds the specified range, or the brake fails to work, please contact your Komatsu distributor for adjustment.

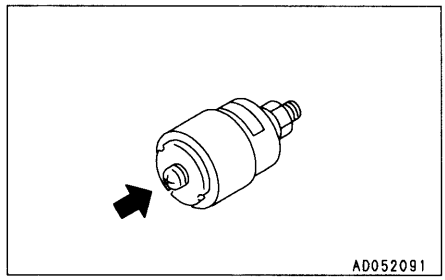
## 24.3.7 CHECK DUST INDICATOR




1. Check that the red piston has not appeared in the transparent portion of dust indicator ①.

2. If the red piston has appeared, clean or replace the element immediately.
   For details of the method of cleaning the element, see "24.2 WHEN REQUIRED".

3. After checking, cleaning, and replacing, press the knob of dust indicator ① to return the red piston to its original position.




## 24.3.8 CHECK ELECTRIC WIRING

**⚠ WARNING**

- **If fuses are frequently blown or if there are traces of short circuit on the electrical wiring, locate the cause and carry out repair.**
- **Accumulation of flammable material (dead leaves, twigs, grass, etc.) around the battery may cause fire, so always check and remove such material.**

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

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.

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

## 24.3.9 CHECK THAT LAMPS LIGHT UP

Turn the head lamp switch and the rear lamp switch to the ON position and check that the head lamps and rear lamps light up.

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.

### 24.3.10 CHECK HORN SOUND

### 24.3.11 CHECK BACKUP ALARM SOUND

### 24.3.12 CHECK SEAT BELT FOR WEAR OR DAMAGE

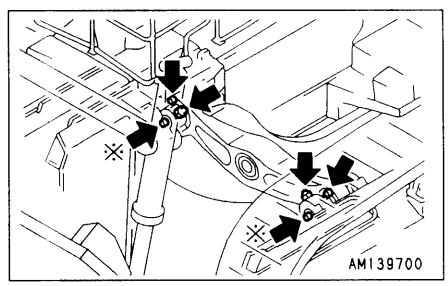
Check the belt and mounting clamps, and if they are worn or damaged, replace the seat belt.

## 24.4 EVERY 250 HOURS SERVICE

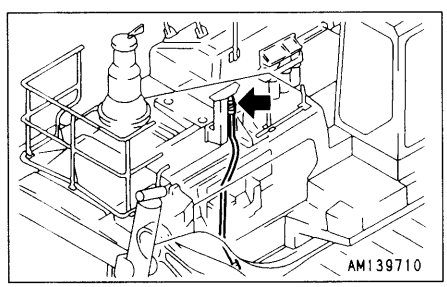
### 24.4.1 LUBRICATING

1. Lower the work equipment to the ground, then stop the engine.
2. Using a grease pump, pump in grease through the grease fittings shown by arrows.
3. After greasing, wipe off any old grease that was pushed out.

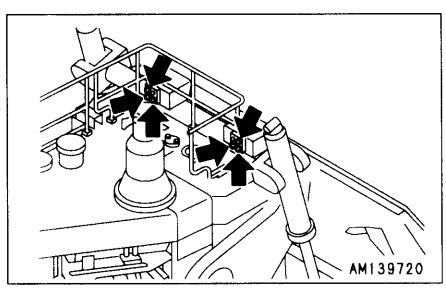
1. Equalizer bar side shaft (6 places)
   Remove the plugs on the two inside points and add grease through the fittings (※) on the inside.



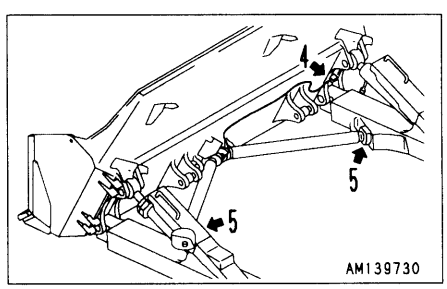

2. Equalizer bar center shaft (1 place)



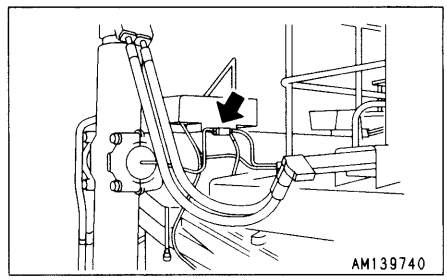

3. Blade lift cylinder support shaft and yoke (6 places)




4. Blade center link (1 place)
5. Blade oblique arm ball joint (2 places)



## 6. Fan bearing

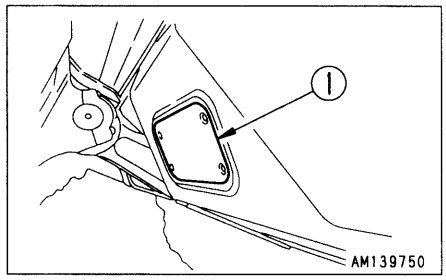


## 24.4.2 CHANGE OIL IN ENGINE OIL PAN, REPLACE ENGINE OIL FILTER CARTRIDGE

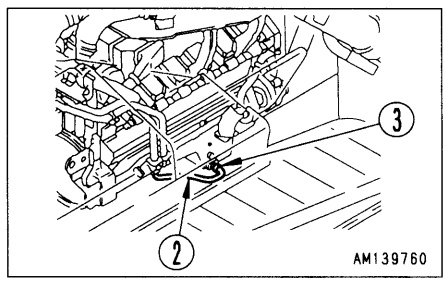
**⚠ WARNING**

**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 129 ℓ capacity
- Refill capacity: 129 ℓ (34.1 US gal, 28.4 UK gal)
- Socket wrench, filter wrench.



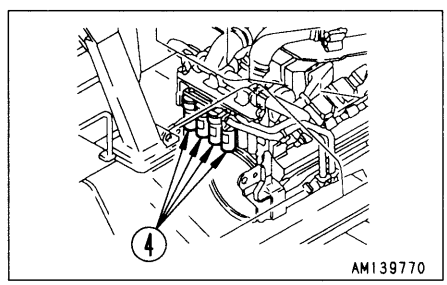

1. Open cover ① on the right side under the chassis, and take out hose ②.
   Set container to catch the oil under the drain valve.



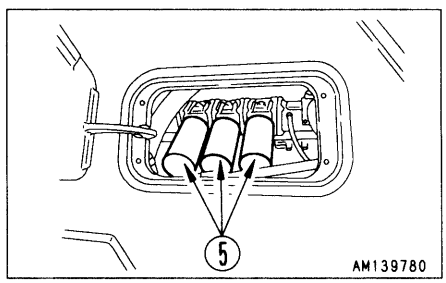

2. Loosen drain valve ③ slowly to avoid getting oil on yourself, and drain the oil.
   Take care not to loosen drain valve ③ so much that the stopper pin in the valve is distorted.
   Tightening torque drain valve ③: 64 ± 15 Nm
   (6.5 ± 1.5 kgm, 47 ± 11 lbft)

3. Check the drained oil, and if there are excessive metal particles of foreign material, please contact your Komatsu distributor.

