Operation & Maintenance Manual

EEAM024501

WA600-6

WHEEL LOADER

SERIAL NUMBER
WA600-6 - 60001 and up

WARNING

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

KOMATSU

FOREWORD

FOREWORD

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

⚠ WARNING

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

Always be sure to read and understand this manual thoroughly before performing operation and maintenance.

Read the safety messages given in this manual and the safety labels affixed to the machine thoroughly and be sure that you understand them fully.

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

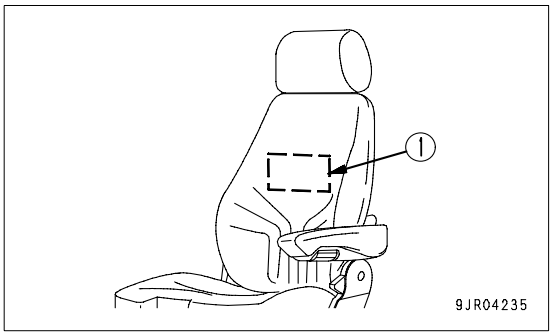
If this manual has been lost or has become dirty and cannot be read, request a replacement manual immediately from Komatsu or your Komatsu distributor.

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

Komatsu delivers machines that comply with all applicable regulations and standards of the country to which it has been shipped. If this machine has been purchased in another country or purchased from someone in another country, it may lack certain safety devices and specifications that are necessary for use in your country. If there is any question about whether your product complies with the applicable standards and regulations of your country, consult Komatsu or your Komatsu distributor before operating the machine.

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.

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

Example of safety message using signal word

WARNING

When standing up from the operator's seat, always place the work equipment lock lever in the LOCK position.
If you accidentally touch the work equipment 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.

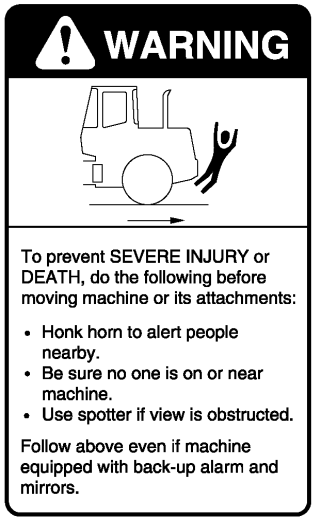
NOTICE	This word is used for precautions that must be taken to avoid actions which could shorten the life of the machine.
REMARKS	This word is used for information that is useful to know.

- **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.



Part No.

Komatsu cannot predict every circumstance that might involve a potential hazard in operation and maintenance. Therefore, the safety messages in this manual and on the machine may not include all possible safety precautions.

If any procedures or actions not specifically recommended or allowed in this manual are used, it is your responsibility to take the necessary steps to ensure safety.

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

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

In addition, the illustrations in this manual may show the machine with optional equipment installed.

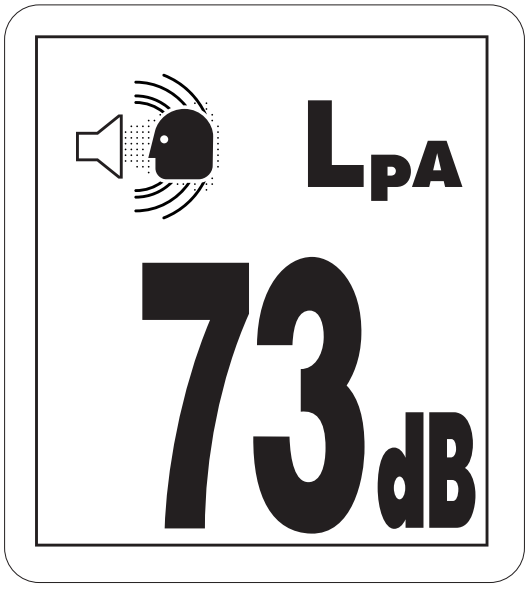
If there are any unclear points or you have any questions, please contact your Komatsu distributor.

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

Noise emission levels

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

- Sound pressure level at the operator's station, measured according to ISO6396 (Dynamic test method, simulated working cycle).



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



Vibration levels

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

The actual acceleration value for the hands and arms is less than or equal to 2.5 m/s². The actual acceleration value for the body is less than or equal to 0.5 m/s².

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

Operating condition:

(WHEEL LOADER:) V-shape loading

Guide to Reduce Vibration Levels on Machine

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

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

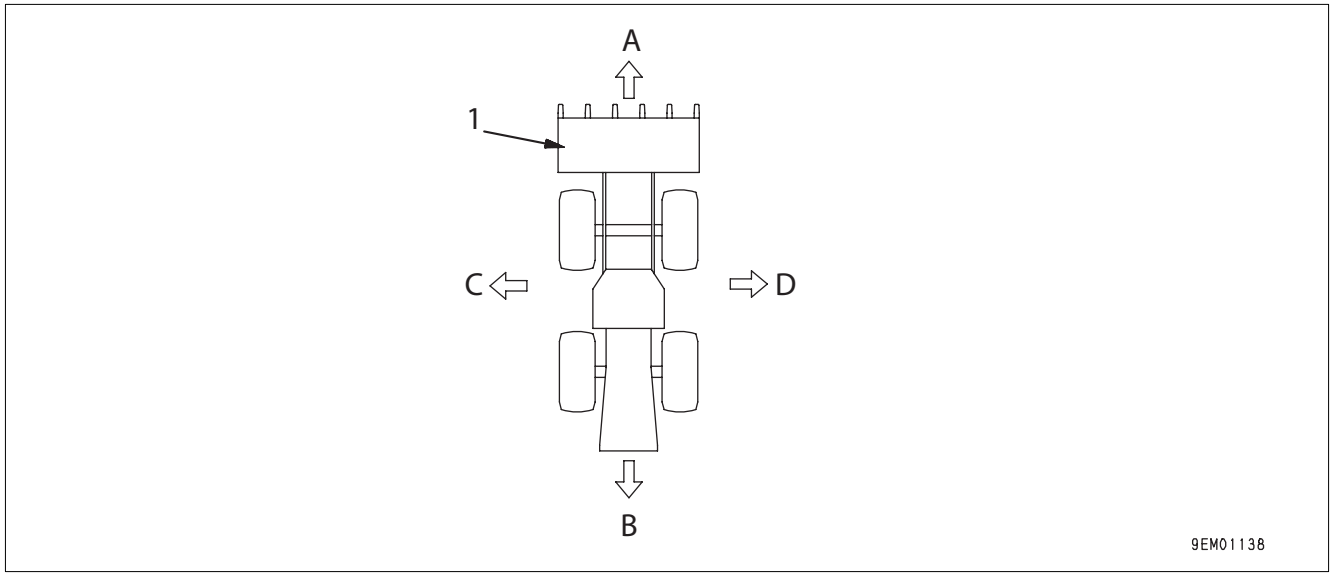
INTRODUCTION

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

- Digging work
- Smoothing
- Pushing work
- Loading work

For details of the operating procedure, see “WORK POSSIBLE USING WHEEL LOADER (3-138)“.

FRONT/REAR, LEFT/RIGHT DIRECTIONS OF MACHINE



(1) Bucket
(A) Front
(B) Rear
(C) Left
(D) Right

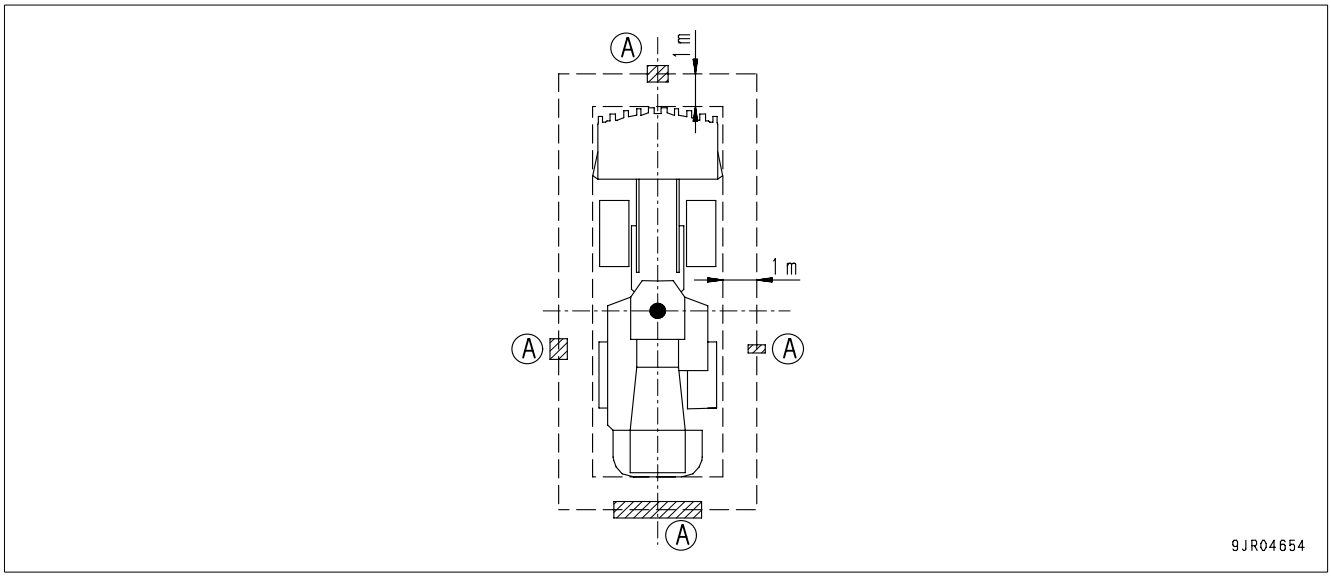
In this manual, the directions of the machine (front, rear, left, right) are determined according to the view from the operator's seat in the direction of travel (front) of the machine.

VISIBILITY FROM OPERATOR'S SEAT

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

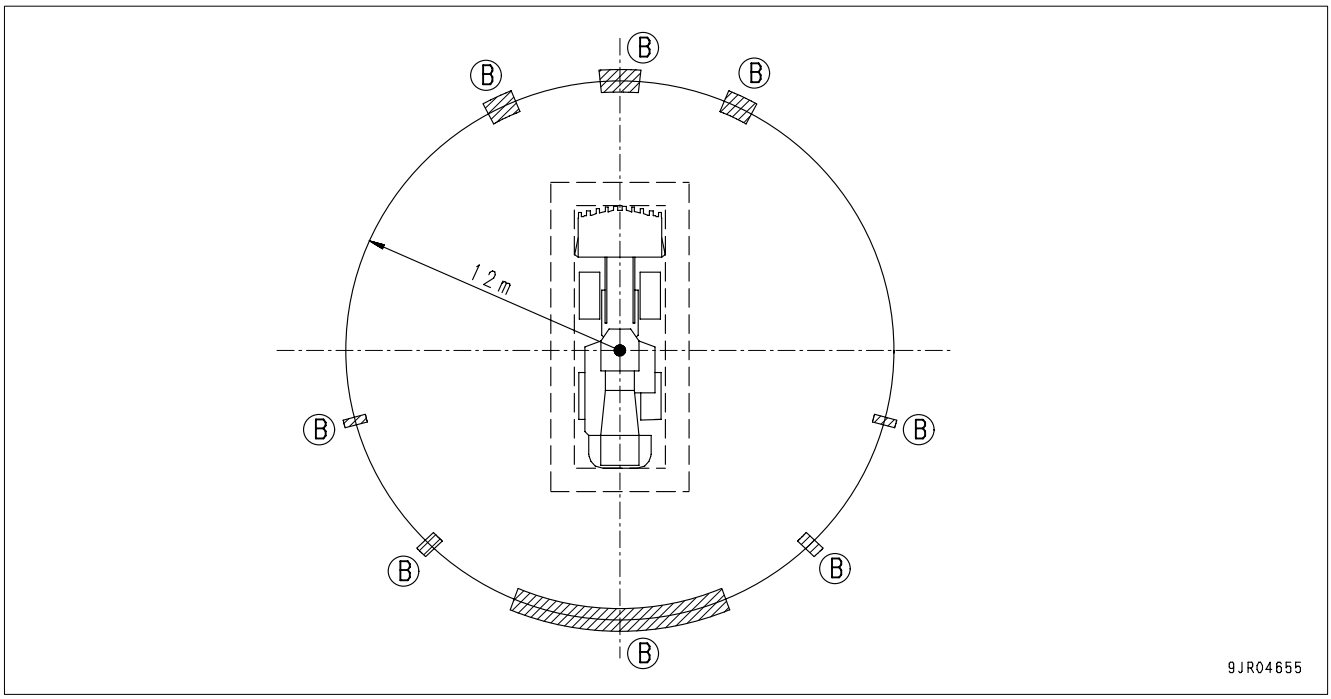
VISIBILITY IN IMMEDIATE AREA

The visibility of this machine in the area 1 m from the outside surface of the machine at a height of 1.5 m 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.



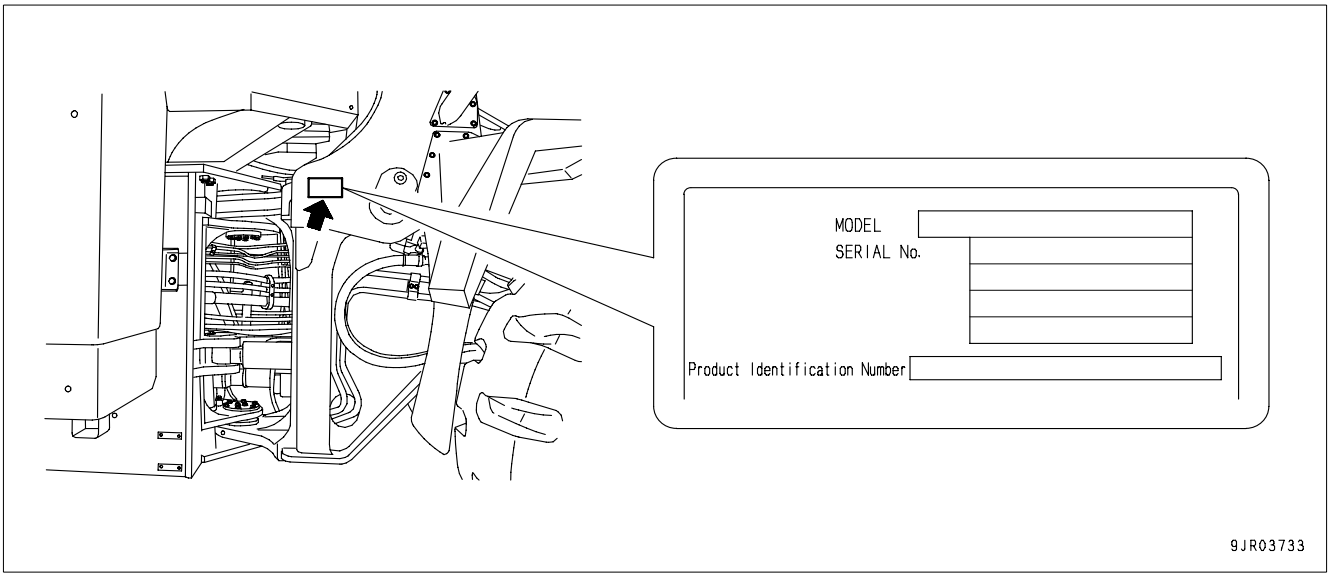
NECESSARY INFORMATION

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

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

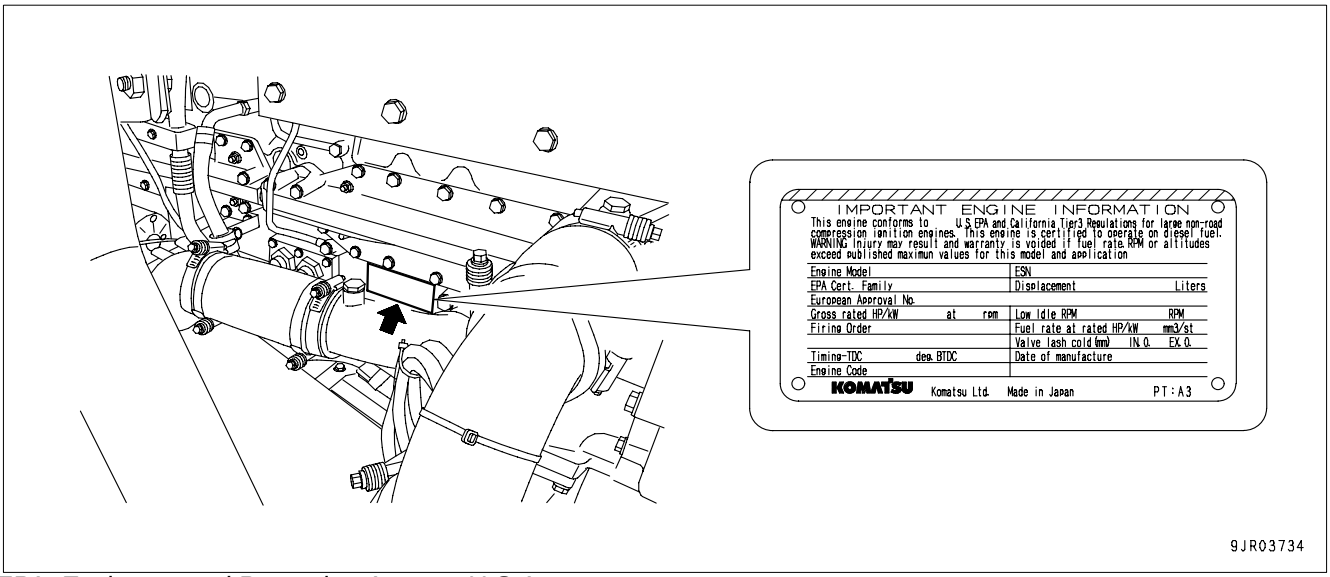
On the center right of the front frame.

The design of the nameplate differs according to the territory.



EPA REGULATIONS, ENGINE NUMBER PLATE

This name plate is affixed on the oil cooler at the side of engine cylinder block on the left side of machine.



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

POSITION OF SERVICE METER

The service meter is displayed on the character display at the bottom center of the machine monitor.

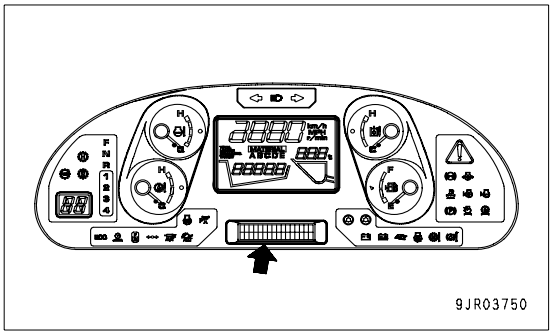
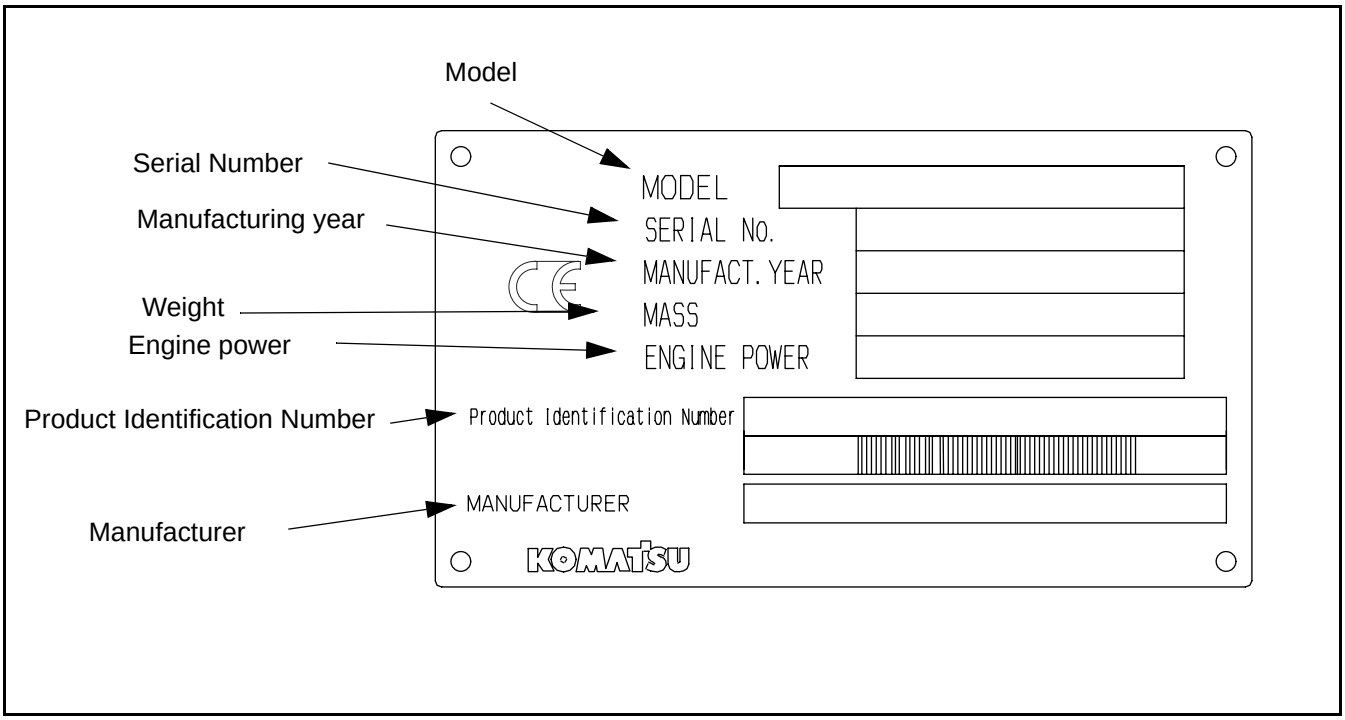


TABLE TO ENTER SERIAL NO. AND DISTRIBUTOR

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

MACHINE SERIAL NUMBER PLATE



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INDEX

COLOPHON

SAFETY

⚠ WARNING

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

SAFETY

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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.

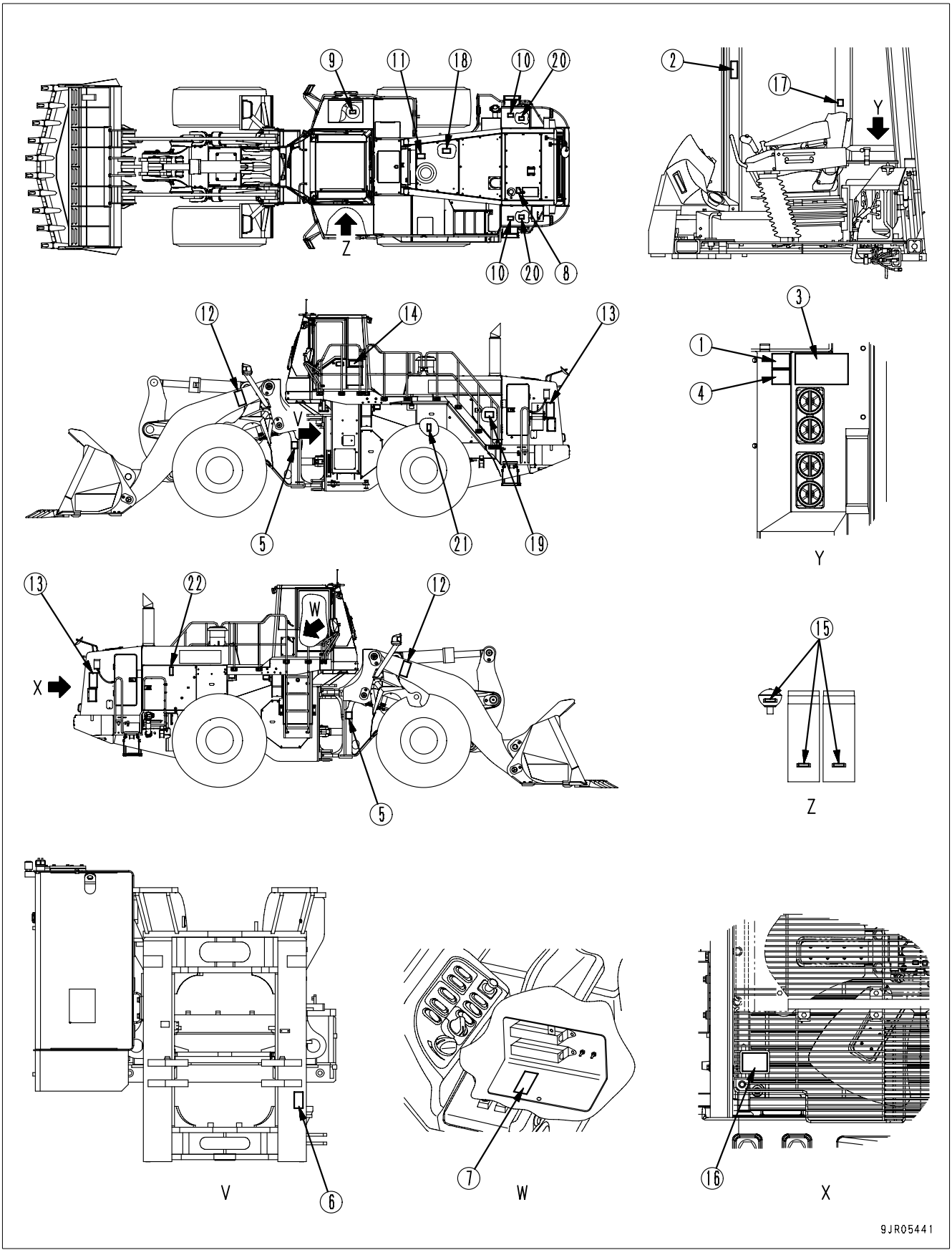
To ensure that the content of these safety labels can be read properly, be sure that they are in the correct place and always keep them clean. When cleaning them, use soap and water. Do not use organic solvents or gasoline.

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

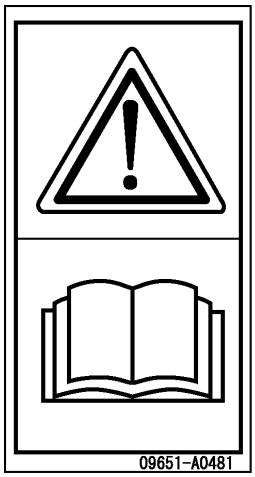


SAFETY LABELS

(1) Caution before starting (09651-A0481)

- Warning!

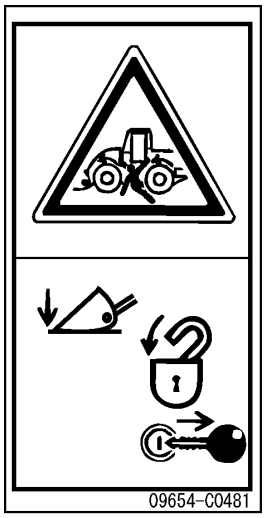
- Read manual before operation, maintenance, disassembly, assembly and transportation.



(2) Caution for lock lever (09654-C0481)

- Sign indicates a hazard of unexpected moving of stopped machine.

- Lower working device to the ground, move safety lever to lock position and take engine key with you before leaving machine.



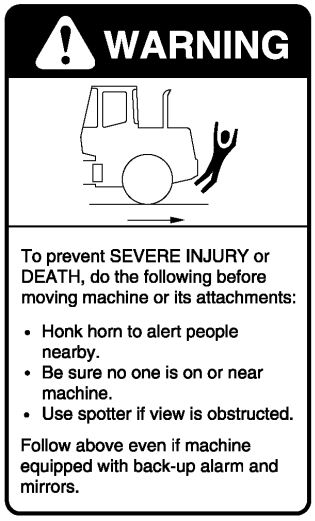
(3) Caution when traveling in reverse

⚠ WARNING

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

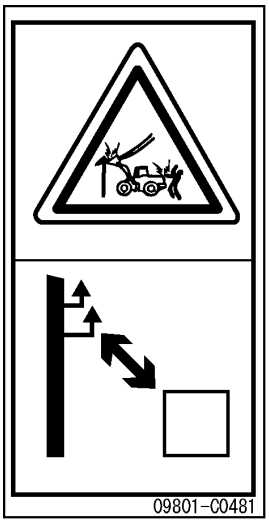
- **Honk horn to alert people nearby.**
- **Be sure no one is on or near the machine.**
- **Use spotter if view is obstructed.**

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



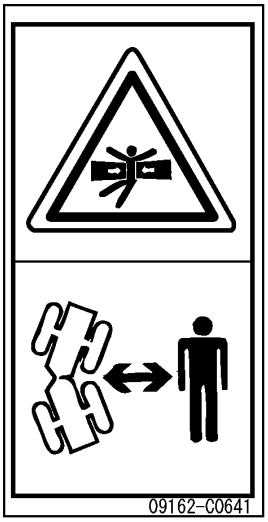
(4) Caution for going close to electric cables (09801-C0481

- Sign indicates an electrocution hazard if machine is brought too near electric power lines.
- Keep a safe distance from electric power lines.



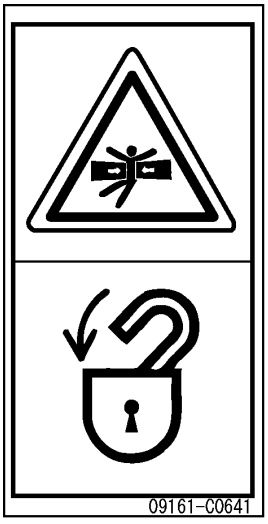
(5) Do not enter (09162-C0641)

- Sign indicates a crush hazard between the articulating parts of the vehicle.
- Keep away from the vehicle when it is moving.



(6) Caution for frame lock bar (09161-C0641)

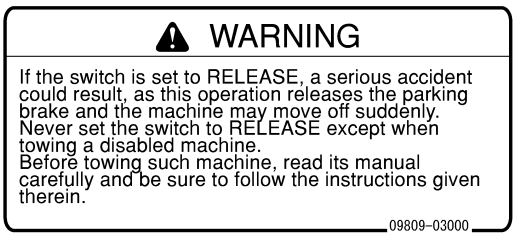
- Sign indicates a crush hazard between the articulating parts of vehicle.
- Lock vehicle with lock bar to avoid movement during maintenance and transportation.



(7) Precautions when releasing parking brake (09809-03000)

⚠ WARNING

If the switch is set to RELEASE, a serious accident could result, as this operation releases the parking brake and the machine may move off suddenly.
Never set the switch to RELEASE except when towing a disabled machine.
Before towing such machine, read its manual carefully and be sure to follow the instructions given therein.



(8) Caution when coolant is at high temperature (09653-A0641)

- Sign indicates a burn hazard from spurting hot water or oil if radiator or hydraulic tank is uncapped while hot.
- Allow radiator of hydraulic tank to cool before removing cap.



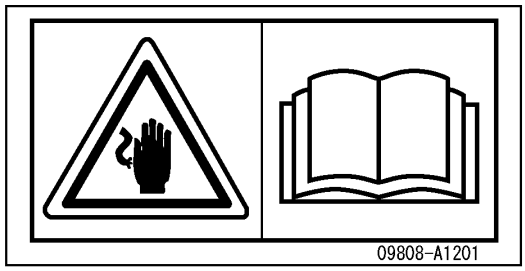
(9) Caution when oil is at high temperature (09653-A0641)

- Sign indicates a burn hazard from spurting hot water or oil if radiator or hydraulic tank is uncapped while hot.
- Allow radiator of hydraulic tank to cool before removing cap.



(10) Caution when handling battery cable (09808-A1201)

- Sign indicates an electric hazard from handling the cable.
- Read manual for safe and proper handling.



(11) Caution to prohibit going up on the hood (09805-A0881)

- There is the hazard of falling down.
- Do not go close to the edge of the machine by mistake.



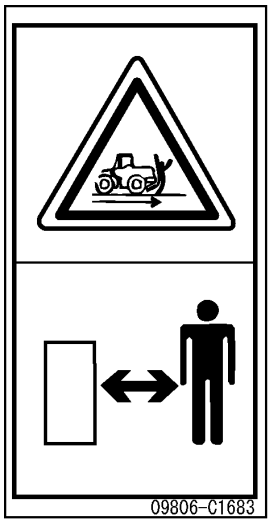
(12) “Do not go under work equipment“ sign (09807-C1683)

- Sign indicates a crush hazard from falling off of working device.
- Keep away when the working device is raised.

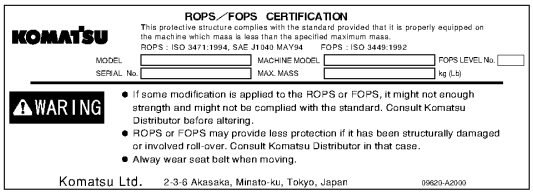


(13) Do not come near machine sign (09806-C1683)

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



(14) “Do not modify ROPS“ sign (09620-A2000)



ROPS/FOPS CERTIFICATION

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

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

WARNING

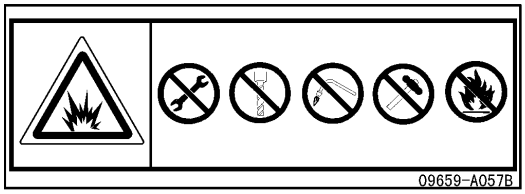
- If some modification is applied to the ROPS or FOPS, it might not enough strength and might not be complied with the standard. Consult Komatsu Distributor before altering.
- ROPS or FOBS may provide less protection if it has been structurally damaged or involved roll-over. Consult Komatsu Distributor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

Always wear seat belt when moving.

(15) High pressure warning

(Caution when handling accumulator) (09659-A057B)

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



(16) Precautions when removing fan net (426-93-43340)

⚠ CAUTION

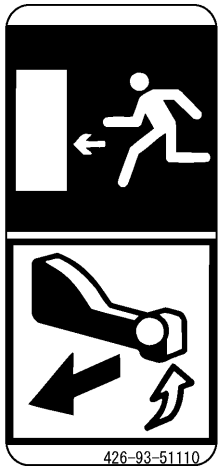
Always stop engine before removing fan net.

⚠ CAUTION

Warning tag must be fixed to starter key.



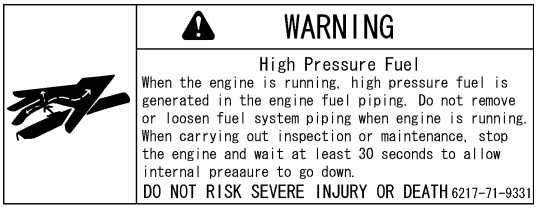
(17) Emergency escape window (426-93-51110)



(18) High-pressure fuel caution (6217-71-9331)

⚠ WARNING

High pressure fuel
When the engine is running, high pressure fuel is generated in the engine fuel piping. Do not remove or loosen fuel system piping when the engine is running.
When carrying out inspection or maintenance, stop the engine and wait at least 30 seconds to allow internal pressure to go down.
DO NOT RISK SEVERE INJURY OR DEATH



(19) EGR piping high-temperature caution (09817-A0753)

- Sign indicates a burn hazard from touching heated parts, such as engine, motor, or muffler during or right after operation.
- Never touch when hot.



(20) Warning for battery

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

⚠ DANGER

Keep sparks, flame, cigarettes away.



(21) Prohibition of jump start (09842-A0481)

(This plate is fixed to the engine starting motor)

- 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.



(22) Prohibited to get on or off rear fender (09805-A0481)

(machines equipped with rear fender)

- Sign indicates a hazard of falling off the fender or hood.



- Never stand close to the edge.

Parts numbers for the safety labels (1),(2), (4): 426-93-43110.

Parts numbers for the safety label (3): 426-93-43120.

Parts numbers for the safety labels (5), (6) (8) to (11): 421-93-21570.

GENERAL PRECAUTIONS

SAFETY RULES

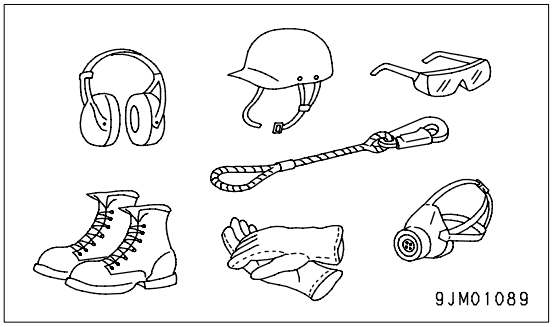
- Only trained and authorized personnel can operate and maintain the machine.
- Follow all safety rules, precautions and instructions when operating or performing maintenance on the machine.
- If you are under the influence of alcohol or medication, your ability to safely operate or repair your machine may be severly impaired putting yourself and everyone else on your jobsite in danger.
- When working with another operator or with a person on worksite traffic duty, be sure that all personnel understand all hand signals that are to be used.

IF ABNORMALITIES ARE FOUND

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

CLOTHING AND PERSONAL PROTECTIVE ITEMS

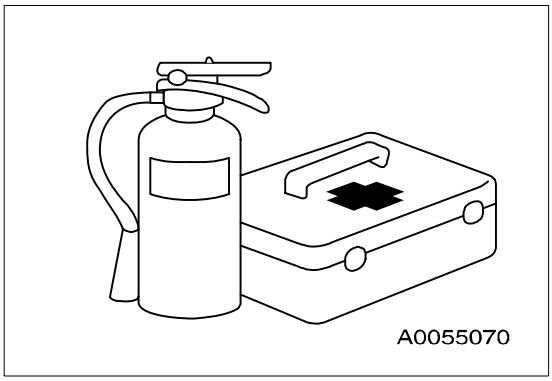
- Do not wear loose clothing and accessories. There is a hazard that they may catch on control levers or other protruding parts.
- If you have long hair and it hangs out from your hard hat, there is a hazard that it may get caught up in the machine, so tie your hair up and be careful not to let it get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



FIRE EXTINGUISHER AND FIRST AID KIT

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

- Be sure that fire extinguishers have been provided and read the labels to ensure that you know how to use them in emergencies.
- Carry out periodic inspection and maintenance to ensure that the fire extinguisher can always be used.
- Provide a first aid kit in the storage point. Carry out periodic checks and add to the contents if necessary.

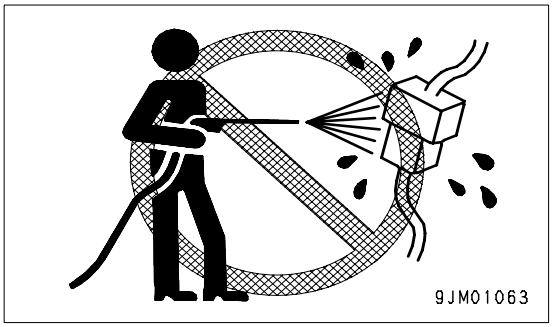


SAFETY FEATURES

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

KEEP MACHINE CLEAN

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



INSIDE OPERATOR'S COMPARTMENT

- When entering the operator's compartment, always remove all mud and oil from the soles of your shoes.

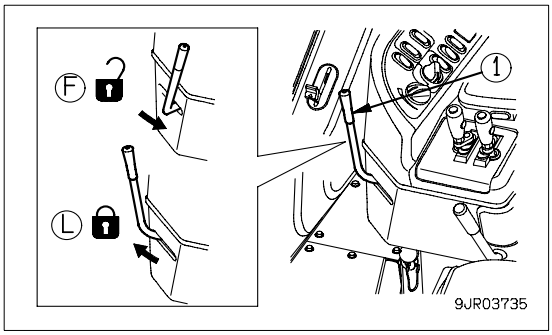
  If you operate the pedal with mud or oil affixed to your shoes, your foot may slip and this may cause a serious accident.
- Do not leave parts or tools lying around the operator's compartment.
- Do not stick suction pads to the window glass. Suction pads act as a lens and may cause fire.
- Do not use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

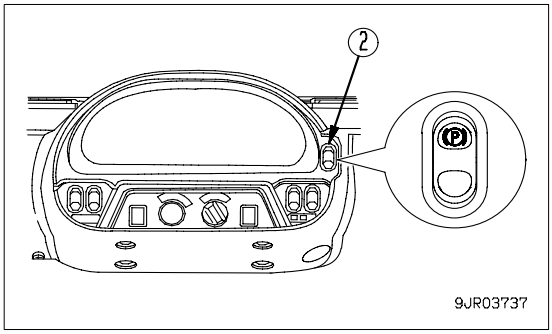
ALWAYS APPLY LOCK WHEN LEAVING OPERATOR'S SEAT

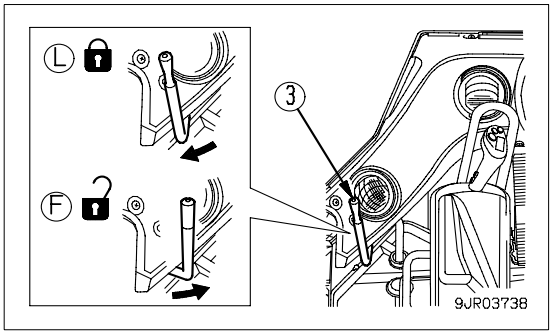
- Before standing up from the operator's seat, such as when carrying out adjustment of the operator's seat, or when leaving the machine, always lower the work equipment to the ground, set work equipment lock lever (1) to LOCK position (L), turn parking brake switch (2) ON, set steering lock lever (3) to LOCK position (L), then stop the engine.

  If you accidentally touch the control levers when they are not locked, there is a hazard that the machine may suddenly move and cause serious injury.

- When leaving the machine, lock all parts, and always takes the key with you and leave it in the specified place.



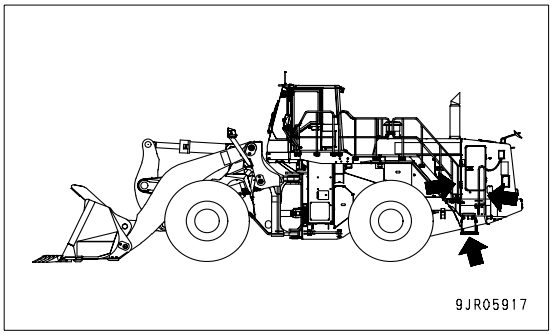




HANDRAILS AND STEPS

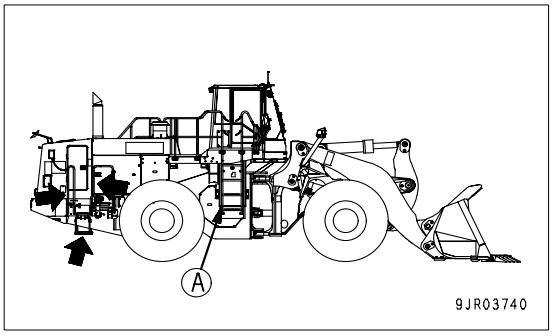
To prevent personal injury caused by slipping or falling off the machine, always do as follows.

- Use the handrails and steps marked by arrows in the diagram on the right when getting on or off the machine.

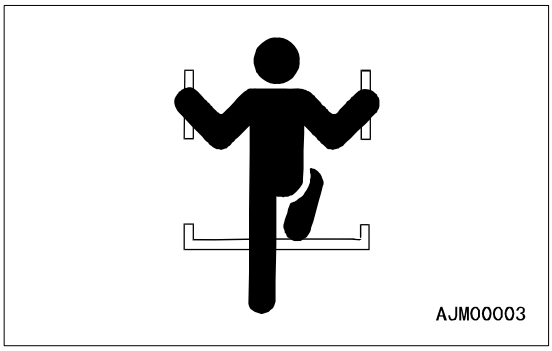


- (A) is the emergency escape step.

  Use this when escaping from the machine in a fire or other emergencies. Do not use it normal situations.



- 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.
- Do not grip the control levers, or work equipment lock lever when getting on or off the machine.
- Never climb on the engine hood or covers where there are no non-slip pads.
- 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.



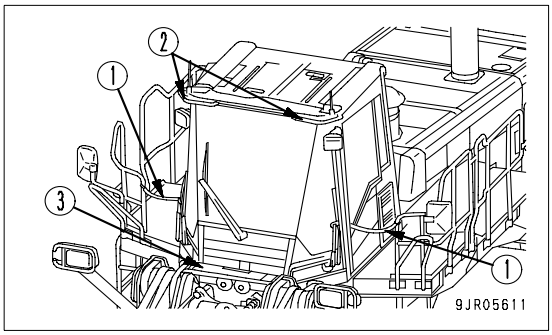
- Before getting on or off the machine, check the handrails and steps, and if there is any oil, grease, or mud on them, wipe it off immediately. In addition, repair any damage and tighten any loose bolts.
- Do not get on or off the machine while holding tools in your hand.

PRECAUTIONS WHEN CLEANING CAB GLASS

- It is extremely dangerous to move from the side of the cab to the step in the center of the front frame. Always articulate the machine fully in the direction to cross over to the step, then stop the engine, remove chain (1), grip handrail (2) at the top of the cab and move to step (3) in the center of the front frame, taking care to position your feet correctly.

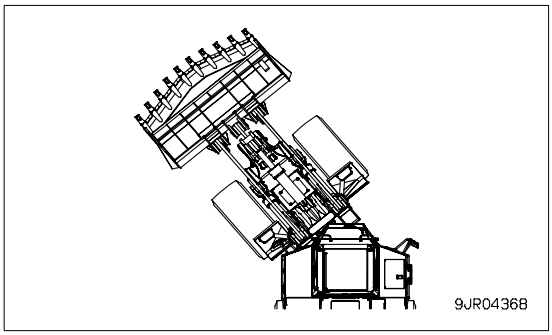
  In addition, when carrying out cleaning, do not let go of handrail (2) at the top of the cab.

  After completing the cleaning operation, fit chain (1) in its original position.



- Do not remove chain (1) unless necessary.
- When cleaning the cab glass, clean only the side to which the machine is articulated. Do not use step (3) in the center of the front frame to move to the side where the machine is not articulated. This is extremely dangerous.

  When cleaning the opposite side, articulate the machine in the opposite direction before starting the operation.



- When cleaning the cab glass, use handrail (2) and step (3), and always be sure to maintain three-point contact (2 feet and 1 hand, or 1 foot and 2 hands) with the handrail and step to ensure that your body is supported properly.

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.

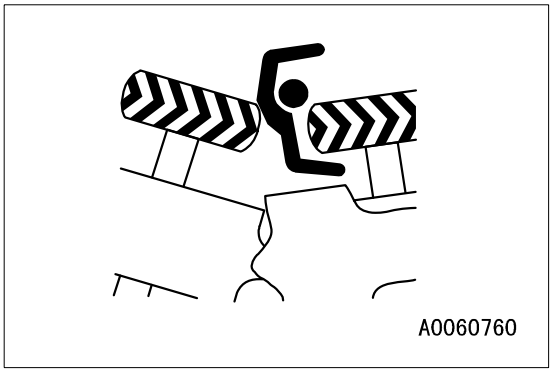
DO NOT GET CAUGHT IN ARTICULATED PORTION

- The clearance at the articulated portion changes.

  If you get caught, it will lead to serious personal injury.

  Do not allow anyone to enter the articulating range.

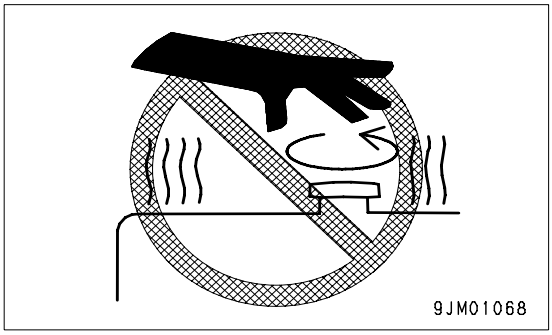
- The clearance in the area around the work equipment changes according to the movement of the link. If you get caught, it will lead to serious injury. Do not allow anyone near any of the rotating or telescoping parts.



PREVENTION OF BURNS

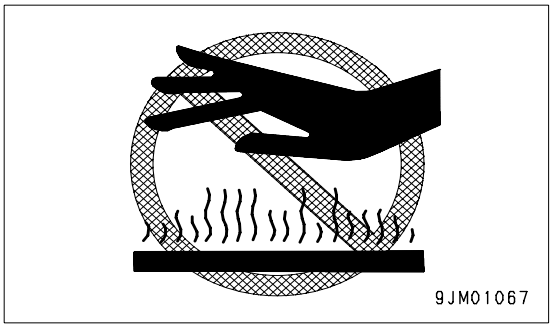
Hot coolant

- 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.



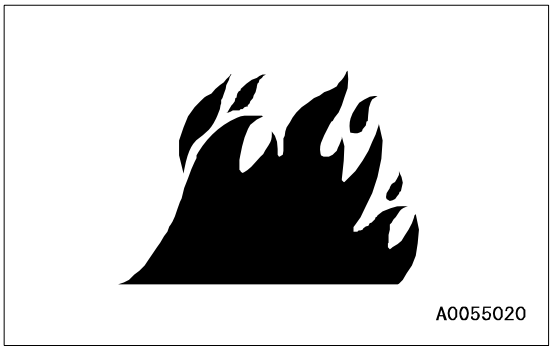
Hot oil

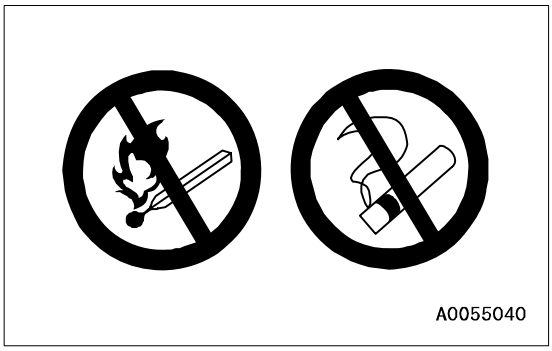
- To prevent burns from hot oil spurting out when checking or draining the oil, wait for the oil to cool to a temperature where it is possible to touch the cap or plug by hand before starting the operation. Even when the oil has cooled down, loosen the cap or plug slowly to relieve the internal pressure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



FIRE PREVENTION

- **Fire caused by fuel or oil**





Fuel, oil, antifreeze, and window washer liquid are particularly flammable and can be hazardous. To prevent fire, always observe the following:

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

- **Fire 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.

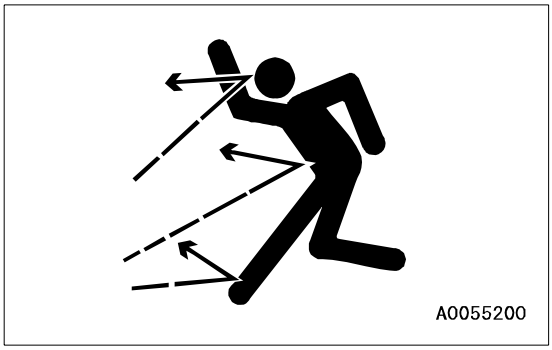
WINDOW WASHER LIQUID

Use an ethyl alcohol base washer liquid.

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

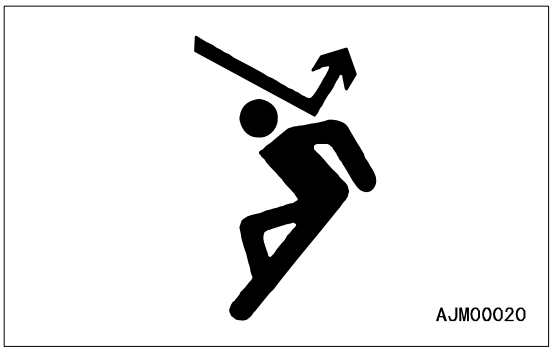
PRECAUTIONS WHEN USING ROPS (Roll Over Protective Structure)

ROPS is installed for operations in places such as mines or quarries where there is danger of falling rocks or in places where there is danger of the machine tipping over.



- If ROPS is installed, do not remove it when operating the machine.
- ROPS is installed to protect the operator when machine rolls over. When machine rolls over, ROPS supports its weight and absorbs its impact energy.
- If ROPS is modified by welding or drilling holes in it, its strength may be reduced. If you want to make any modification, consult your Komatsu distributor.
- 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, or product failures resulting from the use of unauthorized attachments or parts will not be the responsibility of Komatsu.
- When installing and using optional attachments, read the instruction manual for the attachment, and the general information related to attachments in this manual.

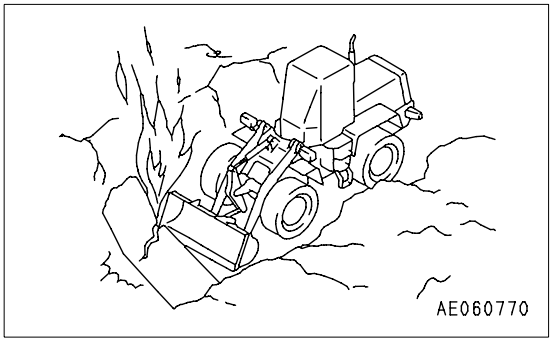
UNAUTHORIZED MODIFICATION

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 thatched roofs, dry leaves or dry grass, there is a hazard of fire, so be careful when operating.
- Check the terrain and condition of the ground at the worksite, and determine the safest method of operation. Do not 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 necessary measures to prevent any unauthorized person from entering the operating area.
- In particular, if you need to operate on a road, protect pedestrian and cars by designating a person for worksite traffic duty or by installing fences around the worksite.
- When traveling or operating in shallow water or on soft ground, check the shape and condition of the bedrock, and the depth and speed of flow of the water before starting operations.
- In order that travel operations can be carried out safely, always keep the roads on the jobsite properly maintained.



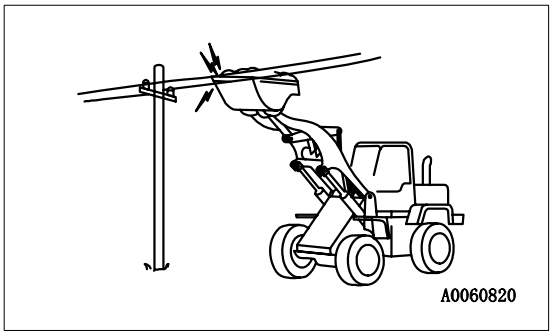
WORKING ON LOOSE GROUND

- 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 injury or property damage. On jobsites where the machine may go close to electric cables, always do as follows.

- Before starting work near electric cables, inform the local power company of the work to be performed, and ask them to take the necessary action.



- Even going close to high-voltage cables can cause electric shock, which may cause serious burns or even death. Always maintain a safe distance (see the table on the right) between the machine and the electric cable. Check with the local power company about safe operating procedure before starting operations.
- To prepare for any possible emergencies, wear rubber shoes and gloves. Lay a rubber sheet on top of the seat, and be careful not to touch the chassis with any exposed part of your body.
- Use a signalman to give warning if the machine approaches too close to the electric cables.
- When carrying out operations near high voltage cables, do not let anyone 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
100V - 200V	Over 2 m
6600V	Over 2 m
22000V	Over 3 m
66000V	Over 4 m
154000V	Over 5 m
187000V	Over 6 m
275000V	Over 7 m
500000V	Over 11 m

ENSURE GOOD VISIBILITY

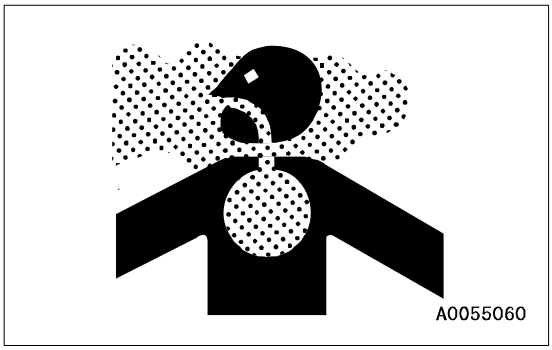
This machine is equipped with mirrors to improve the visibility, but even with mirrors, there are places, which cannot be seen from the operator's seat, so always be careful when operating.

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 one 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

On machines fitted with a cab, there is at the door on the left side and an emergency escape window on the right side.

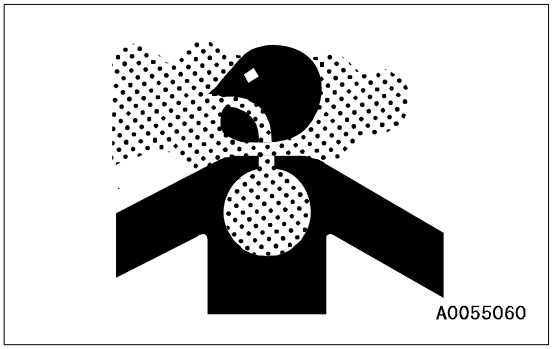
If the door on the left side will not open, escape through the emergency escape window on the right side.

If the emergency escape window on the right side will not open, escape through the door on the left side.

For details of the cab door, see “OPENING CAB, WINDOW DOOR (3-76)“.

BE CAREFUL ABOUT ASBESTOS DUST

There is danger that inhaling air containing asbestos dust may cause lung cancer. There is danger of inhaling asbestos on demolition jobsites or in places handling industrial waste. Always obey the following precautions.



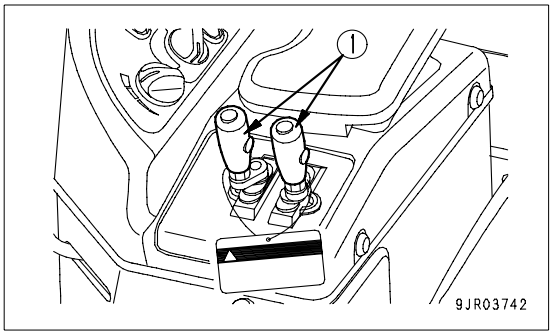
- Spray water to keep down the dust when cleaning.
- Do not use compressed air for cleaning.
- If there is danger that there may be asbestos dust in the air, always operate the machine from an upwind position.
- All workers should use an approved respirator.
- Do not allow other persons to approach during the operation.
- Always observe the rules and regulations for the work site and environmental standards.

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

PRECAUTIONS FOR OPERATION

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).



⚠ DANGER

DO NOT OPERATE
When this tag is not being used, keep it in the storage compartement. Still more, when there is no storage compartement, keep it in the operation manual case.



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, make sure that the work equipment lock lever is in the LOCK position.
- Adjust the mirrors so that the rear of the machine can be seen clearly from the operator's seat
- 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.

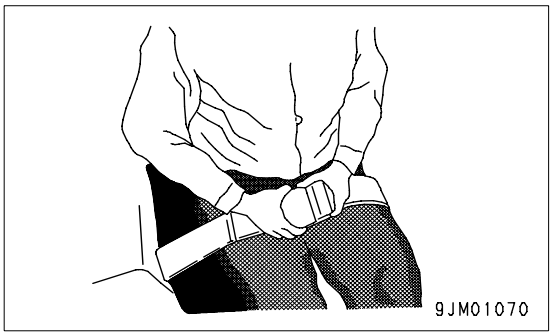
  Before charging or starting the engine with a different power source, melt the battery electrolyte and check for frost and leakage of battery electrolyte before starting.

OPERATION

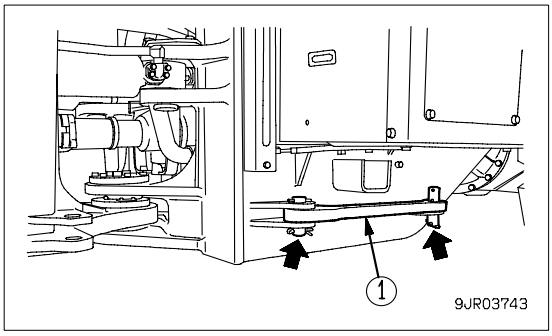
CHECKS BEFORE OPERATION

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.



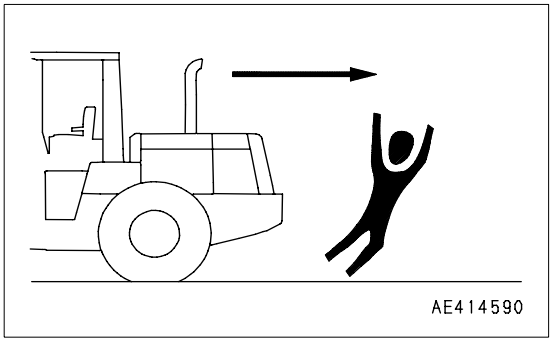
- Before driving the machine or starting operations, check that frame lock bar (1) is securely fixed at the FREE position.



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.
- Do not allow anyone apart from the operator to ride on the machine.
- Check that the backup alarm (alarm buzzer when machine travels in reverse) works properly.
- Lock the cab door and windows securely, both when they are open and when they are 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.

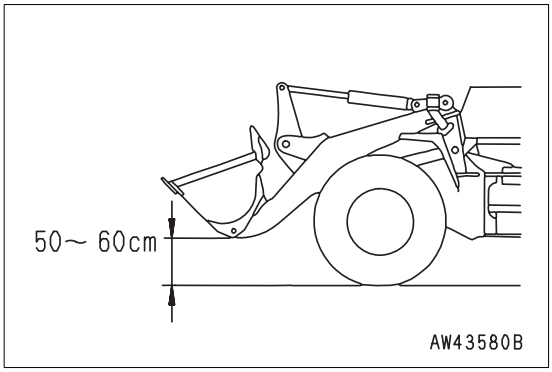
Always be sure to carry out the above precautions even when the machine is equipped with mirrors.



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 it becomes impossible to operate the steering. If the engine stops, depress the brake pedal immediately to stop the machine.
- When traveling on flat ground, keep the work equipment 50 - 60 cm above the ground surface.

  If it is necessary to operate the work equipment control lever, stop the machine, then operate the lever.



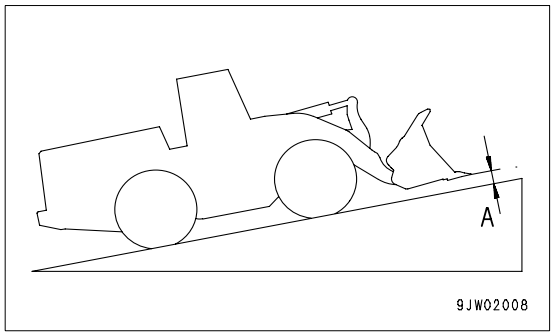
- When traveling on rough ground, travel at low speed and do not operate the steering suddenly. There is danger that the machine may turn over. The work equipment may hit the ground surface and cause the machine to lose its balance, or may damage the machine or structures in the area.
- Avoid traveling 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 mass of the machine.
- When operating in tunnels, under bridges, under electric wires, or other places where the height is limited, operate slowly and be extremely careful not to let the work equipment hit anything.
- 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.

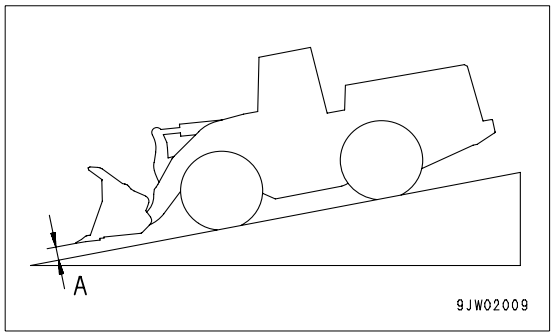
  If you are going to travel continuously, please consult your Komatsu distributor.

TRAVELING ON SLOPES

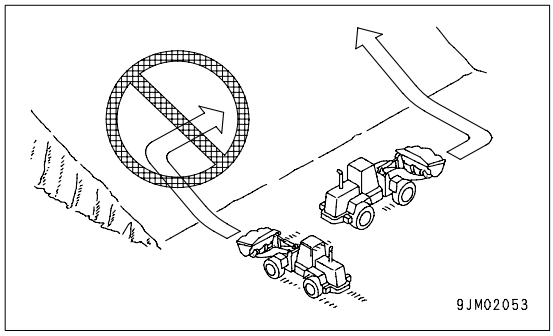
To prevent the machine from tipping over or slipping to the side, always do as follows.

- Keep the work equipment at height (A) (20 - 30 cm above the ground) so that it can be lowered immediately to the ground to stop the machine in case of emergency.





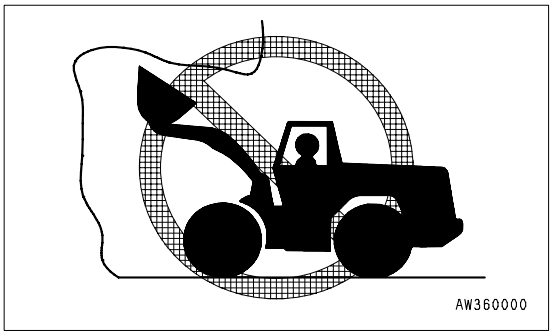
- Always travel straight up or down a slope. Traveling at an angle or across the slope is extremely dangerous.
- Do not turn on slopes or travel across slopes. Always go down to a flat place to change the position of the machine, then travel on to the slope again.

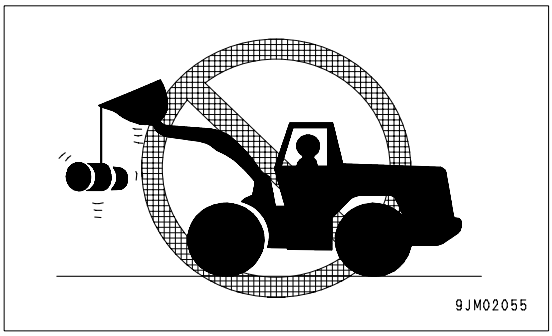


- Travel on grass, fallen leaves, or wet steel plates with low speed. Even with slight slopes there is a hazard that the machine may slip.
- If the engine stops, depress the brake pedal immediately, lower the bucket to the ground, and apply the parking brake to stop the machine.
- When traveling downhill, 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

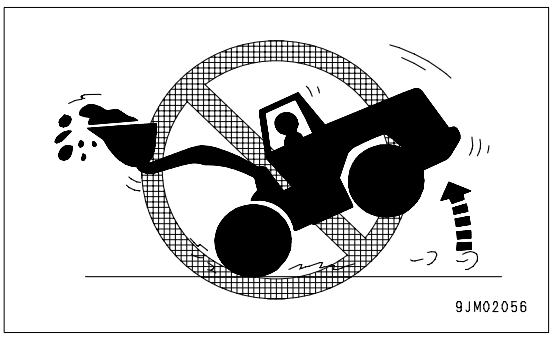
- It is dangerous to excavate the bottom of a rock face. Never do this.
- When digging, never thrust the bucket into a load at an angle. This will bring an excessive load to bear on the machine and will reduce the service life of the machine.
- It is dangerous to apply drive force when excavating a rock face. In addition, an excessive load will be brought to bear on the machine and this will cause damage to the machine.
- Never carry out digging operations on a downhill slope. An excessive load will be brought to bear on the machine and this will cause damage to the machine.
- 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 injury or property damage.



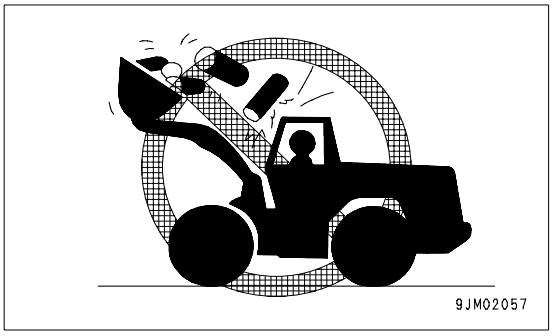


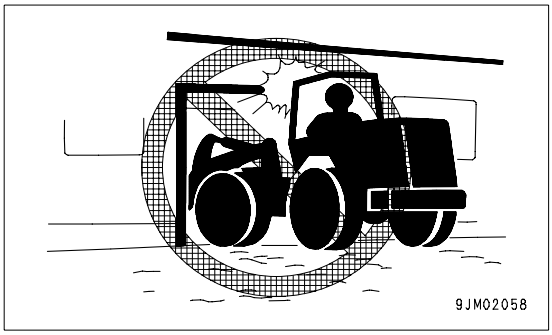
PRECAUTIONS WHEN OPERATING

- When using the machine, to prevent the machine from overturning due to overloading and to avoid damage to the work equipment, do not exceed the maximum permitted load or performance 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 over.



- 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' 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 work equipment hit anything.
- To prevent accidents caused by hitting other objects, always operate the machine at a speed which is safe for operation, particular in confined spaces, indoors, and in places where there are other machines.





METHODS OF USING BRAKE

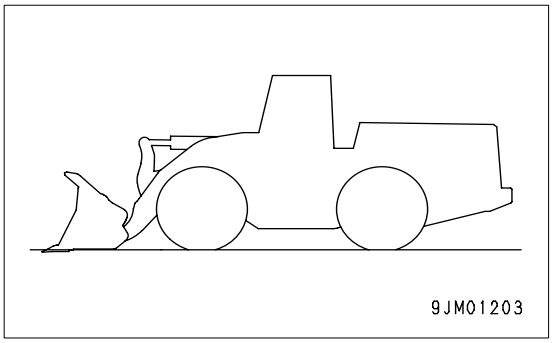
- When the machine is traveling, do not rest your foot on the brake pedal. If you travel with your foot resting on the pedal, the brake will always be applied, and this will cause the brakes to overheat and fail.
- Do not depress the brake pedal repeatedly if not necessary.
- When traveling downhill,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

OPERATE CAREFULLY ON SNOW

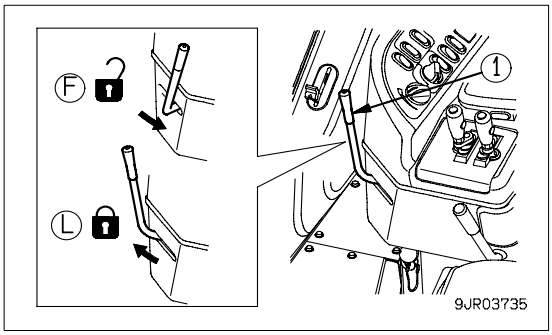
- Snow-covered or frozen surfaces are slippery, so be extremely careful when traveling or operating the machine, and do not operate the levers suddenly. Even a slight slope may cause the machine to slip, so be particularly careful when working on slopes.
- With frozen ground surfaces, the ground becomes soft when the temperature rises, and this may cause the machine to tip over.
- If the machine enters deep snow, there is a hazard that it may tip over or become buried in the snow. Be careful not to leave the road shoulder or to get trapped in a snow drift.
- When clearing snow, the road shoulder and objects placed beside the road are buried in the snow and cannot be seen. There is a hazard of the machine tipping over or hitting covered objects, so always carry out operations carefully.
- When traveling on snow-covered roads, always fit tire chains.
- 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.

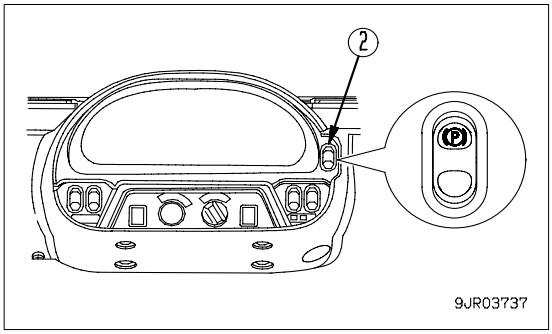
PARKING MACHINE

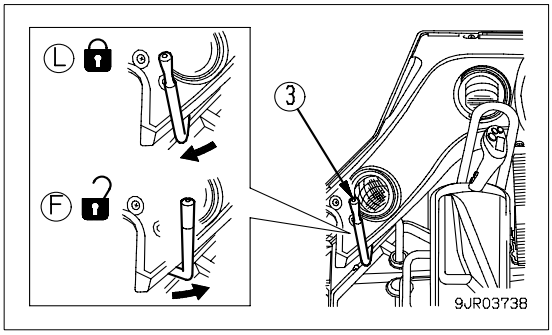
- Park the machine on firm, level ground.
- Select a place where there is no hazard of falling rocks or landslides, or of flooding if the land is low.
- Lower the work equipment completely to the ground.



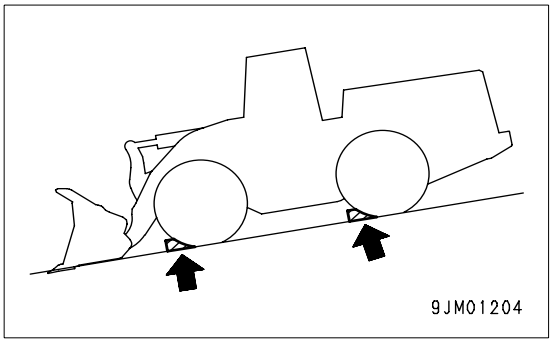
- When leaving the machine, set work equipment lock lever (1) to LOCK position (L), turn parking brake switch (2) ON, set steering lock lever (3) to LOCK position (L), then stop the engine.
- Always close the operator's cab door, and use the key to lock all the equipment in order to prevent any unauthorized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







- If it is necessary to park the machine on a slope, set blocks under the wheels to prevent the machine from moving.



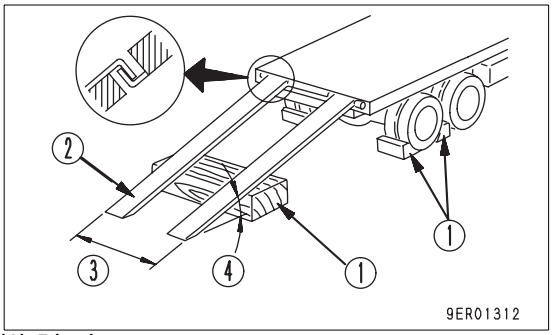
TRANSPORTATION

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

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.



(1) Blocks
(2) Ramp
(3) Distance between ramps
(4) Angle of ramps: Max. 15°

- Run the engine at low idling and operate slowly at low speed.
- 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 (3-169)“.

SHIPPING

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

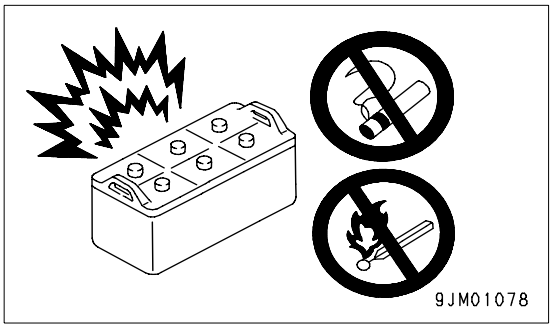
- The weight, transportation height, and overall length of the machine differ according to the work equipment, so be sure to confirm the dimensions.
- When passing over bridges or structures on private land, check first that the structure is strong enough to support the weight of the machine. When traveling on public roads, check first with the relevant authorities and follow their instructions.
- Lock the frame with the frame lock bar to prevent the machine from articulating.
- Fit chains to the front frame and the rear frame to hold the machine securely in position.
- For details of the shipping procedure, see “TRANSPORTATION (3-169)“ in the OPERATION section.

BATTERY

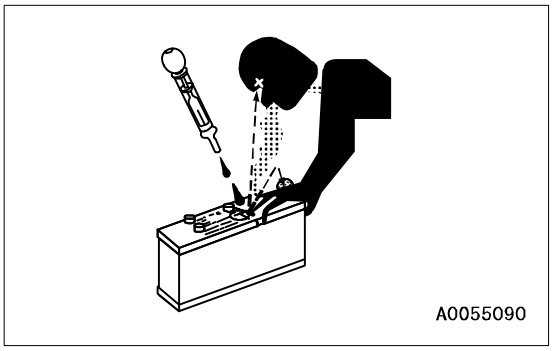
BATTERY HAZARD PREVENTION

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 level of the battery electrolyte is below the lower level. This may cause an explosion. Always inspect the battery electrolyte level periodically and add distilled water to the upper level.
- 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.
- When installing the optional battery disconnector switch, turn the battery disconnector switch to the OFF position.

  For details, see “HANDLING BATTERY DISCONNECTOR SWITCH (6-61)“.

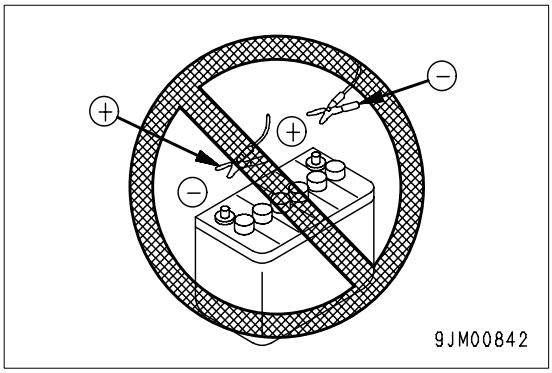
As there is a hazard that sparks will be generated, always do as follows.

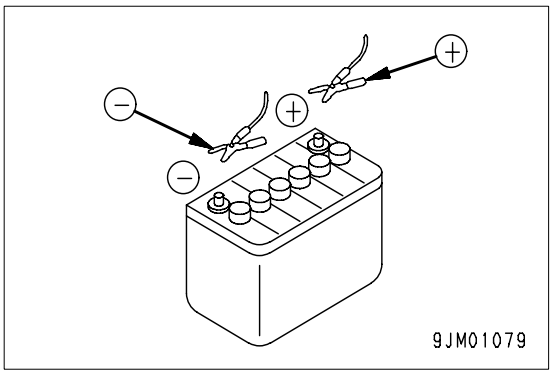
- Do not let tools or other metal objects make any contact between the battery terminals. Do not leave tools or other metal objects lying around near the battery.
- Always disconnect the negative (-) terminal (ground side) first when removing the battery; when installing the battery, connect the positive (+) terminal first, and connect the ground last. Tighten the battery terminals securely.
- 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.

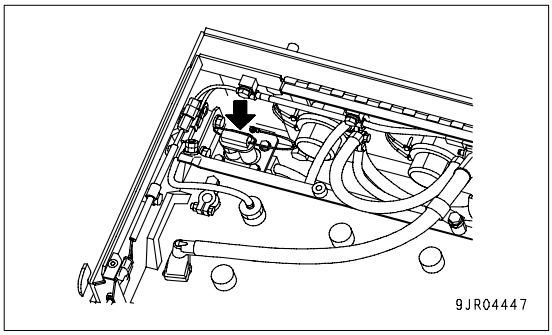
- When starting with a booster cable, carry out the starting operation with two workers (one worker sitting in the operator's seat and the other working with the battery).
- When starting from another machine, do not allow the two machines to touch.
- When connecting the booster cables, turn the starting switch OFF position for both the normal machine and problem machine. There is a hazard that the machine will move when the power is connected.
- Be sure to connect the positive (+) cable first when installing the booster cables. Disconnect the negative (-) cable (ground side) first when removing them.
- When removing the booster cables, be careful not to let the booster cable clips touch each other or to let the clips touch the machine.
- Always wear safety glasses and rubber gloves when starting the engine with booster cables.
- When connecting a normal machine to a problem machine with booster cables, always use a normal machine with the same battery voltage as the problem machine.
- For details of the starting procedure when using booster cables, see “STARTING ENGINE WITH BOOSTER CABLE (3-184)“ in the OPERATION section.





STARTING WITH STARTING AID CONNECTOR (if equipped)

- When using the starting aid connector (if equipped) to start the engine, see “HANDLING STARTING AID CONNECTOR (6-63)“ in the ATTACHMENT AND OPTION Section.



TOWING

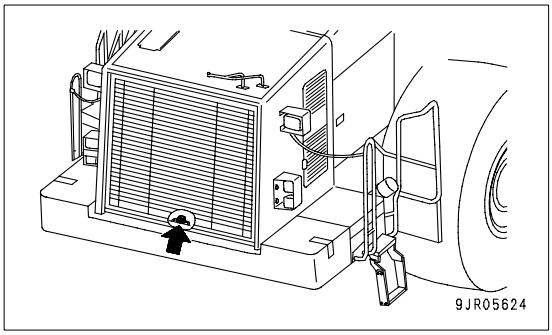
WHEN TOWING

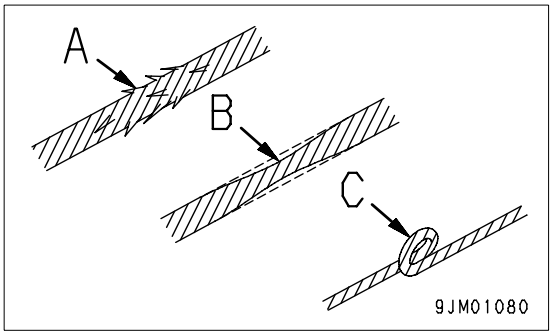
When towing or being towed, mistakes in the method of selecting and inspecting the wire rope or drawbar, or in the method of towing may lead to serious personal injury.

For details of the procedure for towing,see the “METHOD OF TOWING MACHINE (3-179)“

- 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.
- If the machine is moved suddenly, the towing wire or bar will be subjected to an excessive load, and it may break.

  Start the machine gradually and travel at a constant speed.

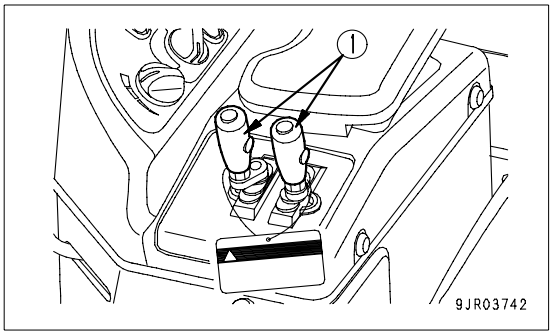




PRECAUTIONS FOR MAINTENANCE

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 necessary.



- 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.
- To prevent the machine from being started by mistake, turn the battery disconnector switch (if equipped) to the OFF position. For details, see “HANDLING BATTERY DISCONNECTOR SWITCH (6-61)“.

KEEP WORK PLACE CLEAN AND TIDY

- Do not leave hammers or other tools lying around in the work place. Wipe up all grease, oil, or other substances that will cause you to slip. Always keep the work place clean and tidy to enable you to carry out operations safely.

  If the work place is not kept claen and tidy, there is the danger that you will trip, slip, or fall over and injure yourself.

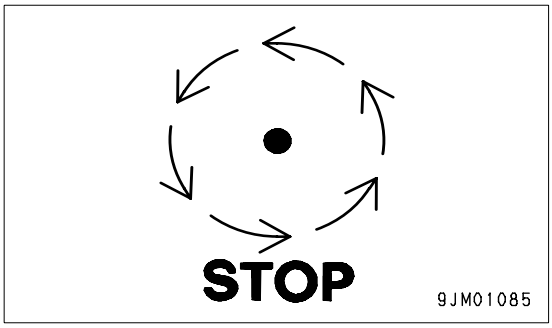
APPOINT LEADER WHEN WORKING WITH OTHERS

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

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

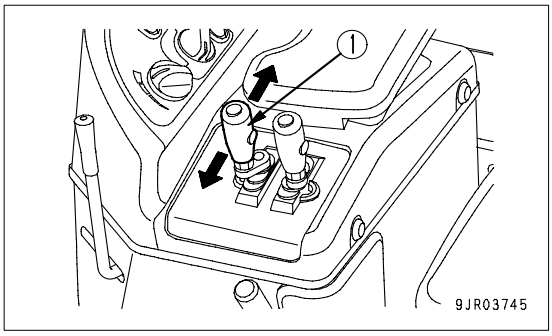
STOP ENGINE BEFORE CARRYING OUT MAINTENANCE

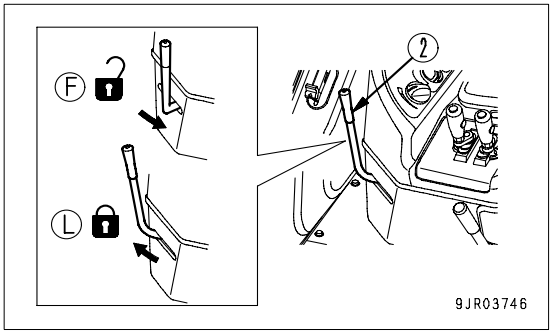
- Stop the machine on firm, level ground.
- Select a place where there is no hazard of falling rocks or landslides, or of flooding if the land is low.
- Lower the work equipment completely to the ground and stop the engine.



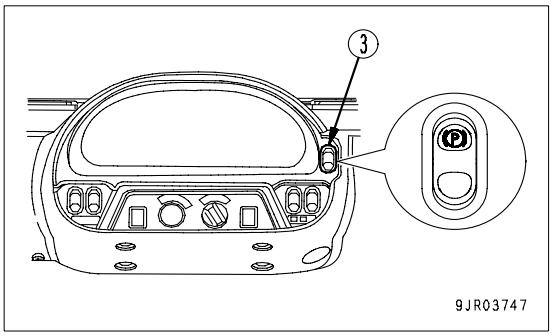
- After stopping the engine, turn the starting switch to the ON position, operate work equipment control lever (1) fully in the RAISE and LOWER directions 2 or 3 times to release the remaining pressure in the hydraulic circuit, then set work equipment lock lever (2) to LOCK position (L).

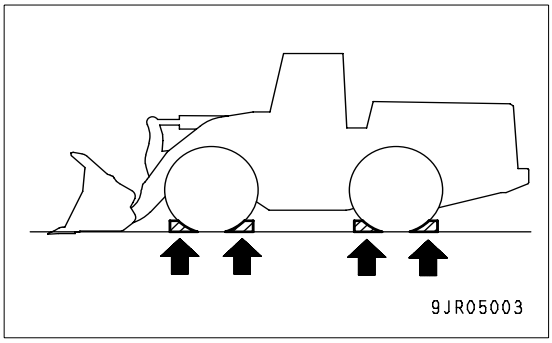
  After releasing the remaining pressure in the hydraulic circuit, turn the starting switch to the OFF position.



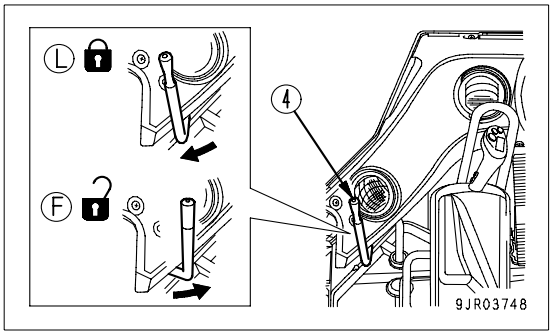


- Turn parking brake switch (3) to the ON position to apply the parking brake, then put blocks under the front and rear of the tires.

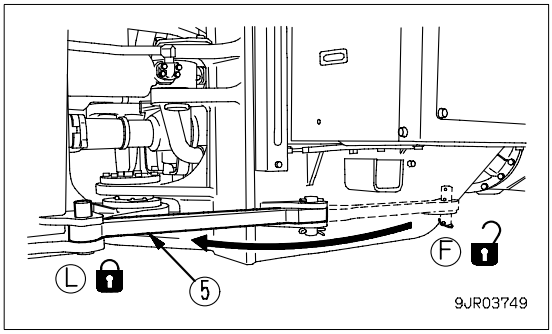




- Set steering lock lever (4) to LOCK position (L).



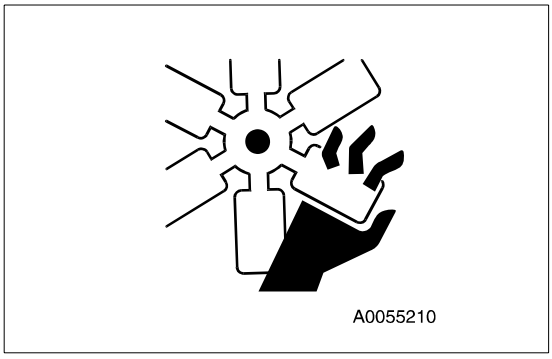
- Set frame lock bar (5) to LOCK position (L) to lock the front frame and rear frame.



TWO WORKERS FOR MAINTENANCE WHEN ENGINE IS RUNNING

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

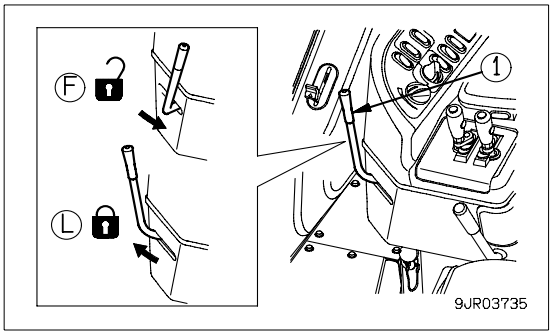
- One worker must always sit in the operator's seat and be ready to stop the engine at any time. All workers must maintain contact with the other workers.
- Never drop or insert tools or other objects into the fan or fan belt. Parts may break or be sent flying.
- When carrying out operations near the fan, fan belt, or other rotating parts, there is a hazard of being caught in the parts, so be careful not to come close.

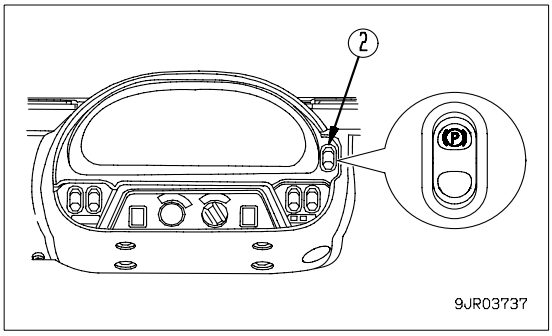


- Set work equipment lock lever (1) to the LOCK position (L) to prevent the work equipment from moving.

  In addition, set parking brake switch (2) 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.



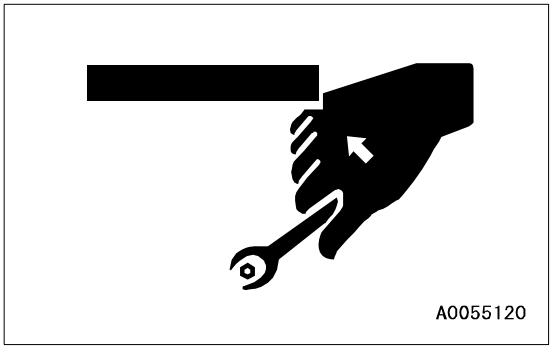


INSPECTION AND MAINTENANCE AFTER TURNING E.C.S.S. SWITCH OFF

For machines equipped with a E.C.S.S. lower the bucket to the ground, turn the E.C.S.S. switch OFF, and stop the engine before starting inspection or maintenance. Never turn the switch ON during inspection or maintenance.

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.



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.

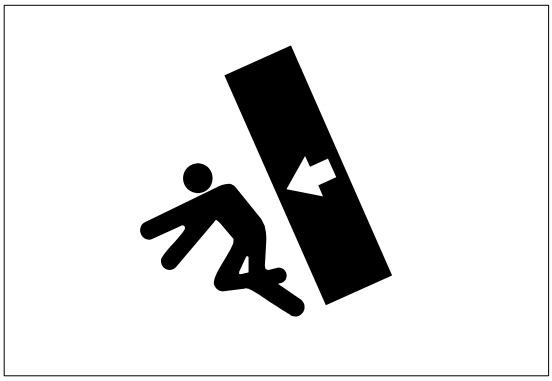


PERSONNEL

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

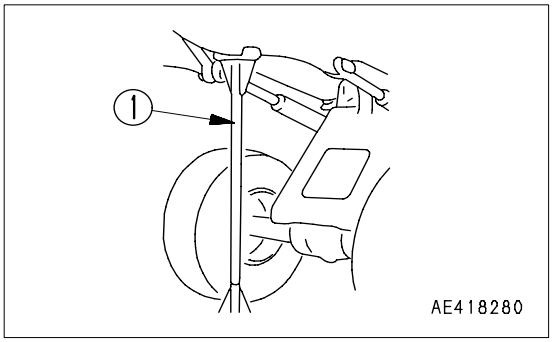
ATTACHMENTS

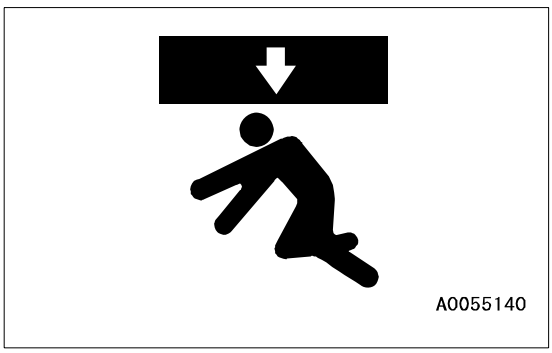
- Appoint a leader before starting removal or installation operations for attachments.
- Place attachments that have been removed from the machine in a stable condition so that they do not fall. And take steps to prevent unauthorized persons from entering the storage area.



WORK UNDER THE MACHINE

- When carrying out inspection and maintenance with the work equipment raised, use strong support (1) that can fully withstand the weight of the work equipment, and be sure to fix the stands in position securely.



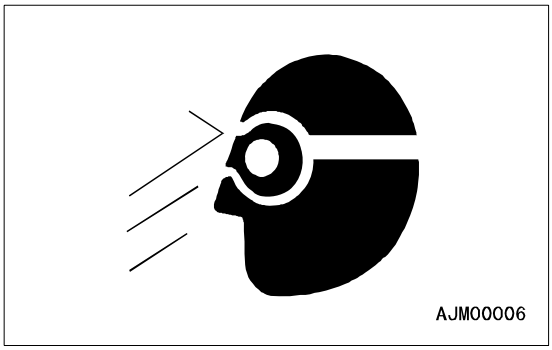


NOISE

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 injury. 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.
- When installing the optional battery disconnector switch, turn the battery disconnector switch to the OFF position.

  For details, see “HANDLING BATTERY DISCONNECTOR SWITCH (6-61)“.

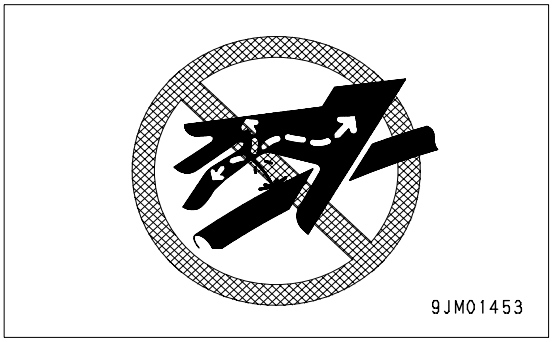
PRECAUTIONS WITH HIGH-PRESSURE OIL

The hydraulic system is always under internal pressure. In addition, the fuel piping is also under internal pressure when the engine is running and immediately after the engine is stopped. When carrying out inspection or replacement of the piping or hoses, check that the internal pressure in the circuit has been released. If this is not done, it may lead to serious personal injury. 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 (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.
- The pressure in the E.C.S.S. circuit is stored by an accumulator. Do not remove the E.C.S.S. piping or components.

  If it is necessary to remove them, please ask your Komatsu distributor to carry out the removal operation.



PRECAUTIONS FOR HIGH-PRESSURE FUEL

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

HANDLING HIGH-PRESSURE HOSES

If oil or fuel leaks from high-pressure hoses, there is danger that it may cause fire or defective operation, which may lead to serious injury or fire. If there are any loose hoses or piping, or any leakage of oil or fuel from the hose or piping mount, stop operation and tighten to the specified torque.

If any hoses or pipes are damaged or deformed, please contact your Komatsu distributor.

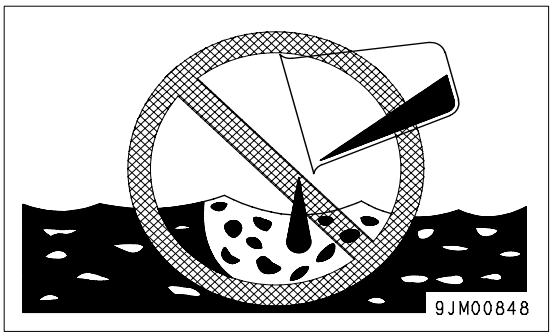
Replace the hose if any of the following problems are found.

- 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.



MAINTENANCE OF AIR CONDITIONER

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

Never touch refrigerant.

COMPRESSED AIR

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

PERIODIC REPLACEMENT OF SAFETY CRITICAL PARTS

- In order for the machine to be operated safety for a long time, it is necessary to add oil and to carry out service and maintenance at periodic intervals. In order to further increase safety, components with a strong relationship to safety, such as hoses and seat belts, must be replaced at periodic intervals.

  Replacement of safety critical parts: See “PERIODIC REPLACEMENT OF SAFETY CRITICAL PARTS (4-16)“.

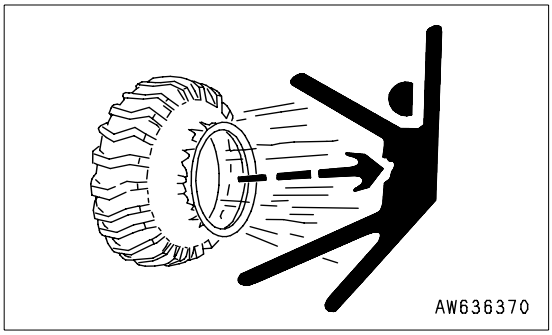
- The material of these components naturally changes over time, and repeated use causes deterioration, wear, and fatigue. As a result, there is a hazard that these components may fail and cause serious injury or death. It is difficult to judge the remaining life of these components from external inspection or the feeling when operating, so always replace them at the specified interval.

- Replace or repair safety-critical parts if any defect is found, even when they have not reached the time specified interval.

PRECAUTIONS WITH TIRES

HANDLING TIRES

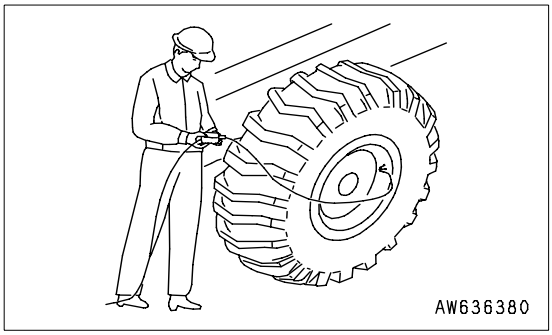
If tires or rims are handled mistakenly, there is danger that the tire may explode or be damaged, or that the rim may fly off and cause serious injury or death.



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 (3-166)“

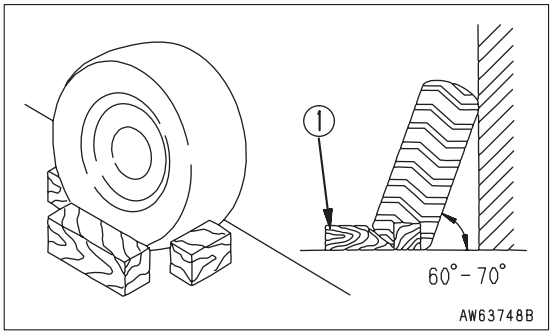


- When pumping up the tires, check that no other person is standing near the tire, and install an air chuck with a clip that can be secured to the air valve.

  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 injury.



- 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.
- Stand the tire on level ground, and block (1) it securely so that it cannot roll or fall over if any person should touch it.

  Do not lay the tire on its side. This will deform the tire and cause it to deteriorate.
- If the tire should fall over, do not attempt to stop it. Get out of the way quickly.

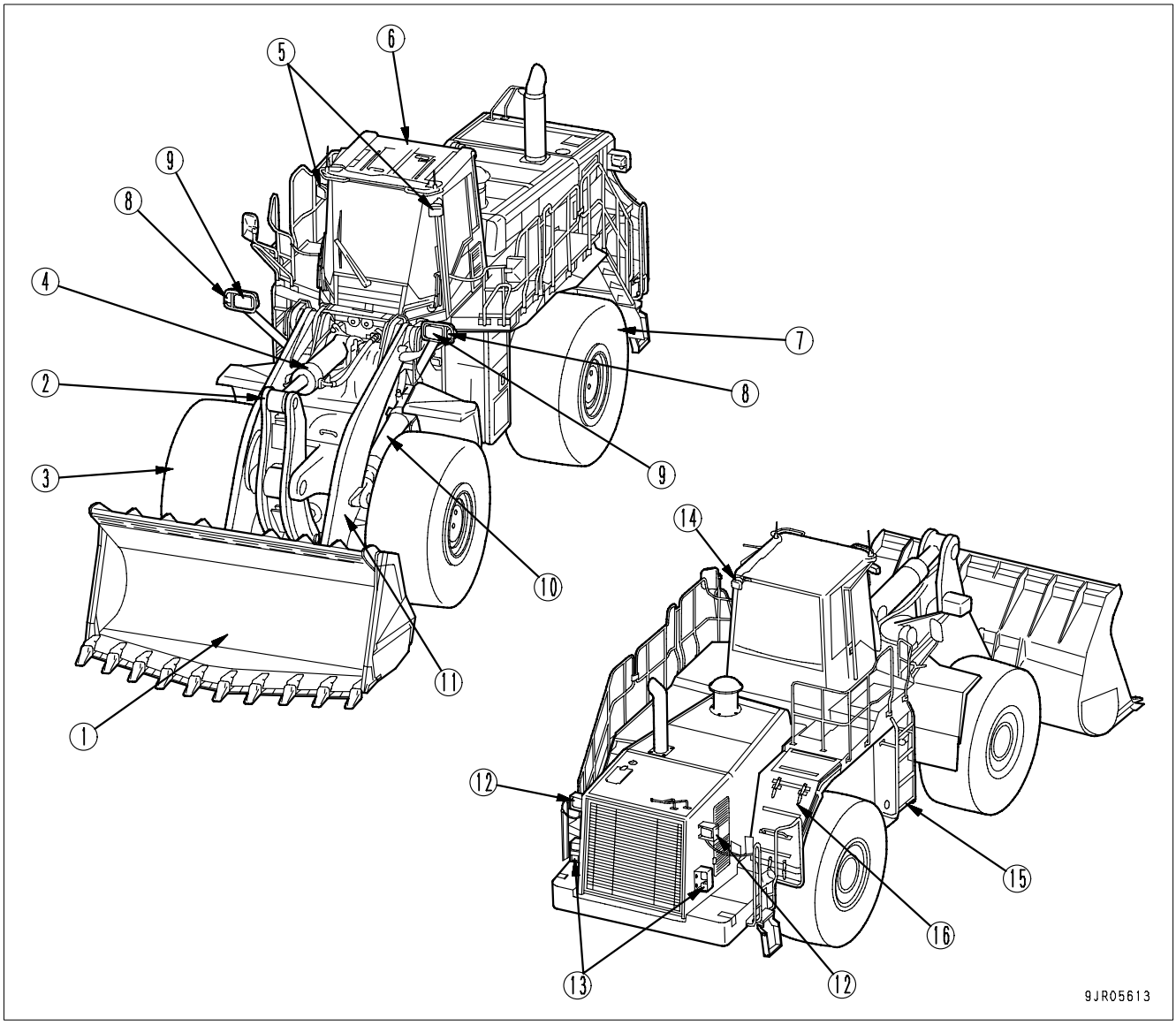
OPERATION

⚠ WARNING

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

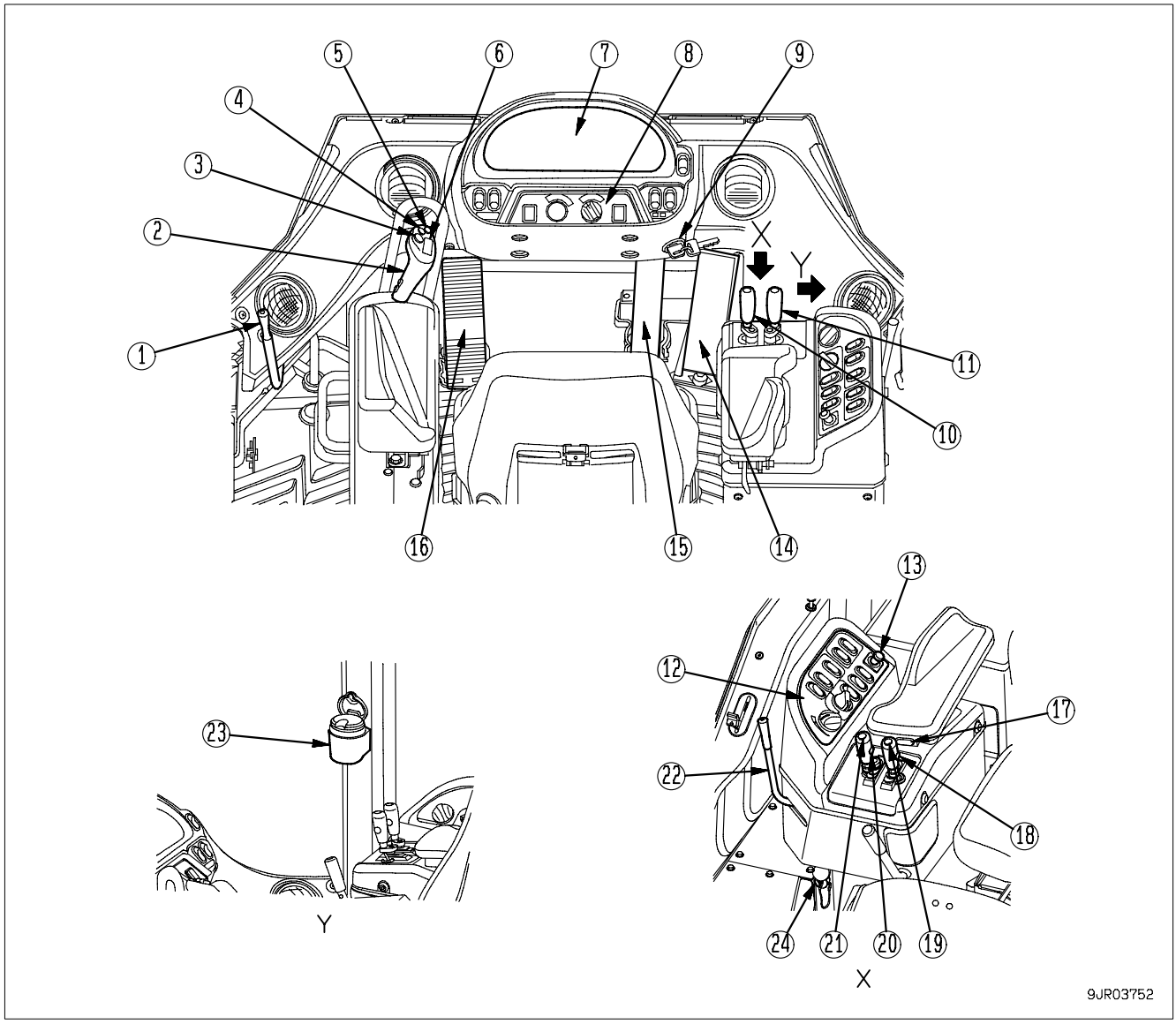
GENERAL VIEW

GENERAL VIEW OF MACHINE



(1) Bucket
(2) Bell crank
(3) Front wheel
(4) Bucket cylinder
(5) Front working lamp
(6) ROPS cab
(7) Rear wheel
(8) Turn signal lamp
(9) Head lamp
(10) Lift cylinder
(11) Lift arm
(12) Rear working lamp
(13) Rear combination lamp
(14) Step lamp
(15) Emergency escape step
(16) Rear fender (if equipped)

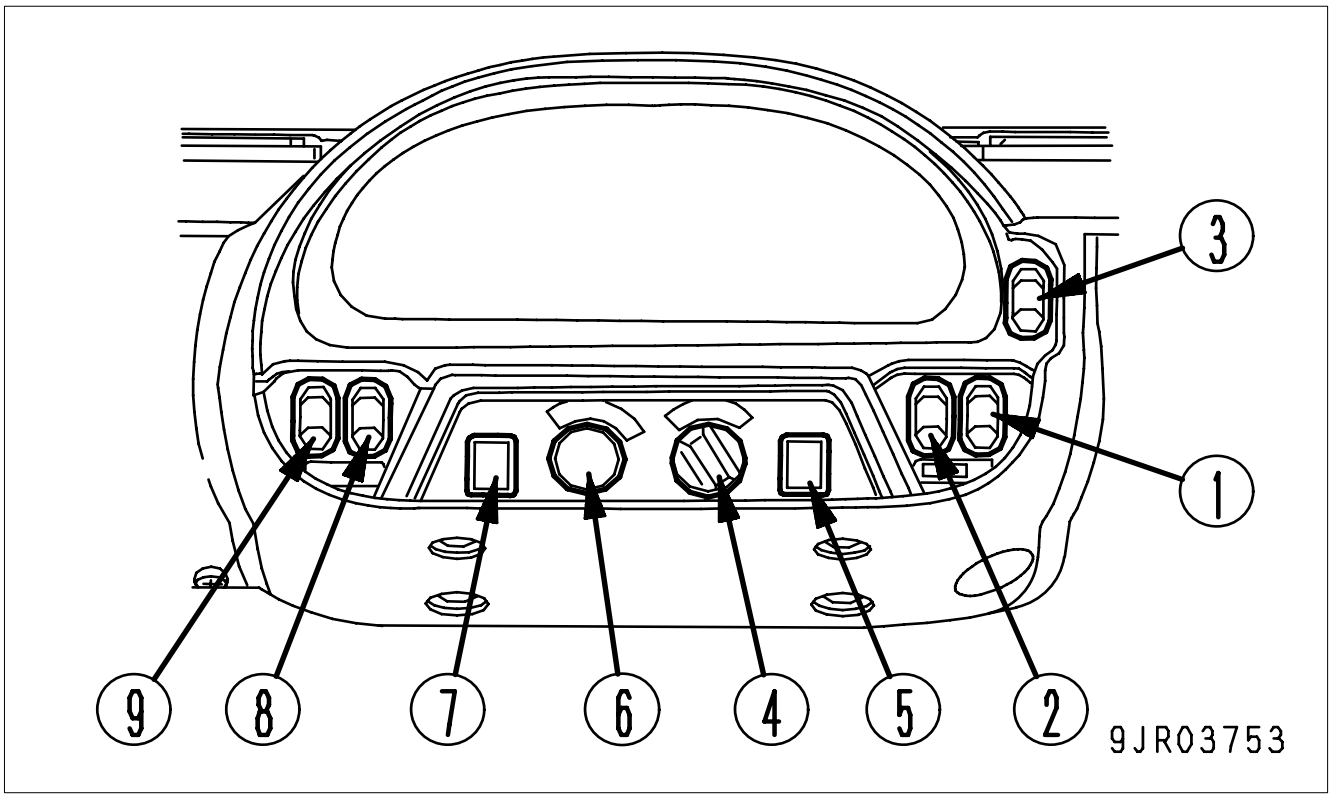
GENERAL VIEW OF CONTROLS AND GAUGES



(1) Steering lock lever
(2) AJSS lever
(3) Horn switch
(4) Shift down switch
(5) Shift up switch
(6) Directional selector switch
(7) Machine monitor
(8) Front switch panel
(9) Starting switch
(10) Bucket control lever
(11) Lift arm control lever
(12) Right switch panel
(13) Cigarette lighter
(14) Accelerator pedal
(15) Right brake pedal
(16) Left brake pedal
(17) Turn signal switch
(18) Load meter sub-total switch (if equipped)
(19) Load meter cancel switch (if equipped)
(20) Hold switch
(21) Kick-down switch
(22) Work equipment lock lever
(23) Ashtray
(24) 12V power takeoff

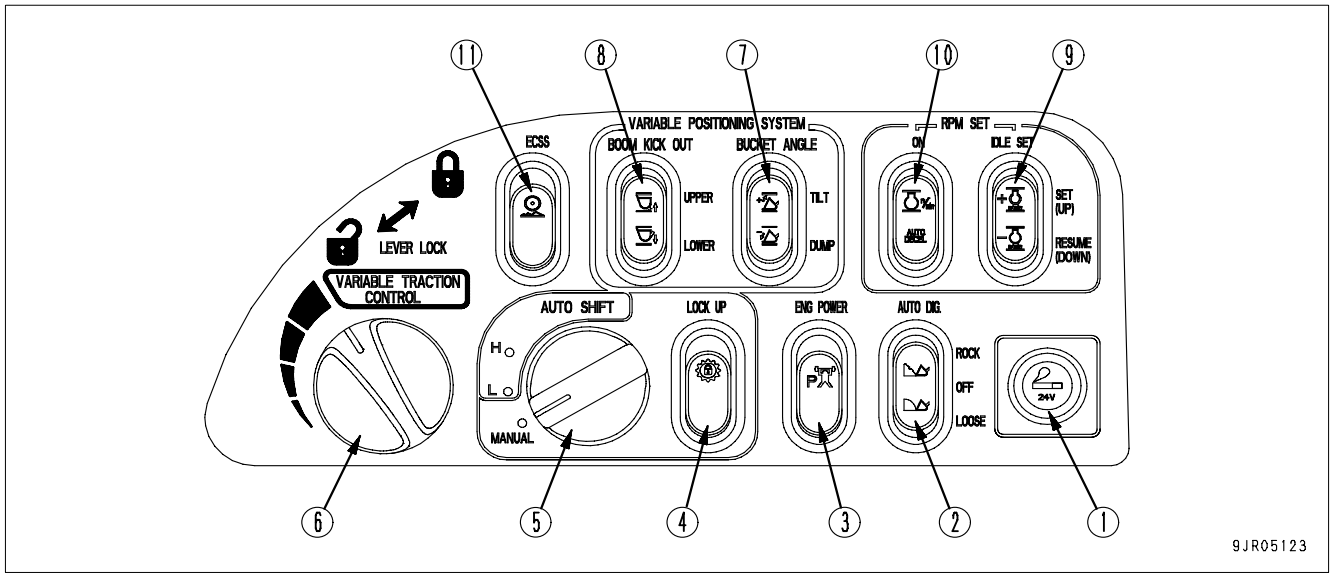
(*) AJSS: Advanced Joystick Steering System

FRONT SWITCH PANEL



(1) Load meter display selector switch (if equipped)
(2) Load meter mode selector switch (if equipped)
(3) Parking brake switch
(4) Lamp switch
(5) Dimmer switch
(6) Front wiper switch
(7) Hazard lamp switch
(8) Machine monitor mode selector switch 2
(9) Machine monitor mode selector switch 1

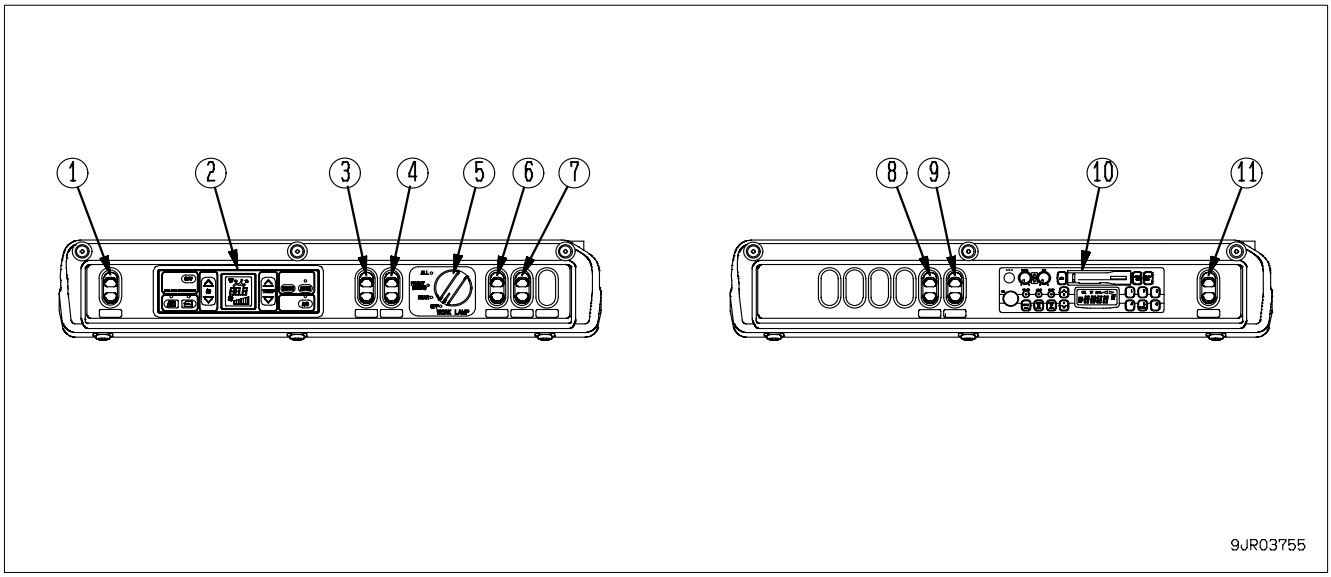
RIGHT SWITCH PANEL



(1) Cigarette lighter
(2) Semi auto digging selector switch (if equipped)
(3) Engine power mode selector switch
(4) Torque converter lock-up switch
(5) Transmission auto shift/manual shift selector switch
(6) Driving force control dial
(7) Remote positioner bucket angle set switch
(8) Remote positioner raise/lower set switch
(9) RPM set idling up-down selector switch (if equipped)
(10) RPM set ON-OFF switch (if equipped)
(11) E.C.S.S. switch (*) (if equipped)

(*) E.C.S.S.: Electrically Controlled Suspension System

OVERHEAD PORTION



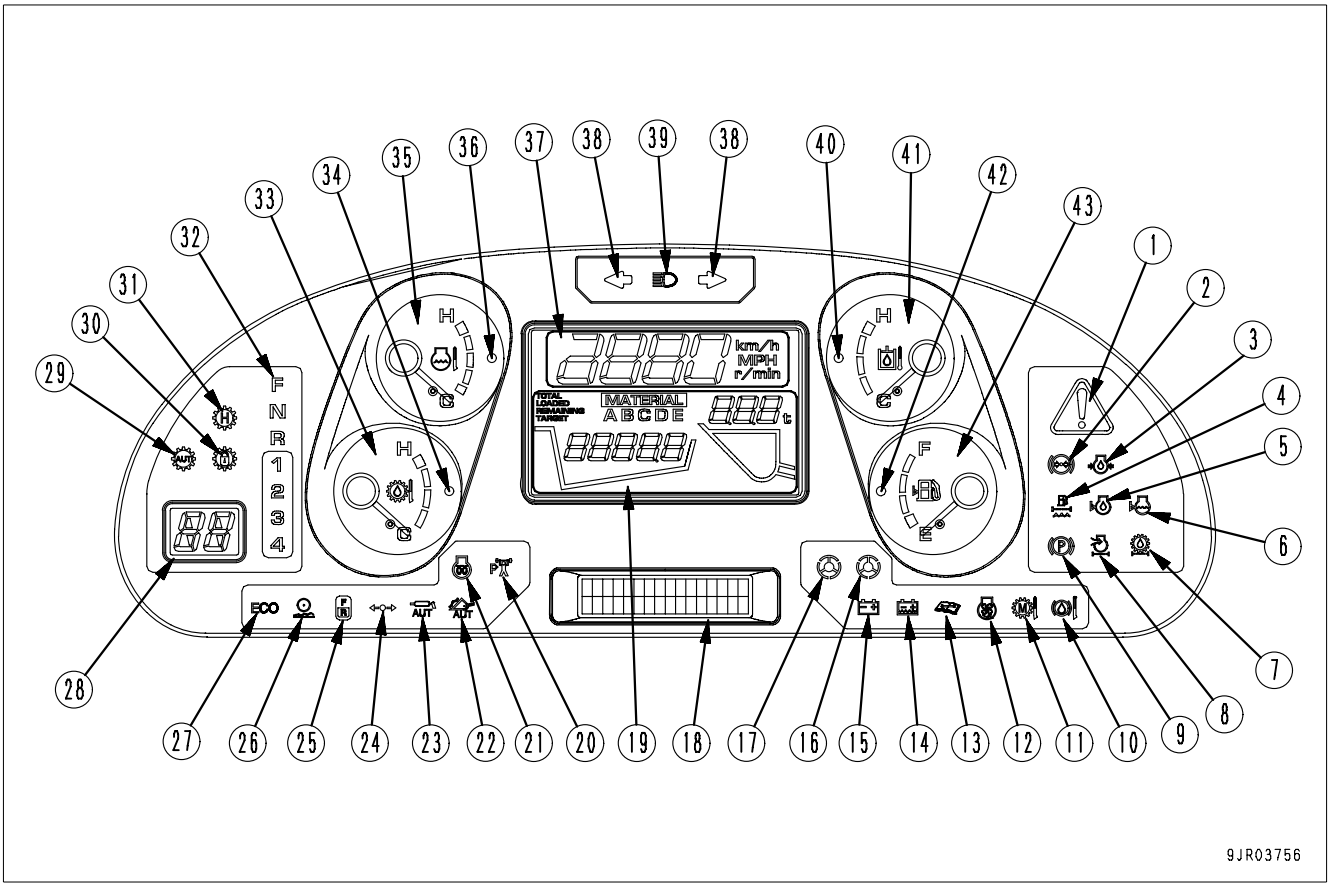
Right overhead portion

(1) Rear heated wire glass switch
(2) Air conditioner control panel
(3) Rear wiper switch
(4) Side wiper switch (if equipped)
(5) Working lamp switch
(6) Fog lamp switch (if equipped)
(7) Beacon lamp switch (if equipped)

Left overhead portion

(8) Auto-greasing switch (if equipped)
(9) Cooling fan reverse rotation switch
(10) Cassette stereo with AM/FM radio
(11) Step light switch

Machine monitor



(1) Central warning lamp
(2) Brake oil pressure caution lamp
(3) Engine oil pressure caution lamp
(4) Fuel filter water detection caution lamp
(5) Engine oil level caution lamp
(6) Radiator water level caution lamp
(7) Transmission oil filter clogging caution lamp
(8) Air cleaner clogging caution lamp
(9) Parking brake pilot lamp
(10) Brake oil temperature caution lamp
(11) Modulation clutch temperature caution lamp
(12) Cooling fan reverse rotation pilot lamp
(13) Maintenance caution lamp
(14) Battery fluid level caution lamp
(15) Battery charge circuit caution lamp
(16) Steering oil pressure caution lamp (if equipped)
(17) Emergency steering pilot lamp (if equipped)
(18) Character display
(19) Load meter (if equipped)
(20) Output mode pilot lamp (power mode)
(21) Preheating pilot lamp
(22) Semi auto digging pilot lamp (if equipped)
(23) Auto-greasing pilot lamp (if equipped)
(24) AJSS actuation pilot lamp (*1)
(25) Directional selector pilot lamp
(26) E.C.S.S. pilot lamp (*2) (if equipped)
(27) Economy mode operation display lamp
(28) Shift indicator
(29) Auto-shift pilot lamp
(30) Lock-up pilot lamp
(31) Shift hold pilot lamp
(32) Shift position pilot lamp
(33) Torque converter oil temperature gauge
(34) Torque converter oil temperature caution lamp
(35) Engine coolant temperature gauge
(36) Engine coolant temperature caution lamp
(37) Speedometer or tachometer
(38) Turn signal pilot lamp
(39) Head lamp high beam pilot lamp
(40) Hydraulic oil temperature caution lamp
(41) Hydraulic oil temperature gauge
(42) Fuel level caution lamp
(43) Fuel gauge

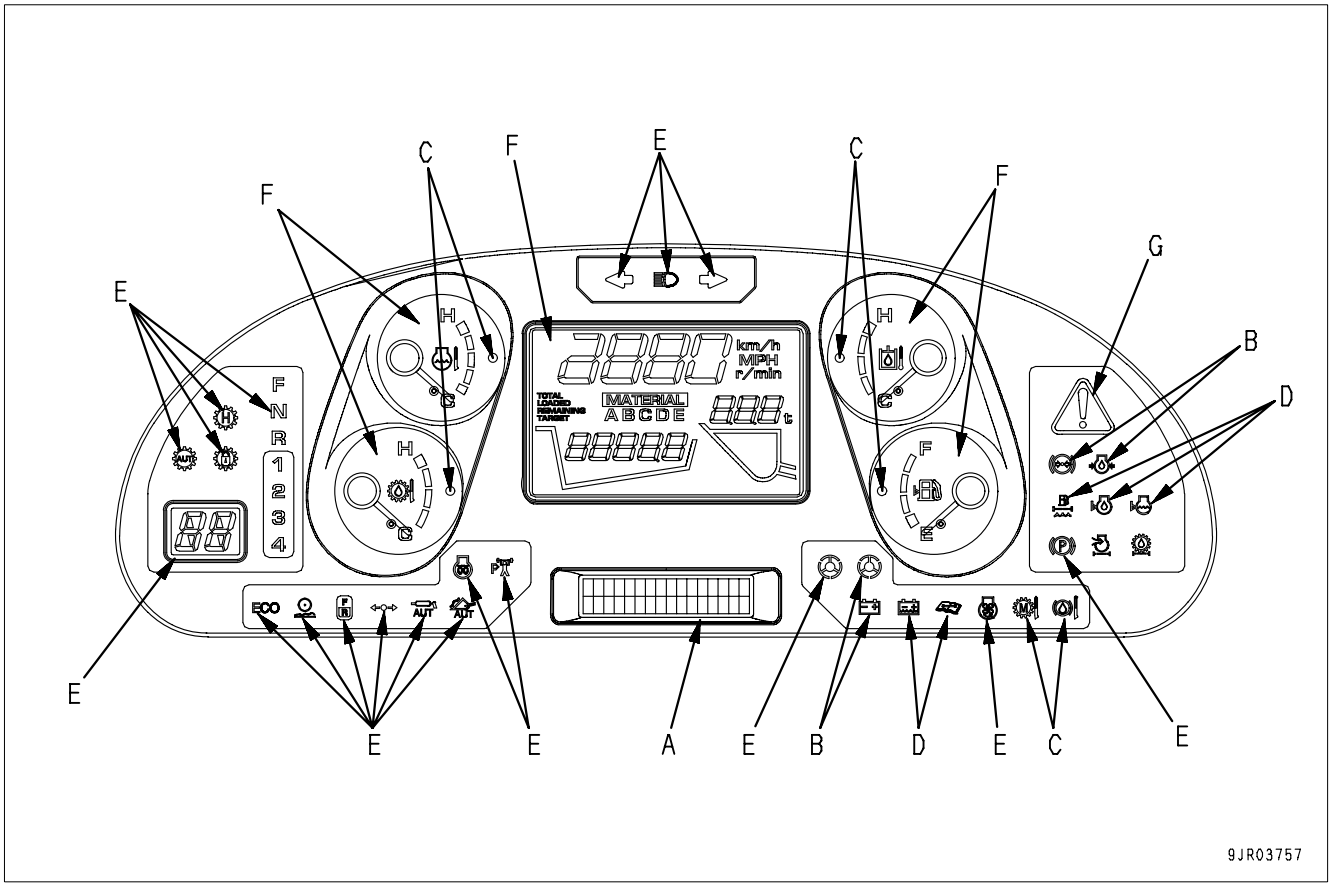
(*1) AJSS: Advanced Joystick Steering System
(*2) E.C.S.S.: Electrically Controlled Suspension System

EXPLANATION OF COMPONENTS

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

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

MACHINE MONITOR



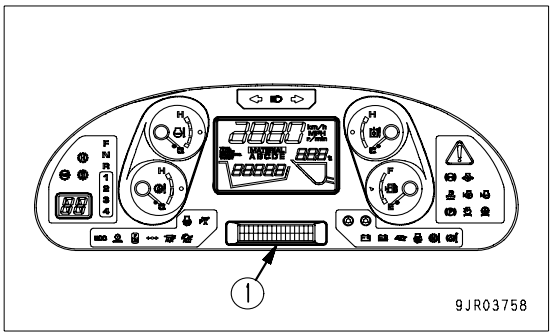
(A) Character display portion
(B) Emergency stop items
(C) Caution items
(D) Inspection and maintenance items
(E) Pilot display portion
(F) Meter display portion
(G) Central warning lamp

NOTICE
Before the engine is started, when the starting switch is turned to the ON position, a system check is carried out, so the central warning lamp, caution lamps, and pilot lamps light up for 2 seconds.
After the warning buzzer sounds for two seconds, it stops to show that everything is normal.
The shift indicator displays “88“ for 2 seconds.
After the above system check, the indicator gauges and meters start to work.
The character display shows “KOMATSU WA 600“ for 3 seconds.
If the lamps or other components do not work, there is probably a failure or disconnection, so ask your Komatsu distributor to carry out inspection.

