

# Operation & Maintenance Manual

WHEEL LOADER

**WA1200-3**

SERIAL NUMBERS 50102 and up

**⚠ WARNING**

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

**NOTICE**

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

**KOMATSU**

# FOREWORD

## **CALIFORNIA**

### **Proposition 65 Warning**

Mercury and mercury compounds are known to the State of California to cause developmental problems. Mercury in this machine is sealed in non-removable backlight bulbs in the monitor display and/or HID lamps. There is no risk of exposure unless the lamps are broken. However, the monitor and lamps must be reused, recycled or properly disposed of in accordance with Local, State and Federal Laws at the end of their useful lives.

## **CALIFORNIA**

### **Proposition 65 Warning**

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

## **CALIFORNIA**

### **Proposition 65 Warning**

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

## FOREWORD

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



### WARNING

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

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

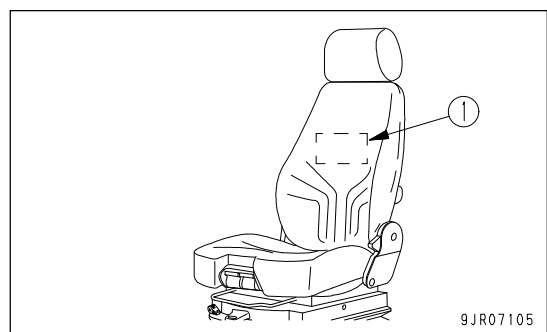
Keep this manual in the storage location for the operation and maintenance manual given below, and have all personnel read it periodically.

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.

Storage location for the Operation and Maintenance Manual:  
Pocket (1) at rear 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.

 <b>DANGER</b>	Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.
 <b>WARNING</b>	Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.
 <b>CAUTION</b>	Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury. This word is used also to alert against unsafe practices that may cause property damage.

### Example of safety message using signal word

 **WARNING**

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

### Other signal words

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

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

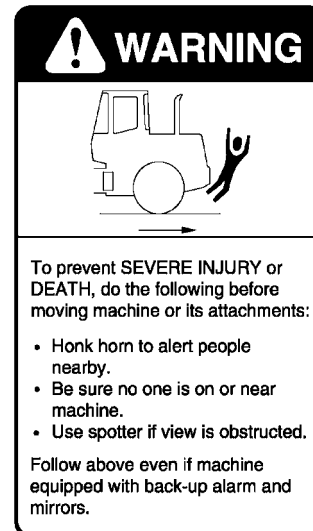
**REMARKS** This word is used for information that is useful to know.

- Safety labels

Safety labels are affixed to the machine to inform the operator or maintenance worker on the spot when carrying out operation or maintenance of the machine that may involve hazard.

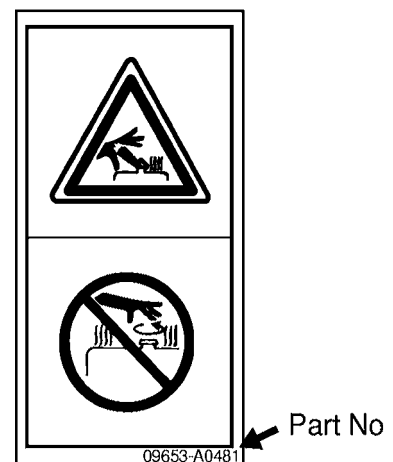
This machine uses "Safety labels using words" and "Safety labels using pictograms" to indicate safety procedures.

#### Example of safety label using words



#### Safety labels using pictogram

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



Komatsu cannot predict every circumstance that might involve a potential hazard in operation and maintenance. Therefore, the safety messages in this manual and on the machine may not include all possible safety precautions. If any procedures or actions not specifically recommended or allowed in this manual are used, it is your responsibility to take the necessary steps to ensure safety.

In no event should you engage in prohibited uses or actions described in this manual.

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

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

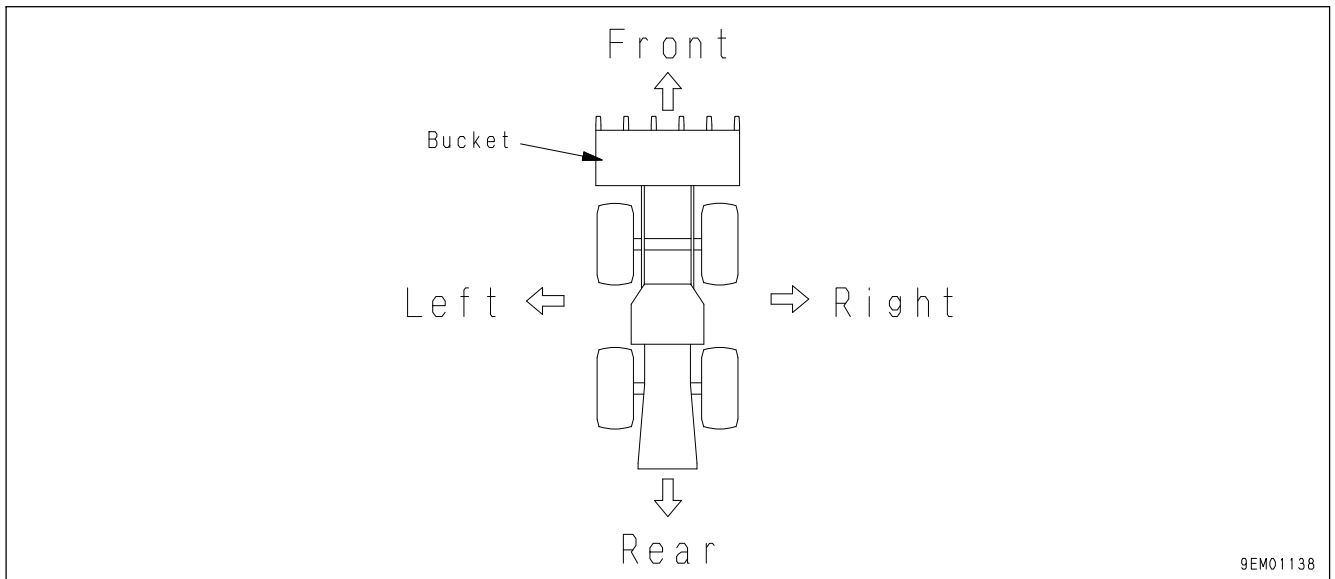
## INTRODUCTION

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

- Digging work
- Smoothing
- Pushing work
- Loading work

For details of the operating procedure, see "WORK POSSIBLE USING WHEEL LOADER (PAGE 3-111)".

### FRONT/REAR, LEFT/RIGHT DIRECTIONS OF MACHINE



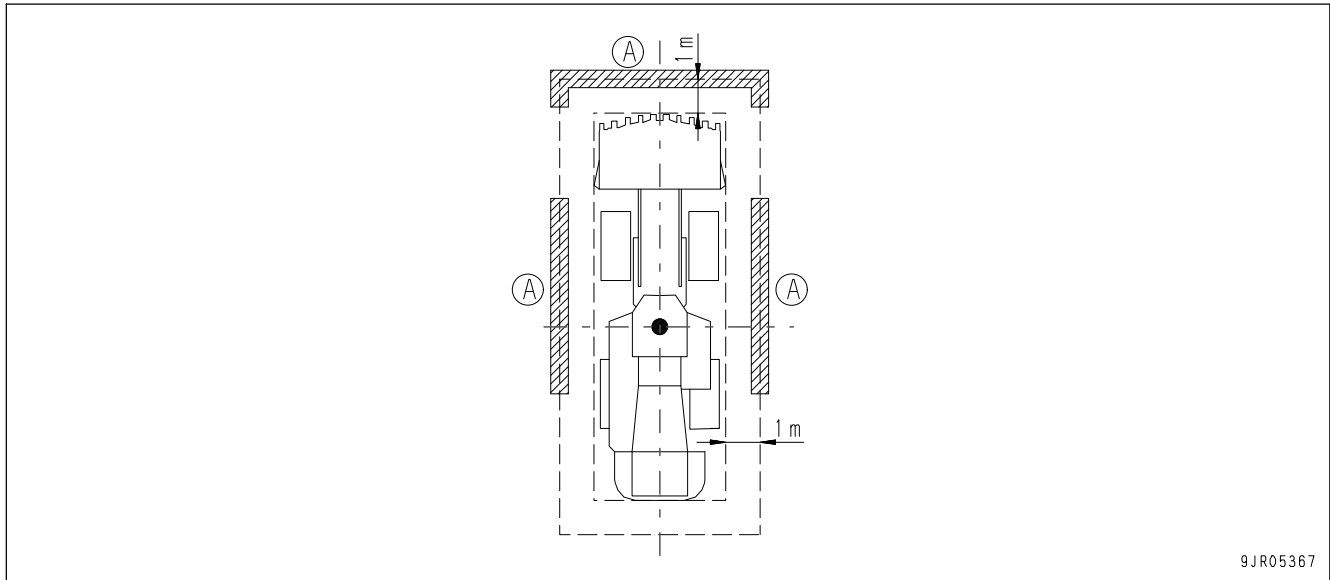
In this manual, the directions of the machine (front, rear, left, right) are determined according to the view from the operator's seat in the direction of travel (front) of the machine.

### VISIBILITY FROM OPERATOR'S SEAT

The visibility standards (ISO 5006) for this machine require a view shown in the diagram below.

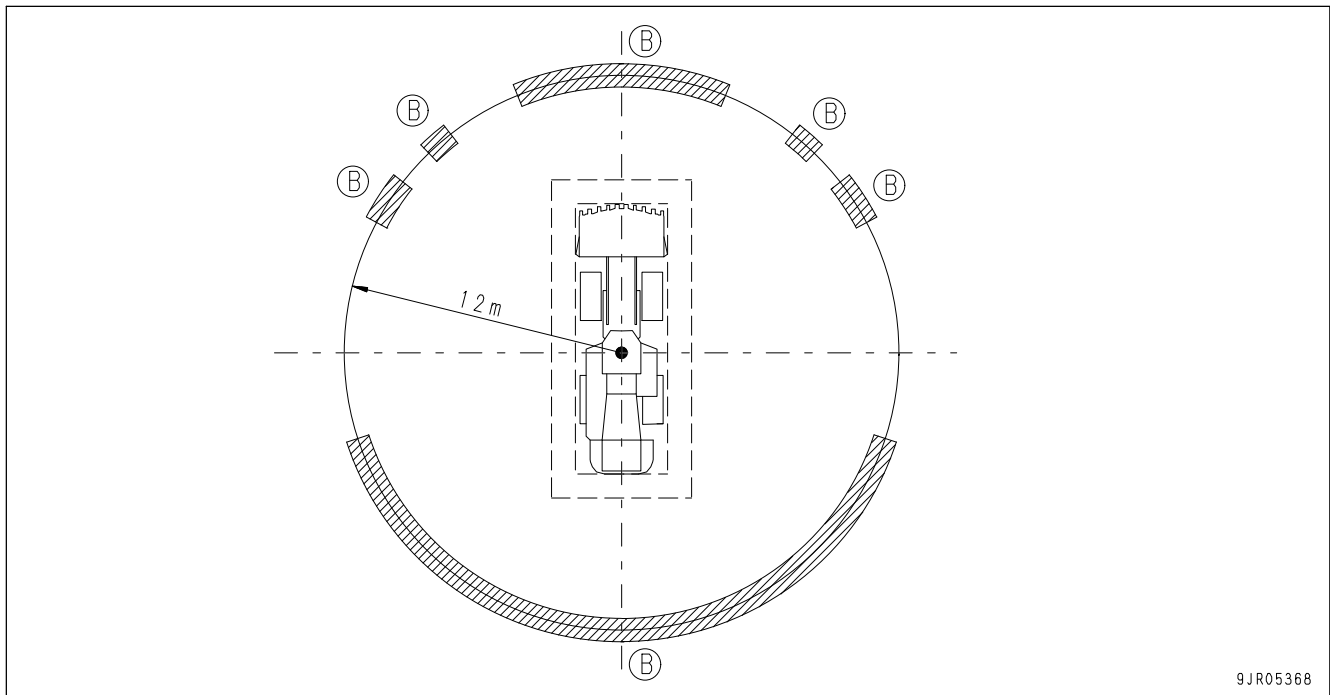
### VISIBILITY IN IMMEDIATE AREA

The visibility of this machine in the area 1 m (3 ft 3in) from the outside surface of the machine at a height of 1.5 m (4 ft 11 in) is shown in the diagram below. The hatched area (A) shows the area where the view is blocked by part of the machine when mirrors or other aids to visibility are installed as standard. Please be fully aware that there are places that cannot be seen when operating the machine.



### 12-M RADIUS VISIBILITY

The visibility at a radius of 12 m from the machine is as shown in the diagram below. The hatched areas (B) show the areas where the view is blocked when mirrors or other aids to visibility are installed as standard. Please be fully aware that there are places that cannot be seen when operating the machine.



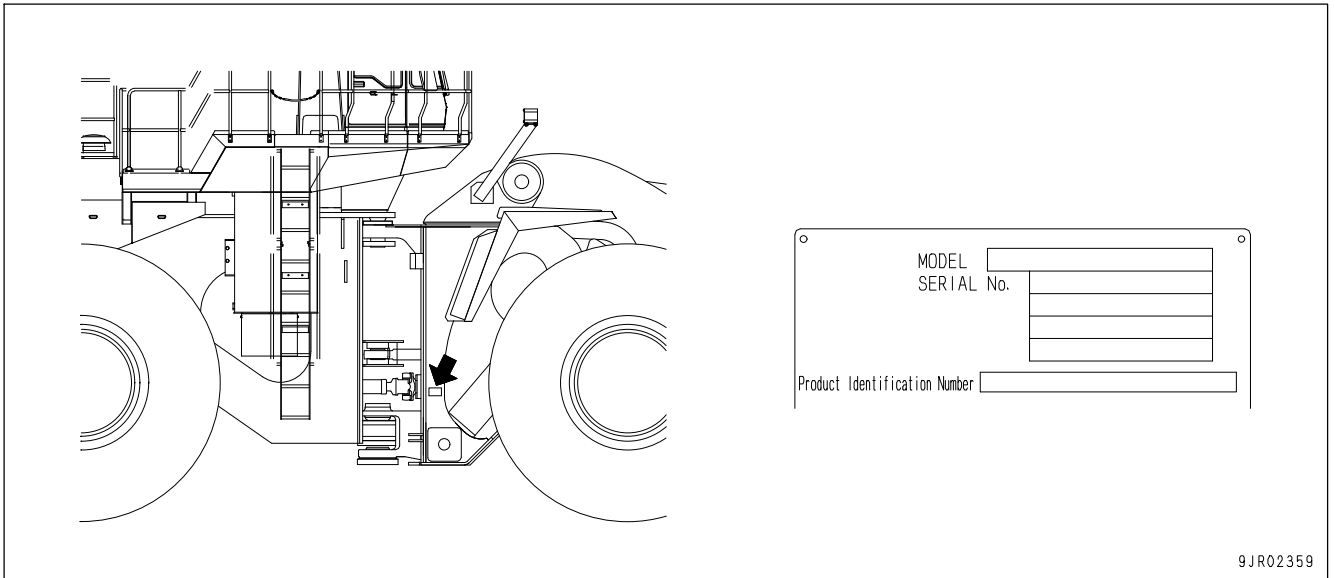
## NECESSARY INFORMATION

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

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

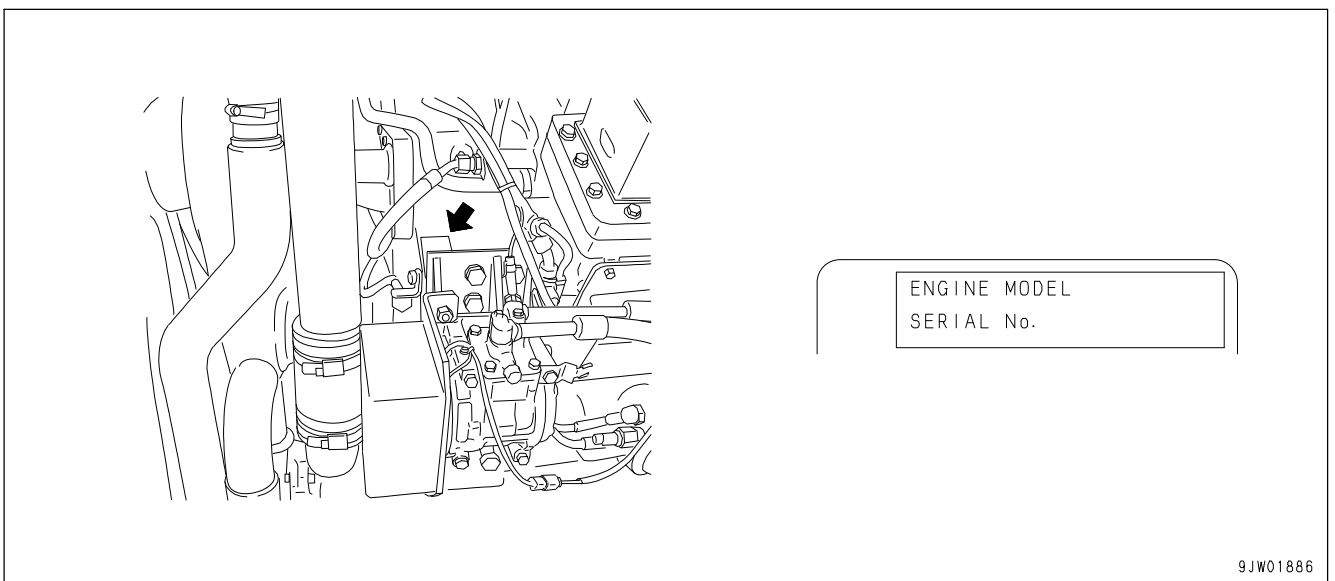
On the center right of the front frame.

The design of the nameplate differs according to the territory.



### ENGINE SERIAL NO. PLATE AND POSITION

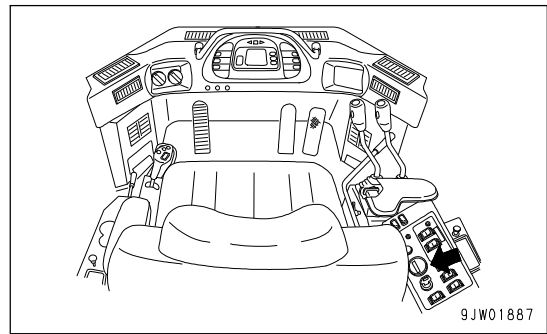
On the right of the cylinder block, when seen from the fan side.





**POSITION OF SERVICE METER**

On the lower right of maintenance monitor.



**TABLE TO ENTER SERIAL NO. AND DISTRIBUTOR**

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

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# SAFETY

## **WARNING**

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

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## SAFETY LABELS

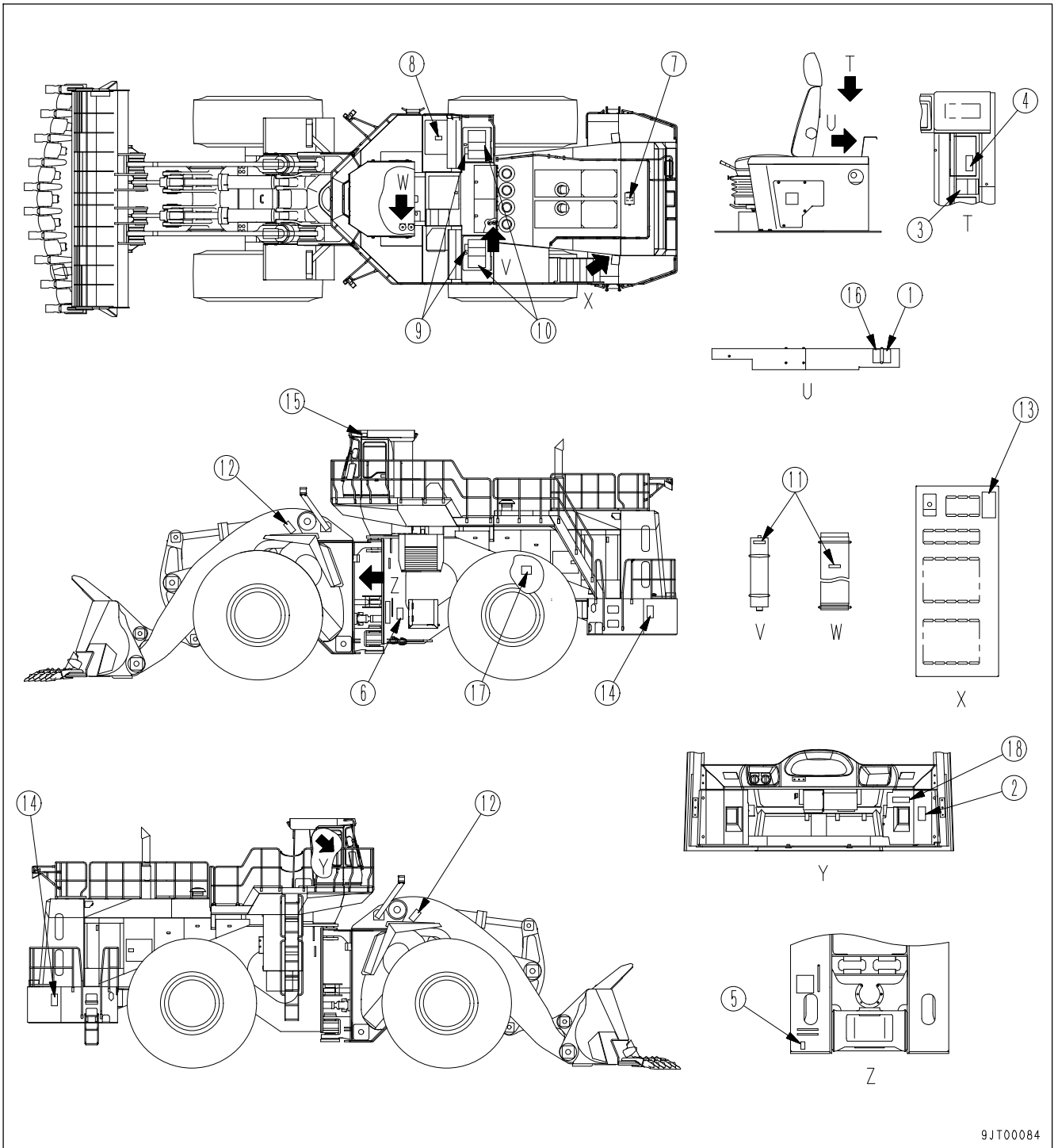
The following safety labels are used on this machine. Be sure that you fully understand the correct position and content of these safety labels.

To ensure that the content of these safety labels can be read properly, be sure that they are in the correct place and always keep them clean. When cleaning them, use soap and water. Do not use organic solvents or gasoline. These may cause the safety labels to peel off.

If the safety labels are damaged or lost, or cannot be read, replace them with new parts. For details of the part numbers, see this manual or check on the actual part, and order the new part from your Komatsu distributor.

There are also other labels in addition to the safety labels. Handle these labels in the same way.

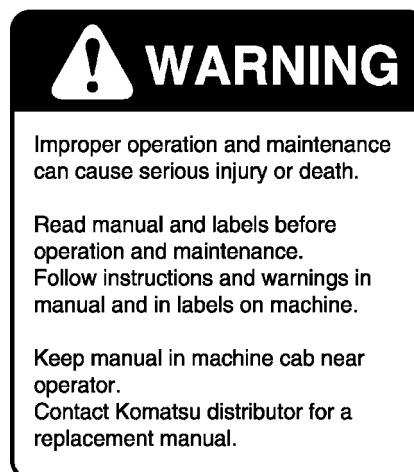
**LOCATION OF SAFETY LABELS**



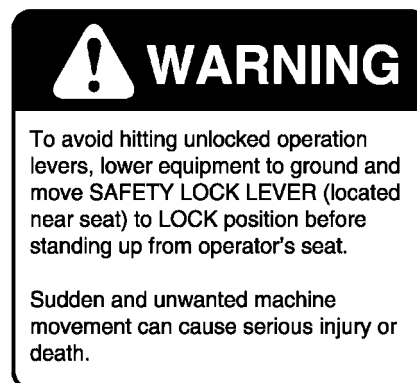
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**SAFETY LABELS**

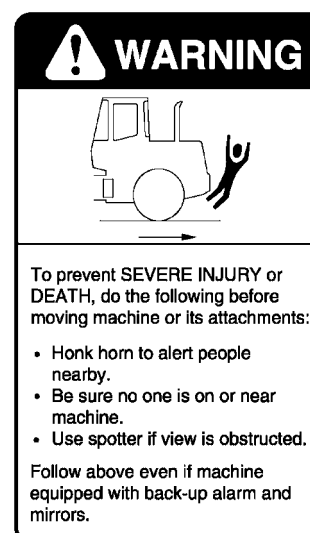
## (1) Caution before starting



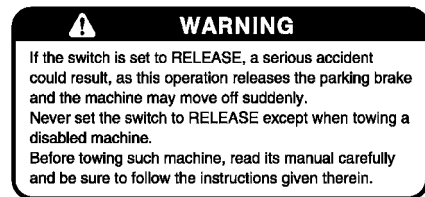
## (2) Caution for lock lever



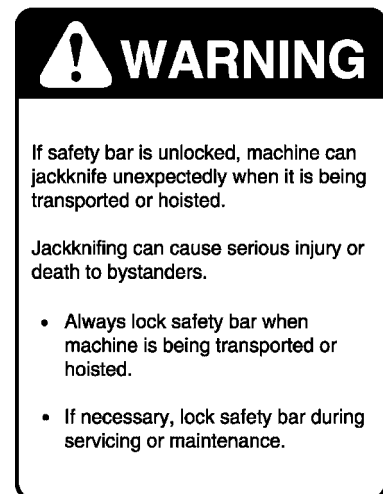
## (3) Caution when traveling in reverse



(4) Caution for parking brake



(5) Caution for frame lock bar



(6) No entry



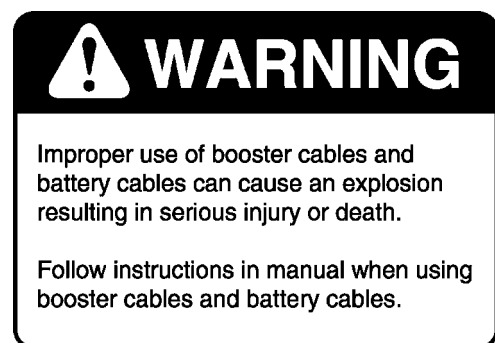
(7) Caution when coolant is at high temperature



(8) Caution when oil is at high temperature



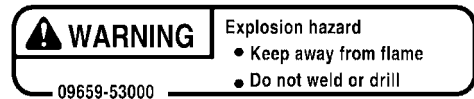
(9) Caution when handling battery cable



(10) Caution when handling battery



(11) Explosion hazard (09659-53000)



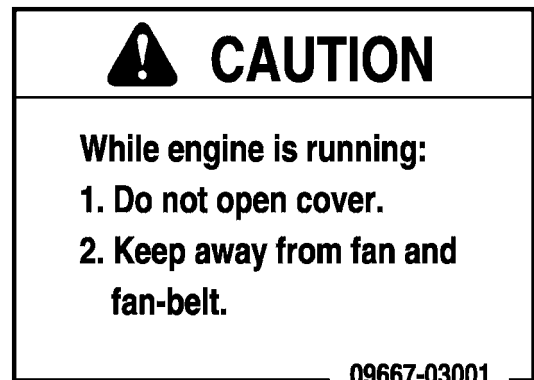
(12) "Do not go under work equipment" sign (09807-C1683)



Sign indicates a crush hazard from falling off of working device.

Keep away when the working device is raised.

(13) "Do not open when engine is running" sign (09667-03001)



(14) "Do not come near machine" sign (09812-03000)



(15) "Do not modify ROPS" sign (09620-30201)

**KOMATSU** ROLL-OVER PROTECTIVE STRUCTURE (ROPS) CERTIFICATION  
 THIS KOMATSU ROPS, MODEL & TYPE No. [ ] SERIAL No. [ ] WHEN  
 INSTALLED IN ACCORDANCE WITH THE MANUFACTURER'S INSTALLATION IN-  
 STRUCTIONS ON A [ ] FOR MAXIMUM PRIME MOVER  
 MASS NOT GREATER THAN [ ] (LBS)(kg). IS CERTIFIED TO  
 COMPLY WITH THE FOLLOWING REQUIREMENTS: a) ISO 3471 (ROPS) & ISO  
 3449 (FOPS) b) SAE J [ ] & SAE J [ ]

---

**WARNING**

- Altering ROPS may weaken it. Consult Komatsu Distributor before altering.
- ROPS may provide less protection if it has been structurally damaged or involved in roll-over.
- Always wear seat belt when moving.

Komatsu Ltd. Japan 2-3-6 Akasaka, Minato-ku, Tokyo, Japan 09620-30201

(16) Caution for electric shock (09801-13001)

**DANGER**

Hazardous voltage hazard  
 Serious injury or death can occur if machine or attachments are not kept safe distance away from electric lines

	VOLTAGE	SAFE DISTANCE
LOW VOLTAGE	100V 200V	2 m
	6,600V	2 m
	22,000V	3 m
	66,000V	4 m
SPECIAL HIGH VOLTAGE	154,000V	5 m
	187,000V	6 m
	275,000V	7 m
	500,000V	11 m

09801-13001

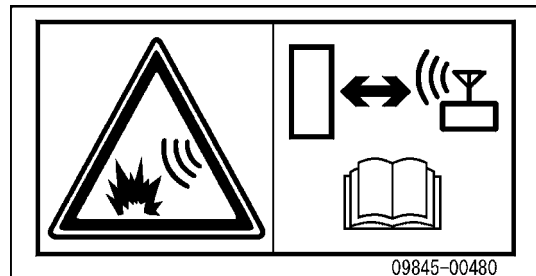
(17) Prohibition of engine start by short-circuiting (09842-A0481)



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.

(18) Caution blast site (09845-00480)  
 (only when equipped with KOMTRAX Plus)



Sign indicates an explosion hazard caused by active radio transmitter at a blast zone.

Keep machine at a safe distance from a blast zone and detonator.

Order safety labels (1) and (2) as part number 42C-93-11180.

Order safety labels (3) and (4) as part number 42C-93-11361.

Order safety labels (5) to (9) as part number 421-93-21311.

Safety label (10) is stuck on the machine by the battery maker.

Safety label (17) is fixed to the engine starting motor.



## GENERAL PRECAUTIONS

### SAFETY RULES

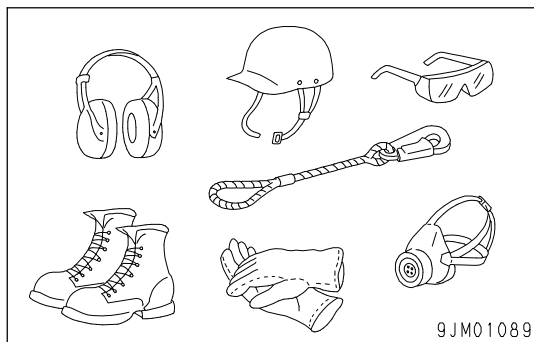
- Only trained and authorized personnel can operate and maintain the machine.
- Follow all safety rules, precautions and instructions in this manual when operating or performing maintenance on the machine.
- If you are not feeling well, or if you are under the influence of alcohol or medication, your ability to safely operate or repair your machine may be severely impaired, putting yourself and everyone else on your job site in danger.
- When working with another operator or with the person on the worksite traffic duty, discuss the content of the operation beforehand and use the determined signals when carrying out the operation.

### 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

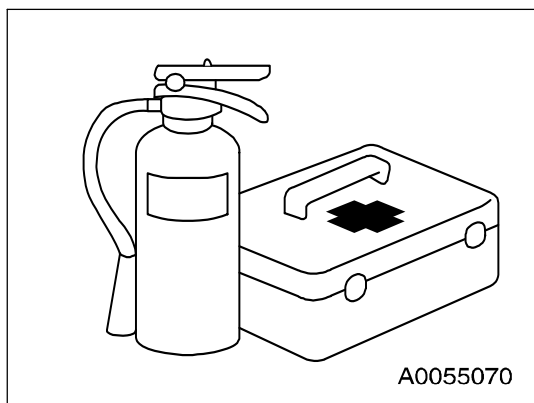
- Do not wear loose clothing and accessories. There is a hazard that they may catch on control levers or other protruding parts.
- If you have long hair and it hangs out from your hard hat, there is a hazard that it may get caught up in the machine, so tie your hair up and be careful not to let it get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

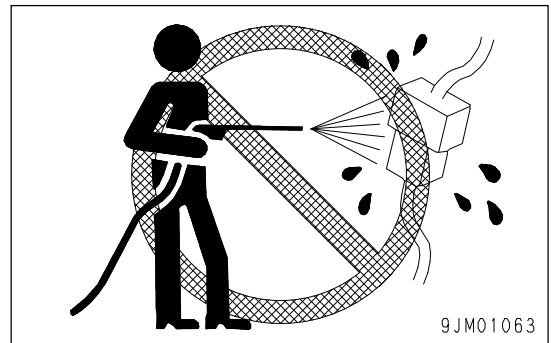


### SAFETY FEATURES

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

**KEEP MACHINE CLEAN**

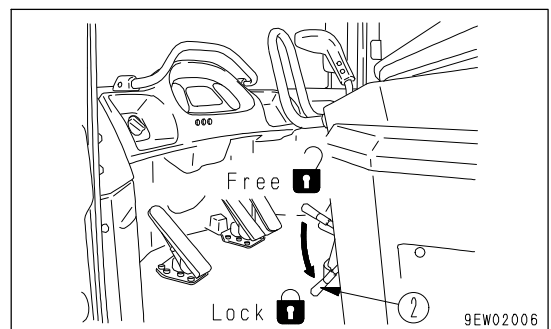
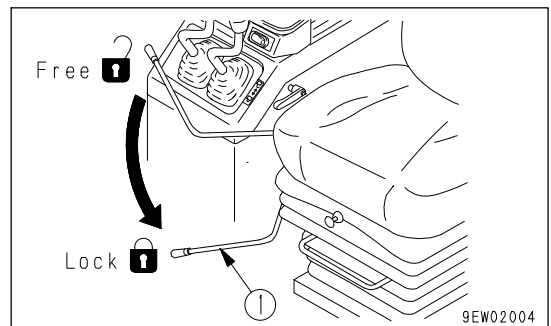
- If water gets into the electrical system, there is a hazard that it will cause malfunctions or misoperation. Do not use water or steam to wash the electrical system (sensors, connectors).
- If inspection and maintenance is carried out when the machine is still dirty with mud or oil, there is a hazard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

**INSIDE OPERATOR'S COMPARTMENT**

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

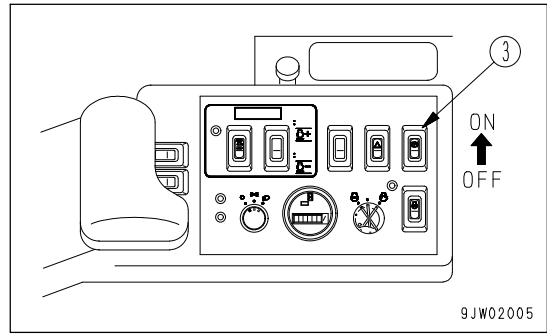
**ALWAYS APPLY LOCK WHEN LEAVING OPERATOR'S SEAT**

- Before standing up from the operator's seat to adjust the operator's seat, always lower the work equipment, set lock levers (1) and (2) to the LOCK position, parking brake switch (3) to the ON position, then stop the engine. If the lock is not applied and the control levers are touched by mistake, the machine may suddenly move and cause serious personal injury or damage.



- When leaving the machine, always lower the work equipment to the ground, set lock levers (1) and (2) to the LOCK position, parking brake switch (3) to the ON position, then stop the engine.

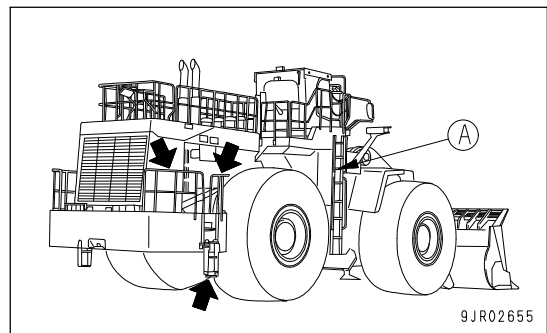
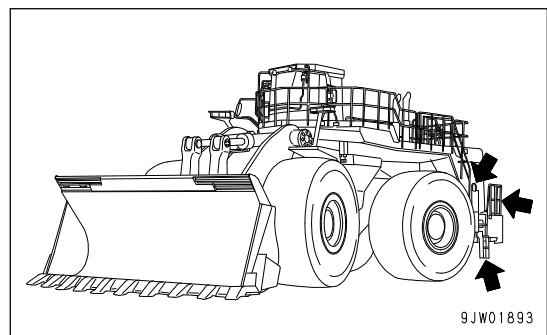
Lock all places and always take the key with you and leave it in the specified location.



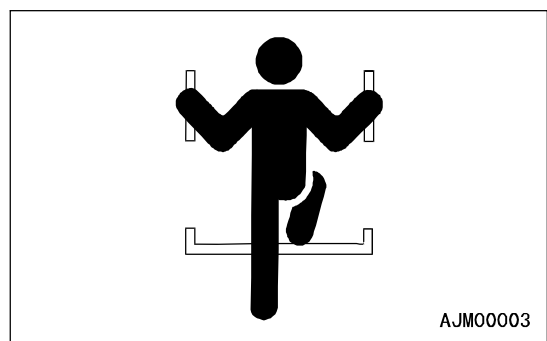
**HANDRAILS AND STEPS**

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

- Use the handrails and steps marked by arrows in the figure on the right when getting on or off the machine.
- Ladder (A) is the ladder for emergency escape. Use this ladder if there is a fire or any other emergency on the machine. Normally, do not use it.



- 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 to ensure that you support yourself.
- When entering the cab, stand on the top step before opening the door.
- Do not grip the control levers or lock lever when getting on or off the machine.
- Never climb on the engine hood or covers where there are no non-slip pads.
- Never move from the step at the rear of the machine or the step at the side of the cab to stand on top of the tire.
- Before getting on or off the machine, check the handrails and steps, and if there is any oil, grease, or mud on them, wipe it off immediately. In addition, 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**

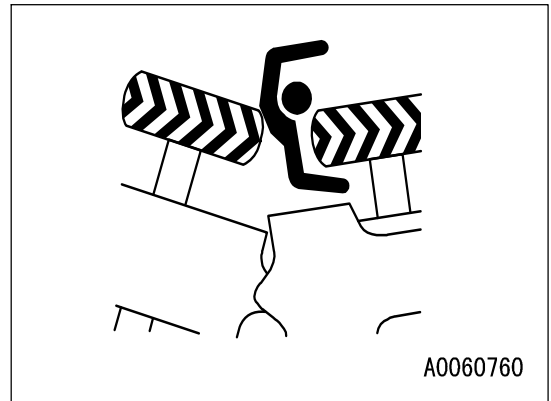
- Never jump on or off the machine. Never get on or off a moving machine.
- If the machine starts to move when there is no operator on the machine, do not jump on to the machine and try to stop it.

**NO PEOPLE ON ATTACHMENTS**

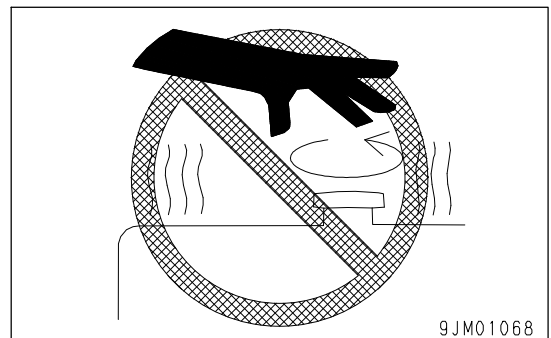
Never let anyone ride on the work equipment, or other attachments. There is a hazard of falling and suffering serious injury.

**DO NOT GET CAUGHT IN ARTICULATED PORTION**

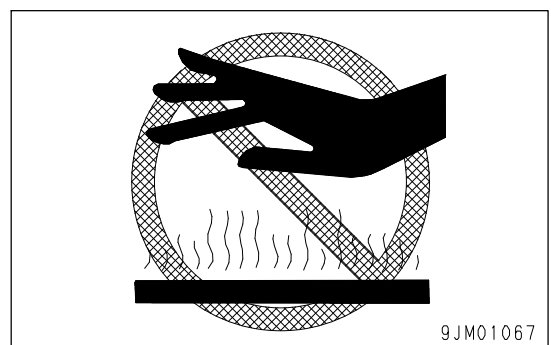
- If the clearance at the articulating portion changes, it will lead to serious personal injury.  
Do not allow anyone to come inside the articulation range.
- The clearance in the area around the work equipment changes according to the movement of the link. If you get caught, it will lead to serious injury. Do not allow anyone near any of the rotating or telescoping parts.

**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.

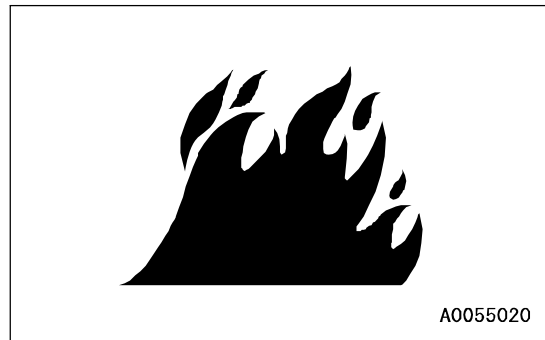


**FIRE PREVENTION**

- **Fire caused by fuel, oil, COOLANT or window washer fluid**

Do not bring any flame or fire close to flammable substances such as fuel, oil, COOLANT or window washer fluid. There is danger that they may catch fire. To prevent fire, always observe the following:

- Do not smoke or use any flame near fuel or other flammable substances.
- Stop the engine before adding fuel.
- Do not leave the machine when adding fuel or oil.
- Tighten all fuel and oil caps securely.
- Be careful not to spill fuel on overheated surfaces or on parts of the electrical system.
- After adding fuel or oil, wipe up any spilled fuel or oil.
- Put greasy rags and other flammable materials into a safe container to maintain safety at the workplace.
- When washing parts with oil, use a non-flammable oil. Do not use diesel oil or gasoline. There is danger that they may catch fire.
- Do not weld or use a cutting torch to cut any pipes or tubes that contain flammable liquids.
- Determine well-ventilated areas for storing oil and fuel. Keep the oil and fuel in the determined place and do not allow unauthorized persons to enter.
- When carrying out grinding or welding work on the machine, move any flammable materials to a safe place before starting.



- **Fire caused by accumulation of flammable material.**

Remove any dry leaves, chips, pieces of paper, dust, or any other flammable materials accumulated or affixed around the engine, exhaust manifold, muffler, or battery, or inside the undercovers.

- **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.
- If the engine does not stop even when the starting switch is turned OFF, pull the emergency fuel cut lever at the side of the rear left entrance to stop the supply of fuel to the engine.

**WINDOW WASHER LIQUID**

Use an ethyl alcohol base washer liquid.

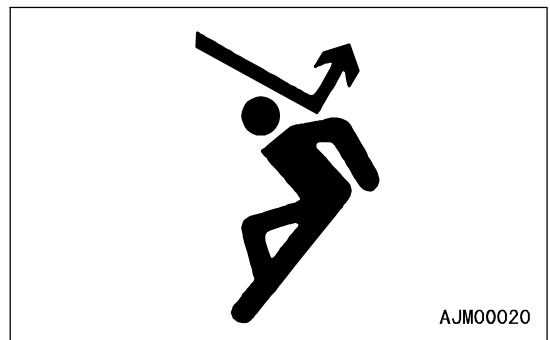
Methyl alcohol base washer liquid may irritate your eyes, so do not use it.

**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 the ROPS is welded, or holes are drilled in it, or it is modified in any other way, its strength may drop. Consult your Komatsu distributor before carrying out any modification.
- If ROPS is damaged or deformed by falling objects or by rolling over, its strength will be reduced and it will not be able to fulfill its function properly. In such cases, always Komatsu contact your distributor for advice of the method of repair.

Even if ROPS is installed, always fasten your seat belt properly when operating the machine. If you do not use your fasten your seat belt properly, it cannot display its effect.

**PRECAUTIONS FOR ATTACHMENTS, OPTIONS**

- 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, product failures or other property damages 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**

If this machine is modified without permission from Komatsu, there is danger that problems may occur with safety and that this may lead to serious personal injury. Modifications may have an adverse effect on items such as machine strength and visibility. Before making any modifications, please consult your Komatsu distributor. Komatsu cannot take any responsibility for accidents, failures, or damage caused by modifications not authorized by Komatsu.

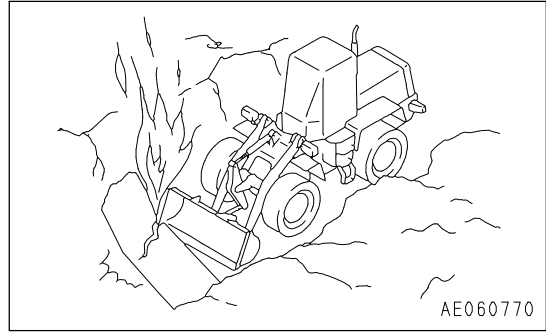
**SAFETY AT WORKSITE**

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

- When carrying out operations near combustible materials such as attached 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 operate 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 action to prevent unauthorized people from approaching the jobsite.

When working on public roads, position flagmen and erect barriers to ensure the safety of passing traffic and pedestrians.

- 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.
- In order that travel operations can be carried out safely, always keep the roads on the jobsite properly maintained.

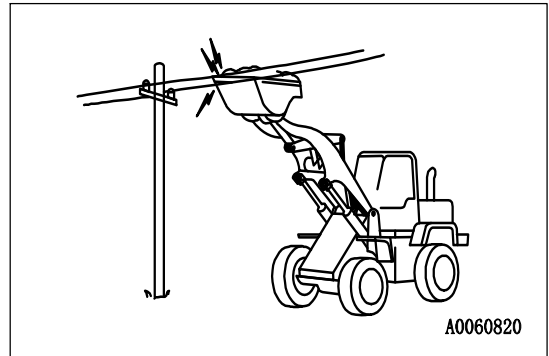
**WORKING ON LOOSE GROUND**

- 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 personal injury or death. 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 near 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 near the machine.

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

**ENSURE GOOD VISIBILITY**

This machine is equipped with mirrors to improve the visibility, but even with mirrors, there are places, which cannot be seen from the operator's seat, so always be careful when operating.

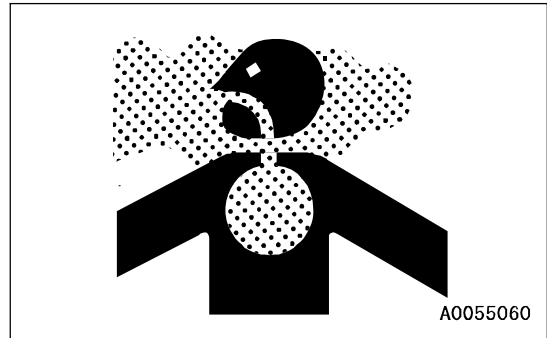
When operating or traveling in places with poor visibility, if it is impossible to confirm the condition of the job side or obstacle is in the area around the machine, there is danger that the machine may suffer damage or the operator may suffer serious personal injury. When operating or traveling in places with poor visibility, always observe the following items strictly.

- If the visibility cannot be sufficiently assured, position a flagman if necessary. The operator should pay careful attention to the signs and follow the instructions of the flagman.
- The signals should be given only by one flagman.
- When working in dark places, turn on the working lamps and front lamps of the machine, and if necessary, set up additional lighting in the area.
- Stop operations if there is poor visibility, such as in fog, snow, rain, or sand storms.
- Check the mirrors on the machine before starting operations every day. Clean off any dirt and adjust the view to ensure good visibility.



**PRECAUTIONS RELATED TO VENTILATION EXHAUST GAS**

The engine exhaust gas contains substances that may damage your health or even cause death. Start or operate the engine in a place where there is good ventilation. If the engine or machine must be operated inside a building or under ground, where the ventilation is poor, take steps to ensure that the engine exhaust gas is removed and that ample fresh air is brought in.

**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 1 signalman should give signals.
- Make sure that all workers understand the meaning of all signals and signs before starting work.

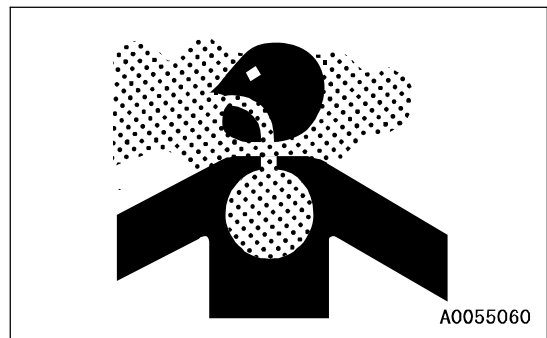
**EMERGENCY EXIT FROM OPERATOR'S CAB**

Machines equipped with a cab have doors on the left and right sides. If the door on the one side does not open, escape from the door on the other side.

**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.
- Do not use compressed air.
- If there is danger that there may be asbestos dust in the air, always operate the machine from an upwind position, and make sure that all workers operate on the upwind side.
- 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.

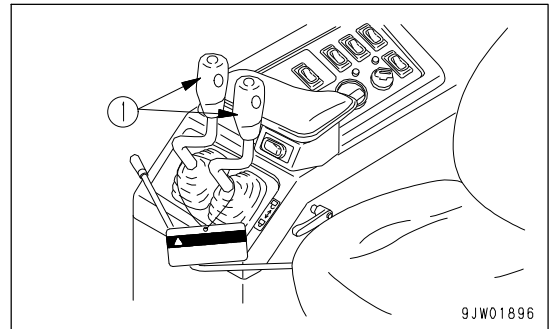


This machine does not use asbestos, but there is a danger that imitation parts may contain asbestos, so always use genuine Komatsu parts.

## PRECAUTIONS FOR OPERATION

### STARTING ENGINE

If there is a warning tag hanging from the work equipment control lever, do not start the engine or touch the levers (1).



### CHECKS BEFORE STARTING ENGINE

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

- Remove all dirt from the surface of the window glass to ensure a good view.
- Remove all dirt from the surface of the lens of the front lamps, working lamps, and rear combination lamp, and check that they light up correctly.
- 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.
- Check that there is no mud or dust accumulated around the movable parts of the accelerator pedal or brake pedal, and check that the pedals work properly.
- 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 the operation of the instruments and gauges, check the angle of the mirror, and check that the control levers are all at the Neutral position.
- Before starting the engine, check that the lock lever is at the LOCK position.
- Adjust the mirrors so that the rear of the machine can be seen clearly from the operator's seat. See "ADJUSTING MIRRORS (PAGE 3-88)".
- Check that there are no persons or obstacles above, below, or in the area around the machine.

### PRECAUTIONS WHEN STARTING

- Start and operate the machine only while seated.
- 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.
- When starting the engine, sound the horn as a warning.
- Do not allow anyone apart from the operator to ride on the machine.
- For machines equipped with a back-up alarm, check that the alarm works properly.

**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.

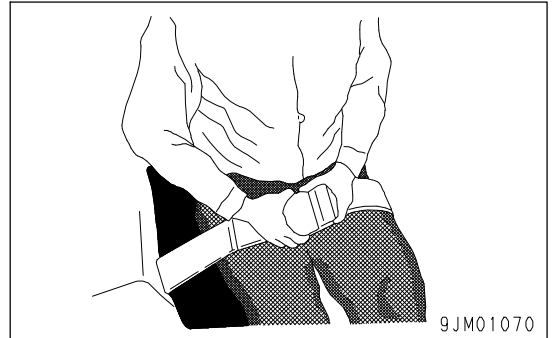
Before charging or starting the engine with a different power source, melt the battery electrolyte and check for frost and leakage of battery electrolyte before starting.

## OPERATION

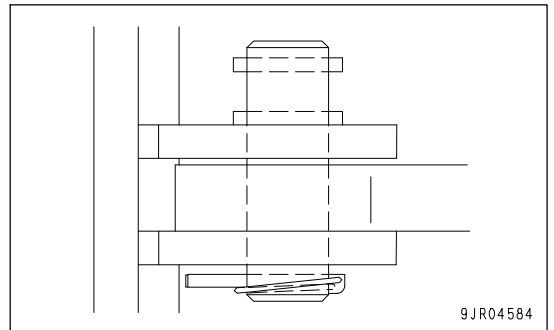
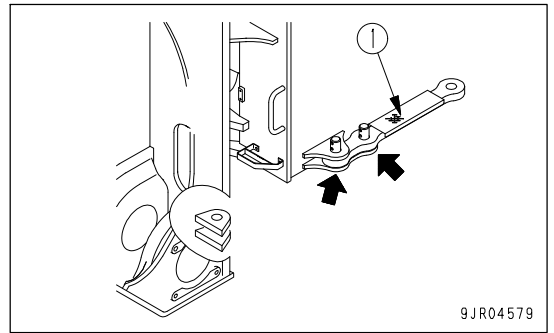
### CHECKS BEFORE OPERATION

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.



- Before driving the machine or starting operations, check that frame lock bar (1) is securely fixed at the FREE position.



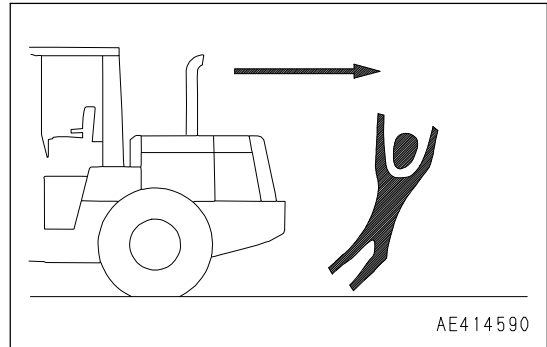
**PRECAUTIONS WHEN TRAVELING IN FORWARD OR REVERSE**

- 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.
- If another person is allowed on the machine, that person may sit only in the assistant's seat.
- Check that the backup alarm (alarm buzzer when machine travels in reverse) works properly.
- Always lock the door and windows of the operator's compartment in position (open or closed).

On jobsites where there is a hazard of flying objects or of objects entering the operator's compartment, check that the door and windows are securely closed.

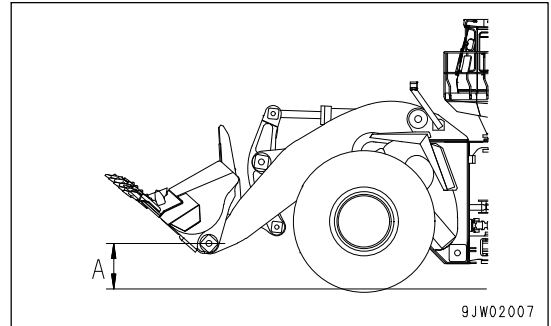
- If there is an area to the rear of the machine which cannot be seen, position a signal person. Take special care not to hit other machines or people when turning or swinging the machine.

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



**PRECAUTIONS WHEN TRAVELING**

- Never turn the key in the starting switch to the OFF position. It is dangerous if the engine stops when the machine is traveling, because the steering cannot be operated. If the engine stops, depress the brake pedal immediately to stop the machine.
- When traveling on level ground, keep the work equipment at height (A) of 110 to 120 cm (43.3 to 47.3 in) from the ground. When traveling, do not operate the work equipment control levers. If the work equipment control levers have to be operated, stop the machine first, then operate the levers.

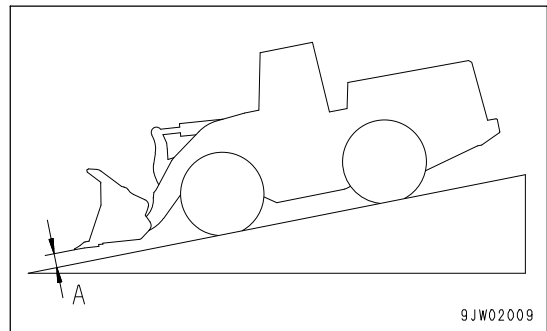
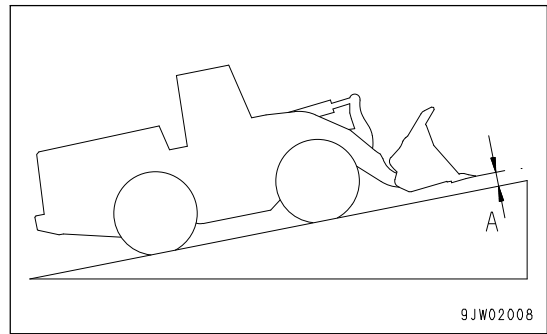


- When traveling on rough ground, travel at low speed and do not operate the steering suddenly. There is danger that the machine may turn over. The work equipment may hit the ground surface and cause the machine to lose its balance, or may damage the machine or structures in the area.
- Avoid traveling over obstacles when possible. If the machine has to travel over an obstacle, keep the work equipment close to the ground and travel at low speed. Never travel over obstacles which make the machine tilt strongly to one side.
- When traveling or carrying out operations, always keep a safe distance from people, structures, or other machines to avoid coming into contact with them.
- When passing over bridges or structures, check first that the structure is strong enough to support the weight of the machine. When traveling on public roads, check first with the relevant authorities and follow their instructions.
- When operating in tunnels, under bridges, under electric wires, or other places where the height is limited, operate slowly and be extremely careful not to let the machine body or work equipment hit anything.
- Always obey the traffic regulations when traveling on public roads (including when crossing the road).
- If you drive the machine at high speed continuously for a long time, the tires will overheat and the internal pressure will become abnormally high. This may cause the tires to burst. If a tire bursts, it produces an extremely large destructive force, and this may cause serious injury or accident.  
If you are going to travel continuously, please consult your Komatsu distributor.
- When the machine is traveling on a flat ground or down a slope, never set the directional selector switch to NEUTRAL position. Always keep it in a speed range when travelling.
  - Otherwise, the engine brake is disabled and the joystick steering lever becomes heavier, potentially inducing an accident.
  - The transmission and other parts of the power train may be damaged, and there is a danger that this will lead to serious injury or death.

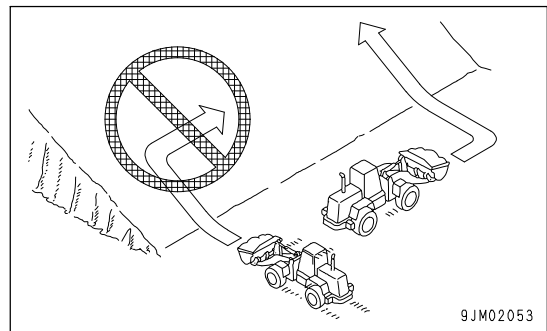
**TRAVELING ON SLOPES**

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

- Keep the work equipment at height (A) of 110 to 120 cm (43.3 to 47.3 in) from the ground, and in case of emergency, quickly lower the bucket to the ground to help the machine to stop.



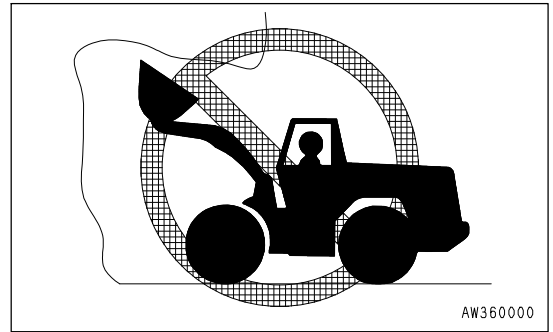
- Always travel straight up or down a slope. Traveling at an angle or across the slope is extremely dangerous.
- Do not turn on slopes or travel across slopes. Always go down to a flat place to change the position of the machine, then travel on to the slope again.



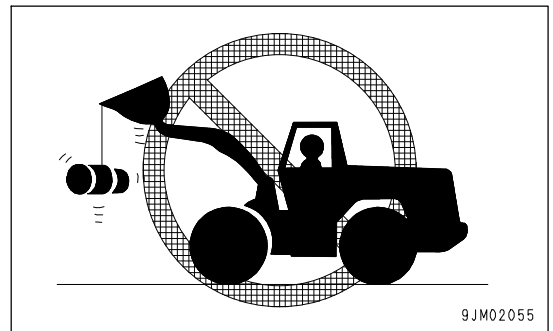
- Travel on grass, fallen leaves, or wet steel plates with low speed. Even with slight slopes there is a hazard that the machine may slip.
- If the engine stops, depress the brake pedal immediately, lower the bucket to the ground, and apply the parking brake to stop the machine.
- When traveling downhill, never shift gear or place the transmission at neutral. It is dangerous not to use the braking force of the engine. Always place the transmission in a low gear before starting to travel downhill.
- When traveling downhill, travel slowly. If necessary, use the braking force of the engine together with the brake pedal to control the travel speed.
- When traveling up or down hills with a loaded bucket, always travel with the bucket facing uphill. If the machine travels with the bucket facing downhill, there is danger that the machine may tip over.

**PROHIBITED OPERATIONS**

- It is dangerous to excavate the bottom of a rock face. Never do this.



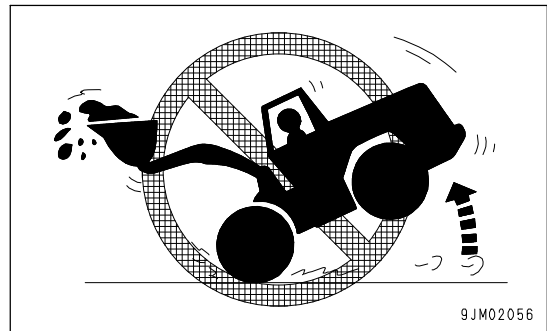
- It is dangerous to use the bucket or lift arm for crane operations, so do not carry out such operations.
- Do not pass the bucket over the head of other workers or over the operator's seat of dump trucks or other hauling equipment. The load may spill or the bucket may hit the dump truck and cause serious personal injury or death.



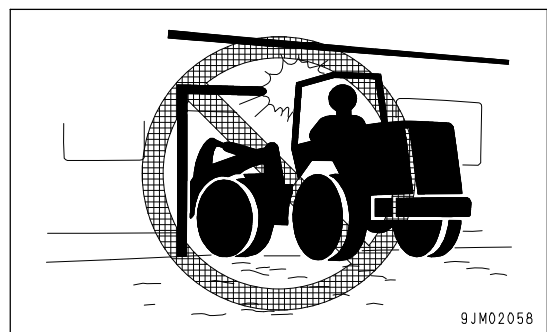
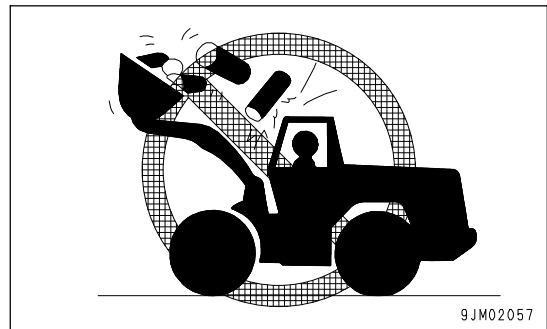


**PRECAUTIONS WHEN OPERATING**

- When using the machine, to prevent personal injury caused by damage to the work equipment or by the machine overturning due to overloading, do not exceed the permitted performance of the machine or the maximum permitted load for the structure of the machine.
- If the engine cannot be started again after it has stopped, immediately operate the work equipment control levers to lower the work equipment to the ground. (After the engine stops, the accumulator allows the work equipment to be operated for a limited time.)
- Be careful not to approach too close to the edge of cliffs. When making embankments or landfills, or when dropping soil over a cliff, dump one pile, then use the next pile of soil to push the first pile.
- The load suddenly becomes lighter when the soil is pushed over a cliff or when the machine reaches the top of a slope. When this happens, there is danger that the travel speed will suddenly increase, so be sure to reduce the speed.
- When the bucket is fully loaded, never start, turn, or stop the machine suddenly. There is danger of the machine turning



- When handling unstable loads, such as round or cylindrical objects, or piled sheets, if the work equipment is raised high, there is danger that the load may fall on top of the operator's compartment and cause serious injury or damage.
- When handling unstable loads, be careful not to raise the work equipment too high or tip the bucket back too much.
- If the work equipment is suddenly lowered or suddenly stopped, the reaction may cause the machine to tip over. Particularly when carrying a load, be sure to operate the work equipment carefully.
- When operating in tunnels, under bridges, under electric wires, or other places where the height is limited, be extremely careful not to let the machine body or work equipment hit anything.
- To prevent accidents caused by hitting other objects, always operate the machine at a speed which is safe for operation, particularly in confined spaces where there are other machines.



**METHODS OF USING BRAKE**

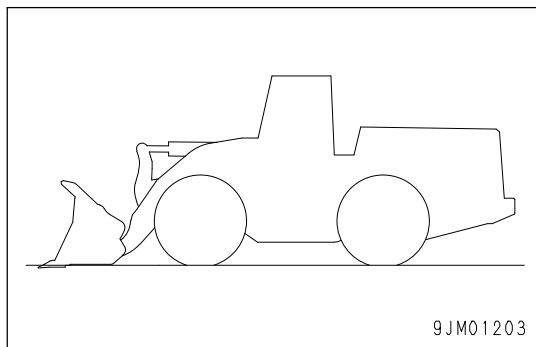
- When the machine is traveling, do not rest your foot on the brake pedal. If you travel with your foot resting on the pedal, the brake will always be applied, and this will cause the brakes to overheat and fail.
- Do not depress the brake pedal repeatedly if not necessary.
- When traveling downhill,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

**OPERATE CAREFULLY ON SNOW**

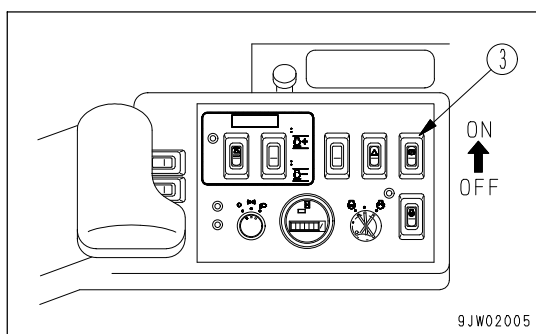
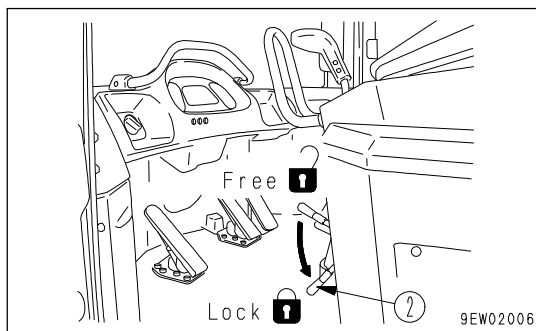
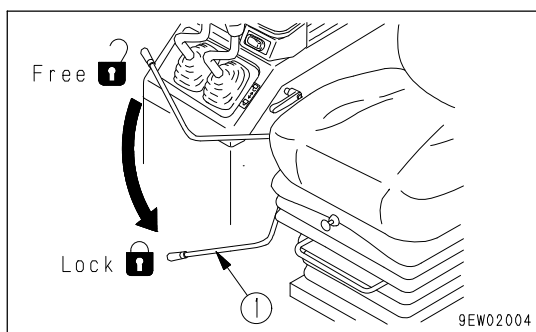
- Snow-covered or frozen surfaces are slippery, so be extremely careful when traveling or operating the machine, and do not operate the levers suddenly. Even a slight slope may cause the machine to slip, so be particularly careful when working on slopes.
- With frozen ground surfaces, the ground becomes soft when the temperature rises, and this may cause the machine to tip over or make it impossible for the machine to escape.
- 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 roads, always fit tire chains (mesh chain etc.).
- When traveling on snow-covered slopes, never apply the foot brake suddenly. Reduce the speed and use the engine as a brake while applying the foot brake intermittently (depress the brake intermittently several times). If necessary, lower the bucket to the ground to stop the machine.

**PARKING MACHINE**

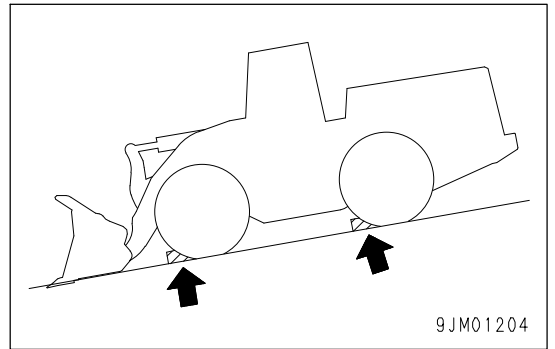
- Park the machine on firm, level ground.
- Select a place where there is no hazard of landslides, falling rocks, or flooding.
- Lower the work equipment completely to the ground.



- When leaving the machine, set lock levers (1) and (2) to the LOCK position, pull parking brake switch (3) to the LOCK position, and stop the engine.
- Always close the operator's cab door, and use the key to lock all the equipment in order to prevent any unauthorized person from moving the machine. Always remove the key, take it with you, and leave it in the specified place.



- If the machine has to be parked on a slope, lower the bucket to the ground and put blocks under the tires to block the wheels and prevent the machine from moving.



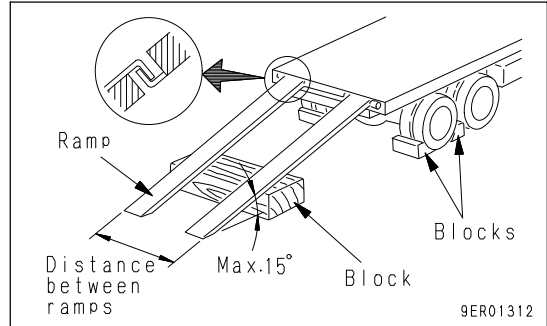
## TRANSPORTATION

This machine must be disassembled for transportation. When transporting the machine, please consult your Komatsu distributor.

### LOADING AND UNLOADING

When loading or unloading the machine, mistaken operation may bring the hazard of the machine tipping over or falling, so particular care is necessary. Always do as follows.

- Perform loading and unloading on firm, level ground only. Maintain a safe distance from the edge of the road or cliff.
- Always use ramps of adequate strength. Be sure that the ramps are wide, long, and thick enough to provide a safe loading slope. Take suitable steps to prevent the ramps from moving out of position or coming off.
- Be sure the ramp surface is clean and free of grease, oil, ice and loose materials. Remove dirt from machine-tracks. On a rainy day, in particular, be extremely careful since the ramp surface is slippery.
- Run the engine at low idling and operate slowly at low speed.
- Run the engine at low speed and travel slowly.
- Never correct your steering on the ramps. If necessary, drive off the ramps, correct the direction, then enter the ramps again.
- When loading or unloading to an embankment or platform, make sure that it has suitable width, strength, and grade.
- For machines equipped with a cab, always lock the door after boarding the machine. If this is not done, the door may suddenly open during transportation. Refer to "TRANSPORTATION (PAGE 3-151)".



### SHIPPING

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

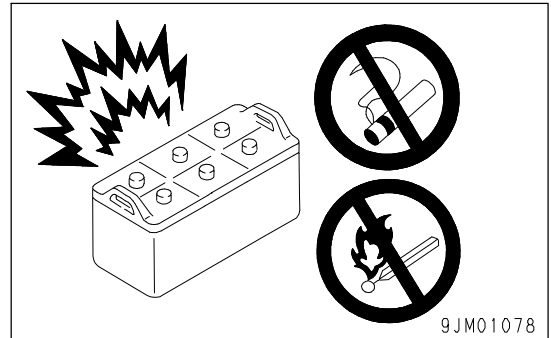
- The weight, transportation height, and overall length of the machine differ according to the work equipment, so be sure to confirm the dimensions.
- When passing over bridges or structures on private land, check first that the structure is strong enough to support the weight of the machine. When traveling on public roads, check first with the relevant authorities and follow their instructions.
- For details of the shipping procedure, see "TRANSPORTATION (PAGE 3-151)" in the OPERATION section.

## BATTERY

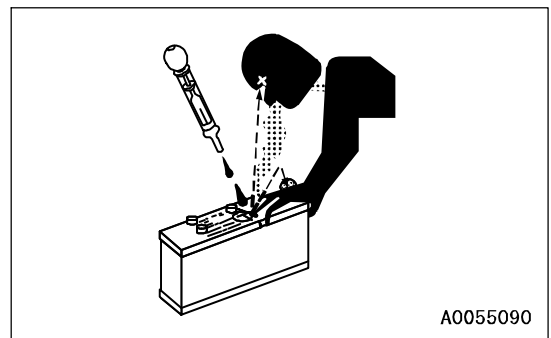
### BATTERY HAZARD PREVENTION

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.

- Do not use or charge the battery if the battery electrolyte level is below the LOWER LEVEL line. This may cause an explosion. Check the battery electrolyte level periodically and add distilled water to bring the electrolyte level to the UPPER LEVEL line.
- 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.

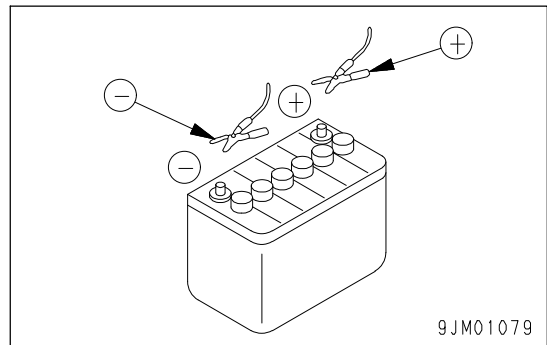
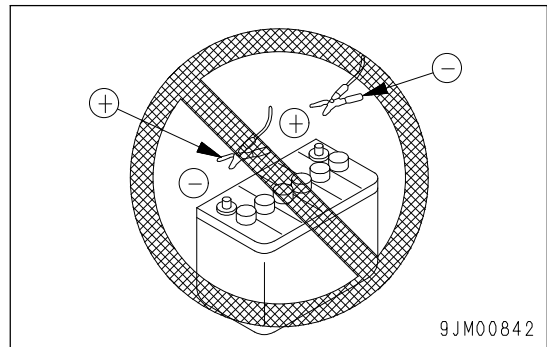
As there is a hazard that sparks will be generated, always do as follows.

- 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.
- For the machine with battery disconnect switch (if equipped), when removing the battery cables, first turn the starting switch to the OFF position, wait over one minute, then turn off the battery disconnect switch, and take out the battery disconnect switch key.  
Then, begin the cable removal at the ground (negative (-)) cable side. When installing the battery cables, be sure to begin with the positive (+) cable side and finish at the ground cable side.
- Attach the battery terminal 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 CABLES**

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 2 workers (1 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 position for both the normal machine and problem machine. There is a hazard that the machine will move when the power is connected.
- For the machine with battery disconnect switch (if equipped), when connecting two machines with booster cables, turn the troubled machines starting switch and battery disconnect switch to the OFF position, then turn the normal machines starting switch to the OFF position. There is a hazard that the troubled machine may 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 glasses and rubber gloves when starting the engine with booster cables.
- When connecting a normal machine to a failed machine with booster cables, always use a normal machine with the same battery voltage as the failed machine.
- For details of the starting procedure when using booster cables, see "STARTING ENGINE WITH BOOSTER CABLE (PAGE 3-163)" in the OPERATION section.



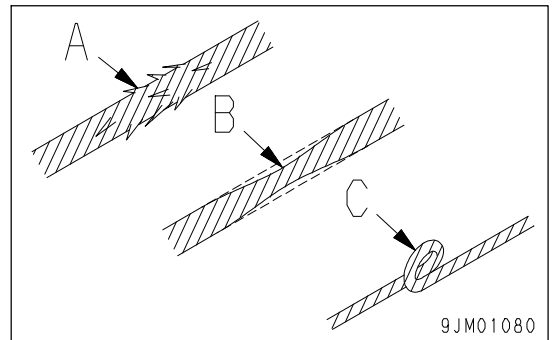
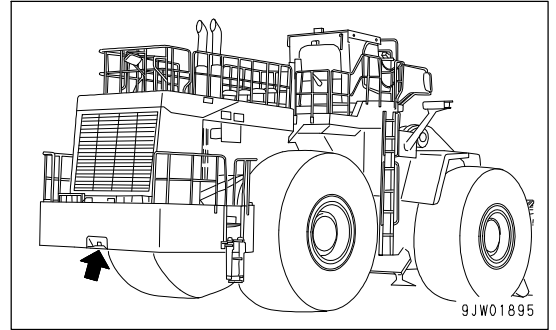
## TOWING

### WHEN TOWING

When towing or being towed, mistakes in the method of selecting and inspecting the wire rope or drawbar, or in the method of towing may lead to serious personal injury.

For details of the procedure for towing, see the "METHOD OF TOWING MACHINE (PAGE 3-158)"

- Always confirm that the wire rope or drawbar used for towing has ample strength for the weight of the machine being towed.
- Never use a wire rope which has cut strands (A), reduced diameter (B), or kinks (C). There is danger that the rope may break during the towing operation.
- Always wear leather gloves when handling wire rope.
- Never tow a machine on a slope.
- During the towing operation, never stand between the towing machine and the machine being towed.

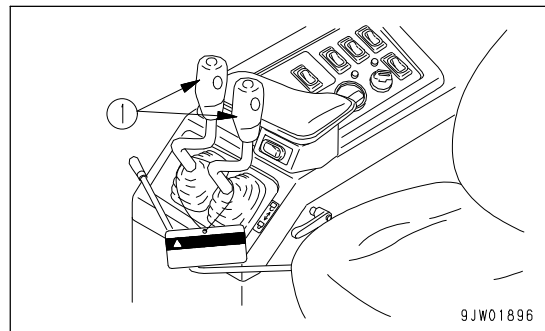




# PRECAUTIONS FOR MAINTENANCE

## WARNING TAG

- Always attach the "DO NOT OPERATE" warning tag to work equipment control lever (1) in the operator's cab to alert others that you are performing service of maintenance on the machine. Attach additional warning tags around the machine if



- Warning tag Part No.09963-03001  
Keep this warning tag in the tool box while it is not used. If there is not the tool box, keep the tag in the operation manual pocket.



- If others start the engine, or touch or operate the work equipment control lever while you are performing service or maintenance, you could suffer serious injury or property damage.

## KEEP WORK PLACE CLEAN AND TIDY

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

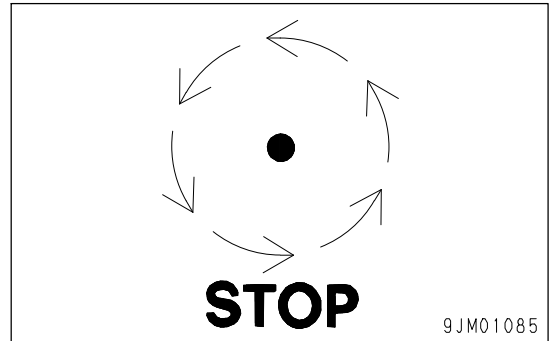
## APPOINT LEADER WHEN WORKING WITH OTHERS

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

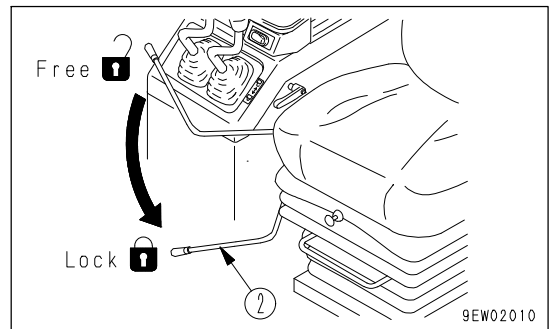
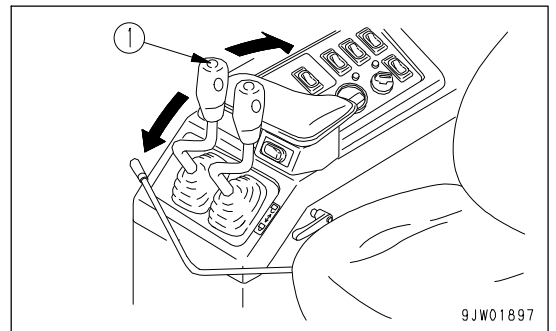
When working with others, misunderstandings between workers can lead to serious accidents.

**STOP ENGINE BEFORE CARRYING OUT MAINTENANCE**

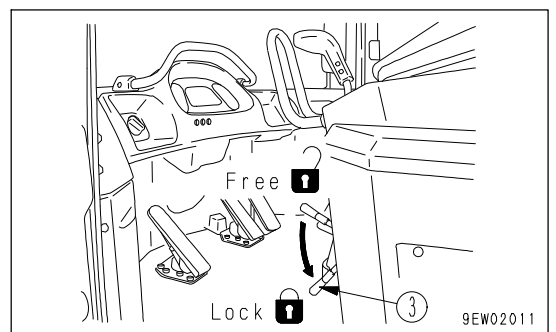
- Stop the machine on firm, level ground.
- Select a place where there is no hazard of landslides, falling rocks, or flooding.
- Lower the work equipment completely to the ground and stop the engine.



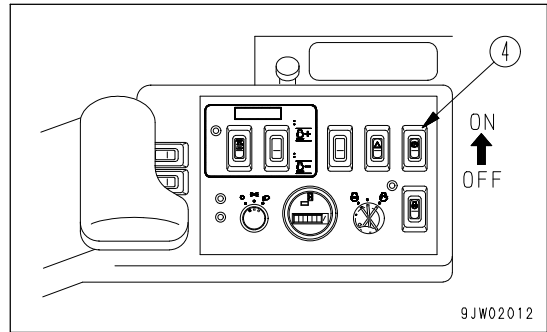
- After stopping the engine, operate work equipment control lever (1) 2 to 3 times fully to the RAISE and LOWER positions to release the pressure inside the hydraulic circuit, then set work equipment lock lever (2) to the LOCK position.



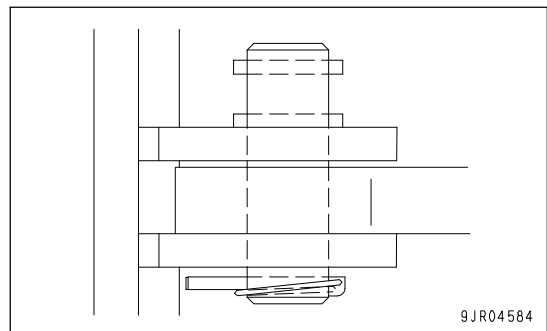
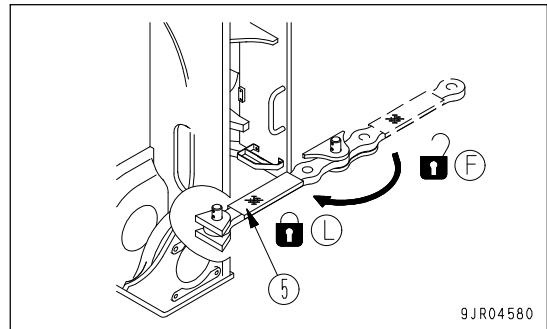
- In addition, set joystick steering lock lever (3) to the LOCK position.



- Turn parking brake switch (4) to the ON position, then put blocks under the front and rear of the tires.



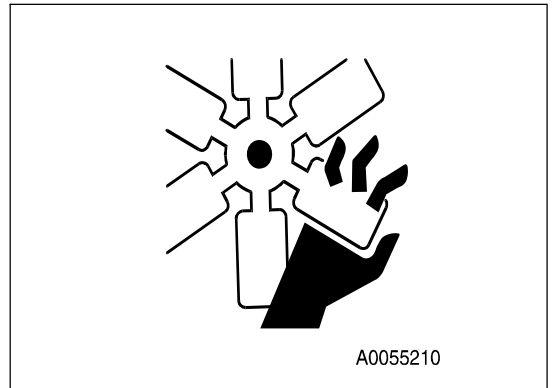
- Set frame lock bar (5) to the LOCK position (L) to prevent the machine from articulating.  
This operation must be carried out by two workers, so be extremely careful when installing.



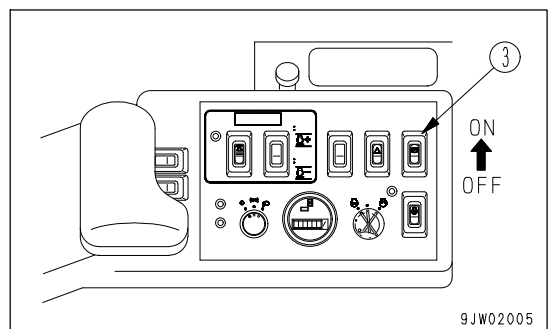
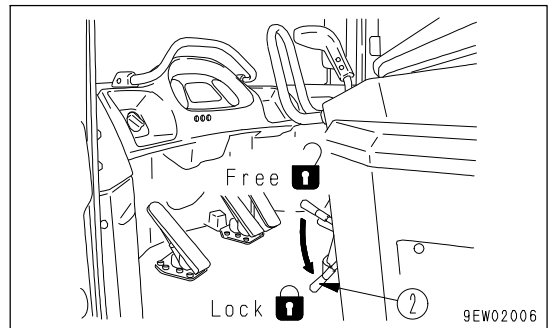
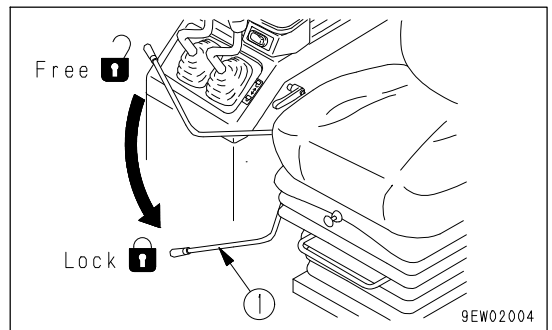
**TWO WORKERS FOR MAINTENANCE WHEN ENGINE IS RUNNING**

To prevent personal 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 2 workers and do as follows.

- 1 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.
- Never drop or insert tools or other objects into the fan or fan belt. Parts may break or be sent flying.
- 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.

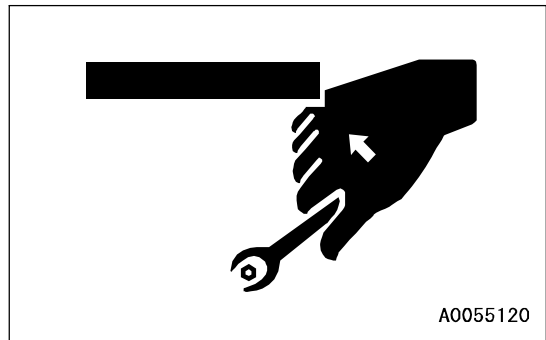


- Set lock levers (1) and (2) to the LOCK position so that the work equipment and steering do not move. Turn parking brake switch (3) to the ON position to prevent the machine from moving.
- Do not touch any control levers. If any control lever must be operated, give a signal to the other workers to warn them to move to a safe place.



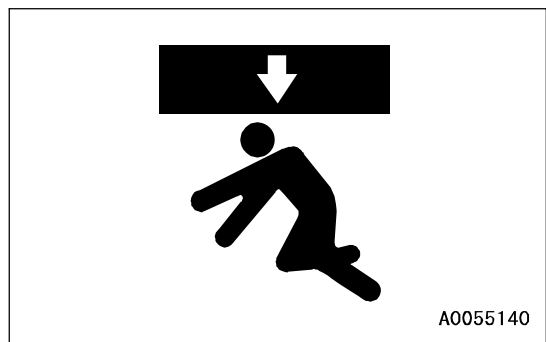
**PROPER TOOLS**

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.



**WORK EQUIPMENT SUPPORT**

- When carrying out inspection and maintenance with the work equipment raised, or if it is necessary to go under the machine, use strong supports that can fully withstand the weight of the machine or work equipment, and be sure to fix the stands in position securely.



**ACCUMULATOR**

The accumulator is charged with high-pressure nitrogen gas. When handling the accumulator, careless procedure may cause an explosion which could lead to serious injury or property damage. For this reason, always observe the following precautions.

- Do not disassemble the accumulator.
- Do not bring it near flame or dispose of it in fire.
- Do not make holes in it, weld it, or use a cutting torch.
- Do not hit or roll the accumulator, or subject it to any impact.
- When disposing of the accumulator, the gas must be released. Please contact your Komatsu distributor to have this work performed.



**PERSONNEL**

Do not allow any unauthorized personnel into the area when servicing the machine. If necessary, employ a guard.

**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.

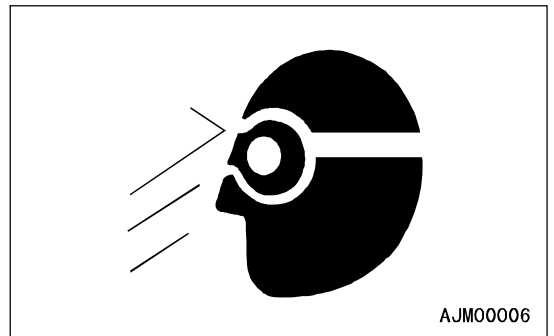
**NOISE**

If the noise from the machine is too loud, it may cause temporary or permanent hearing problems. 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.

**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 serious personal injury or death. Always wear safety glasses 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.

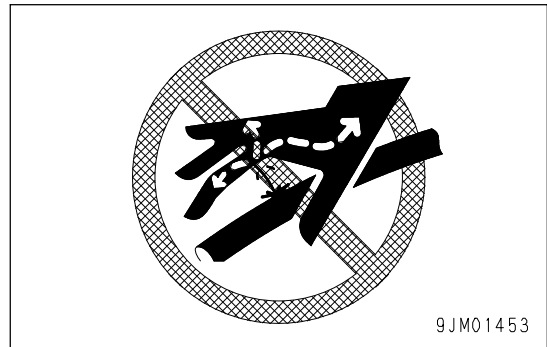
**PRECAUTIONS WITH HIGH-PRESSURE OIL**

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 personal injury, so always do as follows.

- When carrying out inspection and maintenance of the pressure, release the pressure before starting. For details, see "STOP ENGINE BEFORE CARRYING OUT MAINTENANCE (PAGE 2-37)". Do not carry out inspection or replacement work with the circuit 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.



**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 or property damage. 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.

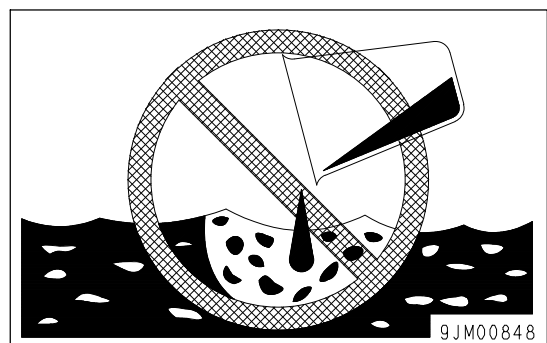
Replace the hose if any of the following problems are found.

- 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.

**WASTE MATERIALS**

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.



**MERCURY CONTAINING COMPONENT(S)**

The monitor display backlight contains mercury. The machine may be equipped with optional High Intensity Discharge lighting lamps which also may contain mercury. These components must be reused, recycled or properly disposed of in accordance with applicable Local, State and Federal Laws.

**MAINTENANCE OF AIR CONDITIONER**

If air conditioner refrigerant gets into your eyes, it may cause blindness; if it touches your skin, it may cause frostbite.

**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 glasses, 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 (PAGE 4-14)".

- The material of these components naturally changes over time, and repeated use causes deterioration, wear, and fatigue. As a result, there is a hazard that these components may fail and cause serious injury or death. It is difficult to judge the remaining life of these components from external inspection or the feeling when operating, so always replace them at the specified interval.
- Replace or repair safety-critical parts if any defect is found, even when they have not reached the specified replacement time.



# PRECAUTIONS WITH TIRES

## HANDLING TIRES

If tires or rims are handled mistakenly, there is danger that the tire may explode or be damaged, or that the rim may fly off and cause serious personal injury or death.

To maintain safety, always do as follows.

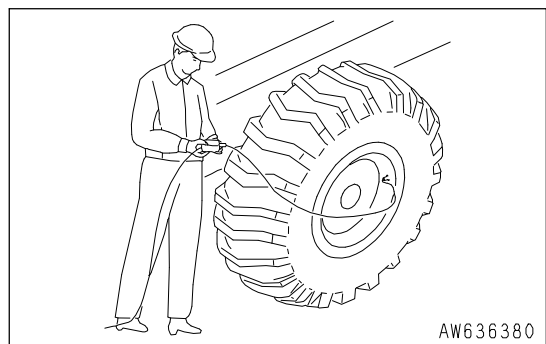
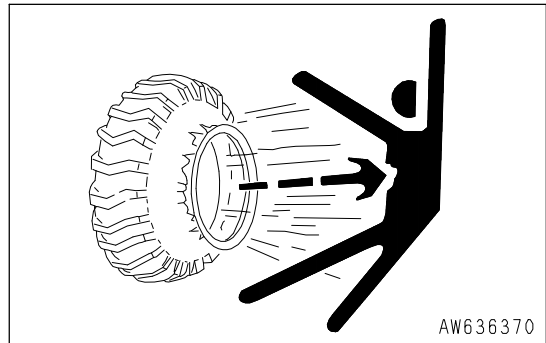
- Maintenance, disassembly, repair, and assembly of the tires and rims requires special equipment and special technology, so always ask your Komatsu distributor to carry out these operations.
- Always use the tires specified by Komatsu and maintain the specified inflation pressure.

Suitable tire inflation pressure: see HANDLING THE TIRES (PAGE 3-124).

- When pumping up the tires, check that no other person is standing near the tire, and install an air chuck with a clip that can be secured to the air valve.

To prevent the tire inflation pressure from becoming too high, measure the pressure from time to time with an air gauge while pumping up the tire.

- If the tire pressure goes down abnormally or the rim parts do not fit the tire, there is a problem with the tire or rim parts. Always contact your Komatsu distributor for repairs.
- If the rim parts are not fitted properly when the tire is being pumped up, there is danger that the rim parts may fly off, so set up a protective fence around the tire, and do not stand directly in front of the rim. Stand beside the tread when pumping up the tire.
- Do not adjust the tire inflation pressure immediately after traveling at high speed or carrying out operations under heavy load.
- Never carry out welding or light a fire near the tire.



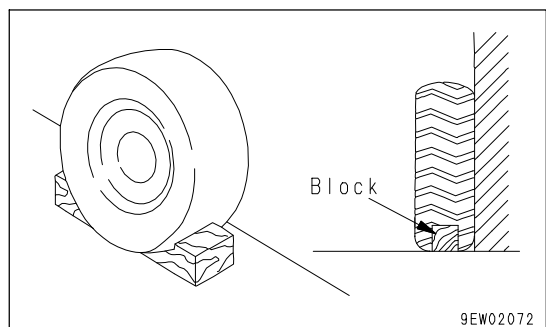
## PRECAUTIONS WHEN STORING TIRES

Tires for construction equipment are extremely heavy, it may lead to serious personal injury or death.

- As a basic rule, store the tires in a warehouse which unauthorized persons cannot enter.  
If the tires must be stored outside, always erect a fence and put up "No Entry" signs.
- His one the tire vertically on level ground in line with the wall, and block it securely so that it cannot roll or fall over if any person should touch it.

If the tire is laid on its side, it will be crushed and deteriorate.

- If the tire should fall over, do not attempt to stop it. Get out of the way quickly.