4. Fit the hose on the engine hook and tighten drain valve ③.

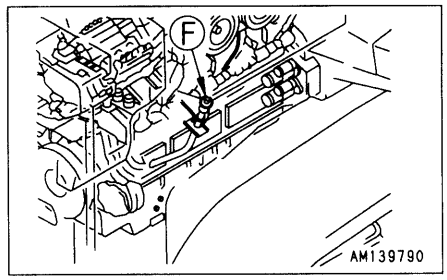



5. Using a filter wrench, remove full-flow filter cartridge ④ and by-pass filter cartridge ⑤ by turning it counterclockwise.
   When doing this, to prevent getting oil on yourself, do not carry out this operation from immediately under the cartridge.
   In particular, if this operation is carried out immediately after stopping the engine, a large amount of oil will come out, so wait for 10 minutes before starting the operation.




6. Clean the filter holder, fill a new cartridge with clean engine oil and coat the packing surface and thread of the new filter cartridge with engine oil (a thin coat of grease is also possible), then install the cartridge.

7. When installing, screw in until the seal surface contacts the filter holder, then tighten 3/4 to 1 of a turn.




8. 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.
   For details of the oil to use, see "20. USE OF FUEL, COOLANT AND LUBRICANTS ACCORDING TO AMBIENT TEMPERATURE".

9. Run the engine at idling for a short time, then stop the engine, and check that the oil level is between the H and L marks on the dipstick. For details, see "24.3 CHECK BEFORE STARTING".

**NOTICE**

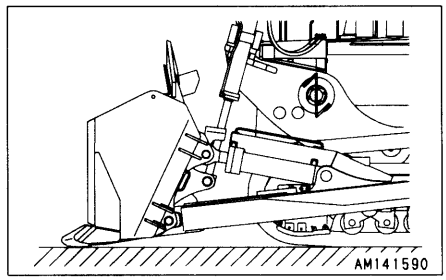
**Even if the machine has not been operated for 250 hours, the oil and filter cartridge must be replaced when the machine has been operated for 6 months.**

**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.**

## 24.4.3 CHECK OIL LEVEL IN HYDRAULIC TANK, ADD OIL

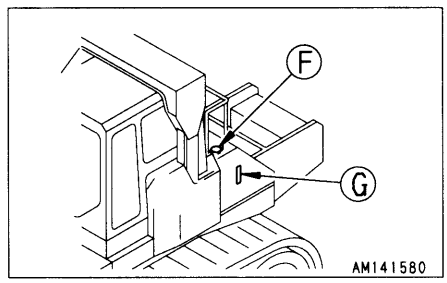
**⚠ WARNING**

- **When removing the oil filler cap, oil may spurt out, so stop the engine and wait for the oil temperature to go down, then 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. Pitch back the blade completely, and lower the blade to the ground in horizontal position shown in the diagram at right. Standard position for check machine.

2. Stop the engine and wait for about 5 minutes before checking oil level. If oil level is between H and L in sight gauge Ⓖ, it is normal.



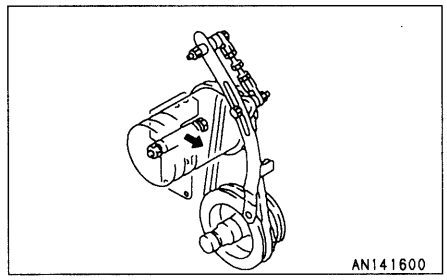

**NOTICE**

**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, add engine oil through oil filler Ⓕ.

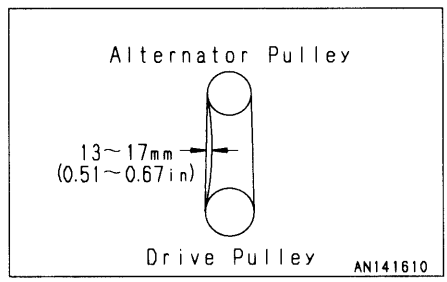
For details of the oil to use, see "20. USE OF FUEL, COOLANT AND LUBRICANTS ACCORDING TO AMBIENT TEMPERATURE".

## 24.4.4 CHECK ALTERNATOR DRIVE BELT TENSION, ADJUST




**Checking**

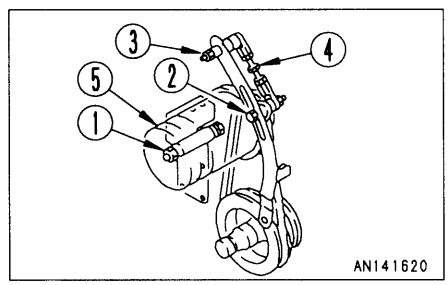
The belt tension should normally deflect by approx. 13 to 17 mm (0.51 to 0.67 in) when pressed with the finger at a point midway between the alternator pulley and the drive pulley (approx. 6 kg (13.2 lb)).




**Adjusting**

1. Loosen bolts ①, ② and nut ③.

2. Turn turnbuckle ④ and move alternator ⑤ so that the deflection of the belt is approx. 13 mm (0.51 in) (approx. 6 kg (13.2 lb)).




**REMARK**

When adjusting the V-belt, do not attempt to push alternator directly with a bar or the like, but use a wood pad to prevent damage to the core.

3. Tighten bolts and nuts ①, ②, and ③ to hold alternator ⑤ in position.
   When tightening nut ③, hold the bolt on both sides to prevent it from turning together with the nut.

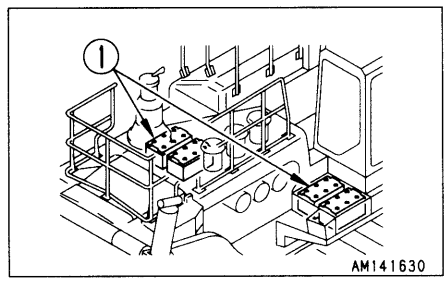
4. Check each pulley for damage, and V-grooves and V-belt for wear. Particularly, check whether V-belt is in contact with bottom of V-groove through wear.

5. Replace two belts at the same time if it has stretched, leaving no allowance for adjustment, or if there is a cut or crack on belt.

6. When the belt is replaced, readjust its tension after running for an hour.

## 24.4.5 CHECK LEVEL OF BATTERY ELECTROLYTE

Carry out this check before operating the machine.




**⚠ 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.**

1. Open the battery cover.

2. Remove cap ①, and check that the electrolyte is at the specified level (10 to 12 mm (0.39 to 0.47 in) 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.

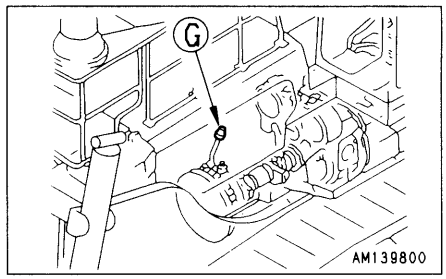
3. When adding distilled water to any cell at cap ①, add distilled water also to the other cells.

