

# Operation & Maintenance Manual

# D155AX-5

## BULLDOZER

SERIAL NUMBER

**D155AX - 76243** and up



### WARNING

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

# KOMATSU



# FOREWORD

## 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 in 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.**

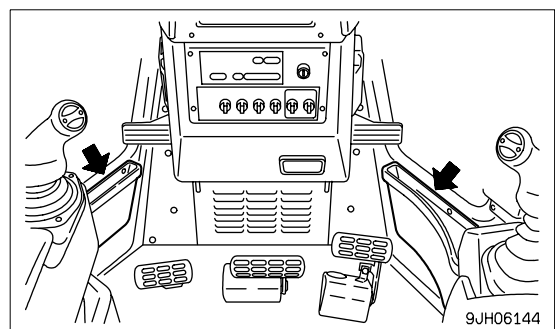
**If you sell the machine, be sure to give this manual to the new owners together with the machine.**

**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

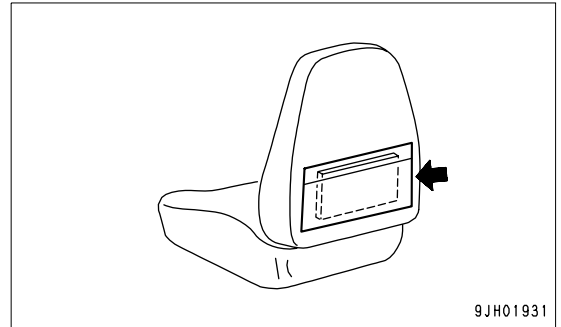
Inside of right and left doors





- Machine equipped without cab

Back pocket of operator's seat



## 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.



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



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



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



When standing up from the operator's seat, always place the 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.

## FOREWORD

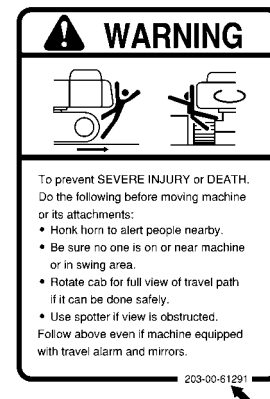
## SAFETY INFORMATION

### ● 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



Part No.

### 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.



Part No.

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.

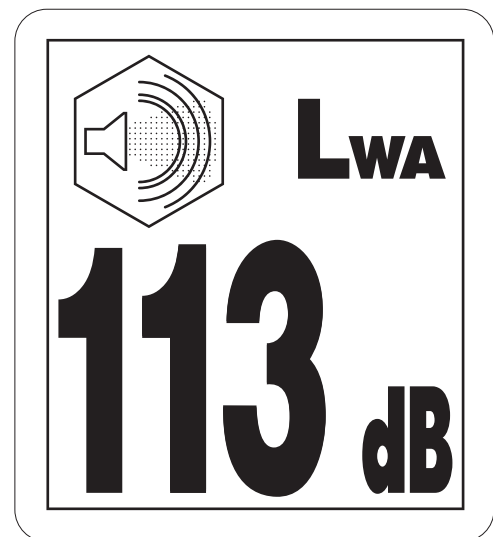
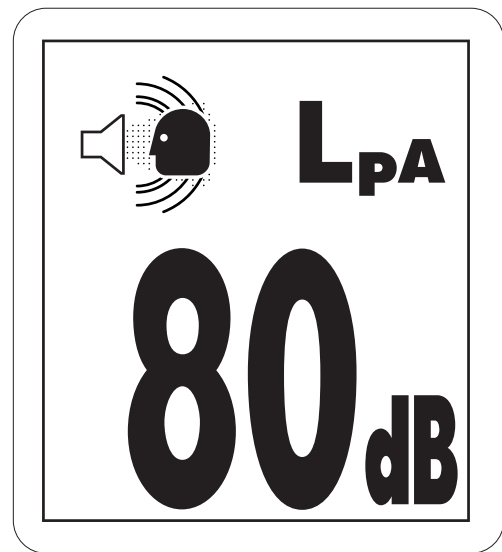
The explanations, values, and illustrations in this manual were prepared based on the latest information available at that time. Continuing improvements in the design of this machine can lead to changes in detail which may not be reflected in this manual. Consult Komatsu or your Komatsu distributor for 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))

## Noise emission levels

Two labels indicating the machine noise level are affixed on the machine.

- Sound pressure level at the operator's station, measured according to ISO6396 (Dynamic test method, simulated working cycle)
- Sound power level emitted by the machine, measured according to ISO 6395 (Dynamic test method, simulated working cycle). This is the guaranteed value as specified in European directive 2000/14/EC.



## Vibration levels

When used for its intended purpose, levels of vibration for the earth-moving machine transmitted from the operator's seat are lower than or equal to the tested vibrations for the relative machinery class in compliance with ISO 7096.

The actual acceleration value for the hands and arms is less than or equal to 2.5 m/s<sup>2</sup>. The actual acceleration value for the body is less than or equal to 0.5 m/s<sup>2</sup>.

These values were determined using a representative machine and measured during the typical operating condition indicated below according to the measurement procedures that are defined in the standards ISO 2631/1 and ISO 5349.

### Operating condition:

(WHEEL LOADER:) V-shape loading

(HYDRAULIC EXCAVATORS:) Excavating (Digging-loading-rotating-unloading-rotating)

(TRACTOR DOZER:) Dozing and spreading material through forward/reversing motion

(Rigid/Articulate dumper:) Work cycle (including waiting, travelling, loading, travelling with load, unloading, and travelling without load)

## Guide to Reduce Vibration Levels on Machine

The following guides can help an operator of this machine to reduce the whole body vibration levels:

1. Use the correct equipment and attachments.
2. Maintain the machine according to this manual
  - Tire pressures (for wheeled machines), tension of crawler (for crawler machines)
  - Brake and steering systems
  - Controls, hydraulic system and linkages
3. Keep the terrain where the machine is working and traveling in good condition
  - Remove any large rocks or obstacles
  - Fill any ditches and holes
  - Site manager should provide machine operators with machine and schedule time to maintain terrain conditions
4. Use a seat that meets ISO 7096 and keep the seat maintained and adjusted
  - Adjust the seat and suspension for the weight and size of the operator
  - Wear seat belt
  - Inspect and maintain the seat suspension and adjustment mechanisms
5. Steer, brake, accelerate, shift gears (for wheeled machines), and move the attachment levers and pedals slowly so that the machine moves smoothly
6. Adjust the machine speed and travel path to minimize the vibration level
  - When pushing with bucket or blade, avoid sudden loading; load gradually
  - Drive around obstacles and rough terrain conditions
  - Slow down when it is necessary to go over rough terrain
  - Make the curve radius of traveling path as large as possible
  - Travel at low speed when traveling around sharp curves
7. Minimize vibrations for long work cycle or long distance traveling
  - Reduce speed to prevent bounce
  - Transport machines long distances between worksites
8. The following guidelines can be effective to minimize risks of low back pain
  - Operate the machine only when you are in good health.
  - Provide breaks to reduce long periods of sitting in the same posture
  - Do not jump down from the cab or machine
  - Do not repeatedly handle and lift loads

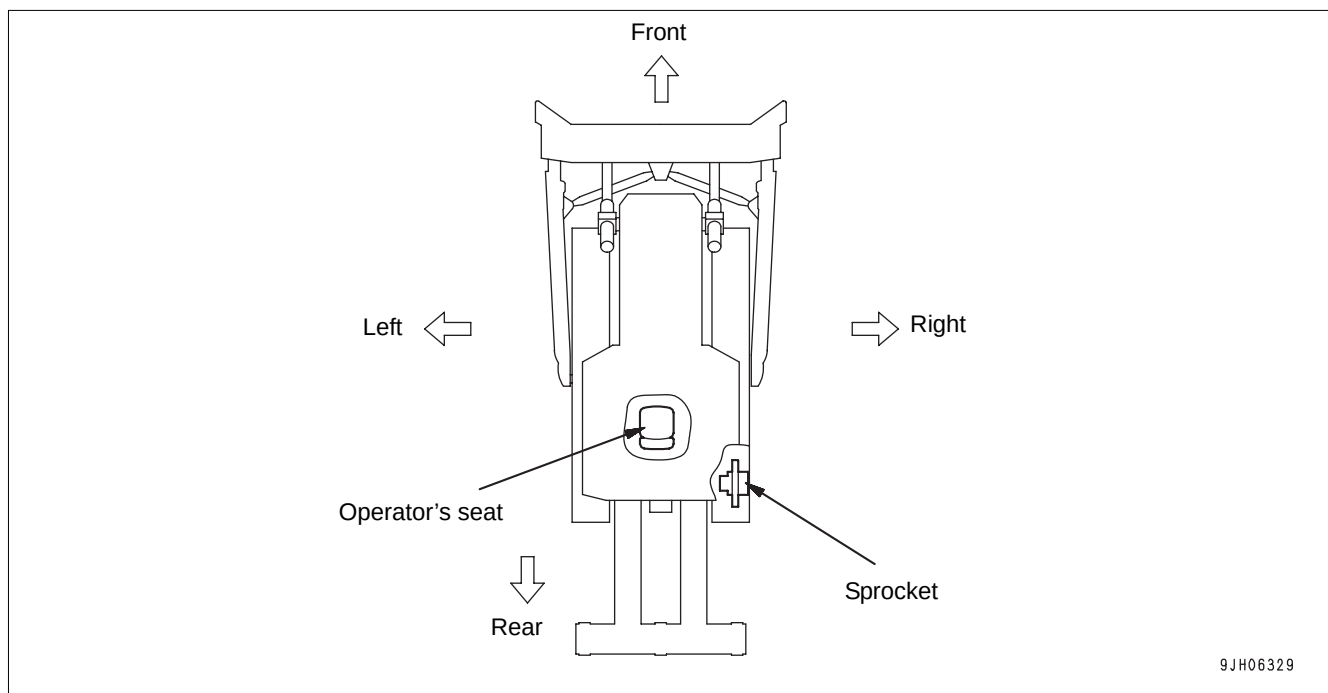
## INTRODUCTION

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 (3-118)” and “RIPPER OPERATION (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.

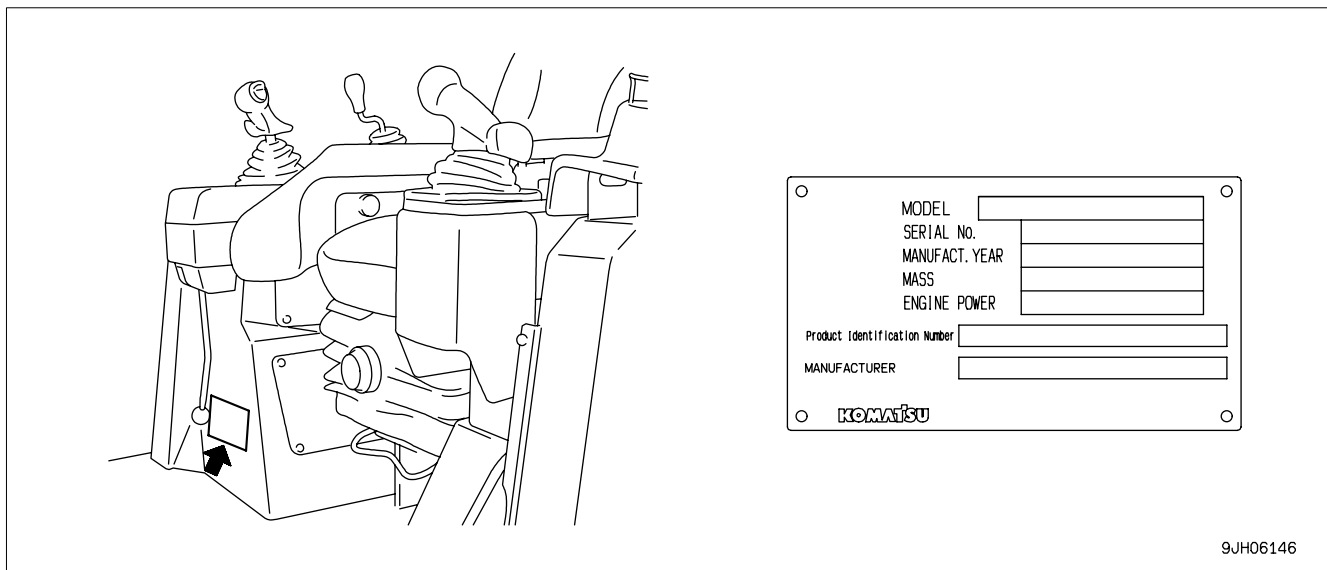
- Run the engine at idling for 15 seconds after starting it. During this time, do not operate the control levers or fuel control dial.
- Idle the engine for 5 minutes after starting it up.
- Avoid operation with heavy loads or at high speeds.
- Immediately after starting the engine, avoid sudden starts,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

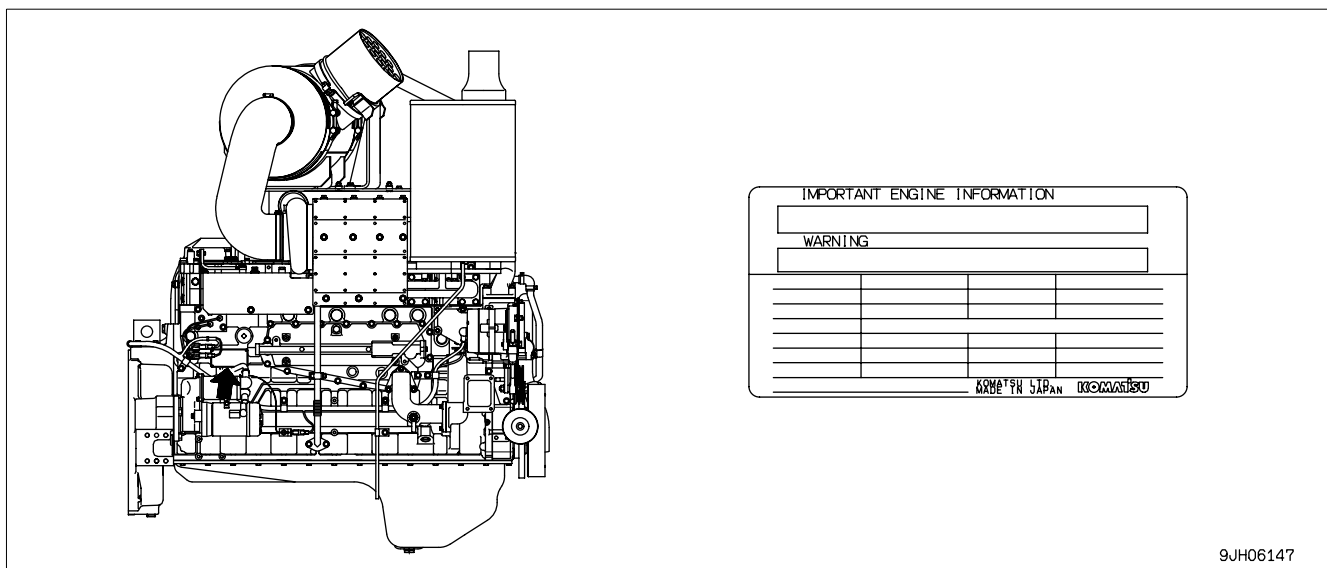
### PRODUCT IDENTIFICATION NUMBER (PIN), MACHINE SERIAL NO. PLATE

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)

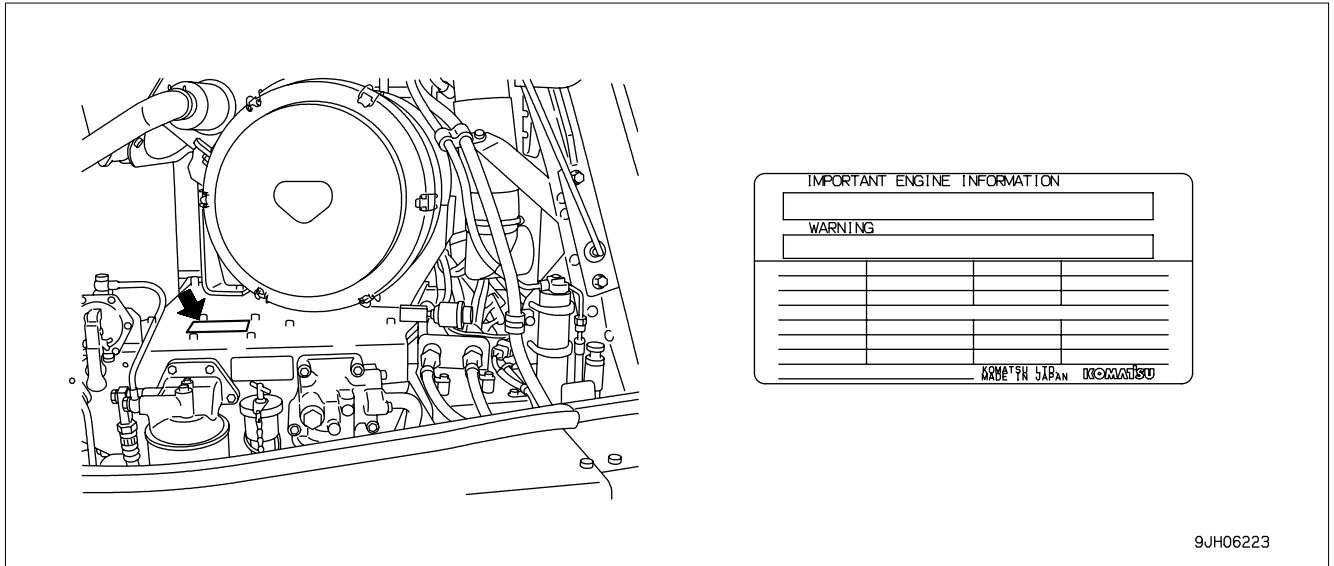
- On the upper of the engine starting motor on the right side of the machine.
- This also acts as the EPA plate.





## ENGINE SERIAL NO. PLATE AND POSITION (2)

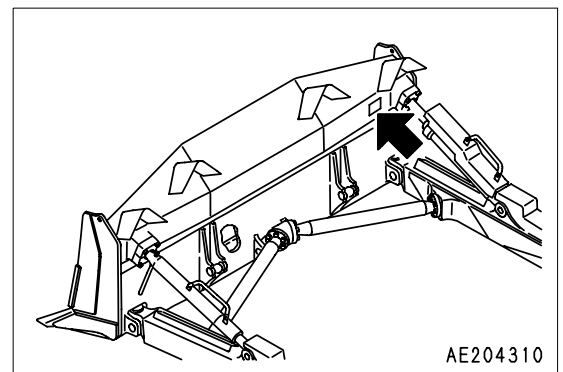
- This is the same content as engine serial No. plate (1).
- Located on the top of the air cleaner mounting bracket on the left of the machine.
- This also acts as the EPA plate.



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

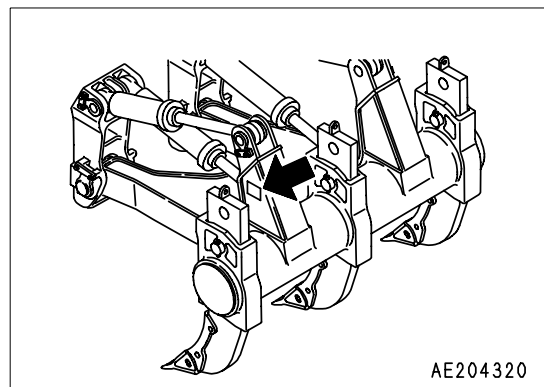
## BLADE SERIAL NO. PLATE POSITION

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



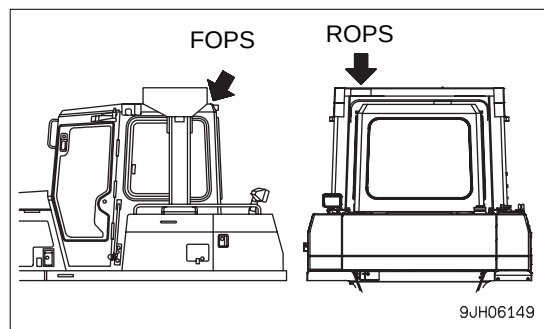
## RIPPER SERIAL NO. PLATE POSITION

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



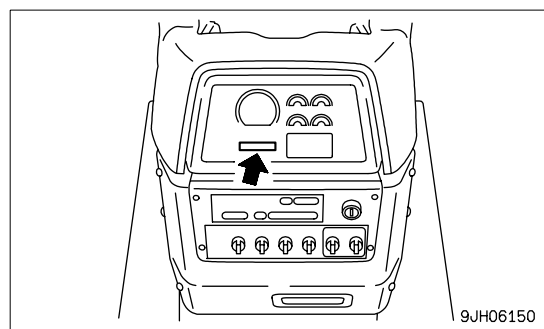
## ROPS, FOPS NO. PLATE POSITION

This is located on the top left.



## POSITION OF SERVICE METER

On top of the machine monitor



## TABLE TO ENTER SERIAL NO. AND DISTRIBUTOR

|                                        |                                              |
|----------------------------------------|----------------------------------------------|
| Machine serial No.                     |                                              |
| Engine serial No.                      |                                              |
| Product Identification Number          |                                              |
| Manufacturers name:                    | KOMATSU LTD.                                 |
| Address:                               | 3-6 Akasaka<br>Minato-ku, 101 Tokyo<br>Japan |
| Distributor<br>Address                 |                                              |
| Phone                                  |                                              |
| Service personnel for your<br>machine: |                                              |

## MACHINE SERIAL NUMBER PLATE

|                               |                               |  |
|-------------------------------|-------------------------------|--|
| Model                         | MODEL                         |  |
| Serial Number                 | SERIAL No.                    |  |
| Manufacturing year            | MANUFACT. YEAR                |  |
| Weight                        | MASS                          |  |
| Engine power                  | ENGINE POWER                  |  |
| Product Identification Number | Product Identification Number |  |
| Manufacturer                  | MANUFACTURER                  |  |
|                               | KOMATSU                       |  |





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## **COLOPHON**

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# SAFETY



## WARNING

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

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## SAFETY

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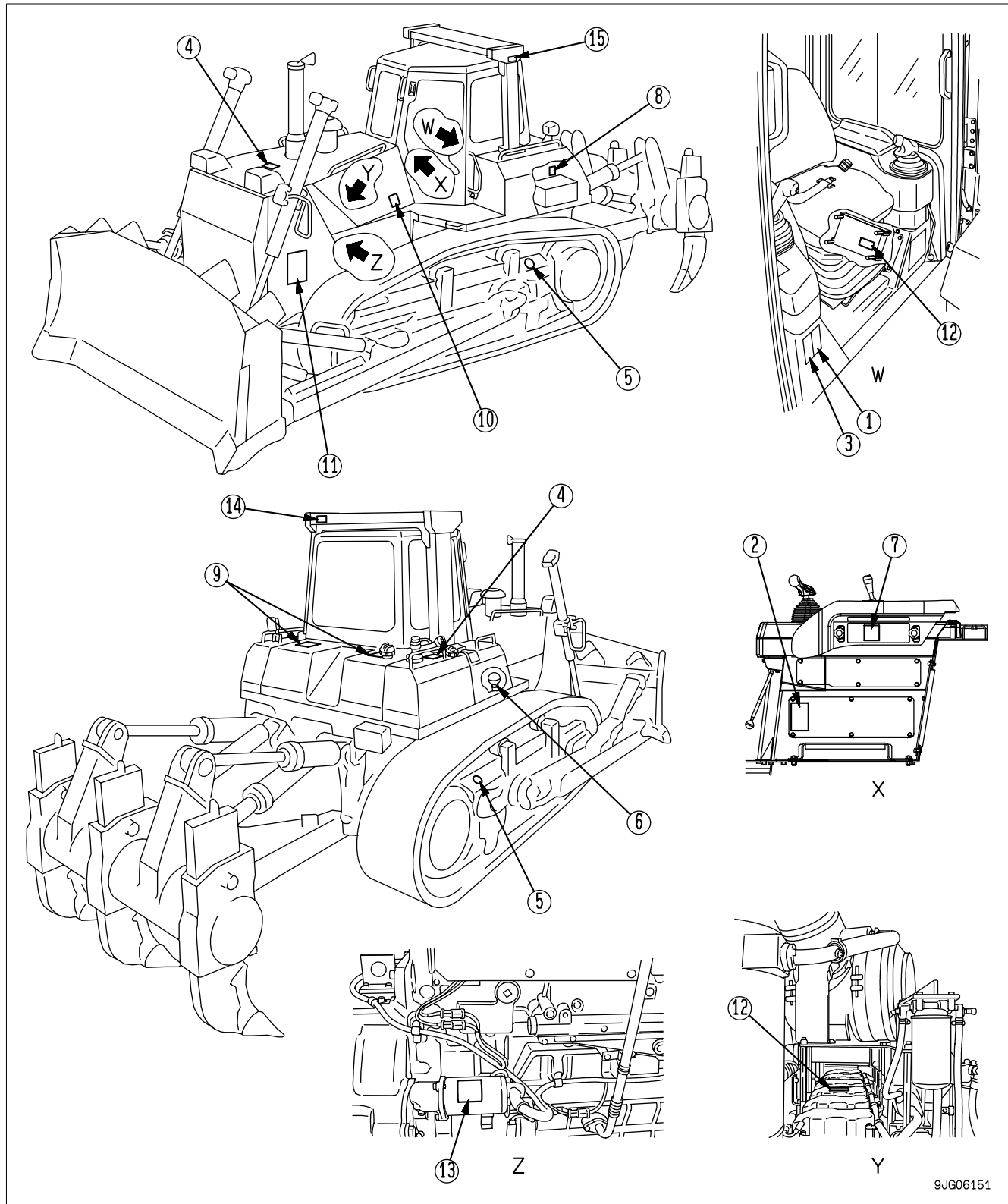
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**SAFETY****SAFETY**

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## SAFETY LABELS

### POSITIONS OF SAFETY PICTOGRAMS

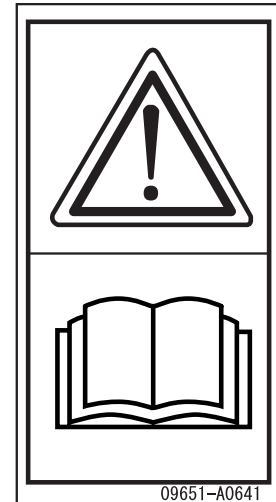




## SAFETY LABELS

### (1) Precautions for operation, inspection, and maintenance (09651-A0641)

- Warning!
- Read manual before operation, maintenance, disassembly, assembly and transportation.



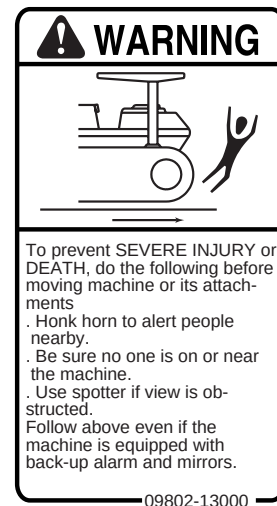
### (2) Precautions when traveling in reverse (09802-13000)

#### **WARNING**

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

- Honk horn to alert people nearby.
- Be sure no one is on or near the machine.
- Use spotter if view is obstructed.

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



### (3) Warning for leaving operator's seat (09654-B0641)

- Sign indicates a hazard of unexpected moving of stopped machine.
- Lower working device to ground, move safety lever to lock position and take engine key with you before leaving machine.



(4) Warning for hot water hazard (09653-A0481)

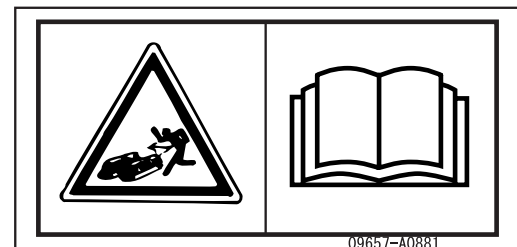
- Never remove the cap when the engine is at operating (High) temperature. Steam or high temperature oil blowing up from the radiator or hydraulic tank, will cause personal injury and / or burns.
- Never remove the radiator or hydraulic tank oil filler when cooling water or hydraulic oil is at high temperatures.



(5) Precautions when adjusting track tension (09657-A0881)

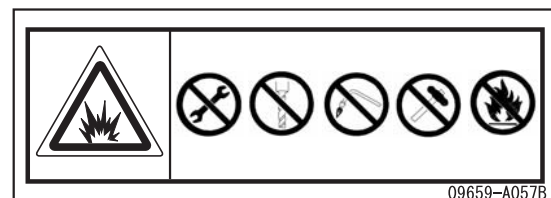
Safety label is attached to the back side of the inspection cover of the track frame.

- Sign indicates a hazard of flying plug from track adjuster that could cause injury.
- Read the manual and adjusting track for safe and proper handling.



(6) Precautions for handling accumulator (09659-A057B)

- There is the hazard of explosion causing injury.
- Do not disassemble the accumulator, make holes in it, weld it, cut it, hit it, roll it or bring it near flame.



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

CAUTION

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

CAUTION

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

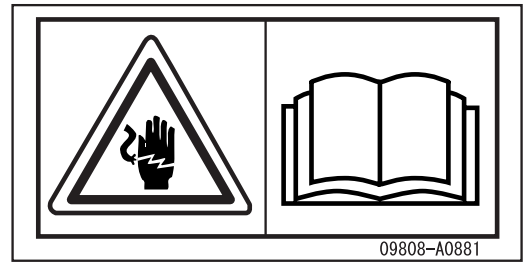
195-98-12940

## SAFETY

## SAFETY LABELS

### (8) Precautions when handling cable (09808-A0881)

- There is the hazard to electric shock when handling electric wires.
- Read the operation and maintenance manual and carrying out the correct method when handling.



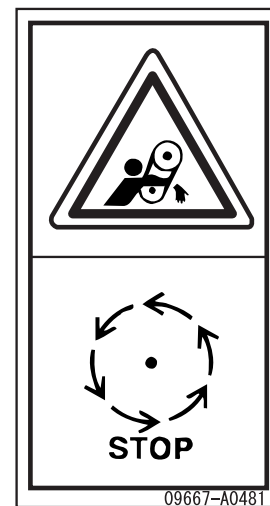
### (9) Caution against falling (09805-C0881)

- Sign indicates a hazard of falling
- Do not stand on this place here



### (10) Caution to stop engine when carrying out inspection and maintenance (09667-A0481)

- Sign indicates a hazard of rotating parts, such as belt.
- Turn off before inspection and maintenance.

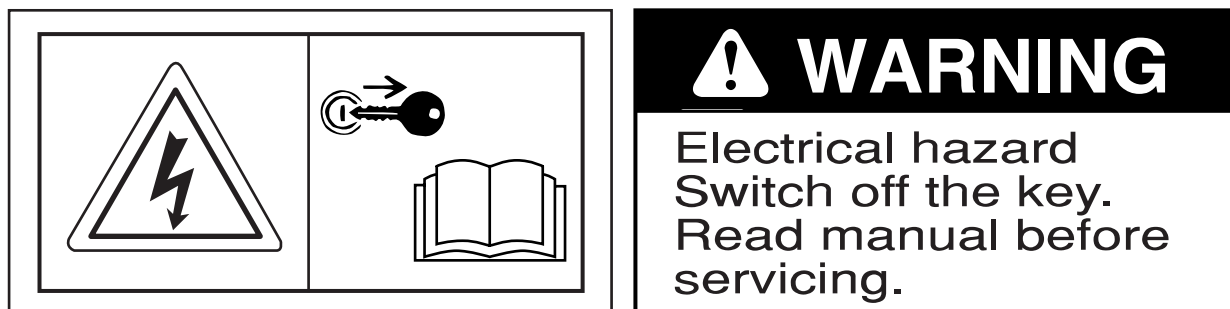


(11) Caution about going close when machine is moving  
(09806-B1683)

- Sign indicates a hazard of being run over by moving equipment.
- Keep a safe distance from equipment when it is moving.



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



There is a danger of electrocution.

Turn the starting switch OFF before starting inspection or repairs, and read the operation and maintenance manual

#### WARNING

Electrical hazard. Switch off the key. Read manual before servicing.

(13) 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.



## SAFETY

## SAFETY LABELS

## (14) ROPS (09620-B2000)

| KOMATSU ROPS CERTIFICATION                                                                                                                                                                                                                                                                                                                                                                                                            |          |                         |                  |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|-------------------------|------------------|
| 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                                                                                                                                                                                                                                                                                                                                                                                                                                 | <b>1</b> | MACHINE MODEL           | <b>2</b>         |
| SERIAL NO.                                                                                                                                                                                                                                                                                                                                                                                                                            | <b>4</b> | MAX. MASS               | <b>5</b> kg (Lb) |
| <b>WARNING</b> <ul style="list-style-type: none"> <li>● 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.</li> <li>● ROPS may provide less protection if it has been structurally damaged or involved roll-over. Consult Komatsu Distributor in that case.</li> <li>● Always wear seat belt when moving.</li> </ul> |          | FOPS LEVEL No. <b>3</b> |                  |
| Komatsu Ltd. 2-3-6 Akasaka, Minato-ku, Tokyo, Japan 09620-B2000                                                                                                                                                                                                                                                                                                                                                                       |          |                         |                  |

## ROPS CERTIFICATION

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

|                  |                   |                      |
|------------------|-------------------|----------------------|
| 1. MODEL         | 3. FOPS LEVEL No. | 5. MAX. MASS kg (Lb) |
| 2. MACHINE MODEL | 4. SERIAL NO.     |                      |

## 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.

## (15) FOPS (09620-C2000)

| FOPS CERTIFICATION                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |          |                                        |             |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|----------------------------------------|-------------|
|  This protective structure was provided to comply with the following standard.<br>FOPS:ISO 3449:1992                                                                                                                                                                                                                                                                                                                                                                                                                                               |          |                                        |             |
| MODEL                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | <u>1</u> | MACHINE MODEL                          | <u>3</u>    |
| SERIAL NO.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | <u>2</u> | FOPS LEVEL No.                         | <u>4</u>    |
| <div style="display: flex; align-items: flex-start;"> <div style="background-color: black; color: white; padding: 5px; margin-right: 10px; text-align: center;"> <b>⚠ WARNING</b> </div> <div> <ul style="list-style-type: none"> <li>● 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.</li> <li>● FOPS may provide less protection if it has been structurally damaged or involved roll-over. Consult Komatsu Distributor in that case.</li> <li>● Always wear seat belt when moving.</li> </ul> </div> </div> |          |                                        |             |
| Komatsu Ltd.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |          | 2-3-6 Akasaka, Minato-ku, Tokyo, Japan | 09620-C2000 |

## FOPS CERTIFICATION

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

|               |                   |
|---------------|-------------------|
| 1. MODEL      | 2. MACHINE MODEL  |
| 3. SERIAL NO. | 4. FOPS LEVEL No. |

- If some modification is applied to the FOBS. It might not enough strength and might not be complied with the standard. Consult Komatsu Distributor before altering.
- FOBS 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.

## GENERAL PRECAUTIONS

### SAFETY RULES

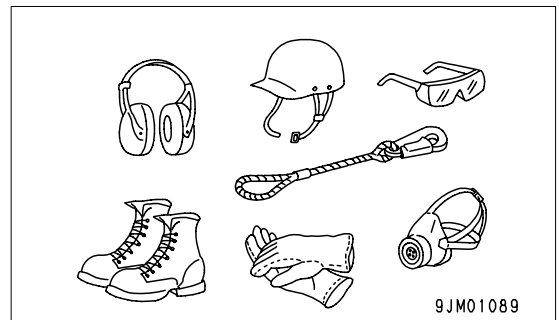
- Only trained and authorized personnel can operate and maintain the machine.
- Follow all safety rules, precautions and instructions when operating or performing maintenance on the machine.
- If you are under the influence of alcohol or medication, your ability to safely operate or repair your machine may be severely 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 problems 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 problem has been corrected.

### CLOTHING AND PERSONAL PROTECTIVE ITEMS

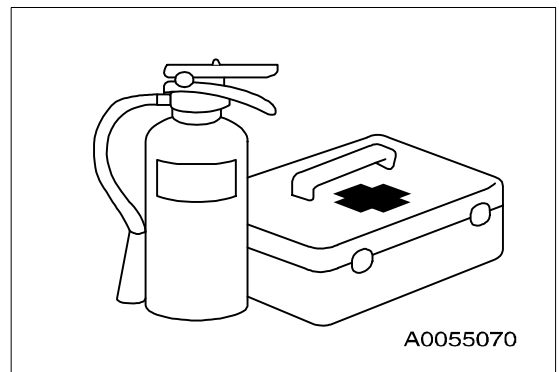
- Do not wear loose clothing and accessories. There is a hazard that they may catch on control levers or other protruding parts.
- If you have long hair and it hangs out from your hard hat, there is a hazard that it may get caught up in the machine, so tie your hair up and be careful not to let it get 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 in the storage point. Carry out periodic checks and add to the contents if necessary.

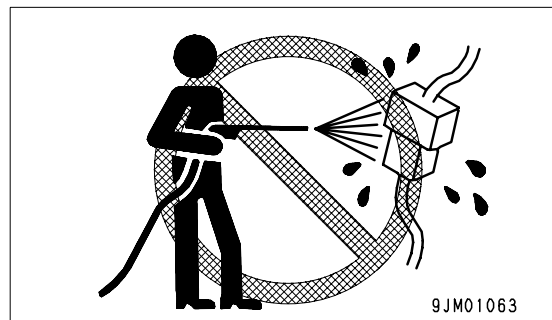


### SAFETY FEATURES

- 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.



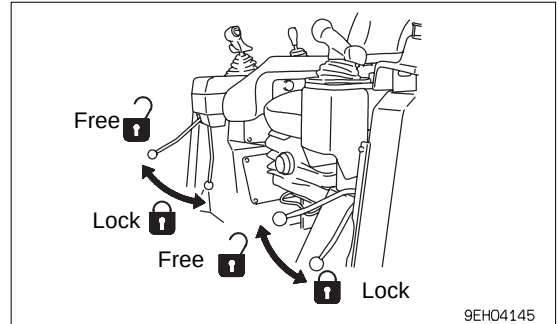
## SAFETY

## GENERAL PRECAUTIONS

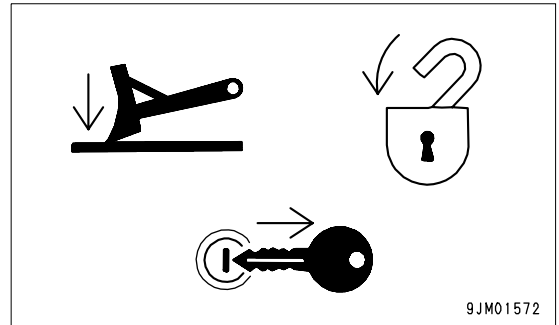
### ALWAYS APPLY LOCK WHEN LEAVING OPERATOR'S SEAT

- Before standing up from the operator's seat, lower the work equipment completely to the ground, set work equipment 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.



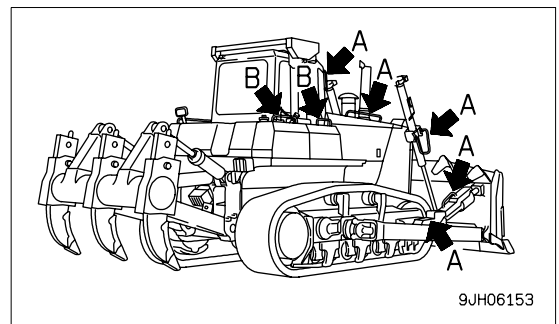
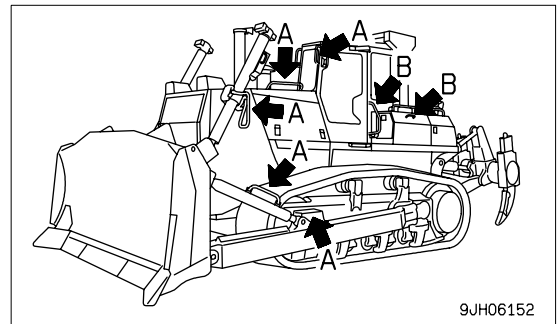
- When leaving the machine, always lower the work equipment completely to the ground, set work equipment lock lever and parking lever securely to the LOCK position, then stop the engine. Use the key to lock all the equipment. Always remove the key, take it with you, and keep it in the specified place.



### HANDRAILS AND STEPS

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

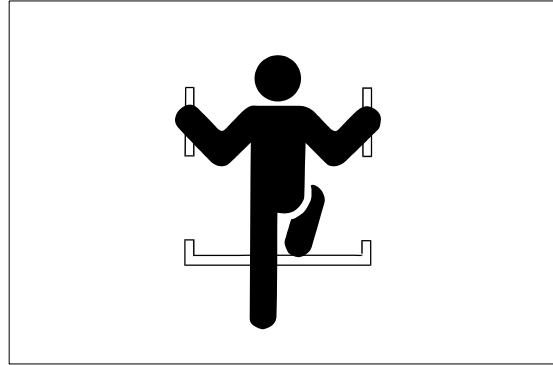
- Use the parts marked by arrow A in the diagrams when getting on or off the machine. Never use the parts marked by arrow B when getting on or off the machine. Use them only when moving along the top of the track or when checking or carrying out maintenance inside the side cover, or when filling the 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.



## GENERAL PRECAUTIONS

## SAFETY

- 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, or work equipment lock lever 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.

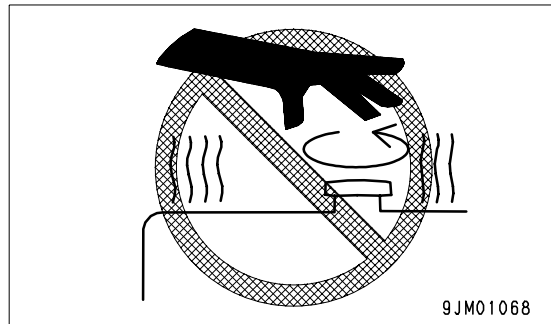
### NO PEOPLE ON ATTACHMENTS

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

### PREVENTION OF BURNS

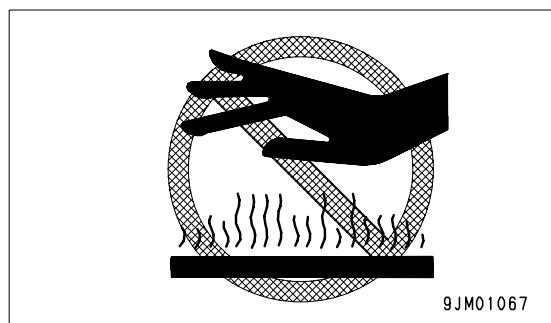
#### Hot coolant

- 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 a 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.



## SAFETY

## GENERAL PRECAUTIONS

### 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.



A0055020



A0055040

#### ● 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.

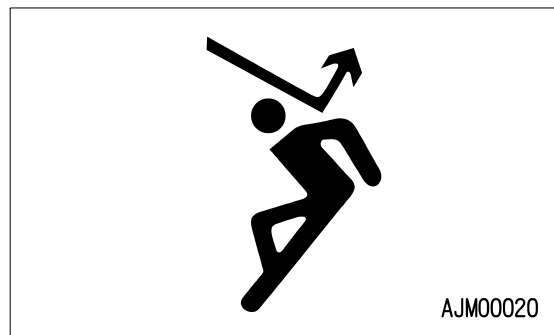
Methyl alcohol base washer liquid may irritate your eyes, so do not use it.

**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.



## SAFETY

## GENERAL PRECAUTIONS

### 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

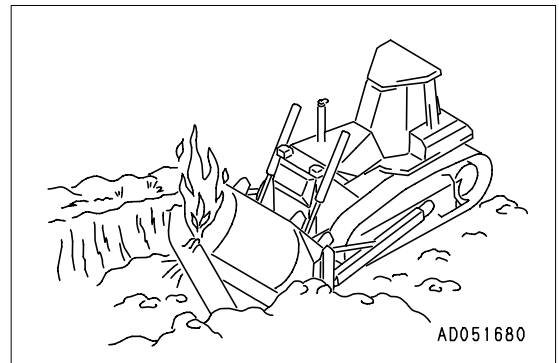
Any modification made without authorization from Komatsu can create hazards. Before making a modification, consult your Komatsu distributor.

- 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.
- 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.

| Voltage of Cables | Safety Distance |
|-------------------|-----------------|
| 100 V - 200 V     | Over 2 m        |
| 6,600 V           | Over 2 m        |
| 22,000 V          | Over 3 m        |
| 66,000 V          | Over 4 m        |
| 154,000 V         | Over 5 m        |
| 187,000 V         | Over 6 m        |
| 275,000 V         | Over 7 m        |
| 500,000 V         | Over 11 m       |

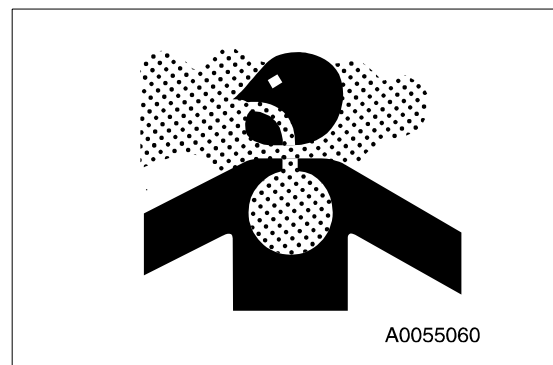
**ENSURE GOOD VISIBILITY**

- 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.



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### 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.



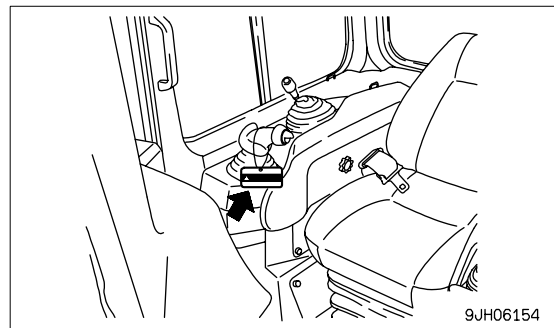
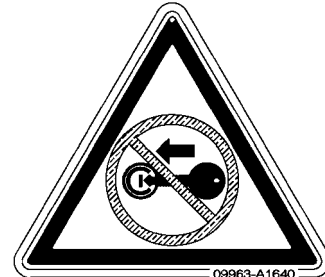
- Do not allow other persons to approach during the operation.
- Always observe the rules and regulations for the work site and environmental standards.

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 in 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 (3-84)".

- 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.

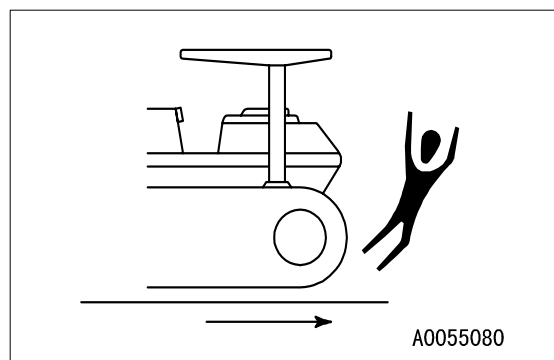
- Always fasten your seat belt.
- Check the operation of travel, steering and brake systems, and work equipment control system.
- Check for any problem in the sound of the machine, vibration, heat, smell, or gauges; check also that there is no leakage of oil or fuel.
- If any problem is found, carry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

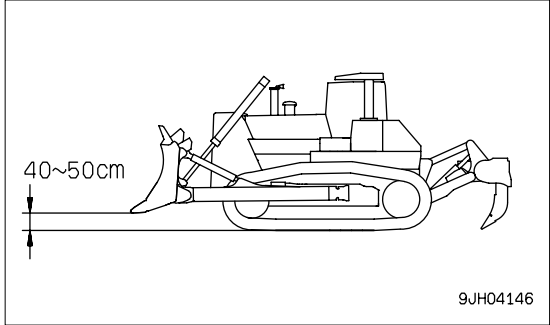
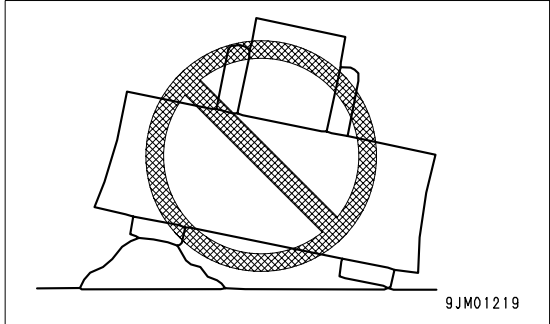
Always be sure to carry out the above precautions even when the machine is equipped with mirrors.



## SAFETY

## PRECAUTIONS FOR OPERATION

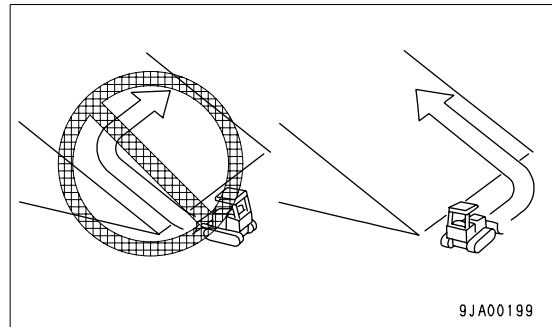
### PRECAUTIONS WHEN TRAVELING

- 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 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.
- 
- 40~50cm
- 9JH04146
- 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.
- 
- 9JM01219

## TRAVELING ON SLOPES

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

- When traveling on slopes, keep the blade approximately 20 to 30 cm 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

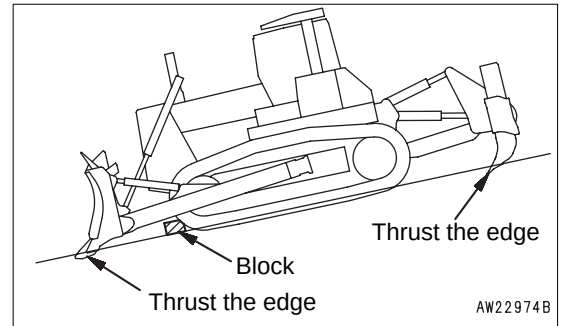
- When the machine is traveling, do not rest your foot on the brake pedal. If you travel with your foot resting on the pedal, the brake will always be applied, and this will cause the brakes to overheat and fail.
- Do not depress the brake pedal repeatedly if not necessary. If this is neglected, the 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 applying 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 (3-108)".
- When leaving the machine, set the 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 (3-108)"  
Locks: See "LOCKING (3-110)"
- Always close the door of the operator's compartment.



## TRANSPORTATION

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

### SHIPPING

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

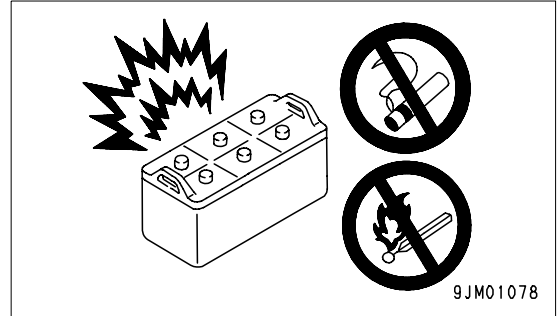
- The weight, transportation height, and overall length of the machine differ according to the work equipment, so be sure to confirm the dimensions.
- When passing over bridges or structures on private land, check first that the structure is strong enough to support the weight of the machine. When traveling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

## **BATTERY**

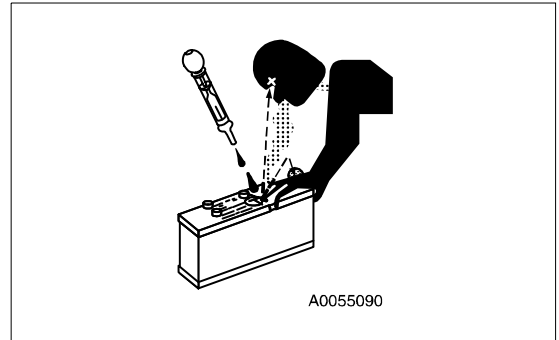
### **BATTERY HAZARD PREVENTION**

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.

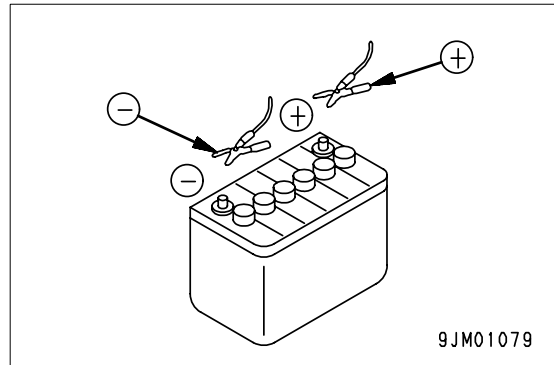
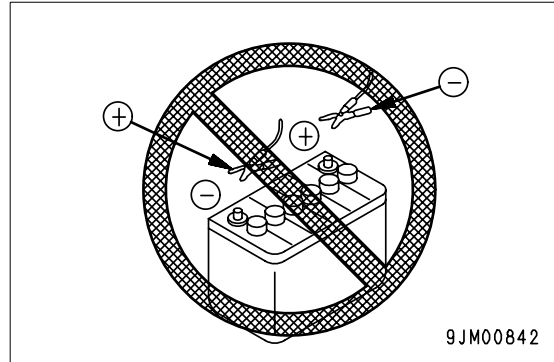
As there is a hazard that sparks will be generated, always do as follows.

- 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 (3-143)".



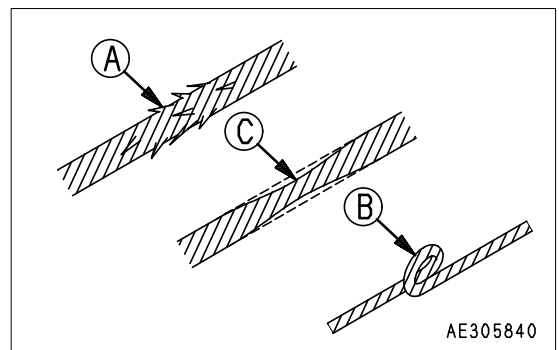
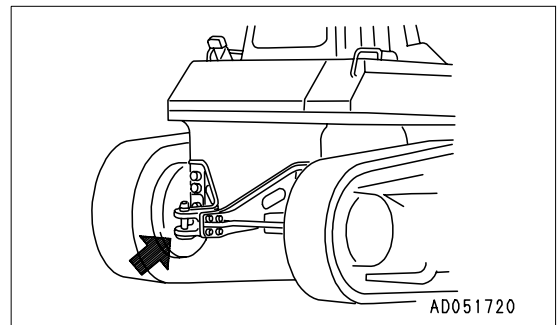
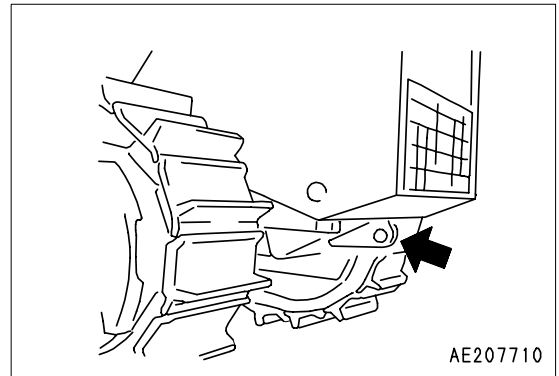


## TOWING

### 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 (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

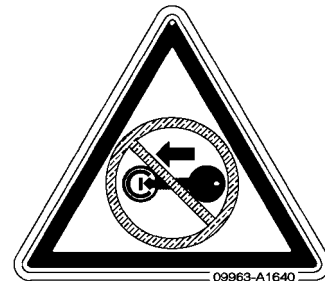
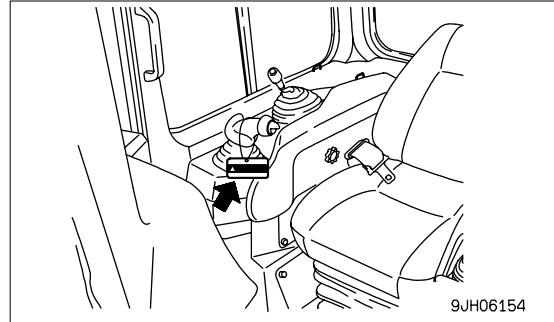
### WARNING TAG

- When carrying out inspection or maintenance, ALWAYS attach the "DO NOT OPERATE" warning tag to the blade control lever in the operator's cab to alert others that you are working on the machine. Attach additional warning tags around the machine in necessary.

Warning tag Part No. 09963-A1640

This tag is placed in the same case as is this operation and maintenance manual.

- 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 clean and tidy, there is the danger that you will trip, slip, or fall over and injure yourself.

### APPOINT LEADER WHEN WORKING WITH OTHERS

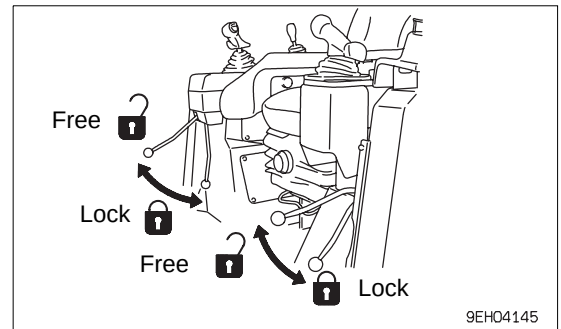
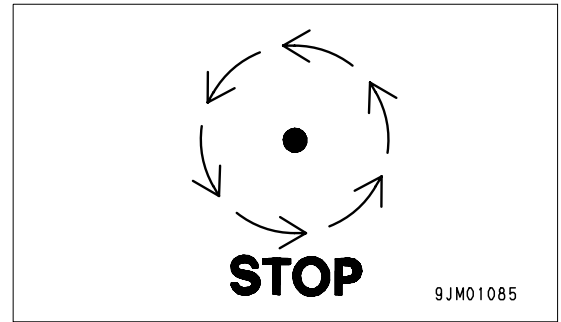
- When repairing the machine or when removing and installing the work equipment, appoint a leader and follow his instructions during the operation.

## SAFETY

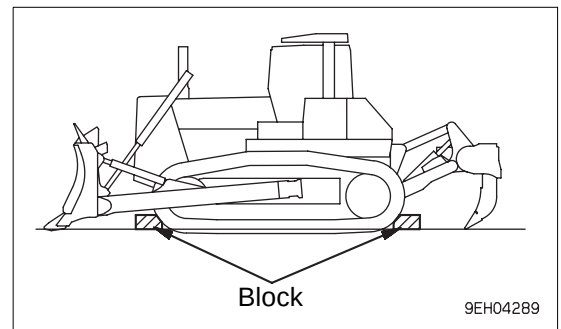
## PRECAUTIONS FOR MAINTENANCE

### STOP ENGINE BEFORE CARRYING OUT INSPECTION 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 work equipment lock lever to the LOCK position.



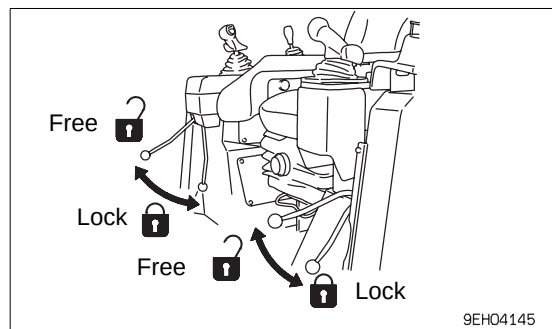
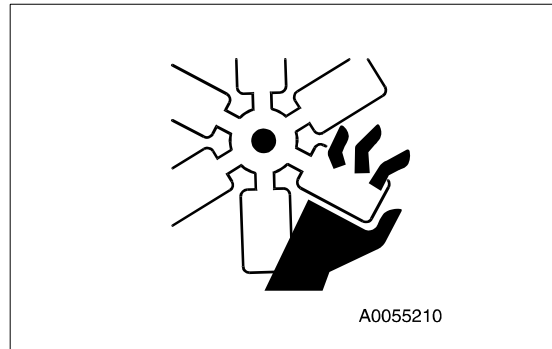
- Put blocks under the track to prevent the machine from moving.



## TWO WORKERS FOR MAINTENANCE WHEN ENGINE IS RUNNING

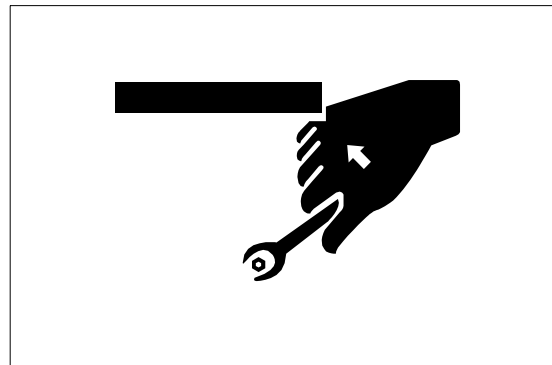
To prevent injury, do not carry out maintenance with the engine running. If maintenance must be carried out with the engine running, carry out the operation with at least two workers and do as follows.

- 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.
- Set the work equipment lock lever to the LOCK position to prevent the machine from moving.
- 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.



## SAFETY

## PRECAUTIONS FOR MAINTENANCE

### HANDLING ACCUMULATOR

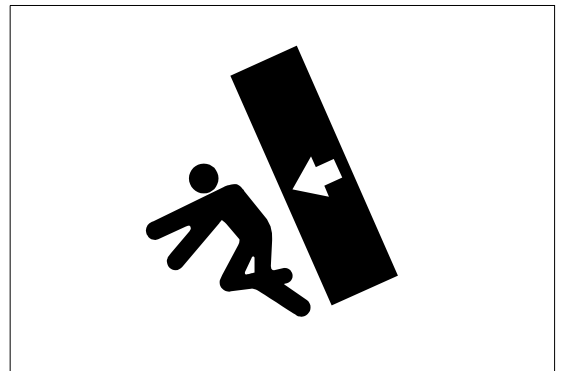
- This machine is equipped with an accumulator. For a short time after the engine is stopped, if the work equipment control lever is moved to the LOWER position, the work equipment will move down under its own weight. After stopping the engine, always set the work equipment lock lever to the LOCK position.
- 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 (3-68)".
- 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.

### PERSONNEL

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**

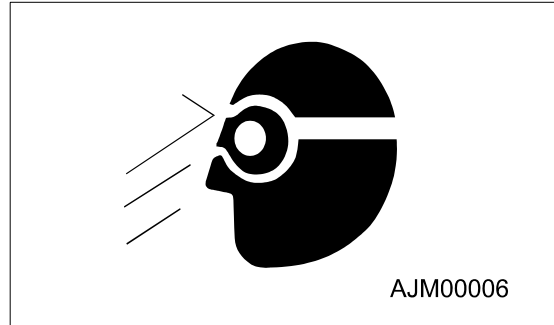
When carrying out maintenance of the engine and you are exposed to noise for long periods of time, wear ear covers or ear plugs while working.

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.

**REPAIR WELDING**

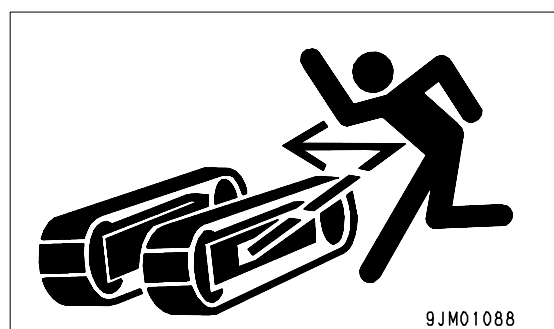
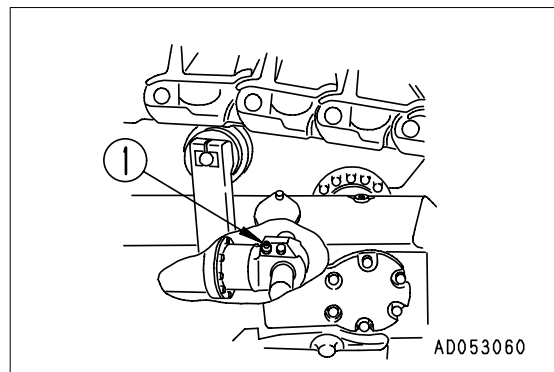
Welding operations must always be carried out by a qualified welder and in a place equipped with proper equipment. There is a hazard of gas, fire, or electrocution when carrying out welding, so never allow any unqualified personnel to carry out welding.