TYPES OF WARNING

If an abnormality occurs on the machine, or if any switch or lever is operated accidently, the monitor display and buzzer give a warning to inform the operator.

Following are the types of warning depending on the level of danger.



REMARK
For details of action codes " E03 - E01", see "ACTION CODE DISPLAY (3-11)" in the OPERATION Section.

EMERGENCY STOP

This warning is given if there is a serious failure that affects the normal operation of the machine or if the setting is incorrect.

The central warning lamp on the monitor and the caution lamp for the problem location light up, and at the same time, the alarm buzzer sounds (the same cycle for ON, OFF) and action code "E03" is displayed on character display (1).

REMARK
The alarm buzzer sounds in a 1.6 second cycle. (0.8 sec. "ON" → 0.8 sec. "OFF") (The same cycle for ON, OFF)

CAUTION

This warning is given if the coolant or oil overheats.

The central warning lamp on the monitor and the individual caution lamp light up, and at the same time, the alarm buzzer sounds (the same cycle for ON, OFF) and action code "E02" is displayed on character display (1).

REMARK
The alarm buzzer sounds in a 1.6 second cycle. (0.8 sec. "ON" → 0.8 sec. "OFF") (The same cycle for ON, OFF)

MISTAKEN OPERATION

This warning is given if any switch or lever is operated mistakenly.

The central warning lamp on the monitor lights up, and at the same time, the alarm buzzer sounds. (The ON and OFF cycles have a different length.)

In addition, if the travel speed overruns, "OVERRUN PROTECT" is displayed on the character display.

REMARK
The alarm buzzer sounds in a 0.25 second cycle. (0.2 sec. "ON" → 0.05 sec. "OFF") (The ON and OFF cycles have a different length)

INSPECTION AND MAINTENANCE

This warning is given if it is necessary to inspect and maintain wear parts, or if it is necessary to check the oil or coolant level.

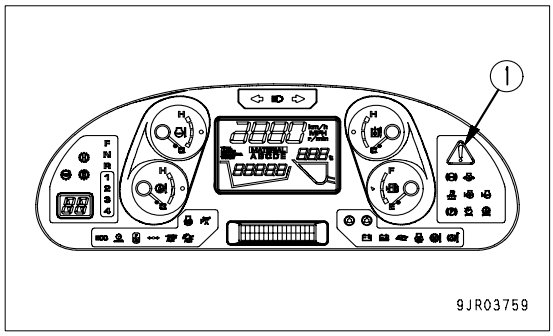
The individual caution lamp on the monitor lights up. At the same time, action code “E01“ is displayed on character display (1).

With this warning, the central warning lamp does not light up and the alarm buzzer does not sound.

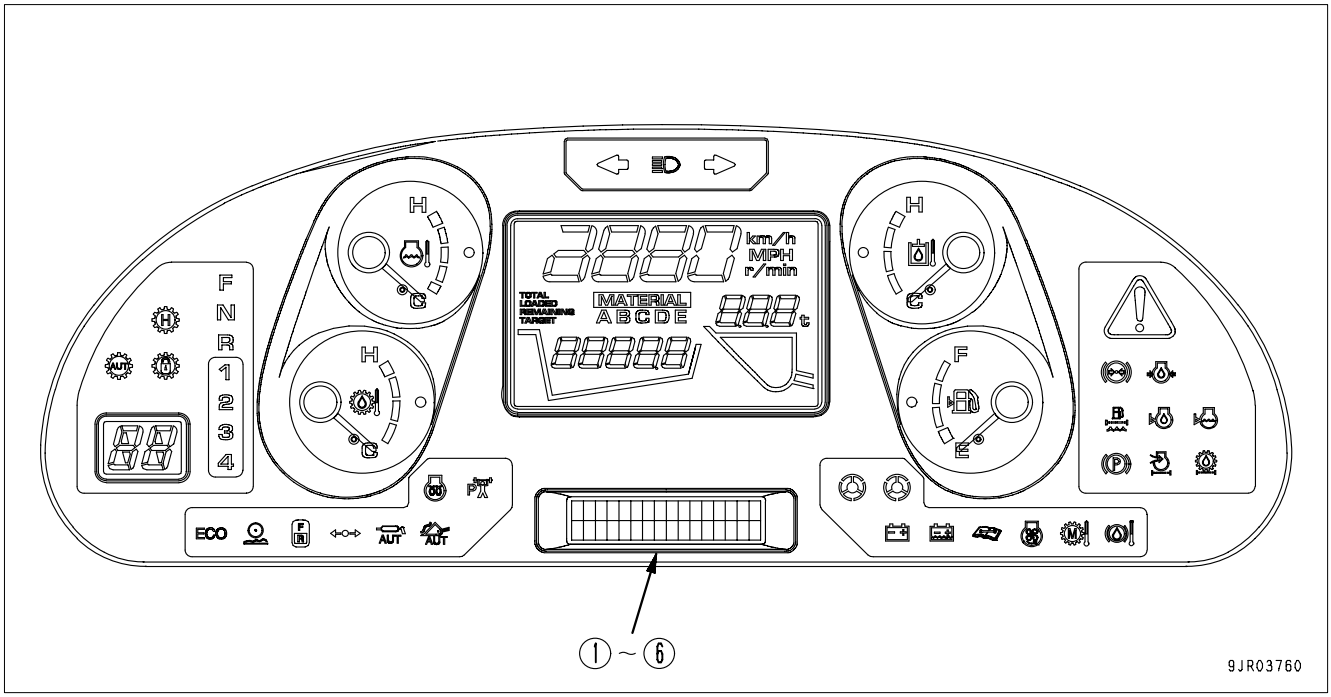
CENTRAL WARNING LAMP

This display (1) lights up if any emergency stop item, caution item, or mistaken operation of any switch or lever occurs. At the same time the alarm buzzer sounds.

Check the display content and perform the specified action for that item.



CHARACTER DISPLAY PORTION



(1) Service meter
(2) Clock
(3) Action code display
(4) Failure code display
(5) Filter, oil replacement time display
(6) Engine speed (or travel speed) display

Normally, this displays the service meter.

If there is any failure on the machine or it is necessary to carry out inspection or maintenance, an action code is displayed to advise the operator to carry out the applicable action.

In addition, when the replacement interval for filters or oil has been reached, the maintenance monitor caution lamp flashes or lights up after the starting switch has been turned ON and system check has been completed to display the filter or oil that needs replacement.

NOTICE
Information regarding the failure of the machine or maintenance is displayed on the character display when the starting switch is at the ON position. Check the display to confirm that there is no abnormality before starting to travel.

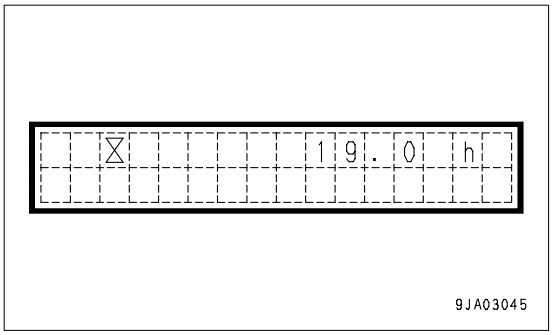
SERVICE METER

This display (1) shows the total number of hours that the machine has been working.

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

The service meter advances 1 for every hour of operation, regardless of the engine speed.

Even if the starting switch is OFF, the service meter is displayed on the top line if the top (◇) portion of the machine monitor mode selector switch 1 is kept pressed.



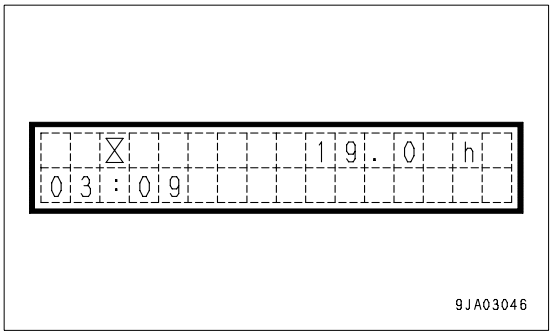
NOTICE
When the starting switch is at the OFF position, if the service meter is displayed even though the top (◇) of machine monitor mode selector switch 1 is not being pressed, there is probably a failure in the machine, so please contact your Komatsu distributor for inspection.

CLOCK

This display (2) shows the time.

For details of the method for setting the time, see “METHOD OF ADJUSTING CLOCK (3-40)“.

Even when the starting switch is OFF, the time is displayed on the bottom line if the top (◇) portion of the machine monitor mode selector switch 1 is kept pressed.



ACTION CODE DISPLAY

⚠ WARNING

If action code E03 is displayed, stop the machine immediately and check the failure code. For details, see “FAILURE CODE DISPLAY (3-13)“.
Inform your Komatsu distributor of the failure code and ask for repairs.

If there is a failure on the machine, or it is necessary to change the method of operation, or if inspection or maintenance must be carried out, action code E01, E02, or E03 is displayed on the character display in display portion (3).

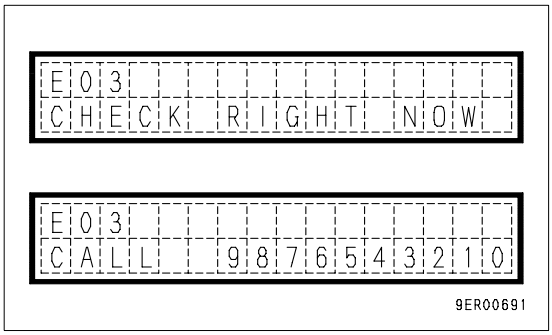
If different failures occur at the same time, the action code for the more serious problem is displayed.

The level of seriousness is as follows, starting with the most serious: E03, E02, E01.

In the case of action codes E02, and E03, the alarm buzzer sounds intermittently and the central warning lamp lights up.

If action codes E01, E02, or E03 are displayed on the character display, stop operations, check the content of the display, and take the following action.

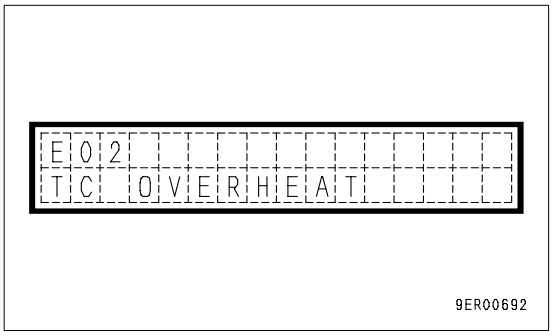
E03: When this code is displayed, stop the machine immediately, check the failure code, and contact your Komatsu distributor for repairs.



REMARK
"E03" is displayed on the top line of the character display, and "CHECK RIGHT NOW" and "CALL" are displayed on the bottom line in turn for 3 seconds each.
The telephone number to call is displayed on the right side of the "CALL" display. If no telephone number has been set, no display is given. For details of the method of inputting the telephone number, see "INPUT METHOD FOR TELEPHONE NUMBER (3-36)".

E02: When this code is displayed, stop the machine and run at the engine under no load at a mid-range speed.

If the action code is still displayed even after the necessary action has been taken, check the failure code and ask your Komatsu distributor to carry out repairs.

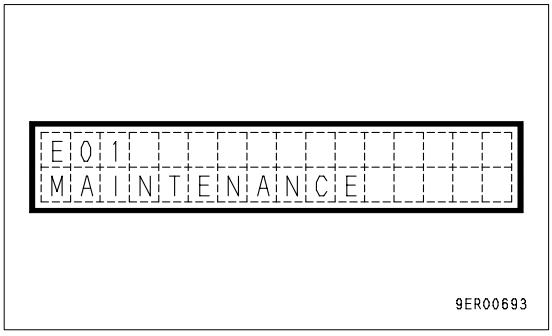


REMARK
The top line of the character display displays "E02" and the bottom line displays the condition of the machine related to overheating.

E01: If there is any problem on the machine, such as a drop in the engine coolant level, the location for maintenance is displayed.

If the maintenance caution lamp lights up the same time, stop the engine and carry out inspection and maintenance of the displayed item.

If "E01" and "MAINTENANCE" are displayed, check the failure code and have repairs carried out.



REMARK
"E01" is displayed on the top line of the character display, and "MAINTENANCE" or the location of the machine requiring inspection, filling, or replacement is displayed on the bottom line.

If any display related to overrun is given, reduce the engine speed or machine travel speed, and continue operations.

FAILURE CODE DISPLAY

If an action code is displayed on the character display, check the failure code according to the failure code display method given below.

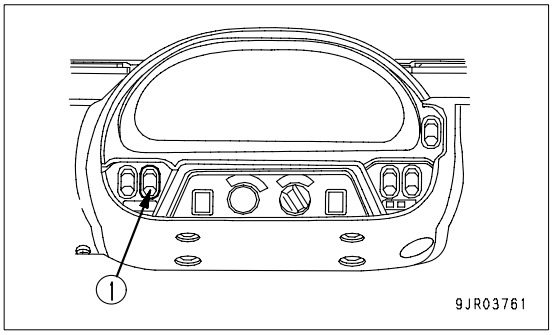
When contacting your Komatsu distributor to request repairs, inform your distributor of the failure code.

Method of displaying failure code

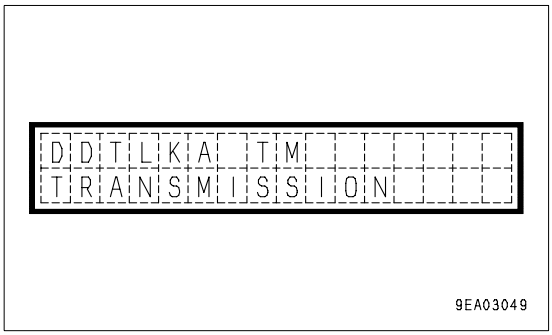
1. With this display portion (4), if an action code is displayed on the character display, press the top (>) portion of machine monitor mode selector switch 2 (1).

   The screen will switch from the action code to the failure code.

   - The failure code is displayed with the first 6 digits on the left of the top line of the character display.
   - The code displayed after the space on the right side of the failure code indicates the controller that detected the failure code.
   - The component causing the failure is displayed on the bottom line of the character display.



Top right code	Controller detecting failure code
MON	Machine monitor
TM	Transmission controller
ENG	Engine controller
WRK	Work equipment controller



2. Press the top (>) portion of machine monitor mode selector switch 2 (1).

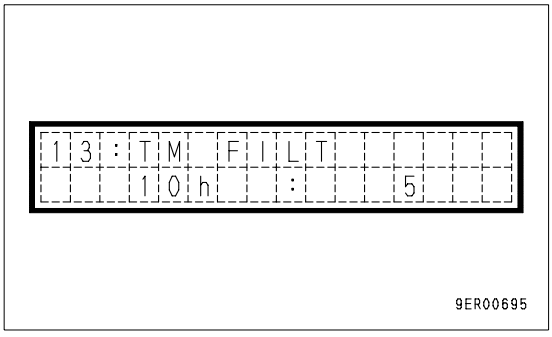
   The service meter displayed when the machine is normal is displayed for several seconds, then the screen returns to the action code display.

   If more than one failure has occurred at the same time, the next failure code is displayed.

FILTER, OIL REPLACEMENT TIME DISPLAY

After the starting switch is turned ON and the system check is completed, this display (5) displays for approx. 30 seconds the filter and oil items that are near to the replacement time. The maintenance caution lamp also flashes or lights up at this time.

After replacing the filter or oil, reset the replacement interval. For details, see “RESET METHOD FOR FILTER, OIL REPLACEMENT TIME (3-34)“.



REMARK
The top line of the character display shows the ID No. and item name for the item needing replacement; the bottom line shows the time remaining until replacement and the total number of times the replacement has been carried out.
If the replacement time has already passed, a minus (-) sign appears before the time.
After the display has been given for 30 seconds, it does not appear again until the starting switch is turned to the ON position.
The message in the illustration above is not shown on the character display if an action code is being displayed.
If there are two or more items to be displayed, the display changes repeatedly every three seconds. If there are more than 10 items, all the items are displayed once each, then the display returns to the normal display.
The display appears when there is 30 hours remaining until the filter or oil replacement time. If the replacement time has passed, a minus (-) sign appears before the time for the first 30 hours. When more than 30 hours have passed, the display is no longer given.
The maintenance caution lamp flashes as the replacement time approaches, and after the replacement time has passed, it lights up.

Items for display of filter, oil replacement time

Item	Replacement interval (H)	Character display	ID number
Engine oil	500	ENG OIL	01
Engine oil filter	500	ENG OIL FILTER	02
Fuel pre-filter	500	FUEL P FILT	41
Transmission oil filter	500	TRANSM FILTER	13
Fuel filter	1000	FUEL FILTER	03
Transmission oil	1000	TRANSM OIL	12
Corrosion resistor	1000	CORR-RESISTER	06
Hydraulic tank breather element	2000	HYD BREATHER	05
Hydraulic filter	2000	HYD FILT	04
Hydraulic oil	2000	HYD OIL	10
Axle oil	2000	AXLE OIL	15

REMARK
See the section below for details of the procedure for replacing the filter and oil.
Engine oil
“CHANGE OIL IN ENGINE OIL PAN, REPLACE ENGINE OIL FILTER CARTRIDGE (4-58)“

Engine oil filter
“CHANGE OIL IN ENGINE OIL PAN, REPLACE ENGINE OIL FILTER CARTRIDGE (4-58)“

Fuel pre-filter
“REPLACE FUEL PRE-FILTER CARTRIDGE (4-59)“

Transmission oil filter
“REPLACE TRANSMISSION OIL FILTER ELEMENT (4-62)“

Fuel filter
“REPLACE FUEL FILTER CARTRIDGE (4-61)“

Transmission oil
“CHANGE OIL IN TRANSMISSION CASE, CLEAN STRAINER (4-65)“

Corrosion resistor
“REPLACE CORROSION RESISTOR CARTRIDGE (4-67)“

Hydraulic tank breather element
“REPLACE HYDRAULIC TANK BREATHER ELEMENT (4-72)“

Hydraulic filter
“CHANGE OIL IN HYDRAULIC TANK, REPLACE HYDRAULIC FILTER ELEMENT (4-69)“

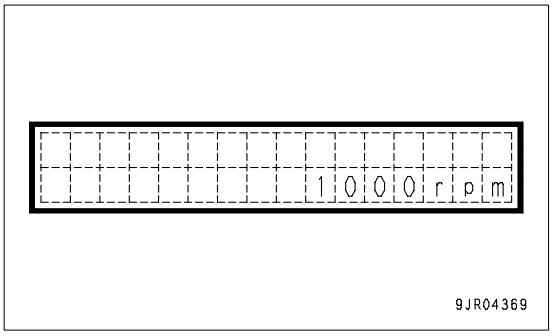
Hydraulic oil
“CHANGE OIL IN HYDRAULIC TANK, REPLACE HYDRAULIC FILTER ELEMENT (4-69)“

Axle oil
“CHANGE AXLE OIL (4-72)“

ENGINE SPEED (OR TRAVEL SPEED) DISPLAY

When the machine monitor meter displays the travel speed, this display (6) shows the engine speed. When the machine monitor meter displays the engine speed, this display (6) shows the travel speed.

For details, see “METHOD OF SWITCHING TRAVEL SPEED/ ENGINE SPEED DISPLAY/NON-DISPLAY (3-43)“.



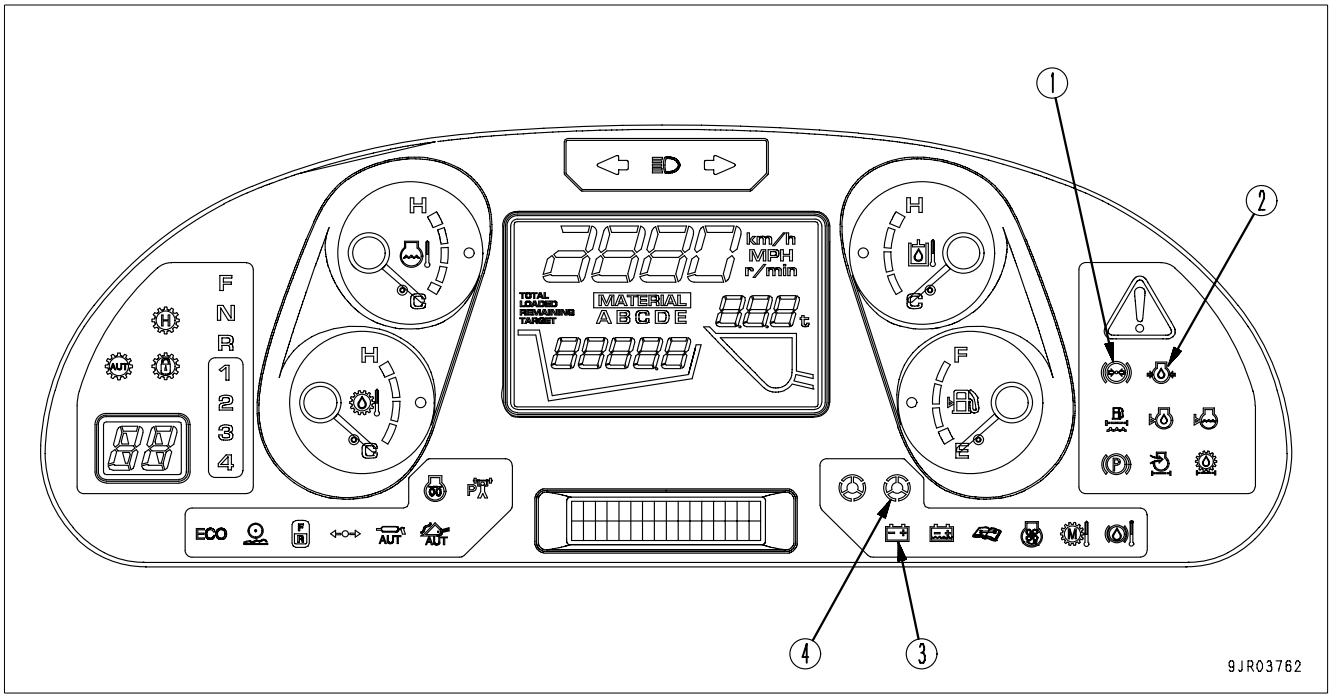
EMERGENCY STOP ITEMS

CAUTION

If these lamps light up and the buzzer sounds, stop operations immediately and carry out inspection and maintenance of the applicable location.

If there is any abnormality in any emergency stop item, the buzzer sounds intermittently and the caution lamp for the location of the abnormality and the central warning lamp light up.

At the same time, “E03 CHECK RIGHT NOW“ is displayed on the character display, so stop the machine immediately, then stop the engine and carry out inspection.

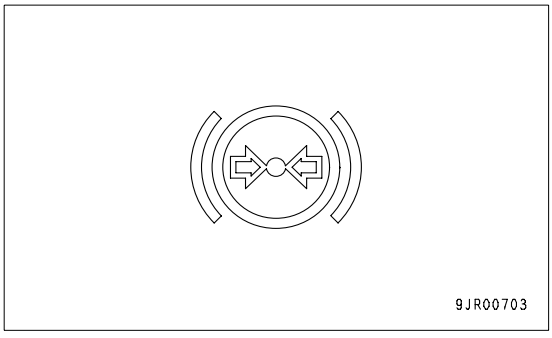


(1) Brake oil pressure caution lamp
(2) Engine oil pressure caution lamp
(3) Battery charge circuit caution lamp
(4) Steering oil pressure caution lamp (if equipped)

BRAKE OIL PRESSURE CAUTION LAMP

This lamp (1) lights up when the brake oil pressure goes below the specified value.

When carrying out the check before starting (starting switch at ON position, engine stopped) the engine is stopped, so the brake circuit is not actuated. For this reason, the brake oil pressure caution lamp and central warning lamp do not light up and the alarm buzzer does not sound.



During operation (engine running)

If the brake oil pressure goes down during operation, the brake oil pressure caution lamp and central warning lamp light up and the alarm buzzer sounds intermittently.

At the same time, “E03 CHECK RIGHT NOW“ is displayed on the character display, so stop the machine immediately, then stop the engine and carry out inspection.

When the brake oil pressure caution lamp lights up, it may be impossible to operate the brakes. Leave the parking brake operated to prevent the machine from moving.

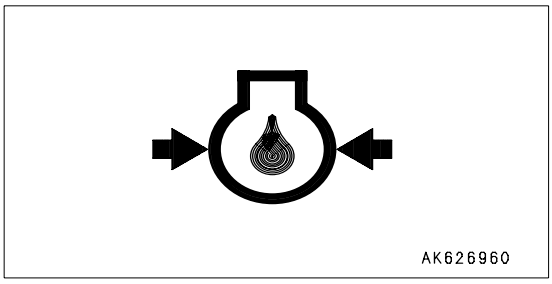
Immediately after the engine starts, the accumulator is in the process of storing pressure, so the brake oil pressure caution lamp lights up, but the central warning lamp does not light up and the alarm buzzer does not sound.

Do not move the machine until the brake oil pressure caution lamp goes out. Keep the parking brake applied.

ENGINE OIL PRESSURE CAUTION LAMP

This lamp (2) lights up to warn the operator that the engine lubricating oil pressure has dropped.

When carrying out the check before starting (starting switch at ON position, engine stopped), the lamp does not light up.



During operation (engine running)

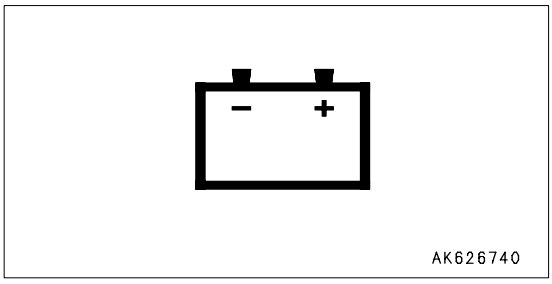
If the engine lubricating oil pressure goes down during operation, the engine lubricating oil pressure caution lamp and central warning lamp light up and the alarm buzzer sounds intermittently.

At the same time, “E03 CHECK RIGHT NOW“ is displayed on the character display, so stop the machine immediately, then stop the engine and carry out inspection.

BATTERY CHARGE CIRCUIT CAUTION LAMP

This lamp (3) lights up when the engine is running to warn the operator that an abnormality has occurred in the charging circuit.

When carrying out the check before starting (starting switch at ON position, engine stopped), the lamp does not light up.



During operation (engine running)

If an abnormality occurs in the charging circuit during operation, the battery charge circuit caution lamp and central warning lamp light up and the alarm buzzer sounds intermittently.

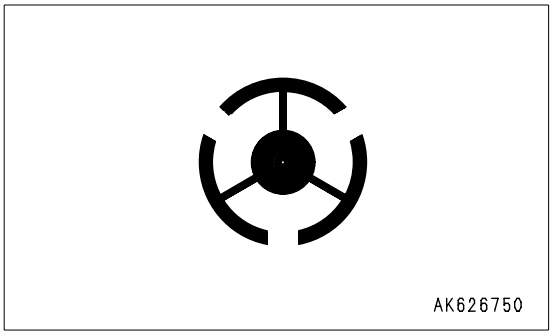
At the same time, “E03 CHECK RIGHT NOW“ is displayed on the character display, so stop the machine immediately, then stop the engine and carry out inspection.

STEERING OIL PRESSURE CAUTION LAMP

(If equipped)

(Red)

This lamp (4) lights up when the engine stops or when the steering oil pressure has dropped.



It also lights up during the check before starting (when the starting switch is at the ON position and the engine is stopped).

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

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

During operations (engine running)

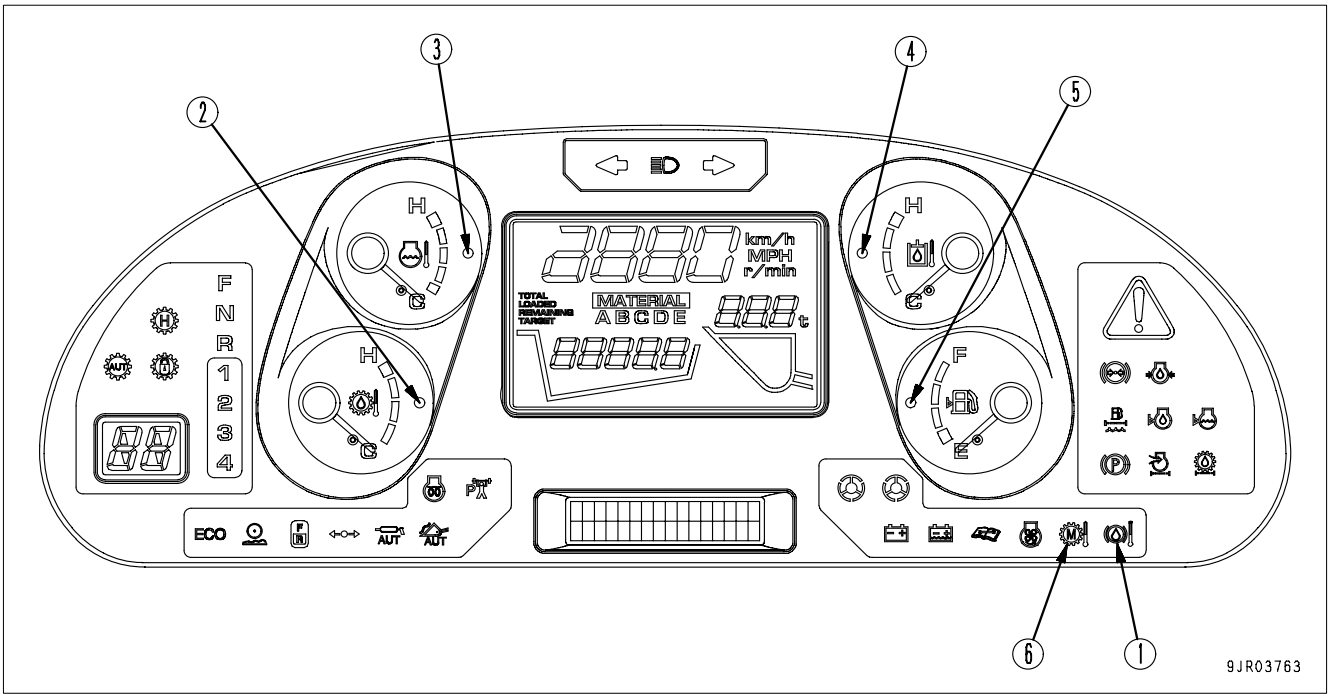
If the steering oil pressure drops, this steering oil pressure caution lamp lights up.

If the lamp lights up, stop the machine immediately, then stop the engine and carry out inspection.

CAUTION ITEMS

⚠ CAUTION

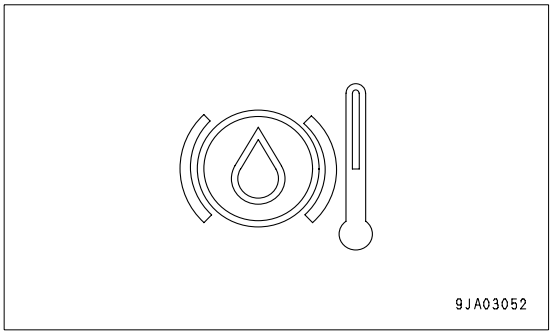
If these lamps light up, stop operations quickly and carry out the following action.



(1) Brake oil temperature caution lamp
(2) Torque converter oil temperature caution lamp
(3) Engine coolant temperature caution lamp
(4) Hydraulic oil temperature caution lamp
(5) Fuel level caution lamp
(6) Modulation clutch temperature caution lamp

BRAKE OIL TEMPERATURE CAUTION LAMP

This lamp (1) lights up to warn the operator that the brake oil temperature has risen.



During operation

When heavy-duty operations are carried out continuously or the brake has been used frequently when traveling long distances downhill, the brake oil temperature becomes high and the brake oil temperature caution lamp flashes. If the brake oil temperature becomes even higher, the brake oil temperature caution lamp lights up and the alarm buzzer sounds intermittently.

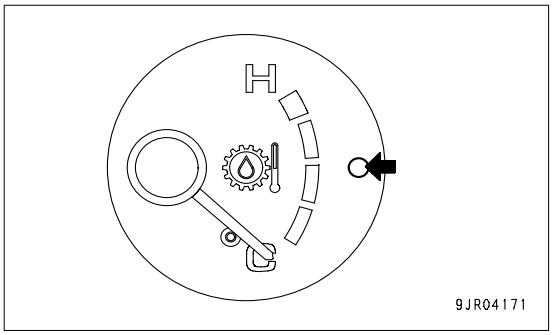
At the same time, “E02 BRAKE OVERHEAT“ is displayed on the character display, so take the following action.

1. Release the accelerator pedal and move the speed range selector switch down one range to reduce the travel speed.
2. Avoid using the brake.
   1) Stop using the brake pedal continuously. Operate the brake intermittently.

   If use of the brake is reduced for a short time in the way recommended above, the brake oil temperature will go down and the caution lamp will go out.

TORQUE CONVERTER OIL TEMPERATURE CAUTION LAMP

This lamp (2) lights up to warn the operator that the torque converter oil temperature has risen.



During operation

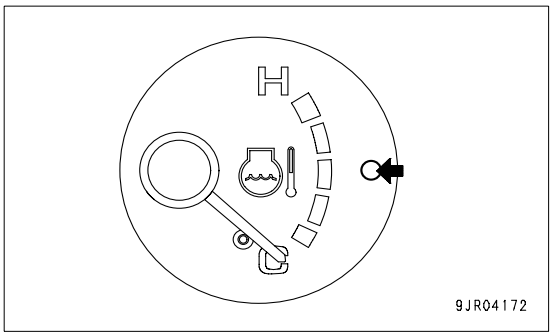
If the torque converter oil temperature rises, the torque converter oil temperature caution lamp only will light up.

If the oil temperature rises further, the central warning lamp will light up and the alarm buzzer will sound intermittently.

The central warning lamp lights up and “E02 TC OVERHEAT“ is displayed on the character display, so stop the machine and run the engine under no load at a mid-range speed until the lamp goes out.

ENGINE COOLANT TEMPERATURE CAUTION LAMP

This lamp (3) warns the operator that the engine coolant temperature has risen.



During operation (engine running)

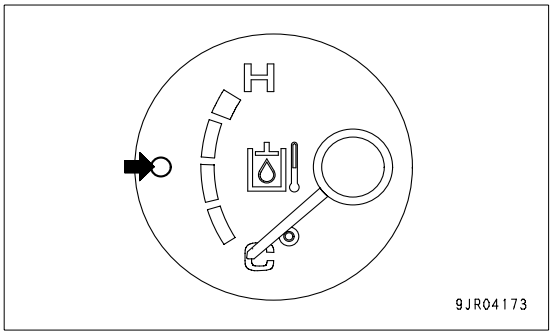
If the coolant temperature rises, the coolant temperature caution lamp lights up.

If the coolant temperature rises further, the central warning lamp will light up and the alarm buzzer will sound intermittently.

The central warning lamp lights up and “E02 ENGINE OVERHEAT“ is displayed on the character display, so stop the machine and run the engine under no load at a mid-range speed until the lamp goes out.

HYDRAULIC OIL TEMPERATURE CAUTION LAMP

This lamp (4) warns the operator that the hydraulic oil temperature has risen.



During operation

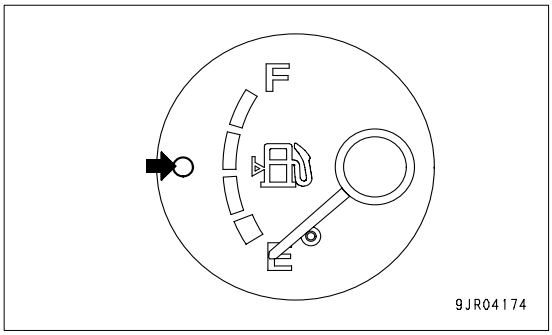
If the hydraulic oil temperature rises, the hydraulic oil temperature caution lamp, the central warning lamp will light up, and the alarm buzzer will sound intermittently.

At the same time, “E02 HYD OVERHEAT“ is displayed on the character display, so stop the machine and run the engine under no load at a mid-range speed until the lamp goes out.

FUEL LEVEL CAUTION LAMP

This lamp (5) lights up when the amount of fuel remaining in the fuel tank goes below approx 120 liters.

If the lamp lights up, check the fuel level immediately and add fuel. For details, see “CHECK FUEL LEVEL, ADD FUEL (3-111)“.

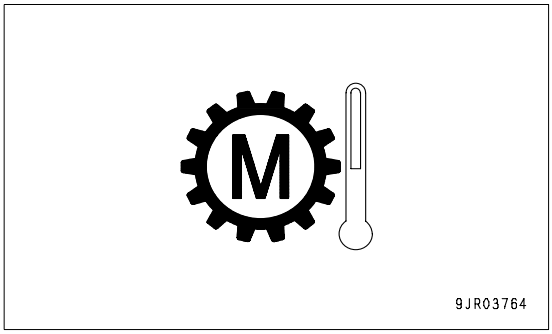


REMARK
Even when the fuel level caution lamp lights up, action code “E02“ is not displayed on the character display.

MODULATION CLUTCH TEMPERATURE CAUTION LAMP

This lamp (6) warns the operator that the modulation clutch temperature has risen.

When carrying out the check before starting (starting switch at ON position, engine stopped), the lamp does not light up.



During operation (engine running)

If the modulation clutch temperature rises, the modulation clutch temperature caution lamp lights up.

If the temperature rises further, the central warning lamp also lights up and the alarm buzzer sounds intermittently.

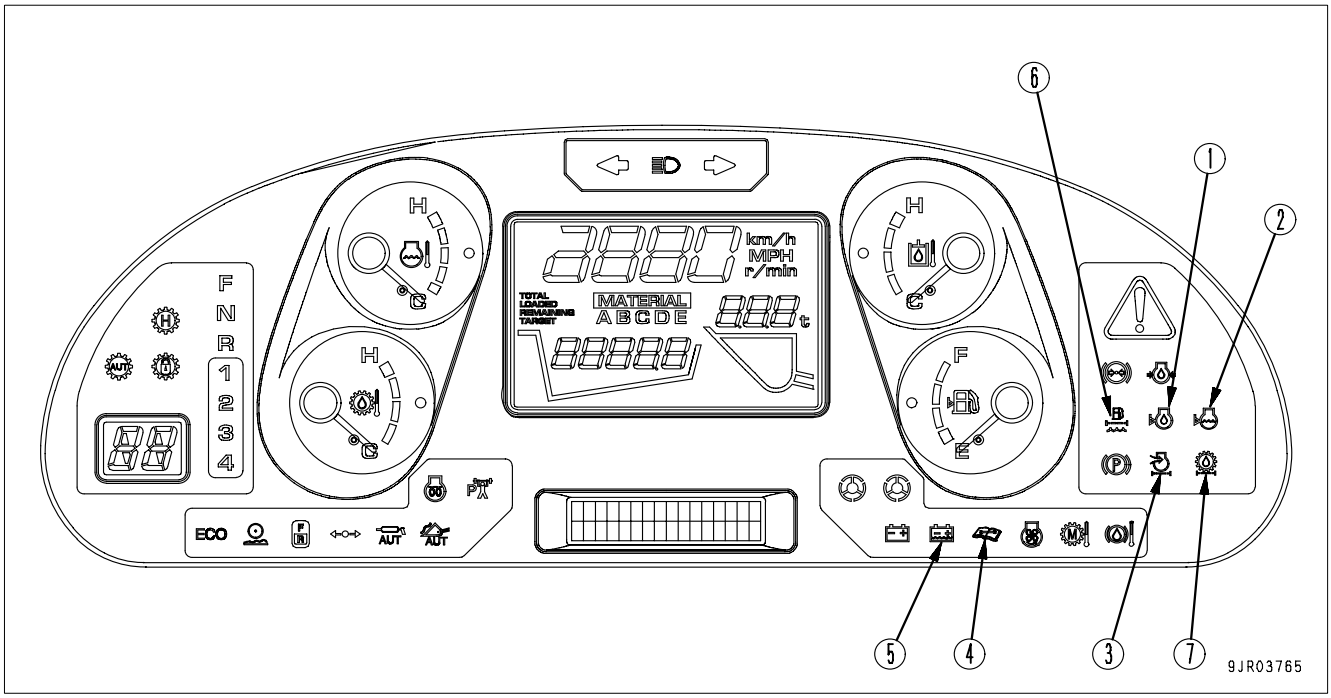
The central warning lamp lights up and “E02 MOD/C OVERHEAT“ is displayed on the character display, so stop the machine and run the engine under no load at a mid-range speed until the lamp goes out.

REMARK
If the left brake pedal is depressed, the modulation clutch will slip and the temperature will rise because of the friction.
In addition, if the drive force control dial is throttled down, the modulation clutch will slip and the temperature will rise because of the friction.
In particular, if the drive force control dial is throttled down and digging operations are carried out in 1st, carry out the operation from the start of pushing to completion of scooping up within 10 seconds in order to prevent overheating of the clutch.

INSPECTION AND MAINTENANCE ITEMS

⚠ CAUTION

If these lamps light up, stop operations quickly and carry out the following action.



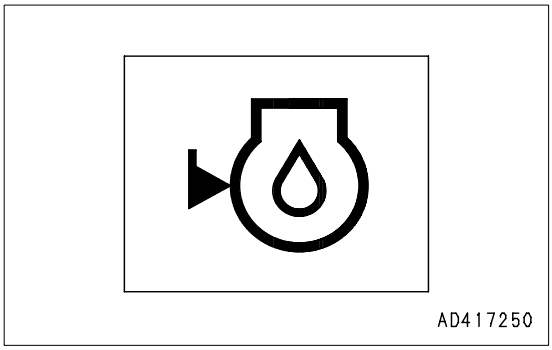
(1) Engine oil level caution lamp
(2) Radiator coolant level caution lamp
(3) Air cleaner clogging caution lamp
(4) Maintenance caution lamp
(5) Battery fluid level caution lamp
(6) Fuel filter water detection caution lamp
(7) Transmission oil filter clogging caution lamp

ENGINE OIL LEVEL CAUTION LAMP

This lamp (1) warns the operator that the oil level in the engine oil pan has dropped.

During checks before starting (when the starting switch is turned to the ON position but the engine is not started), this monitor lights up if the oil level in the engine oil pan is low.

At the same time, “E01 ENG OIL LEV LOW “ is displayed, so do not start the engine. Check the oil level in the engine oil pan, and add oil.



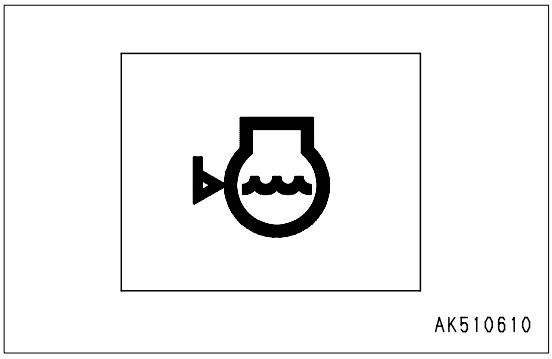
REMARK
During checks before starting, if the engine is started with the engine oil level caution lamp lighted up, the lamp will stay lighted up.
Stop the engine, check the oil level in the engine oil pan, and add oil.

RADIATOR COOLANT LEVEL CAUTION LAMP

This lamp (2) warns the operator that the water level in the radiator has dropped.

During checks before starting (when the starting switch is turned to the ON position but the engine is not started), this monitor lights up if the coolant level in the radiator is low.

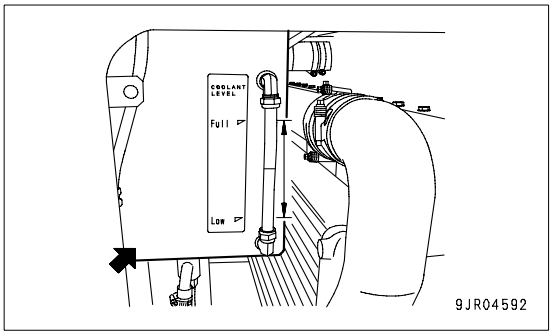
At the same time, “E01 COOLANT LOW “ is displayed, so check the water level in the radiator sub-tank, and add water.



During operation (engine running)

If the water level in the radiator becomes too low, the radiator cooling water level caution lamp will light up.

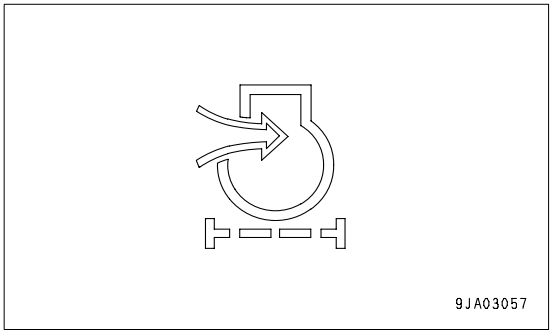
At the same time, “E01 COOLANT LOW “ is displayed, so stop the engine, check the water level in the radiator sub-tank, and add water.



AIR CLEANER CLOGGING CAUTION LAMP

This lamp (3) lights up to warn the operator that the air cleaner is clogged.

When carrying out the check before starting (starting switch at ON position, engine stopped), the lamp does not light up.

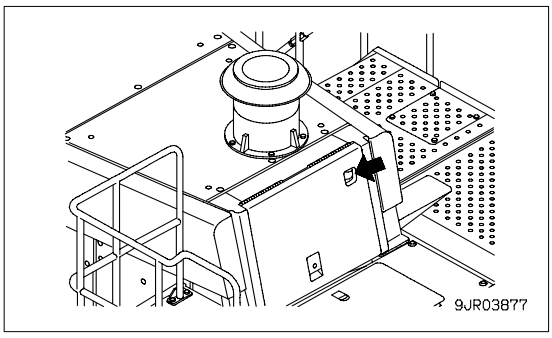


During operation (engine running)

If the air cleaner becomes clogged, the air cleaner clogging caution lamp will light up.

At the same time, “E01 AIR FILTER“ is displayed, so stop the engine, and clean or replace the element.

REMARK
The condition of clogging of the air cleaner can be checked visually with the dust indicator through the cover at the rear of the operator's cab.

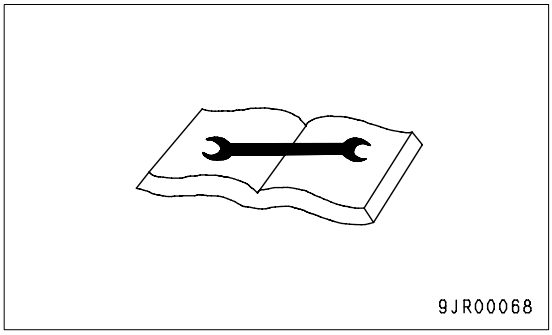


MAINTENANCE CAUTION LAMP

⚠ CAUTION

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

When the time for oil change is reached, this lamp (4) flashes or lights up for approx. 30 seconds after completion of the system check when the starting switch is at the ON position.



REMARK
The maintenance caution lamp flashes when there are less than 30 hours to the replacement time, and after the replacement time has passed, it stays on.

For details of the items covered by filter and oil replacement, see "FILTER, OIL REPLACEMENT TIME DISPLAY (3-13)".

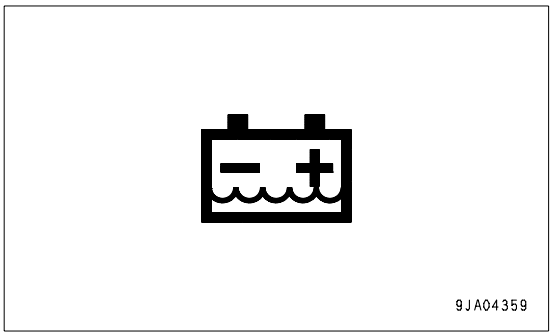
After replacing the filter or oil, reset the replacement interval. For details, see "RESET METHOD FOR FILTER, OIL REPLACEMENT TIME (3-34)".

BATTERY ELECTROLYTE LEVEL CAUTION LAMP

This lamp (5) lights up when the battery electrolyte level is low.

During checks before starting (when the starting switch is turned to the ON position but the engine is not started), this monitor lights up if the battery electrolyte level is low.

At the same time, "E01 BATTERY LEV LOW " is displayed, so check the level of the battery electrolyte and add distilled water.



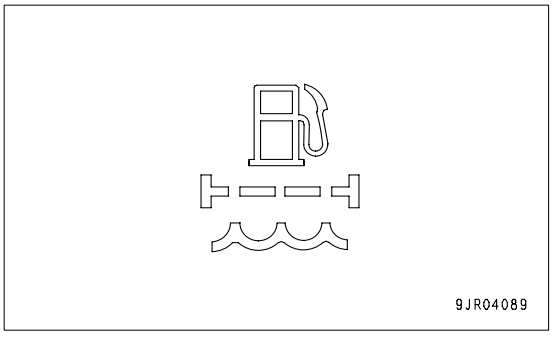
During operation (engine running)

If the battery electrolyte level becomes too low, the battery electrolyte level caution lamp will light up.

At the same time, "E01 BATTERY LEV LOW " is displayed, so check the level of the battery electrolyte and add distilled water.

FUEL FILTER WATER DETECTION CAUTION LAMP

This lamp (6) is not active.

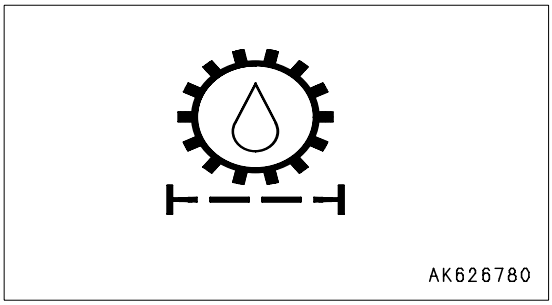


TRANSMISSION OIL FILTER CLOGGING CAUTION LAMP

This lamp (7) lights up when the transmission oil filter is clogged.

When the transmission oil filter is clogged, the transmission clogging caution lamp lights up.

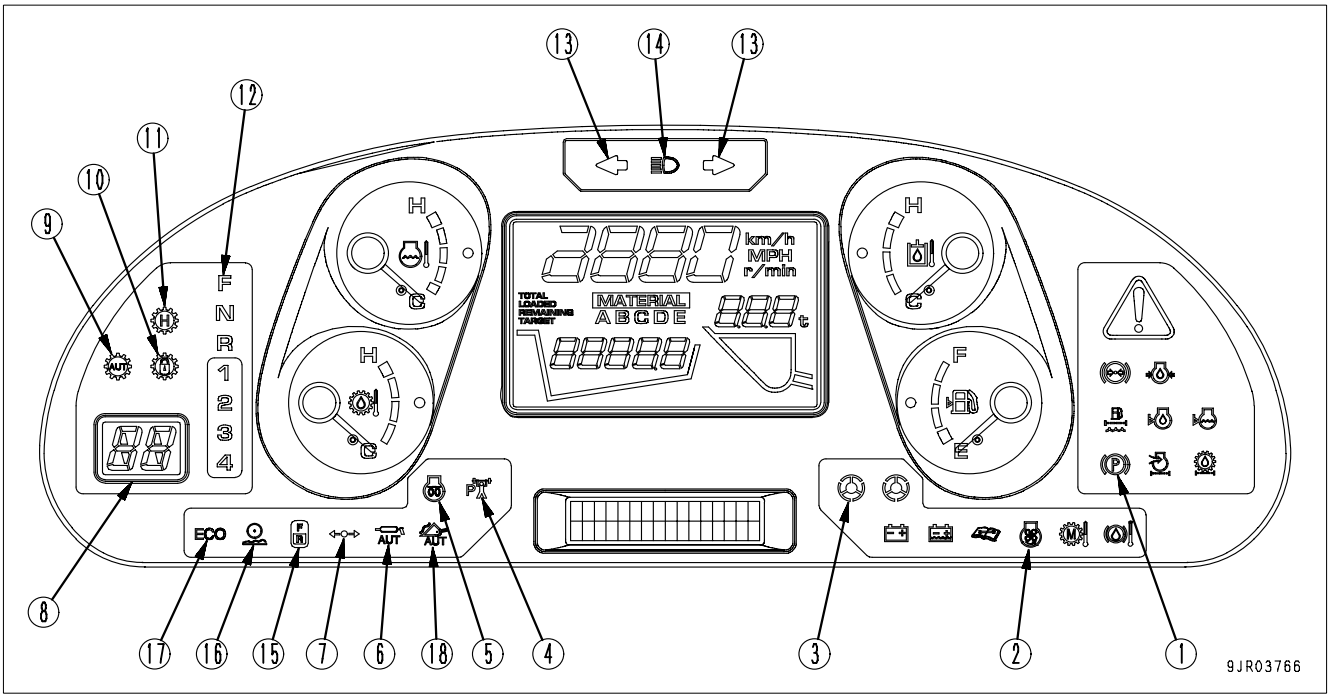
At the same time, “E01 TRANSM FILTER“ is displayed, so stop the engine, and replace the element.



REMARK
If the engine is stopped or the torque converter oil temperature is low, the transmission oil filter clogging caution lamp does not light up.

PILOT DISPLAY PORTION

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



(1) Parking brake pilot lamp
(2) Cooling fan reverse rotation pilot lamp
(3) Emergency steering pilot lamp (if equipped)
(4) Output mode pilot lamp (power mode)
(5) Preheating pilot lamp
(6) Auto-greasing pilot lamp (if equipped)
(7) AJSS actuation pilot lamp (*1)
(8) Shift indicator
(9) Auto shift pilot lamp
(10) Lock-up pilot lamp
(11) Shift hold pilot lamp
(12) Shift position pilot lamp
(13) Turn signal pilot lamp
(14) Head lamp high beam pilot lamp
(15) Directional selector pilot lamp
(16) E.C.S.S. pilot lamp (*2) (if equipped)
(17) Economy operation display lamp
(18) Semi auto digging pilot lamp (if equipped)

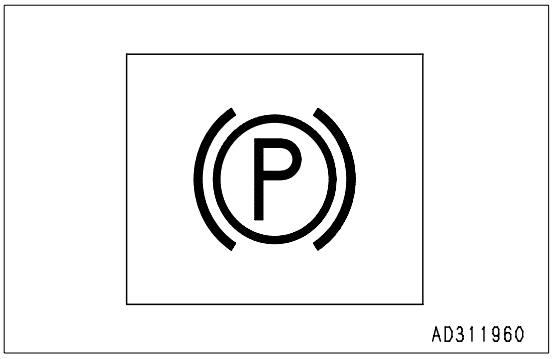
(*1) AJSS: Advanced Joystick Steering System

(*2) E.C.S.S.: Electrically Controlled Suspension System

PARKING BRAKE PILOT LAMP

This lamp (1) shows that the parking brake is applied.

When the parking brake switch is turned ON, the parking brake pilot lamp lights up.



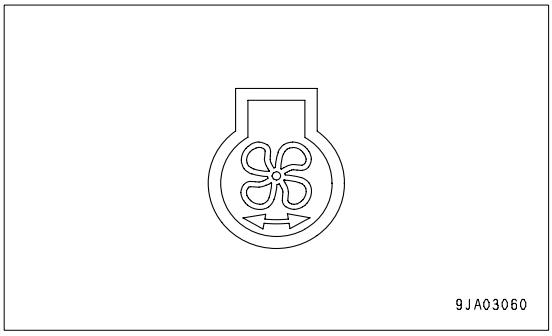
COOLING FAN REVERSE ROTATION PILOT LAMP

This lamp (2) shows that the cooling fan is rotating in the opposite direction.

When the cooling fan reverse rotation switch is turned ON and the fan rotates in reverse, the cooling fan reverse rotation pilot lamp lights up.

At the same time, “COOLING FAN REVERSE“ is displayed on the character display.

For details, see “COOLING FAN REVERSE ROTATION SWITCH (3-61)“.



REMARK
When the engine is running, even if the cooling fan reverse rotation switch is operated, the cooling fan does not rotate in reverse.
In this case, the position of the switch and the actual direction of rotation of the fan are different, so the cooling fan reverse rotation pilot lamp flashes.

EMERGENCY STEERING PILOT LAMP

(If equipped)

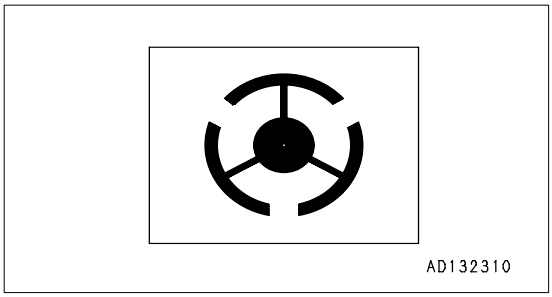
(Green)

This lamp (3) lights up when the emergency steering is actuated.

If the engine stops when the machine is traveling or if any abnormality occurs in the steering oil pressure circuit, and the machine is traveling at a speed of more than 2 km/h, the emergency steering is automatically actuated and the lamp lights up.

If the lamp lights up, move the machine immediately to a safe place, stop the engine, and check the condition.

For details, see “EMERGENCY STEERING (3-133)“.

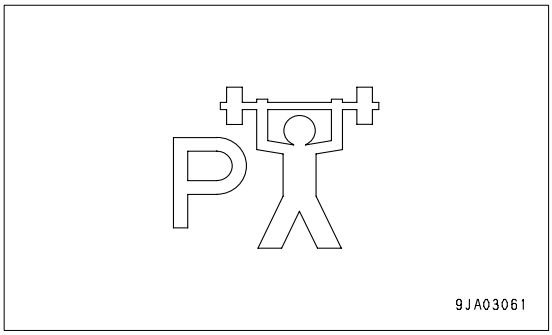


REMARK
The emergency steering does not work when the machine is stopped.

OUTPUT MODE PILOT LAMP (POWER MODE)

This lamp (4) shows that the power mode has been selected.

When the engine power mode selector switch is used to select power mode, the pilot lamp lights up. For details, see “ENGINE POWER MODE SELECTOR SWITCH (3-59)“.



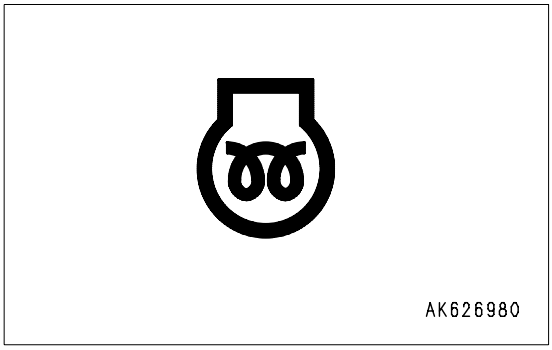
PREHEATING PILOT LAMP

This lamp (5) shows that the engine preheating electrical heater has been actuated.

In cold weather, when the starting switch is turned to the ON position, this pilot lamp lights up. When preheating is completed, the lamp goes out.

The time taken for the preheating to be completed differs according to the temperature of the engine coolant.

For details, see “STARTING ENGINE (3-120)“.



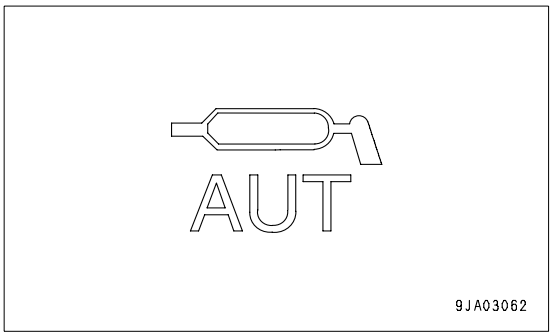
AUTO-GREASING PILOT LAMP

(If equipped)

This lamp (6) shows that the auto-greasing is being actuated.

When the auto-greasing is being actuated, the pilot lamp lights up.

When the grease tank is empty, the lamp flashes (1 Hz), and when there is an abnormality in the auto-greasing device, it flashes rapidly (2 Hz).



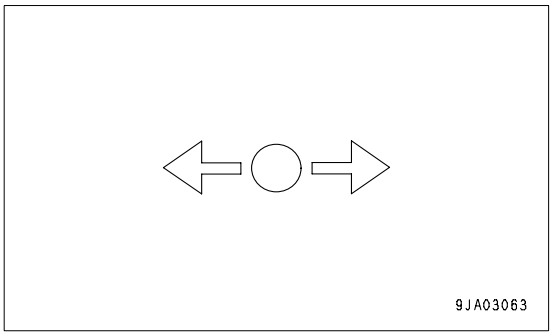
AJSS ACTUATION PILOT LAMP

AJSS: Advanced Joystick Steering System

This lamp (7) shows that the steering lock lever is at the FREE position.

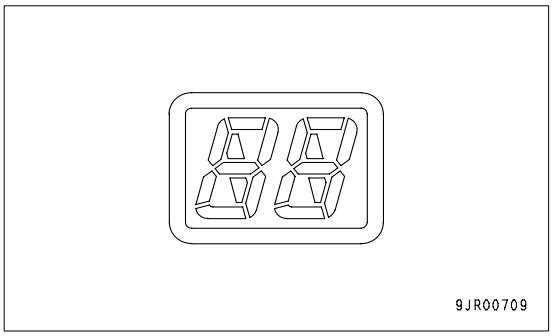
This lamp lights up if the steering lock lever is set to the FREE position when the engine is running.

When the engine is running or when the starting switch is at the ON position, if the AJSS lever is operated or the FR shift is operated, this lamp flashes and the alarm buzzer sounds intermittently.



SHIFT INDICATOR

This lamp (8) shows the transmission shift position (actual speed range).



AUTO-SHIFT PILOT LAMP

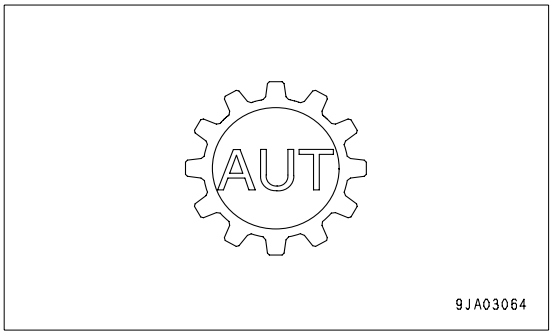
This lamp (9) shows that the auto shift function has been selected.

When the transmission auto shift/manual shift selector switch is set to auto shift, the pilot lamp lights up.

Use the transmission auto shift/manual shift selector switch to select the shift mode.

With the auto shift, select “H“ or “L“ to give different shift points.

For details of the method of selecting, see “TRANSMISSION AUTO SHIFT/MANUAL SHIFT SELECTOR SWITCH (3-58)“.



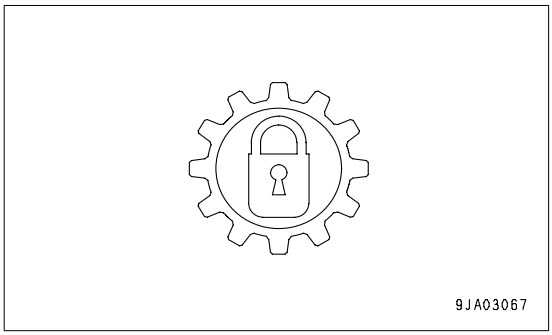
LOCKUP PILOT LAMP

This lamp (10) shows that the torque converter has entered the lock-up.

When the torque converter lock-up switch is turned ON, the pilot lamp lights up.

(It lights up when the transmission actually enters direct drive.)

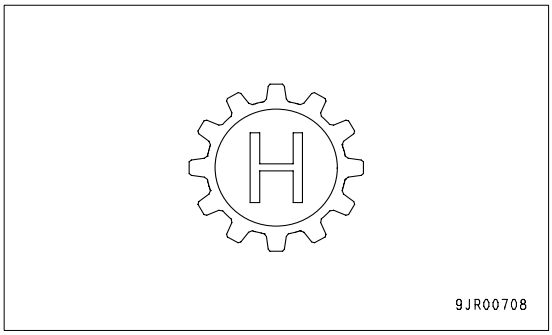
For details of the lock-up, see “TORQUE CONVERTER LOCK-UP SWITCH (3-59)“.



SHIFT HOLD PILOT LAMP

This lamp (11) shows that the shift hold (speed range fixed) is actuated.

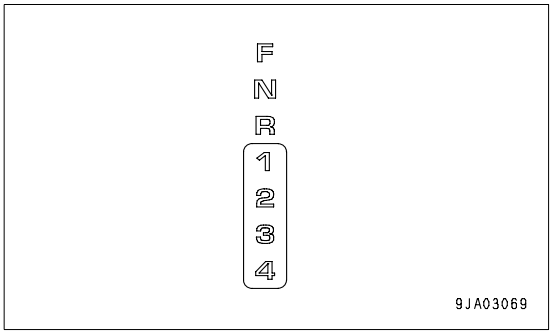
When the hold switch is pressed, the pilot lamp lights up. When the switch is pressed again, the pilot lamp goes out. For details see “HOLD SWITCH (3-53)“.



SHIFT POSITION PILOT LAMP

This lamp (12) shows the selected speed range.

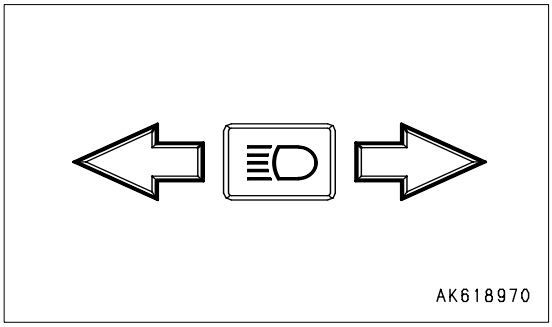
When auto shift has been selected, it shows the maximum speed range selected by the automatic transmission. The maximum speed range can be selected by the shift-up switch and shift-down switch.



TURN SIGNAL PILOT LAMP

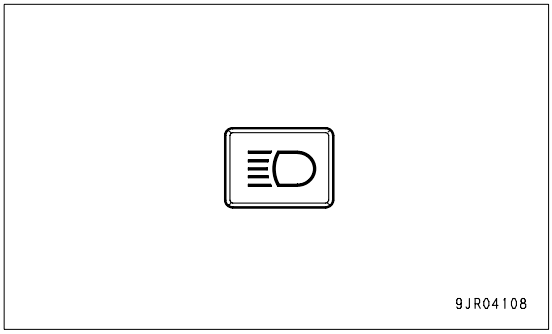
This lamp (13) flashes together with the flashing of the turn signal pilot lamp. (1.2 -1.6 Hz)

If there is a disconnection in the turn signal lamp, the flashing interval becomes shorter. (2 - 4.2 Hz)



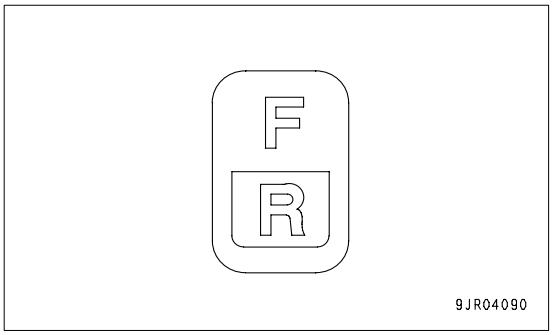
HEAD LAMP HIGH BEAM PILOT LAMP

This lamp (14) shows that the head lamp is on high beam. When the dimmer switch is used to set the head lamp to high beam, the pilot lamp lights up.



DIRECTIONAL SELECTOR PILOT LAMP

This lamp (15) is not active.



E.C.S.S. PILOT LAMP

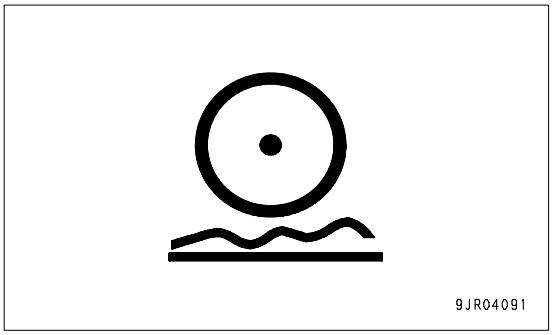
(If equipped)

(*) E.C.S.S.: Electrically Controlled Suspension System

This lamp (16) shows that the E.C.S.S. has been actuated.

When the E.C.S.S. switch is turned ON, the pilot lamp lights up.

For details, see “E.C.S.S. SWITCH (3-54)“.

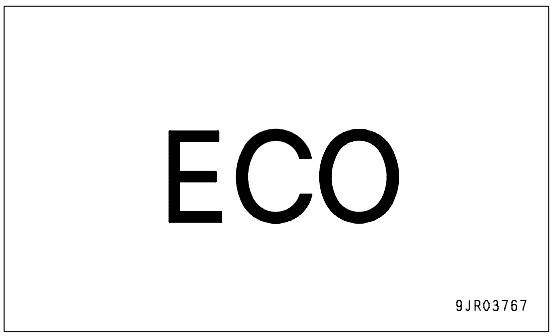


ECONOMY OPERATION DISPLAY LAMP

This lamp (17) lights up to show that the economy mode is being used (economy operation).

It does not light up when the setting is power mode.

This lamp is interconnected with the accelerator pedal and lights up or goes out according to the operation of the accelerator pedal, so use it as a guideline for economy operation.

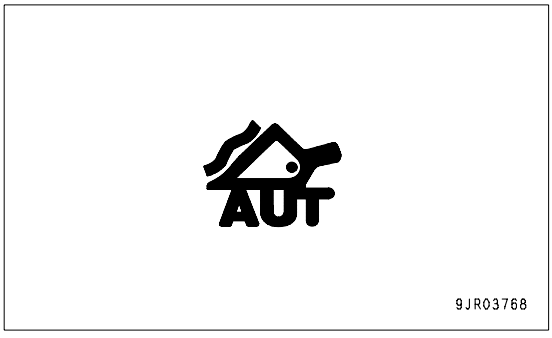


SEMI AUTO DIGGING PILOT LAMP

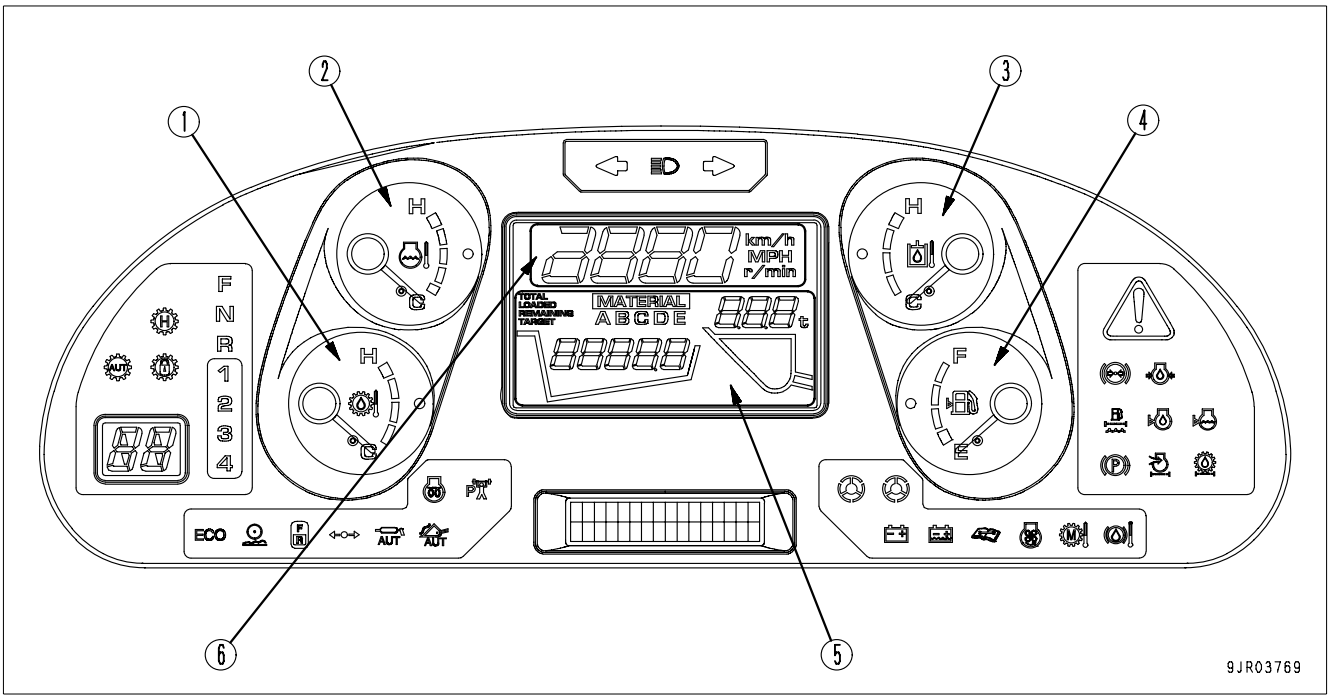
(If equipped)

This lamp (18) shows that the semi auto digging function has been actuated.

When the semi auto digging selector switch is set to ROCK mode or LOOSE mode, the pilot lamp lights up.



METER DISPLAY PORTION



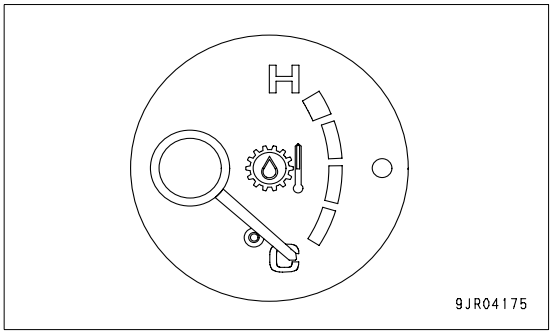
(1) Torque converter oil temperature gauge
(2) Engine coolant temperature gauge
(3) Hydraulic oil temperature gauge
(4) Fuel gauge
(5) Load meter (if equipped)
(6) Speedometer/Tachometer

TORQUE CONVERTER OIL TEMPERATURE GAUGE

This meter (1) shows the torque converter oil temperature.

During normal operations, it should be in the green range.

If it enters the red range during operations, the alarm buzzer sounds, the central warning lamp lights up, and “E02 TC OVERHEAT“ is displayed on the character display. Run the engine under no load at a mid-range speed and wait until the indicator returns to the green range.

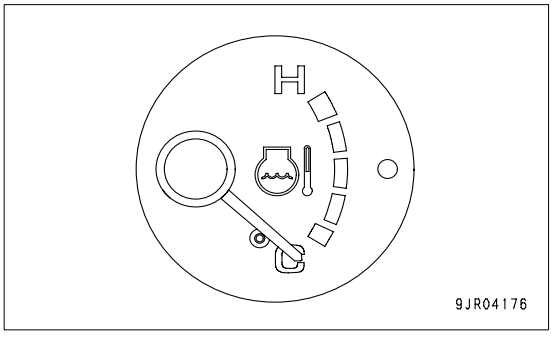


ENGINE COOLANT TEMPERATURE GAUGE

This meter (2) shows the engine coolant temperature.

During normal operations, it should be in the green range.

If it enters the red range during operations, the alarm buzzer sounds, the central warning lamp lights up, and “E02 ENGINE OVERHEAT“ is displayed on the character display. Run the engine under no load at a mid-range speed and wait until the indicator returns to the green range.

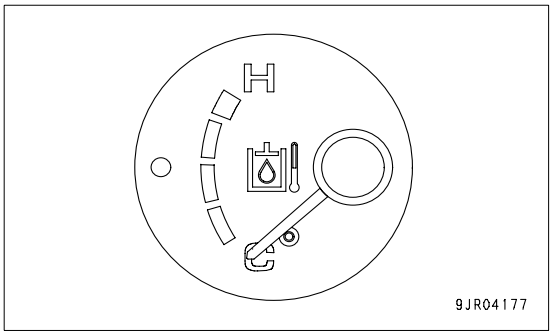


HYDRAULIC TEMPERATURE GAUGE

This meter (3) shows the hydraulic oil temperature.

During normal operations, it should be in the green range.

If it enters the red range during operations, the alarm buzzer sounds, the central warning lamp lights up, and “E02 HYD OVERHEAT“ is displayed on the character display. Run the engine under no load at a mid-range speed and wait until the indicator returns to the green range.



FUEL GAUGE

This meter (4) shows the amount of fuel remaining in the fuel tank.

“F“ shows that the tank is full.

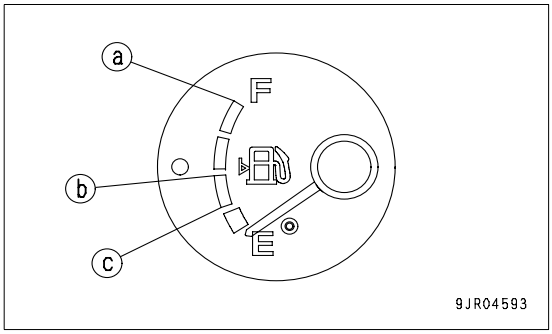
“E“ shows that there is little fuel remaining in the tank. If the remaining fuel goes below 120 liters, the caution lamp inside the fuel gauge lights up.

If it lights up, check the fuel level and add fuel.

Indicator at position (a): Approx. 650 liters

Indicator at position (b): Approx. 420 liters

Indicator at position (c): Approx. 155 liters

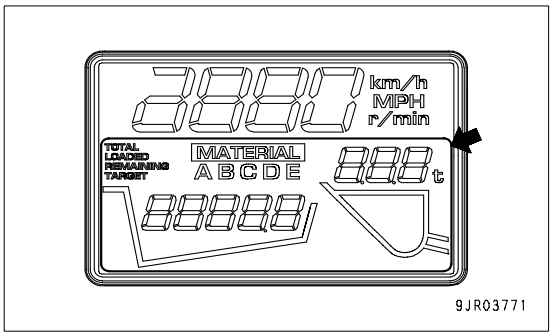


LOAD METER

(If equipped)

This display (5) shows the amount that is loaded.

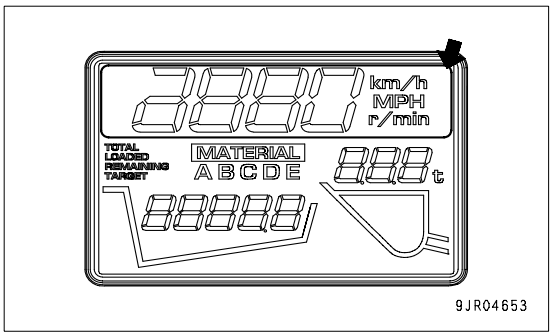
For details, see “HANDLING LOAD METER (6-26)“.



SPEEDOMETER/TACHOMETER

This display (6) shows the travel speed or engine speed.

For details of the method of switching the display, see “METHOD OF SWITCHING TRAVEL SPEED/ENGINE SPEED DISPLAY (3-42)“.

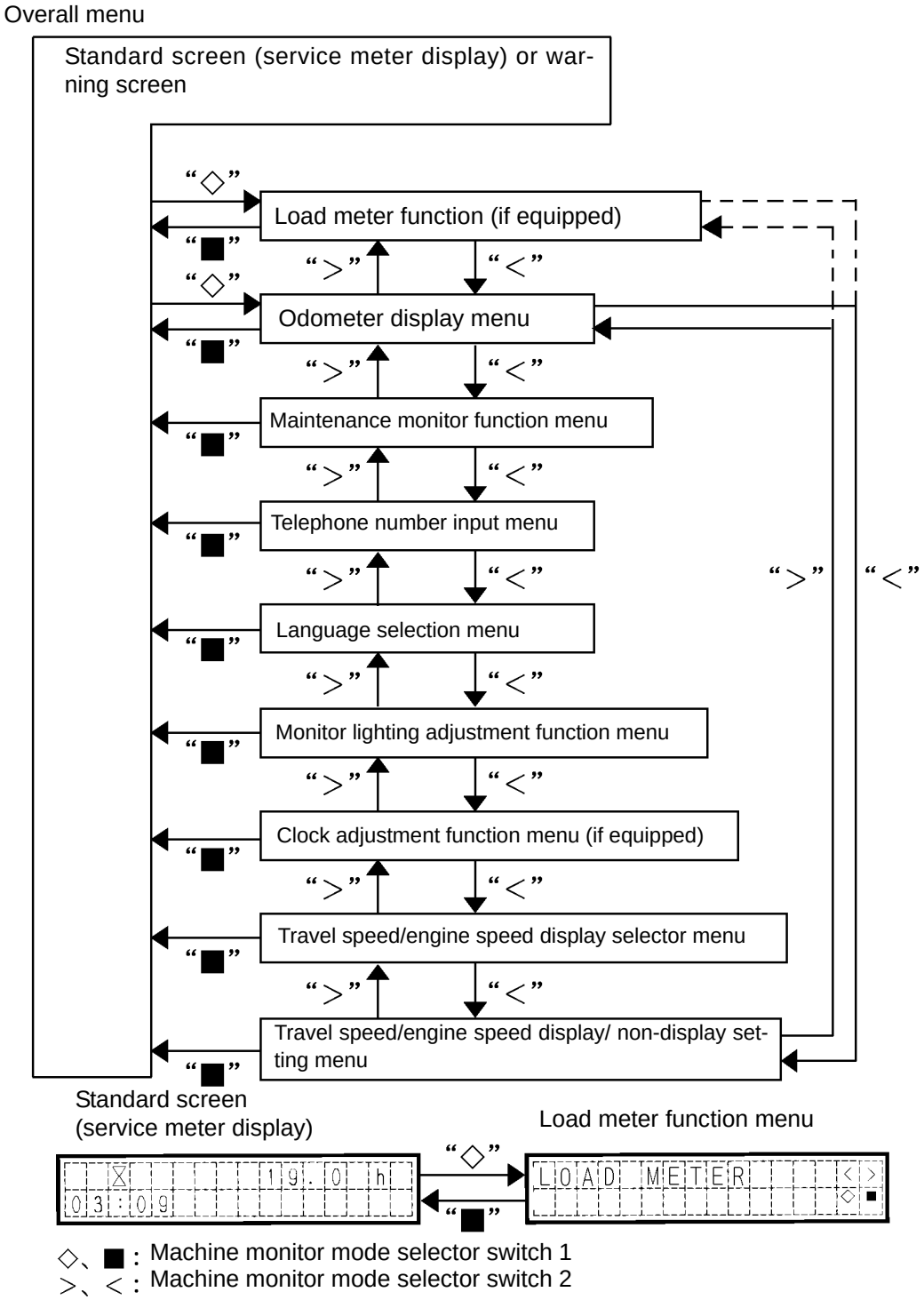


OTHER FUNCTIONS OF MACHINE MONITOR

The machine monitor also has the following functions. Use them if necessary.

When the (◇) portion of the machine monitor mode selector switch 1 is pressed from the standard screen (service meter display) or warning screen, the display changes to “ODO“. Press the (>) or (<) portion of the machine monitor mode selector switch 2 and move to the following menus. (If a load meter is installed, when the machine monitor mode selector switch 1 (◇) is pressed, the screen changes to “LOAD METER“.)

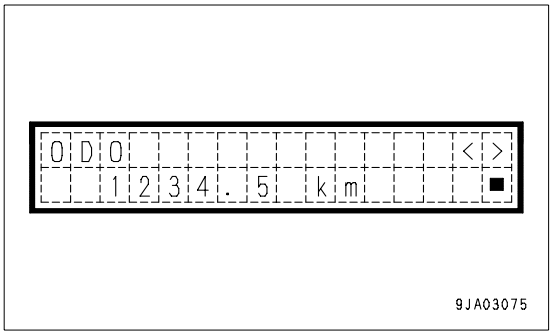
To return from each menu to the standard menu, press the (■) of the machine monitor mode selector switch 1.



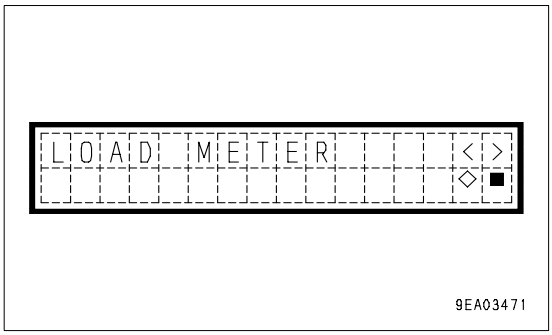
METHOD OF DISPLAYING ODOMETER

Use this when checking the total distance that the machine has traveled.

1. Check that the character display is displaying the service meter or an action code. If there is any other display, turn the starting switch OFF, then turn the starting switch ON again and wait for the service meter display or action code display to appear.
2. Press the (◇) portion of the machine monitor mode selector switch 1 to display “ODO“ (odometer).



REMARK
If a load meter is installed, when the (◇) portion of the machine monitor mode selector switch 1 is pressed, the screen displays “LOAD METER“.
If the (>) or (<) portion of the machine monitor mode selector switch 2 is then pressed, the display changes to “ODO“ (odometer).

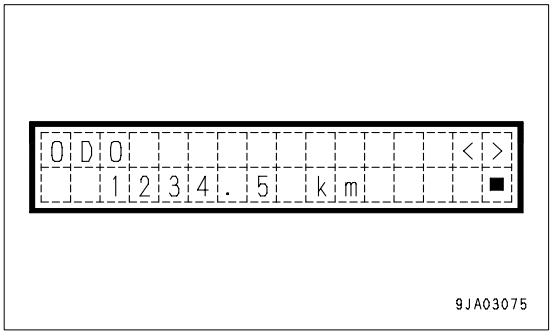


3. After checking the screen, press the (■) portion of the machine monitor mode selector switch 1 or turn the starting switch OFF.

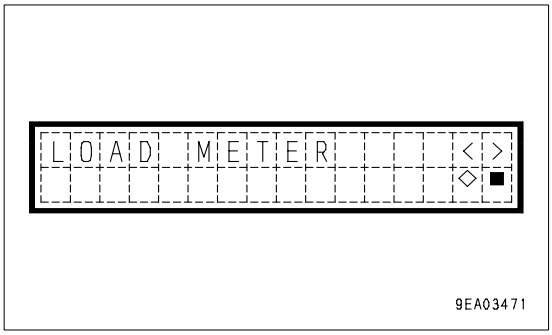
RESET METHOD FOR FILTER, OIL REPLACEMENT TIME

The filter and oil replacement time is displayed on the character display, so if the filter and oil have been replaced, reset the filter and oil change time.

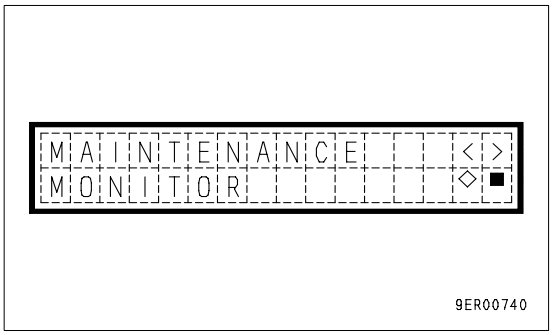
1. Press the (◇) portion of the machine monitor mode selector switch 1 to display “ODO“ (odometer).



REMARK
If a load meter is installed, when the (◇) portion of the machine monitor mode selector switch 1 is pressed, the screen displays “LOAD METER“.
If the (>) or (<) portion of the machine monitor mode selector switch 2 is then pressed, the display changes to “ODO“ (odometer).



2. Press the (>) or (<) portion of the machine monitor mode selector switch 2 to display “MAINTENANCE MONITOR“.

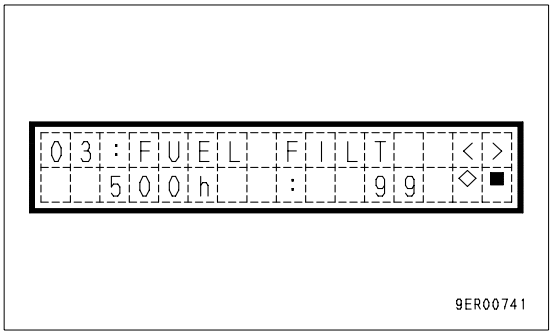


3. Press the (◇) portion of the machine monitor mode selector switch 1. The screen switches to the display shown on the right.

   The replacement interval is shown on the bottom line at the left and the number of times of replacement is shown on the right.

4. Press the (>) or (<) portion of the machine monitor mode selector switch 2 to display the filter or oil item that has been replaced.

   For details of the items to reset, see “FILTER, OIL REPLACEMENT TIME DISPLAY (3-13)“.

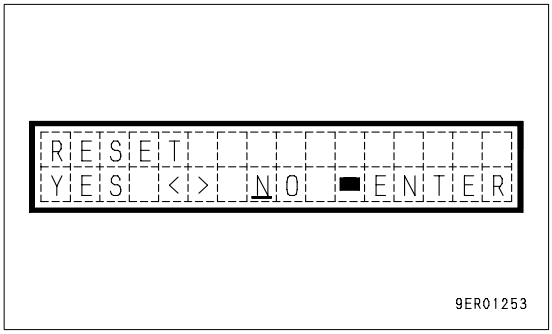


5. Press the (◇) portion of the machine monitor mode selector switch 1. The screen switches to the display shown on the right.

   “RESET“ and “ITEM TO RESET“ are displayed on the top line in turn.

6. When resetting the replacement interval, press the (>) or (<) portion of the machine monitor mode selector switch 2, set the cursor on “YES“, then press the (■) portion of the machine monitor mode selector switch 1. The time is reset and the screen returns to the previous screen.

   To abort the operation, set the cursor on “NO“, then press the (■) portion of the machine monitor mode selector switch 1.

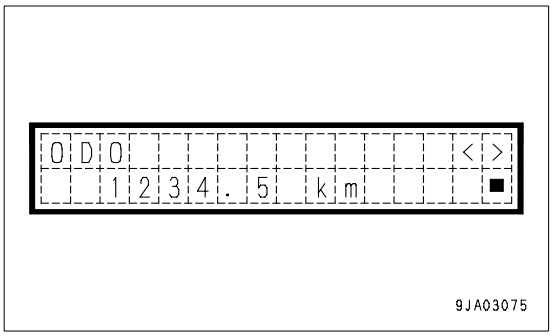


7. When resetting the replacement interval for another item, repeat the procedure from Step 4. After completing the resetting operation, press the (■) portion of the machine monitor mode selector switch 1 twice or turn the starting switch OFF.

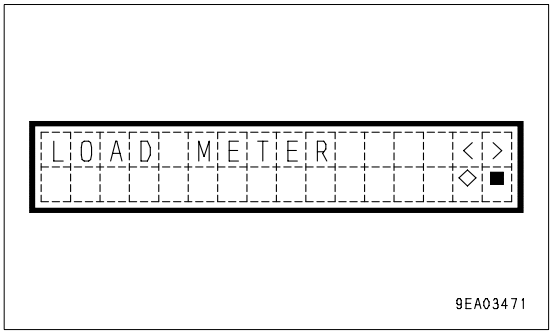
INPUT METHOD FOR TELEPHONE NUMBER

It is possible to display the telephone number on the right side of “CALL“ displayed on the character display when action code “E03“ is generated.

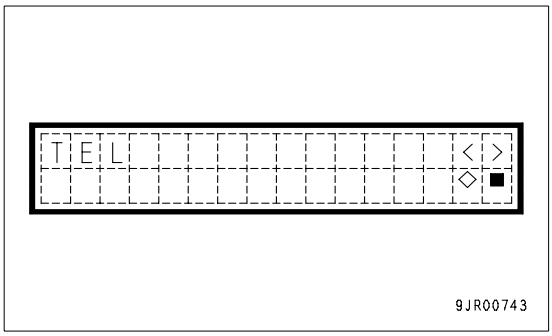
1. Press the (◇) portion of the machine monitor mode selector switch 1 to display “ODO“ (odometer).



REMARK
If a load meter is installed, when the (◇) portion of the machine monitor mode selector switch 1 is pressed, the screen displays “LOAD METER“.
If the (>) or (<) portion of the machine monitor mode selector switch 2 is then pressed, the display changes to “ODO“ (odometer).

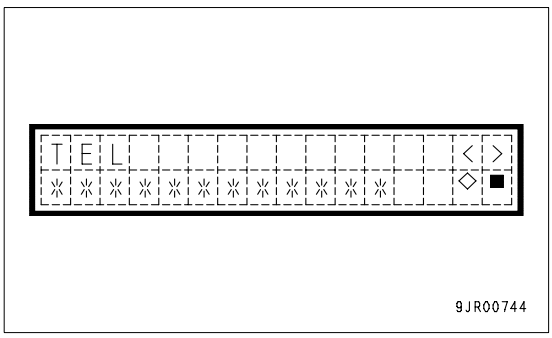


2. Press the (>) or (<) portion of the machine monitor mode selector switch 2 to display “TEL“.



3. Press the (◇) portion of the machine monitor mode selector switch 1. The screen switches to the display shown on the right.

   Once the telephone number has been input, the number will always be displayed on the screen.



4. The telephone number can be displayed up to 12 digits. Input in order starting from the first digit on the left.

   The cursor is displayed at the input position. Press the (>) or (<) portion of the machine monitor mode selector switch 2 to input “0 - 9“. To leave a blank, input “*“.

After selecting the input value, press the (◇) portion of the machine monitor mode selector switch 1. The input value is accepted and the cursor moves to the next digit.

5. Repeat the procedure in Step 4 until the last digit has been input. At the last digit, press the (◇) portion of the machine monitor mode selector switch 1. The input values are accepted and the screen returns to the previous screen.

   If the wrong number is input or the input operation is to be aborted, press the (■) portion of the machine monitor mode selector switch 1. The screen returns to the previous screen.

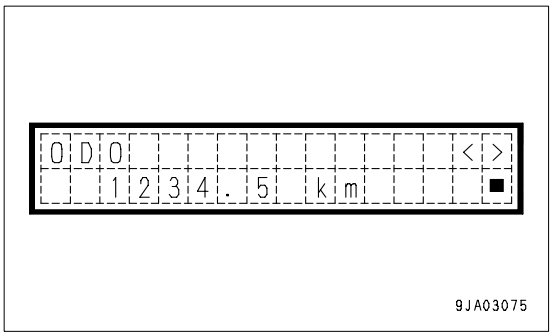
6. After completing the operation, press the (■) portion of the machine monitor mode selector switch 1 twice or turn the starting switch OFF.

METHOD FOR SELECTING LANGUAGE

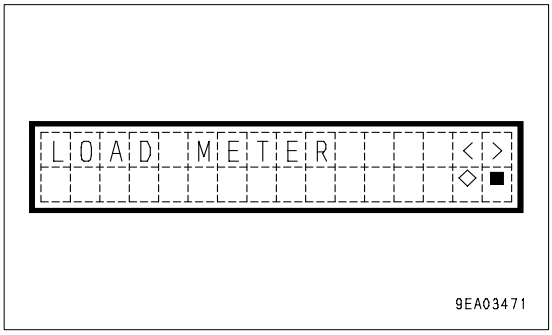
Use this when switching the language displayed on the character display.

The following explanation is for when English is set as the language for the character display.

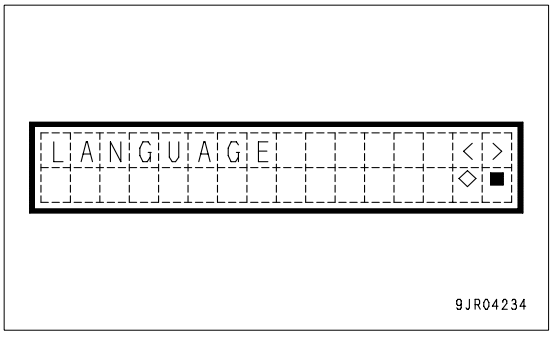
1. Press the (◇) portion of the machine monitor mode selector switch 1 to display “ODO“ (odometer).



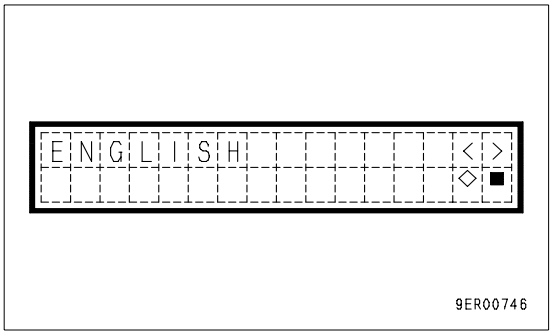
REMARK
If a load meter is installed, when the (◇) portion of the machine monitor mode selector switch 1 is pressed, the screen displays “LOAD METER“.
If the (>) or (<) portion of the machine monitor mode selector switch 2 is then pressed, the display changes to “ODO“ (odometer).



2. Press the (>) or (<) portion of the machine monitor mode selector switch 2 to display “LANGUAGE“.



3. Press the (◇) portion of the machine monitor mode selector switch 1. The presently selected language is displayed.
4. Press the (>) or (<) portion of the machine monitor mode selector switch 2 to select the desired language.



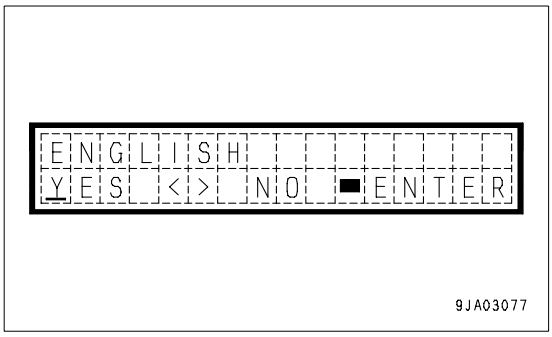
The available languages are English, Japanese, German, French, Italian, Spanish, and Swedish.

Language	Display
English	ENGLISH
Japanese	ﾆﾎﾝｺﾞ
German	DEUTSCH
Franch	FRANCAIS
Italian	ITALIANO
Spanish	Español
Swedish	SVENSKA

5. After selecting the desired language, press the (◇) portion of the machine monitor mode selector switch 1.

   To accept the selected language, set the cursor on “YES“, then press the (■) portion of the machine monitor mode selector switch 1. The language is set and the screen returns to the previous screen.

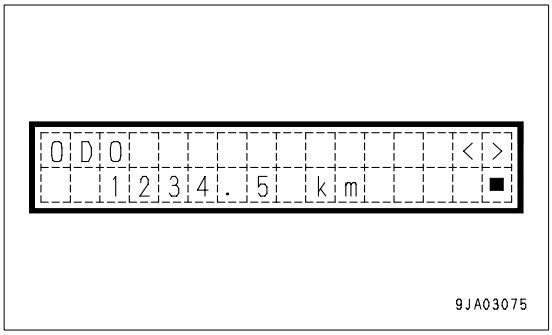
   To abort the operation, set the cursor on “NO“, then press the (■) portion of the machine monitor mode selector switch 1.
6. After completing the operation, press the (■) portion of the machine monitor mode selector switch 1 twice or turn the starting switch OFF.



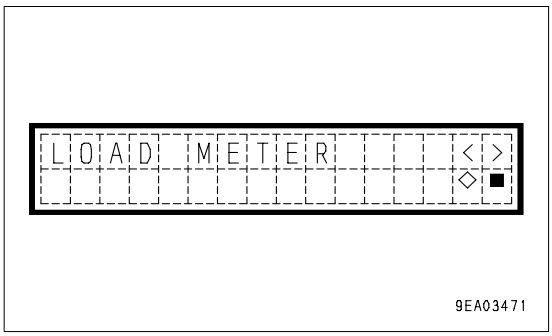
METHOD OF ADJUSTING MONITOR BRIGHTNESS

Do as follows to adjust the brightness of the monitor.

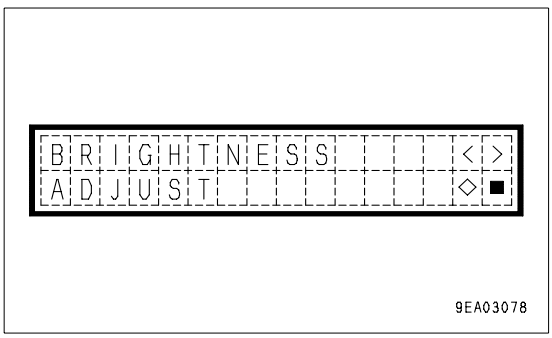
1. Press the (◇) portion of the machine monitor mode selector switch 1 to display “ODO“ (odometer).



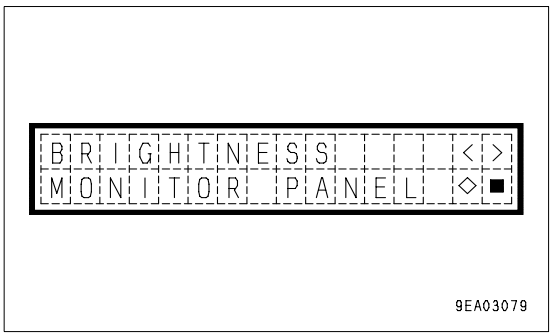
REMARK
If a load meter is installed, when the (◇) portion of the machine monitor mode selector switch 1 is pressed, the screen displays “LOAD METER“.
If the (>) or (<) portion of the machine monitor mode selector switch 2 is then pressed, the display changes to “ODO“ (odometer).



2. Press the (>) or (<) portion of the machine monitor mode selector switch 2 to display “BRIGHTNESS ADJUST“.

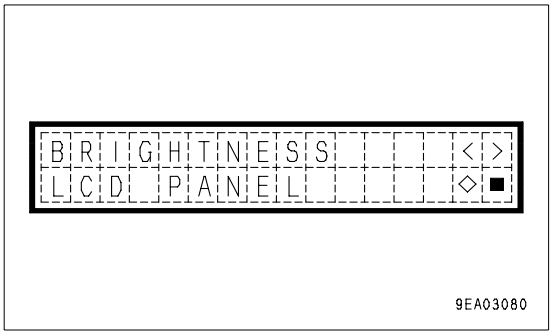


3. Press the (◇) of the machine monitor mode selector switch 1. “MONITOR PANEL“ is displayed on the bottom line, and it becomes possible to adjust the monitor brightness (excluding the liquid crystal display).



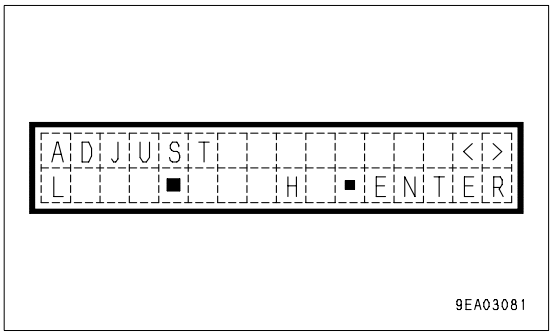
The brightness can be adjusted separately for the monitor overall (excluding the liquid crystal display) and for the liquid crystal display (LCD).

If it is desired to adjust only the liquid crystal display (LCD), press the (>) or (<) of the machine monitor mode selector switch 2 to switch to the “LCD PANEL“ display.



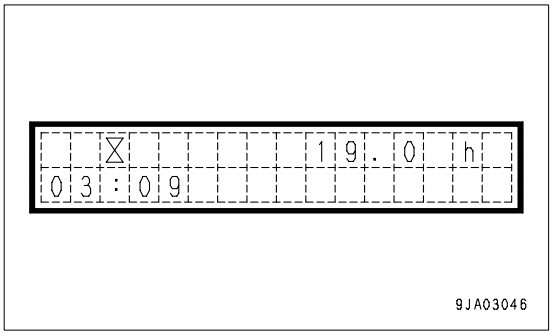
4. Press the (◇) portion of the machine monitor mode selector switch 1. The screen switches to the display shown on the right and it becomes possible to adjust the brightness.
5. Press the (>) or (<) portion of the machine monitor mode selector switch 2 to adjust the brightness between L and H (7 levels).
6. After selecting the desired brightness, press the (■) portion of the machine monitor mode selector switch 1.

   The brightness is set and the screen returns to the previous screen.
7. After completing the operation, press the (■) portion of the machine monitor mode selector switch 1 twice or turn the starting switch OFF.

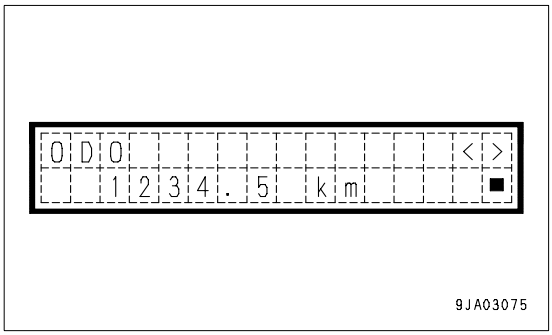


METHOD OF ADJUSTING CLOCK

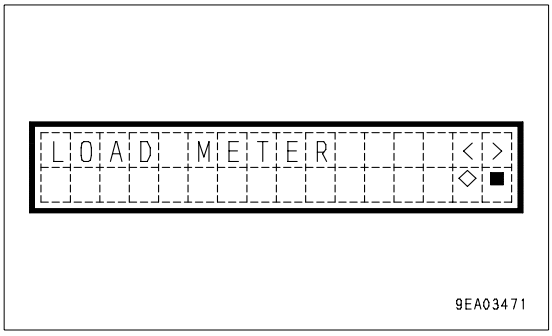
1. Check that the normal service meter and time are displayed on the character display.



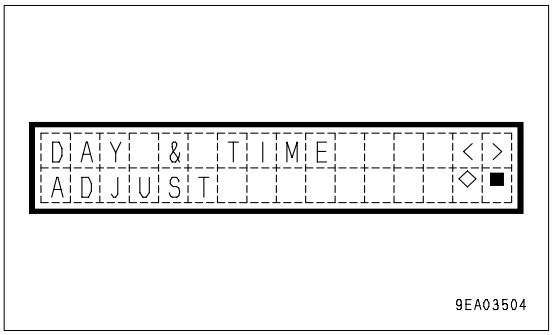
2. Press the (◇) portion of the machine monitor mode selector switch 1 to display “ODO“ (odometer).



REMARK
If a load meter is installed, when the (◇) portion of the machine monitor mode selector switch 1 is pressed, the screen displays “LOAD METER“.
If the (>) or (<) portion of the machine monitor mode selector switch 2 is then pressed, the display changes to “ODO“ (odometer).



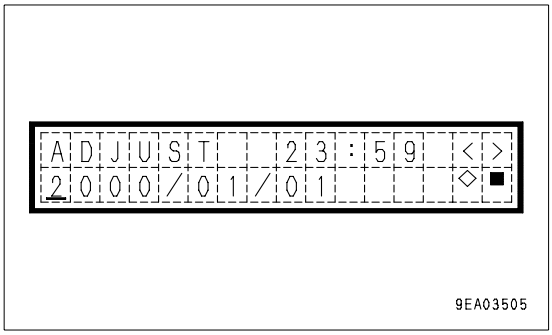
3. Press the (◇) portion of the machine monitor mode selector switch 1, then press the (>) or (<) portion of the machine monitor mode selector switch 2 to display “DAY & TIME ADJUST“.



4. Press the (◇) portion of the machine monitor mode selector switch 1.

   The top line displays “ADJUST 23:59“.

   The bottom line displays “2000/01/01“.



REMARK
Once the time is input, the clock will show the correct time from that time on.

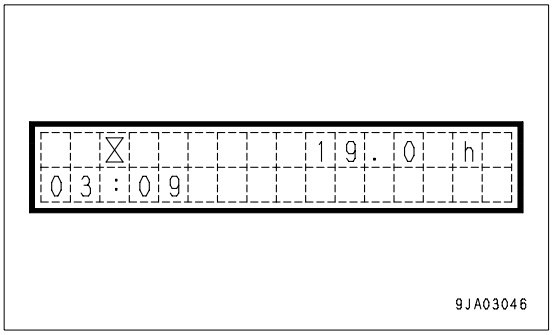
5. 5. Input the time.

   The cursor is displayed in turn at the input position for the date and time. Press the (>) or (<) portion of the machine monitor mode selector switch 2 to input “0 - 9“.

6. After selecting the input value, press the (◇) portion of the machine monitor mode selector switch 1. The input value is accepted and the cursor moves to the next input position.

   Repeat Steps 5 and 6 to input and select the numbers from the year to the minute.

7. At the last digit for the minute units, press the (◇) portion of the machine monitor mode selector switch 1. The input values are accepted and the display portion of the character display returns to the service meter and clock display on the standard screen.

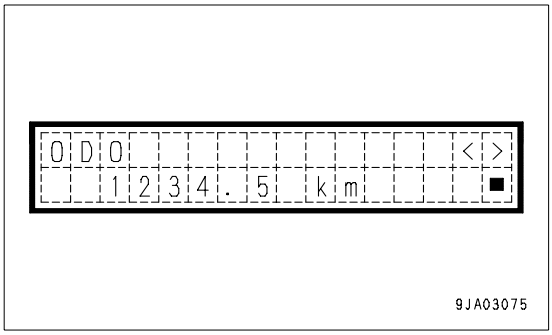


8. If the wrong number is input or the input operation is to be aborted, press the (■) portion of the machine monitor mode selector switch 1. The screen returns to the previous screen.

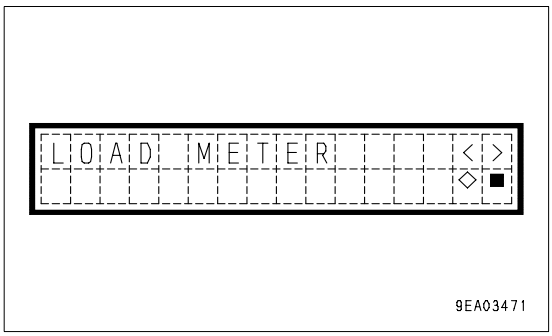
METHOD OF SWITCHING TRAVEL SPEED/ENGINE SPEED DISPLAY

Use this when switching between the travel speed (km/h, MPH) and the engine speed display.

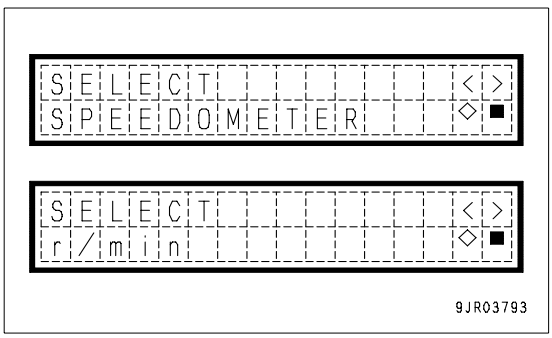
1. Press the (◇) portion of the machine monitor mode selector switch 1 to display “ODO“ (odometer).



REMARK
If a load meter is installed, when the (◇) portion of the machine monitor mode selector switch 1 is pressed, the screen displays “LOAD METER“.
If the (>) or (<) portion of the machine monitor mode selector switch 2 is then pressed, the display changes to “ODO“ (odometer).

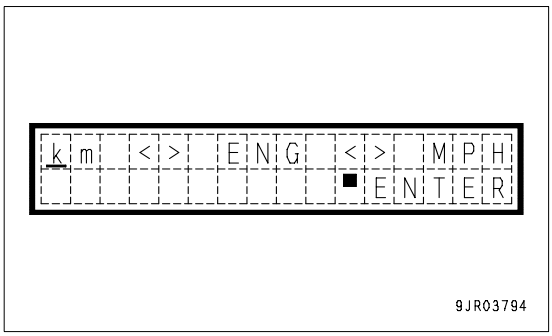


2. Press the (>) or (<) of the machine monitor mode selector switch 2 to display “SELECT SPEED“ or “SELECT r/min“.



3. Press the (◇) portion of the machine monitor mode selector switch 1.

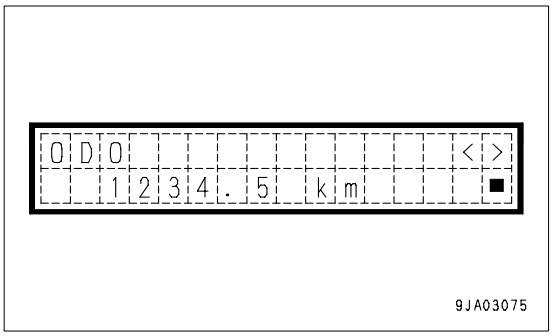
   The display changes and returns to the service meter display.



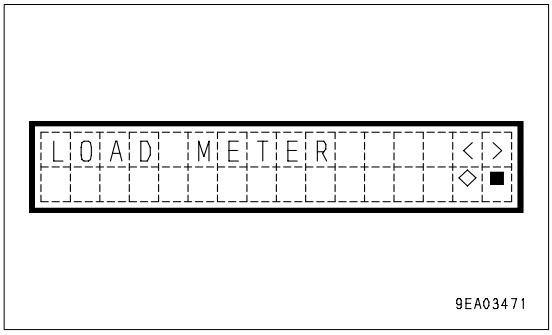
METHOD OF SWITCHING TRAVEL SPEED/ENGINE SPEED DISPLAY/NON-DISPLAY

Use the following method to display the travel speed or engine speed or to have no display on the character display.

1. Press the (◇) portion of the machine monitor mode selector switch 1 to display “ODO“ (odometer).



REMARK
If a load meter is installed, when the (◇) portion of the machine monitor mode selector switch 1 is pressed, the screen displays “LOAD METER“.
If the (>) or (<) portion of the machine monitor mode selector switch 2 is then pressed, the display changes to “ODO“ (odometer).

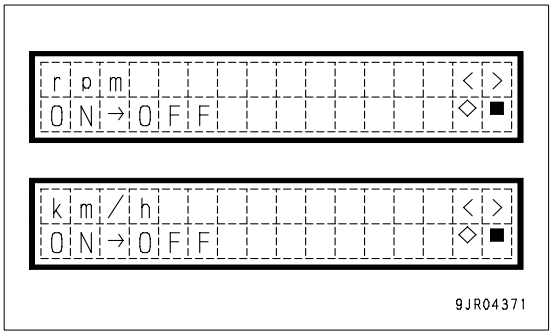


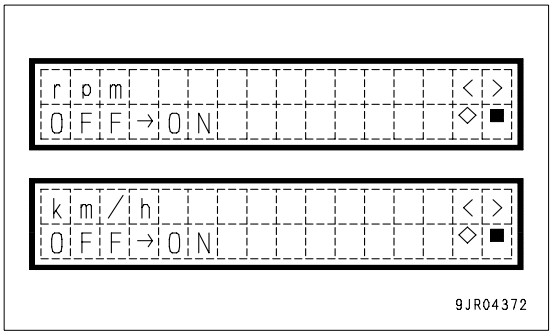
2. Press the (>) or (<) of the machine monitor mode selector switch 2 to display “rpm ON → OFF“ or “km/h ON → OFF“.

   To set to no display for the travel speed or engine speed on the character display, display “rpm OFF → ON“ or “km/h OFF → ON“.

3. Press the (◇) of the machine monitor mode selector switch 1.

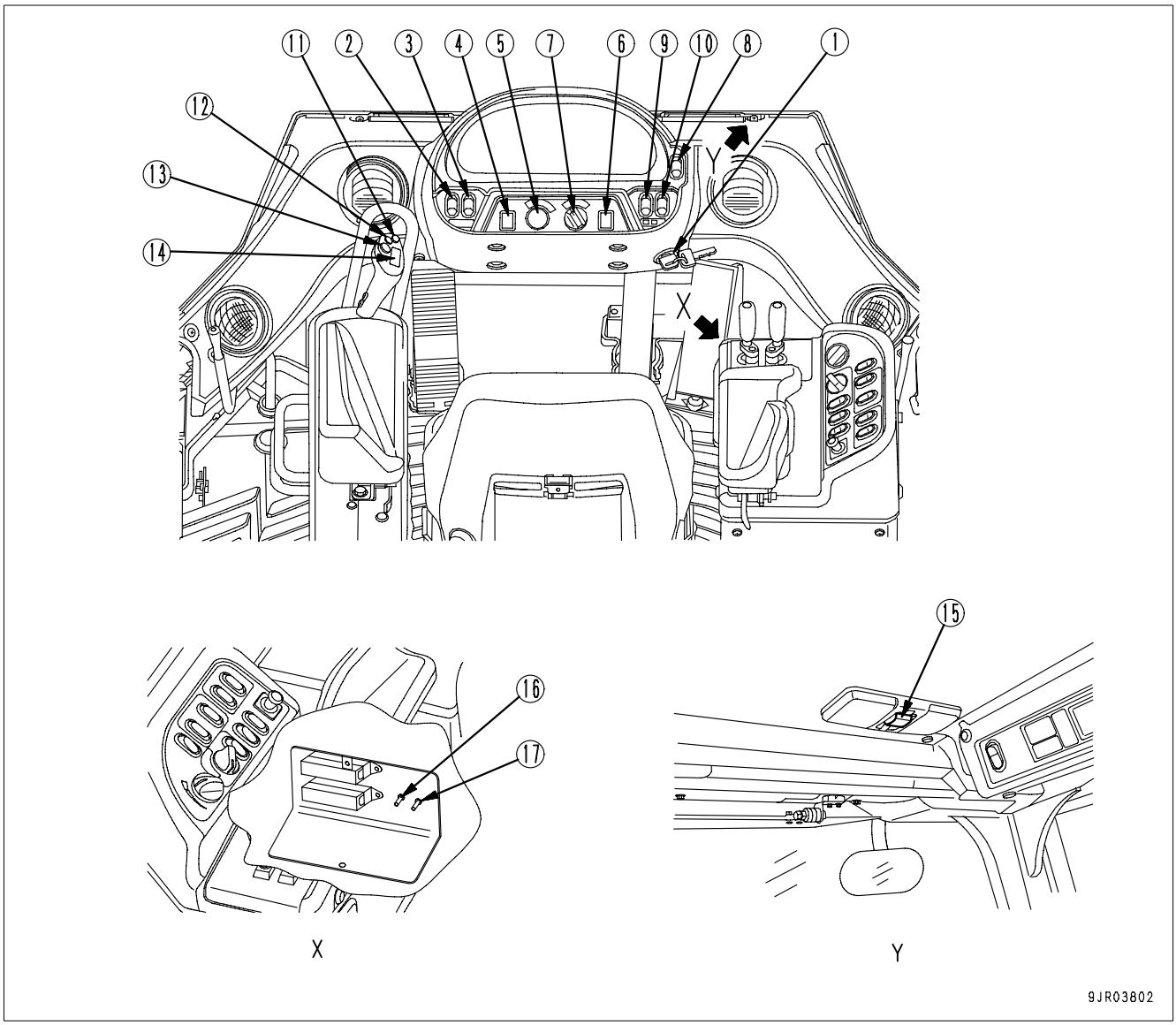
   The item that was being displayed changes to non-display, and the item that was not displayed, is displayed, and the screen returns to the service meter display.