4. Clean the air hole in the battery cap, then tighten the cap securely.

**NOTICE**

**When adding distilled water in cold weather, add it before starting operations in the morning to prevent the electrolyte from freezing.**

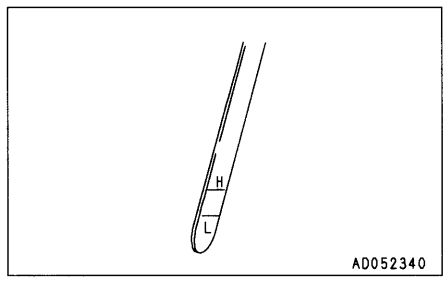
## 24.4.6 CHECK OIL LEVEL IN DAMPER CASE, ADD OIL




1. Remove dipstick Ⓖ and wipe the oil off with a cloth.

2. Insert dipstick Ⓖ fully in the oil filler pipe, then take it out again.

3. The oil level should be between the H and L marks on dipstick Ⓖ.
   If the oil level is below the L mark, add engine oil through oil filler.
   For details of the oil to use, see "20. USE OF FUEL, COOLANT AND LUBRICANTS ACCORDING TO AMBIENT TEMPERATURE".

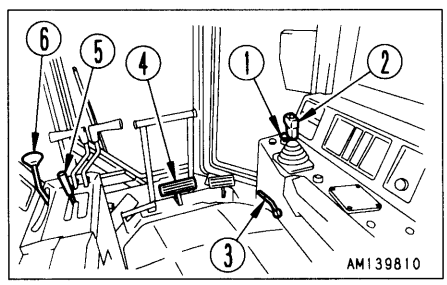



## 24.4.7 CHECK BRAKE PERFORMANCE

**⚠ WARNING**

**If the machine moves when the following check is carried out, ask your Komatsu distributor to carry out repair.**

Before starting the engine, confirm the safety around the machine and carry out the following check.




1. Start the engine.

2. Set safety lock ① to the FREE position, then operate blade control lever ② to raise the blade.
   Keep the safety locks at the FREE position.

3. Place brake lock lever ③ in "FREE".

4. Depress brake pedal ④ and place gear shift lever ⑤ to the 2nd speed position.

**NOTICE**

**Do not place the gear shift lever in the 1st speed position. Otherwise, it will cause damage to the machine.**

5. Operate fuel control lever ⑥ increase the engine speed little by little up to full speed.

6. If the machine does not move when the above operation is carried out, the brakes are normal.

## 24.5 EVERY 500 HOURS SERVICE

**Maintenance for every 250 hours service should be carried out at the same time.**

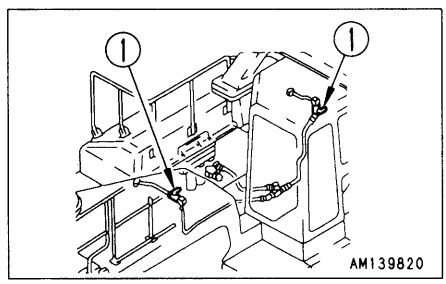
### 24.5.1 REPLACE FUEL FILTER CARTRIDGE

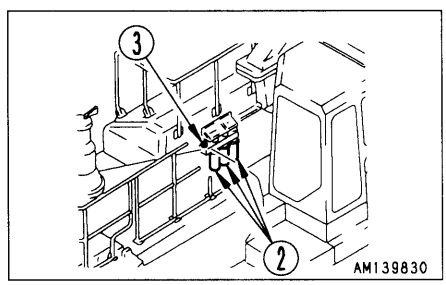
**⚠ WARNING**

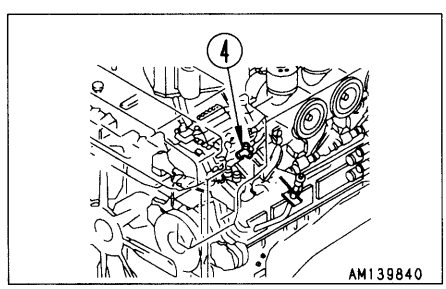
- **Engine is at high temperature immediately after the machine has been operated. Wait for engine to cool down before replacing the filter.**
- **Do not bring fire or sparks near the fuel.**
- **When bleeding the air, be carefull not to let the fuel overflow. It may cause a fire.**

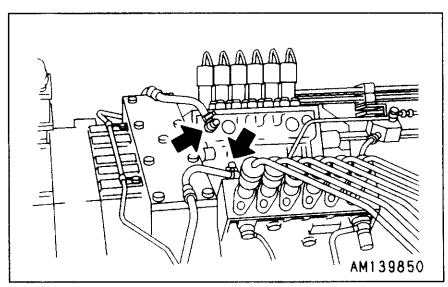
Prepare a filter wrench and a container to catch the fuel.

1. Set the container to catch the fuel under the filter cartridge.
2. Close valves ①.
3. Using a filter wrench, turn filter cartridge ② counterclockwise to remove it.
4. Clean the filter holder, fill a new filter cartridge with clean fuel, coat the packing surface with engine oil, then install it to the filter holder.
5. When installing, tighten until the packing surface contacts the seal surface of the filter holder, then tighten it up 1/2 to 3/4 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.
6. Open valves ① and loosen air bleeding plug ③.
7. Loosen the knob of feed pump ④ and move the pump up and down to draw off fuel until air ceases to come out of plug ③.
8. Push in the knob of feed pump ② and tighten it.



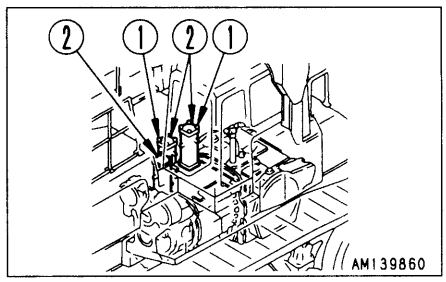




**REMARK**

When only replacing the filter cartridge, it is enough to bleed the air from the air bleeding plug at the filter head.

However, if the fuel piping is removed, bleed the air also from the air bleeding valve of the injection pump. (2 places)

## 24.5.2 REPLACE TRANSMISSION FILTER ELEMENT, TRANSMISSION LUBRICATING FILTER ELEMENT AND TORQUE CONVERTER OIL FILTER ELEMENT



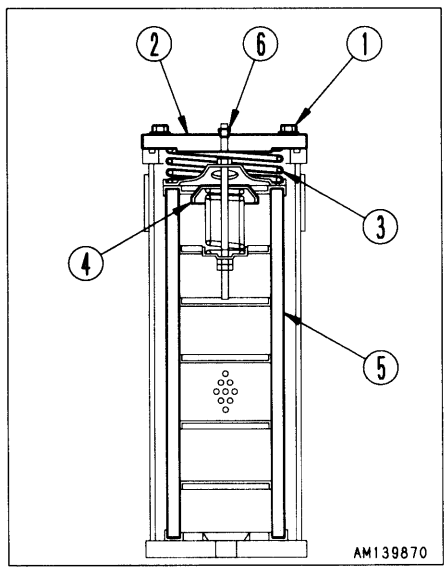

**⚠ WARNING**

**Before opening the filter case, depress the brake pedal several times to release the pressure, then lock the brake pedal. If there is still pressure inside the filter, the oil may spurt out.**

1. Open the floor cover in the middle of the machine.

2. Remove bolts ①, cover ②, spring ③ and valve ④, then take out element ⑤.
   Clean the inside of the case and the removed parts, and install new elements.
   Replace the O-ring at the same time.

3. After replacing the filter, loosen plug ⑥, and crank the engine to bleed the air. After bleeding the air, tighten plug ⑥ again.