**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).



## SAFETY

## PRECAUTIONS FOR MAINTENANCE

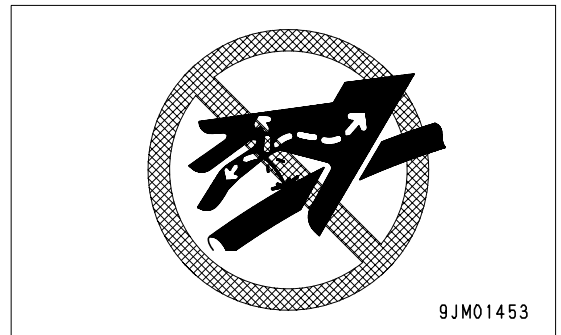
### DO NOT DISASSEMBLE RECOIL SPRING

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 (4-44)". 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

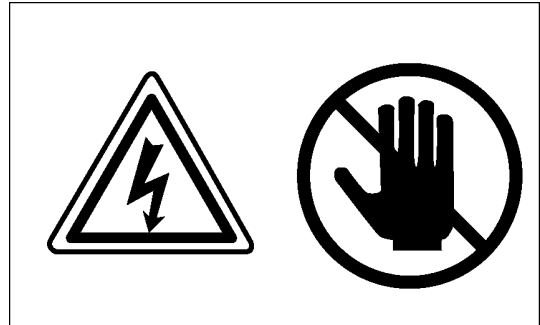
- If oil or fuel leaks from high-pressure hoses, it may cause fire or defective operation, which may lead to serious injury. If any loose bolts are found, stop work and tighten to the specified torque. If any damaged hoses are found, stop operations immediately and contact your Komatsu distributor.

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

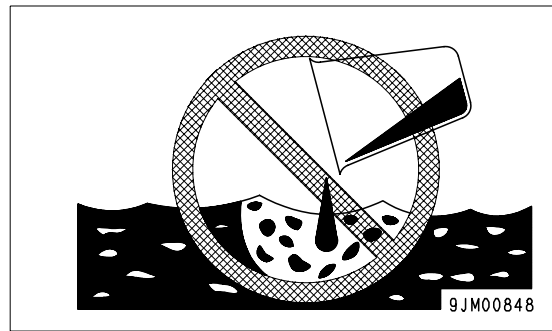
- When the engine is running and immediately after it is stopped, high voltage is generated inside the engine controller and the engine injector, and there is danger of electrocution. Never touch the inside of the controller or the engine injector portion.  
If it is necessary to touch the inside of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

- In order for the machine to be operated safely for a long time, it is necessary to add oil and to carry out service and maintenance at periodic intervals. In order to further increase safety, components with a strong relationship to safety, such as hoses and seat belts, must be replaced at periodic intervals.  
Replacement of safety critical parts: See "PERIODIC REPLACEMENT OF SAFETY CRITICAL PARTS (4-16)".
- 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



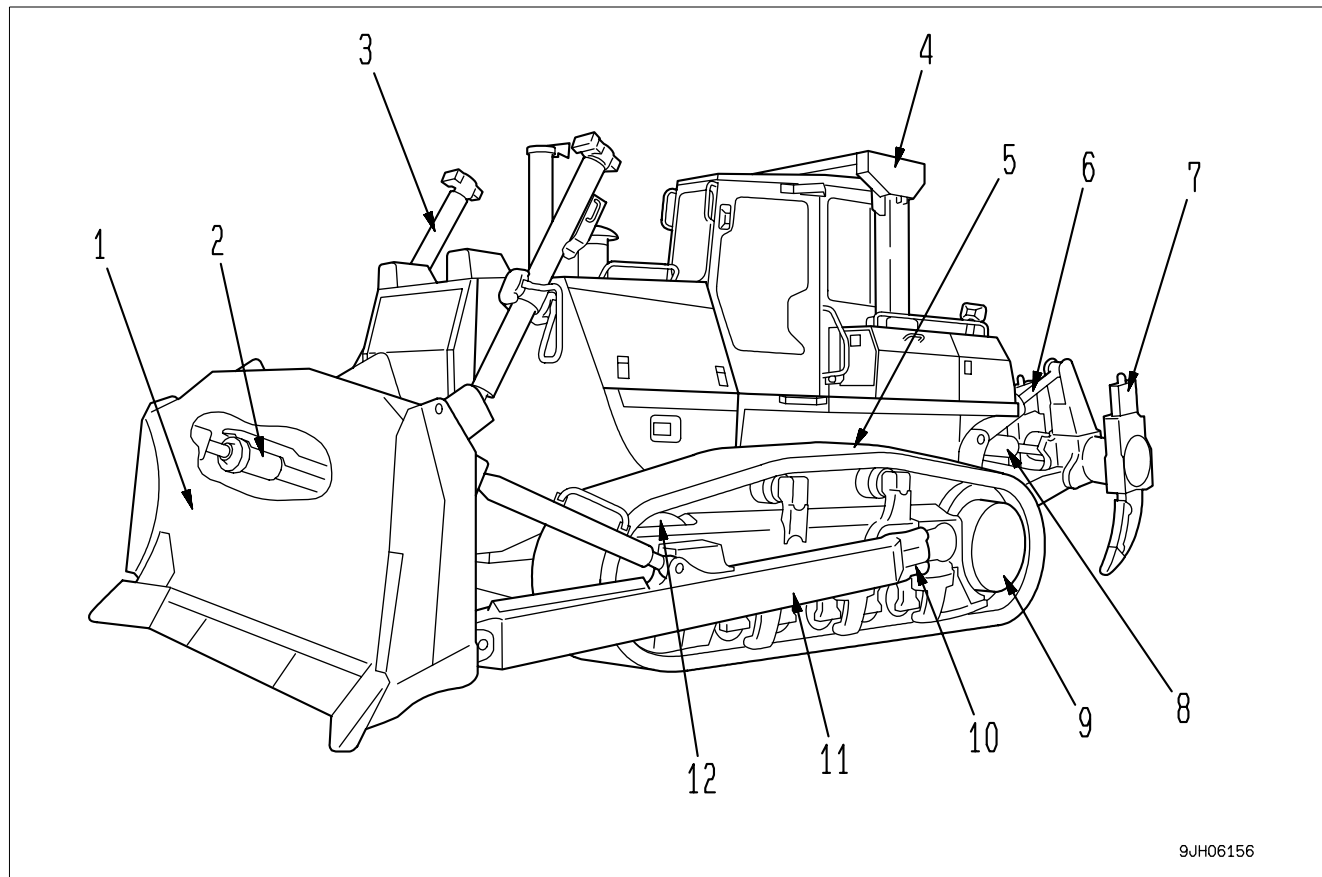
## **WARNING**

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

---

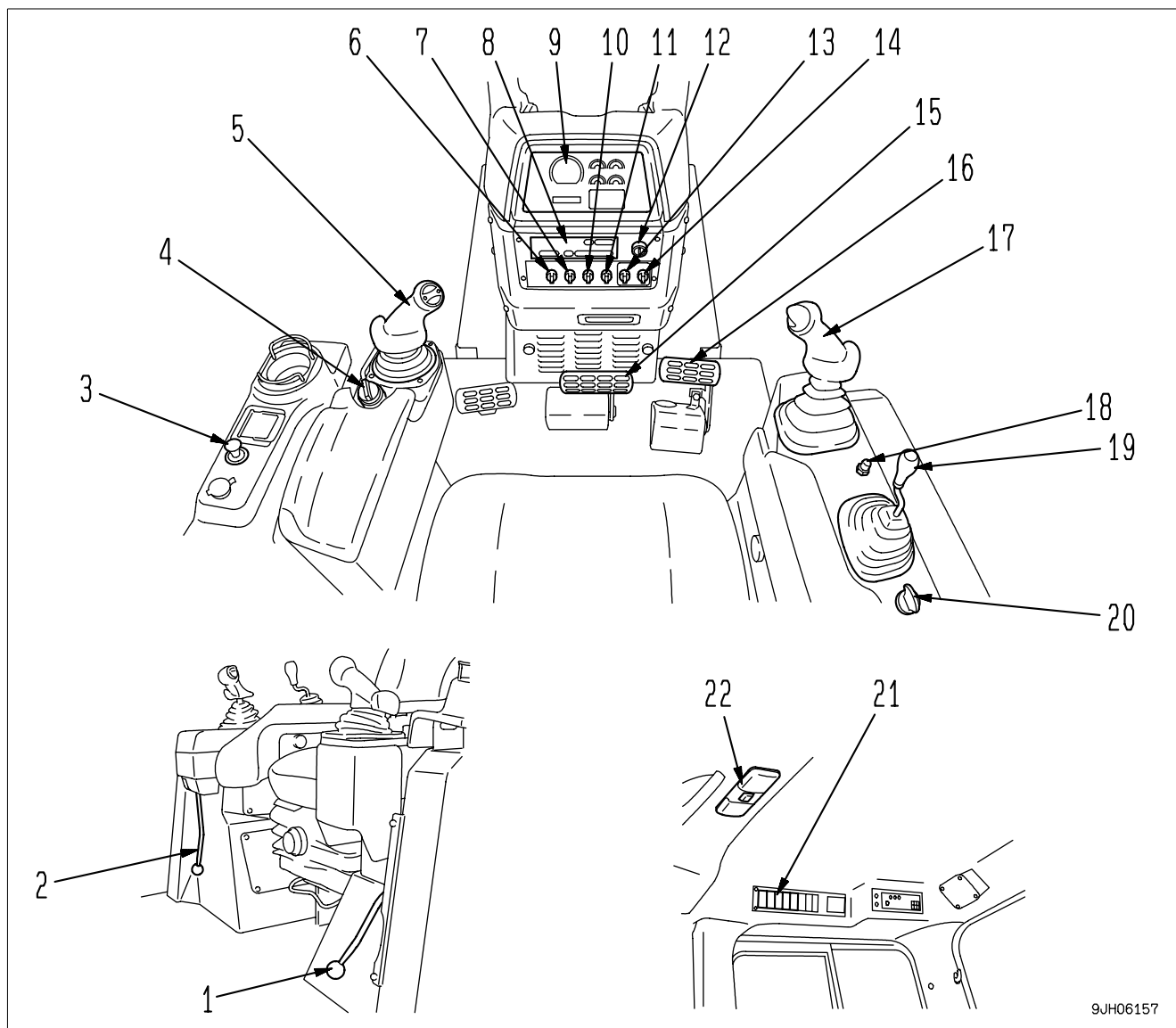
## GENERAL VIEW

### GENERAL VIEW OF MACHINE



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

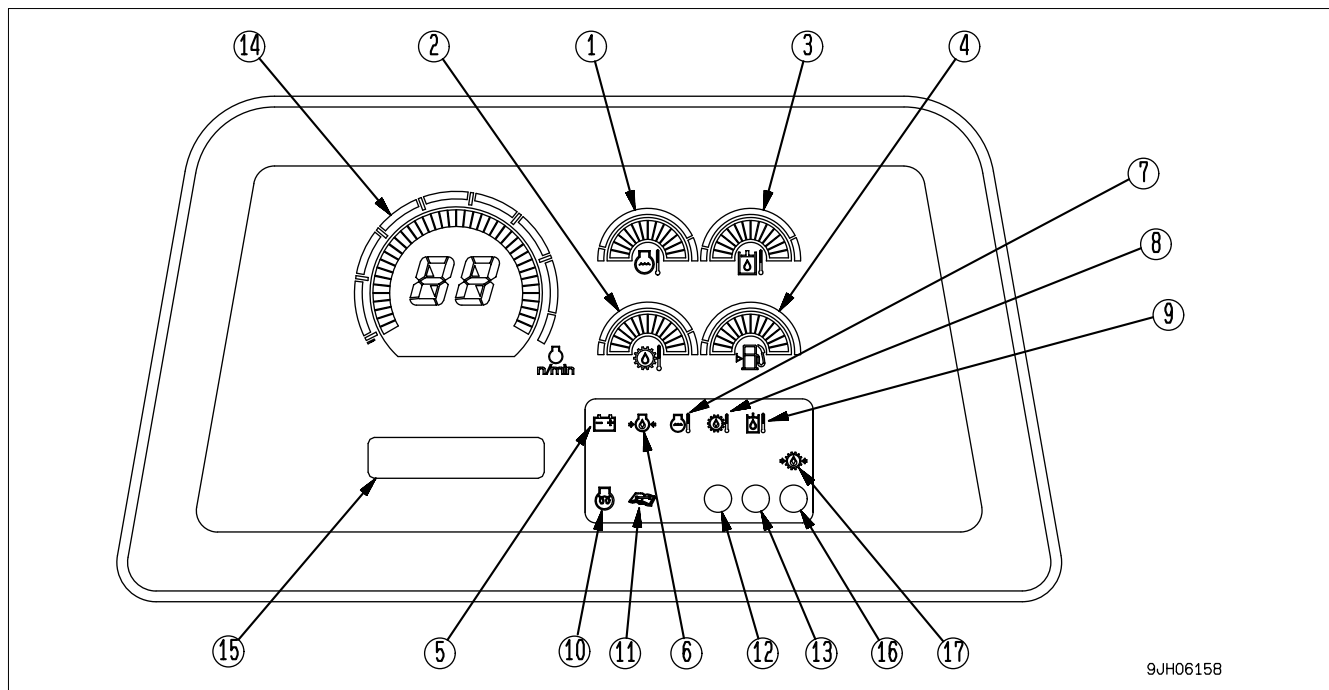
## GENERAL VIEW OF CONTROLS AND GAUGES



9JH06157

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

FRONT PANEL



9JH06158

- |                                              |                                                          |
|----------------------------------------------|----------------------------------------------------------|
| (1) Engine coolant temperature gauge         | (10) Engine pre-heating pilot lamp                       |
| (2) Power train oil temperature gauge        | (11) Maintenance caution lamp                            |
| (3) Hydraulic oil temperature gauge          | (12) Warning lampFilter/oil change interval lamp         |
| (4) Fuel level gauge                         | (13) Filter/oil change interval lamp                     |
| (5) Charge level caution lamp                | (14) Display panel A (speed range display, engine speed) |
| (6) Engine oil pressure caution lamp         | (15) Display panel B (multi-information)                 |
| (7) Engine coolant temperature caution lamp  | (16) Fan operation confirmation lamp                     |
| (8) Power train oil temperature caution lamp | (17) HSS charge pressure caution lamp                    |
| (9) Hydraulic oil temperature caution lamp   |                                                          |

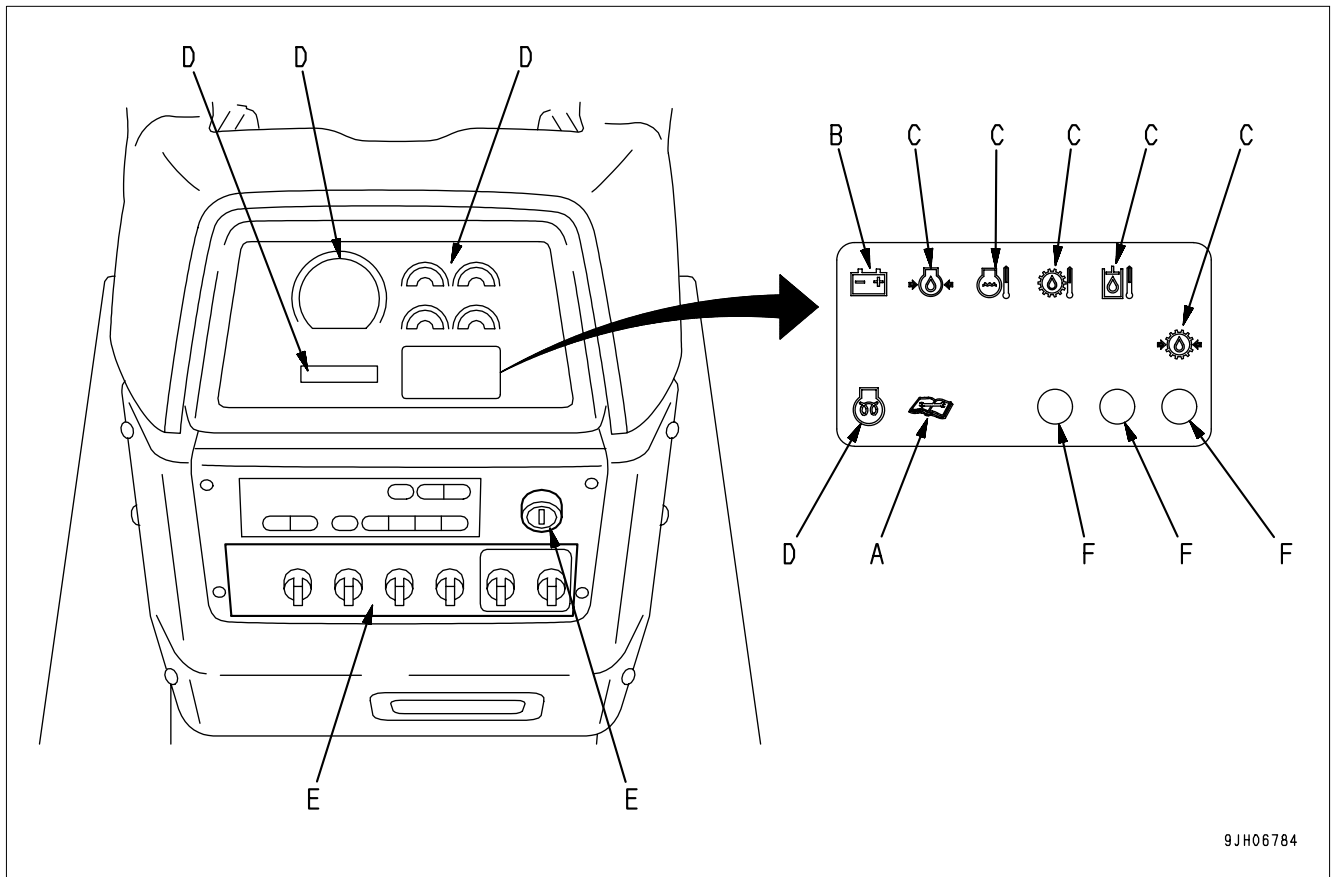
HSS: Hydro Static Steering System

## EXPLANATION OF COMPONENTS

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

To perform suitable operations correctly and safely, it is important to completely understand methods of operating the equipment, and the meanings of the displays.

### FRONT PANEL



- A: Check monitor group
- B: Caution monitor group
- C: Emergency caution items

- D: Meter group
- E: Switches
- F: Lamps

A: Check monitor group (see "CHECK MONITOR GROUP (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 (3-69)".**

B: Caution monitor group (see “CAUTION MONITOR GROUP (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 (3-11)“)



## 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 be taken on immediately 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 group (see “METER GROUP (3-14)“)

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 (3-32)“)

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 (3-21)“)

This consists of the warning lamp, the filter/oil replacement interval lamp, and fan operation confirmation lamp.

## CHECK MONITOR GROUP

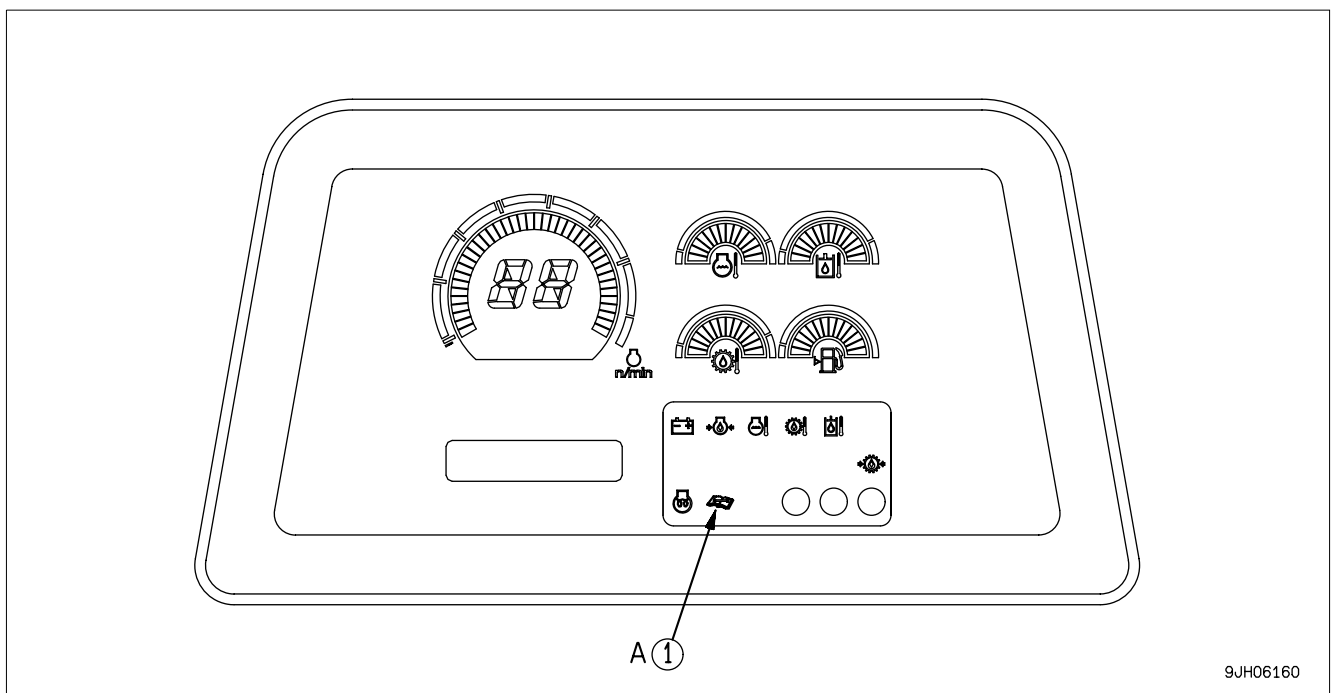
### NOTICE

- When performing the check before starting, do not rely only on these monitors. Always refer to "OPERATION (3-69)" 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 starting 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 starting switch is turned to the ON position, before starting the engine, the caution lamps flash 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.

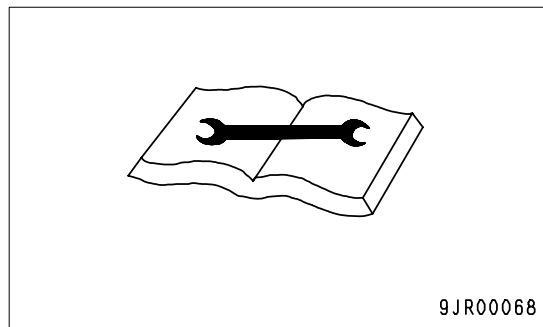
This displays the basic items among the check before starting items that must be checked before starting the engine. If there is any abnormality, the caution lamp for that location will flash.



A(1) Maintenance caution lamp

**MAINTENANCE CAUTION LAMP**

This lamp (1) flashes when the time for changing the filter or oil has been exceeded. "DISPLAY PANEL B (Multi-information) (3-16)" to the maintenance mode, and check or replace the appropriate filter or oil.





## CAUTION MONITOR GROUP

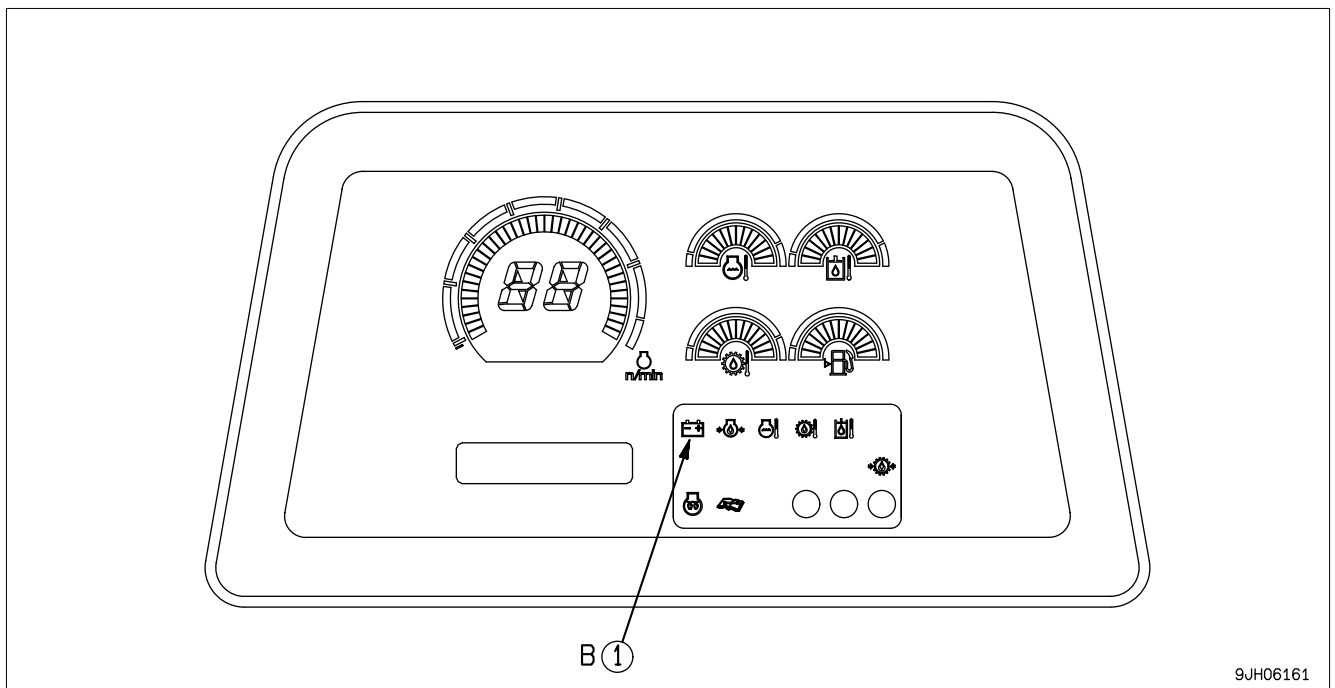
**CAUTION**

If these caution lamps 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 starting 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 problem occurs, the item needing immediate repair is displayed. If there is any problem, the problem location on the caution lamp will flash.



9JH06161

B(1) Charge level caution lamp

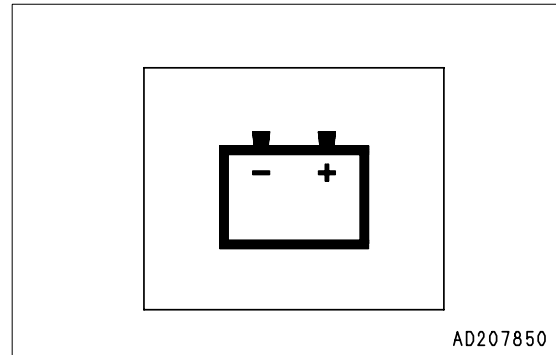
### CHARGE LEVEL CAUTION LAMP

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 (3-146)".

### REMARK

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



## EMERGENCY CAUTION ITEMS

**CAUTION**

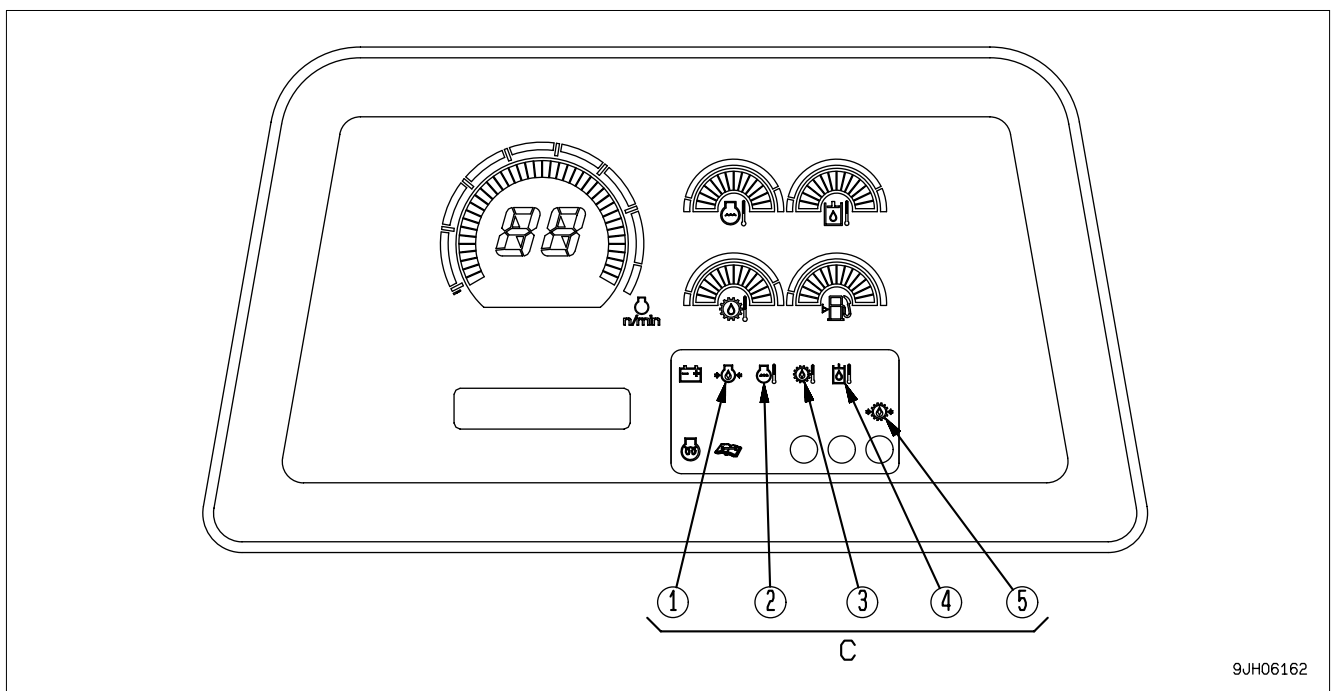
If the caution lamp for any of these items flashes, stop the engine immediately or run it at low idling, and take the following action.

**NOTICE**

- Park the machine on level ground and check the monitor lamps.
- Confirm that these caution lamps light for about 2 seconds after the starting 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.



9JH06162

C (1) Engine oil pressure caution lamp

C (2) Engine coolant temperature caution lamp

C (3) Power train oil temperature caution lamp

C (4) Hydraulic oil temperature caution lamp

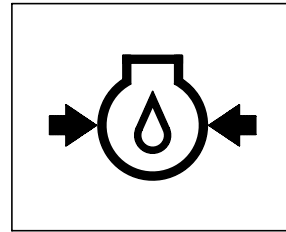
C (5) HSS charge pressure caution lamp

**ENGINE OIL PRESSURE CAUTION LAMP**

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

**REMARK**

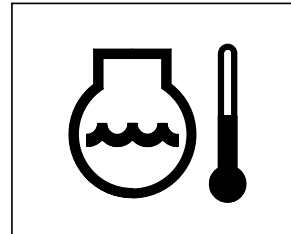
The alarm buzzer sounds, when the starting switch is turned to ON immediately after the engine oil has been changed. It does not indicate an problem.



AD207870

**ENGINE COOLANT TEMPERATURE CAUTION LAMP**

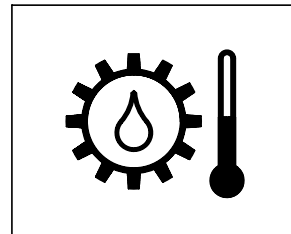
This lamp (2) indicates a rise in the coolant temperature. When the monitor lamp flashes, run the engine at low idling speed until green range of the engine coolant temperature gauge lights.



AD207880

**POWER TRAIN OIL TEMPERATURE CAUTION LAMP**

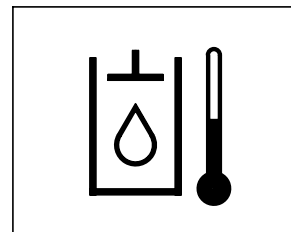
This lamp (3) indicates a rise in the oil temperature of the torque converter outlet. When the monitor lamp flashes, run the engine at the low idling speed until the green range of the power train oil temperature gauge lights.



AD207890

**HYDRAULIC OIL TEMPERATURE CAUTION LAMP**

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.



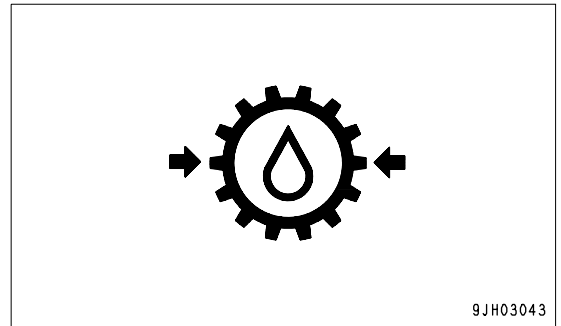
AD207900

### 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.

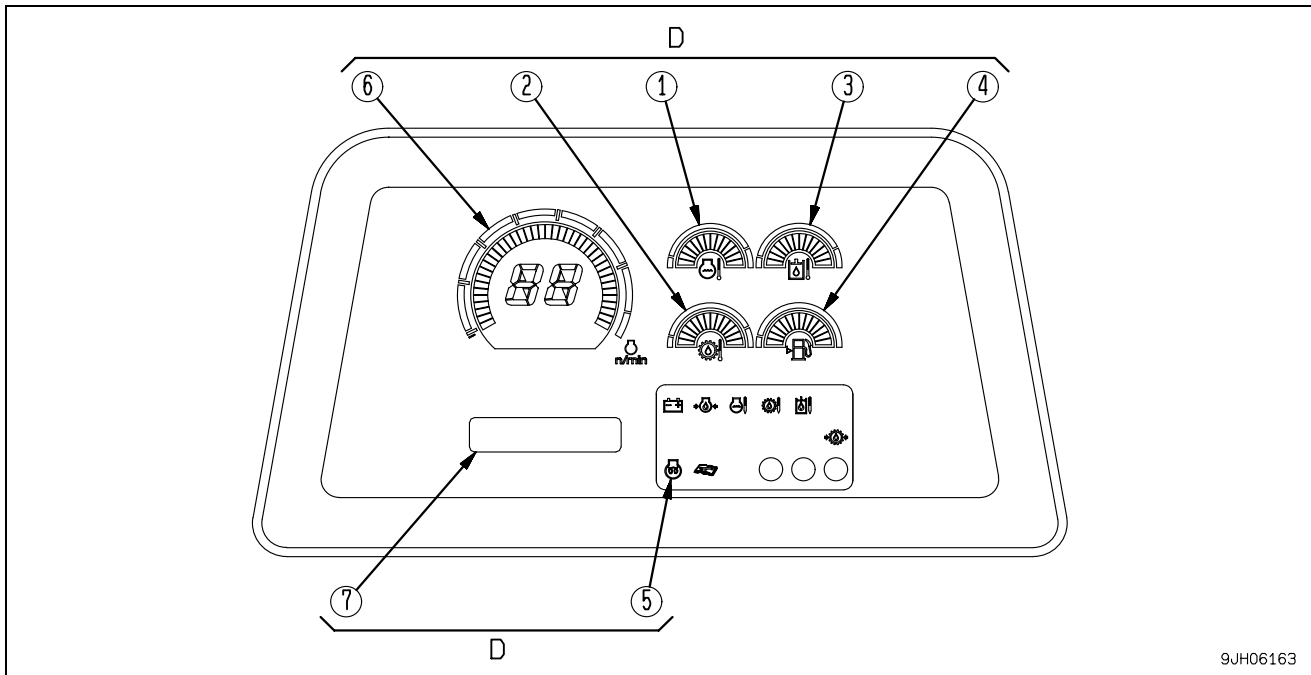


## METER GROUP

### 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.



9JH06163

D (1) Engine coolant temperature gauge

D (2) Power train oil temperature gauge

D (3) Hydraulic oil temperature gauge

D (4) Fuel level gauge

D (5) Engine pre-heating pilot lamp

D (6) Display panel A  
(Speed range display, engine speed)

D (7) Display panel B (multi-information)

### ENGINE COOLANT TEMPERATURE GAUGE

Gauge (1) indicates temperature of the engine coolant.

If the temperature is normal during operation, green range (B) will light.

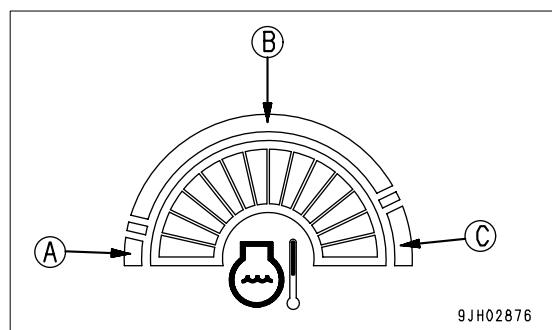
If red range (C) lights during operation, move the fuel control dial to lower engine speed to approx. 3/4 of the full speed, and run until the coolant temperature enters green range (B).

During operation, if red range (C) lights up, the engine coolant temperature monitor flashes, and the alarm buzzer sounds, stop the machine, run the engine at low idling, and wait for the coolant temperature to go down to green range (B).

(A): White range

(B): Green range

(C): Red range



9JH02876

### NOTICE

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

## OPERATION

## EXPLANATION OF COMPONENTS

### 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.

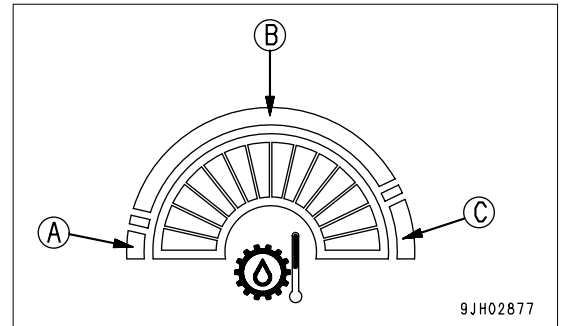
If red range (C) lights up during operation, move the fuel control dial to lower engine speed to approx. 3/4 of the full speed, reduce the load and run until the oil temperature enters green range (B).

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.

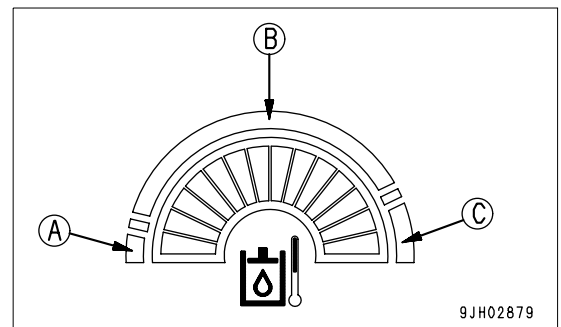
If the temperature is normal during operation, green range (B) will light.

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

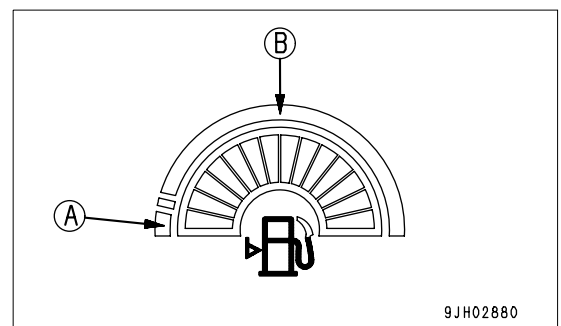
Gauge (4) fuel level in the fuel tank.

During normal operation, the green range (B) should be lit.

If red range (A) lights up during operation, add fuel immediately. If this is not done, the engine speed will become irregular or an error display will be shown on the monitor.

(A): Red range

(B): Green range



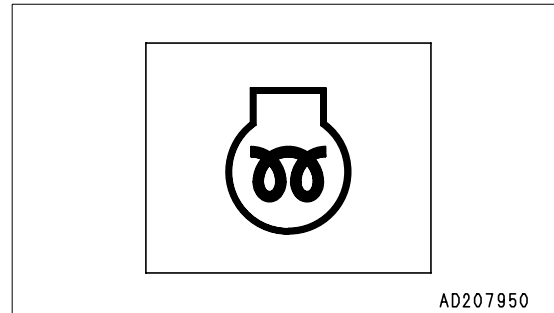
### REMARK

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 of fuel remaining.

### ENGINE PRE-HEATING PILOT LAMP

Lamp (5) indicates that engine is being pre-heated by the electrical heater during cold weather.

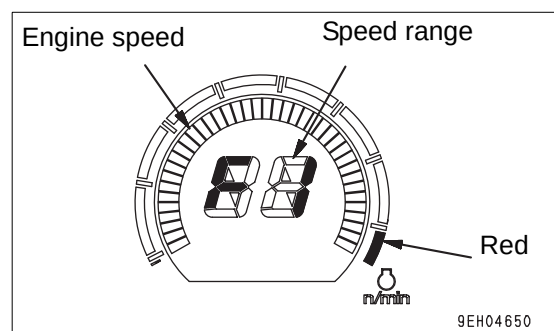
The engine controller detects the coolant temperature and automatically actuates pre-heating in low temperatures when starting the engine.



### 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.

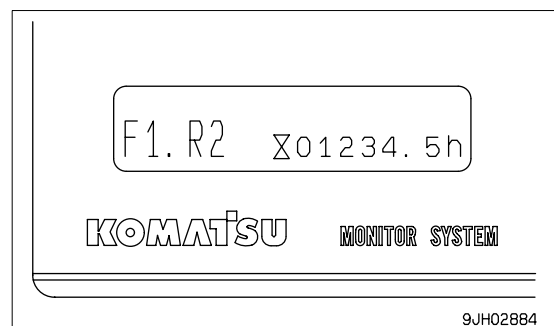


### DISPLAY PANEL B (Multi-information)

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 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.

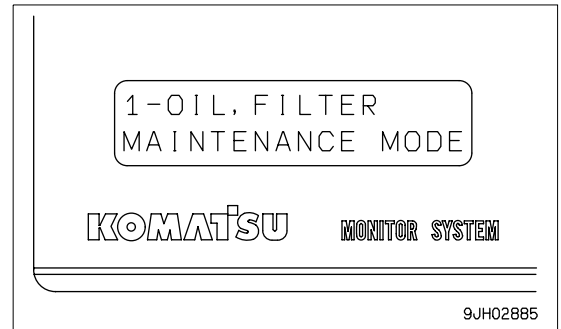
The meter advances by 1 for one hour of engine operation, regardless of the engine speed.

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 (3-146)".

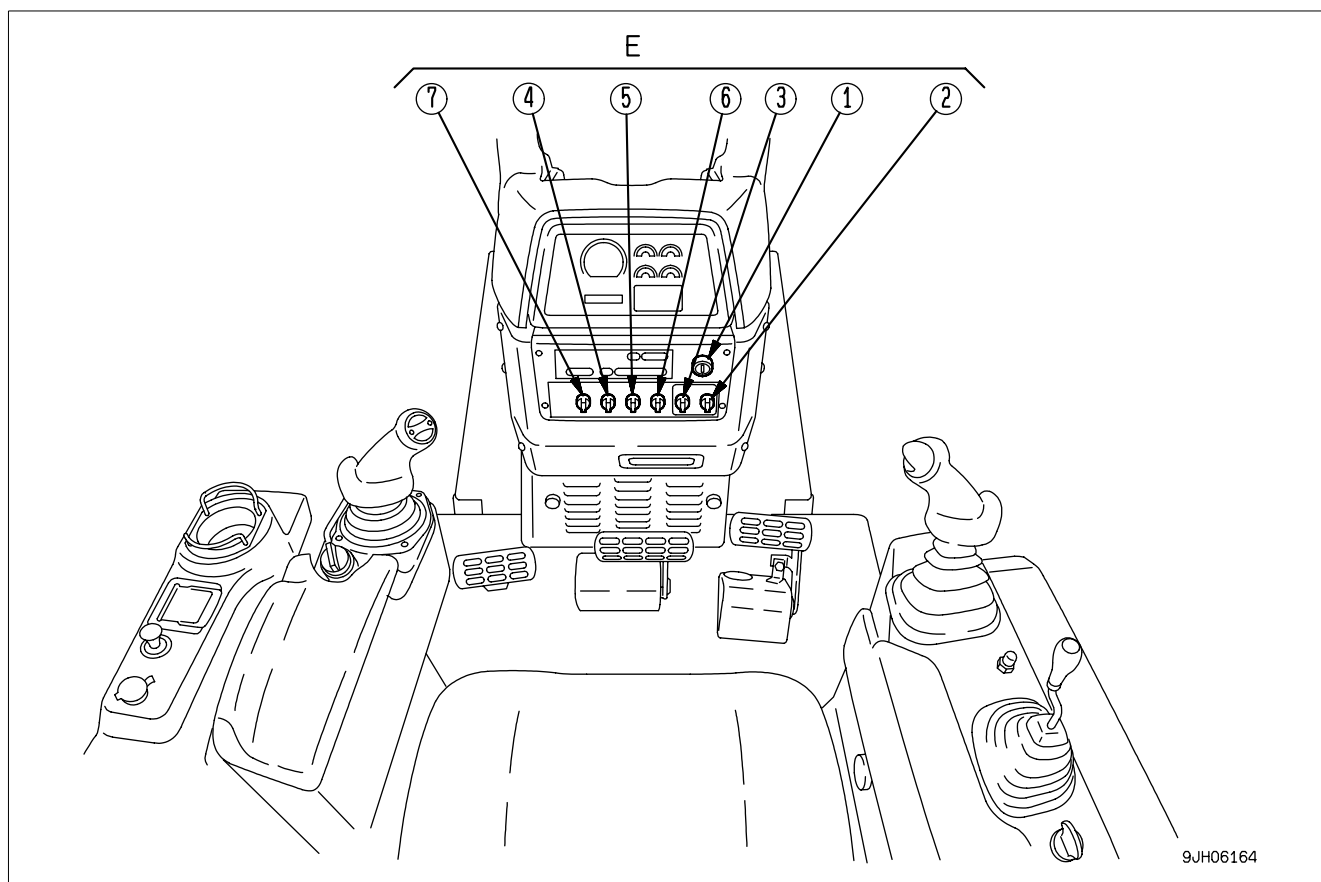


### (2) Maintenance mode

The maintenance mode is displayed by continuing to turn the information switch in the  $\diamond$  direction for 2.5 seconds.  
For details, see "METHOD OF USING DISPLAY PANEL B (Multi-information) (3-23)".



## SWITCHES



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

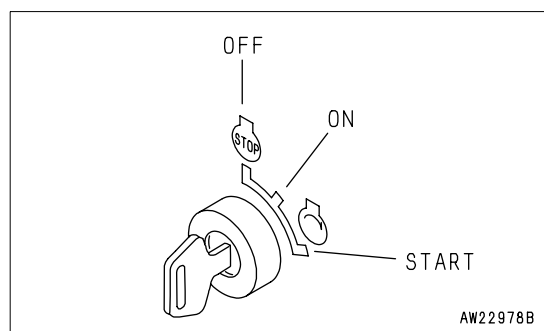
Key insertion-withdrawal position. None of electrical circuits activate.

#### ON

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

#### START

In 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.



## OPERATION

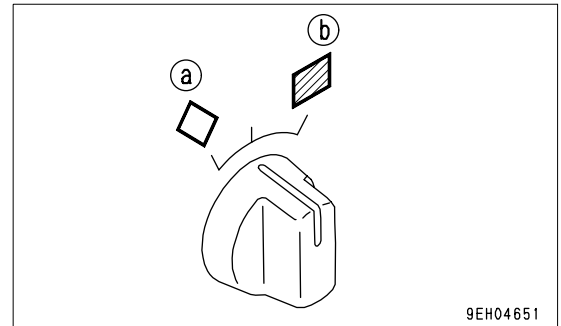
## EXPLANATION OF COMPONENTS

### 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

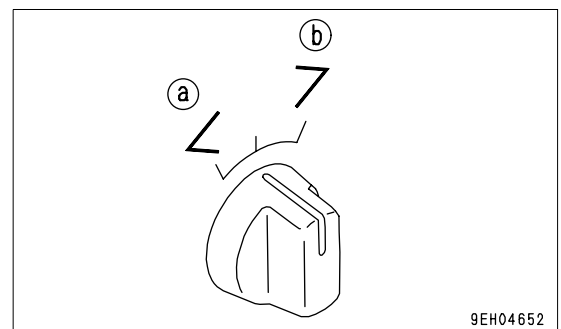


### INFORMATION SWITCH

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.

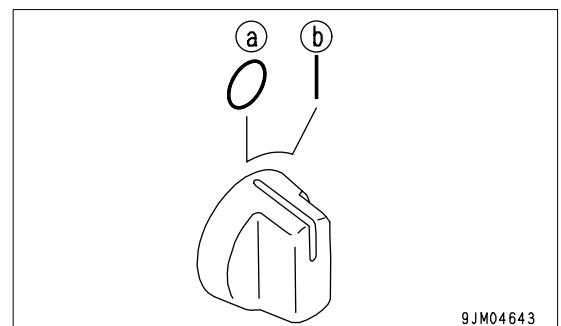


### FRONT LAMP SWITCH

This switch (4) is used to light up the front lamp.

Position (a) (OFF): Lamp goes out

Position (b) (ON): Lamp lights up



### REMARK

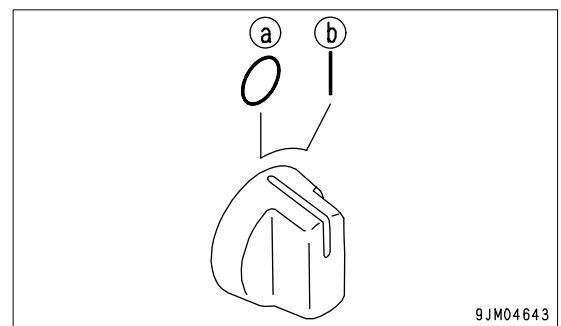
When the head lamp switch is turned ON, the monitor panel lighting dims.

### 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

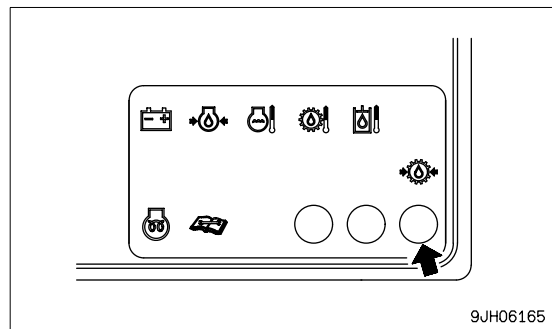
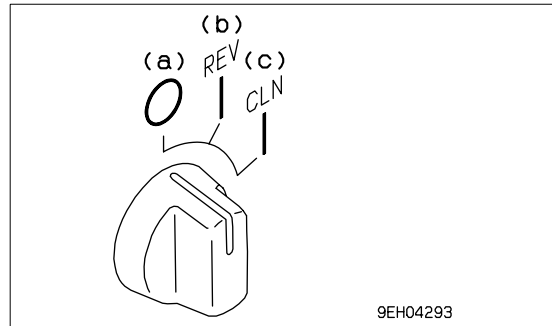
This switch (6) is used to switch the fan to the reverse mode and clean mode.

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 mode 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.



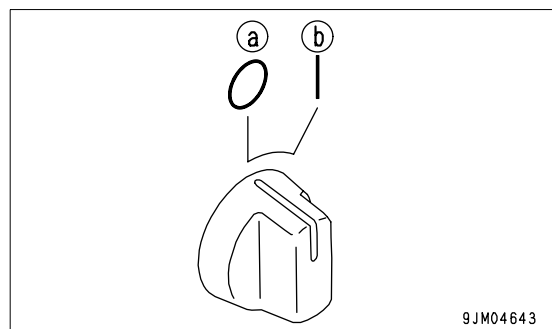
### AUTO SHIFT DOWN SWITCH

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.

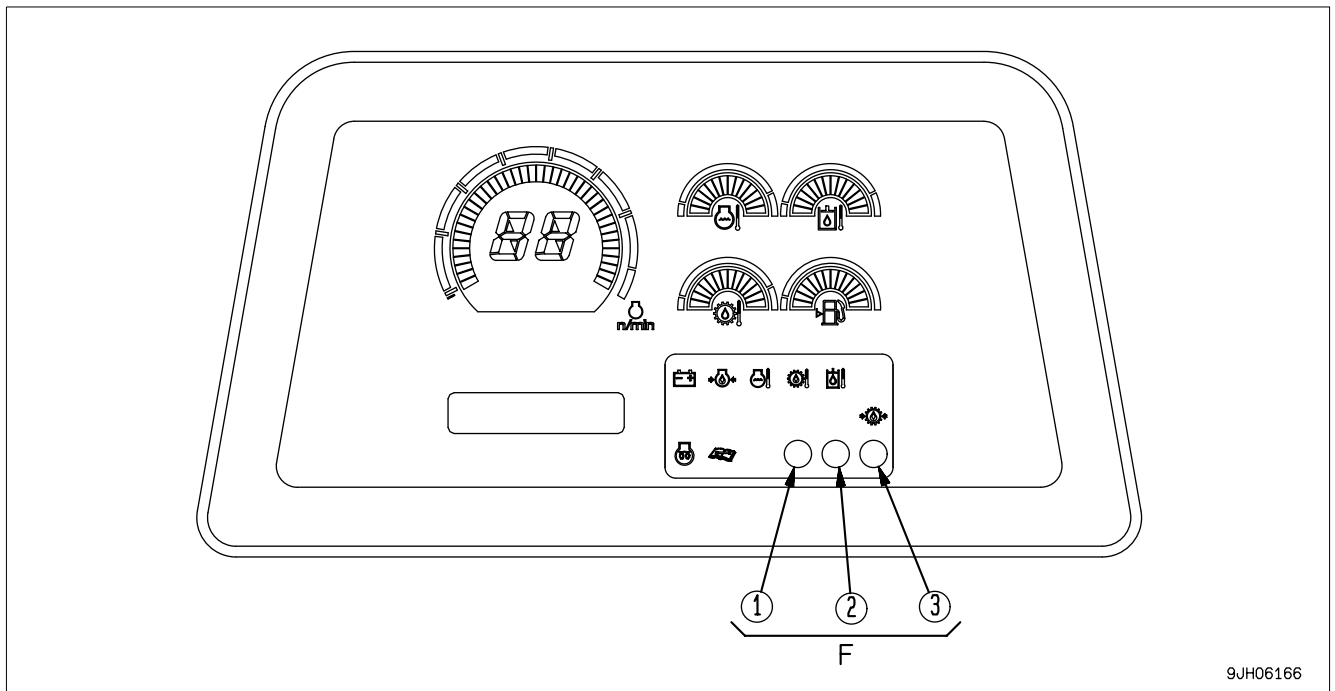
Position (a): Auto shift down canceled

Position (b): Transmission is automatically shifted down

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



## LAMPS



F (1) Warning lamp

F (3) Fan operation confirmation lamp

F (2) Filter/oil change interval lamp

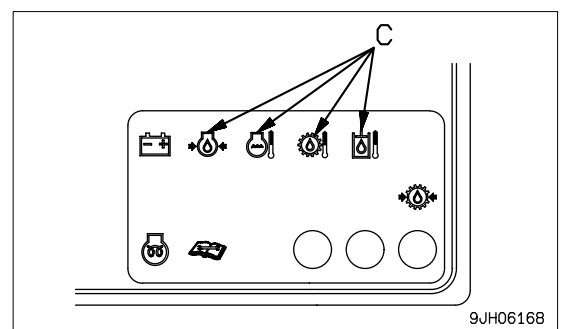
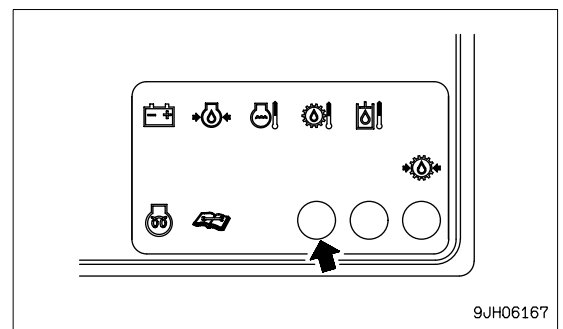
## WARNING LAMP

### NOTICE

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

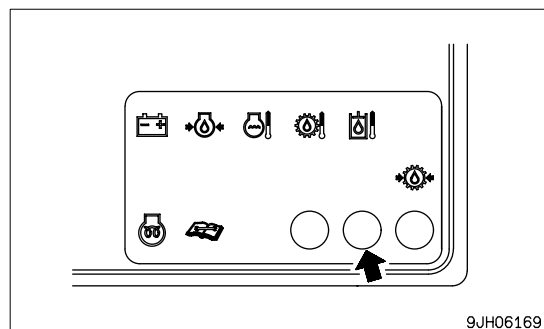
When the caution lamp for the B CAUTION or C CAUTION groups flashes and an abnormality is detected by the electronic control system, the alarm buzzer sounds and this lamp (1) flashes at the same time.

If the lamp flashes, use the monitor panel to check for the location of the abnormality.



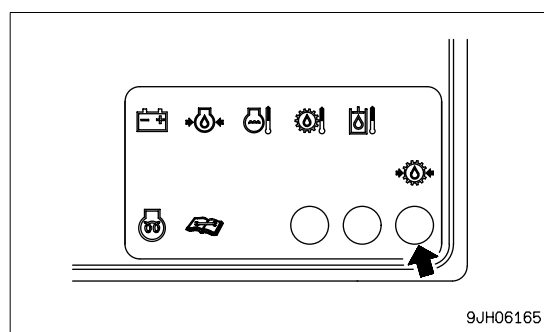
**FILTER/OIL CHANGE INTERVAL LAMP**

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 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 (3-25)

#### METHOD OF USING PM CLINIC AUXILIARY MODE (3-27)

#### METHOD OF USING FAULT CODE DISPLAY MODE (3-28)

#### METHOD OF USING USER ADJUST MODE (3-29)

- 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.

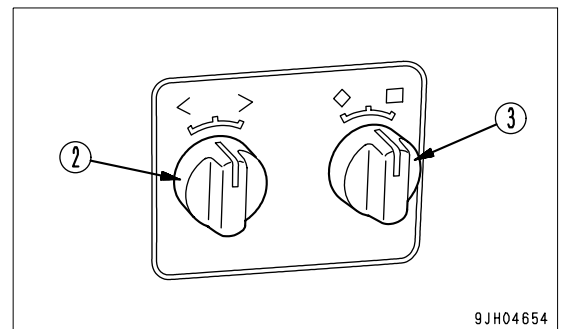
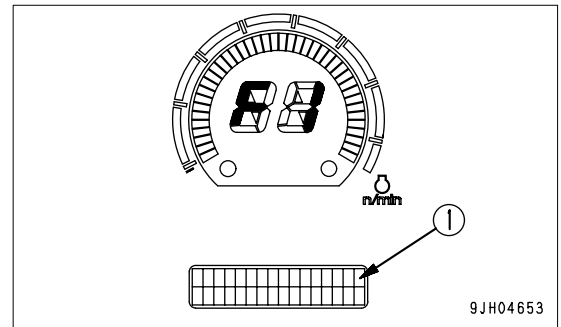
<: Mode item display goes back to previous item, cursor moves to left

>: Mode item display advances to next item, cursor moves to right

◇: Selects mode

□: Cancels mode

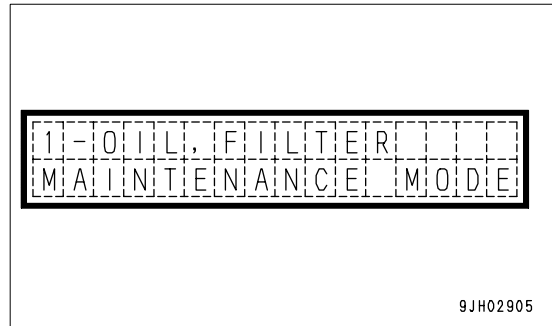
- The four types of mode can be selected in a cycle by operating information switch (2) to > and < to give the following sequence: Maintenance mode ↔ PM clinic auxiliary mode ↔ Fault code display mode ↔ Adjustment mode ↔ Maintenance mode.
- From the normal mode before giving the mode display, if buzzer 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**

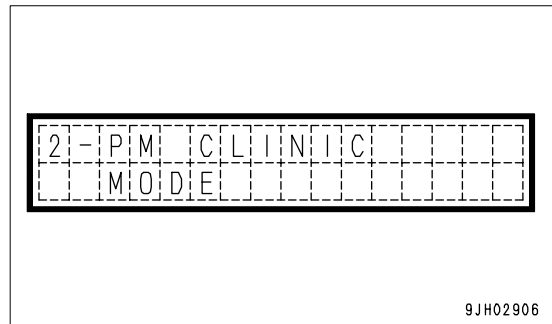
1. When moving from the normal operation display to a user mode, the maintenance mode is displayed. Use the controls to change the mode as follows.

> 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.



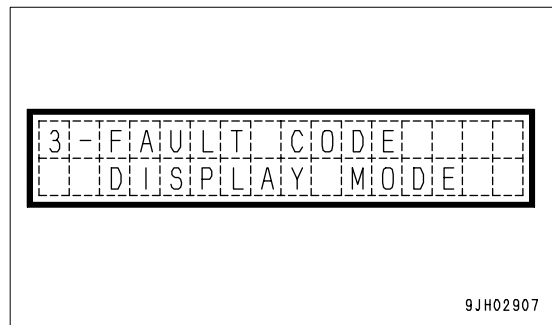
2. The diagram on the right shows the screen display for the PM clinic auxiliary mode. Use the controls to change the mode as follows.

> 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



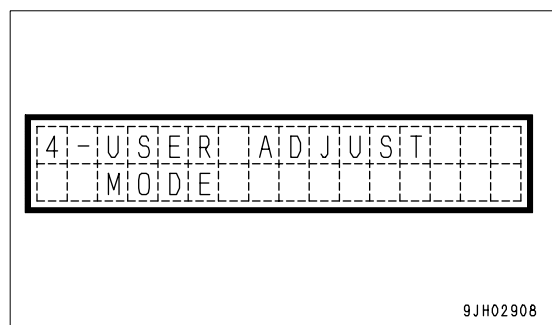
3. The diagram on the right shows the screen display for the fault code display mode. Use the controls to change the mode as follows.

> 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





## OPERATION

## EXPLANATION OF COMPONENTS

### METHOD OF USING MAINTENANCE MODE

#### NOTICE

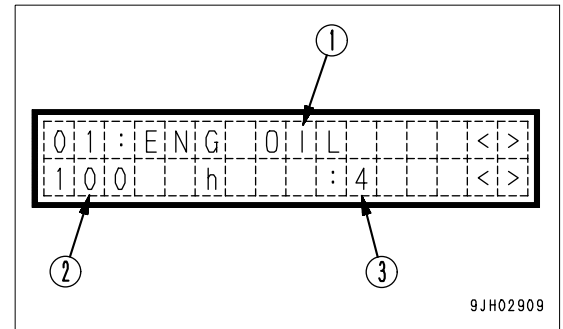
This function is only a guideline. If dirty oil or filters are found during daily maintenance, replace them immediately.

If the controllers or monitor panel are replaced, the timer for this function will not work 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   | 250h                     | 2000h                                   |
| 5.  | CORR.RES  | Corrosion resistor (*) | 0h                       | 0h                                      |
| 6.  | BYPS.FILT | Bypass filter (*)      | 0h                       | 0h                                      |
| 7.  | DAMP.OIL  | Damper oil             | 2000h                    | 2000h                                   |
| 8.  | FNL.OIL   | Final drive oil        | 250h                     | 1000h                                   |
| 9.  | HYD.OIL   | Hydraulic oil          | 250h                     | 2000h                                   |
| 10. | POWL.OIL  | Power train oil        | 250h                     | 1000h                                   |
| 11. | POWL.FILT | Power train oil filter | 250h                     | 500h                                    |
| 12. | HSS.FILT  | HSS charge filter      | 250h                     | 1000h                                   |

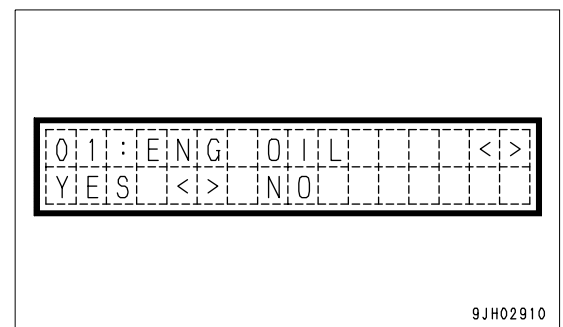
The item marked \* is displayed in the above table, but is not used on this machine.

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.

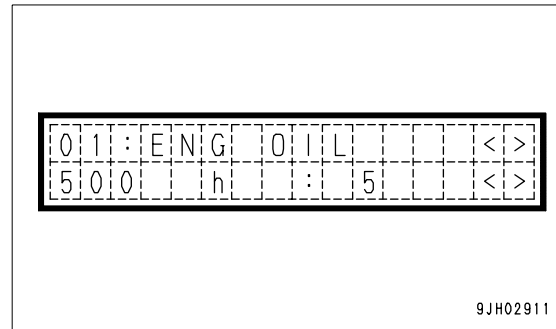
Operate the information switch to select YES, then operate the buzzer cancel switch to ◇. The replacement account will increase by 1, the replacement interval will be reset, and the oil, filter change interval lamp will go out.

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 □.