SWITCHES

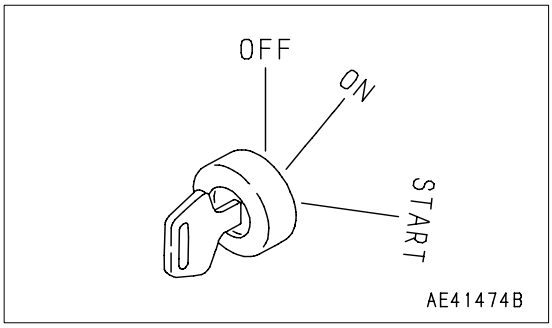
FRONT PANEL, AJSS LEVER SWITCH, REAR BOX



(1) Starting switch
(2) Machine monitor mode selector switch 1
(3) Machine monitor mode selector switch 2
(4) Hazard lamp switch
(5) Front wiper switch
(6) Dimmer switch
(7) Lamp switch
(8) Parking brake switch
(9) Load meter mode selector switch (if equipped)
(10) Load meter display selector switch (if equipped)
(11) Shift-up switch
(12) Shift-down switch
(13) Horn switch
(14) Directional selector switch
(15) Room lamp switch
(16) Emergency parking brake cancel switch
(17) Emergency modulation clutch direct connection 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.

If the engine water temperature is below -5°C when the engine is started, the preheating pilot lamp will light up automatically and preheating will start.

The preheating time differs according to the temperature of the water when the engine is started.

If the preheating pilot lamp lights up, wait for it to go out, then turn the key to the START position.

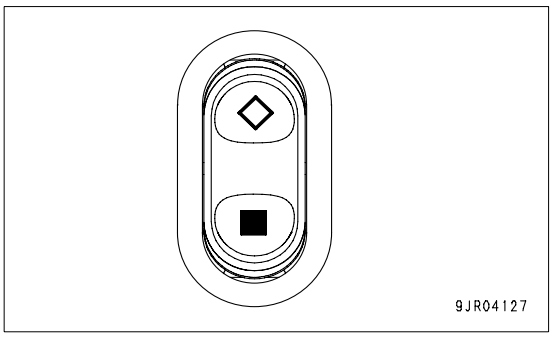
START position

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

MACHINE MONITOR MODE SELECTOR SWITCH 1

This switch (2) is used to switch the function of the character display.

When the switch is released, it automatically returns to its original position.



The basic operation is as follows.

Position (◇):

Press here to select (confirm) each mode or operation

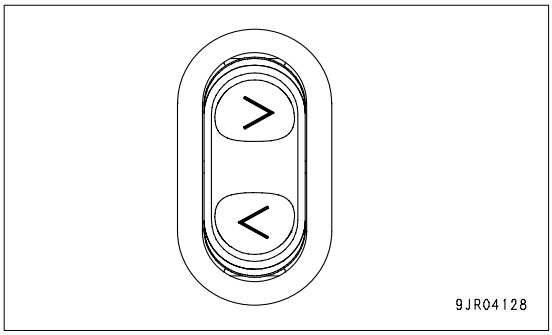
Position (■):

Press here to cancel each mode or operation

MACHINE MONITOR MODE SELECTOR SWITCH 2

This switch (3) is used to switch the function of the character display.

When the switch is released, it automatically returns to its original position.



The basic operation is as follows.

Position (>): Press here to go on to the next screen, or to move the cursor forward, or to increase the number when entering numerals

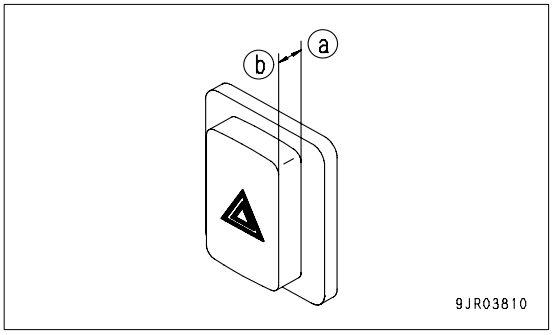
Position (<): Press here to go back to the previous screen, or to move the cursor back, or to reduce the number when entering numerals

HAZARD LAMP SWITCH

⚠ WARNING

Use the hazard lamp only in emergencies. Using the hazard lamp when traveling may cause confusion for other machine operators.

Use this switch (4) only in emergencies, such as when the machine has broken down and must be parked.



Position (a): All turn signal lamps flash

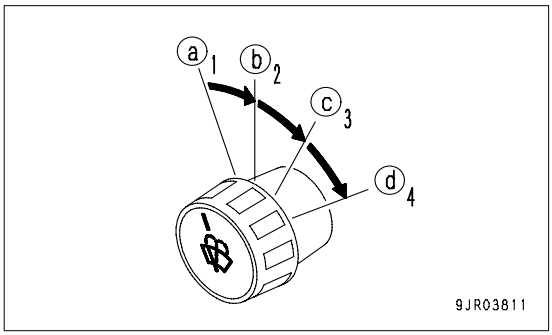
Position (b): OFF

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

FRONT WIPER SWITCH

Turn this switch (5) 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

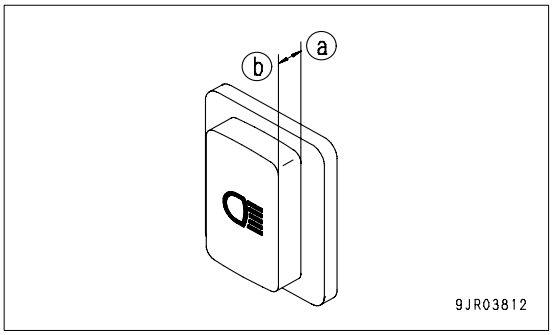
DIMMER SWITCH

Use this switch (6) to switch the head lamps between high beam and low beam.

When the head lamps are at high beam, the high beam pilot lamp lights up.

Position (a): High beam

Position (b): Low beam



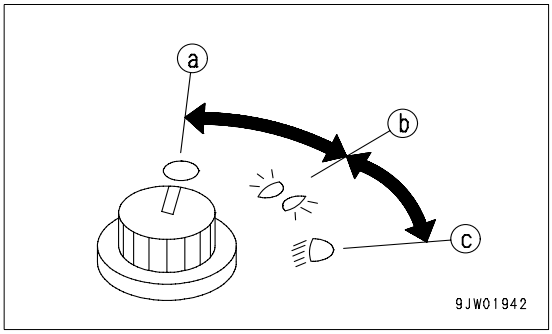
LAMP SWITCH

This switch (7) is used to light up the front lamps, side clearance lamps, tail lamps, and instrument panel.

Position (a): OFF

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

Position (c): Head lamps light up in addition to lamps at (b) position



PARKING BRAKE SWITCH

⚠ WARNING

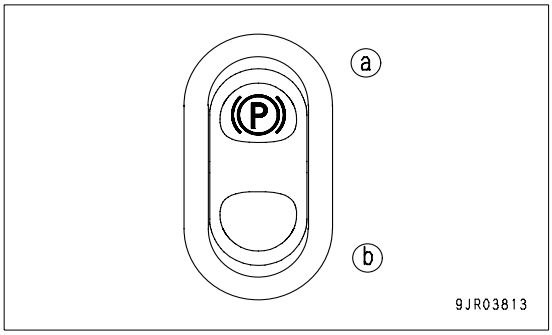
Always apply the parking brake when leaving the machine or when parking it.
Even if the parking brake switch is turned ON, there is danger until the parking brake pilot lamp lights up, so keep the brake pedal depressed.

This switch (8) applies the parking brake.

Position (a): ON parking brake is actuated and parking brake pilot lamp lights up

Position (b): OFF

The parking brake is released.



REMARK
If the directional selector switch is placed at F or R when the parking brake is still applied, the central warning lamp flashes and the alarm buzzer sounds.
If the machine is left with the engine stopped but the parking brake switch is at the “OFF“ position, or if the starting switch is at the “OFF“ position and the parking brake switch is set to the “OFF“ position, when the starting switch is turned to the “ON“ position, the parking brake is applied even if the parking brake switch is at the “OFF“ position. If this happens, after starting the engine, turn the parking brake switch to the “ON“ position, then to the “OFF“ position to release the parking brake.
If the parking brake is still applied, the machine will not move off even if the directional selector switch is operated.

NOTICE

- **Do not use the parking brake switch to apply the brake when traveling except in emergencies. The parking brake may be damaged, resulting in a serious accident. Stop the machine first, then apply the parking brake.**
- **If the parking brake has to be used as an emergency brake when the machine is traveling at high speed, ask your Komatsu distributor to carry out inspection to check that there is no damage to the parking brake.**

LOAD METER MODE SELECTOR SWITCH

(If equipped)

Use this switch (9) to switch the load meter.

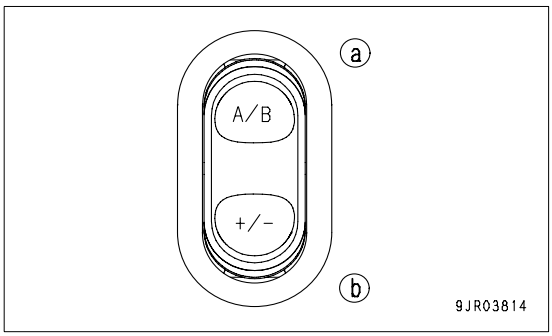
When the switch is released, it automatically returns to its original position.

The switch is operated as follows.

Position (a): Use this position when switching to the display for the target material.

Each time the switch is pressed, it changes A → B → C → D → E → A → · · ·

Position (b): Use this position when switching between Addition mode and Subtraction mode



LOAD METER DISPLAY SELECTOR SWITCH

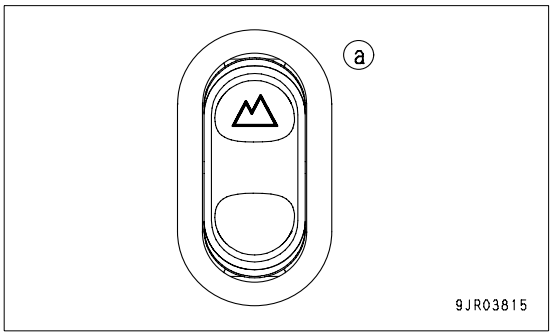
(If equipped)

Use this switch (10) to switch the load meter display.

When the switch is released, it automatically returns to its original position.

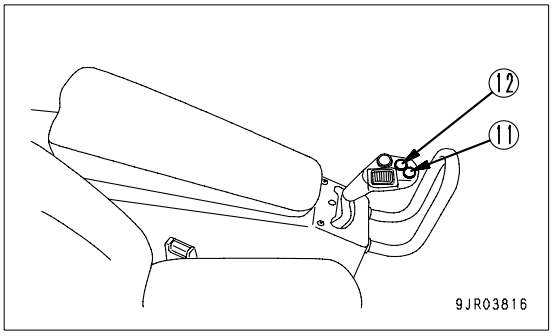
The switch is operated as follows.

Position (a): Use this position when switching to total load display



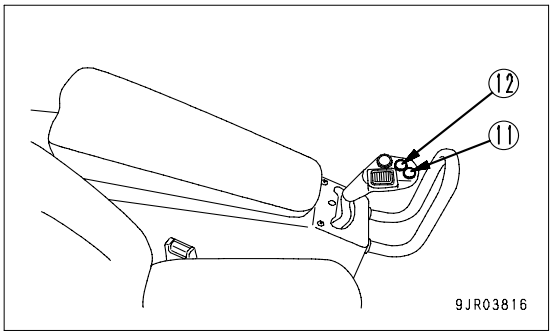
SHIFT UP, SHIFT DOWN SWITCHES

Use switches (11) or (12) when shifting up or shifting down in both the auto shift and manual shift modes.



MANUAL SHIFT

When traveling in F4 or R4, it is possible to shift gear simply by pressing shift-up switch (11) or shift-down switch (12). Use 1st and 2nd when carrying out operations, and 3rd and 4th when traveling.



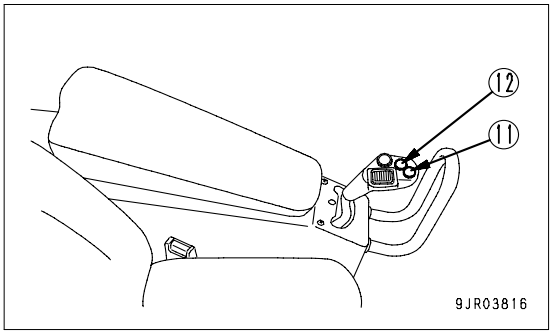
AUTO SHIFT

Of the 4 forward and reverse travel speeds, the transmission speed range is automatically shifted when traveling in 2nd to 4th according to the travel conditions.

When shift-up switch (11) or shift-down switch (12) is pressed, the shift position pilot lamp lights up at the new position, so it is possible to select the speed range when traveling in automatic transmission.

In addition, when switching between forward and reverse, the transmission automatically starts from 2nd.

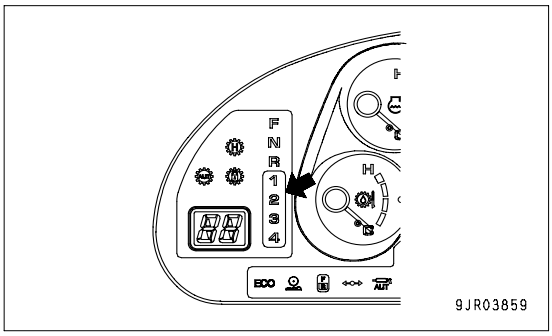
For details, see “TRANSMISSION AUTO SHIFT/MANUAL SHIFT SELECTOR SWITCH (3-58)“.



The ranges of speeds for automatic shifting are as shown in the following table.

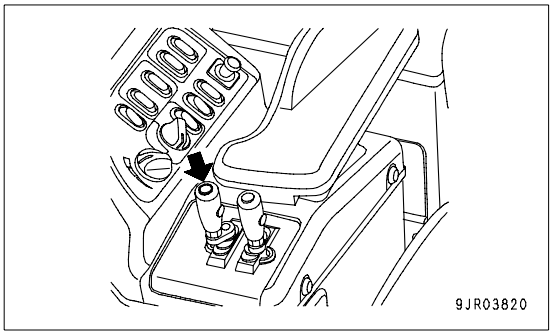
Shift position pilot lamp	1	2	3	4
4	o →	o →	← o →	← o
3	o →	o →	← o	
2	o →	o		

Automatic shifting speed range



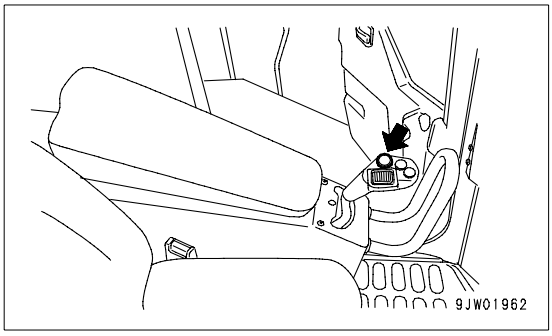
REMARK

The 1st position is fixed at 1st. No automatic gear shifting is carried out.
When shifting down from 2nd to 1st, press the kick-down switch on the lift arm control lever.
If the transmission is in auto-shift and the travel speed is below 12.5 km/h in any speed range when traveling in either forward or in reverse, the kick-down switch is actuated and makes it possible to shift down to 1st.
This makes it easy to carry out load and carry operations.
Even if the travel speed is more than 12.5 km/h, this switch can be used to shift the transmission down. Each time the kick-down switch is pressed, the speed range will shift down one range at a time (when in 4th: F4 → F3 → F2; when in 3rd: F3 → F2).
If the torque converter is locked up, the lock-up is cancelled.



HORN SWITCH

Press this switch (13) at the head of the AJSS lever to sound the horn.



DIRECTIONAL SELECTOR SWITCH

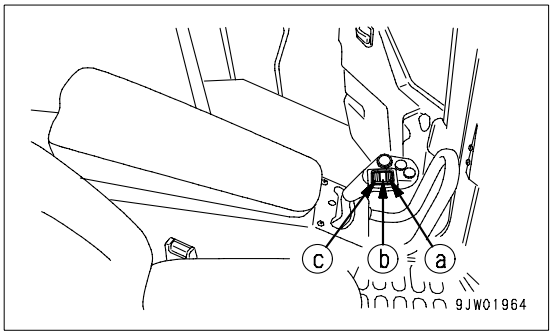
Use the “F“, “N“, or “R“ switch (14) at the head of the AJSS lever to switch the direction of travel for the transmission.

Position (a): FORWARD (F position)

Position (b): Neutral (N position)

Position (c): REVERSE (R position)

Use the shift-up and shift-down switches at the head of the AJSS lever to switch the speed range.



ROOM LAMP SWITCH

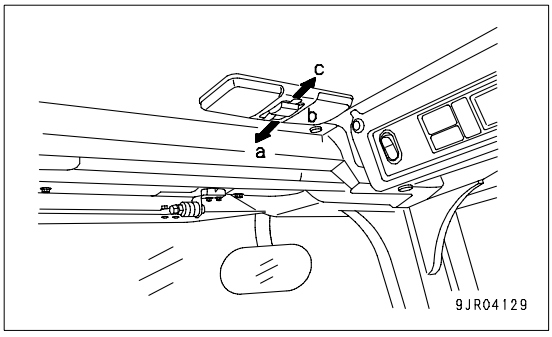
Use this switch (15) to turn on the room lamp.

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

Position (a): OFF

Position (b): Lights up when operator's cab door opens

Position (c): Lights up



REMARK
The room lamp lights up even when the starting switch is OFF, so when leaving the operator's cab, check that the switch is at position (a) (OFF) or (b).

EMERGENCY PARKING BRAKE CANCEL SWITCH

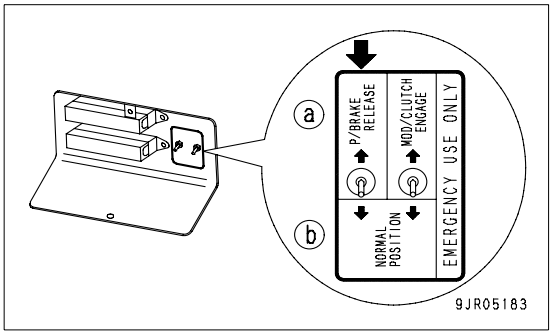
⚠ WARNING

When the emergency parking brake cancel switch is released, the machine may move.
When releasing the emergency parking brake switch, see "METHOD OF RELEASING BRAKE BY USING EMERGENCY PARKING BRAKE CANCEL SWITCH (3-181)".

If the engine will not start for some reason, use this switch (16) to release the parking brake. Please contact your Komatsu distributor to have the brake released.

Position (a): Release

Position (b): Normal position



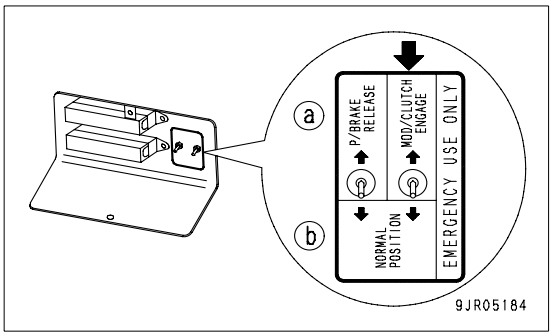
EMERGENCY MODULATION CLUTCH DIRECT CONNECTION SWITCH

If the modulation clutch will not engage for some reason and the machine cannot travel, use this switch (17) to engage the clutch as an emergency measure.

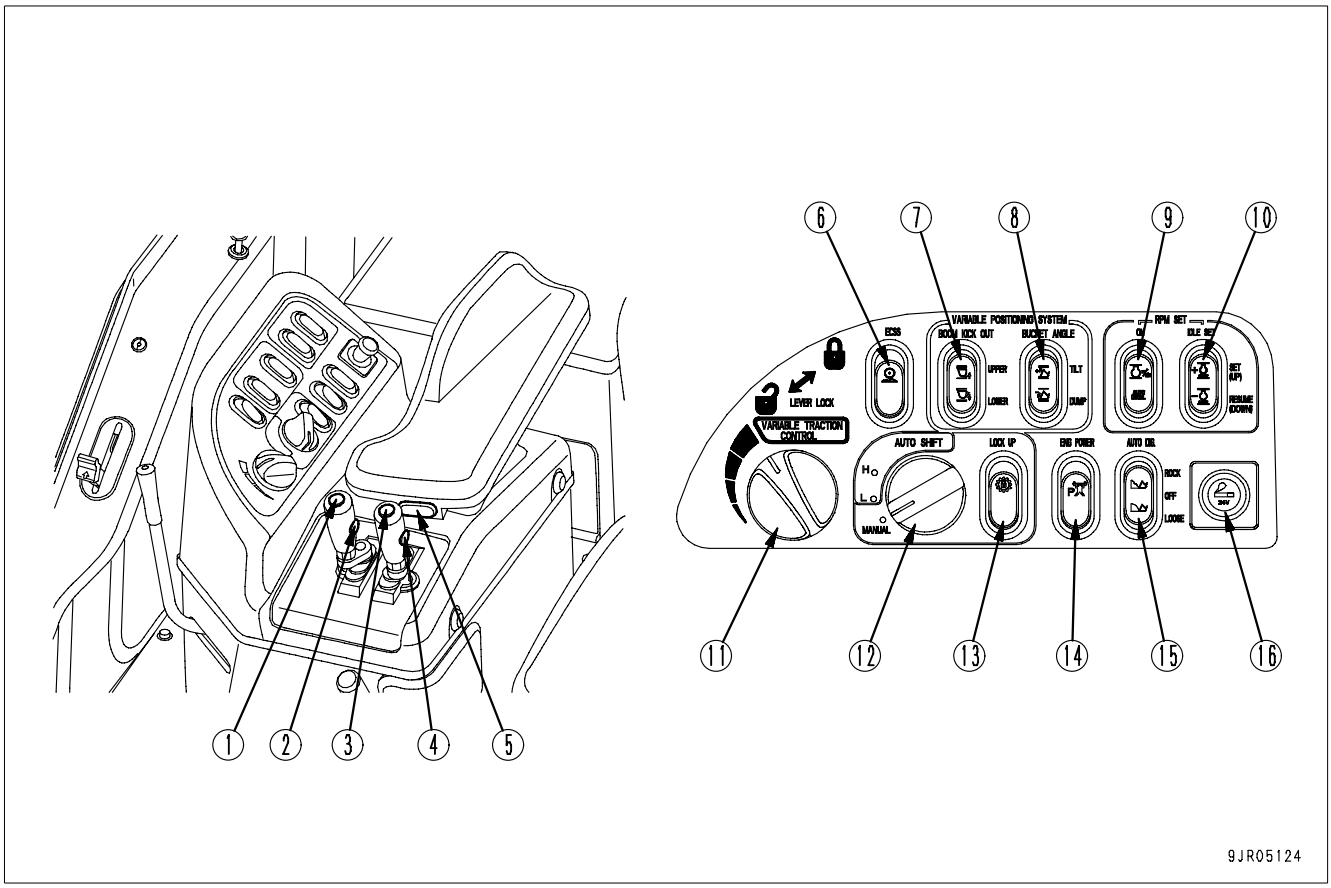
Please contact your Komatsu distributor to have the clutch engaged.

Position (a): Engaged

Position (b): Normal position



RIGHT SWITCH PANEL, CONTROL LEVER SWITCH



(1) Kickdown switch
(2) Hold switch
(3) Load meter cancel switch (if equipped)
(4) Load meter sub-total switch (if equipped)
(5) Turn signal switch
(6) E.C.S.S. switch (*) (if equipped)
(7) Remote positioner raise/lower set switch
(8) Remote positioner bucket angle set switch
(9) RPM set ON-OFF switch (if equipped)
(10) RPM set idling up-down selector switch (if equipped)
(11) Driving force control dial
(12) Transmission auto shift/manual shift selector switch
(13) Torque converter lock-up switch
(14) Engine power mode selector switch
(15) Semi auto digging selector switch (if equipped)
(16) Cigarette lighter

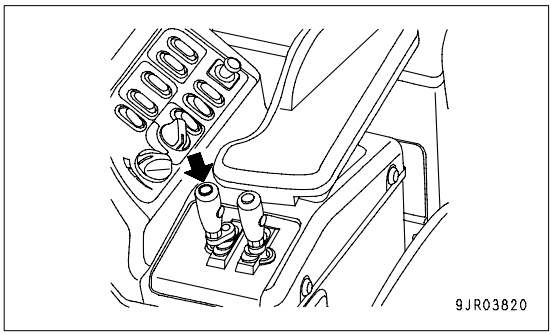
(*) E.C.S.S.: Electrically Controlled Suspension System

KICKDOWN SWITCH

If the transmission is in 2nd in manual shift, press switch (1) at the head of the lift arm control lever to shift down to 1st.

Use this when you need to increase the drawbar pull in digging operations.

If the transmission is in auto-shift, and the travel speed is below 12.5 km/h in any speed range when traveling in either forward or in reverse, the kick-down switch is actuated and it is possible to shift down to 1st.



Even if the travel speed is more than 12.5 km/h, this switch can be used to shift the transmission down. Each time the kick-down switch is pressed, the speed range will shift down one range at a time (F4 -> F3 -> F2).

If the torque converter is locked up, the lock-up is cancelled.

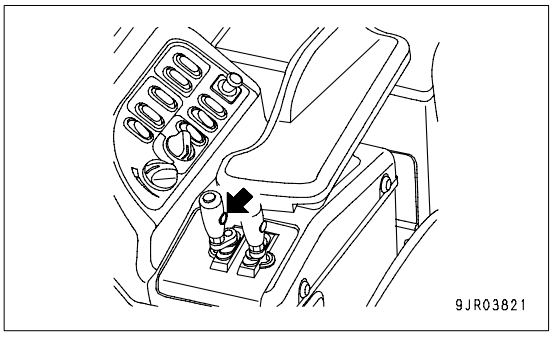
REMARK
When canceling the kickdown, operate the directional selector switch. In manual shift, it is possible to cancel when operating to any speed other than 2nd. It is also possible to cancel the kickdown by turning the starting switch OFF.
In auto shift, if the travel speed is too high after shifting down, the auto shift shifts the transmission up.
In auto shift, when traveling at above 16 km/h in 3rd, or at above 25 km/h in 4th, even when the kickdown switch is pressed, the engine overrun prevention function is actuated and the transmission does not shift down.

HOLD SWITCH

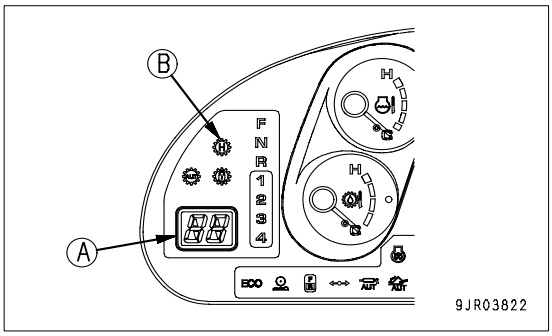
To fix the speed range in automatic transmission, press switch (2) on the side of the lift arm control lever knob. The speed range displayed on shift indicator (A) of the machine monitor is fixed and shift hold pilot lamp (B) lights up.

If the switch is pressed again, the HOLD condition is cancelled and the display goes out.

Use this switch to set to the desired speed range when carrying out operations such as traveling uphill, traveling downhill, driving in reverse, or grading.



REMARK
The torque converter lock-up condition is not fixed.
It is possible to cancel the HOLD condition by operating the directional selector switch or by shifting gear and operating the AUTO SHIFT/MANUAL selector switch to MANUAL. It can also be cancelled by turning the starting switch OFF.



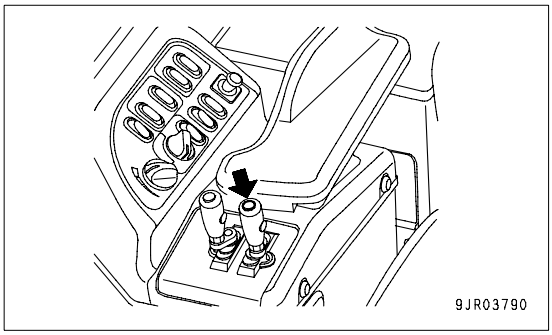
LOAD METER CANCEL SWITCH

(If equipped)

When carrying out operations using the load meter, it is possible to cancel the measured data.

When switch (3) at the top of the bucket control lever is pressed, the data that were just added are cancelled and the display returns to the value before the measurement was made.

The display can be cancelled within 15 seconds after the load is displayed or before the next load is measured.

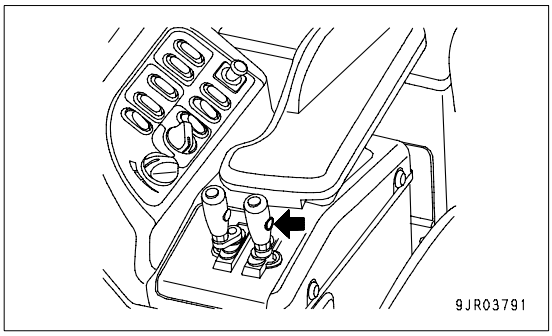


LOAD METER SUBTOTAL SWITCH

(If equipped)

It is possible to return the load meter to 0 for the overall load (when in addition mode) or remaining load (when in subtraction mode). Press switch (4) on the side of the bucket control lever. The overall load display will return to 0.

For details, see “HANDLING LOAD METER (6-26)“.



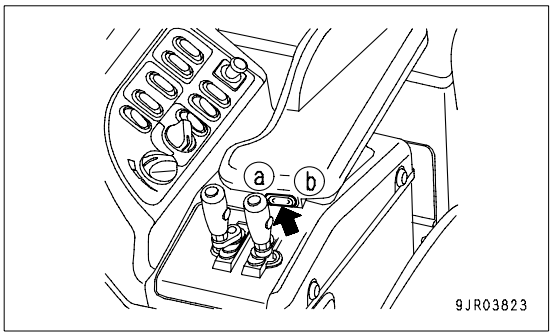
TURN SIGNAL SWITCH

Use this switch (5) to operate the turn signal lamps.

Position (a): Right turn (Push the switch to the right.)

Position (b): Left turn (Push the switch to the left.)

REMARK
When the switch is operated, the turn signal lamp and pilot lamp light up.
When the switch is released, it automatically returns, but the turn signal lamp and pilot lamp remain lighted up until the machine returns to traveling in a straight line.
If the switch is not automatically reset, press the switch again to turn the lamp out.



E.C.S.S. SWITCH

(If equipped)

(*) E.C.S.S.: Electrically Controlled Suspension System

⚠ WARNING

- **If the machine is traveling or the work equipment is raised, the moment the E.C.S.S. switch is turned ON, the work equipment will move.**
- **If operations are carried out with the E.C.S.S. switch at the ON position, the moment the E.C.S.S. switch is operated, the work equipment may move.**
- **Never turn the E.C.S.S. switch ON during inspection or maintenance. The work equipment will move and this will create a dangerous situation.**

NOTICE

- **Always stop the machine and lower the work equipment to the ground before operating the E.C.S.S. switch.**
- **When carrying out inspection and maintenance, first lower the work equipment to the ground, then turn the E.C.S.S. switch OFF before starting the inspection and maintenance operation.**
- **When carrying out leveling work, turn the E.C.S.S. switch OFF.**

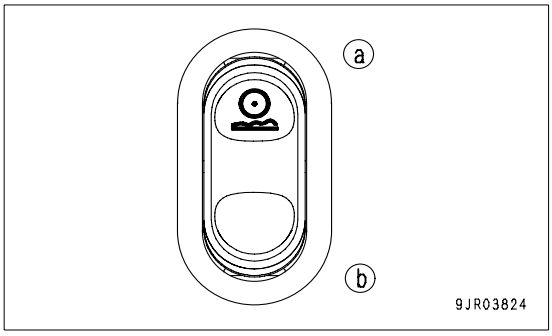
This switch (6) is used to turn the E.C.S.S. ON and OFF.

Position (a): ON

The pilot lamp lights up and the E.C.S.S. is actuated.

Position (b): OFF

The E.C.S.S. is not actuated.



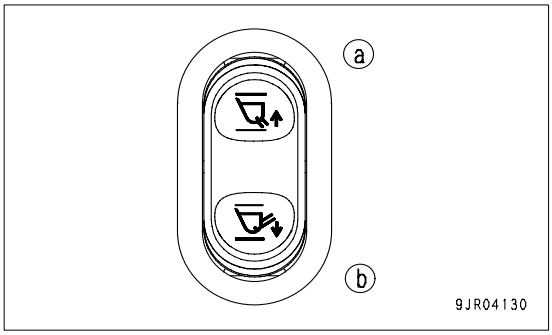
REMARK
The E.C.S.S. is a device that uses the hydraulic spring effect of an accumulator to absorb the vibration of the chassis during travel and allows the machine to travel smoothly and at high speed.
When traveling in 1st, the E.C.S.S. is not actuated.
When the speed range is 2nd to 4th, and the travel speed becomes more than 5 km/h, the E.C.S.S. is automatically actuated; when the travel speed goes below 3 km/h, it is automatically disengaged.

REMOTE POSITIONER RAISE/LOWER SET SWITCH

Use this switch (7) to set the kick-out position for the lift arm.

Position (a): When the lift arm is above the horizontal position, raise the lift arm to the position to set the kick-out. Press the top (a) of this switch to set the kick-out for the RAISE operation at that position.

Position (b): When the lift arm is below the horizontal position, lower the lift arm to the position to set the kick-out. Press the bottom (b) of this switch to set the kick-out for the LOWER operation at that position.



If the setting has been made without problem, the buzzer emits short sounds.

If it was not possible to make the setting, the buzzer does not sound.

If the switch is kept pressed for more than 1 second, the buzzer emits a long sound and the kick-out position setting is cancelled.

For details, see “OPERATING REMOTE BOOM POSITIONER (3-136)“.

REMOTE POSITIONER BUCKET ANGLE SET SWITCH

When setting the angle of the bucket, set the bucket control lever to the HOLD position and stop the machine. If the bucket control lever is not at HOLD and the machine is not stopped, the setting cannot be carried out.

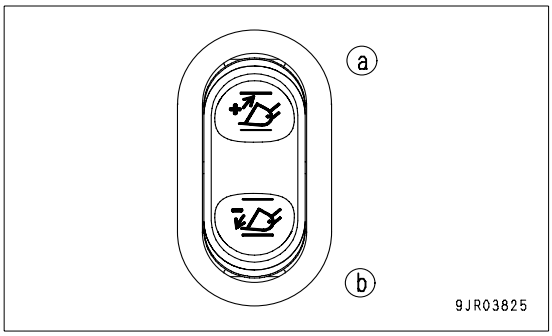
When this switch (8) is pressed, the bucket lower is actuated and the angle of the cutting edge is set to the desired angle when the tilt operation is stopped on the ground.

Each time (a) is pressed, the stop position when the leveler is actuated is set to face up one stage.

Each time (b) is pressed, the stop position when the leveler is actuated is set to face down one stage.

When setting the bucket facing up or down, it is possible to set up or down five stages (± 5) from the horizontal. The angle changes approx. 1° for each stage.

The angle of the bucket doesn't change when the remote positioner bucket angle set switch is pushed. The bucket stops at the set angle by operating the bucket leveller after the angle is set.



When remote positioner bucket angle setting switch (a) or (b) is pressed, the travel speed display on the machine monitor changes to only numerals. (No unit is displayed.)

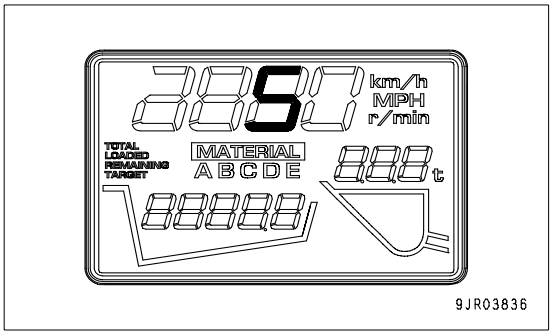
When the initial setting is made, “0“ is displayed.

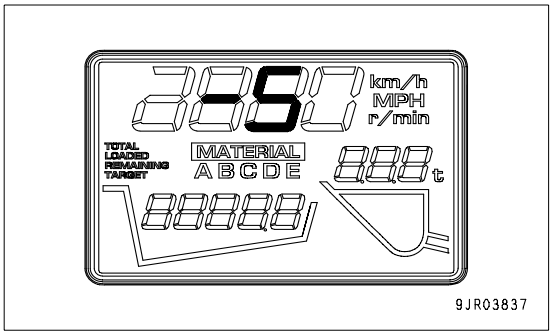
The display shows +5 (up) and -5 (down).

Each time remote positioner bucket angle set switch (a) or (b) is pressed, the display changes +1 or -1, and the buzzer emits short sounds.

When operation of the switch is stopped at the set value, the setting is saved to memory after 3 seconds, and the display switches to the travel speed or engine speed.

Stop the machine before setting the bucket angle.





REMARK
If the switch is not operated for 3 seconds after the monitor display changes to numerals only, the present setting is retained and the display returns to the travel speed or engine speed display.
When the setting has been changed the maximum of +5° or -5°, and the remote positioner bucket angle setting switch (a) or (b) is pressed, the buzzer will emit a long sound.
When digging hard rock, set the bucket angle facing down; when digging soft rock, set the bucket horizontal.
For details of operations, see “WORK POSSIBLE USING WHEEL LOADER (3-138)“ in “DIGGING OPERATIONS (3-139)“ and “DIGGING AND LOADING ON LEVEL GROUND (3-141)“.

For details, see “OPERATING REMOTE BUCKET POSITIONER (3-136)“.

RPM SET ON/OFF SWITCH

(If equipped)

Use this switch (9) to turn the RPM SET system ON-OFF.

Position (a): System ON

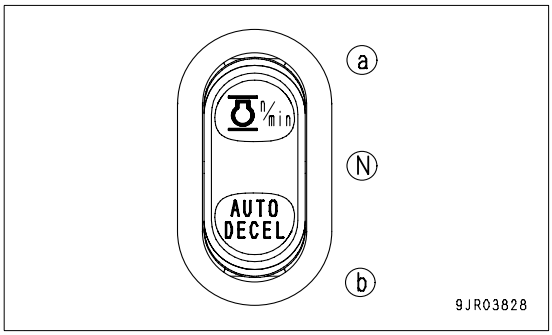
Indicator lamp lights up.

Position (N): System OFF

Indicator lamp goes out.

Position (b): System ON, auto deceleration ON

Indicator lamp lights up.



In this case, if the transmission shift is at neutral and the work equipment control lever is not operated for a certain time (5-10 seconds), the engine automatically returns to low idling speed. If the transmission shift is not at neutral, the engine returns to the original speed.

In addition, even if the work equipment control lever is operated, the engine will return to its original speed.

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.

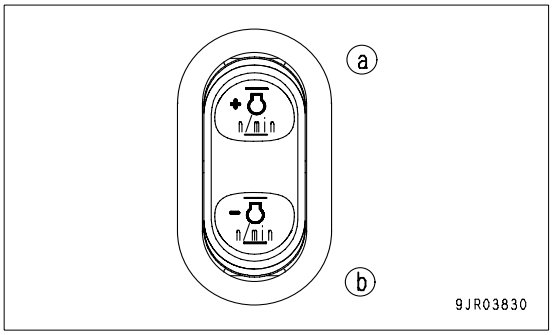
RPM SET IDLING UP-DOWN SELECTOR SWITCH

(If equipped)

⚠ CAUTION

If the RPM set ON-OFF switch or engine starting switch are turned OFF, the idle-up or idle-down speed data in memory are cleared. When setting again, start the procedure from the beginning.
When the setting has been made with the RPM set idling up-down selector switch, if the right brake pedal is depressed when the machine is waiting for a dump truck, the engine speed set in the memory goes down to the idling speed, but when switch position (b) is pressed again, the engine speed returns to the original setting.
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 ON-OFF switch indicator lights up.
If the RPM set ON/OFF switch is set to the ON position and the auto deceleration is also set to the ON position, if the transmission is at neutral and the work equipment control lever is not operated for a certain time (5-10 seconds), the engine automatically returns to low idling speed.
If the transmission is shifted to any position except Neutral, the engine will return to its original speed. In addition, even if the work equipment control lever is operated, the engine will return to its original speed.

Use this switch (10) to hold the engine speed at the desired speed.



Position (a):

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

- When using the accelerator pedal
  Depress the accelerator pedal to raise the engine speed to the desired speed, then press portion (a) of the switch. The speed is recorded in memory.
- When using the RPM set idling up/down selector 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):

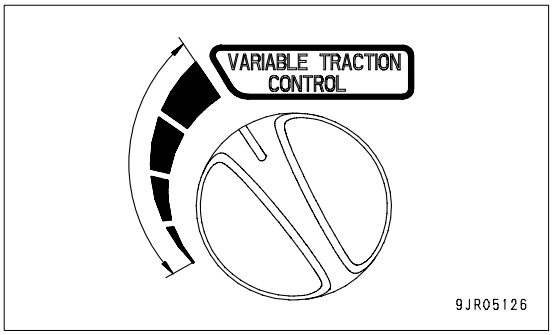
Use this position when lowering the engine speed or when resetting after canceling the RPM set ON/OFF switch.

- When using the RPM set up/down selector 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.

DRIVING FORCE CONTROL DIAL

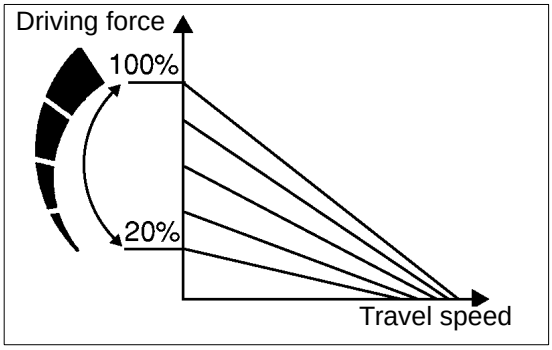
Use this dial (11) to control the driving force.



CAUTION

The driving force control works only when the transmission is in F1.

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).

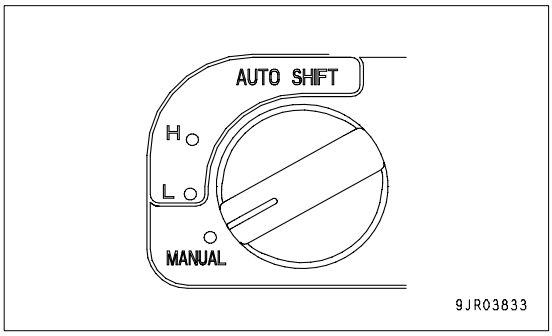


REMARK

Setting the driving force with the driving force control dial to lower the driving force beforehand makes it possible to prevent tire slippage in mud or on slippery road surfaces.
It is possible to change the driving force according to the conditions on the job site, but consider production, tire slippage, and other conditions when deciding the setting.
The driving force control dial maintains the force of the work equipment and lowers the drive force. This is effective in preventing tire slippage and reduces tire wear.
If the drive force control dial is throttled down, the modulation clutch will slip and the temperature will rise because of the friction.
In particular, if the drive force dial is throttled down and digging operations are carried out in first, carry out the operation from the start of pushing to completion of the scooping up within 10 seconds in order to prevent overheating of the clutch.

TRANSMISSION AUTO SHIFT/MANUAL SHIFT SELECTOR SWITCH

Use this switch (12) to switch the transmission between auto shift and manual shift and to set the shift point for auto shift.



At the “L“ and “H“ positions, the transmission shifts to auto shift and the auto shift pilot lamp on the machine monitor lights up. Normally, set to auto shift.

MANUAL position: Transmission is set to manual shift and speed range is range displayed by shift indicator.

L position: Suitable for general excavating and loading. This mode provides smooth gear shifting and low fuel consumption since gear shifting is performed at relatively low engine speed.

H position: Suitable for load and carry operation uphill. This mode provides large rim pull and short cycle time since gear shifting is performed at relatively high engine speed.

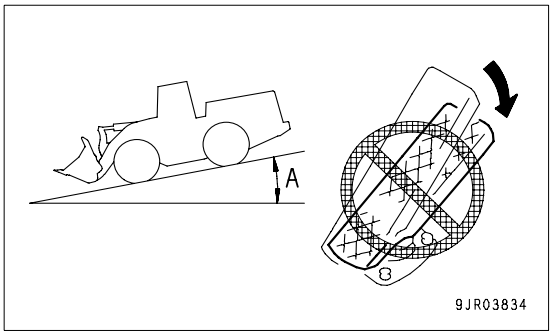
REMARK

For details of manual shift, see “MANUAL SHIFT (3-49)“.
For details of auto shift, see “AUTO SHIFT (3-49)“.

TORQUE CONVERTER LOCK-UP SWITCH

⚠ WARNING

When traveling down slopes of a grade of more than 6°, never depress the accelerator pedal fully, regardless of whether the torque converter lock-up switch is ON or OFF. It is extremely dangerous to drive too fast.

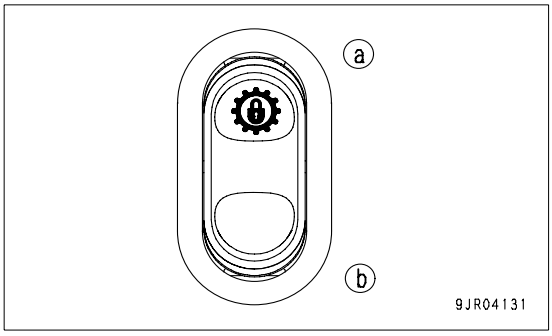


NOTICE
To prevent overrun when the machine next travels at high speed, do not shift down.
When traveling in F3 at a speed of 17 km/h or more, do not shift down to F2.
When traveling in F4 at a speed of 30 km/h or more, do not shift down to F3.

If the transmission is shifted down under the above conditions, the overrun prevention function is actuated and the speed range is maintained until the travel speed is reduced to the condition for shifting gear.

When the actual travel speed range is 2nd - 4th in both forward and reverse, the torque converter lock-up function is actuated according to the travel speed and the transmission changes to direct drive.

Use this switch (13) to operate the torque converter lock-up function.



Position (a): ON

The pilot lamp inside the switch lights up and the lock-up is actuated according to the travel speed. When the lock-up is in use, the lock-up pilot lamp on the machine monitor lights up.

Position (b): OFF

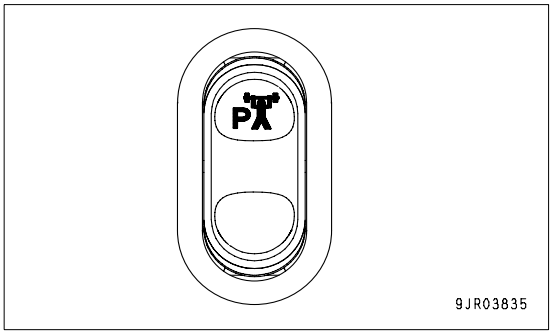
Press this to cancel the lock-up.

The lock-up is cancelled.

REMARK
The torque converter lock-up function makes it possible to improve the efficiency of power transmission when traveling at high speed and also reduces the fuel consumption.
When traveling downhill and using the braking force of the engine, actuate the torque converter lock-up.

ENGINE POWER MODE SELECTOR SWITCH

Use this switch (14) to switch the engine output to match the purpose of the operation.



When the power mode, the output mode pilot lamp (power mode) on the machine monitor lights up. In addition, the economy mode pilot lamp (ECO) goes out.

- Power mode (high engine output)
  Fast operations with emphasis on production.
- Economy mode (low engine output)
  Operations with time to spare in the cycle time with emphasis on fuel consumption.

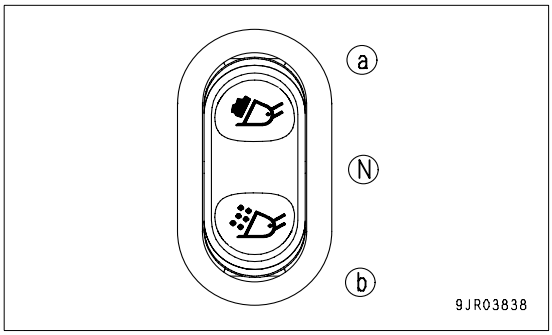
REMARK
For normal operations, use the economy mode to improve the fuel consumption.
When used together with the accelerator, it helps to reduce fuel consumption.

With the power mode, the maximum output is provided according to the amount of the accelerator pedal is depressed.
Use this particularly when the work must be completed in a short cycle time.
Even if the engine is stopped in power mode, when the engine is started again, it will start in economy mode.
(In some territories, the default mode is set to power mode. If it is desired to change the default to the economy mode, please consult your Komatsu distributor.)

SEMI AUTO DIGGING SELECTOR SWITCH

(If equipped)

This switch (15) turns the semi auto digging ON-OFF.



Position (a): ROCK mode

Use this mode when heavy loads are being handled and the bucket tilt operation is carried out intermittently.

Position (b): LOOSE mode

Use this mode when light loads, such as blasted rock, are being handled and the bucket tilt operation is carried out continuously.

N position: Semi auto digging is switched OFF

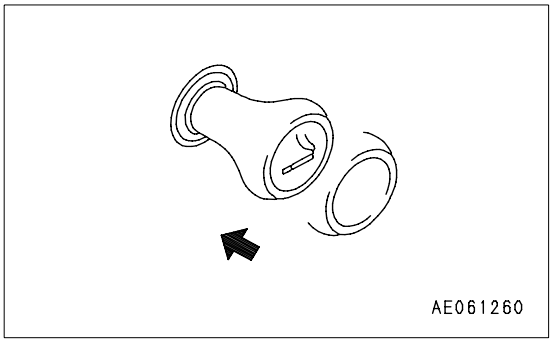
At positions (a) and (b), the pilot lamp inside the machine monitor lights up.

For details, see “SEMI AUTO DIGGING OPERATIONS (3-135)“.

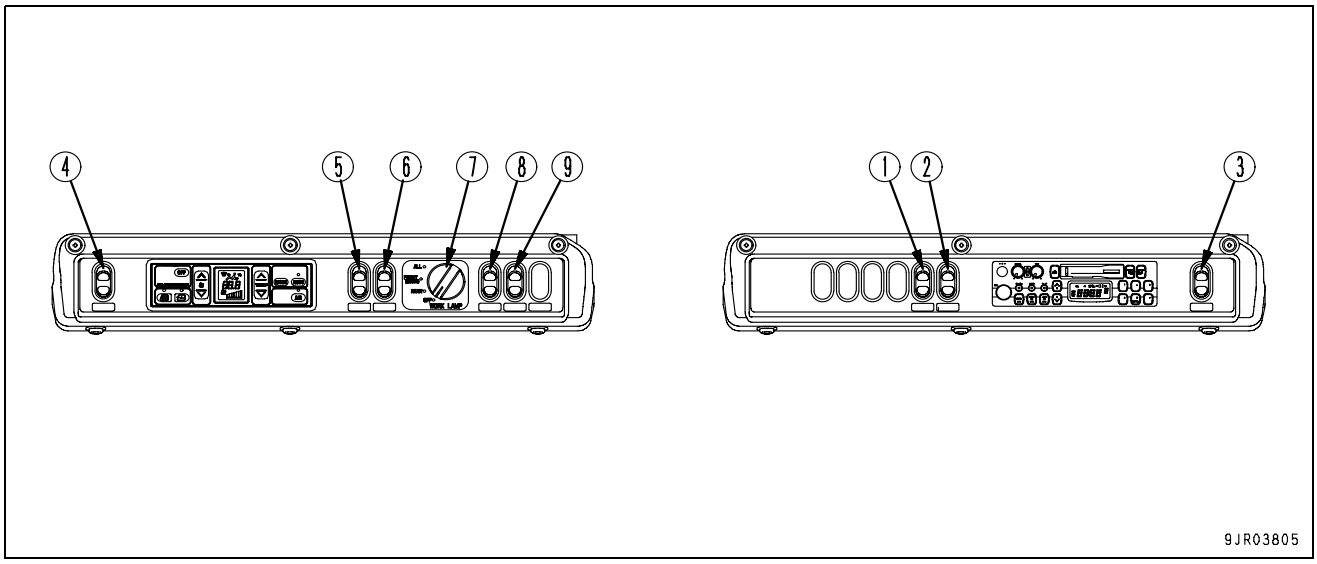
CIGARETTE LIGHTER

This is used to light cigarettes.

After cigarette lighter (16) is pushed in, it will return to its original position after a few seconds, then you may pull it out and light a cigarette.



OVERHEAD PORTION



(1) Auto-greasing switch (if equipped)
(2) Cooling fan reverse rotation switch
(3) Step lamp switch
(4) Rear heated wire glass switch
(5) Rear wiper switch
(6) Side wiper switch (if equipped)
(7) Working lamp switch
(8) Fog lamp switch (if equipped)
(9) Beacon lamp switch (if equipped)

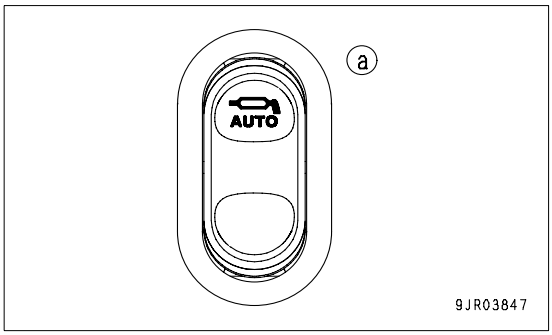
AUTO-GREASING SWITCH

(If equipped)

Use this switch (1) to start the auto-greasing system (if equipped).

Position (a): It is possible to operate the greasing for one cycle when desired, regardless of the time that has passed.

For details, see “HANDLING AUTO-GREASING SYSTEM (6-54)“.



COOLING FAN REVERSE ROTATION SWITCH

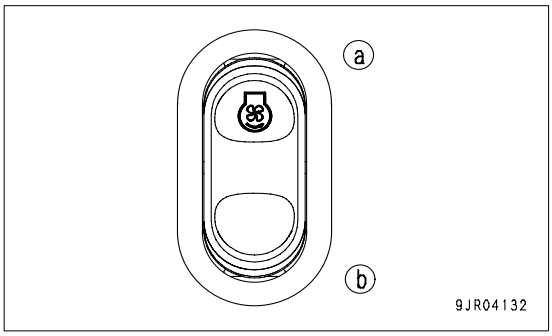
Use this switch (2) to rotate the cooling fan in the reverse direction when cleaning the radiator.

Position (a): ON

The pilot lamp inside the switch and the cooling fan reverse rotation pilot lamp on the machine monitor light up. At the same time, “COOLING FAN REVERSE“ is displayed on the character display, and the fan is rotated in reverse.

Position (b): OFF

The cooling fan is set to rotate in the normal direction.



Operate this switch with the engine stopped.

Switched from normal -> reverse rotation: With engine stopped, turn engine starting switch ON → reverse rotation switch ON → check machine monitor pilot lamp → starting switch START → fan reverse rotation.

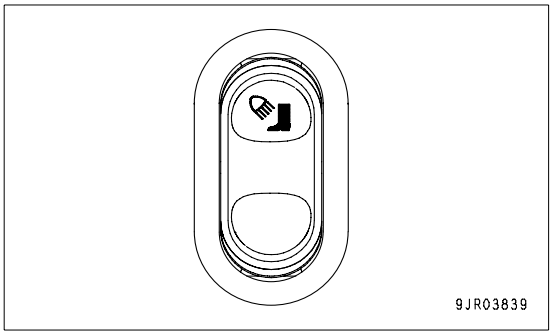
Switched from reverse -> normal rotation: Engine at low speed → starting switch OFF (stop engine) → engine starting switch ON → reverse rotation switch OFF → starting switch START → fan normal rotation.

For details, see “CLEAN FINS BY ROTATING COOLING FAN IN REVERSE (4-33)“ in the WHEN REQUIRED section.

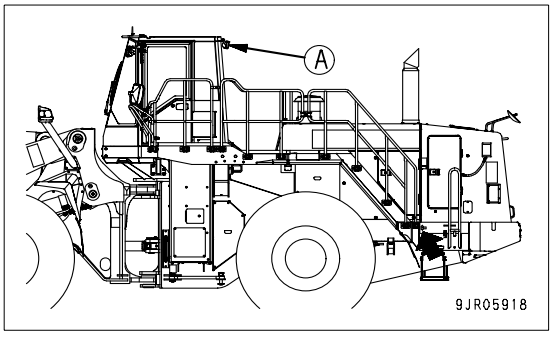
REMARK
When the engine is running, even if the cooling fan reverse rotation switch is operated, the cooling fan does not rotate in reverse.
In this case, the position of the switch and the actual direction of rotation of the fan are different, so the cooling fan reverse rotation pilot lamp flashes.
Use the reverse rotation of the fan only when cleaning the radiator. During normal operations, always run the fan in the normal direction. If the fan is run in the reverse direction during operations, there will be insufficient air flow and the engine will tend to overheat.

STEP LAMP

Use this switch (3) to turn step lamp (A) ON-OFF when getting on or off the machine.



REMARK
There are two step lamp switches: one by the steps and one at the top left inside the operator's compartment. Either of these switches can be used to turn the step lamp ON-OFF.
When the lamp is turned ON from inside the operator's compartment, it is possible to turn it OFF using the switch by the steps after going down the steps.
The step lamp can be turned ON even when the starting switch is at the OFF position. Leaving the step lamp ON will run the battery down, so always turn it OFF when leaving the machine.

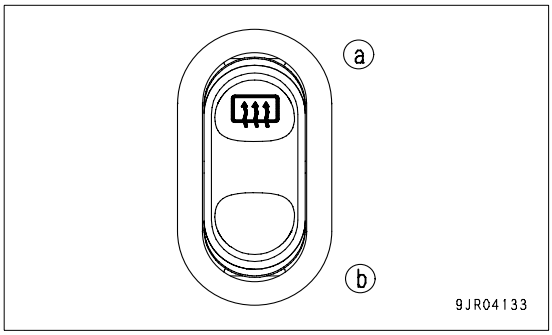


REAR HEATED WIRE GLASS SWITCH

This switch (4) turns the electricity to the heated wire glass at the rear of the operator's compartment ON-OFF when removing the mist from the glass.

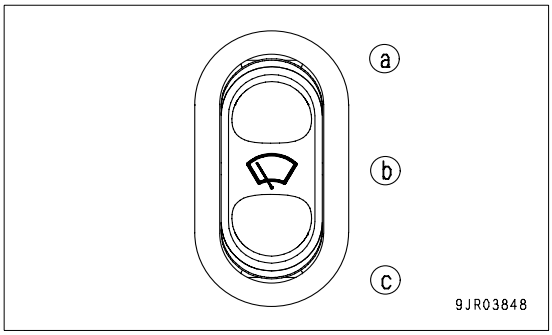
Position (a): ON (removes mist from glass)

Position (b): OFF



REAR WIPER SWITCH

Use this switch (5) to actuate the rear wiper at the rear of the operator's compartment.



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

Position (b): Wiper is operated

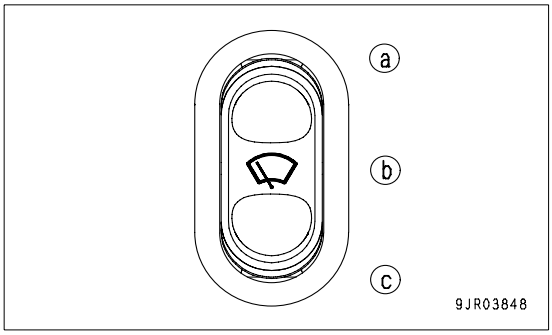
Position (c): OFF

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

SIDE WIPER SWITCH

(If equipped)

Use this switch (6) to actuate the side wiper at the side of the operator's compartment.



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

Position (b): Wiper is operated

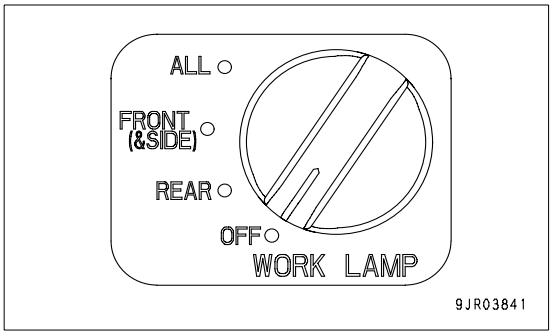
Position (c): OFF

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

WORKING LAMP SWITCH

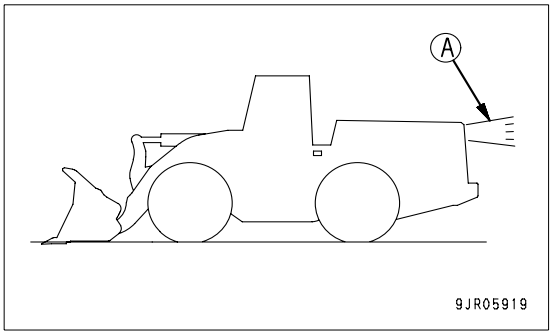
Use this switch (7) to turn the working lamps ON-OFF.

To turn the working lamps ON, first turn the lamp switch to the side clearance ON position or front lamp ON position. If this is not done, the working lamps will not light up. For details, see “LAMP SWITCH (3-47)“.

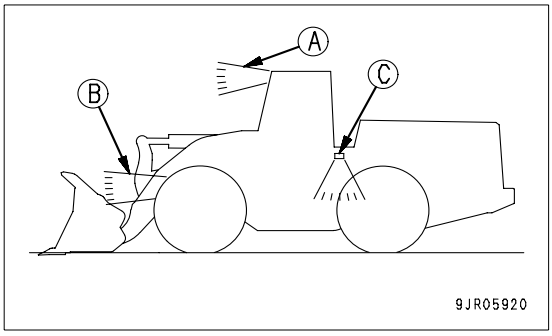


OFF position: All working lamps goes out

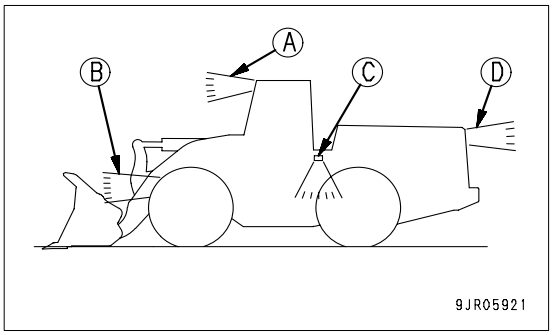
REAR position: Rear working lamp (A) lights up



FRONT (& SIDE) position: Front working lamp (A), front bottom working lamp (B) (if equipped), and side working lamp (C) (if equipped) light up



ALL position: Front working lamp (A), front bottom working lamp (B) (if equipped), side working lamp (C) (if equipped), and rear working lamp (D) light up



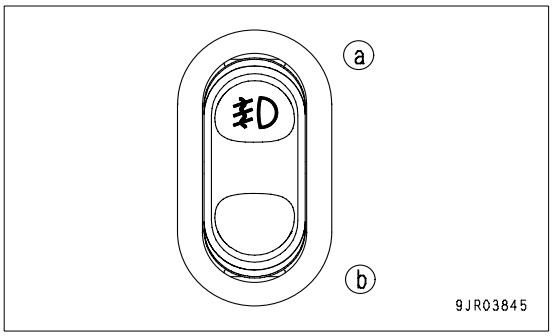
FOG LAMP SWITCH

(If equipped)

Use this switch (8) to turn the fog lamp ON-OFF.

Position (a): ON

Position (b): OFF



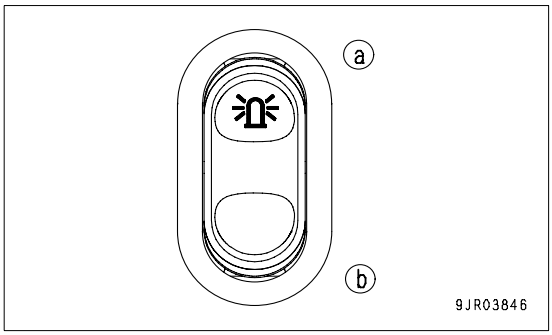
BEACON LAMP SWITCH

(If equipped)

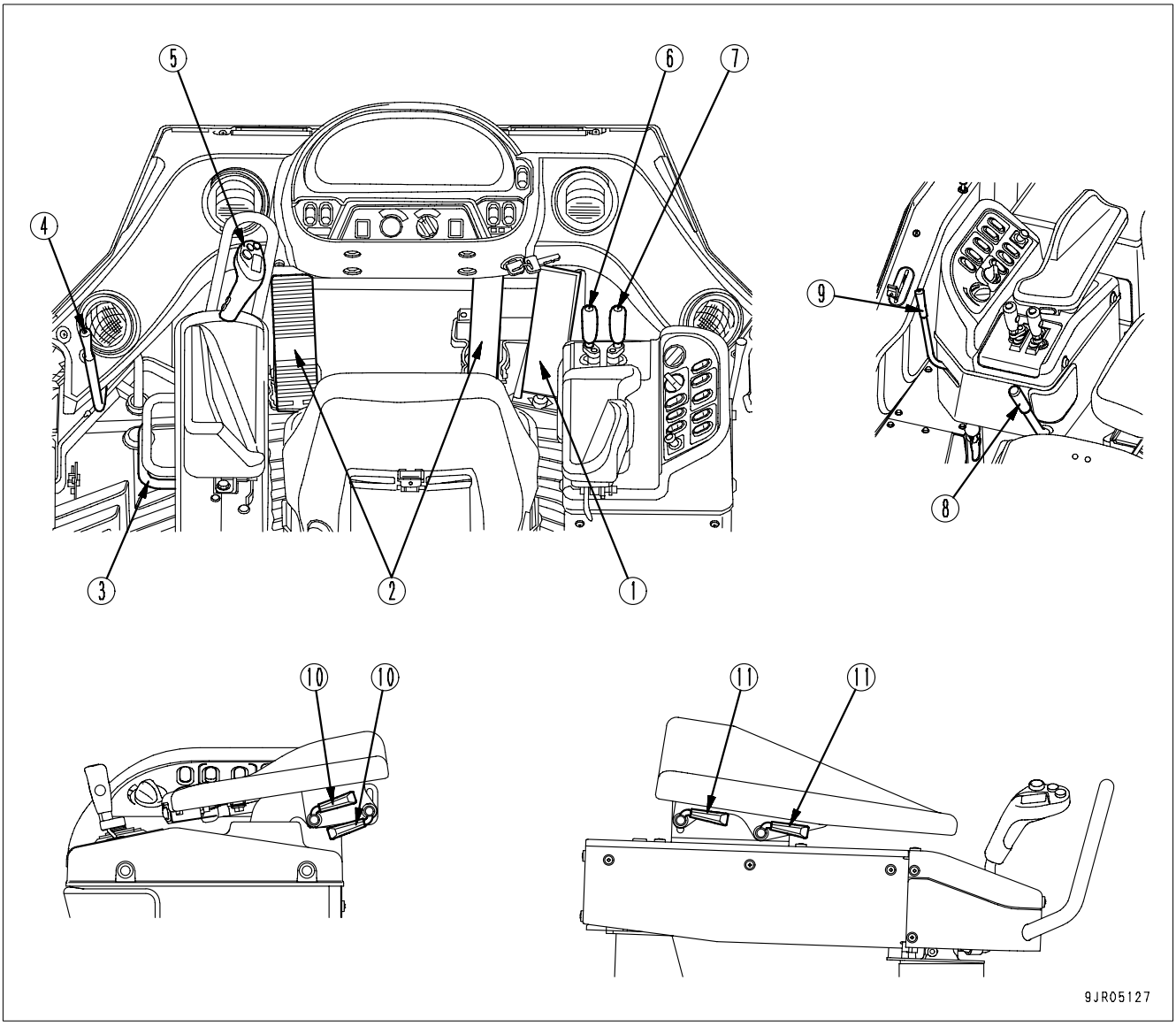
Use this switch (9) to turn the beacon lamp ON-OFF.

Position (a): ON

Position (b): OFF



CONTROL LEVERS, PEDALS

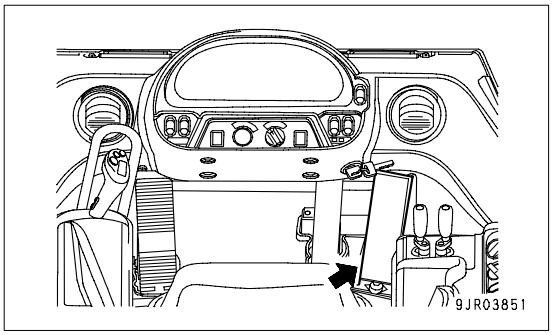


(1) Accelerator pedal
(2) Brake pedal
(3) AJSS lever front-rear adjustment knob
(4) Steering lock lever
(5) AJSS lever
(6) Bucket control lever
(7) Lift arm control lever
(8) Work equipment control lever directional adjustment lever
(9) Work equipment lock lever
(10) Right armrest adjustment lever
(11) Left armrest adjustment lever

ACCELERATOR PEDAL

Use this pedal (1) to adjust the engine speed and output.

It is possible to control the engine speed freely from low idling to full speed.

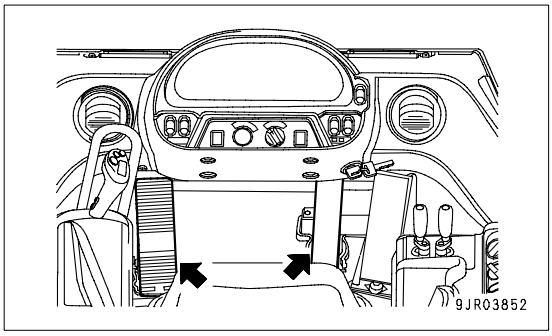


BRAKE PEDAL

⚠ 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.**

Use this pedal (2) to operate the brake.



RIGHT BRAKE PEDAL

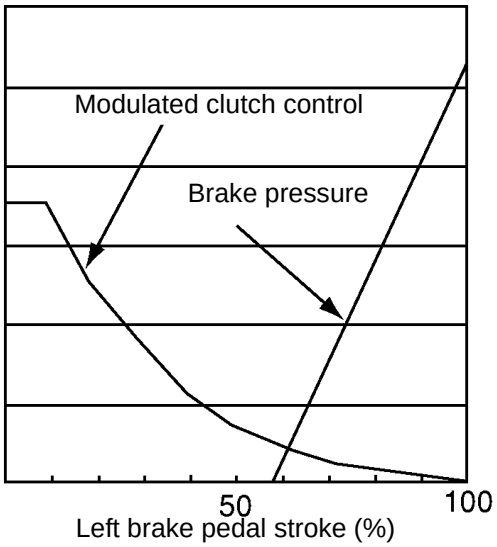
The right brake pedal operates the wheel brakes.

Use the right brake pedal for normal braking operations.

LEFT BRAKE PEDAL

This actuates the wheel brakes.

If the left brake pedal is depressed, the brakes are applied and the driving force is reduced.



REMARK
Use the brakes and accelerator together to reduce the speed or stop the machine. Use the left brake when operating the work equipment.

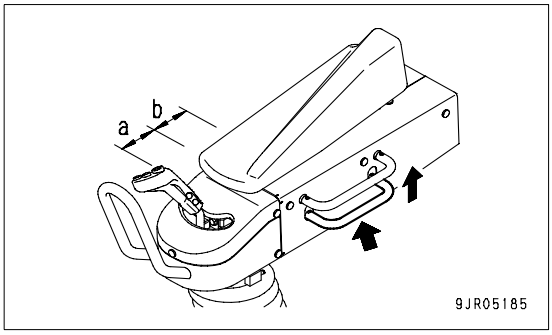
AJSS LEVER FRONT-REAR ADJUSTMENT KNOB

⚠ WARNING

Carry out front-rear of adjustment of the AJSS lever with the machine is stopped. If the machine is moving and the lever is operated (adjusted), it may lead to serious personal injury.

Pull up this lever (3). It is possible to move the AJSS lever within a range (a) to the front and rear of 160 mm (16 mm x 10 stages).

In addition, when getting on or off the machine, it is also possible to move the AJSS lever 150 mm to the rear. (range (b))

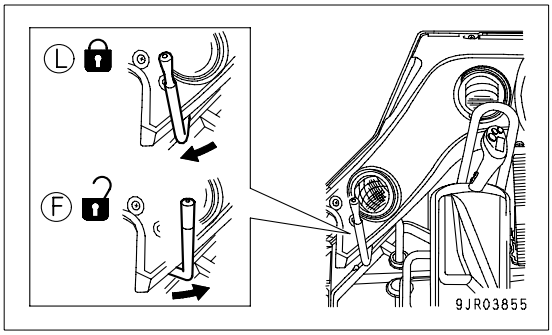


STEERING LOCK LEVER

⚠ WARNING

- **Regardless of whether the engine is running or stopped, always set the 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 AJSS lever is not locked and it is touched by mistake, it may cause serious personal injury.
- **If the steering lock lever is not set securely to LOCK position (L), the lever may not be locked.**
- **When parking the machine or carrying out maintenance, always set the steering lock lever to LOCK position (L).**

This lever (4) is a device to lock the AJSS lever. Push the steering lock lever to the left to lock it.



AJSS LEVER

⚠ WARNING

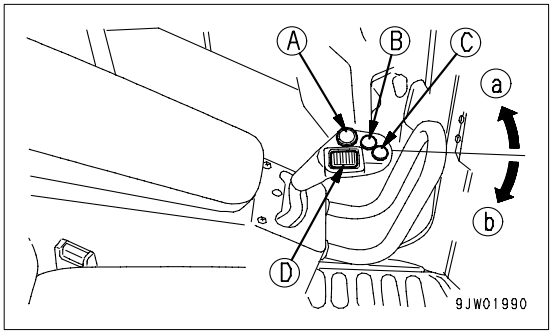
When the engine is running, always set the steering lock lever to the LOCK position when leaving the operator's seat.

Use this lever (5) to steer the machine.

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

(a): Left turn

(b): Right turn



REMARK
The AJSS lever also has the following additional functions: horn switch (A), shift-down switch (B) and shift-up switch (C) to shift the machine transmission, and directional selector switch (D) to change the direction of travel between forward and reverse. For details, see “SWITCHES (3-44)“.

BUCKET CONTROL LEVER

Use this lever (6) to operate the bucket.

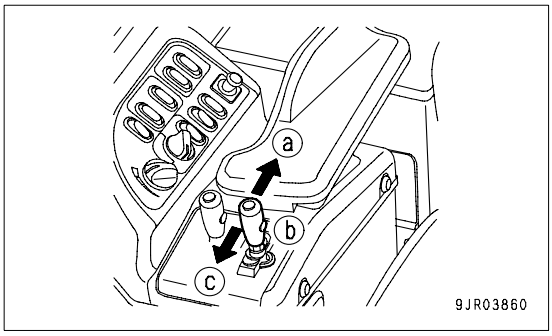
Position (a): TILT

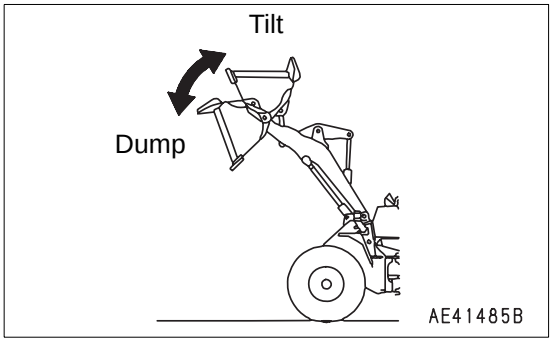
When the lever is pulled further from the TILT position, the lever stays at that position (detent position), and returns to the HOLD position when the bucket reaches the position set for the bucket positioner.

Position (b): HOLD

The bucket is stopped and held in position.

Position (c): DUMP





REMARK
If the engine is stopped or the work equipment lock lever is at the LOCK position, the lever does not stop at the detent position.
In addition, if the bucket is operated towards the tilt position from near the horizontal position, the lever also does not stop at the detent position.

LIFT ARM CONTROL LEVER

Use this lever (7) to operate the lift arm.

Position (a): RAISE

When the lever is pulled further from the RAISE position, the lever stops at that position (detent position). When the lift arm reaches the maximum height, the lever returns to the HOLD position.

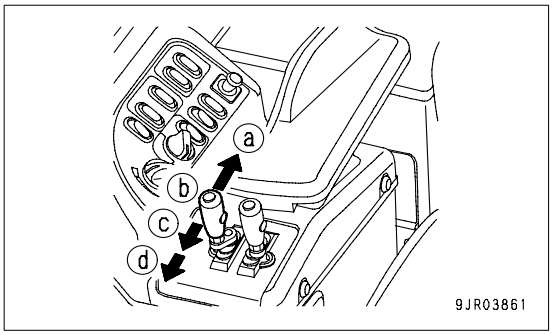
Position (b): HOLD

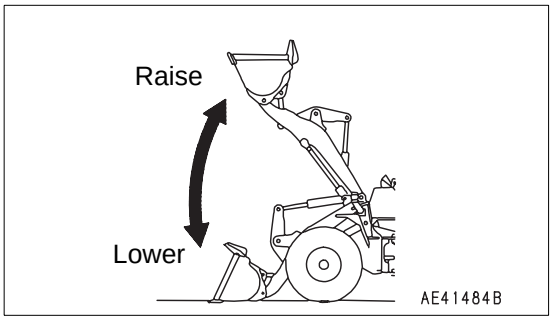
The lift arm is stopped and held in position.

Position (c): LOWER

Position (d): FLOAT

The lift arm moves freely under external force.





REMARK
If the engine is stopped or the work equipment lock lever is at the LOCK position, the lever does not stop at the detent position.

For details of the method of operation when using the remote position, see “REMOTE POSITIONER (3-136)“.

WORK EQUIPMENT CONTROL LEVER DIRECTIONAL ADJUSTMENT LEVER

⚠ WARNING

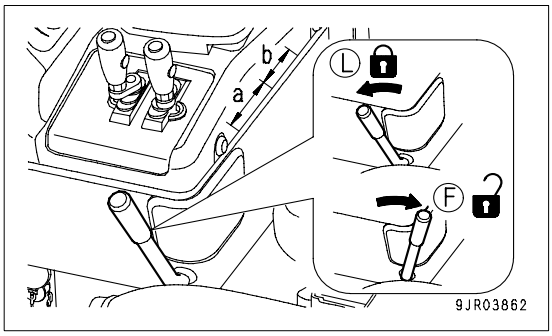
When operating the work equipment control lever directional adjustment lever, be careful not to touch the work equipment control levers.

Use this lever (8) to move the work equipment control levers (right console) within a range (a) to the front and rear of 102 mm (17 mm x 6 stages).

In addition, when carrying out maintenance, it is also possible to move the joystick steering lever 52 mm to the rear. (range (b))

When adjusting the work equipment control lever (right console), set the lever to FREE position (F) before adjusting.

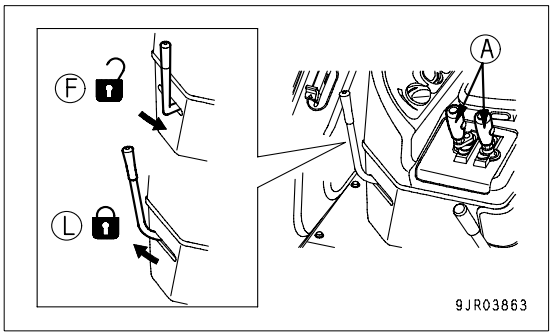
When the lever is released, it returns automatically to LOCK position (L).



WORK EQUIPMENT LOCK LEVER

⚠ WARNING

- **Always set the work equipment lock lever securely to the LOCK position when standing up from the operator's seat. If the work equipment lock lever is not securely in the LOCK condition, and work equipment control lever (A) is touched by mistake, it may cause serious personal injury.**
- **If the work equipment lock lever is not set securely to LOCK position (L), the work equipment may move and cause serious personal injury. Check that the work equipment lock lever is at LOCK position (L).**
- **When operating the work equipment lock lever, be careful not to touch work equipment control lever (A).**



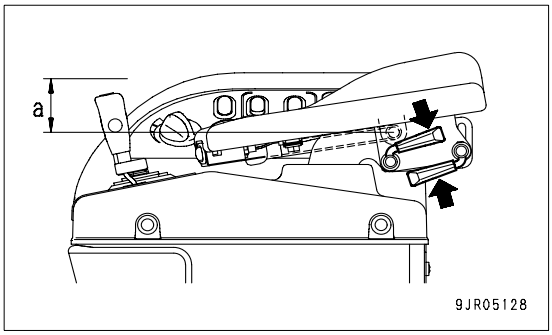
This lever (9) is a device to lock the work equipment control lever.

Push the work equipment lock lever to the outside to lock it.

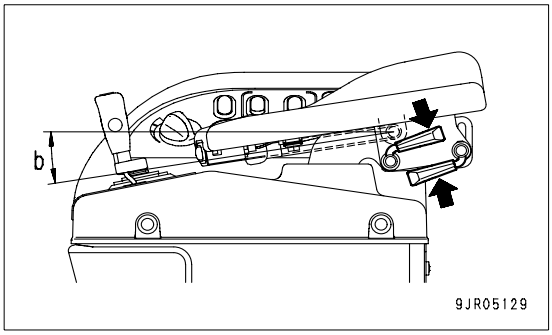
REMARK
This lever shuts off the hydraulic circuit for the work equipment, so if it is at LOCK position (L), the work equipment will not move even if work equipment control lever (A) is operated.

RIGHT ARMREST ADJUSTMENT LEVER

Pull this lever (11) to adjust the height of the armrest within range (a) of 30 mm.

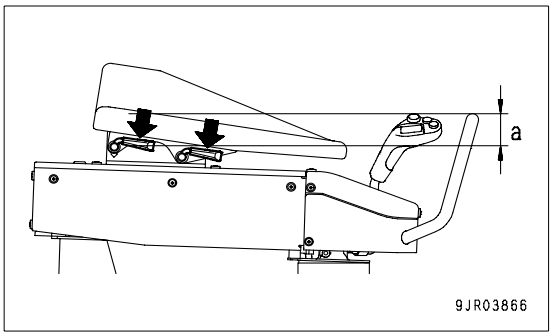


It is possible to adjust the angle within range (b) of approx. 9°.

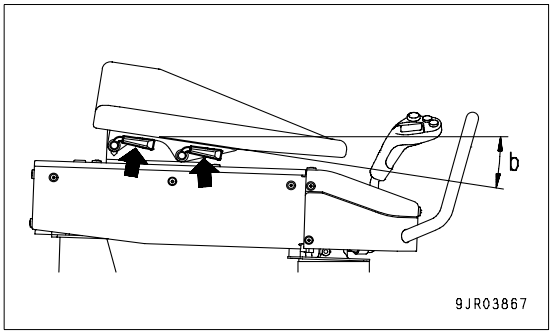


LEFT ARMREST ADJUSTMENT LEVER

Pull this lever (11) to adjust the height of the armrest within range (a) of 30 mm.



It is possible to adjust the angle within range (b) of approx. 7°.



CAP WITH LOCK

The fuel tank filler port and the hydraulic tank filler port (if equipped) are equipped with locks.

Use the starting switch key to open and close the cap.

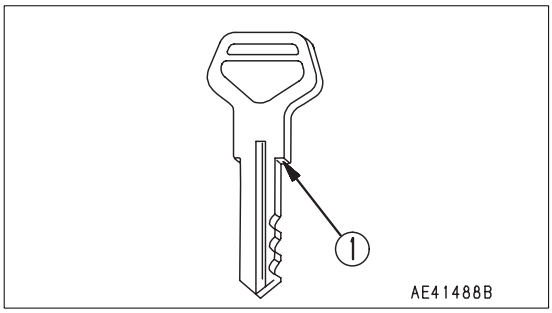
METHOD OF OPENING AND CLOSING CAP WITH LOCK (FOR THE FUEL TANK FILLER PORT)

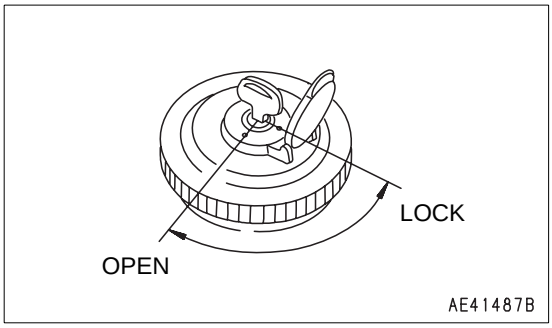
TO OPEN THE CAP

1. Insert the key in the cap lock securely until the shoulder (1) contacts the keyhole.

   If the key is not inserted fully into the cap lock and is turned, the key may break.

2. Turn the key in the cap lock clockwise and align the groove in the rotor and the counter mark on the cap. In this position, the cap can be opened.





TO LOCK THE CAP

1. Screw the cap into place.
2. Insert the key in the cap lock securely until the shoulder contacts the keyhole.

   If the key is not inserted fully into the cap lock and is turned, the key may break.

3. Turn the key counterclockwise and take the key out.

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

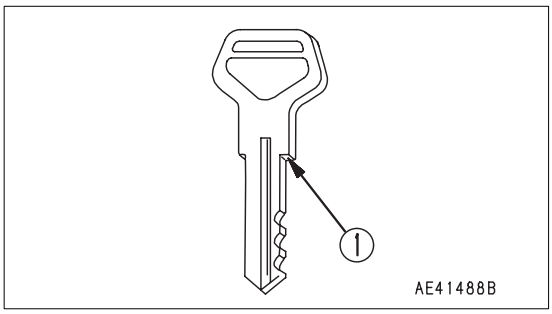
(If equipped)

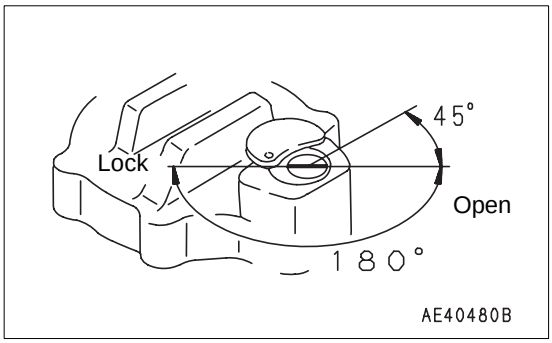
TO OPEN THE CAP

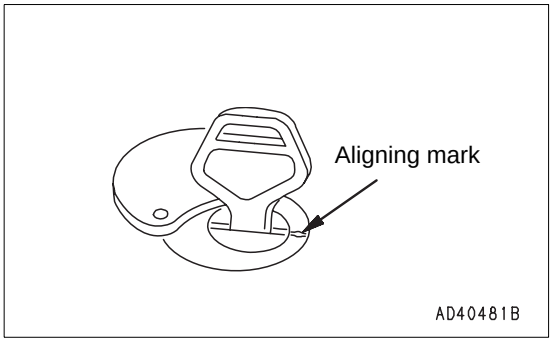
1. Insert the key in the cap lock securely until the shoulder contacts the keyhole.

   If the key is not inserted fully into the cap lock 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. Insert the key in the cap lock securely until the shoulder contacts the keyhole.

   If the key is not inserted fully into the cap lock and is turned, the key may break.

3. Turn the starting switch key counterclockwise and take the key out.

FRAME LOCK BAR

⚠ WARNING

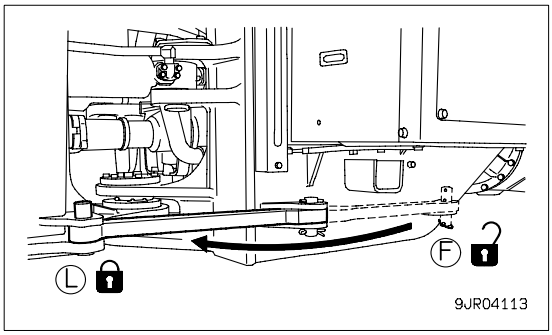
If the machine is transported or lifted when the frame lock bar is not locking the frame, the machine may suddenly articulate.
If the machine articulates, it may cause serious personal injury to people in the surrounding area.
Always lock the frame lock bar when transporting or lifting the machine.
During maintenance, lock the frame lock bar if necessary.

The frame lock bar is a device to lock the front frame and rear frame so that machine does not articulate.

LOCK position (L): Always set to this position when transporting or lifting the machine.

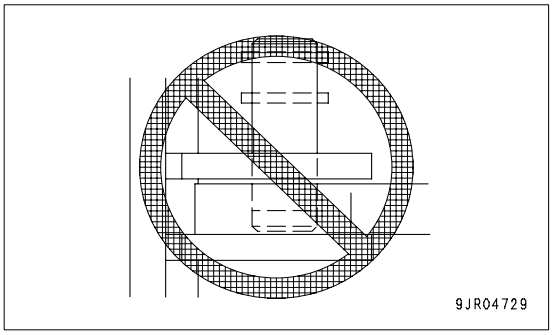
For maintenance, set to this position if necessary.

FREE position (F): Always set to this position when traveling.



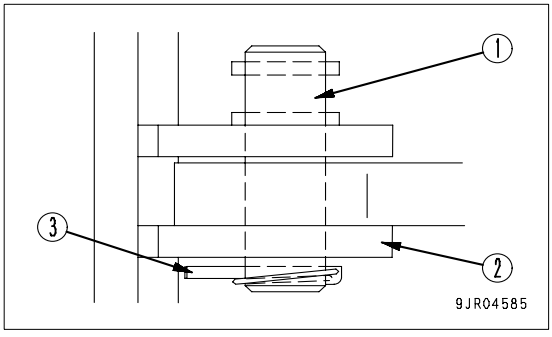
⚠ WARNING

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).

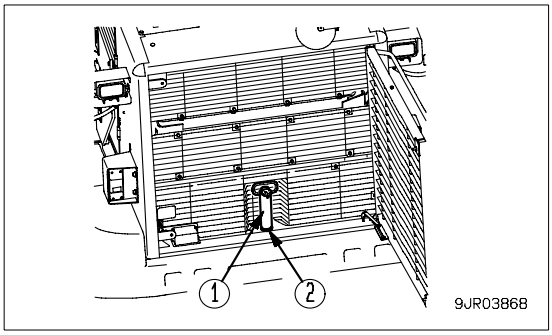


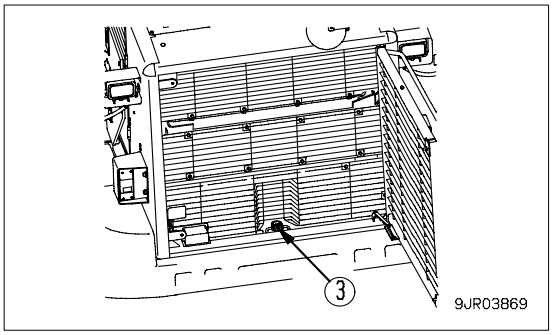
TOWING PIN

Towing pin (1) is installed to the counterweight (2) and is used when towing the machine.

When using towing pin (1), open the rear grill.

Insert linchpin (3) into the towing pin and counterweight so that the towing pin does not come out.

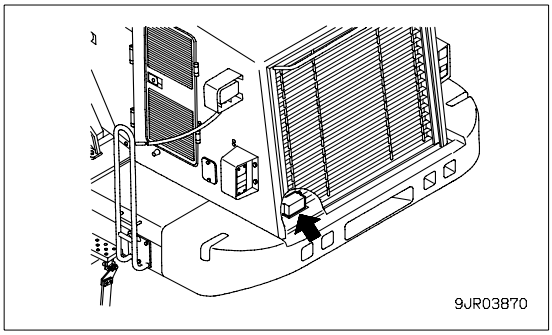




BACKUP ALARM

When the machine travels in reverse, the alarm sounds to warn people in the area that the machine is traveling in reverse.

When the directional selector switch on the head of the AJSS lever is set to the R position, the alarm sounds.



OPENING CAB, WINDOW DOOR

OPEN LOCK CANCEL KNOB FOR RIGHT CAB DOOR

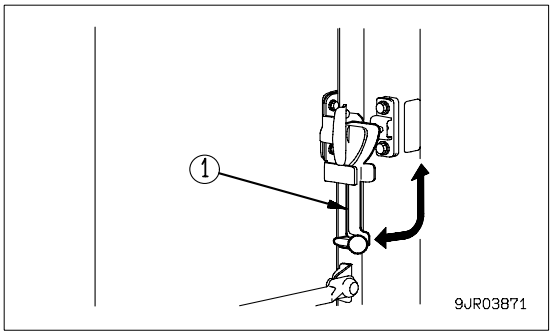
⚠ CAUTION

The right cab door is for use when escaping in an emergency. In normal situations, do not use it for getting in or out of the operator's compartment.
It is dangerous to keep the right window fully open when traveling or during operations. Do not leave it fully open.

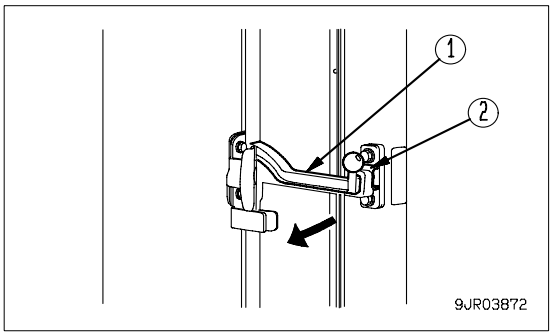
NOTICE
When closing the right window of the cab, insert lock release knob (1) into catch (2), then lower the lock release knob. If the door is closed with the lock release knob already lowered, the lock release knob may be broken.

Use this when it is desired to open the right window.

Pull lock cancel knob (1) up to open the right window.



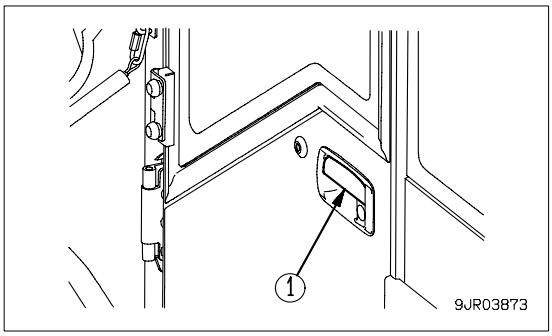
If lock cancel knob (1) is pulled up further, it is possible to open the right window to the open position. If lock lever knob (1) is pulled further to the left, it is possible to open (fully open) the right window.

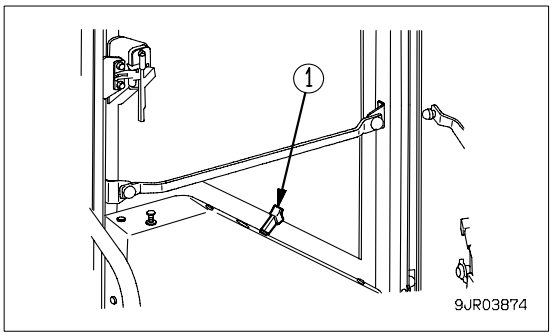


REMARK
The right window of the cab cannot be opened or closed from the outside.

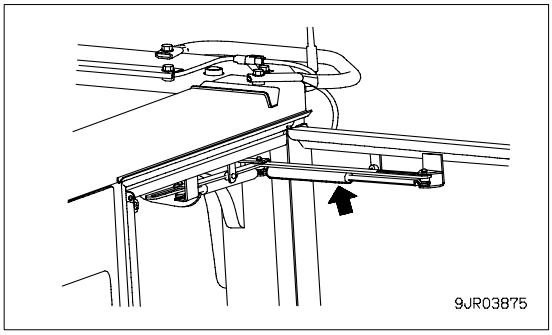
CAB LEFT DOOR OPEN KNOB

Pull open knob (1) to open the left door fully.





If the doorknob is pulled, the gas damper opens the door to the open position.



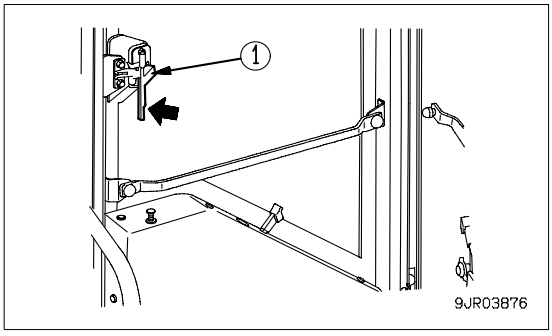
NOTICE
The gas damper is not a lock device to keep the cab door open.
Do not travel or carry out operations with the cab door left open.

OPEN LOCK CANCEL KNOB FOR LEFT CAB WINDOW

Use this when you want to open the window in the left door.

When opening the window, press lock release knob (1) in the direction of the arrow until it stops to hold the window in position.

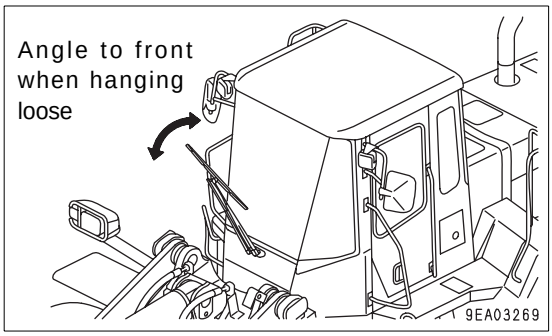
If the door is opened or closed without securing the window in position, the shock may cause the window to close.



HANDLING CAB WIPER

PREVENTING DAMAGE TO WIPER ARM BRACKET

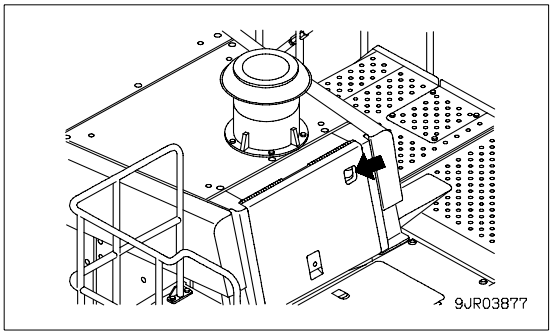
NOTICE
When angling the wiper arm to the front, check that the wiper blade is hanging free.



When angling the wiper arm to the front, such as when wiping the glass clean, if the wiper arm is angled with the wiper blade locked to the arm (the bottom of the blade is caught on the arm), abnormal force is brought to bear on the mounting bracket and the bracket may break.

DUST INDICATOR

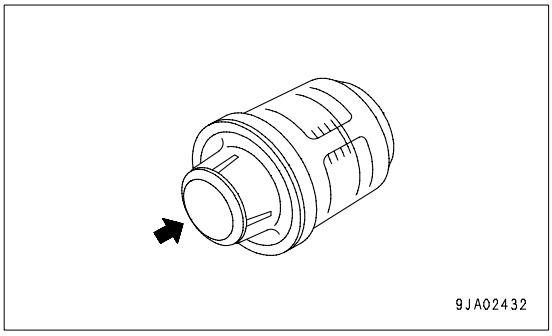
The dust indicator is at the front of the engine hood at the rear of the operator's compartment.



The display is given in five stages according to the degree of clogging of the element.

If the air cleaner is clogged, the air cleaner clogging caution lamp on the machine monitor lights up to inform the operator that the air cleaner needs to be cleaned.

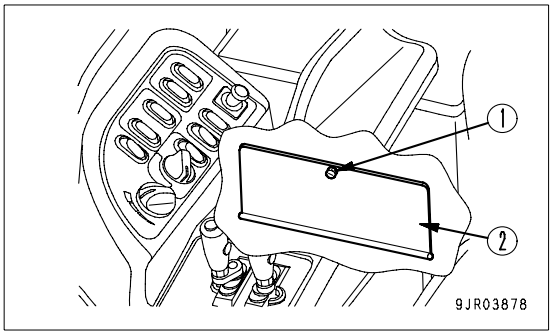
After cleaning, press the reset button to cancel the lamp.



For details of the method of cleaning, see “CLEANING OR REPLACING OUTER ELEMENT (4-22)“.

FUSE

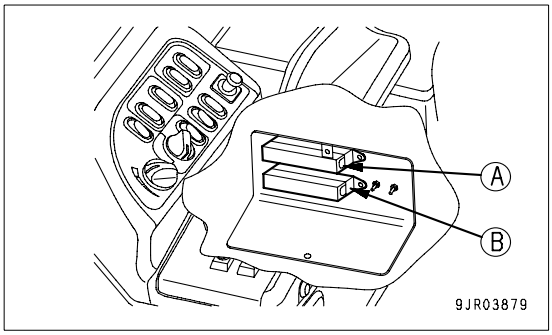
NOTICE
Before replacing a fuse, be sure to turn off the starting switch.



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.

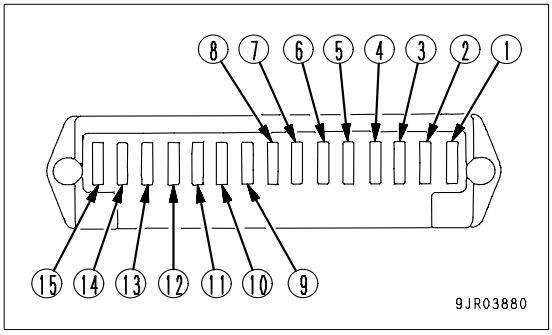


Slide the right console box to the front.

Loosen knob (1) and remove cover (2). A and B inside are the fuse boxes.

FUSE CAPACITY AND NAME OF CIRCUIT

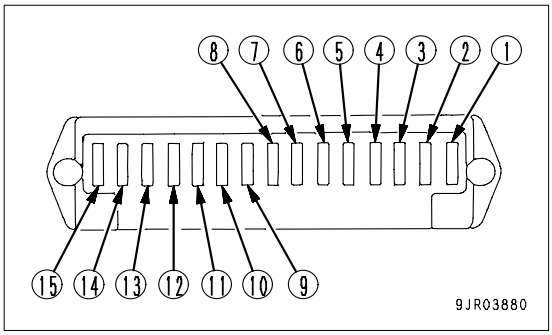
FUSE BOX A



No.	Fuse capacity	Name of circuit
(1)	10A	Starting switch
(2)	10A	Hazard lamp
(3)	10A	Step light
(4)	10A	Transmission controller (B)
(5)	10A	Work equipment controller (B)
(6)	10A	Machine monitor (B), VHMS controller (B)
(7)	5A	Engine controller
(8)	10A	Horn
(9)	20A	Air conditioner blower
(10)	10A	Auto-greasing
(11)	20A	Rear heated wire glass
(12)	10A	Car radio
(13)	20A	Air suspension seat, 12V converter
(14)	10A	VHMS controller (A)
(15)	10A	Spare

FUSE BOX B

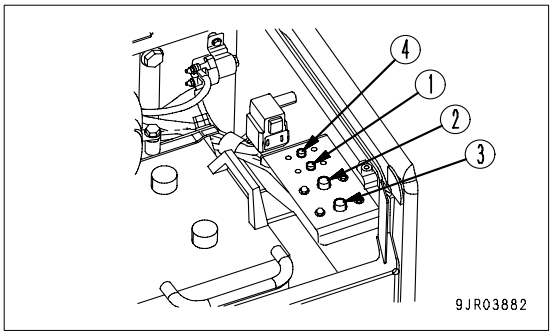
No.	Fuse capacity	Name of circuit
(1)	10A	Turn signal lamp
(2)	10A	Backup lamp, brake lamp
(3)	20A	Front working lamp
(4)	20A	Rear working lamp
(5)	10A	Transmission controller (A)
(6)	10A	Parking brake
(7)	10A	Work equipment controller (A)
(8)	10A	Machine monitor (A)
(9)	20A	Wiper, washer
(10)	10A	Spare
(11)	20A	Main lamp circuit
(12)	10A	Right side clearance lamp
(13)	10A	Left side clearance lamp
(14)	10A	Right front lamp
(15)	10A	Left front lamp



CIRCUIT BREAKER

NOTICE

- **When resetting the circuit breaker, always turn the starting switch OFF first.**
- **Do not keep the circuit breaker reset button pressed.**



- If the starting switch does not work when it is turned to the ON position, check the circuit breaker inside the battery case on the left side of the machine.
- If there is a surge of current, the circuit breaker shuts off the electric circuit to protect the electrical equipment and wiring from damage.

  Press the reset button to reset the circuit after it has been shut off.

REMARK

The circuit breaker is a circuit protection device installed to circuits where a large capacity electric current is flowing. In the same way as a normal fuse, it protects the electrical equipment and wiring from damage if there is an abnormal flow of electricity. However, after the problem point recovers, there is no need to replace any parts. It can simply be reset.

When resetting the electric circuit after it has been cut off, wait for 5-10 minutes after the circuit was cut off, then press the reset button. When resetting the electric circuit after it has been cut off, the operating effort of the reset button may be heavier than when operating it in normal conditions.

There is no difference in the height of the reset button between the condition when that the circuit is cut off or the condition when it has been reset. Check that the circuit has been reset by the effort needed to operate the button. If the circuit reset operation is carried out but the operating effort for the reset button is heavy, it is necessary to inspect the electric circuit.

If the starting motor does not work when the starting switch is turned to the START position, the circuit has probably been cut off by circuit breaker (1), so check circuit breaker (1) and reset it.
If electrical equipment does not work even when the fuse has been replaced, the circuit has probably been cut off by circuit breaker (2) or (3), so check circuit breakers (2) and (3), and reset them.

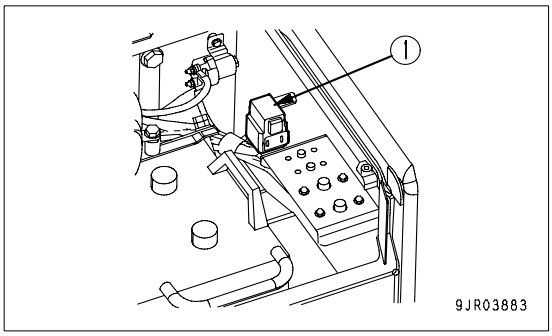
No.	Fuse capacity	Name of circuit
(1)	30A	Starting switch, work equipment controller, machine monitor, VHMS controller
(2)	105A	Fuse, fuse box A 8-15
(3)	105A	Fuse, fuse box B 1-11
(4)	20A	Engine controller

SLOW BLOW FUSE

If the preheating pilot lamp lights up, but 24V is not being impressed on the terminal (20Y) at the connector end of the electrical intake air heater, there is probably a disconnection in the slow blow fuse, so check and replace.

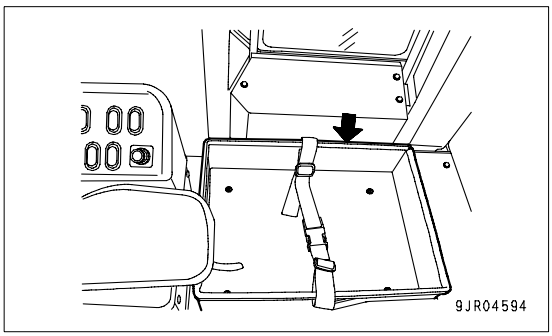
The slow blow fuse is inside the battery box on the right side of the machine (at the rear).

(1) Heater relay (electrical heater)



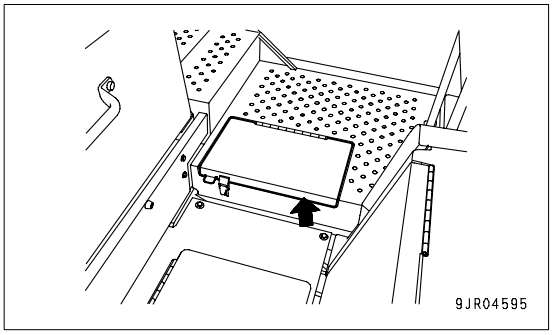
LUNCH BOX TRAY

There is a space for a lunch box at the right rear of the cab. Even a large lunch box 35 cm long, 22 cm wide and 18 cm high can be placed easily and attached with a band.



TOOL BOX

A toolbox is provided at the rear of the operator's compartment to keep tools.



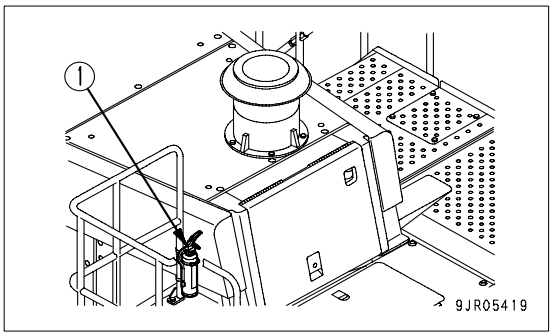
GREASE PUMP

The grease pump can be stored inside the toolbox. After using it, wipe off all the grease on the outside of the pump, then remove the nozzle and store the pump in the toolbox.

LOCATION OF FIRE EXTINGUISHER

(If equipped)

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



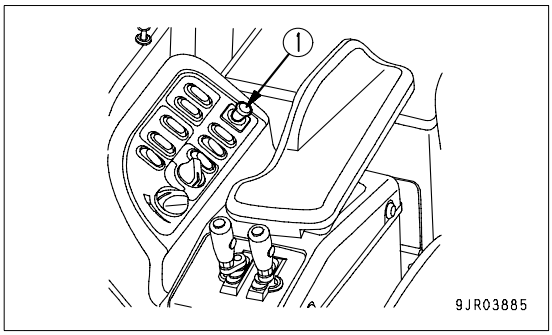
POWER OUTLET

NOTICE

- **There are two power sources: 12V and 24V**
  Check the voltage of the electrical equipment and select the appropriate power source.
  Mistaken use, such as using 24V as the power source for 12V equipment, will cause failure of the equipment.
- **When using the electric power source, do not install any equipment which will exceed the maximum amperage.**

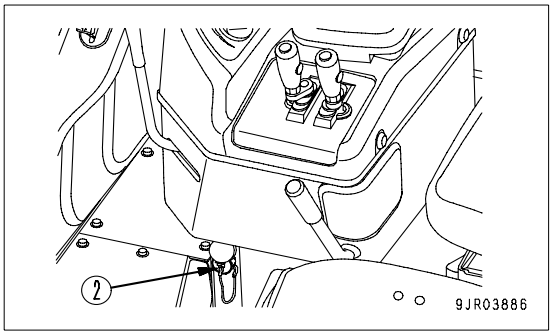
When cigarette lighter (1) is removed, the lighter socket can be used as a 24V power source.

Maximum amperage: 9A (216W)



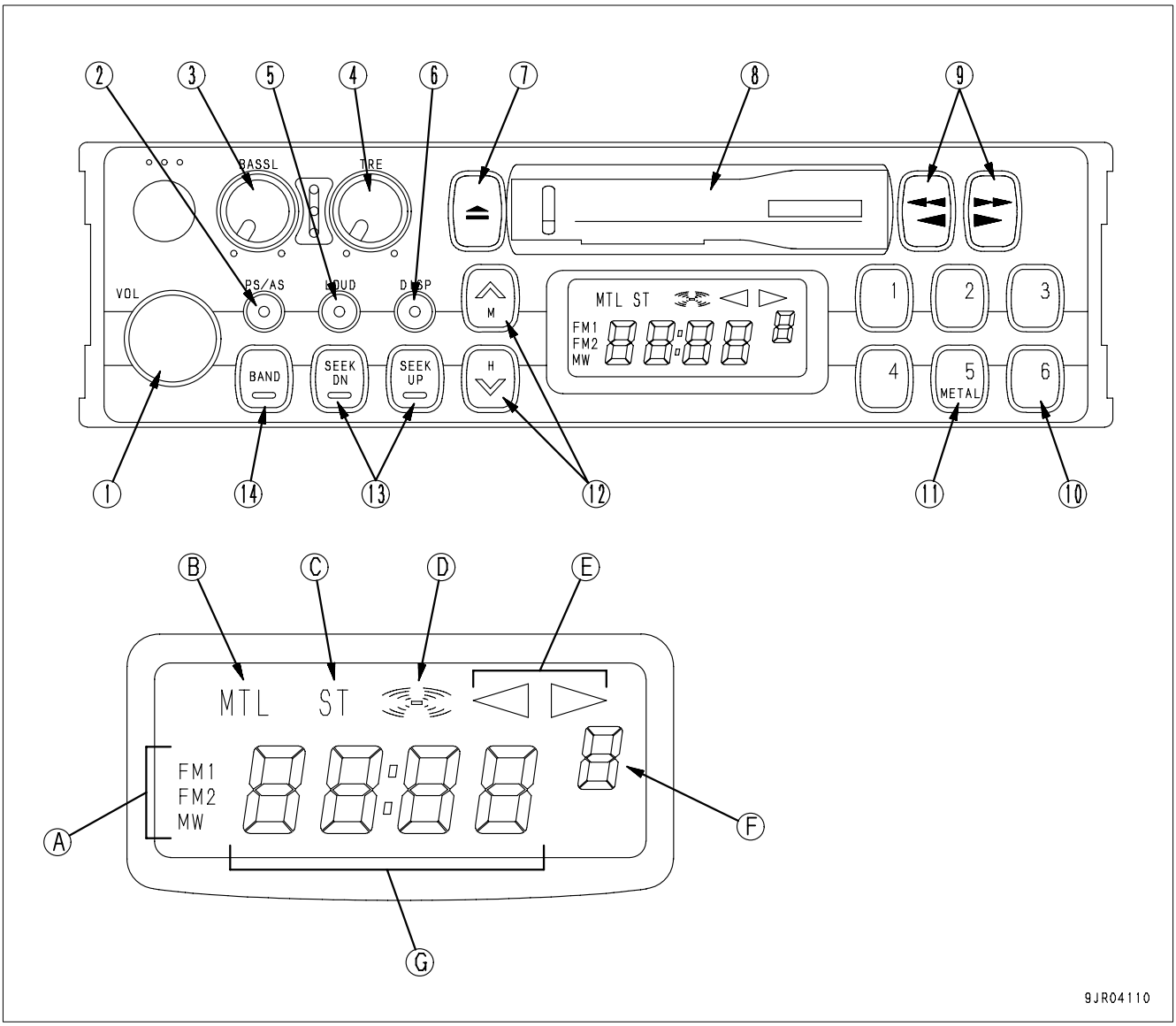
Electric power source (2) can be used as a 12V power source.

Maximum amperage: 10A (120W)



AM/FM RADIO-CASSETTE STEREO

EXPLANATION OF COMPONENTS



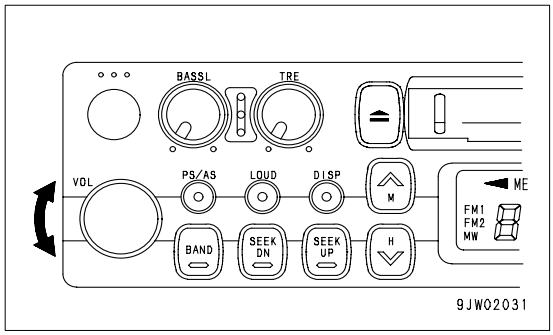
(1) Power switch/volume
(2) Auto-store/preset scan button
(3) Bass control knob
(4) Treble control knob
(5) Loudness button
(6) Time/radio display selector button
(7) Tape eject button
(8) Cassette door
(9) Fast forward, rewind buttons
(10) Preset buttons
(11) Metal tape button
(12) Manual tuning buttons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

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

POWER SWITCH/VOLUME

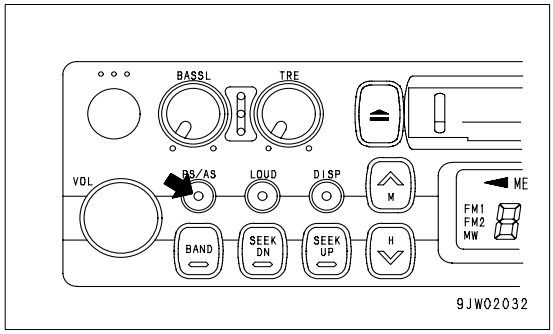
Turn this knob (1) to the right until it clicks to turn the power on.

Turn it further to increase the volume.



AUTO-STORE/PRESET SCAN BUTTON

Use this button (2) to actuate the preset scan and auto-store functions.



- Auto-store

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

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

- 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.

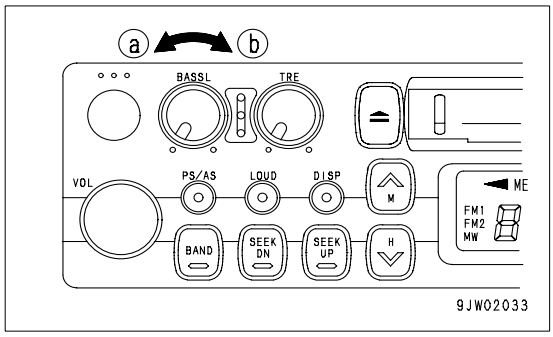
  When the desired station is found, press the button again. This stops the preset scan tuning process and switches to ordinary broadcasting. The same process will be repeated continuously until the button is pressed again.

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

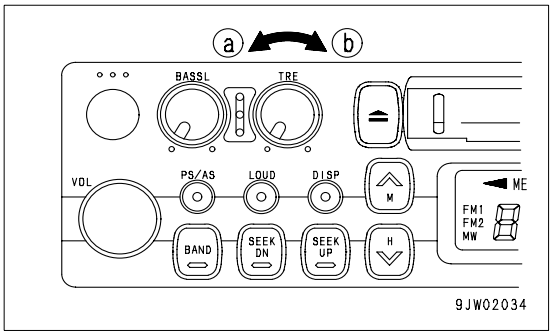


TREBLE CONTROL KNOB

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

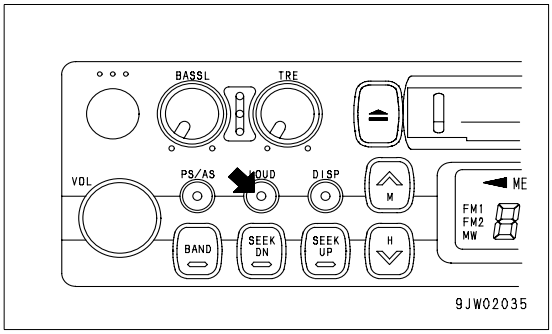


LOUDNESS BUTTON

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.

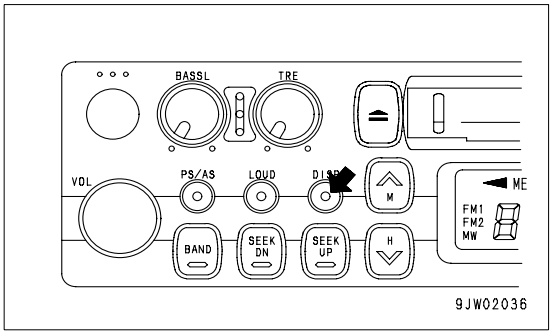
Push button: Actuated (ON)

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

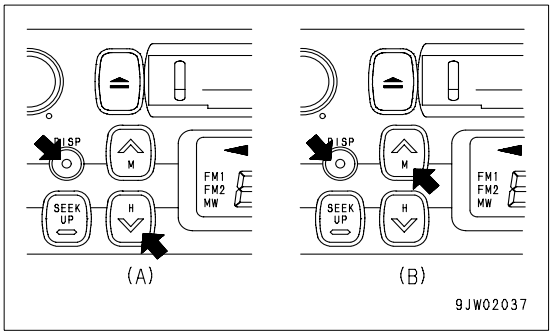
  Press the button to set the time display.

  (A) Correcting hour:

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

  (B) Correcting minute:

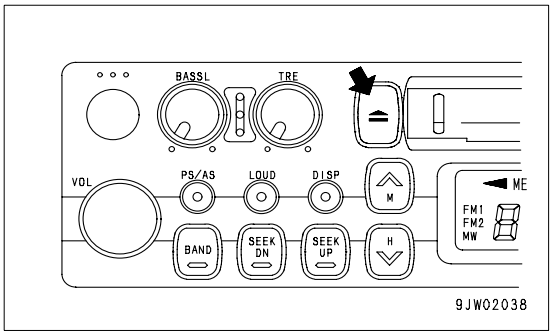
  Keep the DISP button pressed and press the top (M) of the TUNING button to correct the minute.



TAPE EJECT BUTTON

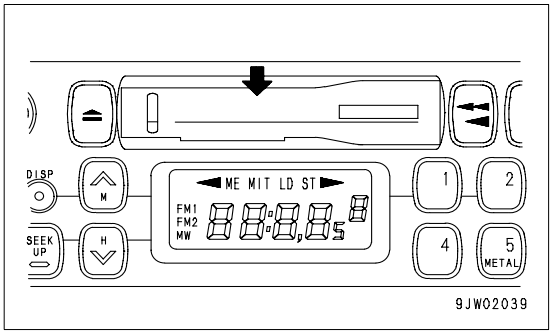
This button (7) is used to stop the tape and to eject the cassette.