## 24.5.3 CHECK OIL LEVEL IN FINAL DRIVE CASE, ADD OIL

**⚠ WARNING**

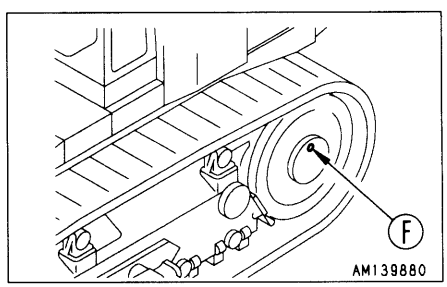
**There is danger that the oil may spurt out under internal pressure, so to the side, and gradually turn the plug to release the internal pressure before removing the plug completely.**

1. Place the machine on a horizontal place.

2. Turn the final drive so oil filler plug Ⓕ comes to the top.

3. Remove oil filler plug Ⓕ to check if the oil level is appropriate, at around the lower edge of the plug hole.

4. If the oil level is still too low, add gear oil through plug hole Ⓕ until the oil overflows.
   Before removing oil plug Ⓕ, remove all the mud and dirt from around oil filler plug Ⓕ. Be careful not to let any dirt or sand get in when adding oil.
   For details of the oil to use, see "20. USE OF FUEL, COOLANT AND LUBRICANTS ACCORDING TO AMBIENT TEMPERATURE".

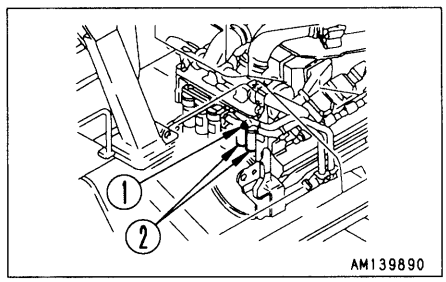


## 24.5.4 REPLACE CORROSION RESISTOR CARTRIDGE

**⚠ WARNING**

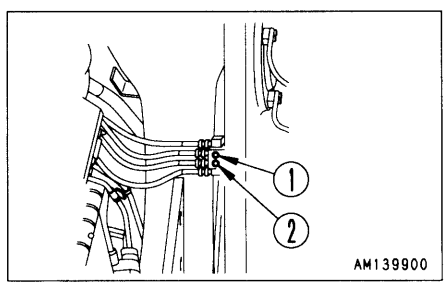
**If the engine has been operated, all parts will be at a high temperature, so never try to replace the cartridge immediately after stopping the engine.**
**Always wait for the engine and other parts to cool down.**

Prepare the following.
- Container to catch drained coolant
- Filter wrench




1. Close valve ①.
2. Set a container to catch the coolant under the cartridge.
3. Using a filter wrench, remove cartridge ②.
4. Clean the filter holder, coat the packing surface and thread of the new cartridge with engine oil, then install it to the filter holder.
5. 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 coolant. If the filter cartridge is too loose, coolant will also leak from the packing, so always tighten to the correct amount.
6. Open valve ①.
7. After replacing the cartridge, start the engine and check for any leakage of water from the filter seal surface. If there is any water leakage, check if the cartridge is tightened properly.

## 24.5.5 GREASE TENSION PULLEY (1 PLACE) AND FAN PULLEY (1 PLACE)




- Tension pulley ①
- Fan pulley ②

## 24.6 EVERY 1000 HOURS SERVICE

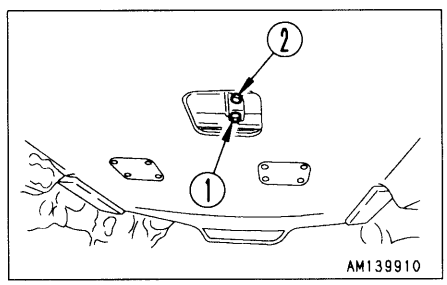
**Maintenance for every 250 and 500 hours service should be carried out at the same time.**

### 24.6.1 CHANGE OIL IN POWER TRAIN CASE, CLEAN STRAINERS (INCL. TRANSMISSION CASE, TORQUE CONVERTER CASE AND BEVEL GEAR CASE)

**⚠ 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.**

Prepare the following.
- Container to catch drained oil: Min 345 ℓ capacity
- Refill capacity: 345 ℓ (91.1 US gal, 75.9 UK gal)

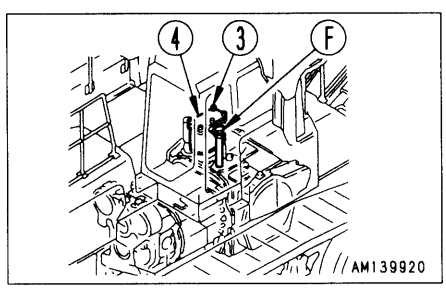



1. Remove the cover on the bottom of the rear body.

2. Remove drain plug ① slowly to avoid getting oil on yourself, and loosen drain plug ② to drain the oil.

3. After draining, tighten drain plug ② and install drain plug ①.

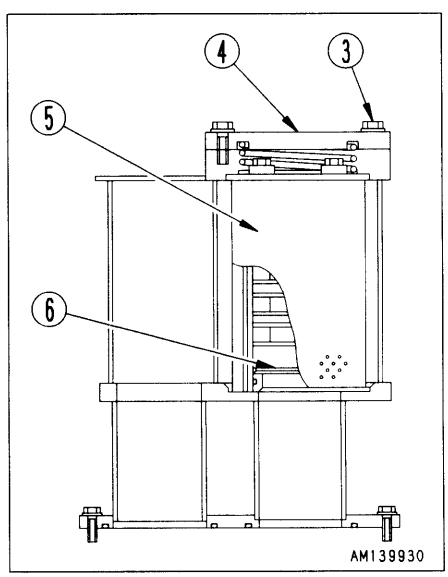
4. Open the inspection cover on rear floor, remove bolts ③ and cover ④.




5. Take out strainer ⑤ and magnet ⑥.
   If any damage to strainer ⑤ or magnet ⑥ is found, replace with a new one.

6. Remove all dirt from strainer, then wash in clean light oil.
   Clean the inside of the case and the plug.

7. Install the strainers to their original position.




8. After installing, replace the element in the transmission filter, transmission lubricating filter and torque converter filter.
   For details, see "24.4 EVERY 250 HOURS SERVICE".

9. Refill the specified quantity of engine oil through oil filler Ⓕ.
   For details of the oil to use, see "20. USE OF FUEL, COOLANT AND LUBRICANTS ACCORDING TO AMBIENT TEMPERATURE".

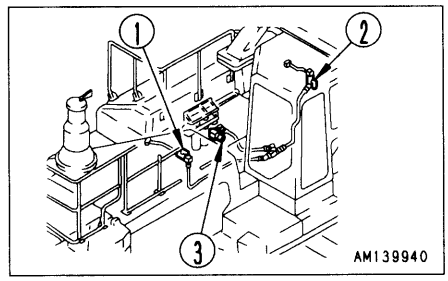
10. Check that the oil is at the specified level.
    For details, see "24.3 CHECK BEFORE STARTING".