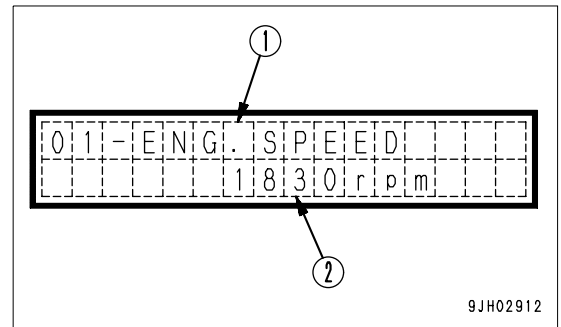
## METHOD OF USING PM CLINIC AUXILIARY MODE

**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  $\diamond$ . The value at that moment is shown on the fixed display.

To cancel this mode, operate the buzzer cancel switch once more to  $\diamond$ .

To return to each function selection mode, operate the buzzer cancel switch to  $\square$ .

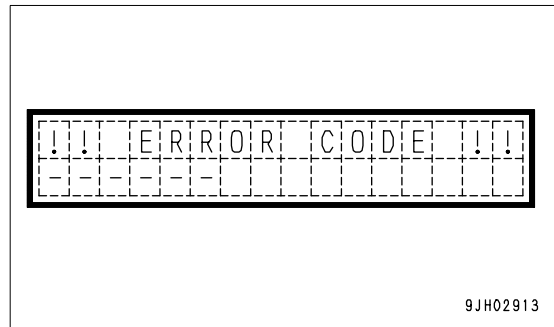
The displayed pressure is the absolute pressure.

**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 problem 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.

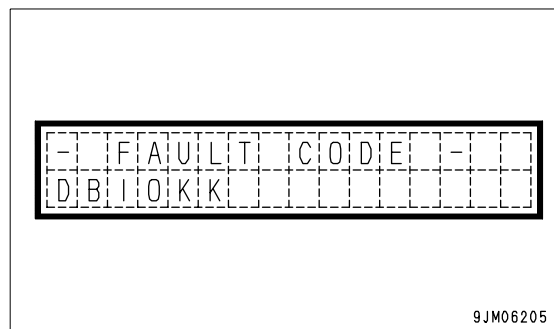
If the failure observation function has not determined the condition of the machine, the display is as shown in the diagram on the right.



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 ☐.

## OPERATION

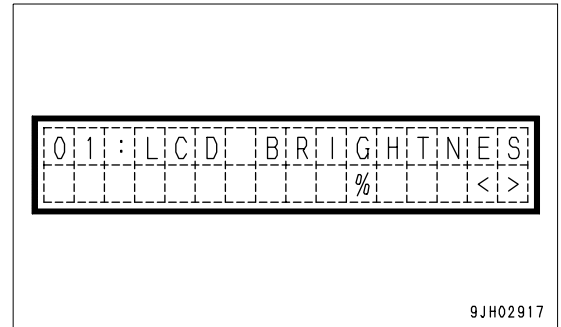
## EXPLANATION OF COMPONENTS

### 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.

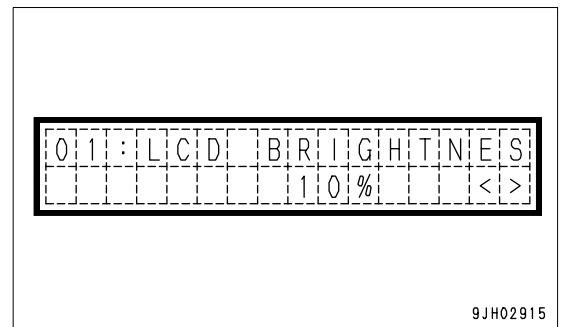


The brightness can be adjusted by operating the information switch.

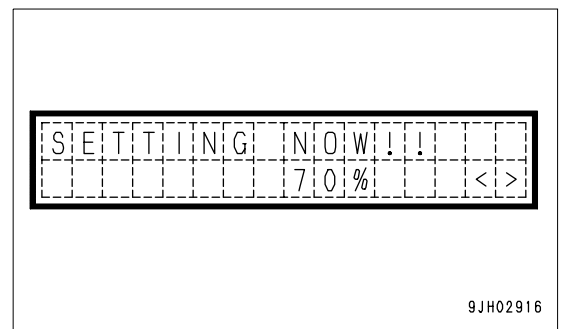
The higher the number, the brighter the screen becomes; the lower the number, the darker the screen becomes.

> position: Number increases

< position: Number decreases

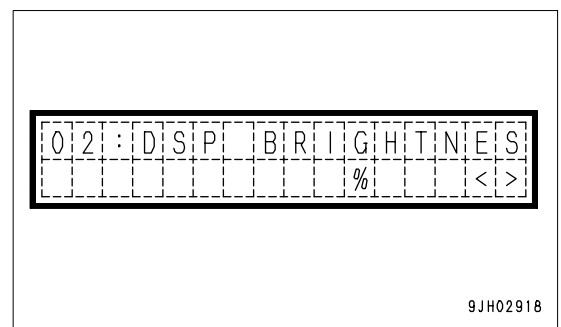


When the buzzer cancel switch is operated to ◇, the brightness of the liquid crystal display backlighting is set.



#### 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.



## EXPLANATION OF COMPONENTS

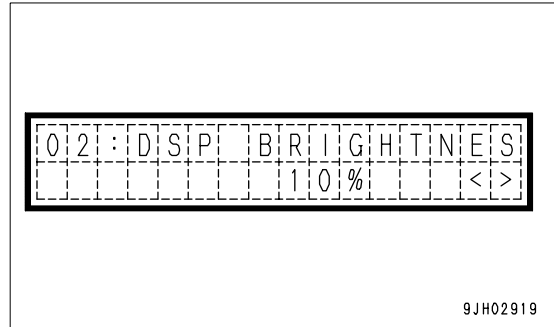
## OPERATION

The brightness can be adjusted by operating the information switch.

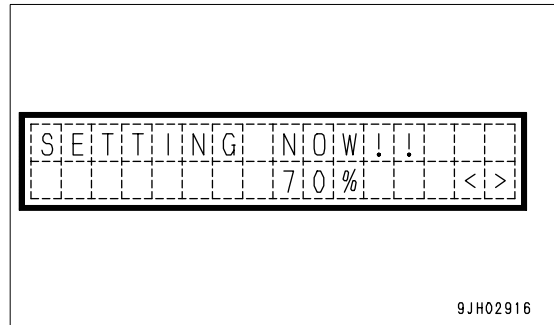
The higher the number, the brighter the screen becomes; the lower the number, the darker the screen becomes.

> position: Number increases

< position: Number decreases



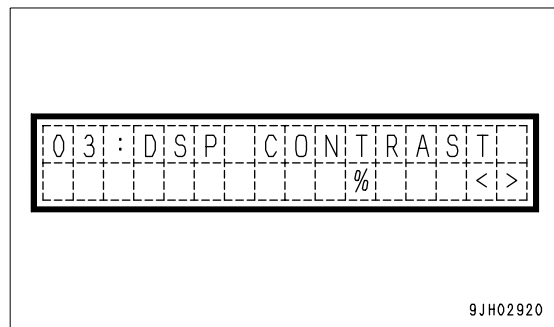
When the buzzer cancel switch is operated to ◇, the brightness of the message display backlighting is set.



### 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.

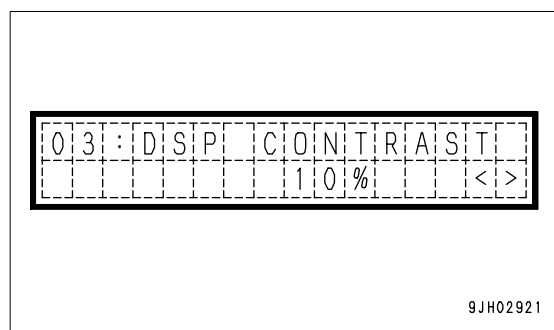


The contrast can be adjusted by operating the information switch.

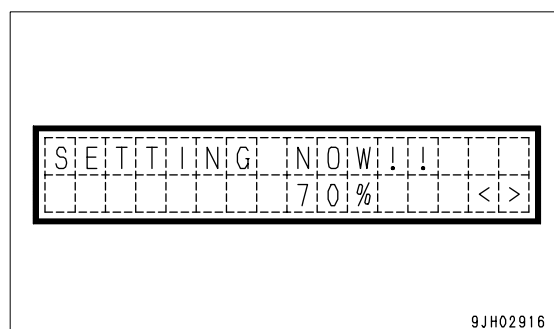
The higher the number, the darker the screen becomes; the lower the number, the lighter the screen becomes.

> position: Number increases

< position: Number decreases



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



## OPERATION

## EXPLANATION OF COMPONENTS

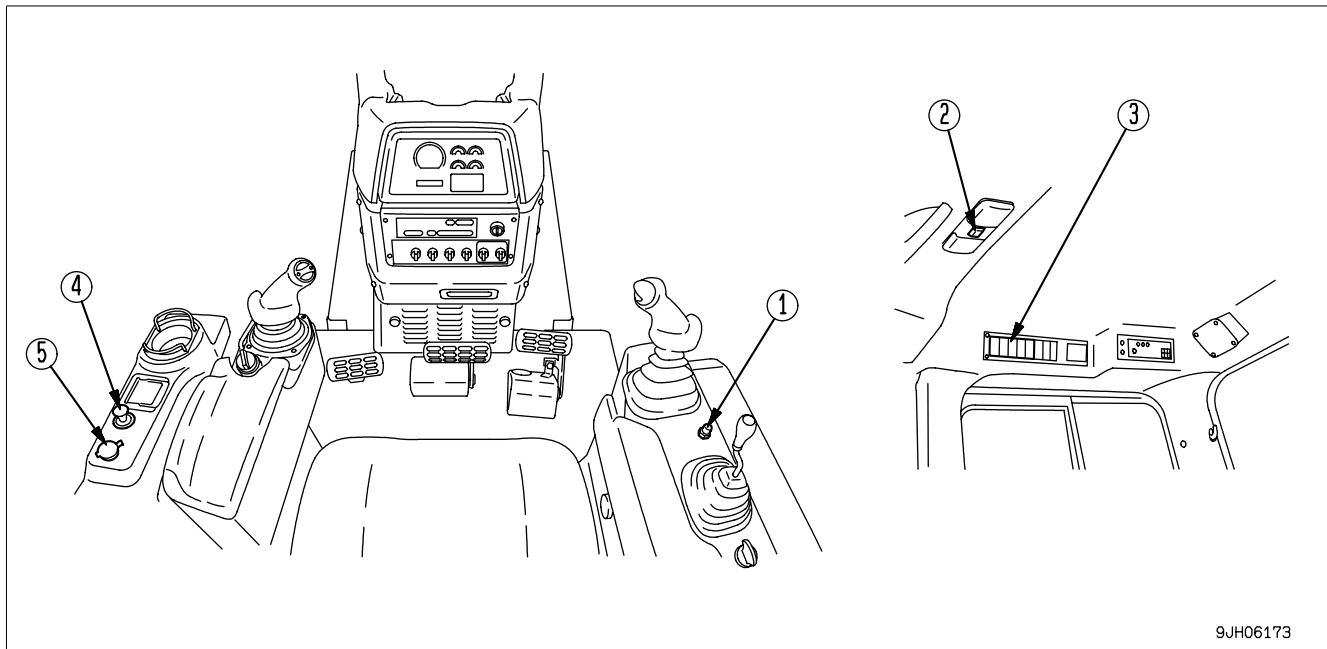
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### REMARK

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 lit or not. Entering this mode when the front lamps are lit makes it possible to adjust the brightness when the front lamps are lit. In the same way, entering this mode when the front lamps are not lit makes it possible to adjust the brightness when the front lamps are not lit.

## SWITCHES

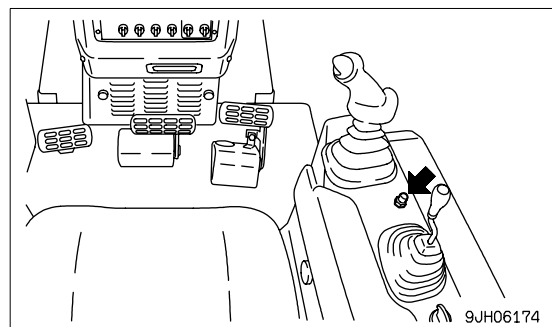


9JH06173

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

### HORN SWITCH

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

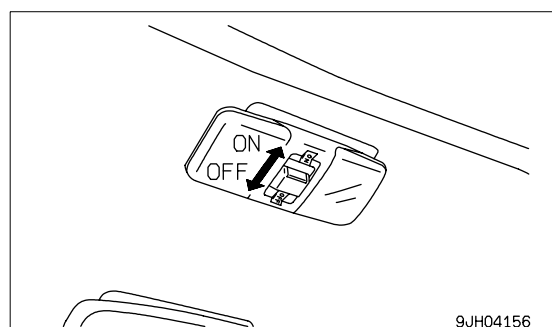


9JH06174

### ROOM LAMP SWITCH

This (2) lights up the room lamp.

ON position: Lamp lights up  
OFF position: Lamp is out



9JH04156



## OPERATION

## EXPLANATION OF COMPONENTS

### WIPER SWITCH

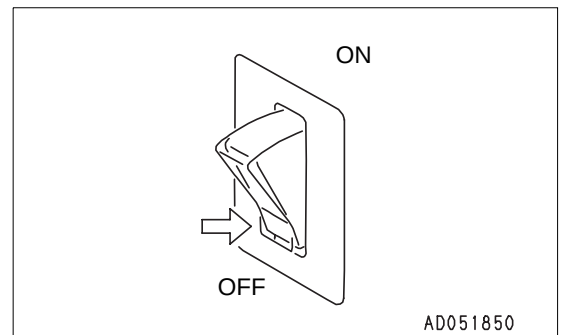
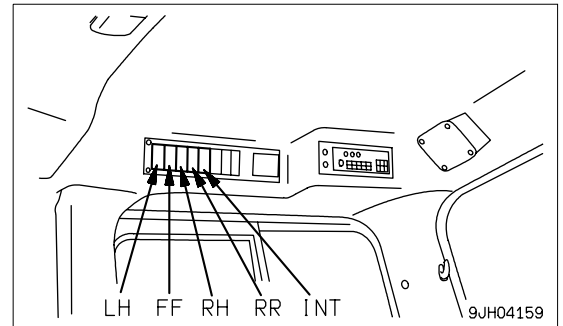
Switch (3) activates the wipers.  
The wiper switches are as follows:

(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:

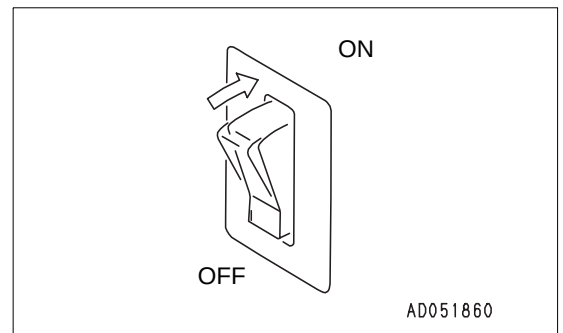
- Window washer only

Keep the switch pressed to the OFF position to spray out water.



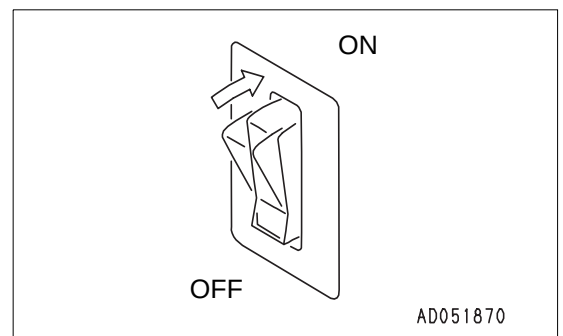
- Wiper only

If this is switched on, the wiper will start.

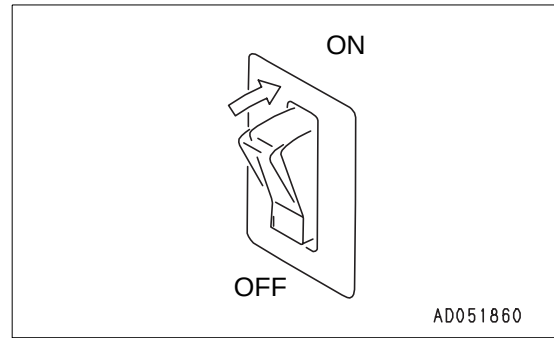


- Wiper and window washer

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.



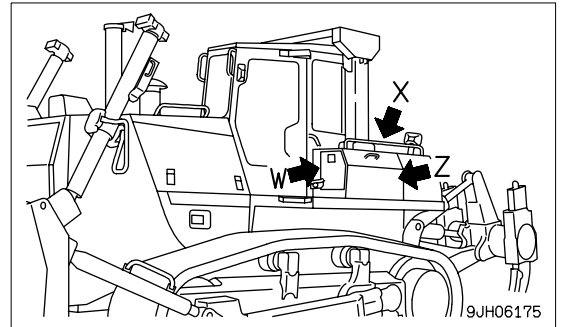
## OPERATION

## EXPLANATION OF COMPONENTS

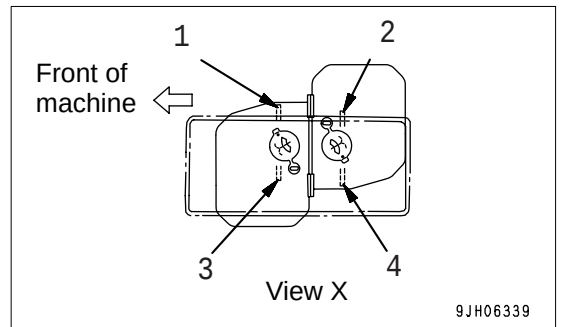
### REMARK

When installing the cab, check the colors and install the washer tank and each window washer hose correctly according to the color.

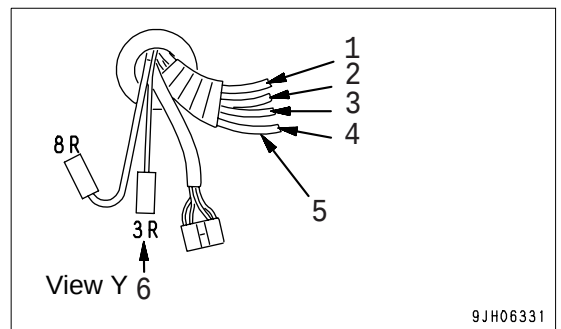
When installing the cab, carry out the operation in accordance with the cab installation procedure manual held by your Komatsu distributor.



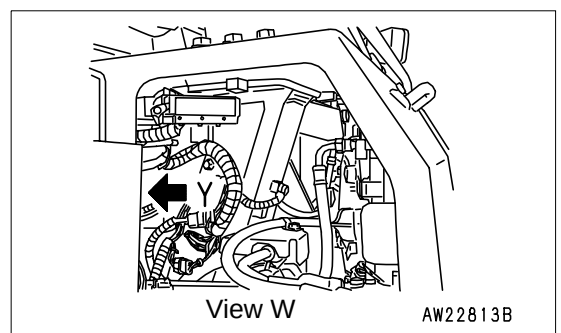
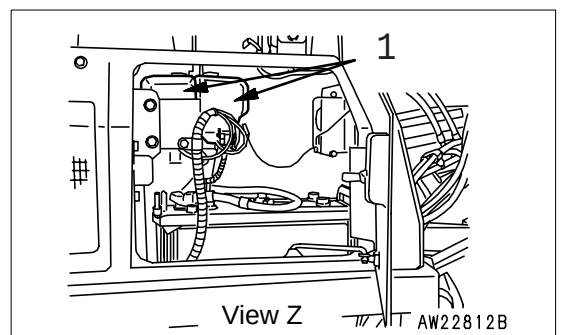
1. For right door (red)
2. For front window (colorless)
3. For rear window (black)
4. For left door (blue)



1. Red - Right door
2. Blue - Left door
3. Black - Rear window
4. Colorless - Front window
5. Washer tube
6. From fuse box (red)  
(back up power source)



1. Washer tank



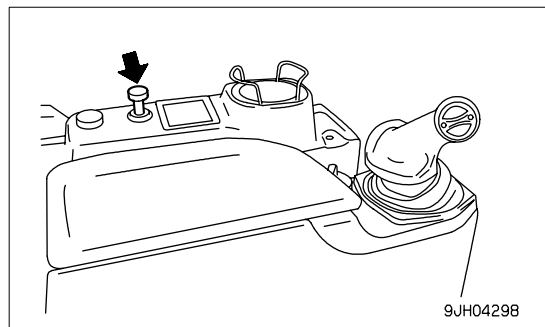
### CIGARETTE LIGHTER

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

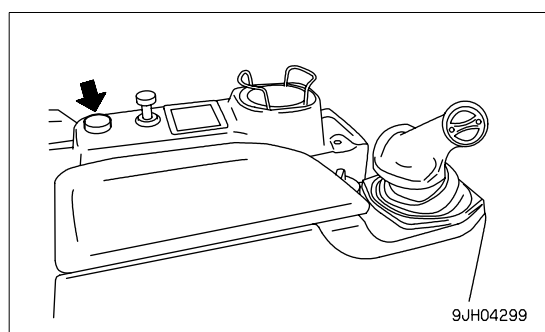
**This cigarette lighter is 24V. Do not use it as the power source for 12V equipment.**



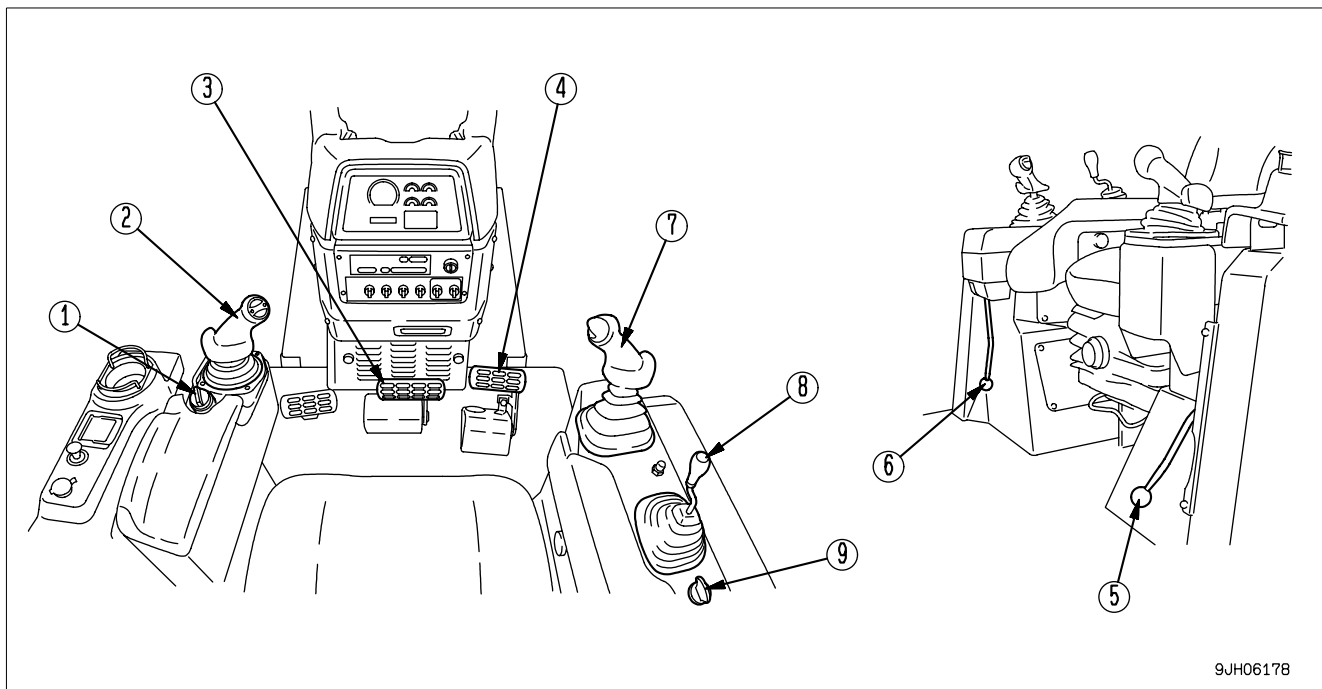
### ACCESSORY SOCKET

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

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



## CONTROL LEVERS, PEDALS



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

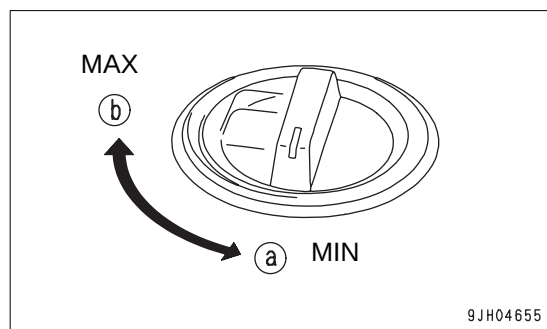
### FUEL CONTROL DIAL

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 starting switch to the OFF position.



9JH04655

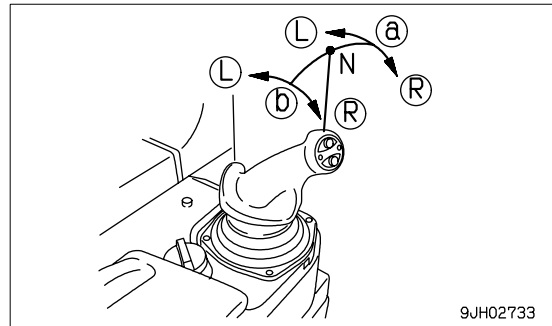
**JOYSTICK (STEERING, DIRECTIONAL AND GEAR SHIFT LEVER)**

(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 moved 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 moved 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.

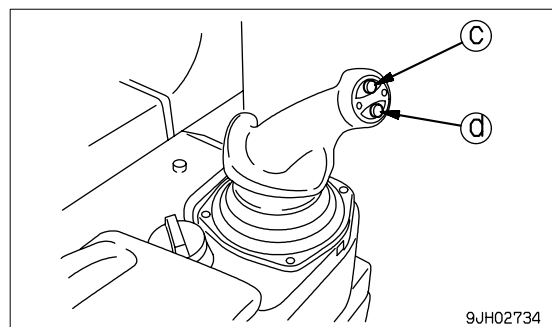
- **Gear shifting**

When the joystick (steering, direction, and gearshift lever) is in 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 travel speed in each speed range, see "SPECIFICATIONS (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 (3-99)". Shift mode selection means the operation to set the selected speed range beforehand in the N position.

- Operating counter-rotation turn

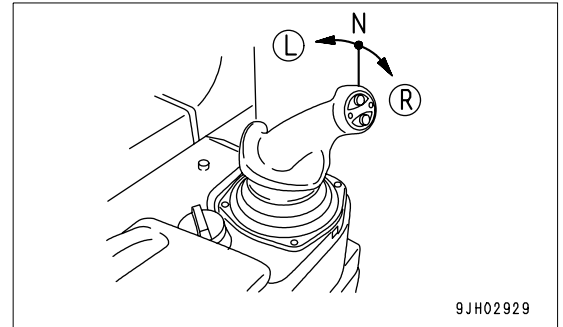
 **WARNING**

When operating the counter-rotation 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 in 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 counter-rotation turn. If the lever is moved further, the speed of the counter-rotation turn will increase.

(R): Right counter-rotation turn

(L): Left counter-rotation turn



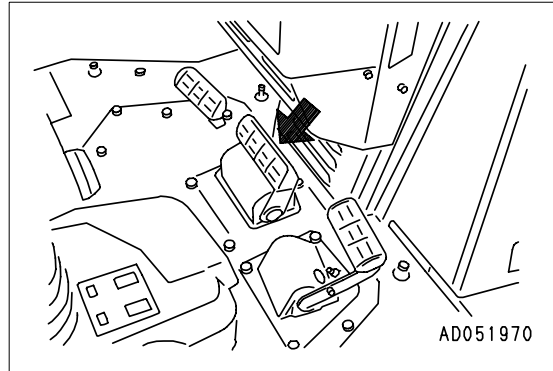
## BRAKE PEDAL



### WARNING

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

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



## DECELERATION PEDAL

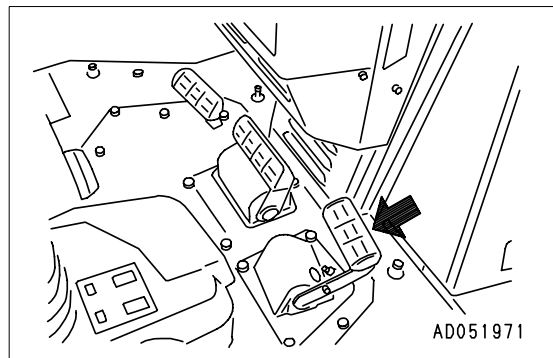


### WARNING

- 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

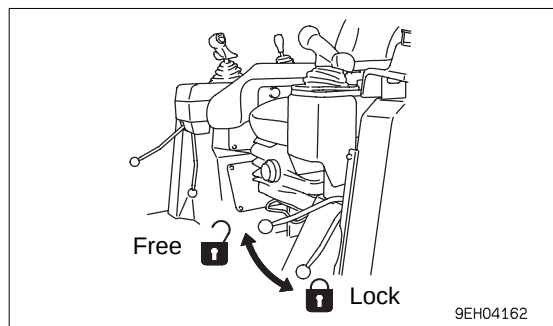
**When the machine is parked, always set the parking lever to the LOCK position.**

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

## REMARK

Before moving the parking brake lever to the LOCK position, return the steering, directional, and gearshift lever to the N position.

When starting the engine, if the parking brake lever is not in the LOCK position, the limit switch is actuated and it is impossible to start the engine.

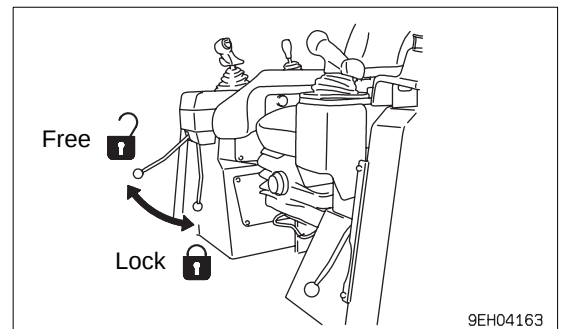




## WORK EQUIPMENT LOCK LEVER

### **WARNING**

- When standing up from the operator's seat, always move the work equipment 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 work equipment lock lever is not completely in 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 work equipment lock lever to the LOCK position.



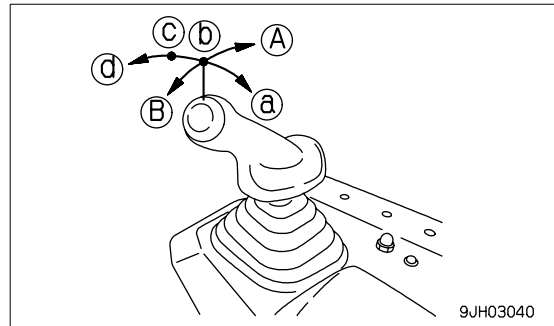
Lever (6) is a device to lock the blade control and ripper control levers.  
When it is set to the LOCK position, the TILT, RAISE, LOWER, and FLOAT operations are locked.

### **REMARK**

When starting the engine, to ensure safety, always set the work equipment 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:

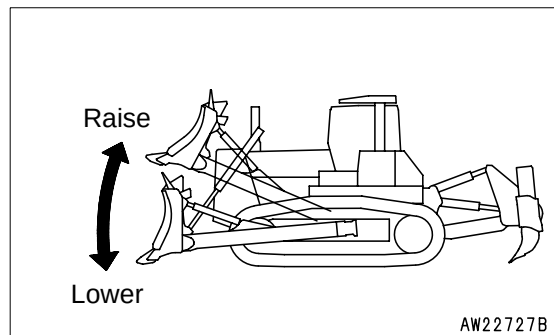
(b) HOLD:

Blade is stopped and held in this position.

(c) LOWER:

(d) FLOAT:

Blade will move freely according to external force.



### REMARK

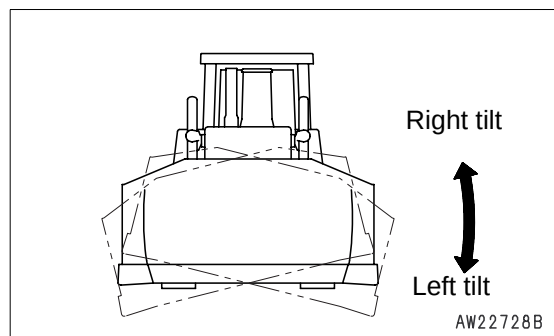
When the lever is in the FLOAT position and it is released, it will not return automatically to the HOLD position, so return it by hand.

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

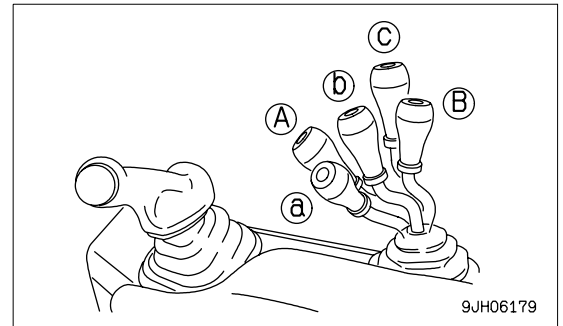


## OPERATION

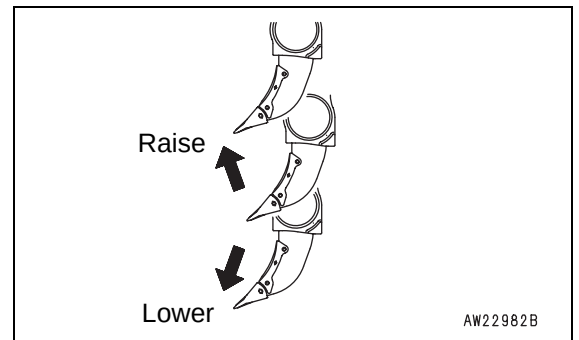
## EXPLANATION OF COMPONENTS

### RIPPER CONTROL LEVER

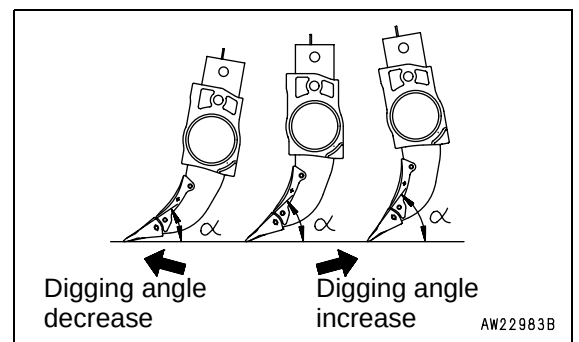
This lever (8) is used to operate the ripper.



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



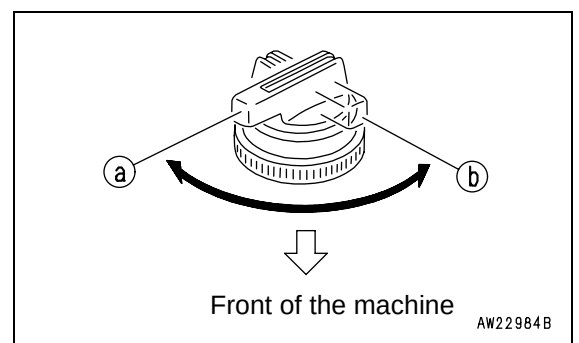
- (A) Digging angle reduced: Cutting angle ( $\alpha$ ) becomes smaller.
- (B) Digging angle increased: Cutting angle ( $\alpha$ ) becomes larger.



### PIN PULLER CONTROL SWITCH

Switch (9) is used to operate the pin puller.

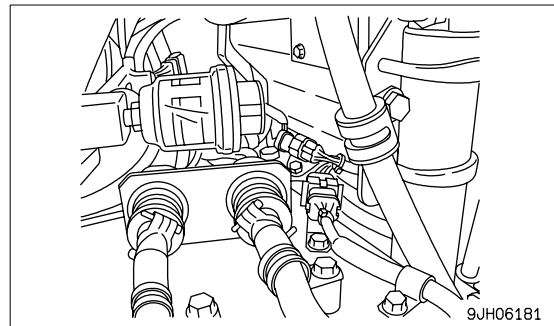
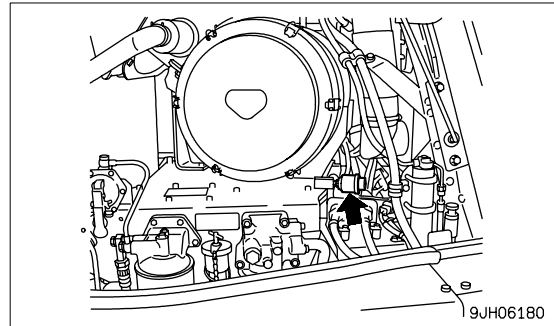
- (a) Pull out: Pin is pulled out
- (b) Push in: Pin is pushed in



## 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 (4-21).



## POWER SOURCE

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 starting 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.

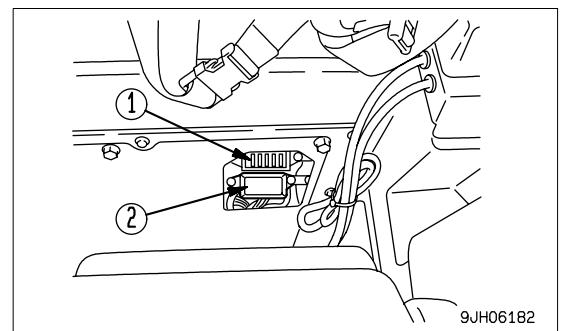
Replace a fuse with another of the same capacity.

Open the cover at the rear of the operator's seat. The fuse box is installed inside.

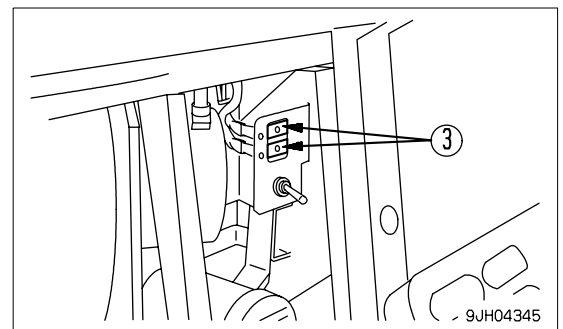
The circuit breakers are inside the air conditioner RECIRC filter cover.

(1) Fuse box FS2

(2) Fuse box FS1

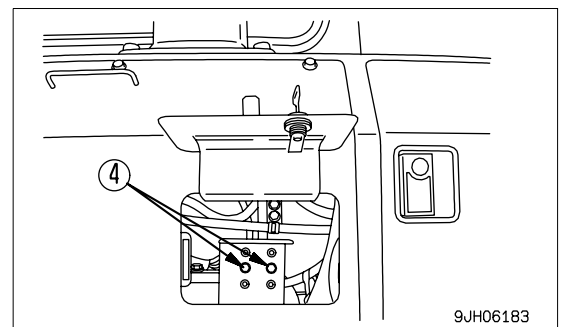


(3) Circuit breaker



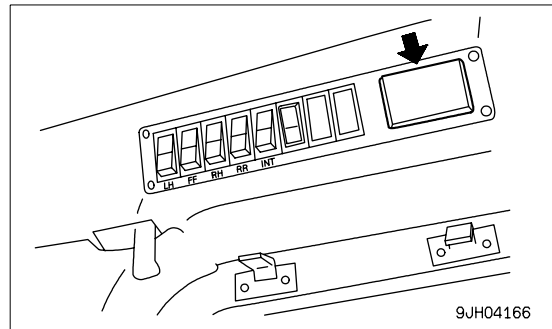
(4) Circuit breaker for main power supply

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.

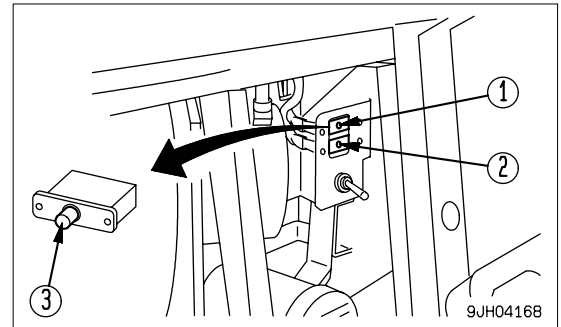


## OPERATION

## EXPLANATION OF COMPONENTS

### 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 to gain access to the circuit breaker.
- 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.



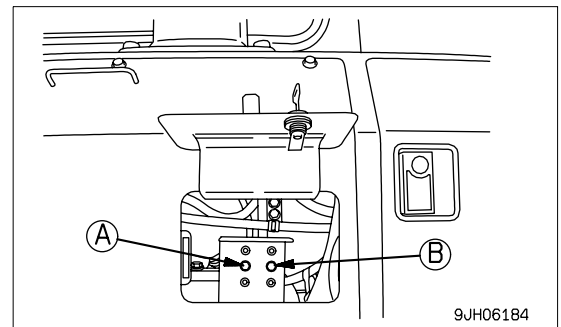
| No  | Fuse capacity | Circuit         |
|-----|---------------|-----------------|
| (1) | 20A           | Starting switch |
| (2) | 20A           | Air conditioner |

#### 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 starting switch 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 to 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 make note of the effort of the reset button when resetting the circuit.
- Do not keep the circuit breaker reset button longer than necessary.
- 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.

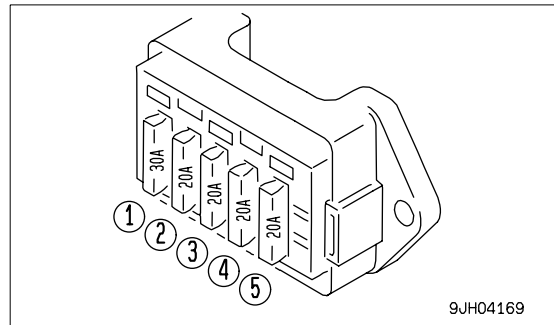
(A): 30A (for regular cab power supply)

(B): 105A (for general power supply)

**FUSE CAPACITY AND NAME OF CIRCUIT****FUSE BOX I**

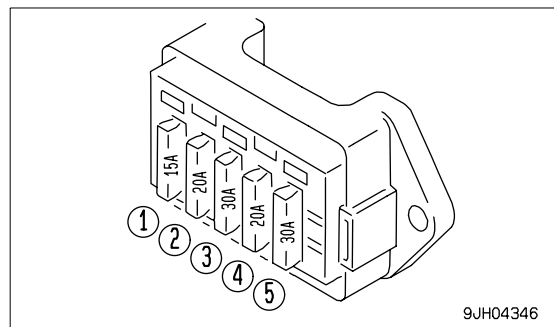
(1) Fuse box fs1

| 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      |

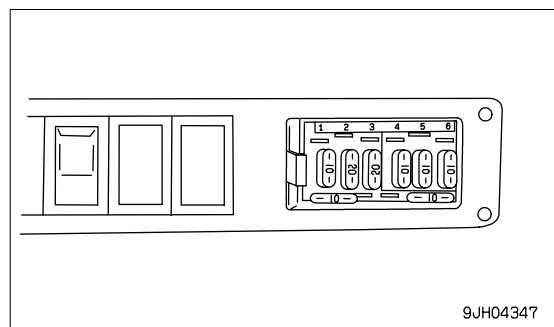


(2) Fuse box fs2

| 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       |



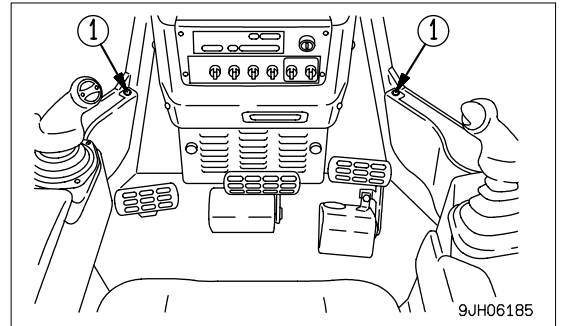


## DOOR POCKET

This is inside the left and right doors. Use them for storing things.

Do not put heavy tools or other heavy objects in them.

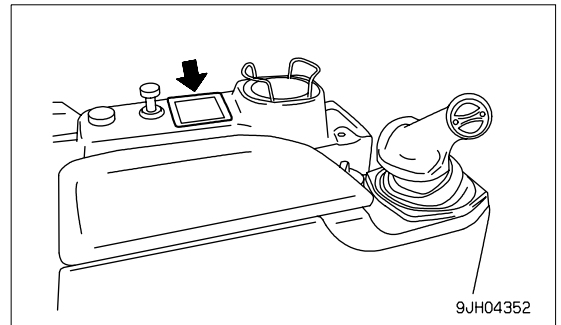
If the pocket is dirty, loosen four bolts (1), then remove the pocket and rinse it.



## ASHTRAY

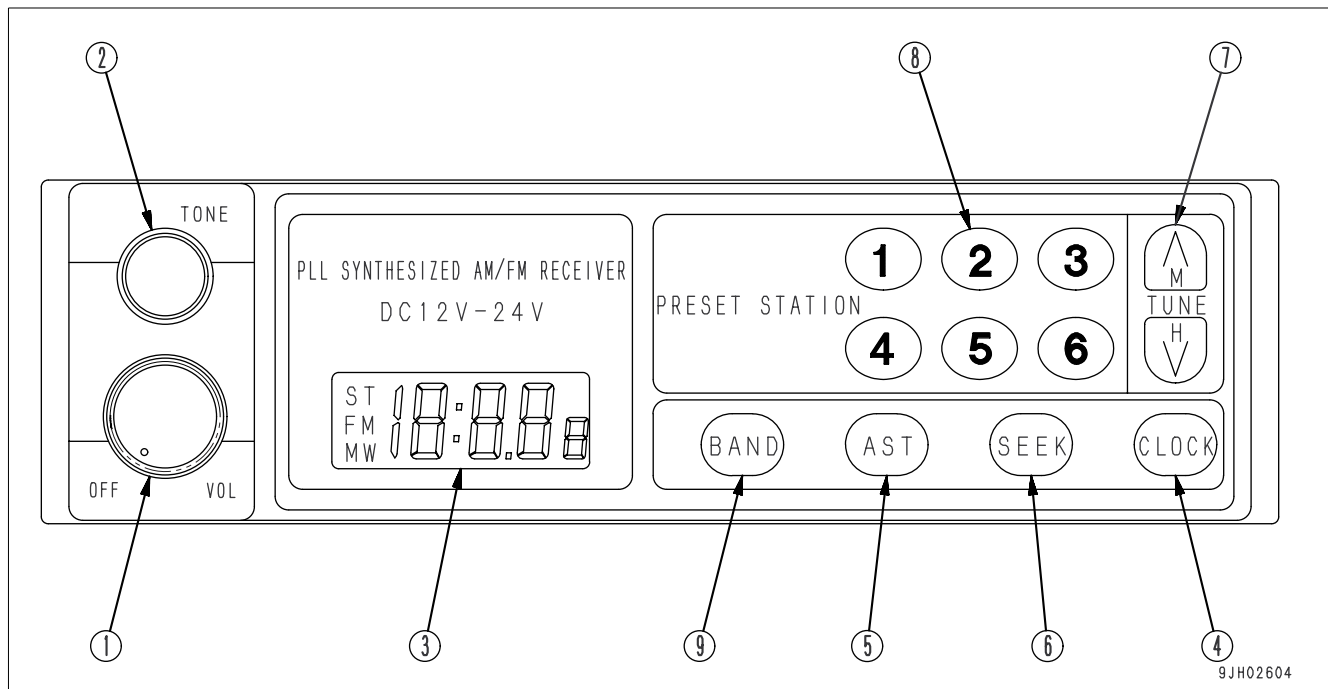
This is on the left side of the operator's seat.

Always make sure that you extinguish the cigarette before closing the lid.



## CAR RADIO, HANDLING

### EXPLANATION OF COMPONENTS



- |                                     |                                  |
|-------------------------------------|----------------------------------|
| (1) Power switch, volume knob       | (6) Seek button (SEEK)           |
| (2) Tone control knob               | (7) Tuning button                |
| (3) Display                         | (8) Preset station buttons       |
| (4) Display selector button (CLOCK) | (9) FM/AM selector button (BAND) |
| (5) Station selector button (AST)   |                                  |

### 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 radio frequency is displayed.

## OPERATION

## EXPLANATION OF COMPONENTS

### **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) is pressed, it is possible to preset one station each for FM and AM.

For details of the method of presetting, see "METHOD OF PRESETTING (3-53)".

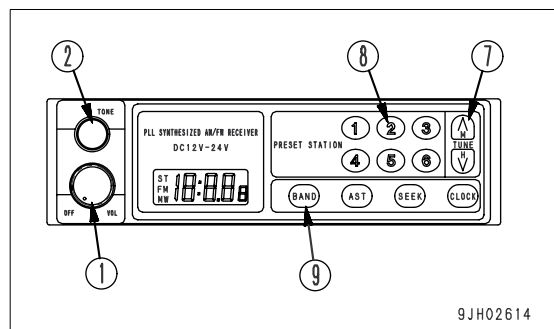
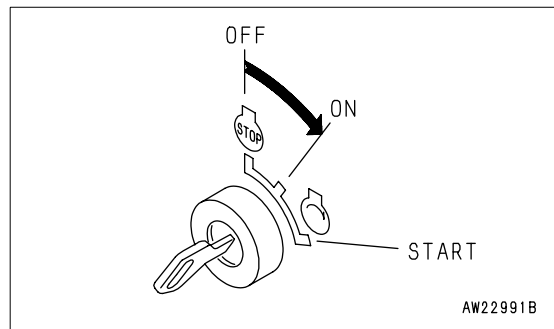
### **FM/AM SELECTOR BUTTON (BAND)**

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

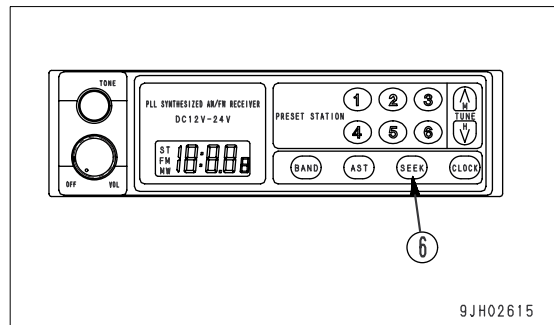
### METHOD OF LISTENING TO RADIO

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) counter-clockwise until a click is heard.



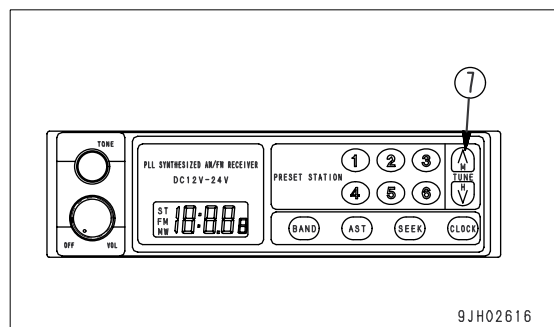
### METHOD OF AUTOMATIC TUNING

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.

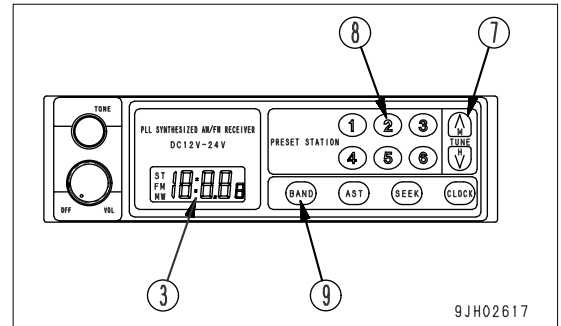


## OPERATION

## EXPLANATION OF COMPONENTS

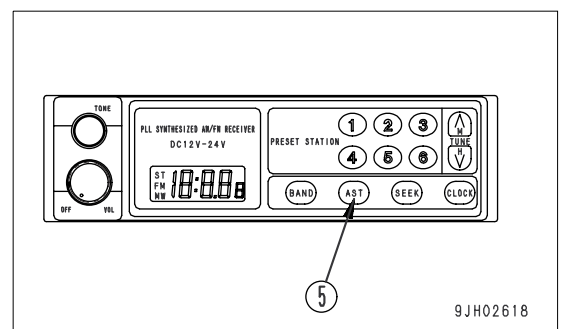
### METHOD OF PRESETTING

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 pre-setting operation again.
  - It is possible to preset 6 FM and 6 AM stations.



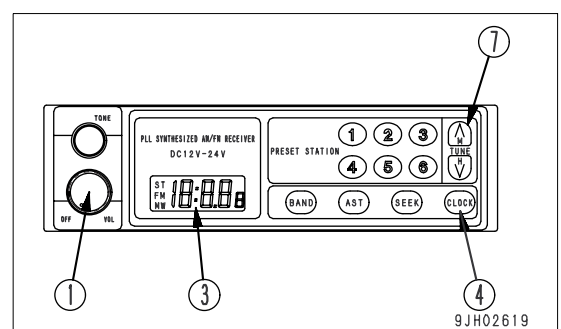
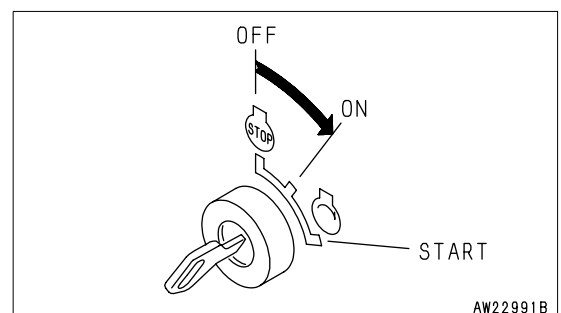
### METHOD OF USING AUTO MEMORY

If AST button (5) is kept pressed for 2 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**

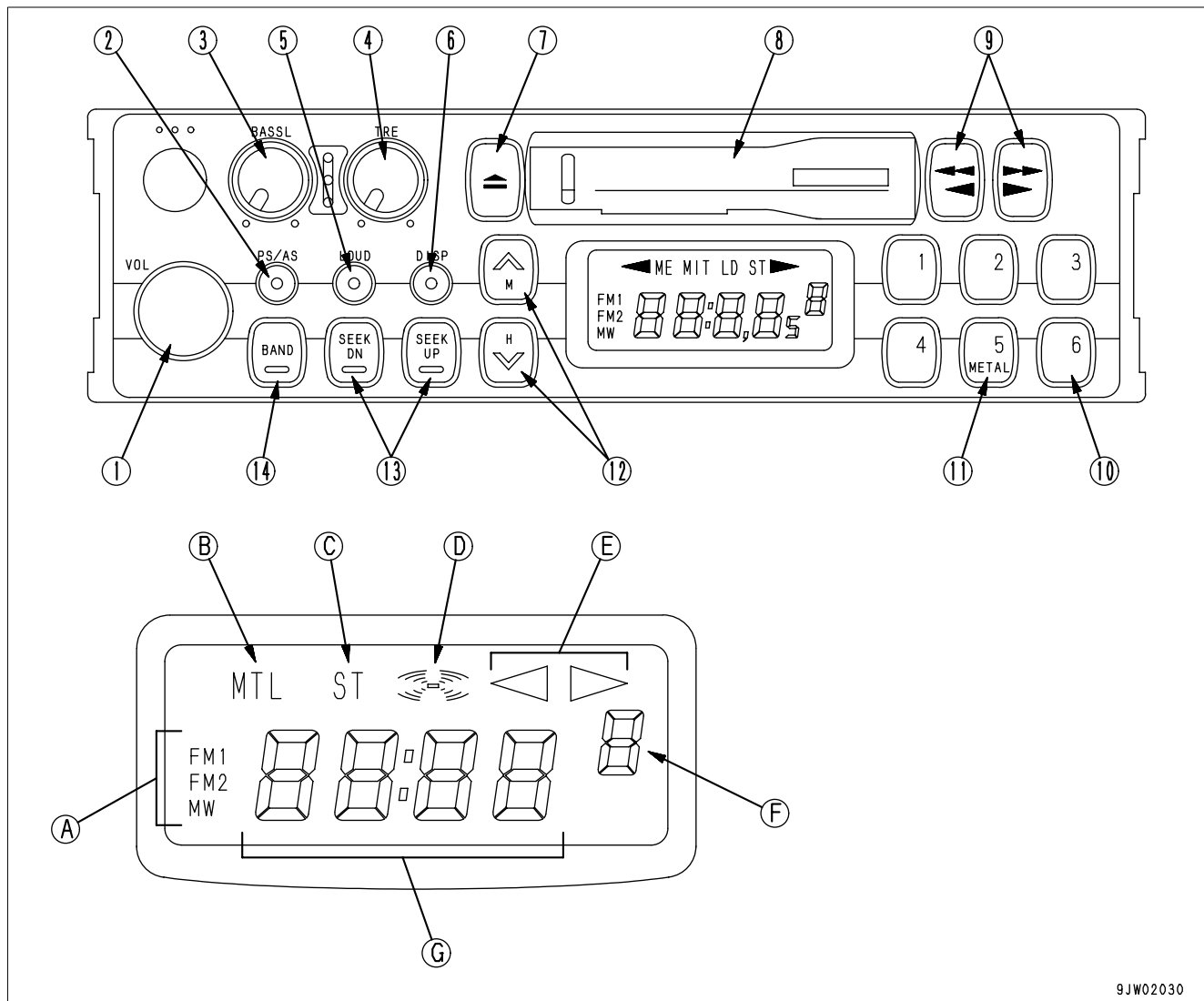
**Always retract the antenna before transporting the machine or driving the machine into a work shop or garage.**

### **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



9JW02030

- |                                        |                                  |
|----------------------------------------|----------------------------------|
| (1) Power switch/volume                | (8) Cassette door                |
| (2) Auto-store/preset scan button      | (9) Fast forward, rewind buttons |
| (3) Bass control knob                  | (10) Preset buttons              |
| (4) Treble control knob                | (11) Metal tape button           |
| (5) Loudness button                    | (12) Manual tuning buttons       |
| (6) Time/radio display selector button | (13) Seek tuning buttons         |
| (7) Tape eject button                  | (14) Band selector button        |
| (A) Band display                       | (E) Tape direction display       |
| (B) Metal tape display                 | (F) Preset channel display       |
| (C) FM stereo reception display        | (G) Time/frequency display       |
| (D) Loudness 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.

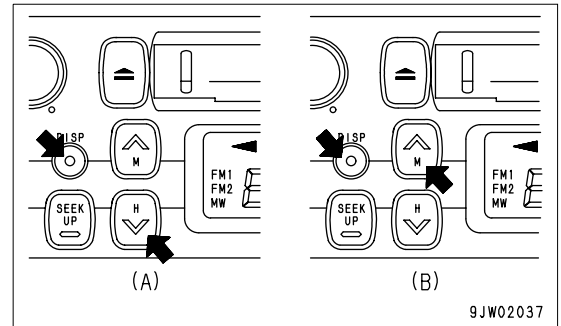


## OPERATION

## EXPLANATION OF COMPONENTS

### 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 also used 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 v" 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.

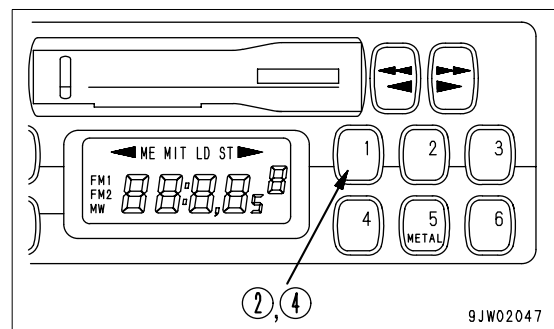
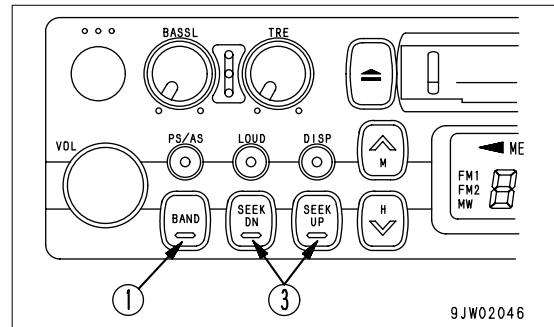
## METHOD OF OPERATION

### 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.



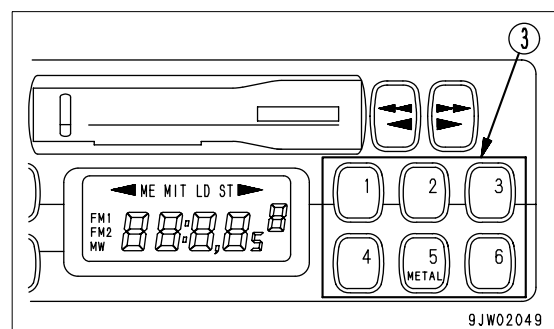
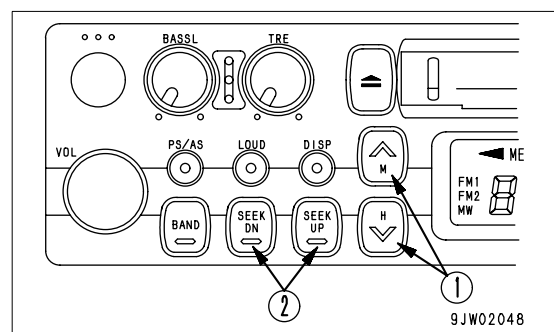
### REMARK

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.

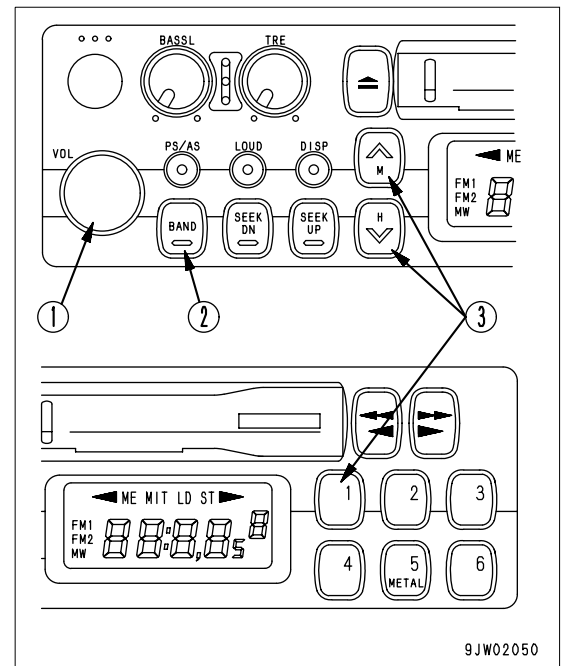


## OPERATION

## EXPLANATION OF COMPONENTS

### 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.

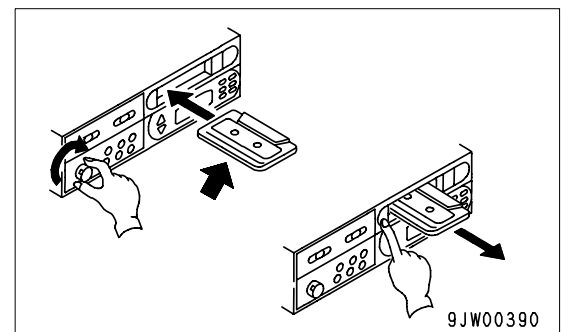
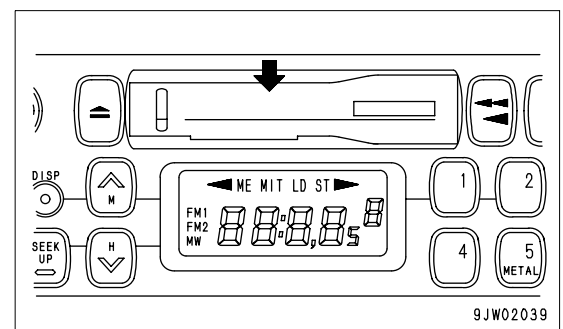


### REMARK

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.

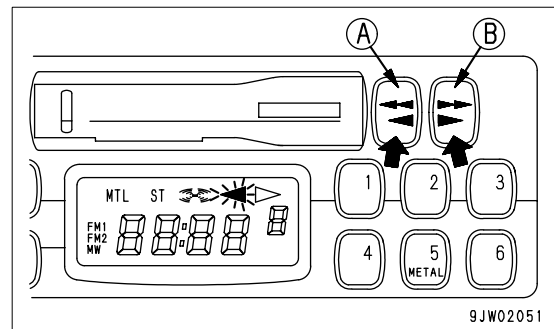
### LISTENING TO CASSETTE TAPE

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 finished 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 to make repairs without delay.
- 
- 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.

