

Operation & Maintenance Manual

BULLDOZER

D475A-5E0

SERIAL NUMBERS 30126 and up

⚠ WARNING

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

NOTICE

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

KOMATSU

FOREWORD

CALIFORNIA

Proposition 65 Warning

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

CALIFORNIA

Proposition 65 Warning

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

Wash hands after handling.

BEFORE READING THIS MANUAL

This manual gives details of the operation and methods of inspection and maintenance for this machine that must be obeyed in order to use the machine safely. Most accidents are caused by the failure to follow fundamental safety rules for the operation and maintenance of machines.

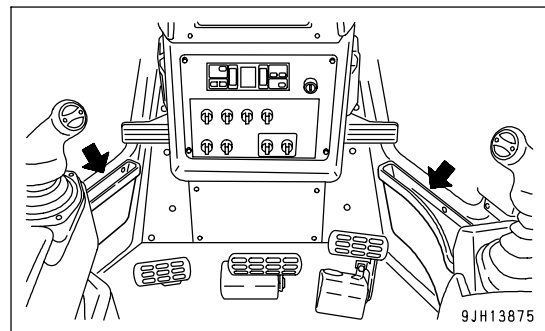
Read, understand and follow all precautions and warnings in this manual and on the machine before performing operation and maintenance. Failure to do so may result in serious injury or death.

Komatsu cannot predict every circumstance that might involve a potential hazard when the machine is used. Therefore, the safety messages in this manual and on the machine may not include all possible safety precautions. If you carry out any operation, inspection, or maintenance under conditions that are not described in this manual, understand that it is your responsibility to take the necessary precautions to ensure safety. In no event should you or others engage in the prohibited uses or actions described in this manual. Improper operation and maintenance of the machine can be hazardous and could result in serious injury or death.

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

Always keep this Operation and Maintenance Manual in the location shown on the right so that all relevant personnel can read it at any time.

Location to keep operation & maintenance manual
In door pocket inside of cab door



If this manual is lost or damaged, contact your distributor immediately to arrange for its replacement. For details regarding the machine serial No. you will need to provide your Komatsu distributor, see "TABLE TO ENTER SERIAL NO. AND DISTRIBUTOR (PAGE 1-8)".

This manual uses the international units (SI) for units of measurement. For reference, units that have been used in the past are given in ().

The explanations, values, and illustrations in this manual have been prepared based on the latest information available as of the date of its publication. Continuing improvements in the design of this machine may lead to additional changes that are not reflected in this manual. Consult Komatsu or your Komatsu distributor for the latest available information concerning your machine or with questions regarding information contained in this manual.

- The numbers in circles in the illustrations correspond to the numbers in () in the text.

(For example: ① → (1))




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, 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.

SAFETY INFORMATION

To enable you to use the machine safely, and to prevent injury to operators, service personnel or bystanders, the precautions and warnings included in this manual and the safety signs attached to the machine must always be followed.

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

The "Safety Alert Symbol" identifies important safety messages on machines, in manuals, and elsewhere. When you see this symbol, be alert to the risk of personal injury or death. Follow the instructions in the safety message.

- | | |
|--|--|
|  DANGER | This signal word indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury. |
|  WARNING | This signal word indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury. |
|  CAUTION | This signal word indicates a potentially hazardous situation exists which, if not avoided, may result in minor or moderate injury. |

The following signal words are used to alert you to information that must be followed to avoid damage to the machine.

- | | |
|----------------|--|
| NOTICE | This precaution is given where the machine may be damaged or the service life reduced if the precaution is not followed. |
| REMARKS | This word is used for information that is useful to know. |

INTRODUCTION

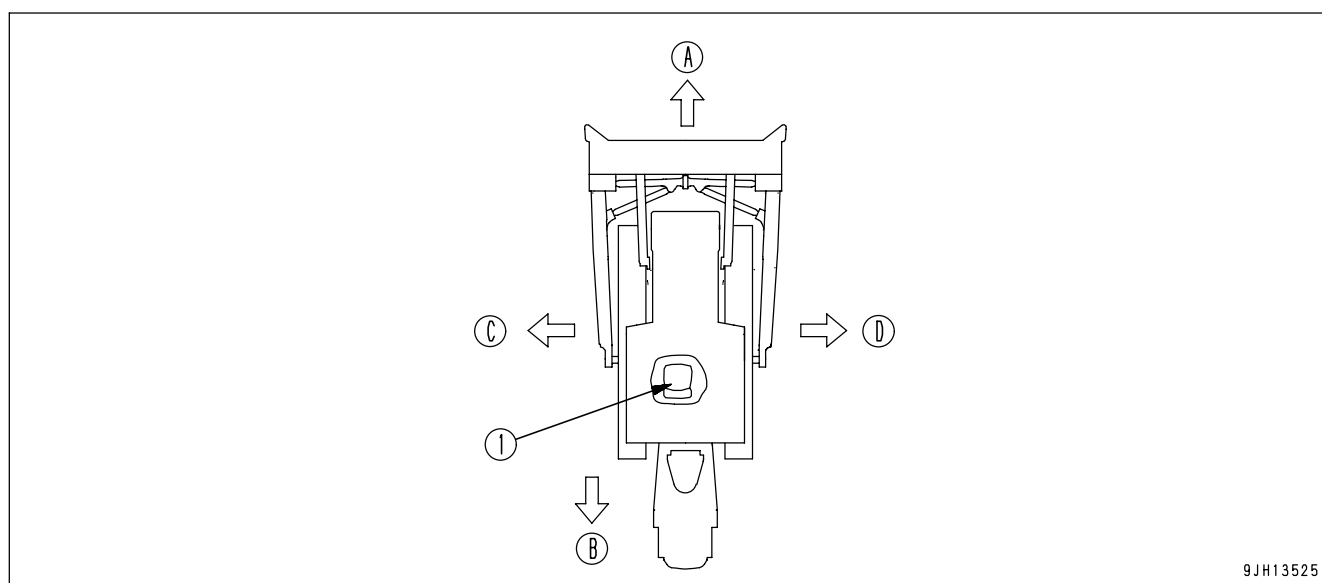
USE OF MACHINE

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

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

For further details, see "WORK POSSIBLE USING BULLDOZER (PAGE 3-141)" and "RIPPER OPERATION (PAGE 3-148)".

FRONT/REAR, LEFT/RIGHT DIRECTIONS OF MACHINE



- (1) Operator's seat
- (A) Front
- (B) Rear

- (C) Left
- (D) Right

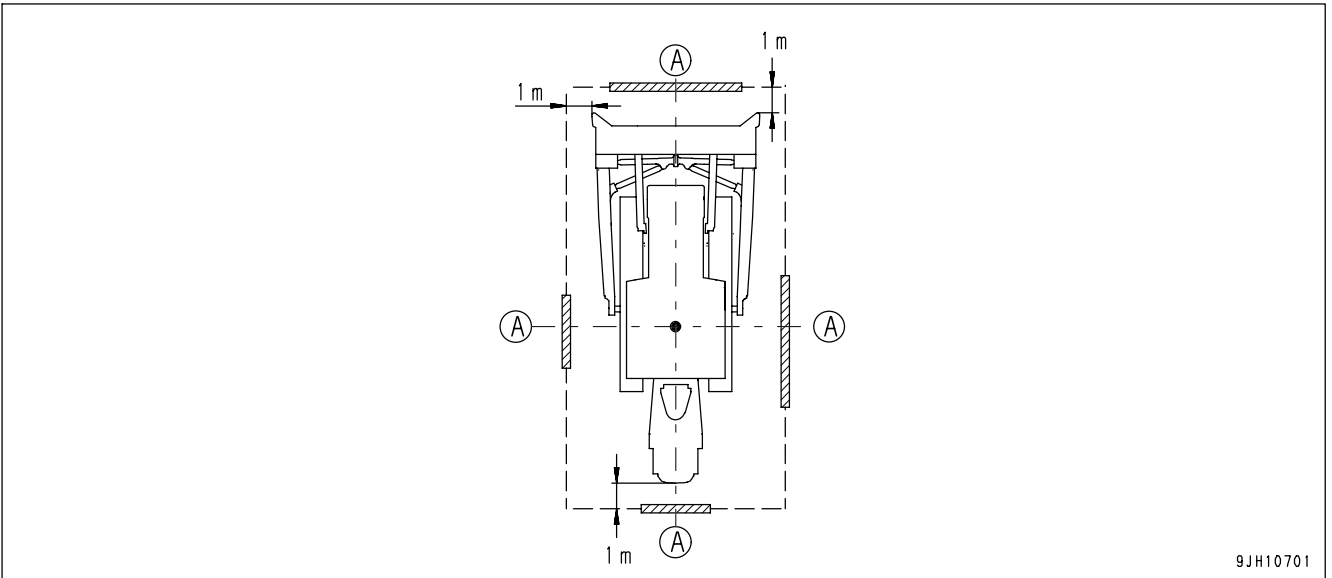
In this manual, the terms front, rear, left, and right refer to the travel direction as seen from the operator's seat when the operator's seat is facing the front.

VISIBILITY FROM OPERATOR'S SEAT

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

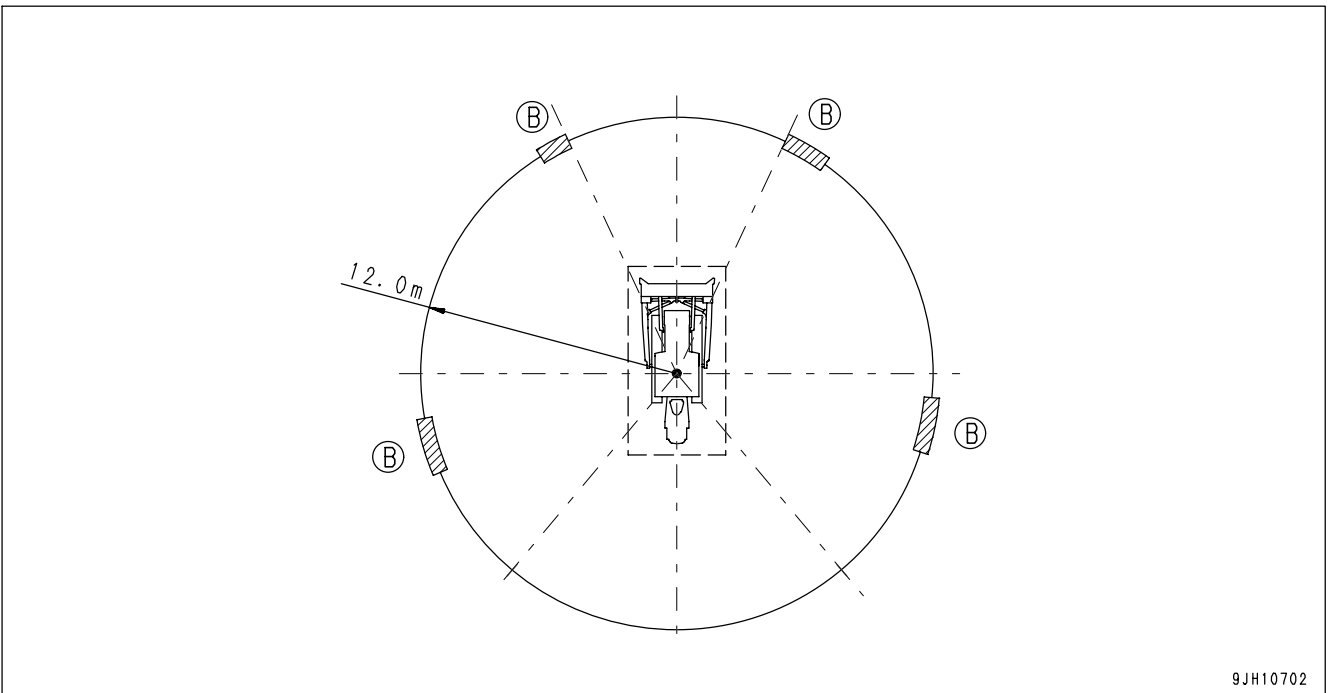
PROXIMITY VISIBILITY

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.



12M CIRCUMFERENCE 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.



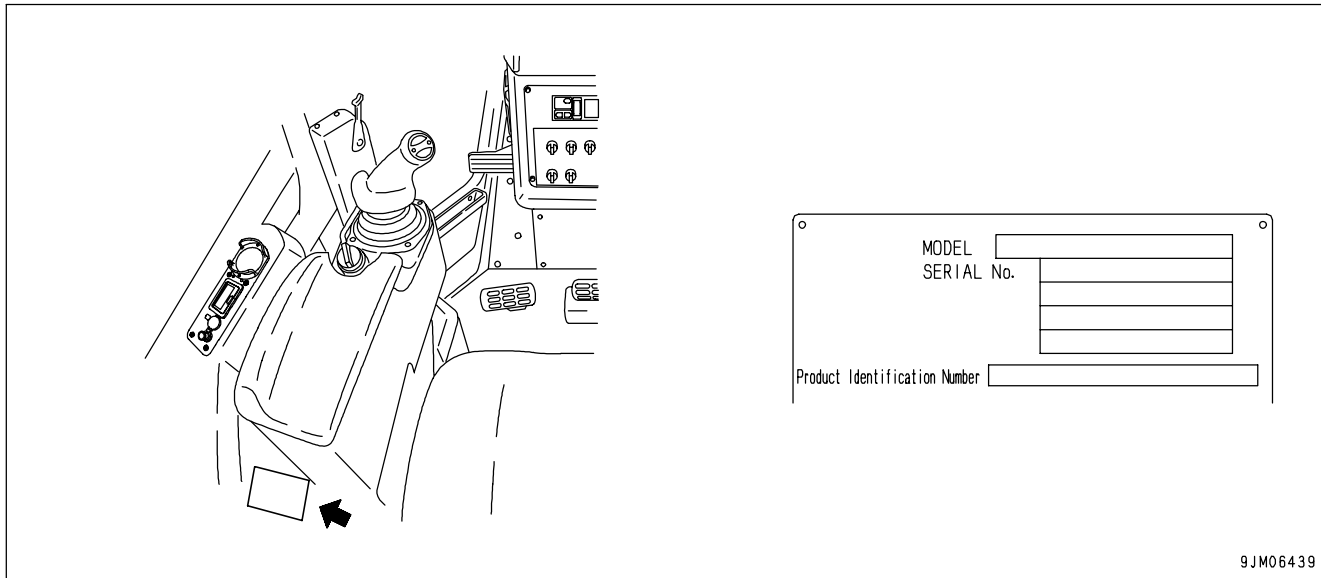
NECESSARY INFORMATION

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

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

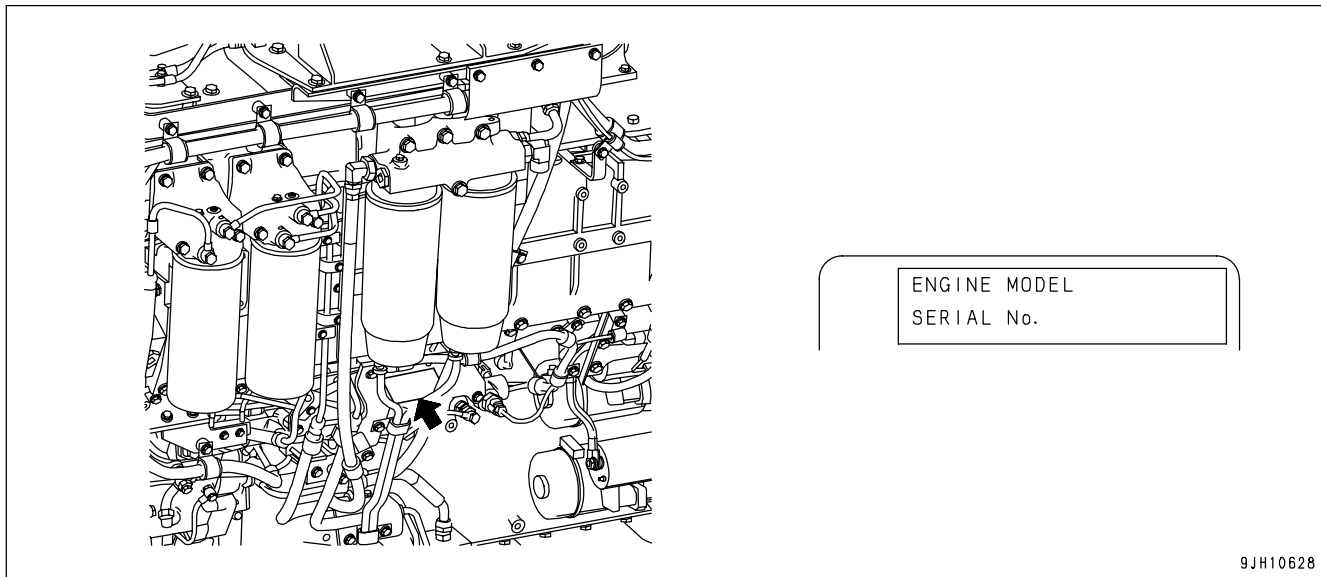
This is inside the console box on the left side of the operator's seat.

The design of the nameplate differs according to the territory.



EPA REGULATIONS, ENGINE NUMBER PLATE

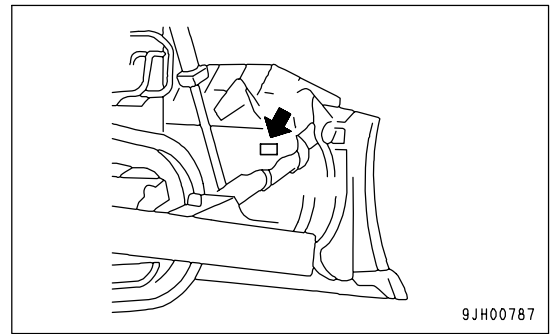
The normal nameplate and the EPA nameplate are on the common rail cover at the bottom of the fuel pre-filter on the left side of the engine.



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

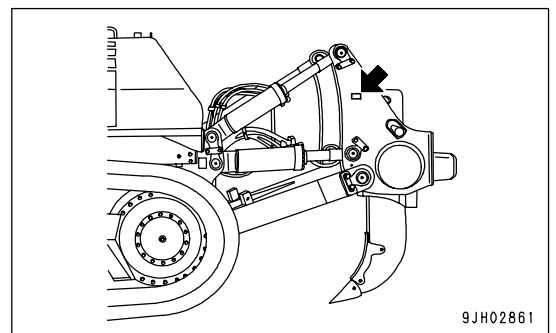
BLADE SERIAL NO. PLATE POSITION

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



RIPPER SERIAL NO. PLATE POSITION

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



POSITION OF SERVICE METER

On top of the machine monitor

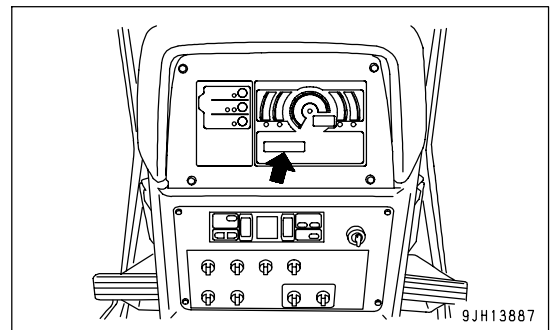


TABLE TO ENTER SERIAL NO. AND DISTRIBUTOR

Machine serial No.	
Engine serial No.	
Product identification number (PIN)	
Distributor name	
Address	-----

Service Personnel	-----
Phone/Fax	-----

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SAFETY

WARNING

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

SAFETY

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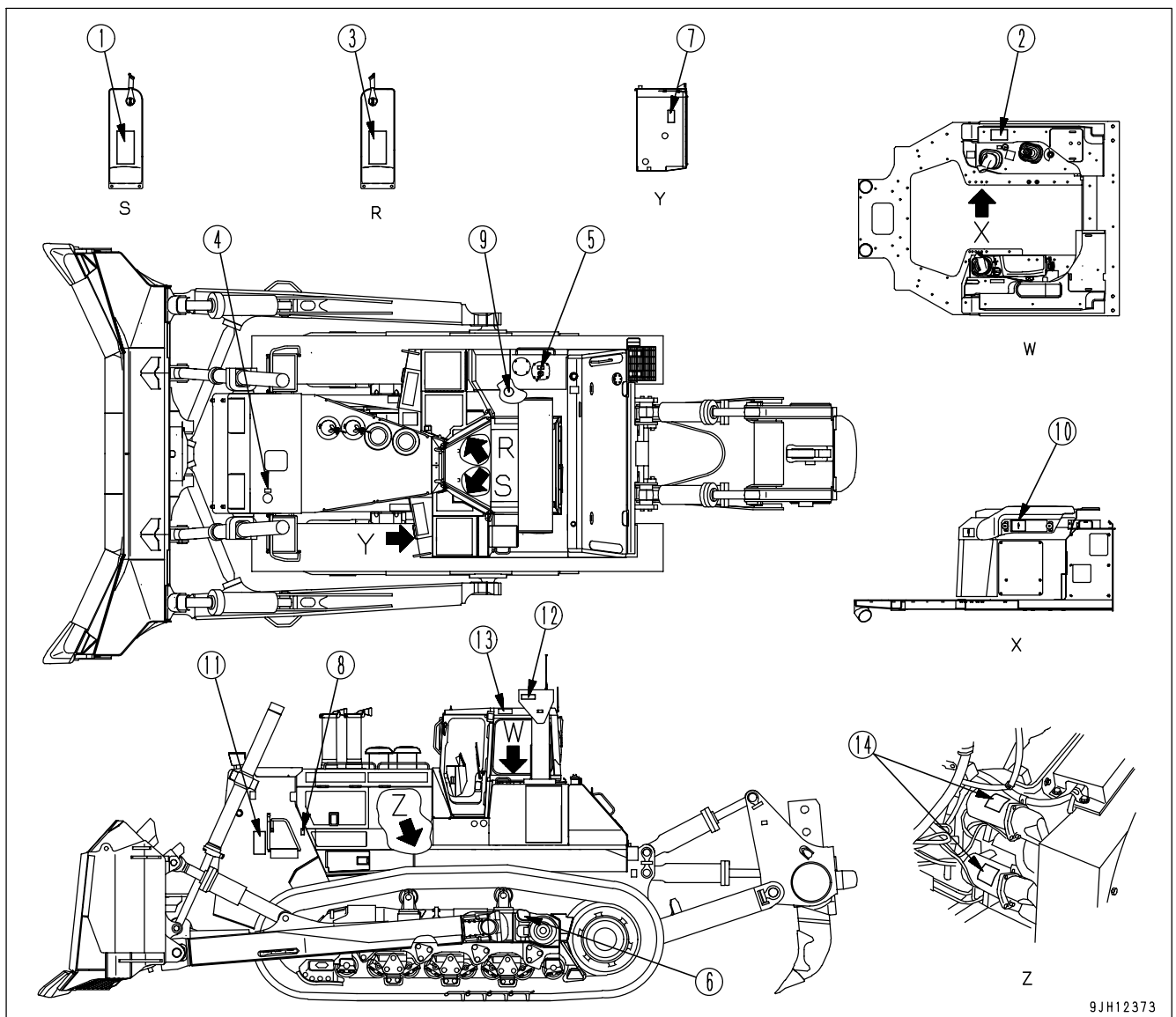
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SAFETY LABELS

The following warning signs and safety labels are used on this machine.

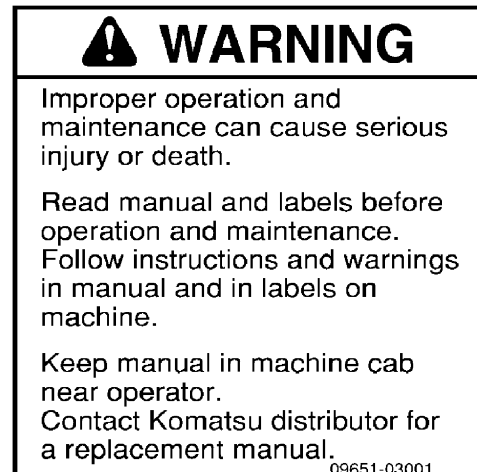
- Be sure that you fully understand the correct position and content of labels.
- To ensure that the content of labels can be read properly, be sure that they are in the correct place and always keep them clean. When cleaning them, do not use organic solvents or gasoline. These may cause the labels to peel off.
- There are also other labels in addition to the warning signs and safety labels. Handle those labels in the same way.
- If the labels are damaged, lost, or cannot be read properly, replace them with new ones. For details of the part numbers for the labels, see this manual or the actual label, and place an order with Komatsu distributor.

POSITIONS OF SAFETY PICTOGRAMS

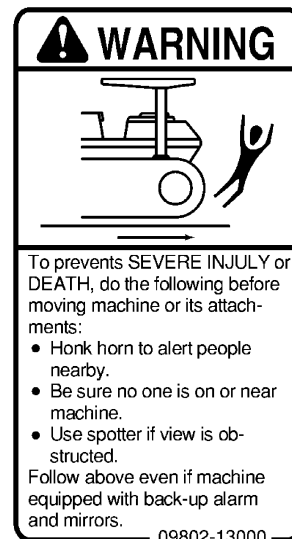


SAFETY LABELS

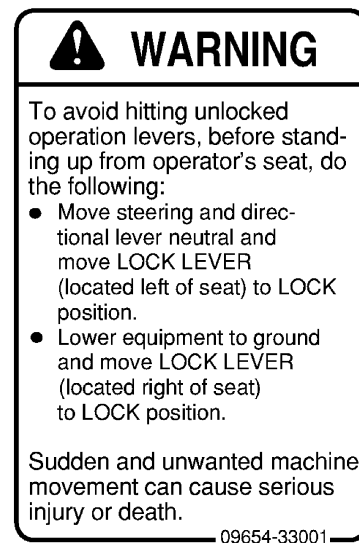
- (1) Caution before operating or maintaining machine
(09651-03001)



- (2) Caution before moving in reverse (09802-13000)



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



(4) Caution for high-temperature coolant (09668-03001)

⚠ WARNING

Hot water hazard.

To prevent hot water from spurting out:

- Turn engine off.
- Allow water to cool.
- Slowly loosen cap to relieve pressure before removing.

09668-03001

(5) Caution for high-temperature hydraulic oil (09653-03001)

⚠ WARNING

Hot oil hazard.

To prevent hot oil from spurting out:

- Turn engine off.
- Allow oil to cool.
- Slowly loosen cap to relieve pressure before removing.

09653-03001

(6) Caution for check and adjust track tension (195-98-22931)

⚠ WARNING



Compressed spring, plug and grease are under hazardous high pressure and can cause serious injury or death.

1. When adjusting track tension, only turn plug (A) ONE TURN. Turning plug further could cause plug and grease to fly off and hurt you. See manual for adjustment instructions.
2. When loosening track shoe, if it does not loosen after turning plug (A) ONE TURN, ask Komatsu dealer or distributor to disassemble.
3. Never disassemble bolts (B). Idler and yoke (C) may suddenly release and hit you. Ask Komatsu dealer or distributor to disassemble.



195-98-22931

(7) Caution for handling electric wires (09808-03000)

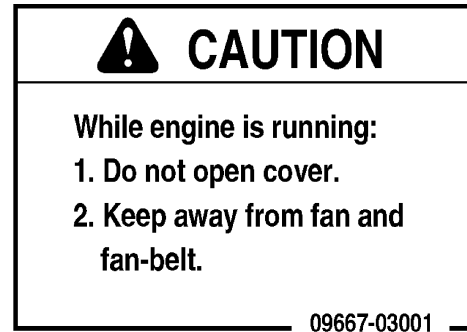
⚠ WARNING

Improper use of booster cables and battery cables can cause an explosion resulting in serious injury or death.

- Follow instructions in manual when using booster cable and battery cables.

09808-03000

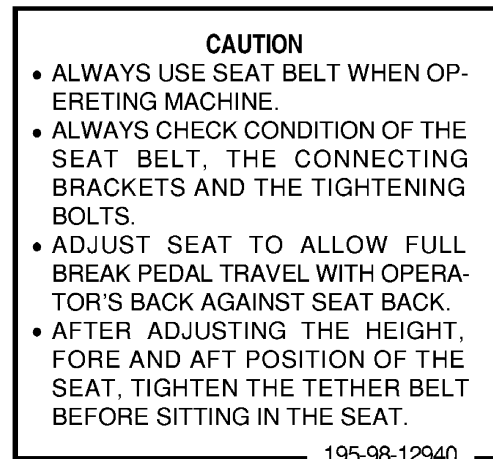
(8) Caution for engine running (09667-03001)



(9) Caution for handling accumulator (09659-53000)



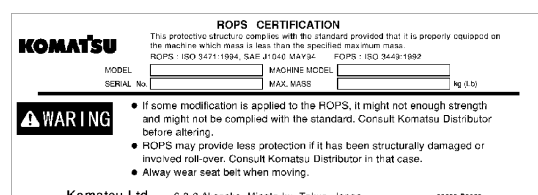
(10) Caution for use of seat belt (195-98-12940)



(11) Caution for approach when machine moving (09812-03000)



(12) Caution for ROPS (09620-B2000)



(13) Caution for FOPS (09620-C2000)

FOPS CERTIFICATION	
<small>This protective structure was provided to comply with the following standard.</small>	
KOMATSU	
<small>FOPS : ISO 3449-1992</small>	
<small>MODEL</small>	<small>MACHINE MODEL</small>
<small>SERIAL NO.</small>	<small>MAX. MASS</small>
<p>WARNING</p> <ul style="list-style-type: none"> • If some modification is applied to the FOPS, it might not enough strength and might not be complied with the standard. Consult Komatsu Distributor before altering. • FOPS may provide less protection if it has been structurally damaged or involved roll-over. Consult Komatsu Distributor in that case. 	
<small>Komatsu Ltd. 2-3-8 Akasaka, Minato-ku, Tokyo, Japan 09620-C2000</small>	

(14) Jump start prohibited (09842-A0481)



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

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

GENERAL PRECAUTIONS COMMON TO OPERATION AND MAINTENANCE

Mistakes in operation, inspection, or maintenance may result in serious personal injury or death. Before carrying out operation, inspection, or maintenance, always read this manual and the safety labels on the machine carefully and obey the warnings.

PRECAUTIONS BEFORE STARTING OPERATION

ENSURING SAFE OPERATION

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

UNDERSTANDING THE MACHINE

Before operating the machine, read this manual thoroughly. If there are any places in this manual that you do not understand, ask the person in charge of safety to give an explanation.

PREPARATIONS FOR SAFE OPERATION

PRECAUTIONS REGARDING SAFETY-RELATED EQUIPMENT

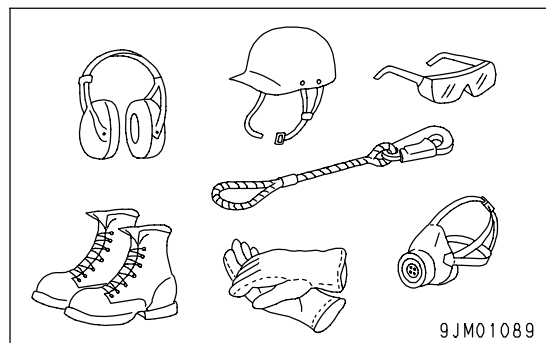
- Be sure that all guards, covers and mirrors are in their proper position. Have guards and covers repaired immediately if they are damaged.
- Understand the method of use of safety features and use them properly.
- Never remove any safety features. Always keep them in good operating condition.

INSPECTING MACHINE

Check the machine before starting operations. If any abnormality is found, do not operate the machine until repairs of the problem location have been completed.

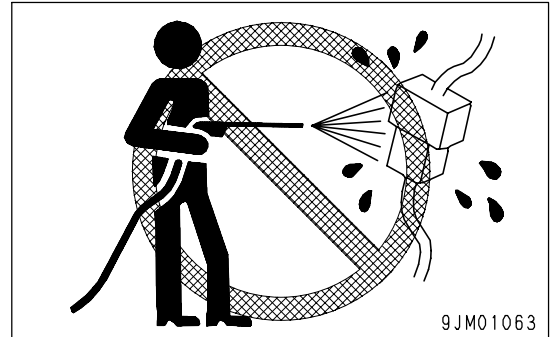
WEAR WELL-FITTING CLOTHES AND PROTECTIVE EQUIPMENT

- Do not wear loose clothes or any accessories. If these catch on the control levers or protruding parts, there is danger that it may cause the machine to move unexpectedly.
- 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.
- 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.
- Check that all protective equipment functions properly before using it.



KEEP MACHINE CLEAN

- If you get on or off the machine or carry out inspection and maintenance when the machine is dirty with mud or oil, there is a hazard that you will slip and fall. Wipe off any mud or oil from the machine. Always keep the machine clean.
- If water gets into the electrical system, there is a hazard that it will cause malfunctions or misoperation. If there is any misoperation, there is danger that the machine may move unexpectedly and cause serious personal injury or death. When washing the machine with water or steam, do not allow the water or steam to come into direct contact with electrical components.

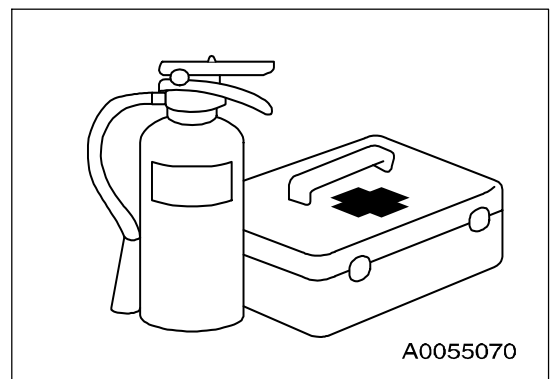
**PRECAUTIONS INSIDE OPERATOR'S COMPARTMENT**

- 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 tools or a machine parts lying around inside the operator's compartment. If tools or parts get into the control devices, it may obstruct operation and cause the machine to move unexpectedly, resulting in serious personal injury or death.
- Do not stick suction pads to the window glass. Suction pads act as a lens and may cause fire.
- Do not use a cell phone when driving or operating the machine. This may lead to mistakes in operation, which could cause serious personal injury or death.
- Never bring any dangerous objects such as flammable or explosive items into the operator's compartment.

PROVIDE 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.

**IF ANY PROBLEM IS 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.

FIRE PREVENTION

ACTION IF FIRE OCCURS

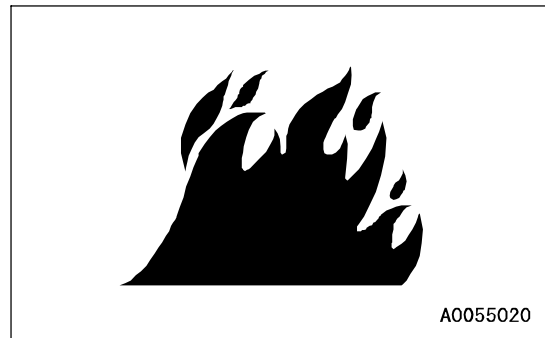
- Turn the start switch OFF to stop the engine.
- Use the handrails and steps to get off the machine.
- Do not jump off the machine. There is the danger of falling and suffering serious injury.

PRECAUTIONS TO PREVENT FIRE

• Fire caused by fuel, oil, antifreeze, or window washer fluid

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

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



• Fire caused by accumulation of flammable material.

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

• Fire coming from electric wiring

Short circuits in the electrical system can cause fire. To prevent fire, always observe the following.

- Keep all 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 piping**

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. There is danger that this may lead to damage to the hoses and cause high-pressure oil to spurt out, leading to fire, serious personal injury or death.

- **Explosion caused by lighting equipment**

- When checking fuel, oil, battery electrolyte, or coolant, always use lighting with anti-explosion specifications.
- When taking the electrical power for the lighting from the machine itself, follow the instructions in this manual.

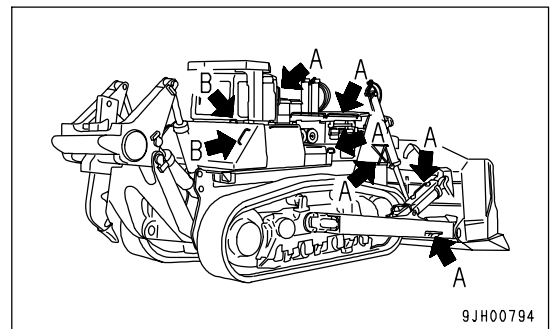
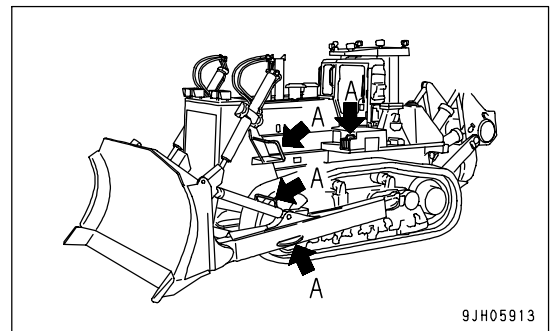
PRECAUTIONS WHEN GETTING ON OR OFF MACHINE

USE HANDRAILS AND STEPS WHEN GETTING ON OR OFF MACHINE

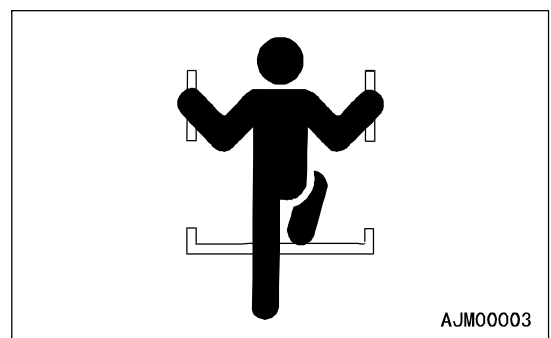
To prevent personal injury caused by slipping or falling off the machine, always do as follows.

- Use the parts marked by arrow A in the diagrams when getting on or off the machine.

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



- Always face the machine and maintain at least three-point contact (both feet and one hand, or both hands and one foot) with the handrail and steps to ensure that you support yourself.



- 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 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.
- Do not get on or off the machine while holding tools in your hand.

NO JUMPING ON OR OFF MACHINE

- 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.

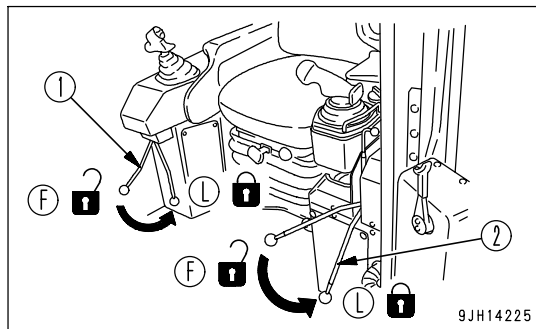
NO PEOPLE ON ATTACHMENTS

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

PRECAUTIONS WHEN STANDING UP FROM OPERATOR'S SEAT

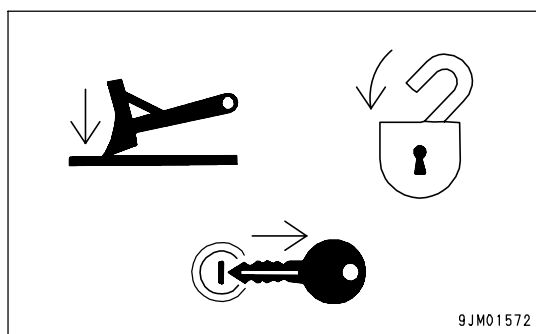
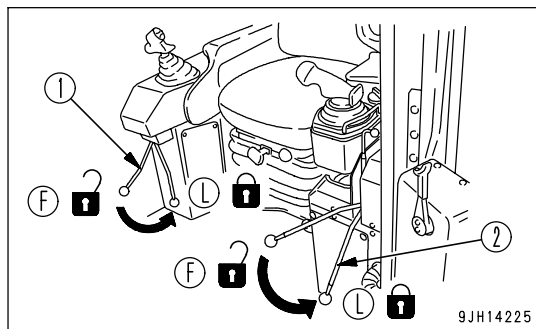
Before standing up from the operator's seat, lower the work equipment completely to the ground, set work equipment lock lever (1) and parking brake lever (2) securely to the LOCK position (L), then stop the engine.

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

**PRECAUTIONS WHEN LEAVING MACHINE**

If the proper procedures are not taken when parking the machine, the machine may suddenly move off by itself, and this may lead to serious personal injury or death. Always do the following.

- When leaving the machine, always lower the work equipment completely to the ground, set work equipment lock lever (1) and parking brake lever (2) securely to the LOCK position (L), then stop the engine. Use the key to lock all the equipment. Always remove the key, take it with you, and keep it in the specified place.

**EMERGENCY EXIT FROM OPERATOR'S CAB**

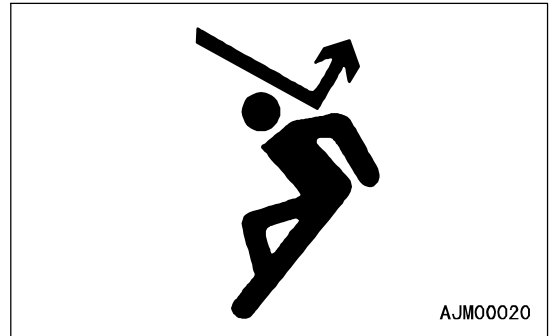
Machines equipped with a cab have doors on the left and right sides. If the door on the one side does not open, escape from the door on the other side.

DO NOT GET CAUGHT IN WORK EQUIPMENT

The clearance in the area around the work equipment changes according to the movement of the link. If you get caught, you may suffer serious personal injury or death. Do not allow anyone to come close to any rotating or extending/retracting portion.

PRECAUTIONS RELATED TO PROTECTIVE STRUCTURES

The operator's compartment is equipped with a structure (ROPS, FOPS) to protect the operator by absorbing the impact energy. If the machine weight (mass) exceeds the certified value (shown on the ROLL-OVER PROTECTIVE STRUCTURE (ROPS) CERTIFICATION plate), ROPS will not be able to fulfill its function. Do not increase machine weight beyond the certified value by modifying the machine or by installing attachments to the machine. Also, if the function of the protective equipment is impeded, the protective equipment will not be able to protect the operator, and the operator may suffer injury or death. Always observe the following.



- If the machine is equipped with a protective structure, do not remove the protective structure and carry out operations without it.
- If the protective structure is welded, or holes are drilled in it, or it is modified in any other way, its strength may drop. Consult your Komatsu distributor before carrying out any modifications.
- If the protective structure 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 contact your Komatsu distributor for advice on the method of repair.
- Even if the protective structure is installed, always fasten your seat belt properly when operating the machine. If you do not fasten your seatbelt properly, it cannot display its effect.

UNAUTHORIZED MODIFICATION

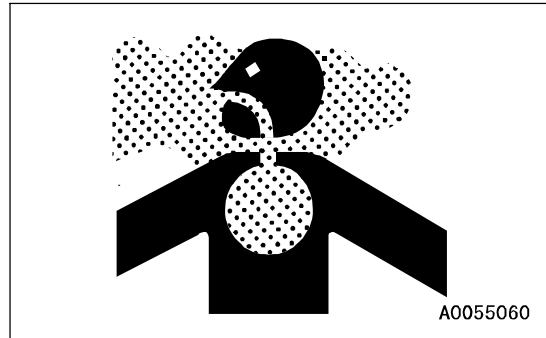
- Komatsu will not be responsible for any injuries, accidents, product failures or other property damages resulting from modifications made without authorization from Komatsu.
- Any modification made without authorization from Komatsu can create hazards. Before making a modification, consult your Komatsu distributor.

PRECAUTIONS RELATED TO ATTACHMENTS AND OPTIONS

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

PRECAUTIONS WHEN RUNNING ENGINE INSIDE BUILDING

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.



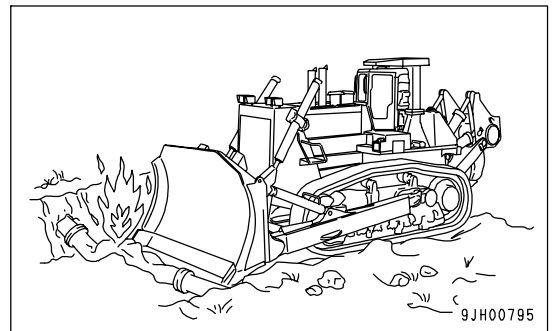
PRECAUTIONS FOR OPERATION

PRECAUTIONS FOR JOBSITE

INVESTIGATE AND CONFIRM JOBSITE CONDITIONS

On the jobsite, there are various hidden dangers that may lead to personal injury or death. Before starting operations, always check the following to confirm that there is no danger on the jobsite.

- 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 water or on soft ground, check the water depth, speed of the current, bedrock, and shape of the ground beforehand and avoid any place that will obstruct travel.



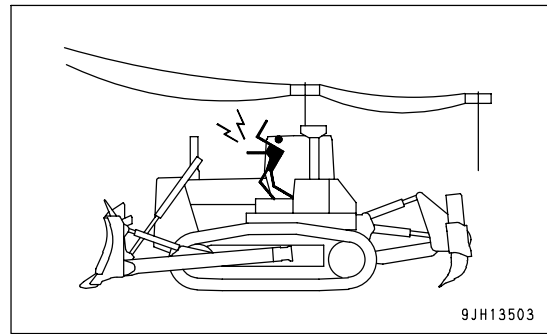
WORKING ON LOOSE GROUND

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

DO NOT GO CLOSE TO HIGH-VOLTAGE CABLES

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

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



- Even going close to high-voltage cables can cause electric shock, which may cause serious burns or even death. Always maintain a safe distance (see the table on the right) between the machine and the electric cable. Check with the local power company about safe operating procedure before starting operations.
 - To prepare for any possible emergencies, wear rubber shoes and gloves. Lay a rubber sheet on top of the seat, and be careful not to touch the chassis with any exposed part of your body.
 - Use a signalman to give warning if the machine approaches too close to the electric cables.
 - When carrying out operations near high voltage cables, do not let anyone near the machine.
 - If the machine should come too close or touch the electric cable, to prevent electric shock, the operator should not leave the operator's compartment until it has been confirmed that the electricity has been shut off.
- Also, do not let anyone near the machine.

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

ENSURE GOOD VISIBILITY

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

When traveling or carrying out operations in places with poor visibility, it is impossible to check for obstacles in the area around the machine and to check the condition of the jobsite. This leads to danger of serious personal injury or death. When traveling or carrying out operations in places with poor visibility, always observe the following.

- Position a signalman if there are areas where the visibility is not good.
- Only one signalman should give signals.
- When working in dark places, turn on the working lamp and front lamps installed to the machine, and set up additional lighting in the work area if necessary.
- Stop operations if the visibility is poor, such as in mist, snow, rain, or dust.
- When checking the mirrors installed to the machine, remove all dirt and adjust the angle of the mirror to ensure good visibility.

CHECKING SIGNS AND SIGNALMAN'S SIGNALS

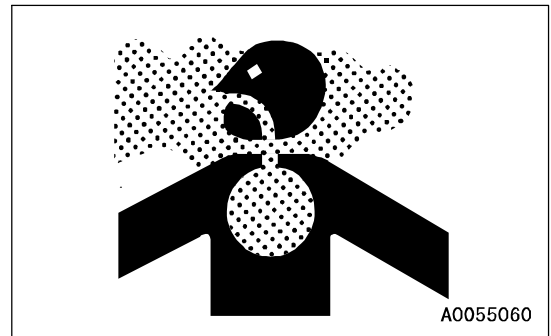
- Set up signs to inform of road shoulders and soft ground. If the visibility is not good, position a signalman if necessary. Operators should pay careful attention to the signs and follow the instructions from the signalman.
- Only one signalman should give signals.
- Make sure that all workers understand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

BEWARE OF ASBESTOS DUST

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

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

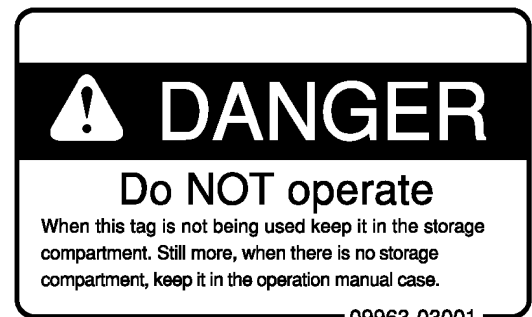
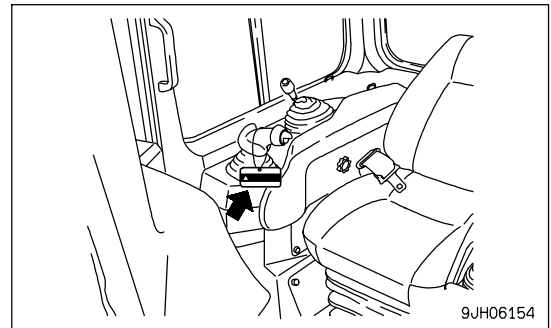
This machine does not use asbestos, but there is a danger that imitation parts may contain asbestos, so always use genuine Komatsu parts.



STARTING ENGINE

USE WARNING TAGS

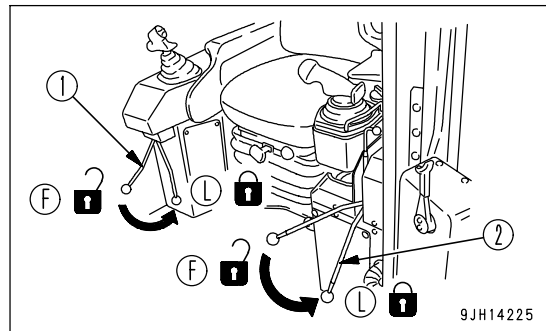
If there is any "DANGER! Do NOT operate!" warning tag displayed, it means that someone is carrying out inspection and maintenance of the machine. If the warning sign is ignored and the machine is operated, there is danger that the person carrying out inspection or maintenance may be caught in the rotating parts or moving parts and suffer serious personal injury or death. Do not start the engine or touch the levers.



INSPECTION AND MAINTENANCE BEFORE STARTING ENGINE

Carry out the following checks before starting the engine at the beginning of the day's work to ensure that there is no problem with the operation of the machine. If this inspection is not carried out properly problems may occur with the operation of the machine, and there is danger that this may lead to serious personal injury or death.

- Remove all dirt from the surface of the window glass to ensure a good view.
- Carry out the "WALK-AROUND CHECK (PAGE 3-89)".
- Remove all dirt from the surface of the lens of the front lamps and working lamps, 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 any pedals, 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 that the gauges work properly, check the angle of the mirror, and check that the control levers are all at the Neutral position.
- Before starting the engine, check that work equipment lock lever (1) and parking brake lever (2) are in LOCK position (L).
- Adjust the mirrors so that you can get a good rear-view from the operator's seat.
For the details of adjustment, see "ADJUST MIRROR (PAGE 3-106)".
- Check that there are no persons or obstacles above, below, or in the area around the machine.



PRECAUTIONS WHEN STARTING ENGINE

- Start and operate the machine only while seated.
- When starting the engine, sound the horn as a warning.
- Do not allow anyone apart from the operator to ride on the machine.
- Do not attempt to start the engine by short-circuiting the engine starting circuit. This may cause fire, serious personal injury or death.

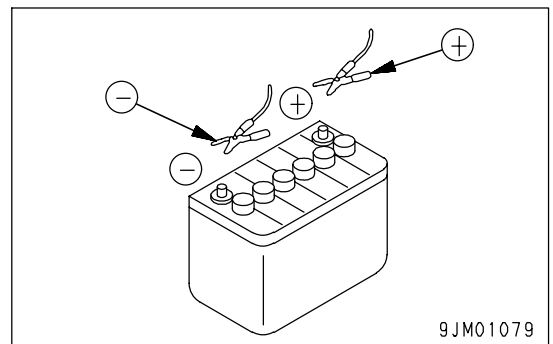
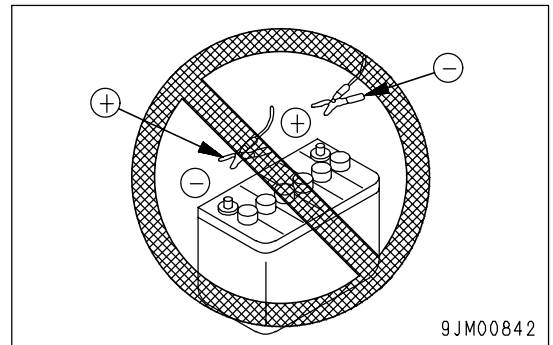
PRECAUTIONS IN COLD AREAS

- Carry out the warming-up operation thoroughly. If the machine is not thoroughly warmed up before the control levers are operated, the reaction of the machine will be slow, and this may lead to unexpected accidents.
- If the battery electrolyte is frozen, do not charge the battery or start the engine with a different power source. There is a hazard that this will ignite the battery and cause the battery to explode.
Before charging or starting the engine with a different power source, melt the battery electrolyte and check that there is no leakage of electrolyte before starting.

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.

- Always wear safety goggles and rubber gloves when starting the engine with booster cable.
- 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.
- 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 to the 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.
- For details of the procedure when starting the machine using a booster cable, see "STARTING ENGINE WITH BOOSTER CABLE (PAGE 3-179)".



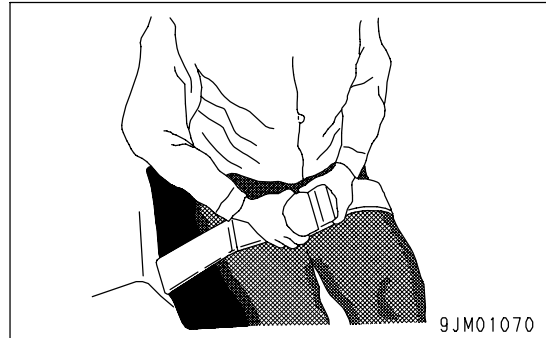
OPERATION

CHECKS BEFORE OPERATION

If the checks before starting are not carried out properly, the machine will be unable to display its full performance, and there is also danger that it may lead to serious personal injury or death.

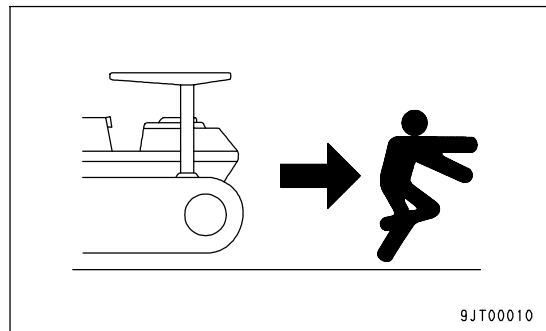
When carrying out the checks, move the machine to a wide area where there are no obstructions, and pay careful attention to the surrounding area. Do not allow anyone near the machine.

- Always wear the seatbelt. There is danger that you may be thrown out of the operator's seat and suffer serious injury when the brakes are applied suddenly.
- Check the operation of travel, steering and brake systems, and work equipment control system.
- Check for any problem in the sound of the machine, vibration, heat, smell, or gauges; check also that there is no leakage of oil or fuel.
- If any problem is found, carry out repairs immediately.



PRECAUTIONS WHEN TRAVELING IN FORWARD OR REVERSE

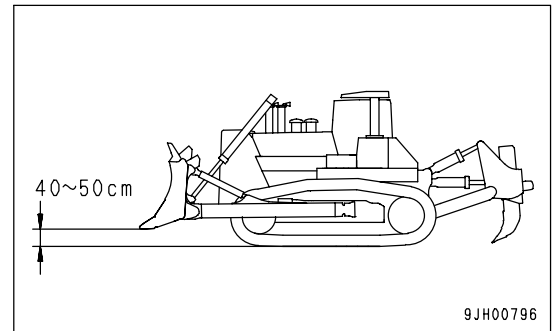
- Lock the cab door and windows securely, both when they are open and when they are closed.
- Do not allow anyone apart from the operator to ride on the machine.
- If there are any persons in the area around the machine, there is danger that they may be hit or caught by the machine, and this may lead to serious personal injury or death. Always observe the following before traveling.
 - Always operate the machine only when seated.
 - Before moving off, check again that there is no person or obstruction in the surrounding area.
 - Before moving, sound the horn to warn people in the surrounding area.
 - Check that the backup alarm (alarm buzzer when machine travels in reverse) works properly.
 - If there is an area to the rear of the machine which cannot be seen, position a signalman.



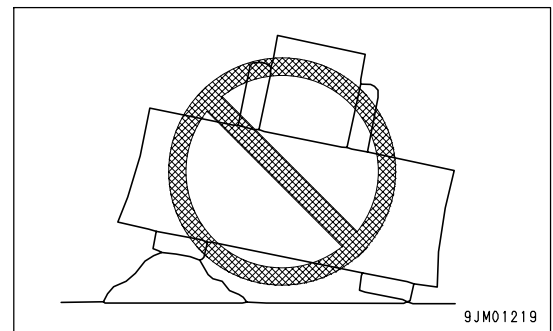
Always be sure to carry out the above precautions even when the machine is equipped with mirrors.

PRECAUTIONS WHEN TRAVELING

- Never turn the starting switch key to the OFF position when the machine is traveling. If the engine stops when the machine is traveling, it may become impossible to operate the steering, and this may cause serious personal injury or death. If the engine stops, depress the brake pedal immediately to stop the machine.
- 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 traveling on the level ground, keep the work equipment approximately 40 to 50 cm above the ground. Otherwise, the work equipment may contact to the ground and the machine may be turned over.

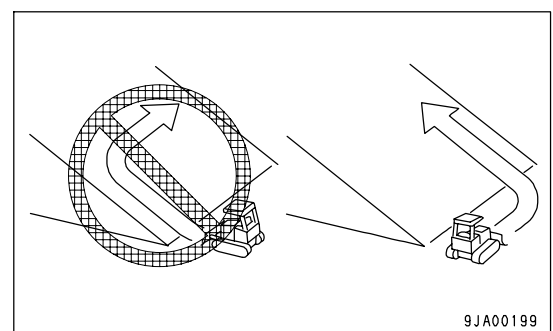


- Avoid traveling over obstacles when possible. If the machine has to travel over an obstacle, keep the work equipment close to the ground and travel at low speed. There is more danger of the machine tipping over to the left or right than tipping over to the front or rear, so do not travel over obstacles which make the machine tilt strongly to the left or right sides.
- 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.
- When passing over bridges or structures, check first that the structure is strong enough to support the weight 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 machine body or work equipment hit anything.

**TRAVELING ON SLOPES**

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

- Keep the work equipment approx. 20 to 30 cm (8 to 12 in) above the ground. In case of emergency, lower the work equipment to the ground immediately to help stop the machine.
- 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.
- 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.
- Apply the brake and use the engine as a brake, if necessary.



PRECAUTIONS WHEN OPERATING

- 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.
- If the machine moves with only either side of the blade loaded, its tail may swing. Take care.

PROHIBITED OPERATIONS

- To make it easier to escape if there is any problem, set the tracks at right angles to the road shoulder or cliff with the sprocket at the rear when carrying out operations.
- When using the machine, to prevent personal injury caused by damage to the work equipment or by the machine overturning due to overloading, do not exceed the permitted performance of the machine or the maximum permitted load for the structure of the machine.

METHOD OF USING BRAKES

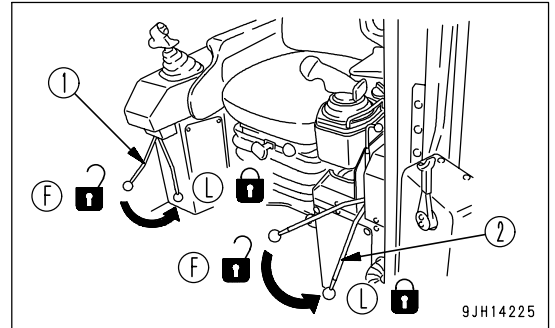
- When the machine is traveling, do not rest your foot on the brake pedal. If you travel with your foot resting on the pedal, the brake will always be applied, and this will cause the brakes to overheat and fail.
- Do not depress the brake pedal repeatedly if not necessary.
- When traveling downhill,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

TRAVELING ON SNOW-COVERED OR FROZEN SURFACES

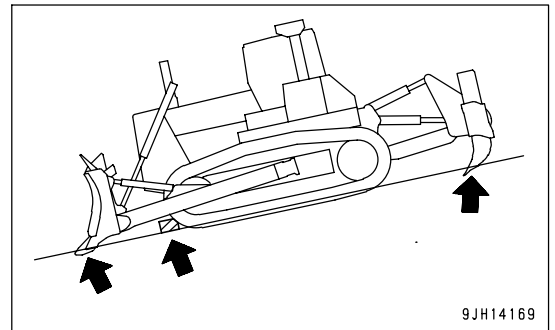
- Snow-covered or frozen surfaces are slippery, so be extremely careful when traveling or operating the machine, and do not operate the levers suddenly. Even a slight slope may cause the machine to slip, so be particularly careful when working on slopes.
- With frozen ground surfaces, the ground becomes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

PARKING MACHINE

- Park the machine on firm, level ground.
- Select a place where there is no hazard of landslides, falling rocks, or flooding.
- Lower the work equipment completely to the ground.
- When leaving the machine, set work equipment lock lever (1) and parking brake lever (2) to the LOCK position (L), and stop the engine.
- Always close the operator's cab door, and use the key to lock all the equipment in order to prevent any unauthorized person from moving the machine. Always remove the key, take it with you, and leave it in the specified place.



- If it is necessary to park the machine on a slope, always do as follows.
 - Set the work equipment on the downhill side and dig it into the ground.
 - In addition, put blocks under the tracks to prevent the machine from moving.



TRANSPORTATION

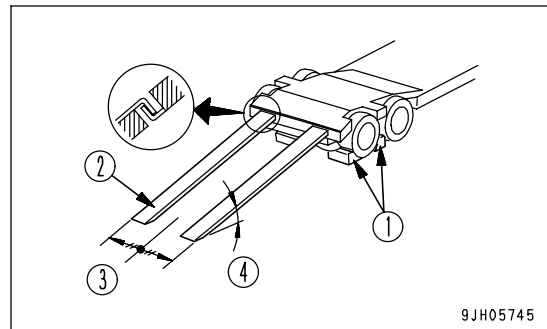
When the machine is transported on a trailer, there is danger of serious personal injury or death during transportation. Always do as follows.

- Always check the machine dimensions carefully. Depending on the work equipment installed, the machine weight, transportation height, and overall length may differ.
- Check beforehand that all bridges and other structures on the transportation route are strong enough to withstand the combined weight of the transporter and the machine being transported.
- The machine can be divided into parts for transportation, so when transporting the machine, please contact your Komatsu distributor to have the work carried out.

LOADING AND UNLOADING

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

- Perform loading and unloading on firm, level ground only. Maintain a safe distance from the edge of the road or cliff.
 - Always use ramps of adequate strength. Be sure that the ramps are wide, long, and thick enough to provide a safe loading slope. Take suitable steps to prevent the ramps from moving out of position or coming off.
 - Be sure the ramp surface is clean and free of grease, oil, ice and loose materials. Remove dirt from machine-tracks. On a rainy day, in particular, be extremely careful since the ramp surface is slippery.
 - Run the engine at low idling and drive the machine slowly at low speed.
 - When on the ramps, do not operate any lever except for the travel lever.
 - Never correct your steering on the ramps. If necessary, drive off the ramps, correct the direction, then enter the ramps again.
 - The center of gravity of the machine will change suddenly at the joint between the ramps and the track or trailer, and there is danger of the machine losing its balance. Travel slowly over this point.
 - When loading or unloading to an embankment or platform, make sure that it has suitable width, strength, and grade.
 - For machines equipped with a cab, always lock the door after boarding the machine. If this is not done, the door may suddenly open during transportation.
- Refer to "TRANSPORTATION (PAGE 3-161)".



- (1) Blocks
- (2) Ramp
- (3) Centerline of trailer
- (4) Angle of ramps: Max. 15°

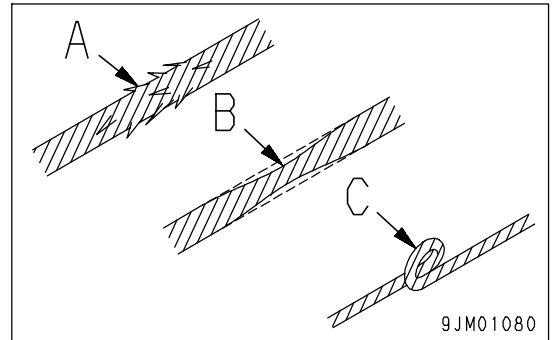
TOWING

PRECAUTIONS WHEN TOWING

Always use the correct towing equipment and towing method. Any mistake in the selection of the wire rope or towing bar or in the method of towing a disabled machine may lead to serious personal injury or death.

For towing, see "METHOD OF TOWING MACHINE (PAGE 3-175)".

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

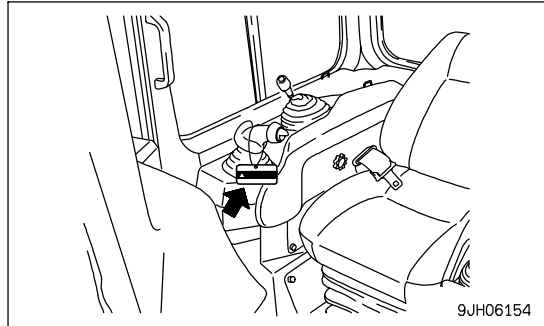


PRECAUTIONS FOR MAINTENANCE

PRECAUTIONS BEFORE STARTING INSPECTION AND MAINTENANCE

DISPLAY WARNING TAG DURING INSPECTION AND MAINTENANCE

When carrying out inspection or maintenance, always attach the "DANGER! Do NOT operate!" warning tag to the work equipment control lever in the operator's cab to alert others that you are working on the machine. If there is any "DANGER! Do NOT operate!" warning tag displayed, it means that someone is carrying out inspection and maintenance of the machine. If the warning sign is ignored and the machine is operated, there is danger that the person carrying out inspection or maintenance may be caught in the rotating parts or moving parts and suffer serious personal injury or death. Do not start the engine or do not touch the levers.

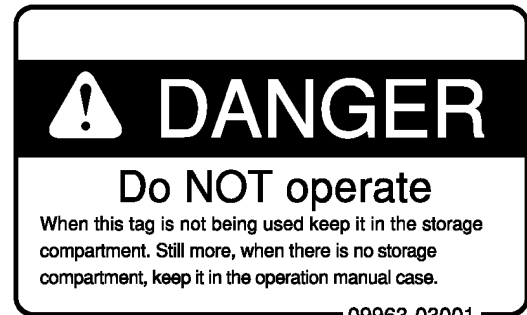


- If necessary, put up signs around the machine also.

Warning tag part number: 09963-03001

When not using this warning tag, keep it in the toolbox.

If there is no toolbox, keep it in the pocket for the Operation and Maintenance Manual



KEEP WORKPLACE CLEAN AND TIDY

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

SELECT SUITABLE PLACE FOR INSPECTION AND MAINTENANCE

- Stop the machine on firm, level ground.
- Select a place where there is no hazard of landslides, falling rocks, or flooding.

ONLY AUTHORIZED PERSONNEL

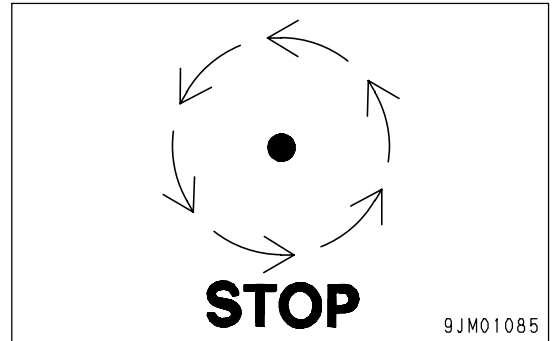
Do not allow any unauthorized personnel into the area when servicing the machine. If necessary, employ a guard.

APPOINT LEADER WHEN WORKING WITH OTHERS

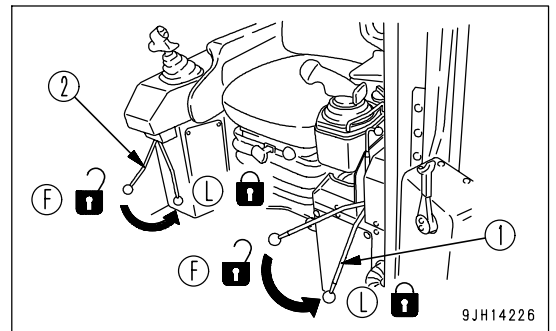
When repairing the machine or when removing and installing the work equipment, appoint a leader and follow his instructions during the operation.

STOP ENGINE BEFORE CARRYING OUT INSPECTION AND MAINTENANCE

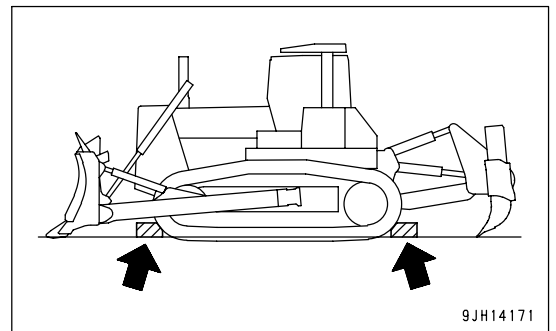
- Lower the work equipment completely to the ground and stop the engine before performing any inspection and maintenance.



- Turn the starting switch to the ON position, operate the work equipment control lever to the RAISE and LOWER position 2 or 3 times repeatedly to release the remaining pressure in the hydraulic circuit, then set parking brake lever (1) and work equipment lock lever (2) to the LOCK position (L).
- Check that the battery relay is off and main power is not conducted. (Wait for approx. one minute after turning off the engine starting switch key and press the horn switch. If the horn does not sound, it is not activated.)



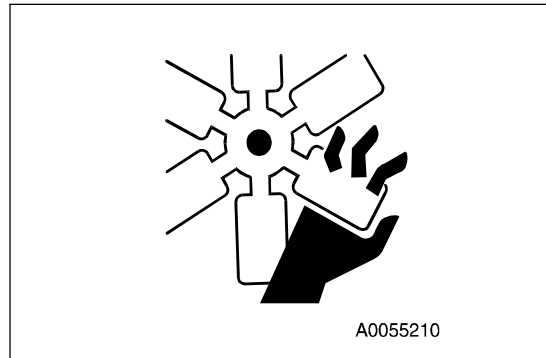
- Put blocks under the track to prevent the machine from moving.



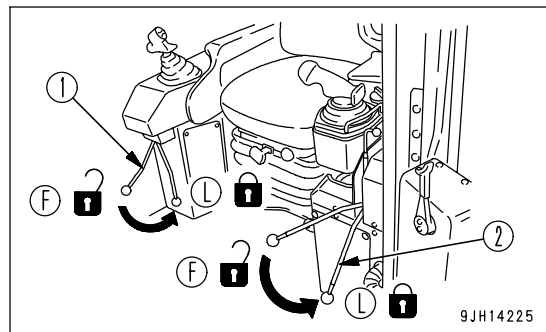
TWO WORKERS FOR MAINTENANCE WHEN ENGINE IS RUNNING

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

- One worker must always sit in the operator’s seat and be ready to stop the engine at any time. All workers must maintain contact with the other workers.
- When carrying out operations near 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.
- Never drop or insert tools or other objects into the fan, fan belt, or other rotating parts. There is danger that they may contact the rotating parts and break or be sent flying.



- Set work equipment lock lever (1) and parking brake lever (2) to the LOCK position (L) to prevent the work equipment 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.



INSTALLING, REMOVING, OR STORING 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.

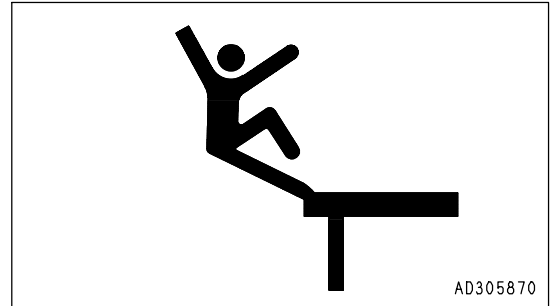


PRECAUTIONS WHEN WORKING AT HIGH PLACES

When working at high places, use a step ladder or other stand to ensure that the work can be carried out safely.

PRECAUTIONS WHEN WORKING ON TOP OF MACHINE

- Clean up the machine to prevent falling off when performing maintenance, always do as follows.
 - Do not spill oil or grease.
 - Do not scatter the tools.
 - Be careful at the time of the walk on the step.
 - Remove mud and the oils and fats kind of the bottom of shoes.
- Never jump off the machine. When getting on or off the machine, maintain at least three-point contact (both feet and one hand, or both hands and one foot) with the handrail and steps to ensure that you support yourself.
- To prevent personal injury caused by slipping or falling off the machine, never climb on the engine hood or covers except the check passage with non-slip pads.



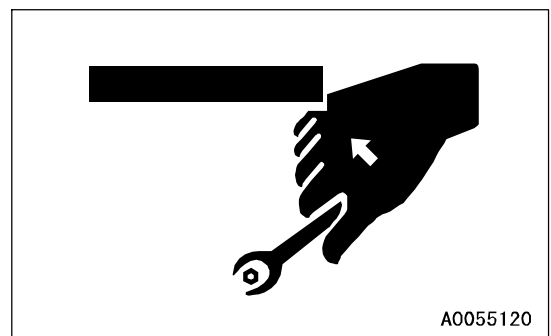
PRECAUTIONS WHEN WORKING UNDER MACHINE OR WORK EQUIPMENT

- Make sure the hoists or jacks you use are in good repair and strong enough to handle the weight of the component. Never use jacks at places where the machine is damaged, bent, or twisted. Never use frayed, twisted or pinched wire rope. Never use bent or distorted hooks.
- It is extremely dangerous to work under the machine if the track shoes are lifted off the ground and the machine is supported only with the work equipment. If any of the control levers is touched by accident, or there is damage occurring to the hydraulic piping, the work equipment or the machine will suddenly drop. This is extremely dangerous. Never work under the work equipment or the machine.
- If it is necessary to raise the work equipment or the machine and then go under it to carry out inspection or maintenance, support the work equipment and machine securely with blocks and stands strong enough to support the weight of the work equipment and machine.
If the work equipment and machine are not supported, there is a hazard that they may come down and that this may lead to serious personal injury or death.
- Never use concrete blocks for supports. They can collapse under even light loads.



PROPER TOOLS

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



PRECAUTIONS FOR INSPECTION AND MAINTENANCE

PRECAUTIONS WHEN 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.

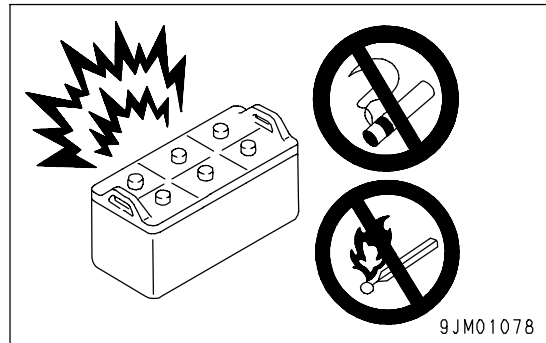
HANDLING BATTERY

Before inspecting or handling the battery, turn the key in the starting switch to the OFF position.

- **Danger of battery exploding**

When the battery is being charged, flammable hydrogen gas is generated and may explode. In addition, the battery electrolyte includes dilute sulphuric acid. Any mistake in handling may cause serious personal injury, explosion, or fire, so always observe the following.

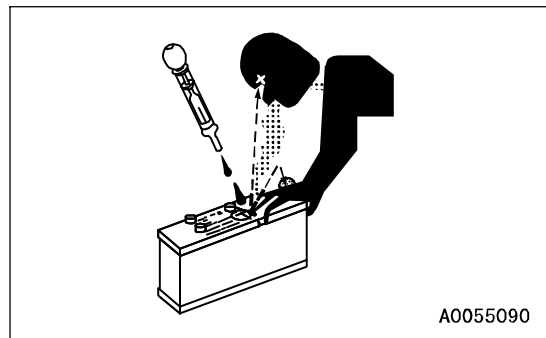
- Do not use or charge the battery if the battery electrolyte is below the LOWER LEVEL mark. This will cause explosion. Always carry out periodic inspection of the battery electrolyte level, and add distilled water (or commercially available battery filler solution) to the UPPER LEVEL mark.
- Do not smoke or bring any flame close to the battery.
- Hydrogen gas is generated when the battery is being charged, so remove the battery from the machine, take it to a well-ventilated place, remove the battery caps, then carry out the charging.
- After charging, tighten the battery caps securely.



- **Danger from dilute sulphuric acid**

When the battery is being charged, flammable hydrogen gas is generated and may explode. In addition, the battery electrolyte includes dilute sulphuric acid. Any mistake in handling may cause serious personal injury, explosion, or fire, so always observe the following.

- When handling the battery, always wear protective goggles and rubber gloves.
- If battery electrolyte gets into your eyes, immediately wash your eyes with large amounts of fresh water. After that, get medical attention immediately.
- If battery electrolyte gets on your clothes or skin, wash it off immediately with large amounts of water.



- **Removing battery cables**

Before repairing the electrical system or carrying out electric welding, turn the starting switch OFF. Wait for approx. 1 minute, then remove the negative (-) battery cable to stop the flow of electricity.

- **Danger of sparks**

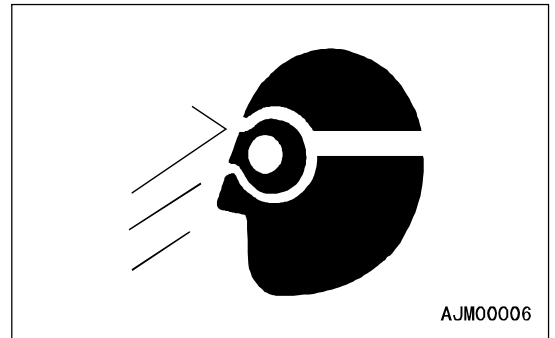
There is hazard that sparks will be generated, so always observe the following.

- Do not let tools or other metal objects make any contact between the battery cables. Do not leave tools lying around near the battery.
- When removing the battery cables, remove the ground cable (negative (-) cable) first. When installing, connect the positive (+) cable first, then connect the ground. Tighten the battery cable terminals securely.
- Secure the battery firmly in the specified position.

PRECAUTIONS WHEN USING HAMMER

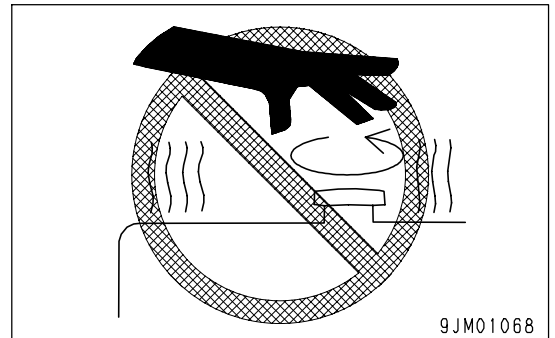
When using a hammer, pins may fly out or metal particles may be scattered. This may lead to serious personal injury or death. Always do as follows.

- 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.
- If hard metal parts such as pins, bucket teeth, cutting edges, or bearings are hit with a hammer, there is a hazard that pieces might be scattered and cause serious personal injury or death. Always wear safety glasses and gloves.
- If the pin is hit with strong force, there is a hazard that it may fly out and injure people in the surrounding area. Do not allow anyone to enter the surrounding area.



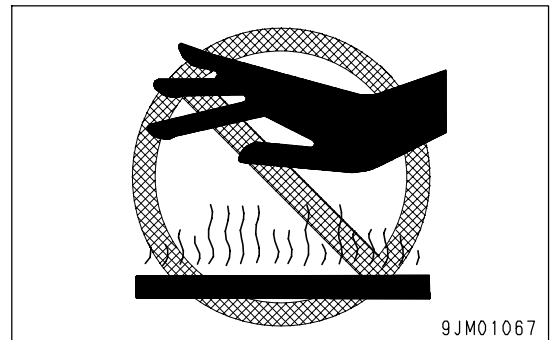
PRECAUTIONS WITH HIGH-TEMPERATURE COOLANT

To prevent burns from boiling water or steam spurting out when checking or draining the coolant, wait for the coolant to cool down to a temperature where the radiator cap can be touched by hand. Then loosen the cap slowly to release the pressure inside the radiator, and remove the cap.



PRECAUTIONS WITH HIGH-TEMPERATURE OIL

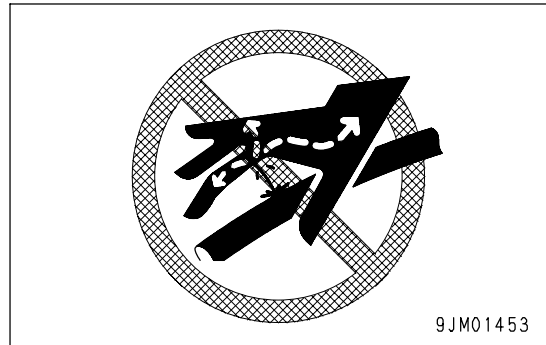
To prevent burns from hot oil spurting out or from touching high-temperature parts when checking or draining the oil, wait for the oil to cool down to a temperature where the cap or plug can be touched by hand. Then loosen the cap or plug slowly to release the internal pressure and remove the cap or plug.



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 or death. Always do as follows.

- Do not carry out inspection or replacement when the circuit is still under pressure.
Release the pressure in the hydraulic circuit. For details, see "METHOD OF RELEASING PRESSURE IN HYDRAULIC CIRCUIT (PAGE 4-85)".
- 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 loss of sight if it contacts your skin or 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.

**PRECAUTIONS WITH HIGH-PRESSURE FUEL**

When the engine is running, high-pressure is generated in the engine fuel piping. When carrying out inspection or maintenance of the fuel piping system, stop the engine and wait for at least 30 seconds to allow the internal pressure to go down before starting the operation.

HANDLING HIGH-PRESSURE HOSES AND PIPING

- If oil or fuel leaks from high-pressure hoses or piping, it may cause fire or misoperation, and lead to serious personal injury, or death. If the hose or piping mounts are loose or oil or fuel is found to be leaking from the mount, stop operations and tighten to the specified torque.
If any damaged or deformed hoses or piping are found, please consult your Komatsu distributor.

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

- Damaged hose or deformed 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.

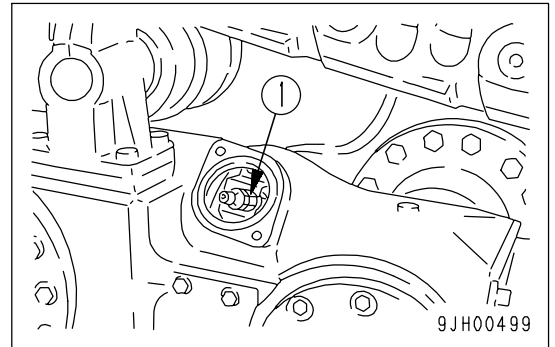
NOISE

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

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

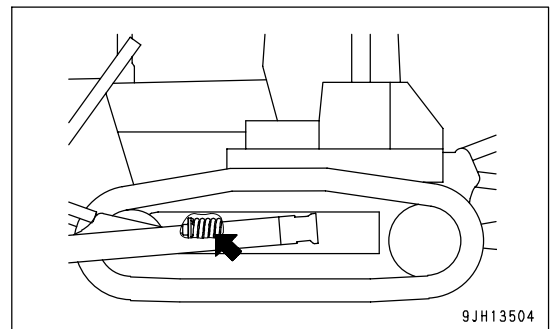
PRECAUTIONS WITH HIGH-PRESSURE GREASE WHEN ADJUSTING TRACK TENSION

- Grease is pumped into the track tension adjustment system under high pressure. If the specified procedure for maintenance is not followed when making adjustment, grease drain valve (1) may fly out and cause serious injury or damage.
- When loosening grease drain valve (1) to loosen track tension, never loosen it more than one turn. In doing so, loosen the valve slowly.
- Never put your face, hands, feet, or any other part of your body directly in front of grease drain valve (1).

**DO NOT DISASSEMBLE RECOIL SPRING**

Never disassemble the recoil spring assembly. The recoil spring assembly has a powerful spring that acts to reduce the impact on the idler. If it is disassembled by mistake, the spring may shoot out and cause serious personal injury or death.

It is necessary to disassemble the recoil spring assembly, always ask your Komatsu distributor to carry out the operation.



HANDLING ACCUMULATOR AND GAS SPRING

This machine is equipped with an accumulator. Even after the engine stops, if the work equipment control lever is operated soon after stop of the engine in the direction to lower the work equipment, the work equipment goes down under its own weight.

After stopping the engine, set the parking brake lever and the work equipment lock lever to the LOCK position. The accumulator and gas spring are charged with high-pressure nitrogen gas. If the accumulator is handled mistakenly, it may cause an explosion that could lead to serious personal injury or death. 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.



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PRECAUTIONS WITH COMPRESSED AIR

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

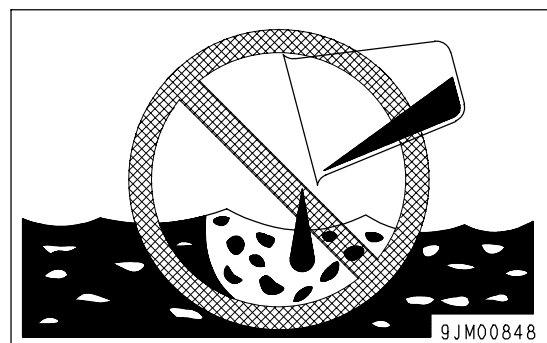
MAINTENANCE OF AIR CONDITIONER

- If air conditioner refrigerant gets into your eyes, it may cause loss of sight; if it contacts your skin, it may cause frostbite. Never loosen any parts of the cooling circuit.

DISPOSING OF 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.



9JM00848

METHOD OF SELECTING WINDOW WASHER FLUID

Use an ethyl alcohol base washer liquid.

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

PERIODIC REPLACEMENT OF SAFETY CRITICAL PARTS

- To enable this machine to be used safely for a long period, always carry out periodic replacement of safety critical parts that have a particularly close relation to safety, such as hoses and the seatbelt.
For details of the replacement of safety critical parts, see "PERIODIC REPLACEMENT OF SAFETY CRITICAL PARTS (PAGE 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 personal injury or death. It is difficult to judge the remaining life of these components from external inspection or the feeling when operating, so always replace them at the specified interval.
- Replace or repair safety-critical parts if any defect is found, even when they have not reached the specified replacement time.

