Operation & Maintenance Manual

SEAM059901T

GALEO

D155AX-5

BULLDOZER

SERIAL NUMBERS 76001 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

FOREWORD

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.

FOREWORD

This manual provides rules and guidelines which will help you use this machine safely and effectively. The precautions in this manual must be followed at all times when performing operation and maintenance. Most accidents are caused by the failure to follow fundamental safety rules for the operation and maintenance of machines. Accidents can be prevented by knowing beforehand conditions that may cause a hazard when performing operation and maintenance.

⚠ WARNING

Operators and maintenance personnel must always do as follows before beginning operation or maintenance.

- **Always be sure to read and understand this manual thoroughly before performing operation and maintenance.**
- **Read the safety messages given in this manual and the safety labels affixed to the machine thoroughly and be sure that you understand them fully.**

Keep this manual at the storage location for the Operation and Maintenance Manual given below, and have all personnel read it periodically.

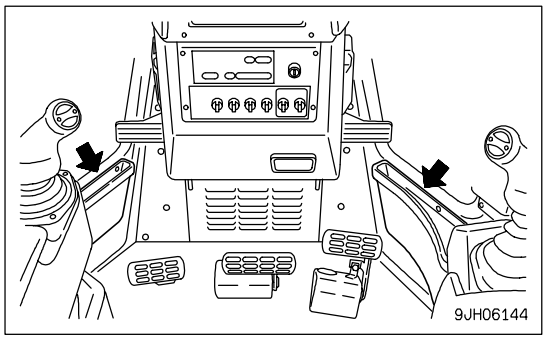
If this manual has been lost or has become dirty and cannot be read, request a replacement manual immediately from Komatsu or your Komatsu distributor.

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

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.

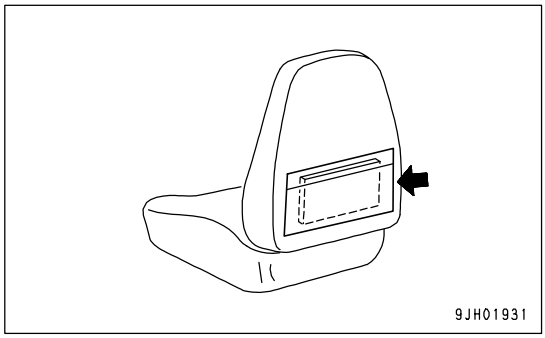
Location to Keep Operation & Maintenance Manual
- Machine equipped with cab

Inside of right and left doors



• Machine equipped without cab

Back pocket of operator's seat



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:**

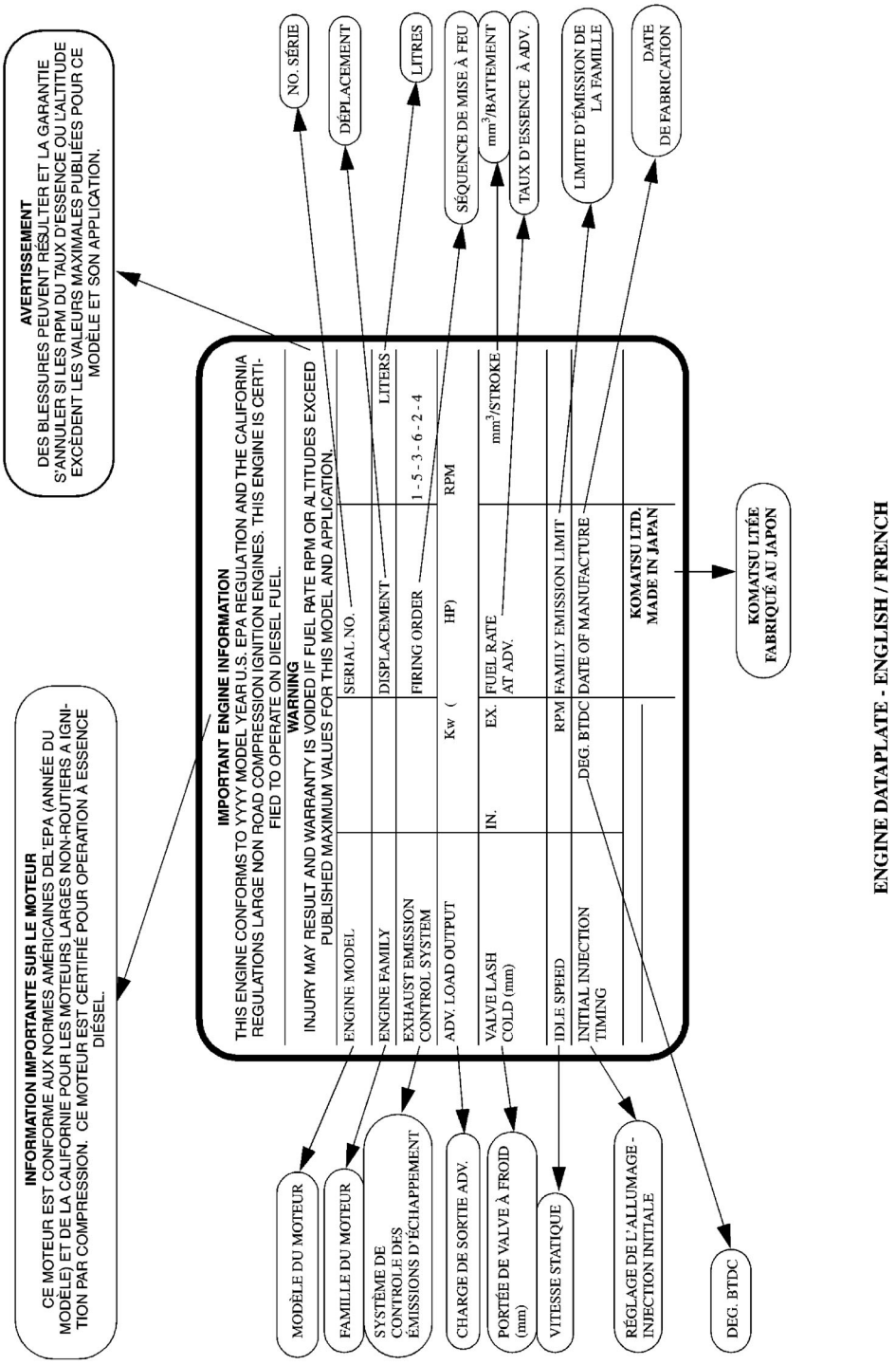
Les bris, autres que ceux résultant de défauts de matériaux ou de construction, ne sont pas couverts par cette Garantie. Komatsu n'est pas responsable pour bris ou dommages résultant de ce que Komatsu détermine comme étant de l'abus ou négligence, incluant mais ne se limitant pas à: l'opération sans 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.**

CEKQ000600 - Komatsu America International Company 12/99

FOREWORD



ENGINE DATAPLATE - ENGLISH / FRENCH

SAFETY INFORMATION

To enable you to use this machine safely, safety precautions and labels are given in this manual and affixed to the machine to give explanations of situations involving potential hazards and of the methods of avoiding such situations.

Signal words

The following signal words are used to inform you that there is a potential hazardous situation that may lead to personal injury or damage.
In this manual and on machine labels, the following signal words are used to express the potential level of hazard.

⚠ DANGER Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.

⚠ WARNING Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.

⚠ CAUTION Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury. This word is used also to alert against unsafe practices that may cause property damage.

Example of safety message using signal word

⚠ WARNING

When standing up from the operator's seat, always place the safety lock lever in the LOCK position.
If you accidentally touch the control levers when they are not locked, this may cause a serious injury or death.

Other signal words

In addition to the above, the following signal words are used to indicate precautions that should be followed to protect the machine or to give information that is useful to know.

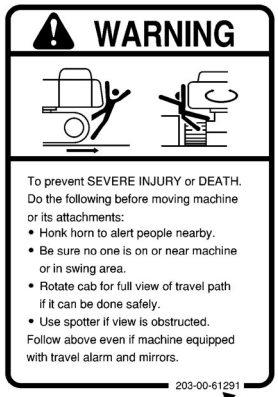
NOTICE This word is used for precautions that must be taken to avoid actions which could shorten the life of the machine.

REMARKS This word is used for information that is useful to know.

- **Safety labels**

Safety labels are affixed to the machine to inform the operator or maintenance worker on the spot when carrying out operation or maintenance of the machine that may involve hazard.
This machine uses "Safety labels using words" and "Safety labels using pictograms" to indicate safety procedures.

Example of safety label using words



Safety labels using pictogram

Safety pictograms use a picture to express a level of hazardous condition equivalent to the signal word. These safety pictograms use pictures in order to let the operator or maintenance worker understand the level and type of hazardous condition at all times. Safety pictograms show the type of hazardous condition at the top or left side, and the method of avoiding the hazardous condition at the bottom or right side. In addition, the type of hazardous condition is displayed inside a triangle and the method of avoiding the hazardous condition is shown inside a circle.

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, it is your responsibility to take the necessary steps to ensure safety.
In no event should you engage in prohibited uses or actions described in this manual.

The explanations, values, and illustrations in this manual were prepared based on the latest information available at that time. 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.

The numbers in circles in the illustrations correspond to the numbers in ( ) in the text. (For example: ① -> (1))

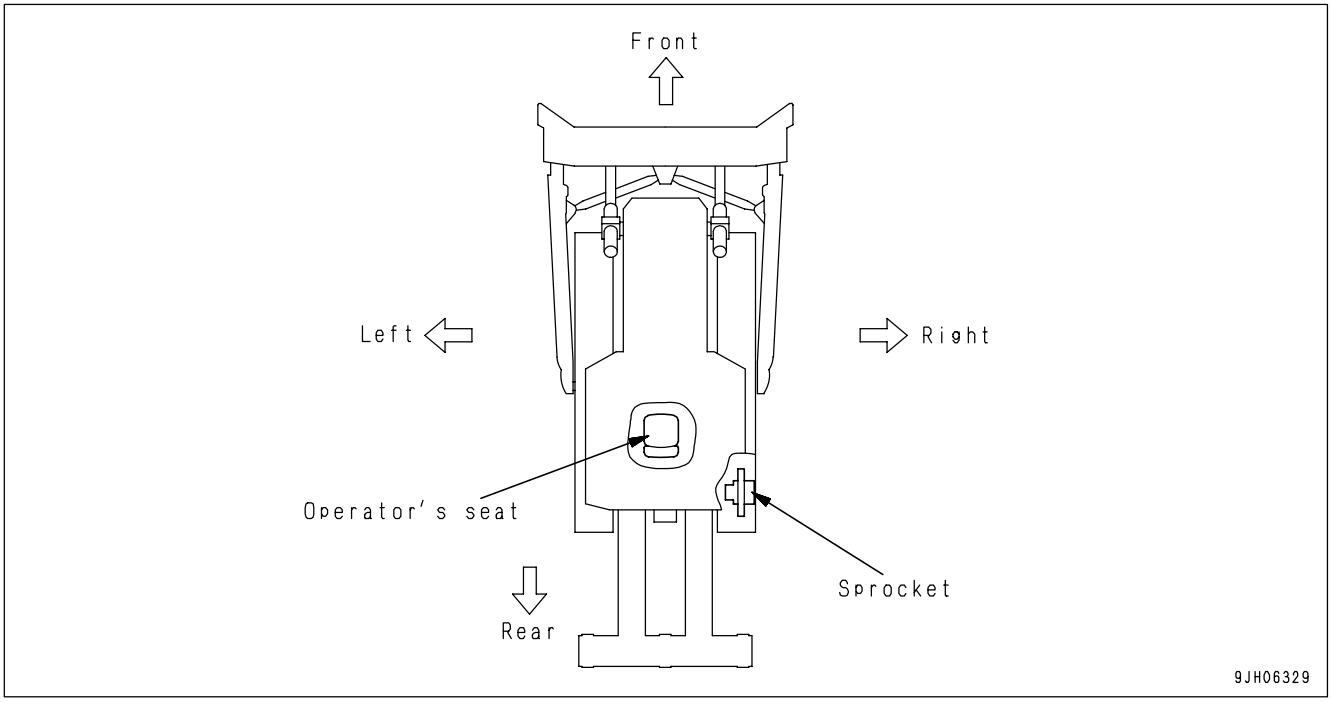
INTRODUCTION

This Komatsu machine is designed to be used mainly for the following work:

- Dozing
- Cutting into hard or frozen ground or ditching
- Felling trees, removing stumps
- Pushing
- Ripping

For further details, see "WORK POSSIBLE USING BULLDOZER (PAGE 3-118)" and "RIPPER OPERATION (PAGE 3-111)".

FRONT/REAR, LEFT/RIGHT DIRECTIONS OF MACHINE



In this manual, the terms front, rear, left, and right refer to the travel direction as seen from the operator's seat when the operator's seat is facing the front and the sprocket is at the rear of the machine.

BREAKING IN THE MACHINE

NOTICE

Your Komatsu machine has been thoroughly adjusted and tested before shipment from the factory. However, operating the machine under full load before breaking the machine in can adversely affect the performance and shorten the machine life.
Be sure to break in the machine for the initial 100 hours (as indicated on the service meter).

Make sure that you fully understand the content of this manual, and pay careful attention to the following points when breaking in the machine.

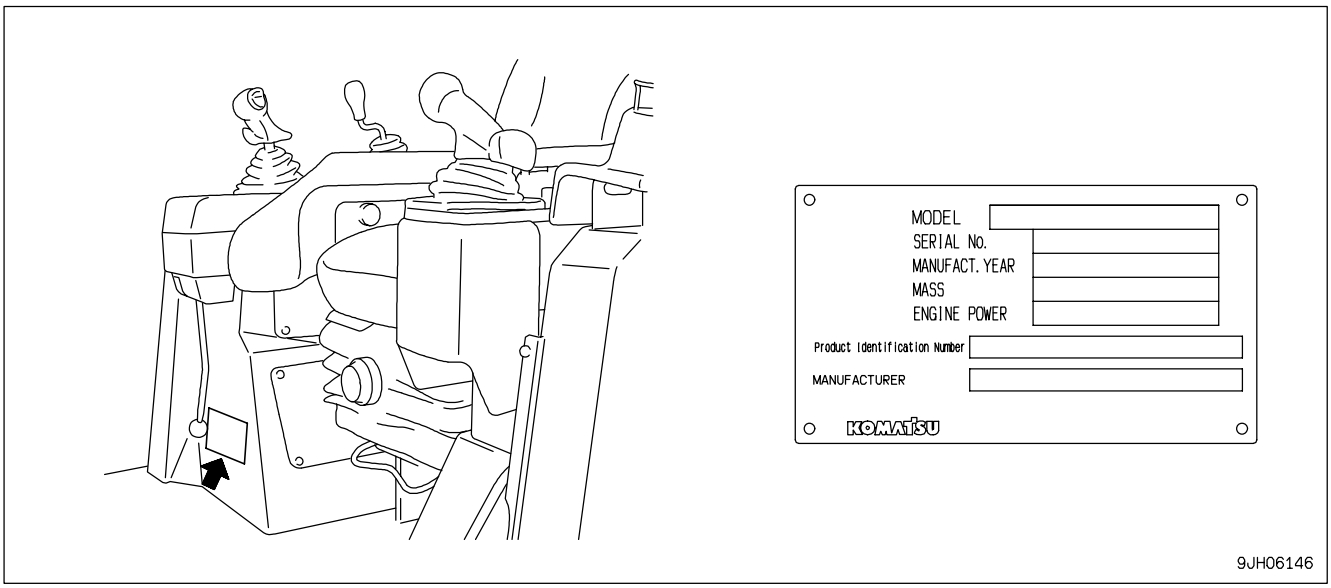
- Run the engine at idling for 15 seconds after starting it. During this time, do not operate the control levers or fuel control dial.
- Idle the engine for 5 minutes after starting it up.
- Avoid operation with heavy loads or at high speeds.
- Immediately after starting the engine, avoid sudden starts, sudden acceleration, unnecessary sudden stops, and sudden changes in direction.

NECESSARY INFORMATION

When requesting service or ordering replacement parts, please inform your Komatsu distributor of the following items.

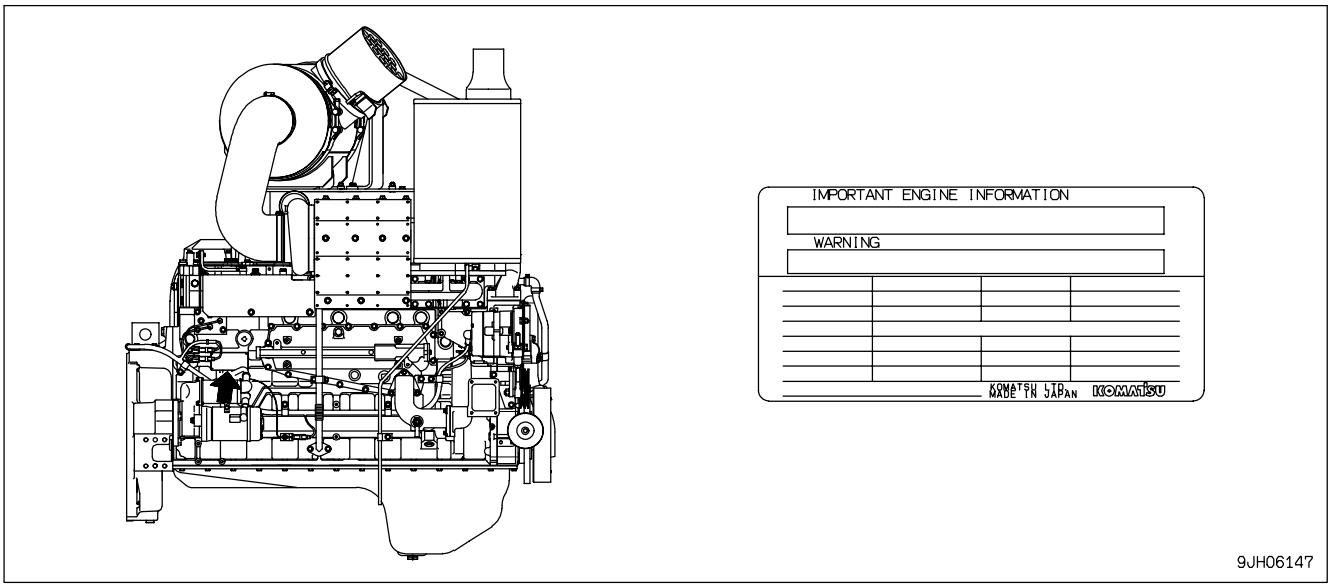
PRODUCT IDENTIFICATION NUMBER (PIN), MACHINE SERIAL NO. PLATE

Under the front of the console box on the right side of the operator's seat.
The design of the nameplate differs according to the territory.



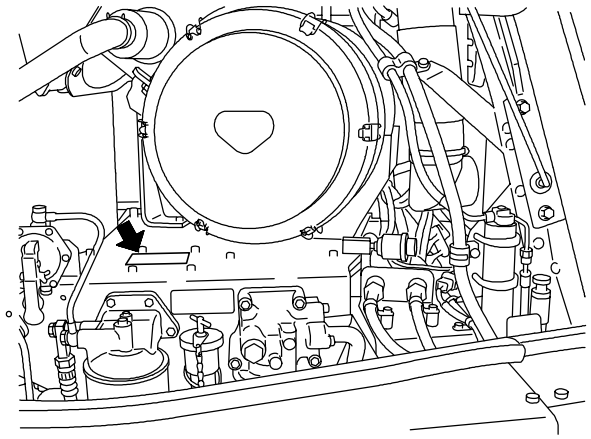
ENGINE SERIAL NO. PLATE AND POSITION (1)

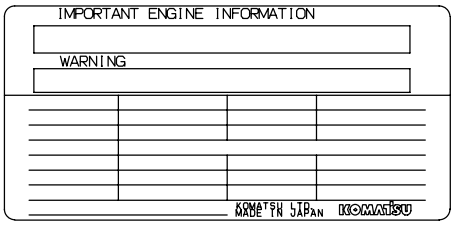
- On the upper of the engine starting motor on the right side of the machine.
- This also acts as the EPA plate.



ENGINE SERIAL NO. PLATE AND POSITION (2)

- This is the same content as engine serial No. plate (1).
- Located on the top of the air cleaner mounting bracket on the left of the machine.
- This also acts as the EPA plate.



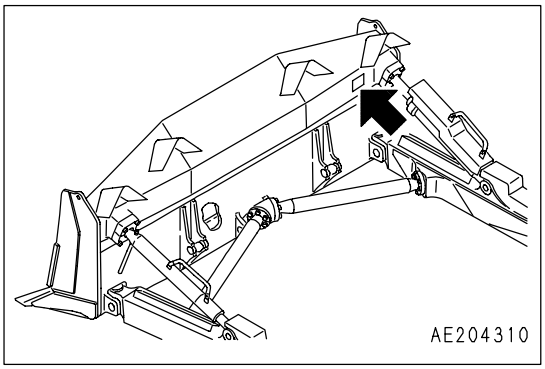


9JH06223

EPA: Environmental Protection Agency, U.S.A.

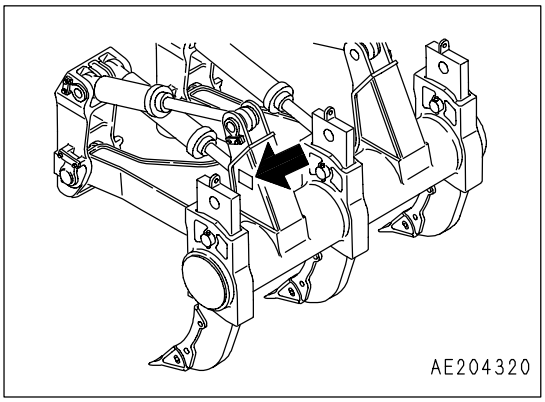
BLADE SERIAL NO. PLATE POSITION

This is located at the upper right of blade back surface.



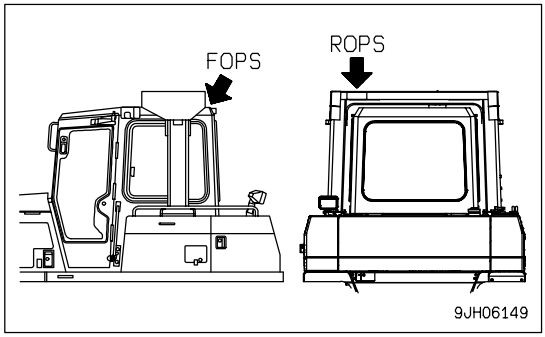
RIPPER SERIAL NO. PLATE POSITION

This is located at the left side surface of ripper beam.



ROPS, FOPS NO. PLATE POSITION

This is located at the top left.



POSITION OF SERVICE METER

On top of the machine monitor

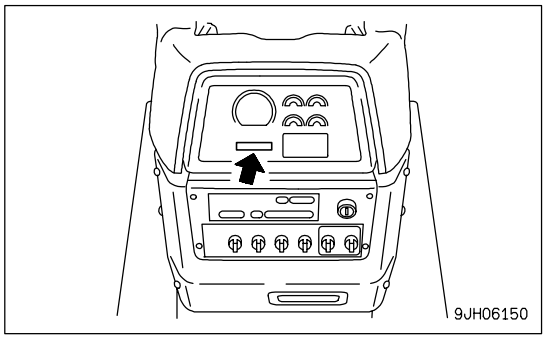


TABLE TO ENTER SERIAL NO. AND DISTRIBUTORN

Machine serial No.	
Engine serial No.	
Product identification number (PIN)	
Distributor name	
Address	
Service Personnel	
Phone/Fax	

CONTENTS

SAFETY

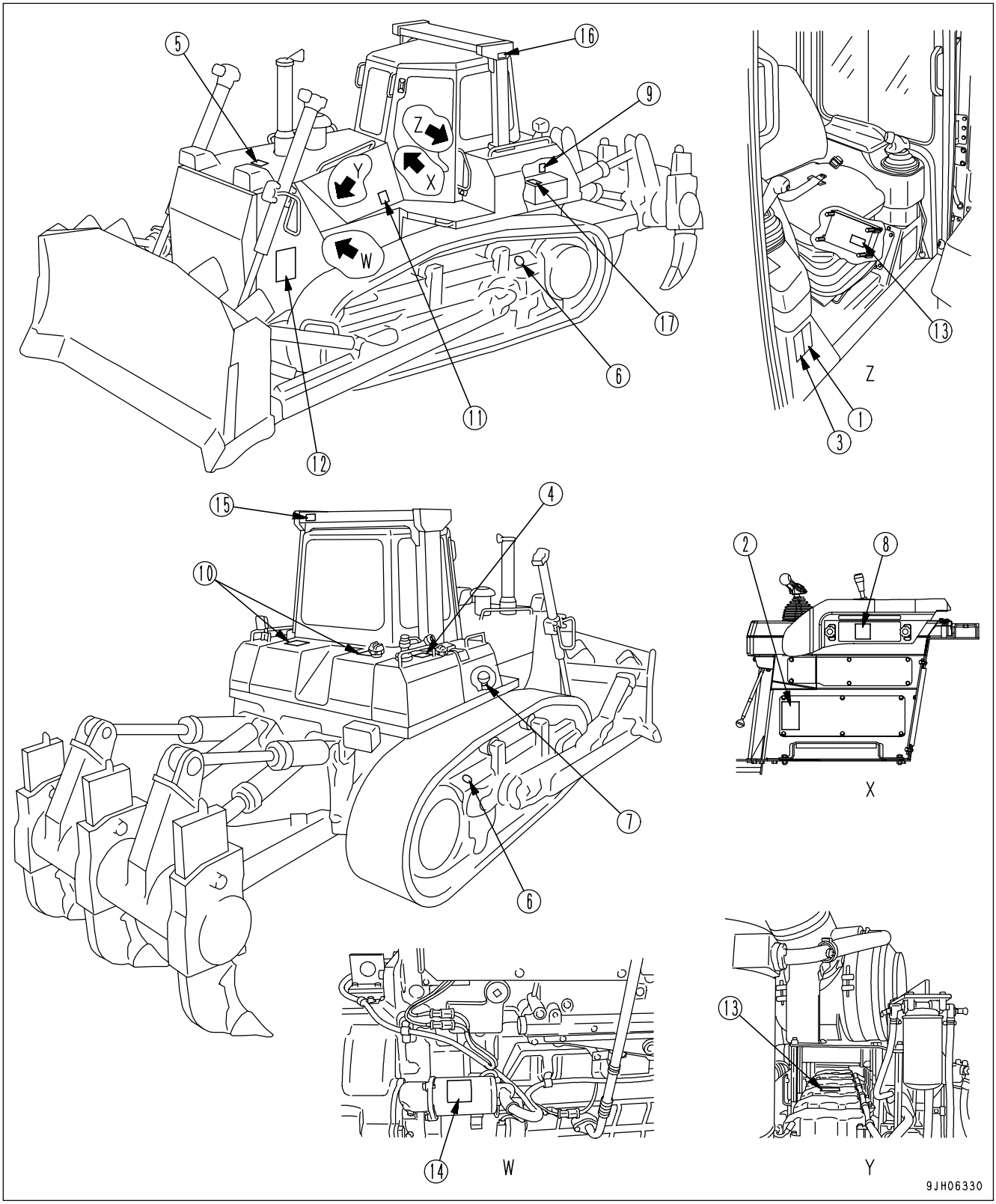
⚠ WARNING

Please read and make sure that you fully understand the precautions described in this manual and the safety labels on the machine. When operating or servicing the machine, always follow these precautions strictly.

SAFETY

SAFETY LABELS

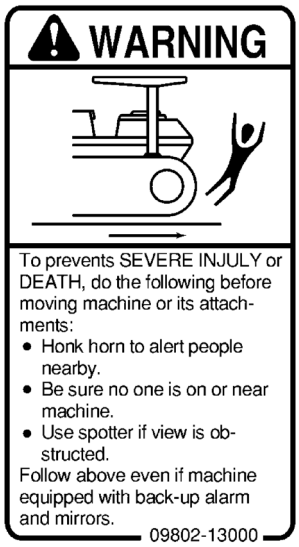
POSITIONS OF SAFETY PICTOGRAMS



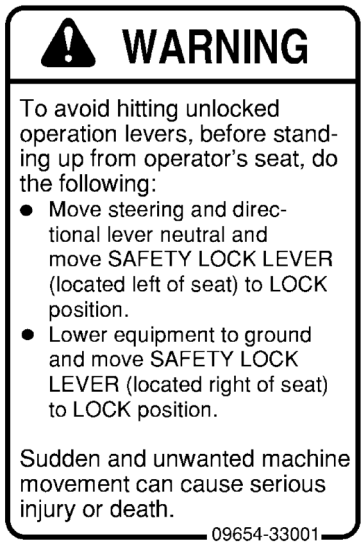
SAFETY LABELS

(1) Precautions for operation, inspection and maintenance (09651-03001)

(2) Precautions when traveling in reverse (09802-13000)



(3) Precautions for leaving the operator's seat (09654-33001)

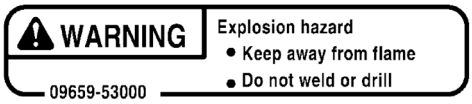


(4) Precautions for high-temperature hydraulic oil (09653-03001)

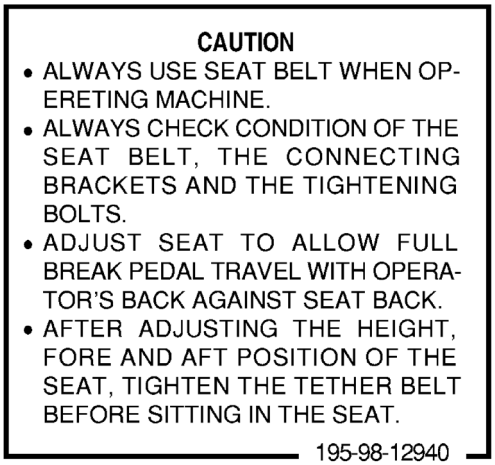
(5) Precautions for high-temperature cooling water (09668-03001)

(6) Precautions when adjusting track tension (09657-03003)
Safety label is attached to the back side of the inspection cover of the track frame.

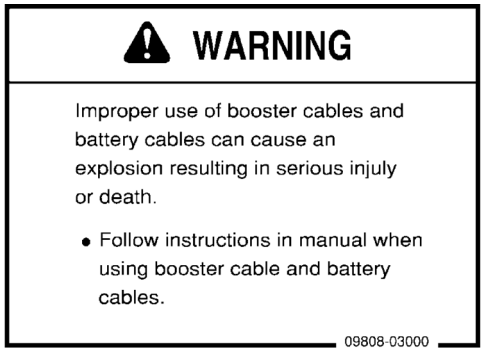
(7) Precautions for handling accumulator (09659-53000)



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



(9) Precautions when handling cable (09808-03000)

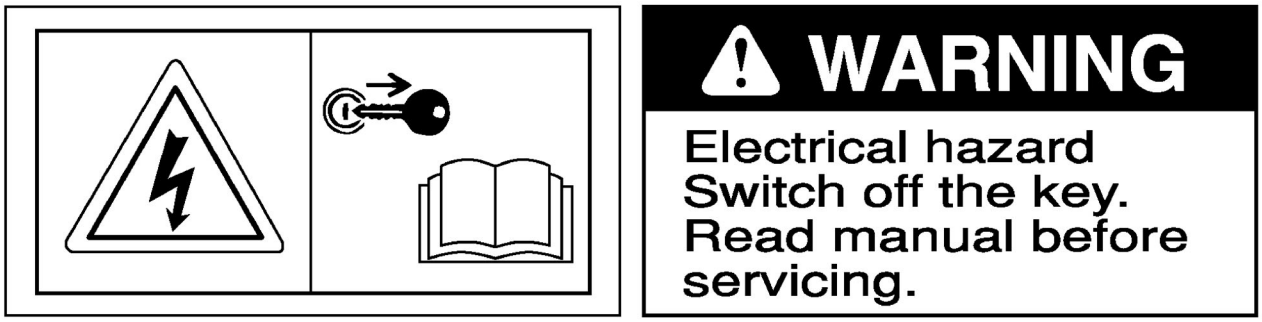


(10) Caution about going on top of fuel tank (17A-98-23920)

(11) Prohibition of running engine during inspection and maintenance (09667-03001)

(12) Caution about going close when machine is moving (09812-03000)

(13) Caution for high voltage (7872-10-1600)



There is danger of electrocution.
Turn the starting switch OFF before starting inspection or repairs, and read the Operation and Maintenance Manual.

(14) Jump start prohibited (09842-A0481)

Start the engine only after sitting down in the operator's seat.

Do not attempt to start the engine by short-circuiting the engine starting circuit. Such an act may cause a serious bodily injury or fire.

(15) ROPS (09620-B2000)

ROPS CERTIFICATION

KOMATSU

This protective structure complies with the standard provided that it is properly equipped on the machine which mass is less than the specified maximum mass.

ROPS:ISO 3471:1994, SAE J1040 MAY94 FOPS:ISO 3449:1992

MODEL		MACHINE MODEL		FOPS LEVEL No.	
SERIAL NO.		MAX. MASS		kg (Lb)	

⚠ WARNING

- If some modification is applied to the ROPS. It might not enough strength and might not be complied with the standard. Consult Komatsu Distributor before altering.
- ROPS may provide less protection if it has been structurally damaged or involved roll-over. Consult Komatsu Distributor in that case.
- Always wear seat belt when moving.

Komatsu Ltd. 2-3-6 Akasaka, Minato-ku, Tokyo, Japan 09620-B2000

(16) FOPS (09620-C2000)

FOPS CERTIFICATION

KOMATSU

This protective structure was provided to comply with the following standard.

FOPS:ISO 3449:1992

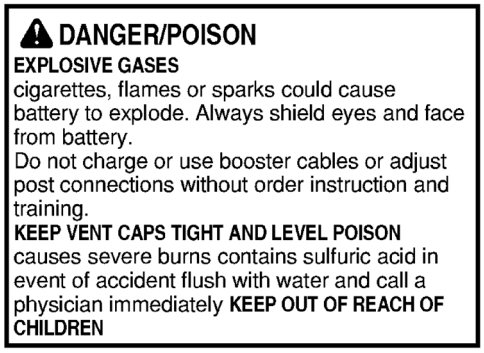
MODEL		MACHINE MODEL	
SERIAL NO.		FOPS LEVEL No.	

⚠ WARNING

- If some modification is applied to the FOPS. It might not enough strength and might not be complied with the standard. Consult Komatsu Distributor before altering.
- FOPS may provide less protection if it has been structurally damaged or involved roll-over. Consult Komatsu Distributor in that case.
- Always wear seat belt when moving.

Komatsu Ltd. 2-3-6 Akasaka, Minato-ku, Tokyo, Japan 09620-C2000

(17) Precautions when handling battery



(This plate is stick on the machine by the battery maker.)

GENERAL PRECAUTIONS

SAFETY RULES

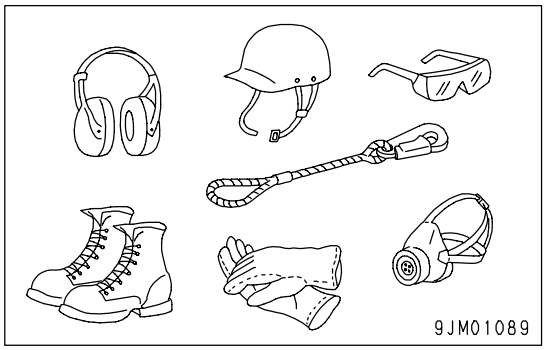
- Only trained and authorized personnel can operate and maintain the machine.
- Follow all safety rules, precautions and instructions when operating or performing maintenance on the machine.
- If you are under the influence of alcohol or medication, your ability to safely operate or repair your machine may be severly impaired putting yourself and everyone else on your jobsite in danger.
- 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.

IF ABNORMALITIES ARE FOUND

If you find any abnormality in the machine during operation or maintenance (noise, vibration, smell, incorrect gauges, smoke, oil leakage, etc., or any abnormal display on the warning devices or monitor), report to the person in charge and have the necessary action taken. Do not operate the machine until the abnormality has been corrected.

CLOTHING AND PERSONAL PROTECTIVE ITEMS

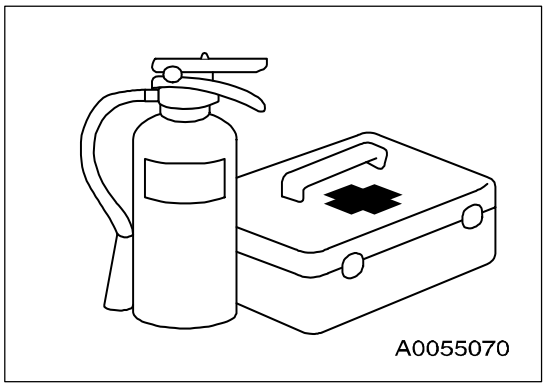
- Do not wear loose clothing and accessories. There is a hazard that they may catch on control levers or other protruding parts.
- If you have long hair and it hangs out from your hard hat, there is a hazard that it may get caught up in the machine, so tie your hair up and be careful not to let it get caught.
- Always wear a hard hat and safety shoes. If the nature of the work requires it, wear safety glasses, mask, gloves, ear plugs, and safety belt when operating or maintaining the machine.
- Check that all protective equipment functions properly before using it.



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 in emergencies.
- Carry out periodic inspection and maintenance to ensure that the fire extinguisher can always be used.
- Provide a first aid kit at the storage point. Carry out periodic checks and add to the contents if necessary.

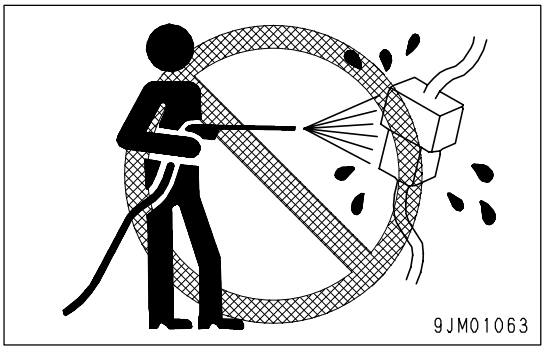


SAFETY FEATURES

- Be sure that all guards and covers are in their proper position. Have guards and covers repaired immediately if they are damaged.
- Understand the method of use of safety features and use them properly.
- Never remove any safety features. Always keep them in good operating condition.

KEEP MACHINE CLEAN

- If water gets into the electrical system, there is a hazard that it will cause malfunctions or misoperation. Do not use water or steam to wash the electrical system (sensors, connectors).
- If inspection and maintenance is carried out when the machine is still dirty with mud or oil, there is a hazard that you will slip and fall, or that dirt or mud will get into your eyes. Always keep the machine clean.

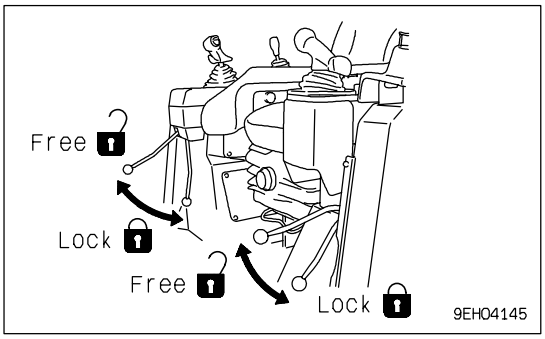


INSIDE OPERATOR'S COMPARTMENT

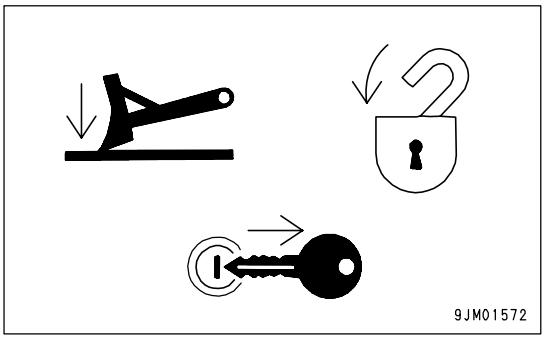
- When entering the operator's compartment, always remove all mud and oil from the soles of your shoes. If you operate the pedal with mud or oil affixed to your shoes, your foot may slip and this may cause a serious accident.
- Do not leave parts or tools lying around the operator's compartment.
- Do not stick suction pads to the window glass. Suction pads act as a lens and may cause fire.
- Do not use cellular telephones inside the operator's compartment when driving or operating the machine.
- Never bring any dangerous objects such as flammable or explosive items into the operator's compartment.

ALWAYS APPLY LOCK WHEN LEAVING OPERATOR'S SEAT

- Before standing up from the operator's seat, lower the work equipment completely to the ground, set safety lock lever and parking lever securely to the LOCK position, then stop the engine.
  If you accidentally touch the levers when they are not locked, there is a hazard that the machine may suddenly move and cause serious injury or property damage.



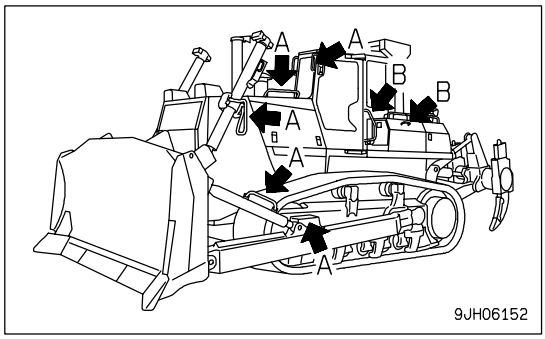
- When leaving the machine, always lower the work equipment completely to the ground, set safety lock lever and Parking lever securely to the LOCK position, then stop the engine. Use the key to lock all the equipment. Always remove the key, take it with you, and keep it in the specified place.

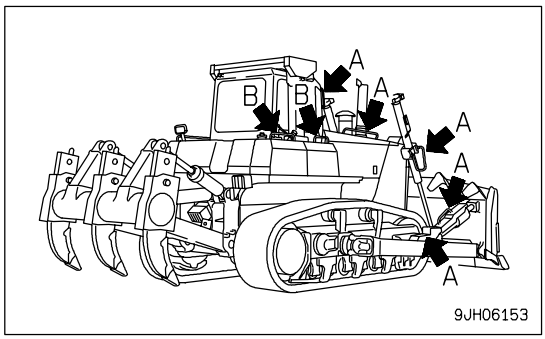


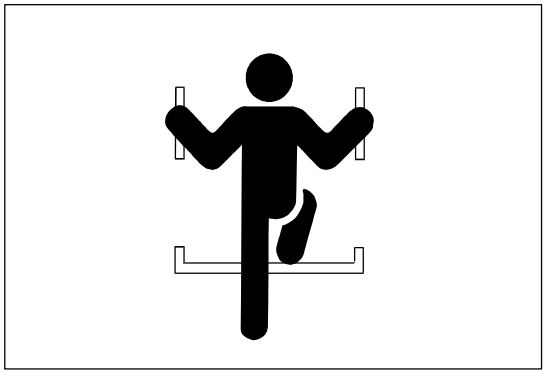
HANDRAILS AND STEPS

To prevent personal injury caused by slipping or falling off the machine, always do as follows.

- Use the parts marked by arrow A in the diagrams when getting on or off the machine.
  Never use the parts marked by arrow B when getting on or off the machine. Use them only when moving along the top of the track or when checking or carrying out maintenance inside the side cover, or when filling the tank with oil.
- Never jump on or off the machine. In particular, never get on or off a moving machine. This may cause serious injury.







- To ensure safety, always face the machine and maintain three-point contact (both feet and one hand, or both hands and one foot) with the handrails and steps (including the track shoe) to ensure that you support yourself.
- Do not grip the control levers when getting on or off the machine.
- Never climb on the engine hood or covers where there are no non-slip pads.
- Before getting on or off the machine, check the handrails and steps (including the track shoe). If there is any oil, grease, or mud on the handrails or steps (including the track shoe), wipe it off immediately. Always keep these parts clean. Repair any damage and tighten any loose bolts.
- Do not get on or off the machine while holding tools in your hand.

MOUNTING AND DISMOUNTING

- Never jump on or off the machine. Never get on or off a moving machine.
- If the machine starts to move when there is no operator on the machine, do not jump on to the machine and try to stop it.

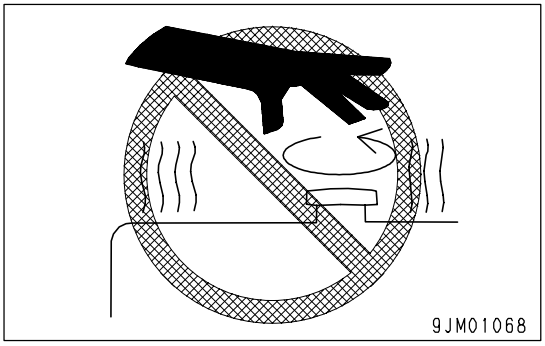
NO PEOPLE ON ATTACHMENTS

Never let anyone ride on the work equipment, or other attachments. There is a hazard of falling and suffering serious injury.

PREVENTION OF BURNS

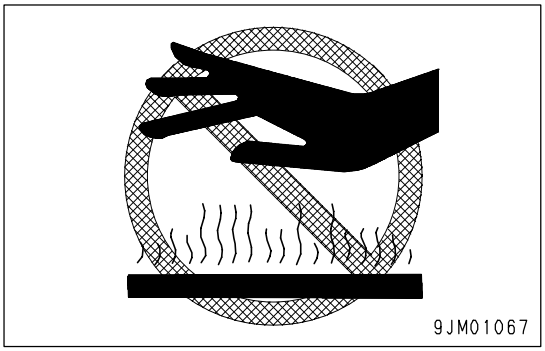
Hot coolant

- To prevent burns from hot water or steam spurting out when checking or draining the coolant, wait for the water to cool to a temperature where it is possible to touch the radiator cap by hand before starting the operation. Even when the coolant has cooled down, loosen the cap slowly to relieve the pressure inside the radiator before removing the cap.



Hot oil

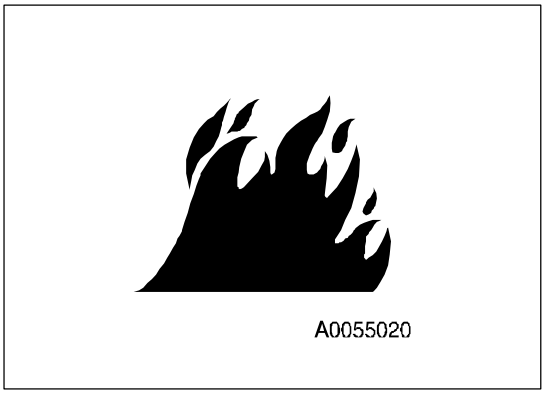
- To prevent burns from hot oil spurting out when checking or draining the oil, wait for the oil to cool to at temperature where it is possible to touch the cap or plug by hand before starting the operation. Even when the oil has cooled down, loosen the cap or plug slowly to relieve the internal pressure before removing the cap or plug.

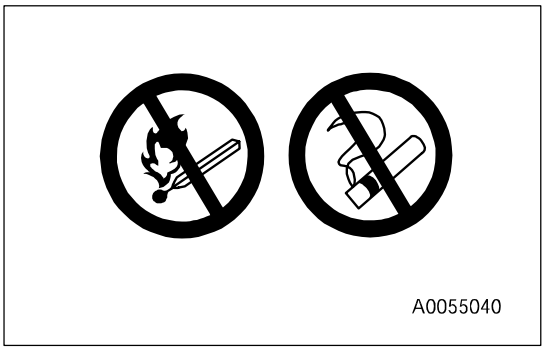


FIRE PREVENTION

- **Fire caused by fuel or oil**

  Fuel, oil, antifreeze, and window washer liquid are particularly flammable and can be hazardous. To prevent fire, always observe the following:
  - Do not smoke or use any flame near fuel or oil.
  - Stop the engine before refueling.
  - Do not leave the machine while adding fuel or oil.
  - Tighten all fuel and oil caps securely.
  - Do not spill fuel on overheated surfaces or on parts of the electrical system.
  - 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.
  - After adding fuel or oil, wipe up any spilled fuel or oil.
  - When carrying out grinding or welding work on the chassis, move any flammable materials to a safe place before starting.
  - When washing parts with oil, use a non-flammable oil. Diesel oil and gasoline may catch fire, so do not use them.
  - Put greasy rags and other flammable materials into a safe container to maintain safety at the work place.
  - Do not weld or use a cutting torch to cut any pipes or tubes that contain flammable liquids.





- **Fire coming from accumulated flammable materials**
  Remove any flammable materials such as dry leaves, chips, pieces of paper, or coal dust accumulated near the engine exhaust manifold, muffler, or battery.
- **Prevention of fire spreading**
  To prevent fires spreading from sparks or burning particles from other fires, remove any flammable materials such as dry leaves, chips, or coal dust accumulated around the cooling system (radiator, oil cooler) or inside the undercover.

- **Fire coming from electric wiring**
  Short circuits in the electrical system can cause fire.
  - Always keep electric wiring connections clean and securely tightened.
  - Check the wiring every day for looseness or damage. Tighten any loose connectors or wiring clamps. Repair or replace any damaged wiring.

- **Fire coming from hydraulic line**
  Check that all the hose and tube clamps, guards, and cushions are securely fixed in position.
  If they are loose, they may vibrate during operation and rub against other parts. This may lead to damage to the hoses, and cause high-pressure oil to spurt out, leading to fire damage or serious injury.

- **Explosion caused by lighting equipment**
  - When checking fuel, oil, battery electrolyte, window washer fluid, or coolant, always use lighting with anti-explosion specifications. If such lighting equipment is not used, there is danger of explosion that may cause serious injury.
  - When taking the electrical power for the lighting from the machine itself, follow the instructions in this manual.

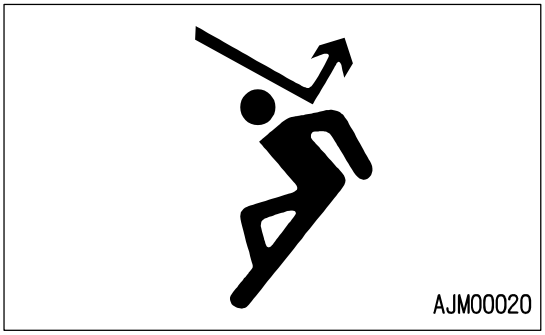
ACTION IF FIRE OCCURS

If a fire occurs, escape from the machine as follows.
- Turn the start switch OFF to stop the engine.
- Use the handrails and steps to get off the machine.

WINDOW WASHER LIQUID

Use an ethyl alcohol base washer liquid.
Methyl alcohol base washer liquid may irritate your eyes, so do not use it.

PRECAUTIONS WHEN USING ROPS (Roll Over Protective Structure)



Install ROPS when working in places where there is danger of falling rocks, such as in mines and quarries, or in places where there is danger of rolling over.

- If ROPS is installed, do not remove it when operating the machine.
- ROPS is installed to protect the operator when machine rolls over. When machine rolls over, ROPS supports its weight and absorbs its impact energy.
- If ROPS is modified, its strength may be reduced. When modifying, consult your Komatsu distributor.
- If ROPS is deformed by falling objects or by rolling over, its strength lowers and its design functions cannot be maintained. In this case, be sure to ask your Komatsu distributor about repair method.

Even when the ROPS is installed, if you do not fasten your seat belt securely, it cannot protect you properly. Always fasten your seat belt when operating the machine.

PRECAUTIONS FOR ATTACHMENTS

- When installing optional parts or attachments, there may be problems with safety or legal restrictions. Therefore contact your Komatsu distributor for advice.
- Any injuries, accidents, or product failures resulting from the use of unauthorized attachments or parts will not be the responsibility of Komatsu.
- When installing and using optional attachments, read the instruction manual for the attachment, and the general information related to attachments in this manual.

UNAUTHORIZED MODIFICATION

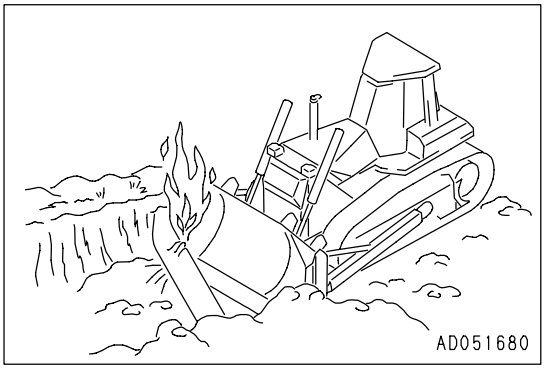
Any modification made without authorization from Komatsu can create hazards. Before making a modification, consult your Komatsu distributor.

- Komatsu will not be responsible for any injuries, accidents, product failures or other property damages resulting from modifications made without authorization from Komatsu.

SAFETY AT WORKSITE

Before starting operations, thoroughly check the area for any unusual conditions that could be dangerous.

- When carrying out operations near combustible materials such as thatched roofs, dry leaves or dry grass, there is a hazard of fire, so be careful when operating.
- Check the terrain and condition of the ground at the worksite, and determine the safest method of operation. Do not carry out operations at places where there is a hazard of landslides or falling rocks.
- 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.
- Take necessary measures to prevent any unauthorized person from entering the operating area.
- In particular, if you need to operate on a road, protect pedestrian and cars by designating a person for worksite traffic duty or by installing fences around the worksite.
- When traveling or operating in shallow water or on soft ground, check the shape and condition of the bedrock, and the depth and speed of flow of the water before starting operations.



WORKING ON LOOSE GROUND

- Avoid traveling or operating your machine too close to the edge of cliffs, overhangs, and deep ditches. The ground may be weak in such areas. If the ground should collapse under the weight or vibration of the machine, there is a hazard that the machine may fall or tip over. Remember that the soil after heavy rain or blasting or after earthquakes is weak in these areas.
- When working on embankments or near excavated ditches, there is a hazard that the weight and vibration of the machine will cause the soil to collapse. Before starting operations, take steps to ensure that the ground is safe and to prevent the machine from rolling over or falling.

DO NOT GO CLOSE TO HIGH-VOLTAGE CABLES

Do not travel or operate the machine near electric cables. There is a hazard of electric shock, which may cause serious injury or property damage. On jobsites where the machine may go close to electric cables, always do as follows.

- Before starting work near electric cables, inform the local power company of the work to be performed, and ask them to take the necessary action.
- Even going close to high-voltage cables can cause electric shock, which may cause serious burns or even death. Always maintain a safe distance (see the table on the right) between the machine and the electric cable. Check with the local power company about safe operating procedure before starting operations.
- To prepare for any possible emergencies, wear rubber shoes and gloves. Lay a rubber sheet on top of the 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.
- When carrying out operations near high voltage cables, do not let anyone come close to the machine.

Voltage of Cables	Safety Distance
100 V - 200 V	Over 2 m (7 ft)
6,600 V	Over 2 m (7 ft)
22,000 V	Over 3 m (10 ft)
66,000 V	Over 4 m (14 ft)
154,000 V	Over 5 m (17 ft)
187,000 V	Over 6 m (20 ft)
275,000 V	Over 7 m (23 ft)
500,000 V	Over 11 m (36 ft)

- If the machine should come too close or touch the electric cable, to prevent electric shock, the operator should not leave the operator's compartment until it has been confirmed that the electricity has been shut off.
  Also, do not let anyone come close to the machine.

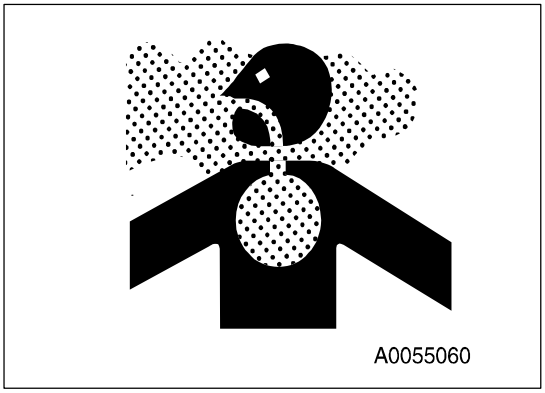
ENSURE GOOD VISIBILITY

- Check for any persons or obstacles in the area around the machine and check the conditions of the jobsite to ensure that operations and travel can be carried out safely. Always do as follows.
  - Position a signalman if there are areas at the rear of the machine where the visibility is not good.
  - When working in dark places, turn on the working lamp and front lamps installed to the machine, and set up additional lighting in the work area if necessary.
  - Stop operations if the visibility is poor, such as in mist, snow, rain, or dust.

VENTILATION FOR ENCLOSED AREAS

Exhaust fumes from the engine can kill.

- If it is necessary to start the engine within an enclosed area, or when handling fuel, flushing oil, or paint, open the doors and windows to ensure that adequate ventilation is provided to prevent gas poisoning.



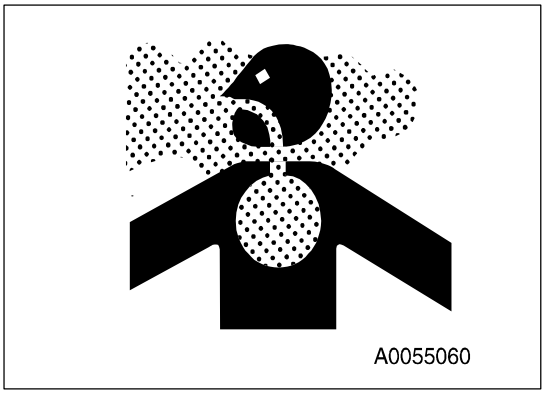
CHECKING SIGNALMAN'S SIGNALS AND SIGNS

- Set up signs to inform of road shoulders and soft ground. If the visibility is not good, position a signalman if necessary. Operators should pay careful attention to the signs and follow the instructions from the signalman.
- Only one signalman should give signals.
- Make sure that all workers understand the meaning of all signals and signs before starting work.

BE CAREFUL ABOUT ASBESTOS DUST

Asbestos dust in the air can cause lung cancer if it is inhaled. There is danger of inhaling asbestos when working on jobsites handling demolition work or work handling industrial waste. Always observe the following.

- Spray water to keep down the dust when cleaning. Do not use compressed air for cleaning.
- If there is danger that there may be asbestos dust in the air, always operate the machine from an upwind position. All workers should use an approved respirator.



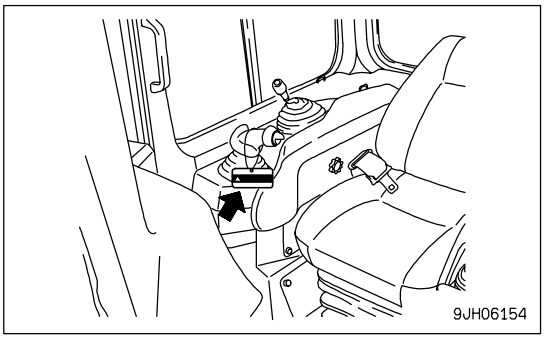
- Do not allow other persons to approach during the operation.
- Always observe the rules and regulations for the work site and environmental standards.

This machine does not use asbestos, but there is a danger that imitation parts may contain asbestos, so always use genuine Komatsu parts.

PRECAUTIONS FOR OPERATION

BEFORE STARTING ENGINE

If there is a warning tag hanging from the work equipment control lever, do not start the engine or touch the levers .



CHECKS BEFORE STARTING ENGINE

Carry out the following checks before starting the engine at the beginning of the day's work.

- Completely remove all flammable materials accumulated around the engine and battery, and remove any dirt from the windows, mirrors, handrails and steps.
- Check the coolant level, fuel level, and oil level in engine oil pan, check for clogging of the air cleaner, and check for damage to the electric wiring.
- Adjust the operator's seat to a position where it is easy to carry out operations, and check that there is no damage or wear to the seat belt or mounting clamps.
- Check that the gauges work properly, check the angle of the lights and working lamps, and check that the control levers are all at the neutral position.
- Adjust the mirrors so that you can get a good rear-view from the operator's seat.
  For the details of adjustment, see "ADJUST MIRROR (PAGE 3-82)".
- Check that there are no persons or obstacles above, below, or in the area around the machine.

PRECAUTIONS WHEN STARTING

- When starting the engine, sound the horn as a warning.
- Start and operate the machine only while seated.
- Do not allow anyone apart from the operator to ride on the machine.
- Do not short circuit the starting motor circuit to start the engine. Short circuit can cause fire.

PRECAUTIONS IN COLD AREAS

- 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.
- If the battery electrolyte is frozen, do not charge the battery or start the engine with a different power source. There is a hazard that this will ignite the battery and cause the battery to explode.
  Before charging or starting the engine with a different power source, melt the battery electrolyte and check that there is no leakage of electrolyte before starting.

OPERATION

CHECKS BEFORE OPERATION

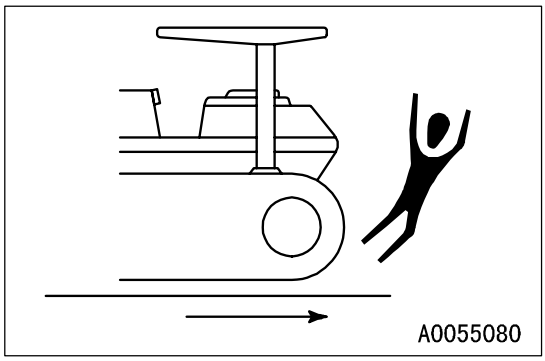
When carrying out the checks, move the machine to a wide area where there are no obstructions, and operate slowly. Do not allow anyone near the machine.

- Always fasten your seat belt.
- Check the operation of travel, steering and brake systems, and work equipment control system.
- Check for any abnormality in the sound of the machine, vibration, heat, smell, or gauges; check also that there is no leakage of oil or fuel.
- If any abnormality is found, carry out repairs immediately.

PRECAUTIONS FOR MOVING MACHINE FORWARD OR IN REVERSE

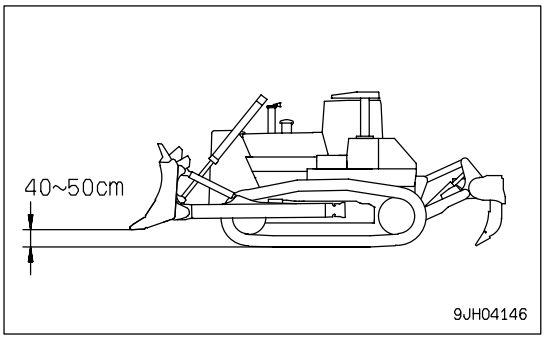
- Before travelling, check again that there is no one in the surrounding area, and that there are no obstacles.
- Before travelling, sound the horn to warn people in the area.
- Always operate the machine only when seated.
- Do not allow anyone apart from the operator to ride on the machine.
- Check that the back-up alarm (alarm buzzer when machine travels in reverse) works properly.
- Fix the operator's compartment doors and windows in position securely.

Always be sure to carry out the above precautions even when the machine is equipped with mirrors.

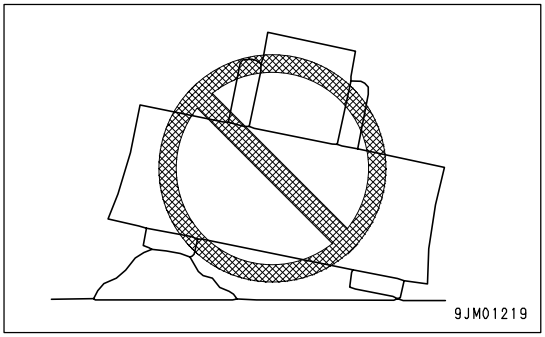


PRECAUTIONS WHEN TRAVELING

- Never turn the starting switch to the OFF position when traveling. It is dangerous if the engine stops when the machine is traveling. When the engine is off, it is impossible to operate the steering. Apply the brakes and stop the machine immediately, if the engine stops.
- When traveling on flat ground, keep the work equipment 40 to 50 cm (16 to 20 in) high above the ground.
- When traveling on rough ground, travel at low speed and do not operate the steering suddenly. There is danger that the machine may turn over. 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.



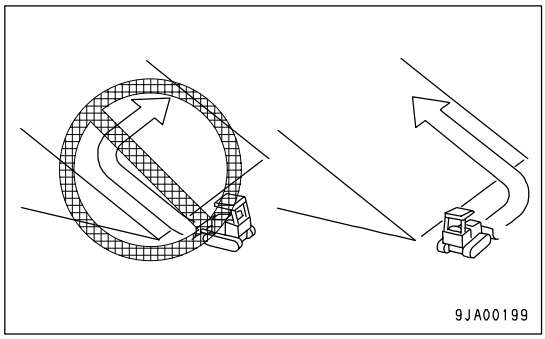
- Avoid traveling over obstacles when possible. If the machine has to travel over an obstacle, keep the work equipment close to the ground and travel at low speed. Never travel over obstacles which make the machine tilt strongly to one side.
- When traveling or carrying out operations, always keep a safe distance from people, structures, or other machines to avoid coming into contact with them.
- When passing over bridges or structures, check first that the structure is strong enough to support the weight of the machine. When traveling on public roads, check first with the relevant authorities and follow their instructions.



- When operating in tunnels, under bridges, under electric wires, or other places where the height is limited, operate slowly and be extremely careful not to let the work equipment hit anything.
- Do not approach the edge of a cliff carelessly. When dropping soil over a cliff for banking or reclamation, leave soil of one scoop at the edge of the cliff and push it with the next scoop.
- When the machine passes over the top of a hill or when a load is dumped over a cliff, the load is suddenly reduced, and there is danger that the travel speed rises suddenly. To prevent this, lower the travel speed.
- If the machine moves with only either side of the blade loaded, its tail may swing. Take care.

TRAVELING ON SLOPES

To prevent the machine from tipping over or slipping to the side, always do as follows.



- When traveling on slops, keep the blade approxmately 20 to 30cm (8 to 12in) above the ground. In case of emergency, quickly lower the blade to the ground to help the machine to stop. Apply the brake and use the engine as a brake, if necessary.
- Always travel straight up or down a slope. Traveling at an angle or across the slope is extremely dangerous.
- Do not turn on slopes or travel across slopes. Always go down to a flat place to change the position of the machine, then travel on to the slope again.
- Travel on grass, fallen leaves, or wet steel plates with low speed. Even with slight slopes there is a hazard that the machine may slip.
- Do not shift the gear while traveling downhill or travel downhill with the transmission in neutral. If this is neglected, the engine does not work as a brake, and that is dangerous. Be sure to set the transmission in one of the lower gear speeds. In addition, apply the brake and use the engine as a brake, if necessary.
- When turning on a downhill ground, lower the travel speed.

PROHIBITED OPERATIONS

- To make it easier to escape if there is any problem, set the tracks at right angles to the road shoulder or cliff with the sprocket at the rear when carrying out operations.
- When operating the machine, take care that it will not exceed its performance values such as stability, maximum using load, etc. to prevent rolling of the machine caused by an overload and disasters caused by breakage of the work equipment.

USING BRAKES

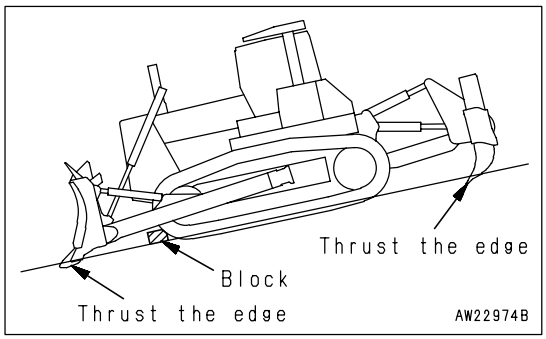
- When the machine is traveling, do not rest your foot on the brake pedal. If you travel with your foot resting on the pedal, the brake will always be applied, and this will cause the brakes to overheat and fail.
- Do not depress the brake pedal repeatedly if not necessary. If this is neglected, the brake will be overheated and will not work when required.
- When traveling downhill, use the braking force of the engine, and always use the right brake pedal.

OPERATE CAREFULLY ON SNOW

- Snow-covered or frozen surfaces are slippery, so be extremely careful when traveling or operating the machine, and do not operate the levers suddenly. Even a slight slope may cause the machine to slip, so be particularly careful when working on slopes.
- With frozen ground surfaces, the ground becomes soft when the temperature rises, and this may cause the machine to tip over.
- If the machine enters deep snow, there is a hazard that it may tip over or become buried in the snow. Be careful not to leave the road shoulder or to get trapped in a snow drift.
- When clearing snow, the road shoulder and objects placed beside the road are buried in the snow and cannot be seen. There is a hazard of the machine tipping over or hitting covered objects, 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 appling the foot brake intermittently (depress the brake intermittently several times). If necessary, lower the blade to the ground to stop the machine.

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 the blocks under the tracks to prevent the machine from moving, then dig the work equipment into the ground.
- After stopping the engine, operate the right work equipment control lever several times to the RAISE and LOWER positions to release the remaining pressure in the hydraulic circuit.



- When parking the machine on a road, put up flags, fences, lighting, or warning signs to enable passing vehicles to recognize the machine clearly. At the same time, make sure that these do not cause obstruction to the passing vehicles.
  Procedure for parking: See "PARKING MACHINE (PAGE 3-108)".
- When leaving the machine, set the safety lock levers (for work equipment and brake) to the LOCK position, and then stop the engine. In addition, use the key to lock all the equipment. Always remove the key and take it with you to be kept at a set location.
  Work equipment posture: See PARKING MACHINE (PAGE 3-108)
  Locks: See LOCKING (PAGE 3-110)
- Always close the door of the operator's compartment.

TRANSPORTATION

The machine can be divided into parts for transportation, so when transportating the machine, please contact your Komatsu distributor to have the work carried out.

SHIPPING

When shipping the machine on a trailer, do as follows.

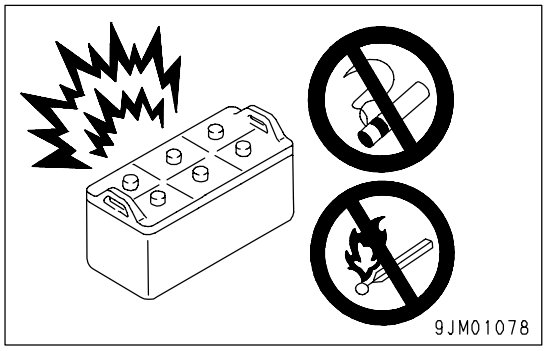
- The weight, transportation height, and overall length of the machine differ according to the work equipment, so be sure to confirm the dimensions.
- When passing over bridges or structures on private land, check first that the structure is strong enough to support the weight of the machine. When traveling on public roads, check first with the relevant authorities and follow their instructions.
- For details of the shipping procedure, see "TRANSPORTATION (PAGE 3-130)" in the OPERATION section.

BATTERY

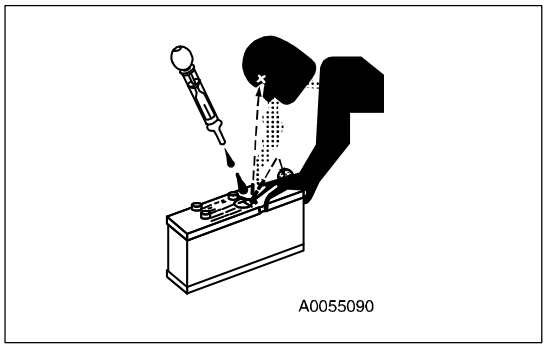
BATTERY HAZARD PREVENTION

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

- When working with batteries, always wear safety glasses and rubber gloves.
- Never smoke or use any flame near the battery.



- If you spill acid on your clothes or skin, immediately flush the area with large amount of water.
- If acid gets into your eyes, flush them immediately with large amount of water and seek medical attention.



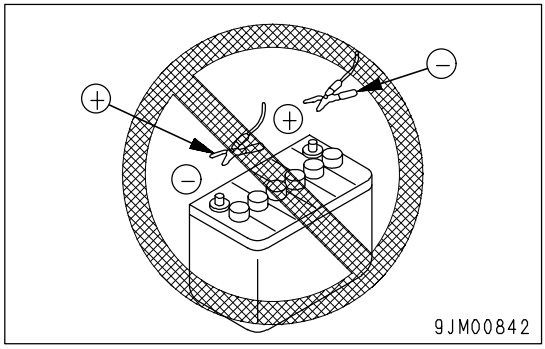
- Before working with batteries, turn the starting switch to the OFF position.

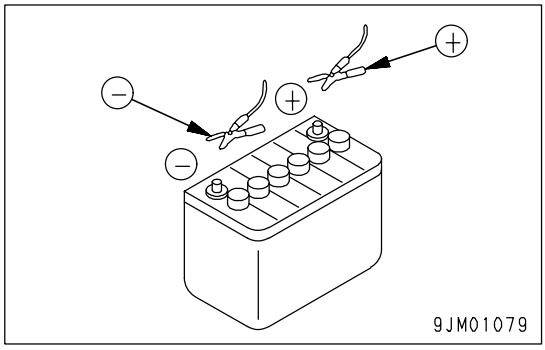
As there is a hazard that sparks will be generated, always do as follows.

- Do not let tools or other metal objects make any contact between the battery terminals. Do not leave tools or other metal objects lying around near the battery.
- Always disconnect the negative (-) terminal (ground side) first when removing the battery; when installing the battery, connect the positive (+) terminal first, and connect the ground last. Tighten the battery terminals securely.
- Tighten the battery terminals securely.
- Flammable hydrogen gas is generated when the battery is charged, so remove the battery from the chassis, take it to a well-ventilated place, and remove the battery caps before charging it.
- Tighten the battery caps securely.
- Install the battery securely to the determined place.

STARTING WITH BOOSTER CABLE

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





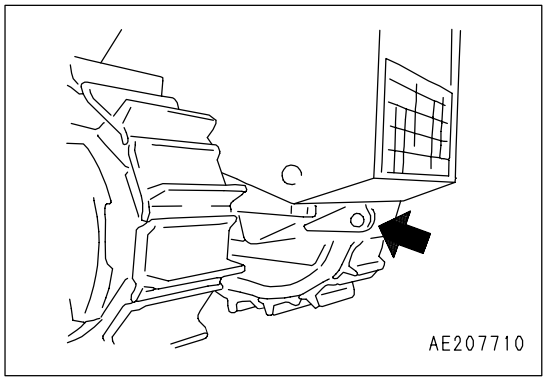
- When starting with a booster cable, carry out the starting operation with two workers (one worker sitting in the operator's seat and the other working with the battery).
- When starting from another machine, do not allow the two machines to touch.
- When connecting the booster cables, turn the starting switch OFF for both the normal machine and problem machine. There is a hazard that the machine will move when the power is connected.
- Be sure to connect the positive (+) cable first when installing the booster cables. Disconnect the negative (-) cable (ground side) first when removing them.
- 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.
- Always wear safety goggles and rubber gloves when starting the engine with booster cables.
- When connecting a normal machine to a problem machine with booster cables, always use a normal machine with the same battery voltage as the problem machine.
- For details of the procedure when starting the machine using a booster cable, see "STARTING ENGINE WITH BOOSTER CABLE (PAGE 3-143)".

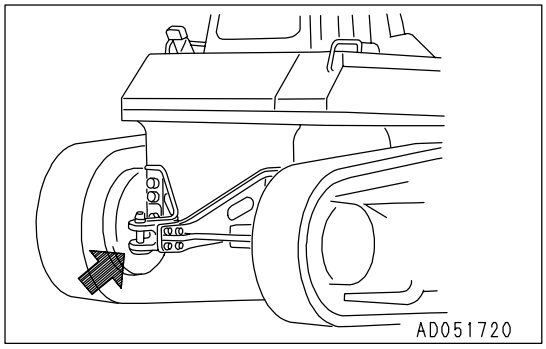
TOWING

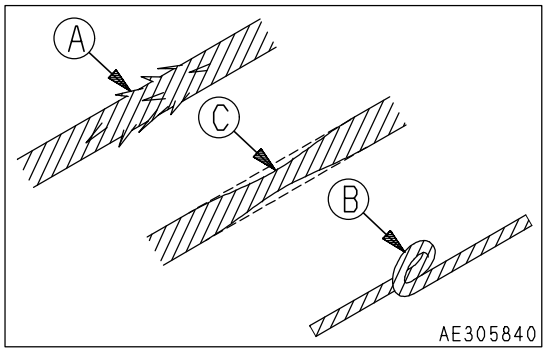
WHEN TOWING

Injury or death could result if a disabled machine is towed incorrectly. Always observe the following rules.

- Never use a towing method different from the one described in this manual.
  For the method of towing, see METHOD OF TOWING MACHINE (PAGE 3-141).
- When handling a wire rope, always wear leather gloves.
- When working with others to prepare for towing, signals should be agreed upon beforehand.
- If your machine is towed by another machine, stop the engine and release the brake. Please contact your Komatsu distributor to have the brake released.
- Towing on slopes is dangerous. When doing so, choose a gentle slope. If no gentle slope is available, make such a slope by earth-removal work.
- When connecting up a towing machine, do not let anyone enter the area between the towing machine and the equipment being towed.
- Do not straddle the towing cable or wire rope.
- When your machine is towed by another machine, ALWAYS use a wire rope with a sufficient towing capacity.
- Set the towing machine and the towing connection of the equipment being towed in a straight line when connecting it.
- Take up the slack in the wire rope and tow the machine.
- When lifting the machine up, use the towing hook.
- If the machine is stuck in mud, dig around the towing hook, then use the towing hook.
  Permitted towing load: 29,300 kg (287,330 N)
- Do not use a broken (A), kinked (B) or frayed (C) wire rope.



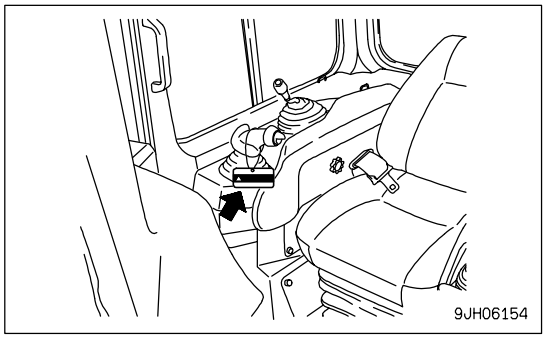




PRECAUTIONS FOR MAINTENANCE

WARNING TAG

- Always attach the "DO NOT OPERATE" warning tag to the work equipment control lever in the operator's cab to alert others that you are performing service or maintenance on the machine. Attach additional warning tags around the machine if necessary.
  Warning tag Part No. 09963-03001
  Keep the tag in the operation manual pocket.
- If others start the engine, or touch or operate the work equipment control lever while you are performing service or maintenance, you could suffer serious injury or property damage.



KEEP WORK PLACE CLEAN AND TIDY

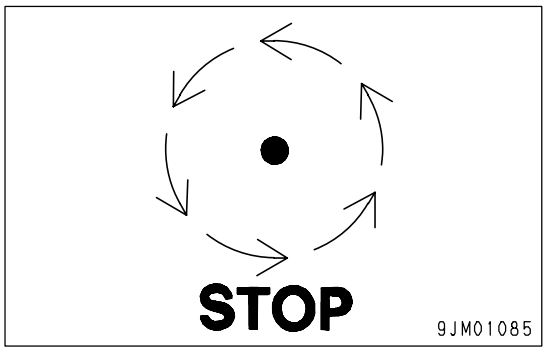
- Do not leave hammers or other tools lying around in the work place. Wipe up all grease, oil, or other substances that will cause you to slip. Always keep the work place clean and tidy to enable you to carry out operations safely. If the work place is not kept claen and tidy, there is the danger that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

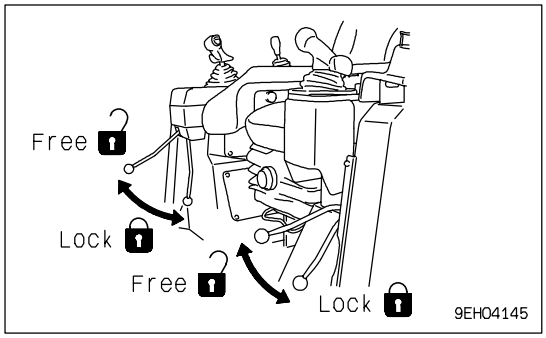
APPOINT LEADER WHEN WORKING WITH OTHERS

- When repairing the machine or when removing and installing the work equipment, appoint a leader and follow his instructions during the operation.

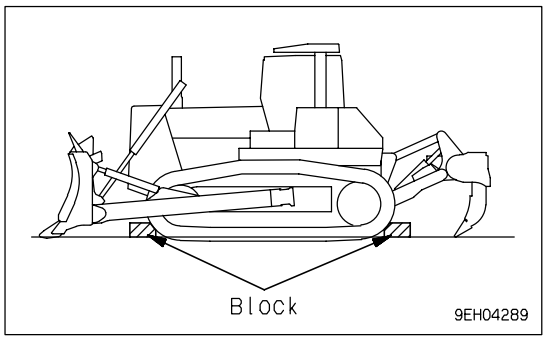
STOP ENGINE BEFORE CARRYING OUT INSPENTION AND MAINTENANCE

- Stop the machine on firm, level ground.
- Select a place where there is no hazard of falling rocks or landslides, or of flooding if the land is low.
- Lower the work equipment completely to the ground and stop the engine.
- Operate the blade control lever 2-3 times to the RAISE and LOWER positions to release the remaining pressure in the hydraulic circuit, then set safety lock lever to the LOCK position.





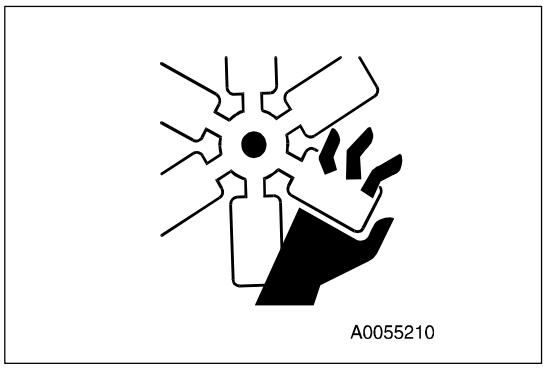
- Put blocks under the track to prevent the machine from moving.



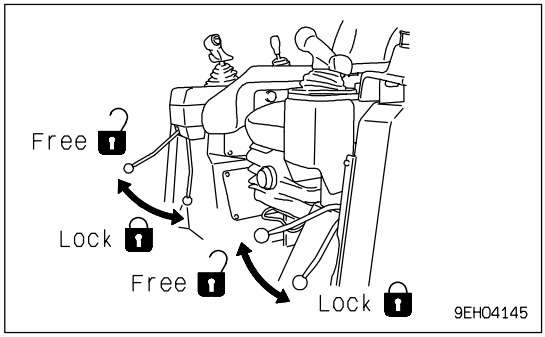
TWO WORKERS FOR MAINTENANCE WHEN ENGINE IS RUNNING

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.