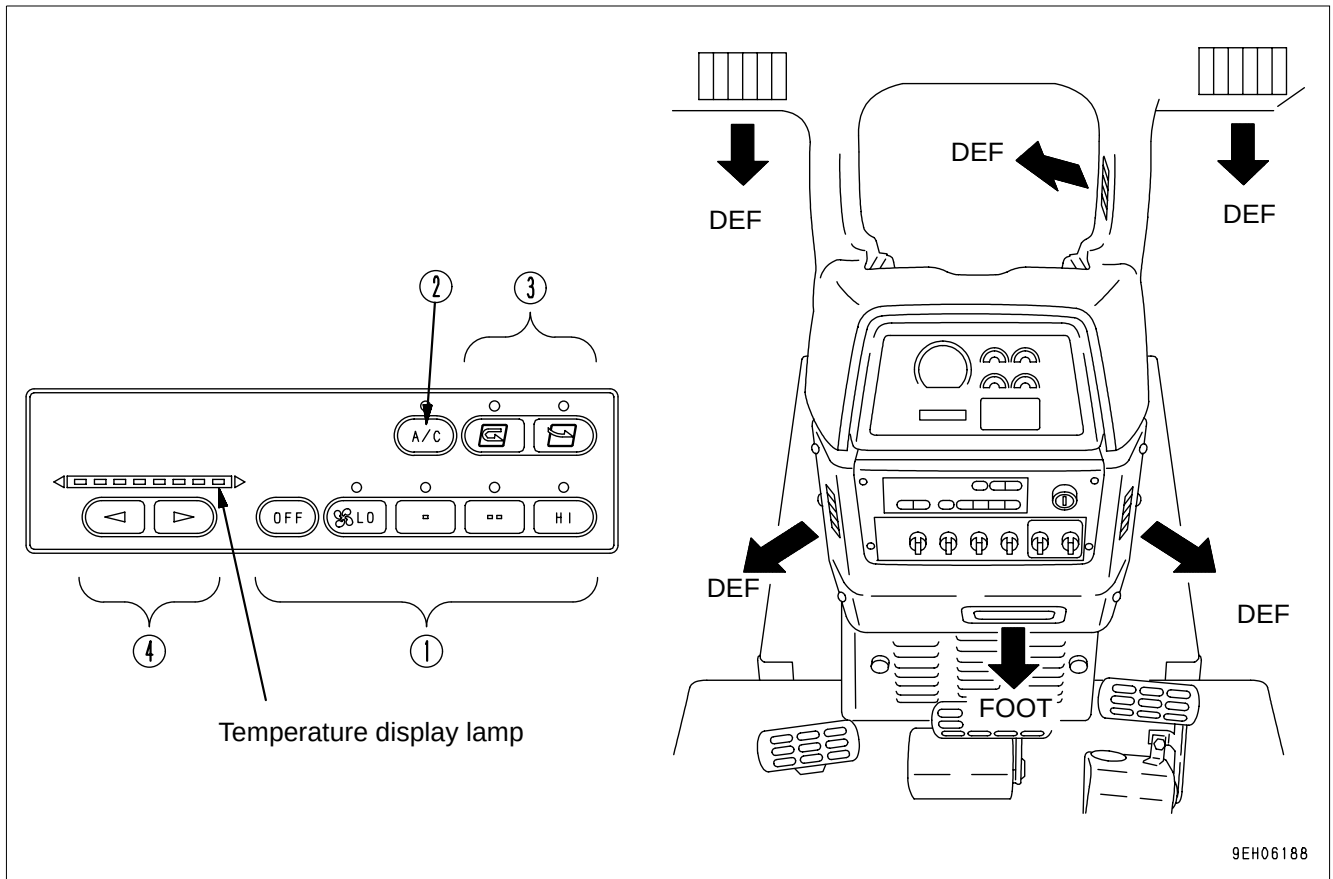
Do not use 120-minute tapes. The tape is thin and it easily gets caught up inside the machine.

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

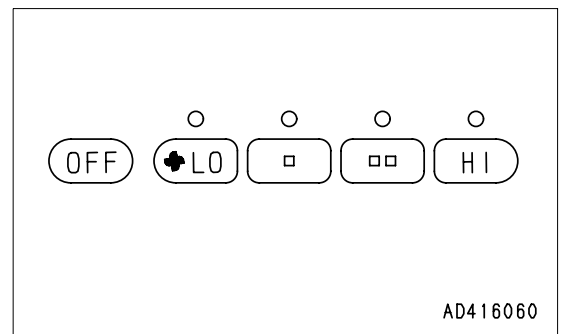
### GENERAL LOCATIONS AND FUNCTION OF CONTROL PANEL



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

### FAN SWITCH

This switch (1) can be used to adjust the airflow 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 airflow.



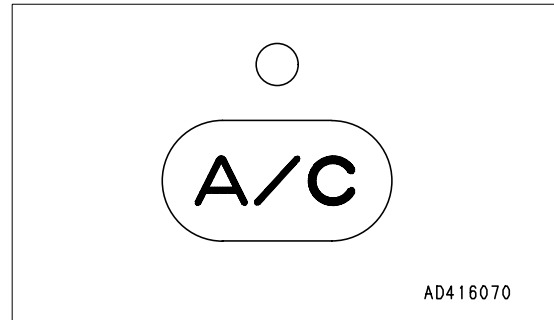
**AIR CONDITIONER SWITCH**

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**

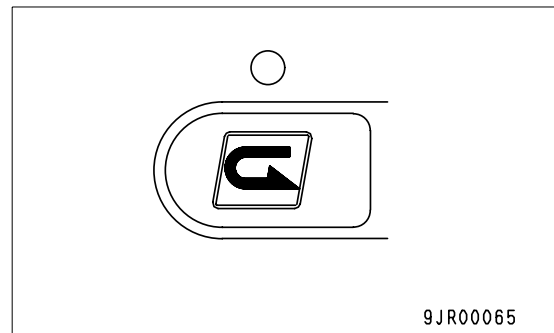
When fresh air is taken into the cab, air pressure in the cab increases, which prevents the dust from entering. When neither heating nor cooling is needed, bring in clean fresh air, with your preferred air flow, to prevent dust from entering the cab.

**FRESH/RECIRC SELECTOR SWITCH**

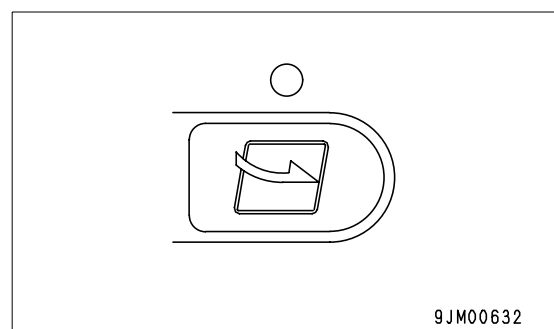
This switch (3) changes between recirculation of the internal air (RECIRC) or intake of external air (FRESH). When pressing the switch, the indicator lamp on the top of switch lights up.

**RECIRC**

Press this switch (3) to circulate only the air inside the cab. Use this switch if it is desired to quickly cool or warm the cab or when the air inside the cab is stale.

**FRESH**

Press this switch (3) to take in air from the outside to cool or warm the cab. It is used to take in fresh air or to remove condensation on the windows.

**TEMPERATURE CONTROL SWITCH**

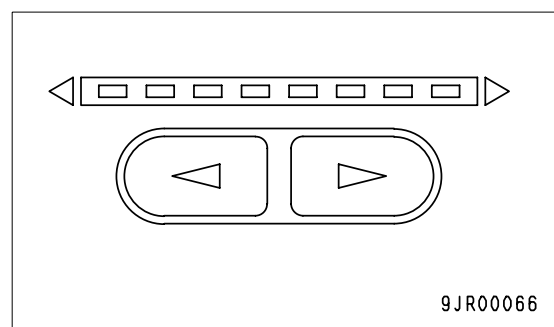
Use this switch (4) to adjust the temperature steplessly from low temperature to high temperature.

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.



## OPERATION

## EXPLANATION OF COMPONENTS

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 reset.

- 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)

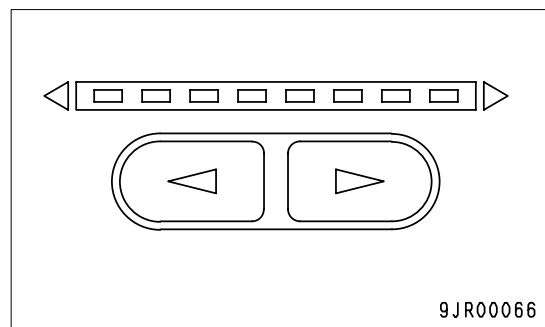
If the air conditioner is used in the FRESH position, the inside of the cab will be pressurized and this will prevent the entry of dust.

The higher the position of the fan switch, the more effective the pressurizing becomes.

## METHOD OF OPERATION

| Condition of use           |        | Switchs    |                        |                            |                              |
|----------------------------|--------|------------|------------------------|----------------------------|------------------------------|
|                            |        | 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 defrosting, set the temperature control switch so that all lamps are red. This will improve defrosting and demisting.



### WHEN NOT USING THE AIR CONDITIONER REGULARLY

Run the air conditioner in cooling or dehumidification + heating mode 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 warm up the inside of the cab, then turn the air conditioner switch on. The air conditioner will be run.

### COOL BOX

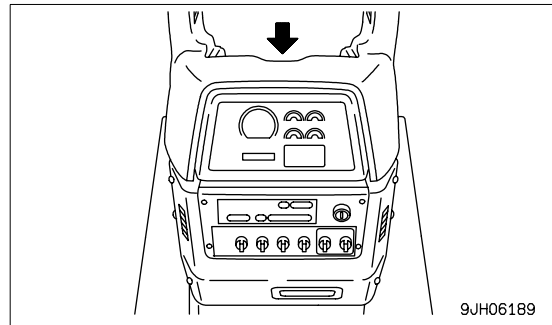
When the cooling is being used, this can be used for keeping drinks and other things cool.

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 in the RECIRC mode, your eyes may start to itch or burn. Ventilate the cab ever 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 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 blows 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 blowing directly on the surface of the glass.

### 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 on the lubricated parts of the compressor. (Run the engine at low speed and set the temperature control lever to 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.



## 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 (4-21)".

## 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 (4-21)".

## **SKILLFUL USE OF AIR-CONDITIONER**

### **WHEN WANTING TO COOL INSIDE OF CAB 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 on 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 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.**

## OPERATION

## EXPLANATION OF COMPONENTS

## HEATER, HANDLING

## METHOD OF OPERATION

| Condition of use              | Switchs    |                         |                                  |
|-------------------------------|------------|-------------------------|----------------------------------|
|                               | Fan switch | Humidity control switch | RECIRC/<br>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.
- Set blower switch (2) to position 3 (HIGH).

## 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.

## NORMAL USE

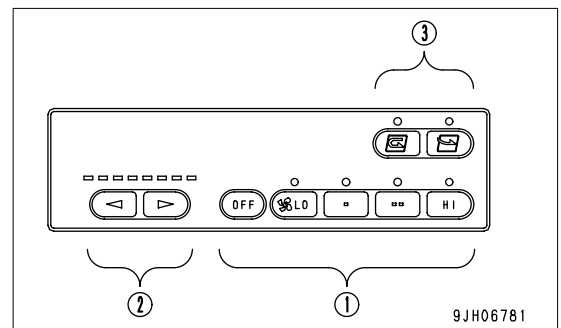
Set each switch to the desired position.

## CLEANING AIR FILTER

If the RECIRC or FRESH air filters are clogged, the heating capacity will drop.

Clean the air filter once a week with compressed air.

For details of the method of cleaning, see "WHEN REQUIRED (4-21)".



## 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 work equipment lock 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.

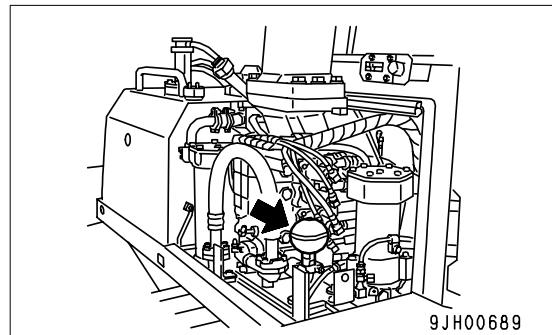
Do not hit it, roll it, or subject it to any impact.

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.

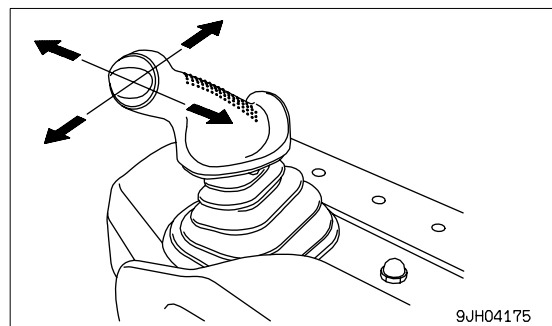
Therefore, if the control lever is moved in the direction to lower the work equipment, it is possible for the work equipment to move under its own weight.

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 and under the machine to check for loose nuts and bolts, or leakage of oil, fuel, or coolant, and check condition of the work equipment and hydraulic system. Also check for loose wiring, play, and accumulation of dust at places with 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 level 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, excessive wear, or play in the work equipment, cylinders, linkage, or hoses. If any abnormality is found, repair it.

2. Remove dirt and dust from around engine, battery radiator.

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

3. Check for leakage of water or oil around engine.

Check that there is no 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 the 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 the 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

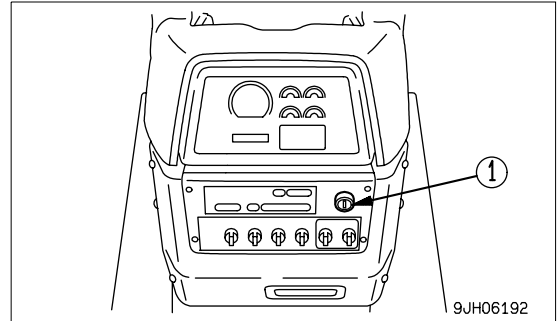
Always check the items in this section before starting the engine each day.

### CHECK MONITOR PANEL

1. Turn starting 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.

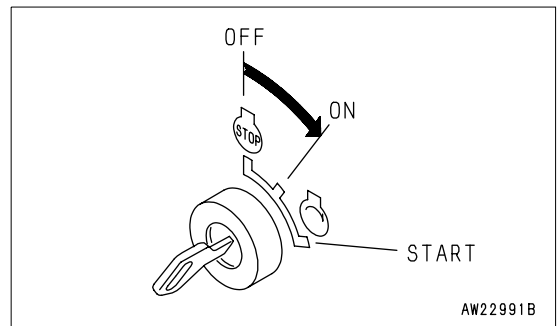
### REMARK

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 rely only on the monitor. Always perform all the items listed for the following checks and maintenance.**



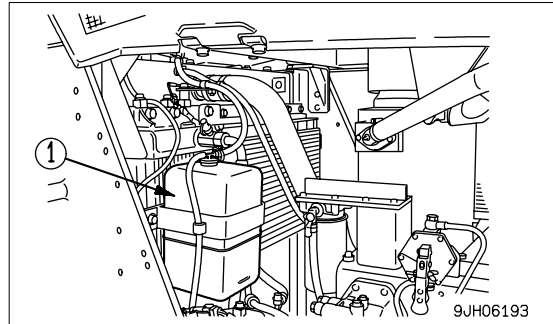
**CHECK COOLANT LEVEL, ADD COOLANT** **WARNING**

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

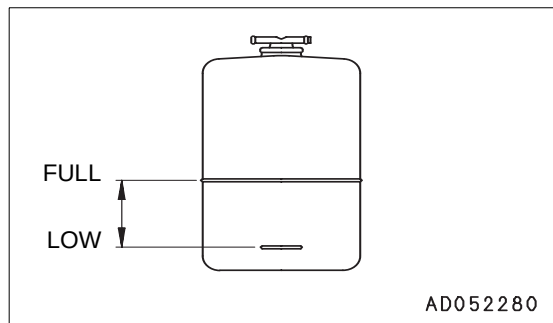
1. Open the engine side cover on the left side of the chassis, and check that the coolant is between the FULL and LOW marks on sub-tank (1). If the coolant level is low, add coolant to the FULL level through the coolant filler port in sub-tank (1).

**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 coolant, close the engine side cover.





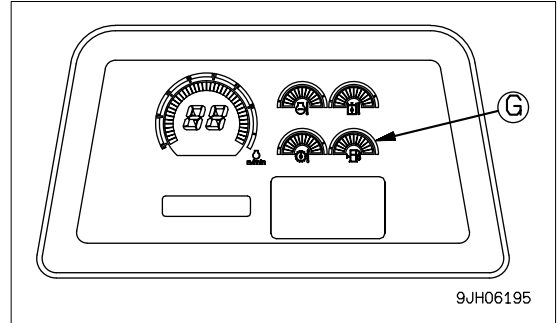
CHECK FUEL LEVEL, ADD FUEL



**WARNING**

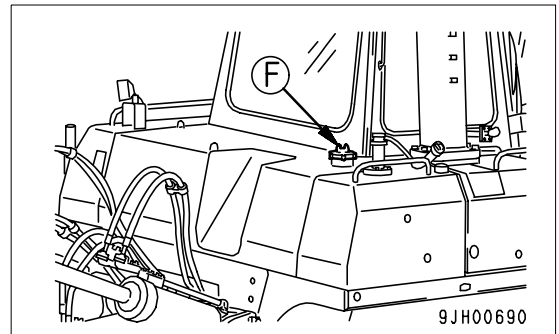
When refilling fuel in the fuel tank, do not spill or let it overflow. The spilt fuel may catch fire. If spilt, wipe it off cleanly. Never expose fuels to fire as they are inflammable and thus dangerous material.

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.



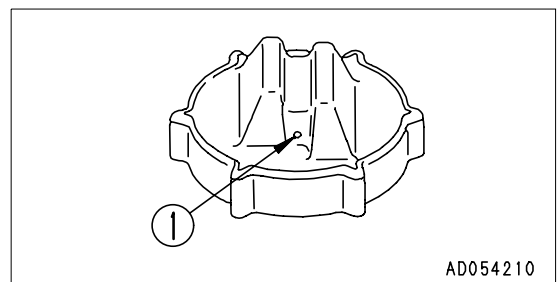
2. After completing work, fill the fuel tank through fuel filler port (F).
3. After adding fuel, tighten the cap securely.

Fuel tank capacity: 625 liters



**REMARK**

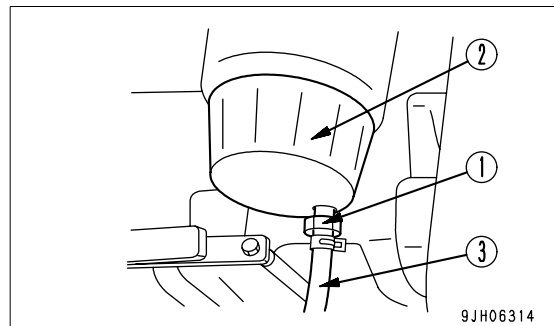
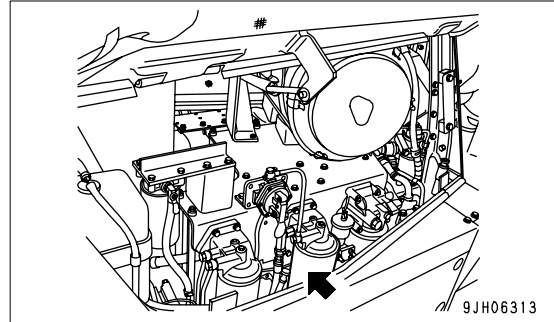
If breather hole (1) in the cap is clogged, the pressure in the tank will drop and fuel will not flow. Clean the hole from time to time.



## CHECK WATER SEPARATOR, DRAIN WATER AND SEDIMENT

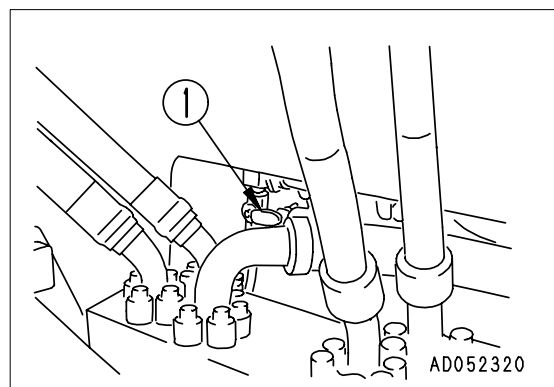
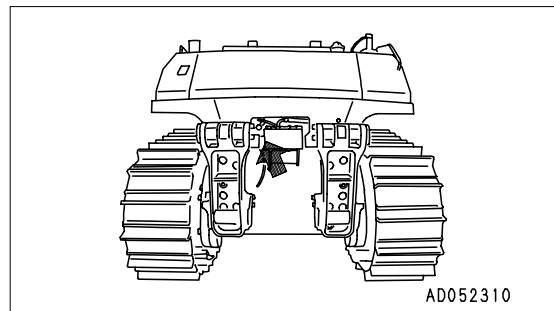
(Machines equipped with additional fuel filter cartridge)

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 plug (1) and drain the water.
4. When fuel comes out from drain hose (3), tighten plug (1) immediately.  
Tightening torque: 0.2 to 0.45 N·m (0.02 to 0.046 kgf·m)



## 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.



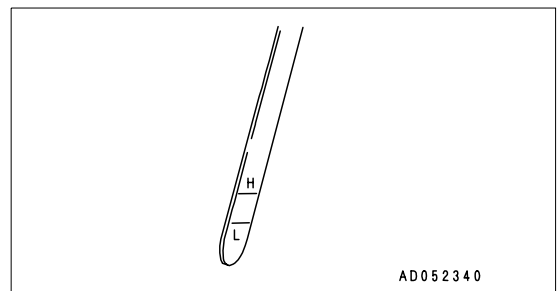
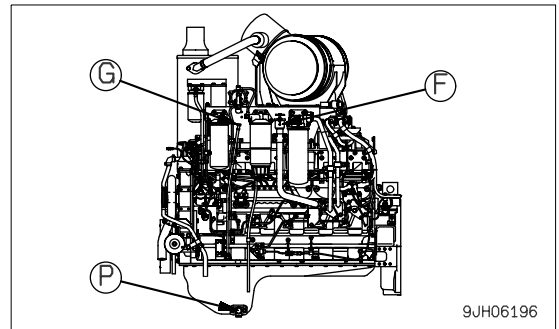
**CHECK OIL LEVEL IN ENGINE OIL PAN, ADD OIL**



**WARNING**

**Parts and oil are at high temperature immediately after the engine is stopped and may cause serious burns. Wait for the oil temperature to go down before performing this 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. Fully insert dipstick (G) into filler pipe (F), then remove it.
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.

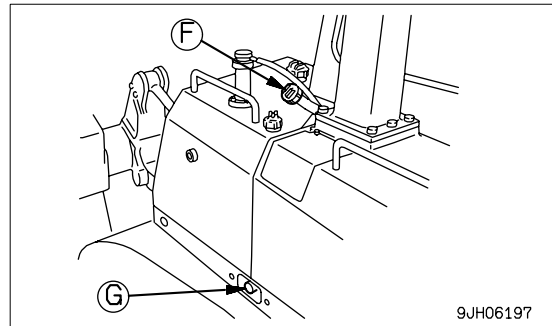
When checking the oil level immediately after stopping the engine, wait for at least 15 minutes after stopping the engine before starting the inspection operation.

If the machine is at an angle, set it in a level position before starting inspection.

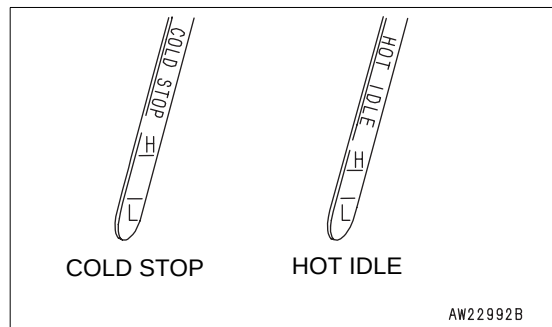
When adding oil, remove the dipstick from the guide to remove the air inside the crankcase.

**CHECK OIL LEVEL IN POWER TRAIN CASE, ADD OIL**

1. Remove dipstick (G), and wipe the oil off with a cloth.
2. Fully insert dipstick (G) into filler pipe (F), then remove it.
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**

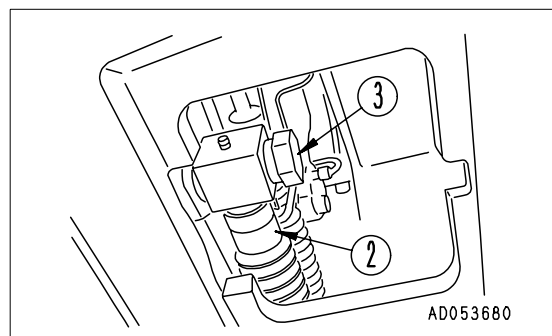
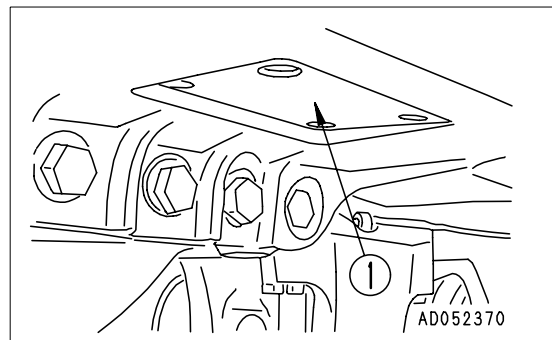
When checking the oil level with the engine stopped before starting operations, check the oil level with the side marked COLD STOP. It is also possible to check the oil level even after starting operations when the power train oil temperature is high, but in this case, run the engine at idling and use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

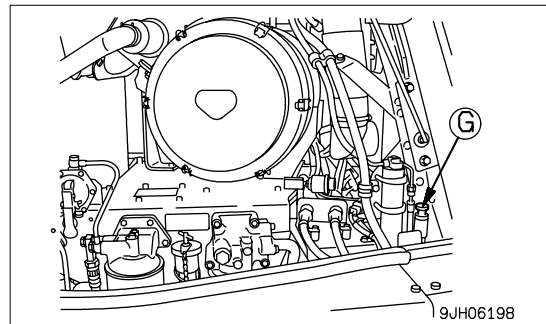


### CHECK BRAKE PEDAL TRAVEL

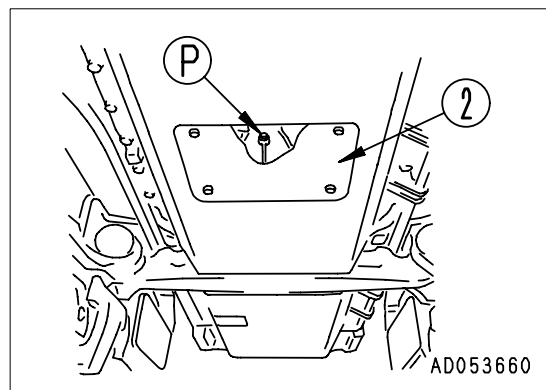
Drive the machine, depress the brake pedal, and check that the machine stops.

### 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. Fully insert dipstick (G) into filler pipe (F), then remove it.
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 inspection cover (2) in the center of the bottom face of the power train case, drain the excess oil from engine damper drain plug (P) (this can be seen towards the front of the machine from the inspection window), then check the oil level again.



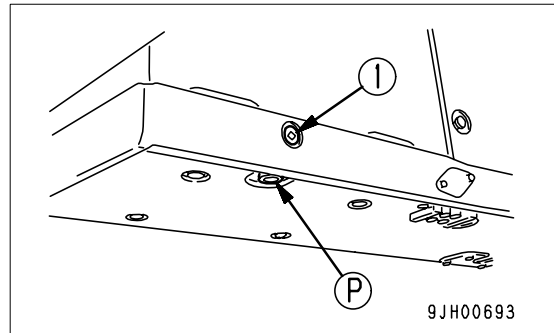
### REMARK

Check the oil level while the engine is stopped.

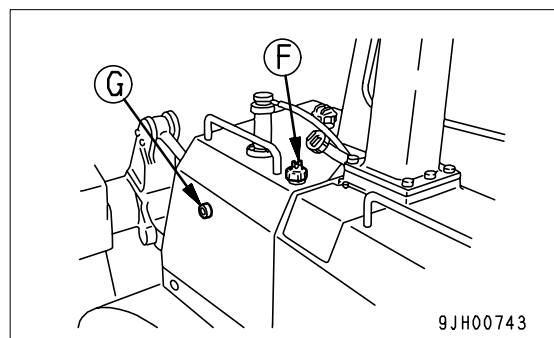
If the machine is inclined, set it in a level position before checking the oil level.

**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.

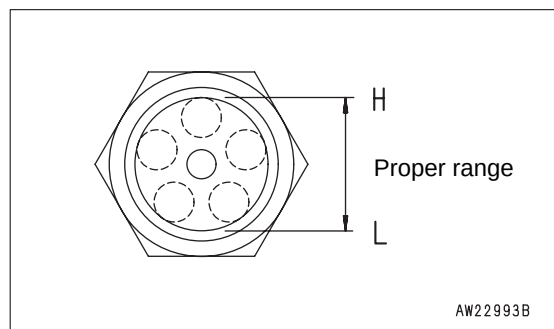


1. Lower the blade and ripper completely to the ground, stop the engine, wait for approx. 5 minutes, then check that the oil level is between the H and L marks on sight gauge (G).

**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.

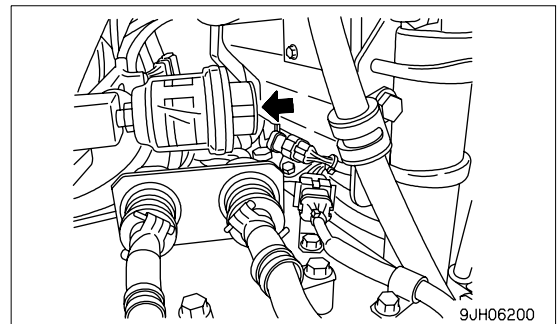
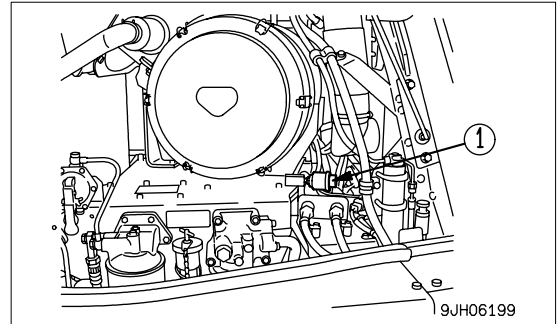
2. If the oil level is below the L line, add oil through oil filler (F) at the top of the hydraulic tank.

**REMARK**

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

**CHECK DUST INDICATOR**

1. Check for the yellow piston overlapping the red zone on the dust indicator (1).
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 (4-24)".
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 WIRING****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 for 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 wiring. Also check for loose terminals, and tighten any loose terminals found.

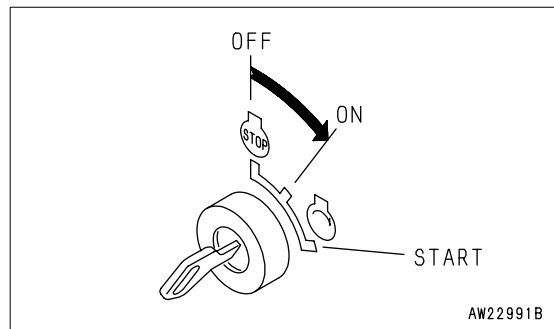
Be sure to check wiring for the battery, starting motor, and alternator.

In addition, if any flammable material is accumulated around the battery, remove it.

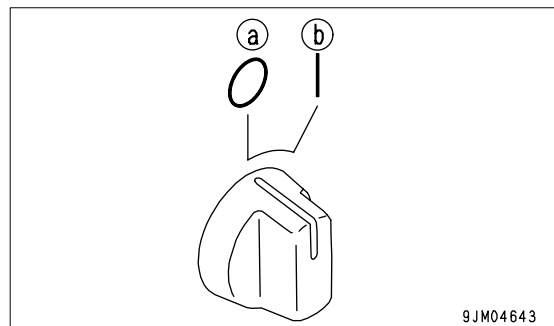
For troubleshooting and repairs, contact your Komatsu distributor.

### CHECK THAT LAMPS LIGHT UP

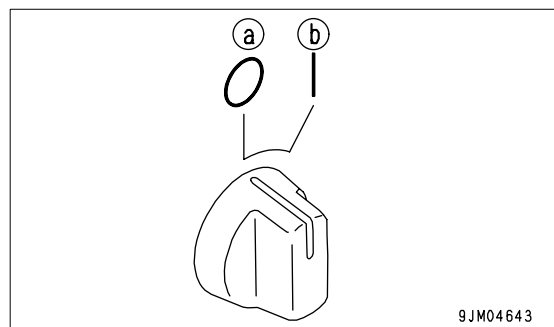
1. Turn starting switch key to the ON position.



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 disconnected wire, contact your Komatsu distributor for repairs.



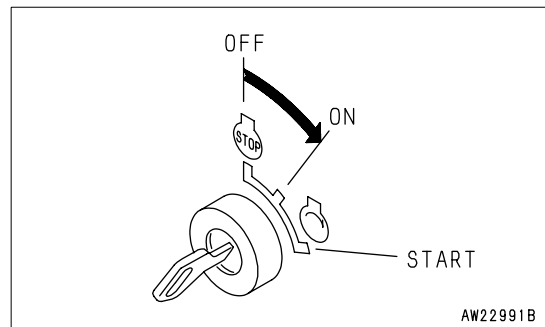


## OPERATION

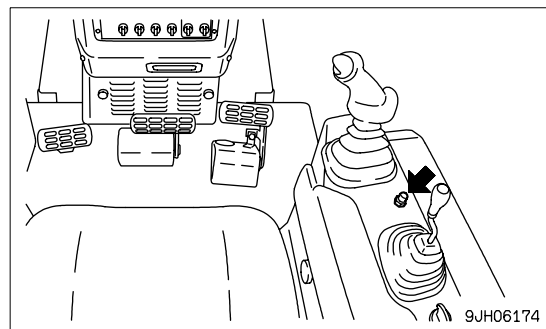
## OPERATION

### CHECK HORN SOUND

1. Turn starting switch key to the ON position.

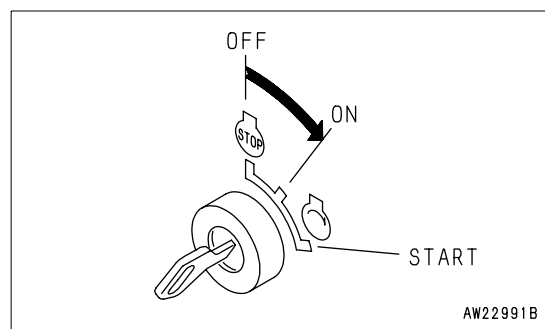


2. Push the horn switch and check that the horn sounds.

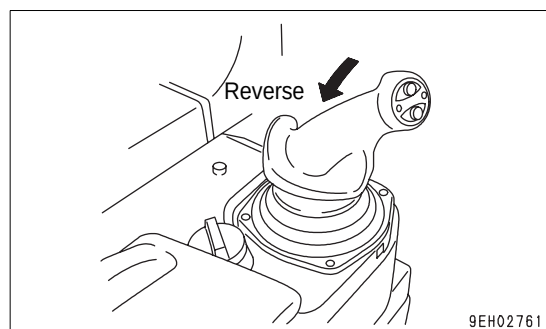


### CHECK BACKUP ALARM SOUND

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.

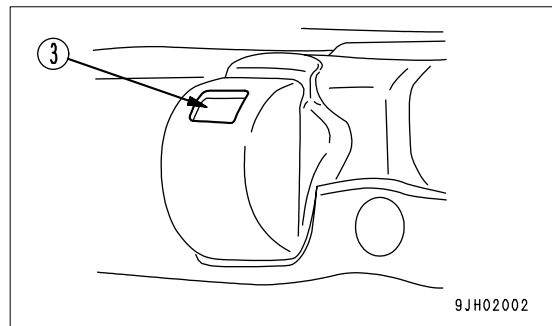
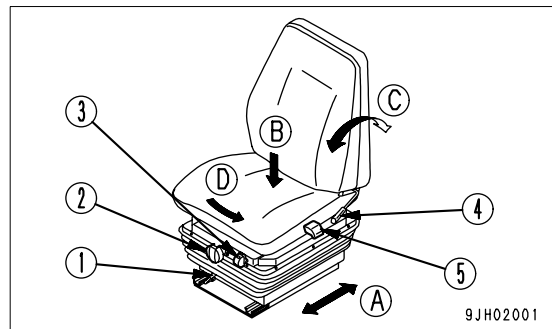
Fore-aft adjustment: 160 mm (8 stages)

#### (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

Weight adjustment range: 50 to 130 kg



#### (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 backrest, return the backrest to its original position before moving the seat.

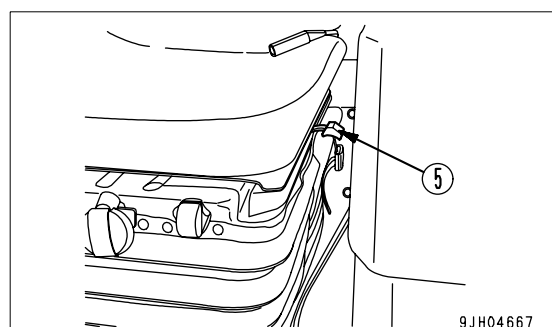
Pull lever (4) up, set the backrest to the desired position, then release the lever.

#### (D) Adjusting direction of seat

Pull up lever (5) to unlock the seat. The seat can then be turned 15° to 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

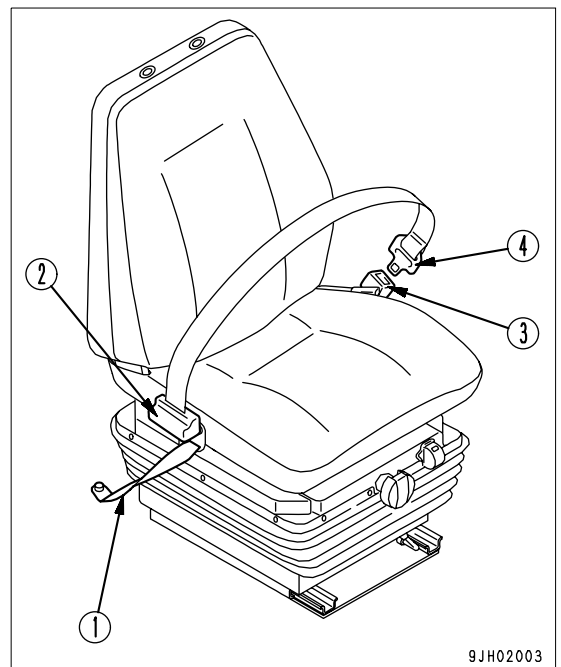
- Before fastening the seat belt, inspect the securing brackets and belt for abnormal conditions. Replace any worn or damaged seat belt or the securing brackets.
- Even if no abnormality can be seen in the belt, replace the seat belt every 3 years. The date of manufacture of the belt is shown on the 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.



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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 retract.

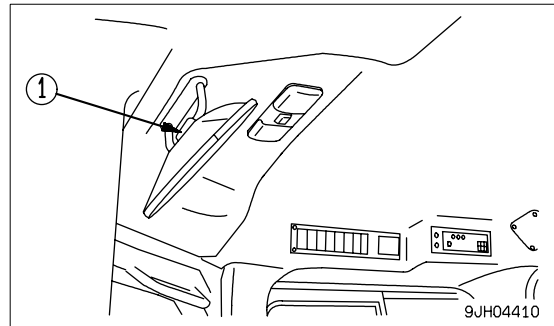
Check the seat belt mounting bolts and re-tighten if necessary.

Tightening torque:  $24.5 \pm 4.9 \text{ N}\cdot\text{m}$  ( $2.5 \pm 0.5 \text{ kgf}\cdot\text{m}$ )

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.

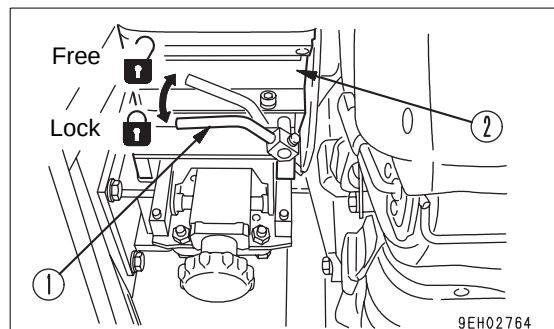
**ADJUST JOYSTICK (PCCS LEVER)**

**WARNING**

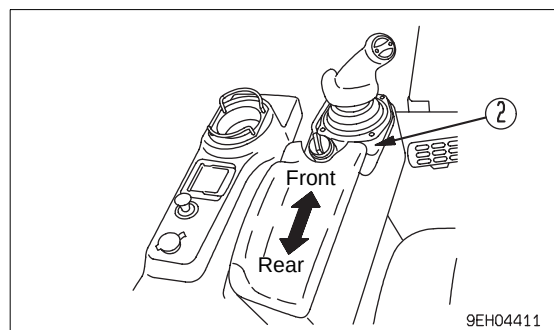
After moving case (2) in order to adjust the position of the steering, directional, and gearshift lever, secure lock lever (1) into the notched hole, making sure it is in the LOCK position. If it is not completely locked, the steering, directional, and gearshift lever may unexpectedly move and cause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

The steering, directional, and speed lever (wrist control type single lever: joystick) can be adjusted up to 90 mm 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

## OPERATION

## OPERATION

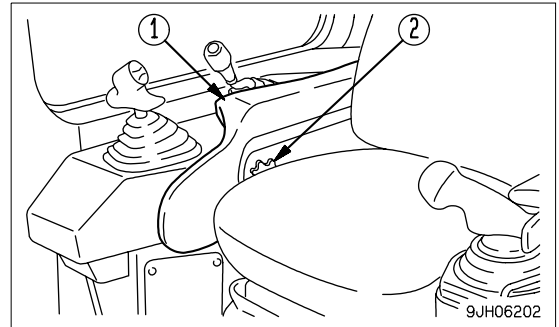
### ADJUST ARMREST

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)

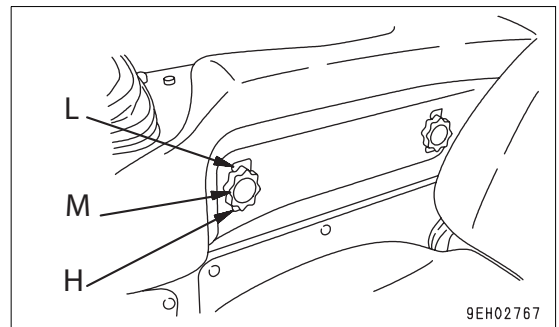
Armrest (1) on the right side of the operator's seat can be adjusted in 3 stages: up 30 mm, standard height (center), or down 25 mm.

1. Loosen knob (2) (2 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.

L Low  
M Middle  
H High

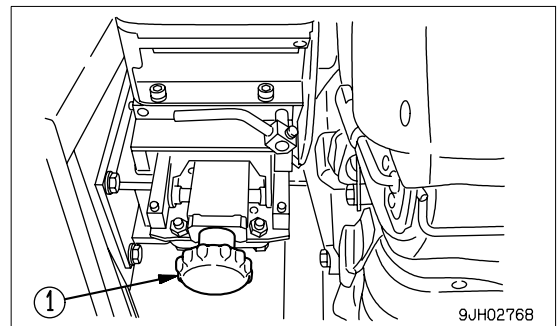


#### ADJUST ARMREST (LEFT)

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 or down 30 mm 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.

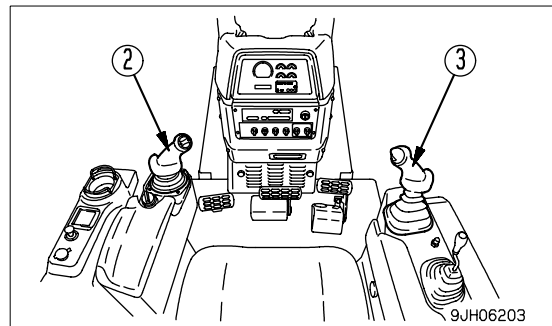
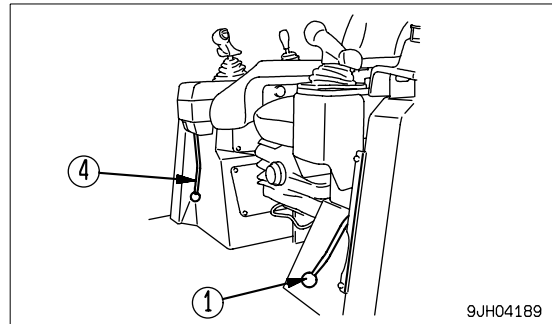
Turn CLOCKWISE to move DOWN  
Turn COUNTERCLOCKWISE to move UP



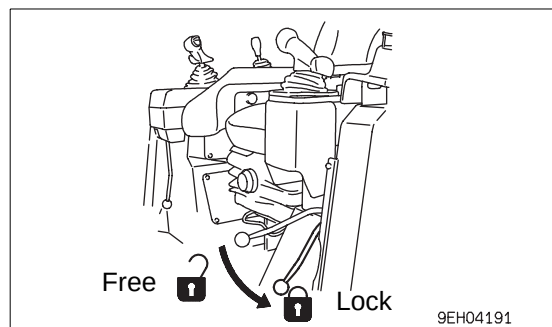
## OPERATIONS AND CHECKS BEFORE STARTING ENGINE

### WARNING

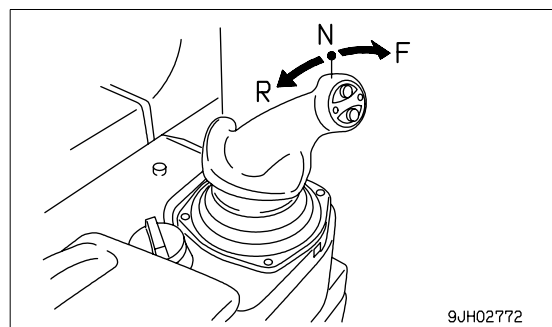
- When starting the engine, check and make sure the work equipment lock lever (4) and parking lever (1) are secured in the LOCK position. If the control levers are not locked and they are touched by accident when starting the engine, the work equipment may move unexpectedly, and this may lead to a serious injury or death.
- When standing up from the operator's seat, always set the work equipment lock lever (4) and parking lever (1) 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 in the LOCK position, the engine will not start.



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



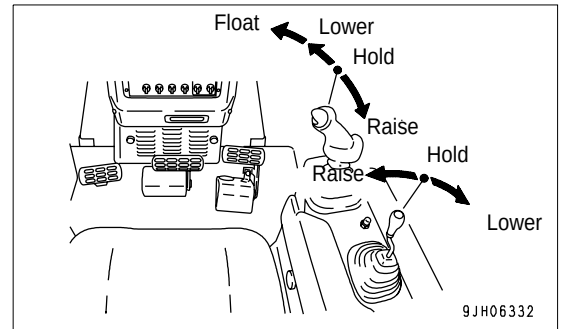
### REMARK

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

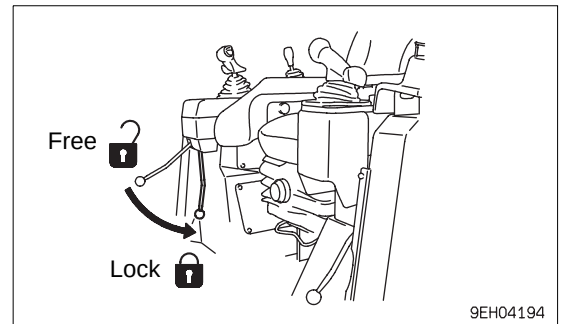
## OPERATION

## OPERATION

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



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



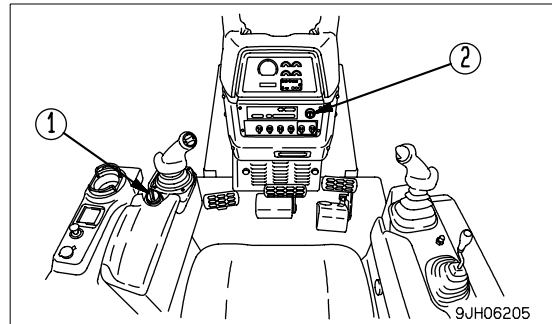
## STARTING ENGINE

### NORMAL STARTING



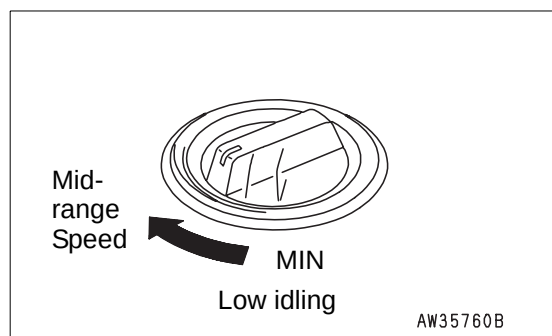
### WARNING

- Sit down in the operator's seat before starting the engine.
- 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 in 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 moved immediately after starting the engine, the engine speed may not change for several seconds.
  - If the fuel control dial is in 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.

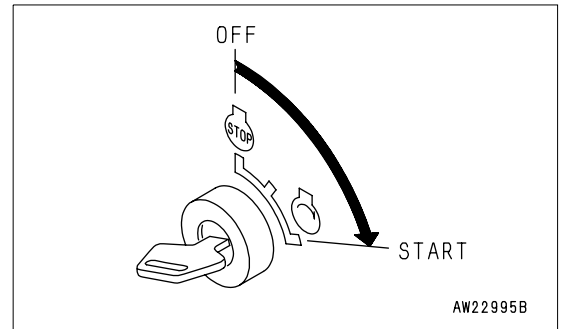




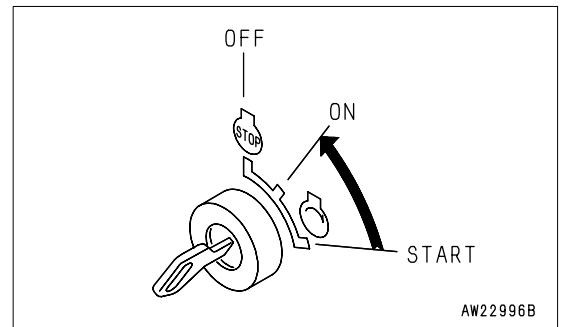
## OPERATION

## OPERATION

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



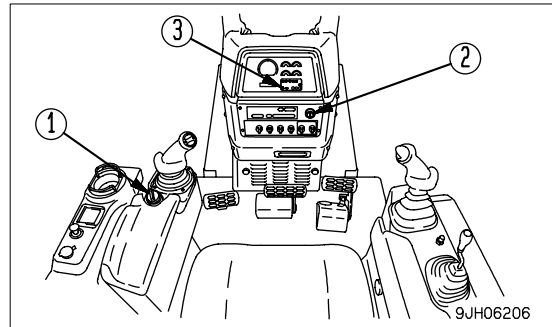
3. When engine is started, release the key of starting switch (2) and the key will return automatically to ON.



## STARTING IN COLD WEATHER

### WARNING

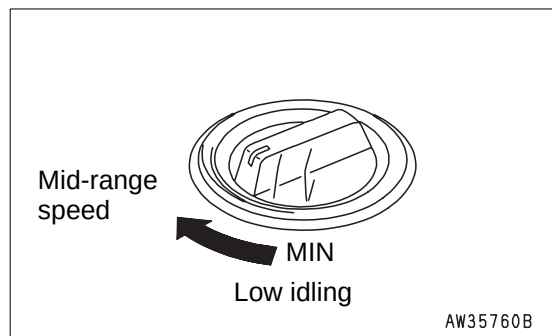
- Start the engine only after sitting down in the operator's seat.
- Do not attempt to start the engine by short-circuiting the engine starting circuit. Such an act may cause a serious bodily injury or fire.
- Check that there are no persons or obstacles in the surrounding area, then sound the horn and start the engine.
- Never use 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.



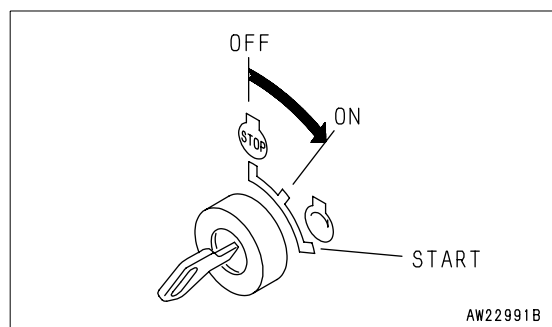
### NOTICE

- 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 in 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 moved immediately after starting the engine, the engine speed may not change for several seconds.
- If the fuel control dial is in 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.



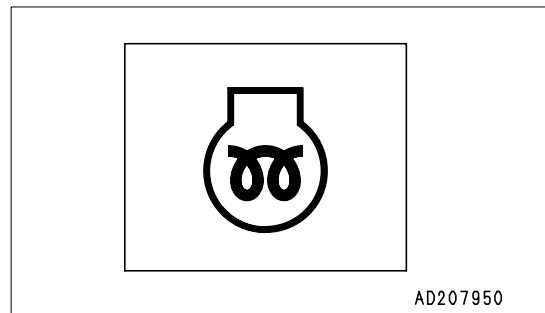
2. Turn the key of starting switch (2) to the ON position.



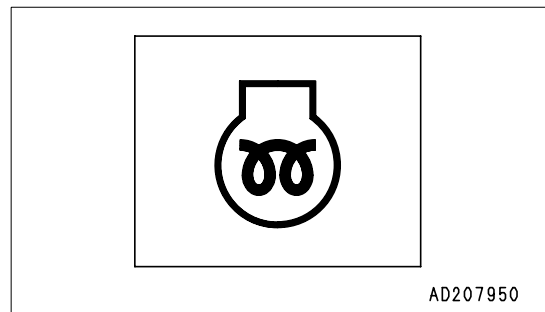
## OPERATION

## OPERATION

3. Check that engine pre-heating pilot lamp (3) on the monitor panel lights up.

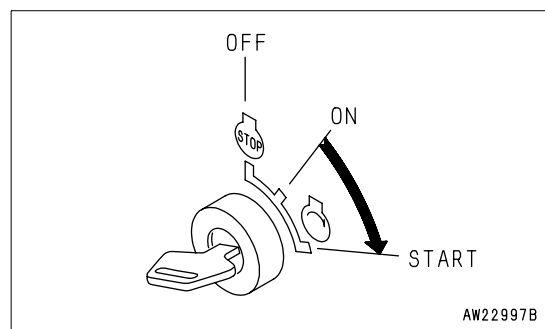


4. Maintain the key in the on position until the pre-heating pilot lamp (3) goes off.

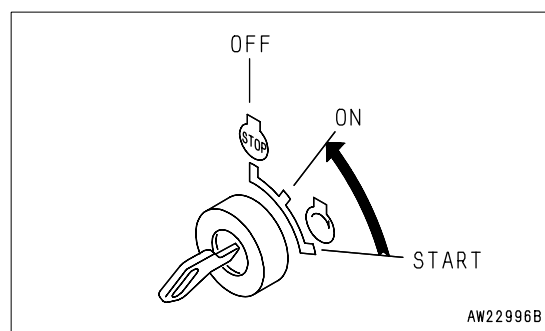


5. When pre-heating pilot lamp (3) goes off, turn the key of starting switch (2) to the START position to crank the engine.  
The time that pre-heating pilot lamp (3) stays on changes according to the ambient temperature as shown in the table below.

| Ambient temperature | Pre-heat time    |
|---------------------|------------------|
| -5°C to -10°C       | 20 to 27 seconds |
| -10°C to -20°C      | 27 to 40 seconds |
| -20°C to -30°C      | 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, pre-heating pilot lamp (3) will light up and pre-heating will start. (Pre-heating continues while the starting switch is being held to the left.)

For details of the pre-heating time, see the table in Step 5.

During the pre-heating operation, pre-heating pilot lamp (3) lights up to show that pre-heating 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 actuated, the engine speed does not change even when the fuel control dial is moved.

| Coolant temperature | Turbo protect time (sec.) |
|---------------------|---------------------------|
| Above 10°C          | 0                         |
| 10 to -30°C         | Change 0 to 20            |
| below -30°C         | 20                        |

## OPERATIONS AND CHECKS AFTER STARTING ENGINE



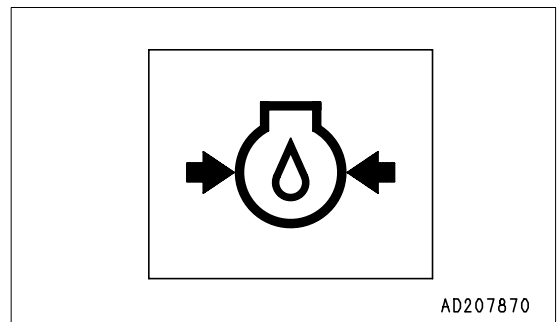
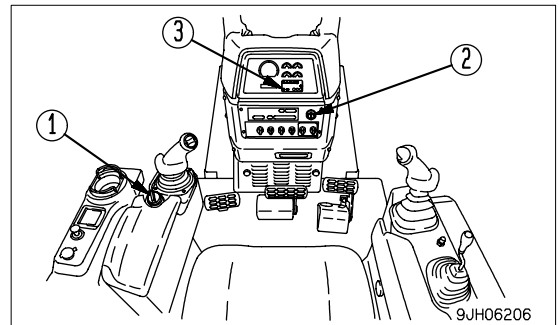
### WARNING

- If there has been any abnormal actuation or trouble, turn the starting 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, particularly in cold areas.

## WARMING UP OPERATIONS

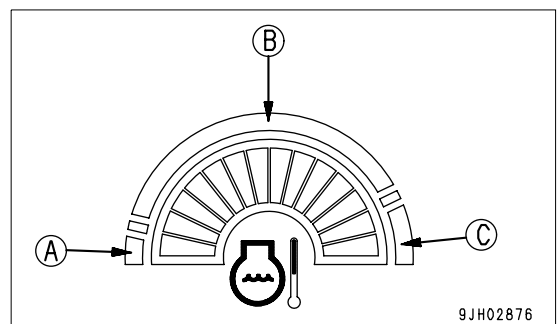
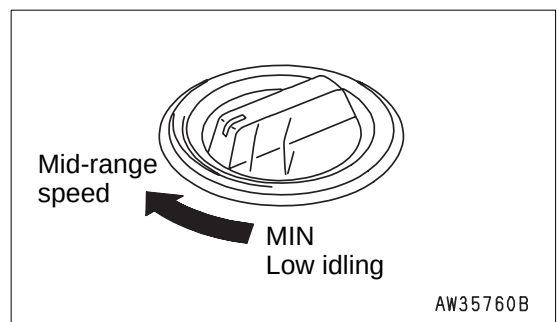
### NOTICE

- 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 turbo-charger 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 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).

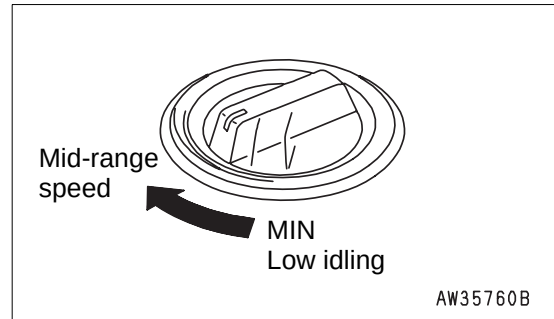
(A): White range  
(B): Green range  
(C): Red range



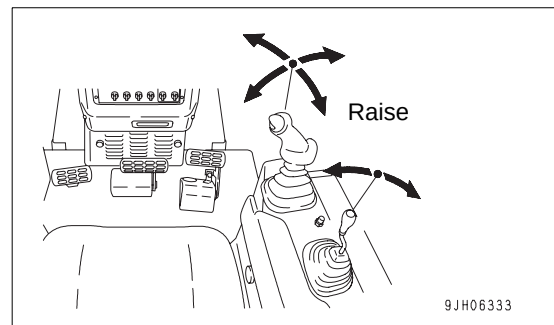
3. Check for abnormal exhaust gas color, noise, or vibration. If any problem is found, contact your Komatsu distributor.

## 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.

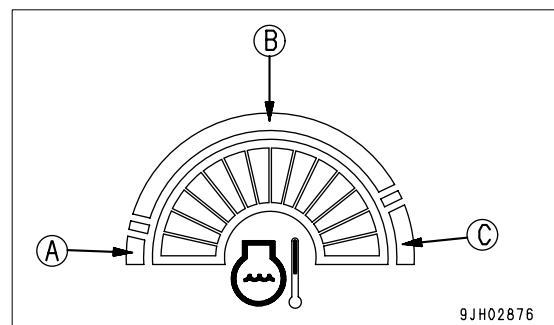


2. Operate blade control lever (4) to the RAISE position, then keep the blade raised to the maximum height and continue to relieve the circuit for 10 minutes.
3. Finally, operate blade control lever (4) and ripper control lever to operate the blade and ripper cylinders several times.  
If the oil temperature 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 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 power train oil temperature is not raised sufficiently, it will take longer to accelerate to the maximum speed.

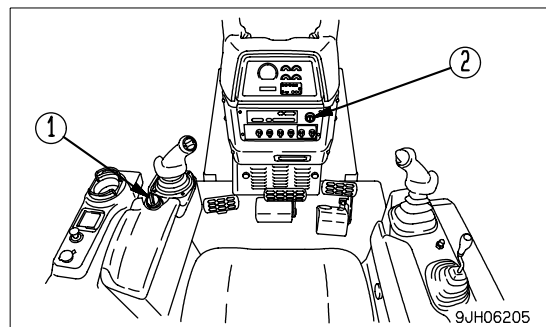
5. Check for abnormal exhaust gas color, noise, or vibration. If any problem is found, contact your Komatsu distributor.

## STOPPING ENGINE

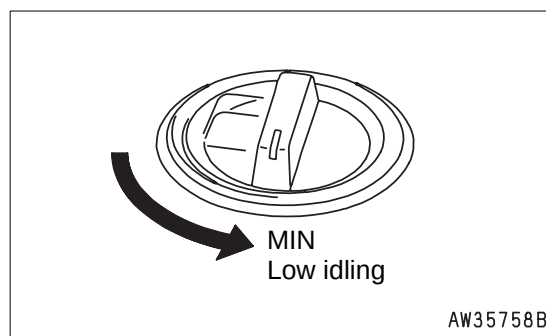
### NOTICE

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.

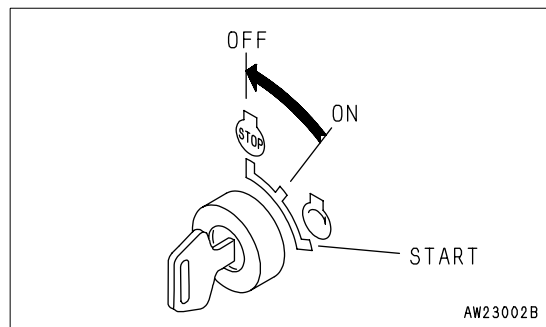
If the engine has overheated, do not stop it abruptly, run it at medium speed allowing the engine to gradually cool down, then stop it.



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.



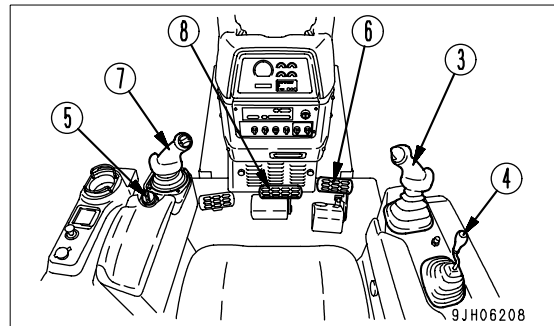
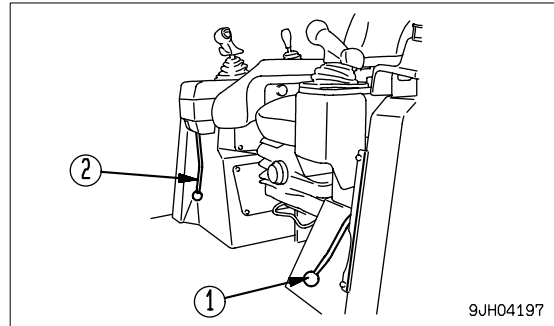
2. Turn the key in starting switch (2) to the OFF position. The engine will stop.
3. Remove the key from starting switch (2).