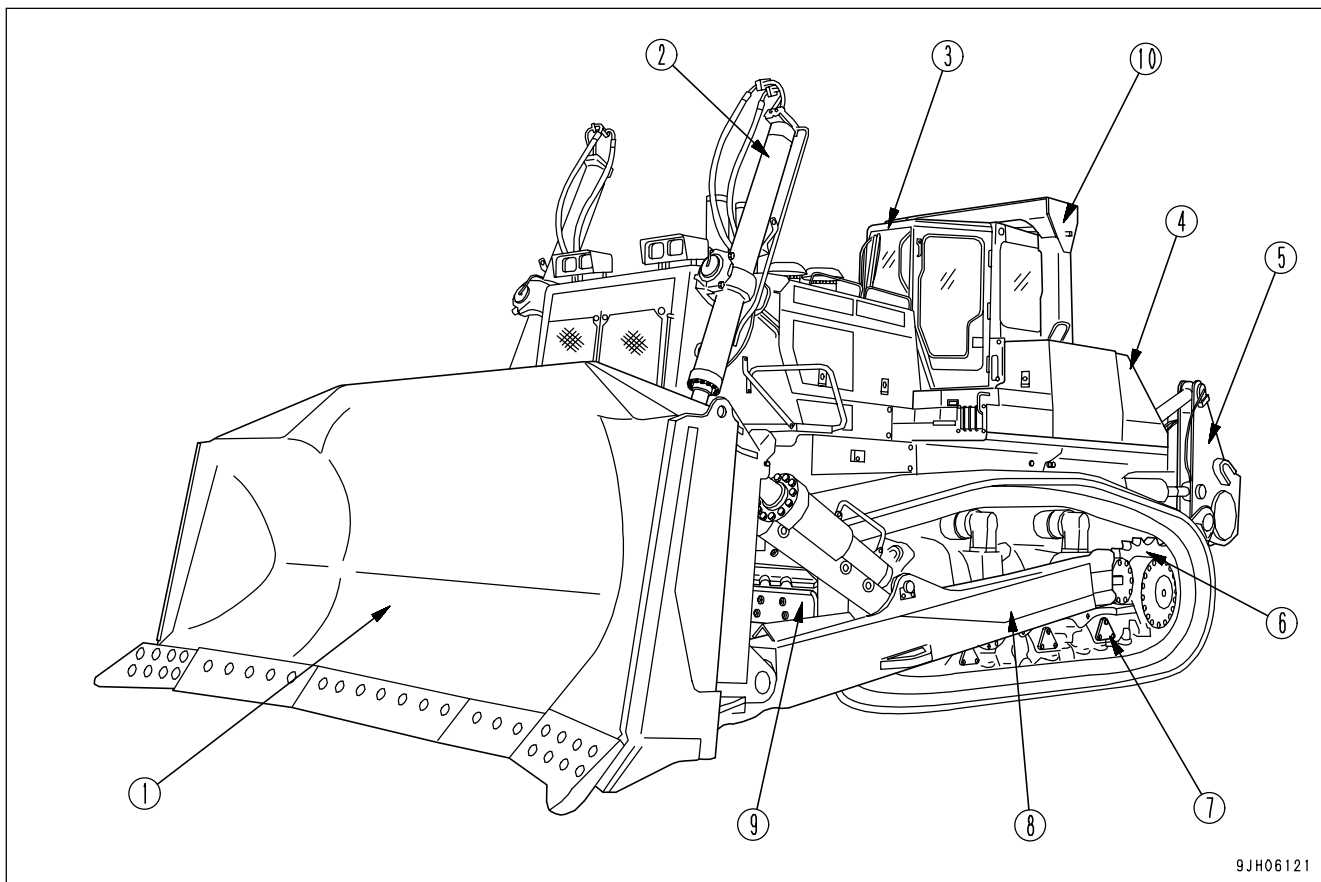
OPERATION

WARNING

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

GENERAL VIEW

GENERAL VIEW OF MACHINE

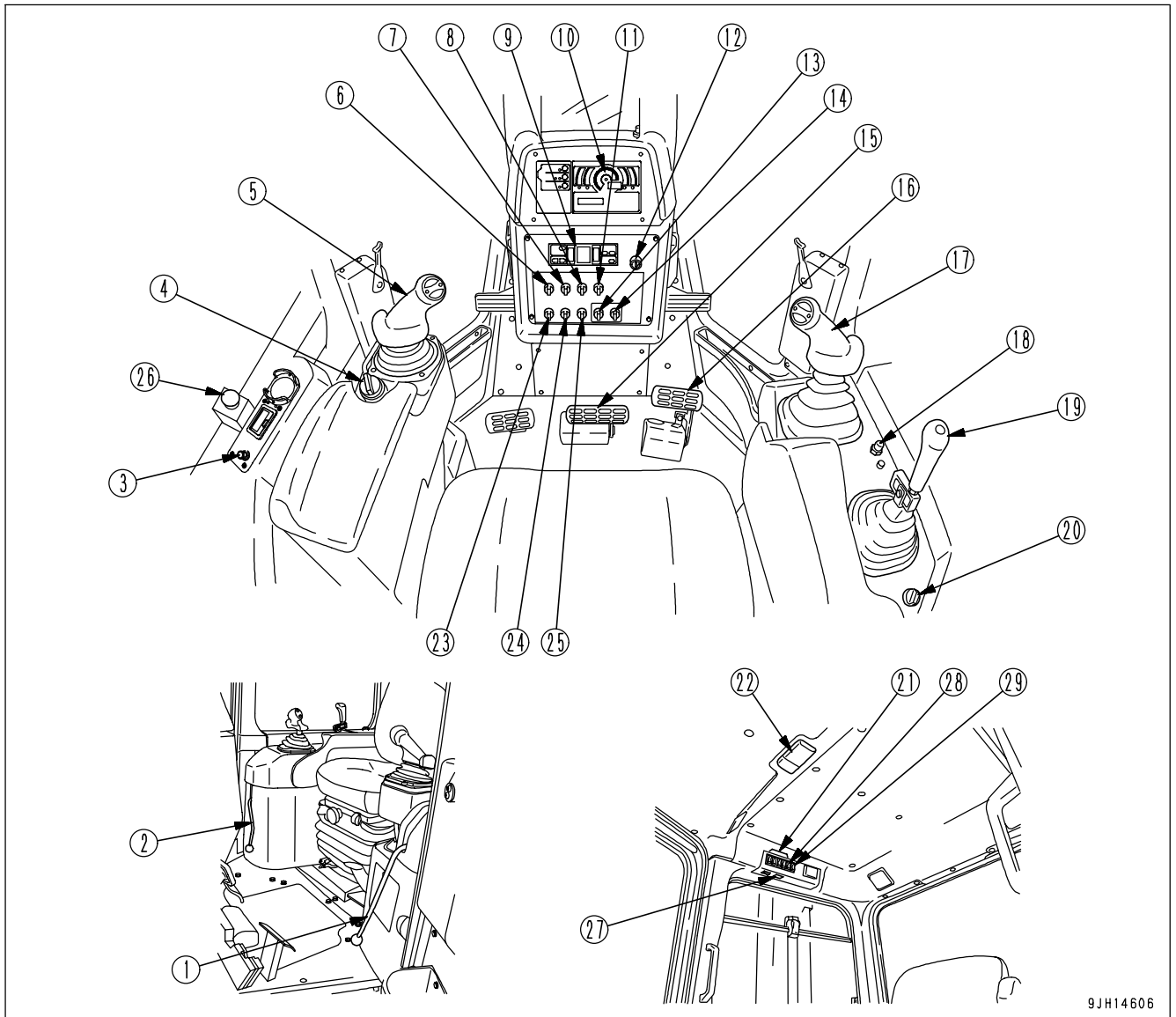


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- (1) Blade
- (2) Blade lift cylinder
- (3) Cab
- (4) Fuel tank
- (5) Ripper

- (6) Sprocket
- (7) Track frame
- (8) Frame
- (9) Track shoe
- (10) ROPS

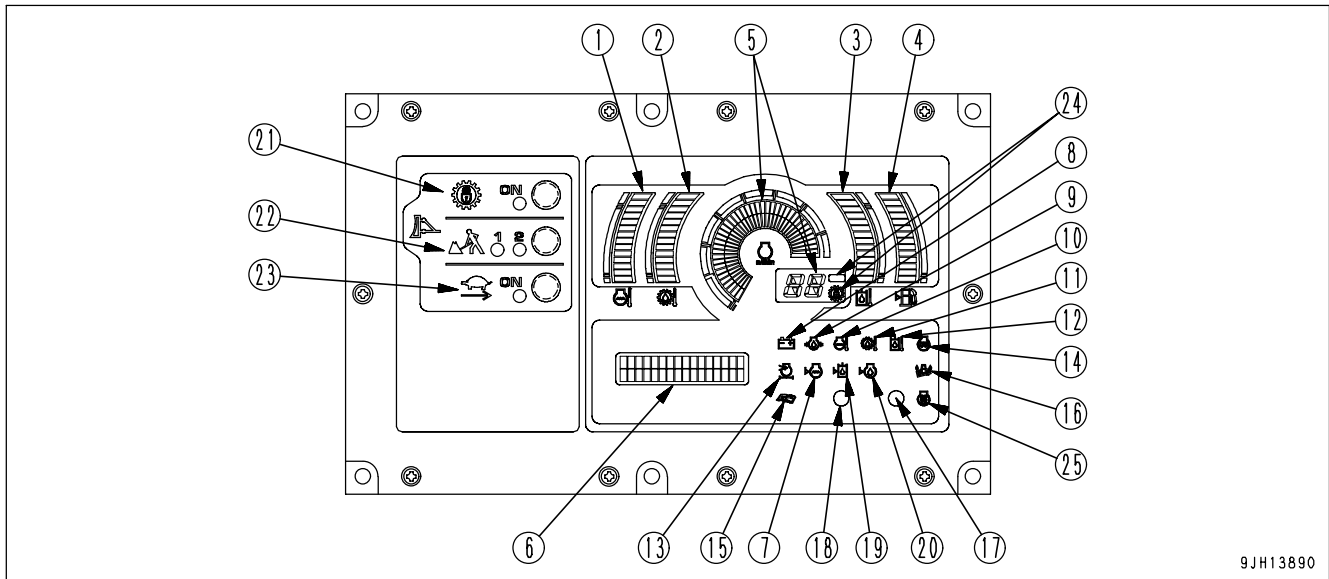
GENERAL VIEW OF CONTROLS AND GAUGES



9JH14606

- | | |
|---|---|
| <ul style="list-style-type: none"> (1) Parking brake lever (2) Work equipment lock lever (3) Cigarette lighter (4) Fuel control dial (5) Joystick
(Steering,directional and gear shift lever) (6) Front lamp,working lamp switch (7) Rear lamp switch (8) Fan rotation selector switch (9) Air conditioner panel or heater panel (10) Display panel A
(speed range display,engine speed) (11) Auto shift down switch (12) Starting switch (13) Information switch (14) Buzzer cancel switch | <ul style="list-style-type: none"> (15) Brake pedal (16) Deceleration pedal (17) blade control lever (18) Horn switch (19) Ripper control lever (20) Pin puller control switch(if equipped) (21) Wiper switch (22) Room lamp switch (23) Extra strong wind flow switch (24) Additional heater switch(if equipped) (25) Working lamp switch inside engine room
(if equipped) (26) Engine emergency stop switch (if equipped) (27) Access lamp switch (if equipped) (28) Front additional working lamp switch (if equipped) (29) Rear additional working lamp switch (if equipped) |
|---|---|

FRONT PANEL



9JH13890

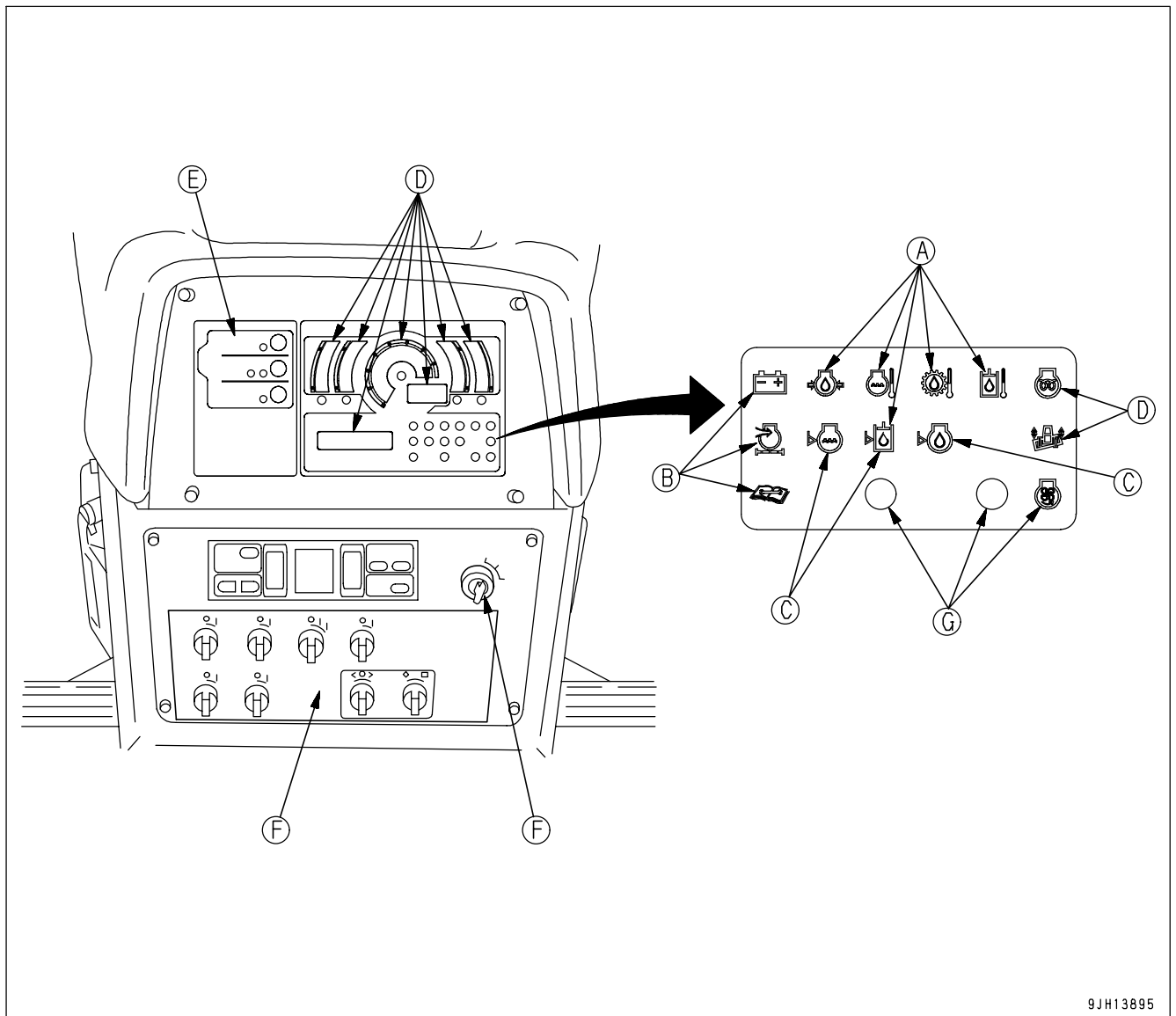
- | | |
|--|---|
| (1) Engine coolant temperature gauge | (13) Air cleaner clogging caution lamp |
| (2) Power train oil temperature gauge | (14) Engine pre-heating pilot lamp |
| (3) Hydraulic oil temperature gauge | (15) Maintenance caution lamp |
| (4) Fuel level gauge | (16) Dual/single tilt selector display lamp |
| (5) Display panel A
(speed range display, engine speed) | (17) Warning lamp |
| (6) Display panel B (multi-information) | (18) Fan rotation selection impossibility lamp |
| (7) Radiator coolant level check lamp | (19) Hydraulic oil level caution lamp (if equipped) |
| (8) Charge condition caution monitor | (20) Engine oil level caution lamp (if equipped) |
| (9) Engine oil pressure caution lamp | (21) Lock up mode switch |
| (10) Engine coolant temperature caution lamp | (22) Economy mode switch |
| (11) Power train oil temperature caution lamp | (23) Reverse slow mode selector lamp |
| (12) Hydraulic oil temperature caution lamp | (24) Torque converter lock up pilot indicator |
| | (25) Fan reversal lamp |

EXPLANATION OF COMPONENTS

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

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

FRONT PANEL



9JH13895

- (A) Emergency caution items
- (B) Caution monitor group
- (C) Check monitor group
- (D) Meter and indicator group
- (E) Mode selection switch group
- (F) Switches
- (G) Lamps

EMERGENCY CAUTION ITEMS


CAUTION

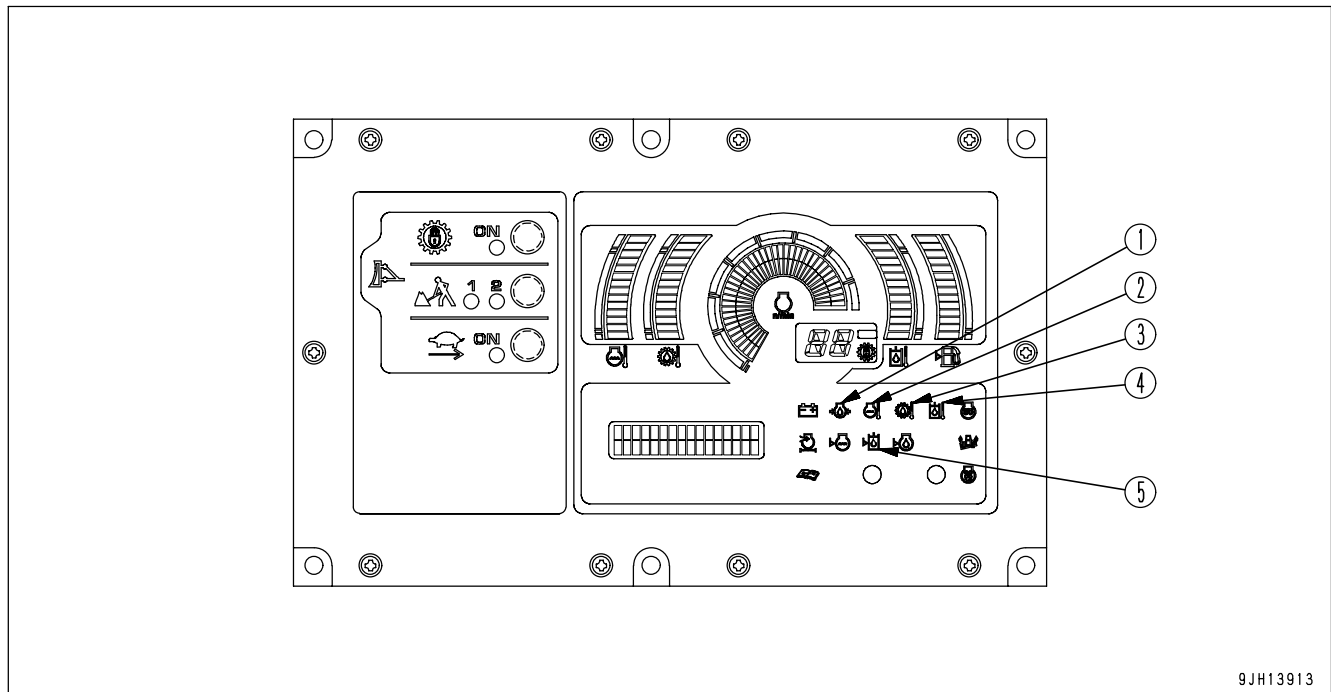
If the caution lamp for any of these items flashes, stop the engine immediately or run it at low idling, and take the following action.

NOTICE

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

These items need to be observed while the engine is running. If any abnormality occurs, items that need to be repaired immediately are displayed.

If there is any abnormality, alarm buzzer sounds intermittently and the abnormal location on the caution lamp will flash.



9JH13913

- | | |
|--|---|
| (1) Engine oil pressure caution lamp | (4) Hydraulic oil temperature caution lamp |
| (2) Engine coolant temperature caution lamp | (5) Hydraulic oil level caution lamp
(if equipped) |
| (3) Power train oil temperature caution lamp | |

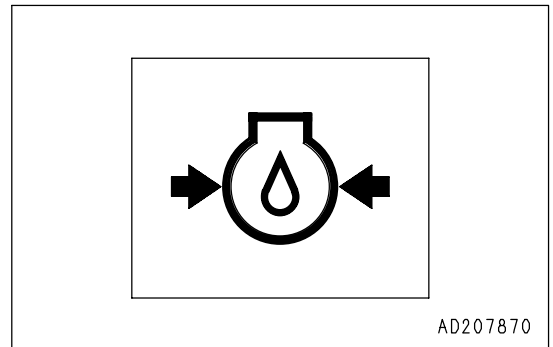
ENGINE OIL PRESSURE CAUTION LAMP

This lamp (1) indicates low engine oil pressure.

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

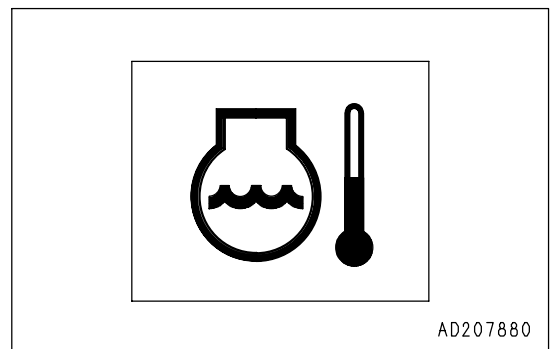
REMARK

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

**ENGINE COOLANT TEMPERATURE CAUTION LAMP**

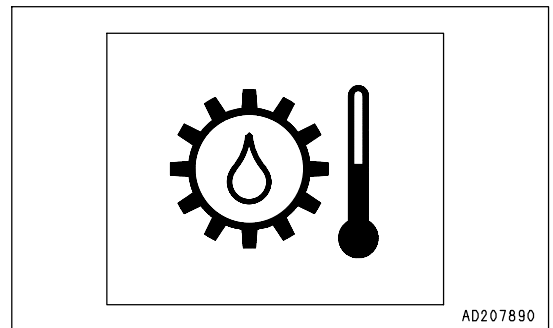
This lamp (2) indicates a rise in the coolant temperature.

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

**POWER TRAIN OIL TEMPERATURE CAUTION LAMP**

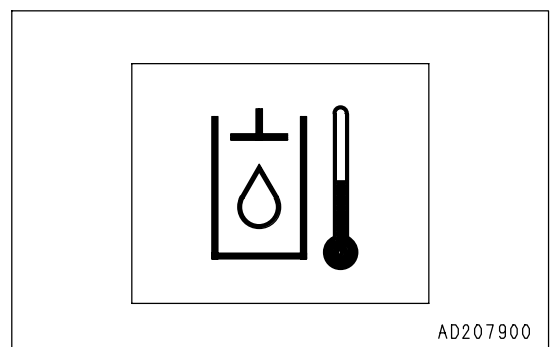
Lamp (3) warns operator that the torque converter outlet port oil temperature has risen.

If it flashes, run the engine at low idling until the power train oil temperature gauge goes down to the green range.

**HYDRAULIC OIL TEMPERATURE CAUTION LAMP**

Lamp (4) indicates a rise in the hydraulic oil temperature.

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

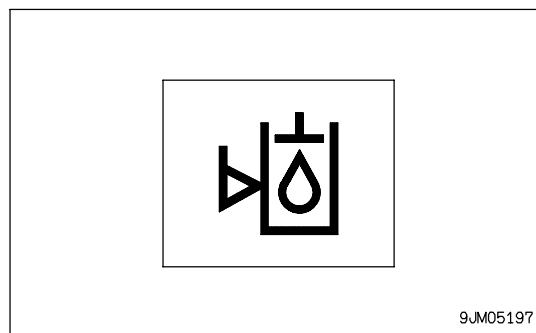


HYDRAULIC OIL LEVEL CAUTION LAMP

(if equipped)

This lamp (5) warns the operator that the level of the hydraulic oil in the hydraulic tank has gone down.

If the lamp flashes, check the level of the hydraulic oil in the hydraulic tank, and add oil.



CAUTION MONITOR GROUP

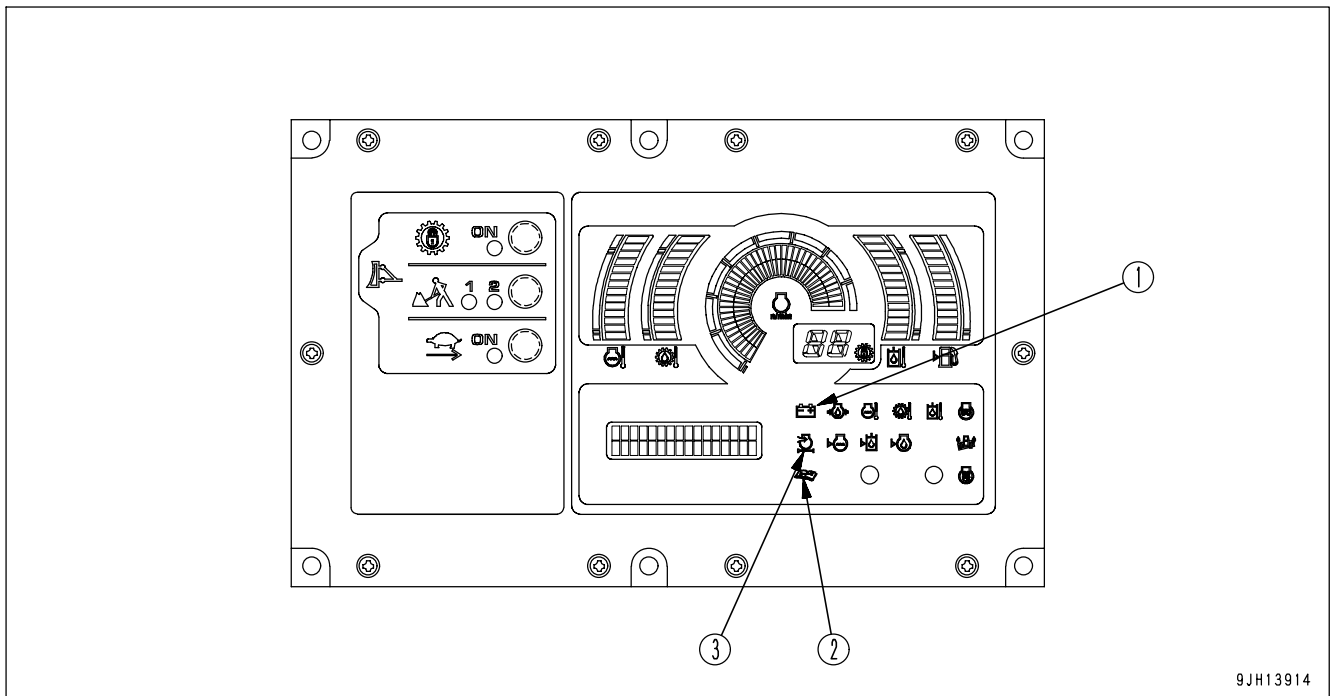


If these caution lamps flash, check and repair the appropriate location as soon as possible.

NOTICE

- Park the machine on level ground and check the monitor lamps.
- Confirm that monitor lamps light up about 3 seconds after the starting switch is turned to the ON position. If any monitor lamp does not light, contact your Komatsu distributor to inspect and repair.

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



- (1) Charge condition caution lamp
- (2) Maintenance caution lamp
- (3) Air cleaner clogging caution lamp

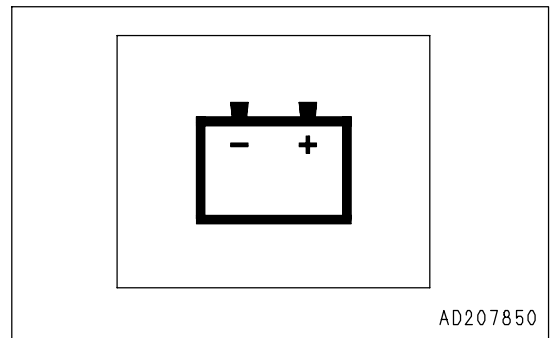
CHARGE CONDITION CAUTION LAMP

Lamp (1) indicates an abnormality in the charging system while the engine is running.

If the monitor lamp flashes, check the V-belt tension. If any abnormality is found, see "OTHER TROUBLE (PAGE 3-182)".

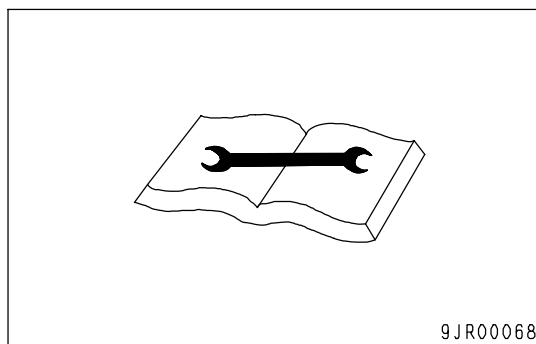
REMARK

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

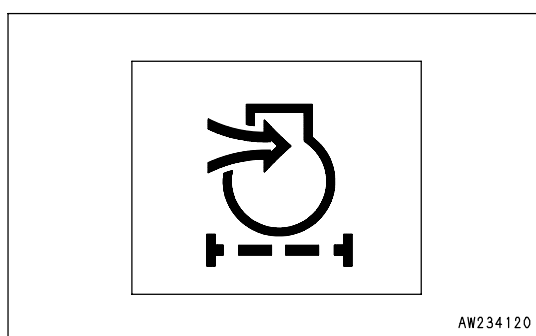


MAINTENANCE CAUTION LAMP

Lamp (2) lights up when the filter or oil change interval has been reached. DISPLAY PANEL B (Multi-information) (PAGE 3-17) to the maintenance mode and check or replace the applicable filter or oil.

**AIR CLEANER CLOGGING CAUTION LAMP**

Lamp (3) warns operator that the air cleaner is clogged. If it flashes, stop the engine, check and clean the air cleaner.



CHECK MONITOR GROUP

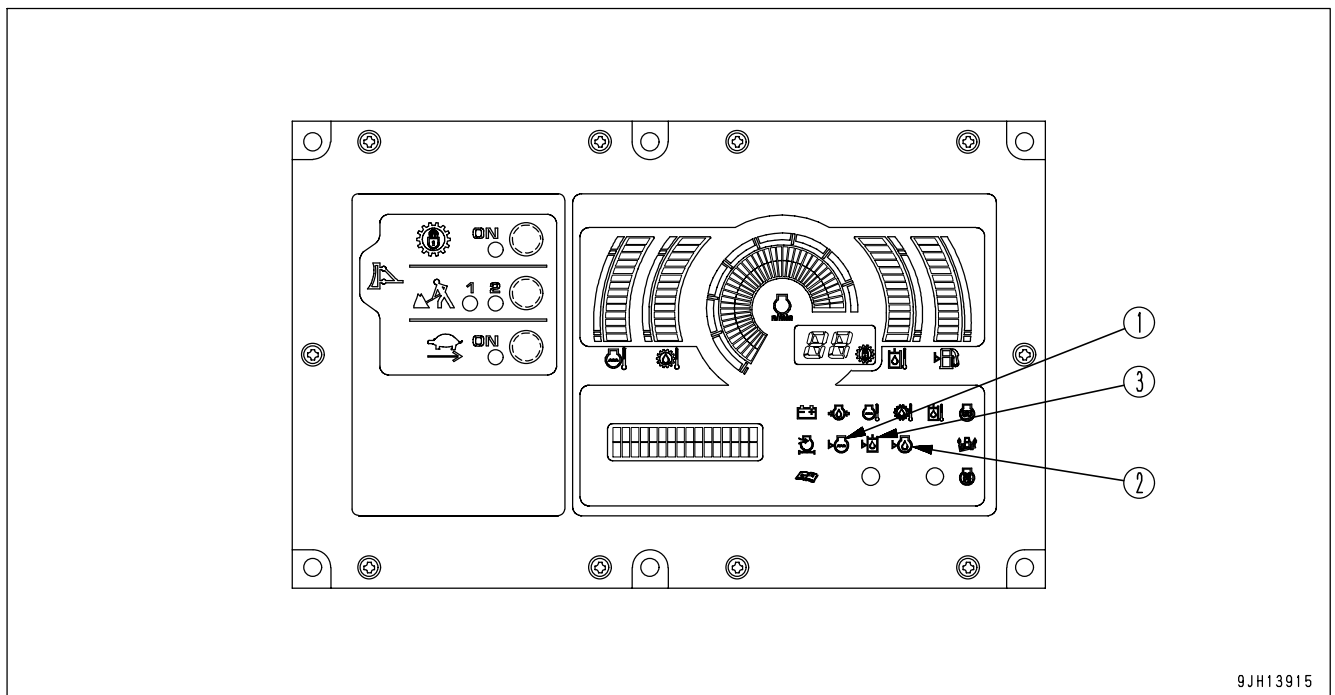
NOTICE

- When performing the check before starting, do not rely only on these monitors. Always refer to "OPERATION (PAGE 3-89)" to perform these checks.
- Park the machine on level ground and then check the monitor lamps.
- Confirm that monitor lamps light up about 3 seconds after the starting switch is turned to the ON position. If any monitor lamp does not light, contact your Komatsu distributor to inspect and repair.

REMARK

- When the starting switch is turned to the ON position, before starting the engine, the caution lamps flash for 3 seconds, the warning lamps light up for 3 seconds, and the alarm buzzer sounds for 1 seconds.
- The caution lamps cannot be checked for any malfunction until at least 5 seconds after the engine has been stopped.

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



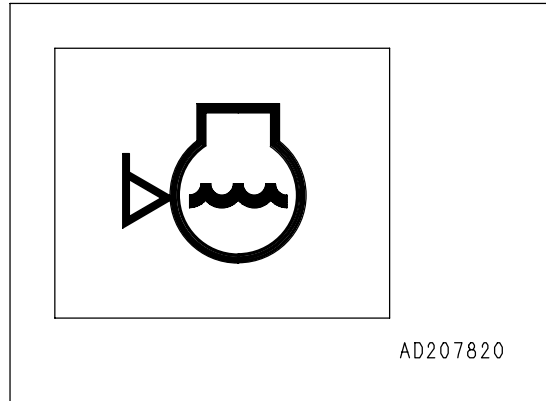
9JH13915

- (1) Radiator coolant level caution lamp
 (2) Engine oil level monitor (if equipped)
 (3) Hydraulic oil level caution lamp (if equipped)

RADIATOR COOLANT LEVEL CAUTION LAMP

This lamp (1) warns the operator that the level of the cooling water in the radiator has gone down.

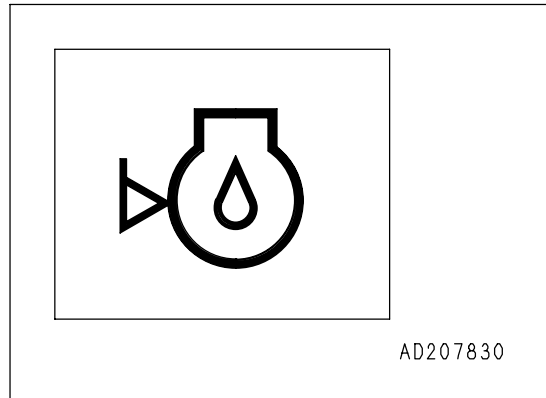
If the lamp flashes, check the level of the cooling water in the main radiator, and add water.

**ENGINE OIL LEVEL MONITOR**

(if equipped)

This lamp (2) warns the operator that the level of the engine oil in the engine oil pan has gone down.

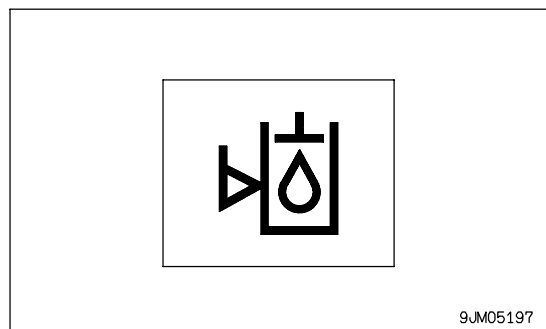
If the lamp flashes, check the oil level in the engine oil pan, and add oil.

**HYDRAULIC OIL LEVEL CAUTION LAMP**

(if equipped)

This lamp (3) warns the operator that the level of the hydraulic oil in the hydraulic tank has gone down.

If the lamp flashes, check the level of the hydraulic oil in the hydraulic tank, and add oil.

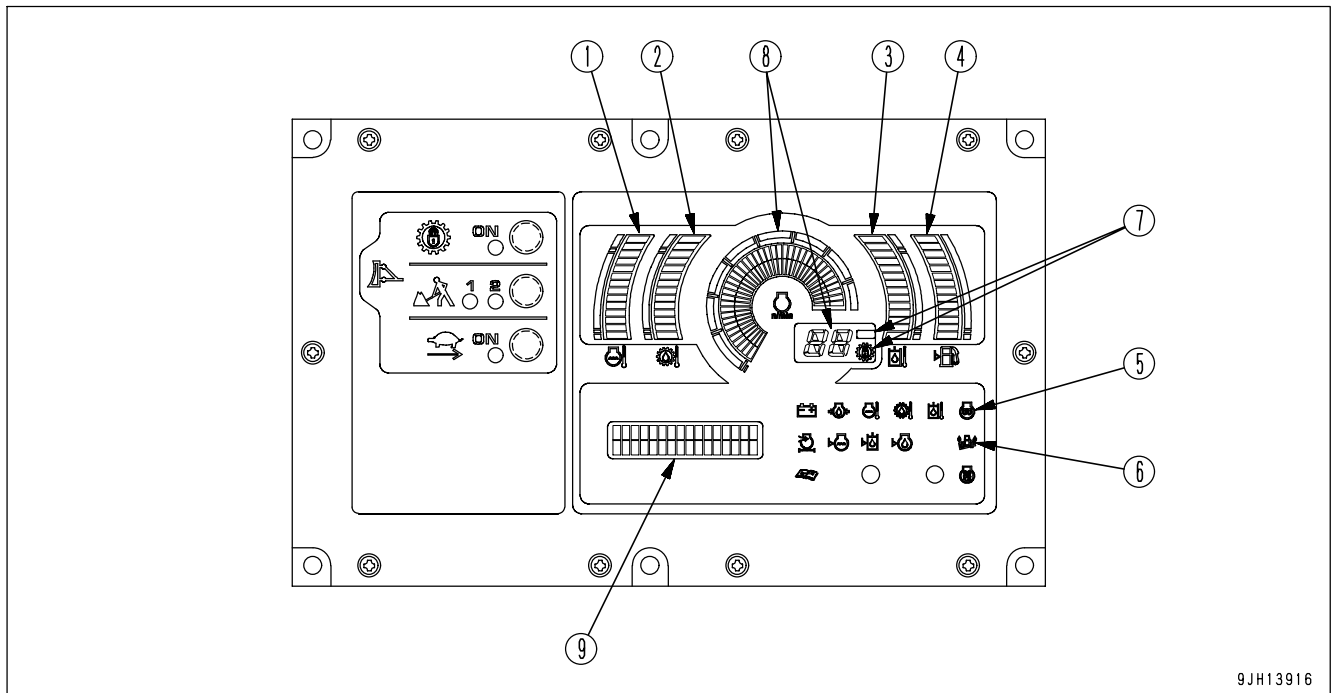


METER GROUP

NOTICE

While the engine is at rest, turn the starting switch to the ON position to see if the engine coolant temperature gauge, power train oil temperature gauge, fuel level gauge, and monitor lamps all light up.

If they do not, have your Komatsu distributor inspect and repair it.

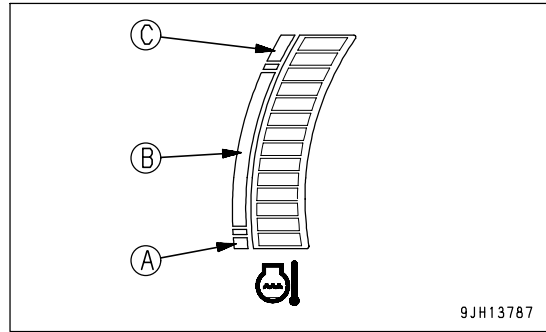


9JH13916

- | | |
|--|--|
| (1) Engine coolant temperature gauge | (7) Torque converter lock-up display indicator |
| (2) Power train oil temperature gauge | (8) Display panel A |
| (3) Hydraulic oil temperature gauge | (speed range display, engine speed) |
| (4) Fuel level gauge | (9) Display panel B (multi-information) |
| (5) Engine pre-heating pilot lamp | |
| (6) Dual/single tilt selector display lamp
(dual tiltdozer specification) | |

ENGINE COOLANT TEMPERATURE GAUGE

Gauge (1) indicates temperature of the engine coolant.
If the temperature is normal during operation, green range (B) will light.
If red range (C) lights during operation, move the fuel control dial to lower engine speed to approx. 3/4 of the full speed, and run until the coolant temperature enters green range (B).
During operation, if red range (C) lights, engine coolant temperature monitor flashes and the alarm buzzer sounds, stop the machine and run at low idle until coolant temperature enters green range (B).



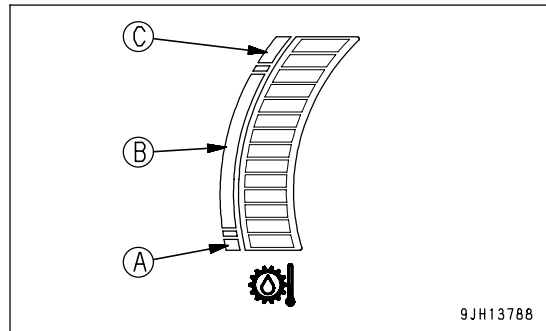
- (A) White range
- (B) Green range
- (C) Red range

NOTICE

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

POWER TRAIN OIL TEMPERATURE GAUGE

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



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

NOTICE

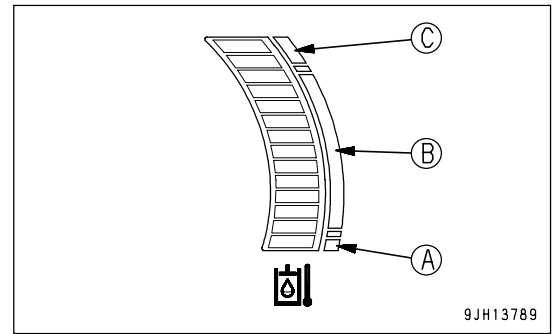
If the power train oil temperature gauge often enters red range (C), shift down one speed range to reduce the load on the power train when operating.

HYDRAULIC OIL TEMPERATURE GAUGE

Gauge (3) indicates the hydraulic oil temperature.

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

If red range (C) lights up during operation, move the fuel control dial down to approx. 3/4 of the full speed, reduce the load, and run until the oil temperature enters green range (B). If the oil temperatures does not enter green range (B) even when the load is reduced, stop the work equipment control lever and run until the oil temperature enters green range (B).



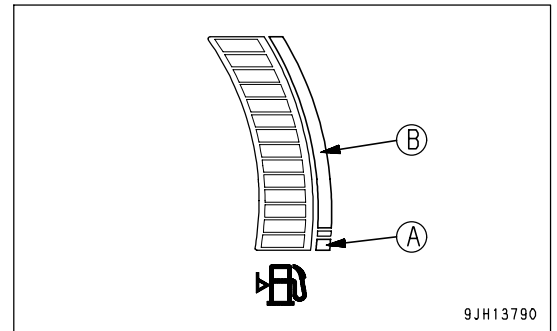
- (A) White range
- (B) Green range
- (C) Red range

FUEL LEVEL GAUGE

Gauge (4) fuel level in the fuel tank.

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

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



- (A) Red range
- (B) Green range

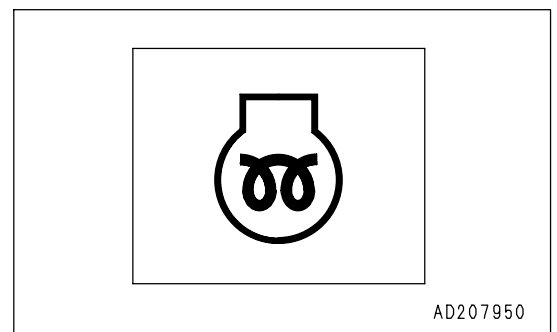
REMARK

- The display is not proportional to the amount of fuel remaining.
- If only the red range (A) lights up, there is less than 270 liters (71.34 US gal) of fuel remaining.

ENGINE PRE-HEATING PILOT LAMP

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

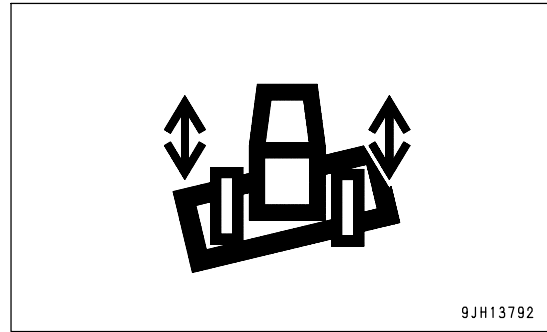
The engine controller detects the coolant temperature and automatically actuates pre-heating in low temperatures when starting the engine.



DUAL/SINGLE TILT SELECTOR DISPLAY LAMP

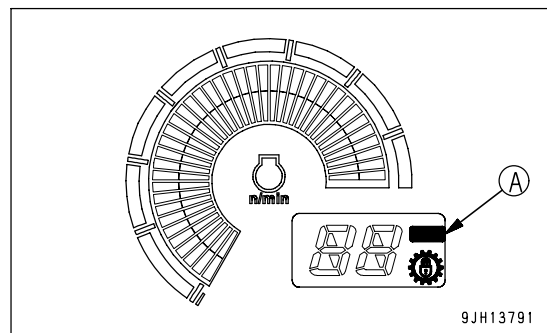
(Dual tiltdozer specification)

This lamp (6) lights up when the dual/single selector switch on the work equipment control lever is set to DUAL.

**TORQUE CONVERTER LOCK-UP DISPLAY INDICATOR**

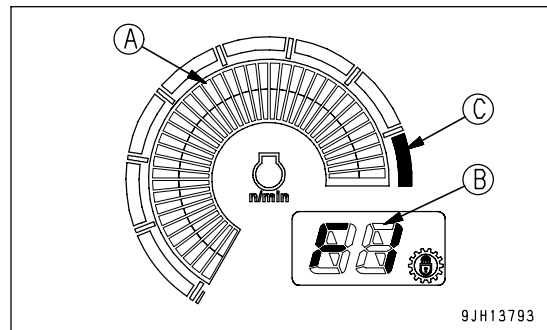
Lamp (A) of this indicator (7) lights up when the torque converter has been automatically locked up (when transmission is set to direct drive) after lock up switch for the mode selection switch panel has been turned ON.

The lamp goes out when torque converter drive is being used.

**DISPLAY PANEL A (speed range display, engine speed)**

Meter (8) displays transmission speed range (B) being used on the machine and engine speed.

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



DISPLAY PANEL B (Multi-information)

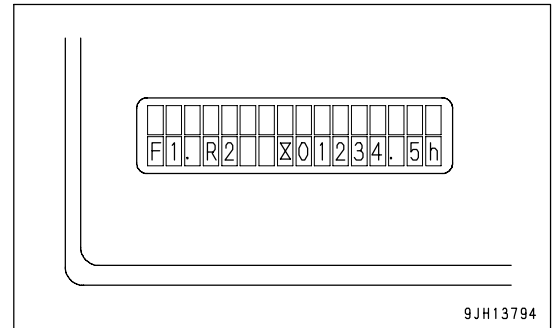
This monitor (9) displays information related to the condition of the machine on the top and bottom lines of the display portion. The content of the display can be switched by operating the service mode selector switch.

(1) Operating mode (normal operation screen)

Use this mode when operating the machine.

REMARK

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



The shift mode selected by operation of the "GEARSHIFTING USING SHIFT MODE SELECTION (PAGE 3-127)" through the shift mode selection is displayed on the left side of the monitor.

The total operating hours of the machine is displayed at the bottom right of the monitor. (Use the service meter function display to set the interval for periodic maintenance.)

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

When the engine is running, the hourglass mark pilot display at the side of the meter lights up to show that the meter is advancing.

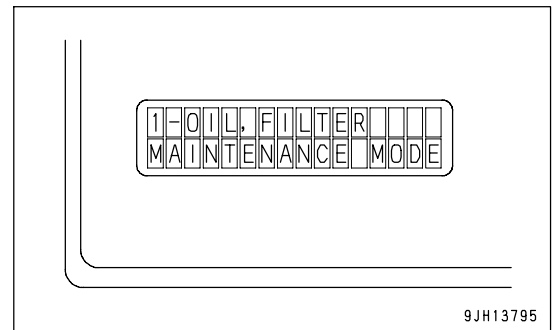
The meter advances by 1 for every hour of operation, regardless of the engine speed.

If there is a failure in the machine, the failure code is also displayed on the top line. If a failure code is displayed, carry out the remedy given in "OTHER TROUBLE (PAGE 3-182)".

(2) Maintenance mode

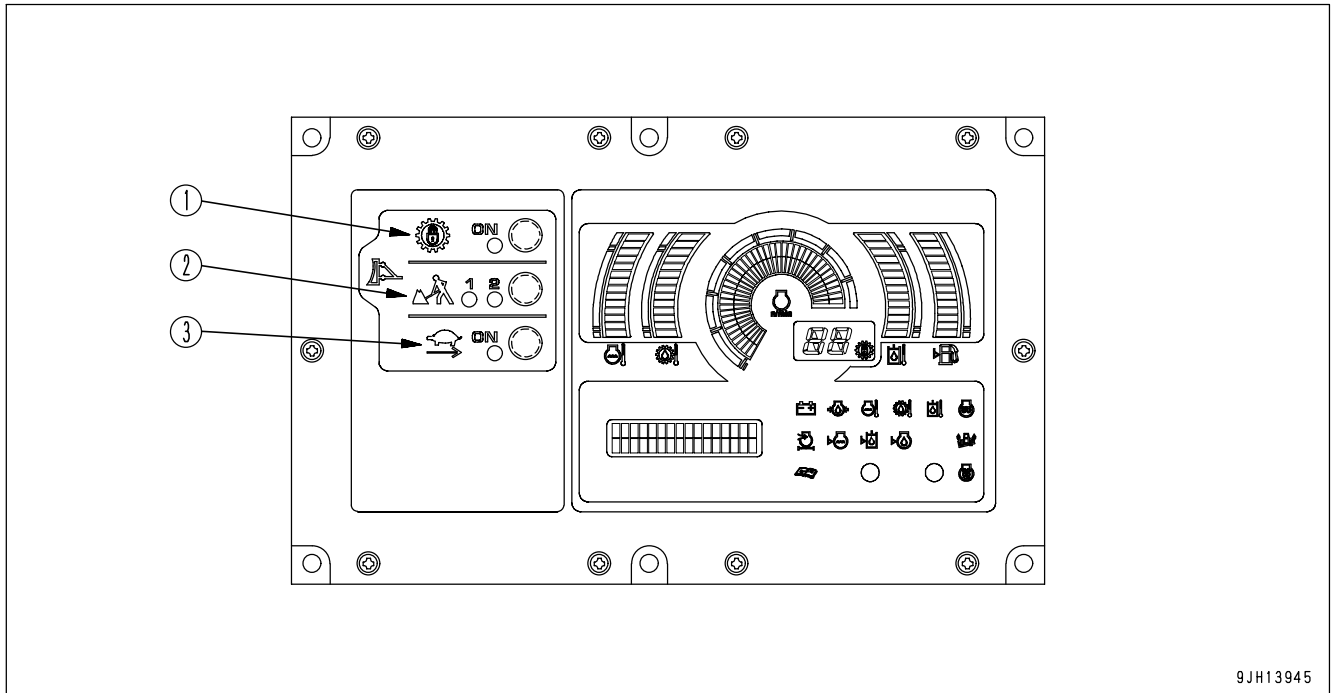
The maintenance mode is displayed by continuing to turn the buzzer cancel switch in the ◊ direction for 2.5 seconds.

For details, see "METHOD OF USING DISPLAY PANEL B (Multi-information) (PAGE 3-26)".



MODE SELECTION SWITCH GROUP

- Press each mode switch to turn it ON or OFF and to select the mode.
- For details of setting the mode to use, see "EFFECTIVE USE OF MODE SELECTION SYSTEM (PAGE 3-143)".
- Only the reverse slow mode can be selected in combination with the lock-up mode.
- The economy mode, and reverse slow mode can be used independently or in combination.



9JH13945

- (1) Lock up mode switch
- (2) Economy mode switch

- (3) Reverse slow mode selector switch

Selecting mode to match the type of work and quality of rock and soil makes to perform operations effectively.

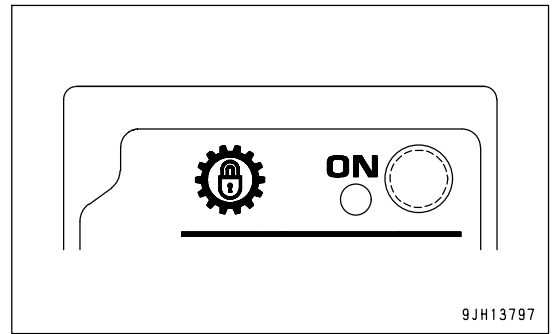
Dozing		Reverse slow mode
Lock up mode	Economy mode	
○	×	○
×	○	○

○: Possible to use ×: Compound use not possible

LOCK UP MODE SWITCH

Switch (1) is used when more power is needed rather than high production (such as when dozing loose soil).

The drive is switched between torque converter drive and direct drive according to the load. When it is ON, the lamp lights up.

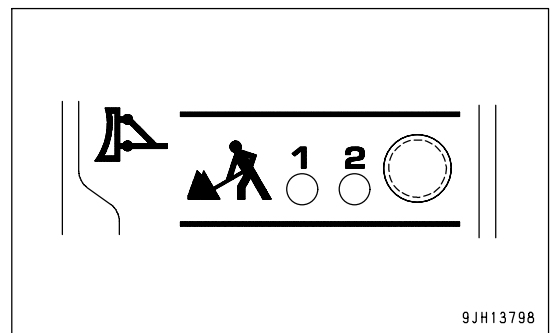


ECONOMY MODE SWITCH

Switch (2) is used for hauling work after ripping or for dozing blasted rock.

When the system is OFF, if the switch is pressed once, mode [1] lights up, and if it is pressed again, mode [2] lights up.

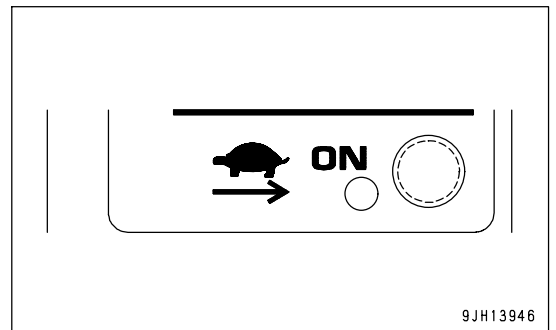
Select the mode according to the type of rock.



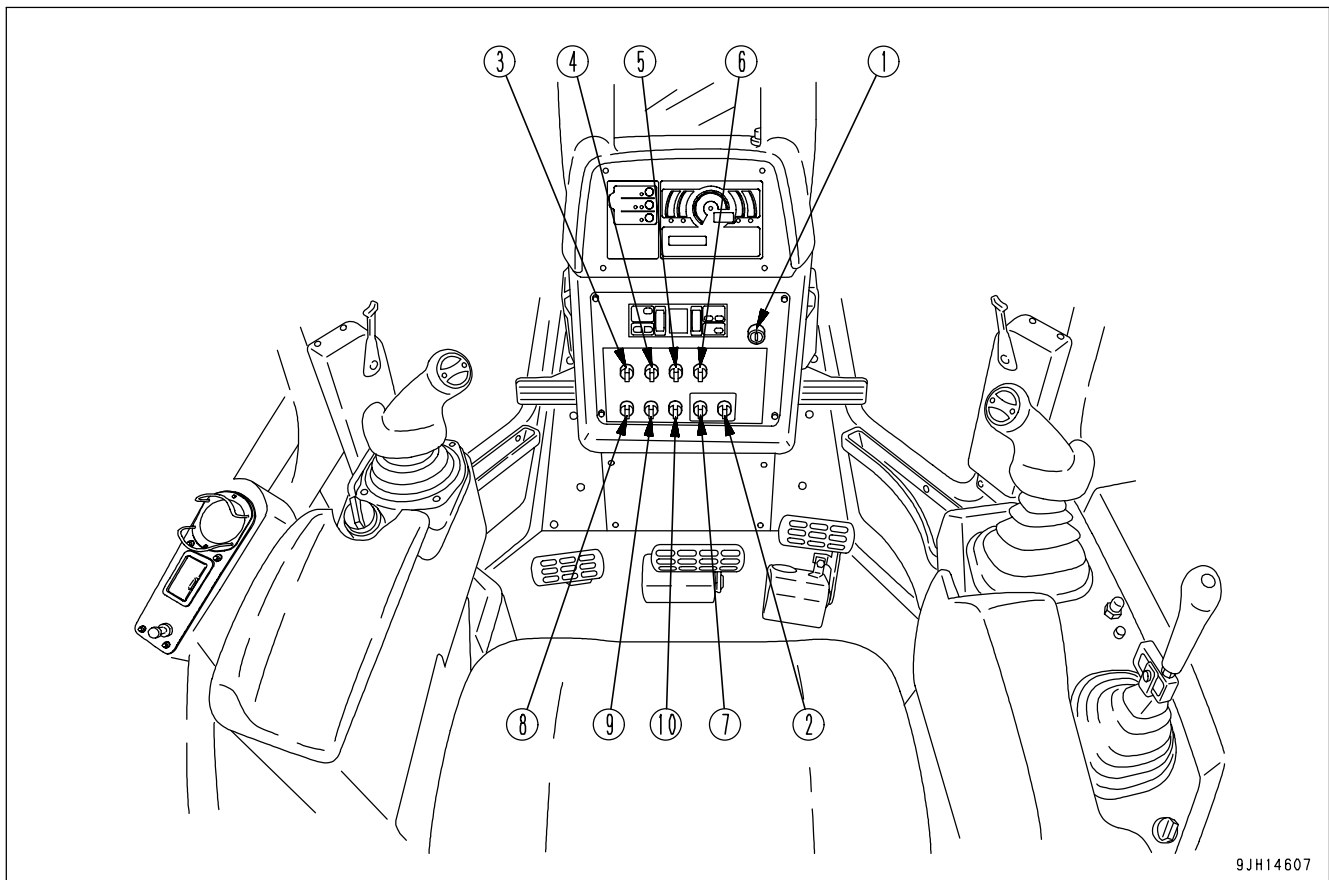
REVERSE SLOW MODE SELECTOR SWITCH

Switch (3) is used to make small reductions in the travel speed when traveling in R1, R2, or R3.

When it is turned ON, the lamp lights up.



SWITCHES



9JH14607

- | | |
|------------------------------------|---|
| (1) Starting switch | (6) Auto shift down switch |
| (2) Buzzer cancel switch | (7) Information switch |
| (3) Front lamp/working lamp switch | (8) Extra strong wind flow switch |
| (4) Rear lamp switch | (9) Additional heater switch (if equipped) |
| (5) Fan rotation selector switch | (10) Working lamp switch inside engine room (if equipped) |

STARTING SWITCH

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

(A): OFF position

At this position, the starting switch key can be inserted and removed. When the switch is turned to this position, all the electric circuits are turned off and the engine stops.

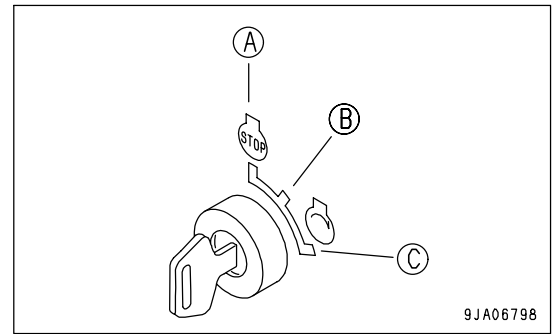
(B): ON position

In this position, electric current flows in the charging and lamp circuits.

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

(C): START position

This is the position to start the engine. Hold the key at this position while cranking the engine. Release the key immediately after the engine has been started. The key will return to ON position (B) when released



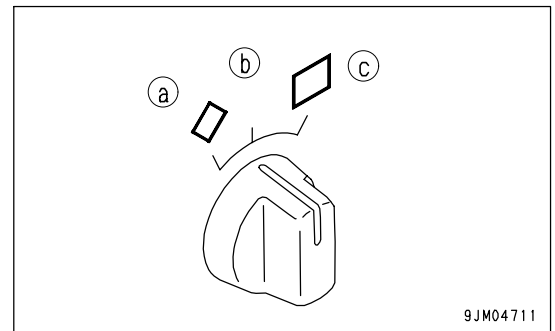
BUZZER CANCEL SWITCH

When switch (2) is operated to the left or right, the alarm buzzer stops.

When the information monitor is in the maintenance mode, switch (2) can be operated to move the cursor left or right.

(a) position: Cancel

(c) position: Select

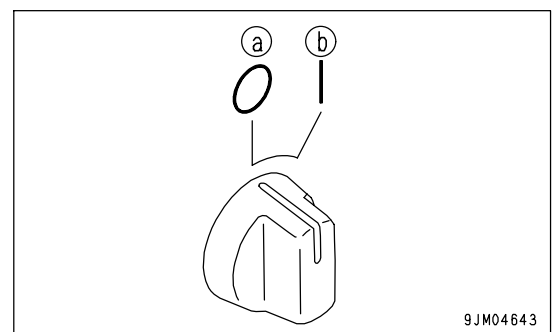


FRONT LAMP/WORKING LAMP SWITCH

Switch (3) lights up when the front lamp, left and right working lamps located on the front fender, and panel lamp light up.

(a) OFF position: Goes out

(b) ON position: Lights up

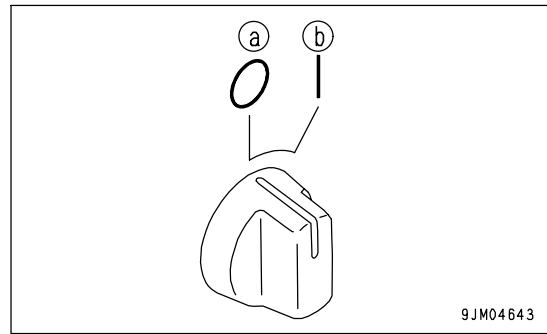


REAR LAMP SWITCH

Switch (4) lights up the rear lamp.

(a) OFF position: goes off

(b) ON position: lights up

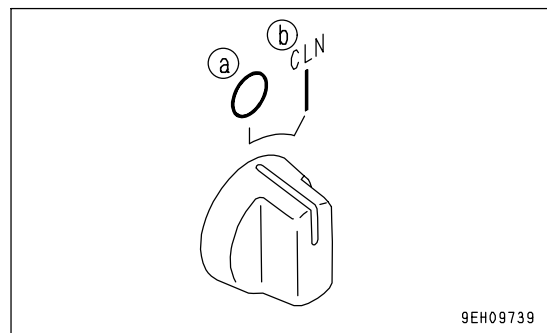
**FAN ROTATION SELECTOR SWITCH**

Set this switch (5) to the (b) CLN position to select the clean mode for the fan.

When the switch is released, it returns automatically to the (a) position.

When the clean mode is selected, the fan reversal lamp lights up.

When the clean mode is being used, turn the switch (5) to the right to return to the normal mode. The fan reversal lamp goes out.



The clean mode is used to blow dust and dirt off the radiator fins. In this mode, the cooling fan rotates at the fullest speed.

When operating the cooling fan rotation selector switch, turn the engine starting switch key to the OFF position to make sure that the engine is not running.

REMARK

The cooling fan rotation selector switch does not work when it is operated while the engine is running.

In that case, the fan rotation selection impossibility lamp flashes to indicate that the fan rotation cannot be changed.

The cooling fan rotation selector switch returns to the normal mode, when the engine stops or when the engine starting switch key is turned to the OFF position.

For cleaning procedures, see "CLEAN AND CHECK RADIATOR FINS, OIL COOLER FINS, AFTERCOOLER FINS (PAGE 4-37)".

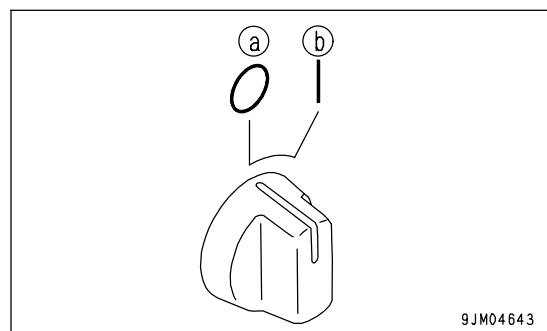
AUTO SHIFT DOWN SWITCH

If switch (6) is turned to the right when the travel speed has gone down because of load condition when traveling, the transmission is automatically shifted to low speed.

Position (a) (OFF): Auto shift down is canceled

Position (b) (ON): Transmission automatically shifts to low speed

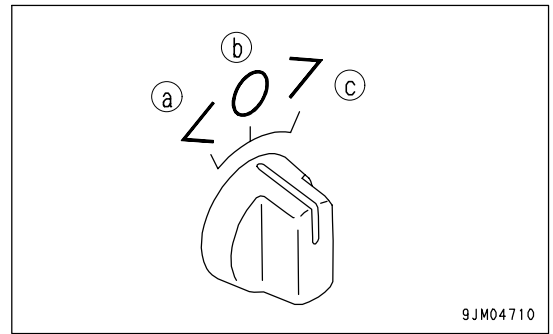
For details, see "AUTO SHIFT DOWN OPERATION (PAGE 3-129)".



INFORMATION SWITCH

This switch (7) is used to carry out the switching of the information monitor display mode and the switching of the cursor with the maintenance mode.

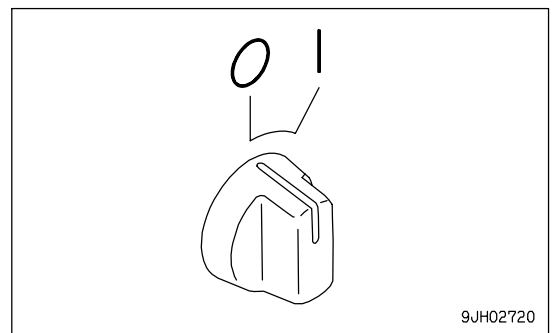
- (a) position: Cursor moves to left
- (c) position: Cursor moves to right



9JM04710

EXTRA STRONG WIND FLOW SWITCH

Switch (8) is used to provide a stronger wind flow than for the normal HIGH position.



9JH02720

ADDITIONAL HEATER SWITCH

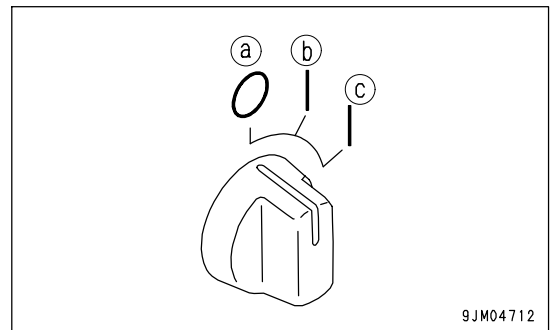
(if equipped)

Switch (9) actuates the hot water heater.

Position (a): Hot water heater OFF

Position (b): Hot water heater LOW (ON)

Position (c): Hot water heater HIGH (ON)



9JM04712

WORKING LAMP SWITCH INSIDE ENGINE ROOM

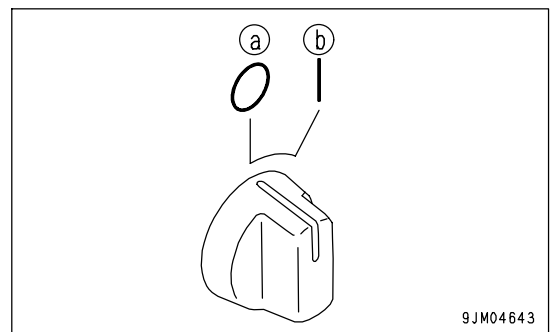
(Mining specification, if equipped)

Use this switch (10) to light up the working lamp switch inside the engine room.

(The lamp lights up even when the main key switch is OFF.)

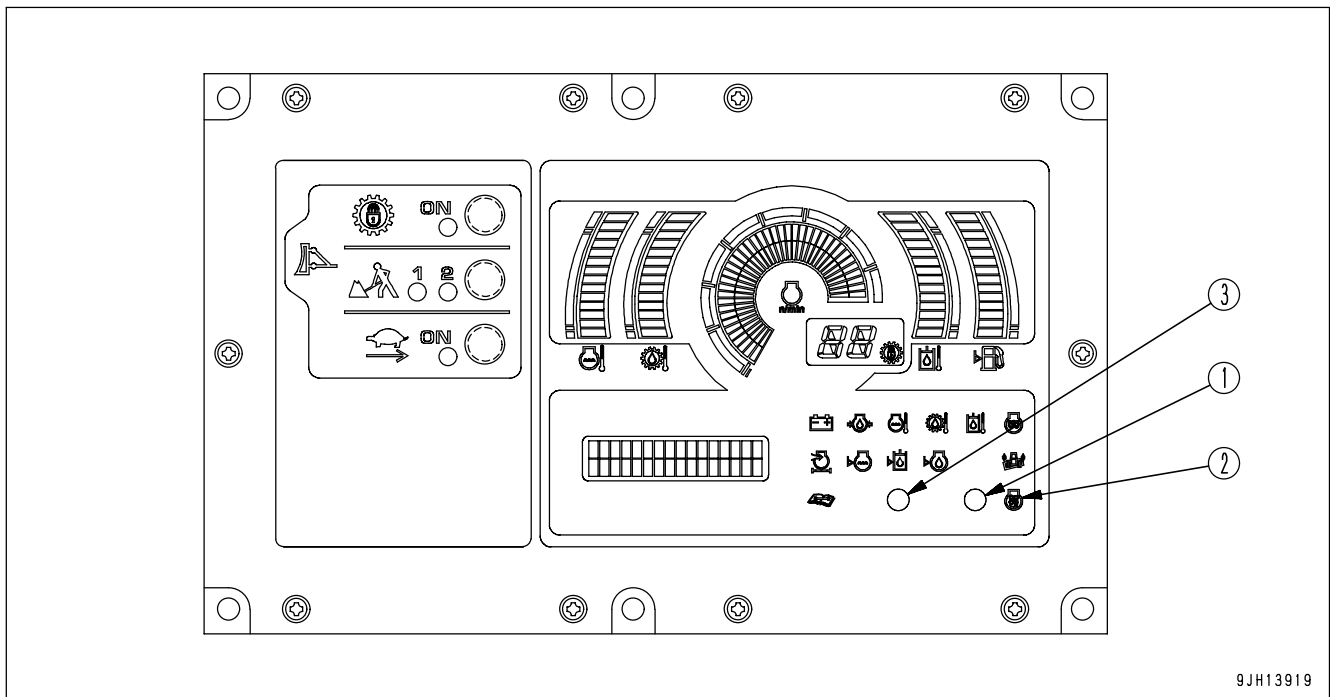
(a) OFF position: goes off

(b) ON position: lights up



9JM04643

LAMPS



9JH13919

- (1) Warning lamp
- (2) Fan reversal lamp

- (3) Fan rotation selection impossibility lamp

WARNING LAMP

(Red)

NOTICE

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

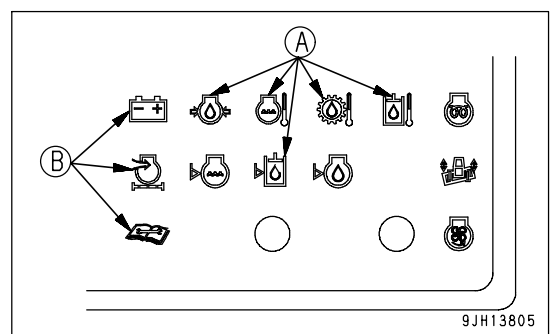
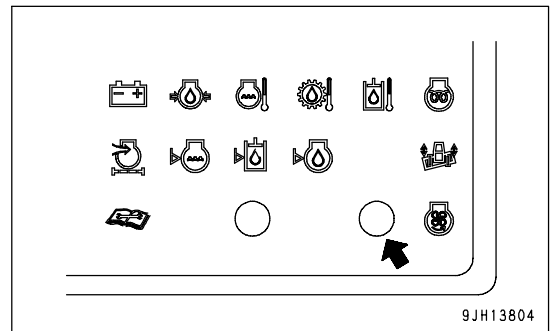
When the caution lamp for the CAUTION (A) and CAUTION (B) groups on the machine monitor system flashes, and an failure code displays it automatically showing an abnormality appears on monitor panel B (multi-information), lamp (1) also flashes at the same time.

If a failure code is displayed, carry out the remedy given in "OTHER TROUBLE (PAGE 3-182)".

If the lamp flashes, check the monitor panel to locate the abnormality.

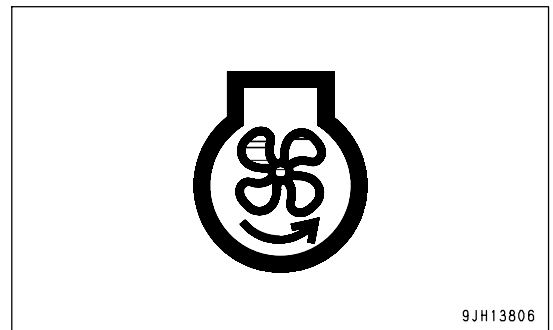
When the monitor inside the CAUTION (A) group flashes, the alarm buzzer also sounds continuously.

See"FRONT PANEL (PAGE 3-5)".



FAN REVERSAL LAMP

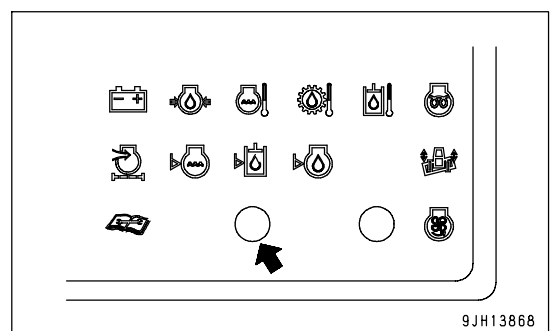
This lamp (2) lights up when the clean mode is selected.



FAN ROTATION SELECTION IMPOSSIBILITY LAMP

(Orange)

This lamp (3) lights up at the same time. When the engine is driving, if the fan rotation selector switch is turned to the (b) CLN position, this lamp (3) flashes for 3 seconds to show that the direction of rotation of the fan has not been changed.



METHOD OF USING DISPLAY PANEL B (Multi-information)

EXPLANATION OF MODES AND CONTROLS

- Display panel B (1) has the function of displaying the following four types of mode. (The diagram on the right shows the normal screen before the mode display.)

Maintenance mode

This displays the time for replacing the filters or oil.

PM clinic auxiliary mode

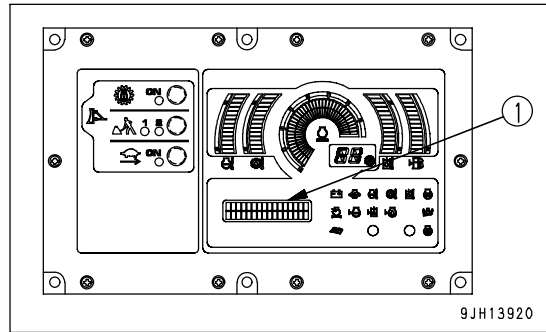
This displays the engine speed and the oil pressure in the hydraulic circuits.

Fault display mode

This displays the fault code related to the electronic control.

Adjustment mode

This adjusts the brightness and contrast of the display.



- There are variations (sub-items) in the four types of mode. For an explanation of the variations, see the following items.

METHOD OF USING MAINTENANCE MODE (PAGE 3-28)

METHOD OF USING PM CLINIC AUXILIARY MODE (PAGE 3-30)

METHOD OF USING FAULT CODE DISPLAY MODE (PAGE 3-31)

METHOD OF USING USER ADJUST MODE (PAGE 3-32)

- Each mode is operated by using information switch (2) and buzzer cancel switch (3) on the dashboard in front of the operator's seat.

After operating the switch, release the switch, and the switch will return automatically to the center position as shown in the diagram on the right.

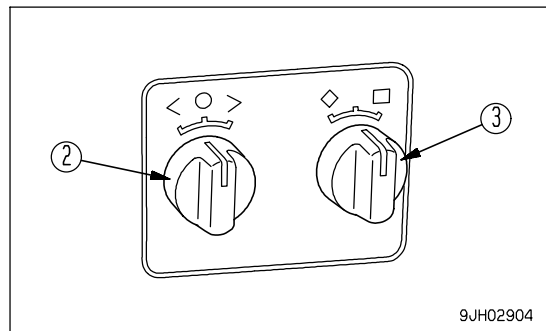
The functions of each position of the switches are as follows.

<: Moves mode to left

>: Moves mode to right

◇: Selects mode

□: Cancels mode



- The four types of mode can be selected in a cycle by operating information switch (2) to > and < to give the following sequence: Maintenance mode ←→ PM clinic auxiliary mode ←→ Fault code display mode ←→ Adjustment mode ←→ Maintenance mode.

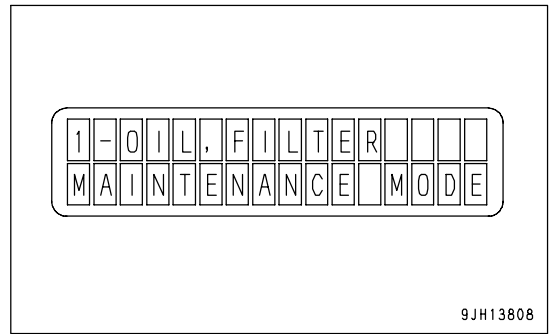
- From the normal mode before giving the mode display, if buzzer cancel switch (3) is operated to ◇ and held for 2.5 seconds, the maintenance mode is displayed. After that, if information switch (2) is operated to >, the mode changes to the PM clinic auxiliary mode. If information switch (2) is operated to <, the mode changes to the user adjust mode.

- When any mode is being displayed, if the buzzer cancel switch is operated to □, the screen returns the normal screen shown before the mode display.

METHOD OF SELECTING MODES

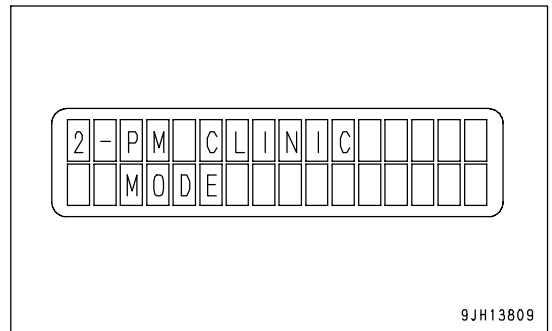
1. When moving from the normal operation display to a user mode, the maintenance mode is displayed. Use the controls to change the mode as follows.

- > position: Go to PM clinic auxiliary mode
- < position: Go to user adjust mode
- position: Go to normal operation screen
- ◇ position: Go to maintenance mode selection screen.



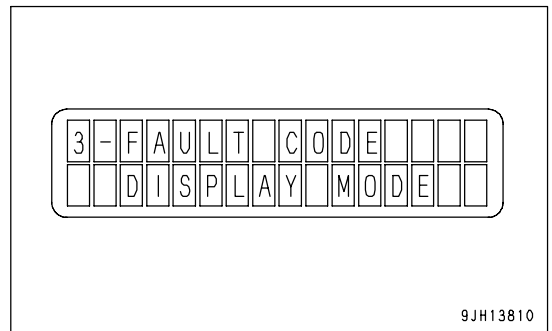
2. The diagram on the right shows the screen display for the PM clinic auxiliary mode. Use the controls to change the mode as follows.

- > position: Go to fault code display mode
- < position: Go to maintenance mode
- position: Go to normal operation screen
- ◇ position: Go to PM clinic auxiliary mode selection item screen



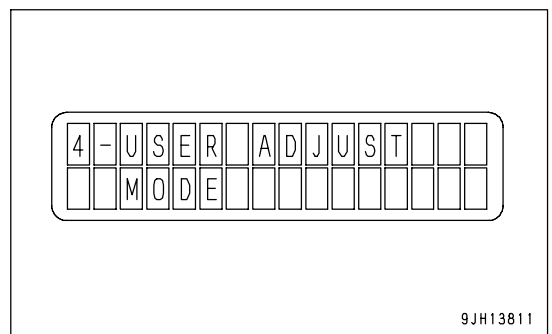
3. The diagram on the right shows the screen display for the fault code display mode. Use the controls to change the mode as follows.

- > position: Go to adjustment mode
- < position: Go to PM clinic auxiliary mode
- position: Go to normal operation screen
- ◇ position: Go to fault code selection item screen



4. The diagram on the right shows the screen display for the user adjust mode. Use the controls to change the mode as follows.

- > position: Go to maintenance mode
- < position: Go to fault code display mode
- position: Go to normal operation screen
- ◇ position: Go to user adjust mode selection item screen



METHOD OF USING MAINTENANCE MODE

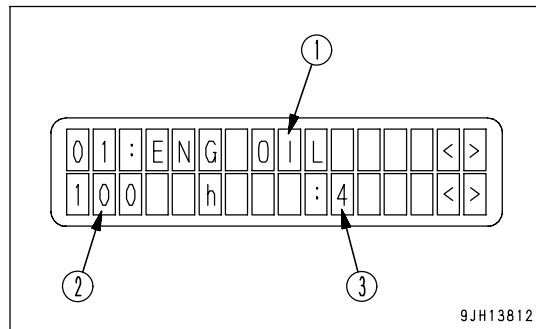
NOTICE

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

The maintenance mode shows the replacement interval for the oil filters and oil on the monitor.

The content of the display is as follows.

- (1) The item is displayed.
- (2) The time remaining until replacement is displayed.
- (3) The number of times that replacement has been made until now is displayed.



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

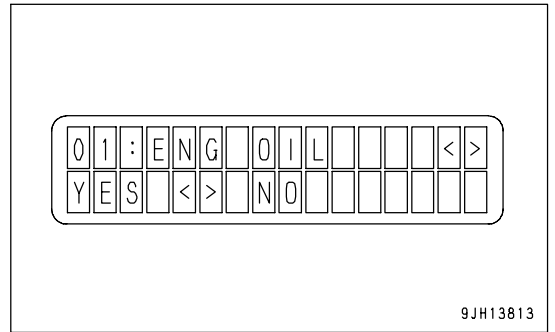
	Display	Item	1st replacement interval	2nd and following replacement intervals
1.	01 ENG OIL	Engine oil	500h	500h
2.	02 ENG FLT	Engine oil filter	500h	500h
3.	03 FUEL FLT	Fuel filter	1000h	1000h
4.	04 HYD FLT	Hydraulic oil filter	250h	2000h
4.1.	18 F.PRE FLT	Fuel pre-filter	500h	500h
7.	07 DAMP OIL	Damper oil	2000h	2000h
8.	08 FNL OIL	Final drive oil	250h	2000h
9.	10 HYD OIL	Hydraulic oil	250h	2000h
10.	19 POWL OIL	Power train oil	250h	1000h
11.	20 POWL FLT	Power train oil filter	250h	500h
12.	12 HSS FLT	HSS charge filter *	0h	0h

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

When the oil or filter has been replaced, select the applicable item, then operate the buzzer cancel switch to \diamond .

The screen will ask if you want to display the replacement history. Operate the information switch to select YES, then operate the buzzer cancel switch to \diamond . The replacement account will increase by 1, the replacement interval will be reset, and the oil, filter change interval lamp will go out.

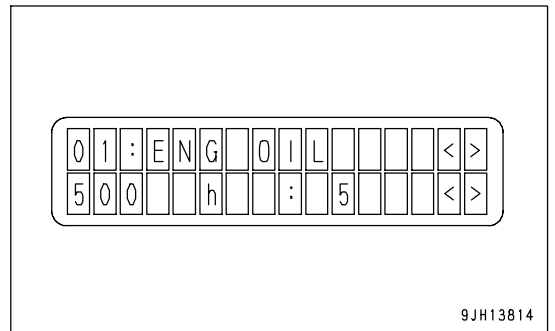
When this is done, if the maintenance caution lamp does not go out, there is another item close to the replacement time, so check the situation.



9JH13813

REMARK

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



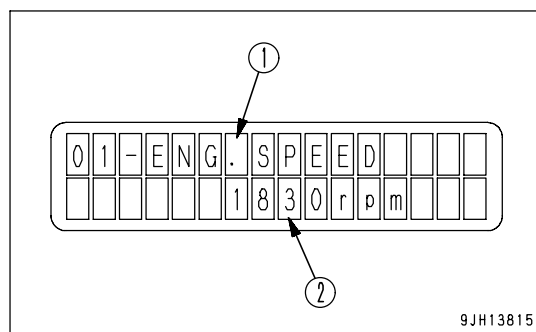
9JH13814

METHOD OF USING PM CLINIC AUXILIARY MODE


CAUTION

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

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



The display items consist of the 11 items in the table below.

The items can be selected by operating the information switch (<, >).

Display	Item	Measured value
01-ENG.SPEED	Engine speed	Speed (rpm)
02-COOLANT TEMP	Engine coolant temperature	temperature (°C)
03-ENG OIL PRESS	Engine oil pressure	Pressure (kPa)
04-AMB PRESS	Ambient pressure	Pressure (kPa)
05-BOOST PRESS	Engine boost pressure	Pressure (kPa)
06-BOOST TEMP	Engine boost temperature	temperature (°C)
07-T/C TEMP	Torque converter oil temperature	temperature (°C)
08-HYD TEMP	Hydraulic oil temperature	temperature (°C)
09-HYD.PUMN PRES F	Hydraulic oil pressure (F pump)	Pressure (MPa)
10-HYD.PUMP PRES R	Hydraulic oil pressure (R pump)	Pressure (MPa)
13-BATTERY VOLT	Battery voltage	Voltage (mV)

REMARK

- Items such as the engine speed fluctuate and are difficult to see during the measurement. In such cases, operate the buzzer cancel switch to \diamond . This makes it possible to hold the display of the value.
- To cancel this mode, operate the buzzer cancel switch again to \diamond .
- To return to the function selection mode, operate the buzzer cancel switch to \square .

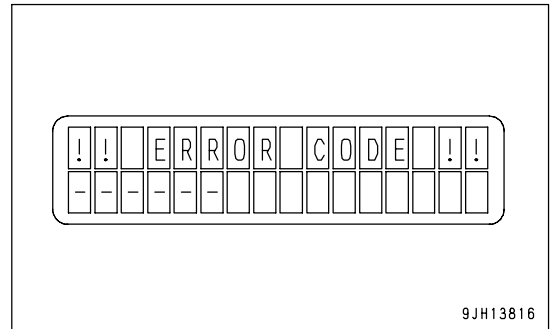
METHOD OF USING FAULT CODE DISPLAY MODE

NOTICE

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

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

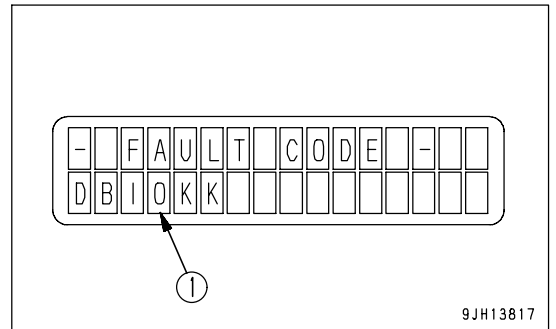
If the failure observation function has not determined the condition of the machine, the display is as shown in the diagram on the right.



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

If multiple failures are occurring, the display automatically changes every 2 seconds, so check the code (1).

The display is shown repeatedly.



REMARK

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

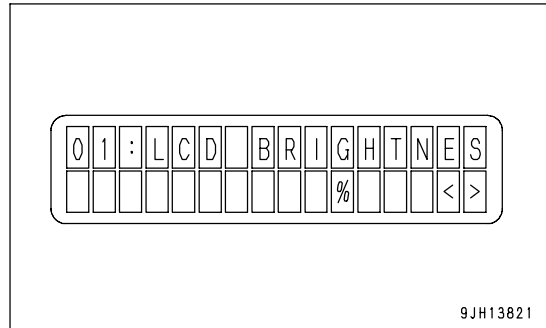
METHOD OF USING USER ADJUST MODE

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

These are displayed on display panel B.

1. Adjusting backlighting of liquid crystal display

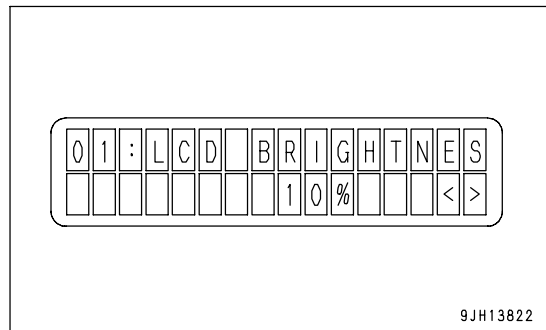
The diagram on the right is the mode for adjusting the brightness of the backlighting of the liquid crystal panel. On this screen, operate the buzzer cancel switch to ◇ to switch to the screen to adjust the brightness.



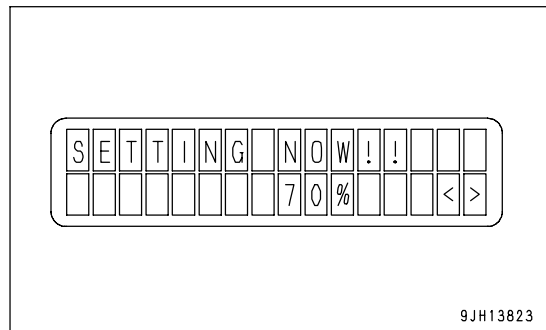
The brightness can be adjusted by operating the information switch.

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

- > position: Number increases
- < position: Number decreases

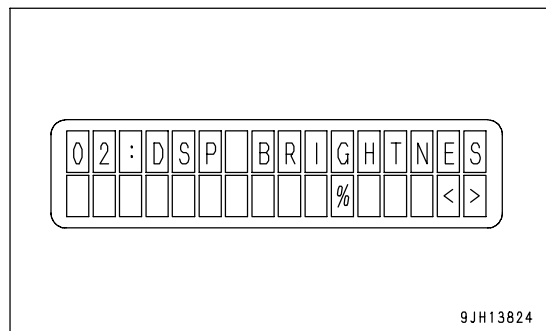


When the buzzer cancel switch is operated to ◇, the brightness of the liquid crystal display backlighting is set.



2. Adjusting backlighting of message display

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

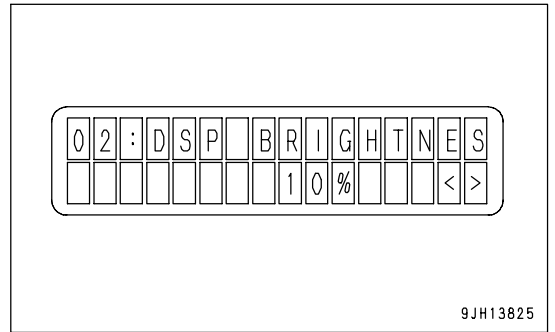


The brightness can be adjusted by operating the information switch.

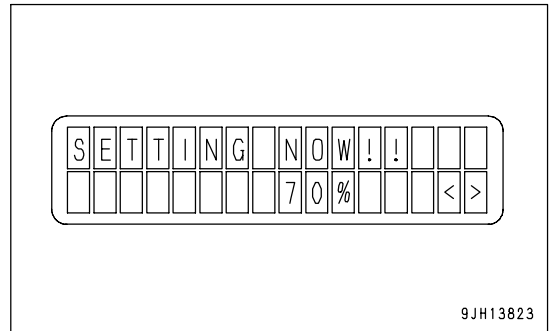
The higher the number, the brighter the screen becomes; the lower the number, the darker the screen becomes.

> position: Number increases

< position: Number decreases



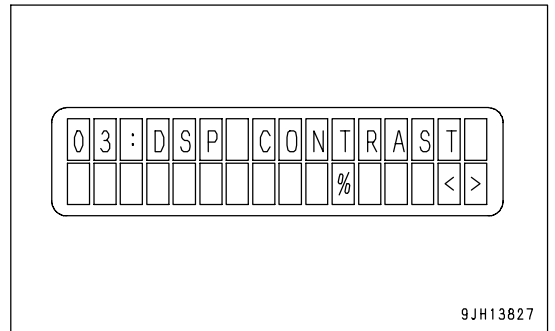
When the buzzer cancel switch is operated to ◇, the brightness of the message display backlighting is set.



3. Adjusting contrast of liquid crystal message display

The diagram on the right is the mode for adjusting the contrast of the liquid crystal message display.

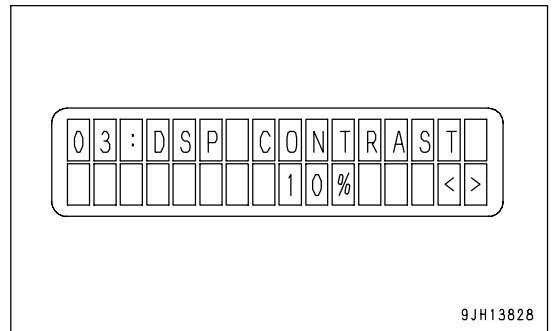
On this screen, operate the buzzer cancel switch to ◇ to switch to the screen to adjust the contrast.