# OPERATION

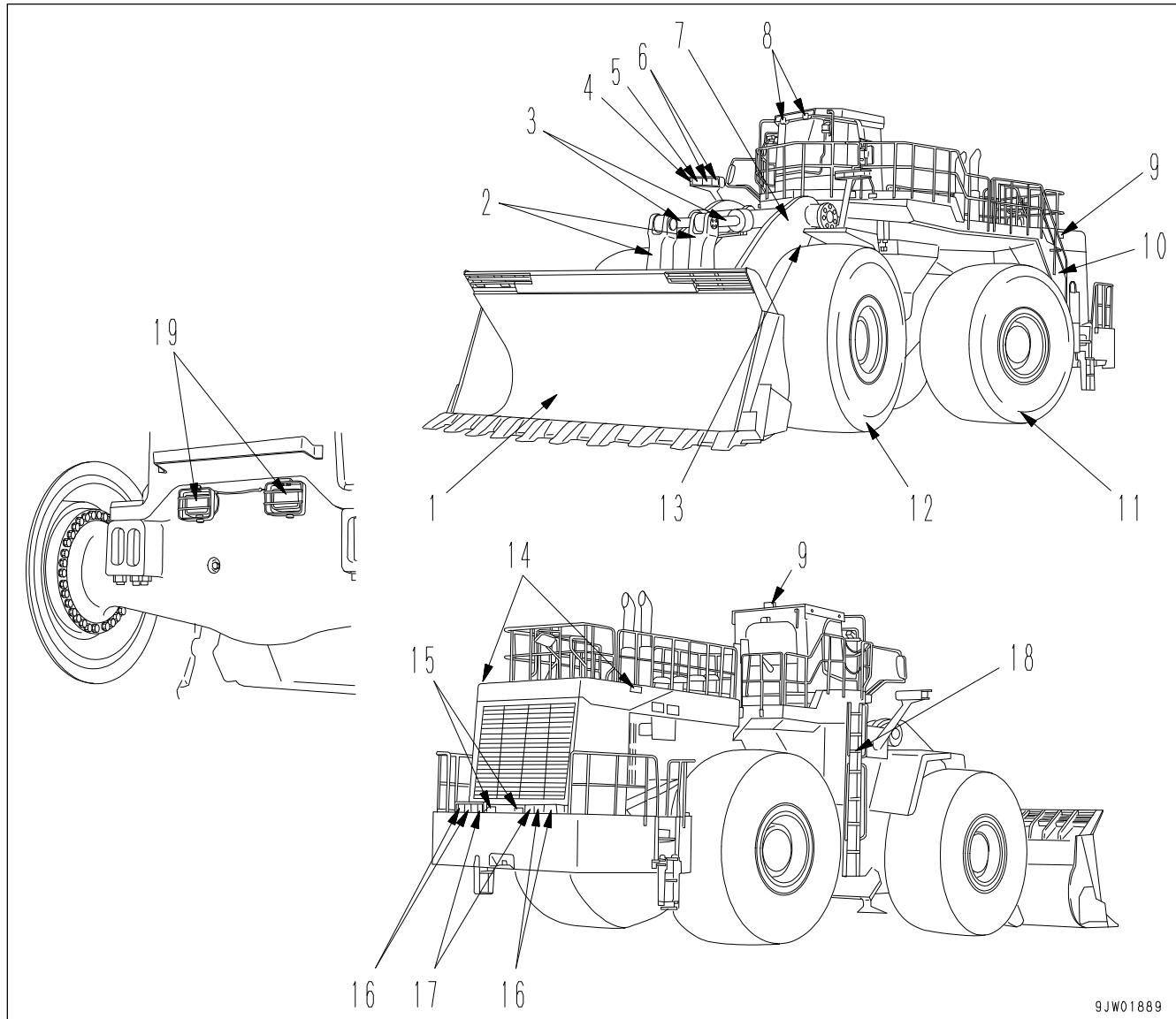
## **WARNING**

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

---

## GENERAL VIEW

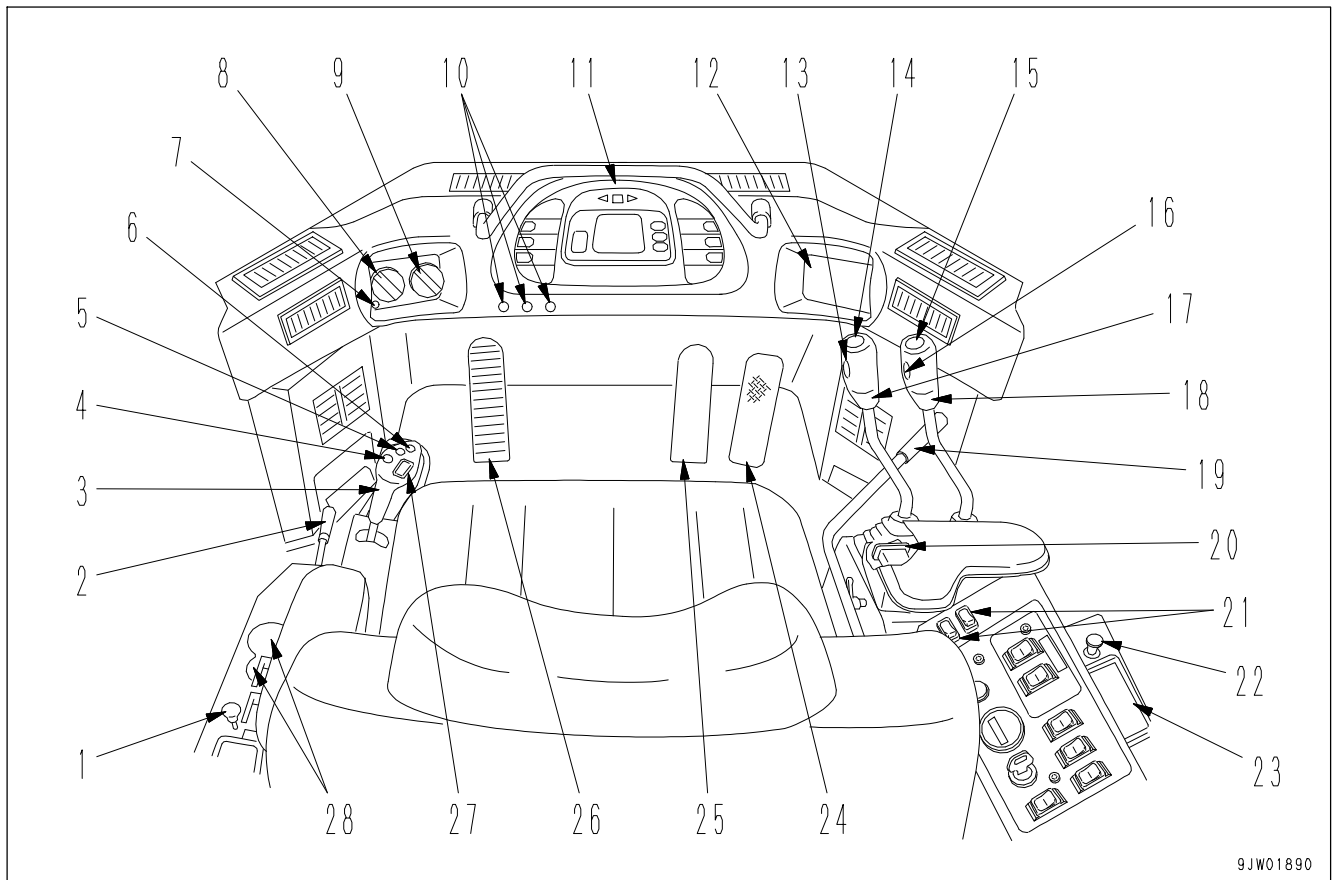
## GENERAL VIEW OF MACHINE



9JW01889

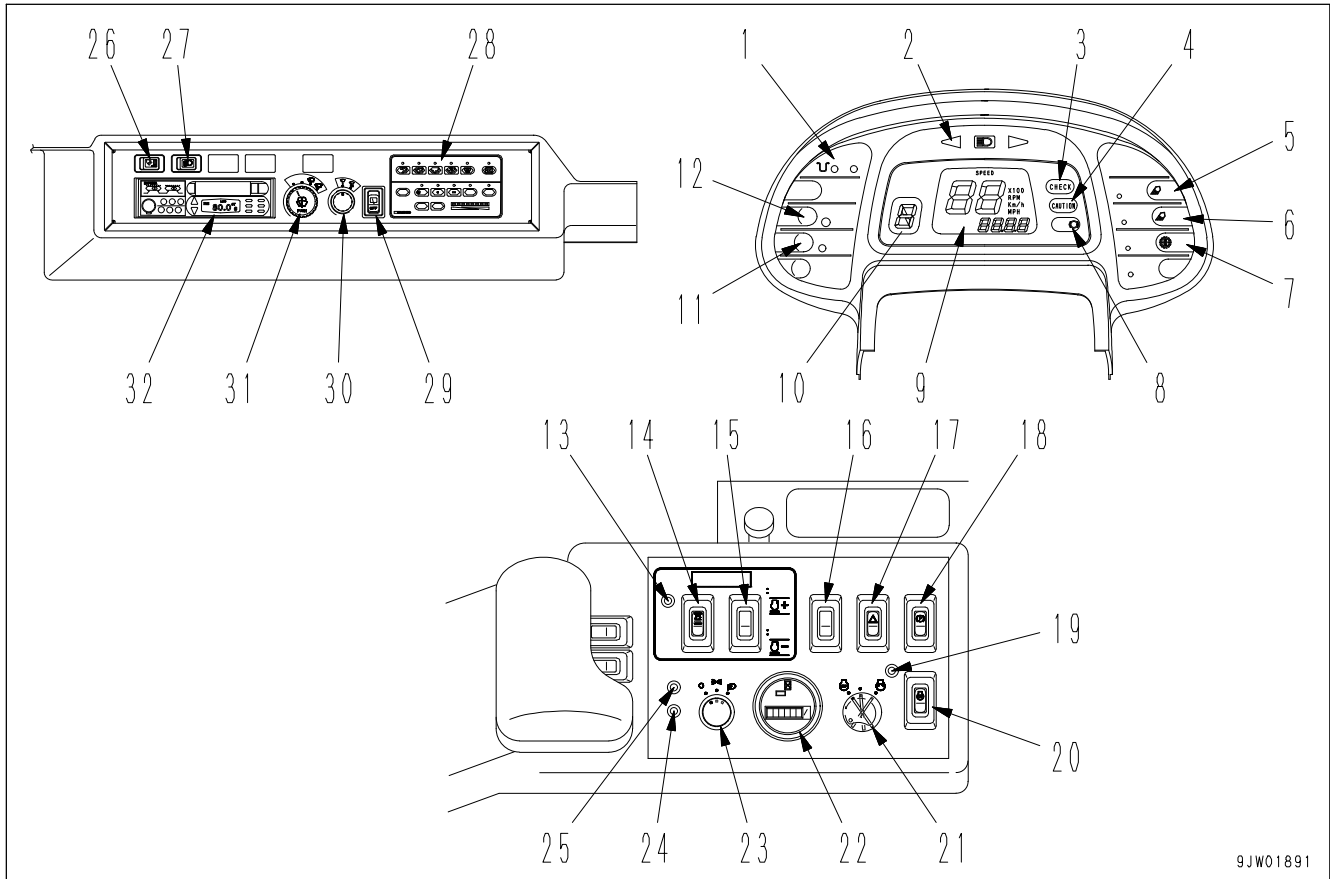
- |   |   |
|---|---|
| (1) Bucket                              | (11) Rear wheel                           |
| (2) Bellcrank                           | (12) Front wheel                          |
| (3) Bucket cylinder                     | (13) Lift cylinder                        |
| (4) Turn signal lamp                    | (14) Engine hood side lamp                |
| (5) Front working lamp (head lamp side) | (15) Backup alarm                         |
| (6) Head lamp                           | (16) Rear working lamp                    |
| (7) Lift arm                            | (17) Rear combination lamp                |
| (8) Front working lamp (cab side)       | (18) Emergency escape ladder              |
| (9) Step lamp                           | (19) Front working lamp (front axle side) |
| (10) Ladder                             |   |

## GENERAL VIEW OF CONTROLS AND GAUGES



9JW01890

- |  |  |
|--|--|
| (1) Rear defroster knob                            | (15) Kick down switch                                |
| (2) Joystick steering lock lever                   | (16) Transmission auto-shift, manual selector switch |
| (3) Joystick steering lever                        | (17) Bucket control lever                            |
| (4) Horn switch                                    | (18) Lift arm control lever                          |
| (5) Shift down switch                              | (19) Work equipment lock lever                       |
| (6) Shift up switch                                | (20) Turn signal switch                              |
| (7) Speed limit ON-OFF indicator lamp              | (21) Power window switch                             |
| (8) Speed limit dial                               | (22) Cigarette lighter                               |
| (9) Drive force limit dial                         | (23) Ash tray  |
| (10) 1st, 2nd, 3rd indicator lamp (for auto-shift) | (24) Accelerator pedal                               |
| (11) Main monitor                                  | (25) Right brake pedal                               |
| (12) Multi monitor                                 | (26) Left brake pedal                                |
| (13) Load meter cancel switch                      | (27) Directional switch                              |
| (14) Speed limit ON-OFF switch                     | (28) Cup holder                                      |



9JW01891

**MAIN MONITOR**

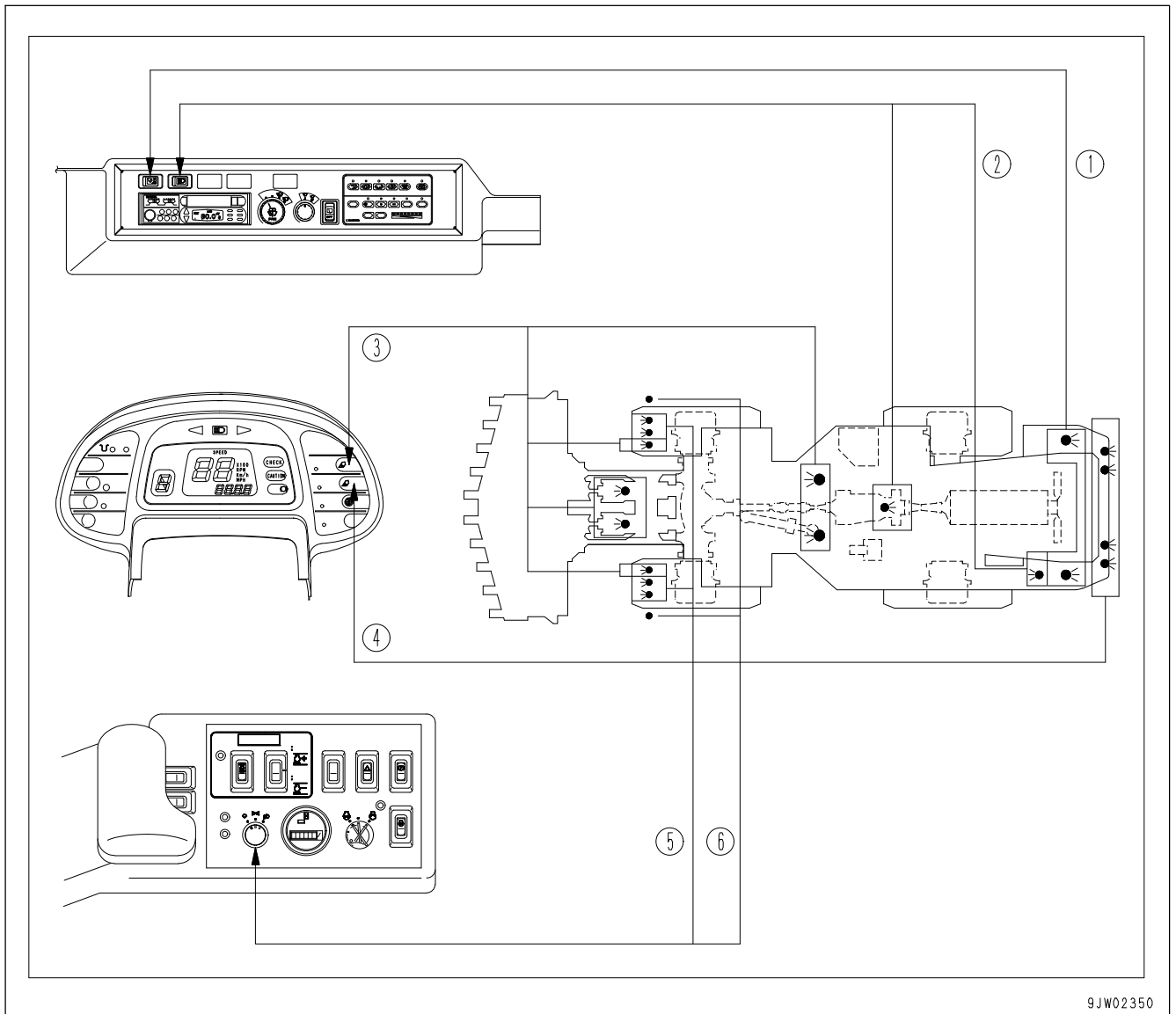
- |  |   |
|--|---|
| (1) Emergency steering pilot lamp              | (8) Parking brake pilot lamp                        |
| (2) Turn signal pilot lamp                     | (9) Speedometer                                     |
| (3) Central check lamp (CHECK)                 | (10) Transmission shift indicator                   |
| (4) Central caution lamp (CAUTION)             | (11) Auto-greasing switch and pilot lamp            |
| (5) Front working lamp switch and pilot lamp   | (12) Tire slip control ON-OFF switch and pilot lamp |
| (6) Rear working lamp switch and pilot lamp    |   |
| (7) Transmission cut-off switch and pilot lamp |   |

**RIGHT SIDE PANEL**

- |   |  |
|---|--|
| (13) RPM set ON indicator lamp              | (20) Ether spray switch                |
| (14) RPM set ON-OFF switch                  | (21) Starting switch                   |
| (15) RPM set idling up-down selector switch | (22) Service meter                     |
| (16) Load meter sub-total switch            | (23) Lamp switch                       |
| (17) Hazard lamp switch                     | (24) Remote positioner lower indicator |
| (18) Parking brake switch                   | (25) Remote positioner upper indicator |
| (19) Prelube indicator                      |  |

**TOP PANEL**

- |  |                                  |
|--|----------------------------------|
| (26) Engine hood side lamp, axle front working lamp switch | (29) Rear wiper switch           |
| (27) Step lamp switch                                      | (30) Wiper selector switch       |
| (28) Air conditioner panel                                 | (31) Front wiper switch          |
|  | (32) AM/FM radio/cassette stereo |



9JW02350

- (1) Engine hood side lamp
- (2) Step lamp
- (3) Front working lamp

- (4) Rear working lamp
- (5) Head lamp
- (6) Small lamp

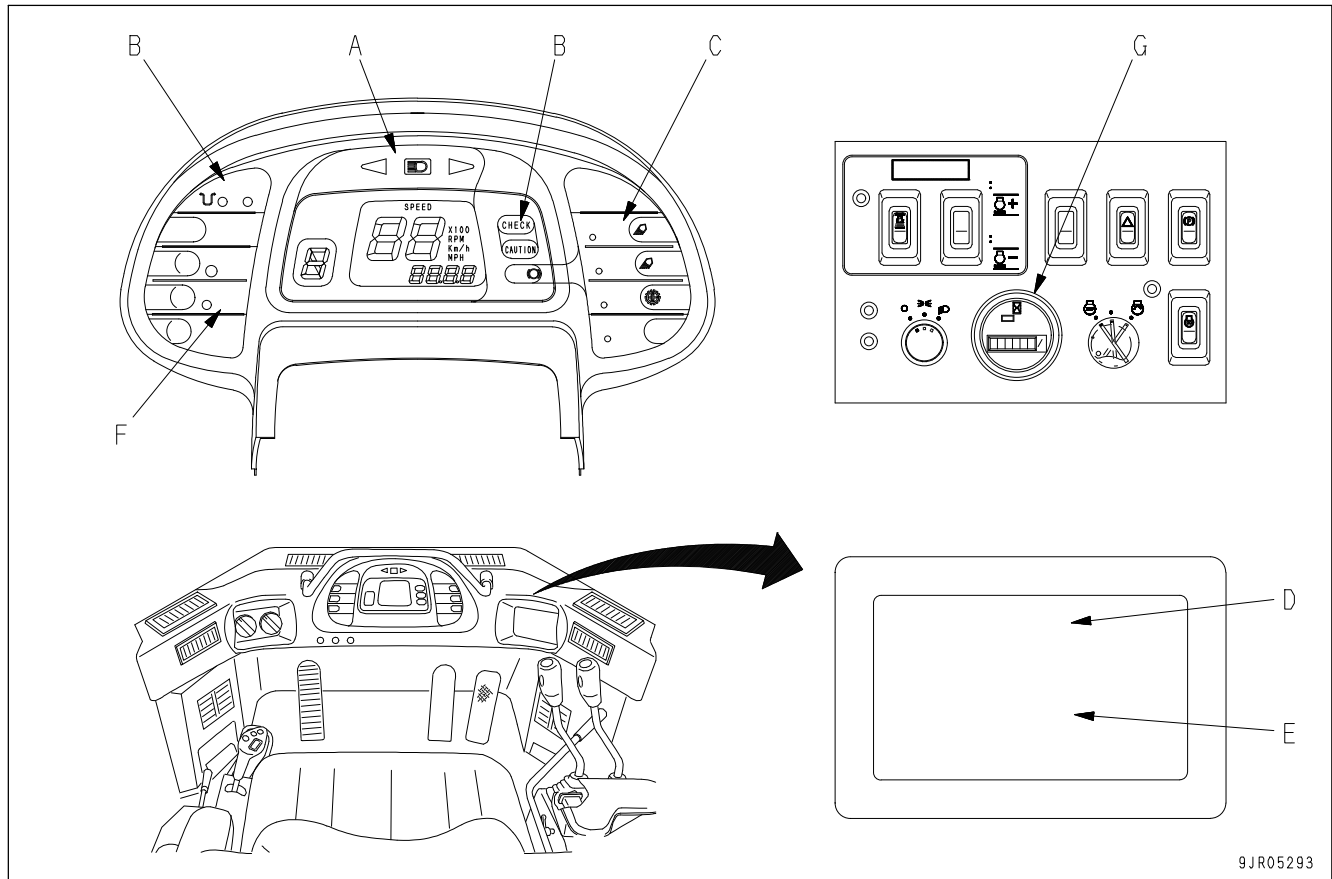
# EXPLANATION OF COMPONENTS

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.

## MACHINE MONITOR

### MONITOR SYSTEM



9JR05293

- A: Meter display portion
- B: Warning display portion
- C: Switch and indicator portion

- D: Meter display portion (monitor display)
- E: Warning display portion (monitor display)
- F: Meter display portion

The machine monitor system consists of the main monitor (in front of the operator’s seat), the monitor screen and caution display screen displayed on the multi monitor (front right of the operator’s seat), and the meter displays (service meter) at the rear of the work equipment control levers. These can also be divided according to their function into the warning display portions (B, E), the meter display portions (A, F), the monitor screen (D), and the switch and indicator portion (C).

### CAUTION

These monitors do not guarantee the condition of the machine.

Do not simply rely on the monitor when carrying out checks before starting (daily inspection). Always get off the machine and check each item directly.

**WARNING DISPLAYS**

(B, Multi monitor caution display screen E) For details, see WARNING DISPLAY (PAGE 3-8)

These consist of the central check lamps (CHECK), central warning lamps (CAUTION), emergency steering pilot lamp, and caution displays on the multi monitor (engine oil pressure, engine water temperature, torque converter oil temperature, hydraulic oil temperature, drop in front/rear brake oil pressure, drop in battery electrolyte level, drop in brake oil level, drop in cooling water level, transmission oil filter clogging, and drop in charging voltage, in addition to displays on the MULTI MONITOR (PAGE 3-11).

**METER DISPLAY PORTION**

(A, F) For details, see METER DISPLAY PORTION (PAGE 3-22) and section on meter display screens displayed on MULTI MONITOR

This consists of the meters (speedometer, transmission shift indicator, service meter), pilot lamps (turn signal lamp, parking brake), and items displayed on the multi monitor (hourmeter, tachometer, engine water temperature gauge, torque converter oil computer gauge, fuel gauge).

**SWITCH AND INDICATOR PORTION**

(C)

This consists of the switches and pilot lamps (front working lamp, rear working lamp, transmission cut-off) and the monitor lamps and switches for the auto-retarder and tire slip control.

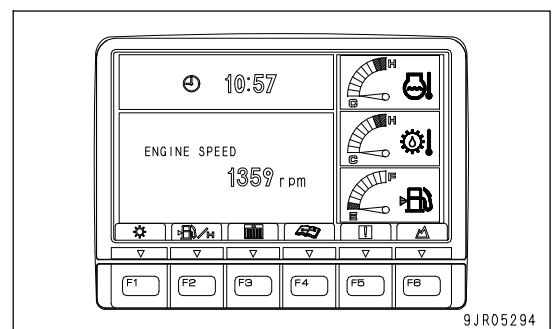
**TESTING ACTUATION OF MACHINE MONITOR SYSTEM**

This machine is equipped with a main monitor and multi monitor that can be used for maintenance, warning displays, fuel consumption display, load meter, and other operations. For details of testing the actuation of the monitor, see the table below.

Main monitor	Multi monitor
<ul style="list-style-type: none"> <li>When the engine starting switch is turned ON, all the monitor lamps and central warning lamps light up for approx. 3 sec. and the alarm buzzer sounds for approx. 1 sec. At the same time, the speedometer displays [88]. In addition, the transmission shift indicator displays [8]. Finally, the buzzer emits 2 beeps to show that the check has been completed. If any item on the main monitor does not light up or give a display, there is probably a failure or broken connection, so please ask your Komatsu distributor to carry out inspection.</li> </ul>	<ul style="list-style-type: none"> <li>When the engine starting switch is turned ON, the default screen is displayed after approx. 1 sec (*). (*) During this time, the computer mounted on the machine starts up and the checks before starting for all parts of the machine are carried out. If any problem is found in this check, the screen changes to the caution screen and details of the problem are displayed. If any problem is displayed, please ask your Komatsu distributor to carry out inspection. After the default screen is displayed, the display changes to the monitor screen after 1 or 2 seconds.</li> </ul>

(Multi monitor display)

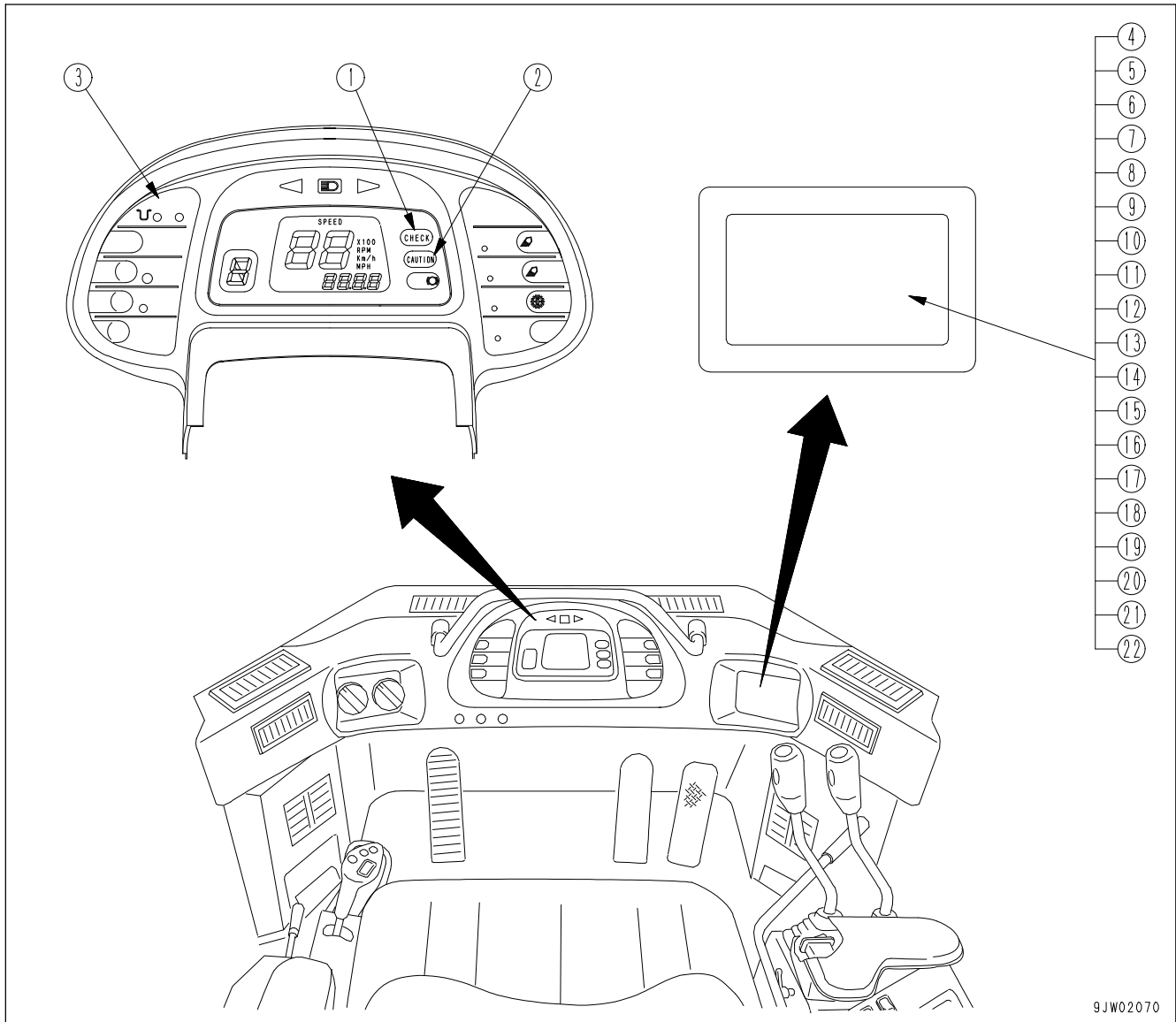
When the starting switch is turned ON, if the joystick steering lever is not at Neutral, the central warning lamp (CAUTION) flashes and the alarm buzzer sounds. If this happens, return the steering lever to the Neutral position. The lamp will go out and the buzzer will stop.



9JR05294



WARNING DISPLAY



9JW02070

MAIN MONITOR

- (1) Central check lamp (CHECK)
- (2) Central caution lamp (CAUTION)
- (3) Emergency steering pilot lamp (red)

MULTI MONITOR

- (4) Engine oil level caution display
- (5) Engine oil pressure caution display
- (6) Engine water temperature caution display
- (7) Fuel level caution display
- (8) Torque converter oil temperature caution display
- (9) Hydraulic oil temperature caution display
- (10) Front brake oil pressure caution display
- (11) Rear brake oil pressure caution display
- (12) Battery electrolyte level (1) caution display
- (13) Battery electrolyte level (2) caution display
- (14) Battery electrolyte level (3) caution display
- (15) Brake oil level caution display
- (16) Engine water level caution display
- (17) Transmission oil filter clogging caution display
- (18) Air cleaner (1) clogging caution display
- (19) Air cleaner (2) clogging caution display
- (20) Air cleaner (3) clogging caution display
- (21) Air cleaner (4) clogging caution display
- (22) Battery charge voltage caution display

## MAIN MONITOR

## CENTRAL CHECK LAMP (CHECK)

## NOTICE

If the monitor flashes, carry out inspection and maintenance of the problem location as soon as possible. If no action is taken, it may lead to failure.

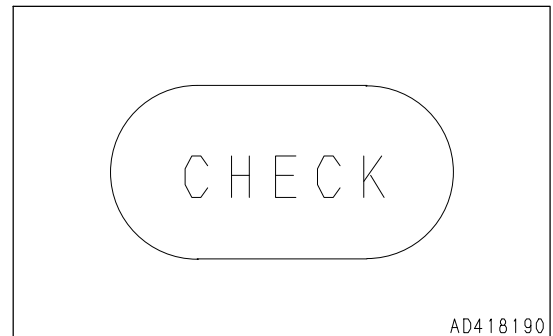
- When the checks before starting (engine oil level, engine water level) are carried out with the starting switch at the ON position, if any problem is found, the location of the problem flashes on the monitor, and at the same time, central check lamp (CHECK) (1) flashes. Check the location where the monitor is flashing and carry out the check before starting.

When carrying out the checks before starting, do not simply rely on the monitor. Always check all the items. For details, see CHECK BEFORE STARTING (PAGE 3-78).

When carrying out the checks before starting, if there is any abnormality in the engine oil level, the engine oil level changes when the engine is started, so the central check lamp and monitor will stop flashing even if there is a problem in the oil level.

If there is any abnormality in the engine water level, when the engine is started, the central check lamp will go out, but the central warning lamp will flash and the alarm buzzer will sound intermittently.

- In addition, see the list of multi monitor display items for details about abnormal items where the central check lamp (CHECK) flashes.

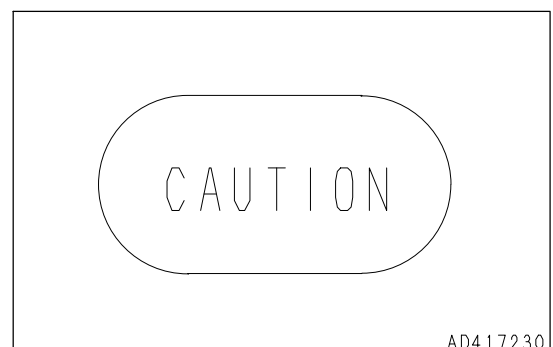


## CENTRAL CAUTION LAMP (CAUTION)



If any of these monitors flash, stop the engine immediately or run it at low idling, and carry out the following action. If no action is taken, it may lead to serious personal injury.

- When the engine is running, if any abnormality is found in any of the warning items (engine water temperature, torque converter oil temperature, engine water level, brake oil pressure, engine oil pressure, fuel level, brake oil level, hydraulic oil temperature), the alarm buzzer sounds intermittently (except for the fuel level and hydraulic oil temperature). The location of the abnormality is displayed on the multi monitor and the central warning lamp (CAUTION) (2)



**EMERGENCY STEERING PILOT LAMP (RED)**

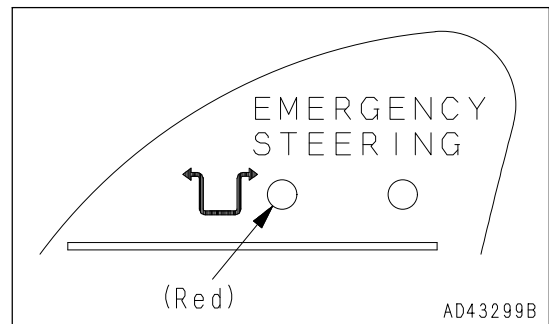
When the machine is traveling, if the engine stops or if there is any abnormality in the pump circuit, this lamp (3) flashes (red) to indicate that the emergency steering system has been actuated. If it flashes, move the machine immediately to a safe place, stop the machine, and carry out inspection.

The emergency steering does not work when the machine is stopped.

When the starting switch is turned ON, the emergency steering pilot lamp (red) flashes.

If the pilot lamp does not flash, it indicates that there is an abnormality, so please ask your Komatsu distributor to carry out repairs.

Do not operate the machine until the problem has been removed.



## MULTI MONITOR

## DISPLAY ITEMS (WARNING ITEMS)

The main warning items displayed on the multi monitor are shown in the table below.

If the warning display is given, take action according to the instructions on the screen.

No.	Item	Display range	Warning output					Cansel switch Yes, No	Error Code No.	Remarks
			Multi monitor warning display	Screen color	Main monitor output		Buzzer			
					CHECK lamp	CAUTION lamp				
1	Engine oil level	Below low level	Abnormal	Red	Flashes	-	-	Yes	C253	
2	Engine oil pressure	Below specified pressure	Abnormal	Red	-	Flashes	Sounds	No	C143	
3	Engine water temperature	More than 102°C	Abnormal	Red	-	Flashes	Sounds	Yes	C151	
4	Fuel level	Below specified level	Lack of fuel	Yellow	Flashes	-	-	Yes	B@BFZK	Before engine runs
		Below specified level	Lack of fuel	Yellow	-	Flashes	-	Yes	b@BFZK	After engine runs
5	Torque converter oil temperature	More than 120°C	Abnormal	Red	-	Flashes	-	Yes	B@CENS	
		More than 130°C	Abnormal	Red	-	Flashes	Sounds	Yes	b@CENS	
6	Hydraulic oil temperature	More than 105°C	Abnormal	Red	-	Flashes	-	Yes	B@HANS	
7	Brake oil pressure (F)	Less than 14.72 MPa (150 kg/cm <sup>2</sup> , 2130 lbft)	Under accumulated pressure	Yellow	-	Flashes	-	Yes	2G41MB	
			Abnormal	Red	-	Flashes	Sounds	No	2G42ZG	
8	Brake oil pressure (R)	Less than 14.72 MPa (150 kg/cm <sup>2</sup> , 2130 lbft)	Under accumulated pressure	Yellow	-	Flashes	-	Yes	2G41MB	
			Abnormal	Red	-	Flashes	Sounds	No	2G43ZG	
9	Battery electrolyte level (1)	Below low level	Abnormal	Yellow	Flashes	-	-	Yes	B@GAZK	
10	Battery electrolyte level (2)	Below low level	Abnormal	Yellow	Flashes	-	-	Yes	B@GBZK	
11	Battery electrolyte level (3)	Below low level	Abnormal	Yellow	Flashes	-	-	Yes	B@GCZK	
12	Brake oil level	Below specified level	Abnormal	Yellow	Flashes	-	-	Yes	B@C5ZK	
		Below specified level	Abnormal	Red	-	Flashes	Sounds	No	b@C5ZK	
13	Engine water level	Below low level	Abnormal	Yellow	Flashes	-	-	Yes	B@BCZK	Before engine runs
		Below low level	Abnormal	Red	-	Flashes	Sounds	No	b@BCZK	After engine runs
14	Transmission filter clogging	Above specified pressure	Abnormal	Yellow	Flashes	-	-	Yes	15B0NX	
15	Air cleaner clogging (1)	Above specified pressure	Abnormal	Yellow	Flashes	-	-	Yes	AA1ANX	
16	Air cleaner clogging (2)	Above specified pressure	Abnormal	Yellow	Flashes	-	-	Yes	AA1BNX	
17	Air cleaner clogging (3)	Above specified pressure	Abnormal	Yellow	Flashes	-	-	Yes	AA1CNX	
18	Air cleaner clogging (4)	Above specified pressure	Abnormal	Yellow	Flashes	-	-	Yes	AA1DNX	
19	Defective charge amount, voltage	When charge is defective	Abnormal	Yellow	Flashes	-	-	Yes	AB00MA	

If a warning is generated, the [Warning screen] and [Screen being used] are displayed in turn. If multiple warnings are generated at the same time, the warning screen is displayed in turn for 5 seconds each.

If the JUMP switch is pressed when the [Warning screen] is being displayed, the [Screen being used] is displayed for 2 minutes.

If the PAUSE switch is pressed when the [Warning screen] is being displayed, the [Warning screen] is displayed for 2 minutes. When this is done, the PAUSE switch changes to the RESTART switch. If the RESTART switch is pressed when the warning screen is being displayed for 2 minutes, the following screen is displayed.

If the CANCEL switch is pressed, the [Warning screen] can be temporarily canceled. The [Warning screen] can be canceled even when there is an abnormality on the machine. When the starting switch is next turned to the ON position, or when the user ID is changed, even when this operation is carried out to cancel the warning screen, the warning screen is displayed again if the abnormality has not been removed.

**ENGINE OIL LEVEL CAUTION DISPLAY**

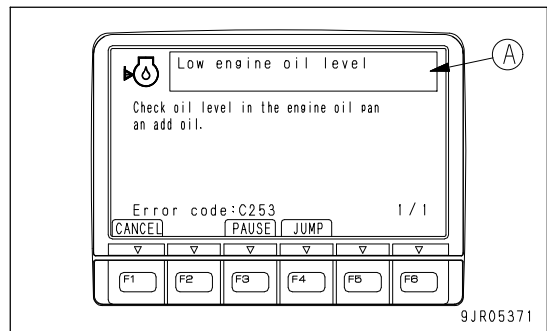
This caution display (4) warns the operator that the oil level in the engine oil pan has gone down.

(A) Title screen: Red

During Check before starting (starting switch ON, engine stopped)  
If the oil level in the engine oil pan is low, the title and message are displayed as an abnormality display on the multi monitor. When this happens, the title screen changes to red and the main monitor central check lamp (CHECK) also flashes.

If this abnormality is displayed, check the oil level in the engine oil pan and add oil.

Stop the machine on level ground before carrying out the check.



During operations (engine running)

Even if there is any display on the multi monitor or the central check lamp (CHECK) on the main monitor flashes during Check before starting, when the engine is started, the check lamp will go out, the multi monitor display will also go out, and the screen will return to the monitor screen.

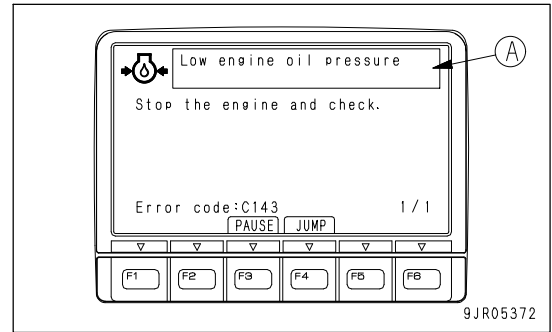
**ENGINE OIL PRESSURE CAUTION DISPLAY**

This caution display (5) warns the operator that the engine oil pressure has gone down.

(A) Title screen: Red

During Check before starting (starting switch ON, engine stopped)  
 If there is no abnormality in the engine lubricating oil system, no display appears on the multi monitor and the central warning lamp (CAUTION) does not flash.

During operations (engine running)  
 If the engine lubricating oil does not reach the specified pressure, the title and message are displayed on the multi monitor as an abnormality display. If this happens, the title screen changes to red, the main monitor central warning lamp (CAUTION) flashes, and the alarm buzzer sounds intermittently.  
 If this abnormality is displayed, stop the engine, then check the oil level in the engine oil pan and add oil.



**ENGINE WATER TEMPERATURE CAUTION DISPLAY**

This caution display (6) warns the operator that there is an abnormality in the water temperature in the engine cooling system.

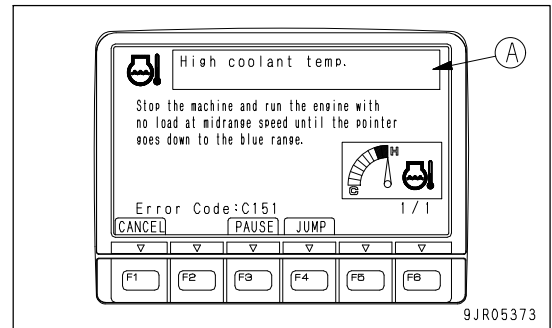
During operations, it is possible to check with the engine water temperature gauge displayed on the monitor screen on the multi monitor. The indicator should be inside the blue range.  
 Engine water temperature caution display (water temperature 102 °C (216°F) or more)

(A) Title screen: Red

- When engine water temperature rises and goes above 102°C (216°F)

The title and message are displayed on the multi monitor as an abnormality display. If this happens, the title screen changes to red, the main monitor central warning lamp (CAUTION) flashes, and the alarm buzzer sounds intermittently.

If this abnormality is displayed, stop operations (stop the machine), run the engine at a mid-range speed and wait for the indicator on the water temperature gauge to enter the blue range.

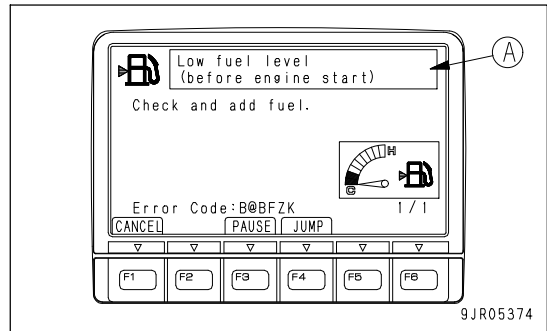


**FUEL LEVEL CAUTION DISPLAY**

This caution display (7) warns the operator that the fuel level is low.  
 Fuel level caution display (Before starting engine)

(A) Title screen: Yellow

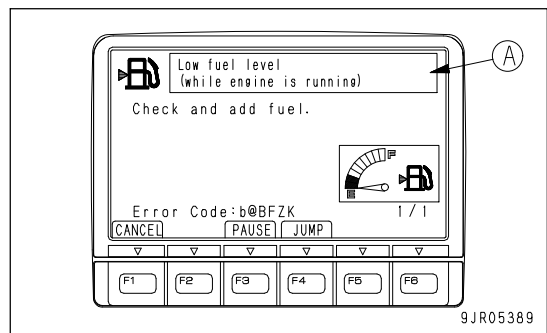
During Check before starting (starting switch ON, engine stopped)  
 If the level of fuel in the fuel tank is low, the title and message are displayed on the multi monitor as an abnormality display.  
 If this happens, the title screen changes to yellow and the main monitor central check lamp (CHECK) flashes.  
 If this abnormality is displayed, check the fuel level and add fuel.



Fuel level caution display (Engine running)

(A) Title screen: Yellow

During operations (engine running)  
 If the level of fuel in the fuel tank is low, the title and message are displayed on the multi monitor as an abnormality display. If this happens, the title screen changes to red and the main monitor central warning lamp (CAUTION) flashes.  
 If this abnormality is displayed, stop the machine and add fuel. Check also for any leakage in the fuel system.



**TORQUE CONVERTER OIL TEMPERATURE CAUTION DISPLAY**

This caution display (8) warns the operator that there is an abnormality in the torque converter oil temperature. During operations, it is possible to check with the torque converter oil temperature gauge displayed on the monitor screen on the multi monitor. The indicator should be inside the blue range.

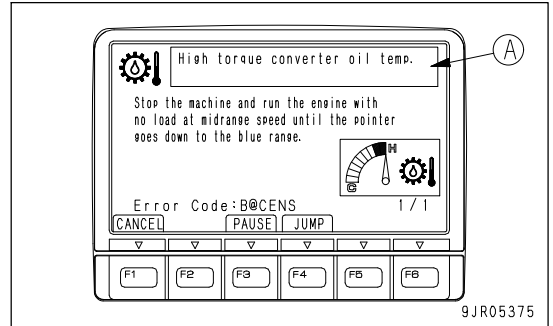
Torque converter oil temperature caution display (oil temperature 120°C (248°F) or more)

(A) Title screen: Red

- When torque converter oil temperature rises and goes above 120°C (248°F)

The title and message are displayed on the multi monitor as an abnormality display. If this happens, the title screen changes to red and the main monitor central warning lamp (CAUTION) flashes.

If this abnormality is displayed, stop operations (stop the machine), run the engine at a mid-range speed and wait for the indicator on the oil temperature gauge to enter the blue range.



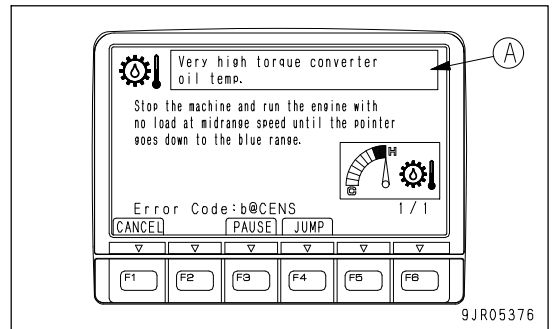
Torque converter oil temperature caution display (oil temperature 130°C (266°F) or more)

(A) Title screen: Red

- When torque converter oil temperature rises and goes above 130°C (266°F)

The title and message are displayed on the multi monitor as an abnormality display. If this happens, the title screen changes to red, the main monitor central warning lamp (CAUTION) flashes, and the alarm buzzer sounds intermittently.

If this abnormality is displayed, stop operations (stop the machine), run the engine at a mid-range speed and wait for the indicator on the water temperature gauge to enter the blue range.





**HYDRAULIC OIL TEMPERATURE CAUTION DISPLAY**

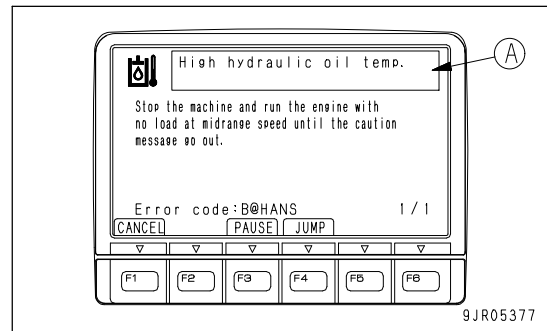
This caution display (9) warns the operator that there is an abnormality in the hydraulic oil temperature.

(A) Title screen: Red

- When hydraulic oil temperature rises and goes above 105°C (221°F)

The title and message are displayed on the multi monitor as an abnormality display. If this happens, the title screen changes to red and the main monitor central warning lamp (CAUTION) flashes.

If this abnormality is displayed, stop operations (stop the machine), run the engine at a mid-range speed and wait for the oil temperature to go down. When the oil temperature goes down and enters the specified range, the caution display goes out.



**BRAKE OIL PRESSURE WARNING DISPLAY**

This warning display informs the operator that there is an abnormality in front brake oil pressure (10) and rear brake oil pressure (11).

Front, rear brake oil pressure accumulated pressure display

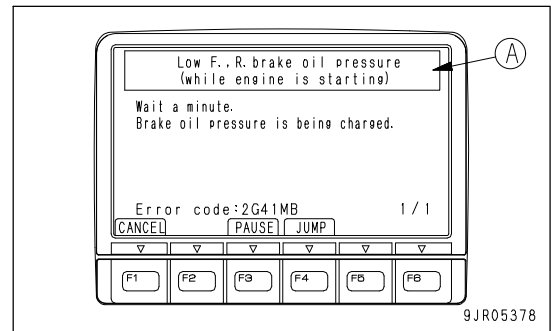
(A) Title screen: Yellow

- When brake oil pressure is being stored and is below 14.72 MPa (150 kg/cm<sup>2</sup>, 2130 PSI)

The title and message are displayed on the multi monitor as an abnormality display. If this happens, the title screen changes to yellow and the main monitor central warning lamp (CAUTION) flashes.

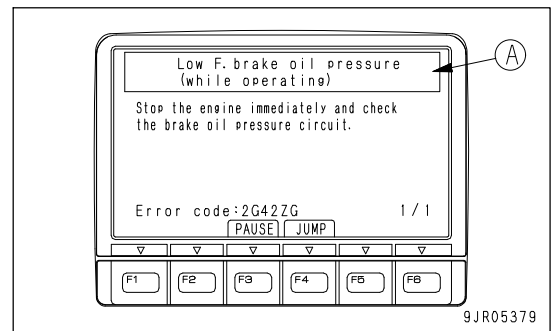
If this abnormality is displayed, stop the machine and wait for the brake oil pressure to be stored.

When the oil pressure is stored (when it goes above 14.72 MPa (150 kg/cm<sup>2</sup>, 2130 PSI)), the abnormality display screen goes out.



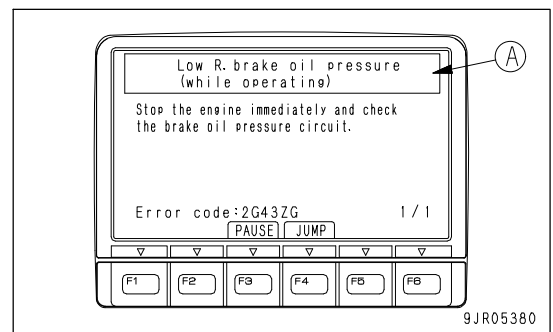
Front brake oil pressure caution display

(A) Title screen: Red



Rear brake oil pressure caution display

(A) Title screen: Red



- When brake oil pressure goes below 14.72 MPa (150 kg/cm<sup>2</sup>, 2130 PSI) during operations  
The title and message are displayed on the multi monitor as an abnormality display. If this happens, the title screen changes to red, the main monitor central warning lamp (CAUTION) flashes, and the alarm buzzer sounds.

**BATTERY ELECTROLYTE LEVEL WARNING DISPLAY**

These warning displays (12), (13), and (14) warn the operator that the battery electrolyte level is low.

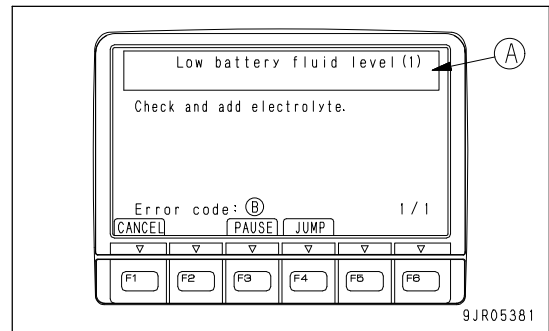
(A) Title screen: Yellow

(B) Error code: B@GAZK (12)  
 B@GBZK (13)  
 B@GCZK (14)

- If level of battery electrolyte is low during Check before starting or during operation

The title and message are displayed on the multi monitor as an abnormality display. If this happens, the title screen changes to yellow and the main monitor central check lamp (CHECK) flashes.

If this abnormality is displayed, stop operations (stop the engine) and check the battery electrolyte level. If it is low, add distilled water.



- There are battery electrolyte level sensors at three places. It is possible to judge which battery has a lower electrolyte level, but if the abnormality display is given, check the electrolyte level for all six batteries.

**BRAKE OIL LEVEL CAUTION PILOT DISPLAY**

This caution display (15) warns the operator that the brake oil level has gone down.

Brake oil level caution display (before starting engine)

(A) Title screen: Yellow

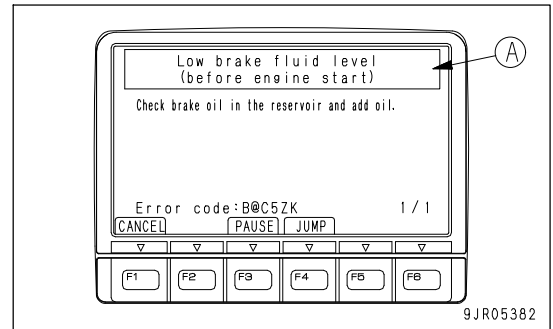
During Check before starting (starting switch ON, engine stopped)

If the level of oil in the brake line or brake cooler line is low, the title and message are displayed on the multi monitor as an abnormality display.

If this happens, the title screen changes to yellow and the main monitor central check lamp (CHECK) flashes.

If the lamp flashes and a message is displayed on the multi monitor, check the brake oil level and add oil.

At the same time, also check for oil leakage from the brake



Brake oil level caution display (when engine is running)

(A) Title screen: Red

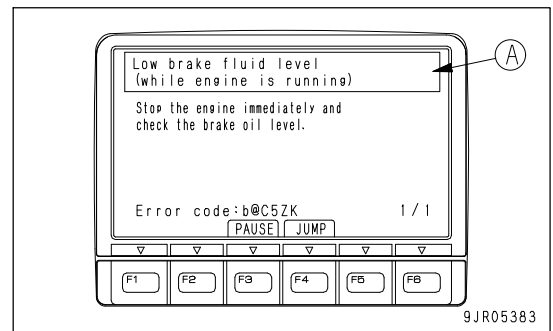
During operations (engine running)

There should be no brake oil level caution display on the multi monitor during operations.

If the oil level in the brake line or brake cooler line goes down, the title and message are displayed on the multi monitor as an abnormality display. If this happens, the title screen changes to red, the main monitor central warning lamp (CAUTION) flashes, and the alarm buzzer sounds intermittently.

If this abnormality is displayed, stop the machine at a safe place, then stop the engine and check the brake oil level and add oil.

At the same time, also check for oil leakage from the brake



**ENGINE WATER LEVEL CAUTION DISPLAY**

This caution display (16) warns the operator that the radiator coolant level has gone down.

Engine water level caution display (before starting engine)

(A) Title screen: Yellow

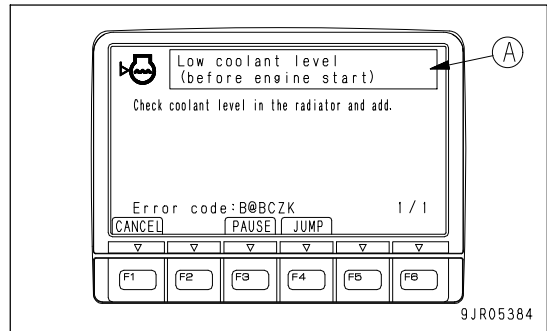
During Check before starting (starting switch ON, engine stopped)

If the level of coolant in the radiator is low, the title and message are displayed on the multi monitor as an abnormality display.

If this happens, the title screen changes to yellow and the main monitor central check lamp (CHECK) flashes.

If the lamp flashes and a message is displayed on the multi monitor, check the radiator coolant level and add water.

Stop the machine on level ground before carrying out the inspection.



Engine water level caution display (when engine is running)

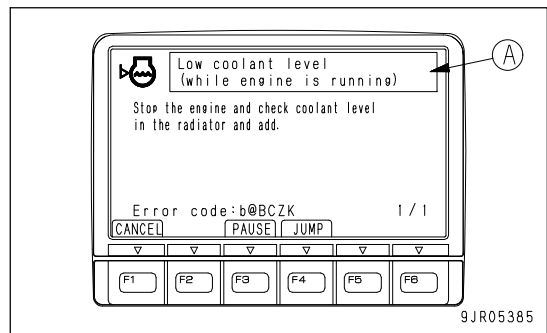
(A) Title screen: Red

During operations (engine running)

The engine water level caution display should not appear on the multi monitor during operations.

If the level of coolant in the radiator is low, the title and message are displayed on the multi monitor as an abnormality display. If this happens, the title screen changes to red, the main monitor central warning lamp (CAUTION) flashes, and the alarm buzzer sounds intermittently. If this happens, stop the engine, check the radiator coolant level and add water.

Stop the machine on level ground before carrying out the inspection.

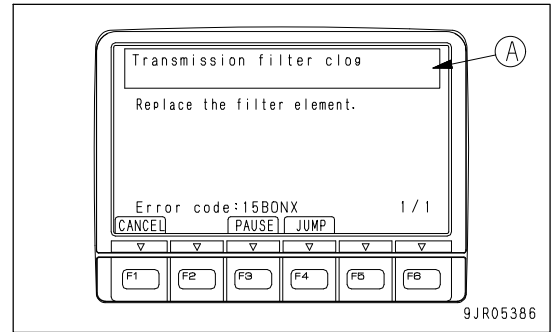


**TRANSMISSION OIL FILTER CLOGGING CAUTION DISPLAY**

This caution display (17) informs the operation that the transmission oil filter is clogged.

(A) Title screen: Yellow

- If transmission oil filter becomes clogged during operations  
The title and message are displayed on the multi monitor as an abnormality display. If this happens, the title screen changes to yellow and the main monitor central check lamp (CHECK) flashes.  
If the lamp flashes and a message is displayed on the multi monitor, stop operations (stop the engine) and replace the transmission filter.



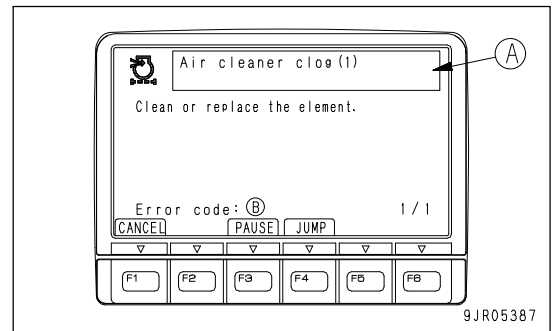
**AIR CLEANER CLOGGING CAUTION DISPLAY**

There are four caution displays (18), (19), (20), and (21). These inform the operator that the air cleaner is clogged.

(A) Title screen: Yellow

- (B) Error code: AA1ANX (18)  
AA1BNX (19)  
AA1CNX (20)  
AA1DNX (21)

- If any air cleaner element becomes clogged during operations (engine running)  
The title and message are displayed on the multi monitor as an abnormality display. If this happens, the title screen changes to yellow and the main monitor central check lamp (CHECK) flashes.  
If the lamp flashes and a message is displayed on the multi monitor, stop operations (stop the engine) and clean or replace the air cleaner element.

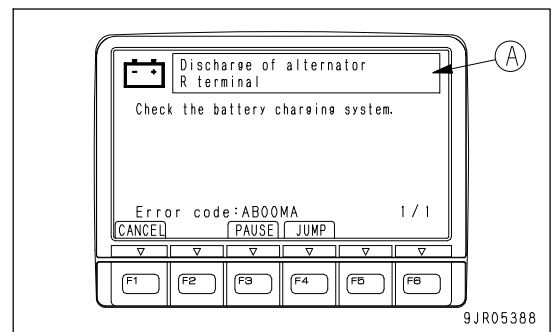


**BATTERY CHARGE VOLTAGE CAUTION DISPLAY**

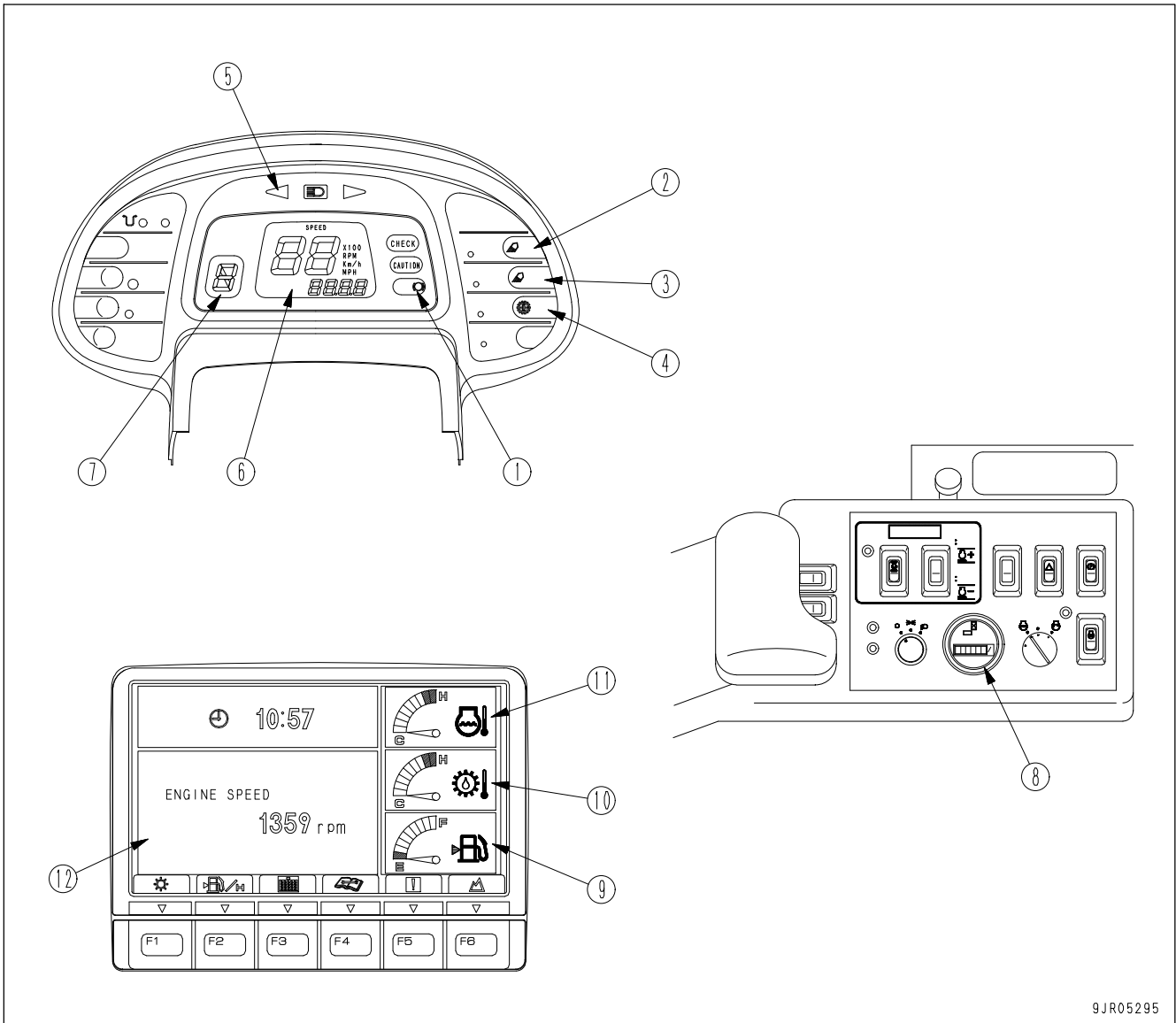
This caution display (22) warns the operator that there is an abnormality in the charging system while the engine is running.

(A) Title screen: Yellow

- If abnormality occurs in charging system during operations (engine running)  
The title and message are displayed on the multi monitor as an abnormality display. If this happens, the title screen changes to yellow and the main monitor central check lamp (CHECK) flashes.  
If the lamp flashes and a message is displayed on the multi monitor, stop operations and check the charging system.



METER DISPLAY PORTION



9JR05295

- (1) Parking brake pilot lamp
- (2) Front working lamp
- (3) Rear working lamp
- (4) Transmission cut-off pilot lamp
- (5) Turn signal pilot lamp
- (6) Speedometer
- (7) Transmission shift indicator
- (8) Service meter

Multi monitor screen

- (9) Fuel gauge
- (10) Torque converter oil temperature gauge
- (11) Engine water temperature gauge
- (12) Engine tachometer

**PILOT DISPLAY**

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

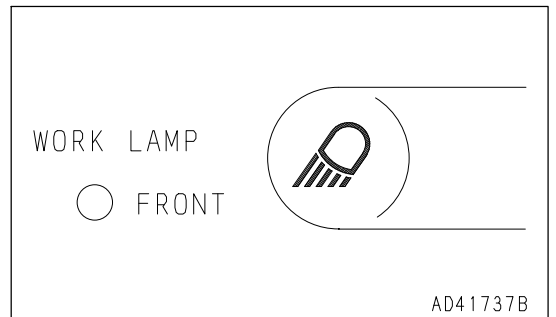
**PARKING BRAKE PILOT LAMP**

This lamp (1) lights up when the parking brake is applied.



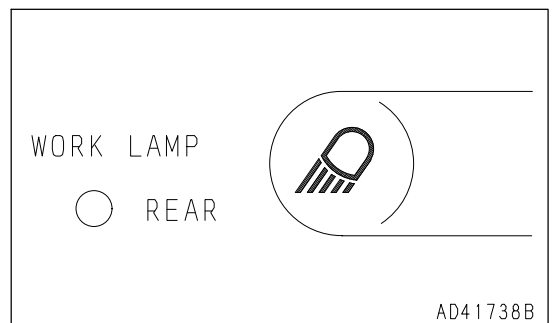
**FRONT WORKING LAMP PILOT LAMP**

This lamp (2) lights up when the front working lamp is turned on.



**REAR WORKING LAMP PILOT LAMP**

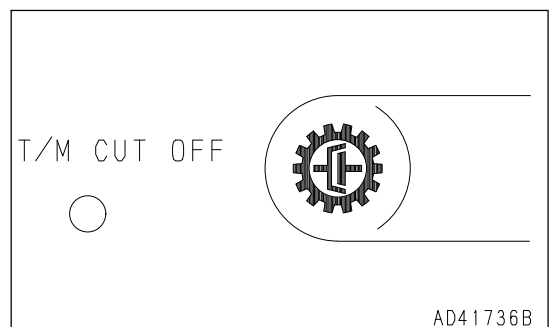
This lamp (3) lights up when the rear working lamp is turned on.



**TRANSMISSION CUT-OFF PILOT LAMP**

This lamp (4) lights up when the transmission cut-off switch is turned ON.

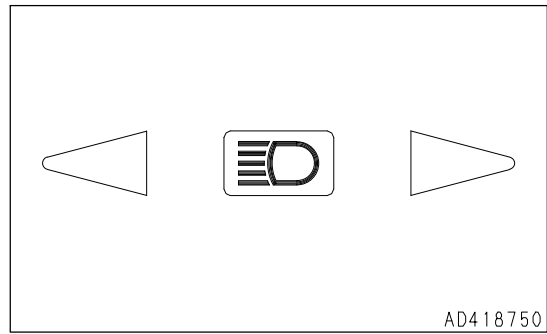
If the left brake pedal is depressed when the lamp is lighted up, the transmission returns to Neutral.





**TURN SIGNAL PILOT LAMP**

When the turn signal lamp flashes, this lamp (5) also flashes.

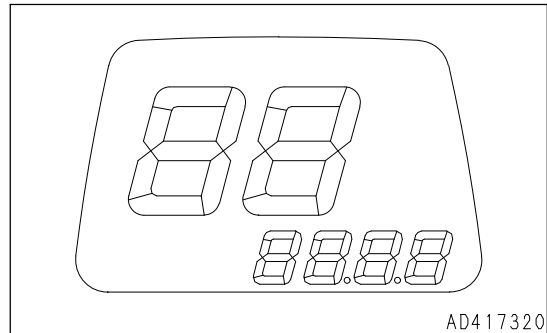


AD418750

**METERS**

**SPEEDOMETER**

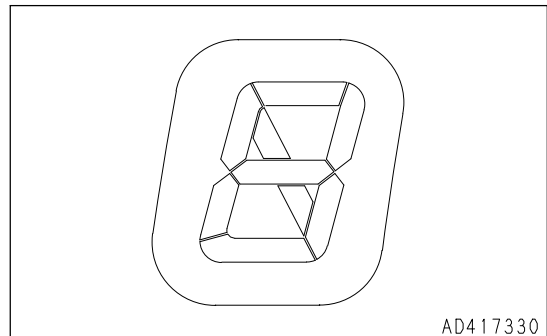
This meter (6) shows the machine travel speed.



AD417320

**TRANSMISSION SHIFT INDICATOR**

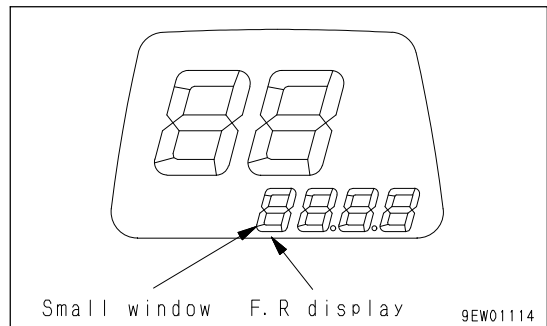
This indicator (7) shows that the transmission speed range. When the directional lever is at N, the indicator shows N. When the directional lever is at F or R, the numeral for the shift position of the shift lever is displayed. (Speed range)



AD417330

**WHEN USING JOYSTICK STEERING SYSTEM**

This shows the transmission speed range. When the directional switch at the head of the joystick lever is set to the N position, the indicator displays N. (The F-R display is shown in the small window under the speedometer.) When the FNR switch on the head of the joystick lever is set to the F or R position, F or R is displayed in the small window at the bottom of the speedometer and the shift indicator displays the transmission speed range and N.



Small window F. R display 9EW01114

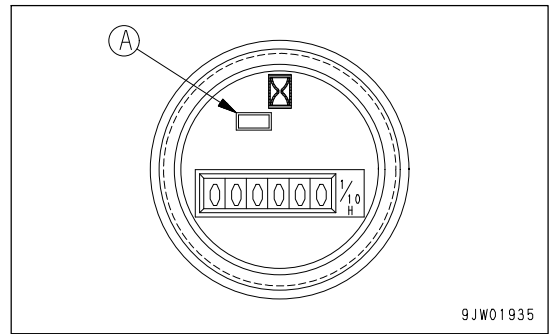
**SERVICE METER**

This meter (8) shows the total number of hours that the machine has worked.

If the engine is running, the service meter advances even if the machine is not moving.

When the engine is running, display plate (A) inside the meter rotates to show that the meter is advancing.

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



9JW01935

**FUEL GAUGE**

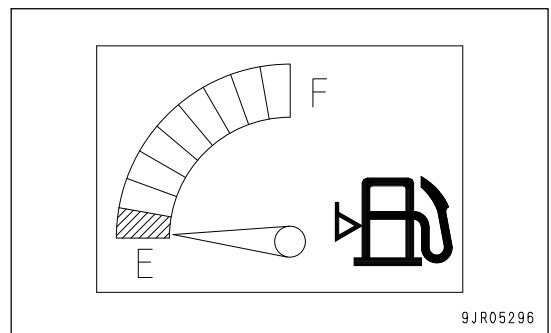
This meter (9) is displayed on the multi monitor and shows the amount of fuel remaining in the fuel tank.

E: This shows that there is less than 900 liters (237.8 US gal) of fuel remaining.

F: This shows that the tank is full (more than 3700 liters (976.8 US gal)).

If the fuel gauge indicator enters the yellow range during operations, it shows that there is less than 900 liters (237.8 US gal) of fuel remaining, so check and add fuel.

When this happens, the main monitor central warning lamp (CAUTION) flashes.



9JR05296

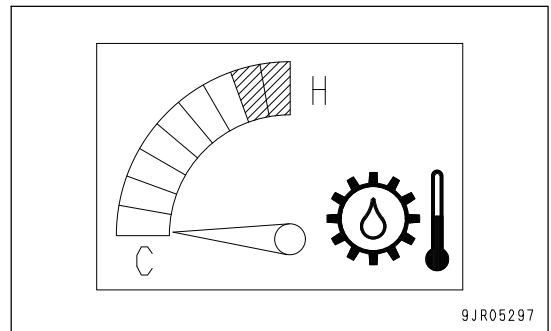
**TORQUE CONVERTER OIL TEMPERATURE GAUGE**

This meter (10) is displayed on the multi monitor and shows the torque converter oil temperature.

The indicator of the torque converter oil temperature gauge should be in the blue range during operations.

If the indicator of the torque converter oil temperature gauge enters the red range during operations, stop the machine and run at the engine under no load at a mid-range speed and wait until the indicator returns to the blue range.

When the indicator enters the 1st segment of the red range, the main monitor central warning lamp (CAUTION) flashes; when it enters the 2nd segment of the red range, the alarm buzzer sounds intermittently.



9JR05297

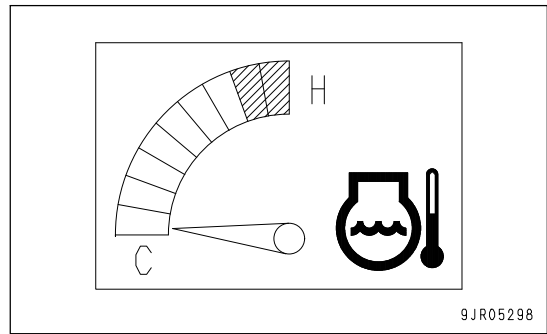
**ENGINE WATER TEMPERATURE GAUGE**

This meter (11) is displayed on the multi monitor and shows the engine water temperature.

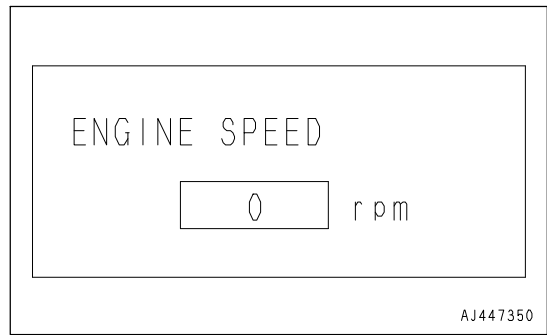
The indicator of the engine water temperature gauge should be in the blue range during operations.

If the indicator of the engine water temperature gauge enters the red range during operations, stop the machine and run at the engine under no load at a mid-range speed and wait until the indicator returns to the blue range.

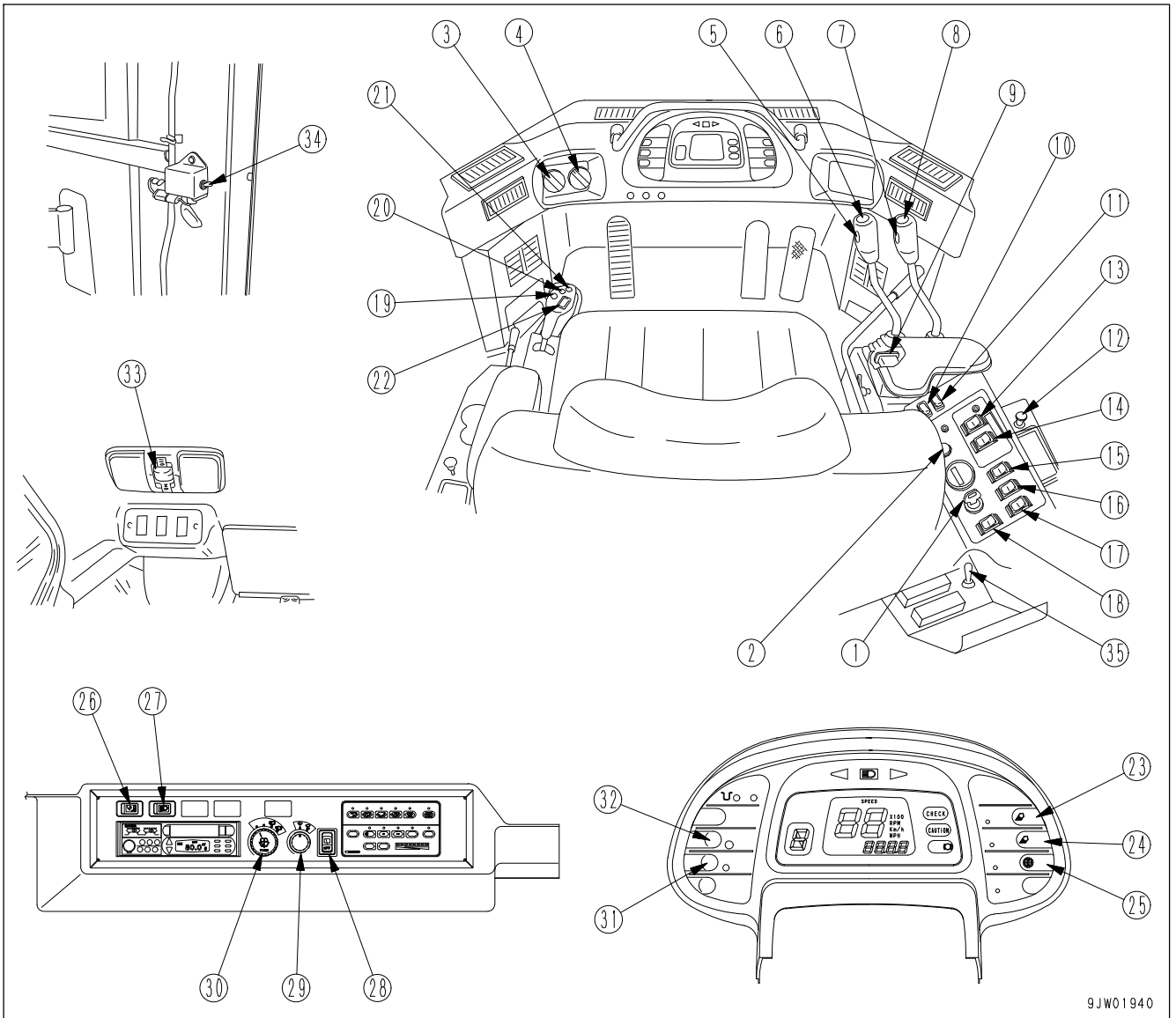
When the indicator enters the 1st segment of the red range, the main monitor central warning lamp (CAUTION) flashes; when it enters the 2nd segment of the red range, the alarm buzzer sounds intermittently.

**ENGINE TACHOMETER**

This meter (12) is displayed on the multi monitor and shows the engine speed.



SWITCHES



9JW01940

- |   |   |
|---|---|
| (1) Starting switch                                 | (19) Horn switch                            |
| (2) Lamp switch                                     | (20) Shift-down switch                      |
| (3) Travel speed limit dial                         | (21) Shift-up switch                        |
| (4) Drive force limit dial                          | (22) Directional selector switch            |
| (5) Load meter cancel switch                        | (23) Front working lamp switch              |
| (6) Travel speed limit ON-OFF switch                | (24) Rear working lamp switch               |
| (7) Transmission auto shift, manual selector switch | (25) Transmission cut-off switch            |
| (8) Kick-down switch                                | (26) Engine hood side lamp switch           |
| (9) Turn signal switch                              | (27) Step lamp switch                       |
| (10) Left power window switch                       | (28) Rear wiper switch                      |
| (11) Right power window switch                      | (29) Wiper selector switch                  |
| (12) Cigarette lighter                              | (30) Front wiper switch                     |
| (13) RPM set ON-OFF switch                          | (31) Auto grease switch                     |
| (14) RPM set idling up-down selector switch         | (32) Tire slip control ON-OFF switch        |
| (15) Load meter sub-total switch                    | (33) Room lamp switch                       |
| (16) Hazard lamp switch                             | (34) Engine room lamp switch                |
| (17) Parking brake switch                           | (35) Emergency parking brake release switch |
| (18) Ether spray switch                             |   |

### STARTING SWITCH

This switch (1) is used to start or stop the engine.

#### OFF position

The key can be inserted and removed at this position. When the key is turned to this position, all electrical circuits are turned off and the engine stops.

In addition, the parking brake is automatically applied.

#### ON position

In this position, electric current flows to the charging circuit, lamp circuit, and accessory circuit.

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

#### START position

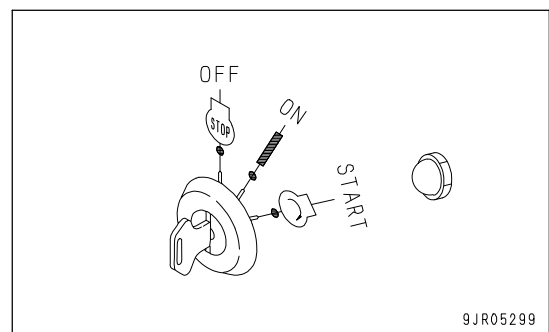
This is the position for starting the engine. When the starting key is turned to the START position, the prelube indicator lights up, prelubrication starts, and the engine starts. After the engine starts, return the starting key to the ON position.

After lubrication, the starting motor turns and the engine starts.

In cold weather, if it is difficult to start the engine, spray ether into the intake manifold at this position. For details of the method of using ether, see STARTING IN COLD WEATHER (PAGE 3-93).

#### REMARK

"Prelube" means forcible feed of oil to all parts of the engine before cranking of the engine starts. This prevents any loss of the oil film at rotating parts of the engine.



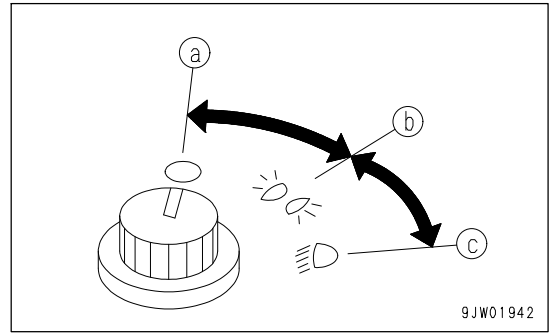
**LAMP SWITCH**

Use this switch (2) to turn on the head lamps, side clearance lamps, tail lamps, and instrument panel lighting.

Position (a): OFF

Position (b): Side clearance lamps, tail lamps, and instrument panel light up

Position (c): Head lamps light up

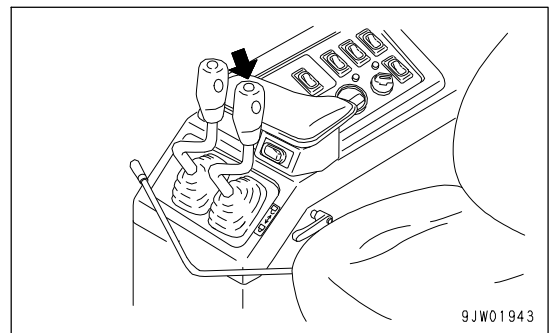
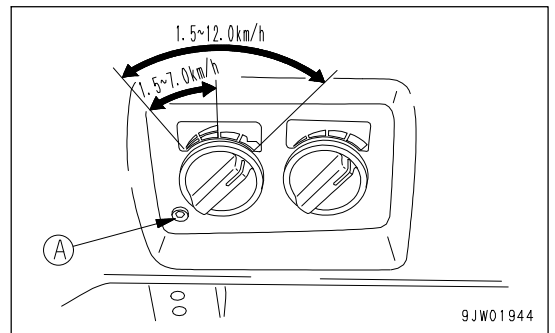


**TRAVEL SPEED LIMIT DIAL**

Use this dial (3) to set the maximum travel speed as desired according to the transmission speed range and position of the dial.

**CAUTION**

- When the travel speed is more than 1.5 km/h (0.9 MPH), the travel speed limit is actuated only when the machine is traveling forward. At speeds of less than 1.5 km/h (0.9 MPH), the system automatically switches to operation of the drive force limit.
- Operate the travel speed limit ON-OFF switch to actuate the travel speed limit only when it is needed.
- When traveling in load-and-carry operations, use the RPM SET method to maintain constant speed in order to reduce fuel consumption.
- The travel speed limit is actuated when the transmission cut-off switch is ON.



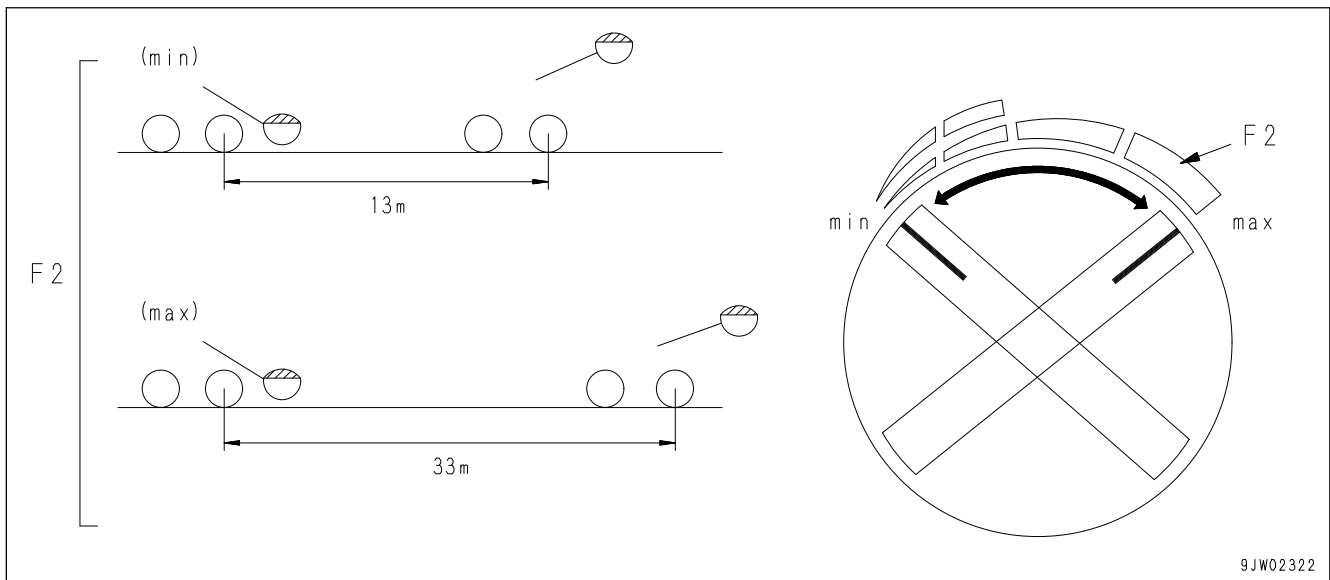
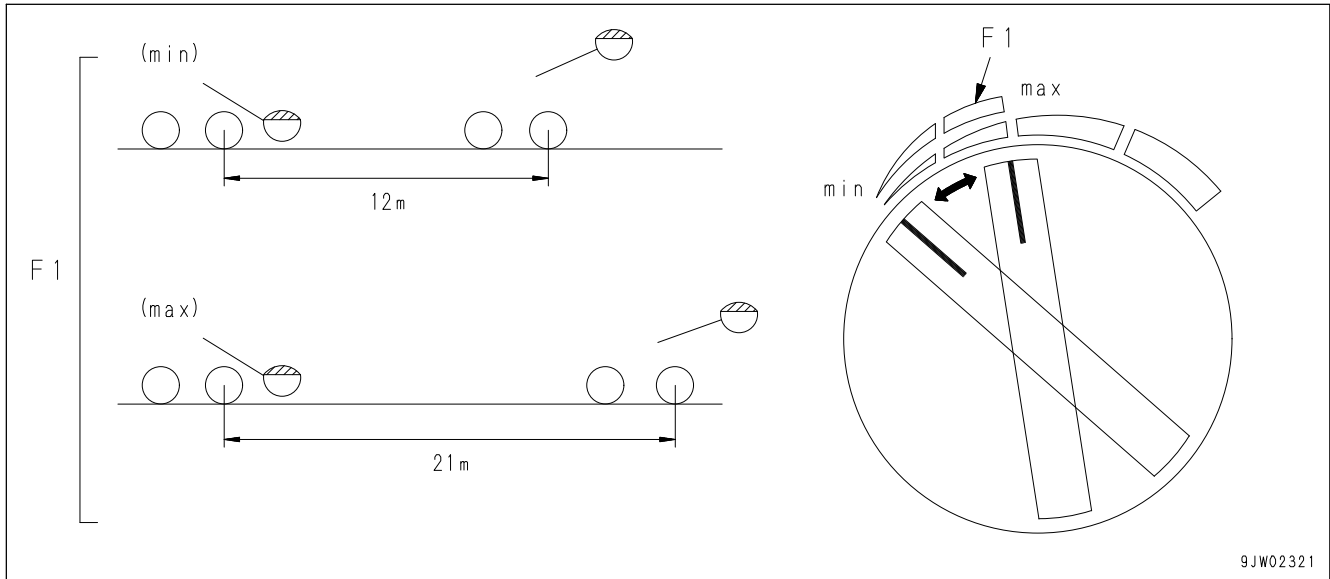
When the travel speed limit ON-OFF switch is at the ON position, travel speed limit ON-OFF indicator lamp (A) lights up. If indicator lamp (A) is not lighted up, the travel speed limit dial does not work.

The maximum travel speeds according to the transmission speed range and travel speed limit dial position are as follows.

Transmission speed range	Maximum travel speed (km/h (MPH))
1st	1.5 to 7.0 (0.7 to 4.4)
2nd	1.5 to 12.0 (0.7 to 7.5)

**REMARK**

Using the travel speed limit dial to set the travel speed makes it easy to carry out operations approaching dump trucks with the accelerator pedal kept depressed.

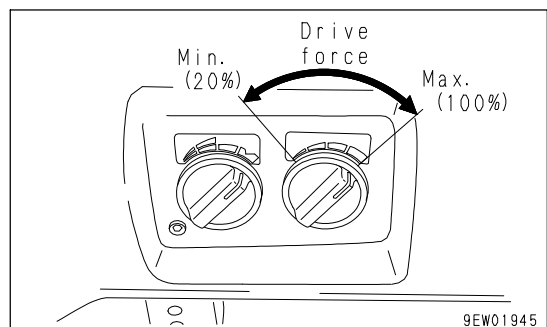


**DRIVE FORCE LIMIT DIAL**

This dial (4) is used to control the drive force.

It is possible to use the dial to change the driving force control between a driving force of 20% (minimum) and driving force 100% (maximum).

- The drive force limit can be actuated only when the transmission is in 1st.
- The drive force limit can be actuated when the transmission cut-off switch is at the ON position.



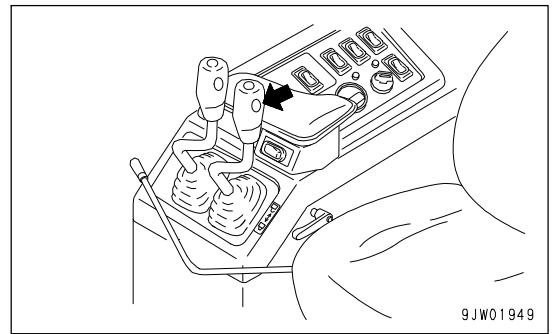
**REMARK**

Using the drive force limit dial to set the driving force can be used to prevent the tires from slipping by lowering the drive force beforehand when traveling in mud or on roads where the tires tend to slip.

It is possible to change the drive force to match the conditions of the jobsite. When doing this, use a setting that gives the best combination for productivity and prevention of tire slippage.

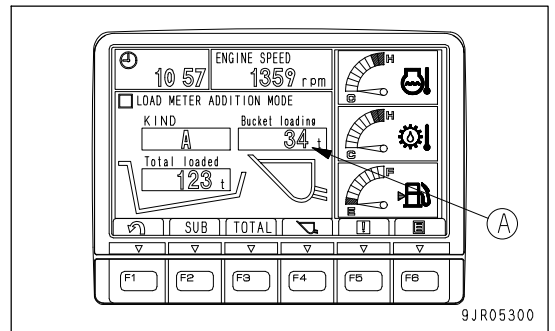
**LOAD METER CANCEL SWITCH**

When the data measured by the load meter are not needed, use this switch (5) to cancel and return to the display in use before the measurement was made.



**CAUTION**

Note that the cancel switch can only be used to cancel the measured data when the payload is being displayed (for 15 sec.) on payload display portion (A) on the multi monitor load meter display screen.



**TRAVEL SPEED LIMIT ON-OFF SWITCH**

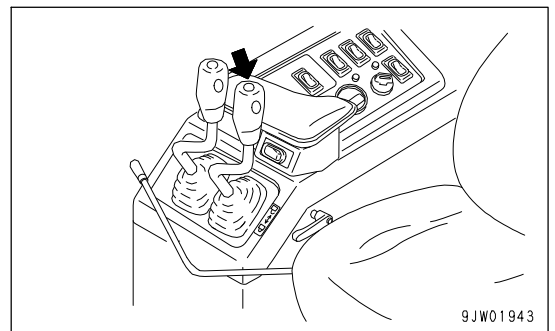
Use this switch (6) to switch to the travel speed limit mode.

ON: Electric power is sent to the travel speed limit mode and the maximum travel speed is set according to the setting of the travel speed limit dial.

OFF: Electric power to the travel speed limit mode is shut off. In this condition, even if the setting of the dial is changed, the maximum travel speed cannot be set.

**REMARK**

The setting of the travel speed limit ON-OFF switch is displayed by the indicator lamp under the travel speed limit dial.  
If the lamp is lighted up, the travel speed limit switch is ON.





**TRANSMISSION AUTO SHIFT/MANUAL SELECTOR SWITCH**

Press this switch (7) to switch the transmission between auto shift and manual shift.

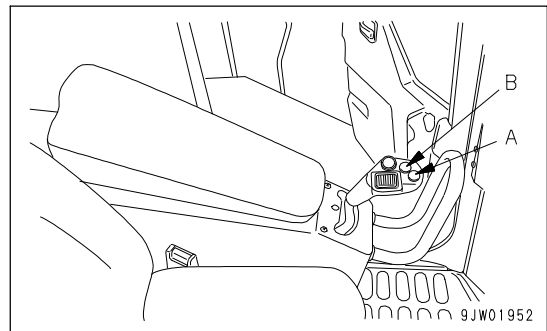
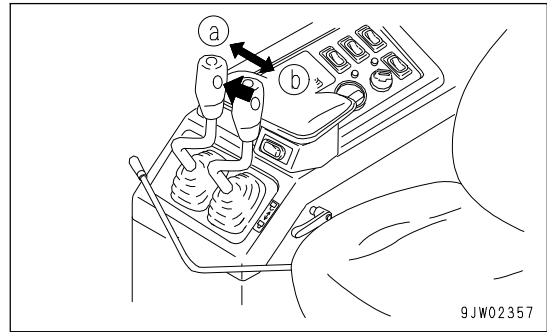
Position (a): This switches to auto shift mode.

If it is set to this position, the speed range last used in the auto shift mode is saved to memory, and that speed range is displayed on the 1st, 2nd, and 3rd indicator lamps at the bottom of the main monitor.

Position (b): This switches to manual shift mode.

If it is set to this position, the transmission speed range is set to 2nd.

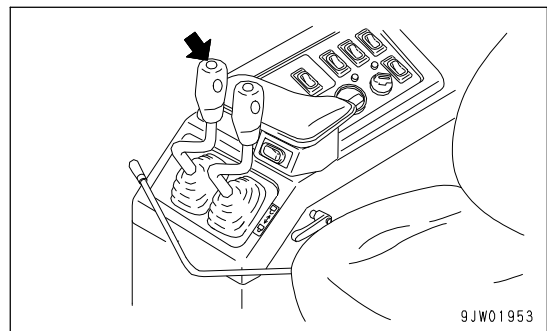
In either position (a) or (b), when shifting gear, use shift up switch (A) or shift down switch (B) at the head of the joystick steering lever.

**KICKDOWN SWITCH**

When the transmission is in 2nd, if switch (8) at the head of the lift arm control lever is pressed, the transmission shifts down to 1st. Use this when it is desired to increase the traction during digging operations.

**REMARK**

When canceling the kickdown switch, operate the forward-reverse switch to REVERSE or Neutral, or shift the transmission to a speed range other than 2nd. It is also possible to cancel the kickdown switch by actuating the parking brake switch or turning the starting switch OFF.

**TURN SIGNAL SWITCH**

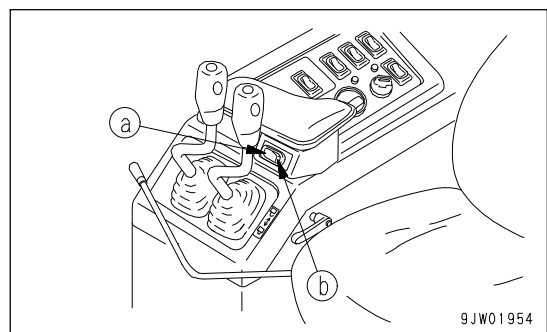
Use this switch (9) to operate the turn signal lamp.

Position (a): Right turn (operate switch to right)

Position (b): Left turn (operate switch to left)

**REMARK**

- When the switch is operated, the turn signal pilot lamp also lights up.
- The turn signal switch does not return automatically when the joystick steering lever is returned. Return it by hand to the neutral position.



**POWER WINDOW SWITCH**

Use these switches (10) and (11) to open and close the window glass in the doors (both sides) of the operator's compartment.

**WARNING**

When closing the window glass, be careful not to get anyone's hands or head caught. There is danger of serious injury if anyone is caught in the window glass.

**NOTICE**

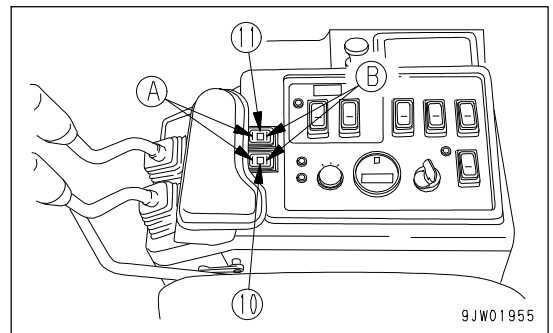
Do not continue to operate this switch in the same direction after the window glass has been fully opened or fully closed. This will cause failure of the power window.

These switches (10) and (11) can be used when the starting switch is at the ON position.

Press portion (A) to lower the side glass.

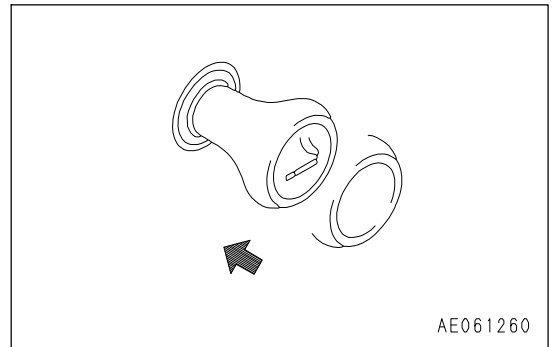
Press portion (B) to raise the side glass.

When the glass reaches the top or bottom and stops, release the switch.

**CIGARETTE LIGHTER**

This is used to light cigarettes.

If the cigarette lighter (12) is pushed in, it will return to its original position after several seconds. When it returns, pull it out and light the cigarette.

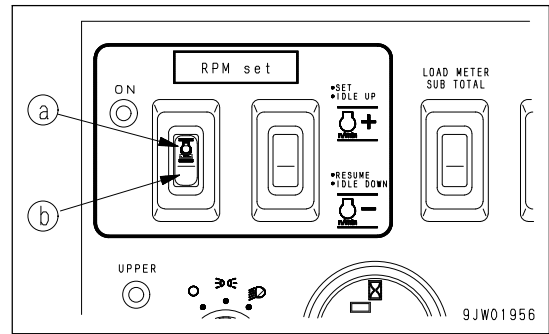


**RPM SET ON-OFF SWITCH**

Use this switch (13) to turn the electric power for the RPM SET system ON or OFF.

Position (a): Power for system is turned ON  
The indicator lamp (ON) lights up.

Position (b): Power for system is turned OFF  
The indicator lamp (ON) goes out.

**REMARK**

- The RPM SET ON-OFF switch is used only for turning the power to the RPM set system ON or OFF. To set the engine speed, use the RPM set IDLE UP-DOWN selector switch.
- This switch is a seesaw switch, so do not press it unnecessarily.

## RPM SET IDLE UP-DOWN SELECTOR SWITCH

 **CAUTION**

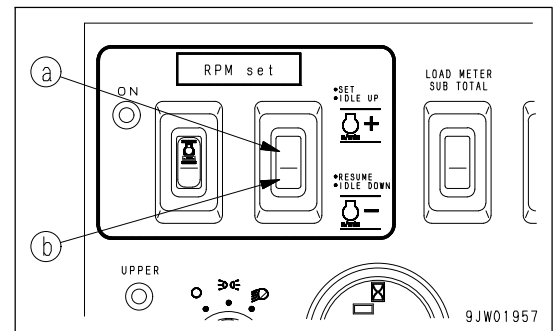
- If the RPM SET ON-OFF switch or engine starting switch are turned OFF, the idle up and idle down speeds are cleared from memory. To set the values again, repeat the operation from the beginning.
- When the values have been set with the RPM SET idle up-down selector switch, if the right brake pedal is depressed when waiting for a dump truck, the engine speed stored in memory will go down to the idling speed, but when portion (b) of the switch is pressed again, the engine will return to the original speed.
- To actuate the switch, check that the RPM SET ON-OFF switch is at the ON position. If it is at the ON position, the indicator lights up.

Use this switch (14) to hold the engine at the desired speed.

## Position (a):

Use this position when setting the engine speed or when raising the set engine speed.

- When using the accelerator pedal  
Depress the accelerator pedal, and when the engine speed rises to the desired set speed, press portion (a) of the switch. The engine speed at that point is set and saved to memory.