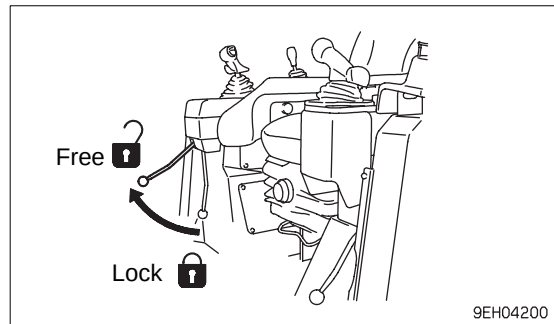
## MOVING MACHINE

**WARNING**

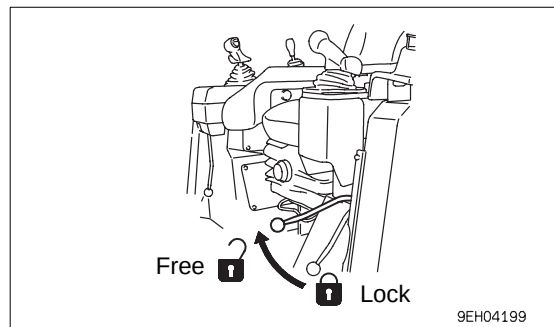
- Before moving the machine, check that the area around the machine is safe, and always sound the horn before moving.  
Do not allow anyone to enter the area around the machine.  
The rear of the machine is a blind spot, so be extremely careful when traveling in reverse.
- When moving the machine down 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 work equipment lock lever (2) for blade control lever (3) and ripper control lever (4) to the FREE position.

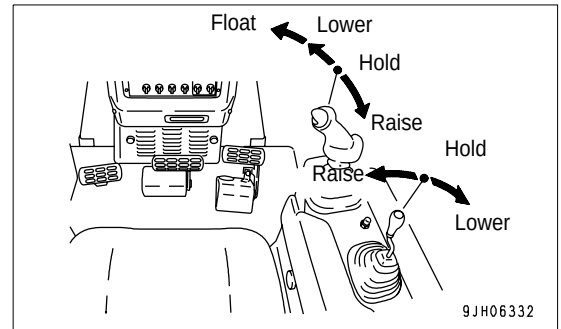




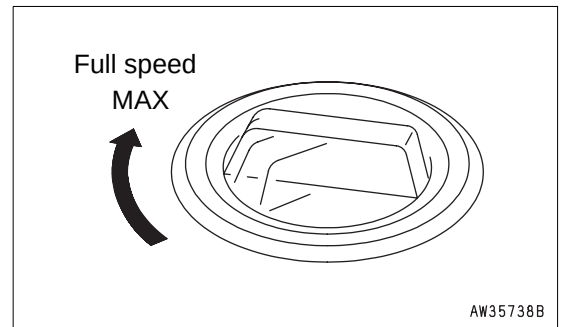
## OPERATION

## OPERATION

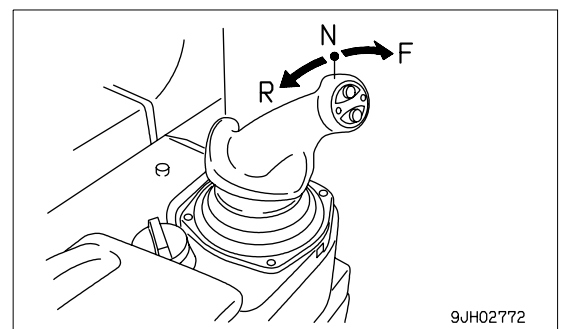
3. Operate blade control lever (3) and ripper control lever (4) to the RAISE position, raise the blade 40 - 50 cm from the ground, and raise the ripper to the maximum height.



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 to move.

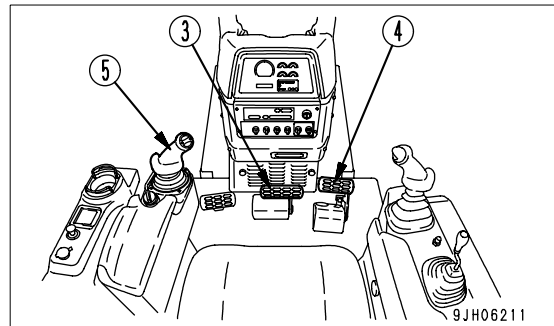
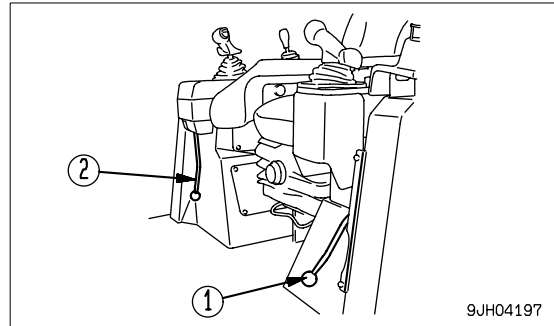


## STOPPING MACHINE



### WARNING

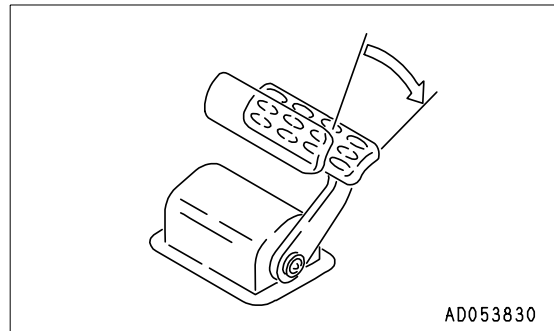
- Avoid stopping suddenly. Give yourself ample room when stopping.
- When stopping the machine, select flat hard ground and avoid dangerous places. If it is unavoidably necessary to park the machine on a slope, place the parking lever (1) in the LOCK position and insert blocks underneath the track shoes. 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 work equipment lock lever (2) in the LOCK position.



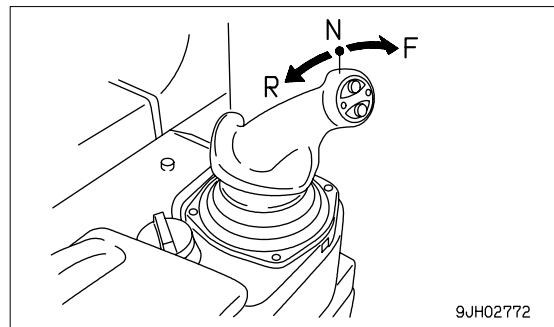
1. Depress brake pedal (3) to apply the brake.

### 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.



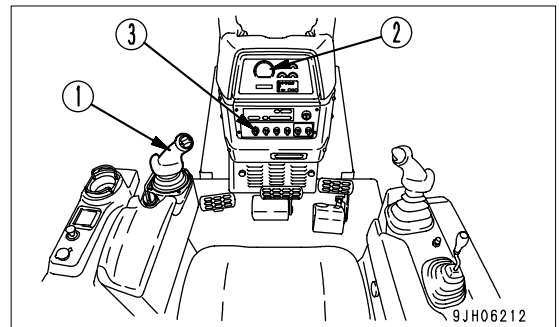
2. Set joystick (5) in the neutral position.



## SHIFTING GEAR

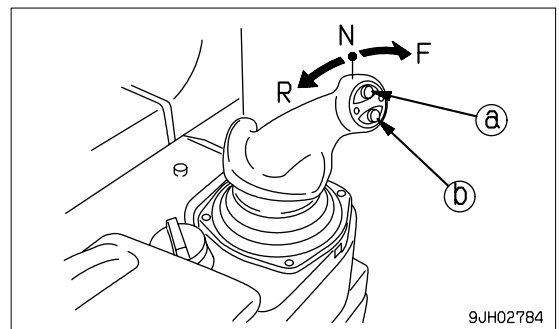
The machine does not have to be stopped to shift gears.

1. Move steering, forward-reverse, gear shift lever (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 moved to the 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 moved to the rear (to set to REVERSE) from the N position, the transmission shifts to R1.  
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 (5-2)".

### REMARK

The speed range in use is displayed on the panel display according to the gearshift operation.

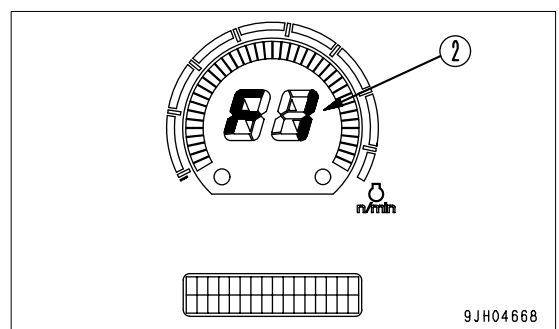
For example:

Neutral: N1 is displayed on the display panel A (2)

FORWARD 2nd: F2 is displayed on the display panel A (2)

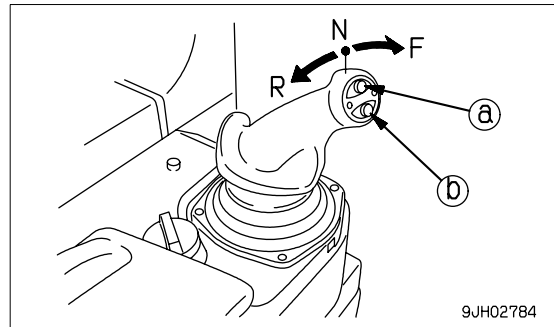
REVERSE 3rd: R3 is displayed on the display panel A (2)

When the parking lever is locked, P is displayed.

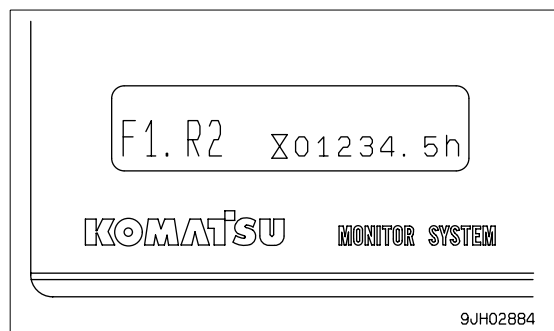


**GEARSHIFTING OPERATION USING PRESET MODE FUNCTION**

- Shift mode selection means that the selected speed range is displayed in the N position before starting.
- When the joystick is in 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 moved 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 in 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 moved 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 in 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 moved 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 moved 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 moved 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 moved back (reverse travel operation), the transmission is shifted to R2.

**REMARK**

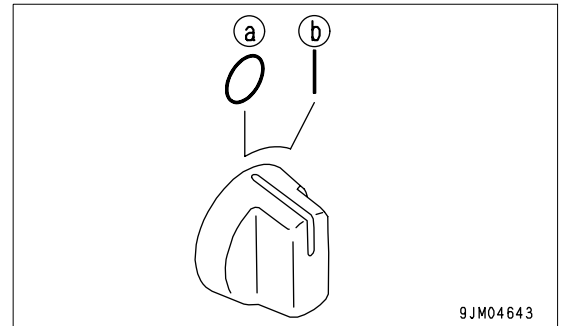
When the starting switch is turned ON, the mode is set to F1-R1.

**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

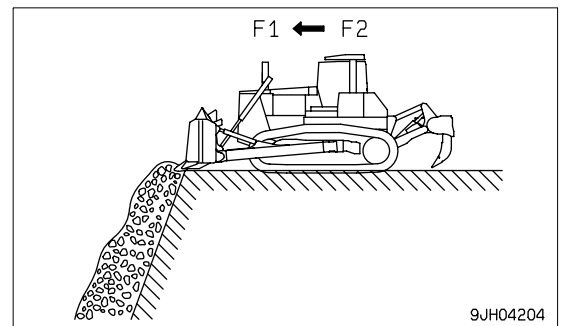
ON position (b): Automatically shifted down to lower speed range



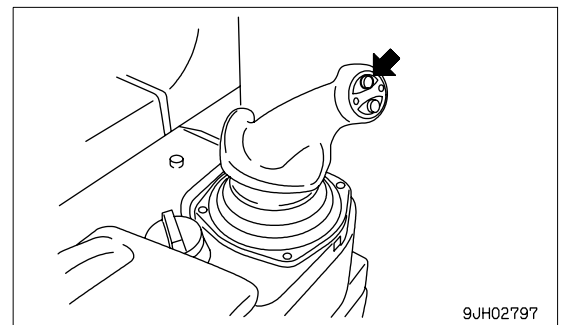
The transmission is automatically shifted down F2 → F1, F3 → F2, R2 → R1, R3 → R2.

**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 FORWARD AND REVERSE



### WARNING

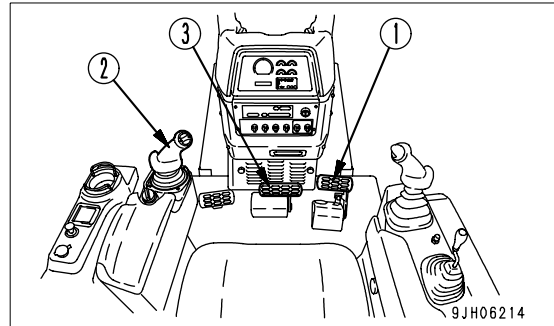
When switching between **FORWARD** and **REVERSE**, first check that the direction of travel is safe.



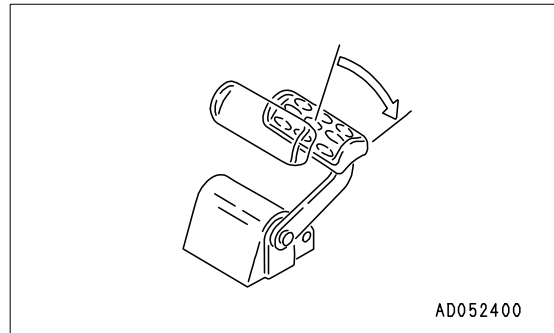
### CAUTION

There is no need to stop the machine even when switching between **FORWARD** and **REVERSE**.

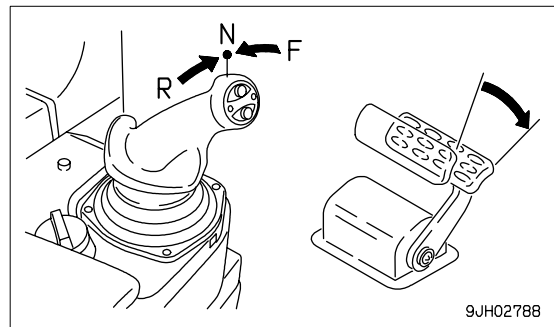
To increase safety, operator comfort, and the life of the transmission, leave the engine running at full speed, and always depress the decelerator pedal to lower the engine speed.



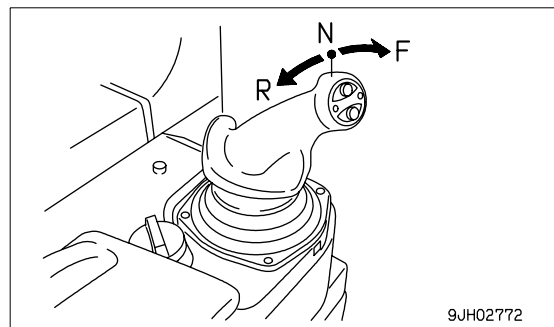
1. Depress decelerator pedal (1) to reduce the engine speed.



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 steering, forward-reverse, gear shift lever (2) to the desired position.



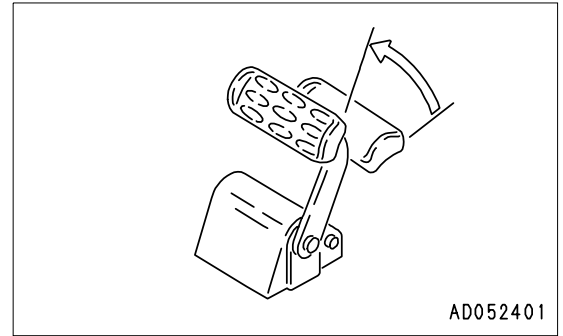
## OPERATION

## OPERATION

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

### REMARK

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



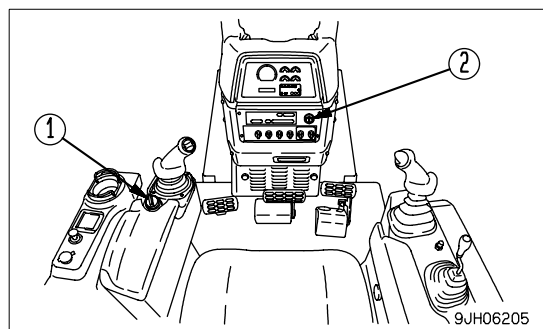
## STEERING MACHINE

### 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 soil.
- Never make a pivot turn at high speed.

### NORMAL TURNING

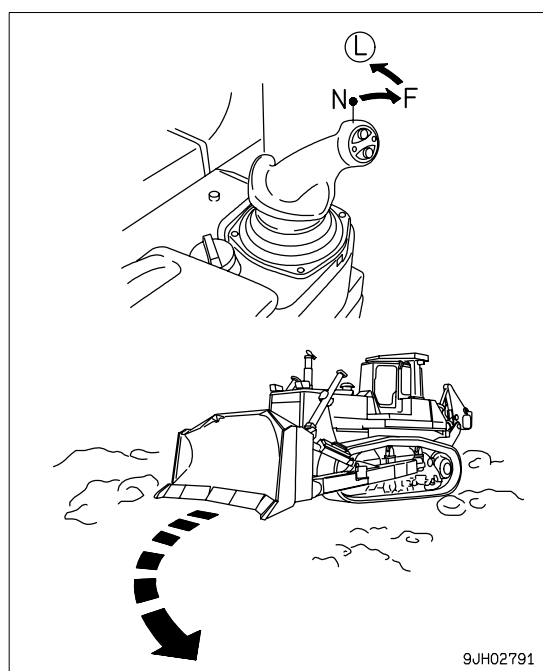
To turn the machine while traveling, incline steering, forward-reverse, gear shift lever (1) in the direction of the turn.



### 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.





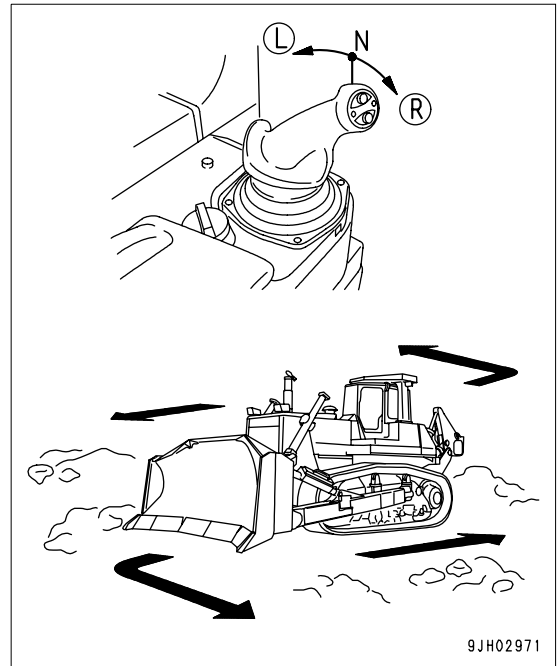
**COUNTERROTATION TURNS TO LEFT WHEN TRAVELING FORWARD****NOTICE**

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 steering, forward-reverse, gear shift lever (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 steering, forward-reverse, gear shift lever (1) to the right (R) in the same way.

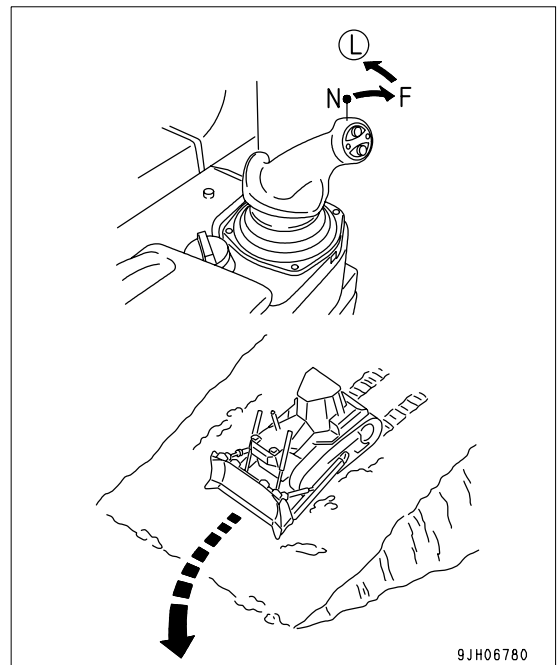
**TURNING WHILE DESCENDING A SLOPE****TURNING GRADUALLY TO LEFT WHILE TRAVELING FORWARD**

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

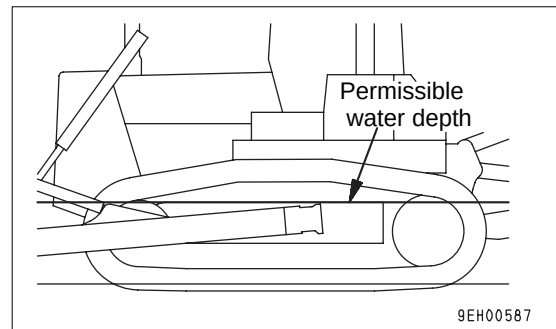
### PAY ATTENTION TO GAUGES

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 steering, forward-reverse, 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 steering, forward-reverse, gear shift lever to the NEUTRAL position.

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

### BRAKING WHEN TRAVELING DOWNHILL

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

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

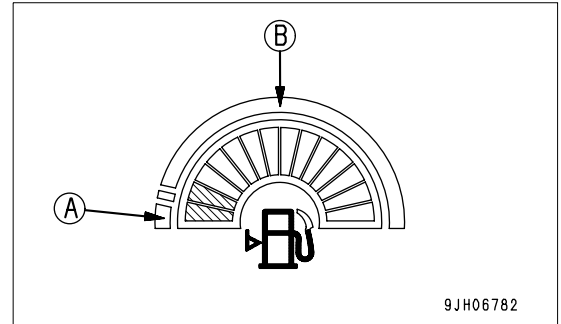
## PRECAUTIONS ON SLOPE

### BE CAREFUL OF FUEL LEVEL

- If the fuel level in the fuel tank becomes low when the machine is working on slopes, the engine may suck in air because of the angle of the machine or the swaying of the machine. This may make the engine stop, 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

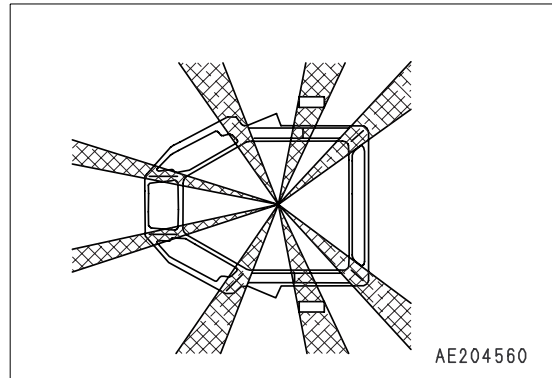
- For safety reasons, do not install anything on the cab glass that will obstruct the view.
- Always keep the glass clean to ensure safety during operations.

## 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.

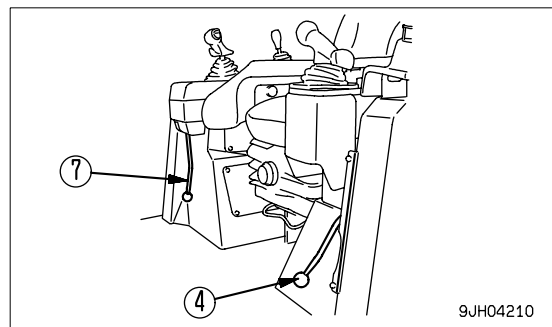
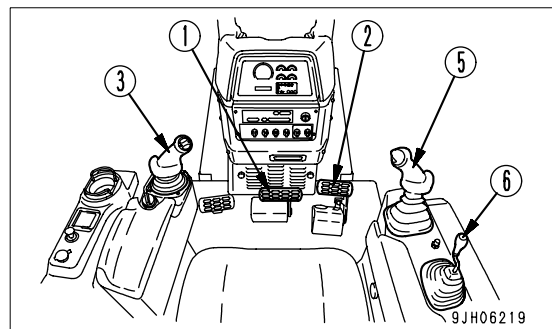


## PARKING MACHINE



### WARNING

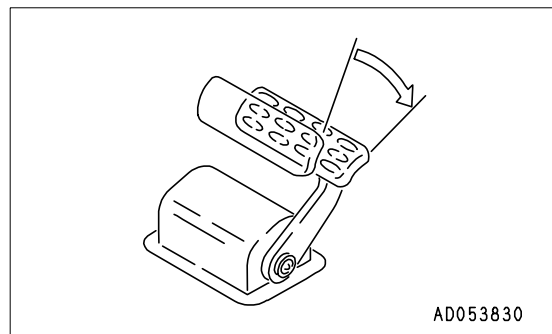
- Avoid stopping suddenly. Give yourself ample room when stopping.
- When stopping the machine, select flat hard ground and avoid dangerous places. If it is unavoidably necessary to park the machine on a slope, place the parking lever (4) in the LOCK position and insert blocks underneath the track shoes. 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 work equipment lock lever (7) in the LOCK position.



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

### NOTICE

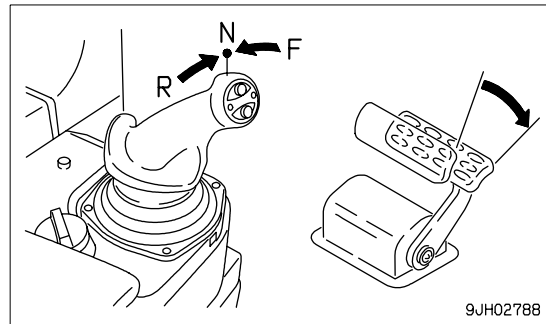
If the brake is depressed when the engine speed or travel speed is high, the brake disc may make a slipping sound. Normally, depress decelerator pedal (2) to reduce the engine speed and travel speed before depressing the brake.



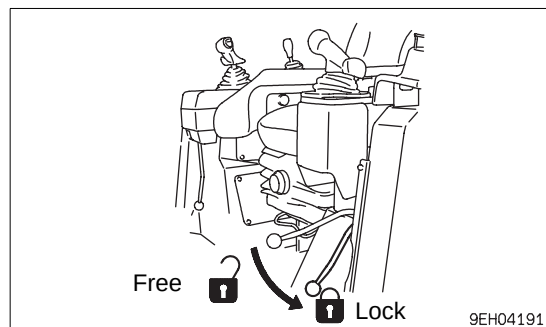
## OPERATION

## OPERATION

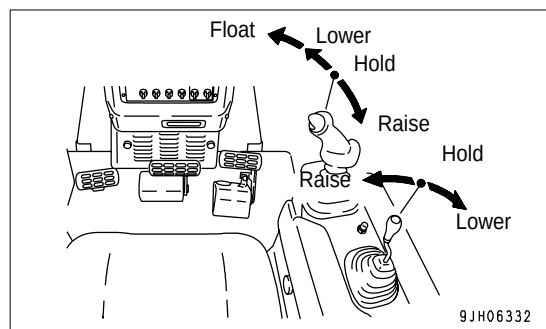
2. Set joystick (steering, directional, and gearshift lever) (3) to the N position.



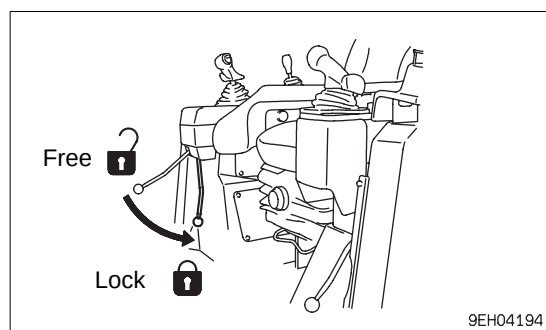
3. Operate parking lever (4) to lock the brakes.



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 work equipment lock lever (7) for blade control lever (5) and ripper control lever (6) to the FREE position.

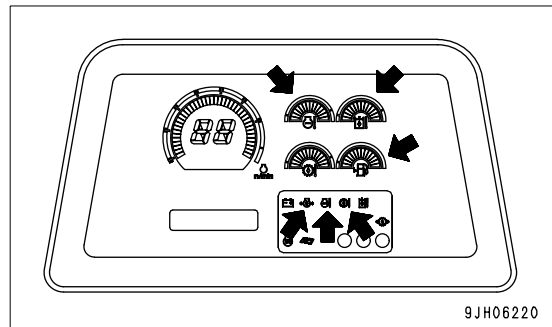


## CHECK AFTER STOPPING ENGINE

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 problem 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

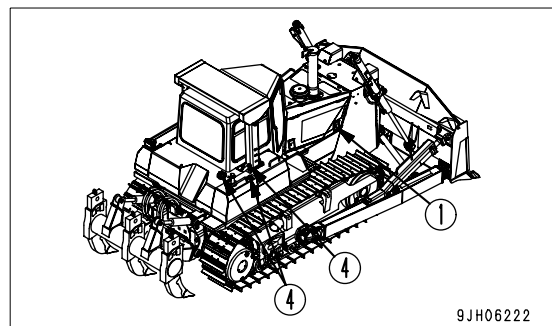
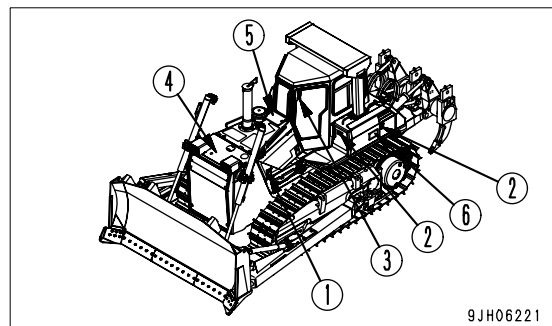
Use the meters and caution lamps to check the engine coolant temperature, engine oil pressure, fuel level, and Power train oil temperature.



## LOCKING

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

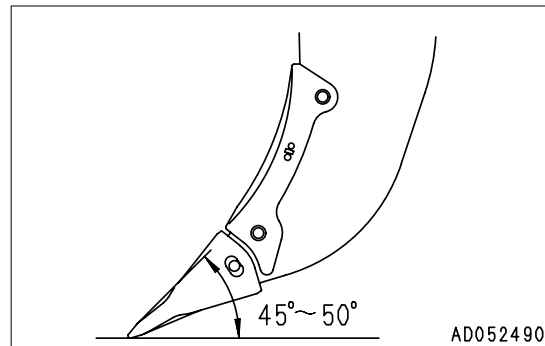
- Left and right engine side covers (1)  
Left and right engine side covers (1) (left side: 2 places; right side: 2 places)
- Battery inspection cover (2)
- Cab door opener (3) (machines equipped with cab)
- Cap with lock (4) (if equipped)
  - Radiator cap
  - Fuel tank cap
  - Hydraulic tank cap
  - 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

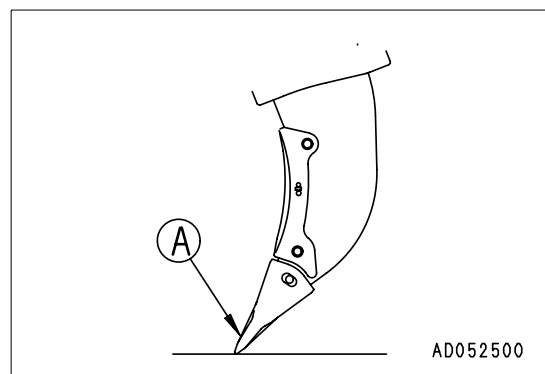
### EFFECTIVE METHOD OF USE

- The most suitable digging angle for the shank is when the shank is perpendicular to the ground surface (angle at tip:  $45^{\circ}$  -  $50^{\circ}$ ).
- 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).



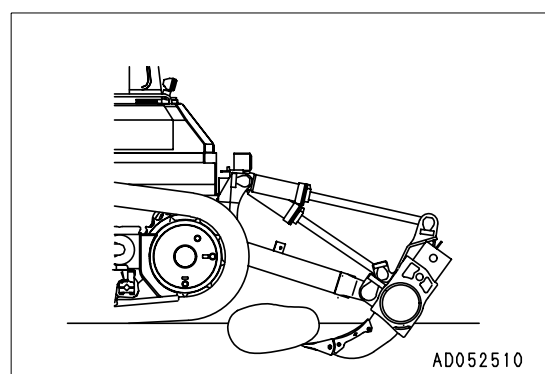
- On comparatively hard bedrock, if ripping is carried out with the shank tilted back, there will be excessive wear of the tip of the point (A), and this will reduce the effectiveness of the self-sharpening ability.
- During ripping operations, if the track starts to slip when ripping boulders or rock 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 (6-6)" to select the most suitable ripper point.



### DIGGING UP BOULDERS OR ROCKBED

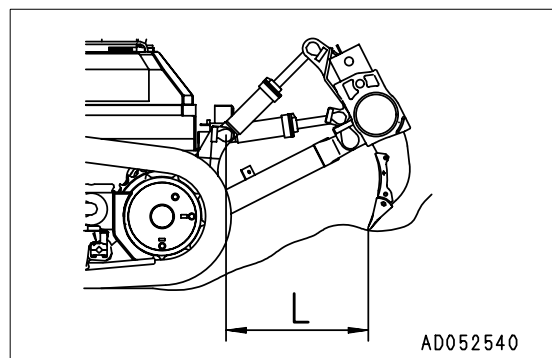
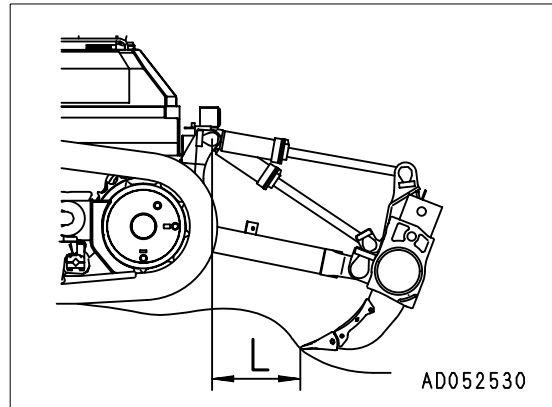
When ripping boulders and rockbed that are difficult to rip, if the track slips or the travel speed becomes slower, operate the tilt cylinder to lift up the boulder or rockbed.



## OPERATING ON SLOPES

When using the variable ripper, adjust the length of the tilt cylinder to select dimension L.

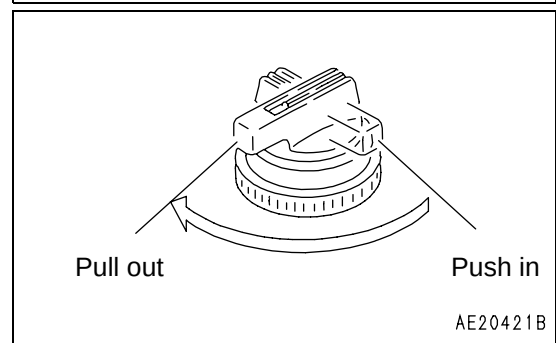
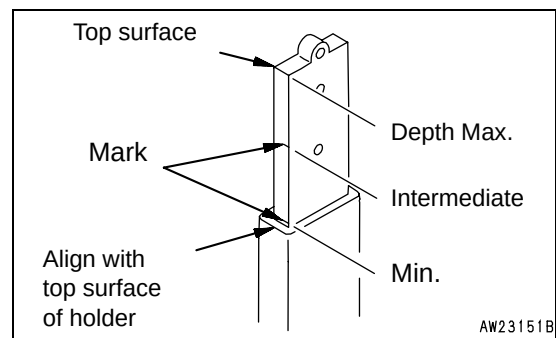
Slope face: Sloping face, such as on embankments



## 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.



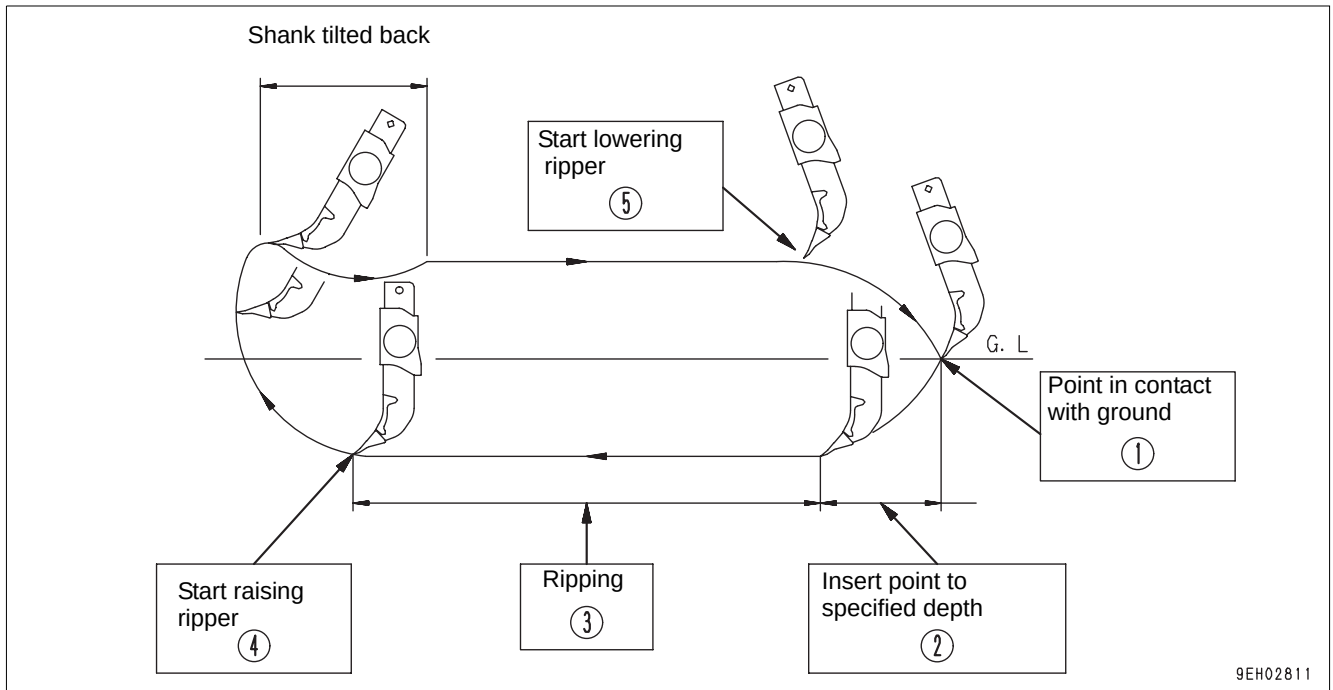
## REMARK

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

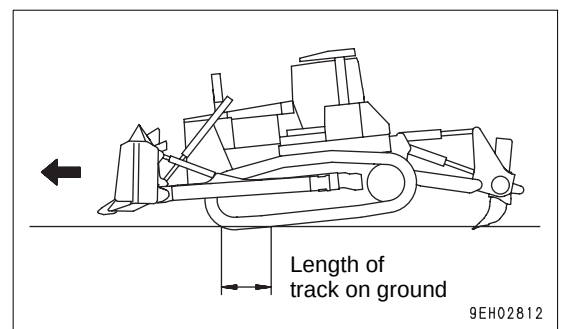
Carry out the ripping operation as follows, passing through the points shown in the diagram above.

- (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

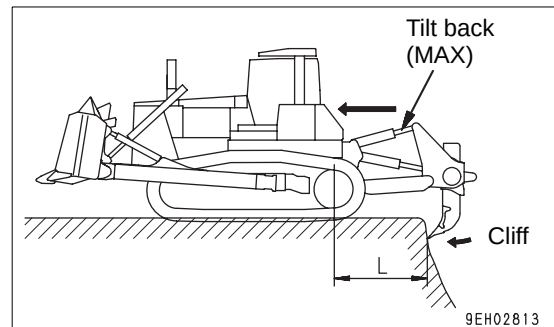
If the ripper is applied with the rear of the machine raised from the ground, the drawbar pull will be low, so the ripping efficiency will be reduced.

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.



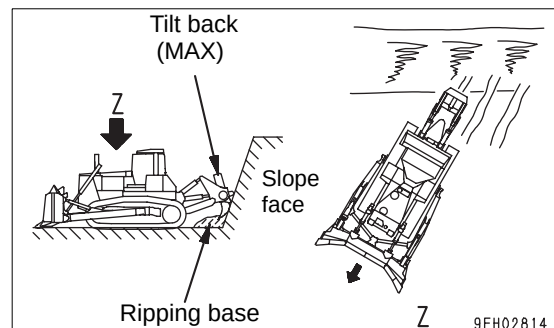
## RIPPING BY SLOPE FACES

(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.

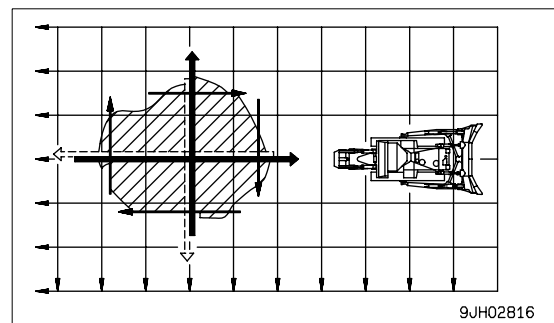
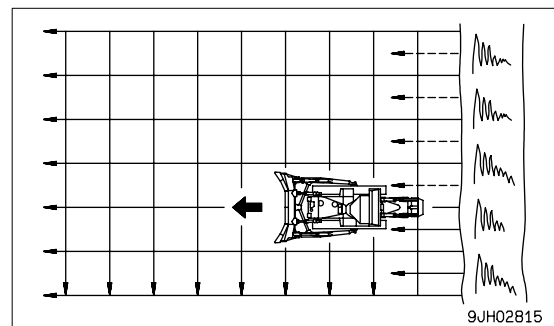
### REMARK

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



Cross ripping

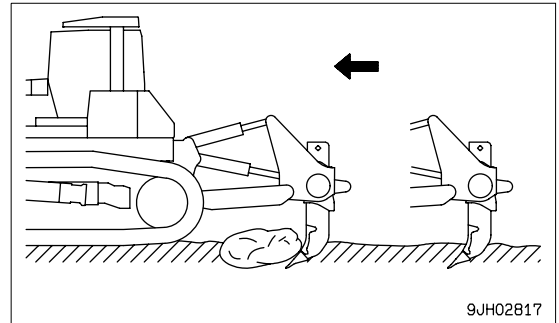
- On jobsites with hard bedrock, for rocks and boulders which are impossible to break or dig up with one ripping pass, carry out the second ripping pass at right angles to the first ripping direction.
- At the edge of cliffs, where it is impossible to apply the ripper in a cross direction, make the space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



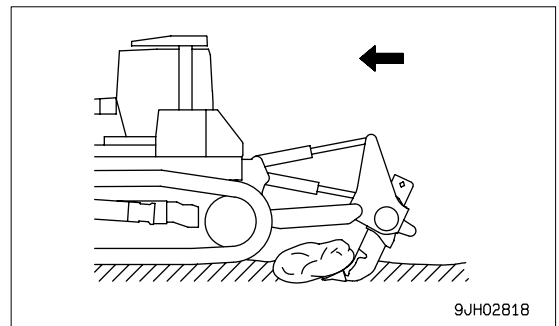
## DIGGING UP BOULDERS

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

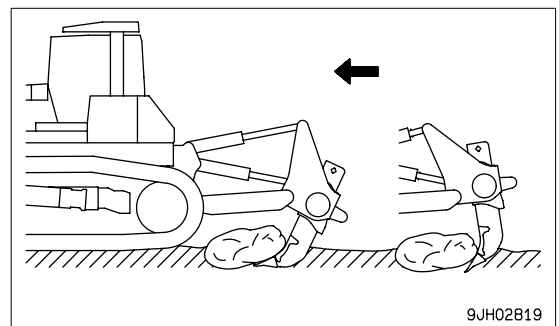
1. Depress the decelerator pedal and lower the engine speed to a point where there is no shoe slippage.



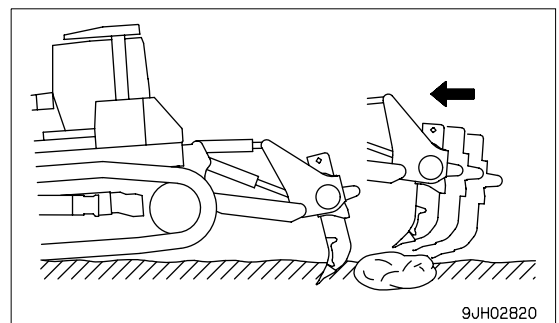
2. Operate the ripper lever to the TILT position and carry out ripping and digging.



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.

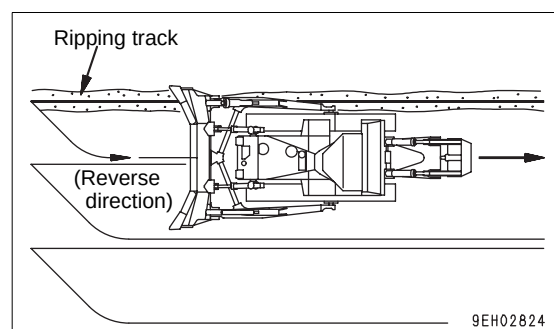
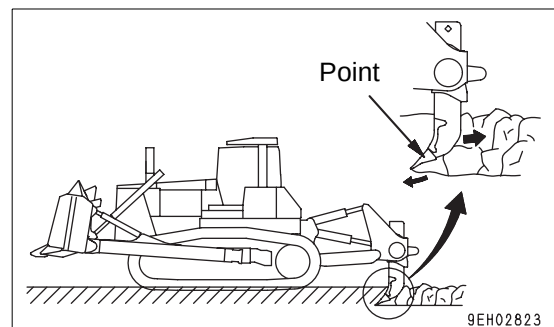
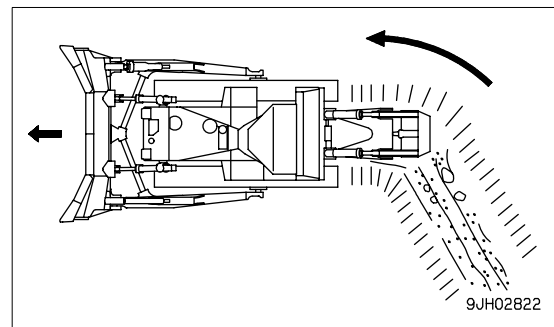
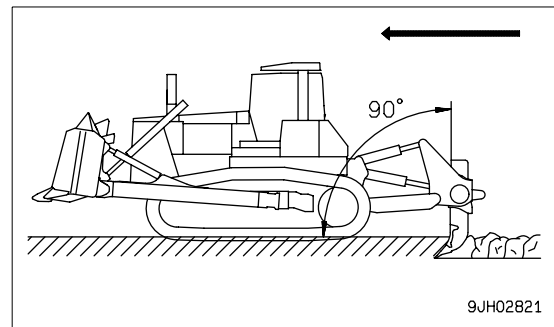


4. Even when the operation in Step 3 is repeated, if it is impossible to break or dig up the boulder, drive back about 10 cm, raise the shank, avoid the rock or boulder that cannot be ripped, then drive forward and start ripping again.



## PRECAUTIONS WHEN RIPPING

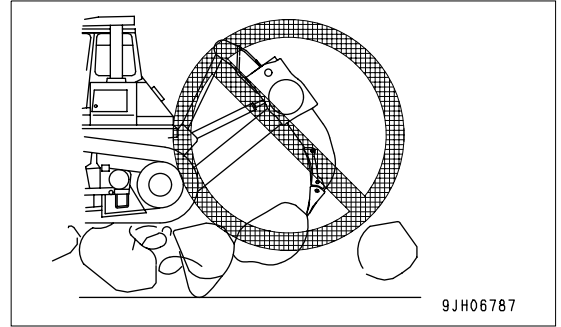
- For the digging angle when ripping, set so that the top of the shank is perpendicular, then lower the ripper.
- Do not carry out ripping for long periods with the shank tilted back. The tip of the point will wear to a round shape.
- Do not change the direction of travel during the ripping operation. 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 hitting any large rocks. As far as possible, choose level ground to travel over.



## OPERATION

## OPERATION

- 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.

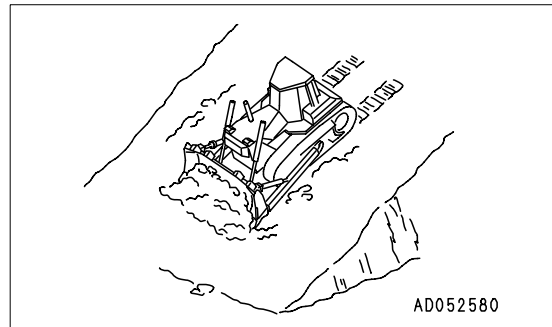


## WORK POSSIBLE USING BULLDOZER

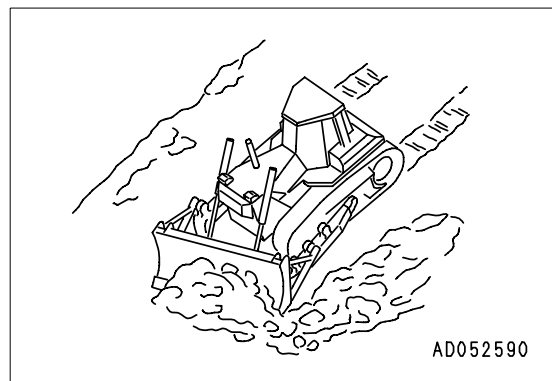
If various attachments are used, it is possible to carry out operations in a wider range than listed below.

### 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).

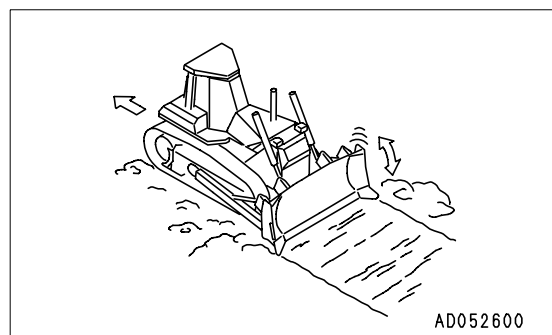


### SMOOTHING

#### NOTICE

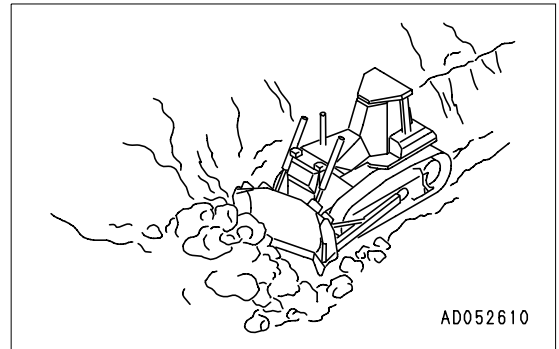
**Avoid smoothing on rocky or stony ground. It can damage the blade.**

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

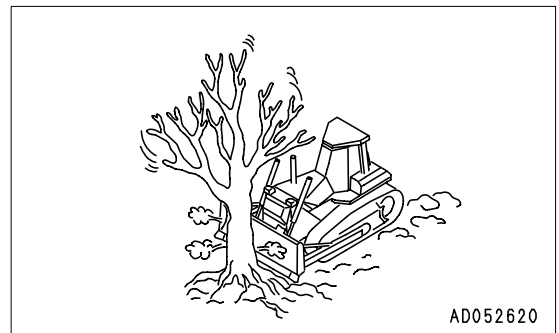
### NOTICE

**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, 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.

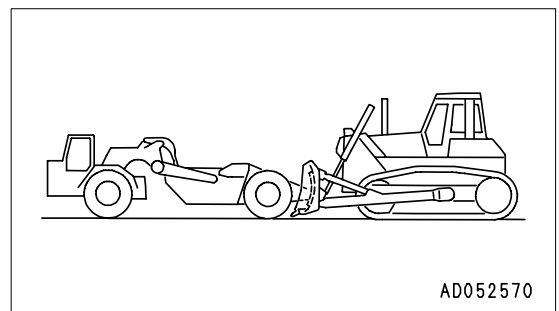
When doing this, never hit the tree at high speed or apply shock to fell the tree.



## 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

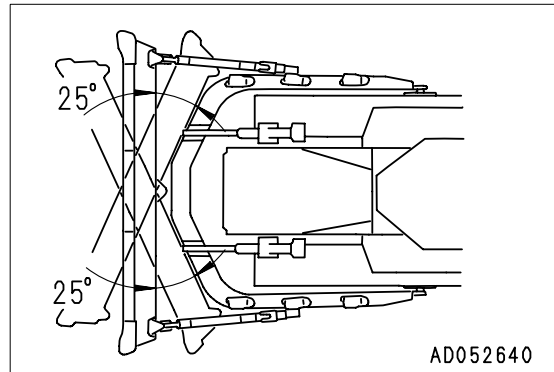
Angledozer only

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

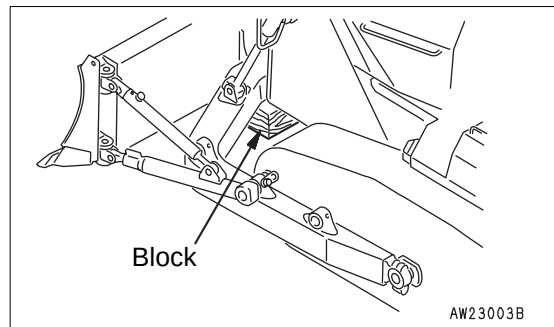


### WARNING

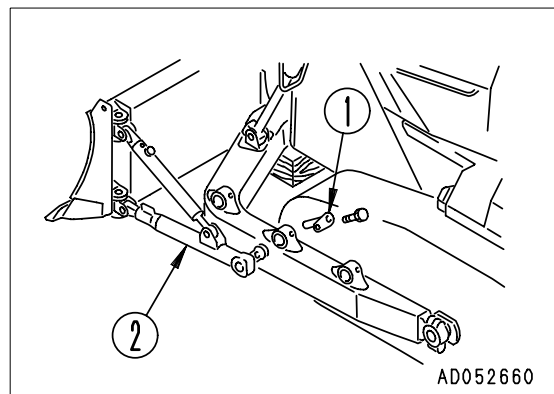
- When adjusting the amount of angling, it is dangerous if the work equipment is moved by mistake. Set the work equipment in a safe condition, then stop the engine and lock the work equipment securely with the work equipment lock lever.
- Be careful when removing arm (2). After arm (2) is removed, the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



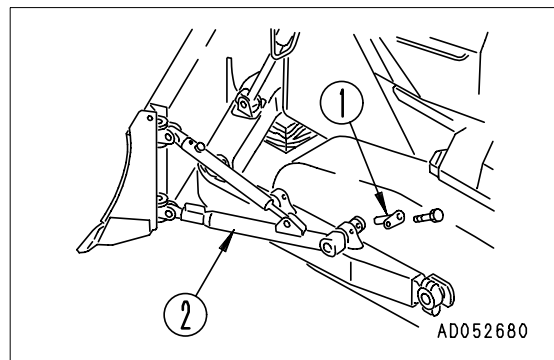
1. Raise the blade 300 - 400 mm above the ground, then put blocks under the frame so that the blade does not come down.



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).



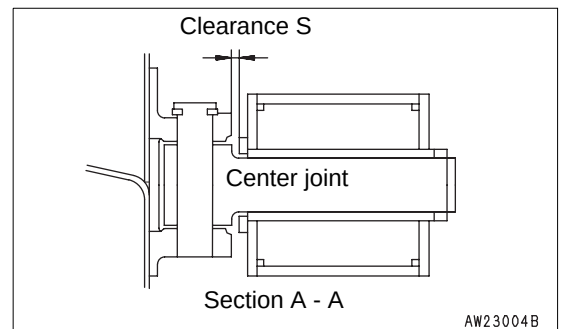
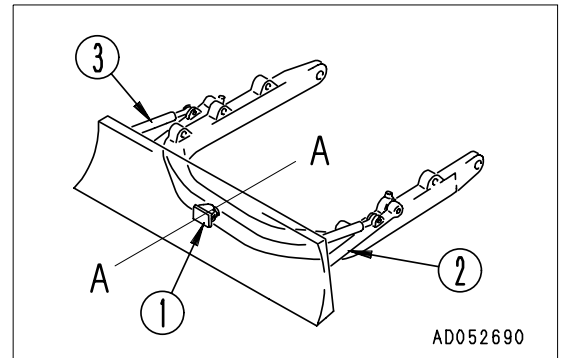


## OPERATION

## OPERATION

### 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.



## ADJUSTING TILT AMOUNT

(Angledozer, power tiltdozer)



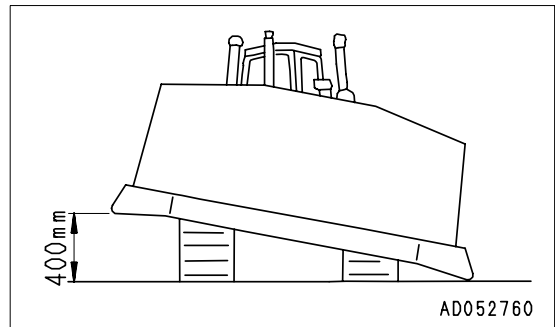
### WARNING

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 work equipment lock lever.

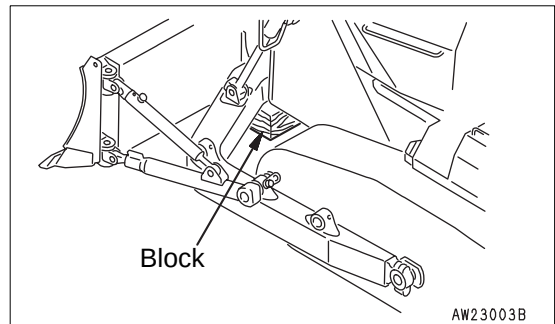
### ANGLEDZOZER

#### NOTICE

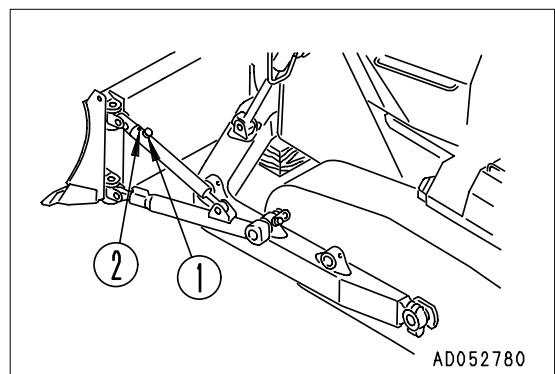
The maximum amount of tilt is 400 mm. Be sure not to exceed 400 mm.



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

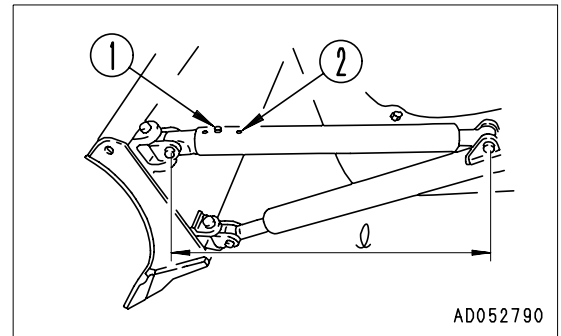
## OPERATION

## OPERATION

3. Tighten set bolt (1).

### NOTICE

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

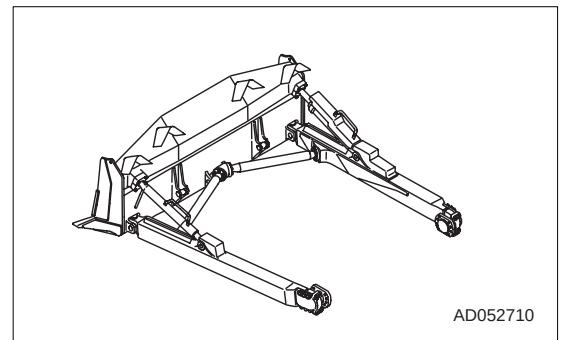


### POWER TILTDOZER

### NOTICE

The maximum tilt is 1000 mm.  
Do not exceed 1000 mm for the tilt during operations.

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

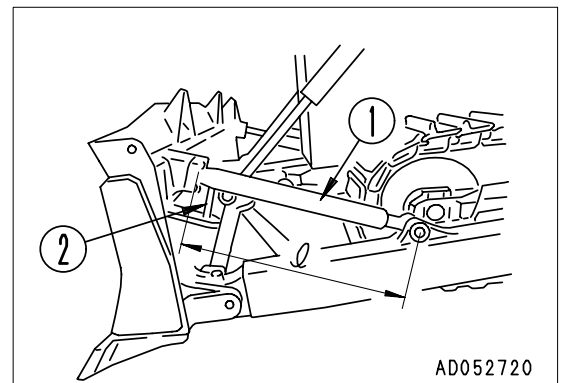


2. If an even greater tilt is needed than can be obtained in Step 1, use adjustment bar (2) installed to left brace (1) and turn brace (1) on extend the length of the brace.

A maximum tilt of 1000 mm 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, but if the length of the brace is adjusted and the tilt exceeds 1000 mm, excessive force will be generated at various parts, so do not use it.

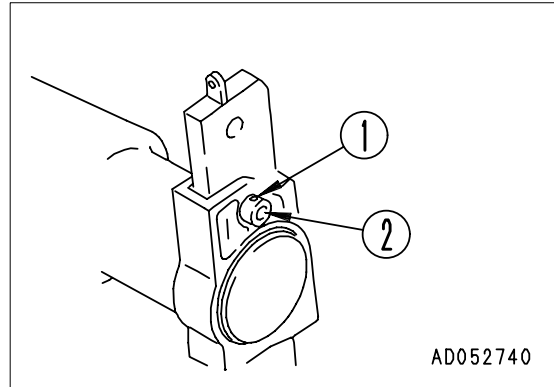
## ADJUSTING RIPPER

### ADJUSTING DIGGING DEPTH

There are mounting holes in the shank to choose 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.

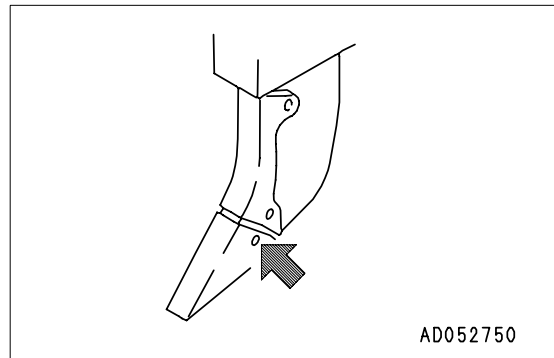
1. Place a pointed object on the tip of pin (1), then hit with a hammer to remove from the opposite side.
2. Remove pin (2) and change the position of the shank hole.
3. Insert pin (1) partially by hand then knock it in with a hammer.
  - The pin is one unit, so when inserting, insert it partially by 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 (3-112)".



### REPLACING POINT AND PROTECTOR

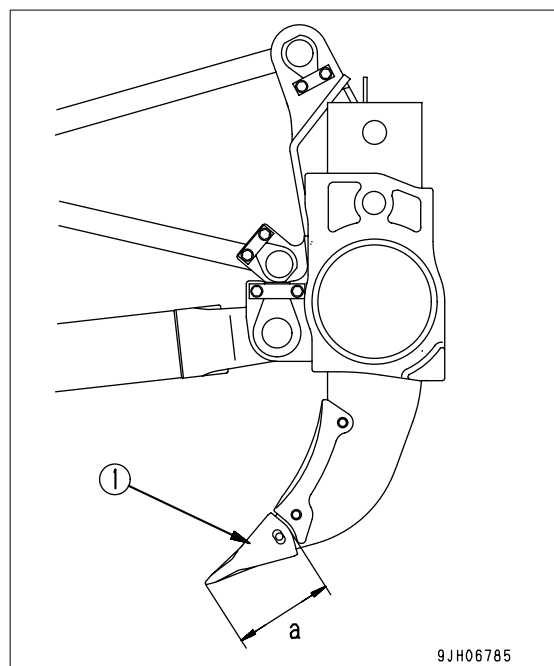
To protect the shank, replace the point and protector installed to the tip of the shank when they are worn.

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)

| NO. | Item              | Judgment standard |            | Action  |
|-----|-------------------|-------------------|------------|---------|
|     |                   | Basic dimension   | Wear limit |         |
| (1) | Wear of point (a) | 335               | 225        | 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 work equipment lock lever.

Adjust the angle ( $\theta$ ) of the blade edge to match the type of soil.

#### ANGLEDZOZER

To make the length of the left and right braces the same, change distance ( $l$ ) between the joints and adjust the cutting angle.