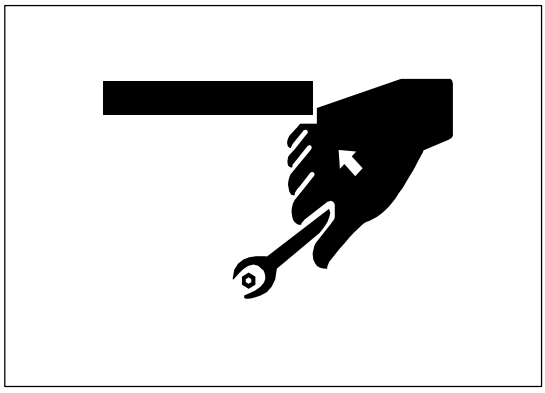


- Make sure that the machine does not move by setting the safety lock lever in the LOCK position.
- When carrying out operations near the fan, fan belt, or other rotating parts, there is a hazard of being caught in the parts, so be careful not to come close.
- Do not touch any control levers. If any control lever must be operated, give a signal to the other workers to warn them to move to a safe place.
- Never drop or insert tools or other objects into the fan or fan belt. Parts may break or be sent flying.



PROPER TOOLS

Use only tools suited to the task and be sure to use the tools correctly. Using damaged, low quality, faulty, makeshift tools or improper use of the tools could cause serious personal injury.



HANDLING ACCUMULATOR

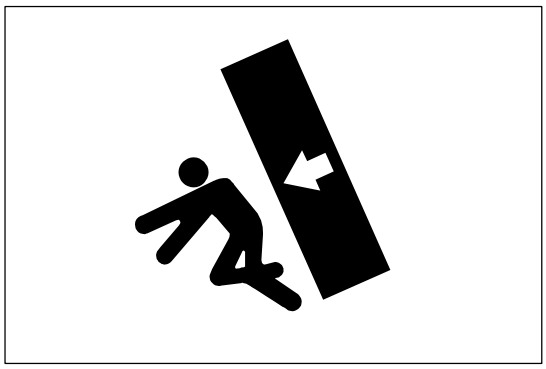
- This machine is equipped with an accumulator. For a short time after the engine is stopped, if the work equipment control lever is moved to the LOWER position, the work equipment will move down under its own weight.
  After stopping the engine, always set the safety lock lever to the LOCK position.
- When releasing the pressure in the work equipment circuit on machines equipped with an accumulator, carry out the procedure in accordance with the method for handling the accumulator.
  Method of releasing pressure: See "METHOD OF RELEASING PRESSURE IN OPERATING CIRCUIT ON MACHINE EQUIPPED WITH ACCUMULATOR (PAGE 3-66)".
- 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 disposing of the accumulator, it is necessary to release the gas from the accumulator. A special air bleed valve is necessary for this operation, please contact your Komatsu distributor.

PERSONNAL

Only authorized personnel can service and repair the machine. Do not allow unauthorized personnel into the area. If necessary, employ an observer.

ATTACHMENTS

- Appoint a leader before starting removal or installation operations for attachments.
- Place attachments that have been removed from the machine in a stable condition so that they do not fall. And take steps to prevent unauthorized persons from entering the storage area.



WORK UNDER THE MACHINE

- If it is necessary to go under the work equipment or the machine to carry out service and maintenance, support the work equipment and machine securely with blocks and stands strong enough to support the weight of the work equipment and machine.
- It is extremely dangerous to work under the machine if the track shoes are lifted off the ground and the machine is supported only with the work equipment. If any of the control levers is touched by accident, or there is damage occurring to the hydraulic piping, the work equipment or the machine will suddenly drop. This is extremely dangerous. Never work under the work equipment or the machine.

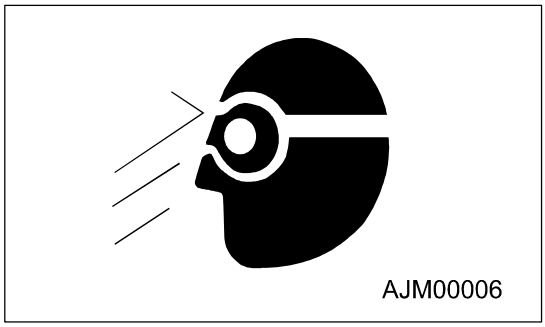
NOISE

When carrying out maintenance of the engine and you are exposed to noise for long periods of time, wear ear covers or ear plugs while working.
If the noise from the machine is too loud, it may cause temporary or permanent hearing problems.

PRECAUTIONS WHEN USING HAMMER

When using a hammer, pins may fly out or metal particles may be scattered. This may lead to serious injury. Always do as follows.

- If hard metal parts such as pins, bucket teeth, cutting edges, or bearings are hit with a hammer, there is a hazard that pieces might be scattered and cause injury. Always wear safety goggles and gloves.
- When hitting pins or bucket teeth, there is a hazard that broken pieces might be sent flying and injure people in the surrounding area. Always check that there is no one in the surrounding area.
- There is a hazard that the pin hit with strong force may fly out and injure people in the surrounding area.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REPAIR WELDING

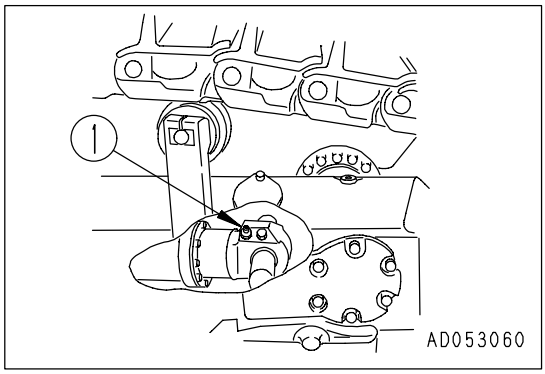
Welding operations must always be carried out by a qualified welder and in a place equipped with proper equipment. There is a hazard of gas, fire, or electrocution when carrying out welding, so never allow any unqualified personnel to carry out welding.

REMOVING BATTERY TERMINAL

When repairing the electrical system or when carrying out electrical welding, remove the negative (-) terminal of the battery to prevent the flow of current.

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, grease drain valve (1) may fly out and cause serious injury or damage.
- When loosening grease drain valve (1) to loosen track tension, never loosen it more than one turn. In doing so, loosen the valve slowly.
- Never put your face, hands, feet, or any other part of your body directly in front of grease drain valve (1).



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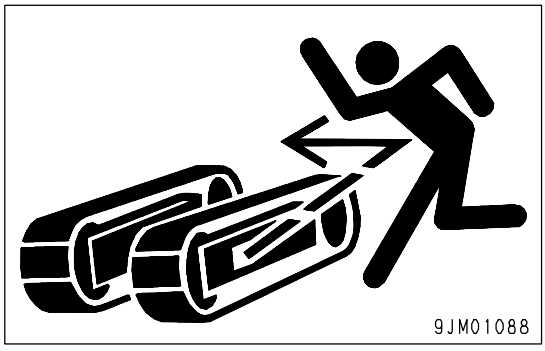
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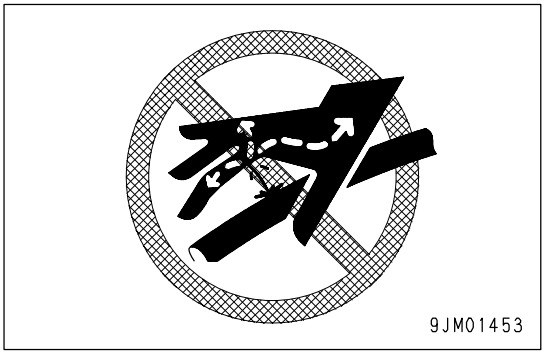
DO NOT DISASSEMBLE RECOIL SPRING

Never attempt to disassemble the recoils spring assembly. It contains a spring under high pressure which serves as a shock absorber for the idler. If it is disassembled by mistake, the spring will fly out and cause serious injury. When it becomes necessary to disassemble it, ask your Komatsu distributor to do the work.

PRECAUTION WITH HIGH-PRESSURE OIL

The hydraulic system is always under internal pressure. When inspecting or replacing 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, so always do as follows.

- Release the pressure. For details, see "PROCEDURE FOR RELEASING INTERNAL PRESSURE IN HYDRAULIC CIRCUIT (PAGE 4-41)". Do not carry out inspection or replacement while the circuit is still under pressure.
- If there is any leakage from the piping or hoses, the surrounding area will be wet, so check for cracks in the piping and hoses and for swelling in the hoses.
  When carry out inspection, wear safety glasses and leather gloves.
- There is a hazard that high-pressure oil leaking from small holes may penetrate your skin or cause blindness if it contacts your eyes directly. If you are hit by a jet of high-pressure oil and suffer injury to your skin or eyes, wash the place with clean water, and consult a doctor immediately for medical attention.



PRECAUTION FOR HIGH FUEL PRESSURE

High pressure is generated inside the engine fuel piping when the engine is running. When carrying out inspection or maintenance of the fuel piping system, wait for at least 30 seconds after stopping the engine to let the internal pressure go down before starting inspection or maintenance.

HANDLING HIGH-PRESSURE HOSES

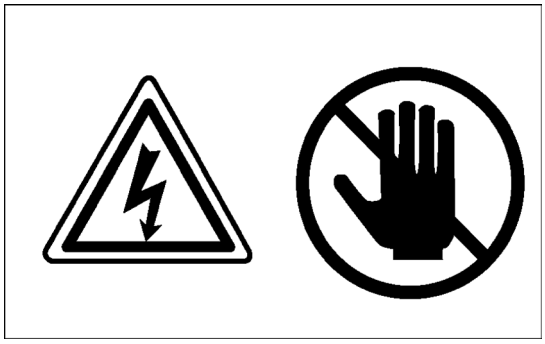
- If oil or fuel leaks from high-pressure hoses, it may cause fire or defective operation, which may lead to serious injury. If any loose bolts are found, stop work and tighten to the specified torque. If any damaged hoses are found, stop operations immediately and contact your Komatsu distributor.

Replace the hose if any of the following problems are found.

- Damaged or leaking hydraulic fitting.
- Frayed or cut covering or exposed reinforcement wire layer.
- Covering swollen in places.
- Twisted or crushed movable portion.
- Foreign material embedded in covering.

PRECAUTION FOR HIGH VOLTAGE

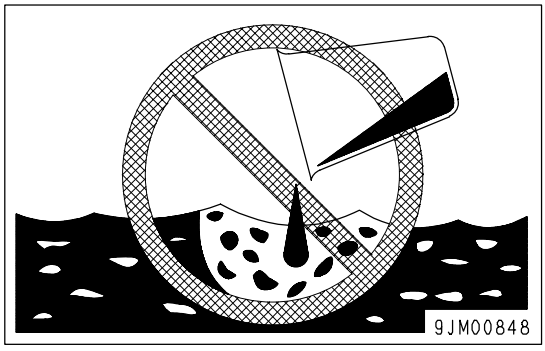
- When the engine is running and immediately after it is stopped, high voltage is generated inside the engine controller and the engine injector, and there is danger of electrocution. Never touch the inside of the controller or the engine injector portion. If it is necessary to touch the inside of the controller or the engine injector portion, please contact your Komatsu distributor.



WASTE MATERIAL

To prevent pollution, pay careful attention to the method of disposing of waste materials.

- Always put oil drained from your machine in containers. Never drain oil directly onto the ground or dump into the sewage system, rivers, the sea, or lakes.
- Obey appropriate laws and regulations when disposing of harmful objects such as oil, fuel, coolant, solvent, filters, and batteries.



MAINTENANCE FOR AIR CONDITIONER

If air conditioner refrigerant gets into your eyes, it may cause blindness; if it touches your skin, it may cause frostbite. Never touch refrigerant.

COMPRESSED AIR

- When carrying out cleaning with compressed air, there is a hazard of serious injury caused by flying particles.
- When using compressed air to clean elements or the radiator, always wear safety goggles, dust mask, gloves, and other protective equipment.

PERIODIC REPLACEMENT OF SAFETY CRITICAL PARTS

- To enable the machine to be used safely for long periods, be particularly careful to periodically replace the seatbelt, hoses, and other parts which have a close relationship to safety.
  See Replacing critical parts: PERIODIC REPLACEMENT OF SAFETY CRITICAL PARTS (PAGE 4-14)
- The material of these components naturally changes over time, and repeated use causes deterioration, wear, and fatigue. As a result, there is a hazard that these components may fail and cause serious injury or death. It is difficult to judge the remaining life of these components from external inspection or the feeling when operating, so always replace them at the specified interval.
- Replace or repair safety-critical parts if any defect is found, even when they have not reached the time specified interval.

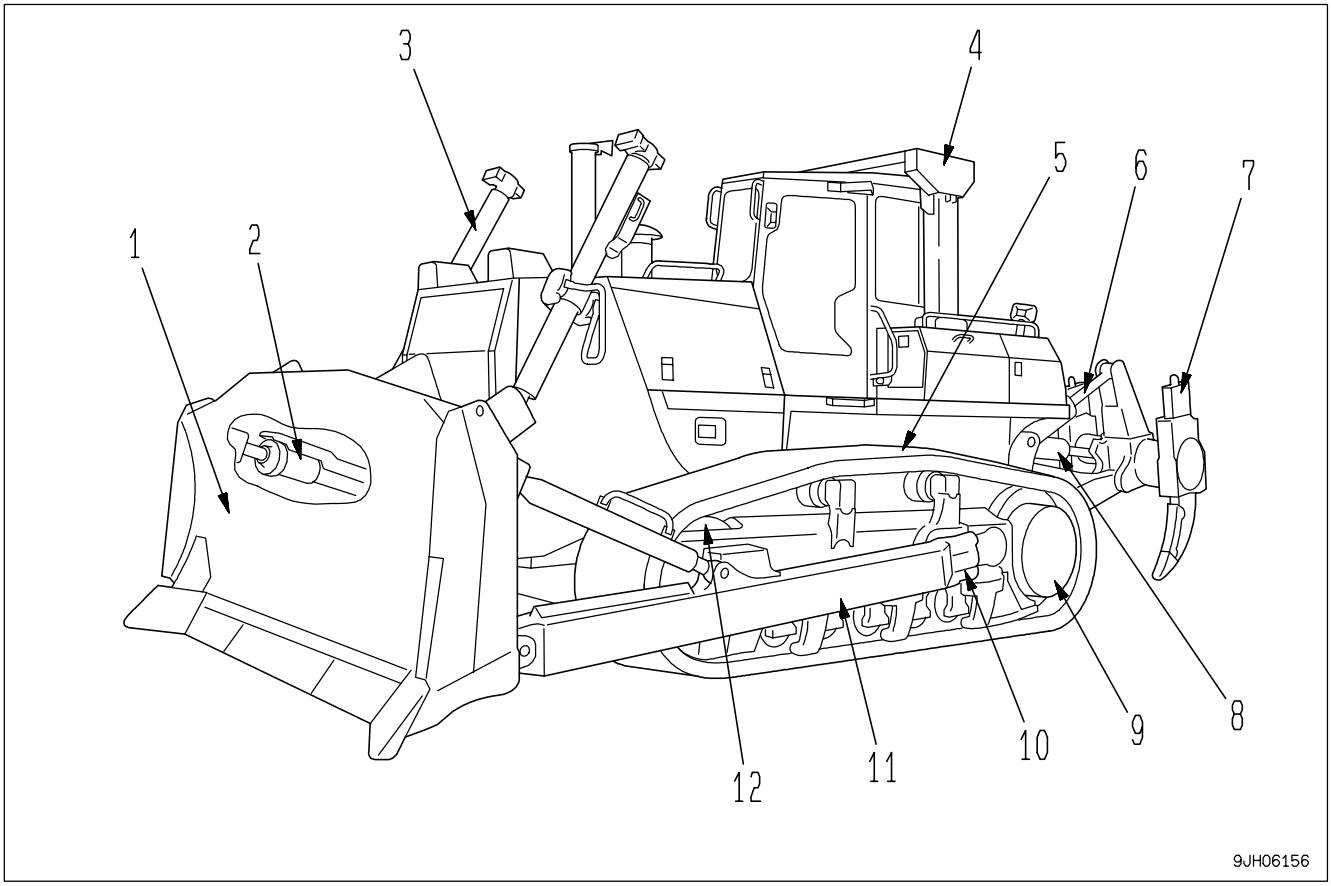
OPERATION

⚠ WARNING

Please read and make sure that you understand the SAFETY section before reading this section.

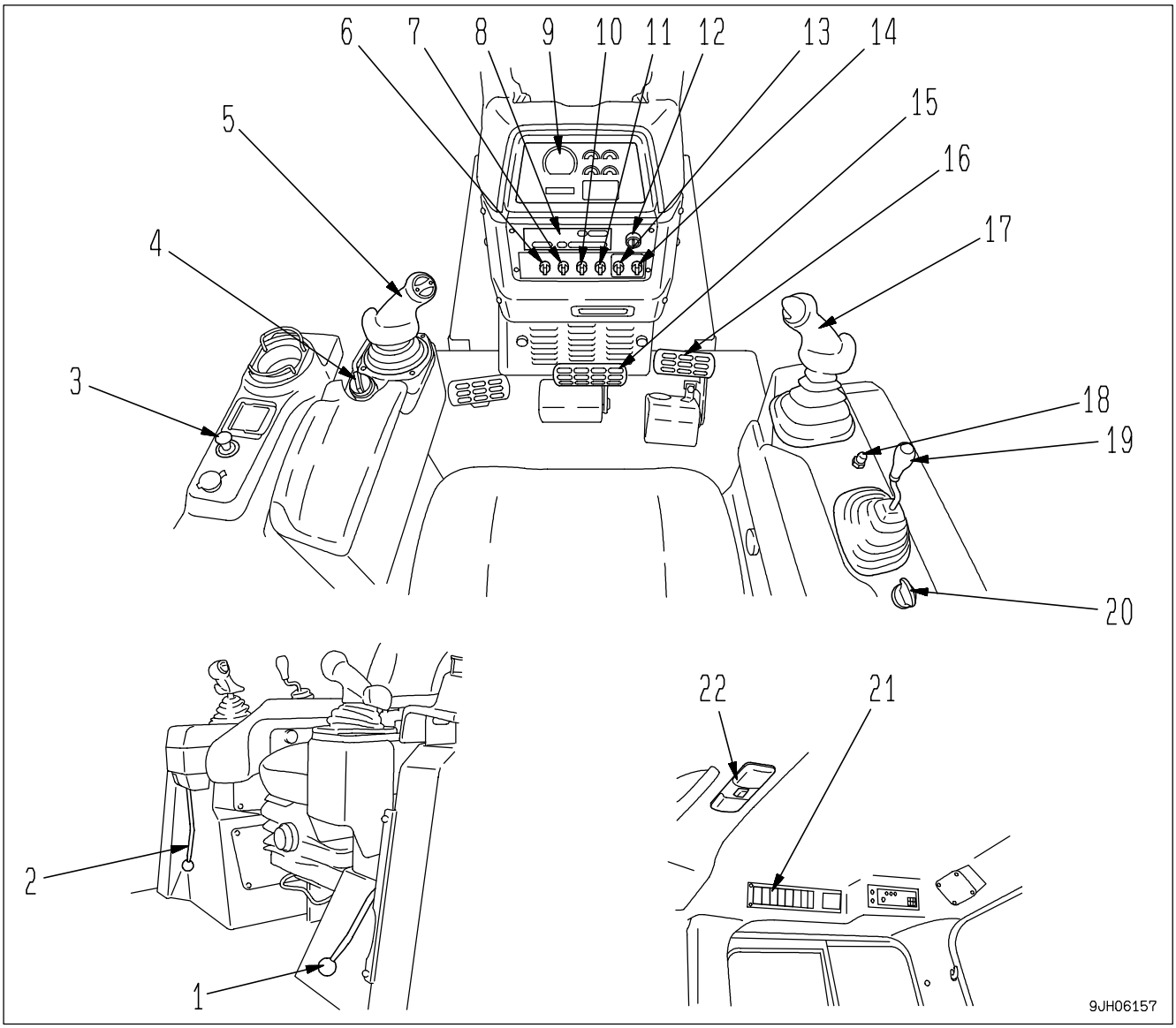
GENERAL VIEW

GENERAL VIEW OF MACHINE



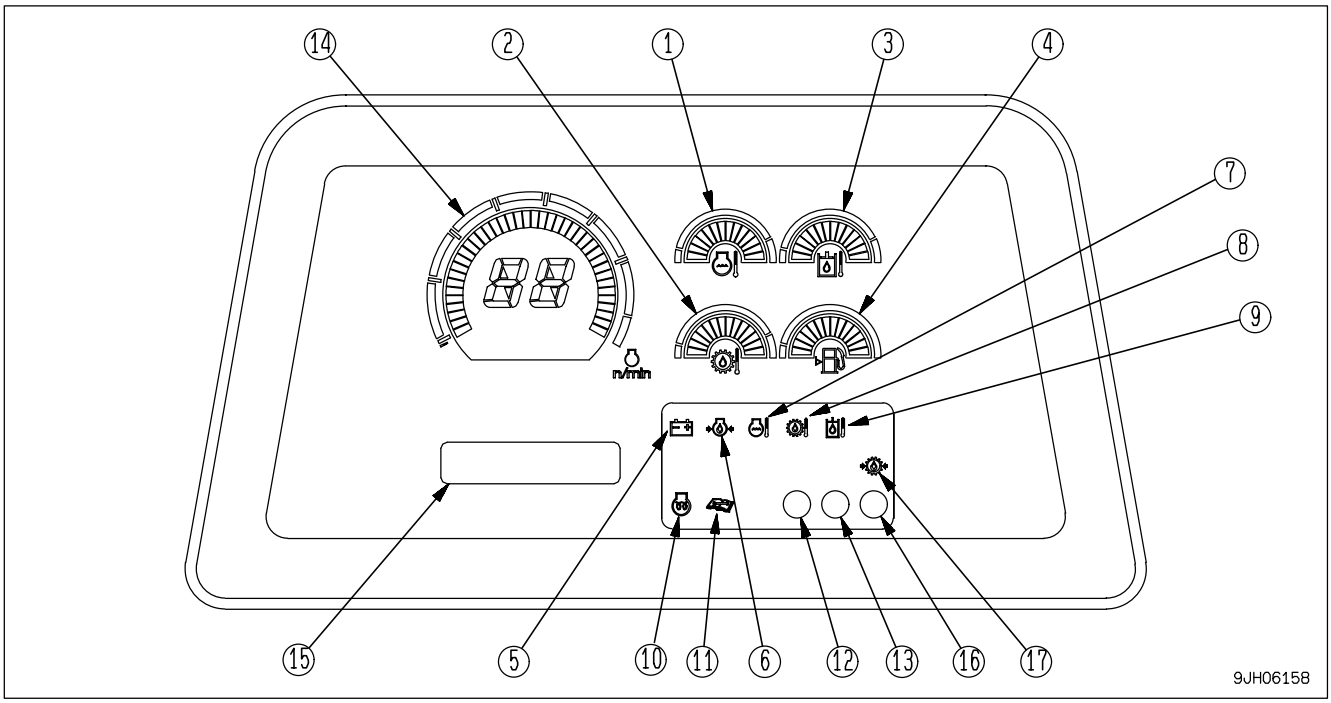
(1) Blade
(2) Blade tilt cylinder
(3) Blade lift cylinder
(4) Cab
(5) Track shoe
(6) Ripper tilt cylinder
(7) Multi ripper
(8) Ripper lift cylinder
(9) Sprocket
(10) Track frame
(11) Frame
(12) Idler

GENERAL VIEW OF CONTROLS AND GAUGES



(1) Parking lever
(2) Safety lock lever
(3) Cigarette lighter
(4) Fuel control dial
(5) Joystick
(Steering, directional and gear shift lever)
(6) Auto shift down switch
(7) Head lamp switch
(8) Air conditioner panel or heater panel
(9) Display panel A (Speed range, Engine speed)
(10) Rear lamp switch
(11) Fan rotation selector switch
(12) Starting switch
(13) Information switch
(14) Buzzer cancel switch
(15) Brake pedal
(16) Deceleration pedal
(17) Blade control lever
(18) Horn switch
(19) Ripper control lever
(20) Pin puller control switch (if equipped)
(21) Wiper switch
(22) Room lamp switch

FRONT PANEL



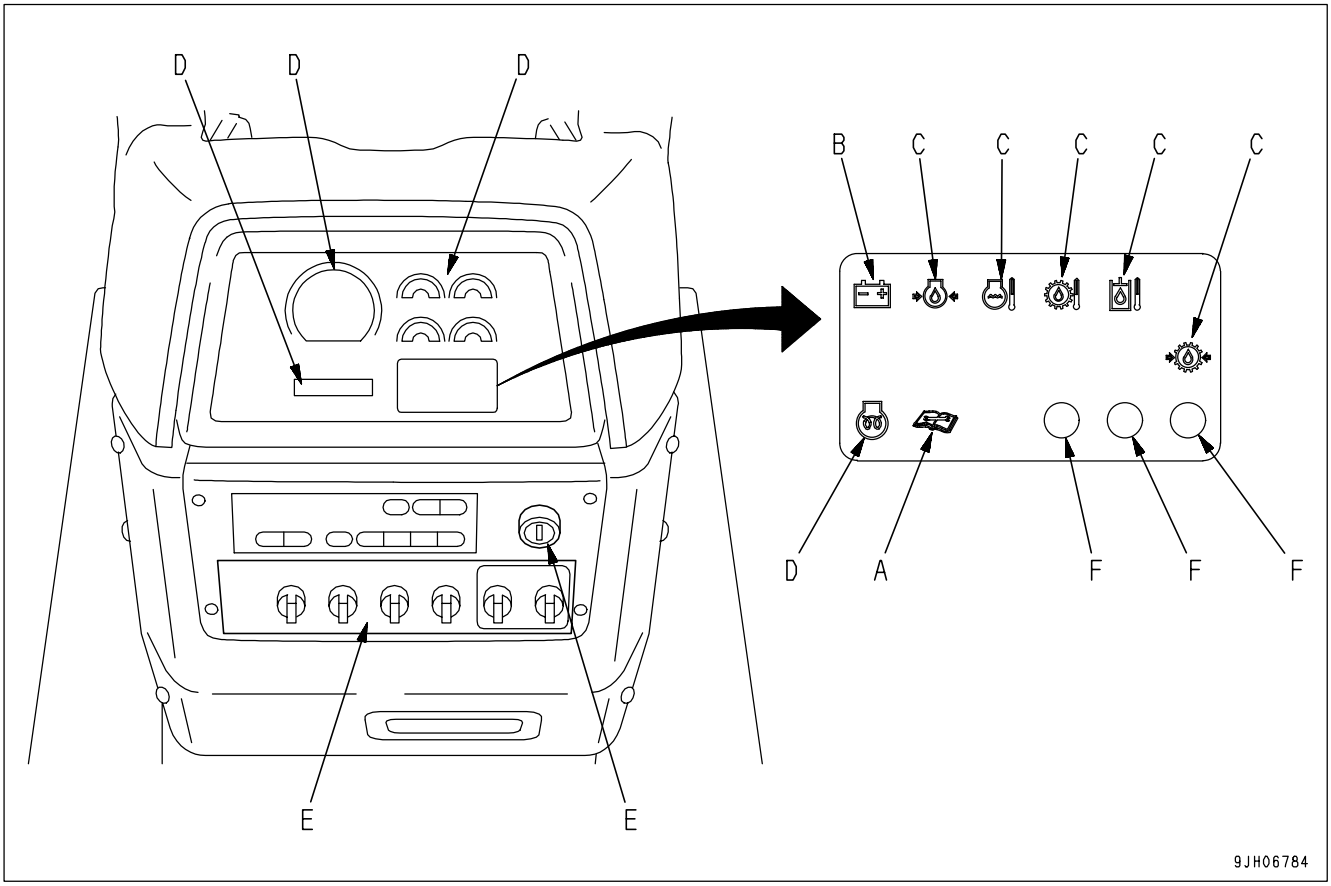
(1) Engine cooling water temperature gauge
(2) Power train oil temperature gauge
(3) Hydraulic oil temperature gauge
(4) Fuel level gauge
(5) Charge monitor
(6) Engine oil pressure caution lamp
(7) Engine cooling water temperature monitor
(8) Power train oil temperature monitor
(9) Hydraulic oil temperature monitor
(10) Engine preheating pilot lamp
(11) Maintenance caution lamp
(12) Warning lamp
(13) Filter, oil change interval lamp
(14) Display panel A (Speed range, Engine speed)
(15) Display panel B (Multi-information)
(16) Fan operation confirmation lamp
(17) HSS charge pressure caution lamp

HSS: HYdro Static Steering System

EXPLANATION OF COMPONENTS

The following is an explanation of the devices needed for operating the machine.
To perform suitable operations correctly and safely, it is important to completely understand the methods of operating equipment and meanings of the displays.

FRONT PANEL



A: Basic check items
B: Caution monitor group
C: Emergency caution items
D: Meter group
E: Switch
F: Lamp

A. Basic check items (see CHECK MONITOR GROUP (PAGE 3-7))
Before the engine is started, the basic items among the check before starting items that must be checked are displayed.
If there is any abnormality, the caution lamp for the location of the abnormality flashes.

NOTICE
When performing the check before starting, do not rely only on these monitors. Always perform the inspection items according to the Maintenance section or Section OPERATION (PAGE 3-67).

B: Caution monitor group (see "CAUTION MONITOR GROUP (PAGE 3-9)")

⚠ CAUTION

If the caution lamp for any of these items flashes, check and repair the appropriate item as soon as possible.

These are items, which need to be observed while the engine is running. If any abnormality occurs, items, which need to be repaired as soon as possible, are displayed.
If there is any abnormality, the appropriate monitor lamp will flash to indicate the location of the abnormality.

C: Emergency caution items (See "EMERGENCY CAUTION ITEMS (PAGE 3-10)")

⚠ CAUTION

If the caution lamp for any of these items flashes, stop the engine immediately or run it at low idling, and take the following action.

This displays the abnormal items that action must immediately be taken when the engine is running.
If there is any abnormality, the monitor showing the location of the abnormality will flash and the alarm buzzer will sound.

D: Meter display (see "METER GROUP (PAGE 3-13)")
This consists of the preheating pilot lamp, power train oil temperature gauge, engine water temperature gauge, hydraulic oil temperature gauge, fuel gauge, display panel A (speed range display) and display panel B (multi-information).

E: Switches (see "SWITCHES (PAGE 3-31)")
This consists of the starting switch, buzzer cancel switch, front lamp switch, rear lamp switch, automatic shift down switch, information switch, and fan rotation selector switch.

F: Lamps (see "LAMPS (PAGE 3-20)")
This consists of the warning lamp, the filter/oil replacement interval lamp, and fan operation confirmation lamp.

CHECK MONITOR GROUP

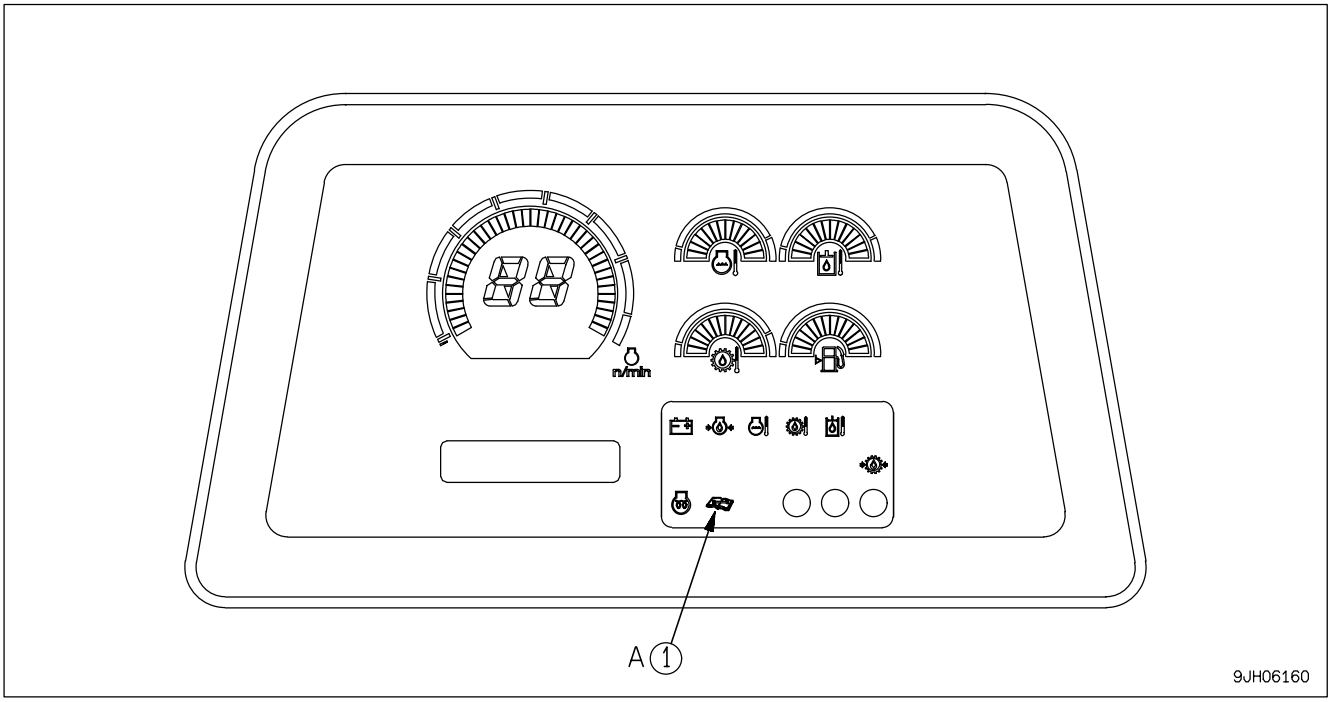
NOTICE

- **When performing the check before starting, do not rely only on these monitors. Always refer to OPERATION (PAGE 3-67) to perform these checks.**
- **Park the machine on level ground and then check the monitor lamps.**
- **Confirm that monitor lamps light up about 2 seconds after the ignition switch is turned to the ON position. If any monitor lamp does not light, contact your Komatsu distributor to inspect and repair.**

REMARK

- When the ignition switch is turned to the ON position, before starting the engine, the caution lamps flashes for 2 seconds, the warning lamps light up for 2 seconds, and the alarm buzzer sounds for 2 seconds.
- The caution lamps cannot be checked for any malfunction until at least 5 seconds after the engine has been stopped.

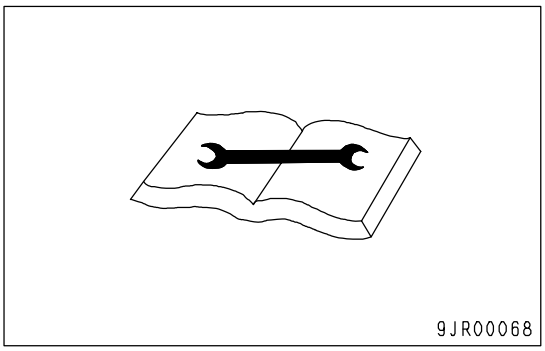
This displays the basic items among the check before starting items that must be checked before starting the engine. If there is any abnormality, the caution lamp for that location will flash.



A(1) Maintenance caution lamp

MAINTENANCE CAUTION LAMP

This lamp (1) flashes when the time for changing the filter or oil has been exceeded. "SWITCH DISPLAY PANEL B (Multi-information) (PAGE 3-15)" to the maintenance mode, and check or replace the appropriate filter or oil.



CAUTION MONITOR GROUP

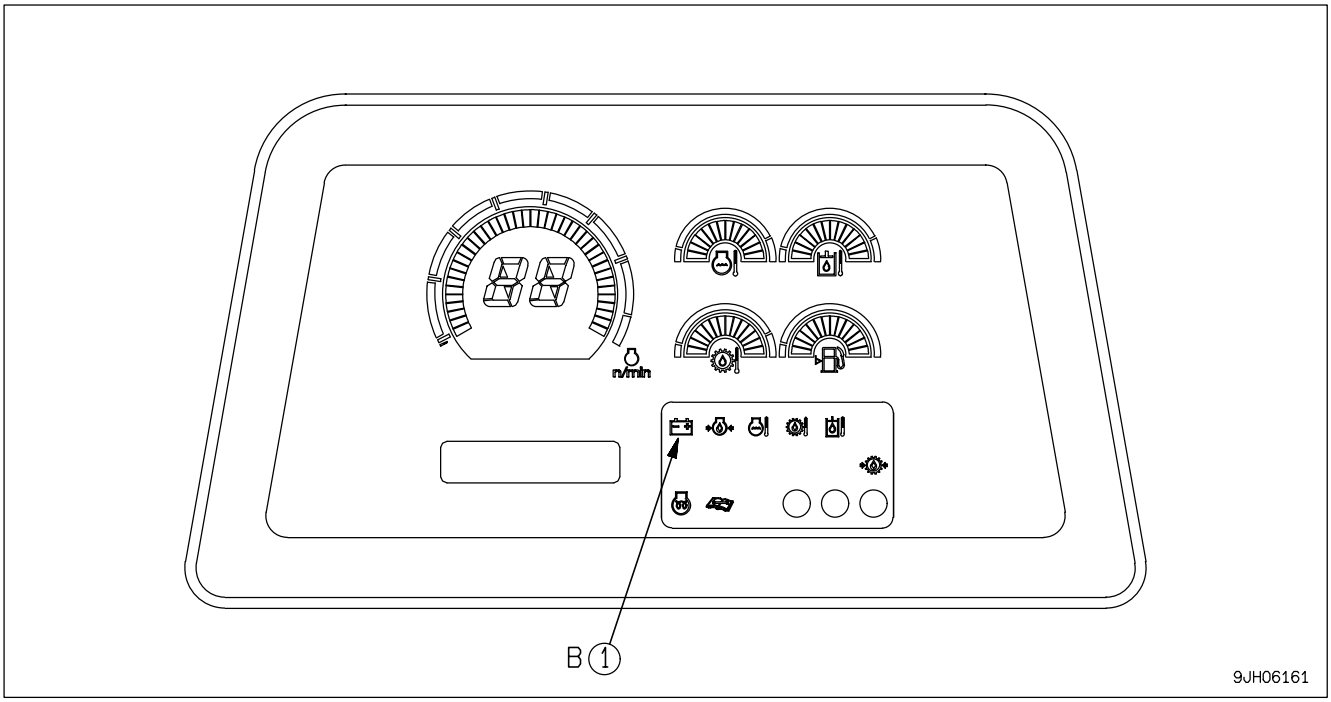
CAUTION

If these caution lamps item flash, check and repair the appropriate location as soon as possible.

NOTICE

- **Park the machine on level ground and check the monitor lamps.**
- **Confirm that monitor lamps light up about 2 seconds after the ignition switch is turned to the ON position. If any monitor lamp does not light, contact your Komatsu distributor to inspect and repair.**

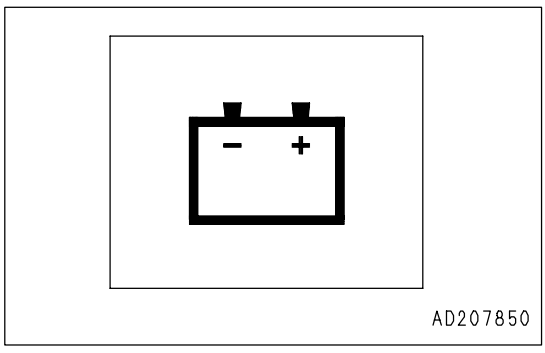
These are items which need to be observed when the engine is running. If any abnormality occurs, the item needing immediate repair is displayed. If there is any abnormality, the abnormal location on the caution lamp will flash.



B(1) Charge monitor

CHARGE MONITOR

Lamp (1) indicates an abnormality in the charging system while the engine is running.
If the monitor lamp flashes, check the V-belt tension. If any abnormality is found, see "OTHER TROUBLE (PAGE 3-146)".



REMARK

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

EMERGENCY CAUTION ITEMS

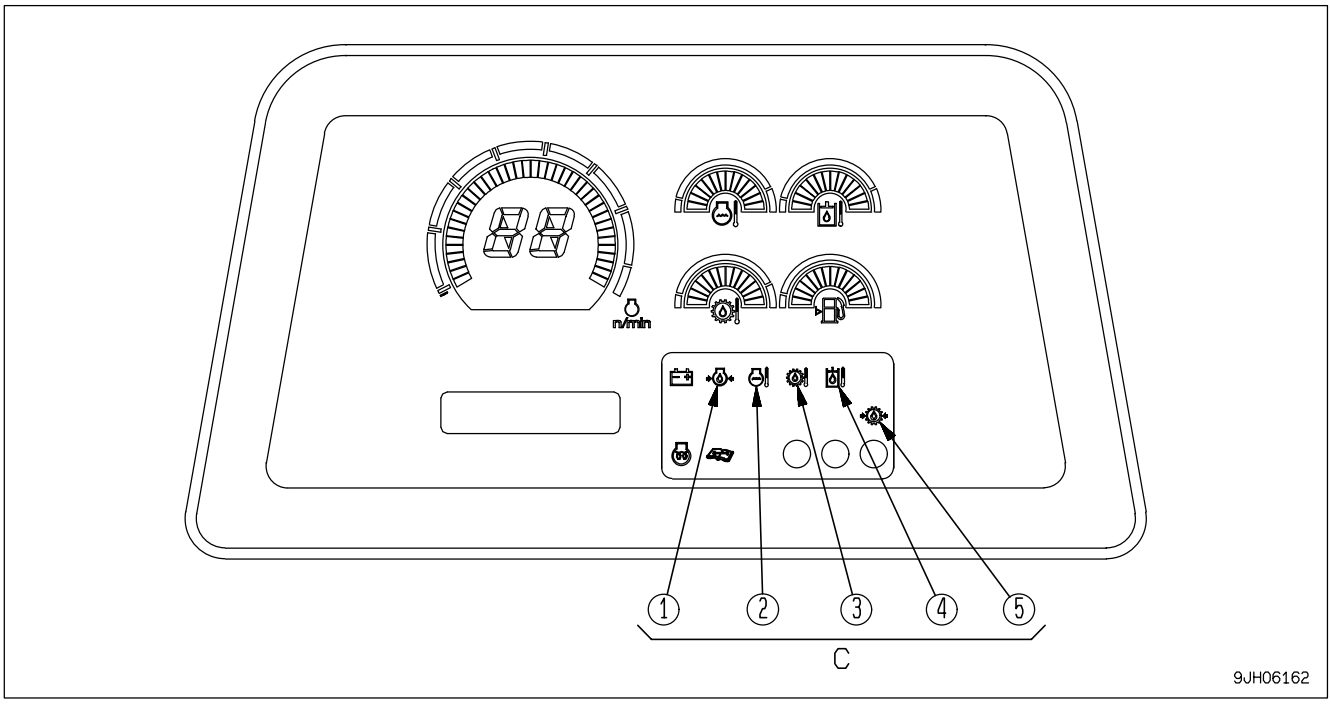
CAUTION

If the caution lamp for any of these items flashes, stop the engine immediately or run it at low idling, and take the following action.

NOTICE

- **Park the machine on level ground and check the monitor lamps.**
- **Confirm that these caution lamps light for about 2 seconds after the ignition switch is turned to ON. If any monitor lamp does not light, have your Komatsu distributor inspect and repair it.**

These items need to be observed while the engine is running. If any abnormality occurs, items that need to be repaired immediately are displayed.
If there is any abnormality, alarm buzzer sounds intermittently and the abnormal location on the caution lamp will flash.

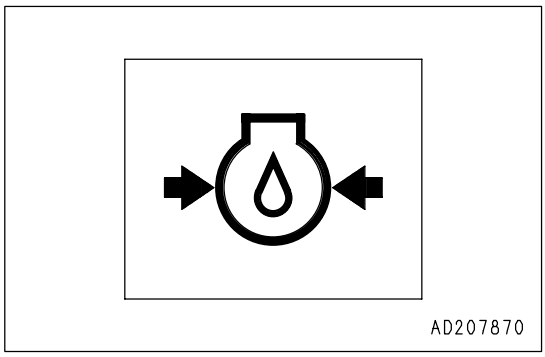


C(1) Engine oil pressure caution lamp
C(2) Engine cooling water temperature monitor
C(3) Power train oil temperature monitor
C(4) Hydraulic oil temperature monitor
C(5) HSS charge pressure caution lamp

ENGINE OIL PRESSURE CAUTION LAMP

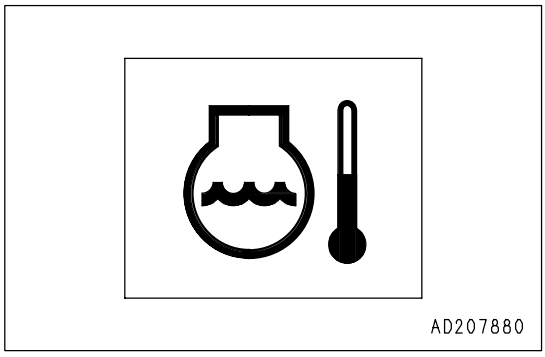
This lamp (1) indicates a low engine oil pressure.
If the monitor lamp flashes, stop the engine and check it immediately.

REMARK
The alarm buzzer sounds, when the starting switch is turned to ON immediately after the engine oil has been changed. It does not indicate an abnormality.



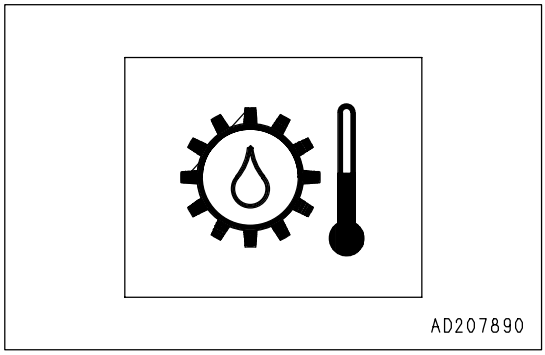
ENGINE COOLING WATER TEMPERATURE MONITOR

This lamp (2) indicates a raise in the coolant temperature.
When the monitor lamp flashes, run the engine at low idling speed until green range of the engine coolant temperature gauge lights.



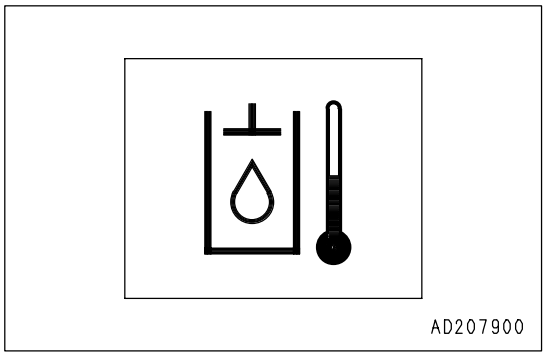
POWER TRAIN OIL TEMPERATURE CAUTION LAMP

This lamp (3) 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.



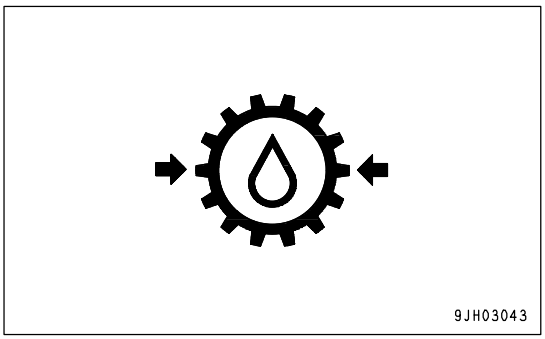
HYDRAULIC OIL TEMPERATURE MONITOR

Lamp (4) 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.



HSS CHARGE PRESSURE CAUTION LAMP

This monitor (5) warns the operator that the HSS charge pressure has dropped. If it flashes, stop the engine and carry out inspection.



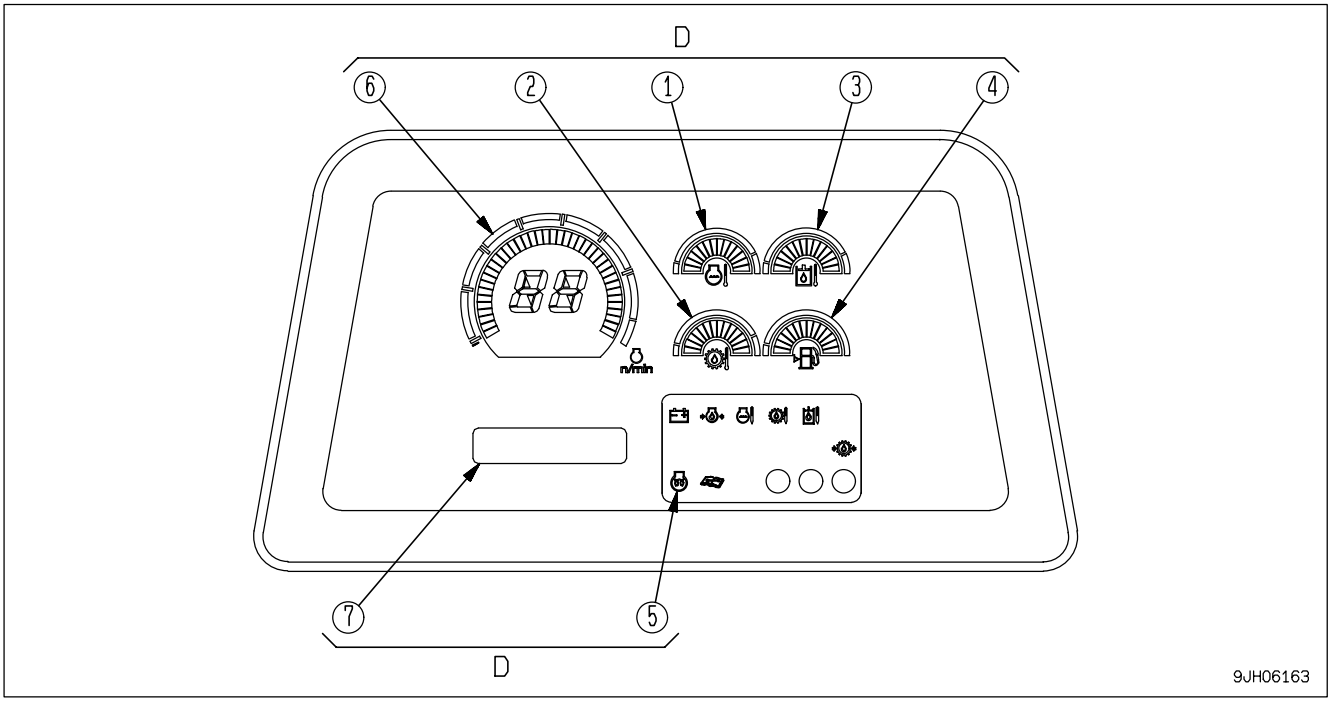
REMARK

The buzzer may sound when the starting switch is turned ON or immediately after the engine is started, but this does not indicate any abnormality.

METER GROUP

NOTICE

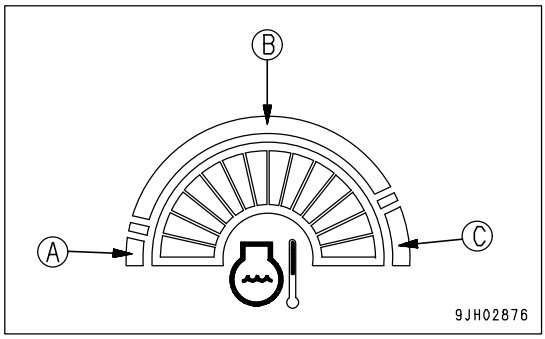
When the engine is stopped, turn that the starting switch to the ON position and check that the gauge or monitor for the engine water temperature gauge, power train oil temperature gauge, and fuel gauge light up.
If they do not light up, please contact your Komatsu distributor for repairs.



D(1) Engine cooling water temperature gauge
D(2) Power train oil temperature gauge
D(3) Hydraulic oil temperature gauge
D(4) Fuel level gauge
D(5) Engine preheating pilot lamp
D(6) Display panel A
(Speed range display, engine speed)
D(7) Display panel B (multi-information)

ENGINE COOLING WATER TEMPERATURE GAUGE

Gauge (1) indicates temperature of the engine coolant.
If the temperature is normal during operation, green range (B) will light.
If red range (C) lights during operation, move the fuel control dial to lower engine speed tp approx. 3/4 of the full speed, and run until the coolant temperature enters green range (B).
During operation, if red range (C) lights up, the engine water temperature monitor flashes, and the alarm buzzer sounds, stop the machine, run the engine at low idling, and wait for the water temperature to go down to green range (B) .
(A): White range
(B): Green range
(C): Red range

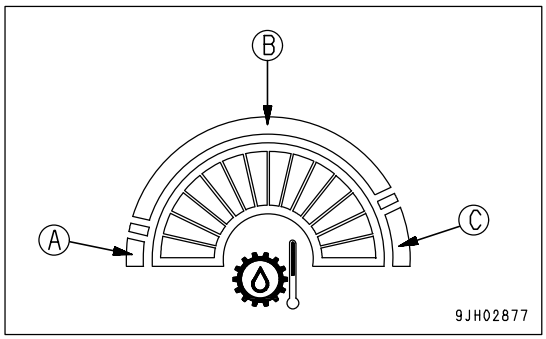


NOTICE

If the coolant temperature gauge often enters red range (C), check the radiator for clogging.

POWER TRAIN OIL TEMPERATURE GAUGE

Gauge (2) indicates the torque converter outlet oil temperature.
If the temperature is normal during operation, green range (B) will light.
If red range (C) lights up during operation, move the fuel control dial to lower engine speed to approx. 3/4 of the full speed, reduce the load and run until the oil temperature enters green range (B).
If red range (C) lights up, the power train oil temperature caution lamp flashes, and the alarm buzzer sounds during operation, stop the machine, run at low idling, and wait for the oil temperature to go down to green range (B).
(A): White range
(B): Green range
(C): Red range

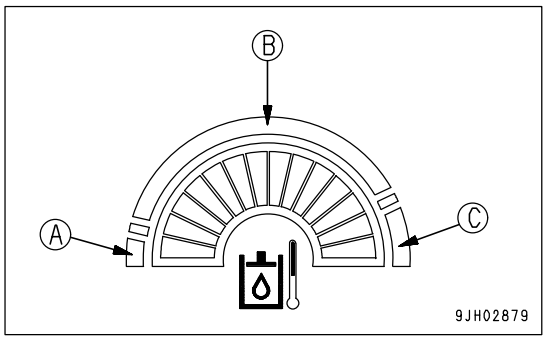


NOTICE

In cases where the power train oil temperature gauge tends to enter red range (C), we recommend that you lower the speed range by one range in order to reduce the load on the power train during operations.

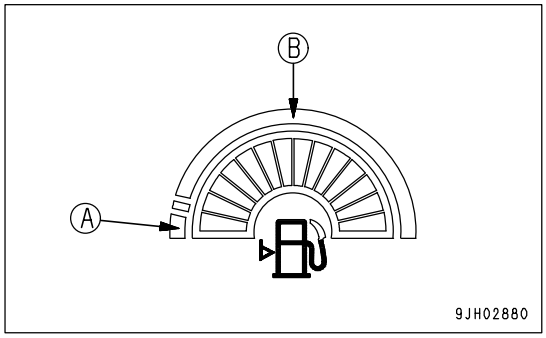
HYDRAULIC OIL TEMPERATURE GAUGE

Gauge (3) indicates the hydraulic oil temperature.
If the temperature is normal during operation, green range (B) will light.
If the red range (C) 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 (B).
(A): White range
(B): Green range
(C): Red range



FUEL LEVEL GAUGE

Gauge (4) fuel level in the fuel tank.
During normal operation, the green range (B) should be lighted up.
If red range (A) lights up during operation, add fuel immediately. If this is not done, the engine speed will become irrgular or an error display will be shown on the monitor.
(A): Red range
(B): Green range

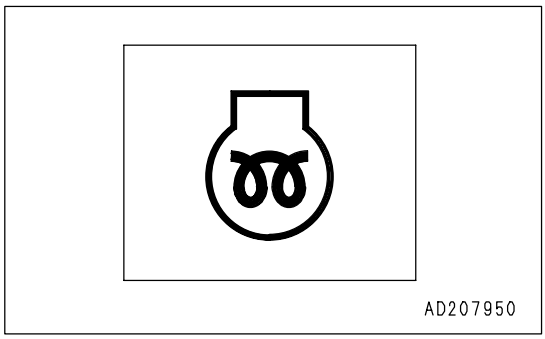


REMARK

- The display is not proportional to the amount of fuel remaining.
- If only the red range (A) lights up, there is less than 60 liters (15.85 US gal) of fuel remaining.

ENGINE PREHEATING PILOT LAMP

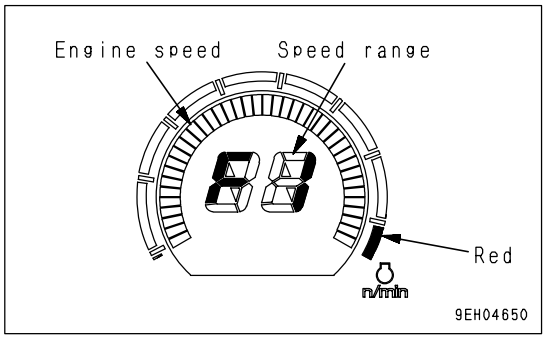
Lamp (5) indicates that engine is being preheated bu the electrical heater during cold weather.
The engine controller detects the coolant temperature and automatically actuates preheating in low temperatures when starting the engine.



DISPLAY PANEL A (speed range display, engine speed)

Meter (6) displays the transmission speed range being used on the machine and engine speed.

- When the transmission is in 1st FORWARD, the display shows F1, and when it is in 1st REVERSE, the display shows R1.
- The peripheral bar graph indicates the engine speed. When the red range lights up during running, shift the gear to a lower speed to run the engine at a speed within the green range.

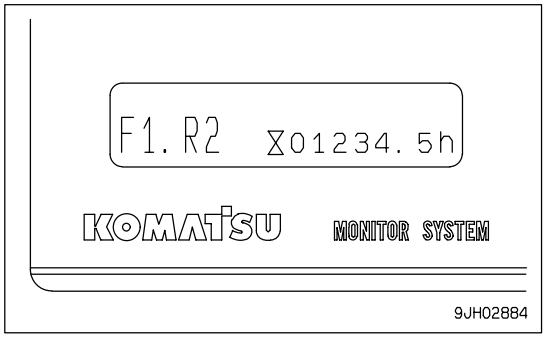


SWITCH DISPLAY PANEL B (Multi-information)

This monitor (7) displays information related to the condition of the machine on the top and bottom lines of the display portion. The content of the display can be switched by operating the Information switch and Buzzer cancel switch.

(1) Operating mode (normal operation screen)

Use this mode when operating the machine.

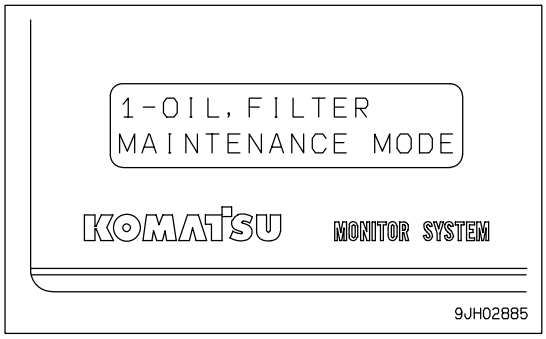


REMARK
When the starting switch is turned from the OFF to the ON position, the multi-information display changes to the operating mode.

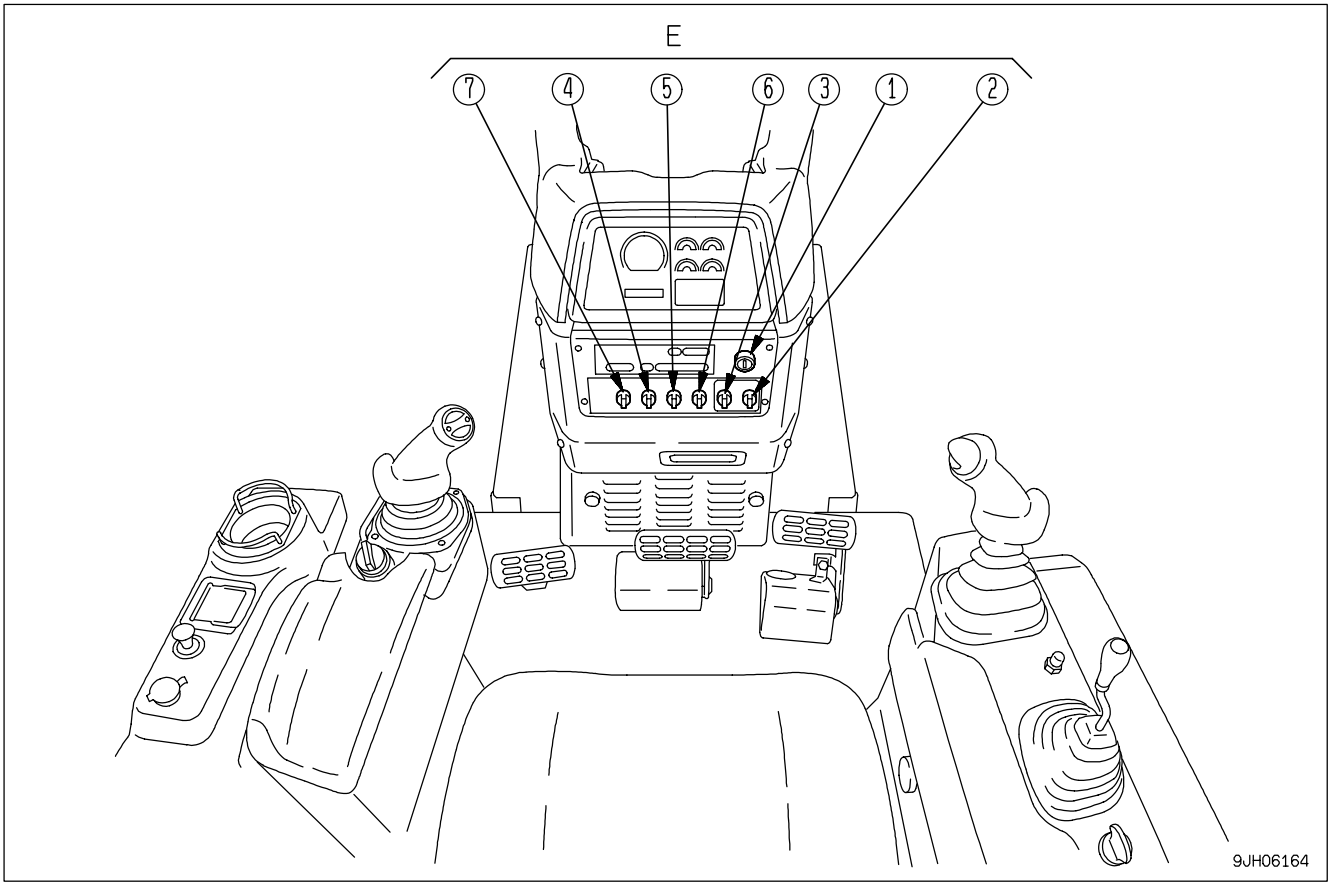
The bottom right of the monitor displays of the total hours of operation of the machine. Use this service meter function display to set the intervals for periodic maintenance.
When the engine is running, the service meter advances, even if the machine is not being operated.
When the engine is running, the operation display of the hourglass mark on the side of the meter lights up to show that the meter is advancing.
The meter advances by 1 for one hour of engine operation, regardless of the engine speed.
The failure code is also displayed on the top line if there is a failure on the machine. If it is displayed, follow the action given in "OTHER TROUBLE (PAGE 3-146)".

(2) Maintenance mode

The maintenance mode is displayed by continuing to turn the information switch in the ◇ direction for 2.5 seconds.
For details, see "METHOD OF USING DISPLAY PANEL B (Multi-information) (PAGE 3-22)".



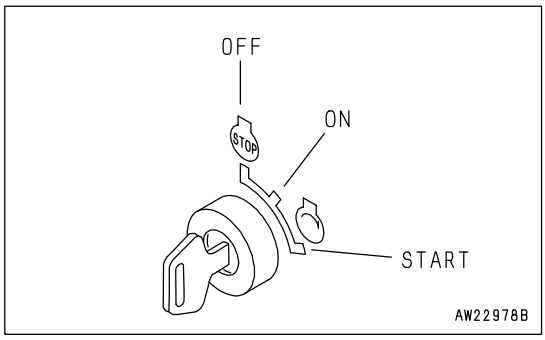
SWITCH



E(1) Starting switch
E(2) Buzzer cancel switch
E(3) Information switch
E(4) Front lamp switch
E(5) Rear lamp switch
E(6) Fan rotation selector switch
E(7) Auto shift down switch

STARTING SWITCH

Switch (1) is used to start the engine.



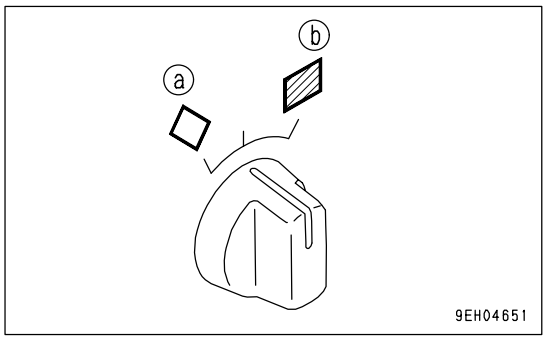
OFF
Key insertion-withdrawal position. None of electrical circuits activate.

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

START
At this key position, the starting motor will crank the engine. Immediately after starting the engine, release the key which will automatically return to the ON position.

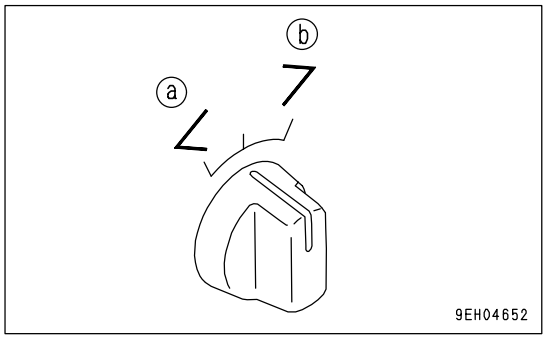
BUZZER CANCEL SWITCH

When this switch (2) is turned to the right, the alarm buzzer stops. When the information monitor is in the maintenance mode, this switch is used to select the mode item.
Position (a): Cancel
Position (b): Select



INFORMATION SWITCH

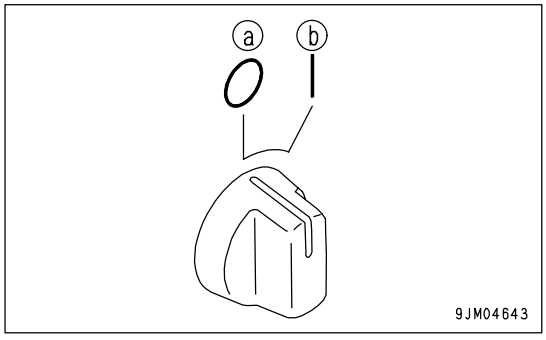
This switch (3) is used to switch the display mode item on the information monitor and to move the cursor in the maintenance mode.
Position (a): Cursor moves to left, mode item display goes back to previous item.
Position (b): Cursor moves to right, mode item display advances to next item.



FRONT LAMP SWITCH

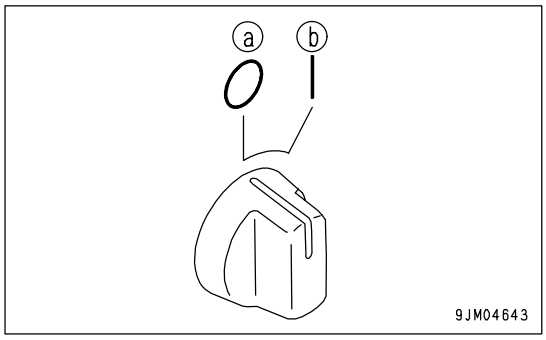
This switch (4) is used to light up the front lamp.
Position (a) (OFF): Lamp goes out
Position (b) (ON): Lamp lights up

REMARK
When the head lamp switch is turned ON, the monitor panel lighting dims.



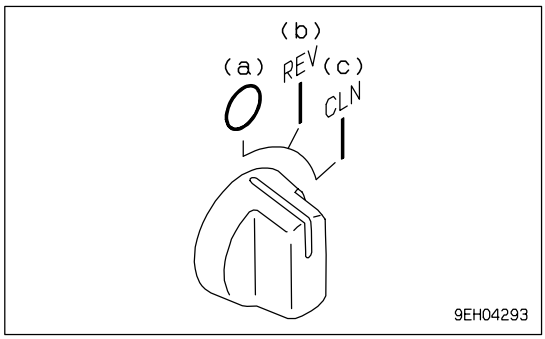
REAR LAMP SWITCH

This switch (5) is used to turn on the rear lamp.
Position (a) (OFF): Lamp goes out
Position (b) (ON): Lamp lights up

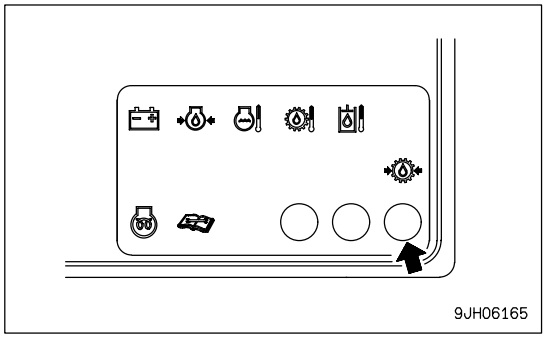


FAN ROTATION SELECTOR SWITCH

This switch (6) is used to switch the fan to the reverse mode and clean mode.
Position (a): Normal mode
Position (b): Reverse mode
Position (c): Clean mode



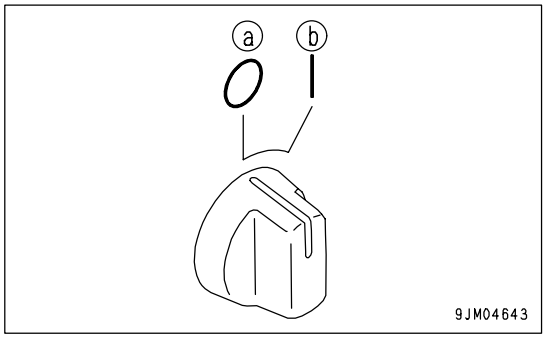
- Use the reverse mode in cold weather to maintain the temperature and use the clean mould when removing dirt and foreign material clogging the radiator. In the clean mode, the fan always rotates at 100% speed.
- When operating the fan rotation selector switch, turn the starting switch to the ON position but do not start the engine.
- After the engine is started, even if the fan rotation selector switch is operated, the fan operation confirmation lamp will flash to inform the operator that the switching operation cannot be carried out.



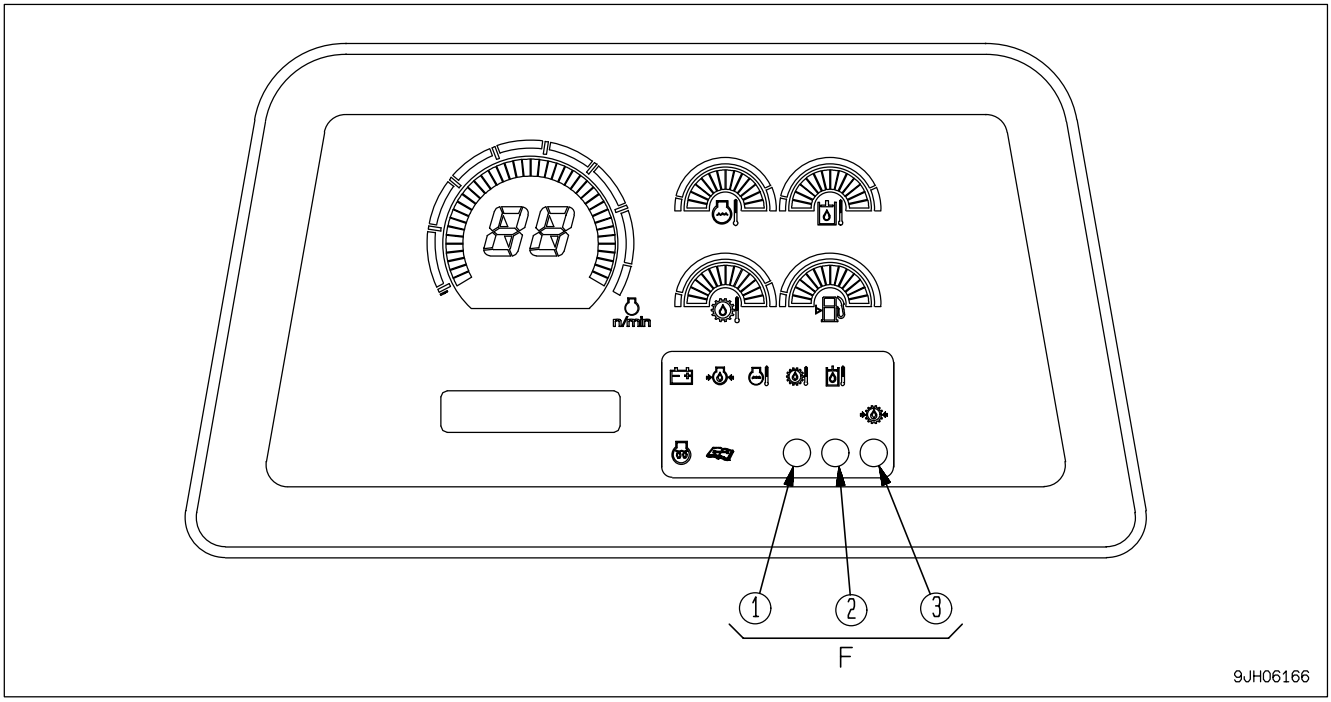
AUTO SHIFT DOWN SWITCH

When this switch (7) is operated to the right, if the load conditions during travel cause the travel speed to drop, the speed range is automatically shifted down one range.
Position (a): Auto shift down canceled
Position (b): Transmission is automatically shifted down

For details, see "AUTO SHIFT DOWN FUNCTION (PAGE 3-101)".



LAMPS



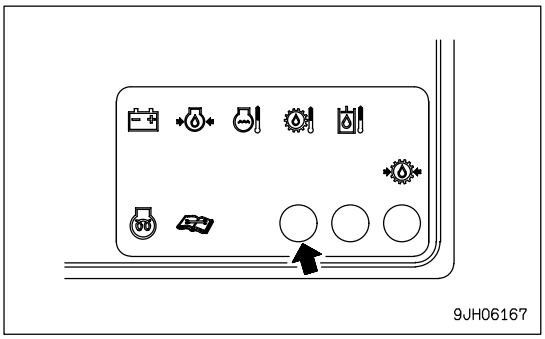
F(1) Warning lamp
F(2) Filter, oil change interval lamp
F(3) Fan operation confirmation lamp

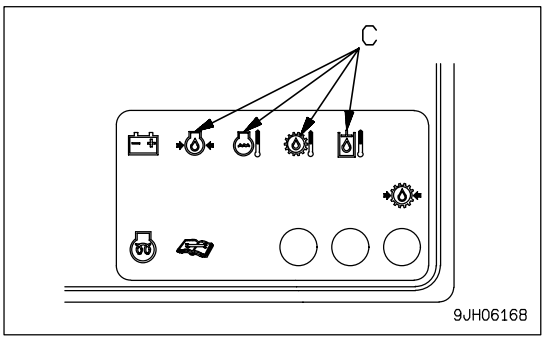
WARNING LAMP

NOTICE

If alarm buzzer sounds, stop work immediatey and perform inspection and maintenance of the appropriate point.

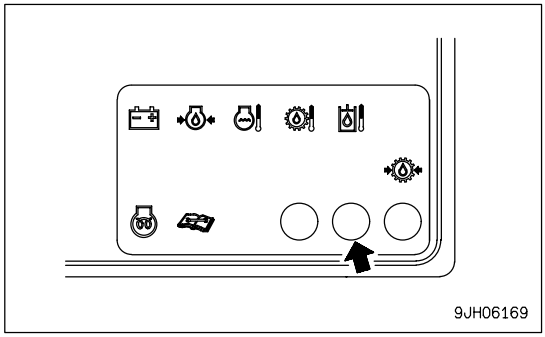
When the caution lamp for the B CAUTION or C CAUTION groups flashes and an abnormality is detected by the electronic control system, the alarm buzzer sounds and this lamp (1) flashes at the same time.
If the lamp flashes, use the monitor panel to check for the location of the abnormality.





FILTER, OIL CHANGE INTERVAL LAMP

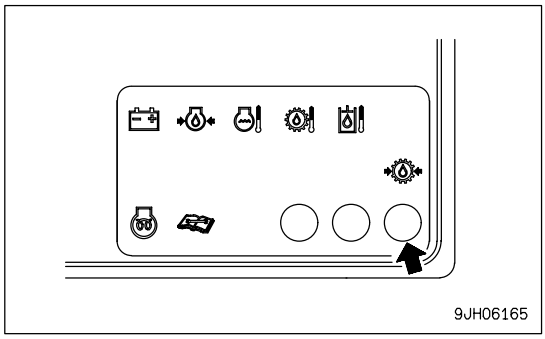
This lamp (2) lights up when the time for replacing the filter or oil is near.



FAN OPERATION CONFIRMATION LAMP

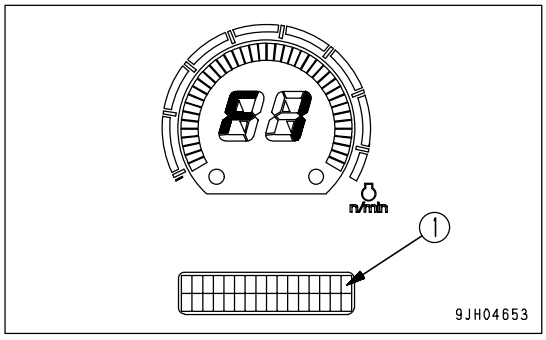
After the engine is started, even if the fan rotation selector switch is operated, this lamp will flash to inform the operator that the switching operation cannot be carried out.

- Before the engine is started, if the starting switch is turned ON, and the fan rotation selector switch is set to the reverse mode (REV) position or clean mode (CLN) POSITION, lamp (3) will light up to inform the operator that the mode has been set to reverse mode (REV) or clean mode (CLN). After the engine starts, the lamp goes out.

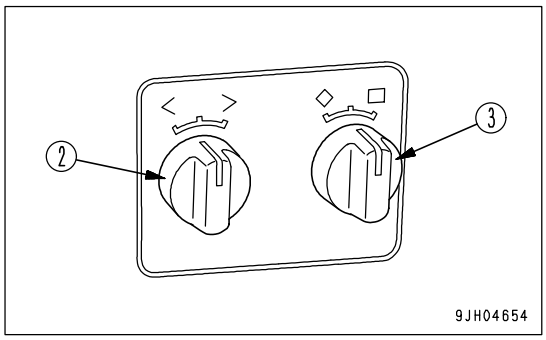


METHOD OF USING DISPLAY PANEL B (Multi-information)

EXPLANATION OF MODES AND CONTROLS



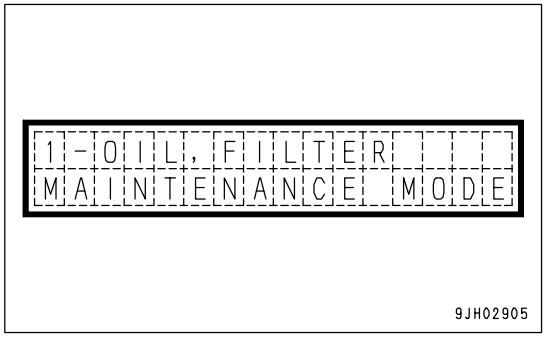
- Display panel B (1) has the function of displaying the following four types of mode. (The diagram on the right shows the normal screen before the mode display.)
  Maintenance mode
  This displays the time for replacing the filters or oil.
  PM clinic auxiliary mode
  This displays the engine speed and the oil pressure in the hydraulic circuits.
  Fault display mode
  This displays the fault code is related to the electronic control.
  Adjustment mode
  This adjusts the brightness and contrast of the display.
- There are variations (sub-items) in the four types of mode. For an explanation of the variations, see the following items.
  METHOD OF USING MAINTENANCE MODE (PAGE 3-24)
  METHOD OF USING PM CLINIC AUXILIARY MODE (PAGE 3-26)
  METHOD OF USING FAULT CODE DISPLAY MODE (PAGE 3-27)
  METHOD OF USING USER ADJUST MODE (PAGE 3-28)



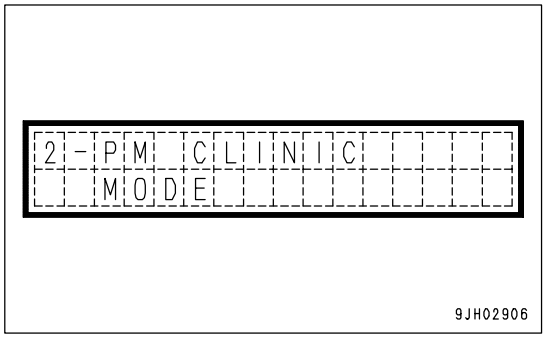
- The operation of each mode is carried out with information switch (2) and buzzer cancel switch (3) on the dashboard in front of the operator's seat.
  After operating the switch, if the switch is released, it will automatically return to the center position as shown in the diagram on the right.
  The functions for each position of the switches are as follows.
  <: Mode item display goes back to previous item, cursor moves to left
  >: Mode item display advances to next item, cursor moves to right
  ◇: Selects mode
  □: Cancels mode
- The four types of mode can be selected in a cycle by operating information switch (2) to > and < to give the following sequence: Maintenance mode ←→ PM clinic auxiliary mode ←→ Fault code display mode ←→ Adju stment mode ←→ Maintenance mode.
- From the normal mode before giving the mode display, if buzzer cancel switch (3) is operated to ◇ and held for 2.5 seconds, the maintenance mode is displayed. After that, if information switch (2) is operated to >, the mode changes to the PM clinic auxiliary mode. If information switch (2) is operated to <, the mode changes to the user adjust mode.
- When any mode is being displayed, if the buzzer cancel switch is operated to □, the screen returns the normal screen shown before the mode display.