- When using the RPM set idling up/down switch  
Keep portion (a) of the switch pressed for at least 0.5 sec to raise the engine speed. When the engine reaches the desired speed, release the switch. The new speed is recorded to memory and the setting is made.

## Position (b):

Use this position when lowering the engine speed or when resetting after canceling the RPM set switch.

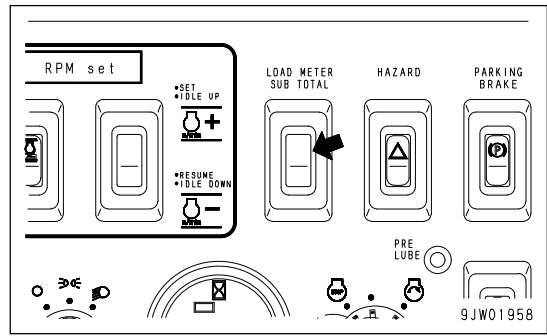
- When using the RPM set up/down switch  
Keep portion (b) of the switch pressed for at least 0.5 sec to lower the engine speed. When the engine reaches the desired speed, release the switch. The new speed is recorded to memory and the setting is made.

**REMARK**

- Setting the engine speed by setting the RPM can prevent the engine speed from going down more than necessary when carrying out operations with the accelerator, so the engine acceleration is improved and the cycle time for operations can be reduced.
- When traveling in load and carry operations, the travel speed is kept constant, so operator fatigue can be reduced.
- When resetting the engine speed to the desired speed without using LOWER position (b) of the RPM set idling up/down selector switch, depress the right brake pedal to cancel the set speed, then use the accelerator pedal to raise the engine speed. When the engine reaches the desired speed, press SET position (a) of the switch. The new speed is recorded to memory and the setting is made.

**LOAD METER SUBTOTAL SWITCH**

Use this switch (15) when setting the load meter total value to 0.0t. The switch returns automatically, so when the total value becomes 0.0t, release the switch.



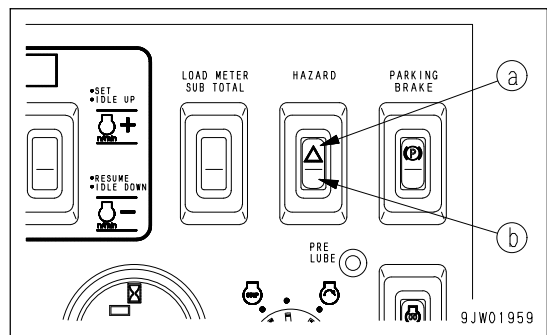
**HAZARD LAMP SWITCH**

Use this switch (16) in emergencies, such as when it is necessary to park the machine because of a breakdown.

Position (a): All turn signal lamps flash

Position (b): OFF

Use this switch only in emergencies. If it is used when the machine is traveling and there is no emergency, it will cause misunderstanding for drivers of other vehicles.



**REMARK**

When this switch is turned to the ON position, the turn signal lamp and turn signal pilot lamp flash.

**PARKING BRAKE SWITCH**

Use this switch (17) to apply the parking brake.

**WARNING**

Always apply the parking brake when leaving the machine or when parking it.

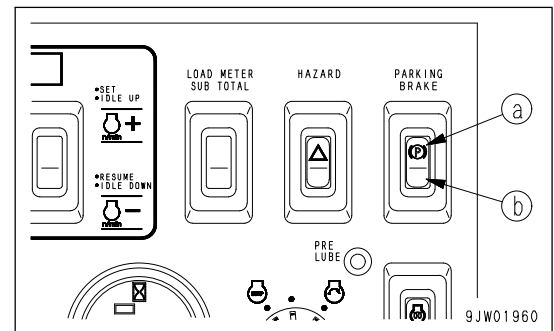
Even if the parking brake switch is turned ON, there is danger until the parking brake pilot lamp lights up, so keep the brake pedal depressed.

Position (a): ON

The parking brake is applied, and the parking brake pilot lamp lights up.

Position (b): OFF (released)

The parking brake is released and the parking brake pilot lamp goes out.

**REMARK**

- If the directional switch is placed in F or R when the parking brake is still applied, the central warning lamp (CAUTION) will flash and the alarm buzzer will sound.
- Before starting the engine, turn the parking brake switch ON, and then OFF again.
- Even if the directional switch is operated when the parking brake is applied, the machine will not move.

**NOTICE**

- Never use the parking brake switch to apply the brakes when traveling, except in an emergency. Apply the parking brake only after the machine has stopped.
- If the parking brake has been used as an emergency brake when traveling at high speed (near the maximum speed), contact your Komatsu distributor to have the parking brake checked for any abnormality.

**ETHER SPRAY SWITCH**

Use this switch (18) to spray ether into the engine intake manifold. Use this when the engine does not start even when the "Procedure for Starting Engine" is used in ambient temperatures of below -10°C (14°F).



Do not spray ether continuously for more than 5 seconds. Ether is volatile and easily ignites, so if too much ether is sprayed, there is danger that it may leak outside and cause an explosion.

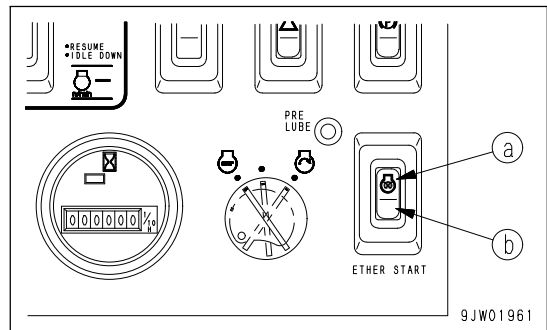
- When it is difficult to start the engine in cold weather, turn the starting switch key to the START position and spray ether into the intake manifold.  
For details of the method of using ether, see STARTING IN COLD WEATHER (PAGE 3-93).
- Simply spraying ether makes it possible to start the engine even at ambient temperatures as low as -20°C (-4°F).
- When spraying ether, keep the starting switch key at the START position and turn the ether spray switch ON.

Position (a): ON, ether is sprayed.

Position (b): OFF, ether is not sprayed.

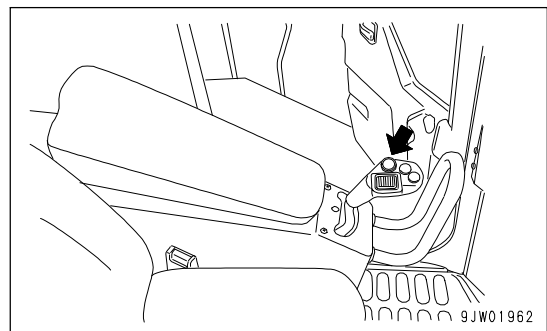
**REMARK**

When the switch is released at the ON position, it will automatically return to the OFF position.



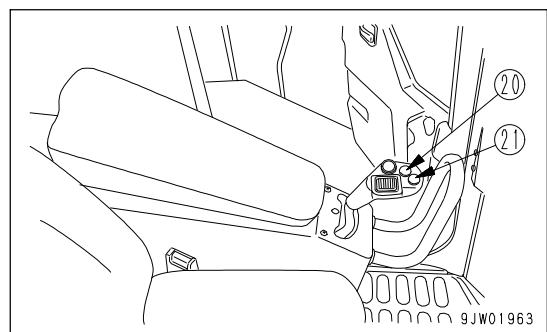
**HORN BUTTON**

Press switch (19) at the head of the joystick steering lever to sound the horn.



**SHIFT UP, SHIFT DOWN SWITCHES**

Use these switches (20) and (21) to shift up and down in either the auto shift or manual shift mode.

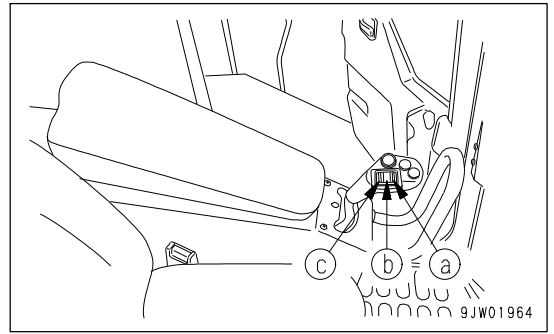


**DIRECTIONAL SELECTOR SWITCH**

Use directional switch (22) at the head of the joystick steering lever to switch the transmission between FORWARD and REVERSE.

- Position (a): FORWARD (F)
- Position (b): Neutral (N)
- Position (c): REVERSE (R)

When shifting the speed range, use the shift up and shift down

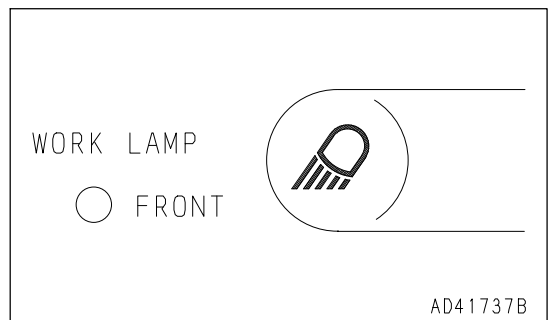


**FRONT WORKING LAMP SWITCH**

Press this button (23) to turn the front working lamps (front working lamp at side of cab, front working lamp on axle, working lamp at side of head lamp) ON and OFF.

When the switch is pressed once, the pilot lamp lights up and the working lamp is turned ON. When the switch is pressed again, the pilot lamp goes out and the working lamp is turned OFF.

- ON: Lamps light up (front working lamp at side of cab, front working lamp on axle, working lamp at side of head lamp)
- OFF: Lamps go out

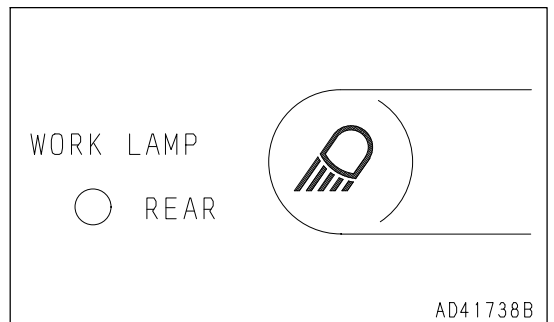


When turning on the front working lamps, set to the side clearance lamp ON position or head lamp ON position, then operate the switch. If the switch is not in one of the above positions, the working lamps will not light up.

**REAR WORKING LAMP SWITCH**

Press this button (24) to turn the rear working lamp ON and OFF. When the switch is pressed once, the pilot lamp lights up and the working lamp is turned ON. When the switch is pressed again, the pilot lamp goes out and the working lamp is turned OFF.

- ON: Lamp lights up
- OFF: Lamp goes out



When turning on the rear working lamp, set to the side clearance lamp ON position or head lamp ON position, then operate the switch. If the switch is not in one of the above positions, the working lamp will not light up.



**TRANSMISSION CUT-OFF SWITCH**

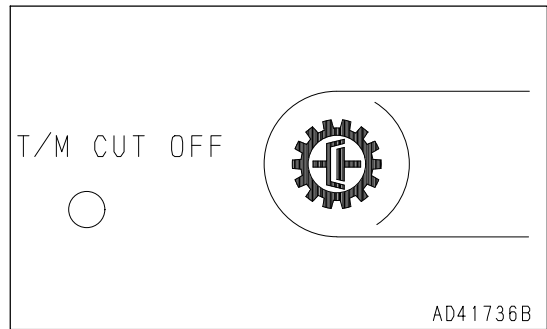


When starting the machine off up a hill, turn the transmission cut-off switch to the OFF position, depress the brake pedal, then gradually depress the accelerator pedal and release the brake slowly to allow the machine to start off. This makes it possible to prevent the machine from rolling back.

Press button switch (25) to turn the system ON and OFF. When the switch is pressed once, the pilot lamp lights up and the system is turned ON. When the switch is pressed again, the pilot lamp goes out and the system is turned OFF. Normally, keep it at the ON position.

OFF: Left brake pedal acts as normal brake (like right brake)  
 ON: Left brake pedal acts as normal brake, but also switches transmission to NEUTRAL.

If the switch is turned to ON, the transmission cut-off pilot lamp will light up.

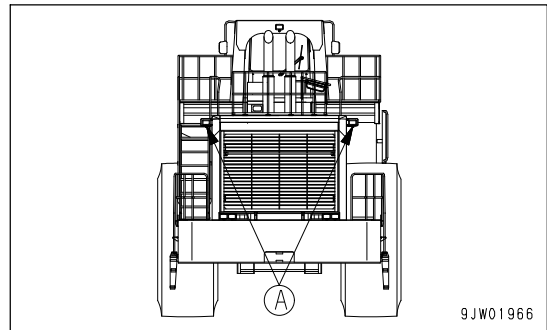


**REMARK**

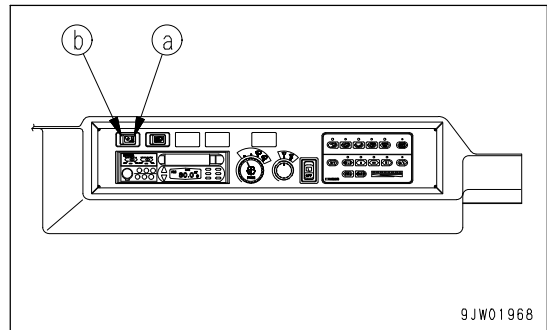
For general operations, using the transmission cut-off function reduces the rise in the brake oil temperature and torque converter oil temperature.

**ENGINE HOOD SIDE LAMP SWITCH**

Use this switch (26) to turn engine hood side lamp (A) on.



Position (a): ON (A) lamp light up  
 Position (b): OFF

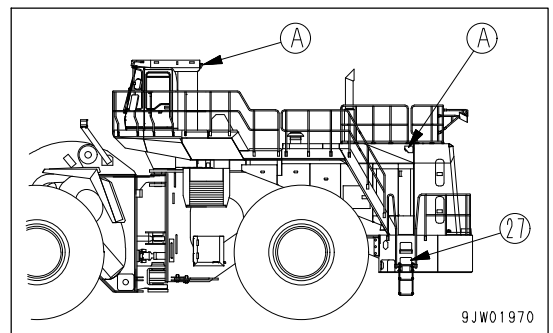
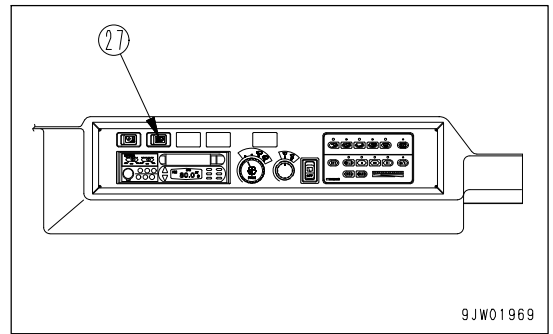


**STEP LAMP SWITCH**

Use this switch (27) to turn step lamp (A) on and off when getting on or off the machine.

**REMARK**

- There are step lamp switches in two places: by the step and at the top right of the operator's cab. Either of these switches can be used to turn the step lamp ON or OFF.
- The step lamp can be turned ON and OFF even when the starting switch is OFF. When leaving the machine, always turn it off.



**REAR WIPER SWITCH**

Press this switch (28) to operate the rear wiper.

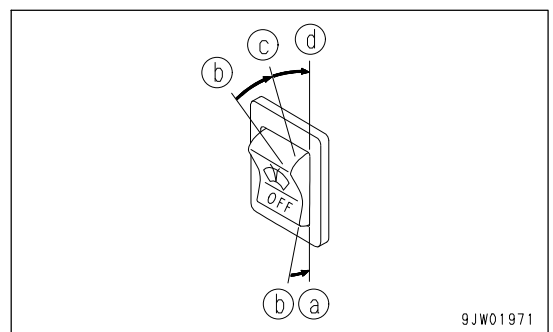
Position (a): Washer liquid is sprayed out

Position (b): OFF

Position (c): Wiper is operated

Position (d): Washer liquid is sprayed out, wiper is operated

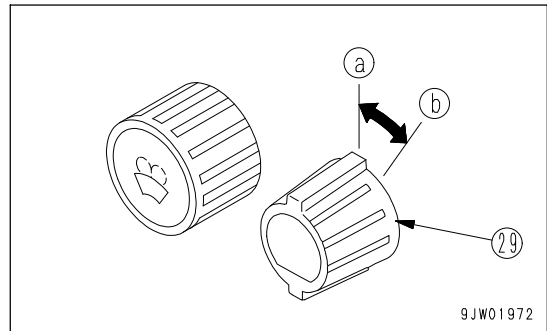
The switch automatically returns from position (a) to position (b) or from position (d) to position (c).



**WIPER SELECTOR SWITCH**

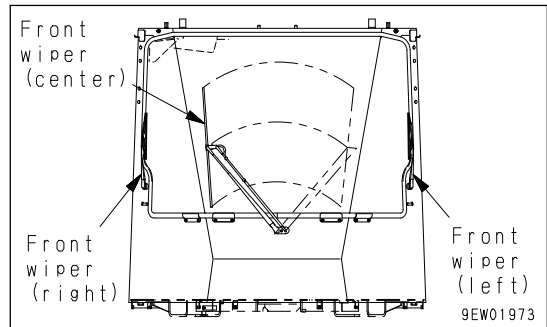
Use this switch (29) to operate and stop the front wiper (center) and front wipers (left, right).

Front wiper switch (30) position	Wiper selector switch (29) position	Front wiper	
		Center	Left, right
(a)1	(a)	Stops	Stops
	(b)		
(b)2 - (d)4	(a)	Operates	Operates
	(b)		Stops



**REMARK**

- When the wipers are operated intermittently, the center and left and right wipers may not move in the same cycle. This is due to the difference in the load on the wipers. It does not indicate any abnormality.
- The speed of the left and right wipers does not change even when the front wiper switch is changed to between low speed and high speed. This does not indicate any abnormality.

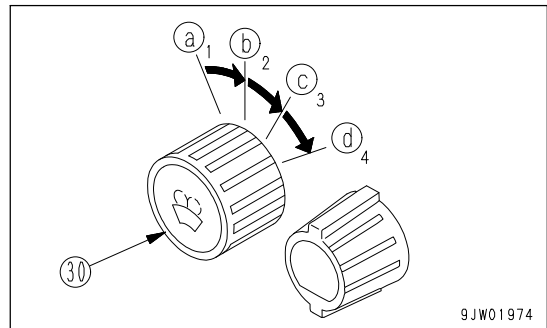


**FRONT WIPER SWITCH**

Turn this switch (30) to operate the front wiper.

Keep this push button pressed to spray washer liquid onto the front glass.

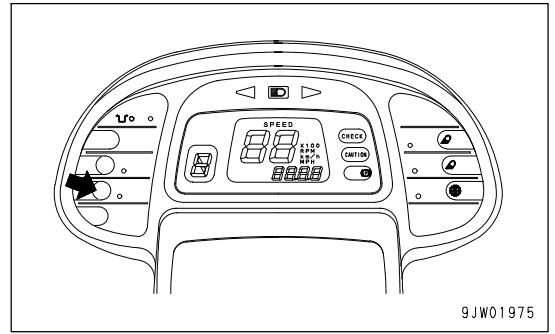
- (a) Position 1: (OFF) Stopped
- (b) Position 2: (INT) Wiper moves intermittently
- (c) Position 3: Wiper moves at low speed
- (d) Position 4: Wiper moves at high speed



**AUTO-GREASING SWITCH**

When this button switch (31) is pressed, the grease pump is actuated as desired, regardless of the timer.

The grease pump is actuated only while the button switch is being pressed. When the switch is released, the grease pump stops immediately. Use this switch when confirming the operation of the grease pump and when carrying out additional greasing.



Turn the starting switch ON and check that the auto greasing indicator lamp (A) on the monitor panel lights up.

Lamp lights up: Normal

Lamp does not light up: Disconnection, broken main piping, no grease inside grease pump

In the following cases, the lamp will flash at 0.5 second intervals.

(1) Empty cartridge, broken circuit

The circuit pressure when the pump is actuated does not rise to the set pressure and cannot carry out greasing

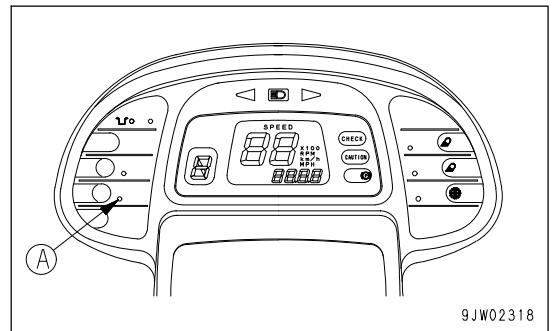
(2) Power supply cut

The power supply is cut and the system cannot function

(3) Defective release of pressure

After completion of greasing, the circuit pressure does not go down and the plunger does not return, so the next greasing cannot be carried out

(4) Even when normal, during period until pressure inside the circuit rises to set pressure

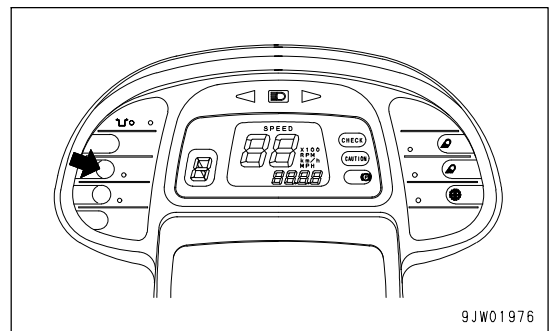


**TIRE SLIP CONTROL ON-OFF SWITCH**

When this button switch (32) is pressed, the drive force is reduced by the drive force limit system, but compared with when the drive force is large, this system can reduce the tire slippage to the minimum.

**CAUTION**

The tire slip control switch should normally be ON.



**ROOM LAMP SWITCH**

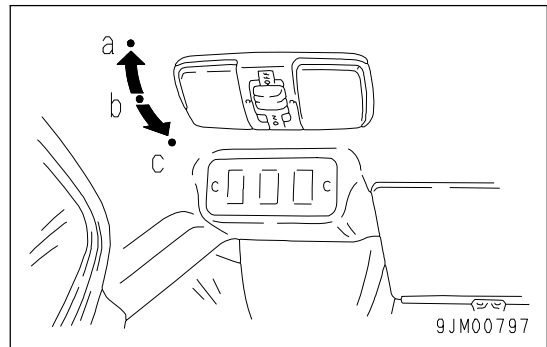
Use this switch (33) to turn on the room lamp.

There are two room lamps: at the front left and rear right of the operator's cab.

Position (a): OFF

Position (b): Lamps light up when cab door is open

Position (c): ON

**REMARK**

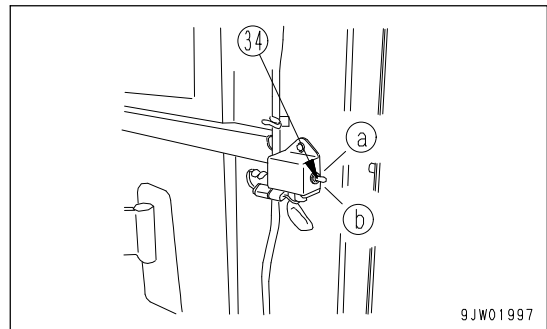
- The room lamps light up even when the starting switch is at the OFF position, so when leaving the operator's cab, turn the switch to position (a) (OFF) or position (b).
- When carrying out operations with the operator's cab fully open, turn the switch to position (a) (OFF).

**ENGINE ROOM LAMP SWITCH**

Use this switch (34) to turn on the lamp when carrying out inspection inside the engine room.

Position (a): Lighting is turned on

Position (b): OFF

**REMARK**

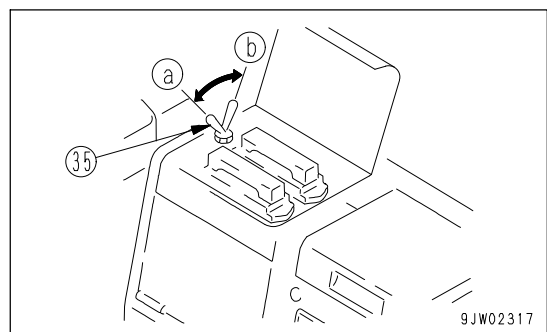
This switch is installed on both sides inside the radiator guard. Either switch can be operated to turn the lighting on.

**EMERGENCY PARKING BRAKE CANCEL SWITCH**

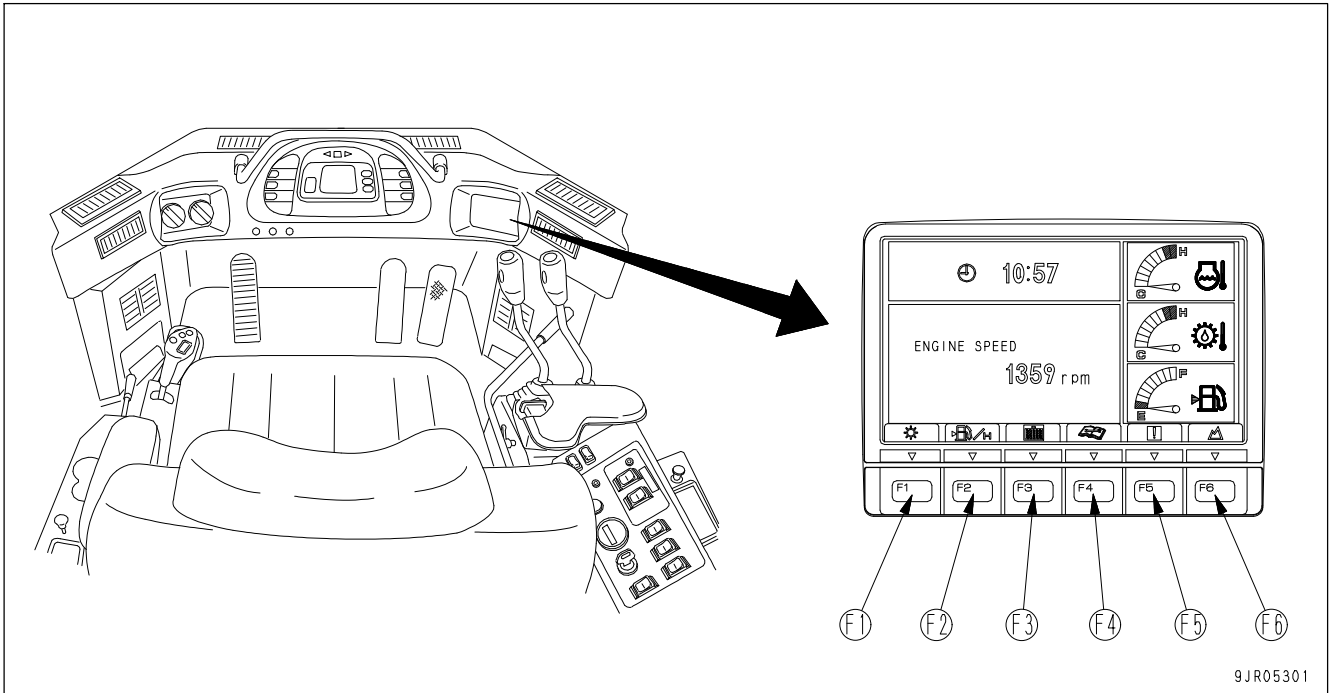
This switch (35) is used to release the parking brake if the engine does not start for some reason. When carrying out the cancel operation, please contact your Komatsu distributor.

Position (a): Cancel

Position (b): Normal



**SWITCHES (MULTI MONITOR)**



9JR05301

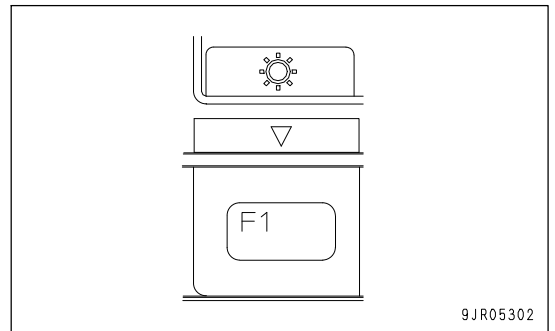
- (F1) Brightness adjustment pop-up display switch
- (F2) Productivity screen selection switch
- (F3) Setting screen selection switch

- (F4) Maintenance screen selection switch
- (F5) Failure list screen selection switch
- (F6) Load meter screen selection switch

**BRIGHTNESS ADJUSTMENT POP-UP DISPLAY SWITCH**

This switch (F1) can be used to adjust the brightness and contrast of the screen.

For details of the method of adjustment, see BRIGHTNESS ADJUSTMENT SCREEN (PAGE 3-142).

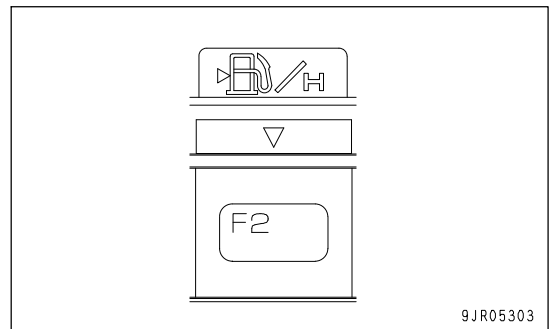


9JR05302

**PRODUCTIVITY SCREEN SELECTION SWITCH**

By using this switch (F2), it is possible to display the present productivity for the calculated period of measurement, and productivity (ton/hour) and fuel consumption (liter/hour) for each operator.

For details of the method of operating the productivity screen, see FUEL CONSUMPTION SCREEN (PAGE 3-134).

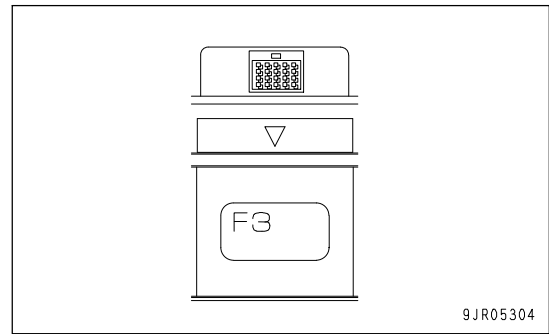


9JR05303

**SETTING SCREEN SELECTION SWITCH**

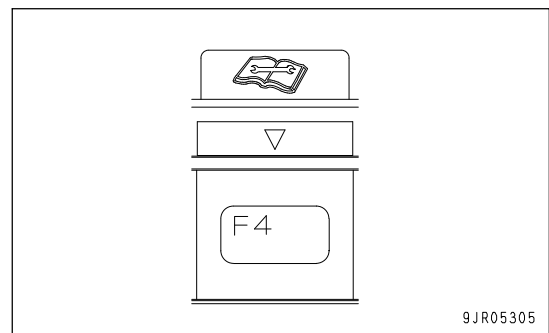
Use this switch (F3) to set the present time and date, the units to use for the data displayed on the monitor, and the user ID. It is also possible to select the language.

For details of the setting procedure, see **SETTING SCREEN (PAGE 3-131)**.

**MAINTENANCE SCREEN SELECTION SWITCH**

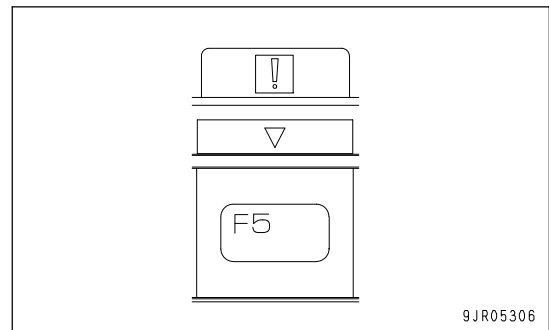
Use this switch (F4) to display the maintenance items and the remaining time left for maintenance.

For details of the operation of the maintenance screen, see **MAINTENANCE SCREEN (PAGE 3-129)**.

**FAILURE LIST SCREEN SELECTION SWITCH**

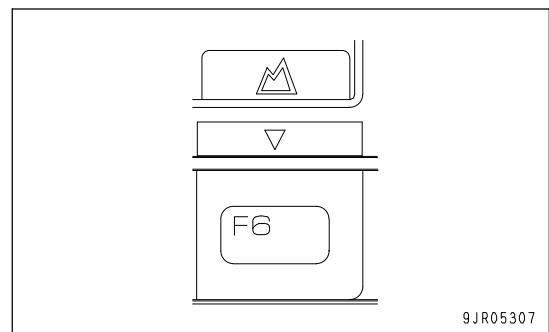
Use this switch (F5) to display the screen giving a list of the presently occurring failures and content of warning displays.

For details of the operation of the failure list screen, see **FAILURE LIST SCREEN (PAGE 3-143)**.

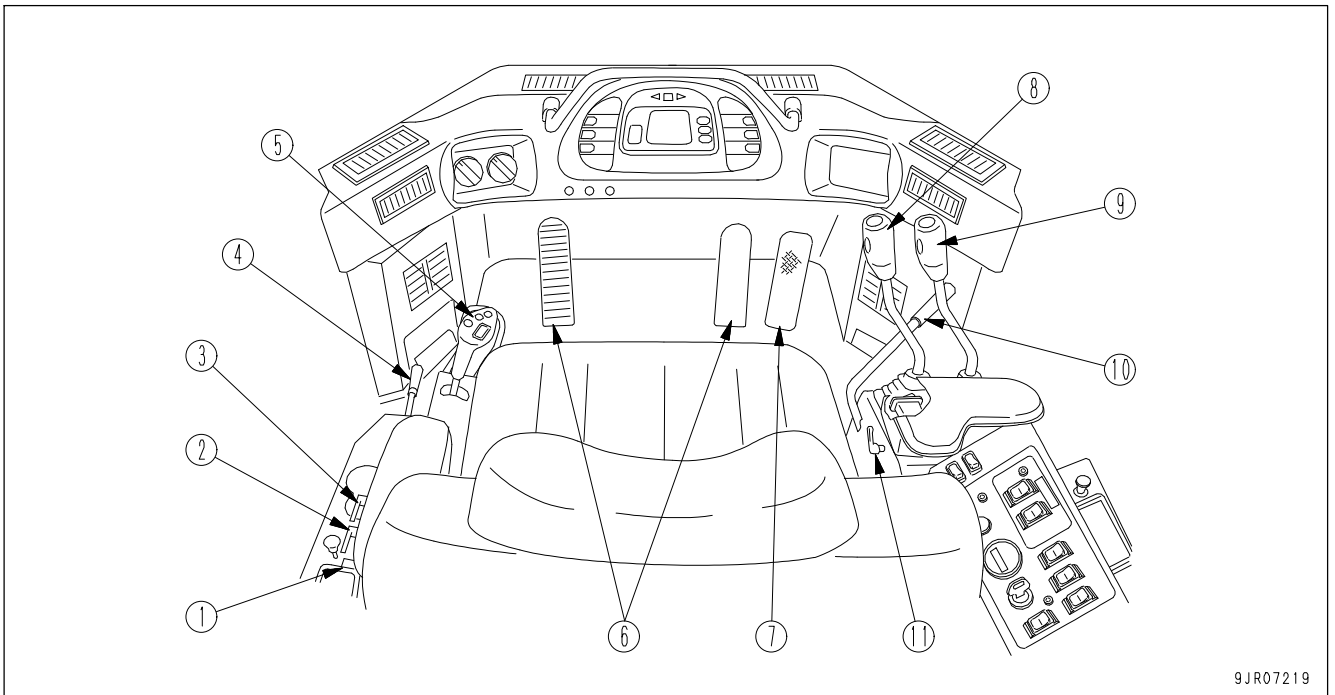
**LOAD METER SCREEN SELECTION SWITCH**

Use this switch (F6) to display the work amount measured by the load meter.

For details of the operation of the load meter screen, see **LOADMETER SCREEN (PAGE 3-138)**.



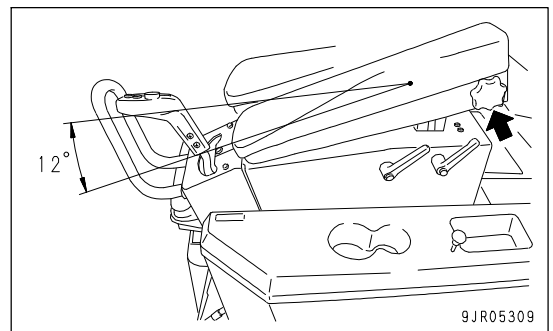
**CONTROL LEVERS, PEDALS, KNOBS**



- |   |                                  |
|---|----------------------------------|
| (1) Armrest angle adjustment knob               | (7) Accelerator pedal            |
| (2) Armrest height adjustment lever             | (8) Bucket control lever         |
| (3) Joystick steering fore-aft adjustment lever | (9) Lift arm control lever       |
| (4) Joystick steering lock lever                | (10) Work equipment lock lever   |
| (5) Joystick steering lever                     | (11) Wrist rest adjustment lever |
| (6) Brake pedals                                |                                  |

**ARMREST ANGLE ADJUSTMENT KNOB**

If this knob (1) is loosened, it is possible to adjust the angle of the armrest within a range of 12° (horizontal - facing down).





**ARMREST HEIGHT ADJUSTMENT LEVER**

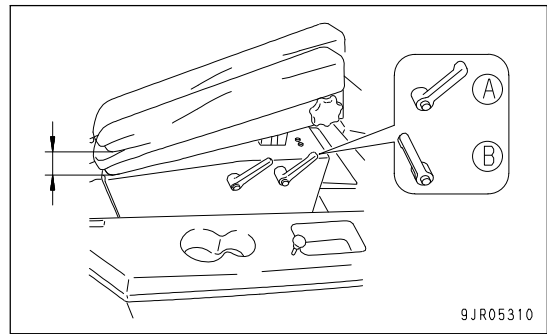
Use this lever (2) to move the armrest up or down within a range of 50 mm (2 in).

Position (A): LOCK

The armrest is locked in position.

Position (B): FREE

The armrest can be moved up and down within a range of 50 mm (2 in).



**JOYSTICK STEERING FORE-AFT ADJUSTMENT LEVER**

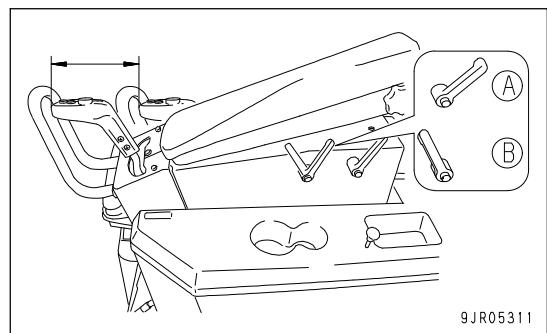
Use this lever (3) to move the joystick steering lever fore and aft within a range of 160 mm (6.3 in).

Position (A): LOCK

The joystick steering lever is locked in position.

Position (B): FREE

The joystick steering lever can be adjusted fore and aft within a range of 160 mm (6.3 in).

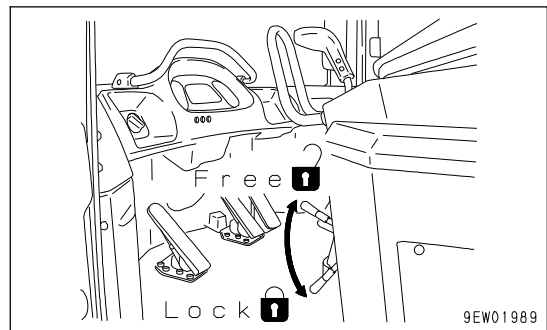


**JOYSTICK STEERING LOCK LEVER**

This lever (4) is the lock device for the joystick steering lever. Push the lock lever down to apply the lock.

**WARNING**

- Regardless of whether the engine is running or stopped, when leaving the operator's seat, set the lock lever securely in the LOCK position. In particular, when the engine is running, if the steering lever is not locked and it is touched by mistake, it may lead to a serious accident.
- If the lock lever is not securely at the LOCK position, there is a possibility that the control levers may not be locked.
- When parking the machine or carrying out maintenance, always set the lock lever to the LOCK position.



**JOYSTICK STEERING LEVER**

Use this lever (5) to steer the machine.

**WARNING**

When the engine is running, always set the lock lever to the LOCK position when leaving the operator's compartment.

When traveling, move the lever in the direction of turning to turn the machine.

(a): Left turn

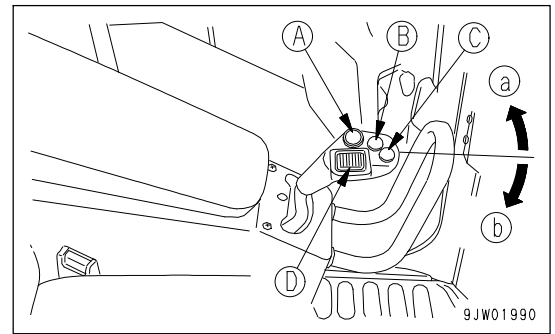
(b): Right turn

(A): Horn button

(B): Shift down switch

(C): Shift up switch

(D): F/N/R switch

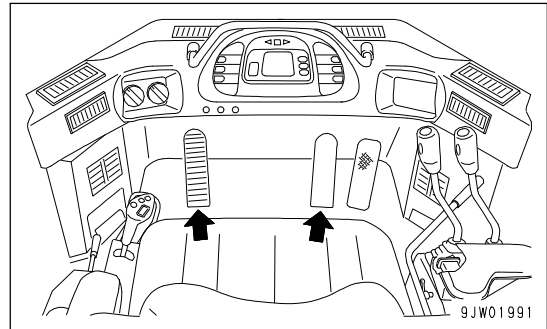
**REMARK**

Additional functions include horn button (A), shift down switch (B) and shift up switch (C) which shift the machine's transmission speed, and F/N/R switch (D) which changes the direction of travel. For details, see Section "SWITCHES (PAGE 3-27)".

**BRAKE PEDALS****WARNING**

- When traveling downhill, always use the right brake pedal, and use the braking force of the engine together with the brake.
- Do not use the brake pedal repeatedly more than necessary. If the brake is used too frequently, the brake will overheat. If this happens, the brakes will not work, so this may lead to a serious accident.
- Do not put your foot on this pedal unless necessary.

These pedals (6) operate the brakes.

**RIGHT BRAKE PEDAL**

The brake pedal operates the wheel brakes.

Use the brake pedal for normal braking operations.

**LEFT BRAKE PEDAL**

The left brake pedal operates the wheel brakes.

For normal braking operations, turn the transmission cut-off switch OFF before using the left brake pedal.

If the transmission cut-off switch is at the ON position, the brake is actuated, but at the same time, the transmission is returned to Neutral.

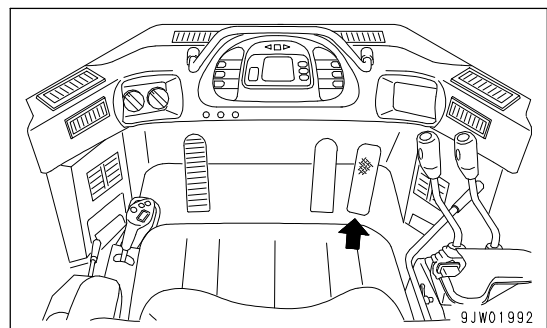
**REMARK**

When using the brake and accelerator together to reduce the machine travel speed or to stop the machine while carrying out operations, set the transmission cut-off switch to the ON position and use the left brake pedal.

**ACCELERATOR PEDAL**

This pedal (7) controls the engine speed and output.

The engine speed can be freely controlled between low idle and full speed.



**BUCKET CONTROL LEVER**

Use this lever (8) to operate the bucket.

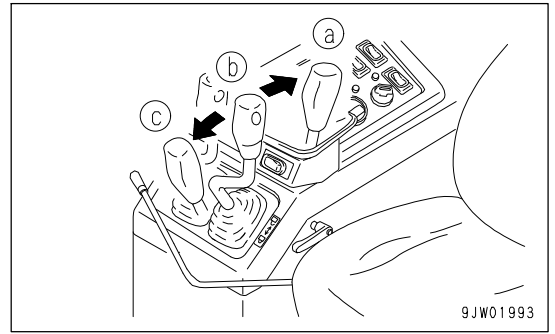
Position (a): TILT

If the lever is pulled further from the TILT position, the lever will stop in that position, and when the bucket reaches the position set by the bucket positioner, the lever will return at the same time to the HOLD position.

Position (b): HOLD

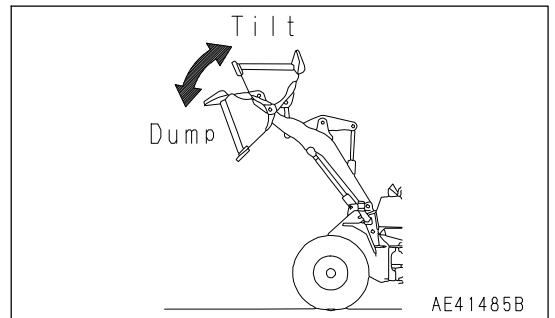
The bucket is kept in the same position.

Position (c): DUMP



**REMARK**

Other functions installed include the travel speed limit ON-OFF switch at the head of the lever and the load meter cancel switch on the side. For details, see SWITCHES (PAGE 3-27).



**LIFT ARM CONTROL LEVER**

Use this lever (9) to operate the lift arm.

Position (a): RAISE

If the lever is pulled further from the RAISE position, the lever will stop at that position, and when the lift arm reaches the position set by the kick-out, the lever will return at the same time to the HOLD position.

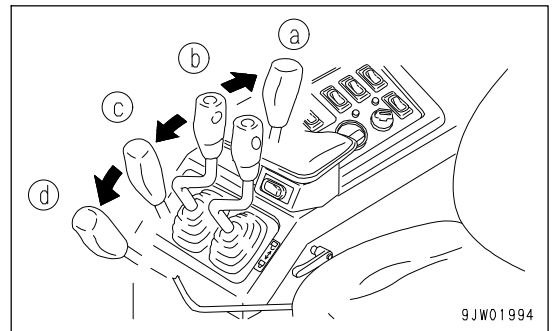
Position (b): HOLD

The lift arm is kept in the same position.

Position (c): LOWER

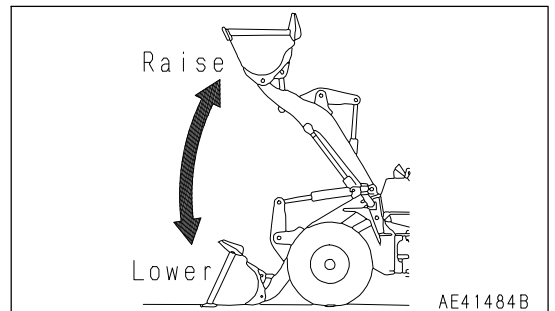
Position (d): FLOAT

The lift arm moves freely under external force.



**REMARK**

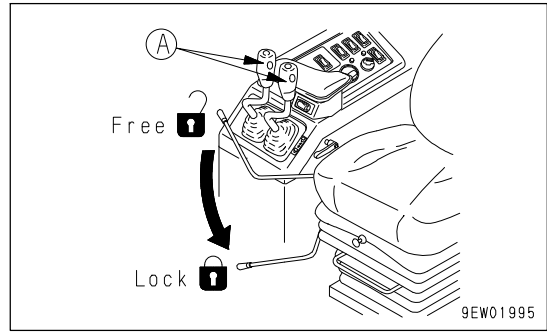
Other functions installed include the kickdown switch at the head of the lever and the transmission auto shift/manual selector switch on the side. For details, see SWITCHES (PAGE 3-27).



## WORK EQUIPMENT LOCK LEVER

**WARNING**

- When standing up from the operator's seat, set the lock lever securely to the LOCK position. If control levers (A) are not locked and they are touched by mistake, it may lead to serious personal injury.
- If the lock lever is not set securely to the LOCK position, the control levers may not be locked.
- When parking the machine or carrying out maintenance, lower the bucket to the ground, then set the lock lever to the LOCK position.



This lever (10) is a lock device for the work equipment control levers.

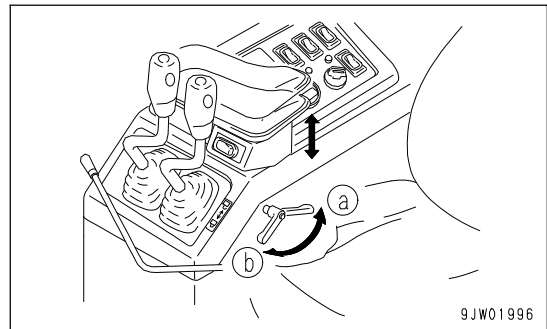
Push the lock lever down to apply the lock.

**WRIST REST ADJUSTMENT LEVER**

Use this lever (11) to adjust the vertical height of the wrist rest.

Position (a): Loosening direction

Position (b): Fixing direction



## CAP WITH LOCK

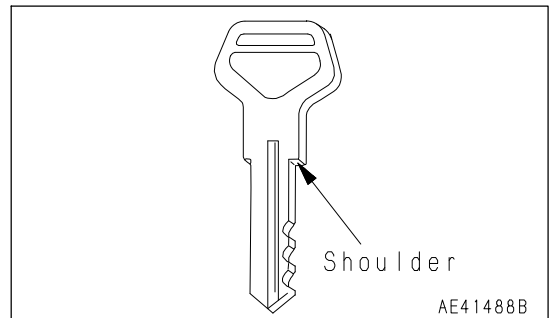
If the machine is equipped with a cap with lock for the fuel tank filler and hydraulic tank filler, open and close the cap as follows. Use the starting switch key to open and close the cap.

### METHOD OF OPENING AND CLOSING CAP WITH LOCK (FOR THE FUEL TANK FILLER PORT)

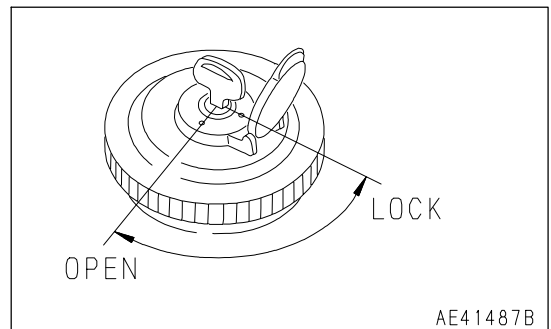
#### TO OPEN THE CAP

1. Insert the key in the starting switch securely until the shoulder contacts the keyhole.

If the key is not inserted fully into the starting switch and is turned, the key may break.



2. Turn the starting switch key clockwise, align the match mark on the cap with the rotor groove, then remove the cap.



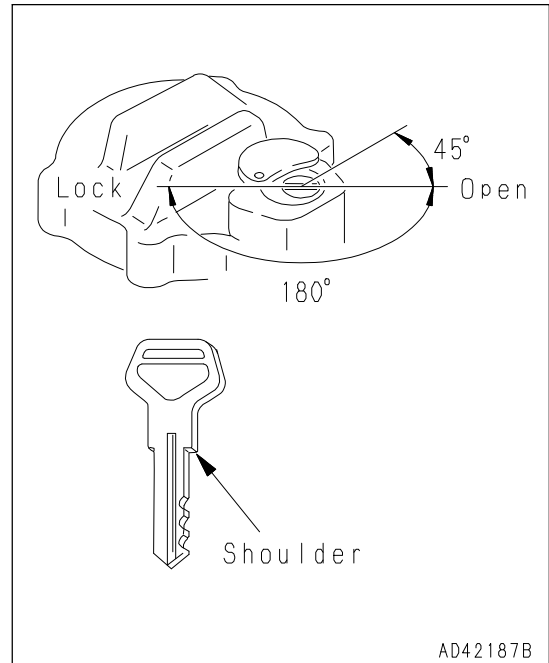
#### TO LOCK THE CAP

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

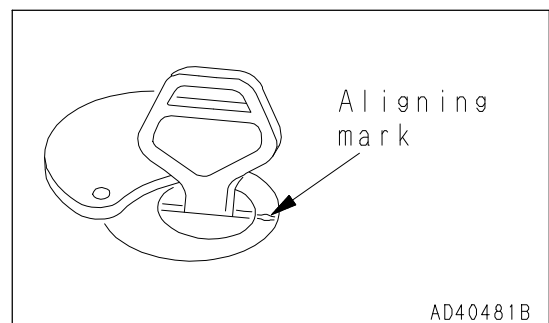
## METHOD OF OPENING AND CLOSING CAP WITH LOCK (FOR HYDRAULIC TANK FILLER AND TRANSMISSION CASE FILLER)

### TO OPEN THE CAP

1. Insert the key in the starting switch securely until the shoulder contacts the keyhole.  
If the key is not inserted fully into the starting switch and is turned, the key may break.



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



### TO LOCK THE CAP

1. Screw the cap into place.
2. Turn the starting switch key counterclockwise and take the key out.

## FRAME LOCK BAR

### WARNING

If frame lock bar is unlocked, machine can jackknife unexpectedly when it is being transported or hoisted.

Jackknifing can cause serious injury or death to bystanders.

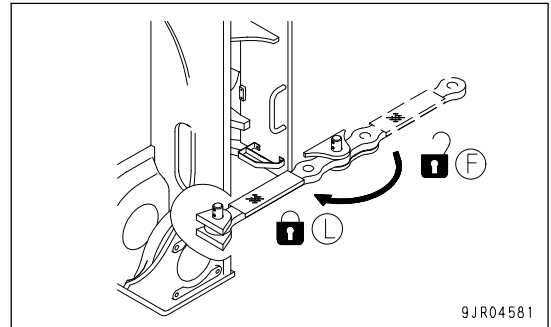
- Always lock frame lock bar when machine is being transported or hoisted.
- If necessary, lock frame lock bar during servicing or maintenance.

The frame lock bar is used to lock the front and rear frames, and prevents the front and rear frames from pivoting.

(L) Lock position: Always lock frame lock bar when machine is being transported or hoisted.

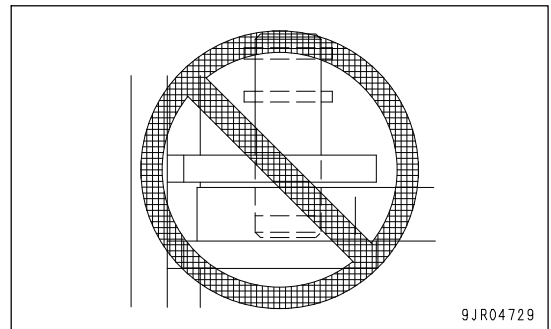
If necessary, lock frame lock bar during servicing or maintenance.

(F) Free position: Always remove the frame lock bar for travel operations.



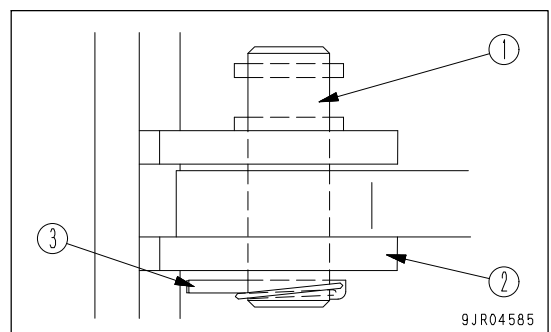
### WARNING

Insert the lock pin of the frame lock bar securely, then fit the linchpin. If it is not inserted fully and a load is applied, there is danger that it might come out and that the frame lock bar may be deformed.



When locking the frame lock bar, lock it as follows.

1. Insert frame lock bar lock pin (1) securely into hinge (2) at the bottom of the front frame.
2. Always secure it with supplied linchpin (3).



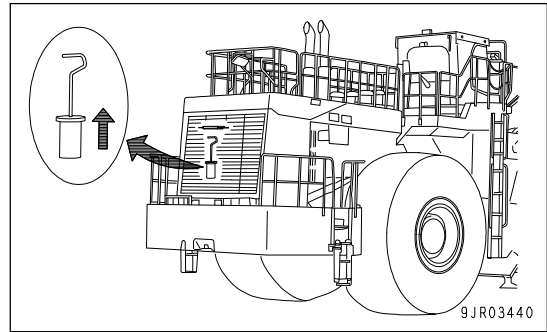


## TOWING PIN

The towing pin is in the counterweight. When using it, remove the cover.

Pull up to remove the towing pin.

When installing the towing pin, insert it securely so that it does not come out.



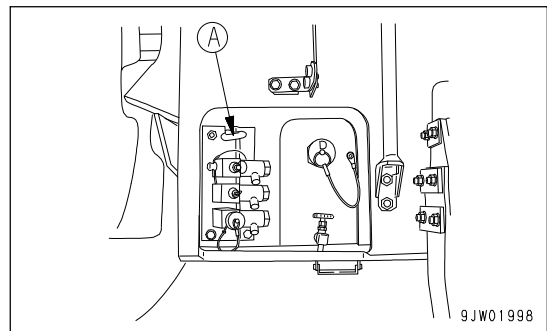
## FUEL STOP KNOB

Use the fuel stop knob if there is a problem and the engine does not stop even when the starting switch is turned to the OFF position. Normally, it should be fully open.

If any problem occurs, pull fuel stop knob (A) to stop the supply of fuel.

If any abnormality occurs that requires use of the fuel stop knob, please contact your Komatsu distributor.

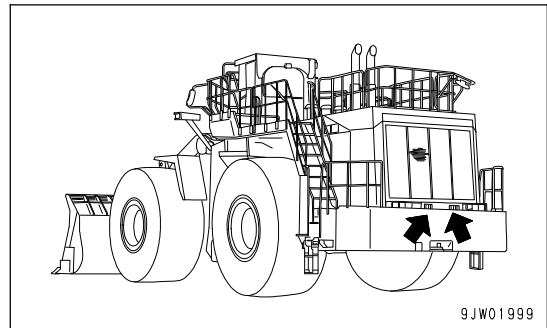
When starting the engine again, bleed the air from the fuel system. For details, see REPLACE FUEL FILTER CARTRIDGE (PAGE 4-50).



## BACKUP ALARM

When the directional selector switch on the head of the joystick steering lever is set to the R position, the alarm will sound at the same time.

This is used to warn people behind the machine that the machine will travel in reverse.



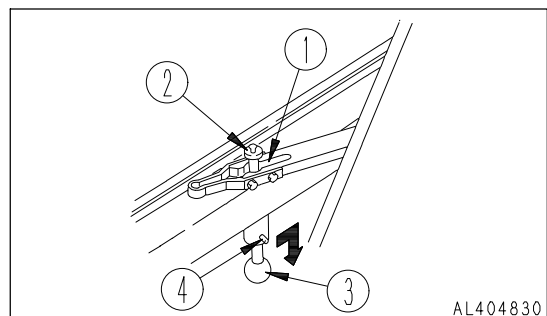
## CAB DOOR OPEN LOCK

This can be used to hold the door open.

Open the door so that tip (2) of the lever is aligned with groove (1) of the lock, then pull down knob (3) as shown in the diagram.

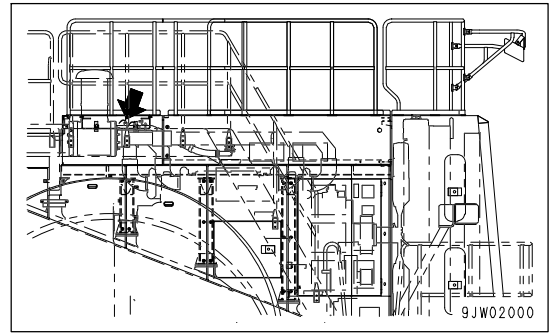
When using the door-open lock, be sure to apply the lock securely.

When releasing the lock and closing the door, push up knob (3) and insert pin (4) securely into the groove.



**TOOL BOX**

The toolbox is installed at the foot of the landing of the steps on the left side of the machine. Use it to store tools, etc.



**FUSE**

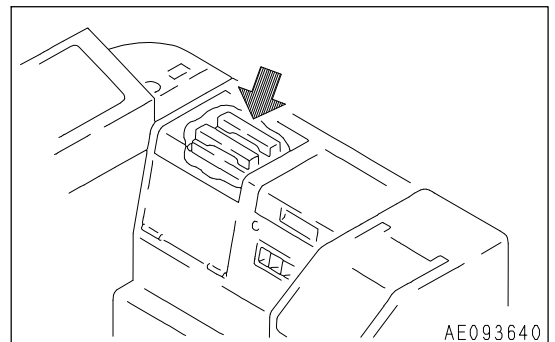
**NOTICE**

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

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

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

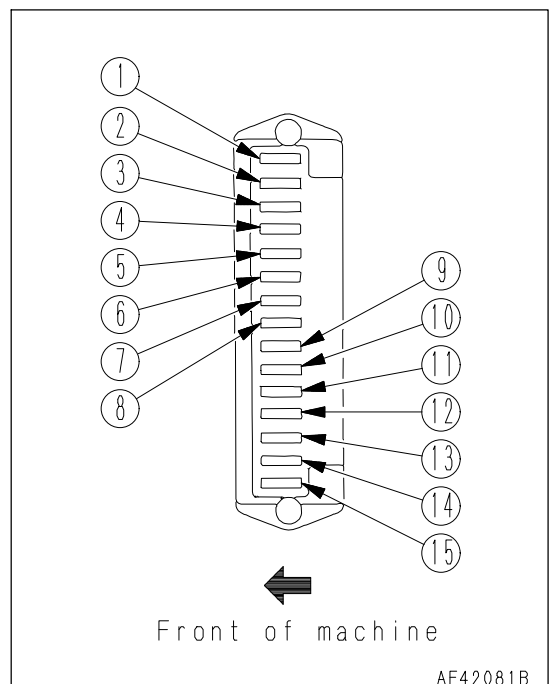
Replace the fuse with another of the same capacity.



**FUSE CAPACITY AND NAME OF CIRCUIT**

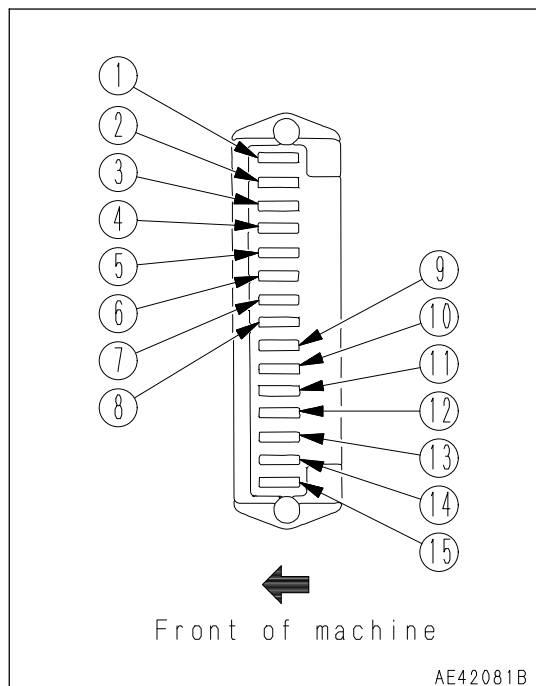
**FUSE BOX 1**

No.	Fuse capacity	Name of circuit
(1)	20A	Main lamp circuit
(2)	20A	Backup lamp, Brake lamp
(3)	10A	Turn signal lamp
(4)	10A	R.H. head lamp
(5)	10A	L.H. head lamp
(6)	10A	R.H. side clearance lamp
(7)	10A	L.H. side clearance lamp
(8)	10A	Parking brake
(9)	10A	Modulating clutch control
(10)	10A	Instrument panel
(11)	10A	Work equipment positioner
(12)	20A	Starting switch
(13)	20A	VSM control
(14)	20A	Cab, Working lamp
(15)	20A	Hazard lamp, Step lamp



FUSE BOX 2

No.	Fuse capacity	Name of circuit
(1)	20A	Front working lamp
(2)	20A	Rear working lamp
(3)	30A	Air conditioner A
(4)	20A	Air conditioner B
(5)	20A	Wiper, Washer
(6)	10A	Transmission controller
(7)	10A	Cigarette lighter, Radio
(8)	10A	12V converter
(9)	20A	VSM controller
(10)	10A	Auto-greasing
(11)	20A	L.H. power window
(12)	20A	R.H. power window
(13)	20A	Air suspension seat, Horn
(14)	20A	Side working lamp
(15)	10A	Option



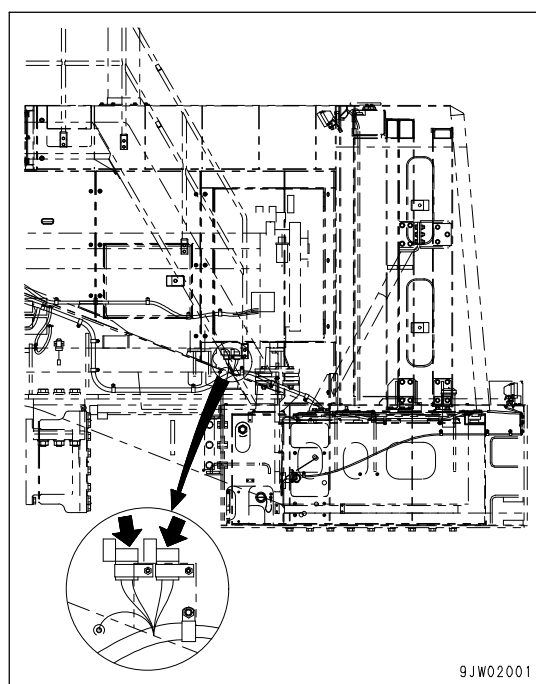
**SLOW BLOW FUSE**

If the power does not come on when the starting switch is turned to the ON position, there is probably a disconnection in the slow blow fuse, so inspect and replace it.

The slow blow fuse is on the left side of the machine at the side of the engine.

SLOW BLOW FUSE

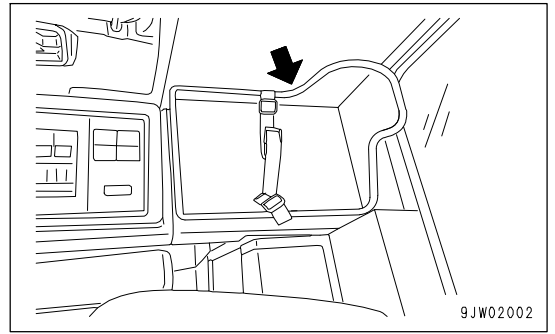
- (1) 120A: Main power
- (2) 80A: Battery power (starting switch, hazard)



**LUNCH BOX TRAY**

There is a space at the rear right of the cab for keeping a lunch box.

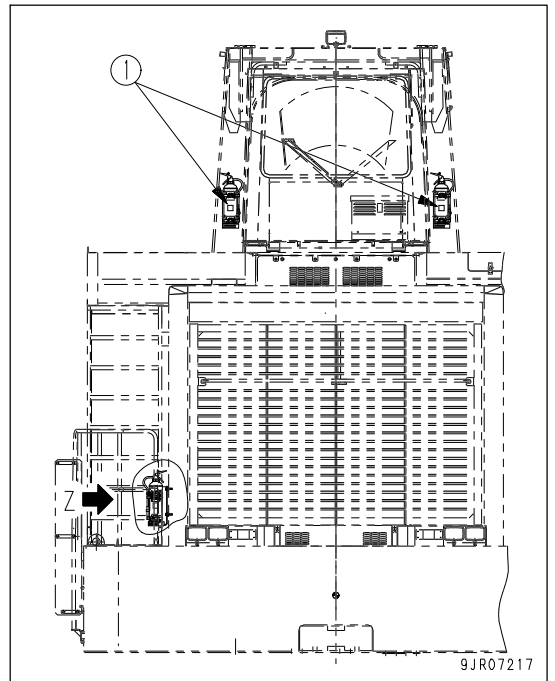
The dimensions are L 47 cm (18.5 in) x W 24.3 cm (9.6 in) x H 10 cm (3.9 in), which is big enough even to hold a large lunch box.



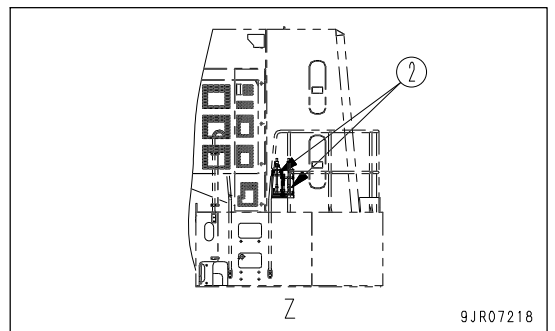
**LOCATION OF FIRE EXTINGUISHER**

(If equipped)

Fire extinguisher (1) is located at the rear of the operator's seat.

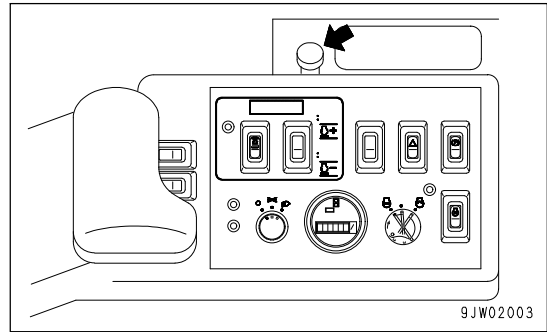


Fire extinguisher (2) is located at the rear left of the radiator guard.



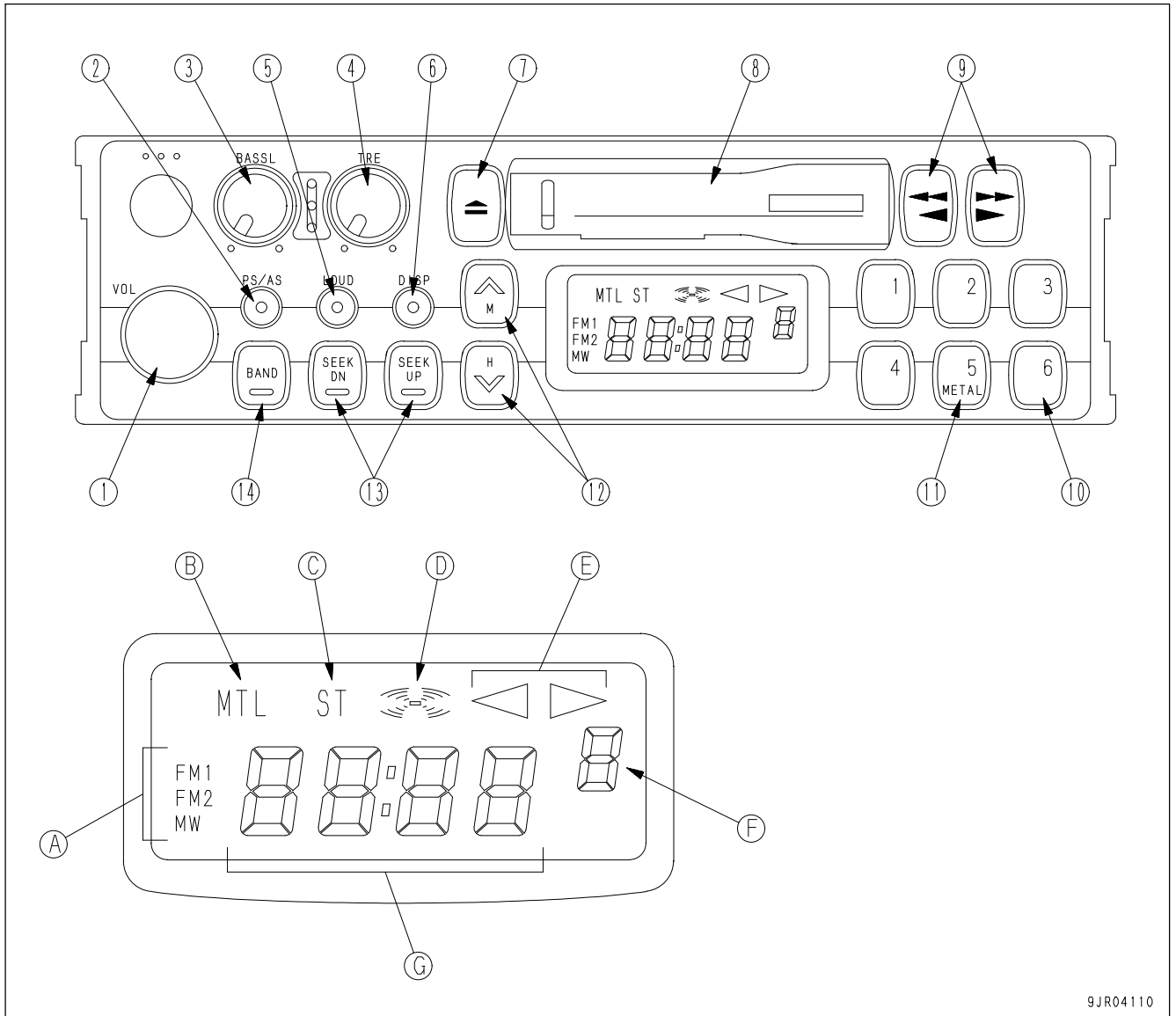
## POWER OUTLET

Removing cigarette lighter (1) allows the socket to be used as a power outlet. The maximum electric current is 10 A (240 W).



AM/FM RADIO-CASSETTE STEREO

EXPLANATION OF COMPONENTS

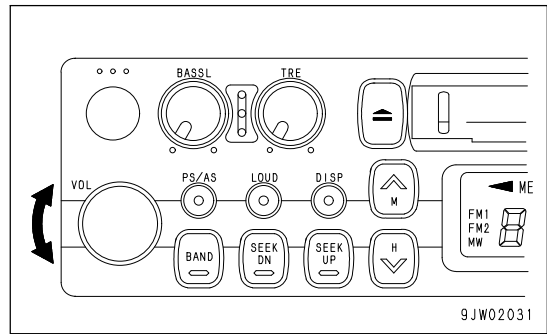


9JR04110

- |  |                                  |
|--|----------------------------------|
| (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**

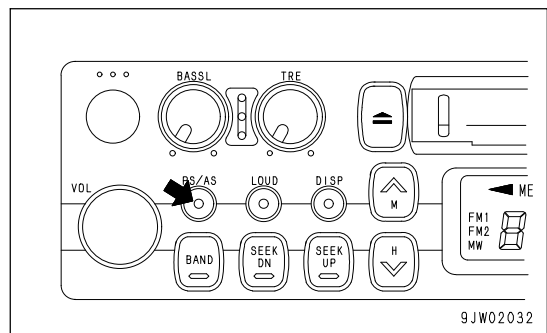
Turn this knob (1) to the right until it clicks to turn the power on.  
Turn it further to increase the volume.



**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.

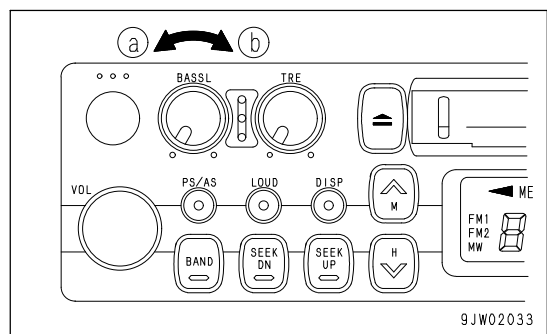
When the display is flashing, the preset scan function is being used.

- Preset scan  
If this button is pressed for less than 0.5 second while in radio reception, programs from the six preset stations in the same band will be broadcast one after another for 5 seconds each, starting from No. 1 through No. 6 stations consecutively.  
When the desired station is found, press the button again. This stops the preset scan tuning process and switches to ordinary broadcasting. The same process will be repeated continuously until the button is pressed

**BASS CONTROL KNOB**

Turn this button (3) to the left to reduce the low tones; turn it to the right to emphasize the low tones.

- Direction (a): Low tone reduced
- Direction (b): Low tone emphasized

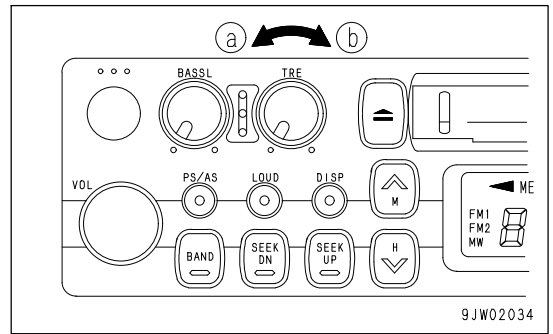


**TREBLE CONTROL KNOB**

Turn this button (4) to the left to reduce the low tones; turn it to the right to emphasize the high tones.

Direction (a): High tone reduced

Direction (b): High tone emphasized

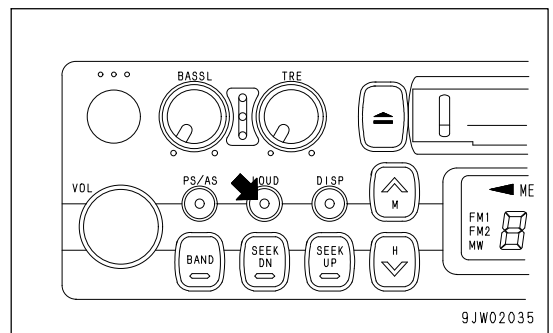


**LOUDNESS BUTTON**

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.

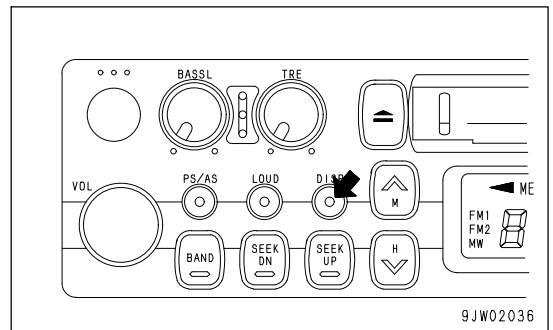
Push button: Actuated (ON)

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 the time

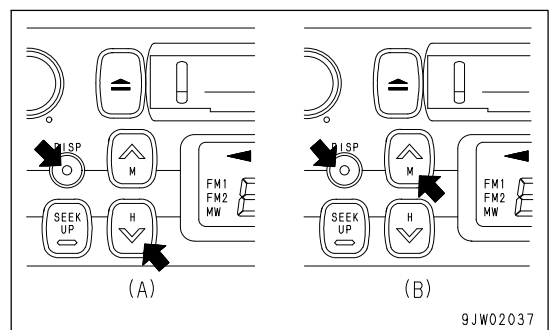
Press the button to set the time display.

(A) Correcting hour:

Keep the DISP button pressed and press the bottom (H) of the TUNING button to correct the hour.

(B) Correcting minute:

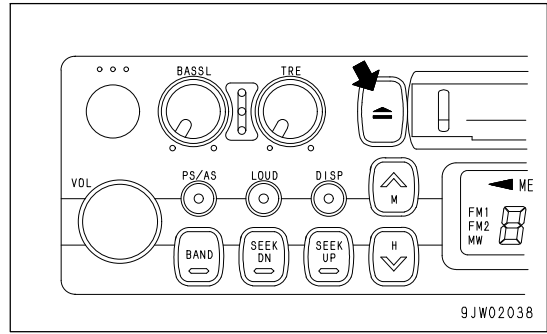
Keep the DISP button pressed and press the top (M) of the TUNING button to correct the minute.





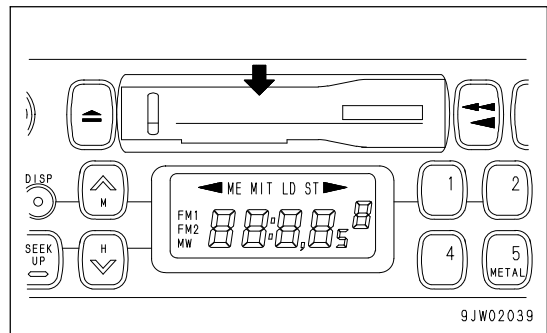
**TAPE EJECT BUTTON**

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



**CASSETTE DOOR**

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



**FAST-FORWARD, REWIND BUTTONS**

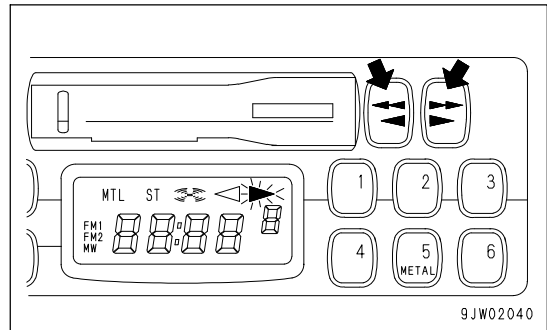
These buttons (9) are used to fast-forward or rewind the tape.

- Fast-forward/rewind

If you press the button pointing in the same direction as the lighted 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 rewind.

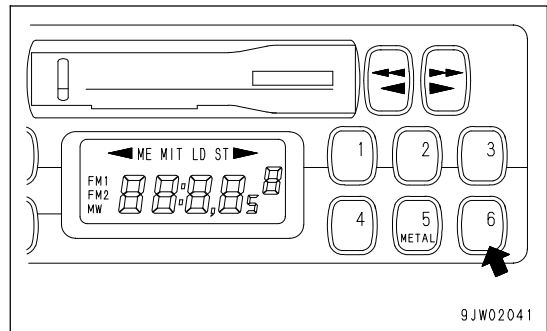
To stop the tape, lightly press the button that is not locked. The fast-forward or rewind operation will be canceled.

If the fast-forward and rewind buttons are pressed at the same time, the tape will change sides.



**PRESET BUTTONS**

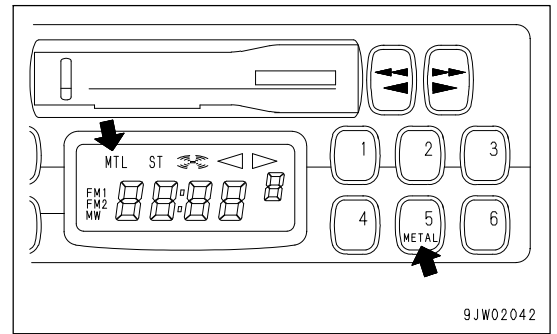
These buttons (10) are used to call up the broadcast station frequencies preset in memory for each of buttons No. 1 to No. 6. It is possible to preset 18 stations (FM: 12; AM: 6) with these buttons.



**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.

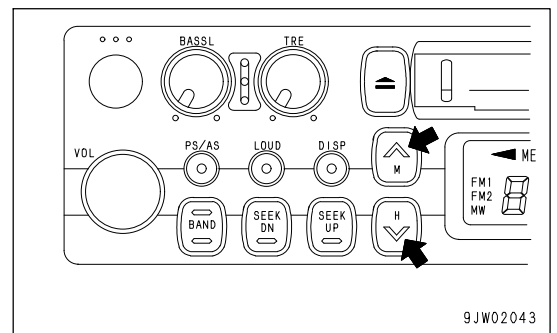


**MANUAL TUNING BUTTONS**

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.

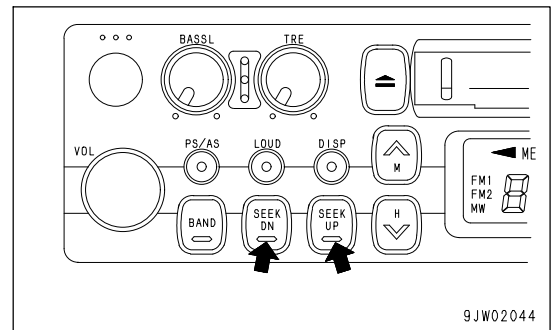


**SEEK TUNING BUTTONS**

These buttons (13) are used to seek tuning.

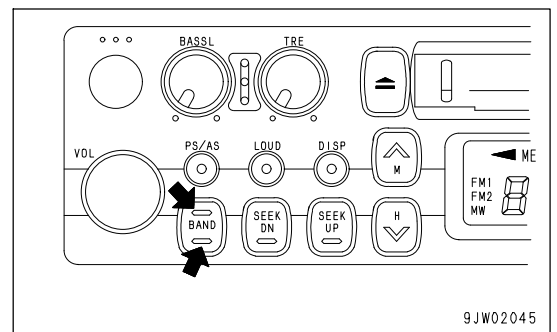
When the "SEEK UP" button is pressed, the search automatically goes up; when the "SEEK DN" button is pressed, the search automatically goes down.

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).

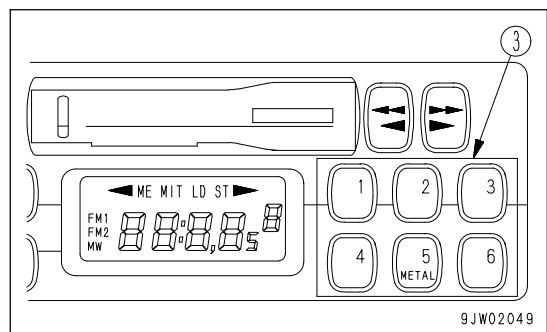
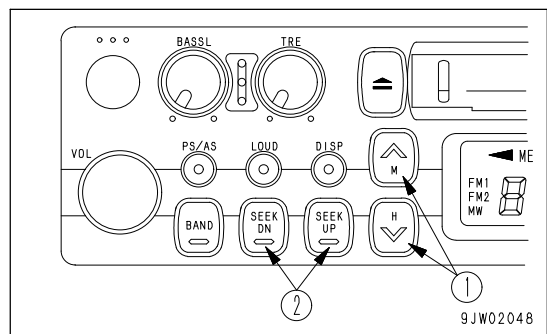
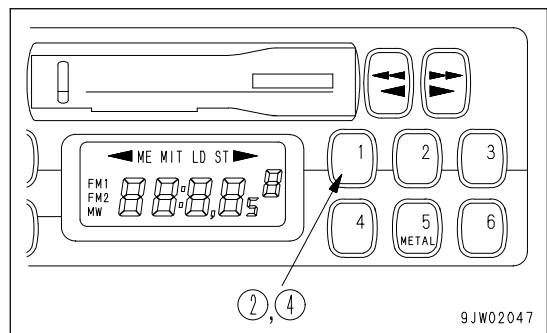
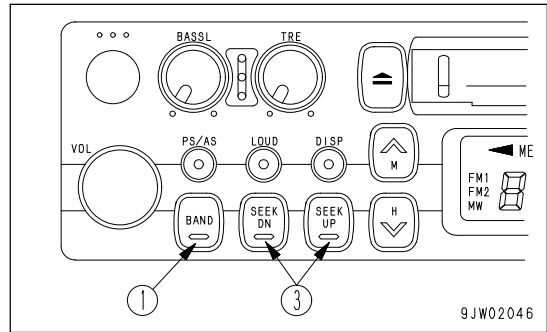
1. If you are playing a cassette, press the tape eject button to stop the tape.
2. Select the station to be preset.  
Use band selector button (1) to select MW (AM), FM1, or FM2, then use the manual tuning button to select the frequency of the broadcasting station.
3. Press manual memory button (2) or 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.

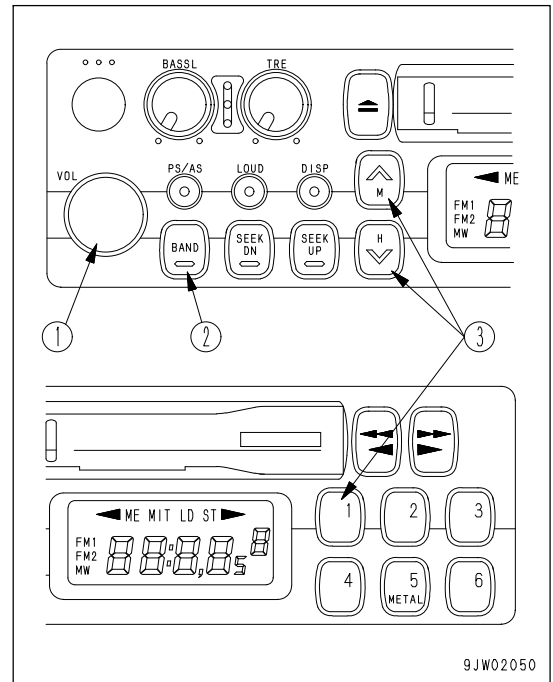
**MANUAL MEMORY BUTTONS**

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 pressed for 2 seconds while the frequency is being displayed to preset the station.



**LISTENING TO RADIO**

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

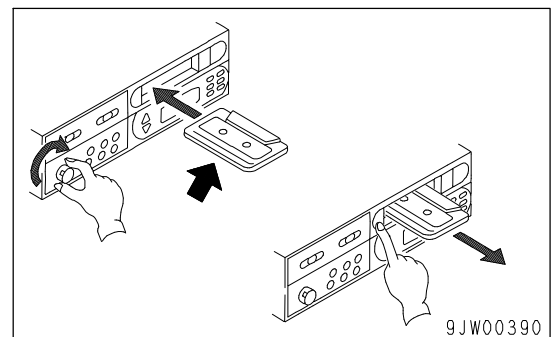
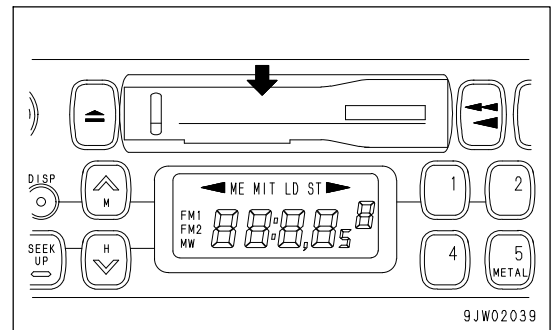


**REMARK**

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

**LISTENING TO CASSETTE TAPE**

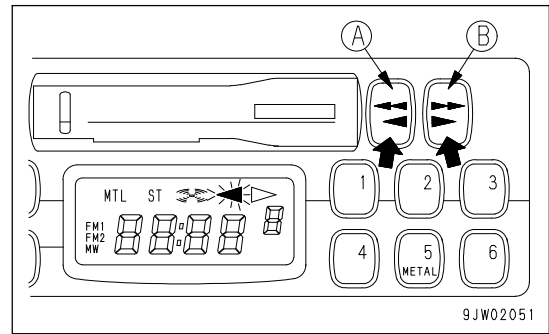
1. Turn the starting switch ON, then turn power switch (1) ON.
2. Set the cassette with the exposed portion of the tape on the right side and push it past the cassette door. The tape will automatically start playing.  
If the arrow indicating the direction of play is pointing to the right, the top side 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.

**PRECAUTIONS 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 problem occurs, turn off the power switch and ask your Komatsu distributor to make repairs without delay.

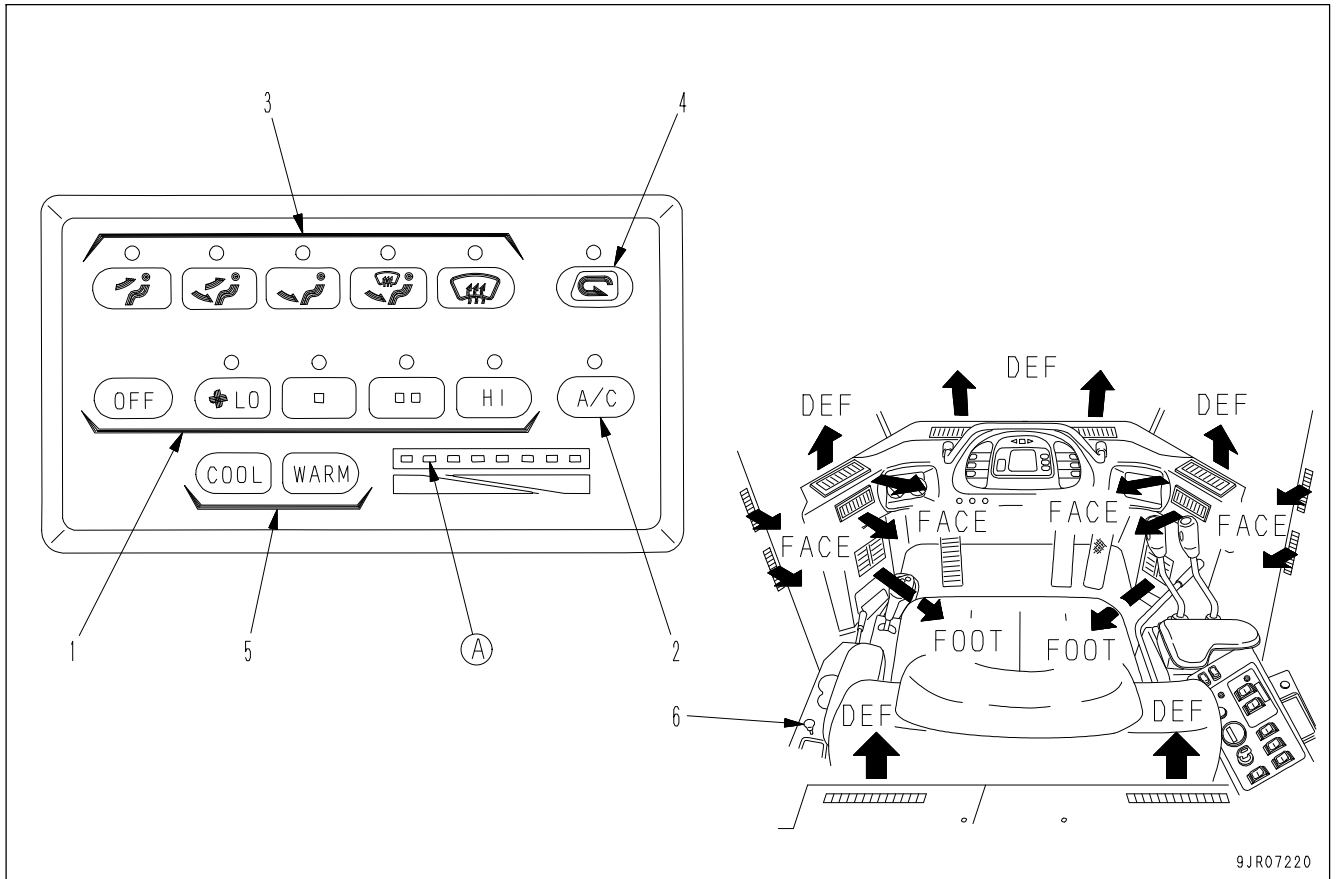
- Stow the antenna when traveling in places with low overhead clearance.
- To ensure safety during operations, keep the volume at a level where it is possible to hear other machines.
- If water gets inside the speaker case or radio (auto tuning), it may cause a serious problem, take care not to let water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

**NOTICE****Handling cassette tape**

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

**AIR CONDITIONER**

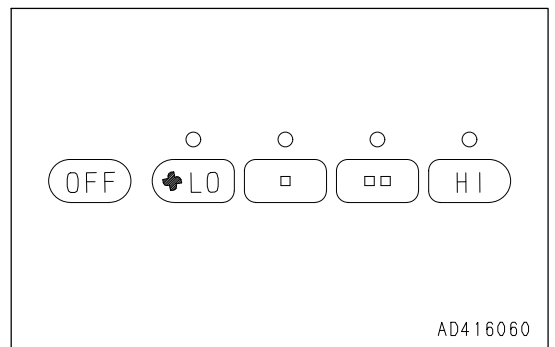
**GENERAL LOCATIONS AND FUNCTION OF CONTROL PANEL**



- (1) Fan switch
- (2) Air conditioner switch
- (3) Mode selector switch
- (4) FRESH/RECIRC selector switch
- (5) Temperature control switch
- (6) Rear defroster knob
- (A) Temperature level indicator lamp

**FAN SWITCH**

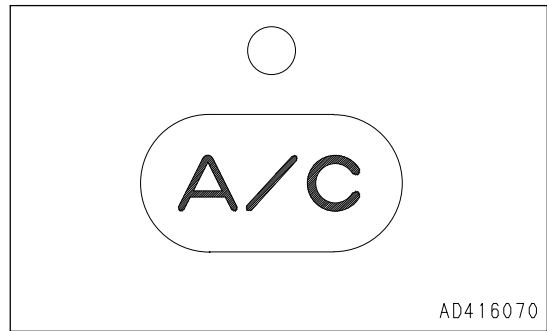
This switch (1) can be used to adjust the airflow in four stages. It also acts as the main switch for the air conditioner. When the OFF switch is pressed, the fan stops. When the switch is pressed, the indicator lamp above the switch lights up to display the airflow.



**AIR CONDITIONER SWITCH**

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

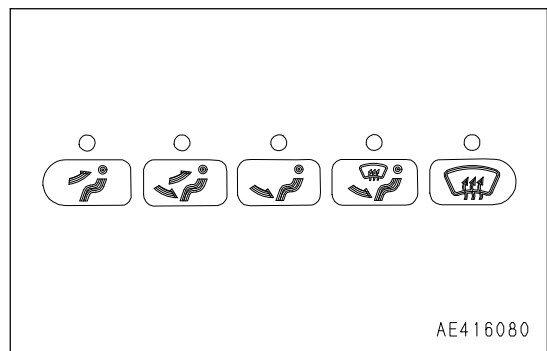
When the fan switch is turned ON and the air conditioner switch is pressed, the indicator lamp above the switch lights up. When the switch is pressed again, the switch is turned OFF and the indicator lamp goes out.

**MODE SELECTOR SWITCH**

This switch (3) is used to select the vents.

The following five vent modes are available: FACE, FACE/FOOT, FOOT, FOOT/DEF, DEF.

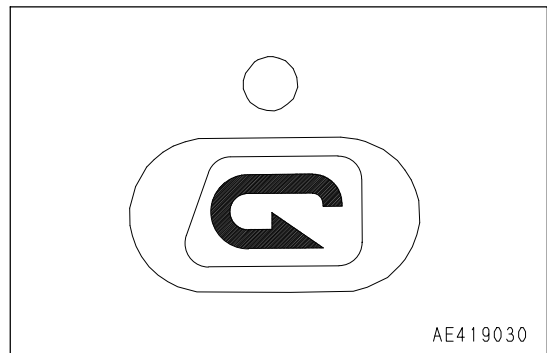
When the switch is pressed, the indicator lamp above the switch lights up to display the vent mode.

**FRESH/RECIRC SELECTOR SWITCH**

This switch (4) is used to select between recirculating the air inside the cab or taking in fresh air from outside.

When the RECIRC position is selected, the indicator lamp above the switch lights up.

When the switch is pressed again, the indicator lamp goes out, and fresh air is taken in.



**TEMPERATURE CONTROL SWITCH**

The temperature can be adjusted with this switch (5) by pressing and holding the up or down button.

The temperature level indicator lamps light up to display the temperature of the air coming from the vents.

The more the blue lamps light up, the lower the temperature is.

The color of the indicator lamp changes while the switch is being pressed.

When the temperature reaches the desired level, release the switch to set the temperature.

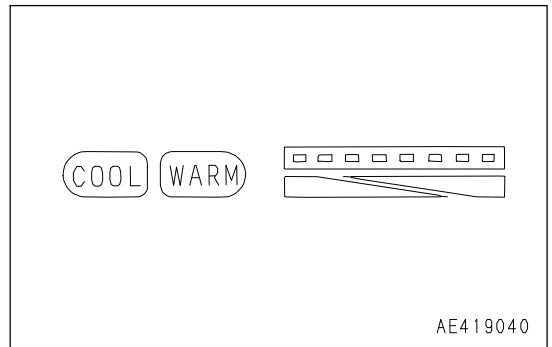
The settings for each mode are retained in memory even when the starting switch is turned OFF.

However, in the following cases, the settings must be 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.