### 24.6.2 CHECK, CLEAN FUEL STRAINER

1. Tighten valve ① and ②.

2. Remove cap ③, and take out the strainer. Clean the strainer and the strainer case.
   The strainer is soldered on cap ③.

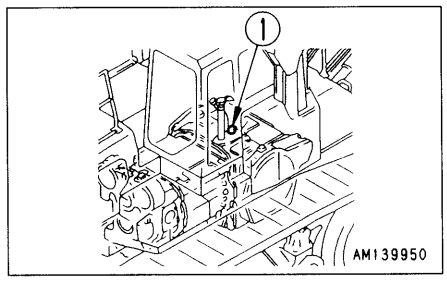
3. After installing them, open valves ① and ②.




### 24.6.3 CLEAN STEERING CLUTCH CASE BREATHER

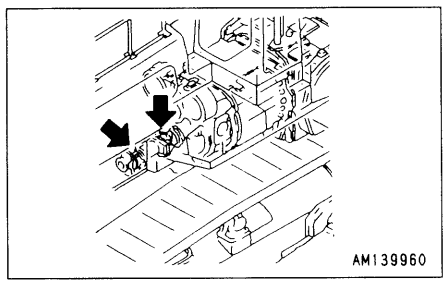
1. Open the rear floor cover.

2. Remove breather ① on steering clutch case, and wash out dust remaining inside with diesel fuel or flushing oil.




### 24.6.4 GREASE UNIVERSAL JOINT

Apply grease to the grease fittings (4 places on diametrically opposite sides) shown by arrows.



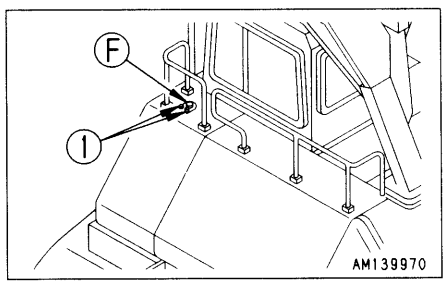

### 24.6.5 REPLACE FILTER ELEMENT OF HYDRAULIC TANK BREATHER

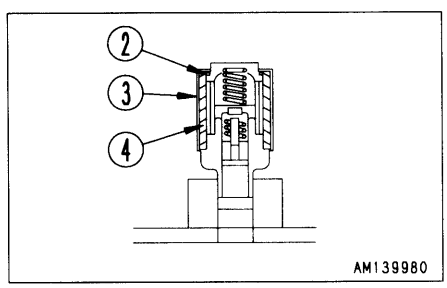
**⚠ WARNING**

**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 oil filler cap Ⓕ, turn it slowly to release the internal pressure, then remove it carefully.**

1. Remove snap ring ② of breather ① and replace filter element ④ with a new one.

2. Install cover ③ and snap ring ②.




### 24.6.6 CHECK ALL TIGHTENING PARTS OF TURBO-CHARGER

Contact your Komatsu distributor to have the tightening portions checked.

## 24.7 EVERY 2000 HOURS SERVICE

**Maintenance for every 250, 500 and 1000 hours service should be carried out at the same time.**

### 24.7.1 CHANGE OIL IN HYDRAULIC TANK, REPLACE HYDRAULIC OIL FILTER ELEMENT AND CLEAN STRAINER

**⚠ 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 oil filler cap Ⓕ, turn it slowly to release the internal pressure, then remove it carefully.**
- **When removing cover ⑥, undo the bolts (4 bolts) gradually to prevent the cover flying off under the force of spring ⑦.**

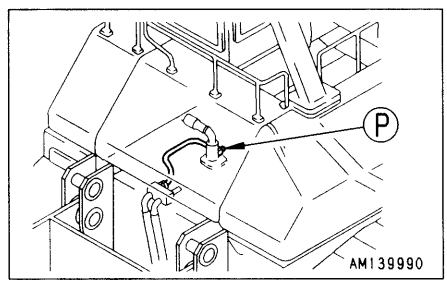
Prepare the following.
- Container to catch drained oil: Min. 300 ℓ capacity
- Refill capacity: 300 ℓ (79.2 US gal, 66.0 UK gal)

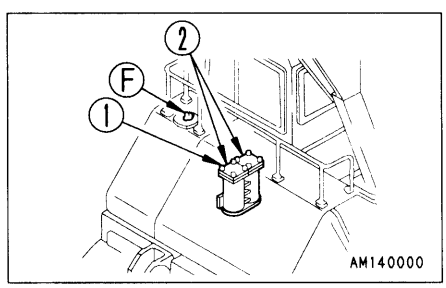
1. Lower the blade and ripper on the ground securely, stop the engine and slowly turn the cap of oil filler Ⓕ to release the internal pressure. Then, remove the cap.

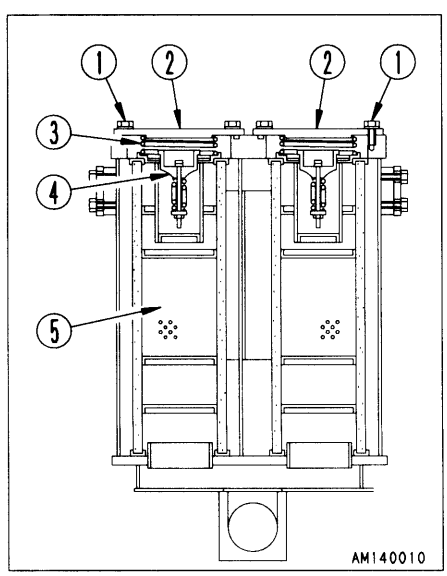
2. Loosen drain valve Ⓟ on the top of the steering case to drain the oil. After draining, tighten valve Ⓟ.
   When loosening drain plug Ⓟ, be careful to avoid getting oil on yourself.

3. Remove bolt ① and cover ②, and take out spring ③, valve ④ and element ⑤.

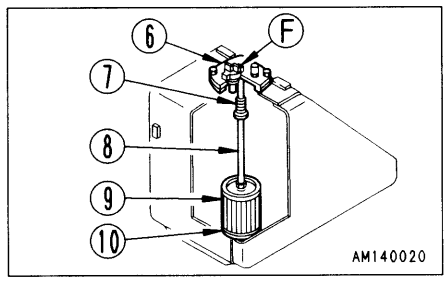
4. Clean the removed parts and install new elements.
   Replace the O-ring at the same time.



5. Remove cover ⑥ at the top of the hydraulic tank and lift up the top of rod ⑧ from above to take out spring ⑦ and strainer ⑨.




6. Remove all dirt from the strainer, then wash in clean light oil or flushing oil.
   If strainer ⑨ is damaged, replace it with a new one.

7. Refit strainer ⑨ by inserting it into tank projecting part ⑩.

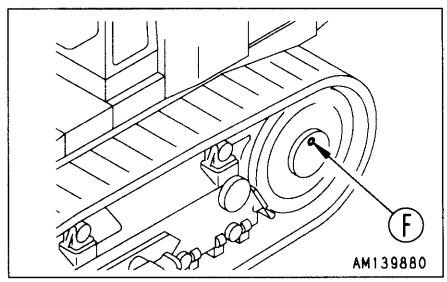
8. Then, refill the specified quantity of engine oil through oil filler Ⓕ.
   For details of the oil to use, see "20. USE OF FUEL, COOLANT AND LUBRICANTS ACCORDING TO AMBIENT TEMPERATURE".