METHOD OF SELECTING MODES

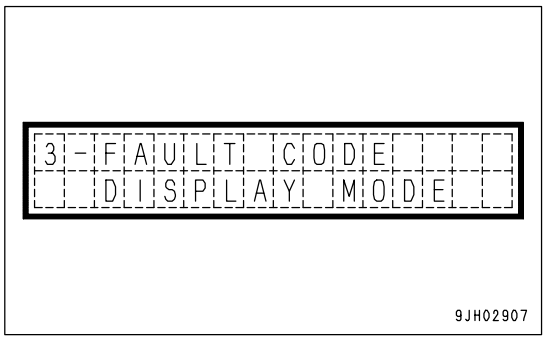
1. When moving from the normal operation display to a user mode, the maintenance mode is displayed. Use the controls to change the mode as follows.
   > position: Go to PM clinic auxiliary mode
   < position: Go to user adjust mode
   ☐ position: Go to normal operation screen
   ◇ position: Go to maintenance mode selection screen.



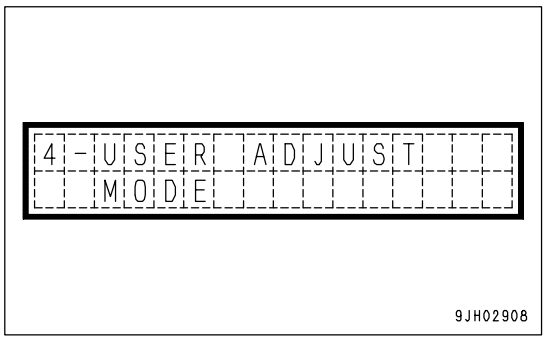
2. The diagram on the right shows the screen display for the PM clinic auxiliary mode. Use the controls to change the mode as follows.
   > position: Go to fault code display mode
   < position: Go to maintenance mode
   ☐ position: Go to normal operation screen
   ◇ position: Go to PM clinic auxiliary mode selection item screen



3. The diagram on the right shows the screen display for the fault code display mode. Use the controls to change the mode as follows.
   > position: Go to adjustment mode
   < position: Go to PM clinic auxiliary mode
   ☐ position: Go to normal operation screen
   ◇ position: Go to fault code selection item screen



4. The diagram on the right shows the screen display for the user adjust mode. Use the controls to change the mode as follows.
   > position: Go to maintenance mode
   < position: Go to fault code display mode
   ☐ position: Go to normal operation screen
   ◇ position: Go to user adjust mode selection item screen

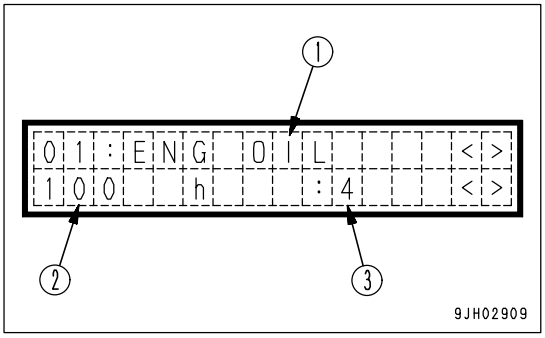


METHOD OF USING MAINTENANCE MODE

NOTICE

This function is only a guideline. If dirty oil or filters are found during daily maintenance, replace them immediately.
If the controllers or monitor panel are replaced, the timer for this function will not worl properly. Contact your Komatsu distributor for replacement.

The maintenance mode shows the replacement interval for the oil filters and oil on the monitor.
The content of the display is as follows.
(1) The item is displayed.
(2) The time remaining until replacement is displayed.
(3) The number of times that replacement has been made until now is displayed.

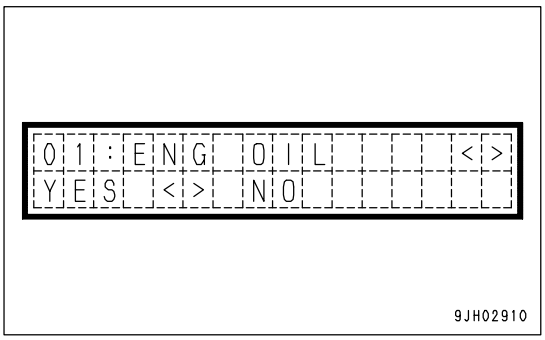


The display items can be displayed in order by operating the information switch to the left or right (<, >).

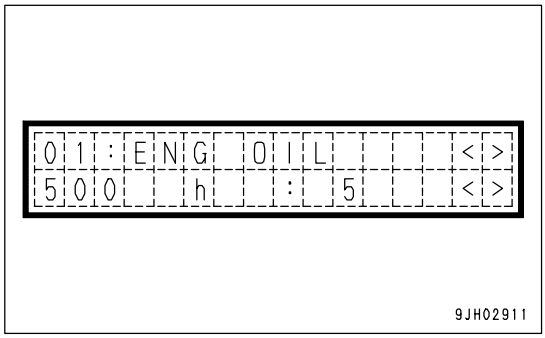
	Display	Item	1st replacement interval	2nd and following replacement intervals
1.	ENG.OIL	Engine oil	500h	500h
2.	ENG.FILT	Engine oil filter	500h	500h
3.	FUEL.FILT	Fuel filter	500h	500h
4.	HYD.FILT	Hydraulic oil filter	500h	2000h
5.	CORR.RES	Corrosion resistor	1000h	1000h
6.	BYPS.FILT	Bypass filter (*)	0h	0h
7.	DAMP.OIL	Damper oil	2000h	2000h
8.	FNL.OIL	Final drive oil	500h	1000h
9.	HYD.OIL	Hydraulic oil	500h	2000h
10.	POWL.OIL	Power train oil	500h	1000h
11.	POWL.FILT	Power train oil filter	500h	500h
12.	HSS.FILT	HSS charge filter	250h	1000h

The item marked * is displayed in the above table, but is not used on this machine.

When the oil or filter has been replaced, select the applicable item, then operate the buzzer cancel switch to ◇.
The screen will ask if you want to display the replacement history. Operate the information switch to select YES, then operate the buzzer cancel switch to ◇. The replacement account will increase by 1, the replacement interval will be reset, and the oil, filter change interval lamp will go out.
When this is done, if the maintenance caution lamp does not go out, there is another item close to the replacement time, so check the situation.



REMARK
To return to the function selection mode, operate the buzzer cancel switch to ☐.

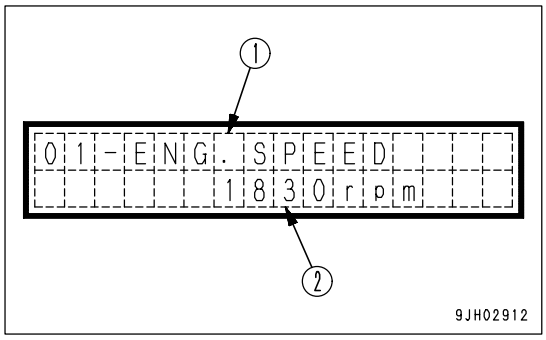


METHOD OF USING PM CLINIC AUXILIARY MODE

CAUTION

When moving the work equipment or setting the transmission to the travel position for carrying out measurements, check carefully that the situation is safe.

The PM clinic auxiliary mode displays the engine speed, hydraulic oil pressure, and other items on display panel B. Display panel B displays the item on the top line (1), and the measured value on the bottom line (2).



The display items consist of the six items in the table below.
The items can be selected by operating the information switch (<, >).

Display	Item	Measured value
01-ENG.SPEED	Engine speed	Speed (rpm)
02-BOOST PRSSURE	Boost pressure	Pressure (kPa)
03-HYD.PUMP PRES	Hydraulic oil pressure	Pressure (MPa)
04-BATTERY VOLT	Battery voltage	Voltage (mV)
05-HSS PUMP-A	HSS A circuit pressure	Pressure (MPa)
06-HSS PUMP-B	HSS B circuit pressure	Pressure (MPa)

REMARK

- Sometimes when measuring with the engine running, the display may flicker and be difficult to read. In such cases, switch the buzzer cancel switch to ◇. The value for that moment is shown on the fixed display.
- To cancel this mode, operate the buzzer cancel switch once more to ◇.
  To return to each function selection mode, operate the buzzer cancel switch to □.
- The displayed pressure is the absolute pressure.

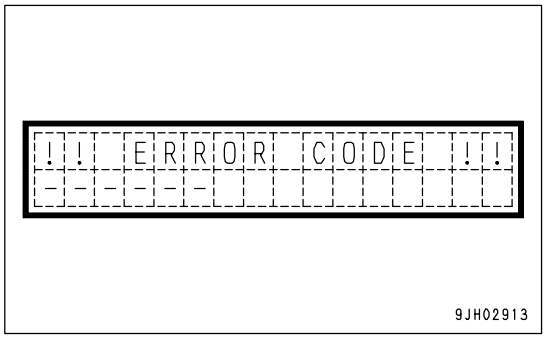
METHOD OF USING FAULT CODE DISPLAY MODE

NOTICE

The fault items observed by this function are connected with the electronic control, so even if a fault code is not displayed, there is probably some problem with the machine. If the operator feels any abnormality with the machine, the machine should be stopped immediately and checked.

When any disconnection or short circuit in any sensor is detected, the location and fault code are displayed by a 6-digit code on display panel B. When contacting your Komatsu distributor, inform your distributor of the code at the same time.

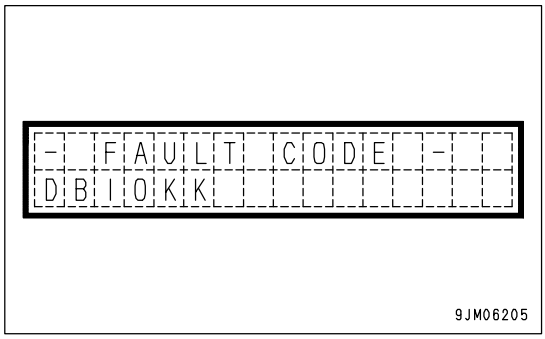
If the failure observation function has not determined the condition of the machine, the display is as shown in the diagram on the right.



With this function, existing failures can be displayed up to a maximum of 20 items.

If multiple failures are occurring, the display automatically changes every 2 seconds, so check the code.

The display is shown repeatedly.



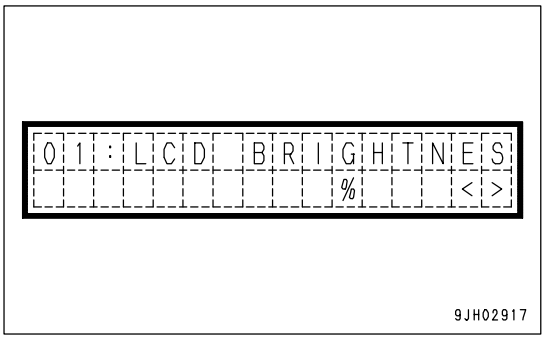
REMARK

To return to the function selection mode, operate the buzzer cancel switch to ☐.

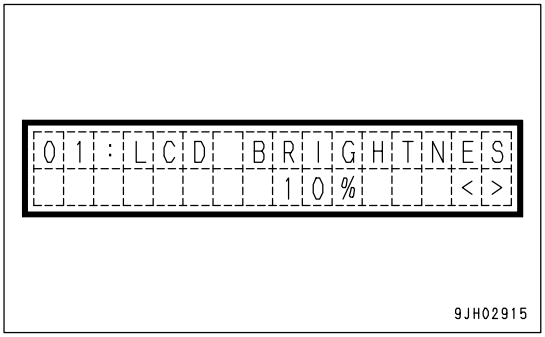
METHOD OF USING USER ADJUST MODE

With the user adjust mode, the brightness of the panel screen backlighting and the contrast of the liquid crystal panel can be changed, or the cooling fan can be set to maximum speed to clean the radiator when it is clogged.
These are displayed on display panel B.

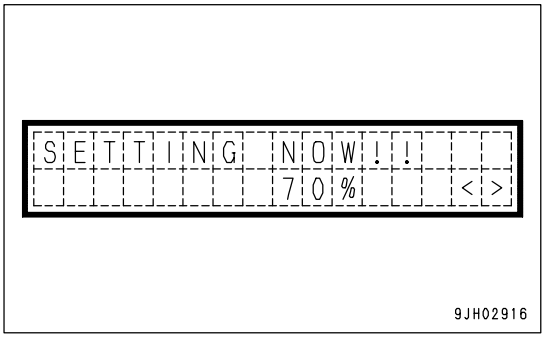
1. Adjusting backlighting of liquid crystal display
   The diagram on the right is the mode for adjusting the brightness of the backlighting of the liquid crystal panel. On this screen, operate the buzzer cancel switch to ◇ to switch to the screen to adjust the brightness.



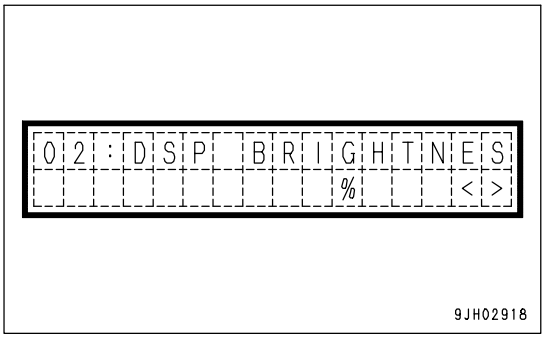
The brightness can be adjusted by operating the information switch.
The higher the number, the brighter the screen becomes; the lower the number, the darker the screen becomes.
> position: Number increases
< position: Number decreases



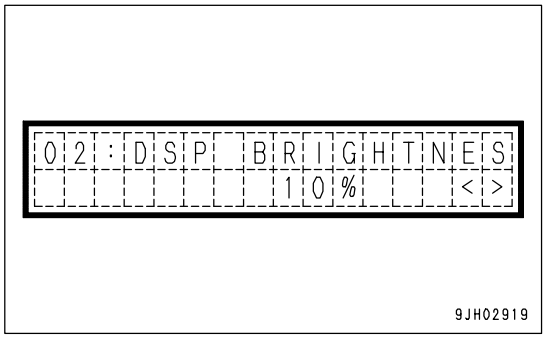
When the buzzer cancel switch is operated to ◇, the brightness of the liquid crystal display backlighting is set.



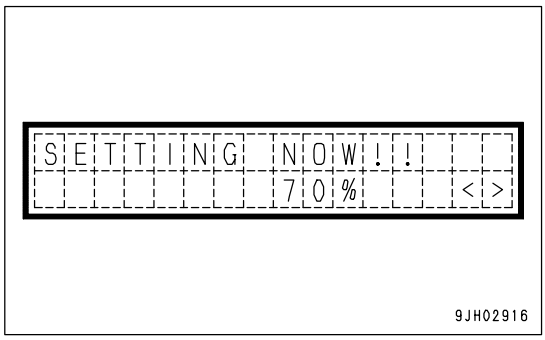
2. Adjusting backlighting of message display
   The diagram on the right is the mode for adjusting the brightness of the backlighting of the message display. On the screen, operate the buzzer cancel switch to ◇ to switch to the screen for adjusting the brightness.



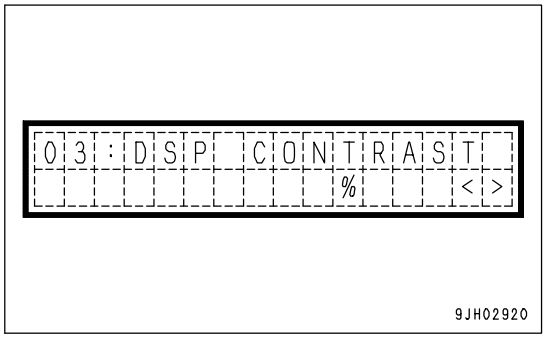
The brightness can be adjusted by operating the information switch.
The higher the number, the brighter the screen becomes; the lower the number, the darker the screen becomes.
> position: Number increases
< position: Number decreases



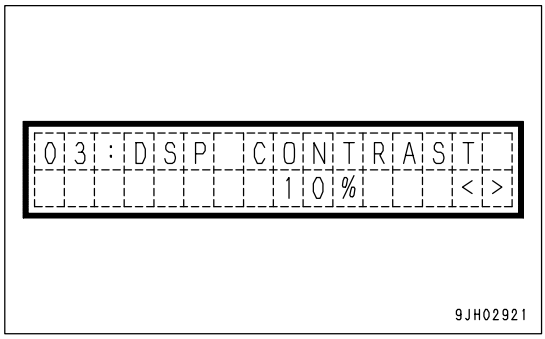
When the buzzer cancel switch is operated to ◇, the brightness of the message display backlighting is set.



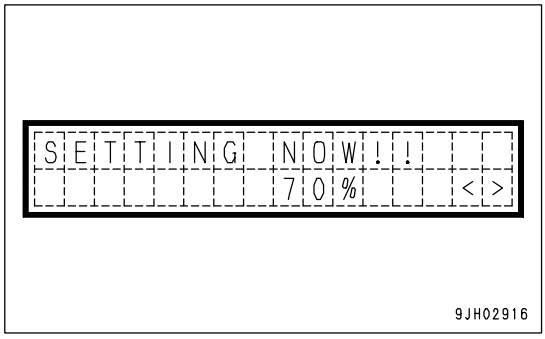
3. Adjusting contrast of liquid crystal message display
   The diagram on the right is the mode for adjusting the contrast of the liquid crystal message display.
   On this screen, operate the buzzer cancel switch to ◇ to switch to the screen to adjust the contrast.



The contrast can be adjusted by operating the information switch.
The higher the number, the deeper the screen becomes; the lower the number, the lighter the screen becomes.
> position: Number increases
< position: Number decreases



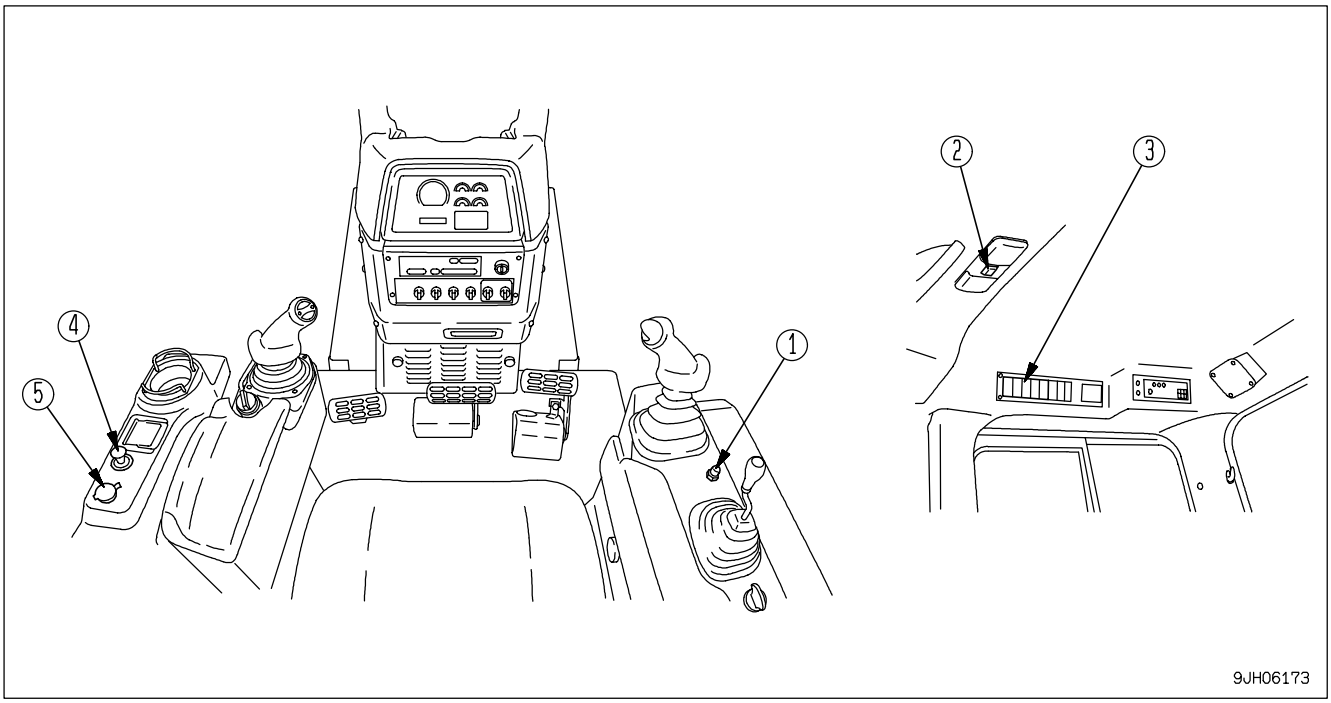
When the buzzer cancel switch is operated to ◇, the contrast of the liquid crystal display is set.



REMARK

- To return to the function selection mode, operate the buzzer cancel switch to ☐.
- The brightness of the backlighting of the monitor panel differs according to whether the front lamp is lighted up or not. Entering this mode when the front lamps are lighted up makes it possible to adjust the brightness when the front lamps are lighted up. In the same way, entering this mode when the front lamps are not lighted up makes it possible to adjust the brightness when the front lamps are not lighted up.

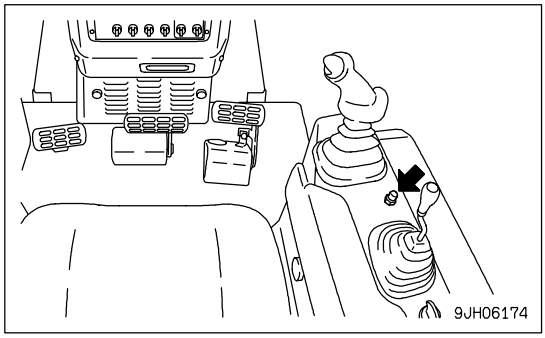
SWITCHES



(1) Horn switch
(2) Room lamp switch
(3) Wiper switch
(4) Cigarette lighter (24V)
(5) Accessory socket (12V)

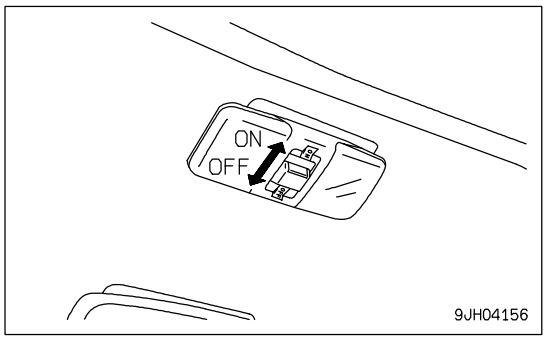
HORN SWITCH

The horn sounds when button (1) at rear of the blade control lever at the right side of operator's seat is pressed.



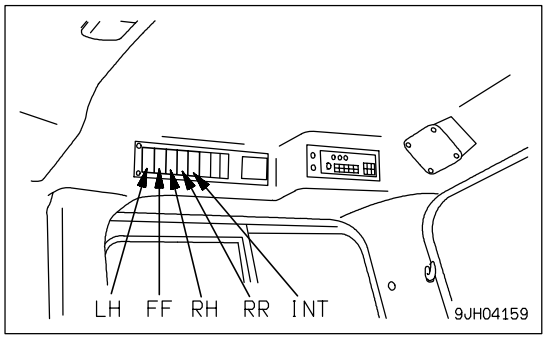
ROOM LAMP SWITCH

This (2) lights up the room lamp.
ON position: Lamp lights up
OFF position: Lamp is out

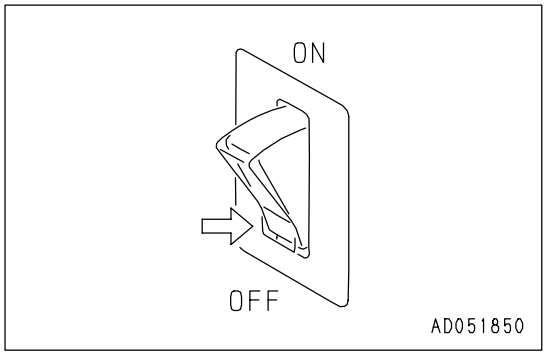


WIPER SWITCH

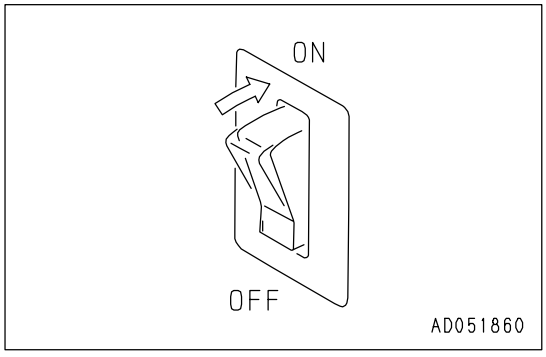
Switch (3) activates the wipers.
The wiper switches are as follows.
(LH) Left door
(FF) Front window
(RH) Right door
(RR) Rear window
(INT) Wiper intermittent operation switch
This is also used as the window washer switch.
The switch is operated as follows.



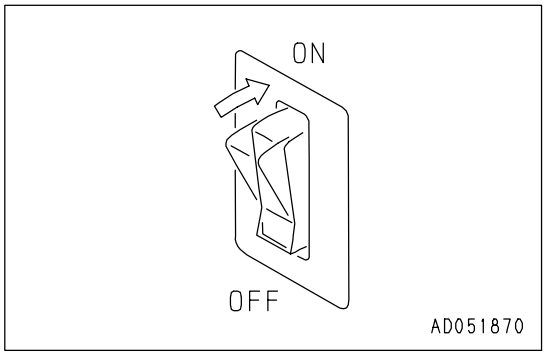
- Window washer only
  Keep the switch pressed to the OFF position to spray out water.



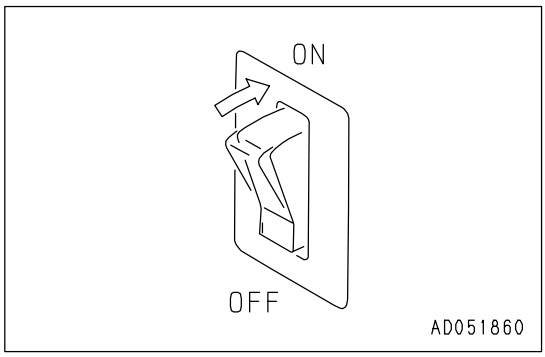
- Wiper only
  If this is switched on, the wiper will start.



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

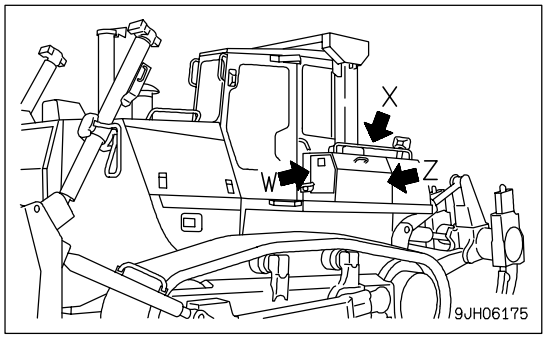


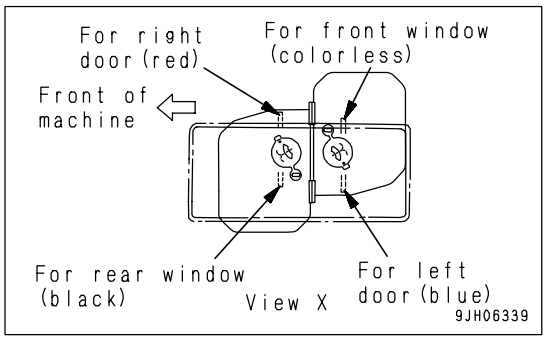
- If the intermittent switch is turned ON, all movement of the wipers will be intermittent.

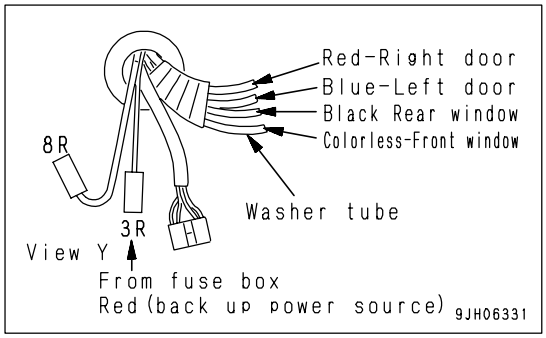


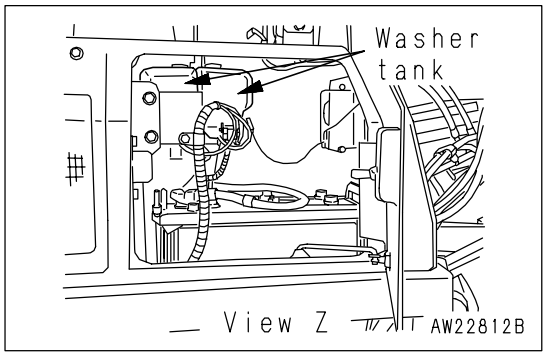
REMARK

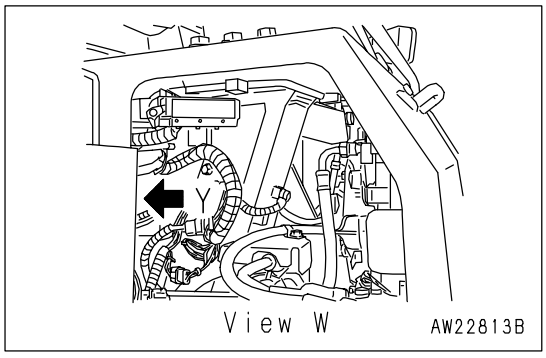
- When installing the cab, check the colors and install the washer tank and each window washer hose correctly according to the color.
- When installing the cab, carry out the operation in accordance with the cab installation procedure manual held by your Komatsu distributor.





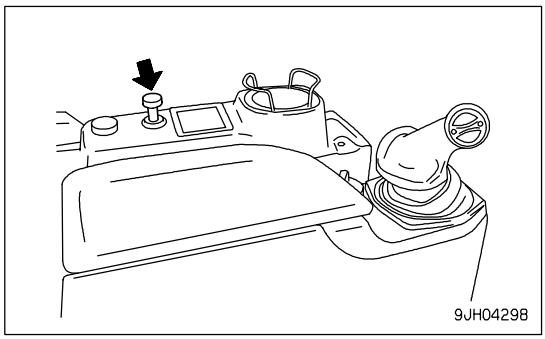






CIGARETTE LIGHTER

Lighter (4) is used to light cigarettes.
When the cigarette lighter is pushed in, it will return to its original position after a few seconds, so take it out to light your cigarette.
Cigarette lighter capacity: 120W



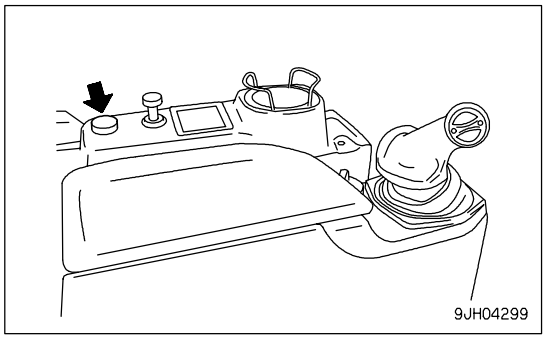
NOTICE

This cigarette lighter is 24V. Do not use it as the power source for 12V equipment.

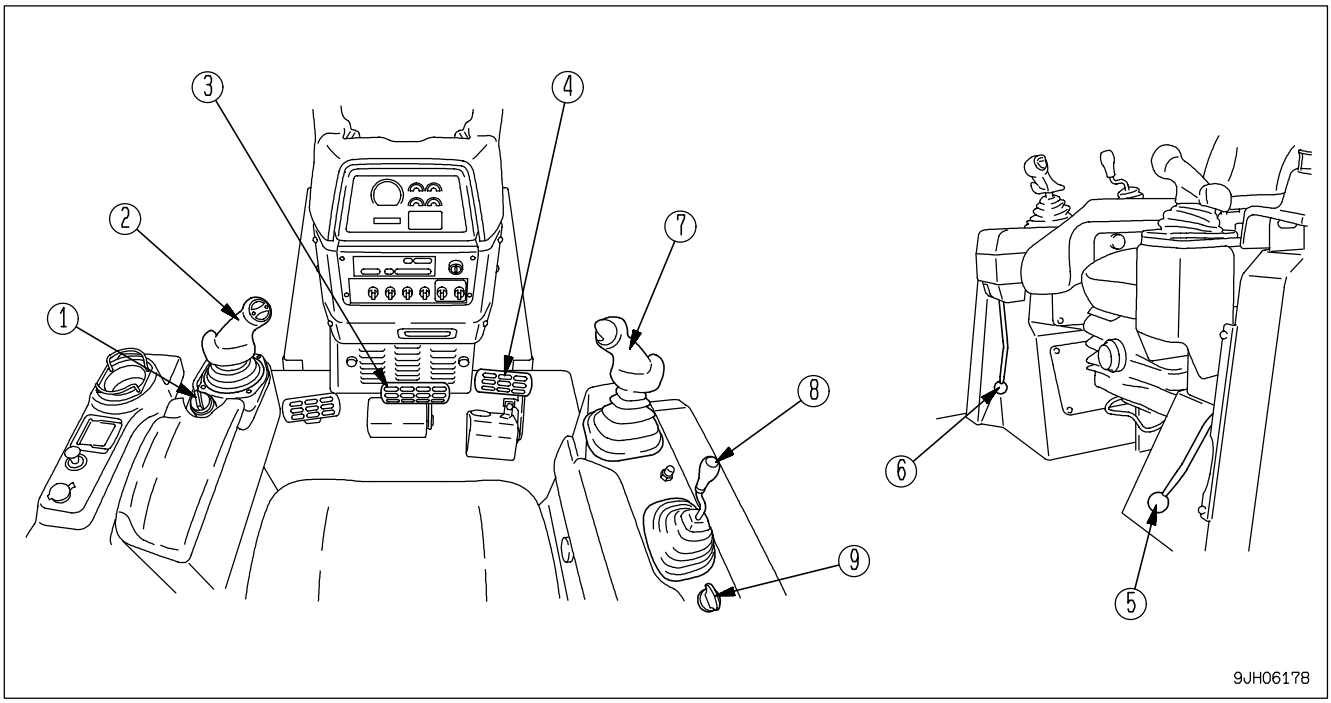
ACCESSORY SOCKET

Socket (5) is used as the power source for a wireless or other 12V equipment.

Accessory socket capacity: 60W (12V x 5A)



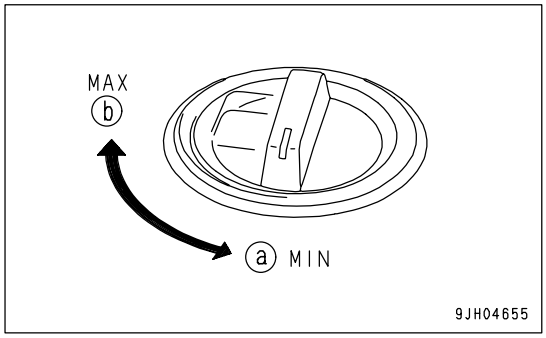
CONTROL LEVERS, PEDALS



(1) Fuel control dial
(2) Joystick
(steering, directional and gear shift lever)
(3) Brake pedal
(4) Deceleration pedal
(5) Parking lever
(6) Safety lever
(7) Blade control lever
(8) Ripper control lever (Variable ripper)
(9) Pin puller control switch (giant ripper)
(if equipped)

FUEL CONTROL DIAL

Dial (1) is used to control the engine speed and output.
(a) Low idling position: Turn fully to the left
(b) High idling position: Turn fully to the right

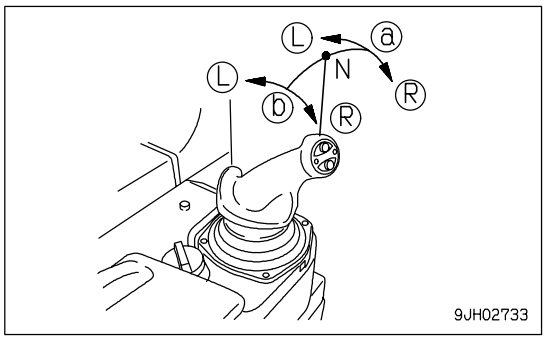


REMARK
When stopping the engine, turn the ignition switch to the OFF position.

JOYSTICK (STEERING, DIRECTIONAL AND GEAR SHIFT LEVER)

(PCCS lever)

This lever (2) is used to switch between forward and reverse, to steer the machine, or carry out counterrotation turns.



REMARK

PCCS: Palm command control system

- **Forward-reverse shifting**

Position (a): FORWARD

Position (b): REVERSE

Position N: Neutral

Move to the front to drive forward; move to the rear to drive in reverse.

- **Steering**

Position (L): Left turn

Position (R): Right turn

With the lever operated to the front or rear, operate the lever partially to the left or right to turn the machine. The machine will turn gradually in the same direction as the lever is operated.

If the lever is operated fully to the left or right, the machine will turn in a small radius.

REMARK

- If the lever is released when steering the machine, the lever will return to the (a) position or the (b) position and the machine will be returned to straight movement.

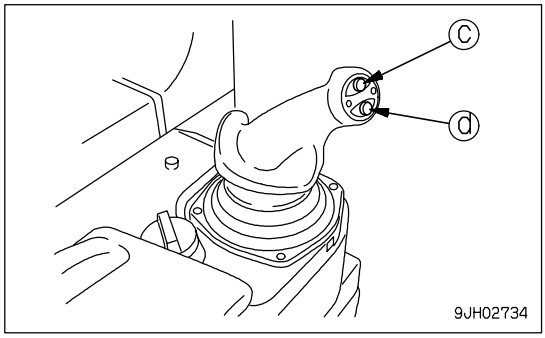
- **Gear shifting**

When the joystick (steering, direction, and gearshift lever) is at the FORWARD or REVERSE position, press switch (c) or (d) to shift the transmission.

up switch (c): Each time the switch is pressed, the transmission shifts up one speed range.

down switch (d): Each time the switch is pressed, the transmission shifts down one speed range.

For details of the maximum of travel speed for each speed range, see "SPECIFICATIONS (PAGE 5-2)".



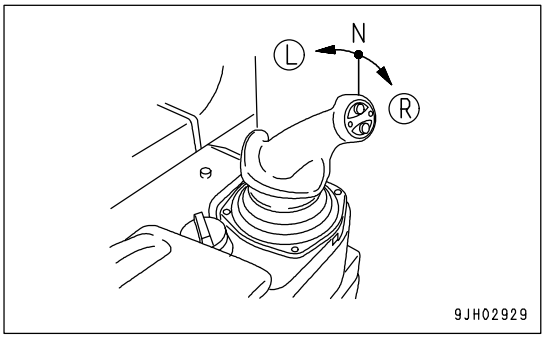
REMARK

- When the transmission is shifted, the speed range being used is displayed on the display panel on the monitor panel.
  Example:
  Neutral: N is displayed on the display panel.
  FORWARD 2nd: F2 is displayed on the display panel.
  REVERSE 3rd: R3 is displayed on the display panel.
  When the parking lever is locked, P is displayed.
- For details of the gearshift operation using the shift mode, see SHIFTING GEAR (PAGE 3-98). Shift mode selection means the operation to set the selected speed range beforehand at the N position.

- **Operating counterrotation turn**

WARNING

When operating the counterrotation turn, if the load on the left and right is not balanced, the machine may make a pivot turn, so check the ground conditions and be careful not to hit any obstacles when carrying out the operation.



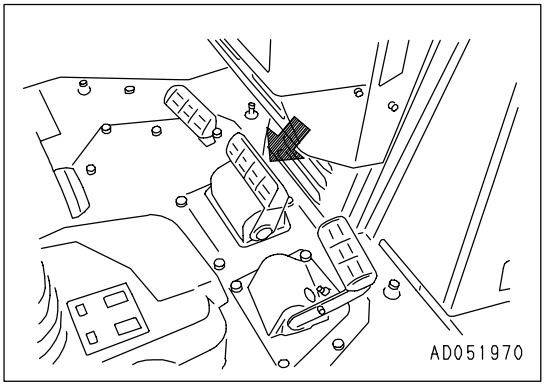
With the lever at the N position, move the lever partially in the direction of turn. The left and right tracks will rotate in opposite directions, and the machine will make a slow counterrotation turn. If the lever is operated further, the speed of the counterrotation turn will increase.
(R): Right counterrotation turn
(L): Left counterrotation turn

BRAKE PEDAL

WARNING

Do not place your foot on this pedal unnecessarily.

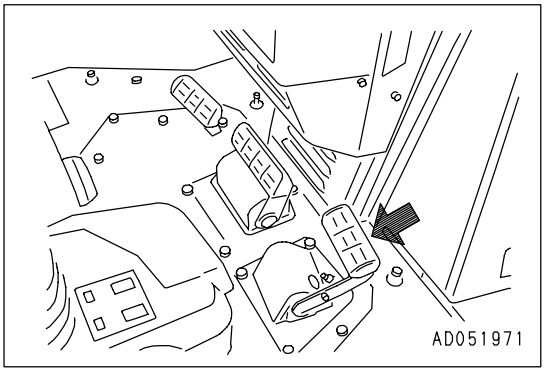
Depress the pedal (3) to apply the right and left brakes.



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.**

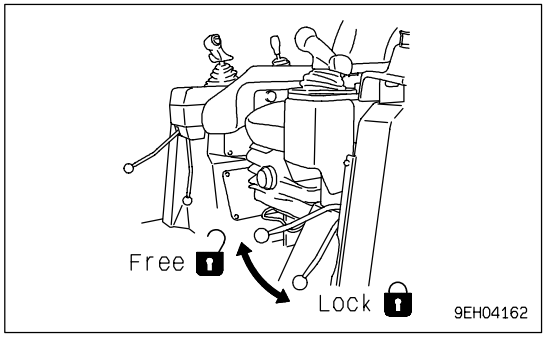


Pedal (4) is used when reducing engine speed or stopping the machine.
When switching between forward and reverse, or when stopping the machine, use this pedal to reduce speed.

PARKING LEVER

WARNING

When the machine is parked, always set the parking lever to the LOCK position.



Lever (5) is used to apply the parking brake.

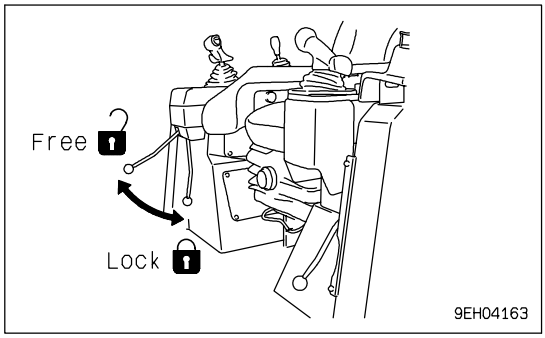
REMARK

- Before moving the parking lever to the LOCK position, return the steering, directional, and gearshift lever to the N position.
- When starting the engine, if the parking lever is not in the LOCK position, the limit switch is actuated and it is impossible to start the engine.

SAFETY LOCK LEVER

WARNING

- **When standing up from the operator's seat, always the safety lock lever securely to the LOCK position.**
  If the blade control and ripper control levers are not locked and are touched by accident, it may lead to serious injury or damage.
- **If the safety lock lever is not securely to the LOCK position, the lock may not be applied.**
  Check that it is in the position shown in the diagram.
- **When parking the machine or when performing maintenance, always lower the blade or ripper to the ground, then set the safety lock lever to the LOCK position.**

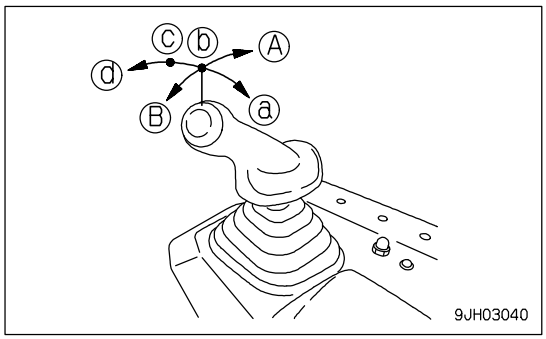


Safety lock lever (6) is a device to lock the blade control and ripper control levers.
When it is set to the LOCK position, the TILT, RAISE, LOWER, and FLOAT operations are locked.

REMARK
When starting the engine, to ensure safety, always set the safety lock lever to the LOCK position.

BLADE CONTROL LEVER

Single tiltdozer



Lever (7) is used to raise or tilt the blade.

- Lifting control

(a) RAISE:

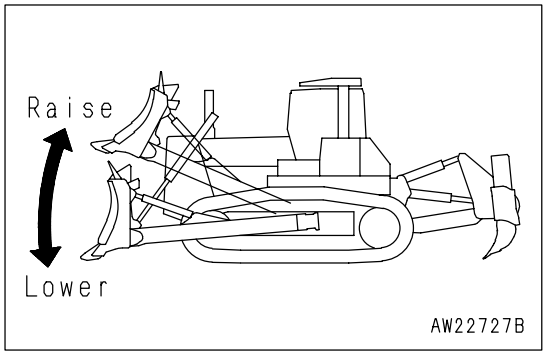
(b) HOLD:

Blade is stopped and held in this position.

(c) LOWER:

(d) FLOAT:

Blade will move freely according to external force.



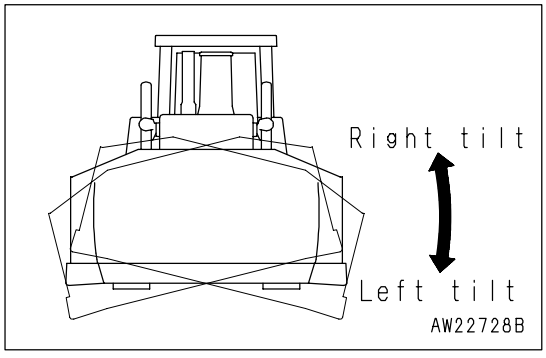
REMARK

- When the lever is at the FLOAT position and it is released, it will not return automatically to the HOLD position, so return it by hand.
- When starting the engine, set the blade control lever to the HOLD position. If it is in the FLOAT position, the engine will not start.

- TILT OPERATION

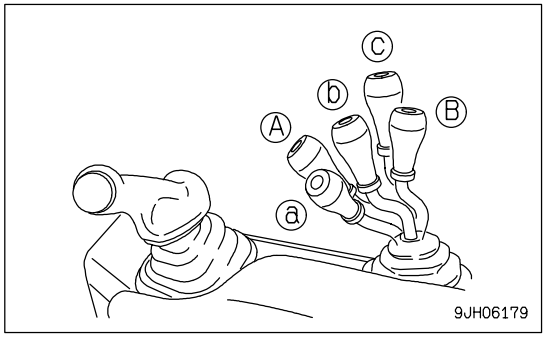
(A) RIGHT TILT

(B) LEFT TILT

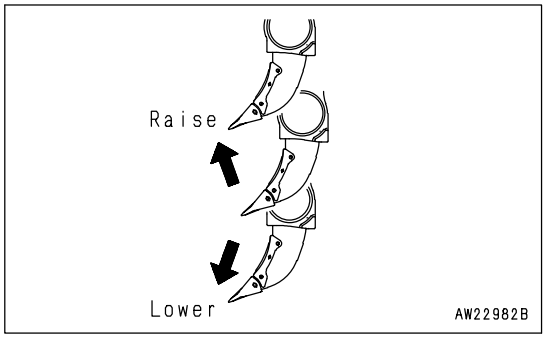


RIPPER CONTROL LEVER

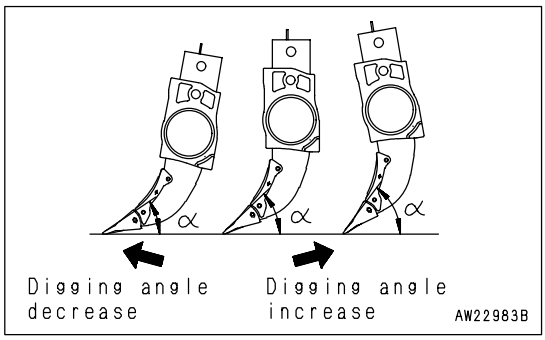
This lever (8) is used to operate the ripper.



(a) RAISE
(b) HOLD: Ripper stops and stays in same position
(c) LOWER

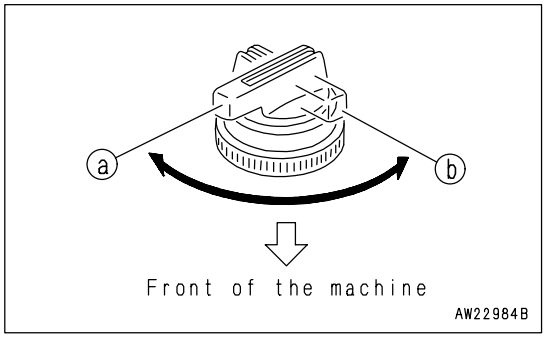


(A) Digging angle reduced: Cutting angle (α) becomes smaller.
(B) Digging angle increased: Cutting angle (α) becomes larger.



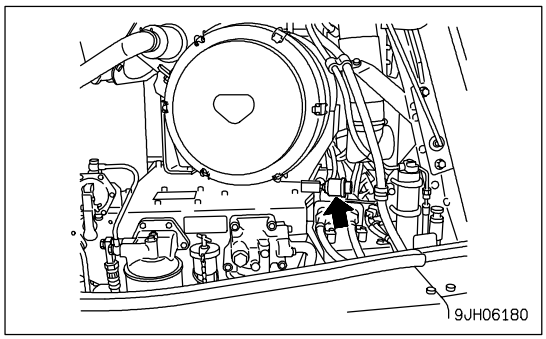
PIN PULLER CONTROL SWITCH

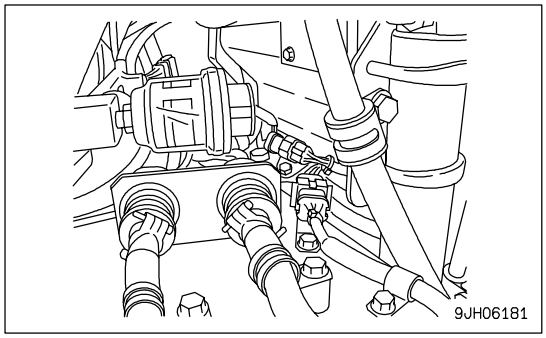
Switch (9) is used to operate the pin puller.
(a) Pull out: Pin is pulled out
(b) Push in: Pin is pushed in



DUST INDICATOR

This informs the operator if the air cleaner element becomes clogged.
For details of the method for cleaning the element, see "WHEN REQUIRED (PAGE 4-20).





POWER SOURSE

It is possible to remove the cigarette lighter and use the socket as a power supply.
Capacity of cigarette lighter: 120W (24V x 5A)

NOTICE

Do not use this as the power supply for 12V equipment.
It will cause failure of the equipment.

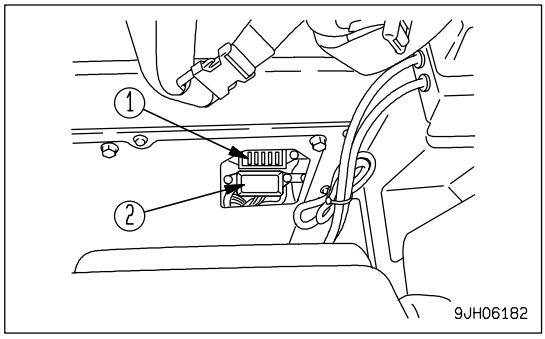
FUSE BOX

NOTICE

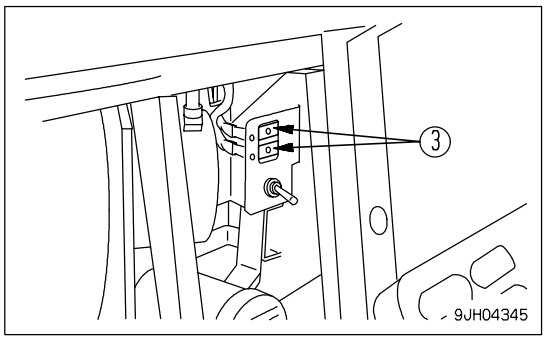
Before replacing a fuse, be sure to turn ignition switch to the OFF position.

Fuses protect the electrical equipment and wiring from burning out.
If a fuse becomes corroded, or white powder can be seen, or a fuse is loose in the holder, replace the fuse.
Replace a fuse with another of the same capacity.
Open the cover at the rear of the operator's seat. The fuse box is installed inside.
The circuit breakers are inside the air conditioner RECIRC filter cover.

(1) Fuse box FS2
(2) Fuse box FS1

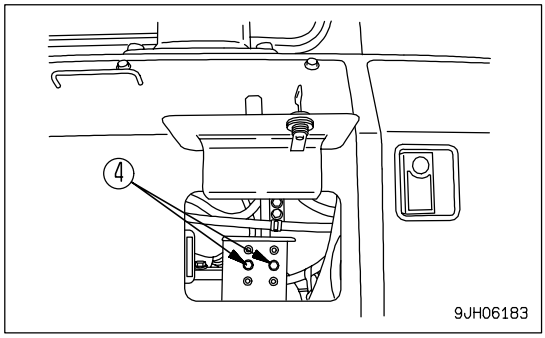


(3) Circuit breaker



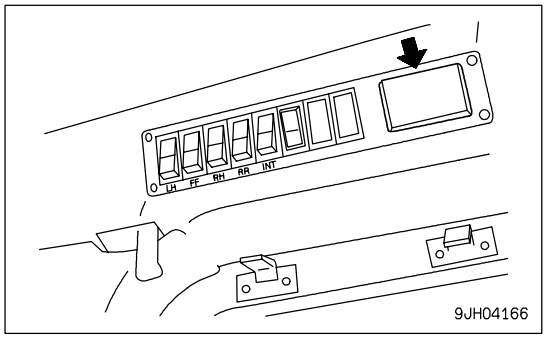
(4) Circuit breaker for main power supply

Open the battery cover inspection window at the rear left of the machine. The circuit breaker for the main power supply is inside

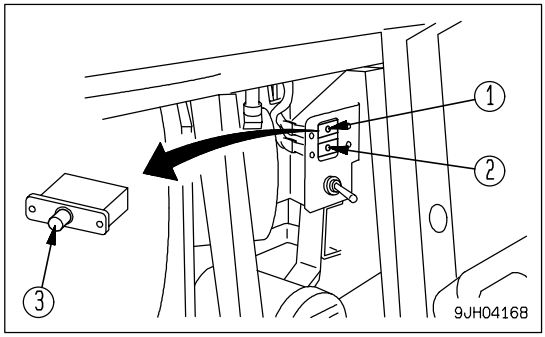


• Cab (machines equipped with cab)

Fuse box is installed at the bottom of the overhead panel.



CIRCUIT BREAKER



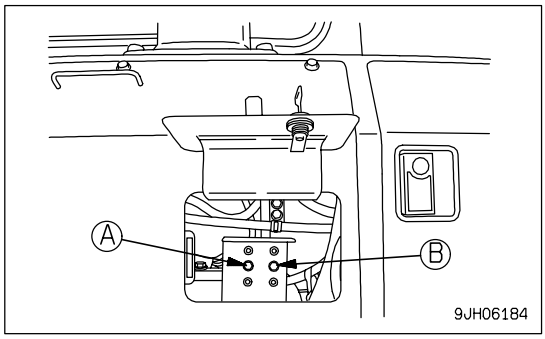
- If the starting switch does not work even when the starting switch is turned to the ON position, open the recirculated air filter cover.
- If excessive current flows through the circuit breaker, it cuts off the electric circuit to prevent damage to the electrical components and wiring.
- To restore the electric circuit after it has been cut off, push in reset button (3). (This springs out when the circuit is cut off.)
  If the electric circuit is normal, reset button (3) will stay pushed in. If it comes out immediately when it is pushed in, the electric circuit must be checked.

No	Fuse capacity	Circuit
(1)	20A	Starting switch
(2)	20A	Air conditioner

REMARK

The circuit breaker is a device installed in electric circuits where a large current flows. It is installed to protect the electric circuit. It protects the electric components and wiring from damage caused by an abnormal current in the same way as a normal fuse. After repairing and restoring the location of the abnormality, there is no need to replace the breaker. It can be used again.

CIRCUIT BREAKER FOR MAIN POWER SUPPLY



- If the starting motor is not actuated when the starting motor is turned ON, open the battery cover inspection window at the rear left of the machine and inspect circuit breakers (A) and (B).
  (A) and (B) also act as the reset button.
- If there is a surge of current, the circuit breaker shuts off the circuit to protect the electrical components and wiring from damage.
- Turn the ignition switcg to the OFF position and reset the circuit breaker.
- When resetting the electrical circuit after it has been shut off, press the reset button 5 - 10 minutes after the circuit has been shut off. When the electrical circuit has been shut off, the operation of the reset button is heavier than when the circuit is normal. The height of the reset button is the same, regardless of whether the circuit has been shut off or has been reset, so check the operating effort of the reset button when resetting the circuit.
- Do not keep the circuit breaker reset button pressed.
- If the starting motor does not work even when the circuit breaker has been reset, contact your Komatsu distributor.

REMARK

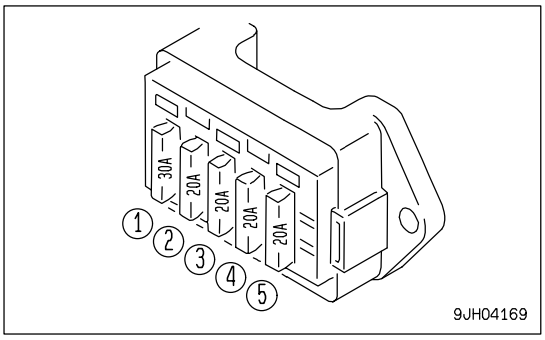
The capacity of circuit breakers (A) and (B) is as follows.
(A): 30A (for regular cab power supply)
(B): 105A (for general power supply)

FUSE CAPACITY AND NAME OF CIRCUIT

FUSE BOX I

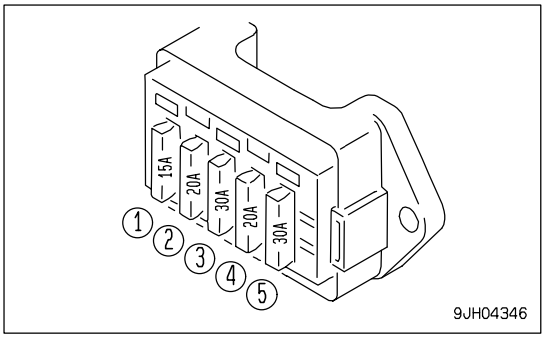
(1) Fuse box fs1

NO.	Fuse capacity	Circuit
1	30A	Additional heater, Spare power source
2	20A	Horn, Ribbon heater
3	20A	Head lamp
4	20A	Rear lamp
5	20A	Transmission Steering controller



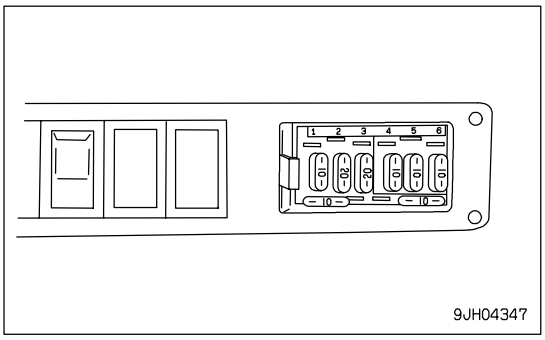
(2) Fuse box fs2

NO.	Fuse capacity	Circuit
1	15A	Monitor panel
2	20A	Fuel pump
3	30A	Air conditioner
4	20A	Backup alarm, pin puller
5	30A	Battery power source (direct from battery)



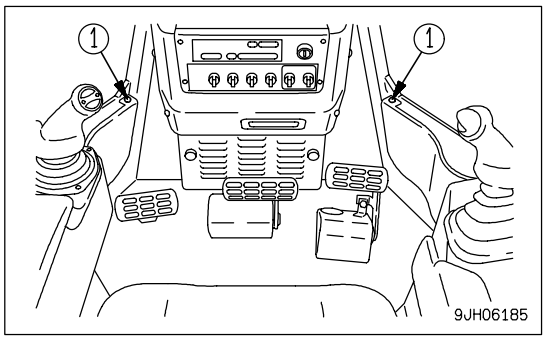
FUSE BOX II

No.	Fuse capacity	Circuit
(1)	10A	Radio memory
(2)	20A	Radio, lamp, cigarette lighter
(3)	20A	Heated wire glass (If equipped)
(4)	10A	Rear wiper
(5)	10A	Front wiper
(6)	10A	Left and right door wiper



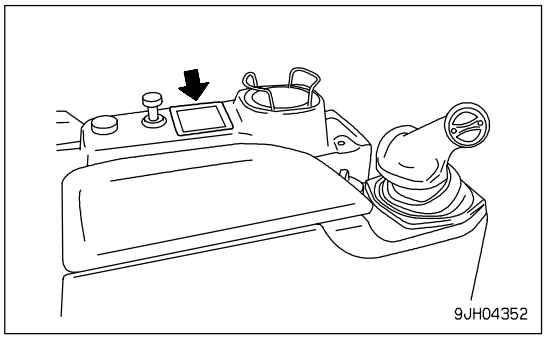
DOOR POCKET

This is inside the left and right doors. Use it for keeping things.
Do not put the heavy tools or other heavy objects in it.
If the pocket is dirty, loosen four bolts (1), then remove the pocket and rinse it.



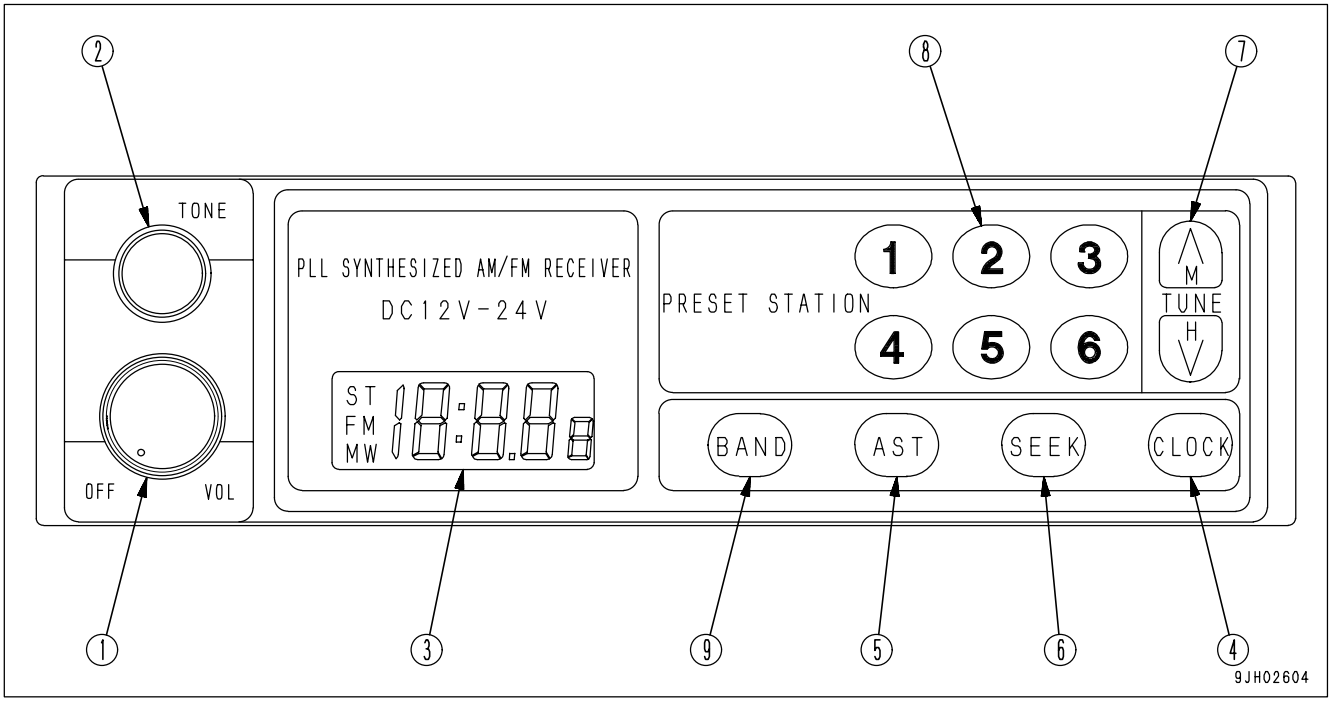
ASHTRAY

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



CAR RADIO, HANDLING

EXPLANATION OF COMPONENTS



(1) Power switch, volume knob
(2) Tone Control Knob
(3) Display
(4) Display selector button (CLOCK)
(5) Station selection button (AST)
(6) Seek button (SEEK)
(7) Tuning Button
(8) Preset Station Buttons
(9) FM/AM selector button (BAND)

POWER SWITCH, VOLUME KNOB
When this knob (1) is turned clockwise from the OFF position, a click is heard and the power is turned on. If it is turned further clockwise, the sound from the speakers will gradually increase.

TONE CONTROL KNOB
When this knob (2) is turned clockwise, the high tone is emphasized; when it is turned counterclockwise, the high tone is reduced.

DISPLAY
This display (3) shows the time and the frequency of the signal being received.

DISPLAY SELECTOR BUTTON (CLOCK)
When this button (4) is pressed, the display switches to the clock display. If it is pressed again, the frequency is displayed.

STATION SELECTOR BUTTON (AST)
When this button (5) is pressed, the preset stations are called up in turn. When the desired broadcasting station is reached, press the button again to stop it.
If this button is kept pressed for 2 seconds, it switches to auto memory.

SEEK BUTTON (SEEK)
When this button (6) is pressed, it automatically searches for stations that can be received. When it finds a station that can be received, it stops.

TUNING BUTTON
When the ∨ part of this button (7) is pressed, the frequency goes up; when the ∧ part of this button (7) is pressed, the frequency goes down. If the button is kept pressed, the frequency changes continuously.

PRESET BUTTON
When this button (8), it is possible to preset one station each for FM and AM.

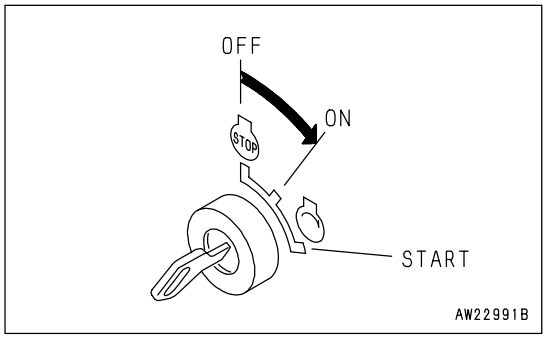
For details of the method of presetting, see "METHOD OF PRESETTING (PAGE 3-51)".

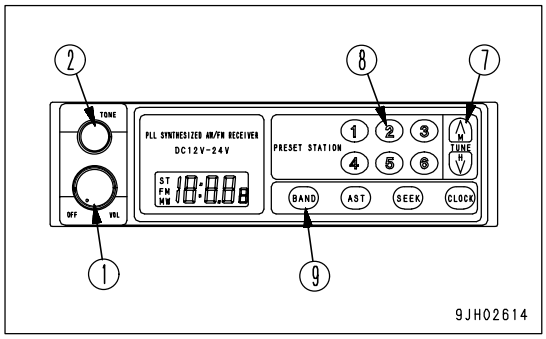
FM/AM SELECTOR BUTTON (BAND)
When this button (9) is pressed, the band switches between FM and AM. Each time the button is pressed, it switches AM → FM → AM.

METHOD OF USE

METHOD OF LISTENING TO RADIO

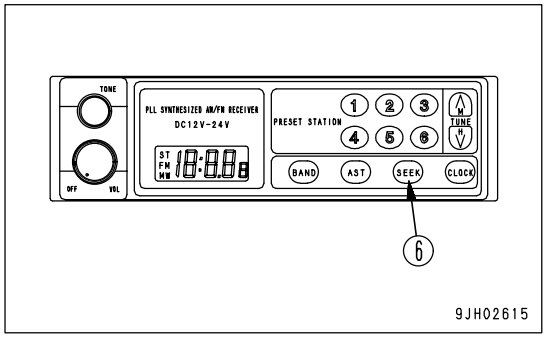
1. Turn the starting switch ON, then turn radio power switch (1) ON.
2. Use BAND button (9) to select AM or FM.
3. Select the channel with PRESET STATION button (8) or TUNE button (7).
4. Turn volume knob (1) and TONE knob (2) to set to the desired volume and tone.
5. To turn the radio OFF, turn the power switch (1) counterclockwise until a click is heard.





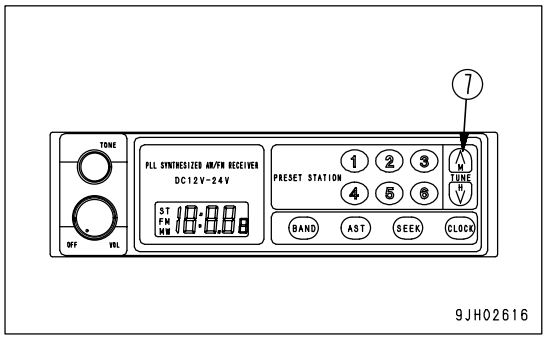
METHOD OF AUTOMATIC TUNING

When SEEK button (6) is pressed, the frequency will move up to a channel that can be received, and then will stop automatically.



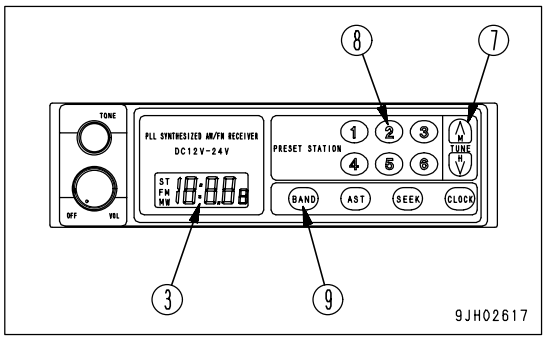
MANUAL STATION SELECTION

If the ∨ part of TUNE button (7) is pressed, the frequency will go up; if the ∧ part of the button is pressed, the frequency will go down. If the button is kept pressed, the frequency will move up or down continuously.



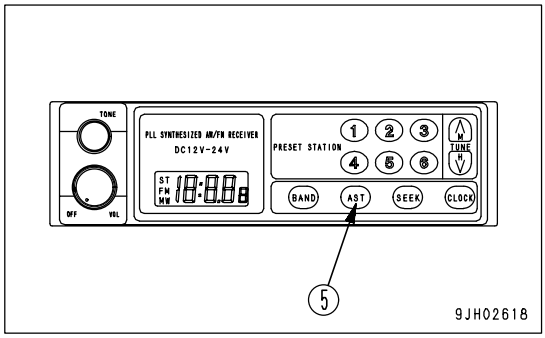
METHOD OF PRESETTING

1. Select the desired preset station.
   Use BAND button (9) to select FM or AM, then use TUNE button (7) to select the frequency of the broadcasting station.
2. Decide one of preset buttons (8) to be used for the preset station, and keep it pressed for 2 seconds. The number of the button will be shown on display (3) and the presetting is completed.
3. Repeat Steps 1 - 2 to preset the other broadcasting stations.
   - To change the setting of a preset button to another station, repeat Steps 1 - 2.
   - If the battery is replaced or the power is switched off, all the preset settings are deleted. Carry out the presetting operation again.
   - It is possible to preset 6 FM and 6 AM stations.



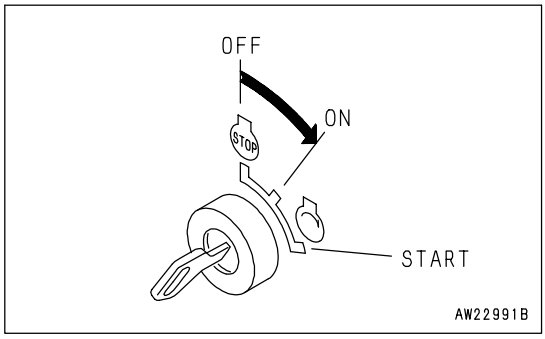
METHOD OF USING AUTO MEMORY

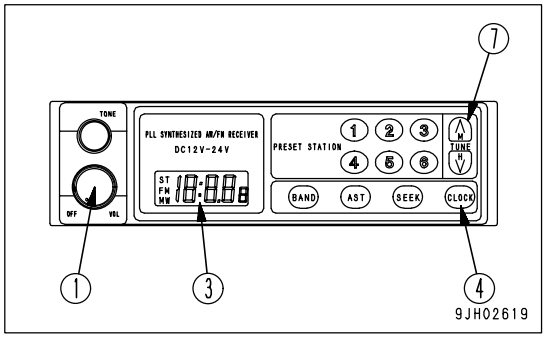
If AST button (5) is kept pressed for two seconds, the broadcasting stations that can be received in the area are called up in turn, and the broadcasting stations are automatically saved in the preset memory.



METHOD OF SETTING TIME

1. Turn the starting switch ON, then turn radio power switch (1) ON.
   If display (3) is showing the frequency, press display selector button (4) to display the time.
2. To set the time, keep the CLOCK button (4) pressed, and Press the ∨ part of TUNE button (7) to change the minutes
   Press the ∧ part of TUNE button (7) to change the hours





MONAURAL/STEREO AUTOMATIC SELECTION RECEPTION

If the reception of the FM stereo broadcast is weak (when you are far from the broadcasting station or are surrounded by hills), the radio is automatically switched from stereo to monaural to reduce the interference. When the stereo broadcast becomes stronger, it automatically switches back to stereo broadcasting.

ANTENNA

NOTICE

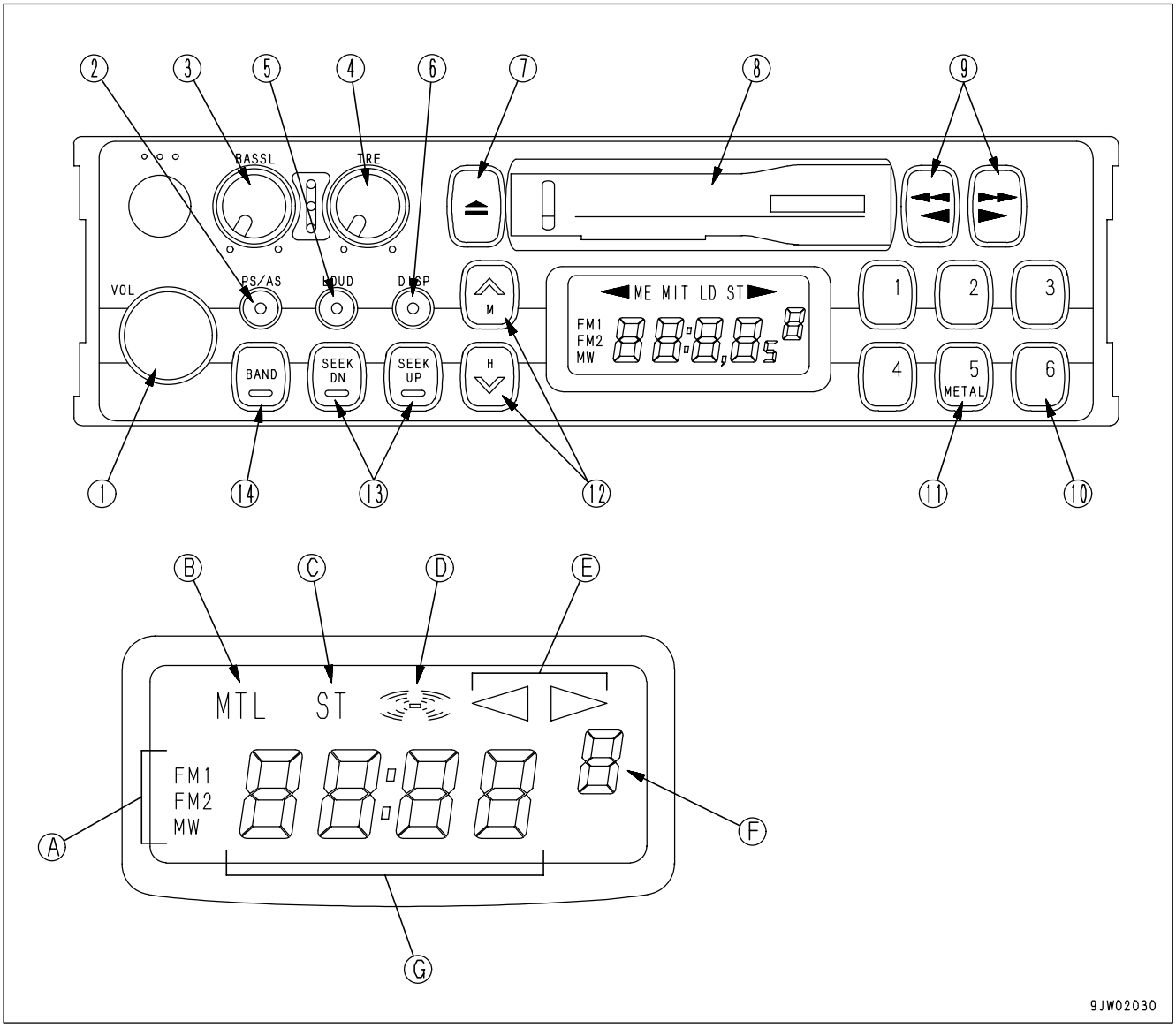
Always retract the antenna before transporting the machine or driving the machine into a work shop or garage.

PRECAUTIONS WHEN USING

- To ensure safety, always keep the sound to a level where it is possible to hear outside sounds during operation.
- If water gets into the speaker case or radio, it may lead to an unexpected failure, so be careful not to get water on the equipment.
- Do not wipe the scales or buttons with benzene, thinner, or any other solvent. Wipe with a soft dry cloth. Use a cloth soaked in alcohol if the equipment is extremely dirty.
- When the battery is replaced, the settings for the preset buttons are all cleared, so set them again.

CAR STEREO, HANDLING

EXPLANATION OF COMPONENTS



(1) Power switch/volume
(2) Auto-store/preset scan button
(3) Bass control knob
(4) Treble control knob
(5) Loudness button
(6) Time/radio display selector button
(7) Tape eject button
(8) Cassette door
(9) Fast forward, rewind buttons
(10) Preset buttons
(11) Metal tape button
(12) Manual tuning buttons
(13) Seek tuning buttons
(14) Band selector button

(A) Band display
(B) Metal tape display
(C) FM stereo reception display
(D) Loudness display
(E) Tape direction display
(F) Preset channel display
(G) Time/frequency display

POWER SWITCH/VOLUME
Turn this knob (1) to the right until it clicks to turn the power on.
Turn it further to increase the volume.

AUTO-STORE/PRESET SCAN BUTTON
Use this button (2) to actuate the preset scan and auto-store functions.

- Auto-store
  Each time this button is pressed for more than 2 seconds while in radio reception, this auto-store function automatically starts to search for the desired station within a receivable band, and memorize the frequency in the preset memory. During this scanning process, the frequency shown in the right side of display continues to change. This indicates that each frequency is memorized in the auto-store.

REMARK
The auto-store function cannot be used when the channel display is flashing.
When the display is flashing, the preset scan function is being used.

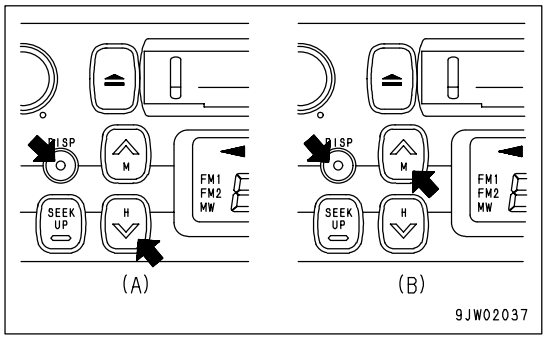
BASS CONTROL KNOB
Turn this knob (3) to the right to emphasize the low tone; turn it to the left to reduce the low tone.
Counterclockwise: Reduce low tone
Clockwise: Emphasize low tone

TREBLE CONTROL KNOB
Turn this knob (4) to the right to emphasize the high tone; turn it to the left to reduce the high tone.
Counterclockwise: Reduce high tone
Clockwise: Emphasize high tone

LOUDNESS BUTTON
This button (5) is used when playing at low volume. It makes it possible to hear more easily by emphasizing the low tone when the low tones are weak.
Push button: Actuated (ON)
Push button again: Canceled (OFF)

TIME/RADIO DISPLAY SELECTOR BUTTON
This button (6) is used to switch between the "Radio/tape display" and the "Time display".

- Correcting time
  Press the button to set to the time display.
  (A) Correcting hour :
  Keep the DISP button pressed and press the bottom tuning button (H) to correct the hour.
  (B) Correcting minute :
  Keep the DISP button pressed and press the top tuning button (M) to correct the minute.



TAPE EJECT BUTTON
This button (7) is used to stop the tape and to eject the cassette.
When this button is pressed, the tape is ejected and the radio plays.

CASSETTE DOOR
Set the cassette with the exposed portion of the tape on the right side and insert it through the cassette door (8).

FAST FORWARD, REWIND BUTTONS
These buttons (9) are used to fast forward or rewind the tape.
- Fast forward/rewind
  If you press the button pointing in the same direction as the arrow indicating the direction of play, the tape will be fast forwarded; if you press the button pointing in the opposite direction, the tape will be rewound.
  To stop the tape, lightly press the button that is not locked. The fast forward or rewind operation will be canceled.

PRESET BUTTONS
These buttons (10) are used to call up the broadcast station frequencies preset in memory for each of buttons No.1 to No.6.
It is possible to preset 18 stations (FM: 12; AM: 6) with these buttons.