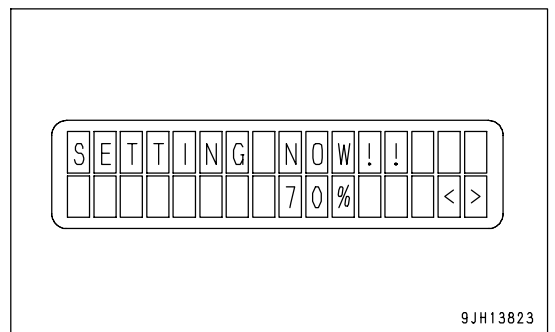
The contrast can be adjusted by operating the information switch. The higher the number, the darker the screen becomes; the lower the number, the lighter the screen becomes.

> position: Number increases

< position: Number decreases



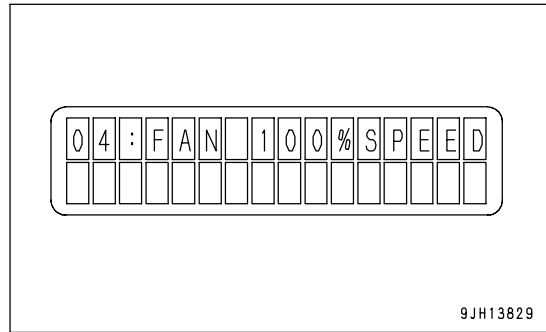
When the buzzer cancel switch is operated to ◇, the contrast of the liquid crystal display is set.



4. Mode to rotate cooling fan at maximum speed

The diagram on the right is the mode for rotating the cooling fan at maximum speed. On this screen, operate the buzzer cancel switch to ◇ to rotate the cooling fan at the maximum speed.

Note that this mode is effective only when the display in the diagram on the right is being given. After leaving this mode, the screen returns to the normal mode.

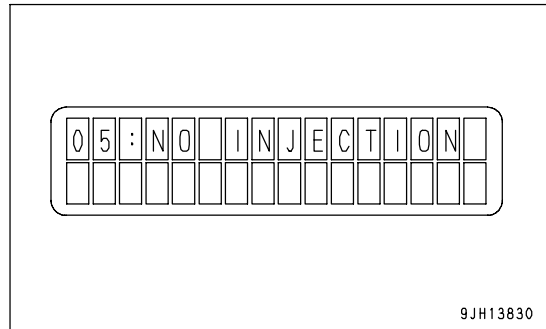


9JH13829

5. Mode for no-injection cranking

The diagram on the right shows the mode for setting to no-injection cranking.

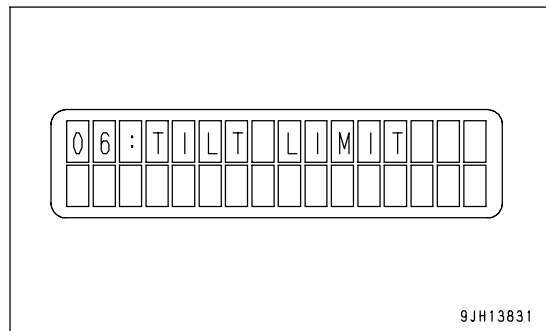
Please contact your Komatsu distributor when using this function.



9JH13830

6. Setting blade tilt angle limit

The diagram on the right shows the mode for setting the blade tilt angle limit. Please contact your Komatsu distributor when using this function.



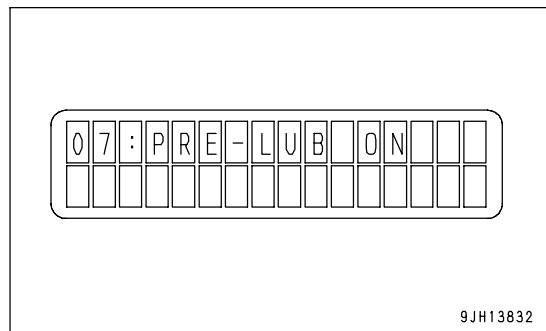
9JH13831

7. Mode for prelube

The diagram on the right shows the mode for machines equipped with prelube. Please contact your Komatsu distributor when using this function.

The diagram on the right shows the mode for emergency starting when there is a failure in the prelube equipment. (For machines equipped with prelube)

When the monitor shows this screen and the information switch is turned, the bottom line of the display is turned OFF. In this condition, it is possible to exit this mode and start the engine without using the prelube. In addition, once the engine is stopped, this mode is canceled.

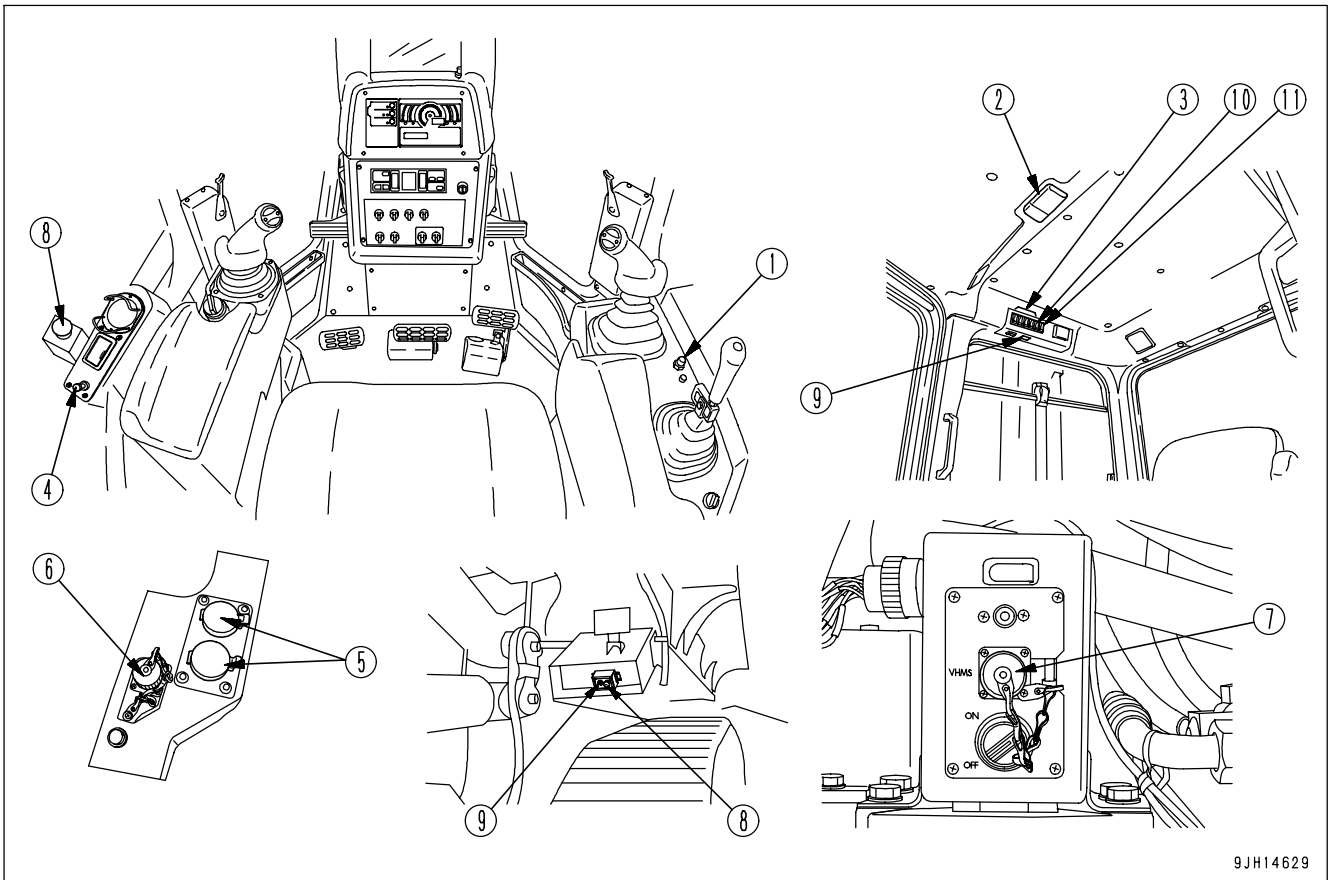


9JH13832

REMARK

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

SWITCHES

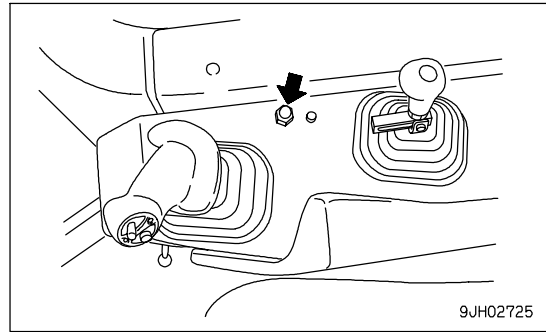


9JH14629

- | | |
|---------------------------------|---|
| (1) Horn switch | (7) Connector for VHMS download |
| (2) Room lamp switch | (8) Engine emergency stop switch (if equipped) |
| (3) Wiper switch | (9) Access lamp switch (if equipped) |
| (4) Cigarette lighter | (10) Front additional working lamp switch (if equipped) |
| (5) Accessory socket | (11) Rear additional working lamp switch (if equipped) |
| (6) Connector for VHMS download | |

HORN SWITCH

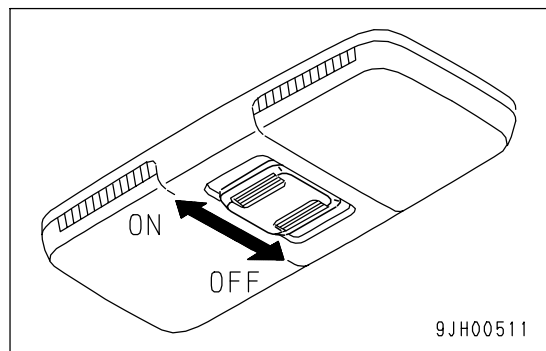
The horn sounds when button (1) at rear of the blade control lever on the right side of operator's seat is pressed.

**ROOM LAMP SWITCH**

Switch (2) lights the room lamp.

ON position: Lamp lights up

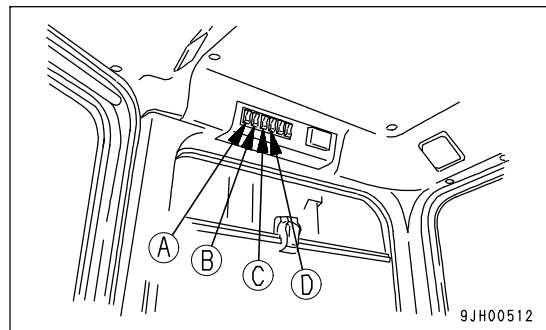
OFF position: Lamp is out

**WIPER SWITCH**

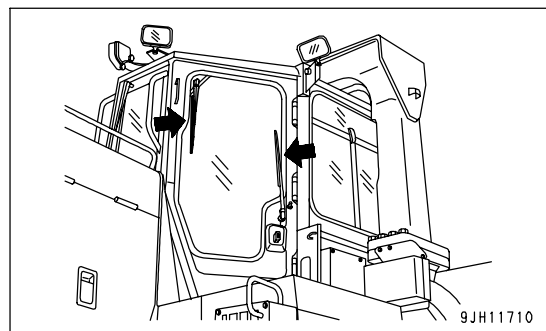
Switch (3) activates the wipers.

The wiper switches are as follows:

- (A) L.H. door
- (B) Front window
- (C) R.H. door
- (D) Rear window

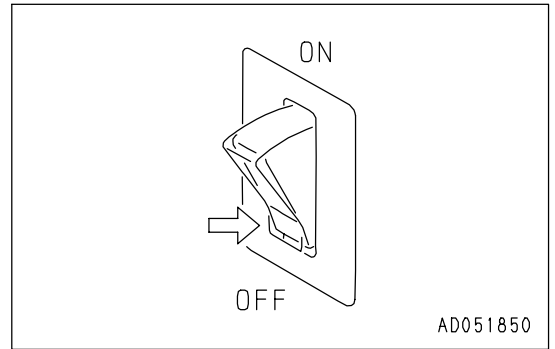


On machines with the double wiper specification, operate the switches on left door (A) and right door (C) to operate the wipers at the top and bottom of the door simultaneously.

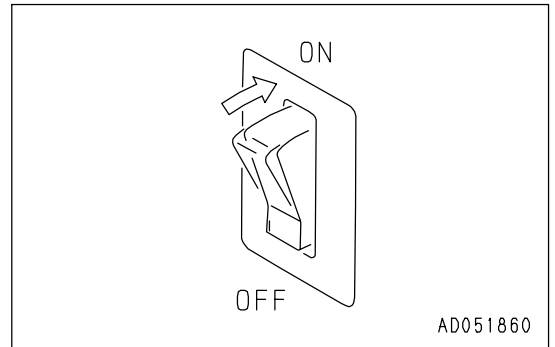


This is also used as the window washer switch.
The switch is operated as follows.

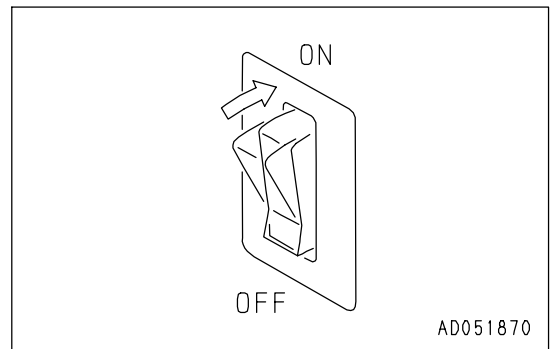
- Window washer only
Keep the switch pressed to the OFF position to spray out water.



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

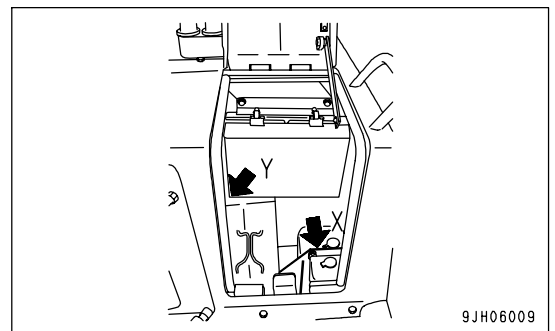


- Wiper and window washer
If this is kept pressed to the ON position while the wiper is working, water will be sprayed out.

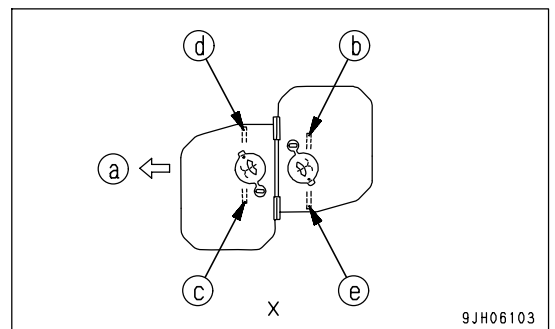


REMARK

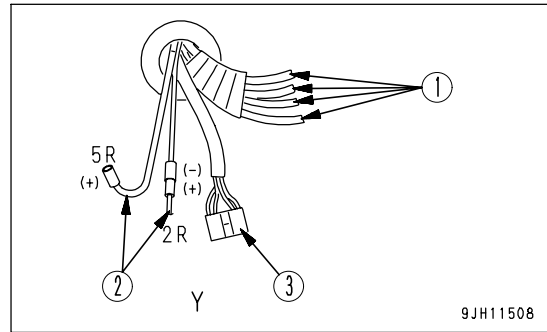
When installing the cab, check the colors of the washer tank and window washer hoses, and be sure to connect correctly.



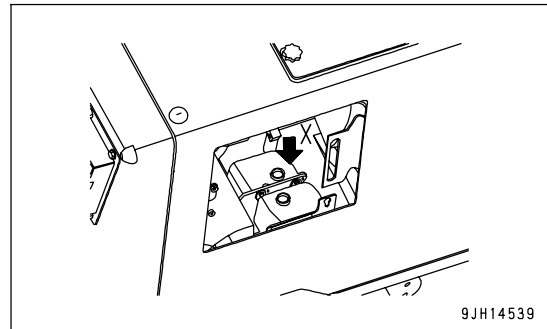
- (a) Front of machine
- (b) Front (no color)
- (c) Rear (black)
- (d) Left side (blue)
- (e) Right side (red)



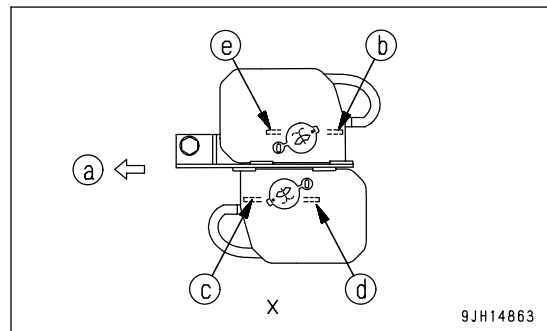
(1)	Washer tube	Red-Right door Blue-Left door Black-Rear window Colorless-Front window
(2)	Power source of cab	5R-ACC power source of cab 2R-Back up power source
(3)	4-pin socket	For washer motor



(For mining specification machine)



- (a) Front of machine
- (b) Front (no color)
- (c) Rear (black)
- (d) Left side (blue)
- (e) Right side (red)

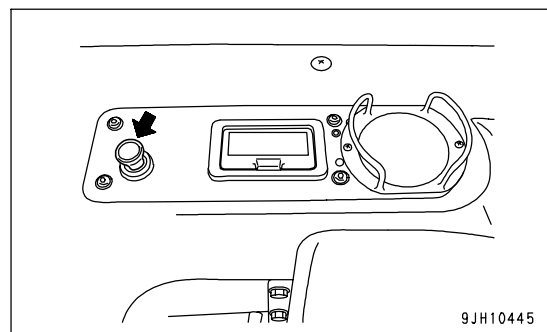


CIGARETTE LIGHTER

This lighter (4) is used to light cigarettes. When the cigarette lighter is pushed in, it will return to its original position after a few seconds, so take it out to light your cigarette. If the cigarette lighter is removed, the socket can be used as a power source.

NOTICE

This cigarette lighter is 24V. Do not use it as the power supply for 12V equipment. This will cause failure of the equipment. The capacity of the cigarette lighter is 120W (24V x 5A).



ACCESSORY SOCKET

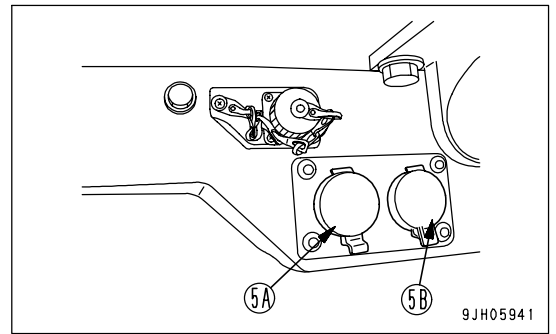
Socket (5) is used as the power source for a wireless device or other 12V equipment.

With both Type (A) and Type (B) electricity flows only when the ignition switch is at the ON position.

The capacity for both Types (A) and (B) is 60W (12V x 5A).

REMARK

This socket is under the left armrest.



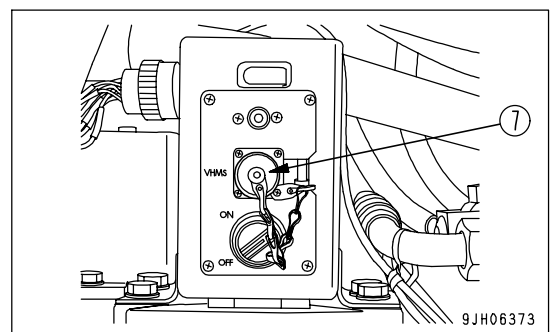
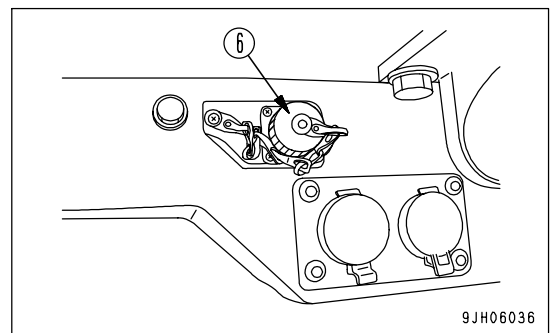
CONNECTOR FOR VHMS DOWNLOAD

It is possible to download the VHMS data using connector (6),(7).

When using this connector, consult your Komatsu distributor.

REMARK

This connector is under the left armrest and in the download box under the fuel tank at the rear of the machine.



ENGINE EMERGENCY STOP SWITCH

(Mining specification, if equipped)

Use this switch (8) to stop the engine.

(A) position: Engine stopped

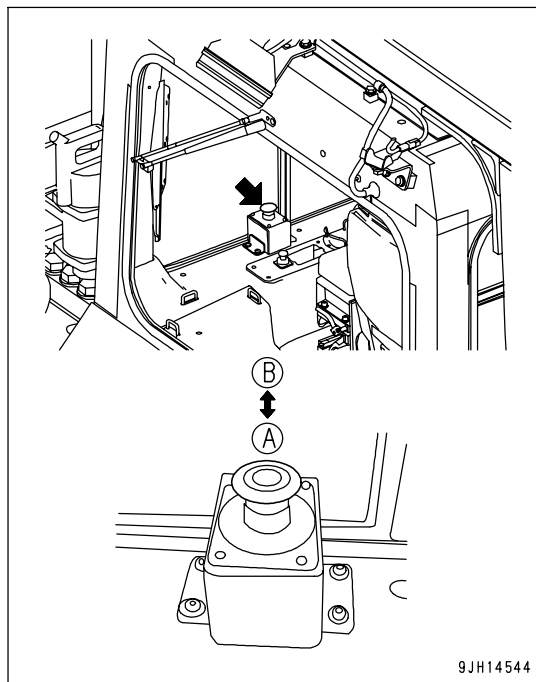
(B) position: Possible to start engine

REMARK

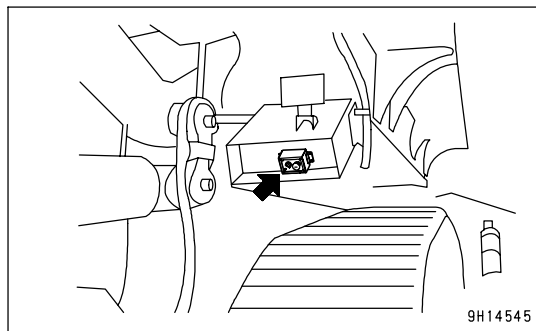
- Both of these switches must be at the (B) position when starting the engine. If they are not at the (B) position, the engine will not start.

When the switch is pressed again, it will return to the (B) position.

- When the engine starting switch is in the engine stop position (A), a sign of STP is shown in the multi-information display. (Ordinary display)

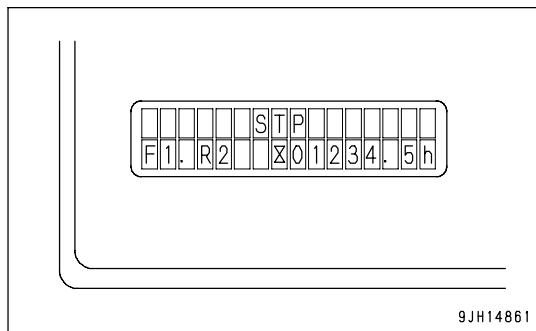


9JH14544



9H14545

(Ordinary Display)

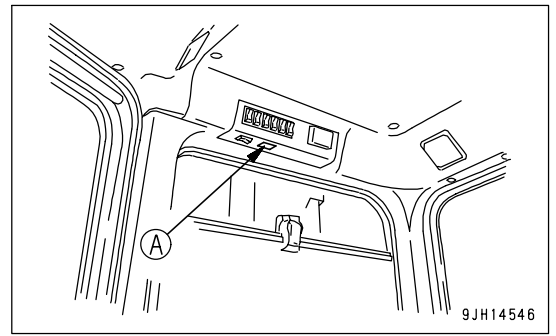


9JH14861

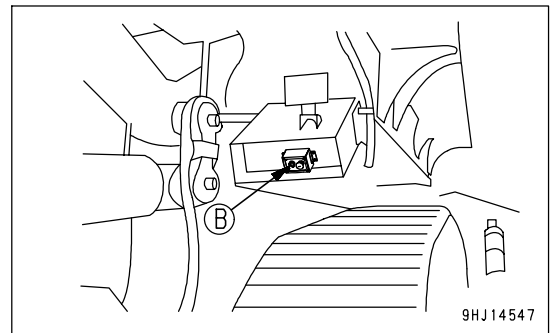
ACCESS LAMP SWITCH

(Mining specification, if equipped)

Use this switch (9) to light up the access lamp (C).
 (The lamp lights up even when the main key switch is OFF.)
 Switches (A) and (B) are synchronized, so it is possible to light up the access lamp with switch (A) and turn it off with switch (B).
 It is also possible to turn the lamp on with switch (B) and turn it off with switch (A).

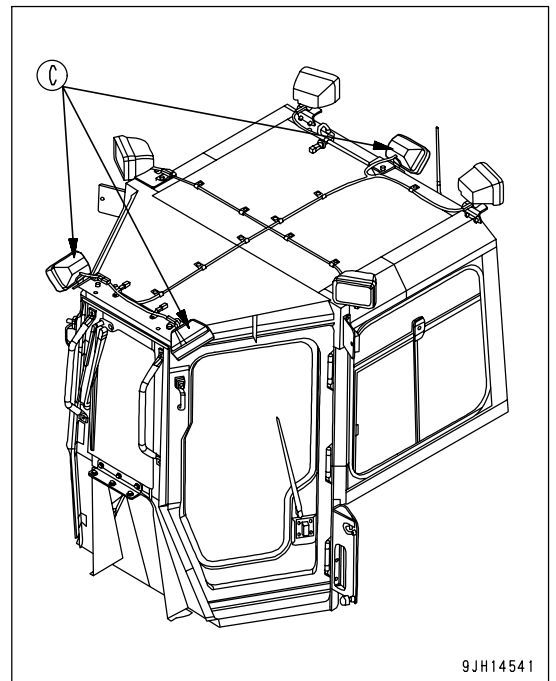


9JH14546



9JH14547

(C): Access Lamp (provided at 3 spots)



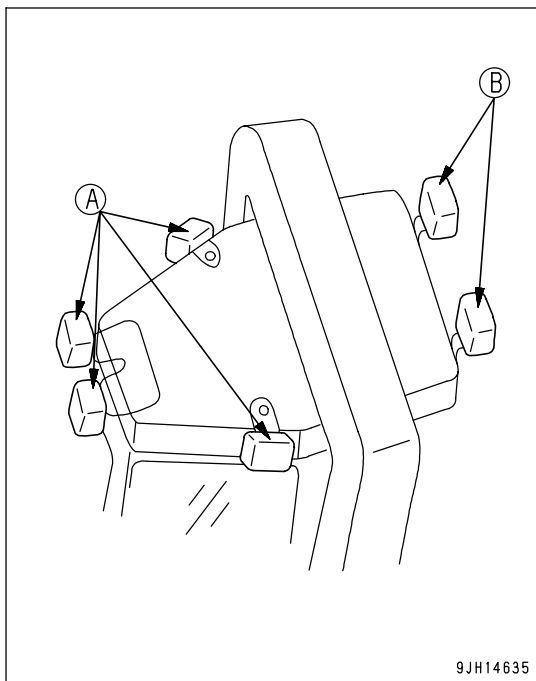
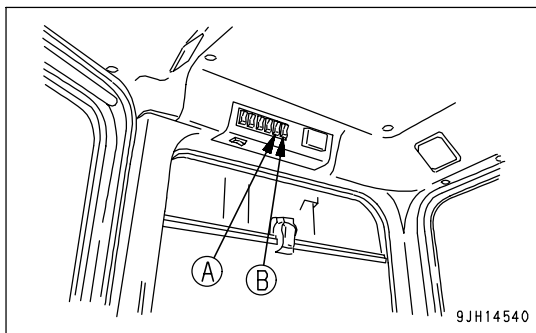
9JH14541

ADDITIONAL WORKING LAMP SWITCH

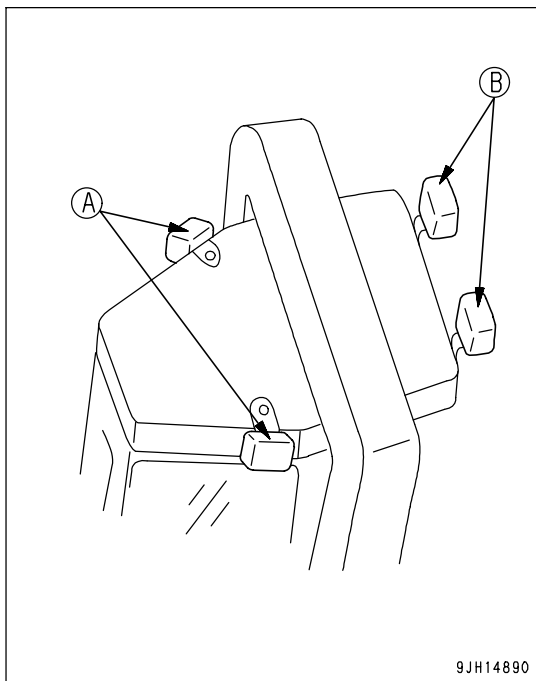
Use these switches (10) and (11) to light up the additional working lamps.

(A): Front additional working lamp switch

(B): Rear additional working lamp switch



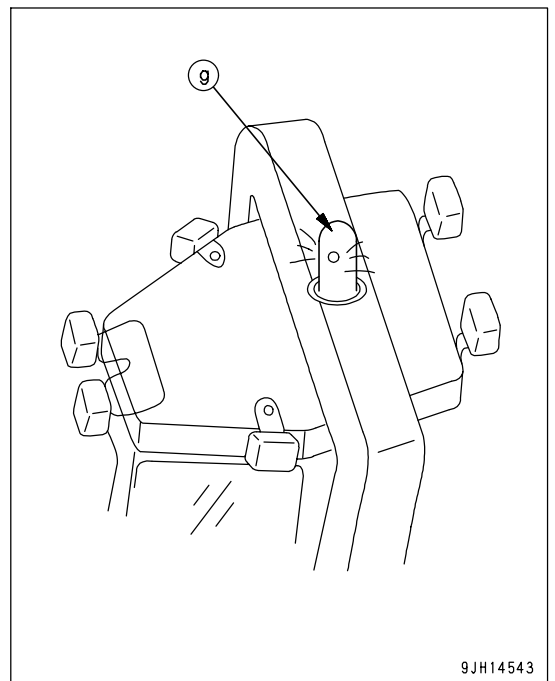
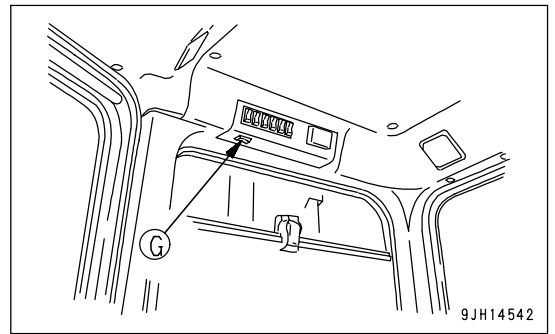
(For mining specification machine)



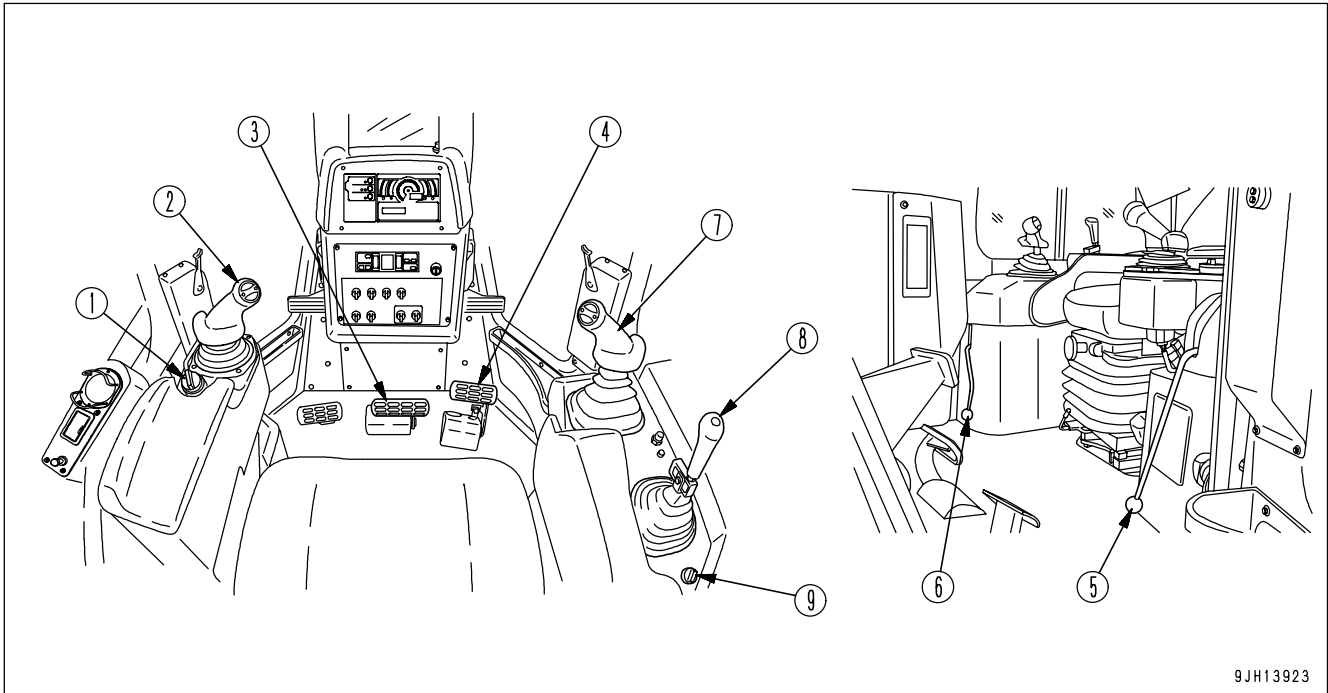
OPTION SWITCHES

This switch (G) is the switch for the following rotating lamp (g).

(G): Rotating lamp switch



CONTROL LEVERS, PEDALS



9JH13923

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

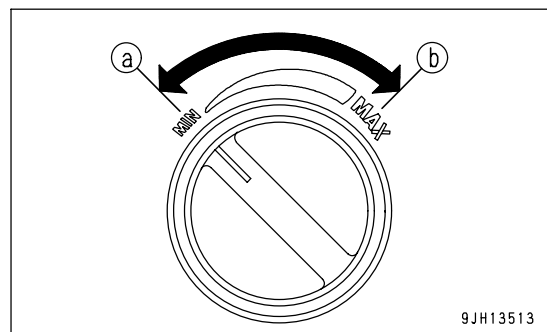
FUEL CONTROL DIAL

Dial (1) is used to control the engine speed and output.

- (a) Low idling position: Turn fully to the left
- (b) High idling position: Turn fully to the right

REMARK

To stop the engine, turn the starting switch to the OFF position.



9JH13513

JOYSTICK (STEERING, DIRECTIONAL AND GEAR SHIFT LEVER)

(PCSS lever)

Lever (2) is used to switch direction of travel and to steer the machine.

REMARK

PCCS: Palm command control system

- **Forward-reverse shifting**

Position (a): FORWARD

Position (b): REVERSE

Position N: Neutral

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

- **Steering**

Position (L): Left turn

Position (R): Right turn

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

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

REMARK

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

- **Gear shifting**

When the steering, directional, and gearshift lever is at the FORWARD or REVERSE position and switch (c) or switch (d) is pushed, the transmission speed will change.

UP switch (c): Each time the switch is pressed, the transmission will shift up one speed.

DOWN switch (d): Each time the switch is pressed, the transmission will shift down one speed.

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

REMARK

- The speed range being used is displayed on the monitor panel according to the gearshift operation.

<Example>

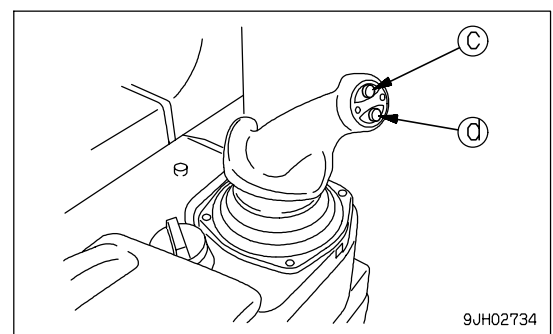
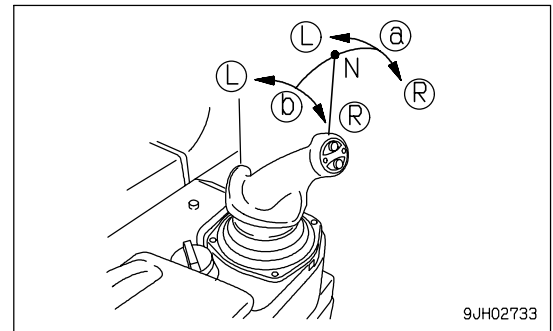
Neutral:N is displayed on the display panel.

FORWARD 2nd:F2 is displayed on the display panel.

REVERSE 3rd:R3 is displayed on the display panel.

When the parking brake lever is locked,P is displayed

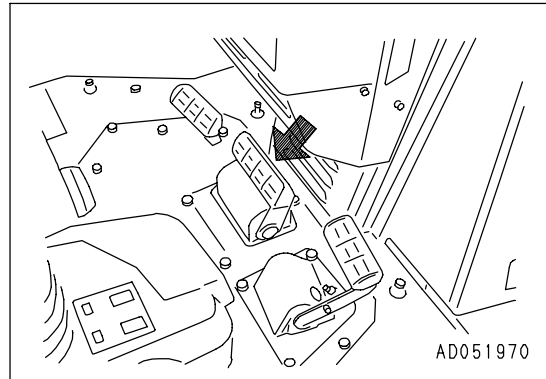
- For details of the method of shifting gear according to the shift mode,see the"SHIFTING GEAR (PAGE 3-126)".Shift mode selection means the selected speed range is displayed at the N position before starting.



BRAKE PEDAL**WARNING**

Do not place your foot on this pedal unnecessarily.

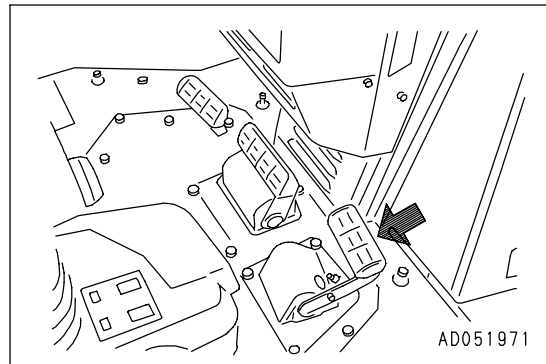
Depress the pedal (3) to apply the right and left brakes.

**DECELERATOR PEDAL****WARNING**

- Do not rest your foot on the pedal if you are not using it.
- When passing over the top of a slope or when dumping soil from a cliff, the load on the machine will suddenly be reduced and the travel speed will increase. This situation is dangerous, so use the decelerator pedal to reduce the travel speed of the machine

Pedal (4) is used when reducing engine speed or stopping the machine.

When switching between forward and reverse, or when stopping the machine, use this pedal to reduce speed.

**REMARK**

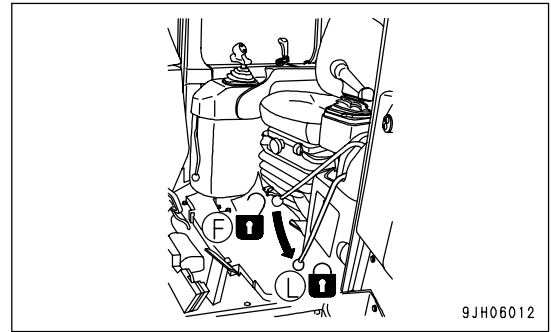
When operating the decelerator pedal, there may be a particular noise, but there is no problem with quality or durability.

PARKING BRAKE LEVER

 **WARNING**

When the machine is parked, always set the parking brake lever to the LOCK position (L).

This lever (5) is used to apply the parking brake.



9JH06012

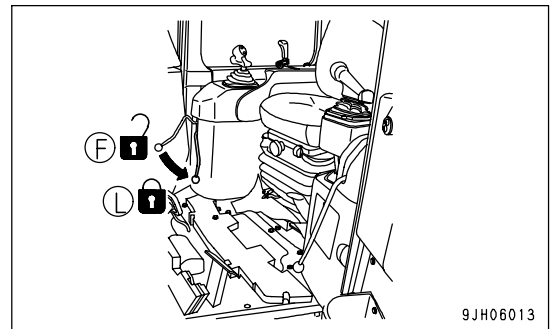
REMARK

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

WORK EQUIPMENT LOCK LEVER

 **WARNING**

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



9JH06013

Lever (6) is a device to lock the blade control and ripper control levers.

When it is set to the LOCK position (L), the TILT, RAISE, LOWER, and FLOAT operations are locked.

REMARK

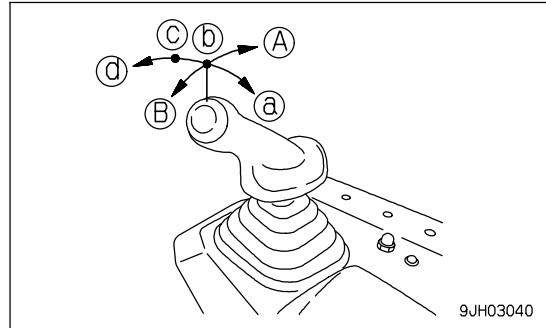
When starting the engine, to ensure safety, always set the work equipment lock lever to the LOCK position (L).

BLADE CONTROL LEVER

Lever (7) is used to operate the blade.

SINGLE TILTDOZER

This lever is used to carry out the blade lift and tilt operations.

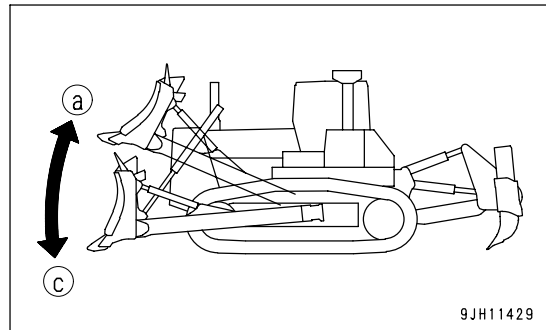


• Lifting control

- (a) RAISE
- (b) HOLD: Blade is stopped and held in this position.
- (c) LOWER
- (d) FLOAT: Blade will move freely according to external force.

REMARK

When released from FLOAT position, this lever (7) will not return to HOLD position, so it must be returned to HOLD by hand.

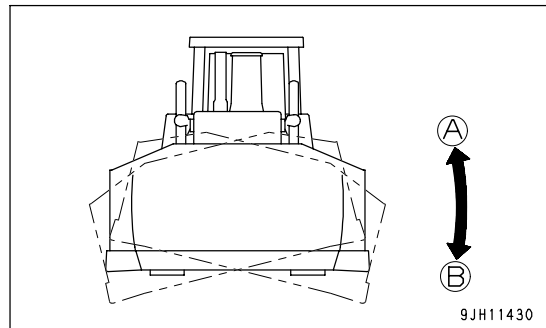


• Tilting control

- (A) RIGHT TILT
- (B) LEFT TILT

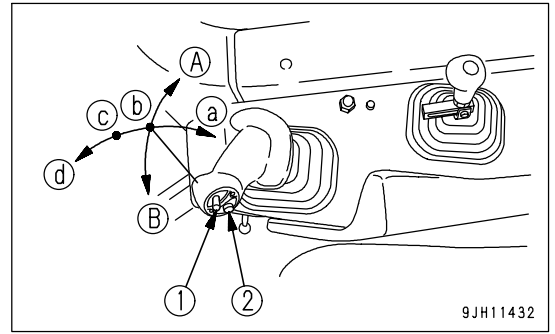
REMARK

With the tilt operation, the blade can be operated to RAISE, HOLD, or LOWER.



DUAL TILTDOZER

This lever is used to carry out the blade lift, tilt, and pitch operations.

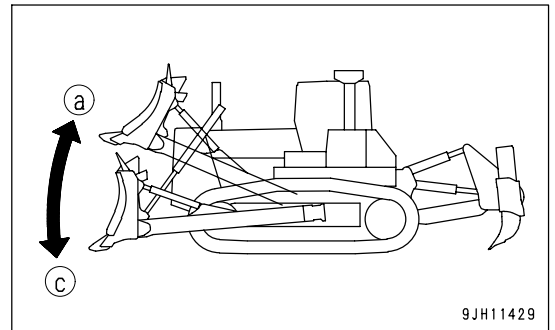


(1) Tilt switch
(2) Pitch button

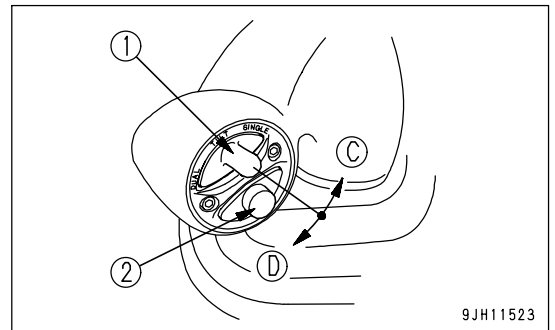
- Lifting control
- (a) RAISE
- (b) HOLD: Blade is stopped and held in this position.
- (c) LOWER
- (d) FLOAT: Blade will move freely according to external force.

REMARK

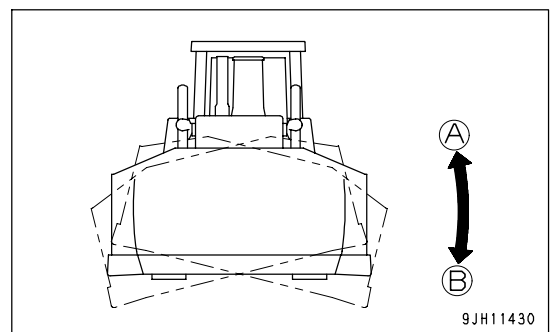
When released from FLOAT position, this lever (7) will not return to HOLD position, so it must be returned to HOLD by hand.



- Single tilt operation
- Operate the tilt switch (1) to the (C) position.

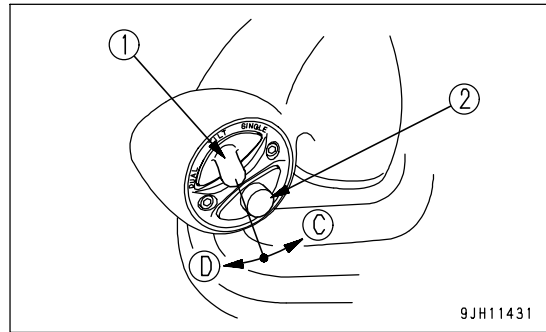


- (A) RIGHT TILT
- (B) LEFT TILT



- Dual tilt operation

Operate the tilt switch (1) to the (D) position.

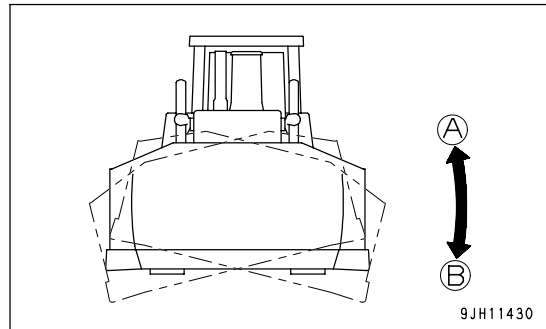


(A) RIGHT TILT

(B) LEFT TILT

REMARK

- With the dual tilt operation, a larger amount of tilt can be obtained than with the single tilt operation.
- With the tilt operation, the blade can be operated to RAISE, HOLD, or LOWER.



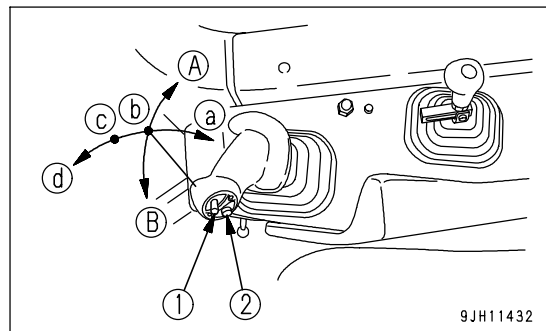
- Pitch control

Rear pitch (R)(cutting angle reduced)

Carry out operation (B) with the pitch button (2) pressed.

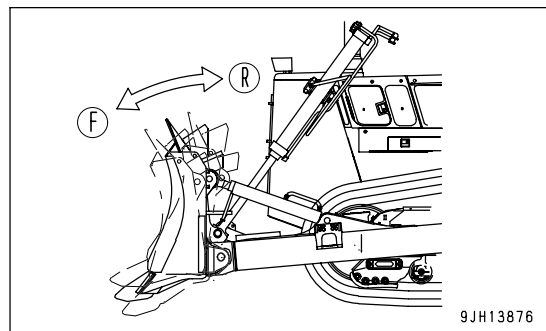
Forward pitch (F)(cutting angle increased)

Carry out operation (A) with the pitch button (2) pressed.



REMARK

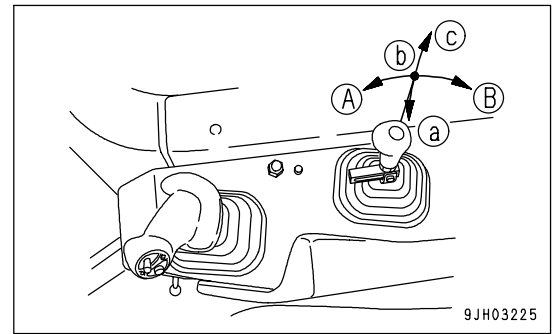
- With the pitch operation, the blade can be operated to any of RAISE, HOLD, or LOWER.
- For details of the effective use of the dual tilt/dozer, see "EFFECTIVE METHOD OF OPERATION FOR DUAL TILTDOZER (PAGE 6-5)".
- To operate the pitch, keep the pitch button pressed and operate the blade control lever to the left or right to start the operation.
- The pitch is the priority circuit, so if the pitch button is pressed during tilt operation, the pitch will be actuated.



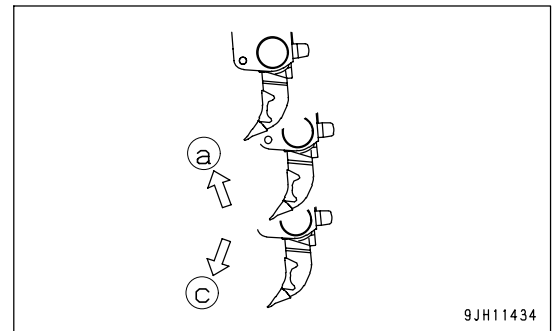
RIPPER CONTROL LEVER

(For variable ripper)

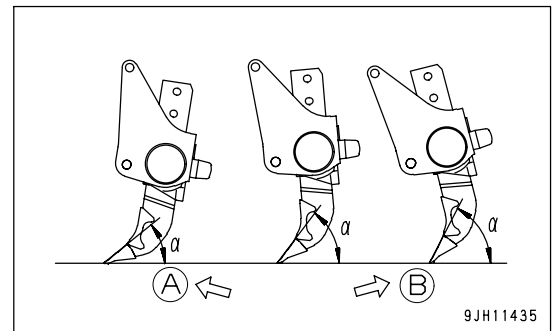
Lever (8) is used to operate the ripper.

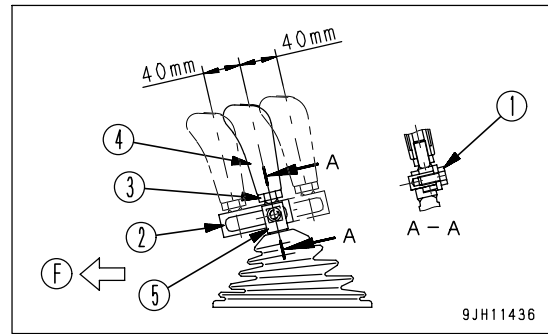


- Lifting control
 - (a) RAISE
 - (b) HOLD: Ripper is stopped and held in the same position.
 - (c) LOWER



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



ADJUSTING FRONT-REAR POSITION OF RIPPER CONTROL LEVER(Range of adjustment: ± 40 mm (1.6 in))

(F)Front of the machine

Lever (8) position can be adjusted to best suit the operator's physique. Follow the steps below for the adjustment.

- Adjustment within range of 40 mm (1.6 in) from neutral to rear

1. Loosen lock nut (1) with a wrench.
2. Set lever (2) to the optimum position.
3. Tighten lock bolt (1) with the wrench to hold lever (2) in position.

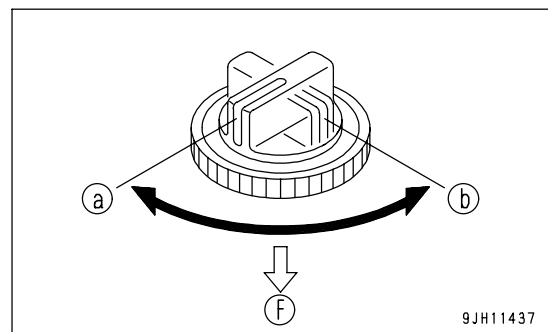
- Adjustment within range of 40 mm (1.6 in) from neutral to front

1. Remove lock bolt (1) with a wrench.
2. Remove lever (2) and reverse it 180°
3. Install lever (2) to lever (5), then set it to the optimum position.
4. Tighten lock bolt (1) with the wrench to hold lever (2) in position.
5. Loosen nut (3).
6. Reverse knob 180°.
7. Tighten nut (3).

PIN PULLER CONTROL SWITCH (IF EQUIPPED)

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

- (a) PULL OUT: Pin is pulled out.
 (b) PUSH IN: Pin is pushed in.



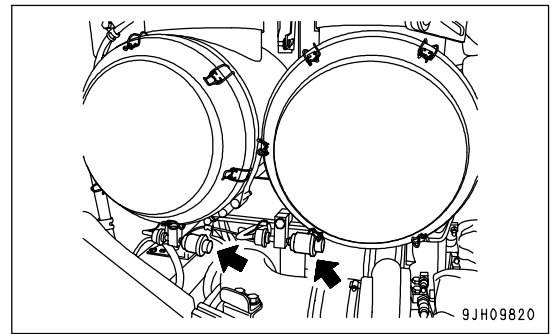
(F)Front of the machine

DUST INDICATOR

This is on the air cleaner bracket inside the engine room. (2 places)

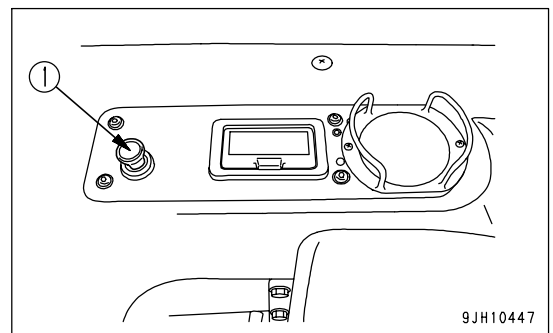
It informs the operator when the air cleaner element has become clogged.

For details of the method of cleaning the element, see "CHECK, CLEAN AND REPLACE AIR CLEANER ELEMENT (PAGE 4-25)".



POWER SOURCE

The cigarette lighter socket (1) can be used as a power source for 24V equipment and the accessory socket (2) can be used for 12V equipment.



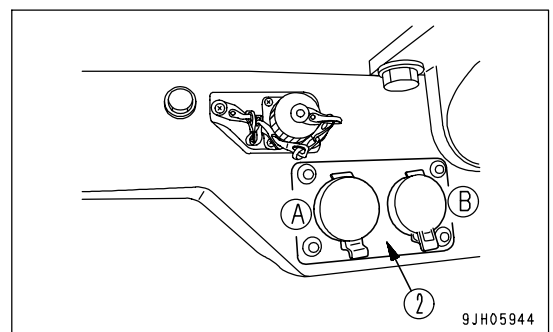
NOTICE

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

The capacity of the cigarette lighter is 120W (24V x 5A).

There are 2 accessory sockets. Their capacity is 60W (12V x 5A).

These 2 accessory sockets only provide power when the starting switch is ON.



FUSE BOX

NOTICE

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

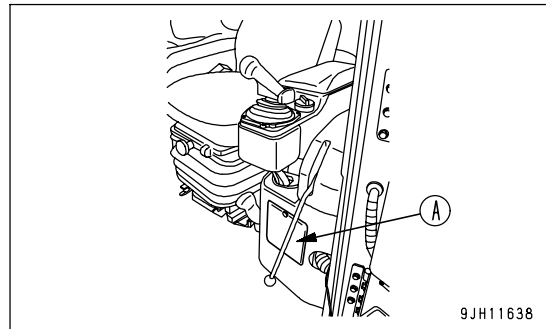
The fuses protect the electric equipment and wiring from burning out.

Replace the fuse if it becomes corroded or is covered in white powder, or if there is any looseness between the fuse holder and the fuse.

Always replace the fuse with a fuse of the specified capacity.

- Chassis

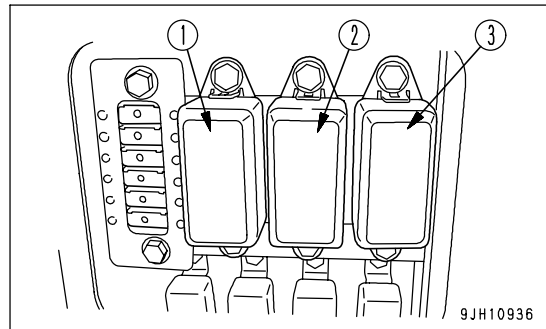
Open the fuse inspection cover (A) at the bottom front left of the operator's compartment. Fuse box is installed inside.



Fuse box (1)

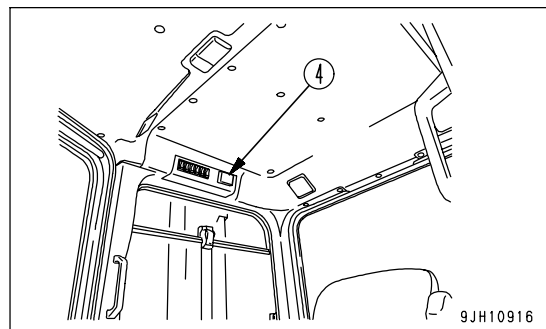
Fuse box (2)

Fuse box (3)



- Cab (machines equipped with cab)

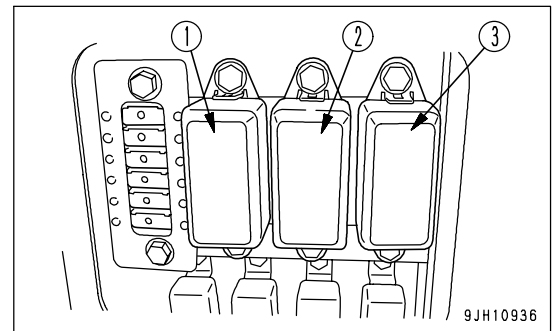
Fuse box (4) is installed at the bottom of the overhead panel.



FUSE CAPACITY AND NAME OF CIRCUIT

Fuse box (1)

NO.	Fuse capacity	Name of circuit
1	20A	VHMS controller
2	20A	VHMS permanently ON power source
3	20A	Permanent power supply for cab
	30A	Permanent power supply for cab (Mining specification, if equipped)
4	10A	Permanent power supply for converter
5	20A	Converter



Fuse box (2)

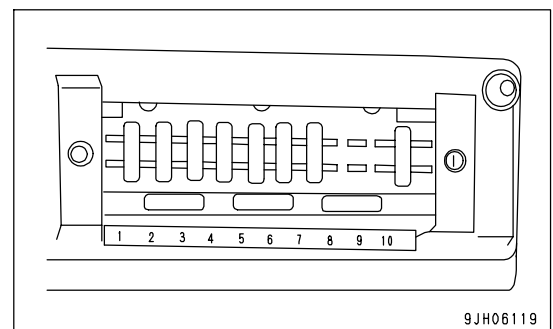
NO.	Fuse capacity	Name of circuit
1	5A	Back-up alarm
2	20A	Preheater power source, pin puller, air suspension seat
3	20A	Additional heater power source
4	20A	Working lamp
5	20A	Rear lamp

Fuse box (3)

NO.	Fuse capacity	Name of circuit
1	5A	ACC signal
2	20A	Horn
3	20A	Spare power source (1)
4	20A	Spare power source (2)
5	20A	Spare ACC signal

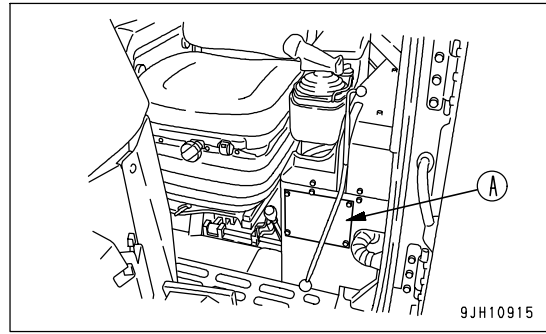
Fuse box (4)

NO.	Fuse capacity	Name of circuit
(1)	10A	Car radio, cigarette lighter, room lamp
(2)	10A	Rear wiper
(3)	10A	R.H. wiper
(4)	10A	Front wiper
(5)	10A	L.H. wiper
(6)	20A	Additional front lamp
(7)	20A	Additional rear lamp, revolving lamp
(8)	-	Spare
(9)	-	Spare
(10)	10A	Radio memory

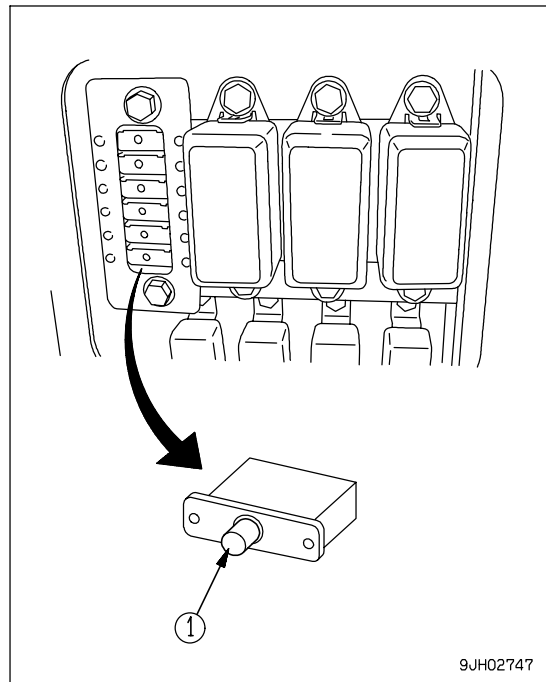


CIRCUIT BREAKER

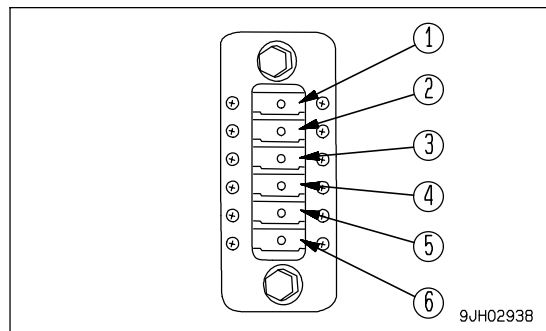
- If the starting switch does not work, open the fuse inspection cover (A) at the bottom front left of the operator's compartment and check.



- If excessive current flows through the circuit breaker, it cuts off the electric circuit to prevent damage to the electrical components and wiring.
- To restore the electric circuit after it has been cut off, push in reset button (1). (This springs out when the circuit is cut off.) If the electric circuit is normal, reset button (1) will stay pushed in. If it comes out immediately when it is pushed in, the electric circuit must be checked.



No.	Capacity	Circuit
(1)	20A	Steering controller
(2)	20A	Monitor panel
(3)	20A	Transmission controller
(4)	20A	Air con main power
(5)	20A	Head lamp
(6)	20A	Starter switch

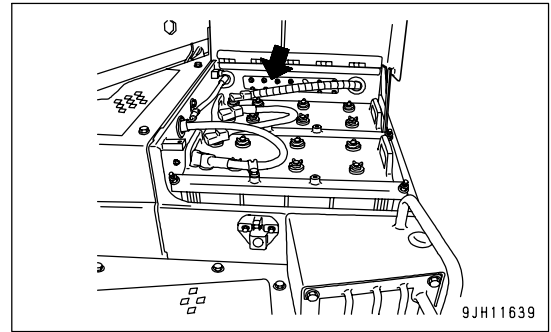


REMARK

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

CIRCUIT BREAKER FOR MAIN POWER SUPPLY

- If the starting motor does not move when the starting switch is turned to the START position, open the battery box and check circuit breakers (A) - (G).
- If there is a surge of current, the circuit breaker shuts off the circuit to protect the electrical components and wiring from damage.

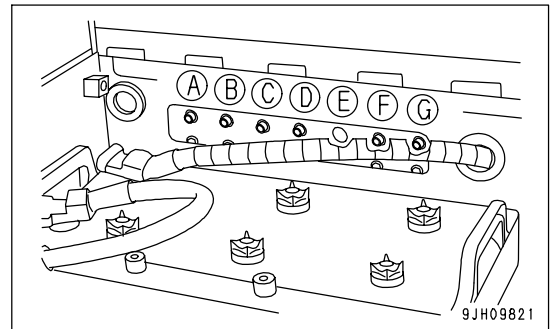


- Turn the starting switch to the OFF position and reset the circuit breaker.
- When resetting the electrical circuit after it has been shut off, press the reset button 5 to 10 minutes after the circuit has been shut off. When the electrical circuit has been shut off, the operation of the reset button is heavier than when the circuit is normal. The height of the reset button is the same, regardless of whether the circuit has been shut off or has been reset, so make note of the effort of the reset button when resetting the circuit.
- Do not keep the circuit breaker reset button longer than necessary.
- If the starting motor does not work even when the circuit breaker has been reset, contact your Komatsu distributor.

REMARK

The capacities for circuit breakers (A) - (G) are as follows.

- (A): 30A (permanent power supply for cab)
- (B): 105A (general power supply)
- (C): 105A (electrical intake air heater)
- (D): 105A (electrical intake air heater)
- (E): 30 A (spare for optional equipment)
Mining specification (permanent power supply for electrical equipment)
- (F): 30A (permanent power supply for engine controller)
- (G): 30A (permanent power supply for engine controller)

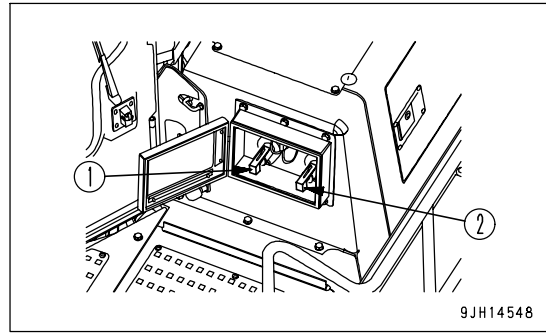


BATTERY ISOLATOR SWITCH, STARTING MOTOR ISOLATOR SWITCH

(Mining specification, if equipped)

Keep the battery isolator switch (1) at the ON position at all times, except when putting the machine into long-term storage or when carrying out maintenance of the electrical system.

Use the starting motor isolator switch (2) only when it is desired to turn off the engine starting system.

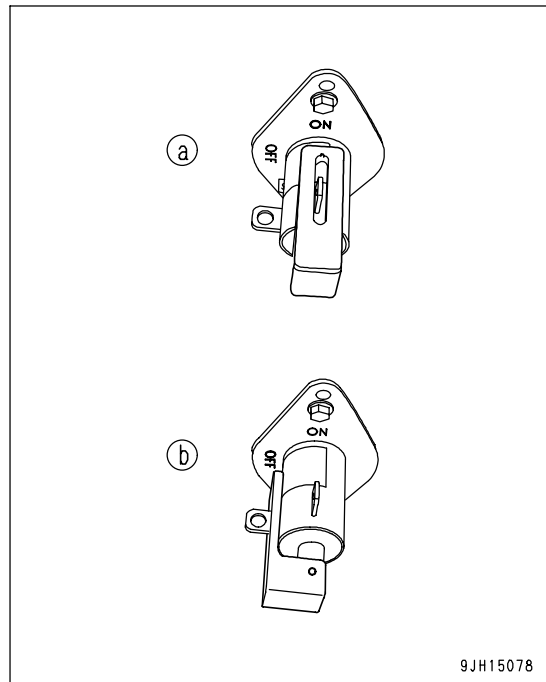


NOTICE

When this switch is turned to the OFF position (b), all the electrical circuits are turned off, so the clock and preset settings for the radio stations may be deleted.

[ON]: When the lever is at the ON position (a), the electrical circuits are connected. Before trying to start the engine, check that this switch is at the ON position (a).

[OFF]: When the lever is at the OFF position (b), the electrical circuits are turned off. When putting the machine into long-term storage or when carrying out maintenance of the electrical system, always check that this switch is at the OFF position (b).



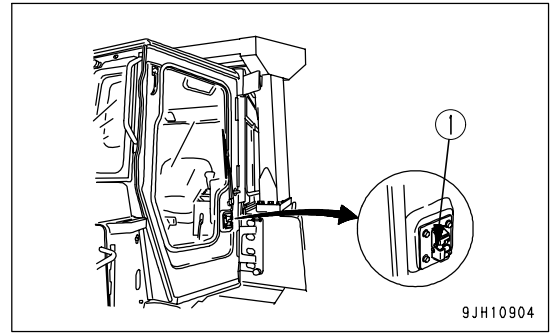
NOTICE

Never turn this switch OFF when the engine is running. There is danger that it will cause failure of the electrical system.

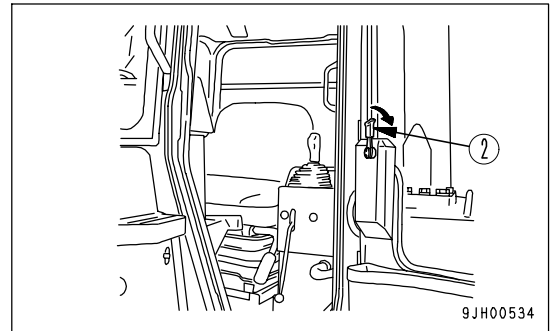
DOOR OPEN LOCK

Use this when you want to keep the door held open.

1. Push the door against door catch (1). The door will be held by the door catch.



2. To release the door, move lever (2) inside the cab forward. This will release the catch.



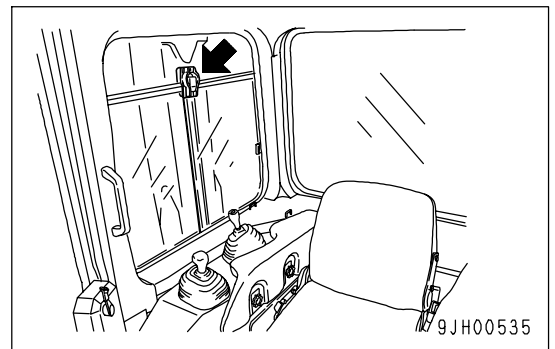
NOTICE

- When keeping the door open, fix it securely to the catch.
- Always close the door when traveling or carrying out operations. Leaving the door open will cause the door to break.
- Keep the door locked open securely. The door may swing closed because of the vibration.

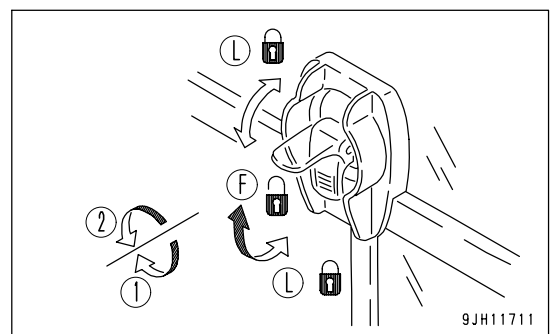
SASH GLASS INTERMEDIATE LOCK

When working with the cab sash glass open, use this lock to prevent the glass from chattering.

- When the lever is in the FREE position (F), the glass can be opened or closed.
- When the lever is moved to the LOCK (up or down) position, the glass is fixed in position.



- If the glass is not held securely, set the lever in the FREE position (F) and rotate clockwise (1) to strengthen the holding power.
- To reduce the holding power, turn counterclockwise (2).



NOTICE

Always close the window when traveling or carrying out operations. Leaving the window open will cause the window to break.

CAP WITH LOCK

Lock-type caps are available for the radiator water filler, power train case oil filler cap, and hydraulic tank oil filler cap. For details of the locations of the caps with locks, see "LOCKING (PAGE 3-140)".

OPENING AND CLOSING CAP WITH LOCK

Use the starting switch key to open and close the locks on the caps except fuel tank cap. The method of opening or closing the locks on the caps are as follows.

OPENING THE COVER

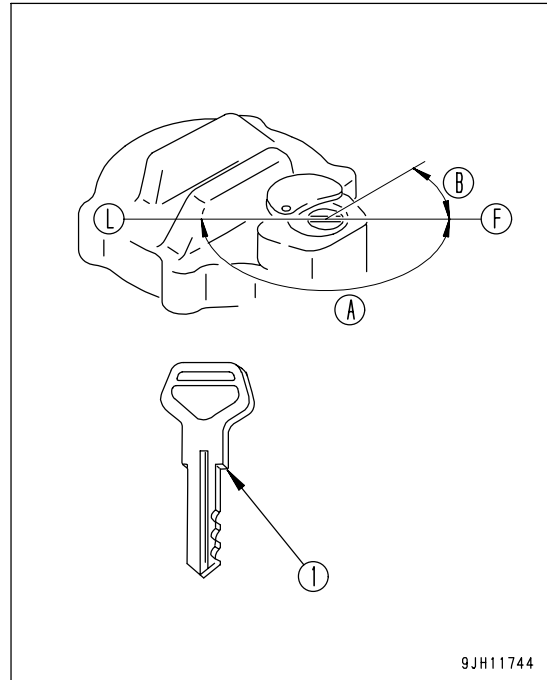
1. Insert the key. Make sure that you have inserted the key fully (1) before turning it. If the key is turned when only partially inserted, it may break.

(L) : Lock position

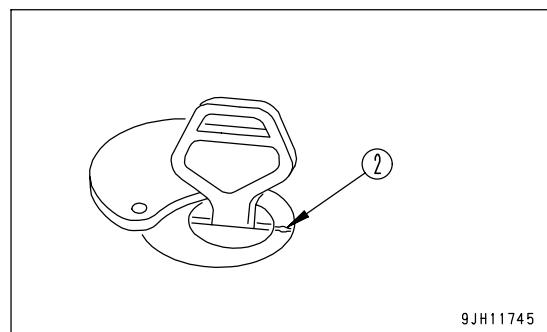
(F) : Open position

(A) : working angle of key 180°

(B) : 45°



2. Turn the key counterclockwise to align the match mark (2) on the cap with the rotor groove, then turn the cap slowly. When a click is heard, the lock is released, enabling the cap to be opened.



LOCKING THE COVER

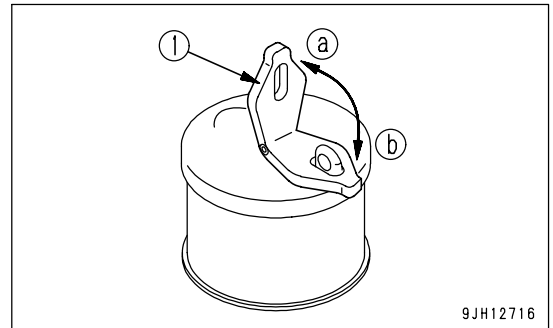
1. Turn the cap into place.
2. Turn the key clockwise and take the key out.

METHOD OF OPENING FUEL CAP

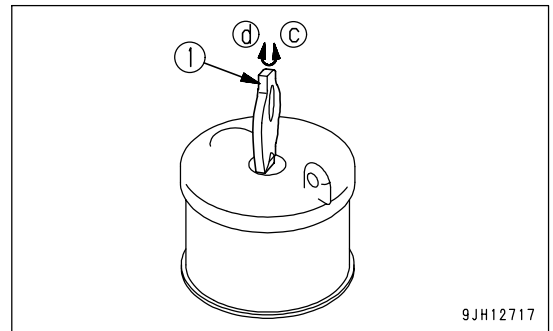
The method of opening or closing the fuel tank cap is as follows.

OPENING THE CAP

1. Raise lever (1) in the (a) direction.
2. When lever (1) is turned in the (c) direction (counterclockwise) by approx 35°, it stops at the stopper, and the cap can be opened.

**CLOSING THE CAP**

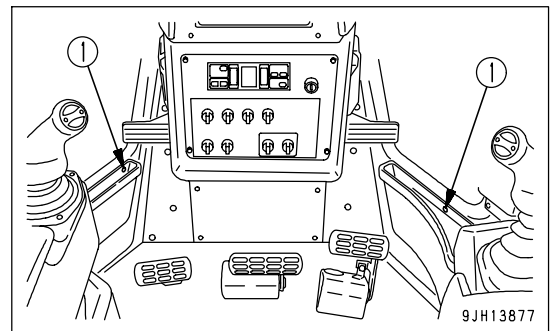
1. After turning lever (1) in the (c) direction (counterclockwise), keep it in that position and fit the cap.
2. Turn lever (1) in the (d) direction (clockwise) until it stops at the stopper, and then tilt it in the (b) direction.

**DOOR POCKET**

This is inside the left and right doors. Use it for keeping things.

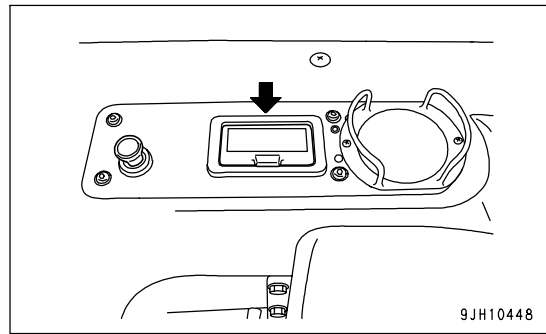
Do not put the heavy tools or other heavy objects in it.

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



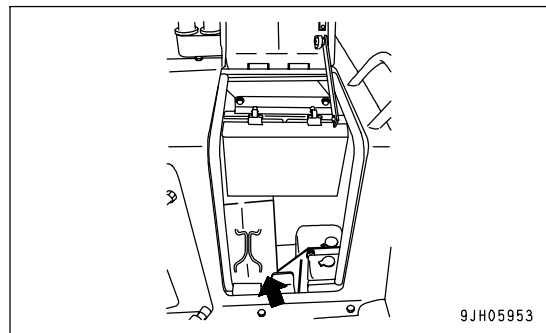
ASHTRAY

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



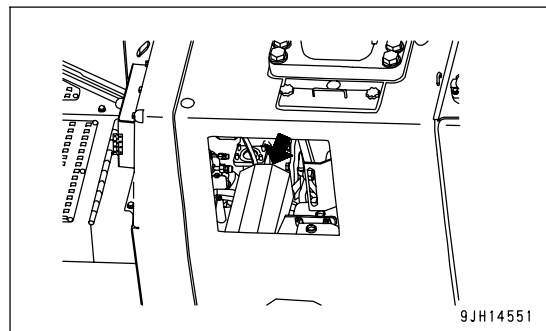
TOOL BOX

This is inside the front of the right fender.
It is used for storing tools.



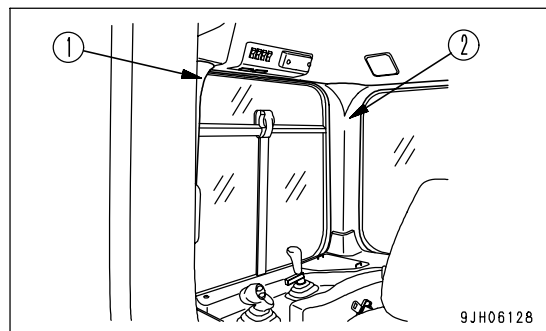
(For mining specification machine)

This is inside the right fender.
It is used for storing tools.



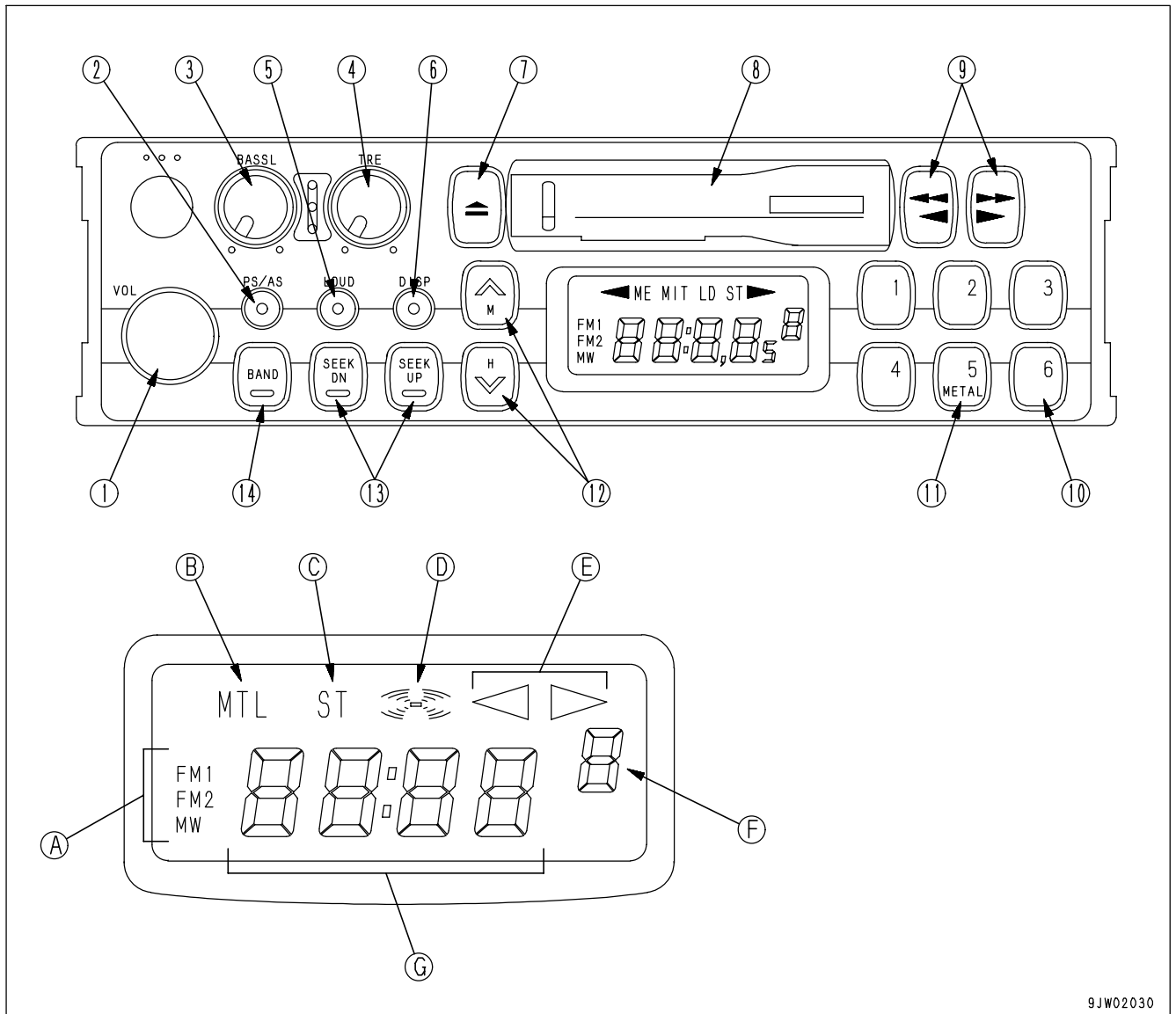
CLEAN INTERIOR OF CAB

If there is any oil or dirt stuck to cab interior (1) and (2), apply a neutral detergent to a cloth and dab to remove the dirt, then wash with water.
After washing with water, dry completely and assemble.



CAR STEREO, HANDLING

EXPLANATION OF COMPONENTS

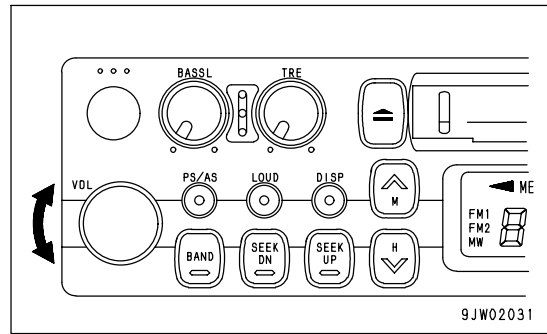


9JW02030

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

POWER SWITCH/VOLUME

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

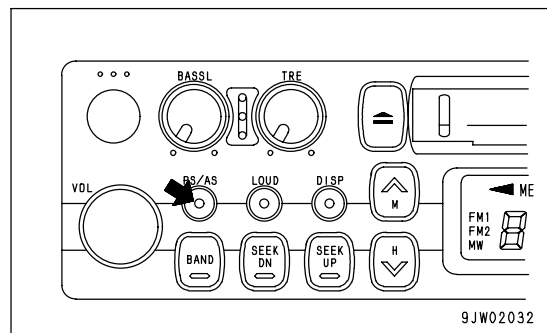


AUTO-STORE/PRESET SCAN BUTTON

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

• Auto-store

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



REMARK

The auto-store function cannot be used when the channel display is flashing.

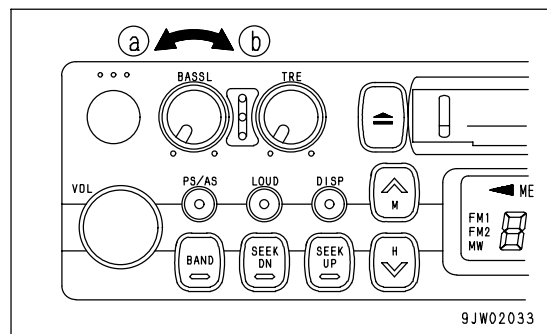
When the display is flashing, the preset scan function is being used.

BASS CONTROL KNOB

Turn this 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

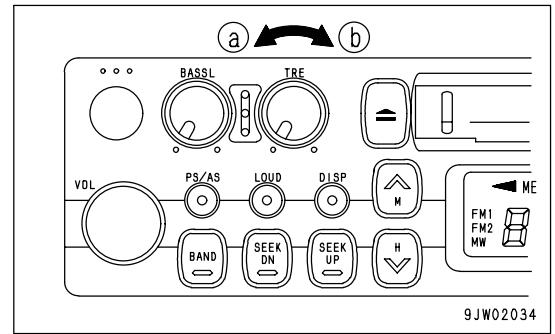


TREBLE CONTROL KNOB

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

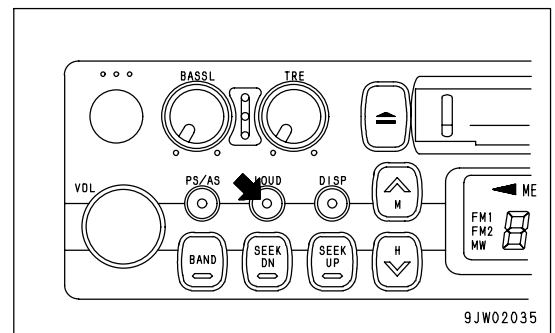


LOUDNESS BUTTON

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.

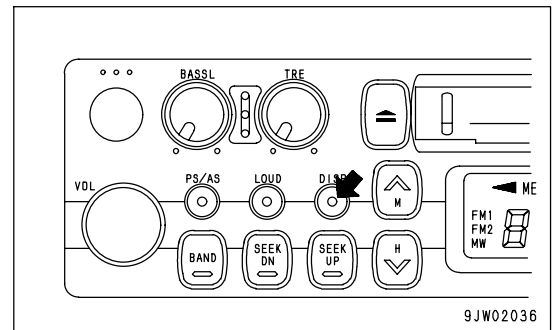
Push button: Actuated (ON)

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 time

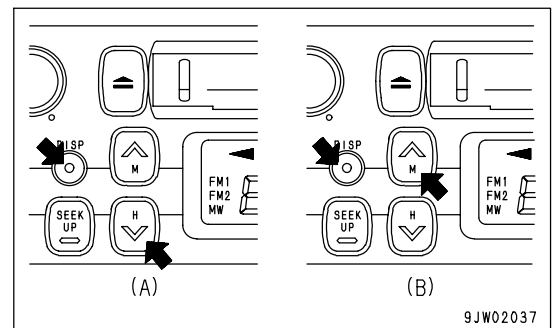
Press the button to set to the time display.