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

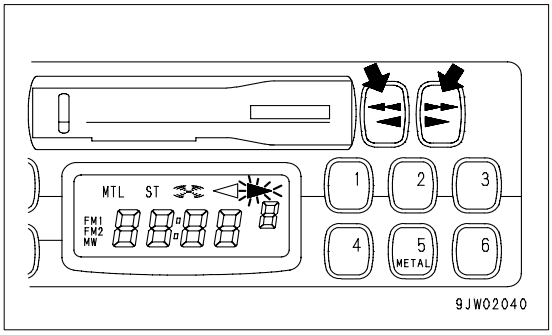
These buttons (9) are used to fast-forward or rewind the tape.

- 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.

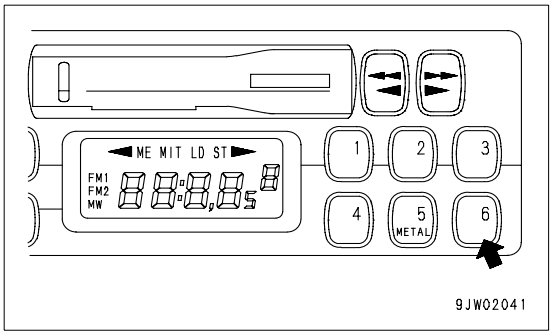
  If the fast forward and rewind buttons are pressed at the same time, the tape will change sides.



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.

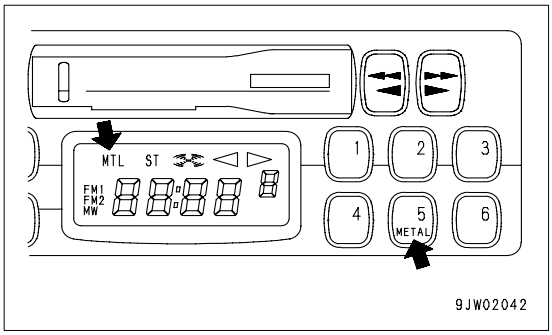
It is possible to preset 18 stations (FM: 12; AM: 6) with these buttons.



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.

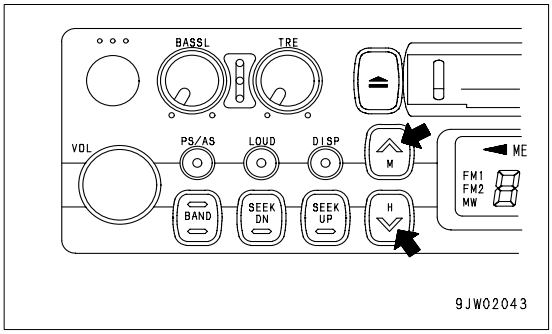


MANUAL TUNING BUTTONS

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 ∨“ button is pressed, the frequency goes down 9 kHz for AM or 0.1 MHz for FM.

If the button is pressed down and held, the frequency will change continuously.

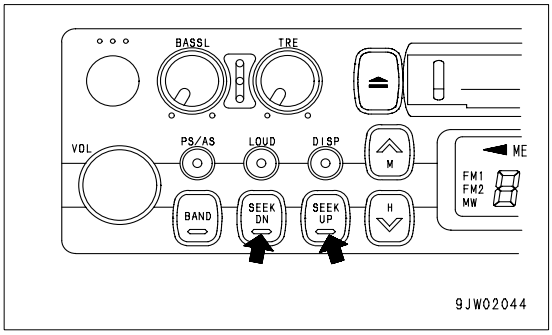


SEEK TUNING BUTTONS

These buttons (13) are used to seek tuning.

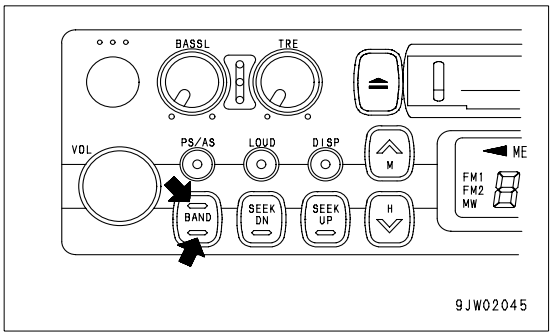
When the “SEEK UP“ button is pressed, the search automatically goes up; when the “SEEK DOWN“ button is pressed, the search automatically goes down.

When the next station that can be received is found, it automatically stops.



BAND SELECTOR BUTTON

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

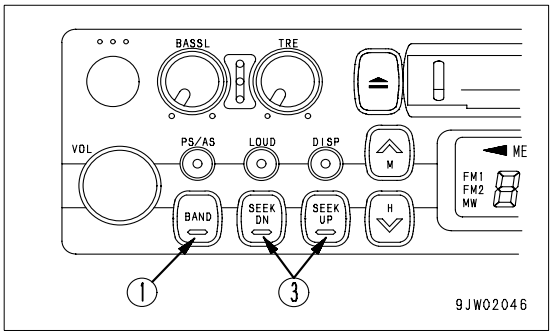


METHOD OF OPERATION

METHOD OF SETTING PRESET BUTTONS

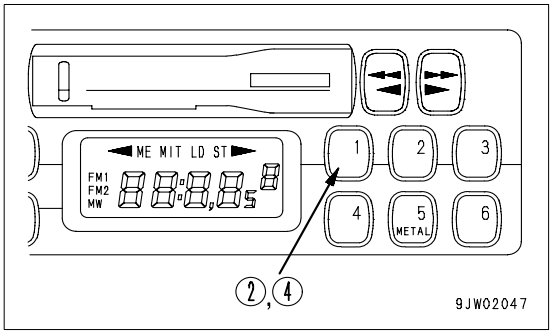
To listen to a preset station, use band selector button (1) to select AM, FM1, or FM2, then press the preset switch number to listen to the desired station.

It is possible to preset six AM stations and 12 FM stations (FM1: 6, FM2: 6).



1. If you are playing a cassette, press the tape eject button to stop the tape.
2. Select the station to be preset.

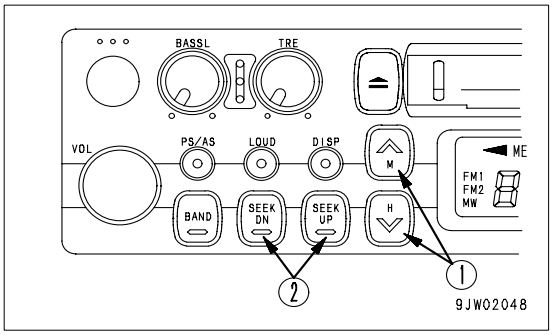
   Use band selector button (1) to select MW (AM), FM1, or FM2, then use the manual tuning button to select the frequency of the broadcasting station.
3. Press manual memory button (2) or seek tuning button (3).
4. Press preset button (4) of the number to be preset for 2 seconds while the frequency display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

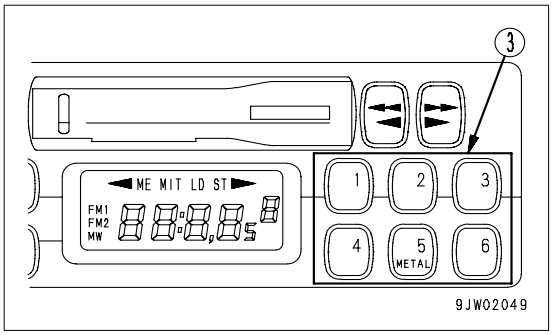


REMARK
Use Steps 2 to 4 also when changing the setting of a preset switch to another station.
When the power is disconnected, such as when the battery is replaced, all the settings are deleted, so preset the stations again.

METHOD OF AUTOMATIC MEMORY

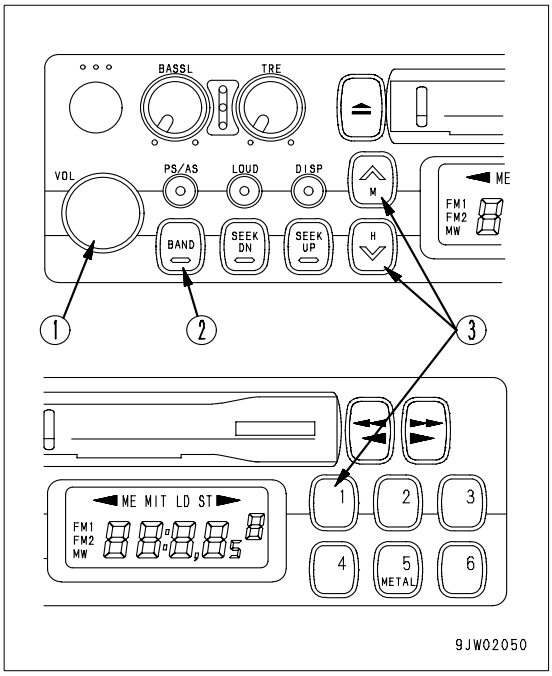
Select the station to be preset with manual tuning button (1) or seek tuning button (2), then keep button No.1 to button No.6 of button (3) pressed for 2 seconds while the frequency is being displayed to preset the station.





LISTENING TO RADIO

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



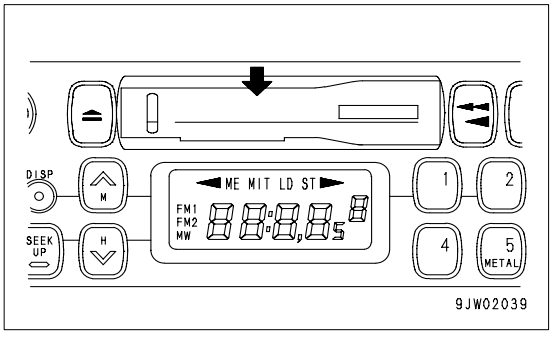
REMARK
To switch to the radio when listening to a cassette, press the cassette eject button to stop the tape.
If you insert a cassette when listening to the radio, the tape will start to play.

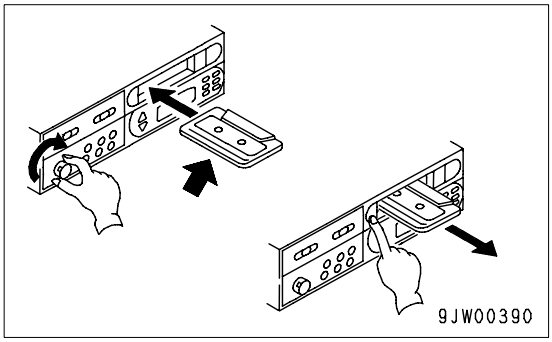
LISTENING TO CASSETTE TAPE

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.

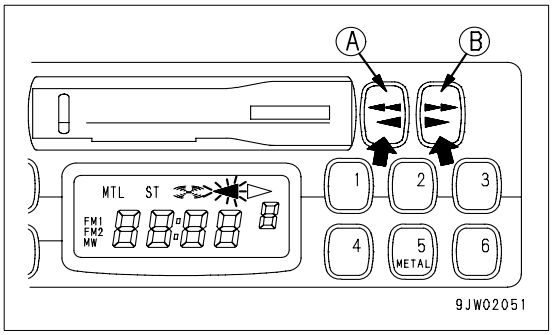




REVERSING TAPE

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

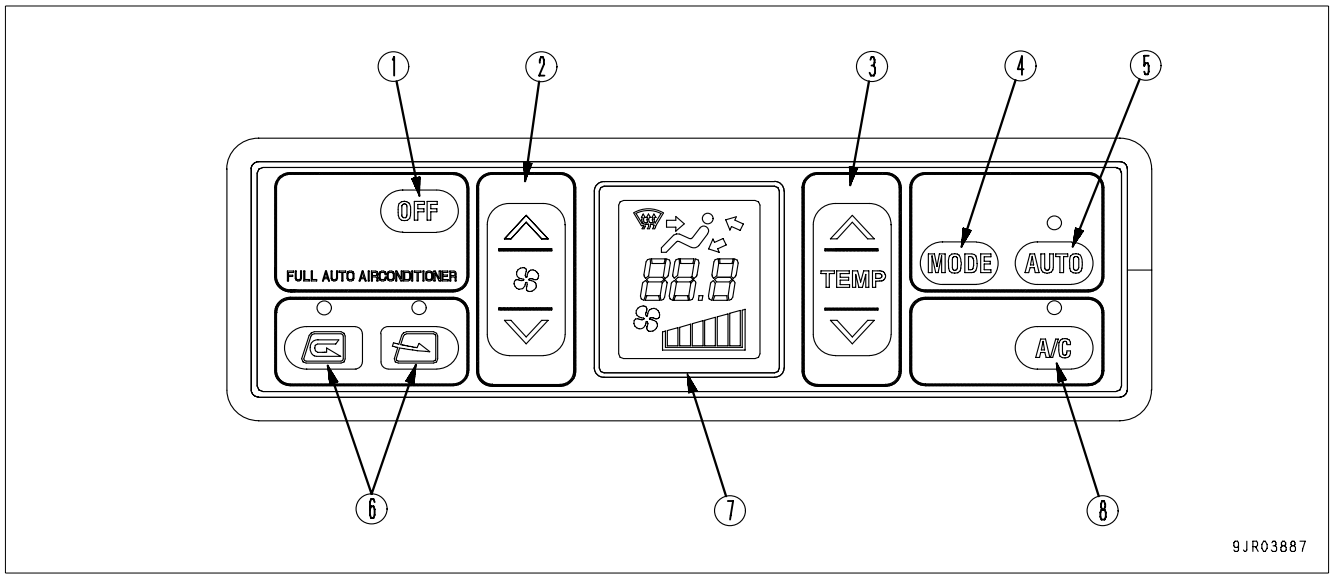
- **If a voltage greater than the specified voltage is input, it may cause fire, electrocution, or other failure. Never input any voltage other than the specified voltage.**
- **Places inside the radio are under high voltage. Do not remove the cover.**
- **Do not carry out any modifications. This may 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 approx. once a month with a commercially available head cleaning tape.
Do not leave the tape any place where it is exposed to direct sunlight, any place that is excessively dusty, or any place where there is a magnetic field.
Do not use 120-minute tapes. The tape is thin and it easily gets caught up inside the machine.
If the tape is slack, it easily gets caught up inside the machine. Use a pencil to wind in the tape to remove any slack.
Do not use any cassette tape if the label has started to come off. It may cause defective rotation, or it may be impossible to get the tape out of the machine.

AIR CONDITIONER

GENERAL LOCATIONS AND FUNCTION OF CONTROL PANEL

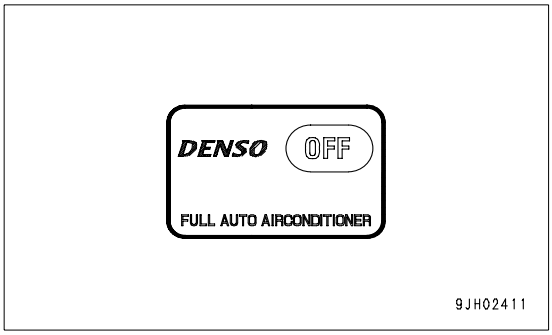


(1) Off switch
(2) Fan switch
(3) Temperature control switch
(4) Vent slector switch
(5) Auto switch
(6) FRESH/RECIRC selector switch
(7) Display monitor
(8) Air conditioner switch

OFF SWITCH

Switch (1) is used to stop the fan and air conditioner.

- When OFF switch (1) is pressed, the set temperature and air flow display on display monitor (7) and the lamps at the top of auto switch (5) and air conditioner switch (8) all go out, and operation stops.



FAN SWITCH

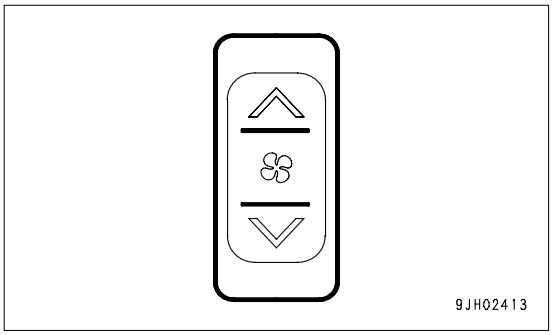
Use this switch (2) to regulate the air flow manually.

When the fan switch is pressed, the lamp at the top of the auto switch goes out to show that operation has changed to manual.

The air flow can be set to one of six levels.

- Press the "∧" switch to increase the air flow; press the "∨" switch to decrease the air flow.

  When doing this, it is possible to check the new set air flow on the monitor display.



Monitor display and air flow

A: Liquid crystal display

B: Air flow

a: Air flow "low"

b: Air flow "medium 1"

c: Air flow "medium 2"

d: Air flow "medium 3"

e: Air flow "medium 4"

f: Air flow "high"

A	B
	a
	b
	c
	d
	e
	f

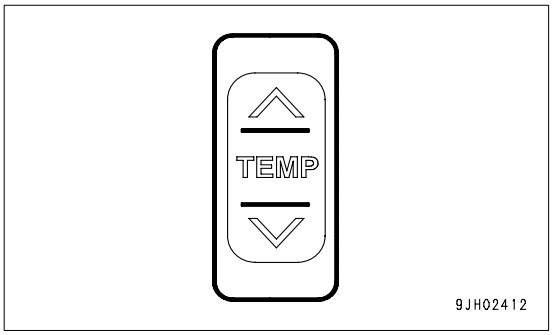
TEMPERATURE CONTROL SWITCH

Use this switch (3) to regulate the temperature inside the cab. It can be set to a range from 18°C - 32°C.

- Press the "∧" switch to increase the set temperature; press the "∨" switch to decrease the set temperature.

  When doing this, it is possible to check the new set temperature on the monitor display.

- The temperature can be set in stages of 0.5°C.



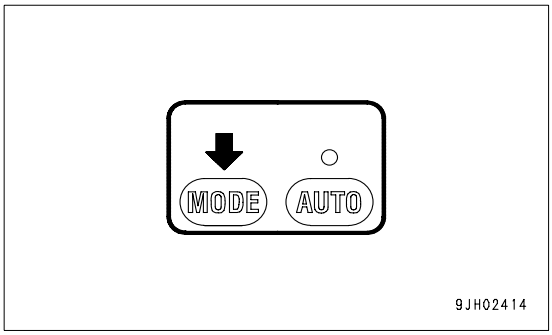
<Monitor display and the function>

Monitor display (°C)	Set temperature
18.0	Max. cooling
18.5 to 31.5	Adjusts temperature inside cab to set temperature
32.0	Max. heating

VENT SELECTOR SWITCH

Use this switch (4) to select the vents manually.

- Each time switch (4) is pressed, the display on monitor display (7) changes and air blows out from the displayed vents.
- During automatic operation, the vents are not selected by using the vent selector switch. The vents are switched automatically.

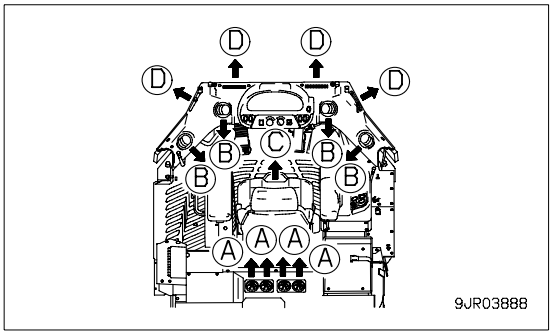


(A): Rear vents (4 places)

(B): Front vents (4 places)

(C): Foot vent (1 place)

(D): Defroster vents (4 places)

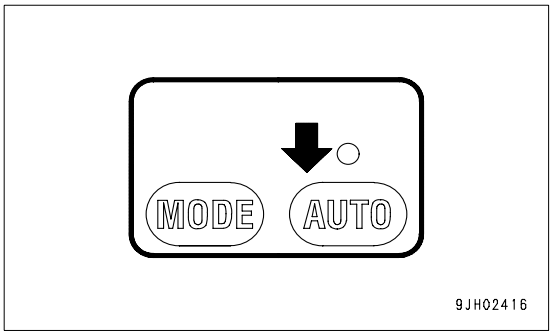


Liqiud crystal display	Vent mode	Vent				Remarks
		(A)	(B)	(C)	(D)	
	Front, rear and foot vents	O	O	O		-
	Front and rear vents	O	O			-
	Front vent		O			Cannot be selected for automatic operation
	Foot vent			O		-
	Foot vents Defroster vent			O	O	Cannot be selected for automatic operation
	Defroster vent				O	Cannot be selected for automatic operation

Note 1: Air blows from vents marked O

AUTO SWITCH

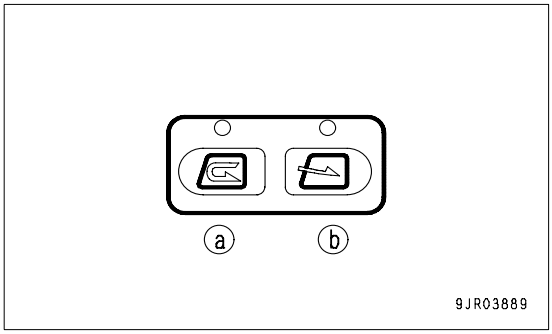
Use this switch (5) to automatically switch the air flow, vents, and air intake source according to the set temperature.



- When auto switch (5) is pressed, the lamp above the auto switch lights up to show that the air conditioner is running under automatic operation.
- Normally, press the switch, use temperature set switch (3) to set to the desired temperature, and run the air conditioner using automatic operation.
- If the fan switch, vent selector switch, or FRESH/RECIRC selector switch are operated, it is possible to change to the air flow, vents, and air intake source, and the system changes to manual operation. When this happens, the lamp above the auto switch goes out.

FRESH/RECIRC SELECTOR SWITCH

Use this switch (6) to change the intake air source manually between recirculation of the air inside the cab and intake of fresh air from outside.

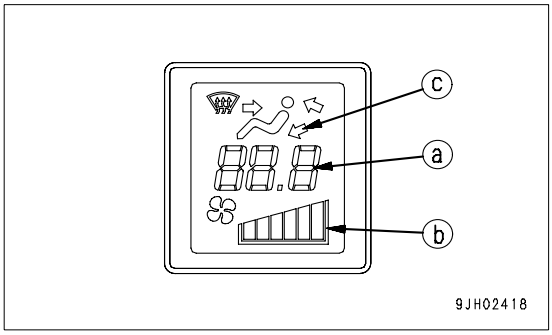


- When (a) of switch (6) is pressed, the air intake source changes to recirculation of the air inside the cab and the lamp above the selector switch lights up.
- When (b) of switch (6) is pressed, the air intake source changes to intake of fresh air from outside and the lamp above the selector switch goes out.
- During automatic operation, the air intake source switch is automatically switched between the recirculated air and fresh air, and the lamps above (a) and (b) of switch (6) go out.

RECIRC	Outside air is shut off and only air inside the cab is circulated. Use this setting to perform rapid cooling of the cab or when outside air is dirty.
FRESH	Outside air is taten into the cab. Use this setting to take in fresh air when performing demisting.

DISPLAY MONITOR

This display monitor (7) shows the condition of set temperature (a), air flow (b), and vent selection (c).



For details of the set temperature, see “TEMPERATURE CONTROL SWITCH (3-92)“.

For details of the air flow, see “FAN SWITCH (3-92)“.

For details of the vent selection, see “VENT SELECTOR SWITCH (3-93)“.

- When OFF switch (1) is pressed, the display of temperature setting (a) and air flow (b) goes out, and operation stops.

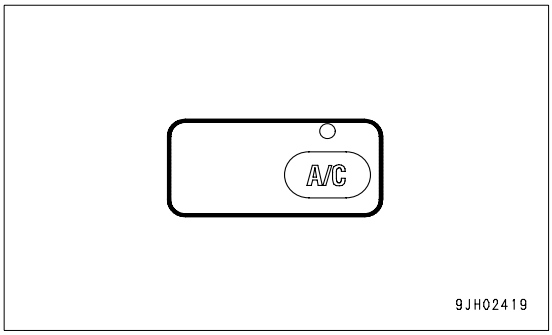
AIR CONDITIONER SWITCH

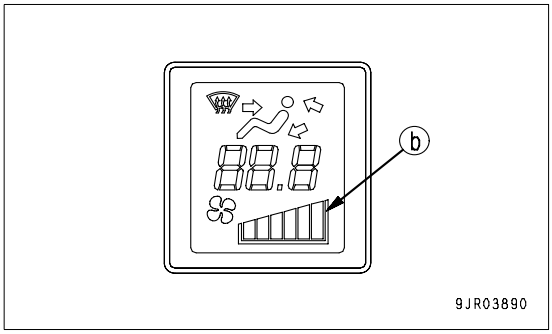
Use this switch (8) to operate or stop the air conditioner (cooling, dehumidifying warming).

- When the fan is actuated (display (b) is shown) and air conditioner switch (8) is pressed, the air conditioner is switched ON, lamp above the air conditioner switch lights up, and the air conditioner starts.

  When switch (8) is pressed again, the air conditioner is switched OFF, lamp above the air conditioner switch goes out, and the air conditioner stops.

- Air conditioner cannot be operated while the fan is off.





METHOD OF OPERATION

For this air conditioner, there are two methods of operation: automatic and manual.

With automatic operation, the air flow, vents, and air intake source are automatically selected according to the set temperature.

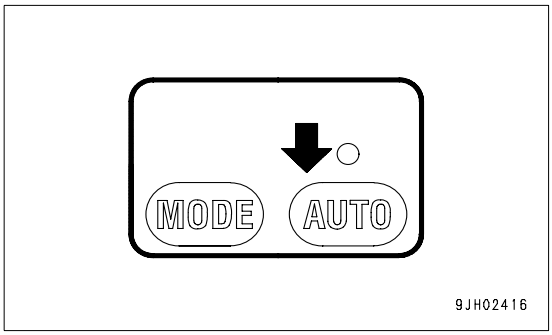
With manual operation, the air flow, vents, and air intake source are switched manually.

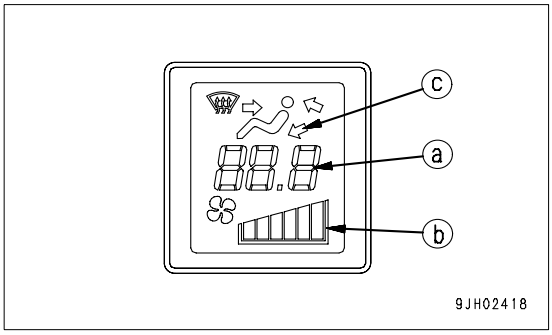
Please select the method of operation as desired.

AUTOMATIC OPERATION

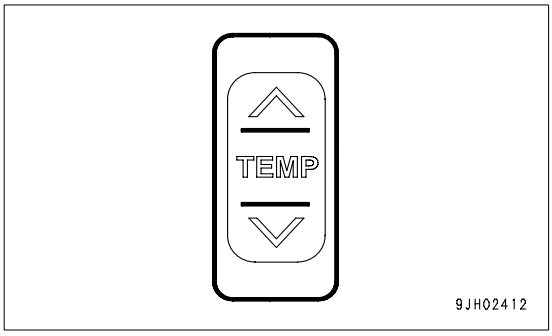
1. Turn the auto switch (5) ON.

   The lamp above this switch (5) lights up, and set temperature (a) and air flow (b) are displayed on the monitor.



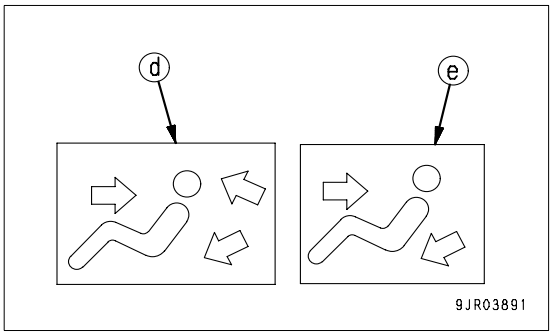


2. Press "∧" or "∨" of temperature set switch (3) to set the temperature to the desired level. The air flow, vents, and air intake source are automatically selected so that the temperature becomes the set temperature.



REMARK

If displays (d) or (e) appear on vent display monitor (c), if the engine water temperature is low, the air flow is automatically selected to prevent cold air from blowing out from the vents.



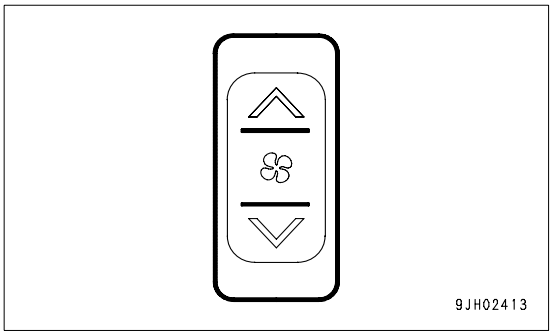
STOPPING AUTOMATIC OPERATION

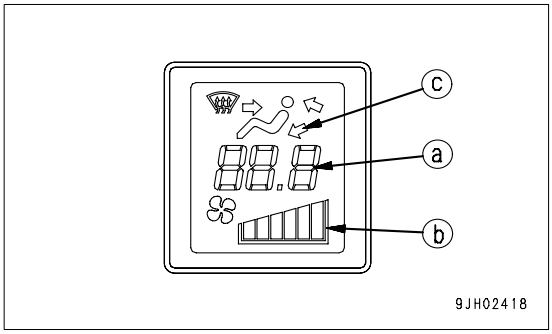
Press OFF switch (1). The displays for set temperature (a) and air flow (b) on the display monitor go out, the lamps above auto switch (5) and air conditioner switch (8) go out, and operation stops.



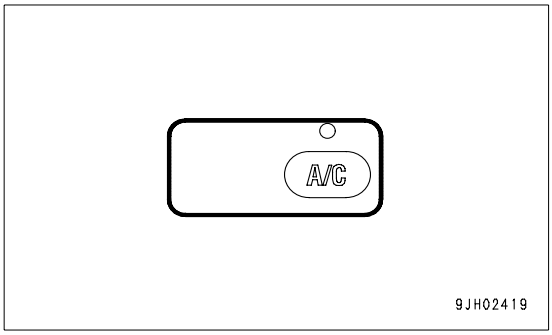
MANUAL OPERATION

1. Press "∧" or "∨" of fan switch (2) to adjust the air flow. When this is done, set temperature (a) and air flow (b) are displayed.

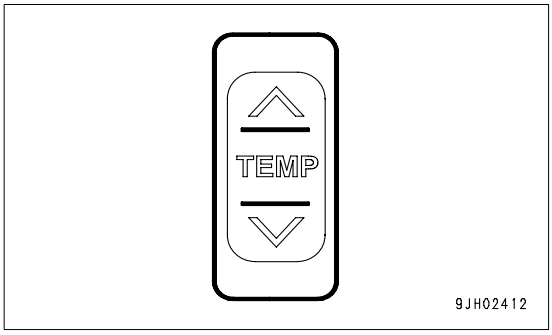




2. Turn air conditioner switch (8) ON. Check that the lamp above air conditioner switch lights up.

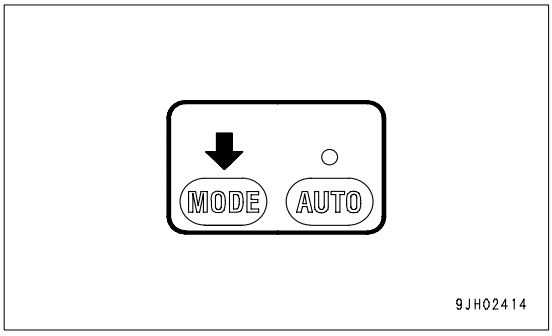


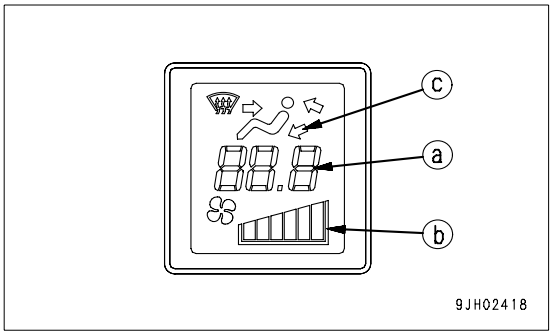
3. Press "∧" or "∨" of the temperature set switch to adjust the temperature inside the cab.



4. Press vent selector switch (4) to select the desired vent.

   Each time switch (4) is pressed, the monitor display for vent (c) changes.

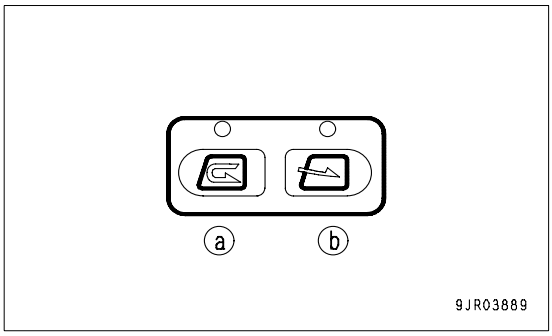




5. Press FRESH/RECIRC selector switch (6) to select recirculation of the air inside the cab or intake of fresh air from the outside.

   (a) Recirculation of air inside cab

   (b) Intake of fresh air from outside



STOPPING MANUAL OPERATION

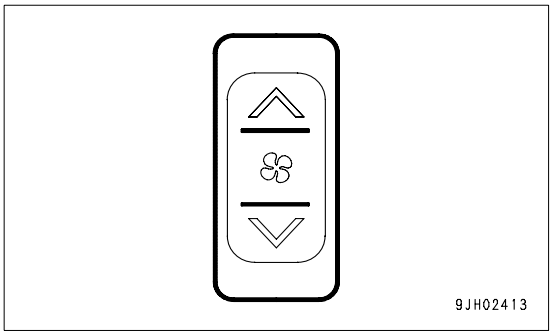
Press OFF switch (1). The displays for set temperature (a) and air flow (b) on the display monitor go out, the lamp above air conditioner switch (8) goes out, and operation stops.

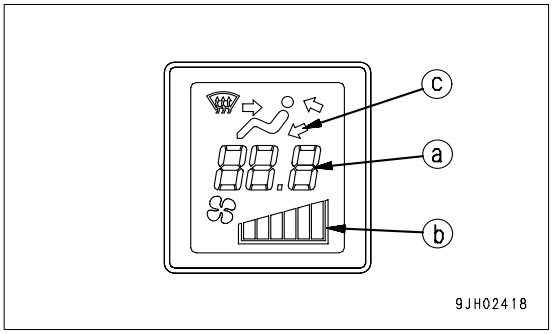


OPERATION WITH COLD AIR TO FACE AND WARM AIR TO FEET

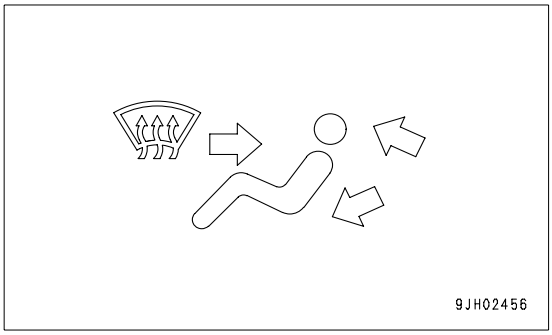
To operate with cold air blowing to the face and warm air blowing to the feet, set as follows.

1. Press "∧" or "∨" of fan switch (2) to adjust the air flow. When this is done, set temperature (a) and air flow (b) are displayed.

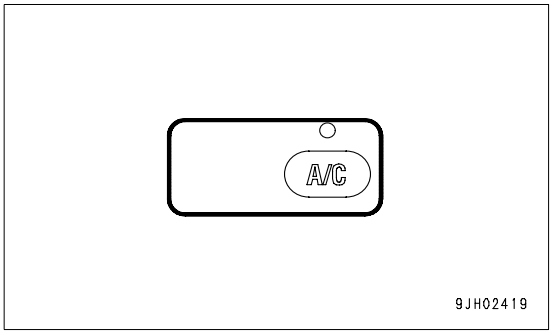




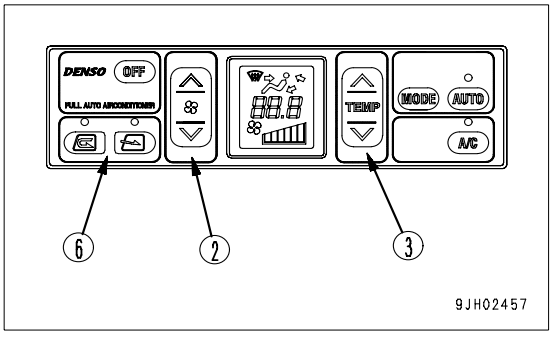
2. Press vent selector switch (4) to set the vents display on the monitor to the display shown in the diagram on the right.



3. Turn air conditioner switch (8) ON. When this is done, the lamp at the top of the air conditioner switch lights up to show that the air conditioner is in operation.



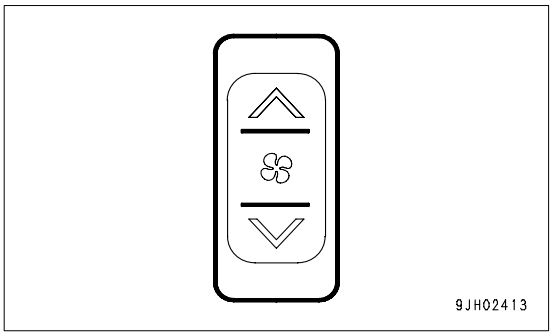
4. Operate fan switch (2), temperature set switch (3), and air intake selector switch (6) to adjust to the desired setting.

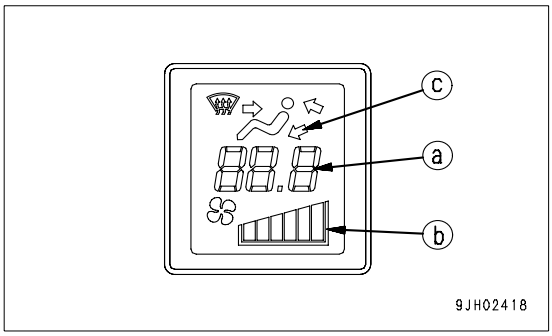


DEFROSTER OPERATION

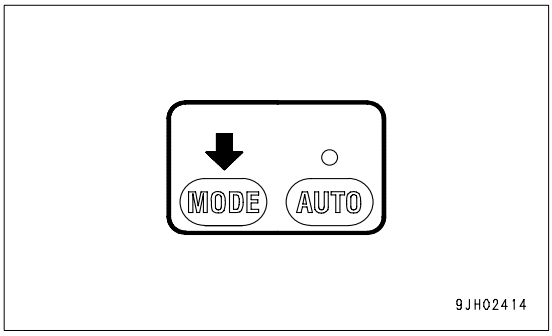
Use the defroster operation to remove all the mist and condensation on the inside of the window glass.

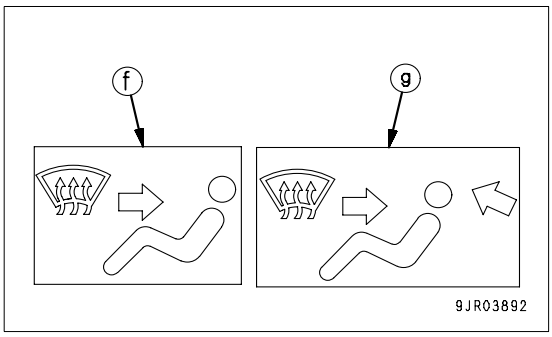
1. Press "∧" or "∨" of fan switch (2) to adjust the air flow. When this is done, set temperature (a) and air flow (b) are displayed.



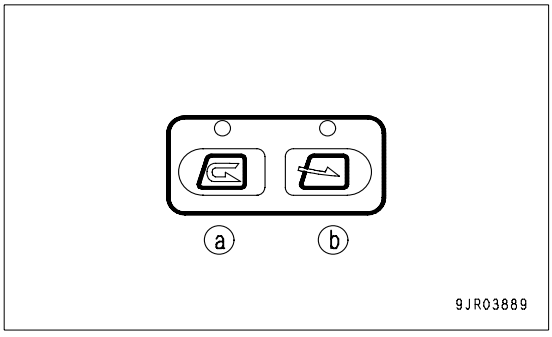


2. Press vent selector switch (4) to set the vent display on the monitor to (f) or (g) shown in the diagram on the right.

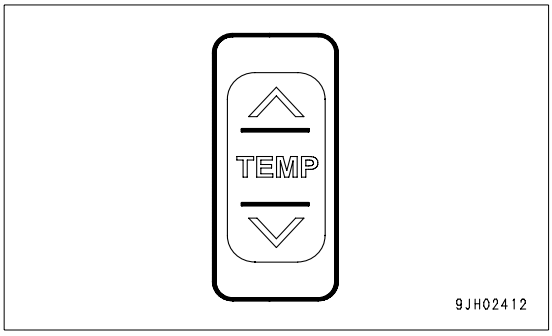




3. Press (b) of FRESH/RECIRC switch (6) to set to FRESH.

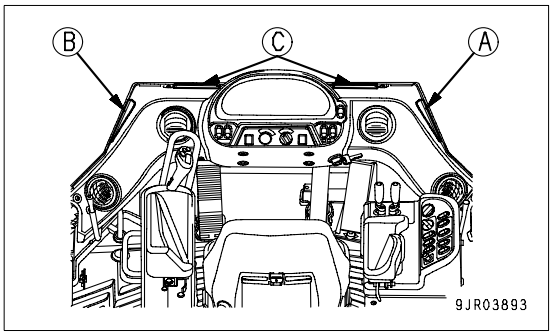


4. Press "∧" or "∨" of temperature set switch (3) to adjust the set temperature display on the monitor to the maximum heating of 32.0.

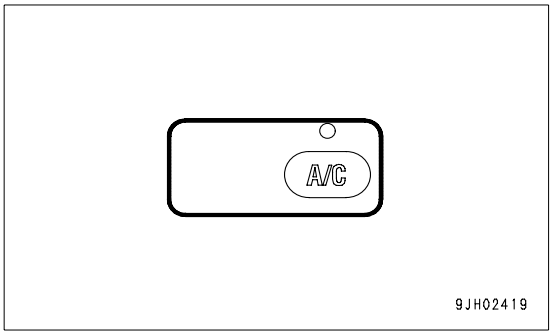


5. Adjust vents (A) and (B) so that the air blows against the window glass.

   (Vent (C) is a fixed type.)



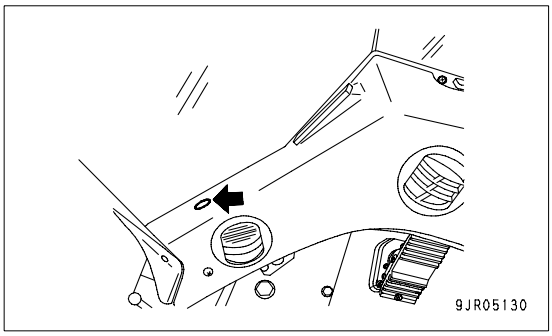
During the rainy season or other times of high humidity, if it is desired to carry out dehumidification, turn air conditioner switch (8) ON.



USE AIR CONDITIONER WITH CARE

NOTICE

- **When running the air conditioner, always start with the engine running at low speed. Never start the air conditioner when the engine is running at high speed. It will cause failure of the air conditioner.**
- **If water gets into the control panel or sunlight sensor, it may lead to unexpected failure, be careful not to let water get on these parts. In addition, never bring any flame near these parts.**
- **For the auto function of the air conditioner to work properly, always keep the sunlight sensor clean and do not leave anything around the sunlight sensor that may interfere with its sensor function.**



VENTILATION

- If you smoke when the air conditioner is on, the smoke may start to hurt your eyes, so open the window and turn the lever to FRESH for a while to remove the smoke while continuing the cooling.
- When using the air conditioner for a long time, carry out ventilation and cooling once every hour.

TEMPERATURE CONTROL

When the cooler is on, set the temperature so that it feels slightly cool when entering the cab (5 or 6 °C lower than the outside temperature). This temperature difference is considered to be the most suitable for your health, so always be careful to adjust the temperature properly.

AIR CONDITIONER MAINTENANCE

When carrying out inspection and maintenance of a machine equipped with an air conditioner, carry out the inspection and maintenance in accordance with the maintenance schedule chart. For details, see “MAINTENANCE SCHEDULE CHART (4-19)“ .

COOL BOX

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

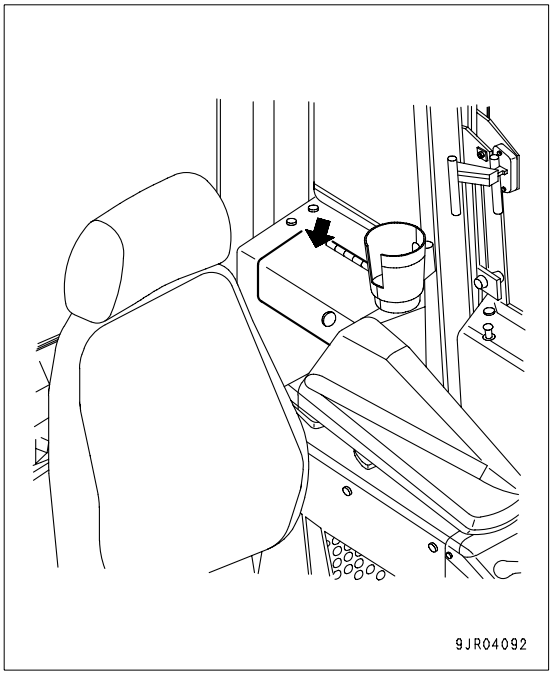
When the heating is being used, it can be used to keep things warm.

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.

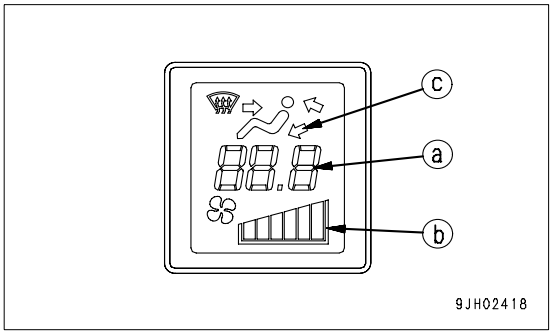


OTHER FUNCTIONS

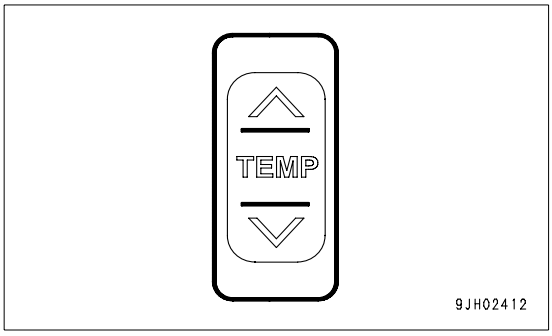
SELF-DIAGNOSTIC FUNCTION

It is possible to perform troubleshooting of various sensors and equipment used on the air conditioner.

1. Press OFF switch (1). The displays for set temperature (a) and air flow (b) on the display monitor go out, the lamps above auto switch (5) and air conditioner switch (8) go out, and operation stops.



2. Keep "∧" or "∨" of temperature set switch (3) pressed for at least 3 seconds. The failure mode is displayed on set temperature (a) portion of the screen.



<Monitor display and failure mode>

Display	Failure mode
E--	No failure
E11	Disconnection in recirculated air sensor
E12	Short circuit in recirculated air sensor
E15	Disconnection in coolant temperature sensor
E16	Short circuit in coolant temperature sensor
E18	Short circuit in sunlight sensor
E43	Problem in vent damper
E44	Problem in air mix damper
E45	Problem in RECIRC/FRESH air damper

- If more than one failure is detected, the display changes in turn when "∧" or "∨" of temperature set switch (3) is pressed.
- After completion of troubleshooting, press OFF switch (1) again. The display returns to the standard display.

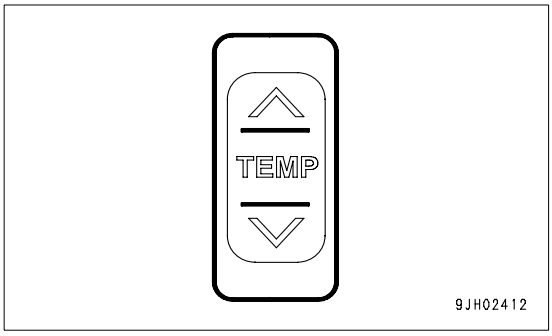
If any problem is detected by the self-diagnostic function, contact your Komatsu distributor perform inspection and repair.

FUNCTION TO SWITCH SET TEMPERATURE DISPLAY BETWEEN FAHRENHEIT AND CELSIUS

It is possible to switch the set temperature display between °F and °C.

If the "∨" and "∧" portions of temperature setting switch (3) are pressed at the same time for more than 5 seconds while the fan is running, the temperature display will switch between °F and °C.

(Note that the unit is not displayed.)



	Liquid crystal display range
°C	18.0 to 32.0
°F	63 to 91

OPERATION

CHECK BEFORE STARTING ENGINE, ADJUST

WALK-AROUND CHECK

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.

⚠ WARNING

- **Always hang a warning sign on the work equipment control levers.**
- **Spilled fuel or oil or accumulation of flammable materials around the battery or other high-temperature parts of the engine, such as the engine muffler or turbocharger will cause fire on the machine. Always check thoroughly and repair any problems or contact your Komatsu distributor.**
- **Always repair any damage to the handrails and steps, and tighten any loose bolts. Failure to do this may cause workers to fall and suffer serious personal injury.**

If the machine is at an angle, reposition it level before checking.

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

1. Check for damage, wear, play in work equipment, cylinders, linkage 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 that there is no dirt accumulated in the radiator or around the engine. Check also that there are no flammable materials (dry leaves, twigs, etc) accumulated around the battery or other high-temperature parts of the engine, such as the engine muffler or turbocharger. If any dirt or flammable materials are found, remove them immediately.

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 of oil from transmission case, axle, hydraulic tank, hoses, joints.

   Check that there is no oil leakage. If any abnormality is found, repair the leakage.

5. Check for oil leakage from the brake line.

   Check that there is no oil leakage. If any abnormality is found, repair the leakage.

6. Check for damage or wear to tires and loose mounting bolts.

   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 bolts. If any abnormality is found, repair or replace the part.

   If any valve caps are missing, install new caps.

7. Check for damage and loose bolts on the handrail and steps.

   Repair any damage and tighten any loose bolts.

8. 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.

NOTICE

- **Before starting operations, clean all dirt from the surface of the lamps. If the lamps are used with mud stuck to the surface, the lamp may overheat and suffer damage.**
- **If the lamp is cleaned when it is overheated, the sudden change in temperature may cause the lens to crack. Turn the lamp off and wait for the temperature to go down before cleaning the lamp.**

9. Check for loose air cleaner mounting bolts.

   Check for the loose bolts. If loose, tighten them.

10. Check for loose battery terminals.

    Tighten any loose terminal.

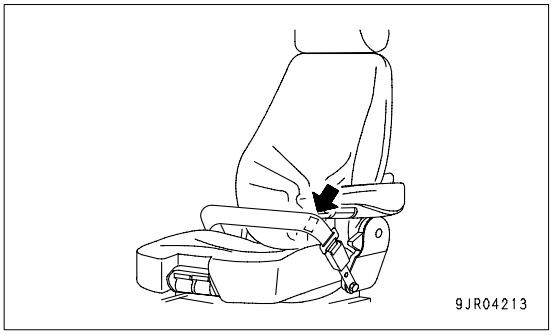
11. Check for damage to the seat belt and mounting clamps.

⚠ WARNING

Even if there appears to be no abnormality with the seat belt, replace it once every three years.

REMARK

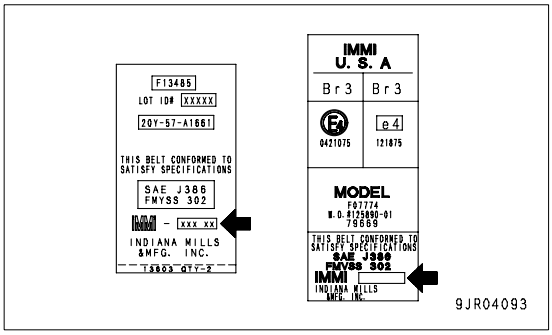
The date of manufacture of the seat belt is marked on the belt at the place indicated by the arrow in the diagram on the right.



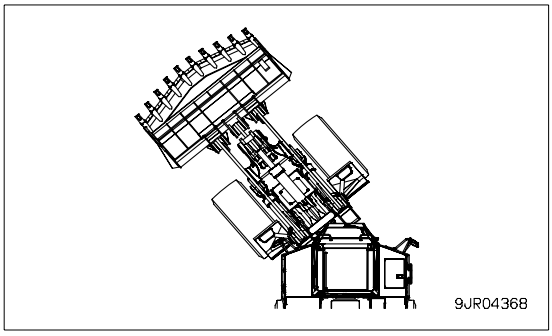
Check that there are no loose bolts on the equipment mounting the seat belt to the machine, and tighten if necessary.

Tightening torque: 24.5 ± 4.9 Nm (2.5 ± 0.5 kgm)

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.



12. Clean cab window.



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

When cleaning the front glass, articulate the machine, and move onto the step at the center of the front frame.

Clean the cab glass only on the side to which the machine is articulated. Using the step in the center of the front frame to move to the opposite side from the side which is articulated is extremely dangerous. Do not do this.

When cleaning the opposite side, first articulate the machine in the opposite direction, then carry out the cleaning.

When articulating the machine, articulate it to an angle of at least 38° from the line to the front. If the angle of articulation is small, it is a long distance to the step in the center of the front frame, and this creates a dangerous situation.

When cleaning the cab glass, use the handrail and step, and always be sure to maintain three-point contact (2 feet and 1 hand, or 1 foot and 2 hands) with the handrail and step to ensure that your body is supported properly.

13. Check rear view mirror, under view mirror

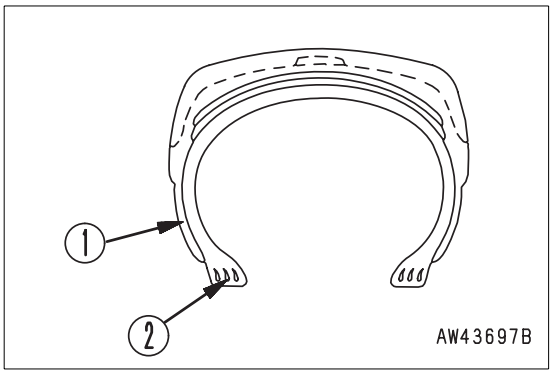
Check that the mirrors are not damaged. Replace them if they are damaged. Clean the surface of the mirrors and adjust the angle so that the operator can see the area to the rear and under the machine from the operator's seat.

When cleaning the mirrors, use a mop with a long handle.

14. 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



(1) Cord
(2) Bead

15. Inspect rims.

⚠ WARNING

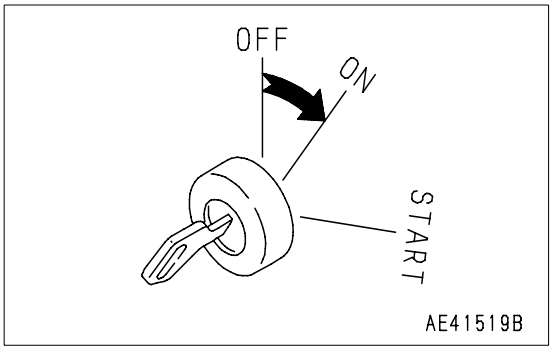
Check the rims (wheels) and rings for deformation, corrosion and cracks.
In particular, check the side rings, lock rings and rim flanges thoroughly.

CHECK BEFORE STARTING

Perform the contents of this section before starting the work of each day.

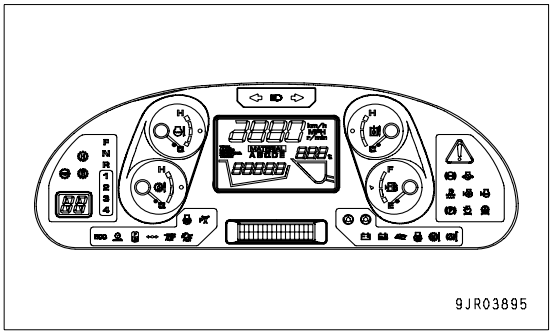
CHECK MONITOR PANEL

1. Turn the starting switch ON.



2. Check that all the monitors, gauges, and the central warning lamp light up for approx. 2 seconds, and that the alarm buzzer sounds for approx. 2 seconds.

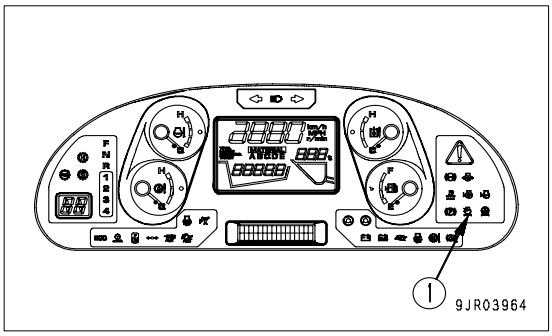
   If the lamps do not light up, there is probably a failure or disconnection. Contact your Komatsu distributor for inspection.



CHECK DUST INDICATOR

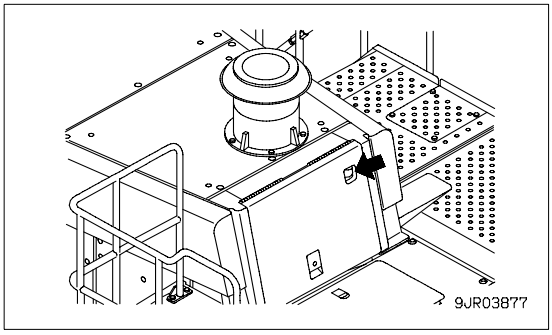
1. If air cleaner clogging caution lamp (1) on the machine monitor lights up, clean the air cleaner element.

   For details of the method of cleaning, see “CLEANING OR REPLACING OUTER ELEMENT (4-22)“.

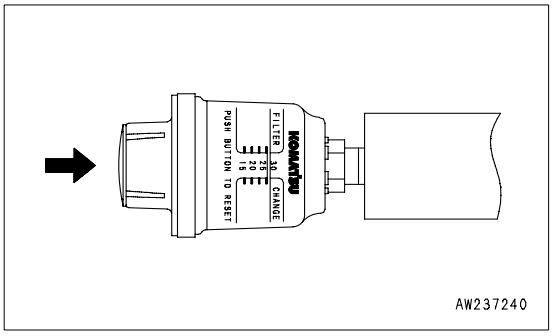


REMARK

A dust indicator is installed inside the engine hood on the left side of the machine. The dust indicator shows the condition of clogging of the air cleaner in 5 stages. This makes it possible to check how clean the element is and when it should be replaced.



2. After cleaning and replacing the element, push the dust indicator button to return the red display to its original position.



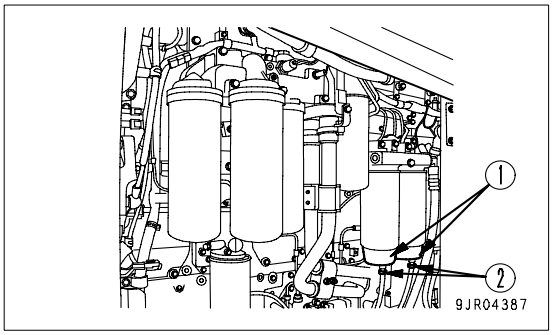
DRAIN WATER FROM FUEL PRE-FILTER

1. Check if any water is accumulated in cap (1) at the bottom of the filter.

2. If there is water accumulated in the cap (1), loosen drain plug (2) and drain the water.

3. Tighten drain plug (2).

   Tightening torque: 0.2 to 0.45 Nm {0.02 to 0.046 kgm}



CHECK COOLANT LEVEL, ADD COOLANT

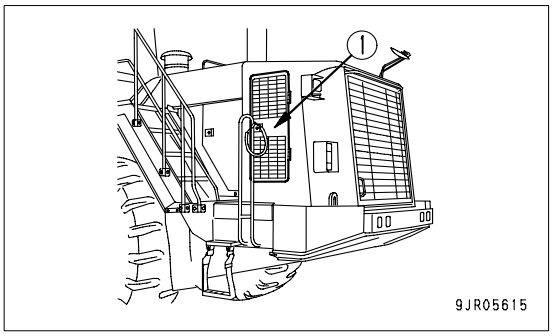
⚠ WARNING

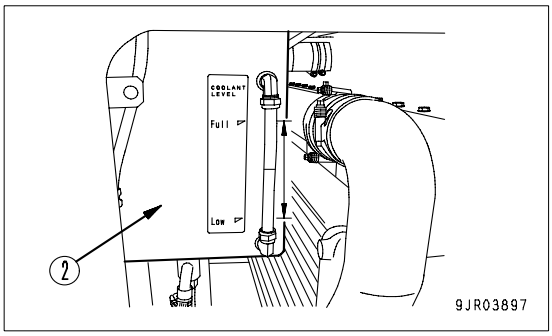
- **Do not open the radiator cap unless necessary. When checking the coolant, always wait for the engine to cool down and check the sub tank.**
- **Immediately after the engine is stopped, the coolant is at a high temperature and the radiator is under high internal pressure. If the cap is removed to check the coolant level in this condition, there is a hazard of burns. Wait for the temperature to go down, then turn the cap slowly to release the pressure and remove it carefully.**

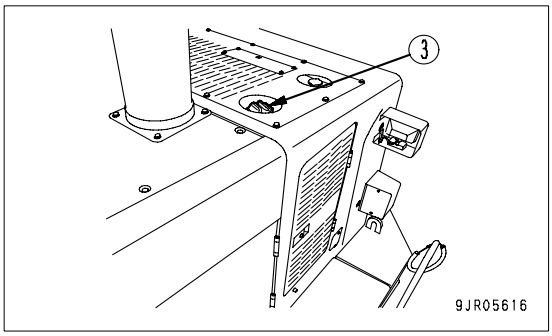
1. Open side door (1) of the radiator guard on the left side of the machine.
2. Check that the coolant is between the FULL and LOW marks on the sight gauge of sub tank (2). If the level is low, open the cap of sub tank (2) and add water through water filler (3) to the FULL level.
3. After adding coolant, tighten the cap securely.
4. If sub-tank (2) is empty, check for water leakage, then check the coolant level in the radiator. If the coolant level is low, add water to the radiator, then add water to sub-tank (2).

   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. Stop the engine and wait for the temperature at all parts to go down.

REMARK
When checking the oil level after the engine has been operated, wait for at least 15 minutes after stopping the engine before checking.
Checking the oil level with the engine idling may be allowed, if the following precautions are thoroughly satisfied:
- o Check that the engine water temperature gauge shows green range.
- o Use the side of the dipstick marked “ENGINE IDLING“.
- o Remove the oil filler cap.

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

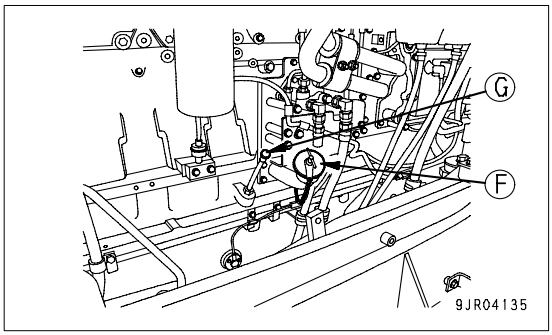
2. Open the engine side cover on the right side of the machine.
3. Take out the dipstick (G) and wipe off the oil with cloth.
4. Fully insert dipstick (G) into filler pipe (F), then remove it.

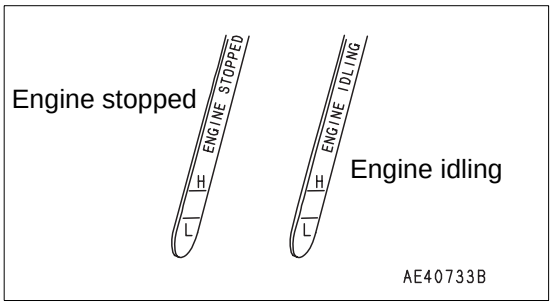
   The oil level should be between the H and L lines on dipstick (G).

   If the oil level is below the L line, add oil through oil filler port (F).

   The dipstick has level markings on both sides. One side gives the levels for measuring when the engine is stopped (ENGINE STOPPED) and the other side gives the levels for when the engine is idling (ENGINE IDLING).

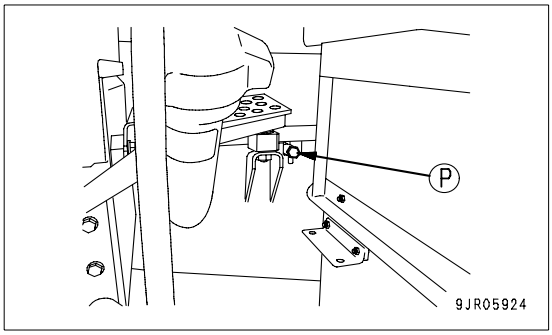
   When measuring the oil level, measure with the engine stopped and use the side of the dipstick marked “ENGINE STOPPED“.





5. If the oil is above the H line, install a hose to the oil drain port of drain plug (P), drain the excess oil, then check the oil level again.

REMARK
Use the supplied hose to prevent oil from spraying out into the surrounding area.



6. If the oil level is correct, tighten oil filler cap (F) securely, then remove the hose and close the engine side cover.

CHECK FUEL LEVEL, ADD FUEL

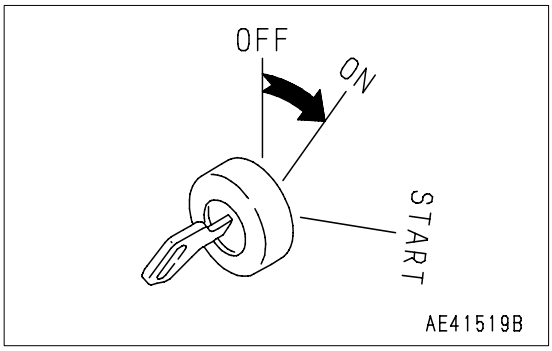
⚠ WARNING

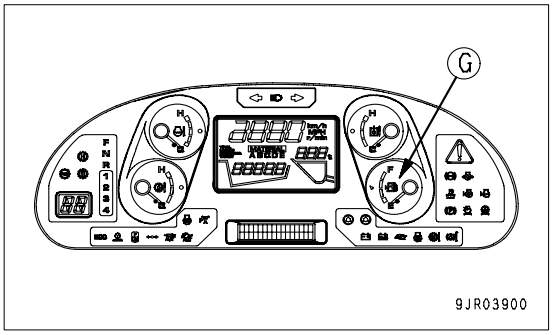
When adding fuel, never let the fuel overflow. This may cause a fire. If any fuel is spilled, wipe it up completely. Never bring flames near fuel because it is highly flammable and dangerous.

NOTICE
If the engine has run out of fuel and stopped, use the electric priming pump to bleed all the air from the fuel line when starting again. For details of the procedure for bleeding air from the fuel line, see "BLEEDING AIR FROM FUEL CIRCUIT (4-43)".
Be careful not to let the engine run out of fuel and stop.
If the engine has run out of fuel, filling the tank completely with fuel will reduce the time needed for bleeding the air.

1. Turn the engine starting switch to the ON position and check the fuel level with fuel level gauge (G).

   After checking, turn the switch back to the OFF position.



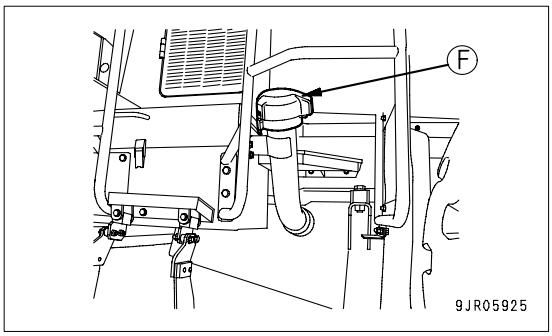


2. If the fuel level is low, then add fuel through oil filler port (F) to fill the tank.

   For details of the method for opening and closing the cap, see "CAP WITH LOCK (3-72)".

3. After adding fuel, tighten the cap securely.

   Fuel capacity: 718 liters



CHECK ELECTRIC WIRING

⚠ WARNING

- **If the fuses frequently blow or if there are traces of short circuits in the electrical wiring, locate the cause and immediately perform repairs, or contact your Komatsu distributor for repairs.**
- **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 clean 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 with full effect.

If there is any problem in the operation of the parking brake, please ask your Komatsu distributor to carry out adjustment.

CHECK BRAKE PEDAL

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	Standard inflation pressure
35/65-33-36PR (Standard)	Front tire: 0.525MPa {5.4kg/cm^2} Rear tire: 0.525MPa {5.4kg/cm^2}
35/65-33-42PR (if equipped)	Front tire: 0.625MPa {6.4kg/cm^2} Rear tire: 0.625MPa {6.4kg/cm^2}
35/65R33☆ (if equipped)	Front tire: 0.59MPa {6.0kg/cm^2} Rear tire: 0.49MPa {5.0kg/cm^2}
35/65R33☆☆ (if equipped)	Front tire: 0.75MPa {7.6kg/cm^2} Rear tire: 0.65MPa {6.6kg/cm^2}

NOTICE
The optimum inflation pressure differs according to the type of work. For details, see “HANDLING THE TIRES (3-166)“.

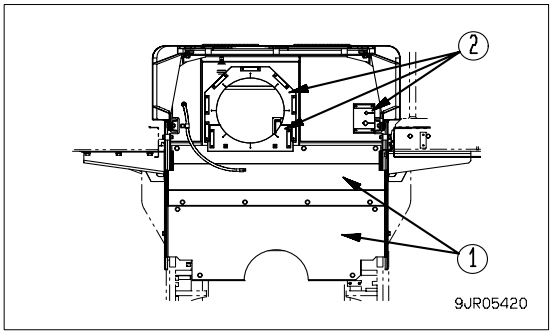
CHECK WATERPROOF/FIREPROOF DIVIDING WALLS

⚠ 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.

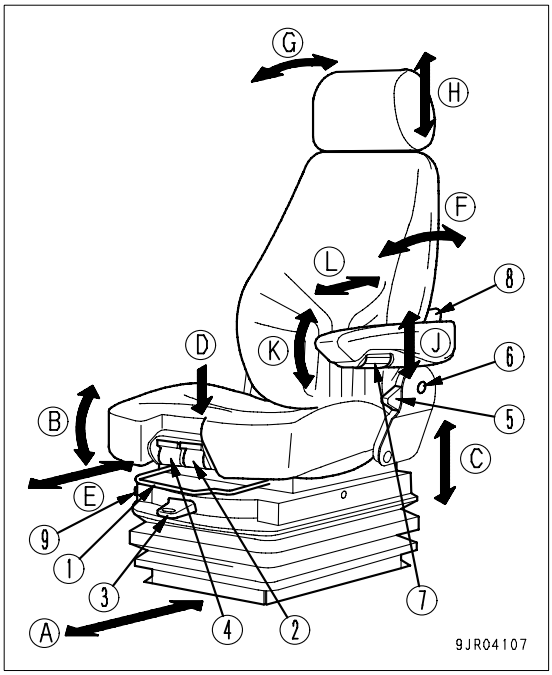
NOTICE
There is danger of damage to the air compressor, so do not keep lever (3) operated continuously for more than 1 minute.

(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 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

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.

(D) Setting seat for weight

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 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

(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

(J) Adjusting height of armrest (steering wheel specification machines only)

Remove cap (6), then loosen the nut. Set to the desired height, then tighten the nut and install the cap.

Amount of adjustment: Up: 16 mm

Down: 24 mm

It is also possible to make the armrest spring up.

(K) Adjusting angle of armrest (steering wheel specification machines only)

Turn knob (7) to adjust the angle of the armrest.

Amount of adjustment: 40 degrees (front: 30 degrees; rear: 10 degrees)

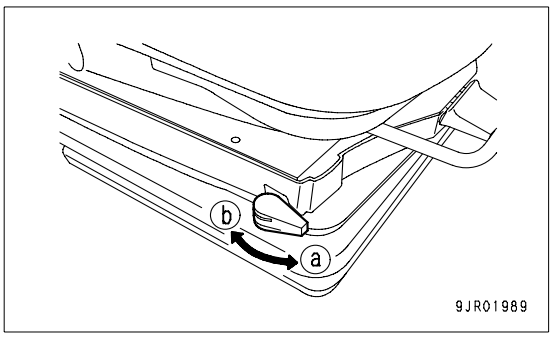
(L) Lumbar support

Turn knob (8) to the right or left to give suitable tension to the lumbar region.

(M) Adjusting hardness of suspension damper

Operate knob (9) to adjust the strength of the suspension damper. Turn knob (9) towards the front of the seat (a) to make the damping force harder; turn it towards the rear of the seat (b) to make the damping force softer.

Amount of adjustment: 5 stages



ADJUST SEAT BELT

Always wear the seat belt.

⚠ WARNING

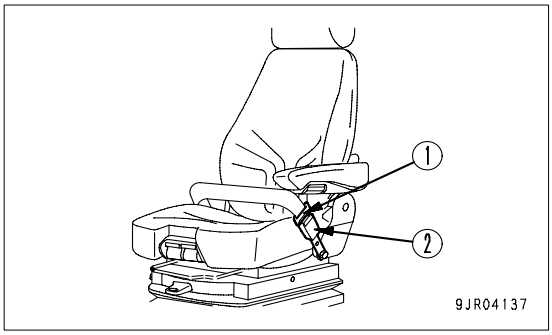
- **Before fastening the seatbelt, check that there is no abnormality in the seatbelt or seatbelt mounting bracket. Replace if any wear or damage is found.**
- **Fasten the seatbelt before starting operations.**
- **Always wear your seatbelt while carrying out operations.**
- **Make sure that the seatbelt is not twisted.**

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): 2000 mm

Range of view X (left): 2000 mm

Range of view X (Room): 1700 mm

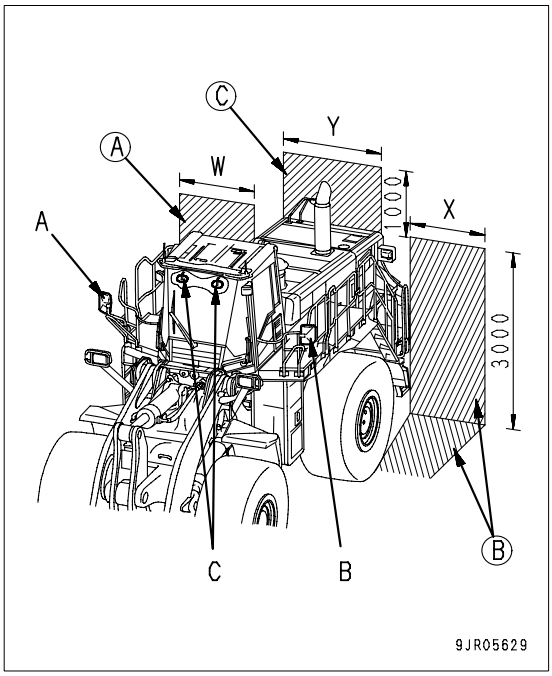
Range of view Z (rear): 1000 mm

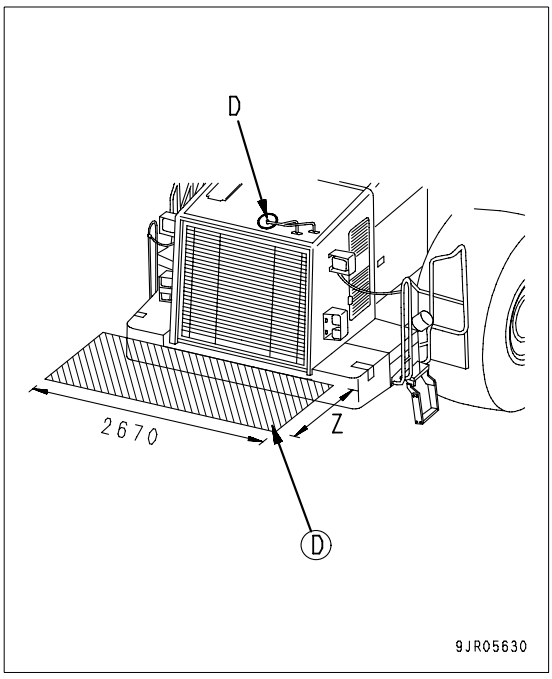
Mirror A: Must be possible to see hatched portion (A)

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)

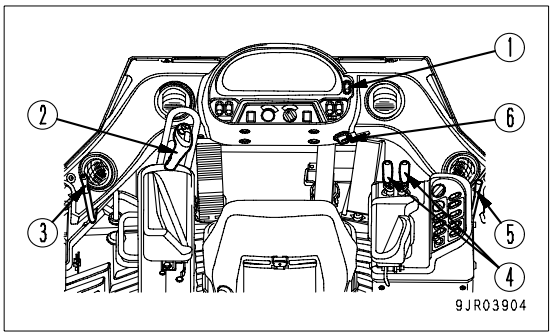




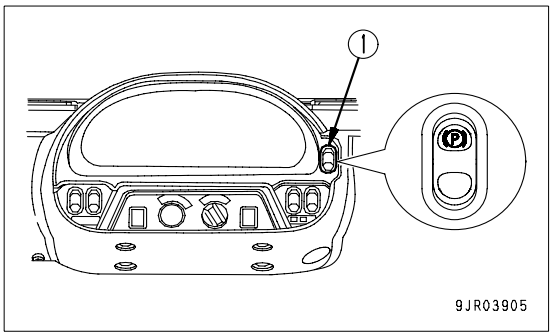
OPERATIONS AND CHECKS BEFORE STARTING ENGINE

⚠ WARNING

Before starting the engine, check that steering lock lever (3) and work equipment lock lever (5) are securely at the LOCK position.
If work equipment control lever (4) or AJSS lever (2) are touched by mistake when the engine starts, the work equipment or machine may move unexpectedly, leading to serious personal injury.



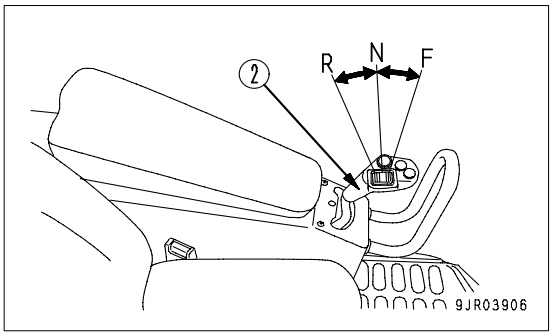
1. Check that parking brake switch (1) is at the ON position.



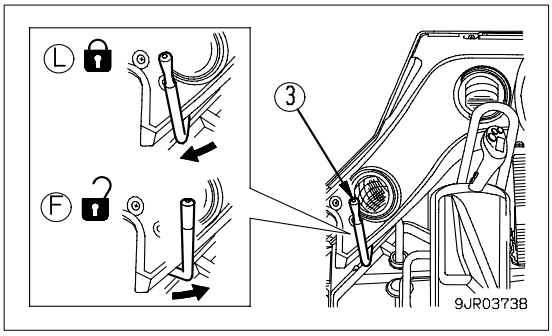
2. Check that the directional selector switch of AJSS lever (2) is at the N position and that the AJSS lever is at the Neutral position.

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

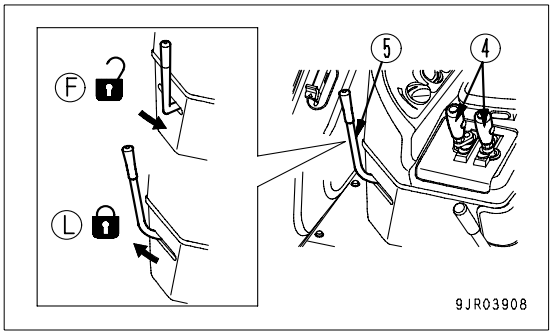
   If the engine does not start, check that steering lock lever (3) is at LOCK position (L).



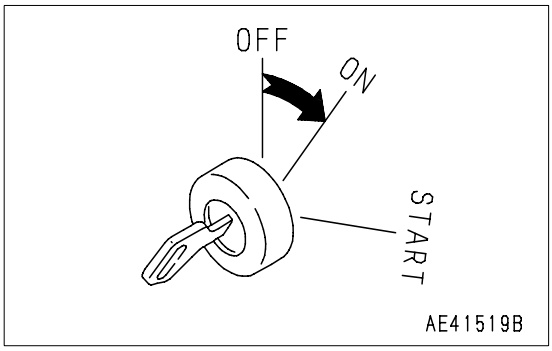
REMARK
If the directional selector switch is not at the N position, the warning buzzer sounds (in a 0.25 second cycle).
If the AJSS lever is not at the Neutral position and the starting switch is turned ON, the alarm buzzer sounds (in a 0.25 second cycle).
If this happens, return the AJSS lever to the Neutral position.



3. Lower the bucket to the ground and check that work equipment lock lever (5) of work equipment control lever (4) is at LOCK position (L). If it is not at LOCK position (L), move it from FREE position (F) to LOCK position (L).



4. Insert the key in starting switch (6), turn the key to the ON position, and check that the machine monitor system works.



Before starting the engine, turn the starting switch to the ON position. All monitors, gauges, and the central warning lamp will light up for approx. 2 seconds, and the alarm buzzer will sound at the same time.

If any monitor does not light up, there is probably a failure or disconnection. Contact your Komatsu distributor for inspection.

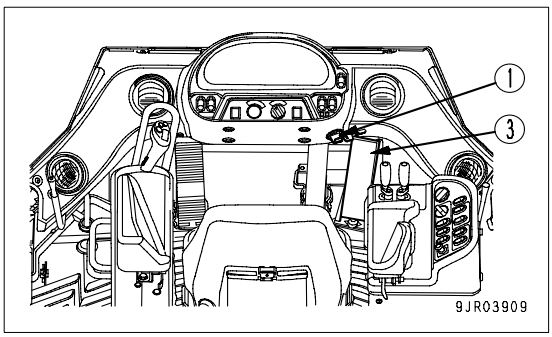
STARTING ENGINE

⚠ 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.**

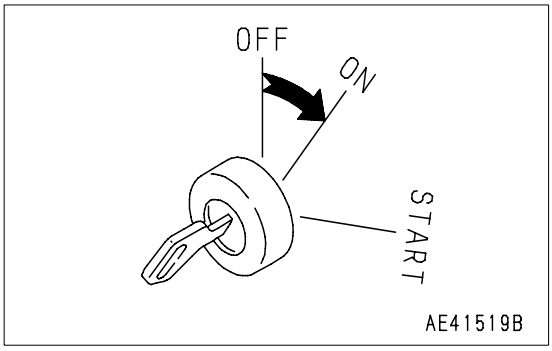
NOTICE

- **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.**
- **Avoid the sudden acceleration of the engine until it is warmed up.**



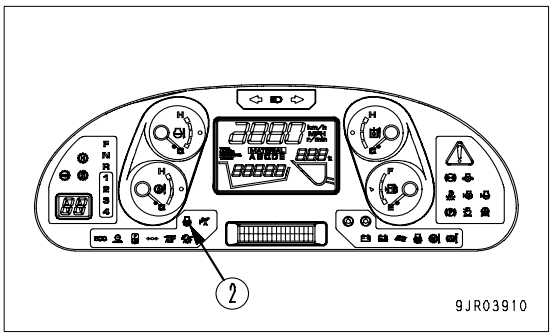
1. Turn the key in starting switch (1) to the ON position. Pre-heating will automatically start and pre-heating pilot lamp (2) will light up.

   Automatic pre-heating is actuated when the cooling water temperature is less than -5°C.



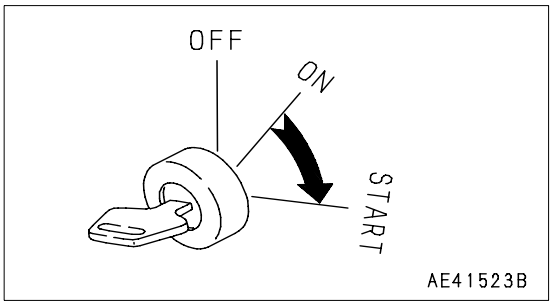
   The pre-heating times are as shown below.

Cooling water temperature	Pre-heating time
above 0°C	0 second
-5°C	20 seconds
below -25°C	45 seconds

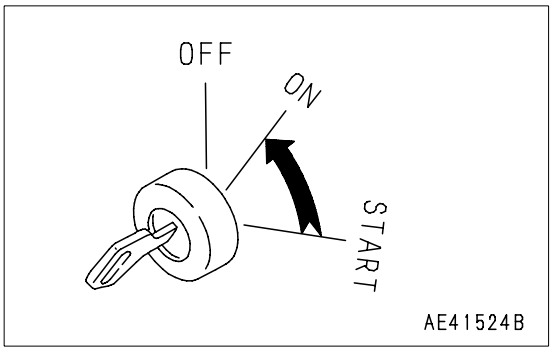


2. Keep the accelerator pedal (3) free without depressing it.

3. After the pre-heating pilot lamp (2) goes out, turn the key of starting switch (1) to the START position to start the engine.



4. After the engine starts, release the key in starting switch (1). The key will automatically return to the ON position.



5. Immediately after starting the engine, run the engine at idling without depressing accelerator pedal (3) for at least 10 seconds in warm weather and for at least 15 seconds in cold weather.

REMARK
Immediately after the engine starts, the turbocharger protect function prevents the engine speed from going above 1000 rpm for a maximum of 20 seconds, even if the accelerator pedal is depressed.

- If the accelerator pedal is kept depressed, the engine speed will suddenly rise after the turbo protect time. To prevent this, release the accelerator pedal.

- The turbocharger rotates at extremely high speed. Immediately after the engine is started, the pressure of the lubricating oil has not risen sufficiently, so if the engine speed is suddenly raised, it may lead to damage or seizure of the turbocharger bearing. The turbo protect function acts to prevent this problem. It uses electronic control to prevent the engine speed from rising above a certain speed for the first few seconds after the engine started.

AUTOMATIC WARMING-UP OPERATION

A function of engine warming-up run (engine rpm: 1000 rpm) is automatically actuated after the engine is started up, when the engine water temperature is low (below 30°C). It is gradually released either when the engine water temperature rises over 30°C, or when 10 minutes have passed since the engine start-up.

OPERATIONS AND CHECKS AFTER STARTING ENGINE

⚠ WARNING

- **Emergency stop**
  If the operation is abnormal or any other trouble occurs, turn the key in the starting switch to the OFF position.
- **If the work equipment is operated without warming up the machine sufficiently, the response of the work equipment to the movement of the control lever will be slow. The work equipment may not move as the operator desires. Follow all warm-up procedures. Particularly in cold areas, make sure to warm up the machine properly.**

BREAKING-IN THE MACHINE

⚠ CAUTION

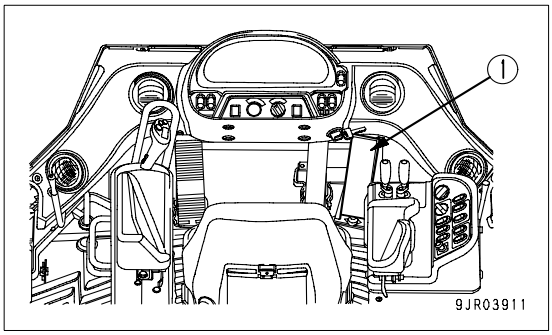
Your Komatsu machine has been thoroughly adjusted and tested before shipment. However, operating the machine under severe conditions at the beginning can adversely affect the performance and shorten the machine life.
Be sure to break-in the machine for the initial 100 hours (as indicated by the service meter).
During break-in operations, follow the precautions described in this manual.

- Idle the engine for 5 minutes after starting it up.
- Avoid operation with heavy loads or at high speeds.
- Immediately after starting the engine, avoid sudden starts, sudden acceleration, unnecessary sudden stops, and sudden changes in direction.

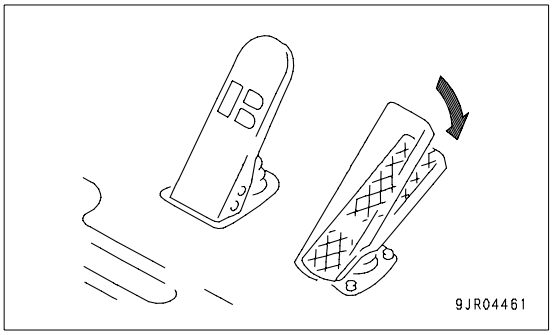
NORMAL OPERATION

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.

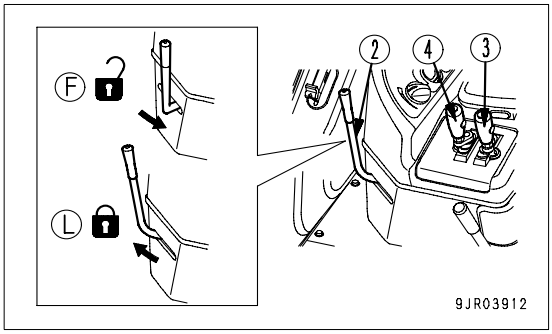


1. Immediately after starting the engine, without depressing the accelerator pedal (1), run the engine at idle for at least 10 seconds during the warm weather and for at least 15 seconds during the cold weather.
2. Depress accelerator pedal (1) lightly and run the engine with no load at midrange speed for about 5 minutes.



3. Carry out the following operation to warm up the hydraulic oil only in cold weather. After carrying out the warming-up operation, check that the engine rotation is smooth, then set work equipment lock lever (2) to FREE position (F), operate bucket control lever (3) for 30 seconds, then operate lift arm control lever (4) for 30 seconds. Operate the two levers in turn for 5 minutes to warm up the hydraulic oil.

   With this operation, the hydraulic oil is warmed up more quickly.

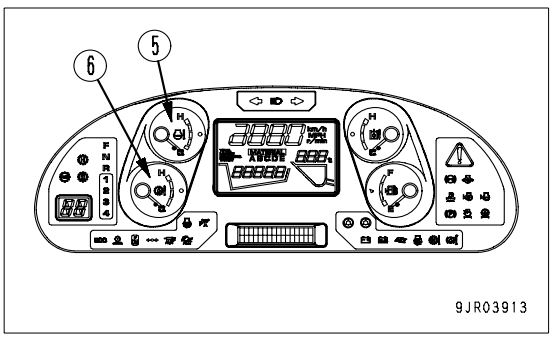


4. After carrying out the warming-up operation, check that the meters, gauges, and pilot lamps work properly.

   If any abnormality is found, carry out maintenance or repair.

   Run the engine under light load until engine coolant temperature gauge (5) and torque converter oil temperature gauge (6) are in the green range.

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

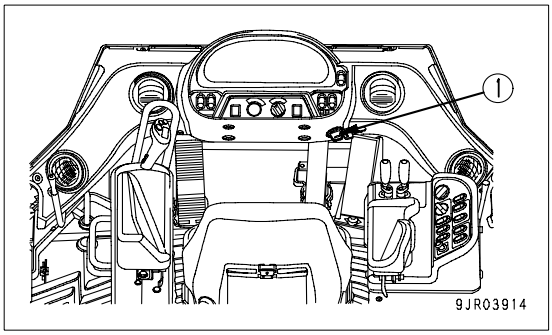


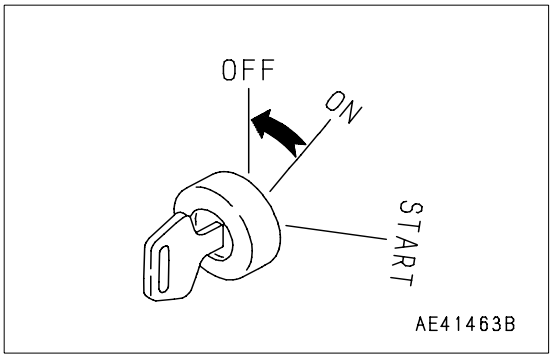
REMARK
The rotating speed of the cooling fan changes according to the following conditions, but this does not indicate any abnormality.
If the hydraulic oil temperature, engine coolant temperature, or transmission oil temperature are high, the rotating speed of the cooling fan becomes higher. In addition, if the air conditioner is running, even when the temperature goes down, the cooling fan speed rises.
However, when the cooling fan is rotating in reverse, if the hydraulic oil temperature is high, the rotating speed becomes higher.

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 about 5 minutes to cool down gradually.
2. Turn the key of 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.

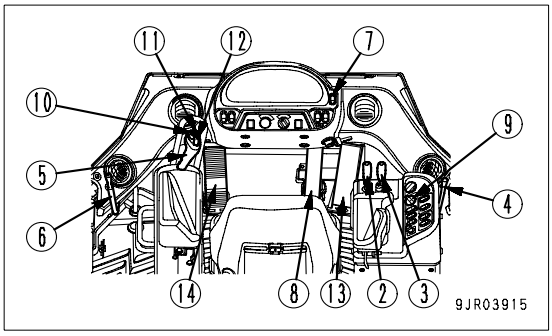
MOVING THE MACHINE (DIRECTIONAL, SPEED), STOPPING THE MACHINE

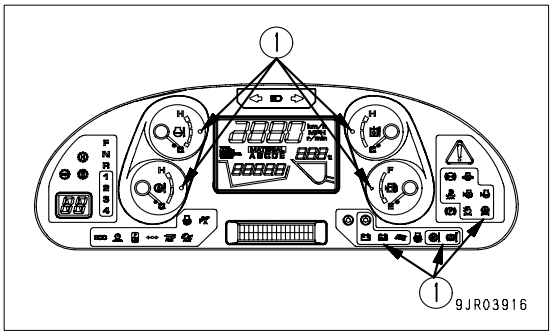
⚠ WARNING

- **Always remove the frame lock bar before traveling. If it is not removed, the steering will not work and this may lead to serious personal injury.**
- **When moving the machine off, check that the surrounding area is safe, then sound the horn and start the machine.**
- **Do not let any person enter the area around the machine.**
- **Remove any obstacles from the travel path.**
- **The rear of the machine is a blind spot, so when traveling in reverse, be particularly careful to check that it is safe.**
- **When starting the machine off on a slope, depress the left brake pedal, then depress the accelerator pedal and slowly let the left brake pedal back to allow the machine to move off. This will prevent the machine from running back down the slope.**

PREPARATIONS FOR MOVING MACHINE

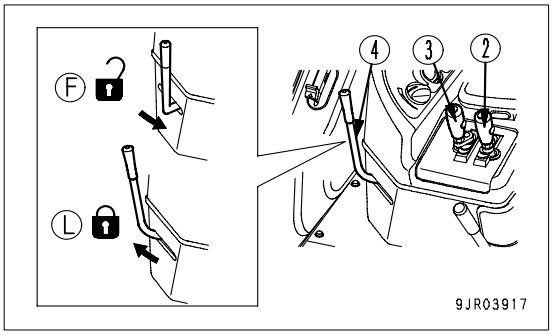
1. Check that warning pilot lamp (1) is not lighted up.

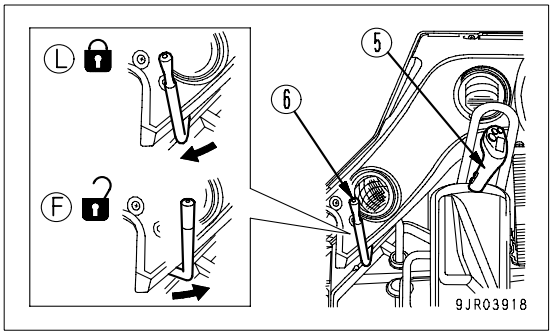




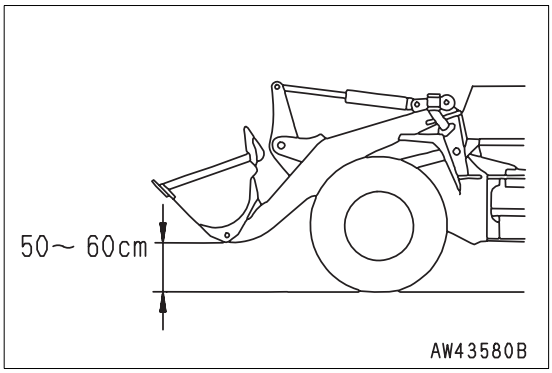
2. Set work equipment lock lever (4) (for bucket control lever (2) and lift arm control lever (3)) and steering lock lever (6) (for AJSS lever (5)) to FREE position (F).

REMARK
If the steering lock lever is not set to FREE position (F), the directional selector switch will remain at the N position even if the switch is operated.
In addition, the speed display on the front machine monitor will show N and will not change, so always set the steering lock lever to FREE position (F).



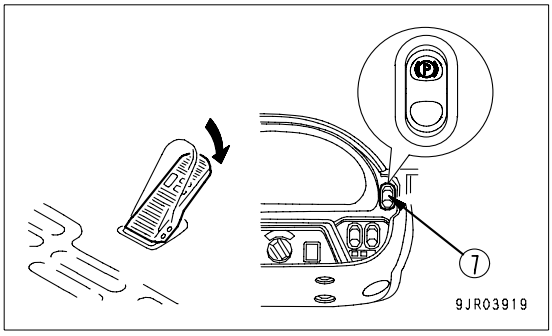


3. Operate lift arm control lever (3) to set the work equipment to the travel posture shown in the diagram on the right.



4. Depress right brake pedal (8), then turn parking brake switch (7) to the OFF (RELEASE) position to release the parking brake.

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.



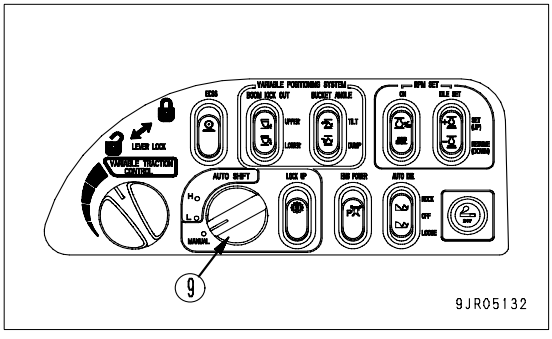
5. Set to the desired speed range position.

   Set the speed range position as follows.

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

   L or H position: Auto shift mode

   If the system is set to this position, the shift range is set to the last shift range used in the previous operation in auto shift mode.

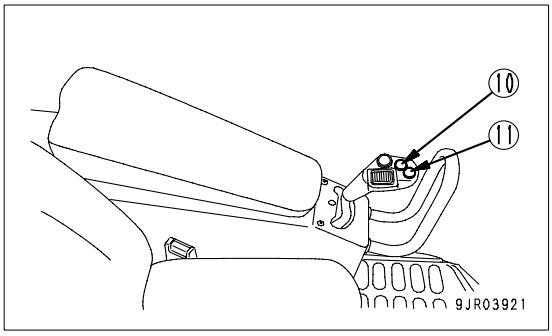


The speed range is displayed by the 1st, 2nd, 3rd, or 4th lamp at the bottom of the machine monitor.

MANUAL position: Manual shift mode

If the system is switched from auto shift mode to manual mode, the shift range being used in auto shift mode is engaged in manual shift mode.

2) To set to a speed range other than the speed range set in Step 1), shift the speed range using shift-up switch (11) or shift-down switch (10) at the head of AJSS lever (5).

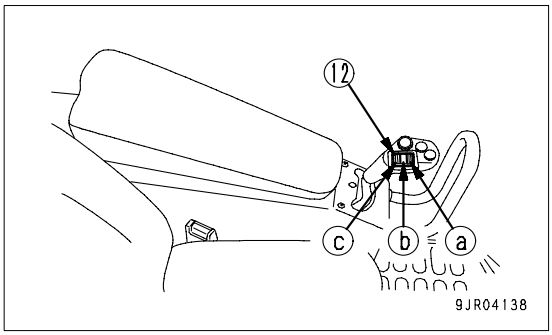


6. Press the desired direction on directional selector switch (12) at the head of AJSS lever (5).

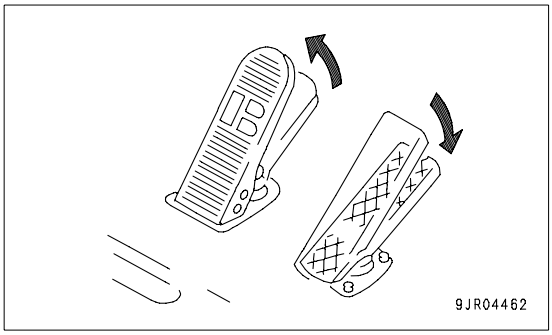
   Position (a): FORWARD (F position)

   Position (b): Neutral (N position)

   Position (c): REVERSE (R position)



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



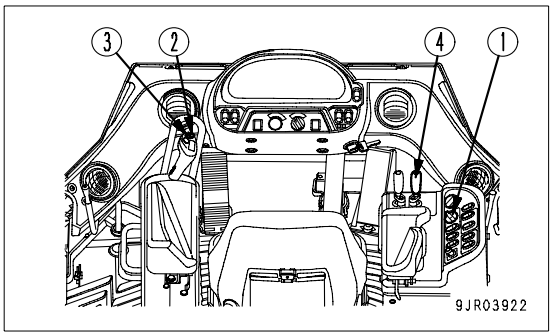
REMARK

When starting the machine off on a slope, depress left brake pedal (14), then depress accelerator pedal (13) and slowly let left brake pedal (14) back to allow the machine to move off. This will prevent the machine from running back down the slope.

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.

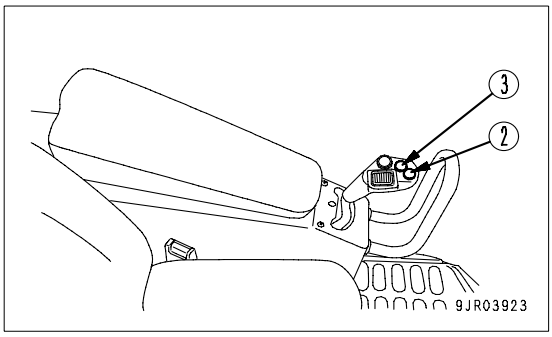


Shift gear as follows.

When shifting gear, select with transmission auto shift/manual shift selector switch (11) and shift with shift-up switch (2) or shift-down switch (3) at the head of the AJSS lever.

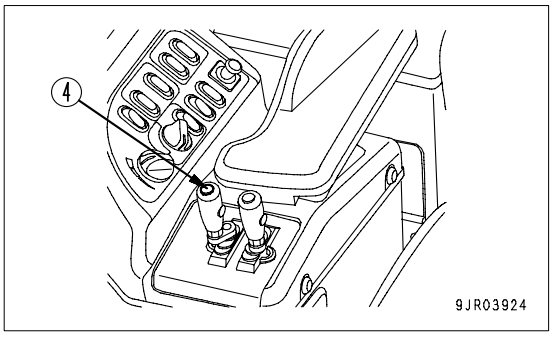
For details, see “PREPARATIONS FOR MOVING MACHINE (3-125)“.

When carrying out digging or loading operations, use 1st or 2nd speed.



REMARK

This machine is equipped with kickdown switch (4). When the machine is traveling in 2nd speed, press the button at the tip of the lift arm control lever and the speed range shifts down to 1st speed.
We recommend use of the kickdown switch when carrying out digging or loading operations in 1st or 2nd speed.
For details of the method of use, see “KICKDOWN SWITCH (3-52)“.



- This machine is equipped with an auto-shift function that automatically shifts the transmission. For details of the method of use, see “TRANSMISSION AUTO SHIFT/MANUAL SHIFT SELECTOR SWITCH (3-58)“ and “AUTO SHIFT (3-49)“.
- When traveling at high speed with the accelerator pedal depressed, even if the transmission is shifted down from 4th → 3rd or 4th → 2nd, to protect the engine from overrunning, the transmission does not shift down. In this case, the central warning lamp lights up and the alarm buzzer sounds. At the same time, “OVERRUN PROTECT“ is displayed on the character display.

  If the alarm buzzer sounds, let the accelerator pedal back immediately, depress the brake pedal to reduce the travel speed, then shift gear.

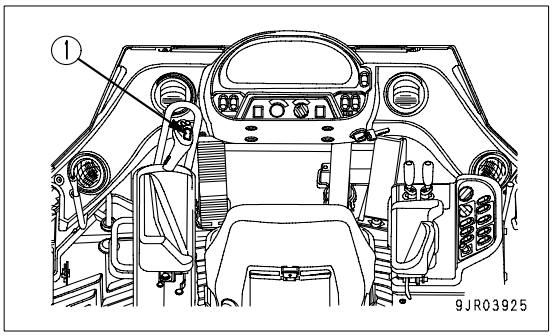
REMARK

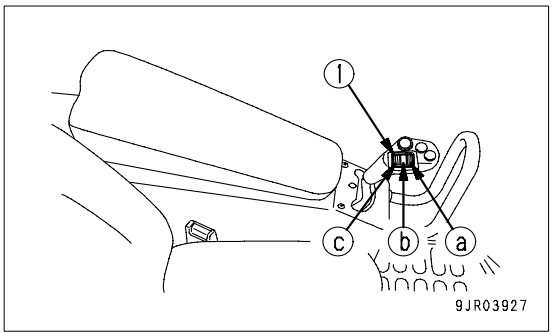
To protect the transmission, immediately after changing direction or shifting gear, the direction of travel or the speed range may not change when the forward-reverse direction is changed or the transmission is shifted up or down, or the kickdown switch is operated, but this does not indicate any abnormality.

CHANGING DIRECTION

⚠ WARNING

- **When changing direction between FORWARD and REVERSE, check that the new direction of travel is safe. There is a blind spot behind the machine, so be particularly careful when changing direction to travel in reverse.**
- **Do not switch between FORWARD and REVERSE when traveling at high speed.**
  When switching between FORWARD and REVERSE, depress the brake to reduce the travel speed sufficiently, then change the direction of travel. (Max.speed for changing direction: 12 km/h)





When switching between FORWARD and REVERSE, it is possible to change direction without stopping the machine.

Set directional selector switch (1) to the desired position.

Position (a): FORWARD (F position)

Position (b): Neutral (N position)

Position (c): REVERSE (R position)

- Check that the backup alarm sounds when the directional selector switch is set to REVERSE. If the backup alarm does not sound, please ask your Komatsu distributor to carry out repairs.

REMARK
If the directional selector switch is operated slowly or is stopped before it reaches the desired direction, the central warning lamp may light up and the alarm buzzer may sound. In this case, there is no failure, but always operate the directional selector switch so that the gearshift is completed within 2 seconds.
To protect the transmission, immediately after changing direction or shifting gear, the direction of travel or the speed range may not change when the forward-reverse direction is changed or the transmission is shifted up or down, or the kickdown switch is operated, but this does not indicate any abnormality.

AUTOMATIC SHIFT

If an attempt is made to switch the direction between forward and reverse when the auto-shift is ON, normally, the gearshift range will switch F3 -> R2, F4 -> R2, or R3 -> F2, R4 -> F2 to make it possible to move the machine off quickly.

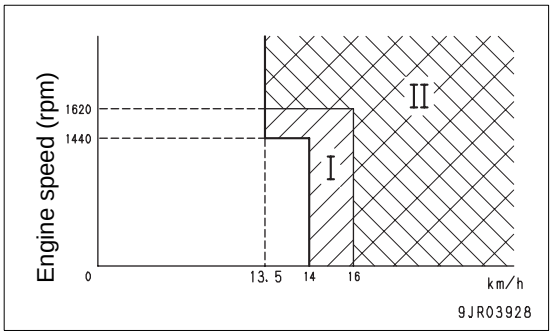
CONTROL FOR CHANGE OF TRAVEL DIRECTION AT HIGH SPEED

If the travel direction is changed when the machine is traveling at high speed, when the travel speed and engine speed are in areas I or II in the chart, the central warning lamp lights up and the alarm buzzer sounds. At the same time, " OVERRUN PROTECT" is displayed on the character display.

If the alarm buzzer sounds, depress the brake immediately to reduce speed sufficiently before changing the travel direction.
Changing the direction of travel at high speed will have an adverse effect on the durability of the transmission.
If the direction of travel is changed in area II, the alarm buzzer will sound, and at the same time the controller will automatically control the speed range to ensure the durability. Note that compared with area I, the deceleration of the machine is weaker.

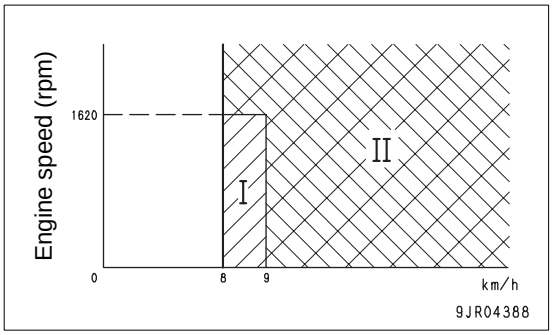
AUTO SHIFT (SHIFT POSITION SPEED RANGE: OTHER THAN 1ST) AND MANUAL SHIFT 2ND, 3RD, 4TH

Gear speed before changing between FORWARD and REVERSE	Gear speed after changing between FORWARD and REVERSE
F2	R3 or R4
F3	R3 or R4
F4	R3 or R4
R2	F3 or F4
R3	F3 or F4
R4	F3 or F4



AUTO SHIFT (SHIFT POSITION SPEED RANGE: 1ST) AND MANUAL SHIFT 1ST

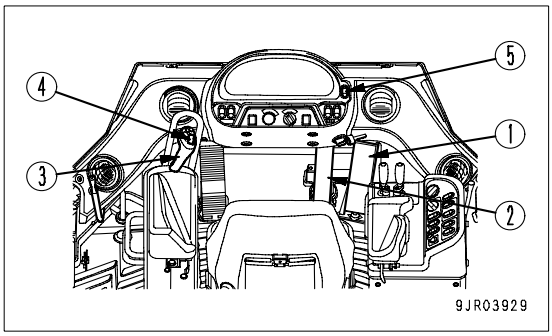
Gear speed before changing between FORWARD and REVERSE	Gear speed after changing between FORWARD and REVERSE
F1	R2 or R3 or R4
R1	F2 or F3 or F4



STOPPING THE MACHINE

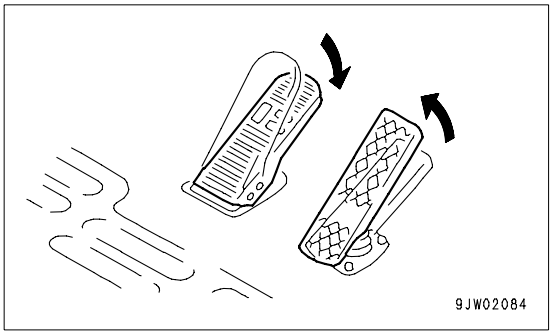
⚠ WARNING

- **Avoid sudden stopping. As far as possible, always leave a margin when stopping the machine.**
- **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 AJSS 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.**

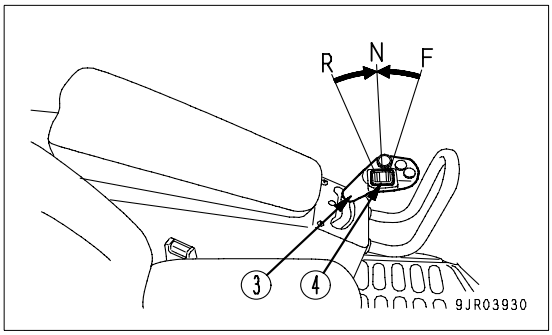


NOTICE
Never use the parking brake switch to brake the machine when traveling except in an emergency. Apply the parking brake only after the machine has stopped.

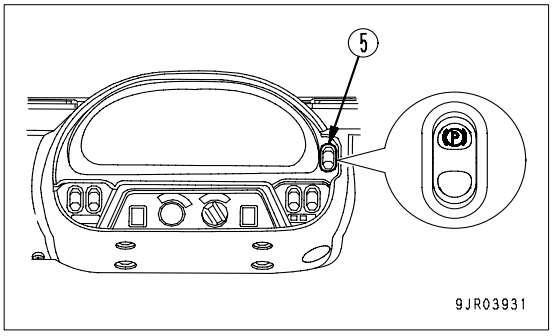
1. Release accelerator pedal (1), then depress brake pedal (2) to stop the machine.



2. Set directional selector switch (4) on the head of AJSS lever (3) to the N position.



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



TURNING

⚠ WARNING

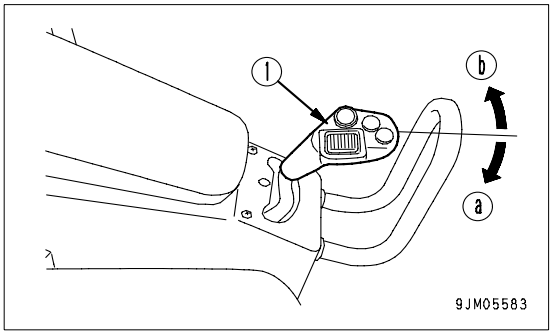
- **Never operate the steering suddenly when traveling at high speed; never operate the steering on steep slopes. These operations are extremely dangerous.**
- **If the engine stops when the machine is traveling, the emergency steering is actuated, but this device is only for use in emergencies, so never stop the engine.**
  It is particularly dangerous if the engine stops on hills, so never under any circumstances stop the engine when traveling on slopes.
  If the engine stops, move the machine immediately to a safe place and stop it there.
- **After articulating the machine to the desired angle, hold the AJSS lever in position. The machine will maintain the angle. While the angle of turning is being maintained, do not operate the AJSS lever in the opposite direction. The machine will shake and create a dangerous condition. In addition, if the AJSS lever is operated in the opposite direction when the machine is turning, there will tend to be a shock, and this will create a dangerous situation.**

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

If it is angled to the right (a), the machine will turn to the right; if it is angled to the left (b), the machine will turn to the left. The more the lever is angled, the greater the angle of articulation will become.

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 AJSS lever, angle the AJSS lever lightly to match the turning angle of the machine.



NOTICE
When making a full turn, operate the AJSS lever to the end of its travel. Do not try to operate it any further. In addition, check that the actuation of the steering is normal. If any abnormality is found, please ask your Komatsu distributor to carry out inspection.

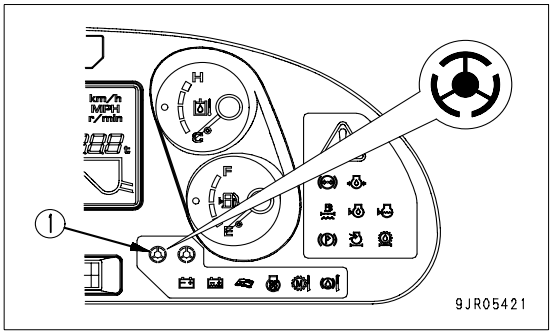
EMERGENCY STEERING

(If equipped)

⚠ CAUTION

Do not actuate the emergency steering except in emergencies.
The emergency steering does not work when the machine is stopped.

In an emergency, even when the engine is stopped, emergency steering pilot lamp (green) (1) lights up to show that it is possible to operate the steering.



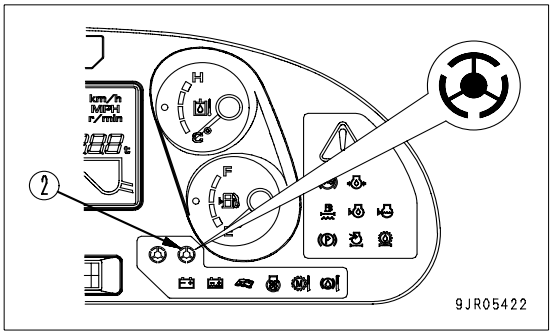
Emergency steering pilot lamp (green) (1) lights up to inform the operator that the emergency steering system has been actuated.

The emergency steering system is provided to enable the machine to be steered under the following conditions.

- The starting switch is at the ON position.
- The steering oil pressure is low or there is no pressure.

  (When the engine has stopped or there is a failure in the steering oil pressure pump, etc.)

When the emergency steering controller detects lack of oil pressure in the steering circuit, steering oil pressure caution lamp (red) (2) lights up.



If this happens, and the machine is traveling at a speed of more than 2 km/h, the emergency steering pump is automatically actuated and emergency steering pilot lamp (green) (1) lights up.

Steering oil pressure caution lamp (red) (2) lights up when the engine is running to inform the operator that the steering system has failed.

If the steering oil pressure caution lamp (red) (2) lights up, move the machine immediately to a safe place, stop the machine, then stop the engine, and carry out inspection.

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

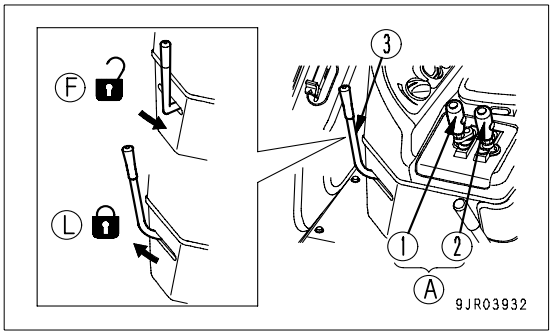
REMARK
If the oil pressure system function is used when the engine is rotating at low speed, steering oil pressure caution lamp (red) (2) may light up momentarily, but this is only for a moment and does not indicate any problem.

When the emergency steering controller detects that the oil pressure in the steering circuit has been restored, the actuation of the emergency steering system is stopped.

OPERATION OF WORK EQUIPMENT

⚠ WARNING

- **When standing up from the operator's seat, always set the work equipment lock lever securely to the LOCK position. If the work equipment lock lever is not locked, and work equipment control lever (A) is touched by mistake, this may lead to serious personal injury.**
- **If the work equipment lock lever is not set securely to LOCK position (L), the work equipment may move and cause serious personal injury. Check that the work equipment lock lever is at the position shown in the diagram.**
- **When pulling the work equipment lock lever up or pushing it down, be careful not to touch work equipment control lever (1).**



Work equipment lock lever (3) is a lock device for work equipment control lever (A).

Push the work equipment lock lever to the outside to apply the lock.

REMARK
This lever locks the hydraulic circuit for the work equipment electrically, so if it is set to LOCK position (L), the work equipment will not move even if work equipment control lever (1) is operated.

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

Set the work equipment lock lever to the FREE position before operating the control lever.

Position (a): RAISE

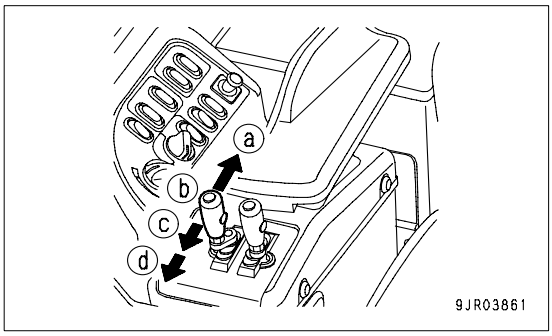
Position (b): HOLD

The lift arm is stopped and held in position.

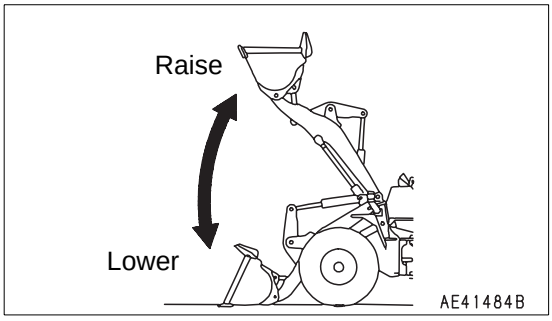
Position (c): LOWER

Position (d): FLOAT

The lift arm moves freely under external force.



When the lever is pulled further from the RAISE position, the lever stops at that position. When the lift arm reaches the maximum height, the lever returns to the HOLD position.



BUCKET CONTROL LEVER

Set the work equipment lock lever to the FREE position before operating the control lever.

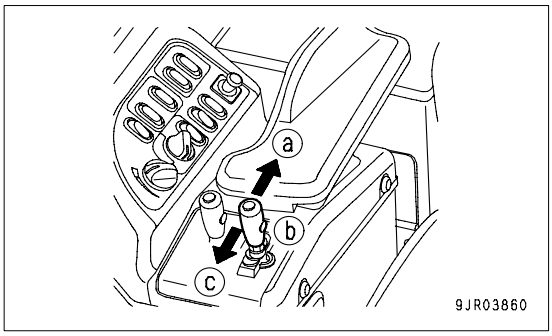
Position (a): TILT

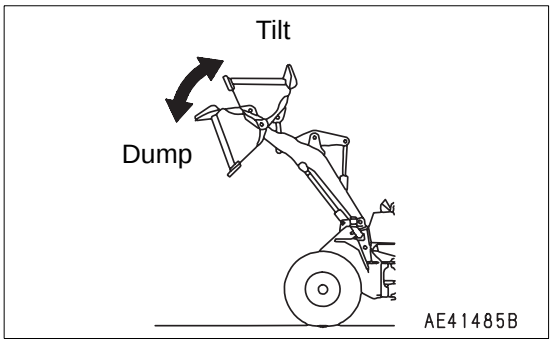
Position (b): HOLD

The bucket is stopped and held in 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.





SEMI AUTO DIGGING OPERATIONS

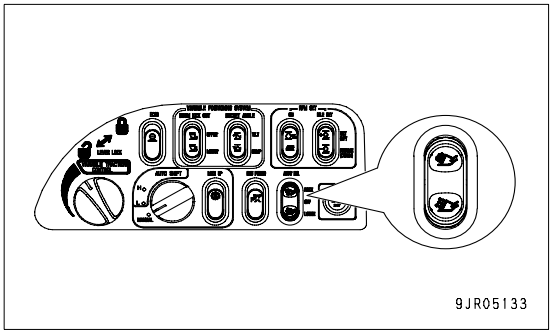
SEMI AUTO DIGGING FUNCTION

With semi auto digging, the bucket tilt operation is automatically controlled. The purpose of this is to make bucket operations easier and relieve the load on the operator. For details of the work that can be carried out with a wheel loader, see “DIGGING OPERATIONS (3-139)“.

ACTUATION OF SEMI AUTO DIGGING

Set the semi auto digging selector switch to “ROCK mode“ or “LOOSE mode“ to match the material being handled.

1. Drive the machine forward and lower the bucket to a position approx. 300 mm above the ground.
2. Press the kickdown switch to shift down to F1.
3. Depress the accelerator pedal and dig the cutting edge of the bucket into the stockpile.
4. Operate the lift arm in the RAISE direction, then return it to HOLD, or set the lift arm control lever to the detent position. This is taken as the starting signal, and semi auto digging will start after approx. 1 second.



During semi auto digging operations, the tilt is operated automatically and the lift arm rises at the same time, even when the lift arm control lever is at the HOLD position.

REMARK
When carrying out digging operations with the speed range in 1st, if the kickdown switch is pressed, the mode will enter the semi auto digging mode.