METAL TAPE BUTTON
(used also for preset button No.5)
This button (11) is used when playing a metal or chrome tape. This button is used also for preset button No.5. When it is pressed, "MTL" appears on the display.

MANUAL TUNING BUTTONS
These buttons (12) are used for manual tuning.
When "TUN ∧" button is pressed, the frequency goes up 9 kHz for AM or 0.1 MHz for FM; when "TUN ∨" button is pressed, the frequency goes down 9 kHz for AM or 0.1 MHz for FM.
If the button is pressed down and held, the frequency will change continuously.

SEEK TUNING BUTTONS
These buttons (13) are used to seek tuning.
When the "SEEK UP" button is pressed, the search automatically goes up; when the "SEEK DOWN" button is pressed, the search automatically goes down.
When the next station that can be received is found, it automatically stops.

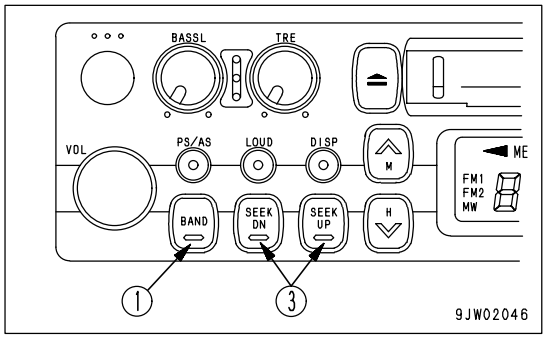
BAND SELECTOR BUTTON
When this button (14) is pressed, the band is switched between FM1, FM2, and MW (AM). The band is shown on the display.

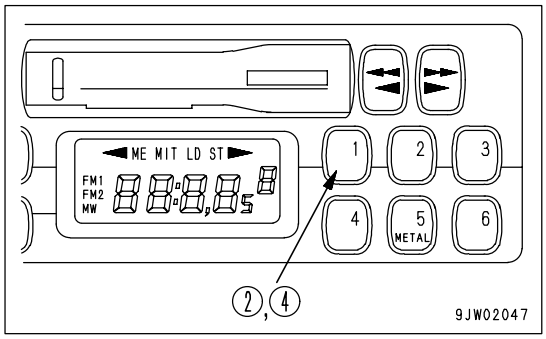
METOD OF OPERATION

METHOD OF SETTING PRESET BUTTONS

To listen to a preset station, use band selector button (1) to select AM, FM1, or FM2, then press the preset switch number to listen to the desired station.
It is possible to preset six AM stations and 12 FM stations (FM1: 6, FM2: 6).

1. If you are playing a cassette, press the tape eject button to stop the tape.
2. Select the station to be preset.
   Use band selector button (1) to select MW (AM), FM1, or FM2, then use the manual tuning button to select the frequency of the broadcasting station.
3. Press manual memory button (2) or seek tuning button (3).
4. Press preset button (4) of the number to be preset for 2 seconds while the frequency display is being shown on the display. (The preset channel and frequency are displayed and the presetting is completed).
5. Repeat Steps 2 to 4 to preset other stations.



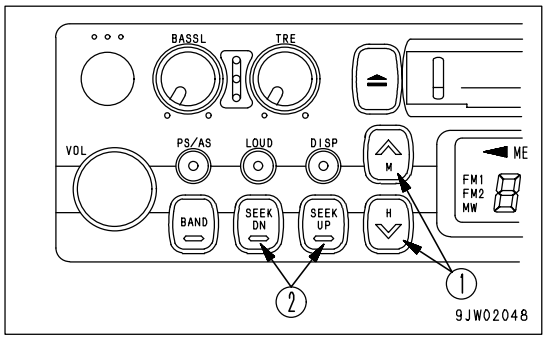


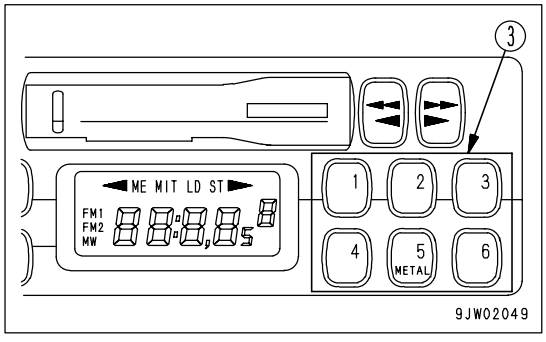
REMARK

- Use Steps 2 to 4 also when changing the setting of a preset switch to another station.
- When the power is disconnected, such as when the battery is replaced, all the settings are deleted, so preset the stations again.

MANUAL MEMORY BUTTON

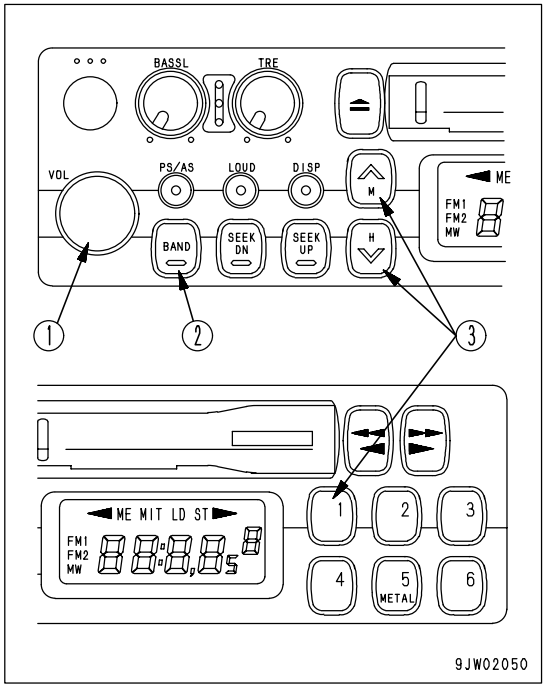
Select the station to be preset with manual tuning button (1) or seek tuning button (2), then keep button No.1 to button No.6 of button (3) pressed for 2 seconds while the frequency is being displayed to preset the station.





LISTENING TO RADIO

1. Turn the starting switch ON, then turn power switch (1) ON.
2. Set band selector button (2) to AM or FM.
3. Select the station with the preset buttons or manual tuning button (3).
4. Adjust the volume, balance, and tone as desired.
5. When turning the radio OFF, turn power switch (1) to the left until it clicks.

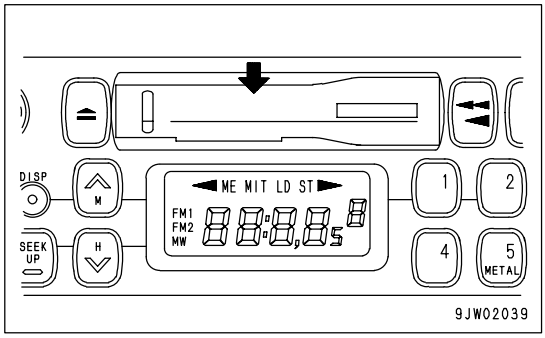


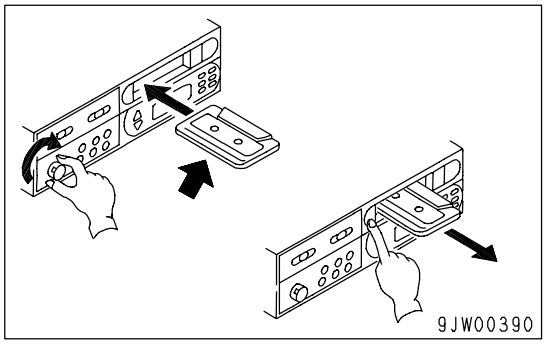
REMARK

- To switch to the radio when listening to a cassette, press the cassette eject button to stop the tape.
- If you insert a cassette when listening to the radio, the tape will start to play.

LISTENING TO CASSETE TAPE

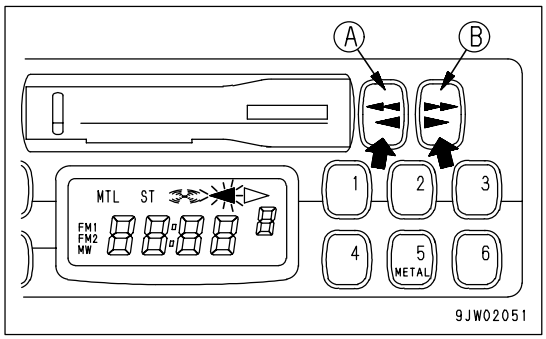
1. Turn the starting switch ON, then turn power switch (1) ON.
2. Set the cassette with the exposed portion of the tape on the right side and push it past the cassette door. The tape will automatically start playing.
   If the arrow indicating the direction of play is pointing to the right, the top side is being played; if the arrow is pointing to the left, the bottom side is being played.
   When the tape reaches the end, it is automatically reversed and the other side starts to play.
3. When finishing with the tape, press the cassette eject button to eject the tape and automatically switch to the radio.





REVERSING TAPE

When listening to the tape, press both FAST FORWARD, REWIND buttons (A) and (B) at the same time lightly.
When this is done, the tape direction display will be reversed.



PRECAUTION WHEN USING

WARNING

- **If a voltage greater than the specified voltage is input, it may cause fire, electrocution, or other failure. Never input any voltage other than the specified voltage.**
- **Places inside the radio are under high voltage. Do not remove the cover.**
- **Do not carry out any modifications. This may cause fire, electrocution, or other failure.**
- **If the sound cannot be heard, nothing is displayed, or any other abnormality occurs, turn off the power switch and ask your Komatsu distributor, as soon as possible, to carry repairs.**

- Stow the antenna when traveling in places with low overhead clearance.
- To ensure safety during operations, keep the volume at a level where it is possible to hear other machines.
- If water gets inside the speaker case or radio (auto tuning), it may cause a serious problem, take care not to let water get in these items.
- Do not wipe the scales or buttons with benzene, thinner, or any other solvent. Wipe with a soft dry cloth. Use a cloth soaked in alcohol if the equipment is extremely dirty.

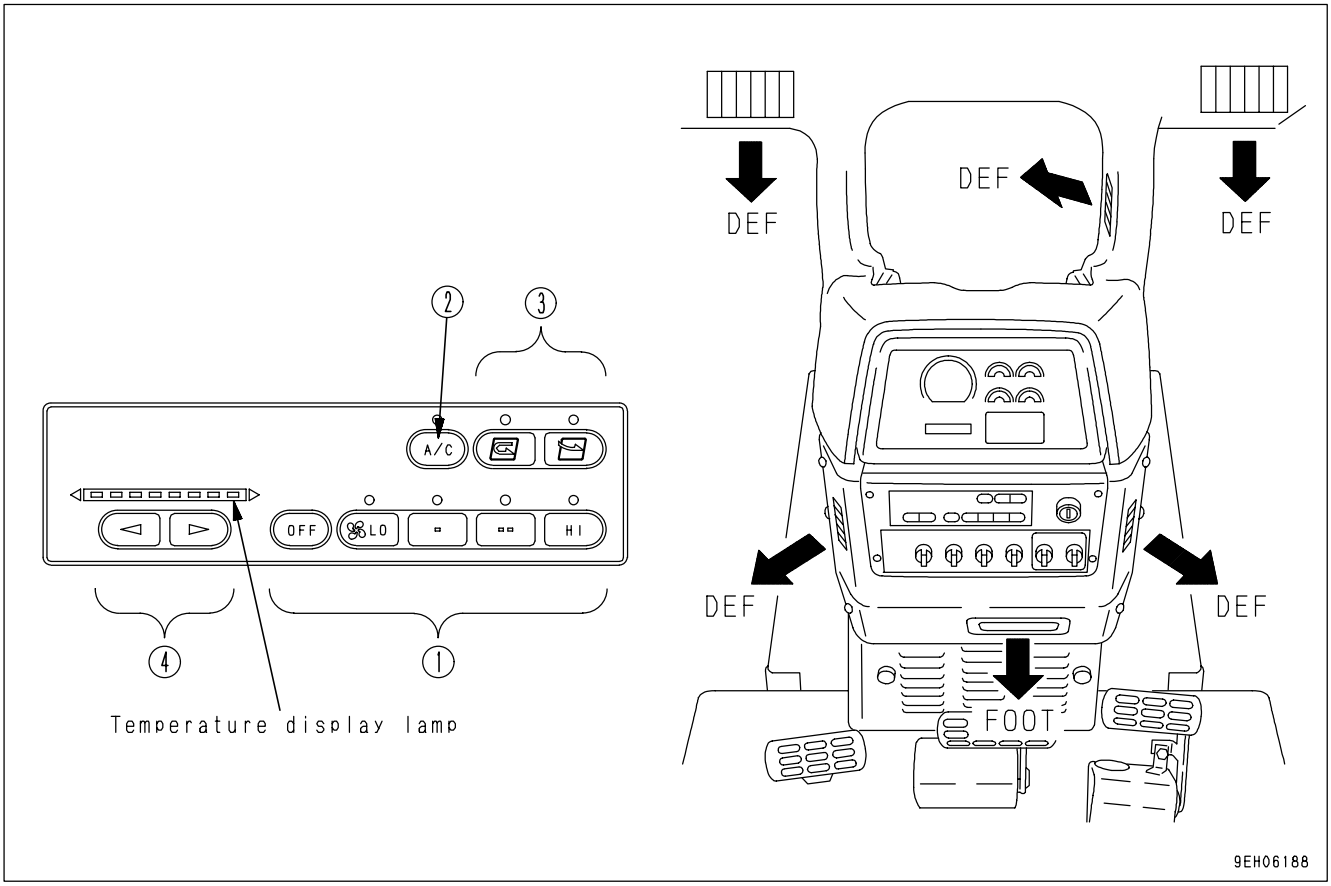
NOTICE

Handling cassette tape

- **Clean the tape head approx. once a month with a commercially available head cleaning tape.**
- **Do not leave the tape any place where it is exposed to direct sunlight, any place that is excessively dusty, or any place where there is a magnetic field.**
- **Do not use 120-minute tapes. The tape is thin and it easily gets caught up inside the machine.**
- **If the tape is slack, it easily gets caught up inside the machine. Use a pencil to wind in the tape to remove any slack.**
- **Do not use any cassette tape if the label has started to come off. It may cause defective rotation, or it may be impossible to get the tape out of the machine.**

AIR CONDITIONER

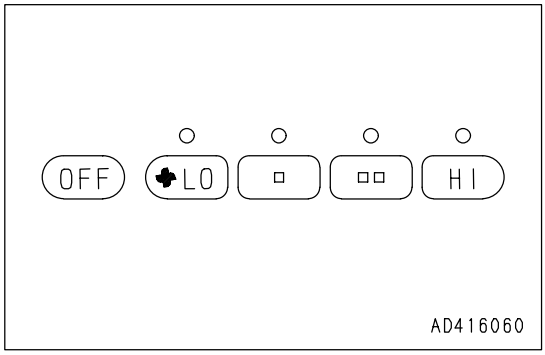
GENERAL LOCATIONS AND FUNCTION OF CONTROL PANEL



(1) Fan switch
(2) Air conditioner switch
(3) Fresh/recirc selector switch
(4) Temperature control switch

FAN SWITCH

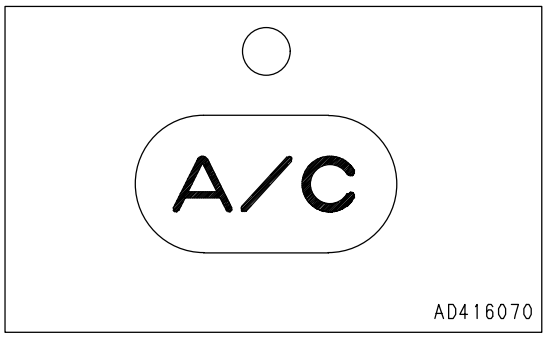
This switch (1) can be used to adjust the air flow in four stages.
It also acts as the main switch for the air conditioner. When the OFF switch is pressed, the fan stops.
When the switch is pressed, the indicator lamp above the switch lights up to display the air flow.



AIR CONDITIONER SWITCH

This switch (2) is used to start or stop the cooling or dehumidifying function.

When the fan switch is turned ON and the air conditioner switch is pressed, the indicator lamp above the switch lights up. When the switch is pressed again, the switch is turned OFF and the indicator lamp goes out.



REMARK

When fresh air is taken into the cab, air pressure in the cab increases, which prevents the dust from entering. When neither heating nor cooling is needed, bring in clean fresh air to prevent the dust from coming in with your preferred air flow.

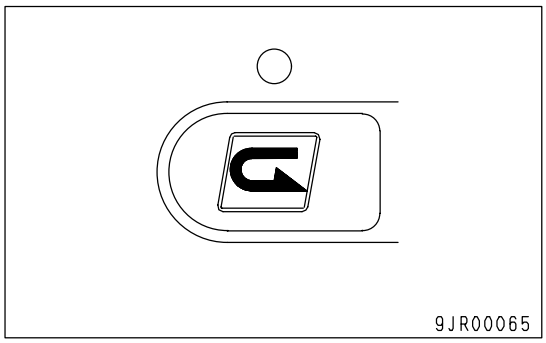
FRESH/RECIRC SELECTOR SWITCH

The switch (3) changes the air source between RECIRC (recirculation of the internal air) and FRESH (intake of fresh air from the outside).

When the switch is pressed, the indicator on top of the switch lights up.

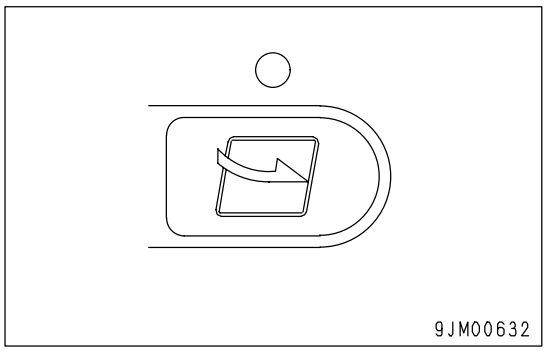
Recirculation of internal air (RECIRC)

Press this switch (3) to circulate only the air inside the cab. Use this position when it is needed to carry out quick heating or cooling of the cab, or when the outside air is dirty.



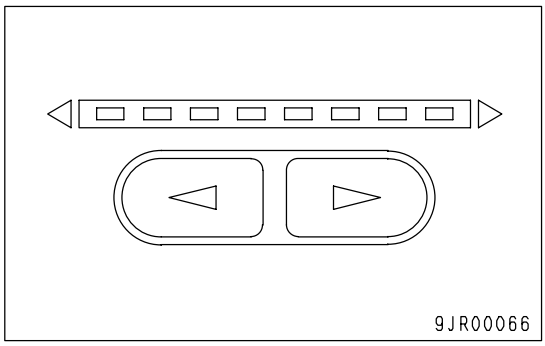
Intake of fresh air (FRESH)

Press this switch (3) to take in fresh air from the outside for normal heating or cooling of the cab. Use this position to make the air inside the cab fresh or to remove the mist from the cab windows.



TEMPERATURE CONTROL SWITCH

This switch (4) can be used to adjust the temperature steplessly between low temperature and high temperature.
The temperature level indicator lamps light up to display the temperature of the air coming from the vents.
The more the blue lamps light up, the lower the temperature is.



The color of the indicator lamp changes while the switch is being pressed.
When the temperature reaches the desired level, release the switch to set the temperature.
The settings for each mode are retained in memory even when the starting switch is turned OFF.
However, in the following cases, the settings must be made again.

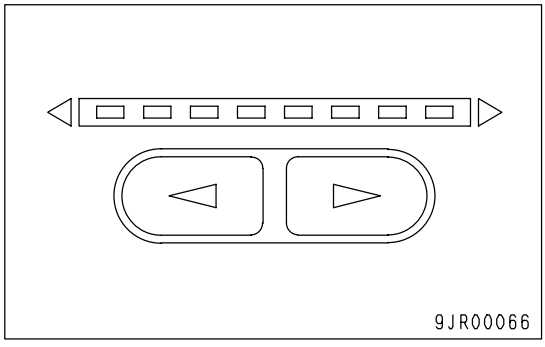
- When the machine has been out of use for more than 7 days
- When the battery voltage is extremely low
- When there has been abnormal interference from outside
- When the fan switch is turned OFF (the setting is not kept in memory with only the air conditioner switch)

If the air conditioner is used in the FRESH position, the inside of the cab will be pressurized and this will prevent the entry of dust.
The higher the position of the fan switch, the more effective the pressurizing becomes.

METHOD OF OPERATION

Switch / Condition of use		Fan switch	Air conditioner switch	Temperature control switch	FRESH/RECIRC selector switch
Cooling	Rapid	HI	ON	All blue	RECIRC
	Normal	HI - LO	ON	More than half are blue	FRESH
Dehumidifying, heating		HI - LO	ON	More than half are red	FRESH
Heating	Rapid	HI	OFF	All red	RECIRC
	Normal	HI - LO	OFF	More than half are red	FRESH
Defroster		HI	ON	More than half are red	FRESH
Vetilation or pressurizing		HI - LO	OFF	All blue	FRESH

When carrying out the defrosting, if the temperature control switch is set so that all lamps are red, this will improve the performance for defrosting and demisting.



WHEN NOT USING THE AIR CONDITIONER REGULARLY

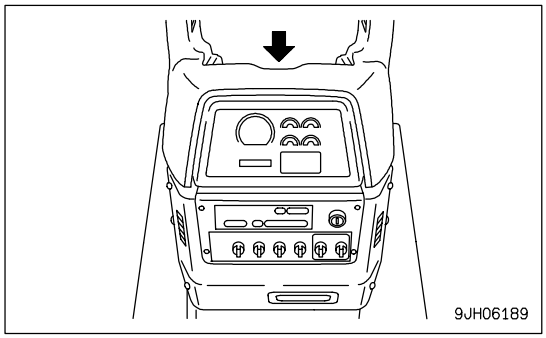
Run the air conditioner at cooling or dehumidification + heating for several minutes from time to time to prevent the loss of the oil film in various parts of the compressor.

REMARK

If the temperature inside the cab is low, the air conditioner may not work. In such cases, use the recirculated air to heat up the inside of the cab, then turn the air conditioner switch on to run the air conditioner.

COOL BOX

When the cooling is being used, this can be used for keeping drinks and other things cool.
When the heating is being used, it can be used to keep things warm.
When not using the box, close the grill.
Do not use the cool box for things which smell or leak water or break easily.
Do not use it as a holder for tools or other small objects.



PRECAUTIONS WHEN USING

PRECAUTIONS WHEN USING THE COOLING

- If you smoke when using the air conditioner, your eyes may start to itch or burn, therefore ventilate the cab every so often to remove the smoke.
- When using the air conditioner for a long period of time, carry out ventilation process at least once every hour.

When using the air conditioner, it is recommended for health reasons, that it should only feel slightly cooler (5 or 6 °C (9 or 10.8°F) lower than the outside temperature) when you enter the cab.
Therefore, adjust the temperature to a suitable level.

SET SO THAT COLD AIR DOES NOT DIRECTLY BLOW ONTO THE GLASS SURFACE

- If the vents (left and right) in the middle of the dashboard are turned so that cold air plays directly on the cab door glass, moisture may condense on the outside of the cab door glass and reduce the visibility. (This occurs particularly in high temperatures.)
  If this happens, close the louvers of the vent and change the direction to prevent the cold air from playing directly on the surface of the glas

CHECKS DURING OFF-SEASON

Even during the off-season, run the compressor at low speed for several minutes once a week to prevent the loss of the oil film at the lubricated parts of the compressor. (Run the engine at low speed and set the temperature control lever at the central position.)

REMARK

When the ambient temperature is low, if the compressor is suddenly run at high speed, it may cause failure of the compressor. Note that the system is set so that the compressor will not run when the cooler switch is turned on, if the ambient temperature is less than 2 to 6.5°C (35.6 to 43.7°F).

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

- The replacement interval may become shorter depending on the conditions during use.
- If the receiver is used when the moisture absorption limit of the desiccant has been exceeded, the refrigerant circuit may become blocked and cause the compressor to break down.

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.

CHECK COMPRESSOR BELT TENSION AND REFRIGERANT (GAS) LEVEL

If the compressor belt is loose, or the refrigerant level is low, cooling is not carried out efficiently.
For details, see "WHEN REQUIRED (PAGE 4-20)".

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 "WHEN REQUIRED (PAGE 4-20)".

SKILLFUL USE OF AIR-CONDITIONER

WHEN WANTING TO COOL INSIDE OF CAMP QUICKLY

If the machine is left in the sun in the middle of summer, the temperature inside the cab may become extremely high. If this happens and it is desired to cool the cab quickly, first open all the doors and windows to remove all the hot air, then turn the air conditioner on.
After starting the engine, press Auto switch (5) and use temperature setting switch (3) to set the temperature to 18.0. Run the engine at a slightly higher speed for 2 or 3 minutes, then close the doors and windows.
When the temperature inside the cab goes down, adjust to the desired temperature.

WHEN WINDOWS ARE MISTED

In the rainy season, when the humidity inside the cab is high, if the windows mist up, run the air conditioner to remove the mist. When the outside air is extremely humid, if the temperature inside the cab is too low, the outside of the glass may mist up. If this happens, adjust the set temperature or stop the air conditioner to adjust the temperature inside the cab.

ACTION WHEN NOT USING AIR-CONDITIONER

At times of the year when the air conditioner is not used, run the air conditioner for several minutes with the engine at low speed once a month to maintain the lubricating oil film at all parts of the compressor. (Running in of air conditioner)
In winter, when the temperature inside the cab is low, the air conditioner may not work. If this happens, use a heater to raise the temperature inside the cab and run in the air conditioner.

NOTICE

- **When breaking in the air conditioner, always run the engine at low speed when starting. Never start the air conditioner when the engine is running at high speed. This will cause failure of the air conditioner.**
- **If water gets into the control panel, it may lead to an unexpected accident. Always be careful to prevent water from entering the control panel. In addition, never bring the control panel close to fire or flame.**

HEATER, HANDLING

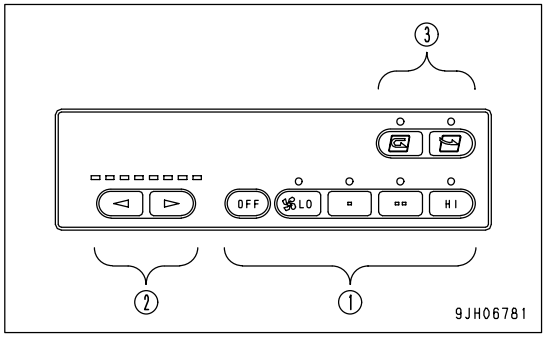
METHOD OF OPERATION

Switch / Condition of use	Fan switch	Humidity control switch	RECIRC/FRESH selector switch
Rapid heating	HI	All red	RECIRC
Ventilation or pressurization	HI - LO	All blue	FRESH

TO HEAT QUICKLY

If the switch is operated as follows, the cab can be heated quickly.

- Set fan switch (1) to H1, humidity control switch (2) to All red, and RECIRC/FRESH selector switch (3) to RECIRC.



NOTICE

If the heating is run continuously for a long time using only recirculated internal air, the air in the cab will become dirty. After the cab warms up, always turn RECIRC/FRESH selector switch (3) to the FRESH position. In this position, the inside of the cab is pressurized, and this prevents the entry of dust.

NORNAL USE

Set each switch to the desired position.

CLEANING AIR FILTER

If the RECIRC or FRESH air filters are clogged, the heating capacity will drop.
Cleaner the air filter once a week with compressed air.
For details of the method of cleaning, see "WHEN REQUIRED (PAGE 4-20)".

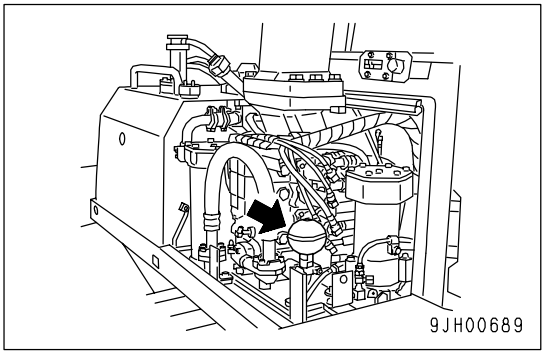
ACCUMULATOR, HANDLING

WARNING

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 lever and parking lever in the LOCK position.
The accumulator is charged with high-pressure nitrogen gas, so improper operation may cause an explosion which will lead to serious injury or damage. When handling the accumulator, always do as follows.

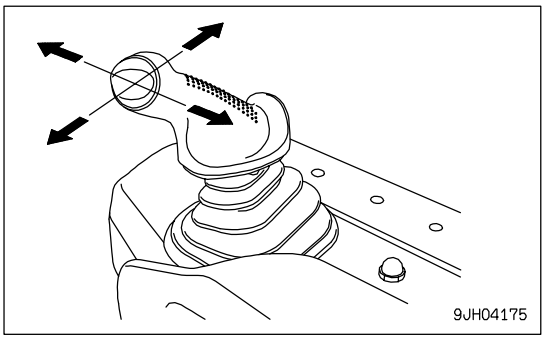
- **Pressure in the control circuit cannot be completely removed. When removing the hydraulic equipment, do not stand in the direction that oil spurts out when performing the operation.**
- **Loosen the bolts slowly.**
- **Do not disassemble the accumulator.**
- **Do not bring it near flame or dispose of it in fire.**
- **Do not make holes in it or weld it.**
- **Do not hit it, roll it, or subject it to any impact.**
- **When disposing of the accumulator, the gas must be released. Contact your Komatsu distributor for proper disposal.**

The accumulator is a device to store the pressure in the control circuit, and when it is installed, the control circuit can be operated for a short time even after the engine is stopped.
Therefore, if the control lever is moved in the direction to lower the work equipment, it is possible for the work equipment to move under its own weight.
The accumulator is installed in the position shown in the diagram on the right.



METHOD OF RELEASING PRESSURE IN OPERATING CIRCUIT ON MACHINE EQUIPPED WITH ACCUMULATOR

1. Lower the work equipment and stop the engine.
2. After stopping the engine, operate control lever full strokes to the front, rear, left, and right to release pressure inside the work equipment circuit.
   However, the pressure cannot be completely released, so if accumulator in the work equipment circuit is removed, loosen the screws slowly, and never stand in the direction oil spurts out.



OPERATION

CHECK BEFORE STARTING ENGINE, ADJUST

WALK-AROUND CHECK

Before starting the engine, look around the machine and under the machine to check for loose nuts or bolts, or leakage of oil, fuel, or coolant, and check the condition of the work equipment and hydraulic system. Check also for loose wiring, play, and accumulation of dust in places which reach high temperatures.

⚠ 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.
- **Do not get on or off the machine from the rear. Using this position is dangerous because it is easy to slip and you cannot be seen from the operator's compartment. Always use the handrail and step at the side when getting on or off the machine.**

If the machine is at an angle, make it horizontal before checking.
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,excecessive wear,or play in the work equipment,cylinders,linkage, or hoses.If any abnormality is found,repair it.

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 battery or high temperature engine parts,such as the engine muffler or turbocharger.Remove all such dirt or flammable material.

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 oil leakage from the engine or coolant leakage from the cooling system. If any abnormality is found, repair it.

4. Check for oil leakage from power train case, final drive case, hydraulic tank, hose, joint.

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 of the undercarriage parts
   Check track shoe, sprocket, idler, guard for damage, wear, loose bolts, or leakage of oil from rollers, etc. Repair them if any trouble is found.

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 bolts.

7. Check for damage to gauges, lamps on instrument panel and loose bolts.

Check for damage to the panel, gauges and lamps. If any abnormality is found, replace the parts. Clean off any dirt on the surface. Tighten any loose bolts.

8. Check for damage to seat belt and mounting clamps.

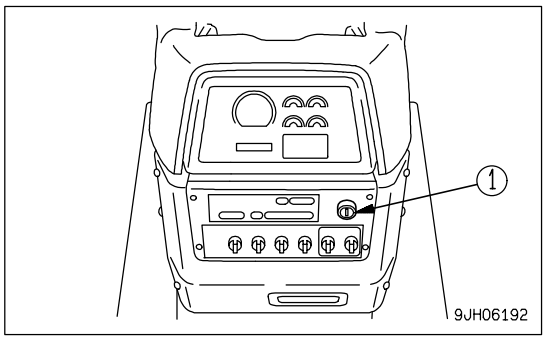
Check that there is no abnormality in the seat belt or mounting clamps. If there is any damage, replace with new parts.

CHECK BEFORE STARTING

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

CHECK MONITOR PANEL

1. Turn ignition switch (1) to the ON position.
2. Check that all monitors and gauges light up for approx. 2 seconds and that the alarm buzzer sounds for approx. 2 seconds.

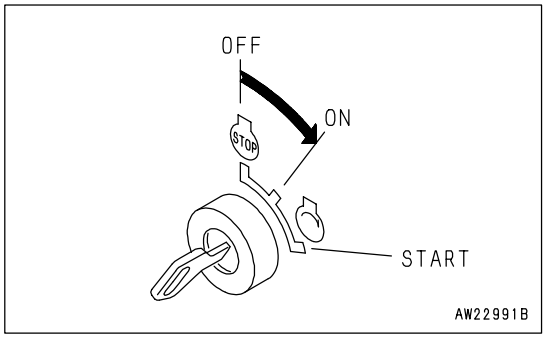


REMARK

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

NOTICE

When performing checks before starting, do not relay only on the monitor. Always perform all the items listed for the following checks and maintenance.

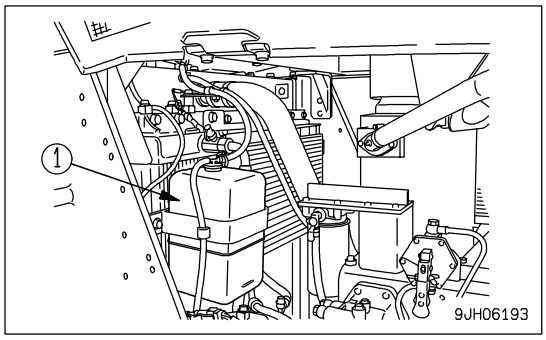


CHECK COOLANT LEVEL, ADD WATER

WARNING

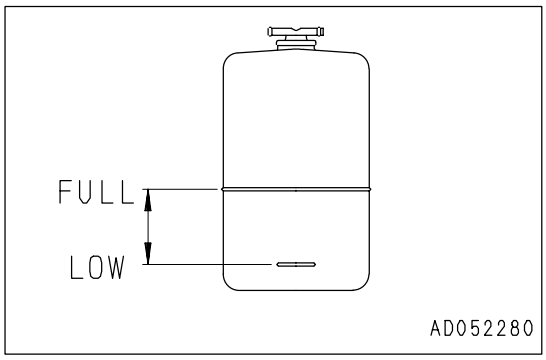
- **Normally, do not open the radiator cap. When checking the cooling water level, check the sub-tank when the engine is cold.**
- **Do not remove the cap when the radiator water is hot. Boiling water may spurt out. After the water temperature goes down, turn the cap slowly to release the pressure, then remove it.**

1. Open the engine side cover on the left side of the chassis, and check that the coolant is between the FULL and LOW marks on sub-tank (1). If the water level is low, add water to the FULL level through the water filler port in sub-tank (1).



REMARK
The coolant may overflow from the sub-tank drain hose. This is no problem. It occurs because too much coolant has been added.

2. After adding coolant, tighten the cap securely.
3. If the sub-tank is empty, check for leakage of coolant, then add it to the radiator and sub-tank.
4. After adding water, close the engine side cover.

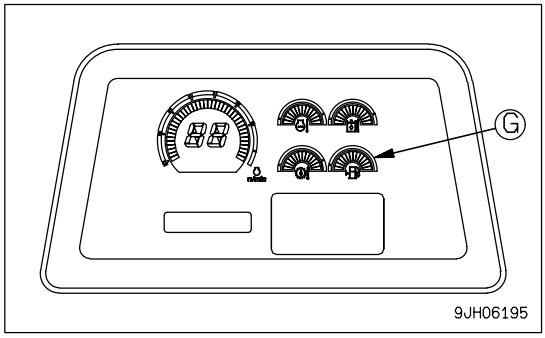


CHECK FUEL LEVEL, ADD FUEL

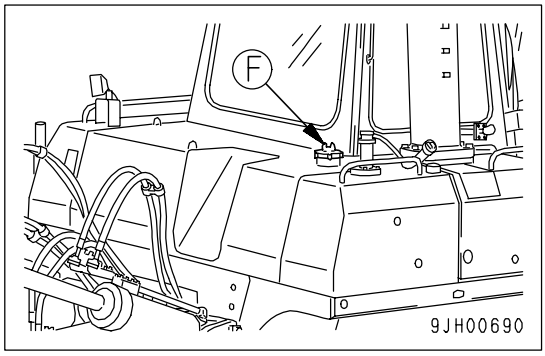
WARNING

When refilling fuel in the fuel tank, do not spill or let it overflow. The spilt fuel may catch fire. If spilt, wipe it off cleanly. Never expose fuels to fire as they are inflammable and thus dangerous material.

1. Turn the engine starting switch to the ON position and check the fuel level gauge (G) on the monitor panel for fuel level. After checking, turn the switch back to the OFF position.



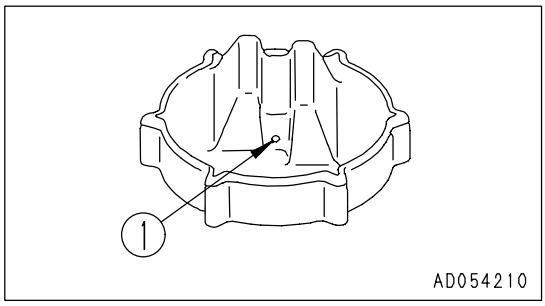
2. After completing work, fill the fuel tank through fuel filler port (F).
3. After adding fuel, tighten the cap securely.



Fuel tank capacity: 625 liters (165 US gal)

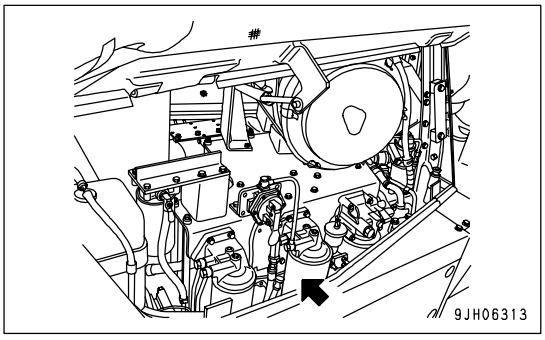
REMARK

If breather hole (1) in the cap is clogged, the pressure in the tank will drop and fuel will not flow. Clean the hole from time to time.

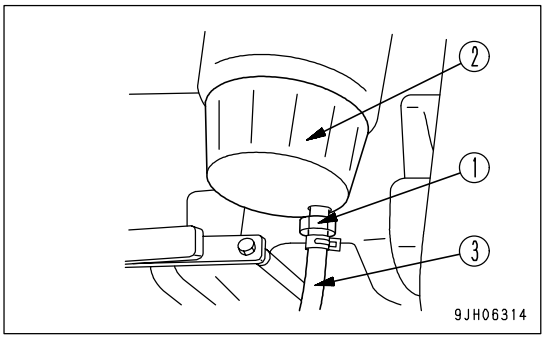


CHECK WATER SEPARATOR, DRAIN WATER AND SEDIMENT
(if equipped)

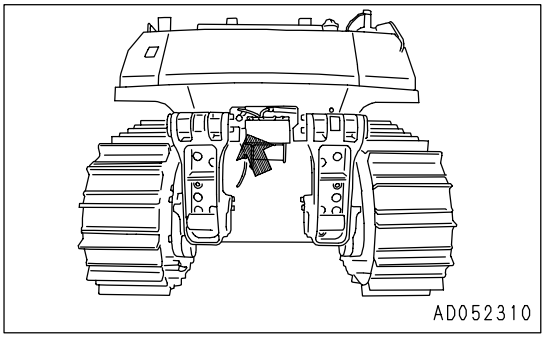
1. Open the side cover on the left side of the machine.
   The water separator forms one unit with the additional fuel filter and is installed at the bottom.

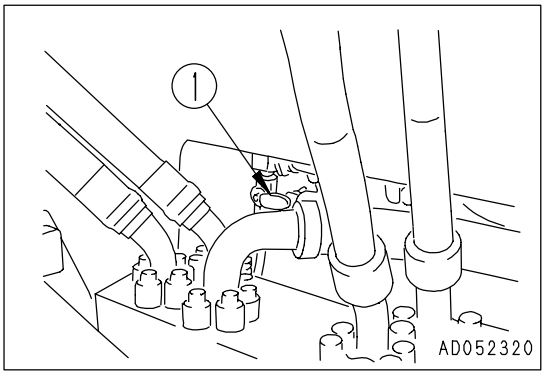


2. It is possible to judge the water level and amount of sediment by looking through transparent cap (2). If there is any water or sediment collected at the bottom, set a container to catch the drain water under drain hose (3).
3. Loosen valve (1) and drain the water.
4. When fuel comes out from drain hose (3), tighten thread (1) immediately.



DRAIN WATER, SEDIMENT FROM FUEL TANK
Loosen drain valve (1) at the bottom of the fuel tank and drain the water and sediment accumulated at the bottom together with the fuel.



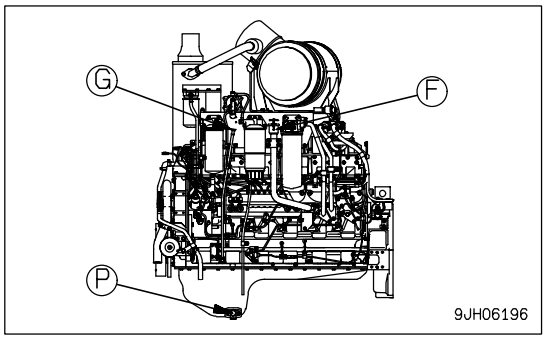


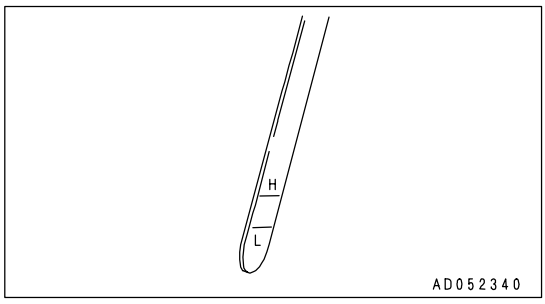
CHECK OIL LEVEL IN ENGINE OIL PAN, ADD OIL

WARNING

Engine parts and oil are at high temperature immediately after the engine is stopped, and will cause serious burns. Wait for the temperature to cool down before starting the operation.

1. Open the engine side cover on the left side of the chassis.
2. Remove dipstick (G), and wipe the oil off with a cloth.
3. Completely insert dipstick (G) into the oil filler pipe, then remove it and check the oil level.
4. The oil level should be between the H and L marks on dipstick (G).
   If the oil level is below the L mark, add engine oil through oil filler (F).
5. If the oil is above the H mark, drain the excess engine oil from drain plug (P), and check the oil level again.
6. If the oil level is correct, tighten the oil filler cap securely and close the engine side cover.



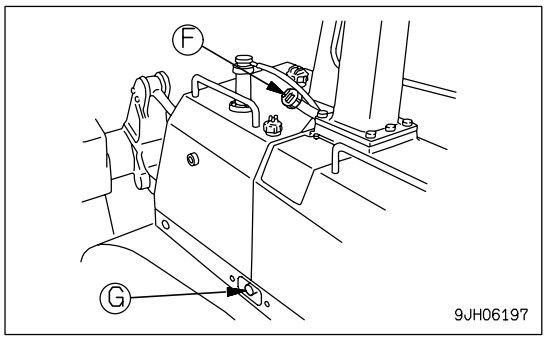


REMARK

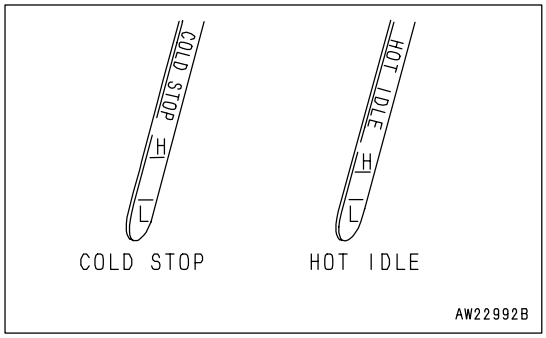
- Check the oil level with the engine stopped.
- When checking the oil level immediately after stopping the engine, wait for at least 15 minutes after stopping the engine before starting the inspection operation.
- If the machine is at an angle, set it in a horizontal position before starting inspection.
- When adding fuel, remove the dipstick from the guide to remove the air inside the crankcase.

CHECK OIL LEVEL IN POWER TRAIN CASE, ADD OIL

1. Remove dipstick (G), and wipe the oil off with a cloth.
2. Completely insert dipstick (G) into the oil filler pipe, then remove it and check the oil level.
3. Check that the oil level is between the H and L marks on dipstick (G).
   If the oil level is below the L mark, add engine oil through oil filler (F).
   The dipstick has two sides for checking the oil level: COLD STOP for use when the engine is stopped and the oil temperature is low; and HOT IDLE for use when the engine is idling and the oil temperature is high.

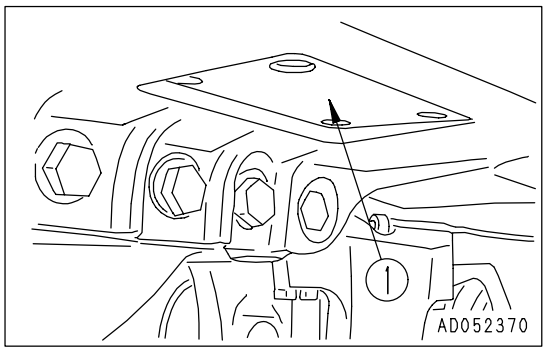


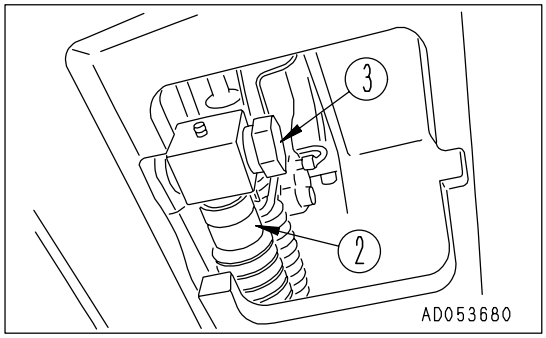
REMARK
When checking the oil level with the engine stopped before starting operations, check the oil level with the side marked COLD STOP. It is also possible to check the oil level even after starting operations when the power train oil temperature is high, but in this case, run the engine at idling and use the side marked HOT IDLE.



4. If the oil is above the H line, remove drain cover (1) at the left side at the bottom surface of the power train case, pull out drain hose (2) from the take-out port, loosen drain plug (3), drain the excess oil, then check the oil level again.
5. If the oil level is correct, tighten the oil filter cap securely.

REMARK
When inspecting, if the machine is at an angle, move it to a horizontal place to carry out the check.



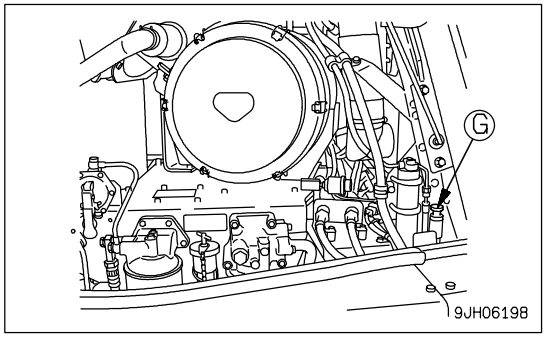


CHECK BRAKE PEDAL TRAVEL

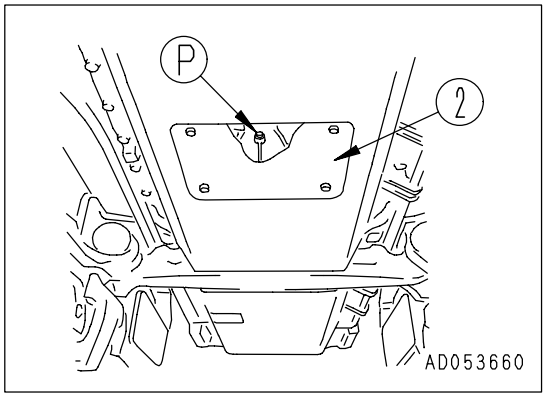
Drive the machine, depress the brake pedal, and check that the machine stops.

CHECK DAMPER CASE OIL LEVEL, ADD OIL

1. Open the engine side cover on the left side of the machine.
2. Remove dipstick (G), and wipe the oil off with a cloth.
3. Completely insert dipstick (G) into the oil filler pipe, then remove it and check the oil level.
4. The oil should be between the H and L marks on dipstick (G). If the oil is below the L mark, add engine oil through the dipstick insertion port.



5. If the oil is above the H mark, open the inspection cover (2) in the center of the bottom face of the power train case, drain the excess oil from drain plug (P) of the engine damper which can be seen towards the front of the machine from the inspection window, then check the oil level again.



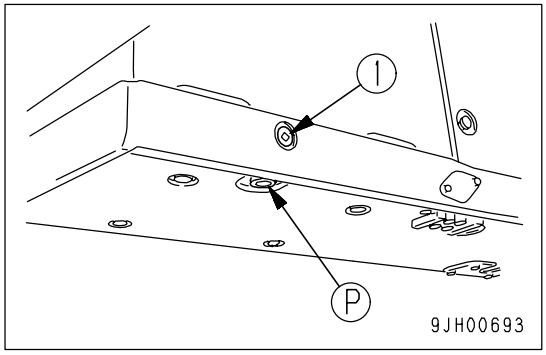
REMARK

- Check the oil level while the engine is stopped.
- If the machine is inclined, set it in a level position before checking the oil level.

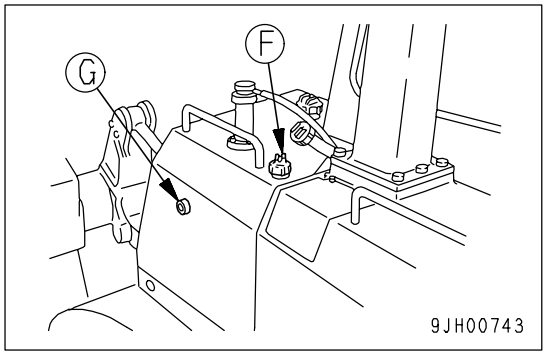
CHECK OIL LEVEL IN HYDRAULIC TANK, ADD OIL

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 remove drain plug (P), loosen drain valve (1), and drain the excess oil.**



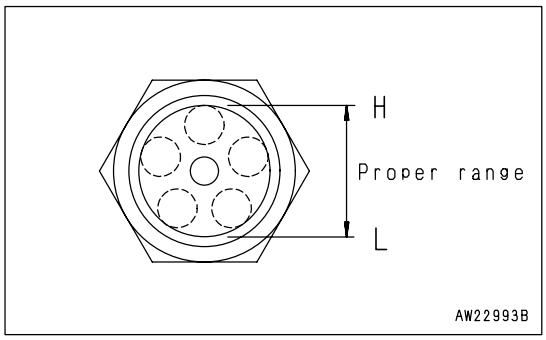
1. Lower the blade and ripper completely to the ground, stop the engine, wait for approx. 5 minutes, then check that the oil level is between the H and L marks on sight gauge (G).



NOTICE

If the oil level is above the H line, do not add oil. Doing so may lead to damage to the oil pressure circuit and spouting out of oil.

2. If the oil level is below the L line, add oil through oil filler (F) at the top of the hydraulic tank.

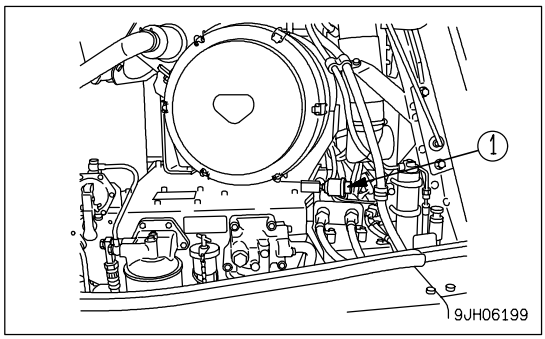


REMARK

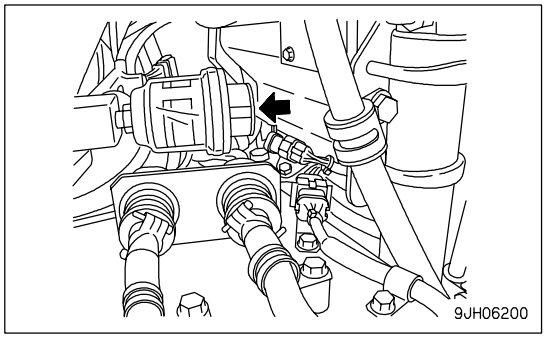
When inspecting, if the machine is at an angle, move it to a horizontal place to carry out the check.

CHECK DUST INDICATOR

1. Check that the yellow piston inside the red zone on the outside diameter of dust indicator (1) is not overlapping.
2. If the yellow piston is overlapping the red zone, clean or replace the element immediately.
   For details of the method of cleaning the element, see "CHECK, CLEAN AND REPLACE AIR CLEANER ELEMENT (PAGE 4-23)".



3. After checking, cleaning, and replacing, press the knob of dust indicator (1) to return the yellow piston to its original position.
   - In environments where the rubber deteriorates quickly or the surface becomes damaged (in direct sunlight, dusty areas, etc.), replace before it becomes dirty and it becomes difficult to judge the condition.



CHECK ELECTRIC WIRINGS

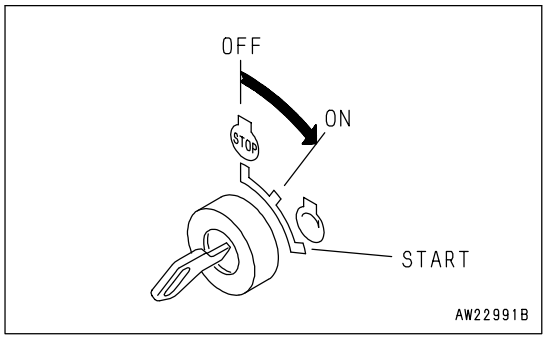
WARNING

- **If fuses are frequently blown or if there is a short circuit in the electrical wiring, locate the cause and repair or contact your Komatsu distributor.**
- **Accumulation of flammable material (dead leaves, twigs, grass, etc.) around the battery may cause fire, so always check and remove such material.**
- **Keep the top surface of the battery clean and check the breather hole in the battery cap. If it is clogged with dirt or dust, wash the battery cap to clear the breather hole.**

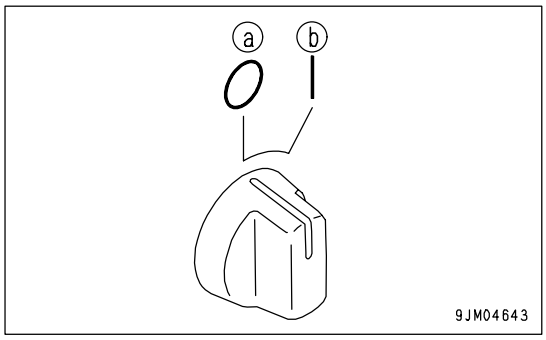
Check that there is no damage to the fuse, that a fuse of the specified capacity is being used, that there are no signs of any disconnection, breakage, or short circuit in the electric wiring, check for any loose terminals, and tighten any loose terminals that are found.
Be particularly careful to check the wiring for the battery, starting motor, and alternator.
In addition, if any flammable material is accumulated around the battery, remove it.
For troubleshooting and repairs, contact your Komatsu distributor.

CHECK THAT LAMPS LIGHT UP

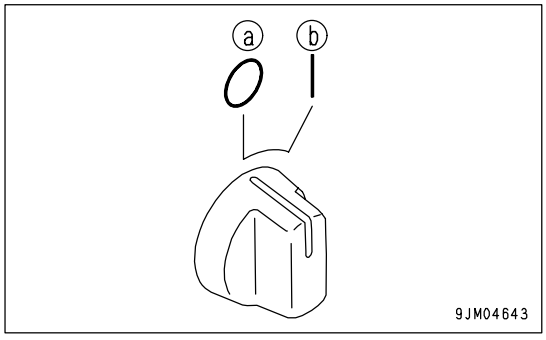
1. Turn ignition switch key to the ON position.



2. Turn the front lamp switch to the ON (b) position and check that the front lamp light up.

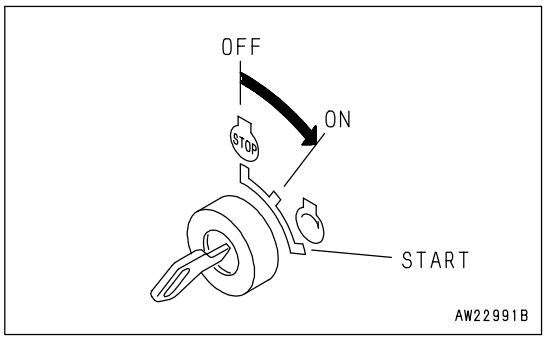


3. Turn the rear lamp switch to the ON (b) position and check that the rear lamps on the left and right fenders light up.
   If the lamps do not light, check for a broken bulb or disconected wire, contact your Komatsu distributor for repairs.

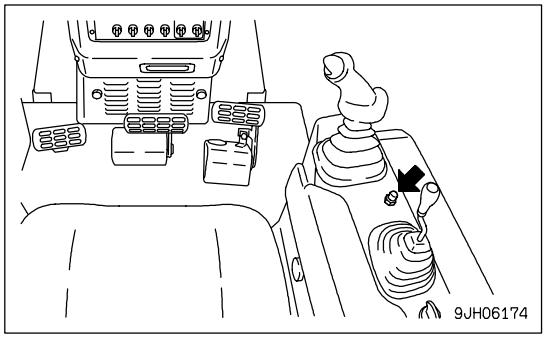


CHECK HORN SOUND

1. Turn ignition switch key to the ON position.

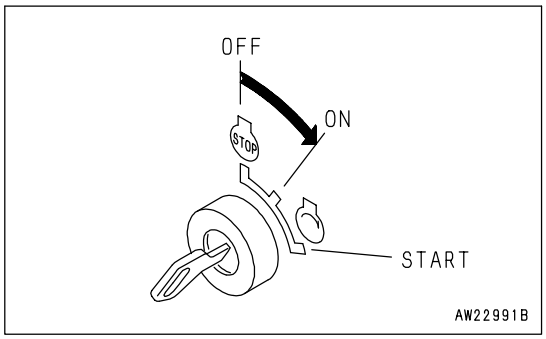


2. Push the horn switch and check that the horn sounds.

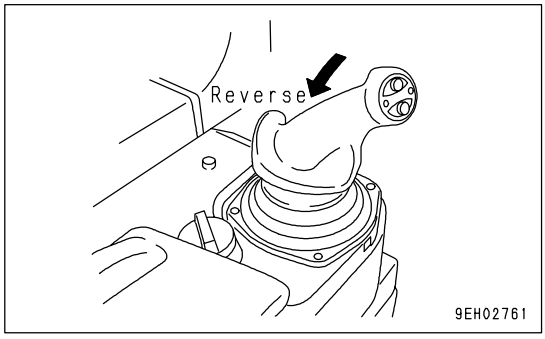


CHECK BACKUP ALARM SOUND

1. After starting the engine, run it at idle, completely depress the brake, and release the parking lever.



2. While depressing the brake pedal, set joystick to the REVERSE position. The buzzer must sound immediately. Buzzer will continue to sound until the joystick is moved to NEUTRAL or FORWARD position.
3. As soon as it is confirmed that the buzzer is working properly, set the joystick to the NEUTRAL position, put the parking lever to the LOCK position, and then release the brake pedal.



ADJUSTMENT

WARNING

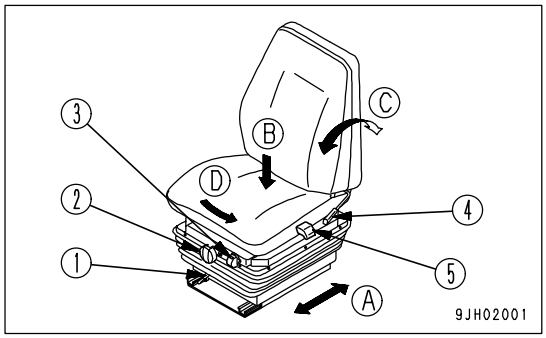
- **Carry out adjustment before starting operations and when the operators change shifts.**
- **Adjust the seat so that you can depress the brake pedal fully with your back pressed against the backrest of the operator's seat.**

ADJUSTING OPERATOR'S SEAT

(A) Fore-and-aft adjustment

Pull lever (1), 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)

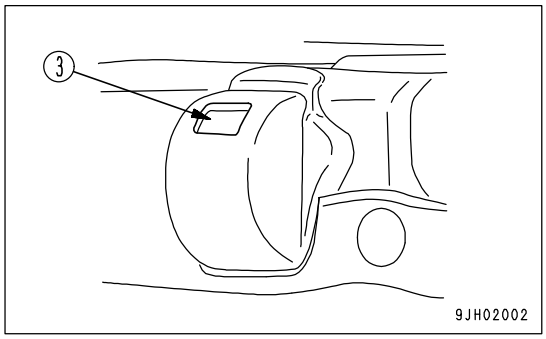


(B) Weight and height adjustment of seat

- Turn knob (2) under the seat so that weight adjustment indicator (3) displays the green range. The height can be adjusted by turning the knob (2) while the green range is displayed.
- Turn the knob clockwise to raise the seat and turn the knob counterclockwise to lower the seat.

Height adjustment range: stepless, 75 mm (3 in)

Weight adjustment range: 50 to 130kg (110 to 237 lb)



(C) Adjust reclining angle

REMARK

When the seat is pushed forward, the available reclining angle becomes greater; when the seat is pushed back, the available reclining angle becomes smaller. When moving the seat back, return the seat back to its original position before moving the seat.

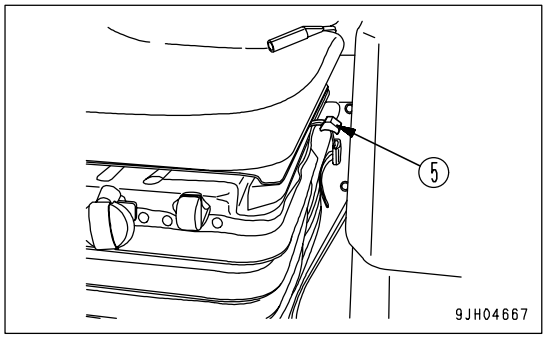
Pull lever (4) up, set the seat back to the desired position, then release the lever.

(D) Adjusting direction of seat

Pull up lever (5) to unlock the seat, and the seat can be turned by hand to the position of 15° on the right.

After changing the direction of the seat, return the lever securely to lock the seat.

- Change the direction of the seat to the right for the ease of operation of the ripper.



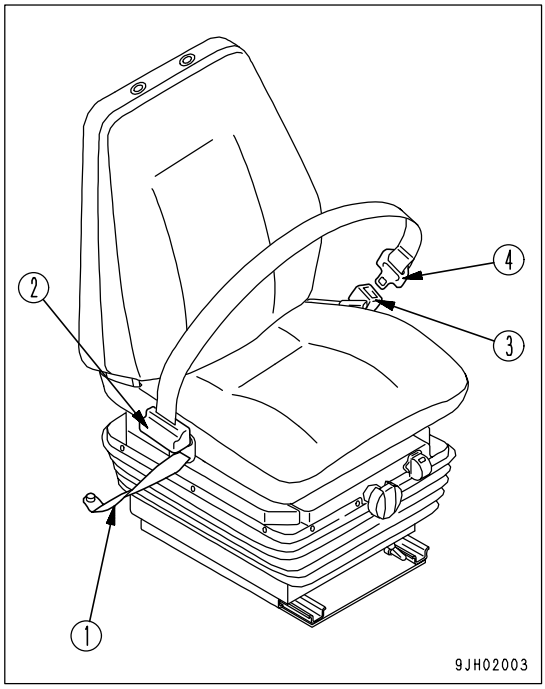
USING SEAT BELT

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.**
- **Even if no abnormality can be seen in the belt, replace the seat belt every 3 years. The date of manufacture of the belt is shown on the back of the belt.**
- **Adjust and fasten the seat belt before operating the machine.**
- **Always use the seat belt when operating the machine.**
- **Fit the seat belt across your lap without twisting.**

FASTEN THE BELT AND REMOVE IT

1. Sit on the seat, depress the brake pedal fully, and adjust the seat so that your back is pressed against the backrest.
2. After adjusting the seat position, adjust tether belt (1). Tense the tether belt and install it when there is no one sitting on the seat.
3. Sit on the seat and hold tongue (4) connected to wind-in mechanism (2) and pull out the belt slowly so that the belt will cover your abdomen sufficiently.
4. Insert tongue (4) in buckle (3) until it clicks. The belt is pulled back into wind-in mechanism (2) until it is fitted to your abdomen. The belt is locked under this condition and cannot be extended anymore. Fit the belt to your abdomen without twisting it.



REMARK

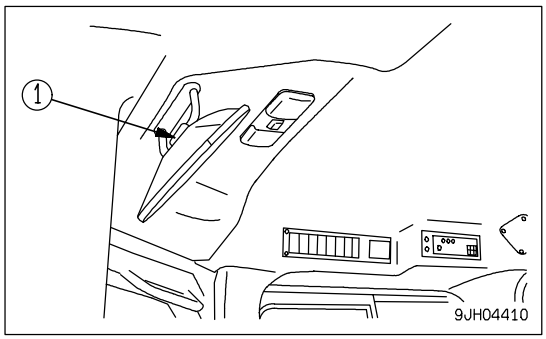
If the belt is locked before the tongue is inserted in the buckle, let it return to the wind-in mechanism, then repeat the above procedure from the start.

5. Pull the belt to check that it is securely locked in position.
6. When removing the belt, press the red button on buckle (3). The belt will automatically be wound in.

Check the seat belt mounting bolts and re-tighten if necessary.
Tightening torque: 24.5 ± 4.9 N·m (2.5 ± 0.5 kgf·m, 18.1 ± 3.6 lbft)
If the seat belt is scratched or frayed, if any fittings are broken or deformed from long service, replace the seat belt immediately.

ADJUST MIRROR

Loosen nut (1) of the mirror and adjust the mirror to a position where it gives the best view from the operator's seat.
In particular, be sure to adjust the mirror so that people at the rear left or right of the machine can be seen clearly.



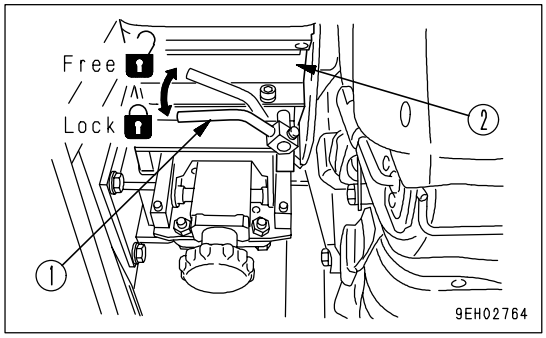
ADJUST JOYSTICK (PCCS LEVER)

WARNING

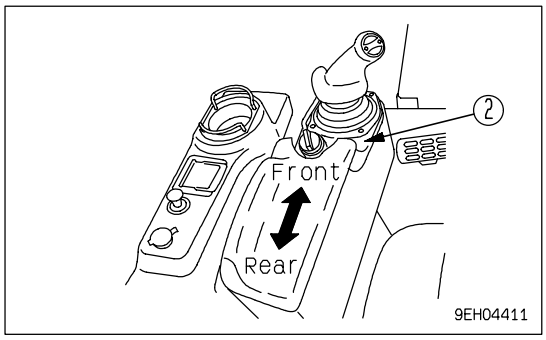
After moving case (2) in order to adjust the position of the steering, directional, and gearshift lever, secure lock lever (1) into the notched hole. Making sure it is in the LOCK position. If it is not completely locked, the steering, directional, and gearshift lever may unexpectedly move and cause damage, serious injury, or death.

The steering, directional, and speed lever (wrist control type single lever: joystick) can be adjusted by 90 mm (3.5 in) in 9 stages to the front or rear. Adjust to the most suitable position to match the adjustment of the operator's seat.

1. Pull up lock lever (1) to the FREE position at the rear of case (2) on left side of the operator's compartment.



2. With lock lever (1) pulled up, use your other hand to grip the front of case (2), then move it forward with your left and right hands. The joystick moves with case (2).
3. Move case (2) to the desired position until a click is heard. Then pull up lock lever (1) and release it. Lock lever (1) automatically returns to the LOCK position.



REMARK
PCCS: Palm command control system

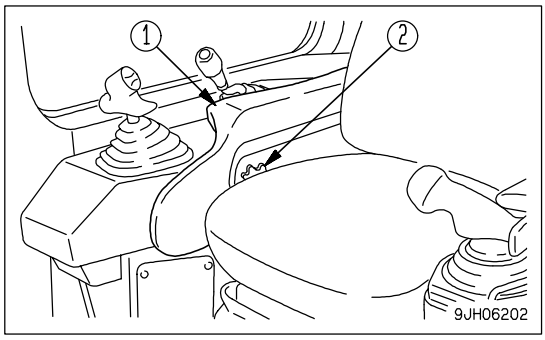
ADJUST ARMREST

The height of the armrest on the left and right sides of the operator's seat can be adjusted to 3 positions. After adjusting the operator's seat, adjust the armrest to a suitable height.

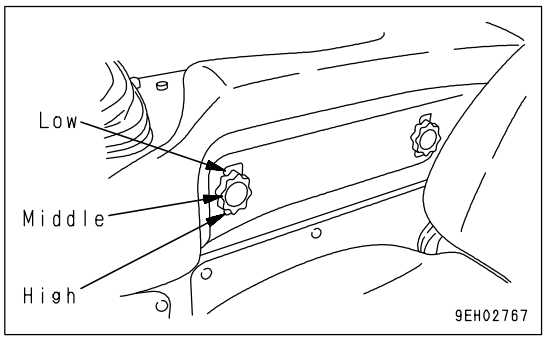
ADJUST ARMREST (RIGHT)

Armrest (1) on the right side of the operator's cab part can be adjusted up 30 mm (1.2 in) or down 25 mm (1.0 in) based on the standard height (center) in three stages.

1. Loosen knob (2) (two places).



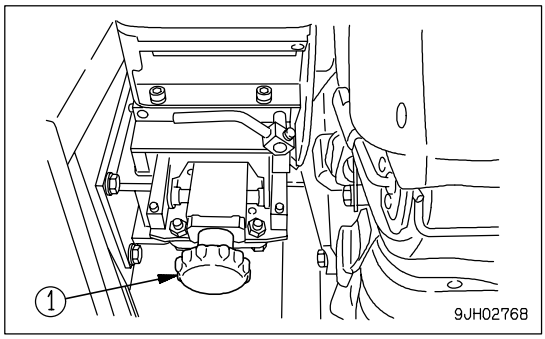
2. Move the armrest on the operator's seat to the front, then align the position of the 3 holes (high, middle, low).
3. Tighten knob (2) securely.



ADJUST ARMREST (LEFT)

The armrest on the left side of the operator's compartment can be adjusted to 2 heights.
It is possible to adjust the standard height up 30 mm (1.2 in) or down 30 mm (1.2 in) gradually.
The joystick moves as a unit.

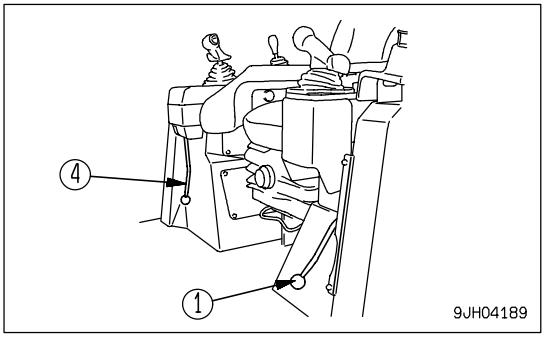
Turn up/down left adjustment knob (1) to adjust the height. Turn the knob to adjust as follows.
Turn CLOCKWISE to move DOWN
Turn COUNTERCLOCKWISE to move UP

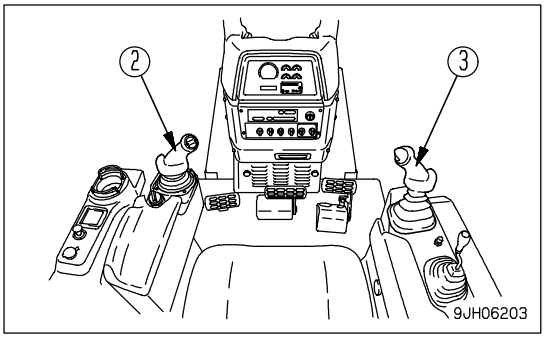


OPERATIONS AND CHECKS BEFORE STARTING ENGINE

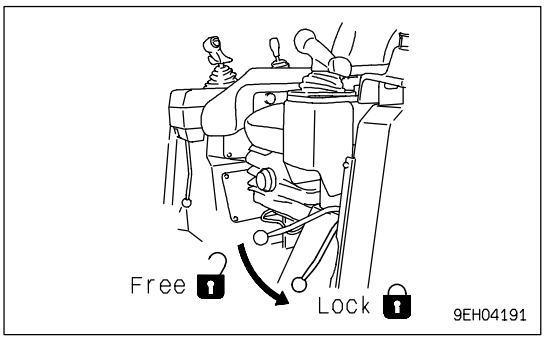
WARNING

- **When starting the engine, check and make sure the safety lock lever and parking lever are secured at the LOCK position.**
  If the control levers are not locked and they are touched by accident when starting the engine, the work equipment may move unexpectedly, and this may lead to a serious injury or death.
- **When standing up from the operator's seat, always set the safety lock lever to the LOCK position, regardless of whether the engine is running or stopped.**

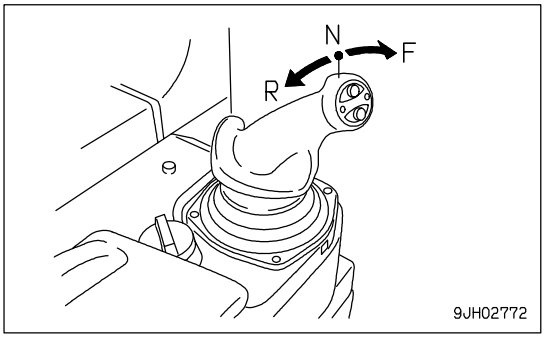




1. Check that parking lever (1) is locked. If this lever is not at the LOCK position, the engine will not start.



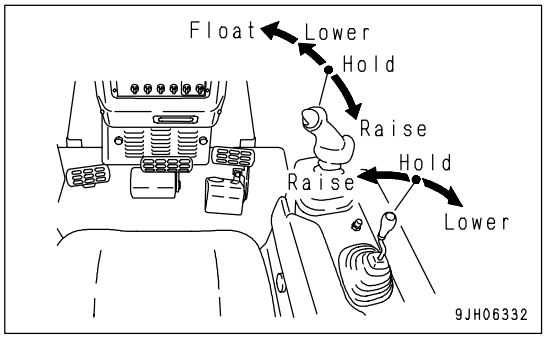
2. Check that joystick (2) is at the N (neutral) position.



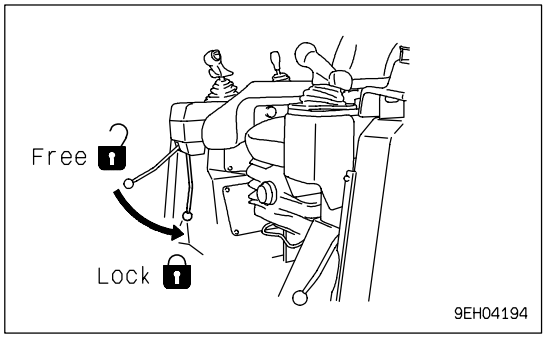
REMARK

The engine cannot be started if joystick (steering, directional, and gearshift lever) (2) is not at the N position.
If joystick (steering, directional, and gearshift lever) (2) is at F or R, the letter P on display panel A will flash.

3. Check that the blade is lowered to the ground and that blade control lever (3) is at the HOLD position. If it is at the FLOAT position, the engine will not start.



4. Check that the ripper is lowered to the ground.
5. Check that safety lever (4) is locked.
   If safety lever (4) is locked, the blade control lever is returned to the HOLD position even if it is at the FLOAT position.

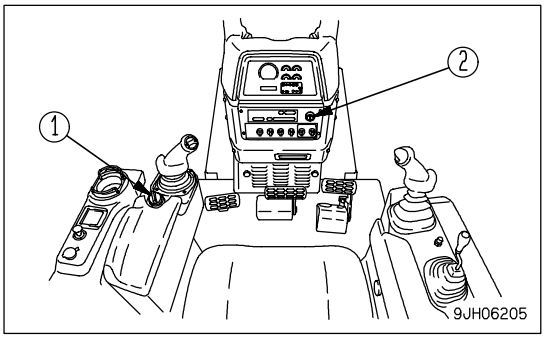


STARTING ENGINE

NORMAL STARTING

⚠ WARNING

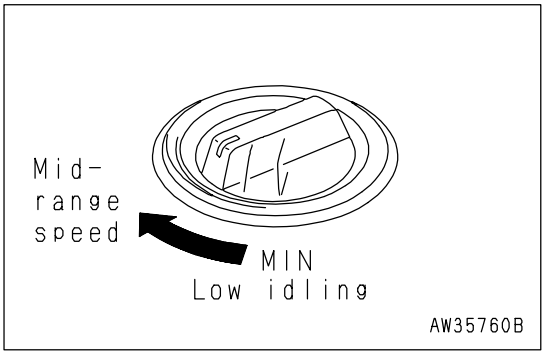
- **Start the engine only after sitting down in the operator's seat.**
- **Do not attempt to start the engine by short-circuiting the engine starting circuit. Such an act may cause serious bodily injury or fire.**
- **Check that there are no persons or obstacles in the surrounding area, then sound the horn and start the engine.**
- **Exhaust gas is toxic. When starting the engine in confined spaces, be particularly careful to ensure good ventilation.**



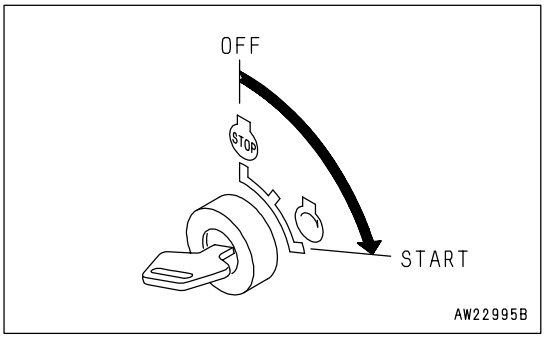
NOTICE

- **Do not crank the starting motor continuously for more than 20 seconds. If the engine does not start, wait for at least 2 minutes, then repeat the procedure from Step 2.**
- **Before starting the engine, check that the fuel control dial is at the low idling (MIN) position.**
- **On this machine, to protect the turbocharger, a turbo protect function is provided. In cold weather, even if fuel control dial (1) is operated immediately after starting the engine, the engine speed may not change for several seconds.**
- **If the fuel control dial is at the FULL position, the engine will accelerate suddenly and cause damage to the engine parts, so set it to an intermediate or low speed position.**

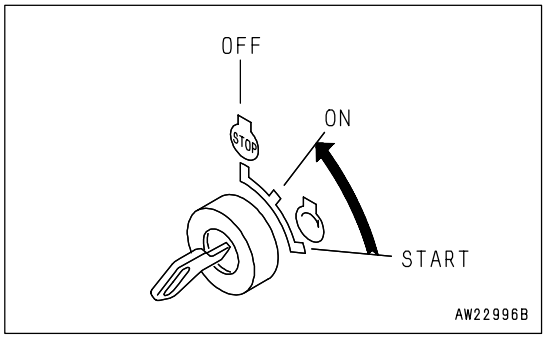
1. Set fuel control dial (1) to make the engine speed slightly higher than low idling.



2. Turn the key of ignition switch (2) to the START position.



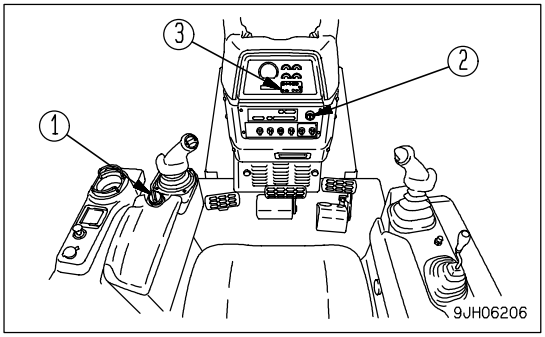
3. When engine is started, release the key of starting switch (2) and the key will return automatically to ON.