(A) Correcting hour :

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

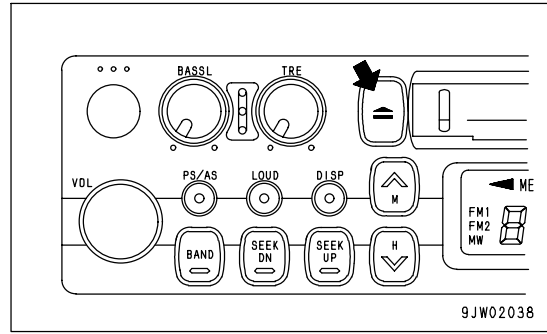
(B) Correcting minute :

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



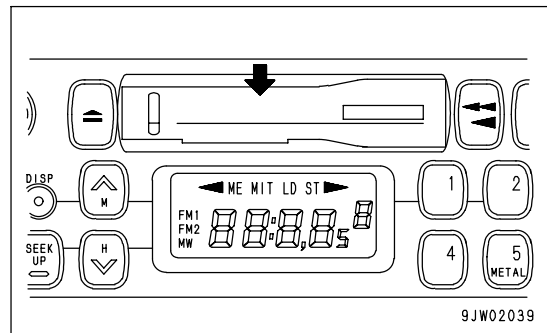
TAPE EJECT BUTTON

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



CASSETTE DOOR

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



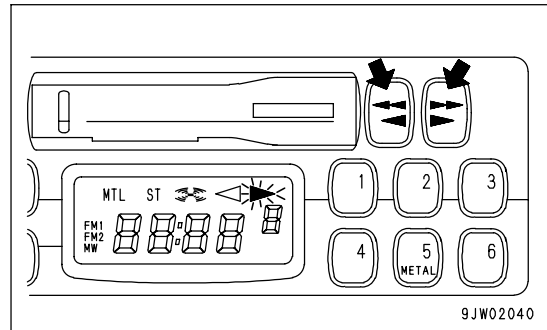
FAST FORWARD, REWIND BUTTONS

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

- Fast forward/rewind

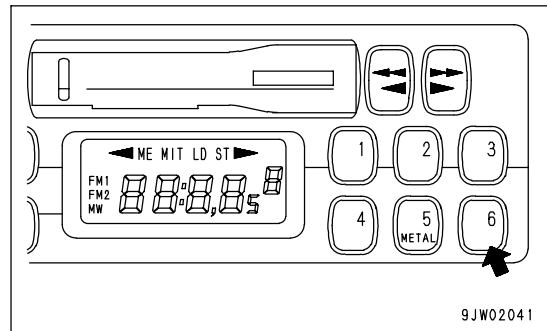
If you press the button pointing in the same direction as the arrow indicating the direction of play, the tape will be fast forwarded; if you press the button pointing in the opposite direction, the tape will be rewound.

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



PRESET BUTTONS

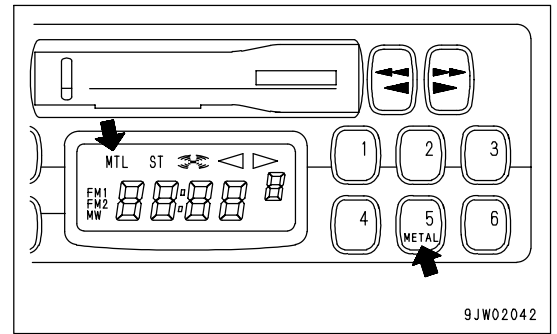
These buttons (10) are used to call up the broadcast station frequencies preset in memory for each of buttons No. 1 to No. 6. It is possible to preset 18 stations (FM: 12; AM: 6) with these buttons.



METAL TAPE BUTTON

(used also for preset button No. 5)

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

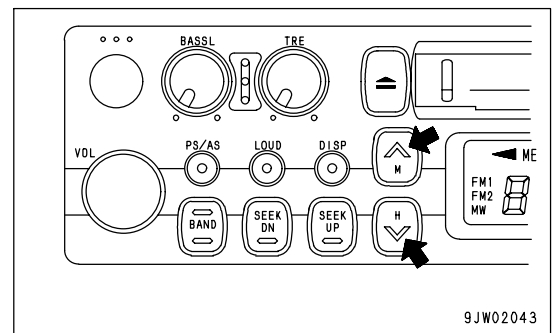


MANUAL TUNING BUTTONS

These buttons (12) are used for manual tuning.

When "TUN ^" button is pressed, the frequency goes up 9 kHz for AM or 0.1 MHz for FM; when "TUN v" button is pressed, the frequency goes down 9 kHz for AM or 0.1 MHz for FM.

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

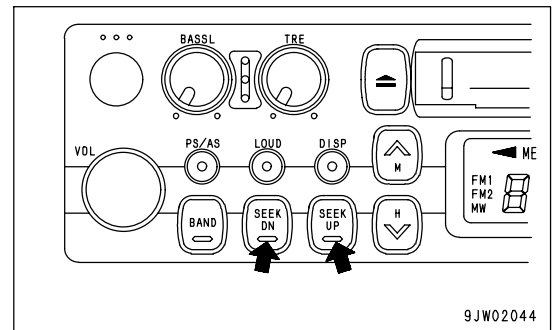


SEEK TUNING BUTTONS

These buttons (13) are used to seek tuning.

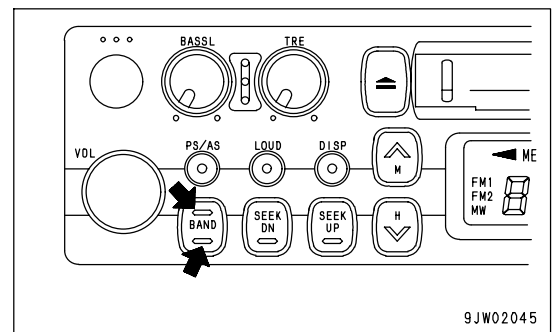
When the "SEEK UP" button is pressed, the search automatically goes up; when the "SEEK DN" button is pressed, the search automatically goes down.

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



BAND SELECTOR BUTTON

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



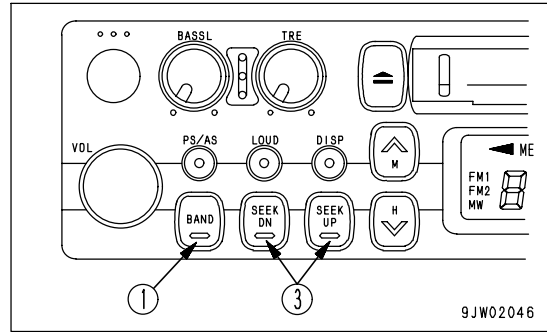
METHOD OF OPERATION

METHOD OF SETTING PRESET BUTTONS

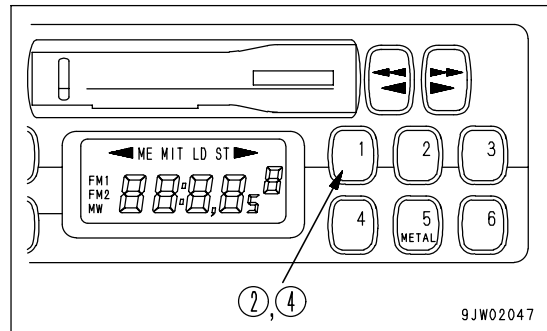
To listen to a preset station, use band selector button (1) to select AM, FM1, or FM2, then press the preset switch number to listen to the desired station.

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

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



3. Press manual memory button (2) or seek tuning button (3).
4. Press preset button (4) of the number to be preset for 2 seconds while the frequency display is being shown on the display. (The preset channel and frequency are displayed and the presetting is completed).
5. Repeat Steps 2 to 4 to preset other stations.

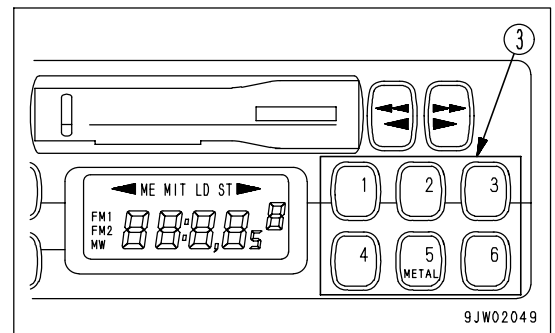
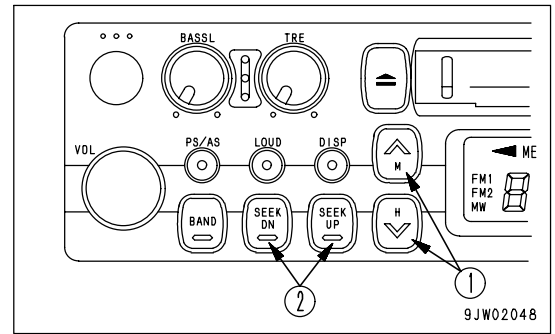


REMARK

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

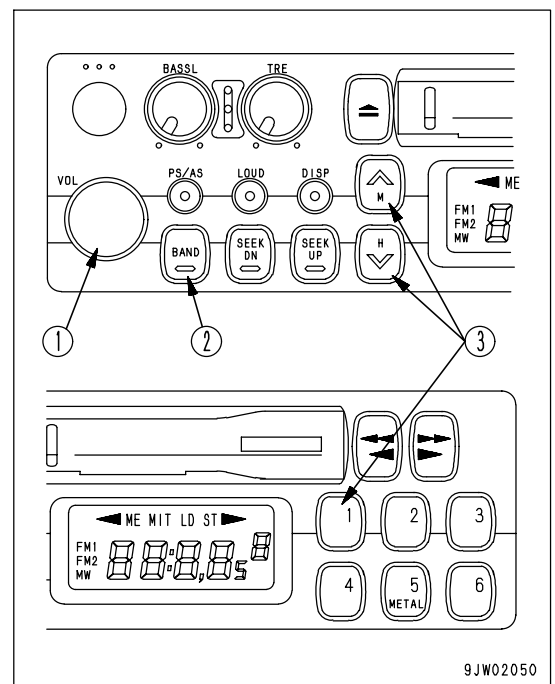
MANUAL MEMORY BUTTON

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



LISTENING TO RADIO

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



REMARK

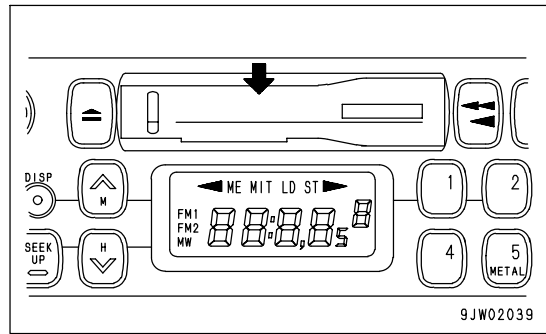
- To switch to the radio when listening to a cassette, press the cassette eject button to stop the tape.
- If you insert a cassette when listening to the radio, the tape will start to play.

LISTENING TO CASSETTE TAPE

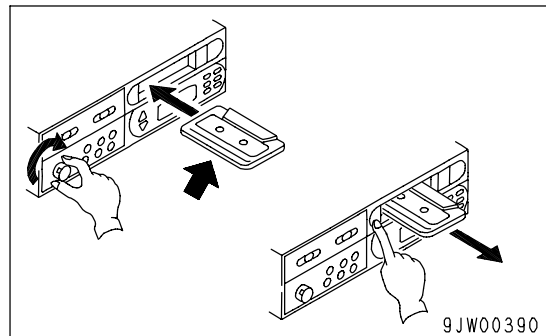
1. Turn the starting switch ON, then turn power switch (1) ON.
2. Set the cassette with the exposed portion of the tape on the right side and push it past the cassette door. The tape will automatically start playing.

If the arrow indicating the direction of play is pointing to the right, the top side is being played; if the arrow is pointing to the left, the bottom side is being played.

When the tape reaches the end, it is automatically reversed and the other side starts to play.



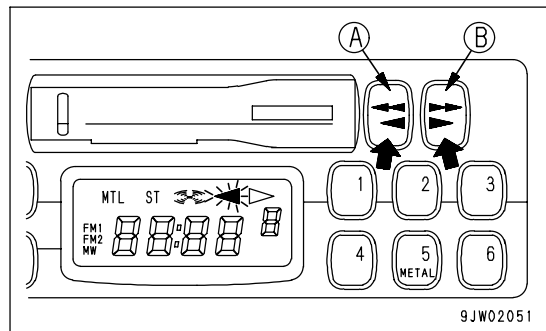
3. When finished with the tape, press the cassette eject button to eject the tape and automatically switch to the radio.



REVERSING TAPE

When listening to the tape, press both FAST FORWARD, REWIND buttons (A) and (B) at the same time lightly.

When this is done, the tape direction display will be reversed.



PRECAUTION WHEN USING**WARNING**

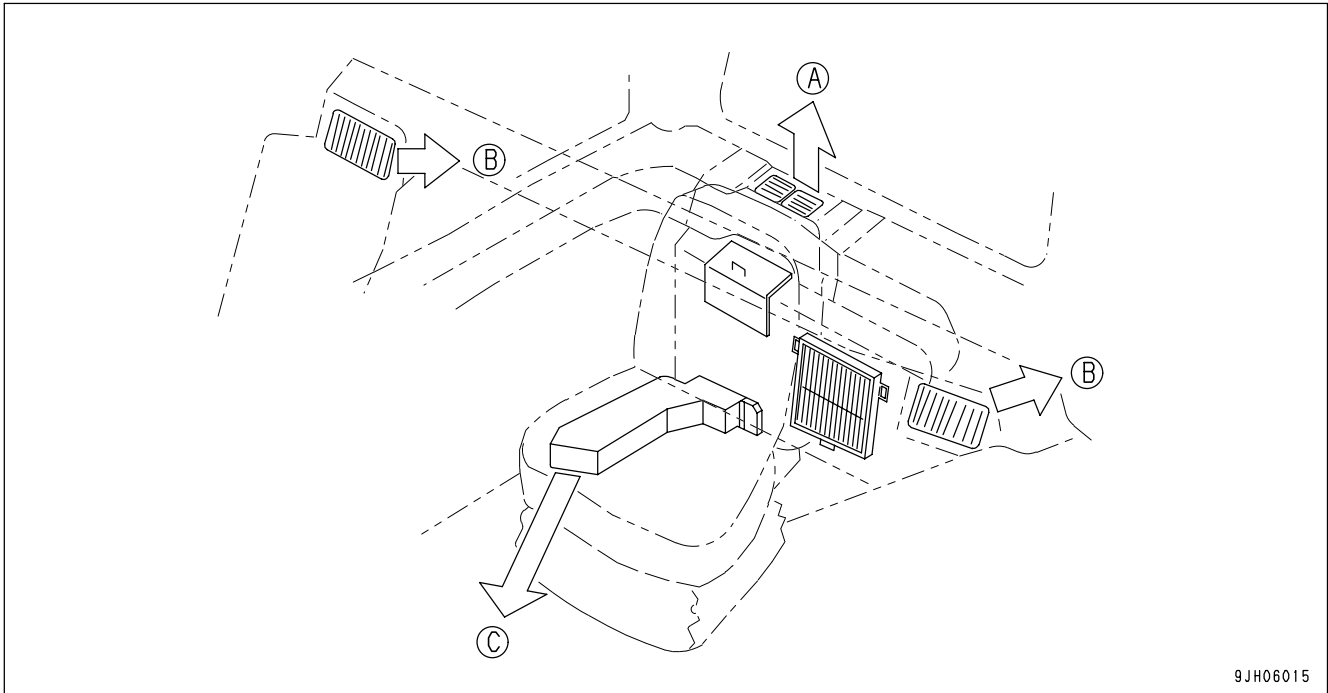
- If a voltage greater than the specified voltage is input, it may cause fire, electrocution, or other failure. Never input any voltage other than the specified voltage.
- Places inside the radio are under high voltage. Do not remove the cover.
- Do not carry out any modifications. This may cause fire, electrocution, or other failure.
- If the sound cannot be heard, nothing is displayed, or any other 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.
- If the battery is disconnected, such as when it is being replaced, or when the battery isolator switch on the mining specification machine is turned OFF, the settings for the preset buttons stored in memory may all be deleted, so reset them after reconnecting the battery.

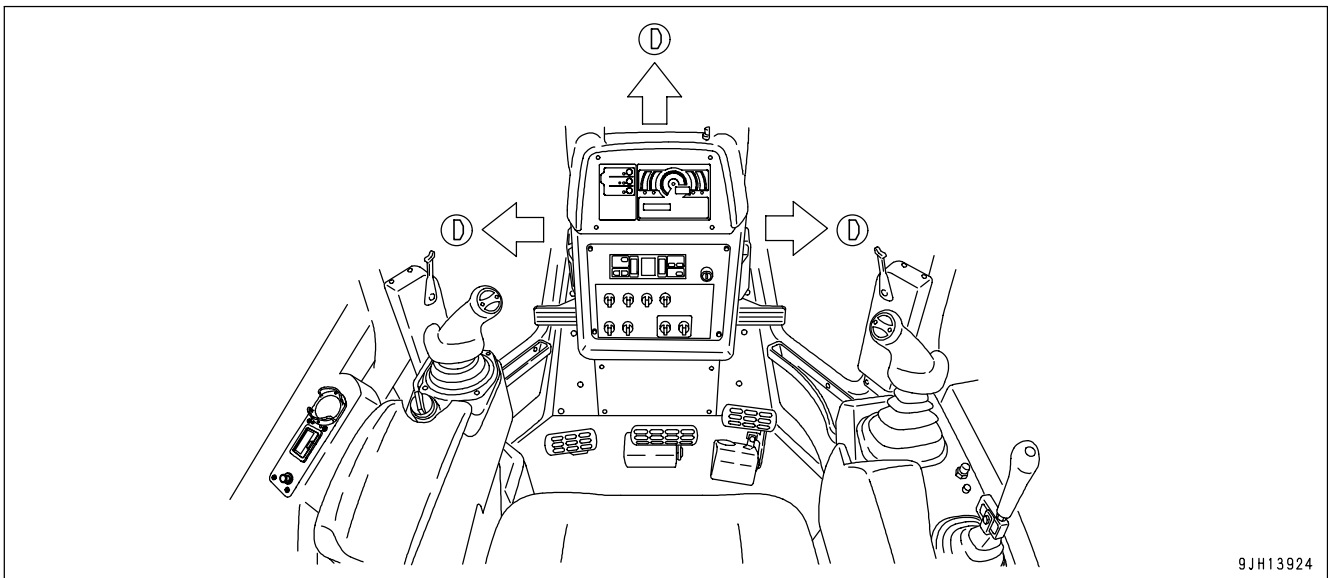
NOTICE**Handling cassette tape**

- 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, HANDLING



9JH06015



9JH13924

The air conditioner is installed behind the operator's seat. The vents blow out cool air or hot air to cool or heat the cab.

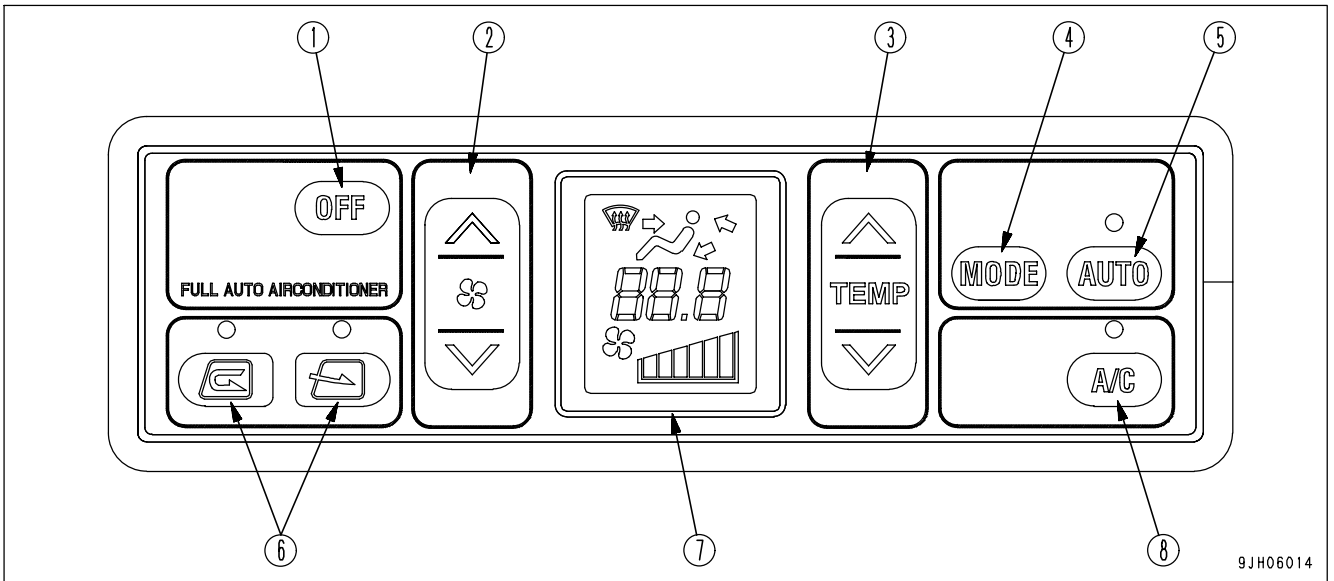
Location of vents

- (A) Rear vent
- (B) Front vent (ceiling)
- (C) Foot vent
- (D) Defroster vent

REMARK

- Vents (A) and (B) have louvers to make it possible to change the direction of the airflow as desired.
- Vent (D) can be opened and closed manually.

GENERAL LOCATIONS OF CONTROL PANEL



- | | |
|--------------------------------|----------------------------------|
| (1) OFF switch | (5) Auto switch |
| (2) Fan switch | (6) RECIRC/FRESH selector switch |
| (3) Temperature control switch | (7) Display monitor |
| (4) Vent selector switch | (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), the lamps above auto switch (5), and air conditioner (8) go out, and operation stops.

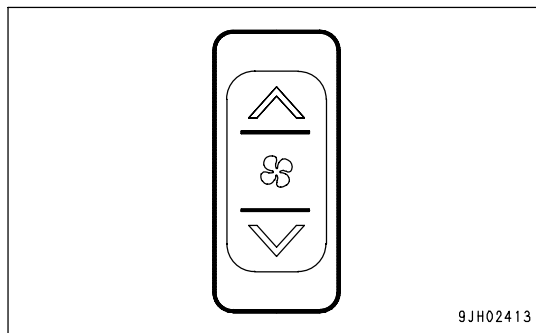


Fan Switch

Switch (2) is used to adjust the air flow.

The air flow can be adjusted to six levels.

- Press the ^ switch to increase the air flow; press the v switch to reduce the air flow.
- During auto operation, the air flow is automatically adjusted.



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"

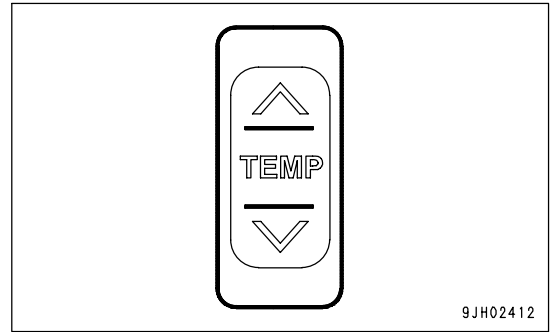
f: Air flow "high"

A	B
	a
	b
	c
	d
	e
	f

Temperature Control Switch

Switch (3) is used to control temperature inside the cab. The temperature can be set between 18°C (64.4°F) and 32°C (89.6°F).

- Press the ^ switch to raise the set temperature; press the v switch to lower the set temperature.
- The temperature is generally set at 25°C (77°F).
- The temperature can be set in stages of 0.5°C (0.9°F).



<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

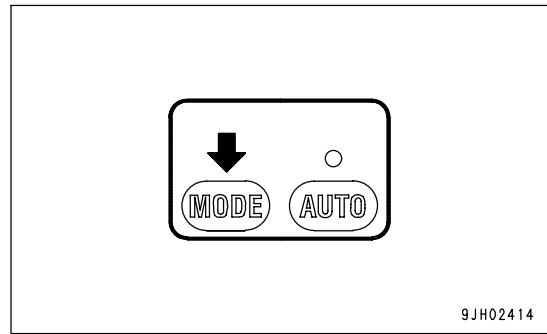
REMARK

If the mode is set to auto mode and the temperature setting is set to 18.0 °C (64.4 °F) or 32.0 °C (89.6 °F), the air flow from the fan is always set to HIGH and does not change even when the set temperature is reached.

Vent Selector Switch

Switch (4) is used to select the vents.

- When switch (4) is pressed, the display on monitor display (7) switches and air blows out from the vents displayed.
- During automatic operation, the vents are automatically selected.



9JH02414

Liquid crystal display	Vent mode	Vent				Remarks
		(A)	(B)	(C)	(D)	
	Front and rear vents (including defroster vent)	○	○		(○)	—
	Front, rear, and foot vents (including defroster vent)	○	○	○	(○)	—
	Foot vent			○		—
	Front, foot vents (including defroster vent)		○	○	(○)	Cannot be selected for automatic operation
	Front vents (including defroster vent)		○		(○)	Cannot be selected for automatic operation

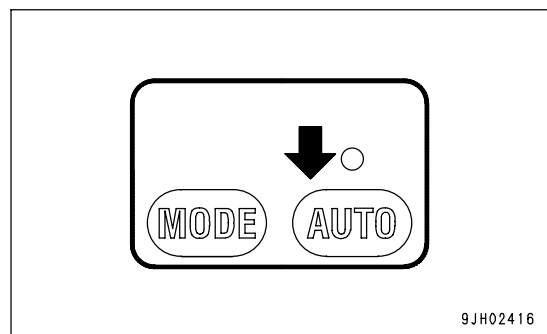
Note 1: Air blows out from vents marked ○

Note 2: The defroster vents can be opened or closed manually with the vent lever.

Auto Switch

With switch (5), the air flow, vents, and air source (RECIRC/FRESH) are automatically selected according to the set temperature.

- When auto switch (5) is pressed, the lamp above the auto switch lights up.
- Press switch (5), then use temperature control switch (3) to set the temperature, and run the air conditioner under automatic control.
- When the control is switched from automatic operation to manual operation, it is possible to operate the to change air flow, vents, and air source (RECIRC/FRESH). When manual control is used, lamp above the auto switch goes out.



9JH02416

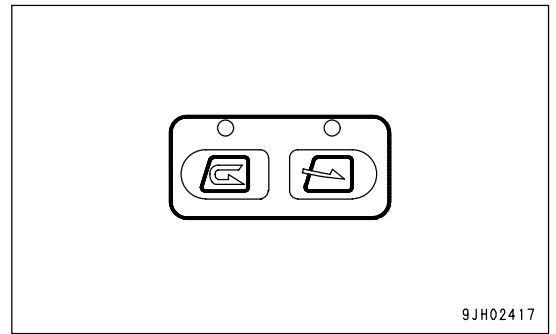
REMARK

When Auto Mode is selected, if the set temperature is set to 18.0 °C (64.4 °F) or 32.0 °C (89.6 °F), the air flow is always set to High, but this is not a problem.

RECIRC/FRESH Selector Switch

Switch (6) is used to switch the air source between recirculation of the air inside the cab and intake of fresh air from the outside.

- When switch (6) is pressed, the lamp above the selector switch lights up to show that air is being blown out.
- During automatic operation, the selection of inside air (RECIRC) and outside air (FRESH) is performed automatically.



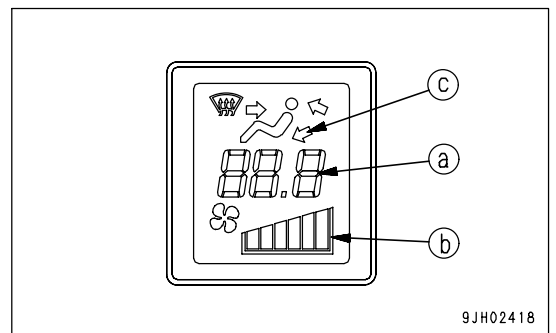
9JH02417

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 taken into the cab. Use this setting to take in fresh air when performing demisting.

Display Monitor

Monitor (7) displays the status of temperature setting (a), air flow (b), and vents (c).

- When OFF switch (1) is pressed, the display of temperature setting (a) and air flow (b) goes out, and operation stops.



9JH02418

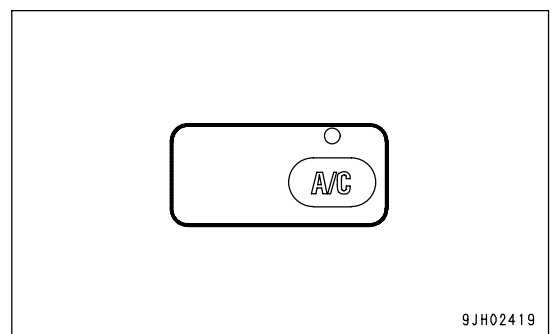
Air Conditioner Switch

Switch (8) is used to turn the air conditioner (cooling, dehumidifying, heating) ON or OFF.

- 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.



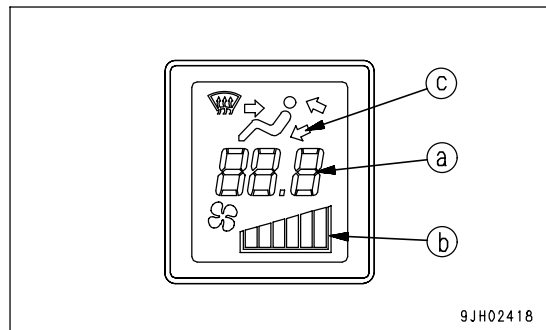
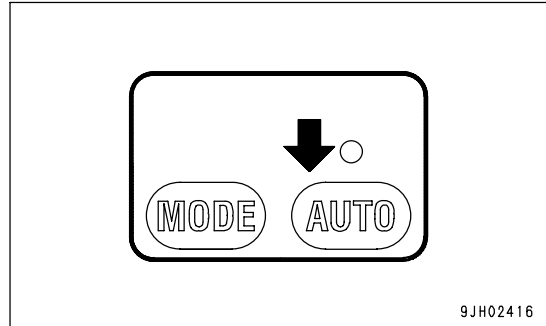
9JH02419

METHOD OF OPERATION

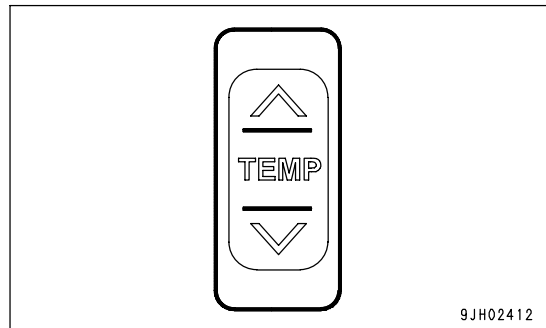
The air conditioner can be operated automatically or manually. Select the method of operation as desired.

Automatic Operation

1. Turn auto switch (5) ON.
 - The lamp above switch (5) lights up.
 - The set temperature (a) and air flow (b) are displayed on the monitor.

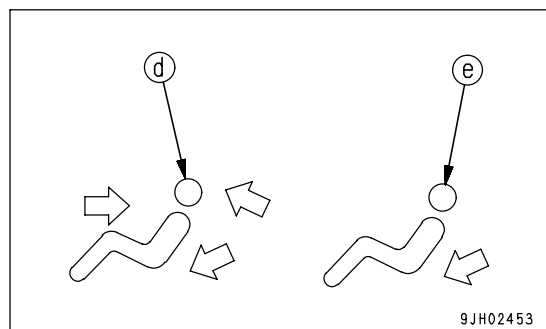


2. Use temperature set switch (3) to set to the desired temperature. The air flow, combination of vents, and selection of fresh or recirculated air is automatically selected according to the set temperature, and the air conditioner is operated automatically to provide the set temperature.



REMARK

When vent display monitor (c) displays (d) or (e), and engine coolant temperature is low, the air flow is automatically limited to prevent cold air from blowing out.



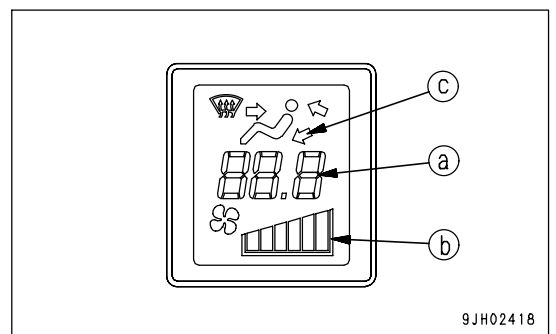
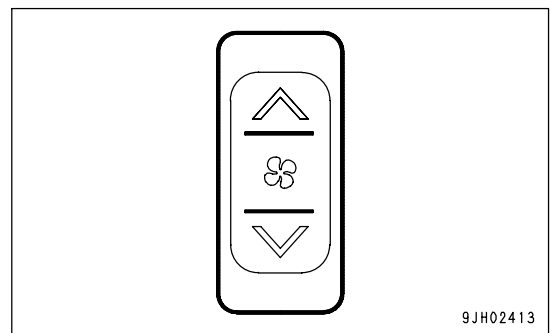
Stopping Automatic Operation

Press OFF switch (1). The displays for temperature setting (a) and air flow (b) on monitor (7), and lamps above auto switch (5) and air conditioner switch (8) go out, the operation stops.

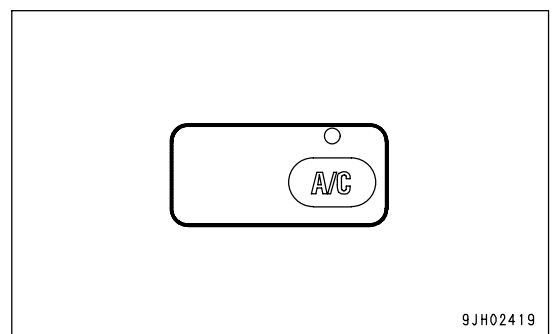


Manual Operation

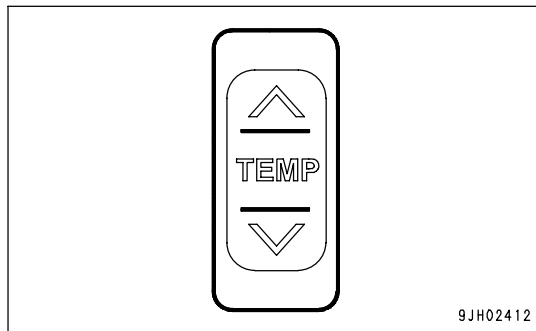
1. Press fan switch (2) and adjust the air flow. When doing this, check that temperature setting (a) and air flow (b) are displayed on monitor (7).



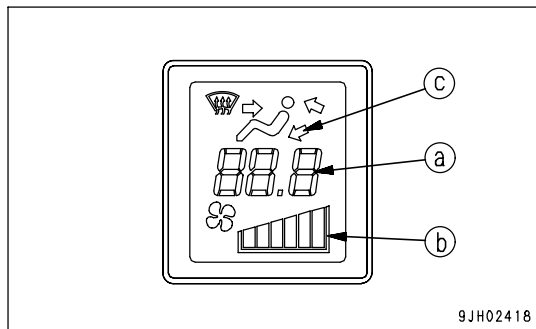
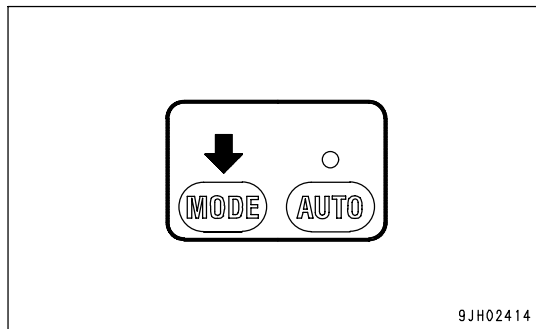
2. Turn air conditioner switch (8) ON. Check that the lamp above air conditioner switch lights up.



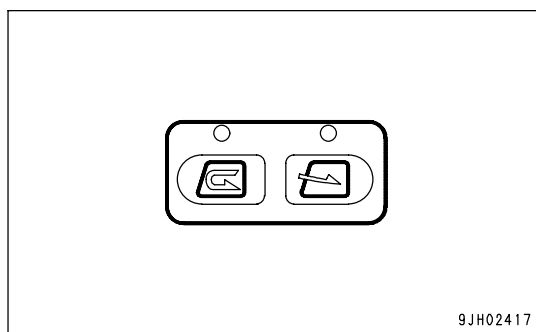
3. Press temperature setting switch (3) and adjust temperature inside the cab.



4. Press vent selector switch (4) and select the desired vents. When this is done, the display for vent (c) of the display monitor changes according to the selection.



5. Press RECIRC/FRESH selector switch (6) and select recirculation of the air inside the cab (RECIRC) or intake of fresh air from outside (FRESH).



Stopping Manual Operation

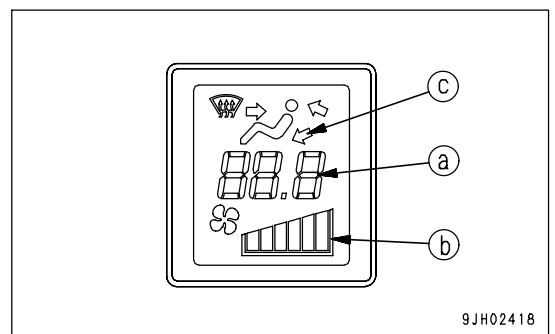
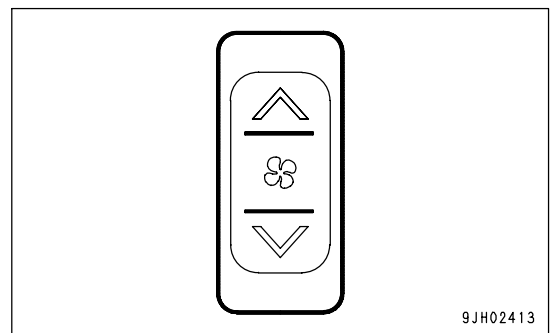
Press OFF switch (1). The displays for temperature setting (a) and air flow (b) on monitor (7), and lamps above auto switch (5) and air conditioner switch (8) go out, the operation stops.



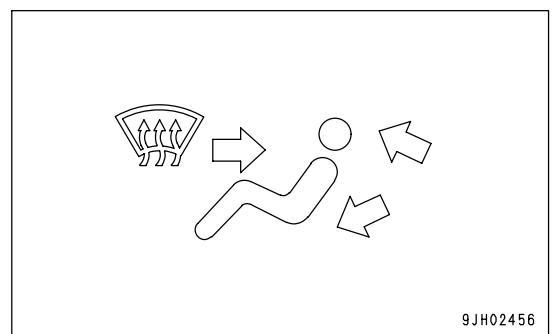
Operation with Cold Air to Face and Warm Air to Feet

To operate with cold air blowing to the face and warm air blowing to the feet, set as follows.

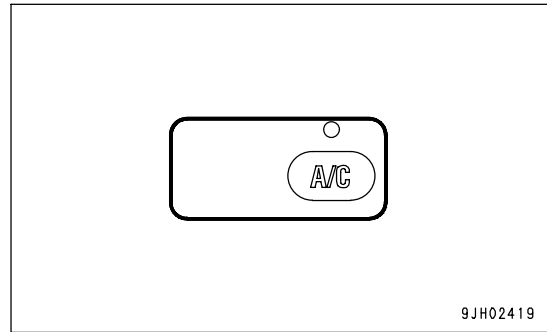
1. Press fan switch (2) and adjust the air flow. When doing this, check that temperature setting (a) and air flow (b) are displayed on monitor (7).



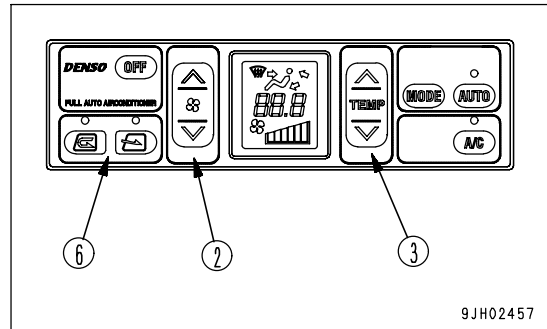
2. Press vent selector switch (4) and set the vent display on the display monitor to the display shown in the diagram on the right.



3. Turn air conditioner switch (8) ON. Check that the lamp above air conditioner switch lights up.

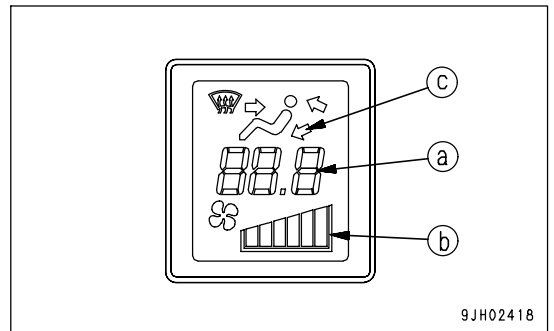
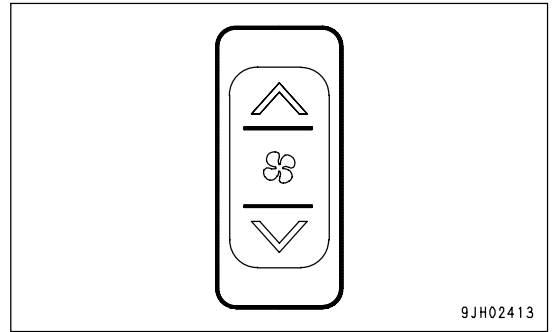


4. Adjust fan switch (2), temperature setting switch (3) and RECIRC/FRESH selector switch (6) to the desired positions.

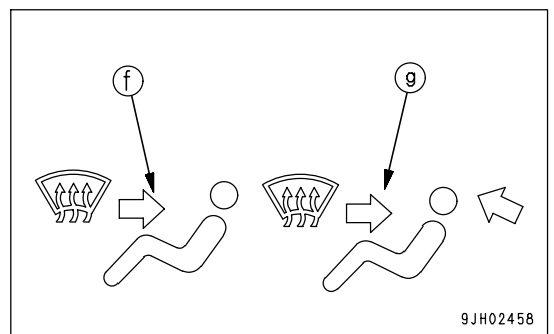
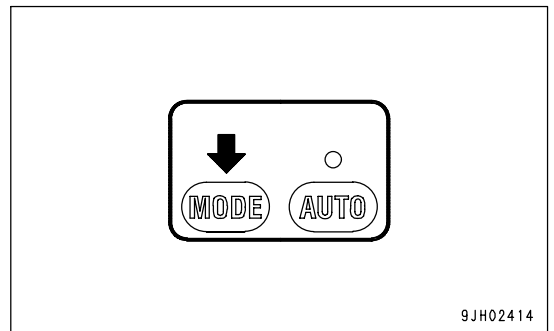


Defroster Operation

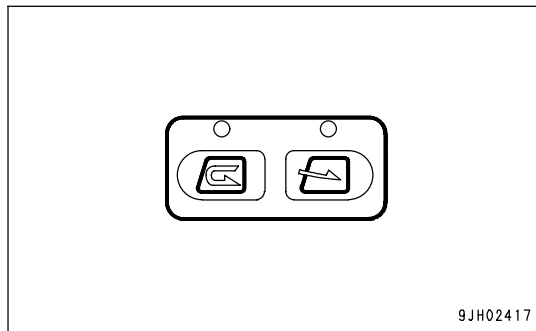
1. Press fan switch (2) and adjust the air flow. When doing this, check that temperature setting (a) and air flow (b) are displayed on monitor (7).



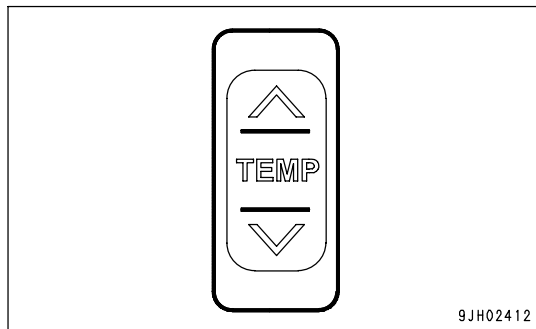
2. Press vent selector switch (4) and set vent display on the display monitor to (f) or (g) as shown in diagram on the right.



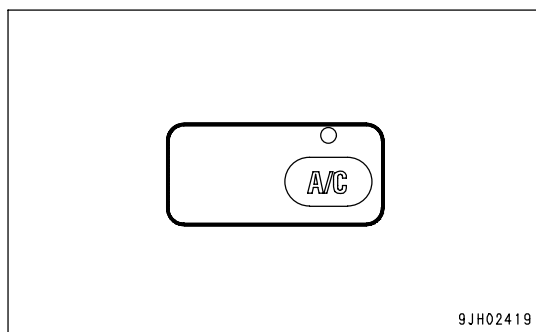
3. Press RECIRC/FRESH selector switch (6) and set it to take in fresh air.



4. Press temperature setting switch (3) and set temperature on the display (7) monitor to maximum heating.



When operating in the rainy season or when it is desired to remove the mist from the window glass or to dehumidify the air, turn air conditioner switch (8) ON.



OTHER FUNCTIONS

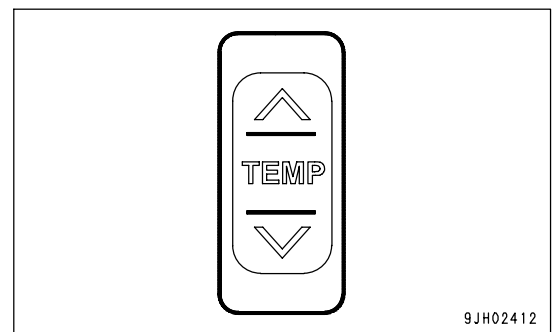
Self-diagnostic Function

It is possible to perform troubleshooting of various sensors and equipment used on the air conditioner.

1. Press OFF switch (1). The temperature setting and air flow display on the liquid crystal display portion go out and operation stops.
2. If the "v" and "^" parts of temperature setting switch (3) are kept pressed at the same time for at least 3 seconds, the troubleshooting mode is displayed on the liquid crystal display portion.

<Monitor display and failure mode>

Display	Failure mode
E--	No failure
E11	Disconnection in recirculated air sensor
E12	Short circuit in recirculated air sensor
E13	Disconnection in fresh air sensor
E14	Short circuit in fresh air sensor
E15	Disconnection in coolant temperature sensor
E16	Short circuit in coolant temperature sensor
E18	Short circuit in sunlight sensor
E21	Disconnection in vent sensor
E22	Short circuit in vent sensor
E43	Problem in vent damper
E44	Problem in air mix damper
E45	Problem in RECIRC/FRESH air damper
E51	Problem in refrigerant pressure



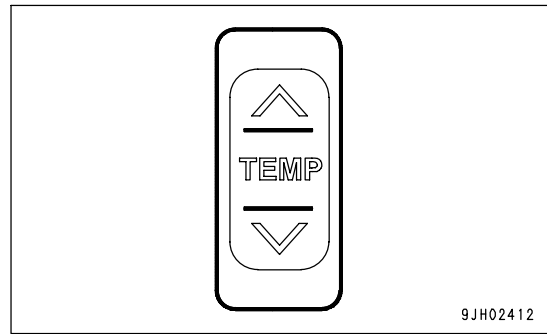
- When more than one failure is detected, press the "v" or "^" portion of temperature setting switch (3) to display the failures in turn.
- After completing the troubleshooting, press OFF switch (1) again to return to the normal display.

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

Extra Strong Wind Flow Function

It is possible to provide a stronger wind flow than for the normal HIGH position.

Use switch (2) to set to HIGH, then turn the extra strong wind flow switch ON. When the extra strong wind flow switch is turned ON, the airflow from the front and the dashboard vents is increased.

PRECAUTIONS WHEN USING AIR CONDITIONER

WHEN CARRYING OUT COOLING, VENTILATE THE CAB FROM TIME TO TIME

- If you smoke when using the air conditioner, your eyes may start to itch or burn, therefore ventilate the cab every so often to remove the smoke.
- When the air conditioner is used for long periods, carry out ventilation once every hour.

BE CAREFUL NOT TO COOL TOO MUCH

- For reasons of health, it is recommended that the cab should feel pleasantly cool when you enter it from the outside (5 to 6°C (9.0 to 10.8°F) lower than the outside temperature). Pay attention to the temperature when carrying out cooling.

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

- If the left and right vents in the dashboard are turned so that cold air plays directly on the cab door glass, moisture will condense on the outside of the cab door glass and reduce the visibility. (This occurs particularly in high temperatures.)
If this happens, operate the louvers of the vents to direct the air upward and stop it from blowing directly on the glass surface.

CHECKS DURING OFF-SEASON

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

REMARK

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

PROCEDURE FOR REPLACING RECEIVER

Replace the receiver once every 2 years.

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

REMARK

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

PRECAUTIONS WHEN REPLACING RECEIVER

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

CHECK COMPRESSOR BELT TENSION AND REFRIGERANT (GAS) LEVEL

If the compressor belt is loose, or the refrigerant level is low, cooling is not carried out efficiently.

For details, see "WHEN REQUIRED (PAGE 4-22)".

CLEANING AIR FILTER

If the air filter for the FRESH or RECIRC air intake becomes clogged, the cooling or heating capacity will drop.

To prevent this, clean the air filter with compressed air once a week.

For details of the cleaning method, see "WHEN REQUIRED (PAGE 4-22)".

EFFECTIVE USE OF AIR CONDITIONER

When it is Desired to Cool Inside of Cab Quickly

If the machine is left in the sun in the middle of summer, the temperature inside the cab may become extremely high. If this happens and it is desired to cool the cab quickly, first open all the doors and windows to remove all the hot air, then turn the air conditioner on.

After starting the engine, press auto switch (5) and use temperature setting switch (3) to set the temperature to 18.0. Run the engine at a slightly higher speed for 2 or 3 minutes, then close the doors and windows.

When the temperature inside the cab goes down, adjust to the desired temperature.

When Window is Misted

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

Action when not Using Air Conditioner

At times of the year when the air conditioner is not used, run the air conditioner for several minutes with the engine at low speed once a month to maintain the lubricating oil film on all parts of the compressor. (Running in of air conditioner)

In winter, when the temperature inside the cab is low, the air conditioner may not work. If this happens, use a heater to raise the temperature inside the cab and run the air conditioner.

NOTICE

- When 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.

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

- Leakage of oil or fuel, or accumulation of flammable material around high temperature parts, such as the engine muffler or turbocharger, may cause fire.
Check carefully, and if any abnormality is found, repair it or contact your Komatsu distributor.
- Do not get on or off the machine from the rear. Using this position is dangerous because it is easy to slip and you cannot be seen from the operator's compartment. Always use the handrail and step at the side when getting on or off the machine.

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

1. Check for damage, wear, play in work equipment, cylinders, linkage, hoses
Check for cracks, excessive wear, play in work equipment, cylinders, linkage, and hoses. If any abnormality is found, repair it.
2. Remove dirt and debris from around the engine, battery, and radiator.
Check for dirt accumulated around the engine and radiator. Also check for flammable material (dry leaves, twigs, etc.) around the battery, engine muffler, turbocharger, or other high temperature engine parts. If any dirt or flammable materials are found, remove them.
For the method of removing dirt from the radiator, see "CLEAN AND CHECK RADIATOR FINS, OIL COOLER FINS, AFTERCOOLER FINS (PAGE 4-37)".
3. Check for coolant and oil leakage around the engine
Check for oil leakage from the engine and coolant leaks from the cooling system. If any problem is found, repair it.
4. Check for leakage from fuel line.
Check that there is no leakage of fuel or damage to the hoses and tubes. If any problem is found, carry out repairs.
5. Check for leakage of oil from power train case, final drive case, hydraulic tank, hose, joints
Check that there is no oil leakage. If any abnormality is found, repair the place where the oil is leaking.
Check for leakage of oil from the undercover. Check the ground for traces of oil leakage.
6. Check the undercarriage (track, sprocket, idler, guard) for damage, wear, loose bolts, or leakage of oil from rollers.
If any problem is found, repair it.
7. Check for problems in handrails, steps, loose bolts.
If any problem is found, repair it. 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. Replace any damaged parts. Clean off any dirt on the surface.

9. Check and cleaning of the rear view mirrors

Check the rear view mirrors for breakage, and replace any broken one. Clean the surface of each mirror and adjust the angle so that the rear view can be seen clearly from the operator's platform.

10. Seat belt and mounting clamps

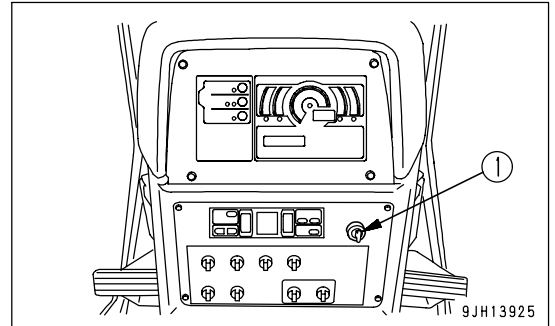
Check for damage or wear to the seat belt and mounting clamps. If there is any damage, replace with new parts.

CHECK BEFORE STARTING

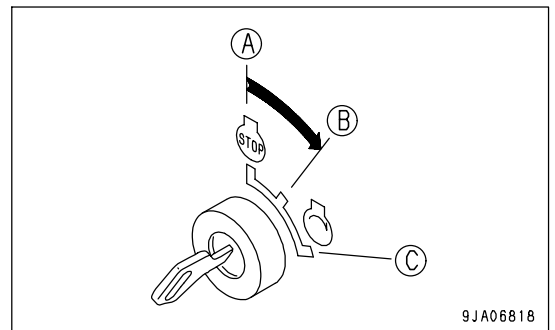
Always check the items in this section before starting the engine each day.

CHECK MACHINE MONITOR

1. Turn starting switch (1) to the ON position (B).



2. Check that the monitor and gauges light for 3 seconds, and the alarm buzzer sounds for 1 seconds.

**REMARK**

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

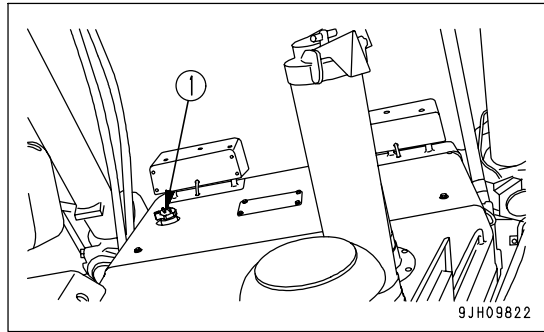
NOTICE

Do not simply use the monitor to carry out the check before starting. Always carry out the check before starting according to the procedure on the following pages.

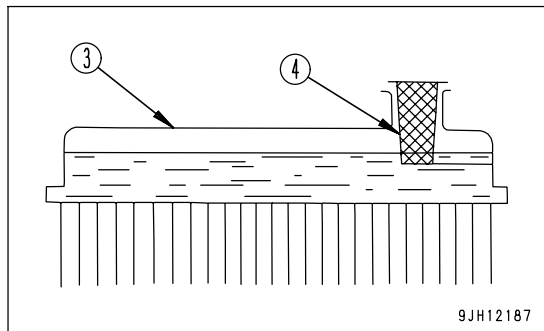
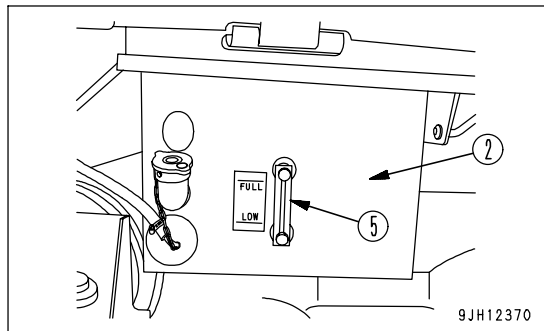
CHECK COOLANT LEVEL, ADD COOLANT

! WARNING

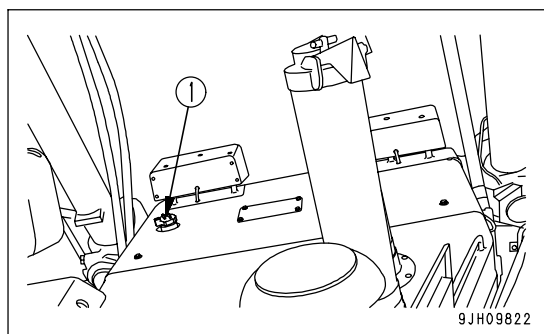
- Normally, do not open the radiator cap (1). When checking the coolant level, check the reserve tank (2) when the engine is cold.
- Do not remove the cap (1) when the radiator (3) coolant is hot. Boiling coolant may spurt out. After the coolant temperature goes down, turn the cap (1) slowly to release the pressure, then remove it.



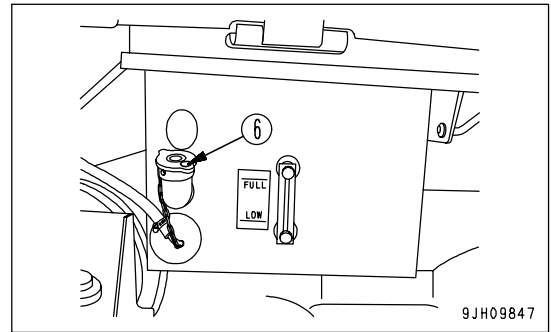
1. Open the side cover on the left side of the machine, then check that the water level (5) in the reserve tank (2) is between the FULL and LOW marks. If the water level (5) is low, add coolant as follows.
2. If the reserve tank becomes empty, there is probably water leakage. After checking, repair any abnormality immediately. If no abnormality is found, check the level of the water in the radiator. If it is low, add Supercoolant (AF-NAC) of the same density as the Supercoolant in the radiator, then add Supercoolant to the reserve tank.
3. In refilling, fill with water through cap (1). Check that the coolant level is higher than the strainer (4) bottom as illustrated at right. At the same time, fill reserve tank (2) with coolant to the full.



4. To refill the radiator, first stop the engine and pour coolant until it reaches the top of the filler opening. Then start the engine, after idling for 5 minutes recheck the coolant level, add coolant if necessary.
5. After adding water, tighten caps (1) and (6) securely.



- If the volume of coolant added is more than usual, check for possible cooling system leaks.
Do not rely solely on the monitor for checking the coolant level.

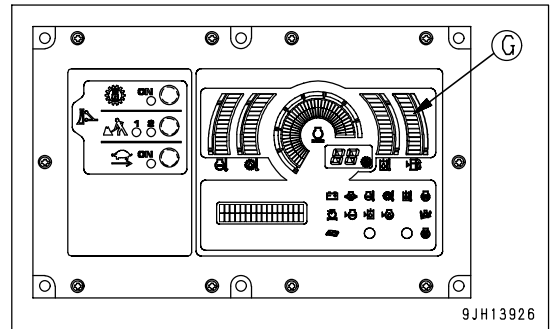


CHECK FUEL LEVEL, ADD FUEL

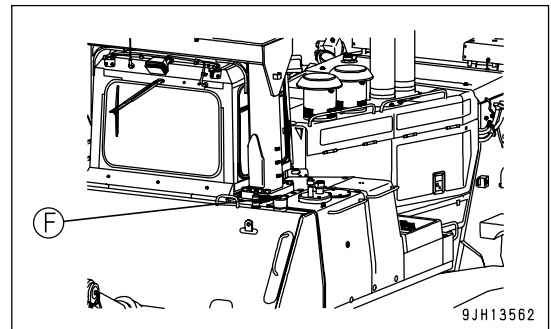
WARNING

When adding fuel, never let the fuel overflow. This may cause a fire. If the fuel is spilt, wipe it off completely.

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

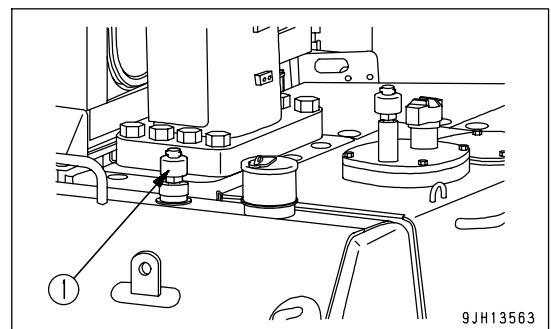


- After completing work, fill the fuel tank through fuel filler port (F).
Check the fuel level with the fuel gauge at the fuel filler port.
- After adding fuel, tighten the cap securely.
Fuel capacity: 1670 liters (441.21 US gal)



REMARK

- When dozing on a grade, make sure there is plenty of fuel in the tank so that the engine fuel line does not become aerated.
- When the filter element of breather (1) gets clogged, pressure inside the tank lowers, hampering the fuel supply. So clean it every now and then.



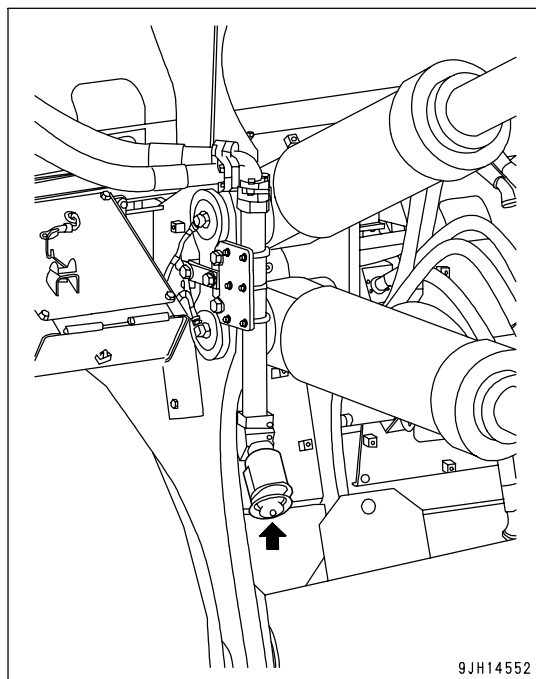
(Fuel quick charge specification, if equipped)

A quick coupler for adding fuel is installed at the rear left of the machine, so use the quick coupler when adding fuel.

Receiver

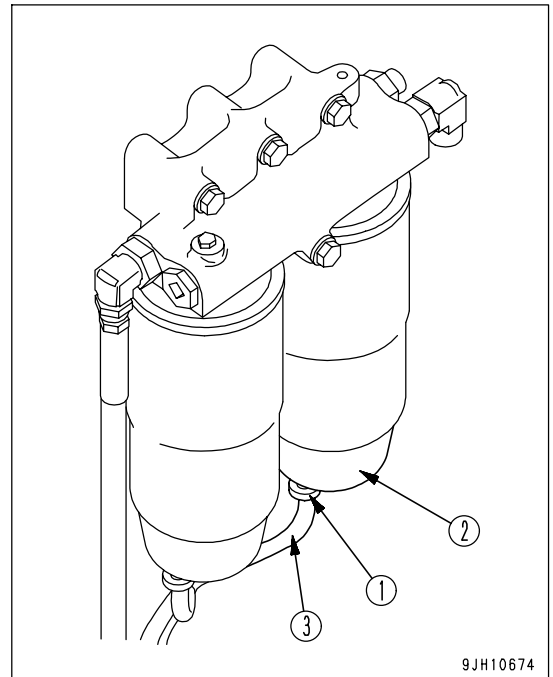
Manufacturer: WIGGINS

Model: ZNC3



CHECK WATER SEPARATOR, DRAIN WATER AND SEDIMENT

1. Open the side cover on the left side of the machine.
The water separator forms one unit with the fuel pre-filter and is at the bottom.
2. It is possible to judge the water level and amount of sediment by looking through transparent cap (2). If there is any water or sediment collected at the bottom, set a container to catch the drain water under drain hose (3).
3. Loosen plug (1) and drain the water.
4. When fuel comes out from drain hose (3), tighten plug (1) immediately.
Tightening torque: 0.2 to 0.45 Nm (0.02 to 0.046 kgm, 0.1 to 0.3 lbft)

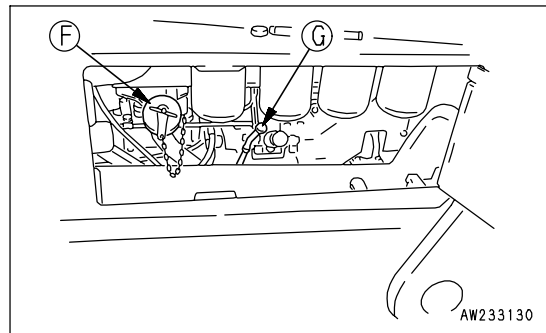


CHECK OIL LEVEL IN ENGINE OIL PAN, ADD OIL

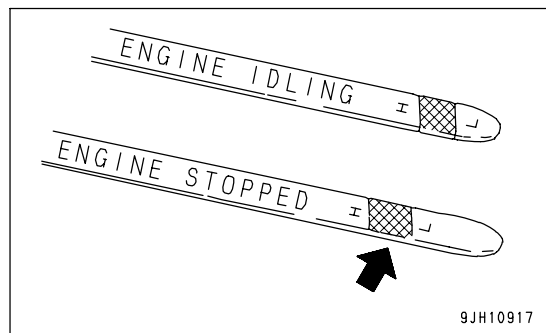
! WARNING

Parts and oil are at high temperature immediately after the engine is stopped and may cause serious burns. Wait for the oil temperature to go down before performing this operation.

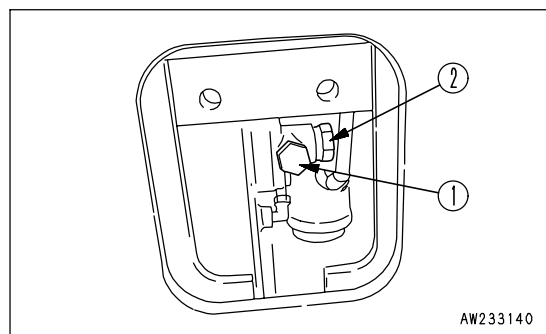
1. Open the engine side cover on the right side of the chassis.
2. Remove dipstick (G), and wipe the oil off with a cloth.
3. Fully insert dipstick (G) into filler pipe, then remove it.



4. The oil level should be between the H and L marks on the ENGINE STOPPED side of dipstick (G).
If the oil level is below the L mark, add oil through oil filler (F).



5. If the oil is above the H mark, remove drain plug (1), loosen drain valve (2) to drain the excess oil, then check the oil level again.
6. If the oil level is correct, tighten the oil filler cap securely and close the engine side cover.



REMARK

- When checking the oil level after the engine has been operated, wait for at least 15 minutes after stopping the engine before checking.
- If the machine is at an angle make it horizontal before checking.
- When adding oil, remove the dipstick from the holder to release the air inside the crankcase.
- The dipstick is marked with the levels for "ENGINE STOPPED" on one side and "ENGINE IDLING" on the other side.

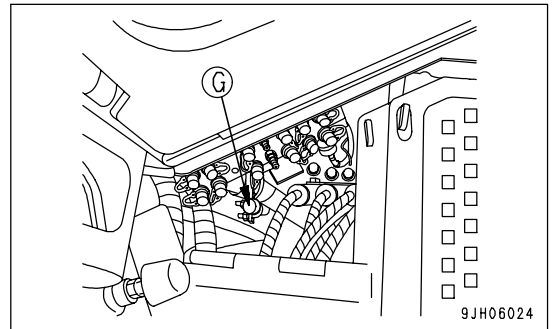
It is also possible to check the oil level with the engine idling, but be sure to remember the following points.

- Check oil when the engine coolant temperature gauge is within the green range.
- Read the dipstick on its reverse side marked with "ENGINE IDLING".

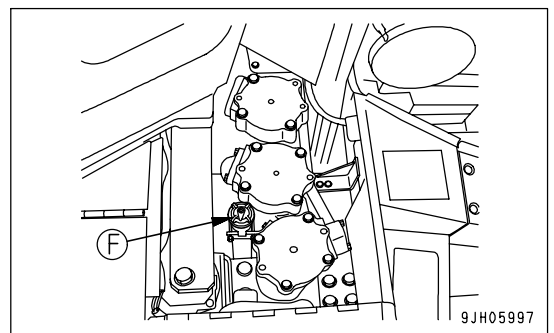
CHECK OIL LEVEL IN POWER TRAIN CASE, ADD OIL

(Including transmission case, torque converter case, and bevel gear case.)

1. Start the engine and run at idling for 5 minutes, then check the oil level with the COLD side of dipstick (G).
Remove dipstick (G), and wipe the oil off with a cloth.

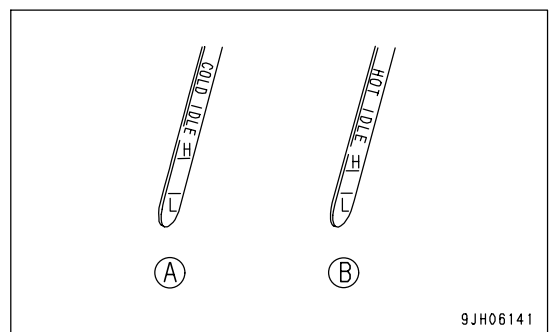


2. Fully insert dipstick (G) into filler pipe, then remove it.



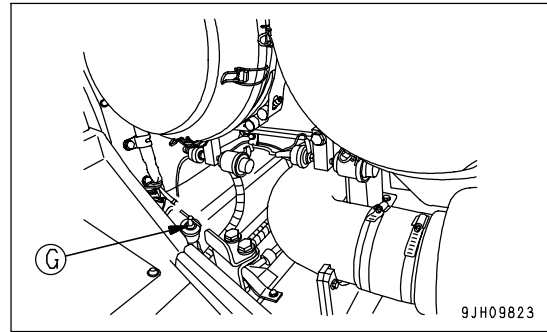
3. The oil level should be between the H and L marks on dipstick (G).
If the oil level is below the L mark, add oil through oil filler port (F).

- (A) Cold oil temperature gauge
- (B) Hot oil temperature gauge

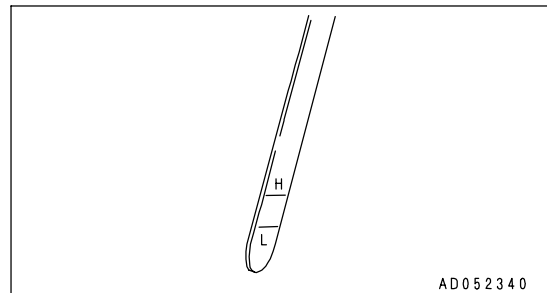


CHECK DAMPER CASE OIL LEVEL, ADD OIL

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



3. The oil level should be between the H and L marks on dipstick (G).
If the oil is below the L mark, add oil through the dipstick holder.
4. If the oil is above the H mark, drain the excess oil from drain plug. After draining the oil, check the oil level again.

**REMARK**

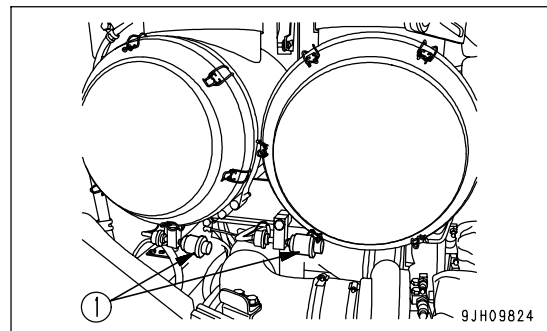
- Check the oil level with the engine stopped.
- When checking the oil level, if the machine is at an angle, move it to a horizontal position before checking.

CHECK BRAKE PEDAL TRAVEL

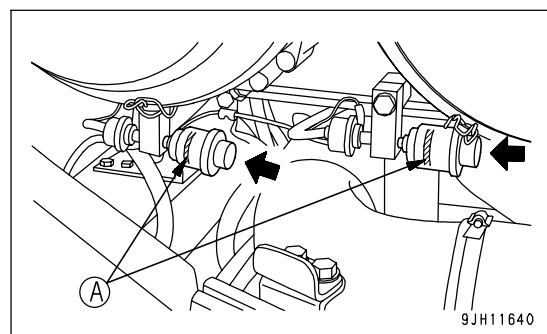
Drive the machine, depress the brake pedal, and check that the machine stops.

CHECK DUST INDICATOR

1. Check for the yellow piston overlapping the red zone (A) on the dust indicator (1).
2. If the yellow piston is overlapping the red zone (A), clean or replace the element immediately.
For details of the method of cleaning the element, see "CHECK, CLEAN AND REPLACE AIR CLEANER ELEMENT (PAGE 4-25)".



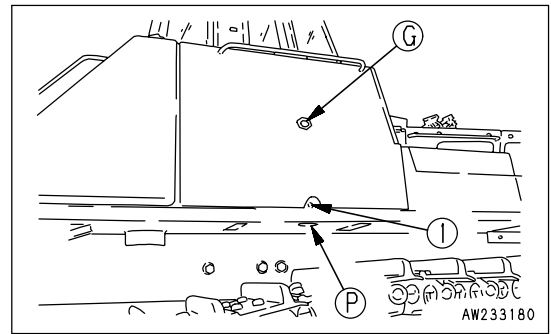
3. After checking, cleaning, and replacing, press the knob of dust indicator (1) to return the yellow piston to its original position.
 - In environments where the rubber deteriorates quickly or the surface becomes damaged (in direct sunlight, dusty areas, etc.), replace before it becomes dirty and it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



CHECK OIL LEVEL IN HYDRAULIC TANK, ADD OIL

**WARNING**

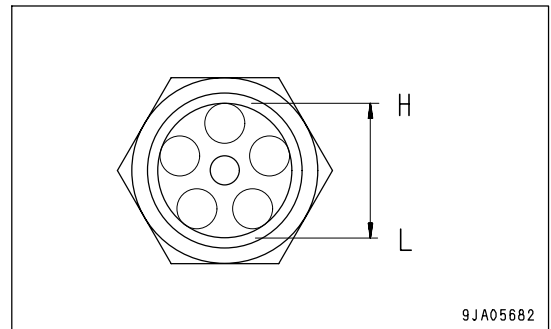
- When removing the oil filler cap, oil may spurt out, so stop the engine and wait for the oil temperature to go down, then turn the cap slowly to release the internal pressure before removing the cap.
- If oil has been added to above the H mark, stop the engine and wait for the hydraulic oil to cool down. Then remove drain plug (P), loosen drain valve (1), and drain the excess oil.



1. Put blade on the ground and stop the engine. Wait for 5 minutes before checking oil level. Oil level should be between the H and L in sight gauge (G).
If the machine is equipped with a ripper, put ripper point on the ground, too.

NOTICE

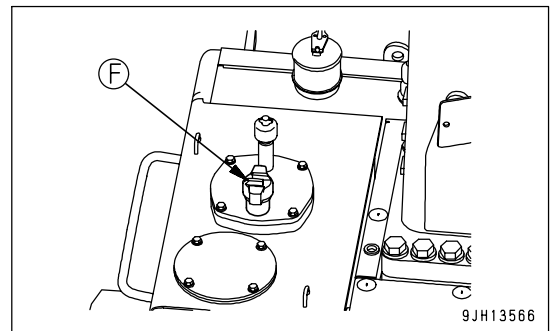
If the oil level is above the H line, do not add oil. Doing so may lead to damage to the oil pressure circuit and spouting out of oil.



2. If the level is below the L mark, add oil through oil filler (F).
3. After adding oil, be sure to screw on the oil filler cap and lock it with the key.

REMARK

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



CHECK ELECTRIC WIRING

! WARNING

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

Check for damage and wrong capacity of the fuse and any sign of disconnection or short circuit in the electric wiring. Check also for loose terminals and tighten any loose parts.

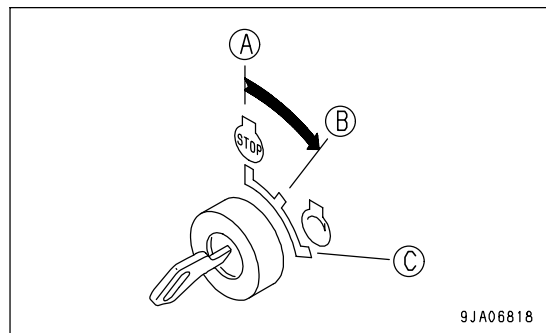
Check the wiring of the "battery", "starting motor" and "alternator" carefully in particular.

Always check if there is any accumulation of flammable material around the battery, and remove such flammable material.

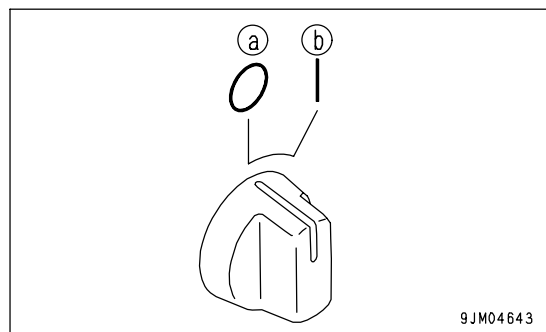
Please contact your Komatsu distributor for investigation and correction of the cause.

CHECK THAT LAMPS LIGHT UP

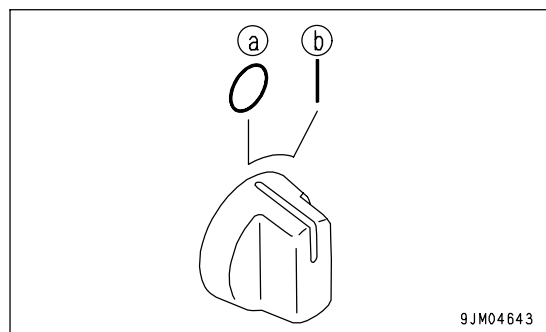
1. Turn starting switch (1) to the ON position (B).



2. Turn the front lamp and working lamp switch to the ON position and check that the front lamps and working lamp light up.

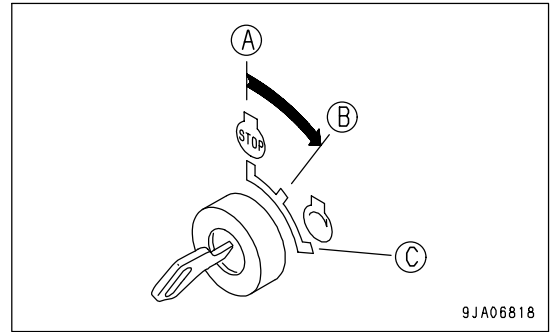


3. Turn the rear lamp switch to the ON position and check that the rear lamps on the left and right fenders light up. If the lamps do not light, check for a broken bulb or disconnected wire, contact your Komatsu distributor for repairs.

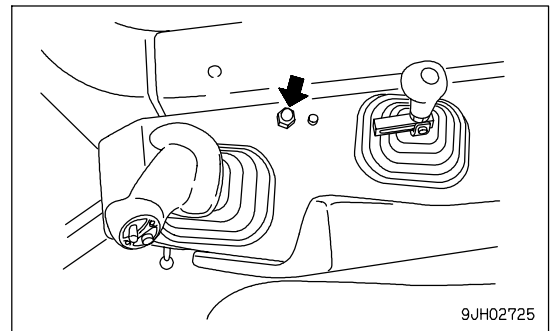


CHECK HORN SOUND

1. Turn starting switch (1) to the ON position (B).

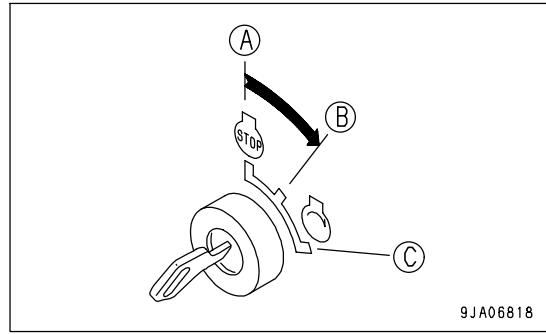


2. Push the horn switch and check that the horn sounds.

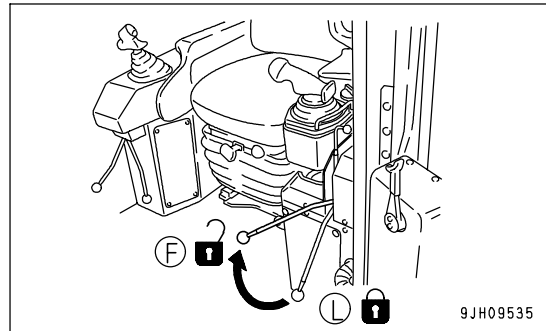


CHECK BACKUP ALARM SOUND

1. Turn starting switch to the ON position (B).



2. Set parking brake lever to the FREE position (F).

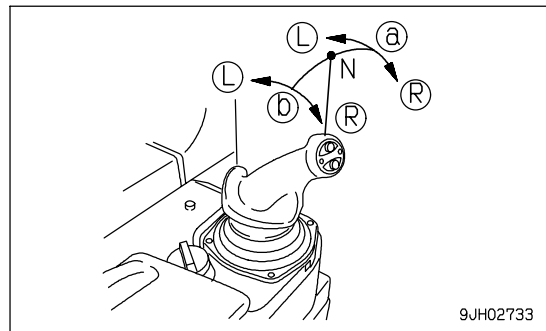
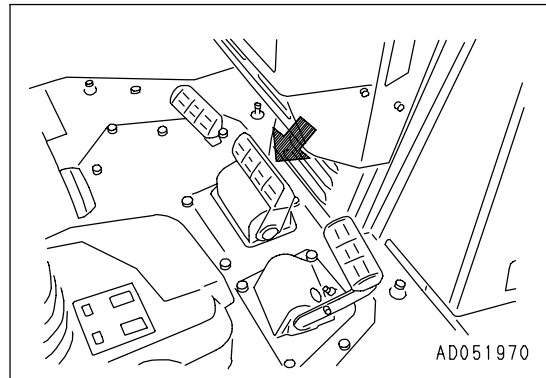


3. While depressing the brake pedal, set joystick to the REVERSE position (b).

The buzzer must sound immediately.

Buzzer will continue to sound until the joystick is moved to NEUTRAL position (N) or FORWARD position (a).

4. As soon as it is confirmed that the buzzer is working properly, set the joystick to the NEUTRAL position (N), put the parking brake lever to the LOCK position (L), and then release the brake pedal.



ADJUSTMENT

ADJUSTING OPERATOR'S SEAT



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.

Adjustments (C), (D), and (K) use the air compressor built into the seat, so turn the engine starting switch to the ON position.

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

Pull lever (1) up, set the seat to the desired position, then release the lever.

Fore-and-aft adjustment: 190 mm (10 mm x 19 stages)

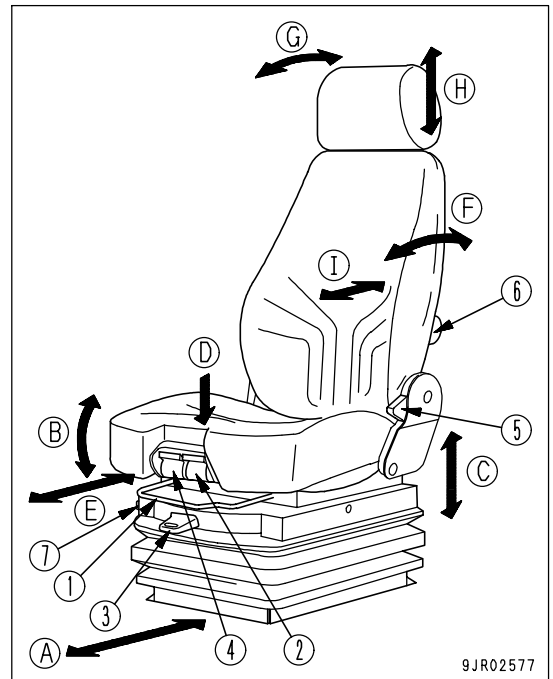
(B) Adjusting seat angle

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

Amount of adjustment

Forward tilt: 3 degrees

Rear tilt: 11 degrees



(C) Adjusting seat height

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

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

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

Amount of adjustment: 80 mm (3.2 in)

(D) Setting seat for weight

To protect the operator, it is necessary to adjust the suspension to match the operator's weight. When carrying out this adjustment, stop the machine, set the seat to the correct posture, then operate the lever.

Pull up lever (3) lightly a short distance. The weight setting is adjusted automatically. (The air pressure inside the suspension is increased or decreased to match the operator's weight.)

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

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

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

(F) Adjusting reclining angle

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

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

Amount of adjustment

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

Rear tilt: 60 degrees

NOTICE

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

(G) Adjusting headrest angle

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

Amount of adjustment: 38 degrees

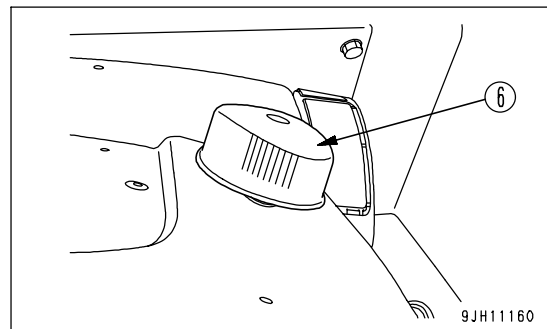
(H) Adjusting headrest height

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

Amount of adjustment: 100 mm (3.9 in)

(I) Lumbar support

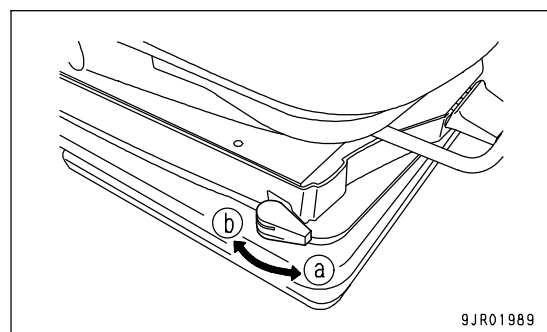
Turn grip (6) to provide suitable support for the lumbar region.



(J) Adjusting hardness of suspension damper

It is possible to adjust the hardness of the suspension damper with knob (7). If knob (7) faces the front of the seat (a), the suspension becomes harder; if it faces the rear of the seat (b), the suspension becomes softer.

Amount of adjustment: 5 stages



USING SEAT BELT

Always install a seat belt on machines equipped with ROPS.



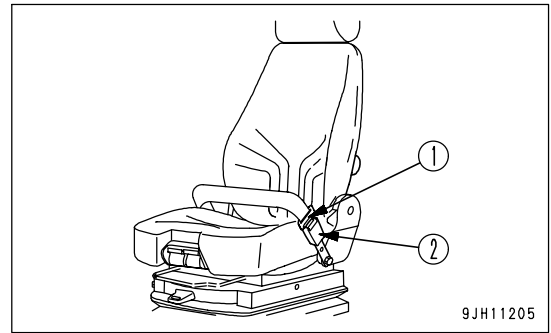
WARNING

- Before fastening the seat belt, inspect the securing brackets and belt for abnormal conditions. Replace any worn or damaged seat belt or the securing brackets.
- Even no problem can be seen with the belt, always replace the seatbelt once every three years. The date of manufacture is given on the rear side of the belt.
- Adjust and fasten the seat belt before operating the machine.
- Always use the seat belt when operating the machine.
- Fit the seat belt across your lap without twisting.

FASTEN THE BELT AND REMOVE IT

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.



Check that the bolts of the clamp securing the belt to the chassis are not loose. Tighten them if they are loose.

Tightening torque: 24.5 ± 4.9 Nm (2.5 ± 0.5 kgm, 18.1 ± 3.6 lbft)

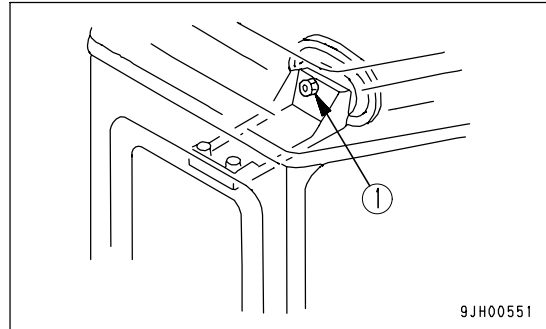
If the seat belt is scratched or frayed, if any fittings are broken or deformed from long service, replace the seat belt immediately.

ADJUST MIRROR

! 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.

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



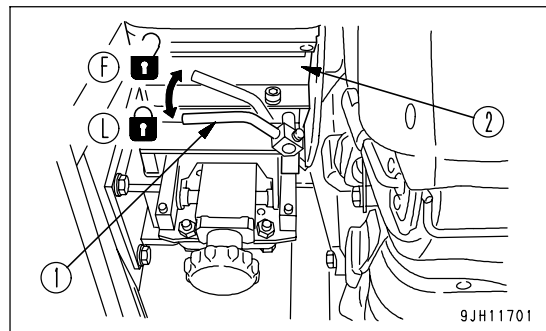
ADJUST JOYSTICK (PCCS LEVER)

! WARNING

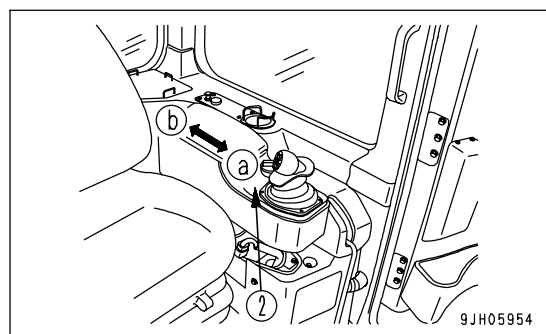
After moving case (2) in order to adjust the position of the steering, directional, and gearshift lever, secure lock lever (1) into the notched hole, making sure it is in the LOCK position. If it is not completely locked, the steering, directional, and gearshift lever may unexpectedly move and cause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

The steering, directional, and speed lever (wrist control type single lever: joystick) can be adjusted by 100 mm (3.9 in) in 5 stages to the front or rear. Adjust to the most suitable position to match the adjustment of the operator's seat.

1. Pull up lock lever (1) to the FREE position (F) at the rear of case (2) on left side of the operator's compartment.
2. With lock lever (1) pulled up, use your other hand to grip the front of case (2), then move it forward with your left and right hands. The joystick moves with case (2).



3. Move case (2) to the desired position until a click is heard. Then pull up lock lever (1) and release it. Lock lever (1) automatically returns to the LOCK position.
 - (a) Front
 - (b) Rear



REMARK

PCCS: Palm command control system

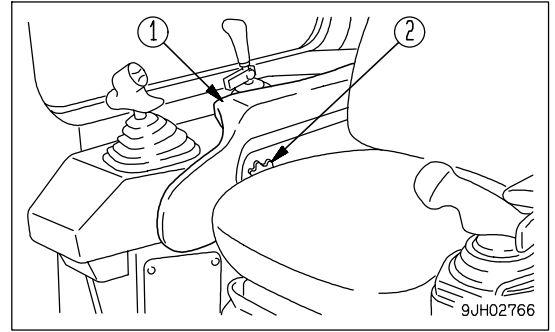
ADJUST ARMREST

The height of the armrests on the right and left sides of the operator's seat can be adjusted according to the following procedure. After adjusting the operator's seat, adjust the armrest height properly.