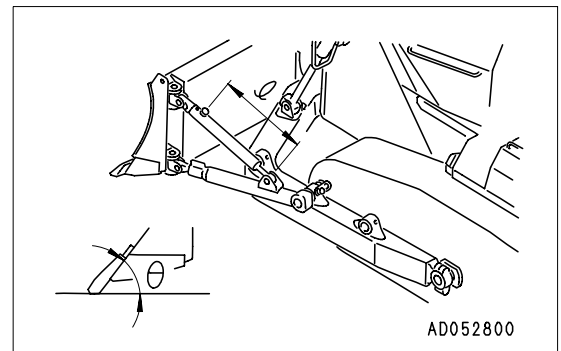
Adjust distance ( $l$ ) between the joints as follows:

To INCREASE distance ( $l$ ), INCREASE cutting angle ( $\theta$ ).

To DECREASE distance ( $l$ ), DECREASE cutting angle ( $\theta$ ).

The standard cutting angle ( $\theta$ ) is  $54^\circ$ .

The standard distance ( $l$ ) between the joints is 1493 mm.



#### POWER TILTDOZER

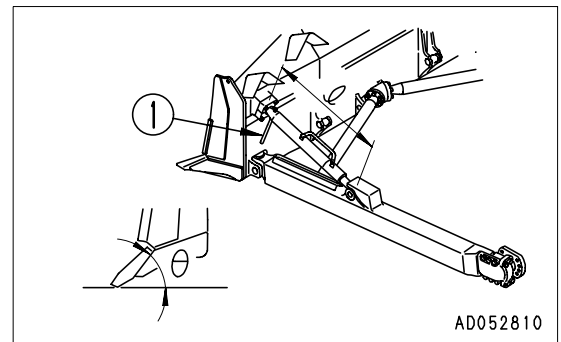
Turn the brace with bar handle (1) and the distance ( $l$ ) between the joints to change the cutting angle ( $\theta$ ) as follows.

INCREASE distance ( $l$ ) to INCREASE angle ( $\theta$ )

DECREASE distance ( $l$ ) to DECREASE angle ( $\theta$ ).

The standard cutting angle ( $\theta$ ) is  $52^\circ$ .

The standard distance ( $l$ ) between the joints is 1389 mm.



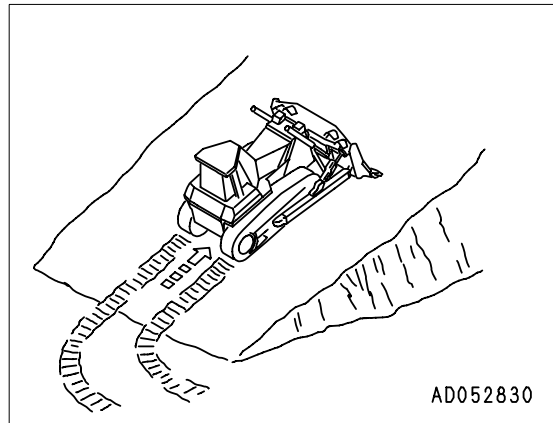
| Cutting angle $\theta$ | Advantages                                                                                                                                                                                             | Disadvantages                                                                                                                                                            |
|------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Large                  | <ul style="list-style-type: none"> <li>Amount of soil spilled to rear of blade is small</li> <li>Separation of soil is good and little soil is carried back</li> </ul>                                 | <ul style="list-style-type: none"> <li>Soil digging resistance and rolling-up resistance are large</li> <li>Load pushed by blade is small</li> </ul>                     |
| Small                  | <ul style="list-style-type: none"> <li>Soil digging resistance and rolling-up resistance are small</li> <li>Load pushed by blade is large</li> <li>Cutting amount on rough surfaces is good</li> </ul> | <ul style="list-style-type: none"> <li>Amount of soil spilled to rear of blade is large</li> <li>Separation of soil is poor and a lot of soil is carried back</li> </ul> |

## TIPS FOR LONGER UNDERCARRIAGE LIFE

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

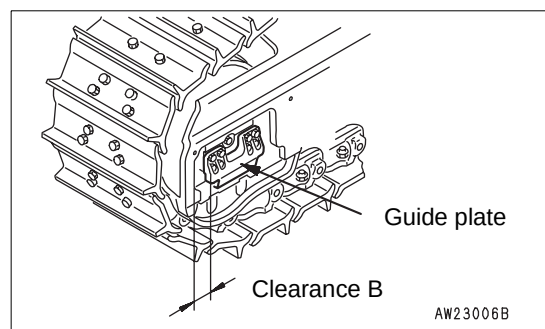
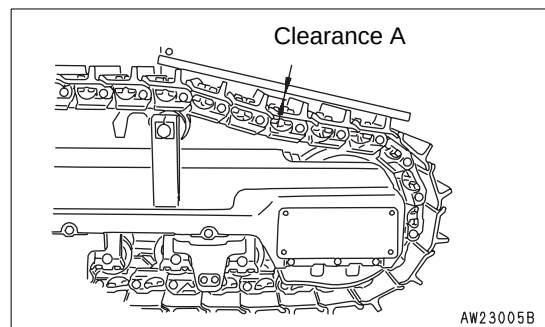
### OPERATION METHOD

- 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 on 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 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, 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 (4-21)".
- 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 (4-36)".



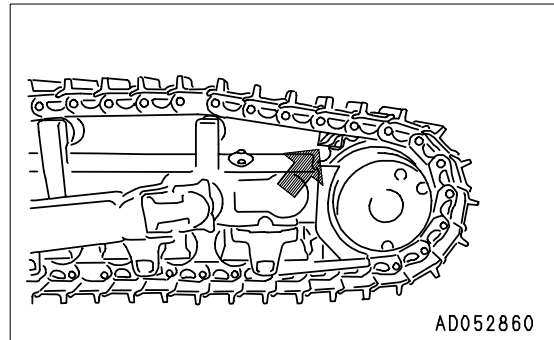
## INSPECTION AND REPAIR

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 least 2 links away for master pin. Of length obtained, 1/4 is the link pitch.



### REMARK

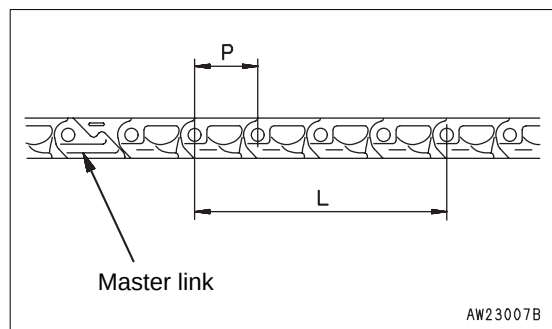
Basic link pitch (P): 228.85 mm

Bushing turning limit link pitch

Heavy-duty: 231.85 mm

Standard: 233.85 mm

There is no link window on the master link.

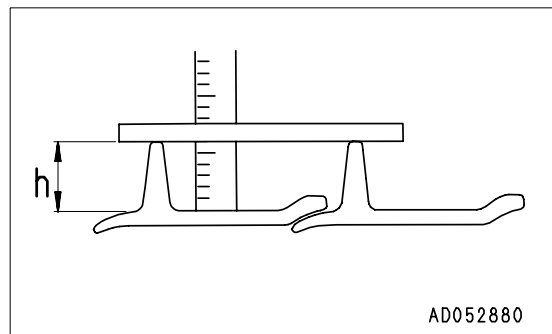


### MEASURING HEIGHT OF GROUSER

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

Basic dimension (h): 80 mm

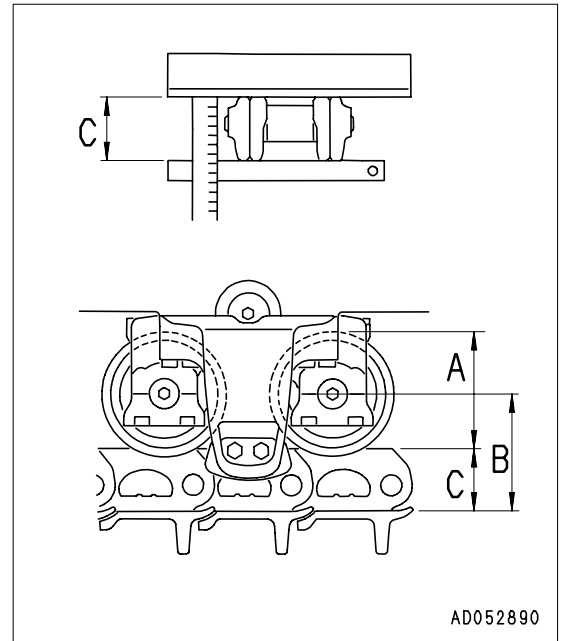
Repair limit: 25 mm





### 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):  
 $A = (B - C) \times 2$   
Basic dimension (h): 250 mm  
Repair limit: 210 mm



## TRANSPORTATION

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

### LOADING, UNLOADING WORK

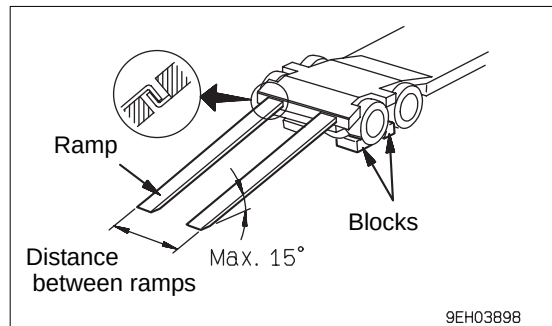


#### WARNING

- 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 attach 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 work equipment lock lever.
3. Set the parking brake 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 perform lifting operations with any person on the machine.
- Always make sure that the wire rope (cable) 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, perform the operation on flat ground as follows:

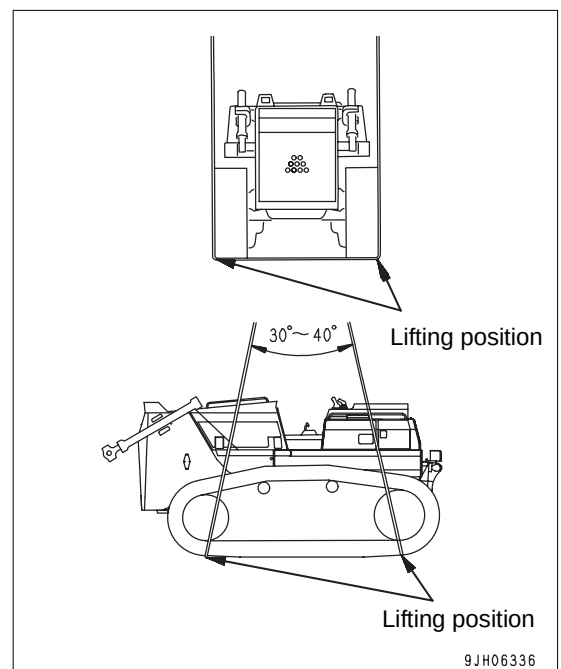
1. Stop the engine and be sure to set the parking lever to the LOCK position.
2. Set the lifting position for the machine as shown in the diagram on the right.

### NOTICE

The lifting procedure applies to machines with standard specifications.

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

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



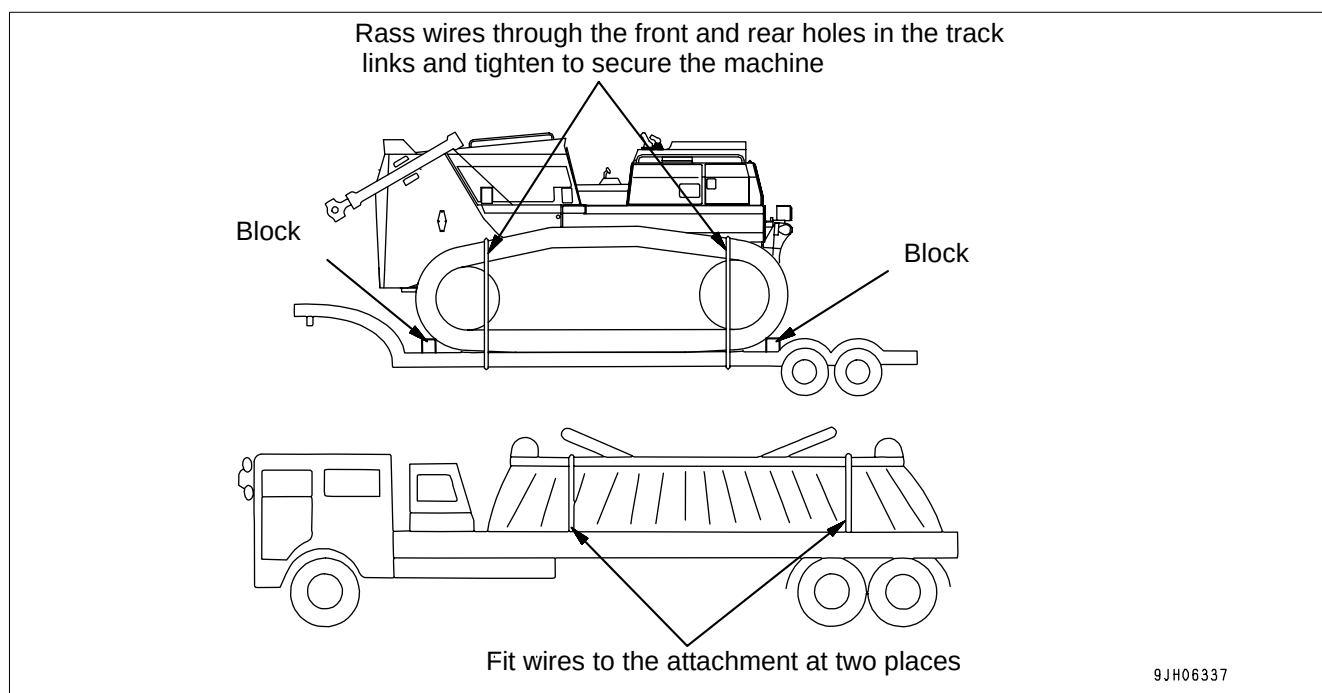
## PRECAUTIONS FOR TRANSPORTATION

### 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.

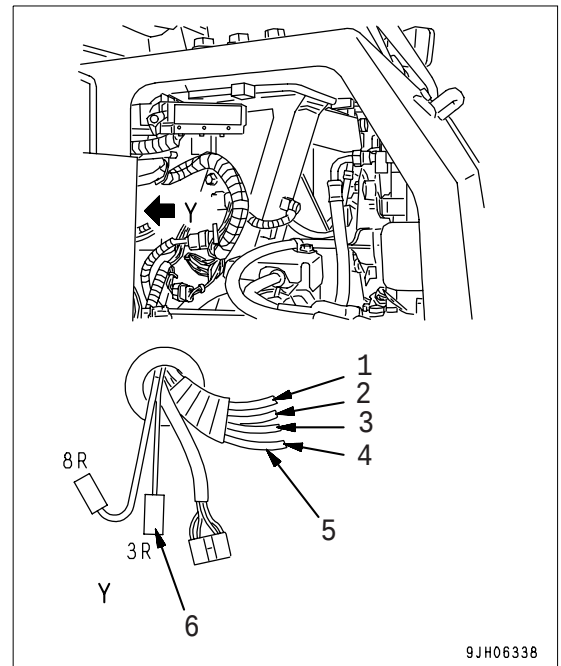
## REMOVAL OF CAB

(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.

1. Red - Right door
2. Blue - Left door
3. Black - Rear window
4. Colorless - Front window
5. Washer tube
6. From fuse box (red)  
(back up power source)



9JH06338

### REMARK

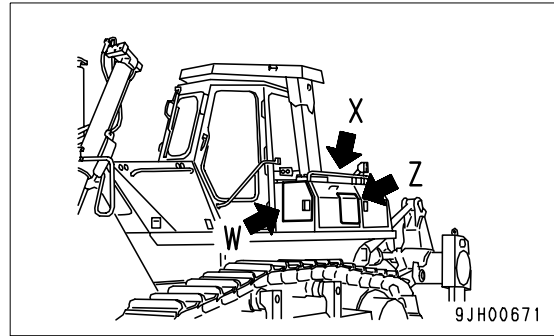
After removing, cover with vinyl bag to prevent dirt or dust from entering the washer hose.

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.

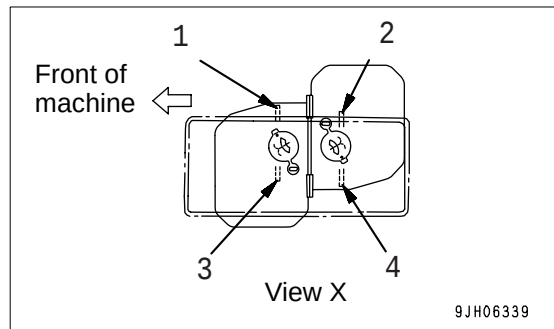
# REMARK

When installing the cab, check the colors and install the washer tank and each window washer hose correctly.

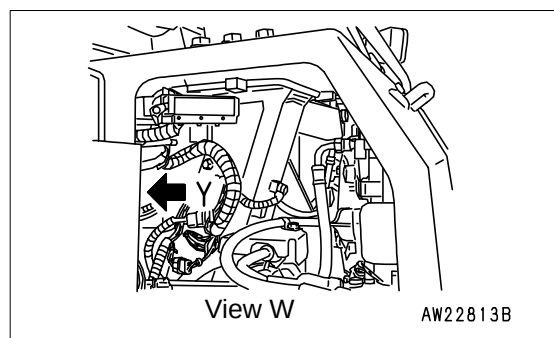
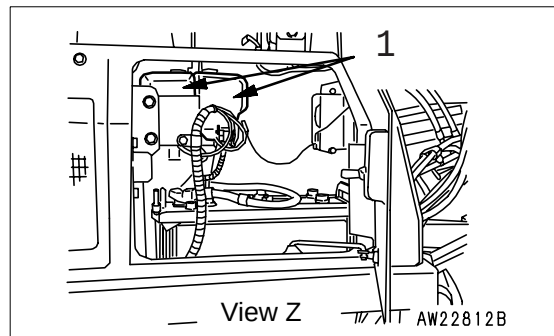
When installing the cab, carry out the operation in accordance with the cab installation procedure manual held by your Komatsu distributor.



1. For right door (red)
2. For front window (colorless)
3. For rear window (black)
4. For left door (blue)



1. Washer tank



## 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 oil with low viscosity for all components. For details of the specified viscosity, see "RECOMMENDED FUEL, COOLANT, AND LUBRICANT (4-12)".

### 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 or request a specialist company to carry out the operation. Antifreeze is toxic. Do not let it flow into drainage ditches or spray it onto the ground surface.
- Antifreeze is flammable. Do not bring any flame close. Do not smoke when handling antifreeze.

#### NOTICE

- Use Komatsu Supercoolant wherever available, or use permanent type antifreeze coolant.
- Never use methanol, ethanol, or propanol-based antifreeze.
- Do not use any water leakage prevention agent, either alone, or in combination with antifreeze.
- Do not mix one brand of antifreeze with a different brand.

For details on the amount of antifreeze mixture and on when to change the coolant, see "CLEAN INSIDE OF COOLING SYSTEM (4-21)".

**BATTERY****WARNING**

- The battery generates flammable gas. 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. 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%. Insulate it against cold temperature to ensure the machine can be started easily the next morning.

**REMARK**

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

| Charging Rate (%) | Electrolyte Temperature (°C) |      |      |      |
|-------------------|------------------------------|------|------|------|
|                   | 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 drastically drops in low temperatures, cover or remove the battery from the machine, store the battery 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 water after the day's work to prevent diluted electrolyte in the battery from freezing during the night.

**AFTER COMPLETION OF WORK**

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

- Remove all the mud and water from the machine body. In particular, wipe the hydraulic cylinder rods clean to prevent damage to the seal caused by mud, dirt, or drops of water on the rod from getting inside the seal.
- Park the machine on hard, dry ground.  
If this is impossible, park the machine on boards.  
The boards prevent the tracks from freezing to the ground, and allow the machine to be moved the next morning.
- Open the drain valve and drain any water collected in the fuel system to prevent it from freezing.
- Fill the fuel tank to capacity. This minimizes moisture condensation in the tank when the temperature drops.



## **AFTER COLD WEATHER**

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

- Replace the fuel and oil for all parts with oil of the viscosity specified.  
For details, see “RECOMMENDED FUEL, COOLANT, AND LUBRICANT (4-12)”.

## LONG-TERM STORAGE

### BEFORE STORAGE

When keeping in long-term storage (more than one month), store 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 a sheet.
- Completely fill the fuel tank. This prevents moisture from collecting.
- 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 in the neutral position, set the work equipment lock lever and parking brake lever in the LOCK position, and set the fuel control dial to the low idling position.
- To prevent corrosion, be sure to fill the cooling system with Supercoolant (AF-NAC) or permanent type anti-freeze (density between 30% and 68%).

### DURING STORAGE



#### WARNING

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

- During storage, operate and move the machine for a short distance once a month so that a new film of oil will coat moving parts. At the same time, also charge the battery.
- Before operating the work equipment, wipe the grease off the hydraulic piston rod.
- For machines equipped with an air conditioner, run the air conditioner.

### AFTER STORAGE

#### NOTICE

**If the machine has been stored without carrying out the monthly rust-prevention operation, consult your Komatsu distributor before using it.**

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 will mix with the oil. Check the oil before and after starting the engine. If there is water in the oil, change all the oil.

## TROUBLESHOOTING

### AFTER RUNNING OUT OF FUEL

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

Always watch the fuel level and be careful not to run out of fuel.

If the engine has stopped because of lack of fuel, it is necessary to use the priming pump to bleed the air completely from the fuel circuit.

### PROCEDURE FOR BLEEDING AIR

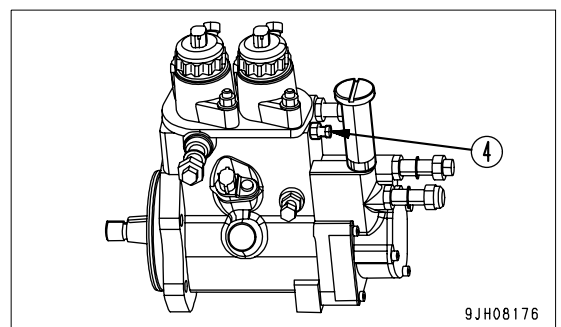
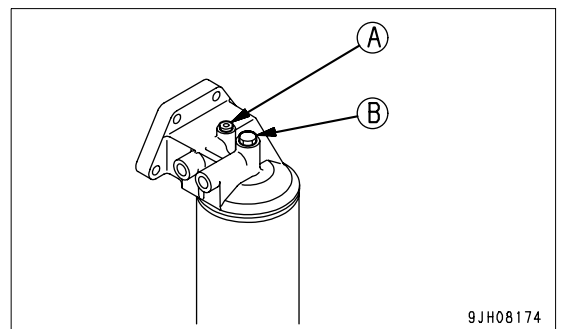
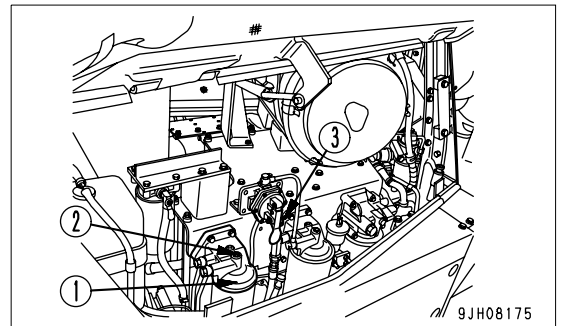


### CAUTION

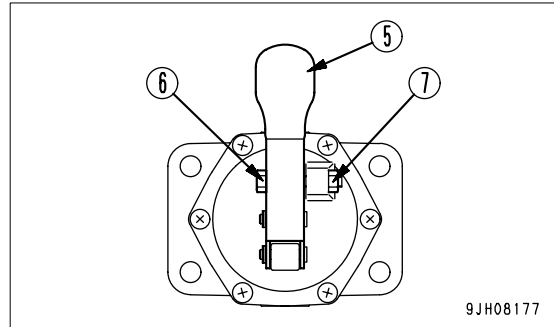
This engine consists of higher precision parts than on the conventional fuel injection pump and nozzle, so if dirt gets in, it will cause problems. If there is any dirt stuck to the fuel line, use fuel to wash it off completely.

Be careful when opening the air bleed plug at the fuel filter head and the air bleeder of the supply pump. The system is still under pressure and fuel may spurt out.

1. Loosen air bleed plugs (A) and (B) in fuel filter head (2).
2. Remove bolt (6) and nut (7) of priming pump (3), then operate lever (5). Check that bubbles come out with the fuel from air bleed plug (A).
3. Wrap sealing tape around air bleed plug (A) before tightening it.  
Tightening torque: 2.0 to 3.9 N·m (0.2 to 0.4 kgf·m)
4. Operate the priming pump again and check that no more bubbles come out with the fuel from air bleed plug (B).
5. Tighten air bleed plug (B).  
Tightening torque: 4.9 to 6.9 N·m (0.5 to 0.7 kgf·m)
6. Loosen air bleeder (4) of the supply pump.
7. Pump priming pump (3) (approx. 90 to 100 times) until no more bubbles come out with the fuel from air bleeder (4), then tighten air bleeder (4).  
Tightening torque: 4.9 to 6.9 N·m (0.5 to 0.7 kgf·m)



8. Push in several times until lever (5) becomes stiff.
9. Install bolt (6) and nut (7) of priming pump (3), then lock lever (5).



10. Turn the key in the starting switch to the START position and start the engine.  
When doing this, 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 try again. Perform this operation a maximum of 4 times.
11. If the engine does not start, repeat the operation from Step 1.

## METHOD OF TOWING MACHINE

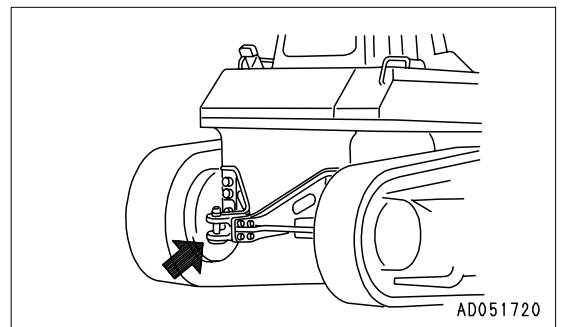
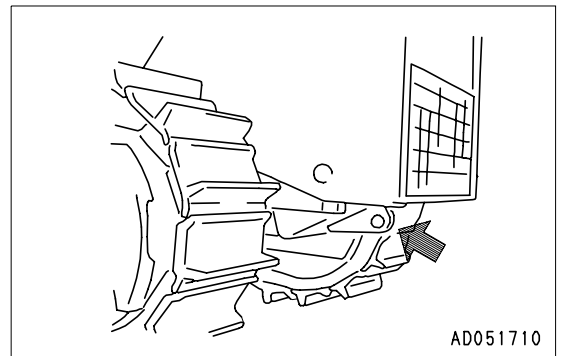


### WARNING

- 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: 29,300 kg (287,330 N)

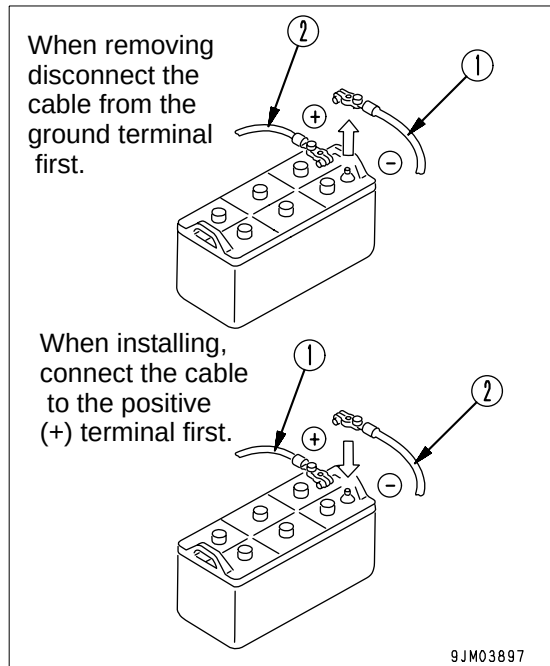


## IF BATTERY IS DISCHARGED



### WARNING

- It is dangerous to charge a battery when mounted on a machine. Make sure that it is dismantled 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 sulfuric 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.



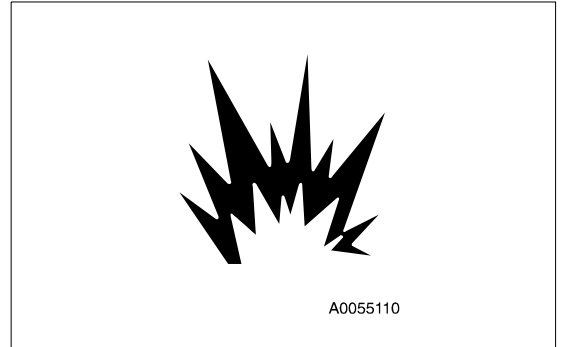
## REMOVAL AND INSTALLATION OF BATTERY

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

## 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 (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 attach 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 danger that this will ignite the battery electrolyte and cause the battery to explode.

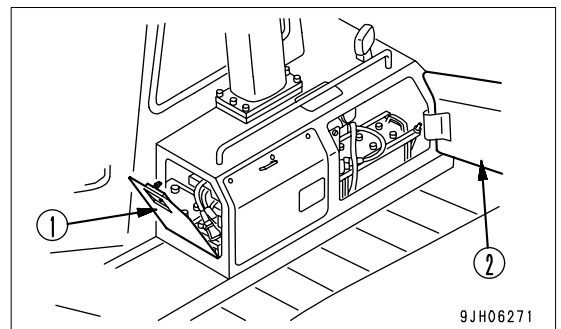


## STARTING ENGINE WITH BOOSTER CABLE

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

### REMOVAL, INSTALLATION OF BATTERY CABLE

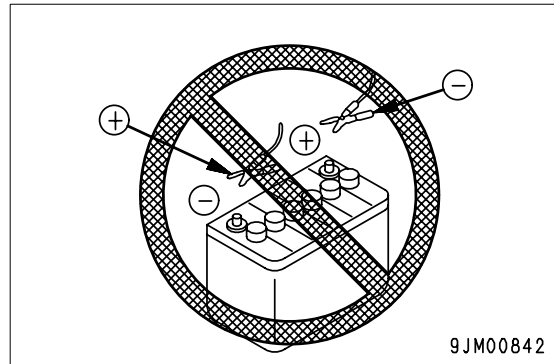
1. Open the battery cover (1).
2. Before removing the battery, remove the ground cable (normally connected to the negative (-) terminal). If any tool touches between the positive terminal and the chassis, there is danger of sparks being generated. Loosen the nut of the terminal and remove the wires from 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 to 19.6 N·m (1.0 to 2.0 kgf·m)
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, 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

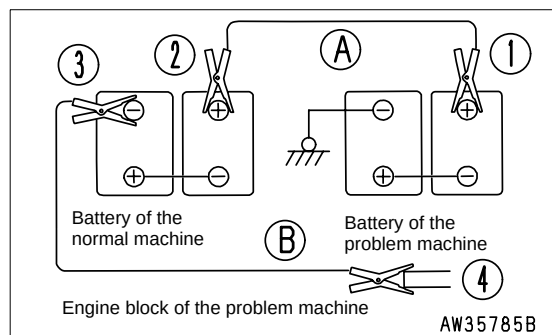
- The size of the booster cable and clip should be suitable for the battery size.
- The battery of the normal machine must be the same capacity as that of the engine to be started.
- Check the cables and clips for damage or corrosion.
- Make sure that the cables and clips are firmly connected.
- Check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





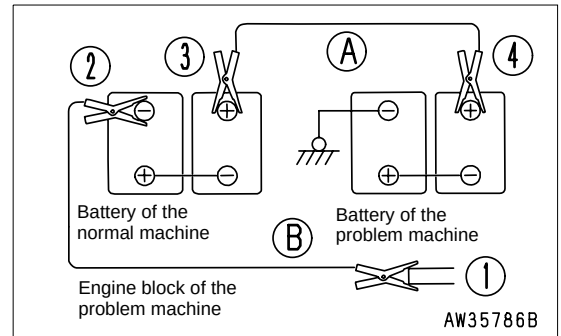
**STARTING THE ENGINE**

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 starting 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 booster cables in the reverse order in which they were connected.

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

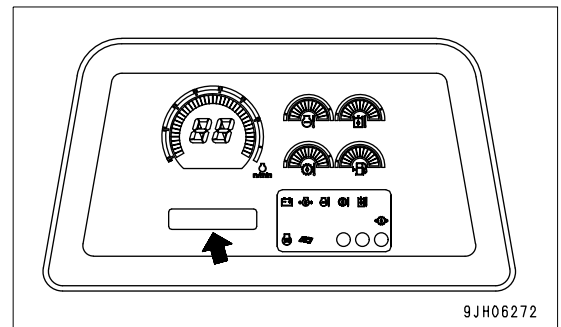
### ELECTRICAL SYSTEM

- ( ): Always contact your Komatsu distributor when dealing with these items.
- In cases of problem 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<br>•Defective wiring                                                                                            | (•Replace)<br>(•Check, repair)                                                                             |
| Abnormal noise is generated from alternator                                                         | •Defective alternator                                                                                                                 | (•Replace)                                                                                                 |
| Starting motor does not turn when starting switch is turned to ON                                   | •Defective wiring<br>•Insufficient battery charge<br>•Safety switch out of adjust                                                     | (•Check, repair)<br>•Charge<br>(•Adjust safety switch)                                                     |
| Pinion of starting motor keeps going in and out                                                     | •Insufficient battery charge                                                                                                          | •Charge                                                                                                    |
| Starting motor turns engine sluggishly                                                              | •Insufficient battery charge<br>•Defective starting motor                                                                             | •Charge<br>(•Replace)                                                                                      |
| Starting motor disengages before engine starts                                                      | •Defective wiring<br>•Insufficient battery charge                                                                                     | (•Check, repair)<br>•Charge                                                                                |
| Automatic pre-heating is not actuated                                                               | •Defective wiring<br>•Defective heater relay<br>•Defective engine controller                                                          | (•Check, repair)<br>(•Replace)<br>(•Check, replace)                                                        |
| Pre-heating pilot lamp does not light up (When the engine coolant temperature is below -5°C (23°F)) | •Defective wiring<br>•Defective heater relay                                                                                          | (•Check, repair)<br>(•Replace)                                                                             |
| Oil pressure caution lamp does not light up when engine is stopped (starting switch in ON position) | •Defective caution lamp<br>•Defective caution lamp switch<br>•Defective wiring                                                        | (•Replace)<br>(•Replace)<br>(•Check, repair)                                                               |
| Charge lamp does not light up when engine is stopped (starting switch in ON position)               | •Defective charge lamp<br>•Defective wiring                                                                                           | (•Replace)<br>(•Check, repair)                                                                             |
| Outside of electrical heater is not warm when touched by hand                                       | •Defective wiring<br>•Disconnection in electrical intake air heater<br>•Defective operation of heater relay                           | (•Check, repair)<br>(•Replace)<br>(•Check, repair heater relay)                                            |
| Air conditioner does not work properly                                                              | •Blown fuse<br>•Insufficient battery charge<br>•Defective air conditioner switch<br>•Defective blower switch<br>•Defective compressor | (•Check, repair)<br>•Charge<br>(•Replace air conditioner switch)<br>(•Replace blower switch)<br>(•Replace) |
| HSS charge pressure caution lamp does not light up when starting switch is turned ON                | •Defective caution lamp<br>•Defective wiring<br>•Defective charge pressure sensor                                                     | (•Replace)<br>(•Check, repair)<br>(•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.                                                                   | <ul style="list-style-type: none"> <li>•Abnormality in back-up alarm relay</li> <li>•Abnormality in engine speed display sensor of monitor panel</li> <li>•Abnormality in buzzer cancel switch</li> </ul> |
| 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.<br>Note: User must be careful<br>Send an emergency request to your Komatsu distributor. | <ul style="list-style-type: none"> <li>•Abnormality in water temperature sensor</li> <li>•Abnormality in HSS power distribution limit function</li> </ul>                                                 |
| Abnormality display method | Displayed in turn on service meter, caution lamp flashes, buzzer sounds                                                                                                                                   |                                                                                                                                                                                                           |
| CALL03                     | Move machine to a safe place.<br>Send an emergency request to your Komatsu distributor.                                                                                                                   | <ul style="list-style-type: none"> <li>•Abnormality in injector</li> <li>•Abnormality in steering potentiometer 1 system</li> <li>•Abnormality in direction detection sensor</li> </ul>                   |
| Abnormality display method | Displayed in turn on service meter, caution lamp flashes, buzzer sounds                                                                                                                                   |                                                                                                                                                                                                           |
| CALL                       | Stop machine immediately.<br>Send an emergency request to your Komatsu distributor.                                                                                                                       | <ul style="list-style-type: none"> <li>•Abnormality in controller power supply</li> <li>•Abnormality in steering potentiometer 2 system</li> <li>•Abnormality in engine pump</li> </ul>                   |
| 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 problem 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<br>•Work equipment lock lever is in LOCK position                                                           | •Add oil to specified level. See EVERY 250 HOURS SERVICE.<br>•Set to FREE position                                                                                                      |
| Machine does not turn when steering is operated                                       | •Parking brake is in LOCK position<br>•Defective lever wiring<br>•Abnormality in HSS pump<br>•Abnormality in HSS motor             | •Set to FREE position<br>(•Check, repair)<br>(•Check, replace)<br>(•Check, replace)                                                                                                     |
| Transmission oil pressure does not rise                                               | •Wear,scuffing of gear pump<br>•Lack of oil in power train case<br><br>•Element strainer of oil filter in power train case clogged | (•Check, replace)<br>•Add oil to specified level. For details,See CHECKS BEFORE STARTING.<br>•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<br>•Lack of engine horsepower                                                                  | •Carry out warming-up operation<br>•See ENGINE                                                                                                                                          |
| Machine does not move when joystick is operated to travel position                    | •Lack of oil in power train case<br><br>•Transmission oil pressure does not rise<br>•Parking brake is in LOCK position             | •Add oil to specified level. See CHECK BEFORE STARTING.<br>•See "Transmission oil pressure does not rise" above<br>•Set to FREE position                                                |
| Machine does not travel in straight line                                              | •Defective adjustment of HSS controller<br>•Abnormality in HSS pump                                                                | (•Adjust)<br><br>(•Check, replace)                                                                                                                                                      |
| Torque converter overheats (Red range of power train oil temperature gauge lights up) | •Lack of oil in power train case<br><br>•Transmission oil pressure does not rise<br>•Excessive load                                | •Add oil to specified level. See CHECK BEFORE STARTING<br>•See "Transmission oil pressure does not rise" above<br>•Shift down one gear, or reduce load and raise speed during operation |

## OPERATION

## TROUBLESHOOTING

## ENGINE

- ( ): Always contact your Komatsu distributor when dealing with these items.
- In cases of problem 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 | <ul style="list-style-type: none"> <li>•Engine oil pan oil level is low (sucking in air)</li> <li>•Clogged oil filter cartridge</li> <li>•Defective tightening of oil pipe joint, oil leakage from damaged part</li> <li>•Defective caution lamp</li> </ul>                                 | <ul style="list-style-type: none"> <li>•Add oil to specified level, see CHECK BEFORE STARTING</li> <li>•Replace cartridge, see EVERY 500 HOURS SERVICE</li> <li>(•Check, repair)</li> <li>(•Replace lamp)</li> </ul>                                                                                                                                                                                |
| Steam is emitted from top part of radiator (pressure valve)                                      | <ul style="list-style-type: none"> <li>•Coolant level low, water leakage</li> <li>•Loose fan belt</li> <li>•Dirt or scale accumulated in cooling system</li> </ul>                                                                                                                          | <ul style="list-style-type: none"> <li>•Add coolant, repair, see CHECK BEFORE STARTING</li> <li>•Adjust fan belt tension, see EVERY 250 HOURS SERVICE</li> <li>•Change coolant, clean inside of cooling system, see WHEN REQUIRED</li> <li>•Clean or repair, see WHEN REQUIRED</li> <li>(•Replace thermostat)</li> <li>•Tighten cap or replace packing</li> <li>(•Replace monitor panel)</li> </ul> |
| Red range of coolant temperature gauge flashes                                                   | <ul style="list-style-type: none"> <li>•Clogged radiator fin or damaged fin</li> <li>•Defective thermostat</li> <li>•Loose radiator filler cap (high altitude operation)</li> <li>•Defective monitor panel</li> </ul>                                                                       | <ul style="list-style-type: none"> <li>(•Replace thermostat)</li> <li>(•Replace coolant temperature gauge)</li> </ul>                                                                                                                                                                                                                                                                               |
| White range of coolant temperature gauge flashes                                                 | <ul style="list-style-type: none"> <li>•Defective thermostat</li> <li>•Defective coolant temperature gauge</li> </ul>                                                                                                                                                                       | <ul style="list-style-type: none"> <li>(•Replace thermostat)</li> <li>(•Replace coolant temperature gauge)</li> </ul>                                                                                                                                                                                                                                                                               |
| Engine does not start when starting motor is turned                                              | <ul style="list-style-type: none"> <li>•Lack of fuel</li> <li>•Air in fuel system</li> <li>•No fuel in fuel filter</li> <li>•Starting motor cranks engine sluggishly</li> <li>•Glow signal does not glow red</li> <li>•Defective compression</li> <li>•Defective valve clearance</li> </ul> | <ul style="list-style-type: none"> <li>•Add fuel, see CHECK BEFORE STARTING</li> <li>•Repair place where air is sucked in</li> <li>(•Fill fuel filter with fuel, see EVERY 500 HOURS SERVICE)</li> <li>•See ELECTRICAL SYSTEM</li> <li>•See ELECTRICAL SYSTEM</li> <li>(•Adjust valve clearance)</li> </ul>                                                                                         |
| Exhaust gas is white or blue                                                                     | <ul style="list-style-type: none"> <li>•Too much oil in oil pan</li> <li>•Improper fuel</li> </ul>                                                                                                                                                                                          | <ul style="list-style-type: none"> <li>•Add oil to specified level, see CHECK BEFORE STARTING</li> <li>•Change to specified fuel</li> </ul>                                                                                                                                                                                                                                                         |
| Exhaust gas occasionally turns black                                                             | <ul style="list-style-type: none"> <li>•Clogged air cleaner element</li> <li>•Defective nozzle</li> <li>•Defective compression</li> </ul>                                                                                                                                                   | <ul style="list-style-type: none"> <li>•Clean or replace, see WHEN REQUIRED</li> <li>(•Replace nozzle)</li> <li>(•Adjust valve clearance)</li> </ul>                                                                                                                                                                                                                                                |
| Combustion noise occasionally makes breathing sound                                              | <ul style="list-style-type: none"> <li>•Defective nozzle</li> </ul>                                                                                                                                                                                                                         | <ul style="list-style-type: none"> <li>(•Replace nozzle)</li> </ul>                                                                                                                                                                                                                                                                                                                                 |
| Abnormal noise generated (combustion or mechanical)                                              | <ul style="list-style-type: none"> <li>•Low grade fuel being used</li> <li>•Overheating</li> <li>•Damage inside muffler</li> <li>•Excessive valve clearance</li> </ul>                                                                                                                      | <ul style="list-style-type: none"> <li>•Change to specified fuel</li> <li>•See item "Red range of coolant temperature gauge flashes".</li> <li>(•Replace muffler)</li> <li>(•Adjust valve clearance)</li> </ul>                                                                                                                                                                                     |

TROUBLESHOOTING

OPERATION

| Problem                                                                    | Main causes                             | Remedy |
|----------------------------------------------------------------------------|-----------------------------------------|--------|
| Monitor displays error code                                                | Please contact your Komatsu distributor |        |
| Alarm buzzer sounds                                                        |                                         |        |
| Engine horsepower lowered suddenly<br>(engine is running in duration mode) |                                         |        |

# MAINTENANCE



## **WARNING**

Please read and make sure that you understand the safety volume 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 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 starting switch.
- Do not apply more than 200 V continuously.
- Connect grounding cable within 1 m 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 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.



## MAINTENANCE

## GUIDES TO MAINTENANCE

### 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 danger that it may be suddenly blow 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 (4-43)".

### 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.

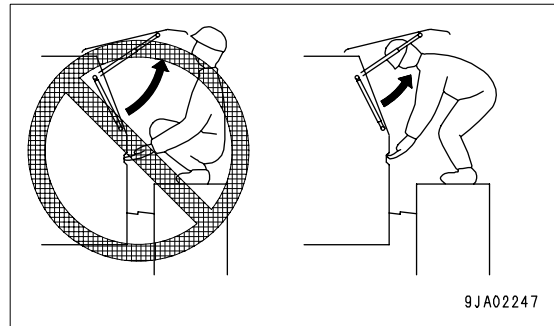
### CHECKS AFTER INSPECTION AND MAINTENANCE:

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.
  - Are there any leakage of coolant or oil? Have all nuts and bolts been tightened?
- Checks when operating engine
  - For details of the checks when operating the engine, see "PROPER TOOLS (2-32)" 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

- Always use Komatsu genuine parts for replacement parts, grease or oil.
- When changing the oil or adding oil, do not mix different types of oil. When changing the type of oil, drain all the old oil and fill completely with the new oil. Always replace the filter at the same time. (There is no problem if the small amount of oil remaining in the piping mixes with the new oil.)
- Unless otherwise specified, when the machine is shipped from the factory, it is filled with the oil and coolant listed in the table below.

| Item                                                | Type                                                                |
|-----------------------------------------------------|---------------------------------------------------------------------|
| Engine oil pan                                      | Engine oil EO15W40DH (Komatsu genuine parts)                        |
| Power train case<br>Final drive case<br>Damper case | Power train oil TO30 (Komatsu genuine parts)                        |
| Hydraulic tank                                      | Power train oil TO10 (Komatsu genuine parts)                        |
| Radiator                                            | Supercoolant AF-NAC (Density: 30% or above) (Komatsu genuine parts) |

## HANDLING OIL, FUEL, COOLANT, AND PERFORMING OIL CLINIC

### OIL

- Oil is used in the engine and hydraulic equipment under extremely severe conditions (high temperature, high pressure), and deteriorates with use.  
Always use oil that matches the grade and maximum and minimum ambient temperatures recommended in the Operation and Maintenance Manual. Even if the oil is not dirty, always change the oil at 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 the machine are caused by the entry of such impurities.  
Take particular care not to let any impurities get in when storing or adding oil.
- Never mix oils of different grades or brands.
- Always add the specified amount of oil.  
Having too much oil or too little oil are both causes of problems.
- If the oil in the work equipment is not clear, there is probably water or air getting into the circuit. In such cases, please contact your Komatsu distributor.
- When changing the oil, always replace the related filters at the same time.
- We recommend you 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.
- When using commercially available oil, it may be necessary to reduce the oil change interval.  
We recommend that you use the Komatsu oil clinic to carry out a detailed checks of the characteristics of the oil.

## FUEL

- 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.
- 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 temperatures below -15°C), so it is necessary to use the fuel that is suitable for the temperature.
- 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.
- If there is any foreign material in the fuel tank, wash the tank and fuel system.

## COOLANT AND WATER FOR DILUTION

- The coolant has the important function of preventing corrosion as well as preventing freezing.  
Even in the areas where freezing is not an issue, the use of antifreeze coolant is essential.  
Komatsu machines are supplied with Komatsu Supercoolant (AF-NAC). Komatsu Supercoolant (AF-NAC) has excellent anticorrosion, antifreeze and cooling properties and can be used continuously for 2 years or 4000 hours.  
Komatsu Supercoolant (AF-NAC) is strongly recommended wherever available.
- When diluting the antifreeze coolant, use distilled water or tap water (soft water).  
Natural water, such as a river water or well water (hard water), contains large amounts of minerals (calcium, magnesium, etc.), and this makes it easier for scale to form inside the engine or radiator. Once scale is deposited inside the engine or radiator, it is extremely difficult to remove. It also causes overheating due to poor heat exchange, so when you dilute the coolant, we recommend that you use water with an overall hardness of less than 100 PPM.
- When using antifreeze, always observe the precautions given in the Operation and Maintenance Manual.
- Antifreeze coolant is flammable, so be sure to keep it away from flame.
- The ratio of Supercoolant (AF-NAC) to water differs according to the ambient temperature.  
For details of the ratio when mixing, see "CLEAN INSIDE OF COOLING SYSTEM (4-21)".  
Supercoolant (AF-NAC) may be supplied already mixed. In such cases, never dilute with water.
- 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 due to air entering the coolant.

## GREASE

- Grease is used to prevent seizure and noises at the joints.
- This construction equipment is used under heavy-duty conditions. Always use the recommended grease and follow the change intervals and recommended ambient temperatures given in this Operation and Maintenance Manual.
- 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.

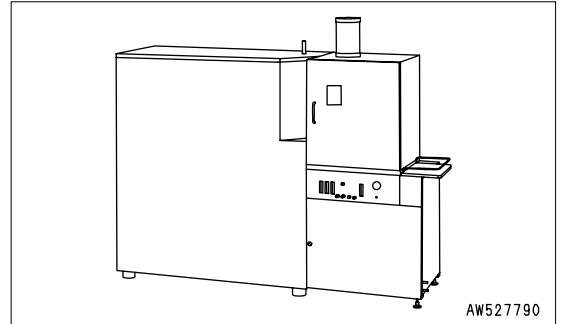
## CARRYING OUT KOWA (Komatsu Oil Wear Analysis)

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

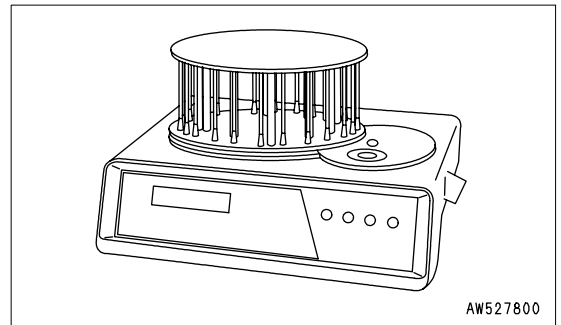
We strongly recommend you to use this service. The oil analysis is carried out at actual cost, so the cost is low, and the results of the analysis are reported together with recommendations which will reduce repair costs and machine downtime.

### KOWA ANALYSIS ITEMS

- Measurement of density of metal wear particles  
This uses an ICP (Inductively Coupled Plasma) analyzer to measure the density of iron, copper, and other 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 attached 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.
- Use of Komatsu genuine filter elements is strongly recommended.

## 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 an electrical short circuit and may lead to malfunction of the machine. Do not wash the inside of the operator's cab with water. When washing the machine, be careful not to let water get into the electrical components.
- Service relating to the electric system is checking fan belt tension, checking damage or wear to the fan belt and checking battery fluid level.
- Never install any electric components other than those specified by Komatsu.
- External electro-magnetic interference may cause malfunction of the control system controller, so before installing a radio receiver or other wireless equipment, contact your Komatsu distributor.
- Be careful to keep the electric system free of water when washing the machine or when it rains.
- When working at the seashore, carefully clean the electric system to prevent corrosion.
- When installing an operator's cab cooler or any other electrical equipment, connect it to an independent power source connector. The optional power source must never be connected to the fuse, starting switch, or battery relay.

## 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 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 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 (3-68)".

## 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 for the part number in the parts book.



## MAINTENANCE

## WEAR PARTS LIST

## WEAR PARTS LIST

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

| Item                    |               | Part No.                     | Part Name           | Weight (kg) | Q'ty     | Replacement frequency    |
|-------------------------|---------------|------------------------------|---------------------|-------------|----------|--------------------------|
| Engine oil filter       |               | 600-211-1340                 | Cartridge           | -           | 1        | Every 500 hour service   |
| Power train filter      |               | 07063-01100<br>(07000-02130) | Element<br>(O-ring) | -<br>-      | 1<br>(1) |                          |
| Fuel filter             |               | 600-319-3520                 | Cartridge           | -           | 1        |                          |
| Additional fuel filter  |               | 600-319-3440                 | Cartridge           | -           | 1        |                          |
| Hydraulic tank breather |               | 20Y-60-21470                 | Cap element         | -           | 1        |                          |
| Charge filter           |               | 07063-51054<br>(07000-02110) | Element<br>(O-ring) | -<br>-      | 1<br>(1) | Every 1000 hours service |
| Hydraulic oil filter    |               | 07063-51100<br>(07000-02130) | Element<br>(O-ring) | -<br>-      | 1<br>(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                 | Cutting edge        | 103.4       | 1        | -                        |
|                         |               | 17A-71-11351                 | Cutting edge        | 57          | 2        |                          |
|                         |               | 17M-71-21930                 | End bit (left)      | 63          | 1        |                          |
|                         |               | 17M-71-21940                 | End bit (right)     | 63          | 1        |                          |
|                         |               | 17A-71-12451                 | (Bolt)              | -           | (33)     |                          |
|                         |               | 17M-71-21530                 | (Nut)               | -           | (33)     |                          |
|                         | U-dozer       | 17A-72-12221                 | Cutting edge        | 69          | 2        |                          |
|                         |               | 17M-72-21160                 | Cutting edge        | 58          | 2        |                          |
|                         |               | 17M-71-21930                 | End bit (left)      | 63          | 1        |                          |
|                         |               | 17M-71-21940                 | End bit (right)     | 63          | 1        |                          |
|                         |               | 17A-71-12451                 | (Bolt)              | -           | (36)     |                          |
|                         |               | 17M-71-21530                 | (Nut)               | -           | (36)     |                          |
|                         | Angledozer    | 175-70-26310                 | Cutting edge        | 48.8        | 1        |                          |
|                         |               | 175-70-21115                 | Cutting edge        | 64.1        | 2        |                          |
|                         |               | 175-71-11454                 | (Bolt)              | -           | (25)     |                          |
|                         |               | 175-71-11530                 | (Nut)               | -           | (25)     |                          |
|                         |               | 175-70-21126                 | End bit (left)      | 37          | 1        |                          |
|                         |               | 175-70-21136                 | End bit (right)     | 37          | 1        |                          |
|                         |               | 175-71-11463                 | (Bolt)              | -           | (14)     |                          |
|                         |               | 175-71-11530                 | (Nut)               | -           | (14)     |                          |
| Ripper                  | Multi         | 175-78-31230                 | Point               | 15          | 3        | -                        |
|                         |               | 195-78-21320                 | Protector           | 13          | 3        |                          |
|                         |               | 09244-02508                  | (Pin)               | -           | (9)      |                          |
|                         | Giant         | 175-78-31230                 | Point               | 15          | 1        | -                        |
|                         |               | 195-78-21320                 | Protector           | 13          | 1        |                          |
|                         |               | 09244-02508                  | (Pin)               | -           | 3        |                          |

## NOTICE

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

## RECOMMENDED FUEL, COOLANT, AND LUBRICANT

- Komatsu genuine oils are adjusted to maintain the reliability and durability of Komatsu construction equipment and components.  
In order to keep your machine in the best conditioner for long periods of time, it is essential to follow the instructions in this Operation and Maintenance Manual.
- Failure to follow these recommendations may result in shortened life or excess wear of the engine, power train, cooling system, and/or other components.
- Commercially available lubricant additives may be good for the machine, but they may also cause harm. Komatsu does not recommend any commercially available lubricant additive.
- Use the oil recommended according to the ambient temperature in the chart below.
- Specified capacity means the total amount of oil including the oil in the tank and the piping. Refill capacity means the amount of oil needed to refill the system during inspection and maintenance.
- When starting the engine in temperatures below 0°C, be sure to use the recommended multi-grade oil, even if the ambient temperature may become higher during the course of the day.
- If the machine is operated at a temperature below -20°C, a separate device is needed, so consult your Komatsu distributor.
- When the fuel sulfur content is less than 0.5%, change the engine oil according to the period inspection table given in this Operation and Maintenance Manual.  
If the fuel sulfur content is more than 0.5%, change the oil according to the following table.

| Fuel sulfur content | Engine oil change interval |
|---------------------|----------------------------|
| 0.5 to 1.0%         | 1/2 of regular interval    |
| Above 1.0%          | 1/4 of regular interval    |

## MAINTENANCE

## RECOMMENDED FUEL, COOLANT, AND LUBRICANT

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

| Reservoir                   | Fluid type                  | AMBIENT TEMPERATURE |               | Recommended komatsu Fluids                                 |
|-----------------------------|-----------------------------|---------------------|---------------|------------------------------------------------------------|
|                             |                             | Min                 | Max           |                                                            |
| Engine oil pan              | Engine oil                  | -30°C               | 30°C          | SAE0W30EOS and HTHS 3.5min.<br>(Note.1)<br>Komatsu EOS0W30 |
|                             |                             | -25°C               | 40°C          | SAE5W40EOS and HTHS 3.5min.<br>(Note.1)<br>Komatsu EOS5W40 |
|                             |                             | -20°C               | 40°C          | SAE10W30DH<br>Komatsu EO10W30DH                            |
|                             |                             | -15°C               | 50°C          | SAE15W40DH<br>Komatsu EO15W40DH                            |
|                             |                             | 0°C                 | 40°C          | SAE30DH<br>Komatsu EO30DH                                  |
| Damper case<br>Idler (each) | Power train oil<br>(note 2) | -30°C               | 50° C         | TO30                                                       |
| Power train case            | Power train oil             | -30°C<br>0° C       | 10° C<br>50°C | TO10<br>TO30                                               |
| Final drive case (each)     | Power train oil             | -30°C               | 50°C          | TO30                                                       |
| Hydraulic system            | Power train oil             | -20° C              | 40° C         | TO10                                                       |
|                             | Hydraulic oil               | -20° C              | 45° C         | HO46-HM                                                    |
|                             | Engine oil                  | -20° C              | 50° C         | SAE10W30DH<br>Komatsu EO10W30DH                            |
|                             |                             | -15° C              | 50° C         | SAE15W40DH<br>Komatsu EO15W40DH                            |
| Grease fitting              | Hyper grease<br>(Note. 3)   | -20° C              | 50° C         | G2-T, G2-TE                                                |
|                             | Lithium EP grease           | -20° C              | 50° C         | G2-LI                                                      |
| Cooling sytem               | Supercoolant<br>AF-NAC      | -30°C               | 50°C          | AF-NAC (Note. 4)                                           |
| Fuel tank                   | Diesel fuel                 | 0° C                | 50° C         | ASTM No. 2-D                                               |
|                             |                             | -30° C              | 20° C         | ASTM No. 1-D                                               |

|                       |        | Engine oil<br>pan | Damper<br>case | Power train<br>case | Final drive<br>case<br>(each) | Hydraulic sys-<br>tem<br>(With blade,<br>without ripper) | Cooling sys-<br>tem<br>(including<br>sub-tank) | Fuel tank |
|-----------------------|--------|-------------------|----------------|---------------------|-------------------------------|----------------------------------------------------------|------------------------------------------------|-----------|
| Specified<br>capacity | Liters | 42                | 1.5            | 90                  | 58                            | 126                                                      | 107                                            | 625       |
| Refill<br>capacity    | Liters | 37                | 1.5            | 45                  | 58                            | 87                                                       | -                                              | -         |

## 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.

Note 1: SAE0W30EOS and SAE5W40EOS must be fully synthetic and HTHS ( High-Temperature High-Shear Viscosity 150°C) must be equal to or higher than 3.5 cP. Komatsu EOS0W30 and EOS5W40 are the most suitable oils. If these oils are not available, follow the instruction "RECOMMENDED BRANDS, RECOMMENDED QUALITY FOR PRODUCTS OTHER THAN KOMATSU GENUINE OIL (4-14)" at the end of this chapter.

Note 2: Power train oil has different properties from engine oil. Be sure to use the recommended oils.

Note 3: Hyper grease (G2-T, G2-TE) has a high performance.

When it is necessary to improve the lubricating ability of the grease in order to prevent squeaking of pins and bushings, the use of G2-T or G2-TE is recommended.

Note 4: Supercoolant (AF-NAC)

1) Coolant has the important function of anticorrosion as well as antifreeze.

Even in the areas where freezing is not an issue, the use of antifreeze coolant is essential.

Komatsu machines are supplied with Komatsu Supercoolant (AF-NAC). Komatsu Supercoolant (AF-NAC) has excellent anticorrosion, antifreeze and cooling properties and can be used continuously for 2 years or 4000 hours.

Komatsu Supercoolant (AF-NAC) is strongly recommended wherever available.

2) For details of the ratio when diluting super coolant with water, see "CLEAN INSIDE OF COOLING SYSTEM (4-21)".

When the machine is shipped from the factory, it may be filled with coolant containing 30% or more Supercoolant (AF-NAC). In this case, no adjustment is needed for temperatures down to -10°C. (never dilute with water)

3) To maintain the anticorrosion properties of Supercoolant (AF-NAC), always keep the density of Supercoolant between 30% and 68%.

## RECOMMENDED BRANDS, RECOMMENDED QUALITY FOR PRODUCTS OTHER THAN KOMATSU GENUINE OIL

When using commercially available oils other than Komatsu genuine oil, or when checking the latest specifications, refer to the Komatsu web page or consult your Komatsu distributor.

# STANDARD TIGHTENING TORQUES FOR BOLTS AND NUTS

## TORQUE LIST



### CAUTION

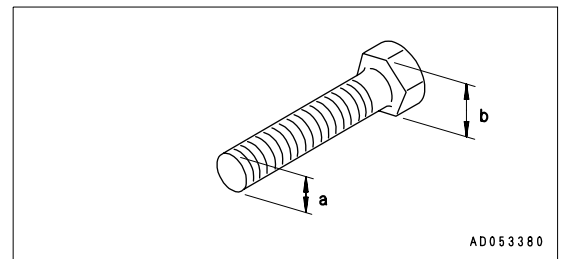
If nuts, bolts, or other parts are not tightened to the specified torque, it will cause looseness or damage to the tightened parts, and this will cause failure of the machine or problems with operation.

Always pay careful attention when tightening parts.

Unless otherwise specified, tighten the metric nuts and bolts to the torque shown in the table below.

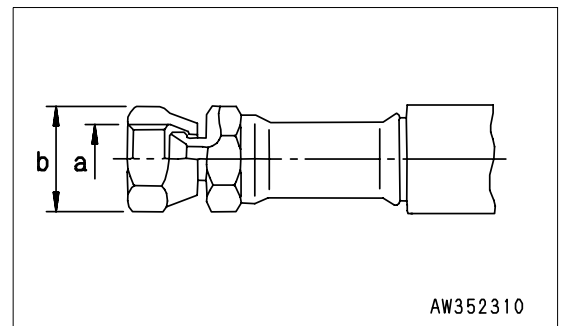
If it is necessary to replace any nut or bolt, always use a Komatsu genuine part of the same size as the part that was replaced.

| Thread diameter of bolt (a)(mm) | Width across flats (b)(mm) | Tightening torque |       |               |             |
|---------------------------------|----------------------------|-------------------|-------|---------------|-------------|
|                                 |                            | Target value      |       | Service limit |             |
|                                 |                            | N·m               | kgf·m | N·m           | kgf·m       |
| 6                               | 10                         | 13.2              | 1.35  | 11.8-14.7     | 1.2-1.5     |
| 8                               | 13                         | 31                | 3.2   | 27-34         | 2.8-3.5     |
| 10                              | 17                         | 66                | 6.7   | 59-74         | 6.0-7.5     |
| 12                              | 19                         | 113               | 11.5  | 98-123        | 10.0-12.5   |
| 14                              | 22                         | 177               | 18    | 157-196       | 16.0-20.0   |
| 16                              | 24                         | 279               | 28.5  | 245-309       | 25.0-31.5   |
| 18                              | 27                         | 382               | 39    | 343-425       | 35.0-43.5   |
| 20                              | 30                         | 549               | 56    | 490-608       | 50.0-62.0   |
| 22                              | 32                         | 745               | 76    | 662-829       | 67.5-84.5   |
| 24                              | 36                         | 927               | 94.5  | 824-1030      | 84.0-105.0  |
| 27                              | 41                         | 1320              | 135.0 | 1180-1470     | 120.0-150.0 |
| 30                              | 46                         | 1720              | 175.0 | 1520-1910     | 155.0-195.0 |
| 33                              | 50                         | 2210              | 225.0 | 1960-2450     | 200.0-250.0 |
| 36                              | 55                         | 2750              | 280.0 | 2450-3040     | 250.0-310.0 |
| 39                              | 60                         | 3280              | 335.0 | 2890-3630     | 295.0-370.0 |



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 | N·m               | kgf·m       |
| 10                     | 14                        | 14.7              | 1.5   | 12.7 - 16.7       | 1.3 - 1.7   |
| 14                     | 19                        | 29.4              | 3.0   | 27.5 - 39.2       | 2.8 - 4.0   |
| 18                     | 24                        | 78.5              | 8.0   | 58.8 - 98.1       | 6.0 - 10.0  |
| 22                     | 27                        | 117.7             | 12.0  | 88.3 - 137.3      | 9.0 - 14.0  |
| 24                     | 32                        | 147.1             | 15.0  | 117.7 - 176.5     | 12.0 - 18.0 |
| 30                     | 36                        | 215.7             | 22.0  | 176.5 - 245.2     | 18.0 - 25.0 |
| 33                     | 41                        | 255.0             | 26.0  | 215.7 - 284.4     | 22.0 - 29.0 |



## PERIODIC REPLACEMENT OF SAFETY CRITICAL PARTS

To ensure safety at all times when operating or driving the machine, the user of the machine must always carry out periodic maintenance. In addition, to further improve safety, the parts in the safety-critical parts list on the next page must also be replaced at the specified interval. These parts are particularly closely connected to safety and fire prevention, so please contact your Komatsu distributor to have them replaced.