9. Check that the oil is at the specified level. For details, see "24.4 EVERY 250 HOURS SERVICE".

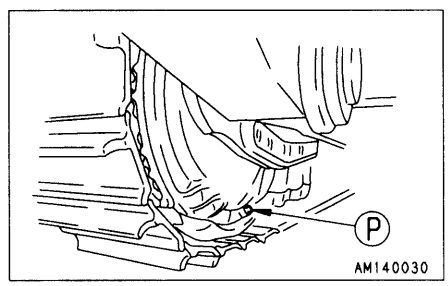
## 24.7.2 CHANGE OIL IN FINAL DRIVE CASE, REPLACE FILTER ELEMENT

**⚠ 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.**
- **There is danger that the oil may spurt out under internal pressure, so to the side, and gradually turn the plug to release the internal pressure before removing the plug completely.**




Prepare the following.
- Container to catch drained oil: Min. 160 ℓ capacity
- Refill capacity: (each) 160 ℓ (42.2 US gal, 35.2 UK gal)

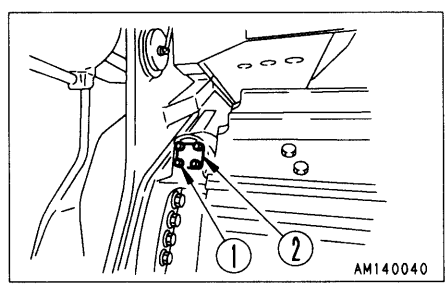



The maintenance shall be made placing the machine on a horizontal plane.

1. Turn the final drive so oil filler plug Ⓕ comes to the top.

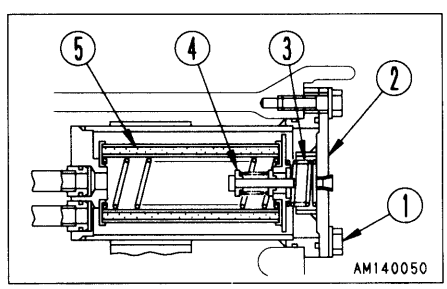
2. Remove oil filler plug Ⓕ and drain plug Ⓟ to drain the oil.
   Remove all the mud and dirt from around oil filler plug Ⓕ before removing it. Be careful not to let any dirt or sand get in when adding oil.

3. After draining, tighten drain plug Ⓟ.



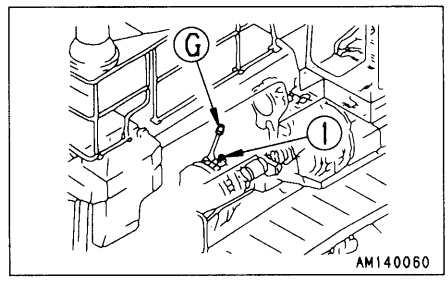

4. Remove bolts ①, cover ②, spring ③ and valve assembly ④, then take out element ⑤.

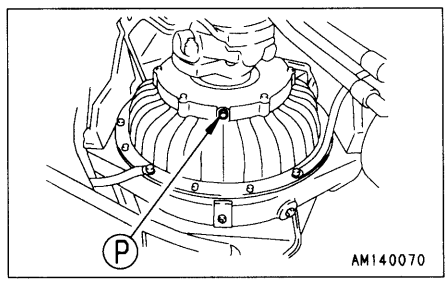
5. After removing element ⑤, clean the case interior and the removed parts, and install a new element.
   Replace the O-ring at the same time.




6. Refill the gear oil until oil overflows from plug hole Ⓕ, and tighten the plugs.
   For details of the oil to use, see "20. USE OF FUEL, COOLANT AND LUBRICANTS ACCORDING TO AMBIENT TEMPERATURE".

## 24.7.3 CHANGE OIL IN DAMPER CASE, CLEAN BREATHER




Prepare the following.

- Container to catch drained oil: Min. 2.4 ℓ capacity
- Refill capacity 2.4 ℓ (0.63 US gal, 0.53 UK gal)

1. Remove breather ① at the top of the damper.
2. Wash out dust remaining inside of breather with diesel oil and flushing oil.
3. Install breather ① to the original position.
4. Open the inspection cover under the chassis.
5. Remove drain plug Ⓟ slowly to avoid getting oil on yourself, and drain the oil.
   After draining the oil, tighten plug Ⓟ.
6. Pull out dipstick Ⓖ, and add engine oil to the specified level through oil filler.
   For details of the oil to use, see "20. USE OF FUEL, COOLANT, AND LUBRICANTS ACCORDING TO AMBIENT TEMPERATURE".
7. Check that the oil level is between the H and L marks on dipstick Ⓖ. For details, see "24.3 CHECK BEFORE STARTING".
8. Close the inspection cover.

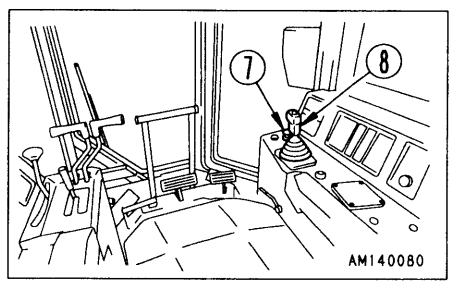
## 24.7.4 REPLACE PPC (PROPORTIONAL PRESSURE CONTROL) FILTER ELEMENT

**⚠ WARNING**

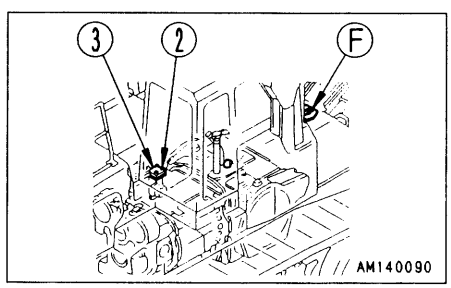
- **When removing oil filler cap Ⓕ, turn it slowly to relieve inner pressure.**
- **When loosening bolt ①, turn it slowly to release the internal pressure.**

**NOTICE**

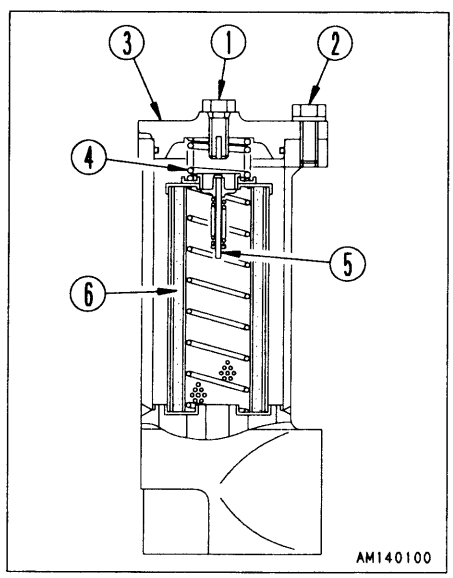
- **If there is oil in the tank, the oil will overflow, so drain the hydraulic oil before carrying out this operation.**
  **For details, see "24.7.1 CHANGE OIL IN HYDRAULIC TANK, REPLACE HYDRAULIC FILTER ELEMENT, AND CLEAN STRAINER".**
- **Release the pressure in the accumulator circuit before replacing the element.**
  **After stopping the engine, set safety locks ⑦ to the FREE position, then operate each work equipment control lever ⑧ 3 or 4 times to the end of its stroke. The remaining pressure in the accumulator circuit will be released after one minute.**