ADJUST ARMREST (RIGHT)

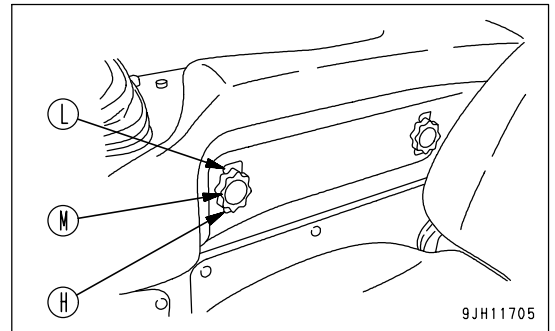
Armrest (1) on the right side of the operator's cab part can be adjusted up 30 mm (1.2 in) or down 30 mm (1.2 in) based on the standard height (center) in three stages.

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



2. Move the armrest on the operator's seat to the front, then align the position of the 3 holes {high (H), middle (M), low (L)}.

3. Tighten knob (2) securely.



ADJUST ARMREST (LEFT)

The armrest on the left side of the operator's compartment can be adjusted to 2 heights.

1. When adjusting height of both armrest and case

It is possible to effortlessly adjust the standard height up 50 mm (2 in) or down 50 mm (2 in).

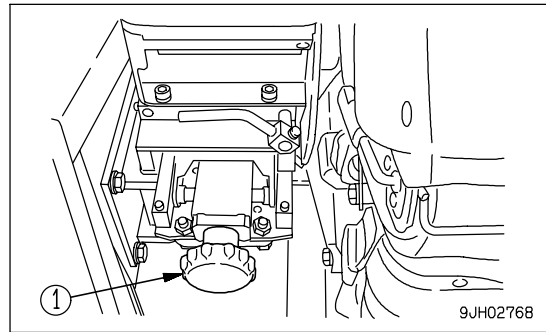
The steering, directional, and gearshift lever moves as a unit.

Turn up/down left adjustment knob (1) to adjust the height.

Turn the knob to adjust as follows.

Turn **CLOCKWISE** to move **UP**

Turn **COUNTERCLOCKWISE** to move **DOWN**



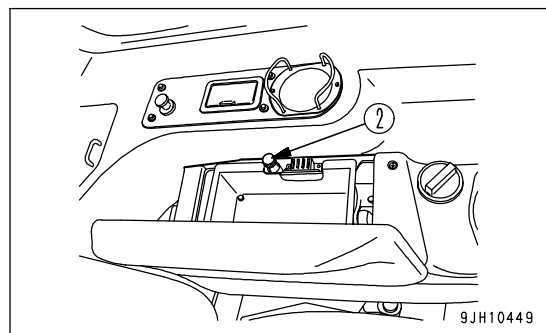
2. When adjusting height of armrest only

It is possible to effortlessly adjust up to 36 mm (1.4 in) upward from the armrest and case contact surface.

The steering, directional, and gearshift lever does not move.

Open the armrest, and turn knob (2) counterclockwise to adjust the height.

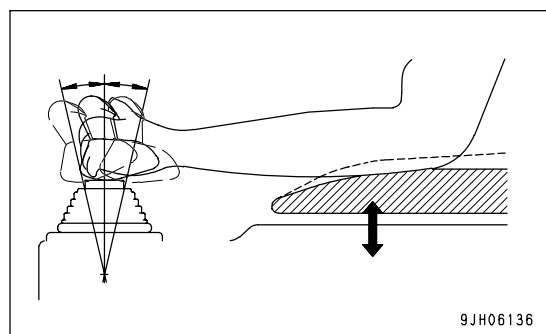
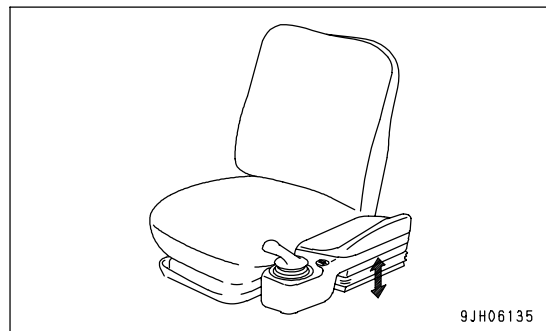
Only the armrest will move up. After adjusting it to the desired height, close the armrest.



3. By carefully adjusting to match the operator's physique, it is possible to operate the travel lever correctly (with fine control and smooth steering) and comfortably (with little fatigue), so adjust the armrest as follows:

1) Sit in the operator's seat, grip the travel lever, and turn up-down adjustment knob (1) to adjust the height of the console assembly to a position where the elbow matches the top surface of the armrest as shown in the diagram on the right.

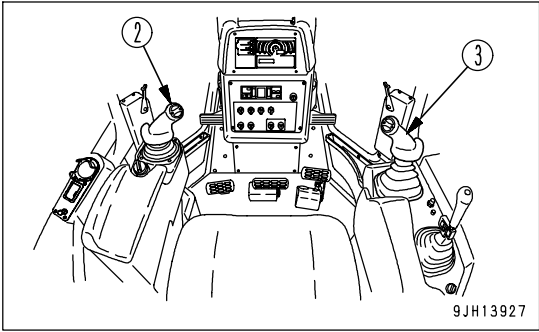
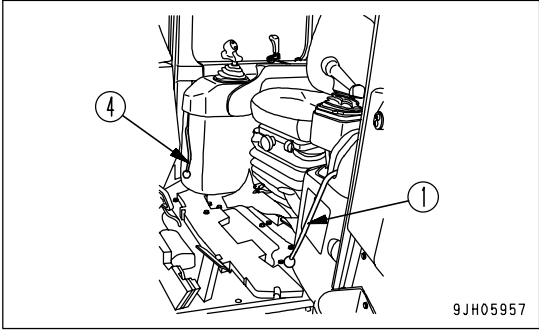
2) Next, operate the travel lever to the left and right, and turn knob (2) to adjust the height of the armrest to match the thickness of the operator's arm so that it is possible to operate smoothly to the left and right using the elbow and the support at the front.



OPERATIONS AND CHECKS BEFORE STARTING ENGINE

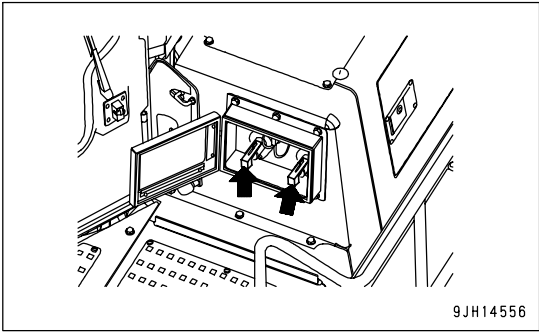
⚠ WARNING

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

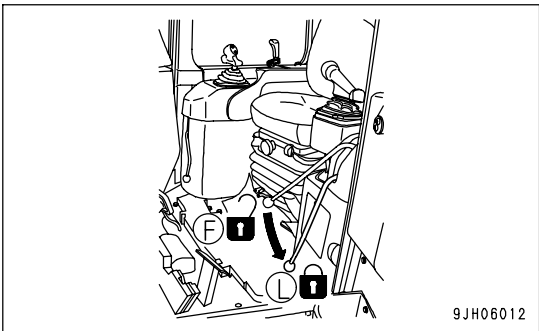


(For mining specification machine)

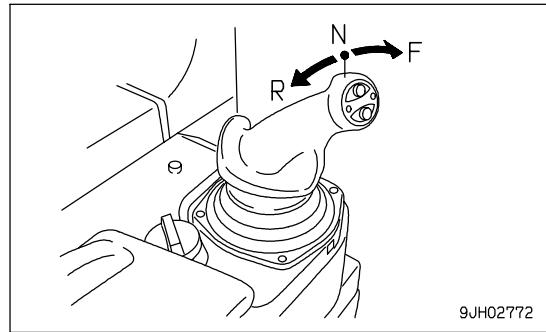
- Check that the battery isolator switch and starting motor isolator switch are at the ON position. (If equipped.)



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



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

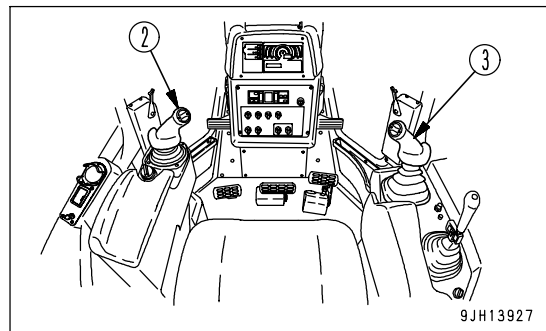


9JH02772

REMARK

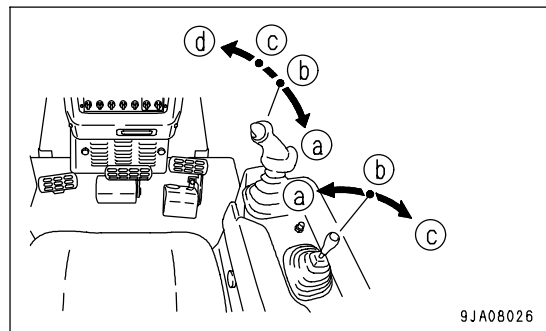
The engine cannot be started if joystick (steering, directional, and gearshift lever) (2) is not in the N position. If joystick (steering, directional, and gearshift lever) (2) is in F or R, the letter P on display panel A will flash.

3. Lower the blade to the ground to check that blade control lever (3) is in HOLD position (b).



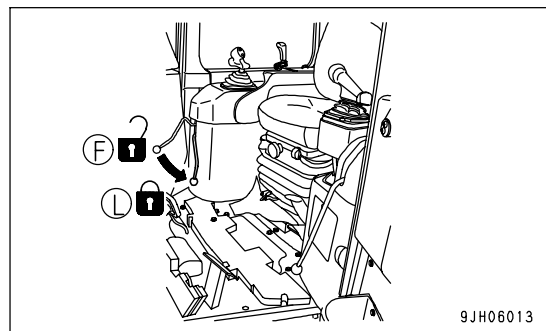
9JH13927

4. Check that the ripper is lowered to the ground.



9JA08026

5. Check that the work equipment lock lever (4) is LOCK position (L).



9JH06013

STARTING ENGINE

NORMAL STARTING



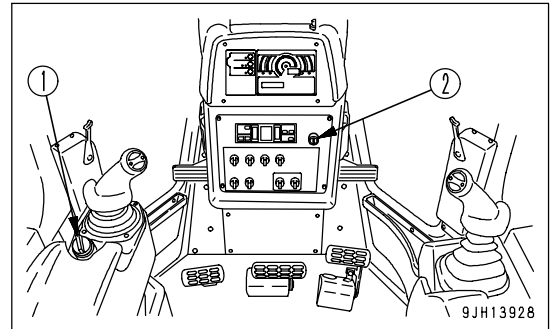
WARNING

- Check that there are no persons or obstacles in the surrounding area, then sound the horn and start the engine.
- Exhaust gas is toxic. When starting the engine in confined spaces, be particularly careful to ensure good ventilation.

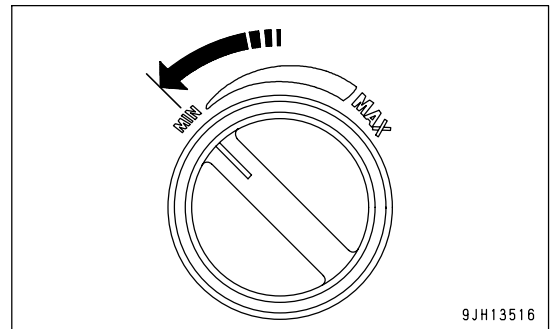
NOTICE

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

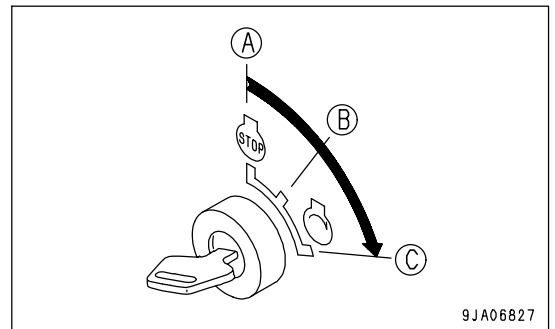
If the engine will not start, wait for at least 2 minutes before trying to start the engine again.



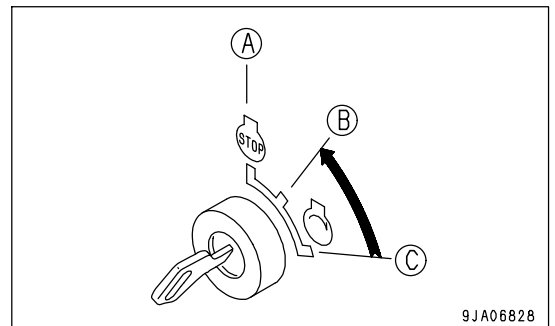
1. Set the fuel control dial to the low idling (MIN) position.
 - If it is at the high idling (MAX) position, always change it to the low idling (MIN) position.



2. Insert the key into starting switch (2) and turn the key to the START position (C). The engine will start.



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



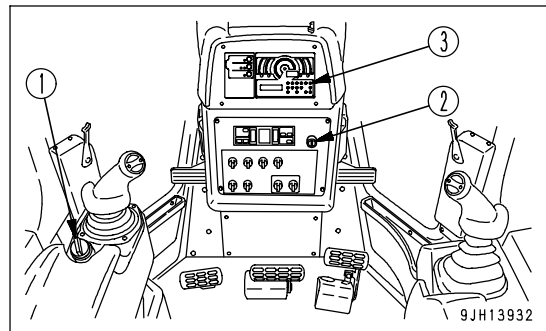
STARTING IN COLD WEATHER

WARNING

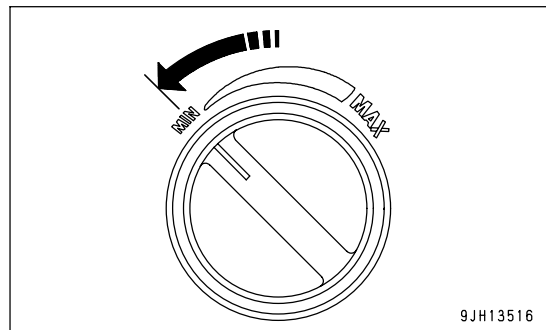
- Always sit in the operator's seat when starting the engine.
- Do not short circuit the starting motor circuit to start the engine. There is danger that this may cause serious personal injury or fire.
- Check that there is no person or obstacle in the surrounding area, then sound the horn before starting the engine.
- Never use any starting aid fluid to start the engine. There is danger that it may cause an explosion.
- Exhaust gas is poisonous. Always ensure that there is good ventilation before starting the engine in an enclosed place.

NOTICE

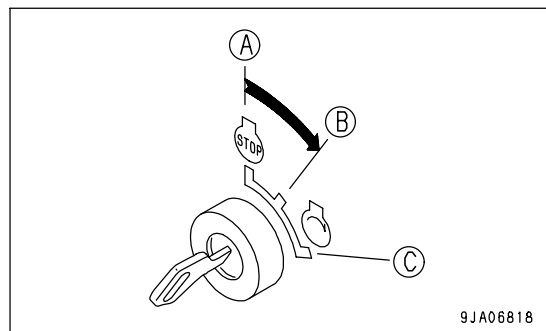
- Do not crank the starting motor continuously for more than 20 seconds. If the engine does not start, wait for at least 2 minutes, then repeat the procedure from Step 2.
- Before starting the engine, check that the fuel control dial is in the low idling (MIN) position.
- On this machine, to protect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



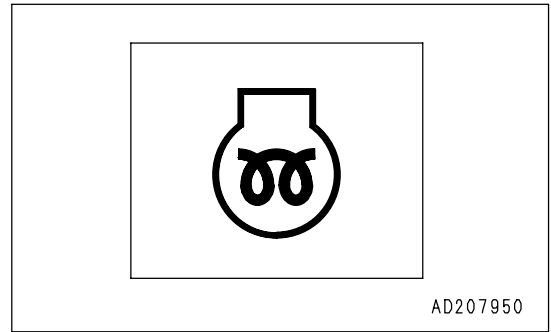
1. Set fuel control dial (1) to the low idling (MIN) position.
If the dial is at the high idling (MAX) position, always change it to the low idling (MIN) position.



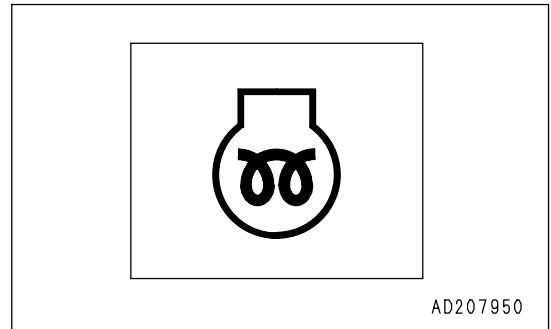
2. Insert the key into starting switch (2) and turn the key to the ON position (B).



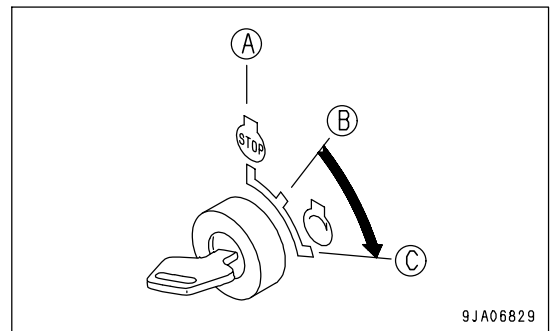
3. Check that engine pre-heating pilot lamp (3) on the monitor panel lights up.
If the engine pre-heating pilot lamp does not light, go to step 5.



4. Keep in this condition until engine pre-heating pilot lamp (3) goes out.
(Pre-heating is completed after approx. 12 seconds, and the lamp goes out.)

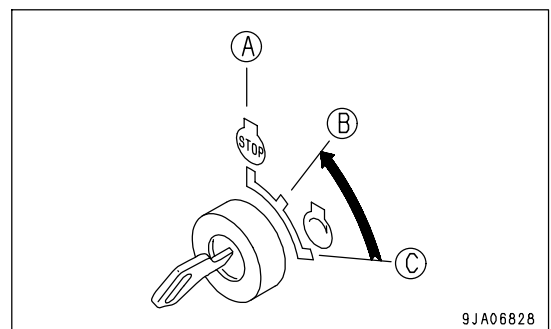


5. When preheating pilot lamp (3) goes off, turn the key of ignition switch (2) to the START position (C) to crank the engine.
The time that preheating pilot lamp (3) stays on changes according to the ambient temperature as shown in the table below.



Ambient temperature	Pre-heat time
0 °C to -20 °C	20 to 40 seconds
-20 °C or less	40 seconds

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



REMARK

Immediately after starting the engine, run at idle. While running the engine, release the decelerator pedal and do not operate the work equipment.

Guideline for idle time

- Cold weather: At least 15 seconds
- 1st start after changing engine oil or engine oil filter: 20 seconds

7. When the engine rotation stabilizes, set fuel control dial (1) to low idle (MIN) position, then perform the warming-up operation.

REMARK

- Regardless of the ambient temperature, if the key in starting switch (2) is turned from the OFF position to the left, engine pre-heating pilot lamp (3) will light and pre-heating will start. (Pre-heating continues while the starting switch is being held to the left.)
For details of pre-heating times, see the table in step 5.
- During the pre-heating operation, engine pre-heating pilot lamp (3) lights to show that preheating is being performed.
Pre-heating is completed within 45 seconds.
- If the engine does not start after pre-heating, wait for 2 minutes, then repeat starting procedure from step 2.
- The actuation time for the turbo protect function and the relationship with the engine coolant temperature are as shown below. If the fuel control dial is operated within the time shown below, the engine speed will not change.

Turbo protect function

The turbo protect function is a function to protect the turbocharger by keeping the engine speed at less than 1000 rpm immediately after the engine is started.

- In cold weather, the turbo protect function is actuated, so the engine speed is kept at 1000 rpm or below for several seconds. After that, it becomes the speed set by the position of the fuel control dial.
- When the turbo protect function is actuated, the engine speed is held at less than 1000 rpm, regardless of the position of the fuel control dial.

Coolant temperature	Turbo protect time (sec.)
Above 10°C (50°F)	0
10 to -10°C (50 to 14°F)	Change 0 to 25
below -10°C (14°F)	25

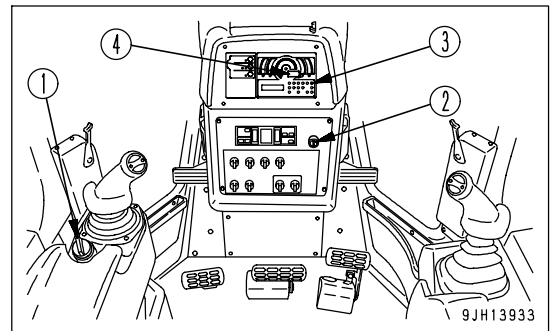
STARTING ENGINE ON MACHINES WITH PRELUBE SYSTEM

**WARNING**

- Always sit in the operator's seat when starting the engine.
- Do not short circuit the starting motor circuit to start the engine. There is danger that this may cause serious personal injury or fire.
- Check that there is no person or obstacle in the surrounding area, then sound the horn before starting the engine.
- Never use any starting aid fluid to start the engine. There is danger that it may cause an explosion.
- Exhaust gas is poisonous. Always ensure that there is good ventilation before starting the engine in an enclosed place.

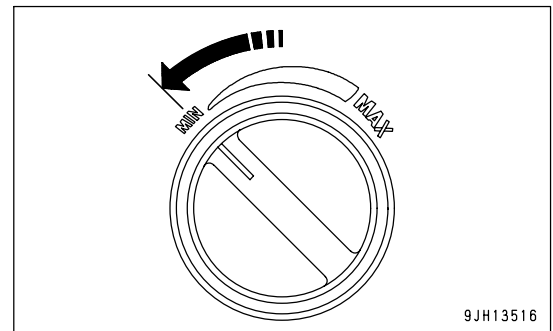
NOTICE

- Do not crank the starting motor continuously for more than 20 seconds. If the engine does not start, wait for 2 minutes, then repeat procedure from step 2.
- Before starting the engine, check that the fuel control dial is at the low idle (MIN) position.
- If the fuel control dial is at the FULL position (MAX), the engine will accelerate suddenly and cause damage to the engine parts, so set it to an intermediate or low speed position.

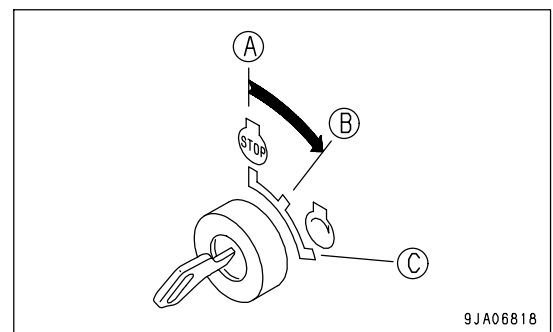


1. Set fuel control dial (1) to the low idling (MIN) position.

If the dial is at the high idling (MAX) position, always change it to the low idling (MIN) position.

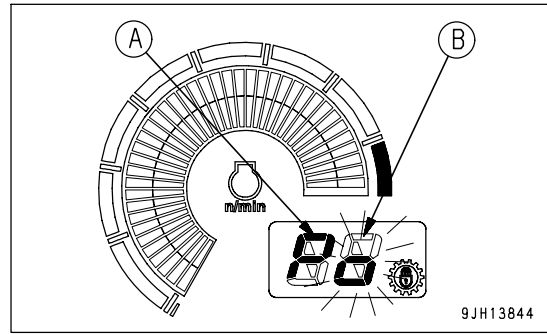


2. Insert the key into starting switch (2) and turn the key to the ON position (B).

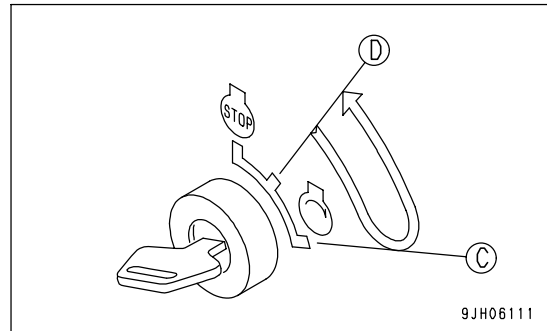


3. Monitor panel speed range display (4) changes as shown on the right.

- (A): Lock lever at safety position
- (B): Flashes: Prelube needed

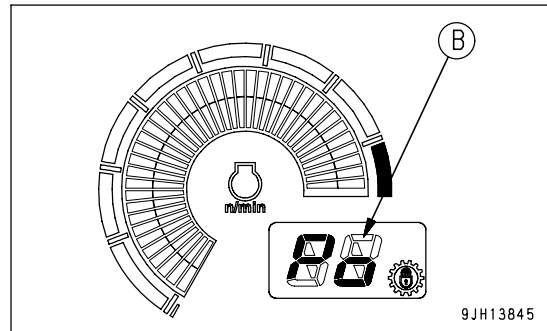


4. Turn the key in starting switch (2) to the START (C) position, then return it to the ON (D) position. If the key is released while it is at the START (C) position, the key automatically returns to the ON (D) position.



5. Monitor panel speed range display (4) changes as shown on the right, indicates the prelube operation is being performed.

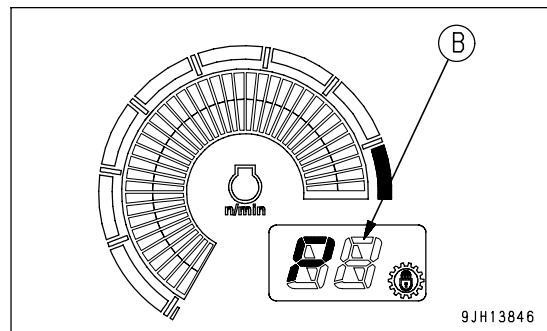
- (B): Lights up: Prelube operation taking place



6. The prelube operation is completed in approx. 5 to 60 seconds. When this happens, monitor panel speed range display (4) changes as shown on the right.

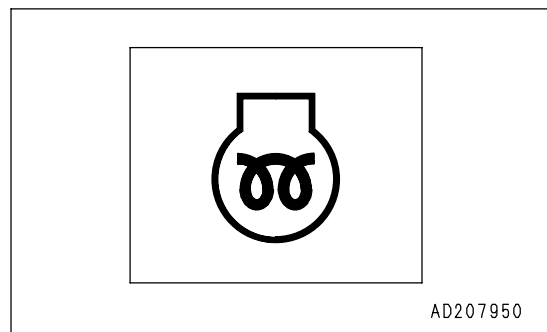
(The time for the prelube operation changes according to the ambient temperature and the engine oil temperature.)

Goes out: Prelube operation completed

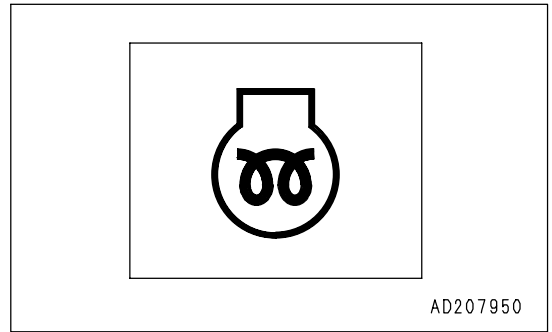


7. Check that engine pre-heating pilot lamp (3) on the monitor panel lights up.

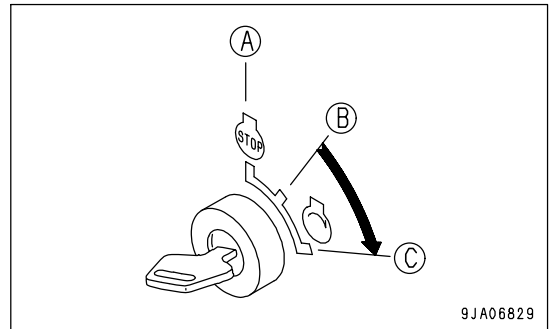
If the engine pre-heating pilot lamp does not light, go on to step 9.



8. Keep in this condition until engine pre-heating pilot lamp (3) goes out.
 (Pre-heating is completed after approx. 12 seconds, and the lamp goes out.)

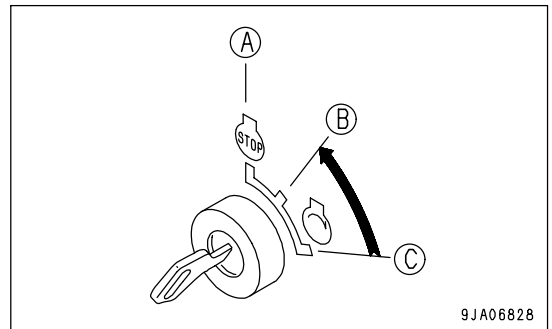


9. When preheating pilot lamp (3) goes off, turn the key of ignition switch (2) to the START position (C) to crank the engine.
 The time that preheating pilot lamp (3) stays on changes according to the ambient temperature as shown in the table below.



Ambient temperature	Pre-heat time
0°C to -10°C (32°F to 14°F)	0 to 15 seconds
-10°C to -20°C (14°F to -4°F)	15 to 30 seconds
-20°C to -30°C (-4°F to -22°F)	30 to 45 seconds
-30°C to (-22°F to)	45 seconds

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



REMARK

Immediately after starting the engine, run the engine at idling, and do not operate the accelerator pedal or work equipment during this time.

Guideline for idling time

- Cold weather: At least 15 seconds
- When first starting engine after changing oil or replacing engine oil filter: 20 seconds

11. When the engine rotation stabilizes, set fuel control dial (1) to low idle (MIN) position, then perform the warming-up operation.

REMARK

- Regardless of the ambient temperature, if the key in starting switch (2) is turned from the OFF position to the left, engine pre-heating pilot lamp (3) will light and pre-heating will start. (Pre-heating continues while the starting switch is being held to the left.)
For details of pre-heating times, see the table in step 9.
- During the pre-heating operation, engine pre-heating pilot lamp (3) lights to show that preheating is being performed.
Pre-heating is completed within 45 seconds.
- If the engine does not start after pre-heating and prelube, wait for 2 minutes, then repeat starting procedure from step 2.
- If it is left for more than 60 seconds in same condition as step 5, speed range display (4) will return to the condition in step 3.
- As shown below, if the operation is not normal, and the adjustment mode on the monitor is used to turn the prelube OFF, it is possible to start the engine. In emergencies, see the method of use for the adjustment mode, move the machine to a safe place, then contact your Komatsu distributor.

Problem	Speed range display	Main causes
Engine does not start	PE (Flashes)	Disconnected oil pressure switch Failure in starter motor Failure in starter motor relay
After the prelube operation, it returns again to the Prelube needed position	Po (Flashes)	Does not reach specified oil pressure in 60 seconds

OPERATIONS AND CHECKS AFTER STARTING ENGINE



WARNING

- If there has been any Emergency stop, abnormal actuation or trouble, turn the starting switch key to the OFF position.
- If the work equipment is operated without sufficiently warming the machine up, response of the work equipment to movement of the control lever will be slow, and the work equipment may not respond as the operator desires, so always perform the warming-up operation. Particularly in cold areas, be sure the warming-up operation is completed.

BREAKING IN THE MACHINE

NOTICE

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

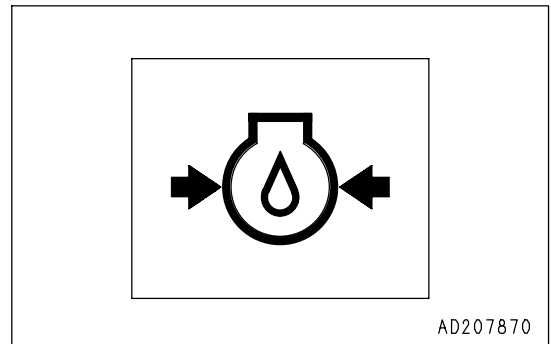
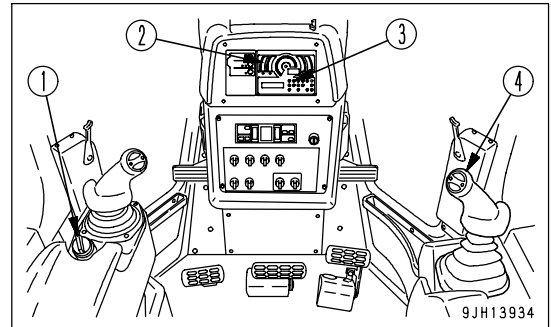
Make sure that you fully understand the content of this manual, and pay careful attention to the following points when breaking in the machine.

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

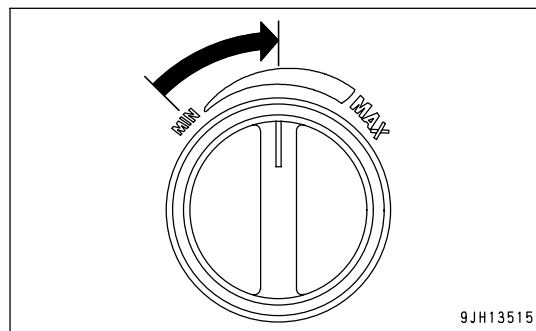
WARMING UP OPERATIONS

NOTICE

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

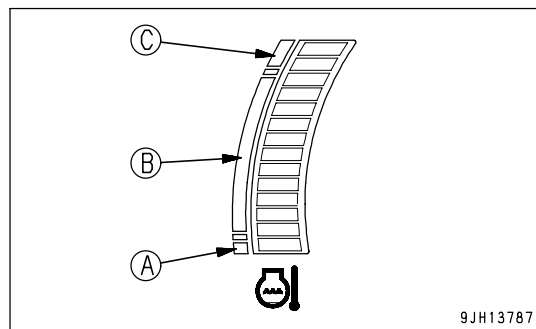


1. Turn fuel control dial (1) to the center position between low idling (MIN) and high idling (MAX) positions and run the engine at a mid-range speed for 5 minutes under no load.



2. After warm-up is completed, check gauges and caution lamps for proper operation. If any problem is found, repair it. Continue to run the engine under a light load until engine coolant temperature gauge indicator (2) is within the green range (B).

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



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

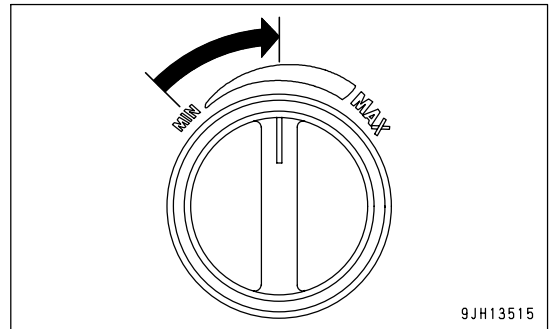
IN COLD AREAS

(AUTOMATIC WARMING-UP OPERATION)

This machine is equipped with an automatic warming-up device.

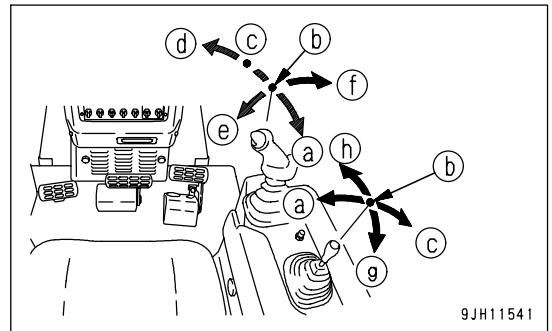
- When the engine is started, if the engine coolant temperature is low (below 30 °C (86 °F)), the warming-up operation is carried out automatically.
- The automatic warming-up operation is canceled if the engine coolant temperature reaches the specified temperature (30 °C (86 °F)) or if the warming-up operation is continued for 10 minutes. If the engine coolant temperature or hydraulic oil temperature are low after the automatic warming-up operation, warm the engine up further as follows.

1. Turn fuel control dial (1) to the center position between LOW IDLE (MIN) and HIGH IDLE (MAX) and run the engine at medium speed for about 10 minutes with no load.



2. Operate blade control lever (4) to the RAISE position, then keep the blade raised to the maximum height and continue to relieve the circuit for 10 minutes.

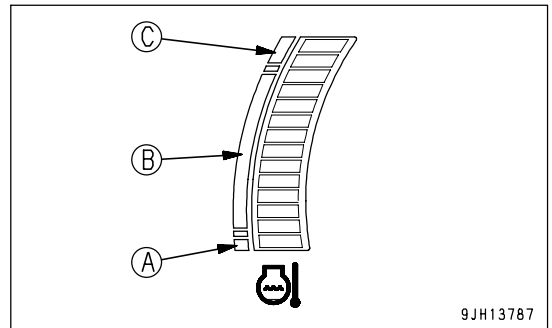
3. Finally, operate blade control lever (4) and ripper control lever to operate the blade and ripper cylinders several times. If the oil temperature in the work equipment is not properly raised, there will be a time lag in the response of the work equipment and steering.



- (a) Raise (e) Left tilt
- (b) Hold (f) Right tilt
- (c) Lower (g) Digging angle increased
- (d) Float (h) Digging angle reduced

4. After warm-up is completed, check gauges and caution lamps for proper operation. If any problem is found, repair it. Continue to run the engine under a light load until engine coolant temperature gauge indicator (2) is within the green range (B).

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



REMARK

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

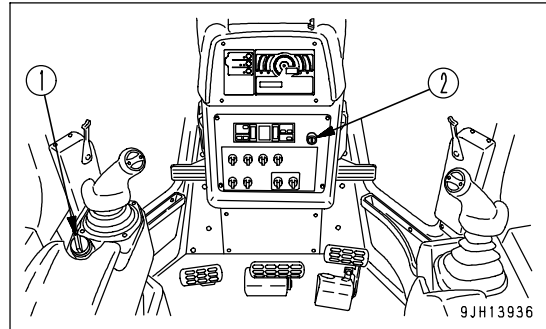
5. Check for abnormal exhaust gas color, noise, or vibration. If any problem is found, contact your Komatsu distributor.

STOPPING ENGINE

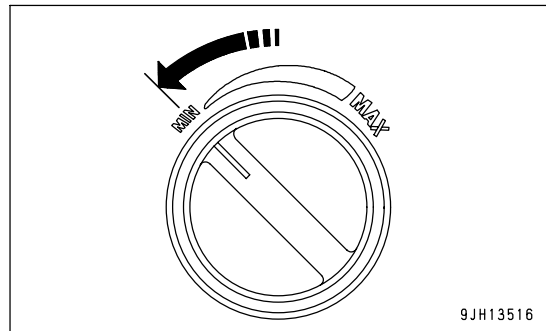
NOTICE

If the engine is stopped without allowing it to cool down, there is danger that the service life of various parts of the engine will be reduced. Except in emergencies, never stop the engine suddenly.

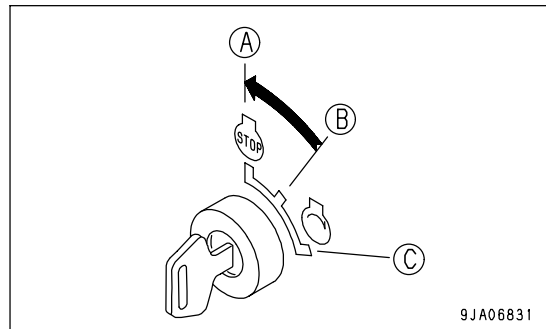
If the engine overheats, do not stop it suddenly. Run it at low speed to allow it to cool down gradually, then stop it.



1. Place fuel control dial (1) in the low idle (MIN) position and run the engine at low idle speed for about 5 minutes to allow it to gradually cool down.



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

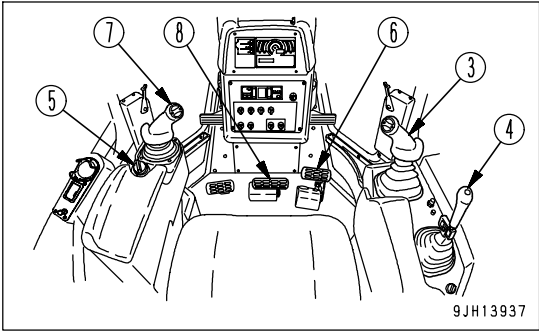
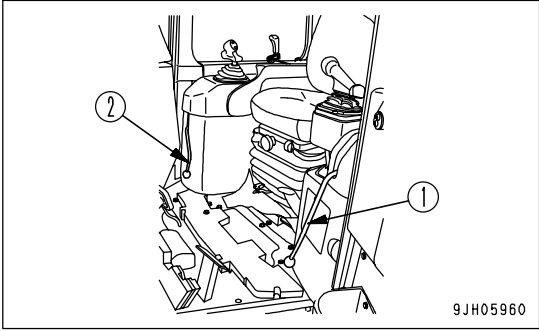


3. Remove the key from starting switch (2).

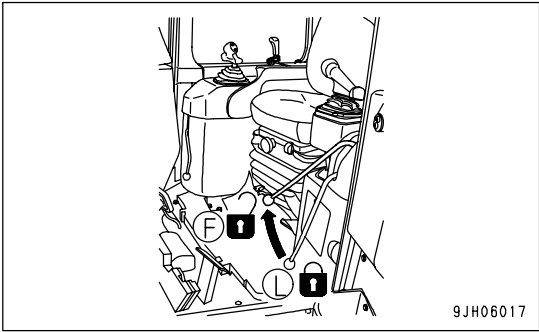
MOVING MACHINE

! WARNING

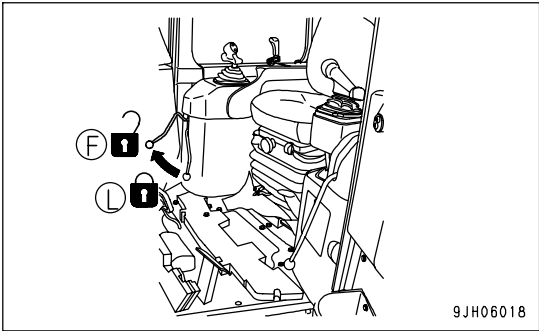
- Before moving the machine, check that the area around the machine is safe, and always sound the horn before moving.
- Do not allow anyone to enter the area around the machine.
- The rear of the machine is a blind spot, so be extremely careful when traveling in reverse.
- When moving the machine down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



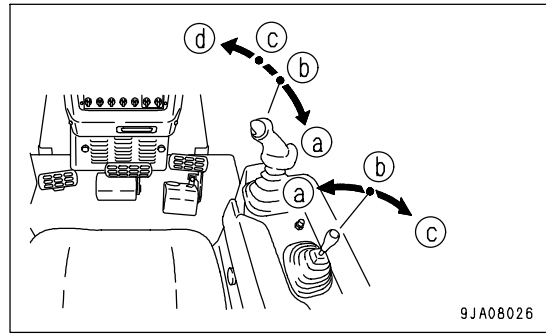
1. Operate parking brake lever (1) to the FREE (F) position.



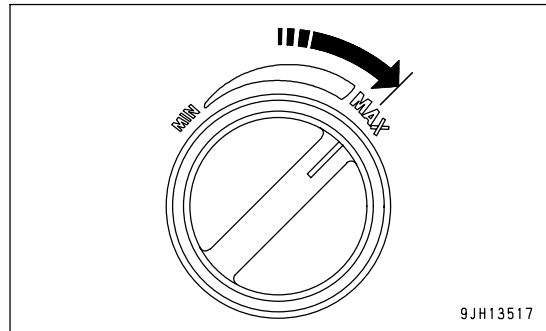
2. Operate work equipment lock lever (2) to the FREE (F) position.



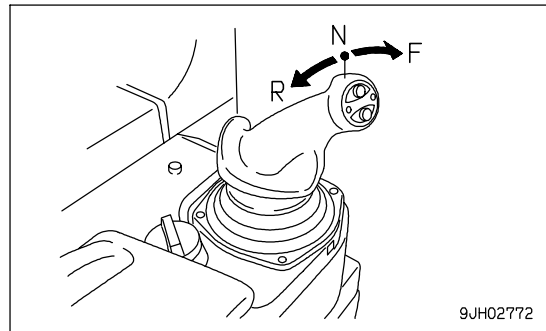
- Operate blade control lever (3) and ripper control lever (4) to the RAISE (a) position so that the blade will rise above the ground by 40 cm to 50 cm (15.8 in to 19.7 in) and the ripper will rise to the upper limit.



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



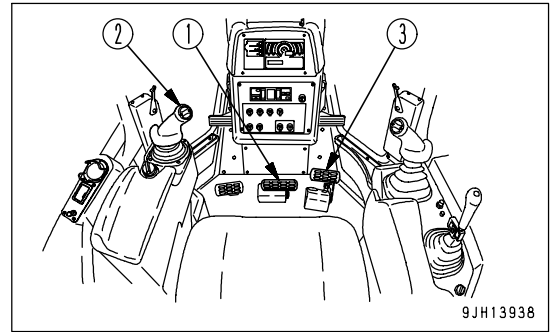
- Move joystick to the F (FORWARD) or R (REVERSE) position, gradually release decelerator pedal (6) and allow the machine to move.



STOPPING MACHINE

**WARNING**

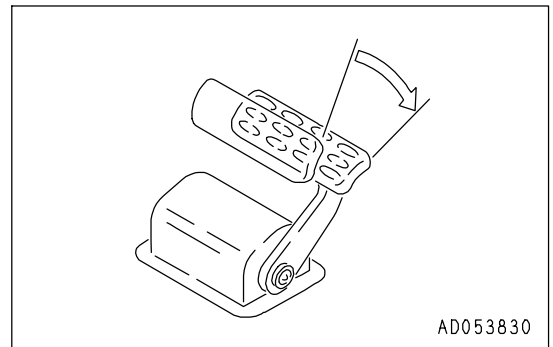
Avoid stopping suddenly. Give yourself ample room when stopping.



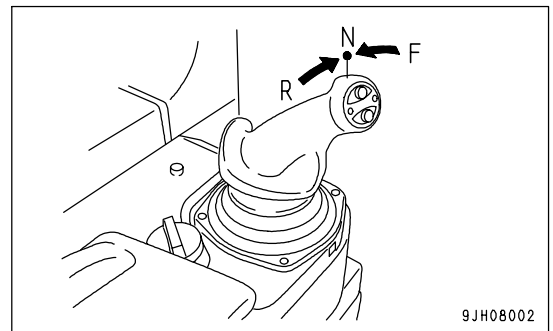
1. Depress brake pedal (1) to stop the machine.

NOTICE

If the brake is depressed when the engine speed or travel speed is high, the brake disc may make a slipping sound. Normally, depress decelerator pedal (3) to reduce the engine speed and travel speed before depressing the brake.



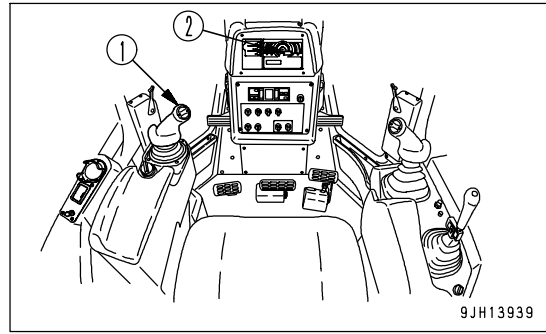
2. Return steering, directional, and gearshift lever (2) to the N position, depress brake pedal (1) further and stop the machine.



SHIFTING GEAR

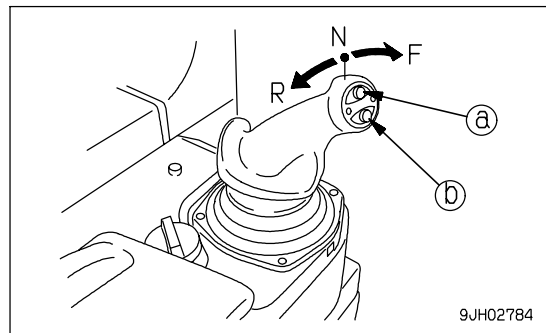
The machine does not have to be stopped to shift gears.

1. Move steering, forward-reverse, gear shift lever (1) to the desired gear position to shift gears.



GEAR SHIFTING

- When the joystick is at the FORWARD or REVERSE position and switch (a) or switch (b) is pushed, the transmission speed will change.
 UP switch (a): Each time the switch is pressed, the transmission will shift up one speed.
 DOWN switch (b): Each time the switch is pressed, the transmission will shift down one speed.



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

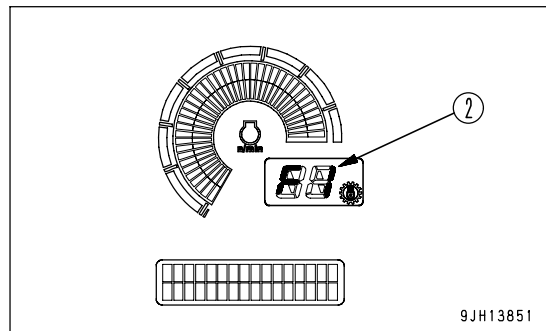
For details of the maximum speed in each speed range, see "SPECIFICATIONS (PAGE 5-2)".

REMARK

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

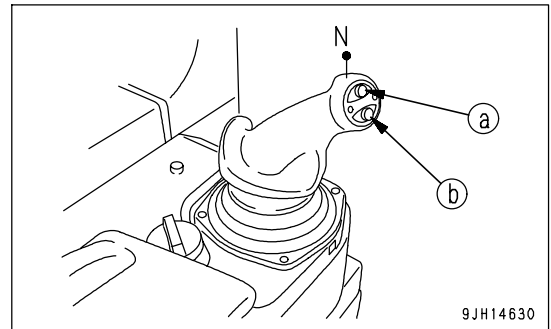
For example:

- Neutral: N is displayed on the display panel A (2)
- FORWARD 2nd: F2 is displayed on the display panel A (2)
- REVERSE 3rd: R3 is displayed on the display panel A (2)
- When the parking brake lever is locked, P is displayed.

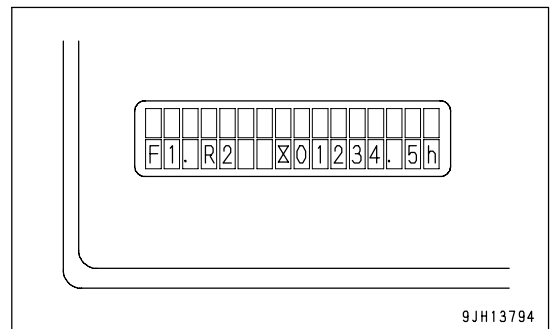


GEARSHIFTING USING SHIFT MODE SELECTION

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



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



- Shift operation when [F1-R2] mode is set
When the steering, directional, and speed lever is in the N position, if the up switch is pressed once, the mode is set to [F1-R2] mode. After that, if the steering, directional, and speed lever is operated forward (forward travel operation), the transmission is shifted to F1. If it is moved back (reverse travel operation), the transmission is shifted to R2.
- Shift operation when [F2-R2] mode is set
When the steering, directional, and speed lever is in the N position, if the up switch is pressed twice, the mode is set to [F2-R2] mode. After that, if the steering, directional, and speed lever is operated forward (forward travel operation), the transmission is shifted to F2. If it is moved back (reverse travel operation), the transmission is shifted to R2.

REMARK

- Even when the transmission is set to [F1-R1] mode, [F1-R2] mode, or [F2-R2] mode, if the UP switch or DOWN switch is operated, this will be given priority and manual operation can be carried out.

For example: After the [F1-R2] mode has been set, if the joystick is operated forward (to set to FORWARD), the speed range is set to F1. However, if the lever is kept operated forward and UP switch (a) is pressed once, the speed

range will shift to F2; if the UP switch is pressed twice, the speed range will shift to F3. When the transmission is in F3 and DOWN switch (b) is pressed once, the speed range will shift to F2; if the DOWN switch is pressed twice, the speed range will shift to F1.

On the other hand, if the joystick is operated to the rear (to set to REVERSE), the speed range is automatically switched R1 → R2. However, if the lever is kept operated to the rear and UP switch (a) is pressed once,

the speed range will shift to R3; if the DOWN switch (b) is pressed once, the speed range will shift to R1.

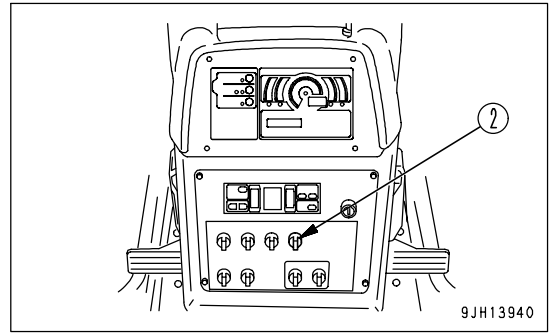
However, the setting stays in the [F1-R2] mode. If the steering, directional, and gearshift lever is returned to N and then operated forward (to set to FORWARD), the speed range is set to F1; if the lever is operated to the rear (to set to REVERSE), the speed range is automatically switched R1 → R2.

- The default setting is [F1 - R1].

After the starting switch is turned OFF, the shift mode returns to the default setting [F1 - R1].

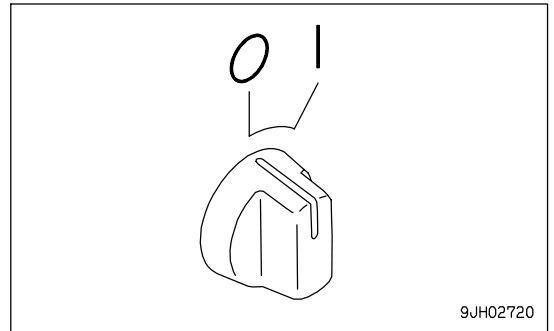
AUTO SHIFT DOWN OPERATION

If the travel speed has gone down because of the load condition when traveling, the transmission is automatically shifted to low speed. Set auto shift down switch (2) on the instrument panel in front of the operator's seat to the b (ON) position to actuate the auto shift.

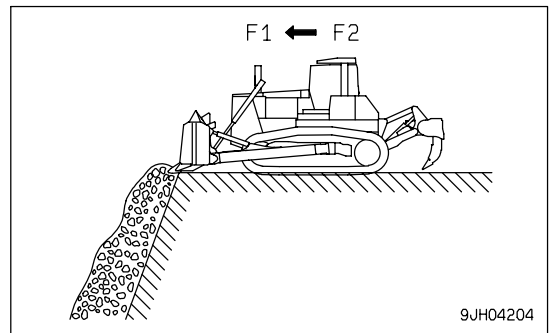


OFF position (a): Automatically canceled

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

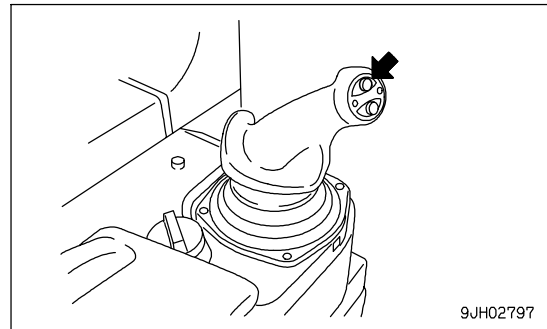
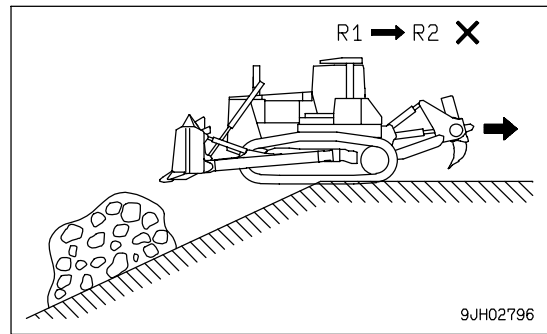


The transmission is automatically shifted down F2 → F1, F3 → F2, R2 → R1, R3 → R2.



REMARK

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



SHIFTING BETWEEN FORWARD AND REVERSE

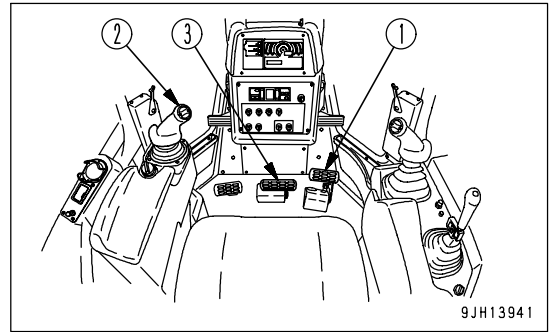
! WARNING

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

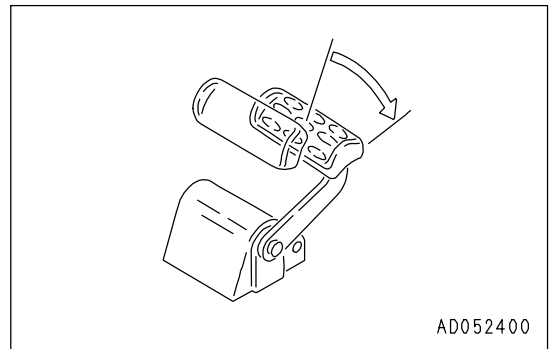
! CAUTION

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

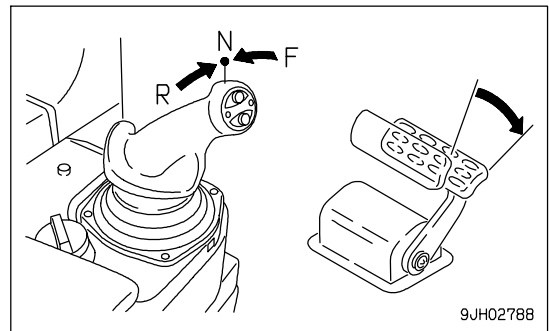
To increase safety, operator comfort, and the life of the transmission, leave the engine running at full speed, and always depress the decelerator pedal to lower the engine speed.



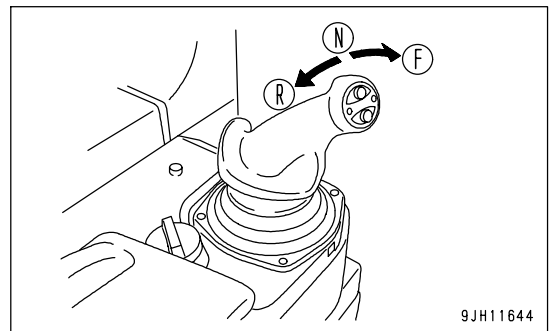
1. Depress decelerator pedal (1) to reduce the engine speed.



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



3. After depressing decelerator pedal (1), move steering, forward-reverse, gear shift lever (2) to the desired position.

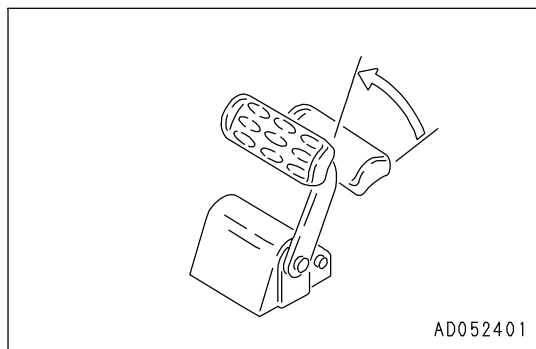


(F) Forward
 (N) Neutral
 (R) Reverse

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

REMARK

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



AD052401

STEERING MACHINE

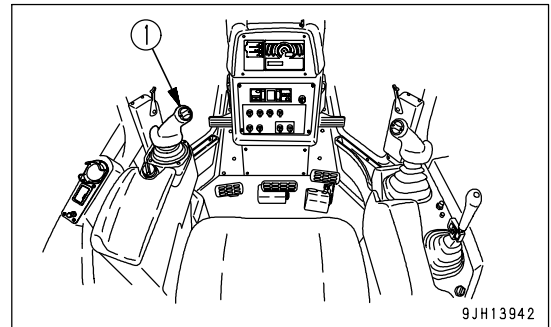


WARNING

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

NORMAL TURNING

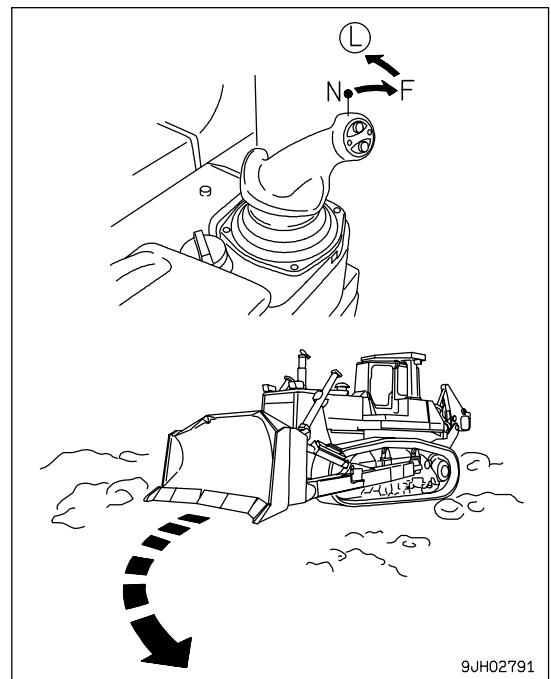
To turn the machine while traveling, incline steering, forward-reverse, gear shift lever (1) in the direction of the turn.



TURNING GRADUALLY TO LEFT WHILE TRAVELING FORWARD

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

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



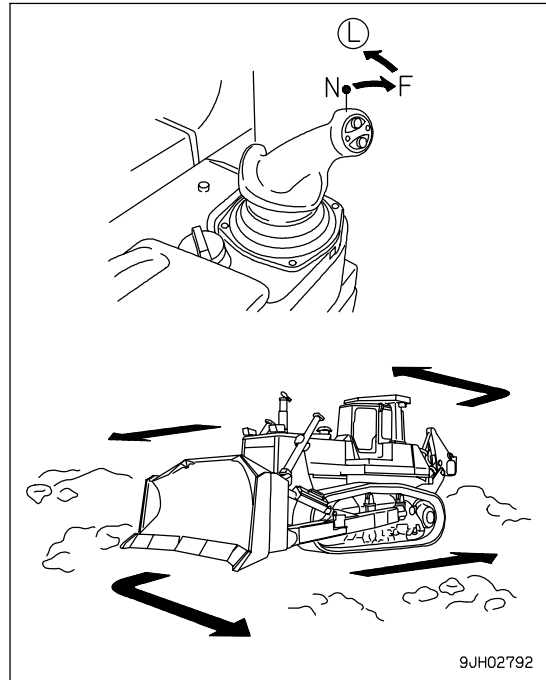
MAKING SHARP TURNS TO LEFT WHILE TRAVELING FORWARD

If the joystick is pushed forward and moved fully to the left (L), the steering clutch is disengaged, the brake is applied, and the machine turns sharply to the left.

REMARK

When making sharp turns to the right, push the joystick forward, and move it fully to the right.

Do the same when traveling in reverse.



TURNING WHILE DESCENDING A SLOPE

With machines that can carry out counter rotation turns, on steep downhill slopes where the machine may travel under its own weight, or on downhill slopes where it is being pushed by a towed machine, the machine will not steer in the opposite direction, so do as follows.

REMARK

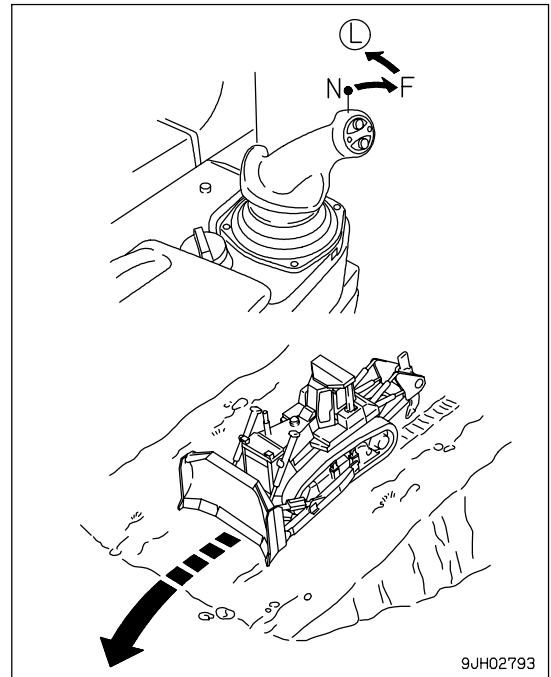
Cross steering means the phenomenon that the machine turns in the opposite direction to the actual steering direction.

TURNING GRADUALLY TO LEFT WHILE TRAVELING FORWARD

If the joystick (1) is pushed forward and moved partially to the left (L), the machine turns gradually to the left.

REMARK

When making gradual turns to the right, push the joystick (1) forward, and move it partially to the right. Do the same when traveling in reverse.



PRECAUTIONS FOR OPERATION

PAY ATTENTION TO GAUGES

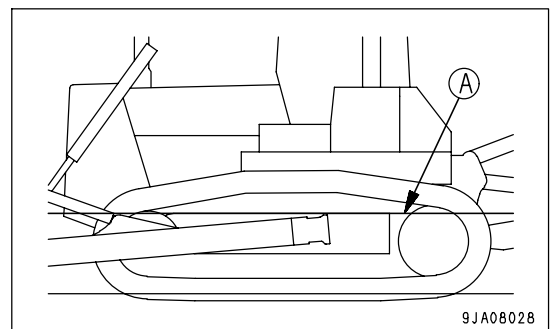
If the red range of the power train oil temperature gauge lights up during operation, reduce the load and wait for the temperature to go down.

PERMISSIBLE WATER DEPTH

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

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

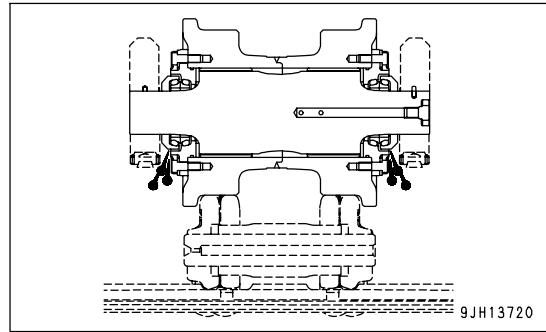
(A): Permissible water depth line



PRECAUTIONS WHEN TRAVELING FOR A LONG TIME

Avoid operating the machine at high speed for a long time, otherwise the temperature of hydraulic oil sharply rises, and that can cause oil leakage from the track rollers or final drive and lower durability.

If there is no way to avoid operating the machine at high speed for a long time, stop the machine every one hour for 30 minutes and let the track rollers and final drive cool off before starting up the machine again.



PRECAUTIONS WHEN TRAVELING UP OR DOWN HILLS

METHOD OF USING DECELERATOR PEDAL

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

USE ENGINE AS BRAKE

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

Do not move the steering, forward-reverse, gear shift lever to the NEUTRAL position.

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

BRAKING WHEN TRAVELING DOWNHILL

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

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

PRECAUTIONS ON SLOPE

BE CAREFUL OF FUEL LEVEL

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

BE CAREFUL OF OIL LEVEL

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

PRECAUTIONS WHEN ENGINE STOPS ON SLOPE

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

METHOD OF USING BRAKES

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

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

REMARK

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

PROHIBITED TO KEEP THE DOOR OPEN DURING OPERATIONS

Always keep the door closed when traveling or carrying out operations.

If the door is open, there is danger of damage from obstacles or strong vibration.

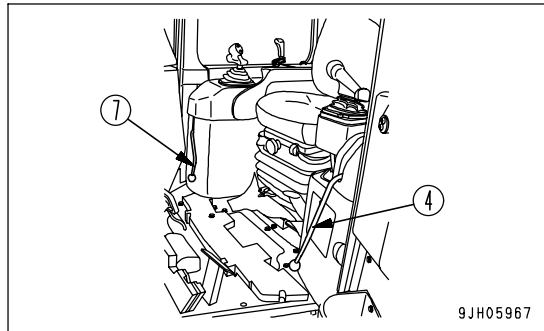
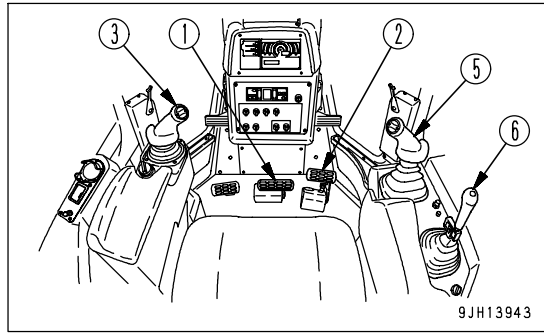
IT IS PROHIBITED TO MODIFY THE CAB GLASS IN ANY WAY THAT WILL OBSTRUCT THE VIEW

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

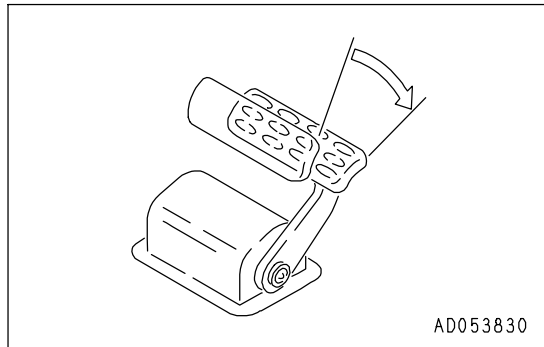
PARKING MACHINE

WARNING

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



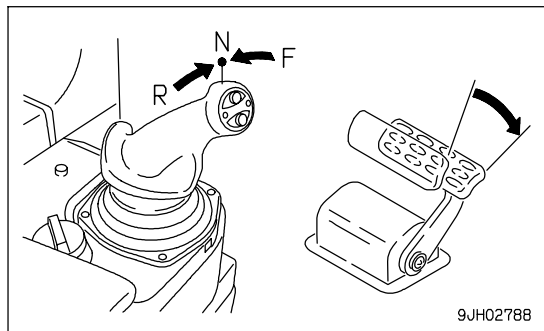
1. Depress brake pedal (1) to stop the machine.



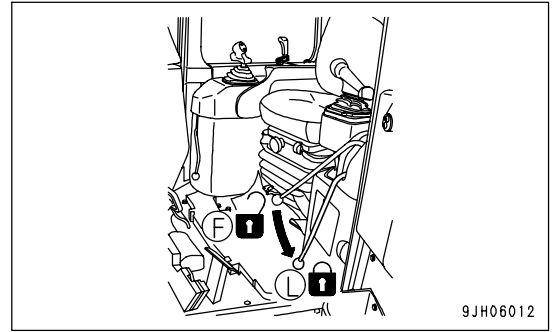
NOTICE

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

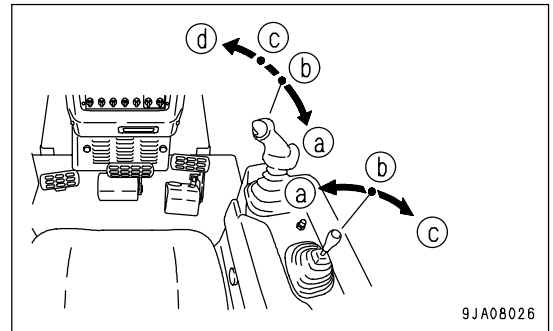
2. Place joystick (3) at the neutral position and set the speed range to 1st.



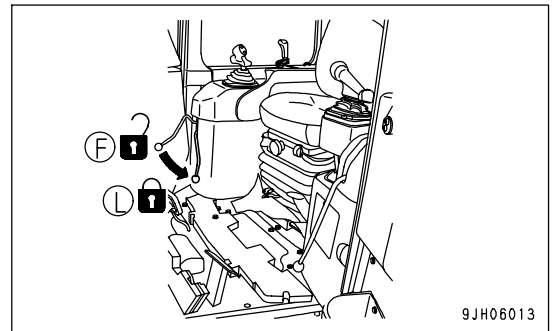
3. Operate parking brake lever (4) to the LOCK (L) position.



- 4. Operate blade control lever (5) and ripper control lever (6) to the LOWER (c) position to lower the blade and ripper to the ground.
- 5. Operate blade control lever (5) and ripper control lever (6) to the HOLD (b) position.



6. Operate blade control lever (5) and work equipment lock lever (7) of ripper control lever (6) to the LOCK (L) position.

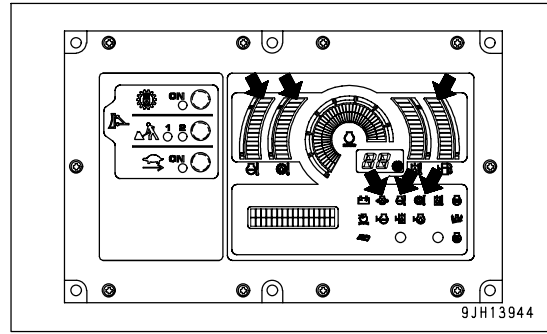


CHECK AFTER STOPPING ENGINE

- 1. Walk around the machine and check the work equipment, machine exterior, and undercarriage, also check for any leakage of oil or coolant. If any problems are found, repair them.
- 2. Fill the fuel tank.
- 3. Check the engine compartment for paper and debris. Clean out any paper and debris to avoid a fire hazard.
- 4. Remove any mud affixed to the undercarriage.

CHECK AFTER FINISHING WORK

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

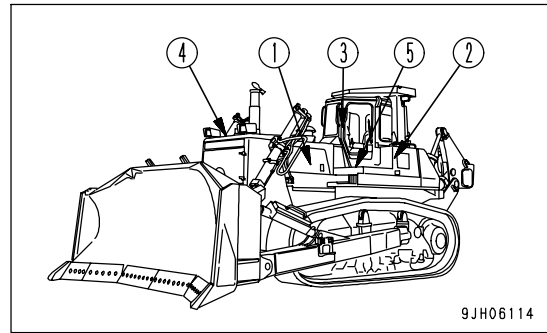


LOCKING

Places that can be locked with the starting switch key.

To prevent vandalism, there are locks in the following places.

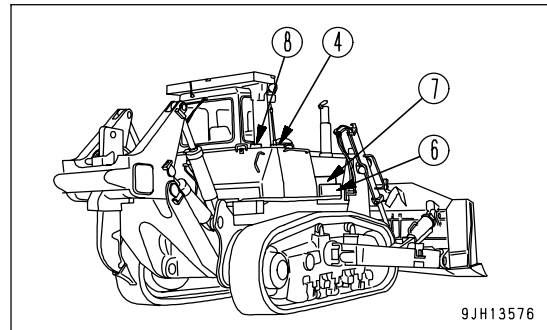
- Left-and-right engine side covers (1)
(left side: 2 places, right side: 2 places)
- Fresh air filter inspection cover (left) (2)
- Cab door opener (3)
- Lock-type caps (4)
 - Radiator cap
 - Hydraulic tank cap
 - Power train oil filler pipe cap
- Battery inspection cover(5), (6)
- Tool box inspection cover (2)



REMARK

It is possible to fit commercially available locks to the following place.

- Power train central pressure inspection, power train oil level inspection cover (7)

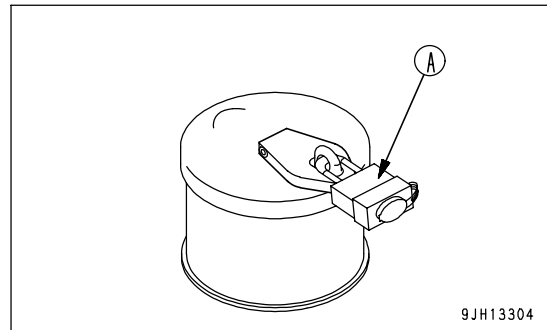


Padlock

- Fuel tank cap (8)

REMARK

If the padlock (A) is to be used, it is recommended to use the type that has the cover to protect the key hole.

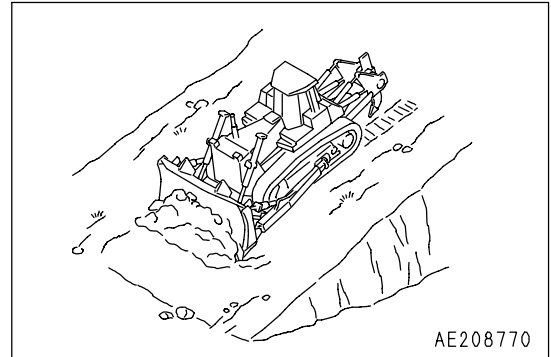


WORK POSSIBLE USING BULLDOZER

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

DOZING

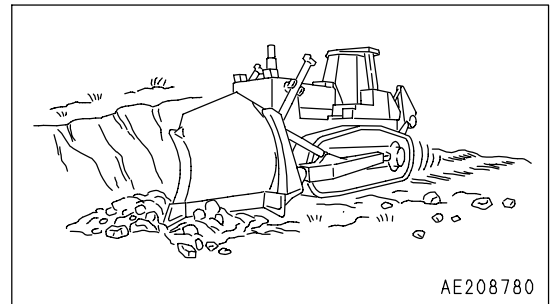
A bulldozer digs and transports dirt in a forward direction. Slope excavation can always be most effectively carried out by proceeding from the top downward.



CUTTING INTO HARD OR FROZEN GROUND OR DITCHING

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

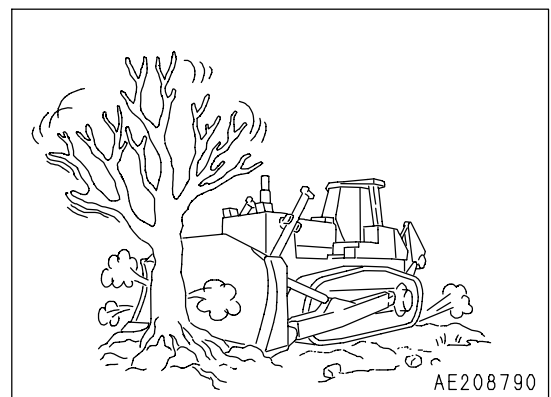
If the ground is harder, use a ripper attachment for better efficiency.



FELLING TREES, REMOVING STUMPS

NOTICE

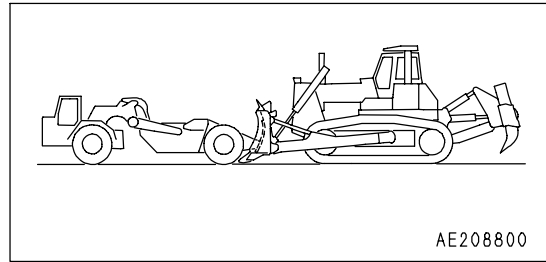
Do not up root trees or stumps or fell trees by angling or tilting the blade.



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

PUSHER OPERATIONS

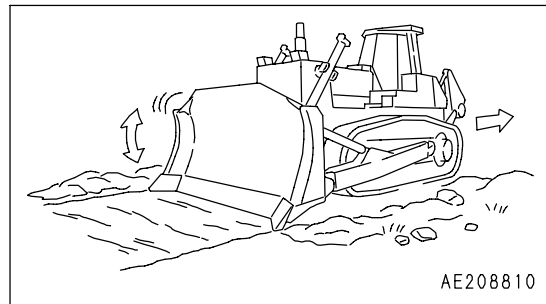
- When carrying out pusher operations, always install a pusher plate.
- When approaching the other machine, depress the decelerator pedal to reduce the engine speed and approach slowly. After coming into contact, raise the travel speed slowly and push with full power.



SMOOTHING

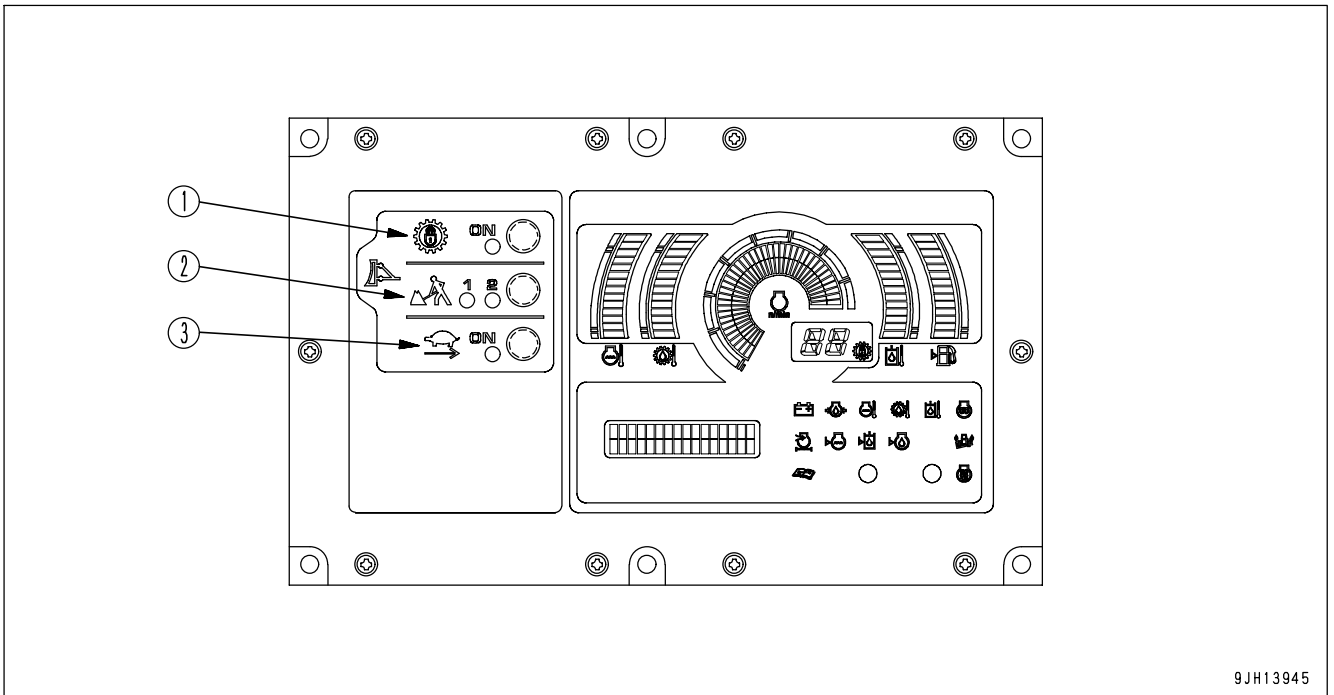
NOTICE

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



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

EFFECTIVE USE OF MODE SELECTION SYSTEM



9JH13945

- (1) Lock up mode switch
- (2) Economy mode selector switch
- (3) Reverse slow mode selector switch

Selecting mode to match the type of work and quality of rock and soil makes to perform operations effectively. For the machine that is solely used for crushed rocks, it can be done that when the ignition switch is turned ON, all mode switches are turned ON. Contact your Komatsu distributor for such modification of the switches.

When all the mode selection switches are off, the selection is suitable for conventional digging and dozing of bedrock.

The condition when all the mode selection switches are off is called the standard mode.

Only the reverse slow mode can be selected in combination with the lock-up mode.

The economy mode, and reverse slow mode can be used independently or in combination.

Dozing		Reverse slow mode
Lock up mode	Economy mode	
○	×	○
×	○	○

○: Possible to use ×: Compound use not possible

SELECTION OF MODE

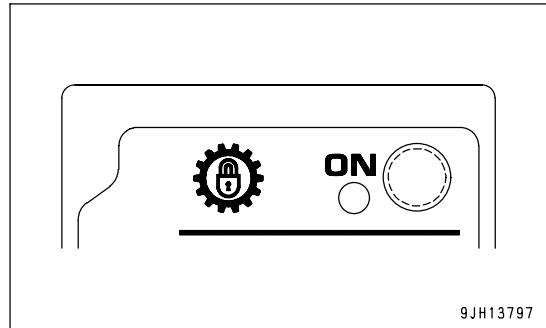
DOZING OPERATIONS

LOCK UP MODE

By using the lock up mode, the travel speed increases, the operating efficiency is improved, and the fuel consumption is also reduced.

- Speed ranges that can be used: All speed ranges
- Applicable operations: Dozing loose material (suitable for long-distance hauling operations)

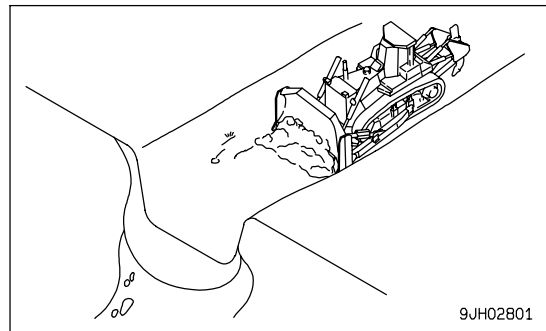
When the lock up mode is turned ON, direct drive or torque converter drive are automatically selected according to the load.



9JH13797

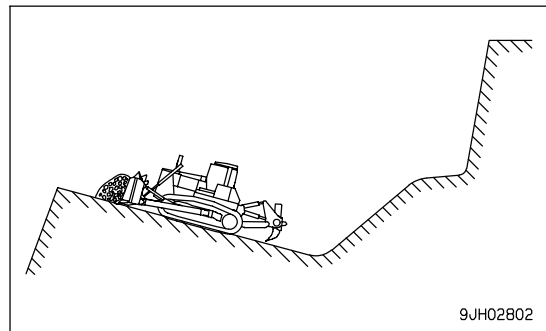
(Example)

- Slot dozing operations



9JH02801

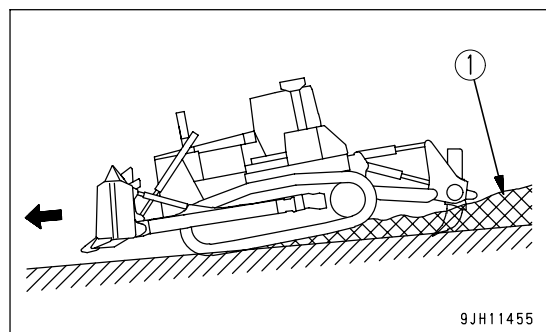
- Hillside dozing operations



9JH02802

REMARK

- If dozing operations are carried out on a slope of more than 15 °, the lock-up tends to be canceled, so operations are easier to carry out in the standard mode.
- For normal ripping operations, if the lock-up mode is used, the lock-up will switch repeatedly between ON and OFF, so use the standard mode or shoe slip control mode.
- Even with ripping operations, if the ground is extremely soft, the lock-up mode can be used.



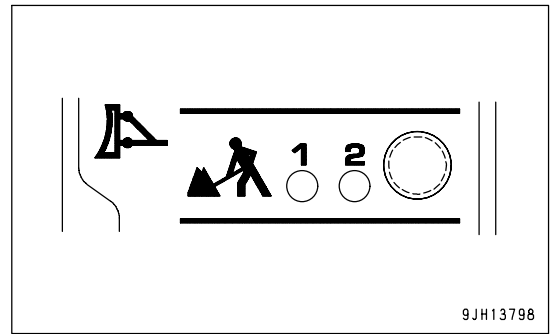
9JH11455

(1)Quality of earth and sand

ECONOMY MODE

Using the economy mode makes it possible to reduce wasteful shoe slippage and to reduce the fuel consumption.

- Speed ranges that can be used: F1
- Applicable operations: Hauling after ripping, dozing blasted rock, smoothing.



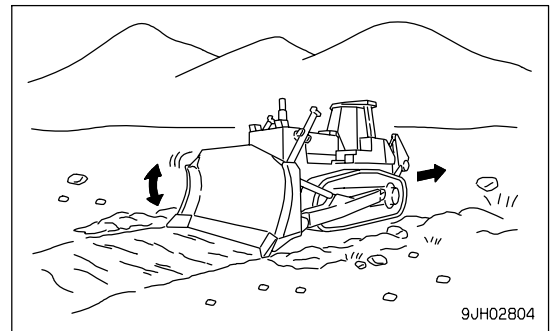
When the economy mode is turned ON, it is automatically set to [1].

Carry out dozing operations in this condition, then set to [2] and carry out operations. From this test, select the matching that gives power and low shoe slip ratio (frequency of deceleration operation).

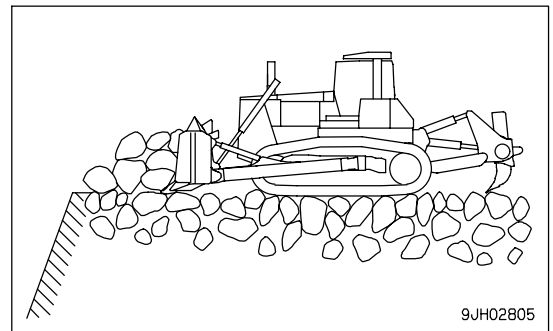
Mode [1] is set to approx. 90% of full power and mode [2] is set to approx 70%.

(Example)

- Fine leveling operations



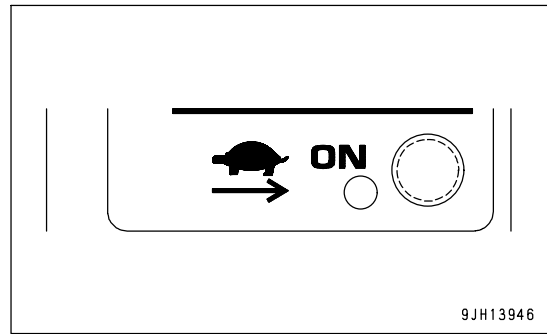
- Ripping and dozing operations



REVERSE SLOW MODE

This reduces the travel speed when traveling in reverse, reduces the frequency of operating the decelerator pedal, and improves the riding comfort for the operator.

- Speed ranges that can be used: R1, 2, 3
- Applicable operations: Travelling on bedrock

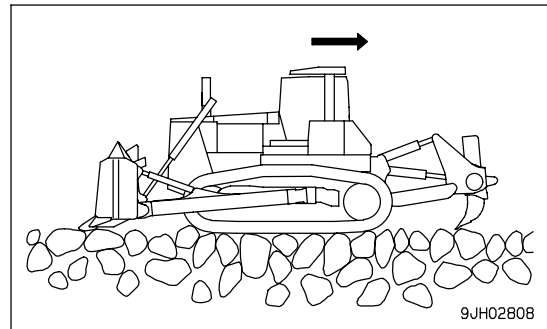


Use this mode to reduce the travel speed when traveling in R1, R2, or R3.