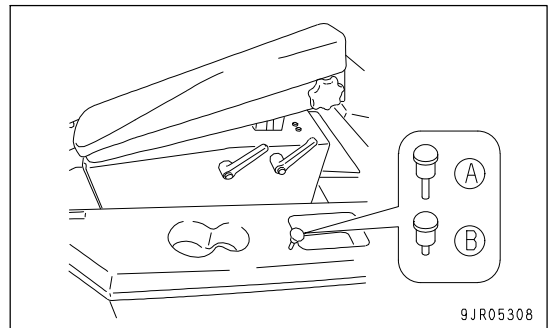


**REAR DEFROSTER KNOB**

Use this knob (6) to send or shut off the flow of air to the rear defroster.

Position (A): Sends flow of air to rear defroster

Position (B): Stops flow of air to rear defroster

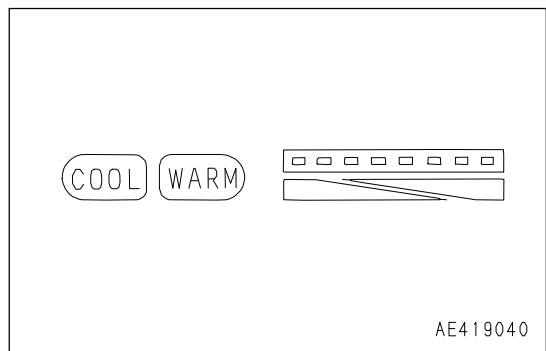




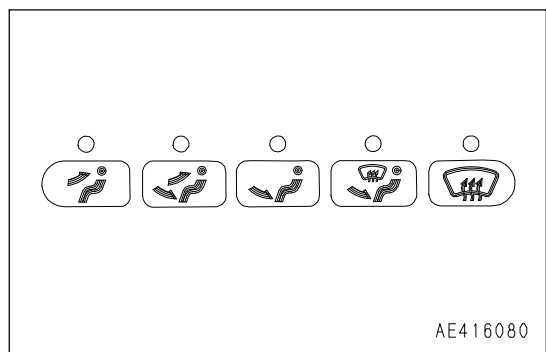
**METHOD OF OPERATION**

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

When defrosting, set the temperature control switch so that all lamps are red. This will improve defrosting and demisting. Set the vent mode selector switch to the intermediate position to give the desired condition. With the FACE vents, it is possible to adjust the direction of the air flow and to turn it on or off. However, do not set to the FACE mode with the vents closed.



AE419040



AE416080

**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.

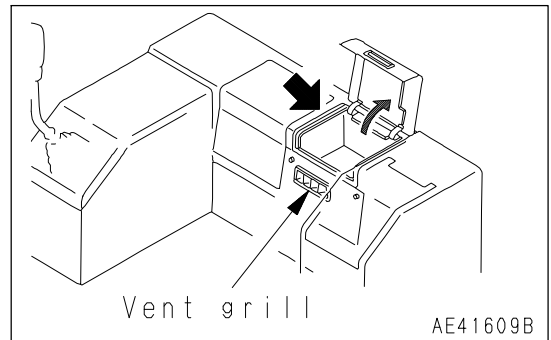
When the heating is being used, it can be used to keep things warm.

When using the box, open the vent grill.

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 HANDLING ACCUMULATOR

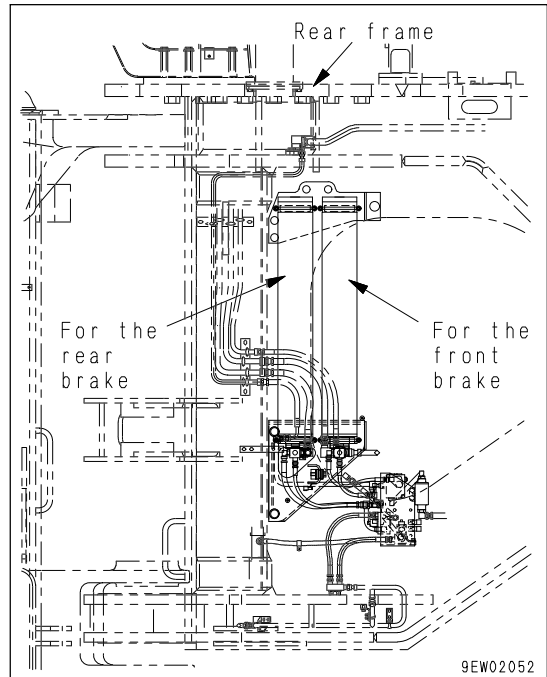


### WARNING

The accumulator is charged with high-pressure nitrogen gas, and it is extremely dangerous if it is handled in the wrong way. Always read the following items and be extremely careful to handle the accumulator properly.

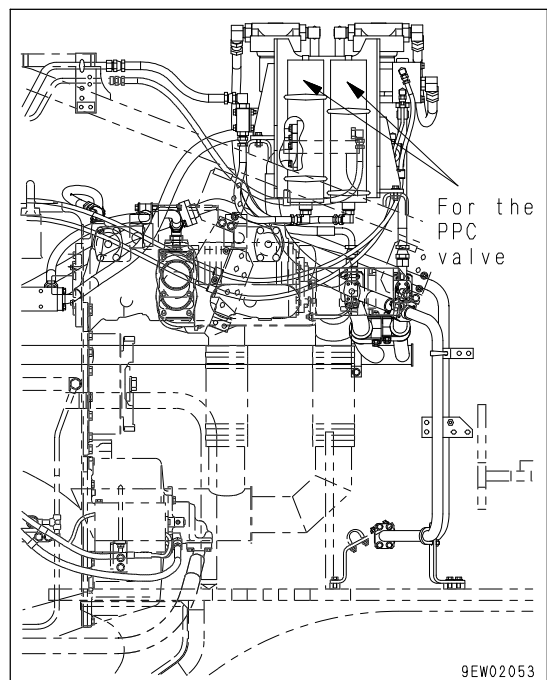
- If there is any failure or problem with the accumulator, contact your Komatsu distributor immediately.
- When charging with gas, the operation should always be carried out by your Komatsu serviceman or by a person licensed to handle high-pressure gas.
- Never hit a charged accumulator or bring flame close to it.
- Do not make any hole or weld any boss to the accumulator.
- Always release the gas before disassembling, servicing, or discarding an accumulator.
- Use the air bleed valve to release the gas.
- Please ask your Komatsu distributor to check the gas pressure every 2000 hours or every one year.

The accumulators for the brakes are on the left inside surface of the rear frame.



The accumulators for the PPC valve are on the left inside surface of the rear frame.

Be extremely careful when handling the accumulators.



# OPERATION

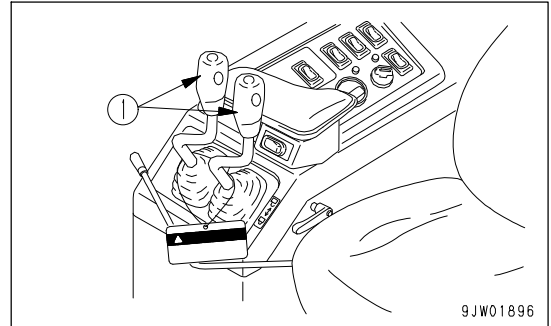
## CHECK BEFORE STARTING ENGINE, ADJUST

### WALK-AROUND CHECK



#### WARNING

- Always attach the warning tag to work equipment control lever (1).
- Leakage of oil or fuel, or accumulation of flammable material around high temperature parts, such as the engine muffler or turbocharger, may cause fire. Check carefully, and if any abnormality is found, repair it or contact your Komatsu distributor.



Before starting the engine, walk around the machine and look at the underside of chassis for anything unusual like loose bolts and nuts, leakage of fuel, oil and coolant. Also check the condition of the work equipment and the hydraulic system.

Also check for loose wiring, play, and collection of dust at places that reach high temperature.

Perform the following inspections and cleaning every day before starting engine for the day's work.

1. Check for damage, wear, play in work equipment, cylinders, linkage and 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 and radiator.  
Check if there is any dirt or dust accumulated around the engine or radiator. Also check if there is any flammable material (dead leaves, twigs, 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 coolant or oil leakage around the engine.  
Check that there is no oil leakage from the engine or coolant leakage from the cooling system. If any problem is found, repair it.
4. Check for leakage from fuel line.  
Check that there is no leakage of fuel or damage to the hoses and tubes. If any problem is found, carry out repairs.
5. Check for leakage of oil from transmission case, torque converter case, axle, hydraulic tank, brake tank, hoses, joints.  
Check that there is no oil leakage. If any abnormality is found, repair the leakage.
6. Check for oil leakage from the brake line.  
Check that there is no oil leakage. If any abnormality is found, repair the leakage.
7. Check for damaged or worn tires, wheels, and wheel hub bolts and nuts, check for loose wheel hub bolts and nuts.  
Check for cracks or peeling of the tires and for cracks or wear to the wheels (side rim, rim base, lock ring). Tighten any loose wheel hub bolts or nuts. If any abnormality is found, repair or replace the part.  
If any valve caps are missing, install new caps.

- 8. Check for damage and loose bolts on the handrail and steps.  
Repair any damage and tighten any loose bolts.
- 9. Check for damage to gauges, lamps on the instrument panel and loose bolts.  
Check for damage to the panel, gauges and lamps. If any problem is found, replace the parts. Clean off any dirt on the surface. Tighten any loose bolts.
- 10. Check for loose air cleaner mounting bolts.  
Check for the loose bolts. If loose, tighten them.
- 11. Check for loose battery terminals.  
Tighten any loose terminal.
- 12. Check for damage to the seat belt and mounting clamps.

 **WARNING**

- Even if there are no signs of damage, replace belts in accordance with the following schedule:  
5 years after the date of seat belt manufacture, or every 3 years after the start of actual usage, whichever date comes first.

**REMARK**

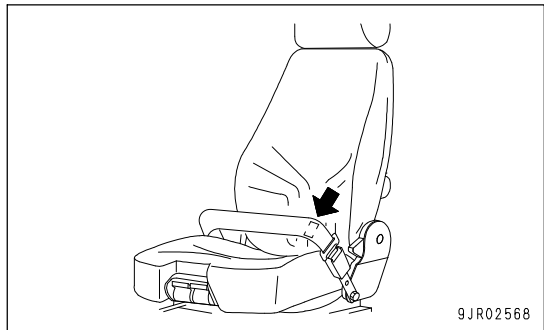
The date of seat belt manufacture attached to the seat belt is the start of the 5-year period. It is not the start of the 3-year period of actual usage.

**REMARK**

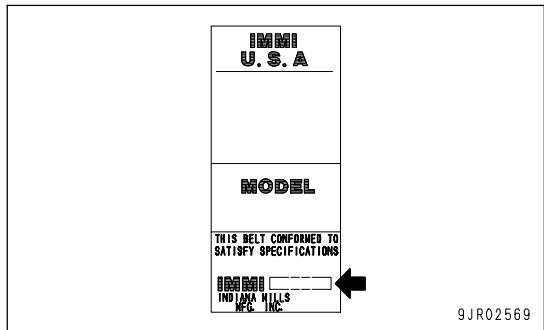
The date of manufacture of the seat belt is marked on the belt at the place indicated by the arrow in the diagram on the right.

Check that there are no loose bolts on the equipment mounting the seat belt to the machine, and tighten if necessary.

Tightening torque: 19.6 to 29.4 Nm (2.0 to 3.0 kgm, 14.5 to 21.7 lbf)



If the belt is damaged or fluff is starting to form, or if there is any damage or deformation of the seat belt holders, replace the seat belt with a new part.



- 13. Check for loose bolts on ROPS  
Check for any loose or damaged bolts.  
If any loose bolts are found, please ask your Komatsu distributor to carry out repairs.

14. Clean cab window.

Clean the cab window to ensure good visibility when operating the machine.

15. Inspect tires.



## WARNING

If worn or damaged tires are used, they may burst and cause serious injury or death.

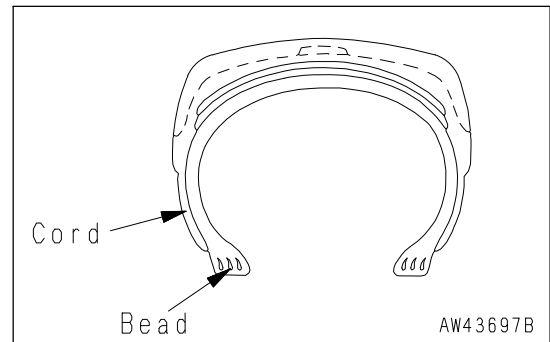
To ensure safety, do not use the following tires.

**Wear:**

- Tires with a tread grooves of less than 15% of that of a new tire
- Tires with extreme uneven wear or with stepped-type wear

**Damage:**

- Tires with damage that has reached the cords, or with cracks in the rubber
- Tires with cut or pulled cords
- Tires with peeled (separated) surface
- Tires with damaged bead
- Leaking or improperly repaired tubeless tires
- Deteriorated, deformed or abnormally damaged tires, which do not seem usable



16. Inspect rims.



## WARNING

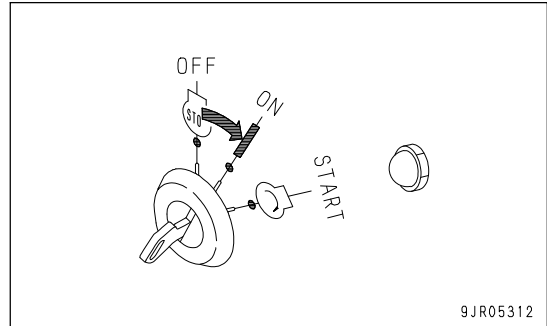
Check the rims (wheels) and rings for deformation, corrosion and cracks. In particular, check the side rings, lock rings and rim flanges thoroughly.

**CHECK BEFORE STARTING**

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

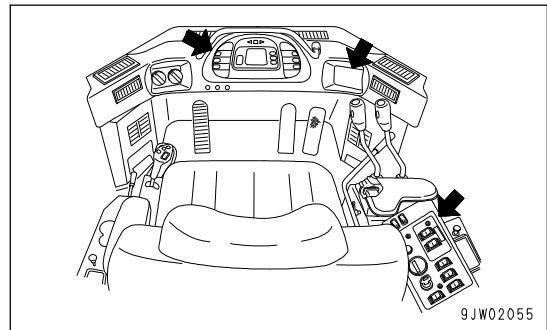
**CHECK MACHINE MONITOR**

1. Turn the starting switch ON.



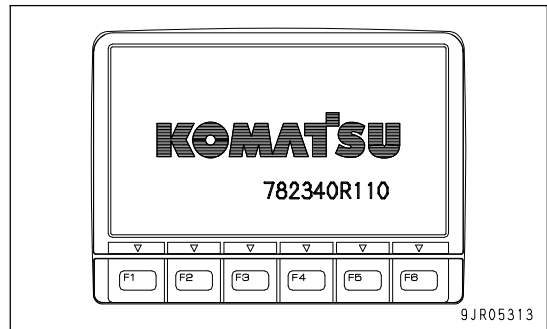
2. Check that the monitors, gauges, and warning lamps light up for approx. 3 seconds and the alarm buzzer sounds for approx. 1 second.

If the lamps do not light up, there is probably a failure or disconnection. Contact your Komatsu distributor for inspection.

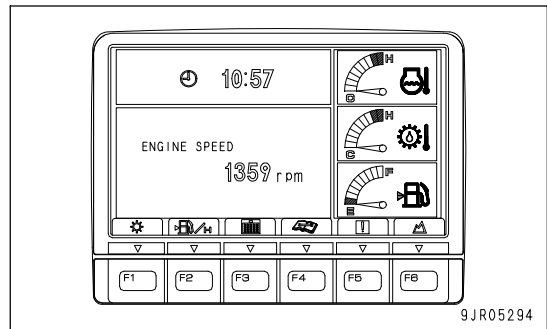


3. When the multi monitor starts up, check that the initial screen appears for 2 to 3 seconds and then changes automatically to the monitor screen.

(Initial screen)



(Monitor screen)



## CHECK COOLANT LEVEL, ADD COOLANT

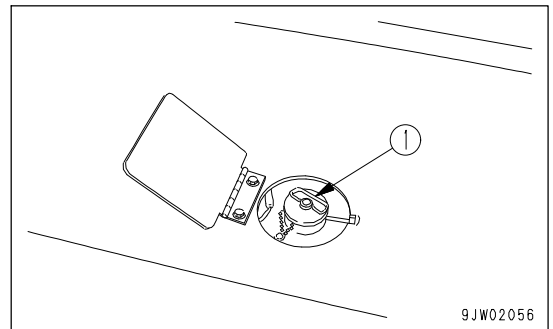
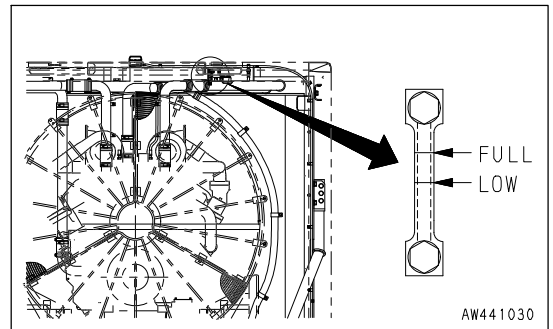
**WARNING**

Do not remove the cap from the radiator when the water is at high temperature. Boiling water may spurt out. When removing the cap, press the button and loosen the cap slightly to release the internal pressure before removing the cap.

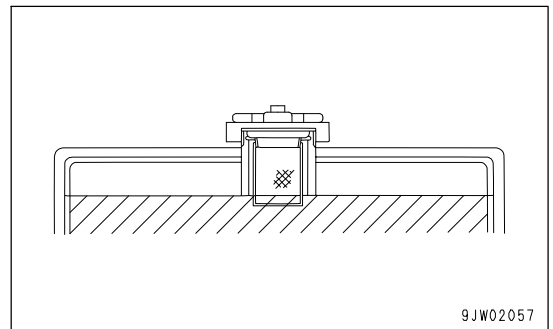
**CAUTION**

When adding water, use the handrail to support yourself securely.

1. Open the cover at the rear left of the machine, check that the water level is between the FULL and LOW marks on the gauge shown on the right. If the water is below the LOW level, remove radiator cap (1) at the rear of the machine and add



2. After adding coolant, tighten the cap securely.



If the volume of coolant added is more than usual, check for possible leakage. Confirm that there is no oil in the coolant.

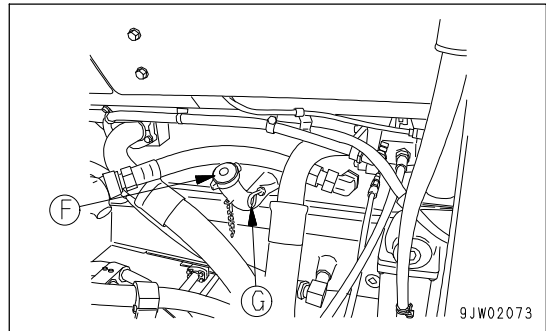


**CHECK OIL LEVEL IN ENGINE OIL PAN, ADD OIL****WARNING**

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 inspection window at the rear left side of the machine.
2. Pull dipstick (G) out, then wipe the oil off with a cloth.

3. Insert the dipstick (G) again fully in the dipstick tube (to a point where a click is heard), then pull it out again.
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 oil through oil filler port (F).

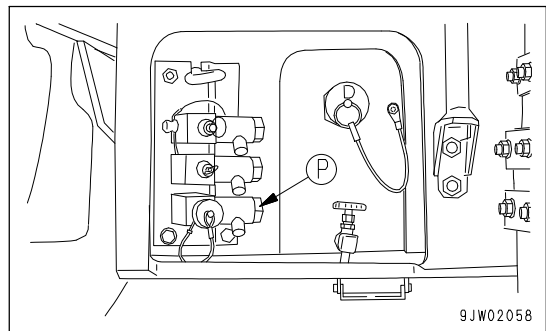


5. If the oil is above the H mark, loosen drain plug (P) and drain the excess oil.

Do not simply let the oil drain out. Use a vinyl hose to drain the oil into an oil container.

Use the dipstick to check the oil level again.

6. If the oil level is correct, tighten oil filler cap (F) securely and close the inspection window.

**REMARK**

- When checking the oil level after the engine has been operated, wait for at least 15 minutes after stopping the engine before checking.
- If the machine is at an angle, make it horizontal before checking.

## CHECK BRAKE OIL TANK LEVEL, ADD OIL

**CAUTION**

When adding oil to the brake oil tank, always use the recommended oil given in "USE OF FUEL, COOLANT AND LUBRICANTS ACCORDING TO AMBIENT TEMPERATURE (PAGE 4-11)".

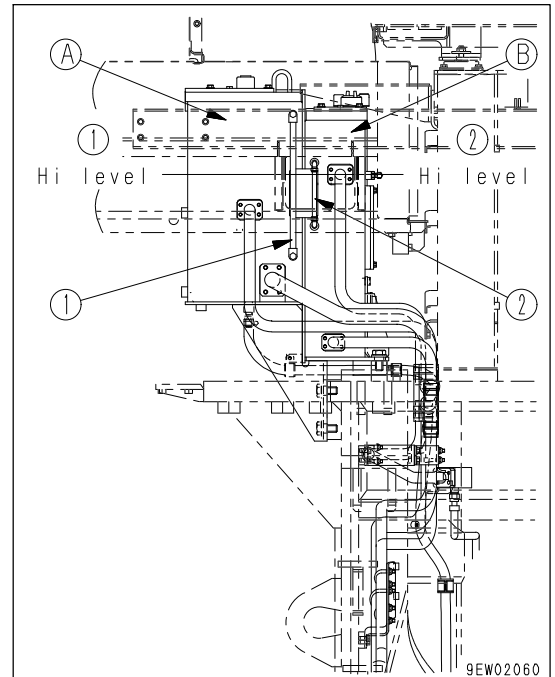
1. Check the oil level using gauge (1) (for brake cooling) and gauge (2) (for brakes) on the side face of the brake tank near the rear frame center pin on the left side of the machine.

There are two brake tanks: Tank (A) on the outside of the machine for brake cooling and tank (B) on the inside of the machine for the brakes.

Check that the oil level in the tank is at the following positions.

Oil level in brake cooling tank (A): Between Hi and LOW level on gauge (1)

Oil level in brake tank (B):  
Between Hi and LOW level on gauge (2)

**NOTICE**

Check the oil level with the brake accumulator discharged.

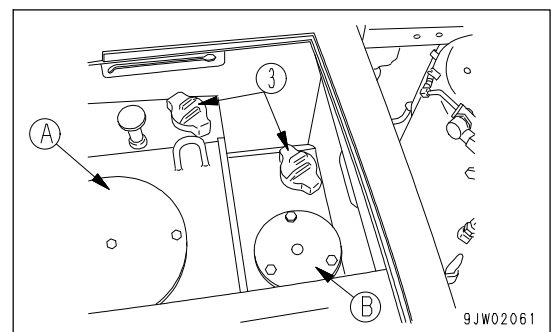
**REMARK**

"Accumulator discharged" means the condition with the engine stopped and the brake pedal depressed several times until the oil pressure sound disappears and the pressure is released.

2. If the oil level is low, open the cover at the top left of the platform, open tank cap (3) of the tank on the side where the oil level is low, then add oil.

**NOTICE**

If the oil level is low, add oil to the tank on the side where the level is low, and check for oil leakage from the brake piping line for that tank.

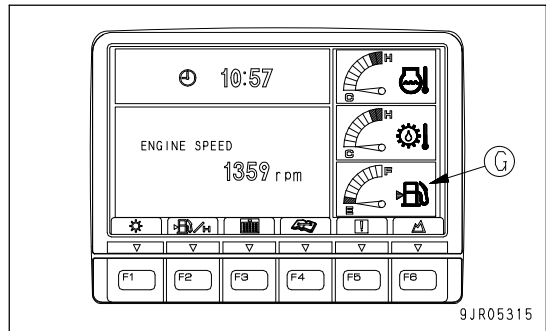
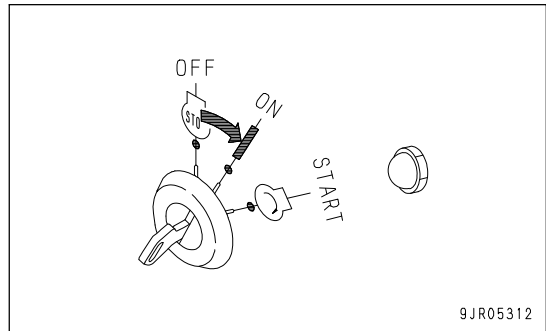


CHECK FUEL LEVEL, ADD FUEL

**WARNING**

When adding fuel, never let the fuel overflow. This may cause a fire. If any fuel is spilled, wipe it up completely. Never bring flames near fuel because it is highly flammable and dangerous.

1. Turn the engine starting switch to the ON position, then check the fuel level with fuel gauge screen (G) on the multi monitor.

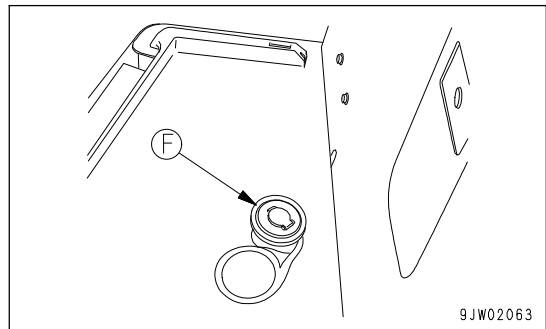


2. After completing operations, add fuel through fuel filler (F) to fill the tank.

For details of the method of opening and closing the cap, see CAP WITH LOCK (PAGE 3-53).

Fuel filler (F) is on both sides at the rear of the machine.

Fuel can be added from either the left or right sides. In both cases, fuel is added to both the fuel tanks.



3. After adding fuel, tighten the cap securely.  
Fuel capacity: 5100 liters (1346.4 US gal)

**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, wrong fuse capacity, and any sign of disconnection or short circuit in the electric wiring. Also, check and tighten any loose terminals.

Particularly, check the wiring of the "battery", "starting motor" and "alternator" carefully.

When checking around the battery, make sure there is no accumulation of flammable material. Remove all flammable material.

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

**CHECK PARKING BRAKE**

Check that the parking brake works properly.

If there is any abnormality in the operation of the parking brake or the brake does not provide the proper braking effect, please contact your Komatsu distributor for adjustment.

**CHECK BRAKE**

Drive the machine forward and check the effect of the brakes.

If there is any problem in the actuation of the brakes, please contact your Komatsu distributor to have the brakes adjusted.

**CHECK INFLATION PRESSURE OF TIRES**

Measure the inflation pressure with a tire pressure gauge, while the tires are cool, before starting work.

Check for damage or wear to the tires and the rims.

Check for loose wheel hub nuts (bolts).

The proper inflation pressure is shown below.

Size	Inflation pressure
55.5/80-57-68PR(L5) (Standard)	0.59 MPa {6.0 kg/cm <sup>2</sup> , 85.2 PSI}
65/65-57-62PR(L5) (If equipped)	0.49 MPa {5.0 kg/cm <sup>2</sup> , 71.0 PSI}
60/80R57★ (L5) (If equipped)	Front wheel: 0.63 MPa {6.4kg/cm <sup>2</sup> , 90.9 PSI} Rear wheel: 0.50 MPa {5.1kg/cm <sup>2</sup> , 72.4 PSI}

**NOTICE**

The optimum inflation pressure differs according to the type of work. For details, see "HANDLING THE TIRES (PAGE 3-124)".

## CHECK WATERPROOF/FIREPROOF DIVIDING WALLS

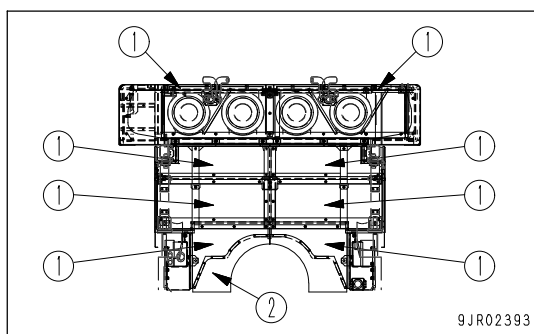
**WARNING**

If the wall between the engine room and hydraulic pump or the rubber sheet are damaged or have come off, and the hydraulic hose breaks, oil will spray onto the high-temperature parts of the engine, and this will lead to fire or other secondary damage.

If the wall or rubber sheet are damaged or have come off, please contact your Komatsu distributor for repairs.

Check that there is no damage or missing parts of rubber sheet (2) or wall (1) between the engine room and hydraulic pump.

If any damage or missing parts are found, please contact your Komatsu distributor for repairs.



## ADJUSTMENT

### SEAT ADJUSTMENT



## WARNING

- Park the machine in a safe place and stop the engine when carrying out adjustment of the operator's seat.
- Adjust the seat position at the beginning of each shift or when operators change.
- Adjust the seat so that the brake pedal can be depressed all the way down with the operator's back against the backrest.

An air compressor built into the seat is used for adjustment (C) and (D), so turn the engine starting switch to the ON position before starting the adjustment.

### NOTICE

There is danger of damage to the air compressor, so do not keep lever (3) operated continuously for more than 1 minute.

#### (A) Fore-and-aft adjustment

Move lever (1) up and move the seat to the desired position and release the lever.

Fore-and-aft adjustment: 210 mm (10 mm x 21 stages)  
(8.3 in (0.4 in) x 21 stages)

#### (B) Adjusting seat angle

Move lever (2) up, move the seat cushion at the front up or down to set to the desired position, then release the lever.

Amount of adjustment  
Forward tilt: 3 degrees  
Rear tilt: 11 degrees

#### (C) Adjusting seat height

The seat height adjustment uses an air system, and it can be adjusted steplessly.

When adjusting the height, pull lever (3) up fully or push it down fully (when pulling it up, pull it until a click is felt). When the seat is set at the desired height, release the lever. If the lever is kept pulled up, the position where the seat does not rise any further is the maximum height. When the seat reaches the maximum height, the suspension automatically goes down slightly to secure the amount of movement of the lever.

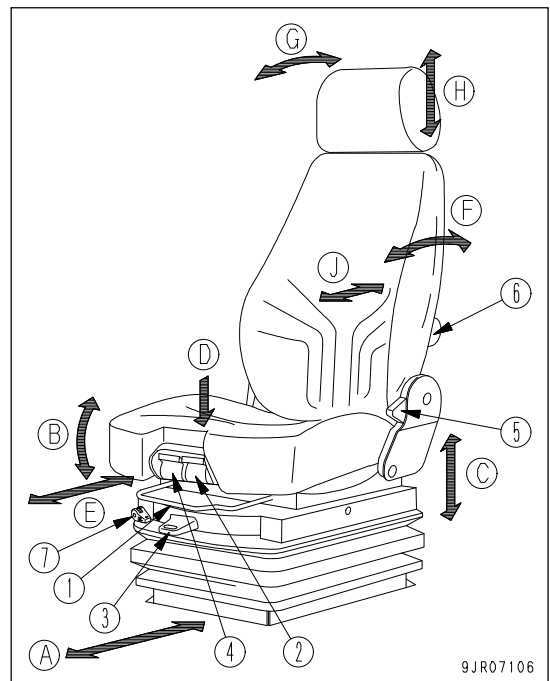
If the operator raises his body from the seat or changes the amount of weight applied to the seat during adjustment, the air in the suspension may be discharged.

Amount of adjustment: 80 mm (3.2 in)

### REMARK

If lever (3) is pulled up further from the maximum height, the air compressor may make a sound of actuation but the seat may not rise. This does not indicate any abnormality.

If this happens, the air compressor will stop automatically after approx. 8 seconds. It will also stop if lever (3) is pushed down.



9JR07106

**(D) Setting seat for weight**

To protect the operator, it is necessary to adjust the suspension to match the operator's weight.

Push lever (3) down to lower the seat to the lowest position, then pull lever (3) up fully (pull it until a click can be felt).

When the lever is released, the weight adjustment is carried out automatically.

To ensure that the weight adjustment is carried out correctly, the operator should sit in the normal operating position when operating the lever. If the operator raises his body from the seat or changes the amount of weight applied to the seat during adjustment, the air in the suspension may be discharged.

When operators change shifts, the new operator should push lever (3) down to lower the seat to the lowest position, then pull lever (3) up fully (pull it until a click it is felt). When the lever is released, the weight adjustment is carried out automatically.

If lever (3) is pulled lightly, the weight adjustment starts, but always pull the lever up fully (pull it until a click is felt) before releasing it.

**REMARK**

- When making initial adjustment or when adjusting the weight settings when operators change shifts, set the damping force of the suspension damper to the soft setting (for details, see "Adjusting hardness of suspension damper"), then adjust it to match the operator's weight. If the damping force of the suspension damper is left set to the hard setting and the height of the seat is adjusted, even if the height is raised, the seat may go down. If the seat goes down, set the damping force of the suspension damper to the soft setting, lower the seat, then adjust the weight again. After completing adjustment of the weight and height, set the damping force of the suspension damper to the desired strength.
- To protect the operator, the suspension must be adjusted to match the operator's weight. Adjust the weight before starting operations.
- When adjusting, do not remove your weight from the seat or change the load in any other way. If this is done, the air may be released from the suspension's seat.

**(E) Fore-and-aft adjustment of seat cushion**

Operate lever (4) up, set the seat cushion to the desired position, then release the lever.

Fore-and-aft adjustment: 60 mm (2.4 in)

**(F) Adjusting reclining angle**

Operate lever (5) up and move the back cushion to the front or rear.

But your back firmly against the seat back when carrying out this adjustment. If you move your back away from the seat back, the seat back may suddenly spring forward.

Amount of adjustment

Forward tilt: 20 degrees (over 20 degrees is free)

Rear tilt: 60 degrees

**NOTICE**

**If the seat back is reclined too far, the seat back may hit the rear glass, so use it in a position where it does not contact the glass.**

**(G) Adjusting headrest angle**

Rotate the backrest to the front or rear and set to the desired angle.

Amount of adjustment: 38 degrees

**(H) Adjusting headrest height**

Move the headrest up or down and set to the desired height.

Amount of adjustment: 100 mm (3.9 in)

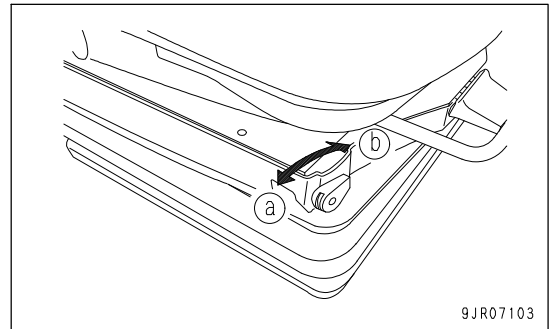
**(J) Lumbar support**

Turn the knob (6) to the right or left to give the suitable amount of lumbar support.

**(K) Adjusting hardness of suspension damper**

Operate knob (7) to adjust the damping force of the suspension damper. If knob (7) is moved to face the outside of the seat (a), the damping force becomes stronger; if the knob is moved to face the inside of the seat (b), the damping force becomes weaker.

Amount of adjustment: 5 stages

**ADJUST SEAT BELT****WARNING**

- Before fitting the seat belt, check that there is no problem in the belt mount bracket or mounting belt. If it is worn or damaged, replace the seat belt.
- Even if there are no signs of damage, replace belts in accordance with the following schedule:  
5 years after the date of seat belt manufacture, or every 3 years after the start of actual usage, whichever date comes first.
- Always wear the seat belt during operations.
- Fit the seat belt so that it is not twisted.

**REMARK**

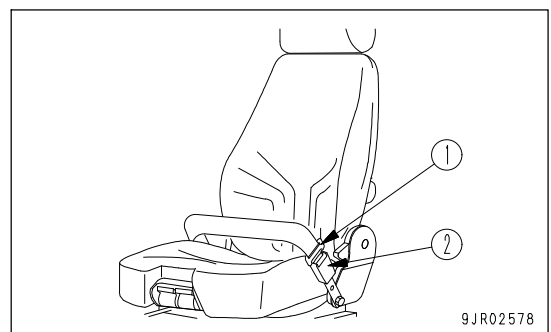
The date of seat belt manufacture attached to the seat belt is the start of the 5-year period. It is not the start of the 3-year period of actual usage.

**FASTENING AND REMOVING BELT**

Fasten the belt so that it is tight without being too tight.

1. Sit on the seat, depress the brake pedal fully, and adjust the seat so that your back is pressed against the backrest.
2. Sit on the seat, pull the right belt, then insert tongue (1) securely into buckle (2) until a click is heard. Pull the belt to check that it is firmly locked.
3. When removing the belt, press the red button in buckle (2) to free the belt.

Fit the belt so that it follows your body and is not twisted.





ADJUSTING MIRRORS

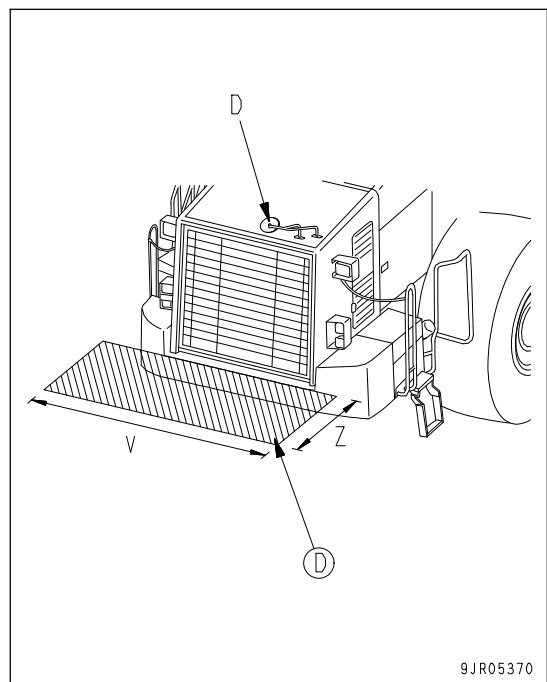
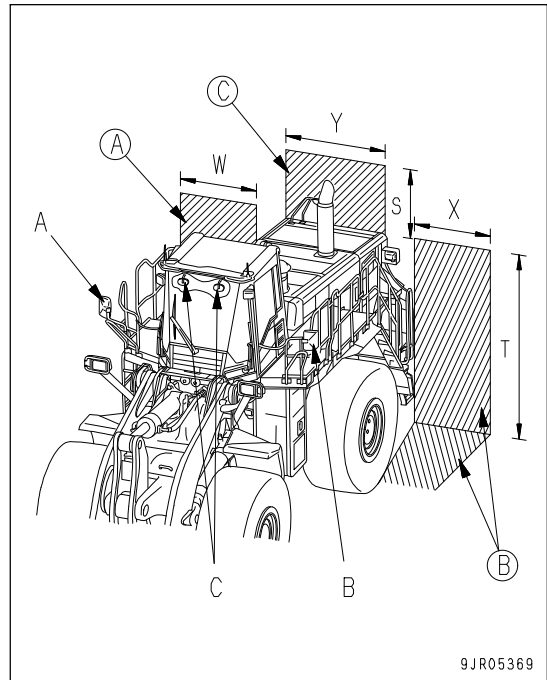
**! WARNING**

Be sure to adjust the mirrors before starting work. If they are not adjusted properly, you cannot secure the visibility and may be injured or may injure someone seriously.

Adjust the position so that the mirror gives a good view from the operator's seat. In particular, be careful to adjust so that it is possible to see people on the left and right sides at the rear of the machine.

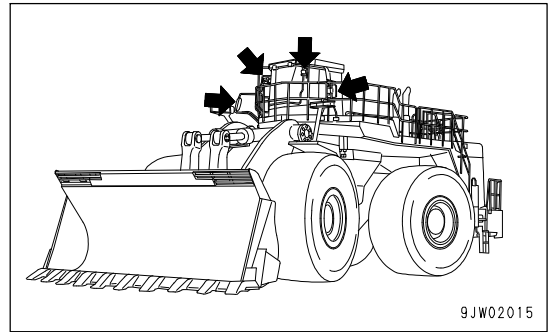
- Range of view W (right): 2300 mm
- Range of view X (left) : 2300 mm
- Range of view T (left, right): 4600 mm
- Range of view Y (room) : 2500 mm
- Range of view S (room) : 2300 mm
- Range of view V (rear) : 6800 mm
- Range of view Z (rear) : 3500 mm

- Mirror A: Must be possible to see hatched portion (A)
- Mirror B: Must be possible to see hatched portion (B)
- Mirror C: Must be possible to see hatched portion (C)
- Mirror D: Must be possible to see hatched portion (D)

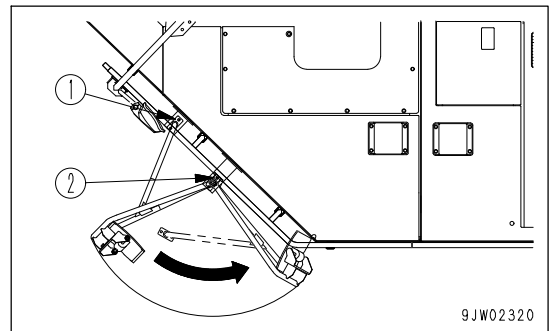


**METHOD OF ADJUSTING REAR VIEW MIRROR**

Sit in the operator's seat and adjust the rear view mirrors so that you can see properly to the rear (4 places).

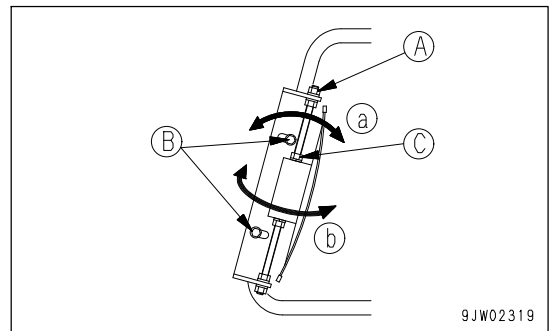


1. Remove 2 bolts (1).
2. Loosen top and bottom bolts (2) without removing them.
3. Turn the mirror until it is close to the step handrail, then adjust the angle of the mirror at this position.



Adjust the mirror angle so that the whole of the rear tire can be seen from the operator's seat.

4. When making the initial adjustment, adjust in the horizontal direction with nut (A) and in the perpendicular direction with bolt (B).
5. When making fine adjustments to the mirror position, loosen nut (C).  
(With nut C it is possible to make fine adjustment in both the horizontal and perpendicular directions.)

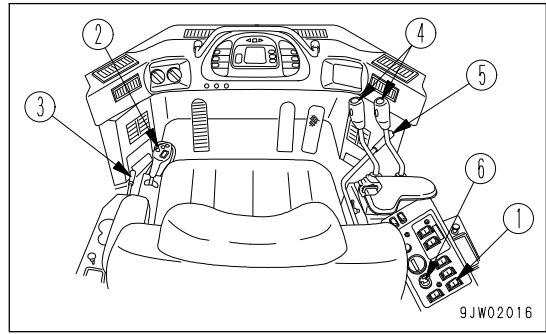


### OPERATIONS AND CHECKS BEFORE STARTING ENGINE

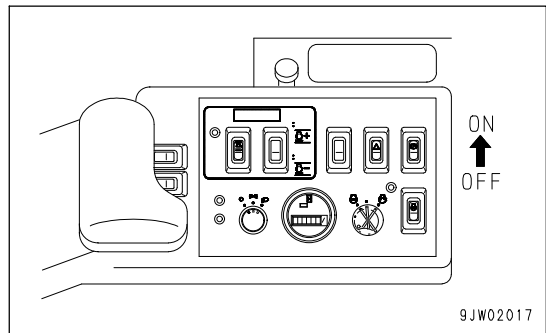
#### **WARNING**

When starting the engine, check that lock levers (3) and (5) are securely at the LOCK position.

If work equipment control levers (4) or joystick steering lever (2) are touched by mistake at the same time as the engine starts, the work equipment or machine may suddenly move and cause serious personal injury.



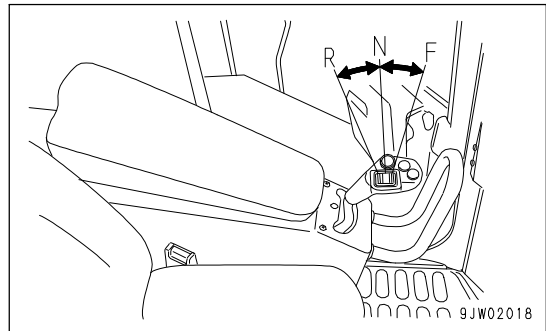
1. Check that parking brake switch (1) is at the ON position.



2. Check that the directional selector switch on joystick steering lever (2) is at the N position and that the joystick steering lever is at the Neutral position.

When starting the engine, if the directional selector switch on the joystick lever is not at the N position and the joystick steering lever is not at the Neutral position, the engine will not start.

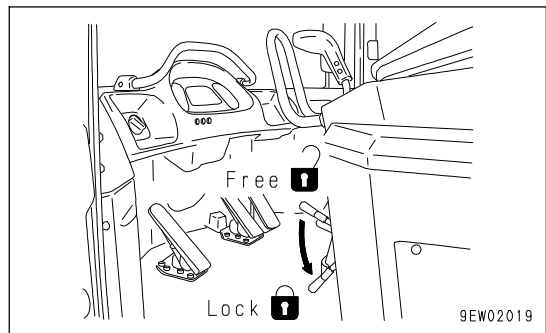
Check also that joystick steering lock lever (3) is at the LOCK position.



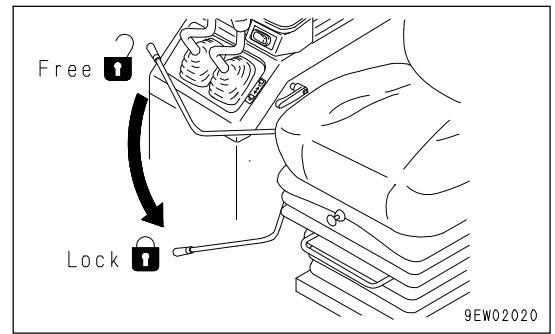
#### REMARK

- If the directional selector switch is not at the N position, the alarm buzzer will emit short sounds (beep beep).
- If the joystick steering lever is not at the Neutral position, the alarm buzzer will emit a long sound (beep).

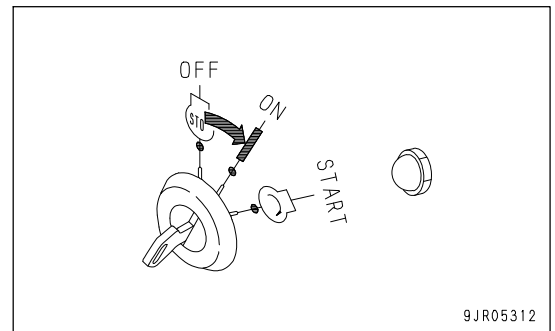
If this happens, return the joystick steering lever to the Neutral position (to the position where the alarm buzzer stops).



3. Lower the bucket to the ground surface and check that work control lever (4) is locked by work equipment lock lever (5).



4. Insert the key in starting switch (6), turn the key to the ON position, and check that the machine monitor system works. When the starting switch is turned to the ON position before starting the engine, all monitor lamps, gauges, and central warning lamps will light up for approx. 3 seconds, the central warning lamp will light up and the alarm buzzer will sound for approx. 1 second. When this happens, 88 is displayed on the speedometer, and 8 is displayed on the transmission shift indicator. If the monitor lamps do not light up, there is probably a failure or disconnection, so please contact your Komatsu distributor for inspection.

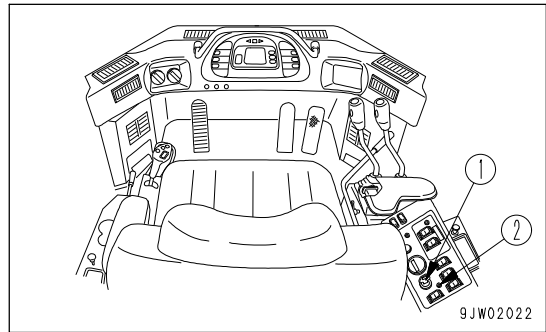


# STARTING ENGINE

## NORMAL STARTING

### **WARNING**

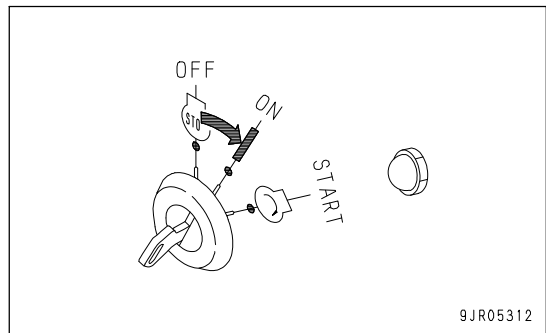
- Sit down in the operator's seat before starting the engine.
- Do not attempt to start the engine by short-circuiting the engine starting circuit. Such an act may cause serious bodily injury or fire.
- Check that there are no persons or obstacles in the surrounding area, then sound the horn and start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



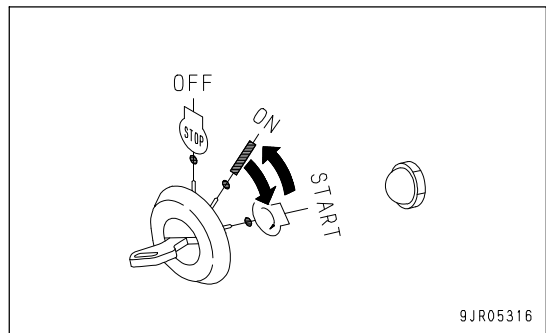
### NOTICE

Do not keep the starting motor rotating continuously for more than 20 seconds.  
 If the engine will not start, wait for at least 2 minutes before trying to start the engine again.

1. Turn the key in starting switch (1) to the ON position.



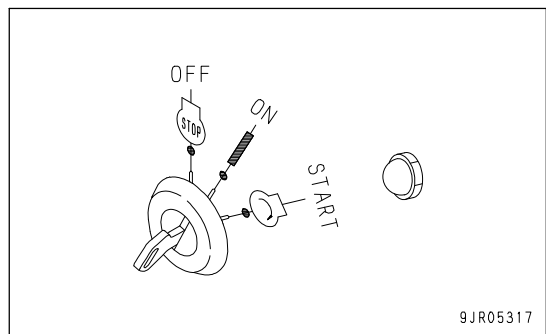
2. Turn the key in starting switch (1) to the START position.  
 When the key is turned to the START position, pre-lube indicator (2) lights up (Orange) and lubrication of the engine starts automatically.  
 Return the key in the starting switch to the ON position.  
 (When the key is released, it will return automatically to the ON position.)



3. After lubrication is carried out and the starting motor cranks, pre-lube indicator (2) goes out and the engine starts.

### REMARK

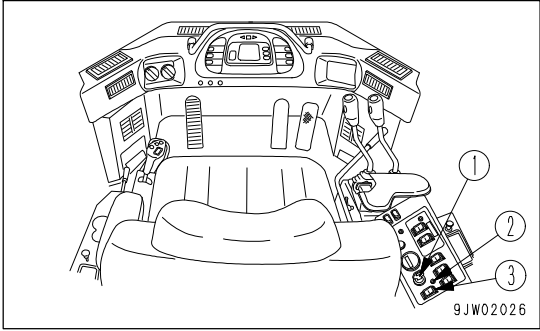
- Even if the starting switch is returned from the START position to the ON position, the starting condition is recorded in memory, so the lubrication and starting of the starting motor is carried out automatically.
- If it is desired to abandon the starting operation, turn the starting switch key to the OFF position.



**STARTING IN COLD WEATHER**

**WARNING**

- Always sit in the operator's seat when starting the engine.
- Do not try to start the engine by short circuit the starting circuit. This may lead to serious personal injury or fire.
- Check that there is no person or obstacle in the surrounding area, sound the horn, then start the engine.
- Exhaust gas is toxic. When starting the engine in a confined space, always be sure to have ample ventilation.
- Never spray ether after the engine starts.

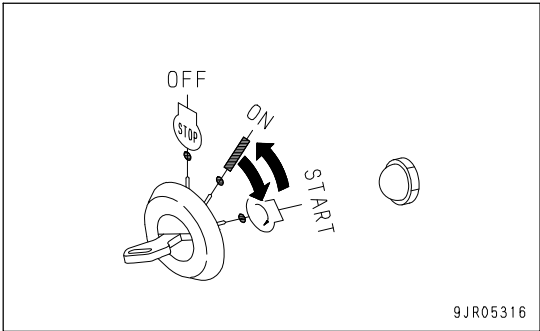


**NOTICE**

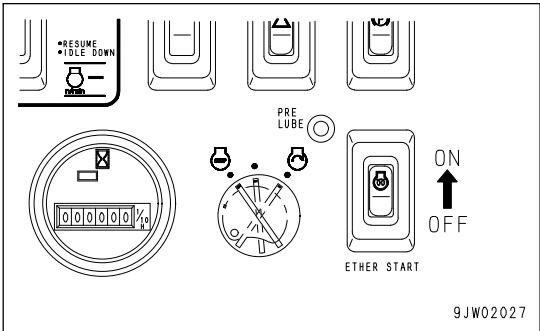
Do not keep the starting motor rotating continuously for more than 20 seconds.  
If the engine will not start, wait for at least 2 minutes before trying to start the engine again.

If the ambient temperature has gone below -10°C (14°F), and is impossible to start the engine using the normal starting procedure, do as follows.

1. Turn the key in starting switch (1) to the START position.  
When the key is turned to the START position, pre-lube indicator (2) lights up (Orange) and lubrication of the engine starts automatically.  
Return the key in the starting switch to the ON position.  
(When the key is released, it will return automatically to the ON position.)



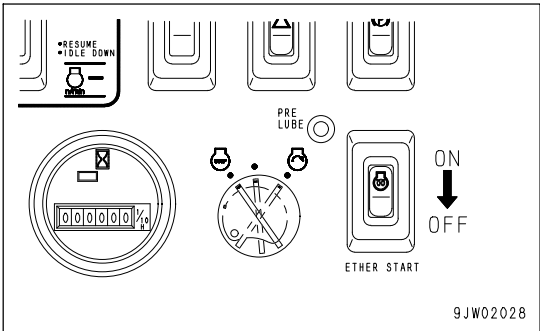
2. After lubrication is carried out and the starting motor cranks, the pre-lube indicator goes out and the engine starts. When this happens, turn ether spray switch (3) to the ON position and spray ether (starting aid fluid) into the intake manifold. The engine will start.



**NOTICE**

Do not continue to spray ether for more than 5 seconds.

3. When the engine starts, release ether spray switch (3) from the ON position.  
The switch automatically returns to the OFF position.



**NOTICE**

Never continue to spray ether after the engine starts.

---

## OPERATIONS AND CHECKS AFTER STARTING ENGINE



### WARNING

- **Emergency stop**  
If there is some abnormal movement or breakdown, turn the key in the starting switch to the OFF position.
  - **Always carry out of the warming-up operation thoroughly.** If the work equipment is operated when of the machine is not properly warmed up, the reaction of the work equipment to the operation of the control levers will be slow or the work equipment may even move in a way not intended by the operator. In particular, be careful to carry out the warming operation thoroughly in cold areas.
- 

## BREAKING-IN THE MACHINE



### CAUTION

This machine has undergone full inspection and adjustment of all parts before shipment from the factory, but if the full load is applied to the machine before all parts have been broken in, there will be adverse effect on the service life and performance of the machine.

Carry out the breaking-in operation for the first 100 hours of the machine (the standard time on the service meter).

Pay particular attention to the following points when carrying out the breaking-in operation.

- Run the engine at low idling and carry out the warming-up operation for 5 minutes after starting the engine.
  - Avoid applying any heavy load or running at high speed during operations.
  - Avoid sudden starting, sudden acceleration, unnecessary sudden stopping, or sudden changes in direction.
-

**NORMAL OPERATION**

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

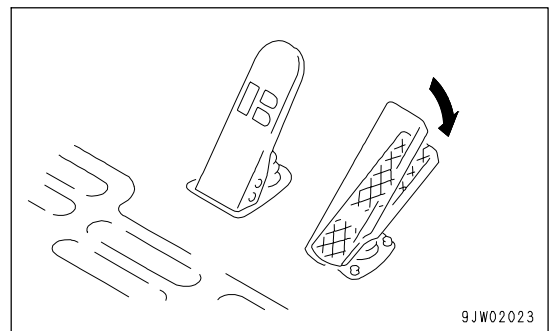
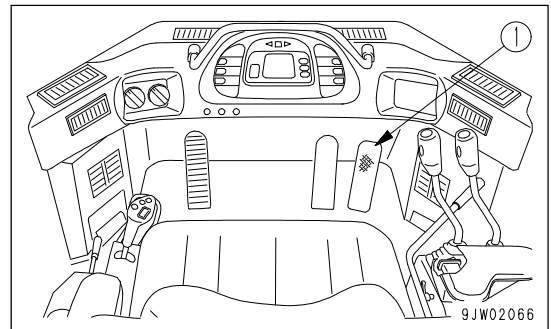
**NOTICE**

**Do not suddenly accelerate the engine before the warming-up operation is completed.**

**Do not run the engine at low idle or high idle continuously for more than 20 minutes.**

**If it is necessary to run the engine at idle, apply a load from time to time or run the engine at a mid-range speed.**

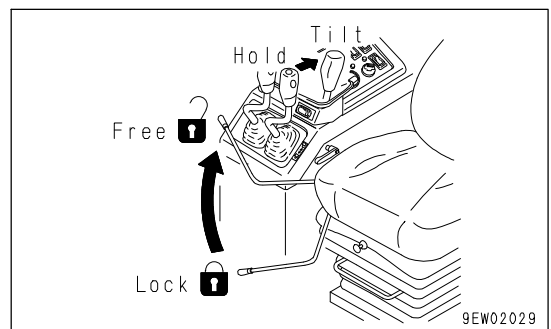
1. Depress accelerator pedal (1) lightly and run the engine with no load at midrange speed for about 5 minutes.



2. To warm up the hydraulic oil (only in cold weather), do as follows.

During the warming-up operation, check that the engine rotation is smooth, then set the work equipment lock lever to the FREE position, and operate the bucket control lever into and out of the TILT position.

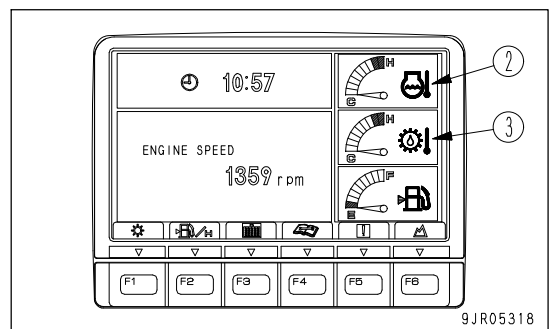
Keep the relief time at the TILT position to a maximum of 10 seconds. In this way, the hydraulic oil will reach the relief pressure and will be warmed up more quickly.



3. After completing the warming-up operation, check that the instruments, gauges, and pilot lamps work properly. If any problem is found, carry out repairs.

Carry out the operation under light load until engine water temperature gauge (2) and torque converter oil temperature gauge (3) on the multi monitor screen enter the green range.

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





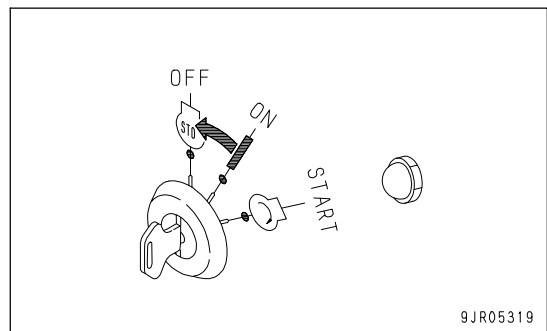
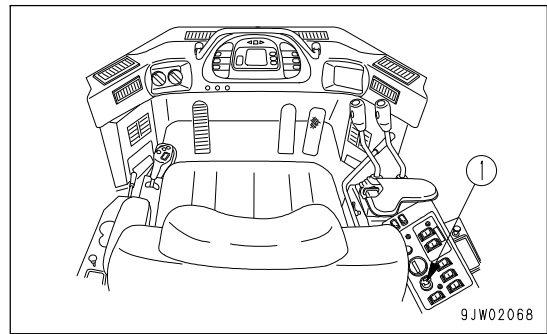
## STOPPING ENGINE

### NOTICE

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

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

1. Run the engine at low idle for approximately 5 minutes to cool down gradually.
2. Turn the key in starting switch (1) to the OFF position to stop the engine.
3. Remove the key from starting switch (1).



## CHECK AFTER STOPPING ENGINE

1. Walk around the machine and check the work equipment, bodywork, and undercarriage, and check also for oil and water leakage.
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.

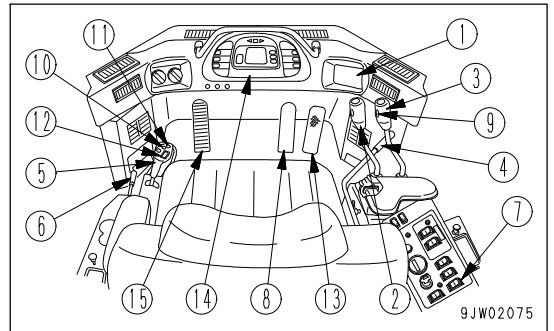
**MOVING THE MACHINE (DIRECTIONAL, SPEED), STOPPING THE MACHINE**

**! WARNING**

- When moving the machine off, check that the area around the machine is safe, then sound the horn before starting.
- Do not allow people to get near the machine.
- Clear the machine's travel path of any obstacle.
- Pay a particular attention to the blind spot at the rear of the machine, when traveling the machine in reverse.

**PREPARATIONS FOR MOVING MACHINE**

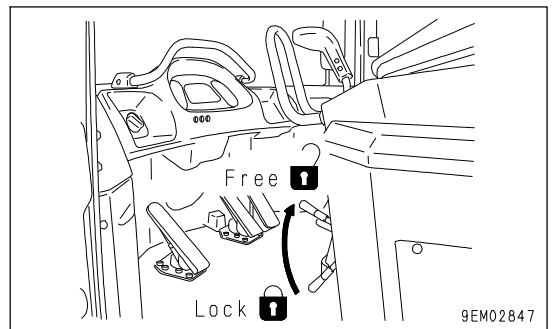
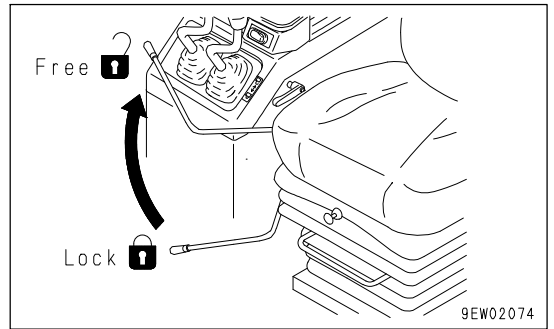
1. Check that there is no warning display on multi monitor (1).



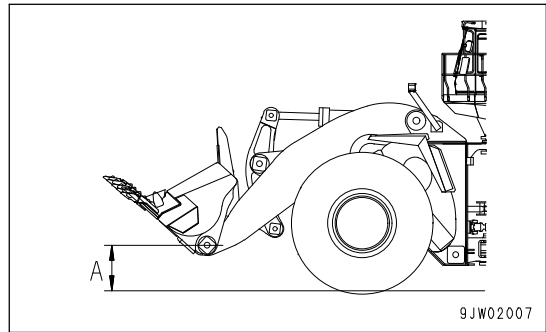
2. Set lock lever (4) of bucket control lever (2) and lift arm control lever (3), and lock lever (6) of joystick steering lever (5) to the FREE position.

**REMARK**

If the lock lever of the joystick steering lever is not set to the FREE position, even when the directional switch is operated, it will stay at N. In addition, the travel speed display on the front main monitor will also change to N and will not shift, so always set to the FREE position.



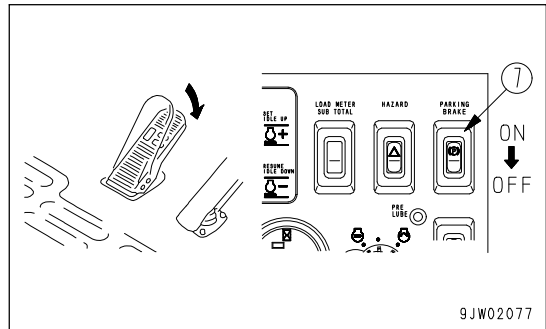
- 3. Operate lift arm control lever (3) to set the work equipment to the travel posture shown in the diagram on the right.  
(A):110 to 120cm (43.3 to 47.3 in)



- 4. Depress right brake pedal (8) and turn parking brake switch (7) to the OFF (RELEASE) position to release the parking brake. Keep right brake pedal (8) depressed.

**REMARK**

If the parking brake is still actuated when parking brake switch (7) is at the OFF (RELEASE) position, turn the parking brake switch ON, then turn it OFF again.



- 5. Set to the desired speed range position.  
Set the speed range position as follows.

- 1) Use transmission auto shift/manual selector switch (9) to select auto shift or manual shift.

Position (a): Auto shift mode

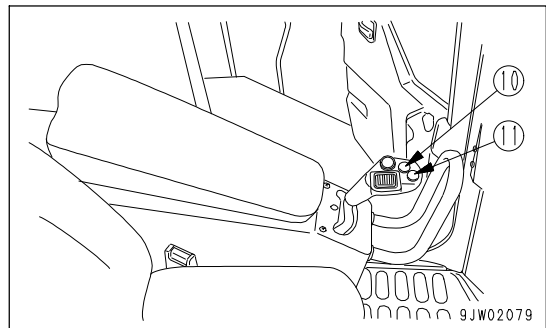
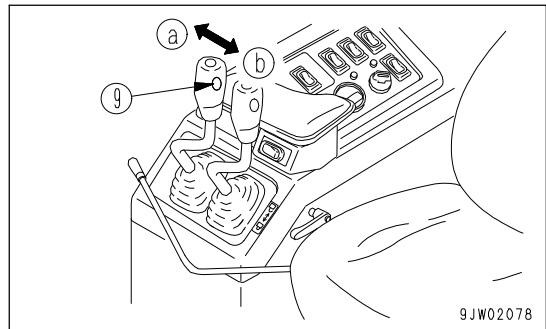
In this position, the transmission is set to the final shift position used when previously using the auto shift mode.

This shift position is displayed by the 1-2-3 speed indicator lamp under the main monitor.

Position (b): Manual shift mode

When shifting from auto shift mode to manual mode, the shift position used in the auto shift mode is retained in the manual shift mode.

- 2) When setting to a speed range different from the range set in Step 1), shift the gear with shift up switch (11) or shift down switch (10) at the head of joystick steering lever (5).

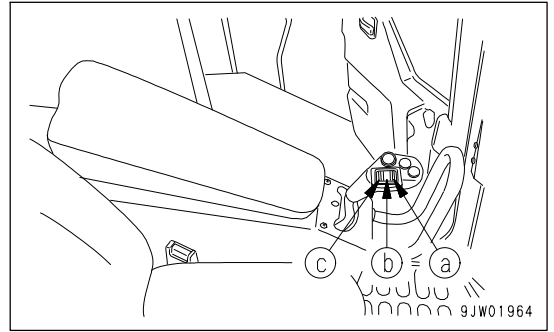


6. Press directional switch (12) at the head of joystick steering lever (5) to select the desired position.

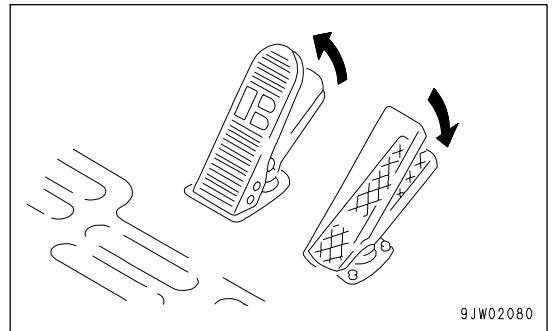
Position (a): FORWARD (F)

Position (b): Neutral (N)

Position (c): REVERSE (R)

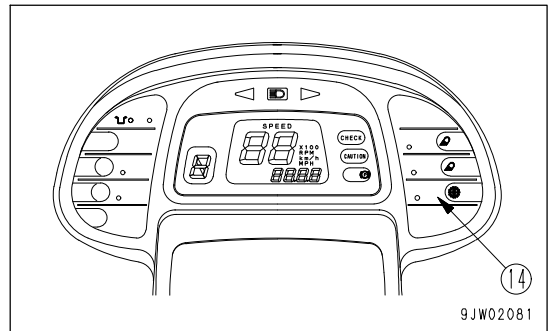


7. Release right brake pedal (8), then depress accelerator pedal (13) to move the machine off.



**REMARK**

When starting the machine off up a slope, turn transmission cut-off switch (14) OFF, and depress left brake pedal (15). Then depress accelerator pedal (13) and gradually release left brake pedal (15) to start the machine off. In this way it is possible to prevent the machine from rolling back.



## CHANGING GEAR SPEED



### WARNING

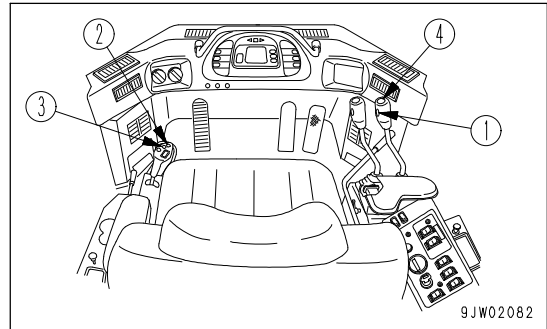
When traveling at high speed, do not shift gear suddenly. Use the brake to reduce the travel speed before shifting gear.

When shifting gear, do as follows.

To set the speed range, select with transmission auto shift/manual selector switch (1) and set with shift up switch (2) or shift down switch (3) on the head of the joystick steering lever.

For details, see Section "PREPARATIONS FOR MOVING MACHINE (PAGE 3-97)".

Use 1st or 2nd speed for digging or loading operations.

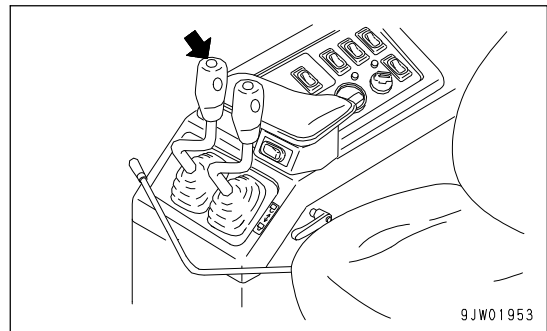


### REMARK

This machine is equipped with kickdown switch (4). When traveling in 2nd, if the button at the tip of the lift arm control lever is pressed, the transmission shifts down to 1st.

For operations carried out in 1st and 2nd, such as digging and loading, we recommend the use of the kickdown switch.

For details of the method of use, see KICKDOWN SWITCH (PAGE 3-32).

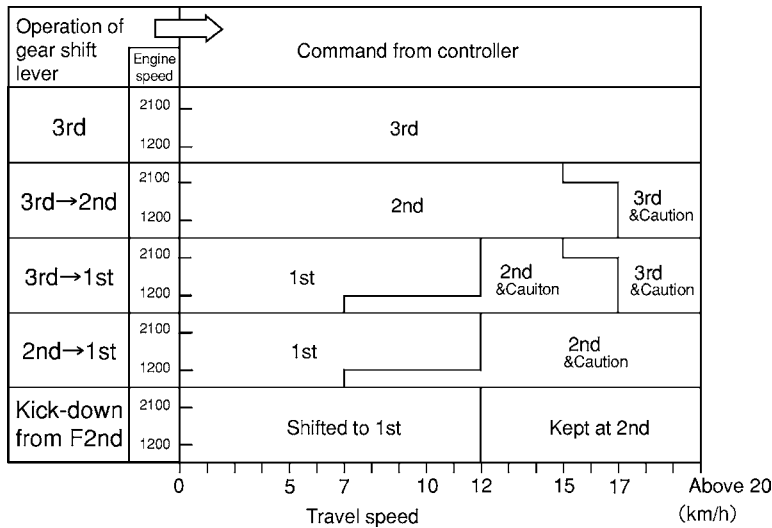


**CONTROL WHEN SHIFTING DOWN AT HIGH SPEED**

Shifting down at high speed has an adverse effect on the durability of the torque converter.

Based on the table below, when shifting down at high speed, the alarm buzzer sounds for 3 seconds (repeated short beeps). At the same time, the controller automatically controls the shift down operation to ensure durability, but note that the deceleration of the machine becomes weaker.

**CONTROL WHEN SHIFTING DOWN**



## CHANGING DIRECTION

### WARNING

- Before changing direction between forward and reverse, check that it is safe to travel in the new direction. The area behind the machine is a blind spot, so be particularly careful when switching to reverse travel.
- When switching between forward and reverse, depress the brake, and reduce the travel speed to a maximum of 11 km/h (6.8 MPH) before changing the direction. Changing direction at high speed will cause damage to the internal parts of the transmission.

## CONTROL FOR SHIFTING GEAR DOWN AT HIGH TRAVEL SPEED

Shifting down at high speed will cause damage to the internal parts of the torque converter.

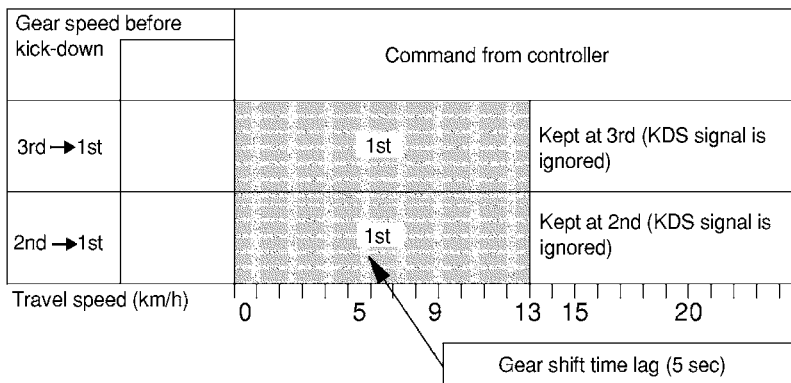
If it is attempted to shift down at high speed, the system takes action to protect the torque converter. The alarm buzzer sounds for 3 seconds (rapid beeps) and the controller acts to automatically delay the shift down as shown in the chart below,

### CAUTION

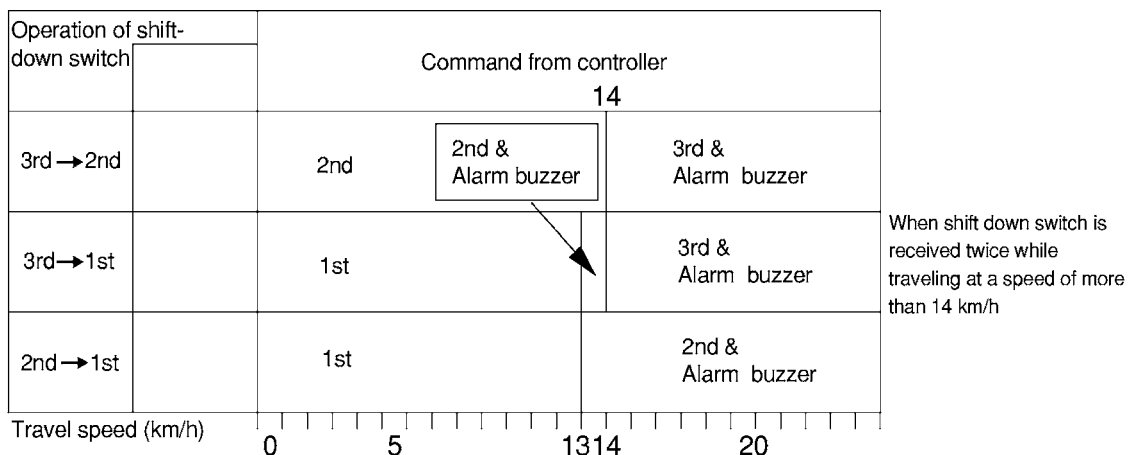
If the CONTROL FOR SHIFTING GEAR DOWN AT HIGH SPEED is actuated, the deceleration of the machine becomes weaker (the machine may momentarily coast), so be extremely careful when shifting down.

#### 1. Protection function when using auto shift

- **KDS (kick-down switch) limit**

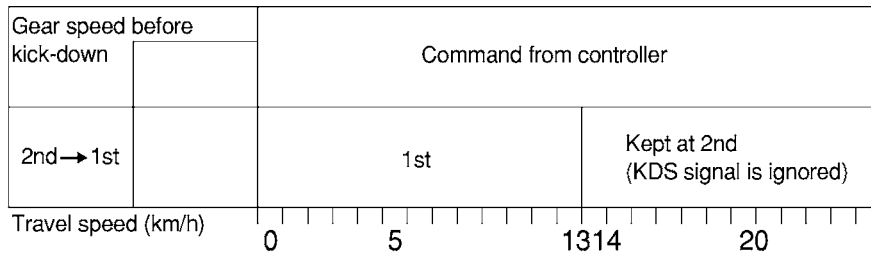


- **Shift-down limit**



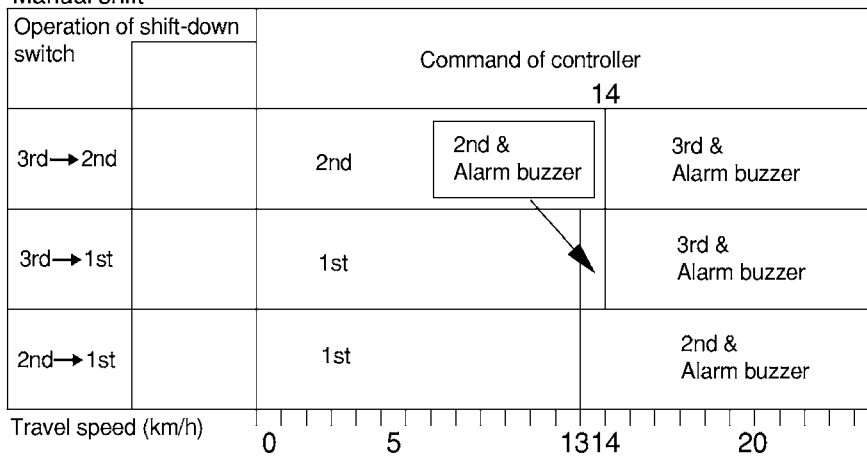
2. Protection function when using manual shift

• KDS (kick-down switch) limit



• Shift-down limit

Manual shift



When shift down switch is received twice while traveling at a speed of more than 14 km/h



**CONTROL FOR CHANGE OF TRAVEL DIRECTION AT HIGH SPEED**

When switching between forward and reverse, depress the brake, and reduce the travel speed to a maximum of 11 km/h (6.8 MPH) before changing the direction. Changing direction at high speed will cause damage to the internal parts of the transmission.

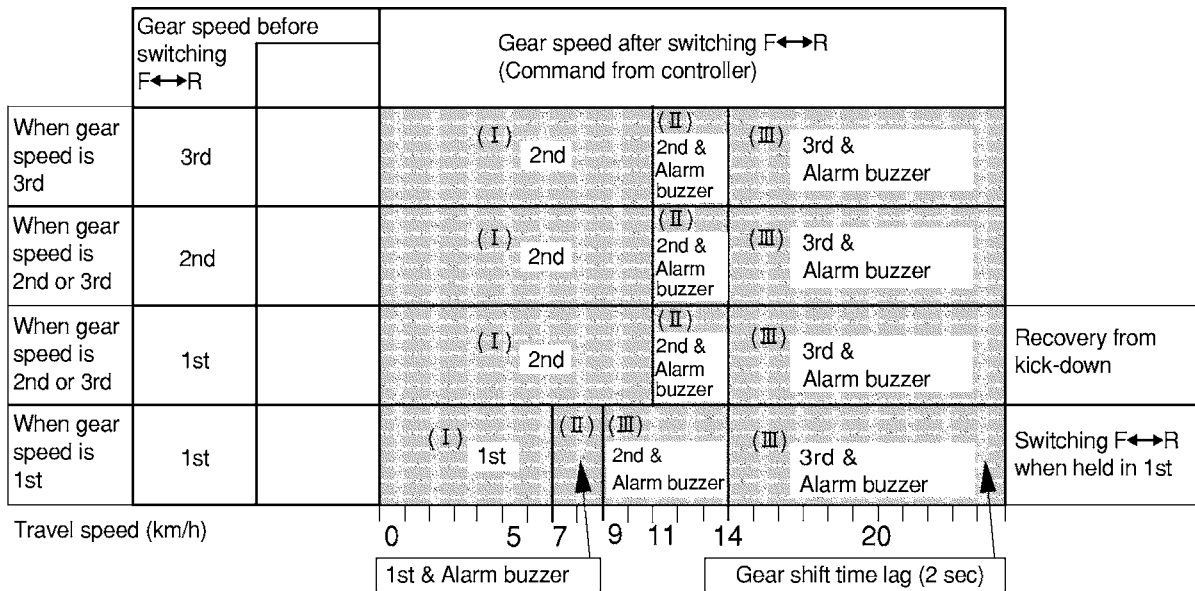
If it is attempted to shift between forward and reverse at high speed, the system takes action to protect the transmission. The alarm buzzer sounds and the controller acts to automatically restrict the gear speed as shown in the chart below,



If the CONTROL FOR CHANGE OF DIRECTION AT HIGH SPEED is actuated in range (II) in the chart below, the deceleration of the machine becomes weaker than in range (I), so be extremely careful when shifting down.

1. Protection function when using auto shift

- Limit when changing direction of travel



- (I): Gear speed is changed as operated
- (II): Gear speed is changed as operated, but alarm buzzer sounds
- (III): Controller restricts gear speed according to travel speed, alarm buzzer sounds

**NOTICE**

If it is attempted to shift between forward and reverse in range (II), the gear speed is changed according to the operation by the operator. However, the alarm buzzer sounds to inform the operator that the speed has not been reduced sufficiently to switch between forward and reverse.

If the alarm buzzer sounds, be careful to carry out sufficient deceleration before switching between forward and reverse.

• Shift-down limit after changing direction of travel

Operation of shift-down switch		Command from controller	
3rd → 2nd		( I ) 2nd	( II ) 3rd & Alarm buzzer
3rd → 1st		( I ) 1st	( II ) 3rd & Alarm buzzer
2nd → 1st		( I ) 1st	( II ) 2nd & Alarm buzzer

Travel speed (km/h)    0    5    10    13 14    20

Switching F ↔ R  
when speed range is  
1st and travel speed  
is more than 14 km/h

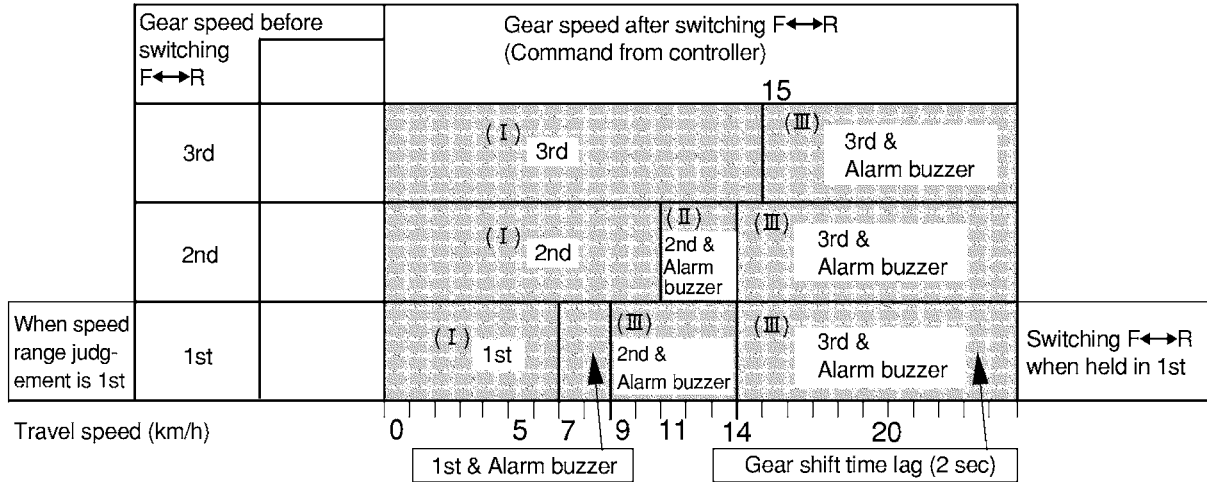
(I): Gear speed is changed as operated

(II): Controller controls gear speed according to travel speed, alarm buzzer sounds

2. Protection function when using manual shift

• Limit when changing direction of travel

(The same control is carried out when coasting in Neutral and shifting to FORWARD or REVERSE))



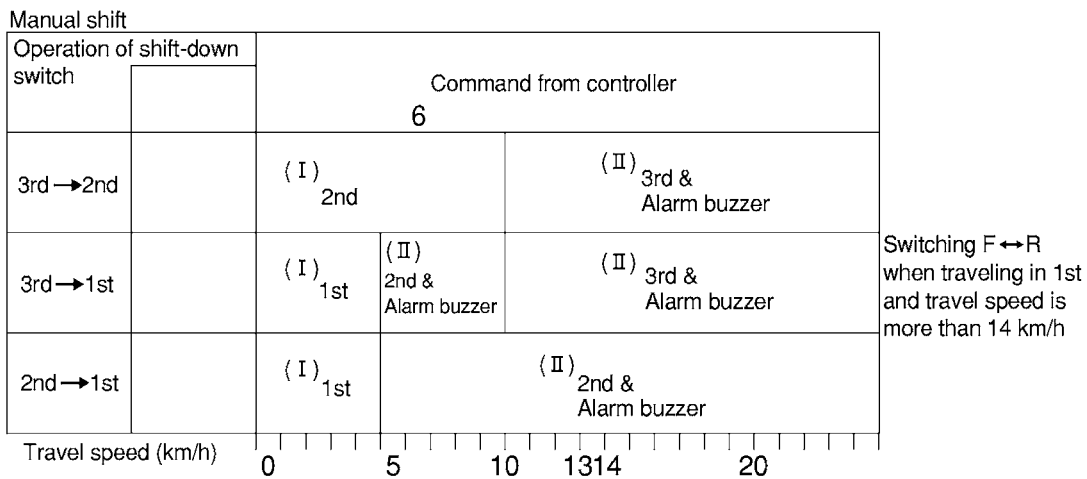
- (I): Gear speed is changed as operated
- (II): Gear speed is changed as operated, but alarm buzzer sounds
- (III): Controller restricts gear speed according to travel speed, alarm buzzer sounds

NOTICE

If it is attempted to shift between forward and reverse in range (II), the gear speed is changed according to the operation by the operator. However, the alarm buzzer sounds to inform the operator that the speed has not been reduced sufficiently to switch between forward and reverse.

If the alarm buzzer sounds, be careful to carry out sufficient deceleration before switching between forward and reverse.

• Shift-down limit after changing direction of travel

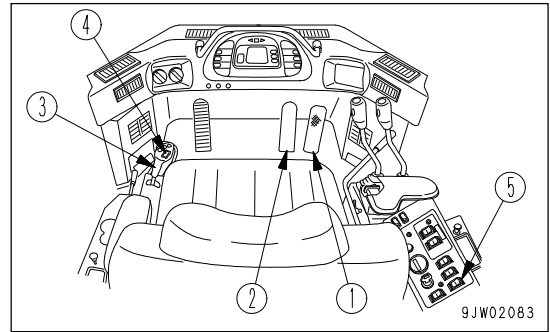


- (I): Gear speed is changed as operated
- (II): Controller controls gear speed according to travel speed, alarm buzzer sounds

## STOPPING THE MACHINE

**WARNING**

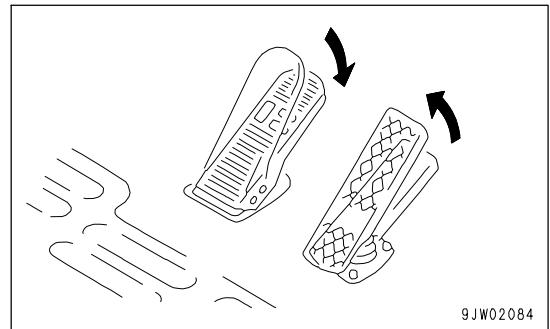
- Avoid stopping the machine suddenly. As far as possible, always leave a margin when stopping.
- Avoid parking the machine on a slope. If it is necessary to park the machine on a slope, stop the machine facing directly down the slope, fit blocks under the tires and lower the bucket to the ground to prevent the machine from moving.
- If the work equipment control lever is touched by mistake, there is danger that the work equipment or machine may move suddenly and cause a serious accident. Before standing up from the operator's seat, always set the lock levers (for the work equipment control levers and joystick steering lever) securely to the LOCK position.
- When the parking brake switch is turned ON, it is dangerous to release the brake pedal immediately. Always keep the brake pedal depressed until the parking brake pilot lamp lights up.



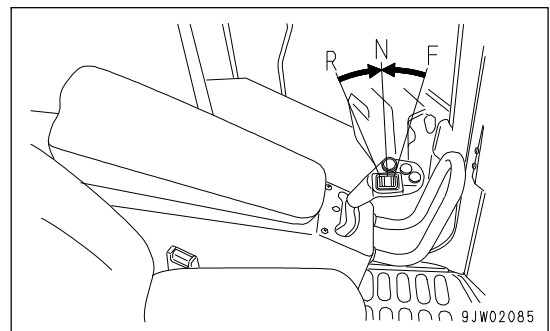
## NOTICE

Never use the parking brake switch to brake the machine when traveling except in an emergency. Apply the parking brake only after the machine has stopped.

1. Release accelerator pedal (1), then depress brake pedal (2) to stop the machine.



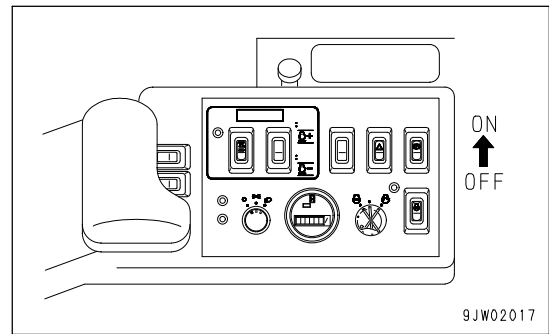
2. Set directional switch (4) at the head of joystick steering lever (3) to the N position.



3. Set parking brake switch (5) to the ON position to apply the parking brake.

**REMARK**

When the parking brake is applied, the transmission is automatically returned to neutral.



## TURNING

**WARNING**

- Operating the steering wheel suddenly at high speed or operating the steering wheel on steep slopes is dangerous. Do not operate the steering wheel in such situations.
- If the engine stops when the machine is traveling, the emergency steering is actuated. Note that this system is only for steering in emergencies, so never stop the engine.

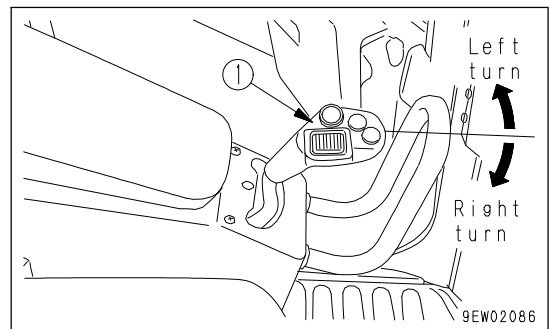
It is particularly dangerous if the engine stops when the machine is traveling on slopes, so never let the engine stop when traveling on slopes.

If the engine stops, stop the machine immediately at a safe place.

When traveling, angle joystick steering lever (1) in the direction of turning, and the machine will turn.

With this machine, the front and rear frames articulate around the connecting pin (center pin) connecting the front and rear frames. The rear wheels follow the same path as the front wheels when the machine turns.

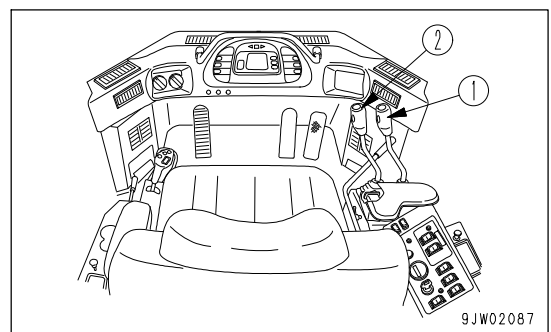
When operating the joystick steering lever, angle the joystick steering lever lightly to follow the turning angle of the machine.

**NOTICE**

When turning fully, stop operating the steering lever when it reaches the end of its stroke. Do not operate beyond this point. Check also that the actuation of the steering is normal. If any abnormality is found, please ask your Komatsu distributor to carry out inspection.

**OPERATION OF WORK EQUIPMENT**

Lift arm control lever (1) and bucket control lever (2) can be used to operate the lift arm and bucket as follows.



**LIFT ARM CONTROL LEVER**

Position (a): RAISE

Position (b): HOLD

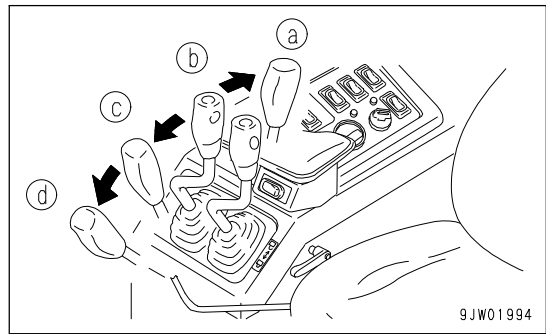
The lift arm is stopped and held in position.

Position (c): LOWER

Position (d): FLOAT

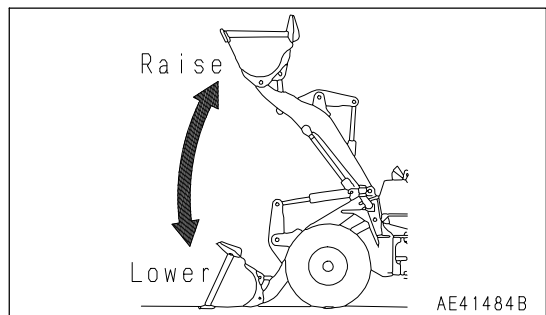
The lift arm moves freely under external force.

When the lift arm control lever is pulled further from the raise position, the lever is stopped in this position until the lift arm reaches the preset kick-out position, and the lever is return to the hold position.



**NOTICE**

Do not use the FLOAT position when lowering the bucket. Use the FLOAT position when leveling, see "LEVELING OPERATIONS (PAGE 3-114)".



**BUCKET CONTROL LEVER**

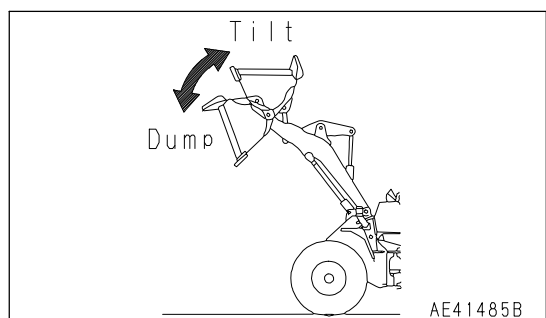
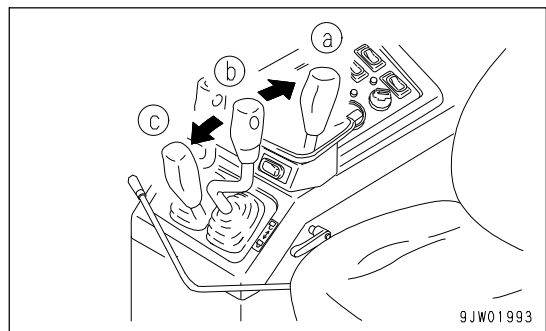
Position (a): TILT

Position (b): HOLD

The bucket is kept in the same position.

Position (c): DUMP

When the bucket control lever is pulled further from the TILT position, the lever is stopped in this position until the bucket reaches the preset position of the positioner, and the lever is returned to the HOLD position.



## WORK POSSIBLE USING WHEEL LOADER

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

### DIGGING OPERATIONS



## WARNING

Always set the machine facing directly to the front when carrying out digging or scooping operations. Never carry out these operations with the machine articulated.

### NOTICE

If the tires slip, the tire life will be reduced, so do not allow the tires to slip during operation.

### LOADING PILED SOIL OR BLASTED ROCK

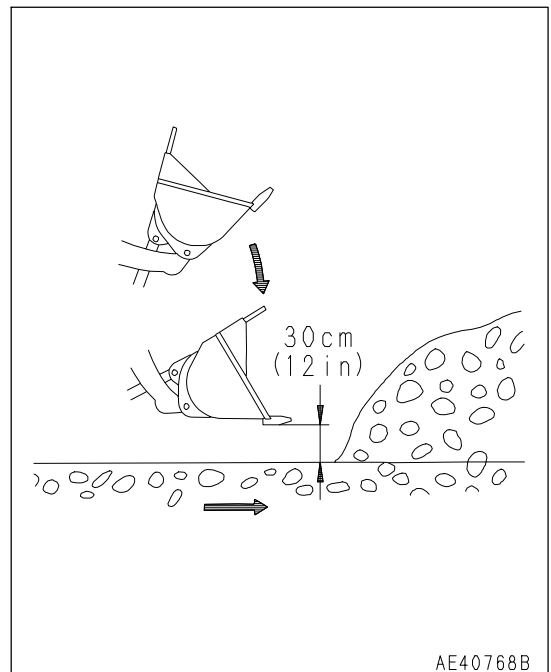
- When loading piled soil or blasted rock, drive the machine forward as follows to load. To prevent cutting of the tires caused by the tires slipping, be careful of the following points during the operation.
  - Always keep the operating jobsite flat, and remove any fallen rocks.
  - When working with stockpiles, operate the machine in 1st or 2nd gear; when loading blasted rock operate the machine in 1st gear.

1. When driving the machine forward and lowering the bucket, stop the bucket about 30 cm (12 in) from the ground, then lower it slowly.

### REMARK

If the bucket hits the ground, the front tires will come off the ground, and the tires will slip.

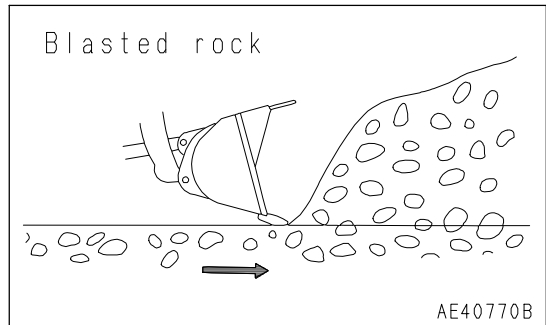
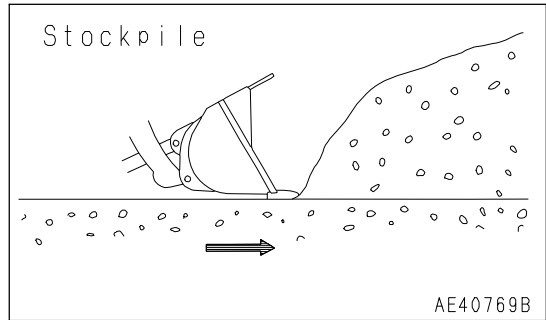
2. Shift down immediately in front of the material to be loaded. When completing the shift down, depress the accelerator pedal at the same time and thrust the bucket into the material.