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.

| Interval              | Check items                                                                                                                                                                          |
|-----------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Check before starting | Oil leakage from the connections or the clamps of fuel and hydraulic hose                                                                                                            |
| Monthly inspection    | Oil leakage from the connections or the clamps of fuel and hydraulic hose.<br>Damage (crack, wear and tear) of fuel and hydraulic hose.                                              |
| Yearly inspection     | Oil leakage from the connections or the clamps of fuel and hydraulic hose.<br>Interference, deformation, deterioration and damage (crack, wear and tear) of fuel and hydraulic hose. |

## 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<br>4000 hours,<br>whichever<br>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,<br>torque converter case                         | 1    |                                                              |
| 13 | Central pressure detection<br>hose - transmission case,<br>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    |                                                              |

# MAINTENANCE

## PERIODIC REPLACEMENT OF SAFETY CRITICAL PARTS

| 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 | Every 3 years                                       |
| 55 | Seat belt                                      |   |                         | 1     |                                                     |
| 57 | High-pressure piping clamp                     |   |                         | 1 set | Every 8000 hours                                    |
| 58 | Fuel spray prevention cap                      |   |                         | 1 set |                                                     |

# MAINTENANCE SCHEDULE CHART

## MAINTENANCE SCHEDULE CHART

### INITIAL 250 HOURS SERVICE (ONLY AFTER THE FIRST 250 HOURS)

|                                                                                                            |      |
|------------------------------------------------------------------------------------------------------------|------|
| REPLACE POWER TRAIN OIL FILTER ELEMENT .....                                                               | 4-57 |
| CHANGE OIL IN POWER TRAIN CASE, WASH STRAINERS (POWER TRAIN PUMP STRAINER, SCAVENGING PUMP STRAINER) ..... | 4-63 |
| CHANGE OIL IN FINAL DRIVE CASE .....                                                                       | 4-65 |
| REPLACE CHARGE FILTER ELEMENT .....                                                                        | 4-68 |
| CHANGE OIL IN HYDRAULIC TANK, REPLACE HYDRAULIC OIL FILTER ELEMENT .....                                   | 4-71 |

### WHEN REQUIRED

|                                                                      |      |
|----------------------------------------------------------------------|------|
| CLEAN INSIDE OF COOLING SYSTEM .....                                 | 4-21 |
| CHECK, CLEAN AND REPLACE AIR CLEANER ELEMENT .....                   | 4-24 |
| CHECK ELECTRICAL INTAKE AIR HEATER .....                             | 4-26 |
| CHECK AND ADJUST TRACK TENSION .....                                 | 4-26 |
| CHECK AND TIGHTEN TRACK SHOE BOLTS .....                             | 4-29 |
| REVERSE AND REPLACE THE END BITS AND CUTTING EDGES .....             | 4-30 |
| CLEAN, CHECK RADIATOR FINS .....                                     | 4-32 |
| REPLACE AIR CONDITIONER BELT .....                                   | 4-33 |
| CLEAN AND CHECK HYDRAULIC COOLER FINS .....                          | 4-34 |
| CLEAN, CHECK AIR CONDITIONER CONDENSER FINS .....                    | 4-35 |
| ADJUST IDLER CLEARANCE .....                                         | 4-36 |
| CHECK UNDERCARRIAGE OIL .....                                        | 4-37 |
| CLEAN AIR CONDITIONER AIR FILTER .....                               | 4-38 |
| CHECK AND ADJUST AIR CONDITIONER .....                               | 4-39 |
| LUBRICATE DOOR HINGE .....                                           | 4-40 |
| CHECK DOOR LATCH .....                                               | 4-40 |
| CHECK DOOR LOCK STRIKER .....                                        | 4-40 |
| REPLACE DOOR DAMPER .....                                            | 4-41 |
| CHECK WINDOW WASHER FLUID LEVEL, ADD FLUID .....                     | 4-41 |
| REPLACE WIPER BLADE .....                                            | 4-41 |
| PROCEDURE FOR BLEEDING AIR IN HYDRAULIC CIRCUIT .....                | 4-43 |
| PROCEDURE FOR RELEASING INTERNAL PRESSURE OF HYDRAULIC CIRCUIT ..... | 4-44 |
| LUBRICATING .....                                                    | 4-44 |

### CHECK BEFORE STARTING

#### EVERY 250 HOURS SERVICE

|                                                    |      |
|----------------------------------------------------|------|
| LUBRICATING .....                                  | 4-46 |
| CHECK OIL LEVEL IN FINAL DRIVE CASE, ADD OIL ..... | 4-50 |
| CHECK LEVEL OF BATTERY ELECTROLYTE .....           | 4-50 |
| CHECK ALTERNATOR DRIVE BELT TENSION, ADJUST .....  | 4-53 |
| CHECK BRAKE PERFORMANCE .....                      | 4-54 |



## MAINTENANCE

## MAINTENANCE SCHEDULE CHART

### EVERY 500 HOURS SERVICE

|                                                                                                 |      |
|-------------------------------------------------------------------------------------------------|------|
| REPLACE FUEL FILTER CARTRIDGE (MACHINES EQUIPPED WITHOUT ADDITIONAL FUEL FILTER CARTRIDGE)..... | 4-55 |
| REPLACE POWER TRAIN OIL FILTER ELEMENT.....                                                     | 4-57 |
| REPLACE HYDRAULIC TANK BREATHER ELEMENT .....                                                   | 4-58 |
| CHANGE OIL IN ENGINE OIL PAN, REPLACE ENGINE OIL FILTER CARTRIDGE .....                         | 4-59 |
| REPLACE ADDITIONAL FUEL FILTER CARTRIDGE (IF EQUIPPED WITH MACHINES) .....                      | 4-61 |

### EVERY 1000 HOURS SERVICE

|                                                                                                            |      |
|------------------------------------------------------------------------------------------------------------|------|
| CHANGE OIL IN POWER TRAIN CASE, WASH STRAINERS (POWER TRAIN PUMP STRAINER, SCAVENGING PUMP STRAINER) ..... | 4-63 |
| CHANGE OIL IN FINAL DRIVE CASE .....                                                                       | 4-65 |
| WASH POWER TRAIN CASE BREATHER.....                                                                        | 4-65 |
| LUBRICATE UNIVERSAL JOINT .....                                                                            | 4-66 |
| CHECK TIGHTENING PARTS OF TURBOCHARGER.....                                                                | 4-67 |
| CHECK, CLEAN FUEL STRAINER .....                                                                           | 4-67 |
| REPLACE CHARGE FILTER ELEMENT.....                                                                         | 4-68 |
| CHECK FOR LOOSE ROPS MOUNT BOLTS .....                                                                     | 4-68 |
| REPLACE FUEL FILTER CARTRIDGE (MACHINES EQUIPPED WITH ADDITIONAL FUEL FILTER CARTRIDGE).....               | 4-69 |

### EVERY 2000 HOURS SERVICE

|                                                                         |      |
|-------------------------------------------------------------------------|------|
| CHANGE OIL IN HYDRAULIC TANK, REPLACE HYDRAULIC OIL FILTER ELEMENT..... | 4-71 |
| CLEAN ENGINE BREATHER ELEMENT.....                                      | 4-72 |
| CHECK ALTERNATOR, STARTING MOTOR.....                                   | 4-72 |
| CHANGE OIL IN DAMPER CASE, CLEAN DAMPER BREATHER .....                  | 4-73 |
| CHECK PIVOT BEARING OIL LEVEL, ADD OIL .....                            | 4-74 |

### EVERY 4000 HOURS SERVICE

|                                                                          |      |
|--------------------------------------------------------------------------|------|
| CHECK PLAY OF TURBOCHARGER ROTOR.....                                    | 4-75 |
| CLEAN, CHECK TURBOCHARGER .....                                          | 4-75 |
| CHECK ENGINE VALVE CLEARANCE, ADJUST .....                               | 4-75 |
| CHECK WATER PUMP .....                                                   | 4-75 |
| CHECK VIBRATION DAMPER.....                                              | 4-75 |
| CHECK INJECTOR.....                                                      | 4-75 |
| CHECKING FOR LOOSENESS OF HIGH-PRESSURE CLAMP, HARDENING OF RUBBER ..... | 4-76 |
| CHECKING FOR MISSING FUEL SPRAY PREVENTION CAP, HARDENING OF RUBBER..... | 4-77 |

### EVERY 8000 HOURS SERVICE

|                                          |      |
|------------------------------------------|------|
| REPLACE INJECTOR NOZZLE TIP.....         | 4-78 |
| REPLACE HIGH-PRESSURE PIPING CLAMP ..... | 4-78 |
| REPLACE FUEL SPRAY PREVENTION CAP .....  | 4-78 |

## **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 oil 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 work equipment lock lever and the parking lever to the LOCK position.
- For details of starting the engine, see "CHECK BEFORE STARTING ENGINE, ADJUST (3-69)" and "STARTING ENGINE (3-88)" in the OPERATION section.
- Never walk in front of the machine when the engine is running. There is danger of touching the fan.
- It is extremely dangerous to go under the machine to clean it when the engine is running. There is danger that the machine may suddenly move. Never go under the machine when the engine is running.

Wash the inside of the cooling system and change the coolant (antifreeze) according to the table below.

| Antifreeze coolant            | Interval of cleaning inside of cooling system and changing antifreeze coolant |
|-------------------------------|-------------------------------------------------------------------------------|
| Komatsu supercoolant (AF-NAC) | Every two years or every 4000 hours whichever comes first                     |

\*: Permanent type antifreeze shall meet the requirements of ASTM D3306-03.

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

The coolant has the important function of preventing corrosion as well as preventing freezing.

Even in the areas where freezing is not an issue, the use of antifreeze coolant is essential.

Komatsu machines are supplied with Komatsu Supercoolant (AF-NAC). Komatsu Supercoolant (AF-NAC) has excellent anticorrosion, antifreeze and cooling properties and can be used continuously for 2 years or 4000 hours. Komatsu Supercoolant (AF-NAC) is strongly recommended wherever available.

To maintain the anticorrosion properties of Supercoolant (AF-NAC), always keep the density of Supercoolant between 30% and 68%.

When deciding the ratio of antifreeze to water, check the lowest temperature in the past, and decide from the mixing table given below.

It is actually better to estimate and temperature about 10°C lower when deciding the mixing ratio.

The mixing ratio depends on the ambient temperature, but it should always be a minimum of 30% by volume (antifreeze/total amount of coolant x 100).

The freezing temperature of undiluted antifreeze is -15°C. Do not store undiluted antifreeze at a temperature of below -15°C.

#### Mixing rate of water and antifreeze

| Min. atmospheric temperature | °C     | -10  | -15  | -20  | -25  | -30  |
|------------------------------|--------|------|------|------|------|------|
| Amount of antifreeze         | Liters | 32.1 | 38.5 | 42.8 | 49.2 | 53.5 |
| Amount of water              | Liters | 74.9 | 68.5 | 64.2 | 57.8 | 53.5 |
| Volume ratio                 | %      | 30   | 36   | 41   | 46   | 50   |



### 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.**

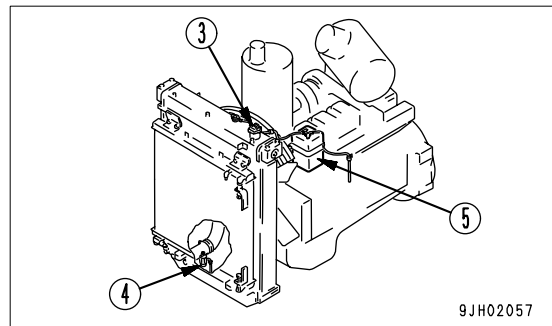
Use antifreeze and appropriate water for diluting. (for details, see "COOLANT AND WATER FOR DILUTION (4-6)")

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

Prepare a container whose capacity is larger than the specified coolant volume to catch drained coolant.

Prepare a hose to supply antifreeze coolant and water.

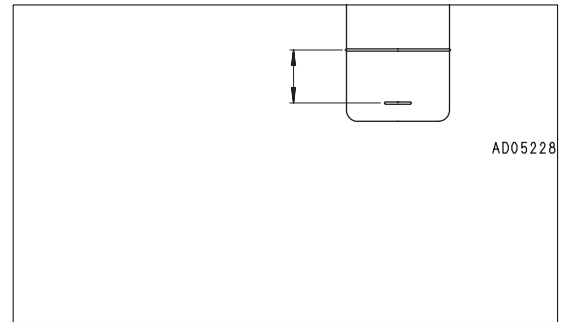
1. Turn cap (3) of the radiator water filler slowly.
2. Set a container to catch the coolant under drain valve (4) at the bottom of the radiator.
3. Open drain valve (4) and drain the water.
4. After draining the antifreeze solution, close drain valve (4), then fill with clean water. After the radiator is filled with water, start and run the engine at low idle speed. After the water temperature rises above 90°C, run the engine for about 10 minutes.
5. Stop the engine and open drain valve (4) to drain the water.
6. After draining the water, clean the radiator with detergent. When carrying out the flushing operation, follow the instructions given with the flushing agent.
7. Close drain valve (4).
8. Add coolant mixed with antifreeze until it overflows from the water filler. Decide the proportions of antifreeze and water according to the table for the mixing rate of water and antifreeze.



## MAINTENANCE

## SERVICE PROCEDURE

9. To remove air in the cooling system, run the engine for 5 minutes at low idle, then for 5 minutes at high idle. (While doing this, leave the radiator cap removed.)
10. Drain the coolant inside sub-tank (5), flush the inside of sub-tank (5), then add coolant to between the FULL and LOW marks.
11. Stop the engine, wait for approx. 3 minutes, then add coolant until the coolant level is near the coolant filler port, and tighten the cap (3). Check the coolant level and add coolant if necessary.

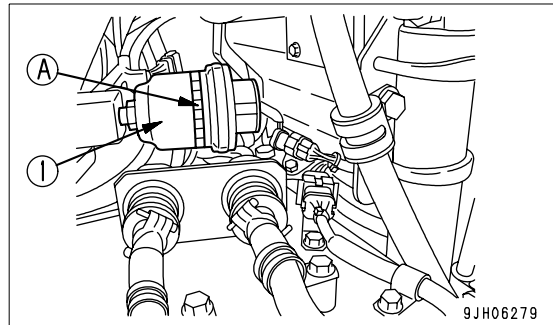


**CHECK, CLEAN AND REPLACE AIR CLEANER ELEMENT****⚠ WARNING**

- 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.

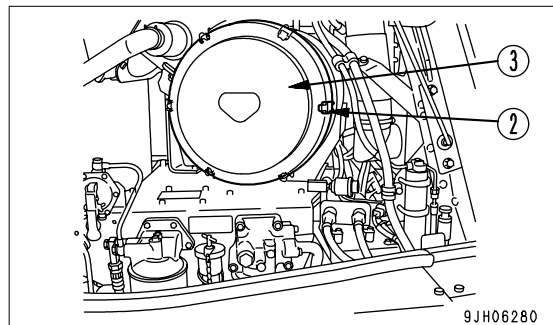
If the element is cleaned frequently before the yellow piston in the dust indicator overlaps the red zone on the outside, the air cleaner will be unable to display its normal performance and the cleaning effect will become poor.

In addition, the frequency of dust stuck to the element falling inside the inner element during the cleaning operation will increase.

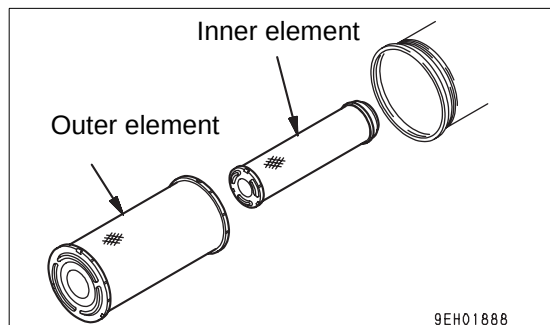
**CLEANING OR REPLACING OUTER ELEMENT****NOTICE**

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**

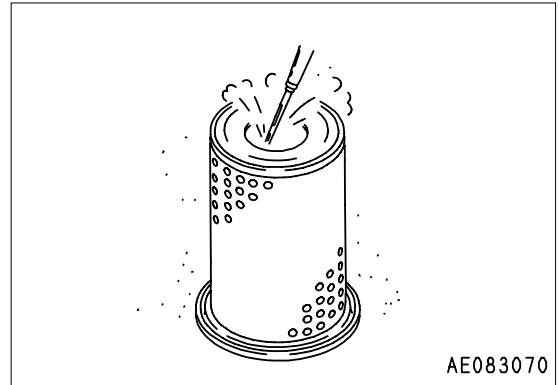
- Never remove the inner element. It will allow dirt to enter and cause failure of the engine.
  - Do not use a screwdriver or other tool.
3. After removing the outer element, cover the air connector inside the air cleaner body with a clean cloth or tape to prevent dirt or dust from entering.



## MAINTENANCE

## SERVICE PROCEDURE

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<sup>2</sup>)) 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.
6. Check that the inner element is not loose. If it is loose, insert it securely.
7. If the yellow piston overlaps the outer element red zone immediately after the outer element is cleaned, replace the inner and outer elements.
8. Remove the cloth or tape cover installed in Step 3.
9. 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.

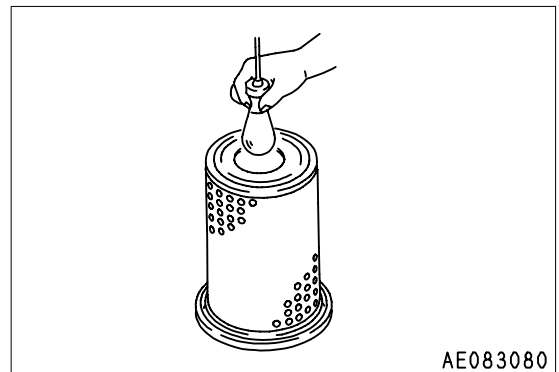


### NOTICE

- **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.**

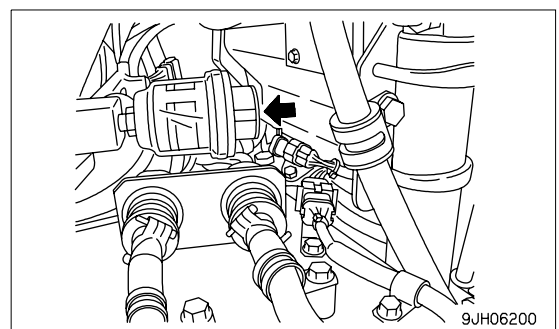
10. After replacing the element, press the dust indicator button to reset it.

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 an 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 clinging to it.

When checking and installing the electric heater, replace its gasket with a new one.

### CHECK AND ADJUST TRACK TENSION

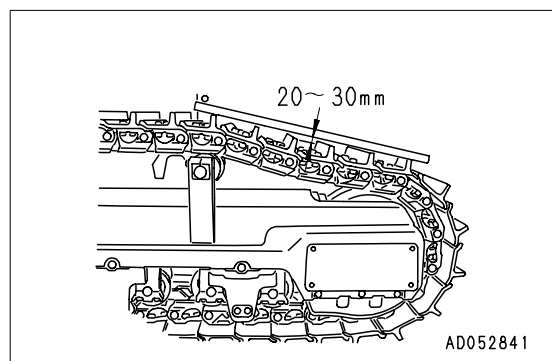
The wear of pins and bushings on the undercarriage will vary with the working conditions and types of soil. It is thus necessary to continually inspect the track tension so as to maintain the standard tension.

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 30 mm, the tension is standard.

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

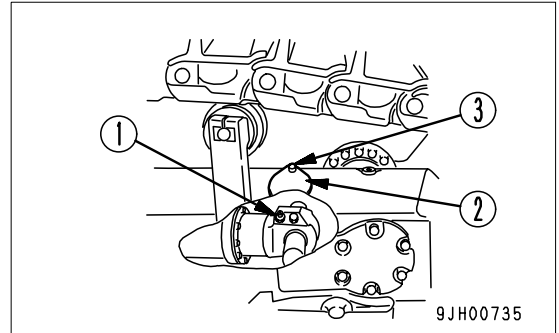




## ADJUSTMENT

**! 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 track tension is not relieved by this procedure, contact your Komatsu distributor for repairs.

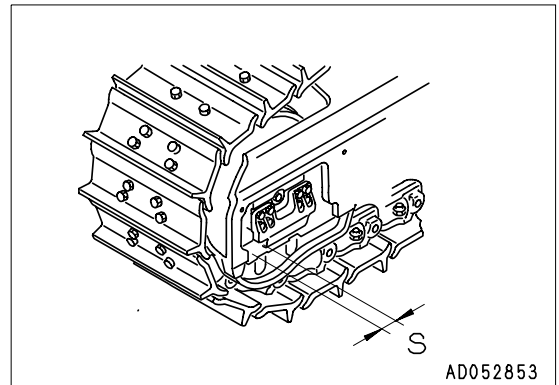
**WHEN INCREASING TENSION**

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 pins and bushings are excessively worn, so they must be either turned or replaced. Please contact your Komatsu distributor.



## WHEN LOOSENING TENSION

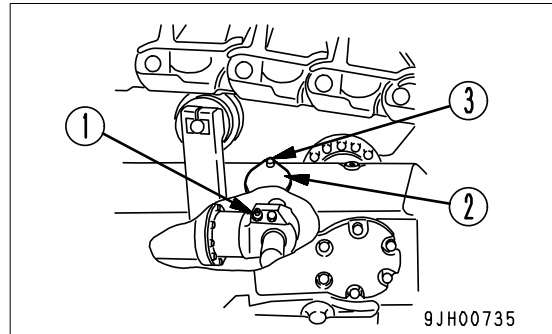
### WARNING

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.

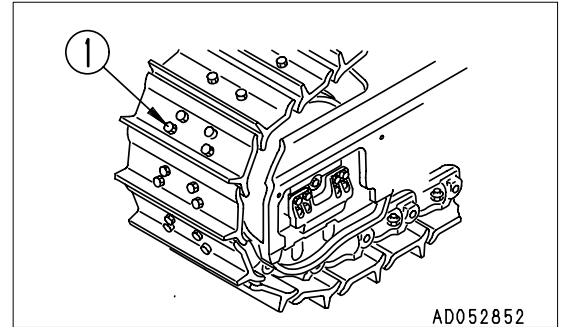
## WHEN REMOVING TRACK

### WARNING

The situation can be extremely dangerous when removing the track. When following the adjustment procedure above in “WHEN LOOSENING TENSION (4-28)“, 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

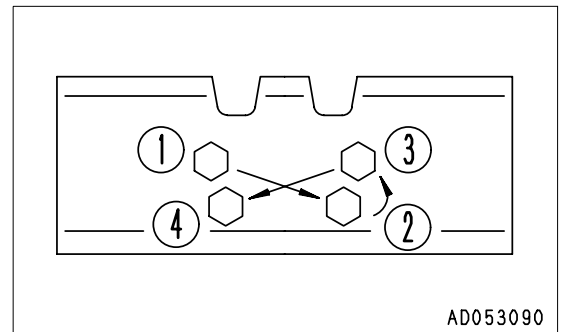
1. First, tighten to a tightening torque of  $588 \pm 58.8$  N·m ( $60 \pm 6$  kgf·m), then check that the nut and shoe are in tight contact with the mating face of the link.
2. After checking, tighten a further  $120^\circ \pm 10^\circ$ .

### METHOD OF TIGHTENING MASTER LINK CONNECTING BOLT

1. First, tighten to a tightening torque of  $392 \pm 39.2$  N·m ( $40 \pm 4$  kgf·m), then check that the mating face of the link is in tight contact.
2. After checking, tighten a further  $180^\circ \pm 10^\circ$ .

### 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 work equipment lock lever.

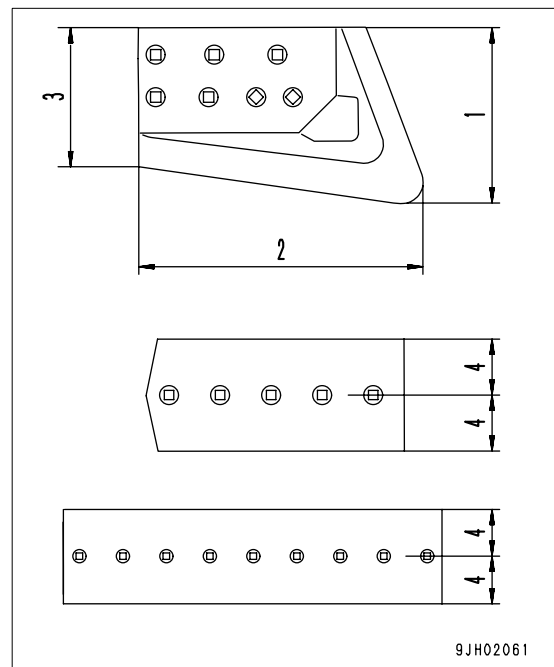
Reverse or replace the end bits and cutting edges before it is worn out to the blade end.

1. Raise the blade to a proper height, position a block under the frame to prevent the blade from falling.
2. Operate the work equipment 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)

| Item |                                                                        |                | Judgment standard    |            |
|------|------------------------------------------------------------------------|----------------|----------------------|------------|
| NO.  | Position of measurement                                                | Work equipment | Standard measurement | Wear limit |
| 1    | Height at outside of end bit                                           | A              | 415                  | 300        |
|      |                                                                        | B              | 292                  | 211        |
| 2    | Width of end bit                                                       | A              | 662                  | 500        |
|      |                                                                        | B              | 435                  | 360        |
| 3    | Height at inside of end bit                                            | A              | 330                  | 260        |
|      |                                                                        | B              | 254                  | 211        |
| 4    | Height of cutting edge (from center of mounting bolt hole to end face) | A              | 165                  | 95         |
|      |                                                                        | B              | 127                  | 86         |



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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 ones.

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 to 1660 N·m (136 to 169 kgf·m)

Angledozer: 738 to 999 N·m (75.3 to 101.9 kgf·m)

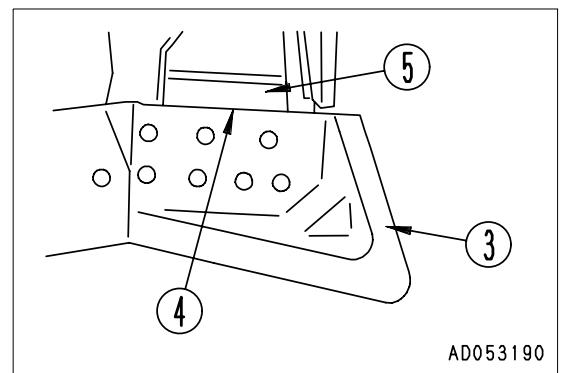
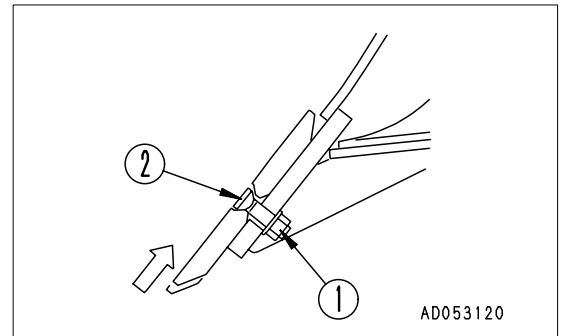
## MAINTENANCE

## SERVICE PROCEDURE

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.

6. Install the cutting edge on 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.
7. When installing end bit (3), put top face (4) of the end bit in tight contact with stopper (5), then tighten the bolt.
8. After several hours of running, retorque the nuts.



**CLEAN AND CHECK RADIATOR FINS**

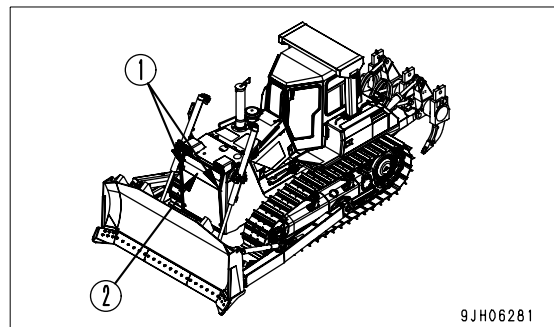
**WARNING**

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.



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

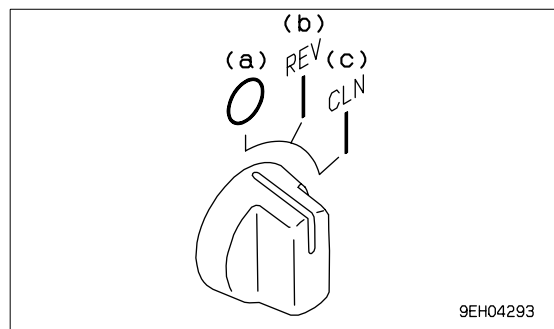
**REMARK**

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.



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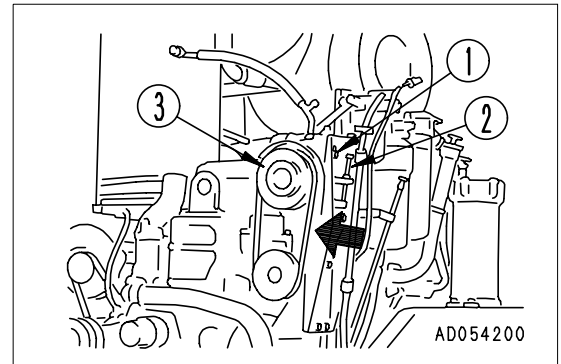
**REMARK**

If dirt is caught in the radiator fins, blow with compressed air to clean.

### REPLACE AIR 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).

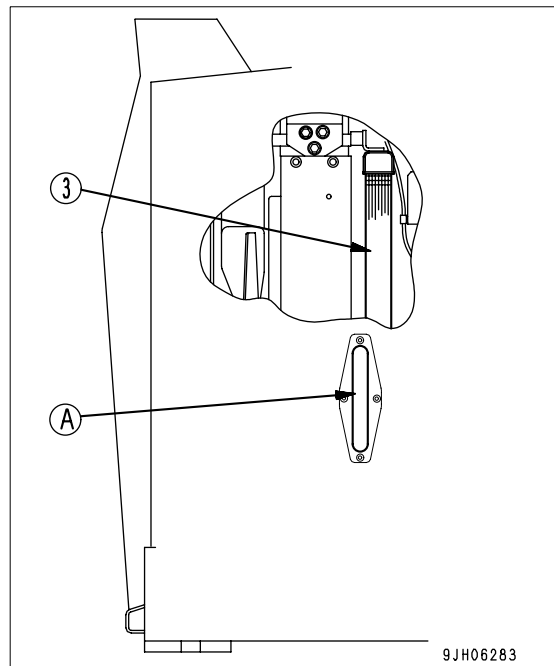
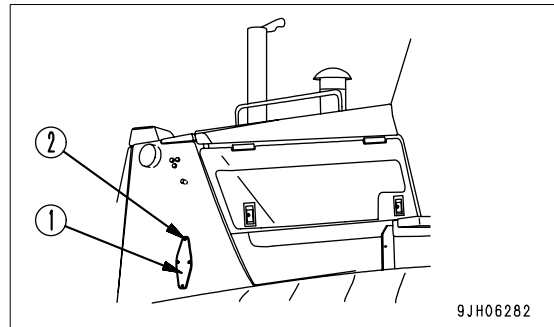
When the belt is a new part, it will stretch at first, so adjust the belt tension again without fail after 2 or 3 days.



**CLEAN AND CHECK HYDRAULIC COOLER FINS**

If the hydraulic cooler fins are clogged or there is dirt caught in the fins, clean and check the fins.

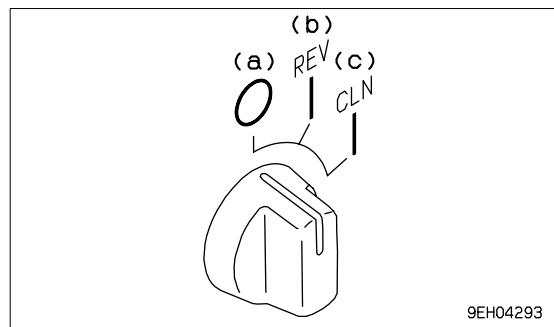
1. Loosen 4 bolts (2) of cover (1) at the left side face of the radiator guard, then remove cover (1).
2. When cover (1) is removed, cleaning hole (A) can be seen. Carry out inspection and cleaning of the hydraulic cooler fins (3) through this hole.
3. Use compressed air to blow off the mud, dirt, or 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.

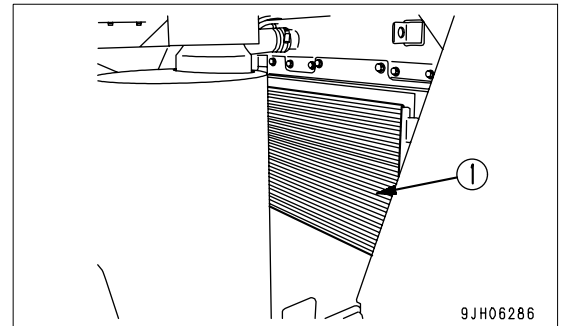




### **CLEAN, CHECK AIR CONDITIONER CONDENSER FINS**

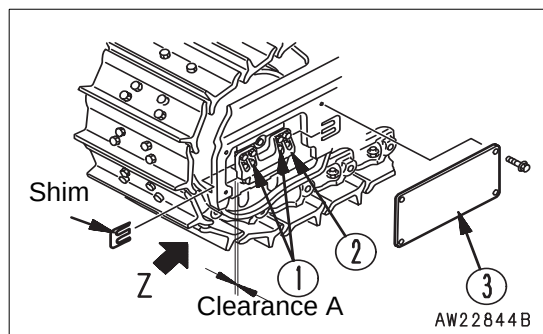
If the air conditioner fins become clogged, clean and inspect.

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**

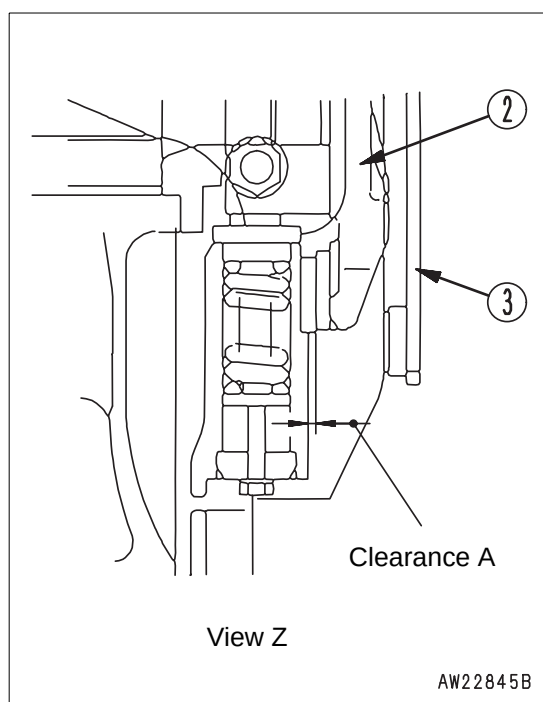
The idler moves to the front and rear under external force. When this happens, guide plate (2) becomes worn. If guide plate (2) becomes worn, the idler will slip to the side or tilt at an angle. This will lead to the track shoe slipping or cause uneven wear, so adjust as follows.

**ADJUSTMENT**

1. Travel on flat ground for 1 to 2 m, 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, loosen bolt (1), and remove the shim to adjust the clearance to a maximum of 0.5 to 1 mm on each side.

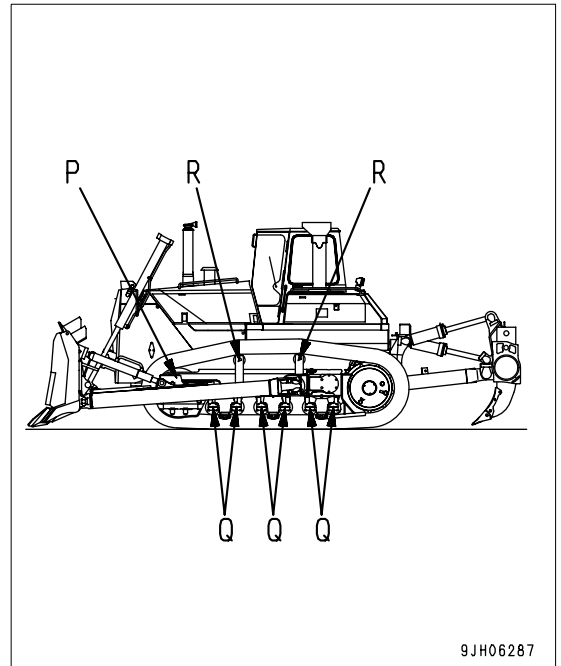
**REMARK**

The thickness of 1 shim is 1.0 mm.



**CHECK UNDERCARRIAGE OIL**

Stop the machine on level ground, and check for any reduction in the oil in the idler (portion P), track roller (portion Q), bogie shaft (portion S), and carrier roller (portion R).

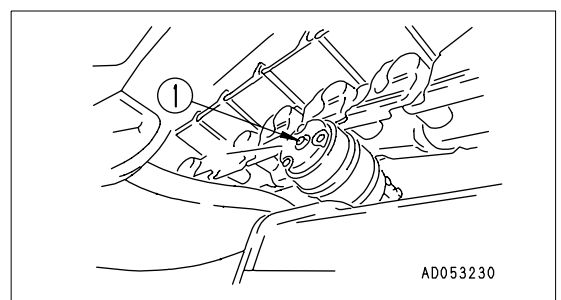
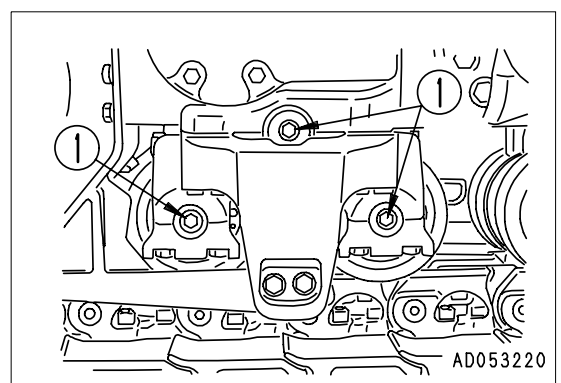
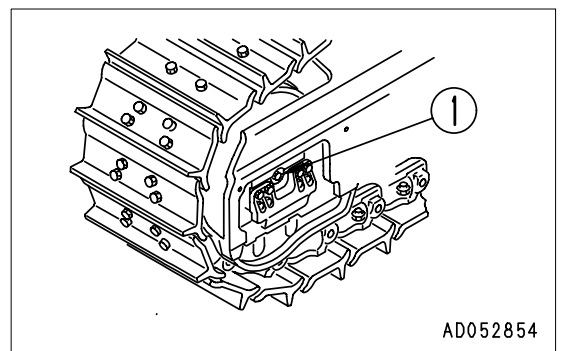


1. Loosen seal bolt (1) slowly and check if oil oozes out from the thread. If oil oozes out, the oil level has not gone down, so tighten the bolt.
2. If no oil comes out even when seal bolt is removed, the oil level is low. Contact your Komatsu distributor for repairs.

**REMARK**

If the side cover is not removed, seal bolt (1) at the idler portion cannot be seen.

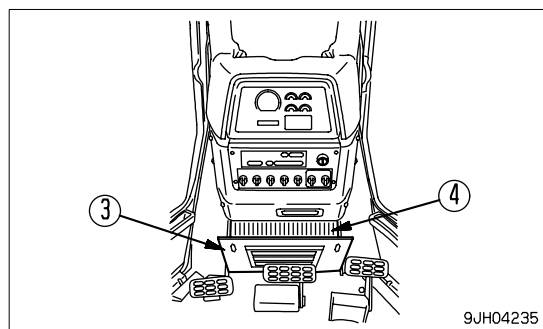
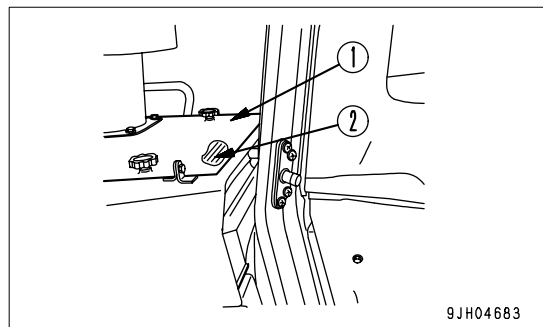
There is 1 bogie shaft seal bolt (1) each on the inside and outside.



### 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.

## MAINTENANCE

## SERVICE PROCEDURE

### CHECK AND ADJUST AIR CONDITIONER

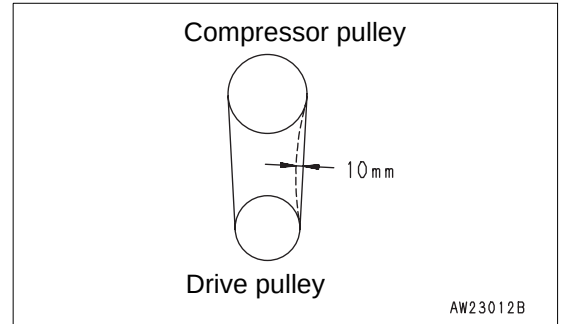
(Machines equipped with cab)

#### 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 when pressed at a point midway between the drive pulley and compressor pulley with a finger force of approx. 6 kg (58.8 N).

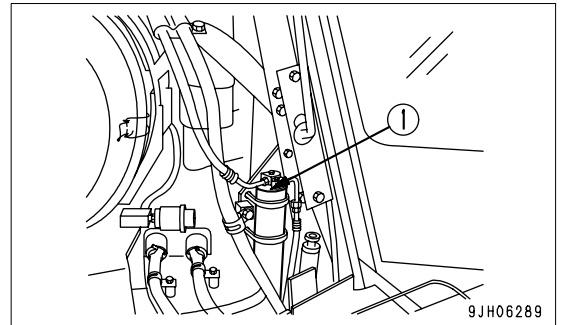
When the V-belt is new, it will stretch at first, so always adjust it after 2 or 3 days.



#### CHECK LEVEL OF REFRIGERANT(GAS)

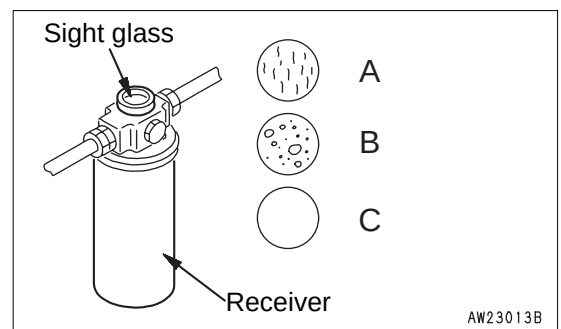
#### WARNING

- 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 (A)
- Some bubbles in flow (bubbles pass continuously): Lack of refrigerant (B)
- Colorless, transparent: No refrigerant (C)



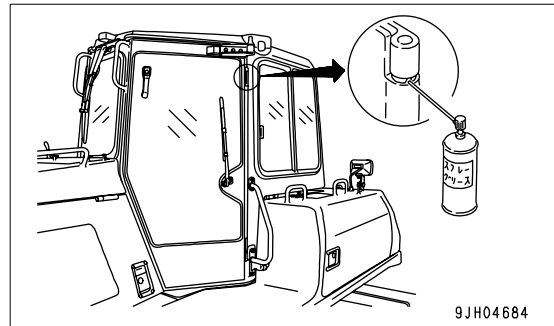
#### REMARK

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 R134a is used as the refrigerant.

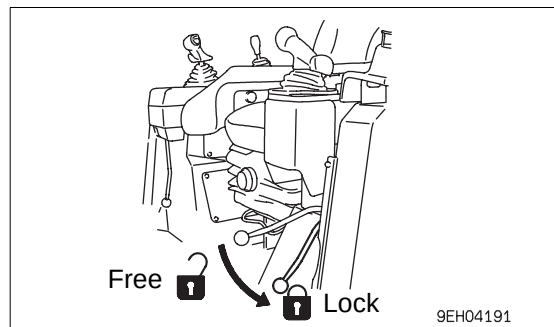
**LUBRICATE DOOR HINGE**

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.

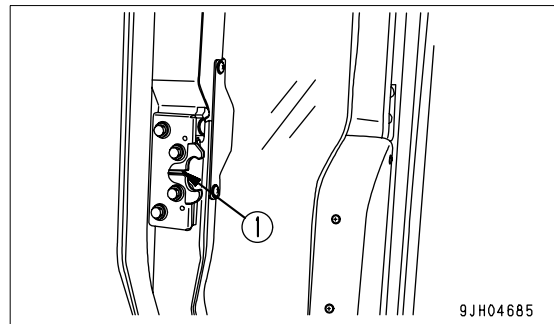
**CHECK DOOR LATCH****WARNING**

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**

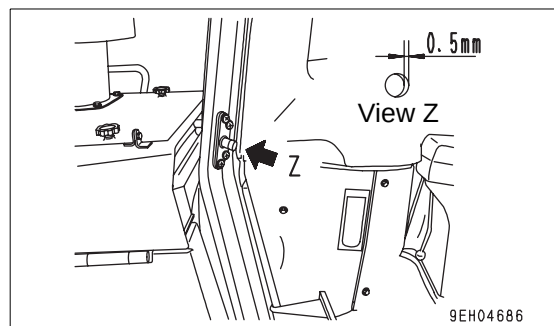
Hold the door open-locked, and check that there is still grease inside the latch. If the amount of grease is low or there is no more grease, coat the inside of the latch with grease from portion (1).

**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, replace the striker. If it is used as it is, the play will increase and this may result in breakage of the hinge or door lock.



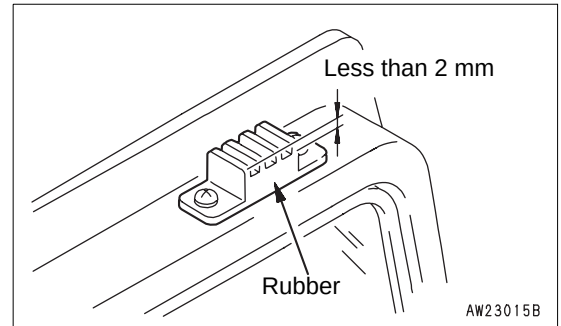
## MAINTENANCE

## SERVICE PROCEDURE

### REPLACE DOOR DAMPER

If the depth of the door damper rubber groove is less than 2 mm, replace the damper.

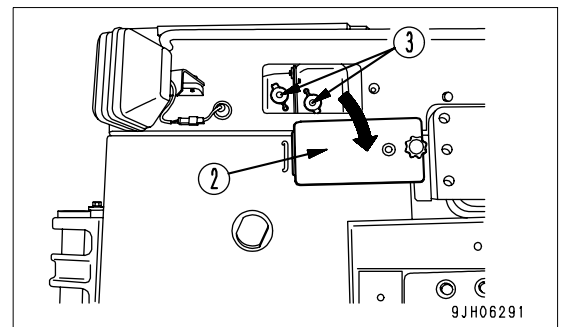
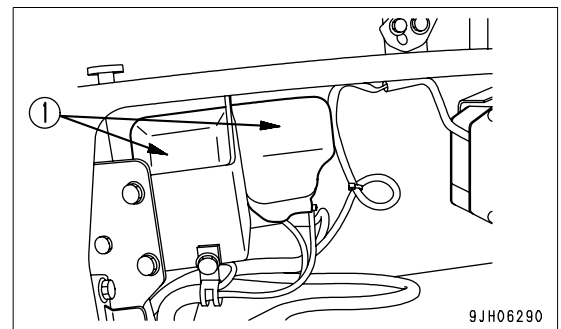
There are two dampers each at the top and bottom on the left and right doors.



### CHECK WINDOW WASHER FLUID LEVEL, ADD FLUID

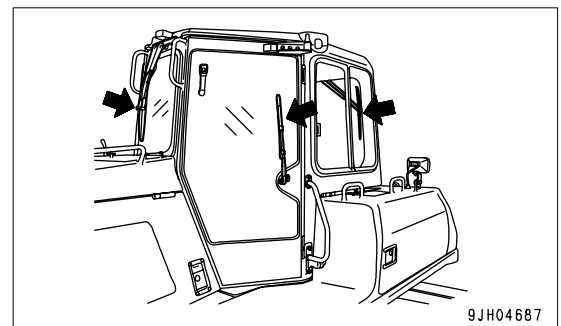
Check the fluid level if no window washer fluid is sprayed out. Open the battery cover at the rear left of the machine and check the level of the fluid in window washer tanks (1). If the level is low, remove top cover (2) and caps (3), then add automobile window washer fluid through the filler port.

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



### REPLACE WIPER BLADE

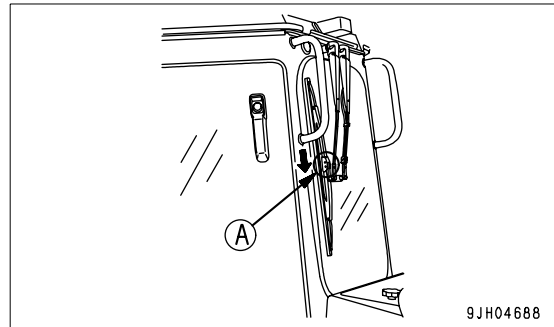
If the blade is damaged, it will not wipe the window clean, so replace the blade.



## REPLACEMENT

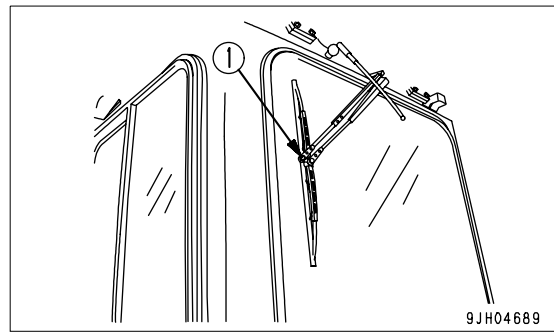
### FRONT, REAR WIPER

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.



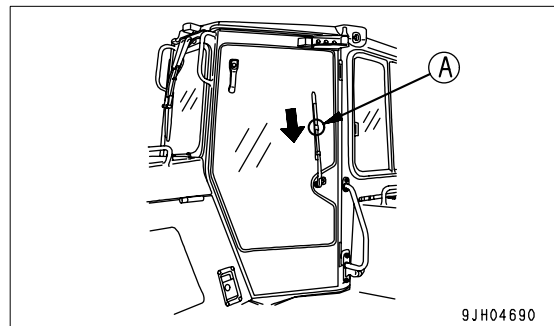
### REAR WIPER

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 (3-93)".

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.**

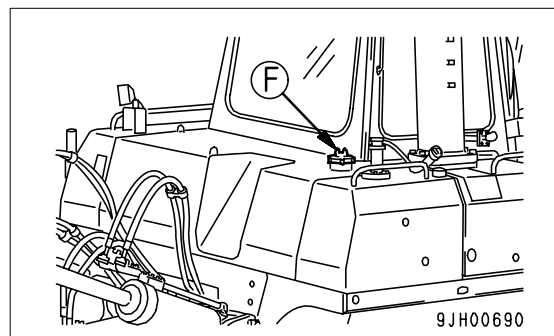
1. Bleeding air from cylinders
2. Run the engine at low idle, and extend and retract each cylinder 4 to 5 times, taking care so that a cylinder is not moved to the end of its stroke. (Stop the cylinder approx. 100 mm short of its stroke end)
3. Next, operate each cylinder 3 to 4 times to the end of its stroke.
4. 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.

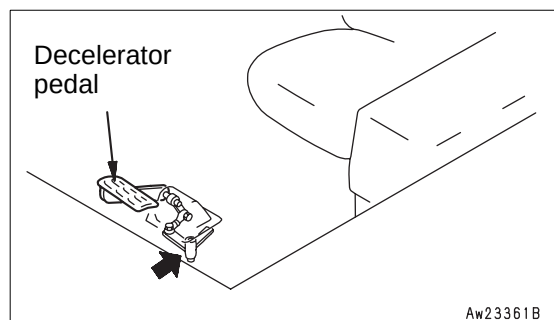
1. Stop the machine on firm level ground.
2. Lower the blade to the ground, then stop the engine.
3. To release the internal pressure, operate the blade control lever in each direction to the end of its stroke within 15 seconds after stopping the engine.
4. Loosen oil filler cap (F) at the top of the 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 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 (3-71)".

- 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 backup alarm sound
- Adjusting operator's seat
- Using seat belt
- Adjust mirror
- Adjust joystick
- Adjust armrest

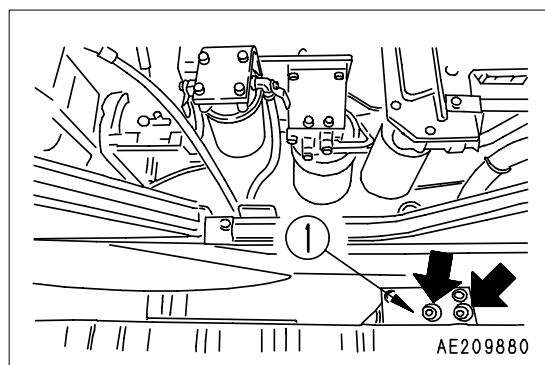
## EVERY 250 HOURS SERVICE

### 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

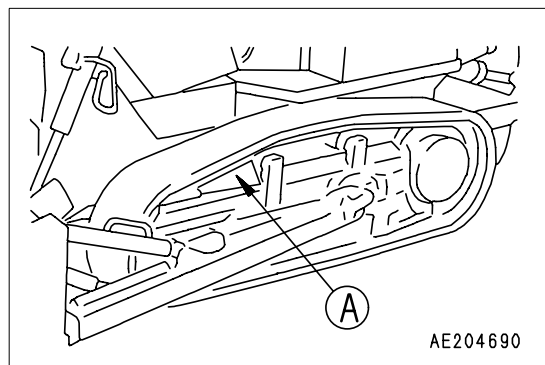
- 1) Remove all soil and mud from the top of track frame and cover (1).



- 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)

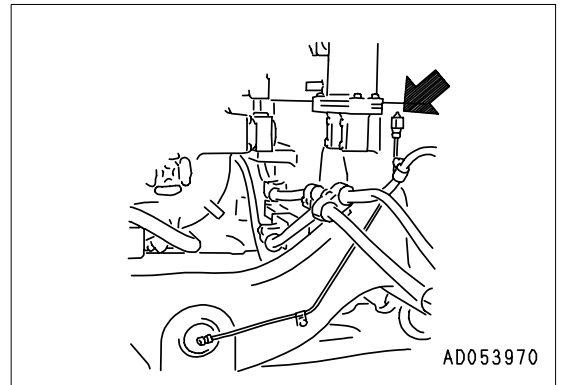
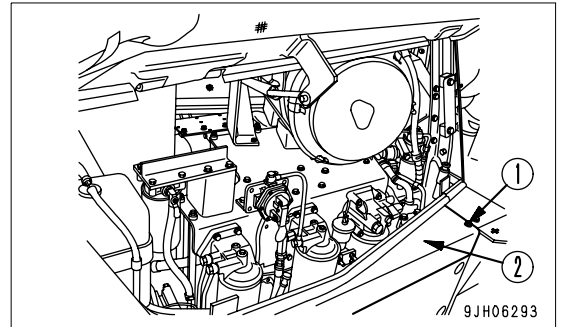
- Grease pump ass'y (07952-80002)
- Nozzle (07951-41043): Tube type



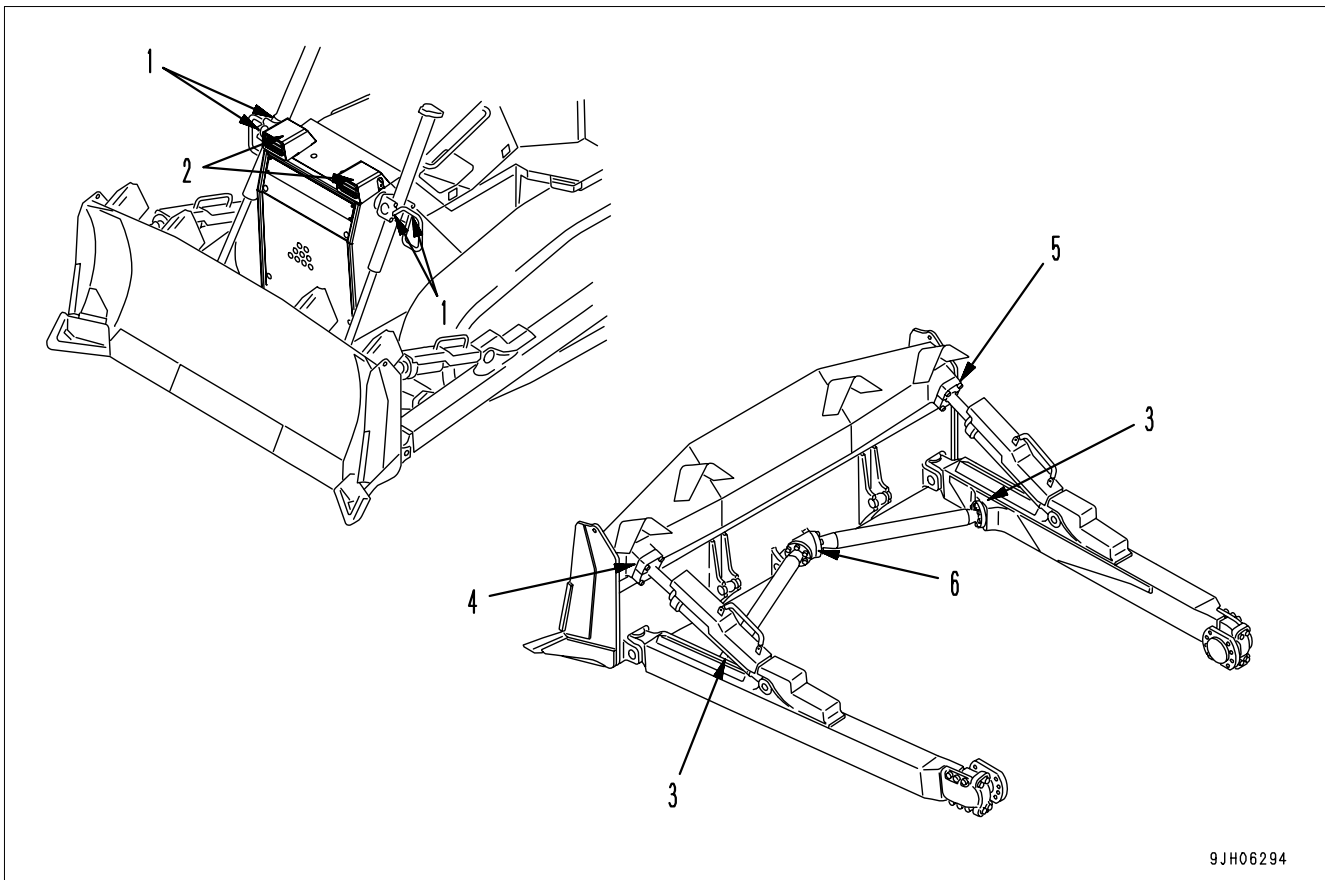
## MAINTENANCE

## SERVICE PROCEDURE

- Grease equalizer bar center pin (1 place)
- 1) Open the engine side cover on 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.

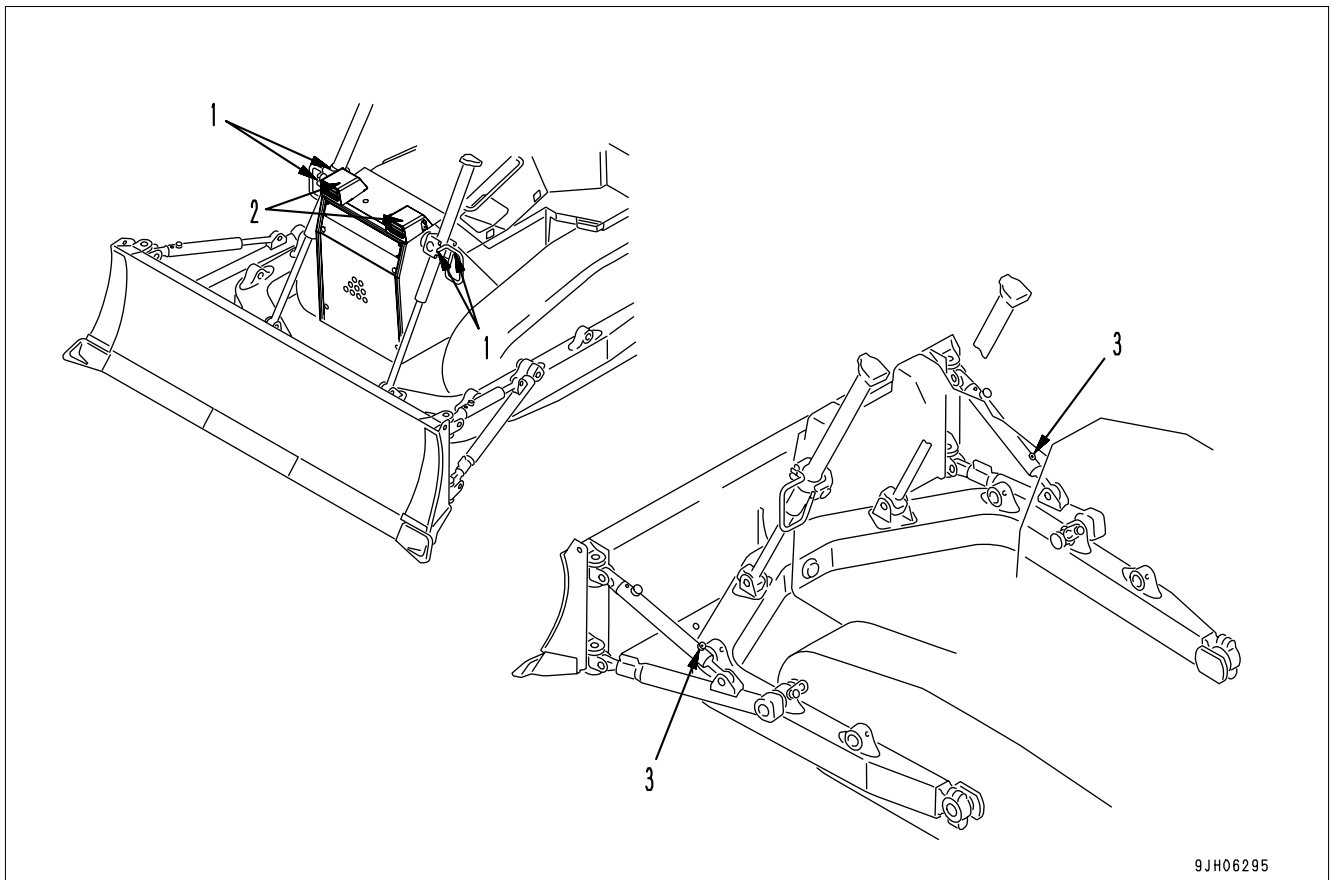


● Power tiltdozer



- |                                            |                                        |
|--------------------------------------------|----------------------------------------|
| (1) Lift cylinder support yoke (4 places)  | (4) Tilt cylinder ball joint (1 place) |
| (2) Lift cylinder support shaft (2 places) | (5) Tilt brace ball joint (1 place)    |
| (3) Blade arm (2 places)                   | (6) Blade center link (1 place)        |

● Angledozer

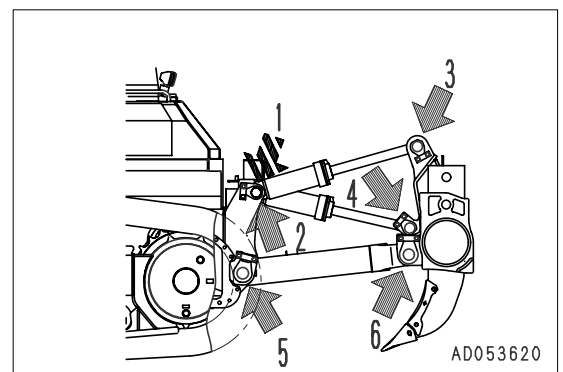


- (1) Lift cylinder support yoke (4 places)
- (2) Lift cylinder support shaft (2 places)

- (3) Tilt brace thread (2 places)

● Ripper

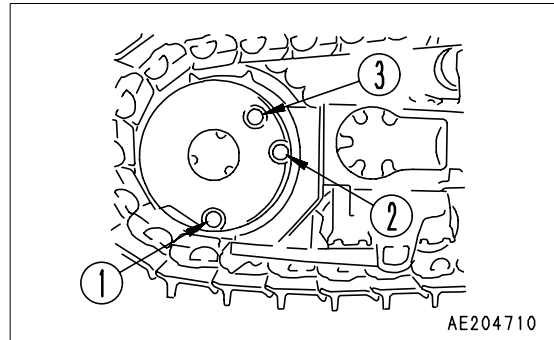
- (1) Tilt cylinder bottom pin (2 places)
- (2) Lift cylinder bottom pin (2 places)
- (3) Tilt cylinder rod end pin (2 places)
- (4) Lift cylinder rod end pin (2 places)
- (5) Arm pin (front) (2 places)
- (6) Arm pin (rear) (2 places)



**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**

Perform this check before operating the machine.