FINISHING SEMI AUTO DIGGING

The semi auto digging finishes when the following condition is reached or the following operation is carried out, and the automatic tilt operation and automatic lift arm RAISE operation stop.

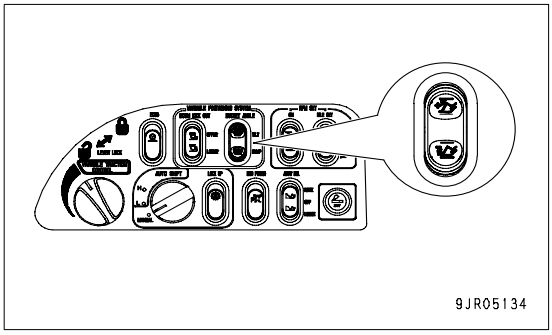
- When the automatic tilt operation sets the bucket to the full tilt position
- When the lift arm rises above the horizontal position
- When the directional selector switch is set to a position other than F or R
- When the semi auto digging selector switch is turned OFF

REMOTE POSITIONER

This machine is equipped with the functions of a remote bucket positioner and remote boom positioner.

OPERATING REMOTE BUCKET POSITIONER

1. Raise the lift arm and dump the bucket.
2. Operate the bucket control lever to the tilt detent position, then release the lever.
3. The bucket will tilt, and when the bucket control lever returns from the detent position to the HOLD position, the bucket tilt operation will stop.
4. When the lift arm is lowered to near the ground level, the cutting edge of the bucket will be set to the position determined by the remote positioner bucket angle set switch.



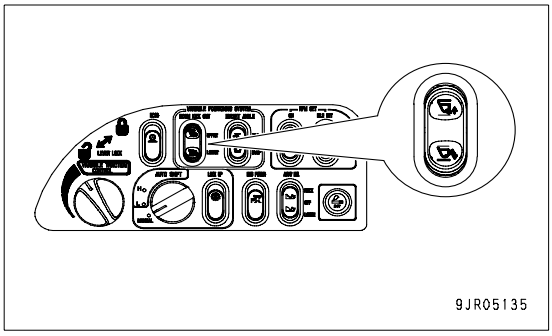
5. If it is desired to stop the cutting angle of the bucket further towards the tilt position (facing up) or dump position (facing down), operate the remote positioner bucket angle set switch to change the stopping angle of the bucket.

   It is possible to set the angle up or down five stages (± 5). The angle changes approx. 1° for each stage.

OPERATING REMOTE BOOM POSITIONER

OPERATING RAISE REMOTE BOOM POSITIONER

1. Set the lift arm to the desired stop position above horizontal.
2. Operate the lift arm control lever to the HOLD position and press the top of the remote positioner raise/lower set switch. The buzzer will emit short sounds, the position is set, and the lamp inside the switch lights up.



Method of checking actuation

- Lower the lift arm, operate the lift arm in the RAISE direction to raise to the detent position, then release the lever.
- The lift arm will go up, and when the lift arm control lever returns from the detent position to the HOLD position, the lift arm operation will stop.

CANCELLING RAISED REMOTE BOOM POSITIONER

Set the lift arm control lever to the HOLD position and keep the top of the remote positioner raise/lower set switch pressed for at least 1 second. The buzzer will emit a long sound, the stop position is reset, and the lamp inside the switch goes out.

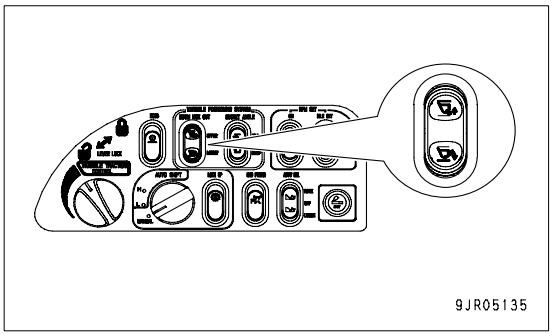
When it has been reset and the lift arm control lever is set to the detent position, if the lift arm is raised to near the maximum height and it returns from the detent position to the HOLD position, the lift arm operation will stop.

OPERATING LOWER REMOTE BOOM POSITIONER

1. Set the lift arm to the desired stop position between a point below horizontal and a point approx. 300 mm above the ground surface.

   (If it is less than 300 mm from the ground, the stop position cannot be set.)

2. Operate the lift arm control lever to the HOLD position and press the top of the remote positioner raise/lower set switch. The buzzer will emit short sounds, the position is set, and the lamp inside the switch lights up.



Method of checking actuation

- Raise the lift arm above horizontal, operate the lift arm control lever to the FLOAT position, then release the lever.

REMARK
If the lift arm is below horizontal and the lift arm control lever is set to the FLOAT position, the lift arm is only set to FLOAT and it does not automatically stop.

- The lift arm will go down, and when the lift arm control lever returns from the FLOAT position to the HOLD position, the lift arm operation will stop.

CANCELLING LOWER REMOTE BOOM POSITIONER

Set the lift arm control lever to the HOLD position and keep the bottom of the remote positioner raise/lower set switch pressed for at least 1 second. The buzzer will emit a long sound, the stop position is reset, and the lamp inside the switch goes out.

When it has been reset and the lift arm control lever is set to the FLOAT position, the lift arm is set to FLOAT and it moves under external force.

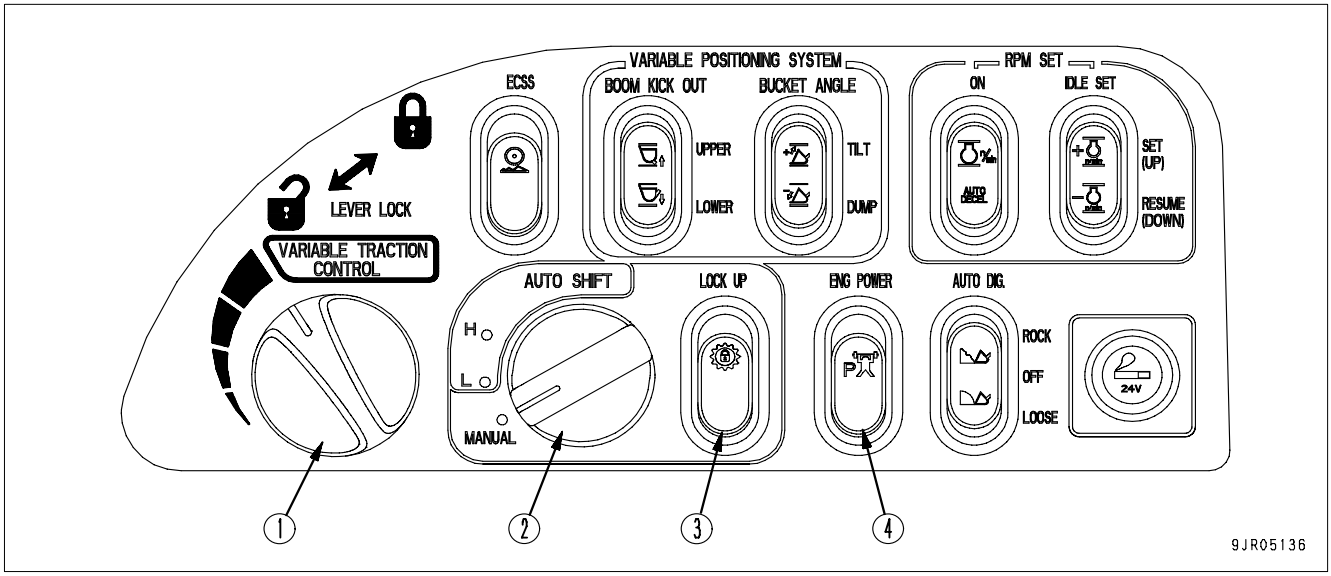
WORK POSSIBLE USING WHEEL LOADER

This section explains about general operations. Be sure to operate the machine correctly. For details, see “PRECAUTIONS WHEN HANDLING BLASTED ROCK (3-145)“.

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

RECOMMENDED COMBINATION OF SWITCHES FOR OPERATION

To improve fuel efficiency and to increase the service life of the machine, we recommend the combination of switches shown in the table below to match the operating conditions.



(1) Driving force control dial
(2) Transmission auto shift/manual shift selector switch
(3) Torque converter lock-up switch
(4) Engine power mode selector switch

			(1)	(2)			(3)		(4)	
Operation	Material	Working area	Driving force control	Auto shift			Lock up		Engine power	
				Manual	L	H	ON	OFF	Economy	Power
V-Shape loading	Stock piling	Flat & Solid ground	100%	o				o	o	
		Slippery ground	20 - 100%	o				o	o	
	Rock	Flat & Solid ground	100%	o				o	o	
		Slippery ground	80 - 100%	o				o	o	
	When high production is reguired		100%	o				o		o
Load & Carry		Level ground	100%		o		o		o	
		Uphill grade	100%			o	o			o
Traveling		Level ground	100%		o		o		o	
		Uphill grade	100%			o	o			o

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.**
- **When the machine is traveling or the work equipment is raised, the moment that the E.C.S.S. switch is turned ON, the work equipment will move.**
- **If operations are carried out with the E.C.S.S. switch left at the ON position, the moment that the E.C.S.S switch is turned ON, the work equipment will move.**

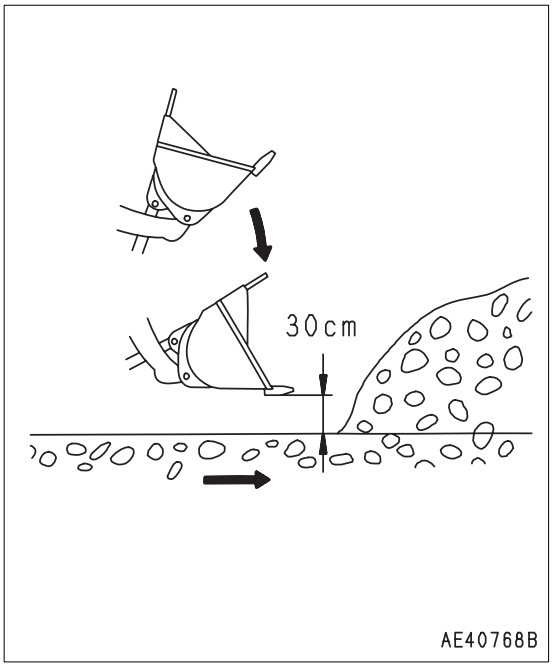
NOTICE
If the tires slip, the tire life will be reduced, so do not allow the tires to slip during operation.

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.

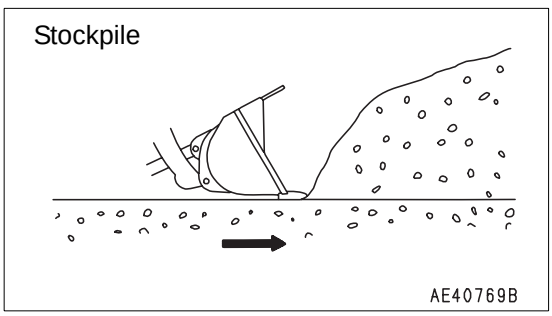
1. When driving the machine forward and lowering the bucket, stop the bucket about 30 cm from the ground, then lower it slowly.

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

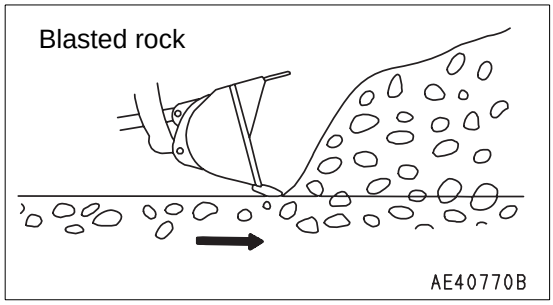


2. Shift down just in front of the stockpile, or actuates the kick-down to shift down. Depress the accelerator pedal at the same time as the shift down is completed and push into the stockpile.

REMARK
To reduce fuel consumption, depress the accelerator pedal the minimum possible amount. If it is depressed fully, the fuel consumption will increase, but there will be no increase in the amount loaded.



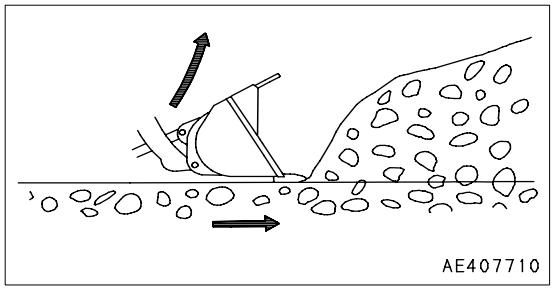
3. When the material is in a stockpile, keep the cutting edge of the bucket horizontal; when loading blasted rock, have the bucket tilting slightly down.



Be careful not to get blasted rock under the bucket. This will make the front tires come off the ground and slip.

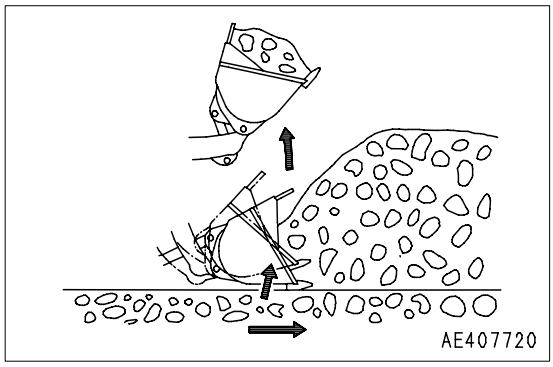
Try to keep the load in the center of the bucket; if the load is on one side of the bucket, the load will be unbalanced.

4. 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.



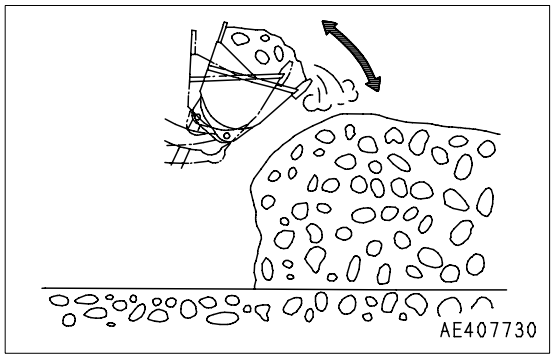
REMARK
If the bucket is thrust too much and the lift arm stops rising or the machine stops moving forward, release the accelerator pedal a little. Proper operation of the accelerator pedal for each type of the soil is effective for saving of fuel and prevention of wear of the tires.

5. 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.

6. 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

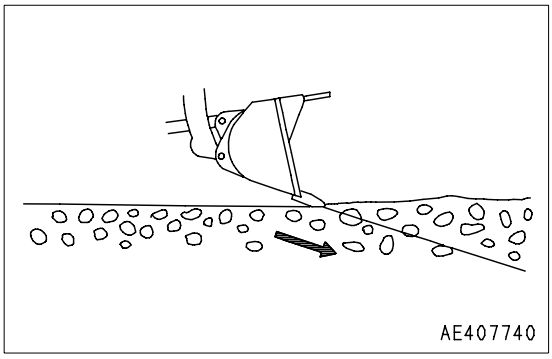
- When digging and loading on level ground, set the bucket edge facing down slightly as follows and drive the machine forward. Always be careful not to load the bucket on one side and cause an unbalanced load.

  This operation should be carried out in 1st gear.

⚠ CAUTION

Do not set the bucket facing down more than 8 degrees.

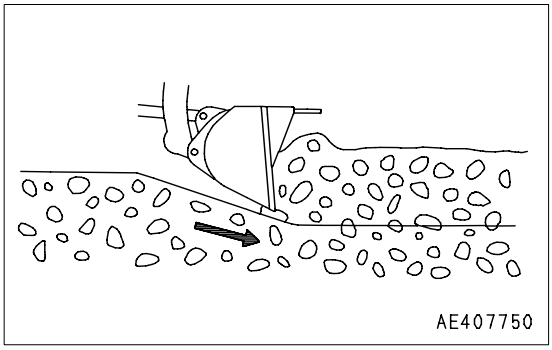
1. Set the edge of the bucket facing slightly down.



⚠ CAUTION

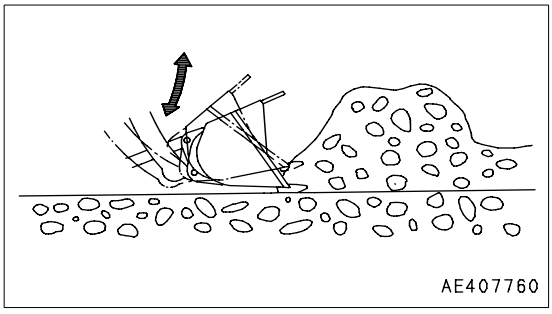
If the bucket hits the rocks in the ground first, a large shock is generated and this may damage the machine.

2. Drive the machine slowly forward, push the lift arm control lever slightly to the front, and dig in to scoop up the load a little at a time.



3. Operate the lift arm control lever slightly up and down to reduce the resistance when driving the machine forward.

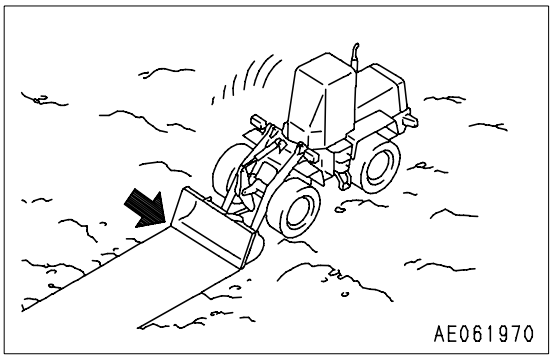
   When digging with the bucket, avoid imposing the digging force on one side of the bucket.



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 8 degrees.
- **When carrying out leveling operations, turn the E.C.S.S. switch OFF.**



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

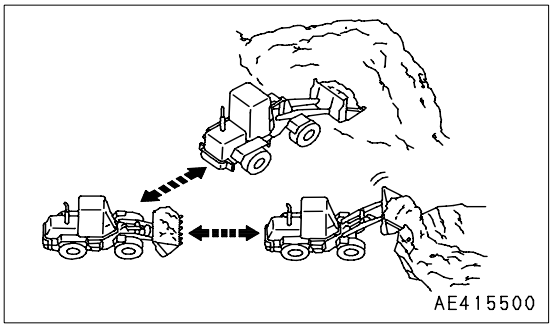
Never set the bucket to the DUMP position when carrying out pushing operation.

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.**
- **When the machine is traveling or the work equipment is raised, the moment that the E.C.S.S. switch is turned ON, the work equipment will move.**
- **If operations are carried out with the E.C.S.S. switch left at the ON position, the moment that the E.C.S.S switch is turned ON, the work equipment will move.**



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 (3-168)“.

LOADING OPERATIONS

Select an efficient method with a suitable turn and movement distance to match the shape of the ground.

⚠ WARNING

- **Always keep the job site level. When the lift arm is raised with the bucket loaded, it is dangerous to operate the steering suddenly or apply the brakes suddenly. Do not carry out such operations.**
- **It is dangerous to thrust the bucket into the material to be loaded (borrow pit, crushed rock, etc.) at high speed. Do not carry out such digging operations.**
- **When traveling or when the work equipment is raised, if the E.C.S.S. switch is turned ON, the work equipment will move at that instant, so operate carefully.**
- **If operations are carried out with the E.C.S.S. switch ON, the work equipment may move at the instant the E.C.S.S. is actuated, so operate carefully.**

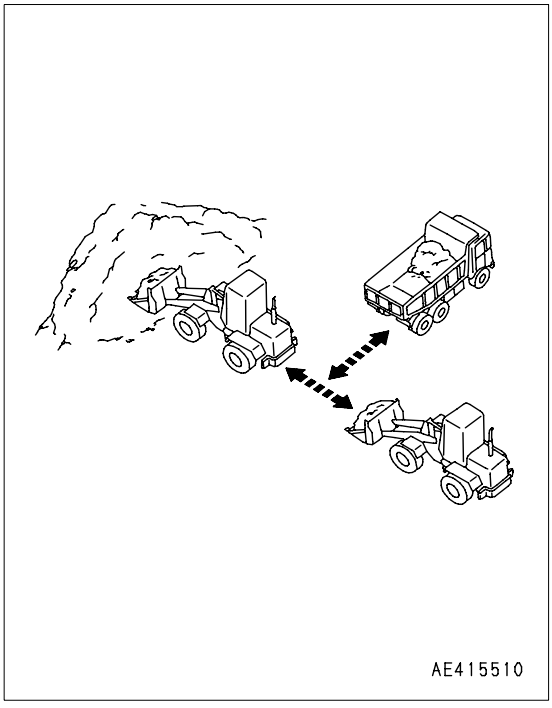
NOTICE

- **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 stock-pile. 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.

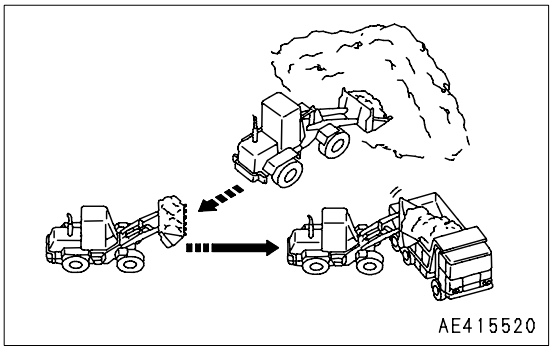


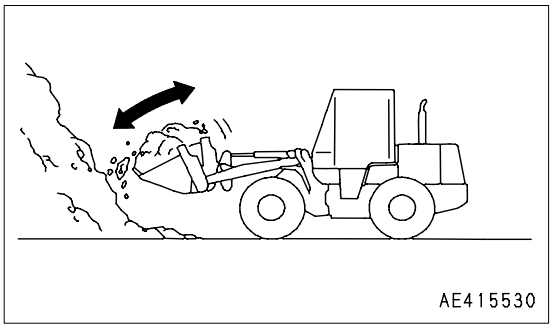
V-SHAPE LOADING

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.

PRECAUTIONS WHEN HANDLING BLASTED ROCK

If the target load is blasted rock, pay careful attention to the following items when carrying out the operation in order to extend the service life of the machine.

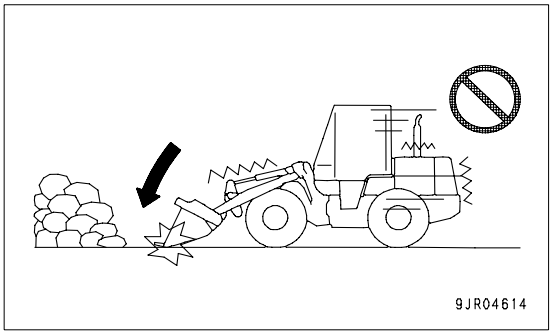
OPERATING PROCEDURE TO PREVENT DAMAGE TO MACHINE

HANDLING BUCKET

When approaching the facing and lowering the bucket to the ground, do not drop the bucket suddenly into contact with the ground. If the bucket is dropped suddenly, the bucket, work equipment, area around the pins, and the machine frame will be subjected to excessive shock, and this will lead to damage or deformation of various parts of the machine.

In addition, the front wheels were come off the ground, so this will cause the machine to slip.

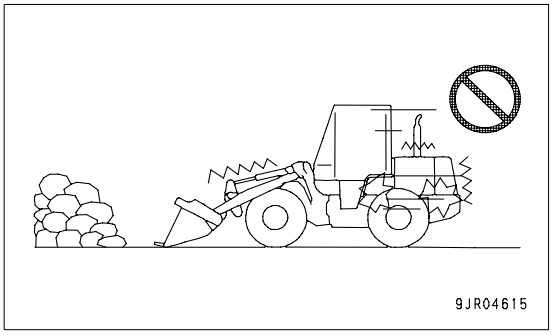
When lowering the bucket to the ground, reduce the lowering speed of the bucket when it is close to the ground and bring it slowly into contact with the ground.



SHIFTING TRANSMISSION WHEN THRUSTING BUCKET IN

When thrusting the bucket into the facing to carry out excavation, do not shift down with the accelerator pedal depressed (with the engine speed raised). If the transmission shifts down when the engine speed is high, there will be an excessive load on the engine, torque converter, transmission, axles, final drive, and the whole power train.

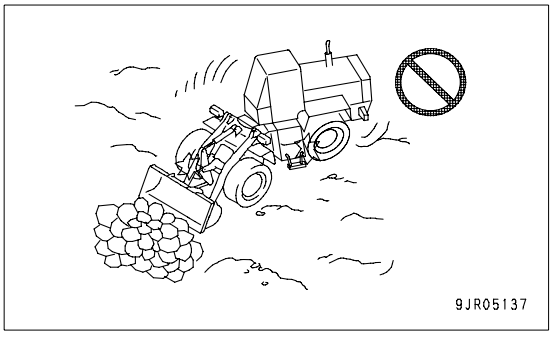
When shifting down to 1st and thrusting the bucket into the facing, release the accelerator pedal to reduce the engine speed before shifting down. Then gradually depress the accelerator pedal. If the accelerator is operated suddenly after shifting down, there will be excessive load brought to bear on the engine and power train.



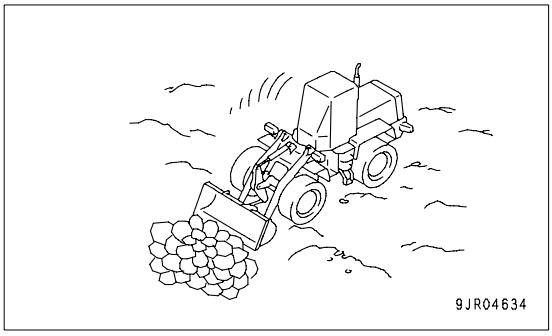
ARTICULATING MACHINE DURING DIGGING OPERATIONS

Do not carry out operations with the machine articulated. If the machine is articulated, the direction of force will be different for the front wheels and rear wheels. As a result, the power when traveling will not be transmitted fully to the front wheels, so this will reduce the digging force and bring an excessive load to bear on the center hinge pin. In addition, even with the front wheels, the power will not be transmitted uniformly to the left and right wheels. The load will be brought to bear on one wheel, so this will reduce the service life of the tire on one side.

If digging work is carried out with the machine articulated, the overall stability of the machine will be poor and there is danger of the machine tipping over.

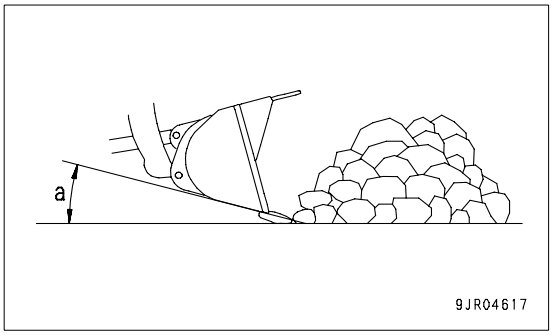


When carrying out operations, do not articulate the machine. Drive straight forward and thrust the bucket in. If this is done, the load on the bucket will be uniform, so this makes it possible to avoid load on one side and makes it easier to load the bucket.



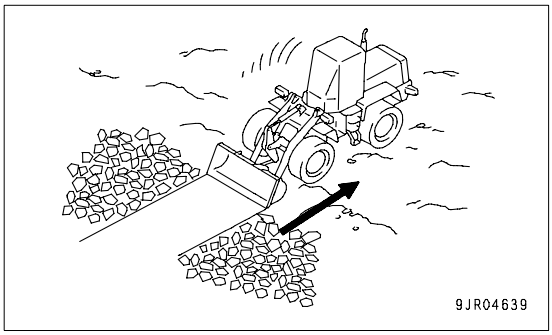
BUCKET DUMP ANGLE WHEN DIGGING OR LOWERING ROADBED

Do not set the cutting edge of the bucket at a large angle to the ground surface when digging or lowering the roadbed. Keep angle (a) between the bucket and the ground surface to a maximum of 8°. If angle (a) between the cutting edge of the bucket and the ground surface is more than 8° when digging or lowering the roadbed, there is danger of damage to the work equipment.

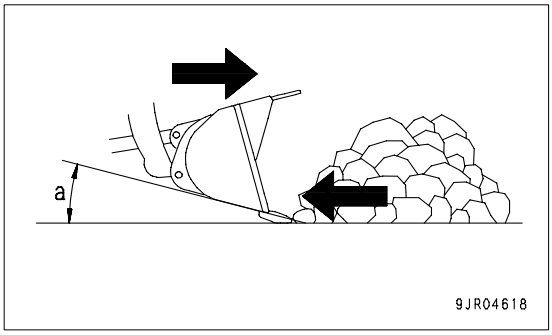


BUCKET DUMP ANGLE WHEN LEVELLING

Drive the machine in reverse when carrying out leveling operations.

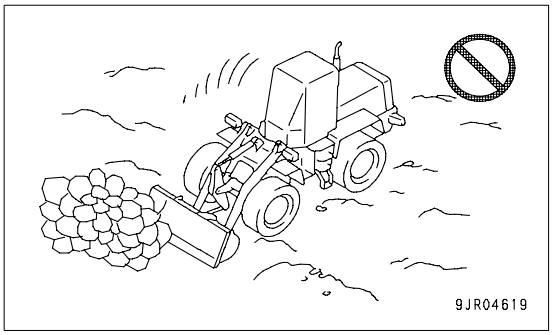


If leveling operations are carried out with the machine traveling forward, do not make angle (a) between the cutting edge of the bucket and the ground surface facing down more than 8°. If leveling operations are carried out when driving forward with angle (a) between the cutting edge of the bucket and the ground surface facing down more than 8°, the bucket cylinder will be pushed by the pushing force of the machine. This will cause the cylinder to retract and the bucket will face down at a greater angle, so there is danger of the work equipment breaking.

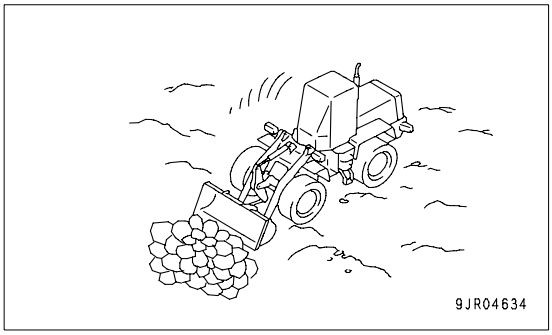


LOADING BUCKET

Do not load the bucket or scoop up the load with the load on the corner of the bucket or the load on one side of the bucket. This will cause the machine to twist and will reduce the service life of the work equipment and the frame.



When carrying out digging or scooping-up operations, thrust the center of the bucket into the load.



BUCKET DUMP OPERATION WHEN DIGGING

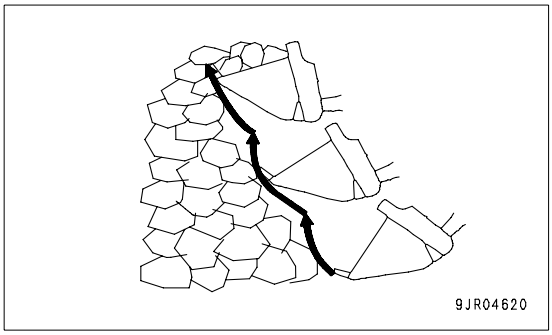
Do not operate the bucket in the DUMP direction when digging. If the bucket control lever is operated to the DUMP position during digging, the machine will not be able to travel forward, the tires will slip, and an excessive load will be brought to bear on the work equipment.

Carry out the scooping-up operations as follows.

1. When thrusting the bucket in, raise the lift arm slightly at the same time. Ample driving force will work on the front wheels.
2. To fill the bucket, operate the bucket tilt and lift 2 - 3 times repeatedly when thrusting the bucket in.

   Operate the control lever slowly near the end of the bucket tilt.
3. When the bucket reaches the end of the tilt stroke, depress the brake pedal to stop the machine.

   When doing this, do not push the bottom of the bucket against the dilution. If the bucket is pushed against the dilution, the bucket, cylinders, and work equipment will be damaged.



4. When the scooping-up operation is completed, operate the bucket tilt and dump, and apply the brakes when traveling in reverse to stabilize the load inside the bucket and prevent spillage of the load.

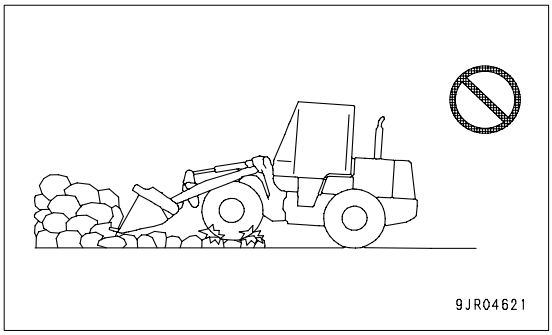
REMARK

To reduce the generation of heat by the torque converter, keep the target time for the digging operation within 10 seconds from the start of thrusting in to the completion of scooping up.
The fuel consumption increases while digging working. Fuel cost is saved by shortening the digging time.

FRONT WHEELS GOING ON BLASTED ROCK

Do not carry out operations that make the front wheels ride up on blasted rock. If the front wheels go on top of blasted rock, there is danger that the sharp parts of the blasted rock will cut the tires.

In particular, avoid pushing the bucket in too far, and when operating near natural rock after blasting (roots), do not let the front wheels ride up on the natural rock (roots). For scooping-up operations near natural rock (roots), do not use a wheel loader. Use a bulldozer or hydraulic excavator.

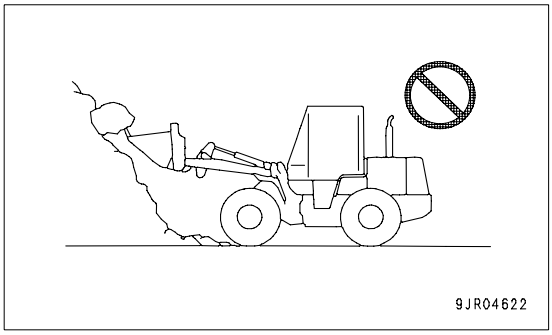


TREATMENT OF LOOSENED BOULDERS

⚠ WARNING

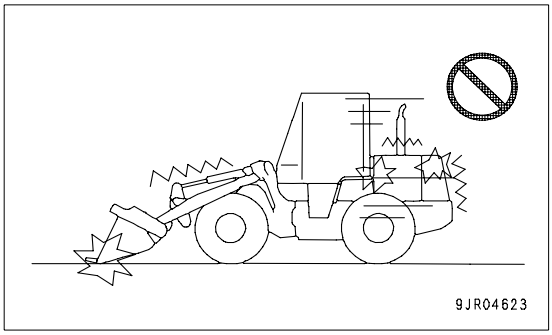
Do not use this machine to deal with loosened boulders. If the boulder is dropped by mistake when handling it, there is danger that it may fall on top of the operator's compartment and cause serious personal injury.

Do not use this machine to handle hanging rocks. There is danger that the rock will fall during the operation to move it and hit the machine or operator's cab. If dropped boulders hit the work equipment cylinders, there is danger that the cylinder will bend and be unable to move. If the boulder is dropped on the operator's compartment, there is danger of serious personal injury.



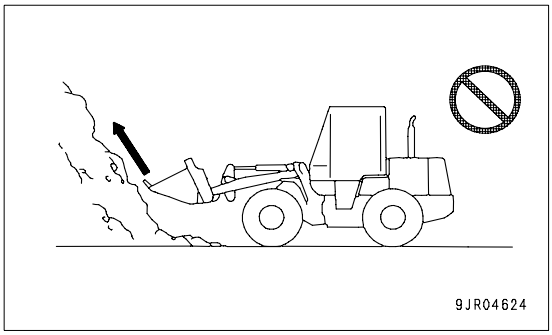
PIT EXCAVATION

Do not try to shave off natural rock (roots) remaining from blasting. Excessive force will be applied to the machine, and there is danger that this may damage the work equipment or frame. For pit excavation operations, do not use a wheel loader. Use a bulldozer or hydraulic excavator.



CUTTING FACE OPERATIONS

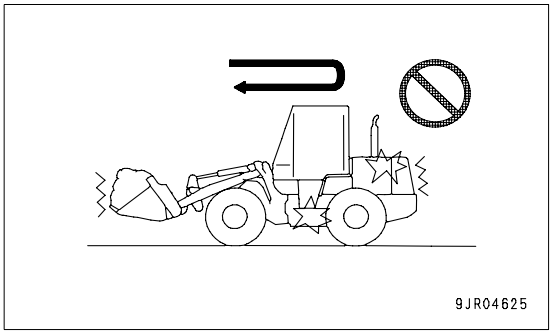
Do not excavate cutting faces. If the cutting face is excavated, excessive force will be applied to the machine, and there is danger that this may damage the bucket, work equipment, or frame. In particular, do not excavate with the bucket raised to a height above the travel posture. For excavation of cutting faces, use a hydraulic excavator.



SWITCHING BETWEEN FORWARD AND REVERSE

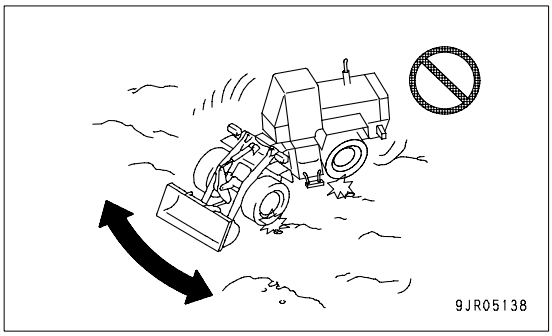
Do not switch the direction of travel of the machine between forward and reverse when traveling at high speed or when the accelerator pedal is depressed. When the machine is traveling at high speed or when the accelerator pedal is depressed, the engine speed is high, and if the direction of travel is switched between forward and reverse. In this condition, an excessive load will be applied to the engine, torque converter, transmission, and other parts of the power train, and this will reduce the service life of the machine.

When switching between forward and reverse, travel at low speed, reduce the engine speed, then stop the machine and switch the direction of travel.



TURNING WHEN TIRES ARE STATIONARY

Do not operate the steering when the machine is stationary. If the steering is operated when the machine is stationary, it will cause wear or cuts in the tires. In addition, it will reduce the durability of the frame and the undercarriage.



PROCEDURE FOR OPERATIONS USING V-SHAPE LOADING OF DUMP TRUCKS

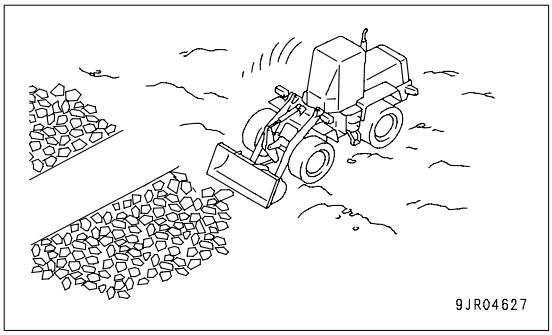
PREPARATIONS FOR LOADING, GATHERING ROCKS

Always keep the job area level and remove any rocks or boulders.

NOTICE

- **When gathering rocks, if the operation is carried out over an area longer than the length of the machine, there is danger that the machine will ride up on boulders and suffer cuts to the tires. When gathering rocks, always carry out the operation in an area shorter than the length of the machine.**
- **When carrying out operations with the bucket in contact with the ground, do not articulate the machine. This will cause tire slippage and damage to the machine.**

1. Put the bucket horizontally in contact with the ground, drive forward, and gather the rocks that have been scattered after loading and after splitting or blasting.
2. After collecting the rocks in an area the length of the machine, change the direction of the machine to gather rocks and increase the area of level ground.



APPROACHING FACING

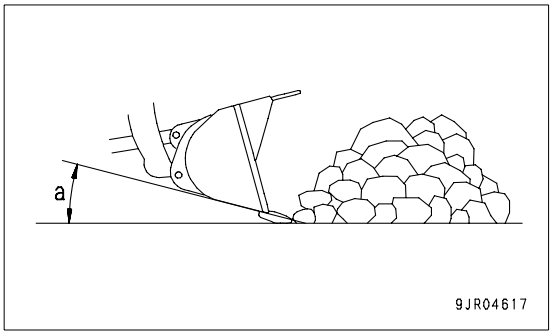
NOTICE

- **When approaching the facing and lowering the bucket to the ground, do not drop the bucket suddenly into contact with the ground. If the bucket is dropped suddenly, the bucket, work equipment, area around the pins, and the machine frame will be subjected to excessive shock, and this will lead to damage or deformation of various parts of the machine.**
  In addition, the front wheels were come off the ground, so this will cause the machine to slip.
  When lowering the bucket to the ground, reduce the lowering speed of the bucket when it is close to the ground and bring it slowly into contact with the ground.
- **Do not set the cutting edge of the bucket at a large angle to the ground surface when digging or lowering the roadbed. Keep angle between the bucket and the ground surface to a maximum of 8°. If angle between the cutting edge of the bucket and the ground surface is more than 8° when digging or lowering the roadbed, there is danger of damage to the work equipment.**
- **Do not load the bucket or scoop up the load with the load on the corner of the bucket or the load on one side of the bucket. This will cause the machine to twist and will reduce the service life of the work equipment and the frame.**

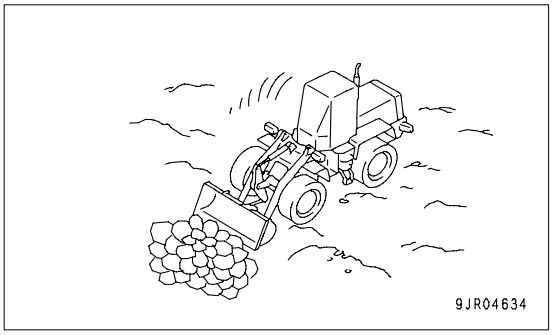
1. Set the machine to the travel posture.

2. Set the shift position to F2, then gradually depress the accelerator pedal and raise the travel speed.

3. When lowering the bucket to the ground, reduce the lowering speed of the bucket when it is close to the ground and bring it slowly into contact with the ground.



4. Make angle (a) between the bucket and the ground surface a maximum of 8°, and operate the tilt and dump so that only the cutting edge comes in contact with the ground.
5. Drive forward at right angles to the rock and change the direction that the machine is facing.
6. Operate the accelerator to match the condition of the road surface so that the tires do not slip.
7. Scoop up the gathered rock. Load hard cutting face rock or boulders in the middle of the bucket.



DIGGING

NOTICE

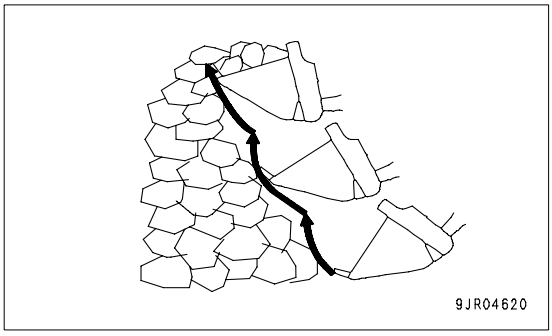
- **Do not shift down with the accelerator pedal depressed (with the engine speed raised). If the transmission is shifted down when the engine speed is high, there will be an excessive load on the engine, torque converter, transmission, axles, final drive, and the whole power train.**
- **When thrusting the bucket in, shift down to 1st. If the bucket is thrust in at high speed, there will be an impact load on the machine and this will reduce the service life of the machine.**
- **When shifting down, release the accelerator pedal to reduce the engine speed before shifting down. Then gradually depress the accelerator pedal. If the accelerator is operated suddenly after shifting down, there will be excessive load brought to bear on the engine and power train.**
- **Do not carry out operations with the machine articulated. If the machine is articulated, the direction of force will be different on the front wheels and rear wheels. As a result, the power when traveling will not be transmitted fully to the front wheels, so this will reduce the digging force and bring an excessive load to bear on the center hinge pin. In addition, even with the front wheels, the power will not be transmitted uniformly to the left and right wheels. The load will be brought to bear on one wheel, so this will reduce the service life of the tire on one side.**
- **Do not push the machine in too far. If it is pushed in too far, a high load will be brought to bear on the machine and this will reduce the service life of the work equipment and frame.**
- **Operate the control lever slowly near the end of the bucket tilt operation. If the control lever is operated suddenly, an impact load will be brought to bear on the tilt cylinder, and there is danger that the cylinder may be damaged.**
- **When close to pit excavation, do not let the front wheels rise up on the cutting face. This will cause cuts to the tires.**

1. Immediately in front of the rock, let the accelerator pedal back and shift down from 2nd to 1st.

2. After shifting down, depress the accelerator pedal gradually and push the rock.
3. Raise the lift arm slightly and increase the driving force of the front wheels. When doing this, do not push in too far.

REMARK
When digging up large rocks, in some cases it may be better not to raise the lift arm too high. If the lift arm is raised too high, the rear wheels may come off the ground.

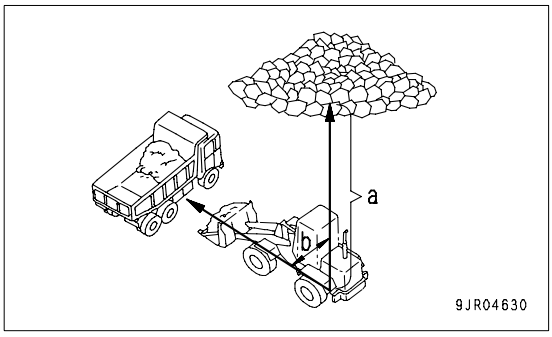
4. After loading the rock completely into the bucket, operate the bucket tilt and lift 2 - 3 times repeatedly to fill the bucket.
5. Let back the accelerator pedal, operate the control levers slowly, and tilt the bucket back fully.
6. To prevent the load from falling out of the bucket, after completing the scooping-up operation, operate in the dump and tilt direction when the bucket is near the full tilt to stabilize the load.



REMARK
If the brakes are operated lightly before traveling in reverse, it is possible to stabilize the load in the bucket.
To prevent generation of heat in the torque converter, keep the standard time for digging to within 10 seconds from the start of pushing in to the completion of scooping up.

TRAVELING IN REVERSE AFTER EXCAVATING

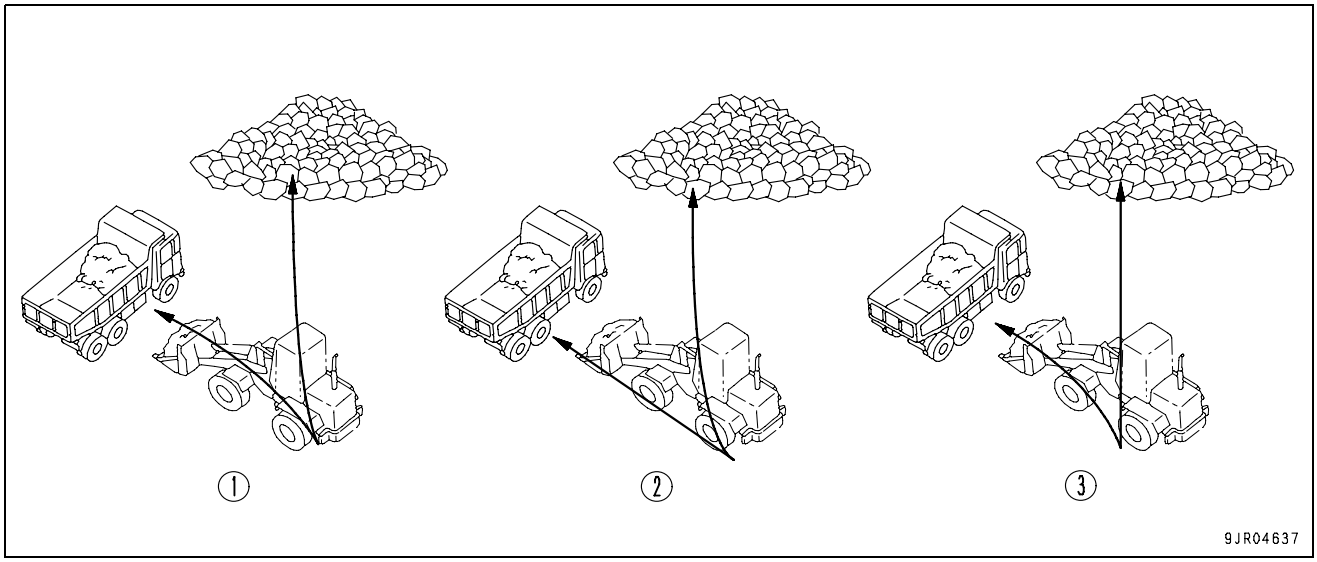
NOTICE
- **Do not operate the steering immediately after starting to travel in reverse. The bucket is still thrust into the rocks, so if the steering is operated, excessive force will be brought to bear on the bucket or frame, and there is danger of damage to the frame.**
- **After shifting the transmission, operate the accelerator pedal slowly. If the accelerator pedal is operated suddenly, the tires will slip and this will cause wear or cutting of the tires.**



1. After completing the excavation, shift to R2 and travel in reverse without operating the steering.
2. As a guideline, reverse travel distance (a) should be 1.2 - 1.5 times the length of the machine. At this distance, the rolling of the tires can prevent wear to the tires.

   In addition, keep an angle (b) of 60° at the intersection between the straight line from the dilution and the straight line from the dump truck.

REMARK
Decide the steering procedure to match the stopping point of the dump truck and the condition of the dilution. When doing this, decide the stopping point for the dump truck so that the operating angle for the steering is less than 20°.



(1) Gradual steering to left or right

(2) Gradual steering to dilution

(3) Direct line to dilution

3. When driving in reverse, do not raise the bucket more than necessary.

   Consider the position of the dump truck, the condition of the road surface, the travel speed, and the speed of the work equipment when deciding the height of the bucket. However, do not raise the bucket so that the top of the load is higher than the horizontal line of sight from the operator.

APPROACHING DUMP TRUCK

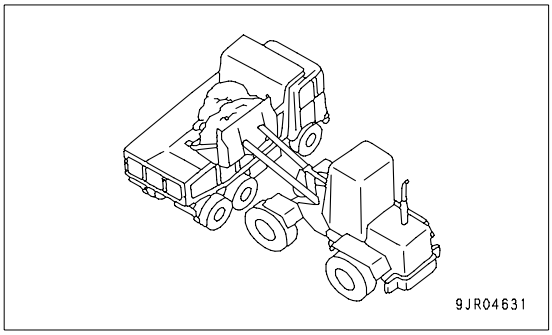
⚠ WARNING

Do not operate the steering suddenly when the bucket is raised. If the steering is operated when the bucket is raised, there is danger that the machine may tip over and cause serious personal injury.

NOTICE

- **Do not shift down with the accelerator pedal depressed (with the engine speed raised). If the transmission is shifted down when the engine speed is high, there will be an excessive load on the engine, torque converter, transmission, axles, final drive, and the whole power train. In addition, the tires will slip and this will cause wear of the tires.**
- **Do not operate the steering immediately after switching between forward and reverse (when the machine is stationary). If the steering is operated when the machine is stationary, it will cause wear or cuts to the tires.**
- **If a transmission cut-off system is installed, turn the transmission cut-off switch to the OFF position and depress the brake, but do not raise the bucket. In this condition, the brake is operated, so heat is generated in the brake chamber and this will cause heat fatigue to parts inside the axle.**

1. Let the accelerator pedal back to reduce the engine speed, then depress the parking brake pedal to stop the machine.
2. Shift gear from R2 to F2.
3. Operate the steering to set the load that at right angles to the dump truck, then drive forward.



REMARK

Operate the steering in the following order: let accelerator pedal back → switch between forward and reverse → depress accelerator pedal to drive forward → approach dump truck. If these operations are carried out at the same time, the engine acceleration will be poor and this will result in poor fuel consumption.

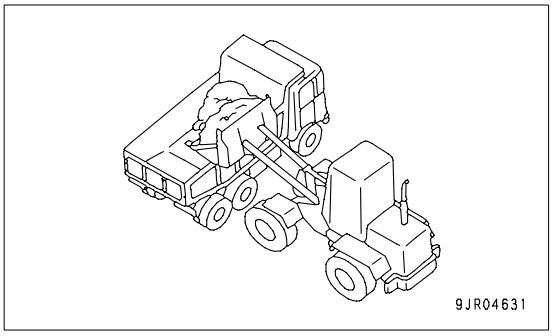
4. Raise the bucket to adjust the bucket height so that when the bucket is tilted down, the cutting edge of the bucket does not hit the bottom face of the dump body or the dilution.

LOADING DUMP TRUCK

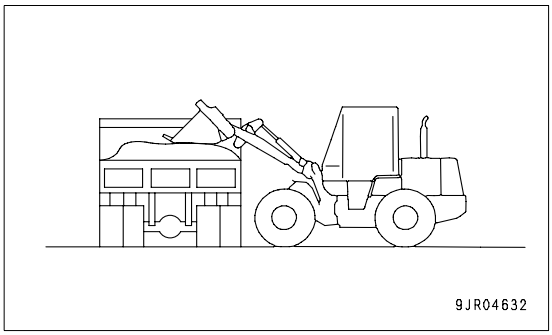
NOTICE

- **Do not load the dump truck suddenly from a high position. If the dump truck is loaded like this, the dump truck will suffer impact load and there is danger that this may damage the body.**
- **Do not operate the dump or stop operations when the engine is running at high speed. There is danger of impact pressure being generated in the hydraulic equipment and causing damage to the hydraulic equipment.**
- **Do not shake the bucket violently to dump the load inside the bucket. The machine will sway greatly and there is danger of damage to the machine. In addition, there is danger of impact pressure being generated in the hydraulic equipment and causing damage to the hydraulic equipment.**
- **When loading the dump truck, do not pushed forcibly with the bucket. This machine and the dump truck will suffer impact shock, and this will cause damage. When pushing the load with the bucket to prevent rocks from falling, carry out the operation softly.**
- **When loading large rocks, first load with sand or soil to act as a cushion. Then load the large rocks on top. If large rocks are loaded directly, they will cause deformation or damage to the dump body.**

1. When loading the dump truck, load at a low point that does not hit with the dump truck or dilution.



2. After completing the loading, if there is danger of rocks falling off, push the load softly with the bucket.



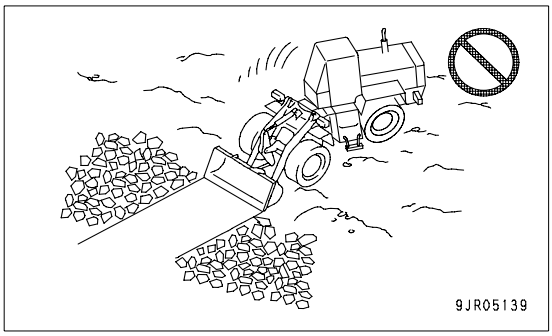
REVERSING AWAY FROM DUMP TRUCK

NOTICE

- **Do not shift down with the accelerator pedal depressed (with the engine speed raised). If the transmission is shifted down when the engine speed is high, there will be an excessive load on the engine, torque converter, transmission, axles, final drive, and the whole power train. In addition, the tires will slip and this will cause wear of the tires.**
- **Do not operate the steering immediately after switching between forward and reverse (when the machine is stationary). If the steering is operated when the machine is stationary, it will cause wear or cuts to the tires.**

1. Switch to R2 and drive in reverse.
2. While driving in reverse, lower the lift arm and operate the steering to face the position for scooping up.
3. Depress the brake pedal and stop the machine.
4. Let back the accelerator pedal to reduce the engine speed, then switch from R2 to F2.
5. Lower the bucket to the ground and drive forward to clear the surface (remove all boulders).

   Do not operate the steering when carrying out the leveling operation. Travel forward with the machine facing directly to the front.

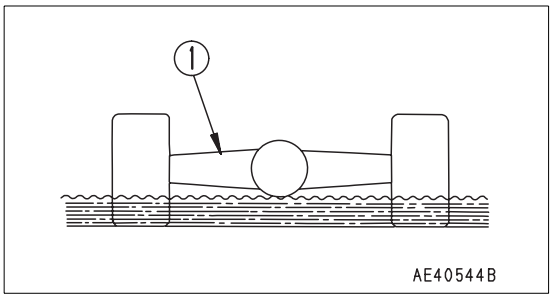


PRECAUTIONS FOR OPERATION

PERMISSIBLE WATER DEPTH

When working in water or on swampy ground, do not let the water come above the bottom of the axle housing (1).

After finishing the operation, wash and check the lubricating points.



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 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

If the foot brake is used excessively when traveling downhill, there is danger that the brake may overheat and be damaged. To prevent this, use the shift-down switch to reduce the speed range, lock up the torque converter, and use the braking force of the engine to reduce the speed when traveling downhill.

Normally, the most suitable speed range when traveling down a slope is the speed range needed when traveling up that slope.

When braking, use the right brake pedal. If the correct speed range is not used, the torque converter oil may overheat. If this happens, shift down to the next speed range to lower the oil temperature. If the temperature gauge does not enter the green range even in 1st, stop the machine, place the directional lever in the N position, and run the engine at a mid-range speed until the gauge enters the green range.

REMARK
If there is danger of the engine overrunning, the central warning lamp lights up and the buzzer sounds intermittently. At the same time, the engine speed flashes on the meter display. Limit the engine speed and machine travel speed when operating.
If the engine speed goes up more, to prevent the engine from overrunning, if the torque converter is locked up, the lock-up is cancelled and the speed range automatically shifts up one speed. At the same time, “OVERRUN PROTECT“ is displayed on the character display. When the engine speed goes down, the transmission automatically returns to the normal speed range control.

IF ENGINE STOPS

If the engine stops on a slope, apply the parking brake immediately, and lower the work equipment to the ground and stop the machine. Then put the directional selector switch in N (neutral) position, and 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.
- The guideline for appropriate tire inflation pressure and appropriate travel speed when traveling on a paved surface with the standard tires (L4) is as follows.

  Tire inflation pressure: Front wheels/rear wheels 0.525 MPa {5.35 kg/cm^2}

  Travel speed: 10 km/h

Ambient temperature (°C)	Tire	Tire conditions	Continuous travel distance
Max. 38	(Standard) 35/65-33-36PR (L4) (Standard tire inflation pressure) 0.525MPa {5.35kg/cm^2}	At least 24 hours after completion of work, when tire temperature has gone down	Max. 40

- 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.

NOTICE
After traveling for 1 hour, stop for 30 minutes. Check the tires and other parts for damage; also check the oil and coolant levels.

- Always travel with the bucket empty.
- Never put “calcium chloride“ or “dry ballast“ in the tires when traveling.

REMOVAL AND INSTALLATION OF THE BUCKET

⚠ WARNING

- **When pins are knocked in with a hammer, pieces of metal may fly and cause serious injury. When carrying out this operation, always wear goggles, hard hat, gloves, and other protective equipment.**
- **When the bucket is removed, place it in a stable condition.**
- **If pins are hit with a strong force, there is a hazard that the pin may fly out and injure people in the surrounding area. Make sure that there is no one in the surrounding area before starting the operation.**
- **When removing the pins, do not stand behind the bucket. In addition, be extremely careful not to put your foot under the bucket while standing at the side for the work.**
- **When removing or inserting pins, be extremely careful not to get your fingers caught.**
- **Never insert your fingers into the pin holes when aligning the holes.**

⚠ CAUTION

The length of the lift arm differs according to the capacity of the bucket. Always install a lift arm that matches the capacity of the bucket. If the bucket capacity is large but the lift arm is not of a suitable length, there is danger that the machine will lose its balance and tip over.
Please consult your Komatsu distributor for details of the combination of bucket and lift arm.

Combination of bucket and lift arm

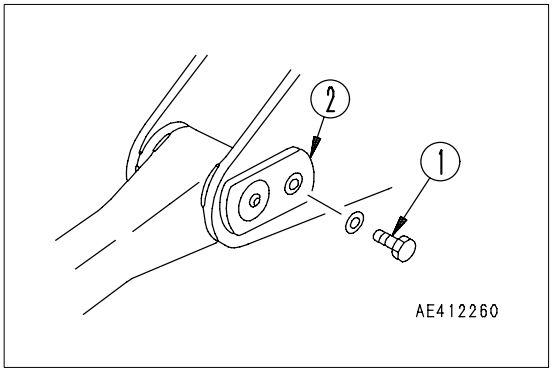
Bucket capacity / Lift arm length	6.4 m^3	7.0 m^3
3850 mm	x	o
3990 mm	o	x

Remove or install the bucket in the following manner, if so required for the convenience of transportation.

NOTICE
This method of removal and installation is applicable to the standard specification machine.
The method of removal and installation will differ according to the attachments and options that are installed.
For details of the procedure for machines that are not the standard specification, please consult your Komatsu distributor.

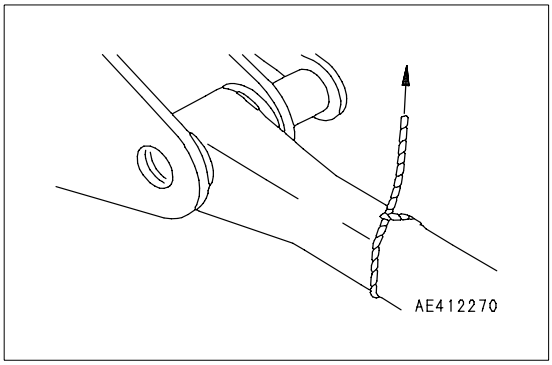
REMOVING THE BUCKET

1. Remove mounting bolt (1).

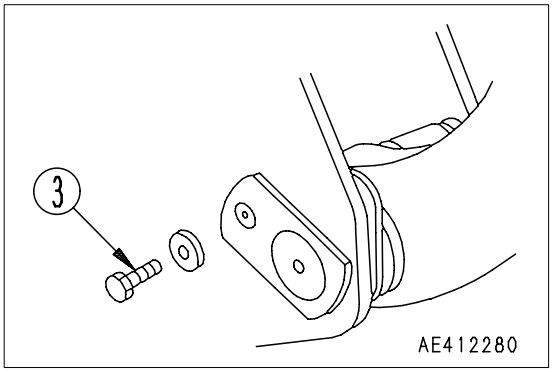


2. Sling the bucket link, then pull out bucket link pin (2).

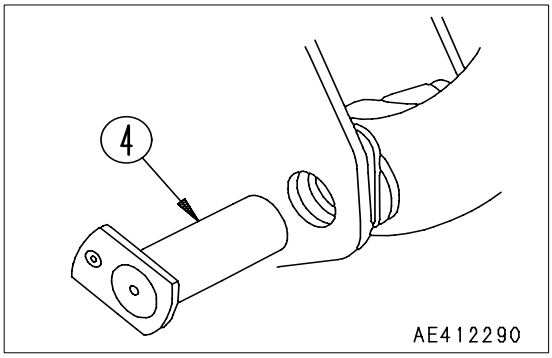
   Secure the bucket link to the tilt lever with wires.



3. Remove mounting bolt (3).

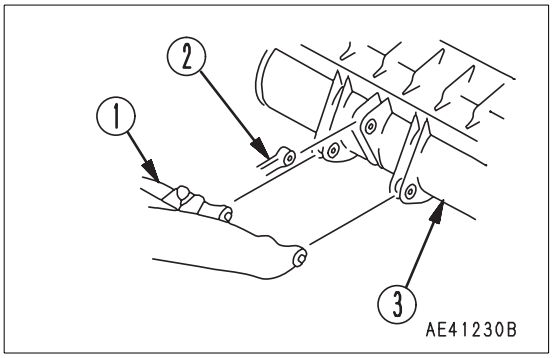


4. Pull out and remove bucket hinge pin (4) on both sides of the bucket.



5. Disconnect the lift arm and bucket.

   (1) Lift arm
   (2) Bucket link
   (3) Bucket



INSTALLING THE BUCKET

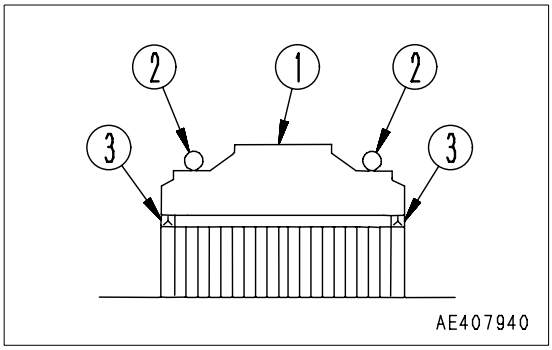
Before installing the bucket, remove all grease, mud, or sand and clean the pin, pin hole, and area around the boss. (If there is any rust or dirt on the inside surface of the pin hole, use sandpaper and remove it carefully.)

After cleaning, coat the pin and inside surface of the pin hole with fresh grease.

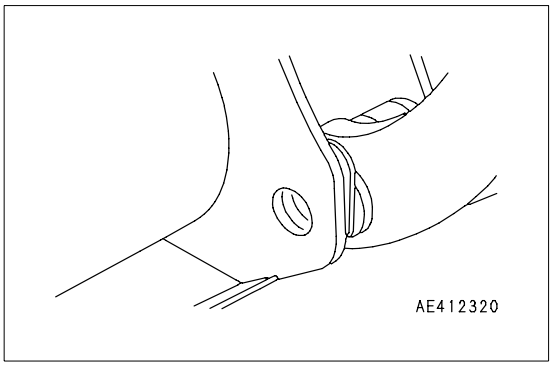
1. Set cord ring (2) on top of lift arm boss (1) as shown in the diagram.

   After completion of assembly of the bucket and adjustment with shims in step 6, move the cord ring down to the groove.

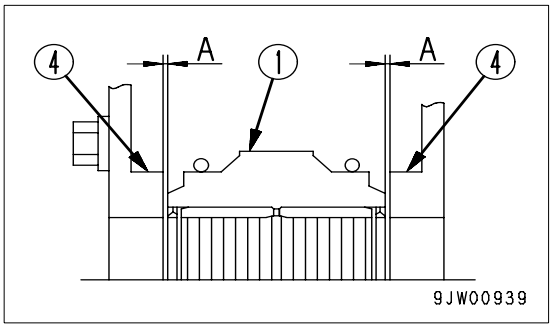
2. Coat dust seal lip portion (3) with grease.



3. Align the left and right bucket pin holes.



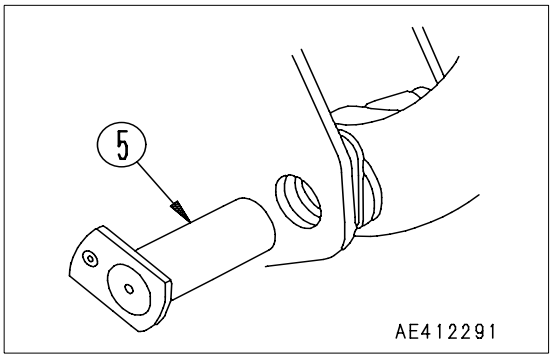
4. Select the number of shims so that clearances “A“ between bucket hinge boss (4) and lift arm boss (1) are less than 1.5 mm.



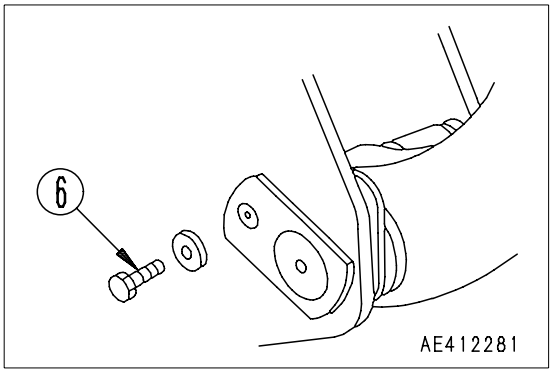
5. Assemble the shims selected in Step 4, align the pin holes, then insert bucket hinge pin (5).

   Coat with grease to prevent damage to the dust seal when inserting the bucket hinge pin.

   Use a bucket hinge pin that has a grease hole.

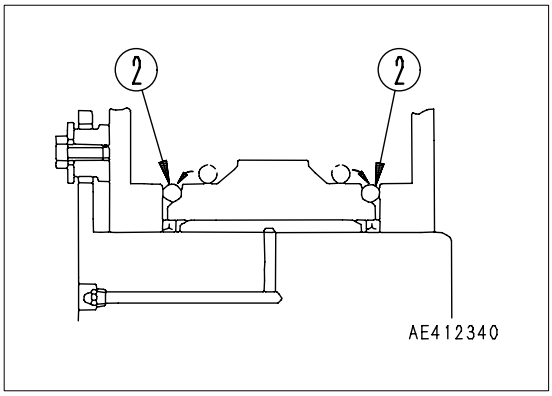


6. Install mounting bolt (6).



7. Coat the groove of cord ring (2) with grease.

8. Move cord ring (2) down to the groove.



NOTICE
Coat the groove of the cord ring with grease before installing it. If the cord ring is installed while the groove is dry, force will be applied to the cord ring when the bucket is operated and this will cause damage to the cord ring.

9. Use the same procedure as in steps 1 to 7 to install the bucket link pin.

   Assemble a pin that has no grease hole at the bucket link.

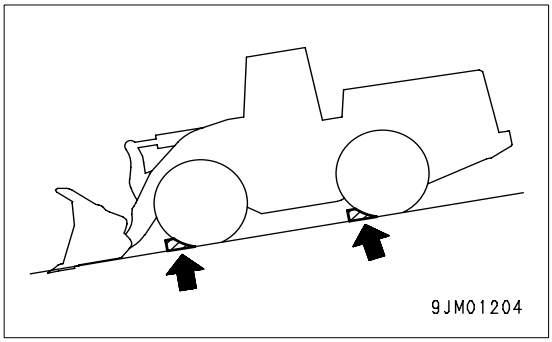
10. Coat the bucket hinge pin and bucket link pin with grease. For details, see “LUBRICATING (4-50)“.

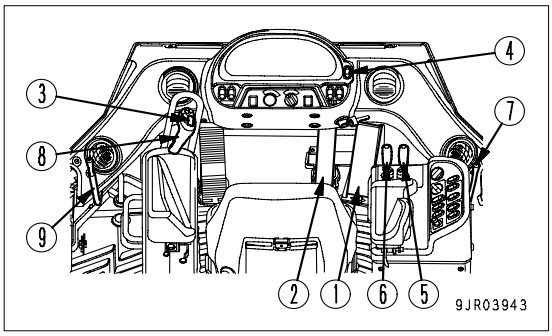
    For details of removing and installing the bucket, please contact your Komatsu distributor.

PARKING MACHINE

⚠ WARNING

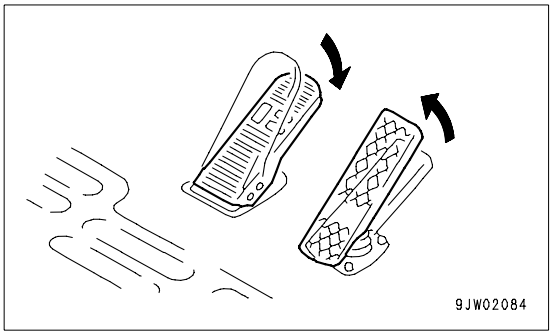
- **Avoid sudden stopping. As far as possible, always leave a margin when stopping the machine.**
- **Avoid parking the machine on a slope. If it is necessary to park the machine on a slope, stop the machine facing directly down the slope, fit blocks under the tires and lower the bucket to the ground 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 AJSS 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.**



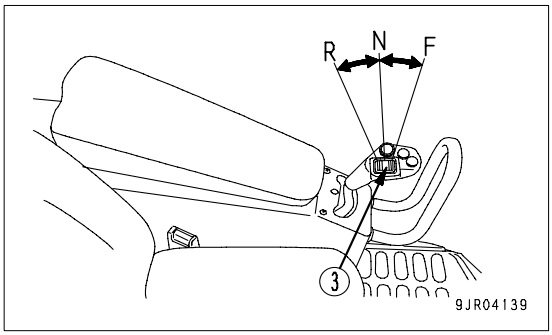


NOTICE
Never use the parking brake switch to brake the machine when traveling except in an emergency. Apply the parking brake only after the machine has stopped.

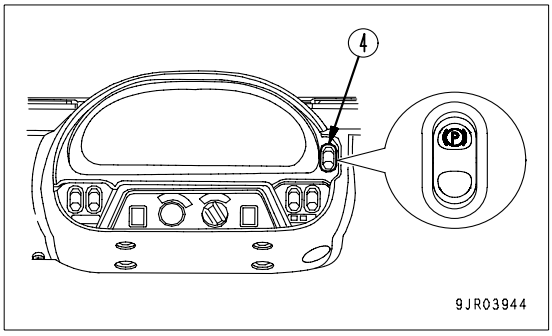
1. Release accelerator pedal (1), then depress brake pedal (2) to stop the machine.



2. Set directional selector switch (3) to the N position.

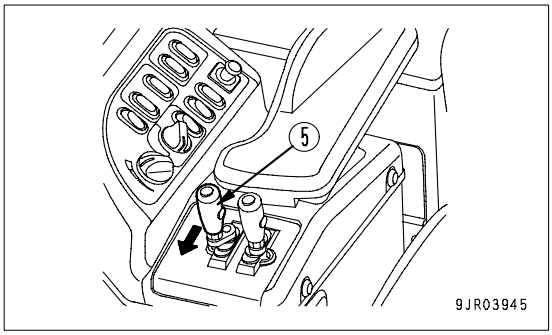


3. Turn parking brake switch (4) ON to apply the parking brake.

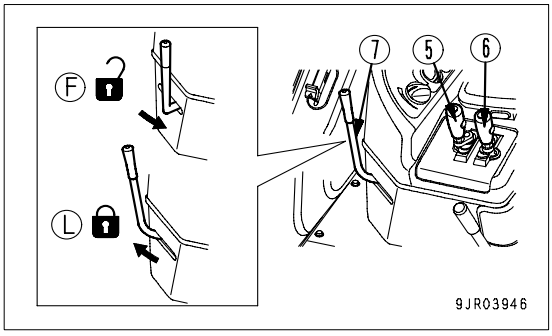


NOTICE
When the parking brake is applied, the transmission is automatically returned to neutral.

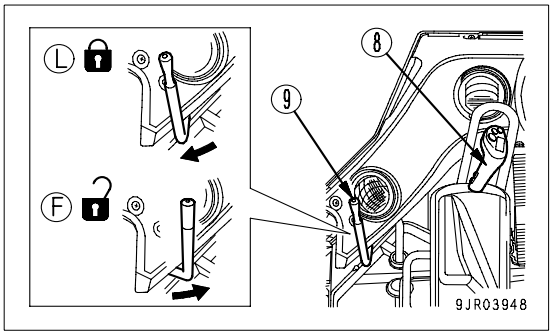
4. Operate lift arm control lever (5) to lower the bucket to the ground.



5. Set work equipment lock lever (7) of lift arm control lever (5) and bucket control lever (6) to LOCK position (L).



6. Set AJSS lever (8) to the Neutral position, then set steering lock lever (9) to lock position (L).



CHECKS AFTER COMPLETION OF OPERATION

Check the engine water temperature, engine oil pressure, torque converter oil temperature, and fuel level with the machine monitor.

If the engine has overheated, do not stop it suddenly. Run the engine at a midrange speed to allow the engine to cool down before stopping it.

Check that there are no loose bodywork mounting bolts.

Check that there are no cracks in the work equipment or bucket.

LOCKING

Always lock the following parts.

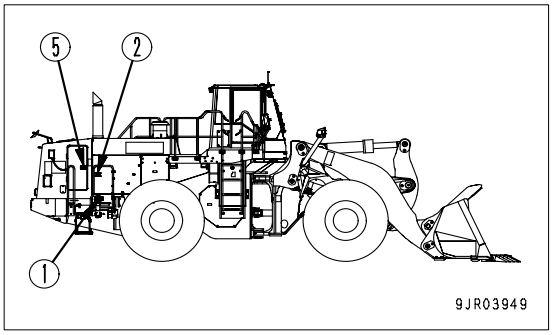
(1) Fuel tank filler cap (1 place)

(2) Engine side panel (2 places)

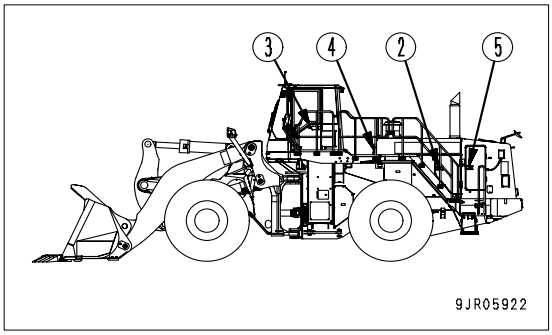
(3) Cab door (1 places)

(4) Engine hood (1 place) (Bulkhead cover)

(5) Radiator guard (2 places)



REMARK
The starting switch key is used for locking places (1), (2), (3), (4) and (5).

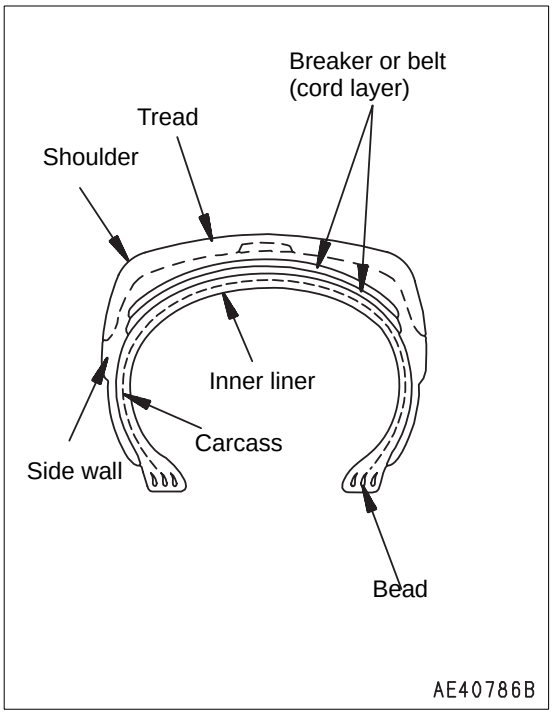


HANDLING THE TIRES

PRECAUTIONS WHEN HANDLING TIRES

⚠ CAUTION

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



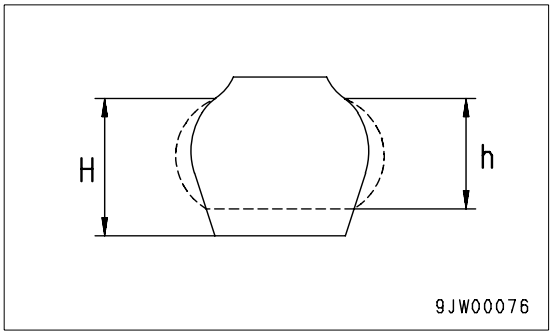
Please contact your Komatsu distributor when replacing the tires. It is dangerous to jack up the machine without taking due care.

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 x 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. 15 to 25 %

When digging (rear wheels off ground): Approx. 25 to 35 %

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.

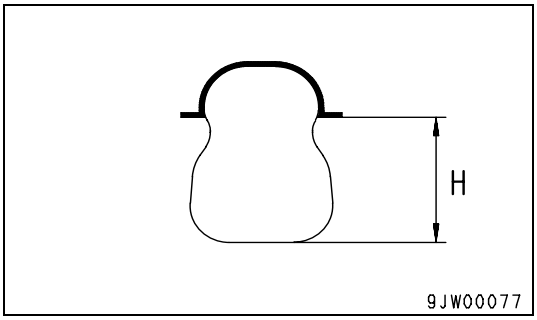
Clearing fallen stones and rocks from the operating area and maintaining the surface will extend the tire life and give improved economy.

- 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
- Operations on sand (operations not using much digging force): Low end of range 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/cm²)				
		Soft ground (sandy ground)		Normal road		When shipped from factory
		Stockpile	Digging	Stockpile	Digging	
35/65-33-36PR (L4 Rock) (Standard)	534	Front tire: 0.525 - 0.625 {5.4 - 6.4} Rear tire:0.525 {5.4}	Front tire: 0.525 - 0.625 {5.4 - 6.4} Rear tire:0.525 {5.4}	Front tire: 0.525 - 0.625 {5.4 - 6.4} Rear tire:0.525 {5.4}	Front tire: 0.525 - 0.625 {5.4 - 6.4} Rear tire:0.525 {5.4}	Front tire: 0.525 {5.4} Rear tire: 0.525 {5.4}
35/65-33-36PR (L5 Rock) (If equipped)						
35/65-33-42PR (L4 Rock) (If equipped)	529	Front tire: 0.625 - 0.725 {6.4 - 7.4} Rear tire: 0.625 {6.4}	Front tire: 0.625 - 0.725 {6.4 - 7.4} Rear tire: 0.625 {6.4}	Front tire: 0.625 - 0.725 {6.4 - 7.4} Rear tire: 0.625 {6.4}	Front tire: 0.625 - 0.725 {6.4 - 7.4} Rear tire: 0.625 {6.4}	Front tire: 0.625 {6.4} Raer tire: 0.625 {6.4}
35/65R33☆ (L4 Rock) (If equipped)	520	Front tire: 0.49 - 0.59 {5.0 - 6.0} Rear tire:0.49 {5.0}	Front tire: 0.49 - 0.59 {5.0 - 6.0} Rear tire:0.49 {5.0}	Front tire: 0.49 - 0.59 {5.0 - 6.0} Rear tire:0.49 {5.0}	Front tire: 0.49 - 0.59 {5.0 - 6.0} Rear tire:0.49 {5.0}	Front tire: 0.59 {6.0} Rear tire: 0.49 {5.0}
35/65R33☆ (L5 Rock) (If equipped)	521					
35/65R33☆☆ (L4 Rock) (If equipped)	530	Front tire: 0.75 - 0.82 {7.6 - 8.3} Rear tire: 0.65 - 0.71 {6.6 - 7.2}	Front tire: 0.75 - 0.82 {7.6 - 8.3} Rear tire: 0.65 - 0.71 {6.6 - 7.2}	Front tire: 0.75 - 0.82 {7.6 - 8.3} Rear tire: 0.65 - 0.71 {6.6 - 7.2}	Front tire: 0.75 - 0.82 {7.6 - 8.3} Rear tire: 0.65 - 0.71 {6.6 - 7.2}	Front tire: 0.75 {7.6} Rear tire: 0.65 {6.6}

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.

PRECAUTIONS FOR USING STONE HANDLING METHOD

When using the stone handling method, it is necessary to choose tires to match the operating conditions. Failure to do this will result in damage to the tires.

The suitable inflation pressure for the tires being used is shown in the table below.

Tire size (Pattern)	Maker	Inflation pressure
35/65R33☆☆VSDL (L-5 Rock)	BRIDGESTONE	0.78MPa {8.0kg/cm^2}

PRECAUTIONS RELATED TO FITTING TIRE CHAINS AND ADDING BALLAST

⚠ WARNING

One way of improving the stability of the machine is to add ballast to the tires (calcium chloride, etc), but this there is danger that this may affect the strength of the machine and lead to serious personal injury, so always observe the following items when adding ballast.
Do not add ballast to all 4 tires. When adding ballast, add to the rear tires only.
Do not add ballast If mesh chains have been fitted to the tires.
Do not add ballast If the machine is equipped with an additional counterweight.
Do not use mesh chains on logging specification machines. In addition, do not add ballast.

- Conditions allowing addition of ballast and use of mesh chains

Specifications	Fitting mesh chains (*1)	Adding ballast (*2)	Simultaneous use of mesh chains and ballast
Standard specification	o	o	x
Standard specification + additional counterweight	o	x	x
Load and carry specification	o	o	x
Logging specification	x	x	x

*1: Possible to fit mesh chains to all 4 tires.

*2: Possible to add ballast to rear tires only. Prohibited to add ballast to all 4 tires.

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 (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

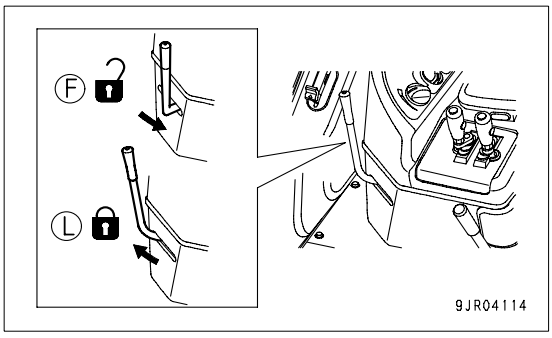
⚠ WARNING

When transporting this machine, observe all related laws and regulations. Disassembling for transportation is needed. Consult your Komatsu distributor for transporting the machine.

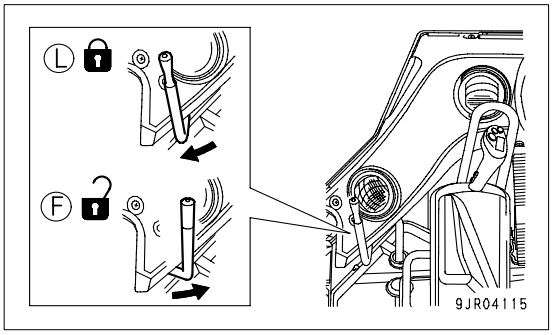
METHOD OF SECURING MACHINE

Load the machine onto a trailer as follows:

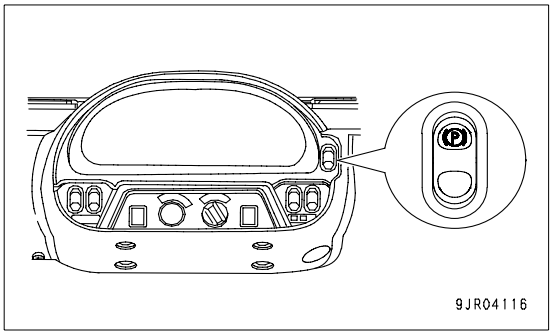
1. Lower the work equipment slowly.
2. Set the work equipment lock lever for the work equipment control lever to LOCK position (L).



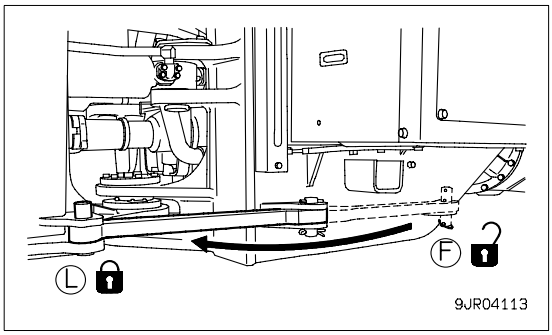
3. Set the steering lock lever to LOCK position (L).



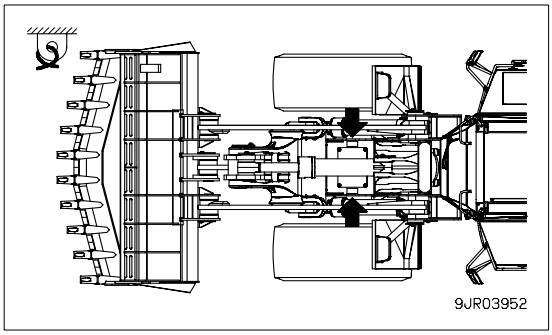
4. Turn the parking brake switch to the ON position to apply the parking brake.
5. Turn the starting switch to the OFF position to stop the engine, and pull out the starting switch key.



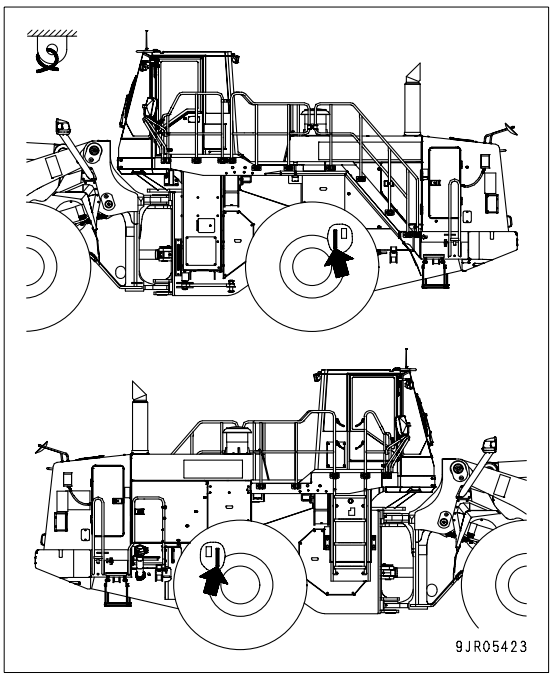
6. Set the frame lock bar to LOCK position (L) to prevent the front frame and rear frame from articulating.



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 rotate the antenna or remove it.
(Fit a seal to prevent dust or dirt from entering the connector portion.)
In addition, reassemble the mirrors so that they are stowed inside the machine width.



METHOD OF LIFTING MACHINE

When lifting the machine at a port or any other place, always use the following procedure to lift it.

⚠ WARNING

- **The operator carrying out the lifting operation using a crane must be a properly qualified crane operator.**
- **Never raise the machine with any worker on it.**
- **Always make sure that the wire rope is of ample strength for the weight of this machine.**
- **When lifting, keep the machine horizontal.**
- **When lifting, always stop the engine, apply the parking brake, and set the lock levers (work equipment, steering) to the LOCK position. Lock with the frame lock bar to prevent the front frame from articulating and to prevent the machine from making any unexpected movement.**
- **Never allow people to enter the area under or around the machine when it is raised.**

Never try to lift the machine in any posture other than the posture given in the procedure below or using lifting equipment other than in the procedure below.

There is a hazard that the machine may lose its balance.

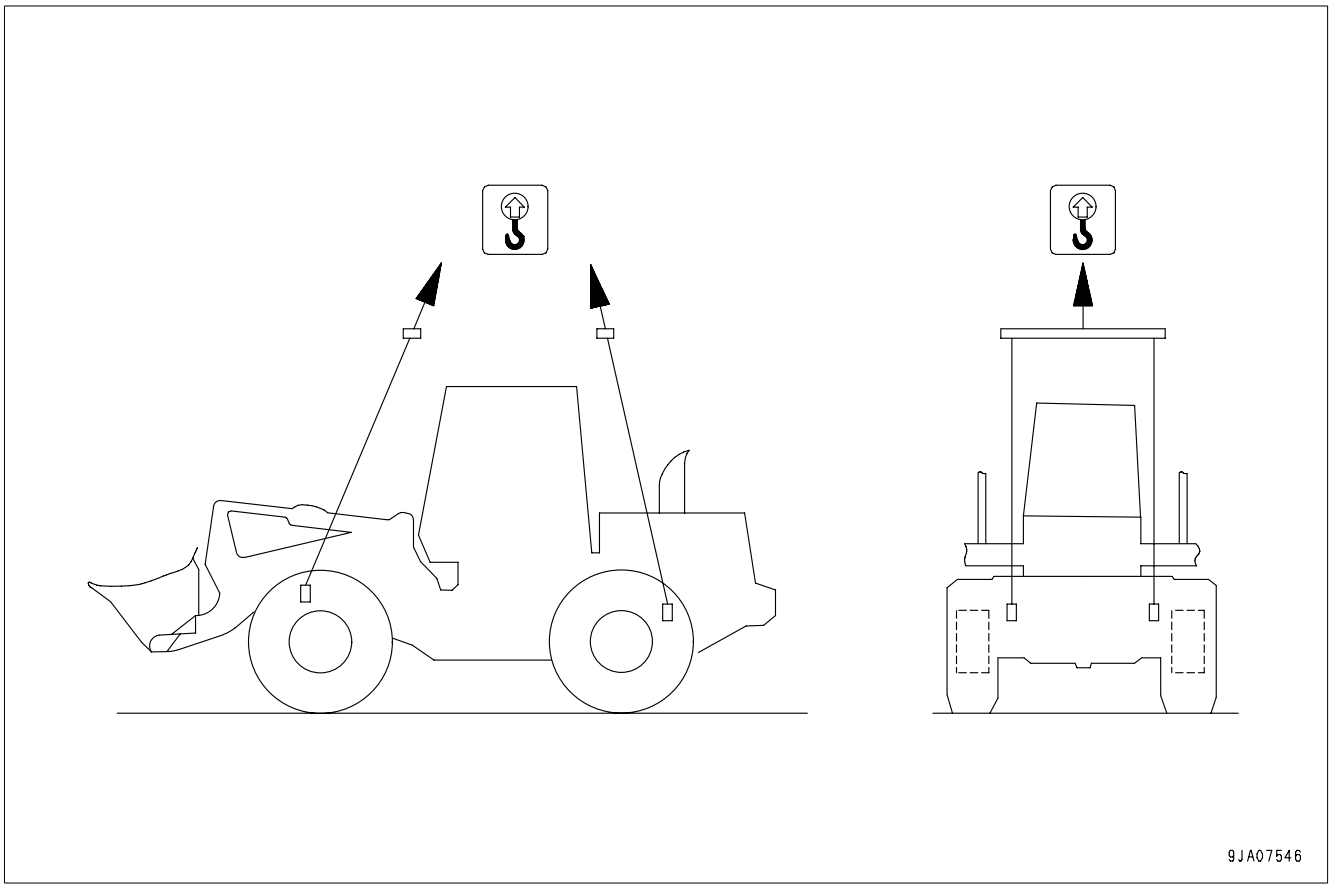
NOTICE
This method of lifting applies to the standard specification machine.
The method of lifting differs according to the attachments and options installed.
For details of the procedure for machines that are not the standard specification, please consult your Komatsu distributor.

For the weight of the standard specification machine, see “WEIGHT TABLE (3-172)“.

NOTICE
- **Use protectors to prevent the wire rope from being cut on sharp corners and to prevent the wire rope from cutting into the machine bodywork.**
- **When using a spreader bar, select an ample width to prevent contact with the machine.**

Please consult your Komatsu distributor before carrying out lifting work.

LOCATION OF LIFTING POSITION MARK



WEIGHT TABLE

		Operating weight	Front wheel load	Rear wheel load	Center of gravity (from front axle)
WA600-6	General spec.	52620 kg	26640 kg	25980 kg	2220 mm
	EU spec	52850 kg	26705 kg	26145 kg	2225 mm

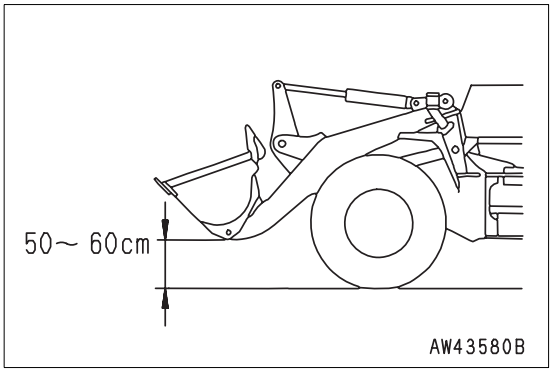
LIFTING PROCEDURE

The machine can be lifted only if it has hook mark labels.

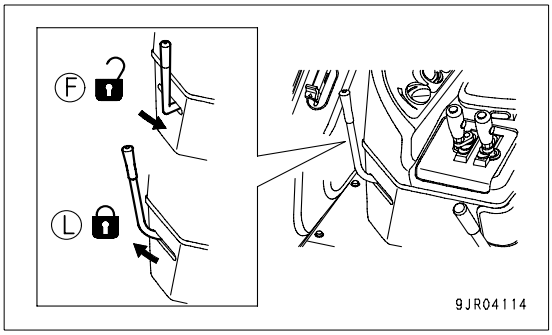
When lifting the machine, stop the machine on level ground and do as follows.

1. Start the engine, make sure that the machine is horizontal, then set the work equipment to the travel posture.

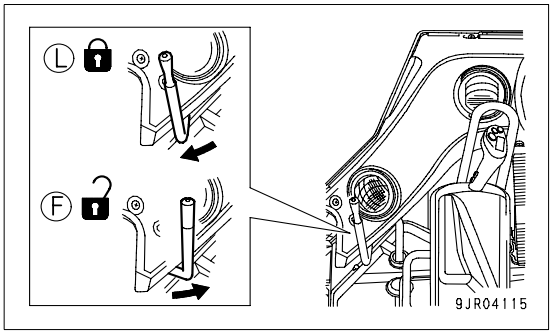
   For details, see “PREPARATIONS FOR MOVING MACHINE (3-125)“.



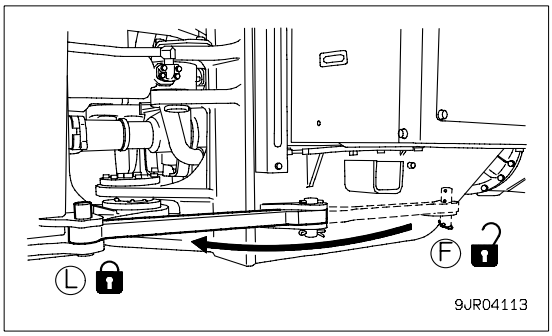
2. Set the work equipment lock lever for the work equipment control lever to LOCK position (L).



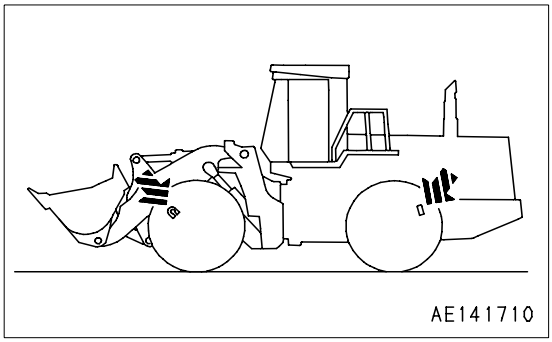
3. Set the steering lock lever to LOCK position (L).



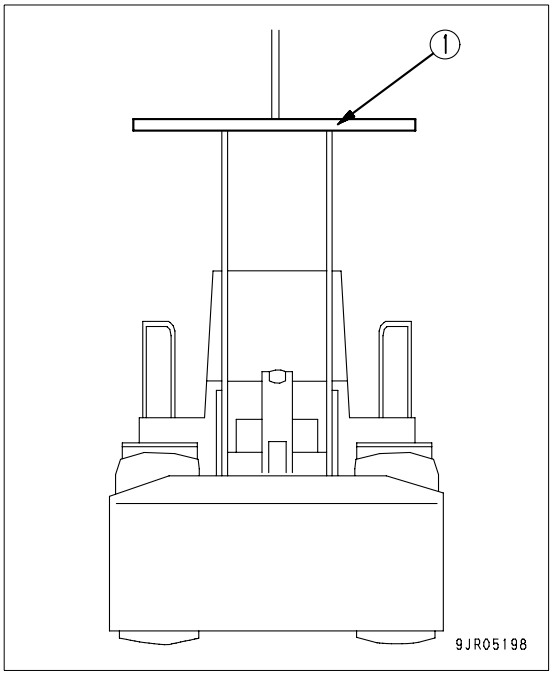
4. Stop the engine, check that the area around the operator's compartment is safe, then set the frame lock bar to the LOCK position (L) to prevent the front frame and rear frame from articulating.



5. Select wire ropes, slings, spreader bars and other lifting equipment to match the weight of the machine, and fit the wire ropes to the lifting hooks at the front of the front frame and the rear of the rear frame (lifting hook marks).



NOTICE
When lifting the front frame, use balance type lifting tool (1) and lift straight.
If the front frame is not lifted straight, the hook will bend and will cause damage to the front frame.



6. When the machine comes off the ground (raised 10 to 20 cm), stop the lifting operation, check carefully that the machine is balanced and that the wire ropes are not loose, then continue the lifting operation slowly.

PRECAUTIONS WHEN DISASSEMBLY OR REASSEMBLING WORK EQUIPMENT

When reassembling the work equipment after disassembly, inspection, or repair, pay attention to the following points to prevent scuffing or other problems with the pins and bushings.

- Clean all sand and soil or old grease from around the pin, bushing, or boss.

  Remove any sand or soil from inside the pin grease hole or bushing groove. Even if only a small amount of dirt or sand gets between the pins or bushings, it will cause premature scuffing.

- Align the pin insertion with the center of the hole and set so that the pin enters smoothly.

  If the pin is forced or knocked in, this will cause premature scuffing or damage to the pin or bushing.

COLD WEATHER OPERATION

PRECAUTIONS FOR LOW TEMPERATURE

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

FUEL AND LUBRICANTS

Change to fuel and oil with low viscosity for all components.

For details of the specified viscosity, see “RECOMMENDED FUEL, COOLANT, AND LUBRICANT (4-10)“.

COOLANT

⚠ WARNING

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

NOTICE

- **Use Komatsu Supercoolant (AF-NAC) wherever available, or use permanent type antifreeze coolant.**
- **Never use methanol, ethanol, or propanol-based antifreeze.**
- **Do not use any water leakage prevention agent, either alone, or in combination with antifreeze.**
- **Do not mix one brand of antifreeze with a different brand.**
- **When using Komatsu Supercoolant (AF-NAC), there is no need to use a corrosion resistor. For details, see “CLEAN INSIDE OF COOLING SYSTEM (4-24)“.**

For details of the antifreeze mixture when changing the coolant, see “CLEAN INSIDE OF COOLING SYSTEM (4-24)“.

BATTERY

⚠ WARNING

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

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

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

Charging Rate (%)	Electrolyte Temperature (°C)			
	20	0	-10	-20
100	1.28	1.29	1.30	1.31
90	1.26	1.27	1.28	1.29
80	1.24	1.25	1.26	1.27
75	1.23	1.24	1.25	1.26

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

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.
- Fill the fuel tank to capacity. This minimizes moisture condensation in the tank when the temperature drops.

AFTER COLD WEATHER

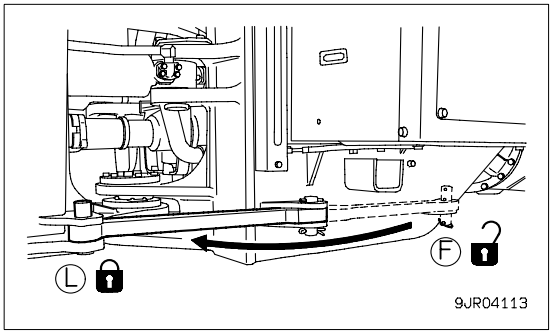
When the season changes and the weather becomes warmer, do as follows.

- Replace all fuel and oil with fuel and oil of the specified viscosity. For details, see “RECOMMENDED FUEL, COOLANT, AND LUBRICANT (4-10)“.

WARMING-UP OPERATION FOR STEERING HYDRAULIC CIRCUIT IN COLD WEATHER

⚠ WARNING

When the oil temperature is low, if the AJSS lever is operated or any operation to stop in a certain position is carried out, there may be a time lag before the machine turns and stops.
In this case, to ensure safety, use the frame lock lever and carry out the warming-up operation in a wide space.
When doing this, do not relieve the pressure in the hydraulic 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

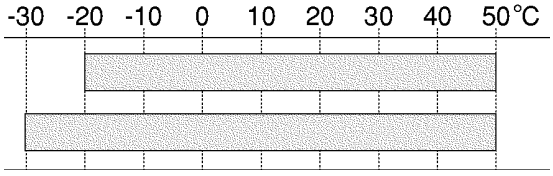
Slowly operate the AJSS lever to the left and right to warm up the oil in the steering valve.

(Repeat this operation for about 10 minutes to warm up the oil.)

NOTICE
Operate the AJSS 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 AJSS lever is operated.

RECOMMENDED OIL

Select the oil from the table below according to the ambient temperature.

RESERVOIR	KIND OF FLUID	AMBIENT TEMPERATURE	Recommended Komatsu Fluids
Hydraulic system	Engine oil		HO46-HM HO-MVK

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 separately. In addition, turn the battery connector switch (if equipped) to the OFF position.
- Lock each control lever with the lock lever.
- To prevent corrosion, be sure to fill the cooling system with Supercoolant (AF-NAC) or permanent type antifreeze (density between 30% and 68%).

DURING STORAGE

⚠ WARNING

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

- During storage, operate and move the machine for a short distance once a month so that a new film of oil will coat moving parts. At the same time, also charge the battery.
- 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 a 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.

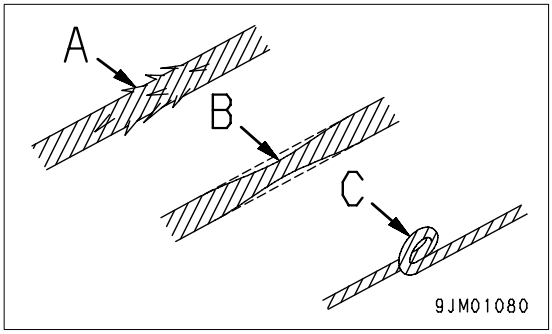
Before starting the engine after it has run out of fuel, fill the fuel tank, then bleed the air from the fuel line.

For details of the method for bleeding the air, see “BLEEDING AIR FROM FUEL CIRCUIT (4-43)“.

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 rope 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 387660N (39530kg). Do not tow any load greater than this.**
- **Towing is only permitted 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, 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 rimpull 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 rimpull, while towing on slopes or on uneven road surfaces will require the maximum rimpull.

WHEN ENGINE RUNS

- If the transmission and AJSS lever 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 RUN

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 cannont 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

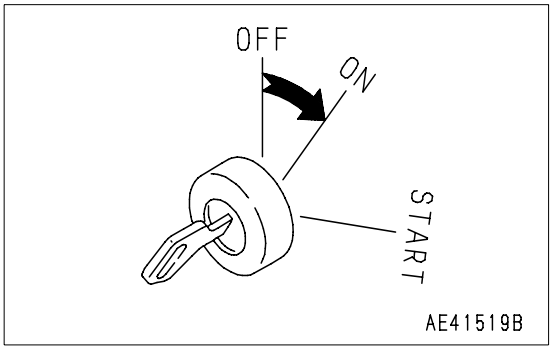
- **When releasing the parking brake, stop the machine on level ground and check that the surrounding area is safe. If it is necessary to release the brake on a slope in an emergency, block the tires before starting the operation.**
- **If the parking brake is released, the brake cannot be used, so check 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

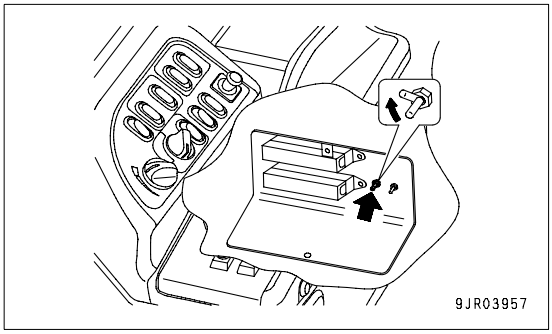
If the pressure in the brake accumulator is high, do as follows.

1. Turn the starting switch ON.



2. Set the emergency parking brake switch to the “RELEASE“ position.

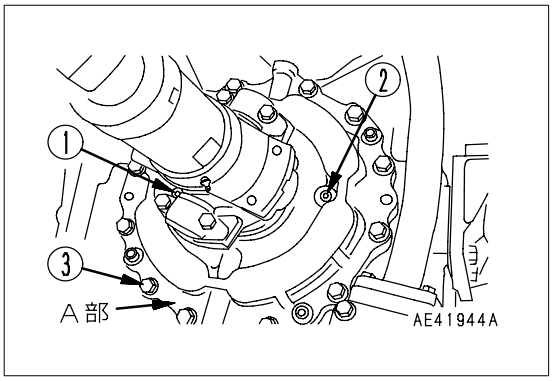
   When doing this, check that the warning lamp for the parking brake goes out. When the switch is turned to the “RELEASE“ position, the alarm buzzer sounds continuously.



REMARK
Normally, keep this switch at the “NORMAL“ position.
If the brake accumulator pressure is low, the parking brake warning lamp may not go out and the alarm buzzer may make a continuous high-pitched sound.
If this happens, release the brake. For details, see “METHOD OF RELEASING MECHANICALLY“.

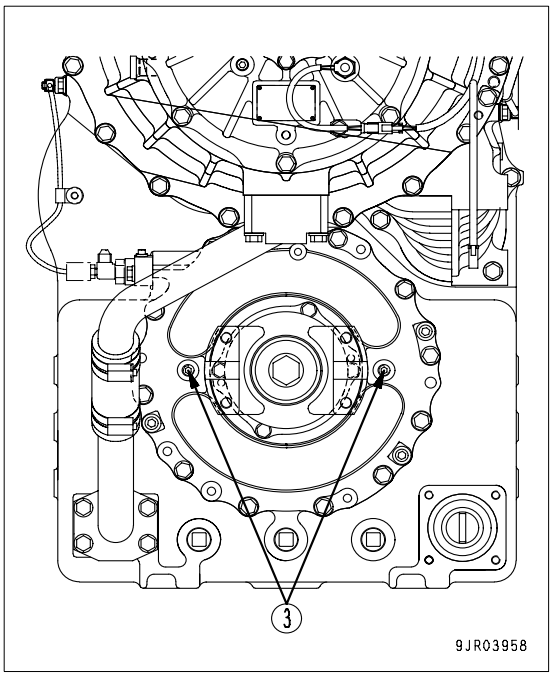
METHOD OF RELEASING MECHANICALLY

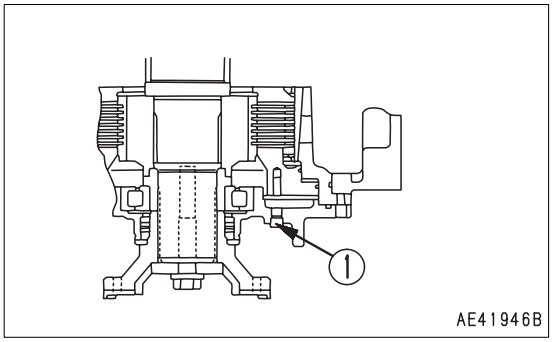
1. Remove plugs (1) and (2) at the rear of the transmission case.
2. Remove bolts (3) (2 out of 12) at portion A installing the parking brake chamber cover.



3. Screw bolts (3) into the holes from which plugs (1) and (2) were removed and tighten uniformly until they stop.

   The parking brake is released.





(1) Threaded hole M12

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.

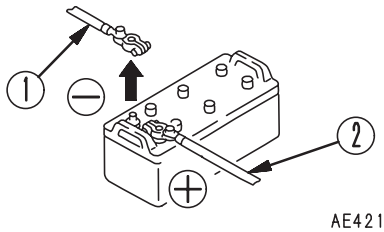
NOTICE
Always request your Komatsu distributor to carry out the emergency travel operation.

IF BATTERY IS DISCHARGED

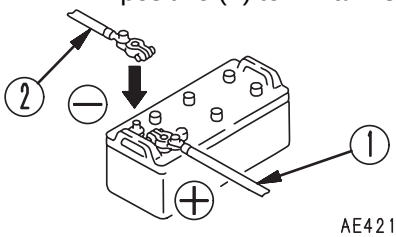
⚠ WARNING

- **It is dangerous to charge a battery when mounted on a machine. Make sure that it is dismounted before charging.**
- **When checking or handling the battery, stop the engine and turn the starting switch key to the OFF position.**
- **The battery generates hydrogen gas, so there is a hazard of explosion. Do not bring lighted cigarettes near the battery, or do anything that will cause sparks.**
- **Battery electrolyte is dilute 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.**

When removing, disconnect the cable from the ground terminal first



When installing, connect the cable to the positive (+) terminal first



REMOVAL AND INSTALLATION OF BATTERY

1. Before removing battery, remove the ground cable (normally connected to the negetive (-) terminal). If any tool touches between the positive terminal and the chassis, there is danger of sparks being generated. Loosen the nuts of the terminal and remove the wires from the battery.
2. After installing the battery, fix it with the battery hold down.

   Tightening torque: 2 to 2.9 Nm {0.2 to 0.3 kgm}
3. When installing the battery, connect the ground cable last.

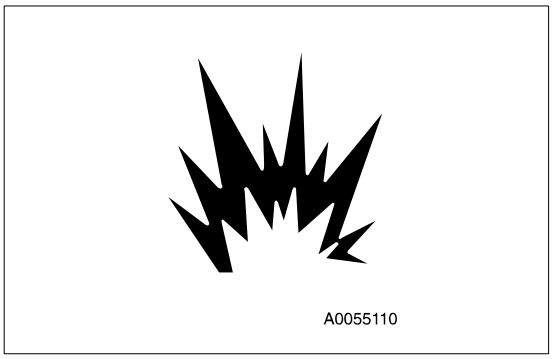
   Insert the hole of the terminal on the battery and tighten the nut.

   Tightening torque: 5.9 to 9.8 Nm {0.6 to 1.0 kgm}

REMARK
The batteries are on both sides at the rear of the machine. The battery used for the ground is on the right side 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 (3-176)“ and the instruction manual accompanying the charger, and do as follows.



- Do not use or charge the battery if the level of the battery electrolyte is below the lower level. This may cause an explosion. Always inspect the battery electrolyte level periodically and add distilled water to the upper level.
- 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.

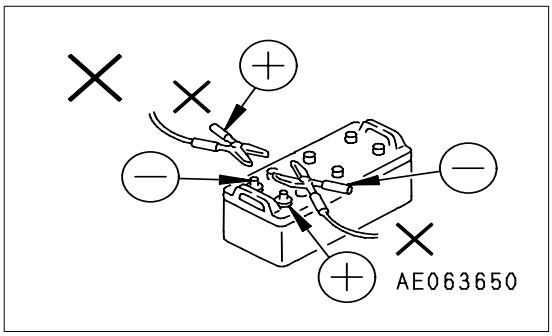
STARTING ENGINE WITH BOOSTER CABLE

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

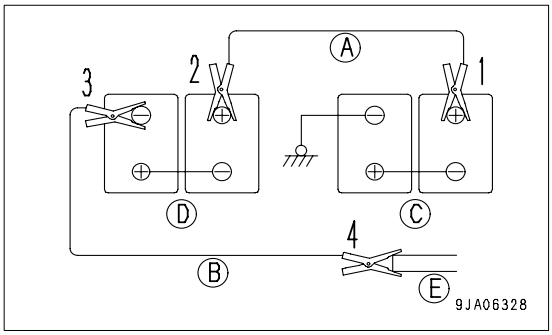
- **The starting system on this machine is 24V. For the normal machine, use a machine that is also 24V.**
- **Always use a booster cable or clip of a thickness that is suitable for the size of the battery.**
- **For the battery on the normal machine, use a battery with the same capacity as the problem machine.**
- **Check that the cable and clips are not damaged or corroded.**
- **Connect the clips securely.**
- **Check that the lock levers (work equipment, steering) 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 problem machine in the OFF position.

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

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



STARTING ENGINE

⚠ WARNING

Check that the lock levers (work equipment, steering) and parking brake levers of both the normal machine and the problem machine are at the LOCK position. Check also that all control levers are at the HOLD position.

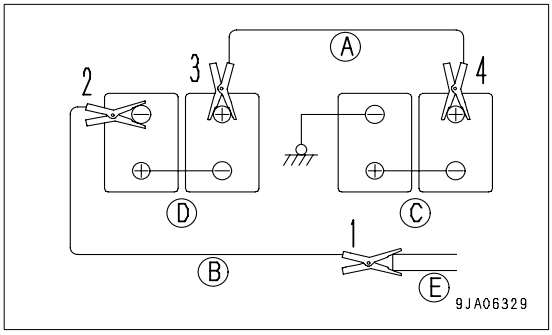
1. Make sure the clips are firmly connected to the battery terminals.
2. Start engine of the normal machine and run it at high idle speed.
3. Turn the starting switch of the problem machine to the START position and start the engine.

   If the engine doesn't start at first, 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 connected.

1. Remove one clip of booster cable (B) from the engine block of the problem machine (C).
2. Remove the other clip of booster cable (B) from the negative (-) terminal of the normal machine (D).
3. Remove one clip of booster cable (A) from the positive (+) terminal of the normal machine.
4. Remove the other clip of booster cable (A) from the positive (+) terminal of the problem machine (E).



STARTING ENGINE WHEN USING STARTING AID CONNECTOR (if equipped)

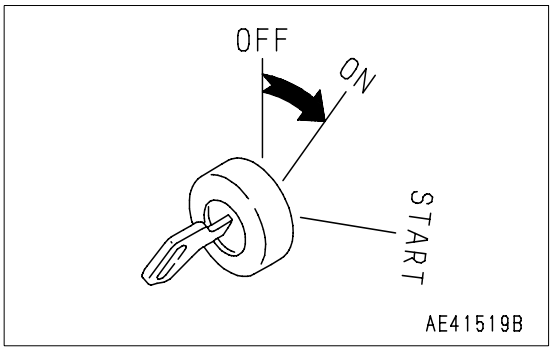
When using the starting aid connector (if equipped) to start the engine, see “HANDLING STARTING AID CONNECTOR (6-63)“ in the ATTACHMENT AND OPTION Section.

METHOD FOR LOWERING WORK EQUIPMENT WHEN ENGINE HAS STOPPED

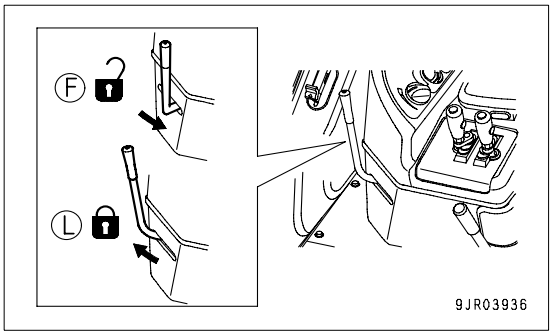
⚠ WARNING

Check that the surrounding area is safe, then lower the work equipment.

1. Turn starting switch key to the ON position.

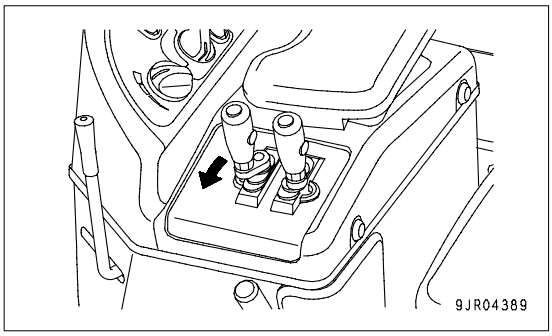


2. Turn the work equipment lock lever to FREE position (F).

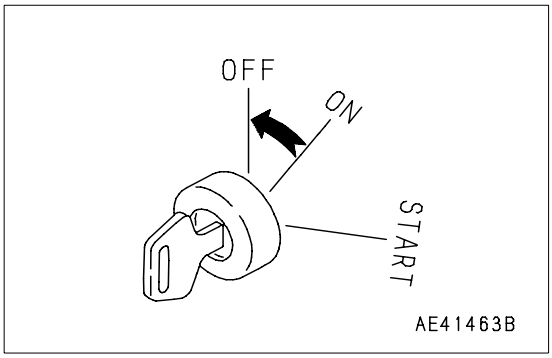


3. Operate the lift arm control lever to lower the bucket to the ground.

4. Set the work equipment lock leve to the LOCK position (L) securely.



5. Turn the key in the starting switch to the OFF position and stop the engine.



REMARK
Carry out this operation within two minutes after the engine is stopped. If the machine is left after the engine has stopped, the pressure in the accumulator will go down and it will be impossible to lower the work equipment.