- When the material is in a stockpile, keep the cutting edge of the bucket horizontal; when loading blasted rock, have the bucket tilting slightly down.

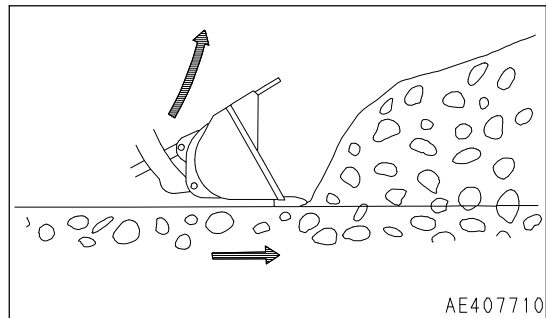
Be careful not to get blasted rock under the bucket. This will make the front tires come off the ground and slip. Try to keep the load in the center of the bucket; if the load is on one side of the bucket, the load will be unbalanced.



- At the same time as thrusting the bucket into the material, raise the lift arm to prevent the bucket from going in too far. By raising the lift arm, ample traction will be produced by the front tires.

**REMARK**

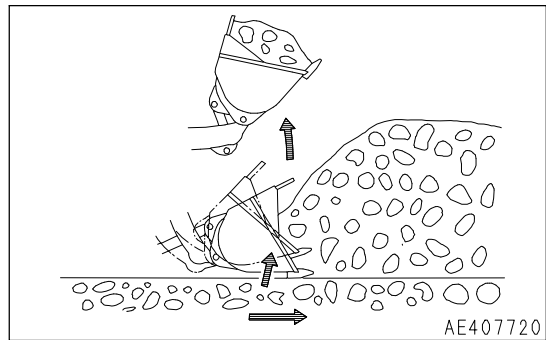
If the bucket is thrust too much and the lift arm stops rising or the machine stops moving forward, release the accelerator pedal a little. Proper operation of the accelerator pedal for each type of the soil is effective for saving of fuel and prevention of wear of the tires.



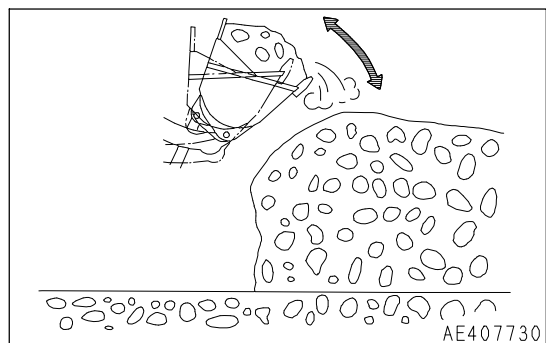
- Check that there is enough material loaded into the bucket, then operate the bucket control lever to tilt the bucket and load the bucket fully.

**REMARK**

If the bucket edge is moved up and down while pushing in the bucket and digging, the front tires will come off the ground and this will cause the tires to slip.



- If there is too much material loaded in the bucket, dump and tilt the bucket quickly to remove the excessive load. This prevents spillage of the load during hauling.

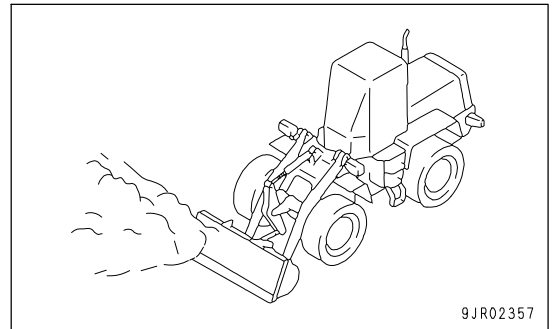


**DIGGING AND LOADING ON LEVEL GROUND**

When digging and loading on level ground, keep the cutting edge of the bucket facing slightly down and drive forward to carry out the operation. The most suitable speed range is 1st.

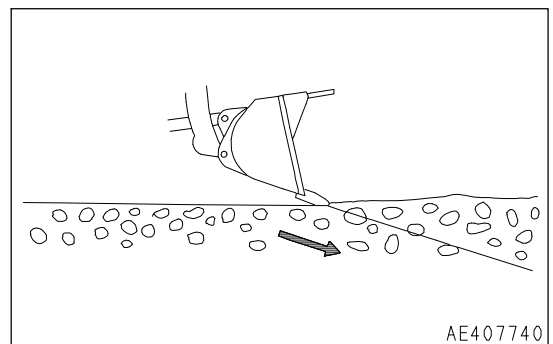
**CAUTION**

- When facing the cutting edge of the bucket down, do not face it down more than 20°.
- Be careful not to apply the load to only one side of the bucket, such as when carrying out digging at an angle. This may reduce the durability of the machine.



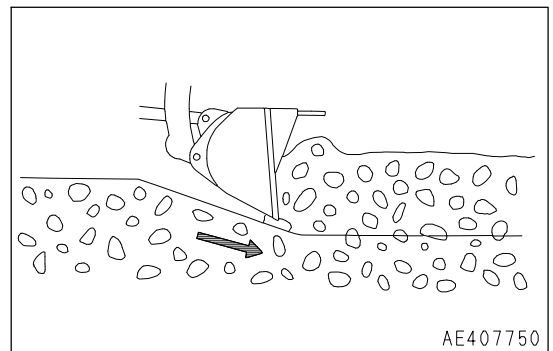
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1. Set the edge of the bucket facing slightly down.



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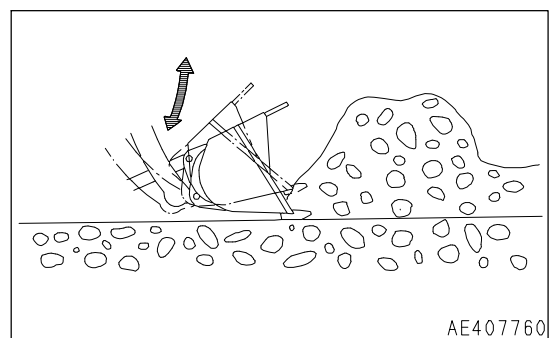
2. Drive the machine forward and operate the lift arm control lever forward to cut a thin layer of the surface each time when excavating the soil.



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3. Operate the lift arm control lever slightly up and down to reduce the resistance when driving the machine forward.

When digging with the bucket, avoid imposing the digging force on one side of the bucket.



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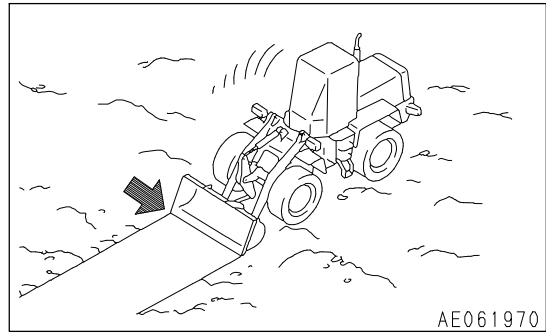
### LEVELING OPERATIONS

#### NOTICE

Always operate the machine in reverse when carrying out leveling operations.

If it is necessary to carry out leveling operations when traveling forward, do not set the bucket dumping angle to more than 20 degrees.

1. Scoop soil into the bucket. Move the machine backward while spreading soil from the bucket little by little.
2. Go over the spread soil with the bucket teeth touching the ground and level the ground by back-dragging.
3. Scoop some more soil into the bucket, put the lift arm control lever in FLOAT position, level the bucket at ground level, and smooth the ground by moving backward.



### PUSHING OPERATION

**! CAUTION**

Never set the bucket to the DUMP position when carrying out pushing operation.

When carrying out pushing operations, set the bottom of the bucket parallel to the ground surface.

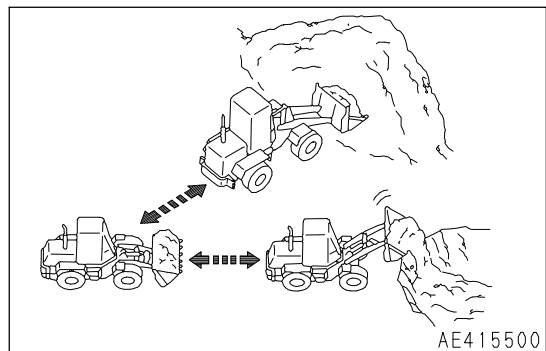
### LOAD AND CARRY OPERATIONS

**! WARNING**

When carrying a load, lower the bucket to lower the center of gravity when traveling.

The load and carry method for wheel loaders consists of a cycle of scooping -> hauling -> loading (into a hopper, truck, etc.). Always keep the travel path properly maintained.

When using the load and carry method, see "PRECAUTIONS FOR USING LOAD AND CARRY METHOD (PAGE 3-125)".



### LOADING OPERATIONS

Select the method of operation which will give the minimum amount of turning and travel in order to provide the most efficient method for the jobsite.

**! WARNING**

- Always keep the working area flat. Do not turn suddenly or apply the brake suddenly when traveling with a raised load. These actions are dangerous.
- It is also dangerous to drive the bucket at high speed into a stockpile or pile of rocks.

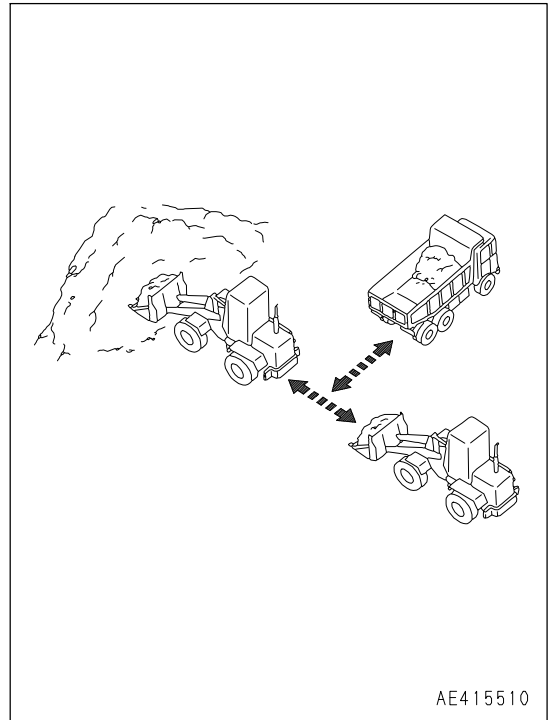
#### NOTICE

- If the tires slip, the tire life will be reduced, so do not allow the tires to slip during operation.
- Avoid excessive bucket shaking.

**CROSS DRIVE LOADING**

Always set the wheel loader facing at a right angle to the stockpile. After digging in and scooping up the load, drive the machine straight back in reverse, then bring the dump truck in between the stock pile and the wheel loader.

This method requires the least time for loading, and is extremely effective in reducing the cycle time.

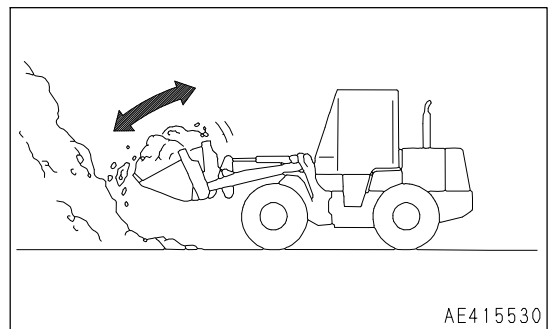
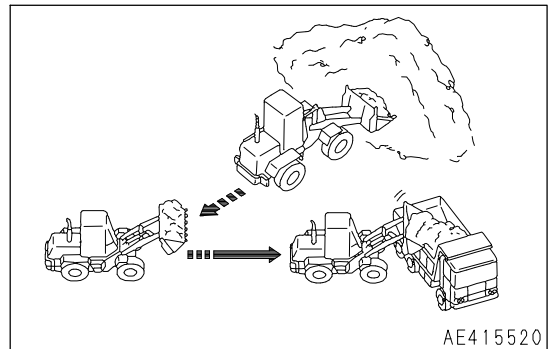


**V-SHAPE LOADING**

Position the dump truck so that the direction of approach of the wheel loader is approx. 60 degrees from the direction of approach to the stockpile. After loading the bucket, drive the wheel loader in reverse, then turn it to face the dump truck and travel forward to load the dump truck.

The smaller the turning angle of the wheel loader is, the more efficient the operation becomes.

When loading a full bucket and raising it to the maximum height, first shake the bucket to stabilize the load before raising the bucket. This will prevent the load from spilling to the rear.



**PRECAUTIONS WHEN PILING UP LOADS**

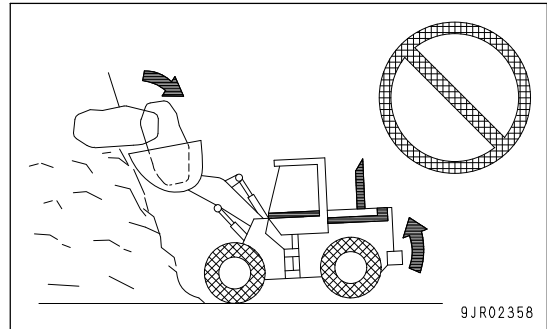
When forming products into a pile, be careful not to let the rear counterweight come into contact with the ground. Do not set the bucket to the DUMP position when piling-up loads.

**REMARK**

As far as possible, do not use the transmission cut-off function during scraping-up operation. This will prevent the machine from rolling back.

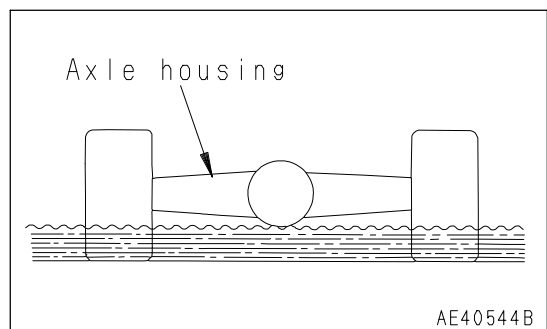
**NOTICE**

Do not dig out and drop hanging rocks. When the hanging rock falls, it may subject the machine to an unexpected load and this will damage the machine.

**PRECAUTIONS FOR OPERATION****PERMISSIBLE WATER DEPTH**

When working in water or on swampy ground, do not let the water come above the bottom of the axle housing.

After finishing the operation, wash and check the lubricating

**IF WHEEL BRAKE DOES NOT WORK**

If the machine is not stopped by depressing the brake pedal, use the parking brake to stop the machine.

**NOTICE**

If the parking brake has been used as an emergency brake, contact your Komatsu distributor to have the parking brake checked for any abnormality.

## PRECAUTIONS WHEN DRIVING UP OR DOWN SLOPES

### LOWER THE CENTER OF GRAVITY WHEN TURNING

When turning on slopes, lower the work equipment to lower the center of gravity before turning. It is dangerous to turn the machine suddenly on slopes.

### BRAKING ON DOWNHILL SLOPE

When the machine is traveling on a flat ground or down a slope, never set the directional selector switch to NEUTRAL position. Always keep it in a speed range when travelling.

- Otherwise, the engine brake is disabled and the joystick steering lever becomes heavier, potentially inducing an accident.
- The transmission and other parts of the power train may be damaged, and there is a danger that this will lead to serious injury or death.

If the foot brake is used too frequently when traveling downhill, there is danger that the brakes may overheat and be damaged. Use the shift down switch to reduce the speed range and make full use of the braking force of the engine when traveling downhill.

When applying the brake, use the right brake pedal and turn the transmission cut-off switch OFF. If the correct speed range is not used, the torque converter oil may overheat. If this happens, shift down one speed range and lower the oil temperature.

If the gauge does not enter the green range even in 1st, stop the machine, and return the directional switch to the N position. Then run the engine at a mid-range speed and wait for the gauge to return to the green range.

### IF ENGINE STOPS

If the engine stops on a slope, apply the parking brake immediately and lower the work equipment to the ground to stop the machine. Return the directional switch to the N position, then start the engine again.

**PRECAUTIONS WHEN DRIVING MACHINE**

When the machine travels at high speed for a long distance, the tires become extremely hot. This causes early wear of the tires and should be avoided as much as possible. If the machine must be driven for a long distance, take the following precautions.

- Follow the regulations related to this machine, and drive carefully.
- Before driving the machine, carry out the checks before starting.
- The most suitable tire pressure, travel speed, or tire type differ according to the condition of the travel surface. Contact your Komatsu distributor or tire dealer for information.
- When traveling with standard tires (L5) on a paved road surface, use the following table as a guide.

Ambient temperature (°C)	Tire	Tire conditions	Continuous travel distance
Max. 45	(Standard) 55.5/80-57-68PR (L5) (Standard tire inflation pressure) 0.59 MPa (6.0 kg/cm <sup>2</sup> , 85.2 PSI)	At least 24 hours after completion of work, when tire temperature has gone down	Max. 25 km
	(If equipped) 65/65-57-62PR (L5) (Standard tire inflation pressure) 0.49 MPa (5.0 kg/cm <sup>2</sup> , 71.0 PSI)		

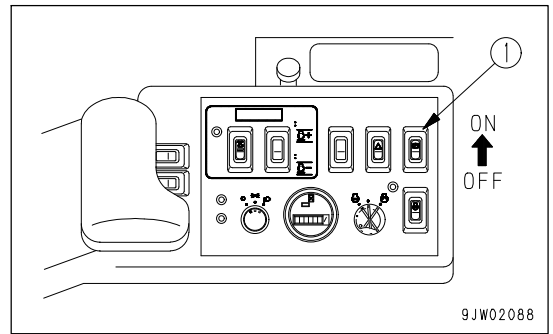
- If the ambient temperature, tire conditions, or continuous travel distance are not within the conditions in the above table, please contact your Komatsu distributor or the tire dealer.
- Check the tire pressure before starting, when the tire is cool.
- Always travel with the bucket empty.
- Never put "calcium chloride" or "dry ballast" in the tires when traveling.

## ADJUSTING WORK EQUIPMENT POSTURE



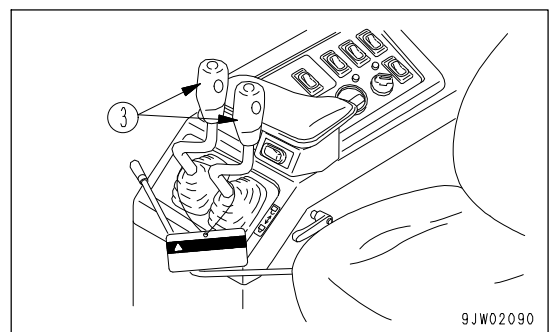
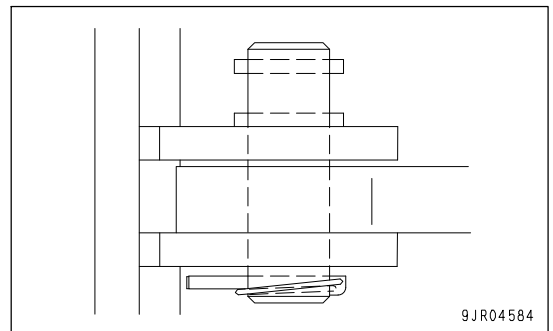
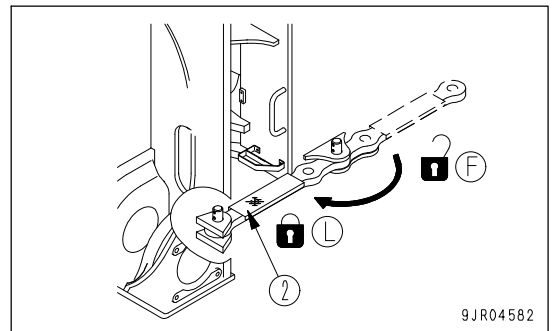
### WARNING

- Stop the machine on level ground and put blocks under the front and rear of the tires.
- Apply parking brake (1).
- Use the frame lock bar (2) to lock the front and rear frames.
- Always hang a warning sign on work equipment control levers (3).
- Do not go under the work equipment when the lift arm is raised.



This machine is equipped with a bucket positioner and remote boom positioner.

This section explains the procedure for adjusting these devices to match the operation.



## ADJUSTING BUCKET POSITIONER

Please contact Komatsu distributor to adjusting bucket positioner.

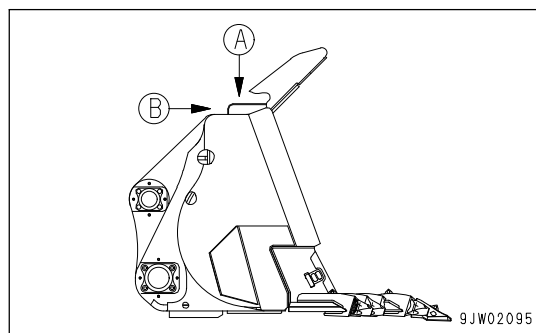


**BUCKET LEVEL INDICATOR**

(A) and (B) at the top rear of the bucket are the level indicators. They check the bucket angle during operations.

(A): Parallel with cutting edge

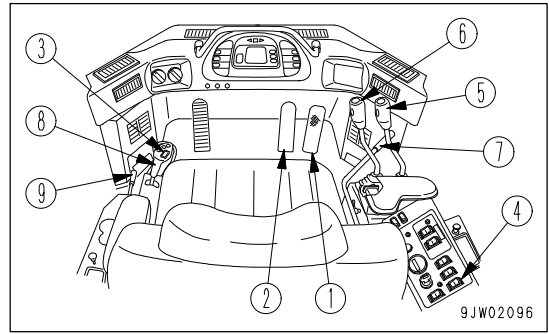
(B): 90 degrees to cutting edge



**PARKING MACHINE**

**! WARNING**

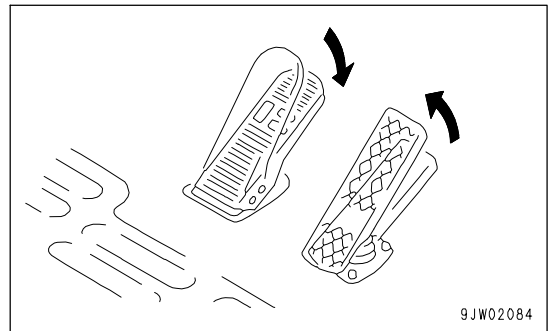
- Avoid stopping the machine suddenly. As far as possible, always leave a margin when stopping.
- Avoid parking the machine on a slope. If it is necessary to park the machine on a slope, stop the machine facing directly down the slope, fit blocks under the tires and lower the bucket to the ground to prevent the machine from moving.
- If the control levers (work equipment, steering) are touched by mistake, there is danger that the work equipment or machine may move suddenly and cause a serious accident. Before standing up from the operator's seat, always set the lock levers (work equipment, steering) securely to the LOCK position.
- When the parking brake switch is turned ON, it is dangerous to release the brake pedal immediately. Always keep the brake pedal depressed until the parking brake pilot lamp lights up.



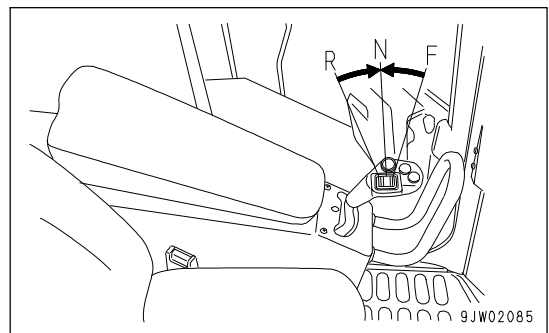
**NOTICE**

Never use the parking brake switch to brake the machine when traveling except in an emergency. Apply the parking brake only after the machine has stopped.

1. Release accelerator pedal (1), then depress brake pedal (2) to stop the machine.



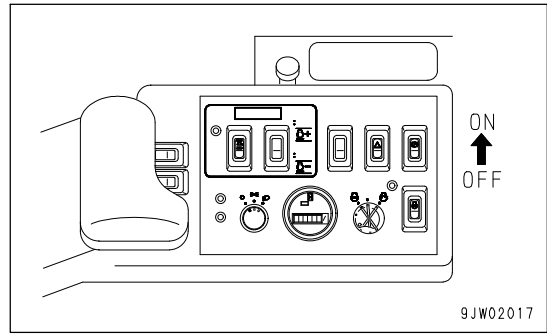
2. Set directional switch (3) to the N position.



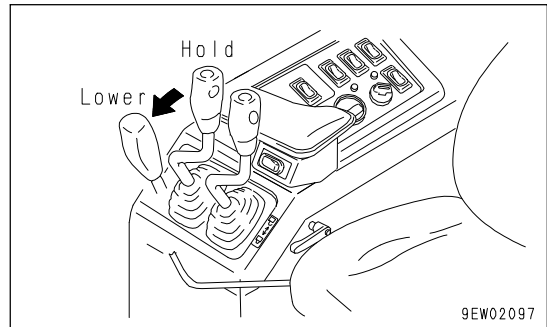
- Set parking brake switch (4) to the ON position to apply the parking brake.

**NOTICE**

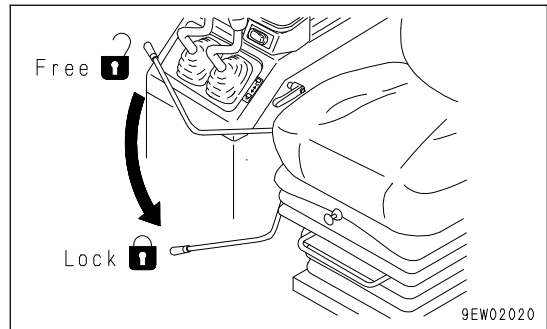
When the parking brake is applied, the transmission is automatically returned to neutral.



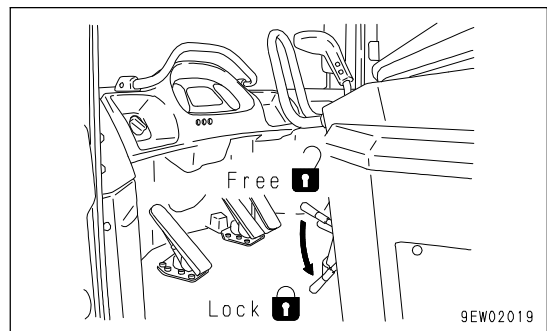
- Operate lift arm control lever (5) to lower the bucket to the ground.



- Lock lift arm control lever (5) and bucket control lever (6) with work equipment lock lever (7).



- Set joystick steering lever (8) to the N position, then set joystick steering lock lever (9) to the LOCK position.



## CHECKS AFTER COMPLETION OF OPERATION

Use the multi monitor to check the engine water temperature, engine oil pressure, torque converter oil temperature, and remaining fuel level.

If the engine has overheated, do not stop it immediately. Run it at a mid-range speed and gradually allow the engine to cool down before stopping it.

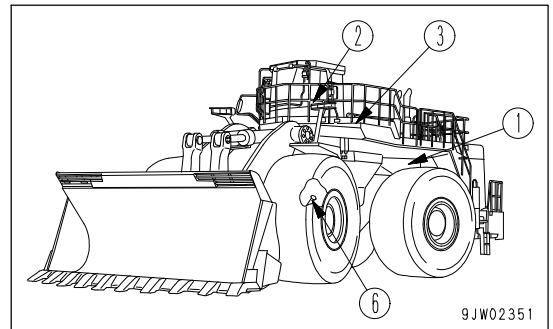
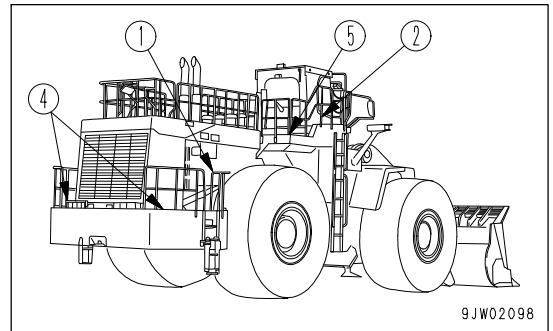
## LOCKING

Always lock the following parts.

- (1) Engine side panel (left, right)
- (2) Cab door (left, right)
- (3) Brake tank (1 point)
- (4) Fuel tank filler cap (2 points)
- (5) Hydraulic tank filler cap
- (6) Transmission case filler cap

## REMARK

The starting switch key is used for locking places 1, 2, 3, 4, 5, and 6.



## HANDLING THE TIRES

### PRECAUTIONS WHEN HANDLING TIRES



If a tire has reached any of the following service limits, there is danger that the tire may burst or cause an accident, so to ensure safety, replace it with a new tire.

- Service limits for wear

When the remaining depth of the grooves on construction equipment tires (at a point approx. 1/4 of the tread width) is 15% of the groove depth on a new tire.

When the tire shows marked uneven wear, stepped wear or other abnormal wear, or when the cord layer is exposed.

- Service limits for damage

When there is external damage extending to the cord or when the cord is broken

When the cord is cut or there is dragging

When the tire is peeling (there is separation)

When the bead is damaged

For tubeless tires, when there is air leakage or improper repair

Please contact your Komatsu distributor when replacing the tires. It is dangerous to jack up the machine without taking due care.

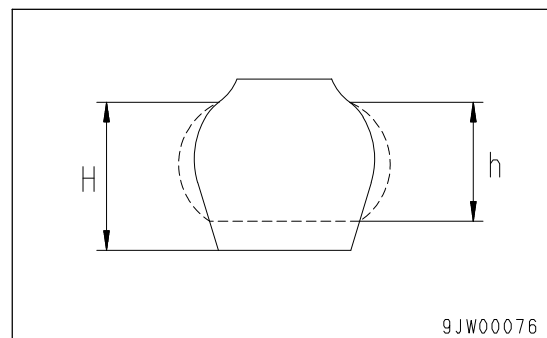
### TIRE PRESSURE

Measure the tire pressure before starting operations, when the tires are cool.

If the tire inflation pressure is too low, there will be overload; if it is too high, it will cause tire cuts and shock burst.

To prevent these problems, adjust the tire inflation pressure according to the table on the next page.

Deflection ratio =  $H - h / H \times 100$



As a guideline that can be checked visibly, the deflection ratio of the front tire (deflection/free height) is as follows.

When carrying normal load (lift arm horizontal): Approx. 10 to 15 %

When digging (rear wheels off ground): Approx. 20 to 25 %

When checking the tire inflation pressure, check also for small scratches or peeling of the tire, for nails or pieces of metal which may cause punctures, and for any abnormal wear.

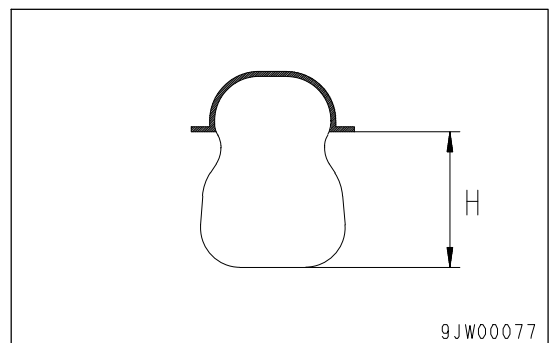
Clearing fallen stones and rocks from the operating area and maintaining the surface will extend the tire life and give improved economy.

- For operations on normal road surfaces, rock digging operations: High end of range in air pressure chart
- Stockpile operations on soft ground: Average pressure in air pressure chart

If the deflection of the tire is excessive, raise the inflation pressure within the limits given in the table to give a suitable deflection (see deflection ratio).

Tire size (pattern)	H Free height (mm)	Inflation pressure (MPa{kg/cm <sup>2</sup> , PSI})					
		Normal road				When shipped from factory	
		Stockpile		Digging			
55.5/80-57-68PR (L5 Rock) (Standard)	929	0.54 to 0.59 {5.5 to 6.0, 78.1 to 85.2}		0.54 to 0.59 {5.5 to 6.0, 78.1 to 85.2}		Both front and rear 0.59 {6.0, 85.2}	
65/65-57-62PR (L5 Rock) (If equipped)	992	0.44 to 0.49 {4.5 to 5.0, 63.9 to 71.0}		0.44 to 0.49 {4.5 to 5.0, 63.9 to 71.0}		Both front and rear 0.49 {5.0, 71.0}	
60/80R57★ (L5 Rock) (If equipped)	1,124	Front wheel	0.59 to 0.70 {6.0 to 7.1, 85.2 to 101}	Front wheel	0.59 to 0.70 {6.0 to 7.1, 85.2 to 101}	Front wheel	0.63 {6.4, 90.9}
		Rear wheel	0.47 to 0.56 {4.8 to 5.7, 68.2 to 80.9}	Rear wheel	0.47 to 0.56 {4.8 to 5.7, 68.2 to 80.9}	Rear wheel	0.50 {5.1, 72.4}

Stockpile operations mean the loading of sand and other loose materials.



**PRECAUTIONS FOR USING LOAD AND CARRY METHOD**

When traveling continuously with load and carry operations, choose the correct tires to match the operating conditions, or choose the operating conditions to match the tires. If this is not done, the tires will be damaged, so contact your Komatsu distributor or tire dealer when selecting tires.

## OPERATION OF MULTI MONITOR

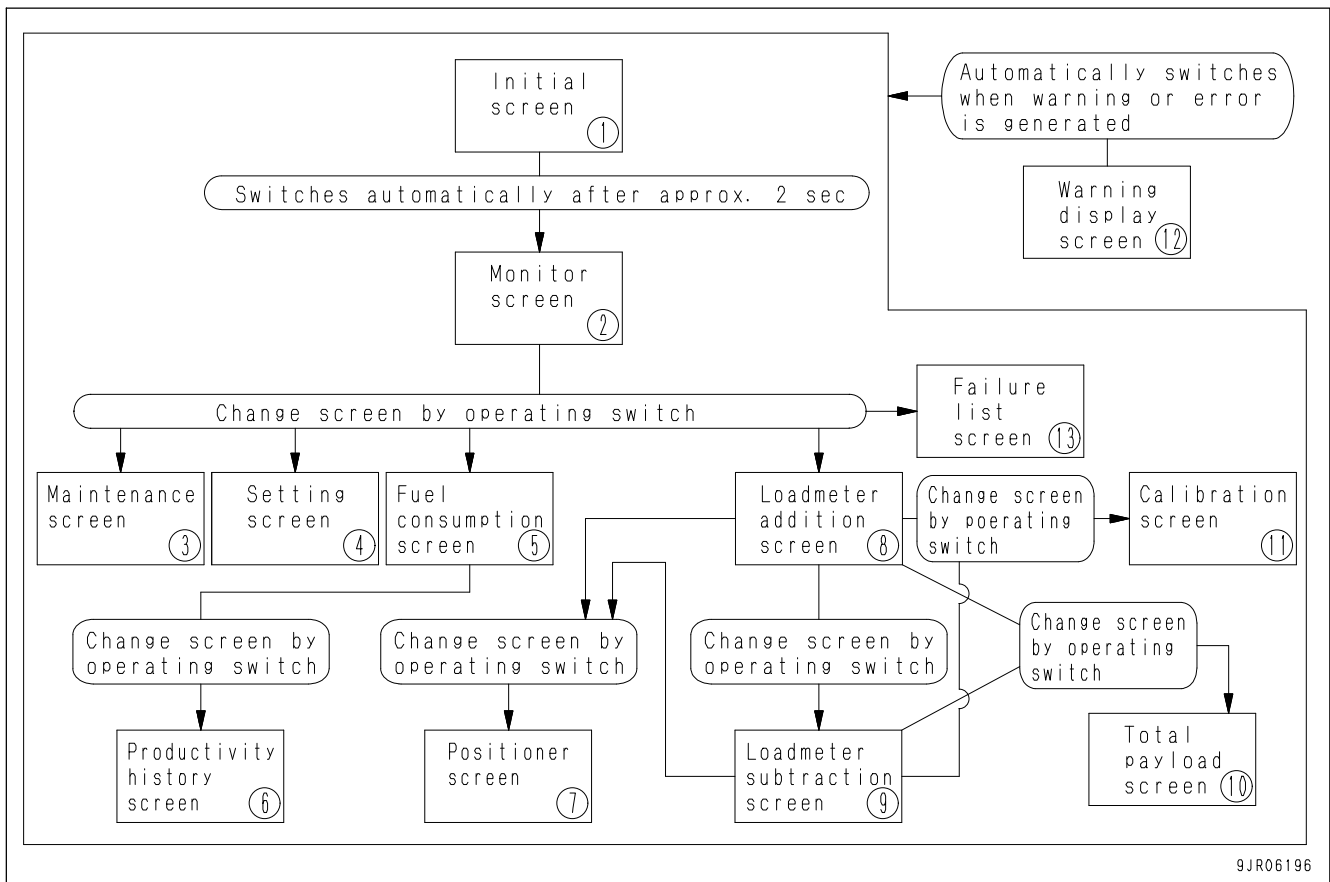
### MULTI MONITOR

This machine is equipped with a monitor display (multi monitor).

This display shows the engine water temperature gauge, torque converter oil temperature gauge, fuel gauge, tachometer, and selector switch to switch to various screens. By using the selector switch, it is possible to switch to screens such as the maintenance screen, fuel consumption screen, and load meter screen.

In addition, it also displays a warning/failure display screen for items related to the function of the machine, so it acts as a display type management monitor.

### CHANGES OF SCREEN AND CONTENT OF DISPLAY ON MULTI MONITOR



9JR06196

(1) Initial screen:

This is displayed for approx. 2 seconds before the monitor starts functioning.

(2) Monitor screen:

This displays the engine water temperature gauge, torque converter oil temperature gauge, fuel gauge, tachometer, clock, and selector switch to switch to various screens.

For details, see MONITOR SCREEN (PAGE 3-128).

(3) Maintenance screen:

This displays the maintenance items and the time remaining for items requiring maintenance.

For details, see MAINTENANCE SCREEN (PAGE 3-129).

(4) Setting screen:

This displays the current time, the unit for data displayed on the monitor, and the user ID. It is also possible to select the language for the display.

For details, see SETTING SCREEN (PAGE 3-131).

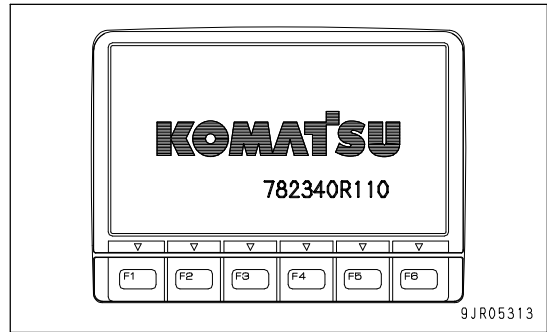
- (5) Fuel consumption screen:  
This displays the productivity (ton/hour), fuel consumption ratio (liter/hour), and the data measurement period.  
For details, see FUEL CONSUMPTION SCREEN (PAGE 3-134).
- (6) Productivity history screen:  
Use the HISTORY switch on the fuel consumption screen to switch to the productivity history screen. This screen displays the productivity (ton/hour) and fuel consumption ratio (liter/hour) for each kind of material.  
For details, see PRODUCTIVITY DISPLAY (PAGE 3-134).
- (7) Positioner screen:  
If the positioner is set to the UPPER and LOWER positions for the lift arm, the lift arm reduces speed and stops at the set position. This is the screen used to set the UPPER and LOWER positions.  
For details, see POSITIONER SCREEN (PAGE 3-136).
- (8) Load meter addition mode screen:  
This is the addition mode for the load meter. The kind of material, load amount display, and total load are displayed.  
For details, see LOADMETER ADDITION MODE (PAGE 3-138).
- (9) Load meter subtraction mode screen:  
When the [Subtraction mode screen display] switch on the load meter addition mode screen is pressed, the screen switches to the subtraction mode screen. On this screen, each measured load is subtracted from the set target data and the remaining load is displayed.  
This is the subtraction mode for the load meter. The kind of material, load amount display, and total load are displayed.  
For details, see LOADMETER SUBTRACTION MODE (PAGE 3-140).
- (10) Total production screen:  
When the [Total production display] on the load meter addition mode screen or subtraction mode screen is pressed, the screen switches to the total production screen. This screen shows the number of loads and load for each kind of material and the date when the final data were cleared.  
For details, see ADDITION MODE TOTAL PRODUCTION DISPLAY (PAGE 3-139).
- (11) Calibration screen:  
When the CAL switch on the load meter addition and subtraction setting screen is pressed, the screen switches to the calibration screen. This screen displays the method for carrying out calibration. By operating the machine according to the display on the screen, calibration is automatically carried out.  
For details, see CALIBRATION DISPLAY (PAGE 3-139).
- (12) Warnings/failure display screen:  
If any abnormality occurs that might lead to damage to the machine, the title and message are displayed as a warning display on the screen. There are 19 items with warning displays. If an abnormality occurs, the screen being used is shown in turn with the abnormality display. In addition, if any failure occurs, the location of the failure is displayed in the same way with the warning display.  
For details, see WARNING/FAILURE DISPLAY SCREEN (PAGE 3-143).
- (13) Failure list of screen:  
The failures that are occurring and the content of the warning are displayed as a list on the screen.  
For details, see of FAILURE LIST SCREEN (PAGE 3-143).



## OPERATION OF SCREENS

### INITIAL SCREEN

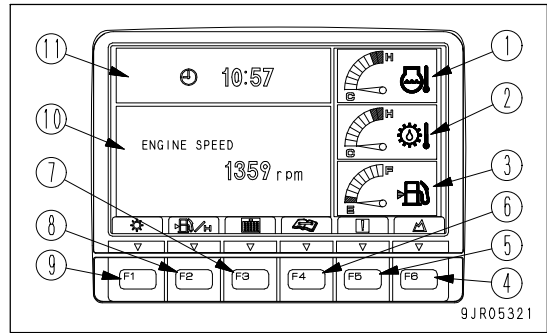
This screen appears when the engine starting switch is turned to the ON position. After approx. 2 seconds, it automatically switches to the next monitor screen. During these 2 seconds, the multi monitor itself checks that all items are functioning normally. If everything is normal, the screen switches to the monitor screen.



### MONITOR SCREEN

This screen displays engine water temperature gauge (1), torque converter oil temperature gauge (2), fuel gauge (3), tachometer (10), and clock (11).

In addition to this, switches are displayed that can be used to display the load meter screen (4), failure list screen (5), maintenance screen (6), setting screen (7), fuel consumption screen (8), and brightness adjustment screen (9).

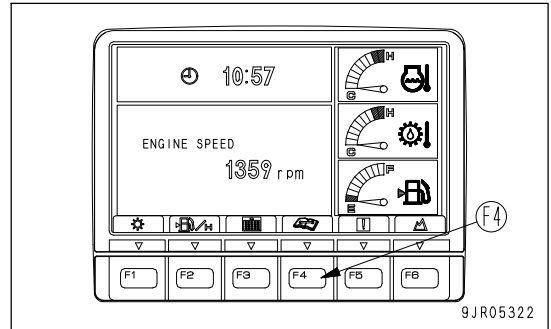


**MAINTENANCE SCREEN**

The maintenance screen is used to check the maintenance items, the time remaining until maintenance (in relation to the maintenance interval set for each item), and the operation when the maintenance time for the maintenance item has been reached.

**CHECKING MAINTENANCE ITEMS AND TIME REMAINING UNTIL MAINTENANCE**

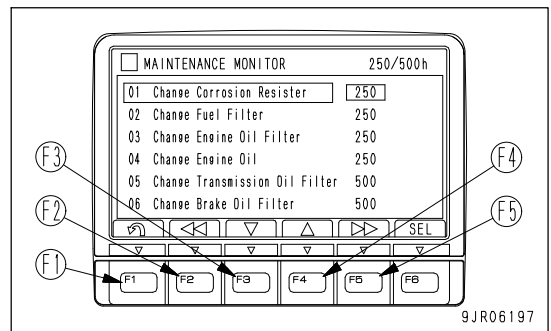
1. Press [Maintenance] switch (F4) at the bottom center of the monitor screen.



2. The screen changes to the MAINTENANCE MONITOR screen. On this screen, the time remaining until maintenance for each maintenance item is displayed.

In addition, the maintenance items can be marked by pressing switches (F2) or (F5), and then selected by switches (F3) or (F4).

- Switch (F2): This moves to the display for the item with a smaller maintenance set interval (previous page)
- Switch (F5): This moves to the display for the item with a larger maintenance set interval (next page)
- Switch (F3): This selects the item below the displayed maintenance item
- Switch (F4): This selects the item above the displayed maintenance item



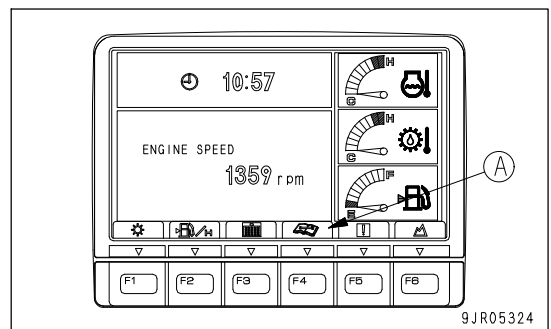
3. Press [Return] switch (F1) at the bottom left of the MAINTENANCE MONITOR screen. This returns to the original monitor screen.

**OPERATION WHEN MAINTENANCE TIME FOR MAINTENANCE ITEM HAS BEEN REACHED**

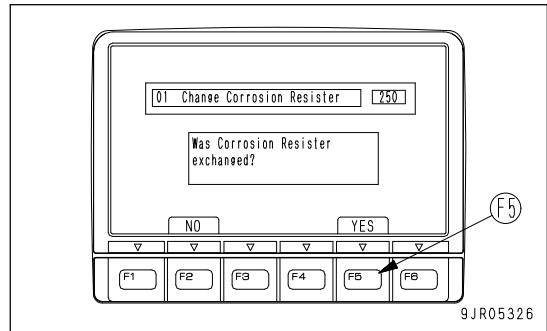
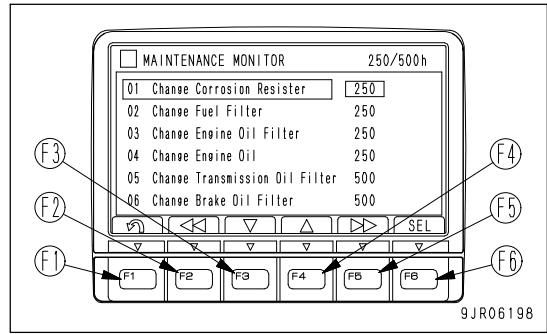
**⚠ CAUTION**

If the [Maintenance] switch on the monitor screen changes to yellow or red, stop operations immediately, check the maintenance item, and carry out maintenance.

1. When there are 30 hours remaining to maintenance, mark (A) at the top of the [Maintenance] switch on the monitor screen changes to yellow; when the hours remaining reaches 0, the switch changes to red.



2. Press the [Maintenance] switch. The screen changes to the MAINTENANCE MONITOR screen. Press switch (F2) or (F5) to search and check for the items which have reached the maintenance time.
3. The time remaining until maintenance for the items that have reached the maintenance time lights up. Stop operations and carry out maintenance.
4. After completing the maintenance, use switches (F3) or (F4) to select the maintenance items that are lighted up, then confirm the selection with [SEL] switch (F6).
5. The reset screen is displayed. If maintenance is completed, press [YES] switch (F5). The screen will return to the original MAINTENANCE MONITOR screen and the time will change to the set maintenance time (in the case of the diagram on the right: 250h).
6. Press [Return] switch (F1) at the bottom left of the MAINTENANCE MONITOR screen. This returns to the original monitor screen.



**LIST OF MAINTENANCE ITEMS**

The set maintenance items and replacement intervals for this machine are as follows.

No.	Interval	Item
1	250H	Change Corrosion Resistor
2	250H	Change Fuel Filter
3	250H	Change Engine Oil Filter
4	250H	Change Engine Oil
5	500H	Change Transmission Oil Filter
6	500H	Change Brake Oil Filter
7	1000H	Change Transmission Oil
8	1000H	Clean Transmission Breather
9	1000H	Clean Transmission Strainer
10	1000H	Change By-pass Engine Oil Filter
11	2000H	Change Brake Oil
12	2000H	Change Brake Oil Tank Breather
13	2000H	Change Hyd. Tank Breather Element
14	2000H	Clean Hyd. Tank Strainer
15	2000H	Change Brake Line Strainer
16	2000H	Clean Pilot Line Strainer
17	2000H	Change Axle Oil
18	2000H	Change Linkage Pin Lube Oil
19	2000H	Change Hyd. Oil Filter
20	2000H	Change Hyd. Oil

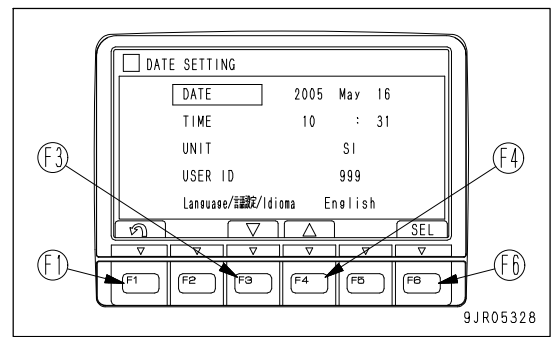
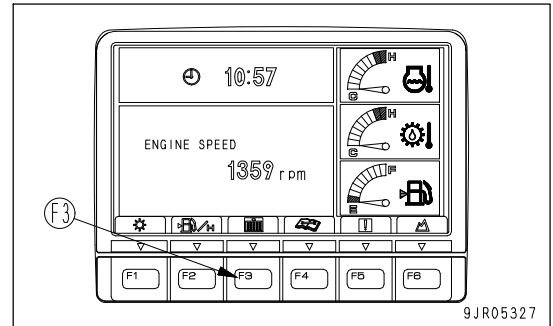
## SETTING SCREEN

This screen is used to input the date and time, set the units to be used, register the user ID number, and to select the language.

### SWITCHING TO SETTING SCREEN

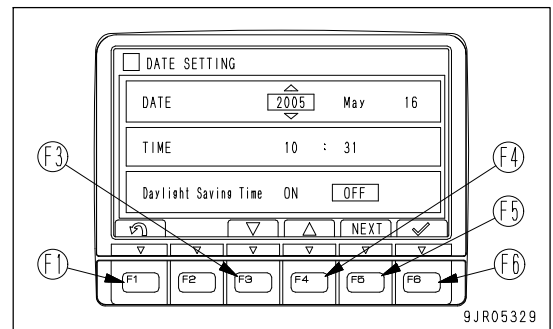
Press the [Setting screen] switch (F3) at the bottom center of the monitor screen. The screen changes to the SETTING screen.

This screen displays items including inputting and setting the date, inputting and setting the time, setting the units to use, registering the user ID number, and selecting the language.



### INPUTTING, SETTING DATE

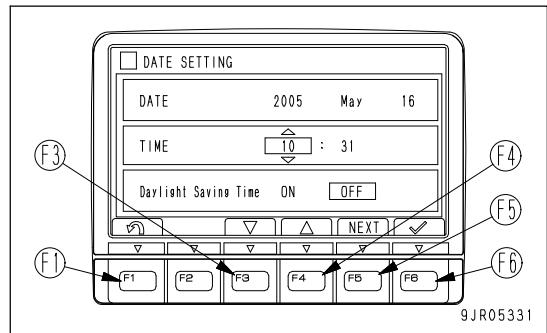
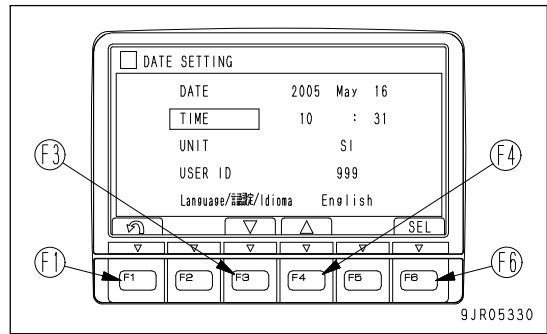
1. Use switch (F3) or (F4) to select the DATE button displayed on the screen, then confirm the selection with [SEL] switch (F6). The DATE SETTING screen is displayed.
2. Check that the yellow cursor is on the year, then use switch (F3) or (F4) to change to the current year.
3. After setting the year, press [NEXT] switch (F5) and move the yellow cursor to the month. Use switch (F3) or (F4) to change to the current month.



4. After setting the month, press [NEXT] switch (F5) and move the yellow cursor to the date. Use switch (F3) or (F4) to change to the current date.  
After setting the date, press [NEXT] switch (F5) and set the hour and minute. After that, if any language except Japanese is selected (English, Spanish), it is possible to set Daylight Saving Time (Summer Time).
5. Press [✓] switch (F6). The setting is saved and the screen returns to the setting screen.

**INPUTTING, SETTING HOUR, MINUTE**

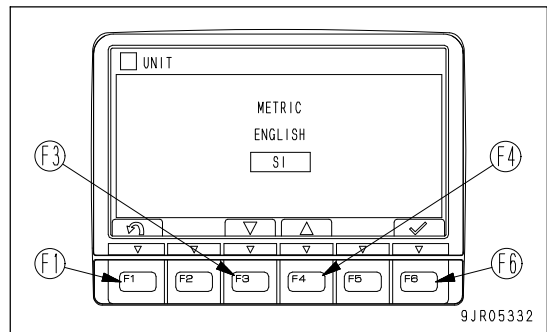
1. Use switch (F3) or (F4) to select the TIME button displayed on the screen, then confirm the selection with [SEL] switch (F6). The DATE SETTING screen is displayed.
2. Check that the yellow cursor is on the hour, then use switch (F3) or (F4) to change to the current hour.
3. After setting the hour, press [NEXT] switch (F5) and move the yellow cursor to the minute. Use switch (F3) or (F4) to change to the current minute.
4. After setting the minute, press [NEXT] switch (F5) and set Daylight Saving Time (Summer Time). Use switch (F3) or (F4) to move the green cursor to ON or OFF to select. If the selected language is Japanese, it is not possible to set Daylight Saving Time (Summer Time).
5. Press [✓] switch (F6). The setting is saved and the screen returns to the setting screen.



**SETTING UNIT**

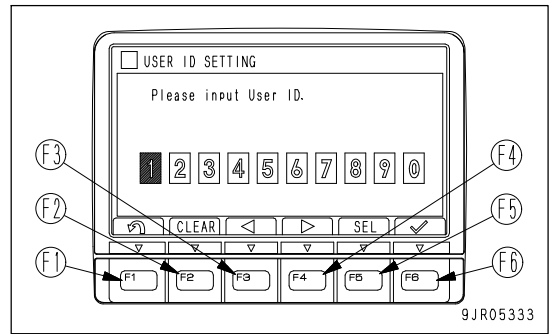
If the multi monitor is set to English or Spanish, it is possible to set the units. The following explanation uses the English setting as an example and introduces the method of setting the units.

1. Use switch (F3) or (F4) to select the UNIT button displayed on the screen, then confirm the selection with [SEL] switch (F6). The UNIT SETTING screen is displayed.
2. Use switch (F3) or (F4) to change to the desired unit (metric, English, SI).
3. Press [✓] switch (F6). The setting is saved and the screen returns to the setting screen.



**INPUTTING, SETTING USER ID NUMBER**

1. Use switch (F3) or (F4) to select the USER ID button displayed on the screen, then confirm the selection with [SEL] switch (F6). The USER ID screen is displayed.
2. It is possible to input a User ID as desired up to a maximum of 10 digits. Use switch (F3) or (F4) to select the number, then input the number with [SEL] switch (F5). The input numbers can be deleted one digit at a time with the [CLEAR] switch. Repeat the inputting process to complete the input.
3. Press [✓] switch (F6). The setting is saved and the screen returns to the setting screen.

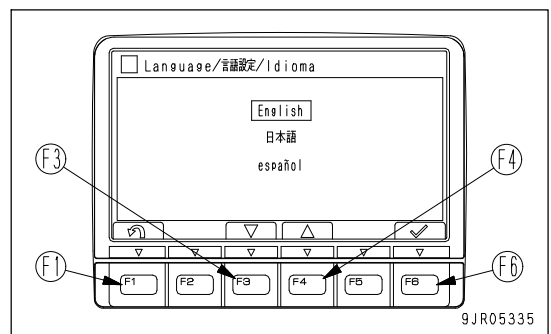
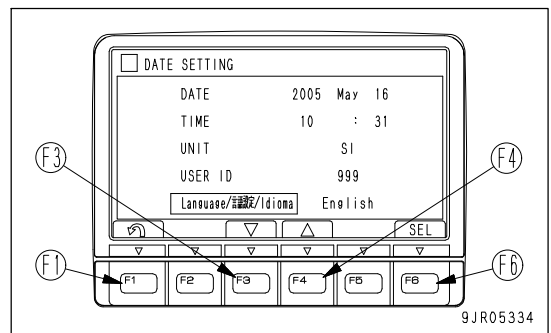


**REMARK**

Even on the warning/failure display screen, if the display is cancelled with the [CANCEL] switch, if the user ID is changed, the presently existing failures are displayed again. This function makes it possible to check the condition of the machine even when the operator changes shifts.

**SELECTING LANGUAGE FOR MULTI MONITOR**

1. Use switch (F3) or (F4) to select the Language button displayed on the screen, then confirm the selection with the [SEL] switch. The Language screen is displayed.
2. The present language for the multi monitor is marked by the yellow cursor. Use switch (F3) or (F4) to select the desired language.
3. Press [✓] switch (F6). The selected language is saved and the screen returns to the setting screen.



### FUEL CONSUMPTION SCREEN



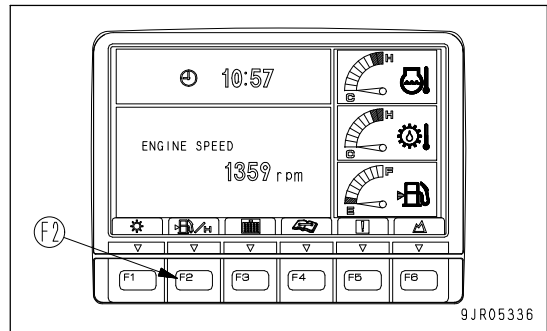
To display this fuel consumption screen, it is necessary first to set to the load meter total payload mode. The data saved in the load meter are displayed on the fuel consumption screen.

With this screen, it is possible to check the productivity (ton/hour), fuel consumption ratio (liter/hour), kind of material, and the data measurement period.

In addition, it is possible to check the productivity history by pressing the HISTORY switch displayed on the screen.

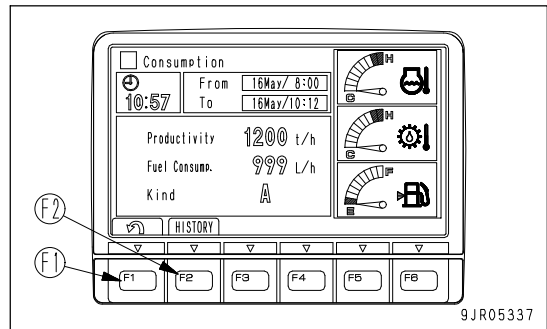
### PRODUCTIVITY DISPLAY

1. Press the Fuel consumption screen selector switch (F2) at the bottom left of the monitor screen.



2. The screen changes to the Consumption screen. This screen displays the present time, productivity (ton/hour), fuel consumption ratio (liter/hour), kind of material, and the data measurement period. (The display becomes the first value for the productivity history.)

3. Press the [Return] switch (F1) at the bottom left of the Consumption screen. The screen returns to the original monitor screen.



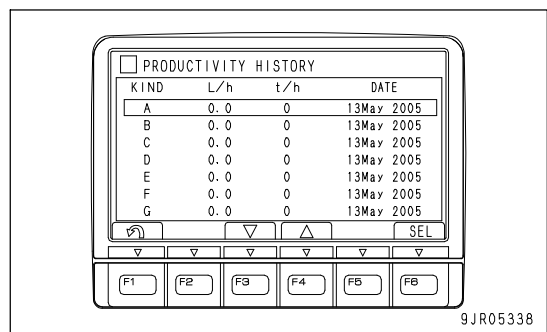
### PRODUCTIVITY HISTORY DISPLAY

1. The Consumption screen displays the productivity for only one kind of material. If it is desired to check the productivity history of the other kinds of material, press the HISTORY screen switch (F2) at the bottom of the screen.

2. The screen changes to the PRODUCTIVITY HISTORY screen.

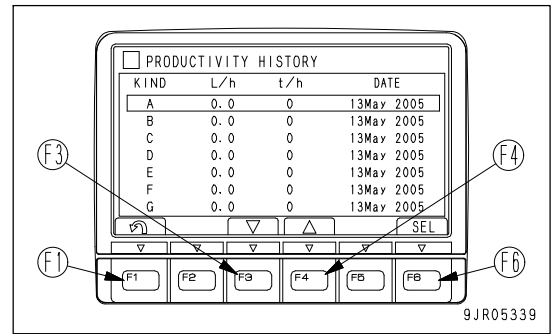
This screen displays the productivity for each kind of material, fuel consumption ratio and the final date of the period.

After checking, press the [Return] switch (F1) at the bottom left of the screen. The screen returns to the Consumption screen.



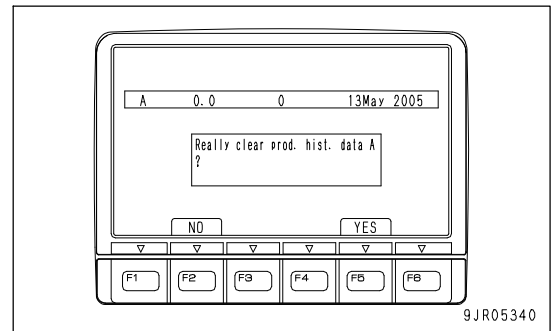
**DELETING PRODUCTIVITY HISTORY**

1. If you want to delete the KIND data displayed on the PRODUCTIVITY HISTORY screen, use switch (F3) or (F4) to select the KIND data, then confirm the selection with [SEL] switch (F6).



2. The CLEAR PRODUCTION HISTORY DATA screen is displayed.

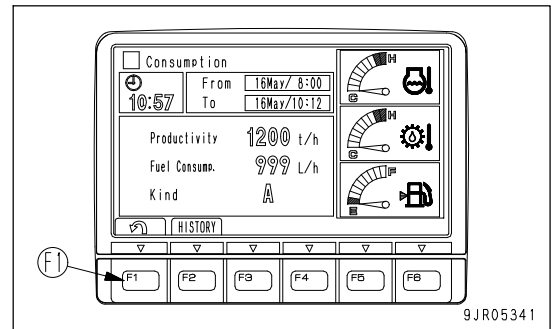
Confirm the data to be deleted, then press the [YES] switch. The screen will return to the original PRODUCTIVITY HISTORY screen, the cleared data is displayed as 0, and the date changes to the cleared date.



**REMARK**

Once data have been cleared, they cannot be restored. When clearing data, check carefully that the correct data has been selected, then delete the data.

3. After checking that the data have been cleared, press the [Return] switch (F1) at the bottom left of the screen. The screen returns to the Consumption screen.
4. Press [Return] switch (F1) at the bottom left of the Consumption screen. The screen returns to the original monitor screen.



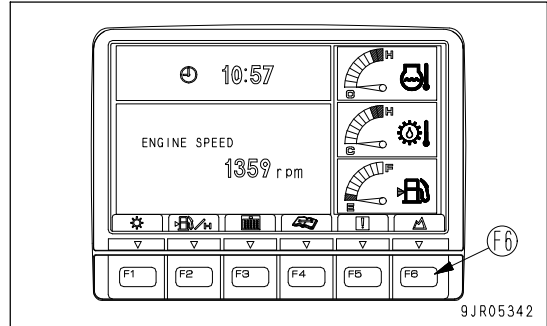


**POSITIONER SCREEN**

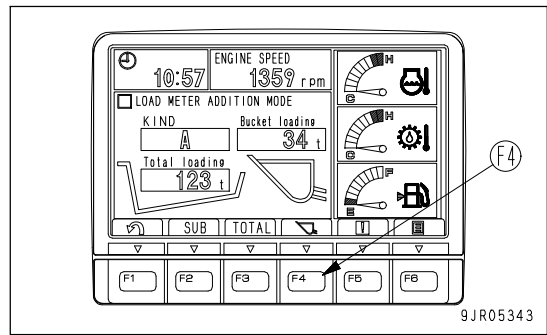
With the positioner system, if the stop positions for UPPER and LOWER of the lift arm are set, the system automatically reduces the lift arm speed and stops it when it is close to the set position.

**POSITIONER SCREEN DISPLAY**

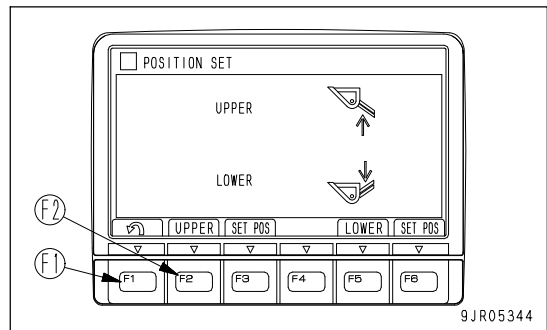
1. Press the load meter screen selector switch (F6) at the bottom right of the monitor screen. The LOAD METER screen is displayed.



2. Press the positioner selector switch (F4) on the LOAD METER screen.

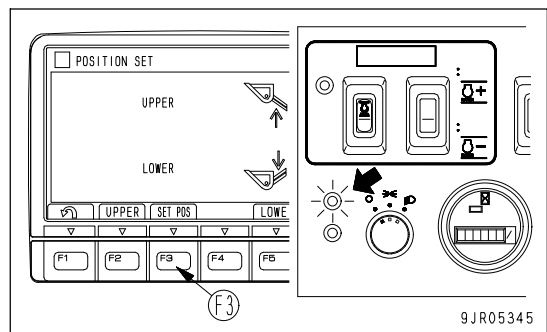


3. The screen switches to the POSITION SET screen. This screen displays the UPPER and LOWER stop position set switches for the lift arm.



**SETTING LIFT ARM UPPER STOP POSITION**

1. Press the [UPPER] switch (F2) on the POSITION SET screen. The UPPER display changes to green. When this happens, the position UPPER display indicator lamp installed to the console on the right of the operator's seat lights up.
2. Operate the lift arm control lever to raise the lift arm. Decide the position for the lift arm to stop, return the control lever to HOLD, and stop the upward movement of the lift arm. (Set the UPPER position above the horizontal position for the lift arm.)

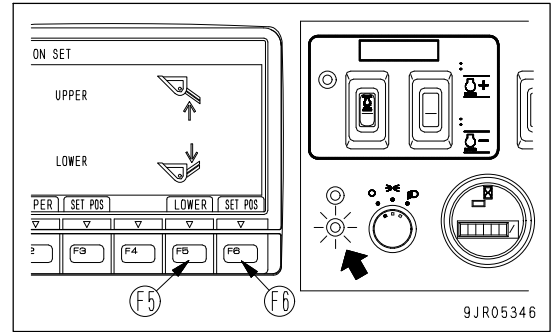


3. In this condition, press the UPPER stop position set switch (F3) on the POSITION SET screen. The position UPPER display indicator lamp flashes. (Approx. 2.5 sec.)

4. After the lamp flashes, a reception sound (beep, beep) is emitted, and when the indicator lamp lights up, the setting of the UPPER stop position is completed.  
Always check that the indicator lamp lights up.
5. This setting is retained even when the engine starting switch is turned to the OFF position, as long as [UPPER] switch (F2) on the POSITION SET screen is not turned OFF.
6. After setting, press [Return] switch (F1) at the bottom left of the POSITION SET screen. The screen returns to the original load meter screen.

**SETTING LIFT ARM LOWER STOP POSITION**

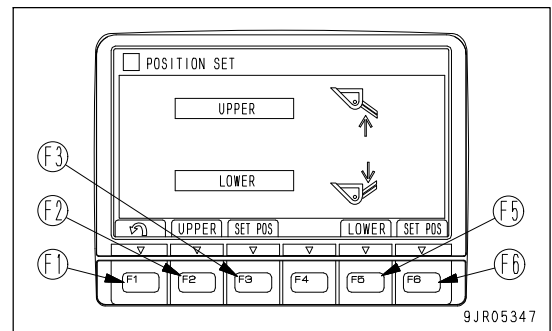
1. Press [LOWER] switch (F5) on the POSITION SET screen.  
The LOWER display changes to green. When this happens, the position LOWER display indicator lamp installed to the console on the right of the operator's seat lights up.
2. Operate the lift arm control lever to lower the lift arm.  
Decide the position for the lift arm to stop, return the control lever to HOLD, and stop the downward movement of the lift arm. (Set the LOWER position below the horizontal position for the lift arm.)



3. In this condition, press LOWER stop position set switch (F6) on the SET POS screen. The position LOWER display indicator lamp flashes. (Approx. 2.5 sec.)
4. After the lamp flashes, a reception sound (beep, beep) is emitted, and when the indicator lamp lights up, the setting of the LOWER stop position is completed.  
Always check that the indicator lamp lights up.
5. This setting is retained even when the engine starting switch is turned to the OFF position, as long as [LOWER] switch (F5) on the POSITION SET screen is not turned OFF (indicator lamp goes out).
6. After setting, press [Return] switch (F1) at the bottom left of the POSITION SET screen. The screen returns to the original load meter screen.

**SETTING LIFT ARM UPPER AND LOWER STOP POSITIONS**

1. Press [UPPER] and [LOWER] switches (F2) , (F5) on the POSITION SET screen, and check that the UPPER and LOWER displays change to green.
2. For the other operations, use the same procedure as in Steps 2 - 5 for setting the lift arm UPPER and LOWER stop positions.
3. After setting, press [Return] switch (F1) at the bottom left of the POSITION SET screen. The screen returns to the original load meter screen.



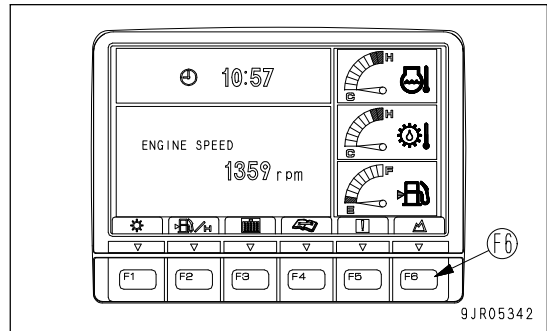
### LOADMETER SCREEN

The load meter has two screens: the addition mode screen and the subtraction mode screen. Select the appropriate screen and according to the purpose.

### LOADMETER ADDITION MODE

#### LOADMETER ADDITION MODE SCREEN DISPLAY

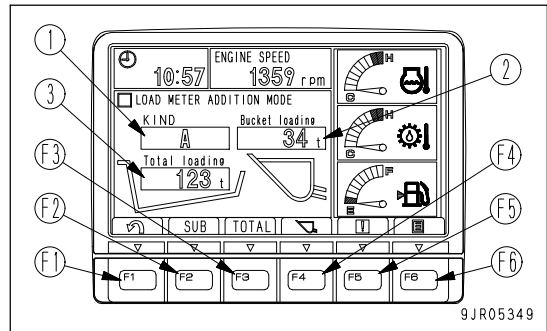
1. Press [Load meter screen] selector switch (F6) at the bottom right of the monitor screen.



2. The screen switches to the LOAD METER ADDITION MODE screen.

This screen consists of kind of load display (1), load display (2), total load display (3), return switch (F1), subtraction mode selector switch (F2), total load display switch (F3), positioner screen selector switch (F4), failure list screen selector switch (F5), and [load meter addition mode setting screen] selector switch (F6).

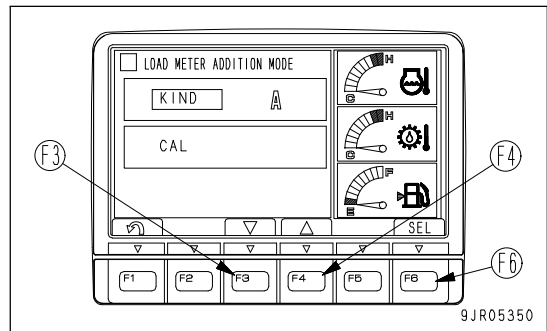
The screen display shows the load for each bucket, the total payload, and the kind of load.



3. When changing the kind of load on the screen, press [Load meter addition mode setting screen] selector switch (F6).

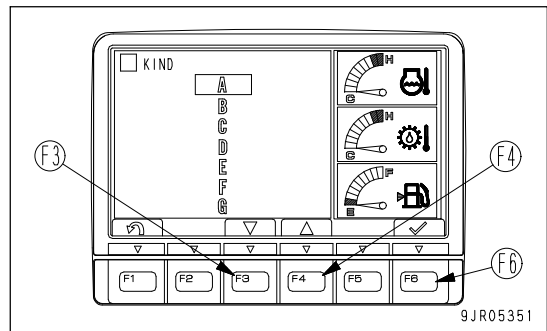
4. The screen switches to the LOAD METER ADDITION MODE SETTING screen.

Use switches (F3) or (F4) to select the KIND displayed on the screen, then confirm the selection with [SEL] switch (F6).



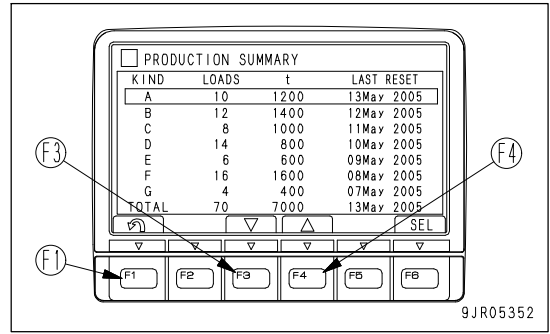
5. The screen switches to the KIND OF LOAD SELECTION screen.

Use switches (F3) or (F4) to select the KIND displayed on the screen, then press [I] switch (F6) to select the kind of load displayed on the screen.



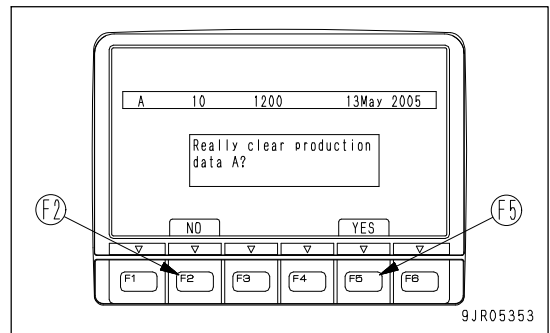
**ADDITION MODE TOTAL PRODUCTION DISPLAY**

1. The LOAD METER ADDITION MODE screen can display the load for only one kind of material. If you wish to check the load for other kinds of material, press the [TOTAL] switch (F3) at the bottom center of the LOAD METER ADDITION MODE
2. The PRODUCTION SUMMARY screen is displayed.  
This screen displays the number of loads, total load, and final date of the period.  
After checking, press the [Return] switch (F1) at the bottom left of the screen. The screen returns to the LOAD METER ADDITION MODE screen.



**DELETING ADDITION MODE PRODUCTION TOTAL**

1. If it is desired to delete the KIND data displayed on the PRODUCTION SUMMARY screen, use switches (F3) or (F4) to select the KIND, then confirm the selection with [SEL] switch (F6).
2. The DELETE PRODUCTION LATER screen is displayed.  
Check the data that you want to delete, then press [YES] switch (F5).  
The screen returns to the PRODUCTION SUMMARY screen, a 0 display appears for the cleared data, and the date of clearing appears in the [FINAL RESET] column.



**REMARK**

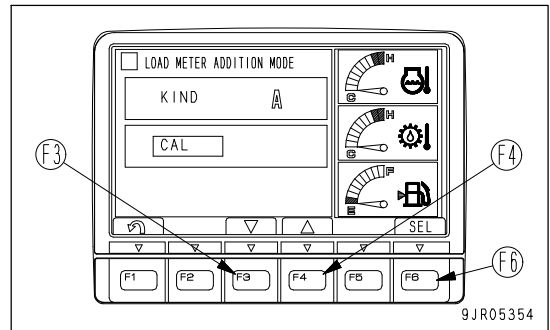
Once data have been cleared, they cannot be restored. When clearing data, check carefully that the correct data has been selected, then delete the data.

**CALIBRATION DISPLAY**

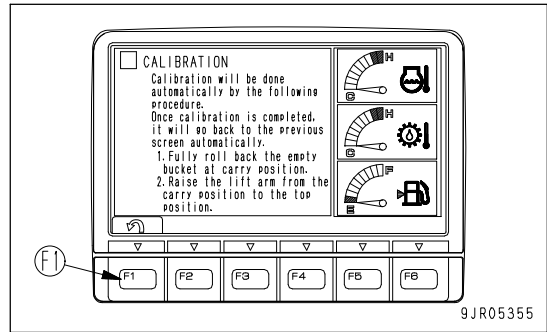
**! CAUTION**

After completing the warming-up operation, carry out calibration under the same conditions as for the actual operation.

1. Use switches (F3) or (F4) to select [CAL] displayed on the LOAD METER ADDITION MODE SETTING screen, then confirm the selection with [SEL] switch (F6).



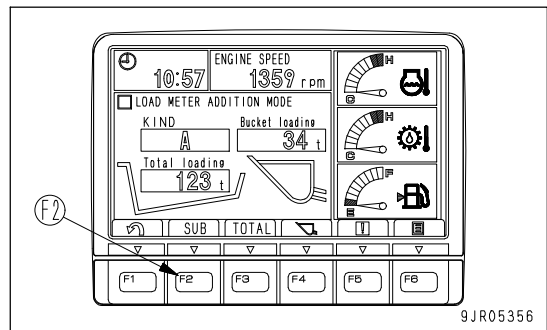
2. The screen displays the method for carrying out calibration.  
When carrying out calibration, tilt back the bucket when it is empty and raise it from the bucket travel posture to the maximum height. When this is done, the measurement is automatically made. (Approx. 15 seconds)
3. After the automatic measurement is carried out, the CAL screen automatically returns to the original screen.  
If it is desired to return to the original screen without carrying out calibration, press the [Return] switch (F1) at the bottom of the screen.



**LOADMETER SUBTRACTION MODE**

**LOADMETER SUBTRACTION MODE SCREEN DISPLAY**

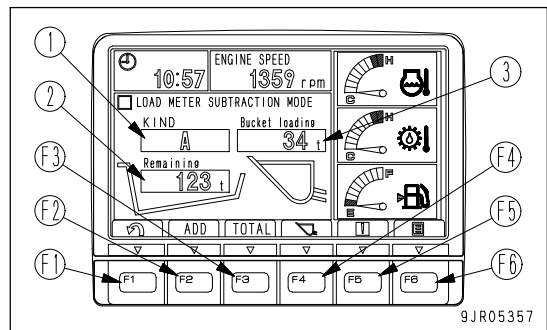
1. Press the [SUB] switch (F2) at the bottom of the LOAD METER ADDITION MODE screen.



2. The screen switches to the LOAD METER SUBTRACTION MODE screen.

This screen consists of kind of material display (1), remaining amount display (2), load display (3), return switch (F1), addition mode selector switch (F2), total load display switch (F3), positioner screen selector switch (F4), failure list screen selector switch (F5), and [load meter subtraction mode setting screen] selector switch (F6).

The load for each bucket is measured and is subtracted from the target value already set for the subtraction standard setting, and this is displayed on the screen. However, this is only when the screen is set to the subtraction mode screen.



**(PRECAUTIONS WHEN OPERATING SUBTRACTION MODE)**

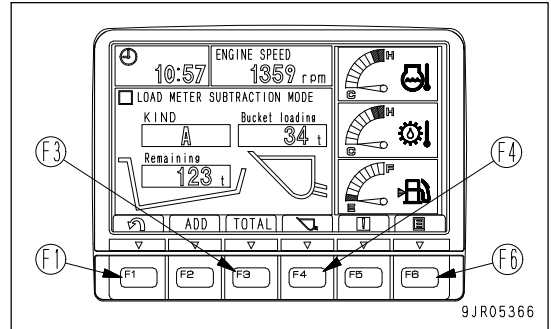
The load in the bucket is measured and the remaining load is displayed, but if the remaining load in the subtraction mode is a negative value, the method with the subtraction mode is as follows.

- 1) The remaining load is displayed in red (to indicate a negative value) for 3 seconds and the alarm buzzer sounds intermittently.
- 2) After that, the remaining load changes to a yellow display and the load remaining to the target value is displayed.  
(It returns to the value before the last bucket was measured.)
- 3) From this condition, load the dump truck with only an amount that matches the target value.
- 4) Raise and lower the lift arm again to measure the remaining load again.
- 5) Load the dump truck with the load in the bucket. When the remaining load value becomes 0 or a negative number (red display), the alarm buzzer sounds intermittently.

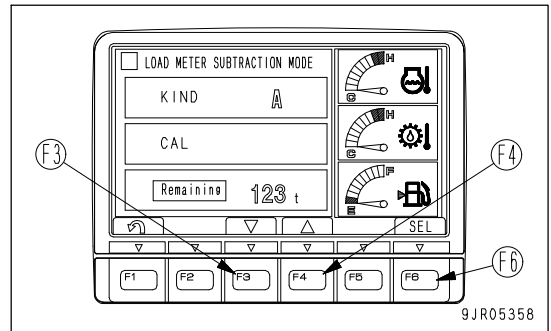
- 6) Turn the sub total switch at the top of the console on the right side of the operator's seat ON (the remaining display becomes the load in the bucket subtracted from the target value), and load the bucket as the first load for the next dump truck.
- 7) When emptying the bucket and starting new loading, turn the cancel switch on the side of the bucket control lever ON within 15 seconds of measuring the bucket load, then empty the bucket.

**LOADMETER SUBTRACTION STANDARD SETTING DISPLAY**

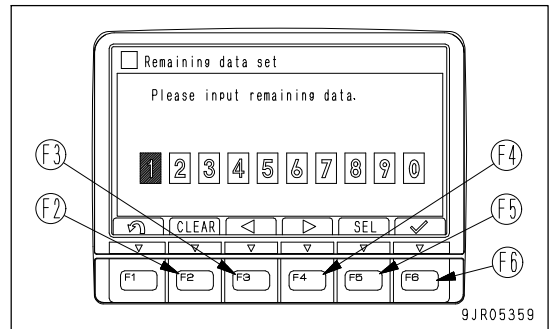
1. If it is desired to change the standard value displayed on the screen, press [LOAD METER SUBTRACTION MODE SETTING] selector switch (F6) on the LOAD METER SUBTRACTION MODE screen.



2. The screen changes to the LOAD METER SUBTRACTION MODE SETTING screen. Use switches (F3) or (F4) to select [Remaining] displayed on the screen, then confirm the selection with [SEL] switch (F6).



3. The screen changes to the Remaining data set screen. Use switches (F3) or (F4) to select the numbers for the new target value for remaining data, then input the selection with [SEL] switch (F5). If the wrong number is input, use [CLEAR] switch (F2) to cancel the input numbers one by one. Continue to input the numbers until all the numbers of the target value for remaining data have been input. The maximum value for the remaining data is 65535. Even if any value above that is input, 65535 will be input.



4. PRESS [✓] switch (F6). This completes the input of the target value for the remaining data, and the screen returns to the LOAD METER SUBTRACTION MODE SETTING screen.

**OTHER DISPLAYS**

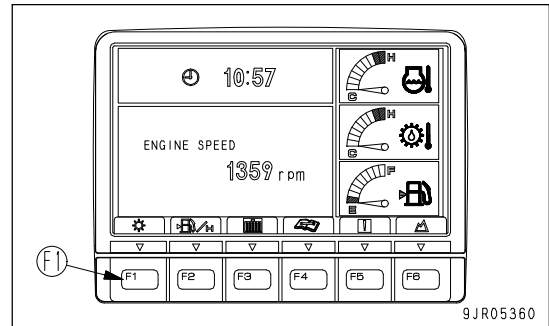
- The following display selector switches are shown on the LOAD METER SUBTRACTION MODE screen, but these switches are the same as for the items already explained for the LOAD METER ADDITION MODE screen.
  - Total load display switch (F3)
  - Positioner screen selector switch (F4)
  - Return switch (F1)
- [KIND] and [CAL] are displayed on the LOAD METER SUBTRACTION MODE screen, but these switches are the same as for the items already explained for the LOAD METER ADDITION MODE screen.

## BRIGHTNESS ADJUSTMENT SCREEN

This is the screen for adjusting the brightness, contrast, and back light of the LCD screen.

### BRIGHTNESS ADJUSTMENT SCREEN DISPLAY

1. Press the [BRIGHTNESS ADJUSTMENT] switch (F1) at the bottom left of the monitor screen.

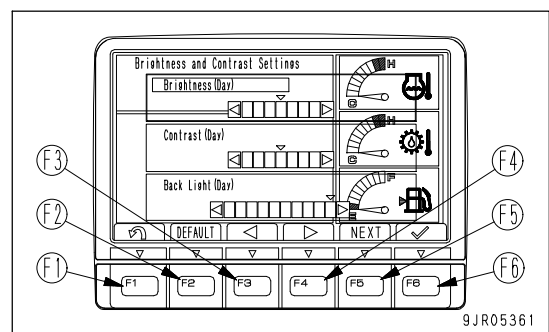


2. The screen changes to the Brightness and Contrast Settings screen.

Use this screen to adjust the brightness, contrast, and back light of the LCD screen.

Starting with the brightness (marked by the yellow cursor), use switches (F3) or (F4) to adjust to the desired brightness.

3. Press [NEXT] switch (F5). The yellow cursor moves to Contrast.
4. In the same way as for Brightness, use switches (F3) or (F4) to adjust to the desired contrast.
5. Press [NEXT] switch (F5). The yellow cursor moves to Back Light. Carry out adjustment in the same way as above.
6. Press [✓] switch (F6). The new settings are saved and the screen returns to the monitor screen.



If [DEFAULT] switch (F2) is pressed on the Brightness and Contrast Settings screen, the settings can be returned to the original settings made when the machine was shipped from the factory.

### REMARK

- The brightness can be adjusted to two settings according to whether the light switch is ON or OFF. The brightness, contrast, and backlight can be adjusted for each of these two conditions.
- If it is desired to change the settings, adjust the settings for brightness, contrast, and backlight under each condition.

**WARNING/FAILURE DISPLAY SCREEN**

This display screen appears if any abnormality occurs in any items previously set in the warning display portion. The title and message of the warning portion are displayed in turn on the screen being used. If this happens, stop operations immediately and carry out inspection or replacement. In addition, if any failure occurs, the location of the failure is displayed on the failure display screen. If the failure display screen appears, please ask your Komatsu distributor to carry out repairs.

For details of the warning items and action to take, see MULTI MONITOR (PAGE 3-11).

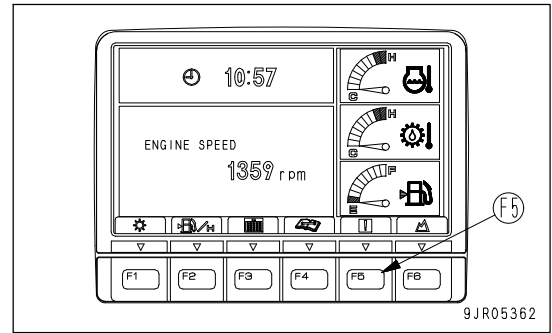
**FAILURE LIST SCREEN**

This screen displays the failure codes for failures that have occurred. If a failure is repaired, the failure code is automatically removed from the failure list screen.

If the failure list screen has been cancelled by the JUMP switch or DELETE switch, use the warning/failure display screen to check the failure code and content of the failure again.

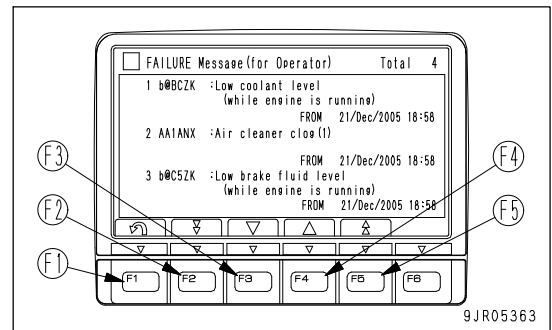
**FAILURE LIST SCREEN DISPLAY**

1. Press the [FAILURE LIST SCREEN] switch (F5) at the bottom right of the monitor screen.



2. The screen changes to the FAILURE Message screen. This screen consists of index number (1), failure code for failure that has occurred (2), content of failure that has occurred (3), time of occurrence (4), display page selector switches (F2) and (F5), display up/down switches (F3) and (4), and return switch (F1).

3. After checking the content of the failure, press the [Return] switch (F1) at the bottom left of the screen. The screen will return to the original monitor screen.

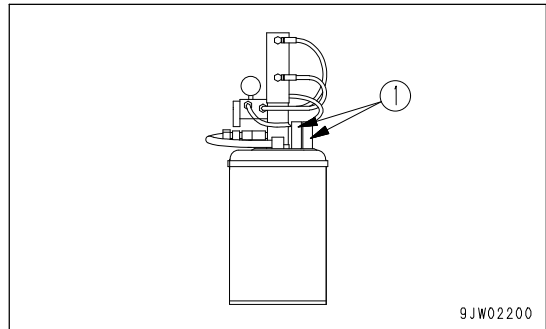




## OPERATING AUTO-GREASING SYSTEM

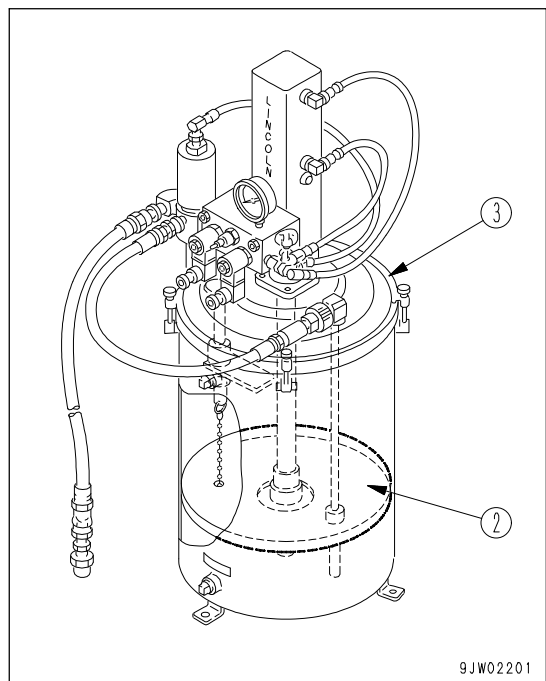
### CHECKING AUTO-GREASING SYSTEM

1. Check that a pail of grease is in the grease pump case. If the grease level is low, fill with grease.
2. Check that there is no leakage of grease between the grease can or grease pump case (1) and follower plate (2).



### NOTICE

Do not remove follower plate (2). If follower plate (2) is not used, pump (3) will be unable to suck up grease even if there is still a large quantity of grease in the can.



3. Turn the starting switch ON and check that auto-greasing level indicator lamp (4) on the monitor panel lights up.

Lamp lights up: Normal

Lamp does not lights up: Disconnection, broken main piping, no grease inside grease pump.

In the following cases, the lamp will flash at 0.5 second intervals.

- (1) Empty cartridge, broken circuit

The circuit pressure when the pump is actuated does not rise to the set pressure and cannot carry out greasing

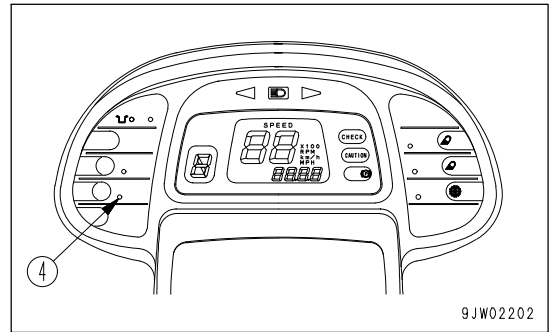
- (2) Power supply cut

The power supply is cut and the system cannot function

- (3) Defective release of pressure

After completion of greasing, the circuit pressure does not go down and the plunger does not return, so the next greasing cannot be carried out

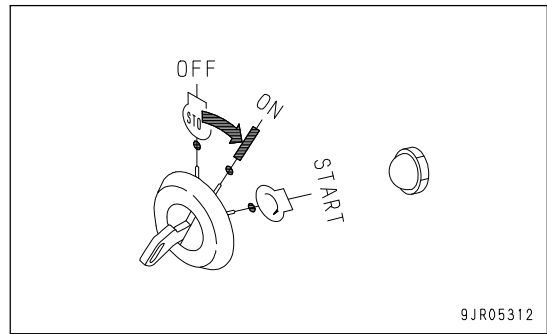
- (4) Even when normal, during period until pressure inside the circuit rises to set pressure



If the lamp still flashes after the grease pump is filled with grease, consult your Komatsu distributor.

**METHOD OF OPERATING AUTO-GREASING SYSTEM**

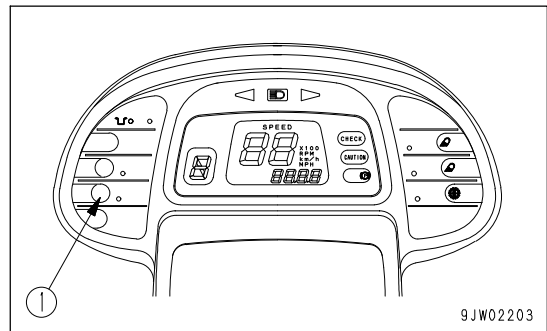
1. When the starting switch of the machine is turned ON, this system automatically starts operation.



2. Auto-greasing switch (1)

If auto-greasing switch (1) is pressed, the grease pump can be operated, regardless of the timer. The grease pump operates only while the auto-greasing switch is kept pressed. The grease pump stops immediately when the auto-greasing switch is released.

This switch is used mainly to check the operation of the grease pump or to supply additional grease.



**PRECAUTIONS WHEN HANDLING AUTO-GREASING SYSTEM**

1. Adjustment of discharge from injector (1)

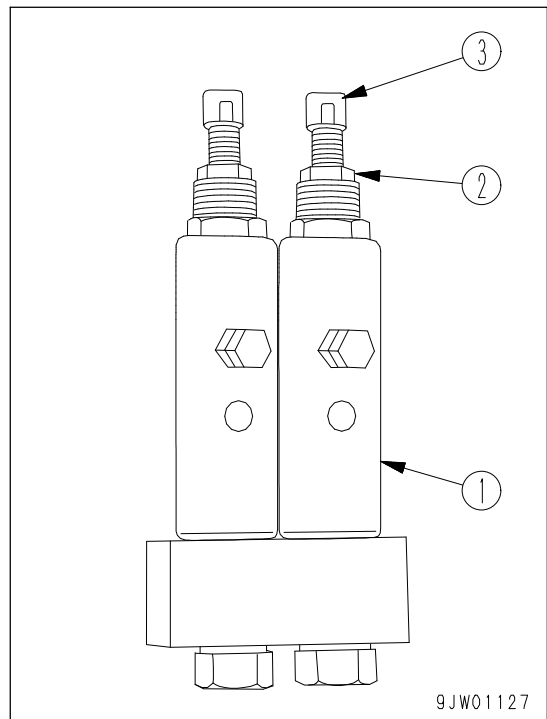
Set the all injectors to the maximum discharge.

Loosen lock nut (2) and turn adjustment screw (3) counterclockwise.

2. Method of bleeding air from main line

Loosen the plug installed to each injector to bleed the air from the main piping. This work should be carried out by two persons.

Start bleeding at the injector nearest the grease pump, then bleed at the other injectors in order (Rear frame → Front frame → Lift arm → Bellcrank).



- 1) One person removes plug (4) from one injector, then stays there.

If it is necessary to bleed the air from the main piping, remove this plug (4) and bleed the air.

This plug is installed to the manifold end of each terminal injector.

- 2) The other person presses the auto-greasing switch to start the grease pump.
- 3) Discharge the grease containing air (milky white in many cases) from the injector. If normal grease comes out, stop the grease pump.

- 4) Tighten plug (4) of the injector to prevent the grease from leaking.

It is impossible to see if the air has been bled by simply checking the pressure gauge. Even if air is mixed in the grease, the auto-grease system operates since the discharge pressure of the grease pump is high.

To see if the greasing system is working normally, check that the grease pump is balanced and stopped in the specified (operating) time (60 seconds).

3. Method of bleeding air from pressure switch This work shall be performed by two persons.

- 1) Remove pressure switch (6) fitted to block (5) installed to the auto-greasing device at the rear left of the cab, then wait.

- 2) One worker presses the auto-greasing switch in the operator's cab to start the grease pump.

- 3) Grease containing air (milky white in many cases because of the air) is discharged from block (5).

When normal grease comes out, stop the grease pump.

- 4) Install pressure switch (6) to block (5).

(Check that there is no leakage of grease.)

4. Method of bleeding air from supply line

This work shall be performed by two persons.

- 1) Remove supply grease line pressure gauge (7) fitted to block (5), then wait.

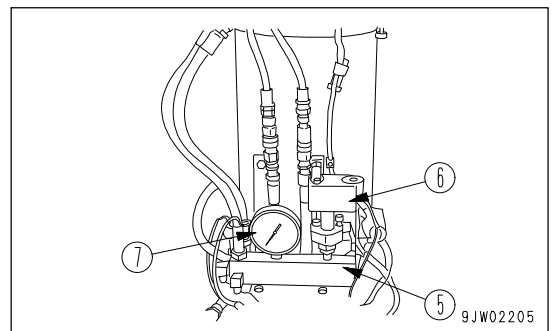
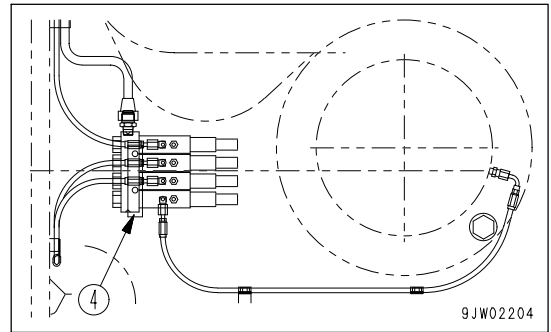
- 2) One worker presses the auto-greasing switch in the operator's cab to start the grease pump.

- 3) Grease containing air (milky white in many cases because of the air) is discharged from block (5).

When normal grease comes out, stop the grease pump.

- 4) Install supply line pressure gauge (7) to block (5).

(Check that there is no leakage of grease.)

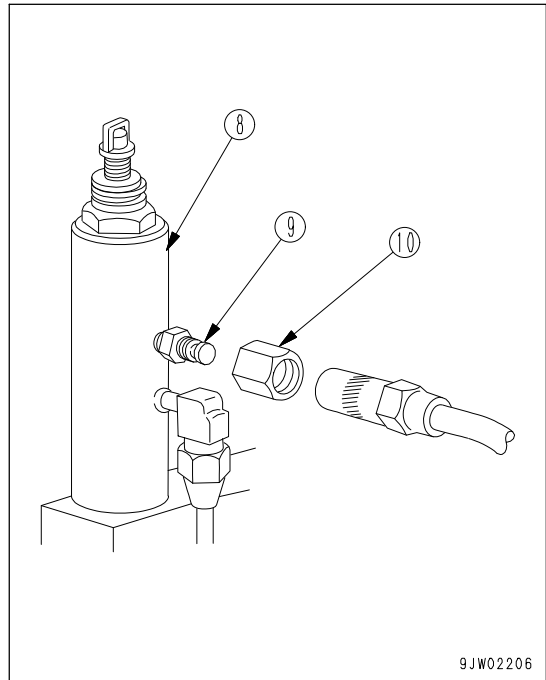


## NOTICE

If air is left in the circuit, the grease pressure will not rise to the specified level or will take a long time to rise to the specified level, and the injector will not work normally.