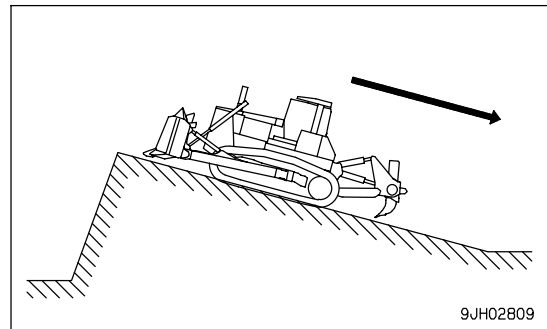
When the reverse slow mode is ON, the travel speed is set to approx. 80% of the full travel speed.

Use this mode to reduce the travel speed when traveling in reverse after ripping and dozing bedrock or when traveling in reverse after dozing on steep slopes. The travel speed differs in each mode according to whether it is used in combination with the economy mode.

When traveling on bedrock, if it is felt that the travel speed when traveling in reverse is too high, turn the reverse slow mode ON. This will reduce the travel speed when traveling in reverse.

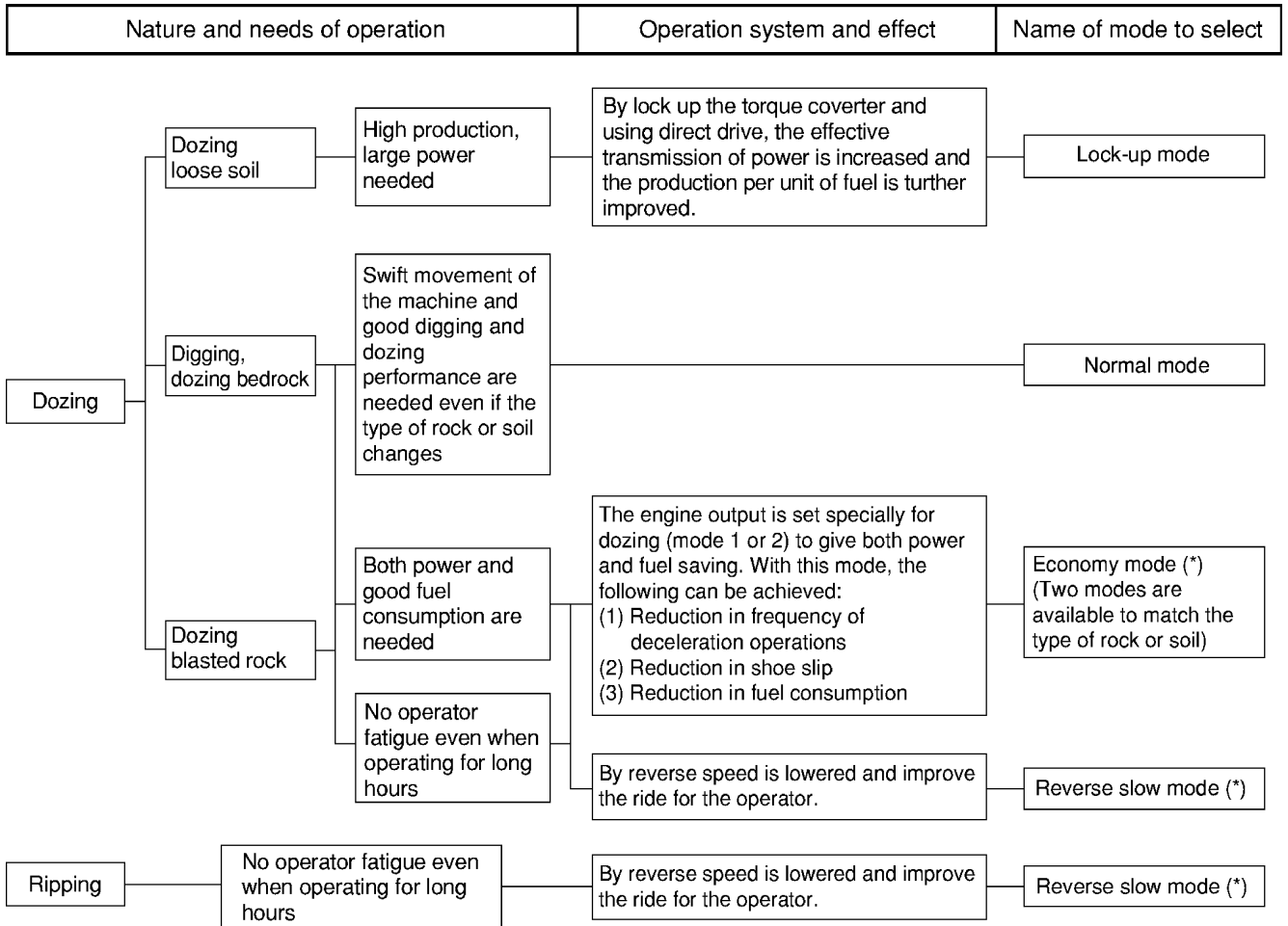


When traveling down slopes, if it is felt that the travel speed when traveling in reverse is too high, turn the reverse slow mode ON. This will reduce the travel speed when traveling in reverse.



PROCEDURE FOR SELECTING MODE ACCORDING TO NATURE OR NEEDS TO WORK

Use the table below to select the mode that matches the nature or needs of the operation.

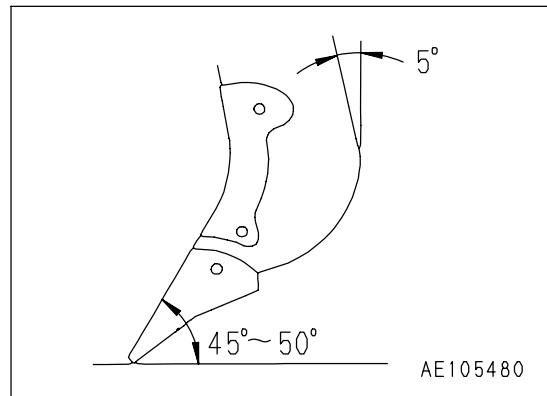


(*): The dozing economy mode and reverse slow mode can all be selected independently or in combination. In addition, it is possible to select and correct as needed, so it is possible to achieve precise matching for various types of operation.

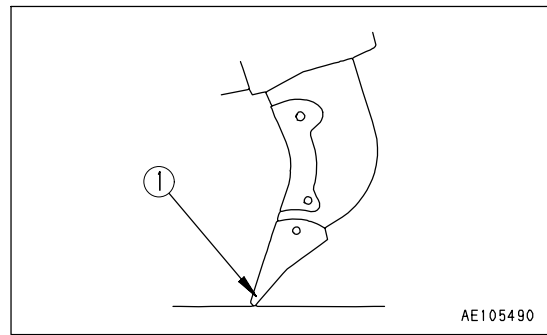
RIPPER OPERATION

EFFECTIVE METHOD OF USE

- The optimum digging angle for the shank is when the shank is perpendicular to the ground (ripping angle: 45° to 50°).
- In comparatively soft rock (seismic velocity: 1500 m/s or below), it is also possible to carry out ripping with the shank tilted to the rear.



- On comparatively hard rock, if ripping is carried out with the shank tilted to the rear, there will be excessive wear of the point of tip (1), and the self-sharpening ability will be lost.
- During ripping operations, if the shoes slip because of boulders or resistance from the bedrock, use the tilt cylinder. When picking up a stone, advance the machine at a fixed gear speed (F1 or F2).

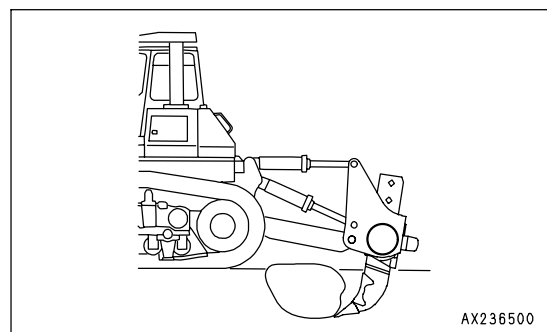


REMARK

- When raising boulders or digging up rockbed, do not put the transmission in neutral. If the transmission is in neutral, the reaction of the tilt cylinder will push the machine back. Always operate the machine with the transmission in FORWARD.
- Choosing a suitable ripper point to match the type of rock is one of the most important elements in using the ripper effectively. Ripper points are available for different types of rock, so select the most suitable ripper point from the list. For details, see "PROCEDURE FOR SELECTING RIPPER POINT (PAGE 6-4)".

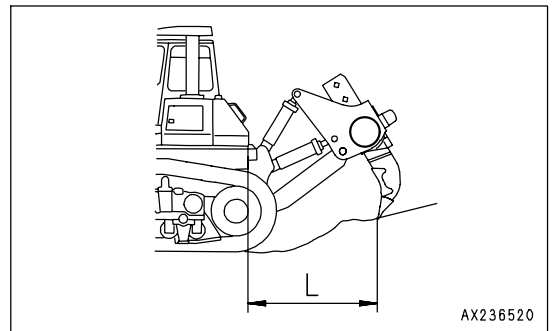
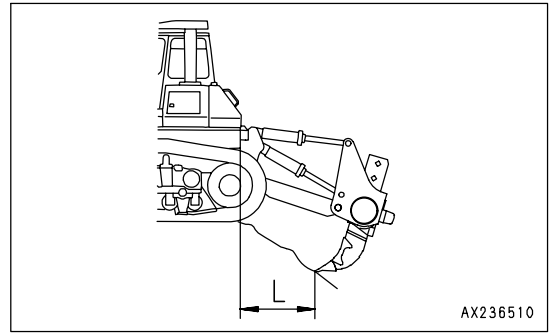
DIGGING UP BOULDERS OR ROCKBED

During ripper operations, if stubborn boulders or rockbed cause the travel speed to become slower, operate the tilt cylinder to dig up the boulder/rockbed.



OPERATING ON SLOPES

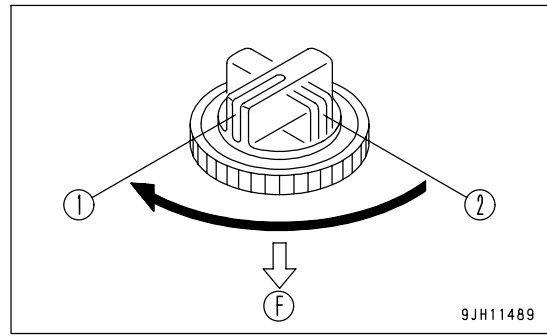
When using the variable ripper, adjust the length of the tilt cylinder to select dimension L.



METHOD OF OPERATING PIN PULLER

(Machines equipped with giant-shank ripper)

1. Stop the machine in a safe place and lower the shank to the ground.
2. Operate the pin puller controller switch to the "PULL OUT" position (1) and remove the mounting pin.

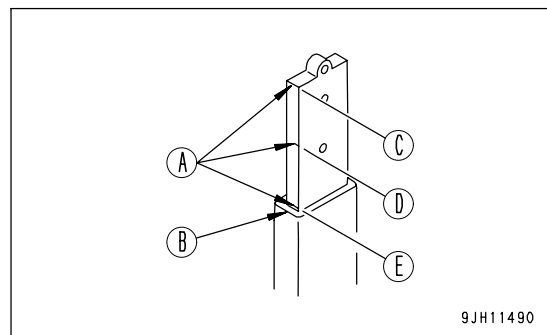


(F)Front of the machine

3. Move the ripper up or down to set to the desired shank position.

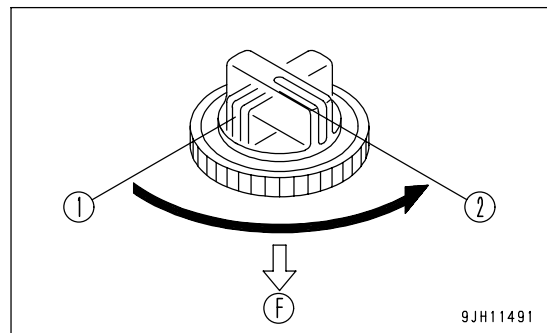
REMARK

Align mark of ripper (A) with top surface of holder (B).



- (C)Depth Max.
- (D)Depth intermediate
- (E)Depth min.

4. Operate the pin puller control switch to insert the mounting pin. If the pin does not match the position of the hole in the shank, set the pin puller control switch to the "PUSH IN" position (2) and slowly move the ripper up or down.



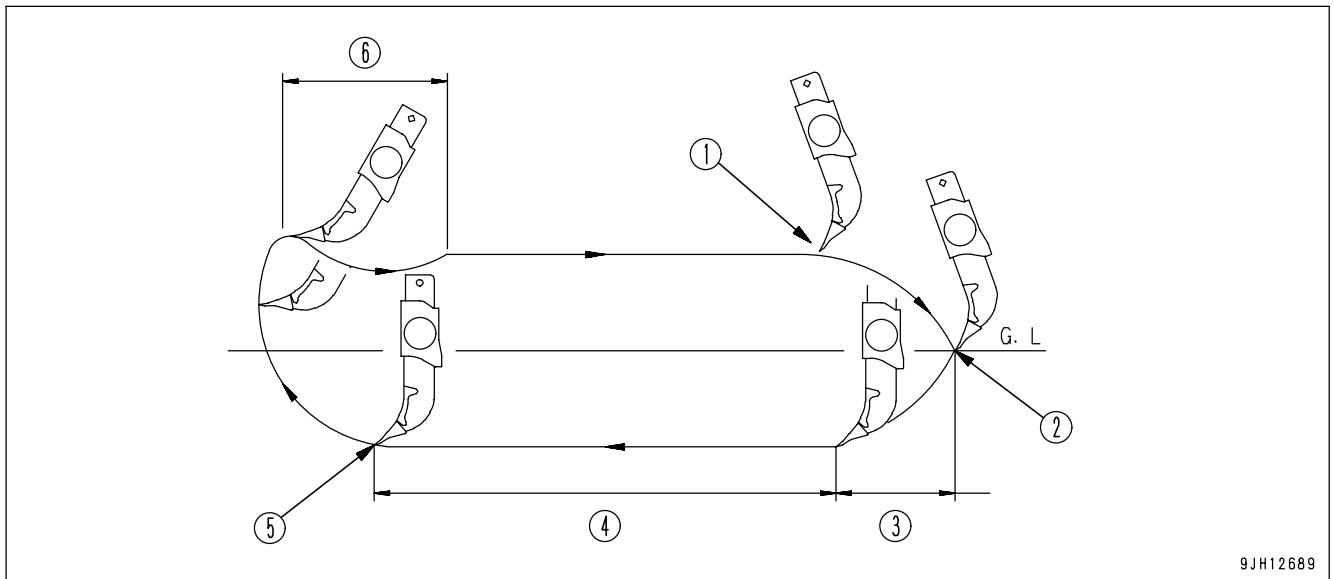
(F)Front of the machine

REMARK

When raising the pin position to increase the digging depth, use a long protector to prevent wear of the shank.

OPERATING METHOD FOR RIPPING OPERATIONS

BASIC OPERATING METHOD



9JH12689

- | | |
|-------------------------------------|--------------------------|
| (1) Start lowering ripper | (4) Ripping |
| (2) Point in contact with ground | (5) Start raising ripper |
| (3) Insert point to specified depth | (6) Shank tilted back |

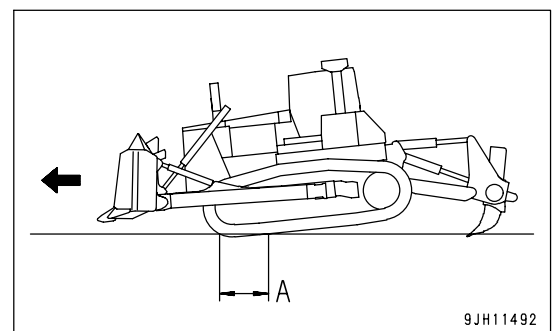
TRACK OF RIPPER SHANK

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

- (1) Tilt the ripper back, lower the ripper point to the ground that the place to begin ripping, and raise the rear of the machine.
- (2) To press the decelerator pedal and lower the engine speed, set the speed range to F1, and tilt the ripper to insert the point to the specified depth.
- (3) When the ripper point reaches the specified depth, raise the engine speed to full speed and travel forward. Tilt the shank and carry out ripping. If the circuit is relieved even when the shank is tilted, change the shank mounting hole to the hole below and reduce the ripping depth.
- (4) After completing the ripping, travel forward, raise the shank from the bed rock, then travel in reverse.
- (5) While traveling in reverse, tilt the ripper back, and when the starting point for the ripping is reached, lower the ripper.

REMARK

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

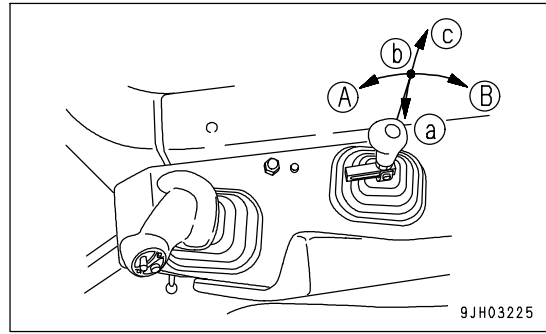


9JH11492

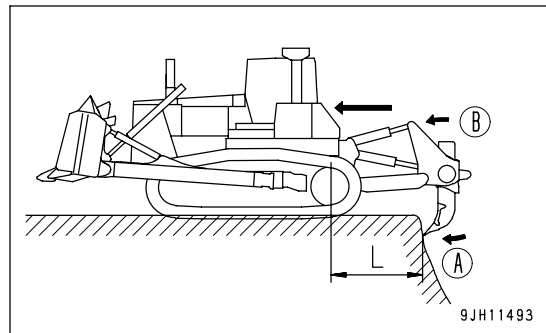
(A) Length of track on ground

RIPPING BY CLIFFS

- When carrying out ripping at the edge of a cliff, tilt the ripper back (B) to make depth (L) longer.



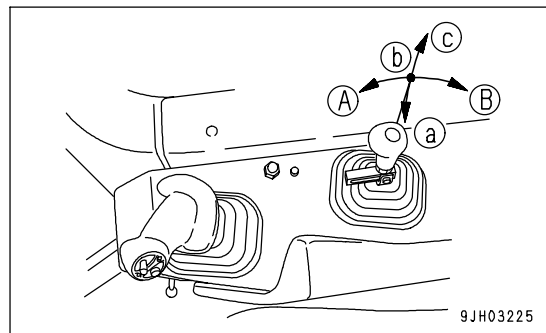
- Depress the decelerator pedal, drive slowly forward, and when the ripper point contacts the cliff, tilt the ripper in (A).



RIPPING BY SLOPE FACES

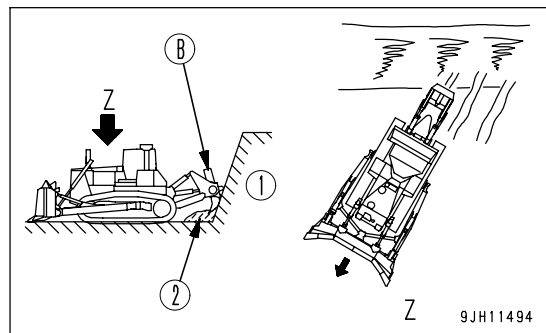
(Giant ripper)

- When carrying out ripping work at the edge of slope faces, make the ripper tilt back (B) angle small, and if there is an area where the slope face (1) has not been ripped, apply the ripper diagonally.



REMARK

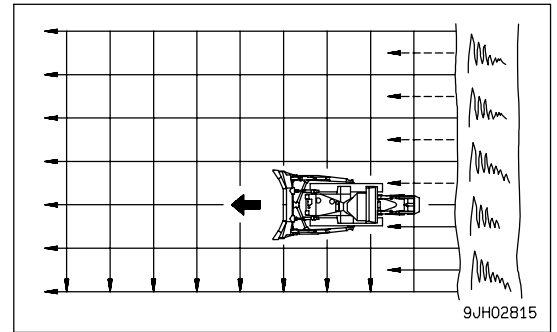
In the case of the multi-shank ripper, carry out ripping at right angles to the slope face.



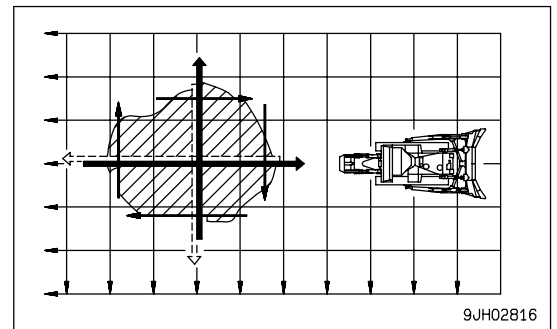
- (B) Tilt back (MAX)
- (1) Slope face
- (2) Ripping base

Cross ripping

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



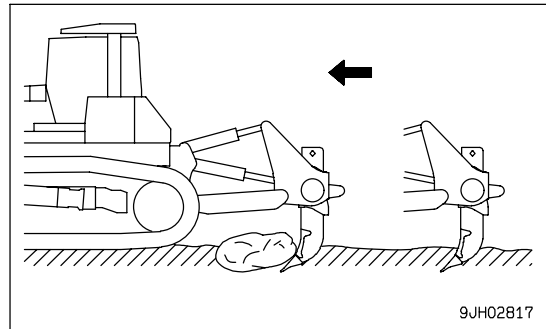
- During the ripping operation, if there is any hard bedrock, carry out ripping in the opposite direction to the direction where the ripper was applied. If it is still impossible to break up the rock, break up the area around the bedrock a little at the time.
- When carrying out concentrated ripping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



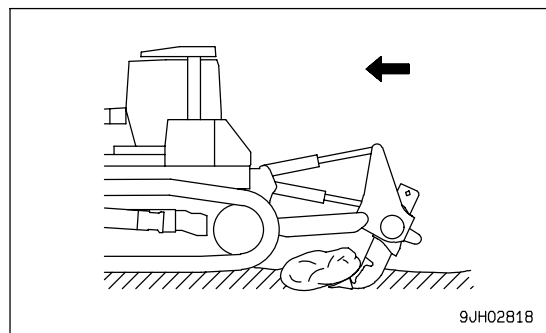
DIGGING UP BOULDERS

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

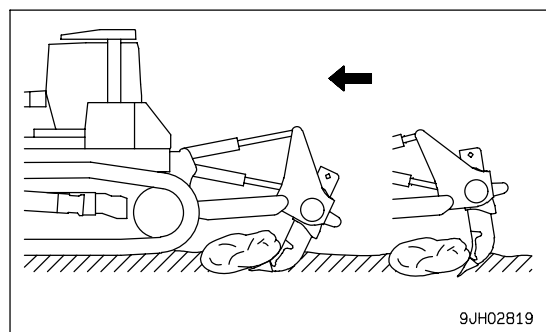
1. Depress the decelerator pedal and lower the engine speed to a point where there is no shoe slippage.



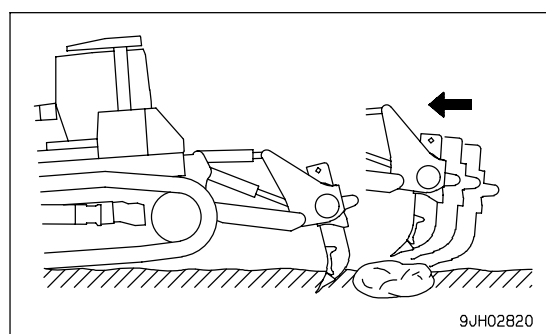
2. Operate the ripper lever to the TILT position and carry out ripping and digging.



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

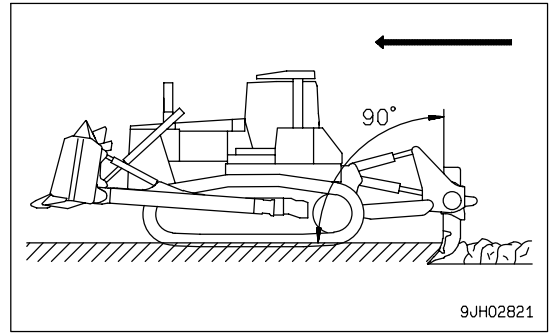


4. Even when the operation in Step 3 is repeated, if it is impossible to break or dig up the boulder, drive back about 10 cm, raise the shank, avoid the rock or boulder that cannot be ripped, then drive forward and start ripping again.

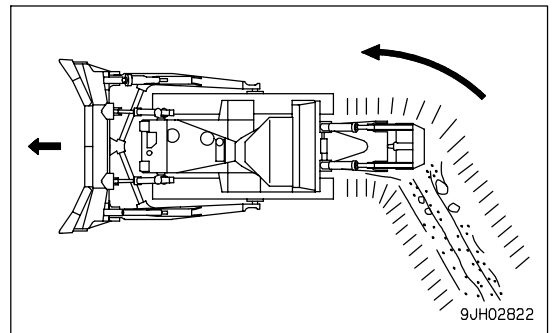


PRECAUTIONS WHEN RIPPING

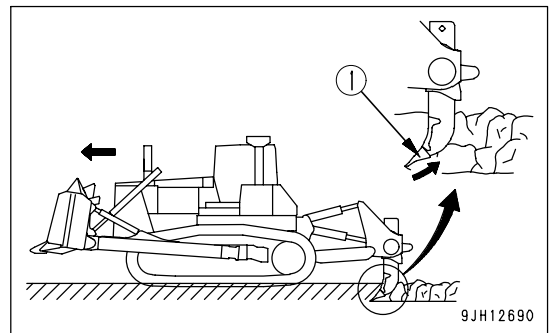
- For the digging angle when ripping, set so that the top of the shank is perpendicular, then lower the ripper.
- Do not carry out ripping for long periods with the shank tilted back. The tip of the point will wear to a round shape.



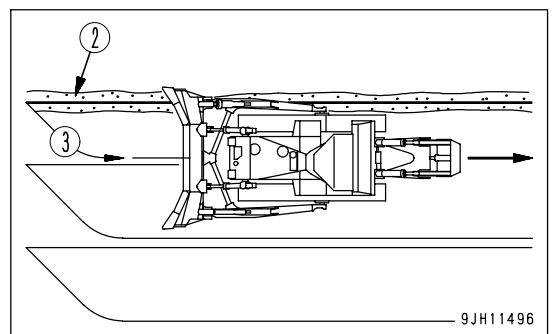
- Do not change the direction of travel during the ripping operation. This will cause breakage of the shank. When changing the direction of travel, remove the shanks from the ground before turning.



- Never drive in reverse when the ripper point is inserted in the bedrock. The pin installing the point will break and the point will fall off.
Move the machine forward, and raise ripper slowly.



- After ripping, if the broken rock is comparatively large, avoid traveling over the ripping path (2) when traveling in reverse. When traveling in reverse (3), check the rear carefully to avoid hitting any large rocks. As far as possible, choose level ground to travel over.



ADJUSTING POSTURE OF WORK EQUIPMENT



WARNING

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

BLADE ADJUSTMENT

TILTING THE TILTDOZER

NOTICE

The maximum amount of tilt is 900 mm (2.9 ft).

(When the semi-U blade is used.)

Be sure not to exceed 900 mm (2.9 ft) for the tilt.

Tilt exceeding the maximum limit imposes unnecessary forces onto sections. This may cause damage to the machine.

The following tilt amount can be obtained by operating the blade control lever.

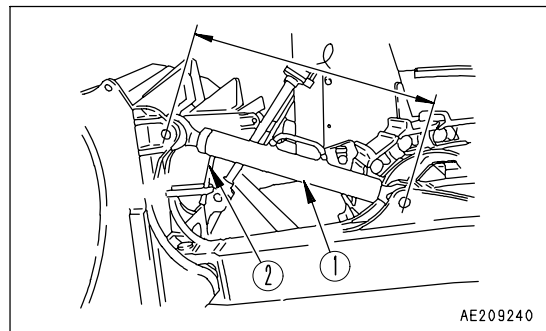
Right side: 600 mm (23.6 in) or more

Left side: 600 mm (23.6 in) or more

If an even greater tilt is necessary, do as follows.

Use rod (2) installed to the left brace to turn brace (1) and change the length (ℓ) of the brace. This makes it possible to obtain a maximum tilt of 900 mm (2.9 ft).

- Standard distance (ℓ) between joints is 1845 mm (6.0 ft).



AE209240

ADJUSTING BRACE



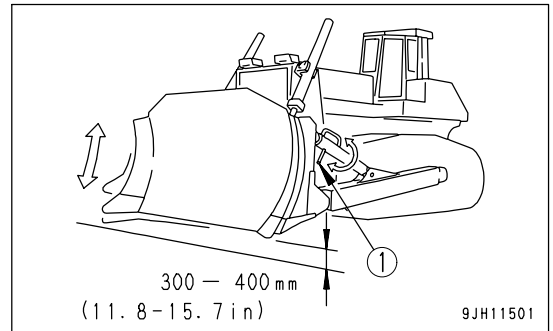
WARNING

If maintenance is carried out with the engine running, always have one worker sitting in the operator's seat while another worker carries out the maintenance. Both workers must mutually confirm the safety during the operation.

Adjustment can be carried out more easily if the engine is started, the inching operation used to carry out tilting to the left and right, and the blade shaken up and down while turning the brace handle (1).

- When extending the brace

It is easy to carry out the adjustment if the blade is set on top of a block and the brace handle is turned.

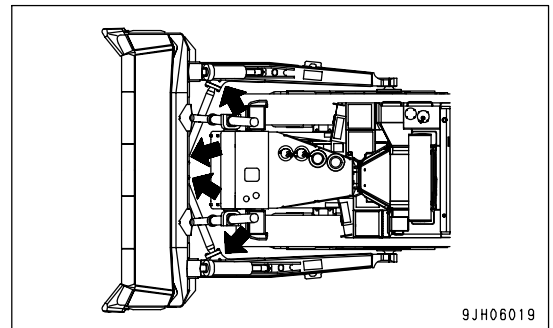


REMARK

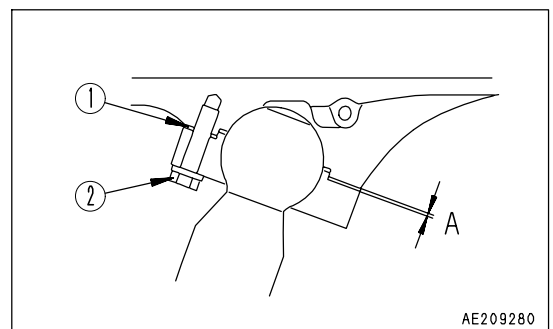
When operated in this way, the blade is tilted, so the handle gradually becomes heavier. When this happens, return the blade from the tilt position to the horizontal position and turn the handle again according to the procedure given above.

SHIM ADJUSTMENT

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



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



ADJUSTING RIPPER

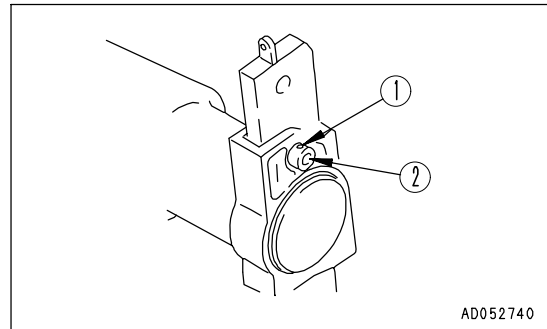
ADJUSTING DIGGING DEPTH

Mounting pin holes are provided in the shank and these are used according to the desired digging depth. For normal use, use the bottom hole, and when particularly deep digging is needed, use the top hole.

To change the digging depth, do as follows.

(Machines equipped with multi-shank ripper)

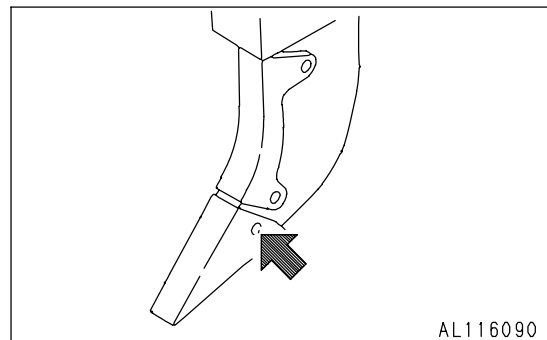
1. Place a pointed object on the tip of pin (1), then hit with a hammer to remove from the opposite side.
2. Remove pin (2) and change the position of the shank hole.
3. Insert pin (1) partially by hand then knock it in with a hammer.
 - The pin is made of one piece, so insert it partially by hand then knock it in with a hammer.
 - When a giant ripper is installed, use the pin puller.
 For details, see "METHOD OF OPERATING PIN PULLER (PAGE 3-150)".



REPLACING POINT AND PROTECTOR

To protect the shank, if the protector and point installed to the tip are worn, replace them.

Place a pin remover on the pin marked by the arrow, then hit with a hammer to remove from the opposite side.



REMARK

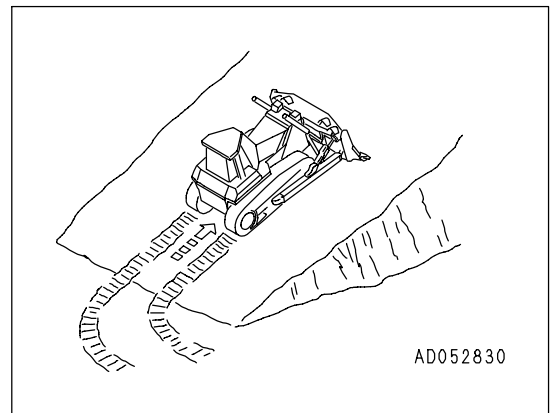
The pin is a unitized type, so insert the pin partially by hand, then knock it in fully with a hammer.

TIPS FOR LONGER UNDERCARRIAGE LIFE

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

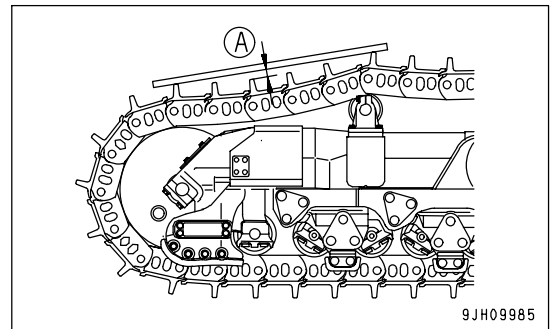
OPERATION METHOD

- Select the track shoe that best suits the type of soil to be encountered in service.
Consult your Komatsu distributor when selecting track shoes.
- Do not allow shoe slippage to occur during operation. If slippage occurs, reduce load to the blade until slipping stops.
- Avoid sudden starts, acceleration or stops, unnecessary high speeds and sharp turns.
- Always operate machine in a straight line whenever possible. When making turns, be careful not to allow the machine to stay to one side, so operation in both turning directions can be done properly. Make turns with the largest possible radius.
- Prior to operation, clear boulders and obstacles to prevent machine from riding over them while operating.
- On a slope, operate the machine parallel to the inclination of the slope. Do not operate across the slope. Also when stopping the machine on a slope, the machine should face the top of the slope.
- When ground inclines to the left or right during digging operations, do not continue to dig with the incline. Move the machine back to level ground and start to dig again.
- Do not force the machine to carry out work that exceeds its working capability. Such work includes cases where the idler or sprocket come off the ground when the machine meets obstacles that resist the power of the machine during dozing or ripping operations.



INSPECTION AND ADJUSTING

- Properly adjust track tension.
Tension should be measured at clearance (A) shown in the diagram - usually 20 to 30 mm (0.8 to 1.2 in) at this point. For rocky terrain, tighten tracks slightly. In clay or sandy areas, slightly loosen them. (For inspection and adjustment procedures, refer to "CHECK AND ADJUST TRACK TENSION (PAGE 4-30)").
- Check idler rollers for oil leakage as well as for loose bolts and nuts. If any trouble is detected, repair immediately.



INSPECTION AND REPAIR

Frequent inspection and prompt repair will reduce repair costs.

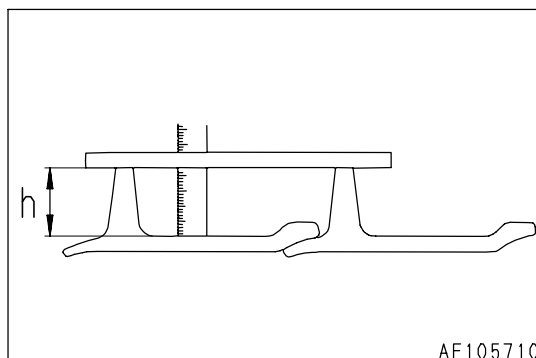
The following items for inspection will serve as a guide to maintenance service of each undercarriage part. Perform periodical inspection and contact the Komatsu distributor in your area when machine has approached repairable limits and reversing limits.

MEASURING HEIGHT OF GROUSER

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

Standard height (h): 105 mm (4.1 in)

Repair limit (h): 35 mm (1.4 in)



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MEASURING OUTSIDE DIAMETER OF TRACK ROLLER

1. Measure the outside diameter of the tread (dimension A).

(1) Double flange roller

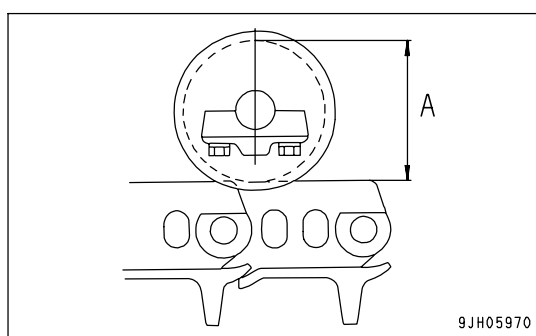
Standard dimension (A): 300 mm (11.8 in)

Repair limit (A): 246 mm (9.7 in)

(2) Single flange roller

Standard dimension (A): 300 mm (11.8 in)

Repair limit (A): 230 mm (9.1 in)



9JH05970

TRANSPORTATION

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

TRANSPORTATION PROCEDURE

When transporting the machine, choose the optimum transportation method in reference to the weight and dimensions shown in "SPECIFICATIONS (PAGE 5-2)". Note that machine specifications (weight and dimensions) vary depending on the kind of track shoes and work equipment.

LOADING, UNLOADING WORK



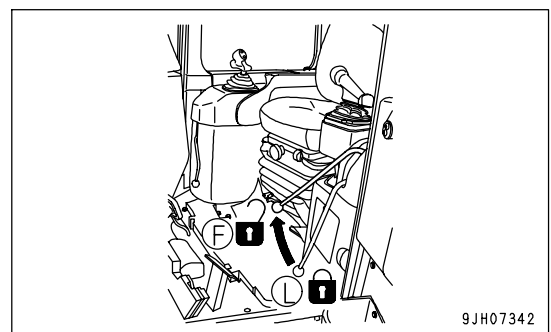
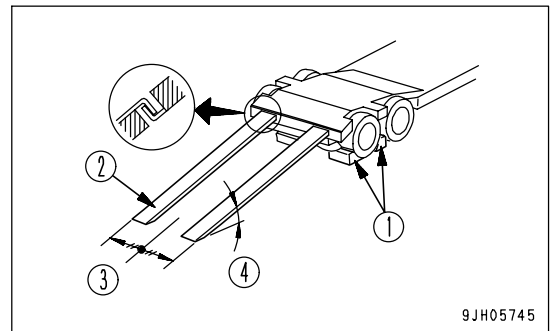
WARNING

- Make sure the ramp has sufficient width, length and thickness to enable the machine to be safely loaded and unloaded. If the ramp sags appreciably, reinforce it with blocks, etc.
- When loading and unloading the machine, park the trailer on a flat firm roadbed. Keep a fairly long distance between the road shoulder and the machine.
- Remove the mud from the undercarriage to prevent the machine from slipping to the side on slopes. Be sure the ramp surface is clean and free of grease, oil, ice and loose materials.
- Never change the direction of travel when on the ramps. If it is necessary to change direction, drive off the ramps and correct the direction, then drive on to the ramps again.

When loading or unloading, always use ramps or a platform. Proceed as follows.

LOADING

1. Load and unload on firm level ground only.
Maintain a safe distance from the edge of a road.
2. Apply the trailer brakes securely, then put blocks (1) under the tires to prevent the trailer from moving.
 - Set left and right ramps (2) parallel to each other and equally spaced to the left and right of center (3) of the trailer. Make angle of installation (4) a maximum of 15°. If the ramps bend a large amount under the weight of the machine, put blocks under the ramps to prevent them from bending.
3. Start the engine.
Warm the engine up fully.
4. Set parking brake lever to the FREE position (F).
5. Set the transmission in the 1st gear and run the engine at low idle.



6. Set the travel direction toward the ramps and drive slowly.
7. The center of gravity of the machine shifts suddenly at the border between the ramps and trailer, and the machine is unbalanced and becomes dangerous. Accordingly, pass the border slowly.
8. Stop the machine at the specified position on the trailer.

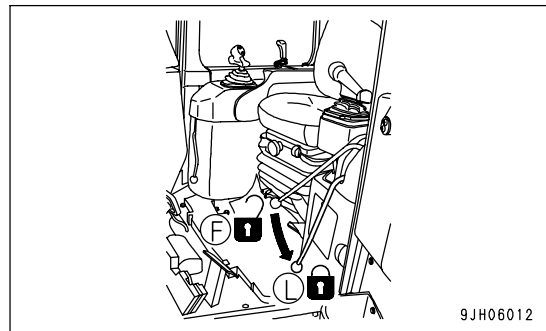
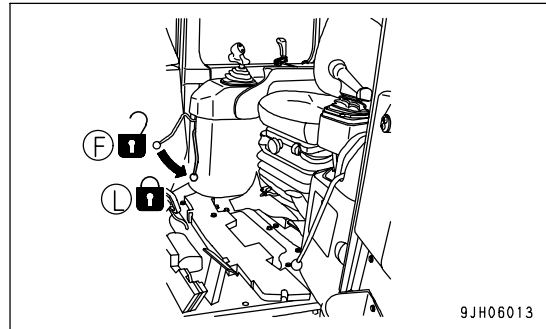
SECURING MACHINE

NOTICE

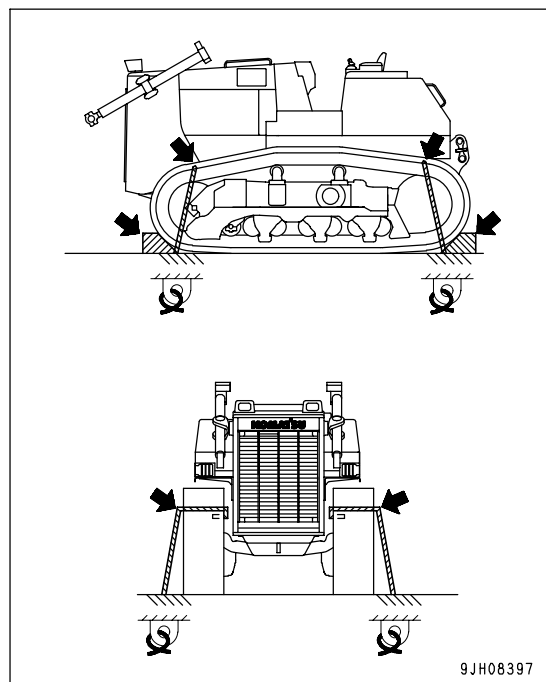
Stow the antenna away.

Load the machine onto a trailer as follows:

1. Lower the work equipment slowly.
(When transporting with work equipment installed)
2. Set the work equipment lock lever to the LOCK position (L) securely.
(When transporting with work equipment installed)
3. Set the parking brake lever to the LOCK position (L) securely.
4. Stop the engine, then remove the key from the starting switch.



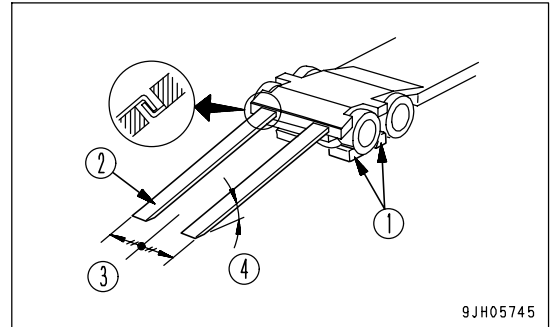
5. Place blocks under both ends of the tracks to prevent the machine from moving during transportation, and secure the machine with chains or wire rope of suitable strength.
Be particularly careful to secure the machine in position so it does not slip to the side.



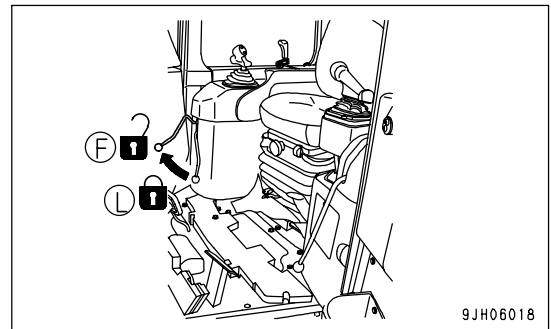
UNLOADING

1. Load and unload on firm level ground only. Maintain a safe distance from the edge of a road.
2. Apply the trailer brakes securely, then put blocks (1) under the tires to prevent the trailer from moving.

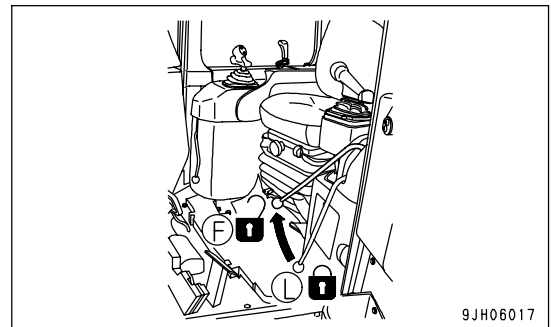
- Set left and right ramps (2) parallel to each other and equally spaced to the left and right of center (3) of the trailer. Make angle of installation (4) a maximum of 15°. If the ramps bend a large amount under the weight of the machine, put blocks under the ramps to prevent them from bending.



3. Remove the chains and wire ropes fastening the machine.
4. Start the engine.
Warm the engine up fully.
5. Set main work equipment lock lever to FREE position (F), and raise the work equipment.
(When transporting with work equipment installed)



6. Set parking brake lever to the FREE position (F).
7. Set the transmission in the 1st gear and run the engine at low idle.
8. Set the travel direction toward the ramps and drive slowly.



9. The center of gravity of the machine shifts suddenly at the border between the ramps and trailer, and the machine is unbalanced and becomes dangerous. Accordingly, pass the border slowly.
10. Drive down the ramps slowly and carefully until the machine leaves the ramps perfectly.

METHOD OF LIFTING MACHINE



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 carrying out lifting operations, set the work equipment lock lever and parking brake lever to the LOCK position to prevent the machine from moving unexpectedly.
- Never enter the area under or around a raised machine.

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

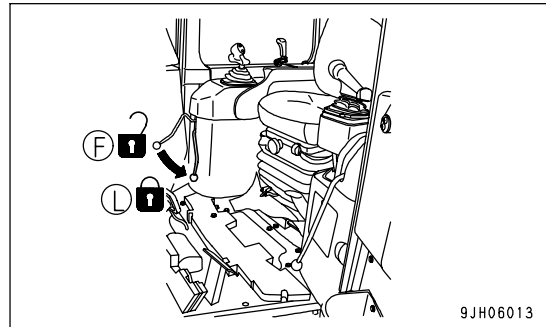
This method of lifting applies to the standard specification machine.

The method of lifting differs according to the attachments and options installed.

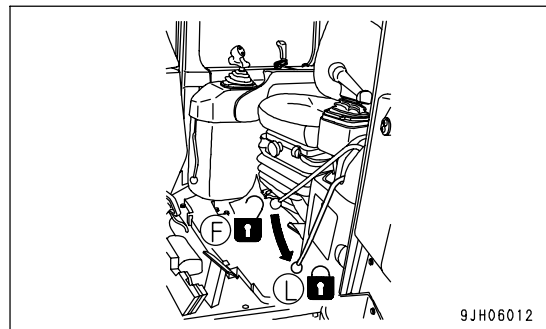
For details of the procedure for machines that are not the standard specification, please consult your Komatsu distributor.

When lifting the machine, stop it on a level place, then observe the following procedure.

1. Set the work equipment lock lever to the LOCK position (L) securely.



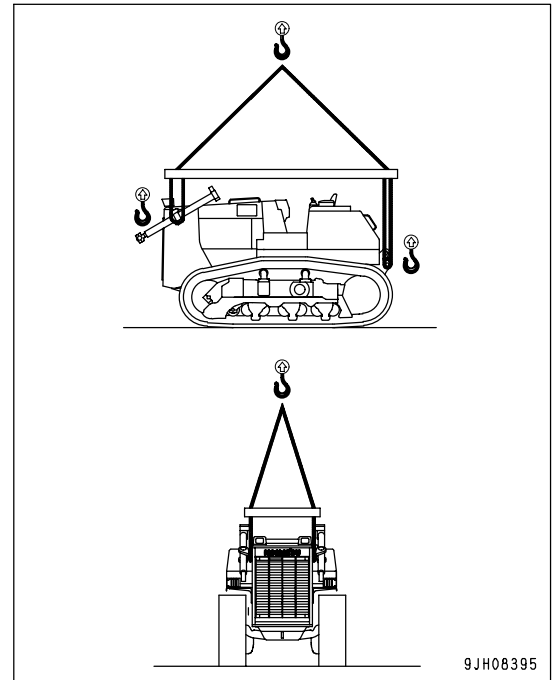
2. Set the parking brake lever to the LOCK position (L) securely.



3. Stop the engine.

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.



4. Install wire ropes, slings, etc. matched to the weight of the machine to the lifting points as shown in the diagram on the right.
5. After setting the wire ropes, lift up the machine and stop at 100 to 200 mm (3.9 to 7.9 in) above the ground, and check that the wire ropes are not slack and the machine is level, then lift up slowly.

TRAVELING ON ROADS

- When traveling on paved roads, use flat shoes to protect their surface.
Even when travelling a short distance, always place boards to protect the road surface.

REMARK

Note that the asphalt road becomes soft in summer.

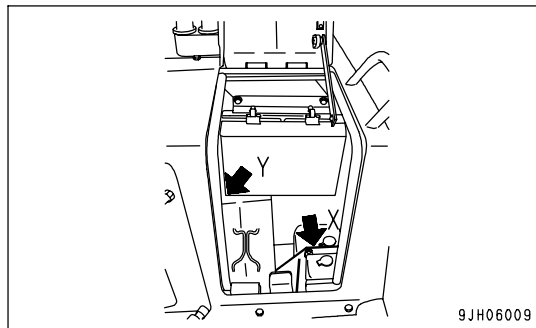
REMOVAL OF CAB

(Machine equipped with cab)

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

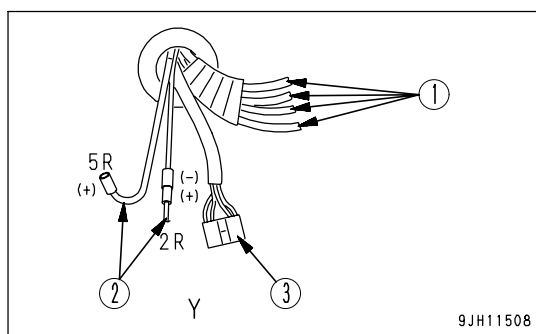
1. Remove the cab wiring harness connector and washer hose.

- 1) Pull the grommet portion in towards the cab from the hole in the machine cover, then remove.
- 2) Disconnect 4 washer hoses and the wiring (single wires x 2, 4-pin plug x 1) from the socket.



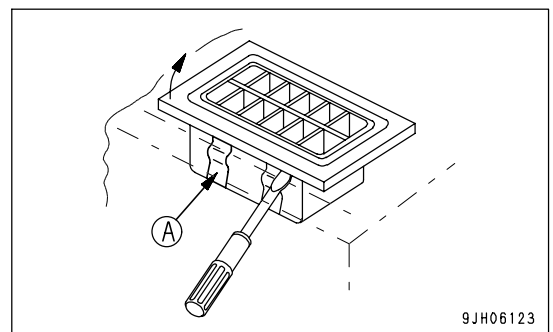
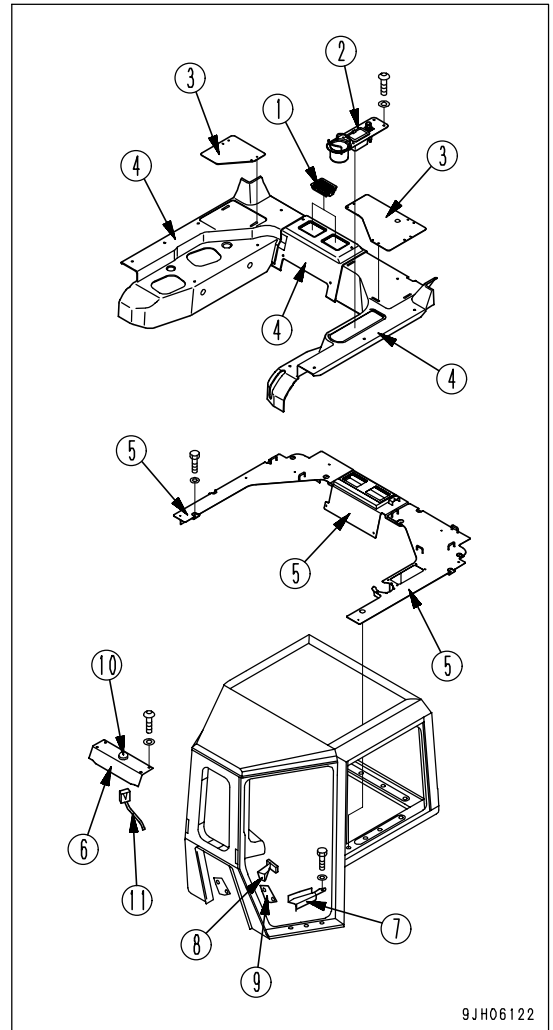
- After removing, cover the washer hoses with a vinyl bag to prevent any dirt or dust from entering.
- Before removing the cab, measure the clearance between the cab and each lever (joystick and blade control lever, etc.). Note the measurements to use as a standard when installing the cab again.

(1)	Washer tube	Red-Right door Blue-Left door Black-Rear window Colorless-Front window
(2)	Power source of cab	5R-ACC power source of cab 2R-Back up power source
(3)	4-pin socket	For washer motor

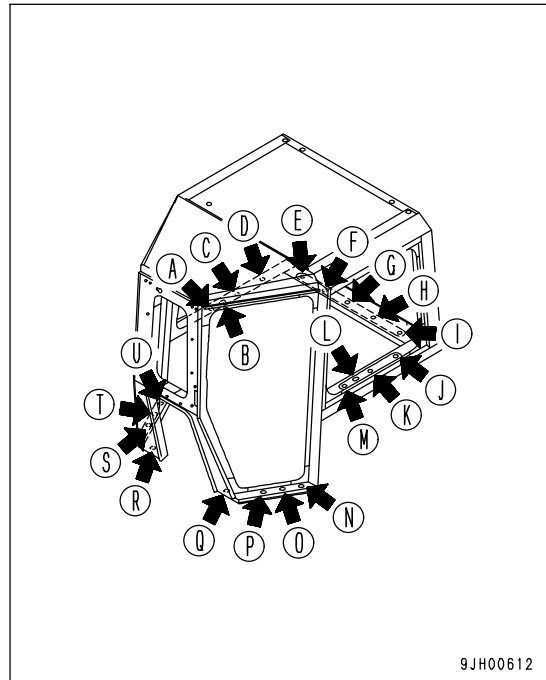


2. Removing covers inside cab

- 1) Use a screwdriver to push tab (A) in from the side and remove louver (1).
- 2) Remove ashtray assembly (2).
Remove the connector for the cigarette lighter power supply.
- 3) Remove rubber sheet (3), and pull it out as it is.
- 4) Remove the clip, then remove decoration (4).
- 5) Remove decoration lower plate (5).
- 6) Remove front cover (6).
Remove connector (11) of sunlight sensor (10) also.
- 7) Remove entrance cover (7).
- 8) Remove high mount foot rest (8).
- 9) Remove cover (9).

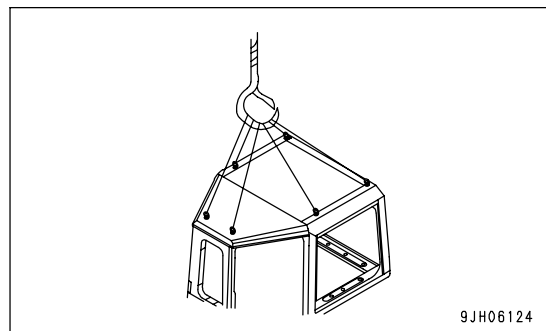


3. Remove the cab mount bolts.
Remove the bolts marked (A) - (U) shown on the right.



4. Raise the cab and lower it.
After inserting eyebolts into the roof, fit to the lifting hook, then lift up and lower.

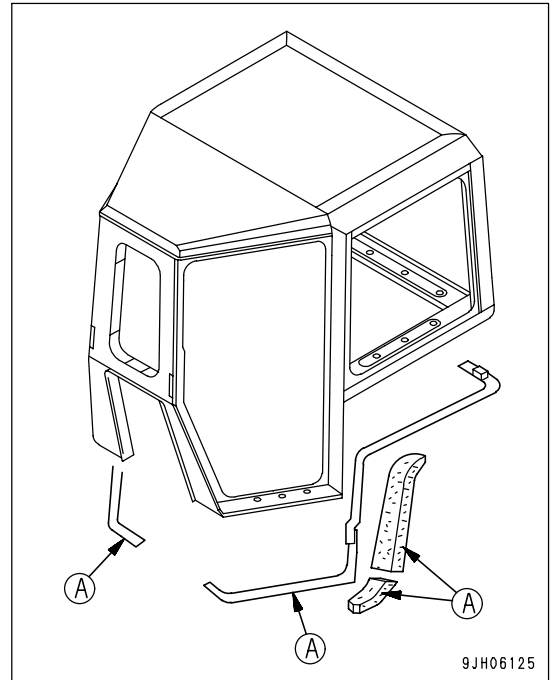
Weight of cab: Approx. 470 kg (1,036 lb)
(MSHA glass specification machine: Approx. 530 kg (1,169 lb))



INSTALLATION OF CAB

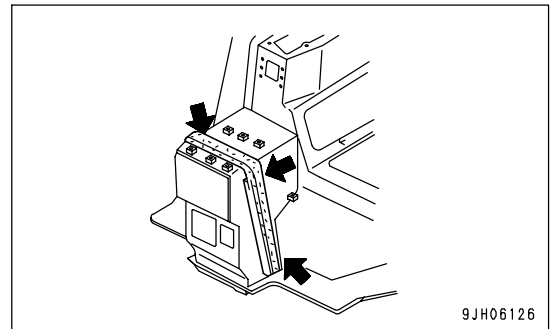
1. Replacing cab seals

- 1) Raise the cab to replace the seal at the mating surface of the operator's cab assembly.
 - Weight of cab: Approx. 470 kg (1,036 lb)
(MSHA glass specification machine: Approx. 530 kg (1,169 lb))
- 2) Remove all the old seal with a scraper.
- 3) Remove any dirt or oil from the mounting surface of seal (A).
- 4) Remove the paper backing from the new seal, then stick it in the same position as the old seal.
The new seal is longer the necessary, so cut off the excess portion.



2. Replacing dashboard seal

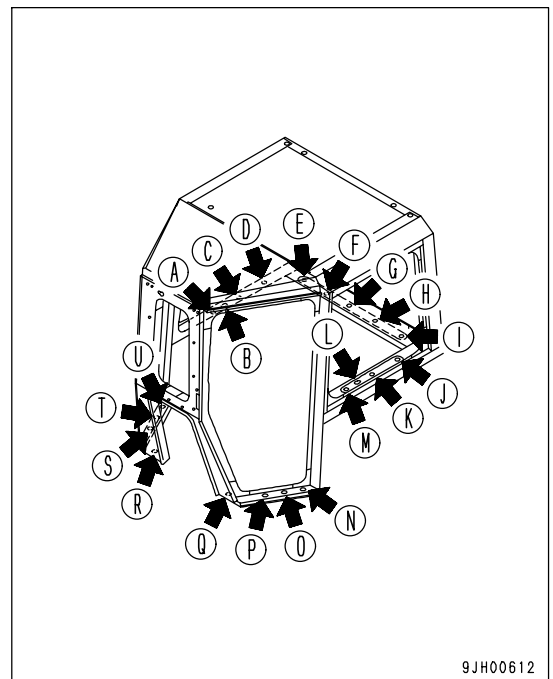
- 1) Remove the old seal and replace it with a new seal.
- 2) Coat the outside of the seal with grease (G2-Li).
(This is to make sliding easier and prevent deformation of the seal when the cab is installed.)



3. Reinstalling cab

Install the cab parts in the opposite order to removal.
Connect all parts that were disconnected.

- 1) Lower the cab slowly on top of the floor frame.
- 2) Align the cab with the floor frame, then install bolts and washers in holes (A) - (U).
Do not completely tighten the bolts. Screw them in 3 or 4 turns.
- 3) Tighten the bolts in holes (N) - (U) fully.
Tighten in the order (N), (U), (Q), (R), (O), (T), (P), (S).
- 4) Tighten bolts (A) to (M) completely.
- 5) connect the cab wiring harness connector and washer hoses in reverse order of removal.
- 6) Install covers inside the cab in reverse order of removal.



INSTALLATION OF ROPS

Tighten the bolts securely to the following torque.

- All 16 bolts: 1960 to 2450 Nm (200 to 250 kgm, 1447 to 1808 lbft)

COLD WEATHER OPERATION

PRECAUTIONS FOR LOW TEMPERATURE

If the temperature becomes low, it becomes difficult to start the engine, and the coolant may freeze, so do as follows.

FUEL AND LUBRICANTS

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

COOLANT



WARNING

- Antifreeze is toxic. Be careful not to get it into your eyes or on your skin. If it should get into your eyes or on your skin, wash it off with large amounts of fresh water and see a doctor at once.
- When changing the coolant or when handling coolant containing antifreeze that has been drained when repairing the radiator, please contact your Komatsu distributor or request a specialist company to carry out the operation. Antifreeze is toxic. Do not let it flow into drainage ditches or spray it onto the ground surface.

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.

The Supercoolant is already diluted with distilled water, so it is not flammable.

For details of the density of the Supercoolant and the interval for changing the coolant, see "CLEAN INSIDE OF COOLING SYSTEM (PAGE 4-22)".

BATTERY

 **WARNING**

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

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

REMARK

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

Charging Rate (%)	Electrolyte Temperature	20°C (68°F)	0°C (32°F)	-10°C (14°F)	-20°C (-4°F)
	100		1.28	1.29	1.30
90		1.26	1.27	1.28	1.29
80		1.24	1.25	1.26	1.27
75		1.23	1.24	1.25	1.26

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

AFTER COMPLETION OF WORK



WARNING

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

To prevent mud, water, or the undercarriage from freezing and making it impossible for the machine to move on the following morning, 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 operation in water or mud, remove water from undercarriage as described below to extend undercarriage service life.

AFTER COLD WEATHER

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

- Replace the fuel and oil for all parts with oil of the viscosity specified.

For details, see "RECOMMENDED FUEL, COOLANT, AND LUBRICANT (PAGE 4-12)".

LONG-TERM STORAGE

BEFORE STORAGE

When putting the machine in storage for a long time (more than one month), do as follows.

- Clean and wash all parts, then store the machine indoors. If the machine has to be stored outdoors, select level ground and cover the machine with canvas.
- 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.
- Place all control levers at the neutral position, set the work equipment lock lever and parking brake lever to the lock position, and set the fuel control dial to the low idling position.
- To prevent rust, fill with Komatsu genuine super coolant to give a density of at least 30% for the engine coolant.

DURING STORAGE



WARNING

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

- During storage, operate and move the machine for a short distance once a month so that a new film of oil will coat moving parts. At the same time, also charge the battery.
- When operating the work equipment, wipe off all the grease from the hydraulic cylinder rods.
- If the machine is equipped with an air conditioner, operate the air conditioner for 3 to 5 minutes once a month to lubricate all parts of the air conditioner compressor. Always run the engine at low idle when doing this. In addition, check the refrigerant level twice 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.

STARTING MACHINE AFTER LONG-TERM STORAGE

When starting the engine after the machine has been in storage for a long period, carry out the warming-up operation thoroughly. For details, see the procedure in "WARMING UP OPERATIONS (PAGE 3-119)".

TROUBLESHOOTING

AFTER RUNNING OUT OF FUEL

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

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

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

- For details of the method of bleeding the air, see "BLEED AIR FROM FUEL CIRCUIT (PAGE 4-49)".

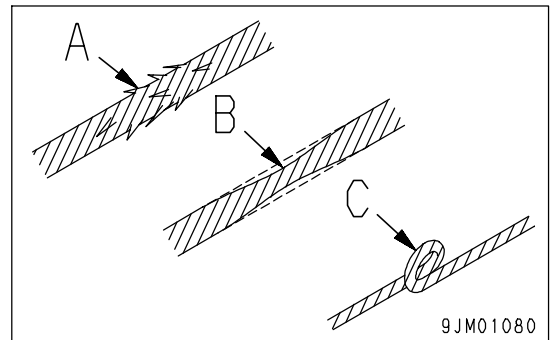
METHOD OF TOWING MACHINE



WARNING

Serious injury or death could result if a disabled machine is towed incorrectly or if there is a mistake in the selection or inspection of the wire rope.

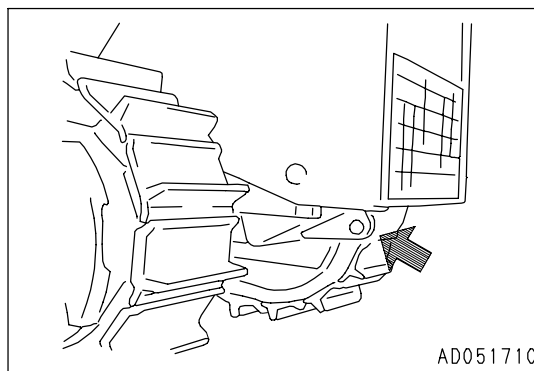
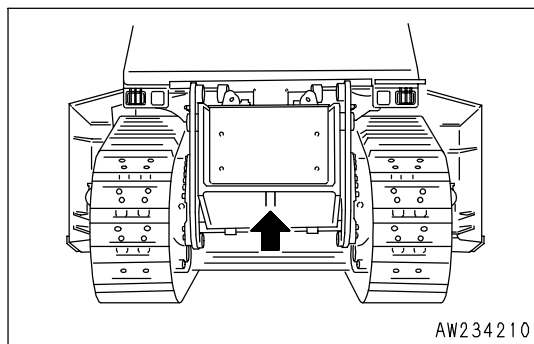
- Always check that the wire rope used for towing has ample strength for the weight of the machine being towed.
- Never use a wire rope which has cut strands (A), reduced diameter (B), or kinks (C). There is danger that the rope may break during the towing operation.
- Always wear leather gloves when 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.
- Operate the machine slowly and be careful not to apply any sudden load to the wire rope.



NOTICE

The max. allowable drawbar pull of this machine is 755,110 N (77,000 kg). Do not attempt to pull anything beyond this limit.

- If the machine is stuck in mud and cannot escape under its own power, or when towing a heavy object, fit wire to the towing hook as shown in the diagram on the right, or if the machine is equipped with a counterweight, fit the wire to the towing hook on the counterweight and tow the machine.
- When towing a machine, travel at a speed of less than 1 km/h for a distance of only a few meters to a place that is suitable for carrying out repairs.
This is for use only in emergencies.

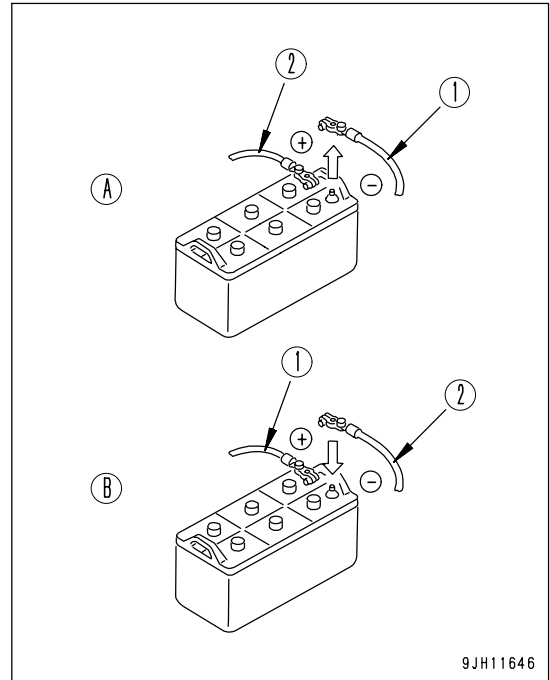


IF BATTERY IS DISCHARGED



WARNING

- It is dangerous to charge a battery when mounted on a machine. Make sure that it is dismantled before charging.
- When checking or handling the battery, stop the engine and turn the starting switch key to the OFF position.
- The battery generates hydrogen gas, so there is a hazard of explosion. Do not bring lighted cigarettes near the battery, or do anything that will cause sparks.
- Battery electrolyte is dilute sulfuric acid, and it will attack your clothes and skin. If it gets on your clothes or on your skin, immediately wash it off with a large amount of water. If it gets in your eyes, wash it out with fresh water and consult a doctor.
- When handling batteries, always wear 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.



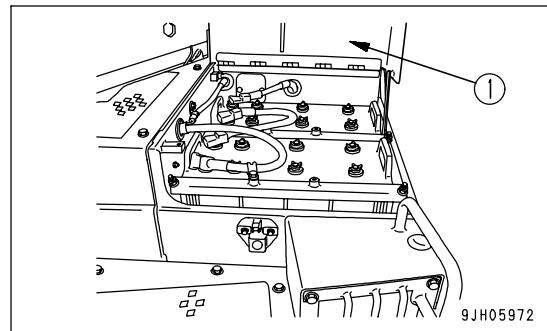
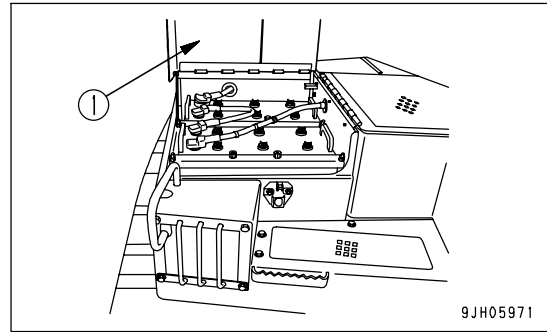
- (A) When removing, disconnect the cable from the ground terminal first.
- (B) When installing, connect the cable to the positive(+) terminal first.

REMOVAL AND INSTALLATION OF BATTERY

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

REMOVAL, INSTALLATION OF BATTERY CABLE

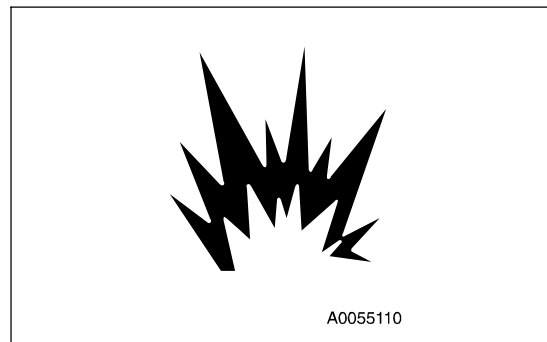
1. Open battery cover (1).
2. Before removing the battery, remove the ground cable (normally connected to the negative (-) terminal). If any tool touches between the positive terminal and the chassis, there is danger of sparks being generated. Loosen the nut of the terminal and remove the wires from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



PRECAUTIONS WHEN CHARGING BATTERY

When charging the battery, if the battery is mistakenly handled, there is danger of explosion. Follow the precautions in "IF BATTERY IS DISCHARGED (PAGE 3-177)" and the instructions given in the charger manual, and always do as follows.

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



STARTING ENGINE WITH BOOSTER CABLE

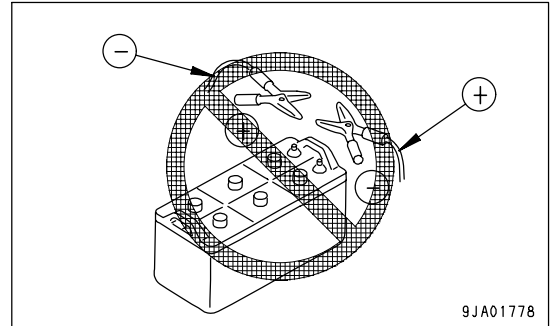
When starting the engine with a booster cable, do as follows.

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

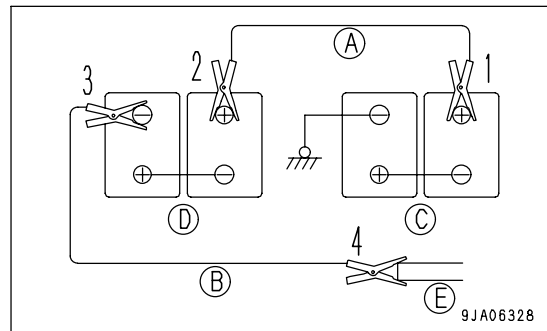
- The size of the booster cable and clip should be suitable for the battery size.
- The battery of the normal machine must be the same capacity as that of the engine to be started.
- Check the cables and clips for damage or corrosion.
- Make sure that the cables and clips are firmly connected.
- Check that the work equipment lock levers and parking brake levers of both machines are in the LOCK position.
- Check that each lever is in the NEUTRAL position.
- If the machine is equipped with a battery isolator switch, turn the battery isolator switch to the OFF position before connecting the booster cable. This will prevent damage to the electrical equipment on the problem machine.

CONNECTING THE BOOSTER CABLES

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

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

1. Connect the clip of booster cable (A) to the positive (+) terminal of battery (C) on the problem machine.
2. Connect the clip at the other end of booster cable (A) to the positive (+) terminal of battery (D) on the normal machine.
3. Connect the clip of booster cable (B) to the negative (-) terminal of battery (D) on the normal machine.
4. If the machine is equipped with a battery isolator switch, turn the battery isolator switch on the problem machine to the ON position.
5. Connect the clip at the other end of booster cable (B) to engine block (E) on the problem machine.



STARTING THE ENGINE



WARNING

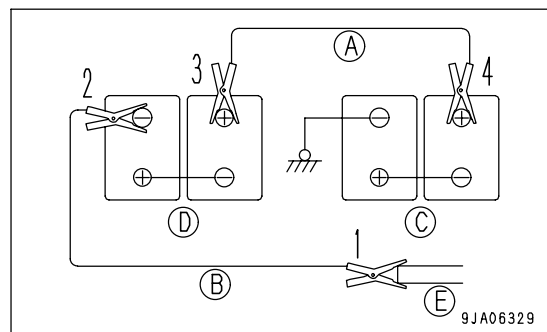
Always check that the work equipment lock lever and Parking brake lever is set to the LOCK position, regardless of whether the machine is working normally or has failed. Check also that all the control levers are in the HOLD or NEUTRAL position.

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, try again after 2 minutes or so.

DISCONNECTING THE BOOSTER CABLES

After the engine has started, disconnect the booster cables in the reverse of the order in which they were connected.

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



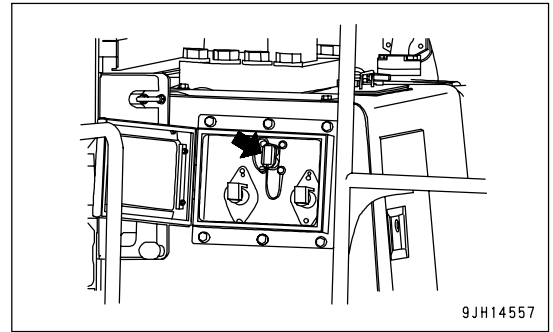
WHEN USING EXTERNAL POWER SOURCE CONNECTOR FOR STARTING MOTOR

(Mining specification, if equipped)

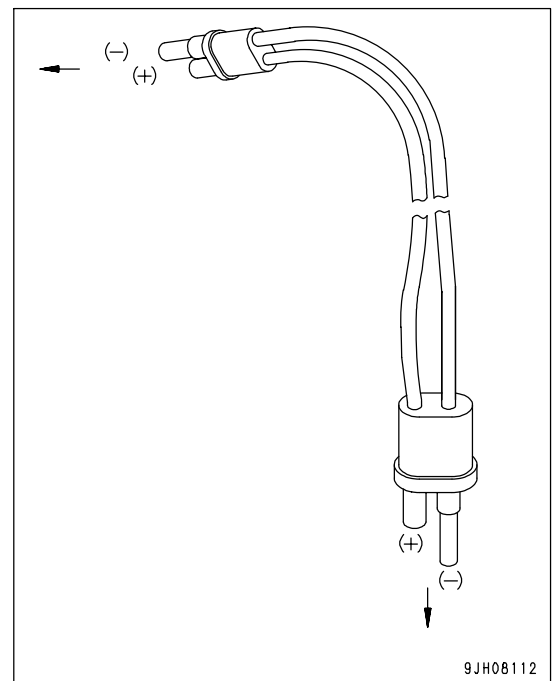
There is an external power source connector for the starting motor installed to this machine.

The connector of this type can be used to start the engine with a booster cable.

- The connector is inside the left fender switch box.

**CONNECTING BOOSTER CABLE**

1. Connect the booster cable to the external power source connector for the starting motor of the problem machine.
2. Connect the other end of this cable to the external power source connector for the starting motor of the normal machine.



OTHER TROUBLE

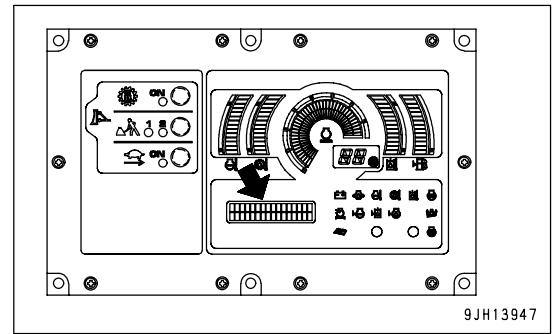
ELECTRICAL SYSTEM

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

Problem	Main cause	Remedy
Lamp does not glow brightly even when the engine runs at high speed	• Defective wiring	(• Check, repair loose terminals, disconnections Check fuses and diodes in fuse box)
Lamp flickers while engine is running	• Defective adjustment of fan belt tension	• Adjust fan belt tension For details, see EVERY 250 HOURS SERVICE
Charge lamp does not go out even when engine is running	• Defective alternator • Defective wiring	(• Replace) (• Check, repair Check fuse, diode in fuse box)
Abnormal noise is generated from alternator	• Defective alternator	(• Replace)
Starting motor does not crank when starting switch is turned ON	• Defective wiring • Battery isolator switch is OFF (if equipped) • Insufficient battery charge	(• Check, repair) • Turn switch ON. • Charge
Pinion of starting motor keeps going in and out	• Insufficient battery charge	• Charge
Starting motor turns engine sluggishly	• Insufficient battery charge • Defective starting motor	• Charge (• Replace)
Starting motor disengages before engine starts	• Defective wiring • Insufficient battery charge	(• Check, repair) • Charge
Engine pre-heating monitor lamp does not light up (When the temperature of the engine coolant exceed 20°C (68°F), this condition is normal)	• Defective wiring • Defective timer • Defective monitor • Disconnection in glow plug	(• Check, repair) (• Replace) (• Replace) (• Replace)
Air conditioner operation is defective	• Blown fuse • Insufficient battery charge • Defective air conditioner switch • Defective blower switch • Defective compressor	(• Check, repair) • Charge (• Replace air conditioner switch) (• Replace blower switch) (• Replace)
Blade does not pitch when pitch operation is carried out (dual tilt specification machine only)	• Defective wiring • Defective switch • Defective solenoid valve	(• Check, repair) (• Replace) (• Replace)

MONITOR PANEL

When an error code appears on the display panel B (multi-information), take appropriate remedies based upon the table below.



Abnormality code	Abnormality	Method of displaying abnormality	Remedy
E01	<ul style="list-style-type: none"> • Lock up torque converter does not come ON • Dual tilt does not work 	Abnormality code and service hour are displayed in turn on service meter portion	The automatic functions stop and some functions stop, but it is still possible to carry out operations. Please contact your Komatsu distributor immediately for repairs.
E02	<ul style="list-style-type: none"> • Tilt limit does not work • Does not shift up or shift down • Pitch does not work 	Abnormality code and service hour are displayed in turn on service meter portion, caution lamp flashes, buzzer sounds	If user stops engine and then starts again, operations are possible without limit functions. However, user must be careful. Please contact your Komatsu distributor immediately for repairs.
E03+CALL	<ul style="list-style-type: none"> • Number of speed ranges that can be used is limited • Engine does not run at full speed • Excessive shock when shifting gear • Turning ability becomes poor • Excessive braking shock • Abnormal engine coolant temperature sensor 	Abnormality code and service hour are displayed in turn on service meter portion, caution lamp flashes, buzzer sounds	Move machine to a safe place, then contact your Komatsu distributor immediately for repairs.
E04+CALL	<ul style="list-style-type: none"> • Engine control impossible • Travel impossible • Machine does not stop 	Abnormality code and service hour are displayed in turn on service meter portion, caution lamp flashes, buzzer sounds	Stop machine, then contact your Komatsu distributor immediately for repairs.

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
Torque converter oil pressure does not rise	<ul style="list-style-type: none"> • Improper tightening of oil pipe or pipe joint, air leaking in because of damage, oil leakage • Wear, gouging of gear pump • Lack of oil in transmission case • Clogged oil filter element strainer in transmission case 	<ul style="list-style-type: none"> • Inspect, repair (• Check, replace) • Add oil to specified level. See Checks before starting • Clean. See EVERY 500 HOURS SERVICE
Torque converter overheats	<ul style="list-style-type: none"> • Clogged radiator • Fan rotation speed is slow • Engine coolant temperature too high • Clogged oil cooler • Oil pressure too low • Low circulation of oil due to worn gear pump 	<ul style="list-style-type: none"> • Clean, wash radiator core (• Check and repair hydraulic circuit of fan motor) • See Engine Related (• Clean or replace) • See Torque converter oil pressure does not rise (• Replace gear pump)
Torque converter oil temperature gauge does not work	<ul style="list-style-type: none"> • Defective oil temperature gauge • Defective connection of wiring 	<ul style="list-style-type: none"> (• Replace oil temperature gauge) (• Check, repair)
Lacks drawbar pull	<ul style="list-style-type: none"> • Lack of engine horsepower • Torque converter oil pressure too low • Steering clutch slipping 	<ul style="list-style-type: none"> • See Engine Related • See Torque converter oil pressure does not rise (• Inspect, repair)
Machine does not move when steering, directional, speed lever is placed in FORWARD	<ul style="list-style-type: none"> • Lack of oil in the steering clutch case • Oil pressure in transmission does not rise • Steering clutch slipping • Wear, gouging of gear pump • Clogged oil strainer element in steering clutch case • Defective wiring of steering, directional, speed lever • Parking brake is at LOCK 	<ul style="list-style-type: none"> • Add oil to specified level. See Checks before starting • See Torque converter oil pressure does not rise (• Check, repair) • Clean. See EVERY 1000 HOURS SERVICE • Check wiring • Set parking brake to FREE position
Machine does not turn when steering is operated	<ul style="list-style-type: none"> • Brake is not applied on side which is pulled • Defective wiring of steering, directional, speed lever 	<ul style="list-style-type: none"> (• Adjust linkage, Check brake pressure) (• Check wiring)
Machine does not stop when brake pedal is depressed	<ul style="list-style-type: none"> • Defective brake adjustment • Defective brake pedal wiring 	<ul style="list-style-type: none"> (• Adjust linkage, adjust brake pressure) (• Check wiring)
Track comes off	<ul style="list-style-type: none"> • Track shoe assembly too loose 	<ul style="list-style-type: none"> • Adjust track tension. See WHEN REQUIRED
Abnormal wear of sprocket	<ul style="list-style-type: none"> • Track shoe assembly too loose or too tight 	<ul style="list-style-type: none"> • Adjust track tension. See WHEN REQUIRED

Problem	Main causes	Remedy
Blade lifting speed is slow or does not rise (or blade tilting speed is slow)	<ul style="list-style-type: none"> • Lack of hydraulic oil • Defective hydraulic switch • Work equipment lock lever is at LOCK position 	<ul style="list-style-type: none"> • Add oil to specified level. See Checks before starting • Replace • Set lock lever to FREE position
Ripper movement is slow	<ul style="list-style-type: none"> • Lack of hydraulic oil • Defective solenoid valve • Work equipment lock lever is at LOCK position 	<ul style="list-style-type: none"> • Add oil to specified level. See Checks before starting • Replace • Set lock lever to FREE position
Ripper lacks power	<ul style="list-style-type: none"> • Leakage of oil from piping 	(• Tighten piping)

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 monitor flashes when engine speed is raised after completion of warm-up	<ul style="list-style-type: none"> • Engine oil pan oil level is low (sucking in air) • Clogged oil filter cartridge • Defective tightening of oil pipe joint, oil leakage from damaged part • Defective monitor panel 	<ul style="list-style-type: none"> • Add oil to 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)	<ul style="list-style-type: none"> • Coolant level low, leakage • Fan rotation speed is low • Dirt or scale accumulated in cooling system 	<ul style="list-style-type: none"> • Add coolant, repair, see CHECK BEFORE STARTING • Check and repair hydraulic circuit of fan motor • Change coolant, clean inside of cooling system, see WHEN REQUIRED
Engine coolant temperature monitor remains lit	<ul style="list-style-type: none"> • Clogged radiator fin or damaged fin • Defective thermostat • Loose radiator filler cap (high altitude operation) • Defective monitor panel 	<ul style="list-style-type: none"> • Clean or repair, see WHEN REQUIRED (• Replace thermostat) • Tighten cap or replace packing (• Replace)
Engine does not start when starting motor is turned	<ul style="list-style-type: none"> • Lack of fuel • Air in fuel system • Defective fuel injection pump or nozzle • Starting motor cranks engine sluggishly • Defective valve clearance 	<ul style="list-style-type: none"> • Add fuel, see CHECK BEFORE STARTING • Repair place where air is sucked in (• Replace pump or nozzle) • See ELECTRICAL SYSTEM (• Adjust valve clearance)
Exhaust gas is white or blue	<ul style="list-style-type: none"> • Too much oil in oil pan • Improper fuel 	<ul style="list-style-type: none"> • Add oil to specified level, see CHECK BEFORE STARTING • Change to specified fuel
Exhaust gas occasionally turns black	<ul style="list-style-type: none"> • Clogged air cleaner element • Defective nozzle • Defective compression • Defective turbocharger 	<ul style="list-style-type: none"> • Clean or replace, see WHEN REQUIRED (• Replace nozzle) (• Adjust valve clearance) (• Clean or replace,turbocharger)
Combustion noise occasionally makes breathing sound	<ul style="list-style-type: none"> • Defective compression 	<ul style="list-style-type: none"> (• Replace nozzle)
Abnormal noise generated (combustion or mechanical)	<ul style="list-style-type: none"> • Low grade fuel being used • Overheating • Damage inside muffler • Excessive valve clearance 	<ul style="list-style-type: none"> • Change to specified fuel • See item "Engine coolant temperature monitor remains lit" (• Replace muffler) (• Adjust valve clearance)

WHEN MODE SELECTION SYSTEM FLASHES

If the caution lamp flashes, or it becomes impossible to control the engine speed with the fuel control dial or decelerator pedal, stop operation immediately, check the monitor panel display, then contact your Komatsu distributor for repairs.

In addition to the above problems, if any of the problems in the table below occur, there is probably an abnormality in the work equipment lever switch, transmission speed range sensor, or other part, so please contact your Komatsu distributor for repairs.

Mode	Operation	Problem
Economy	Dozing	<ul style="list-style-type: none"> • Engine speed changes, difficult to carry out work • No feeling of control, engine stays at full or partial speed
Reverse slow	Reverse travel	<ul style="list-style-type: none"> • Ripper lifting speed is slow • Travel speed in Reverse Slow is fast
Lock-up	All operations	<ul style="list-style-type: none"> • Lock-up does not work • Excessive shock when shifting gear
-	Travel under own power	<ul style="list-style-type: none"> • Engine runs at partial speed when traveling under own power

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.

CLEAN OIL AND GREASE:

Use clean oil and grease. Also, keep the containers of the oil and grease clean. Keep foreign materials away from oil and grease.

CHECK FOREIGN MATERIAL IN DRAINED OIL:

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

FUEL STRAINER:

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

WELDING INSTRUCTIONS:

- Cut off power. Wait for approx. one minute after turning off the engine starting switch key, and then disconnect the negative (-) terminal of the battery.
- Do not apply more than 200 V continuously.
- Connect grounding cable within 1 m (3.3 ft) of the area to be welded. If grounding cable is connected near instruments, connectors, etc., the instruments may malfunction.
- If a seal or bearing happens to come between the part being welded and grounding point, change the grounding point to avoid such parts.
- Do not use the area around the work equipment pins or the hydraulic cylinders as the grounding point.

OBJECTS IN YOUR POCKETS:

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

DUSTY WORKSITES:

When working at dusty worksites, do as follows:

- Clean the radiator fins and other parts of the heat exchange equipment more frequently, and take care not to let the fins become clogged.
- Replace the fuel filter more frequently.
- Clean electrical components, especially the starting motor and alternator, to avoid accumulation of dust.
- When checking and replacing the oil or filters, move the machine to a place where there is no dust and take care to prevent dust from entering the system.

AVOID MIXING OILS:

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

LOCKING INSPECTION COVERS:

Lock inspection cover securely into position with the lock bar. If inspection or maintenance is performed with inspection cover not locked in position, there is a danger that it may be suddenly blow shut by the wind and cause injury to the worker.

BLEEDING AIR:

When hydraulic equipment has been repaired or replaced, or the hydraulic piping has been removed and installed again, the air must be bled from the circuit. For details, see "BLEEDING AIR IN HYDRAULIC SYSTEM (PAGE 4-48)".

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.