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 Lamp flickers while engine is running	•Defective wiring •Defective belt	(•Check, repair loose terminals, disconnections) •Check, replace belt. See EVERY 500 HOURS SERVICE.
Even when engine is running, battery charge circuit caution lamp does not go out	•Defective alternator •Defective wiring •Defective belt	(•Replace) (•Check, repair) •Check, replace belt. See EVERY 500 HOURS SERVICE.
Abnormal noise is generated from alternator	•Defective alternator	(•Replace)
Starting motor does not turn when starting switch is turned ON	•Defective wiring •Insufficient battery charge	(•Check, repair) •Charge
Pinion of starting motor keeps going in and out	•Insufficient battery charge	•Charge
Starting notor turns engine sluggishly	•Insufficient battery charge •Defective starting motor	•Charge •Replace
Starting motor disengages before engine starts	•Defective wiring •Insufficient battery charge	(•Check, repair) •Charge
Engine pre-heating pilot lamp does not light up	•Defective wiring •Defective heater relay, slow blow fuse, coolant temperature sensor •Defective preheating pilot lamp	(•Check, repair) (•Replace) (•Replace)
Even when engine is stopped, battery charge circuit caution lamp does not light up (starting switch at ON position)	•Defective wiring •Defective monitor	(•Check, repair) (•Replace)

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
Transmission		
Engine is running but machine does not move	•Parking brake applied •Directional lever is not shifted properly •Lack of oil in transmission case	•Release parking brake •Shift lever properly •Add oil to specified level. See WHEN REQUIRED
Even when engine is run at full throttle, machine only move slowly and lacks power	•Lack of oil in transmission case •Screen is clogged	•Add or drain oil to specified level. See WHEN REQUIRED (•Disassemble, clean)
Oil overheats	•Too much oil or too little oil •Machine is not traveling in correct speed range •Torque converter is stalled for long periods •Engine is overheating	•Add or drain oil to specified level. See WHEN REQUIRED •Place in correct speed range •Reduce stall time (•Check engine)
Noise generated	•Lack of oil	•Add or drain oil to specified level. See WHEN REQUIRED
Axle		
Noise generated	•Lack of oil •Improper oil used (for machines with anti slip differential)	•Add or drain oil to specified level. See WHEN REQUIRED •Replace with specified oil
Brake		
Brake is not applied when pedal is depressed	•Disc has reached wear limit •Defective hydraulic system •Lack of oil •Air in brake line	(•Replace disc) (•Chack, repair) •Add oli to specified level. See EVERY 100 HOURS SERVICE •Bleed air. See WHEN REQUIRED
Brake drags or remains applied	•Vent hole of brake valve is clogged	•Clean
Brake squeal	•Disc is worn •Large amount of water in axle oil •Deteriorated axle oil due to overuse of brake	(•Replace disc) •Change axle oil •Change axle oil

Problem	Main causes	Remedy
Steering		
Steering wheel is heavy	•Defective hydraulic system •Lack of oil	(•Check, repair) •Add oil to specified level. See EVERY 100 HOURS SERVICE
Steering wheel is loose	•Play in steering cylinder pin •Defective hydraulic system •Lack of oil	•Grease bearing or replace pin and bushing where there is play (•Check, repair) •Add oil to specified level. See EVERY 100 HOURS SERVICE
Parking brake		
Brake does not work well	•Disc is worn	(•Replace disc)
Brake drags or remains applied	•Lack of oil in transmission case •Screen is clogged	•Add or drain oil to specified level. See WHEN REQUIRED (•Disassemble, clean)
Hydraulic system		
Lacks bucket lifting power Takes time to lift the bucket	•Lack of oil •Clogged hydraulic tank filter	•Add oil to specified level. See EVERY 100 HOURS SERVICE •Replace filter. See EVERY 2000 HOURS SERVICE
Excessive bubbles in oil	•Low quality oil being used •Oil level is low •Air in oil line	•Replace wiyh good quality oil •Add oil to specified level. See EVERY 100 HOURS SERVICE •Bleed air. See WHEN REQUIRED
Hydraulic pressure is low	•Oil level is low and pump is sucking in air	•Add oil to specified level. See EVERY 100 HOURS SERVICE Then bleed air. See WHEN REQUIRED
Movement of cylinder is irregular	•Oil level is low	•Add oil to specified level. See EVERY 100 HOURS SERVICE

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 lamp lights up	•Engine oil pan level is low (sucking in air) •Clogged oil filter cartridge •Defective tightening of oil pipe joint, oil leakage from damaged part •Defective monitor	•Add oil specified level, see CHECK BEFORE STARTING •Replace cartridge, see EVERY 500 HOURS SERVICE (•Check, repair) (•Replace)
Steam is emitted from top part of radiator (pressure valve) Water temperature gauge is in red range Coolant temperature monitor lights up	•Cooling water level low, water leakage •Dirt or scale accumulated in cooling system •Clogged radiator fin or damaged fin •Defective thermostat •Defective thermostat seal •Loose radiator filler cap (high altitude operation) •Defective monitor	•Add cooling water, repair, see WHEN REQUIRED •Change cooling water, clean inside of cooling system, see WHEN REQUIRED •Clean or repair, see WHEN REQUIRED (•Replace thermostat) (•Replace thermostat seal) •Tighten cap or replace packing (•Replace)
Engine water temperature gauge is in white range below	•Defective thermostat •Defective monitor	(•Replace thermostat) (•Replace)
Engine does not start when starting motor is turned	•Lack of fuel •Air in fuel line •Defective injection pump or injector •Starting motor cranks engine too slowly •Starting motor is not rotating •Preheating pilot lamp does not light up •Defective valve clearance (defective compression)	•Add fuel, see CHECK BEFORE STARTING •Repair place where air is sucked in (•Replace pump or nozzle) •See ELECTRICAL SYSTEM •See ELECTRICAL SYSTEM •See ELECTRICAL SYSTEM (•Defective valve clearance)
Exhaust gas is white or blue	•Too much oil in oil pan •Insufficient fuel	•Add oil to specified level, see CHECK BEFORE STARTING •Replace with specified oil
Exhaust gas occasionally turns black	•Clogged air cleaner element •Defective injector •Defective compression •Defective turbocharger	•Clean or replace, see WHEN REQUIRED (•Replace injector) (•See defective compression above) (•Clean or replace turbocharger)
Combustion noise occasionally makes breathing sound	•Defective nozzle	(•Replace nozzle)
Abnormal noise generated (combustion or mechanical)	•Low grade fuel being used •Overheating •Damage inside muffler •Excessive valve clearance	•Chenge to specified fuel •Refer to “Engine water temprature gauge is in red range“ as above •Replace muffler (•Adjust valve clearance)

MAINTENANCE

⚠ WARNING

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

GUIDES TO MAINTENANCE

Do not perform any inspection and maintenance operation that is not found in this manual.

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 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.
- Remove the negative (-) terminal of the battery to stop the flow of electric current.

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:

- Check the air cleaner clogging caution lamp more frequently to check the degree of clogging of the air cleaner.

  Clean the air cleaner element more frequently.
- 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:

After repairing or replacing the parts of hydraulic circuit, or removing the piping of hydraulic circuit, it is necessary to bleed the air from inside of the circuit. See “BLEEDING AIR FROM HYDRAULIC TANK (4-41)“ for bleeding the air.

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 (2-38)“ 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)
Axle	Axle oil AXO80 (Komatsu genuine parts)
Radiator	Supercoolant AF-NAC (Density: 30% or above) (Komatsu genuine parts)

HANDLING OIL, FUEL, COOLANT, AND PERFORMING OIL CLINIC

OIL

- Oil is used in the engine and hydraulic equipment under extremely severe conditions (high temperature, high pressure), and deteriorates with use.

  Always use oil that matches the grade and maximum and minimum ambient temperatures recommended in the Operation and Maintenance Manual. Even if the oil is not dirty, always change the oil at the specified interval.
- Oil corresponds to blood in the human body, 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 for the temperature in the Operation and Maintenance Manual.
  - If the fuel is used at temperatures lower than the specified temperature (particularly at temperatures below -15°C, the fuel will solidify.
  - If the fuel is used at temperatures higher than the specified temperature, the viscosity will drop, and this may result in problems such as a drop in output.
- 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

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

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

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

  Komatsu Supercoolant (AF-NAC) is strongly recommended wherever available.
- When using Komatsu Supercoolant (AF-NAC), there is no need to use a corrosion resistor. For details, see “CLEAN INSIDE OF COOLING SYSTEM (4-24)“.
- When diluting the antifreeze coolant, use distilled water or tap water (soft water).

  Natural water, such as a river water or well water (hard water), contains large amounts of minerals (calcium, magnesium, etc.), and this makes it easier for scale to form inside the engine or radiator. Once scale is deposited inside the engine or radiator, it is extremely difficult to remove. It also causes overheating due to poor heat exchange, so when you dilute the coolant, we recommend that you use water with an overall hardness of less than 100 PPM.
- When using antifreeze, always observe the precautions given in the Operation and Maintenance Manual.
- Antifreeze coolant is flammable, so be sure to keep it away from flame.
- The ratio of Supercoolant (AF-NAC) to water differs according to the ambient temperature.

  For details of the ratio when mixing, see “CLEAN INSIDE OF COOLING SYSTEM (4-24)“.

  Supercoolant (AF-NAC) may be supplied already mixed. In such cases, never dilute with water.
- If the engine overheats, wait for the engine to cool before adding coolant.

- If the coolant level is low, it will cause overheating, and will also cause problems with corrosion due to air entering the coolant.

GREASE

- Grease is used to prevent seizure and noises at the joints.
- This construction equipment is used under heavy-duty conditions. Always use the recommended grease and follow the change intervals and recommended ambient temperatures given in this Operation and Maintenance Manual.
- Grease fittings not listed in the inspection and maintenance section are grease fittings that are used at the time of overhaul, so there is no need to grease these points.

  When using the machine after it has been in storage for a long time, carry out greasing if there is any stiffness or screeching.
- 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)

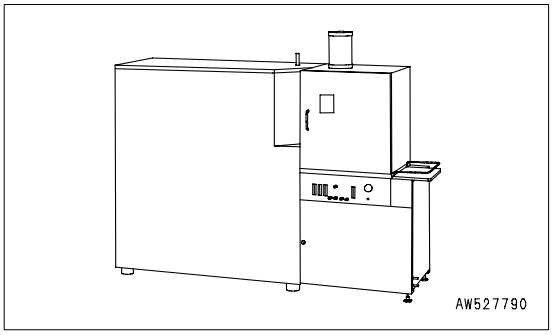
KOWA is a maintenance service that makes it possible to prevent machine failures and downtime. With KOWA, the oil is periodically sampled and analyzed. This enables early detection of wear of the machine drive parts and other problems.

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

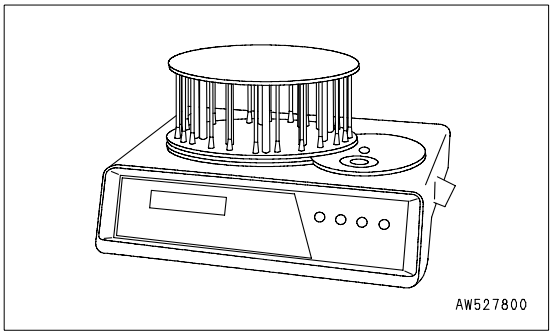
- Measurement of density of metal wear particles

  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 particle quantifier index measurement machine to measure the quantity of iron particles of 5μ 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 antifreeze 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, buckt 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	600-211-1340	Cartridge	3	Every 500 hours
Fuel filter	600-319-3520	Cartridge	1	
Fuel pre-filter	600-319-3440	Cartridge	2	
Brake oil filter (if equipped)	426-43-38760	Cartridge	2	
Transmission oil filter	424-16-11140 (07000-A2125) (07000-A2014)	Element (O-ring) (O-ring)	3 (3) (3)	
Transmission strainer	07000-75085 07000-B2100	O-ring O-ring	1 1	Every 1000 hours
Corrosion resistor	600-411-1171	Cartridge	1	
Hydraulic filter	209-60-77531 (07002-61423) (07000-A2010) (07000-A5200)	Element (O-ring) (O-ring) (O-ring)	1 (1) (1) (1)	Every 2000 hours
Hydraulic tank strainer	07000-A5230	O-ring	1	
Hydraulic tank breather	285-62-17320	Element	2	
Air conditioner air filter	426-07-32441	Element (FRESH)	1	
	426-07-32441	Element (RECIRC)	1	
PPC accumulator	426-62-23750 (07002-62034)	Accumulator (O-ring)	1 (1)	Every 2 years or every 4000 hours whichever comes first
Air cleaner	600-185-6100	Element ASS'Y	1	-
	600-185-6110	Outer element ASS'Y	1	
1-piece bucket tooth	426-70-13311 (02091-12050) (02290-12031) (178-70-14150) (178-70-14160)	Tooth (Bolt) (Nut) (Shim) (Shim)	6 (18) (18) (6) (6)	
1-piece corner tooth	426-70-13321 426-70-13331 (02091-12050) (02091-12015) (02290-12031) (178-70-14240) (178-70-14250)	Right corner tooth Left corner tooth (Bolt) (Bolt) (Nut) (Shim) (Shim)	1 1 (4) (2) (6) (2) (2)	
Tip tooth	426-847-1110 (426-847-1130)	Tooth (Pin)	10 (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, be sure to use the recommended multi-grade oil, even if the ambient temperature may become higher during the course of the day.

- If the machine is operated at a temperature below -20°C, a separate device is needed, so consult your Komatsu distributor.

- When the fuel sulfur content is less than 0.2%, 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 0.2%, change the oil according to the following table.

Sulfur content (%)	Oil change interval
Less than 0.2%	500 hours
0.2 to 0.5%	250 hours
0.5% and up	Not recommendable (*)

* If these fuels are used, there is danger that serious trouble may occur because of early deterioration of the engine oil or early wear of the internal parts of the engine. If the local situation makes it necessary to use these fuels, always remember the following.

1) Be sure to check Total Basic Number (TBN) of oil frequently by TBN handy checker etc., and change oil based on the result.

2) Always be aware that oil change interval is extremely shorter than standard.

3) Be sure to carry out periodic engine inspection by distributor's expert since change interval of periodic replacement parts and overhaul interval are also shorter.

USE OF FUEL, COOLANT AND LUBRICANTS ACCORDING TO AMBIENT TEMPERATURE

Reservoir	Fluid type	AMBIENT TEMPERATURE		Recommended Komatsu Fluids
		Min	Max	
Engine oil pan	Engine oil	-30°C	30°C	(Note.1) Komatsu EOS0W30
		-25°C	40°C	(Note.1) Komatsu EOS5W40
		-20°C	40°C	Komatsu EO10W30-DH
		-15°C	50°C	Komatsu EO15W40-DH
		0°C	40°C	Komatsu EO30-DH
Transmission case	Power train oil (Note. 2)	0°C	50°C	TO30
		-30° C	10°C	TO10
Hydraulic system	Power train oil	-20° C	40° C	TO10
	Hydraulic oil	-20° C	50° C	HO46-HM
		-30° C	50° C	HO-MVK
	Engine oil	-20° C	50° C	Komatsu EO10W30-DH
		-15° C	50° C	Komatsu EO15W40-DH
Axle	Axle oil (Not.e 3)	-30° C	45° C	AXO80
	Power train oil (Note. 4)	45° C	50° C	TO50
Pin/bushings Grease fitting (Note. 5)	Hyper grease (Note. 6)	-20° C	50° C	G2-T, G2-TE
	Lithium EP grease	-20° C	50° C	G2-LI
Work equipment pin (Note. 7)	Gear oil	-30°C	50° C	GO80W90
Cooling sytem	Supercoolant AF-NAC (Note. 8)	-30°C	50°C	AF-NAC
Fuel tank	Diesel fuel	-30° C	20° C	ASTM Grade No. 1-D S15 ASTM Grade No. 1-D S500
		-10° C	50° C	ASTM Grade No. 2-D S15 ASTM Grade No. 2-D S500

- ASTM: American Society of Testing and Material

Reservoir Capacity		Engine oil pan	Transmis-sion case	Hydraulic system	Front axle	Rear axle	Pins	Fuel tank	Cooling system
Specified	Liters	97	120	592	155	155	-	718	182
Refill	Liters	86	83	443	155	155	-	-	147

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.

Always use the fuel specified for the temperature in the Operation and Maintenance Manual.

- If the fuel is used at temperatures lower than the specified temperature (particularly at temperatures below -15°C), the fuel will solidify.
- If the fuel is used at temperatures higher than the specified temperature, the viscosity will drop, and this may result in problems such as a drop in output.

Note. 1: HTHS (High-Temperature High-Shear Viscosity 150°C), specified by ASTM D4741 must be equal to or higher than 3.5 mPa-S. Komatsu EOS0W30 and EOS5W40 are the most suitable oils.

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

Note. 3: Axle oil AXO80 has the function of preventing squealing from the brakes and LSD (Limited Slip Differential).

If only AXO80 is recommended, use Komatsu genuine AXO80 or equivalent.

Note. 4: When the ambient temperature is higher than 45°C and the machine operation hour is longer than 12 hours/day, then the use of TO50 instead of AXO80 is recommended.

Squealing of the brakes may occur with TO50, but there is no problem with the brake performance or durability.

For machines with LSD, use AXO80 regardless of the ambient temperature. Do not use TO50.

Note. 5: If the machine is equipped with an auto-greasing device, use lithium-based grease No. 0 when operating at temperatures below -20°C.

Note. 6: Hyper grease (G2-T, G2-TE) has a high performance.

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

Note. 7: Use GL-5 class oil for the gear oil. Do not use GL-4 class oil.

Note. 8: Supercoolant (AF-NAC)

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

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

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

Komatsu Supercoolant AF-NAC is strongly recommended wherever available.

2) For details of the ratio when diluting super coolant with water, see “CLEAN INSIDE OF COOLING SYSTEM (4-24)“.

Supercoolant AF-NAC may be supplied in premix. In this case, always top off with premix solution. (never dilute with water)

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

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

When using commercially available oils other than Komatsu genuine oil, consult your Komatsu distributor.

STANDARD TIGHTENING TORQUES FOR BOLTS AND NUTS

TORQUE LIST

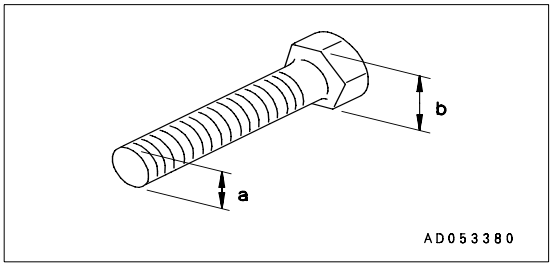
⚠ CAUTION

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

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

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

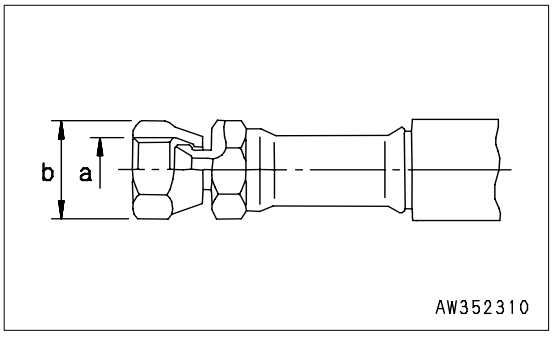
Thread diameter of bolt (a)(mm)	Width across flats (b)(mm)	Tightening torque			
		Target value		Service limit	
		N·m	kgf·m	N·m	kgf·m
6	10	13.2	1.35	11.8-14.7	1.2-1.5
8	13	31	3.2	27-34	2.8-3.5
10	17	66	6.7	59-74	6.0-7.5
12	19	113	11.5	98-123	10.0-12.5
14	22	172	17.5	153-190	15.5-19.5
16	24	260	26.5	235-285	23.5-29.5
18	27	360	37	320-400	33.0-41.0
20	30	510	52.3	455-565	46.5-58.0
22	32	688	70.3	610-765	62.5-78.0
24	36	883	90	785-980	80.0-100.0
27	41	1295	132.5	1150-1440	118.0-147.0
30	46	1720	175.0	1520-1910	155.0-195.0
33	50	2210	225.0	1960-2450	200.0-250.0
36	55	2750	280.0	2450-3040	250.0-310.0
39	60	3280	335.0	2890-3630	295.0-370.0



Apply the following table for Hydraulic Hose.

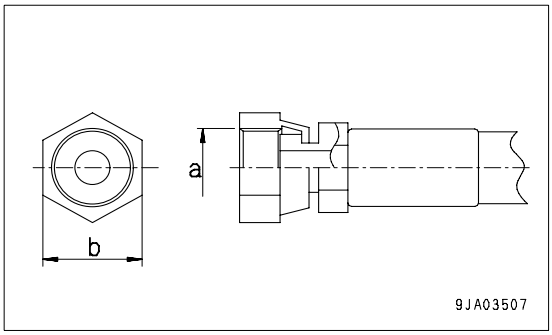
- Taper seal

Thread diameter a (mm)	Width across flats b (mm)	Tightening torque			
		Target value		Permissible range	
		N·m	kgf·m	N·m	kgf·m
10	14	14.7	1.5	12.7 - 16.7	1.3 - 1.7
14	19	29.4	3.0	27.5 - 39.2	2.8 - 4.0
18	24	78.5	8.0	58.8 - 98.1	6.0 - 10.0
22	27	117.7	12.0	88.3 - 137.3	9.0 - 14.0
24	32	147.1	15.0	117.7 - 176.5	12.0 - 18.0
30	36	215.7	22.0	176.5 - 245.2	18.0 - 25.0
33	41	255.0	26.0	215.7 - 284.4	22.0 - 29.0



- Face seal

Nominal - No. of threads (a)	Width across flats (b) (mm)	Tightening torque			
		Target value		Permissible range	
		N·m	kgf·m	N·m	kgf·m
9/16 -18UNF	19	44	4.5	35 - 63	3.5 - 6.5
11/16 -16UN	22	74	7.5	54 - 93	5.5 - 9.5
13/16 -16UN	27	103	10.5	84 - 132	8.5 - 13.5
1 -14UNS	32	157	16.0	128 - 186	13.0 - 19.0
13/16 -12UN	36	216	22.0	177 - 245	18.0 - 25.0



PERIODIC REPLACEMENT OF SAFETY CRITICAL PARTS

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

Material quality of these parts can change as time passes and they are likely to wear out or deteriorate. However, it is difficult to determine the extent of wear or deterioration at the time of periodic maintenance. Hence, it is required to replace them with new ones regardless of their condition after a certain period of usage. This is important to ensure that these parts maintain their full performance at all times.

Furthermore, should anything abnormal be found on any of these parts, replace it with a new one even if the periodic replacement time for the part has not yet arrived.

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

Also perform the 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	Fuek hose (fuel tank - fuel pre-filter)	1	Every 2 years or every 4000 hours, whichever comes frist
2	Fuel hose (fuel pre-filter - feed pump)	1	
3	Fuel hose (feed pump - cooling plate)	1	
4	Fuel hose (cooling plate - fuel block)	1	
5	Fuel hose (supply pump overflow)	1	
6	Fuel hose (electric priming pump inlet port)	1	
7	Fuel hose (electric priming pump outlet port)	1	
8	Fuel return hose (engine - fuel tank)	1	
9	Spill hose (engine outlet port connector - fuel tank)	1	
10	EGR valve greasing hose	1	
11	Work equipment hose (hydraulic pump - main control valve)	5	
12	Work equipment hose (main control valve - lift cylinder)	6	
13	Work equipment hose (main control valve - dump cylinder)	2	
14	Work equipment hose (main control valve - hydraulic tank)	1	
15	Work equipment hose (hydraulic tank - hydraulic pump)	1	
16	Hydraulic pump LS hose (main control valve - hydraulic pump)	4	
17	Hydraulic pump pressure hose (main control valve - hydraulic pump)	4	
18	Main suction hose	2	
19	Steering hose (steering pump - steering valve)	1	
20	Steering hose (steering valve - steering cylinder)	6	
21	Steering hose (steering valve - hydraulic tank)	2	
22	Steering hose (hydraulic tank - steering pump)	1	
23	Steering pump LS hose (steering valve - steering pump)	1	
24	Steering pump pressure hose (steering valve - steering pump)	1	
25	Brake hose (pump - accumulator charge valve)	2	
26	Brake hose (accumulator charge valve - accumulator)	2	
27	Brake hose (accumulator - tandem valve)	2	
28	Brake hose (accumulator - single valve)	1	
29	Brake hose (accumulator - accumulator charge valve P.P port)	1	

No.	Safety critical parts for periodic replacement	Q'ty	Replacement interval
30	Brake hose (tandem valve - front brake)	3	Every 2 years or every 4000 hours, whichever comes first
31	Brake hose (tandem valve - rear brake)	2	
32	Brake hose (single valve - tandem valve)	1	
33	Brake hose (tandem valve - drain block)	1	
34	Brake hose (single valve - drain block)	1	
35	Brake hose (brake accumulator - parking brake emergency release valve)	1	
36	Brake hose (parking brake emergency release valve - parking brake)	1	
37	Brake hose (parking brake solenoid valve - parking brake emergency release valve)	1	
38	Brake hose (parking brake emergency release valve - drain block)	1	
39	Brake hose (drain block - hydraulic tank)	1	
40	Brake hose (accumulator charge valve drain - hydraulic tank)	2	
41	Brake hose (hydraulic tank - brake pump)	1	
42	Accumulator (for PPC)	1	
43	Engine high-pressure piping clamp	1 set	Every 8000 hours
44	Fuel spray prevention cap	1 set	
45	Seat belt	1	Every 3 years

MAINTENANCE SCHEDULE CHART

MAINTENANCE SCHEDULE CHART

INITIAL 10 HOURS SERVICE (SERVICE FOR FIRST 50 HOURS ON NEW MACHINE)

LUBRICATING 4-50

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

REPLACE TRANSMISSION OIL FILTER ELEMENT 4-62
REPLACE HYDRAULIC TANK FILTER ELEMENT 4-69

WHEN REQUIRED

CHECK, CLEAN, OR REPLACE AIR CLEANER ELEMENT 4-22
CLEAN INSIDE OF COOLING SYSTEM 4-24
CHECK TRANSMISSION OIL LEVEL, ADD OIL 4-28
CHECK AXLE OIL LEVEL, ADD OIL 4-30
CLEAN AXLE CASE BREATHER 4-31
CLEAN AIR CONDITIONER CONDENSER 4-32
CHECK WINDOW WASHING FLUID LEVEL, ADD FLUID 4-32
CLEAN RADIATOR FINS 4-33
REPLACE BUCKET TEETH 4-37
LUBRICATING 4-38
CHECK AIR CONDITIONER 4-39
REPLACE SLOW BLOW FUSE 4-40
BLEEDING AIR FROM HYDRAULIC TANK 4-41
BLEEDING AIR FROM FUEL CIRCUIT 4-43
CHECKING FUNCTION OF ACCUMUULATOR 4-46
SELECTION AND INSPECTION OF TIRES 4-46

CHECK BEFORE STARTING

EVERY 50 HOURS SERVICE

DRAIN WATER, SEDIMENT FROM FUEL TANK 4-49

EVERY 100 HOURS SERVICE

LUBRICATING 4-50
LUBRICATE REAR AXLE PIVOT PIN 4-52
CHECK OIL LEVEL IN HYDRAULIC TANK, ADD OIL 4-53
CLEAN ELEMENT IN AIR CONDITIONER FRESH AIR FILTER 4-54

EVERY 250 HOURS SERVICE

CHECK BATTERY ELECTROLYTE LEVEL 4-55
CHECK PARKING BRAKE 4-56
CHECK FOR LOOSE WHEEL HUB BOLTS, TIGHTEN 4-57
CLEAN ELEMENT IN AIR CONDITIONER RECIRCULATION FILTER 4-57
CHECKING FUNCTION OF ACCUMUULATOR 4-57

EVERY 500 HOURS SERVICE

CHANGE OIL IN ENGINE OIL PAN, REPLACE ENGINE OIL FILTER CARTRIDGE 4-58
REPLACE FUEL PRE-FILTER CARTRIDGE 4-59
REPLACE FUEL FILTER CARTRIDGE 4-61
REPLACE TRANSMISSION OIL FILTER ELEMENT 4-62
REPLACE BRAKE OIL FILTER CARTRIDGE (if equipped) 4-63
CHECK, REPLACE COMPRESSOR DRIVE BELT FOR ALTERNATOR, AIR CONDITIONER 4-64

EVERY 1000 HOURS SERVICE

CHANGE OIL IN TRANSMISSION CASE, CLEAN STRAINER 4-65
CLEAN TRANSMISSION CASE BREATHER 4-66
LUBRICATING 4-66
REPLACE CORROSION RESISTOR CARTRIDGE (Only when corrosion resistor cartridge is used) 4-67
CHECK, GREASE COMPRESSOR DRIVE BELT TENSION PULLEY ASSEMBLY FOR ALTERNATOR, AIR CONDITIONER 4-68

EVERY 2000 HOURS SERVICE

CHANGE OIL IN HYDRAULIC TANK, REPLACE HYDRAULIC FILTER ELEMENT 4-69
CLEAN HYDRAULIC TANK STRAINER 4-71
REPLACE HYDRAULIC TANK BREATHER ELEMENT 4-72
CHANGE AXLE OIL(*) 4-72
REPLACE ELEMENT IN AIR CONDITIONER RECIRCULATION AIR FILTER, FRESH AIR FILTER 4-73
CLEAN PPC CIRCUIT STRAINER 4-74
CHECK ALTERNATOR 4-74
CHECK ENGINE VALVE CLEARANCE, ADJUST 4-74
CHECK BRAKE DISC WEAR 4-74
CHECKING FUNCTION OF ACCUMULATOR 4-75
CHECK BOOST PIPING CLAMPS 4-75
CHANGE OIL FOR WORK EQUIPMENT PINS 4-76

*: 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 4000 HOURS SERVICE

CHECK WATER PUMP 4-77
CHECK STARTING MOTOR 4-77
CHECK AIR CONDITIONER COMPRESSOR, ADJUST 4-77
LUBRICATING 4-77
CHECK FOR LOOSE ENGINE HIGH-PRESSURE PIPING CLAMPS, HARDENING OF RUBBER 4-79
CHECKING FOR MISSING FUEL SPRAY PREVENTION CAP, HARDENING OF RUBBER 4-80

EVERY 8000 HOURS SERVICE

REPLACE ENGINE HIGH-PRESSURE PIPING CLAMPS 4-81
REPLACE FUEL SPRAY PREVENTION CAP 4-81
OVERHAUL STARTING MOTOR AND ALTERNATOR 4-81

SERVICE PROCEDURE

INITIAL 10 HOURS SERVICE (SERVICE FOR FIRST 50 HOURS ON NEW MACHINE)

Carry out the following maintenance every 10 hours for the first 50 hours of operation of a new machine.

- Lubricating

For details of the service procedure, see the section on EVERY 100 HOURS SERVICE.

INITIAL 250 HOURS SERVICE

Perform the following maintenance only after the first 250 hours.

- Replace transmission oil filter element
- Replace hydraulic tank filter element

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

WHEN REQUIRED

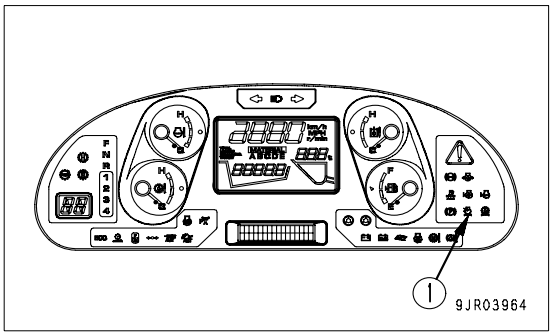
CHECK, CLEAN, OR REPLACE AIR CLEANER ELEMENT

⚠ 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.**

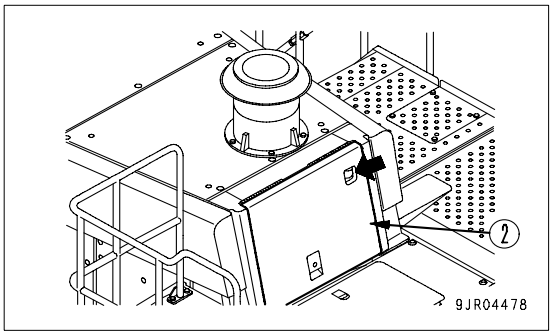
CHECKING

If air cleaner clogging caution lamp (1) on the machine monitor lights up, clean the air cleaner element.



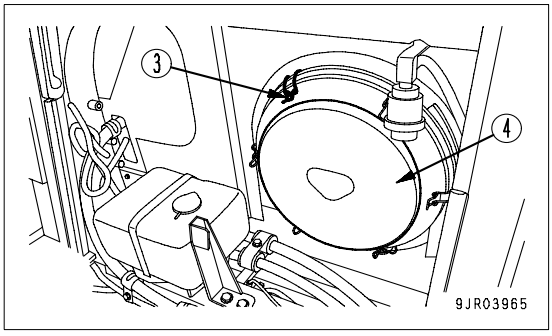
NOTICE
Do not clean the element until the air cleaner clogging caution lamp lights up.
If the element is cleaned frequently before the air cleaner clogging caution lamp lights up, the air cleaner will not be able to display its performance fully and the cleaning efficiency will drop.
In addition, the frequency of dirt stuck to the element falling inside the inner element will increase.

REMARK
A dust indicator (with 5-stage display) is installed to the side of the air cleaner. This displays the condition of the clogging of the air cleaner.
This makes it possible to check the clean status of the element and the replacement time.



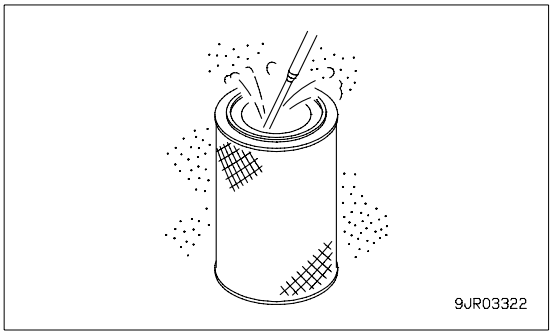
CLEANING OR REPLACING OUTER ELEMENT

1. Open cover (2) at the rear of the operator's compartment.
2. Remove lock (3) of the cover, then remove cover (4).
3. Remove outer element.
4. Clean the inside and the cover of the air cleaner body.

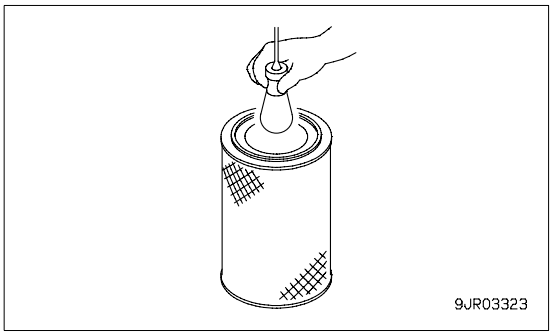


5. Direct dry compressed air (Max. 0.69 MPa (7 kg/cm^2) from the inside of the outer element along its folds. Then direct the compressed air from the outside along the folds, and again from the inside.

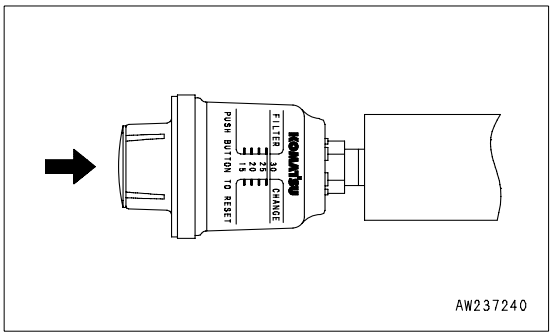
   1) If the air cleaner clogging warning lamp flashes immediately after the outer element has been cleaned, replace both the inner and outer elements.



NOTICE
After cleaning and drying the element, check it by shining a light through it. If any small holes or thin cracks are found, replace the element.
When cleaning the element, do not hit it or beat it against anything.
Do not use an element that has damaged folds, gaskets, or seals.



6. After cleaning the element, install it, then install cover (4).
7. After cleaning and replacing the element, push the dust indicator button to return the red display to its original position.



REMARK
After cleaning the element, press the button of the dust indicator. If the dust indicator shows the 5th stage even when the button is pressed, replace the element.
After the element is cleaned or replaced with a new element, the dust indicator may show the 3rd stage.

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. Install a new inner element to the connector.

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.
6. After replacing the element, return the red display of the dust indicator to its original position.

CLEAN INSIDE OF COOLING SYSTEM

⚠ WARNING

- **Immediately after the engine is stopped, the coolant is at high temperature and the radiator is under high internal pressure. If the cap is removed in this condition and the water is drained, it will cause burns. Wait for the temperature to go down, then turn the cap slowly to release the pressure.**
- **The engine is run during the flushing operation. Before standing up from or leaving the operator's seat, always set the lock lever (work equipment, steering) to the LOCK position.**
- **For details of the procedure when starting the engine, see "CHECK BEFORE STARTING ENGINE, ADJUST (3-104)" and "STARTING ENGINE (3-120)".**
- **There is danger of contact with the fan if the engine is run with the undercover removed. When the engine is running, never go inside the rear of the machine.**

Clean the inside of the cooling system, change the coolant and replace the corrosion resistor according to the table below.

Antifreeze coolant	Interval of cleaning inside of cooling system and changeing antifreeze coolant	Replacing corrosion resistor
Komatsu supercoolant (AF-NAC)	Every two years or every 4000 hours whichever comes first	unnecessary
Permanent type antifreeze (All-season type, *)	Every year (autumn) or every 2000 hours whichever comes first	Every 1000 hours and when cleaning the inside of the cooling system and when changing coolant

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

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

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

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

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

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

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

When using Komatsu Supercoolant (AF-NAC), there is no need to use a corrosion resistor.

When no corrosion resistor is used, use the special cover (600-411-9000). Please consult your Komatsu distributor about the method of installing.

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

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

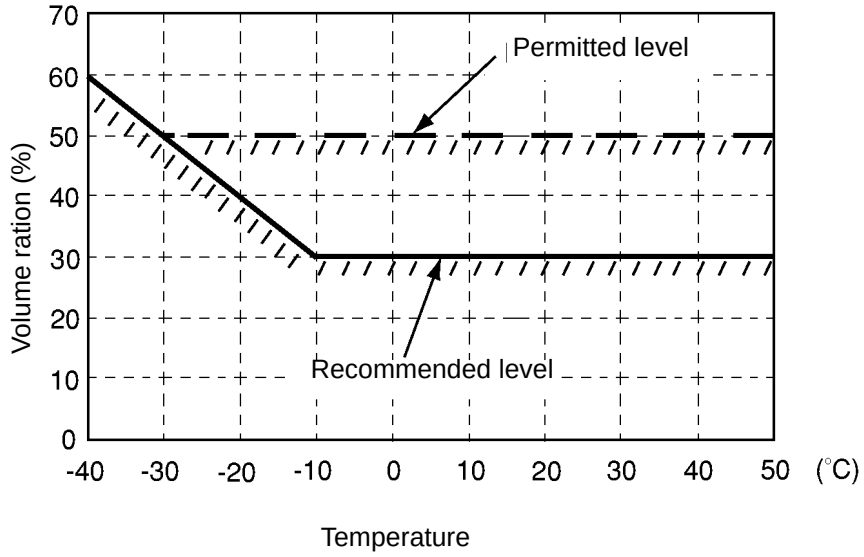
The mixing ratio depends on the ambient temperature, but it should always be a minimum of 30% by volume (antifreeze/total amount of coolant x 100).

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

Mixing rate of water and antifreeze

Min atmospheric temperature	°C	- 10	- 15	- 20	- 25	- 30
Amount of antifreeze	Liters	44.0	52.9	60.5	67.5	73.5
Amount of water	Liters	103.0	94.0	86.5	79.5	73.5
Volume ratio	%	30	36	41	46	50

If the jobsite changes frequently and it is difficult to manage the density of the antifreeze, a density of up to 50% can be permitted.



⚠ WARNING

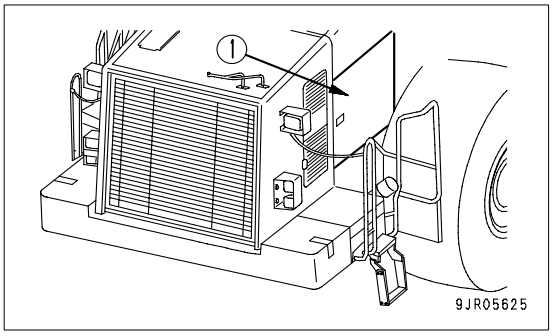
Super coolant is flammable, so be particularly careful to keep it away from flame.
Super coolant is toxic. When removing the drain plug, be careful not to get coolant on yourself.
If it gets into your eyes, wash your eyes immediately with ample water, then consult a doctor for treatment.

Always use Komatsu genuine super coolant (AF-NAC) for the coolant.

Use tap water to dilute the coolant. If river water or well water or simple water supply must be used, please consult your Komatsu distributor.

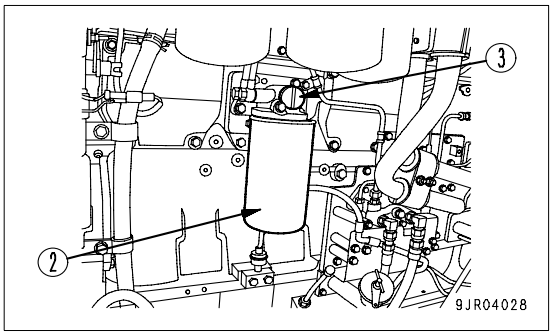
We recommend the use of a super coolant density meter to control the mixing ratio.

1. Stop the machine in a horizontal place.
2. Stop the engine.
3. Open engine inspection cover (1).

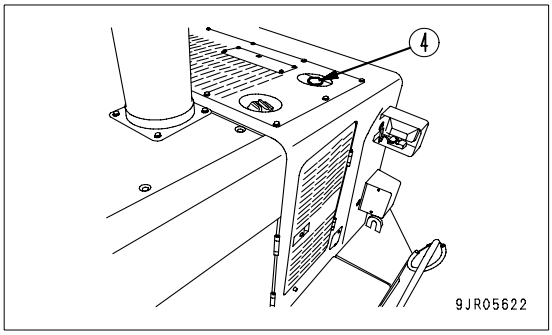


4. Tighten valve (3) of corrosion resistor (2).

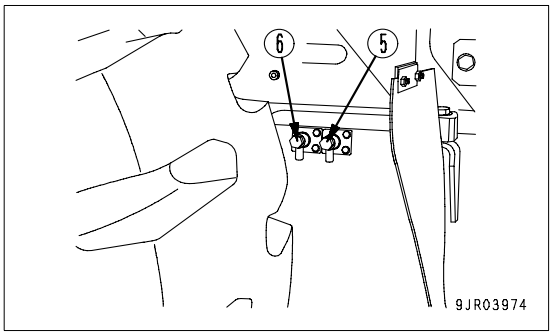
   (Only when corrosion resistor is used)



5. Loosen radiator cap (4) slightly to release the pressure, then remove the cap.



6. Prepare a container to catch the supercoolant mix.
7. Install a hose to the coolant drain port of radiator drain valve (5) and oil cooler drain valve (6), then open drain valves (5) and (6) and drain the water.



REMARK
Use the supplied hose to prevent coolant from spraying out into the surrounding area.

8. After draining the water, close radiator drain valve (5) and oil cooler drain valve (6).
9. Add tap water through radiator water filler (7).
10. 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.
11. Stop the engine.
12. Open radiator drain valve (5) and oil cooler drain valve (6) and drain the water.
13. After draining, close radiator drain valve (5) and oil cooler drain valve (6), then remove the hoses.

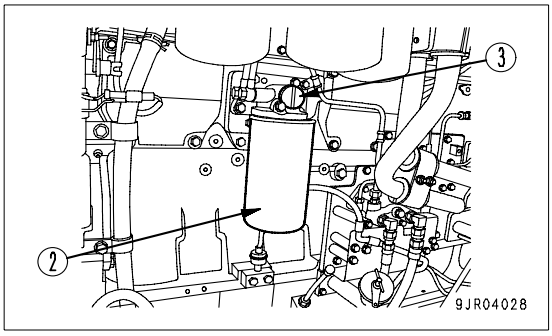
14. Replace corrosion resistor (2).

    For details of the procedure for replacing the corrosion resistor, see “REPLACE CORROSION RESISTOR CARTRIDGE (4-67)“.

    (Only when corrosion resistor is used)

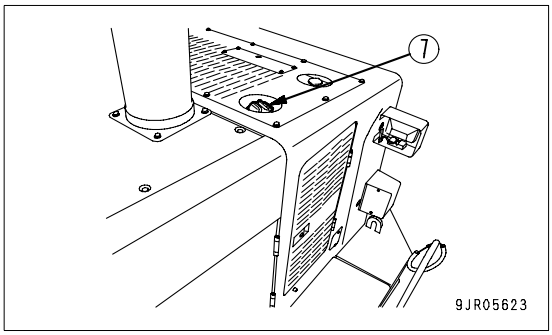
15. Open valve (3) of corrosion resistor (2).

    (Only when corrosion resistor is used)



16. Fill the radiator through radiator filler port (7) with super coolant and tap water to the bottom of the filler port.

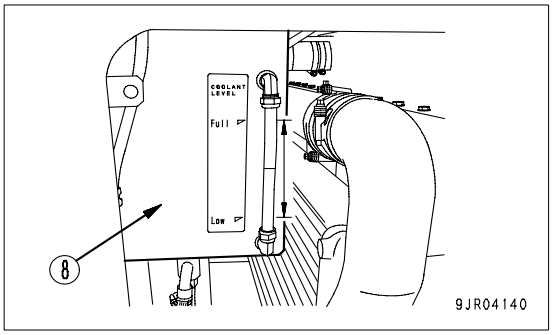
    For details of the ratio of super coolant and water, see Mixing rate of water and antifreeze.



17. 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.)

18. Open drain plug (5) and drain the coolant from sub tank (8). Wash the inside of the sub tank, then add water to between the FULL - LOW marks.

19. 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.



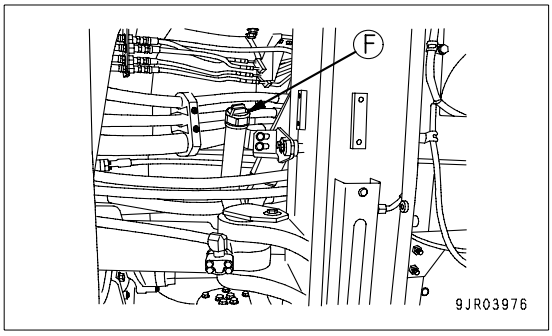
CHECK TRANSMISSION OIL LEVEL, ADD OIL

⚠ 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.

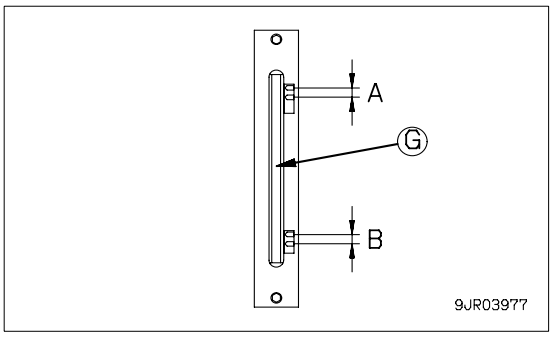
1. Stop the engine.



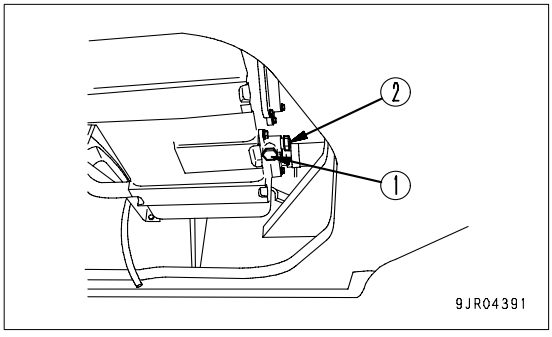
REMARK
Wait for at least 12 hours after stopping the engine before carrying out the inspection. If this is not done, there will be oil remaining at various places and it will be impossible to check the oil level correctly.

2. Remove cap of oil filler (F).
3. Use sight gauge (G) to check the oil level.
4. If the oil level is not within the range at upper area “A“ of the sight gauge, add oil through oil filler (F).

   For details of the oil to use, see “USE OF FUEL, COOLANT AND LUBRICANTS ACCORDING TO AMBIENT TEMPERATURE (4-11)“.



5. Use sight gauge (G) to check the oil level.
6. If the oil is above range A, remove drain plug (1), install and nipple, then install a hose to the nipple.
7. Loosen drain plug (2), drain the excess oil, then check the oil level again.



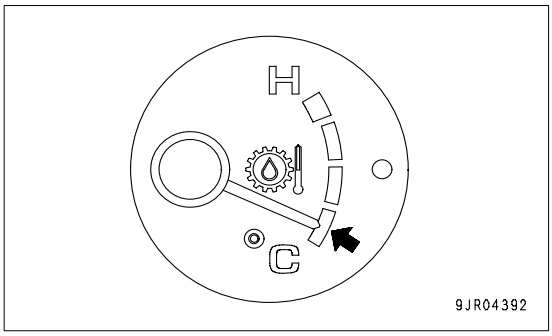
REMARK
Use the supplied nipple and hose to prevent oil from spraying out into the surrounding area.

8. If the oil level is correct, tighten the cap of oil filler (F), then remove the hose and nipple.

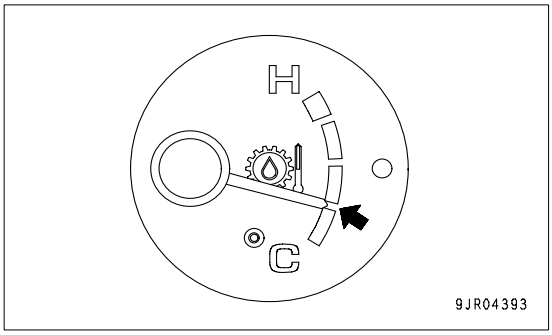
Check the oil level at least 12 hours after the engine has stopped, and use the ENGINE STOP position.

It is also possible to check when the engine is running at low idling, but in that case, do as follows.

Method of checking level at idling	(1) When checking after leaving at idling (when heat is balanced in whole transmission as after actual work)	User operating continuously (check during lunch time or check during change of shift)	1) Run at idling for at least 15 minutes, then leave 2)Check when torque converter oil temperature gauge is in middle of bottom scale
	(2) When checking after raising temperature with stall	When shipped from factory, etc	1) When raising temperature with stall, check when torque converter oil gauge is between bottom scale and second scale from bottom 2) Run at idling for at least 15 minutes, then leave



Oil level should be inside range B at bottom of sight gauge (G).



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.

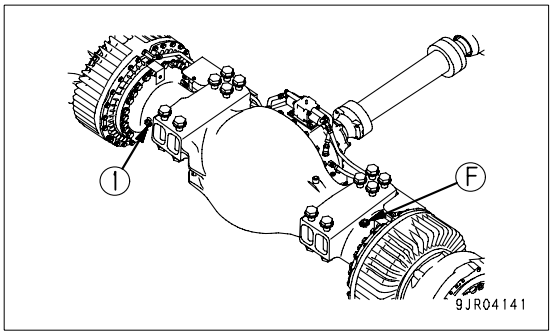
Inspect the machine on a horizontal surface.

(If the road surface is at an angle, the oil level cannot be checked correctly.)

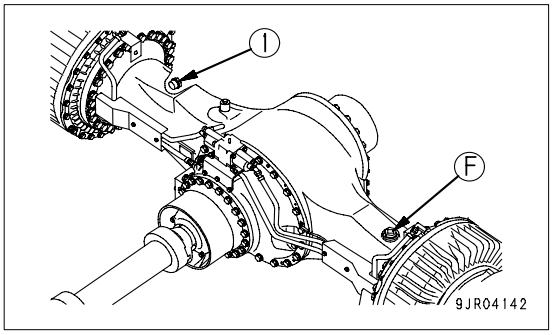
1. Stop the machine in a horizontal place.
2. Stop the engine, then wait for the oil temperature to go down.
3. Remove level plug (1).
4. Check that the oil level reaches the bottom of the plug hole.
5. If the oil is not near the bottom edge of the hole, add oil through oil filler (F).
6. If the oil level is correct, install level plug (1)

   Tightening torque: 152 ± 24 Nm (15.5 ± 2.5 kgm)

Front



Rear



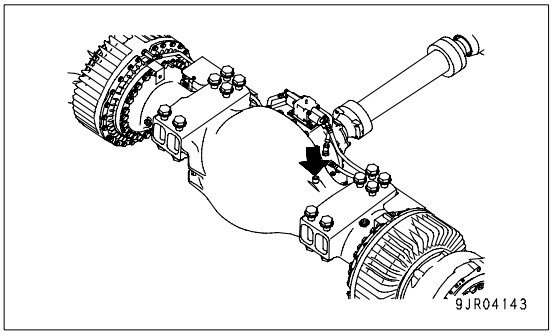
CLEAN AXLE CASE BREATHER

1. Stop the machine in a horizontal place.
2. Stop the engine.
3. Use a brush to clean off any mud or dirt from around the breather.
4. After removing all the mud or dirt from around the breather, remove the breather, and soak it in flushing liquid to clean it.

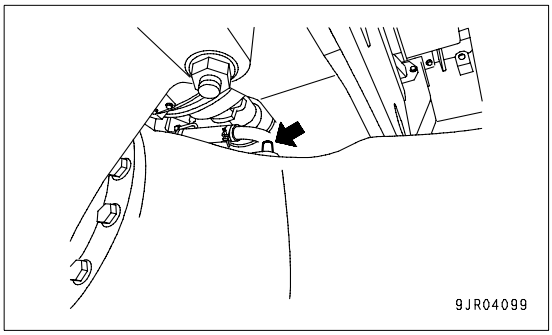
   When cleaning the breather, clean the breathers at two places (front and rear).

   After removing the breather, take steps to prevent dirt or dust from entering the mount.
5. Install the breather.

Front



Rear



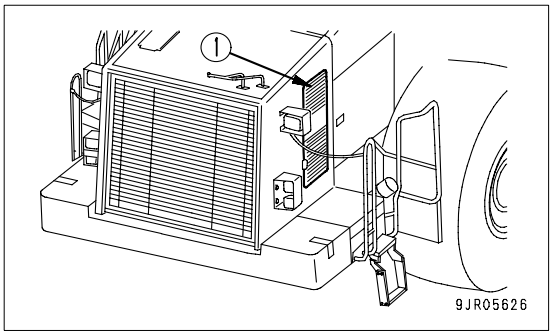
CLEAN AIR CONDITIONER CONDENSER

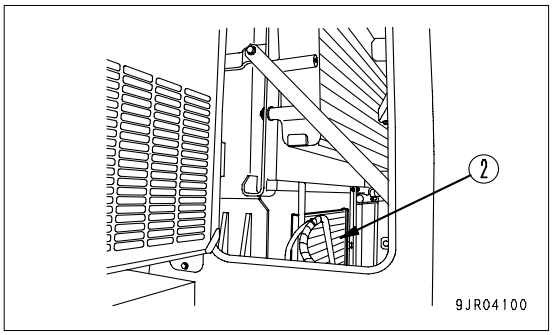
⚠ WARNING

- **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.**

1. Open side door (1) of the radiator guard on the right side of the machine.
2. Use high-pressure water to wash off all the mud and dirt from around condenser (2) and side door (1) of the radiator guard on the right side of the machine.

   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.
3. Close side door (1).

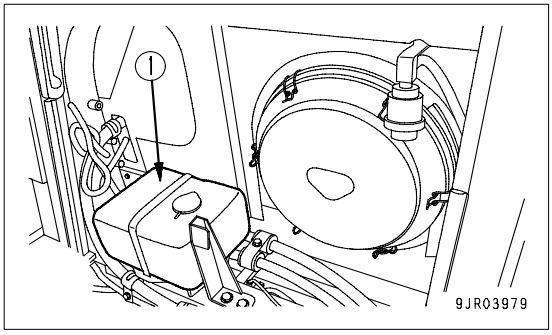




CHECK WINDOW WASHING FLUID LEVEL, ADD FLUID

1. Open cover (1) of the engine hood at the rear of the operator's compartment.
2. Check the level of fluid in washer tank (2). If it is low, add automobile window washer fluid.

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



CLEAN RADIATOR FINS

⚠ WARNING

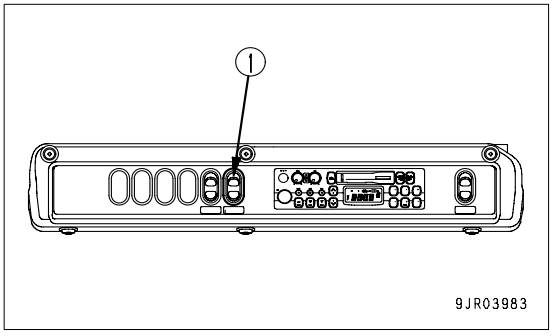
- **If compressed air, high-pressure water, or steam hits your body directly or dirt is sent flying by the compressed air, high-pressure water, or steam, there is danger of personal injyury. Always wear protective glasses, dust mask, and other protective equipment.**
- **Before carrying out cleaning and inspection, always stop the engine and check that the fan does not rotate. When rotating the fan, always install the fan net and close the radiator to prevent anyone from touching the fan.**

Clean the radiator fins if any mud or dirt is stuck to the radiator.

CLEAN FINS BY ROTATING COOLING FAN IN REVERSE

NOTICE
When rotating the fan in reverse, be careful of flying dust and take steps to prevent cloth or other objects from getting caught in the fan.

On jobsites where it is easy for dirt to stick to the radiator or cooler, turn cooling fan reverse rotation switch (1) ON to rotate the fan in reverse. This will blow off the dirt and dust stuck to the radiator or cooler, and can extend the cleaning interval.

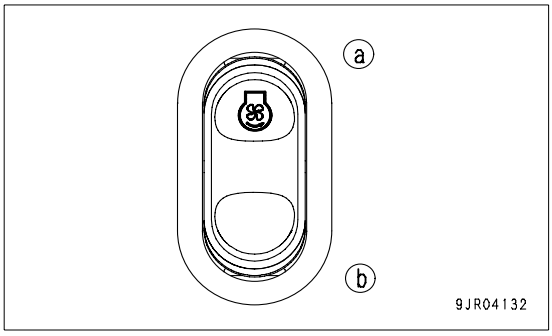


METHOD OF ROTATING FAN IN REVERSE

NOTICE
- **When the engine is running, even if the cooling fan reverse rotation switch is operated, the fan will not rotate in reverse, but the cooling fan reverse rotation pilot lamp on the main monitor will flash. Operate this switch only when the engine is stopped.**
- **When the fan is rotating in reverse, the pilot lamp on the main monitor lights up. Do not carry out operations while the lamp is lighted up. If the fan is run in the reverse direction during operations, the machine will be unable to display its performance fully and the engine will tend to overheat. During normal operations, always run the fan in the normal direction.**
- **When stopping the engine with the fan rotating in reverse, first run the engine at low idling before stopping it.**
- **When cleaning the fins by the rotating the cooling fan in reverse, clean after finishing operations or after warming-up the hydraulic oil. If the temperature of the hydraulic oil is low, the fan is held at low speed to protect the hydraulic circuit, so it will be unable to display its cleaning performance properly.**

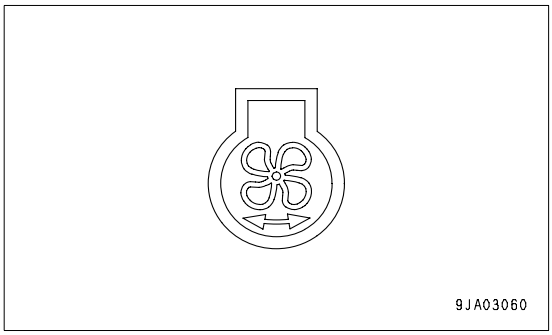
1. Stop the machine on horizontal ground and turn the parking brake switch ON.
2. Stop the engine.
3. Turn the starting switch to the ON position.

4. Set cooling fan reverse rotation switch (1) to position (a) (ON).



5. Check that the pilot lamp inside the switch cooling fan and the reverse rotation pilot lamp on the main monitor are lighted up. At the same time, “COOLING FAN REVERSE“ is displayed on the character display and the fan is set to reverse rotation.
6. Turn the key in the starting switch to the START position and start the engine.

   The cooling fan will rotate in reverse.



REMARK
The normal flow of air from the cooling fan is from the engine to the rear of the machine. During cleaning operations, if the fan is rotated in reverse, the flow of air is from the rear of the machine to the engine, and this blows out the dirt from the radiator fins.

7. Run the engine at high idle.

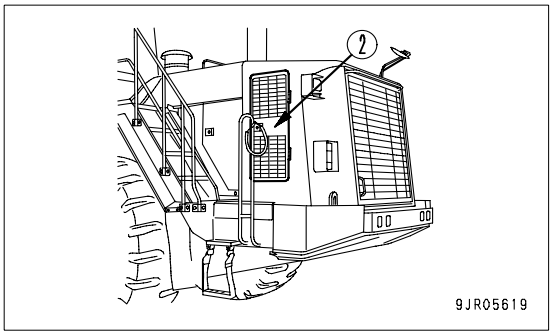
   Select the time for running the engine at high idle as follows according to the condition of clogging.

   Normal clogging: 1 to 2 minutes

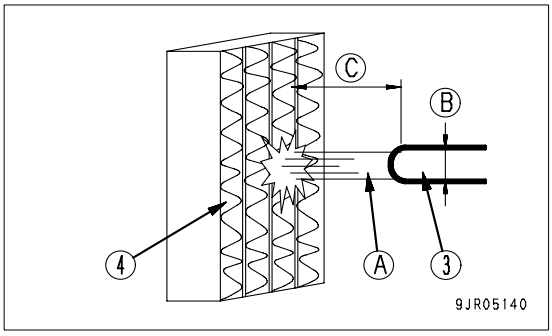
   Excessive clogging: 2 to 3 minutes

REMARK
If there are many pieces of wood or chips stuck to the radiator fins, open the cleaning cover (2) and run the engine at high idling. The pieces of wood and chips will be blown out through the opening of the cleaning cover. The pieces of wood and chips will be blown out into the surrounding area, so to ensure safety, check that there is no one in the surrounding area before carrying out the operation.

8. After completing the cleaning, run the engine at low idle for approx. 10 seconds.
9. Turn the starting switch to the OFF position and stop the engine.
10. After stopping rotation of the fan, open cleaning cover (2).
11. Use compressed air to blow out the dirt to the side of the machine.



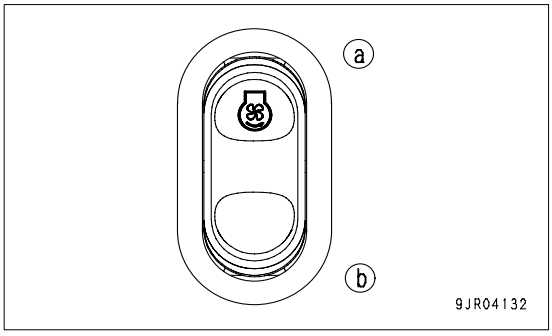
NOTICE
If the steam jet nozzle (3) is brought too close the radiator fins (4), it may damage the fins, so keep the nozzle a suitable distance away from the fins when cleaning.
Use the following conditions as a guideline when cleaning.
Spray pressure (A): Max. 9.8 MPa {100 kg/cm²}
Nozzle diameter (B): Max diameter 2 mm
Distance between nozzle and fin (C): Min. 100 mm



REMARK
Steam or water can be used instead of compressed air.

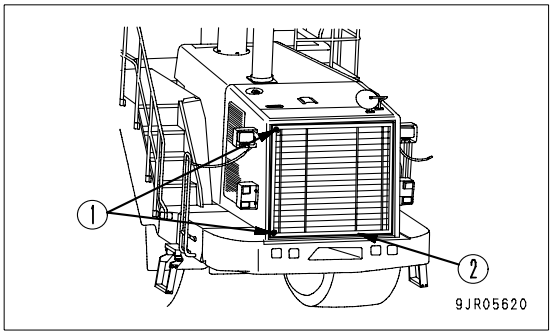
12. After blowing out the dirt, close cleaning cover (2).
13. Turn starting switch key to the ON position.
14. Set cooling fan reverse rotation switch (1) to position (b) (OFF) to cancel the reverse rotation.
15. Check the rubber hose. Replace with a new one if the hose is found to have cracks or to be hardened by aging.

    Also, check hose clamps for looseness.

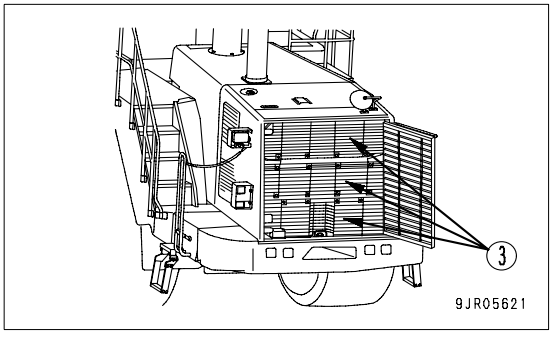


CLEAN FINS WITH COMPRESSED AIR

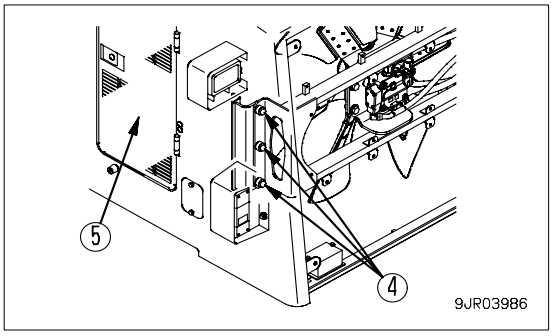
1. Stop the machine on horizontal ground and turn the parking brake switch ON.
2. Stop the engine.
3. Remove bolt (1) and open radiator grill (2).



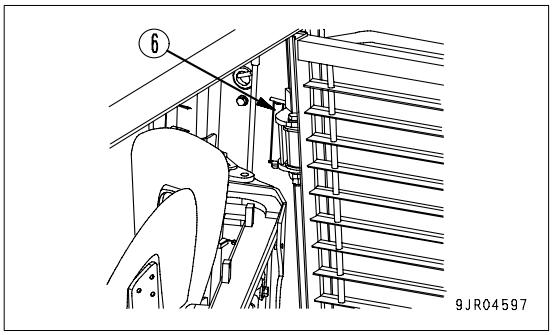
4. Remove the bolts from the fan nets, then remove fan nets (3).



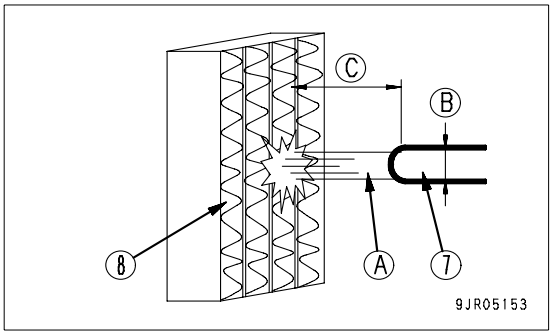
5. Remove bolts (4), then swing the fan towards the grill.



6. Insert the lock pin (6) to lock in position.
7. Use compressed air to blow out the dirt to the side of the machine.



NOTICE
If the steam jet nozzle (7) is brought too close the radiator fins (8), it may damage the fins, so keep the nozzle a suitable distance away from the fins when cleaning.
Use the following conditions as a guideline when cleaning.
Spray pressure (A): Max. 9.8 MPa {100 kg/cm²}
Nozzle diameter (B): Max diameter 2 mm
Distance between nozzle and fin (C): Min. 100 mm



REMARK
Steam or water can be used instead of compressed air.

8. Open cleaning cover (5) and blow out the dust from the front and rear.
9. 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.
10. After blowing out the dirt, close cleaning cover (2).
11. Close the fan and tighten bolts (4).

    Tightening torque: 245 to 309 Nm {25 to 31.5 kgm}

12. Install fan nets (3), then tighten the bolts of the fan nets.
13. Close radiator grill (2), then tighten bolts (1).

REPLACE BUCKET TEETH

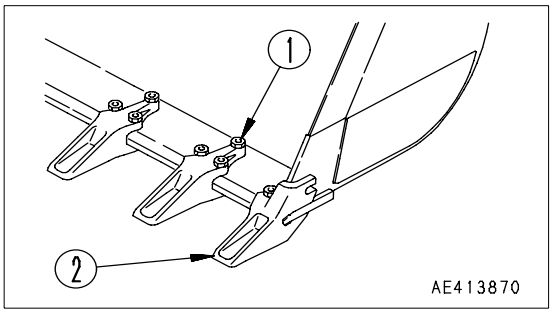
⚠ WARNING

- **It is dangerous if the work equipment moves by mistake when the teeth are being replaced. Set the work equipment in a stable condition, stop the engine, and lock the work equipment control levers securely with the work equipment lock lever.**
- **If the pins are hit with a strong force, there is danger that the pin may fly. Make sure that there is no person in the surrounding area.**
- **Pieces may fly during the replacement operation, so always wear protective glasses, gloves, and other protective equipment.**

ONE-PIECE TOOTH

When the bucket teeth are worn, replace them as follows.

1. Raise the bucket to a height greater than the height of the block.
2. Set the bucket so that the bottom of the bucket is horizontal to the block, then set the center of the bucket bottom on the block.
3. After lowering the bucket onto the block, stabilize it, then stop the engine.
4. Remove the bolt and nuts (1), then remove bucket tooth (2).
5. Clean the installation surface of bucket tooth (2).
6. Install the new tooth on the bucket. When doing this, insert shims to remove any clearance between the tooth and top surface of the bucket.



7. Tighten the nut temporarily so that there is no clearance between the tooth and tip of the bucket, then hit the tip of the tooth with a hammer.
8. Tighten bolts and nuts (1).

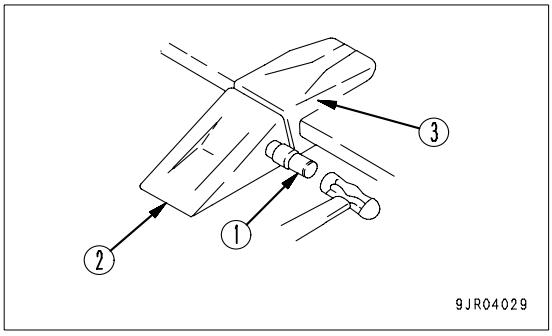
   Tightening torque for mounting nut: 2840 ± 294 Nm {290 ± 30 kgm}
9. After operating the machine for a few hours, tighten the mounting nuts again.

BUCKET WITH TIP TOOTH

Replace the teeth before they wear down as far as the adapter.

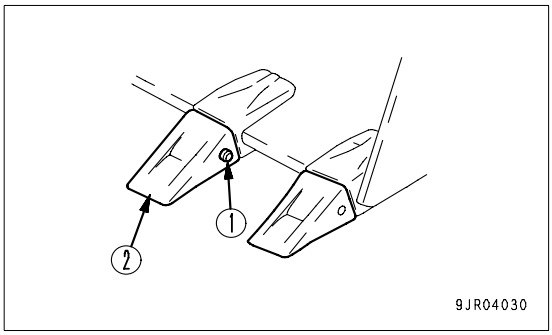
1. Raise the bucket to a height greater than the height of the block.
2. Set the bucket so that the bottom of the bucket is horizontal to the block, then set the center of the bucket bottom on the block.
3. After lowering the bucket onto the block, stabilize it, then stop the engine.

4. Using a rod of slightly smaller circumference than pin (1), put it in contact with the pin, then hit the rod with a hammer to remove the pin.
5. Remove tooth (2).



REMARK
If it cannot be removed by this method, for safety reasons, always contact your Komatsu distributor to have the replacement carried out.

6. Clean bucket and adapter (3).
7. Install the new bucket tooth to bucket adapter (3).
8. Insert pin (1) into the bucket tooth, then hit with a hammer.
9. After operating the machine for a few hours, check that the pin does not come out.



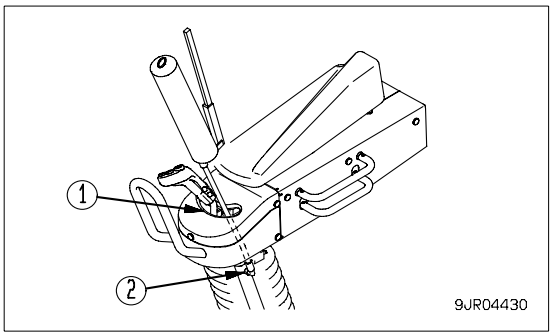
LUBRICATING

If the AJSS lever is heavy or stiff when adjusted to the front or rear, lubricate the U-joint.

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.

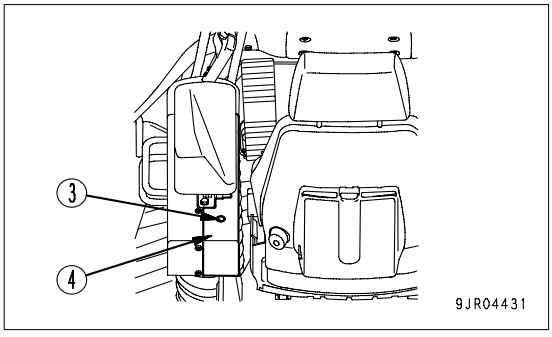
(1) AJSS lever U-joint

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) AJSS lever fore-and-aft slide rail

Remove grommet (3) and pump in grease through the grease fitting on the inside of cover (4).



CHECK AIR CONDITIONER

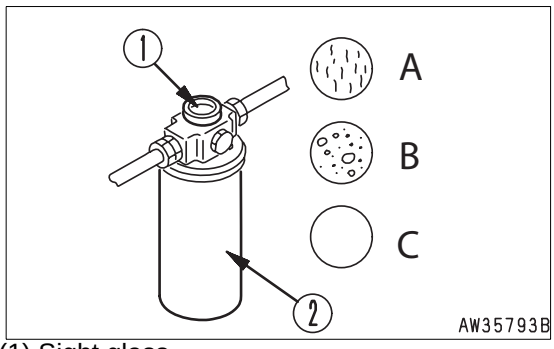
CHECK LEVEL OF REFRIGERANT (GAS)

⚠ 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.

1. Start the engine.
2. Run the air conditioner at maximum cooling.
3. Open the cover at the rear of the operator's compartment.
4. Look at the sight glass (inspection window) of the receiver to check the condition of the refrigerant gas (Freon R134a) flowing through the refrigerant circuit.
   - No bubbles in refrigerant flow: Suitable (A)
   - Some bubbles in flow (bubbles pass continuously): Lack of refrigerant (B)
   - Colorless, transparent: No refrigerant (C)



(1) Sight glass
(2) Receiver

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.

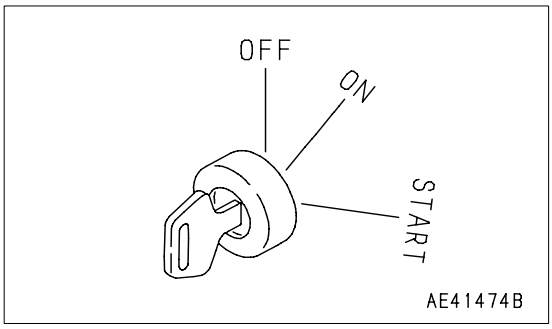
OPERATING THE AIR CONDITIONER OFF-SEASON

Even during the off-season, operate the air conditioner for 3 to 5 minutes once a month to maintain the oil film at all parts of the compressor.

REPLACE SLOW BLOW FUSE

NOTICE

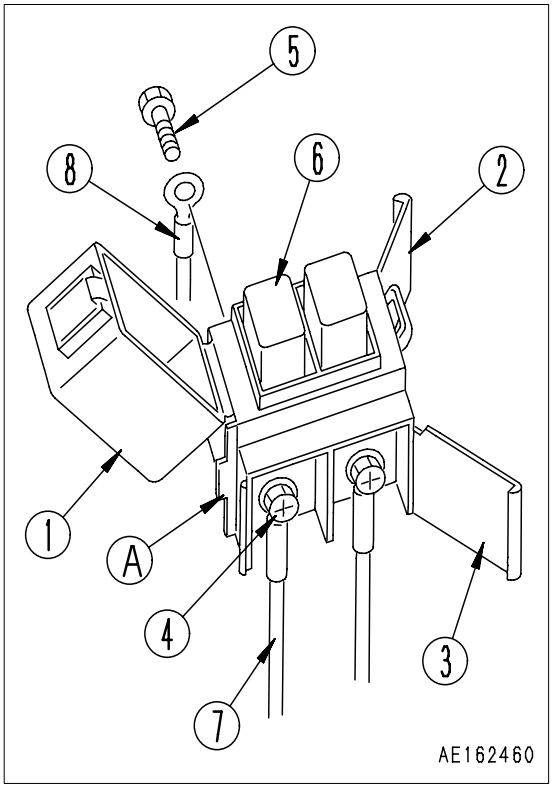
- **Always turn the power OFF when replacing the slow blow fuse (turn the starting switch to the OFF position).**
- **Always replace the slow blow fuse with a fuse of the same capacity.**



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 replacing oil and filter element or cleaning strainer, bleed the air from the circuit.

When changing the oil in the hydraulic tank, or removing the piston pump, or removing the piping of the piston pump, bleed the air in the following way after assembling.

After bleeding air from piston pump, bleed air from hydraulic circuit.

For details, contact your Komatsu distributor.

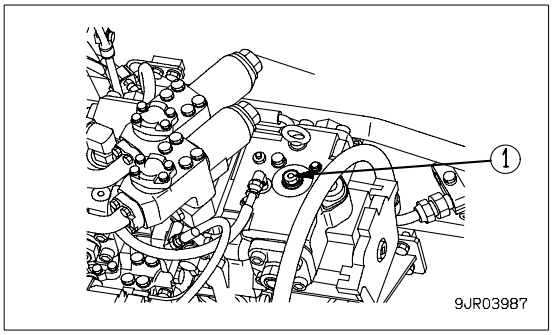
BLEEDING AIR FROM PISTON PUMP

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.

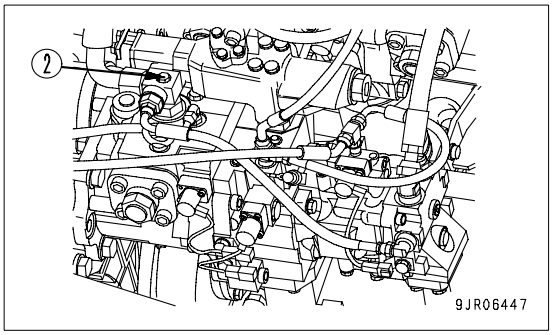
Leave the hydraulic tank cap off until the air is completely bled from the piston pump.

1. Loosen air are bleeder (1) at the top of the piston pump and plug (2) at the connection portion of the piston pump case drain hose.



2. When oil overflows from air bleeder (1) and plug (2), the bleeding operation is completed, so tighten air bleeder (1) and plug (2).

3. Check the oil level. If the oil level is low, add oil to the specified level. For details, see “CHECK OIL LEVEL IN HYDRAULIC TANK, ADD OIL (4-53)“.

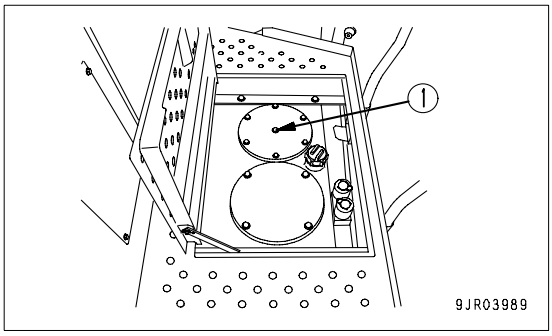


4. Install the oil filler cap to the hydraulic tank.

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 the hydraulic oil level. If the oil level is low, add oil to the specified level. For details, see “CHECK OIL LEVEL IN HYDRAULIC TANK, ADD OIL (4-53)“.
2. Start the engine and set the parking brake switch to the ON position.
3. Run for approx. 5 minutes at low idling, then check that there is no leakage of oil from any part.
4. Run the engine at low idling and operate each hydraulic cylinders (of steering, bucket and lift arm) 4 to 5 times, stopping 100 mm from stroke end.
5. Next, operate each hydraulic cylinder (steering, bucket, lift arm) 3 to 4 times to the end of the stroke.
6. Stop the engine.
7. Loosen air bleed plug (1) of the hydraulic tank and bleed the air from the hydraulic tank.
8. When the oil flows out and all the air has been bled, tighten plug (1).
9. Check the hydraulic oil level. If the oil level is low, add oil to the specified level. For details, see “CHECK OIL LEVEL IN HYDRAULIC TANK, ADD OIL (4-53)“.
10. Start the engine.



11. Next, raise the engine speed (approx. 1500 rpm), repeat Steps 5 - 8 to bleed the air, and repeat this operation until no more air comes out from plug (1).
12. After bleeding the air, tighten the air bleeding plug (1).

    Tightening torque of the plug: 11.3 ± 1.47 Nm (1.15 ± 0.15 kgm)
13. Check the hydraulic oil level. If the oil level is low, add oil to the specified level. For details, see “CHECK OIL LEVEL IN HYDRAULIC TANK, ADD OIL (4-53)“.

BLEEDING AIR FROM FUEL CIRCUIT

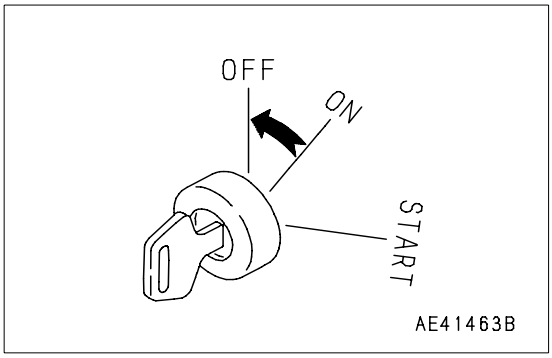
This machine is equipped with an electric priming pump to bleed the air from the fuel circuit. In the following cases, use the procedure below to bleed the air.

- When fuel filter has been replaced
- When engine has run out of fuel
- When starting the engine for the first time after replacing the supply pump or modifying the piping or any other parts

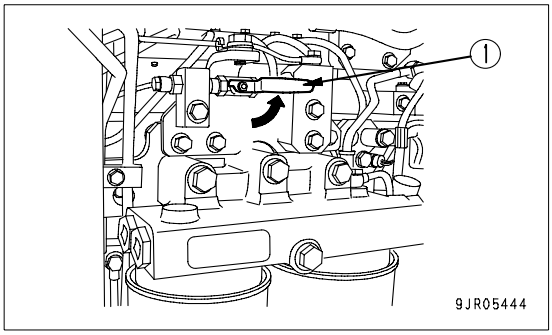
PROCEDURE FOR BLEEDING AIR

⚠ WARNING

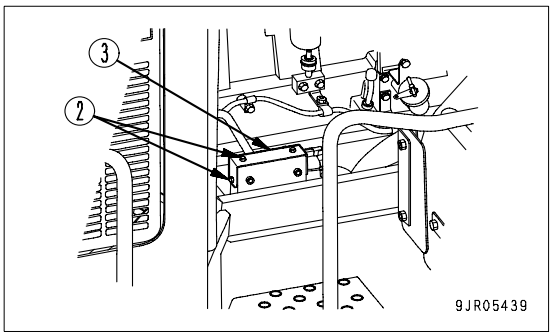
When using the electric priming pump, do not loosen the air bleed plug for the fuel circuit. When the electric priming pump is operated, pressure is applied to the fuel circuit, so if the air bleed plug is loosened, fuel will spurt out and create a dangerous situation.



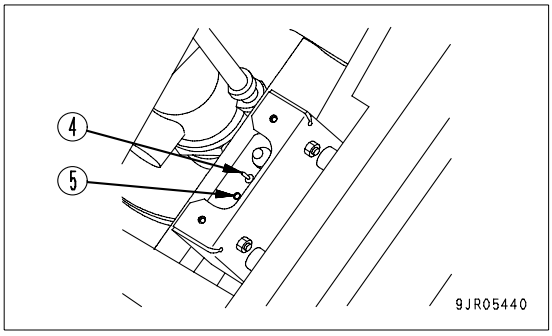
1. Turn the key in the starting switch to the OFF position and stop the engine.
2. Open air bleed valve (1).



3. Loosen 4 screws (2), then remove cover (3) from the electric priming pump switch.

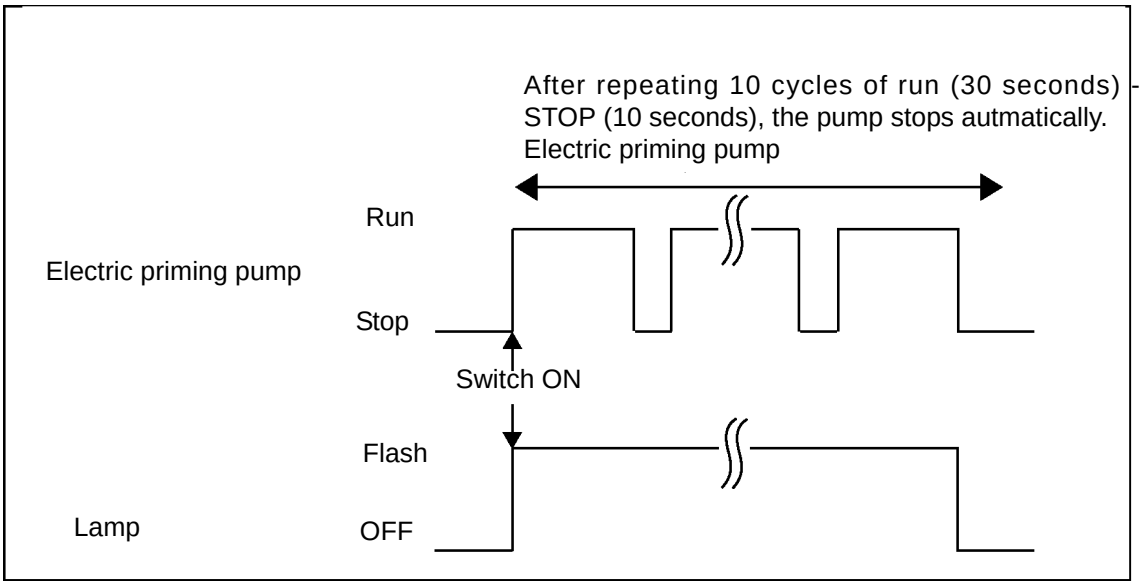


4. Operate switch (4) of the electric priming pump to the ON position. Lamp (5) will flash and the electric priming pump will start.

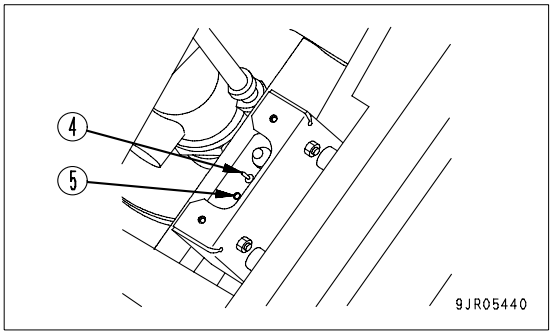


REMARK
The electric priming pump switch has a built-in timer, and this actuates and stops the pump automatically.
While the lamp is flashing, the electric priming pump will stop, but this does not indicate any abnormality.
If the switch is turned to the OFF position when the lamp is lighted up, the lamp will go out and the electric priming pump will stop.

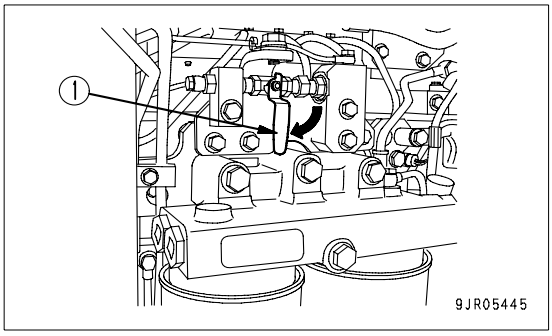
RELATIONSHIP BETWEEN ACTUATION OF ELECTRIC PRIMING PUMP AND FLASHING OF LAMP



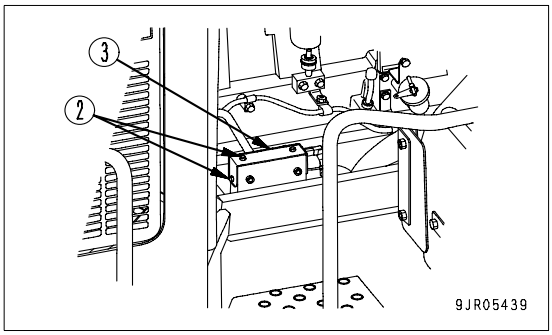
5. When the specified time (approx. 7 minutes) has passed, lamp (5) automatically goes out and the electric priming pump stops.
6. If the fuel has been drained from the fuel circuit, such as when the engine has run out of fuel and stopped, or maintenance has been carried out on the fuel hoses or tubes, or the supply pump has been replaced, turn the switch for the electric priming pump to the ON position again after the electric priming pump stops automatically (lamp goes out).
7. When the lamp goes out, the air bleed operation is completed.



8. Close air bleed valve (1).



9. Install cover (3) and tighten with screws (2).



10. Start the engine. If the engine does not start, try again by following the steps below.

1) Loosen 4 screws (2), then remove cover (3) from the electric priming pump switch.

2) Operate switch (4) of the electric priming pump to the ON position.

3) Try to start the engine while the electric priming pump is in operation. If the engine still does not start, wait for approx. 2 minutes, and then repeat steps 2) and 3).

4) After the engine has started, run the engine for approx. 5 minutes to bleed air from the fuel system completely.

5) Stop the engine, then install cover (3) and tighten screws (2).

6) Check that air bleed valve (1) is closed.

7) Start the engine in the normal way.

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.

CHECKING FUNCTION OF ACCUMULATOR

For details of handling the accumulator, see Section “ACCUMULATOR (2-39)“.

ACCUMULATOR FOR E.C.S.S.

When the E.C.S.S. switch is ON, the hydraulic spring effect of the accumulator absorbs the up-and-down motion of the machine during travel and reduces the swaying.

Drive the machine and compare the up-and-down movement of the machine during travel when the E.C.S.S. switch is ON and when it is OFF.

If there is no change in the up-and-down movement of the machine, the gas pressure in the accumulator has probably dropped.

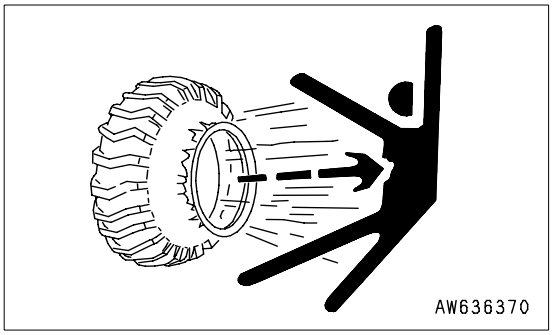
Please contact your Komatsu distributor to have the accumulator inspected.

REMARK
Carry out the inspection with the speed range set to 2 - 4, with the machine traveling at a speed of at least 5 km/h. If the speed range is 1st or the machine is traveling at a speed of less than 5 km/h, the E.C.S.S. will not be actuated even if the E.C.S.S. switch is turned ON.

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.

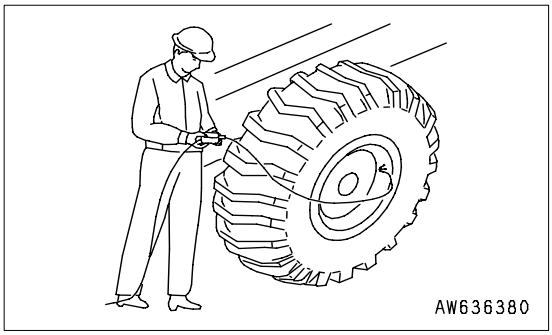
Since the travel speed indicated on the speedometer varies with the tire size, consult your Komatsu distributor when using optional tires.

	Maximum load (kg)	Size	Remarks
Front, rear wheels	23600	35/65-33-36PR (Standard)	Type 3 for construction
Front, rear wheels	25450	35/65-33-42PR (if equipped)	
Front, rear wheels	23000	35/65R33☆ (if equipped)	
Front, rear wheels	28000	35/65R33☆☆ (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	Standard inflation pressure
35/65-33-36PR (Standard)	Front tire: 0.525MPa {5.4kg/cm^2} Rear tire: 0.525MPa {5.4kg/cm^2}
35/65-33-42PR (if equipped)	Front tire: 0.625MPa {6.4kg/cm^2} Rear tire: 0.625MPa {6.4kg/cm^2}
35/65R33☆ (if equipped)	Front tire: 0.59MPa {6.0kg/cm^2} Rear tire: 0.49MPa {5.0kg/cm^2}
35/65R33☆☆ (if equipped)	Front tire: 0.75MPa {7.6kg/cm^2} Rear tire: 0.65MPa {6.6kg/cm^2}

NOTICE
The optimum inflation pressure differs according to the type of work. For details, see “HANDLING THE TIRES (3-166)“.

CHECK BEFORE STARTING

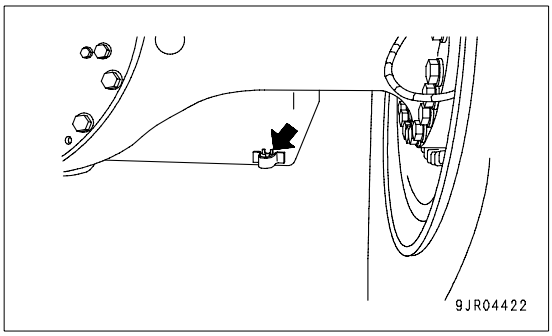
For the following items, see “CHECK BEFORE STARTING (3-107)“.

- Check monitor panel
- Check dust indicator
- Drain water from fuel pre-filter
- Check coolant level, add coolant
- Check oil level in engine oil pan, 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

1. Prepare a container to catch the fuel and place it under the fuel tank.
2. Open the drain valve on the left side of the fuel tank and drain out all the water and sediment collected at the bottom of the tank.
3. When all the water and sediment has drained out, close the drain valve.



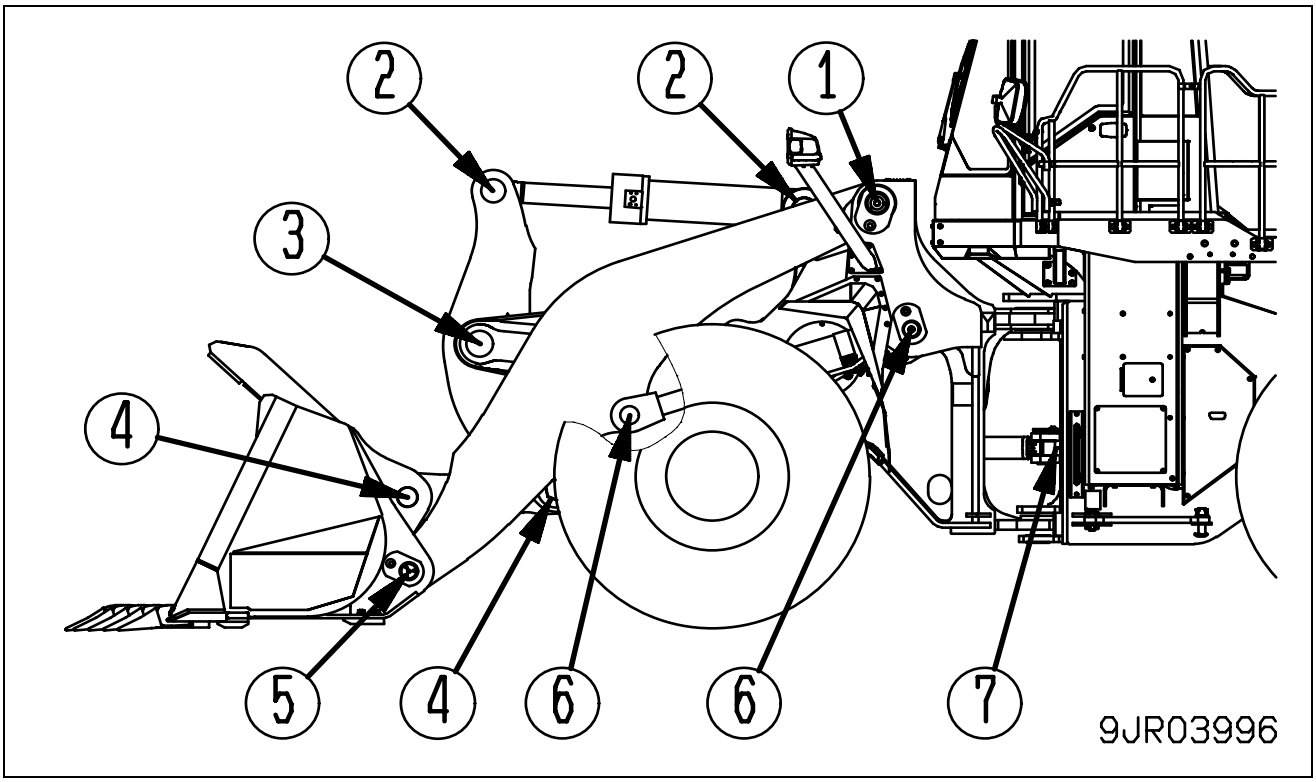
EVERY 100 HOURS SERVICE

Maintenance for every 50 hours service should be carried out at the same time.

LUBRICATING

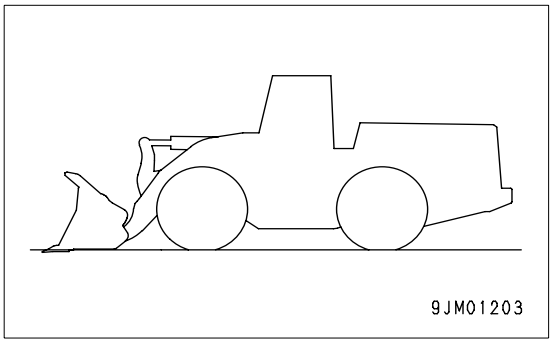
1. Using a grease pump, pump in grease through the grease fittings marked by the arrows.
2. After greasing, wipe off any old grease that was pushed out.

NOTICE
During the initial breaking in for a new machine, carry out lubrication every 10 hours for the first 50 hours of operation.



When greasing dump cylinder pin (2), bell crank pin (3), bucket link pin (4), bucket hinge pin (5) and lift cylinder pin (6), set the bucket in the posture shown below.

Lower the bucket to the ground and set it horizontally.



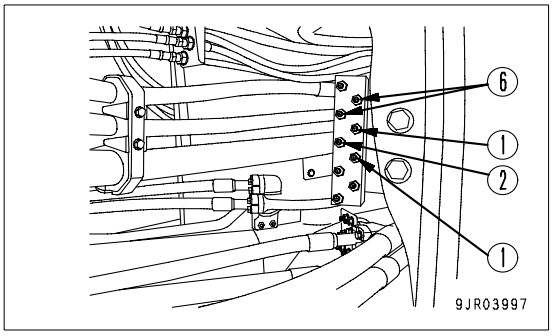
(1) Lift arm pivot pin (2 places)

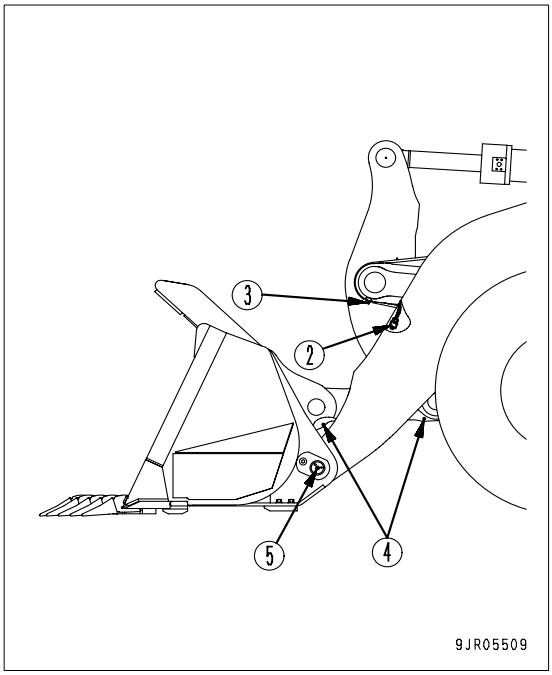
(2) Dump cylinder pin (2 places)

(3) Tilt lever pin (1 place)

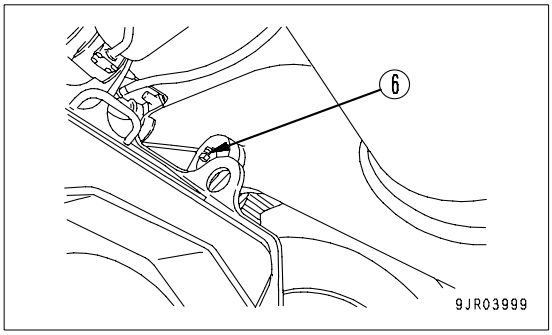
(4) Bucket link pin (2 places)

(5) Bucket hinge pin (2 places)

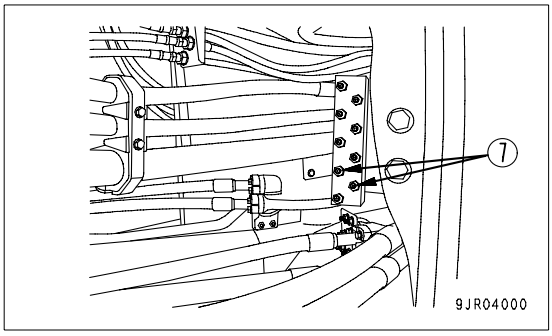


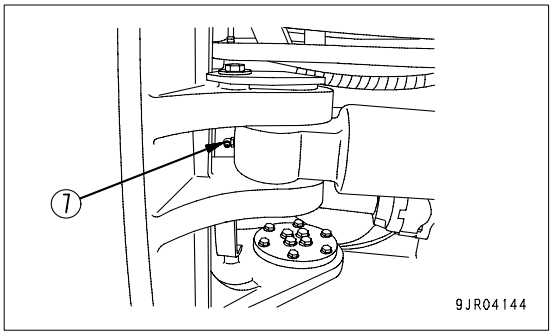


(6) Lift cylinder pin (4 places)



(7) Steering cylinder pin (4 places)

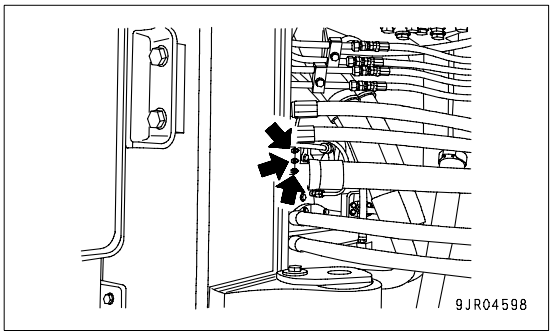




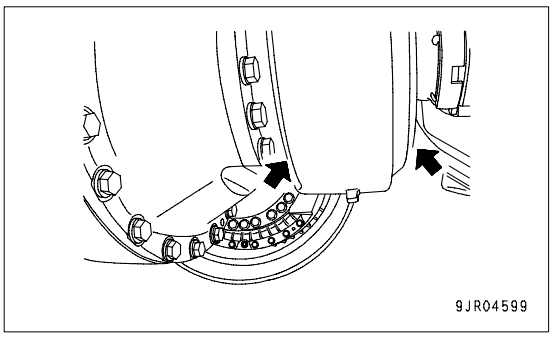
LUBRICATE REAR AXLE PIVOT PIN

(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.



NOTICE
When greasing, carry out greasing until grease comes out from both ends of the axle support.

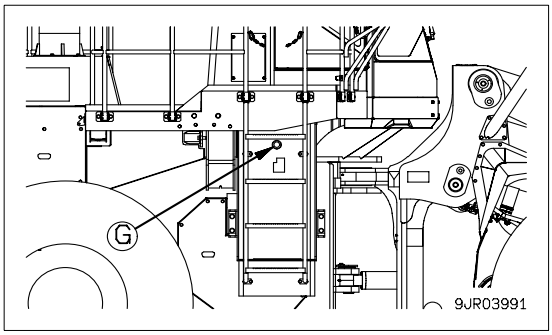


CHECK OIL LEVEL IN HYDRAULIC TANK, ADD OIL

⚠ WARNING

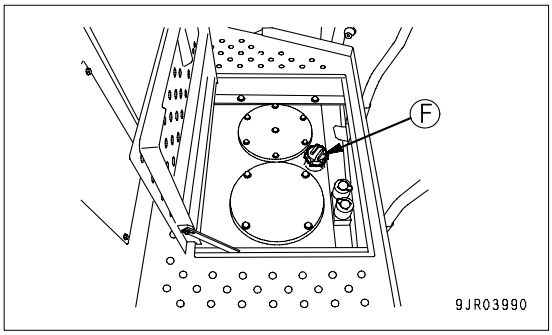
- **The parts and oil are at high temperature immediately after the engine is stopped, and may cause burns. Wait for the temperature to go down before starting the work.**
- **When removing the oil filler cap, turn it slowly to release the internal pressure, then remove it.**

1. Lower the bucket to the ground, stop the engine, and wait for approx. 5 minutes.
2. Check the oil level with sight gauge (G) of the hydraulic tank. The oil level should be near the top of sight gauge (G).



NOTICE
If the oil level is above the top of sight gauge (G), stop the engine, wait for the hydraulic oil to cool down, then drain the excess oil from the drain plug. Using the machine with excess oil in the circuit will cause damage to the hydraulic circuit or cause the oil to spurt out.

3. If the oil is not up to the top of the sight gauge, open the inspection cover above the step and add oil through oil filler port (F).



CLEAN ELEMENT IN AIR CONDITIONER FRESH AIR FILTER

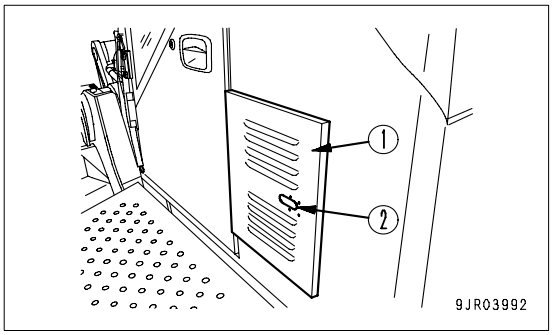
⚠ WARNING

If compressed air scattered around dust and debris, there is danger of injury. Always wear protective equipment such as protective glasses and mask.

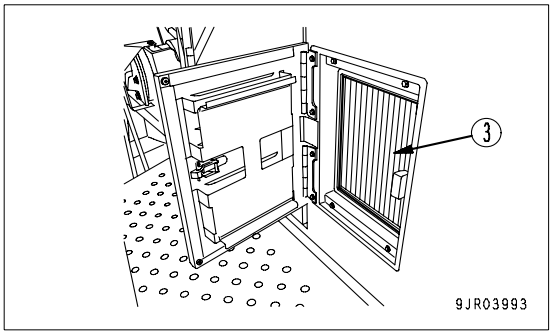
If the air conditioner has been used, the air filter should be cleaned.

Stop the air conditioner before cleaning the element.

1. Stop the engine.
2. Grip handle (2) of cover (1) on the left side of the operator's compartment and open the cover.



3. Remove element (3) and clean it.
4. Direct dry compressed air (less than 0.69 MPa (7 kgf/ cm²) to the element from inside along its folds, then direct it from outside along its folds and again from inside.
5. Install element (3).
6. Then close cover (1).



EVERY 250 HOURS SERVICE

Maintenance for every 50 and 100 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 danger of the electrolyte freezing if distilled water is added, add the distilled water before starting operations on the next day.

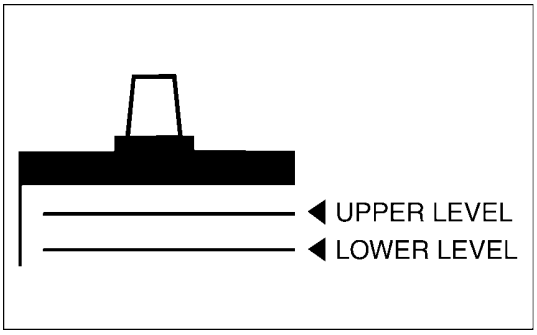
Try to check the electrolyte level on the daily basis. Be sure to check it at least once a month.

WHEN CHECKING ELECTROLYTE LEVEL FROM SIDE OF BATTERY

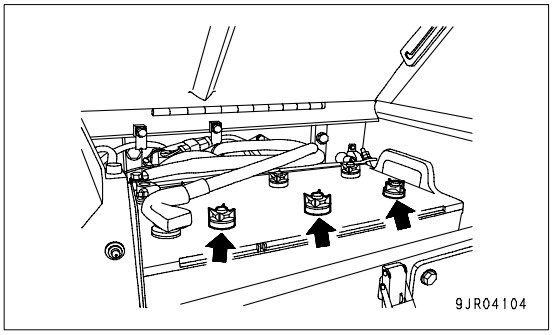
If it is possible to check the electrolyte level from the side of the battery, check as follows.

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 water.



3. 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.

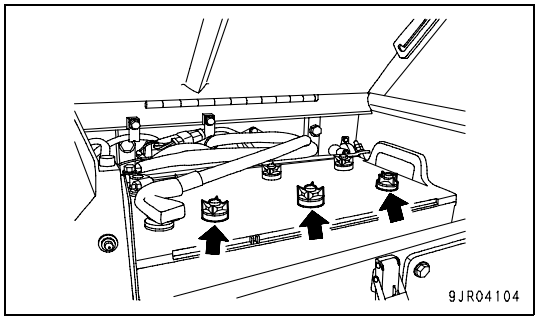
WHEN IT IS IMPOSSIBLE TO CHECK ELECTROLYTE LEVEL FROM SIDE OF BATTERY

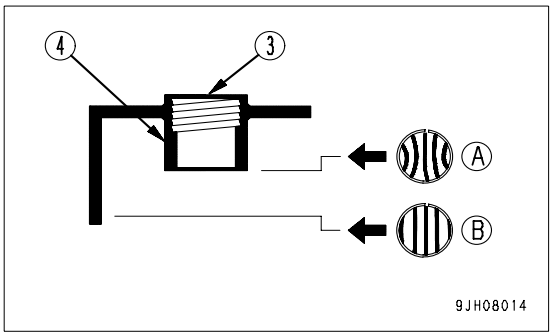
If it is impossible to check the electrolyte level from the side of the battery, or there is no display of the UPPER LEVEL line on the side of the battery, check as follows.

1. Remove the cap on the top of the battery, look into the filler port (4) 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).

- (A) Suitable level: Electrolyte level is up to bottom of sleeve, so surface tension causes electrolyte surface to bulge and poles appear bent.
- (B) Low: Electrolyte level is not up to bottom of sleeve (3), so poles appear straight and not bent.

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





REMARK
If water is added to above the bottom tip of the sleeve (3), 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.

CHECK FOR LOOSE WHEEL HUB BOLTS, TIGHTEN

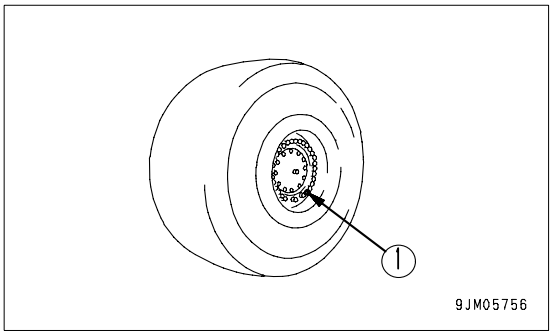
If wheel hub bolts (1) are loose, tire wear will be increased and accidents may be caused.

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.

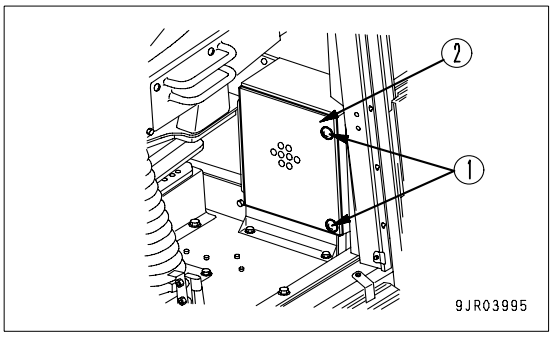
   Tightening torque: 824 to 1030 Nm {84 to 105 kgm}

2. If any stud bolt is broken, replace all the stud bolts for that wheel.



CLEAN ELEMENT IN AIR CONDITIONER RECIRCULATION FILTER

1. Loosen screw (1), then remove filter cover (2).
2. Pull the filter out.
3. Clean with compressed air in the same way as for the fresh air filter.



CHECKING FUNCTION OF ACCUMULATOR

For details of handling the accumulator, see Section “ACCUMULATOR (2-39)“.

BRAKE ACCUMULATOR

If the engine stops when the machine is traveling, the oil pressure in the accumulator can be used to apply the brake as an emergency measure.

1. Stop the machine on level ground and lower the work equipment completely to the ground.
2. Apply the parking brake.
3. Start the engine, run it at a mid-range speed for 1 minute, then stop the engine.
4. Turn the starting switch key to the ON position and depress the brake pedal repeatedly.
   - If the brake oil pressure caution lamp does not light up even when the brake is depressed 6 times, the gas pressure in the accumulator is normal.
   - If the brake oil pressure caution lamp lights up when the brake has been depressed 5 or less times, the gas pressure in the accumulator has probably dropped. Please contact your Komatsu distributor to have the accumulator inspected.

REMARK
Carry out the check within 5 minutes after stopping the engine. If the machine is left with the engine stopped, the accumulator pressure will drop and it will be impossible to check the cause of the problem.

EVERY 500 HOURS SERVICE

Maintenance for every 50, 100 and 250 hours service should be carried out at the same time.

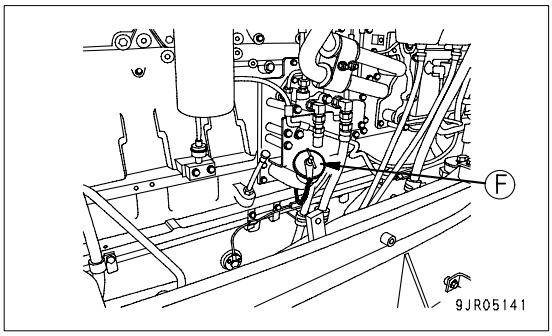
CHANGE OIL IN ENGINE OIL PAN, REPLACE ENGINE OIL FILTER CARTRIDGE

⚠ 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.**

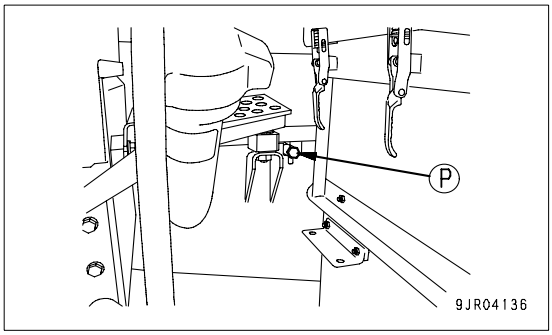
- Refill capacity: 86 liters
- Prepare a filter wrench

1. Stop the engine and wait for the temperature at all parts to go down.
2. Open the engine side cover on the right side of the chassis.
3. Open oil filler (F).



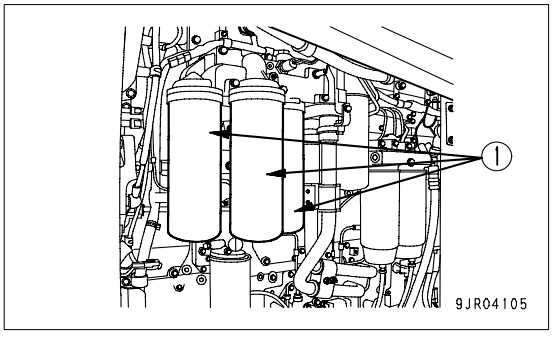
4. Place a container to catch the oil under drain plug (P).
5. Install a hose to the drain port of drain plug (P), then loosen drain plug (P) and drain the oil.

REMARK
Use the supplied hose to prevent oil from spraying out into the surrounding area.



6. Check the drained oil, and if there are excessive metal particles or foreign material, please contact your Komatsu distributor.
7. Tighten drain plug (P), then remove the hose.
8. Using the filter wrench, turn filter cartridge (1) counterclockwise to remove it.

   In particular, if this operation is carried out immediately after stopping the engine, a large amount of oil will come out, so wait for 10 minutes before starting the operation.
9. Clean the filter holder of the filter head.



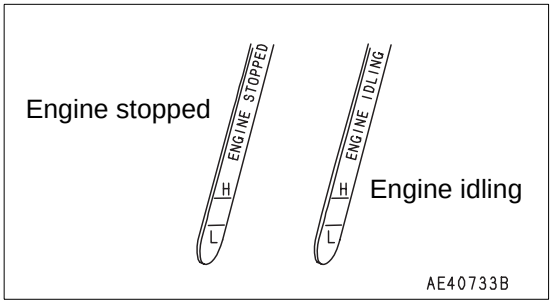
10. Fill a new filter cartridge with clean oil, coat the seal portion and the threaded portion of the new filter cartridge with oil, then install.

11. Install the new filter cartridge to the filter holder.

    When installing, bring the seal surface into contact with the filter holder, then tighten a further 3/4-1 turns by hand.

12. 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.

13. Run the engine for a short time at low idling, then stop the engine and check that the oil level is between the H and L lines on the dipstick. For details, see “CHECK OIL LEVEL IN ENGINE OIL PAN, ADD OIL (3-110)“.



REPLACE FUEL PRE-FILTER CARTRIDGE

⚠ WARNING

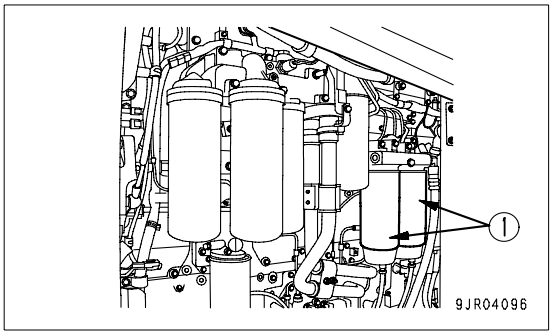
- **After the engine has been operated, all parts are at high temperature, so do not replace the filter immediately. Wait for all parts to cool down before starting the operation.**
- **High pressure is generated inside the engine fuel piping system when the engine is running. When replacing the filter, wait for at least 30 seconds after stopping the engine to let the internal pressure go down before replacing the filter.**
- **Do not bring any fire or flame close.**

NOTICE

- **Genuine Komatsu fuel filter cartridges use a special filter that has highly efficient filtering ability. When replacing the filter cartridge, always use a genuine Komatsu part.**
- **The common rail fuel injection system used on this machine consists of more precise parts than the conventional injection pump and nozzle.**
  If any part other than a genuine Komatsu filter cartridge is used, dust or dirt may get in and cause problems with the injection system. Always avoid using substitute parts.
- **When carrying out inspection or maintenance of the fuel system, pay more attention than normal to the entry of dirt. If dirt is stuck to any part, use fuel to wash it off completely.**

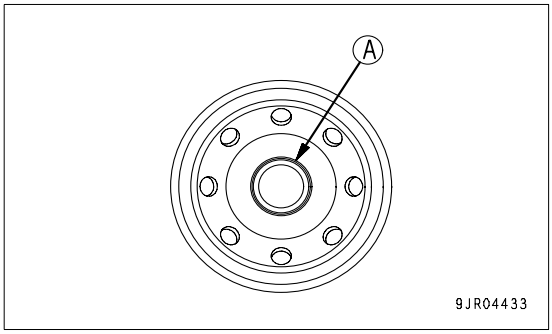
- Prepare a container to catch drain fuel.
- Prepare a filter wrench

1. Set the container to catch the fuel under the filter cartridge (1).
2. Remove transparent cup (2) from the filter and inspect it. If it is broken or damaged, replace it with a new part.
3. Using a filter wrench, turn filter cartridge (1) counterclockwise on remove it.



4. Clean transparent cup (2) and remove seal (3). Coat the new seal with clean fuel or oil.
5. Install transparent cup (2) to the new filter cartridge.

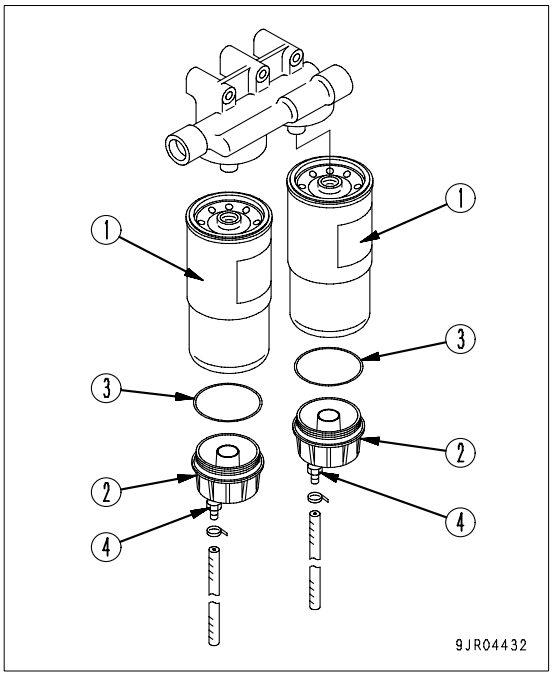
   Tightening torque for cup: 10 Nm (1.0 kgm)



NOTICE
It is not necessary to fill the filter cartridge with oil.
Cap (A) is installed to prevent dirt from entering the inside of the filter cartridge.

   When replacing the filter cartridge, check that drain plug (4) at the bottom of transparent cup (2) is securely tightened.

   (Tightening torque: 0.2-0.4 Nm (0.02 - 0.046 kgm)



6. Clean the filter holder.
7. Coat the packing surface of the filter cartridge with oil.
8. Remove filter cartridge cap (A) and install to the filter holder.
9. When installing, tighten until the packing surface contacts the seal surface of the filter holder, then tighten it 3/4 of a turn.

   If the filter cartridge is tightened too far, the packing will be damaged and this will lead to leakage of fuel. If the filter cartridge is too loose, fuel will also leak from the packing, so always tighten the correct amount.

REPLACE FUEL FILTER CARTRIDGE

⚠ WARNING

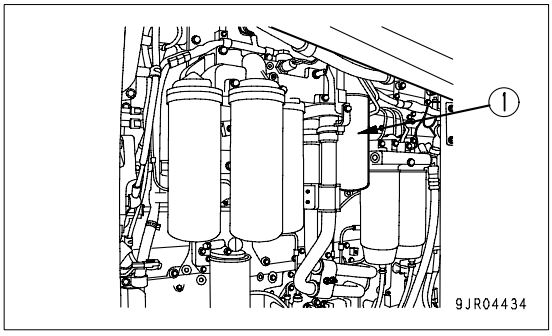
- **After the engine has been operated, all parts are at high temperature, so do not replace the filter immediately. Wait for all parts to cool down before starting the operation.**
- **High pressure is generated inside the engine fuel piping system when the engine is running. When replacing the filter, wait for at least 30 seconds after stopping the engine to let the internal pressure go down before replacing the filter.**
- **Do not bring any fire or flame close.**

NOTICE

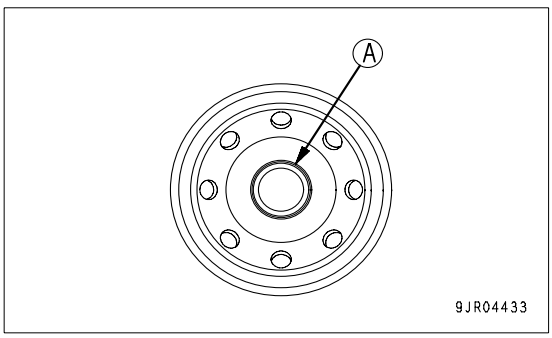
- **Genuine Komatsu fuel filter cartridges use a special filter that has highly efficient filtering ability. When replacing the filter cartridge, always use a genuine Komatsu part.**
- **The common rail fuel injection system used on this machine consists of more precise parts than the conventional injection pump and nozzle.**
  If any part other than a genuine Komatsu filter cartridge is used, dust or dirt may get in and cause problems with the injection system. Always avoid using substitute parts.
- **When carrying out inspection or maintenance of the fuel system, pay more attention than normal to the entry of dirt. If dirt is stuck to any part, use fuel to wash it off completely.**

- Prepare a container to catch drain fuel.
- Prepare a filter wrench

1. Set the container to catch the fuel under the filter cartridge (1).
2. Using a filter wrench, turn filter cartridge (1) counterclockwise on remove it.
3. Clean the filter holder.
4. Coat the packing surface of the filter cartridge with oil.
5. Remove filter cartridge cap (A) and install to the filter holder.



NOTICE
Do not fill the filter cartridge with fuel.
Cap (A) is installed to prevent dirt from entering the inside of the filter cartridge.



6. When installing, tighten until the packing surface contacts the seal surface of the filter holder, then tighten it 3/4 of a turn.