STARTING IN COLD WEATHER

WARNING

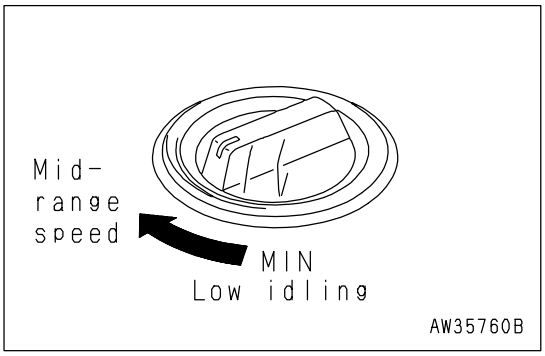
- **Start the engine only after sitting down in the operator's seat.**
- **Do not attempt to start the engine by short-circuiting the engine starting circuit. Such an act may cause a serious bodily injury or fire.**
- **Check that there are no persons or obstacles in the surrounding area, then sound the horn and start the engine.**
- **Never sue starting aid fluids as they may cause explosions.**
- **Exhaust gas is toxic. When starting the engine in confined spaces, be particularly careful to ensure good ventilation.**



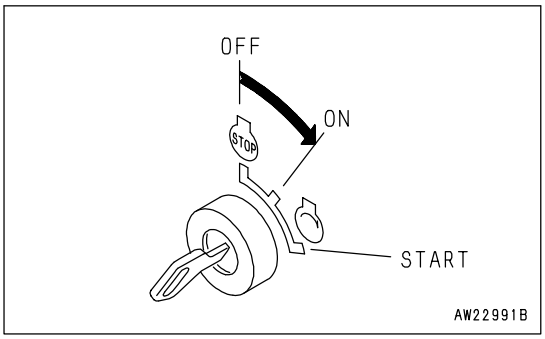
NOTICE

- **Do not crank the starting motor continuously for more than 20 seconds. If the engine does not start, wait for at least 2 minutes, then repeat the procedure from Step 2.**
- **Before starting the engine, check that the fuel control dial is at the low idling (MIN) position.**
- **On this machine, to protect the turbocharger, a turbo protect function is provided. In cold weather, even if fuel control dial (1) is operated immediately after starting the engine, the engine speed may not change for several seconds.**
- **If the fuel control dial is at the FULL position, the engine will accelerate suddenly and cause damage to the engine parts, so set it to an intermediate or low speed position.**

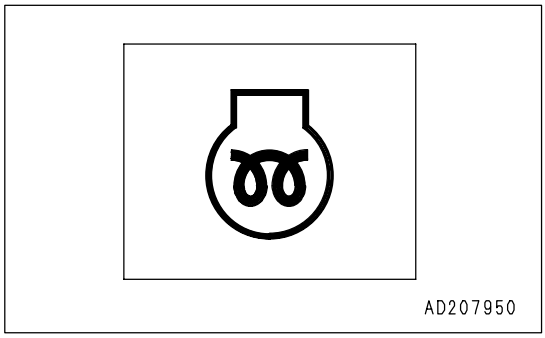
1. Turn fuel control dial (1) to the center position between MIN and MAX position.



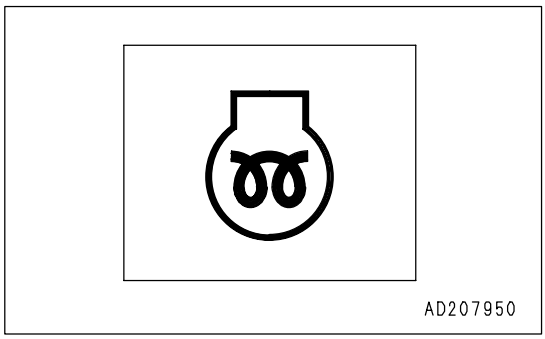
2. Turn the key of starting switch (2) to the ON position.



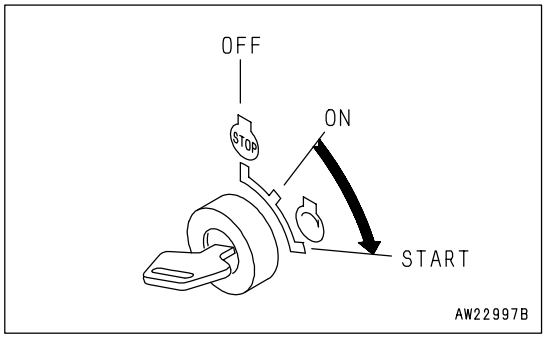
3. Check that preheating pilot lamp (3) on the monitor panel lights up.



4. Maintain the key in the on position until the preheating pilot lamp (3) goes off.

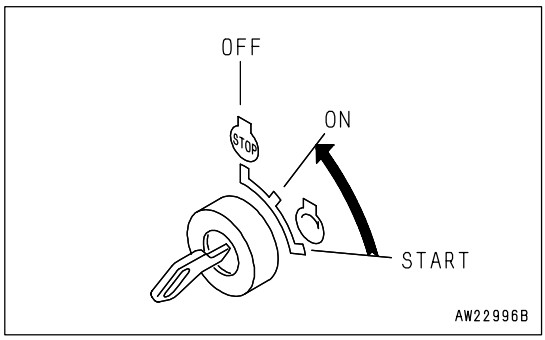


5. When preheating pilot lamp (3) goes off, turn the key of starting switch (2) to the START position to crank the engine.
   The time that preheating pilot lamp (3) stays on changes according to the ambient temperature as shown in the table below.



Ambient temperature	Preheat time
-5°C to -10°C (23°F to 14°F)	20 to 27 seconds
-10°C to -20°C (14°F to -4°F)	27 to 40 seconds
-20°C to -30°C (-4°F to -22°F)	40 seconds

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



REMARK
Immediately after starting the engine, run at idle. While running the engine, release the decelerator pedal and do not operate the work equipment.
Guideline for idle time
- Cold weather: At least 15 seconds
- 1st start after changing engine oil or engine oil filter: 20 seconds

7. When the engine rotation stabilizes, return to the low idle (MIN) position of fuel control dial (1) and then carry out the warming-up operation.

REMARK
- Regardless of the ambient temperature, if the key in the starting switch (2) is turned from the OFF position to the left, preheating pilot lamp (3) will light up and preheating will start. (Preheating continues while the starting switch is being held at the left.)
  For details of the preheating time, see the table in Step 5.
- During the preheating operation, preheating pilot lamp (3) lights up to show that preheating is being carried out.
- If the engine does not start with the above operation, wait for at least 2 minutes, and repeat the procedure in Steps 3 and 4.

REMARK
- The turbo protect function is a function to protect the turbocharger. It keeps the engine speed below 1000 rpm for a set time after the engine is started even if the pedal is fully depressed.
- The basic function acts to cancel the actuation of the turbo protect function when the engine oil pressure rises. The settings for the maximum actuation time are as shown below. When the turbo protect function is being actuated, the engine speed does not change even when the fuel control dial is operated.

Cooling water temperature	Turbo protect time (sec.)
Above 10°C (50°F)	0
10 to -30°C (50 to -22°F)	Change 0 to 20
below -30°C (-22°F)	20

OPERATIONS AND CHECKS AFTER STARTING ENGINE

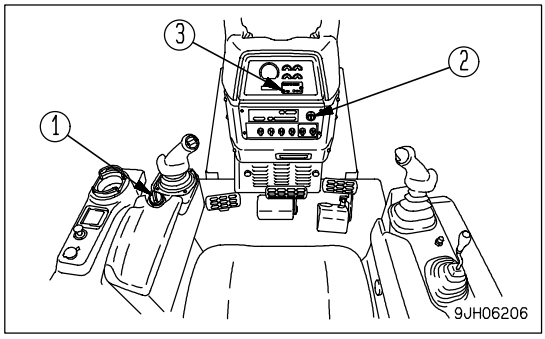
WARNING

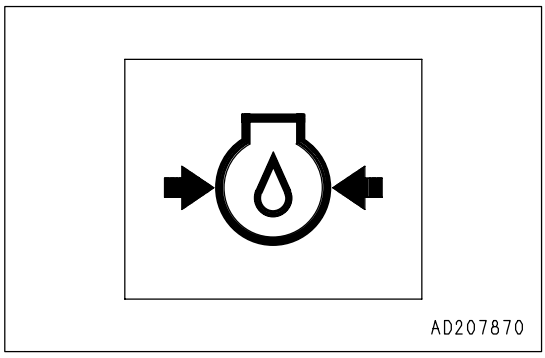
- **If there has been any abnormal actuation or trouble, turn the ignition switch key to the OFF position.**
- **If the work equipment is operated without sufficiently warming up the machine, the response of the work equipment to the movement of the control levers will be slow and may not move as the operator desires. Always warm the machine to full operating temperature, particulary in cold areas.**

NORMAL OPERATION

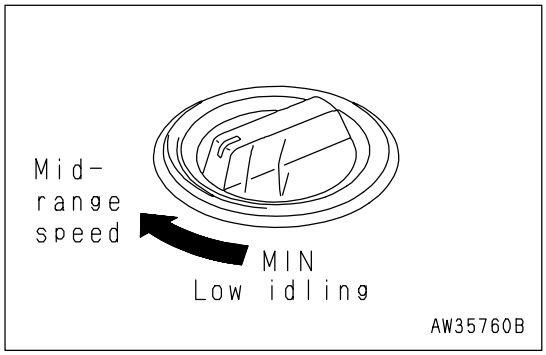
NOTICE

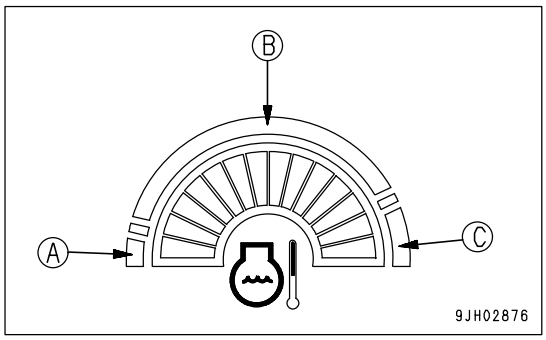
- **Do not perform operations or suddenly operate the levers when the hydraulic oil is at a low temperature. Always perform the warming-up operation until the hydraulic oil temperature monitor displays the green range. This will help extend the machine life.**
  Do not suddenly accelerate the engine before the machine reaches full operating temperature.
- **Do not run the engine at low or high idle for more than 20 minutes. This will cause oil leaks from the turbocharger oil supply piping.**
  If it is necessary to run the engine at idling, apply a load from time to time or run the engine at a mid-range speed.
- **If engine oil pressure caution lamp (3) flashes or the buzzer sounds intermittently, stop the engine and check for the cause.**





1. Turn fuel control dial (1) to the center position between low idling (MIN) and high idling (MAX) positions and run the engine at a mid-range speed for 5 minutes under no load.
2. After warm-up run is completed, check gauges and caution lamps for proper operation. If any abnormality is found, repair it.
   Continue to run the engine under a light load until engine coolant temperature gauge indicator (2) is within the green range (B).
   (A): White range
   (B): Green range
   (C): Red range

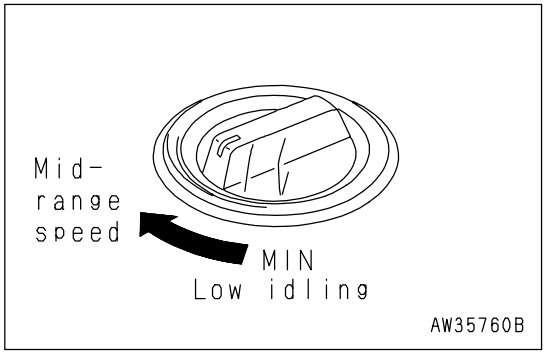




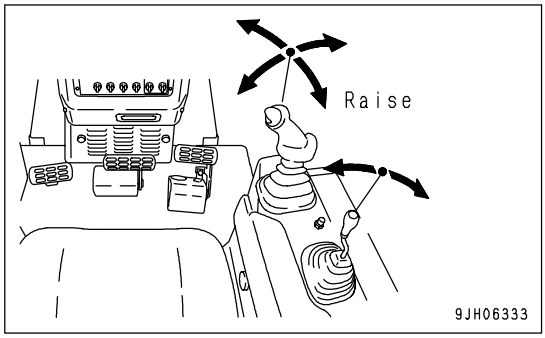
3. Check that there is no abnormal exhaust gas color, noise or vibration. If any abnormality is found, contact your Komatsu distributor.

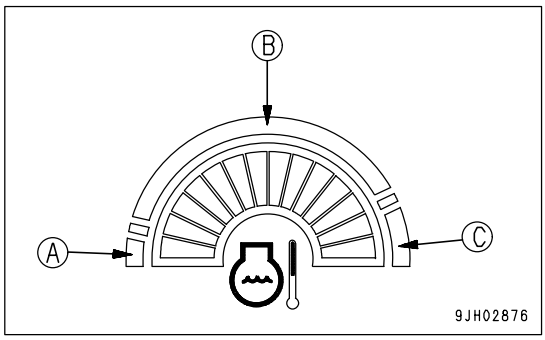
IN COLD AREAS

1. Turn fuel control dial (1) to the center position between low idling (MIN) and high idling (MAX) positions and run the engine at a mid-range speed for 10 minutes under no load.



2. Operate blade control lever (4) to the RAISE position, then keep the blade raised to the maximum height and continue to relieve the circuit for 10 minutes.
3. Finally, operate blade control lever (4) and ripper control lever to operate the blade and ripper cylinders several times.
   If the oil temperature in the work equipment is not properly raised, there will be a time lag in the response of the work equipment and steering.
4. After warm-up run is completed, check gauges and caution lamps for proper operation. If any abnormality is found, repair it.
   Continue to run the engine under a light load until engine coolant temperature gauge indicator (2) is within the green range (B).
   (A): White range
   (B): Green range
   (C): Red range





REMARK
If the oil temperature in the power train is not raised properly, it will take longer to accelerate to the maximum speed.

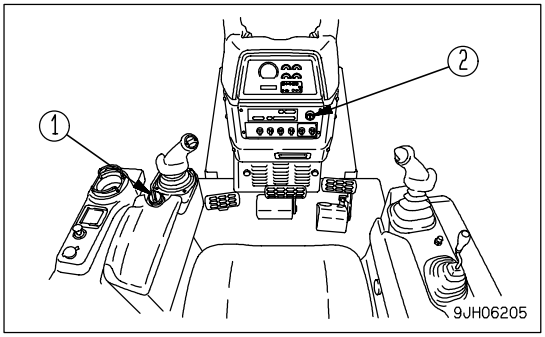
5. Check that there is no abnormal exhaust gas color, noise or vibration. If any abnormality is found, contact your Komatsu distributor.

STOPPING ENGINE

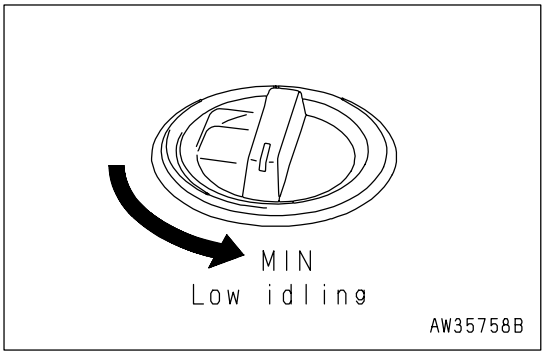
NOTICE

If the engine is abruptly stopped before it has cooled down, engine life may be drastically shortened. Do not abruptly stop the engine except for an emergency.

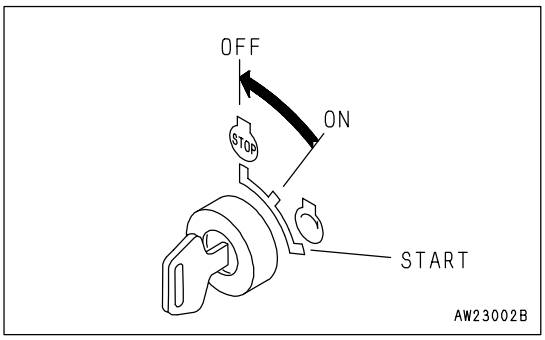
If the engine has overheated, do not stop it abruptly, run it at medium speed allowing the engine to gradually cool down, then stop it.



1. Turn fuel control dial (1) in the low idling (MIN) positions and run the engine at low idling speed for 5 minutes to allow the engine to gradually cool down.



2. Turn the key in ignition switch (2) to the OFF position. The engine will stop.

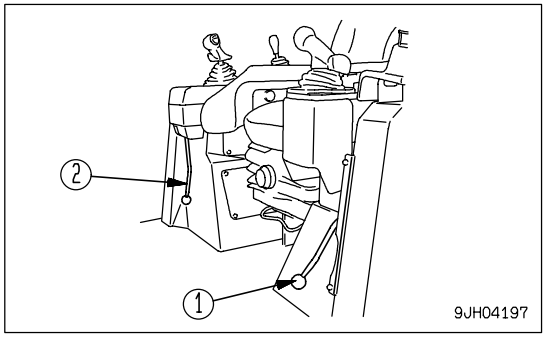


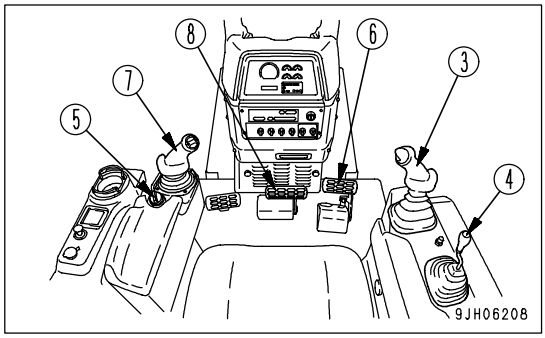
3. Remove the key from ignition switch (2).

MOVING MACHINE OFF

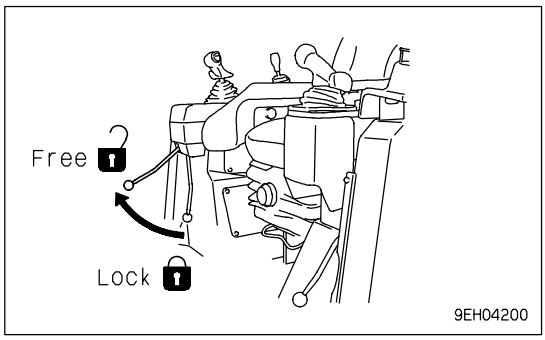
⚠ WARNING

- **Before moving the machine, check that the area around the machine is safe, and always sound the horn before moving.**
  Do not allow anyone to enter the area around the machine.
  The rear of the machine is a blind spot, so be extremely careful when traveling in reverse.
- **When moving the machine down a slope, always keep brake pedal (8) depressed, even after releasing parking lever (1).**
- **When moving the machine up a steep slope, turn fuel control dial (5) to high idling (MAX) position and run the engine at full speed, and keep brake pedal (8) and deceleration pedal (6) depressed. Then operate steering, directional, and gearshift lever (4) from the N (neutral) position to the direction of travel and slowly release brake pedal (8). When the travel speed rises, slowly release deceleration pedal (6).**

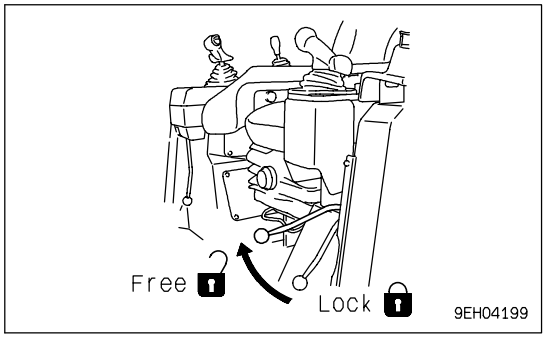




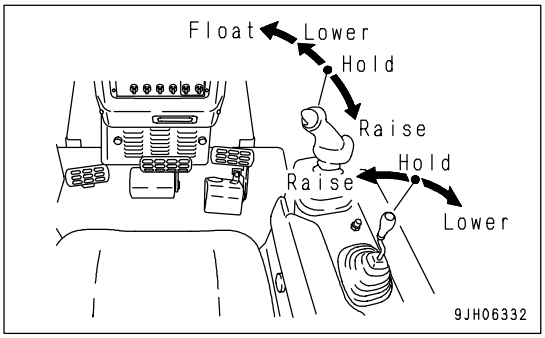
1. Set parking lever (1) to the FREE position



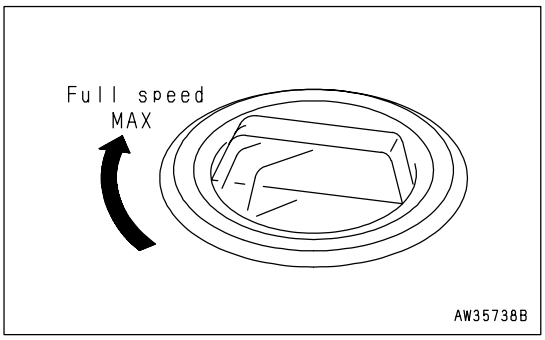
2. Set safety lever (2) for blade control lever (3) and ripper control lever (4) to the FREE position.



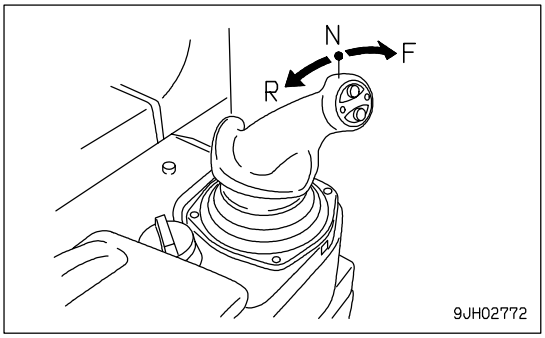
3. Operate blade control lever (3) and ripper control lever (4) to the RAISE position, raise the blade 40 - 50 cm (15.8 - 19.7 in) from the ground, and raise the ripper to the maximum height.



4. Turn fuel control dial (5) to the full speed (MAX) position, raise the engine speed, and fully depress decelerator pedal (6).



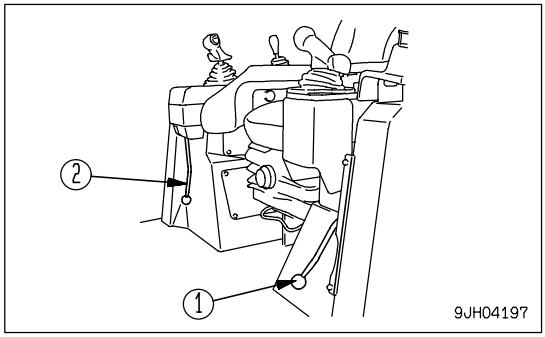
5. Move joystick to the F (FORWARD) or R (REVERSE) position, gradually release decelerator pedal (6) and allow the machine.

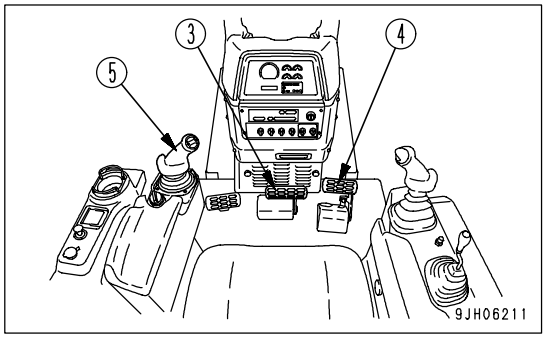


STOPPING MACHINE

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 parking lever (1) in the LOCK position and insert blocks underneath the track shoes. As an additional safety measure, thrust the blade into the ground.**
- **If the work equipment control lever is touched by accident, the work equipment may suddenly move, and may cause damage, serious injury, or death. Before leaving the operator's seat, always secure safety lock lever (2) at the LOCK position.**

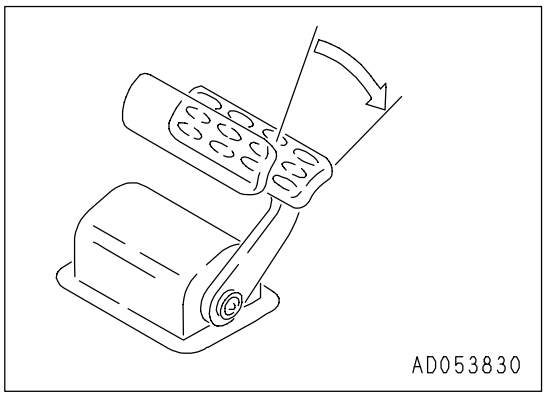




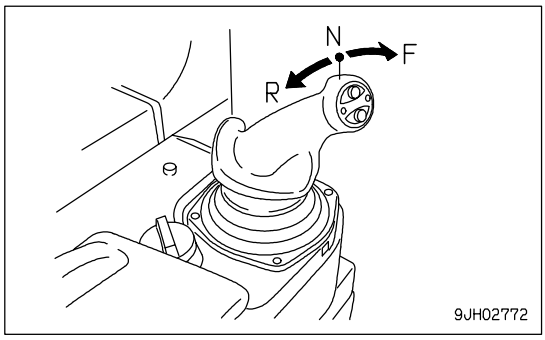
1. Depress brake pedal (3) to apply the brake.

NOTICE

If the brake is depressed when the engine speed or travel speed is high, the brake disc may make a slipping sound. Normally, depress decelerator pedal (4) to reduce the engine speed and travel speed before depressing the brake.



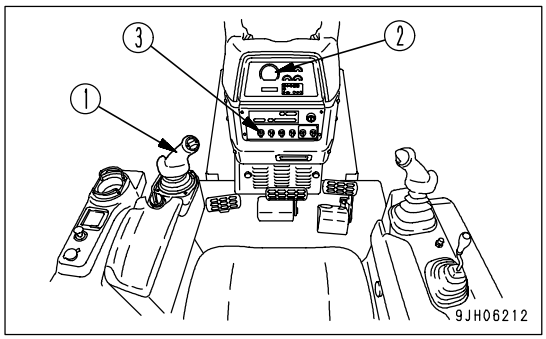
2. Set joystick (5) at the neutral position.



SHIFTING GEAR

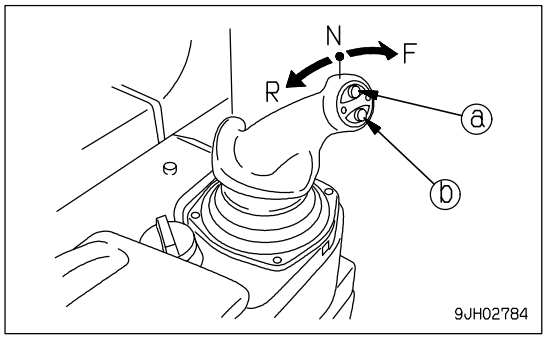
The machine does not have to be stopped to shift gears.

1. Move joystick (1) to the desired gear position to shift gears.



GEAR SHIFTING

- The transmission speed will change when switch (a) or switch (b) is pushed.
  Up switch (a): Each time switch is pressed, transmission speed shifts up one speed
  Down switch (b): Each time switch is pressed, transmission speed shifts down one speed

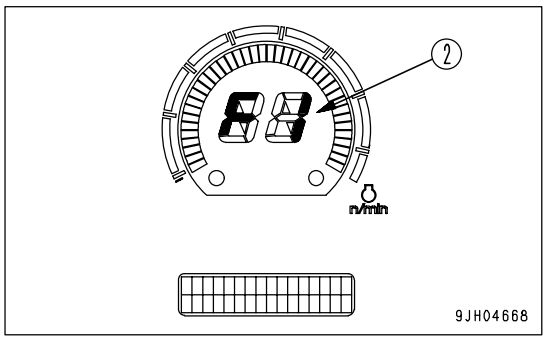


- When the lever is operated forward (to set to FORWARD) from the N position, the transmission shifts to F1.
  If the UP switch is pressed once when the transmission is in F1, the transmission shifts to F2.
  If the UP switch is pressed once when the transmission is in F2, the transmission shifts to F3.
  If the DOWN switch is pressed once when the transmission is in F3, the transmission shifts to F2.
  If the DOWN switch is pressed once when the transmission is in F2, the transmission shifts to F1.
- When the lever is operated rear (to set to REVERSE) from the N position, the transmission shifts to F1.
  If the UP switch is pressed once when the transmission is in R1, the transmission shifts to R2.
  If the UP switch is pressed once when the transmission is in R2, the transmission shifts to R3.
  If the DOWN switch is pressed once when the transmission is in R3, the transmission shifts to R2.
  If the DOWN switch is pressed once when the transmission is in R2, the transmission shifts to R1,

For details of the maximum speed in each speed range, see SPECIFICATIONS (PAGE 5-2).

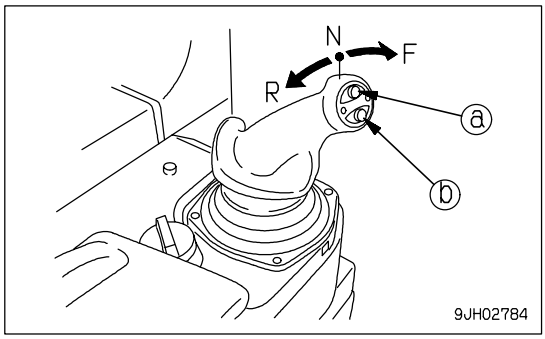
REMARK

The speed range in use is displayed on the panel display according to the gearshift operation.
For example:
Neutral: N1 is displayed on the display panel A (2)
FORWARD 2nd: F2 is displayed on the display panel A (2)
REVERSE 3rd: R3 is displayed on the display panel A (2)
When the parking lever is locked, P is displayed.



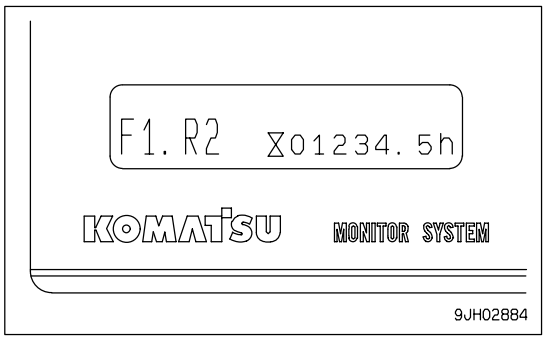
GEARSHIFTING OPERATION USING PRESET MODE FUNCTION

- Shift mode selection means that the selected speed range is displayed at the N position before starting.
- When the joystick is at the N position, if UP switch (a) or DOWN switch (b) is pressed, the shift mode selection can be carried out.



- F1-R1 mode
- F1-R2 mode
- F2-R2 mode

- The selected shift mode is displayed on display panel B (multi-information) of the monitor panel.



- Shift operation when F1-R1 mode is set
  After this mode is set, when the joystick (steering, directional, and gearshift lever) is operated to the front (FORWARD operation), the speed range shifts to F1. When the lever is operated to the rear (REVERSE operation), the speed range shifts to R1.

- Shift operation when [F1-R2] mode is set
  When the steering, directional, and speed lever is at the N position, if the up switch is pressed once, the mode is set to [F1-R2] mode. After that, if the steering, directional, and speed lever is operated forward (forward travel operation), the transmission is shifted to F1. If it is operated back (reverse travel operation), the transmission is shifted to R2.

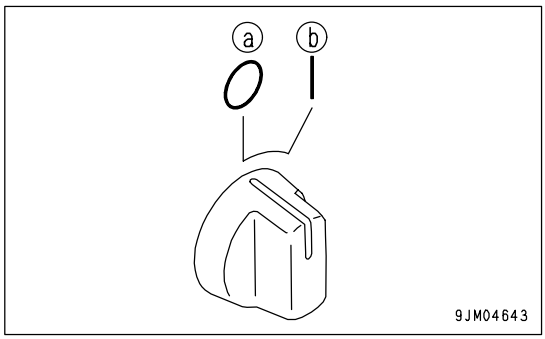
- Shift operation when [F2-R2] mode is set
  When the steering, directional, and speed lever is at the N position, if the up switch is pressed twice, the mode is set to [F2-R2] mode. After that, if the steering, directional, and speed lever is operated forward (forward travel operation), the transmission is shifted to F2. If it is operated back (reverse travel operation), the transmission is shifted to R2.

REMARK
Even when the mode is set to [F1-R1] mode, [F1-R2] mode, or [F2-R2] mode, it is possible to switch to the desired speed range simply by operating the up switch or down switch.
For example, when the mode is set to [F1-R2] mode, if the steering, directional, and speed lever is operated forward (forward travel operation), the transmission is shifted to F1, but if up switch (a) is pressed once with the lever pushed forward, the
transmission is shifted to F2; if it is pressed twice, the transmission is shifted to F3. If the down switch (b) is pressed once when the transmission is in F3, the transmission is shifted to F2; if it is pressed twice, the transmission is shifted to F1.
If the steering, directional, and speed lever is operated back (reverse travel operation), the transmission is shifted to R2, but if up switch (a) is pressed once with the lever pulled back, the transmission is shifted to R3; if down switch (b) is pressed
once, the transmission is shifted to R1.
However, the mode remains in the [F1-R2] mode. If the steering, directional, and speed lever is returned to the N position and operated forward again (forward travel operation), the transmission is shifted to F1. If it is operated back (reverse travel
operation), the transmission is shifted to R2.

REMARK
When the starting switch is turned ON, the mode is set to F1-R1.

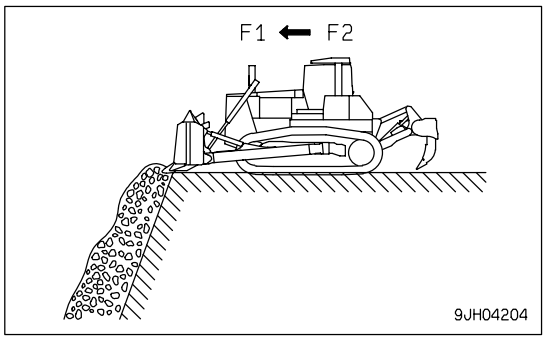
AUTO SHIFT DOWN FUNCTION

When the load conditions during travel cause the travel speed to drop, this function automatically shifts the transmission down to a lower speed range. This function can be used by setting the auto shift down switch (3) on the instrument panel in front of the operator's seat to the ON (b) position.



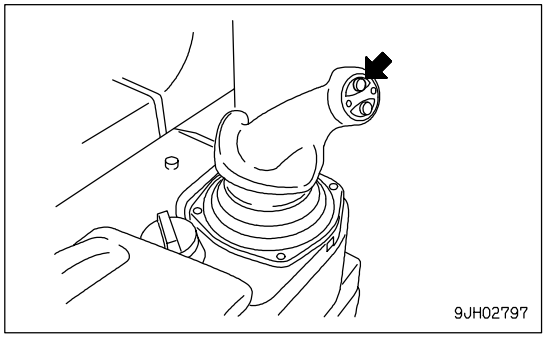
OFF position (a): Canceling function
ON position (b): Automatically shifted down to lower speed range

The transmission is automatically shifted down F2→ F1, F3 → F2, R2 → R1, R3 → R2.



REMARK

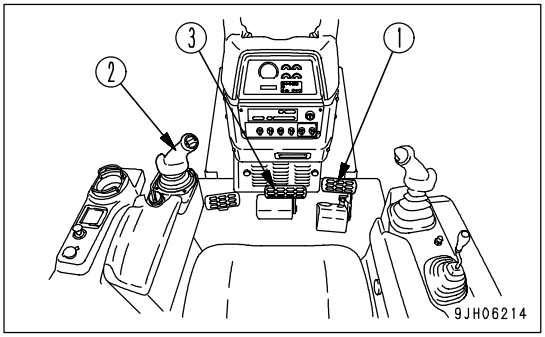
- For safety reasons, during auto shift down, the transmission is prevented from shifting up.
- If it is desired to shift up, use manual control and press the UP button on the steering, directional, and gearshift lever.



SHIFTING BETWEEN FOEWARD AND REVERSE

WARNING

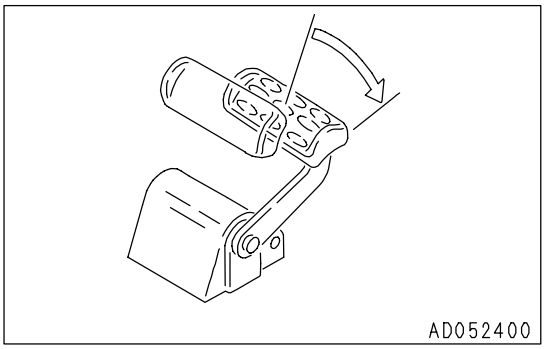
When switching between FORWARD and REVERSE, check first that the direction of travel is safe.



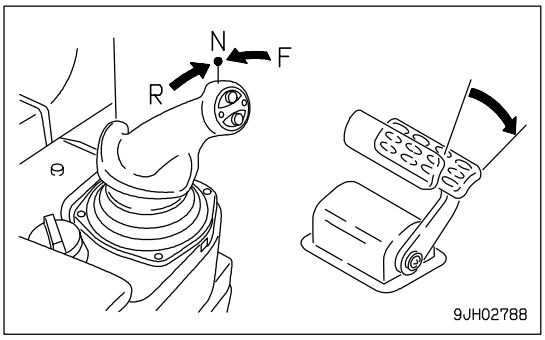
CAUTION

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.

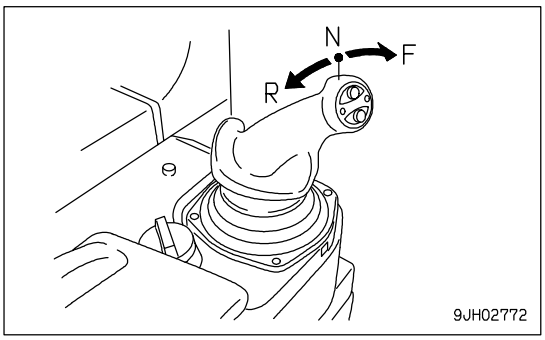
1. Depress decelerator pedal (1) to reduce the engine speed.



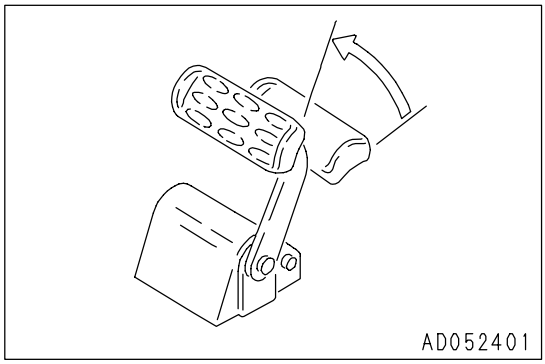
2. Move joystick (2) to the neutral position, reduce the speed, then depress brake pedal (3) and stop the machine.



3. After depressing decelerator pedal (1), move joystick (2) to the desired position.



4. Release decelerator pedal (1) and raise the engine speed.



REMARK
When the joystick is placed in REVERSE, the backup alarm will sound.

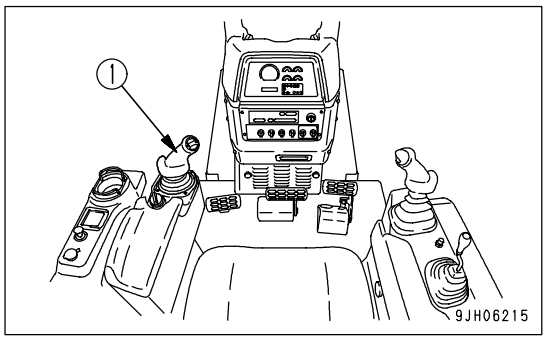
STEERING MACHINE

⚠ 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.**

NORMAL TURNING

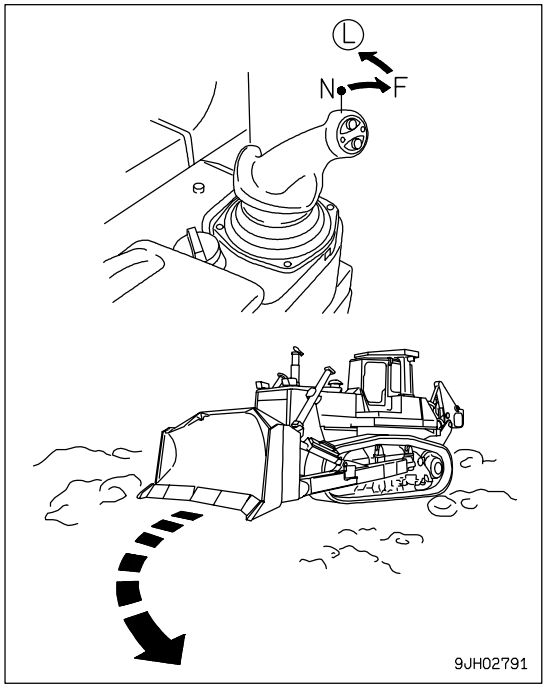
To turn the machine while traveling, incline joystick (1) in the direction to turn.



TURNING TO LEFT WHILE TRAVELING FORWARD

If the joystick is pushed forward and moved partially to the left (L), the steering clutch is disengaged and the machine turns gradually to the left.

When turning gradually to the right, push the joystick forward, and move it partially to the right.
Do the same when traveling in reverse.



COUNTERROTATION TURNS TO LEFT WHEN TRAVELING FORWARD

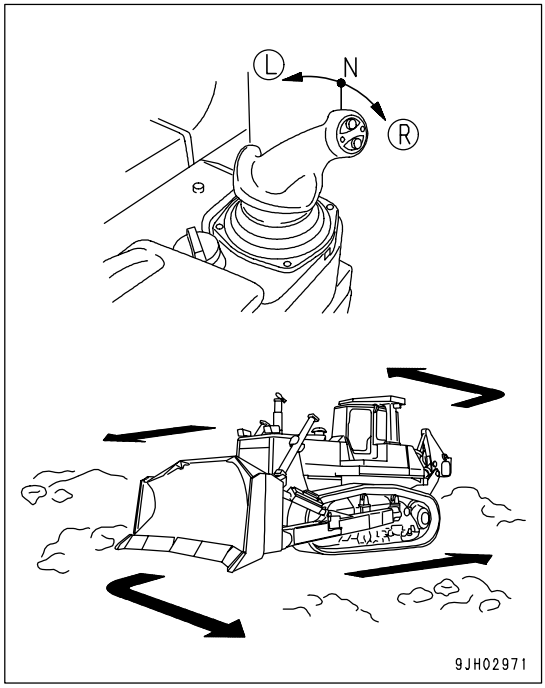
NOTICE

When carrying out a counterrotation turn, if the load is not equal on the left and right sides, the machine may carry out a pivot turn, so check the ground conditions and be careful not to hit any obstacles.

With joystick (1) in the N position, operate the lever partially to the left (L). The left and right tracks will rotate in opposite directions, and the machine will make a slow counterrotation turn. If the lever is moved further, the speed of the counterrotation turn will increase.

REMARK

When making a right counterrotation turn, move the joystick (1) to the right (R) in the same way.



TURNING WHILE DESCENDING A SLOPE

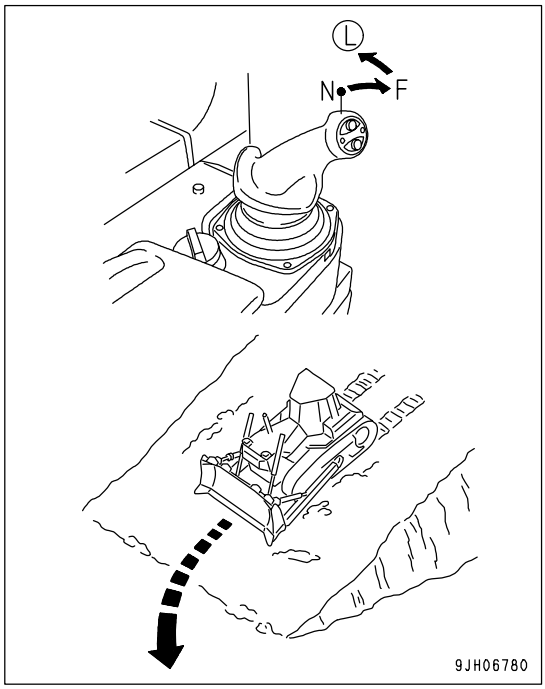
TURNING GRADUALLY TO LEFT WHILE TRAVELING FORWARD

If the joystick (1) is pushed forward and moved partially to the left (L), the machine turns gradually to the left. (Does not become cross steering)

REMARK

When making gradual turns to the right, push the joystick (1) forward, and move it partially to the right. (Does not become reverse steering)

Do the same when traveling in reverse.



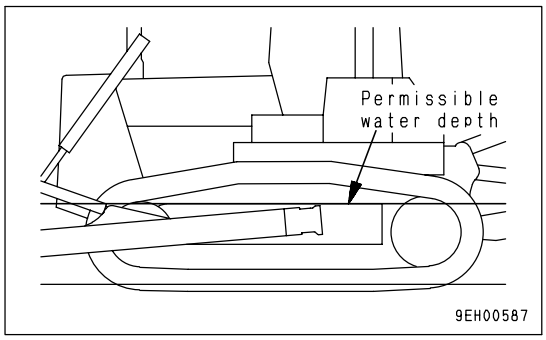
PRECAUTIONS FOR OPERATION

PAY ATTENTION TO GAUGES

If the red range of the power train oil temperature gauge lights up during operation, reduce the load and wait for the temperature to go down.

PERMISSIBLE WATER DEPTH

When operating in water, always keep top surface 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.



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 may stall.

USE ENGINE AS BRAKE

When going downhill, move gear shift lever into low speed to run engine at slow speed and travel down slope using the engine as a brake.
Do not move the joystick to the N position.
When traveling down hills of more than 15°, shift down to 1st speed (R1 or F2).

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.

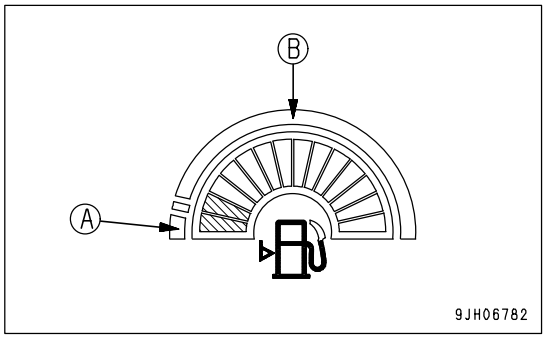
PRECAUTIONS ON SLOPE

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, the braking effect will be reduced, so be careful not to let the fuel level in the fuel tank become too low.

- When working on slopes where the angle of the machine is more than 20°, if the 2nd level of the fuel gauge lights up, add fuel immediately.

(A): Red range
(B): Green range



BE CAREFUL OF OIL LEVEL

When operating machine on sloped areas of more than 20°, fill all appropriate components with oil to H level.

PRECAUTIONS WHEN ENGINE STOPS ON SLOPE

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

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.

PROHIBITED TO KEEP THE DOOR OPEN DURING OPERATIONS

Always keep the door closed when traveling or carrying out operations.
If the door is open, there is danger of damage from obstacles or strong vibration.

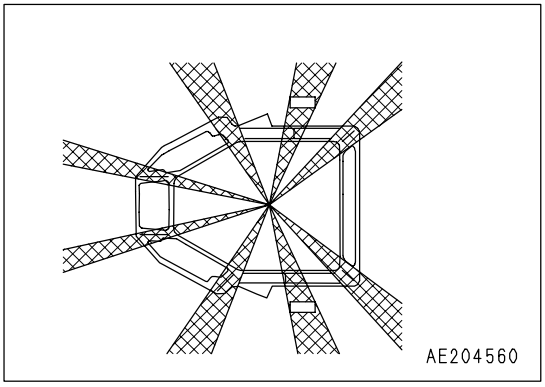
IT IS PROHIBITED TO MODIFY THE CAB GLASS IN ANY WAY THAT WILL OBSTRUCT THE VIEW

- For safety reasons, do not install anything to the cab glass that will obstruct the view.
- Always keep the glass clean to ensure safety during operations.

PRECAUTIONS FOR BLIND SPOTS CAUSED BY CAB STAY AND ROPS STAY

WARNING

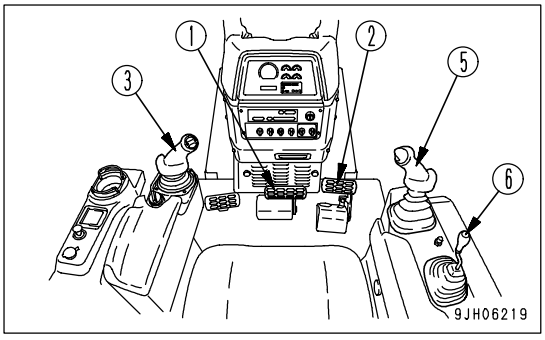
The cab stay and ROPS stay cause blind spots.
When operating, always be sure to check carefully that there is no obstacle or worker in the surrounding area.

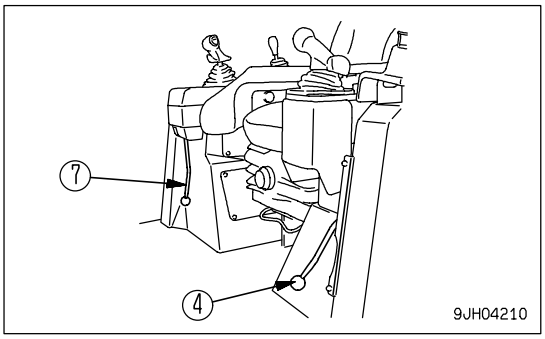


PARKING MACHINE

WARNING

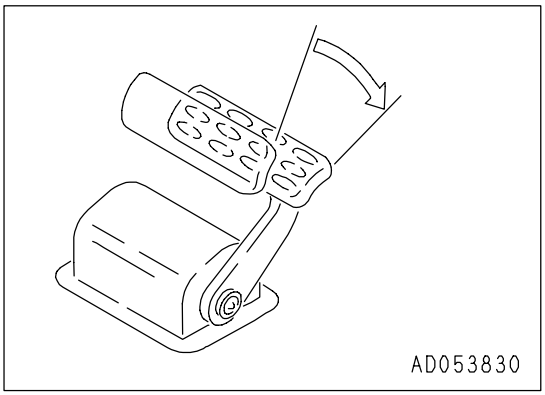
- **Avoid stopping suddenly. Give yourself ample room when stopping.**
- **When stopping the machine, select flat hard ground and avoid dangerous places. If it is unavoidably necessary to park the machine on a slope, place the parking lever (4) in the LOCK position and insert blocks underneath the track shoes. As an additional safety measure, thrust the blade into the ground.**
- **If the work equipment control lever is touched by accident, the work equipment may suddenly move, and may cause damage, serious injury, or death. Before leaving the operator's seat, always secure safety lock lever (7) at the LOCK position.**



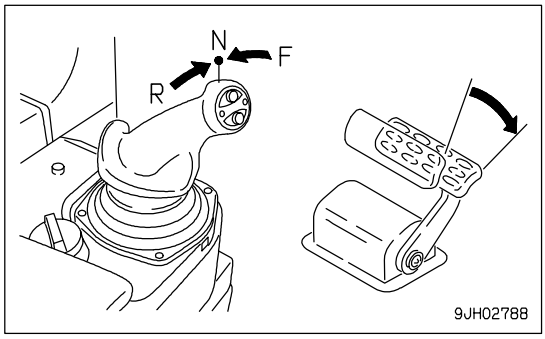


1. Depress brake pedal (1) to stop the machine.

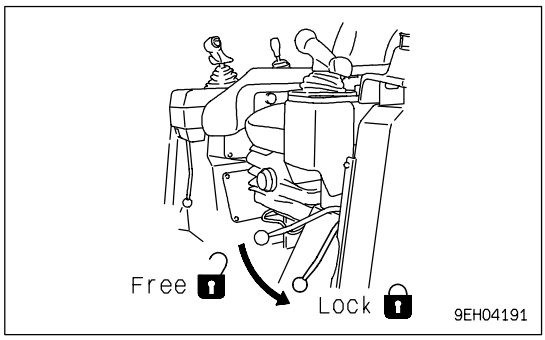
NOTICE
If the brake is depressed when the engine speed or travel speed is high, the brake disc may make a slipping sound. Normally, depress decelerator pedal (2) to reduce the engine speed and travel speed before depressing the brake.



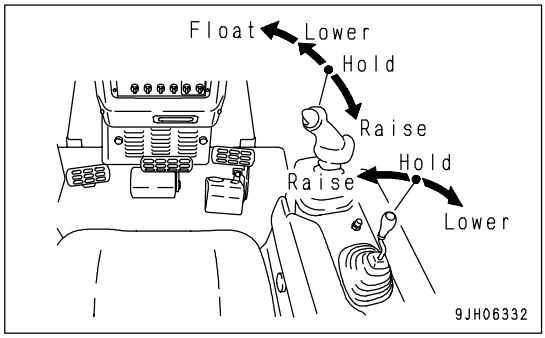
2. Set joystick (steering, directional, and gearshift lever) (3) to the N position.



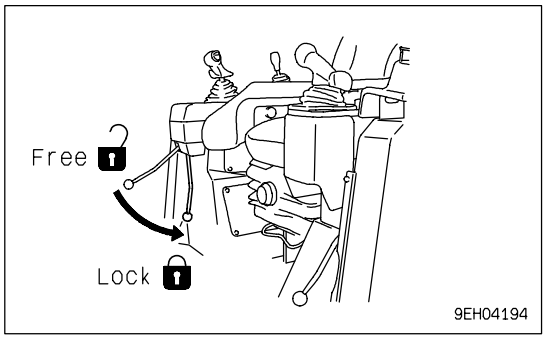
3. Operate parking lever (4) to lock the brakes.



4. Operate blade control lever (5) and ripper control lever (6) to the LOWER position, and lower the blade and ripper to the ground.
5. Set blade control lever (5) and ripper control lever (6) to the HOLD position.



6. Set safety lever (7) for blade control lever (5) and ripper control lever (6) to the FREE position.

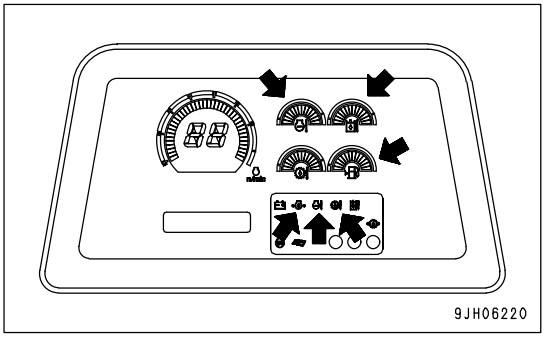


CHECK AFTER STOPPING ENGINE

1. Walk around the machine and check the work equipment, machine exterior, and undercarriage, also check for any leakage of oil or coolant. 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 affixed to the undercarriage.

CHECK AFTER FINISHING WORK

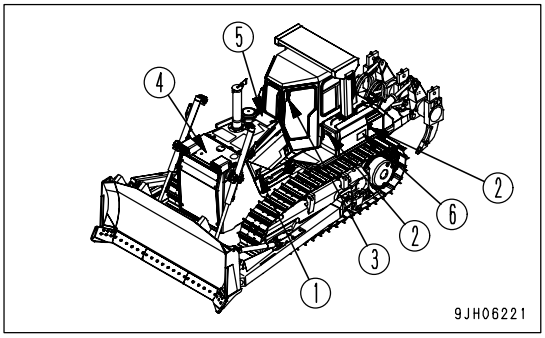
Use the meters and caution lamps to check the engine coolant temperature, engine oil pressure, fuel level, and Power train oil temperature.

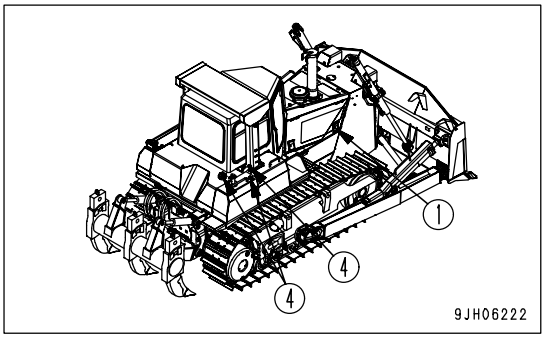


LOCKING

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

- Left and right engine side covers (1)
  Left and right engine side covers (1) (left side: two places; right side: two places)
- Battery inspection cover (2)
- Cab door opener (3) (machines equipped with cab)
- Cap with lock (4) (if equipped)
  - Radiator cap
  - Fuel tank cap
  - Hydraulic tank cap
  - Hydraulic tank breather
  - Power train oil filler tube cap
- Cover on top of hood at front of cab (for air conditioner filter) (5)
- Circuit breaker cover (6)

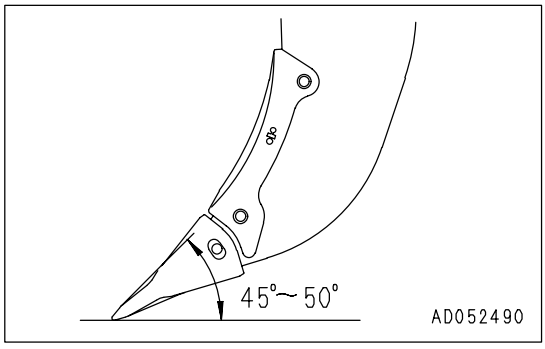




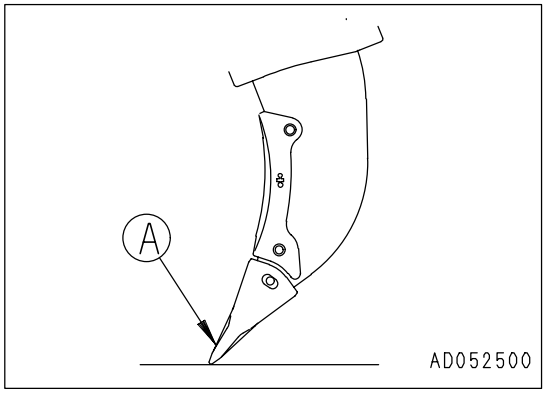
RIPPER OPERATION

EFFECTIVE METHOD OF USE

- The most suitable digging angle for the shank is when the shank is perpendicular to the ground surface (angle at tip: 45° - 50°).
- For comparatively soft rock (seismic velocity: 1200m/s or below), it is also possible to carry out ripping with the shank tilted to the rear (maximum ripping angle).



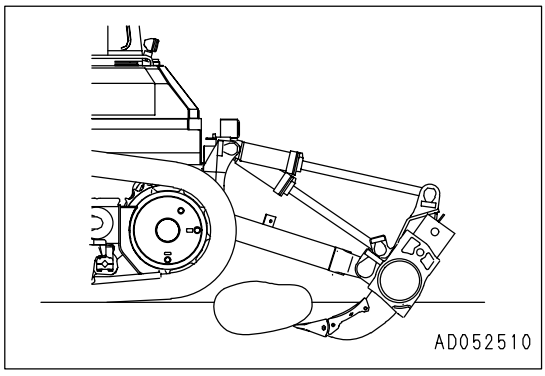
- On comparatively hard bedrock, if ripping is carried out with the shank tilted back, there will be excessive wear of the tip of the point (A), and this will reduce the effectiveness of the self-sharpening ability.
- During ripping operations, if the track starts to slip when ripping boulders or rock that is difficult to rip, use the tilt cylinder.



- Selecting a suitable ripper point to match the type of rock is extremely important to obtain effective ripping.
  A variety of ripper points to match each type of rock is available, so use the information in "PROCEDURE FOR SELECTING RIPPER POINT (PAGE 6-6)" to select the most suitable ripper point.

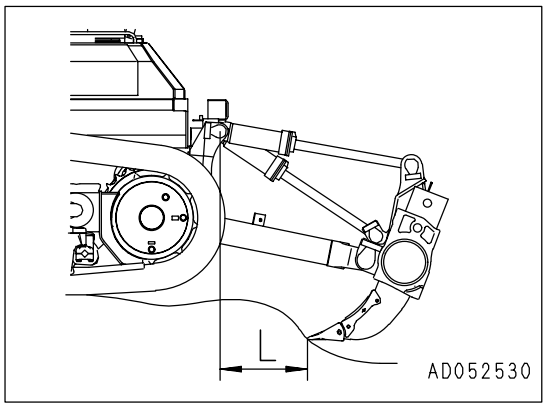
DIGGING UP BOULDERS OR ROCKBED

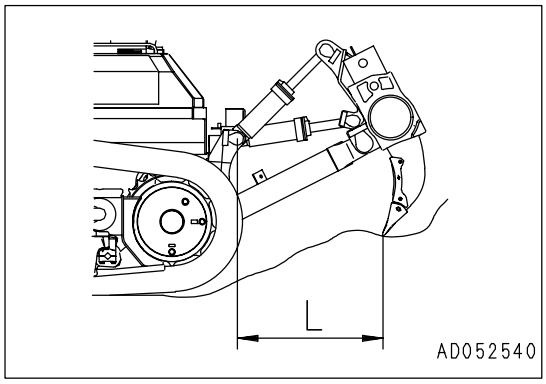
When ripping boulders and rockbed that are difficult to rip, if the track slips or the travel speed becomes slower, operate the tilt cylinder to lift up the boulder or rockbed.



OPERATING ON SLOPES

When using the variable ripper, adjust the length of the tilt cylinder to select dimension L.
Slope face: Sloping face, such as on embankments

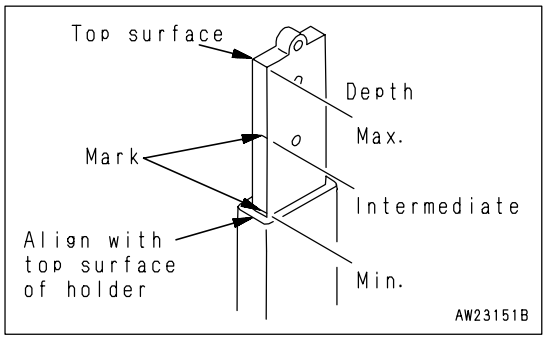


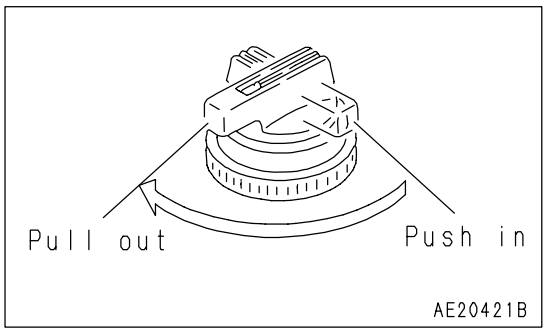


METHOD OF OPERATING PIN PULLER

This operation is used only when a giant ripper is installed.

1. Stop the machine at a safe place and lower the shank completely to the ground.
2. Operate the pin-puller control switch to remove the mounting pin.
3. Raise or lower the ripper to set the shank to the desired position.
4. Operate the pin-puller control switch to insert the mounting pin. If the pin and hole in the shank are not aligned, set the pin puller control switch to "Push in" and move the ripper up or down slowly.
   - When inserting the pin in a higher hole in the shank in order to carry out deep ripping operations, use a long protector to prevent wear of the shank.



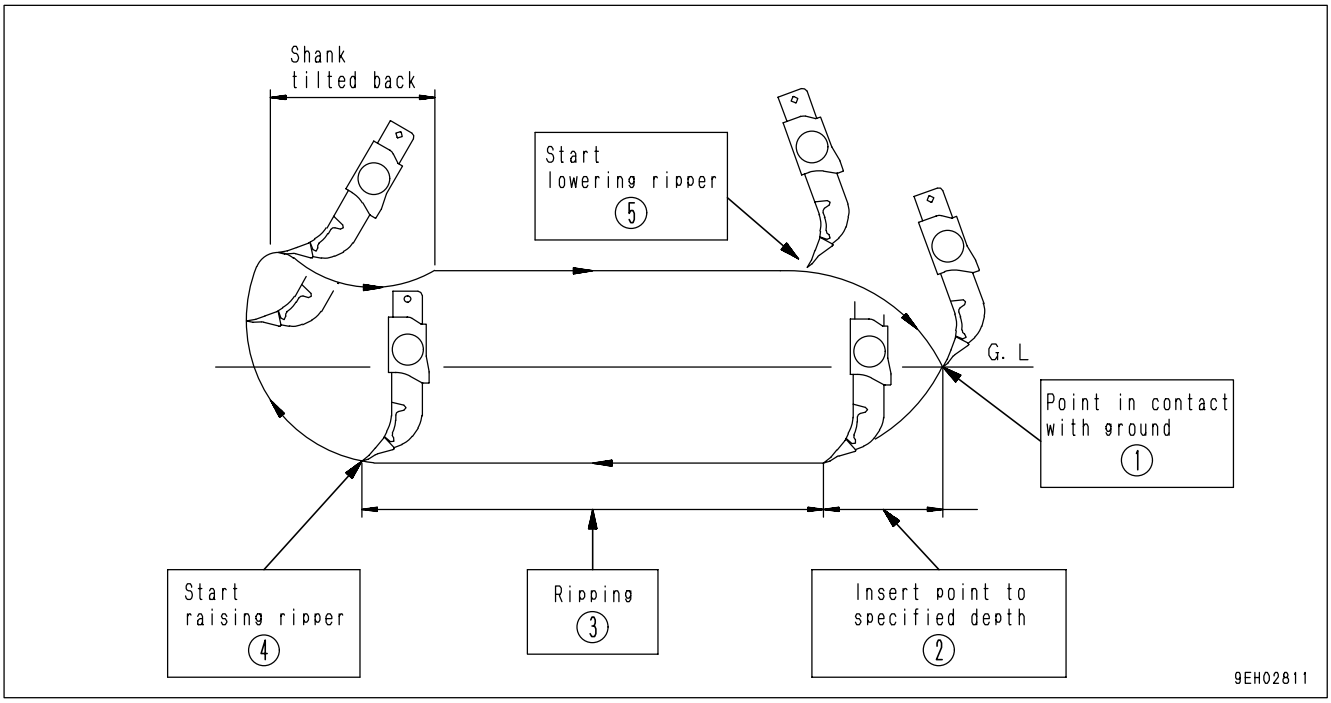


REMARK

If the mounting pin cannot be removed by operating the switch, move the ripper slightly up or down and tilt it. This will make it possible to remove the pin.

OPERATING METHOD FOR RIPPING OPERATIONS

BASIC OPERATING METHOD



TRACK OF RIPPER SHANK

Carry out the ripping operation as follows, passing through the points shown in the diagram above.

(1) Tilt the ripper back, lower the ripper point to the ground that the place to begin ripping, and raise the rear of the machine.

(2) To press the decelerator pedal and lower the engine speed, set the speed range to F1, and tilt the ripper to insert the point to the specified depth.

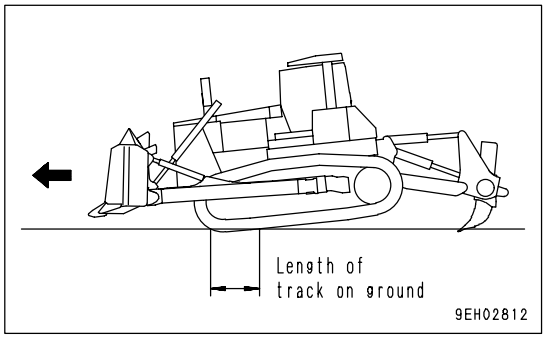
(3) When the ripper point reaches the specified depth, raise the engine speed to full speed and travel forward. Tilt the shank and carry out ripping.
If the circuit is relieved even when the shank is tilted, change the shank mounting hole to the hole below and reduce the ripping depth.

(4) After completing the ripping, travel forward, raise the shank from the bed rock, then travel in reverse.

(5) While traveling in reverse, tilt the ripper back, and when the starting point for the ripping is reached, lower the ripper.

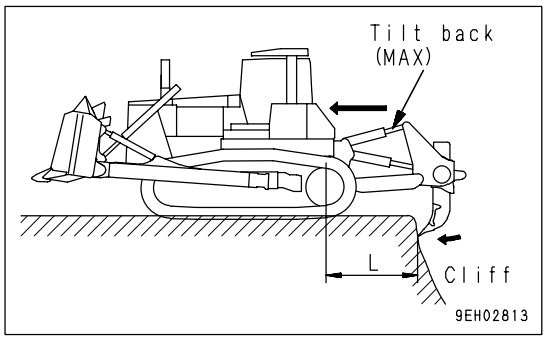
REMARK

- If the ripper is applied with the rear of the machine raised from the ground, the drawbar pull will be low, so the ripping efficiency will be reduced.
- If the ripping depth is kept constant, there will be no unevenness, and this will increase the efficiency of the dozing operation.



RIPPING BY CLIFFS

- When carrying out ripping at the edge of a cliff, tilt the ripper back to make depth (L) longer.
- Depress the decelerator pedal, drive slowly forward, and when the ripper point contacts the cliff, tilt the ripper.



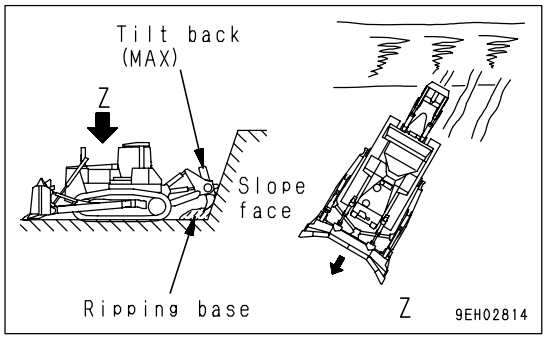
RIPPING BY SLOPE FACES

(Giant ripper)

- When carrying out ripping work at the edge of slope faces, make the ripper tilt back angle small, and if there is an area where the slope face has not been ripped, apply the ripper diagonally.

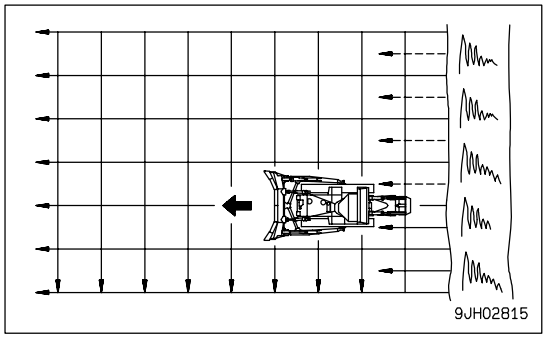
REMARK

In the case of the multi-shank ripper, carry out ripping at right angles to the slope face.

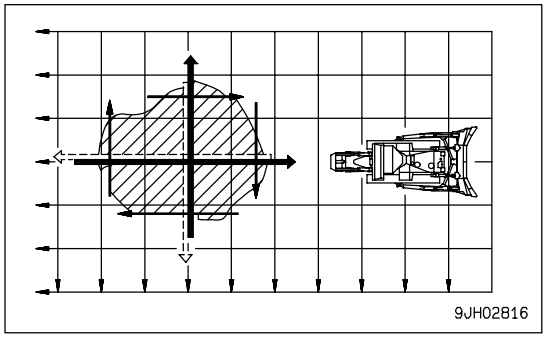


Cross ripping

- On jobsites with hard bedrock, for rocks and boulders which are impossible to break or dig up with one ripping pass, carry out the second ripping pass at right angles to the first ripping direction.
- At the edge of cliffs, where it is impossible to apply the ripper in a cross direction, make the space between the shanks smaller and carry out ripping.



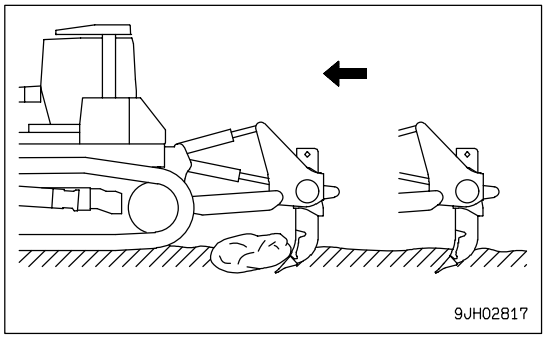
- During the ripping operation, if there is any hard bedrock, carry out ripping in the opposite direction from the direction where the ripper was applied. If it is still impossible to break up the rock, break up the area around the bedrock a little at the time.
- When carrying out concentrated ripping of hard bedrock, the work efficiency is high if the ripper is applied to the whole of the digging face.



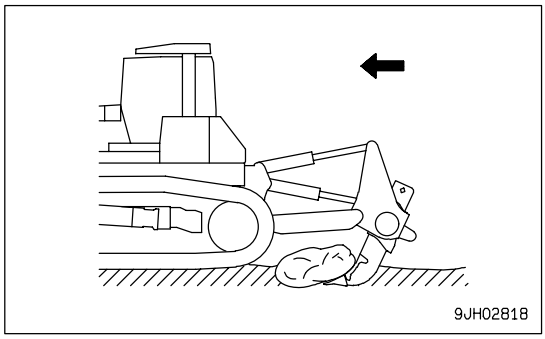
DIGGING UP BOULDERS

During the ripping operation, if boulders are found which are difficult to break and shoe slippage occurs, dig up the boulder as follows.

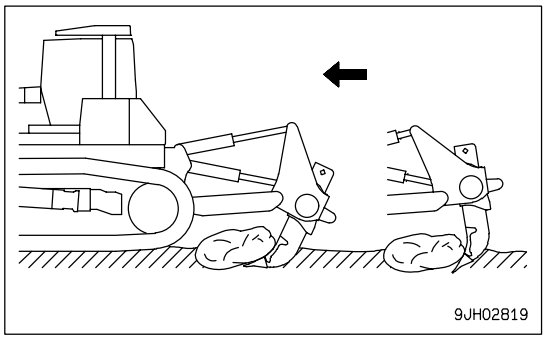
1. Depress the decelerator pedal and lower the engine speed to a point where there is no shoe slippage.



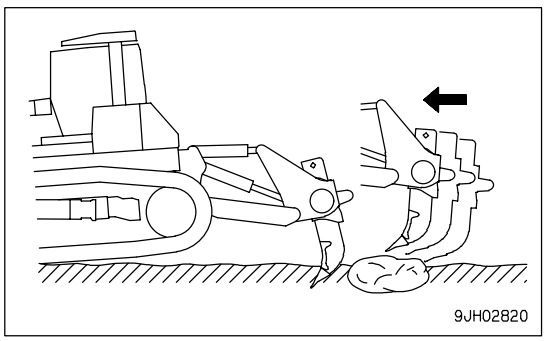
2. Operate the ripper lever to the TILT position and carry out ripping and digging.



3. If there are boulders which are impossible to break or dig up with the tilt operation, move forward slightly and tilt the shank back, then operate the tilt again and dig up the boulder.

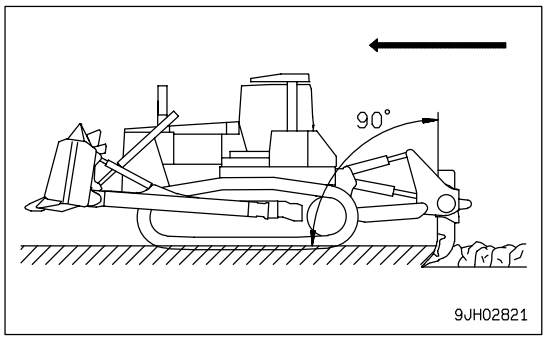


4. Even when the operation in Step 3 is repeated, if it is impossible to break or dig up the boulder, drive back about 10 cm, raise the shank, avoid the rock or boulder that cannot be ripped, then drive forward and start ripping again.

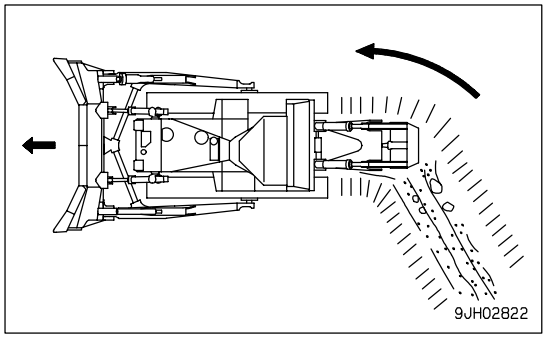


PRECAUTIONS WHEN RIPPING

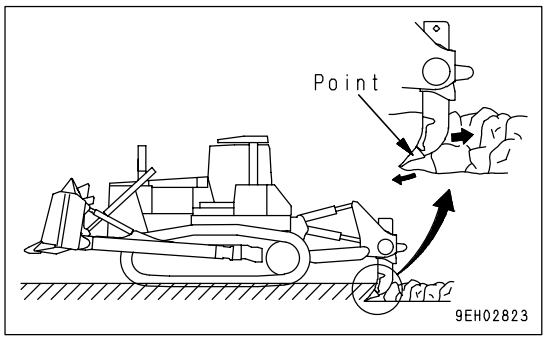
- For the digging angle when ripping, set so that the top of the shank is perpendicular, then lower the ripper.
- Do not carry out ripping for long periods with the shank tilted back. The tip of the point will wear to a round shape.



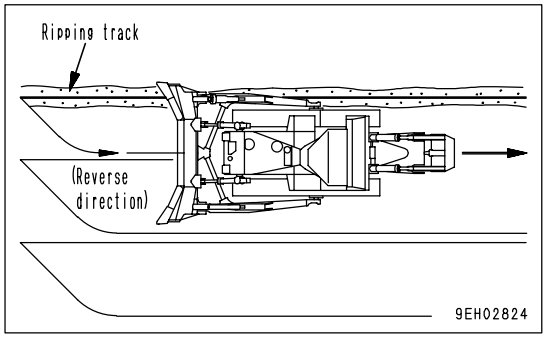
- Do not change the direction of travel during the ripping operation. This will cause breakage of the shank. When changing the direction of travel, remove the shanks from the ground before turning.



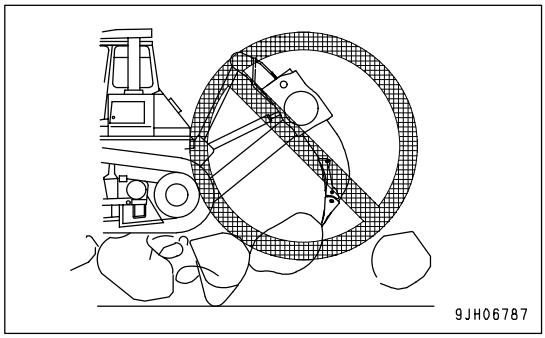
- Never drive in reverse when the ripper point is inserted in the bedrock. The pin installing the point will break and the point will fall off.
  Stop the machine, tilt back slightly, then raise the ripper slowly.



- After ripping, if the broken rock is comparatively large, avoid traveling over the ripping path when traveling in reverse. When traveling in reverse, check the rear carefully to avoid heating any large rocks. As far as possible, choose level ground to travel over.



- If ripping operations are carried out with the shank at the maximum length on bedrock, the point will not penetrate the ground properly. This will cause an increase in the load and may lead to breakage of the shank. For this reason, avoid carrying out operations on bedrock with the shank at the maximum length.

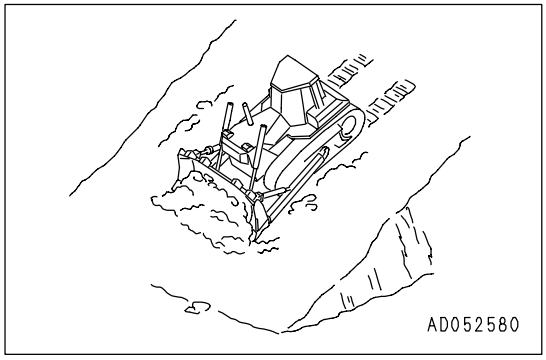


WORK POSSIBLE USING BULLDOZER

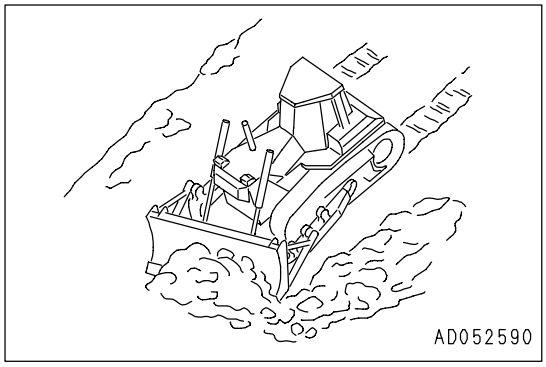
If various attachments are used, it is possible to carry out operations in a wider range than listed below.

DOZING

A bulldozer digs and transports dirt in a forward direction. Slope excavation can always be most effectively carried out by proceeding from the top downward.



When dozing toward one side only, operate with angled blade (angledozer only).

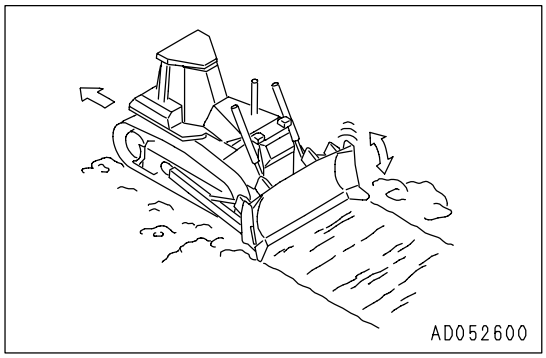


SMOOTHING

NOTICE

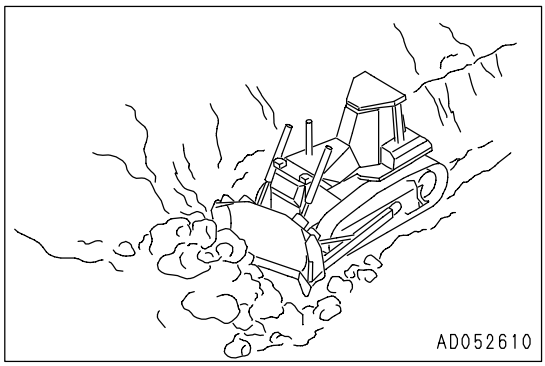
Avoid smoothing on rocky or stony ground. It can damage the blade.

When finishing the ground surface to a smooth finish after digging or filling operations, keep a full load of soil in the blade and operate the blade up or down in small movements while traveling forward. When leveling windrows or ruts left by the tracks, set the blade to the FLOAT position, travel at low speed in reverse and drag the blade over the ground surface.



CUTTING INTO HARD OR FROZEN GROUND OR DITCHING

For digging and ditch excavation of hard or frozen ground, tilt the blade. Even hard ground can be dug effectively by a tilted or angled blade.

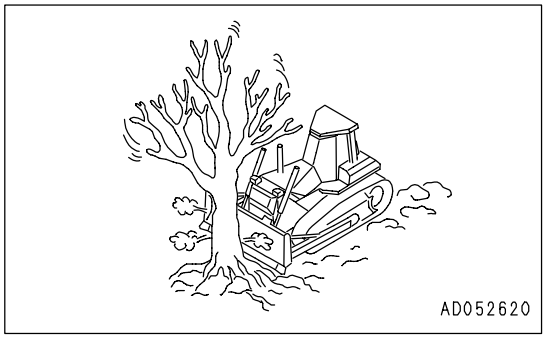


FELLING TREES, REMOVING STUMPS

NOTICE

Do not uproot trees or stumps or fell trees by angling or tilting the blade.