 **WARNING**

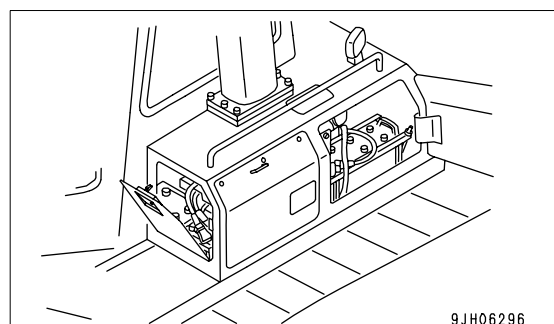
- Do not use the battery if the battery electrolyte level is below the LOWER LEVEL line. This will accelerate deterioration of the inside of the battery and reduce the service life of the battery. In addition, it may cause an explosion.
- The battery generates flammable gas and there is danger of explosion, 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 on the left side of the machine.

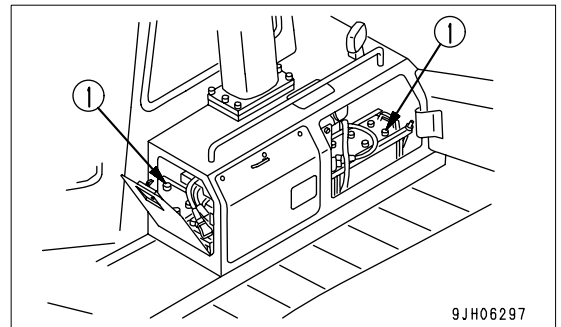
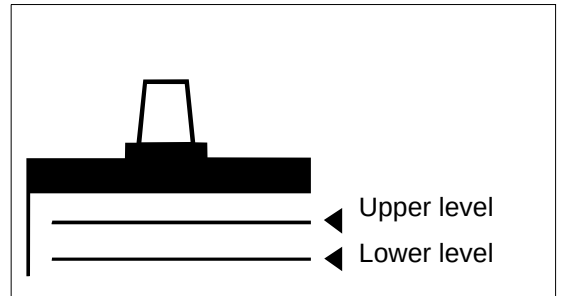




### WHEN CHECKING ELECTROLYTE LEVEL FROM SIDE OF BATTERY

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.



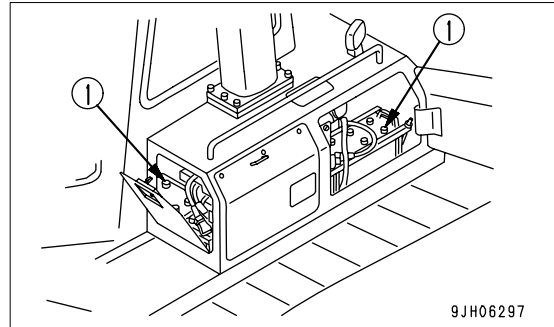
#### REMARK

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**

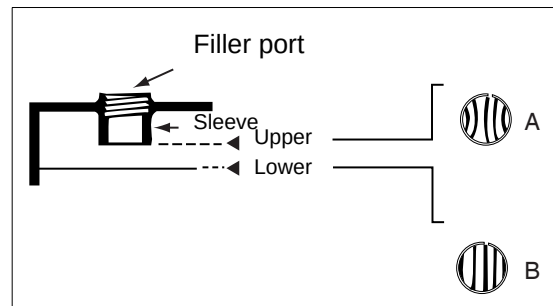
If it is impossible to check the electrolyte level from the side of the battery, or there is no display of the UPPER LEVEL line on the side of the battery, check as follows.

1. Remove cap (1) on 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.

- A Correct level**  
The electrolyte level is up to the bottom of the sleeve, so the surface tension causes the surface to rise and the plate appears to be warped.
- B Too low (level)**  
The electrolyte level is not up to the bottom of the sleeve, so the plate appears to be normal.



2. After adding distilled water, tighten cap (1) securely.

**REMARK**

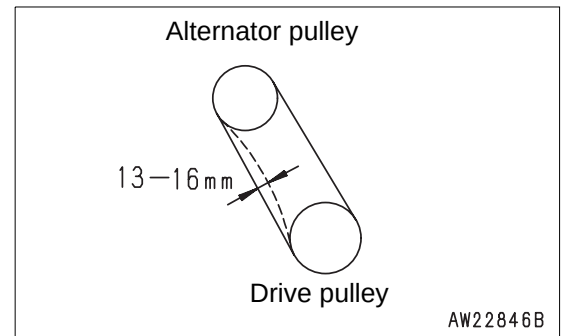
If distilled water is added to above the bottom of the sleeve, use a syringe to lower the level to the bottom of the sleeve. Neutralize the removed fluid with baking soda (sodium bicarbonate), then flush it away with a large amount of water or consult your Komatsu distributor or battery maker.

**WHEN IT IS POSSIBLE TO USE INDICATOR TO CHECK ELECTROLYTE LEVEL**

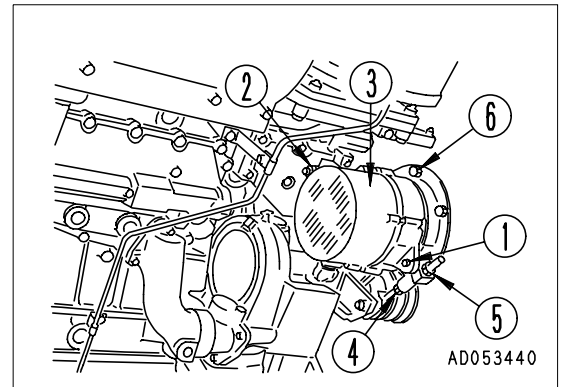
If it is possible to use an indicator to check the electrolyte level, follow the instructions given.

**CHECK ALTERNATOR DRIVE BELT TENSION, ADJUST****CHECKING**

The standard deflection for the drive belt is approx. 13 to 16 mm when pressed by thumb (approx. 10 kg) 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 moving 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**

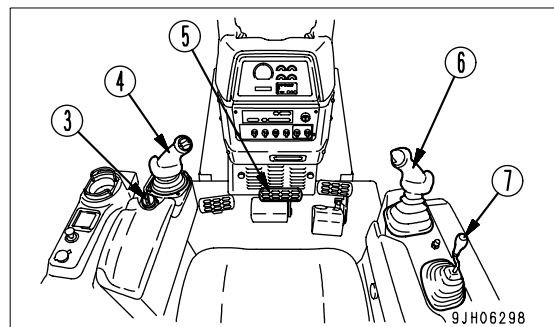
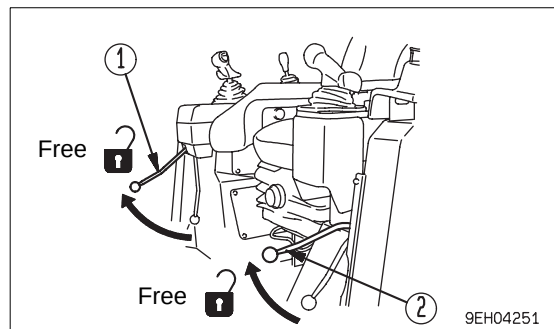
If the machine moves during the following operation, please contact your Komatsu distributor for repairs immediately.

**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 work equipment lock 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 work equipment lock lever (1) in 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 (MACHINES EQUIPPED WITHOUT ADDITIONAL FUEL FILTER CARTRIDGE)



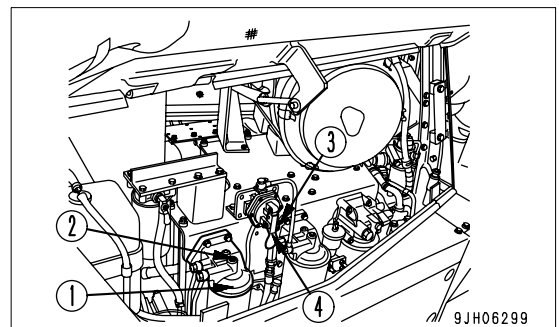
#### WARNING

- 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

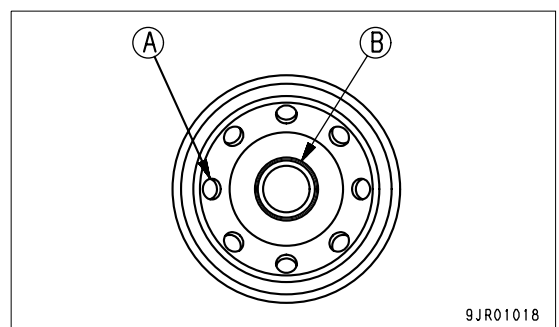
- Genuine Komatsu fuel filter cartridges use a special filter that has highly efficient filtering ability. When replacing the filter cartridge, always use a genuine Komatsu part.
- The common rail fuel injection system used on this machine consists of more precise parts than the conventional injection 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 on the left of the machine.
  2. Using a filter wrench, turn filter cartridge (1) counterclockwise on remove it.
  3. Clean the filter holder, then coat the packing portion of the new filter cartridge with oil, and install.



#### NOTICE

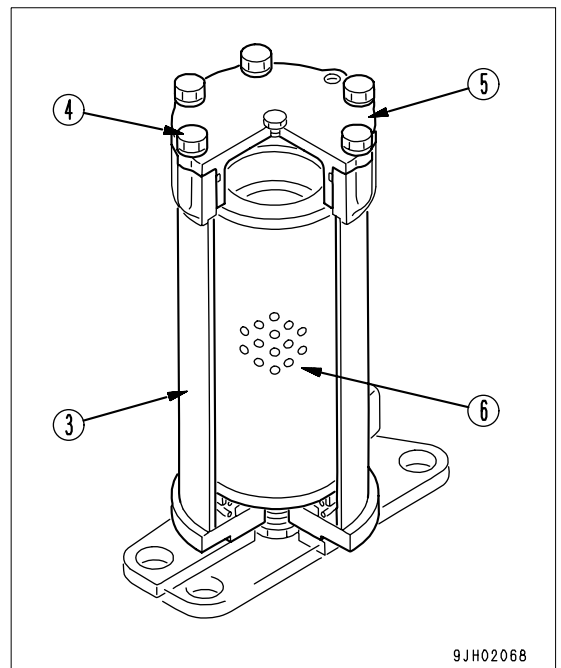
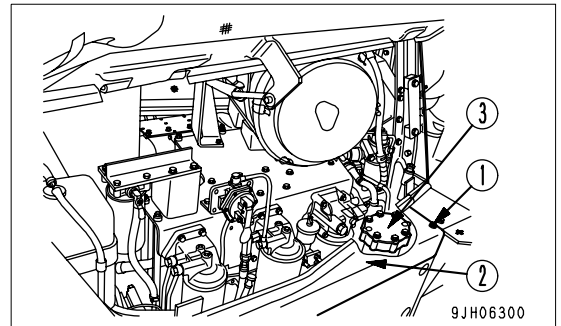
- Do not fill the fuel filter cartridge with fuel.
- Remove cap (B) and install the fuel filter.



4. When installing, tighten until the packing surface contacts the seal surface of the filter holder, then tighten it 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 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) on 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 fuel leakage from the filter seal surface.

### REPLACE POWER TRAIN OIL FILTER ELEMENT

1. Open the engine side cover on the left side of the machine, remove bolt (1) then open cover (2) to the outside using the bottom hinge 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 on the left side of the machine.

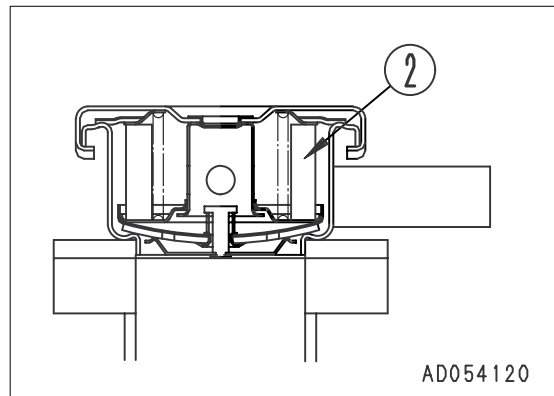
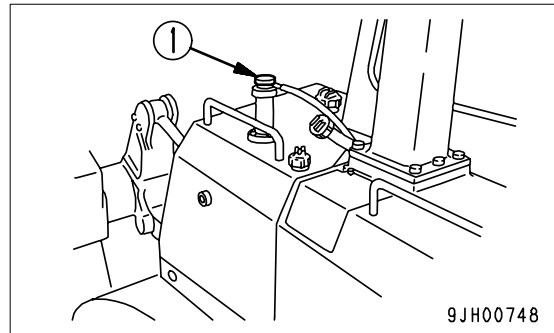


## REPLACE HYDRAULIC TANK BREATHER ELEMENT

### **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) on 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**

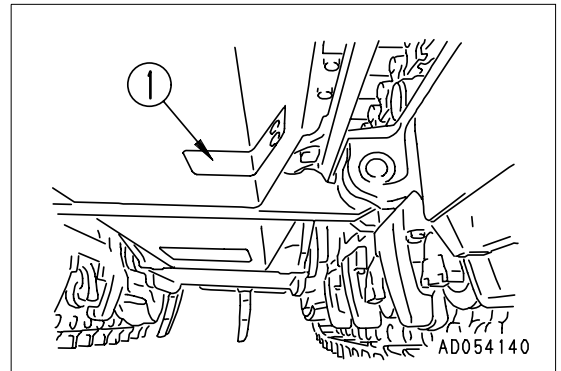
The oil is at high temperature after the engine has been operated, so never change the oil immediately after finishing operations. Wait for the oil to cool down before changing it.

- Oil replacement amount: 37 liters
- Prepare a socket wrench and filter wrench.

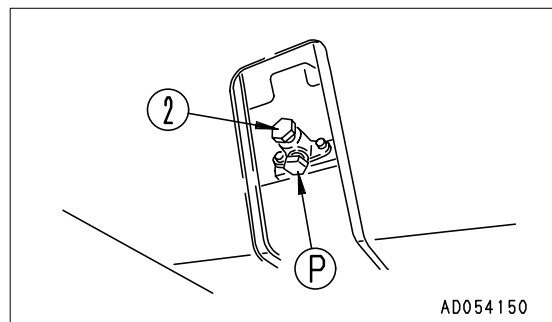
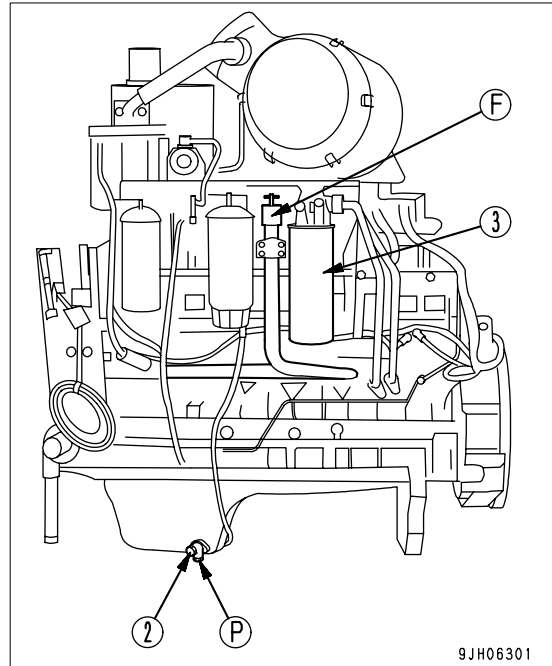
After the machine has been operated for 6 months, even if it has not been operated for 500 hours, change the engine oil and replace the filter cartridge at 6 months.

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):  $68.6 \pm 9.81 \text{ N}\cdot\text{m}$   
( $7 \pm 1 \text{ kgf}\cdot\text{m}$ )  
Tightening torque for drain valve (2):  $63.7 \pm 14.7 \text{ N}\cdot\text{m}$   
( $6.5 \pm 1.5 \text{ kgf}\cdot\text{m}$ )
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 (3-75)".

## REPLACE ADDITIONAL FUEL FILTER CARTRIDGE (IF EQUIPPED WITH MACHINES)

**WARNING**

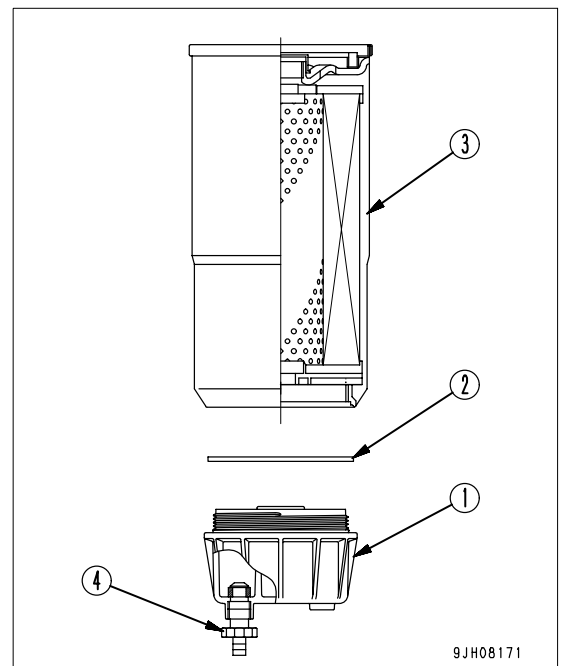
- After the engine has been operated, all parts are at high temperature, so do not replace the filter immediately. Wait for all parts to cool down before starting the operation.
- High pressure is generated inside the engine fuel piping system when the engine is running. When replacing the filter, wait 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.
- Be careful when opening the air bleed plug in the fuel filter head. It is still under pressure, so fuel may spurt out.

**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

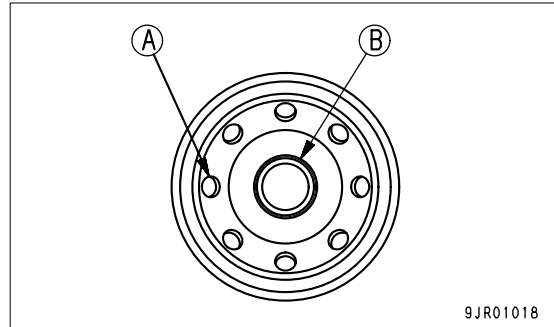
1. Close the fuel valve.
2. Set the container to catch the fuel under the additional fuel filter cartridge.
3. Using a filter wrench, turn filter cartridge counterclockwise to remove it.
4. After removing the filter, remove transparent bowl (1) and inspect it. If there is any damage, replace it with a new part.
5. Clean transparent bowl (1) and remove seal (2). Coat new seal (2) with clean fuel or oil, then install it.
6. Install transparent bowl (1) to new filter cartridge (3).  
Tightening torque: 10 N·m (1 kgf·m)



9JH08171

**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.**



7. When installing, tighten until the packing surface contacts the seal surface of the filter holder, then tighten it 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 the correct amount.
  - When tightening with a filter wrench, be extremely careful not to dent or damage the filter.
8. After completion of the replacement of fuel filter cartridge (1), bleed the air.  
Bleed the air as follows:
9. Add fuel to the fuel tank until full (to FULL mark on the fuel gauge).
10. 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.
11. After replacing the filter cartridge, start the engine and check for any leakage of fuel from the filter seal surface.

## EVERY 1000 HOURS SERVICE

Maintenance for every 250 and 500 hours should be performed at the same time.

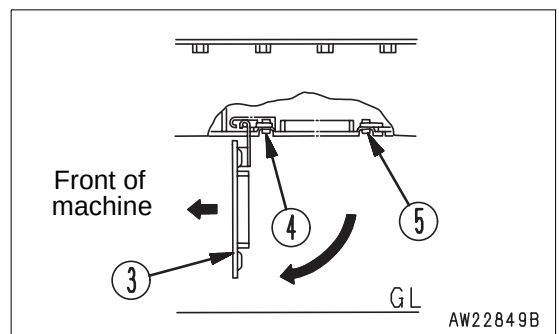
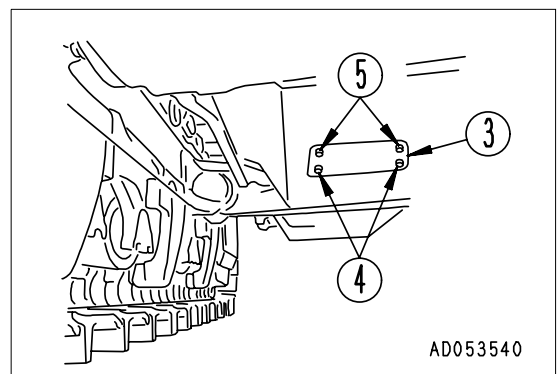
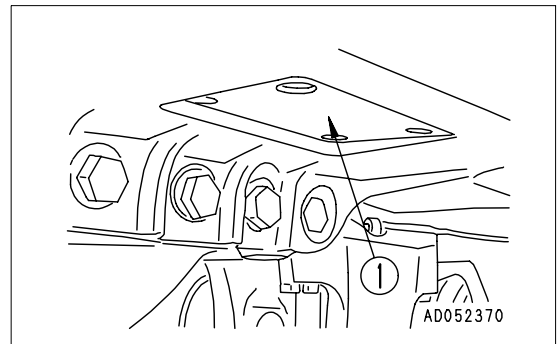
### CHANGE OIL IN POWER TRAIN CASE, WASH STRAINERS (POWER TRAIN PUMP STRAINER, SCAVENGING PUMP STRAINER)



#### 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.

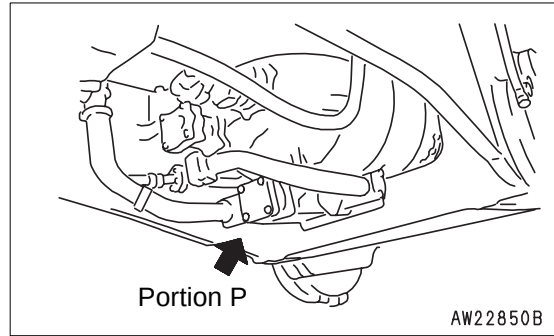
- Oil replacement amount: 45 liters
1. Remove drain cover (1) on the left side at the bottom of the power train case, pull out drain hose (2) from the takeoff port, then loosen drain plug (P1) and drain the oil. After draining the oil, tighten drain plug (P1). Do not remove drain plug (P1).
  2. Remove inspection cover (3) of the undercover on the bottom rear of the machine as follows.
    - 1) Remove 2 bolts (4) on the machine front end.
    - 2) Hold down cover (3) and remove 2 bolts (5) on 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. Remove drain plug (P2) in the strainer cover, and drain the oil (approx. 4 liters) collected inside the piping.
  4. Loosen mounting bolt (6) of the power train strainer, and remove cover (7).
  5. Remove spring (8), then remove strainer (9).
  6. 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.



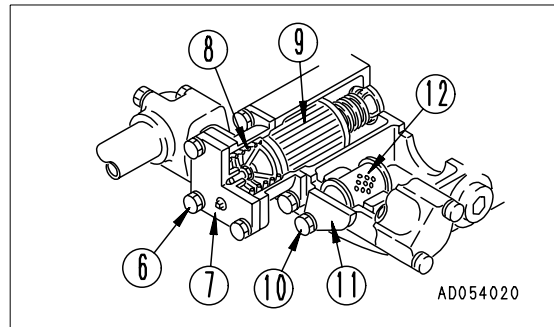
SERVICE PROCEDURE

MAINTENANCE

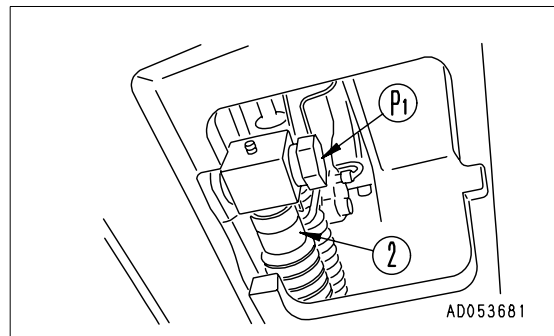
7. Loosen mounting bolt (10) of the scavenging pump strainer, then remove cover (11).



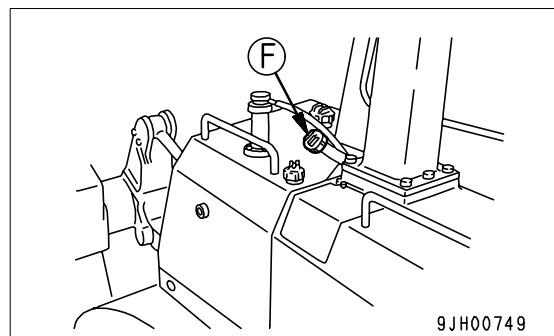
8. Remove strainer (12).
9. Remove any dirt stuck to strainer (12), then wash it in clean diesel oil or flushing oil. Wash the removed parts and the inside of the case at the same time.
10. Install the strainers in their original position.



11. Replace the power train oil filter element. For details, see "REPLACE POWER TRAIN OIL FILTER ELEMENT (4-57)".



12. Refill the specified quantity of engine oil through oil filler (F).
13. 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 (3-76)".  
If the spring or strainer are damaged, replace them with a new part.

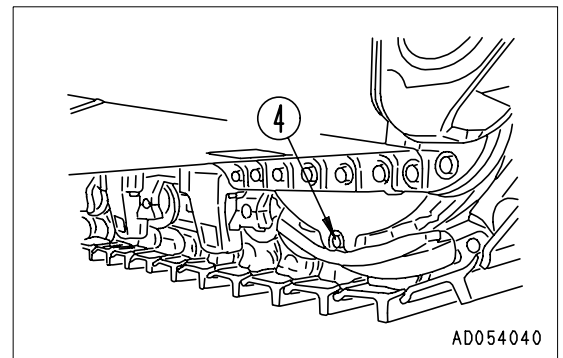
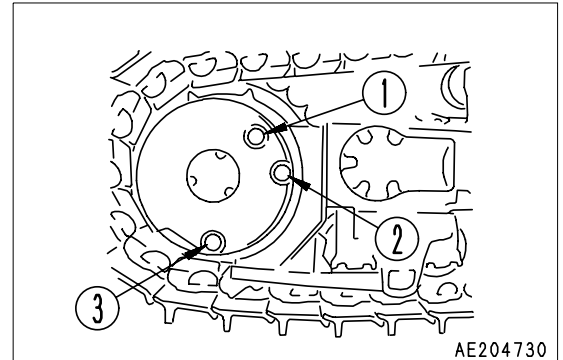


## CHANGE OIL IN FINAL DRIVE CASE

**WARNING**

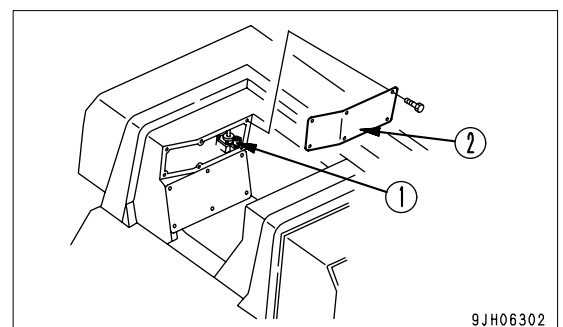
The oil is at high temperature immediately after the machine has been operated. Wait for the oil to cool down before starting the operation.

- Oil replacement amount: 58 liters
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 (4-50)".

**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.

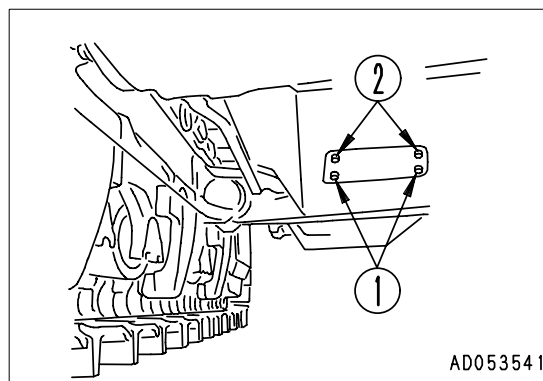
- Power train case breather (1 place)
- Remove inspection cover (2) at the bottom right of the operator's seat. The breather (1) is installed on the right side of the window (rear of machine).



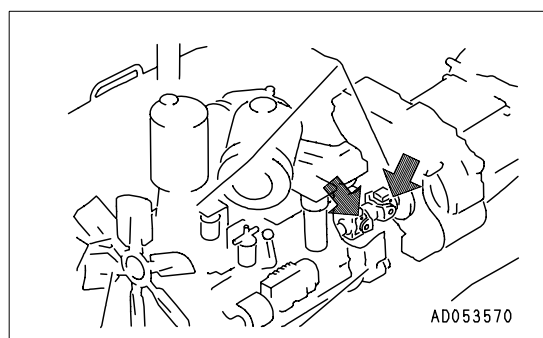
## LUBRICATE UNIVERSAL JOINT

**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 of the cover so that you can easily get out of the way.

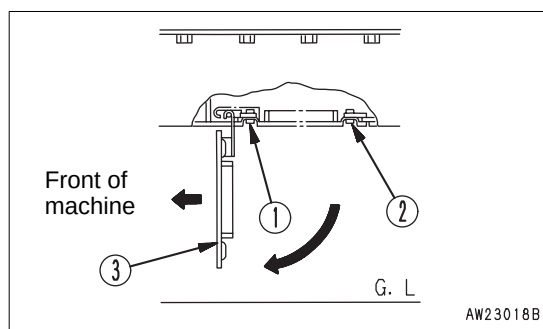


Apply grease to the grease fittings (2 places) shown by arrows.



Remove inspection cover (3) of the undercover on the rear bottom of the chassis as follows.

1. Remove 2 bolts (1) toward 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.



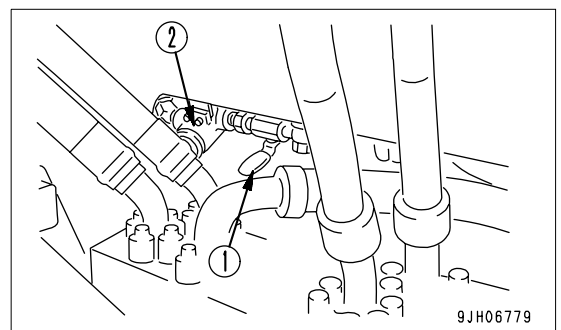
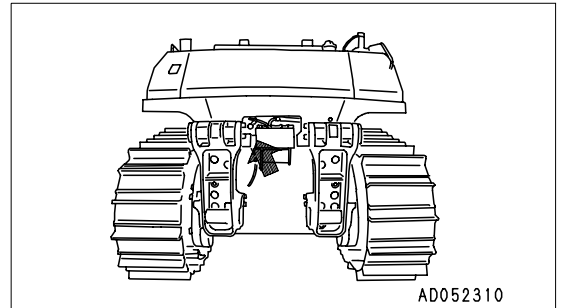


### CHECK TIGHTENING PARTS OF TURBOCHARGER

Contact your Komatsu distributor to have the tightening portions checked.

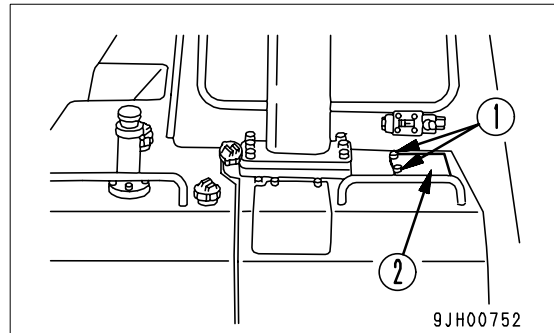
### CHECK, CLEAN FUEL STRAINER

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).

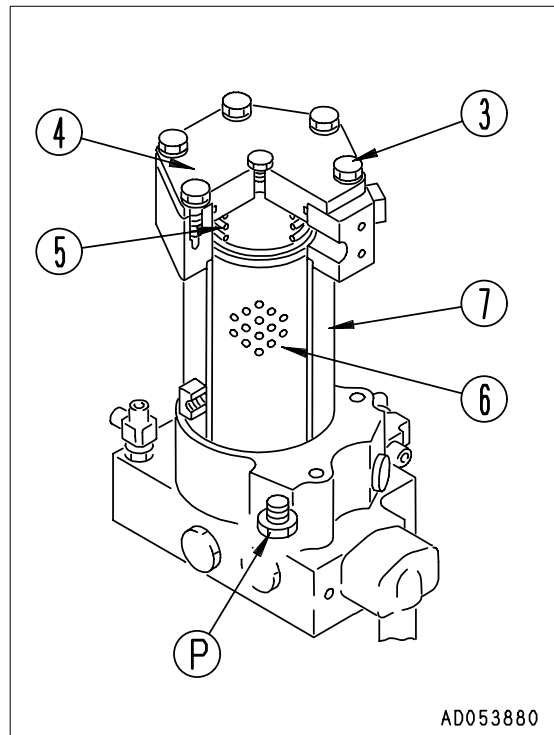


**REPLACE CHARGE FILTER ELEMENT**

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).

**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  $927 \pm 103 \text{ N}\cdot\text{m}$  ( $94.5 \pm 10.5 \text{ kgf}\cdot\text{m}$ )

If a damaged bolt is found, replace the bolt with a genuine Komatsu bolt.

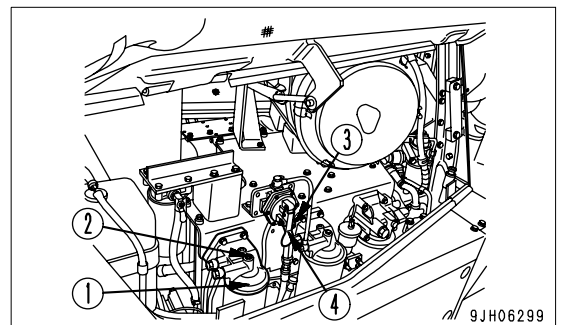
**REPLACE FUEL FILTER CARTRIDGE (MACHINES EQUIPPED WITH ADDITIONAL FUEL FILTER CARTRIDGE)****WARNING**

- 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.
- Be careful when opening the air bleed plug in the fuel filter head. It is still under pressure, so fuel may spurt out.

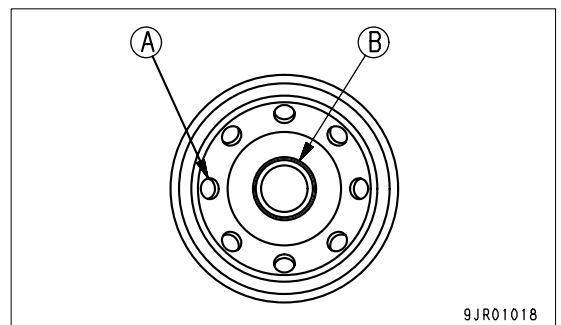
**NOTICE**

- 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 on the left of the machine.
  2. Using a filter wrench, turn filter cartridge (1) counterclockwise to remove it.
  3. Clean the filter holder, then coat the packing portion of the new filter cartridge with oil, and install.

**NOTICE**

- Do not fill the fuel filter cartridge with fuel.
- Remove cap (B) and install the fuel filter.



4. When installing, tighten until the packing surface contacts the seal surface of the filter holder, then tighten it 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 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) on 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 fuel leakage from the filter seal surface.

## 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 HYDRAULIC OIL FILTER ELEMENT

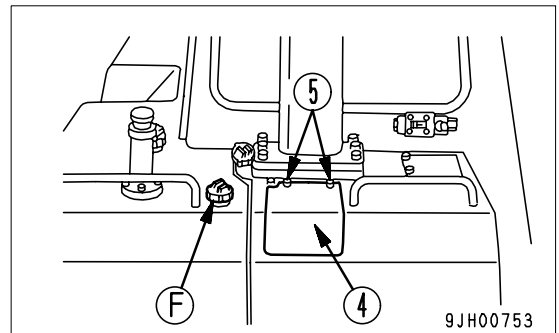
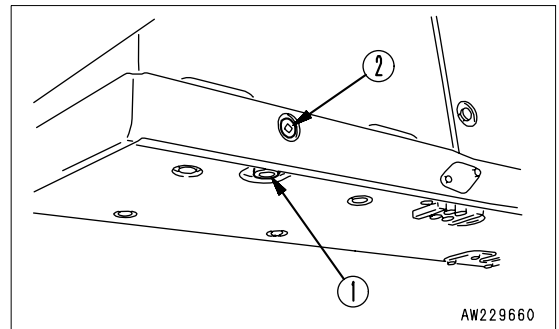


## WARNING

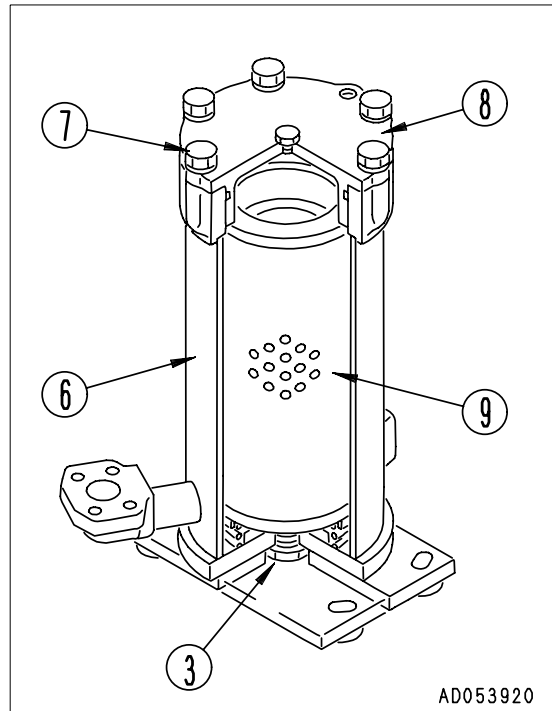
The oil is at high temperature immediately after the machine has been operated. Wait for the oil to cool down before changing the oil.

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

- Oil replacement amount: 87 liters
- 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) on the cover at the front of the hydraulic tank, then remove the inspection cover.



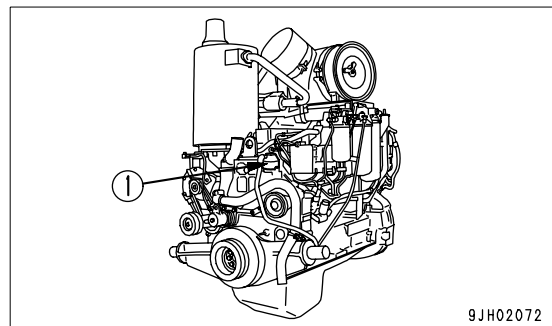
4. Remove mounting bolts (7) of hydraulic oil filter (6), then remove cover (8).
5. Remove drain plug (3) that can be seen from under the fender and drain the oil between there and the oil filter case. When loosening drain plug (3), be careful not to get oil over yourself.
6. Remove element (9).
7. Clean the inside of the case and removed parts. Install a new filter. Always use Komatsu genuine filter.
8. Install 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 (3-78)".

#### CLEAN ENGINE BREATHER ELEMENT

1. Wipe off all the dirt from around the breather (1).
2. Remove breather (1).
3. Rinse 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 may 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

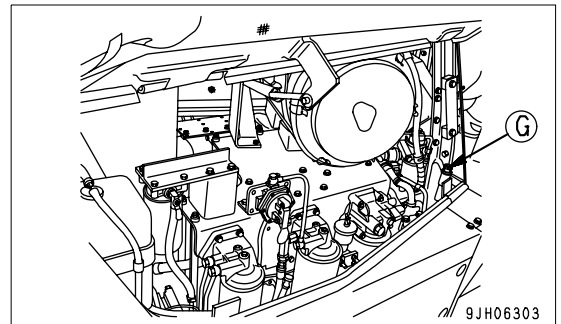


**WARNING**

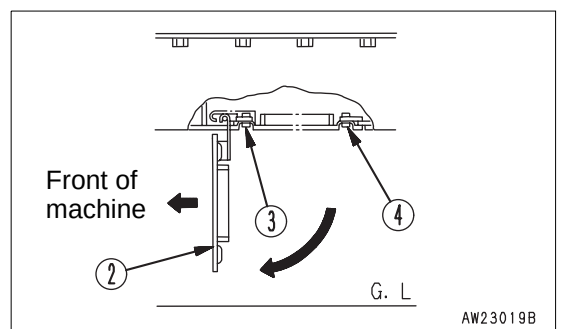
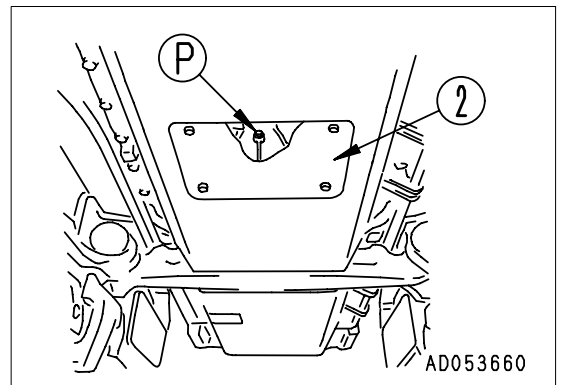
- The oil is at high temperature immediately after the machine has been operated. Wait for the oil to cool down before carrying out maintenance.
- The undercover is heavy. Do not go directly under the cover when opening or closing it. When removing bolts (4), carry out the operation at the rear of the point immediately under the cover so that it is possible to escape at any time.

- Refill capacity: 1.5 liters

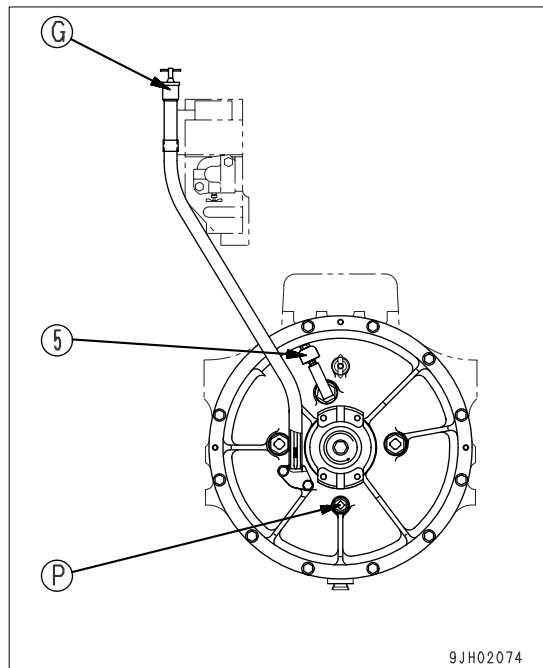
1. Open the engine side cover on the left of the machine; you can see gauge (G).



2. Remove the undercover (2) at the bottom rear of the chassis as follows.
3. Remove 2 bolts (3) toward the front of the chassis.
4. Hold down cover (1) and gradually remove 2 bolts (4) at the machine rear end. (Rainwater or other accumulated water may flow out, so be careful.)

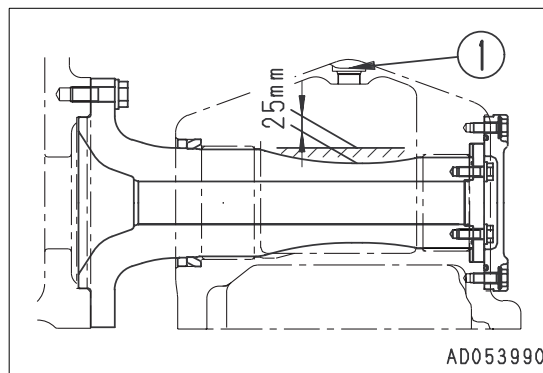
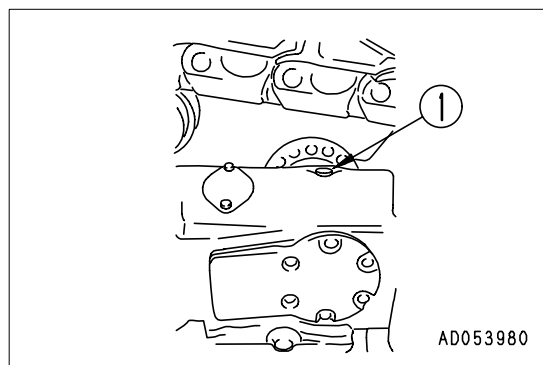


5. Lower cover (2) gradually to open it. Drain plug (P) can be seen at the top.
6. Remove dipstick (G), then remove drain plug (P) and drain the oil.  
After draining the oil, tighten drain plug (P).
7. Add engine oil through the holder of dipstick (G). After adding the oil, insert dipstick (G).
8. Remove 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.
9. Install undercover (2), then close engine side cover (1) on 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) shown in the diagram. If the oil level is low, add engine oil through the hole of plug (1).
3. Install plug (1).





## 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.

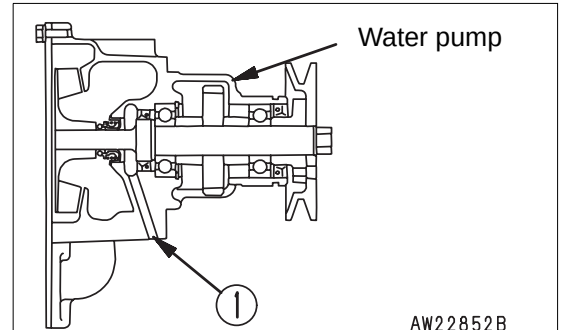
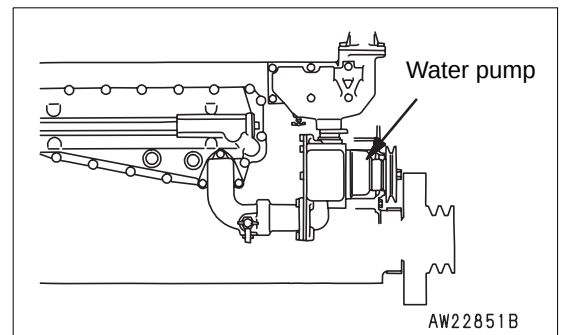
### CLEAN, CHECK TURBOCHARGER

### CHECK ENGINE VALVE CLEARANCE, ADJUST

As special tools is required for removing and adjusting the parts, you should request service from your Komatsu distributor.

### CHECK WATER PUMP

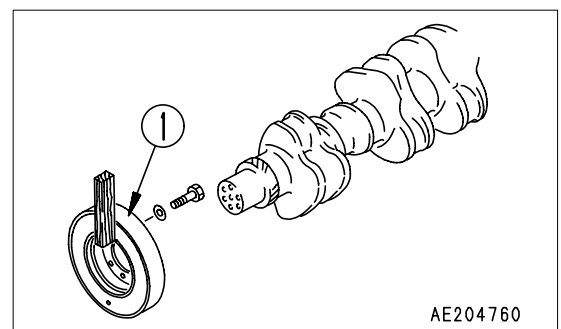
Check for leakage of oil or water, and check for clogging of breather hole (drain hole) (1). If any abnormality is found, please ask your Komatsu distributor to carry out repairs or replacement.



### 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.



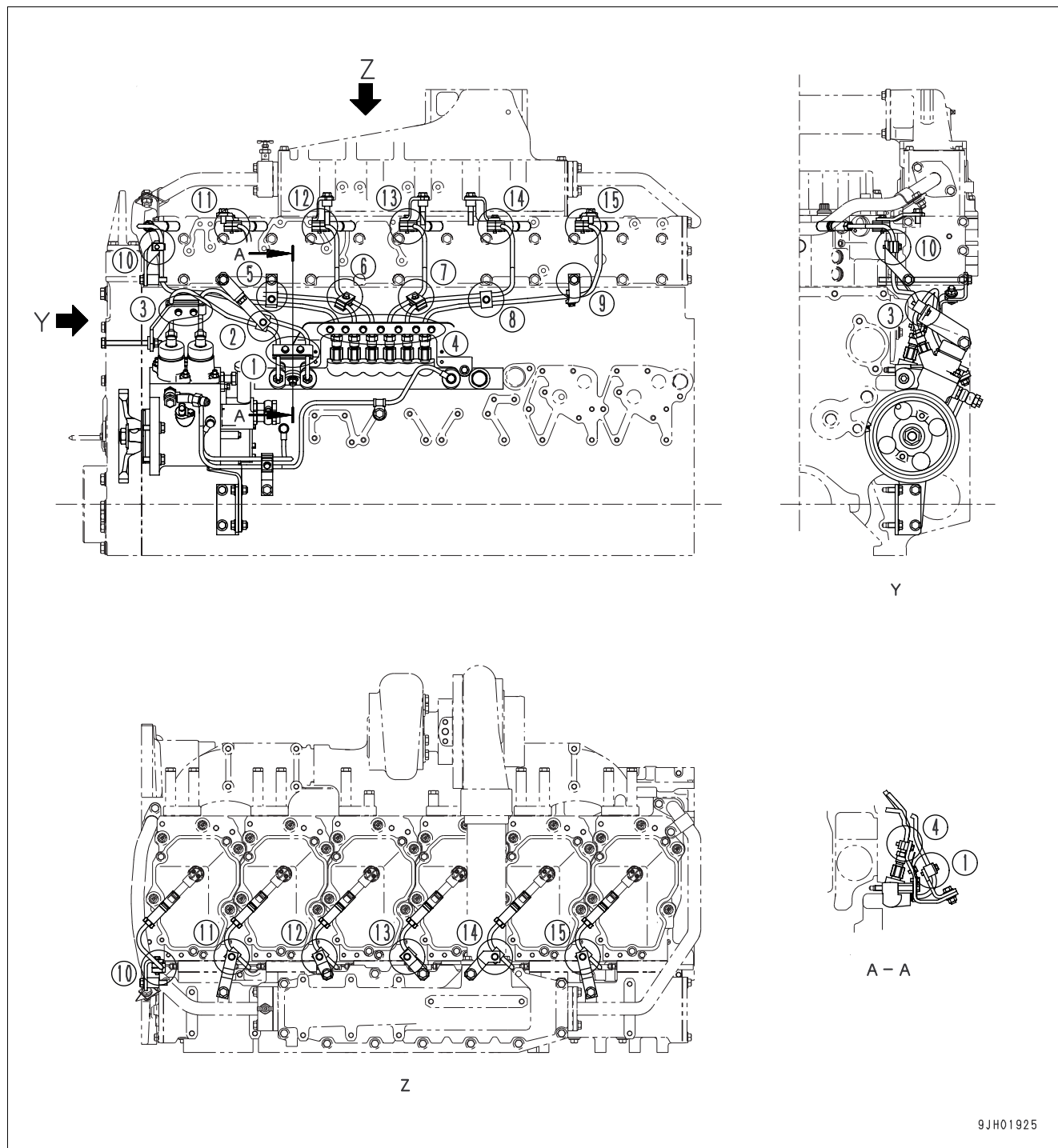
### CHECK INJECTOR

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 (3-139)" "Exhaust color is black".

**CHECKING FOR LOOSENESS OF HIGH-PRESSURE CLAMP, HARDENING OF RUBBER**

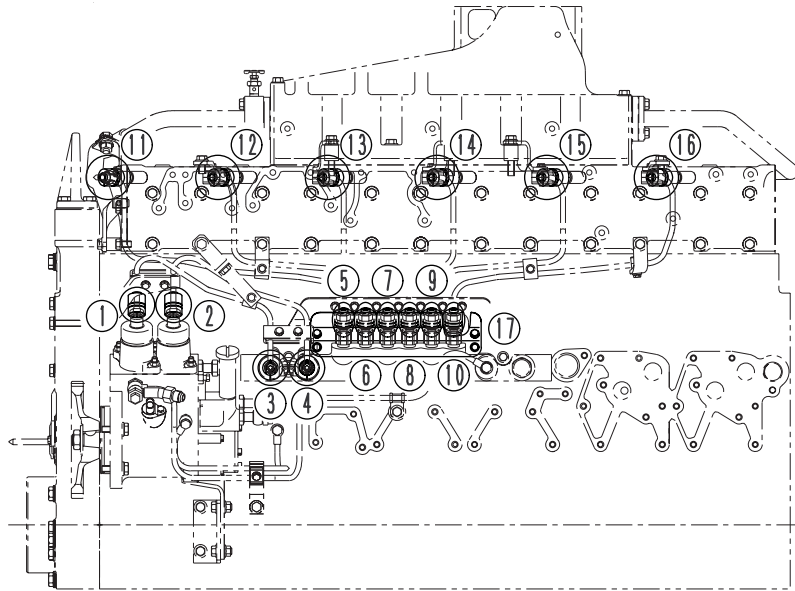
Check for any looseness in the high-pressure clamp mounting bolts (1) to (15) in the drawing in the illustrations below. Check visually and feel with your finger to check that the rubber has not hardened. If there is any problem, the problem part must be replaced. Contact your Komatsu distributor for part replacement.

**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. Contact your Komatsu distributor for part replacement.



9JH01926

## **EVERY 8000 HOURS SERVICE**

Maintenance for every 10, 100, 250, 500, 1000, 2000, and 4000 hours of service should be performed at the same time.

### **REPLACE INJECTOR NOZZLE TIP**

Contact your Komatsu distributor to have the injector nozzle assembly replaced.

### **REPLACE HIGH-PRESSURE PIPING CLAMPS**

Contact your Komatsu distributor to have the engine high-pressure clamps replaced.

### **REPLACE FUEL SPLAY PREVENTION CAPS**

Contact your Komatsu distributor to have the fuel spray prevention cap replaced.

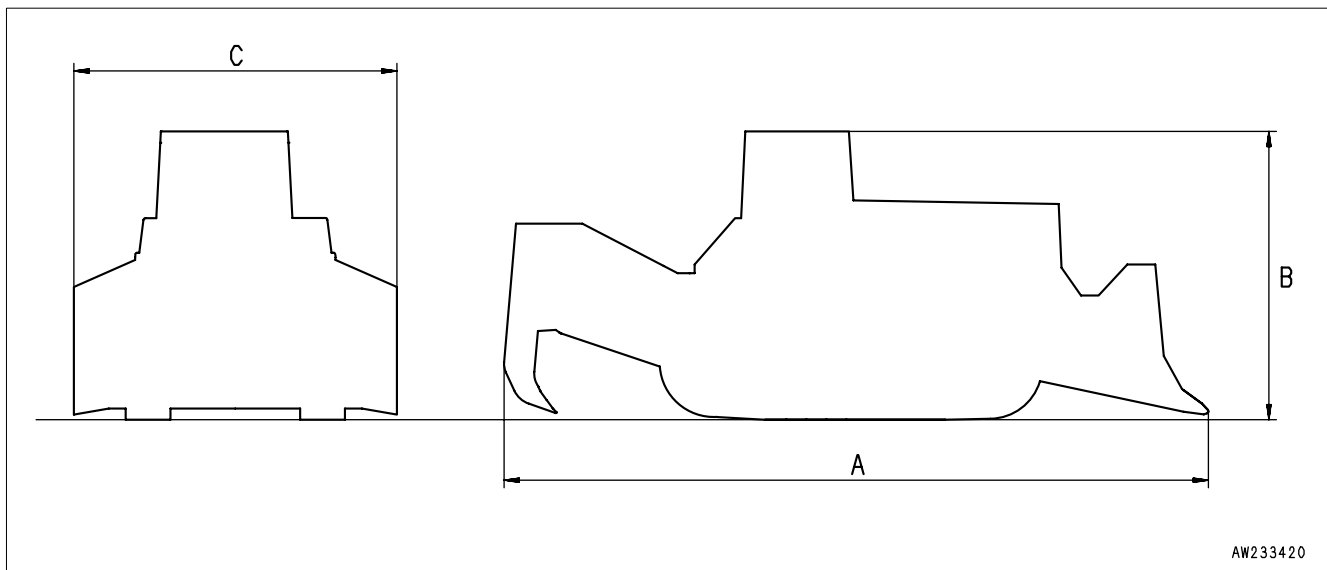
# **SPECIFICATIONS**

# SPECIFICATIONS

|   | Item                                                           |         | Unit        | D155AX-5                         |
|---|----------------------------------------------------------------|---------|-------------|----------------------------------|
|   | Operating weight<br>(without operator)                         |         | kg          | 39,500 *1                        |
|   | Blade (straight tiltdozer)<br>Unit weight (including cylinder) |         | kg          | 4,900                            |
|   | Ripper unit weight                                             |         | kg          | 3,710                            |
|   | Name of engine                                                 |         | -           | Komatsu SA6D140E-3 diesel engine |
|   | Engine horsepower                                              |         | kW (HP)/rpm | 231(310)/1,900                   |
| A | Overall length                                                 |         | mm          | 8,155                            |
| B | Overall height                                                 |         | mm          | 3,500                            |
| C | Overall width                                                  |         | mm          | 3,955                            |
|   | Travel speed<br>(1st/2nd/3rd)                                  | Forward | km/h        | 3.5/6.2/10.8                     |
|   |                                                                | Reverse | km/h        | 4.8/8.4/13.9                     |

\*1: Hydraulic tiltdozer (semi U-dozer)

With hydraulic variable multi-shank ripper, ROPS, cab, 560 mm HD shoe, side cover, air conditioner.



# ATTACHMENTS, OPTIONS



## **WARNING**

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

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## GENERAL PRECAUTIONS

### 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 distributor for a new copy.

Depending on the attachment, install the necessary front guard on 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), 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

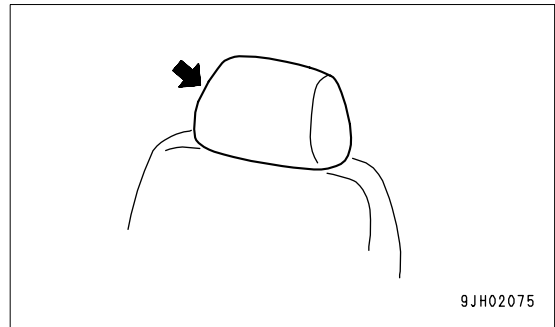
### INTRODUCTION OF ATTACHMENTS AND OPTIONS

| Name          | Specifications, use          |
|---------------|------------------------------|
| Track shoes   | Wide shoe width 610 mm       |
|               | Wide shoe width 660 mm       |
|               | Wide shoe width 710 mm       |
|               | Heavy-duty shoe width 610 mm |
|               | Heavy-duty shoe width 660 mm |
| 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.



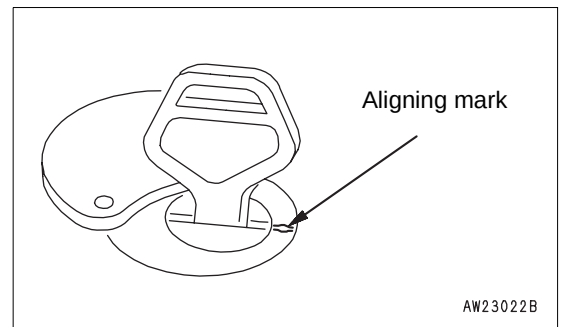
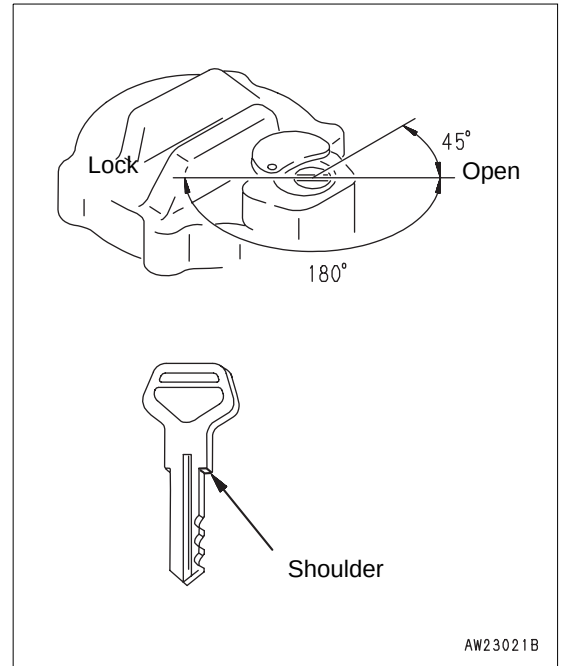
## CAP WITH LOCK, HANDLING

### 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.

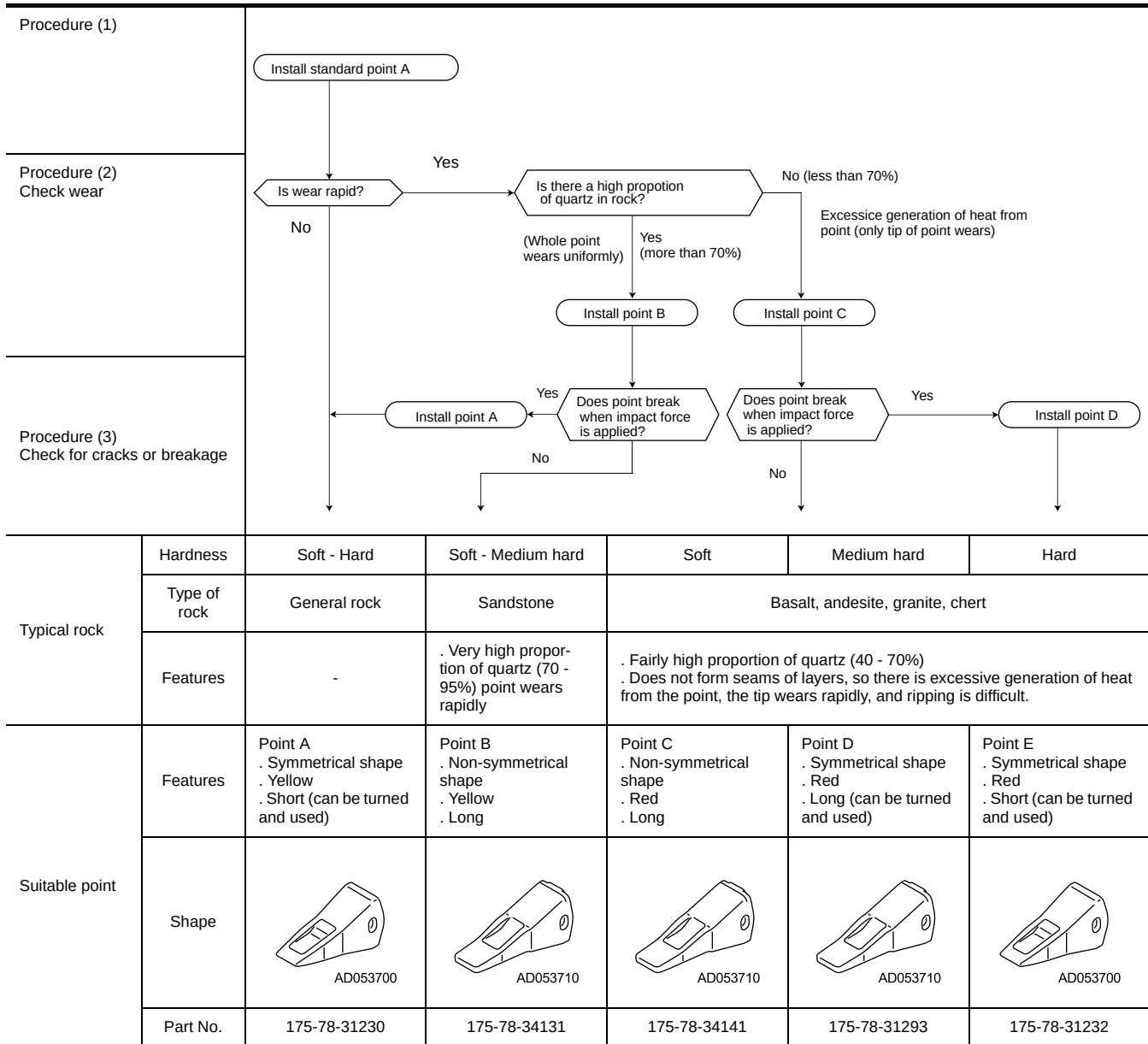


#### TO LOCK THE CAP

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



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## INDEX

# INDEX

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# COLOPHON

D155AX-5 GALEO BULLDOZER  
Form No. EEAM023402

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