   If the filter cartridge is tightened too far, the packing will be damaged and this will lead to leakage of fuel. If the filter cartridge is too loose, fuel will also leak from the packing, so always tighten the correct amount.

7. After completing the replacement of fuel filter cartridge (1), bleed the air from the circuit. For details, see “BLEEDING AIR FROM FUEL CIRCUIT (4-43)“.

8. After completely bleeding the air, start the engine and check that there is no leakage of fuel from the filter seal surface. If any leakage of fuel is found, check that the filter cartridge is tightened properly. If the fuel still leaks,

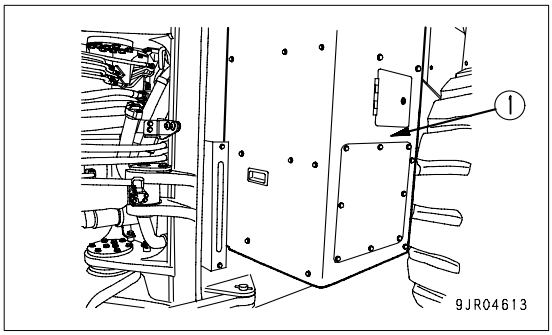
   repeat Steps 1 and 2 to remove the filter cartridge, then check the packing surface for damage or embedded dirt. If any problem is found, replace the cartridge with a new part, then repeat Steps 3 - 8 to install the new cartridge.

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. Stop the engine and wait for the temperature at all parts to go down.
2. Loosen 2 bolts at the bottom face of accumulator mount (1) on the left side of the rear frame, then remove the cover.
3. Set a container to catch the drained oil directly under drain plug (3) at the bottom of filter case (2).

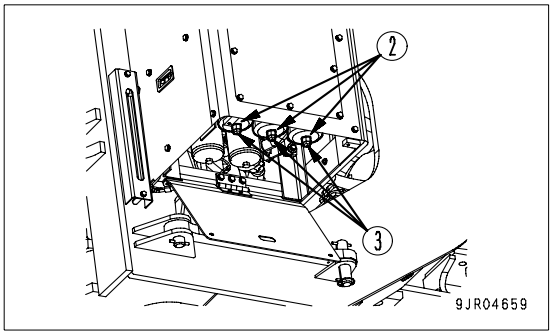


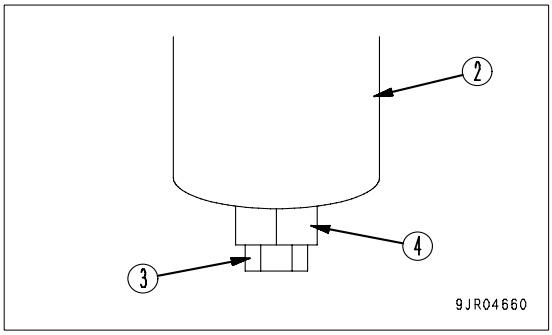
4. Remove drain plug (3) from filter case (2) and drain the oil.
5. After draining the oil, tighten drain plug (3).
6. Loosen hexagon part (4) of case (2), then remove case (2).
7. Take out element, then clean the inside of the case.
8. Replace the filter gasket and O-ring with new parts. Coat the gasket and O-ring thinly with clean engine oil before installing.
9. Assemble the new element, then set the case in position and install it.

   Drain mount tightening torque: 49 to 58.8 Nm (5 to 6 kgm)

   Case tightening torque: 58.8 to 78.5 Nm (6 to 8 kgm)

10. Run the engine for a short time at idling, then check that the oil is at the specified level. For details, see “CHECK TRANSMISSION OIL LEVEL, ADD OIL (4-28)“.





REPLACE BRAKE OIL FILTER CARTRIDGE

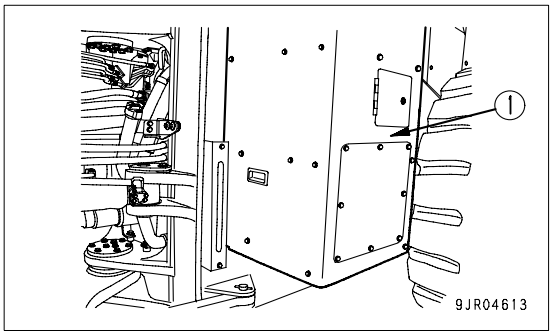
(If equipped)

⚠ WARNING

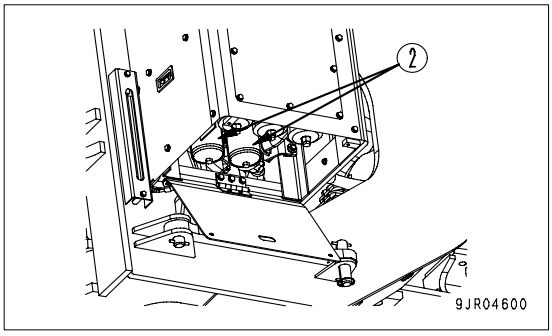
Parts and oil are at high temperature immediately after the engine is stopped and may cause serious burns. Wait for the oil temperature to go down before performing this operation.

- Prepare a container to catch drain fuel.
- Prepare a filter wrench

1. Loosen 2 bolts at the bottom face of accumulator mount (1) on the left side of the rear frame, then remove the cover.

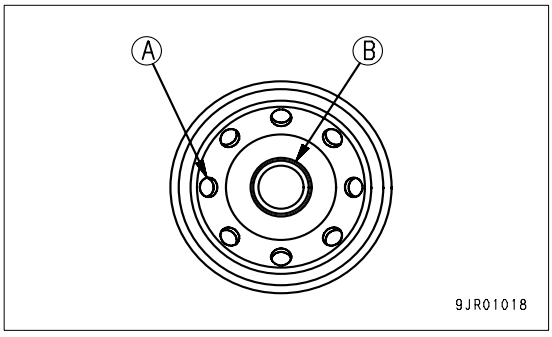


2. Set the container to catch the fuel under the filter cartridge (2).
3. Using a filter wrench, turn filter cartridge (2) counterclockwise to remove it.
4. Clean the filter holder.



5. Check that a new filter cartridge is installed to cap (B), then fill with fresh oil.

NOTICE
When filling with oil, always use fresh oil and be careful not to let any dirt or dust get in. Fill with oil through 8 small holes (A) (dirty side). Cap (B) is to prevent oil containing dirt from getting into the clean side. Always add the oil with cap (B) installed.



6. Coat the packing surface of the filter cartridge with oil.
7. Remove filter cartridge cap (B), then install to the filter holder.

   Tightening torque for filter cartridge: 35 - 41 Nm {3.6 - 4.2 kgm}

8. Run the engine at low idling for a short time, then check that the oil is at the specified level. For details, see “CHECK AXLE OIL LEVEL, ADD OIL (4-30)“.

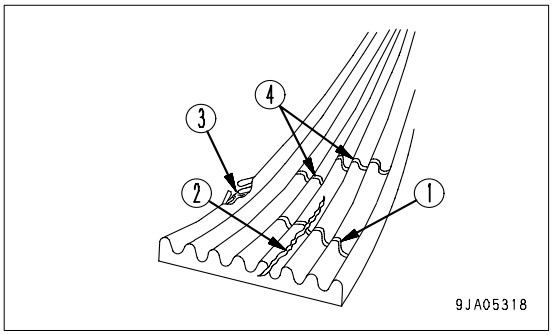
CHECK, REPLACE COMPRESSOR DRIVE BELT FOR ALTERNATOR, AIR CONDITIONER

CHECKING

If the alternator drive belt is in any of the following conditions, the belt must be replaced.

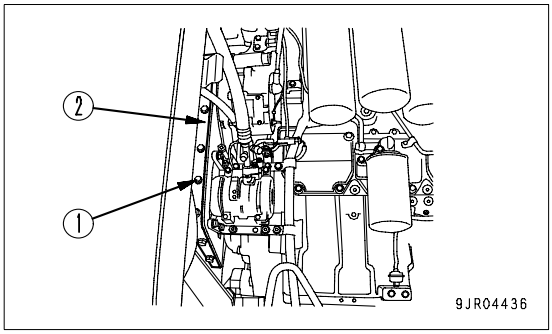
- When horizontal scratch (1) crosses vertical scratch (2)
- When there are tears (3) in part of the belt

In case (4) where there are horizontal scratches only, there is no need to replace the belt.



REPLACING

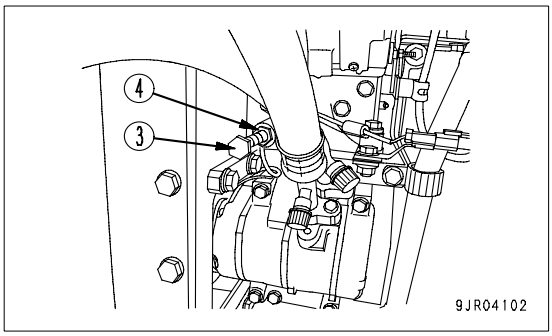
1. Remove 9 bolts (1), then remove cover (2).

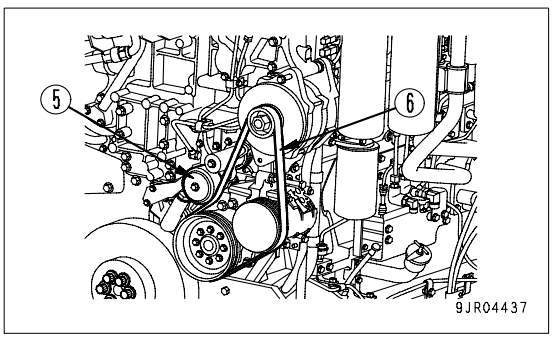


2. Loosen locknut (4) of push bolt (3), then tighten push bolt (3) fully to push in tension pulley (5).

   This will loosen belt (6).

3. Replace the belt.
4. Loosen push bolt (3) until approx. 90 mm of the thread appears, then tighten the locknut (4).
5. Install cover (2), then install 9 bolts (1).





EVERY 1000 HOURS SERVICE

Maintenance for every 50, 100, 250 and 500 hours service should be carried out at the same time.

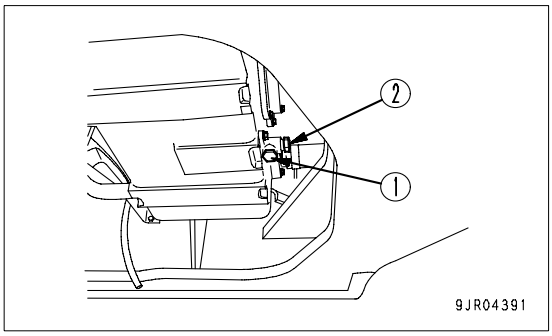
CHANGE OIL IN TRANSMISSION CASE, CLEAN STRAINER

⚠ 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.**

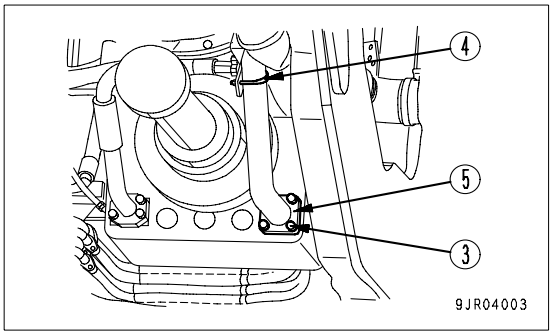
- Refill capacity: 83 liters

1. Stop the engine and wait for the temperature at all parts to go down.
2. Set a container to catch the drained oil directly under drain plug (1).
3. Remove drain plug (1), install and nipple, then install a hose to the nipple.
4. Loosen drain plug (2) and drain the oil.



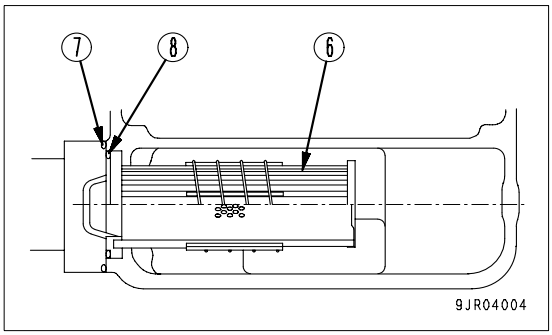
REMARK
Use the supplied nipple and hose to prevent oil from spraying out into the surrounding area.

5. After draining the oil, tighten drain plug (2), remove the hose and nipple, then install drain plug (1).
6. Set a container directly under the transmission filter case to catch the drained oil.
7. Replace the element. For details, see “REPLACE TRANSMISSION OIL FILTER ELEMENT (4-62)“.
8. Remove bolt (3), U-clamp (4), and tube (5).

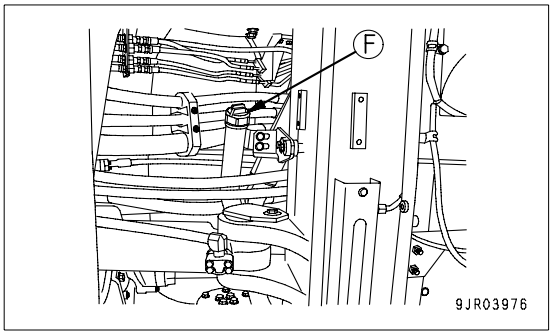


9. Pull out strainer (6).
10. Remove the dirt stuck to strainer (6), then wash in clean diesel oil or flushing oil. If strainer (6) is damaged, replace it with a new part.
11. Install strainer (6), tube (5), and U-clamp (4), then tighten bolts (3).

    Replace O-ring (7) of tube (5) to O-ring (8) at the strainer portion with new parts, then install the cover.

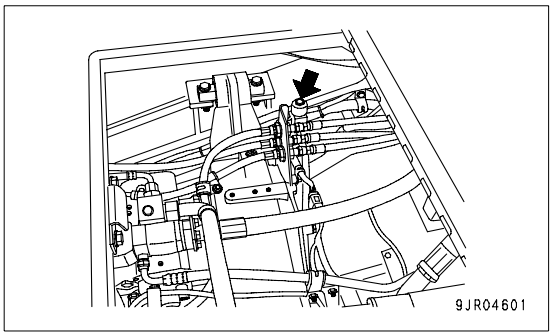


12. Pour in the specified amount of engine oil from oil filler (F).
13. After adding oil, check that the oil is at the specified level. For details, see “CHECK TRANSMISSION OIL LEVEL, ADD OIL (4-28)“.
14. Check that there is no leakage of oil from the transmission case or oil filter.



CLEAN TRANSMISSION CASE BREATHER

1. Stop the engine and wait for the temperature at all parts to go down.
2. Remove all mud and dirt from around the breather.
3. Remove the breather and fit a cover to the breather mounting hole to prevent dirt from entering.
4. Soak the breather in flushing liquid and wash it.
5. Install the breather.

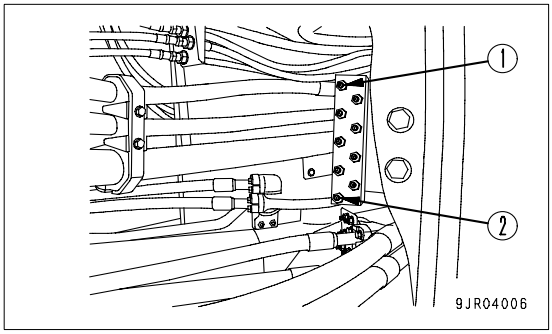


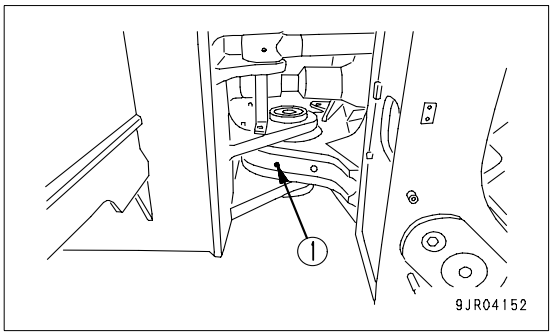
LUBRICATING

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) Center hinge pin (2 places)

(2) Drive shaft center support (1 place)



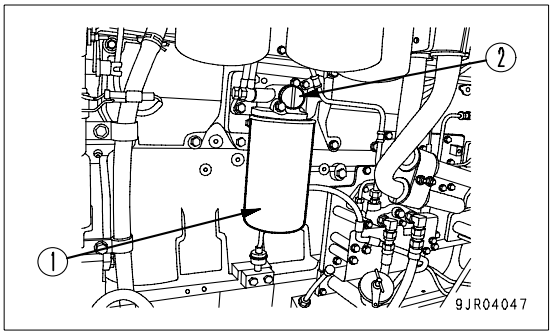


REPLACE CORROSION RESISTOR CARTRIDGE

(Only when corrosion resistor cartridge is used)

1. Stop the engine.
2. Open the engine side cover located on the right of the engine hood.
3. Close valve (2) on top of corrosion resistor (1).

REMARK
Closing valve (2) shuts off the coolant circuit to the corrosion resistor.
For this reason, only the amount of coolant inside the corrosion resistor is lost.

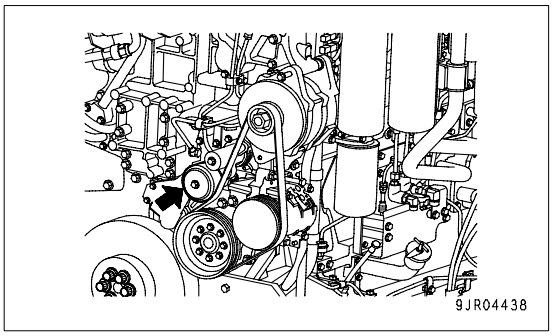


4. Using a filter wrench, turn cartridge (2) to the left to remove it.
5. Clean the filter holder of the filter head.
6. Coat the seal surface of the new cartridge thinly with oil, then install the cartridge.
7. When installing, bring the gasket into contact with the seal surface of the filter holder, then tighten approx. 2/3 turns.
8. Close valve (2).
9. After replacing the cartridge, start the engine and check that there is no leakage of water from the cartridge seal surface.
10. Close the engine side cover on the right side of the machine.

CHECK, GREASE COMPRESSOR DRIVE BELT TENSION PULLEY ASSEMBLY FOR ALTERNATOR, AIR CONDITIONER

CHECKING

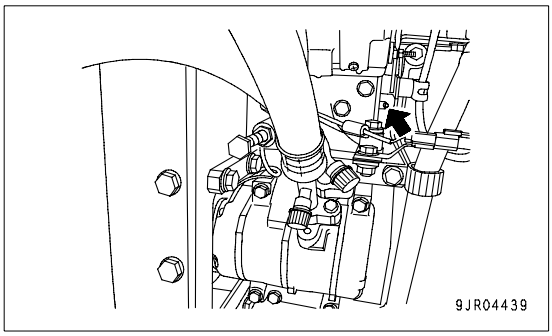
Check the pulley for play and leakage of grease. If there is any abnormality, please contact your Komatsu distributor for disassembly and repair or replacement.



LUBRICATING

Using a grease pump, pump in grease through the grease fittings shown by arrow.

After greasing, wipe off any old grease that was pushed out.



EVERY 2000 HOURS SERVICE

Maintenance for every 50, 100, 250, 500 and 1000 hours service should be carried out at the same time.

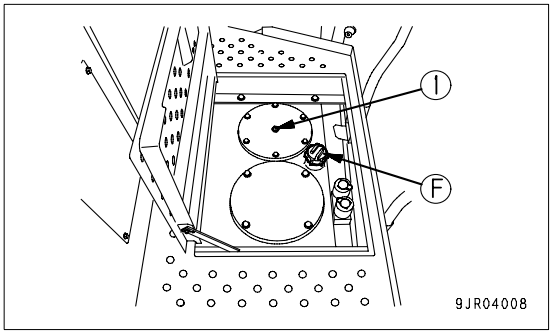
CHANGE OIL IN HYDRAULIC TANK, REPLACE HYDRAULIC FILTER ELEMENT

⚠ WARNING

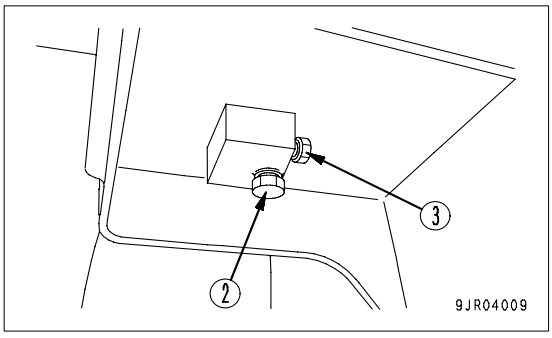
- **The parts and oil are at high temperature immediately after the engine is stopped, and may cause burns. Wait for the temperature to go down before starting the work.**
- **When removing the oil filler cap, turn it slowly to release the internal pressure, then remove it.**

- Refill capacity: 443 liters

1. Set the bucket horizontally on the ground, then turn the parking brake ON.
2. Stop the engine and wait for the temperature at all parts to go down.
3. Open the cover on the right side of the operator's compartment.
4. Remove oil filler (F) and plug (1) from the filter case.

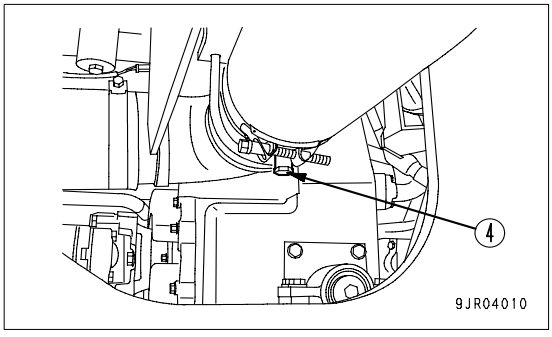


5. Set a container to catch the oil under drain plug (2).
6. Remove drain plug (2), then loosen plug (3) and drain the oil.
7. After draining the oil, tighten drain plug (2) and plug (3).



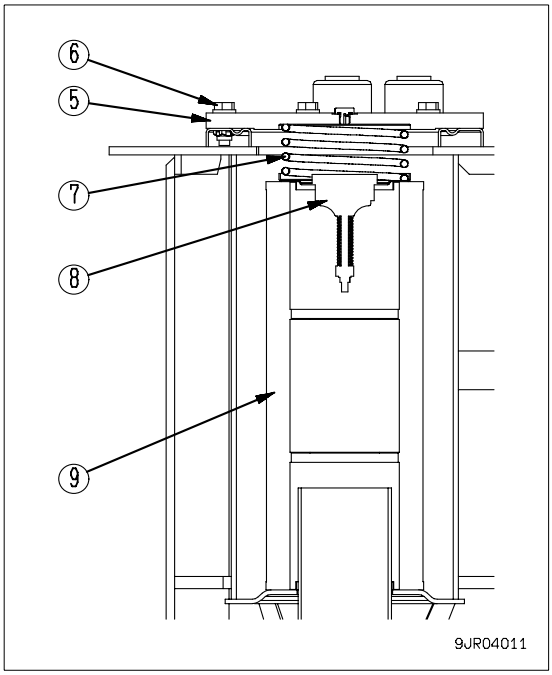
8. Remove plug (4) and drain the oil inside the suction tube.
9. Replace the O-ring installed to the plug with a new part.

   O-ring part number: 07002-61423



⚠ CAUTION

When removing the filter cover, keep the filter pressed down by hand. The filter cover is being pushed by a spring, so if the filter cover mounting bolts are removed carelessly, there is danger that the filter cover will spring out and cause injury.

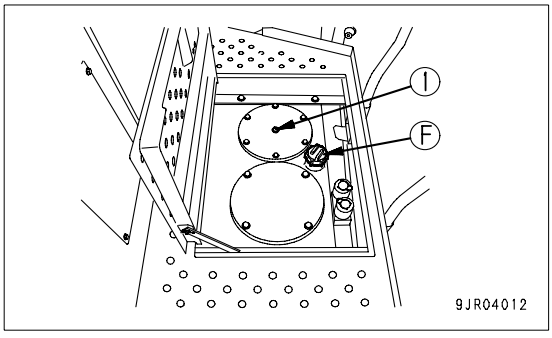


10. Press down 2 filter covers (5) at the top of the fuel tank by hand, remove mounting bolts (6), then remove the covers slowly.
11. Remove spring (7) and bypass valve (8), then remove element (9).
12. Check that there is no foreign material inside the tank, then clean it.
13. Fit a new O-ring to filter cover (5).
14. Install a new element, then install bypass valve (8), spring (7), and filter cover (5).
15. Keep filter cover (5) pressed down by hand and tighten the mounting bolts uniformly.
16. Add the specified amount of oil through oil filler (F), then install the cap.
17. Check that the hydraulic oil is at the standard level. For details, see “CHECK OIL LEVEL IN HYDRAULIC TANK, ADD OIL (4-53)“.
18. 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 before the end of stroke).

NOTICE

If the engine is run at high speed immediately after startup or a cylinder is pushed up to its stroke end, air taken inside the cylinder may cause damage to the piston packing.

19. Next, operate the steering, bucket, and lift arm cylinders to the end of their stroke 3 to 4 times, then stop the engine and loosen vent plug (1) to bleed the air from the hydraulic tank. After bleeding the air, tighten plug (1) again.
20. Check the oil level, then add oil to the specified level. For details, see “CHECK OIL LEVEL IN HYDRAULIC TANK, ADD OIL (4-53)“.
21. Run the engine at low idle, loosen the air bleeding plug (1) to bleed the air from inside the filter tank.



22. Next, increase the engine speed and repeat the procedure in Step 15 to bleed the air. Continue this operation until no more air comes out from plug (1).
23. After completely bleeding the air, tighten plug (1).

    Tightening torque: 11.30 ± 1.47 Nm {1.15 ± 0.15 kgm}
24. Check that the hydraulic oil is at the standard level. For details, see “CHECK OIL LEVEL IN HYDRAULIC TANK, ADD OIL (4-53)“.
25. Check that there is no leakage of oil from the filter cover mount.

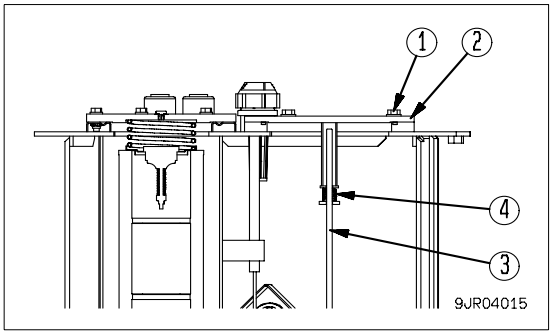
CLEAN HYDRAULIC TANK STRAINER

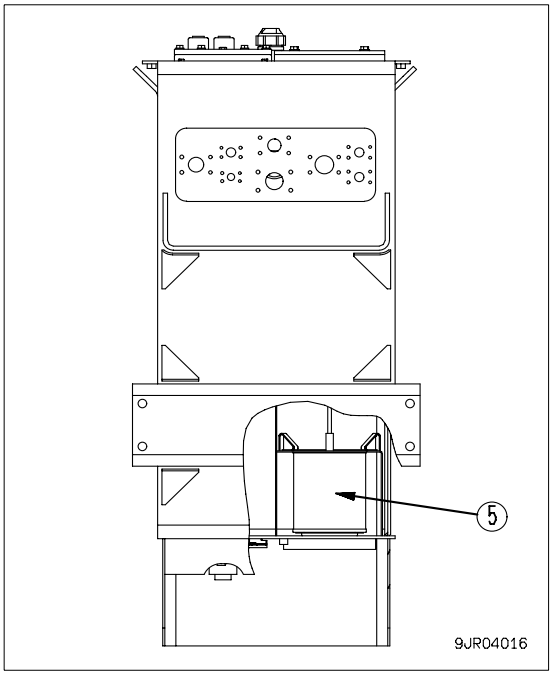
When changing the oil in the hydraulic tank, drain the oil from the tank and clean the strainer.

1. Set the bucket horizontally on the ground, then turn the parking brake ON.
2. Stop the engine and wait for the temperature at all parts to go down.
3. Open the cover on the right side of the operator's compartment.
4. Loosen bolt (1), then remove strainer cover (2).
5. Remove strainer (5) together with rod (3) and spring (4).
6. Remove any dirt stuck to strainer (5), then wash it in clean diesel oil or flushing oil. If strainer (5) is damaged, replace it with a new part.
7. Install rod (3), spring (4), and strainer (5).
8. Install cover (2).

   Replace the cover O-ring with a new part.

   When doing this, look through the mounting hole of cover (2) and check that the strainer guide pin is fitted into the guide hole.
9. Close the cover on the right side of the operator's compartment.



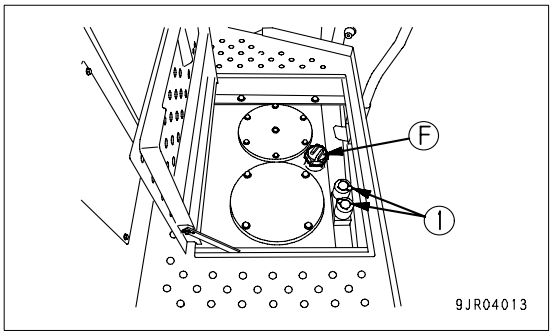


REPLACE HYDRAULIC TANK BREATHER ELEMENT

⚠ 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. Set the bucket horizontally on the ground, then turn the parking brake ON.
2. Stop the engine and wait for the temperature at all parts to go down.
3. Open the cover on the right side of the operator's compartment.
4. Remove the cap of oil filler (F).
5. Remove the snap ring from breather (1), then remove the breather cap.
6. Replace the filter element with a new part, then install the breather cap and snap ring.
7. Tighten the cap of oil filler (F).
8. Close the cover on the right side of the operator's compartment.



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.

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.**

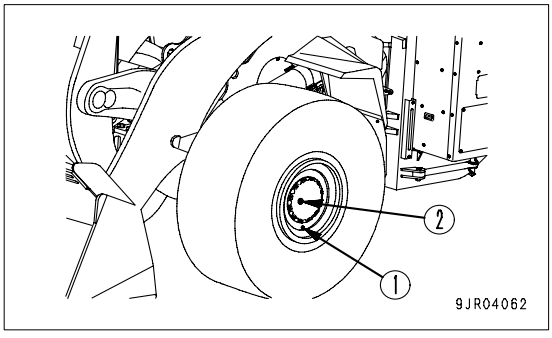
- Refill capacity: Front axle: 155 liters

  Rear axle: 155 liters

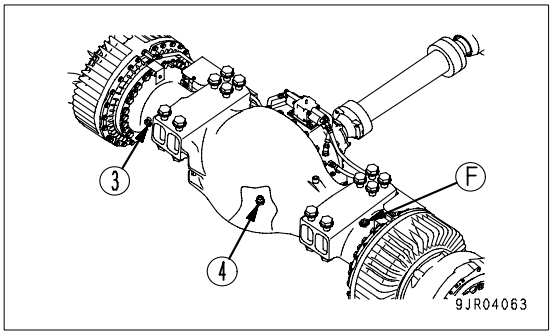
1. To prevent the drained oil from coming into contact with the tires, do as follows.

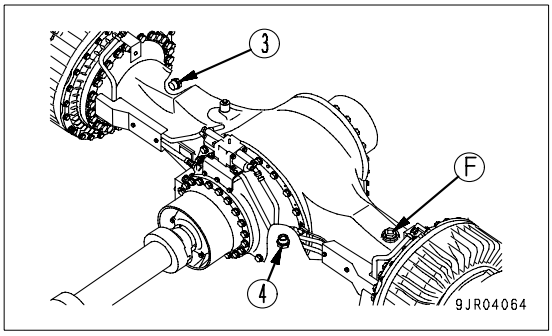
   Move the machine so that drain plug (1) of the final drive is at the top. Remove plug (1), install the nipple of the supplied tool, then insert the hose.

   Move the machine so that plug (1) is at the bottom, then remove oil filler plug (2) and drain the oil through the hose.

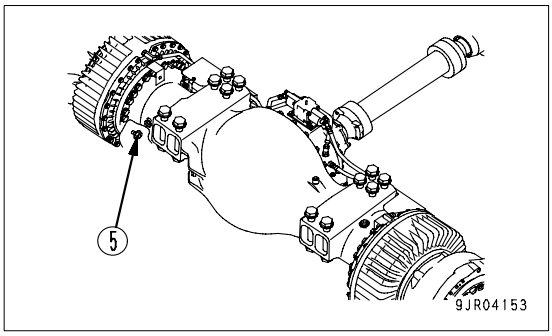


2. Remove front and rear oil filler plugs (F), then remove level plug (3) and drain plug (4) to drain the oil.





3. Remove drain plug (5) and attach the tool (nipple and hose) to drain the oil.
4. After draining the oil, clean drain plugs (1), (4) and (5), then install them.
5. Add oil to the specified level through the oil filler ports (F) and (2) of the axle housing and left and right final drives.
6. After adding oil, check at level plug (3) that the oil is at the specified level. For details, see CHECK AXLE OIL LEVEL, ADD OIL (4-30).



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

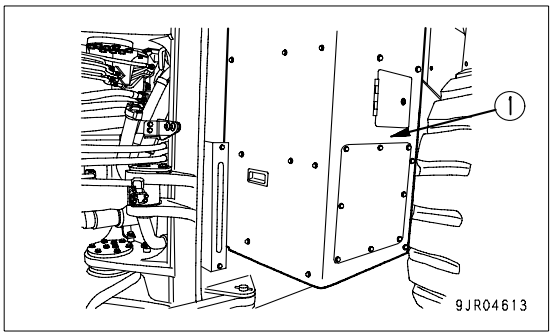
Remove both the recirculation air filter and fresh air filter in the same way as when cleaning, and replace them with new parts.

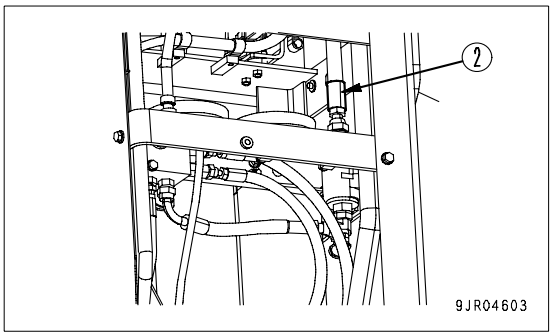
For details of cleaning the recirculation air filter, see “CLEAN ELEMENT IN AIR CONDITIONER RECIRCULATION FILTER (4-57)“.

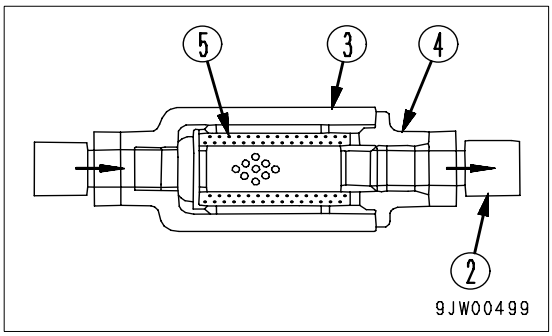
For details of cleaning the fresh air filter, see “CLEAN ELEMENT IN AIR CONDITIONER FRESH AIR FILTER (4-54)“.

CLEAN PPC CIRCUIT STRAINER

1. Set the bucket horizontally on the ground, then turn the parking brake ON.
2. Stop the engine and wait for the temperature at all parts to go down.
3. Remove cover (1) from the accumulator mount on the left side of the rear frame.
4. Remove outlet hose (2) of the PPC circuit strainer.
5. Remove cap (4) from strainer case (3), then take out strainer (5).
6. Wash strainer (5) in clean diesel oil.
7. Install strainer (5) so that the covered end of strainer case (3) is on the inside, then tighten cap (4).
8. Install outlet hose (2) of the PPC circuit strainer to cap (4).
9. Install cover (1) to the accumulator mount on the left side of the rear frame.
10. Start the engine.
11. Operate the bucket control lever to the TILT position and the boom control lever to the FLOAT position. When the cylinder reaches the end of its stroke, hold it there for one minute.
12. Operate the bucket control lever to the DUMP position and the lift arm control lever to the RAISE position. When the cylinder reaches the end of its stroke, hold it there for one minute.
13. Stop the engine.







For details of the procedure for bleeding air from the hydraulic circuit, please contact your Komatsu distributor.

CHECK ALTERNATOR

When carrying out the EVERY 2000 HOURS SERVICE or EVERY YEAR SERVICE, remove the belt and check that the alternator rotates smoothly. If it does not rotate smoothly, please ask your Komatsu distributor to carry out inspection and repair.

CHECK ENGINE VALVE CLEARANCE, ADJUST

As special tool is required for removing and adjusting the parts, request your Komatsu distributor for service.

CHECK BRAKE DISC WEAR

As special tool is required for checking and adjusting the parts, request Komatsu distributor for service.

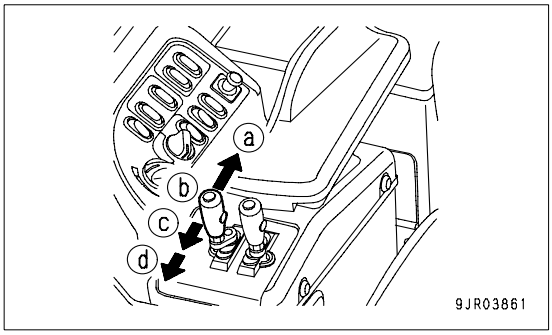
CHECKING FUNCTION OF ACCUMULATOR

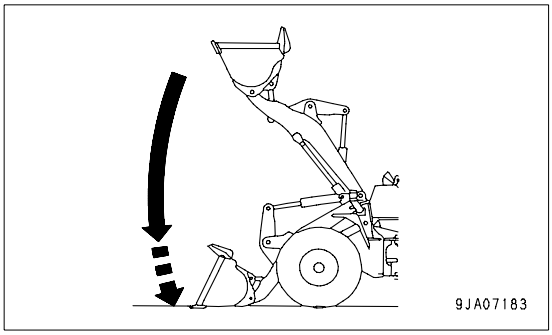
For details of handling the accumulator, see Section “ACCUMULATOR (2-39)“.

PPC ACCUMULATOR

If the engine stops with the work equipment raised, and it is impossible to start the engine again, it is possible as an emergency measure to actuate the valve with the oil pressure stored in the accumulator and lower the work equipment to the ground.

1. Apply the parking brake.
2. Raise the work equipment to the maximum height, then operate the lift arm control lever to HOLD position (b).
3. Stop the engine.
4. Leave the work equipment lock lever in the FREE position.
5. Check that the area around the machine is safe, then turn the starting switch to the ON position, set the lift arm control lever to FLOAT position (d), and lower the work equipment to a point 1 m above the ground.
6. When the lift arm comes to the 1m position, return the lift arm control lever to LOWER position (c), and lower the work equipment slowly to the ground.





REMARK
Carry out the check within 2 minutes after stopping the engine. If the machine is left with the engine stopped, the accumulator pressure will drop and it will be impossible to check the cause of the problem.

If the work equipment stops while it is moving, the gas pressure in the accumulator has probably dropped.

Please contact your Komatsu distributor to have the accumulator inspected.

Replace the accumulator every 4000 hours or every 2 years.

CHECK BOOST PIPING CLAMPS

Check the clamps of the hoses between the air cleaner and the turbocharger. Tighten any loose clamps.

Check the clamps of the hoses between the turbocharger and the aftercooler or engine. Tighten any loose clamps.

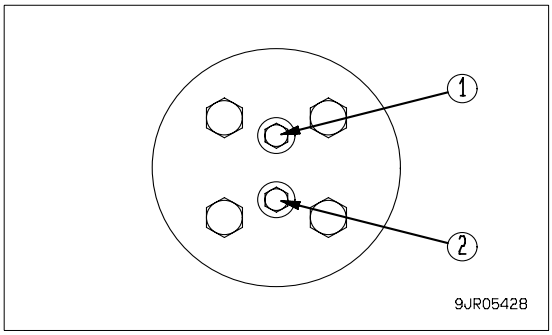
CHANGE OIL FOR WORK EQUIPMENT PINS

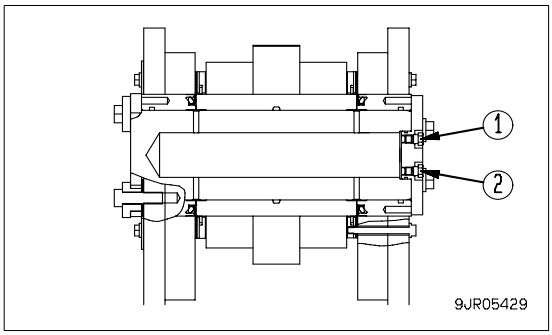
(Only machines equipped with oil-sealed pins)

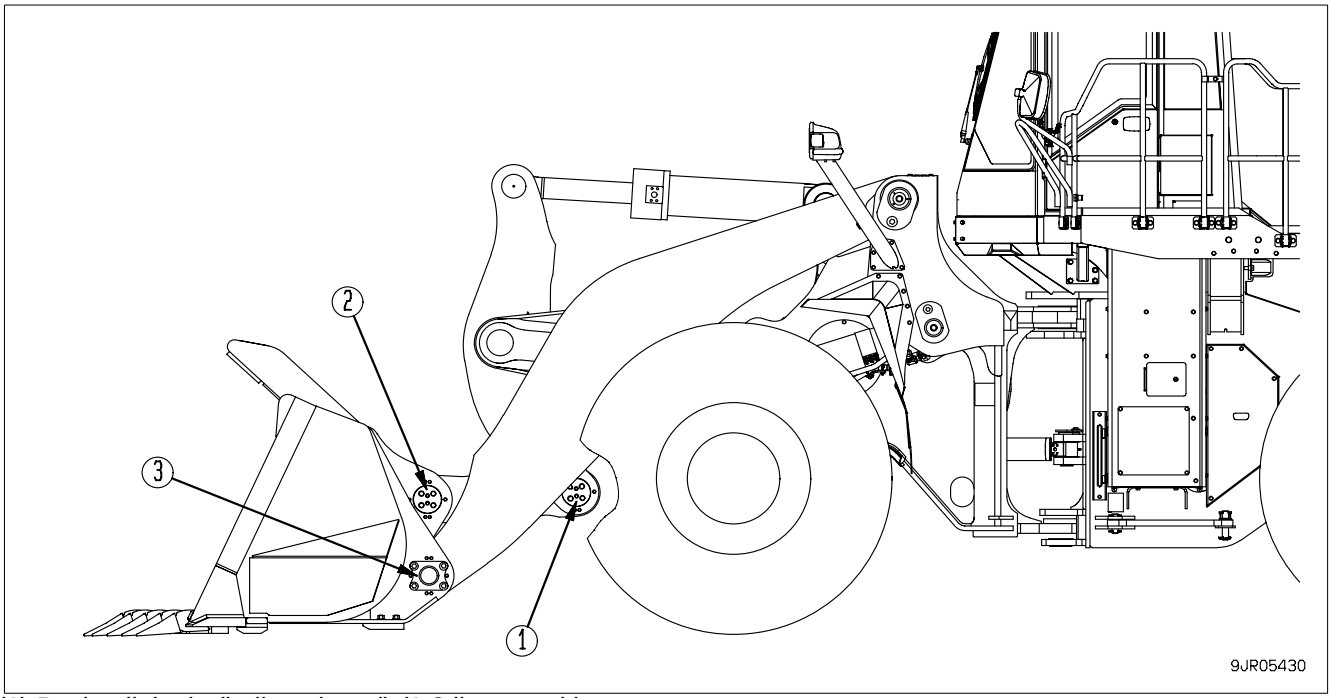
⚠ CAUTION

If the plug is loosened immediately after operations, the oil may spurt out.

1. Set the bucket horizontally on the ground, then turn the parking brake ON.
2. Stop the engine and wait for the temperature at all parts to go down.
3. 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.
4. Remove plug (2) at the bottom and drain the oil.
5. Install bottom plug (2).
6. Add oil through the top plug hole until it flows out from the plug hole.
7. Install top plug (1).







(1) Bucket link pin (bellcrank end) (1.2 liters each)

(2) Bucket link pin (bucket end) (1.2 liters each)

(3) Bucket hinge pin (2 places) (1.2 liters each)

EVERY 4000 HOURS SERVICE

Maintenance for every 50, 100, 250, 500, 1000 and 2000 hours service should be carried out at the same time.

CHECK WATER PUMP

Check that there is no leakage of water from around the water pump. If there is any water leakage, please ask your Komatsu distributor to carry out repairs.

CHECK STARTING MOTOR

The brush may be worn or have no grease on the bearing, so contact your Komatsu distributor for inspection or repair.

If the engine is started frequently, carry out inspection every 1000 hours.

CHECK AIR CONDITIONER COMPRESSOR, ADJUST

As special tool is required for checking and adjusting the parts, request Komatsu distributor for service.

LUBRICATING

Carry out the greasing once every two years, regardless of whether the 4000 hour interval has passed.

⚠ CAUTION

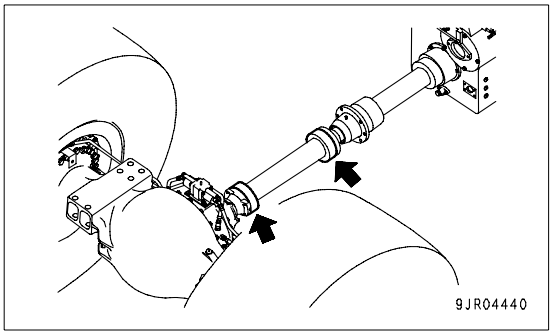
If you fail to grease the drive shaft, the shaft will break, and there is danger that the broken shaft will cause serious damage to the machine. To avoid this problem always maintain the specified greasing interval strictly.

If special drive shaft grease is used, carry out greasing every 4000 hours or every two years. When the special grease is not used, and the normal lithium-based grease is used, carry out greasing every 1000 hours.

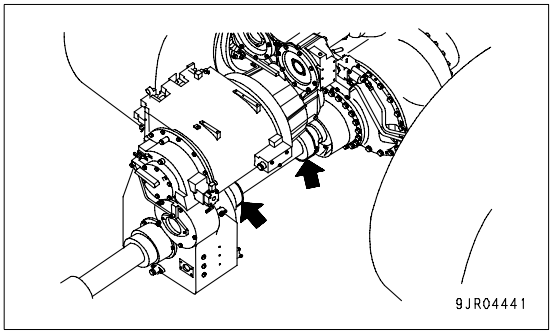
Special drive shaft grease: 56B-20-19910

1. Using a grease pump, pump in grease through the grease fittings marked by the arrows.
2. Grease the spider portion until grease comes out from the cap seal.
3. After greasing, wipe off any old grease that was pushed out.

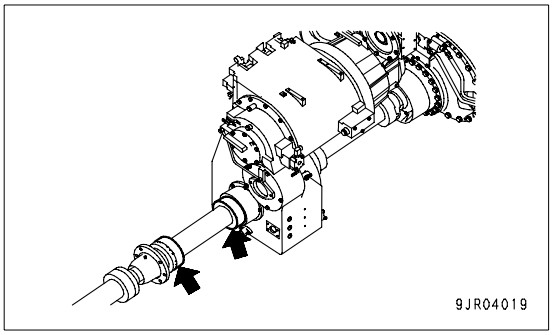
(1) Front drive shaft (2 places)



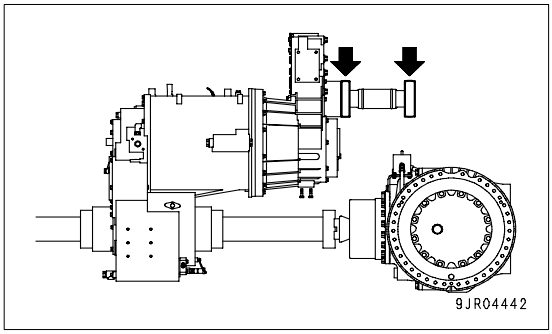
(2) Rear drive shaft (2 places)



(3) Center drive shaft (2 places)

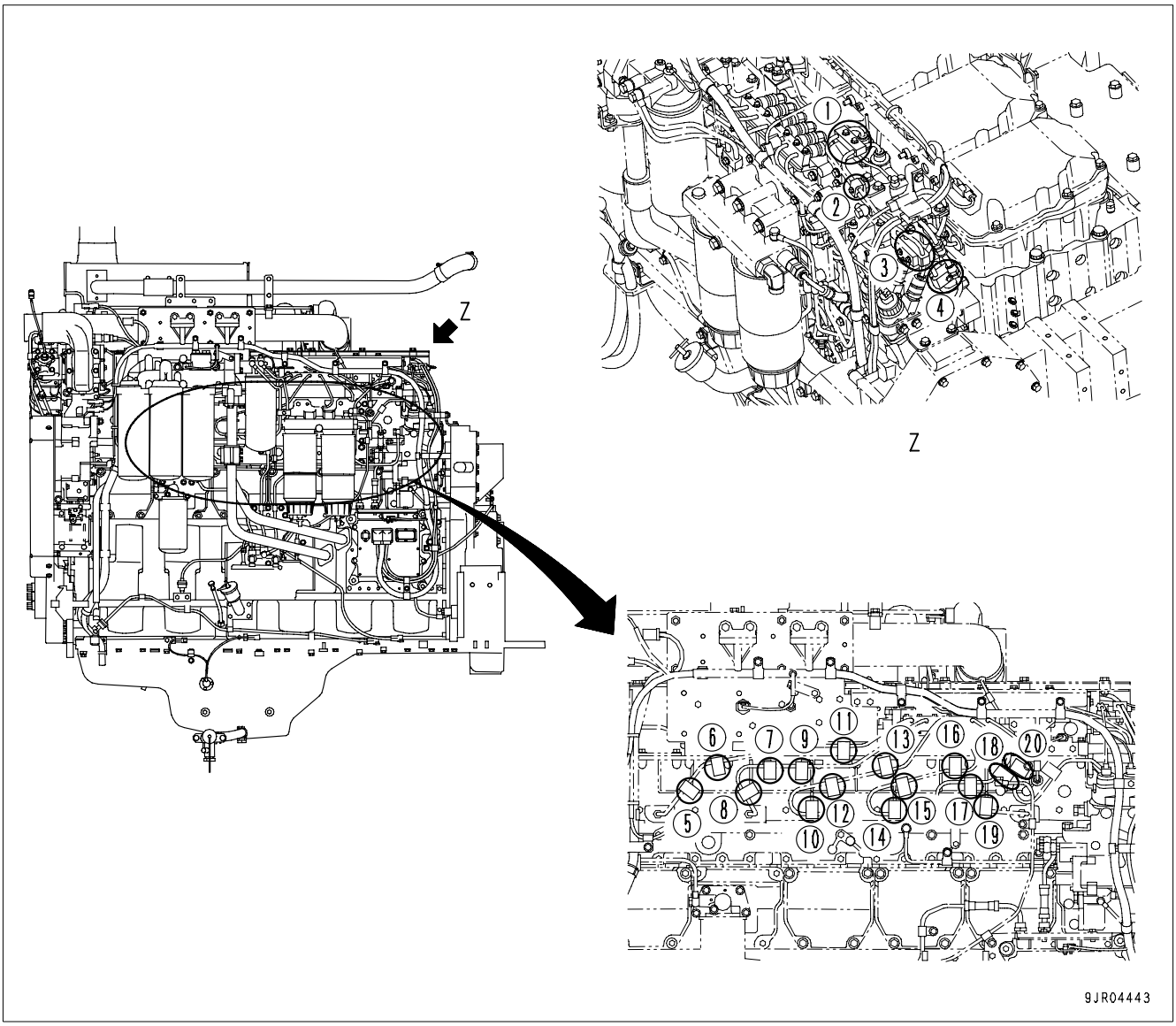


(4) Upper drive shaft (2 places)



CHECK FOR LOOSE ENGINE HIGH-PRESSURE PIPING CLAMPS, HARDENING OF RUBBER

Check visually and touch by hand to check that there are no loose mounting bolts for high-pressure piping clamps (1) - (20) in the diagram and no hardening of any rubber parts. If any problem is found, the part must be replaced. In this case, please ask your Komatsu distributor to carry out the replacement.

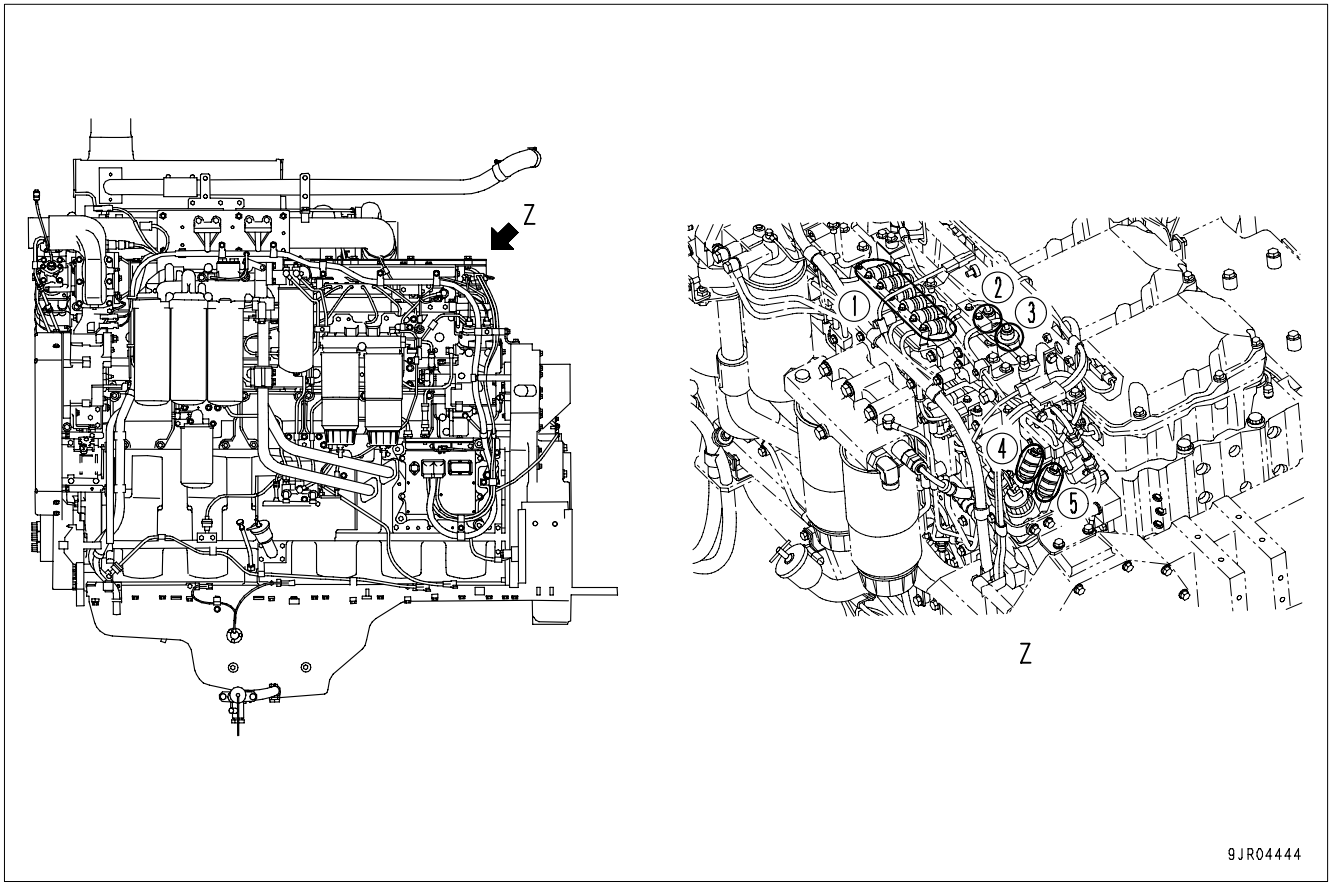


NOTICE

If the engine continues to be used when there are loose bolts, hardened rubber, or missing parts, there is danger of damage or breakage occurring due to vibration and wear at the connections of high-pressure piping. Always check that the proper high-pressure piping clamps are correctly installed.

CHECKING FOR MISSING FUEL SPRAY PREVENTION CAP, HARDENING OF RUBBER

Fuel spray prevention caps (1) - (5) are protective parts installed to prevent fire caused by fuel leaking and spraying out on to high temperature parts of the engine. Check visually that there are no missing caps or loose bolts, and feel with your finger to check that the rubber has not hardened. If there is any problem, the problem part must be replaced. Contact your Komatsu distributor for part replacement.



EVERY 8000 HOURS SERVICE

Maintenance for every 50, 100, 250, 500, 1000, 2000 and 4000 hours service should be carried out at the same time.

REPLACE ENGINE HIGH-PRESSURE PIPING CLAMPS

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

REPLACE FUEL SPRAY PREVENTION CAP

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

OVERHAUL STARTING MOTOR AND ALTERNATOR

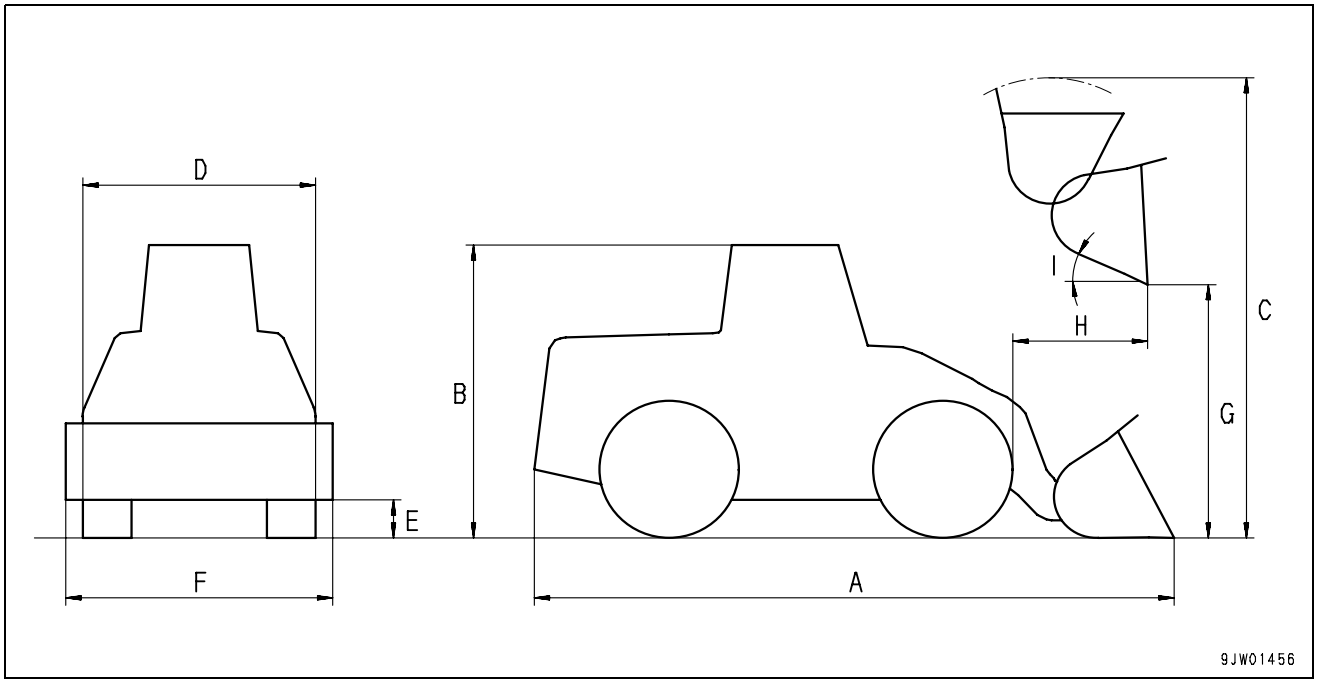
Ask your Komatsu distributor to carry out this work.

SPECIFICATIONS

SPECIFICATIONS

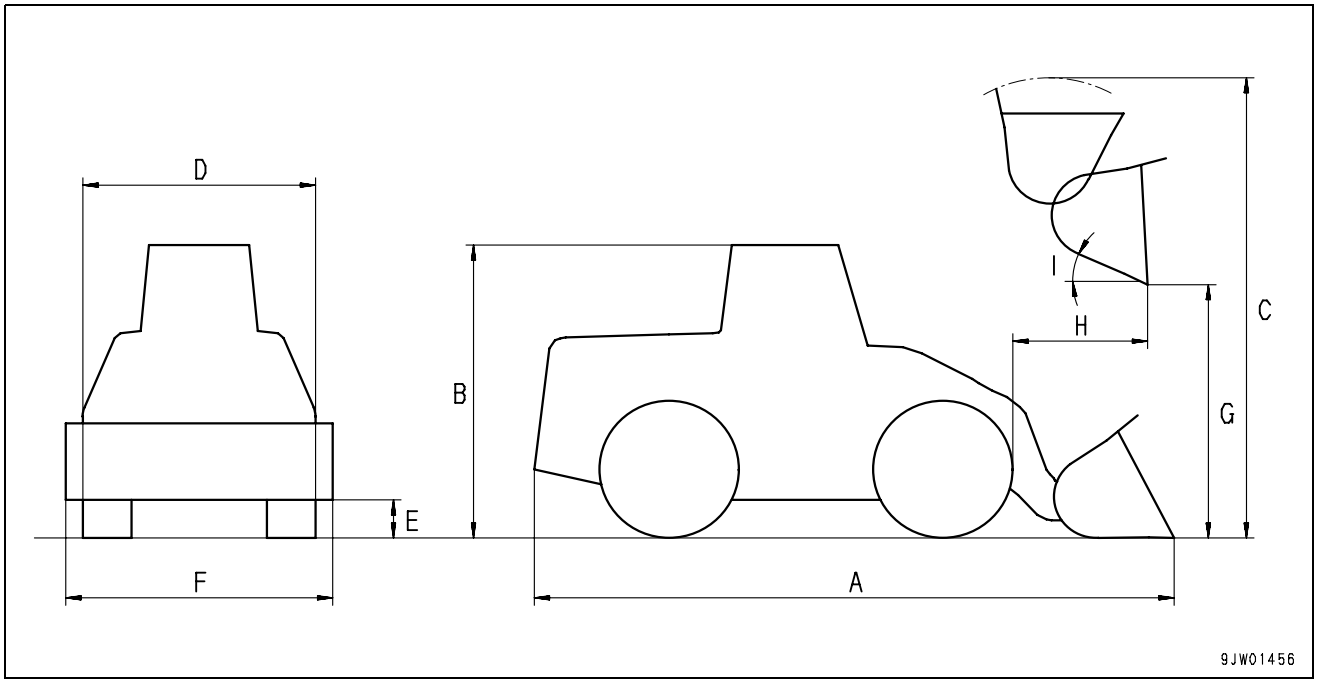
Machine equipped with 6.4 m³ bucket

	Item			Unit	WA600-6	
					General spec.	EU spec.
	Operating weight (including 1 operator: 80 kg)			kg	52700	52930
	Normal load			kg	11680	
	Bucket capacity (with spade nose tooth)			m^3	6.4	
	Engine model			-	Komatsu SAA6D170E-5 diesel engine	
	Engine horsepower	Economy mode		kW (HP)/rpm	382{513}/1700	
		Power mode		kW (HP)/rpm	393{527}/1800	
A	Overall length (including teeth)			mm	11985	
B	Overall height			mm	4460	
C	Bucket overall height (When bucket lifted)			mm	7925	
D	Overall width			mm	3540	
E	Min. ground clearance			mm	525	
F	Bucket width			mm	3910	
G	Clearance	Tip of bucket [Tip of tooth]		mm	4270 [3995]	
H	Reach	Tip of bucket [Tip of tooth]		mm	1610 [1800]	
I	Dump angle			degrees	45	
	Min. turning radius	Outside of chassis		mm	8500	
		Center of outside tire		mm	7075	
	Travel speed (Economy mode) [in lock-up]	Forward	1st	km/h	6.6	
			2nd	km/h	11.5 [12.1]	
			3rd	km/h	19.4 [20.9]	
			4th	km/h	31.5 [35.5]	
		Reverse	1st	km/h	7.3	
			2nd	km/h	12.5 [12.8]	
			3rd	km/h	21.1 [22.5]	
			4th	km/h	34.0 [38.4]	
	Travel speed (Power mode) [in lock-up]	Forward	1st	km/h	6.7	
			2nd	km/h	11.7 [12.4]	
			3rd	km/h	20.3 [21.7]	
			4th	km/h	33.8 [37.7]	
		Reverse	1st	km/h	7.3	
			2nd	km/h	12.8 [13.5]	
			3rd	km/h	22.0 [23.7]	
			4th	km/h	37.0 [41.0]	


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9JW01456

Machine equipped with 7.0 m^3 bucket

	Item			Unit	WA600-6	
					General spec.	EU spec.
	Operating weight (including 1 operator: 80 kg)			kg	52900	53130
	Normal load			kg	12600	
	Bucket capacity (with spade nose tooth)			m^3	7.0	
	Engine model			-	Komatsu SAA6D170E-5 diesel engine	
	Engine horsepower	Economy mode		kW (HP)/rpm	382{513}/1700	
		Power mode		kW (HP)/rpm	393{527}/1800	
A	Overall length (including teeth)			mm	11870	
B	Overall height			mm	4460	
C	Bucket overall height (When bucket lifted)			mm	7775	
D	Overall width			mm	3540	
E	Min. ground clearance			mm	525	
F	Bucket width			mm	3910	
G	Clearance	Tip of bucket [Tip of tooth]		mm	4005 [3730]	
H	Reach	Tip of bucket [Tip of tooth]		mm	1690 [1885]	
I	Dump angle			degrees	45	
	Min. turning radius	Outside of chassis		mm	8440	
		Center of outside tire		mm	7075	
	Travel speed (Economy mode) [in lock-up]	Forward	1st	km/h	6.6	
			2nd	km/h	11.5 [12.1]	
			3rd	km/h	19.4 [20.9]	
			4th	km/h	31.5 [35.5]	
		Reverse	1st	km/h	7.3	
			2nd	km/h	12.5 [12.8]	
			3rd	km/h	21.1 [22.5]	
			4th	km/h	34.0 [38.4]	
	Travel speed (Power mode) [in lock-up]	Forward	1st	km/h	6.7	
			2nd	km/h	11.7 [12.4]	
			3rd	km/h	20.3 [21.7]	
			4th	km/h	33.8 [37.7]	
		Reverse	1st	km/h	7.3	
			2nd	km/h	12.8 [13.5]	
			3rd	km/h	22.0 [23.7]	
			4th	km/h	37.0 [41.0]	


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ATTACHMENTS, OPTIONS

⚠ WARNING

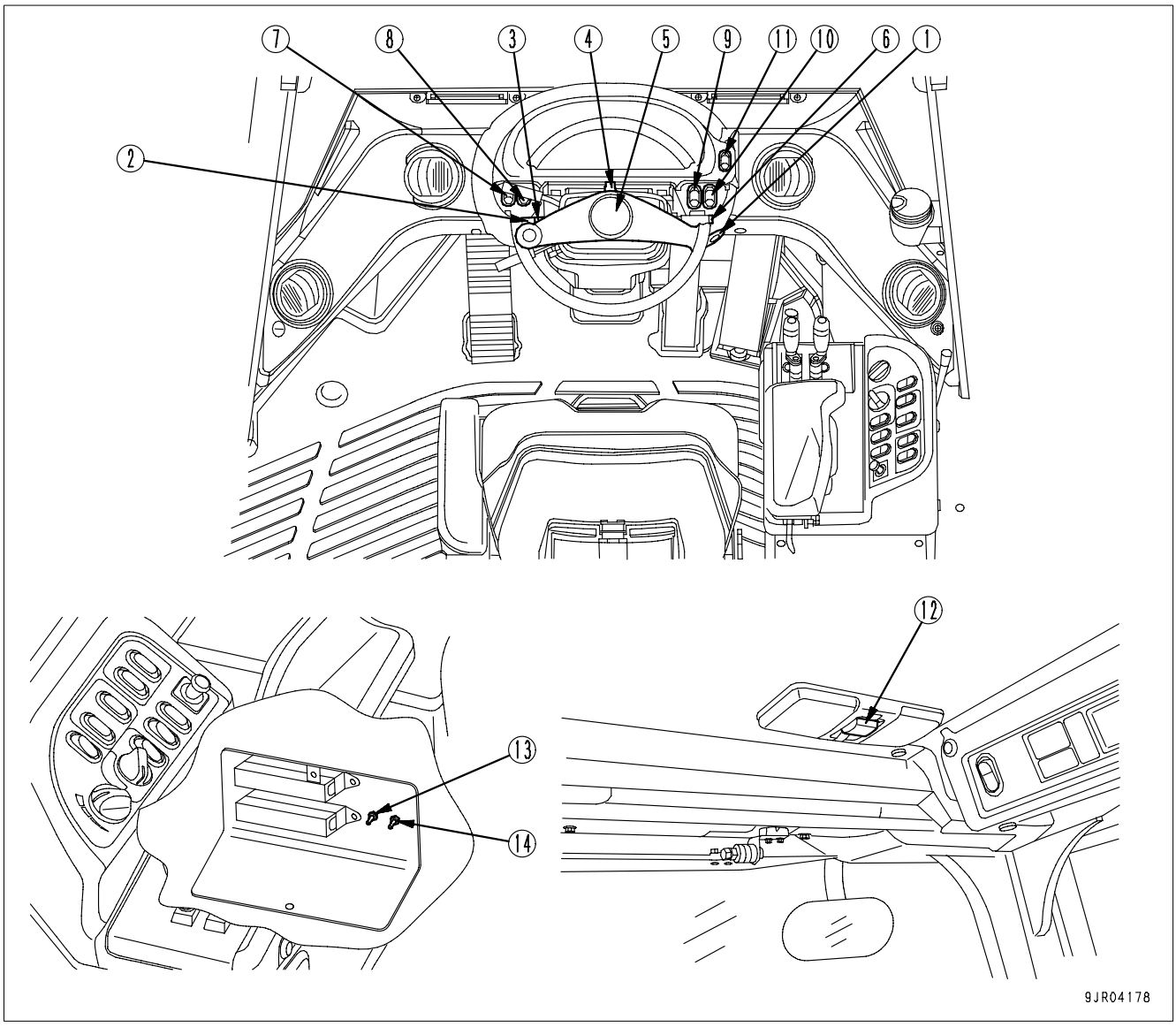
Please read and make sure that you understand the SAFETY section before reading this section.

HANDLING STEERING WHEEL SPECIFICATION MACHINE

To ensure efficient and safe use of the steering wheel specification machine, always read the following before using the machine.

EXPLANATION OF COMPONENTS

SWITCHES, FRONT PANEL, STEERING WHEEL SWITCH, REAR BOX



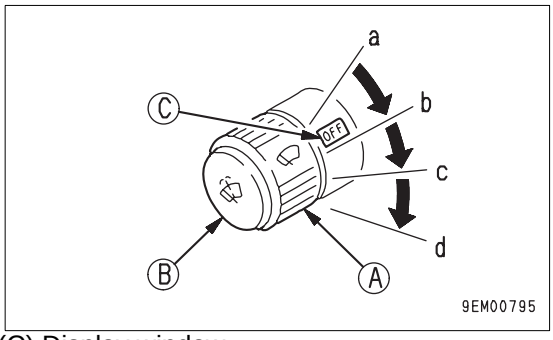
(1) Starting switch
(2) Front wiper switch
(3) Rear wiper switch
(4) Hazard lamp switch
(5) Horn switch
(6) Lamp switch
(6) Turn signal lever
(6) Dimmer switch
(7) Machine monitor mode selector switch 1
(8) Machine monitor mode selector switch 2
(9) Load meter mode selector switch (if equipped)
(10) Load meter display selector switch (if equipped)
(11) Parking brake switch
(12) Room lamp switch
(13) Emergency parking brake cancel switch
(14) Emergency modulation clutch direct connection switch

For details of switches (1), (7) - (14), see “SWITCHES (3-44)“ in the OPERATION section.

FRONT WIPER SWITCH

Turn rotary switch (A) of switch (2) to operate the front wiper.

If push button (B) is pressed, washer liquid will be sprayed out onto the front glass while the button is being pressed.



(C) Display window

Position (a): (OFF) Stop

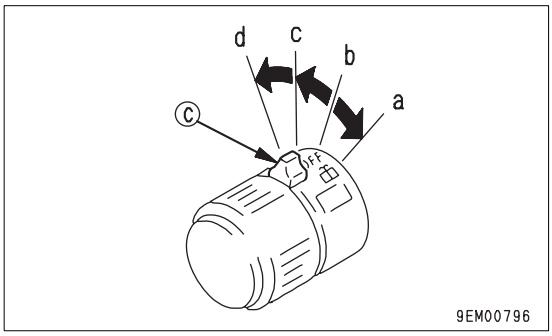
Position (b): (INT) Intermittent wiper

Position (c): Low-speed wiper

Position (d): High-speed wiper

REAR WIPER SWITCH

Turn lever (C) on switch (3) 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

HAZARD LAMP SWITCH

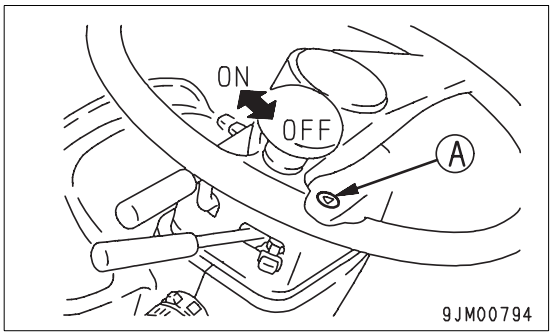
⚠ WARNING

Use the hazard lamp only in emergencies. Using the hazard lamp when traveling may cause confusion for other machine operators.

This switch (4) is used in emergencies, such as when the machine breaks down and has to be parked on the road.

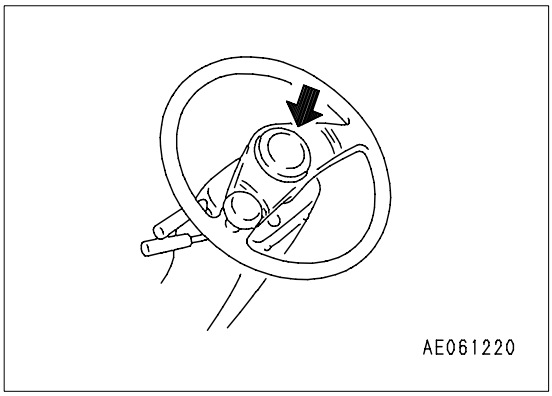
ON position: All turn signal lamps flash.

REMARK
When this switch is turned to the ON position, the turn direction indicator lamps and turn indicator pilot lamp flash, and display lamp (A) lights up at the same time.



HORN SWITCH

When the horn button (5) in the center of the steering wheel is pressed, the horn will sound.



LAMP SWITCH

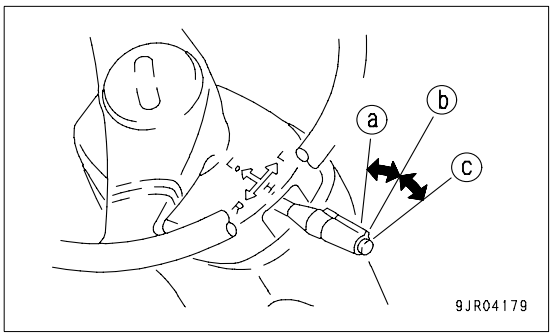
This switch (6) is used to light up the front lamps, side clearance lamps, tail lamps, and instrument panel.

Position (a): OFF

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

Position (c): Head lamps light up in addition to lamps at (b) position

REMARK
The lamp switch can be operated regardless of the position of the lever.

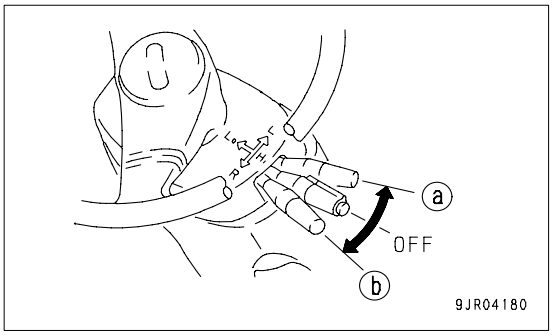


TURN SIGNAL LEVER

This switch (6) is used to operate the turn signal lamp.

(a) position: LEFT TURN (Push lever FORWARD.)

(b) position: RIGHT TURN (Pull lever BACK.)



REMARK
When the lever is operated, the turn signal pilot lamp also flashes.
When the steering wheel is turned back, the lever automatically returns to its original position. If it does not return, return it manually.

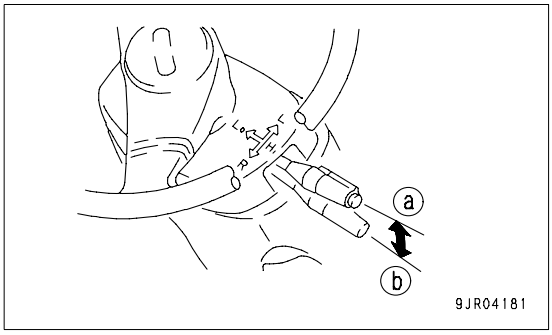
DIMMER SWITCH

Use this switch (6) to switch the head lamps between high beam and low beam.

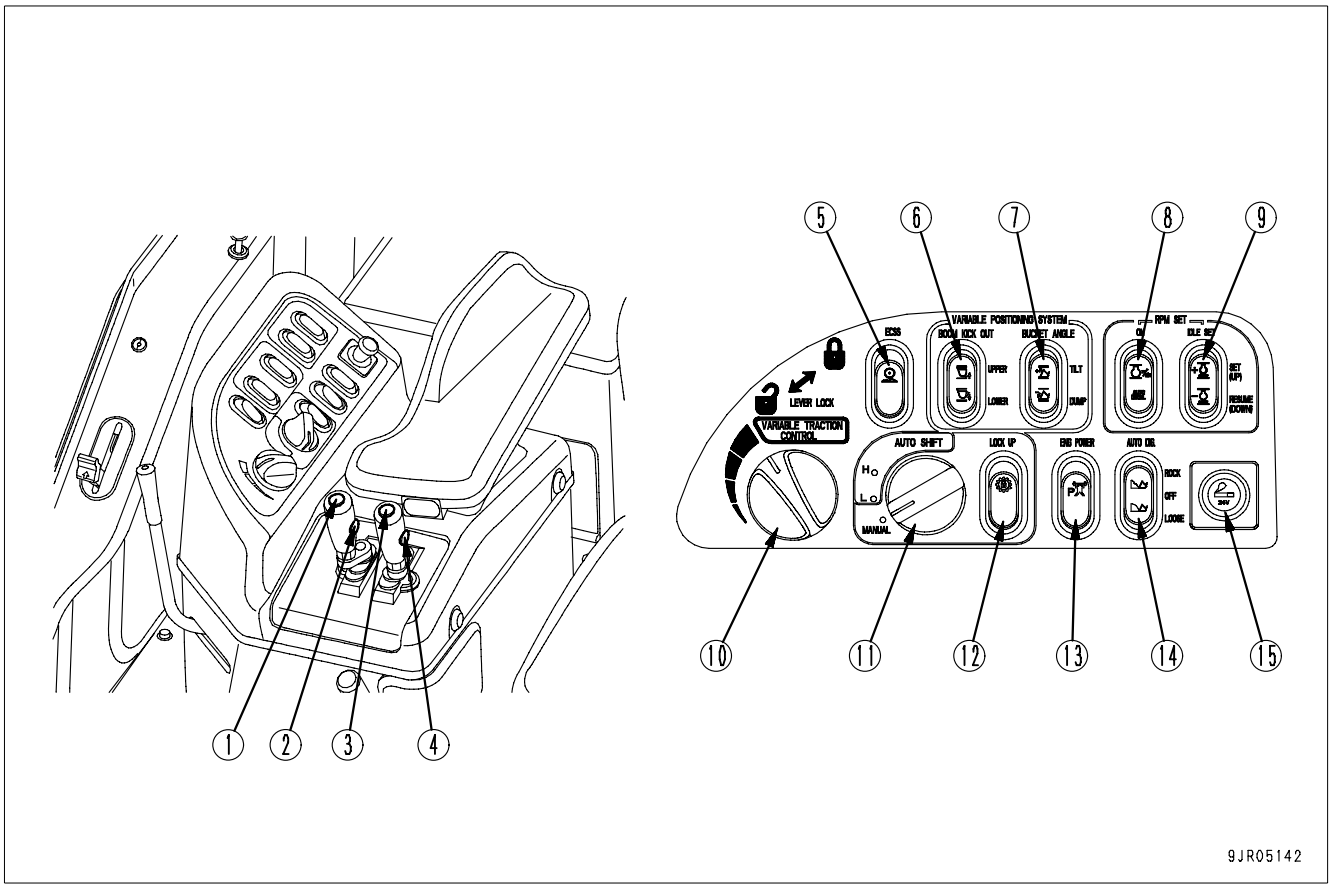
When the head lamps are at high beam, the high beam pilot lamp lights up.

Position (a): High beam

Position (b): Low beam



RIGHT SWITCH PANEL, CONTROL LEVER SWITCH

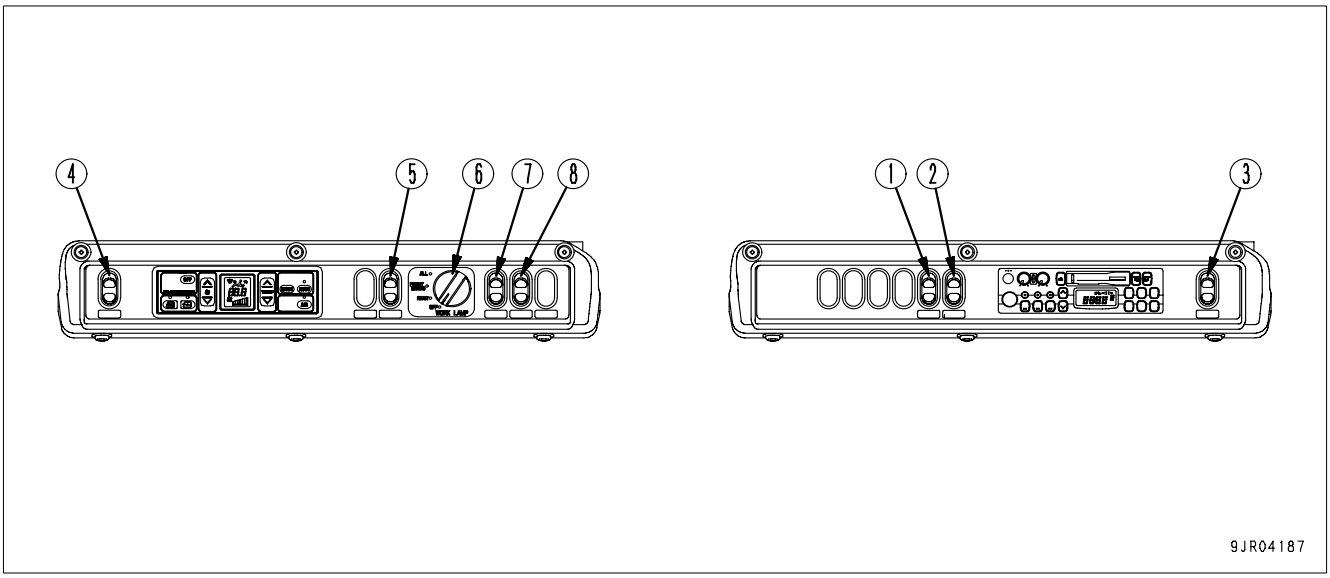


(1) Kickdown switch
(2) Hold switch
(3) Load meter cancel switch (if equipped)
(4) Load meter sub-total switch (if equipped)
(5) E.C.S.S. switch (*) (if equipped)
(6) Remote positioner raise/lower set switch
(7) Remote positioner bucket angle set switch
(8) RPM set ON-OFF switch (if equipped)
(9) RPM set idling up-down selector switch (if equipped)
(10) Driving force control dial
(11) Transmission auto shift/manual shift selector switch
(12) Torque converter lock-up switch (if equipped)
(13) Engine power mode selector switch
(14) Semi auto digging selector switch (if equipped)
(15) Cigarette lighter

(*) E.C.S.S.: Electrically Controlled Suspension System

For details of switches (1) - (15), see “SWITCHES (3-44)“ in the OPERATION section.

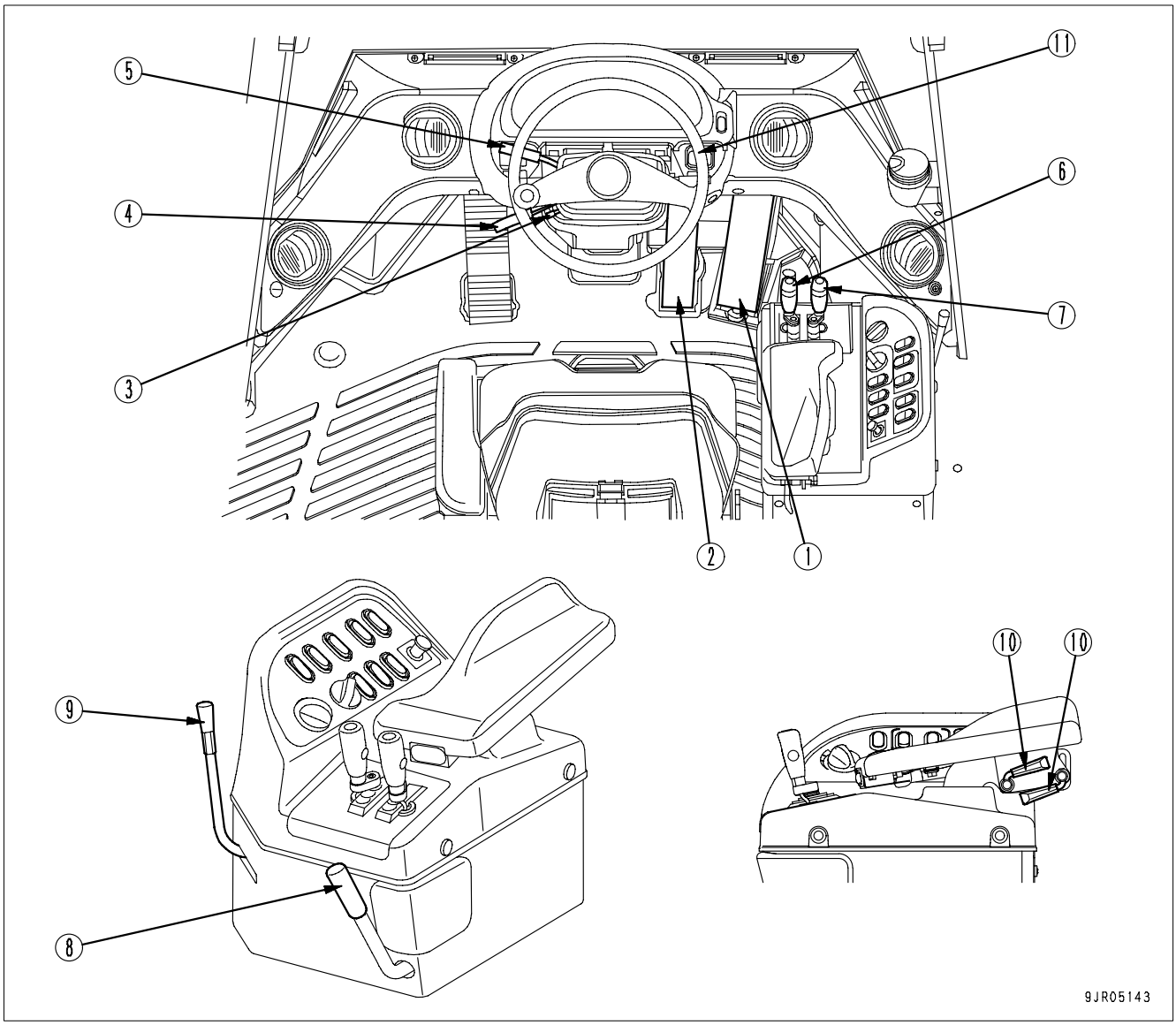
OVERHEAD PORTION



(1) Auto-greasing switch (if equipped)
(2) Cooling fan reverse rotation switch
(3) Step lamp switch
(4) Rear heated wire glass switch
(5) Side wiper switch (if equipped)
(6) Working lamp switch
(7) Fog lamp switch (if equipped)
(8) Beacon lamp switch (if equipped)

For details of switches (1) - (8), see “SWITCHES (3-44)“ in the OPERATION section.

CONTROL LEVERS, PEDALS



(1) Accelerator pedal
(2) Brake pedal
(3) Gearshift lever stopper
(4) Gearshift lever
(5) Directional lever
(6) Bucket control lever
(7) Lift arm control lever
(8) Work equipment control lever directional adjustment lever
(9) Work equipment lock lever
(10) Right armrest adjustment lever
(11) Steering wheel

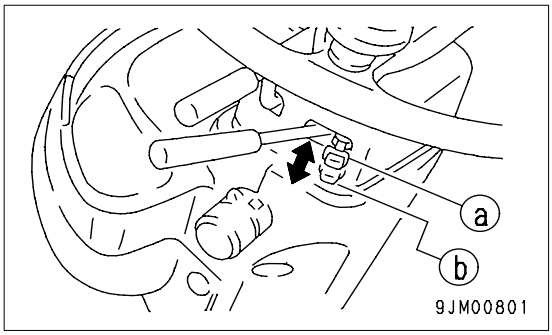
For details of pedals (1) and (2), and levers (6) - (10), see “CONTROL LEVERS, PEDALS (3-65)“ in the OPERATION Section.

GEARSHIFT LEVER STOPPER

This stopper (3) prevents the gearshift lever from entering the 3rd or 4th positions when working.

Position (a): Stopper actuated.

Position (b): Stopper released.



GEARSHIFT LEVER

This lever (4) changes the speed range of the transmission.

MANUAL SHIFT

This machine has a 4-FORWARD, 4-REVERSE speed transmission.

Place the gearshift lever in a suitable position to obtain the desired speed range.

1st and 2nd speeds are used for working.

3rd and 4th speeds are used for traveling.

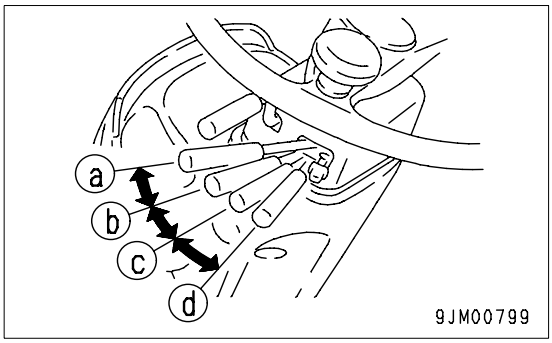
However, when the gearshift lever stopper is being used, it is impossible to shift to 3rd or 4th. Disengage the gearshift lever stopper before trying to shift gear.

Position (a): 1st

Position (b): 2nd

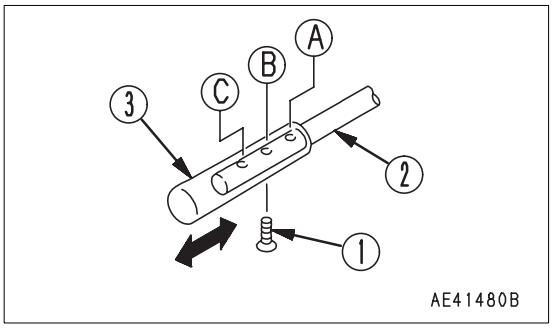
Position (c): 3rd

Position (d): 4th



REMARK

The length of the lever (2) can be adjusted to 3 stages (positions (A), (B), (C)). To adjust the length, remove the screw (1) at the bottom of the lever knob, slide the knob (3) to the desired position, then tighten the screw again.
(The lever is installed to position (B) when it is shipped from the factory.)



AUTO SHIFT

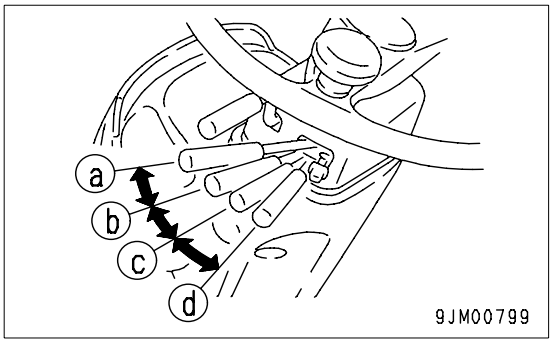
Automatic gear shifting can be carried out in the 2nd through 4th speed range of the four forward and reverse speeds depending on the travel conditions.

Position (a): 1st

Position (b): 2nd

Position (c): 3rd

Position (d): 4th



For details, see “TRANSMISSION AUTO SHIFT/MANUAL SHIFT SELECTOR SWITCH (3-58)“.

The ranges of speeds for automatic shifting are as shown in the following table.

Gear shift lever position	1	2	3	4
4	o →	o →	← o →	← o
3	o →	o →	← o	
2	o →	o		

Automatic shifting speed range

REMARK

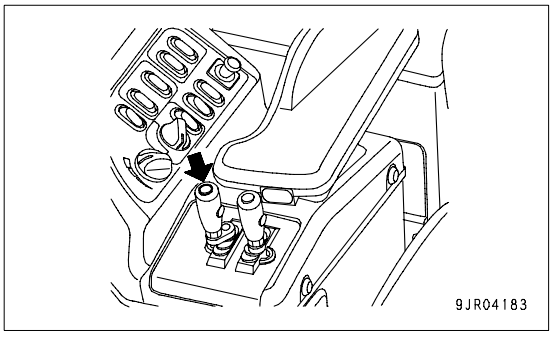
When the gear shift lever is at 1st, it is fixed in 1st. It is not automatically shifted.

When shifting down from 2nd to 1st, press the kick-down switch on the lift arm control lever.

If the transmission is in auto-shift and the travel speed is below 12.5 km/h in any speed range when traveling in either forward or in reverse, the kick-down switch is actuated and makes it possible to shift down to 1st.

In addition, if the travel speed is more than 12.5 km/h, each time the kickdown switch is pressed, the transmission can be switched down one range at a time: F4 → F3 → F2 (if the gear shift lever is at F4), or F3 → F2 (if the gear shift lever is at F3).

If the torque converter is locked up, the lock-up is cancelled.



DIRECTIONAL LEVER

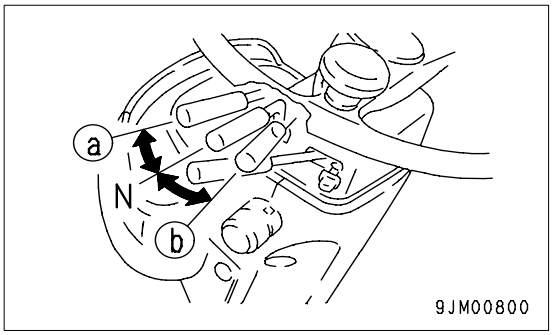
This lever (5) is used to switch the direction of travel of the machine between forward and reverse.

When starting the engine, if the directional lever is not at the N position, the engine will not start.

Position (a): FORWARD

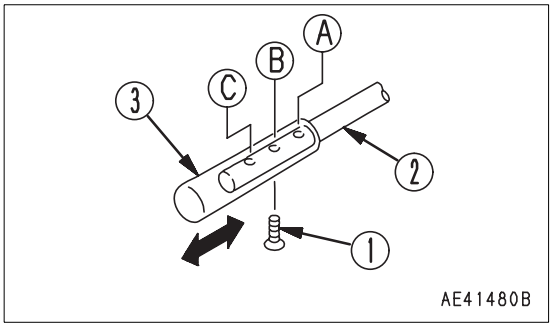
Position N: NEUTRAL

Position (b): REVERSE



REMARK

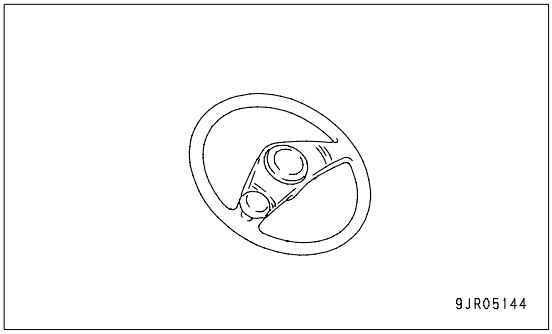
The length of the lever (2) can be adjusted to 3 stages (positions (A), (B), (C)). To adjust the length, remove the screw (1) at the bottom of the lever knob, slide the knob (3) to the desired position, then tighten the screw again.
(The lever is installed to position (B) when it is shipped from the factory.)



STEERING WHEEL

Use this steering wheel (11) to steer the machine.

When traveling, use steering wheel to turn the machine.



STEERING TILT LEVER

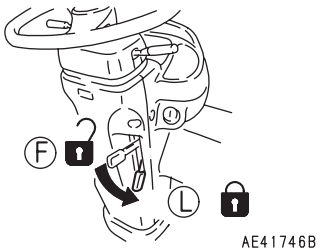
⚠ WARNING

Stop the machine before adjusting the tilt of the steering wheel. If this operation (adjustment) is carried out while the machine is moving, it may lead to a serious accident or personal injury.

This lever allows the steering column to be tilted forward or backward.

Pull the lever up (F) and move the steering wheel to the desired position. Then push the lever down to lock (L) the steering wheel in position.

Range of adjustment: 125 mm (stepless)



FUNCTIONS OF STEERING WHEEL SPECIFICATION MACHINE

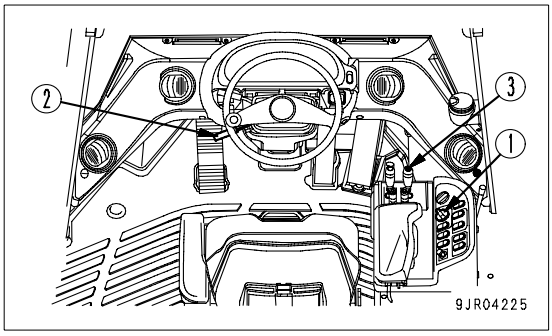
The steering wheel specification machine uses a steering wheel to steer the machine in place of the AJSS lever.

Use the directional lever and gearshift lever under the steering wheel to switch the transmission between FORWARD and REVERSE, and to select the speed range.

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.

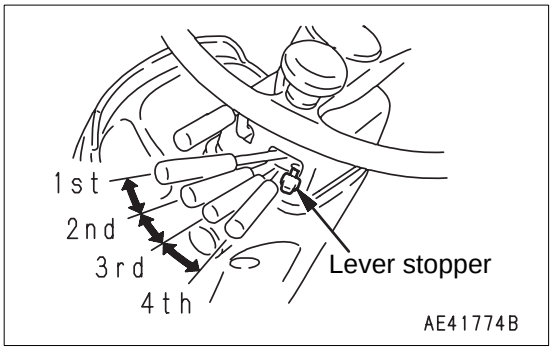


Shift gear as follows.

When shifting gear, use the auto shift/manual shift selector switch (1) to select the mode and gear shift lever (2) to set the speed range.

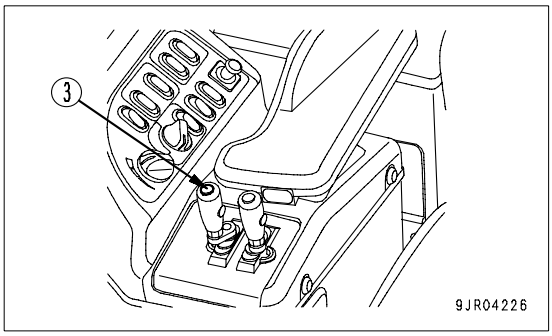
For details, see “PREPARATIONS FOR MOVING MACHINE (3-125)“.

When carrying out digging and loading operations, 1st and 2nd are used, so use the gearshift lever stopper.



REMARK

This machine is equipped with kickdown switch (3). When the machine is traveling in 2nd speed, press the button at the tip of the lift arm control lever and the speed range shifts down to 1st speed.
We recommend use of the kickdown switch when carrying out digging or loading operations in 1st or 2nd speed.
For details of the method of use, see “KICKDOWN SWITCH (3-52)“.



- This machine is equipped with an auto-shift function that automatically shifts the transmission. For details of the method of use, see “TRANSMISSION AUTO SHIFT/MANUAL SHIFT SELECTOR SWITCH (3-58)“ and “AUTO SHIFT (6-10)“.
- When traveling at high speed with the accelerator pedal depressed, even if the transmission is shifted down from 4th → 3rd or 4th → 2nd, to protect the engine from overrunning, the transmission does not shift down. In this case, the central warning lamp lights up and the alarm buzzer sounds. At the same time, “OVERRUN PROTECT“ is displayed on the character display.

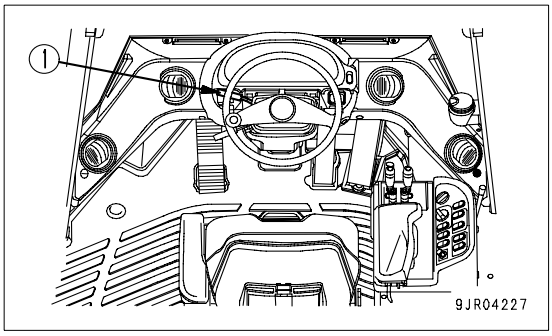
  If the alarm buzzer sounds, let the accelerator pedal back immediately, depress the brake pedal to reduce the travel speed, then shift gear.

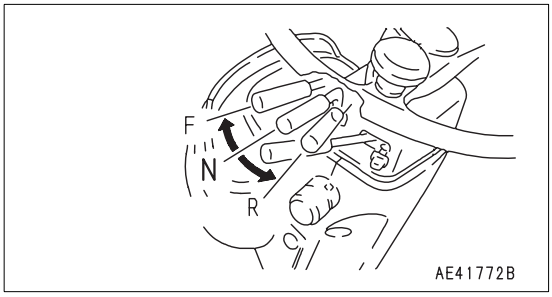
REMARK
To protect the transmission, immediately after the direction has been shifted between forward and reverse and immediately after the speed range has changed, even if the directional selector is operated, or the gearshift lever is operated, or the kickdown switch is operated, the direction or speed range may not change immediately, but this does not indicate any abnormality.

CHANGING DIRECTION

⚠ WARNING

- **When changing direction between FORWARD and REVERSE, check that the new direction of travel is safe. There is a blind spot behind the machine, so be particularly careful when changing direction to travel in reverse.**
- **Do not switch between FORWARD and REVERSE when traveling at high speed.**
  When switching between FORWARD and REVERSE, depress the brake to reduce the travel speed sufficiently, then change the direction of travel. (Max.speed for changing direction: 12 km/h (7.5 MPH))





There is no need to stop the machine even when switching between FORWARD (F) and REVERSE (R).

Place directional lever (1) in the desired position.

- Check that the backup alarm sounds when the directional lever is operated to REVERSE (R). If the backup alarm does not sound, ask your Komatsu distributor to carry out repairs.

REMARK
If the directional lever is operated slowly or is stopped between directions, the central warning lamp may light up and the alarm buzzer may sound. This does not indicate any failure, but please operate the directional lever so that the shift is completed within 2 seconds.
To protect the transmission, immediately after the direction has been shifted between forward and reverse and immediately after the speed range has changed, even if the directional selector is operated, or the gearshift lever is operated, or the kickdown switch is operated, the direction or speed range may not change immediately, but this does not indicate any abnormality.

AUTOMATIC SHIFT

If an attempt is made to switch the direction between forward and reverse when the auto-shift is ON, normally, the gearshift range will switch F3 -> R2, F4 -> R2, or R3 -> F2, R4 -> F2 to make it possible to move the machine off quickly.

CONTROL FOR CHANGE OF TRAVEL DIRECTION AT HIGH SPEED

If the travel direction is changed when the machine is traveling at high speed, when the travel speed and engine speed are in areas I or II in the chart, the central warning lamp lights up and the alarm buzzer sounds. At the same time, " OVERRUN PROTECT" is displayed on the character display.

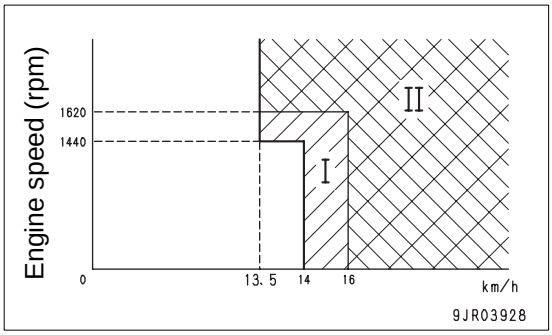
If the alarm buzzer sounds, depress the brake immediately to reduce speed sufficiently before changing the travel direction.

Changing the direction of travel at high speed will have an adverse effect on the durability of the transmission.

If the direction of travel is changed in area II, the alarm buzzer will sound, and at the same time the controller will automatically control the speed range to ensure the durability. Note that compared with area I, the deceleration of the machine is weaker.

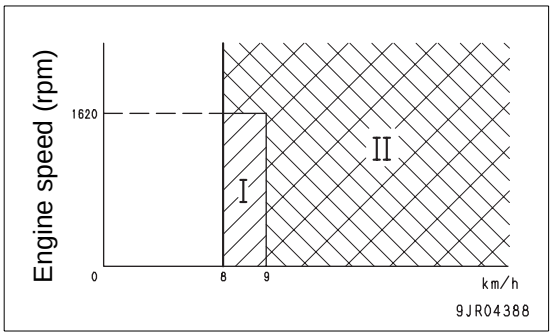
AUTO SHIFT (SHIFT POSITION SPEED RANGE: OTHER THAN 1ST) AND MANUAL SHIFT 2ND, 3RD, 4TH

Gear speed before changing between FORWARD and REVERSE	Gear speed after changing between FORWARD and REVERSE
F2	R3 or R4
F3	R3 or R4
F4	R3 or R4
R2	F3 or F4
R3	F3 or F4
R4	F3 or F4



AUTO SHIFT (SHIFT POSITION SPEED RANGE: 1ST) AND MANUAL SHIFT 1ST

Gear speed before changing between FORWARD and REVERSE	Gear speed after changing between FORWARD and REVERSE
F1	R2 or R3 or R4
R1	F2 or F3 or F4



TURNING

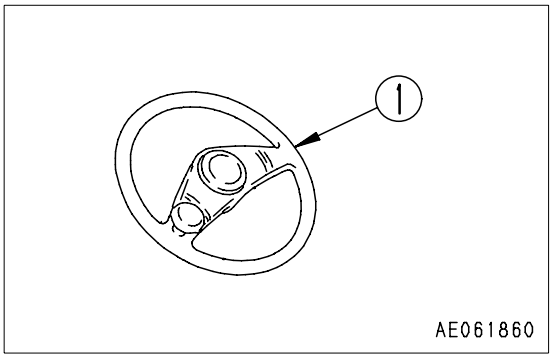
⚠ WARNING

- **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.

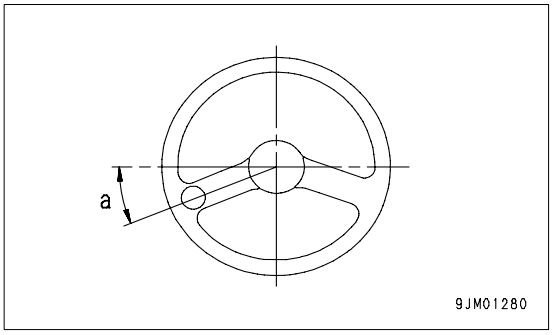
When traveling,use steering wheel (1) to turn the machine.

With this machine, the front frame is joined to the rear frame at the center of the machine by the center pin. The front and rear frames bend at this point, and the rear wheels follow in the same track as the front wheels when turning.

Turn the steering wheel lightly to follow the machine as it turns.



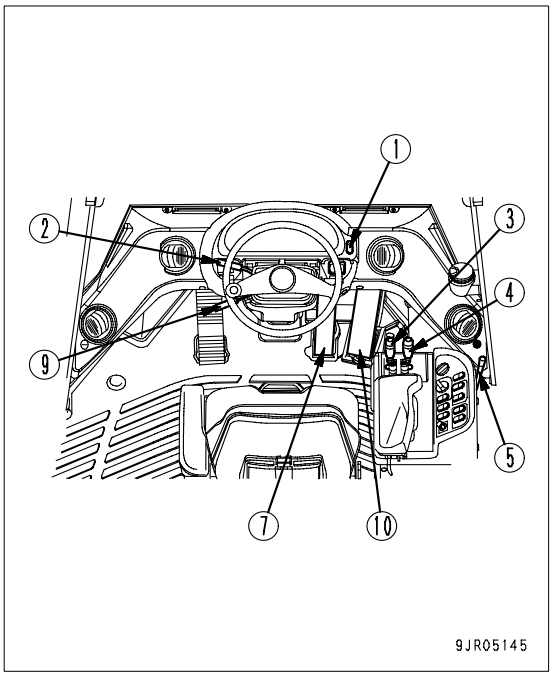
NOTICE
Do not attempt to turn the steering wheel any further in an effort to make a sharp turn, when it reaches its stroke end. Check that steering wheel play (a) is somewhere between 50 to 100 mm and that steering normally functions. If any abnormality is noticed, call your Komatsu distributor for inspection and repair.



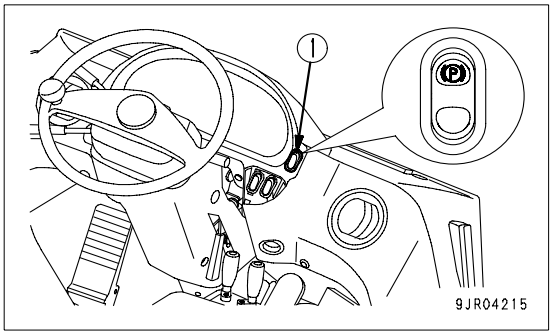
MOVING MACHINE OFF (MACHINES EQUIPPED WITH STEERING WHEEL)

⚠ WARNING

- **Regardless of whether the engine is running or not, always check that the work equipment lock lever is securely at the LOCK position before standing up from the operator's seat.**
- **There is danger that if the work equipment control levers are touched by accident when the engine is started, the work equipment or machine may move unexpectedly and cause serious personal injury.**
- **When traveling, always release the frame lock bar. If it is not removed, the steering will not work and this may lead to a serious accident or personal injury.**
- **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.**
- **When starting the machine off up a slope, depress the left brake pedal, then gradually depress the accelerator pedal and let the brake pedal back to allow the machine to move off. This will prevent the machine from rolling back.**

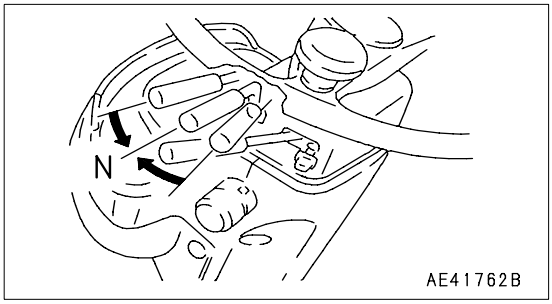


1. Fasten the seat belt.
2. Check that parking brake switch (1) is at the ON position.



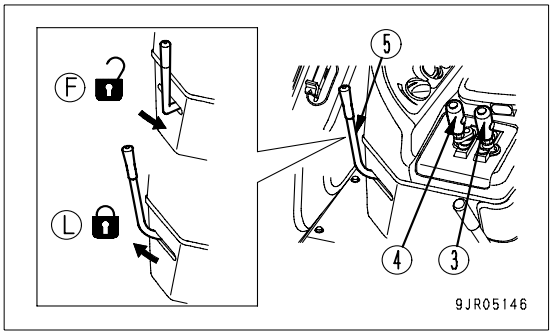
3. Check that directional lever (2) is at the N position.

   When starting the engine, if directional lever (2) is not at the N position, the engine will not start.



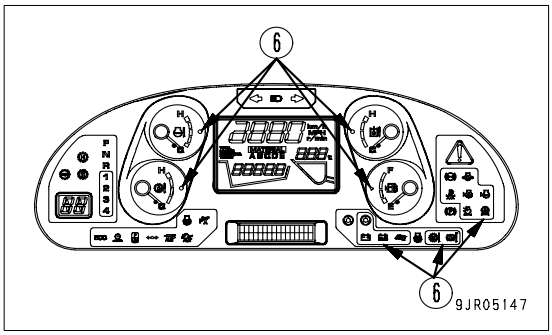
REMARK
If the directional lever is not at the N position, the alarm buzzer will emit short sounds.

4. Check that the bucket is in contact with the ground, then set work equipment lock lever (5) of bucket control lever (3) and lift arm control lever (4) to LOCK position (L).



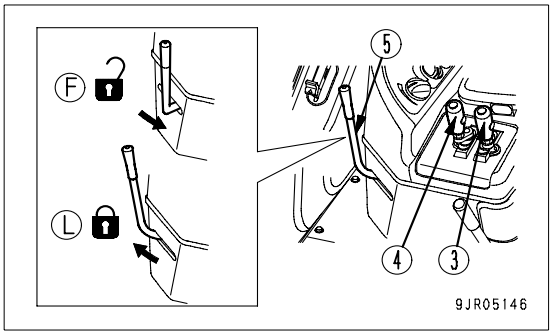
5. Start the engine. For details, see “STARTING ENGINE (3-120)“.

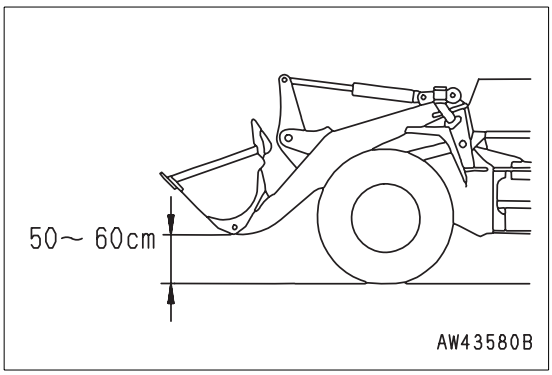
6. Check that warning pilot lamp (6) is not lighted up.



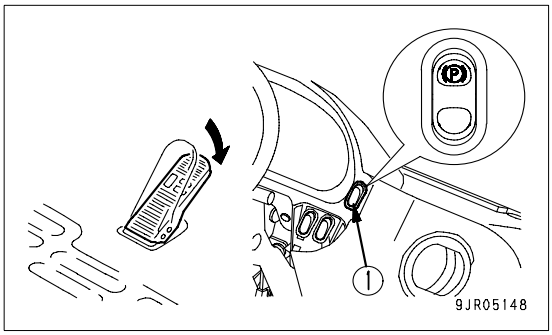
7. Set work equipment lock lever (5) to FREE position (F).

8. Operate lift arm control lever (4) to set the work equipment to the travel posture shown in the diagram on the right.





9. Depress right brake pedal (7), then turn parking brake switch (1) to the OFF (RELEASE) position to release the parking brake.



REMARK
If the parking brake is still actuated when parking brake switch (1) is at the OFF (RELEASE) position, turn the parking brake switch ON, then turn it OFF again.

10. Set to the desired speed range position.

Set the speed range position as follows.

1) Use transmission auto shift/manual shift selector switch (8) to select auto shift (L or H) or manual shift.

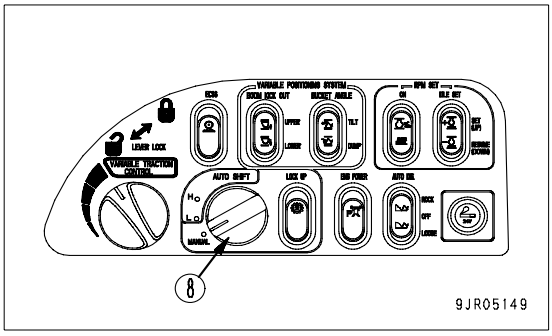
L or H position: Auto shift mode

If the system is set to this position, the shift range is set to the last shift range used in the previous operation in auto shift mode.

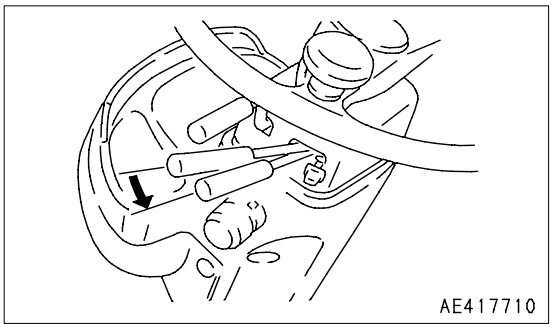
The speed range is displayed by the 1st, 2nd, 3rd, or 4th lamp at the bottom of the machine monitor.

MANUAL position: Manual shift mode

If the system is switched from auto shift mode to manual mode, the shift range being used in auto shift mode is engaged in manual shift mode.



2) When making any shift operation not set in Step 1), use gear shift lever (9).

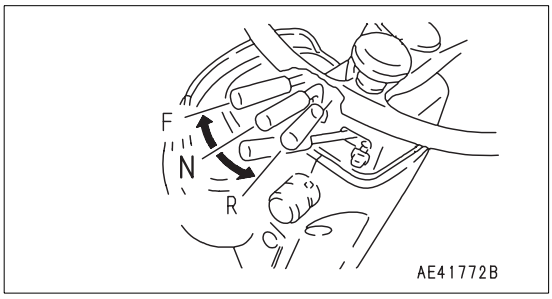


11. Set directional lever (2) to the desired position.

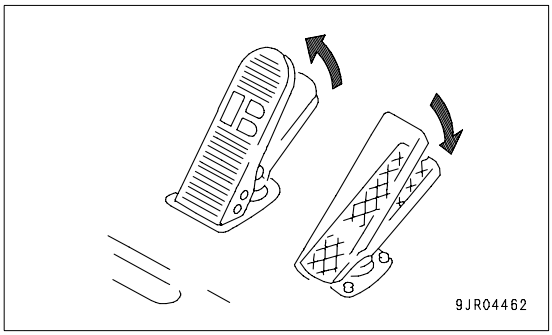
(F) FORWARD

(N) NEUTRAL

(R) REVERSE



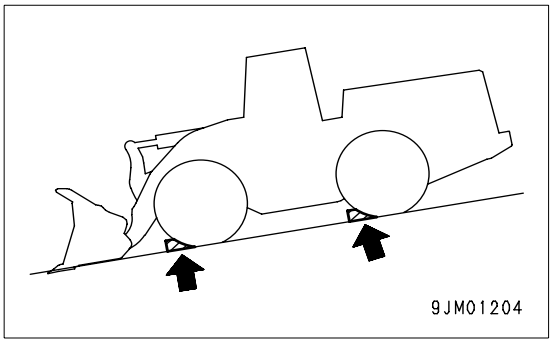
12. Release right brake pedal (7), then depress accelerator pedal (10) to move the machine off.

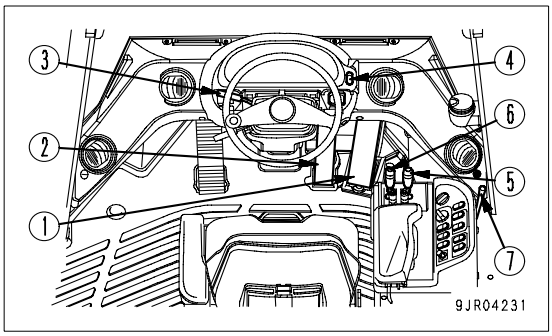


METHOD OF STOPPING, PARKING MACHINE (MACHINES EQUIPPED WITH STEERING WHEEL)

⚠ WARNING

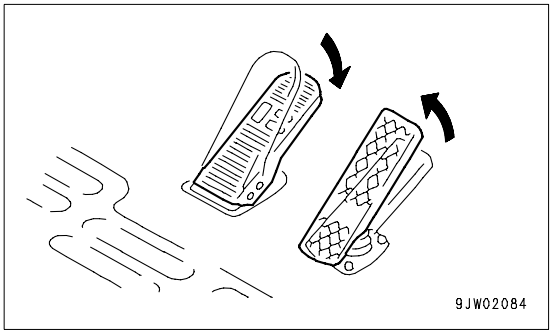
- **Avoid sudden stopping. As far as possible, always leave a margin when stopping the machine.**
- **Avoid parking the machine on a slope. If it is necessary to park the machine on a slope, stop the machine facing directly down the slope, fit blocks under the tires and lower the bucket to the ground 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 leaving the operator's compartment, always set the work equipment lock 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.**



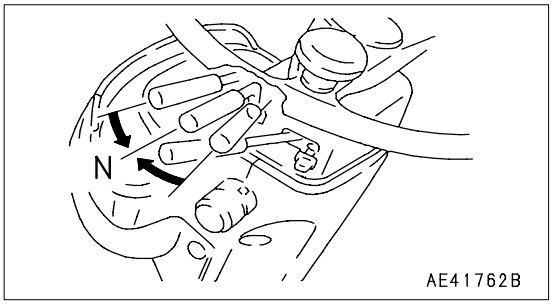


NOTICE
Never use the parking brake switch to brake the machine when traveling except in an emergency. Apply the parking brake only after the machine has stopped.

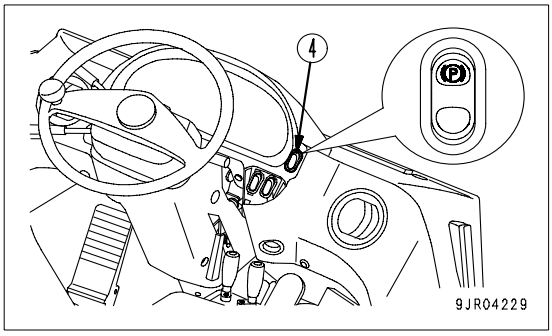
1. Release accelerator pedal (1), then depress brake pedal (2) to stop the machine.



2. Place directional lever (3) in N (neutral) position.

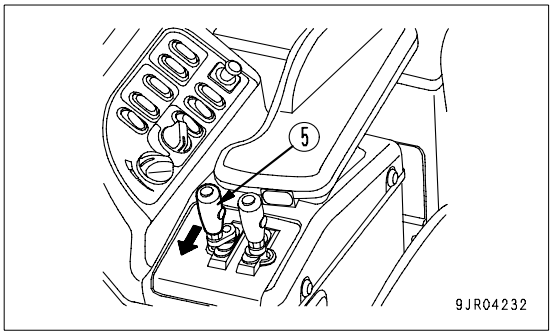


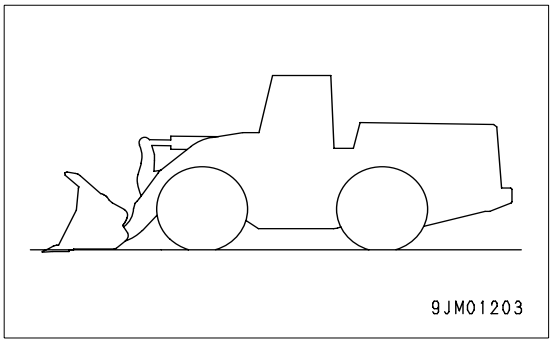
3. Turn parking brake switch (4) ON to apply the parking brake.