5. Filling branch lines (Injector - Pin) with grease

Remove cap (10) from filler fitting (9) of injector (8), then operate the grease gun manually to fully charge all the branch lines with grease.

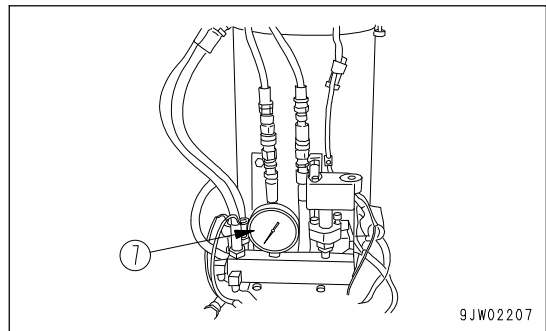


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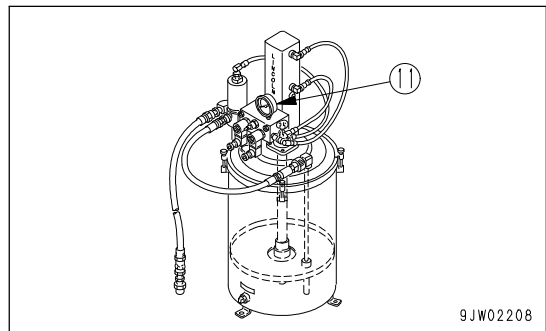
6. Check of supply line pressure

Check grease pump pressure gauge (11) and supply grease line pressure gauge (7).

- Supply grease line pressure gauge  
Normal value: 20.6 MPa (210 kg/cm<sup>2</sup>, 2982 PSI)
- Grease pump pressure gauge  
Normal value: 2.06 MPa (21 kg/cm<sup>2</sup>, 298.2 PSI)



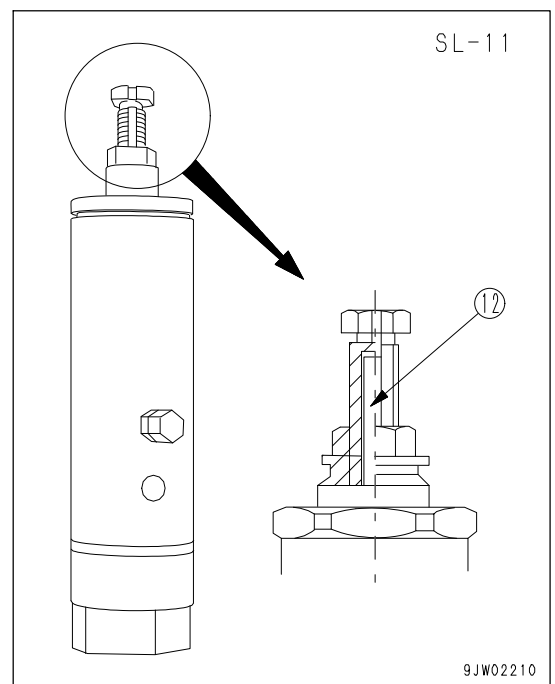
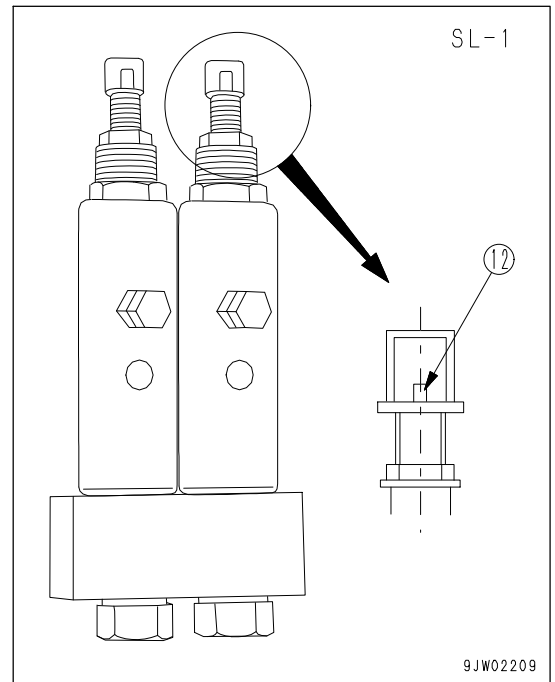
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7. Check of operation of injector

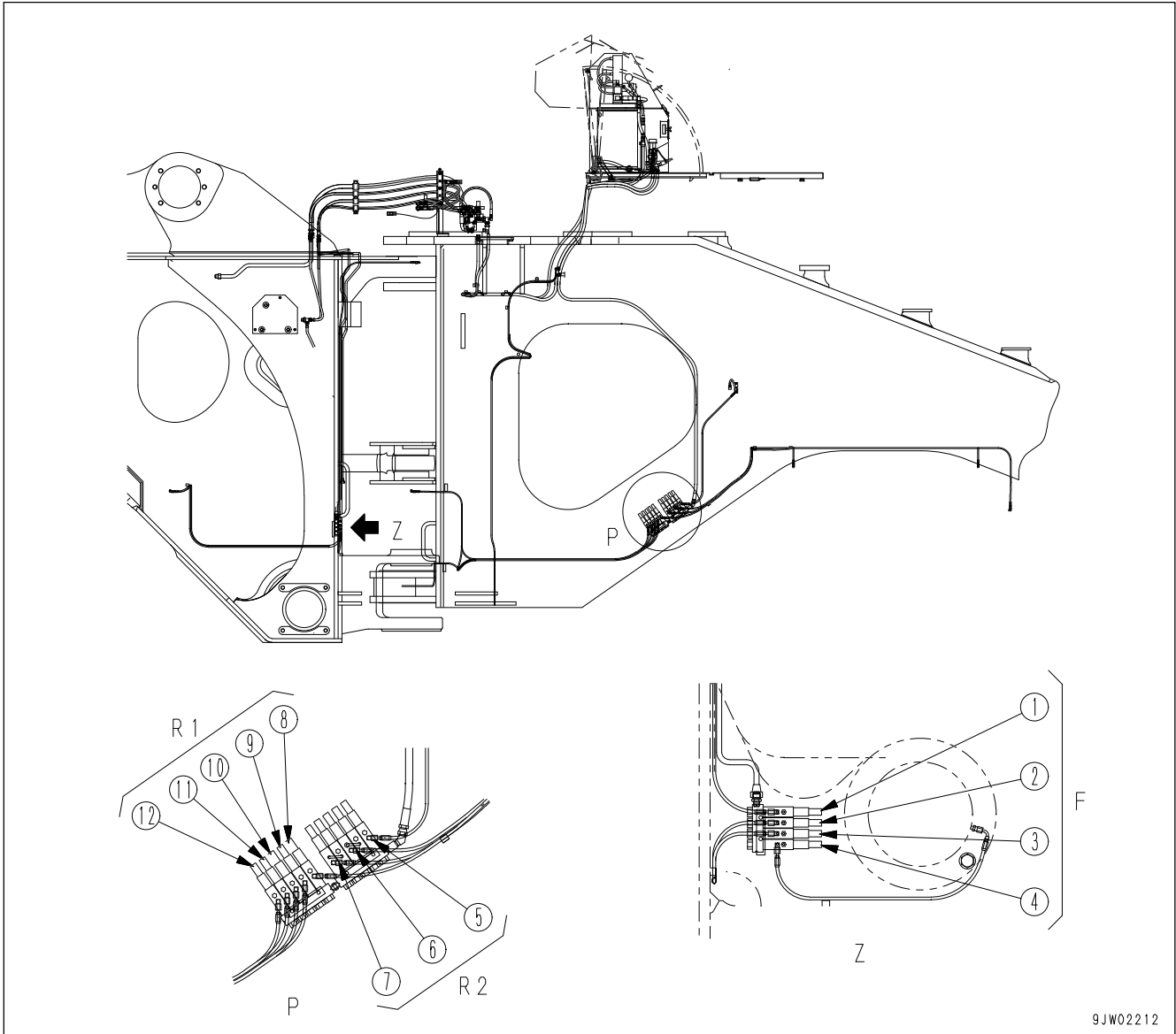
Turn the auto-greasing switch ON and check that indicator pins (12) of the injectors (SL-1, SL-11) are working properly.



### METHOD OF ADJUSTING DISCHARGE FROM INJECTOR

Please contact Komatsu distributor to adjusting bucket positioner.

### GREASING POINTS



9JW02212

F

- (1) Center hinge pin (upper)
- (2) Steering cylinder (bottom right)
- (3) Steering cylinder (bottom left)
- (4) Center support

R2

- (5) Transmission support
- (6) Rear axle support (top)
- (7) Rear axle support (center)

R1

- (8) Rear axle support (front)
- (9) Center hinge pin (lower)
- (10) Fuel oil cooler
- (11) A Steering cylinder (rod left)
- (12) Steering cylinder (rod right)

## TRANSPORTATION

Always obey the traffic regulations when transporting the machine by road.

### TRANSPORTATION PROCEDURE

As a basic rule, always transport the machine on a trailer.

When selecting the trailer, see the weights and dimensions given in Section "SPECIFICATIONS (PAGE 5-2)".

Note that the specifications for the weights and dimensions for transportation differ according to the type of tires and type of bucket.

### LOADING, UNLOADING WORK



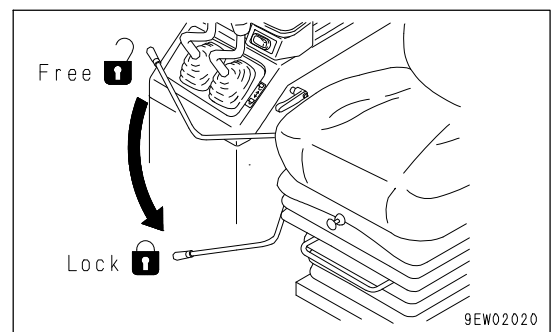
## WARNING

When transporting this machine, observe all related laws and regulations. Disassembling for transportation is needed. Consult your Komatsu distributor for transporting the machine.

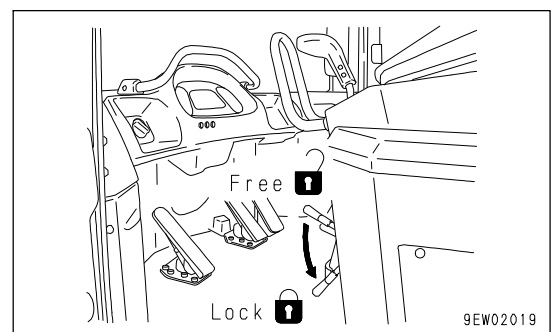
### METHOD OF SECURING MACHINE

Load the machine onto a trailer as follows:

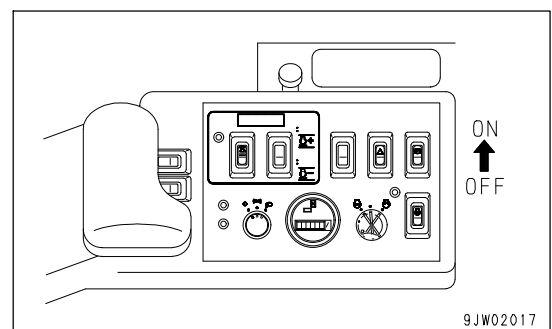
1. Lower the work equipment slowly.
2. Lock the work equipment control levers securely with the work equipment lock lever.



3. Set the joystick steering lever at Neutral, then lock it with the joystick steering lock lever.

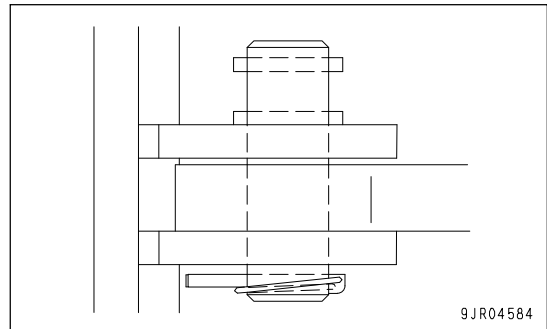
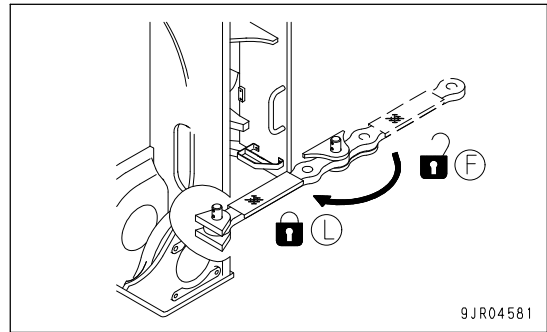


4. Turn the parking brake switch to the ON position to apply the parking brake.
5. Turn the starting switch to the OFF position to stop the engine, and pull out the starting switch key.





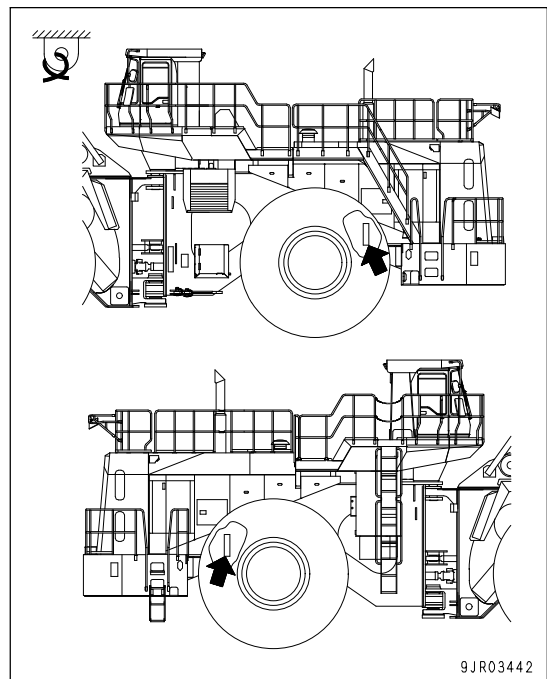
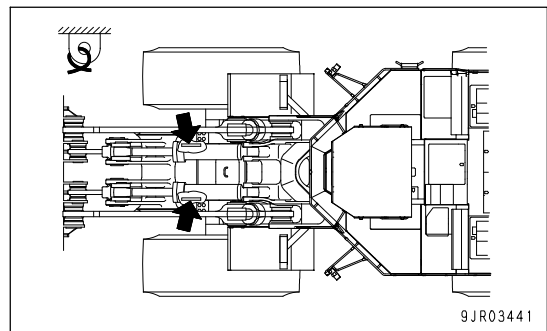
6. Lock the front and rear frame with the frame lock bar.



7. Put blocks in front of and behind the wheels and secure the machine with chains or wire rope of a suitable strength to prevent the machine from moving during transportation.

**NOTICE**

Always retract the antenna and reassemble the mirrors so that they are within the width of the machine.



## 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

### FUEL AND LUBRICANTS

Change to fuel and oil with low viscosity for all components.

For details of the specified viscosity, see "RECOMMENDED FUEL, COOLANT, AND LUBRICANT (PAGE 4-10)".

### COOLANT



#### WARNING

- COOLANT 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 COOLANT that has been drained when repairing the radiator, please contact your Komatsu distributor or request a specialist company to carry out the operation. COOLANT is toxic. Do not let it flow into drainage ditches or spray it onto the ground surface.
- COOLANT is flammable. Do not bring any flame close. Do not smoke when handling COOLANT.

### NOTICE

- Use Komatsu genuine SUPERCOOLANT (AF-NAC) wherever available, or use permanent type antifreeze COOLANT.
- Never use methanol, ethanol, or propanol-based antifreeze COOLANT.
- Do not use any water leakage prevention agent, either alone, or in combination with antifreeze COOLANT.
- Do not mix one brand of antifreeze COOLANT with a different brand.

For details of the COOLANT mixture when changing the coolant, see "CLEAN INSIDE OF COOLING SYSTEM (PAGE 4-23)".

### STARTING ENGINE

- Spray ether to start the engine.
- For details of the method for starting, see STARTING IN COLD WEATHER (PAGE 3-93).

**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	20°C (68°F)	0°C (32°F)	-10°C (14°F)	-20°C (-4°F)
	100		1.28	1.29	1.30
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.

**PRECAUTIONS AFTER COMPLETION OF WORK**

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

**AFTER COLD WEATHER**

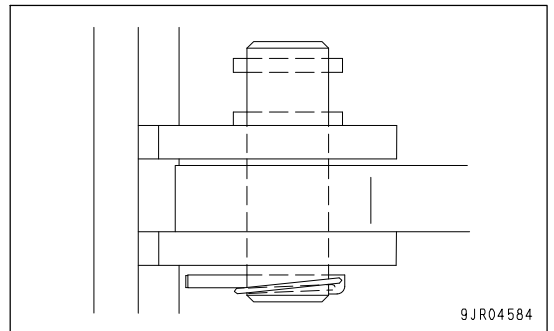
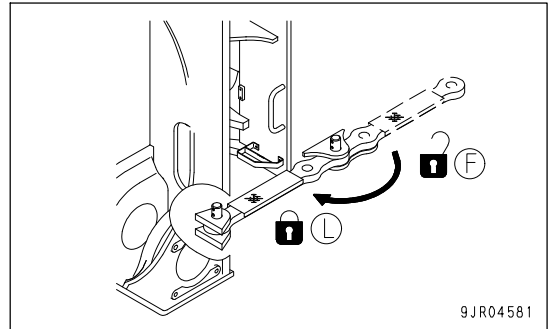
When the season changes and the weather becomes warmer, do as follows.

- Replace all fuel and oil with fuel and oil of the specified viscosity. For details, see "RECOMMENDED FUEL, COOLANT, AND LUBRICANT (PAGE 4-10)".

**WARMING-UP OPERATION FOR STEERING HYDRAULIC CIRCUIT IN COLD WEATHER**

**WARNING**

If the steering lever is operated and then stopped while the oil temperature is low, there may be a time lag before the machine stops turning. In this case, use the frame lock bar to ensure safety, and perform the warming-up operation in a wide place. Do not relieve the hydraulic pressure in the circuit continuously for more than 5 seconds.



When the temperature is low, do not start the operation of the machine immediately after starting the engine.

**Warming up steering hydraulic circuit**

Slowly operate the steering lever to the left and right to warm up the oil in the steering valve. (Repeat this operation for about 10 minutes to warm up the oil.)

**NOTICE**

Operate the steering lever a little and stop in that position. Then confirm that the machine is being steered by an angle equivalent to the amount that the steering lever is operated.

**RECOMMENDED OIL**

Select the oil from the table below according to the ambient temperature.

RESERVOIR	KIND OF FLUID	AMBIENT TEMPERATURE									
		-22	-4	14	32	50	68	86	104	122°F	
		-30	-20	-10	0	10	20	30	40	50°C	
Hydraulic system	Engine oil	TO10									
		SAE 5W-20CD									

If SAE5W-20CD is used in the cold season, replace it with TO10 oil when the cold season finishes.

## 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.
- Coat the exposed portion of the hydraulic cylinder piston rod with grease.
- Disconnect the negative terminals of the battery and cover it or remove it from the machine and store it
- Lock each control lever with the lock lever.
- To prevent rust, fill with COOLANT to give a density of at least 30% for the engine coolant.

### 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.
- When operating the work equipment, wipe off all the grease from the hydraulic cylinder rods.
- If the machine is equipped with an air conditioner, operate the air conditioner for 3 to 5 minutes once a month to lubricate all parts of the air conditioner compressor. Always run the engine at low idle when doing this. In addition, check the refrigerant level twice 1 year.

### 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

### WHEN MACHINE RUNS OUT OF FUEL



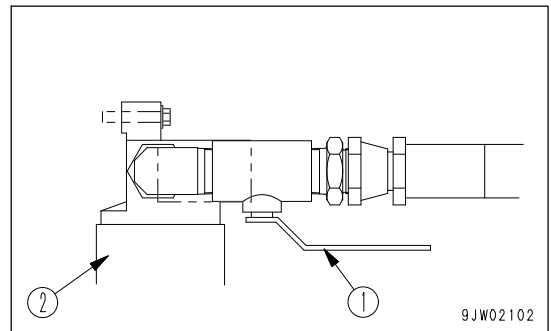
#### WARNING

When starting the engine again, check carefully that the area around the engine is safe before cranking the engine.

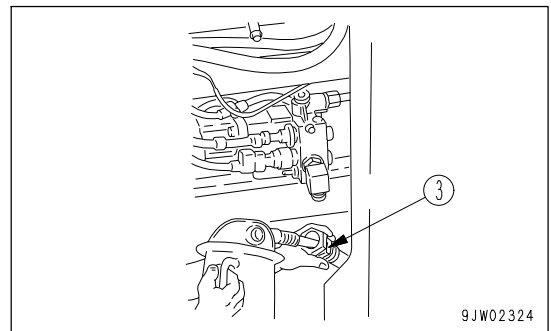
If the machine has run out of fuel, add fuel and then do as follows.

#### PROCEDURE FOR BLEEDING AIR

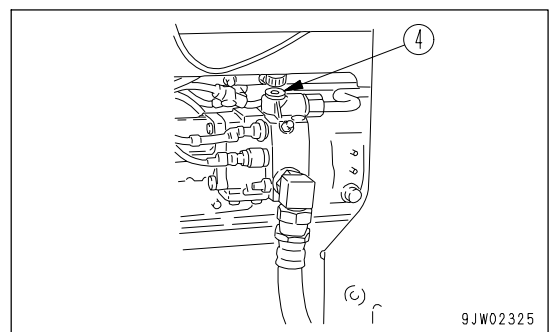
1. Open valve (1) leading to the engine PT pump. (This valve is installed at the side of fuel filter (2) installed at the front right of the fuel tank at the rear of the machine.)



2. Remove the fuel hose (3) connected to the fuel injection pump, add fuel through the mouthpiece of the hose, and fill the fuel filter with fuel. (Amount of fuel: 20 liters (5.28 US gal))
3. Close valve (1). In this condition, add more fuel through the mouthpiece of fuel hose (3) to fill the hose with fuel.
4. Connect fuel hose (3) to the fuel injection pump.



5. Remove plug (4) at the top of the fuel injection pump and fill the pump with fuel. (Amount of fuel: 5 liters (1.32 US gal))  
After filling with fuel, install plug (4).
6. Open valve (1), then start the engine.



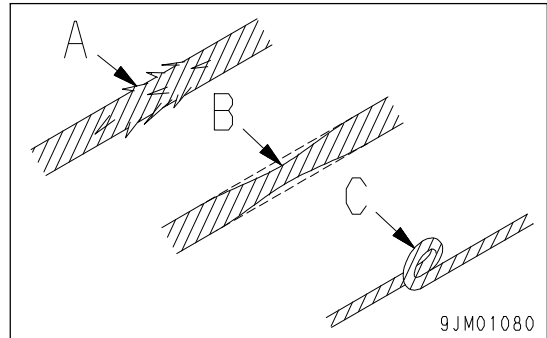
## METHOD OF TOWING MACHINE



### WARNING

Injury or death could result if a disabled machine is towed incorrectly or if there is a mistake in the selection of the wire rope or drawbar.

- Always confirm that the wire rope or drawbar used for towing has ample strength for the weight of the machine being towed.
- Never use a wire rope which has cut strands (A), reduced diameter (B), or kinks (C). There is danger that the rope may break during the towing operation.
- Always wear leather gloves when handling wire rope.
- Never tow a machine on a slope.
- Never go between the towing machine and the towed machine during the towing operation.
- If the machine moves suddenly, a load is applied suddenly to the towing wire or drawbar, and the towing wire or drawbar may break. Move the machine gradually to a constant speed.
- Be extremely careful if there is a failure in the engine or brake system: the brakes will not work.
- If the steering and the brakes on the disabled machine cannot be operated, do not let anyone ride on the disabled machine.



### NOTICE

- The permissible towing capacity for this machine is as shown below. Do not tow any load greater than this.  
Machines equipped with tire size 55.5/80-57-68PR (standard): 1,006,100 N (102,600 kg)  
Machines equipped with tire size 65/65-57-62PR (option): 1,031,600 N (105,200 kg)
- Towing is permitted only in order to move a disabled machine to a place where it is possible to carry out inspection and maintenance. It must not be towed for long distances.
- Please consult your Komatsu distributor for information about towing a disabled machine.

This machine must not be towed except in emergencies. When towing the machine, take the following precautions.

- Before releasing the brakes, put blocks under the wheels to prevent the machine from moving. If the wheels are not blocked, the machine may suddenly move.
- When towing a machine, tow it at a low speed of less than 2 km/h (1.2 MPH), and for a distance of a few meters to a place where repairs can be carried out. The machine should be towed only in emergencies. If the machine must be moved long distances, use a transporter.
- Use a towing machine of the same class as the machine being towed.  
Check that the towing machine has ample braking power, weight, and rim pull to allow it to control both machines on slopes or on the tow road.
- Use the specified towing pin for both the towing machine and the machine being towed.
- To protect the operator if the towing wire or towing bar breaks, install protective plates on both the towing machine and the machine being towed.
- Keep the angle of the towing wire as small as possible.  
Keep the angle between the center lines of the two machines to within 30 degrees.
- When towing down a slope, use two towing machines. One machine should be uphill from the disabled machine and should be connected with towing wire or a drawbar to pull the disabled machine back and keep it stable. The other machine should tow the disabled machine downhill.
- Towing may be carried out under various differing conditions, so it is impossible to determine beforehand the requirements for towing.  
Towing on flat horizontal roads will require the minimum rim pull, while towing on slopes or on uneven road surfaces will require the maximum rim pull.

## WHEN ENGINE RUNS

- If the transmission and steering wheel can be operated, and the engine is running, it is possible to tow the machine out of mud or to move it for a short distance to the edge of the road.
- The operator should sit on the machine being towed and operate the steering in the direction that the machine is towed.

## WHEN ENGINE DOES NOT RUNS

When towing a machine with the engine stopped, use the following procedure.

1. The transmission oil does not lubricate the system, so remove the front and rear drive shafts. If necessary, block the tires to prevent the machine from moving.
2. The steering cannot be operated, so remove the steering cylinder.  
Even if the brakes are in good condition, the brakes can only be used a limited number of times. There is no change in the operating force for the brake pedal, but the braking force is reduced each time the pedal is depressed.
3. Connect the towing equipment securely. When carrying out towing operations, use two machines of at least the same class as the machine being towed. Connect one machine each to the front and rear of the machine being towed, then remove the blocks from the tires and tow the machine.
4. Parking brake  
The parking brake cannot be turned OFF. To release the parking brake, do as follows.



## RELEASING PARKING BRAKE

Please ask your Komatsu distributor to release the parking brake.

### WARNING

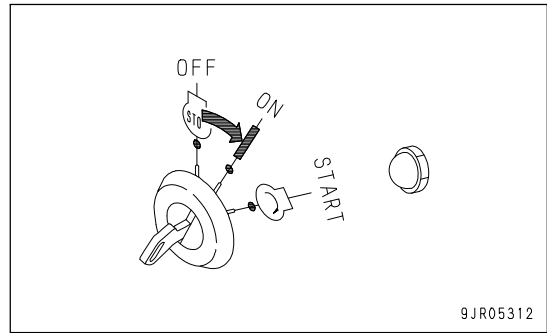
- When releasing the parking brake, stop the machine on level ground and check that the surrounding area is safe. If it is necessary to release the brake on a slope in an emergency, block the tires before starting the operation.
- If the parking brake is released, the brake cannot be used, so check the safety carefully when moving the machine.

If the engine will not run for some reason, use the following methods to release the parking brake and tow the machine.

### METHOD OF RELEASING BRAKE BY USING EMERGENCY PARKING BRAKE CANCEL SWITCH

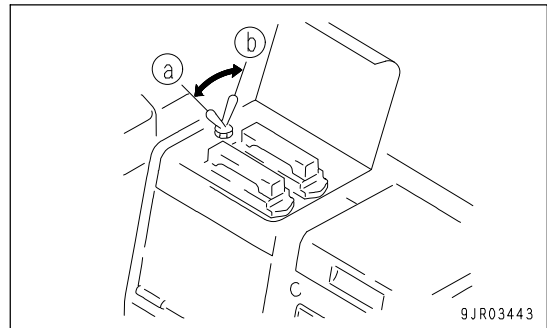
If the pressure in the brake accumulator is high, do as follows.

1. Turn the starting switch ON.



2. Set the emergency parking brake cancel switch to the CANCEL position (a).

When doing this, check that the parking brake warning lamp goes out. When the parking brake is cancelled, the alarm buzzer emits a continuous sound.

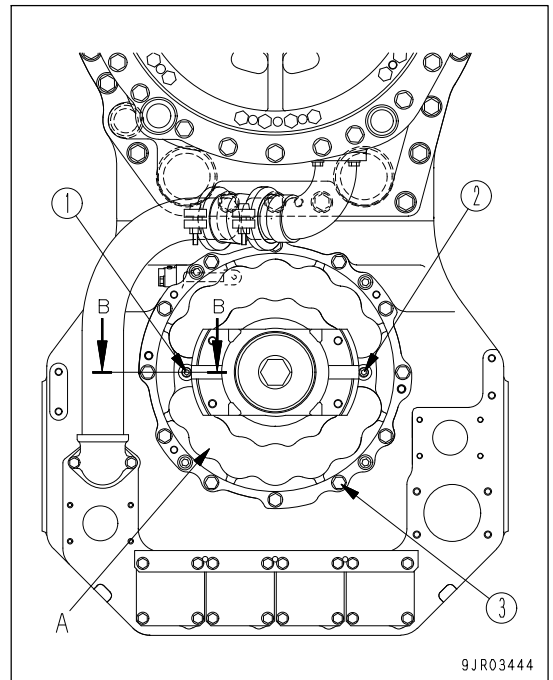


#### REMARK

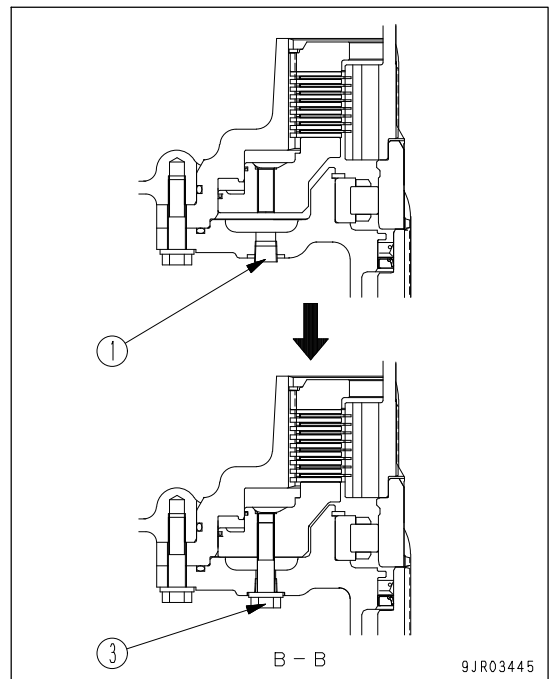
- Normally, set the switch to the NORMAL position (b).
- If the brake accumulator pressure is low, the parking brake warning lamp will not go out and the alarm buzzer will emit a continuous sound. If this happens, see the following METHOD OF RELEASING BRAKE MECHANICALLY to release the brake.

**METHOD OF RELEASING MECHANICALLY**

1. Remove plugs (1) and (2) at the rear of the transmission case.
2. Remove 2 bolts (3) (2 out of 12) from portion (A) installing the parking brake chamber cover.



3. Screw bolts (3) into the holes for plugs (1) and (2), and tighten them uniformly until they stop and cannot be tightened any more.  
The parking brake is released.

**EMERGENCY TRAVEL OPERATION**

The normal gear shifting operation is carried out by electric signals. If there should be a failure in the electrical system and the machine does not move, please contact your Komatsu distributor to have the machine moved.

**NOTICE**

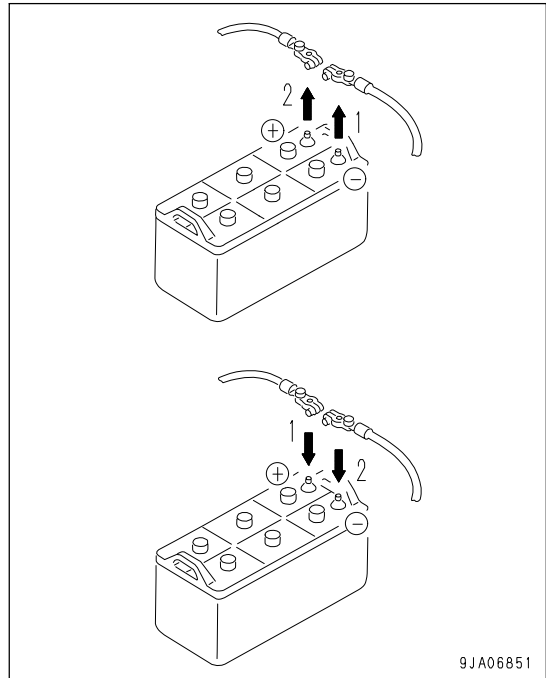
Always request your Komatsu distributor to carry out the emergency travel operation.

## IF BATTERY IS DISCHARGED



### WARNING

- It is dangerous to charge a battery when installed on a machine. Make sure that it is removed before charging.
- When checking or handling the battery, stop the engine and turn the starting switch key to 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 safety glasses 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.



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## 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.

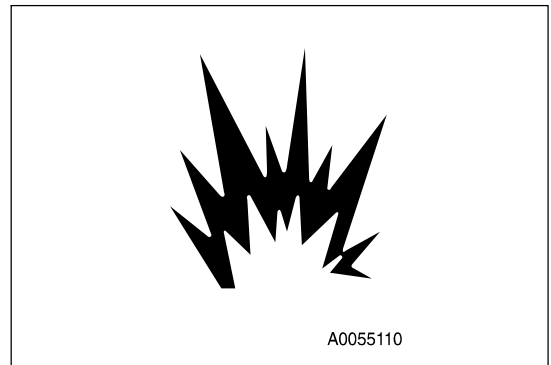
### REMARK

There are 3 batteries each (total: 6) on both sides at the rear of the machine.

## PRECAUTIONS FOR 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 "BATTERY (PAGE 3-154)" and the instruction manual accompanying the charger, and do as follows.

- Do not use or charge the battery if the battery electrolyte level is below the LOWER LEVEL line. This may cause an explosion. Check the battery electrolyte level periodically and add distilled water to bring the electrolyte level to the UPPER LEVEL line.
- 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.



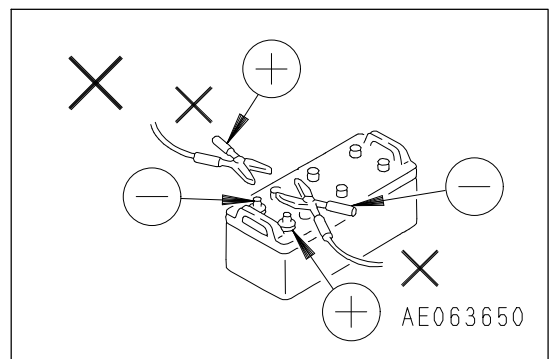
## STARTING ENGINE WITH BOOSTER CABLE

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

### 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

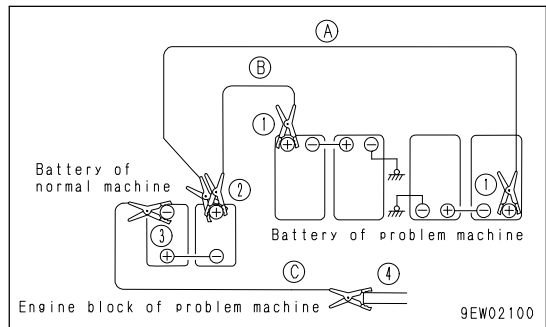
- Always use a booster cable or clip of a thickness that is suitable for the size of the battery.
- For the battery on the normal machine, use a battery with the same capacity as the problem machine.
- Check that the cable and clips are not damaged or corroded.
- Connect the clips securely.
- Check that the lock levers and parking brakes of both machines are at the LOCK position.
- Check that all levers are at the neutral position.

### CONNECTING THE BOOSTER CABLE

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

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

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



### STARTING ENGINE



### CAUTION

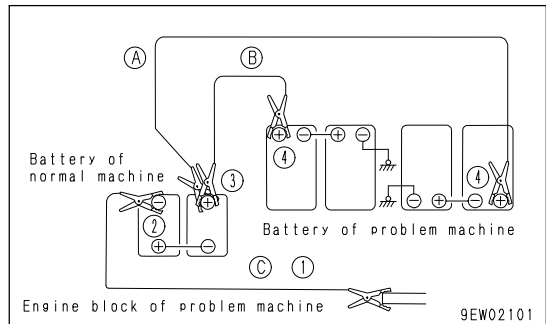
Always check that the lock lever is set to the LOCK position, regardless of whether the machine is working normally or has failed. Check also that all the control levers are at the HOLD or neutral position.

1. Make sure the clips are firmly connected to the battery terminals.
2. Turn the starting switch of the problem machine to the START position and start the engine.  
If the engine doesn't start at first, wait for at least 2 minutes before trying again.

### DISCONNECTING THE BOOSTER CABLE

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

1. Remove one clip of booster cable (C) from the engine block of the problem machine.
2. Remove the other clip of booster cable (C) from the negative (-) terminal of the normal machine.
3. Remove one clip of booster cable (A) and (B) from the positive (+) terminal of the normal machine.
4. Remove the other clip of booster cable (A) and (B) from the positive (+) terminal of the problem machine.



## OTHER TROUBLE

## ELECTRICAL SYSTEM

- ( ): Always contact your Komatsu distributor when dealing with these items.
- In cases of problems 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	<ul style="list-style-type: none"> <li>• Defective wiring</li> <li>• Defective fan belt tension</li> </ul>	<ul style="list-style-type: none"> <li>( • Check, repair loose terminals, disconnections)</li> <li>• Adjust alternator belt tension, see CHECK ALTERNATOR DRIVE BELT</li> </ul>
Lamp flickers while engine is running		
Charge level caution appears on multi monitor when engine is running	<ul style="list-style-type: none"> <li>• Defective alternator</li> <li>• Defective monitor</li> </ul>	<ul style="list-style-type: none"> <li>( • Replace)</li> <li>( • Check, repair)</li> </ul>
Abnormal noise is generated from alternator	<ul style="list-style-type: none"> <li>• Defective alternator</li> </ul>	<ul style="list-style-type: none"> <li>( • Replace)</li> </ul>
Prelube motor does not work and starting motor does not turn when starting switch is turned to ON	<ul style="list-style-type: none"> <li>• Defective wiring</li> <li>• Insufficient battery charge</li> </ul>	<ul style="list-style-type: none"> <li>( • Check, repair)</li> <li>• Charge</li> </ul>
Pinion of starting motor keeps going in and out (rattles)	<ul style="list-style-type: none"> <li>• Insufficient battery charge</li> </ul>	<ul style="list-style-type: none"> <li>• Charge</li> </ul>
Starting motor turns engine sluggishly	<ul style="list-style-type: none"> <li>• Insufficient battery charge</li> <li>• Defective starting motor</li> </ul>	<ul style="list-style-type: none"> <li>• Charge</li> <li>( • Replace)</li> </ul>
Starting motor disengages before engine starts	<ul style="list-style-type: none"> <li>• Defective wiring</li> <li>• Insufficient battery charge</li> </ul>	<ul style="list-style-type: none"> <li>( • Check, repair)</li> <li>• Charge</li> </ul>
Engine starting aid fluid is not injected	<ul style="list-style-type: none"> <li>• Defective wiring</li> </ul>	<ul style="list-style-type: none"> <li>( • Check, repair)</li> </ul>
Engine oil pressure caution appears on multi monitor while engine is stopped	<ul style="list-style-type: none"> <li>• Defective wiring</li> <li>• Defective monitor, defective sensor</li> </ul>	<ul style="list-style-type: none"> <li>( • Replace)</li> <li>( • Check, repair, replace)</li> </ul>
Battery charge caution appears on multi monitor while engine is stopped	<ul style="list-style-type: none"> <li>• Defective wiring</li> <li>• Defective monitor</li> </ul>	<ul style="list-style-type: none"> <li>( • Check, repair)</li> <li>( • Replace)</li> </ul>

**CHASSIS**

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

Problem	Main causes	Remedy
<b>Transmission</b>		
Engine is running but machine does not move	<ul style="list-style-type: none"> <li>• Parking brake is applied</li> <li>• Directional switch is not operated properly</li> <li>• Lack of oil in transmission case</li> </ul>	<ul style="list-style-type: none"> <li>• Release parking brake</li> <li>• Operate switch properly</li> <li>• Add oil to specified level, see WHEN REQUIRED</li> </ul>
Even when engine is run at full throttle, machine only moves slowly and lacks power	<ul style="list-style-type: none"> <li>• Lack of oil in transmission case</li> <li>• Transmission strainer is clogged</li> </ul>	<ul style="list-style-type: none"> <li>• Add oil to specified level, see WHEN REQUIRED</li> <li>( • Disassemble, clean)</li> </ul>
Oil overheats	<ul style="list-style-type: none"> <li>• Too much oil or too little oil</li> <li>• Machine is not traveling in correct speed range</li> <li>• Torque converter is stalled for long periods</li> <li>• Engine is overheating</li> </ul>	<ul style="list-style-type: none"> <li>• Add or drain oil to specified level, see WHEN REQUIRED</li> <li>• Place in correct speed range</li> <li>• Reduce stall time</li> <li>( • Check engine)</li> </ul>
Noise generated	<ul style="list-style-type: none"> <li>• Lack of oil</li> </ul>	<ul style="list-style-type: none"> <li>• Add oil to specified level, see WHEN REQUIRED</li> </ul>
<b>Axle</b>		
Noise generated	<ul style="list-style-type: none"> <li>• Lack of oil</li> </ul>	<ul style="list-style-type: none"> <li>• Add oil to specified level, see WHEN REQUIRED</li> </ul>
<b>Disc brake</b>		
Brake has no effect even when pedal is depressed	<ul style="list-style-type: none"> <li>• Disc has reached wear limit</li> <li>• Defective hydraulic system</li> <li>• Lack of oil</li> <li>• Air in brake line</li> </ul>	<ul style="list-style-type: none"> <li>( • Replace disc)</li> <li>• Add oil to specified level, see CHECKS BEFORE STARTING</li> <li>• Bleed air. See WHEN REQUIRED</li> </ul>
Brake drags or remains applied	<ul style="list-style-type: none"> <li>• Vent in valve clogged</li> <li>• Defective operation of brake valve</li> <li>• Defective operation of slack adjuster</li> </ul>	<ul style="list-style-type: none"> <li>• Clean</li> <li>( • Check, repair)</li> <li>( • Check, repair)</li> </ul>
Brakes slip	<ul style="list-style-type: none"> <li>• Worn disc</li> </ul>	<ul style="list-style-type: none"> <li>( • Replace)</li> </ul>
<b>Parking brake</b>		
Brake effect is poor	<ul style="list-style-type: none"> <li>• Linkage is loose</li> <li>• Pad is wet</li> <li>• Deteriorated air cylinder spring</li> <li>• Worn pad</li> </ul>	<ul style="list-style-type: none"> <li>• Adjust</li> <li>• Clean</li> <li>( • Replace spring)</li> <li>• Adjust or replace</li> </ul>

Problem	Main causes	Remedy
<b>Steering</b>		
Steering lever is heavy	<ul style="list-style-type: none"> <li>• Defective hydraulic system</li> <li>• Lack of oil</li> </ul>	<ul style="list-style-type: none"> <li>( • Check, repair)</li> <li>• See EVERY 100 HOURS SERVICE</li> </ul>
<b>Hydraulic system</b>		
Bucket lacks lifting power Bucket takes time to rise	<ul style="list-style-type: none"> <li>• Lack of oil</li> <li>• Clogged hydraulic tank filter</li> </ul>	<ul style="list-style-type: none"> <li>• Add oil to specified level, see EVERY 100 HOURS</li> <li>• Replace filter, see EVERY 2000 HOURS SERVICE</li> </ul>
Excessive bubbles in oil	<ul style="list-style-type: none"> <li>• Low quality oil being used</li> <li>• Oil level is low</li> <li>• Air in oil line</li> </ul>	<ul style="list-style-type: none"> <li>• Replace with good quality oil</li> <li>• Add oil to specified level, see EVERY 100 HOURS SERVICE</li> <li>• Bleed air, see WHEN REQUIRED</li> </ul>
Hydraulic pressure is low	<ul style="list-style-type: none"> <li>• Oil level is low and pump is sucking in air</li> </ul>	<ul style="list-style-type: none"> <li>• Add oil to specified level, see EVERY 100 HOURS SERVICE. Then bleed air, see WHEN REQUIRED</li> </ul>
Movement of cylinder is irregular	<ul style="list-style-type: none"> <li>• Oil level is low</li> <li>• Leakage inside cylinder</li> </ul>	<ul style="list-style-type: none"> <li>• Add oil to specified level, see EVERY 100 HOURS SERVICE</li> <li>( • Check, repair)</li> </ul>



**ENGINE**

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

Problem	Main causes	Remedy
Engine oil pressure caution appears on CGC monitor	<ul style="list-style-type: none"> <li>• Engine oil pan level is low (sucking in air)</li> <li>• Clogged oil filter cartridge</li> <li>• Defective tightening of oil pipe, pipe joint, oil leakage from damaged part</li> <li>• Defective pilot 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 250 HOURS SERVICE</li> <li>( • Check, repair)</li> <li>( • Replace)</li> </ul>
Steam is emitted from top part of radiator (pressure valve)	<ul style="list-style-type: none"> <li>• Cooling water level low</li> <li>• Loose fan belt</li> </ul>	<ul style="list-style-type: none"> <li>• Add cooling water, repair, see CHECK BEFORE STARTING</li> <li>• Adjust fan belt tension see EVERY 250 HOURS SERVICE</li> </ul>
Engine water temperature caution appears on multi monitor	<ul style="list-style-type: none"> <li>• Dirt or scale accumulated in cooling system</li> <li>• Clogged radiator fin or damaged fin</li> <li>• Defective thermostat</li> <li>• Loose radiator filler cap (high altitude operation)</li> <li>• Defective pilot lamp</li> </ul>	<ul style="list-style-type: none"> <li>• Change cooling water, 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)</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>• Defective fuel injection pump or nozzle</li> <li>• Starting motor cranks engine sluggishly</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>( • Replace pump or nozzle)</li> <li>• See ELECTRICAL SYSTEM</li> <li>( • Adjust valve clearance)</li> </ul>
Lubricating pressure does not rise when prelube motor is operated	<ul style="list-style-type: none"> <li>• Defective prelube motor</li> </ul>	( • Replace)
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>

Problem	Main causes	Remedy
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> <li>• Defective turbocharger</li> </ul>	<ul style="list-style-type: none"> <li>• Clean or replace, see WHEN REQUIRED</li> <li>( • Replace nozzle)</li> <li>( • See defective compression above)</li> <li>• Clean or replace turbocharger)</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 "Engine water temperature pilot lamp lights up" [above</li> <li>( • Replace muffler)</li> <li>( • Adjust valve clearance)</li> </ul>



# MAINTENANCE

## **WARNING**

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

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## GUIDES TO MAINTENANCE

Do not perform any inspection and maintenance operation that is not found in this manual.

### 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:

For lubrication of the machine, use the Komatsu genuine lubricants. Moreover use oil of the specified viscosity according to the ambient temperature.

### ALWAYS USE CLEAN WASHER FLUID:

Use automobile window washer fluid, and be careful not to let any dirt get into it.

### ALWAYS USE CLEAN OIL AND GREASE:

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

### CHECKING FOR FOREIGN MATERIALS IN DRAINED OIL AND ON FILTERS:

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 (3.3 ft) of the area to be welded. If grounding cable is connected near instruments, connectors, etc., the instruments may malfunction.
- If a seal or bearing happens to come between the part being welded and grounding point, change the grounding point to avoid such parts.
- Do not use the area around the work equipment pins or the hydraulic cylinders as the grounding point.

### DO NOT DROP THINGS INSIDE MACHINE:

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

**DUSTY WORKSITES:**

When working at dusty worksites, do as follows:

- Inspect the air cleaner clogging monitor frequently to see if the air cleaner is clogged.  
Clean the air cleaner element at a shorter interval than specified.
- Clean the radiator core frequently to avoid clogging.
- Clean and replace the fuel filter frequently.
- Clean electrical components, especially the starting motor and alternator, to avoid accumulation of dust.
- When inspecting or changing the oil, move the machine to a place that is free of dust to prevent dirt from getting into the oil.

**AVOID MIXING OIL:**

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 FROM HYDRAULIC CIRCUIT:**

If the hydraulic oil equipments have been repaired or replaced and if the hydraulic hoses, pipes, etc. have been disconnected, it is necessary to bleed air from the circuit. See "CHANGE OIL IN HYDRAULIC TANK, REPLACE HYDRAULIC FILTER ELEMENT (PAGE 4-70)".

**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 them or bend them sharply. If they are installed so, their service life will be shortened extremely and they may be damaged.

**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?
- Check when the engine is running
  - See "TWO WORKERS FOR MAINTENANCE WHEN ENGINE IS RUNNING (PAGE 2-39)" in the section on safety for checking when the engine is running. Pay attention to safety.
  - Check if the inspected and maintenance area is operating normally.
  - Increase the engine speed to check for fuel and oil leakage.

## 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)
Transmission case	Power train oil TO30 (Komatsu genuine parts)
Hydraulic system	Power train oil TO10 (Komatsu genuine parts)
Brake oil tank	Power train oil TO10 (Komatsu genuine parts)
Axle	Axle oil AXO80 (Komatsu genuine parts)
Radiator	SUPERCOOLANT (AF-NAC) (Komatsu genuine parts) (Density: 30% or above)

## 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, 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 (5°F)), 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.

## NOTICE

**Always use diesel fuel. Never use any other fuel.**

**The engine on this machine uses electronic control and high-pressure fuel injection equipment to enable it to provide good fuel consumption and good exhaust gas characteristics. For this reason, high-precision parts and lubricating ability are demanded. Using low-viscosity fuel with poor lubricating ability will cause a marked reduction in the durability of the engine.**

## COOLANT AND WATER FOR DILUTION

- Komatsu genuine SUPERCOOLANT (AF-NAC) 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). SUPERCOOLANT (AF-NAC) has excellent anticorrosion, antifreeze and cooling properties and can be used continuously for two years or 4000 hours.  
Komatsu SUPERCOOLANT (AF-NAC) is strongly recommended wherever available.
- The density used for the COOLANT differs according to the ambient temperature.  
For details of the density of the COOLANT, see "CLEAN INSIDE OF COOLING SYSTEM (PAGE 4-23)".  
Even in the areas where it is not considered necessary to prevent freezing, always use COOLANT with a density of over 30% in order to prevent corrosion of the cooling system.  
SUPERCOOLANT (AF-NAC) may be supplied already mixed. In such cases, never dilute with water.
- When diluting the 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.
- Undiluted coolant is flammable, so be sure to keep it away from flame.
- 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.
- Grease fittings not included in the maintenance section are grease fittings for overhaul, so they do not need grease.  
If any part becomes stiff after being used for long time, add grease.
- Always wipe off all of the old grease that is pushed out when greasing.  
Be particularly careful to wipe off the old grease in places where sand or dirt sticking in the grease would cause wear of the rotating parts.

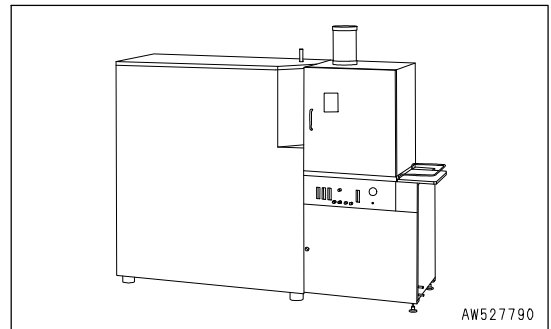
**CARRYING OUT KOWA (Komatsu Oil Wear Analysis)**

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.

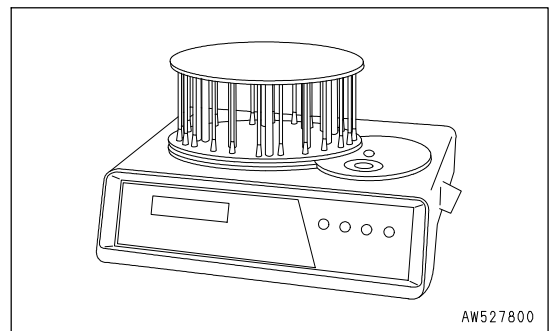
We strongly recommend you to use this service. The oil analysis is carried out at actual cost, so the cost is low, and the results of the analysis are reported together with recommendations which will reduce repair costs and machine downtime.

**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 quantity of particles  
This uses a PQI (Particle Quantifier Index) measurer to measure the quantity of iron particles of 5µm or more, enabling early detection of failures.



- Others  
Measurements are made of items such as the ratio of water in the oil, density of the COOLANT, ratio of fuel in the oil, and dynamic viscosity, enabling a highly precise diagnosis of the machine's health.

**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.
- Always use Komatsu genuine filters.

## OUTLINE OF ELECTRIC SYSTEM

- It is extremely dangerous if the electrical equipment becomes wet or the covering of the wiring is damaged. This will cause 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, before installing a radio receiver or other wireless equipment, contact your Komatsu distributor.
- When working at the seashore, carefully clean the electric system to prevent corrosion.
- The optional power source must never be connected to the fuse, starting switch, or battery relay.

## WEAR PARTS

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

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

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

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

## WEAR PARTS LIST

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

Item	Part No.	Part Name	Q'ty	Replacement frequency	
Engine oil filter	42C-01-12911	Cartridge	4	EVERY 250 HOURS	
Fuel filter	42C-04-11350	Cartridge	3		
Corrosion resistor	42C-01-12920	Cartridge	2		
Transmission oil filter	07063-01210 (07000-15180)	Element (O-ring)	2 (2)	EVERY 500 HOURS	
Brake oil filter	208-60-61180 (07000-15210)	Element (O-ring)	1 (1)		
	07063-01035 (07000-12115)	Element (O-ring)	1 (1)		
By-pass filter	CH44100 (Cummins)	Cartridge	1	EVERY 1000 HOURS	
Hydraulic filter	208-60-61180 (07000-12010)	Element (O-ring)	3 (3)	EVERY 2000 HOURS	
	(07000-15210)	(O-ring)	(3)		
Hydraulic tank breather	285-62-17320	Element	6		
Brake oil tank breather	419-60-15250	Element	1		
Air cleaner	6128-81-7042	Element Ass'y	4	-	
	600-181-4400	Outer element Ass'y	4		
Air conditioner air filter	209-979-6260	Element	3	-	
Tip tooth	General rock	42C-70-13110	Tooth	10	-
	Limestone	42C-70-13310	Tooth	10	

## 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 (32°F), 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 (-4°F), 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

USE OF FUEL, COOLANT AND LUBRICANTS ACCORDING TO AMBIENT TEMPERATURE

Reservoir	Fluid Type	Ambient Temperature, degrees Celsius										Recommended Komatsu Fluids
		-22	-4	14	32	50	68	86	104	122	°F	
		-30	-20	-10	0	10	20	30	40	50	°C	
Engine oil pan	Engine oil	[Shaded bar from 14°C to 68°C]										Komatsu EO10W30-DH
		[Shaded bar from 14°C to 104°C]										Komatsu EO15W40-DH
		[Shaded bar from 32°C to 86°C]										Komatsu EO30-DH
Transmission case	Power train oil (Note.1)	[Shaded bar from 32°C to 86°C]										TO30
		[Shaded bar from -22°C to 14°C]										TO10
Hydraulic system	Power train oil	[Shaded bar from 14°C to 68°C]										TO10
	Hydraulic oil	[Shaded bar from 14°C to 104°C]										HO46-HM
		[Shaded bar from -22°C to 104°C]										HO-MVK
	Engine oil	[Shaded bar from 14°C to 86°C]										Komatsu EO10W30-DH
[Shaded bar from 14°C to 104°C]										Komatsu EO15W40-DH		
Brake tank	Brake Cooling	[Shaded bar from -22°C to 104°C]										TO10
Axle	Power train oil	[Shaded bar from -22°C to 104°C]										TO30
	Engine oil	[Shaded bar from 32°C to 86°C]										EO50-CD
	Axle oil	[Shaded bar from -22°C to 68°C]										AXO80
Auto-Grease (Note.2)	Lithium EP grease	[Shaded bar from 14°C to 68°C]										G2-LI
Work equipment pin	Gear oil (Note. 3)	[Shaded bar from 14°C to 68°C]										GO80W90
Cooling system	SUPERCOOLANT (AF-NAC) (Note.4)	[Shaded bar from -22°C to 104°C]										AF-NAC
Fuel tank	Diesel fuel	[Shaded bar from -22°C to 68°C]										ASTM Grade No.1-D S15 ASTM Grade No.1-D S500
		[Shaded bar from 14°C to 86°C]										ASTM Grade No.2-D S15 ASTM Grade No.2-D S500

AJA00845

• ASTM: American Society of Testing and Material

Capacity \ Reservoir		Engine oil pan	Transmission case	Hydraulic system	Brake tank	
					Brake	Cooling
Specified	Liters	300	380	1900	60	280
	US gal	79.20	100.32	501.60	15.84	73.92
Refill	Liters	260	350	1200	45	270
	US gal	68.64	92.40	316.80	11.88	71.28

Capacity \ Reservoir		Axle (front and rear) (each)	Auto-grease	Work equipment pin	Cooling system	Fuel tank
US gal	176.88	-	-	134.64	1346.4	
Refill	Liters	670	-	-	-	-
	US gal	176.88	-	-	-	-

**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: Oil used in the power train is different from engine oil. Use an appropriate oil recommended for each application.

Note .2: If the machine is equipped with an auto-greasing device, use lithium-based grease No. 0 when operating at temperatures below -20°C (-4°F).

Note .3: Use GL-5 for the SAE80W-90 gear oil. Do not use GL-4.

**Note 4: COOLANT**

1) Komatsu genuine SUPERCOOLANT (AF-NAC) 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 SUPERCOOLANT (AF-NAC). SUPERCOOLANT (AF-NAC) has excellent anticorrosion, antifreeze and cooling properties and can be used continuously for two years or 4000 hours. SUPERCOOLANT (AF-NAC) is strongly recommended wherever available.

2) For details of the ratio when diluting COOLANT with water, see "CLEAN INSIDE OF COOLING SYSTEM (PAGE 4-23)".

When the machine is shipped from the factory, it may be filled with coolant containing 30% or more COOLANT (AF-NAC). In this case, no adjustment is needed for temperatures down to -10°C (14°F). (never dilute with water)

3) To maintain the anticorrosion properties of COOLANT, always keep the density of COOLANT between 30% and

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

When using commercially available oils other than Komatsu genuine oil, consult your Komatsu distributor.

# STANDARD TIGHTENING TORQUES FOR BOLTS AND NUTS

## TORQUE LIST



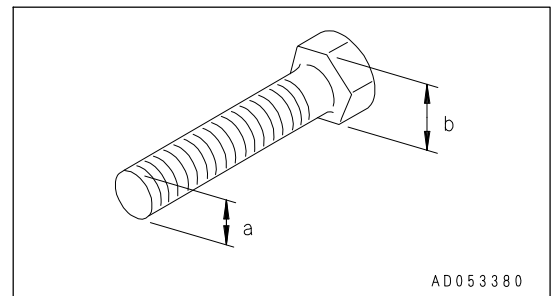
If nuts, bolts, or other parts are not tightened to the specified torque, it will cause looseness or damage to the tightened parts, and this will cause failure of the machine or problems with operation.

Always pay careful attention when tightening parts.

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

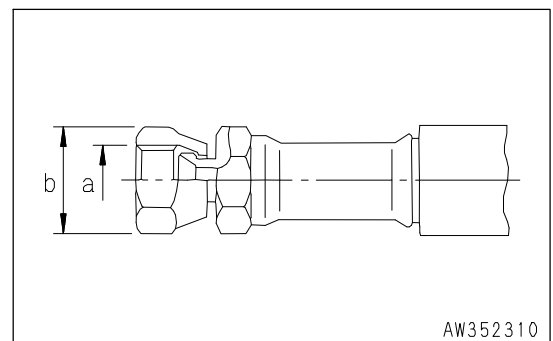
If it is necessary to replace any nut or bolt, always use a Komatsu genuine part of the same size as the part that was replaced.

Thread diameter of bolt (a)(mm)	Width across flats (b)(mm)	Tightening torque					
		Target value			Service limit		
		Nm	kgm	lbft	Nm	kgm	lbft
6	10	13.2	1.35	9.8	11.8-14.7	1.2-1.5	8.7-10.8
8	13	31	3.2	23.1	27-34	2.8-3.5	20.3-25.3
10	17	66	6.7	48.5	59-74	6.0-7.5	43.4-54.2
12	19	113	11.5	83.2	98-123	10.0-12.5	72.3-90.4
14	22	177	18	130.2	157-196	16.0-20.0	115.7-144.7
16	24	279	28.5	206.1	245-309	25.0-31.5	180.8-227.8
18	27	382	39	282.1	343-425	35.0-43.5	253.2-314.6
20	30	549	56	405.0	490-608	50.0-62.0	361.7-448.4
22	32	745	76	549.7	662-829	67.5-84.5	488.2-611.2
24	36	927	94.5	683.5	824-1030	84.0-105.0	607.6-759.5
27	41	1320	135.0	976.5	1180-1470	120.0-150.0	868.0-1085.0
30	46	1720	175.0	1265.8	1520-1910	155.0-195.0	1121.1-1410.4
33	50	2210	225.0	1627.4	1960-2450	200.0-250.0	1446.6-1808.3
36	55	2750	280.0	2025.2	2450-3040	250.0-310.0	1808.3-2242.2
39	60	3280	335.0	2423.1	2890-3630	295.0-370.0	2133.7-2676.2



Apply the following table for Hydraulic Hose.

Thread diameter a (mm)	Width across flats b (mm)	Tightening torque					
		Target value			Permissible range		
		Nm	kgm	lbft	Nm	kgm	lbft
10	14	14.7	1.5	10.8	12.7 - 16.7	1.3 - 1.7	9.4 - 12.3
14	19	29.4	3.0	21.7	27.5 - 39.2	2.8 - 4.0	20.3 - 28.9
18	24	78.5	8.0	57.9	58.8 - 98.1	6.0 - 10.0	43.4 - 72.3
22	27	117.7	12.0	86.6	88.3 - 137.3	9.0 - 14.0	65.1 - 101.3
24	32	147.1	15.0	108.5	117.7 - 176.5	12.0 - 18.0	86.8 - 130.2
30	36	215.7	22.0	159.1	176.5 - 245.2	18.0 - 25.0	130.2 - 180.8
33	41	255.0	26.0	188.1	215.7 - 284.4	22.0 - 29.0	159.1 - 209.8





## 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.

**SAFETY CRITICAL PARTS**

No.	Safety critical parts for periodic replacement	Q'ty	Replacement interval
1	Fuel hose (Fuel tank - fuel filter)	1	Every 4000 hours or every 2 years, whichever comes sooner
2	Fuel hose (Fuel filter - P.T. pump)	1	
3	Fuel hose (Fuel return - cooler tube)	1	
4	Fuel hose (Cooler tube - fuel cooler in)	1	
5	Fuel hose (Fuel cooler out - cooler tube)	1	
6	Fuel hose (Cooler tube - fuel tank)	1	
7	Steering cylinder hose	4	
8	Hose of main suction tube	1	
9	Outlet hoses of steering pump	2	
10	Suction hoses of loader pump	2	
11	Outlet hoses of loader pump	4	
12	Outlet hoses of switch pump	2	
13	Brake hose (Pump - accumulator charge valve)	2	
14	Brake hose (Accumulator - tandem valve)	2	
15	Brake hose (Accumulator - single valve)	2	
16	Brake hose (Charge valve - accumulator)	2	
17	Brake hose (Tandem valve - front brake)	4	
18	Brake hose (Tandem valve - rear brake)	3	
19	Brake hose (Single valve - tandem valve)	1	
20	Brake hose (Tandem valve - drain block)	1	
21	Brake hose (Single valve - drain block)	1	
22	Brake hose (Drain block - brake oil tank)	2	
23	Brake hose (Brake accumulator - emergency parking brake valve)	1	
24	Brake hose (Emergency parking brake valve - parking brake)	1	
25	Brake hose (Emergency parking brake valve - parking brake solenoid)	1	
26	Brake hose (Emergency parking brake valve - drain block)	1	
27	Brake hose (Charge valve drain - drain block)	1	
28	Brake hose (Brake tank - brake pump)	1	
29	Brake hose (Charge valve P.P port - accumulator)	1	
30	Packings, seals, O-rings of steering cylinder	1 set	
31	Rubber parts for treadle valve	1 set	
32	Rubber parts for slack adjuster	1 set	
33	Hydraulic pump pilot hose	1	
34	O-ring for main control valve	1 set	At overhaul (12000 hours)
35	O-ring for steering demand valve	1 set	
36	Seat belt	1	Every 3 years after beginning to use or 5 years after manufacturing of seat belt, whichever comes sooner

# MAINTENANCE SCHEDULE CHART

## MAINTENANCE SCHEDULE CHART

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

REPLACE TRANSMISSION OIL FILTER ELEMENT ----- 4- 58

### WHEN REQUIRED

CHECK, CLEAN, OR REPLACE AIR CLEANER ELEMENT ----- 4- 20

CLEAN INSIDE OF COOLING SYSTEM ----- 4- 23

CHECK TRANSMISSION OIL LEVEL, ADD OIL ----- 4- 26

CHECK AXLE OIL LEVEL, ADD OIL ----- 4- 27

CLEAN AXLE CASE BREATHER ----- 4- 27

CLEAN FUEL TANK BREATHER ----- 4- 28

CLEAN AIR CONDITIONER CONDENSER ----- 4- 28

CHECK WINDOW WASHING FLUID LEVEL, ADD FLUID ----- 4- 28

CLEAN RADIATOR FINS AND OIL COOLER FINS ----- 4- 29

CLEAN FUEL COOLER FINS ----- 4- 29

REPLACE BUCKET TEETH ----- 4- 30

LUBRICATING ----- 4- 34

CHECK AIR CONDITIONER ----- 4- 35

BLEEDING AIR FROM BRAKE HYDRAULIC CIRCUIT ----- 4- 36

BLEEDING AIR FROM PPC CIRCUIT ----- 4- 36

REPLACE SLOW BLOW FUSE ----- 4- 37

BLEEDING AIR FROM HYDRAULIC TANK ----- 4- 38

REPLACE ETHER CARTRIDGE ----- 4- 40

SELECTION AND INSPECTION OF TIRES ----- 4- 41

### CHECK BEFORE STARTING

### EVERY 50 HOURS SERVICE

DRAIN WATER, SEDIMENT FROM FUEL TANK ----- 4- 44

### EVERY 100 HOURS SERVICE

CHECK OIL LEVEL IN HYDRAULIC TANK, ADD OIL ----- 4- 45

CLEAN ELEMENT IN AIR CONDITIONER FRESH AIR FILTER ----- 4- 46

**EVERY 250 HOURS SERVICE**

CHECK BATTERY ELECTROLYTE LEVEL -----	4- 47
CHECK PARKING BRAKE -----	4- 48
CHANGE OIL IN ENGINE OIL PAN, REPLACE ENGINE OIL FILTER CARTRIDGE -----	4- 49
REPLACE FUEL FILTER CARTRIDGE -----	4- 50
CHECK, ADJUST DENSITY OF COOLING WATER ADDITIVE -----	4- 52
REPLACE CORROSION RESISTOR CARTRIDGE -----	4- 53
CHECK, ADJUST FAN BELT -----	4- 53
CHECK ALTERNATOR DRIVE BELT -----	4- 53
CHECK ENGINE BREATHER HOSE -----	4- 54
CHECK ENGINE HOSES -----	4- 54
CHECK FAN -----	4- 54
CHECK AIR CONDITIONER COMPRESSOR BELT TENSION, ADJUST -----	4- 55
CHECK FOR LOOSE WHEEL HUB NUTS, TIGHTEN -----	4- 56
CLEAN ELEMENT IN AIR CONDITIONER RECIRCULATION FILTER -----	4- 56
CHECK FRAME AND LIFT ARM -----	4- 56
CHECK REMAINING AMOUNT OF GREASE IN AUTO-GREASING TANK, ADD GREASE -----	4- 57

**EVERY 500 HOURS SERVICE**

REPLACE TRANSMISSION OIL FILTER ELEMENT -----	4- 58
REPLACE BRAKE OIL FILTER ELEMENT -----	4- 60
LUBRICATE CENTER DRIVE SHAFT -----	4- 62

**EVERY 1000 HOURS SERVICE**

CHANGE OIL IN TRANSMISSION CASE, CLEAN STRAINER -----	4- 63
CLEAN TRANSMISSION CASE BREATHER -----	4- 64
REPLACE BYPASS OIL FILTER ELEMENT -----	4- 65
LUBRICATING -----	4- 68
TIGHTEN ROPS -----	4- 68

**EVERY 1500 HOURS SERVICE**

CHECK ENGINE VALVE CLEARANCE AND INJECTOR, ADJUST -----	4- 69
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**EVERY 2000 HOURS SERVICE**

CHANGE OIL IN HYDRAULIC TANK, REPLACE HYDRAULIC FILTER ELEMENT -----	4- 70
CLEAN HYDRAULIC TANK STRAINER -----	4- 72
REPLACE HYDRAULIC TANK BREATHER ELEMENT -----	4- 73
CLEAN PPC CIRCUIT STRAINER -----	4- 73
CHANGE AXLE OIL(*) -----	4- 74
REPLACE ELEMENT IN AIR CONDITIONER RECIRCULATION AIR FILTER, FRESH AIR FILTER ---	4- 76
CHECK BRAKE DISC WEAR -----	4- 76
CHANGE BRAKE OIL -----	4- 77
CLEAN BRAKE CIRCUIT STRAINER -----	4- 79
REPLACE BRAKE OIL TANK BREATHER -----	4- 80
CHECK ACCUMULATOR FUNCTION -----	4- 80
CHECK ACCUMULATOR GAS PRESSURE -----	4- 81
CHANGE OIL FOR WORK EQUIPMENT PINS -----	4- 81

\*: The interval of 2000 hours for changing the axle oil is for standard operations. If the brake is used frequently or the brakes make a sound, change the oil after a shorter interval.

**EVERY 10000 HOURS SERVICE**

CLEAN ENGINE -----	4- 83
CHECK FAN DRIVE IDLER ARM -----	4- 83
GREASE ENGINE MOUNT TRUNNION -----	4- 83
CHECK FAN PULLEY -----	4- 84
CHECK WATER PUMP -----	4- 84
CHECK TURBOCHARGER -----	4- 84
CHECK VIBRATION DAMPER -----	4- 84

## SERVICE PROCEDURE

### INITIAL 250 HOURS SERVICE

Perform the following maintenance only after the first 250 hours.

- Replace transmission oil filter element

For details of the method of maintaining, see EVERY 500 HOURS MAINTENANCE.

## WHEN REQUIRED

### CHECK, CLEAN, OR REPLACE AIR CLEANER ELEMENT

#### WARNING

- If inspection, cleaning, or maintenance is carried out with the engine running, dirt will get into the engine and damage it. Always stop the engine before carrying out these operations.
- When using compressed air, there is danger that dirt may be blown around and cause serious injury. Always use protective glasses, dust mask, and other protective equipment.

### CHECKING

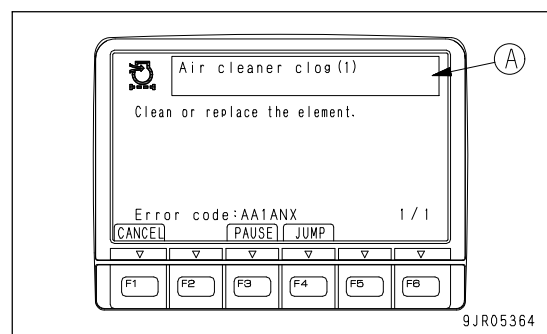
If air cleaner clogging warning display (A) is displayed on the multi monitor, clean the air cleaner element.

### NOTICE

Do not clean the element until the air cleaner clogging warning display is given.

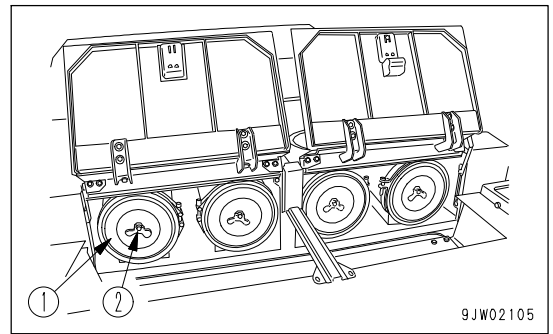
If the element is cleaned frequently before the air cleaner clogging warning display is given, the air cleaner will not be able to display its proper performance and the cleaning efficiency will go down.

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



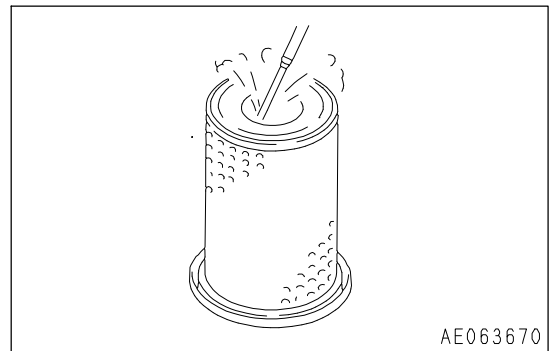
**CLEANING OR REPLACING OUTER ELEMENT**

1. Remove wing nut (1), then remove outer element (2).
2. Clean the inside of the air cleaner body.

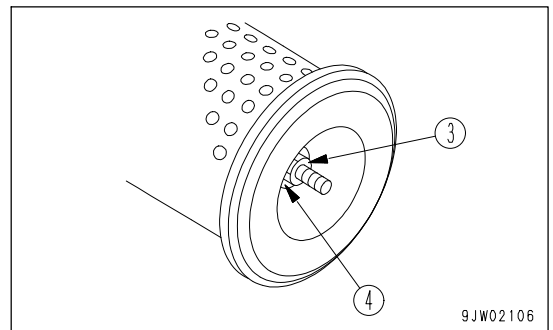


3. Direct dry compressed air (less than 0.2 MPa {2.1 kg/cm<sup>2</sup>, 30.0 PSI}) to the outer element from inside along its folds, then direct it from outside along its folds and again from inside.

- 1) Remove 1 seal from the element whenever the element has been cleaned.
- 2) Replace the outer element if it has been cleaned 6 times repeatedly or used throughout a year. Replace the inner element at the same time.
- 3) If the air cleaner clogging warning display is given immediately after the outer element has been cleaned, even when it has not been cleaned 6 times, replace the both the inner and outer elements.
- 4) Check inner element mounting nuts for looseness and, if necessary, retighten.



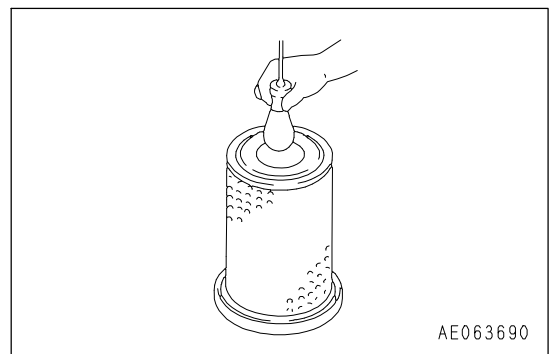
4. If small holes or thinner parts are found on the element when it is checked by shining a light through it after cleaning, replace the element.
5. If seal washer (4) is damaged or the thread of nut (3) is broken, replace with new parts.



**NOTICE**

**When cleaning the element, do not hit or beat it against anything. Do not use an element whose folds, gasket or seal are damaged.**

6. Set the cleaned element.





**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 inside of the air cleaner body, then remove the cover installed in Step 2.
4. Fit a new inner element to the connector and tighten it with nuts.

**NOTICE**

**The inner element must not be used again even after cleaning. When replacing the outer element, replace the inner element at the same time.**

5. Install the outer element and the cover.

**REMARK**

For both of inner element and outer element, when the element is attached, nuts should be tighten up with the shaking motion of element in the way that the sealing rubber of the tip of the element closely contact with the inside of the body.

**CLEAN INSIDE OF COOLING SYSTEM**

 **WARNING**

- Immediately after the engine is stopped, the cooling water is at high temperature and the radiator is under high internal pressure. If the radiator cap is removed in this condition and the water is drained, it may cause burns. To prevent this, wait for the temperature to go down, then turn the cap slowly to release the internal pressure.
- The cleaning operation is carried out with the engine running. When standing up from the operator's seat or leaving the cab, set the parking brake lever and work equipment lock lever to the LOCK position.
- For details when starting the engine, see "CHECK BEFORE STARTING ENGINE, ADJUST (PAGE 3-75)" and "STARTING ENGINE (PAGE 3-92)".
- When the undercover has been removed, there is danger of coming into contact with the fan.  
When the engine is running, never go into the area at the rear of the machine.

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

Clean the inside of the cooling system, change the coolant and replace the corrosion resistor according to the table below.

Coolant	Type of additive for coolant	Interval of cleaning inside of cooling system and changing antifreeze coolant	Replacing corrosion resistor
Komatsu genuine SUPERCOOLANT (AF-NAC)	Cummins DCA4	Every two years or every 4000 hours whichever comes first	Every 250 hours and when cleaning the inside of the cooling system and when changing coolant
Permanent type antifreeze (All-season type)		Every year (autumn) or every 2000 hours whichever comes first	

Komatsu genuine SUPERCOOLANT (AF-NAC) 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 SUPERCOOLANT (AF-NAC). SUPERCOOLANT (AF-NAC) has excellent anticorrosion, antifreeze and cooling properties and can be used continuously for two years or 4000 hours.

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

To maintain the anticorrosion properties of COOLANT, always keep the density of COOLANT between 30% and 64%.

The mixing ratio differs according to the ambient temperature, but a minimum of 30% by volume is needed. When deciding the proportions for mixing the COOLANT with water, investigate the minimum temperature in the past and use the table below to decide the mixing ratio.

In fact, set a temperature that is 10°C (18°F) lower than the minimum temperature.

The freezing temperature of 100% undiluted COOLANT is -15°C (5°F). Be careful not to keep undiluted COOLANT at temperatures below -15°C (5°F).

**Mixing rate of water and COOLANT**

Min atmospheric temperature	°C	- 10	- 15	- 20	- 25	- 30
	°F	14	5	-4	-13	-22
Amount of COOLANT	Liters	148	177	202	227	246.5
	US gal	39.07	46.73	53.33	59.93	65.08
Amount of water	Liters	345	316	291	266	246.5
	US gal	91.08	83.42	76.82	70.22	65.07
Amount of additive (DCA4)	Liters	17				
	US gal	4.49				
Volume ratio	%	30	36	41	46	50

**! WARNING**

- COOLANT is flammable, so keep it away from flame.
- COOLANT is toxic. When open the drain valve, be careful not to get water containing coolant on you. If it gets in your eyes, flush your eyes with large amount of fresh water and see a doctor at once.
- When changing the coolant or draining the coolant from the radiator before carrying out repairs, ask a specialist company to handle any coolant containing COOLANT, or contact your Komatsu distributor. COOLANT is toxic, so never pour it into drainage water ditches or drain it onto the ground surface.

**NOTICE**

Please use Komatsu genuine SUPERCOOLANT (AF-NAC) for the COOLANT. As a basic rule, we do not recommend the use of any COOLANT other than SUPERCOOLANT (AF-NAC).

When diluting the COOLANT, use distilled water or tap water (soft water).

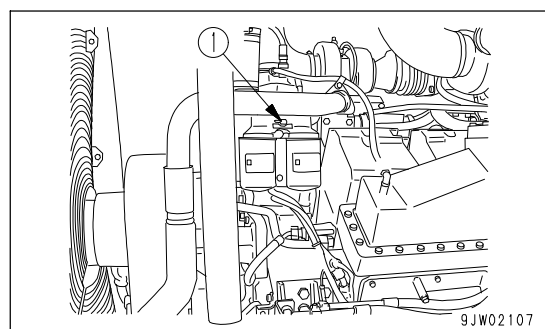
(For details of the distilled water, see "COOLANT AND WATER FOR DILUTION (PAGE 4-5)").

We recommend the use of a COOLANT density meter to control the mixing ratio.

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

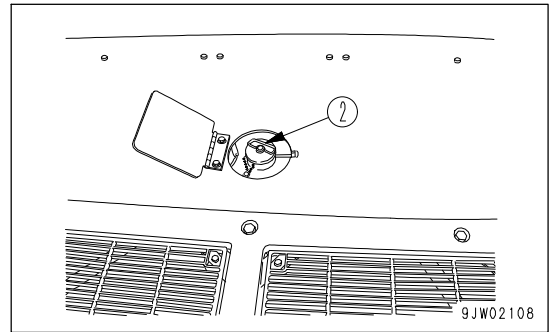
Prepare a hose to supply COOLANT and water.

1. Stop the engine, then turn corrosion resistor valve (1) to the OFF position to close it.

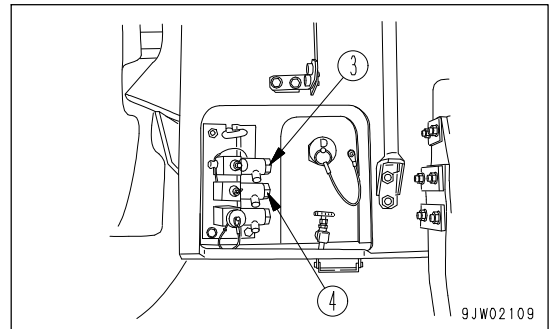


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2. Press the pressure reduction button on radiator cap (2) to release the pressure before removing the cap.



3. Prepare a container to catch the coolant , then open drain plugs (3) and (4) of the radiator, and drain the water.
4. After draining the coolant, close drain plugs (3) and (4), and fill with tap water.
5. When the radiator is full, start the engine, and run it at low idle. Keep the engine running at low idle for 10 minutes until the coolant temperature reaches more than 90°C (194°F).
6. Stop the engine, open drain plugs (3) and (4) to drain the



7. Close drain plugs (3) and (4).
8. Replace the corrosion resistor, then set valve (1) to the ON position to open it.  
For details of the procedure for replacing the corrosion resistor, see REPLACE CORROSION RESISTOR CARTRIDGE (PAGE 4-53).
9. Put the COOLANT and water into a mixing container and mix it thoroughly.  
For details of the ratio for mixing COOLANT and water, see "Mixing rate of water and COOLANT".
10. Pour the coolant mixture made in Step 9 through the water filler up to the bottom of the filler port.
11. To bleed the air from the cooling system, run the engine at low idle for 5 minutes, and for a further 5 minutes at high idle. (When doing this, leave the radiator cap off.)
12. Stop the engine, wait for approx. 3 minutes, then add tap water until the water level is near the water filler port, and tighten the cap. Check the coolant level and add water if necessary.

**CHECK TRANSMISSION OIL LEVEL, ADD OIL****WARNING**

The parts and oil are at high temperature immediately after the engine is stopped, and may cause burns. Wait for the temperature to go down before starting the work.

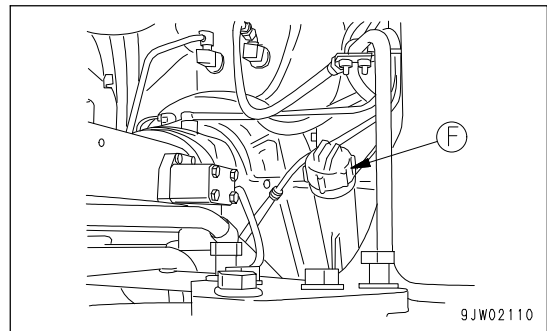
Carry out this procedure if there is any sign of oil on the transmission case, or if there is oil mixed with the cooling water.

Before starting the engine, check that the oil is in area A at the top of sight gauge (G) or between top area A and bottom area B.

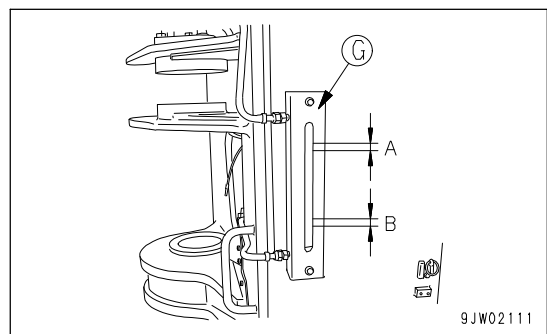
When changing the oil, such as when changing the transmission oil or when the transmission has been replaced, add oil first to area A at the top of sight gauge (G).

After that, use the procedure below to check the oil level.

1. Start the engine and run it at low idle.
2. Remove cap of oil filler (F).

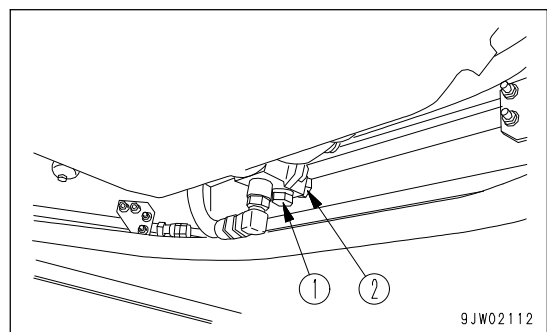


3. When the oil is warmed up (approx. 40 - 60 °C (104 - 140 ° F)), check the oil level with sight gauge (G).  
If the oil is inside bottom area B of sight gauge (G), the oil level is correct.



4. If the oil does not reach bottom area B of sight gauge (G), add oil through oil filler port (F).

5. If the oil is above bottom area B of sight gauge (G), remove drain plug (1), loosen drain valve (2) to drain the excess oil, then check the oil level again.



6. If the oil level is correct, then tighten the cap.

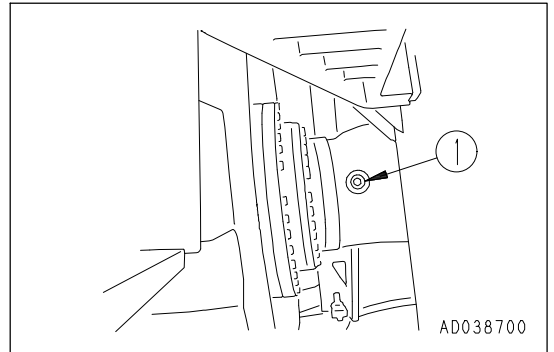
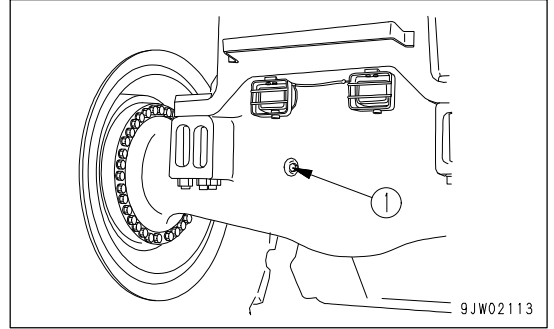
**CHECK AXLE OIL LEVEL, ADD OIL**

 **WARNING**

The parts and oil are at high temperature immediately after the engine is stopped, and may cause burns. Wait for the temperature to go down before starting the work.

Perform this procedure if there is any sign of oil on the axle case. Inspect the machine on a horizontal surface. (If the road surface is at an angle, the oil level cannot be checked correctly.)

1. Stop the engine and remove level plug (1).

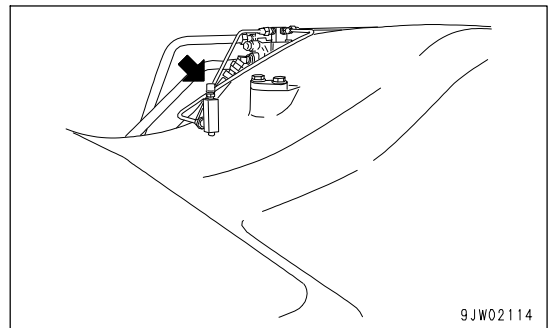


2. Check that the oil level is near the bottom of the plug hole.
3. If the oil is not near the bottom edge of the hole, add oil through oil filler (F).
4. If the oil level is correct, install level plug (1)

Tightening torque: 127 to 177 Nm (13.0 to 18.0 kgm, 94.0 to 130.2 lbft)

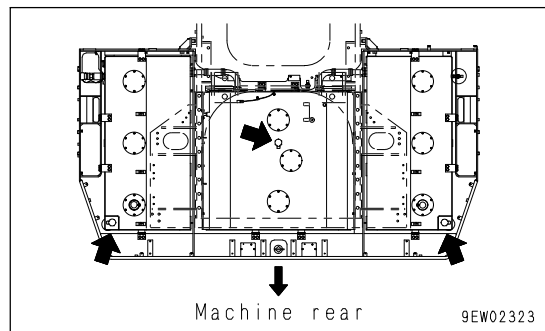
**CLEAN AXLE CASE BREATHER**

Remove all mud and dirt from around the breather with a brush. After removing the mud or dirt from around the breather, remove the breather, immerse it in cleaning fluid and clean it. When cleaning the breather, clean the breathers at two places (front and rear). After removing the breather, take steps to prevent dirt or dust from entering the mount.



### CLEAN FUEL TANK BREATHER

If there is any mud or dirt stuck to the breather, remove it with a brush.



### CLEAN AIR CONDITIONER CONDENSER

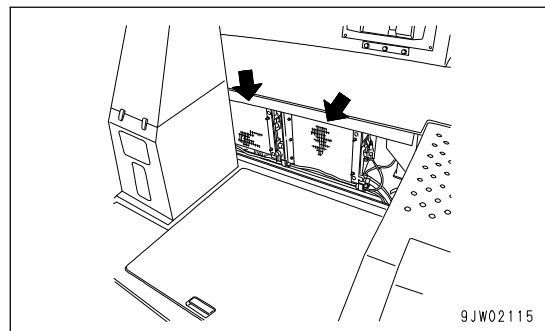
**! WARNING**

- Do not wash the condenser with a steam cleaner. There is danger that the condenser could overheat.
- If high-pressure water hits your body directly or dirt is sent flying, there is danger of personal injury. Always wear protective glasses, dust mask, and other protective equipment.

Remove the cover of the air condenser.

If there is mud or dust on the air conditioner condenser, clean it with water.

If the water pressure is too high, the fins may get deformed. When washing with a high pressure washing machine, apply the water from a reasonable distance.



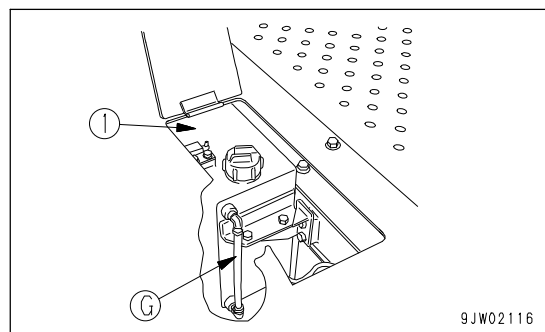
### CHECK WINDOW WASHING FLUID LEVEL, ADD FLUID

Check the level of the washer fluid in washer tank (1). If the level is low, add automobile window washer fluid.

It should be possible to see the washer fluid level in sight gauge (G).

If the fluid level is close to the bottom of the sight gauge, add fluid as soon as possible.

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



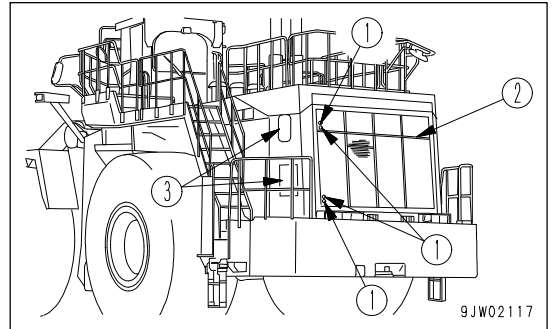
**CLEAN RADIATOR FINS AND OIL COOLER FINS**

**! WARNING**

If compressed air, high-pressure water, or steam hits your body directly or dirt is sent flying by the compressed air, high-pressure water, or steam, there is danger of personal injury. Always wear protective glasses, dust mask, and other protective equipment.

Carry out this procedure if there is any mud or dirt stuck to the radiator or oil cooler.

1. Remove bolt (1) and open radiator grill (2).
2. Open inspection cover (3) at the side face of the radiator
3. Use compressed air to blow off the mud, dirt, or leaves clogging radiator fins.



Steam or water may be used instead of compressed air. However, when carrying out powerful steam cleaning (high-pressure machine wash) of the heat exchange equipment (radiator, oil cooler), maintain sufficient distance from the machine when carrying out the operation. If steam cleaning (high-pressure machine wash) is carried out at close range, there is danger that the internal fins of the heat exchange equipment may be deformed, and this will cause early clogging and breakage.

4. Check the rubber hose. Replace with a new one if the hose is found to have cracks or to be hardened by aging. Also, check hose clamps for looseness.

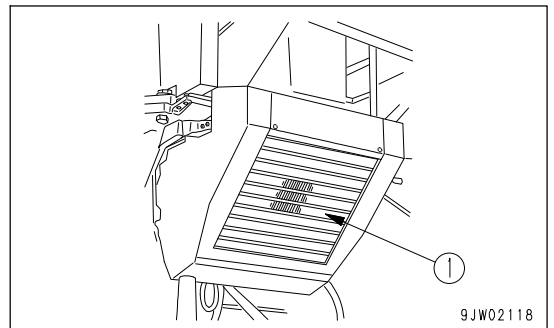
**CLEAN FUEL COOLER FINS**

**! WARNING**

- Never use steam cleaning to clean the fuel cooler fins. There is danger that the fuel may overheat.
- Letting compressed air or pressurized water hit a person's body directly, or using these and causing dust to fly may cause personal injury. Always wear protective glasses, anti-dust mask, and other protective equipment.

If there is mud or dust on the fuel cooler, clean the fuel cooler.

1. Remove cover (1) from the fuel cooler.
2. Use compressed air or high-pressure water to remove any mud, dirt, or leaves stuck to the fuel cooler.





## REPLACE BUCKET TEETH



### WARNING

- If the pin is hit out with strong force, there is danger that the pin may fly out. Check that there is no one in the surrounding area.
- There is danger of pieces flying during the replacement operation, so always wear protective clothing, such as safety glasses and gloves.

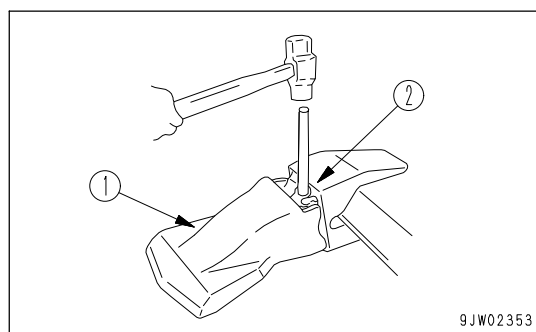
### TIP TOOTH

Replace the teeth before they wear down as far as the adapter.

1. Remove pin (2) installing the tooth to the bucket, then remove tooth (1).

To remove pin (2), hit it from the top and remove it from the bottom.

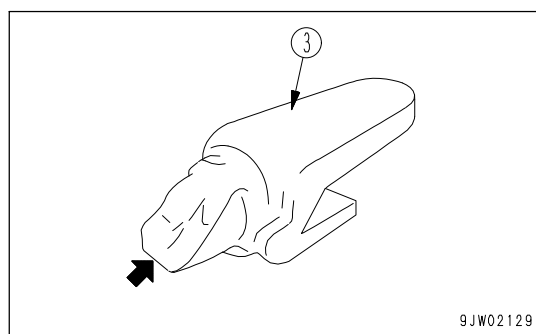
Turn tooth (1) counterclockwise to remove it.



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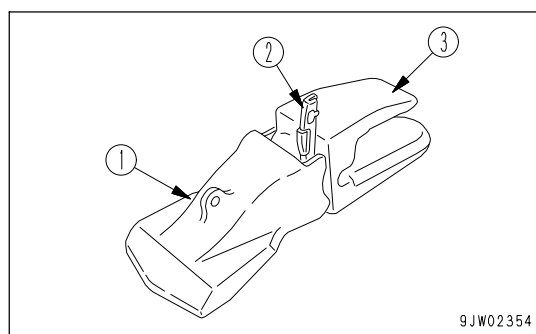
2. Clean the tip of adapter (3).

If there is sand or mud stuck to the adapter, the tooth will not enter and it will be impossible to knock in the pin.



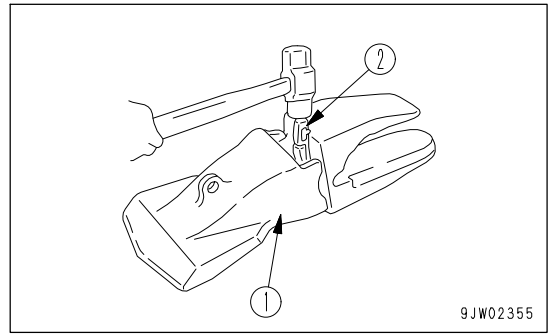
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3. Push tooth (1) on to adapter (3), check the direction of pin (2), then insert it.

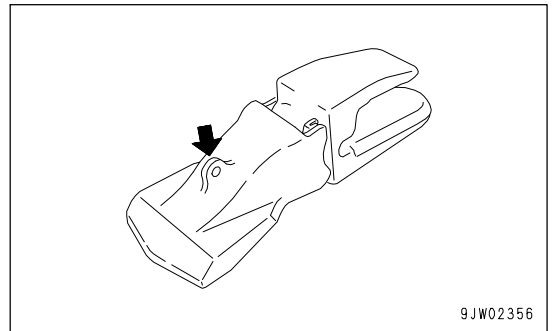


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4. Tap pin (2) and knock it in until it is level with the ear of tooth



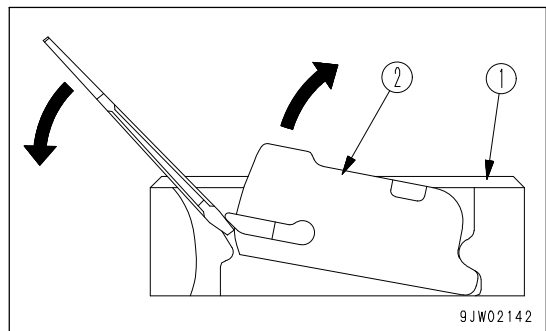
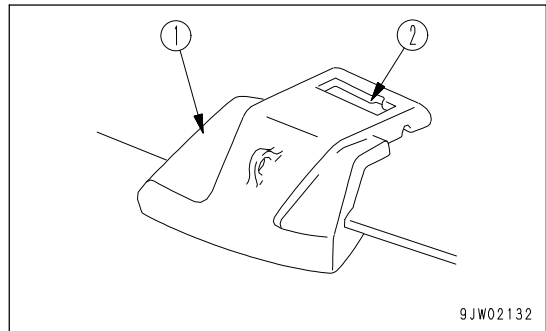
5. After installing the tooth, use a gas cutter to remove the lifting hook.