1. Remove oil filler cap Ⓕ of the hydraulic tank.

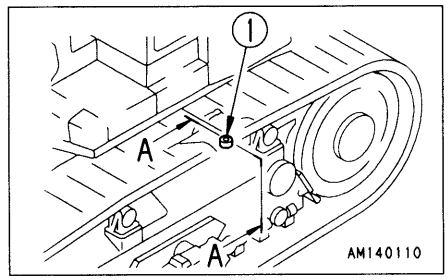



2. Open the inspection cover in the middle of the floor.
3. Loosen bolt ①, remove bolts ② and filter cover ③, then take out spring ④, valve ⑤, and element ⑥.
4. Wash the parts that have been removed, then fit a new element and install all the parts again.
   Replace the O-ring at the same time.
5. Close the inspection cover.

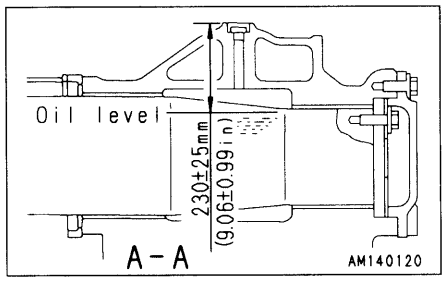


## 24.7.5 CHECK OIL LEVEL IN PIVOT BEARING, ADD OIL

1. Remove plug ①.
   When removing plug ①, be careful not to let dirt or dust get in.

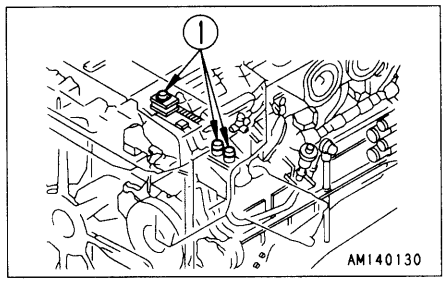



2. Check that the oil is at the level shown in the diagram.
   If the oil level is low, add engine oil (CD Class SAE30, regardless of the ambient temperature) through the hole for plug ①. (each 70 ℓ (18.5 US gal, 15.4 UK gal))




## 24.7.6 CLEAN ENGINE BREATHER ELEMENT

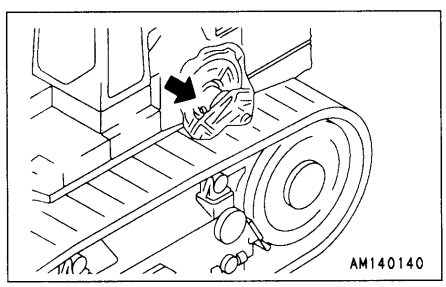
1. Wipe off all the dirt around the breather on the cam follower cover.
2. Remove breather ①.
3. Wash the whole breather in diesel oil or flushing oil, then blow it dry with compressed air.
4. Replace the breather O-ring with a new part, coat with engine oil, and install it.

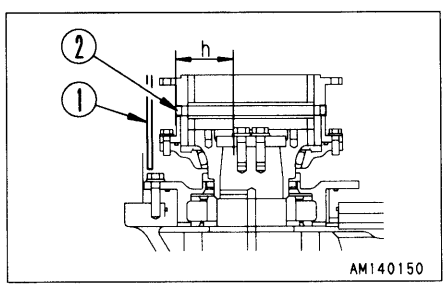



## 24.7.7 CHECK OIL LEAKAGE FROM GEAR COUPLING

Check that there is no oil leakage. If any abnormality is found, contact your Komatsu distributor for disassembly and repair or replacement.

1. Remove protective cover ①.
2. Turn the final drive to bring plug ② to the top position.
3. Remove plug ② and check the oil level "h".
   h = 145 ± 10 mm (5.7 ± 0.4 in)



### 24.7.8 CLEAN, CHECK TURBOCHARGER

Contact your Komatsu distributor for cleaning or inspection.

### 24.7.9 CHECK PLAY OF TURBOCHARGER ROTOR

Contact your Komatsu distributor to have the play checked.

### 24.7.10 CHECK ALTERNATOR, STARTING MOTOR

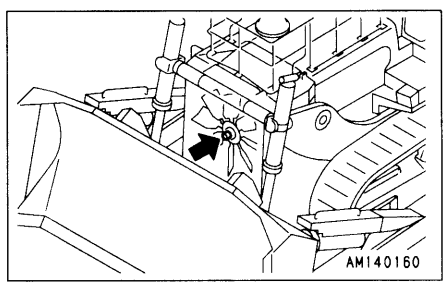
The brush may be worn, or the bearing may have run out of grease, so contact your Komatsu distributor for inspection or repair.

If the engine is started frequently, carry out inspection every 1000 hours.

### 24.7.11 CHECK ENGINE VALVE CLEARANCE, ADJUST

As special tool is required for removing and adjusting the parts, you shall request Komatsu distributor for service.