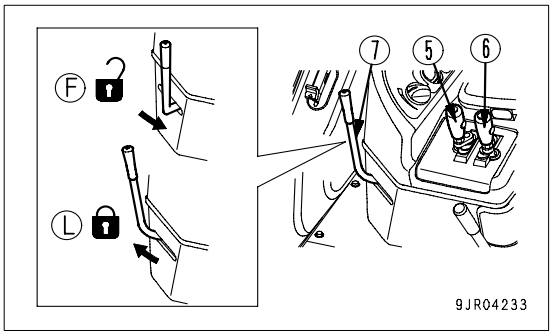
NOTICE
When the parking brake is applied, the transmission is automatically returned to neutral.

4. Operate lift arm control lever (5) to lower the bucket to the ground.





5. Set work equipment lock lever (7) of lift arm control lever (5) and bucket control lever (6) to LOCK position (L).



SELECTING BUCKET AND TIRES

⚠ CAUTION

The length of the lift arm differs according to the capacity of the bucket. Always install a lift arm that matches the capacity of the bucket. If the bucket capacity is large but the lift arm is not of a suitable length, there is danger that the machine will lose its balance and tip over.
Please consult your Komatsu distributor for details of the combination of bucket and lift arm.

Combination of bucket and lift arm

Bucket capacity / Lift arm length	6.4 m^3	7.0 m^3
3850 mm	x	o
3990 mm	o	x

Select the most suitable bucket and tires for the type of work and the ground conditions on the jobsite.

Type of work	Bucket	Ground conditions	Tire	Installation of tire protector
Loading materials and blasted rock	Straight edge rock bucket 6.4 or 7.0 m^3	General ground conditions	35/65-33-36PR (L4)	unnecessary
		Hard ground		
Loading blasted rock	Spade nose bucket 6.4 or 7.0 m^3	General ground conditions	35/65-33-36PR (L4)	unnecessary
		Hard ground		
		Ground with many boulders	35/65-33-36PR (L5)	Mesh chain
		Soft ground with many boulders		
Loading and carrying blasted rock	Spade nose bucket 6.4 or 7.0 m^3	General ground conditions	35/65R33☆ (L4) 35/65R33☆ (L5) 35/65R33☆☆ (L4)	unnecessary
		Hard ground		
		Ground with many rocks		Mesh chain
		Soft ground with many rocks		
		Soft ground		

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 coolant and 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 (6-25).

   - Type of power supply: Single-phase AC
   - Voltage: 230V
   - Power supply procedure: Min. 6.3 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.

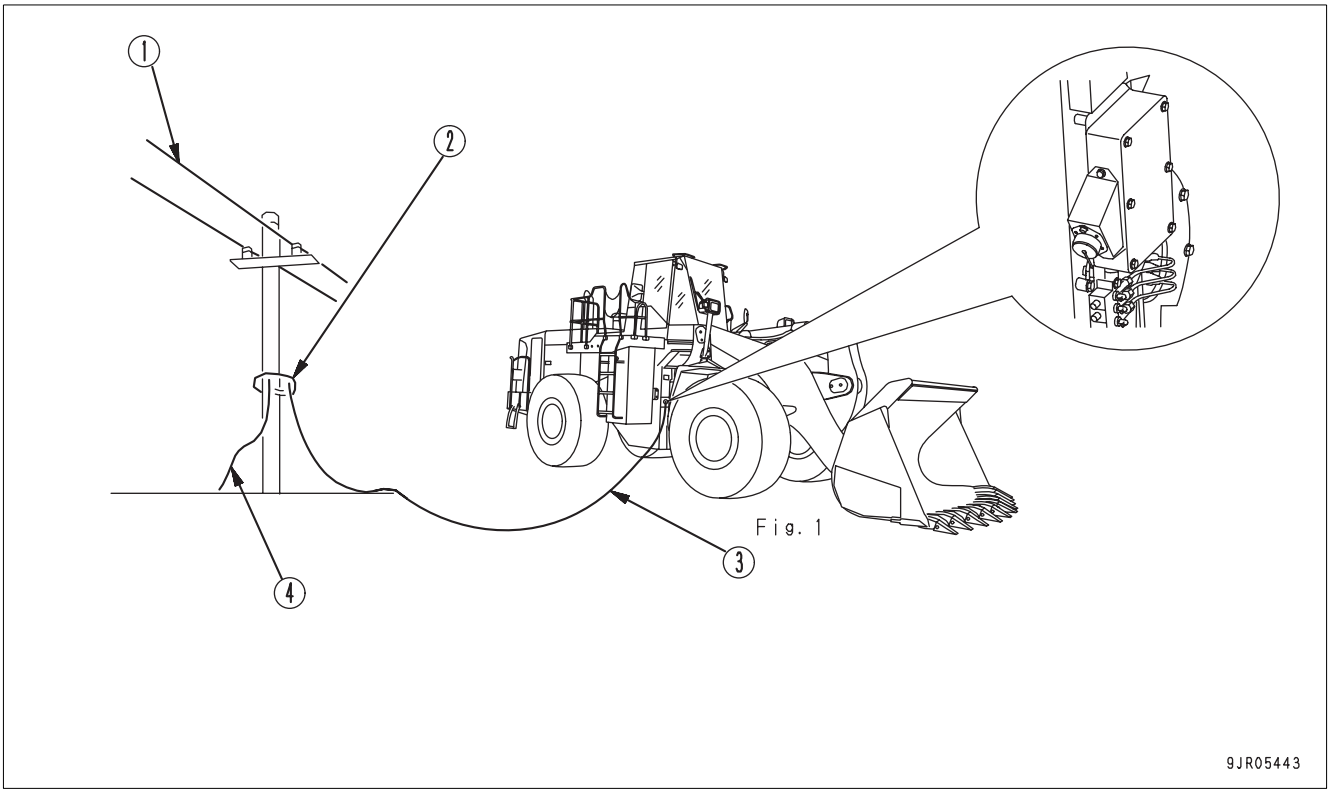


Fig. 1

(1) Single phase AV 230V

(2) Power supply
- Must be able to provide at least 6.3 kVA
- Install main switch
- Electrical leakage breaker

(Note 1) (Install a device with the ability to prevent electric leakage and overload)

External power source input cable
- Use a 3-core cable

(3)
- Nominal cross-sectional area of one core should be 14 mm²
- Use cabtire cable
- The lenght should be less than 30 m (Note 3)

Ground cable (Note 2)

(4)
- Always ground the ground cable
- In local areas, bury a ground rod in the ground.

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.

Cross-sectional example for reference (according to KES 07. 418. 6)

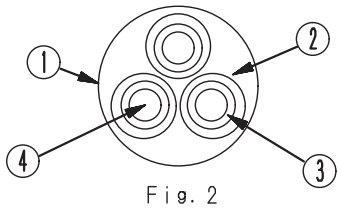


Fig. 2

9EW02274

(1) Sheath (covering)
(2) Insulation
(3) Wrap with paper tape
(4) Conducting body (Core wire)

- The nominal cross-sectional area of one core should be 14 mm².
- 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.

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.

(1) Connector body
(2) Solder
(3) Insulator
(4) Insulating tube
(5) Core wire
(6) Contact

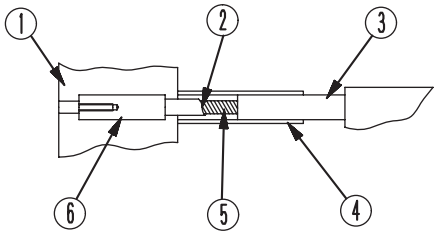


Fig. 3

9EW02275

Contact Symbol	Core wire to connect	
A	Ground circuit wire	
B	Power source circuit wire	→ Supply circuit
C	Power source circuit wire	

⚠ 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 (6-22). 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: 6.3 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.

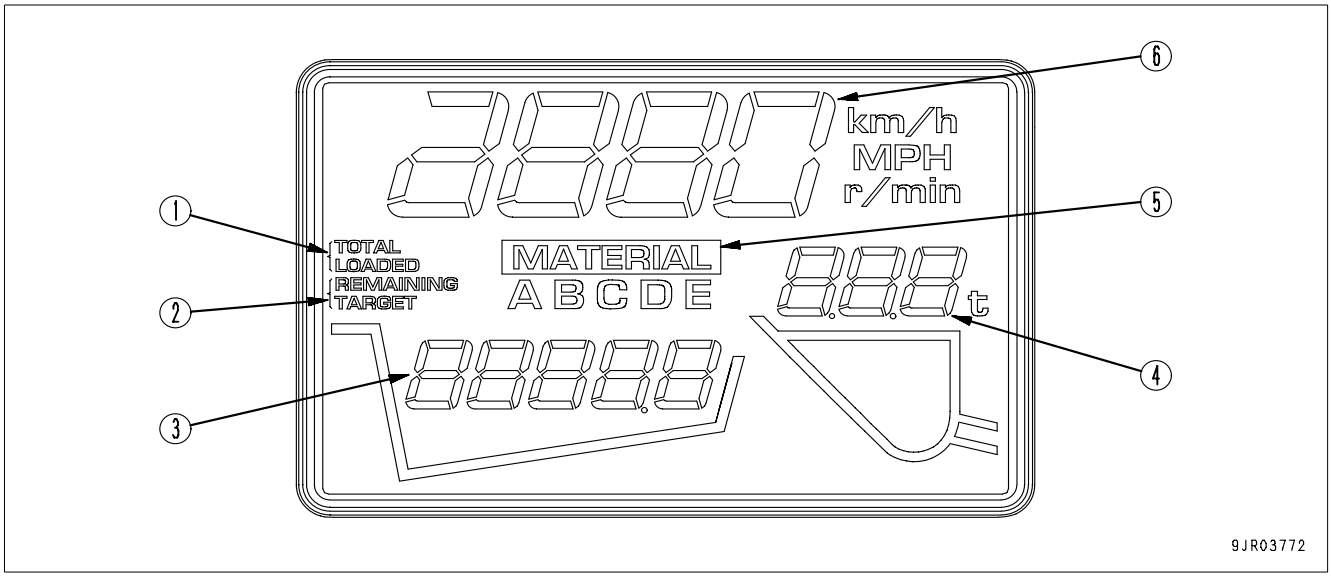
This completes the operations for setting up the external power supply.

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.

HANDLING LOAD METER

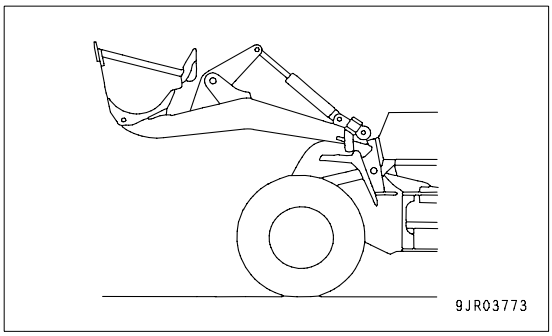
OUTLINE OF LOAD METER



(1) Addition mode display
(2) Subtraction mode display
(3) Total load display/load remaining to target load display
(4) Bucket load display
(5) Target load display
(6) Travel speed display/engine speed display

The load meter divides the type of material being handled into five categories. It measures the load in the bucket and displays the total load or the load remaining to the target load.

The total load or load remaining to the target load can be displayed from 0.1 tons to a maximum of 99999 tons, but up to 9999.9 tons, the digit shown after the decimal point displays the load in units of 100 kg. When the load exceeds 10000 tons, the decimal point disappears and the display is shown in units of 1 ton.



The load meter has two modes: addition mode and subtraction mode.

Addition mode: The display shows the load in the bucket added to the existing total load. This is useful for calculating the production within a fixed time or when loading a dump truck or hopper.

For details of setting the addition mode, see “SETTING ADDITION MODE (6-30)“.

Subtraction mode: The display shows the load in the bucket subtracted from the remaining target load. When the target load becomes “0“, the loading is completed.

This is useful for calculating a fixed load.

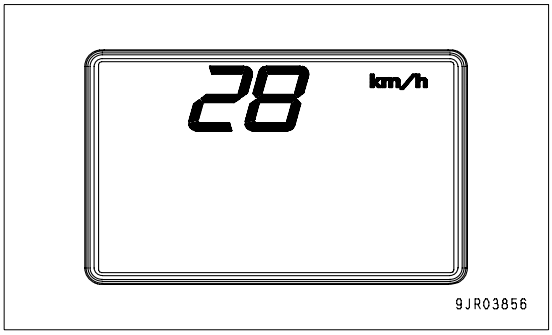
For details of setting the subtraction mode, see “SETTING SUBTRACTION MODE (6-30)“.

The load meter can divide the type of material being handled into five categories. It can save to memory the total load or the load remaining to the target load for each category.

For details of setting the load material category, see “SELECTING LOAD MATERIAL CATEGORY DISPLAY (6-37)“.

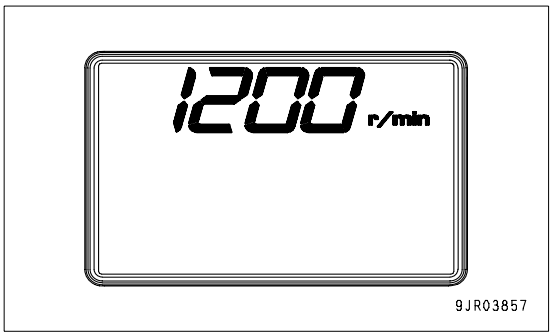
It is possible to display only the travel speed or engine speed without carrying out the load meter calculation or displaying the result.

For details about setting to no-display, see “STOPPING LOAD METER CALCULATION (6-35)“.



It is possible to switch the load meter display from the machine travel speed to the engine speed display or from the engine speed display to the machine travel speed display.

For details of the method of switching the display, see “METHOD OF SWITCHING TRAVEL SPEED/ENGINE SPEED DISPLAY (3-42)“.



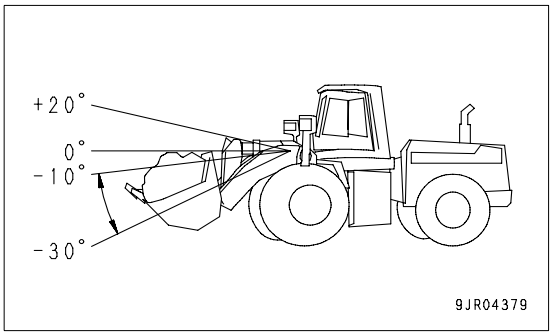
PRINCIPLE OF LOAD METER MEASUREMENT

To allow you to obtain precise measurements with the load meter, it is necessary first to understand the measurement principle. When carrying out calibration and when making actual measurements, it is important to remember the following points.

CONDITIONS FOR STARTING MEASUREMENT

The conditions for starting the measurement must fulfill the following.

The lift arm angle (the angle between the horizontal and the line connecting the lift arm pin and bucket pin) must be within -30° and -10° (horizontal is 0°, so the angle must be below horizontal (marked with a - sign); the angle above horizontal is marked with a + sign). When the lift arm is raised, if the lift arm starts from an angle below -30°, no measurement is carried out until the lift arm reaches -30°. If the lift arm is operated RAISE → STOP → RAISE AGAIN, this is judged as one load, and no measurement is carried out when the lift arm is raised again. If the lift arm is lowered and then raised, the next measurement is carried out.



CONDITIONS FOR COMPLETING MEASUREMENT

The measurement is completed if any of the following conditions are fulfilled.

- When the lift arm is stopped (angle speed: less than 0.5°/sec)
- When the lift arm angle exceeds +20°
- When the lift arm RAISE speed is greatly reduced (less than 70% of angle speed for previous 1 second)

CONDITIONS FOR SUCCESSFUL MEASUREMENT

To complete the measurement successfully, it is necessary to continue to raise the lift arm for at least 1.5 seconds after starting the measurement. If the lift arm is stopped before 1.5 seconds has passed, the operation will be ended without making any measurement. (The display stays at 0 tons.)

METHOD OF CALCULATION AND DISPLAY

- The load is calculated from the pressure on the lift arm cylinder (bottom, head), the lift arm angle, and the angle speed.
- Even if the bucket holds a load of the same weight, if the center of gravity is different (in particular, to the front or rear), the pressure on the lift arm cylinder changes. If the calibration is carried out with the load in the actual load posture, and the load is measured in the same posture, the measurement will be more accurate. When the load is measured, if the load is to the front of the position when the load calibration was carried out, the load display will show a greater weight than the actual load. The more the load is to the front, the greater the weight display becomes.
- The calculation is made once in 1 second, but for the first 0.5 seconds after the lift arm starts to rise, the pressure changes, so no measurement is made. If the lift arm RAISE operation continues for 1.5 - 2.5 seconds, the measurement is carried out once; if it continues for 2.5 - 3.5 seconds, the measurement is carried out twice; if it continues for more than 3.5 seconds, the measurement is carried out three times. The final calculation is the average of the measurements. The more measurements that are made, the more accurate the measurement becomes.
- If the lift arm RAISE operation continues for 1.5 - 2.5 seconds (starting from the point where the lift arm goes above -30°), only one measurement is made, so the accuracy may be poor. In this case, the result of the measurement will appear in a flashing display. If this happens, press the load meter cancel switch and carry out the measurement again.

POINTS TO REMEMBER TO ENSURE HIGH ACCURACY

CALIBRATION

1. **Necessity**

   The pressure when unloaded and loaded (rated load, 1/2 rated load) ↔ load map is registered in the machine monitor panel. However, there are variations in each machine, so it is necessary to compensate for the variations in each machine in order to ensure at accuracy of the load meter. For this reason, there is a calibration system (unloaded, loaded). Calibration must be carried out in the following cases.

   - When new machine is delivered
   - When lift arm is changed
   - When machine monitor panel is replaced
   - When the pressure sensor, lift arm angle sensor is replaced
   - Periodically (every 3 months)

2. **Points to remember when carrying out calibration**

   When carrying out calibration, remember the following points.

   - When calibrating the load, the known weight is needed. It is necessary to use the known weight or to calculate the weight from the measurements of the machine when unloaded and the machine when it is loaded. Using the actual load will give higher accuracy.
   - Payload: Calibrate the load using the rated load and 1/2 rated load as a guideline.
   - Load the posture: Carry out the load calibration in the same posture as when carrying out actual operations.

- Warming up: Carry out warming up to set the hydraulic oil temperature to the normal working range, then carry out normal operations (including raising and lowering the lift arm) for at least 10 minutes (preferably more than 30 minutes).
- Lift arm RAISE speed: To make the lift arm RAISE speed constant, carry out at the lift arm RAISE detent.
- Accelerator pedal: Depress the accelerator pedal to the same angle as for actual operations. Do not change the angle of the accelerator pedal. Always keep it constant.
- Bucket posture: Measure at full tilt. Carry out calibration also at full tilt.

For details of the method of calibration, see the Operation and Maintenance Manual.

WHEN MEASURING

1. **Load posture**

   If the center of gravity of the load changes (in particular, to the front or rear), the pressure on the lift arm cylinder changes, and the accuracy becomes poor. Carry out the load calibration in the same load posture as when measuring.

2. **Warming up**

   If the hydraulic oil temperature is low, the accuracy may be poor. Carry out normal operations (including raising and lowering the lift arm) for at least 10 minutes (if possible, 30 minutes) before starting measurement.

3. **Lift arm operation**

   If the lift arm RAISE speed changes during the measurement, the lift arm cylinder pressure also changes and the accuracy of the measurement becomes poor. In the measurement range (-30° and above), keep the lift arm speed constant as far as possible (keep the movement of the lift arm control lever constant).

4. **Bucket operation**

   If the bucket tilt angle changes, the center of gravity of the load changes and the accuracy of the measurement becomes poor. During calibration and measurement, operate so that the bucket is tilted fully.

5. **Travel**

   Always stop the machine when measuring. Do not travel. If the machine has to travel, travel at low speed (5 km/h) and avoid accelerating or decelerating.

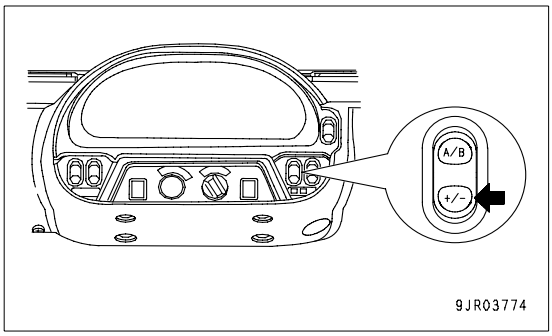
6. **Angle of ground**

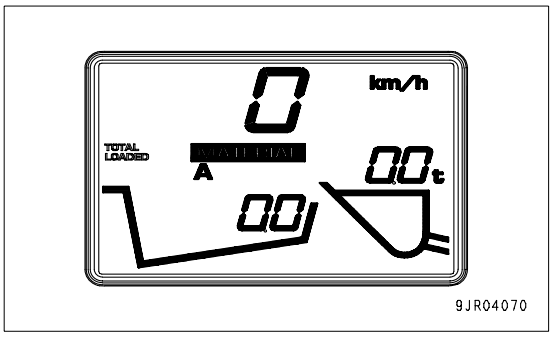
   If the measurement is carried out on a slope, the accuracy of the measurement becomes poor. Always measure on level ground.

USING LOAD METER

SETTING ADDITION MODE

1. Press the load meter mode selector switch (+/-) to display “TOTAL LOADED“ on the load meter.

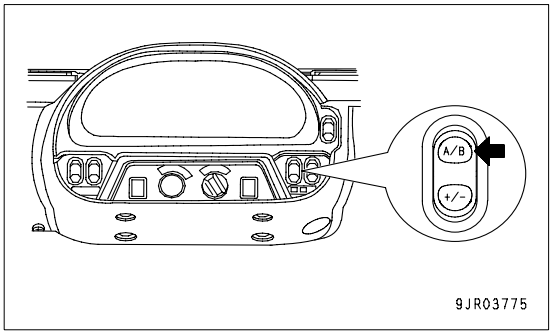




2. Press the load meter mode selector switch (A/B) to select the category of load material.

   This completes the setting of the addition mode. Calculation starts.

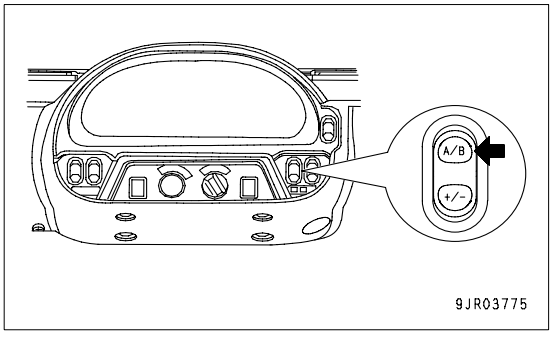
REMARK
When the load meter is set to the addition mode, even when the starting switch is turned OFF and operations are stopped, when operations begin again with the same type of mode, there is no need to reset. The new load is added to the load existing before operations were stopped.



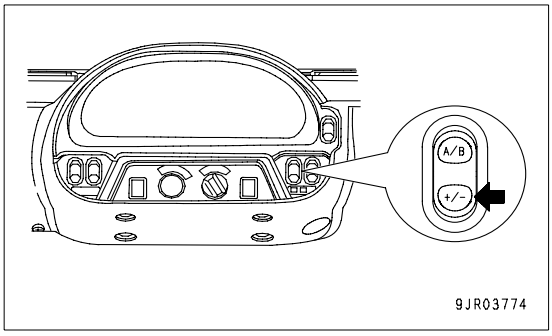
SETTING SUBTRACTION MODE

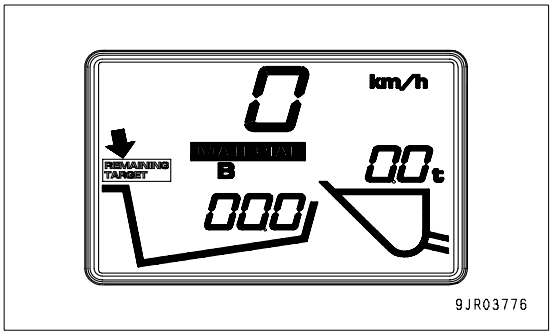
1. Press the load meter mode selector switch (A/B) to select the category of load material.

REMARK
When load meter mode selector switch (+/-) is pressed on the subtraction mode input screen, the buzzer sounds and the setting changes to the addition mode. To return to the subtraction mode, press load meter mode selector switch (+/-) again.



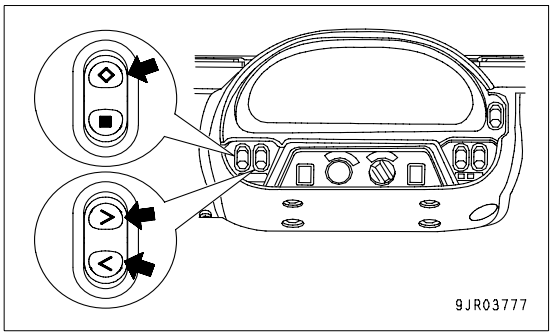
2. Press the load meter mode selector switch (+/-) to display “REMAINING TARGET“ on the load meter.



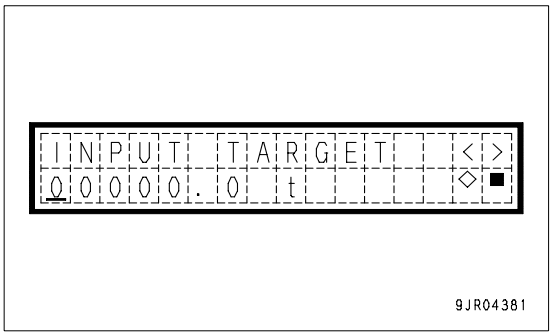


3. Use the (◇) portion of the machine monitor mode selector switch 1 and the (>) or (<) portion of the machine monitor mode selector switch 2 to input the target load.

   The character display before input displays 00000.0t and the cursor is on the 10000 digit.

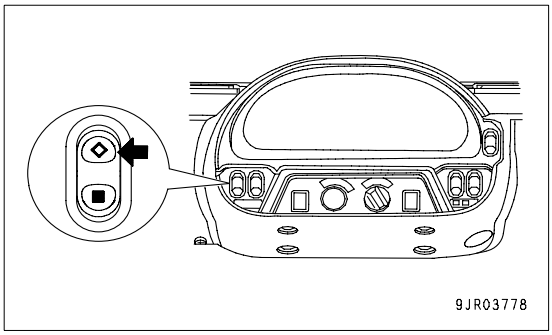


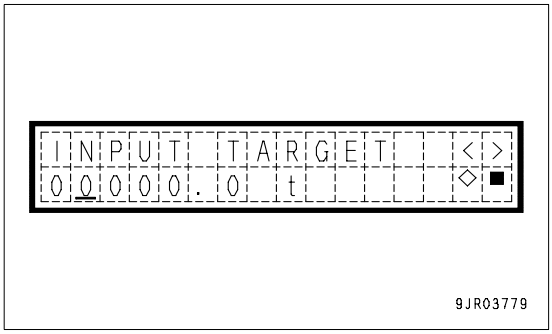
REMARK
The (◇) portion of the machine monitor mode selector switch 1 is used to accept the display on the character display. When the switch is pressed, the input for the digit marked by the cursor is accepted and the cursor moves to the next digit. Use the (>) or (<) portion of the machine monitor mode selector switch 2 to changethe input value. Press the (>) portion to increase the value; press the (<) to decrease the value. After using the (>) or (<) portion of the machine monitor mode selector switch 2 to change the input value, press the (◇) portion of the machine monitor mode selector switch 1 to accept the input value for the digit marked by the cursor.



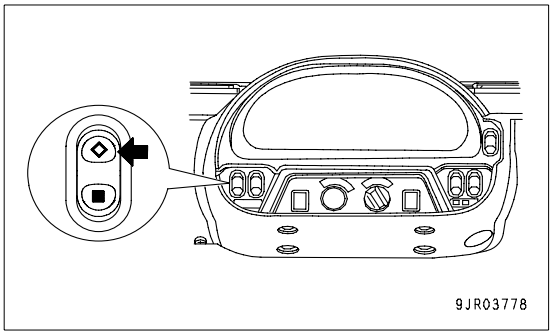
The following explanation uses a target load of 300t as an example.

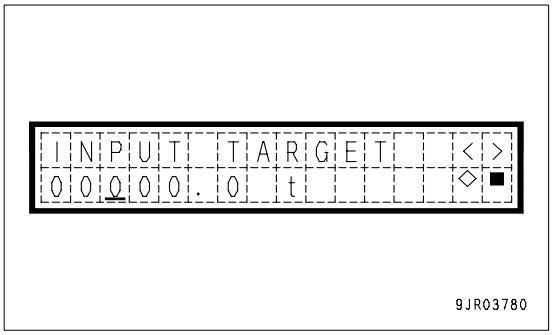
1) Press the (◇) portion of the machine monitor mode selector switch 1. Accept “0“ for the 10000 digit for the target load on the character display. The cursor then moves from the 10000 digit to the 1000 digit.



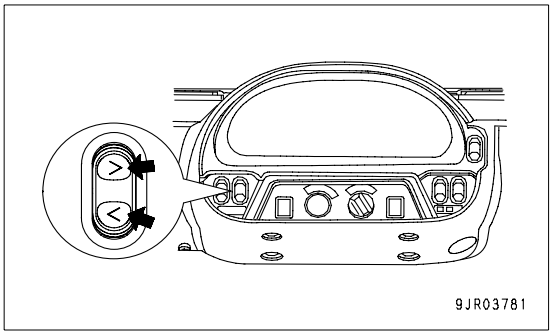


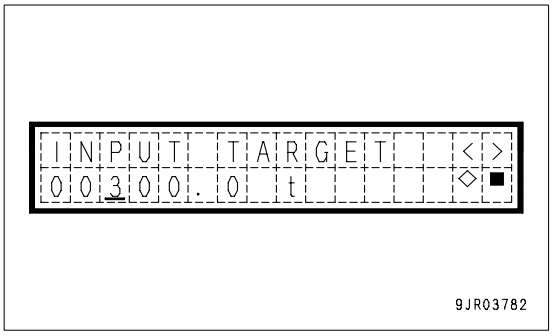
2) Press the (◇) portion of the machine monitor mode selector switch 1. Accept “0“ for the 1000 digit for the target load on the character display. The cursor then moves from the 1000 digit to the 100 digit.



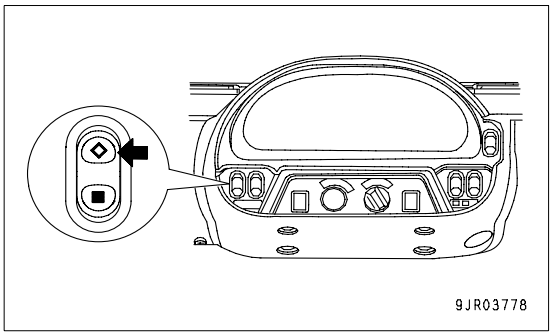


3) Press the (>) or (<) portion of the machine monitor mode selector switch 2 to change the input value to “3“ for the target load on the character display.

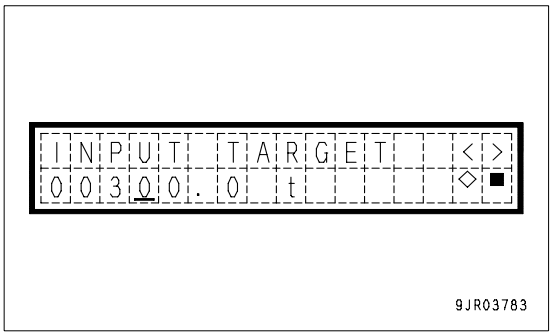




4) Press the (◇) portion of the machine monitor mode selector switch 1. Accept “3“ for the 100 digit for the target load on the character display. The cursor then moves from the 100 digit to the 10 digit.



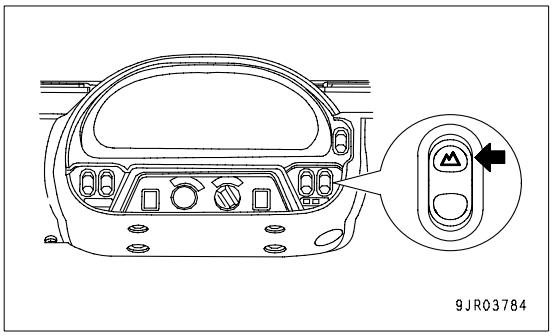
5) The value for the 10 digit, the 1 digit and the first place of decimal stays as 0, so press the (◇) portion of the machine monitor mode selector switch 1 twice. This completes the input

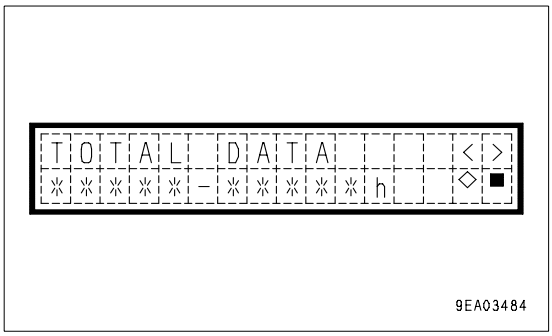


TOTAL LOAD DATA DISPLAY

1. Press the top of the load meter display selector switch. “TOTAL DATA“ is displayed on the character display.

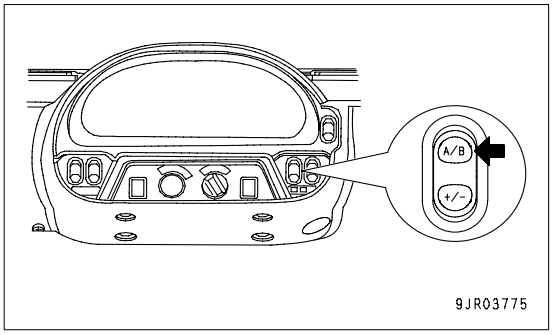
   The bottom line shows the time that the loading was carried out.



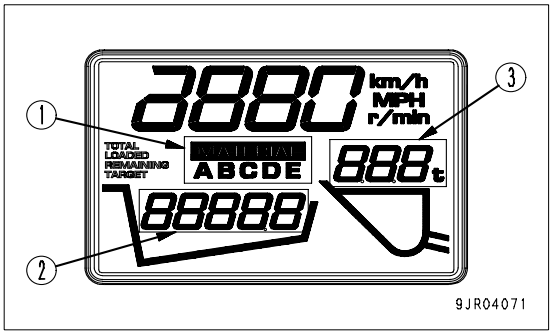


2. Press the load meter mode selector switch (A/B). Each time the switch is pressed, “MATERIAL“ changes from A → B → C → D → E → A.

   When this happens, the load for the category of material displayed in “MATERIAL“ is displayed on load meter display portion (2) and the number of loads is displayed on load meter display portion (3).



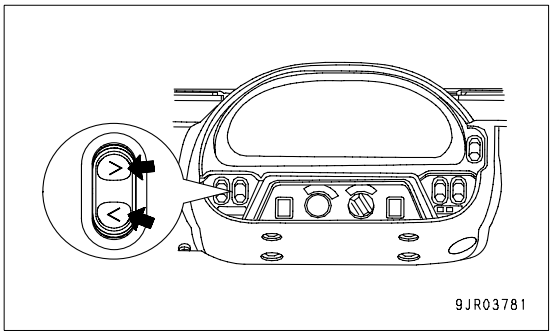
REMARK
A, B, C, D, E (all lamps light up) displays the load, regardless of material category A, B, C, D, E.



CLEARING TOTAL LOAD

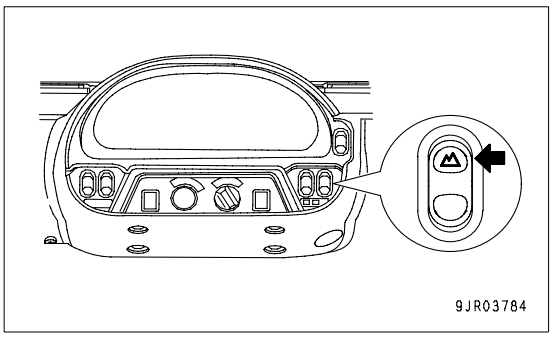
The calculated total load can be cleared as follows.

1. Press the (>) or (<) portion of the machine monitor mode selector switch 2 to select the category of load displayed for “MATERIAL“.



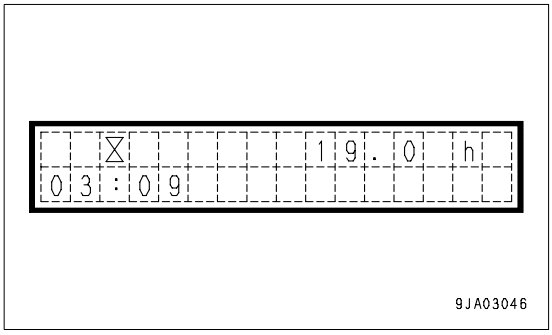
2. With the total load displayed, keep the top of the load meter display selector switch pressed for at least 4 seconds. The data for the total load for the selected material will be cleared.

3. When it is cleared, the buzzer sounds and the character display returns to the normal service meter and clock display.



REMARK
If the display for the category of material on the load meter is A, B, C, D, E (all lamps light up), all the total load data are cleared. If top of the load meter display selector switch is pressed when the total load data are being displayed, the load meter returns to the normal service meter and clock display.

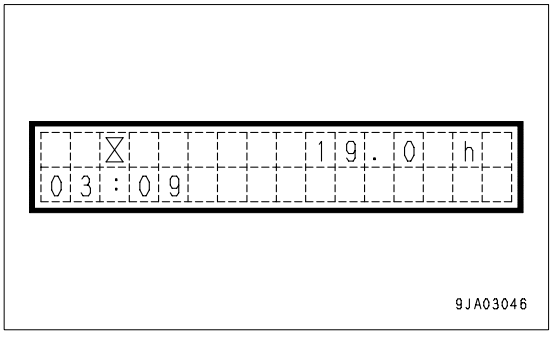
- If operations are started when the load meter is displaying the calculated data and measurements are made by the load meter, the load meter returns to the normal service meter and clock display.
- The display for the number of loads has a maximum of 500. Even if the actual number of loads has exceeded 500, the display remains at 500.



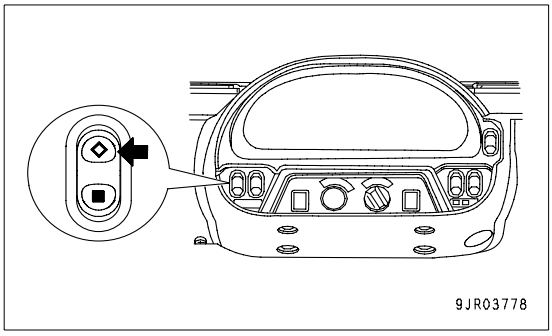
STOPPING LOAD METER CALCULATION

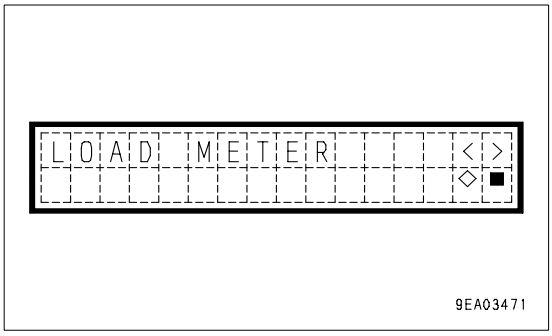
When the load meter calculation is stopped and is not used, the load meter gives no display.

1. Check that the standard service meter and time is displayed on the character display.

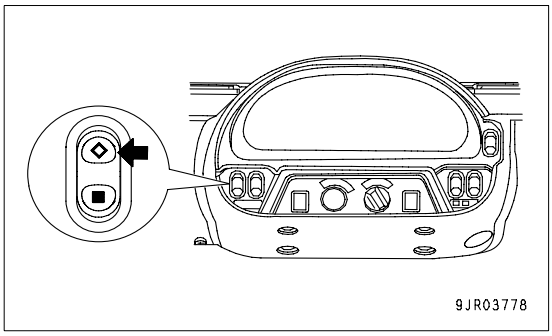


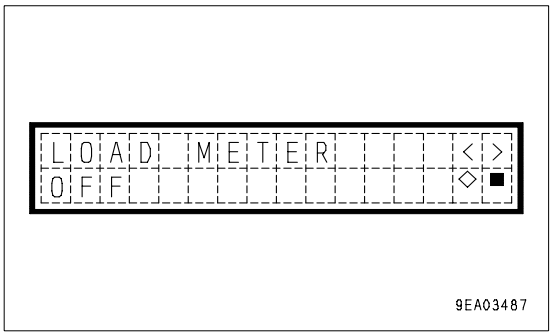
2. Press the (◇) portion of the machine monitor mode selector switch 1 and display “LOAD METER“ on the character display.





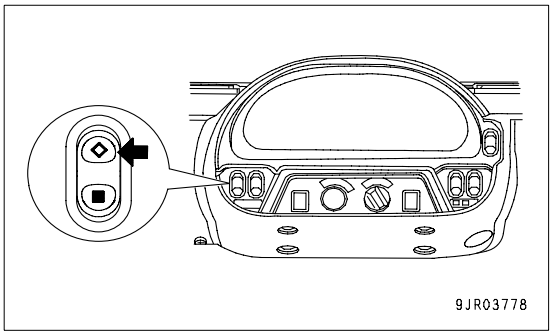
3. Use the (◇) portion of the machine monitor mode selector switch 1 and the (>) or (<) portion of the machine monitor mode selector switch 2 to display “OFF“ on the character display.





4. Press the (◇) portion of the machine monitor mode selector switch 1. No other display is given on the load meter.

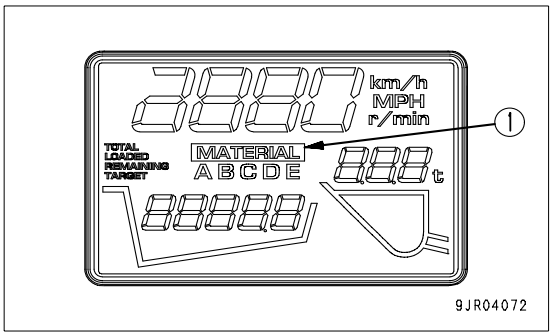
5. If you want to start measurement again, carry out Steps 1 and 2, then press the machine monitor mode selector switch 1 (◇) to select the “LOAD METER“ menu.



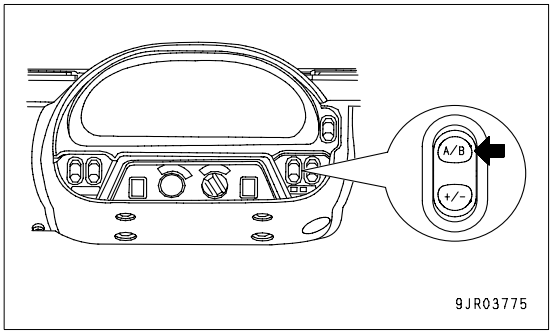
SELECTING LOAD MATERIAL CATEGORY DISPLAY

The type of material being handled can be divided into five categories. It is possible to record the total load or the load remaining to the target load for each category.

The load material category is displayed from A to E on the bottom line of “MATERIAL“ (1) on the load meter.



1. Press the load meter mode selector switch (A/B). Each time the switch is pressed, the category of material on the bottom line of “MATERIAL“ changes from A → B → C → D → E → A. Set to the desired display.



REMARK
It is possible to switch the display for the category of material on both the addition mode and subtraction mode.

CALIBRATING WITH EMPTY BUCKET

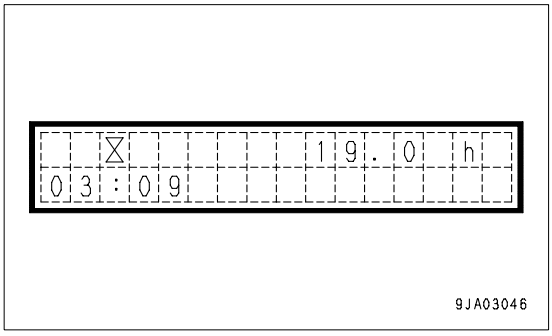
1. Before carrying out calibration, set the machine in the following condition.

   1) Empty the bucket.

   2) Carry out the warming-up operation.

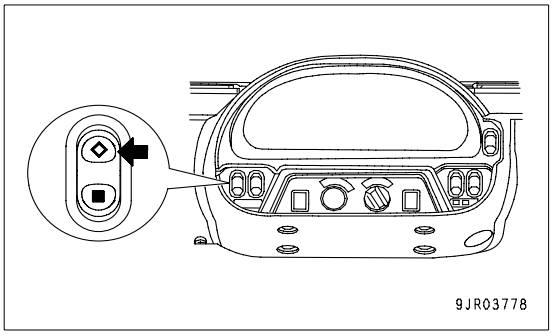
   Carry out warming up to set the hydraulic oil temperature to the normal working range, then carry out normal operations (including raising and lowering the lift arm) for at least 10 minutes (preferably more than 30 minutes).

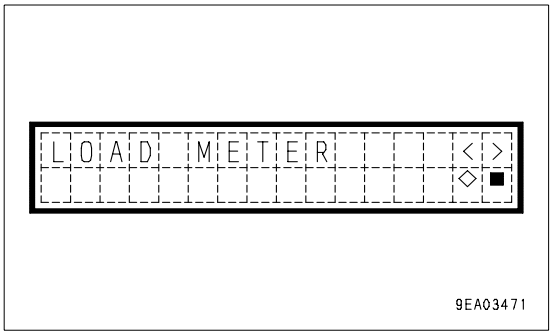
2. Set so that the character display shows the normal service meter and clock display.



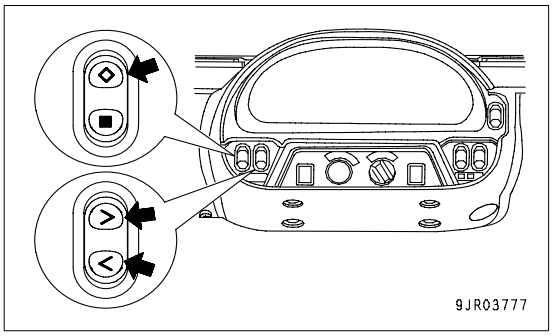
3. Press the (◇) portion of the machine monitor mode selector switch 1.

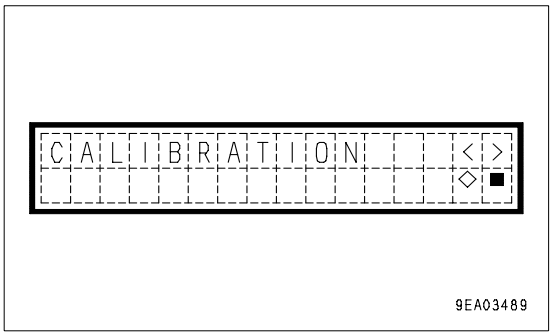
   “LOAD METER“ is displayed on the top line of the character display.





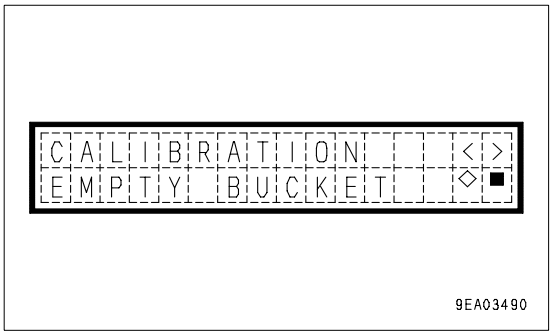
4. Use the (◇) portion of the machine monitor mode selector switch 1 and the (>) or (<) portion of the machine monitor mode selector switch 2 to display “CALIBRATION“ on the character display.





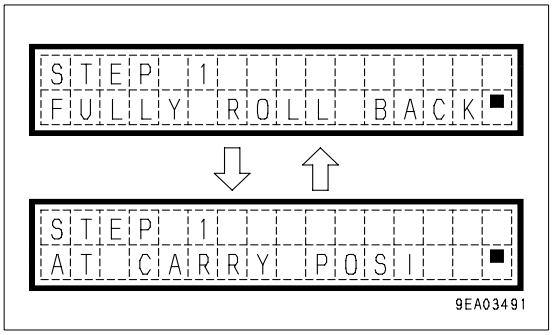
5. Press the (◇) portion of the machine monitor mode selector switch 1.

   “CALIBRATION EMPTY BUCKET“ is displayed on the character display.



6. Press the (◇) portion of the machine monitor mode selector switch 1.

   “STEP 1“ is displayed on the top line of the character display, and “FULLY ROLL BACK“ and “AT CARRY POSI“ are displayed in turn for 3 seconds each on the bottom line.



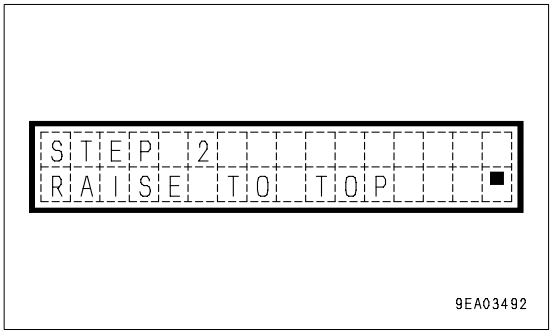
7. Tilt the bucket back fully, then lower the lift arm to set to the travel posture.

   When the lift arm is lowered, the display on the character display changes to “STEP 2 RAISE TO TOP“.

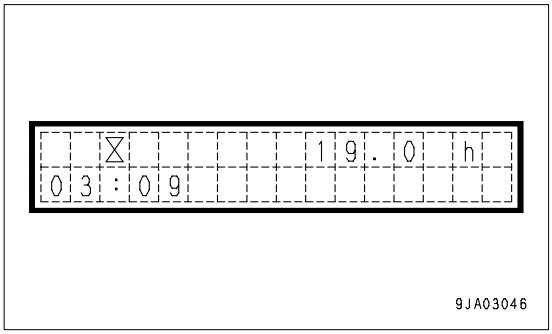
8. Raise the lift arm to the maximum height at the same speed as for actual operations.

   Depress the accelerator pedal to the same angle as for actual operations. Do not change the angle of the accelerator pedal. Always keep it constant. To make the lift arm RAISE speed constant, carry out at the lift arm RAISE detent.

   This completes the calibration with empty bucket.

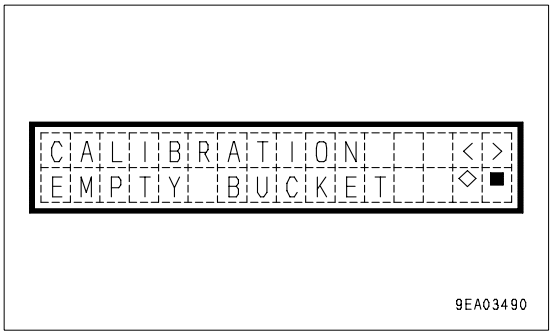


If the calibration is completed correctly, the buzzer sounds and the character display returns to the normal service meter and clock display.



If the calibration with empty bucket cannot be completed correctly, the buzzer sounds and the character display shows “CALIBRATION“ on the top line and “EMPTY BUCKET“ on the bottom line.

9. If the calibration with empty bucket cannot be completed correctly, carry out the procedure from Step 6 again.



CALIBRATION WITH LOADED BUCKET

1. Before carrying out calibration, set the machine in the following condition.

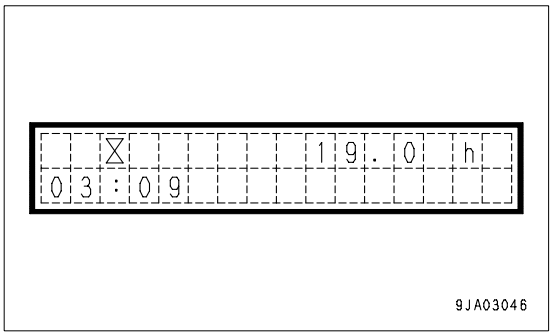
   1) Carry out the warming-up operation.

   Carry out warming up to set the hydraulic oil temperature to the normal working range, then carry out normal operations (including raising and lowering the lift arm) for at least 10 minutes (preferably more than 30 minutes).

   2) Load the bucket with a known weight.

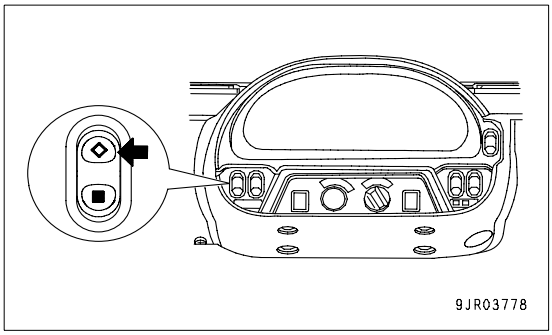
   Be careful that the center of gravity of the load does not change when raising or lowering the lift arm.

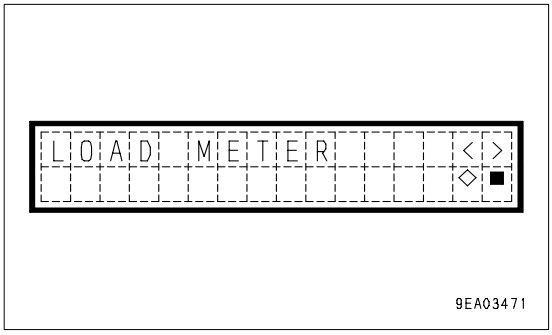
2. Set so that the character display shows the normal service meter and clock display.



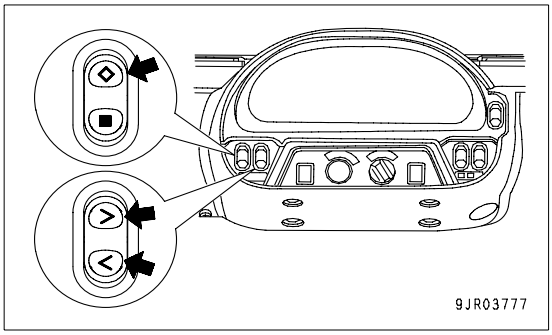
3. Press the (◇) portion of the machine monitor mode selector switch 1.

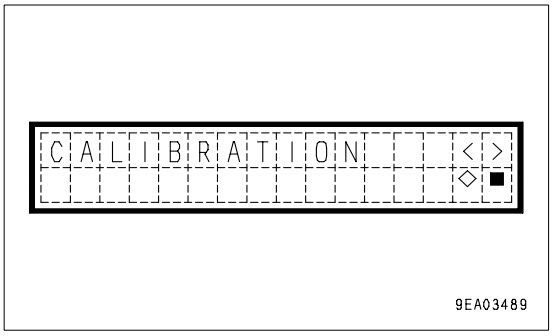
   “LOAD METER“ is displayed on the top line of the character display.





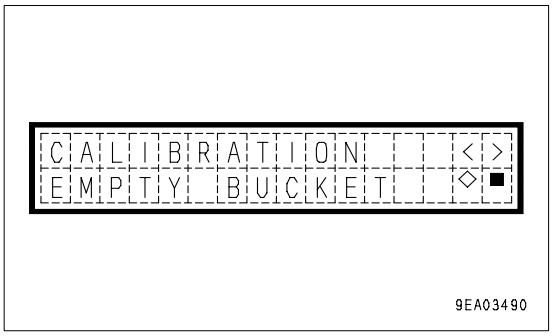
4. Use the (◇) portion of the machine monitor mode selector switch 1 and the (>) or (<) portion of the machine monitor mode selector switch 2 to display “CALIBRATION“ on the character display.





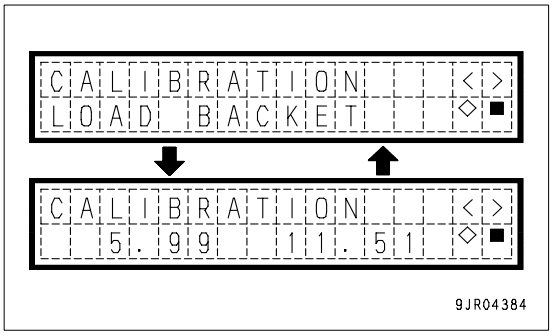
5. Press the (◇) portion of the machine monitor mode selector switch 1.

   “CALIBRATION EMPTY BUCKET“ is displayed on the character display.



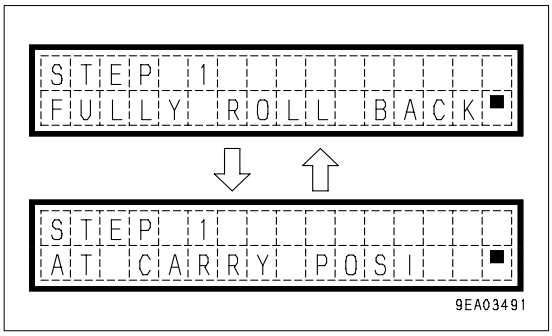
6. Press the machine monitor mode selector switch 2 (>).

   “CALIBRATION“ is displayed on the top line of the character display, and “LOAD BUCKET“ and the previously input weight are displayed for 3 seconds each.



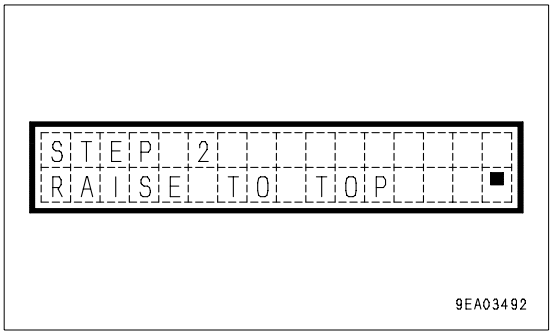
7. Press the (◇) portion of the machine monitor mode selector switch 1.

   “STEP 1“ is displayed on the top line of the character display, and “FULLY ROLL BACK“ and “AT CARRY POSI“ are displayed in turn for 3 seconds each on the bottom line.



8. Tilt the bucket back fully, then lower the lift arm to set to the travel posture.

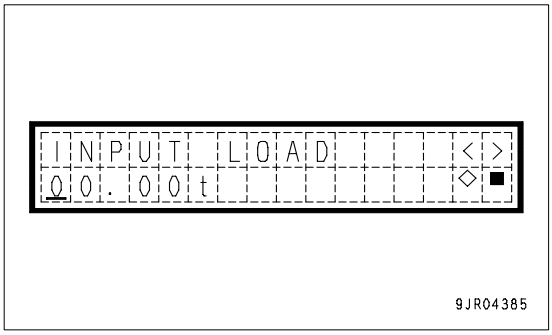
   When the lift arm is lowered, the display on the character display changes to “STEP 2 RAISE TO TOP“.



9. Raise the lift arm to the maximum height at the same speed as for actual operations.

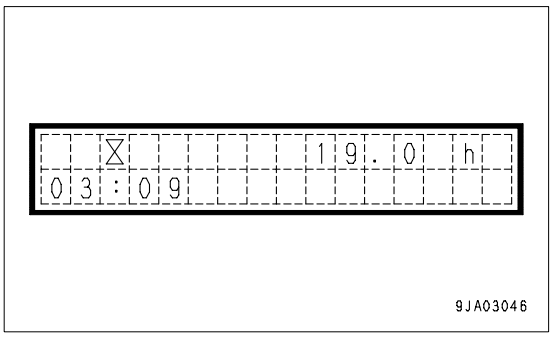
   Depress the accelerator pedal to the same angle as for actual operations. Keep the accelerator angle constant and do not change it. Carry out the lift arm RAISE at the detent.

10. When the calibration is completed correctly, the screen for inputting the weight is displayed.



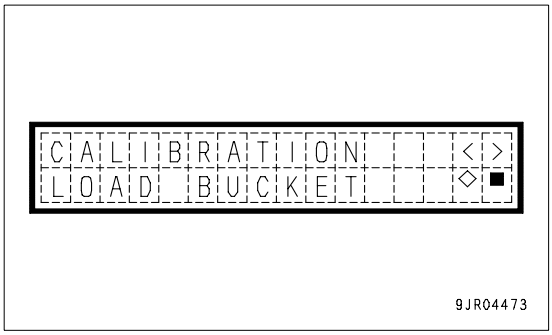
REMARK
For details of the method of inputting, see “SETTING SUBTRACTION MODE (6-30)“.
The load meter automatically judges if it is “1/2 rated load calibration“ or “rated load calibration“, and rewrites the data. Even if the input value is the same as the previous value, input the weight.

When the weight is input, the buzzer sounds and the character display returns to the normal service meter and clock display.



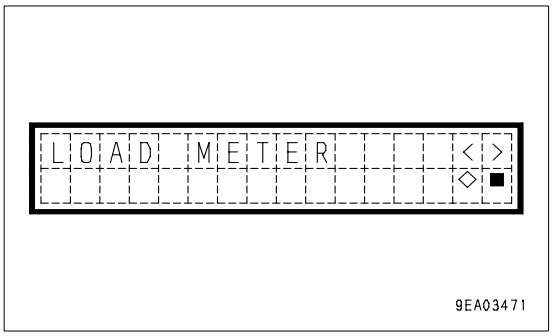
If the calibration when loaded cannot be completed normally, the buzzer sounds, “CALIBRATION“ appears on the top line of the character display, and “LOAD BUCKET“ appears on the bottom line.

11. If the calibration when loaded cannot be completed normally, carry out the operation again from Step 6.

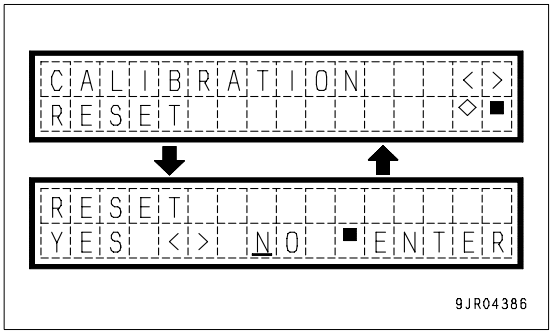


RESETTING CALIBRATION

1. Check that the standard service meter and time is displayed on the character display.
2. Press the (◇) portion of the machine monitor mode selector switch 1 to display “LOAD METER“.

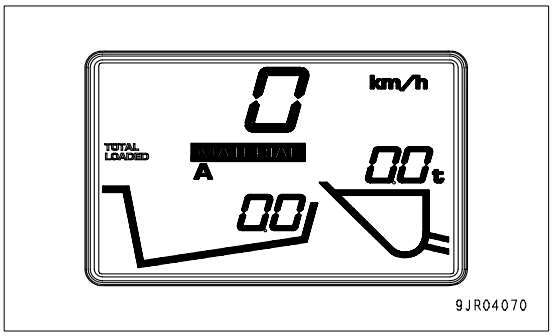


3. Press machine monitor mode selector switch 1 (◇), then press machine monitor mode selector switch 2 (>) or (<) to display “CALIBRATION RESET“ on the character display.
4. Press machine monitor mode selector switch 1 (◇), press machine monitor mode selector switch 2 (<) to move the cursor to “YES“, then press machine monitor mode selector switch 1 (■).



METHOD OF USING ADDITION MODE

1. Set the load meter to the addition mode. For details, see “SETTING ADDITION MODE (6-30)“.

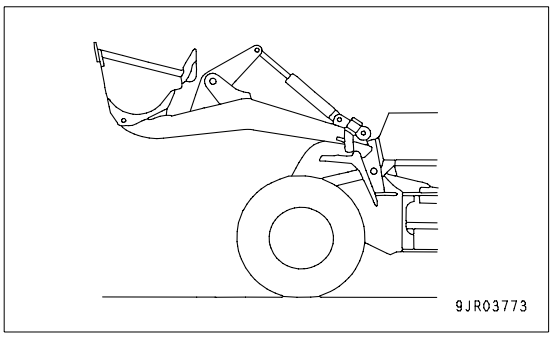


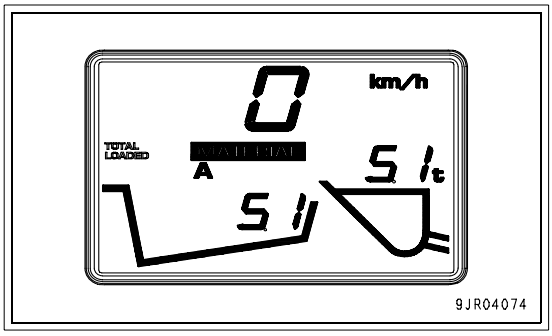
The following explanation uses “A“ selected as the “MATERIAL“ as an example.

2. Fill the bucket with the first load, tilt the bucket fully, raise the lift arm above the horizontal position, then load the dump truck.

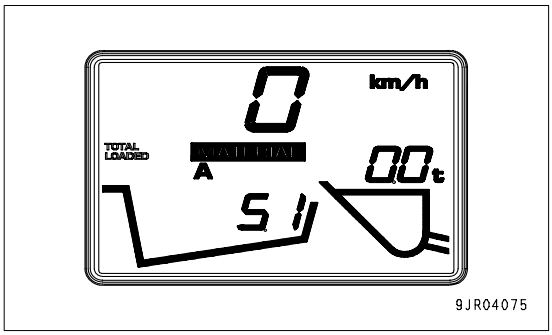
   Let us take the load as 5.1t.

   The display shows the bucket load as 5.1t, and the total load display shows 5.1.

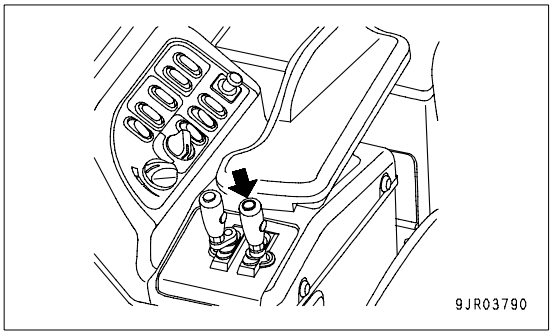




When 15 seconds have passed since the start of the measurement, the bucket load display goes out and returns to 0.0t. The total load display shows 5.1.



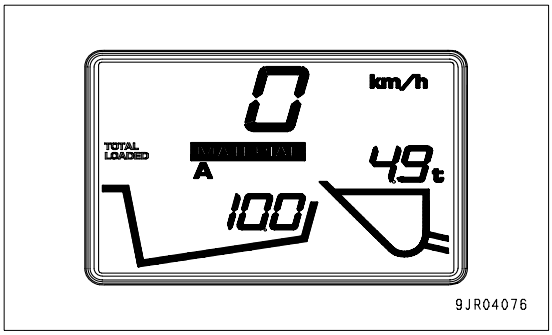
REMARK
When the bucket is tilted back fully and the lift arm is raised above the travel posture, the measurement of the load starts. If the first load is not discharged in Step 1, and the lift arm is lowered to the travel posture, then raised again to the horizontal position, the load will be measured as the second load, even though it has not been discharged. In this case, the bucket load display will show 5.1t, and the total load display will show 10.2. To cancel the mistaken second load data, press the load meter cancel switch. The measurement is cancelled and the total load display returns to 5.1.
It is possible to cancel the measurement 15 seconds after the load is displayed or before measuring the next load.



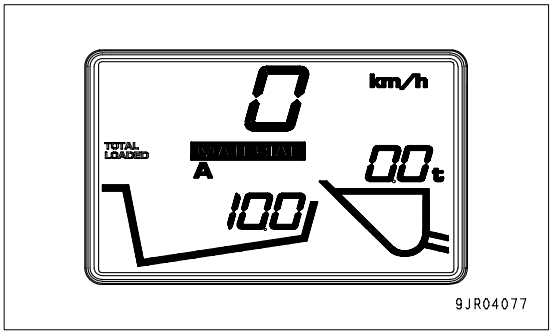
3. Fill the bucket with the second load, tilt the bucket back fully, raise the lift arm above the horizontal position, then load the dump truck.

   Let us take the load in this case as 4.9t.

   The display shows the bucket load as 4.9t, and the total load display shows 10.0.



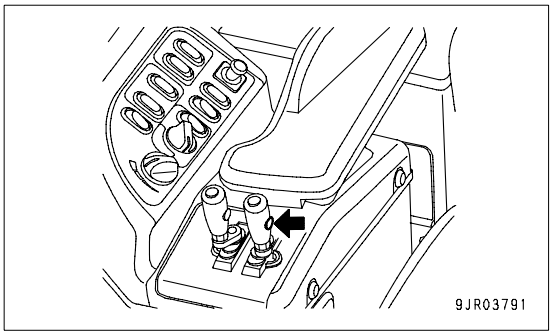
When 15 seconds have passed since the start of the measurement, the bucket load display goes out and returns to 0.0t. The total load display shows 10.0.



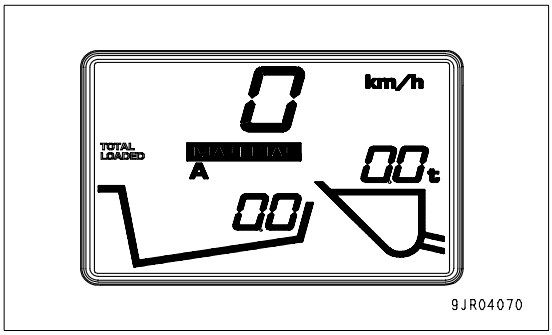
Repeat Step 3 for the third and following loads. The total load display shows the total amount that has been loaded.

4. When resetting the total load in order to carry out the next loading cycle, press the load meter sub-total switch.

   The load meter display returns to the initial condition.

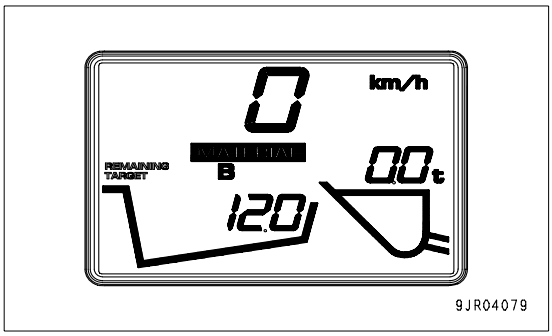


REMARK
To reset, keep the load meter sub-total switch pressed for at least 2 seconds.
When printer is connected
If the load meter sub-total switch is released after less than 2 seconds, the data are printed out but the data are not reset.
If the load meter sub-total switch is kept pressed for more than 2 seconds, the data are not printed out, but the data are reset.



METHOD OF USING SUBTRACTION MODE

1. Set the load meter to the subtraction mode. For details, see “SETTING SUBTRACTION MODE (6-30)“.

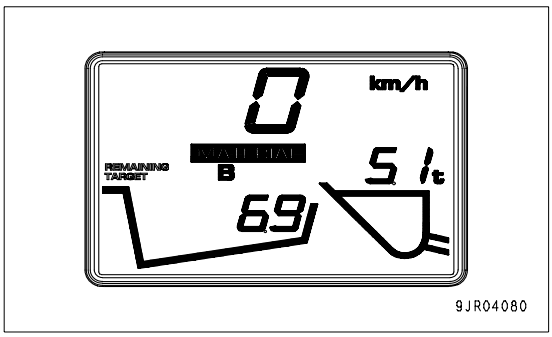


Let us take the target load as 12.0t.

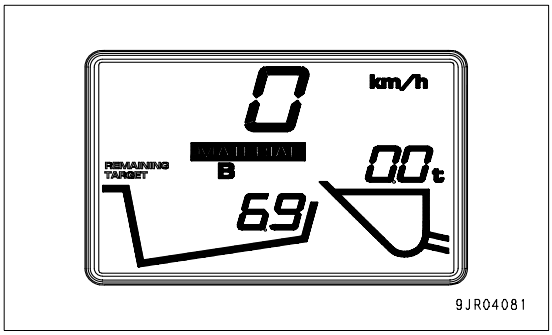
2. Fill the bucket with the first load, tilt the bucket back fully, raise the lift arm above the horizontal position, then load the dump truck.

   Let us take the load as 5.1t.

   The display shows the bucket load as 5.1t, and the total load display shows 6.9.

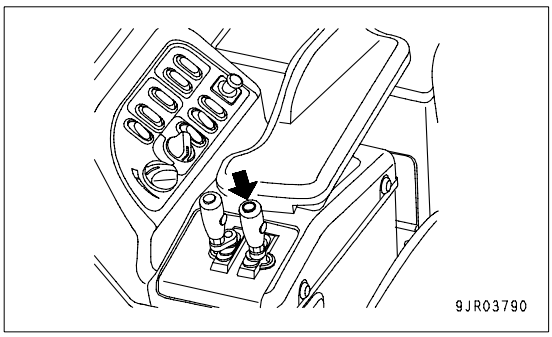


When 15 seconds has passed since the start of the measurement, the bucket load display goes out and returns to 0.0t. The total load display shows 6.9.



REMARK

When the bucket is tilted back fully and the lift arm is raised above the travel posture, the measurement of the load starts. If the first load is not discharged in Step 1, and the lift arm is lowered to the travel posture, then raised again to the horizontal position, the load will be measured as the second load, even though is has not been discharged. In this case, the bucket load display will show 5.1t, and the total load display will show 1.8. To cancel the mistaken second load data, press the load meter cancel switch. The measurement is cancelled and the total load display returns to 6.9.

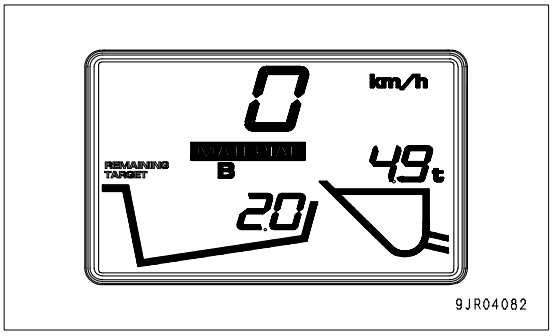


3. Fill the bucket with the second load, tilt the bucket back fully, raise the lift arm above the horizontal position, then load the dump truck.

   Let us take the load in this case as 4.9t.

   The display shows the bucket load as 4.9t, and the total load display shows 2.0.

   When 15 seconds has passed since the start of the measurement, the bucket load display goes out and returns to 0.0t. The total load display shows 2.0.



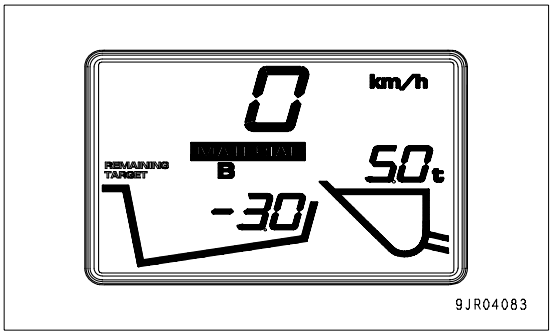
4. Fill the bucket with the third load, tilt the bucket back fully, then raise the lift arm above the horizontal position.

   Let us take the load in this case as 5.0t.

   The display shows the bucket load as 5.0 t, and the total load display shows - 3.0. This means that the total load is 3.0t over the target load.

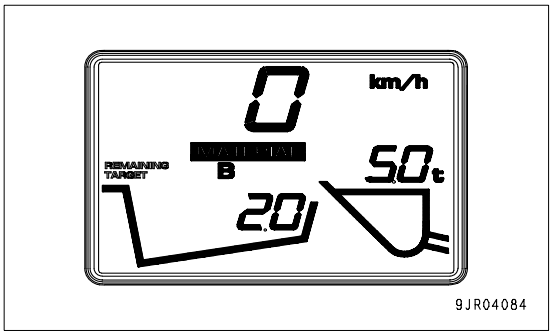
   The buzzer sounds and “TARGET OVER“ is displayed for 5 seconds after the target load shows -3.0. After 5 seconds, the total load display changes to 2.0.

   This is the target load after completion of loading the second bucket. The bucket at present has a load of 5.0t, but only 2.0t of this needs to be loaded.

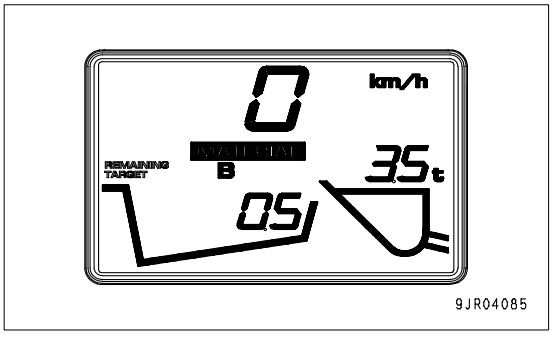


5. Using 2.0t as the target, load part of the present 5.0t load into the dump truck from the bucket.

   The target load of 2.0 flashes.



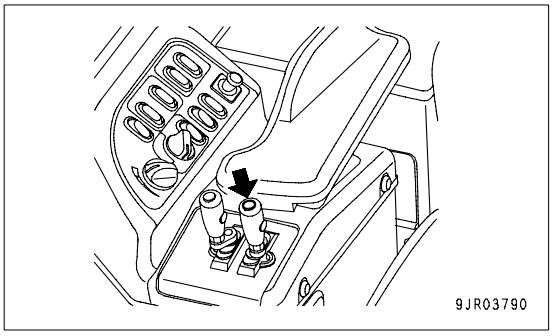
6. After loading, lower the bucket to the travel posture, then raise the lift arm and measure the remaining load in the bucket. If we take the remaining load in the bucket as 3.5t, the target load becomes 0.5.



REMARK

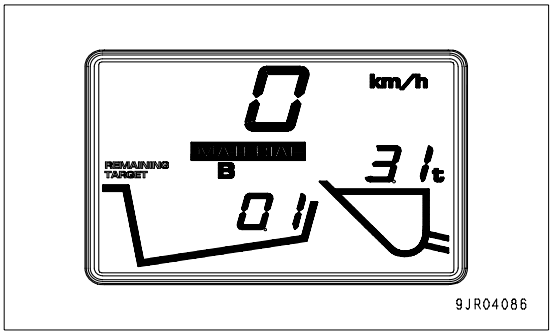
If the actual load exceeds the target load and 2.2t is loaded when the target load is 2.0t, the alarm buzzer sounds. At the same time, “TARGET OVER“ is displayed on the character display. Press the load meter cancel switch. The alarm buzzer will stop.

Notice that even if the starting switch is turned off, the alarm buzzer does not stop.



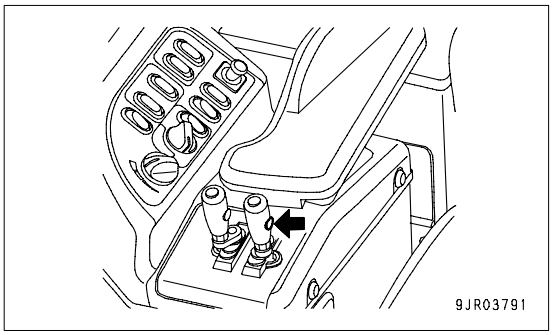
7. Using 0.5t as the target, load part of the remaining 3.5t load into the dump truck from the bucket.

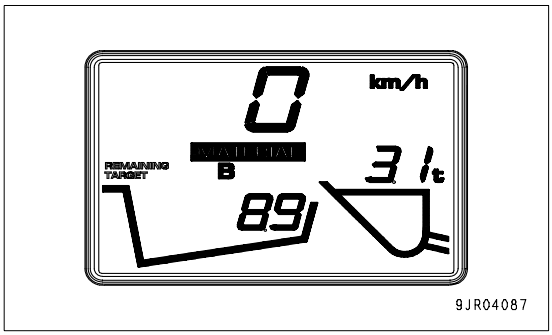
8. After loading, lower the bucket to the travel posture, then raise the lift arm and measure the remaining load in the bucket. If we take the remaining load in the bucket as 3.1t, the target load becomes 0.1.



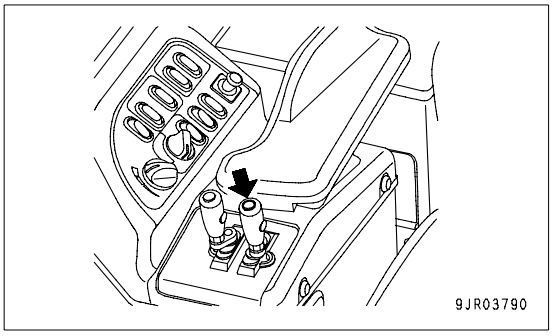
9. When resetting the total load in order to carry out the next loading cycle, press the load meter sub-total switch. This completes the first loading operation.

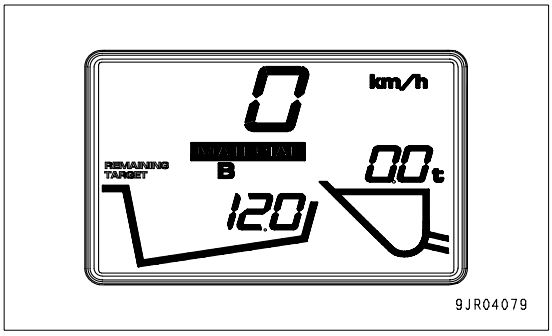
   In this case, the load remaining in the bucket becomes the target load for the second cycle.





10. Dump the load in the bucket into the dump truck and start the second loading cycle.





REMARK
If the load remaining in the bucket is not used, dump the load and press the load meter cancel switch. The target load returns to the initial value of 12.0.
For details of the method of switching to the addition mode, see of “SETTING ADDITION MODE (6-30)“.

PRINTOUT FROM LOAD METER

If a printer is installed, it is possible to print out the content of the load.

There are three types of load meter printout (A, B, C).

For details of the output mode of the printout type, see “SELECTION OF PRINTOUT MODE (6-51)“.

A mode: Total printout

The number of loads for each category of material and the total load are printed out.

B mode: Sub-Total printout

The load each time and the total load for each category of material, together with the overall total load are printed out.

C mode: The data for A mode are printed out together with addition of the maintenance items and time remaining to maintenance.

The printouts shown below are examples of the load meter printouts for the WA600-6.

Ex:

Output with mode A

WA600-6 #60001		
25/OCT/2005	17:30	
Material	Times	Total Load
A	1	2.62t
B	2	6.04t
C	3	7.11t
D	4	9.13t
E	5	14.82t
Total	15	39.72t

Output with mode B

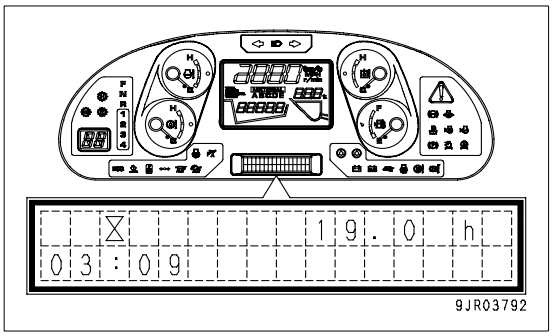
WA600-6 #60001	
25/OCT/2005	17:30
Material A	
1: 2.62t	
Total: 1 times	2.62t
Material B	
1: 2.62t	2: 3.42t
Total: 2 times	6.04t
Material C	
1: 3.43t	2: 2.25t
3: 1.43t	
Total: 3 times	7.11t
Material D	
1: 1.43t	2: 2.27t
3: 2.05t	4: 3.38t
Total: 4 times	9.13t
Material E	
1: 3.48t	2: 2.94t
3: 3.64t	4: 1.97t
5: 2.79t	
Total: 5 times	14.82t

Output with mode C

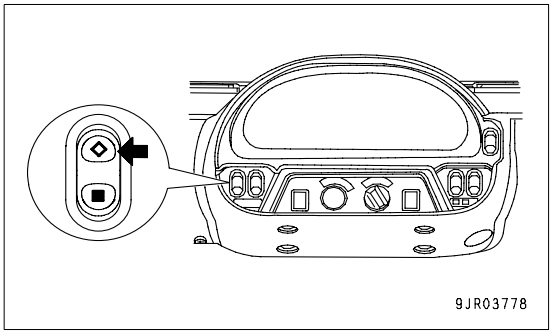
WA600-6 #60001		
Start time		
25/OCT/2005	9:15	
Service meter	00043.0h	
End time		
25/OCT/2005	17:30	
Service meter	00051.2h	
Material	Times	Total Load
A	1	2.62t
B	2	6.04t
C	3	7.11t
D	4	9.13t
E	5	14.82t
Total	15	39.72t
Maintenance		
Engine oil		500h
Transmission oil		1000h
Hydraulic oil		2000h
Axle oil		2000h
Engine oil filter		500h
Transmission oil filter		500h
Hydraulic oil filter		2000h
Axle pivot pin		100h
Boom pin		250h
Steering cylinder pin		250h
Center hinge pin		250h

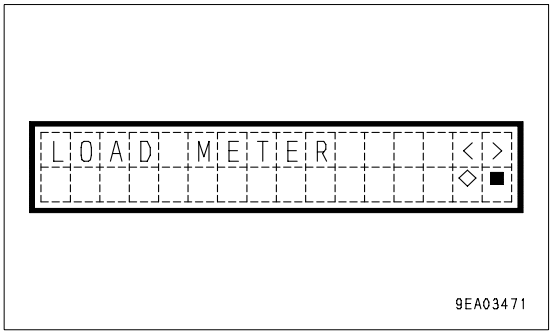
SELECTION OF PRINTOUT MODE

1. Check that the character display shows the normal service meter and clock display.

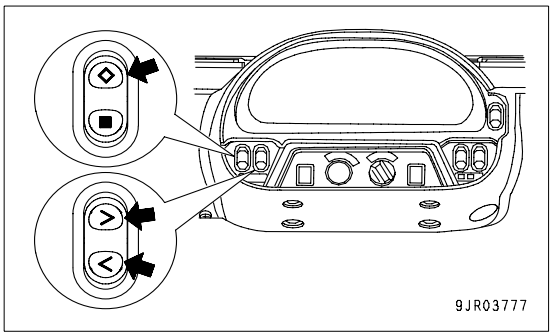


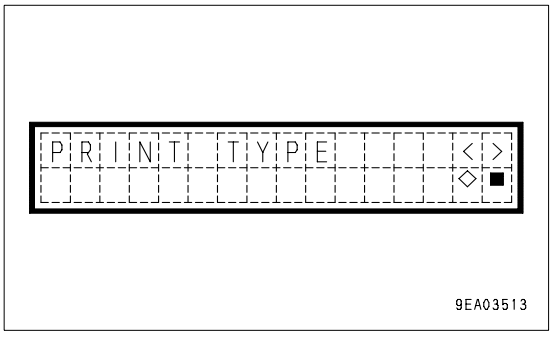
2. Press the (◇) portion of the machine monitor mode selector switch 1 and display “LOAD METER“ on the character display.





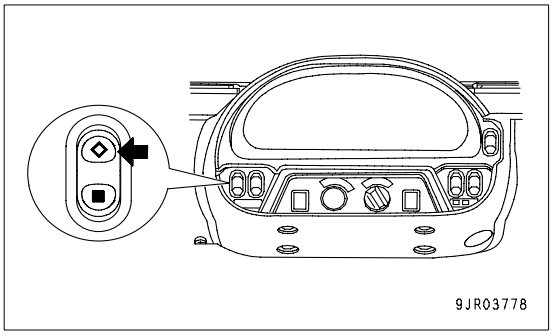
3. Use the (◇) portion of the machine monitor mode selector switch 1 and the (>) or (<) portion of the machine monitor mode selector switch 2 to display “PRINT TYPE“ on the character display.

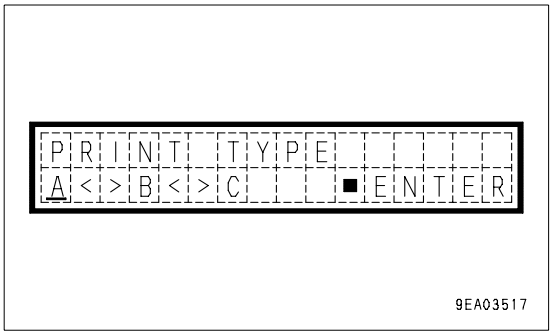




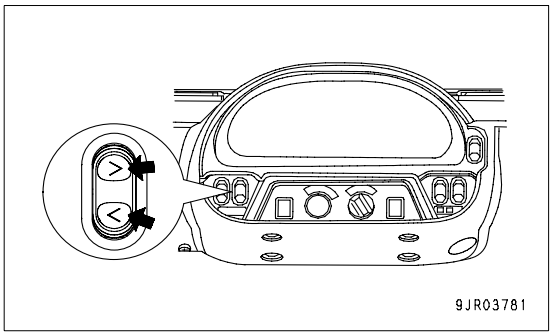
4. Press the (◇) portion of the machine monitor mode selector switch 1.

   “A<>B<>C“ is displayed on the bottom line of the character display.

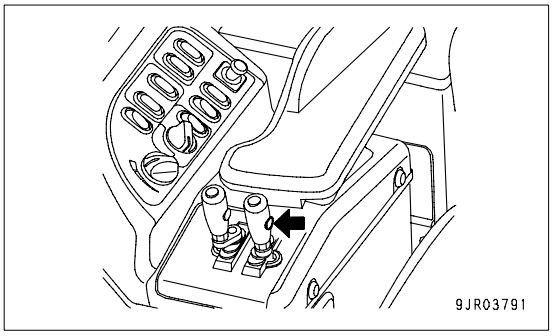




5. Press the (>) or (<) portion of the machine monitor mode selector switch 2 to move the cursor under A, B, or C to set the desired load meter printout mode. For details, see “PRINTOUT FROM LOAD METER (6-50)“. The type of printout can be selected from the three printout modes.

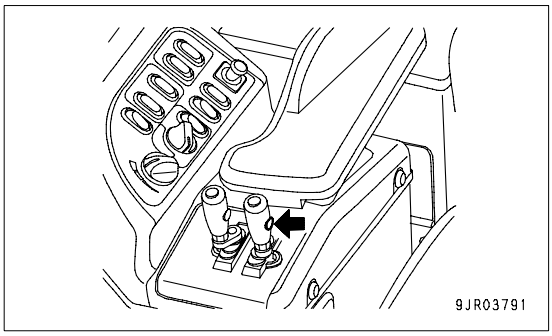


6. When the system is set to C mode, the data are printed out when the setting is made and the print mode returns to A or B.

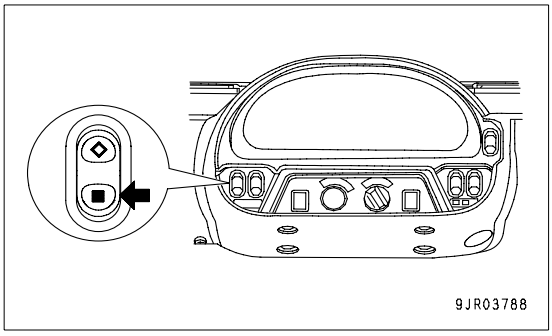


7. To print out in A or B mode, press the load meter sub-total switch.

   The data are printed out.



REMARK
If you make a mistake in the setting, press the (■) portion of the machine monitor mode selector switch 1.
The display will return to the previous display.



HANDLING AUTO-GREASING SYSTEM

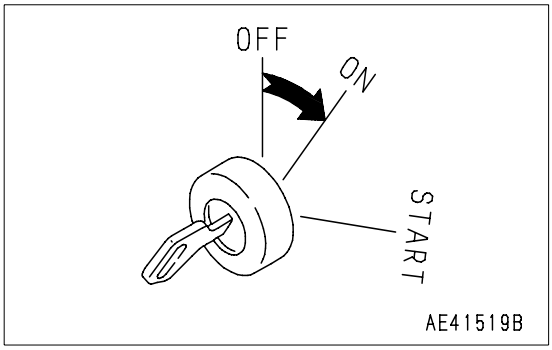
With this system, the grease is automatically supplied through the conmputer controls.

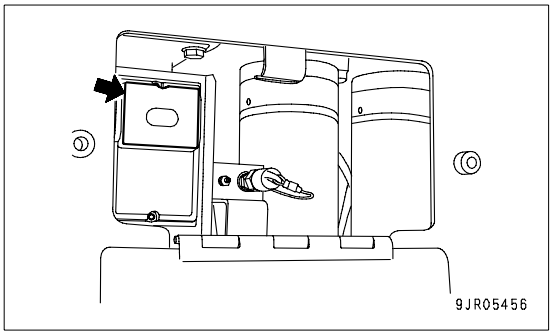
If any abnormality occurs in the lubrication controller, please inform your Komatsu distributor of the symptoms and ask for repairs to be carried out.

METHOD OF OPERATING AUTO-GREASING SYSTEM

1. Turn the starting switch ON.

REMARK
Immediately after the electric power is input, all the display lamps of the lubrication controller inside the cover under the hydraulic tank on the right side of the machine light up for several seconds. This is the self-check for the lamps. It does not indicate any abnormality.
The display for the start of the count for the greasing interval flashes, but all other display portions go out after several seconds.
If the starting switch is turned ON/OFF repeatedly several times when the greasing time has not been reached, the greasing compensation circuit is actuated. Immediately after the starting switch is turned ON, it starts greasing automatically. After the greasing LED shown on the “Lubrication controller display list“ lights up and the 7-segment LED gives a display, the system returns to the condition above.

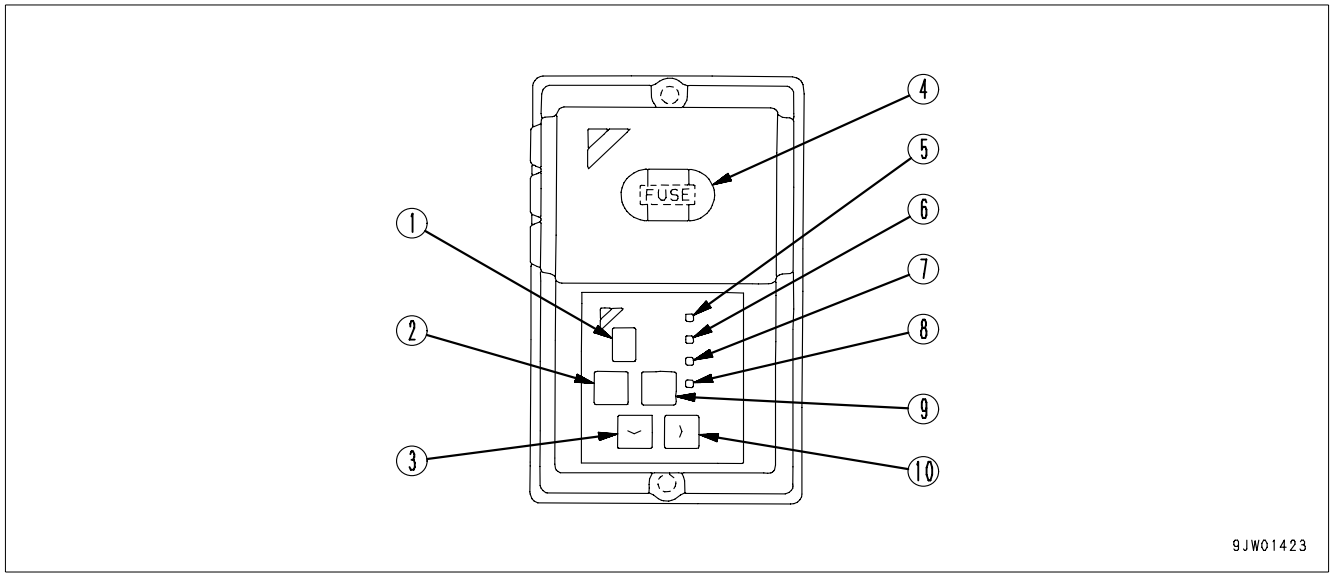




2. Centralized greasing is carried out in accordance with the set time and frequency limit for greasing.

REMARK
If the starting switch is turned ON/OFF frequently before the greasing interval is reached, the warning for the remaining time is displayed earlier, but this does not indicate any abnormality.

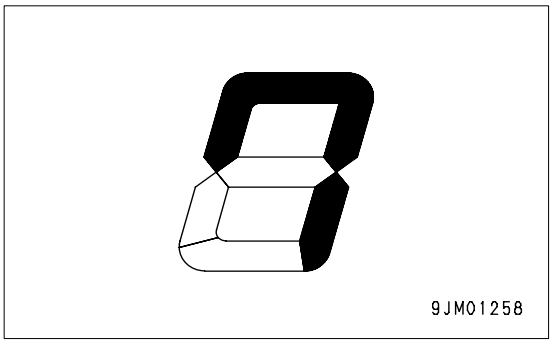
LUBRICATION CONTROLLER DISPLAY TABLE



(1) 7-segment LED
(2) Cancel key
(3) Level selector key
(4) Blade-type fuse
(5) Power source LED
(6) Greasing LED
(7) Warning LED
(8) Setting LED
(9) Starting key
(10) Item selector key

Remaining number of times of greasing

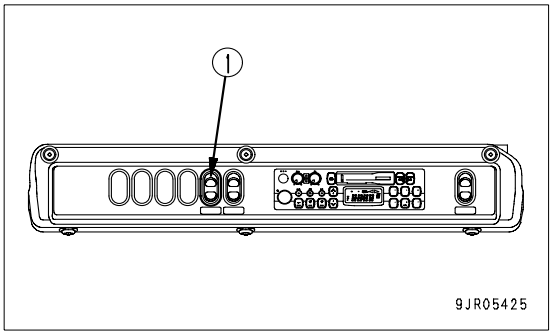
If the remaining number of times of greasing is less than 10, remaining number is displayed and it flashes. If the remaining number of times is 10 or more, only the flashing is shown without displaying the number.



OPERATION AS DESIRED

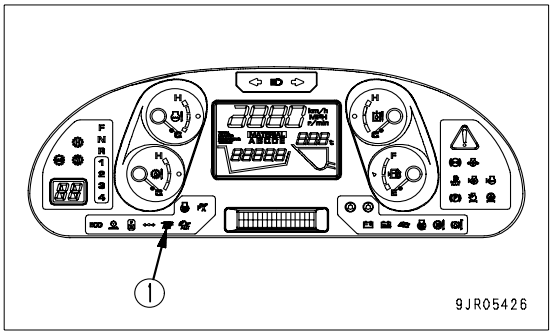
Press auto-greasing switch (1) at the left overhead portion or the start button of the lubrication controller inside the cover under the hydraulic tank on the right side of the machine to carry out one cycle of operation as desired, regardless of the total time.

The count for the greasing interval being calculated is canceled, and after the electric pump automatically stops, the count starts again.



PILOT LAMP DISPLAY ON MACHINE MONITOR

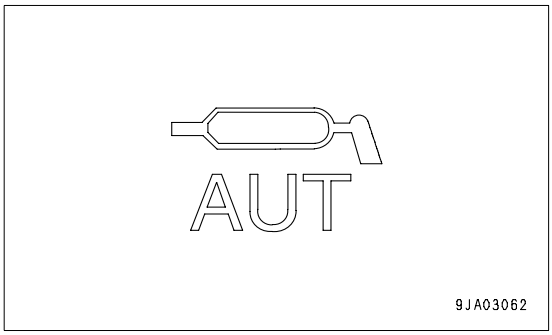
The display of pilot lamp (2) on the machine monitor lights up or flashes according to the following conditions.



When lighted up: Normal operation

Flashing at 1-second intervals: Grease tank empty

Flashing at 0.5-second intervals: Defective pressure release, pressurized pump, pressure detection, blown fuse



SETTING GREASING TIME

The set time and greasing frequency limit differs according to the operating condition and greasing plan for the machine, so set the following items to carry out suitable centralized greasing.

- Greasing interval (Hr): Greasing interval for automatic operation
- Greasing time (min): Length of time pump is operated for each greasing operation
- Greasing frequency limit (times): Number of times of operation until 3200 cc grease tank becomes empty

The settings when the machine is shipped from the factory are as follows.

Greasing interval: 2 hours

Greasing time: 10 minutes

Greasing frequency limit: 150 times

The grease level alarm is set to sound after approx. 300 hours on the hourmeter (standard operation).

NOTICE
Note that if the greasing interval is reduced, the consumption of grease inside the grease tank will increase.
In addition, if the greasing interval is reduced, there will be an increase in grease dripping from the ends of the work equipment pins, and this may cause dirt to accumulate on or around the machine.

SETTING GREASING TIME IN COLD AREAS

In cold temperatures, the viscosity of the grease increases and the resistance inside the piping becomes greater, so it is necessary to extend the length of the greasing.

Use lithium-based grease No. 0 for the grease.

When changing the set value, please contact your Komatsu distributor.

METHOD OF SETTING

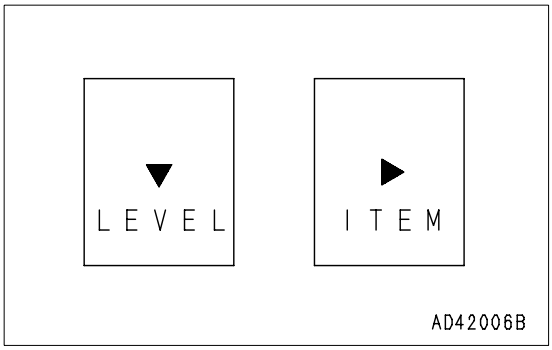
When setting the various items, the value is not input directly. Select the code number from the set code table below, and set as follows.

SETTING CODE TABLE

Code no.	0	1	2	3	4	5	6	7	8	9
Greasing interval	/	1	1.5	2	3	4	5	6	8	/
Greasing time (min)	/	2	3	5	7	10	15	20	25	/
Greasing frequency limit	/	25	50	75	100	150	200	250	/	/

PROCEDURE FOR SETTING

1. Stop the working machine on the flat and hard ground, and stop the engine.
2. Set the work equipment lock lever at LOCK position and set the starting switch at ON position.
3. Turn the starting switch to START and start the engine.
4. Press the LEVEL and ITEM keys at the same time to set to the setting mode.
5. Press the ITEM key one or more times to select the item to be set.



REMARK
Each time the ITEM key is pressed, the setting item is changed: a → b → c → a.

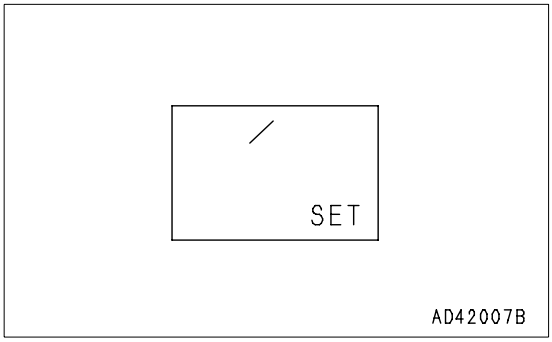
6. When the item to be set flashes, press the LEVEL key.

   The set item and numeral are displayed alternately (a →→ 0 →→ a →→ 0).

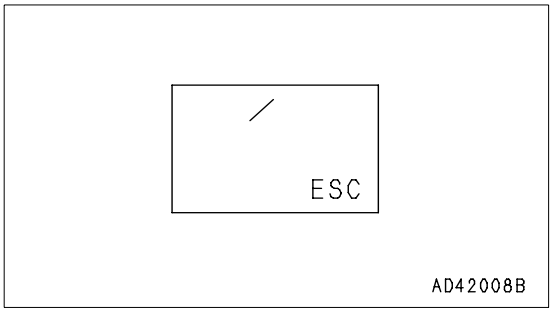
7. Refer to the setting code table and press the ITEM key one or more times to select the code number to be set.

REMARK
Each time the ITEM key is pressed, the code number (numeric portion) goes up by 1.

8. When the code number that is to be set flashes, press the SET key to carry out the setting.



9. Repeat Steps 6 to 8 to set all of the items a, b, and c. After completing the setting, press the ESC key to leave the setting mode.

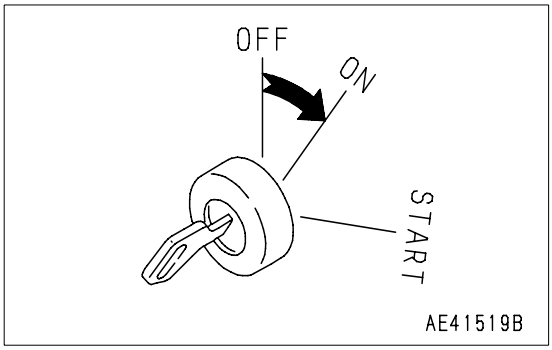


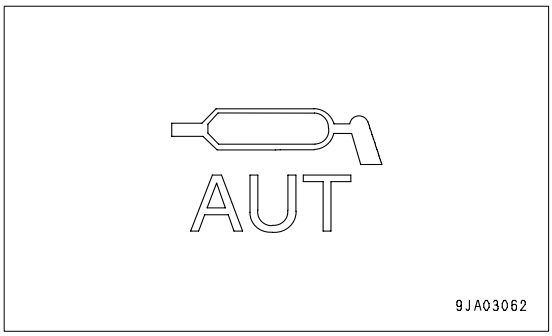
REMARK
Even if it is desired to change only one item, always carry out the setting according to Steps 4 to 8. After completing the setting, always press the ESC key to leave the setting mode.
If the power is then turned ON, the count for the greasing interval will start immediately after the ESC key is pressed. Part of the display segment flashes to indicate that the system is counting. After setting, the set value is retained in memory even if the power is turned OFF.

CHECK AMOUNT OF GREASE

1. Turn the starting switch ON.
2. Check the display of the pilot lamp on the machine monitor. If the pilot lamp flashes at 1-second intervals, it indicates that the grease tank is empty.

   Add grease to the grease tank.





GREASING

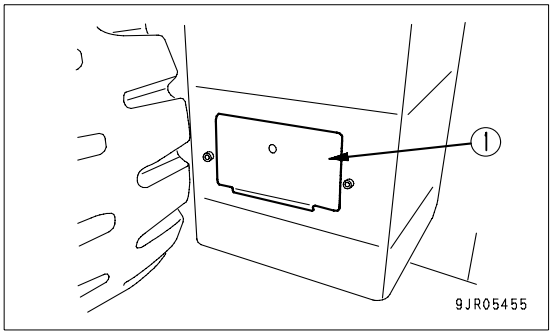
⚠ WARNING

Air bleeding of pump involves danger because of high pressure. Ask your Komatsu distributor for air bleeding.

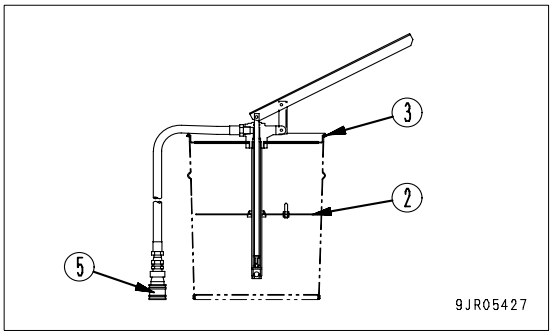
NOTICE
After greasing, always reset the greasing count on the controller. (For details, see "TROUBLESHOOTING (6-60)")

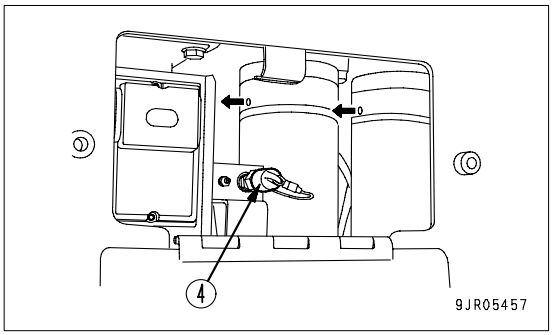
Be sure to use the special grease pump (566-96-6A840) and supply grease with it according to the following procedures, taking care not to let air or dust get in to the grease. Supply grease while the ambient temperature is above -10°C.

1. Open cover (1) under the hydraulic tank.



2. Bring a new 18 kg grease can and remove the lid. Push follower plate (2) in the grease pump into the grease surface, then insert the pump and the set the special pail lid (3) in position. Next, operate the pump handle and check that clean grease comes out from the tip of the hose.
3. Remove cap (4) of the pump greasing port, screw in mouthpiece (5) of the hose, then operate the grease pump.
4. When grease is supplied for the first time, there is usually some air under the follower plate (2). If grease is supplied to the upper limit, however, the air is bled through the small hole on the side of the tank. When supplying grease next time and there after, stop supplying it when it reaches the bottom of this air bleed hole.
5. After completing the greasing operation, remove hose mouthpiece (5) and be sure to install cap (4) of the pump greasing port. Keep the grease pump and grease can in a clean place.





PRECAUTIONS WHEN HANDLING AUTO-GREASING SYSTEM

- Basically, the power source input to the lubrication controller should be DC24V, but use a maximum limit of 30V.
- The grease nipple installed to the service port used for initial charging of the divider valve has a ball check structure, so it may leak if dirt gets stuck in it.

  Check it from time to time, and replace the grease nipple immediately if any grease is leaking.
- When carrying out initial operation or when the grease tank is empty, air may get into the piston portion of the pump. If the pressure does not rise within the specified time when running the pump, and an error is displayed for the controller, bleed the air.
- If the divider valve or grease piping are removed when replacing the attachment on the machine, handle carefully to prevent any damage. When storing or installing again, be extremely careful to prevent the entry of air, and particularly dirt. If there is any air in the system, bleed the air immediately.

TROUBLESHOOTING

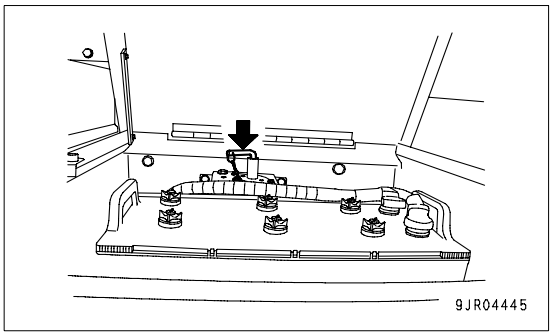
If any abnormality occurs in the greasing system, the error codes will flash alternately to display the type of abnormality.

Error code	Item	Cause	Remedy
E → a	Defective pressurizing of pump	•Air in main piping	•Run pump as necessary and release grease from end of piping to bleed air
		•Air inside pump	•Release grease from air bleed in pump to bleed air
		•Grease tank is empty	•Add grease
		•Grease leaking from main piping	•Check, tighten connections of main piping (including hoses)
E → b	Abnormality in release of pressure	•Abnormality in pressure-releasing structure built into pump	•Disassemble pressure-releasing portion carefully, then check and clean
		•Abnormality in pressure-detection equipment built into pump	•Check limit switch at pressure-detection portion
E → c	Abnormality in pressure detection	•Abnormality in pressure-detection equipment built into pump	•Check limit switch at pressure- detection portion
		•Abnormality in pressure-releasing structure built into pump	•Disassemble pressure-releasing portion carefully, then check and clean
E → 0	Empty tank	•Greasing frequency limit has been reached	•Add grease Reset frequency counter to zero.
		•Grease added during frequency count	•Confirm that 0 flashes three times on 7-segment LED by pressing reset button on controller for more than 5 seconds.

HANDLING BATTERY DISCONNECTOR SWITCH

This switch cuts the flow of electricity from the battery.

This is inside the battery box on the right side of the machine.

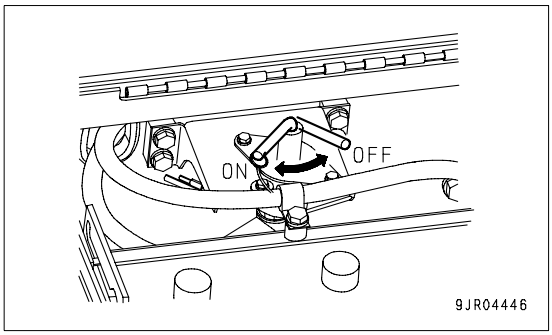


EXPLANATION OF COMPONENTS

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 disconnector 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 disconnector 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

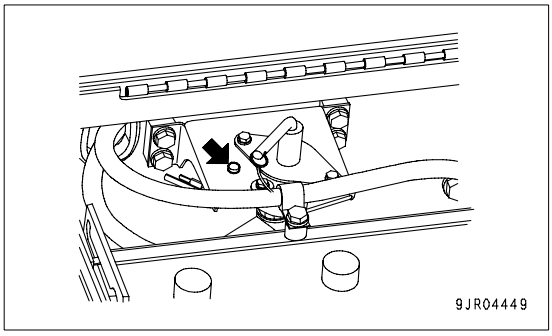
REMARK

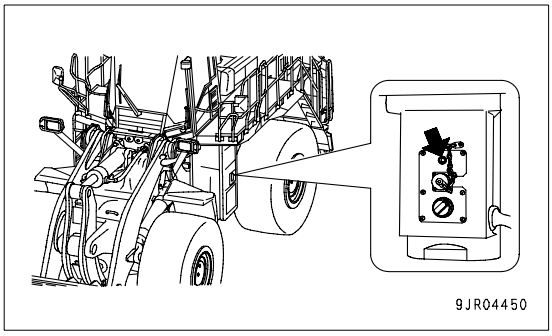
When the battery disconnector switch is turned OFF, all of the electrical systems on the machine stop.

The time display on the radio and monitor, the preset memory for radio station reception, and the memory for the load meter data are lost, so reset them when using.

Immediately after the starting switch is turned OFF, the VHMS saves the data to memory. Check that the VHMS actuation indicators on the component box on the left side of the rear frame and at the side of the battery disconnector switch are out before turning the battery disconnector switch OFF.

Immediately after the fan has been rotated in reverse, even if the starting switch is turned OFF, the fan reverse rotation solenoid retains electric power. This is to protect the hydraulic motor. Before turning the battery disconnector switch OFF, check first that the fan is completely stopped.



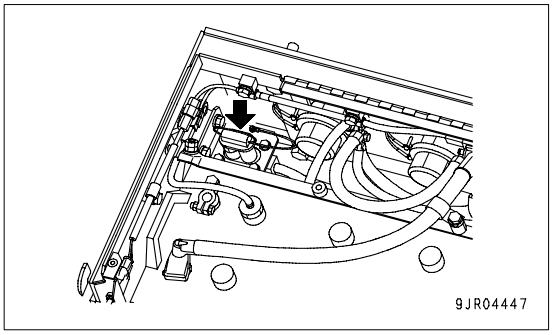


HANDLING STARTING AID CONNECTOR

STARTING ENGINE WHEN USING STARTING AID CONNECTOR

This machine is equipped with a starting aid connector conforming to SAE J1283.

The starting aid connector is inside the battery box on the left side of the machine.



PRECAUTIONS WHEN CONNECTING OR REMOVING STARTING AID CONNECTOR

⚠ WARNING

- **Do not allow the normal machine and the problem machine to come into contact. Hydrogen gas is generated from the battery, so there is danger of explosion from sparks around the battery.**
- **Be careful not to mistake the connection of the starting aid connector. In addition, when the final connection is made, it is connected to the problem machine, but there is danger of sparks being generated when this happens.**

NOTICE

- **The starting system on this machine is 24V. For the normal machine, use a machine that is also 24V.**
- **Always use a starting aid cable 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 connectors are not damaged or corroded.**
- **Connect the connectors securely.**
- **Check that the lock levers (work equipment, steering) of both machines are at the LOCK position and that the parking brake switches of both machines are ON (actuated).**
- **Check that all levers are at the neutral position.**

CONNECTING STARTING AID CABLE

Turn the starting switches of both the normal machine and the problem machine to the OFF position and connect the starting aid cables in the order normal machine → problem machine.

STARTING ENGINE

⚠ WARNING

Check that the lock levers (work equipment, steering) and parking brake levers of both the normal machine and the problem machine are at the LOCK position. Check also that all control levers are at the HOLD position.

1. Check that the connector is securely connected.
2. Start engine of the normal machine and run it at high idle speed.
3. Turn the starting switch of the problem machine to the START position and start the engine.

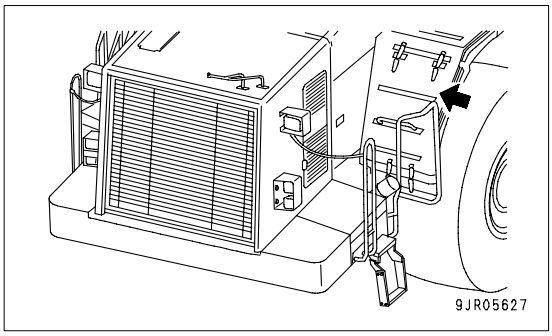
   If the engine doesn't start at first, wait for at least 2 minutes before trying again.

REMOVING STARTING AID CABLE

When the engine starts, remove the starting aid cables in the order problem machine → normal machine.

HANDLING REAR FENDER

The rear fender acts to prevent mud from being sprayed up on the machine and into the surrounding area.



HANDLING

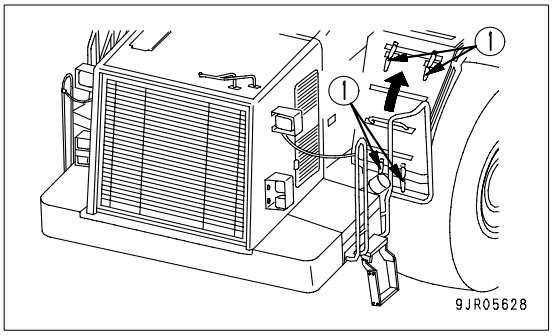
⚠ WARNING

When traveling or carrying out operations, lower the rear fender and lock it securely. If the rear fender is raised when traveling or carrying out operations, it will block the view, and there is danger that this may lead to serious personal injury.

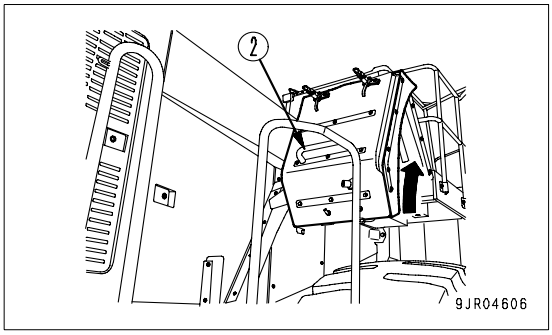
NOTICE
If the machine travels or operations are carried out with the rear fender raised, it will be impossible to prevent mud from spraying on the machine and into the surrounding area. In addition, it will cause damage to the rear fender.

When carrying out maintenance and opening the engine side cover on the right side of the machine, raise the rear fender first.

1. Remove lock (1).



2. Hold grip (2) and raise the rear fender.



HANDLING MACHINES EQUIPPED WITH VHMS

- VHMS is a machine management system. When a communications terminal is installed, it is possible to transmit data.
- A contract is necessary before the VHMS communications terminal can be used. Any customers desiring to use the VHMS system should consult their Komatsu distributor.

VHMS INSTALLED, COMMUNICATIONS TERMINAL NOT INSTALLED

BASIC PRECAUTIONS

⚠ WARNING

- **Never disassemble, repair, modify, or move the VHMS or cables. This may cause failure or fire on the VHMS equipment or the machine itself. (Your Komatsu distributor will carry out removal and installation of VHMS.)**
- **Do not allow cables or cords to become caught; do not damage or pull cables or cords by force. Short circuits or disconnected wires may cause failure or fire on the VHMS equipment or the machine itself.**

REMARK
There is absolutely no need to inspect or operate the VHMS, but if any abnormality is found, please contact your Komatsu distributor.

VHMS AND COMMUNICATIONS TERMINAL INSTALLED

- The VHMS equipment is a wireless device using radio waves, so it is necessary to obtain authorization and conform to the laws of the country or territory where the machine equipped with VHMS is being used. Always contact your Komatsu distributor before selling or exporting any machine equipped with VHMS.
- When selling or exporting the machine or at other times when your Komatsu distributor considers it necessary, it may be necessary for your Komatsu distributor to remove the VHMS equipment or to carry out action to stop communications.
- If you do not obey the above precautions, neither Komatsu nor your Komatsu distributor can take any responsibility for any problem that is caused or for any loss that results.

BASIC PRECAUTIONS

⚠ WARNING

- **Never disassemble, repair, modify, or move the VHMS, terminal, antenna, or cables. This may cause failure or fire on the VHMS equipment or the machine itself. (Your Komatsu distributor will carry out removal and installation of the VHMS and terminal.)**
- **Do not allow cables or cords to become caught; do not damage or pull cables or cords by force. Short circuits or disconnected wires may cause failure or fire on the VHMS equipment or the machine itself.**
- **For anyone wearing a pacemaker, make sure that the communications antenna is at least 22 cm from the pacemaker. The radio waves may have an adverse effect on the operation of the pacemaker.**

NOTICE

- **Please contact your Komatsu distributor before installing a top guard or other attachment that covers the antenna.**
- **Be careful not to get water on the communications terminal or wiring.**

REMARK

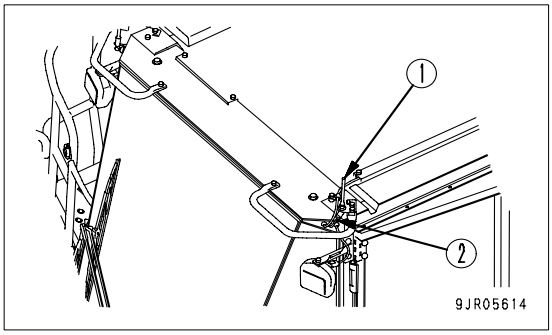
The communications terminal uses wireless communications, so it cannot be used inside tunnels, underground, inside buildings, or in mountain areas where radio waves cannot be received. Even when the machine is outside, it cannot be used in areas where the radio signal is weak or in areas outside the wireless communication service area.

There is absolutely no need to inspect or operate the VHMS or communications terminal, but if any abnormality is found, please contact your Komatsu distributor.

CHECK BEFORE STARTING

CHECK VHMS ANTENNA AND CABLE

- There is no need to check or operate the VHMS controller.
- To ensure proper communications performance, check the following items daily. If any problem is found, please consult your Komatsu distributor.
  - Is communications antenna (1) missing, disconnected, or damaged?
  - Is antenna cable (2), missing, disconnected, or damaged?



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COLOPHON

WA600-6 GALEO WHEEL LOADER
Form No. EEAM024501

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