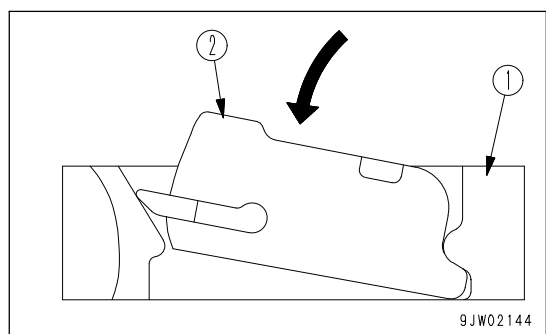
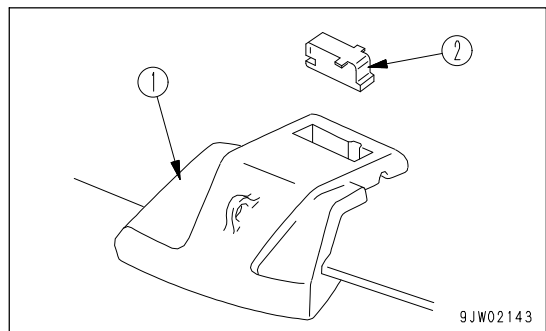
**EDGE PROTECTOR**

(Edge and side edge)

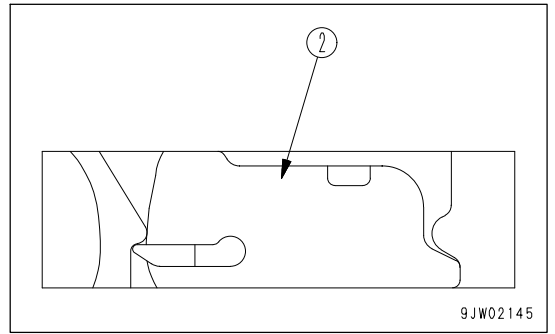
1. Remove pin (2) with a bar, then slide edge protector (1) to the front to remove it.



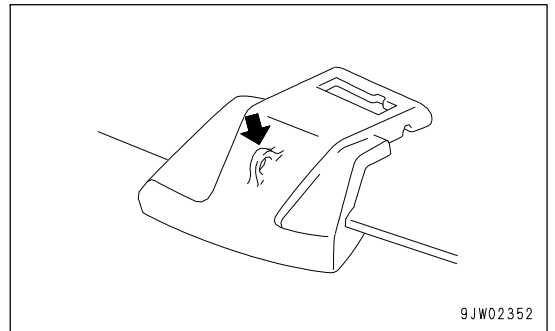
2. Install a new edge protector (1) to the bucket, then insert pin (2).



3. Tap lightly with a hammer to fit pin (2) completely.



4. After installing the edge protector, use a gas cutter to remove the lifting hook.

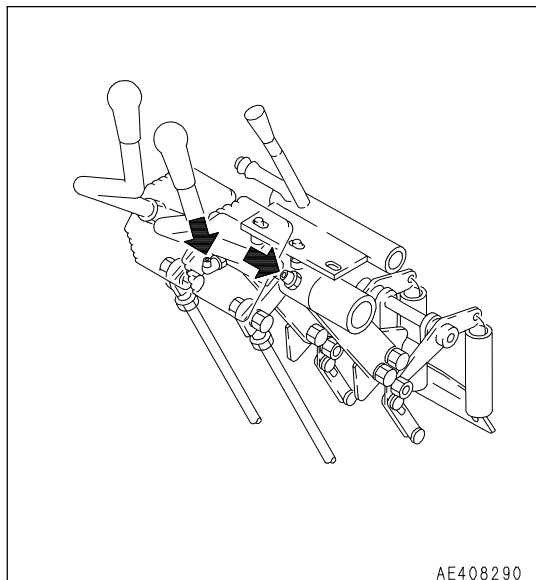


**LUBRICATING**

1. Using a grease pump, pump in grease through the grease fittings shown by arrows.
2. After greasing, wipe off any old grease that was pushed out.

(1) Work equipment control valve linkage (2 places)

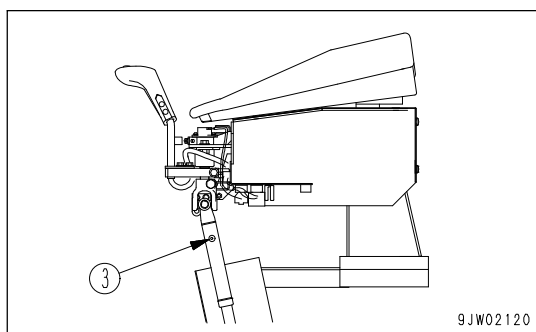
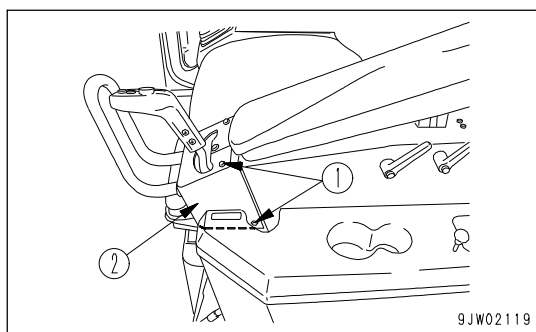
If the work equipment control lever is heavy or does not move smoothly, apply grease.



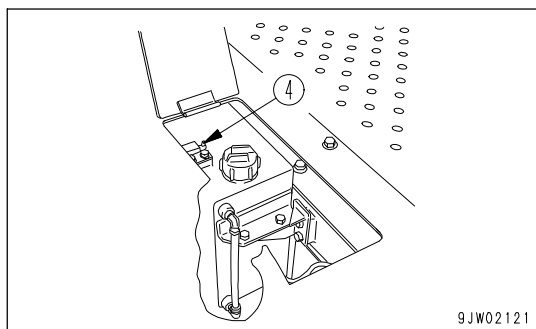
Joystick steering U-joint (2 points)

If the joystick steering is heavy or stiff when adjusted to the front or rear, lubricate the U-joints.

- Top (inside operator's compartment)
  - Remove 4 bolts (1), open cover (2) to the front, then pump in grease through grease fitting (3).
  - When doing this, be careful not to damage the grease nipple inside cover (2).



- Bottom (under floor)
  - Add grease through grease fitting (4) installed to the top of the window washer tank.



**CHECK AIR CONDITIONER**

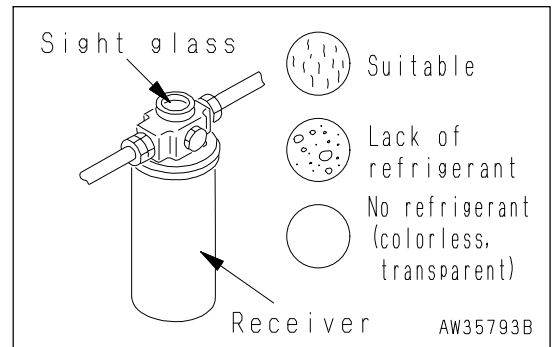
**CHECK LEVEL OF REFRIGERANT (GAS)**

 **WARNING**

If the refrigerant used in the air conditioner gets into your eyes or on your hands, it may cause loss of sight or frostbite. Do not touch the refrigerant. Never loosen any part of the refrigerant circuit.  
Do not bring any flame close to any point where the refrigerant gas is leaking.

If there is a lack of refrigerant (gas), the cooling performance will be poor. When operating the air conditioner at high speed with the engine at full throttle, use the receiver sight glass (inspection window) to check the condition of the refrigerant gas (R134a) flowing in the refrigerant circuit.

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



**REMARK**

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

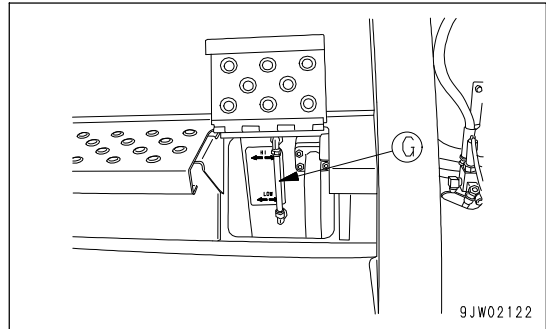
**OPERATING THE AIR CONDITIONER OFF-SEASON**

Even during the off-season, operate the air conditioner for 3 to 5 minutes once 1 month to maintain the oil film at all parts of the compressor.

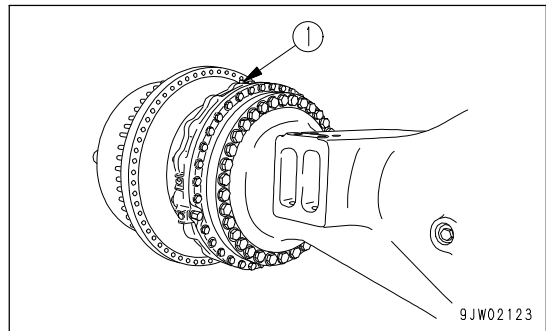
## BLEEDING AIR FROM BRAKE HYDRAULIC CIRCUIT

After removing the piping of brake hydraulic circuit, bleed the air from inside of the circuit as follows:

1. After assembling the piping, be sure to check that the connectors are not loose.
2. Put blocks under the wheels.
3. Use sight gauge (G) at the rear of the brake oil tank to check that the oil is up to the specified level.



4. Remove the air bleeder cap from the brake housing and insert one end of a vinyl hose in the brake housing and put the other end in a container.
5. Depress the brake pedal and loosen bleeder screw (1) to bleed air. After tightening bleeder screw, release the brake pedal slowly.
  - This work are to be performed by two persons. One depresses the brake pedal, and the other bleeds air through the bleeder screw (1).
  - Use the left-hand brake pedal.
  - Supply brake oil periodically to keep the level sufficiently high.



6. Repeat this operation until air bubbles stop coming out of the hose. Then, depress the pedal to the end and tighten bleeder screw (1) while the oil is flowing out.
7. Bleed the air at all 4 locations (4 wheels). After bleeding the air, check the oil level in the brake oil tank, and add oil if the level is low.

## BLEEDING AIR FROM PPC CIRCUIT

When removing piping of PPC circuit, or removing strainer, after assembling, bleed air from inside of the circuit as follows:

1. Put bucket control lever in TILT position and lift arm control lever in FLOAT position, and after cylinder reaches stroke end, keep in that position for one minute.
2. Put bucket control lever in DUMP position and lift arm control lever in RAISE position, and after cylinder reaches stroke end, keep in that position for one minute.

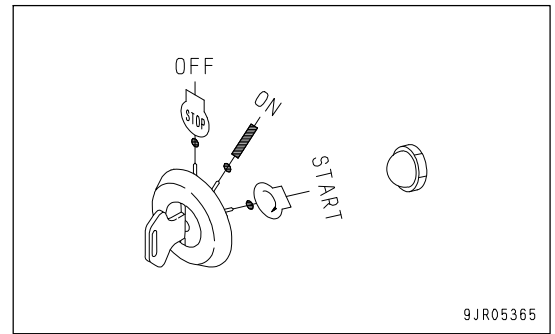
For details, contact your Komatsu distributor.

## REPLACE SLOW BLOW FUSE

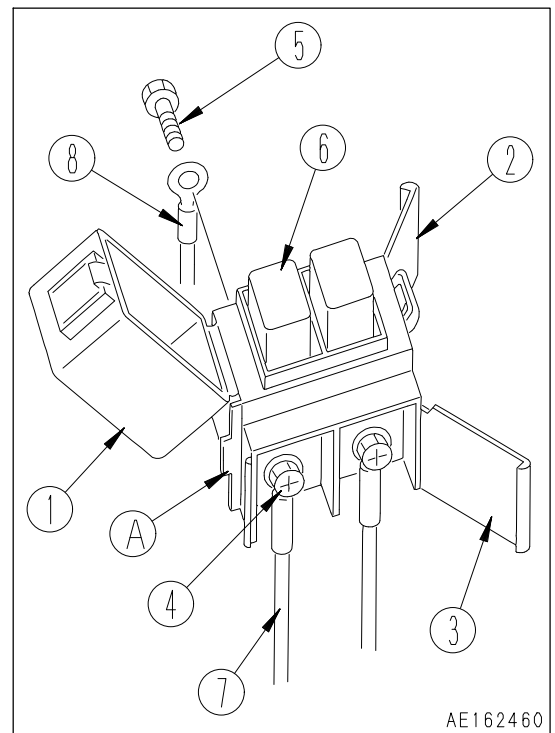
### NOTICE

- Always turn the power OFF when replacing the slow blow fuse (turn the starting switch to the OFF position).
- Always replace the slow blow fuse with a fuse of the same capacity.

1. Turn the starting switch to the OFF position.
2. Remove the slow blow fuse box from the chassis.



3. Open covers (1), (2), and (3) of the slow blow fuse box. Covers (2) and (3) can be removed easily by using protrusion (A) on the body as a fulcrum and levering the catch of the cover with a flat-headed screwdriver to release it.
4. Loosen screws (4) and (5), and remove. When screws (4) and (5) are removed, slow blow fuse (6) will also come off together with electric wiring (7) and (8).
5. Using screws (4) and (5), install a new slow blow fuse together with electric wiring (7) and (8) to the slow blow fuse box, then close covers (1), (2), and (3).
6. Install the slow blow fuse box to the chassis.





**BLEEDING AIR FROM HYDRAULIC TANK**

After changing, replacing or cleaning the oil, filter element, or strainer, bleed the air from inside the circuit.

If the oil or element in the hydraulic tank has been replaced, or any hydraulic cylinder, piston pump, work equipment, or piston pump piping has been removed, do as follows to bleed the air after completing the replacement operation

When bleeding the air, bleed the air from the piston pump first, then bleed the air from the hydraulic system.

**BLEEDING AIR FROM PISTON PUMP**

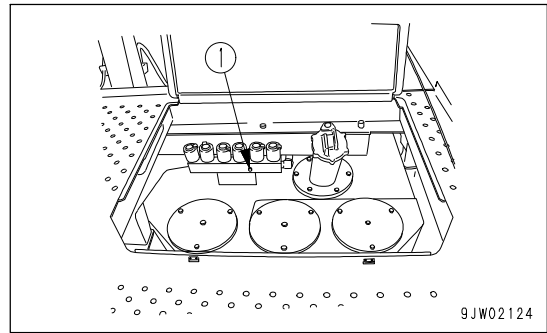
**NOTICE**

If the air is not bleed completely, the piston pump may be damaged, so always carry out the air bleeding operation correctly.

Before bleeding the air from the piston pump, check that the hydraulic is filled with oil up to the top of the sight gauge. (If the oil level is low, add oil.) The cap of the hydraulic tank remains removing, until the air bleeding of the piston pump finishes.

Remove plug (1) at the top of the hydraulic tank, then connect the pressurizing air hose.

Plug thread size: PT1/8



**BLEEDING AIR FROM TUBE ON SUCTION SIDE**

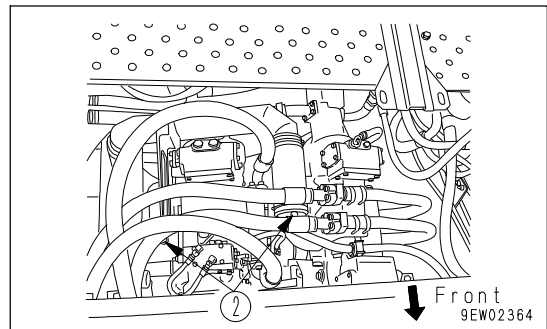
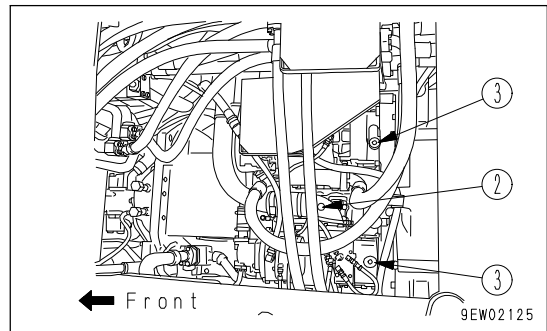
1. Loosen plug (2) on top of the tube at the suction side of the piston pump. (Loosen one place at a time.)
2. Supply air to the pressurizing air hose to pressurize the hydraulic tank.

**NOTICE**

To prevent the oil from spurting out, pressurize the hydraulic tank gradually.

3. When oil flows from the plug hole and the air has been completely removed, tighten plug (2). Repeat the same procedure to bleed the air from the other locations.

There is a plug in the suction tube of each pump, so carry out the bleeding operation for all plugs (4 places).



**REMARK**

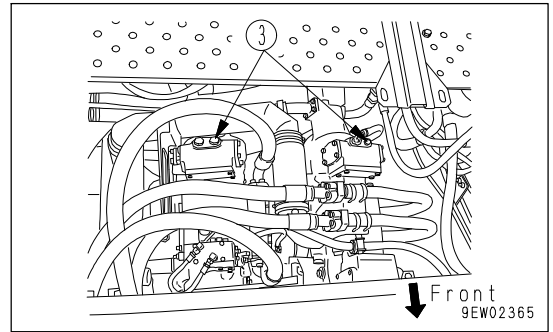
If all 4 plugs are loosened at the same time, oil will spurt out, so bleed the air from 1 plug at a time.

**BLEEDING AIR INSIDE PISTON PUMP**

1. Loosen plug (3) installed to the piston pump. (Loosen one place at a time.)
2. Supply air to the pressurizing air hose to pressurize the hydraulic tank.

**NOTICE**

To prevent the oil from spurting out, pressurize the hydraulic tank gradually.

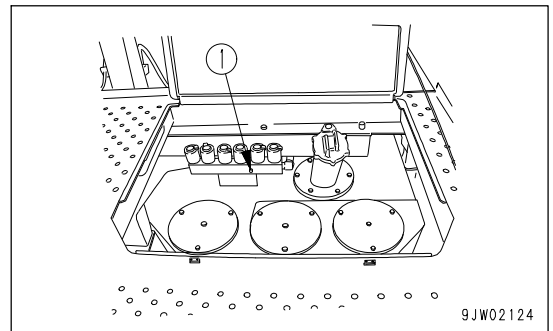


3. When oil flows from the plug hole and the air has been completely removed, tighten plug (3). Repeat the same procedure to bleed the air from the other locations.  
There is a plug in the suction tube of each pump, so carry out the bleeding operation for all plugs (4 places).

**REMARK**

If all 4 plugs are loosened at the same time, oil will spurt out, so bleed the air from 1 plug at a time.

4. Check the hydraulic oil level, and add oil if the oil level is low.
5. Remove the pressurizing air hose from the hydraulic tank and install plug (1).



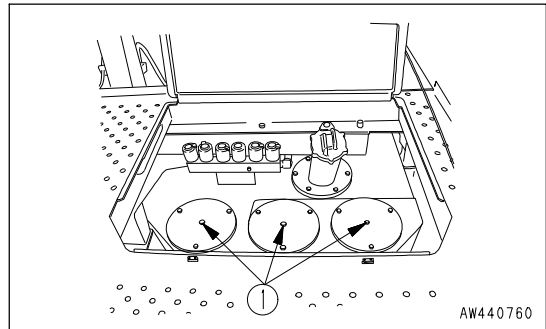
## BLEEDING AIR FROM HYDRAULIC CIRCUIT

### NOTICE

When bleeding the air, if the engine is run at high speed from the start, or the cylinder is operated fully to the end of its stroke, the air inside the cylinder may damage the piston packing.

Always do as follows when bleeding the air.

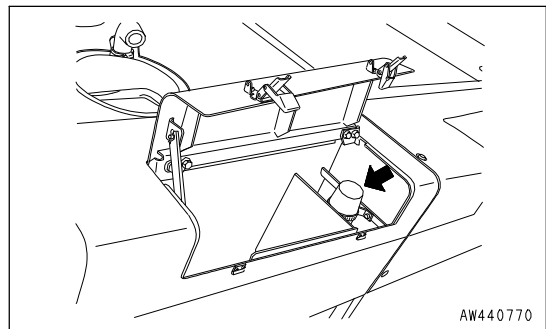
1. Check that the hydraulic oil in the hydraulic tank is at the specified level.
2. Start the engine, run at low idling for approx. 5 minutes, then check that there is no oil leakage from any place.
3. Run the engine at low idle, and extend and retract the steering, bucket, and lift arm cylinders 4 to 5 times. Be careful not to operate the cylinder to the end of its stroke (stop approx. 100 mm (3.9 in) before the end of stroke).
4. Next, operate the steering, bucket, and lift arm cylinders fully to the end of their stroke 3 or 4 times, then stop the engine.
5. Bleed the air from air bleed plugs (1) (3 places) in turn. Loosen plug (1), and when oil flows from the plug hole and the air has been completely removed, tighten plug (1).
6. Check the hydraulic oil level and ensure that is correct, Refer to "CHECK OIL LEVEL IN HYDRAULIC TANK, ADD OIL (PAGE 4-45)".



7. Next, raise the engine speed (approx. 1500 rpm) and repeat the air bleed operation in Steps 4 and 5. Repeat this operation until no more air comes out from plug (1).
8. After completing the air bleed operation, tighten plug (1).  
Tightening torque: 9.8 to 12.8 Nm (1.0 to 1.3 kgm, 7.2 to 9.4 lbf)
9. Check the hydraulic oil level and ensure that is correct, Refer to "CHECK OIL LEVEL IN HYDRAULIC TANK, ADD OIL (PAGE 4-45)".

## REPLACE ETHER CARTRIDGE

If the ether cartridge is empty, replace it with a new cartridge.

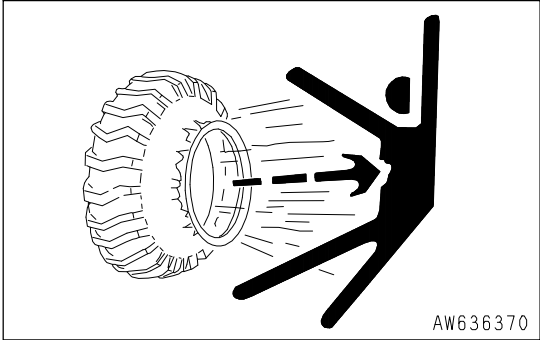


**SELECTION AND INSPECTION OF TIRES**

**! WARNING**

If a tire or a rim is handled improperly, the tire may burst or may be damaged and the rim may be broken and scattered, and that can cause serious injury or death.

- Since maintenance, disassembly, repair and assembly of the tires and rims require special equipment and skill, be sure to ask a tire repair shop to do the work.
- Do not heat or weld the rim to which the tire is installed. Do not make a fire near the tire.



**SELECTION OF TIRES**

**! WARNING**

Select the tires according to the conditions of use and the weight of the attachments on the machine. Use only specified tires and inflate them to the specified pressure.

Select the tires according to the conditions of use and the weight of the attachments of the machine. Use the following table.

Since the travel speed indicated on the speedometer varies with the tire size, consult your Komatsu distributor when using optional tires.

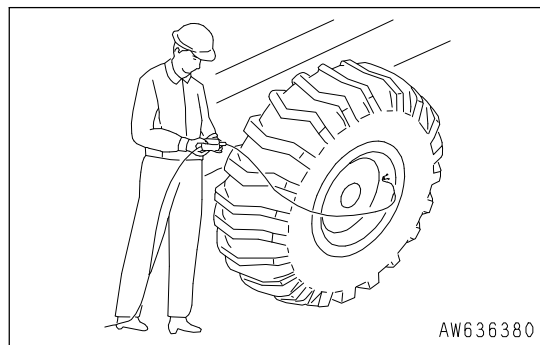
	Maximum load (kg (lb))	Tire size	Remarks
Front wheel	95300 (210137)	55.5/80-57-68PR(L5) (Standard)	
	95000 (209475)	65/65-57-62PR(L5) (If equipped)	
	111800 (246519)	60/80R57 ★ (L5) (If equipped)	
Rear wheel	95300 (210137)	55.5/80-57-68PR(L5) (Standard)	
	95000 (209475)	65/65-57-62PR(L5) (If equipped)	
	91000 (200655)	60/80R57 ★ (L5) (If equipped)	

**CHECK INFLATION PRESSURE OF TIRES**

**! WARNING**

When inflating a tire, check that no one will enter the working area. Use an air chuck which has a clip and which can be fixed to the air valve.

- While inflating the tire, check the inflation pressure occasionally so that it will not rise too high.
- If the rim is not fitted normally, it may be broken and scattered while the tire is inflated. To ensure safety, place a guard around the tire and do not work in front of the rim but work on the tread side of the tire.
- Abnormal drop of inflation pressure and abnormal fitting of the rim indicate trouble in the tire or rim. In this case, be sure to ask a tire repair shop to carry out repairs.
- Be sure to observe the specified inflation pressure.
- Do not adjust the inflation pressure of the tires just after high-speed travel or heavy-duty work.



**CHECK**

Measure the inflation pressure with a tire pressure gauge, while the tires are cool, before starting work.

**INFLATION OF TIRES**

Adjust the inflation pressure properly.

When inflating a tire, use an air chuck which can be fixed to the air valve of the tire as shown in the figure. Do not work in front of the rim but work on the tread side of the tire.

The proper inflation pressure is shown below.

Size	Inflation pressure
55.5/80-57-68PR(L5) (Standard)	0.59 MPa {6.0 kg/cm <sup>2</sup> , 85.2 PSI}
65/65-57-62PR(L5) (If equipped)	0.49 MPa {5.0 kg/cm <sup>2</sup> , 71.0 PSI}
60/80R57★(L5) (If equipped)	Front wheel: 0.63 MPa {6.4kg/cm <sup>2</sup> , 90.9 PSI} Rear wheel: 0.50 MPa {5.1kg/cm <sup>2</sup> , 72.4 PSI}

**NOTICE**

The optimum inflation pressure differs according to the type of work. For details, see "HANDLING THE TIRES (PAGE 3-124)".

**CHECK BEFORE STARTING**

For the following items, see "CHECK BEFORE STARTING (PAGE 3-78)".

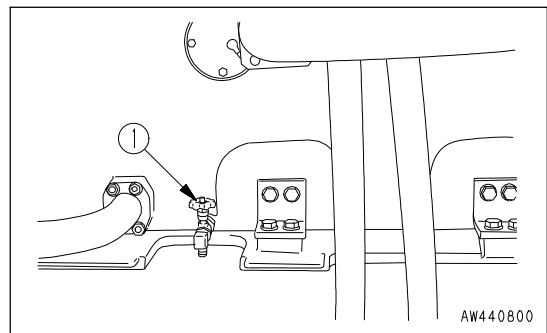
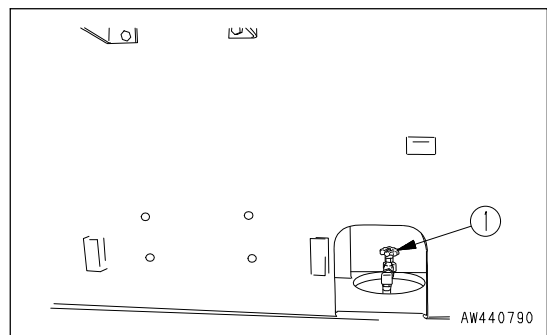
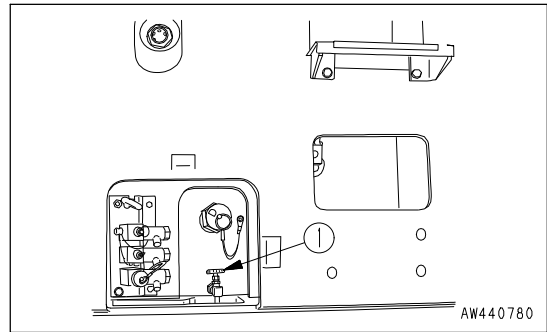
- Checking with machine monitor
- Check coolant level, add coolant
- Check oil level in engine oil pan, add oil
- Check brake oil tank level, add oil
- Check fuel level, add fuel
- Check electric wiring
- Check parking brake
- Check brake pedal
- Check inflation pressure of tires
- Check waterproof/fireproof dividing walls

**EVERY 50 HOURS SERVICE**

**DRAIN WATER, SEDIMENT FROM FUEL TANK**

Open drain valve (1) (3 places) at the right side of the fuel tank, and drain the water and sediment accumulated at the bottom of the tank.

There are drain valves in the left, right, and center fuel tanks, so drain the water and sediment from all the tanks.



**EVERY 100 HOURS SERVICE**

Maintenance for every 50 hours service should be carried out at the same time.

**CHECK OIL LEVEL IN HYDRAULIC TANK, ADD OIL**

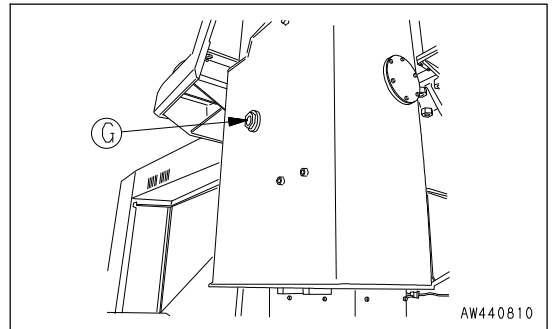
**! WARNING**

- The parts and oil are at high temperature immediately after the engine is stopped, and may cause burns. Wait for the temperature to go down before starting the work.
- When removing the oil filler cap, turn it slowly to release the internal pressure, then remove it.

1. Lower the bucket to the ground, stop the engine, wait for approx. 5 minutes, then check that the oil level is near the top of sight gauge (G).

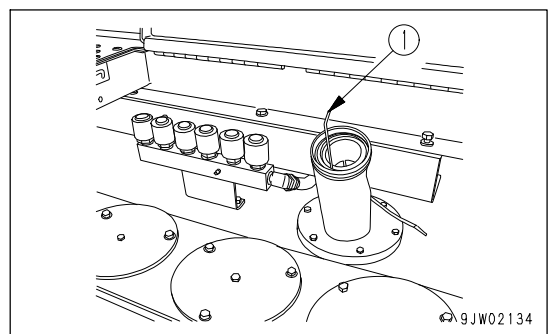
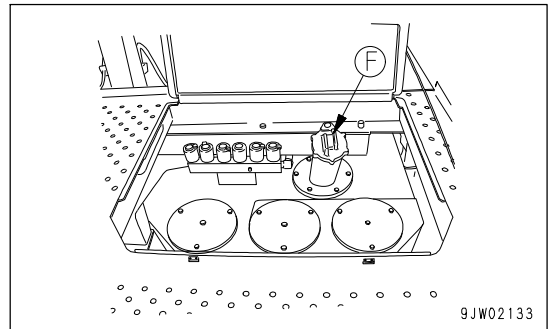
**NOTICE**

If the oil has been added to above H level, stop the engine and wait for the hydraulic oil to cool down, then drain the excess oil from the drain plug. If the oil is above H level, it will damage the hydraulic circuit or cause the oil to spurt out.



2. If the oil level is not near the top of the sight gauge, open the inspection cover at the top of the step and add oil through oil filler (F).

When adding oil, it is possible to check the oil level with oil level gauge (1). The oil should be near the H mark on the oil level gauge.



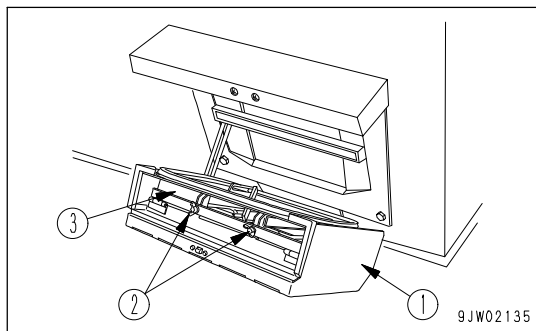


**CLEAN ELEMENT IN AIR CONDITIONER FRESH AIR FILTER****WARNING**

If compressed air scattered around dust and debris, there is danger of injury. Always wear protective equipment such as protective glasses and mask.

If the air conditioner has been used, the air filter should be cleaned.  
Stop the air conditioner before cleaning the element.

1. Open air conditioner FRESH filter cover (1) at the rear of the cab.
2. Remove wing bolt (2) then take out filter element (3) and clean it.
3. Blow dry compressed air (Max. 0.20 MPa (2 kg/cm<sup>2</sup>, 28.4 PSI)) from the inside of the element along its folds. Then blow the compressed air from the outside along the folds, and again from the inside.

**REMARK**

When assembling the element again, install so that the arrow at the top of the element faces the inside of the cab.

### EVERY 250 HOURS SERVICE

Maintenance for every 50 hours service should be carried out at the same time.

### CHECK BATTERY ELECTROLYTE LEVEL

Carry out this procedure 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, 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

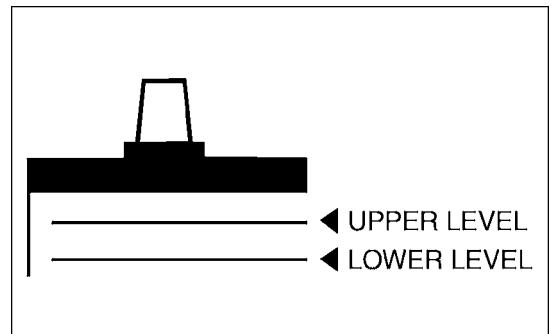
If there is a fear that the battery water may freeze after refilling with purified water (e.g. commercially available replenishment water for a battery), do the replenishment before the day's work on the next day.

Inspect the battery electrolyte level at least once 1 month and follow the basic safety procedures given below.

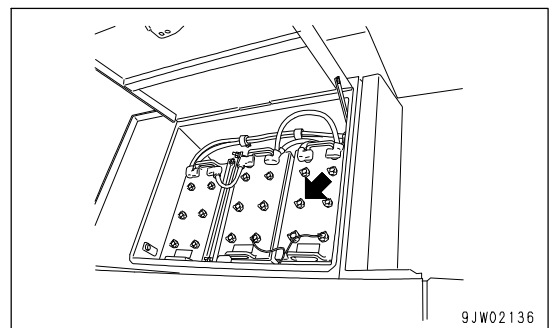
### WHEN CHECKING ELECTROLYTE LEVEL FROM SIDE OF BATTERY

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 mid point of U.L and L.L marks, remove the cap immediately and add the distilled
3. After adding distilled water, tighten cap (1) securely.
4. After adding, securely tighten the cap.



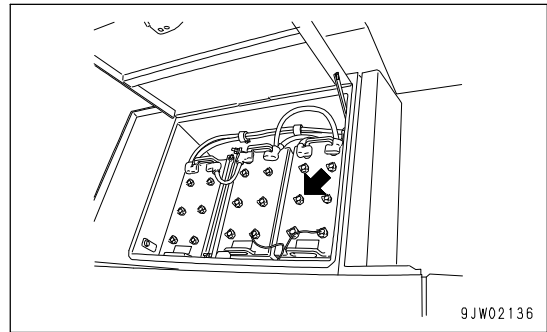
### REMARK

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.

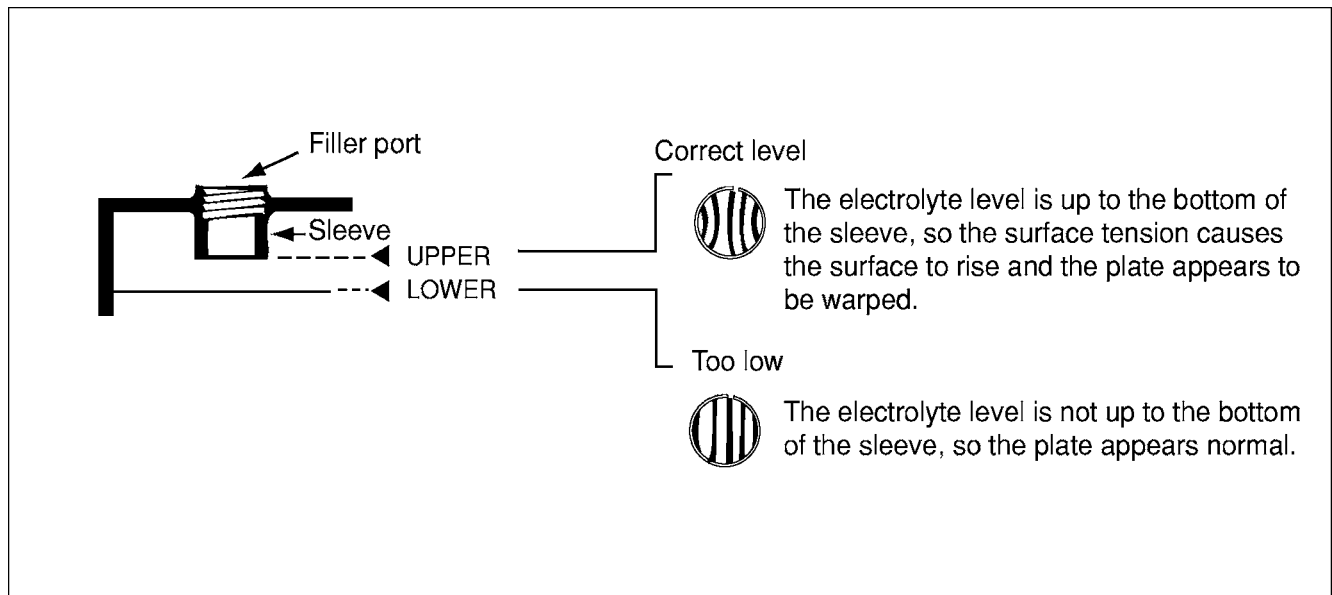
**WHEN IT IS IMPOSSIBLE TO CHECK ELECTROLYTE LEVEL FROM SIDE OF BATTERY**

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 the cap on the top of the battery, look into the filler port and check the electrolyte level. If the electrolyte level is not up to the UPPER LEVEL line, add distilled water (locally available refill material can be used).



Use the diagram below for reference, and check if the electrolyte reaches the bottom of the sleeve.



2. After adding, securely tighten the cap.

**REMARK**

If water is added to above the bottom tip of the sleeve, use a pipette to remove electrolyte. Neutralize the removed electrolyte with sodium bicarbonate, then flush it away with a large amount of water. If necessary, contact your Komatsu distributor or your 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 PARKING BRAKE**

1. Set the machine on a dry downhill slope, press the parking brake switch to the ON position, and check if the parking brake hold the machine in position.
2. If any problem is found, please contact your Komatsu distributor.

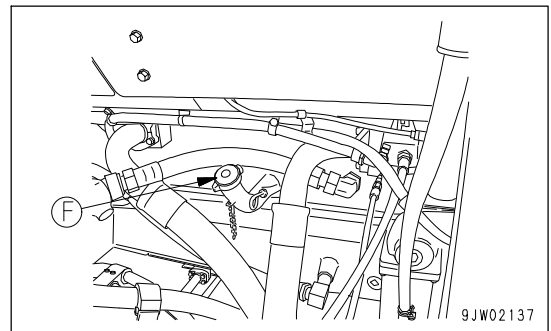
**CHANGE OIL IN ENGINE OIL PAN, REPLACE ENGINE OIL FILTER CARTRIDGE**

**! WARNING**

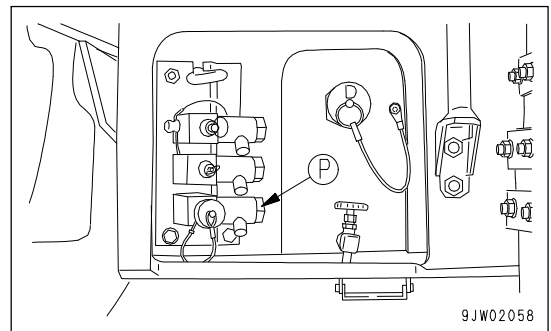
- The parts and oil are at high temperature immediately after the engine is stopped, and may cause burns. Wait for the temperature to go down before starting the work.
- When removing the oil filler cap, turn it slowly to release the internal pressure, then remove it.

- Refill capacity of oil pan: 260 liters (68.64 US gal)
- Prepare a filter wrench

1. Open the engine side cover at the left side of the machine, then open engine oil filler (F).

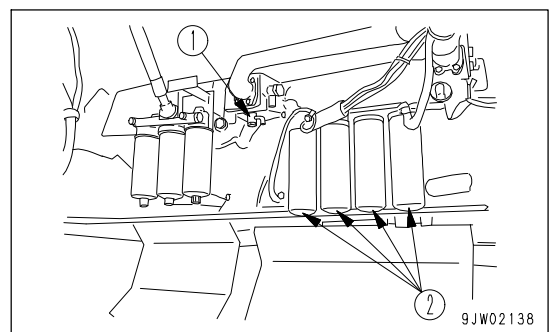


2. Set the container to catch the oil immediately under drain plug (P) on the left side of the machine.



3. Loosen drain plug (P), and drain the oil.
4. Check the drained oil, and if there are excessive metal particles or foreign material, please contact your Komatsu distributor.
5. Install drain plug (P).

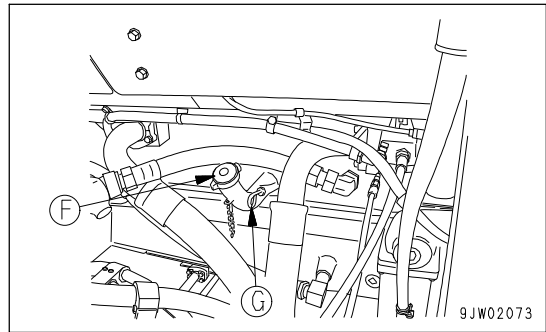
6. Open the cover at the front face of the center fuel tank, then set the container to catch the oil immediately under drain plug (1).



7. Loosen drain plug (1) to drain fuel.
8. Inspect the drained oil, and if there is a large amount of metal particles or foreign material, please contact your Komatsu distributor.
9. Tighten drain plug (1).
10. Using the filter wrench, remove full-flow filter cartridge (2) (4 places).

11. Clean the filter holder, fill the new filter cartridge with oil, then coat the seal and thread of the filter cartridge with oil (or coat thinly with grease) and install.
12. When installing, bring the seal surface into contact with the filter holder, then tighten a further 3/4 to 1 turns.

13. After replacing the filter cartridge, add engine oil through oil filler (F) until the oil level is between the H and L marks on the dipstick.
14. Run the engine at idling for a short time, and check that there is no leakage of oil from the filter or drain plug.
15. Stop the engine, wait for approx. 5 minutes, then check that the oil level is between the H and L marks on dipstick (G). For details, see CHECK OIL LEVEL IN ENGINE OIL PAN, ADD OIL (PAGE 3-80).



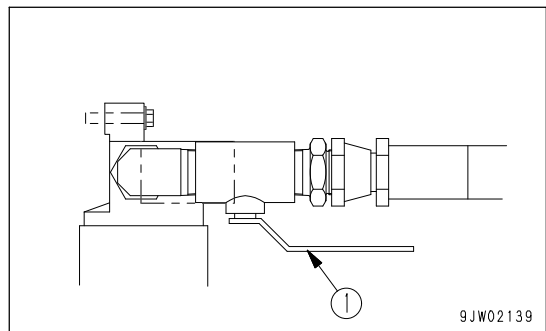
## REPLACE FUEL FILTER CARTRIDGE

### WARNING

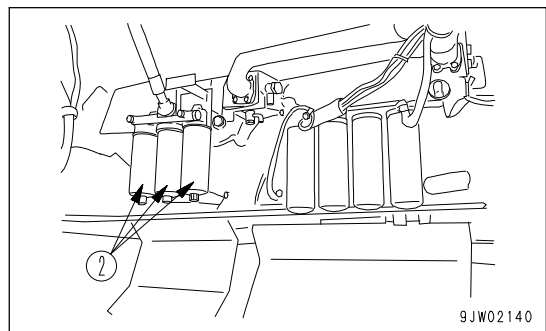
- The oil is at high temperature after the engine has been operated, so never replace the filter immediately after finishing operations. Wait for the parts to cool down before changing the filter.
- Do not bring fire or sparks near the fuel.

- Prepare a filter wrench for fuel filter element.

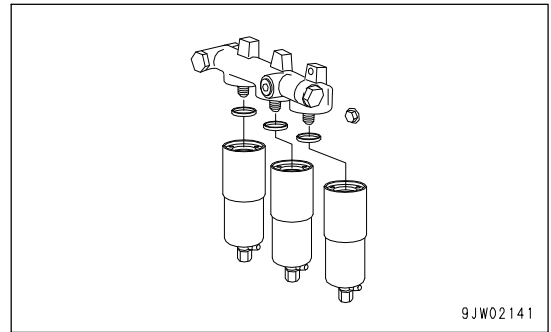
1. Open the cover at the front of the center fuel tank, then set the container under the fuel filter cartridge to catch the oil.
2. Close fuel valve (1) at the fuel filter head.



3. Loosen the plug at the bottom of the filter cartridge and drain the fuel from filter cartridge (2).
4. Using the filter wrench, remove filter cartridge (2) (3 places).



5. Remove seal ring (3) from the thread of the filter head.
6. Clean the seal surface of the filter head, then install the supplied seal ring to the new filter.
7. Fill the new filter cartridge with clean fuel, coat the packing surface thinly with clean oil, then install to the filter head.



8. When installing, tighten until the packing surface contacts the seal surface of the filter holder, then tighten a further 1/2 to 3/4 turns.  
If the filter cartridge is tightened too far, the packing will be damaged and this will lead to leakage of fuel. If the filter is too loose, fuel will also leak from the packing, so always tighten the correct amount.

**WARNING**

The engine will start, so check carefully that the area around the engine is safe before cranking.

9. After replacing the filter cartridge, turn the key in the starting switch to the START position and start the engine. When the engine starts, check that there is no leakage of oil from the filter seal. If there is any oil leakage, check the tightening condition of the filter cartridge. If there is still leakage of oil, repeat Steps 2 to 4 to remove the filter cartridge. If there is any damage or foreign material caught in the surface of the packing, replace the cartridge with a new part, and repeat Steps 5 to 8 to install it.

## CHECK, ADJUST DENSITY OF COOLING WATER ADDITIVE


**WARNING**

Immediately after the engine is stopped, the cooling water is at high temperature and the radiator is under high internal pressure. If the radiator cap is removed in this condition and the water is drained, it may cause burns. To prevent this, wait for the temperature to go down, then turn the cap slowly to release the internal pressure.

1. Prepare cooling water additive (DCA4) density test kit (1).

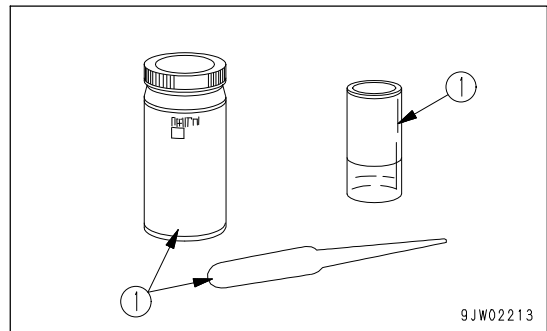
Density test kit

Cummins Part No. CC2602 (contains 50 sheets)

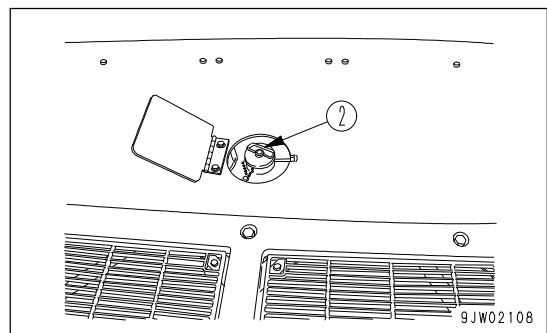
CC2602A (contains 4 sheets)

CC2602B (contains 1 sheet)

There is an expiry date for the test kit, so stock a suitable number to match the frequency of use.



2. Push the pressure reduction button on radiator cap (2) to release the pressure, then remove the cap.



3. Remove a small amount of coolant from the radiator and measure the density of the additive with a density test kit. For details of the method of measuring, see the instructions provided with the test kit.
4. Considering the results of the measurement, decide the method of adjusting the density of the cooling water additive, then carry out the adjustment.
  - 1) If density is less than 1.2 (unit/gallon)
    - Replace the corrosion resistor, then replace with coolant of the specified additive density.  
For details of the replacement procedure, see REPLACE CORROSION RESISTOR CARTRIDGE (PAGE 4-53) and CLEAN INSIDE OF COOLING SYSTEM (PAGE 4-23).
  - 2) If density is 1.2 - 3 (unit/gallon)
    - Replace only the corrosion resistor.  
For details of the replacement procedure, see REPLACE CORROSION RESISTOR CARTRIDGE (PAGE 4-53).
  - 3) If density is more than 3 (unit/gallon)
    - Do not replace the corrosion resistor.  
If the density is below 3 (unit/gallon) at the following inspection, replace the corrosion resistor.

**NOTICE**

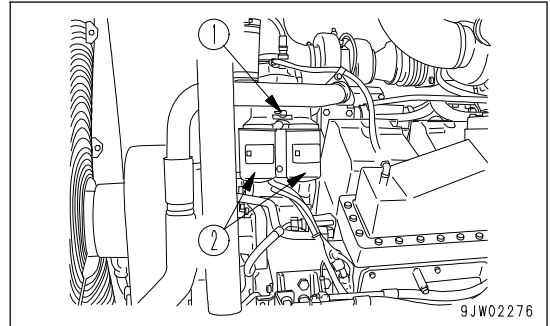
If the density of the cooling water additive is low, it will cause pitting of the liner and corrosion of the cooling system. On the other hand, if the density is too high, it will cause leakage from the water pump seal.

## REPLACE CORROSION RESISTOR CARTRIDGE

### NOTICE

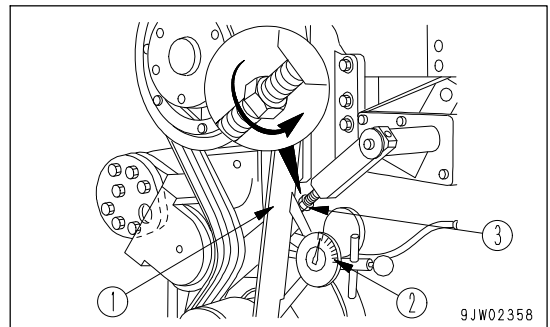
Replace the corrosion resistor cartridge only when necessary. For details, see **CHECK, ADJUST DENSITY OF COOLING WATER ADDITIVE (PAGE 4-52)**.

1. Open the engine side cover located on the right of the engine hood.
2. Set valve (1) of the corrosion resistor to the OFF position to close it.
3. Using a filter wrench, turn cartridge (2) to the left to remove it.
4. Clean the surface of the filter holder and the area around the filter holder.  
If the cartridge seal is left on the filter holder, remove it.
5. Apply oil to the sealing surface of a new cartridge, then install it to the filter holder.
6. When installing, bring the seal into contact with the filter holder seal surface, then tighten a further approx. 1/2 - 3/4 turns.
7. Set valve (1) to the ON position to open it.
8. Start the engine and check that there is no leakage of water from the cartridge seal surface.



## CHECK, ADJUST FAN BELT

1. Check fan belt (1) for any cracks, wear, cuts, tears, or any other problems. If any problem is found, it is necessary to replace the fan belt, so ask your Komatsu distributor to carry out the replacement.
2. Use belt tension gauge (2) to measure the tension of the fan belt (1) at a midpoint between the pulleys.  
Specified value for belt tension: 5300 N (544.3 kg)  
(reading of tension gauge)
3. Adjust the belt tension to the specified value.  
If rod (3) is turned in the direction of the arrow, the tension increases.  
If the specified tension cannot be reached even when adjusting the rod, ask your Komatsu distributor to carry out inspection and maintenance.

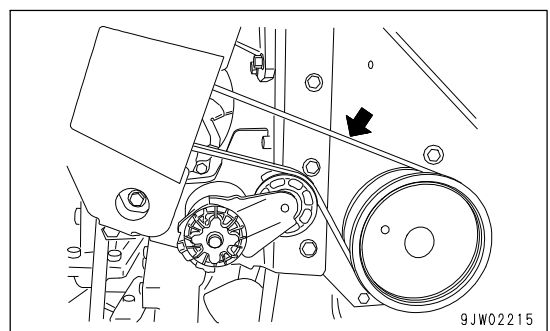


## CHECK ALTERNATOR DRIVE BELT

Check the alternator drive belt, and replace the belt if any of the following problems are found.

- Cracks
- Wear
- Cuts, tears

This machine is equipped with a belt tensioner to maintain a constant tension, so it is unnecessary to adjust the belt tension, regardless of any elongation of the belt.

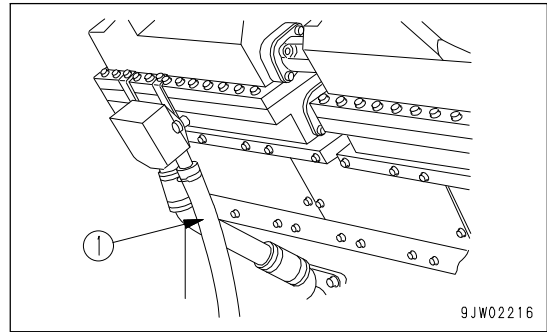




### CHECK ENGINE BREATHER HOSE

Check that there are no cracks, clogging, or damage to engine breather hose (1).

If there is any problem with the hose, replace it.



### CHECK ENGINE HOSES

Check the hoses and hose connections for the engine lubrication and cooling system. If any leakage or damage is found, carry out replacement or repair.

### CHECK FAN



#### WARNING

Breakage of the fan blade leads to serious personal injury.

When rotating the crankshaft, do not push or pull the fan blades. These actions will cause damage to the fan.

#### REMARK

When rotating the crankshaft, use a barring tool.

Check that there are no cracks in the fan, loose rivets, or deformed blades.

Check that there are no loose fan mounting bolts.

If any abnormality is found in the fan, replace it.



#### WARNING

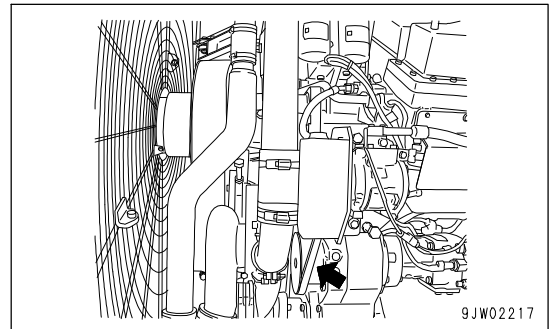
If the fan has deformed, do not correct it and use it as it is. There is danger that this may lead to a serious accident.

## CHECK AIR CONDITIONER COMPRESSOR BELT TENSION, ADJUST

### CHECKING

The deflection should be approx. 12.5 to 16.5 mm (0.5 to 0.7 in) when pressed with a finger force of approx. 98.1 N (10 kg) at a point midway between the air conditioner compressor pulley and drive pulley.

When using a belt tension gauge, the tension should be in a range of 353 to 530 N (36 to 54 kg).



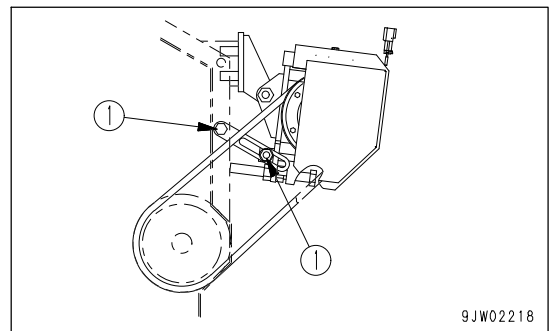
### CHECK WHEN CHANGING THE V-BELT

The deflection should be approx. 9 to 12.5 mm (0.355 to 0.5 in) when pressed with a finger force of approx. 98.1 N (10 kg) at a point midway between the air conditioner compressor pulley and drive pulley.

When using a belt tension gauge, the tension should be in a range of 530 to 745 N (54 to 76 kg).

### ADJUSTING

1. Loosen bolt (1).

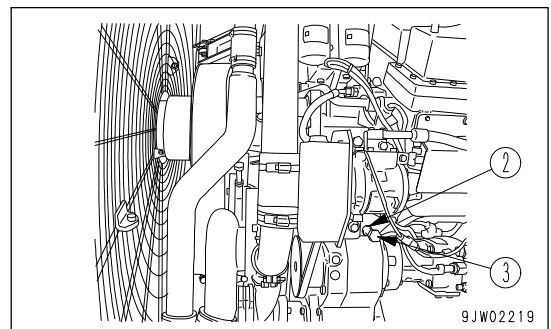


2. Loosen locknut (2).
3. Turn adjustment bolt (3) and adjust the belt tension so that the deflection is the standard value.

Deflection when checking: (approx. 98.1 N (10 kg)) approx. 12.5 to 16.5 mm (0.5 to 0.7 in)

Deflection when replacing: (approx. 98.1 N (10 kg)) approx. 9 to 12.5 mm (0.355 to 0.5 in)

4. After adjusting, tighten locknut (2).
5. Tighten bolt (1).



6. Check each pulley for damage, wear of the V-groove, and wear of the V-belt. Be particularly careful to check that the V-belt is not in contact with the bottom of the V-groove.
7. If the belt has elongated and there is no more allowance for adjustment, or if the belt is cut or cracked, replace the belt.

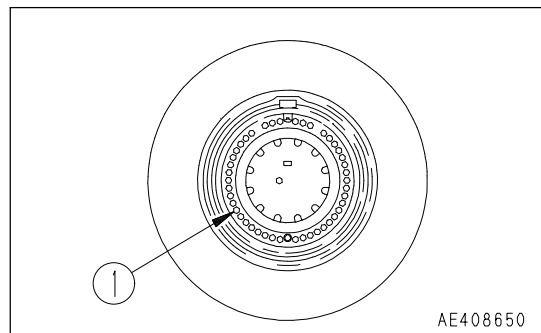
If the V-belt has been replaced with a new part, there will be initial elongation, so inspect and adjust it again after one-hour of operation.

**CHECK FOR LOOSE WHEEL HUB NUTS, TIGHTEN**

If wheel hub nuts (1) are loose, tire wear will be increased and accidents may be caused.

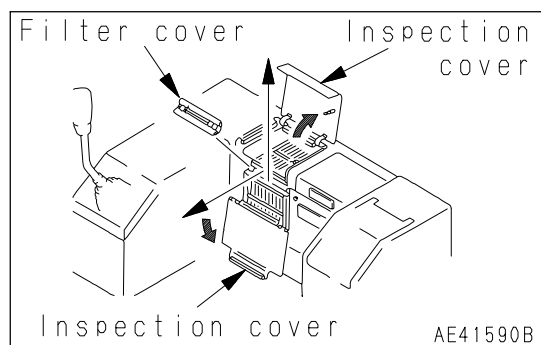
1. Check for loose nuts, and tighten if necessary.  
 When checking for loose nuts, always turn the nuts in the direction of tightening to check.  
 Tightening torque: 1470 to 1810 Nm  
 (150 to 185 kgm, 1085 to 1338.1 lbft)

2. If any stud bolt is broken, replace all the stud bolts for that wheel.



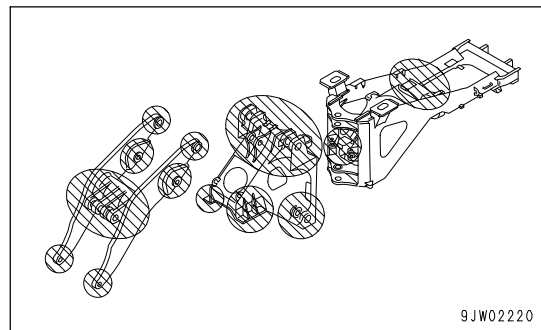
**CLEAN ELEMENT IN AIR CONDITIONER RECIRCULATION FILTER**

1. Open the filter inspection cover, remove the filter cover, then remove the filter in the direction of the arrow.  
 When removing the filter to the side, put your weight on the seat, and push down.
2. Clean with compressed air in the same way as for the fresh air filter.  
 If the filter is extremely dirty, rinse it in water.  
 After rinsing the filter, dry it completely before installing it



**CHECK FRAME AND LIFT ARM**

1. Wash the frame and lift arm so that the check can be carried out easily.
2. Check all parts of the frame and lift arm for damage.  
 In particular, check the parts marked in color in the diagram.  
 If any crack or other damage is found, repair it.  
 For details of the method of repair, please consult your Komatsu distributor.

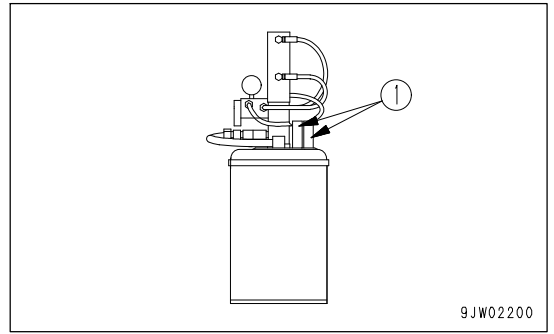


**CHECK REMAINING AMOUNT OF GREASE IN AUTO-GREASING TANK, ADD GREASE**

Use level gauge (1) to check the remaining amount of grease. If the grease level is low, add grease.

If a pail is not being used: Fill with grease

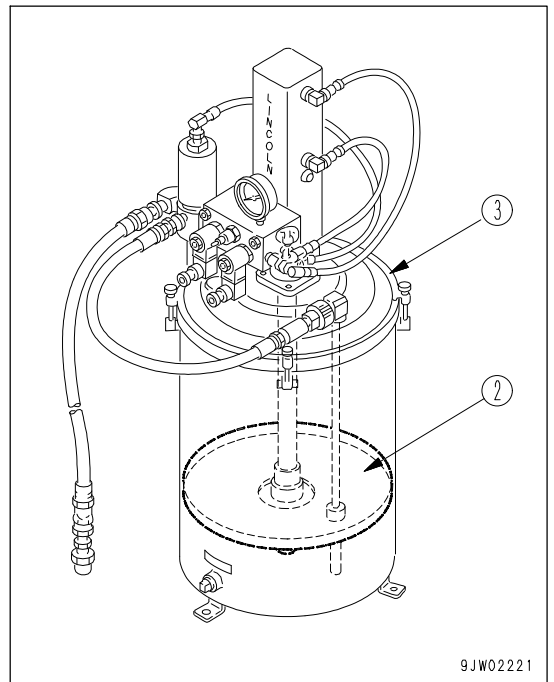
If a pail is being used: Replace pail



9JW02200

**NOTICE**

- Never remove the follower plate. If the follower plate (2) is not used, pump (3) will not be able to suck up the grease even if there is grease remaining in the tank.
- Use the appropriate follower plate according to whether a pail is being used or not.



9JW02221

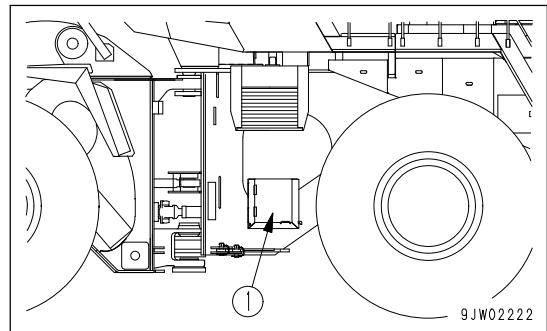
**EVERY 500 HOURS SERVICE**

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

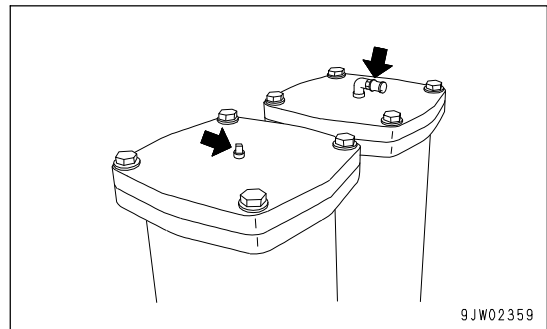
**REPLACE TRANSMISSION OIL FILTER ELEMENT****WARNING**

- 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 cleaning the engine breather.
- When using compressed air, there is a hazard that dirt may be blown up and cause serious injury. Always use safety glasses, dust mask, or other protective equipment.

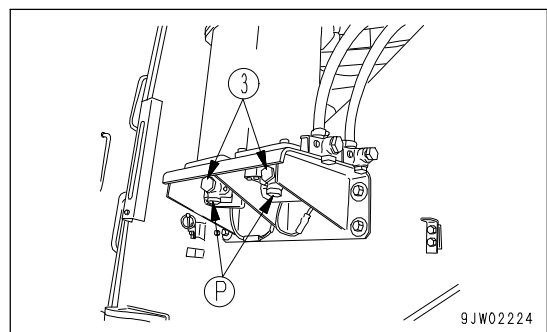
1. Open cover (1) at the left side of the machine.
2. Set the container to catch the oil under the filter case.



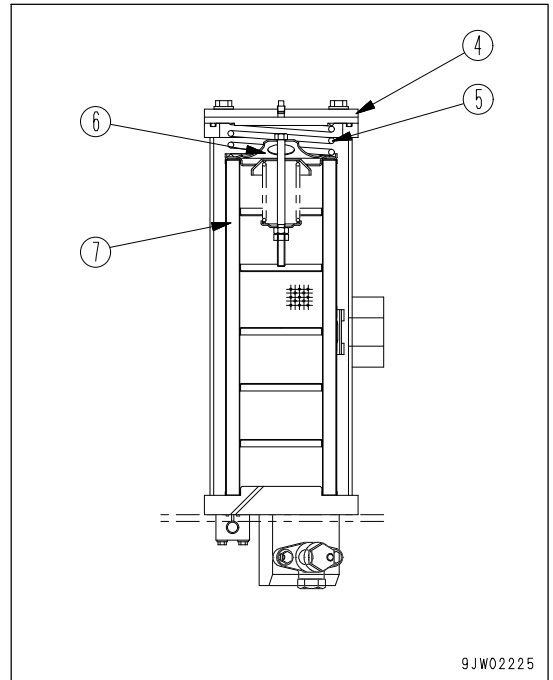
3. Remove the plug and nipple at the center of the filter case.



4. Remove drain plug (P), then loosen plug (3) slowly and drain the oil.
5. After draining the oil, tighten plug (3), then install drain plug



6. Remove the mounting bolts of filter case cover (4), then remove the cover. When doing this, hold the cover down when removing the bolts to prevent the cover from flying off under the force of spring (5).
7. Remove spring (5) and bypass valve (6), then take out element (7).
8. Check that there is no foreign material inside the filter case, then clean the inside of the case.
9. Install a new element, then set bypass valve (6), spring (5), and cover (4) in the filter case. When doing this, if the cover O-ring is damaged or deteriorated, replace the O-ring.
10. Hold down the cover and tighten the mounting bolts uniformly.
11. Run the engine at idle for a short time, then check that the oil is up to the specified level. For details, see "CHECK TRANSMISSION OIL LEVEL, ADD OIL (PAGE 4-26)".

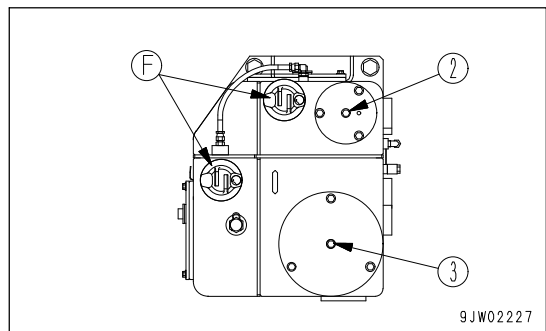
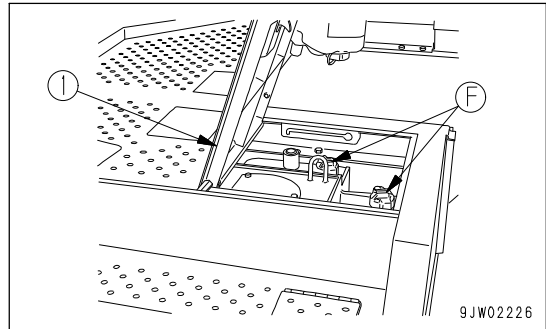


REPLACE BRAKE OIL FILTER ELEMENT

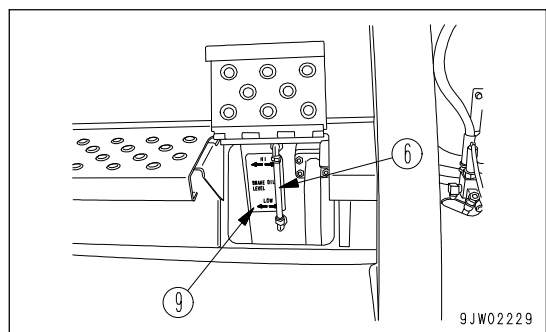
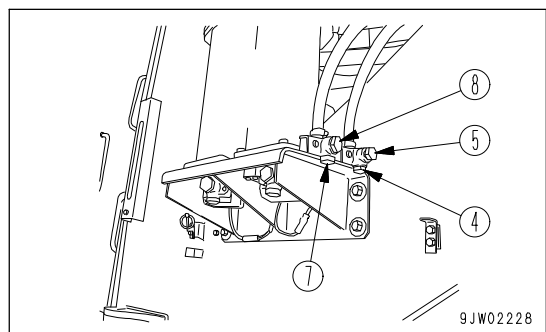
**! WARNING**

- 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 cleaning the engine breather.
- When using compressed air, there is a hazard that dirt may be blown up and cause serious injury. Always use safety glasses, dust mask, or other protective equipment.

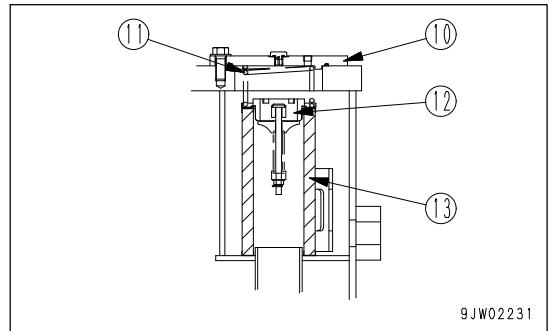
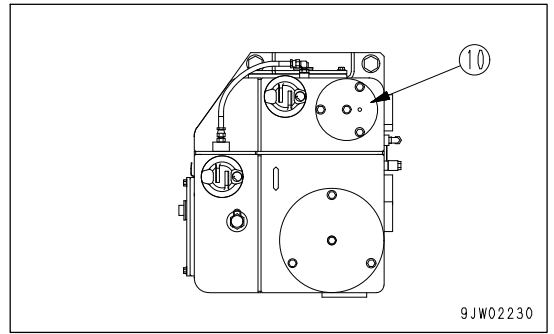
1. Set the container directly under the brake oil drain valve to catch the oil.
2. Open inspection cover (1) at the top left of the machine, then remove oil filler caps (F) and plugs (2) and (3) in the center of the filter cover.



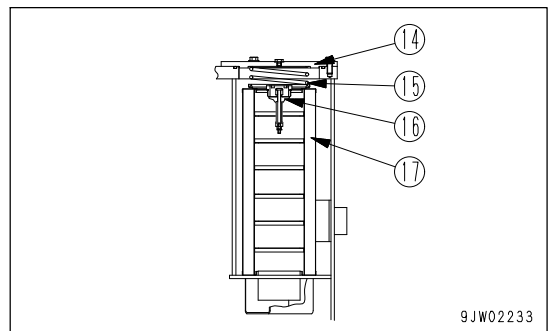
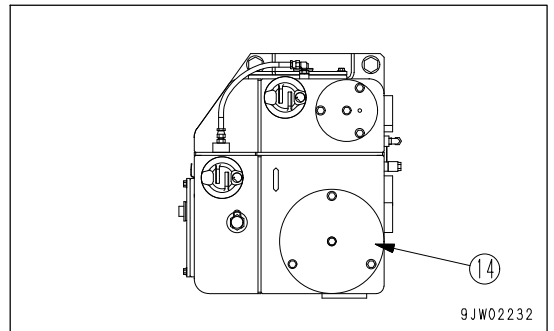
3. Remove drain plug (4), then loosen plug (5) gradually and drain the oil from the brake oil tank until it reaches the bottom of sight gauge (6).
4. Remove drain plug (7), then loosen plug (8) gradually and drain the oil from the brake cooling oil tank until it reaches the bottom of sight gauge (9).
5. After draining the oil, tighten plugs (5) and (8), then install drain plugs (4) and (7).



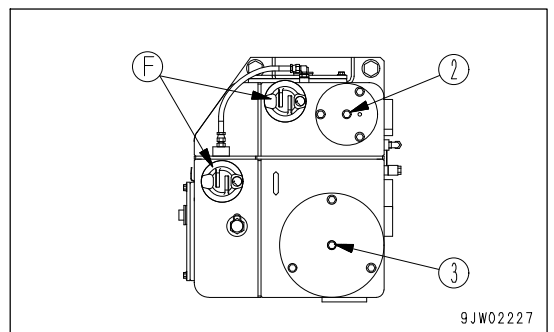
6. Remove the mounting bolts of cover (10) on the top surface of the brake oil tank, then remove the cover. When doing this, hold the cover down when removing the bolts to prevent the cover from flying off under the force of spring (11).
7. Remove spring (11) and bypass valve (12), then take out element (13).
8. Check that there is no foreign matter inside the tank, then clean the inside of the tank.
9. Install a new element, then set bypass valve (12), spring (11), and cover (10) in the brake oil tank. When doing this, if the cover O-ring is damaged or deteriorated, replace the O-ring. Also, be careful that the O-ring does not come out when assembling.
10. Hold down cover (10) and tighten the mounting bolts



11. Remove the mounting bolts of cover (14) on the top surface of the brake cooling oil tank, then remove the cover. When doing this, hold the cover down when removing the bolts to prevent the cover from flying off under the force of spring (15).
12. Remove spring (15) and bypass valve (16), then take out element (17).
13. Check that there is no foreign matter inside the tank, then clean the inside of the tank.
14. Install a new element, then set bypass valve (16), spring (15), and cover (14) in the brake cooling oil tank. When doing this, if the cover O-ring is damaged or deteriorated, replace the O-ring.
15. Hold down cover (14) and tighten the mounting bolts



16. Add engine oil through oil fillers (F) to the specified level, then install plugs (2) and (3) in the center of the filter cover.
17. Install the oil filler caps.
18. Idle the engine for a short time, then check that the oil is at the specified level. For details, see CHECK BRAKE OIL TANK LEVEL, ADD OIL (PAGE 3-81).

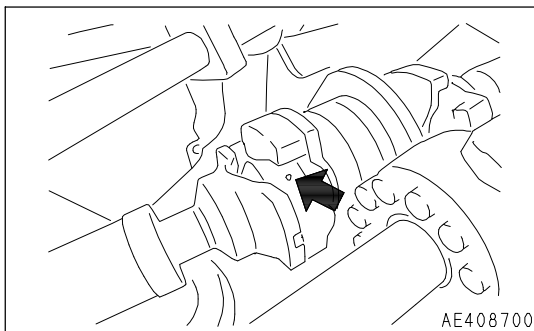




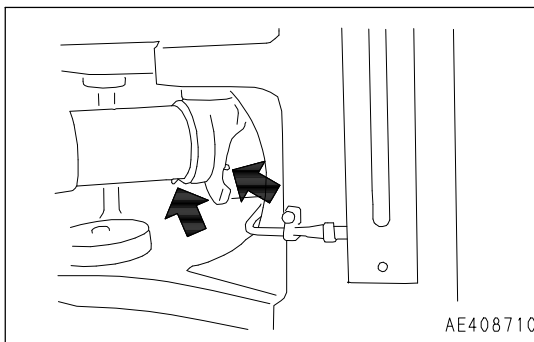
**LUBRICATE CENTER DRIVE SHAFT**

(3 places)

1. Using a grease pump, pump in grease through the grease fittings marked by the arrows.



2. After greasing, wipe off any old grease that was pushed out.



**EVERY 1000 HOURS SERVICE**

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

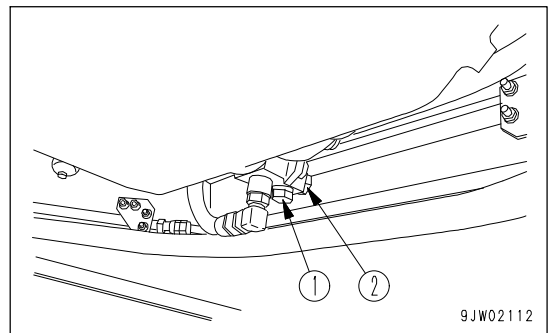
**CHANGE OIL IN TRANSMISSION CASE, CLEAN STRAINER**

**! WARNING**

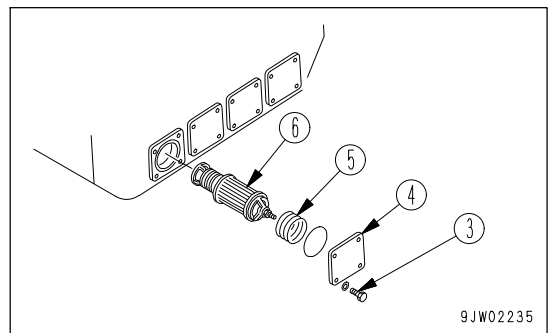
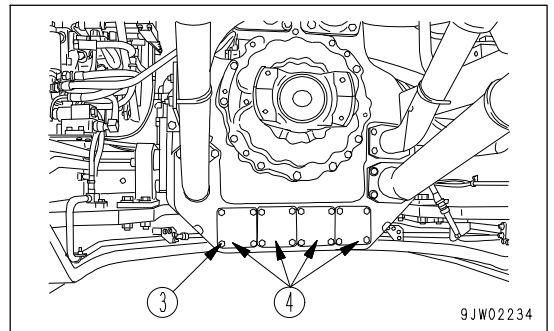
- The parts and oil are at high temperature immediately after the engine is stopped, and may cause burns. Wait for the temperature to go down before starting the work.
- When removing the oil filler cap, turn it slowly to release the internal pressure, then remove it.

- Refill capacity: 350 liters (92.4 US gal)

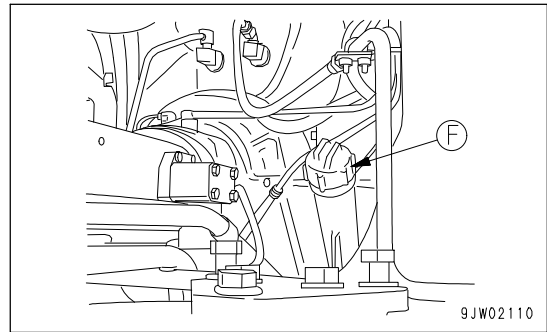
1. Set a container under drain plug (1) to catch the oil, then remove drain plug (1), loosen plug (2) and drain the oil. Loosen plug (2) gradually to prevent the oil from flowing out suddenly.
2. After draining the oil, tighten plug (2), then install drain plug (1).
3. Drain the oil from the filter case. For details, see REPLACE TRANSMISSION OIL FILTER ELEMENT (PAGE 4-58). After draining the oil, close the drain valve, then install the drain plug.



4. Remove bolt (3), then remove cover (4) and take out strainer (6) together with spring (5).
5. Remove any dirt stuck to strainer (6), then wash it in clean diesel oil or flushing oil. If strainer (6) is damaged, replace it with a new one.
6. Install spring (5) and strainer (6). Replace the O-ring on the cover with a new part, then install cover (4).

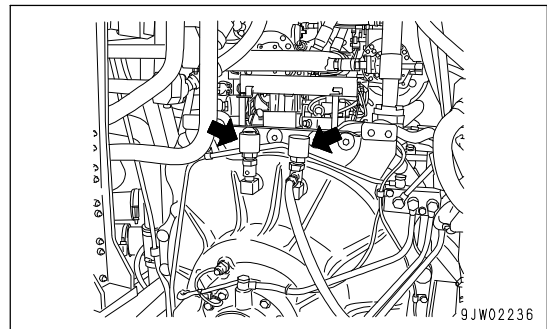


7. Pour in the specified amount of engine oil from oil filler (F).
8. After filling with oil, check that the oil is at the specified level.  
For details, see "CHECK TRANSMISSION OIL LEVEL, ADD OIL (PAGE 4-26)".
9. Check that there is no leakage of oil from the transmission case or oil filter.



### CLEAN TRANSMISSION CASE BREATHER

Remove all mud and dirt from around the breather, then remove the breather, immerse it in cleaning fluid and clean it. Be careful not to let dirt enter through the mount while the breather is removed.

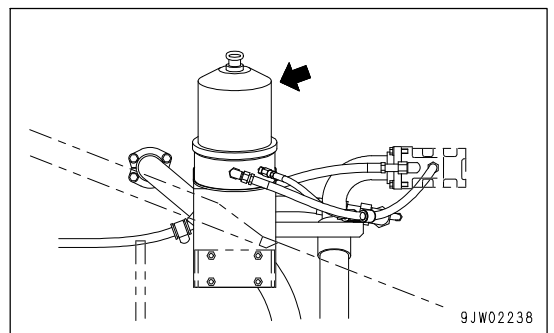
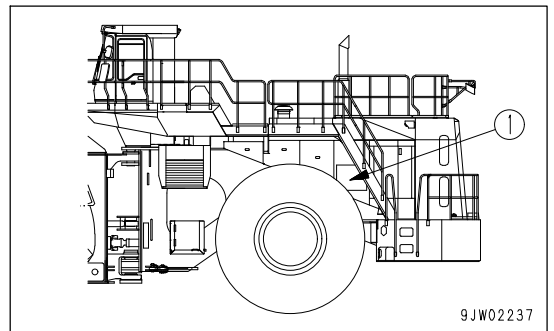


REPLACE BYPASS OIL FILTER ELEMENT

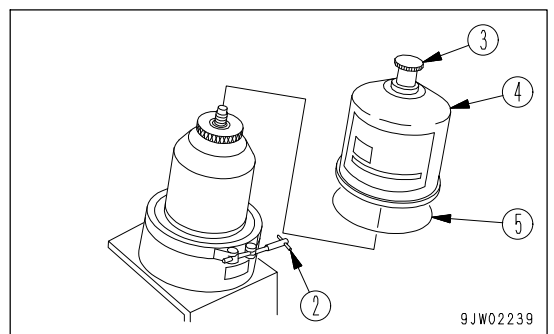
**! WARNING**

- The parts and oil are at high temperature immediately after the engine is stopped, and may cause burns. Wait for the temperature to go down before starting the work.
- When removing the oil filler cap, turn it slowly to release the internal pressure, then remove it.

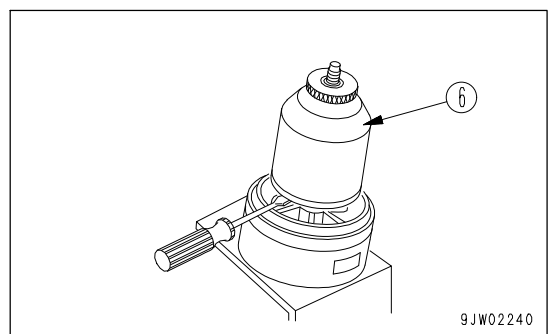
1. Open inspection cover (1) at the left side of the machine, and set the container to catch the oil under the engine oil bypass filter.



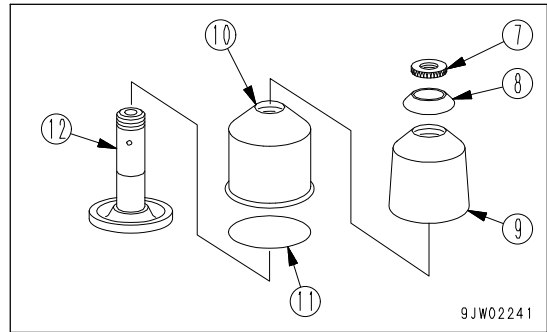
2. Loosen clamp (2), then remove it.  
 3. Loosen knob (3), then remove housing (4) and O-ring (5).



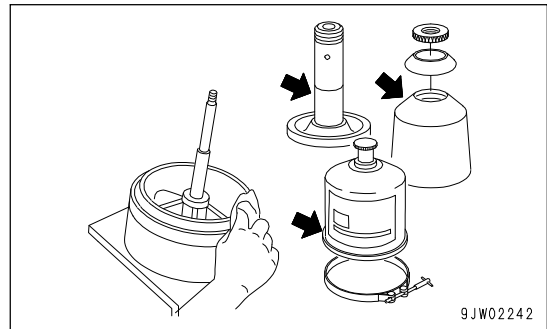
4. Using a flat-headed screwdriver, lift the turbine assembly (6) up approx. 25 mm (1 in) and wait until the oil flow stops.  
 5. When no more oil flows out, remove turbine assembly (6).



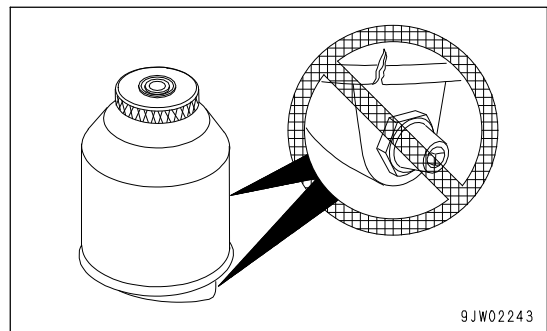
6. Loosen nut (7), then remove cone washer (8), turbine case (9), filter element (10), and O-ring (11) from rotor turbine (12).



7. Clean all parts and the seal surface with a clean cloth.

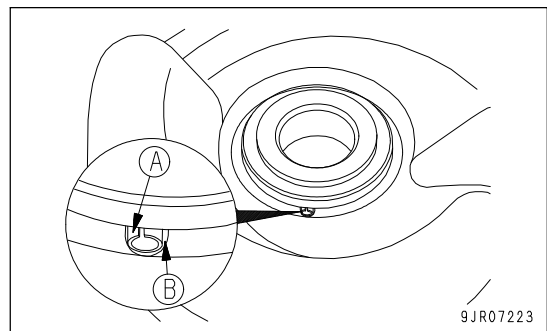


8. Check that there is no damage to the nozzle portion. Check also that there are no cracks or damage to any other parts. Replace any parts which are cracked or damaged.



**NOTICE**

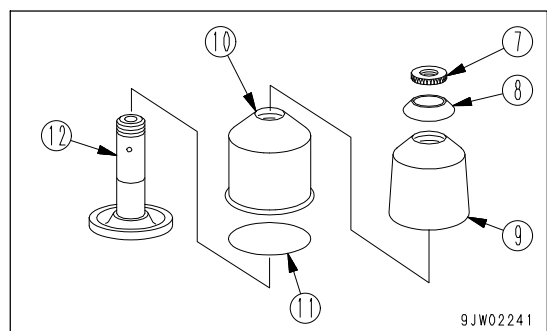
When installing rotor turbine (12), make sure that roll pin (A) in the rotor turbine shaft is aligned with slot (B) in the rotor turbine base. Failure to align them could cause damage to the turbine assembly.



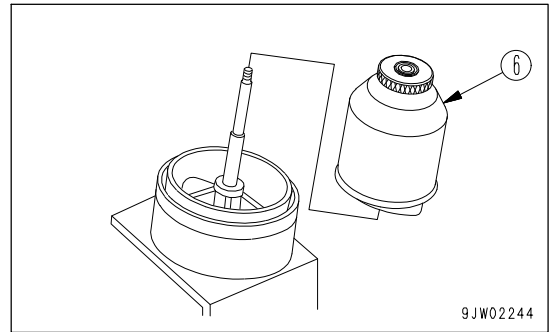
9. Replace O-ring (11), then install new filter element (10) to rotor turbine (12).  
 10. Install turbine case (9), cone washer (8), and nut (7) to rotor turbine (12). Tighten nut (7) fully by hand.

**NOTICE**

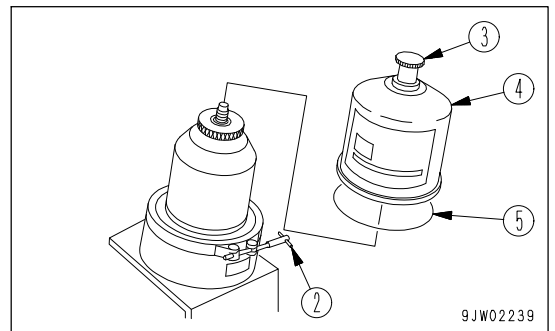
Tighten nut (7) by hand. Do not tighten it with a wrench.



11. Install turbine assembly (6), taking care not to damage the bushing portion of the filter.  
If turbine assembly (6) is installed correctly to the filter base, turbine assembly (6) will rotate freely in the direction of



12. Replace O-ring (5), install housing (4), then tighten knob (3) by hand.
13. Install clamp (2) and tighten it by hand.

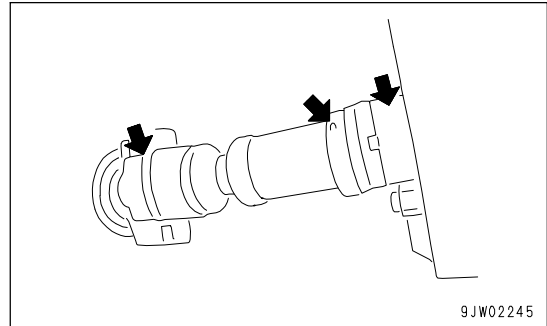


14. Check the oil level in the engine oil pan.
15. Start the engine and check for oil leakage.
16. Check that the oil is up to the specified level. For details, see CHECK OIL LEVEL IN ENGINE OIL PAN, ADD OIL (PAGE 3-80).

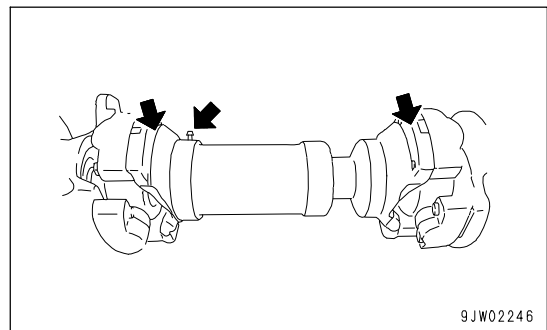
**LUBRICATING**

1. Using a grease pump, pump in grease through the grease fittings marked by the arrows.
2. After greasing, wipe off any old grease that was pushed out.

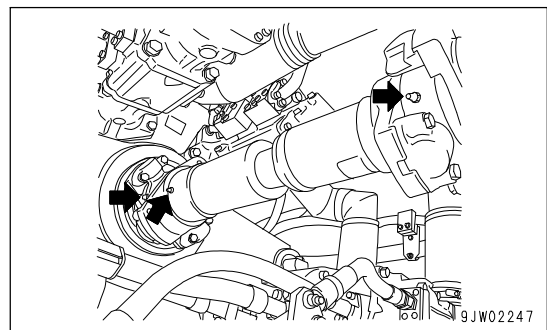
(1) Front drive shaft (3 places)



(2) Rear drive shaft (3 points)



(3) Upper drive shaft (3 places)



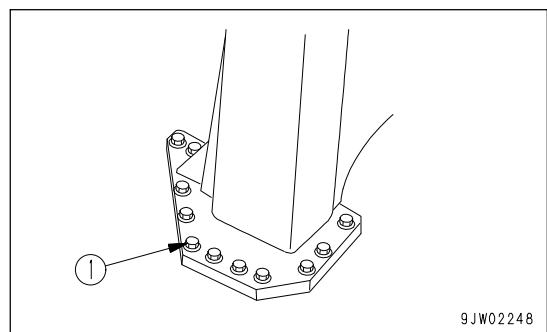
**TIGHTEN ROPS**

Check that there is no looseness in mounting bolts (1) of the ROPS. If any bolt is loose, tighten it.

Tightening torque: 4500 to 5500 Nm

(459 to 561 kgm, 3319.9 to 4057.7 lbf)

The tightening torque is large, so a power wrench is needed when tightening. Please request your Komatsu distributor to carry out this work.



**EVERY 1500 HOURS SERVICE**

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

**CHECK ENGINE VALVE CLEARANCE AND INJECTOR, ADJUST**

As special tool is required for removing and adjusting the parts, request your Komatsu distributor for service.



**EVERY 2000 HOURS SERVICE**

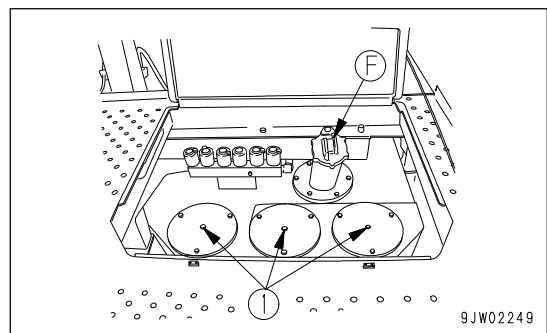
Maintenance for every 50, 100, 250, 500 and 1000 hours service should be carried out at the same time.

**CHANGE OIL IN HYDRAULIC TANK, REPLACE HYDRAULIC FILTER ELEMENT****WARNING**

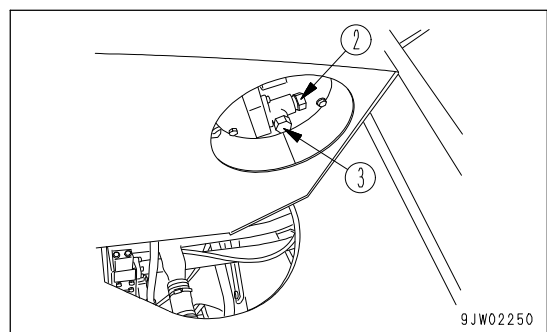
- The parts and oil are at high temperature immediately after the engine is stopped, and may cause burns. Wait for the temperature to go down before starting the work.
- When removing the oil filler cap, turn it slowly to release the internal pressure, then remove it.

- Refill capacity: 1200 liters (316.8 US gal)

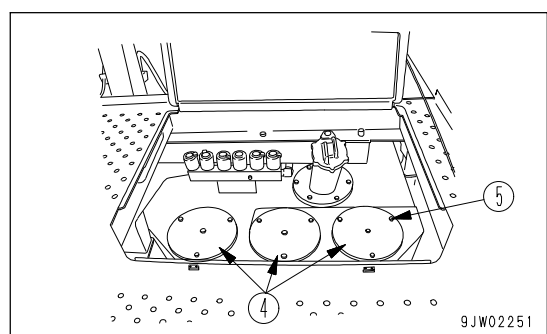
1. Lower the bucket horizontally to the ground and apply the parking brake, then stop the engine.
2. Remove oil filler (F) and plug (1) from the filter case.



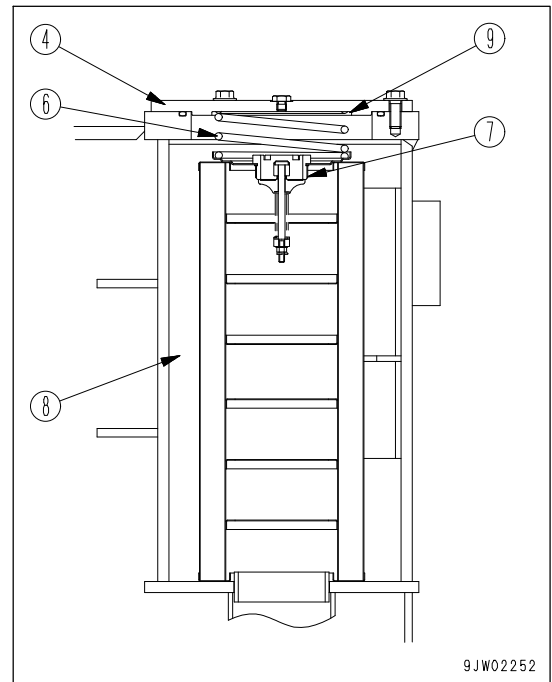
3. Set a container to catch the oil under drain plug (3).
4. Remove drain plug (3).
5. Open drain valve (2) gradually and drain the oil.
6. After draining the oil, close drain valve (2), then tighten drain plug (3).



7. Remove mounting bolts (5) of the 3 filter covers (4) at the top of the tank, then remove the covers.  
When doing this, the cover may fly off because of the force of spring (6), so keep the cover pushed down while removing the bolts.



8. Remove spring (6) and bypass valve (7), then take out element (8).
9. Check that there is no foreign material inside the tank, then clean it.
10. Install a new element, then place bypass valve (7), spring (6), and cover (4) into the tank.  
Replace cover O-ring (9) with a new one.
11. When installing the cover bolts, push down the cover and tighten the bolts evenly.



12. Add engine oil through oil filler port (F) to the specified level, then install the cap and plug (1) of the filter case.
13. Bleed the air from the piston pump and the hydraulic system. For details, see BLEEDING AIR FROM HYDRAULIC TANK (PAGE 4-38).

**NOTICE**

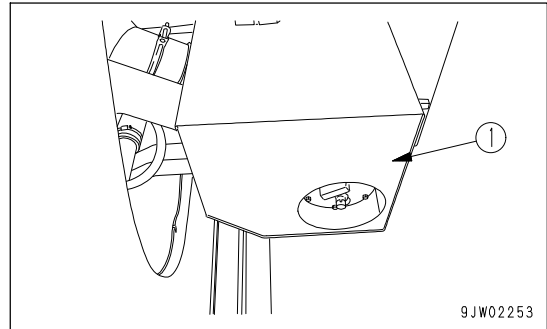
**Be sure to bleed the air completely. If the air is not completely bled, the piston pump and cylinders may be broken.**

14. After completely bleeding the air, tighten plug (1).  
Tightening torque: 9.8 to 12.8 Nm (1.0 to 1.3 kgm, 7.2 to 9.4 lb ft)
15. Lower the bucket horizontally to the ground and stop the engine.
16. Check that the hydraulic oil is at the standard level. For details, see "CHECK OIL LEVEL IN HYDRAULIC TANK, ADD OIL (PAGE 4-45)".
17. Check that there is no leakage of oil from the filter cover mount.

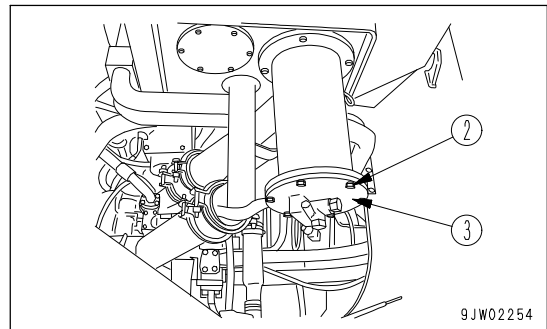
## CLEAN HYDRAULIC TANK STRAINER

When changing the oil in the hydraulic tank, drain the oil from the tank and clean the strainer.