CONTROLLER:

The controller for the machine monitor may be actuated mistakenly by radio wave interference from the outside, so when installing any radio control equipment to the machine, please consult your Komatsu distributor.

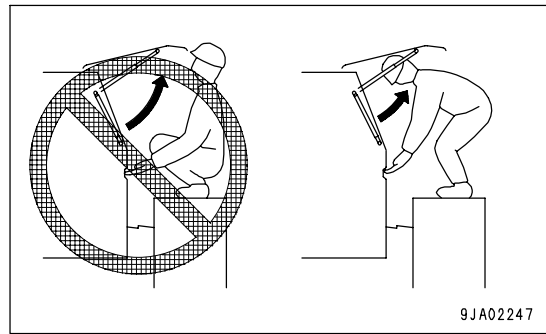
CHECKS AFTER INSPECTION AND MAINTENANCE:

If you forget to perform the checks after inspection and maintenance, unexpected problems may occur, and this may lead to serious injury or property damage. Always do the following:

- Checks after operation (with engine stopped)
 - Have any inspection and maintenance points been forgotten?
 - Have all inspection and maintenance items been performed correctly?
 - Have any tools or parts been dropped inside the machine? It is particularly dangerous if parts are dropped inside the machine and get caught in the lever linkage mechanism.
 - Are there any leakage of coolant or oil? Have all nuts and bolts been tightened?
- Checks when engine is running
 - For the checks when the engine is running, see "TWO WORKERS FOR MAINTENANCE WHEN ENGINE IS RUNNING (PAGE 2-30)" in the SAFETY section, and take care of safety sufficiently.
 - Check that the inspected and maintained parts work normally.
 - Raise the engine speed and check for fuel leakage and oil leakage.

PRECAUTIONS WHEN OPENING AND CLOSING ENGINE SIDE COVER:

When standing on the track to open the engine side cover, adopt a standing position, hold the side cover with both thumbs, and open it slowly with your other fingers.



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)
Damper case	Powertrain oil TO30 (Komatsu genuine parts)
Power train oil pan	
Final drive case	Gear oil GO85W140 (Komatsu genuine parts)
Hydraulic oil system	Powertrain oil TO10 (Komatsu genuine parts)
Radiator	Supercoolant AF-NAC (density: 30% or above) (Komatsu genuine parts)

HANDLING OIL, FUEL, COOLANT, AND PERFORMING OIL CLINIC

OIL

- Oil is used in the engine and hydraulic equipment under extremely severe conditions (high temperature, high pressure), and deteriorates with use.
Always use oil that matches the grade and maximum and minimum ambient temperatures recommended in the Operation and Maintenance Manual. Even if the oil is not dirty, always change the oil at the specified interval.
- Oil corresponds to blood in the human body, 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 (5°F), 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 oil for the fuel.

To ensure good fuel consumption characteristics and exhaust gas characteristics, the engine mounted on this machine uses an electronically controlled high-pressure fuel injection device. This device requires high precision parts and lubrication, so if low viscosity fuel with low lubricating ability is used, the durability may drop markedly.

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 antifreeze, always observe the precautions given in the Operation and Maintenance Manual.
- The Supercoolant is already diluted with distilled water, so it is not flammable.
- With the Supercoolant (AF-NAC), the density used for the coolant differs according to the ambient temperature. For details of the coolant density, see "CLEAN INSIDE OF COOLING SYSTEM (PAGE 4-22)". Even in areas where it is not considered necessary to prevent freezing, always use Supercoolant (AF-NAC) with a density of over 30% in order to prevent corrosion of the cooling system. Supercoolant (AF-NAC) is diluted with distilled water that does not contain any ions or water-hardening substances. Never dilute the Supercoolant with ordinary 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 included in the maintenance section are grease fittings for overhaul, so they do not need grease.
If any part becomes stiff after being used for long time, add grease.
- Always wipe off all of the old grease that is pushed out when greasing.
Be particularly careful to wipe off the old grease in places where sand or dirt sticking in the grease would cause wear of the rotating parts.

CARRYING OUT KOWA (Komatsu Oil Wear Analysis)

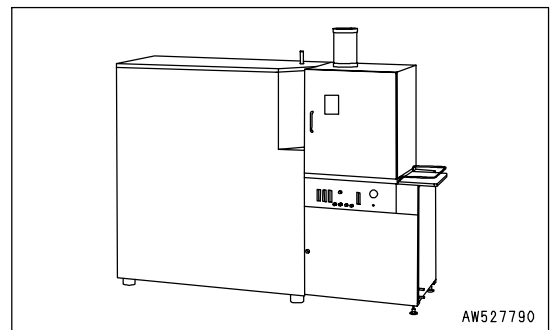
The oil clinic samples the oil periodically and analyzes it. This is a preventive maintenance service, which provides early discovery of abnormal parts and wear of the drive parts of the machine. This then makes it possible to ensure prevention of failures and reduction in downtime.

Komatsu’s long years of experience and rich supply of accumulated data make it possible to accurately determine the condition of your machine. This enables us to locate the problems and to recommend suitable and timely repair methods.

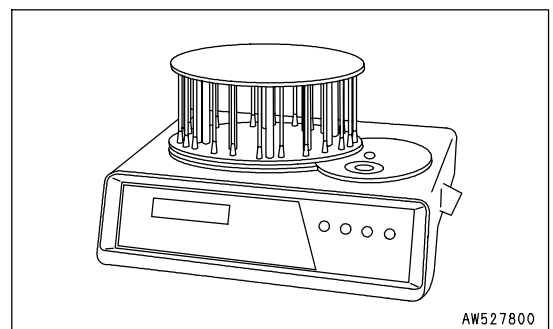
The oil clinic charges the customer only the actual costs, and provides an immediate report of the results of the analysis and recommendations for action to take. This low-cost service can save you high costs and inconvenience in the future, so we strongly recommend you to avail yourself of this service.

KOWA ANALYSIS ITEMS

- Measurement of density of metal wear particles
This uses an ICP (Inductively Coupled Plasma) analyzer to measure the density of iron, copper, and other metal wear particles in the oil.



- Measurement of quantity of particles
This uses a PQI (Particle Quantifier Index) measurer to measure the quantity of iron particles of 5µm or more, enabling early detection of failures.



- Others
Measurements are made of items such as the ratio of water in the oil, density of the 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

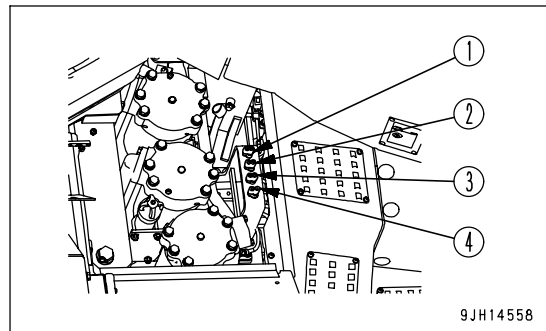
- Precautions when sampling
 - Make sure that the oil is well mixed before sampling.
 - Perform sampling at regular fixed intervals.
 - Do not perform sampling on rainy or windy days when water or dust can get into the oil.
 - If an oil sampling coupler is equipped, use the coupler to sample the oil. (if equipped.)

(Mining specification, if equipped)

- (1): Coolant
- (2): Engine oil
- (3): Hydraulic oil
- (4): Power train oil

Test port

Manufacturer: HYDROTECHNIK
 Model: 2103-01-40.00



Mounting screw
 Size: R1/8

- Precautions when sampling
 - Run the engine at low idling when sampling.
 - Park the machine before carrying out sampling.
 - (Parking brake ON, work equipment lock lever ON, steering lock lever ON)
 - The sampled oil is at high temperature, so be careful not to burn yourself.

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

STORING OIL AND FUEL

- Keep indoors to prevent any water, dirt, or other impurities from getting in.
- When keeping drum cans for a long period, put the drum on its side so that the filler port of the drums is at the side to prevent moisture from being sucked in.
 - If drums have to be stored outside, cover them with a waterproof sheet or take other measures to protect them.
- To prevent any change in quality during long-term storage, be sure to use in the order of first in - first out (use the oldest oil or fuel first).

FILTERS

- Filters are extremely important safety parts. They prevent impurities in the fuel and air circuits from entering important equipment and causing problems.

Replace all filters periodically. For details, see the Operation and Maintenance Manual.

However, when working in severe conditions, replace the filters at shorter intervals according to the oil and fuel (sulfur content) being used.

- Never try to clean the filters (cartridge type) and use them again. Always replace with new filters.
- When replacing oil filters, check if any metal particles are attached to the old filter. If any metal particles are found, contact your Komatsu distributor.
- Do not open packs of spare filters until just before they are to be used.
- Use of Komatsu genuine filter elements is strongly recommended.

OUTLINE OF ELECTRIC SYSTEM

- It is extremely dangerous if the electrical equipment becomes wet or the covering of the wiring is damaged. This will cause an electrical short circuit and may lead to malfunction of the machine. Do not wash the inside of the operator's cab with water. When washing the machine, be careful not to let water get into the electrical components.
- Service relating to the electric system is checking fan belt tension, checking damage or wear to the fan belt and checking battery fluid level.
- Never install any electric components other than those specified by Komatsu.
- External electro-magnetic interference may cause malfunction of the control system controller, before installing a radio receiver or other wireless equipment, contact your Komatsu distributor.
- When working on the seashore, carefully clean the electric system to prevent corrosion.
- When installing electrical equipment, connect it to the special power source connector.
Do not connect the optional power source to the fuse, starting switch, or battery relay.

HANDLING HYDRAULIC RELATED EQUIPMENT

- During operations and after completion of operations, the hydraulic equipment is at a high temperature. During operations, it is also under high pressure, so when carrying out inspection and maintenance of hydraulic related equipment, be careful of the following points.
 - Stop the machine on flat ground, lower the work equipment completely to the ground, and carry out the operation so that there is no pressure on the cylinder circuits.
 - Always stop the engine.
 - Immediately after stopping operations, the hydraulic oil and lubricating oil is at high temperature and high pressure, so wait for the oil temperature to go down before starting maintenance.
Even after the temperature has gone down, some parts may still be under internal pressure, so when loosening plugs, bolts, or hose connections, do not stand directly in front of the parts, and loosen slowly to release the internal pressure before removing.
 - When carrying out inspection and maintenance of the hydraulic circuit, always release the air in the hydraulic tank to remove the internal pressure.
- Inspection and maintenance include checking the hydraulic system for oil level, replacement of filter elements and replacement of hydraulic oil.
- If high-pressure hoses have been removed, check that there is no damage to the O-rings. If any damage is found, replace the O-ring.
- When the hydraulic oil filter elements or strainers are cleaned or replaced, or when any hydraulic component has been repaired or replaced, or when a hydraulic piping has been disconnected, bleeding air from the hydraulic system is required.

WEAR PARTS

Replace wear parts such as the filter element or cutting edge at the time of periodic maintenance or before they reach the wear limit. The wear parts should be replaced correctly in order to ensure more economic use of the machine. When replacing parts, always use Komatsu genuine parts.

As a result of our continuous efforts to improve product quality, the part number may change, so inform your Komatsu distributor of the machine serial number and check for the latest part number when ordering parts.

WEAR PARTS LIST

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

*: For mining specification machine

Item	Part No.	Part name	Weight kg (lb)	Q'ty	Replacement interval
Engine oil filter	600-211-1340	Cartridge	-	4	Every 500 hours
Transmission filter	07063-51142 (07000-E5165)	Element (O-ring)	- -	1 (1)	
Transmission lubricating filter	07063-51142 (07000-E5165)	Element (O-ring)	- -	1 (1)	
Torque converter filter	07063-51142 (07000-E5165)	Element (O-ring)	- -	1 (1)	
Fuel pre-filter	600-319-3440	Cartridge	-	2	
Fuel main filter	600-319-3520	Cartridge	-	2	Every 1000 hours
Hydraulic tank breather element	421-60-35170	Element	-	1	
Fuel tank breather element	421-60-35170	Element	-	1	
Power train case breather element	*285-62-17320	Element	-	1	Every 2000 hours
Damper case breather	17M-12-21180	Filter	-	4	
	*285-62-17320	Element	-	1	
Hydraulic oil filter	208-60-71122 (07000-15210)	Element (O-ring)	- -	1 (2)	-
Air cleaner	600-185-6100	Element assembly	-	2	
	600-185-6110	Outer element	-	2	
	600-185-6120	Inner element	-	2	

Item	Part No.	Part name	Weight kg (lb)	Q'ty	Replacement interval	
Blade	Semi U-dozer	198-71-31540	Cutting edge	114.2	2	-
		198-71-31550	Cutting edge	157.5	3	
		198-71-62540	Cutting edge	-	2	
		198-71-62550	Cutting edge	-	3	
		(198-71-21850)	(Bolt)	-	(34)	
		(198-71-21890)	(Washer)	148.0	(34)	
		(198-71-21911)	(Nut)	148.0	(34)	
		198-71-31520	End bit (left)	-	1	
		198-71-31530	End bit (right)	-	1	
		(198-71-21870)	(Bolt)	-	(8)	
		(198-71-21860)	(Bolt)	-	(8)	
		(198-71-21880)	(Boss)	-	(8)	
		(198-71-21890)	(Washer)	-	(8)	
		(198-71-21911)	(Nut)	-	(16)	
	Full U-dozer	198-71-31540	Cutting edge	114.2	2	
		198-71-31550	Cutting edge	157.5	2	
		198-71-62540	Cutting edge	-	2	
		198-71-62550	Cutting edge	-	3	
		(198-71-21850)	(Bolt)	-	(26)	
		(198-71-21890)	(Washer)	148.0	(26)	
		(198-71-21911)	(Nut)	148.0	(26)	
		198-71-31520	End bit (left)	-	1	
		198-71-31530	End bit (right)	-	1	
		(198-71-21870)	(Bolt)	-	(8)	
(198-71-21860)		(Bolt)	-	(8)		
(198-71-21880)		(Boss)	-	(8)		
(198-71-21890)		(Washer)	-	(8)		
(198-71-21911)		(Nut)	-	(16)		
Ripper	(Variable giant ripper)	198-78-21330	Protector	38.5	1	
		195-78-21340	Point	34.3	1	
		(198-71-21410)	(Pin assembly)	-	(3)	
	(Variable multi ripper)	198-78-21330	Protector	38.5	3	
		195-78-21340	Point	34.3	3	
		(198-71-21410)	(Pin assembly)	-	(9)	

NOTICE

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

RECOMMENDED FUEL, COOLANT, AND LUBRICANT

- Komatsu genuine oils are adjusted to maintain the reliability and durability of Komatsu construction equipment and components.

In order to keep your machine in the best conditioner for long periods of time, it is essential to follow the instructions in this Operation and Maintenance Manual.

- Failure to follow these recommendations may result in shortened life or excess wear of the engine, power train, cooling system, and/or other components.
- Commercially available lubricant additives may be good for the machine, but they may also cause harm. Komatsu does not recommend any commercially available lubricant additive.
- Use the oil recommended according to the ambient temperature in the chart below.
- Specified capacity means the total amount of oil including the oil in the tank and the piping. Refill capacity means the amount of oil needed to refill the system during inspection and maintenance.
- When starting the engine in temperatures below 0°C (32°F), be sure to use the recommended multi-grade oil, even if the ambient temperature may become higher during the course of the day.
- If the machine is operated at a temperature below -20°C (-4°F), a separate device is needed, so consult your Komatsu distributor.
- When the fuel sulfur content is less than 0.2%, 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.

Reservoir	Fluid Type	Ambient Temperature, degrees Celsius										Recommended Komatsu Fluids
		-22	-4	14	32	50	68	86	104	122°F		
		-30	-20	-10	0	10	20	30	40	50°C		
Engine oil pan	Engine oil	(Note.1)										Komatsu EOS0W30
		(Note.1)										Komatsu EOS5W40
		(Note.1)										Komatsu EO10W30-DH
		(Note.1)										Komatsu EO15W40-DH
		(Note.1)										Komatsu EO30-DH
Damper case	Powertrain oil (Note.2)	(Note.1)										TO30
Power train oil pan (incl. Transmission,torque converter and bevel gear case)	Powertrain oil	(Note.1)										TO10
		(Note.1)										TO30
Final drive case (each)	Gear oil	(Note.1)										GO75W90
		(Note.1)										GO85W140
Hydraulic system	Powertrain oil	(Note.1)										TOS5W30
		(Note.1)										TO10
	Hydraulic oil	(Note.1)										HO46-HM
		Engine oil	(Note.1)									
(Note.1)										Komatsu EO15W40-DH		
Grease fitting	Hyper grease (Note.3)	(Note.1)										G2-T,G2-TE
	Lithium EP grease	(Note.1)										G2-LI
Cooling system	Coolant (Note.4)	(Note.1)										Supercoolant AF-NAC
Fuel tank	Diesel fuel	(Note.1)										ASTM Grade No.1-D S15 ASTM Grade No.1-D S500
		(Note.1)										ASTM Grade No.2-D S15 ASTM Grade No.2-D S500

• ASTM: American Society of Testing and Material

		Engine oil pan	Power train oil pan (incl. transmission, torque converter and bevel gear cassettes)	Damper case	Final drive case (each)	Hydraulic system	Fuel tank	Cooling system
Specified amount	Liter	126	410	2.2	75	420	1670	210
	US gal	33.29	108.32	0.58	19.82	110.96	441.21	55.48
Refill capacity	Liter	121	210	2.2	75	170	-	-
	US gal	31.97	55.48	0.58	19.82	44.91	-	-

NOTICE

Always use diesel oil for the fuel.

To ensure good fuel consumption characteristics and exhaust gas characteristics, the engine mounted on this machine uses an electronically controlled high-pressure fuel injection device. This device requires high precision parts and lubrication, so if low viscosity fuel with low lubricating ability is used, the durability may drop markedly.

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

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

Note 4: Supercoolant (AF-NAC)

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

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

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

2) For details of the Supercoolant AF-NAC density, see "CLEAN INSIDE OF COOLING SYSTEM (PAGE 4-22)". Supercoolant AF-NAC is supplied already diluted. In this case, add the pre-diluted fluid to keep the tank full. (Never dilute the Supercoolant with ordinary 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

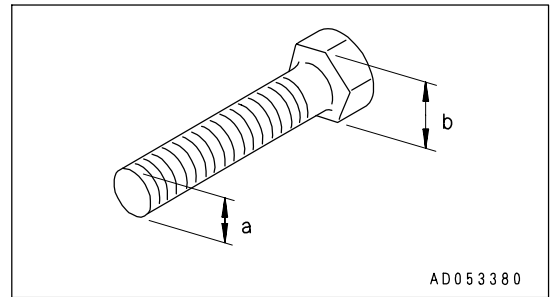


If nuts, bolts, or other parts are not tightened to the specified torque, it will cause looseness or damage to the tightened parts, and this will cause failure of the machine or problems with operation.

Always pay careful attention when tightening parts.

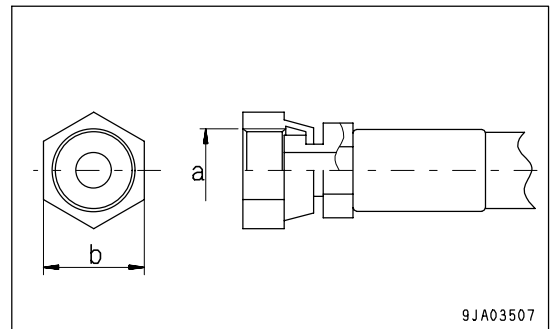
Unless otherwise specified, tighten the metric nuts and bolts to the torque shown in the table below. If it is necessary to replace any nut or bolt, always use a Komatsu genuine part of the same size as the part that was replaced.

Thread diameter of bolt (a)(mm)	Width across flats (b)(mm)	Tightening torque					
		Target value			Service limit		
		Nm	kgm	lbft	Nm	kgm	lbft
6	10	13.2	1.35	9.8	11.8-14.7	1.2-1.5	8.7-10.8
8	13	31	3.2	23.1	27-34	2.8-3.5	20.3-25.3
10	17	66	6.7	48.5	59-74	6.0-7.5	43.4-54.2
12	19	113	11.5	83.2	98-123	10.0-12.5	72.3-90.4
14	22	177	18	130.2	157-196	16.0-20.0	115.7-144.7
16	24	279	28.5	206.1	245-309	25.0-31.5	180.8-227.8
18	27	382	39	282.1	343-425	35.0-43.5	253.2-314.6
20	30	549	56	405.0	490-608	50.0-62.0	361.7-448.4
22	32	745	76	549.7	662-829	67.5-84.5	488.2-611.2
24	36	927	94.5	683.5	824-1030	84.0-105.0	607.6-759.5
27	41	1320	135.0	976.5	1180-1470	120.0-150.0	868.0-1085.0
30	46	1720	175.0	1265.8	1520-1910	155.0-195.0	1121.1-1410.4
33	50	2210	225.0	1627.4	1960-2450	200.0-250.0	1446.6-1808.3
36	55	2750	280.0	2025.2	2450-3040	250.0-310.0	1808.3-2242.2
39	60	3280	335.0	2423.1	2890-3630	295.0-370.0	2133.7-2676.2



Apply the following table for Hydraulic Hose.

Nominal- No. of threads (a)	Width across flats (b) mm	Tightening torque					
		Target valve			Permissible range		
		Nm	kgm	lbft	Nm	kgm	lbft
9/16 -18UNF	19	44	4.5	32.5	34 - 54	3.5 - 5.5	25.3 - 39.8
11/16 -16UN	22	74	7.5	54.2	54 - 93	5.5 - 9.5	39.8 - 68.7
13/16 -16UN	27	103	10.5	75.9	84 - 132	8.5 - 13.5	61.5 - 97.6
1 -14UNS	32	157	16.0	115.7	128 - 186	13.0 - 19.0	94.0 - 137.4
1 3/16 -12UN	36	216	22.0	159.1	177 - 245	18.0 - 25.0	130.2 - 180.8



PERIODIC REPLACEMENT OF SAFETY CRITICAL PARTS

For using the machine safely for an extended period of time, you are required to periodically replace the safety (critical and fire prevention) related parts listed in the table of important parts on the following page.

Material quality of these parts can change as time passes and they are likely to wear out or deteriorate. However, it is difficult to determine the extent of wear or deterioration at the time of periodic maintenance. Hence, it is required to replace them with new ones regardless of their condition after a certain period of usage. This is important to ensure that these parts maintain their full performance at all times.

Furthermore, should anything abnormal be found on any of these parts, replace it with a new one even if the periodic replacement time for the part has not yet arrived.

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

Also perform the following checks with hydraulic hoses which need to be replaced periodically. Tighten all loose clamps and replace defective hoses, as required.

When replacing hoses, always replace O-rings, gaskets, and other such parts at the same time.

Have your Komatsu distributor replace the critical parts.

SAFETY CRITICAL PARTS

NO.	Periodic replacement parts	Q'ty		Replacement interval
		Single	Dual	
1	Fuel hose (spill hose between nozzles)	4	4	Every 2 years or every 4000 hours, whichever comes sooner
2	Turbocharger oil supply hose	2	2	
3	Fuel hose (nozzle - fuel return hose)	1	1	
4	Fuel hose (fuel filter - injection pump)	2	2	
5	Fuel hose (feed pump - fuel return hose)	1	1	
6	Hose between torque converter oil cooler - steering case	1	1	
7	Power train pressure detection hose assembly	1	1	
8	Fuel hose (fuel tank - fuel strainer)	3	3	
9	Fuel hose (fuel return)	1	1	
10	Hose between torque converter outlet port - torque converter oil cooler	1	1	
11	Fuel hose (fuel strainer - feed pump)	1	1	
12	Hose between main valve - ripper relay tube	4	4	
13	Hose between ripper relay tube - ripper divider lock	4	4	
14	Hose between ripper divider block - ripper lift cylinder	4	4	
15	Hose between ripper divider block - ripper tilt cylinder	4	4	
16	Hose between main valve - tank	2	2	
17	Hose between PPC accumulator - PPC lock valve	1	1	
18	Hose between PPC lock valve - blade PPC valve	1	1	
19	Hose between PPC lock valve - ripper PPC valve	1	1	
20	Hose between self-pressure reduction valve - main valve	1	1	
21	Hose between self-pressure reduction valve - PPC basic pressure divider block	1	1	
22	Hose between PPC basic pressure divider block - PPC accumulator	1	1	
23	Hose between PPC basic pressure divider block - blade relay block	-	1	
24	Hose between PPC basic pressure divider block - EPC divider block	1	1	
25	Hose between EPC divider block - hydraulic pump	1	1	
26	Hose between EPC divider block - fan pump	2	2	
27	Hose between EPC divider block - pump merge-divider valve	1	1	
28	Hose between blade PPC valve - blade relay block	4	4	
29	Blade relay block - main valve	4	6	
30	Hose between blade PPC valve - PPC drain relay block	1	1	
31	Hose between ripper PPC valve - ripper relay block	4	4	
32	Hose between ripper relay block - main valve	4	4	
33	Hose between ripper PPC valve - PPC drain relay block	1	1	
34	Hose between blade relay block - PPC drain relay block	-	1	

NO.	Periodic replacement parts	Q'ty		Replacement interval	
		Single	Dual		
35	Hose between pump merge-divider valve - PPC drain relay block	-	1	Every 2 years or every 4000 hours, whichever comes sooner	
36	Hose between PPC drain relay block - tank	1	1		
37	Pump merge-divider valve - tank	-	1		
38	Hose between hydraulic pump - main valve	6	6		
39	Hose between hydraulic pump - tank	1	1		
40	Hose between main valve - blade lift divider block	4	4		
41	Hose between blade lift divider block - relay tube	2	2		
42	Hose between relay tube - blade lift cylinder	2	2		
43	Hose between main low valve - blade tilt relay block	2	4		
44	Hose between fan pump - tank	2	2		
45	Hose between fan pump LPV30 - fan pump discharge merge block	1	1		
46	Hose between fan pump discharge merge block - fan motor	2	2		
47	Hose between fan motor - tank	3	3		
48	Hose between fan motor - hydraulic cooler	2	2		
49	Hydraulic cooler - bypass valve	1	1		
50	Hose between hydraulic cooler - tank	2	2		
51	Rubber mount for parking cable bracket (P/L. end)	2	2		
52	Accumulator (for control circuit)	1	1		
53	Hose between air cleaner and turbocharger	2	2		
54	Hose between turbocharger and aftercooler	4	4		
55	Hose between aftercooler and engine	4	4		
56	High-pressure piping clamps	1set	1set		Every 8000 hours
57	Fuel spray prevention cap	1set	1set		
58	Seat belt	1	1		Every 3 years

MAINTENANCE SCHEDULE CHART

MAINTENANCE SCHEDULE CHART

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

REPLACE TRANSMISSION FILTER ELEMENT, TRANSMISSION LUBRICATION FILTER ELEMENT, AND TORQUE CONVERTER FILTER ELEMENT -----	4- 64
CHANGE OIL IN POWER TRAIN CASE, CLEAN STRAINERS -----	4- 68
CHANGE OIL IN HYDRAULIC TANK, REPLACE HYDRAULIC FILTER ELEMENT, CLEAN HYDRAULIC TANK STRAINER -----	4- 76
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WHEN REQUIRED

CLEAN INSIDE OF COOLING SYSTEM -----	4- 22
CHECK, CLEAN AND REPLACE AIR CLEANER ELEMENT -----	4- 25
CHECK AND ADJUST TRACK TENSION -----	4- 30
CHECK AND TIGHTEN TRACK SHOE BOLTS -----	4- 33
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EVERY 250 HOURS SERVICE

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SERVICE PROCEDURE

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

Perform the following maintenance only after the first 250 hours.

- Replace transmission filter element, transmission lubrication filter element and torque converter oil filter element
- Change oil in power train case, clean strainer
(Including transmission case, torque converter case, bevel gear case)
- Change oil in hydraulic tank, replace hydraulic oil filter element, clean hydraulic tank strainer
- Change oil in final drive case

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

WHEN REQUIRED

CLEAN INSIDE OF COOLING SYSTEM



WARNING

- Immediately after the engine is stopped, the coolant is at a high temperature and the radiator is under high internal pressure. If the cap is removed to drain the coolant in this condition, there is a hazard of burns. Wait for the temperature to go down, then turn the cap slowly to release the pressure before removing it.
- Cleaning is carried out with the engine running. When standing up or leaving the operator's seat, set the work equipment lock lever and the parking brake lever to the LOCK position.
- For details of starting the engine, see "CHECK BEFORE STARTING ENGINE, ADJUST (PAGE 3-89)" and "STARTING ENGINE (PAGE 3-111)" in the OPERATION section.
- Never enter front the machine when the engine is running.
There is danger of touching the fan.

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

Clean the inside of the cooling system, change the coolant according to the table below.

Antifreeze coolant	Interval for cleaning inside of cooling system and changing antifreeze coolant
Komatsu supercoolant (AF-NAC)	Every two years or every 4000 hours whichever comes first
Permanent type antifreeze (All-season type, *)	Every year (autumn) or every 2000 hours whichever comes first

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

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%.

Supercoolant (AF-NAC) is already diluted with distilled water. When using coolant, investigate the lowest temperatures in the past and decide the density for the coolant from the coolant density table below.

When actually deciding the density for the coolant, set it for a temperature 10°C (18°F) below the actual temperature.

The coolant density varies according to the ambient temperature, but it must always be a minimum of 30%.

Coolant density table

Minimum Temp	°C	Above -10	-15	-20	-25	-30	-35	-40	-45	-50
	°F	Above 14	5	-4	-13	-22	-31	-40	-49	-58
Concentration (%)		30	36	41	46	50	54	58	61	64

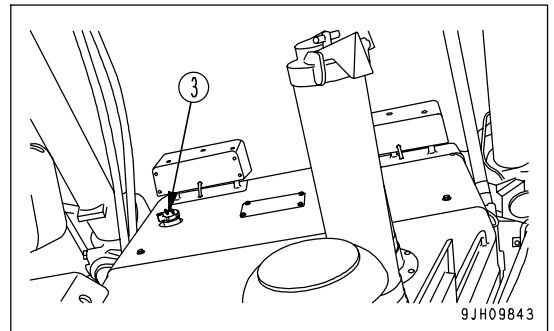
! WARNING

- Antifreeze is toxic. When open the drain valve, be careful not to get water containing antifreeze on you. If it gets in your eyes, flush your eyes with large amount of fresh water and see a doctor at once.
- When changing the coolant or draining the coolant from the radiator before carrying out repairs, ask a specialist company to handle any coolant containing antifreeze, or contact your Komatsu distributor. Antifreeze is toxic, so never pour it into drainage water ditches or drain it onto the ground surface.

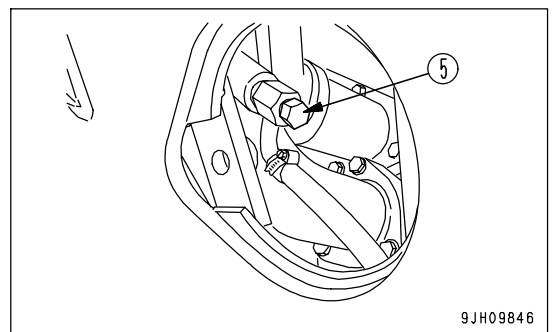
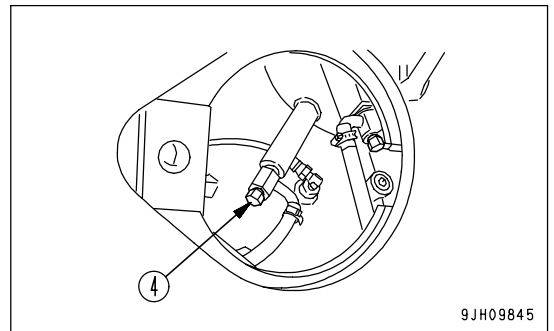
The coolant is already diluted with distilled water. (For details of the distilled water, see "COOLANT AND WATER FOR DILUTION (PAGE 4-6)". Check the density with a coolant tester.

Prepare a container whose capacity is larger than the specified coolant volume to catch drained coolant.
Prepare a hose to use when filling with coolant.

1. Stop the machine on level ground, then stop the engine.
2. Turn radiator cap (3) slowly, and remove.

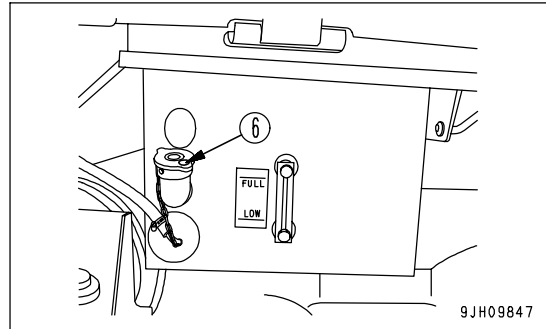


3. Prepare a container to catch the drained coolant, then open radiator drain valves (4) and (5) at the bottom of the radiator, and drain the water.
4. After draining the water, close drain valves (4) and (5), then fill with city water.
5. When the radiator is filled with water, start the engine, run at low idling, raise the water temperature to at least 90 °C, then run the engine for approx. 10 minutes.
6. Open drain valves (4), (5), and drain the water.
7. After draining the water, clean the cooling system with cleaning agent.
For the cleaning method, see the instructions for the cleaning agent.
8. Close drain valves (4), and (5).

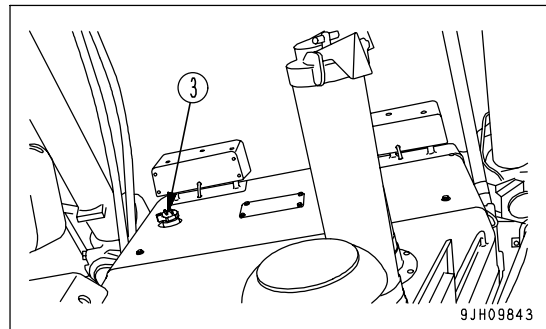


9. Add Supercoolant through the water filler up to the bottom of the filler port.
For details of the Supercoolant density, see the COOLANT DENSITY TABLE.

- 10. To remove air in the cooling system, run the engine for 5 minutes at low idle, then for 5 minutes at high idle. (While doing this, leave the radiator cap removed.)
- 11. Open cap (6) of the coolant reserve tank, add coolant to the specified level, then tighten cap (6). For details, see "CHECK COOLANT LEVEL, ADD COOLANT (PAGE 3-92)".



- 12. Stop the engine, wait for approx. 3 minutes, add Supercoolant up to the bottom of the filler port, then tighten the radiator cap (3).

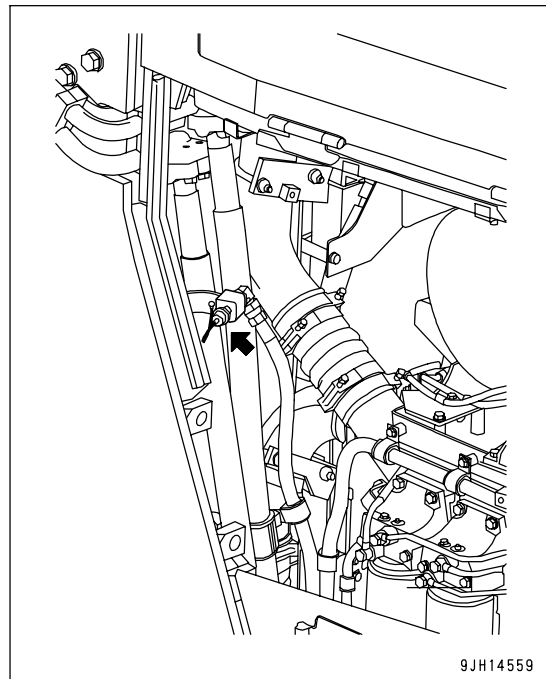


(Mining specification, if equipped)

If a quick coupler is installed for draining the coolant or adding water, use the quick coupler.

Quick coupler
 Manufacturer: WIGGINS
 Model: EC258AB

Mounting screw
 Size: 1/2-14A NPT



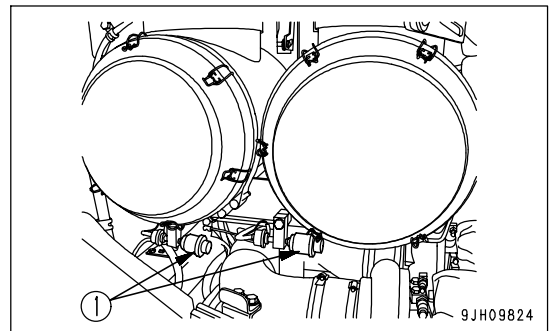
CHECK, CLEAN AND REPLACE AIR CLEANER ELEMENT

WARNING

- Always wear protective glasses, dust mask, or other protective equipment.
- When removing the air cleaner element from the air cleaner body, it is dangerous to pull it out by force.
When working at high places or where the foothold is poor, be careful not to fall because of the reaction when pulling out the outer element.

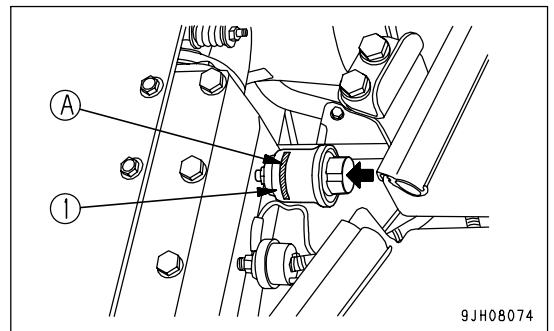
CHECKING

If the internal yellow piston overlaps the red zone (A) on the outside diameter of dust indicator (1), clean the air cleaner element.
After cleaning, press the reset button to reset the piston.



NOTICE

Do not clean the element until the yellow piston in dust indicator (1) overlaps the red zone (A) on the outer diameter.
If the element is cleaned frequently before the yellow piston in dust indicator (1) overlaps the red zone (A) on the outer diameter, the air cleaner will not be able to provide its expected performance and the cleaning efficiency will become poor.
In addition, dirt stuck to the element will drop inside the inner element more frequently during the cleaning operation.

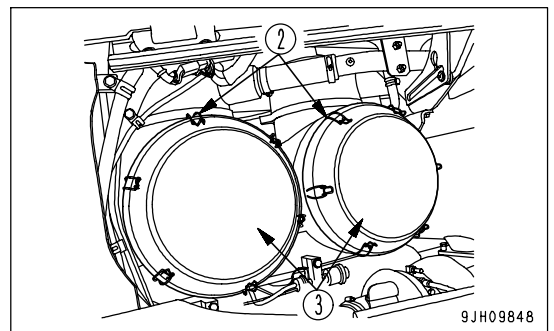


CLEANING OUTER ELEMENT

NOTICE

Before and after cleaning the element, do not leave or keep it in direct sunlight.

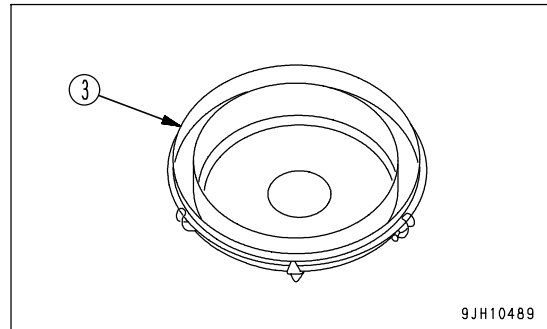
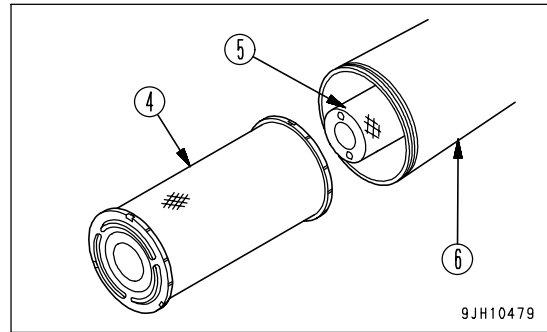
1. Remove 6 holders (2), then remove cover (3) and take out outer element (4).



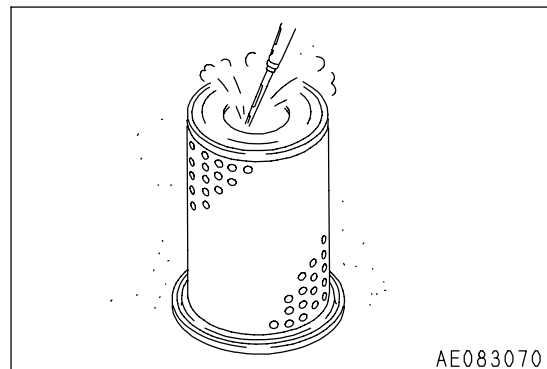
NOTICE

- Never remove the inner element (5). It will allow dirt to enter and cause failure of the engine.
- Do not use a screwdriver or other tool.

2. Hold the outer element (4), move it carefully up and down and to the left and right, and rotate the element to the left and right while pulling it out.
3. After removing the outer element, cover the air connector inside the air cleaner body with a clean cloth or tape to prevent dirt or dust from entering.
4. Use a brush or cloth to remove all the dirt stuck to cover (3) and the inside of air cleaner body (6).

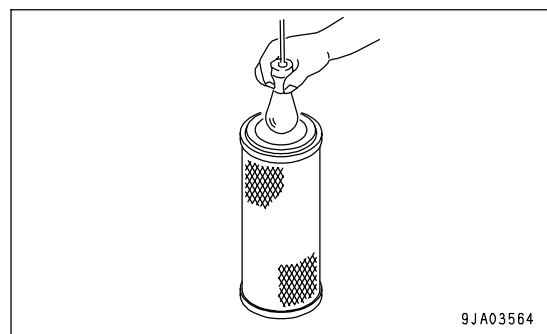


5. Direct dry compressed air (Max. 0.69 MPa (7 kg/cm², 99.4 PSI)) from the inside of the outer element along its folds. Then direct the compressed air from the outside along the folds, and again from the inside.
 - 1) Check that the inner element is not loose. If it is loose, insert it securely.
 - 2) If the yellow piston overlaps the red zone (A) on the outer diameter immediately after the outer element is cleaned, replace both the inner and outer elements.



NOTICE

If small holes or thinner parts are found on the element when it is checked with an electric bulb after cleaning and drying, replace the element. When cleaning the element, do not hit it or beat it against something. Do not use an element whose folds or gasket or seal are damaged.

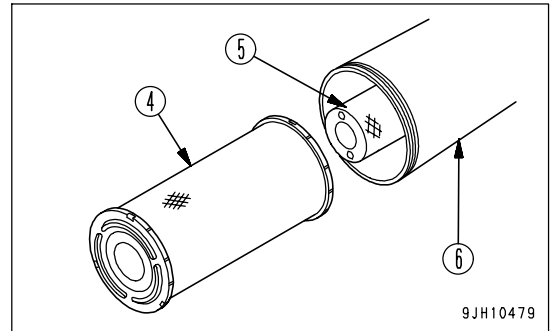


6. If small holes or thinner parts are found on the element when it is checked with an electric bulb after cleaning and drying, replace the element.

NOTICE

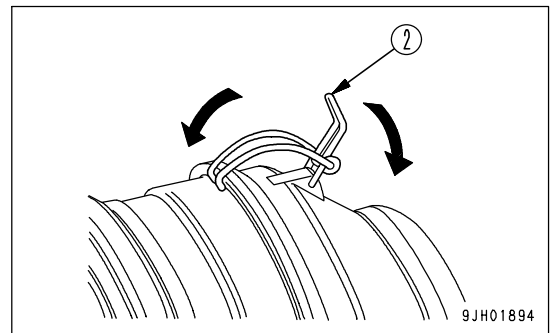
- The inner element must not be cleaned and used again. When replacing the outer element, replace the inner element at the same time.
- If the inner element is not installed properly and the outer element and cover are installed, there is danger that the outer element will be damaged.
- The seal portion on imitation parts lacks precision, and allows the entry of dust, which leads to damage of the engine. Do not use such imitation parts.

7. Remove the cloth or tape cover installed in Step 3.
8. Check that there is no dirt or oil stuck to the seal portion of the new element or cleaned element. Wipe off any dirt or oil.
9. Push the outer element in straight with your hand when installing it to the air cleaner body.
If the outer element is held and rocked lightly up and down and to the left and right while pushing it in, the outer element can be inserted easily.

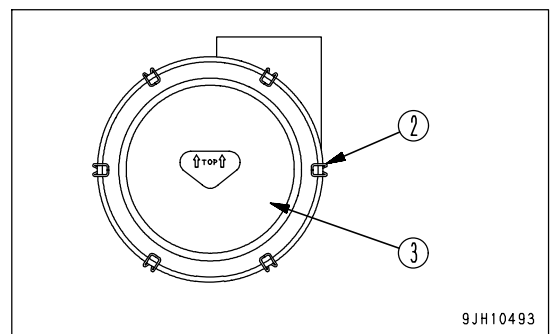


NOTICE

When inserting the element, if the rubber at the tip is swollen or the outer element is not pushed in straight, and cover (3) is assembled by force to hook (2), there is danger that the hook and air cleaner body may be damaged, so be careful when assembling.

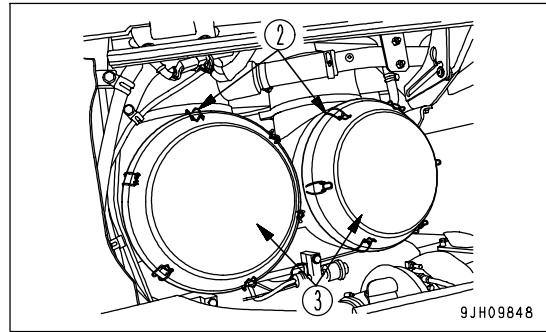


10. Install cover (3) as follows.
 - 1) Align cover (3) with the element.
 - 2) Hook the tip of hook (2) to the protruding part of the air cleaner body and lock it in position.
 - 3) When locking hooks (2) in position, apply the hooks in turn on opposite sides (top, bottom, left, right) in the same way as when tightening bolts.
 - 4) When cover (3) is installed, check that the clearance between the air cleaner body and cover (3) is not too large. If it is too large, install again.

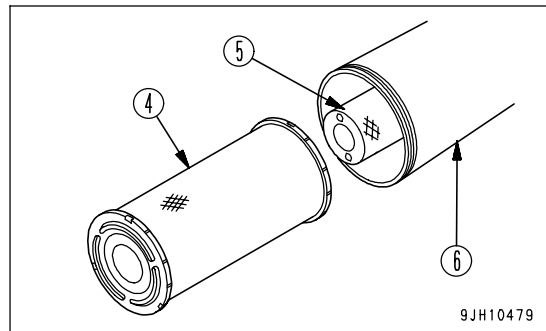


REPLACING ELEMENT

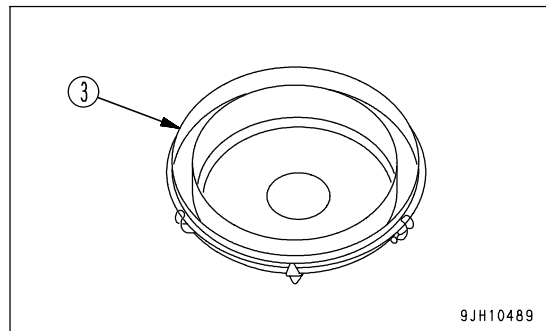
1. Open cover on the right side of the machine.
2. Remove 6 holders (2), then remove cover(3).



3. Hold the outer element (4), move it carefully up and down and to the left and right, and rotate the element to the left and right while pulling it out.



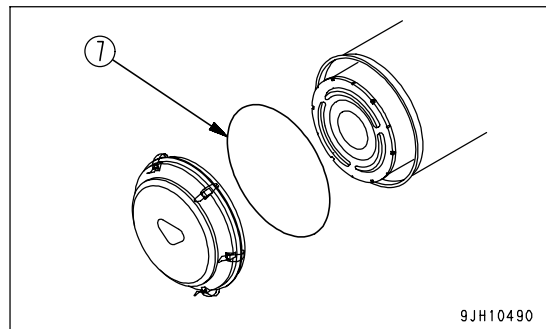
4. Use a brush or cloth to remove all the dirt stuck to cover (3) and the inside of air cleaner body (6).



NOTICE

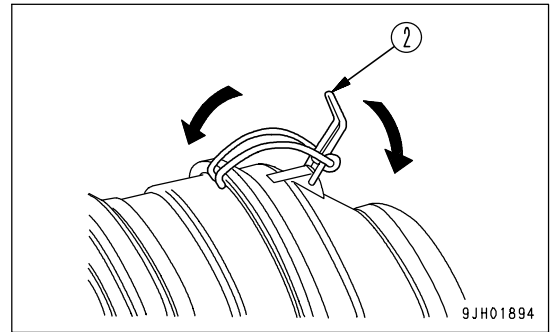
- The inner element must not be cleaned and used again. When replacing the outer element, replace the inner element at the same time.
- If the inner element is not installed properly and the outer element and cover are installed, there is danger that the outer element will be damaged.
- The seal portion on imitation parts lacks precision, and allows the entry of dust, which leads to damage of the engine. Do not use such imitation parts.

5. Remove inner element (5), then quickly install the new inner element.
Push the inner element in properly and check that it is fitted securely.
6. Push new outer element (4) straight into the air cleaner body with your hand.
If you hold the element and move it carefully up and down and to the left and right, it is easier to insert the element.
7. Replace O-ring (7) for cover (3) with new one.



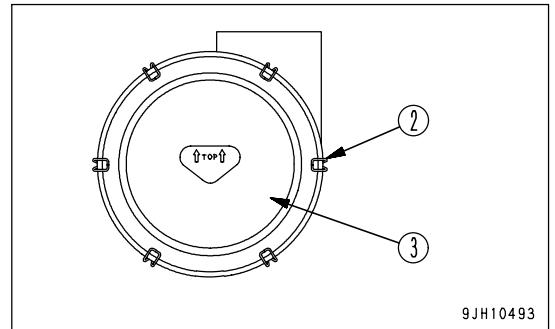
NOTICE

When inserting the element, if the rubber at the tip is swollen or the outer element is not pushed in straight, and cover (3) is assembled by force to hook (2), there is danger that the hook and air cleaner body may be damaged, so be careful when assembling.



8. Install cover (3) as follows.

- 1) Align cover (3) with the element.
- 2) Hook the tip of hook (2) to the protruding part of the air cleaner body and lock it in position.
- 3) When locking hooks (2) in position, apply the hooks in turn on opposite sides (top, bottom, left, right) in the same way as when tightening bolts.
- 4) When cover (3) is installed, check that the clearance between the air cleaner body and cover (3) is not too large. If it is too large, install again.



CHECK AND ADJUST TRACK TENSION

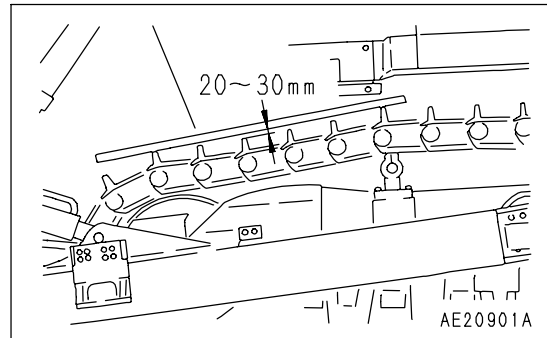
The wear of pins and bushings on the undercarriage will vary with the working conditions and types of soil. It is thus necessary to continually inspect the track tension so as to maintain the standard tension.

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

INSPECTION

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

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



ADJUSTMENT



WARNING

Grease inside the adjusting mechanism is under high pressure.

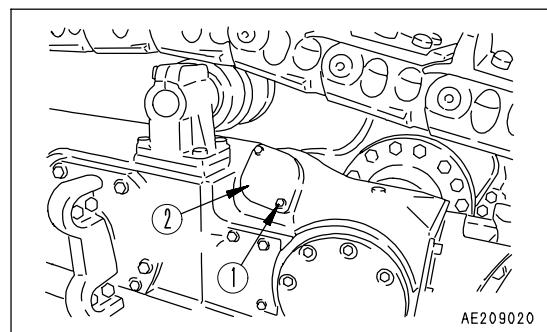
Grease coming from plug (4) under pressure can penetrate the body causing injury or death. For this reason, do not loosen plug (4) more than one turn. Do not loosen any part other than plug (4). Furthermore, do not bring your face in front of the grease fitting. If track tension is not relieved by this procedure, contact your Komatsu distributor for repairs.

WHEN INCREASING TENSION

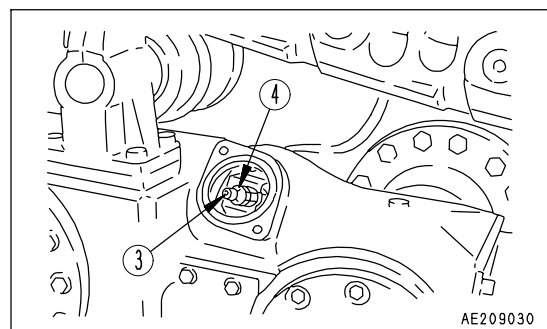
1. First remove the bolt (1) and then remove the cover (2).

NOTICE

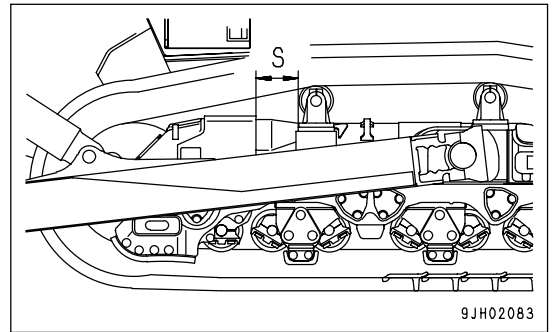
- When removing cover (2), be careful not to let any dirt get inside.
- There is a safety label stuck to the back of cover (2). Be careful not to damage the safety label.



2. Pump in grease through the grease fitting (3) with a grease pump.
3. To check that the correct tension has been achieved, move the machine backwards and forwards.
4. Check the track tension again, and if the tension is not correct, adjust it again.



5. Continue to pump in grease until (S) becomes 350 mm (13.8 in). If the tension is still loose, the pin and bushing are excessively worn, so they must be either turned or replaced. Contact your Komatsu distributor for repairs.



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WHEN LOOSENING TENSION

**WARNING**

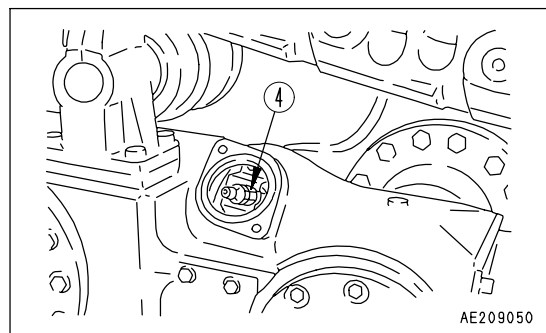
It is extremely dangerous to release the grease by any method except the procedure given below.
If track tension is not relieved by this procedure, contact your Komatsu distributor for repairs.

1. Remove both bolts (1), then remove cover (2).

NOTICE

- When removing cover (2), be careful not to let any dirt get inside.
- There is a safety label stuck to the back of cover (2). Be careful not to damage the safety label.

2. Loosen plug (4) gradually to release the grease.
3. Turn plug (4) a maximum of one turn.
4. If the grease does not come out smoothly, move the machine backwards and forwards a short distance.
5. Tighten plug (4).
6. To check that the correct tension has been achieved, move the machine backwards and forwards.
7. Check the track tension again, and if the tension is not correct, adjust it again.



AE209050

WHEN REMOVING TRACK

 **WARNING**

Depending on the situation, the operation to remove the track may be extremely dangerous.
 Before removing the track, if the procedure "WHEN LOOSENING TENSION (PAGE 4-32)" does not loosen the track tension, contact your Komatsu distributor for repairs.

CHECK AND TIGHTEN TRACK SHOE BOLTS

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

METHOD OF TIGHTENING SHOE BOLT

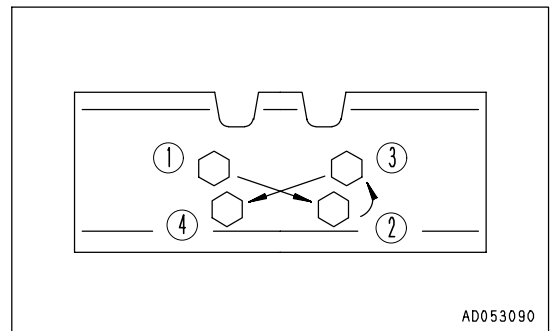
1. First tighten to a tightening torque of $980 \pm 98 \text{ Nm}$ ($100 \pm 10 \text{ kgm}$, $723.3 \pm 72.3 \text{ lbft}$) and then check that the link contact surfaces are in close contact.
2. After checking, tighten a further $180^\circ \pm 10^\circ$.

METHOD OF TIGHTENING MASTER LINK CONNECTING BOLT

1. Tighten first to a tightening torque of $980 \pm 98 \text{ Nm}$ ($100 \pm 10 \text{ kgm}$, $723.3 \pm 72.3 \text{ lbft}$), then check that the link mating surface is in close contact.
2. After checking, tighten a further $180^\circ \pm 10^\circ$.

ORDER FOR TIGHTENING

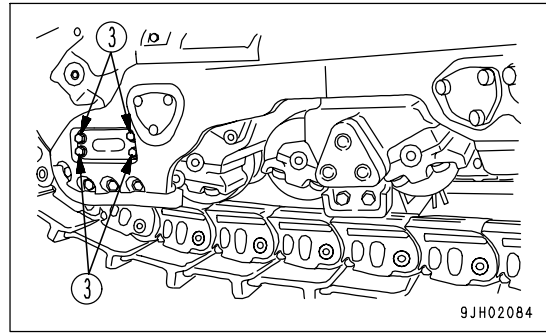
Tighten the bolts in the order shown in the diagram on the right.



ADJUST IDLER CLEARANCE

The idler moves forward and backward under external pressure when this happens, side guide (1) and guide plate (2) become worn.

As they become worn, there is side play in the idler, or the idler turns at an angle, causing the track to come off or resulting in uneven wear, so adjust as follows.

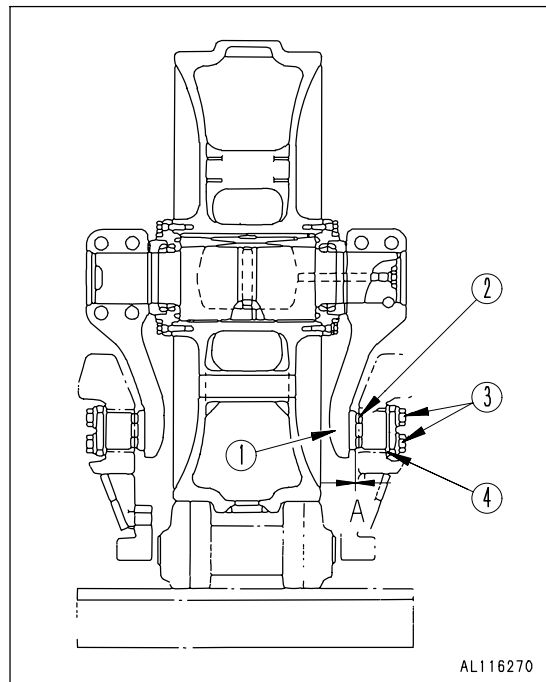


ADJUSTMENT

1. Drive the machine for 8 to 12 m (24.4 to 36.6 ft) on flat ground, then measure clearance A (4 places: left, right, inside outside) between the track frame and side guide (1).
2. If clearance A is more than 3 mm (0.1 in), remove bolt (3), then take out shim (4), and adjust to that the clearance on one side is less than 0.5 mm (0.02 in).

REMARK

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



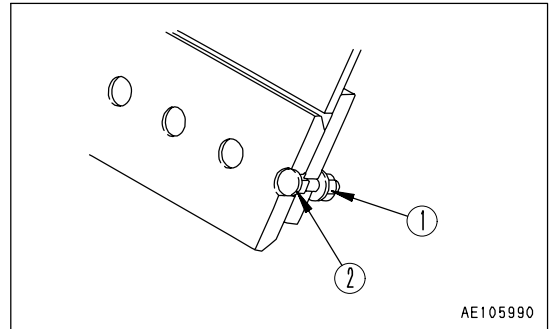
REVERSE AND REPLACE THE END BITS AND CUTTING EDGES



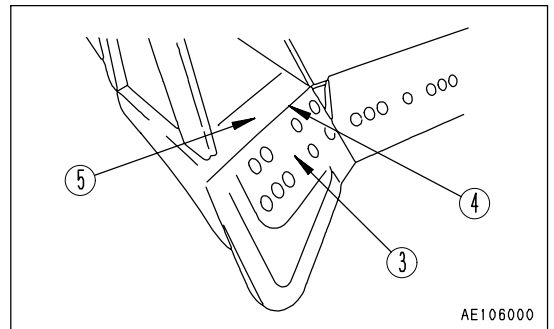
It is dangerous if the work equipment moves by mistake when the cutting edges and end bits are being reversed or replaced. Set the work equipment in a stable condition, then stop the engine and lock the blade control lever securely with the work equipment lock lever.

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

1. Raise the blade to a proper height, position a block under the frame to prevent the blade from falling.
2. Operate the work equipment lock lever to the LOCK position. If the cutting edge and the end bit on both sides are worn out, replace with new one. If the mounting surface is worn, correct it before turning or replacing the end bits.



3. Loosen nut (1) and remove bolt (2). Then remove the cutting edge and the end bit and clean the mounting surface.
4. Reverse or replace the cutting edge and the end bit when worn out. If bolt (1) and nut (2) are damaged, replace them with new ones at the same time.

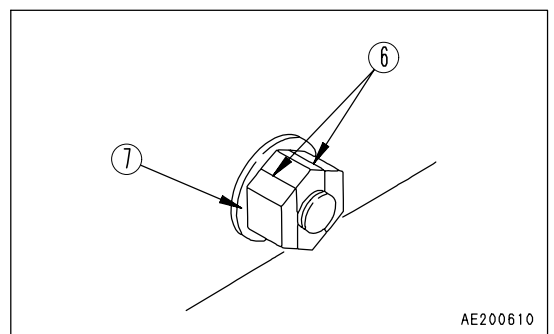


5. Install the edge to the blade, then tighten partially. Drop the blade three to five times on to the ground or rock to remove any play in bolt (2), then tighten it to the correct tightening torque. When installing end bit (3), put top surface (4) of the end bit in close contact with stopper (5), then tighten with the bolts.
 - Tightening torque: 3340 ± 373 Nm (341 ± 38 kgm, 2466.3 ± 274.8 lbft)
6. After several hours of running, retorque the nuts.

REMARK

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

When the nut is rusted and is removed by gas cutting, cut on both side (6) of the nut as shown in the diagram. Be careful not to damage seat surface (7). If it is damaged, repair it. Be careful not to get spatter on the mounting surface.



METHOD OF USING POWER WRENCH

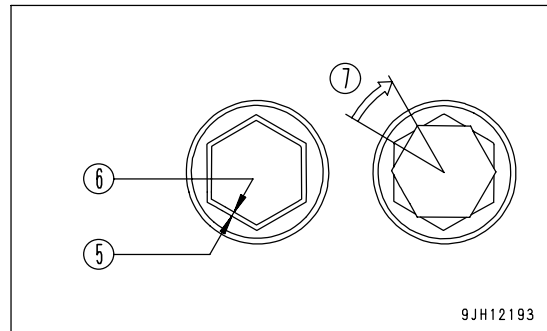
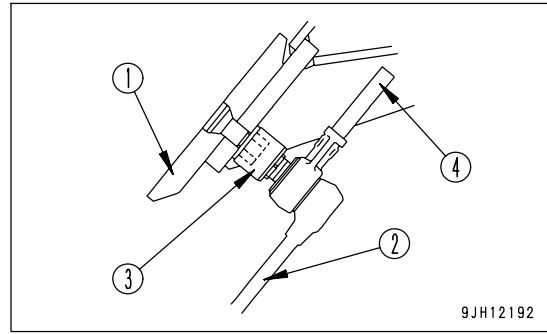
The power wrench set is equipped with a special socket.

This socket is designed to grip the nuts and prevent the wrench set from pulling out. This means that tightening can be performed by one worker.

This socket has a double construction, and is designed so that the outside can rotate 30°

It is used as follows.

- (1) Cutting edges or end bit
 - (2) Ratchet handle or torque wrench
 - (3) Rotating socket
 - (4) Reaction arm
1. Align the hexagons of the inside socket (6) and outside socket (5), the insert the nut that is to be tightened or loosened.
 2. After inserting the nut, turn the outside socket (5) 30° clockwise (7).
When this is done, the outside socket will catch the notch in the nut seat surface, and the wrench will not come off.
 3. Put the reaction arm (4) in contact with the blade rib, and tighten or loosen.
 4. Turn the outside socket (5) counterclockwise, and remove the wrench.



CLEAN AND CHECK RADIATOR FINS, OIL COOLER FINS, AFTERCOOLER FINS

Carry out this procedure if there is any mud or dirt stuck to the radiator or oil cooler.

REMARK

Check the hydraulic cooler hoses. If any hose is cracked or hardened by age, replace with a new hose. Also check and tighten all loose hose clamps.

CLEANING BY ROTATING COOLING FAN IN REVERSE DIRECTION

 **WARNING**

When cleaning the cooling fan by turning it in the reverse direction, make sure that the parking brake lever is in the LOCK position.

NOTICE

When rotating the cooling fan in the reverse direction, be extremely careful of flying dust.

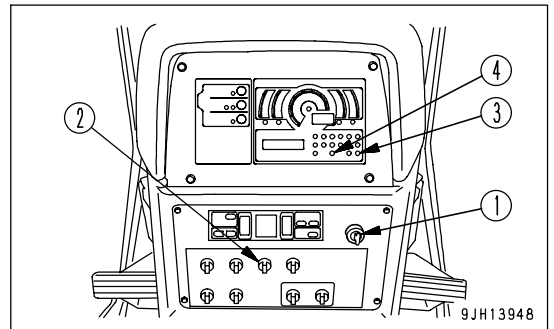
Open up the right and left engine side covers and check that no dust and dirt are accumulated inside the engine room.

When the fan operation confirmation lamp is lighted and the fan is turning in the reverse direction, the machine does not move even if the steering - forward and reverse - gearshift lever is operated to any of the forward, reverse and steering positions. This function is designed to protect the radiator.

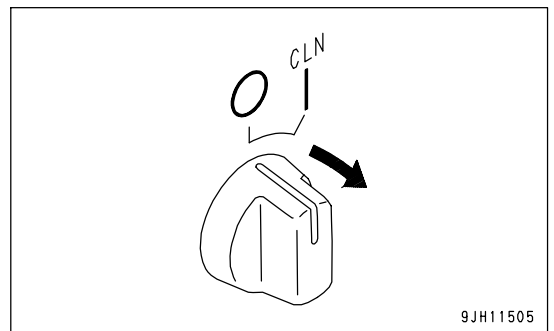
When stopping the engine when the cooling fan is rotating in the reverse direction, first run the engine at low idling, then stop it.

The dust and dirt stuck to the radiator and cooler can be blown out by rotating the cooling fan in the reverse direction.

1. Turn starting switch (1) to the "OFF" position and stop the engine.
2. Turn starting switch (1) to the "ON" position.



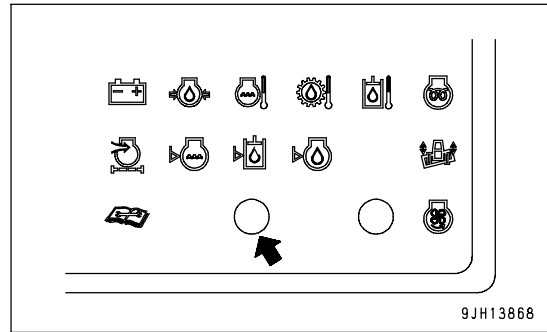
3. Turn fan rotation selector switch (2) to the cleaning (CLN) position.
Fan reversal lamp (3) lights up.



REMARK

Even if the fan rotation selector switch is turned while the engine is running, the fan does not change its rotation direction.

Then fan rotation selection impossibility lamp (4) flashes, telling you that the fan rotation cannot be switched.

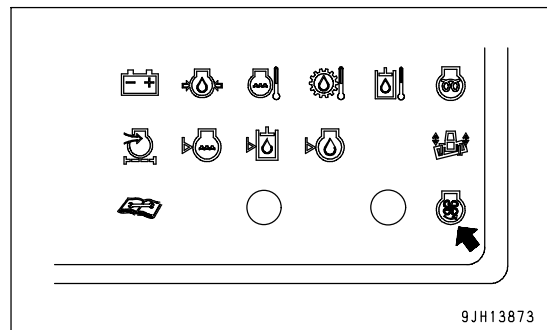


4. Start up the engine by turning engine starting switch key (1).
The cooling fan begins to turn in the reverse direction.
5. Run the engine at high idle.
Select the time for running the engine at high idle as follows according to the condition of clogging.
Normal clogging: 1 to 2 minutes
Excessive clogging: 2 to 3 minutes
6. After completing the cleaning, run the engine at low idle for approx. 10 seconds.
7. Turn starting switch (1) to the "OFF" position and stop the engine.

REMARK

When the cooling fan is turning for cleaning, power cannot be switched off immediately, even if the engine starting switch key is turned to the OFF position in order to protect the hydraulic circuit.

8. Turn starting switch (1) to the "ON" position.
9. Check that fan reversal lamp (3) is unlighted and start up the engine. The cooling fan begins to turn in the normal direction.



REMARK

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

CLEANING WITH COMPRESSED AIR

! WARNING

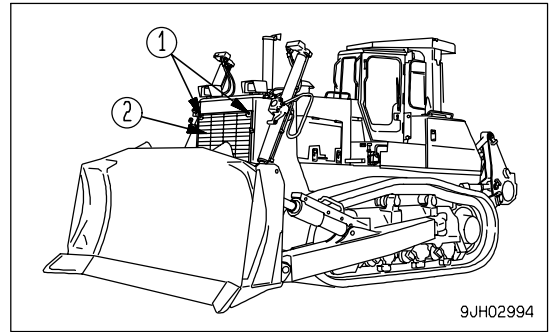
- Directing compressed air, pressurized water, or steam directly at your body, or using these and causing dust to fly may cause personal injury. Always wear protective glasses, anti-dust mask, and other protective equipment.
- When carrying out cleaning, always stop the engine and check that the fan is not rotating. If you touch the fan when it is rotating, it will cause serious personal injury.

NOTICE

When using compressed air for cleaning, blow it keeping some distance to avoid damaging the fins. Damage on the fins can cause water leakage and overheating. In a dusty job site, check the fins every day, regardless of the maintenance interval.

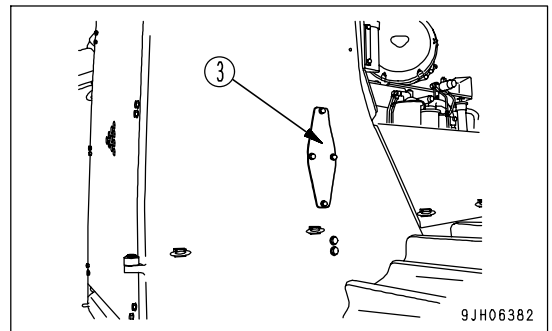
CLEAN RADIATOR FINS

1. Remove bolts (1) at the center and four corners of the radiator grill, then open radiator grill (2).
2. Clean the radiator fins clogged with mud, dust and leaves with compressed air. Steam or water may be used instead of compressed air.



REMARK

Use compressed air to blow off any dirt embedded in the radiator fins. It is also possible to blow with compressed air from the side holes on both sides (3) of the radiator guard.

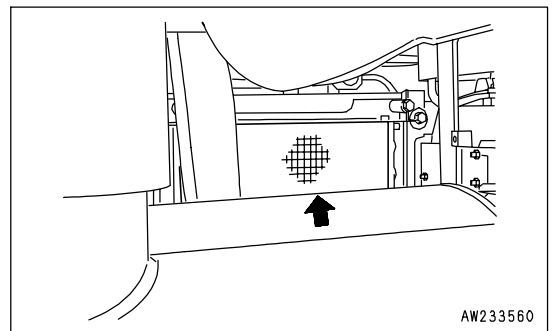


CLEAN OIL COOLER FINS

1. Open the engine side cover on the right side of the machine.
2. Blow off dirt, dust and dry leaf shreds that clog the oil cooler fins, with compressed air. Steam or water may well be used for this purpose instead of compressed air.

REMARK

Check the hydraulic cooler hoses. If any hose is cracked or hardened by age, replace with a new hose. Also check and tighten all loose hose clamps.

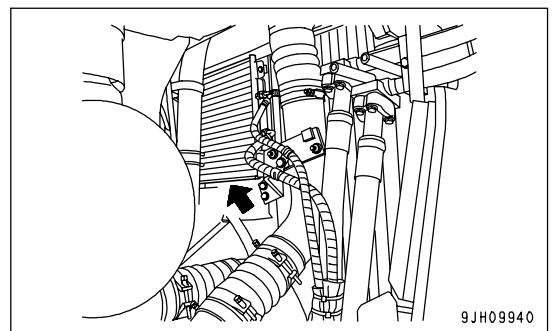


CLEAN AFTERCOOLER FINS

1. Open the engine side cover on the right side of the machine.
2. Blow off dirt, dust and dry leaf shreds that clog the after-cooler fins, with compressed air. Steam or water may well be used for this purpose instead of compressed air.

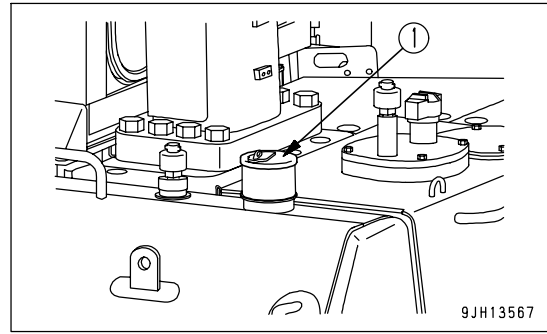
REMARK

Check the hydraulic cooler hoses. If any hose is cracked or hardened by age, replace with a new hose. Also check and tighten all loose hose clamps.



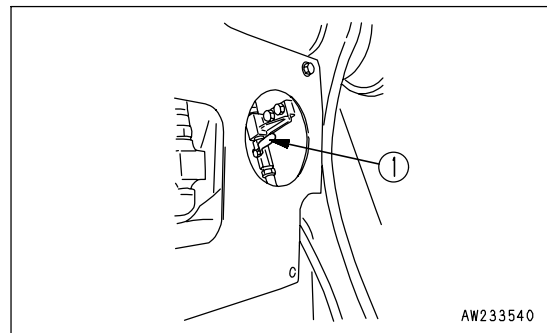
CLEAN FUEL TANK STRAINER

Clean the strainer if there is any dirt collected in it.
 Remove the filler cap (1) of the fuel tank and take out strainer.
 If the strainer is dirty, clean it with diesel fuel.



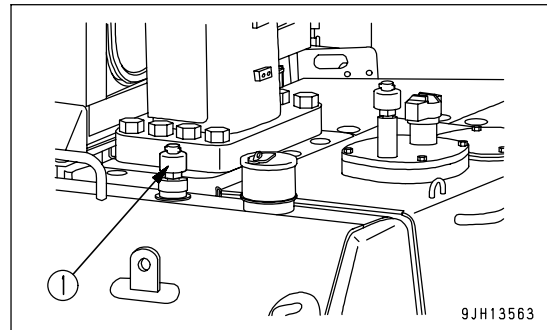
DRAIN WATER AND SEDIMENT IN FUEL TANK

Carry out this procedure after the machine has been at rest for a long time and after a long spell of rainy days.
 Loosen valve (1) at the bottom of the fuel tank, and drain the water and sediment collected at the bottom of the tank together with the fuel.



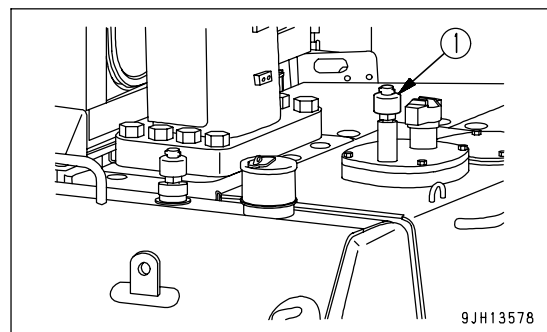
CLEAN FUEL TANK BREATHER

Remove breather (1) on the side of the fuel tank, remove any dirt stuck to the breather, then wash with clean diesel oil or flushing oil.



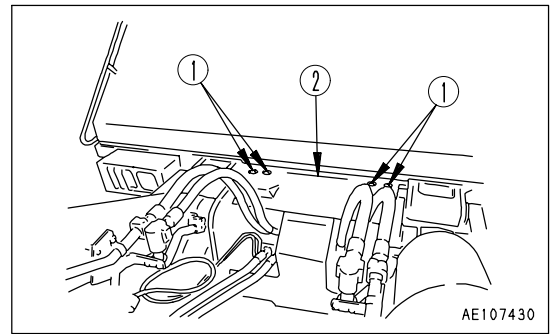
CLEAN HYDRAULIC TANK BREATHER

Remove breather (1) on the side of the hydraulic tank, remove any dirt stuck to the breather, then wash with clean diesel oil or flushing oil.

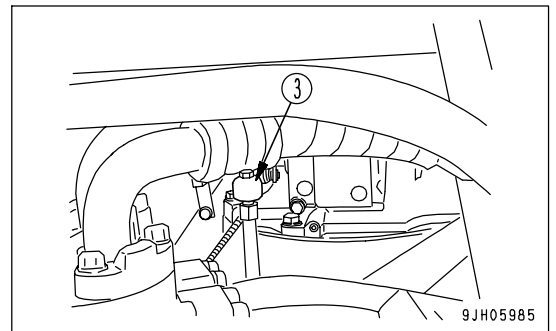


CLEAN STEERING CLUTCH CASE BREATHER

1. Open the rear cover.
2. Remove bolts (1), then remove cover (2).

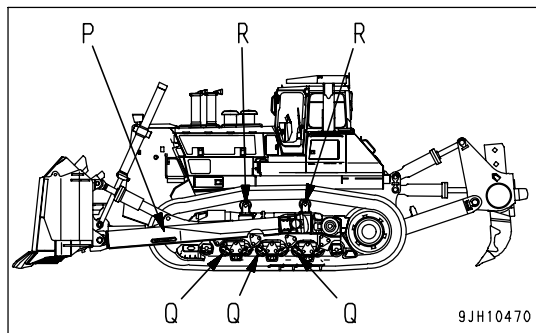


3. Remove breather (3) on steering clutch case, remove any dirt stuck to the breather, then wash with clean diesel oil or flushing oil.

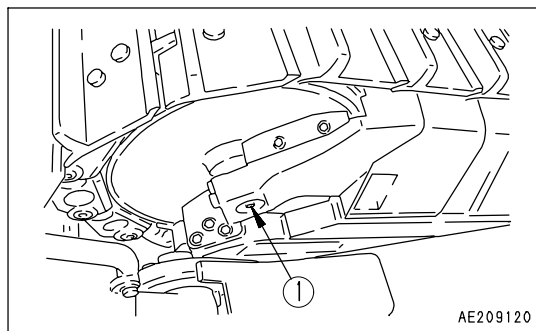


CHECK UNDERCARRIAGE OIL

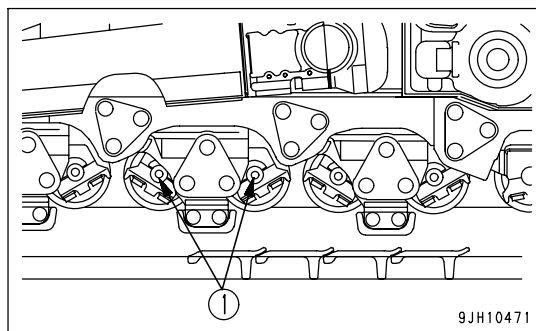
Stop the machine on level ground, and check for any reduction in the oil at the idler (portion P), track roller (portion Q), and carrier roller (portion R).



1. Loosen seal bolt (1) slowly and check if oil oozes out from the thread. If oil oozes out, the oil level has not gone down, so tighten the bolt.

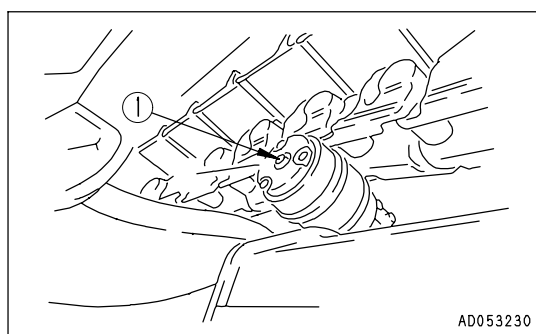


2. If no oil comes out even when seal bolt is removed, the oil level is low. Contact your Komatsu distributor for repairs.



REMARK

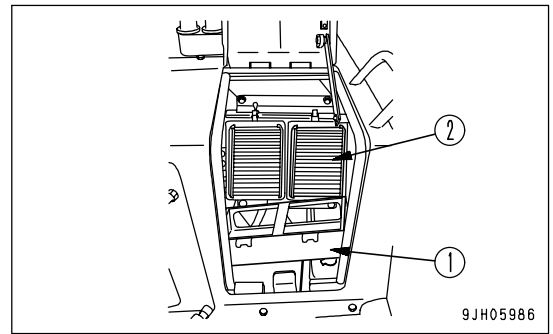
Bogie shaft seal bolt (1) is located on both the inside and outside.



CLEAN AIR CONDITIONER AIR FILTER (FRESH/RECIRC FILTER)

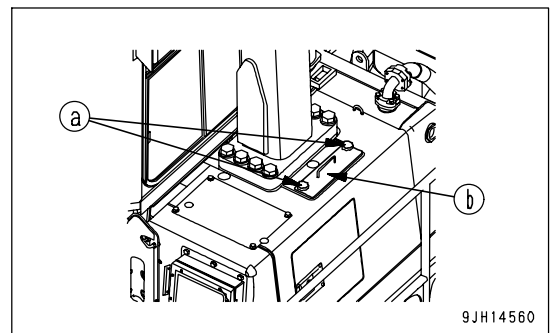
Clean the air conditioner air filter if it becomes clogged or if there is dirt or oil stuck to it.

1. Open inspection cover (1) and remove fresh air filter (2).

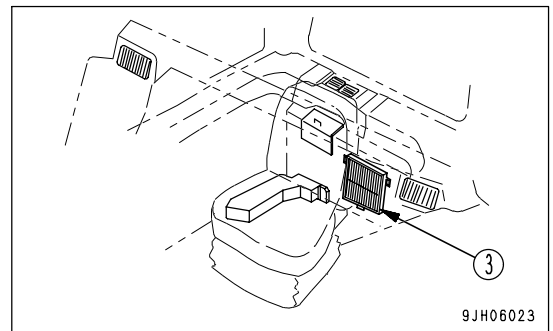


(For mining specification machine)

Loosen nut (a), pull handle (b), and remove the FRESH filter.



2. Remove RECIRC filter (3) at the rear of the cab.
3. Use compressed air to clean filters (2) and (3).
If there is any oil stuck to the filter or it is extremely dirty, wash it in water containing a neutral agent.
After washing with water, dry the filter thoroughly and use it again.

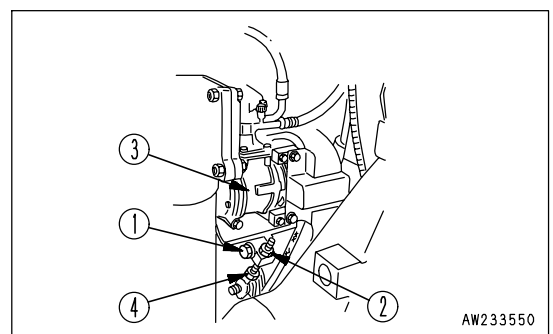


REMARK

If the filters cannot be cleaned with air or in water, replace them with new ones.

REPLACE AIR CONDITIONER BELT

1. Loosen 3 bolts (1) and lock nut (2), then move compressor (3) to the side.
2. Replace the V-belt.
 - When adjusting the V-belt, do not push the compressor directly with a bar. Use adjust nut (4).
Tighten adjust nut (4) and bolts (1), and apply tension to the V-belt. The standard deflection for the V-belt is approx. 18 to 22 mm (0.71 to 0.88 in) when the belt is pushed by thumb (approx. 58.8 N {6 kg}) at a point midway between the air compressor pulley and fan pulley.



CHECK AND ADJUST AIR CONDITIONER

CHECK TENSION OF COMPRESSOR BELT

If the belt is loose, it will slip and the cooling effect will be reduced. From time to time, press a point midway between the alternator drive pulley and compressor pulley with your finger and check that the tension.

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

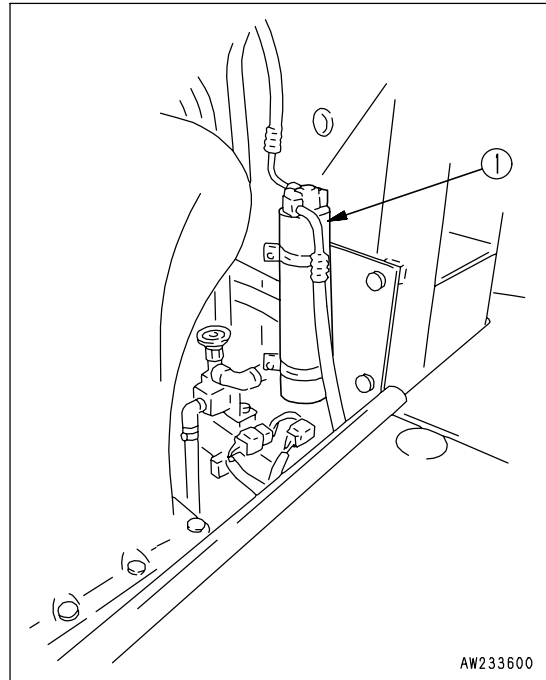
For check tension of belt, see "CHECKING (PAGE 4-56)".

CHECK LEVEL OF REFRIGERANT(GAS)

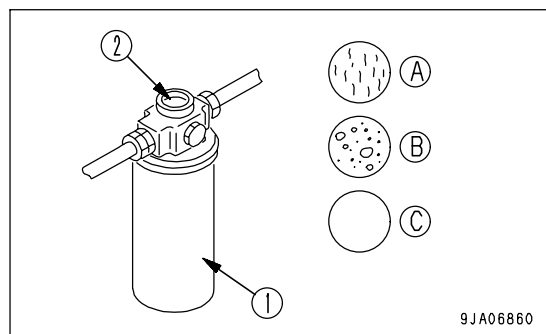
! WARNING

- When handling refrigerant gas, always follow local laws and regulations.
- The refrigerant used in the cooler is colorless and odorless and does not harm the atmosphere, but if the liquid gets into your eyes or on your hands, it may cause loss of sight or frostbite, so never loosen any part of the refrigerant circuit.

If the level of the refrigerant (gas) is low, the cooling effect will be reduced. Run the engine at high idle, and check the flow of the refrigerant gas (R134a) in the refrigerant circuit through the sight glass (2) (inspection window) of the receiver (1) when the cooler is running at high speed.



- (A) Correct: No bubbles are included in the flow
- (B) Low: Bubbles are included in the flow (bubbles pass continuously)
- (C) None: Colorless, transparent



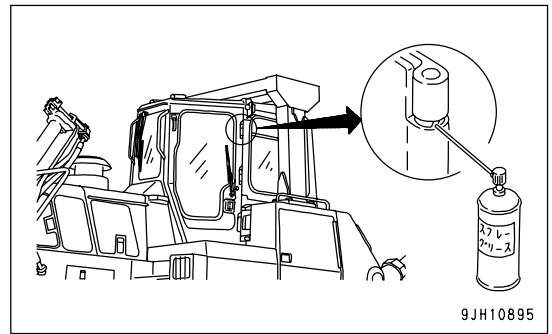
REMARK

- When there are bubbles, the refrigerant gas level is low, so contact your refrigerant dealer to have refrigerant added. If the air conditioner is run with the refrigerant gas level low, it will cause damage to the compressor.
- New Freon R134a is used as the refrigerant.

Charge amount of air conditioner refrigerant (gas): 1100 g

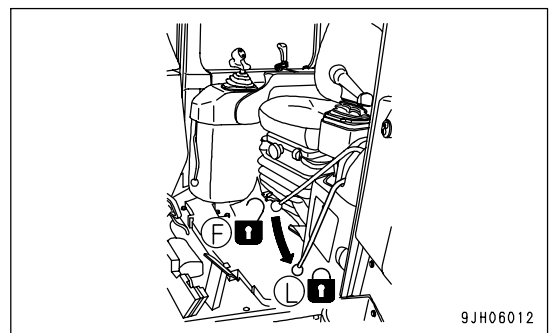
LUBRICATE DOOR HINGE

If the door makes a squeaking noise when it is opened or closed, spray lubricant in through the split in the hinge bushing.
If the bushing is worn, replace the hinge.



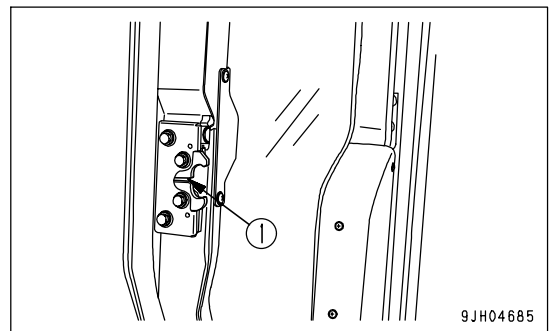
CHECK DOOR LATCH

WARNING
If the control lever is touched by accident during checking, the machine moves off suddenly, and this may lead to serious injury or death.
Before checking door latch, stop the engine and set the parking brake lever securely to the LOCK position.