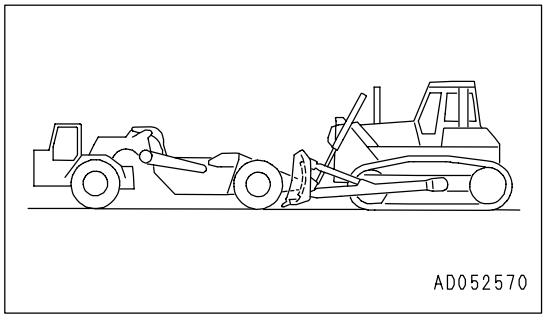
For trees with a diameter of 10 to 30 cm (3.9 to 11.8 in), raise the blade high and push 2 or 3 times to fell the tree.
Next, travel in reverse, and dig the corner of the blade into the ground to cut and dig up the roots.
When doing this, never hit the tree at high speed or apply shock to fell the tree.



PUSHER OPERATIONS

NOTICE

- **Always install a pusher plate when carrying out pusher operations.**
- **When approaching the other machine, use the decelerator pedal or fuel control dial to reduce the travel speed and approach the other machine slowly. After making contact, raise the travel speed gradually and push at full power.**



ADJUSTING POSTURE OF WORK EQUIPMENT

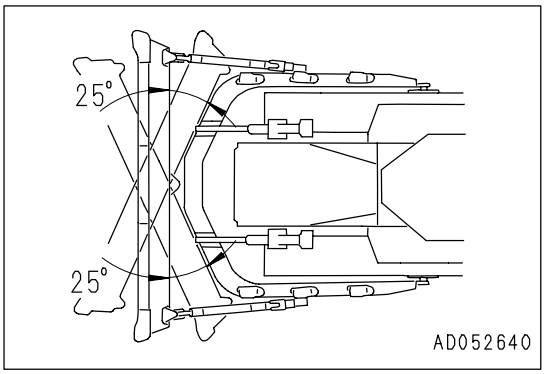
METHOD OF ANGLING BLADE

Angledozers only

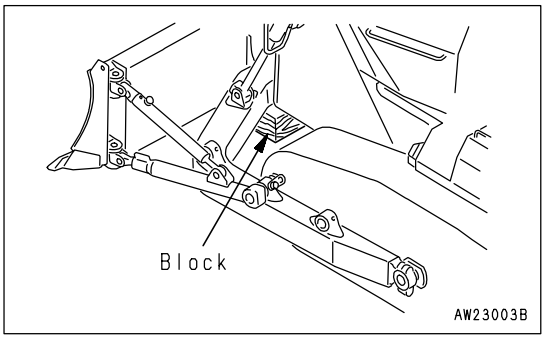
When dozing toward one side only, operate with angled blade.

WARNING

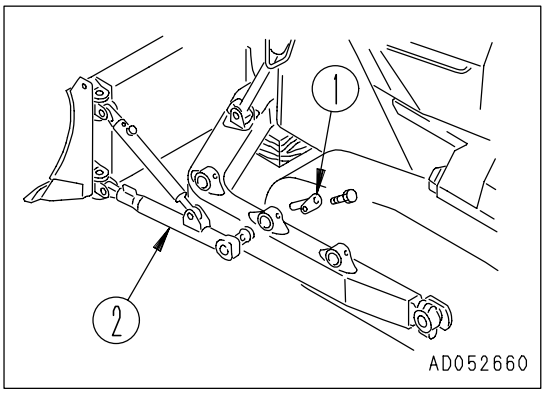
- **When adjusting the amount of angling, it is dangerous if the work equipment is moved by mistake. Set the work equipment in a safe condition, then stop the engine and lock the work equipment securely with the safety lever.**
- **Be careful when removing arm (2). After arm (2) is removed, the blade can move freely.**



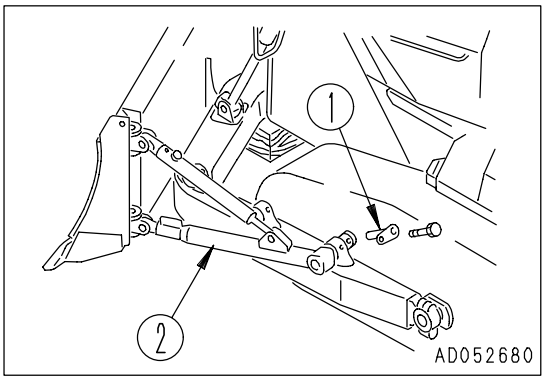
1. Raise the blade 300-400 mm above the ground, then put blocks under the frame so that the blade does not come down.



2. Remove pins (1) on the left and right sides, then remove arm (2) from the frame.

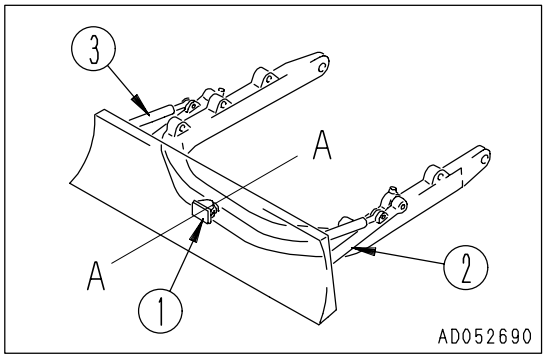


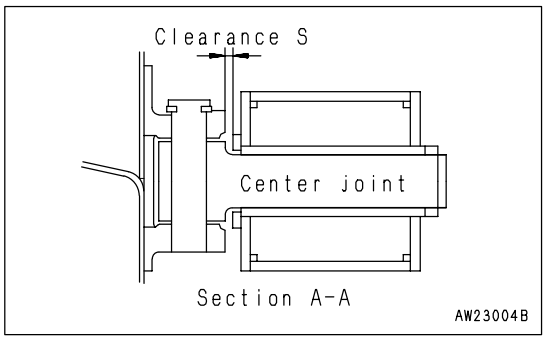
3. Insert arm (2) into the desired position on the bracket on top of the frame (3 places on each side), and insert pins (1).



REMARK

When assembling a C-frame to an angledozer, adjust the length of arm (2) and brace (3) so that clearance S of center joint (4) is 20 mm (0.8 in).





ADJUSTING TILT AMOUNT

(Angledozer, power tiltdozer)

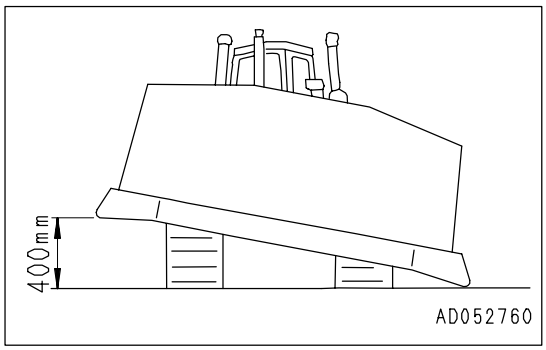
WARNING

When adjusting the amount of tilt, 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 lever.

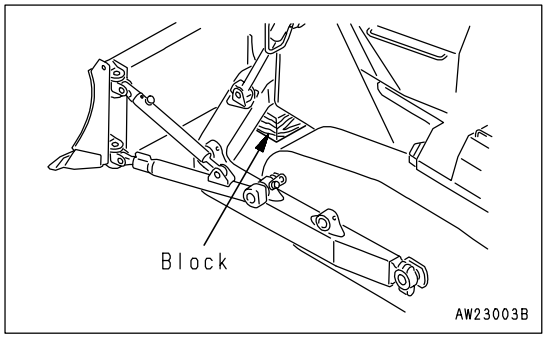
ANGLEDOZER

NOTICE

The maximum amount of tilt is 400 mm (15.8 in). Be sure not to exceed 400 mm (15.8 in).



1. Raise the blade 300-400 mm above the ground, then put blocks under the frame so that the blade does not come down.

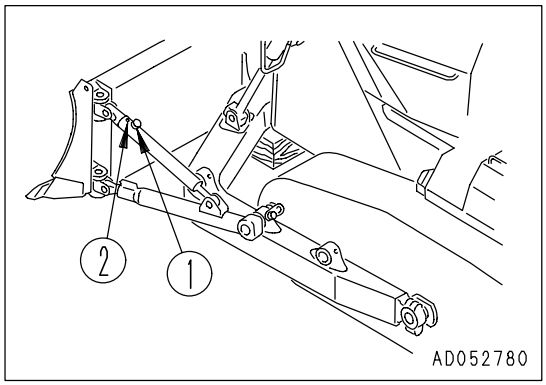


2. Loosen the bolt (1) of the brace, insert a suitable bar into hole (2) of the brace, and turn it.

REMARK

When turning the brace with bar, keep the blade above the ground.

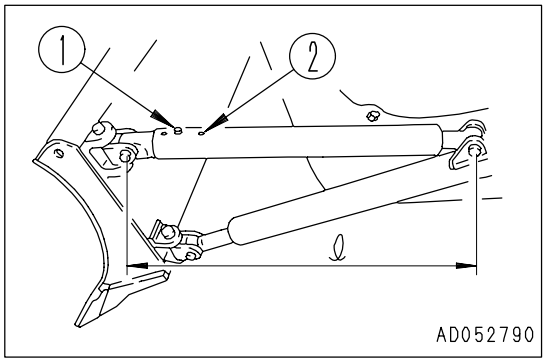
Right tilt: Make right side shorter, left side longer
Left tilt: Make left side shorter, right side longer



3. Tighten set bolt (1).

NOTICE

The standard distance ℓ between the brace joints is 1493 mm (4 ft 11 in), but do not exceed a maximum tilt of 400 mm (15.8 in) when carrying out operations. If the tilt exceeds 400 mm (15.8 in), excessive force will be generated at various parts.

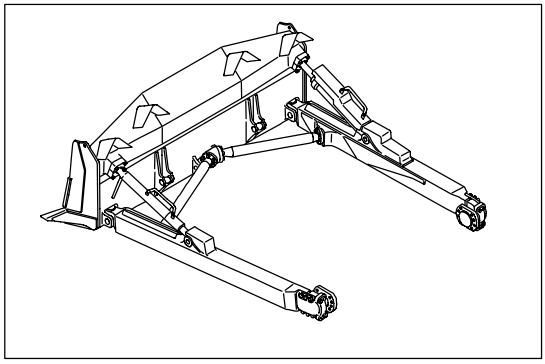


POWER TILTDOZER

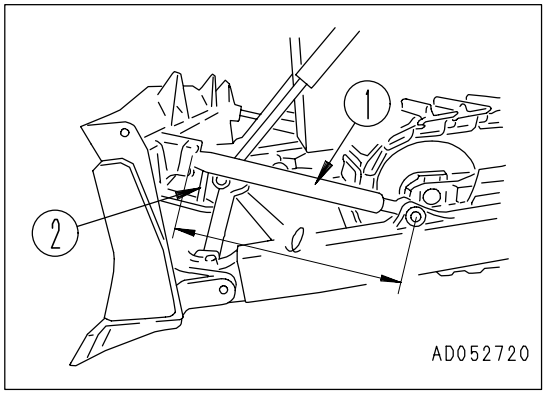
NOTICE

The maximum tilt is 1000 mm (3 ft 3 in).
Do not exceed 1000 mm (3 ft 3 in) for the tilt during operations.

1. It is possible to obtain the tilt of approx. 500 mm (19.7 in) by operating the blade control lever.



2. If an even greater tilt is needed than can be obtained in Step 1, use adjustment bar (2) installed to left brace (1) and turn brace (1) to extend the length of the brace.
   A maximum tilt of 1000 mm (3 ft 3 in) can be obtained.



REMARK

When adjusting the amount of tilt as explained in step 1 and 2 above, keep the blade above the ground.

NOTICE

The standard distance ℓ between the joints is 1389 mm (4 ft 7 in), but if the length of the brace is adjusted and the tilt exceeds 1000 mm (3 ft 3 in), excessive force will be generated at various parts, so do not use it.

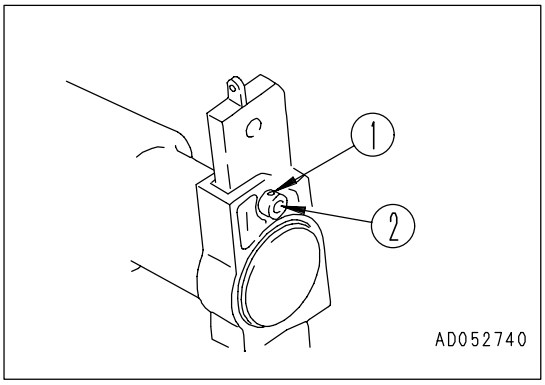
ADJUSTING RIPPER

ADJUSTING DIGGING DEPTH

There are mounting holes in the shank to chose to match the ripping depth. Normally, use the bottom hole, but if particularly deep ripping is needed, use the top hole.

When changing the ripping depth, do as follows.

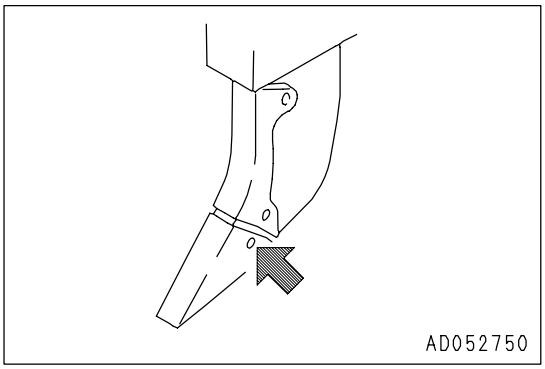
1. Place a pointed object on the tip of pin (1), then hit with a hammer to remove from the opposite side.
2. Remove pin (2) and change the position of the shank hole.
3. Insert pin (1) partially by hand then knock it in with a hammer.
   - The pin is one unit, so when inserting, insert it partially by hand, then knock it in with a hammer.
   - When a giant ripper is installed, use the pin puller. For details, see "METHOD OF OPERATING PIN PULLER (PAGE 3-112)".



REPLACING POINT AND PROTECTOR

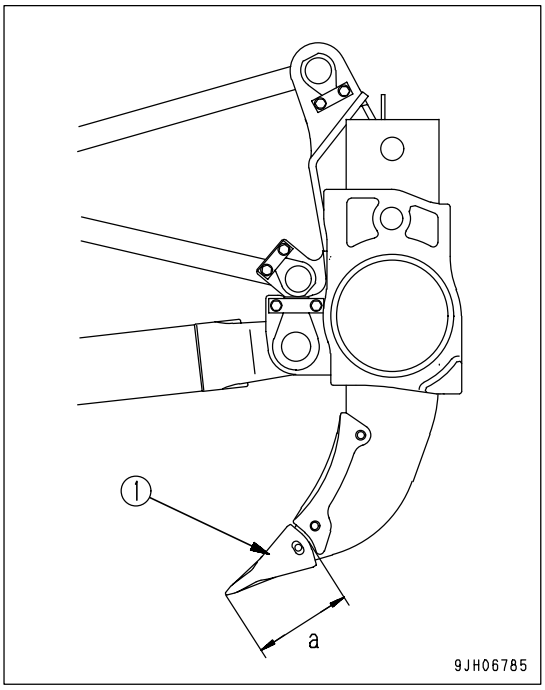
To protect the shank, replace the point and protector installed to the tip of the shank when they are worn.

Put a pin removal bar in contact with the pin marked by the arrow, then hit it with a hammer and remove it from the opposite side.



(Unit: mm (in))

NO.	Item	Judgment standard		Action
		Basic dimension	Wear limit	
(1)	Wear of point (a)	335 (13.2)	225 (8.9)	Replace



ADJUST ANGLE OF BLADE EDGE

(Angledozer, power tiltdozer)

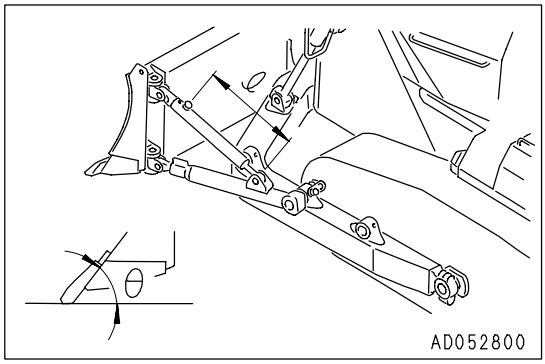
WARNING

It is dangerous if the work equipment moves by mistake when adjusting angle of the blade edge. Set the work equipment in a stable condition, then stop the engine and lock the work equipment securely with the safety lock lever.

Adjust the angle (θ) of the blade edge to match the type of soil.

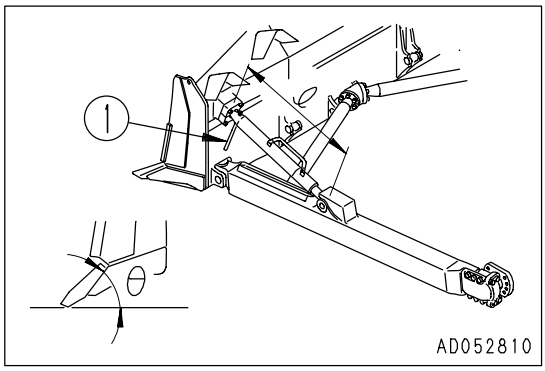
ANGLEDOZER

To make the length of the left and right braces the same, change distance (ℓ) between the joints and adjust the cutting angle.
Adjust distance (ℓ) between the joints as follows:
To INCREASE distance (ℓ), INCREASE cutting angle (θ).
To DECREASE distance (ℓ), DECREASE cutting angle (θ).
The standard cutting angle (θ) is 54°.
The standard distance (ℓ) between the joints is 1493 mm (4 ft 11 in).



POWER TILTDOZER

Turn the brace with bar handle (1) and the distance (ℓ) between the joints to change the cutting angle (θ) as follows.
INCREASE distance (ℓ) to INCREASE angle (θ)
DECREASE distance (ℓ) to DECREASE angle (θ).
The standard cutting angle (θ) is 52°.
The standard distance (ℓ) between the joints is 1389 mm(4ft 7 in).



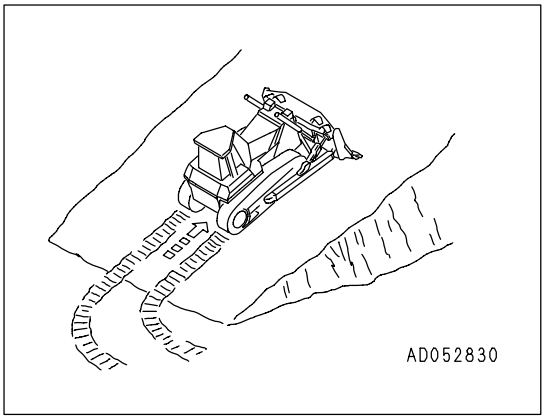
Cutting angle θ	Advantages	Disadvantages
Large	• Amount of soil spilled to rear of blade is small • Separation of soil is good and little soil is carried back	• Soil digging resistance and rolling-up resistance are large • Load pushed by blade is small
Small	• Soil digging resistance and rolling-up resistance are small • Load pushed by blade is large • Cutting amount on rough surfaces is good	• Amount of soil spilled to rear of blade is large • Separation of soil is poor and a lot of soil is carried back

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.

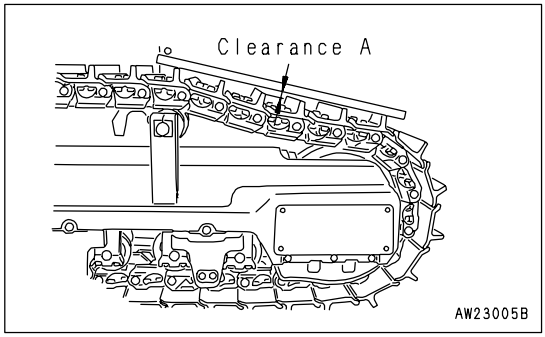
OPERATION METHOD

- Select the track shoe that best suits the type of soil to be encountered in service.
  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, unnecessary 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 the left or right during digging operations, do not continue to dig with the incline. Move the machine back to level ground and start to dig again.
- If you come across obstacles that are difficult to move during dozing operations or ripper operations, and the idler or sprocket come up from the ground, it means that the operation is excessive for the machine, so avoid such operations.

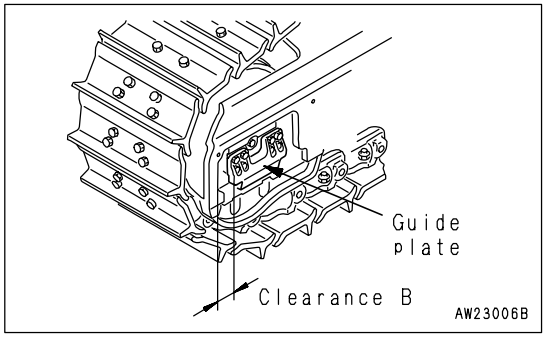


INSPECTION AND ADJUSTING

- Adjust the track shoe to the proper tension.
  When adjusting the tension, measure clearance A between the idler and carrier roller in the diagram on the right. The normal clearance is 20 to 30 mm (0.8 to 1.2 in), but on bedrock, set the tension slightly higher, and on viscous ground, set it slightly looser.
  (Inspect and adjust the track tension. For details of the method of inspection and maintenance for the track tension, see "WHEN REQUIRED (PAGE 4-20)".



- Check idler rollers for oil leakage as well as for loose bolts and nuts. If any trouble is detected, repair immediately.
- Check clearance B between the idler guide plate and track frame. If clearance B becomes larger, the idler will move to the side and cause the track shoe to come off. For details of the method of inspection and maintenance, see "ADJUST IDLER CLEARANCE (PAGE 4-33)".



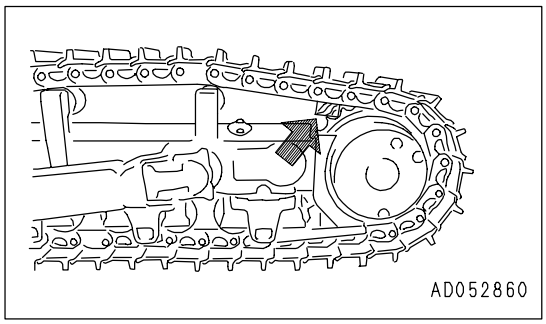
INSPECTION AND REPAIR

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 LINK PITCH

1. Insert a wooden block between track shoe and sprocket to take up the slack in track shoes.
2. Measure pitch length of 4 links in stretched portion at more than 2 links away from master pin. Of length obtained, 1/4 is the link pitch.



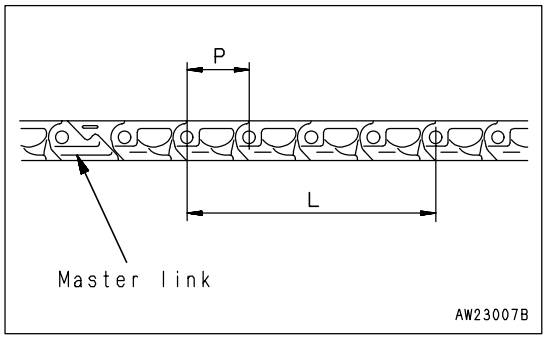
REMARK

Basic link pitch (P): 228.85 mm (9.0 in)

Bushing turning limit link pitch

Heavy-duty: 231.85 mm (9.1 in)

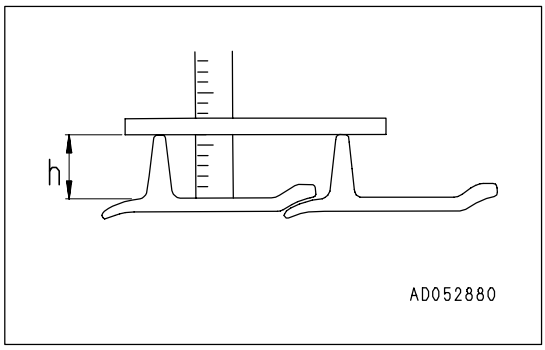
Standard: 233.85 mm (9.2 in)



There is no link window on the master link.

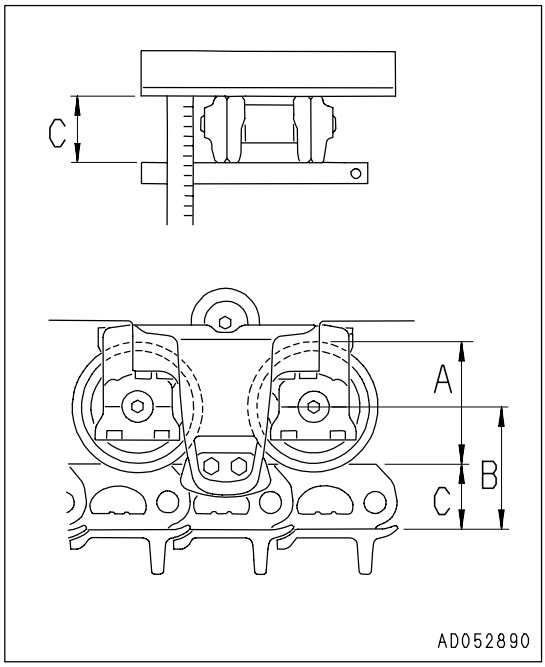
MEASURING HEIGHT OF GROUSER

After taking up slack in track shoes, measure height at center of shoe as shown below.
Basic dimension (h): 80 mm (3.2 in)
Repair limit: 25 mm (1.0 in)



MEASURING OUTSIDE DIAMETER OF TRACK ROLLER

1. Measure the height (dimension C) of the link tread as shown in the diagram.
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
   Basic dimension (h): 250 mm (9.9 in)
   Repair limit: 210 mm (8.3 in)



TRANSPORTATION

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

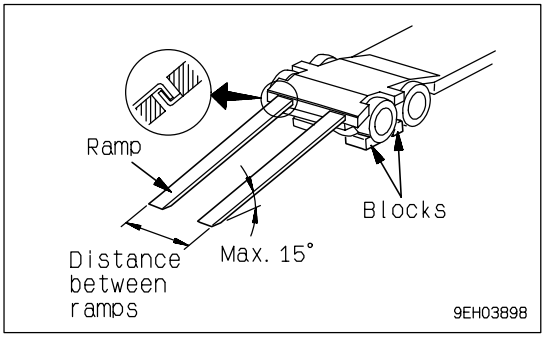
LOADING, UNLOADING WORK

⚠ WARNING

- **Use ramps with ample width, length, and thickness to allow safe loading and unloading. If the ramps bend excessively, reinforce them with blocks.**
- **Select firm, level ground when loading the machine. Maintain a safe distance from the edge of the road.**
- **Remove all mud and dirt from the machine tracks in order to prevent the machine from slipping on the ramps. Be sure that the ramp surface is clean and free of grease, oil, or ice.**
- **On the ramps, run the engine at low speed and drive slowly.**
- **Never correct your steering on the ramps. If it is necessary to change direction, drive off the ramps and correct the direction.**
- **Never use counterrotation turns.**

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

1. Properly apply the brakes on the trailer and insert blocks beneath the tires to ensure that it does not move. Then fix the ramps in line with the centers of the trailer and the machine.



2. Decide the direction to travel on the ramps, place the steering, direction, and gearshift lever in 1st, and drive slowly to load or unload the machine.
3. Load the machine correctly in the specified position on the trailer.

PRECAUTIONS FOR LOADING

After placing the machine on the specified position of the trailer, secure it according to the following procedure.

1. Lower the work equipment slowly.
2. Secure control levers with the safety lock lever.
3. Set the parking lever to the LOCK position.
4. Turn the starting switch to the OFF position, stop the engine, and take out the key.
5. Lock the cab door, left and right engine side covers, and the battery inspection cover.
6. When transporting the machine, place wooden blocks under the front and rear track shoes to prevent the machine from moving. Also, hold it down with chains or wire rope of a suitable strength. Be particularly careful to ensure that the machine does not slip sideways.

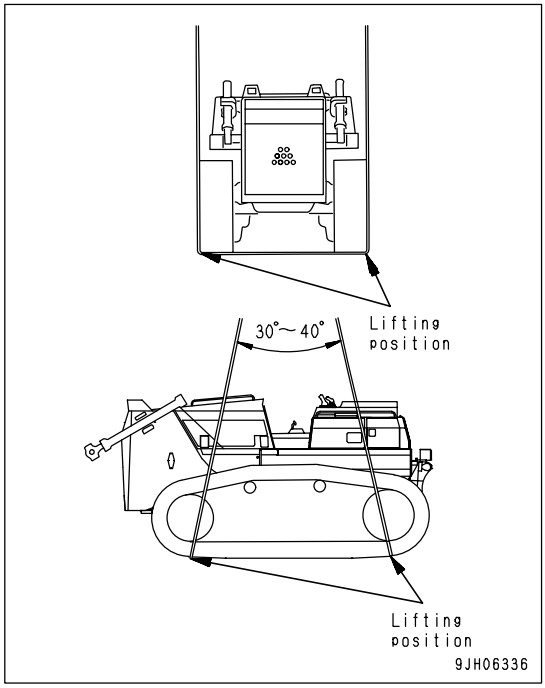
METHOD OF LIFTING MACHINE

WARNING

- **Never carry out the lifting operation with any person on the machine.**
- **Always make sure that the wire rope used for lifting the machine is of ample strength for the weight of the machine.**
- **Never try to lift the machine in any posture other than the posture given in the procedure below. There is danger that the machine may lose its balance.**
- **When lifting the machine,pay careful attention to the center of gravity to maintain the balance.**

When lifting the machine, carry out the operation on flat ground as follows.

1. Stop the engine and be sure to set the parking lever to the LOCK position.
2. Set the lifting position for the machine as shown in the diagram on the right.



NOTICE

The lifting procedure applies to machines with standard specifications. The method of lifting differs according attachments and options actually installed on the machine. For the proper lifting procedures, contact your Komatsu distributor.

For details of the weight, see "SPECIFICATIONS (PAGE 5-2)".

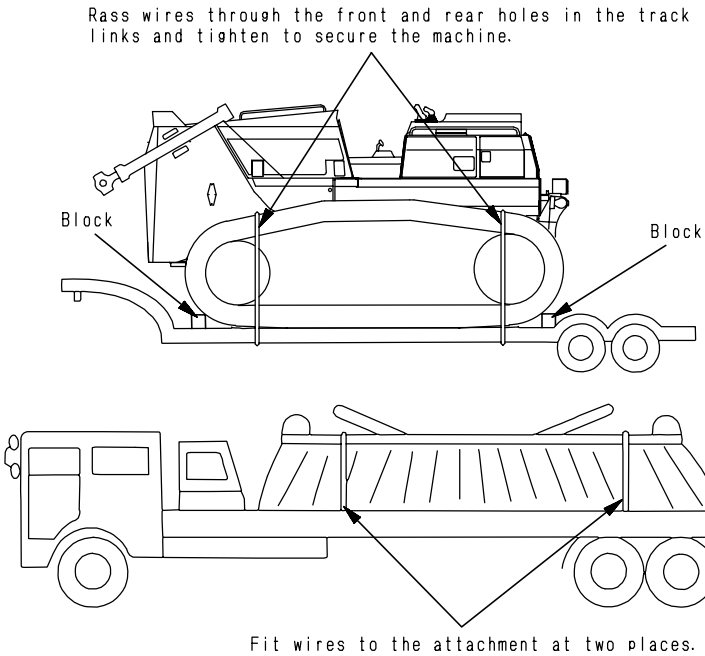
PRECAUTIONS FOR TRANSPORTATION

WARNING

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

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

- Method of transportation



TRAVELING ON ROADS

- When driving on a paved road, use the flat track shoe to protect the pavement.
  Even if the travel distance is short, be sure to protect the pavement by placing protective sheets on the road.

REMARK

Note that the asphalt road becomes soft in summer.

REMOVAL OF CAB

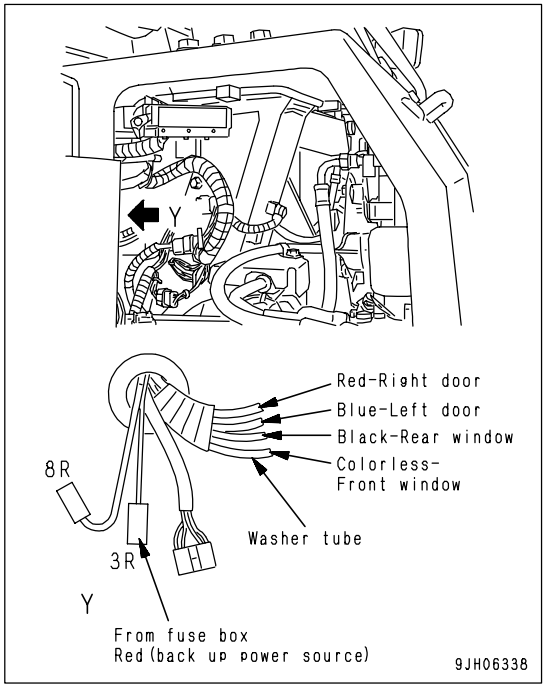
(Machines equipped with cab)

If it is necessary to remove the cab for transporting, disconnect the washer hoses, cab power source, and washer motor wiring from the socket before removing the cab.

1. Pull the grommet portion in towards the cab from the hole in the machine cover, then remove.
2. Disconnect the 4 washer hoses and electric wires (2 single wires, 1 4-pin socket) from the socket.
3. When removing the cab, carry out the operation according to the cab installation manual held by your Komatsu distributor.

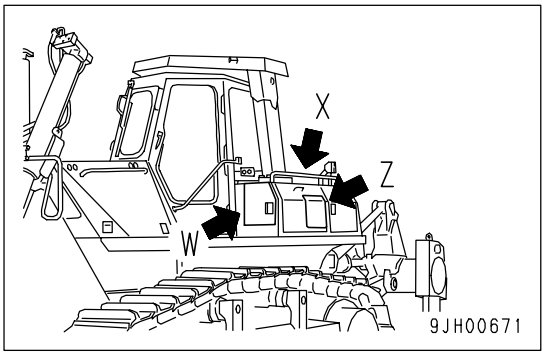
REMARK

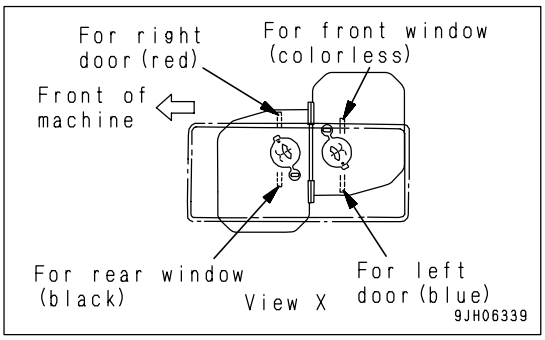
- After removing, cover with vinyl bag to prevent dirt or dust from entering the washer hose.
- Before removing the cab, check the clearance between the cab and the levers, and use for information as reference for confirming the position when installing the cab.

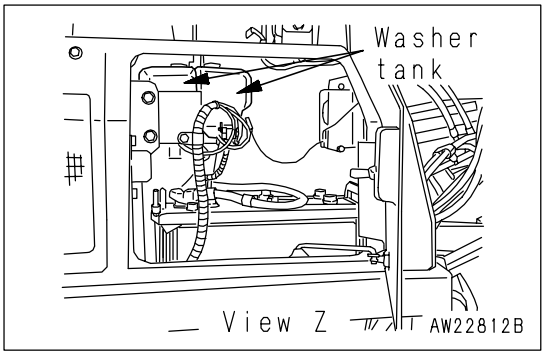


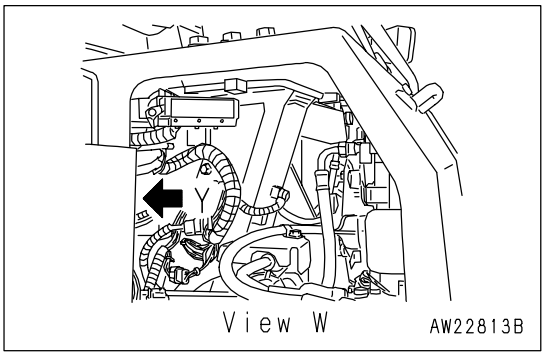
REMARK

- When installing the cab, check the colors and install the washer tank and each window washer hose correctly.
- When installing the cab, carry out the operation in accordance with the cab installation procedure manual held by your Komatsu distributor.









COLD WEATHER OPERATION

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.

FUEL AND LUBRICANTS

Change to fuel and oil with low viscosity for all components. For details of the specified visicosity, see "USE OF FUEL, COOLANT AND LUBRICANTS ACCORDING TO AMBIENT TEMPERATURE (PAGE 4-10)".

COOLANT

⚠ WARNING

- **Antifreeze is toxic. Be careful not to get it into your eyes or on your skin. If it should get into your eyes or on your skin, wash it off with large amounts of fresh water and see a doctor at once.**
- **When changing the coolant or when handling coolant containing antifreeze that has been drained when repairing the radiator, please contact your Komatsu distributor. Antifreeze is toxic, so do not let it flow into drainage ditches or spray it on to the ground surface.**
- **Antifreeze is flammable, so do not bring any flame close. Do not smoke when handling antifreeze.**

NOTICE

- **Never use methanol, ethanol or propanol based antifreeze.**
- **Avoid using any leak-preventing agent, regardless if it is sold separately or in antifreeze.**
- **Do not mix one brand of antifreeze with a different brand.**

For details of the antifreeze mixture when changing the coolant, see "CLEAN INSIDE OF COOLING SYSTEM (PAGE 4-20)".

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

Standard requirements for permanent antifreeze

- SAE J1034
- FEDERAL STANDARD O-A-548D

REMARK

In areas where permanent antifreeze is not available, it is possible to use antifreeze whose main component is ethylene glycol and does not contain any corrosion inhibitor. (Such antifreeze can be used for the winter season only.) However, in such a case, the coolant must be changed twice a year (spring and fall), so use permanent antifreeze when possible.

BATTERY

WARNING

- **The battery generates flammable gas, so 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 a large amount of water and consult a doctor.**
- **Battery electrolyte dissolves paint. If it gets on the bodywork, wash it off immediately with water.**
- **If the battery electrolyte is frozen, do not charge the battery or start the engine with a different power source. There is danger that the battery may explode.**
- **Battery electrolyte is toxic, so do not let it flow into drainage ditches or spray it on to the ground surface.**

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

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

Temperature (°C) / Charging Rate (%)	20	0	-10	-20
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

- As the battery capacity drops markedly in low temperatures, cover the battery or remove it from the machine, keep it in a warm place, and install it again the next morning.
- If the electrolyte level is low, add distilled water in the morning before beginning work. Do not add the water after the day's work so as to prevent fluid in the battery from freezing during the night.

AFTER COMPLETION OF WORK

WARNING

- **Performing idle-running of the tracks is dangerous, so stay well away from the tracks.**

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.

- Remove all the mud and water from the machine body. In particular, wipe the hydraulic cylinder rod clean to prevent damage to the seal caused by mud or dirt on the rod surface getting inside the seal together with drops of water.
- Park the machine on hard, dry ground.
  If this is impossible, park the machine on wooden boards.
  The boards help protect the tracks from being frozen in soil so the machine can move next morning.
- Open the drain valve and drain any water collected in the fuel system to prevent it from freezing.
- After operation in water or mud, remove water from undercarriage as described below to extend undercarriage service life.

1. Swing 90° with engine at low idling and bring the work equipment to the side of the track.
2. Jack up the machine until the track is raised slightly from the ground. Rotate the track under no load. Repeat this procedure on both the left and right sides.

AFTER COLD WEATHER

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

- Change the fuel and oil in each component to fuel and oil of the specified viscosity. For details, see "USE OF FUEL, COOLANT AND LUBRICANTS ACCORDING TO AMBIENT TEMPERATURE (PAGE 4-10)".

LONG-TERM STORAGE

BEFORE STORAGE

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

- Clean and wash all parts, then store the machine indoors. If the machine has to be stored outdoors, select level ground and cover the machine with canvas.
- Fill the fuel tank to prevent moisture from accumulating.
- 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.
- Place all control levers at the neutral position, set the safety lock lever and parking lever to the LOCK position, and set the fuel control dial to the low idling position.
- To prevent rust, fill the radiator with engine coolant with an antifreeze density of at least 30%.

DURING STORAGE

⚠ WARNING

When it is necessary to perform the rust-preventive operation while the machine is indoors, open the doors and windows to improve ventilation and prevent gas poisoning.

- During storage, always operate the machine 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.
- For machines equipped with an air conditioner, run the air conditioner.

AFTER STORAGE

NOTICE

If the machine has been stored without the monthly rust prevention operation, consult your Komatsu distributor for service.

When using the machine after long-term storage, do as follows before using it.

- Wipe off the grease from the hydraulic cylinder rods.
- Add oil and grease at all lubrication points.
- When the machine is stored for a long period, moisture in the air can contaminate the oil over time. Check the oil for presence of water before and after starting the engine. If there is water in the oil, change the oil.

TROUBLESHOOTING

AFTER RUNNING OUT OF FUEL

WARNING

When air bleed plug (2) at the top of the fuel filter head or supply pump air breather (4) are removed, the system is still under pressure, so fuel may spurt out. Loosen these parts slowly before opening them.

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

PROCEDURE FOR BLEEDING AIR

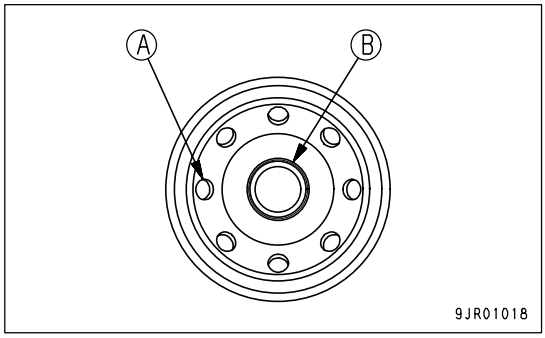
1. Remove the fuel filter cartridge, fill the filter case with fuel, then install again.

NOTICE

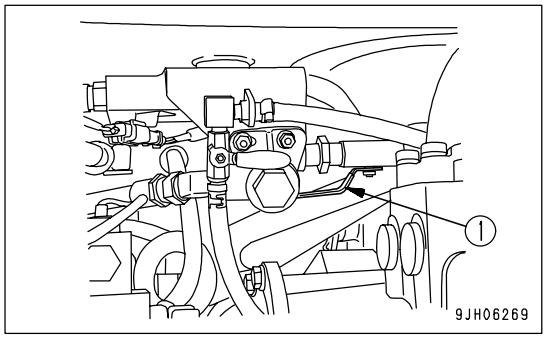
- **The common rail type fuel injection system used on this machine consists of higher precision parts than the conventional injection pump and nozzle. This means that problems are more likely to occur when dust or dirt gets in. For this reason, take even more care than usual not to let dirt or dust get in during inspection or maintenance. If any dirt should be stuck to any part, use fuel to wash it off completely.**
- **If clean fuel is not available, keep the fuel cartridge in position and bleed the air with the priming pump lever (4).**

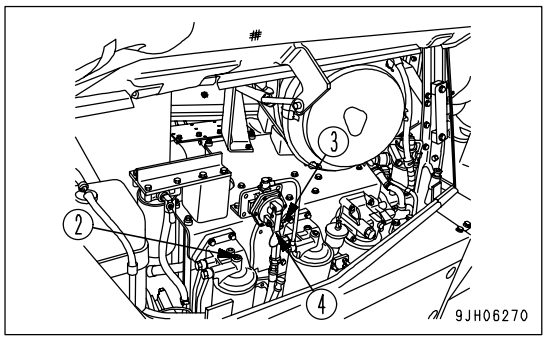
NOTICE

- **When filling with fuel, use clean fuel and be careful not to let any dust or dirt get in. Portion (B) at the center is the clean side, so be particularly careful not to let any dust or dirt get in.**
- **When adding fuel, always add from small hole (A) at eight places on the dirty side.**



2. Loosen air bleed plug (2) at the top of the fuel filter head and open fuel supply valve (1) at the bottom of the fuel tank.
3. Remove lock bolt (3) of the priming pump, then pump lever (4) backwards and forwards and check that fuel comes out from air bleed plug (2).
   When fuel comes out, install lock bolt (3).





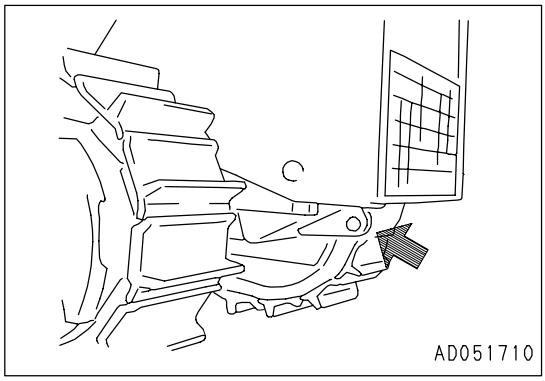
4. Install lock bolt (3) of the priming pump, then lock lever (4).
5. If the air is not bled properly, return to Step 3 and bleed the air again.
6. For normal starting operations, turn key in the ignition switch to the START position to start the engine.

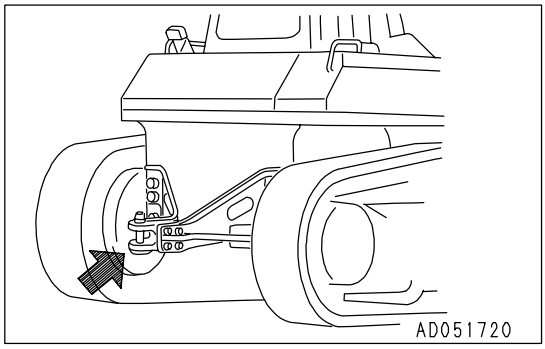
METHOD OF TOWING MACHINE

WARNING

- **Be sure to use a wire rope sufficiently strong for the towing weight.**
- **When using the towing hook, be sure to use a shackle.**
- **Set the wire rope level and align it with the track frame.**
- **Tow the machine slowly.**

If the machine is stuck in mud and cannot get out under its own power, or when the machine is being used to tow a heavy object, fit the wire to the towing hook as shown in the diagram on the right, or if the machine is equipped with a drawbar, fit the wire to the drawbar pin when towing.
Towing capacity: 29300 kg (287330 N)

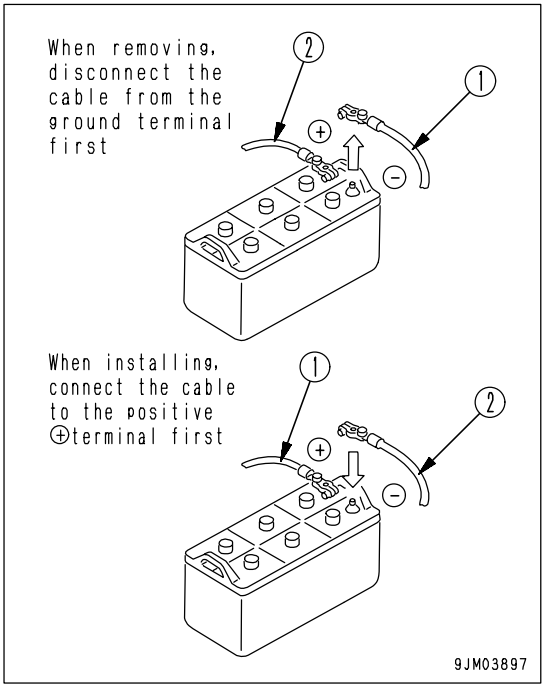




IF BATTERY IS DISCHARGED

WARNING

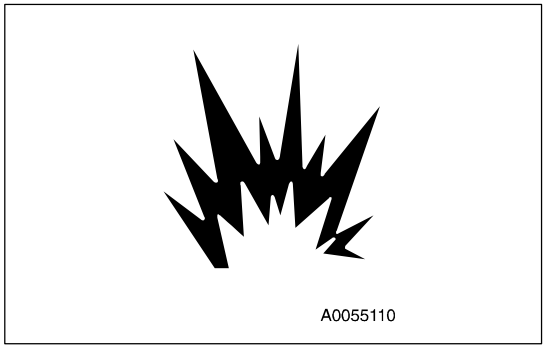
- **It is dangerous to charge a battery when mounted on a machine. Make sure that it is dismounted before charging.**
- **When checking or handling the battery, stop the engine and turn the starting switch key to the OFF position.**
- **The battery generates hydrogen gas, so there is a hazard of explosion. 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, immediately wash it off with a large amount of water. If it gets in your eyes, wash it out with fresh water and consult a doctor.**
- **When handling batteries, always wear protective goggles and rubber gloves.**
- **When removing the battery, first disconnect the cable from the ground (normally the negative (-) terminal). When installing, install the positive (+) terminal first.**
  If a tool touches the positive terminal and the chassis, there is danger that it will cause a spark, so be extremely careful.
- **If the terminals are loose, there is danger that the defective contact may generate sparks that will cause an explosion.**
- **When removing or installing the terminals, check which is the positive (+) terminal and which is the negative (-) terminal.**



REMOVAL, INSTALLATION OF BATTERY CABLE

- Before removing the battery, remove the ground cable (normally connected to the negative (-) terminal).
  If any tool touches between the positive terminal and the chassis, there is a hazard of sparks being generated.
- When installing the battery, connect the ground cable last.
- When replacing the battery, secure it with battery fitting.
  Tightening torque:Tightening battery terminal: 9.8 to 14.7 N·m (1 to 1.5 kgf·m, 7.2 to 10.8 lbft)

PRECAUTIONS WHEN CHARGING BATTERY



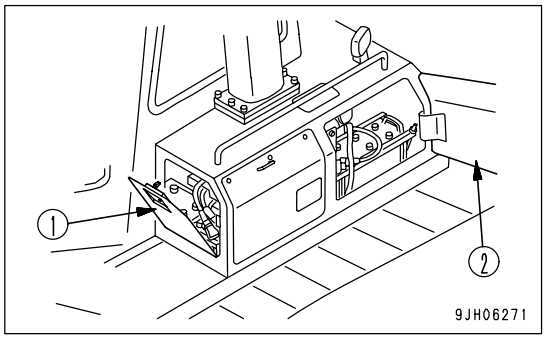
When charging the battery, if the battery is not handled correctly, there is danger that the battery may explode. Always follow the instructions in "IF BATTERY IS DISCHARGED (PAGE 3-142)" and the instruction manual accompanying the charger, and do as follows.

- Set the voltage of the charger to match the voltage of the battery to be charged. If the correct voltage is not selected, the charger may overheat and cause an explosion.
- Connect the positive (+) charger clip of the charger to the positive (+) terminal of the battery, then connect the negative (-) charger clip of the charger to the negative (-) terminal of the battery. Be sure to fix the clips securely.
- Set the charging current to 1/10 of the value of the rated battery capacity; when carrying out rapid charging, set it to less than the rated battery capacity.
  If the charger current is too high, the electrolyte will leak or dry up, and this may cause the battery to catch fire and explode.
- If the battery electrolyte is frozen, do not charge the battery or start the engine with a different power source. There is a hazard that this will ignite the battery electrolyte and cause the battery to explode.

STARTING ENGINE WITH BOOSTER CABLE

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

REMOVAL AND INSTALLATION OF BATTERY

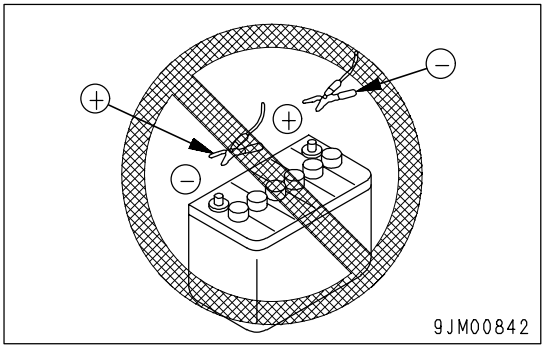


1. Open the battery cover (1).
2. Before removing the battery, remove the ground cable (normally connected to the negative (-) terminal). If any tool touches between the positive terminal and the chassis, there is danger of sparks being generated. Loosen the nut of the terminal and remove the wires from the battery.
3. When installing, connect the ground cable last.
   Insert the terminal cable on the battery, then tighten the nut.
   Tightening torque: 9.8 - 19.6 N·m (1.0 - 2.0 kgf·m, 7.2 - 14.5 lbft)
4. Close battery cover (1).

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 and rubber gloves.**
- **Be careful not to let the normal machine and problem machine contact each other. This prevents sparks from generating near the battery which could ignite the hydrogen gas given off by the battery.**
- **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.**
- **When disconnecting the booster cable, take care not to bring the clips in contact with each other or with the machine body.**



NOTICE

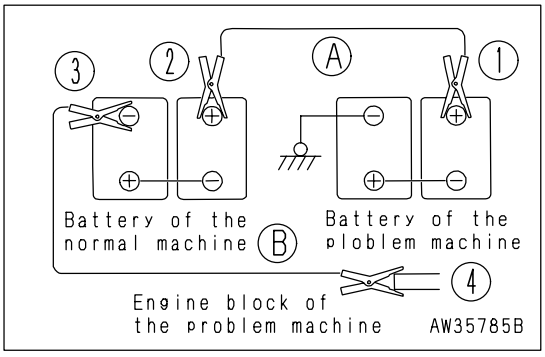
- **The size of the booster cable and clip should be suitable for the battery size.**
- **The battery of the normal machine must be the same capacity as that of the engine to be started.**
- **Check the cables and clips for damage or corrosion.**
- **Make sure that the cables and clips are firmly connected.**
- **Check that the safety lock levers and parking brake levers of both machines are in the LOCK position.**
- **Check that each lever is in the NEUTRAL position.**

CONNECTING THE BOOSTER CABLES

Keep the starting switch of the normal machine and problem machine in the OFF position.

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

1. Connect one clip (1) of booster cable (A) to the positive (+) terminal of the discharged battery.
2. Connect the other clip (2) of booster cable (A) to the positive (+) terminal of the booster battery.
3. Connect one clip of booster cable (B) to the negative (-) terminal of the booster battery.
4. Connect the other clip of booster cable (B) to the engine block of the problem machine.



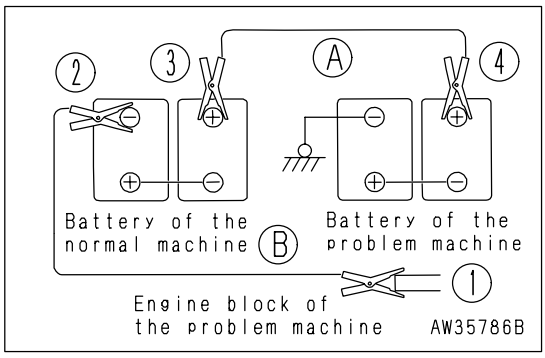
STARTING THE ENGINE

1. Make sure the clips are firmly connected to the battery terminals.
2. Start the engine of the booster machine and keep it running at high idling speed.
3. Turn the ignition switch of problem machine to the START position, and start the engine. If the engine doesn't start at first, try it again after 2 minutes.

DISCONNECTING THE BOOSTER CABLES

After the engine has started, disconnect the booster cables in reverse order of connection.

1. Remove clip of booster cable (B) from the engine block of problem machine.
2. Remove clip of booster cable (B) from negative (-) terminal of the booster battery.
3. Remove clip of booster cable (A) from the positive (+) terminal of booster battery.
4. Remove clip (4) of booster cable (A) from positive (+) terminal of the discharged battery.



OTHER TROUBLE

ELECTRICAL SYSTEM

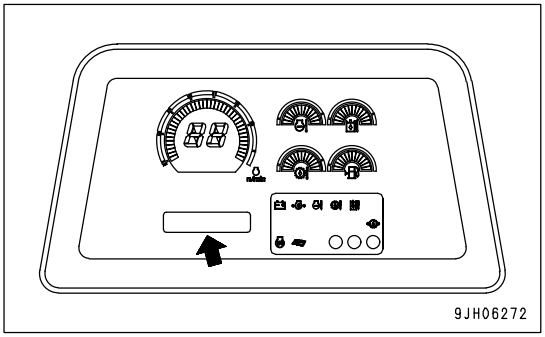
- ( ): Always contact your Komatsu distributor when dealing with these items.
- In cases of abnormalities or causes which are not listed below, contact your Komatsu distributor for repairs.

Problem	Main causes	Remedy
Lamp does not glow brightly even when the engine runs at high speed	• Defective wiring	(• Check,repair loose terminals, disconnections)
Lamp flickers while engine is running	• Defective adjustment of fan belt tension	• Adjust alternator belt tension For details, see EVERY 250 HOURS SERVICE
Charge lamp does not go out even when engine is running	• Defective alternator • Defective wiring	(• Replace) (• Check, repair)
Abnormal noise is generated from alternator	• Defective alternator	(• Replace)
Starting motor does not turn when starting switch is turned to ON	• Defective wiring • Insufficient battery charge • Safety switch out of adjust	(• Check, repair) • Charge (• Adjust safety switch)
Pinion of starting motor keeps going in and out	• Insufficient battery charge	• Charge
Starting motor turns engine sluggishly	• Insufficient battery charge • Defective starting motor	• Charge (• Replace)
Starting motor disengages before engine starts	• Defective wiring • Insufficient battery charge	(• Check, repair) • Charge
Automatic preheating is not actuated	• Defective wiring • Defective heater relay • Defective engine controller	(• Check, repair) (• Replace) (• Check, replace)
Preheating pilot lamp does not light up (When the engine water temperature is below -5°C(23°C))	• Defective wiring • Defective heater relay	(• Check, repair) (• Replace)
Oil pressure caution lamp does not light up when engine is stopped (starting switch at ON position)	• Defective caution lamp • Defective caution lamp switch • Defective wiring	(• Replace) (• Replace) (• Check, repair)
Charge lamp does not light up when engine is stopped (starting switch at ON position)	• Defective charge lamp • Defective wiring	(• Replace) (• Check, repair)
Outside of electrical intake air Outside of electrical intake air by hand	• Defective wiring • Disconnection in electrical intake air heater • Defective operation of heater relay	(• Check, repair) (• Replace) (• Check, repair heater relay)

Problem	Main causes	Remedy
Air conditioner does not work properly	• Blown fuse • Insufficient battery charge • Defective air conditioner switch • Defective blower switch • Defective compressor	(• Check, repair) • Charge (• Replace air conditioner switch) (• Replace blower switch) (• Replace)
HSS charge pressure caution lamp does not light up when starting switch is turned ON	• Defective caution lamp • Defective wiring • Defective charge pressure sensor	(• Replace) (• Check, repair) (• Replace)

MONITOR PANEL

When an error code appears on the service meter display, take appropriate remedies based upon the table below.



Error code	Remedy	Problem
E01	Automatic functions stop and some of the other functions stop, but operation is possible. Contact your Komatsu distributor for repairs.	• Abnormality in back-up alarm relay • Abnormality in engine speed display sensor of monitor panel • Abnormality in buzzer cancel switch
Abnormality display method	Displayed in turn on service meter	
E02	User should take action. When engine is stopped and started again, operation is possible without limit functions. Note: User must be careful Send an emergency request to your Komatsu distributor.	• Abnormality in water temperature sensor • Abnormality in HSS power distribution limit function
Abnormality display method	Displayed in turn on service meter, caution lamp flashes, buzzer sounds	
CALL03	Move machine to a safe place. Send an emergency request to your Komatsu distributor.	• Abnormality in injector • Abnormality in steering potentiometer 1 system • Abnormality in direction detection sensor
Abnormality display method	Displayed in turn on service meter, caution lamp flashes, buzzer sounds	
CALL	Stop machine immediately. Send an emergency request to your Komatsu distributor.	• Abnormality in controller power supply • Abnormality in steering potentiometer 2 system • Abnormality in engine pump
Abnormality display method	Displayed in turn on service meter, caution lamp flashes, buzzer sounds	

CHASSIS

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

Problem	Main causes	Remedy
When brake pedal is depressed, machine does not stop	• Brakes out of adjust, defective brake oil pressure	(• Check, adjust, repair)
Track comes off	• Track too loose	Adjust track tension, see WHEN REQUIRED
Abnormal wear of sprocket	• Track too loose or too tightened	
Blade,ripper lifting speed is slow or they do not move	• Lack of hydraulic oil • Work equipment lock lever is at LOCK position	• Add oil to specified level. See EVERY 250 HOURS SERVICE. • Set to FREE position
Machine does not turn when steering is operated	• Parking brake is at LOCK position • Defective lever wiring • Abnormality in HSS pump • Abnormality in HSS motor	• Set to FREE position (• Check, repair) (• Check, replace) (• Check, replace)
Transmission oil pressure does not rise	• Wear,scuffing of gear pump • Lack of oil in power train case • Element strainer of oil filter in power train case clogged	(• Check, replace) • Add oil to specified level. For details,See CHECKS BEFORE STARTING. • Clean. For details, see EVERY 1000 HOURS SERVICE.
Lack of drawbar pull (travel speed does not rise)	• Lack of engine horsepower	• See ENGINE
Pickup of travel speed is slow	• Power train oil temperature is low • Lack of engine horsepower	• Carry out warming-up operation • See ENGINE
Machine does not move when joystick is operated to travel position	• Lack of oil in power train case • Transmission oil pressure does not rise • Parking brake is at LOCK position	• Add oil to specified level. See CHECK BEFORE STARTING. • See "Transmission oil pressure does not rise" above • Set to FREE position
Machine does not travel in straight line	• Defective adjustment of HSS controller • Abnormality in HSS pump	(• Adjust) (• Check, replace)
Torque converter overheats (Red range of power train oil temperature gauge lights up)	• Lack of oil in power train case • Transmission oil pressure does not rise • Excessive load	• Add oil to specified level. See CHECK BEFORE STARTING • See "Transmission oil pressure does not rise" above • Shift down one gear, or reduce load and raise speed during operation

ENGINE

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

Problem	Main causes	Remedy
Engine oil pressure caution lamp flashes when engine speed is raised after completion of warm-up	• Engine oil pan oil level is low (sucking in air) • Clogged oil filter cartridge • Defective tightening of oil pipe joint, oil leakage from damaged part • Defective caution lamp	• Add oil to specified level, see CHECK BEFORE STARTING • Replace cartridge, see EVERY 500 HOURS SERVICE (• Check, repair) (• Replace lamp)
Steam is emitted from top part of radiator (pressure valve)	• Cooling water level low, water leakage • Loose fan belt • Dirt or scale accumulated in cooling system	• Add cooling water, repair, see CHECK BEFORE STARTING • Adjust fan belt tension, see EVERY 250 HOURS SERVICE • Change cooling water, clean inside of cooling system, see WHEN REQUIRED
Red range of water temperature gauge flashes	• Clogged radiator fin or damaged fin • Defective thermostat • Loose radiator filler cap (high altitude operation) • Defective monitor panel	• Clean or repair, see WHEN REQUIRED (• Replace thermostat) • Tighten cap or replace packing (• Replace monitor panel)
White range of water temperature gauge flashes	• Defective thermostat • Defective water temperature gauge	(• Replace thermostat) (• Replace water temperature gauge)
Engine does not start when starting motor is turned	• Lack of fuel • Air in fuel system • No fuel in fuel filter • Starting motor cranks engine sluggishly • Glow signal does not glow red • Defective compression • Defective valve clearance	• Add fuel, see CHECK BEFORE STARTING • Repair place where air is sucked in (• Fill fuel filter with fuel, see EVERY 500 HOURS SERVICE) • See ELECTRICAL SYSTEM • See ELECTRICAL SYSTEM (• Adjust valve clearance)
Exhaust gas is white or blue	• Too much oil in oil pan • Improper fuel	• Add oil to specified level, see CHECK BEFORE STARTING • Change to specified fuel
Exhaust gas occasionally turns black	• Clogged air cleaner element • Defective nozzle • Defective compression	• Clean or replace, see WHEN REQUIRED (• Replace nozzle) (• Adjust valve clearance)
Combustion noise occasionally makes breathing sound	• Defective nozzle	(• Replace nozzle)

Problem	Main causes	Remedy
Abnormal noise generated (combustion or mechanical)	• Low grade fuel being used • Overheating • Damage inside muffler • Excessive valve clearance	• Change to specified fuel • See item "Red range of water temperature gauge flashes". (• Replace muffler) (• Adjust valve clearance)
Monitor displays error code	Please contact your Komatsu distributor	
Alarm buzzer sounds		
Engine horsepower lowered suddenly (engine is running in duration mode)		

MAINTENANCE

⚠ WARNING

Please read and make sure that you understand the SAFETY section before reading this section.

GUIDES TO MAINTENANCE

Do not perform any inspection and maintenance operation that is not found in this manual.
Stop the machine on flat hard ground when performing inspections and maintenance.

CHECK SERVICE METER
Check the service meter reading every day to see if the time has come for any necessary maintenance maintenance to be performed.

KOMATSU GENUINE REPLACEMENT PARTS:
Use Komatsu genuine parts specified in the Parts Book as replacement parts.

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

ALWAYS USE CLEAN WASHER FLUID:
Use automobile window washer fluid, and be careful not to let any dirt get into it.

CLEAN OIL AND GREASE:
Use clean oil and grease. Also, keep the containers of the oil and grease clean. Keep foreign materials away from oil and grease.

CHECK FOREIGN MATERIAL IN DRAINED OIL:
After oil is changed or filters are replaced, check the old oil and filters for metal particles and foreign materials. If large quantity of metal particles or foreign materials are found, always report to the person in charge, and carry out suitable action.

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

WELDING INSTRUCTIONS:
- Turn off the engine ignition switch.
- Do not apply more than 200 V continuously.
- Connect grounding cable within 1 m (3.3 ft) of the area to be welded. If grounding cable is connected near instruments, connectors, etc., the instruments may malfunction.
- If a seal or bearing happens to come between the part being welded and grounding point, change the the grounding point to avoid such parts.
- Do not use the area around the work equipment pins or the hydraulic cylinders as the grounding point.

OBJECTS IN YOUR POCKETS:
- When opening inspection windows or the oil filler port of the tank to carry out inspection, be careful not to drop nuts, bolts, or tools inside the machine.
  If such things are dropped inside the machine, it may cause damage and/or malfunction of the machine, and will lead to failure. If you drop anything inside the machine, always remove it immediately.
- Do not put unnecessary things in your pockets. Carry only things which are necessary for inspection.

DUSTY WORKSITES:
When working at dusty worksites, do as follows:
- Inspect the air cleaner clogging monitor frequently to see if the air cleaner is clogged.
  Clean the air cleaner element at a shorter interval 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.
- When inspecting or changing the oil, move the machine to a place that is free of dust to prevent dirt from getting into the oil.

AVOID MIXING OILS:
If a different brand or grade of oil has to be added, drain the old oil and replace all the oil with the new brand or grade of oil. Never mix different brand or grade of oil.

LOCKING INSPECTION COVERS:
Lock inspection cover securely into position with the lock bar. If inspection or maintenance is performed with inspection cover not locked in position, there is a hazard that it may suddenly blown shut by the wind and cause injury to the worker.

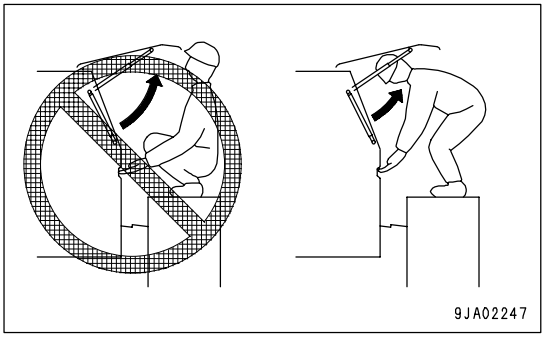
BLEEDING AIR:
When hydraulic equipment has been repaired or replaced, or the hydraulic piping has been removed and installed again, the air must be bled from the circuit. For details, see "PROCEDURE FOR BLEEDING AIR FROM HYDRAULIC CIRCUIT (PAGE 4-40)".

PRECAUTIONS WHEN INSTALLING HYDRAULIC HOSES:
- When removing parts at locations where there are O-rings or gasket seals, clean the mounting surface, and replace with new parts.
  When doing this, be careful not to forget to assemble the O-rings and gaskets.
- When installing the hoses, do not twist or bend them into loops with a small radius.
  This will cause damage to the hose and drastically reduce its service life.

CHECKS AFTER INSPECTION AND MAINTENANCE:
If you forget to perform the checks after inspection and maintenance, unexpected problems may occur, and this may lead to serious injury or property damage. Always do the following:
- Checks after operation (with engine stopped)
  - Have any inspection and maintenance points been forgotten?
  - Have all inspection and maintenance items been performed correctly?
  - Have any tools or parts been dropped inside the machine? It is particularly dangerous if parts are dropped inside the machine and get caught in the lever linkage mechanism.
  - Is there any coolant or oil leaks?
    Have all nuts and bolts been tightened?
- Checks when operating engine
  - For details of the checks when operating the engine, see "PROPER TOOLS (PAGE 2-31)" and pay careful attention to safety.
  - Are the inspection and maintenance items working properly?
  - Is there any leakage of fuel or oil when the engine speed is raised?

PRECAUTIONS WHEN OPENING AND CLOSING ENGINE SIDE COVER:

- When standing on track to open the engine side cover, adopt a standing position, hold the side cover with both thumbs, and open it slowly with your other fingers.
- When the side cover is open, do not open or close the cab. Before opening or closing the cab, always close the engine side cover first.



OUTLINES OF SERVICE

HANDLING OIL, FUEL, COOLANT, AND PERFORMING OIL CLINIC

OIL

- Oil is used in the engine and work equipment under extremely severe conditions (high temperature, high pressure), and 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 change 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 machines 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.
- At the time of shipping from the factory, SAE1OWCD is used for hydraulic type of oil. When HO46-hydraulic oil is going to be used, change specified amount of oil (whole amount). The hydraulic oil that is not recommended by Komatsu can cause clogging of oil filter, so do not use it. The portion of the oil that remains in the piping or cylinders will not be a problem even though it will be mixed into new oil.

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 (5 °F)). It is necessary to use the fuel that is suitable for 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.

COOLANT

- River water contains large amount 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 antifreeze, always observe the precautions given in the Operation and Maintenance Manual.
- Komatsu machines are supplied with Komatsu specified antifreeze in the coolant when the machine is shipped. This antifreeze is also effective in preventing corrosion of the cooling system.
  Replace the antifreeze periodically. For details, see "CLEAN INSIDE OF COOLING SYSTEM (PAGE 4-20)".
- Antifreeze is flammable, so be extremely careful not to expose it to flame or fire.
- The proper mixing proportion of the antifreeze depends on the ambient temperature. For the mixing proportion, see "CLEAN INSIDE OF COOLING SYSTEM (PAGE 4-20)".
- 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.

GREASE

- Grease is used to prevent twisting and noise at the joints.
- The nipples not included in the MAINTENANCE section are nipples used when overhauling, so they do not need grease.
  If any part becomes stiff or generates noise after being used for a long time, grease it.
- 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.

CARRYING OUT KOWA (Komatsu Oil Wear Analysis)

KOWA is a maintenance service that makes it possible to prevent machine failures and down-time. With KOWA, the oil is periodically sampled and analyzed. This enables early detection of wear of the machine drive parts and other abnormalities.

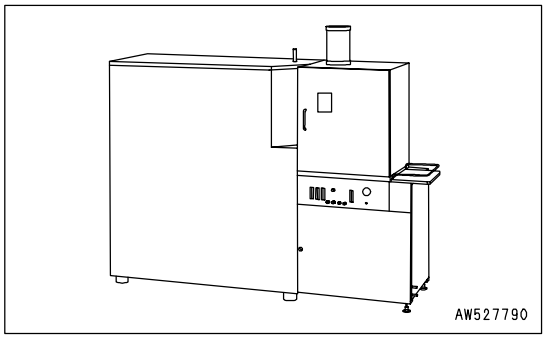
Periodic use of KOWA makes the following possible:

It enables abnormalities to be detected early, leading to reduction of repair costs and machine downtime.

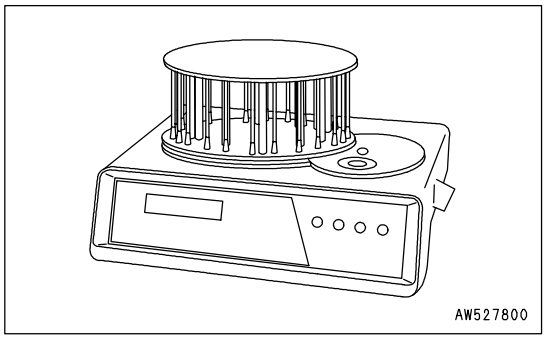
It enables repair schedules to be planned, leading to improved machine availability.

KOWA ANALYSIS ITAMS

- Analysis of metal wear particles
  This uses an ICP (Inductively Coupled Plasma) analyzer to measure the density of metal wear particles in the oil.



- Measurement of particle quantity
  This uses a PQI (Particle Quantifier Index) measurer to measure the quantity of large iron particles in the oil.



- Others
  Measurements are made of items such as the ratio of water or fuel in the oil, and the dynamic viscosity.

OIL SAMPLING

- Sampling interval
  250 hours: Engine
  500 hours: Other components
- Precautions when sampling
  - Make sure that the oil is well mixed before sampling.
  - Perform sampling at regular fixed intervals.
  - Do not perform sampling on rainy or windy days when water or dust can get into the oil.

For further details of KOWA, please contact your Komatsu distributor.

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 drums is at the side to prevent moisture from being sucked in.
  If drums 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).

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, replace 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 affixed to the old filter. If any metal particles are found, contact your Komatsu distributor.
- Do not open packs of spare filters until just before they are to be used.
- Always use Komatsu genuine filters.

OUTLINE OF ELECTRIC SYSTEM

- It is extremely dangerous if the electrical equipment becomes wet or the covering of the wiring is damaged. This will cause electrical leakage and may lead to malfunction of the machine.
- Inspection and maintenance works include checking the fan belt for tension and damage as well as the battery for electrolyte level.
- Never remove or disassemble any electric components installed in the machine.
- Never install any electric components other than those 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, ignition switch, battery relay, etc.

HANDLING HYDRAULIC RELATED EQUIPMENT

- During operations and after completion of operations, the hydraulic equipment is at a high temperature. During operations, it is also under the high pressure, so when carrying out inspection and maintenance of hydraulic related equipment, be careful of the following points.
  - Stop the machine on flat ground, lower the work equipment completely to the ground, and carry out the operation so that there is no pressure on the cylinder circuits.
  - Always stop the engine.
  - Immediately after stopping operations, the hydraulic oil and lubricating oil is at high temperature and high pressure, so wait for the oil temperature to go down before starting maintenance.
    Even after the temperature has gone down, some parts may still be under internal pressure, so when loosening plugs, bolts, or hose connections, do not stand directly in front of the parts, and loosen slowly to release the internal pressure before removing.
  - When carrying out inspection and maintenance of the hydraulic circuit, always release the air in the hydraulic tank to remove the internal pressure.
- Inspection and maintenance works include checking the hydraulic system for oil level, replacement of filter elements and replacement of hydraulic oil.
- If high-pressure hoses have been removed, check that there is no damage to the O-rings. If any damage is found, replace the O-ring.
- It is necessary to bleed the air from the circuits when the hydraulic filter element or strainer have been replaced or washed, or when hydraulic equipment has been repaired or replaced, or when the hydraulic piping has been removed.
- The accumulator is charged with high-pressure nitrogen gas, and it is extremely dangerous if it is handled incorrectly. For details of the method of handling, see "ACCUMULATOR, HANDLING (PAGE 3-66)".

WEAR PARTS LIST

Wear parts such as the filter element, air cleaner element 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.
When changing parts,use Komatsu genuine parts of excellent quality.
When ordering parts, please check the part number in the parts book.

WEAR PARTS LIST

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

Item		Part No.	Part Name	Weight (kg(lb))	Q'ty	Replacement frequency
Engine oil filter		600-211-1340	Cartridge	-	1	Every 500 hour service
Power train filter		07063-01100 (07000-02130)	Element (O-ring)	- -	1 (1)	
Fuel filter		600-311-3310	Cartridge	-	1	
Hydraulic tank breather		20Y-60-21470	Cap element	-	1	
Corrosion resistor		600-411-1161	Cartridge	-	1	Every 1000 hours service
Charge filter		07063-51054 (07000-02110)	Element (O-ring)	- -	1 (1)	
Hydraulic oil filter		07063-51100 (07000-02130)	Element (O-ring)	- -	1 (1)	Every 2000 hours service
Air cleaner		600-185-6100	Element ass'y	-	1	-
		600-185-6110	Outer element ass'y		1	
Air conditioner	Fresh filter	14X-911-7750	Filter	-	2	-
	Recirc filter	20Y-979-6261	Filter	-	1	
Blade	Semi U-dozer	195-70-12492 17A-71-11351 17M-71-21930 17M-71-21940 17A-71-12451 17M-71-21530	Cutting edge Cutting edge End bit (left) End bit (right) (Bolt) (Nut)	103.4 (228) 57 (126) 63 (139) 63 (139) - -	1 2 1 1 (33) (33)	-
	U-dozer	17A-72-12221 17M-72-21160 17M-71-21930 17M-71-21940 17A-71-12451 17M-71-21530	Cutting edge Cutting edge End bit (left) End bit (right) (Bolt) (Nut)	69 (152) 58 (128) 63 (139) 63 (139) - -	2 2 1 1 (36) (36)	-
	Angledozer	175-70-26310 175-70-21115 175-71-11454 175-71-11530 175-70-21126 175-70-21136 175-71-11463 175-71-11530	Cutting edge Cutting edge (Bolt) (Nut) End bit (left) End bit (right) (Bolt) (Nut)	48.8 (108) 64.1 (141) - - 37 (82) 37 (82) - -	1 2 (25) (25) 1 1 (14) (14)	-
Ripper	Multi	175-78-31230 195-78-21320 09244-02508	Point Protector (Pin)	15 (33.08) 13 (28.67) -	3 3 (9)	-
	Giant	175-78-31230 195-78-21320 09244-02508	Point Protector (Pin)	15 (33.08) 13 (28.67) -	1 1 3	-

NOTICE

When handling parts that weigh more than 25 kg (55 lb), remember that they are heavy objects, and take the necessary care.

USE OF FUEL, COOLANT AND LUBRICANTS ACCORDING TO AMBIENT TEMPERATURE

RESERVOIR	KIND OF FLUID	AMBIENT TEMPERATURE -22 -4 14 32 50 68 86 104 122°F -30 -20 -10 0 10 20 30 40 50°C	CAPACITY	
			Specified	Refill
Engine oil pan	Engine oil	SAE 30 SAE 10W SAE 10W-30 SAE 15W-40	42 ℓ 11.09 US gal	37 ℓ 9.77 US gal
Damper case		SAE 30	1.5 ℓ 0.40 US gal	1.5 ℓ 0.40 US gal
Power train case		SAE 30	90 ℓ 23.78 US gal	45 ℓ 11.89 US gal
Final drive case (each)		SAE 10W	58 ℓ 15.31 US gal	58 ℓ 15.31 US gal
Hydraulic system		SAE 10W SAE 10W-30 SAE 15W-40	126 ℓ 33.26 US gal	87 ℓ 22.99 US gal
Fuel tank	Diesel fuel ※2	ASTM D975 No.2 ※1	625 ℓ 165 US gal	—
Grease fitting	Grease	NLGI No.2	—	—
Cooling system (incl. sub-tank)	Water	Add antifreeze	107 ℓ 28.27 US gal	—

※1 ASTM D975 No. 1
※2 Use only diesel fuel.

*1: ASTM D975 No.1
*2: Use only diesel fuel.

NOTICE

Use only diesel fuel.

The engine mounted on this machine employs electronic control and a high-pressure fuel injection device to obtain good fuel consumption and good exhaust gas characteristics. For this reason, it requires high precision for the parts and good lubrication. If kerosene or other fuel with low lubricating ability is used, there will be a big drop in durability.

REMARK

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

- When starting the engine with an atmospheric temperature of lower than 0°C (32°F), be sure to use engine oil of SAE10W, SAE10W-30 and SAE15W-40, even though the atmospheric temperature goes up to 10°C (50° F) more or less during the day.

- 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 range 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

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

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 EO30-CD EO10-30CD EO15-40CD	GO90 GO140	G2-LI G2-LI-S	AF-ACL AF-PTL AF-PT(Winter, one season type)
2	AGIP	Diesel sigma S super dieselmulti-grade *Sigma turbo	Rotra MP	GR MU/EP	-
3	AMOCO	*Amoco 300	Multi-purpose gear oil	PYKON premium grease	-
4	ARCO	*Arcofleet S3 pius	Arco HD gear oil	Litholine HEP 2 Arco EP moly D	-
5	BP	Vanellus C3	Gear oil EP Hypogear EP	Energrease LS-EP2	Antifreeze
6	CALTEX	*RPM delo 400 RPM delo 450	Universal thuban Universal thuban EP	Marfak all purpose 2 Ultra-duty grease 2	AF engine coolant
7	CASTROL	*Turbomax *RX super CRD	EP EPX Hypoy Hypoy B Hypoy C	MS3 Spheerol EPL2	Anti-freeze
8	CHEVRON	*Delo 400	Universal gear	Ultra-duty grease 2	-
9	CONOCO	*Fleet motor oil	Universal gear lubricant	Super-sta grease	-
10	ELF	Multiperformance 3C Performance 3C	-	Tranself EP Tranself EP type 2	Glacelf
11	EXXON (ESSO)	Essolube D3 *Essolube XD-3 *Essolube XD-3 Extra *Esso heavy duty Exxon heavy duty	Gear oil GP Gear oil GX	Beacon EP2	All season coolant
12	GULF	Super duty motor oil *Super duty plus	Multi-purpose gear lubricant	Gulfcrown EP2 Gulfcrown EP special	Antifeeze and coolant
13	MOBIL	Delvac 1300 *Delvac super 10W-30, 15W-40	Mobilube GX Mobilube HD	Mobilux EP2 Mobilgease 77 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	*Superme duty fleet motor oil	Multi-purpose 4092 Multi-purpose 4140	Multi-purpose white grease 705 707L White-bearing grease	Anti-freeze and summer coolant
15	PETROFIN E	FINA kappa TD	FINA potonic N FINA potonic NE	FINA marson EPL2	FINA tamidor
16	SHELL	Rimura X	Spirax EP Spirax heavy duty	Albania EP grease	-
17	SUN	-	Sunoco GL5 gear oil	Sunoco ultra prestige 2EP Sun prestige 742	Sunoco antifreeze and summer coolant
18	TEXACO	*Ursa super plus Ursa premium	Multigear	Multifak EP2 Starplex 2	Coda 2055 startex antifreeze coolant
19	TOTAL	Rubia S *Rubia X	Total EP Total Transmission TM	Multis EP2	Antigal/antifreeze
20	UNION	*Guardol	MP gear lube LS	Unoba EP	-
21	VEEDOL	*Turbostar *Diesel star MDC	Multigear Multigear B Multigear C	-	Antifreeze

PERIODIC REPLACEMENT OF SAFETY CRITICAL PARTS

For using the machine safely for an extended period if time, you are required to periodically replace the safety (critical and fire prevention) related parts listed in the table of important parts on the following page.
Material quality of these parts can change as time passes and they are likely to wear out or deteriorate. However, it is difficult to determine the extent of wear or deterioration at the time of periodic maintenance. Hence, it is required to replace them with new ones regardless of their condition after a certain period of usage. This is important to ensure that these parts maintain their full performance at all times.
Furthermore, should anything abnormal be found on any of these parts, replace it with a new one even if the periodic replacement time for the part has not yet arrived.
If any of the hose clamps show deterioration like deformation or cracking, replace the clamps at the same time as the hoses.
Also perform the following checks with hydraulic hoses which need to be replaced periodically. Tighten all loose clamps and replace defective hoses, as required.
When replacing hoses, always replace O-rings, gaskets, and other such parts at the same time.
Have your Komatsu distributor replace the critical parts.