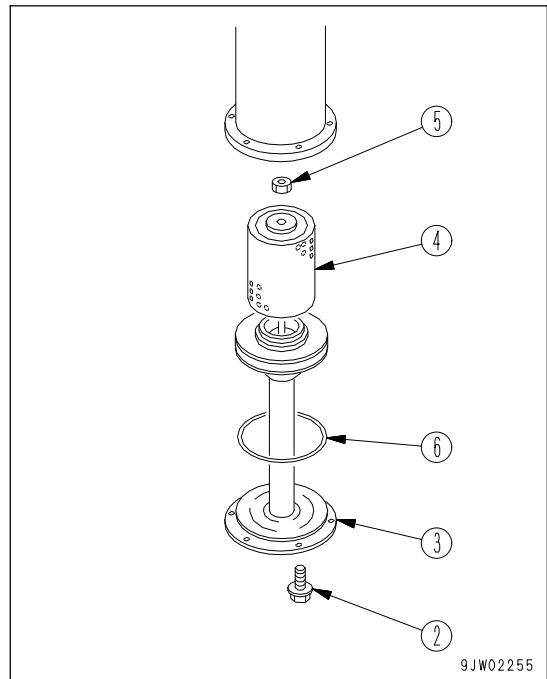
1. Loosen the mounting bolts, then remove cover (1).



2. Loosen bolts (2), then remove holder (3) together with strainer (4) from the hydraulic tank.



3. Loosen nut (5), then remove strainer (4).
4. Remove any dirt from strainer (4), then wash in clean diesel oil or flushing oil.  
If strainer (4) is broken, replace it with a new part.
5. Install strainer (4) to holder (3), then tighten nut (5).  
Tightening torque: 59 to 74 Nm (6.0 to 7.5 kgm, 43.4 to 54.2 lbf·ft)
6. Install holder (3).  
Replace O-ring (6) of the holder with a new part.

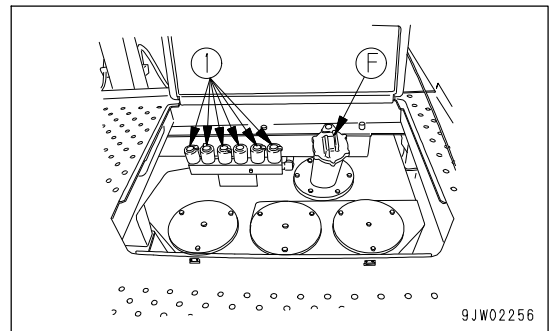


**REPLACE HYDRAULIC TANK BREATHER ELEMENT**

**! WARNING**

- The parts and oil are at high temperature immediately after the engine is stopped, and may cause burns. Wait for the temperature to go down before starting the work.
- When removing the oil filler cap, turn it slowly to release the internal pressure, then remove it.

1. Remove the cap of oil filler (F).
2. Remove the snap ring from breather (1), then remove the breather cap.
3. Replace the filter element with a new part, then install the breather cap and snap ring.
4. Tighten the cap of oil filler (F).

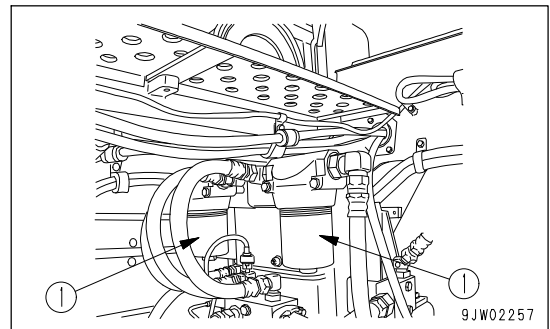


**REMARK**

It is possible to replace the element with the breather installed in the tank. However, if the breather is removed, do not wrap the taper thread of the breather with seal tape when assembling again, and be careful not to tighten too much.

**CLEAN PPC CIRCUIT STRAINER**

1. Remove filter case (1).
2. Take out the strainer, clean off dirt clung to it, and wash it in clean light oil or diesel oil.  
If the strainer is damaged, replace it with a new one.
3. Install the strainer and filter case (1).
4. Put bucket control lever in TILT position and lift arm control lever in FLOAT position, and after cylinder reaches stroke end, keep in that position for one minute.
5. Put bucket control lever in DUMP position and lift arm control lever in RAISE position, and after cylinder reaches stroke end, keep in that position for one minute.
6. Bleed the air from the hydraulic circuit. For details, see "BLEEDING AIR FROM PPC CIRCUIT (PAGE 4-36)".



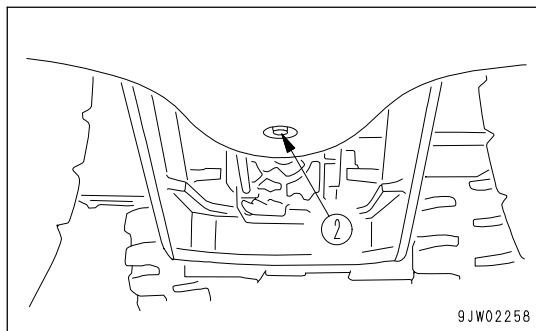
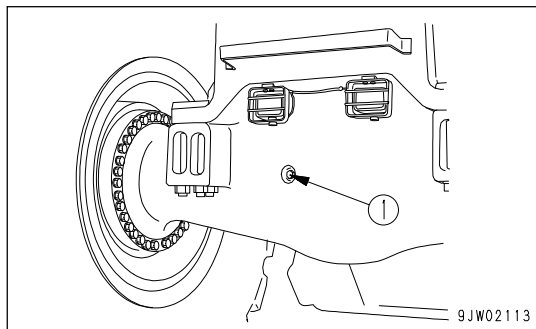
## CHANGE AXLE OIL

**WARNING**

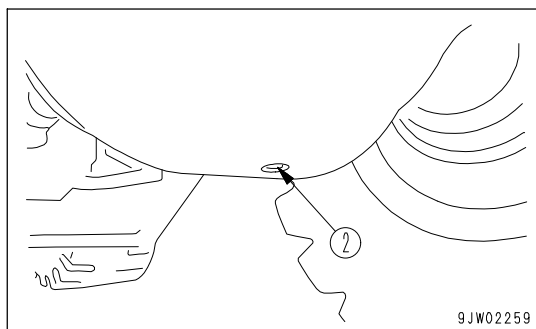
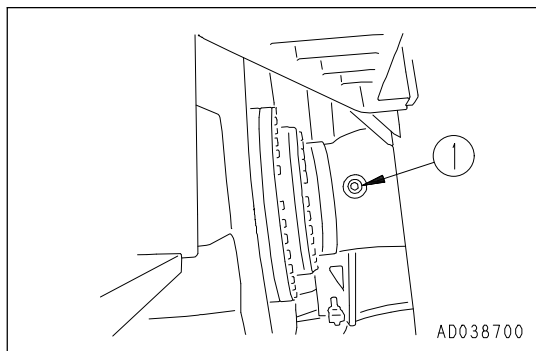
- The parts and oil are at high temperature after the engine is stopped, and may cause burns. Wait for the temperature to go down before starting the work.
- When removing the plug, oil may spurt out, so turn the plug slowly to release the internal pressure, then remove it carefully.

- Refill capacity (front and rear, each): 670 liters (176.88 US gal)

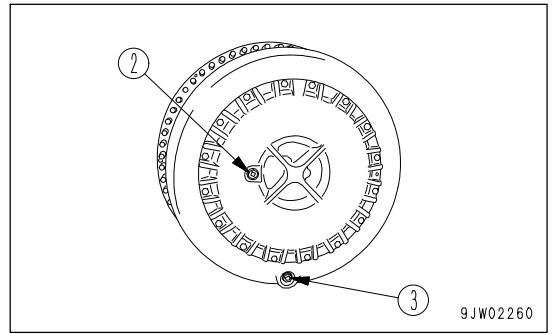
1. Remove front oil filler plug (1), then remove drain plug (2) to drain the oil.



2. Remove rear oil filler plug (1), then remove drain plug (2) to drain the oil.



3. Stop the machine so that drain plug (3) of the final drive is at the bottom. Remove oil filler plug (4) and drain plug (3), then insert the tube of the supplied tool in the hole of plug (3) and drain the oil.
4. After draining the oil, clean drain plugs (2) and (3), then install them.
5. Add the specified amount of oil through oil filler ports (1) and (4) of the axle housing and left and right final drives.
6. After adding oil, check at level plug (1) that the oil is at the specified level. For details, see "CHECK AXLE OIL LEVEL, ADD OIL (PAGE 4-27)".



**REMARK**

For operations where the brake is used frequently, change the axle oil at shorter intervals.

## REPLACE ELEMENT IN AIR CONDITIONER RECIRCULATION AIR FILTER, FRESH AIR FILTER

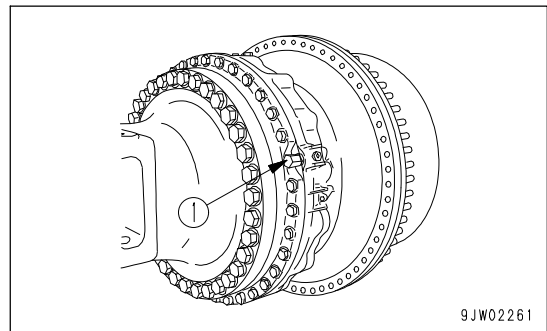
Remove both the recirculation air filter and fresh air filter in the same way as when cleaning, and replace them with new parts.

For details of cleaning the recirculation air filter, see "CLEAN ELEMENT IN AIR CONDITIONER RECIRCULATION FILTER (PAGE 4-56)".

For details of cleaning the fresh air filter, see "CLEAN ELEMENT IN AIR CONDITIONER FRESH AIR FILTER (PAGE 4-46)".

## CHECK BRAKE DISC WEAR

1. Remove cap nut (1).



2. Use calipers to measure protrusion (a) of indicator (2).

Wear limit (a) = 7 mm (0.276 in)

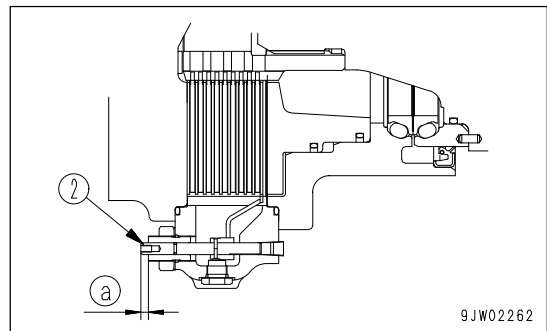
(Reference: For new machine, (a) = 0 mm)

- If the disc is near the wear limit, carry out inspection at shorter intervals, regardless of the specified inspection interval.
- If the disc wear exceeds the wear limit, please contact your Komatsu distributor for check and maintenance.

3. Install cap nut (2).

Tightening torque: 117.6 to 161.7 Nm

(12 to 16.5 kgm, 86.8 to 119.3 lbft)



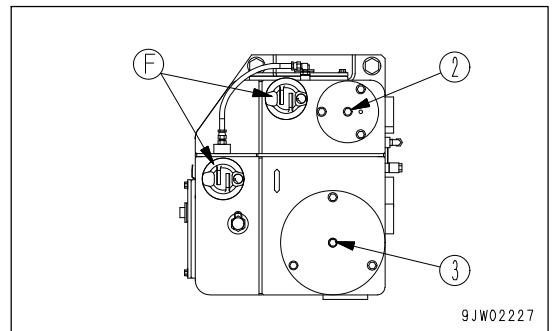
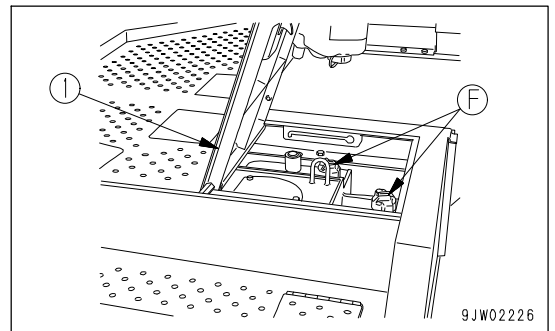
CHANGE BRAKE OIL

**! WARNING**

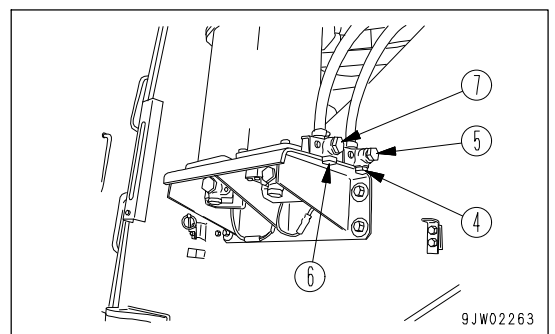
- The parts and oil are at high temperature after the engine is stopped, and may cause serious burns. Wait for the temperature to go down before cleaning the engine breather.
- When using compressed air, there is a hazard that dirt may be blown up and cause serious injury. Always use safety glasses, dust mask, or other protective equipment.

- Refill capacity: Total 315 liters (83.16 US gal)

1. Set the container directly under the brake oil drain valve to catch the oil.
2. Open inspection cover (1) at the top left of the machine, then remove oil filler caps (F) and plugs (2) and (3) in the center of the filter cover.

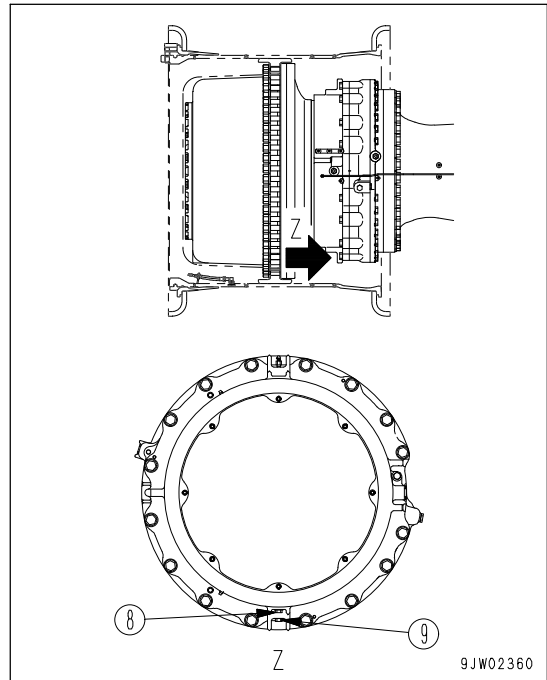


3. Remove drain plugs (4) and (6), then gradually loosen plugs (5) and (7) and drain the oil from the brake oil tank and brake cooling oil tank.
4. After draining the oil, tighten plugs (5) and (7), then install drain plugs (4) and (6).

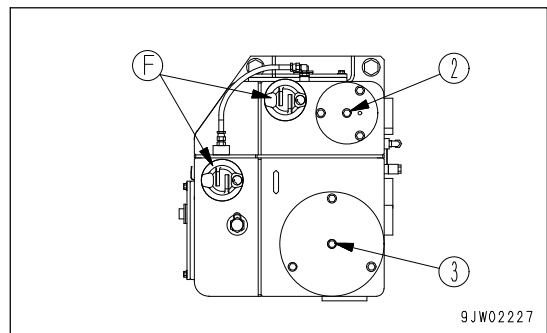




5. Set a container under drain plugs (8) and (9) of the cooling circuit of the axle final drive to catch the oil.  
(Approx. 50 liters (13.2 US gal) of oil will come out from each wheel.)
6. Loosen drain plugs (8) and (9), and drain the oil from the 4 wheels  
(front, rear, left, and right).
7. After draining the oil, tighten plugs (8) and (9).  
Tightening torque: 58.8 to 78.4 Nm (6 to 8 kgm, 43.4 to 57.9 lbft).
8. Replace the filter element. For details, see REPLACE BRAKE OIL FILTER ELEMENT (PAGE 4-60).

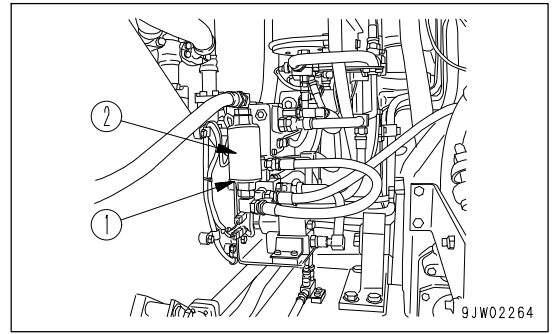


9. Add the specified amount of engine oil through oil fillers (F) to the specified level in both tanks, then install plugs (2) and (3) in the center of the filter cover.
10. Install the oil filler caps.
11. Start the engine and bleed the air from the circuit. For details, see BLEEDING AIR FROM BRAKE HYDRAULIC CIRCUIT (PAGE 4-36).
12. Idle the engine for a short time, then check that the oil is at the specified level. For details, see CHECK BRAKE OIL TANK LEVEL, ADD OIL (PAGE 3-81).

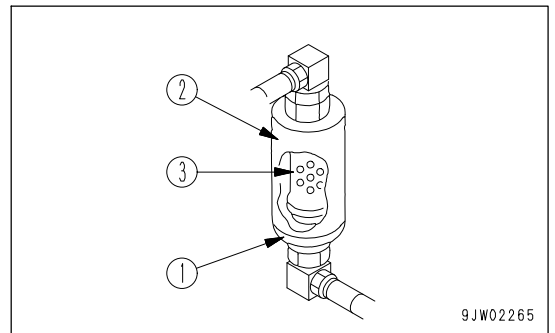


**CLEAN BRAKE CIRCUIT STRAINER**

1. Remove flange (1).
2. Remove strainer case (2), then take out strainer (3) and wash it in clean diesel oil.



3. Assemble strainer (3) to strainer case (2), then install flange (1).

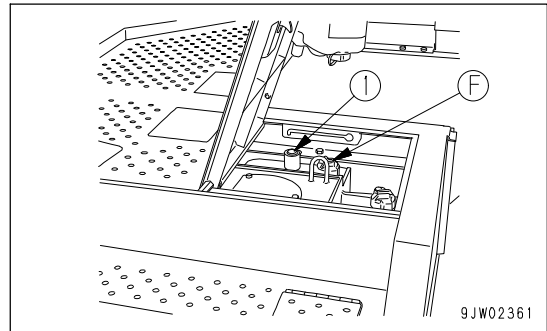


## REPLACE BRAKE OIL TANK BREATHER

### WARNING

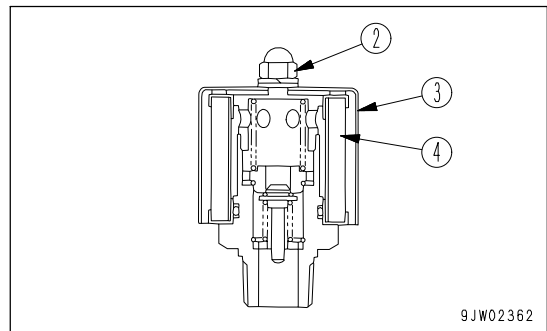
- The parts and oil are at high temperature immediately after the engine is stopped, and may cause burns. Wait for the temperature to go down before starting the work.
- When removing the oil filler cap, turn it slowly to release the internal pressure, then remove it.

1. Remove the cap of oil filler (F).
2. Remove nut (2) from breather (1), then remove breather cap (3).
3. Replace filter element (4) with a new part, then install breather cap (3) and tighten nut (2).  
Tightening torque:  
2.65 to 3.24 Nm (0.27 to 0.33 kgm, 2.0 to 2.4 lbft)
4. Tighten the cap of oil filler (F).



### REMARK

It is possible to replace the element with the breather installed in the tank. However, if the breather is removed, do not wrap the taper thread of the breather with seal tape when assembling again, and be careful not to tighten too much.



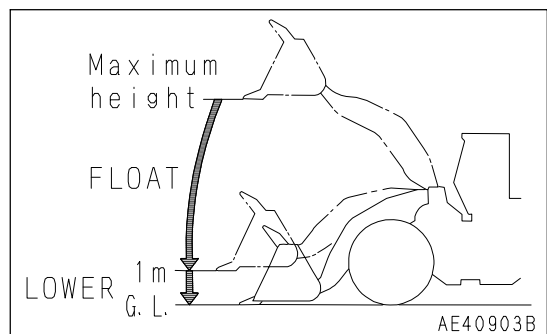
## CHECK ACCUMULATOR FUNCTION

Check the gas pressure of the accumulator as follows.

### CHECKING

1. Stop the machine on level ground and apply the parking brake.
2. Raise the work equipment to the maximum height, then place the lift arm control lever at HOLD.
3. Leave the work equipment in this position, and stop the engine.
4. Confirm that it is safe around the machine, then set the lift arm control lever at FLOAT and lower the work equipment to a position 1 m (3.28 ft) from the ground.
5. When the work equipment reaches a position 1 m (3.28 ft) from the ground, move the lift arm control lever to LOWER, and lower the work equipment slowly to the ground.

If the work equipment stops moving during checking, the gas pressure may be below the service limit (0.69 MPa (7 kg/cm<sup>2</sup>, 99.4 PSI)), so contact your Komatsu distributor to have the gas pressure measured or gas charged.



Carry out the checks within five minutes of stopping the engine. If the machine is left with the engine stopped, the accumulator pressure will drop and it will be impossible to carry out the check.

**CHECK ACCUMULATOR GAS PRESSURE**

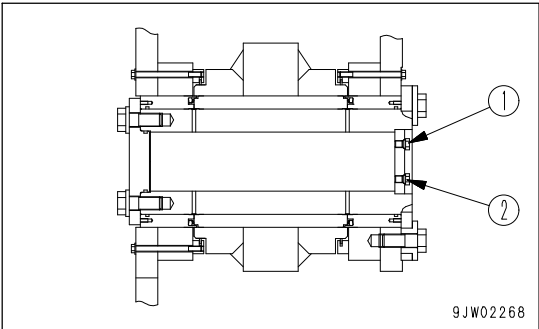
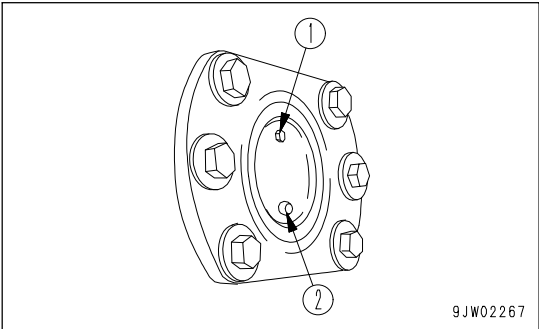
Please contact your Komatsu distributor to have the gas pressure checked when making periodically replacement of safety parts or carrying out the legally required 2000 hour or every year service.

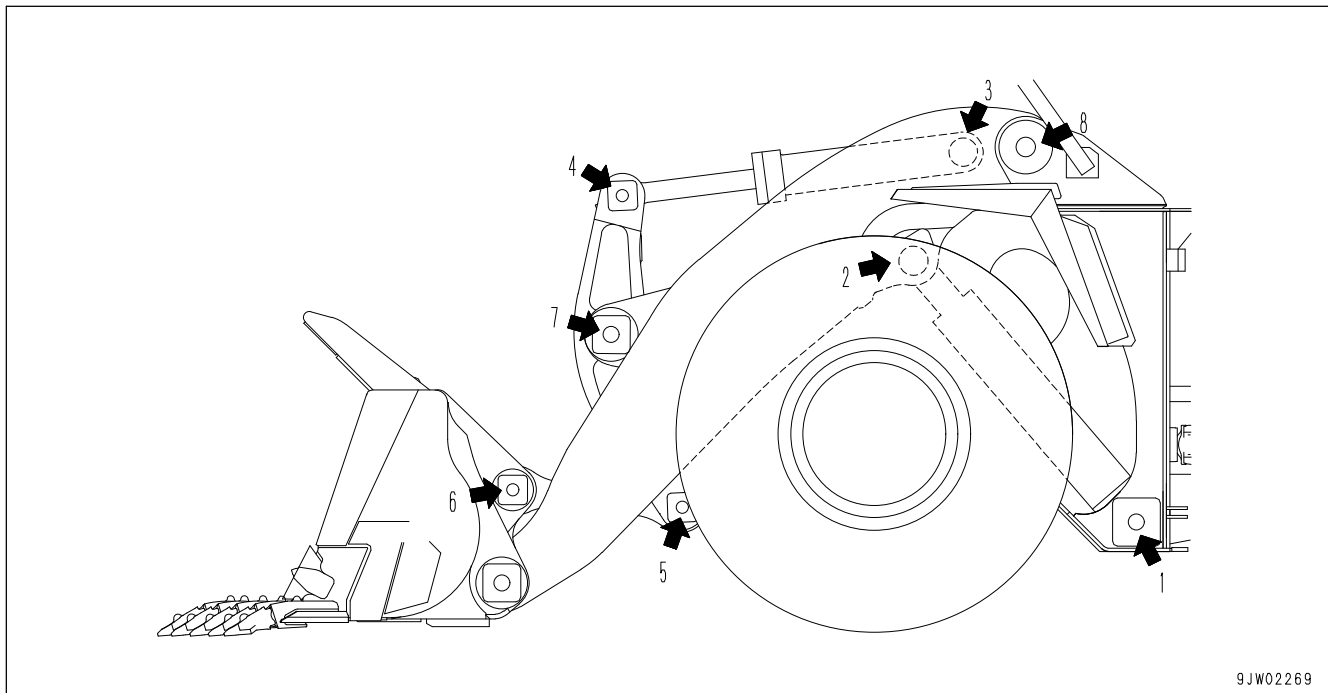
**CHANGE OIL FOR WORK EQUIPMENT PINS**

 **CAUTION**

If the plug is loosened immediately after operations, the oil may spurt out.

1. Lower the bucket horizontally to the ground.
2. Slowly loosen plug (1) at the top of each work equipment pin in the diagram below, check that oil does not spurt out, then remove the plug.
3. Remove plug (2) at the bottom and drain the oil.
4. Install bottom plug (2).
5. Add oil through the top plug hole until it flows out from the plug hole.
6. Install top plug (1).





- (1) Lift cylinder pin (bottom end) (2 places) (5.4 liters (1.49 US gal) each)
- (2) Lift cylinder pin (rod end) (2 places) (4.8 liters (1.27 US gal) each)
- (3) Bucket cylinder pin (bottom end) (2 places) (1.8 liters (0.48 US gal) each)
- (4) Bucket cylinder pin (rod end) (2 places) (1.7 liters (0.45 US gal) each)
- (5) Bucket link pin (bellcrank end) (2 places) (1.9 liters (0.50 US gal) each)
- (6) Bucket link pin (bucket end) (2 places) (2.0 liters (0.53 US gal) each)
- (7) Bellcrank pin (2 places) (5.6 liters (1.48 US gal) each)
- (8) Lift arm hinge pin (2 places) (11.2 liters (2.96 US gal) each)
- (9) Bucket hinge pin (2 places) (5.6 liters (1.48 US gal) each)

### EVERY 10000 HOURS SERVICE

Carry out this service every 10,000 hours or every two years, whichever comes sooner.

Carry out the EVERY 50 HOURS, EVERY 100 HOURS, EVERY 250 HOURS, EVERY 500 HOURS, EVERY 1000 HOURS, and EVERY 2000 HOURS SERVICE at the same time.

### CLEAN ENGINE



### WARNING

If compressed air, high-pressure water, or steam hits your body directly or dirt is sent flying by the compressed air, high-pressure water, or steam, there is danger of personal injury. Always wear protective glasses, dust mask, and other protective equipment.

Before carrying out the maintenance for EVERY 10000 HOURS, clean the engine with a steam cleaner.

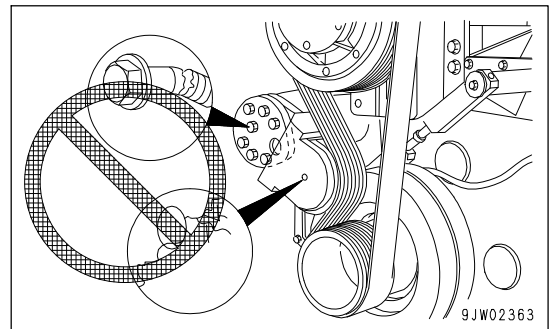
### NOTICE

To prevent problems caused by water entering the engine openings and electric system, be careful not to direct steam at such parts.

### CHECK FAN DRIVE IDLER ARM

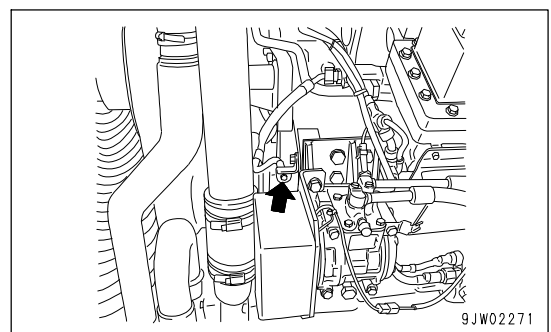
Check that there is no damage or deterioration of the fan drive idler arm.

If there are any broken or cracked bolts, please contact your Komatsu distributor for repairs.



### GREASE ENGINE MOUNT TRUNNION

1. Using a grease pump, pump in grease through the grease fittings marked by arrows.  
Stop greasing when grease comes out from the trunnion.
2. After greasing, wipe off all the grease that was pushed out.



**CHECK FAN PULLEY**

Ask your Komatsu distributor to carry out this work.

**CHECK WATER PUMP**

Check the water pump and bypass tube for leakage of water or oil.

Check that there is no excessive leakage from the drain hole (breather hole) of the water pump.

If any problem is found, please ask your Komatsu distributor to carry out repairs.

**CHECK TURBOCHARGER**

Ask your Komatsu distributor to carry out this work.

**CHECK VIBRATION DAMPER**

Ask your Komatsu distributor to carry out this work.

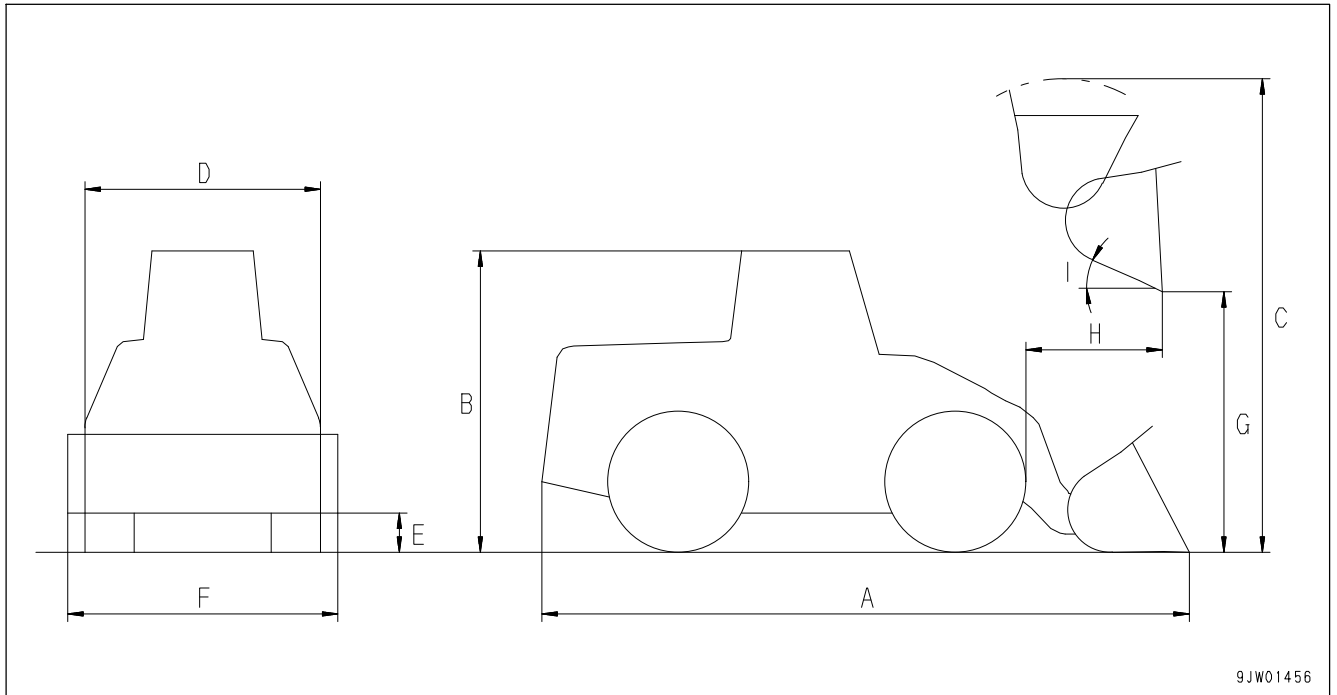
# **SPECIFICATIONS**



# SPECIFICATIONS

WA1200-3

Item		Unit	Tire size			
			55.5/80-57-68PR	65/65-57-62PR		
Operating weight (including 1 operator: 80kg (176 lb))		kg (lb)	205200 (452466)	210400 (463932)		
Normal load		kg (lb)	36000 (79380)			
Bucket capacity		m <sup>3</sup> (cu.yd)	20 (25.9)			
Engine model		-	Cummins QSK60			
Engine horsepower		kW{HP}/rpm	1163 (1560) / 1900			
A	Overall length	Tip of bucket (tip of teeth)	mm (ft in)	17680 (58' 0") Rock: 18210 (59' 9") Limestone: 18175 (59' 8")		
B	Overall height		mm (ft in)	6865 (22' 6") 6930 (22' 9")		
C	Max. dimension when shaking bucket		mm (ft in)	11865 (38' 11") 11930 (39' 2")		
D	Overall width		mm (ft in)	5710 (18' 9") 5970 (19' 7")		
E	Min. ground clearance		mm (ft in)	650 (2' 2") 715 (2' 4")		
F	Bucket width		mm (ft in)	6550 (21' 6")		
G	Clearance	Tip of teeth (tip of bucket)	mm (ft in)	Rock: 6285 (20' 7") (6735 (22' 1"))	Rock: 6350 (20' 10") (6800 (22' 4"))	
				Limestone: 6325 (20' 9") (6735 (22' 1"))	Limestone: 6390 (21' 0") (6800 (22' 4"))	
H	Reach	Tip of bucket (tip of teeth)	mm (ft in)	Rock: 2970 (9' 8") (2665 (8' 9"))	Rock: 2905 (9' 6") (2600 (8' 6"))	
				Limestone: 2955 (9' 8") (2665 (8' 9"))	Limestone: 2890 (9' 6") (2600 (8' 9"))	
I	Dump angle		degrees	45		
	Min. turning radius	Outside of machine	mm (ft in)	14330 (47' 0")		
		Center of outside tire	mm (ft in)	12015 (39' 5")		
	Travel speed (low speed/high speed)	Forward	1st	km/h (MPH)	6.3 (3.9)	6.5 (4.0)
			2nd	11.5 (7.1)	11.9 (7.4)	
			3rd	19.8 (12.3)	20.4 (12.7)	
		Reverse	1st	km/h (MPH)	7.4 (4.6)	7.7 (4.8)
			2nd	13.4 (8.3)	13.9 (8.6)	
			3rd	22.6 (14.0)	23.2 (14.4)	





# ATTACHMENTS, OPTIONS

## **WARNING**

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

---

## SELECTING BUCKET AND TIRES

Select the most suitable bucket and tires for the type of work and the ground conditions on the jobsite.

Type of work	Bucket	Ground condition	Tire
Loading blasted rock	Spade nose bucket (20.0 m <sup>3</sup> (25.9 cy.yd))	General ground conditions	55.5/80-57-68PR(L5) 65/65-57-62PR(L5)
		Hard ground	60/80R57 ★ (L5)
		Ground with many boulders	55.5/80-57-68PR(L5) 65/65-57-62PR(L5)
		Soft ground with many boulders	60/80R57 ★ (L5) Use tire chains as a tire protector
Loading and carrying blasted rock	Spade nose bucket (20.0 m <sup>3</sup> (25.9 cy.yd))	General ground conditions	55.5/80-57-68PR(L5) 65/65-57-62PR(L5)
		Hard ground	60/80R57 ★ (L5)
		Ground with many rocks	55.5/80-57-68PR(L5) 65/65-57-62PR(L5)
		Soft ground with many rocks	60/80R57 ★ (L5)
		Soft ground	Use tire chains as a tire protector

The most commonly used combinations have been explained. For details of other combinations, such as the hi-lift bucket, bucket with spade nose zipper lip, 53.5/85-57 tires, please consult your Komatsu distributor.

The displayed travel speed changes according to the tire size, so when installing optional tires, please contact your Komatsu distributor.

On jobsites where there are boulders or sharp rocks, install tire protectors (mesh chain).

Check the chain for cuts or sagging before starting operation.

Be careful not to let the tires and chain slip during operation.

## STARTING IN COLD AREAS

In cold areas, if it is necessary to warm the oil and water, carry out the following items to warm up all parts before starting the engine and operating the machine.

### ELECTRIC HEATER

In cold areas, an external power supply electric heater is available as an option for the cooling system and lubricating oil system to maintain the temperature after stopping the machine and make it easier to start again.

- The electric heater keeps the following lubricating oil warm.
  - (1) Engine oil
  - (2) Hydraulic oil
  - (3) Transmission oil

## PROCEDURE FOR SETTING UP EXTERNAL POWER SOURCE FOR EXTERNAL POWER SOURCE TYPE ELECTRIC HEATER

1. When using this electric heater, it is necessary to set up the following external power supply facility.

For details, see ESTABLISHING POWER SUPPLY (PAGE 6-6).

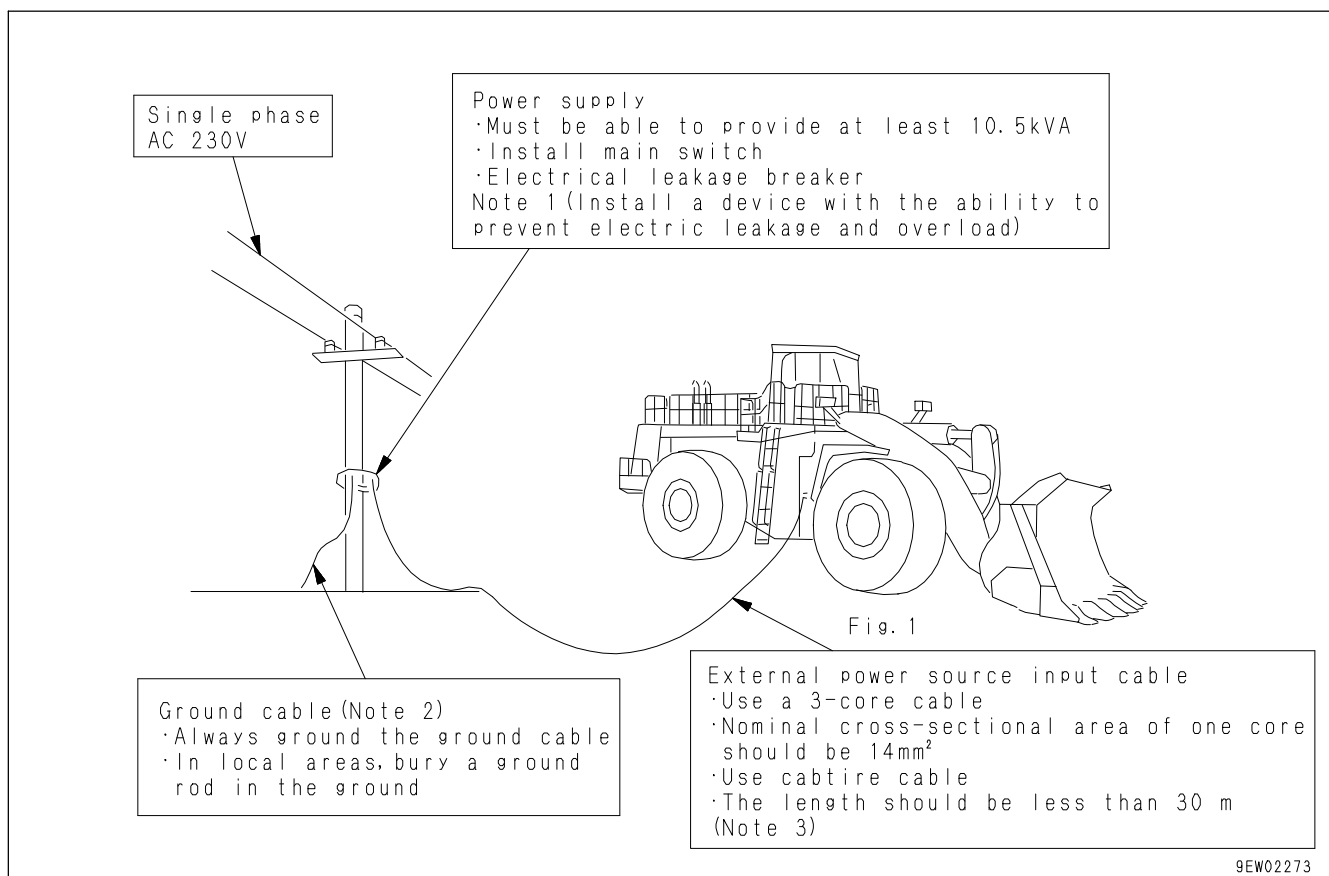
- Type of power supply: Single-phase AC
- Voltage: 230V
- Power supply procedure: Min. 10.5 kilovolt-ampere (kVA)

2. It is necessary to make locally an electric cable that can bring the above electricity from the external power supply facility to the receptacle installed on the machine.

See Item 3 below for details of the method of making the cable.

3. Making external power supply input cable

The external power supply input cable is the electric cable bringing the electricity from the local AC power supply to the input receptacle on the machine. It is connected by the procedure shown in Diagram 1 and actuates the electric heater.



Note 1: The electric leakage breaker is installed to prevent danger of electrocution if the electrical supply leaks in the machine.

Note 2: The reason for connecting the ground cable to the ground is the same as for Note. 1.

Note 3: This is to prevent any drop in voltage.

**MANUFACTURING EXTERNAL POWER SOURCE INPUT CABLE**

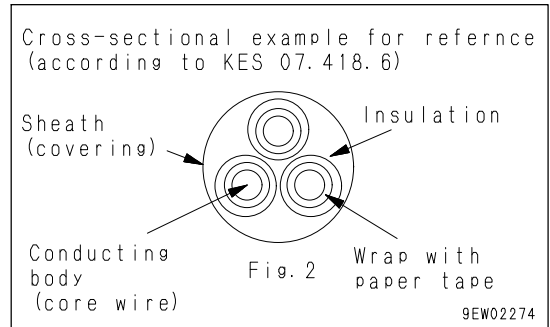
The external power source input cable must be made locally to match the local conditions, but this does not mean that any type of cable can be used.

The following explains the procedure for making the cable and precautions to be followed when making it, so follow this procedure when making the cable.

**Cable specifications and installing procedure**

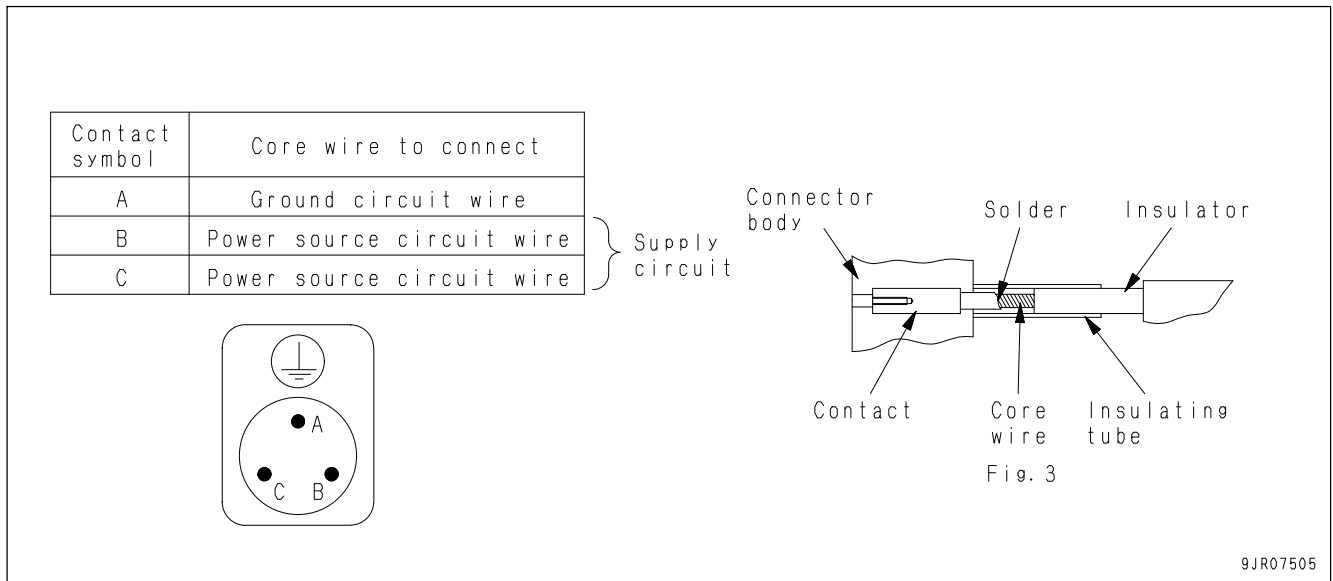
1. Purchase locally a 3-core Type 2 EP rubber insulated heavy-duty chloroprene sheath cable, using the specifications in the diagram on the right for reference.

- The nominal cross-sectional area of one core should be 14 mm<sup>2</sup>.
- Use a cable with a voltage resistance capacity of 3000 V for 1 minute.
- To prevent any drop in the voltage, keep the length within 30 m (98 ft).



2. Connect the machine input connector (sent as an individual part) 426-06-11630 (Connector) to the end of the cable.

The connector has 3 contacts and each is provided with a code, so connect the cable core wires as shown in the chart below.



**CAUTION**

- Always weld the connections between the connector and the core wire.
- Fit the welding parts with a rubber tube or wrap with insulating tape to insulate the welding parts and prevent short circuits caused by contact between semiconductors.
- Always use 426-06-11630 for the connector. If any other connector is used, it will be impossible to connect to the external power source input receptacle.

3. Modify the other end of the cable so that it can be connected to the power supply facility shown in Diagram 1. When the connection modification is finished, the external power source input cable is completed.



## **ESTABLISHING POWER SUPPLY**

When using this preheater, it is necessary to set up the external power supply facility shown in Diagram 1 in PROCEDURE FOR SETTING UP EXTERNAL POWER SOURCE FOR EXTERNAL POWER SOURCE TYPE ELECTRIC HEATER (PAGE 6-4). This power source facility is to supply to the preheater the AC voltage electricity sent from a generator or substation. It must have a structure that enables the external power source input cable to be connected easily to it.

The shape, size, and method of setting up the facility can be decided locally, but the specifications should be as follows.

Power source facility specifications

- (1) Output electricity type: Single phase AC
- (2) Output voltage: 230V
- (3) Power supply procedure: 10.5 kilovolt-ampere (kVA)
- (4) Main switch: Yes
- (5) Electrical leakage breaker: Yes
- (6) Ground circuit: Yes

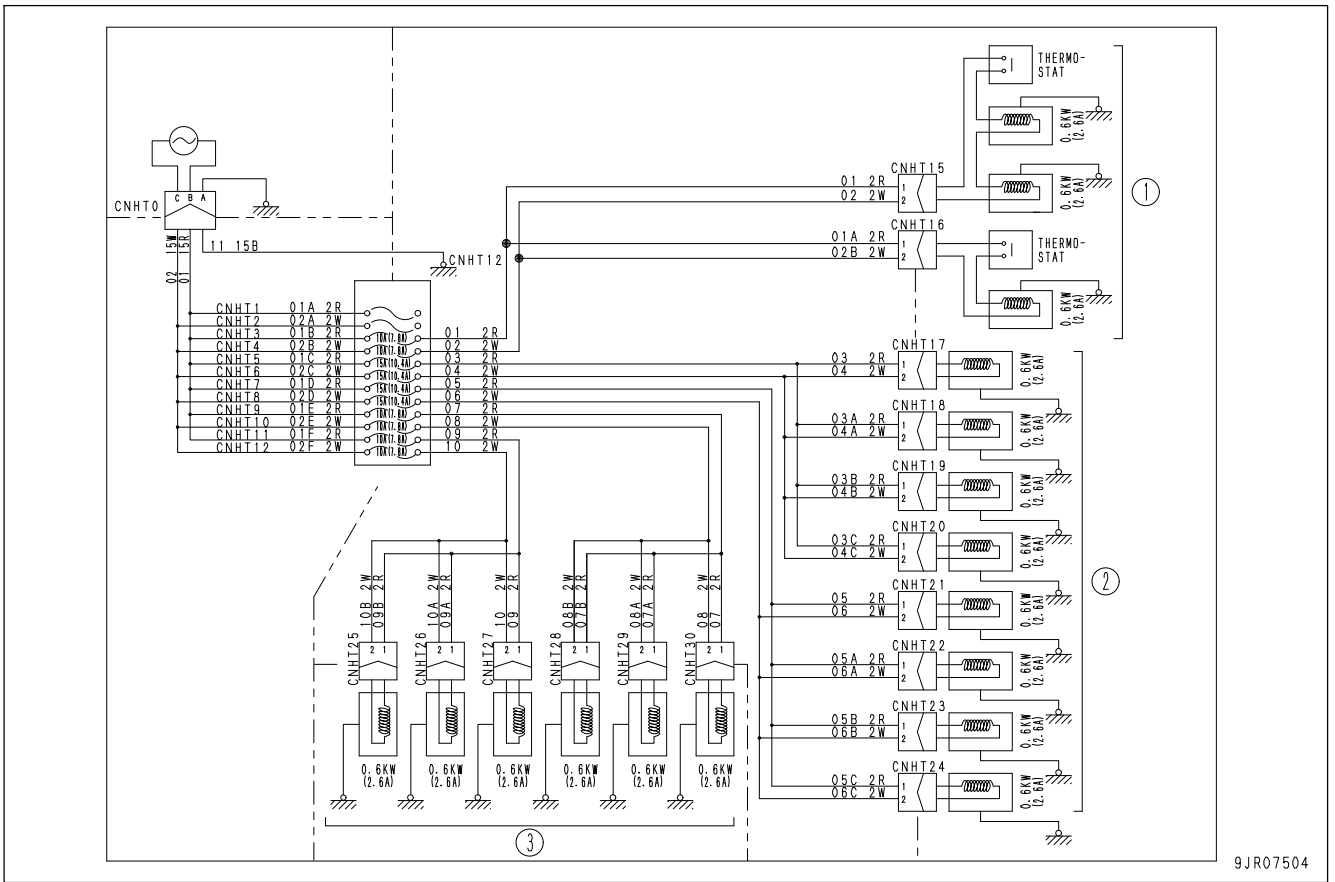
Note: When setting up the power supply, follow all related laws and regulations in that country and use an authorized contractor.

This completes the operations for setting up the external power supply.

## **CHECK ACTUATION AFTER COMPLETION OF ASSEMBLY**

1. Check that there is no leakage of oil or water.
2. Check that there is no interference with the wiring harnesses.
3. Connect to the external power supply and use a tester to check that 230V is flowing to each heater connector.

CIRCUIT DIAGRAM FOR EXTERNAL POWER SOURCE TYPE ELECTRIC HEATER



9JR07504

- (1) Engine oil pan heater
- (2) Hydraulic tank heater

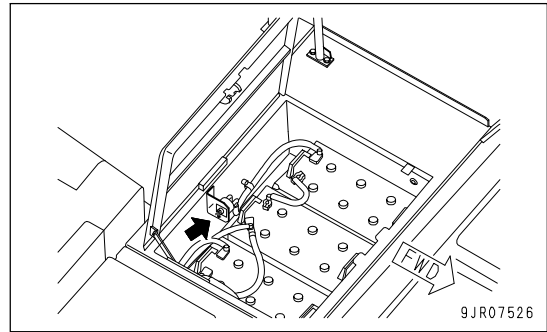
- (3) Transmission oil pan heater

## HANDLING BATTERY DISCONNECTOR SWITCH

This switch cuts the flow of electricity from the battery.

This switch is installed in the battery boxes on the right and left sides of the machine.

(The illustration shows the switch on the left side of the machine. This switch is also installed to the symmetrical position on the right side of the machine.)



## EXPLANATION OF COMPONENT

### BATTERY DISCONNECTOR SWITCH

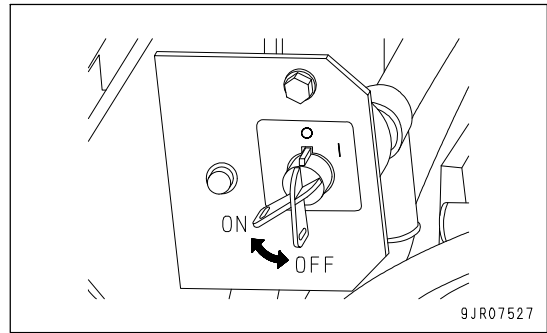
OFF position

The key can be inserted and removed from the switch, and the flow of electricity from the battery is turned on or off.

ON position

Electricity flows from the battery to the circuits.

Always set to this position before operating the machine.



## HANDLING



### WARNING

Do not turn the battery disconnect switch OFF when the engine is running or immediately after the engine is stopped. There is danger that this may cause serious damage to the electrical system.

In the following cases, set the battery disconnect switch to the OFF position.

- When machine is put into long-term storage (1 month or more)
- When electrical system is to be repaired
- When carrying out electric welding
- When inspecting or handling battery
- When replacing fuse or slow blow fuse

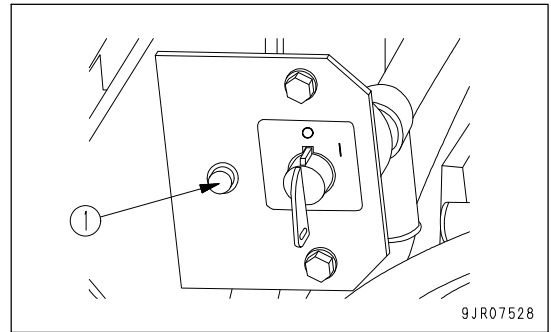
## NOTICE

- When the battery disconnecter switch is turned OFF, all of the electrical systems on the machine stop.
- The preset memory of the radio clock and the tuned radio stations are lost. When using them again, set them again.
- When turning the battery disconnect switch to the OFF position, be sure to turn the starting switch to the OFF position, wait for at least one minute after the engine stops, and ensure that the green indicator lamp (1) is turned OFF.

If the battery disconnecter switch is turned to the OFF position while the starting switch is in the ON position, while the engine is running, or the indicator lamp is lighting, the electrical system may be damaged seriously or may have trouble.

- There is one battery disconnecter switch in each of the battery boxes on the right and left sides of the machine. When putting the machine into long-term storage or when repairing the electrical system, turn both of those switches to the OFF position.

When only either of them is turned to the OFF position, the electrical system is not turned OFF.



## SERVICE CENTER

The work of filling with oil and coolant and draining them, oil sampling and greasing to auto grease fittings can collectively be done in this service center.

### REMARK

A pump for filling and draining is required to do the work in this service center.

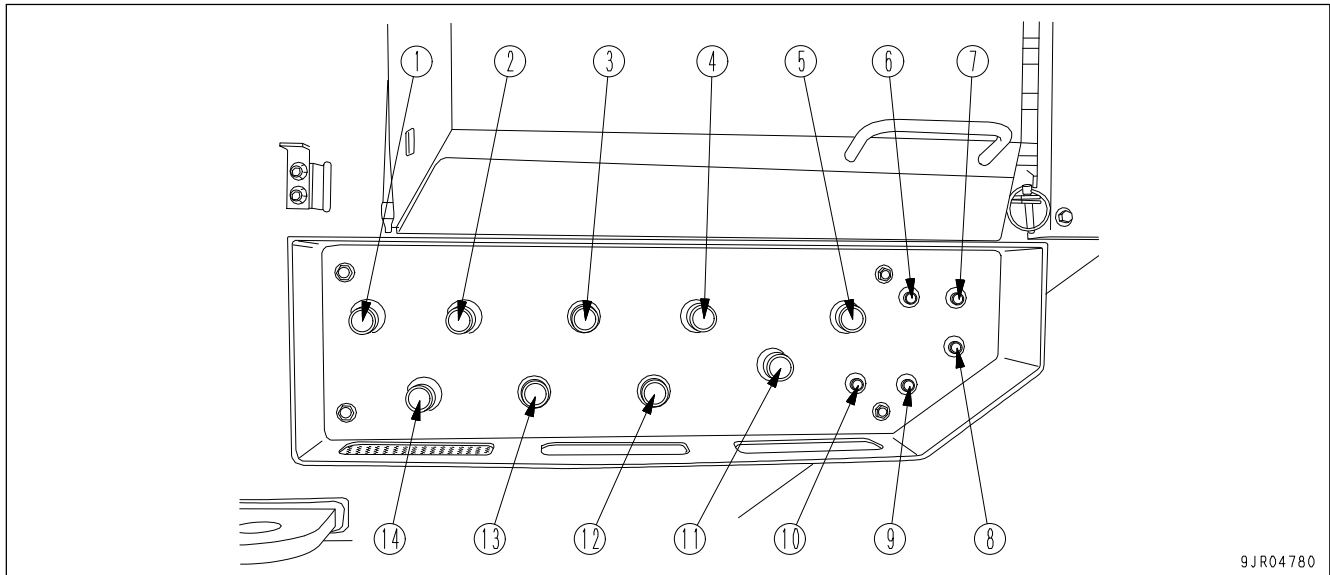
1. Stop the engine.



### CAUTION

Oil is still hot and highly pressurized right after the engine is stopped. If you start the work immediately, you may get a burn, so wait for oil pressure to go down and the coolant temperature to cool off.

The function of each plug is as follows:



9JR04780

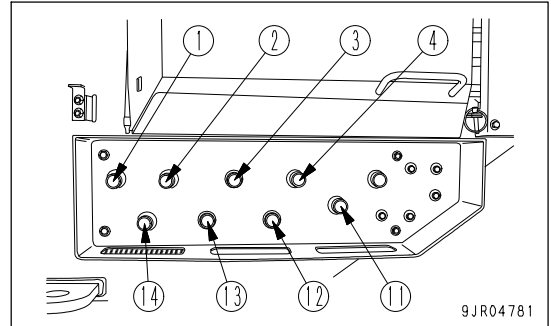
- |   |  |
|---|--|
| (1) Filling brake cooling oil tank with oil and draining    | (8) Taking a sample of hydraulic oil                         |
| (2) Filling brake oil tank with oil and draining            | (9) Taking a sample of brake oil                             |
| (3) Filling hydraulic tank with hydraulic oil and draining  | (10) Spare (2)   |
| (4) Filling engine oil pan with engine oil and draining     | (11) Filling auto grease tank with grease                    |
| (5) Spare (1)   | (12) Filling radiator with coolant and draining              |
| (6) Taking a sample of transmission oil                     | (13) Filling torque converter cooler with water and draining |
| (7) Releasing remaining internal pressure in hydraulic tank | (14) Filling transmission with oil and draining              |

**SIZE OF SCREWS USED IN SERVICE CENTER**

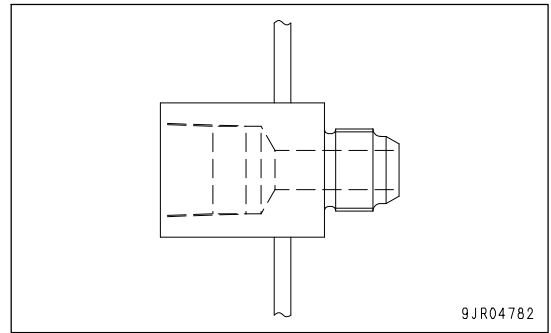
**SIZE OF SCREWS USED AT PORTIONS FOR FILLING WITH OIL AND COOLANT AND DRAINING**

The size of screws used at the connecting aperture to fill with oil and coolant and drain them is as shown below. Prepare for a connecting hose mouthpiece that fits each specific screw.

- (1) Filling brake cooling oil tank with oil and draining
- (2) Filling brake oil tank with oil and draining
- (3) Filling hydraulic tank with hydraulic oil and draining
- (4) Filling engine oil pan with engine oil and draining
- (11) Filling auto grease tank with grease
- (12) Filling radiator with coolant and draining
- (13) Filling torque converter cooler with water and draining
- (14) Filling transmission with oil and draining



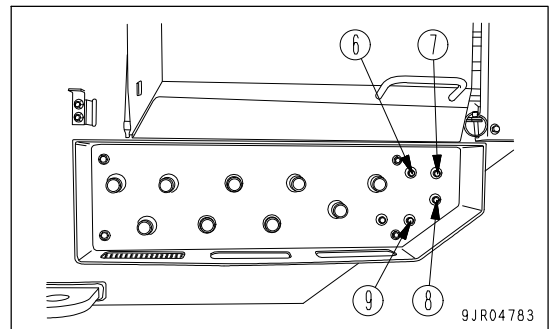
Size of connecting aperture: 3/4 - 14 NPTF



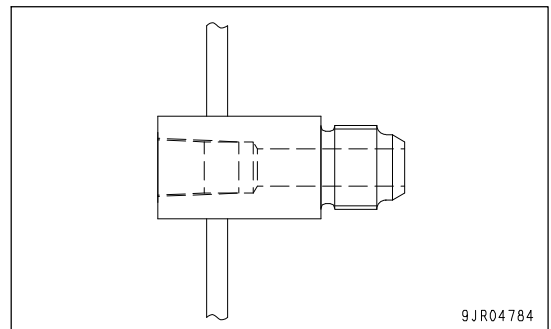
**SIZE OF SCREWS FOR OIL SAMPLING AND INTERNAL PRESSURE RELEASING PORTIONS**

The size of screws used at the portions of oil sampling and internal pressure releasing is as shown below. Prepare for a connecting hose mouthpiece that fits each specific screw.

- (6) Taking a sample of transmission oil
- (7) Releasing remaining internal pressure in hydraulic tank
- (8) Taking a sample of hydraulic oil
- (9) Taking a sample of brake oil

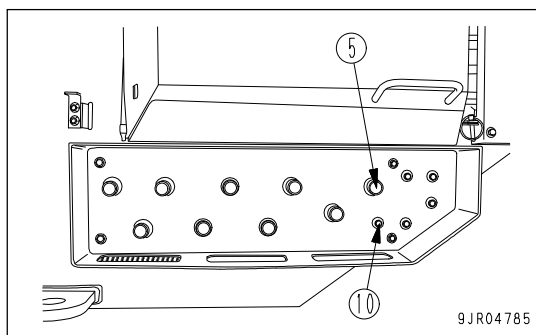


Size of connecting aperture: 3/4 - 18 NPTF



**SIZE OF SCREWS AT SPARE PIPING**

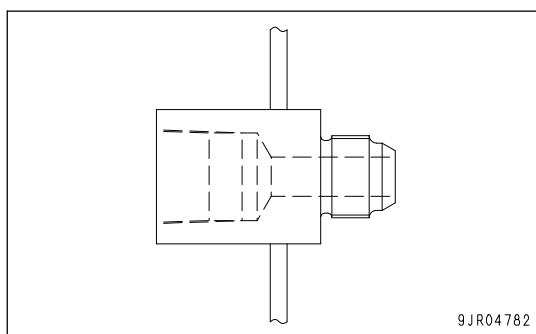
Fittings for the piping are installed as a spare.



(5) Spare (1)

Size of fittings for piping inside machine: 22 mm x 1.5 mm

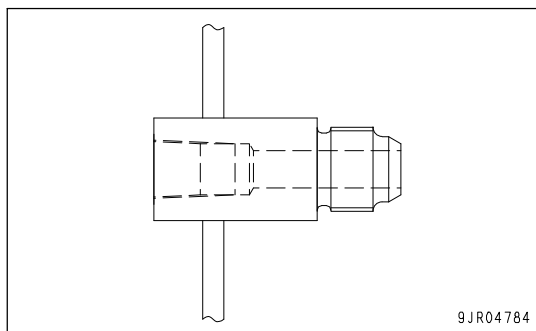
Size of fittings for piping outside machine: 3/4 - 18 NPTF



(10) Spare (2)

Size of fittings for piping inside machine: 18 mm x 1.5 mm

Size of fittings for piping outside machine: 3/4 - 18 NPTF



## LOCATION OF SWITCHING VALVES FOR REFILLING WITH OIL AND COOLANT AND DRAINING

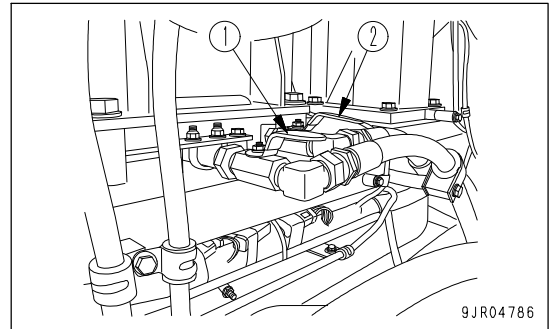
A switching valve is provided in the piping to fill with oil and coolant and drain them. Keep the switching valves open all the time, and close them when replacing the hoses.

Open each valve before the work and close it after the work.

(1) Switching valve in piping of brake cooling oil tank

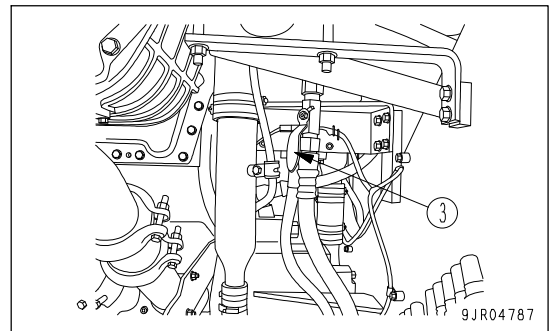
(2) Switching valve in piping of brake oil tank

This valve is provided in the hood inside the brake oil tank. (On the left side of the machine)



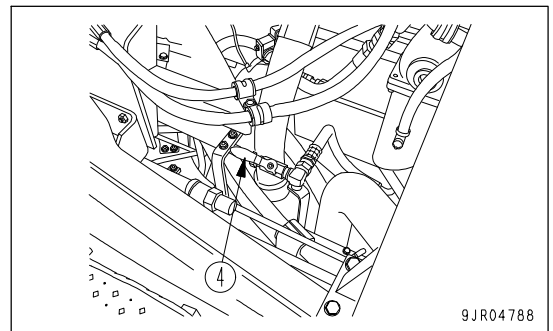
(3) Switching valve in piping of hydraulic tank

This valve is located inside the hydraulic tank suction pipe frame. (On the right side of the machine)



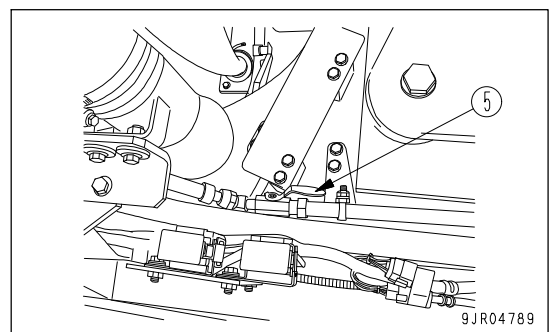
(4) Switching valve in piping of engine oil pan

This valve is located on the left side of the engine oil pan. (On the left side of the machine)



(5) Switching valve in radiator piping

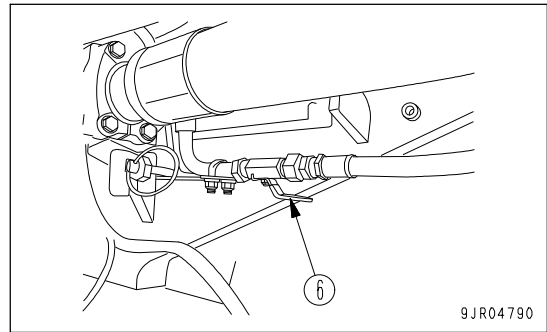
This valve is located near the slow blow fuse on the left side of the engine.





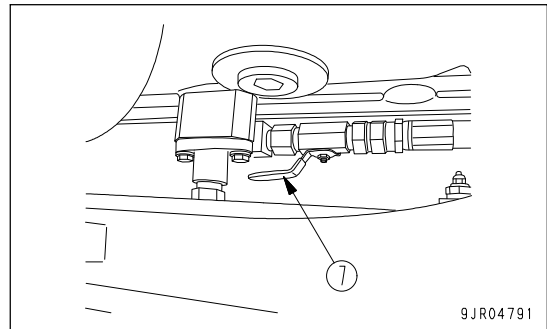
(6) Switching valve in torque converter cooler piping

This valve is located on the lower left side of the torque converter cooler. (On the rear left side of the machine)



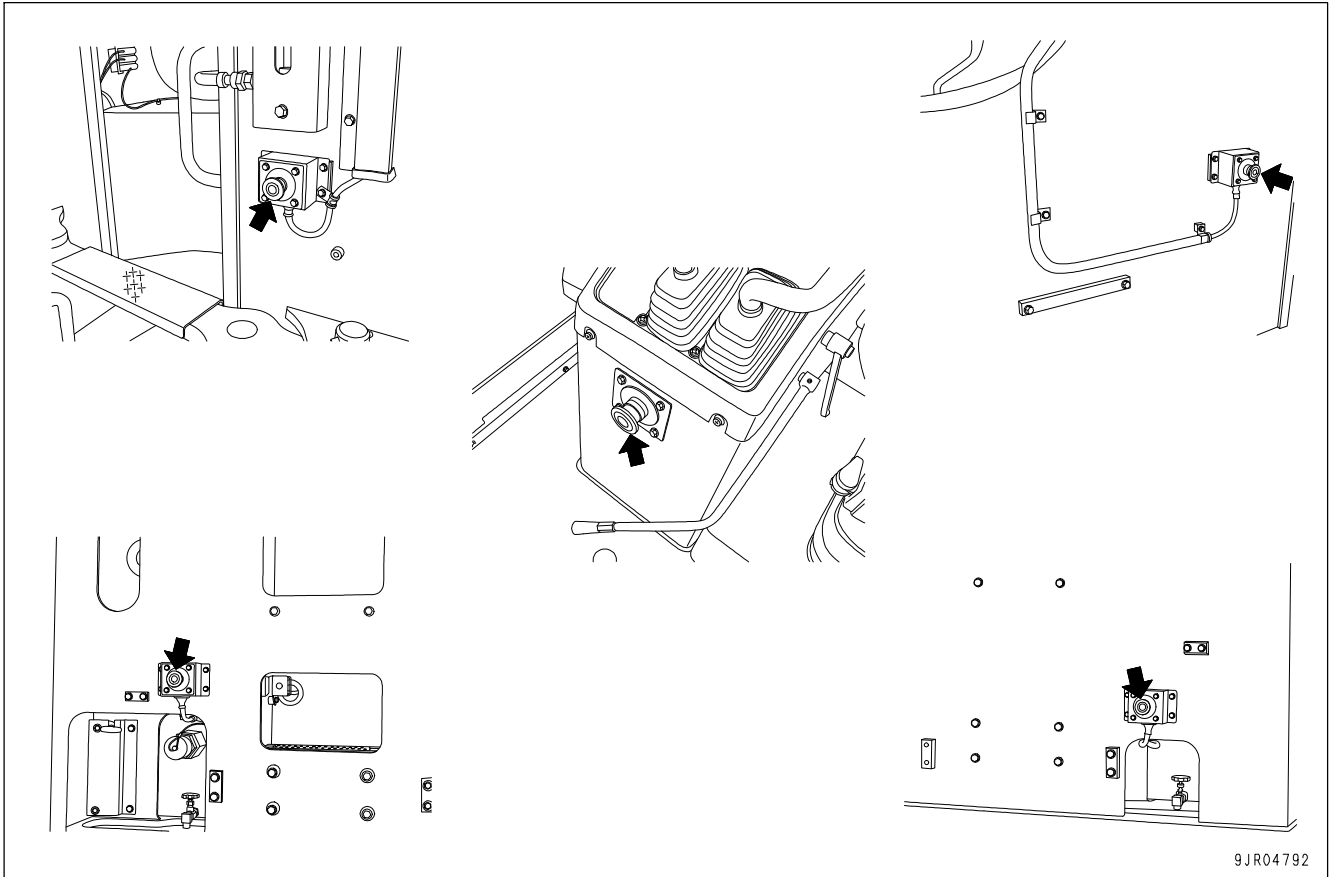
(7) Switching valve in transmission piping

This valve is located at the transmission drain plug.



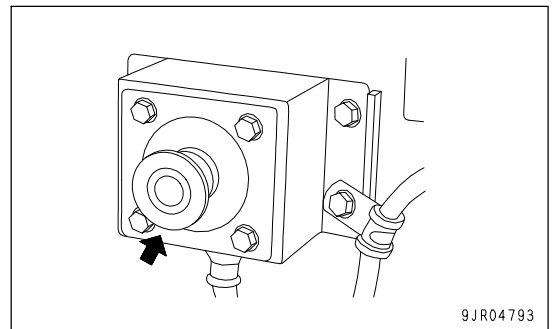
## EMERGENCY ENGINE STOP SWITCH

An emergency engine stop switch is provided in the operator's cab and four other spots on the machine's periphery (5 spots in total). If any one of them is pressed, the engine stops. Use this switch only in emergency, and for normal starting and stopping of the engine, use the engine starting switch.



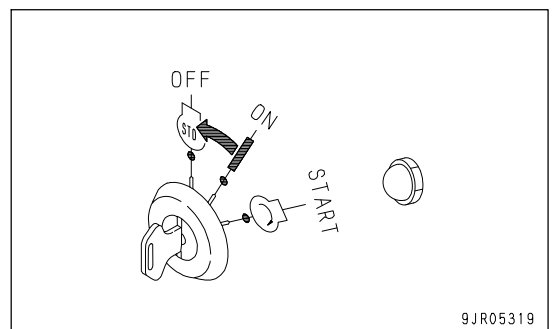
9JR04792

1. Press the nearest emergency engine stop switch, and the engine stops.



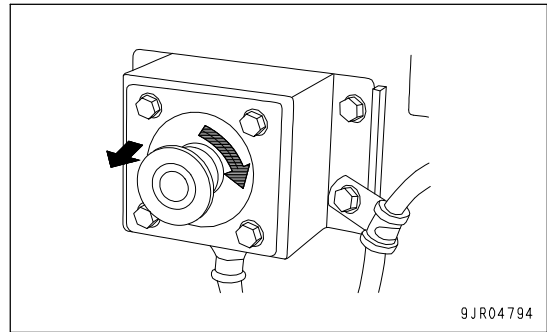
9JR04793

2. If the engine remains in a standstill for a while, turn off the engine starting switch in the operator's cab. (If any of the lights is kept on, the battery can run down.)
3. Remove the cause that necessitated the engine to stop all of sudden.



9JR05319

4. Reset the emergency engine stop switch by turning the button in the arrow direction (clockwise) until it comes out. Now the switch is in the emergency stop position again.
5. When starting up the engine again, use the engine starting switch.

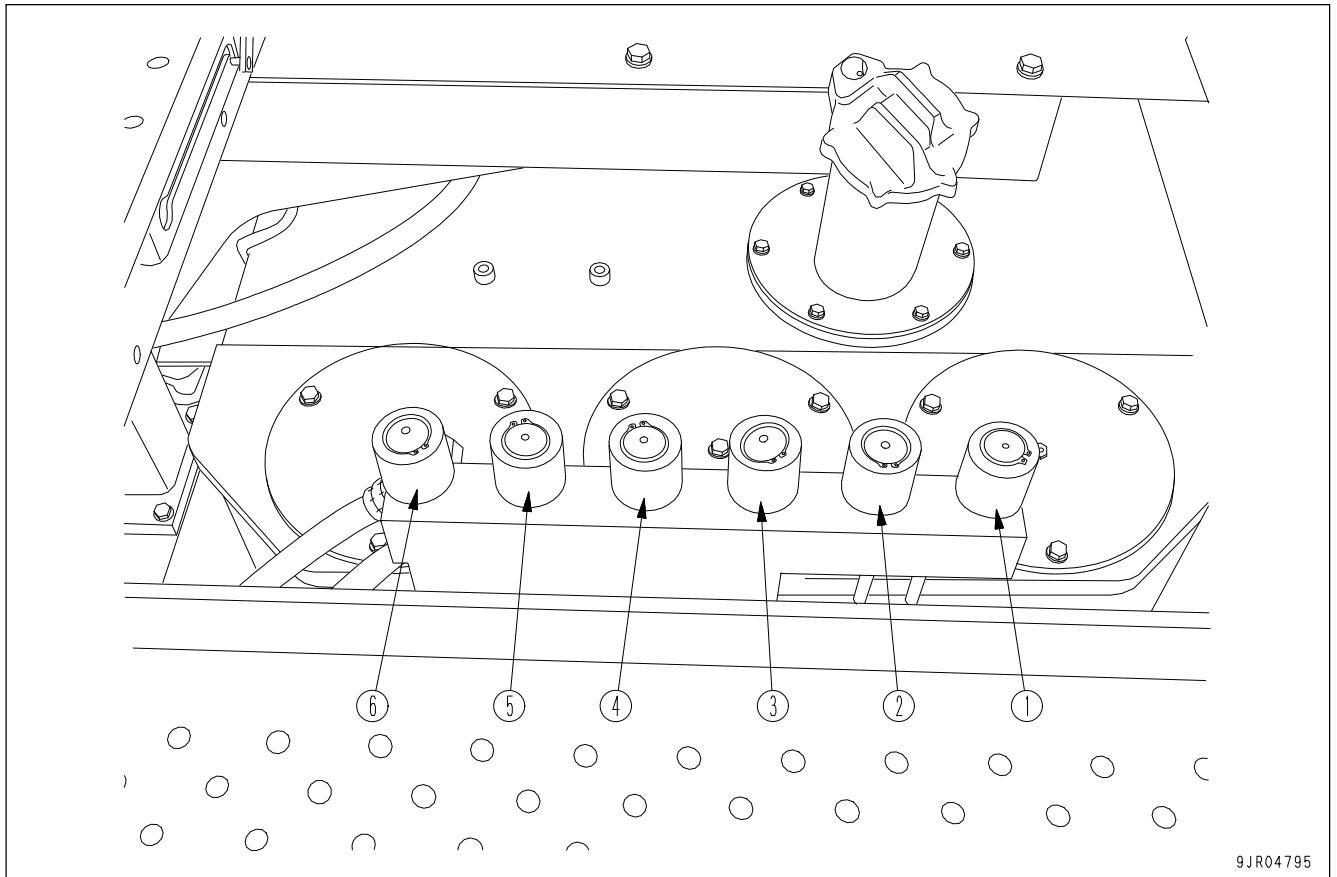


## CENTRALIZED BREATHER

A centralized breather serving the damper case, front and rear axle housings, torque converter and transmission (at right and left) is provided on top of the hydraulic tank.

### REMARK

In the case of standard specifications, an independent breather is provided for each of them. For this model, however, a breather is centralized on top of the hydraulic tanks to make the maintenance work easier.

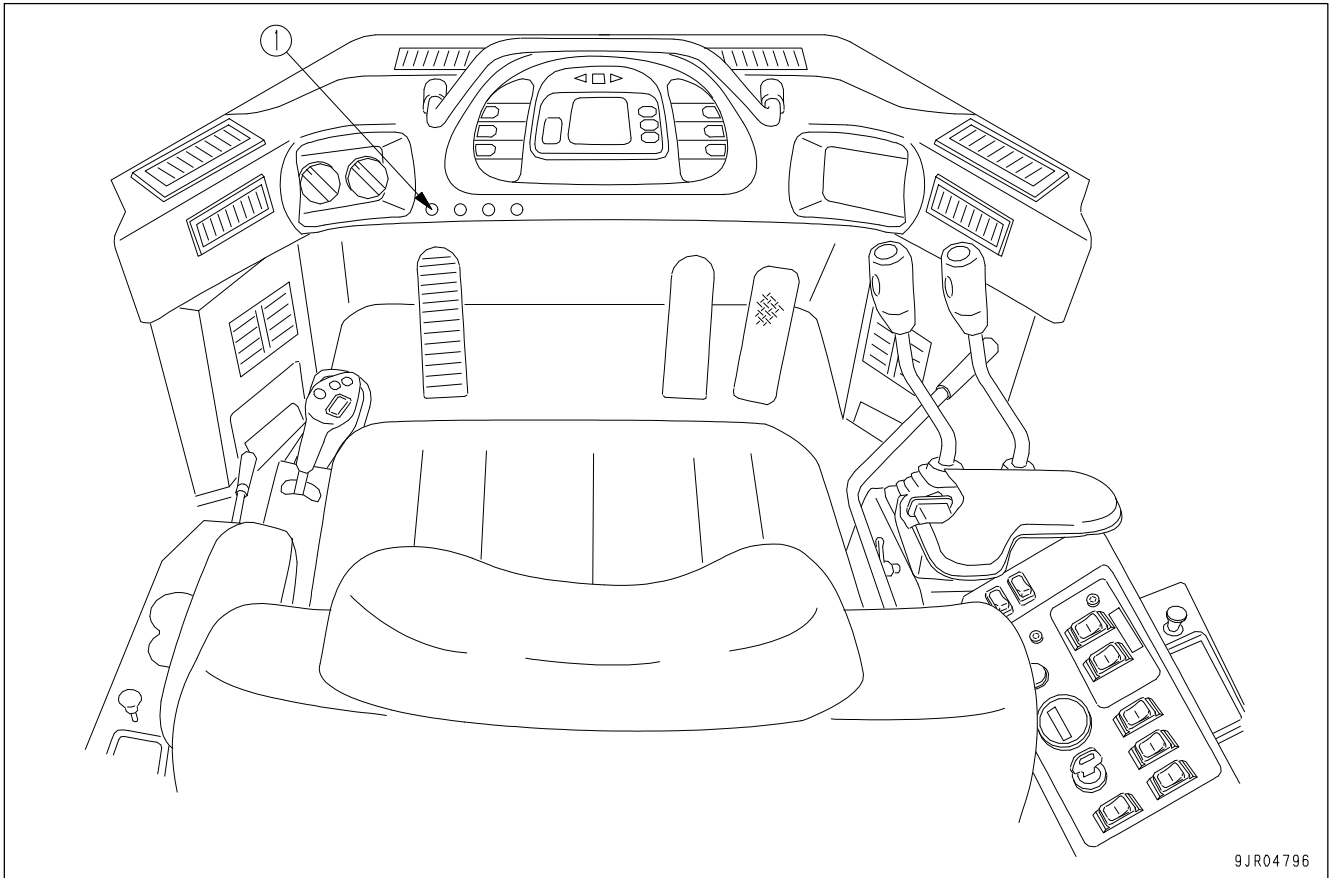


- (1) Damper Case
- (2) Rear Axle Housing
- (3) Front Axle Housing

- (4) Torque Converter
- (5) Transmission (right)
- (6) Transmission (left)

For a cleaning method of the breather, see "MAINTENANCE", and clean it according to the instructions.

## HYDRAULIC OIL LEVEL WARNING DISPLAY



9JR04796

(1) Hydraulic oil level warning lamp: red

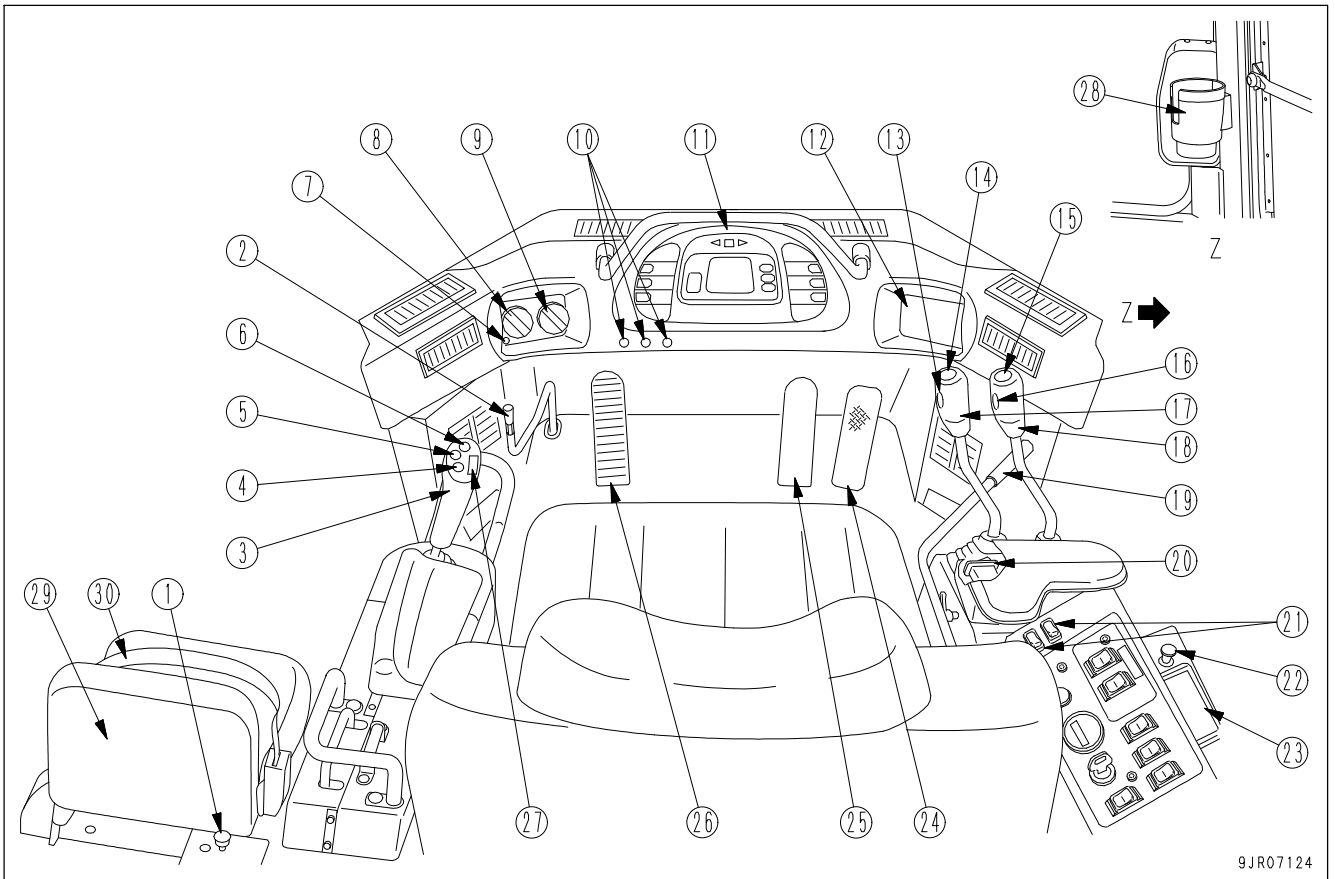
When the hydraulic oil level goes down below a certain limit during the machine operation, the hydraulic oil level warning lamp lights up.

If the lamp lights on, stop the machine and switch off the engine immediately, and check the machine for a source of oil leak, repair the oil-leaking spot, refill the tank with hydraulic oil and check the oil level.

# HANDLING MACHINE EQUIPPED WITH TRAINER SEAT

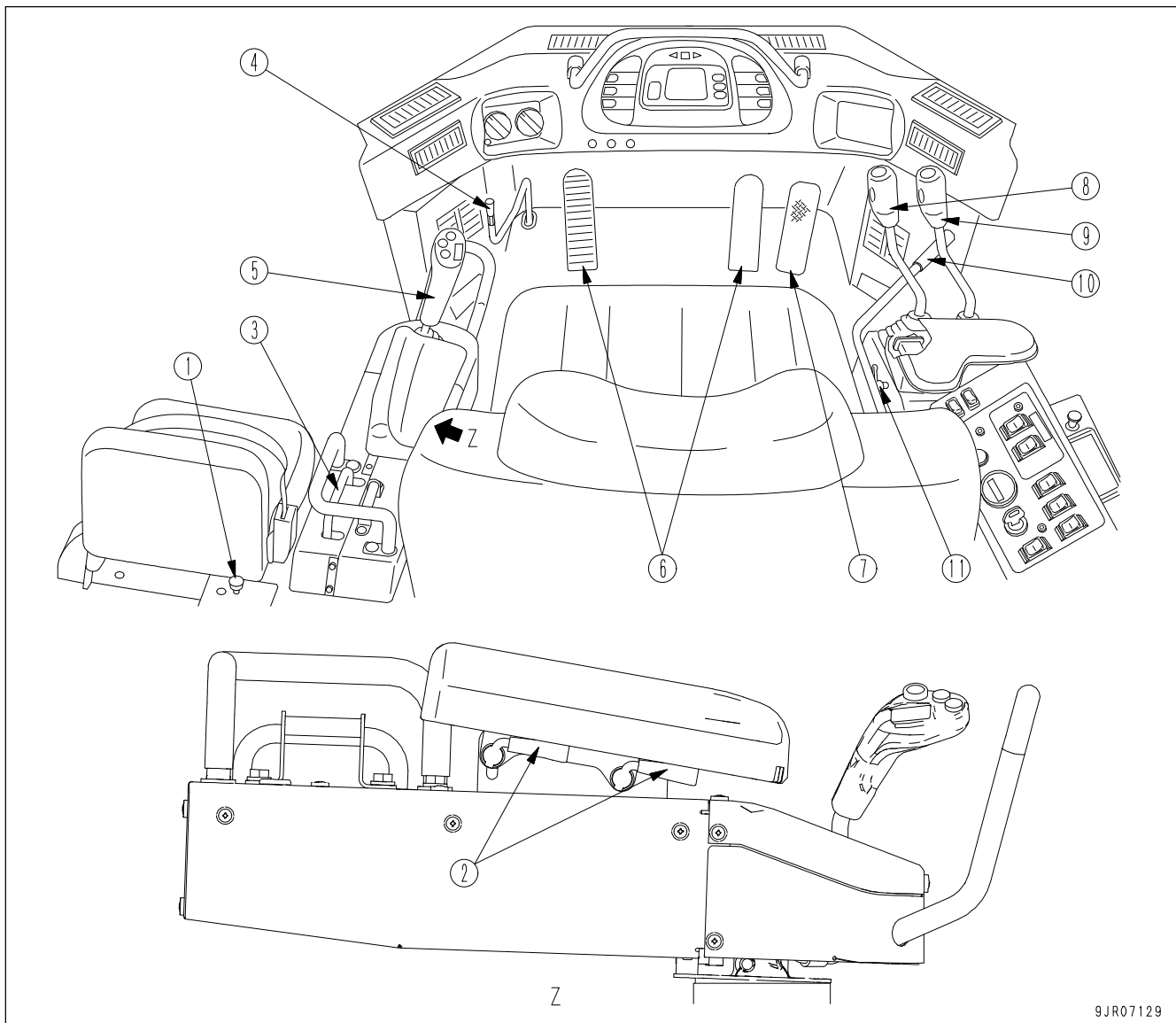
With this specification, the machine is equipped with a seat for the trainer to sit in.  
The left console portion is changed, so always read this explanation before using the machine.

## GENERAL VIEW OF CONTROLS AND GAUGES



- |  |  |
|--|--|
| (1) Rear defroster knob                            | (16) Transmission auto-shift, manual selector switch |
| (2) Joystick steering lock lever                   | (17) Bucket control lever                            |
| (3) Joystick steering lever                        | (18) Lift arm control lever                          |
| (4) Horn switch                                    | (19) Work equipment lock lever                       |
| (5) Shift down switch                              | (20) Turn signal switch                              |
| (6) Shift up switch                                | (21) Power window switch                             |
| (7) Speed limit ON-OFF indicator lamp              | (22) Cigarette lighter                               |
| (8) Speed limit dial                               | (23) Ash tray  |
| (9) Drive force limit dial                         | (24) Accelerator pedal                               |
| (10) 1st, 2nd, 3rd indicator lamp (for auto-shift) | (25) Right brake pedal                               |
| (11) Main monitor                                  | (26) Left brake pedal                                |
| (12) Multi monitor                                 | (27) Directional switch                              |
| (13) Load meter cancel switch                      | (28) Cup holder                                      |
| (14) Speed limit ON-OFF switch                     | (29) Assistant's seat                                |
| (15) Kick down switch                              | (30) Assistant's seat belt                           |

## CONTROL LEVERS, PEDALS, KNOBS



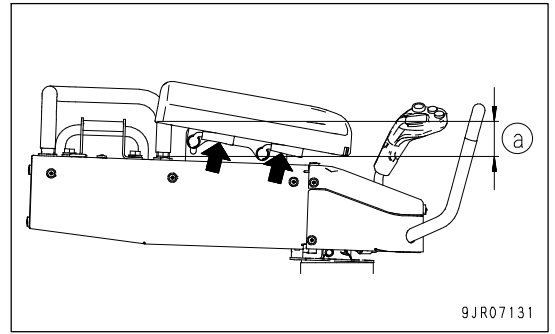
- |  |                                  |
|--|----------------------------------|
| (1) Rear defroster knob                                | (7) Accelerator pedal            |
| (2) Arm rest adjustment lever                          | (8) Bucket control lever         |
| (3) Joystick steering front-rear lever adjustment knob | (9) Lift arm control lever       |
| (4) Joystick steering lock lever                       | (10) Work equipment lock lever   |
| (5) Joystick steering lever                            | (11) Wrist rest adjustment lever |
| (6) Brake pedal  |                                  |

For details of handling knob (1), see "AIR CONDITIONER (PAGE 3-69)" in the OPERATION section.

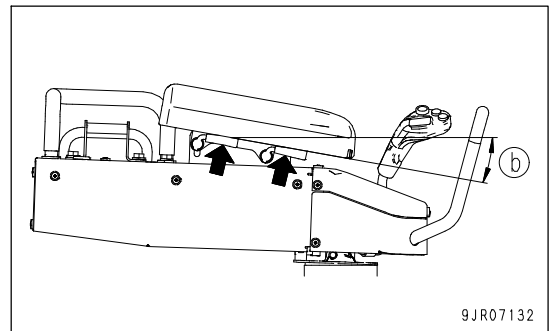
For details of handling levers and pedals (5) - (11), see "CONTROL LEVERS, PEDALS, KNOBS (PAGE 3-47)" in the OPERATION section.

**ARM REST ADJUSTMENT LEVER**

Pull this lever (2) to adjust the height of the armrest within range (a) of 23 mm (0.9 in).



It is possible to adjust the angle within range (b) of approx. 8°.



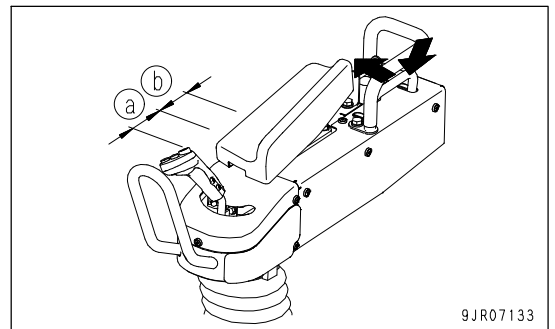
**JOYSTICK STEERING FRONT-REAR LEVER ADJUSTMENT KNOB**

 **WARNING**

Carry out front-rear adjustment of the joystick steering lever with the machine stopped. If the machine is moving and the lever is operated (adjusted), it may lead to serious personal injury.

When this lever (3) is pulled, it is possible to adjust the joystick steering lever within a range of 160 mm (6.3 in) (range (a)) (16 mm (0.6 in) x 10 stages).

When getting on or off the machine, it is possible to move it a further 150 mm (5.9 in) to the rear. (range (b))





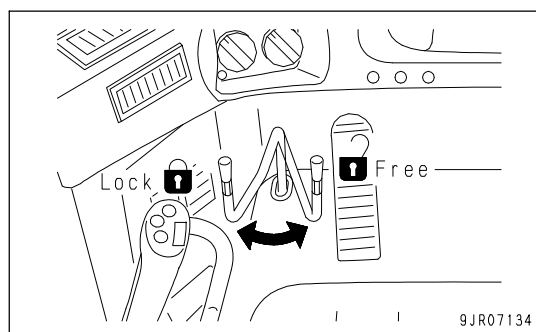
## JOYSTICK STEERING LOCK LEVER



### WARNING

- Regardless of whether the engine is running or stopped, always set the joystick steering lock lever securely to the LOCK position when standing up from the operator's seat.  
In particular, when the engine is running, if the joystick steering lever is not locked and it is touched by mistake, it may cause serious personal injury.
- If the joystick steering lock lever is not set securely to LOCK position, the lever may not be locked.
- When parking the machine or carrying out maintenance, always set the steering lock lever to LOCK position.

This lever (4) is a device to lock the joystick steering lever. Push the joystick steering lock lever to the left to lock it.



## HANDLING TRAINER SEAT

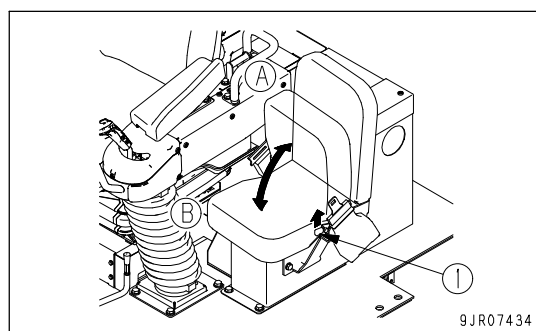


### WARNING

Before starting operation, check that there is no problem with the seat mounting bracket, belt mounting bracket, or seat belt. If any part is worn or damaged, replace it.

When getting in or out of the operator's compartment or when the trainer seat is not being used, pull up lever (1) to set the seat to the stowed position (position A).

When using the trainer seat, pull up lever (1) and lower the seat to position (B).



## WHEN REQUIRED

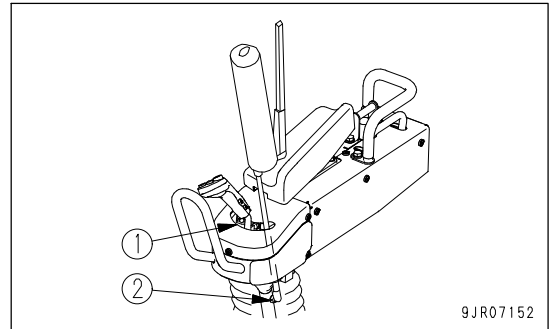
### LUBRICATING

If the joystick steering lever is heavy or stiff when adjusted to the front or rear, lubricate the U-joints.

1. Using a grease pump, pump in grease through the grease fittings shown by arrows.
2. After greasing, wipe off any old grease that was pushed out.

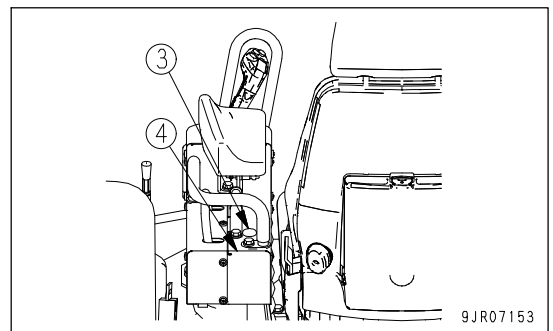
#### (1) Joystick steering lever U-joint

Carry out greasing of grease fitting (2) through gap (1) of the cover. When doing this, be careful not to damage the grease fitting inside the cover.



#### (2) Joystick steering lever fore-and-aft slide rail

Remove grommet (3) and pump in grease through the grease fitting on the inside of cover (4).





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**WA1200-3 WHEEL LOADER**

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Form No. TEN00460-01

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Printed in Japan 01-13

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