### 24.7.12 GREASING TO THE FAN MOUNT SPLINE



## 24.8 EVERY 4000 HOURS SERVICE

**Maintenance for every 250, 500, 1000 and 2000 hours service should be carried out at the same time.**

### 24.8.1 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.

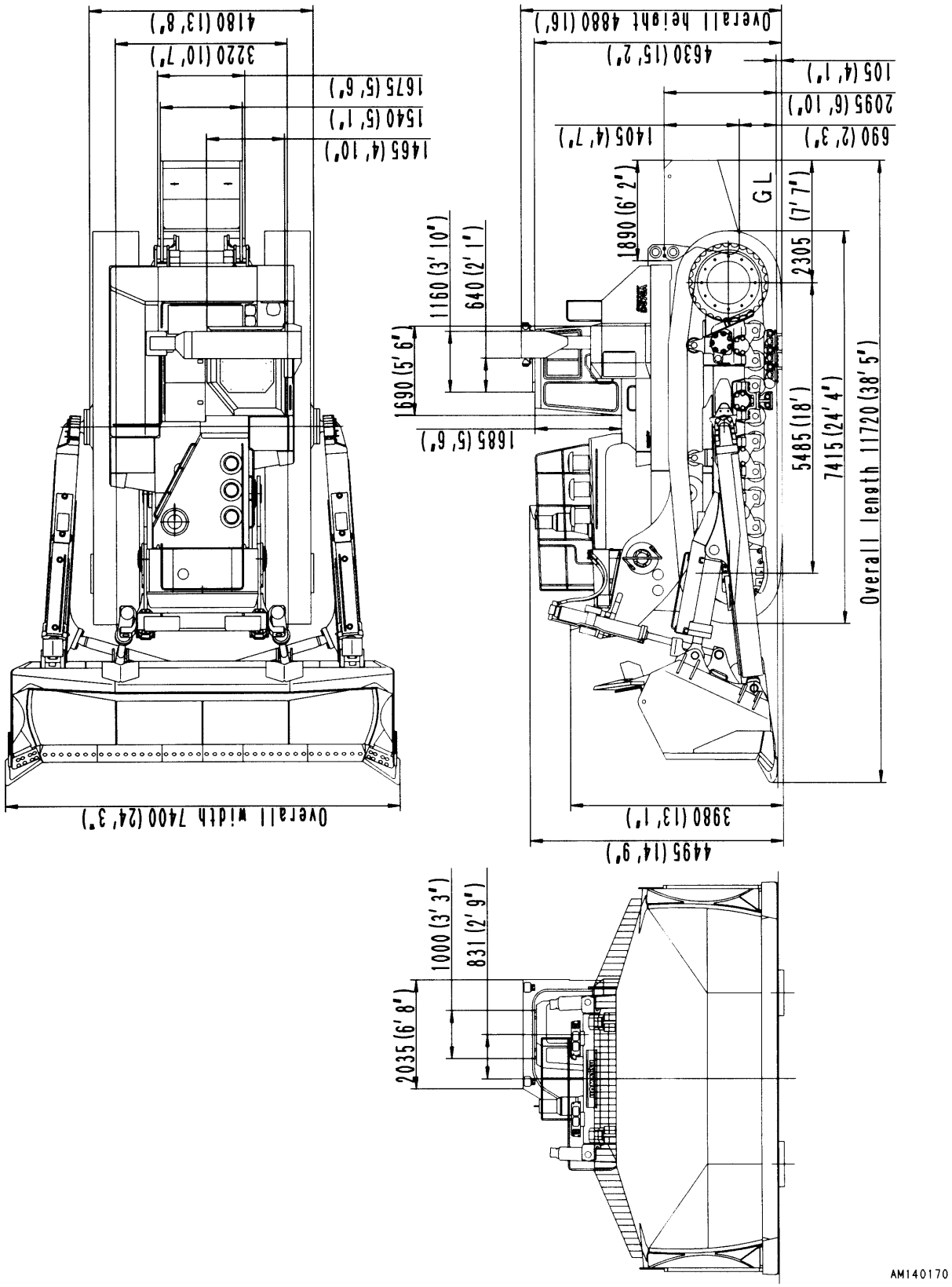
### 24.8.2 CHECK VIBRATION DAMPER

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

# SPECIFICATIONS

# 25. SPECIFICATIONS

| | | | |
|---|---|---|---|
| **OPERATING WEIGHT (without operator)** | | | 148000 kg (326340 lb) |
| (with super blade, counterweight, 860 mm (34 in) shoe, ROPS cab, and air conditioner) | | | |
| **PERFORMANCE** | | | |
| • Travel speed | Forward | 1st | 3.7 km/h (2.3 MPH) |
| | | 2nd | 6.8 km/h (4.2 MPH) |
| | | 3rd | 12.0 km/h (7.5 MPH) |
| | Reverse | 1st | 4.5 km/h (2.8 MPH) |
| | | 2nd | 8.0 km/h (5.0 MPH) |
| | | 3rd | 13.8 km/h (8.6 MPH) |
| **BLADE** | | | For crushed rock surface application |
| • Weight of attachment (incl. tilt cylinder and cylinder support) | | | 29210 kg (64408 lb) |
| • Max. tilt | | | 1000 mm (3 ft 3 in) |
| • Pitch angle | | | 45° – 77° |
| **ENGINE** | | | |
| • Model | | | Komatsu SA12V170 diesel engine |
| • Flywheel horsepower | | | 858 kW (1150 HP)/1800 rpm |
| • Maximum torque | | | 5472 Nm (558 kgm)/1300 rpm |
| • Starting motor | | | 24 V 11 kW x 2 pieces |
| • Alternator | | | 24 V 75 A |
| • Battery | | | 12 V 200 Ah x 4 pieces |


Overall width 7400 (24' 3")
4180 (13' 8")
3220 (10' 7")
1675 (5' 6")
1540 (5' 1")
1465 (4' 10")
Overall height 4880 (16')
4630 (15' 2")
105 (4' 1")
2095 (6' 10")
690 (2' 3")
1405 (4' 7")
1890 (6' 2")
GL
2305 (7' 7")
1160 (3' 10")
640 (2' 1")
1690 (5' 6")
1685 (5' 6")
5485 (18')
7415 (24' 4")
Overall length 11720 (38' 5")
3980 (13' 1")
4495 (14' 9")
1000 (3' 3")
831 (2' 9")
2035 (6' 8")
AM140170

# OPTIONS, ATTACHMENTS

# 26. GENERAL PRECAUTIONS

## 26.1 PRECAUTIONS RELATED TO SAFETY

If attachments or options other than those authorized 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 (55 lb)), 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 position 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 front 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.

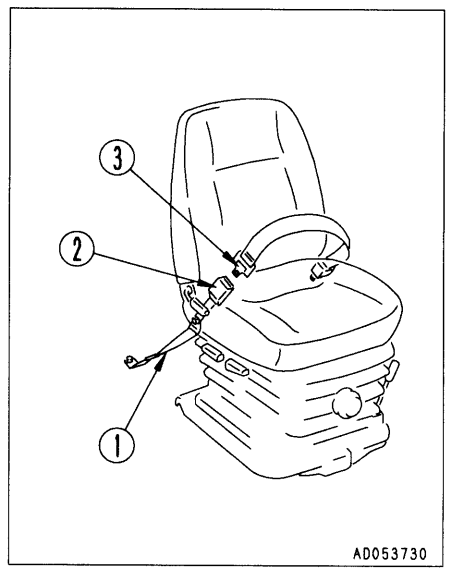
# 27. USING SEAT BELT

When operating a machine equipped with ROPS, be sure to use the seat belt.

**⚠ WARNING**

- **Before fastening the seat belt, inspect the securing brackets and belt for abnormal conditions.**
  **Replace any worn or damaged seat belt or the securing brackets.**
- **Adjust and fasten the seat belt before operating the machine.**
- **Always use seat belt when operating the machine.**
- **Fit the seat belt across your lap without twisting.**

## 27.1 FASTEN THE BELT AND REMOVE IT IN THE FOLLOWING MANNER




1. Adjust the seat so that the brake pedal can be depressed all the way with the operator's back against the backrest.

2. After positioning the seat, adjust the tether belt ①. With the seat unoccupied, tense the belt slightly across the seat and install.

3. Sit in the seat, hold the tongue of reel ②, and pull the belt out slowly to a length which fully covers your lap.

4. Insert the tongue into buckle ③ and push until there is a click. Pull back reel ② until the belt fits securely across your lap. In this condition, the lock is applied to prevent the belt from extending any further.
   Fit the seat belt across your lap without twisting.

**REMARK**

If the lock is applied before the tongue is installed into the buckle, return the belt to the reel, then carry out the operation again from the beginning.

5. Tense the belt and check that the lock is applied.

6. To remove the belt, press the red button on buckle ②. The belt will automatically wind in.

Inspect bolts and fittings on the chassis for tightness. Retighten any loose bolts to 19.6 to 29.4 Nm (2 to 3 kgm, 14.5 to 21.7 lbft) torque.

If the seat is scratched or frayed or if any of the fittings are broken or deformed from long service, replace the seat belt immediately.

**D575A-2 SUPER DOZER**

Form No. SEAM007905T