SAFETY CRITICAL PARTS

NO.	Safety critical parts for periodic replacement			Q'ty	Replacement interval
1	Fuel tank	-	hand priming pump	1	Every 2 years or 4000 hours, whichever comes sooner
2	Engine overflow nipple	-	joint (bottom of fuel tank)	1	
3	Engine overflow nipple	-	joint (bottom of fuel tank)	1	
4	joint (bottom of fuel tank)	-	fuel tank (overflow)	1	
5	joint (bottom of fuel tank)	-	fuel tank (spill)	1	
6	Hand priming pump	-	supply pump	1	
7	Power train pump	-	Power train filter	1	
8	Steering case cover	-	HSS motor gear train	1	
9	Power train filter	-	transmission control valve	1	
10	Transmission control valve	-	brake valve	1	
11	Torque converter	-	oil cooler	1	
12	Oil cooler	-	transmission case, torque converter case	1	
13	Central pressure detection hose	-	transmission case, torque converter case	1	
14	Hydraulic tank	-	charge pump	1	
15	Charge pump	-	charge filter	1	
16	HSS, PPC charge valve	-	accumulator	1	
17	HSS, PPC charge valve	-	hydraulic tank	1	
18	HSS, PPC charge valve	-	PPC lock valve	1	

NO.	Safety critical parts for periodic replacement			Q'ty	Replacement interval
19	PPC lock valve	-	PPC valve (blade)	1	Every 2 years or 4000 hours, whichever comes sooner
20	PPC lock valve	-	PPC valve (ripper)	1	
21	HSS, PPC charge valve	-	CLSS valve	1	
22	HSS, PPC charge valve	-	HSS pump	1	
23	PPC relief valve	-	HSS pump	1	
24	HSS pump	-	HSS motor	1	
25	HSS pump	-	HSS motor	1	
26	HSS motor	-	central drain block	1	
27	Central drain block	-	hydraulic tank	1	
28	HSS motor	-	central drain block	1	
29	HSS motor	-	cooler bypass valve	1	
30	HSS pump	-	central drain block	1	
31	HSS pump	-	cooler bypass valve	1	
32	Cooler bypass valve	-	oil cooler	1	
33	Cooler bypass valve	-	oil cooler	1	
34	Oil cooler	-	cooler bypass valve	1	
35	Oil cooler	-	cooler bypass valve	1	
36	Cooler bypass valve	-	hydraulic tank	1	
37	Work equipment hydraulic pump	-	CLSS valve	1	
38	CLSS valve	-	block (blade lift)	2	
39	Block (blade lift)	-	blade lift cylinder	4	
40	CLSS valve	-	divider block (ripper)	1	
41	CLSS valve	-	divider block (ripper)	1	
42	CLSS valve	-	divider block (ripper)	1	
43	CLSS valve	-	divider block (ripper)	1	
44	Divider block (ripper)	-	ripper lift cylinder	4	
45	Divider block (ripper)	-	ripper tilt cylinder	4	
46	Fan pump	-	reducing pressure valve	1	
47	Self-reducing pressure valve	-	fan motor	2	
48	Self-reducing pressure valve	-	fan pump servo	1	
49	Fan motor	-	hydraulic tank	2	
50	Fan motor	-	central drain block	2	
51	Fan pump	-	central drain block	1	
52	Charge filter	-	HSS motor	1	
53	Self-reducing pressure valve	-	central drain block	1	
54	Injector ass'y			1 set	
55	Seat belt			1	Every 3 years
57	High-pressure piping clamp			1 set	Every 8000 hours
58	Fuel spray prevention cap			1 set	

STANDARD TIGHTENING TORQUES FOR BOLTS AND NUTS

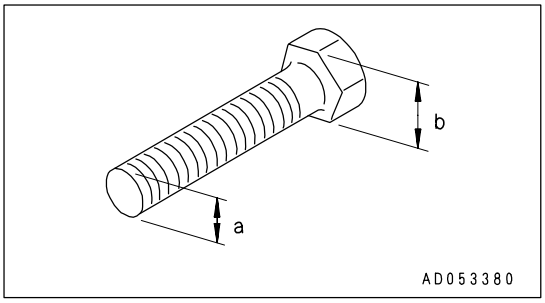
TORQUE LIST

CAUTION

If nuts, bolts, or other parts are not tightened to the specified torque, it will cause looseness or damage to the tightened parts, and this will cause failure of the machine or problems with operation.
Always pay careful attention when tightening parts.

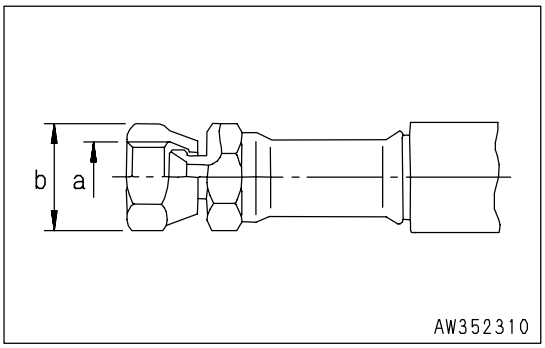
Unless otherwise specified, tighten the metric nuts and bolts to the torque shown in the table below.
If it is necessary to replace any nut or bolt, always use a Komatsu genuine part of the same size as the part that was replaced.

Thread diameter of bolt (a)(mm)	Width across flats (b)(mm)	Tightening torque					
		Target value			Service limit		
		N·m	kgf·m	lbft	N·m	kgf·m	lbft
6	10	13.2	1.35	9.8	11.8-14.7	1.2-1.5	8.7-10.8
8	13	31	3.2	23.1	27-34	2.8-3.5	20.3-25.3
10	17	66	6.7	48.5	59-74	6.0-7.5	43.4-54.2
12	19	113	11.5	83.2	98-123	10.0-12.5	72.3-90.4
14	22	177	18	130.2	157-196	16.0-20.0	115.7-144.7
16	24	279	28.5	206.1	245-309	25.0-31.5	180.8-227.8
18	27	382	39	282.1	343-425	35.0-43.5	253.2-314.6
20	30	549	56	405.0	490-608	50.0-62.0	361.7-448.4
22	32	745	76	549.7	662-829	67.5-84.5	488.2-611.2
24	36	927	94.5	683.5	824-1030	84.0-105.0	607.6-759.5
27	41	1320	135.0	976.5	1180-1470	120.0-150.0	868.0-1085.0
30	46	1720	175.0	1265.8	1520-1910	155.0-195.0	1121.1-1410.4
33	50	2210	225.0	1627.4	1960-2450	200.0-250.0	1446.6-1808.3
36	55	2750	280.0	2025.2	2450-3040	250.0-310.0	1808.3-2242.2
39	60	3280	335.0	2423.1	2890-3630	295.0-370.0	2133.7-2676.2



Apply the following table for Hydraulic Hose.

Thread diameter a (mm)	Width across flats b (mm)	Tightening torque					
		Target value			Permissible range		
		N·m	kgf·m	lbft	N·m	kgf·m	lbft
10	14	14.7	1.5	10.8	12.7 - 16.7	1.3 - 1.7	9.4 - 12.3
14	19	29.4	3.0	21.7	27.5 - 39.2	2.8 - 4.0	20.3 - 28.9
18	24	78.5	8.0	57.9	58.8 - 98.1	6.0 - 10.0	43.4 - 72.3
22	27	117.7	12.0	86.6	88.3 - 137.3	9.0 - 14.0	65.1 - 101.3
24	32	147.1	15.0	108.5	117.7 - 176.5	12.0 - 18.0	86.8 - 130.2
30	36	215.7	22.0	159.1	176.5 - 245.2	18.0 - 25.0	130.2 - 180.8
33	41	255.0	26.0	188.1	215.7 - 284.4	22.0 - 29.0	159.1 - 209.8



MAINTENANCE SCHEDULE CHART

MAINTENANCE SCHEDULE CHART

INTIAL 250 HOURS SERVICE(ONLY AFTER THE FIRST 250 HOURS)

WHEN REQUIRED

CHECK BEFORE STARTING

EVERY 250 HOURS SERVICE

EVERY 500 HOURS SERVICE

EVERY 1000 HOURS SERVICE

EVERY 2000 HOURS SERVICE

EVERY 4000 HOURS SERVICE

EVERY 8000 HOURS SERVICE

SERVICE PROCEDURE

INITIAL 250 HOURS SERVICE(ONLY AFTER THE FIRST 250 HOURS)

Perform the following maintenance only after the first 250 hours.

- Replace power train oil filter element
- Change oil in power train case, wash strainers (power train pump strainer, scavenging pump strainer)
- Change oil in final drive case
- Replace charge filter element
- Change oil in hydraulic tank, replace hydraulic filter element.

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

WHEN REQUIRED

CLEAN INSIDE OF COOLING SYSTEM

⚠ WARNING

- **Immediately after the engine is stopped, the coolant is at a high temperature and the radiator is under high internal pressure. If the cap is removed to drain the coolant in this condition, there is a hazard of burns. Wait for the temperature to go down, then turn the cap slowly to release the pressure before removing it.**
- **Cleaning is carried out with the engine running. When standing up or leaving the operator's seat, set the safety lock lever and the parking lever to the LOCK position.**
- **For details of starting the engine, see "CHECK BEFORE STARTING ENGINE, ADJUST (PAGE 3-67)" and "STARTING ENGINE (PAGE 3-86)" in the OPERATION section.**
- **Never enter front the machine when the engine is running.**
  There is danger of touching the fan.

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 1000 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, autume) (Drain antifreeze in spring, add antifreeze in autumn)	
When no using antifreeze	Every 6 months or every 1000 hours, whichever come first	

Stop the machine on level ground when cleaning or changing the coolant.
Use a permanent type of antifreeze.
If, for some reason, it is impossible to use permanent type antifreeze, use an antifreeze containing ethylene glycol.
The ratio of antifreeze to water depends on the ambient temperature, but to obtain the corrosion resistance effect, a minimum ratio of 30% by volume is necessary.
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 (18°F) lower when deciding the mixing rate.

Mixing rate of water and antifreeze

Min. atmospheric temperature	°C	-10	-15	-20	-25	-30	-35	-40
	°F	14	5	-4	-13	-22	-31	-40
Amount of antifreeze	liter	32.1	38.5	42.8	49.2	53.5	57.8	62.1
	US gal	8.48	10.17	11.31	13.00	14.13	15.27	16.41
Amount of water	liter	74.9	68.5	64.2	57.8	53.5	49.2	44.9
	US gal	19.79	18.10	16.96	15.27	14.13	13.00	11.86

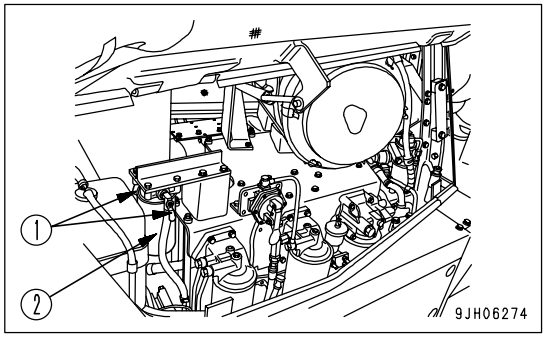
WARNING

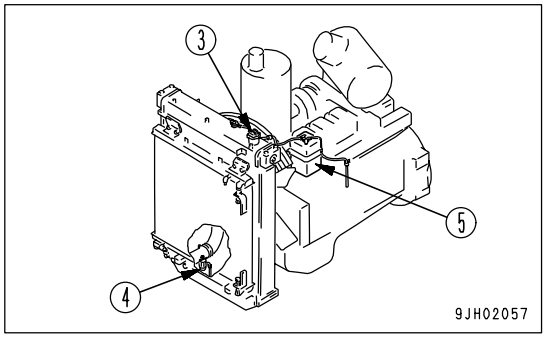
Antifreeze is flammable, so keep it away from flame.
Antifreeze is toxic. When removing the drain plug, be careful not to get water containing antifreeze on you. If it gets in your eyes, flush your eyes with large amount of fresh water and see a doctor at once.

Use city water for the coolant.
If river water, well water or other such water supply must be used, contact your Komatsu distributor.
We recommend use of an antifreeze density gauge to control the mixing proportions.

WARNING

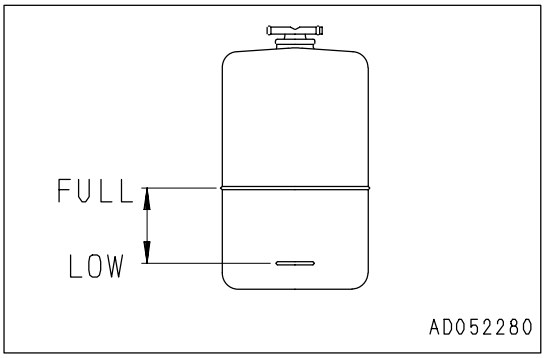
When removing the drain plug, be careful not to be covered with the drained coolant.





1. Stop the engine and close lever (1) of corrosion resistor (2). (2 places)
2. Turn cap (3) of the radiator water filler slowly.
3. Set a container to catch the coolant under drain valve (4) at the bottom of the radiator.
4. Open drain valve (4) and drain the water.
5. After draining the water, close drain valve (4), fill with city water until the radiator is full, then start the engine and run at low idling.
6. Open drain valve (4), keep the engine running at low idling, add water, and flush for 10 minutes.
   When flushing, adjust the amount of water poured in and drained to ensure that the radiator is always full of water. Always check that the hose has not come of the radiator cap during the flushing operation.
7. After completing the flushing operation, stop the engine, stop adding water, then drain the water and close drain valve (4).
8. After draining the water, clean the radiator with detergent.
   When carrying out the flushing operation, follow the instructions given with the flushing agent.
9. After flushing, open drain valve (4), drain all the water, then close the drain valve and add city water to near the mouth of the water filler.
10. After filling with city water to near the mouth of the water filler, open drain valve (4), add water, run at the engine at low idling, and flush until clean water comes out.
    When flushing, adjust the amount of water added and drained to ensure that the radiator is always full of water.
11. When clean water comes out, stop the engine, stop adding water, and drain all the water.
12. Close drain valve (4) and add coolant to near the mouth of the water filler.
13. Replace the corrosion resistor cartridge, then turn valve (1) until it contacts the OPEN stopper.
    For details of the method of replacing the corrosion resistor cartridge, see "REPLACE CORROSION RESISTOR CARTRIDGE (PAGE 4-63)".
14. Add a mixture of antifreeze and city water until it overflows from the radiator filler port. Decide the mix ratio of the super coolant and city water from the WATER AND ANTIFREEZE MIXTURE PROPORTION TABLE.

15. To bleed the air mixed in the coolant, run the engine at low idling for 5 minutes, then run for a further 5 minutes at high idling.
    (When doing this, leave the water filler cap off.)
16. Drain the coolant inside sub-tank (5), flush the inside of sub-tank (5), then add water to between the FULL and LOW marks.
17. Stop the engine, wait for approx. 3 minutes, then add water to near the mouth of the water filler and tighten cap (3).



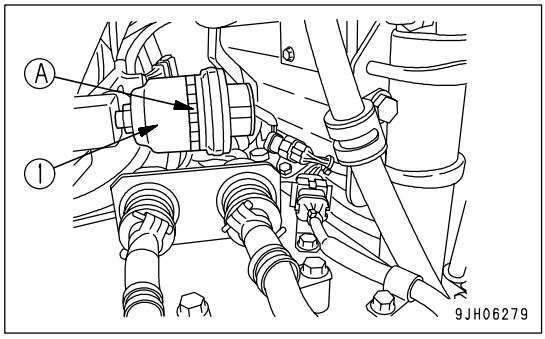
CHECK, CLEAN AND REPLACE AIR CLEANER ELEMENT

⚠ WARNING

- **Always wear protective glasses,dust mask,or other protective equipment.**
- **When removing the air cleaner element from the air cleaner body,it is dangerous to pull it out by force.**
  When working at high places or where the foothold is poor, be careful not to fall because of the reaction when pulling out the outer element.

CHECKING

When the yellow piston inside red zone (A) of the dust indicator (1) overlaps the red zone, clean the air cleaner element. After cleaning, press the reset button.



NOTICE

Always wait for the yellow piston in the dust indicator to overlap the red zone on the outside before cleaning the element.

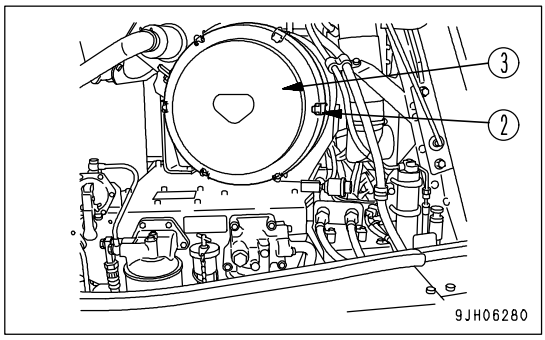
If the element is cleaned frequently before the yellow piston in the dust indicator overlaps the red zone on the outside, the air cleaner will be unable to display its normal performance and the cleaning effect will become poor.

In addition, the frequency of dust stuck to the element falling inside the inner element during the cleaning operation will increase.

CLEANING OR REPLACING OUTER ELEMENT

NOTICE

Before and after cleaning the element, do not leave or keep it in direct sunlight.

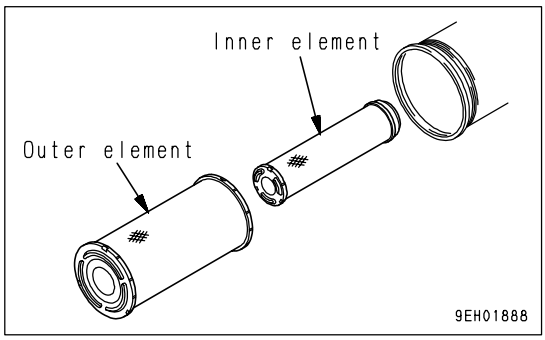


1. Remove 6 hooks (2), then remove cover (3).
   Remove outer element.
2. Hold the outer element, rock it lightly up and down and to the left and right, and rotate the element to the left and right to pull it out.

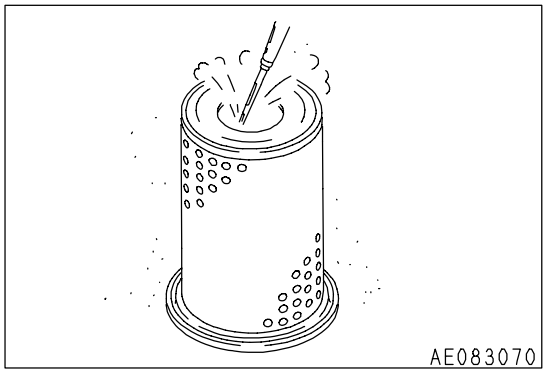
NOTICE

- **Never remove the inner element. It will allow dirt to enter and cause failure of the engine.**
- **Do not use a screwdriver or other tool.**

3. After removing the outer element, cover the air connector inside the air cleaner body with a clean cloth or tape to prevent dirt or dust from entering.

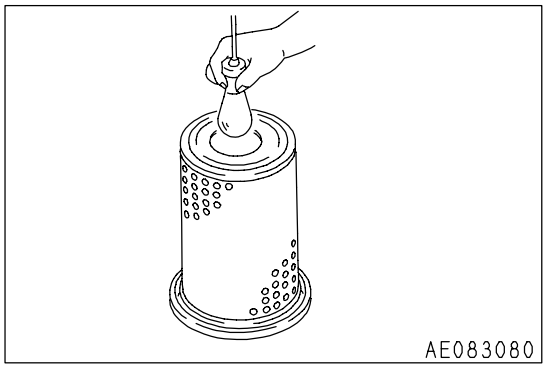


4. Use a clean cloth or brush to remove the dirt stuck to the cover and the inside of the air cleaner body.
5. Direct dry compressed air (Max. 0.69 MPa (7 kgf/cm^2, 99.4 PSI)) from the inside of the outer element along its folds. Then direct the compressed air from the outside along the folds, and again from the inside.
   1) Check that the inner element is not loose. If it is loose, insert it securely.
   2) If the yellow piston overlaps the outer element red zone immediately after the outer element is cleaned, replace the inner and outer elements.
6. Remove the cloth or tape cover installed in Step 3.
7. 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.

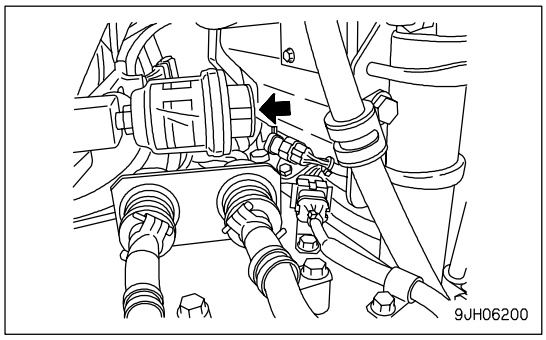


NOTICE
- **Do not use an element whose folds or gasket or seal are damaged.**
- **When cleaning the element, do not hit it or beat it against something.**

8. After replacing the element, press the dust indicator button to reset it.
   The yellow piston will return to its original position.



REPLACING INNER ELEMENT
1. First remove the outer element, and then remove the inner element.
2. Cover the air connector side (outlet side) with a clean cloth or tape.
3. Clean the air cleaner body interior, then remove the cover installed in Step 2.
4. Fit a new inner element to the connector.
   Do not clean and reinstall a inner element.
5. Install the outer element and the cover.



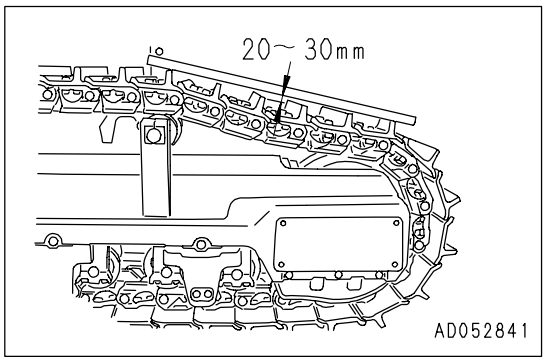
CHECK ELECTRICAL INTAKE AIR HEATER
Check before the cold season starts (once a year).
Remove the electric heater from the engine intake manifold and check for wire disconnections and dirt clung to it.
When checking and installing the electric heater, replace its gasket with a new part.

CHECK TRACK TENSION

The wear of pins and bushings on the undercarriage will vary with the working conditions and types of soil. 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

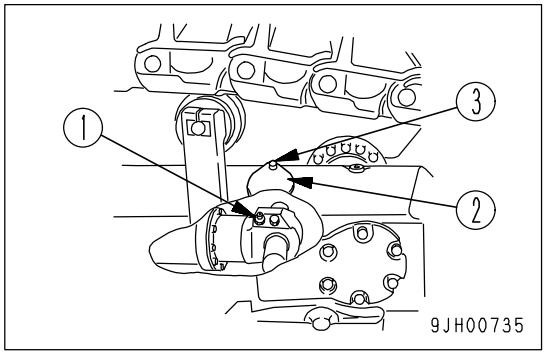
Stop the machine on level ground (stop with the transmission in FORWARD without applying the brake). Then place a straight bar on the track shoes between the carrier roller and the idler as shown in the figure, and measure the clearance between the bar and the grouser at the midpoint. If the clearance (A) is 20 to 30mm (0.79 to 1.18in), 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 plug (1).
If the track tension is not relieved by this procedure, please contact your Komatsu distributor for repairs.



WHEN INCREASING TENSION

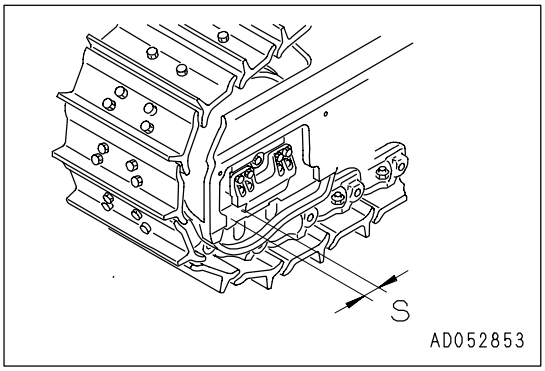
1. Remove 2 bolts (3), then remove cover (2).

NOTICE

- **The safety label is stuck on the back of cover (2), so be careful not to damage the safety label.**
- **When removing cover (2), be careful not to let any dirt or soil get in.**

2. Pump in grease through the grease fitting 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. Continue to pump in grease until S becomes 0 mm. If the tension is still loose, the pin and bushing are excessively worn, so they must be either turned or replaced. Please contact your Komatsu distributor.

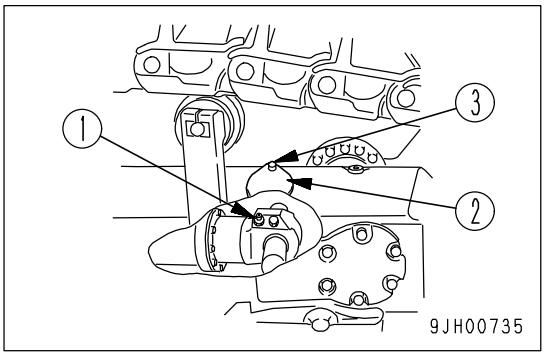


WHEN LOOSENING TENSION

⚠ WARNING

It is extremely dangerous to release the grease by any method except the procedure given below. If the track tension is not relieved by this procedure, please contact your Komatsu distributor.

1. Remove 2 bolts (3), then remove cover (2).



NOTICE

- **The safety label is stuck on the back of cover (2), so be careful not to damage the safety label.**
- **When removing cover (2), be careful not to let any dirt or soil get in.**

2. Loosen lubricator(1) gradually to release the grease.
3. Turn lubricator(1) a maximum of one turn.
4. If the grease does not come out smoothly, move the machine forwards and backwards a short distance.
5. Tighten lubricator(1).
6. To check that the correct tension has been achieved, move the machine backwards and forwards.
7. Check the track tension again, and if the tension is not correct, adjust it again.

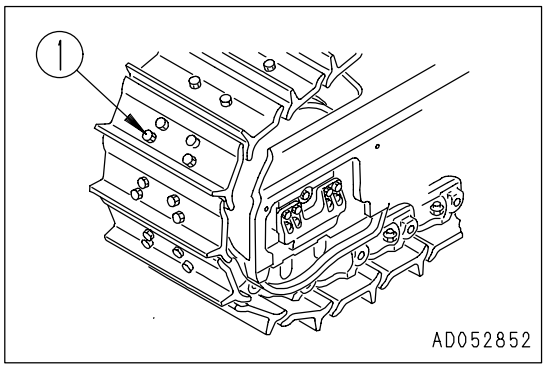
WHEN REMOVING TRACK

⚠ WARNING

The situation can be extremely dangerous when removing the track.
When following the adjustment procedure above in "WHEN LOOSENING TENSION (PAGE 4-26)", if the track does not become loose, contact your Komatsu distributor for repairs.

CHECK AND TIGHTEN TRACK SHOE BOLTS

If the machine is used with track shoe bolts (1) loose, they will break, so tighten any loose bolts immediately.



METHOD OF TIGHTENING SHOE BOLT

1. First, tighten to a tightening torque of 588 ± 58.8 N·m (60 ± 6 kgf·m, 434 ± 43.4 lbft), then check that the nut and shoe are in tight contact with the mating face of the link.

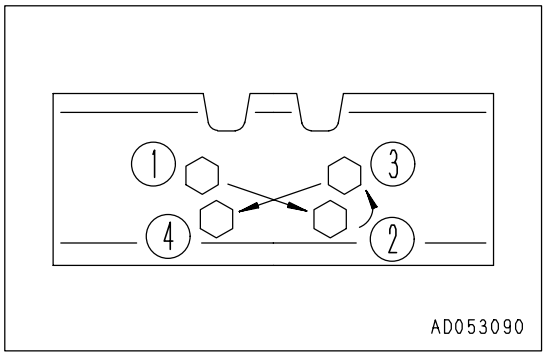
2. After checking, tighten a further. 120° ± 10°.

METHOD OF TIGHTENING MASTER LINK CONNECTING BOLT

1. First, tighten to a tightening torque of 392 ± 39.2 N·m (40 ± 4 kgf·m, 289.3 ± 28.9 lbft), then check that the mating face of the link is in tight contact.
2. After checking, tighten a further 180° ± 10°.

ORDER FOR TIGHTENING

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



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 lever.

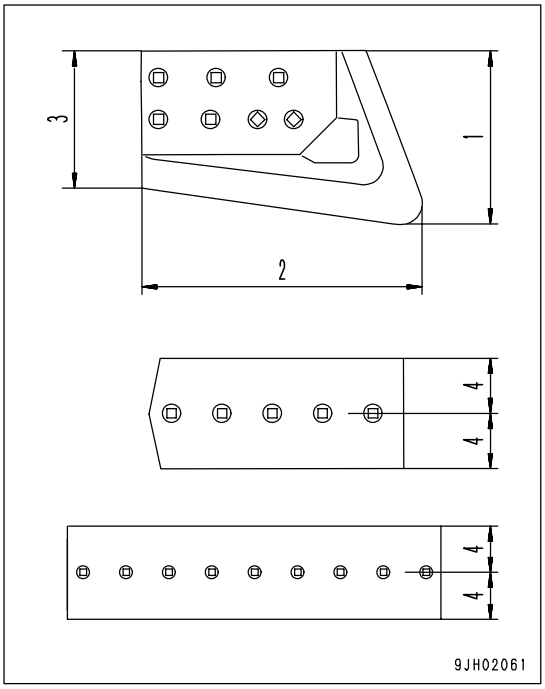
Reverse or replace the end bits and cutting edges before it is worn out to the blade end.

1. Raise the blade to a proper height, apply a block under the frame to prevent the blade from falling.
2. Operate the safety lock lever to the LOCK position.
3. Measure the wear of the end bit and cutting edge in accordance with the wear standards given below.

Wear standards

(Unit: mm (in))

Item			Judgment standard	
NO.	Position of measurement	Work equipment	Standard measurement	Wear limit
1	Height at outside of end bit	A	415 (16.4)	300 (11.8)
		B	292 (11.5)	211 (8.3)
2	Width of end bit	A	662 (26.1)	500 (19.7)
		B	435 (17.1)	360 (14.2)
3	Height at inside of end bit	A	330 (13.0)	260 (10.2)
		B	254 (10.0)	211 (8.3)
4	Height of cutting edge (from center of mounting bolt hole to end face)	A	165 (6.5)	95 (3.7)
		B	127 (5.0)	86 (3.4)



The symbols in the Work equipment column are as follows.
A: Semi U-dozer, U-dozer
B: Angledozer

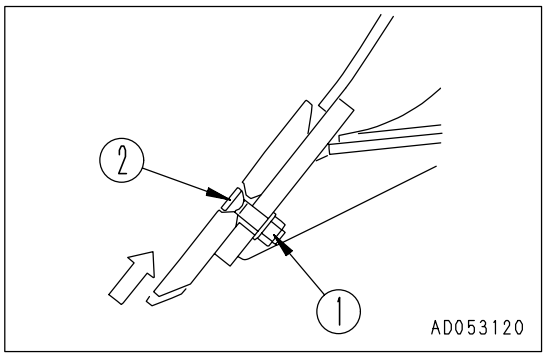
REMARK

- 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.

4. Remove the cutting edge and the end bit and clean the mounting surface.
5. Reverse or replace the cutting edge and the end bit when worn out.

   Tightening torque for mounting nut
   Semi U-dozer: 1330 - 1660 N·m (136 - 169 kgf·m, 983.7 - 1222.4 lbft)
   Angledozer: 738 - 999 N·m (75.3 - 101.9 kgf·m, 544.6 - 737 lbft)

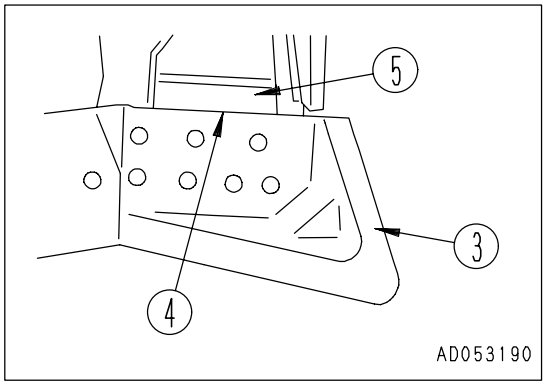
If bolt (2) and nut (1) are damaged, replace them with new ones at the same time.



Loosen nut (1) remove bolt (2), then replace or turn.

1) Install the cutting edge to the blade and tighten the bolt temporarily. Press the blade against the ground to eliminate the play of bolt (2), then tighten the bolt to the specified torque.

2) When installing end bit (3), put top face (4) of the end bit in tight contact with stopper (5), then tighten the bolt.



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

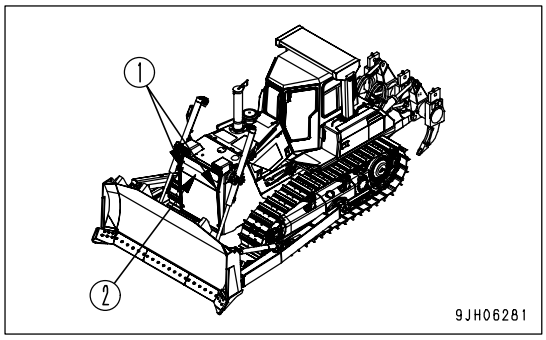
CLEAN, CHECK RADIATOR FINS

WARNING

For the cleaning and check, stop the engine without fail and confirm that the fan is not rotating, and carry out the work.
Be sure to close the radiator grille before turning the radiator fan so that no one will touch the turning fan carelessly.

When the radiator fins are blocked with mud, dirt, or debris, clean as follows.

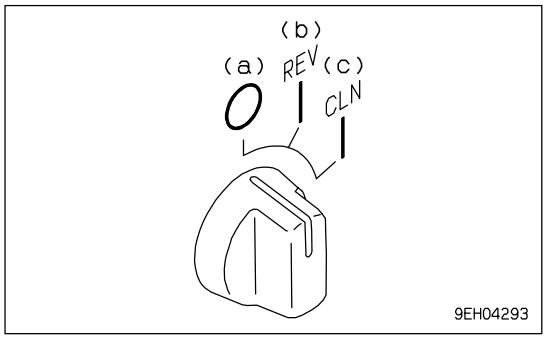
1. Remove four bolts (1) at corners of grill (2), then open the grill.



2. Clean the radiator fins with compressed air. Steam or water may be used instead of compressed air.

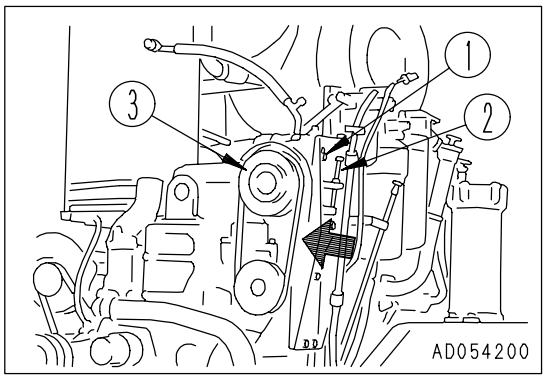
REMARK
Check the hydraulic cooler hoses. If any hose is cracked or hardened by age, replace with a new hose. Also check and tighten all loose hose clamps.

When cleaning the radiator fins, it is possible to reverse the direction of rotation of the fan to switch the direction of the air flow. Set the fan rotation selector switch to the CLN (c) position, then start the engine.
The fan will rotate in reverse at 100 percent speed, so the fins can be cleaned.
The fan rotation selector switch cannot be used when the engine is running.



REMARK
If dirt is caught in the radiator fins, blow with compressed air to clean.

REPLACE AIE CONDITIONER BELT

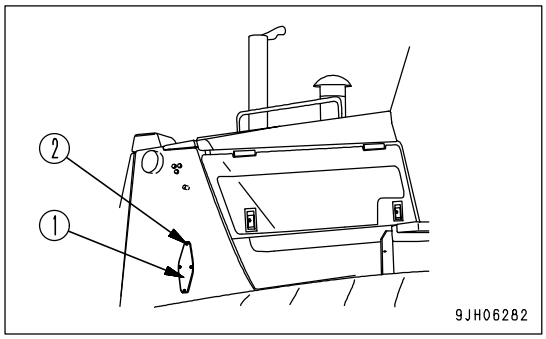


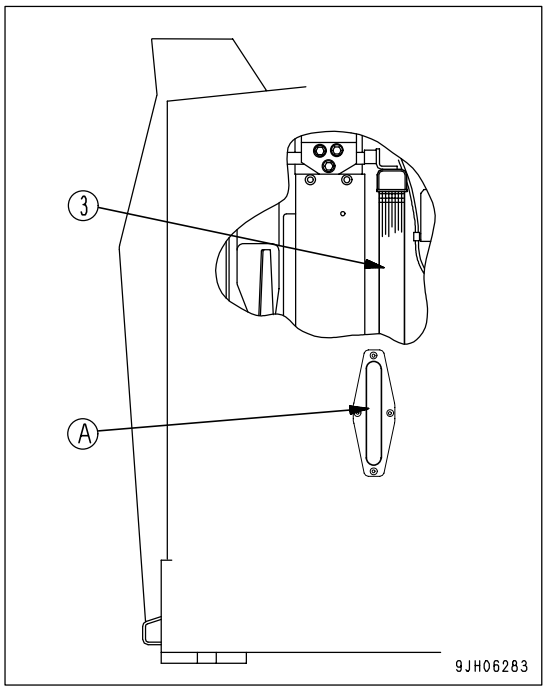
1. Loosen 4 bolts (1) and jack bolt (2), then move compressor (3) to the side.
2. Replace the V-belt.
   - When adjusting the V-belt, do not push the compressor directly with the bar. Use jack bolt (2).
3. Tighten jack bolt (2) and bolt (1) to apply tension to the V-belt. The deflection of the bolt should be approx. 10 mm (0.4 in) when the belt is pressed at the midpoint between the air compressor pulley and fan pulley with a finger force of approx. 6 kg (58.8 N).
   When the belt is a new part, it will stretch at first, so adjust the belt tension again without fail after 2 or 3 days.

CLEAN, CHECK HYDRAULIC COOLER FINS

If the hydraulic cooler fins are clogged or there is dirt caught in the fins, clean and check the fins.

1. Loosen 4 bolts (2) of cover (1) at the left side face of the radiator guard, then remove cover (1).
2. When cover (1) is removed, cleaning hole (A) can be seen. Carry out inspection and cleaning of the hydraulic cooler fins (3) through this hole.
3. Use compressed air to blow off the mud, dirt, or leaves clogging the hydraulic cooler fins. It is also possible to use steam or water in place of compressed air.

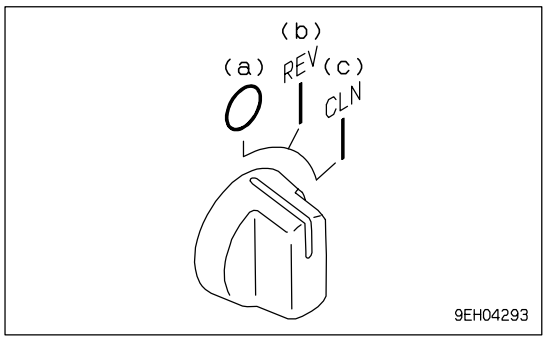




When cleaning the hydraulic cooler, it is possible to reverse the direction of rotation of the fan to switch the direction of the air flow. Set the fan rotation selector switch to the CLN (c) position, then start the engine.

The fan will rotate in reverse at 100 percent speed, so the fins can be cleaned.

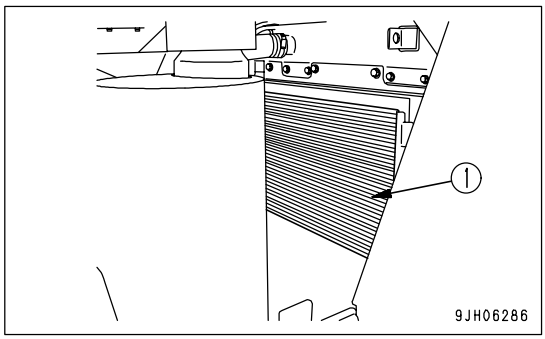
The fan rotation selector switch cannot be used when the engine is running.



CLEAN, CHECK AIR CONDITIONER CONDENSER FINS

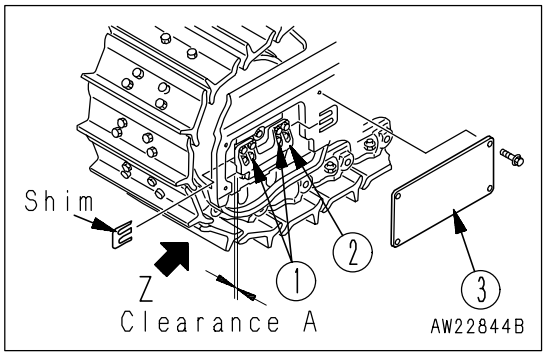
If the air conditioner fins become clogged, clean and inspect.

1. Open the engine side cover on the right side of the machine.
2. Use compressed air to blow off all the mud, dirt, and leaves clogging fins (1).



ADJUST IDLER CLEARANCE

The idler moves to the front and rear under external force. When this happens, guide plate (2) becomes worn. It guide plate (2) becomes worn, the idler will slip to the side or tilt at an angle. This will lead to the track shoe slipping or cause uneven wear, so adjust as follows.

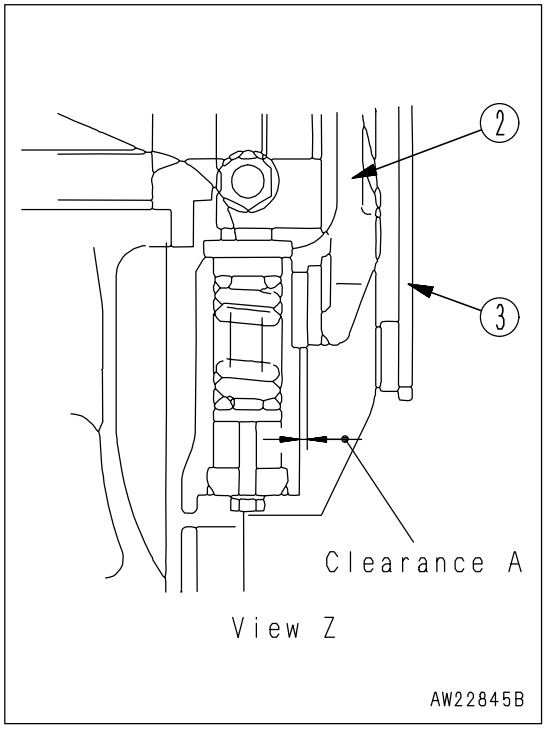


ADJUSTMENT

1. Travel on flat ground for 1 to 2 m (39.4 to 78.8 in), then remove cover (3) (both in and out of) on the side face of the idler.
2. Measure clearance A (4 places: left, right, inside, outside) between the track frame and guide plate.
3. If clearance A is more than 3 mm (0.118 in), loosen bolt (1), and remove the shim to adjust the clearance to a maximum of 0.5 to 1 mm (0.020 to 0.039 in) on each side.

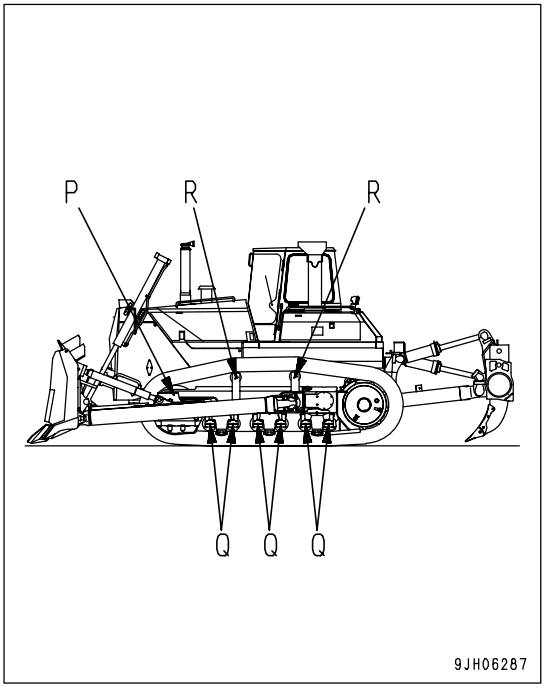
REMARK

The thickness of 1 shim is 1.0 mm (0.039 in).

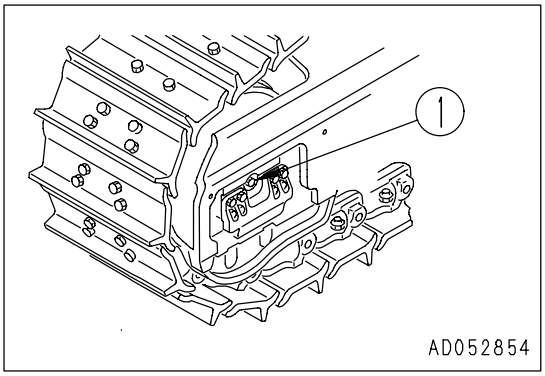


CHECK UNDERCARRIAGE OIL

Stop the machine on level ground, and check for any reduction in the oil at the idler (portion P), track roller (portion Q), bogie shaft (portion S), and carrier roller (portion R).

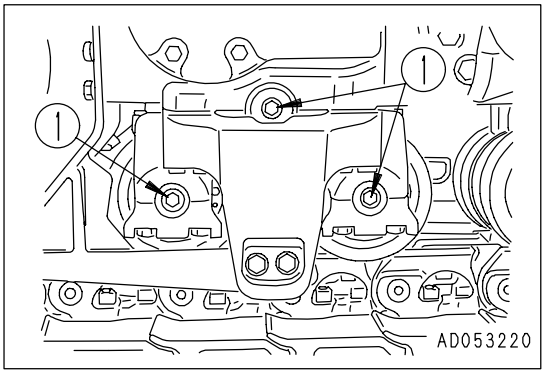


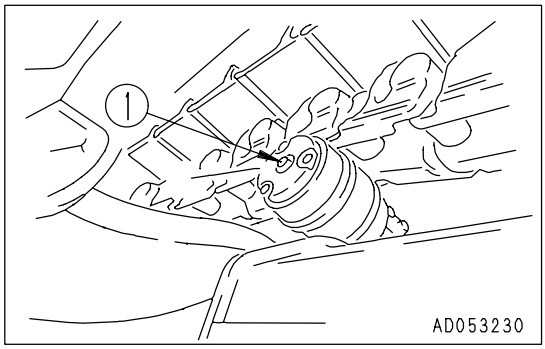
1. Loosen seal bolt (1) slowly and check if oil oozes out from the thread. If oil oozes out, the oil level has not gone down, so tighten the bolt.
2. If no oil comes out even when seal bolt is removed, the oil level is low. Contact your Komatsy distributor for repairs.



REMARK

- If the side cover is not removed, seal bolt (1) at the idler portion cannot be seen.
- There is 1 bogey shaft seal bolt (1) each on the inside and outside.

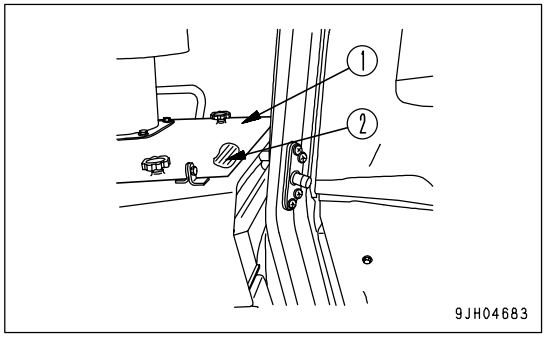




CLEAN AIR CONDITIONER AIR FILTER (FRESH/RECIRC FILTER)

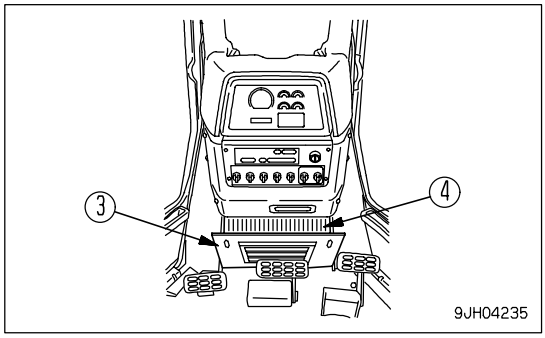
Clean the air conditioner air filter if it becomes clogged or if there is dirt or oil stuck to it.

1. Open inspection cover (1) on top of the hood, then remove pressure air filter (2).
2. Open inspection cover (3) under the front panel and pull up recirculation air filter (4) to remove it.
3. Clean filters (2) and (4) 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.



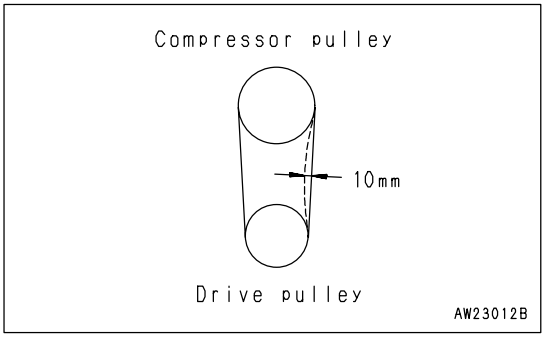
REMARK

If the filters cannot be cleaned with air or in water, replace them with new ones.



CHECK, ADJUST AIR CONDITIONER
(Machines equipped with cab)

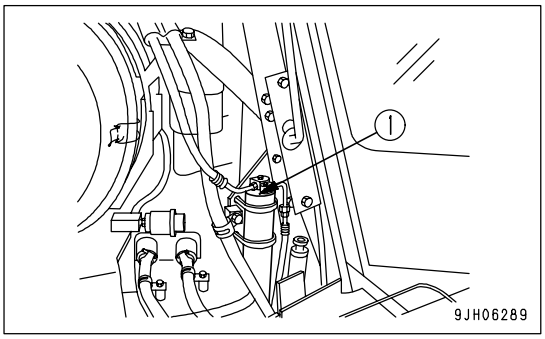
CHECK TENSION OF COMPRESSOR BELT
If the belt is loose, it will slip and will not be able to carry out cooling properly.
Check the belt tension from time to time. The deflection should be 10 mm (0.4 in) when pressed at a point midway between the drive pulley and compressor pulley with a finger force of approx. 6 kg (58.8 N).
When the V-belt is new, it will stretch at first, so always adjust it after 2 or 3 days.



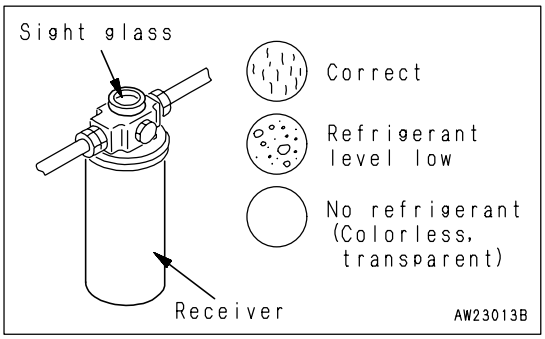
CHECK LEVEL OF REFRIGERANT(GAS)

WARNING

- **When handling refrigerant gas, always follow local laws and regulations.**
- **The refrigerant used in the cooler is colorless and odorless and does not harm the atmosphere, but 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.**



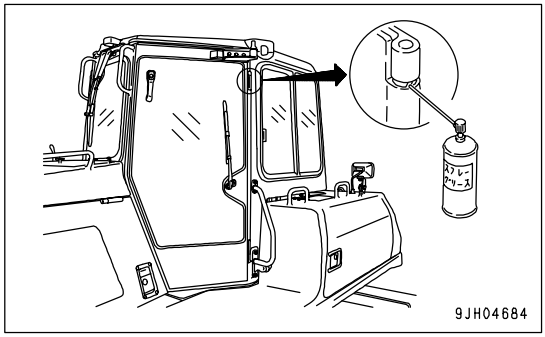
If the level of the refrigerant (gas) is low, the cooling effect will be reduced. Run the engine at high idling, and check the flow of the refrigerant in the refrigerant circuit through the sight glass of the receiver (1) when the cooler is running at high speed.
- No bubbles in refrigerant flow: Suitable
- Some bubbles in flow (bubbles pass continuously): Lack of refrigerant
- 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.
- New Freon R134a is used as the refrigerant.

LUBRICATE DOOR HINGE

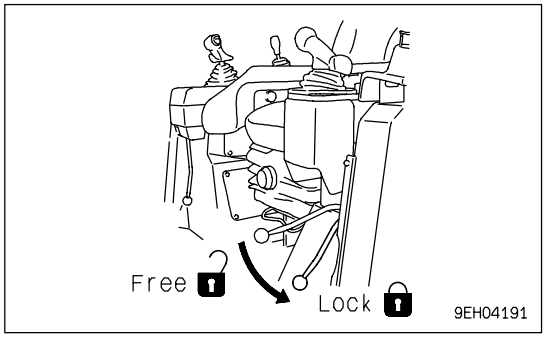
If the door makes a squeaking noise when it is opened or closed, spray lubricant in through the split in the hinge bushing.
If the bushing is worn, replace the hinge.



CHECK DOOR LATCH

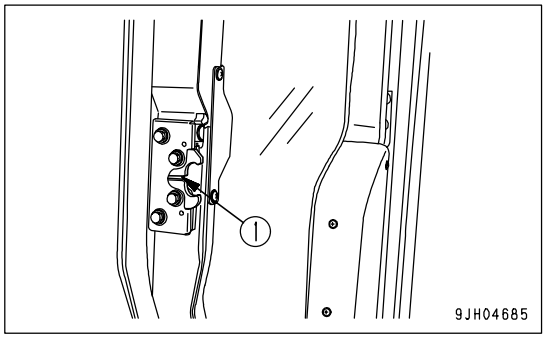
⚠ WARNING

If the control lever is touched by accident during checking, the machine moves off suddenly, and this may lead to serious injury or death.
Before checking door latch, stop the engine and set the parking lever securely to the LOCK position.



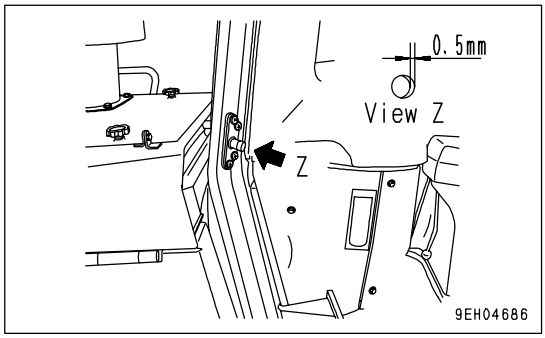
Check
Hold the door open-locked, and check that there is still grease inside the latch. If the amount of grease is low or there is no more grease, coat the inside of the latch with grease from portion (1).

REMARK
If there is no more grease inside the latch, the movement will become poor because of dust inside the latch, and the handle may be stiff when opening the door.



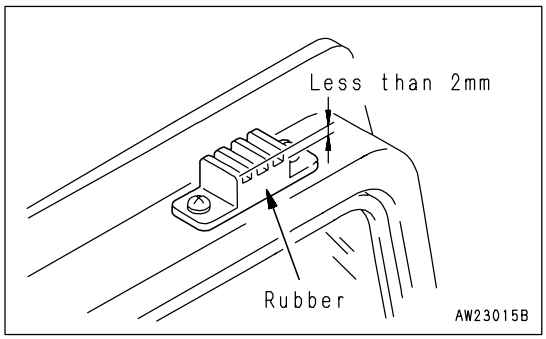
CHECK DOOR LOCK STRIKER

If the wear of the door lock striker exceeds 0.5 mm (0.02 in), replace the striker. If it is used at it is, the play will increase and this may result in breakage of the hinge or door lock.



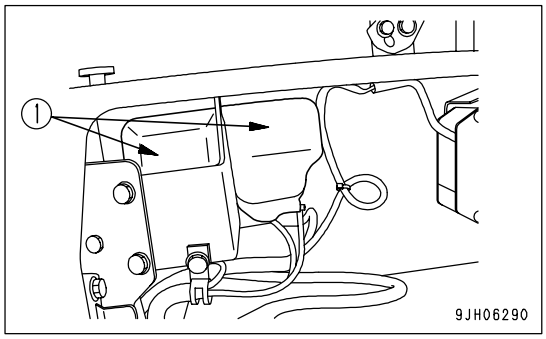
REPLACE DOOR DAMPER

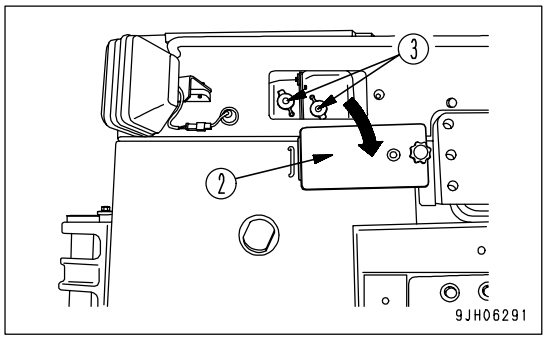
If the depth of the door damper rubber groove is less than 2 mm (0.08 in), replace the damper.
There are two dampers each at the top and bottom on the left and right doors.



CHECK WINDOW WASHER FLUID LEVEL, ADD FLUID

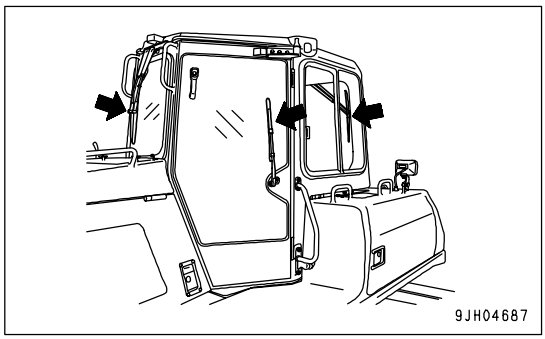
Check the fluid level if no window washer fluid is sprayed out.
Open the battery cover at the rear left of the machine and check the level of the fluid in window washer tank (1). If the level is low, remove top cover (2) and cap (3), then add automobile window washer fluid through the filler port.
When adding fluid, be careful not to let any dust get in.





REPLACE WIPER BLADE

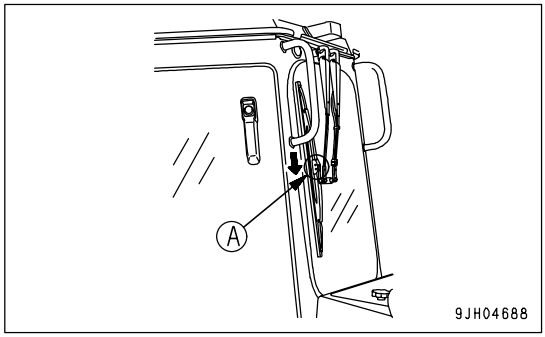
If the blade is damaged, it will not wipe the window clean, so replace the blade.



REPLACEMENT

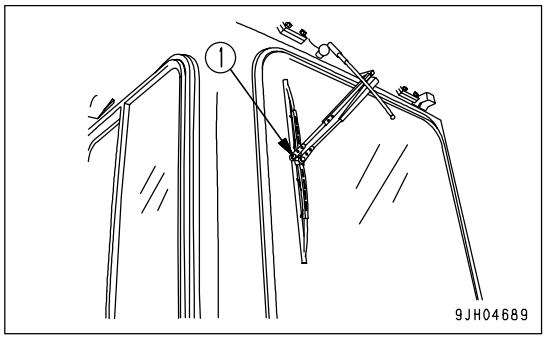
FRONT, REAR WIPER

1. It is hooked at portion (A), so move the blade in the direction of the arrow to remove it.
2. Install the new blade and hook it securely.



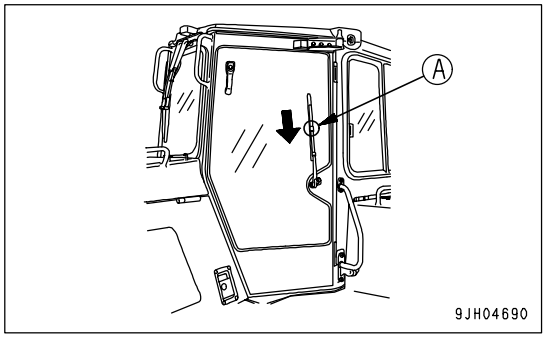
REAR WIPER

1. Remove E-ring (1).
   The blade can then be removed.
2. Install a new blade, then install securely with E-ring (1).



DOOR WIPER

1. It is hooked at portion (A), so move the blade in the direction of the arrow to remove it.
2. Install the new blade and hook it securely.



PROCEDURE FOR BLEEDING AIR FROM HYDRAULIC CIRCUIT

See "OPERATIONS AND CHECKS AFTER STARTING ENGINE (PAGE 3-91)".
Since the engine must be started and the blade must be operated, see OPERATION.

NOTICE

If the engine is run at high speed immediately after startup or a cylinder is pushed up to its stroke end, air taken inside the cylinder may cause damage to the piston packing.

1. Bleeding air from cylinders

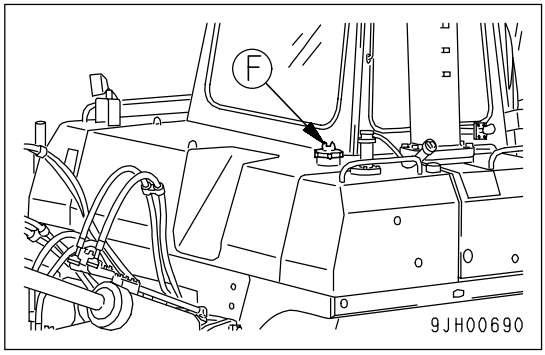
    1) Run the engine at low idling, and extend and retract each cylinder 4 to 5 times, taking care so that a cylinder may not be brought up to its stroke end. (Stop the cylinder approx. 100 mm (3.9 in) short of its stroke end)
    2) Next, operate each cylinder 3 to 4 times to the end of its stroke.
    3) Finally, operate each cylinder 4 to 5 times to the end of its stroke to completely remove the air.

PROCEDURE FOR RELEASING INTERNAL PRESSURE IN HYDRAULIC CIRCUIT

WARNING

- **The hydraulic system is always under internal pressure, so when inspecting or replacing the piping or hoses, always release the pressure in the circuit before starting. If the pressure is not released, high pressure oil may spurt out and cause serious personal injury.**
- **The parts and oil are at high temperature after the engine is stopped, and may cause serious burns. Wait for the temperature to go down before starting the operation.**
- **When the oil filler cap is removed, oil may spurt out, so turn the cap slowly to release the pressure before removing the cap.**

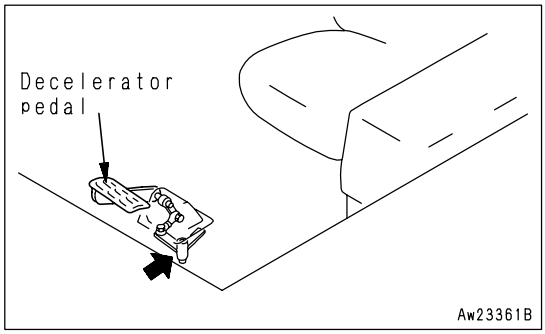
1. Stop the machine on firm level ground.
2. Lower the blde to the ground, then stop the engine.
3. To release the internal pressure, operate the blade control lever in each direction to the end of its stroke within 15 seconds after stopping the engine.
4. Loosen oil filler cap (F) at the top of the hydraulic tank slowly to release the internal pressure.
5. Start the engine, run it at low idling for approx. 5 seconds, then stop the engine and operate the work equipment control lever to the front, rear, left, and right.
   - Repeat the above Step 3 2 - 3 times to completely remove the remaining pressure.



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.

Fuel control (1 place)



CHECK BEFORE STARTING

For details of the following items, see "CHECK BEFORE STARTING (PAGE 3-69)".

- Check monitor panel
- Check coolant level, add coolant
- Check fuel level, add fuel
- Check water separator, drain water and sediment
- Drain water, sediment from fuel tank
- Check oil level in engine oil pan, add oil
- Check oil level in power train case, add oil
- Check brake pedal travel
- Check damper case oil level, add oil
- Check oil level in hydraulic tank, add oil
- Check dust indicator
- Check electric wiring
- Check that lamps light up
- Check horn sound
- Check back-up alarm sound
- Check seat belt for wear or damage
- Adjust mirror
- Adjust joystick
- Adjust armrest

EVERY 250 HOURS SERVICE

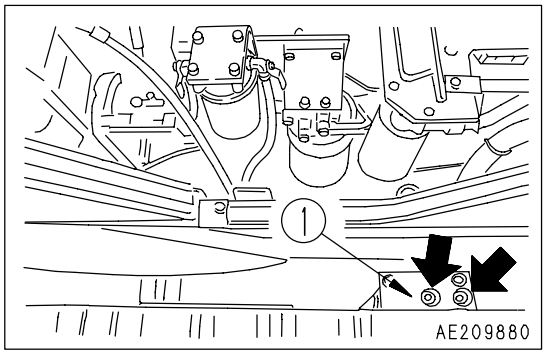
LUBRICATING

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.

• Grease equalizer bar side pin (4 places)

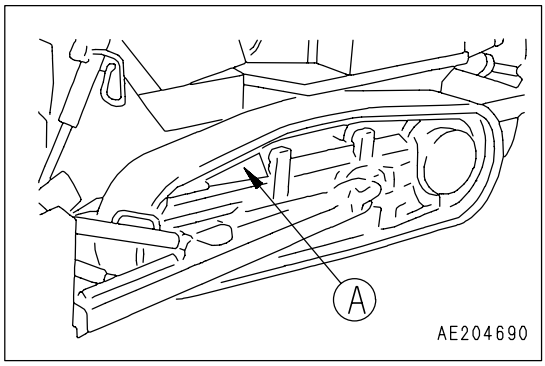
Left and right sides of machine: 2 places each

1) Remove all soil and mud from the top of track frame and cover (1).



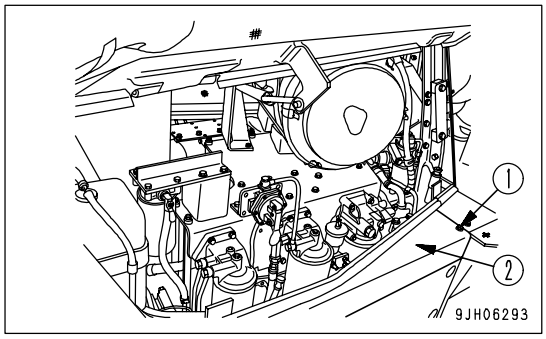
2) Climb on top of the straight frame and remove the red plug from (A) between the track frame and track shoe.
3) Carry out the greasing from the top of the track shoe.

Parts to use (supplied parts)
- Grease pump ass'y (07952-80002)
- Nozzle (07951-41043): Tube type

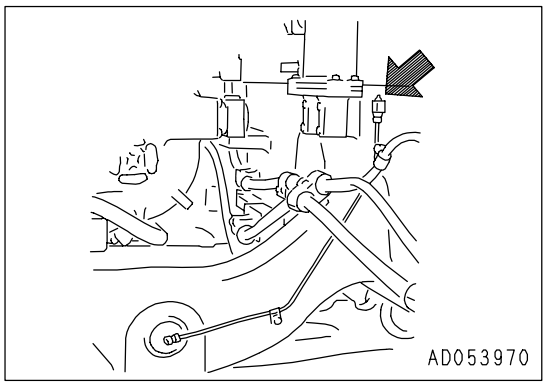


• Grease equalizer bar center pin (1 place)

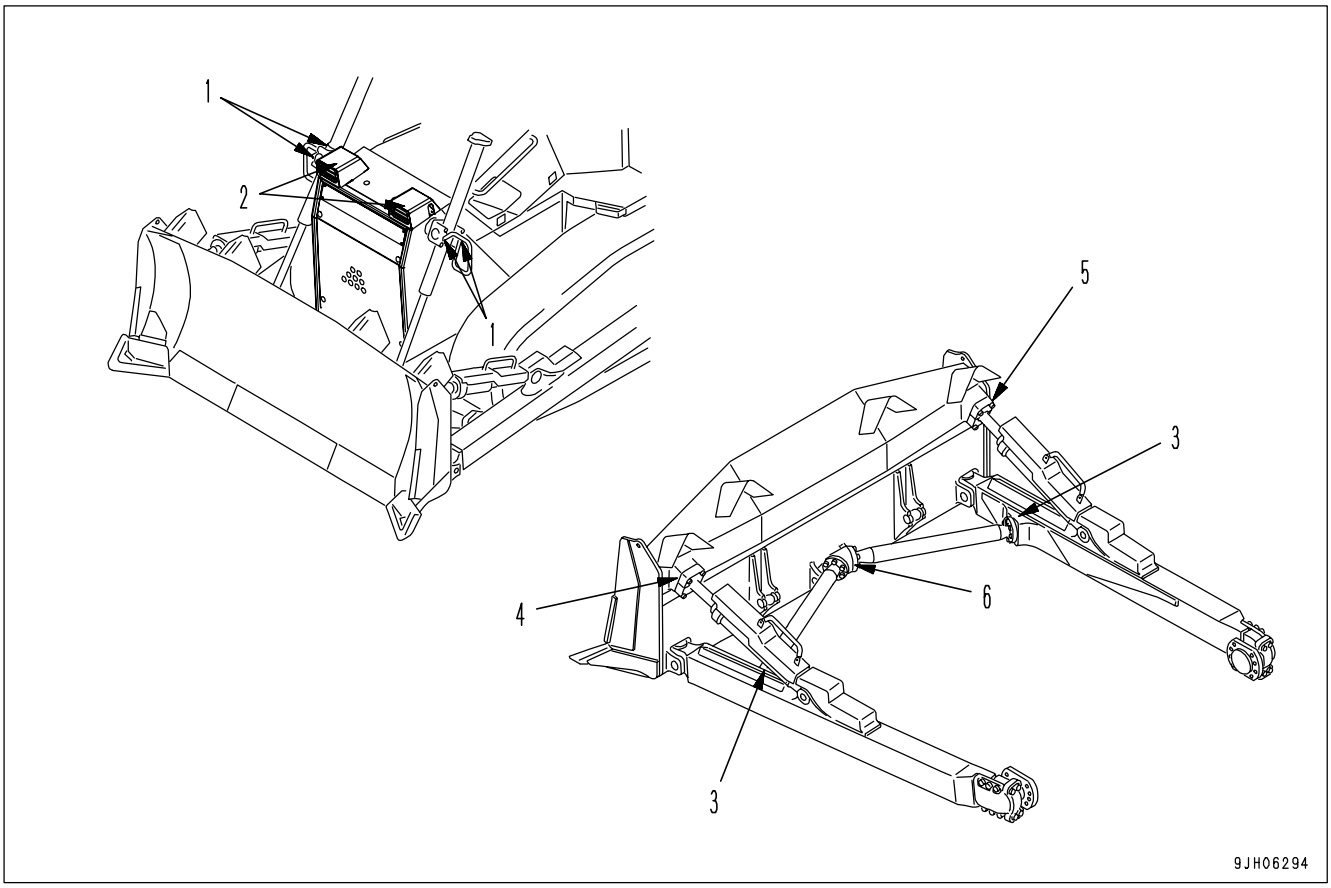
1) Open the engine side cover at the left of the machine, then remove 2 bolts (1).
2) Pull hinged cover (2) and open.



3) Pump in grease through the grease fitting marked by the arrow.
4) Return hinged cover (2) to its original position, install bolts (1) to hold in position, then close the engine side cover on the left side of the machine.

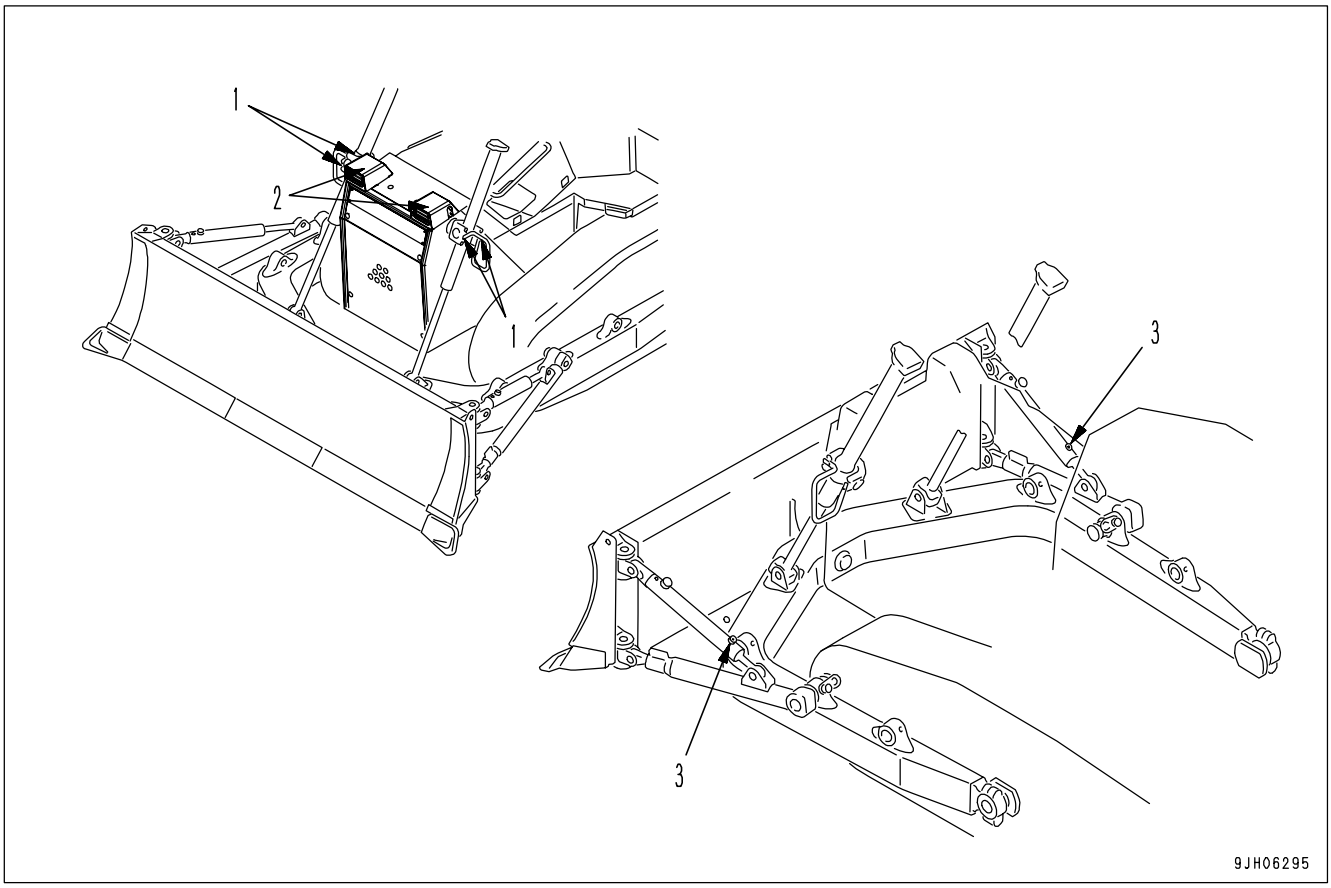


• Power tiltdozer



(1) Lift cylinder support yoke (4 places)
(2) Lift cylinder support shaft (2 places)
(3) Blade arm (2 places)
(4) Tilt cylinder ball joint (1 place)
(5) Pitch cylinder ball joint (1 place)
(6) Blade center link (1 place)

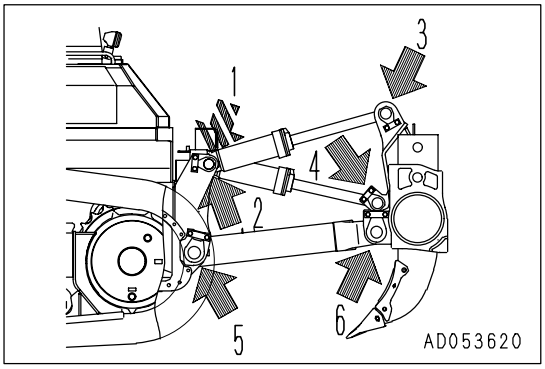
• Angledozer



(1) Lift cylinder support yoke (4 places)
(2) Lift cylinder support shaft (2 places)
(3) Tilt brace thread (2 places)

• Ripper

(1) Tilt cylinder bottom pin (2 places)
(2) Lift cylinder bottom pin (2 places)
(3) Tilt cylinder rod end pin (2 places)
(4) Lift cylinder rod end pin (2 places)
(5) Arm pin (front) (2 places)
(6) Arm pin (rear) (2 places)

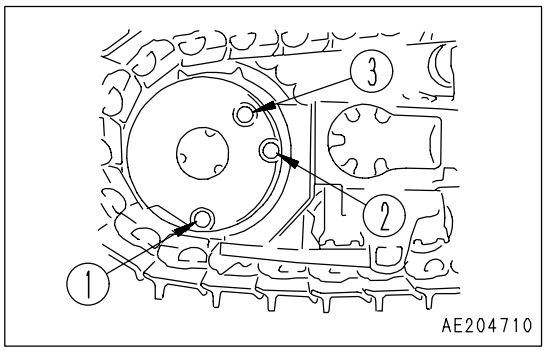


CHECK OIL LEVEL IN FINAL DRIVE CASE, ADD OIL

⚠ WARNING

The oil is at high temperature immediately after the machine has been operated. Wait for the oil to cool down before starting the operation.

1. Stop the machine so that drain plug (1) is at the bottom.
2. Remove oil level plug (2) and check whether the final drive case is filled with oil to lower edge of the plug hole.
3. If the oil level is low, remove plug (3) and add engine oil until it overflows from oil level plug (2).



CHECK LEVEL OF BATTERY ELECTROLYTE

Carry out this check before operating the machine.

⚠ WARNING

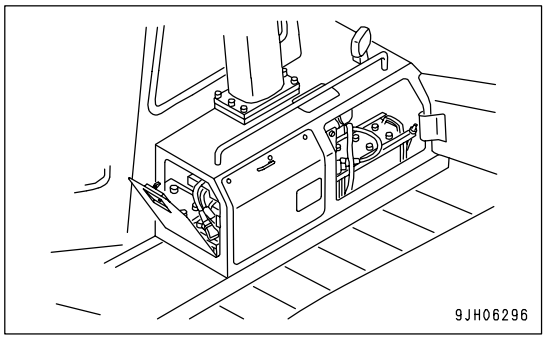
- **Do not use the battery if the battery electrolyte level is below the LOWER LEVEL line. This will accelerate deterioration of the inside of the battery and reduce the service life of the battery. In addition, it may also cause an explosion.**
- **The battery generates flammable gas and there is danger of explosion, so 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 a large amount of water and consult a doctor.**
- **When adding distilled water to the battery, do not allow the battery electrolyte to go above the UPPER LEVEL line. If the electrolyte level is too high, it may leak and cause damage to the paint surface or corrode other parts.**

NOTICE

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

Inspect the battery electrolyte level at least once a month and follow the basic safety procedures given below.

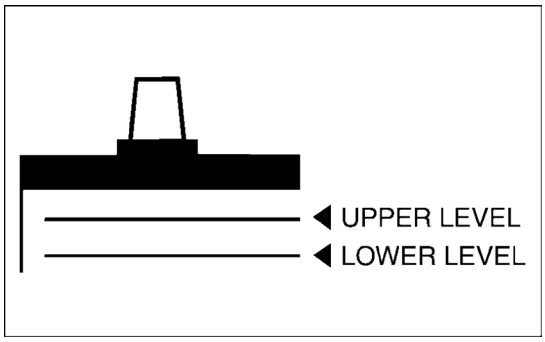
Open battery cover at the left side of the machine.



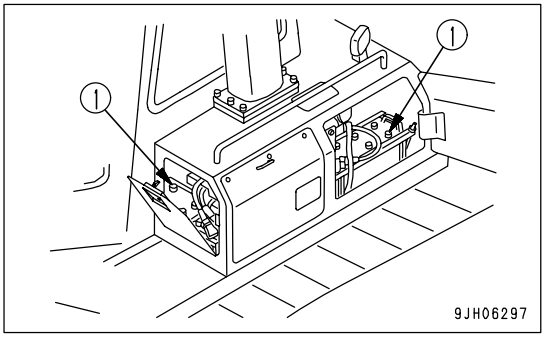
WHEN CHECKING ELECTROLYTE LEVEL FROM SIDE OF BATTERY

If it is possible to check the electrolyte level from the side of the battery, check as follows.

1. Use a wet cloth to clean the area around the electrolyte level lines and check that the electrolyte level is between the UPPER LEVEL (U.L.) and LOWER LEVEL (L.L.) lines.
   If the battery is wiped with a dry cloth, static electricity may cause a fire or explosion.



2. If the electrolyte level is below the midway point between the U.L and L.L lines, remove cap (1) and add distilled water to the U.L line.
3. After adding distilled water, tighten cap (1) securely.



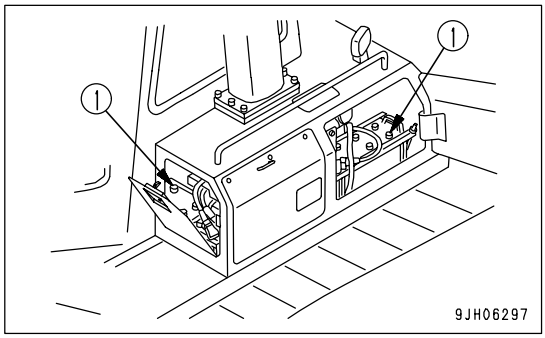
REMARK

If distilled water is added to above the U.L. line, use a syringe to lower the level to the U.L. line. Neutralize the removed fluid with baking soda (sodium bicarbonate), then flush it away with a large amount of water or consult your Komatsu distributor or battery maker.

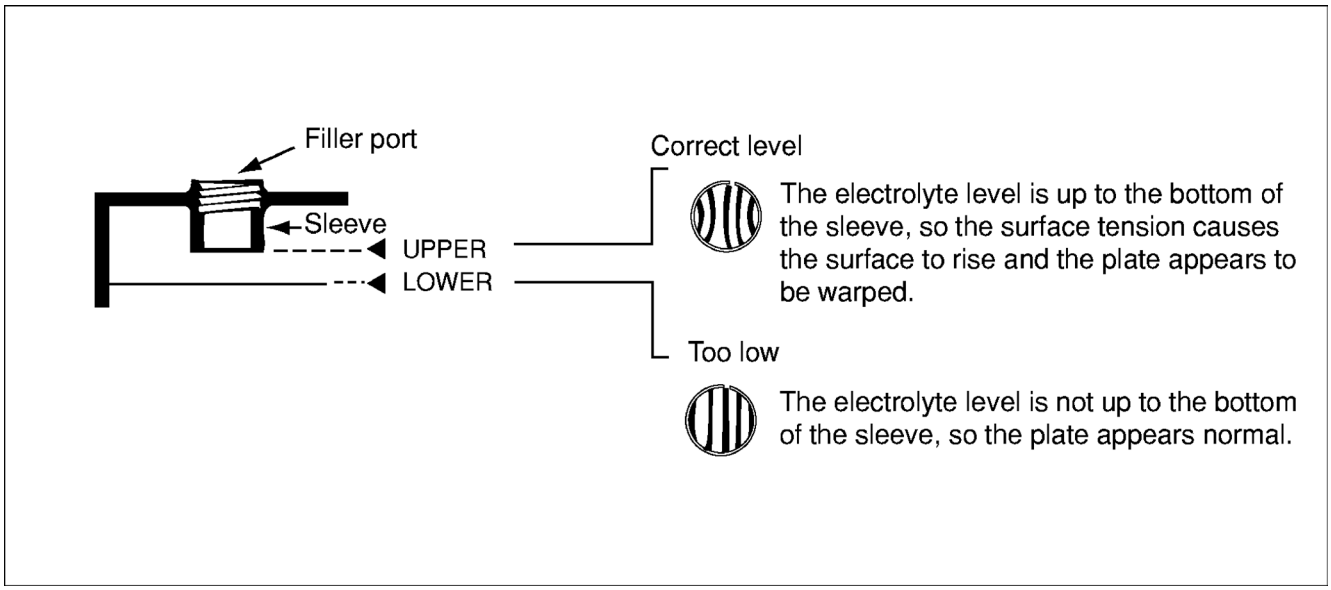
WHEN IT IS IMPOSSIBLE TO CHECK ELECTROLYTE LEVEL FROM SIDE OF BATTERY

If it is impossible to check the electrolyte level from the side of the battery, or there is no display of the UPPER LEVEL line on the side of the battery, check as follows.

1. Remove cap (1) at the top of the battery, look through the water filler port, and check the electrolyte surface. If the electrolyte does not reach the sleeve, add distilled water so that the level reaches the bottom of the sleeve (UPPER LEVEL line) without fail.



Use the diagram below for reference, and check if the electrolyte reaches the bottom of the sleeve.



2. After adding distilled water, tighten cap (1) securely.

REMARK

If distilled water is added to above the bottom of the sleeve, use a syringe to lower the level to the bottom of the sleeve. Neutralize the removed fluid with baking soda (sodium bicarbonate), then flush it away with a large amount of water or consult your Komatsu distributor or battery maker.

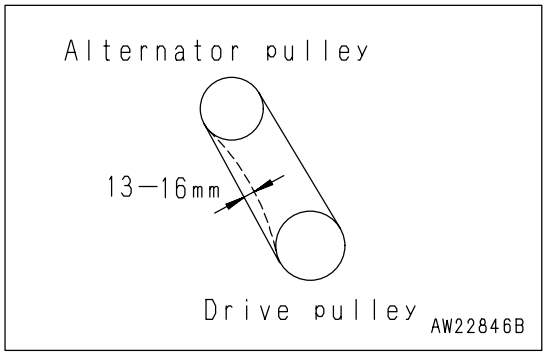
WHEN IT IS POSSIBLE TO USE INDICATOR TO CHECK ELECTROLYTE LEVEL

If it is possible to use and indicator to check the electrolyte level, follow the instructions given.

CHECK ALTERNATOR DRIVE BELT TENSION, ADJUST

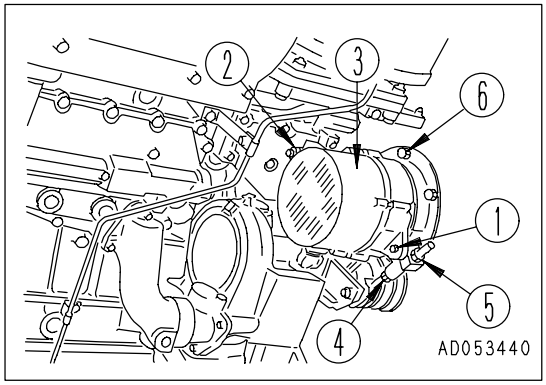
CHECKING

The standard deflection for the drive belt is approx.13 to 16 mm (0.51 to 0.63 in) when pressed by thumb (approx.10 kg (22.05 lb)) at a point midway between the drive pulley and alternator pulley.



ADJUSTING

1. Remove cover mounting bolts (6) (2 places), and remove the cover.
2. Loosen bolts and nuts (1), (2), and (5), then turn nut (4) and adjust the belt tension.
3. After adjusting, tighten bolts and nuts (1), (2), and (5), to secure alternator (3) in position.
4. Reinstall the cover removed in step 1. Confirm that no part of the cover touches any turning part of the alternator.



REMARK

- Check each pulley for damage, wear of the V-groove, and wear of the V-belt. In particular, be sure to check that the V-belt is not touching the bottom of the V-groove.
- If any pulley is defective, ask your Komatsu distributor to replace it.
- If any belt has stretched and there is no allowance for adjustment, or if there are cuts or cracks on any belt, replace both belts at the same time.
- When adjusting the V-belt, do not push the tension pulley directly with a steel bar, etc., but put a wood piece, etc. between the pulley and bar.
- After replacing the V-belt, operate for 1 hour, then check and adjust the belt tension again.

CHECK BRAKE PERFORMANCE

WARNING

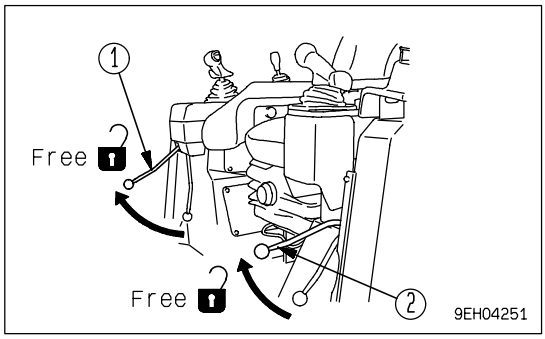
If the machine moves during the following operation, please contact your Komatsu distributor for repairs immediately.

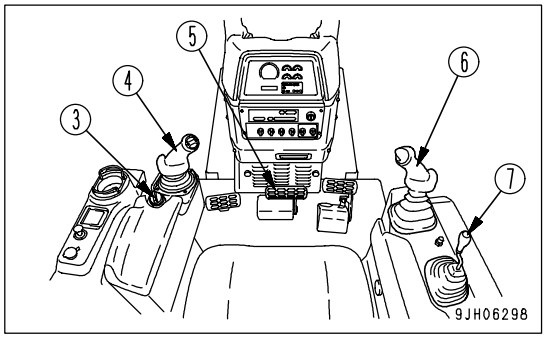
NOTICE

Do not place the joystick in the 1st speed position.
Otherwise, it will cause damage to the machine.

Before starting the engine, check that the area around the machine is safe, then do as follows.

1. Start the engine.
2. After completing the warm-up operation, set fuel control dial (3) to the SLOW position.
3. Set safety lever (1) to the FREE position then operate blade control lever (6) and ripper control lever (7) to raise the blade and ripper.
   Leave the safety lever (1) to the FREE position.
4. Set parking lever (2) to the FREE position.
5. Depress brake pedal (5), set joystick (4) in FORWARD, then press the shift up button to enter 2nd speed.
6. Operate fuel control dial (3) and gradually raise the engine speed to full throttle. (Keep the brake pedal depressed.)
7. Check that the machine does not move. This indicates that brake performance is normal.





EVERY 500 HOURS SERVICE

Maintenance for every 250 hours should be performed at the same time.

REPLACE FUEL FILTER CARTRIDGE

WARNING

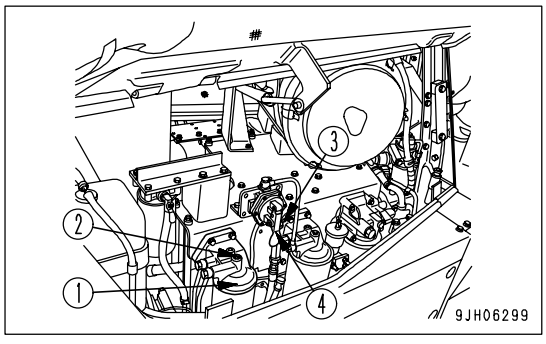
- **After the engine has been operated, all parts are at high temperature, so do not replace the filter immediately. Wait for all parts to cool down before starting the operation.**
- **High pressure is generated inside the engine fuel piping system when the engine is running.**
  When replacing the filter, wait for at least 30 seconds after stopping the engine to let the internal pressure go down before replacing the filter.
- **Do not bring any fire or flame close.**

NOTICE

- **Genuine Komatsu fuel filter cartridges use a special filter that has highly efficient filtering ability. When replacing the filter cartridge, always use a genuine Komatsu part.**
- **The common rail fuel injection system used on this machine consists of more precise parts than the conventional injection pump and nozzle.**
  If any part other than a genuine Komatsu filter cartridge is used, dust or dirt may get in and cause problems with the injection system. Always avoid using substitute parts.
- **When carrying out inspection or maintenance of the fuel system, pay more attention than normal to the entry of dirt. If dirt is stuck to any part, use fuel to wash it off completely.**

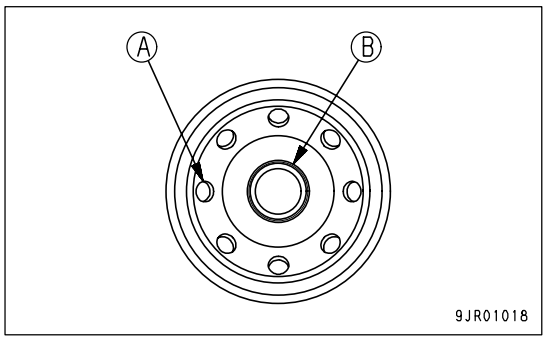
- Container to catch the oil
- Filter wrench

1. Set the container to catch the fuel under the filter cartridge.
   - The fuel filter is found by opening the engine side cover at the left of the machine.
2. Using a filter wrench, turn filter cartridge (1) counterclockwise to remove it.
3. Clean the filter holder, fill the new filter cartridge with clean fuel, coat the packing surface thinly with engine oil, then install to the filter holder.



NOTICE

- **When adding fuel, do not remove cap (B). Always add fuel from the 8 small holes (A) on the dirty side.**
- **After adding fuel, remove cap (B) and install the fuel filter.**
- **Always fill with clean fuel. Be careful not to let any dirt or dust get into the fuel. In particular, center portion is the clean side, so do not remove cap (B) when adding fuel. Be careful not to let dirt or dust get into center portion on the clean side.**



4. 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.
5. After completion of the replacement of fuel filter cartridge (1), bleed the air.

Bleed the air as follows.

6. Add fuel to the fuel tank until full (to FULL mark on the fuel gauge).
7. After replacing filter cartridge (1), loosen air bleed plug (2).
8. Remove lock bolt (3) from the priming pump, then pump lever (4) backwards and forwards until no more bubbles come out with the fuel from air bleed plug (2).
9. Tighten air bleed plug (2), install lock bolt (3) to the priming pump, and lock lever (4).
   Use a genuine Komatsu part for the fuel filter cartridge. After replacing the filter cartridge, run the engine, and check for any leakage of oil from the filter seal surface.

REPLACE EXTRA FUEL FILTER CARTRIDGE (WHEN EQUIPPED)

⚠ WARNING

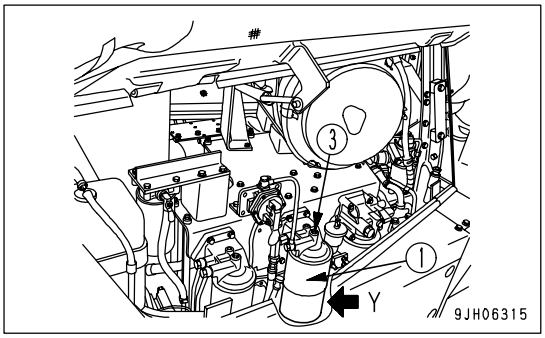
- **After the engine has been operated, all parts are at high temperature, so do not replace the filter immediately. Wait for all parts to cool down before starting the operation.**
- **High pressure is generated inside the engine fuel piping system when the engine is running.**
  When replacing the filter, wait for at least 30 seconds after stopping the engine to let the internal pressure go down before replacing the filter.
- **Do not bring any fire or flame close.**

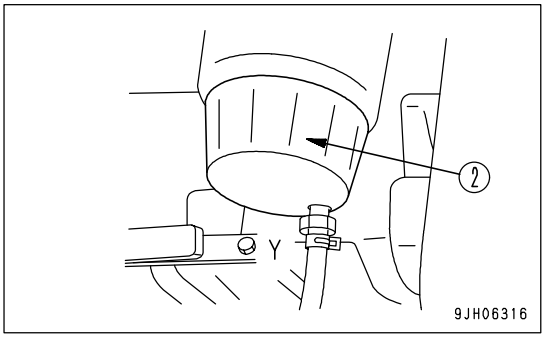
NOTICE

- **Genuine Komatsu fuel filter cartridges use a special filter that has highly efficient filtering ability. When replacing the filter cartridge, always use a genuine Komatsu part.**
- **The common rail fuel injection system used on this machine consists of more precise parts than the conventional injection pump and nozzle.**
  If any part other than a genuine Komatsu filter cartridge is used, dust or dirt may get in and cause problems with the injection system. Always avoid using substitute parts.
- **When carrying out inspection or maintenance of the fuel system, pay more attention than normal to the entry of dirt. If dirt is stuck to any part, use fuel to wash it off completely.**

- Container to catch the oil
- Filter wrench

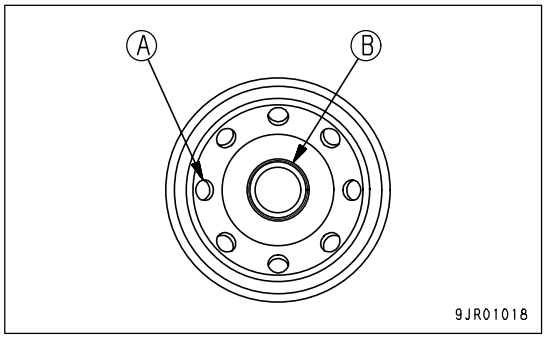
1. Set the container to catch the fuel under the additional fuel filter cartridge.
2. Using a filter wrench, turn filter cartridge (1) counterclockwise to remove it.
3. After removing the cartridge, turn cup (2) of the water separator installed to the bottom of the cartridge counterclockwise. (This cup is used again.)
4. Install cup (2) to the bottom of the new additional fuel filter cartridge. (When doing this, always replace the O-ring with a new part.)
   - Cup tightening torque: 10 N·m (1.0 kgf·m, 7.2 lbft)
5. Clean the filter holder, fill the new filter cartridge with clean fuel, coat the packing surface thinly with engine oil, then install to the filter holder.





NOTICE

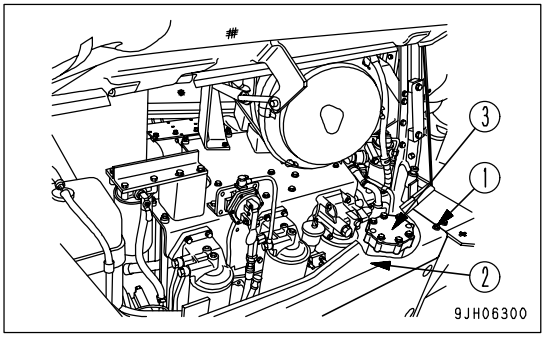
- **When adding fuel, do not remove cap (B). Always add fuel from the 8 small holes (A) on the dirty side.**
- **After adding fuel, remove cap (B) and install the fuel filter.**
- **Always fill with clean fuel. Be careful not to let any dirt or dust get into the fuel. In particular, center portion is the clean side, so do not remove cap (B) when adding fuel. Be careful not to let dirt or dust get into center portion on the clean side.**



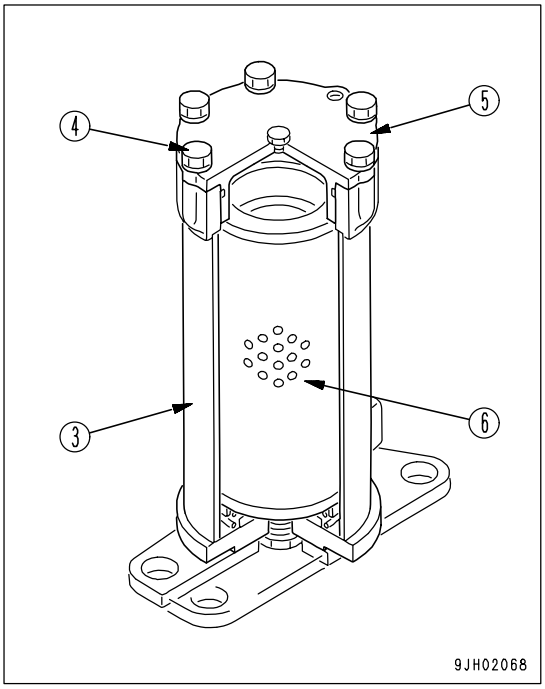
6. When installing, tighten until the packing surface contacts the seal surface of the filter holder, then tighten it up 1/2 to 3/4 of a turn.
   If the filter cartridge is tightened too far, the packing will be damaged and this will lead to leakage of fuel. If the filter cartridge is too loose, fuel will also leak from the packing, so always tighten to the correct amount.
   - When tightening with a filter wrench, be extremely careful not to dent or damage the filter.
7. After completion of the replacement of fuel filter cartridge (1), bleed the air.
   Bleed the air as follows.
8. Add fuel to the fuel tank until full (to FULL mark on the fuel gauge).
9. After replacing filter cartridge (1), loosen air bleed plug (3) and add fuel until no more bubbles come out in the fuel from the air bleed plug.
10. After replacing the filter cartridge, start the engine and check for any leakage of fuel from the filter seal surface.

REPLACE POWER TRAIN OIL FILTER ELEMENT

1. Open the engine side cover at the left side of the machine, remove bolt (1) then open cover (2) to the outside using the bottom hinged as a pivot.



2. Remove mounting bolt (4) of filter (3), then remove cover (5).
3. Take out element (6).
4. Clean the removed parts and the inside of the case, then install a new element.
   Use Komatsu genuine element.
5. Close cover (2) and tighten bolt (1), then close the engine side cover at the left side of the machine.

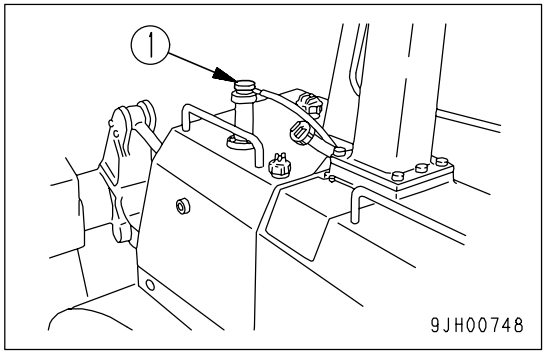


REPLACE HYDRAURIC TANK BREATHER ELEMENT

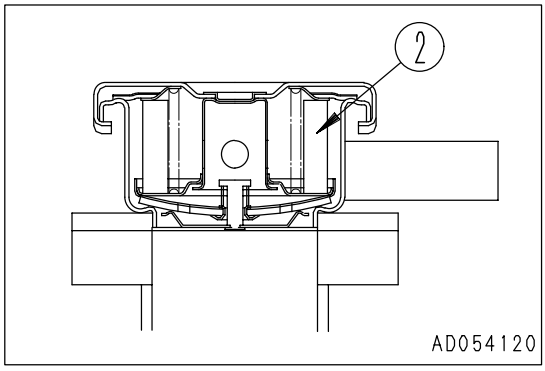
WARNING

Replace the element when the oil is cold.
When removing breather cap (1), turn it slowly to release the internal pressure before removing it.

1. Remove breather cap (1) at the top of the hydraulic tank.



2. Replace element (2) inside the cap.



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

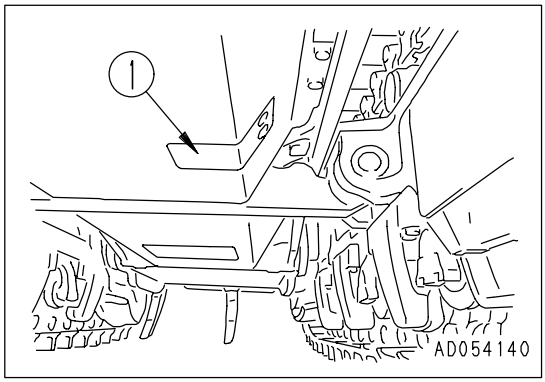
WARNING

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.

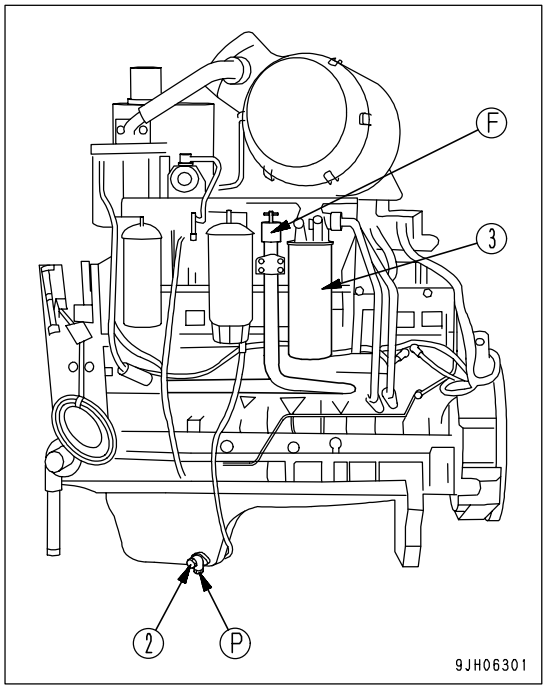
- Oil replacement amount: 37 liters (9.77US gal)
- Prepare a socket wrench and filter wrench.

After the machine has been operated for 6 months, even if it has not been operated for 500 hours, change the engine oil and replace the filter cartridge at 6 months.
And after the machine has been operated for 500 hours, even if it has not been operated for 6 months, change the engine oil and replace the filter cartridge at 500 hours.

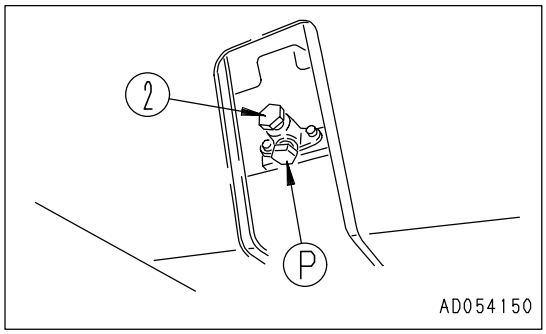
1. Remove the cover (1) on the bottom of the machine and set a container to catch the drained oil directly under the drain plug.



2. Taking care not to get oil over yourself, remove drain plug (P) slowly, then loosen drain valve (2) and drain the oil.
   Be careful not to loosen the drain valve too much and deform the stopper pin inside the valve.
3. Check the drained oil, and if there are excessive metal particles or foreign material, please contact your Komatsu distributor.
4. Tighten drain plug (P) and drain valve (2).
   Tightening torque for drain plug (P): 68.6 ± 9.81 N·m (7 ± 1 kgf·m, 50.6 ± 7.2 lbft)
   Tightening torque for drain valve (2): 63.7 ± 14.7 N·m (6.5 ± 1.5 kgf·m, 47 ± 10.8 lbft)
5. Using the filter wrench, turn full-flow filter cartridge (3) to the left and remove it.
   To prevent getting oil on yourself, do not carry out this operation from immediately under the cartridge.
6. Clean the filter holder, fill the new filter cartridge with engine oil, coat the packing surface and thread with engine oil (or coat it thinly with grease), then install the filter cartridge.



REMARK
Check that the old packing is not stuck to the filter holder. If the old packing is stuck to the holder, it will cause oil leakage.



7. When installing, bring the packing face into contact with the filter holder, then tighten a further 3/4 - 1 turn.
   - When using a filter wrench to tighten, be extremely careful not to damage or dent the filter.
8. After replacing the filter cartridge, add engine oil through oil filler port (F) so that the oil level is between the H and L marks on dipstick (G).
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 "CHECK OIL LEVEL IN ENGINE OIL PAN, ADD OIL (PAGE 3-73)".

EVERY 1000 HOURS SERVICE

Maintenance for every 250 and 500 hours should be performed at the same time.

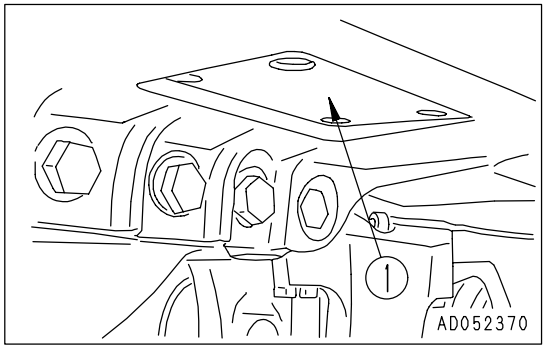
CHANGE OIL IN POWER TRAIN CASE, WASH STRAINERS(POWER TRAIN PUMP STRAINER, SCAVENGING PUMP STRAINER)

⚠ WARNING

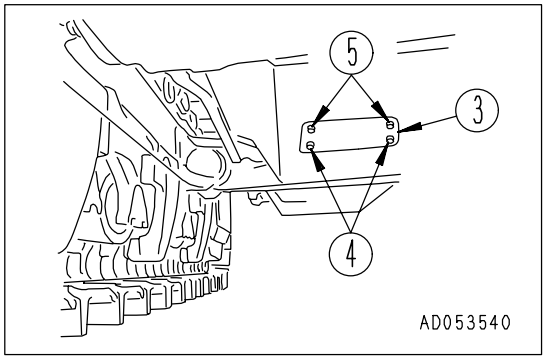
- **The oil is at high temperature immediately after operations, so wait for the temperature to go down before starting the operation.**
- **The undercover is heavy. Do not go directly under the cover when opening or closing it. When removing bolts (5), carry out the operation at the rear of the point immediately under the cover so that it is possible to escape at any time.**
  Prepare the following.

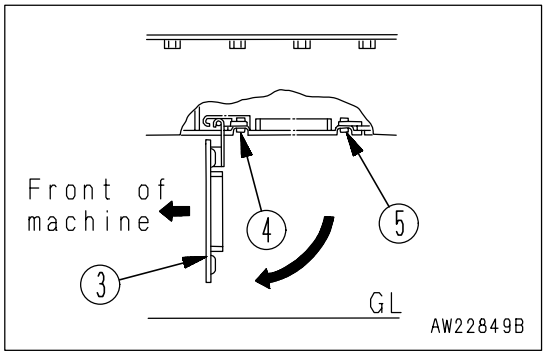
- Oil replacement amount: 45 liters (11.89 US gal)

1. Remove drain cover (1) on the left side at the bottom of the power train case, pull out drain hose (2) from the takeoff port, then loosen drain plug (P1) and drain the oil.
   After draining the oil, tighten drain plug (P1).
   Do not remove drain plug (P1).

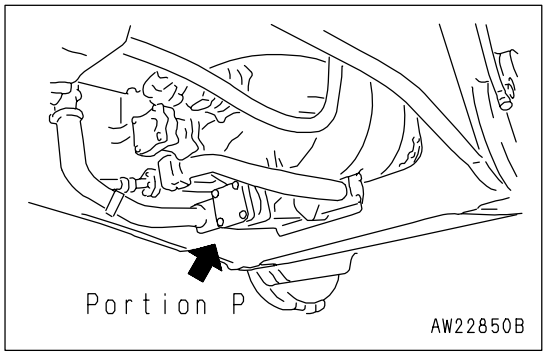


2. Remove inspection cover (3) of the undercover at the bottom rear of the machine as follows.
   1) Remove 2 bolts (4) at the machine front end.
   2) Hold down cover (3) and remove 2 bolts (5) at the machine rear end gradually. (Rainwater or other accumulated water may flow out, so be careful.)
   3) Lower cover (3) gradually and open it. (The front side of the cover is hinged.)
      The strainer can be seen at top portion P.
3. Loosen mounting bolt (6) of the power train strainer, and remove cover (7).
4. Remove spring (8), then remove strainer (9).
5. Remove any dirt stuck to strainer (9), then wash it in clean diesel oil or flushing oil. Wash the removed parts and the inside of the case at the same time.

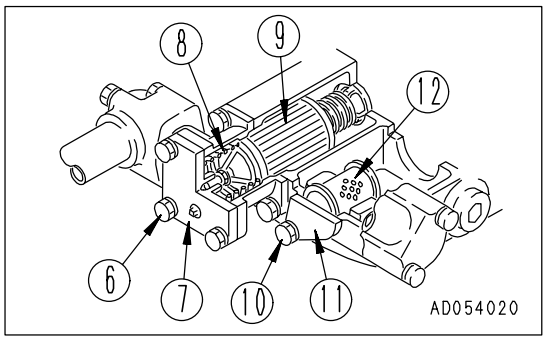




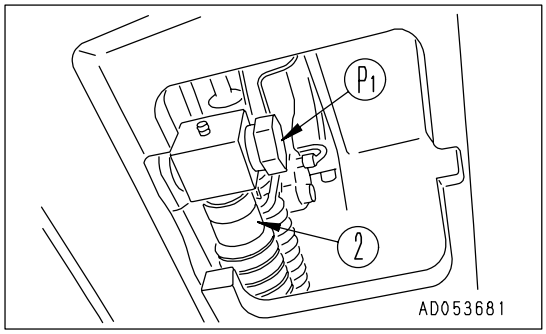
6. Loosen mounting bolt (10) of the scavenging pump strainer, then remove cover (11).



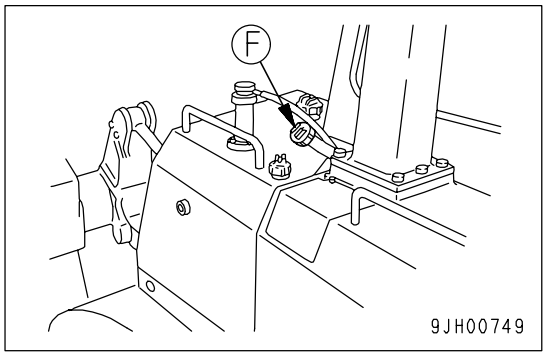
7. Remove strainer (12).
8. Remove any dirt stuck to strainer (12), then wash it in clean diesel oil or flushing oil. Wash the removed parts and the inside of the case at the same time.
9. Install the strainers to their original position.



10. Replace the power train oil filter element. For details, see "REPLACE POWER TRAIN OIL FILTER ELEMENT (PAGE 4-56)".



11. Refill the specified quantity of engine oil through oil filler (F).
12. After filling with oil, check that the oil is at the specified level. For details, see "CHECK OIL LEVEL IN POWER TRAIN CASE, ADD OIL (PAGE 3-74)".
    If the spring or strainer are damaged, replace them with a new part.



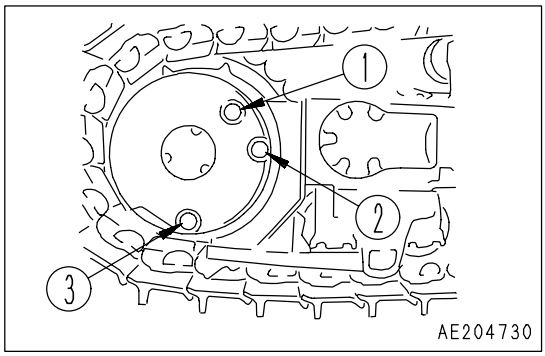
CHANGE OIL IN FINAL DRIVE CASE

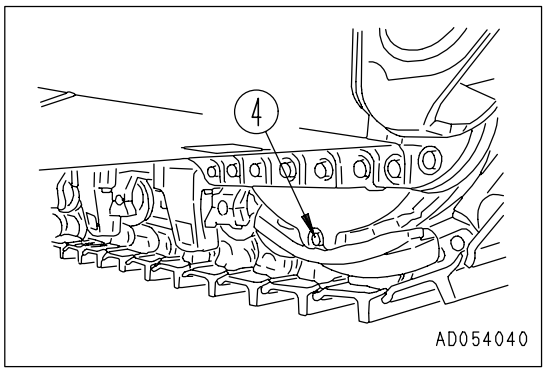
WARNING

The oil is at high temperature immediately after the machine has been operated. Wait for the oil to cool down before starting the operation.

- Oil replacement amount: 58 liters (15.31 US gal)

1. Stop the machine so that drain plug (3) is directly at the bottom.
2. Remove oil level plug (2) and oil filler plug (1), then remove drain plugs (3) and (4) and drain the oil. After draining the oil, tighten the plugs.
3. Add engine oil to the specified level through the hole in oil filler plug (1).
4. After filling with oil, check that the oil is at the specified level. For details, see "CHECK OIL LEVEL IN FINAL DRIVE CASE, ADD OIL (PAGE 4-47)".

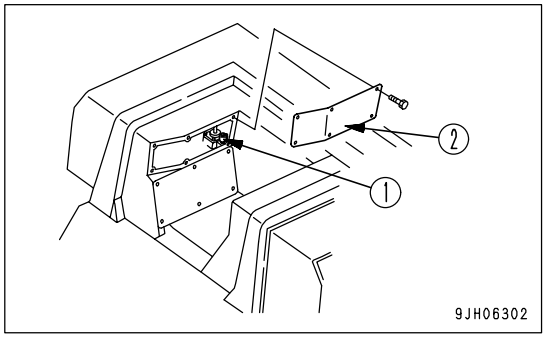




WASH POWER TRAIN CASE BREATHER

Remove the breather, then wash it in clean diesel oil or flushing oil to rinse the dirt out from inside.

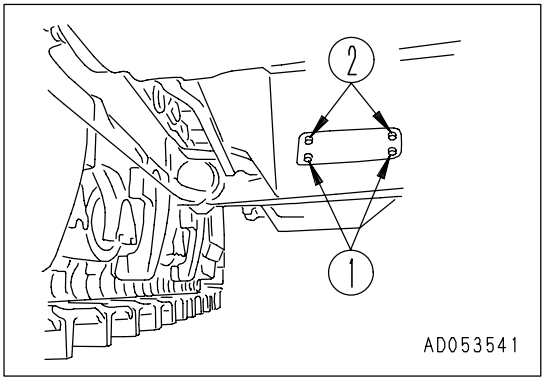
- Power train case breather (1 place)
  Remove inspection cover (2) at the bottom right of the operator's seat. The breather (1) is installed on the right side of the window (rear of machine).



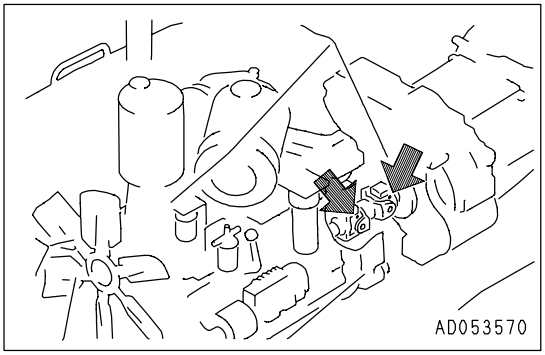
LUBRICATE UNIVERSAL JOINT

WARNING

The undercover is heavy. Never try to open or close the cover when directly beneath it. When removing bolts(2), carry out the work from the rear below the cover so that you can easily get out of the way.

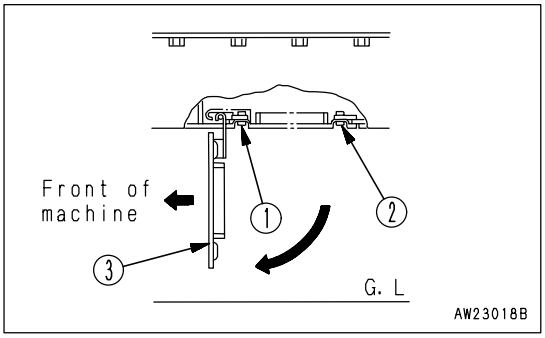


Apply grease to the grease fittings (2 places) shown by arrows.



Remove inspection cover (3) of the undercover at the rear bottom of the chassis as follows.

1. Remove 2 bolts (1) at the front of the machine.
2. Support the cover with your elbow while gradually removing 2 bolts (2) at the rear of the machine.
3. Lower the cover gradually to open it.



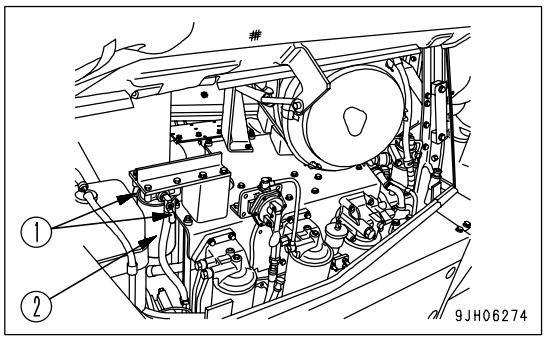
REPLACE CORROSION RESISTOR CARTRIDGE

WARNING

The oil is at high temperature after the engine has been operated, so never replace the cartridge immediately after finishing operations.
Wait for the oil to cool down before replacing cartridge.

- Container to catch coolant
- Filter wrench

1. Close lever (1) of corrosion resistor (2). (2 places)
2. Set a container under the cartridge to catch the coolant.
3. Using a filter wrench, turn cartridge (2) to the left to remove it.
4. Clean the filter holder, coat the seal surface of the new cartridge thinly with engine oil, then install the cartridge.
   - Always use a genuine Komatsu part for the cartridge.



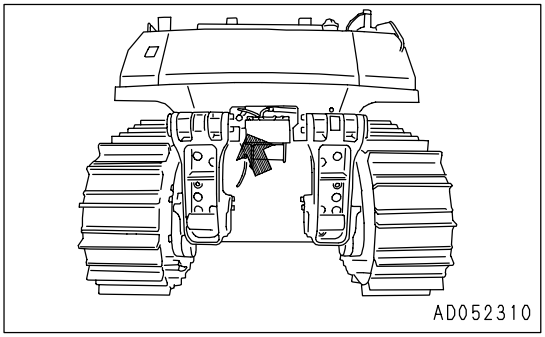
5. When installing the cartridge, bring the packing surface into contact with the seal surface of the filter holder, then tighten a further 2/3 times.
   If the filter cartridge is tightened too far, the gasket will be damaged and water will leak. If it is too loose, water will leak from the gap in the gasket, so always keep to the proper tightening angle.
6. Open lever (1) of corrosion resistor (2).
7. After replacing the cartridge, run the engine, and check for any leakage of water from the filter seal surface. If any water leakage is found, check the tightening of the filter cartridge.

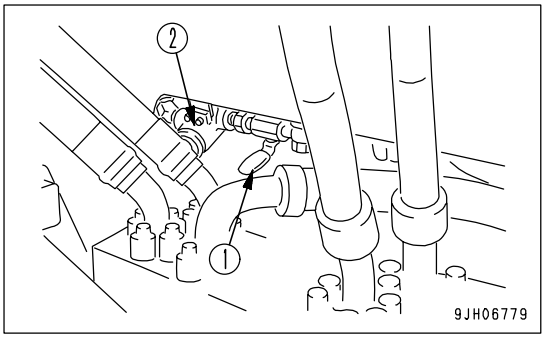
CHECK TIGHTENING PARTS OF TURBOCHARGER

Contact your Komatsu distributor to have the tightening portions checked.

CHECK, CLEAN FUEL STRAINER

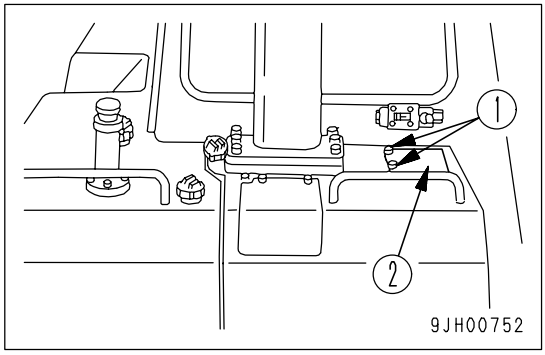
1. Tighten fuel supply valve (1) at the bottom of the fuel tank, remove cap (2), then wash the strainer and strainer case. The strainer forms one unit with the cap.
2. After checking and cleaning the strainer, set it in the case, then tighten the cap.
3. After installing, open fuel supply valve (1).



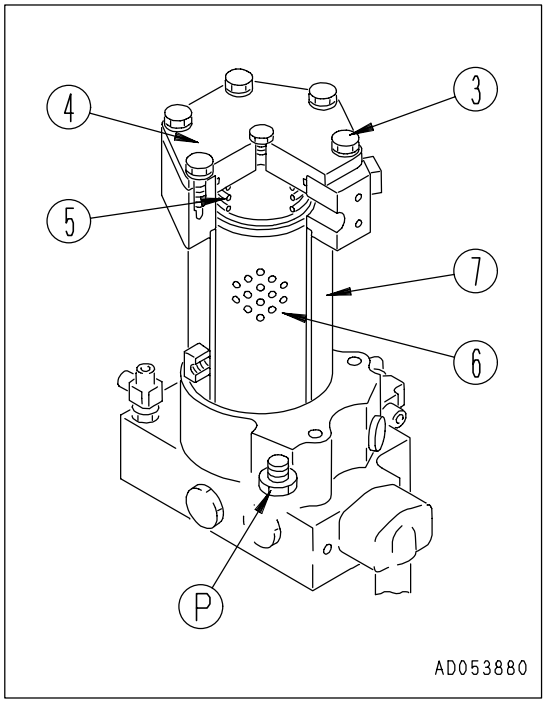


REPLACE CHARGE FILTER ELEMENT

1. Loosen mounting bolts (1), then remove inspection cover (2).



2. Loosen mounting bolts (3), then remove filter cover (4).
3. Remove drain plug (P) (which can be seen from under the fender) and drain the oil.
4. Take out spring (5), then remove element (6).
5. Clean the inside of filter case (7) and the parts that were removed, then install a new element.
   Use a genuine Komatsu element.

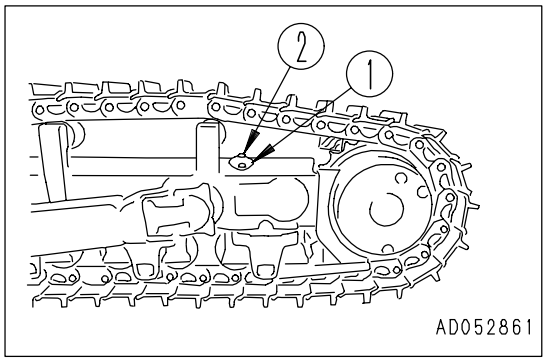


6. Install inspection cover (2) with bolts (1).

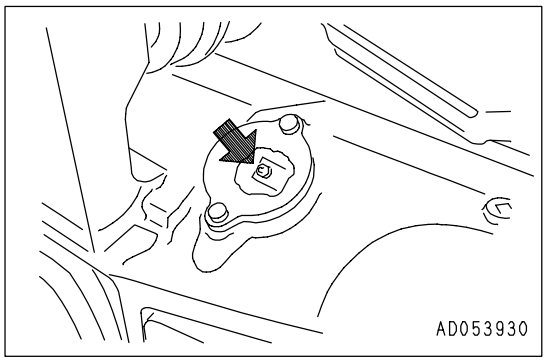
LUBRICATE IDLER ADJUSTMENT ROD

(left and right: 1 place each)

1. Remove bolt (2), then remove cover (1).



2. Pump in grease through the grease fitting marked by the arrow.



CHECK FOR LOOSE ROPS MOUNT BOLTS

(If equipped)

Check for loose and damaged bolts.

If a loose bolt is found, tighten it to a torque of 927 ± 103 N·m (94.5 ± 10.5 kgf·m, 684 ± 76 lbft)

If a damaged bolt is found, replace the bolt with a genuine Komatsu bolt.

EVERY 2000 HOURS SERVICE

Maintenance for every 250, 500, and 1000 hours should be performed at the same time.

CHANGE OIL IN HYDRAULIC TANK, REPLACE HYDRAURIC OIL FILTER ELEMENT

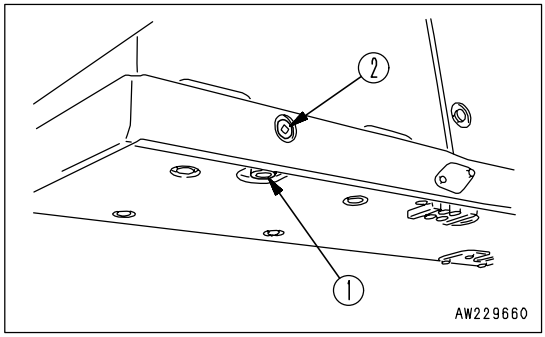
⚠ WARNING

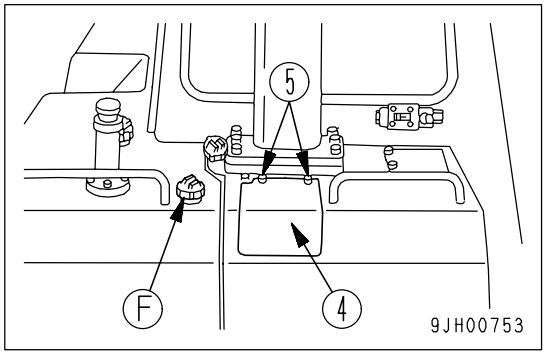
The oil is at high temperature immediately after the machine has been operated. Wait for the oil to cool down before changing the oil.

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

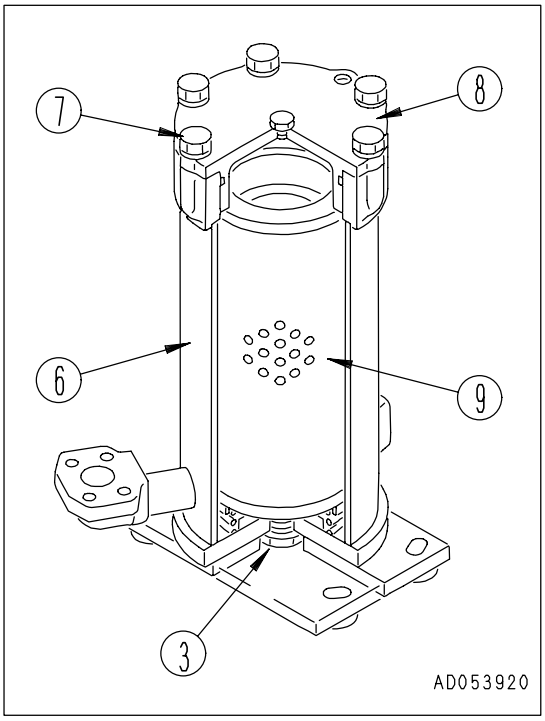
- Oil replacement amount: 87 liters (22.99 US gal)

1. Lower the blade and the ripper completely to the ground, and stop the engine. Turn the cap of oil filler port (F) slowly to release the internal pressure, then remove the cap.
2. Remove plug (1) at the bottom of the hydraulic tank, loosen drain valve (2), and drain the oil. After draining the oil, tighten drain valve (2) and plug (1). When loosening and drain valve (2), be careful not to get oil over yourself.
3. Tighten mounting bolts (5) of inspection cover (4) of the cover at the front of the hydraulic tank, then remove the inspection cover.





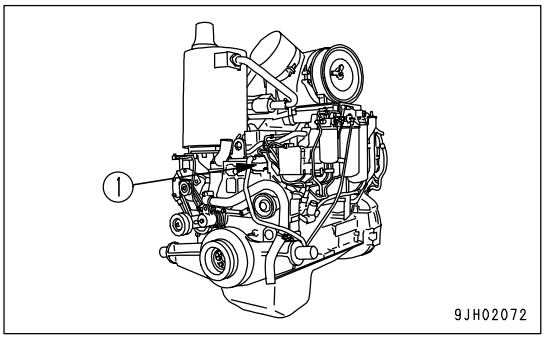
4. Remove mounting bolts (7) of hydraulic oil filter (6), then remove cover (8).
5. Remove drain plug (3) that can be seen from under the fender and drain the oil between there and the oil filter case. When loosening drain plug (3), be careful not to get oil over yourself.
6. Remove element (9).
7. Clean the inside of the case and removed parts.
   Replace a new filter. Always use Komatsu genuine filter.
8. Replace drain plug (3).
9. Close filter cover (8), then tighten bolts (7).
10. Refill the specified quantity of engine oil through oil filler (F).



11. After filling with oil, check that the oil is at the specified level. For details, see "CHECK OIL LEVEL IN HYDRAULIC TANK, ADD OIL (PAGE 3-76)".

CLEAN ENGINE BREATHER ELEMENT

1. Wiper of all the dirt from around the breather (1).
2. Remove breather (1).
3. Rinse of the breather unit in diesel oil or flushing oil, then dry with compressed air.
4. Replace the breather O-ring with a new part, coat with engine oil, then install.



CHECK ALTERNATOR, STARTING MOTOR

The brushes mat be worn or the bearing may have run out of grease, contact your Komatsu distributor for inspection and repairs.

If the engine is started frequently, have this inspection carried out every 1000 hours.

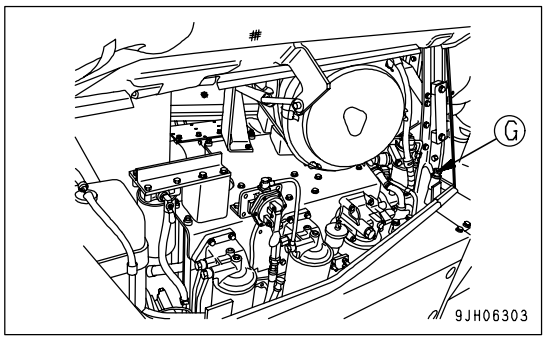
CHANGE OIL IN DAMPER CASE, CLEAN DAMPER BREATHER

WARNING

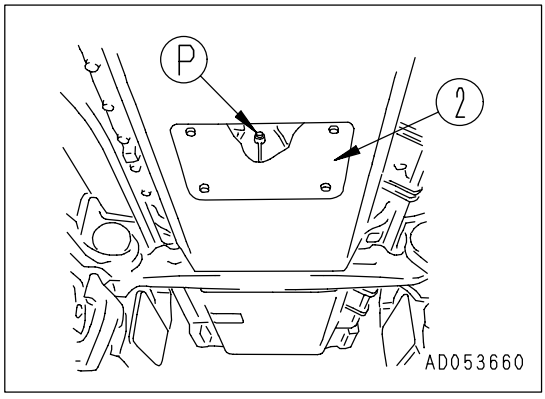
- **The oil is at high temperature immediately after the machine has been operated.Wait for the oil to cool down before carrying out maintenance.**
- **The undercover is heavy. Do not go directly under the cover when opening or closing it. When removing bolts (4), carry out the operation at the rear of the point immediately under the cover so that it is possible to escape at any time.**

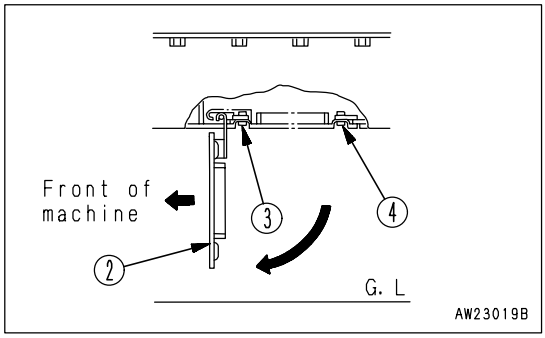
- Refill capacity: 1.5 liters (0.40 US gal)

1. Open the engine side cover at the left of the machine; you can see gauge (G).



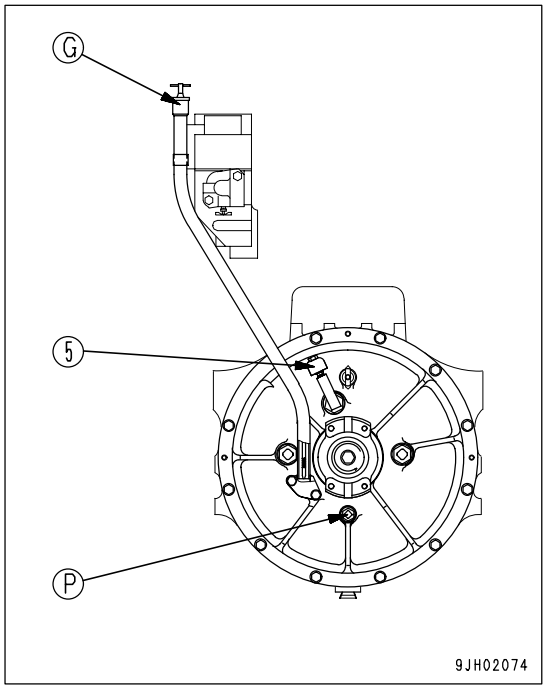
2. Remove the undercover (2) at the bottom rear of the chassis as follows.
   1) Remove 2 bolts (3) at the front of the chassis.
   2) Hold down cover (1) and remove 2 bolts (4) at the machine rear end gradually. (Rainwater or other accumulated water may flow out, so be careful.)





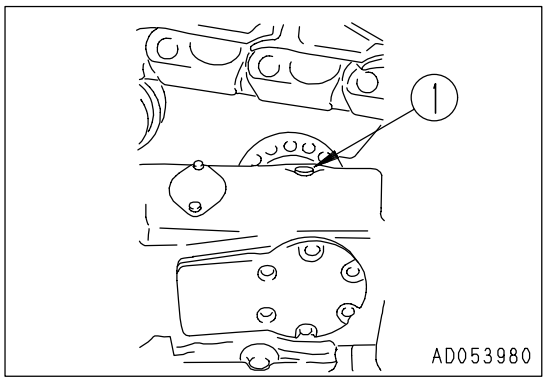
3) Lower cover (2) gradually and open it. Drain plug (P) can be seen at the top.

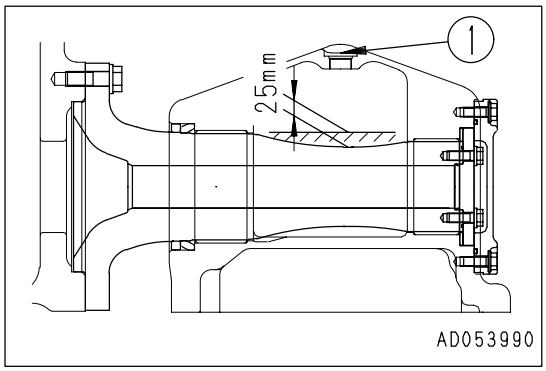
3. Remove dipstick (G), then remove drain plug (P) and drain the oil.
   After draining the oil,tighten drain plug (P).
4. Add engine oil through the holder of dipstick (G). After adding the oil, insert dipstick (G).
5. Remove any dirt or dust stuck to breather (5), then wash with clean diesel oil or flushing oil.If it cannot be cleaned completely, replace with a new part.
6. Install undercover (2), then close engine side cover (1) at the left side of the machine.



CHECK PIVOT BEARING OIL LEVEL, ADD OIL

1. Remove plug (1).
2. Check that the oil level is up to the oil level (25 mm (1.0 in)) shown in the diagram. If the oil level is low, add engine oil through the hole of plug (1).
3. Install plug (1).





CHECK INJECTOR

Check the color of the exhaust gas visually. If there is any abnormality in the exhaust gas color, contact your Komatsu distributor for inspection.

For details, see "TROUBLESHOOTING (PAGE 3-139)" "Exhaust color is black".

EVERY 4000 HOURS SERVICE

Maintenance for every 250, 500, 1000, and 2000 hours should be performed at the same time.

CHECK PLAY OF TURBOCHARGER ROTOR

Contact your Komatsu distributor to have the rotor play checked.

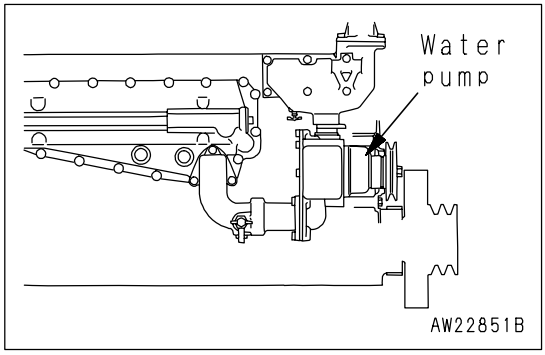
CLEAN, CHECK TURBOCHARGER

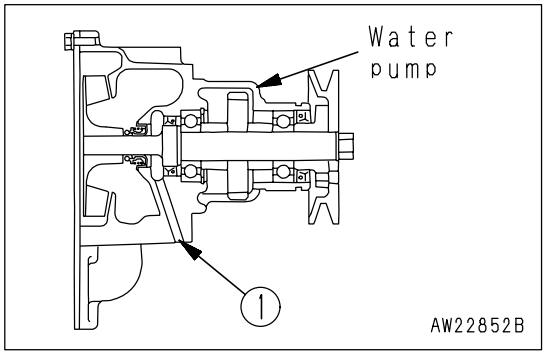
CHECK ENGINE VALVE CLEARANCE, ADJUST

As special tool is required for removing and adjusting the parts, you shall request Komatsu distributor for service.

CHECK WATER PUMP

Check for leakage of oil or water, and check for clogging of breather hole (drain hole) (1). If any abnormality is found, please ask your Komatsu distributor to carry out repairs or replacement.

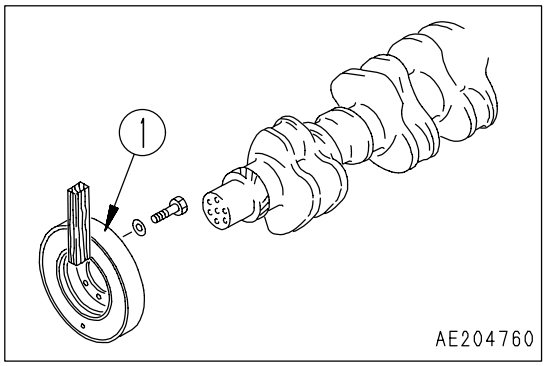




CHECK VIBRATION DAMPER

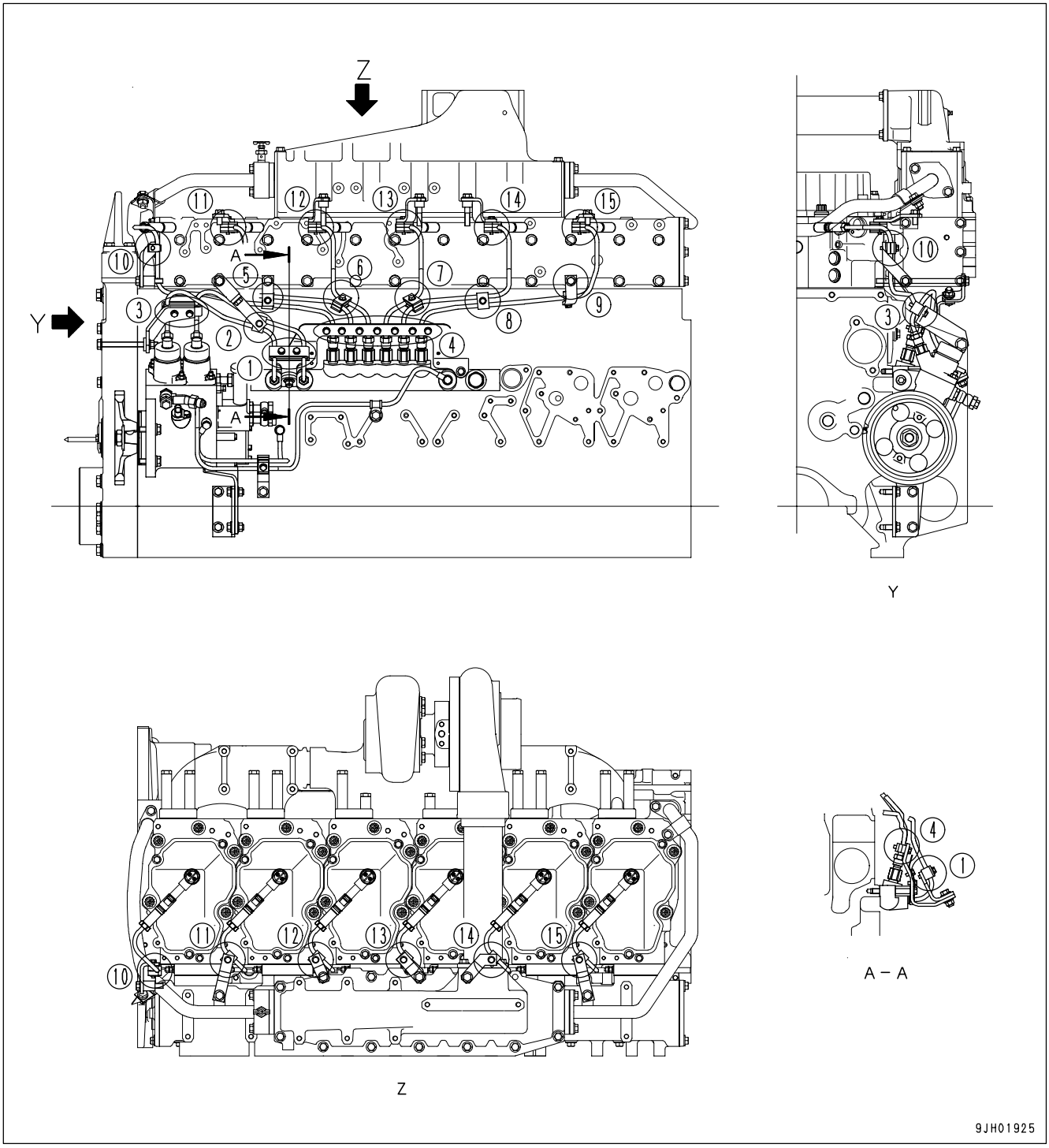
Check that there is no deformation of the surface of damper (1) and that there are no signs of leakage of damper oil from around the damper.

If any abnormality is found, please ask your Komatsu distributor to carry out replacement.



CHECKING FOR LOOSENESS OF HIGH-PRESSURE CLAMP, HARDENING OF RUBBER

Check that there is no looseness in the high-pressure clamp mounting bolts (1) - (15) in the drawing on the next page. Check visually and feel with your finger to check that the rubber has not hardened. If there is any problem, the problem part must be replaced. In such a case, please contact your Komatsu distributor.

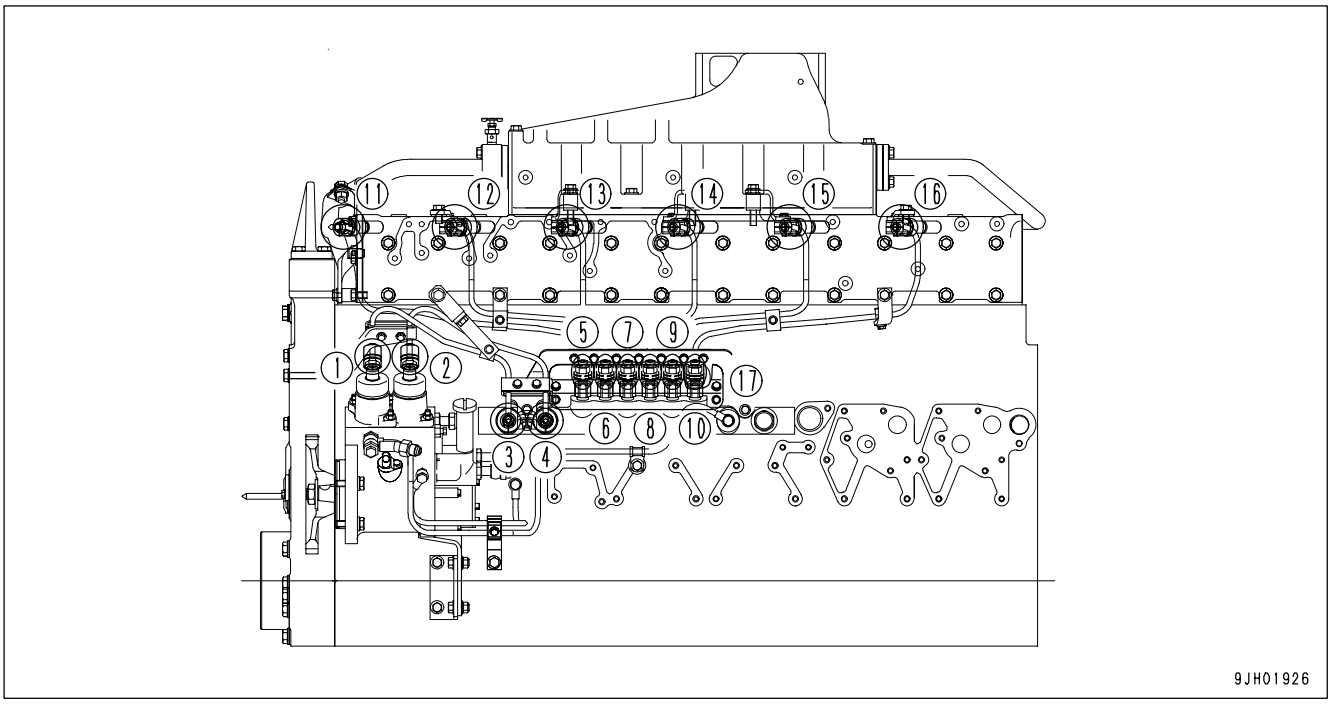


NOTICE

If the engine continues to be used when there are loose bolts, hardened rubber, or missing parts, there is danger of damage or breakage occurring due to vibration and wear at the connections of high-pressure piping. Always check that the proper high-pressure piping clamps are correctly installed.

CHECKING FOR MISSING FUEL SPRAY PREVENTION CAP, HARDENING OF RUBBER

Fuel spray prevention caps (1) - (16) and fuel spray prevention cover (17) are protective parts installed to prevent fire caused by fuel leaking and spraying out on to high temperature parts of the engine. Check visually that there are no missing caps or loose bolts, and feel with your finger to check that the rubber has not hardened. If there is any problem, the problem part must be replaced. In such a case, please contact your Komatsu distributor.



REPLACE INJECTOR ASSEMBLY

Please contact your Komatsu distributor to have the injector nozzle assembly replaced.

EVERY 8000 HOURS SERVICE

Maintenance for every 10, 100, 250, 500, 1000, 2000 and 4000 hours service should be carried out at the same time.

REPLACE HIGH-PRESSURE PIPING CLAMP

Please contact your Komatsu distributor to have the engine high-pressure clamp replaced.

REPLACE FUEL SPLAY PREVENTION CAP

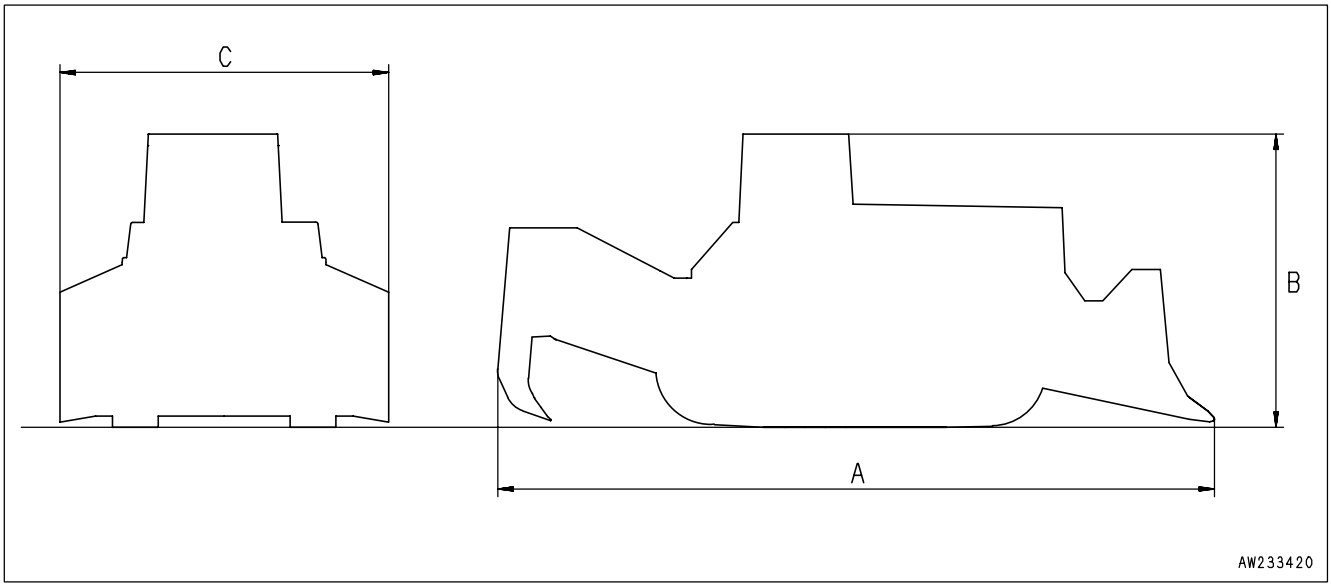
Please contact your Komatsu distributor to have the fuel spray prevention cap replaced.

SPECIFICATIONS

SPECIFICATIONS

	Item		Unit	D155AX-5
	Operating weight (without operator)		kg(lb)	39,500 (87,098) *1
	Blade (straight tiltdozer) Unit weight (including cylinder)		kg(lb)	4,900 (10,805)
	Ripper unit weight		kg(lb)	3,710 (8,181)
	Name of engine		-	Komatsu SA6D140E-3 diesel engine
	Engine horsepower		Kw(HP)/rpm	231(310)/1,900
A	Overall length		mm(ft in)	8,155 (26’ 9")
B	Overall height		mm(ft in)	3,500 (11’ 6")
C	Overall width		mm(ft in)	3,955 (12’ 12")
	Travel speed (1st/2nd/3rd)	Forward	km/h(MPH)	3.5/6.2/10.8 (2.2/3.9/6.7)
		Reverse	km/h(MPH)	4.8/8.4/13.9 (3.0/5.2/8.6)

*1: Hydraulic tiltdozer (semi U-dozer)
With hydraulic variable multi-shank ripper, ROPS, cab, 560 mm (22.1 in) HD shoe, side cover, air conditioner.



ATTACHMENTS, OPTIONS

⚠ WARNING

Please read and make sure that you understand the SAFETY section before reading this section.

GENERAL PRECAURIONS

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, contact your Komatsu distributor first.
If you do not contact Komatsu, we cannot accept any responsibility for any accidents or failures.

⚠ WARNING

General precautions

- **Read the instruction manual for the attachment thoroughly, and do not use this attachment unless you are sure that you have understood the guides completely.**
  If you lose the instruction manual, always ask the manufacturer or your Komatsu distributors for a new copy.
- **Depending on the attachment, install the necessary front guard to the machine.**
- **Depending on the attachment, the impact noise may make it difficult for fellow workers to transmit instructions for the operation. Before starting operation, decide a leader and determine the signals to be used.**
- **Do not carry out swinging operations to the side with a heavy load on the attachment. This is particularly dangerous on slopes.**
- **Comparing with a machine equipped with a bucket, a machine equipped with a breaker has a heavy load at the front of the work equipment and is unstable. To avoid a hazard of tipping over, do not carry out operations with the attachment swung to the side.**
- **When an attachment is installed, the swing range and center of gravity of the machine are different, and the machine may move in an unexpected way. Be sure that you understand the condition of the machine properly.**
- **Before starting operations, set up a fence around the machine to prevent people from entering.**
  Never operate the machine when there are people near the machine.
- **To prevent serious accidents caused by misoperation, do not put your foot on the pedal except when operating the pedal.**

Precautions for removal and installation operations

When removing or installing the attachments, obey the following precautions and take care to ensure safety during the operation.

- **Carry out the removal and installation operation on a flat, firm ground surface.**
- **When the operation is carried out by two or more workers, determine the signals and follow these during the operation.**
- **When carrying heavy objects (more than 25 kg or 55 lb), use a crane.**
- **When removing heavy parts, always support the part before removing it.**
  When lifting such as 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 it is in a stable condition and will not fall over.**
- **Never go under a load suspended from a crane.**
  Always stand in a position that is safe even if the load should fall.

NOTICE

Qualifications are required to operate a crane. Never allow the crane to be operated by an unqualified person.
For details of removal and installation operations, contact your Komatsu distributor.

INTRODUCTION OF ATTACHMENTS AND OPTIONS

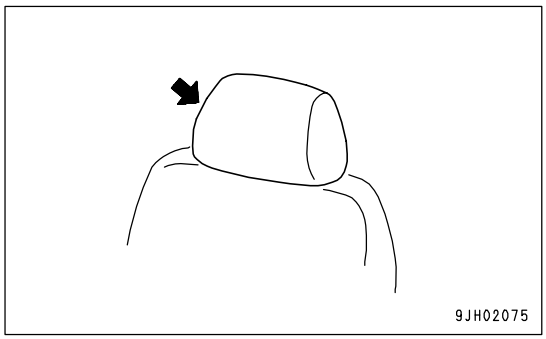
INTRODUCTION OF ATTACHMENTS AND OPTIONS

Name	Specifications, use	
Track shoes	Wide shoe width	610 mm (24 in)
	Wide shoe width	660 mm (26 in)
	Wide shoe width	710 mm (28 in)
	Heavy-duty shoe width	610 mm (24 in)
	Heavy-duty shoe width	660 mm (26 in)
Ripper point		
Cap with lock		
Headrest		

Various other optional parts are available, so please contact your Komatsu distributor.

HEADREST, HANDLING

Use the headrest fully pushed in to the lowest position.



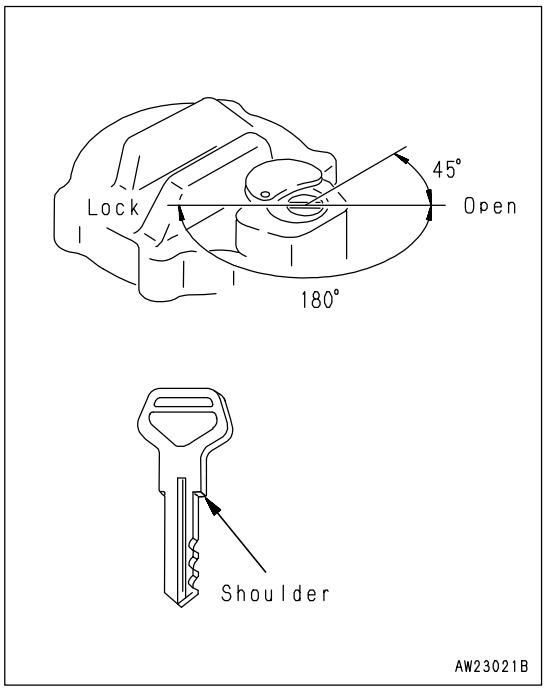
CAP WITH LOCK, HANDLING

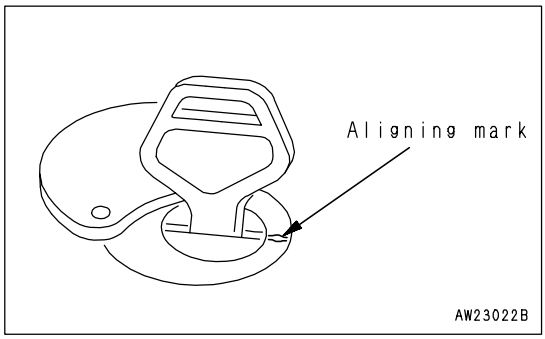
METHOD OF OPENING AND CLOSING CAP WITH LOCK

Lock-type caps are available for the radiator water filler, fuel tank filler cap, power train case oil filler cap, hydraulic tank oil filler cap, and hydraulic tank breather cap. The method of opening or closing the cap is as follows.

TO OPEN THE CAP

1. Insert the key.
   Insert the key fully up to the shoulder before turning it. If the key is inserted half way and turned, the key may break.
2. Turn the key counterclockwise to align the match mark on the cap with the rotor groove, then turn the cap slowly. When a click is heard, the lock is released, enabling the cap to be opened.



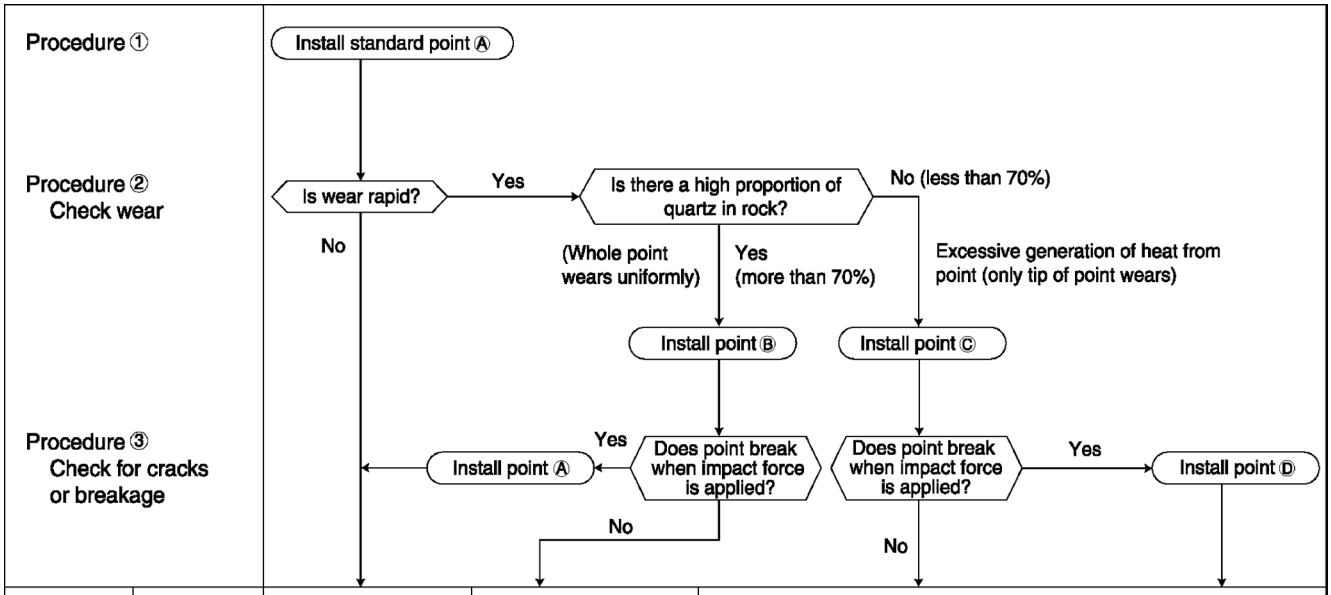


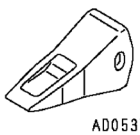
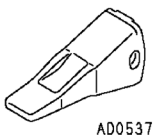
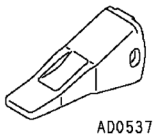
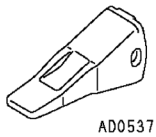
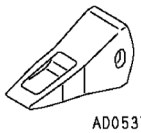
TO LOCK THE CAP

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

PROCEDURE FOR SELECTING RIPPER POINT

PROCEDURE FOR SELECTING RIPPER POINT



Typical rock	Hardness	Soft ↔ Hard	Soft ↔ Medium hard	Soft ↔ Medium hard ↔ Hard		
	Type of rock	General rock	Sandstone	Basalt, andesite, granite, chert		
	Features	—	・Very high proportion of quartz (70 - 95%), point wears rapidly	・Fairly high proportion of quartz (40 – 70%) ・Does not form seams or layers, so there is excessive generation of heat from the point, the tip wears rapidly, and ripping is difficult		
Suitable point	Features	Point Ⓐ ・Symmetrical shape ・Yellow ・Short (can be turned and used)	Point Ⓑ ・Non-symmetrical shape ・Yellow ・Long	Point Ⓒ ・Non-symmetrical shape ・Red ・Long	Point Ⓓ ・Symmetrical shape ・Red ・Long (can be turned and used)	Point Ⓔ ・Symmetrical shape ・Red ・Short (can be turned and used)
	Shape					
	Part No.	175-78-31230	175-78-34131	175-78-34141	175-78-31293	175-78-31232

INDEX

D155AX-5 GALEO BULLDOZER
Form No. SEAM059901T