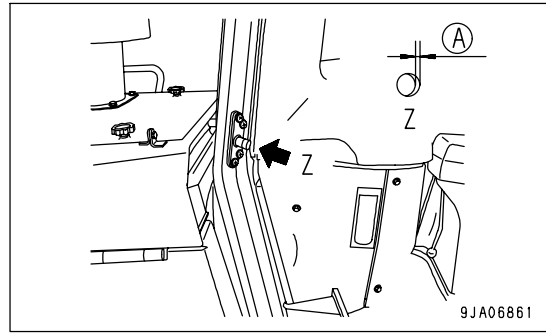
Check
Hold the door open-locked, and check that there is still grease inside the latch. If the amount of grease is low or there is no more grease, coat the inside of the latch with grease from portion (1).

REMARK
If there is no more grease inside the latch, the movement will become poor because of dust inside the latch, and the handle may be stiff when opening the door.



CHECK DOOR LOCK STRIKER

If wear (A) of the door of lock striker exceeds 0.5 mm (0.02 in), replace the striker. If it is used as it is, the play will increase and this may result in breakage of the hinge or door lock.

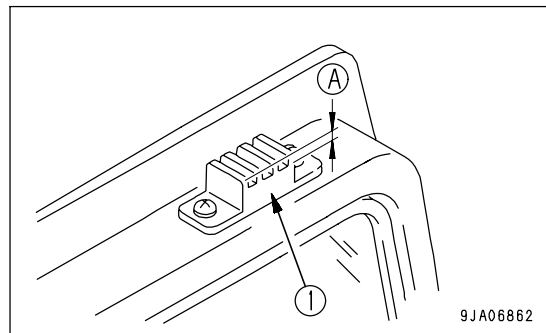


9JA06861

REPLACE DOOR DAMPER

If depth (A) of the groove of door damper rubber (1) is less than 2 mm (0.08 in), replace the damper.

There are 4 dampers: 1 each at the top and bottom on the left and right doors.



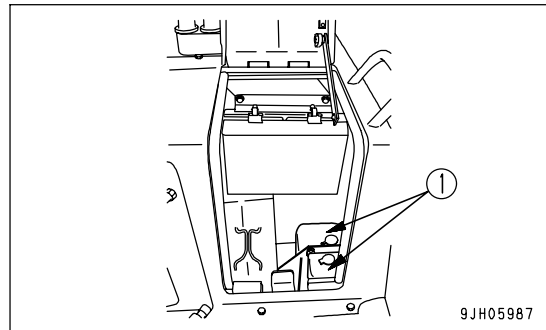
9JA06862

CHECK WINDOW WASHER FLUID LEVEL, ADD FLUID

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

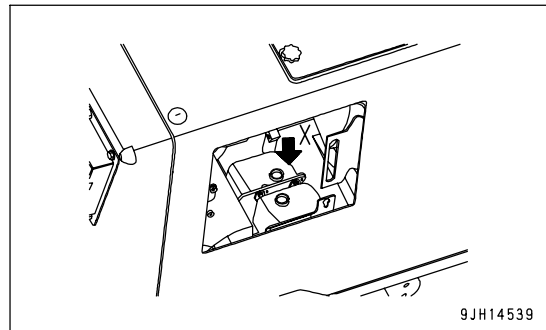
Open the battery cover, check the level of the fluid in window washer tank (1), and if it is low, add automobile window washer fluid.

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



9JH05987

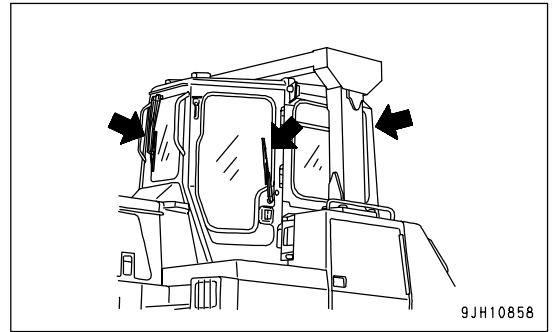
(For mining specification machine)



9JH14539

REPLACE WIPER BLADE

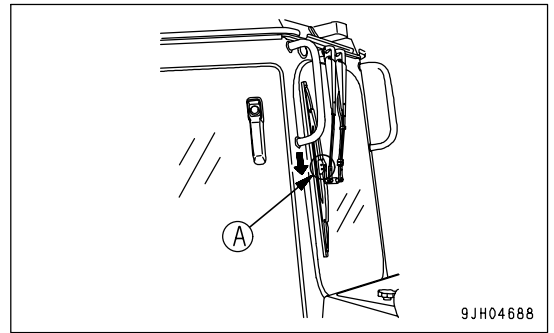
If the blade is damaged, it will not wipe the window clean, so replace the blade.



REPLACEMENT

FRONT, REAR WIPER

1. It is hooked at portion (A), so move the blade in the direction of the arrow to remove it.
2. Install the new blade and hook it securely.

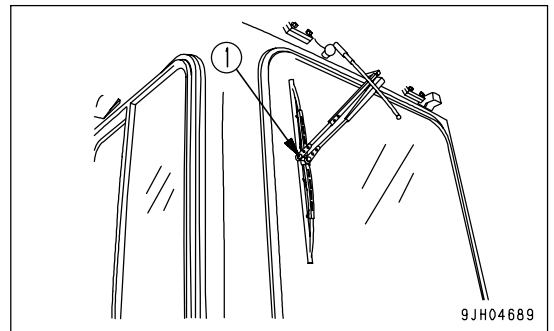


REAR WIPER

1. Remove E-ring (1).

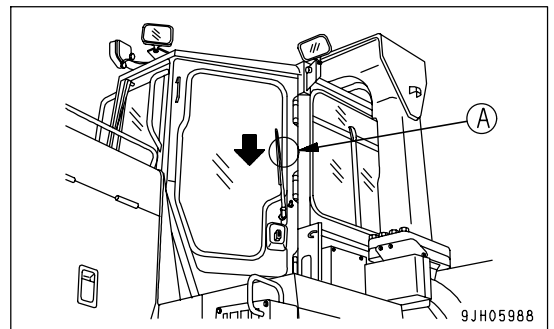
The blade can then be removed.

2. Install a new blade, then install securely with E-ring (1).



DOOR WIPER

1. It is hooked at portion (A), so move the blade in the direction of the arrow to remove it.
2. Install the new blade and hook it securely.



BLEEDING AIR IN HYDRAULIC SYSTEM

See "OPERATIONS AND CHECKS AFTER STARTING ENGINE (PAGE 3-119)".

Since the engine must be started and the blade must be operated, see OPERATION.

NOTICE

If the engine is run at high speed immediately after startup or a cylinder is pushed up to its stroke end, air taken inside the cylinder may cause damage to the piston packing.

1. Bleeding air from cylinders

- 1) Run the engine at low idle, and extend and retract each cylinder 4 to 5 times, taking care that a cylinder is not moved to the end of its stroke. (Stop the cylinder approx. 100 mm (3.9 in) short of its stroke end)
- 2) Next, operate each cylinder 3 to 4 times to the end of its stroke.
- 3) Finally, operate each cylinder 4 to 5 times to the end of its stroke to completely remove the air.

BLEED AIR FROM FUEL CIRCUIT

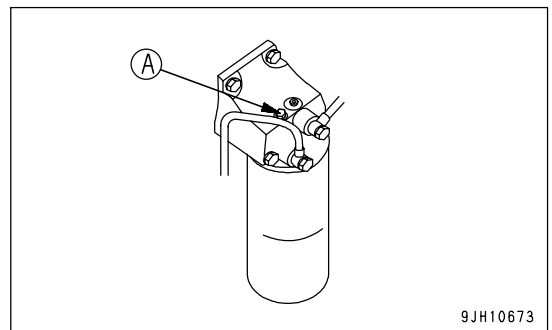
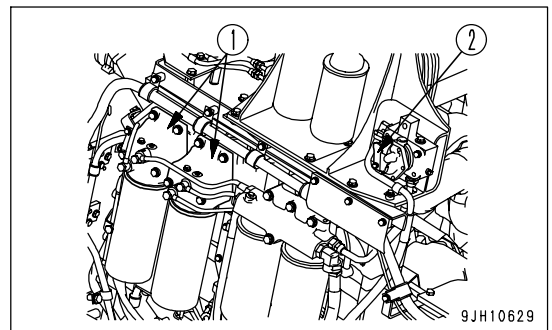
In the following cases, carry out the procedure given below to bleed the air from the fuel circuit.

- 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

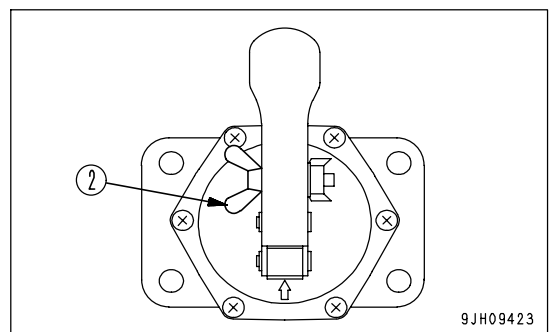
! CAUTION

- The fuel injection pump and nozzle of this engine consist of more precise parts than the conventional ones. If foreign matter enters them, it can cause a trouble. Accordingly, if dust sticks to the fuel system, wash it off with clean fuel.
- When opening the air bleeding plug at the fuel filter head, take care. Fuel may spout because of residual pressure.

1. Loosen air bleed plug (A) of fuel filter head (1).



2. Loosen the wing nut of priming pump (2), carry out pumping to pump out the bubbles from air bleed plug (A), and check that fuel comes out.
3. Tighten the air bleed plug (A).
Tightening torque: 2.0 to 3.9 Nm {0.2 to 0.4 kgm}
4. Tighten the butterfly nut of the lever of priming pump (2).

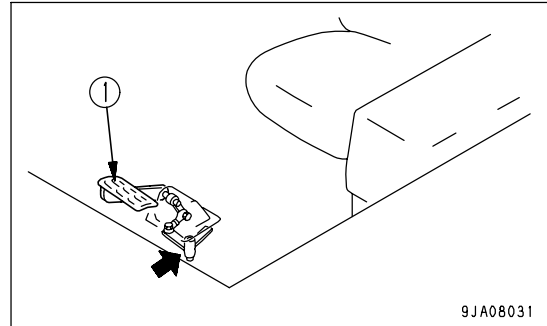


5. If the engine does not start, repeat the operation from Step 1.

LUBRICATING

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

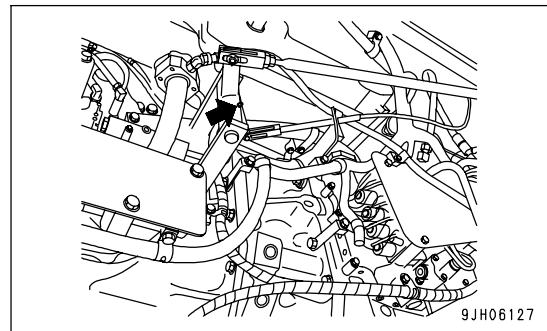
Fuel control (1 place)



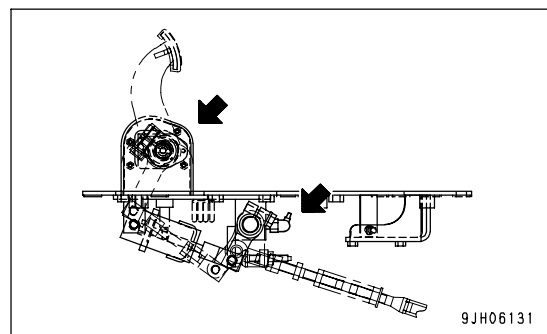
9JA08031

(1)Decelerator pedal

Brake pedal (3 places)

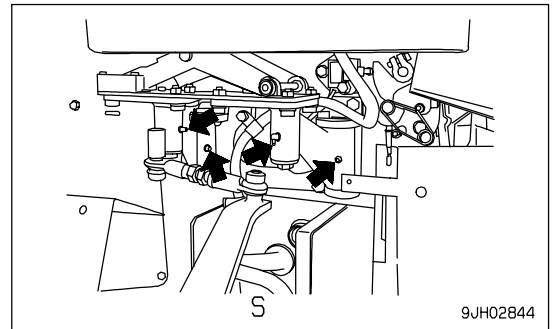
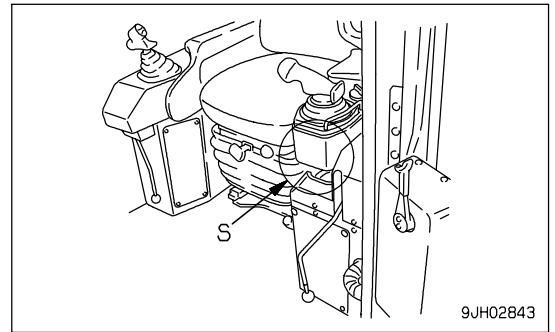


9JH06127

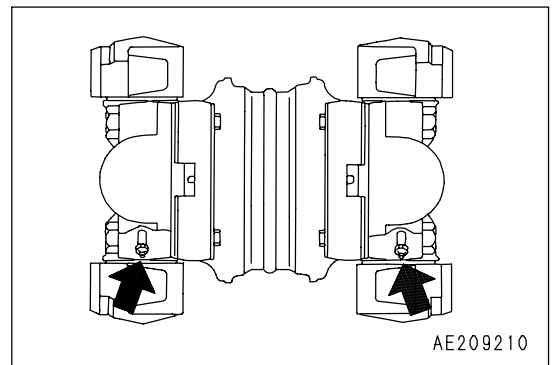


9JH06131

Steering, directional, gearshift lever rotating link (4 places)



Universal joint (2 places)

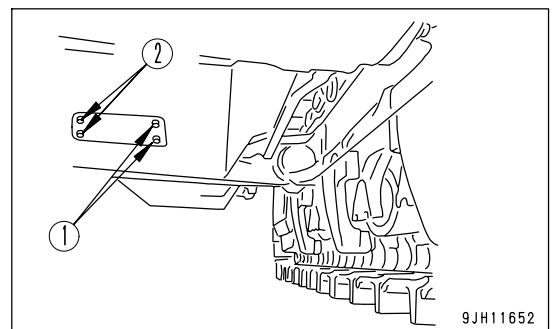


! WARNING

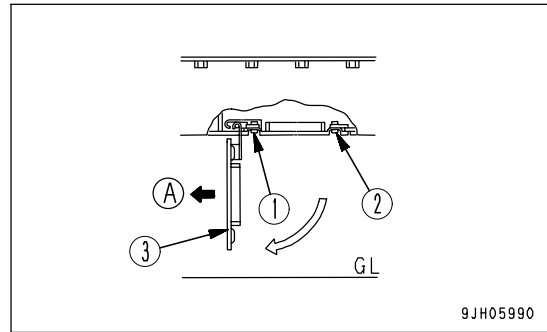
The undercover is heavy. Never try to open or close the cover when directly beneath it. When removing bolts(2), carry out the work from the rear of the cover so that you can easily get out of the way.

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

- 1) Remove 2 bolts (1) at the front of the machine.
- 2) Support the cover with your elbow while gradually removing 2 bolts (2) at the rear of the machine.
- 3) Lower the cover gradually to open it.



(A) Right of machine



CHECK BEFORE STARTING

For details of the following items, see "CHECK BEFORE STARTING (PAGE 3-91)".

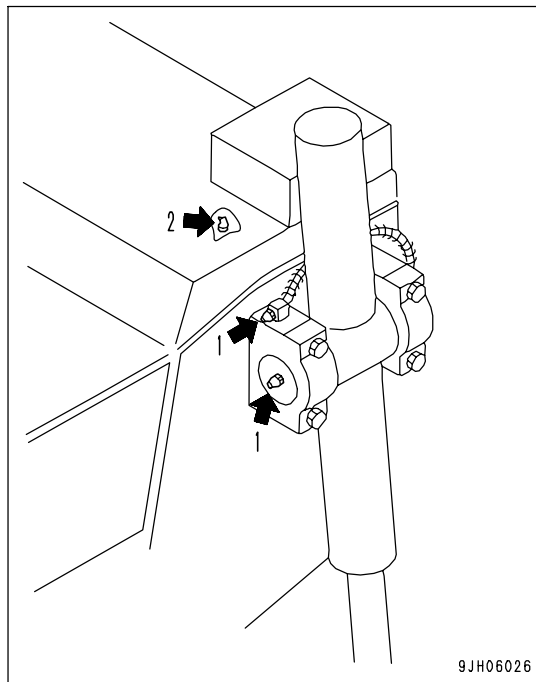
- Checking with machine monitor
- Check coolant level, add coolant
- Check fuel level, add fuel
- Check for water and sediment in water separator, drain water
- Check oil level in engine oil pan, add oil
- Check oil level in power train case (incl. transmission case, torque converter case and bevel gear cases), add oil
- Check damper case oil level, add oil
- Check brake pedal travel
- Check dust indicator
- Check oil level in hydraulic tank, add oil
- Check electric wiring
- Check that lamps light up
- Check horn sound
- Check backup alarm sound
- Adjusting operator's seat
- Check seat belt for wear or damage
- Adjust mirror
- Adjust joystick
- Adjust armrest

EVERY 250 HOURS SERVICE

LUBRICATING

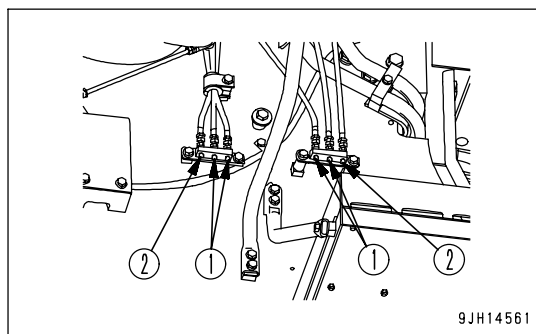
1. Lower the work equipment to the ground, then stop the engine.
2. Using a grease pump, pump in grease through the grease fittings shown by arrows.
3. After greasing, wipe off any old grease that was pushed out.

- (1) Blade lift cylinder support yoke (4 places)
- (2) Blade lift cylinder support shaft (2 places)

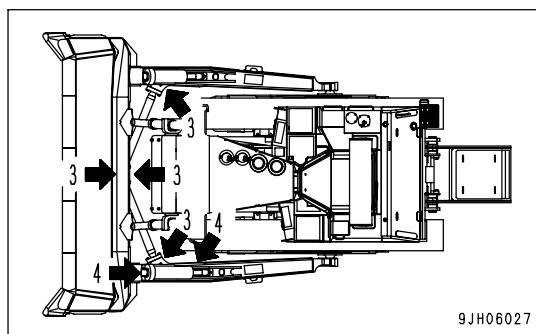


(Mining specification, if equipped)

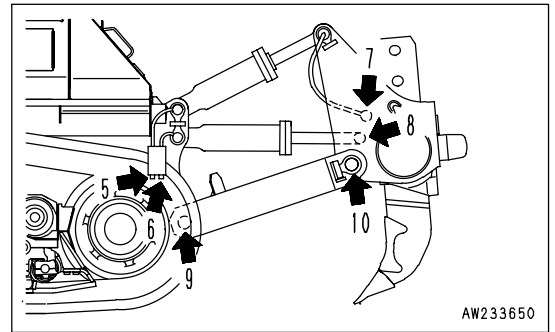
Centralized lubricating



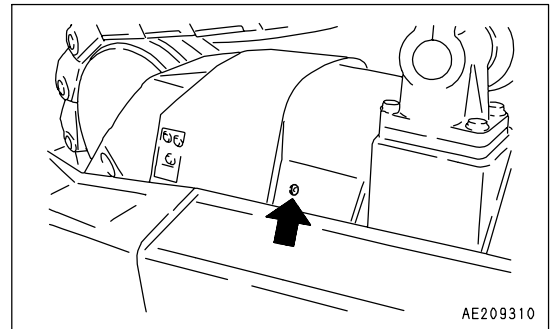
- (3) Blade-arm ball joint (3 places)
- Center link pin (1 place)
- (4) Brace screw (2 places)



- (5) Ripper tilt cylinder bottom pin (2 places)
 - (6) Ripper lift cylinder bottom pin (2 places)
 - (7) Ripper tilt cylinder rod end pin (2 places)
 - (8) Ripper lift cylinder rod end pin (2 places)
 - (9) Ripper arm pin (front) (2 places)
 - (10) Ripper arm pin (rear) (2 places)
- The illustration on the right shows Giant Ripper (if equipped).

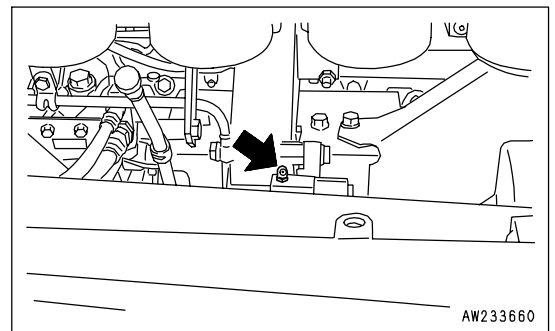


- (11) Equalizer bar side shaft (2 places)



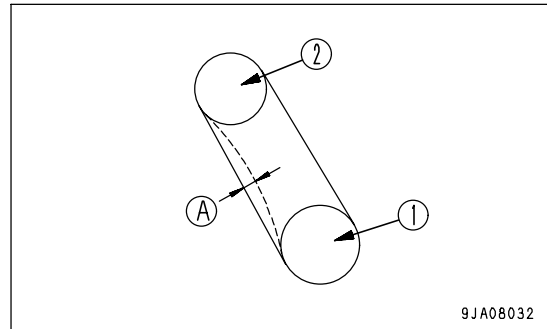
- (12) Suspension (equalizer bar center shaft) (1 place)

1. Add grease to the suspension (equalizer bar center shaft) through the grease fitting on the right side of the engine room (marked with an arrow).
2. Pump the greasing lever up and down 3 to 5 times.



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

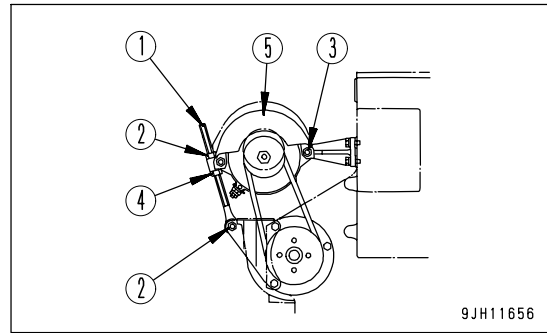
Push a point midway between drive pulley (1) and alternator pulley (2) with a finger to check the tension. Deflection (A) when 1 belt is pressed with a finger force of approx. 6 kg should be approx. 15 mm.



9JA08032

ADJUSTING

1. Loosen nuts (2) of adjust bolt (1) and mounting nut (3) (at 3 spots).
2. Turn nut (4) clockwise, then move alternator (5) to adjust the belt tension so that the deflection is approx. 15 mm (0.59 in) when pushed with a force of 6 kg.



9JH11656

REMARK

When adjusting the belt tension, never push the alternator directly with a bar. If it is necessary to push the alternator, insert a piece of wood in-between and push it with a bar.

3. Tighten loosened nuts (2) and (3) to secure alternator (5) (at 3 spots).
4. Check for damage to the pulleys, and wear of the V-groove and V-belt. Be particularly careful to check that the V-belt is not in contact with the bottom of the V-groove.
5. If any belt has stretched and there is no allowance for adjustment, or if there are cuts or cracks on any belt, replace the belt.
6. After replacing the belt, operate for one hour, then adjust again.

CHECK LEVEL OF BATTERY ELECTROLYTE

Carry out this procedure before operating the machine.

! WARNING

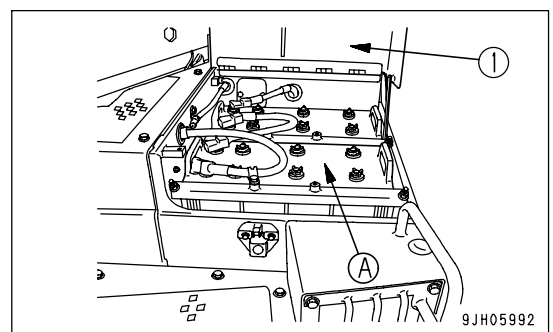
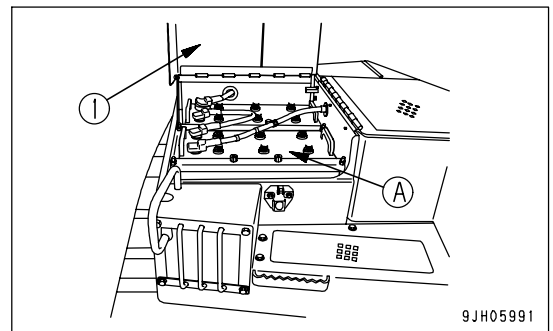
- Do not use the battery if the battery electrolyte level is below the LOWER LEVEL line. This will accelerate deterioration of the inside of the battery and reduce the service life of the battery. In addition, it may cause an explosion.
- The battery generates flammable gas and there is danger of explosion,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

NOTICE

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

Inspect the battery electrolyte level at least once a month and follow the basic safety procedures given below.

Open covers (1) on the left and right sides of the machine. The batteries are mounted at portion (A).

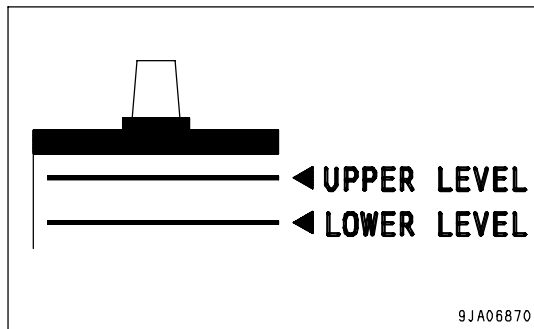


WHEN CHECKING ELECTROLYTE LEVEL FROM SIDE OF BATTERY

If it is possible to check the electrolyte level from the side of the battery, check as follows.

1. Use a wet cloth to clean the area around the electrolyte level lines and check that the electrolyte level is between the UPPER LEVEL (U.L.) and LOWER LEVEL (L.L.) lines.

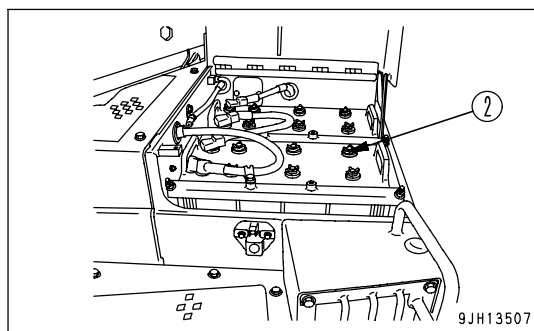
If the battery is wiped with a dry cloth, static electricity may cause a fire or explosion.



2. If the electrolyte level is below the midway point between the UPPER LEVEL (U.L.) and LOWER LEVEL (L.L.) lines, remove cap (2) and add purified water (e.g. commercially available replenishment water for a battery) to the U.L. line.
3. After adding distilled water, tighten cap (2) securely.

REMARK

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



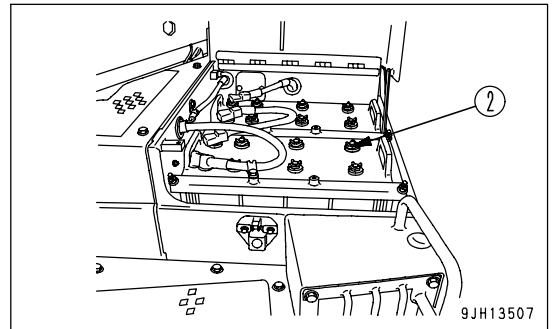
WHEN IT IS IMPOSSIBLE TO CHECK ELECTROLYTE LEVEL FROM SIDE OF BATTERY

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

1. Remove cap (2) at the top of the battery, look through the water filler port (3), and check the electrolyte surface. If the electrolyte does not reach the sleeve (4), add purified water (e.g. commercially available replenishment water for a battery) so that the level reaches the bottom of the sleeve (UPPER LEVEL line) without fail.

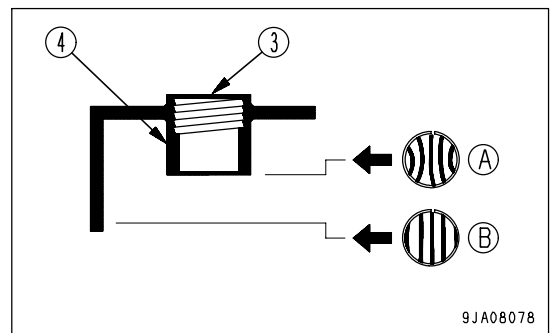
- (A) Suitable level: Electrolyte level is up to bottom of sleeve, so surface tension causes electrolyte surface to bulge and poles appear bent.
- (B) Low: Electrolyte level is not up to bottom of sleeve, so poles appear straight and not bent.

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



REMARK

If water is added to above the bottom tip of the sleeve, use a pipette to remove electrolyte. Neutralize the removed electrolyte with sodium bicarbonate, then flush it away with a large amount of water. If necessary, contact your Komatsu distributor or your battery maker.



WHEN IT IS POSSIBLE TO USE INDICATOR TO CHECK ELECTROLYTE LEVEL

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

CHECK BRAKE PERFORMANCE

**WARNING**

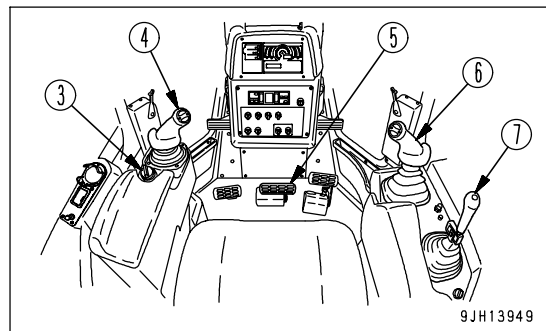
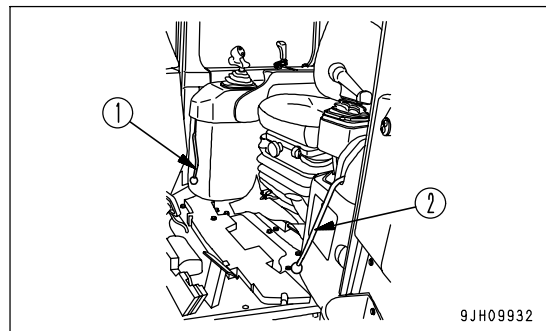
If the machine moves during the following operation, please contact your Komatsu distributor for repairs immediately.

NOTICE

Set the steering, directional, speed lever to 1st and depress the brake pedal. Run the engine at low speed. Do not run it at full speed; this will cause damage to the machine.

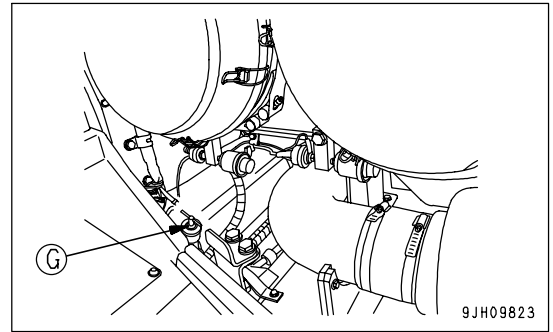
Before starting the engine, check that the area around the machine is safe, then do as follows:

1. Start the engine.
2. After completing the warm-up operation, set fuel control dial (3) to the SLOW position.
3. Set work equipment lock lever (1) to the FREE position then operate blade control lever (6) and ripper control lever (7) to raise the blade and ripper.
Leave the work equipment lock lever (1) in the FREE position.
4. Set parking brake lever (2) to the FREE position.
5. Depress brake pedal (5), set steering, directional, speed lever (4) to FORWARD, then press the shift-up button to set to 2nd.
6. Operate fuel control dial (3) and gradually raise the engine speed to full throttle. (Keep the brake pedal depressed.)
7. Check that the machine does not move. This indicates that brake performance is normal.

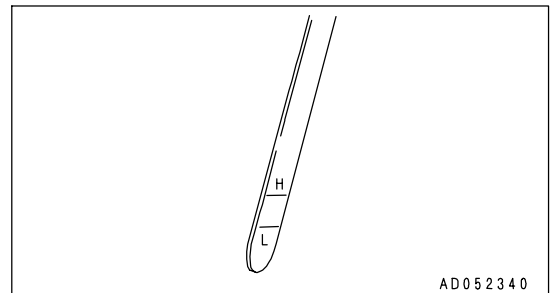


CHECK OIL LEVEL IN DAMPER CASE, ADD OIL

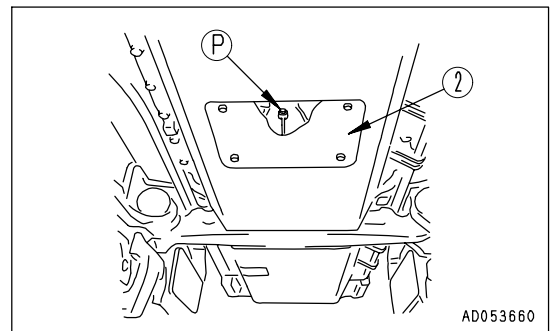
1. Open the engine side cover on the right side of the machine.
2. Remove dipstick (G) and wipe the oil off with a cloth.
3. Fully insert dipstick (G) into filler pipe, then remove it.



4. The oil should be between the H and L marks on dipstick (G).
If the oil is below the L mark, add oil through the dipstick insertion port.



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



REMARK

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

EVERY 500 HOURS SERVICE

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

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



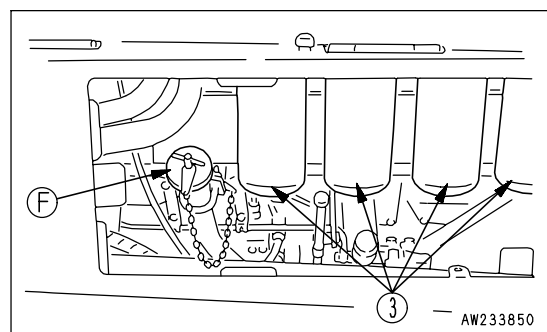
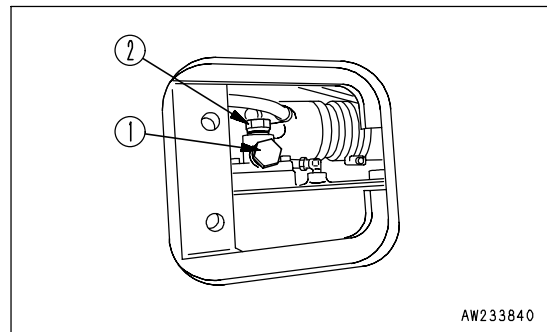
WARNING

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

NOTICE

If fuel has a high sulphuric content, shorten the replacement interval of engine oil. For more details, see "RECOMMENDED FUEL, COOLANT, AND LUBRICANT (PAGE 4-12)".

- Use a venturi component type for the engine oil filter.
 - Refill capacity: 121 liters (31.97 US gal)
 - Prepare a socket wrench and filter wrench.
1. Open cover under the chassis. Set a container to catch oil under drain valve (2).
 2. Remove drain plug (1) and slowly open drain valve (2), and drain the oil.
Take care not to open drain valve (2) so much that the stopper pin in the valve is distorted.
Tightening torque for drain plug (1): $68.6 \pm 9.81 \text{ Nm}$
($7 \pm 1 \text{ kgm}$, $50.6 \pm 7.2 \text{ lbft}$)
Tightening torque for drain valve (2): $63.7 \pm 14.7 \text{ Nm}$ ($6.5 \pm 1.5 \text{ kgm}$, $47.0 \pm 10.8 \text{ lbft}$)
 3. Check the drained oil, if there is excessive metal particles or foreign material, contact your Komatsu distributor.
 4. Close drain valve (2) and insert and tighten drain plug (1).
 5. Use a filter wrench and remove each filter cartridge (3) in turn, starting from the front of the machine.
 6. Clean the filter holder, fill the new filter cartridge with engine oil, coat the packing surface and thread with engine oil (or coat it thinly with grease), then install the filter cartridge.
 7. When installing the filter cartridge, bring the packing surface into contact with the filter holder, then tighten a further 3/4 to 1 turn.

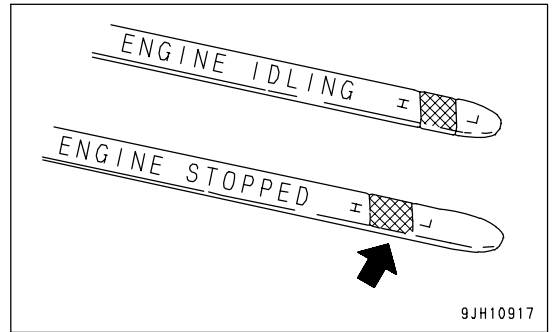


8. After replacing the filter cartridge, add engine oil through oil filler port (F) until the oil level is between the H and L marks on the dipstick.

9. Run the engine at idling for a short time, then stop the engine, and check that the oil level is between the H and L marks on the dipstick. For details, see "CHECK OIL LEVEL IN ENGINE OIL PAN, ADD OIL (PAGE 3-96)".

Even if the machine has not been operated for 500 hours, the oil and filter cartridge must be replaced when the machine has been operated for 12 months.

In the same way, even if the machine has not been operated for 12 months, the oil and filter cartridge must be replaced when the machine has been operated for 500 hours.



(Mining specification, if equipped)

If a quick coupler is installed for draining or adding engine oil, use the quick coupler.

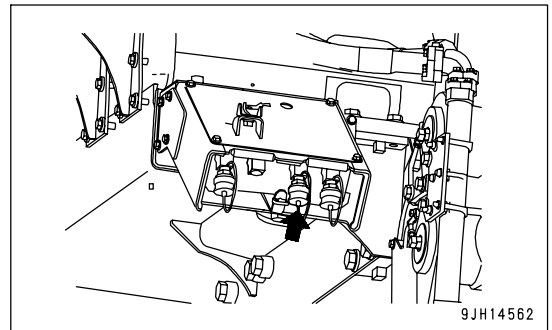
Quick coupler

Manufacturer: WIGGINS

Model: ON2

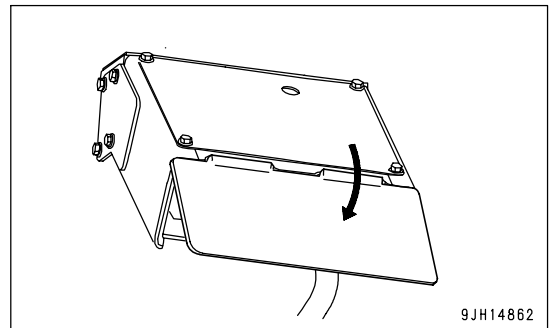
Mounting screw

Size: 3/4-14 NPT



NOTICE

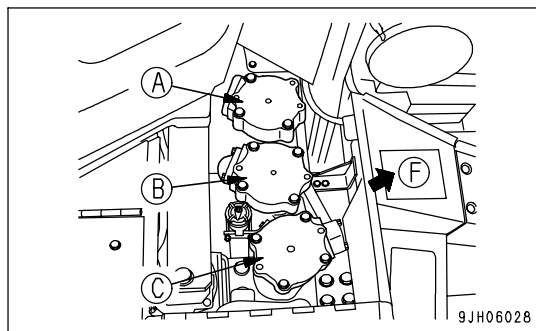
If the quick coupler is not installed securely, oil may be sent flying around during refilling. For safety, use the quick coupler with the box cover closed.



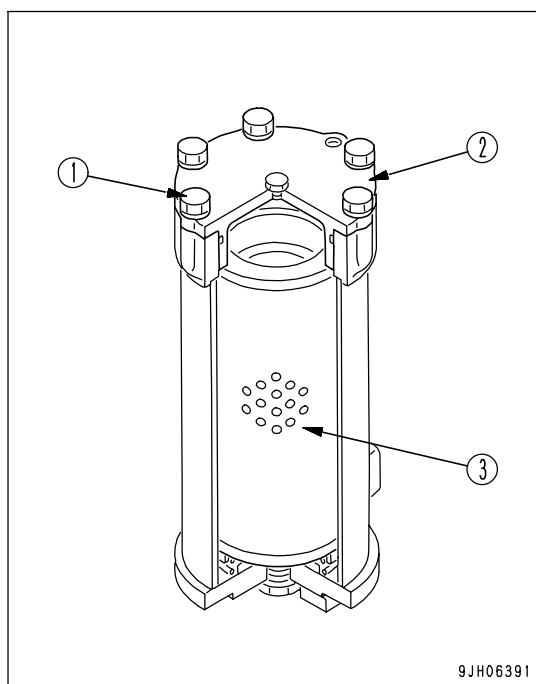
REPLACE TRANSMISSION FILTER ELEMENT, TRANSMISSION LUBRICATION FILTER ELEMENT AND TORQUE CONVERTER OIL FILTER ELEMENT**WARNING**

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

1. Remove the floor cover on right side fender.
 - (A) Torque converter oil filter
 - (B) Transmission lubrication filter
 - (C) Transmission filter
 - (F) Direction of advance



2. Remove mounting bolt (1) of the filter, then remove cover (2).
3. Take out element (3).
4. Clean inside of the case and the removed parts, then install a new element.
Replace the O-ring with a new one.



REPLACE FUEL PRE-FILTER CARTRIDGE

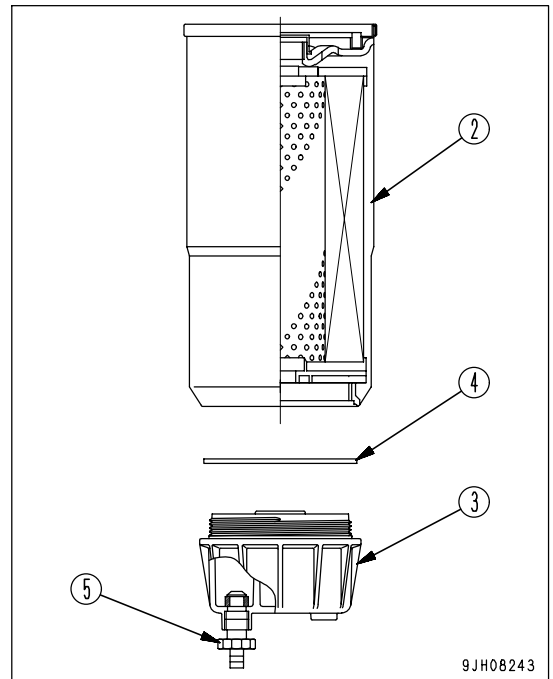
WARNING

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

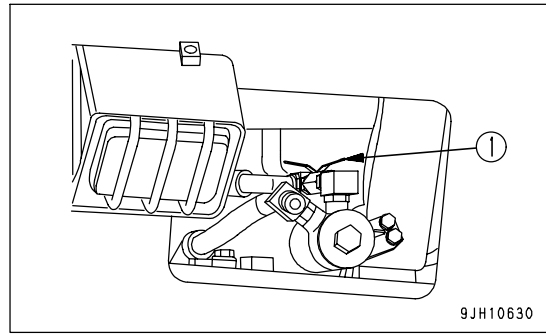
NOTICE

- Genuine Komatsu fuel filter cartridges use a special filter that has highly efficient filtering ability. When replacing the filter cartridge, always use a genuine Komatsu part.
- The common rail injection system used on this machine consists of more precise parts than the conventional injection pump and nozzle. If any part other than a genuine Komatsu filter cartridge is used, dust or dirt may get in and cause problems with the injection system. Always avoid using substitute parts.
- When carrying out inspection or maintenance of the fuel system, pay more attention than normal to the entry of dirt. If dirt is stuck to any part, use fuel to wash it off completely.

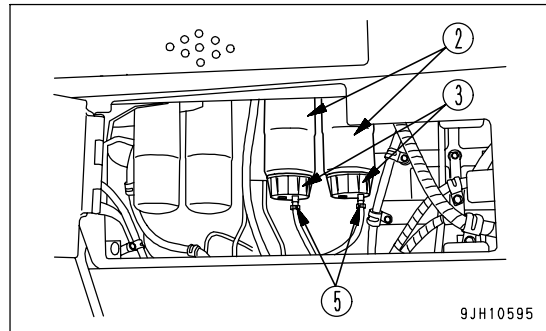
- Container to catch the oil
- Prepare a filter wrench



1. Close the fuel valve (1).
2. Set a container under the fuel pre-filter cartridge to catch the oil.
3. Remove transparent cup (3) from the filter (2) and inspect it. If it is broken or damaged, replace it with a new part.



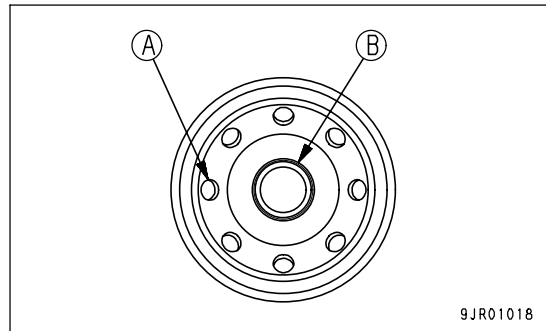
4. Clean transparent cup (3) and remove seal (4). Coat the new seal with clean fuel or oil.
5. Install transparent cup (3) to the new filter cartridge. Tightening torque for cup: 10 Nm {1.0 kgm, 7.2 lbft}



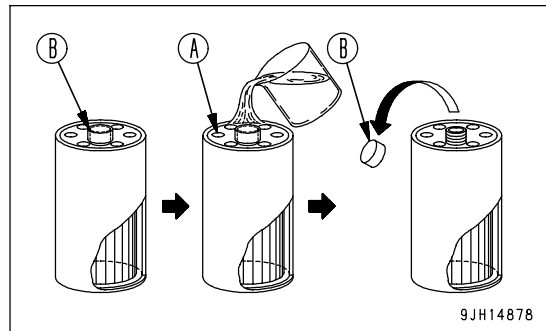
6. Check that cap (B) is installed to the new filter cartridge, then fill with clean fuel.

NOTICE

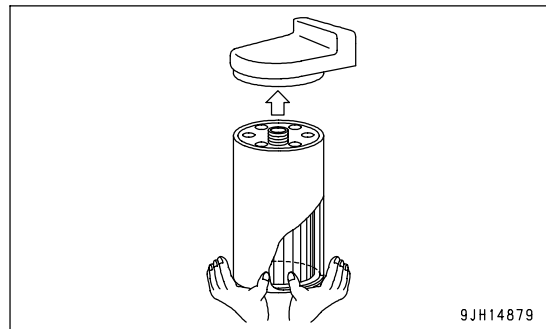
When filling with fuel, always use fresh fuel and be careful not to let any dirt or dust get in. Fill with fuel through 8 small holes (A) (dirty side). Cap (B) is to prevent oil containing dirt from getting into the clean side. Always add the oil with cap (B) installed.



7. Remove cap (B) after topping off the filter cartridge with fuel.



8. Clean the filter holder, coat the seal surface of the new cartridge thinly with oil, then install the cartridge.
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.



- Open the fuel valve, start the engine, and run the engine for approx. 10 minutes at low idling until the engine speed stabilizes. Check for any leakage of oil from the filter cartridge seal surface or transparent cup, and check for any sucking in of air.

NOTICE

When replacing the fuel main filter cartridge, replace the filter cartridge, then bleed the air. For details, see "REPLACE FUEL MAIN FILTER CARTRIDGE (PAGE 4-70)" in the Operation and Maintenance Manual.

Do not fill the fuel main filter cartridge with fuel.

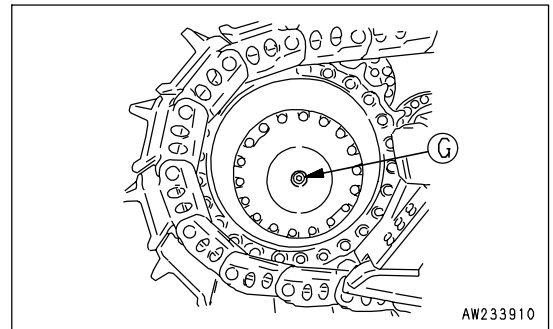
CHECK OIL LEVEL IN FINAL DRIVE CASE, ADD OIL



WARNING

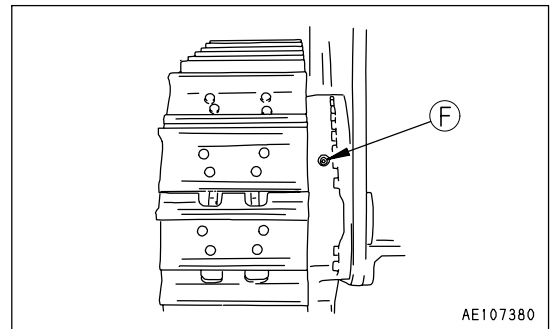
There is danger that oil may spurt out under internal pressure, so stand to the side, and gradually turn the plug to release internal pressure before removing the plug.

- Place the machine on a horizontal place.
- Remove oil level plug (G) and check the oil level. The oil level should be within a range from the bottom edge of the plug hole to 20 mm (0.8 in) down from the hole.



AW233910

- If the oil level is still too low, add oil through oil filter plug hole (F) until the oil overflows. Before removing oil plug (F), remove all the mud and dirt from around oil filler plug (F). Be careful not to let any dirt or sand get in when adding oil.



AE107380

EVERY 1000 HOURS SERVICE

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

CHANGE OIL IN POWER TRAIN CASE, CLEAN STRAINERS

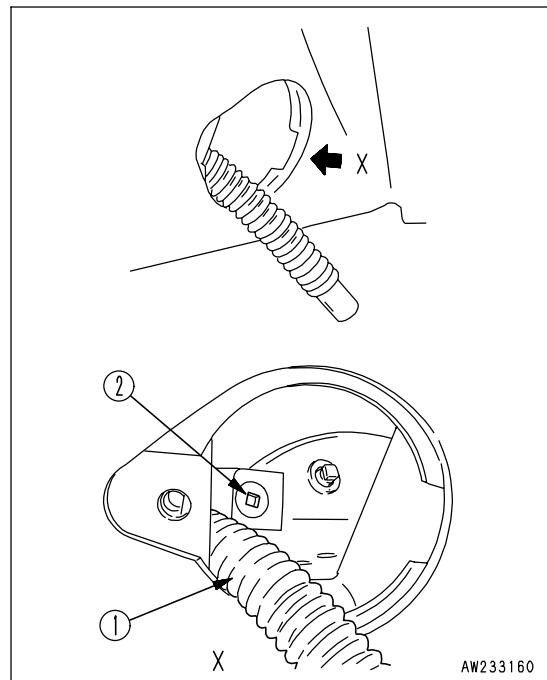
(Including transmission case, torque converter case, and bevel gear case.)

**WARNING**

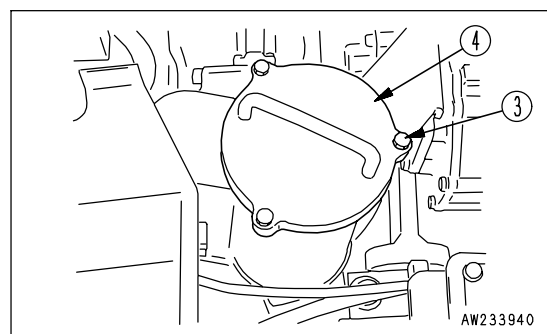
- The oil is at high temperature immediately after the machine has been operated. Wait for the oil to cool down before starting the operation.
- The undercover is heavy. Never open and close operation right below the undercover. When removing bolts, work behind the right below and be ready for escaping at any time.

- Refill capacity: 210 liters (55.48 US gal)

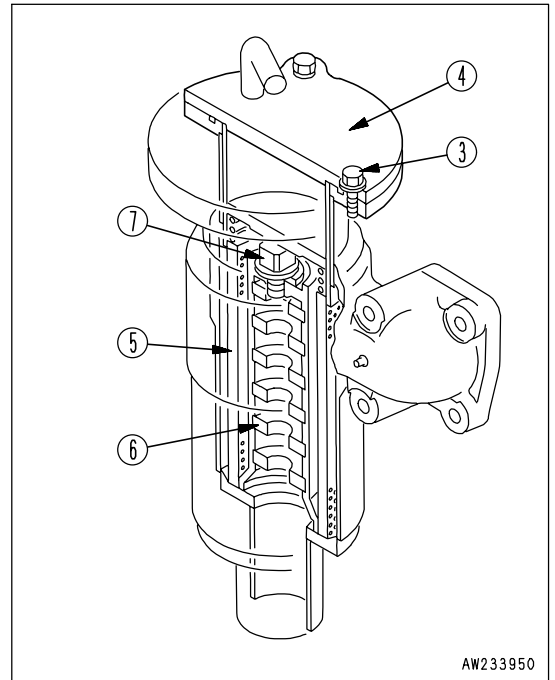
1. Remove the cover on the bottom of the rear body.
2. Pull out hose (1), then loosen drain plug (2) and drain the oil.
3. After draining the oil, tighten drain plug (2).
4. Insert hose (1) inside the cover, then install the cover.



5. Remove the cover on left fender, remove bolts (3) and case (4).
6. Take out strainer (5) and magnet (6).
If any damage to strainer (5) or magnet (6) is found, replace with a new one.

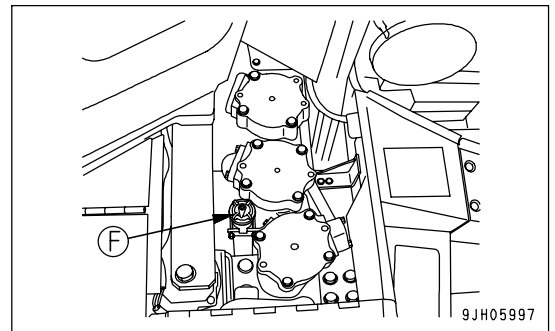


- 7. Loosen bolt (7), then divide into strainer (5) and magnet (6).
Tightening torque of bolt (7): 46 to 59 Nm (4.7 to 5.9 kgm, 34 to 43 lbft)
- 8. Remove all dirt from strainer, then wash in clean diesel oil or flushing oil.
Clean the case interior and the removed parts.
- 9. Install the strainers to their original position.
- 10. After installing, replace the element in the power train oil filter.
For details, see "EVERY 500 HOURS SERVICE (PAGE 4-62)".



AW233950

- 11. Refill the specified quantity of oil through oil filler (F).
- 12. After adding oil, check that the oil is at the specified level. For details, see "CHECK OIL LEVEL IN POWER TRAIN CASE, ADD OIL (PAGE 3-97)".



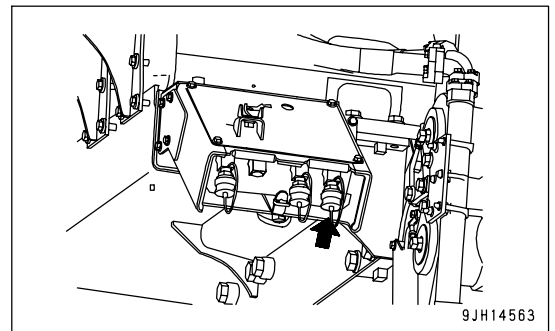
9JH05997

(Mining specification, if equipped)

If a quick coupler is installed for draining or adding power train oil, use the quick coupler.

Quick coupler
Manufacturer: WIGGINS
Model: ON2

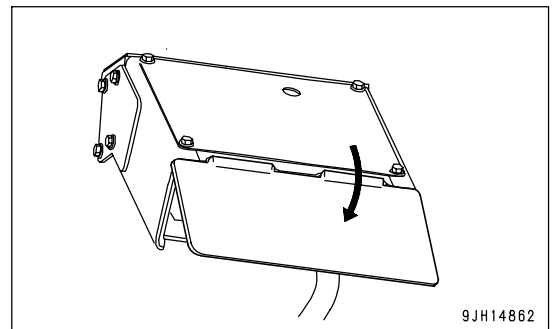
Mounting screw
Size: 3/4-14 NPT



9JH14563

NOTICE

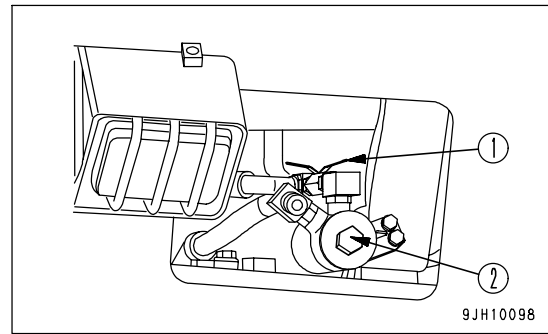
If the quick coupler is not installed securely, oil may be sent flying around during refilling. For safety, use the quick coupler with the box cover closed.



9JH14862

CHECK, CLEAN FUEL STRAINER

1. Tighten valve (1).
2. Remove cap (2), and wash the strainer and strainer case.
The strainer forms one unit with the cap.
3. After checking and cleaning, set the strainer in the case, then tighten cap (2).
4. After installing, open valve (1).

**REPLACE FUEL MAIN FILTER CARTRIDGE****WARNING**

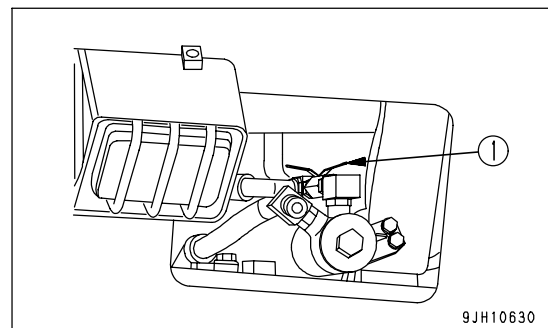
- After the engine has been operated, all parts are at high temperature, so do not replace the filter immediately. Wait for all parts to cool down before starting the operation.
- High pressure is generated inside the engine fuel piping system when the engine is running.
When replacing the filter, wait for at least 30 seconds after stopping the engine to let the internal pressure go down before replacing the filter.
- Do not bring any fire or flame close.
- Be careful when opening the air bleed plug in the fuel filter head. It is still under pressure, so fuel may spurt out.

NOTICE

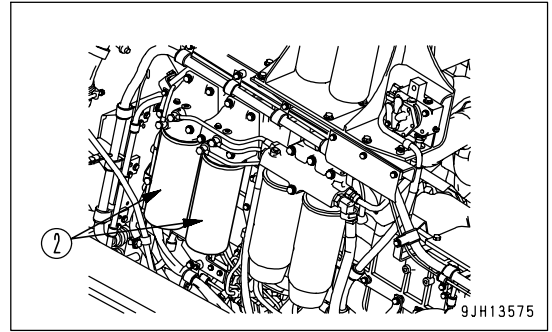
- Genuine Komatsu fuel filter cartridges use a special filter that has highly efficient filtering ability. When replacing the filter cartridge, always use a genuine Komatsu part.
- The common rail fuel injection system used on this machine consists of more precise parts than the conventional injection pump and nozzle.
If any part other than a genuine Komatsu filter cartridge is used, dust or dirt may get in and cause problems with the injection system. Always avoid using substitute parts.
- When carrying out inspection or maintenance of the fuel system, pay more attention than normal to the entry of dirt. If dirt is stuck to any part, use fuel to wash it off completely.

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

1. Set the container under the filter cartridge to catch the drained oil.
2. Close valve (1) of fuel strainer part.

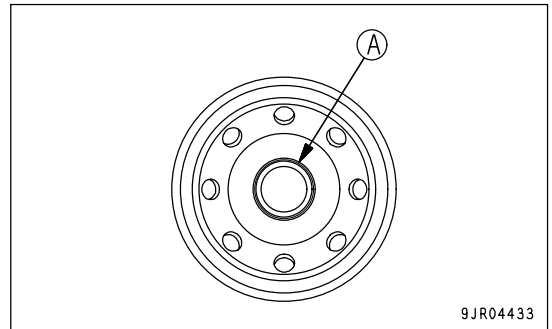


- Using a filter wrench, turn filter cartridge (2) counterclockwise to remove it.



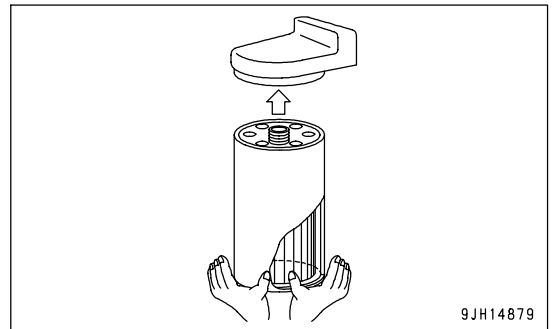
NOTICE

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



- Clean the filter holder, coat the packing surface of the new filter cartridge thinly with oil, then install the filter cartridge to the filter holder.
- When installing, tighten until the packing surface contacts the seal surface of the filter holder, then tighten a further 3/4 of a turn.

If the filter cartridge is tightened too far, the packing will be damaged and this will lead to leakage of fuel. If the filter cartridge is too loose, fuel will also leak from the packing, so always tighten to the correct amount.



- After filter cartridge (2) has been replaced with a new one, bleed air from the cartridge in reference to "BLEED AIR FROM FUEL CIRCUIT (PAGE 4-49)".

CHECK FOR LOOSE ROPS MOUNT BOLTS

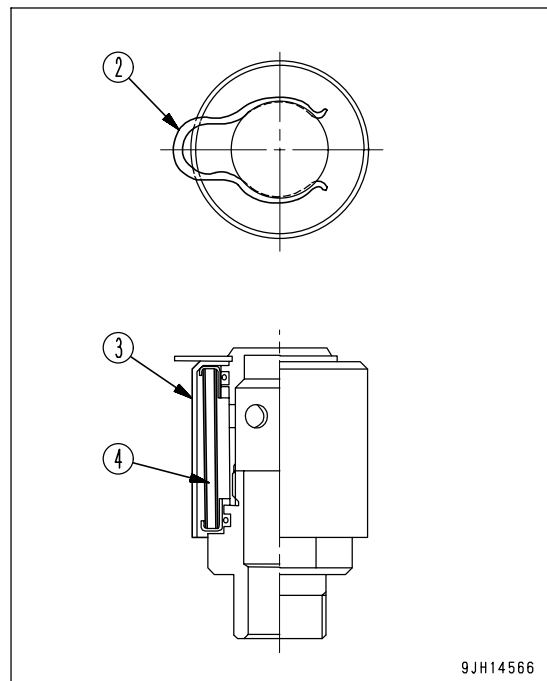
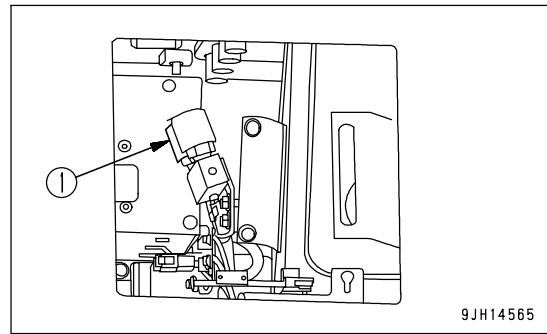
Check for loose and damaged bolts. If any loose bolt is found, tighten to a torque of 1960 to 2450 Nm (200 to 250 kgm, 1446.6 to 1808.3 lbft).

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

REPLACE POWER TRAIN CASE BREATHER

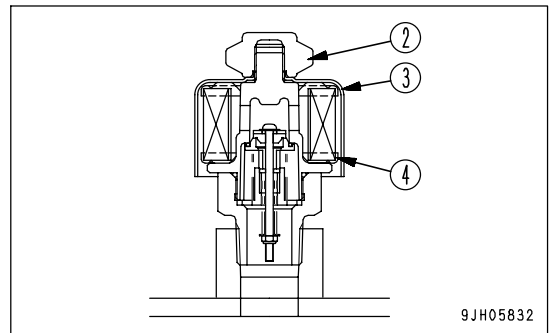
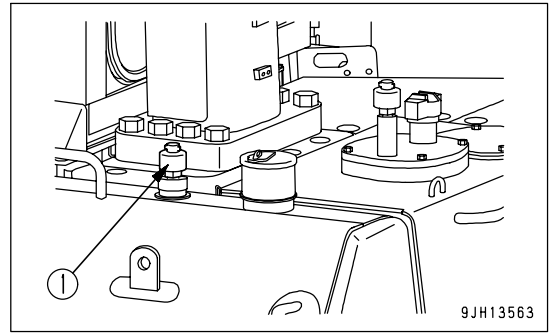
(Mining specification, if equipped)

1. Remove clip (2) from breather assembly (1) at the left fender, then remove cover (3).
2. Replace breather element (4) with a new part.
3. Install cover (3) and clip (2).



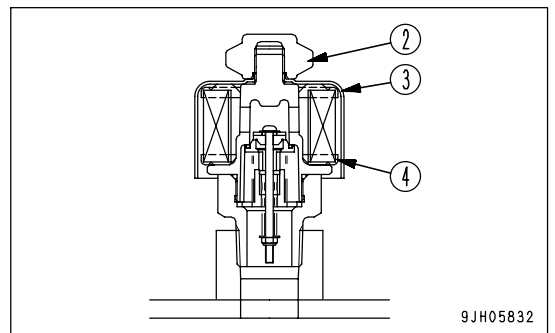
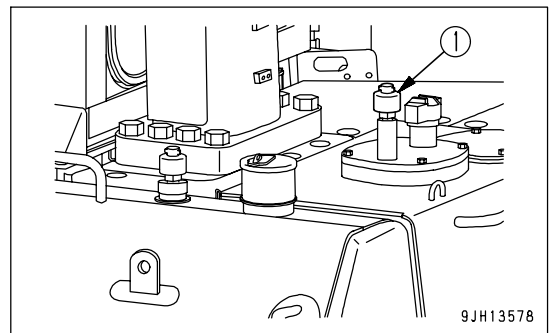
REPLACE FUEL TANK BREATHER ELEMENT

1. Remove nut (2) of breather assembly (1) at the top surface of the fuel tank, then remove cover (3).
2. Replace breather element (4) with a new part.
3. Install cover (3) and nut (2).



REPLACE HYDRAULIC TANK BREATHER ELEMENT

1. Remove nut (2) of breather assembly (1) at the top of the hydraulic tank, then remove cover (3).
2. Replace breather element (4) with a new part.
3. Install cover (3) and nut (2).

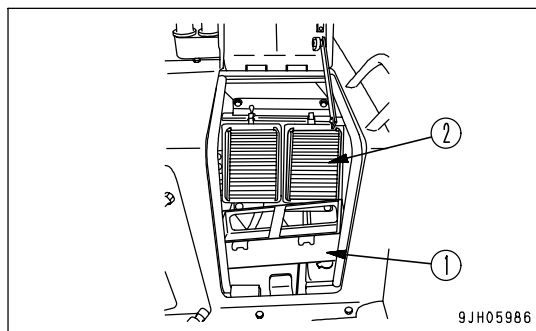


REPLACE AIR CONDITIONER AIR FILTER (FRESH, RECIRC FILTER)

Replace the air conditioner air filters every 1000 hours.

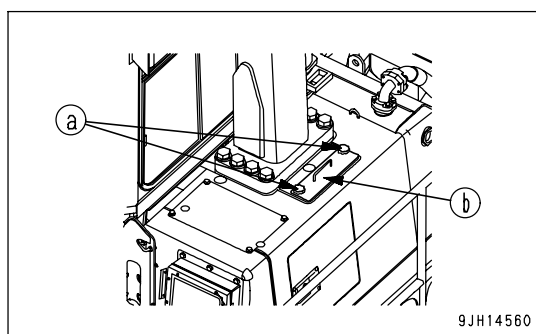
If the air conditioner air filter becomes clogged or there is dirt or oil stuck to it, replace it with a new part if necessary.

1. Open inspection cover (1) and remove fresh air filter (2).

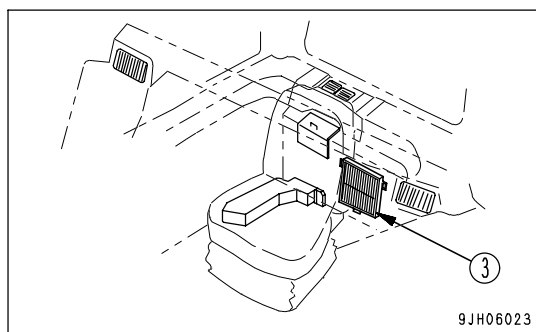


(For mining specification machine)

- Loosen nut (a), pull handle (b), and remove the FRESH filter.



2. Remove RECIRC filter (3) at the rear of the cab.
3. After removing the filters, replace them with new parts.

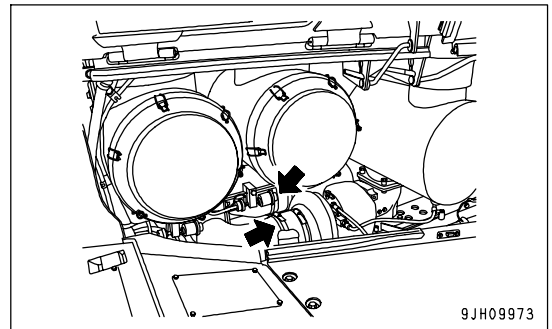


CHECK HOSE CLAMPS BETWEEN AIR CLEANER AND TURBOCHARGER, TURBOCHARGER AND AFTERCOOLER, AFTERCOOLER AND ENGINE

1. Check hose clamps between air cleaner and turbocharger

Check that the hose is inserted is at least 40mm. Check that the clamps are tightened.

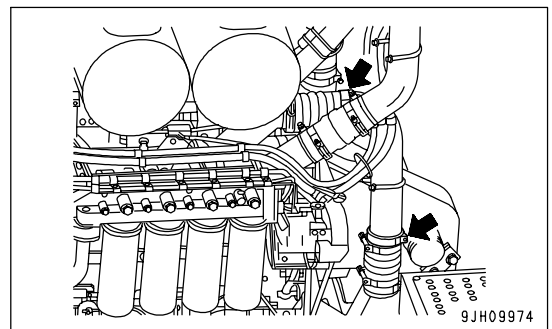
Tightening torque: $8.83 \pm 0.5\text{Nm}$
 ($0.9 \pm 0.05\text{kgm}$, $6.5 \pm 0.4\text{lbft}$)



2. Check hose clamps between turbocharger and aftercooler

Check that the hose is inserted is at least 80 mm. Check that the clamps are tightened.

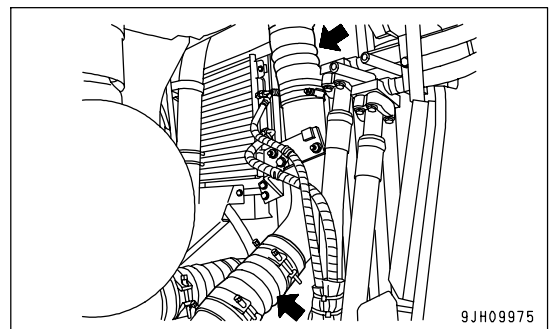
Tightening torque: $24.0 \pm 1.0\text{ Nm}$
 ($2.45 \pm 0.1\text{kgm}$, $17.7 \pm 0.7\text{lbft}$)



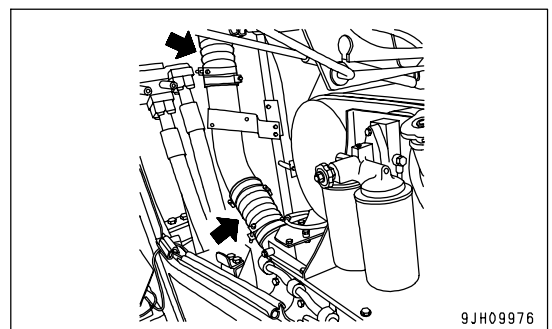
3. Check hose clamps between aftercooler and engine

Check that the hose is inserted is at least 80 mm. Check that the clamps are tightened.

Tightening torque: $24.0 \pm 1.0\text{ Nm}$
 ($2.45 \pm 0.1\text{kgm}$, $17.7 \pm 0.7\text{lbft}$)



Check those on the other side, too.



EVERY 2000 HOURS SERVICE

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

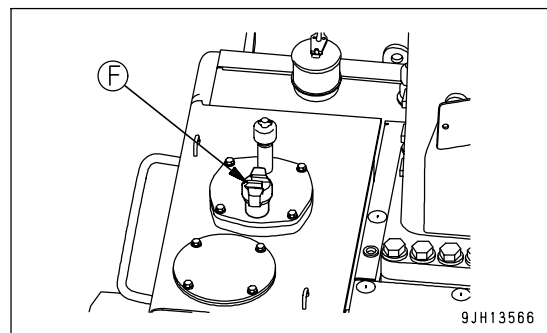
CHANGE OIL IN HYDRAULIC TANK, REPLACE HYDRAULIC OIL FILTER ELEMENT, CLEAN HYDRAULIC TANK STRAINER

WARNING

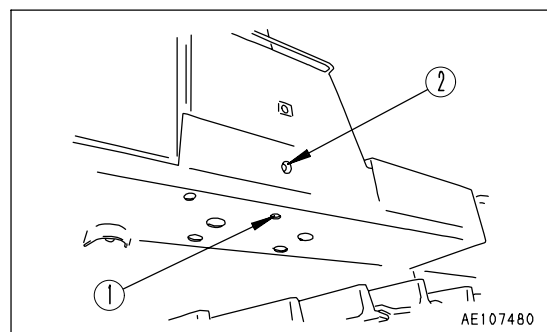
- The oil is at high temperature immediately after the machine has been operated. Wait for the oil to cool down before changing the oil.
- When removing the oil filler cap (F), turn it slowly to release the internal pressure, then remove it carefully.

- Refill capacity: 170 liters (44.91 US gal)

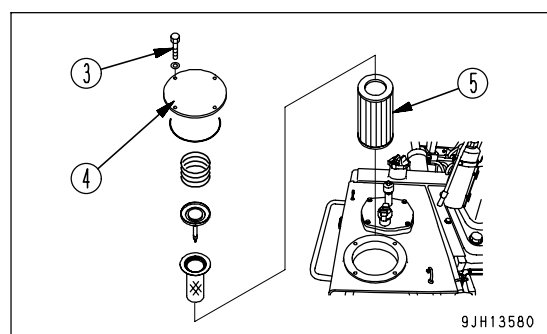
1. Lower the blade and ripper on the ground securely, stop the engine and slowly turn the cap of oil filler (F) to release the internal pressure. Then, remove the cap.



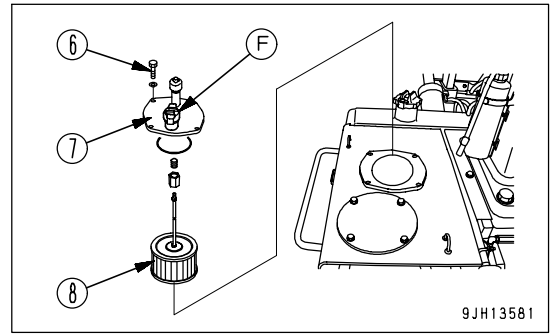
2. Remove drain plug (1) at the bottom of the tank and loosen drain valve (2). After draining the oil, tighten drain plug (1) and drain valve (2). When loosening drain valve (1), be careful not to get oil on yourself.



3. Remove bolts (3), then remove cover (4), and take out element (5).
4. Clean the inside of case and removed parts and install a new element.



5. Remove bolts (6), then remove cover (7) and take out the strainer.
6. Wash the strainer in clean diesel oil or flushing oil.
7. Install the strainer to its original position.
8. Add oil through oil filler port (F) to the specified level.
9. After adding oil, check that the oil is at the specified level. For details, see "CHECK OIL LEVEL IN HYDRAULIC TANK, ADD OIL (PAGE 3-99)".

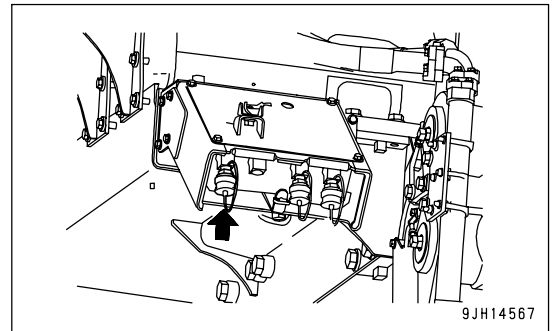


(Mining specification, if equipped)

If a quick coupler is installed for draining or adding hydraulic oil, use the quick coupler.

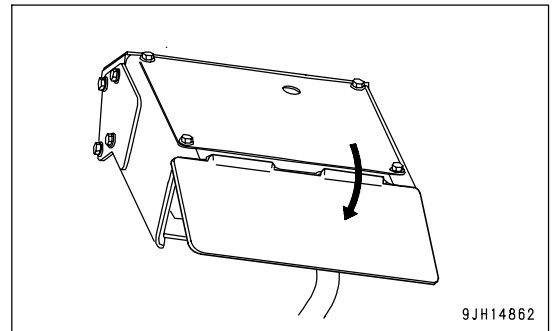
Quick coupler
 Manufacturer: WIGGINS
 Model: ON2

Mounting screw
 Size: 3/4-14 NPT



NOTICE

If the quick coupler is not installed securely, oil may be sent flying around during refilling. For safety, use the quick coupler with the box cover closed.



CHANGE OIL IN FINAL DRIVE CASE

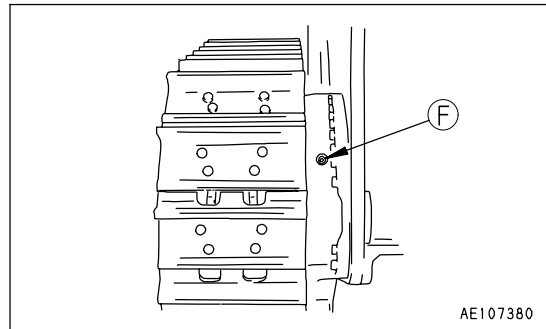
**WARNING**

- The oil is at high temperature immediately after the machine has been operated. Wait for the oil to cool down before starting the operation.
- There is danger that oil spouts out due to the internal pressure. When removing the plug, work from the side, turn the plug slowly to release the internal pressure, and remove it carefully.

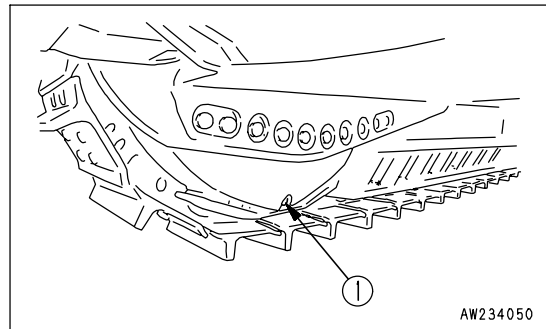
- Refill capacity: 75 liters (19.82 US gal)

1. Remove oil filler plug (F), then remove drain plug (1) and level plug (G), and drain the oil.

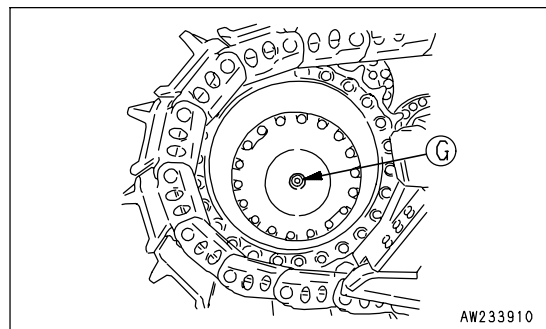
Remove all the mud and dirt from around oil filler plug (F) before removing it. Be careful not to let any dirt or sand get in when adding oil.



2. After draining the oil, tighten the drain plug (1).



3. Remove level plug (G), refill oil from oil filler plug hole (F) until the oil overflows the level plug hole.
After refilling, tighten the plugs.

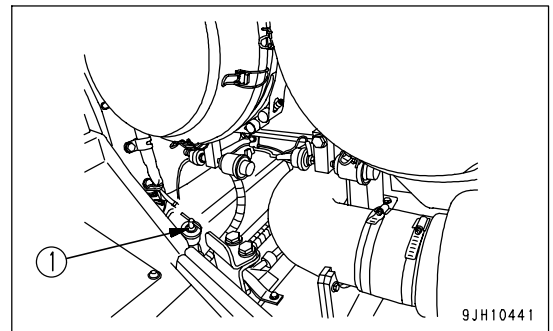


CHANGE OIL IN DAMPER CASE AND BREATHER FILTER, CLEAN DAMPER BREATHER

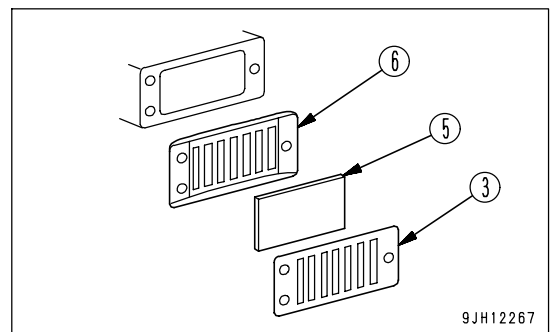
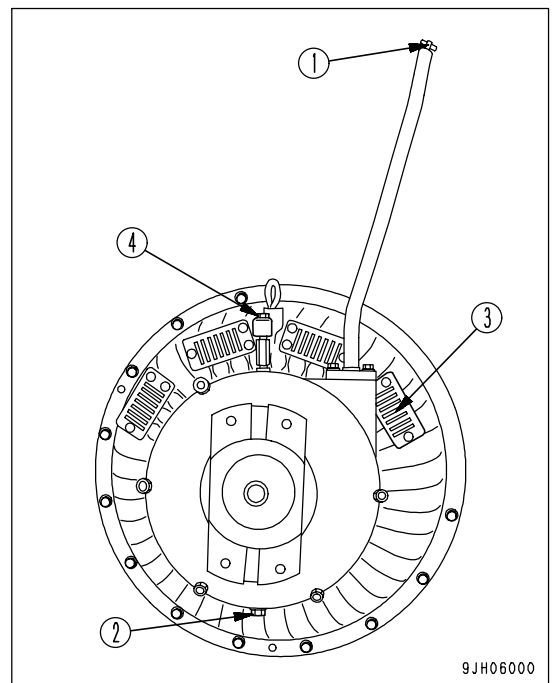
! WARNING

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

- Refill capacity: 2.2 liters (0.58 US gal)
- 1. Remove breather (4) at the top of the damper.
- 2. Wash out dust remaining inside of breather with diesel oil and flushing oil.
- 3. Install breather (4) to the original position.

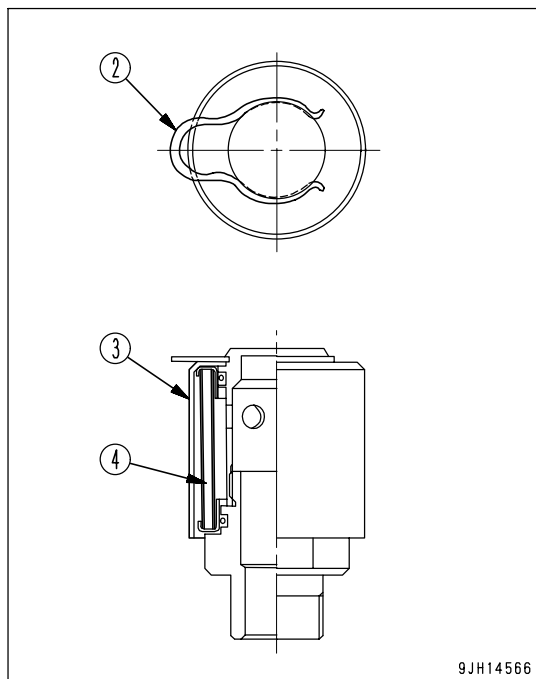
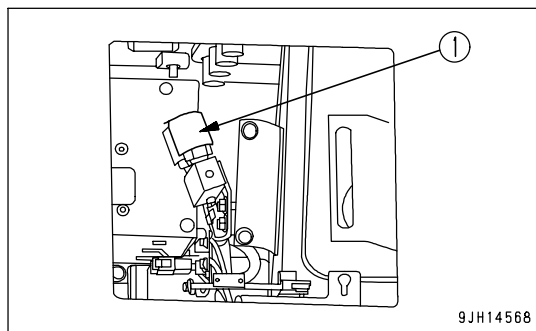


- 4. Remove slit plate (3), breather filter (5) and holder (6) on the upper part of the damper cover.
- 5. Wipe off dusts stuck to the slit plate and holder and then wash them with clean light oil or detergent liquid. Replace the filter with a new one.
- 6. Open the inspection cover under the chassis.
- 7. Remove drain plug (2) slowly to avoid getting oil on yourself, and drain the oil. After draining the oil, tighten plug (2).
- 8. Pull out dipstick (1), and add oil to the specified level through oil filler.
- 9. Check that the oil level is between the H and L marks on dipstick. For details, see "CHECK OIL LEVEL IN DAMPER CASE, ADD OIL (PAGE 4-61)".
- 10. Close the inspection cover.



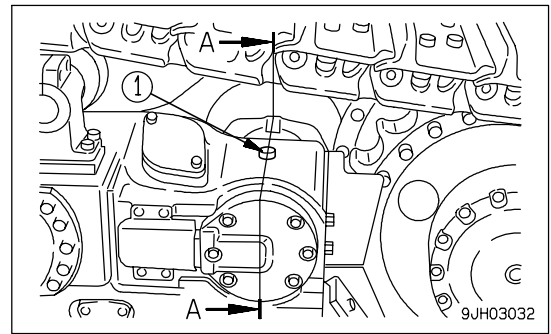
(For mining specification machine)

11. Remove clip (2) from breather assembly (1) at the left fender, then remove cover (3).
12. Replace breather element (4) with a new part.
13. Install cover (3) and clip (2).

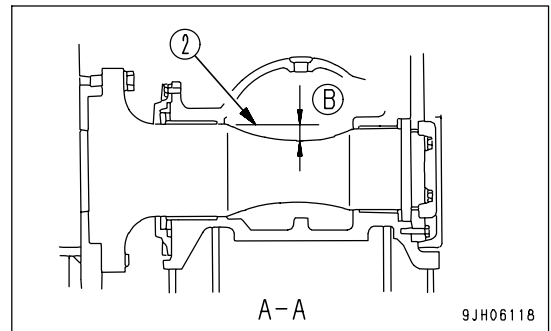


CHECK PIVOT BEARING OIL LEVEL, ADD OIL

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

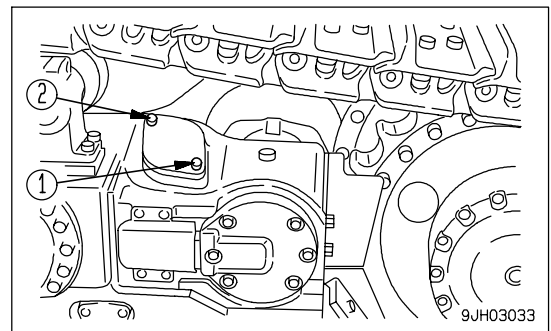


2. Check that the oil is up to oil level (2) in the diagram.
If the oil level is low, add oil through the hole for plug (1).
(B): 10 to 30 mm (0.4 to 1.2 in)

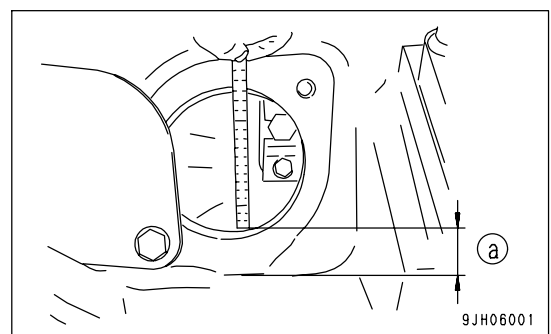


CHECK OIL LEVEL IN RECOIL SPRING, ASSIST CYLINDER CASE, ADD OIL

1. Remove bolts (1), then remove cover (2).
When removing the cover, be careful not to let dirt or sand get in.
2. Loosen the plug and confirm that the internal pressure is released.



Insert a scale and check that the oil level (a) is 90 to 110 mm (3.5 to 4.5 in) from the bottom edge of the inspection port.
If the oil is insufficient, add oil.



CHECK ALTERNATOR, STARTING MOTOR

The brushes may be worn or the bearing may have run out of grease, contact your Komatsu distributor for inspection and repairs.

If the engine is started frequently, have this inspection carried out every 1000 hours.

CHECK ENGINE VALVE CLEARANCE, ADJUST

Special tools are required for removal and adjustment of the parts, have your Komatsu distributor perform this service.

CHECKING CHARGE PRESSURE OF NITROGEN GAS IN ACCUMULATOR (FOR CONTROL CIRCUIT)**WARNING**

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

- The pressure in the hydraulic circuit cannot be completely removed. When removing the hydraulic equipment, do not stand in the direction that the oil spurts out when carrying out the operation. In addition, loosen the bolts slowly when carrying out the operation.
- Do not disassemble the accumulator.
- Do not bring it near flame or dispose of it in fire.
- Do not make holes in it or weld it.
- Do not hit it, roll it, or subject it to any impact.
- When disposing of the accumulator, the gas must be released. Please contact your Komatsu distributor to have this work carried out.

NOTICE

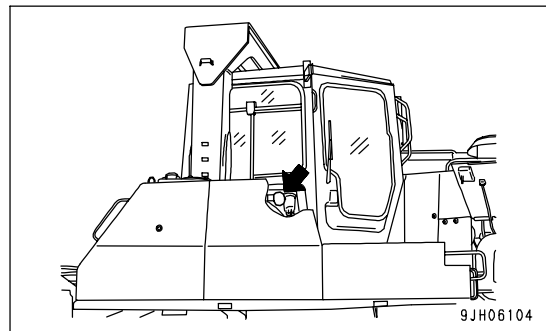
If the nitrogen gas charge pressure in the accumulator is low and operations are continued, it will become impossible to release the remaining pressure inside the hydraulic circuit if a failure occurs on the machine.

FUNCTION OF ACCUMULATOR

The accumulator stores the pressure in the control circuit. Even after the engine is stopped, the control circuit can be operated, so the following actions are possible.

- If the control lever is operated in the direction to lower the work equipment, it is possible for the work equipment to go down under its own weight.
- The pressure in the hydraulic circuit can be released.

The accumulator is installed to the position shown in the diagram on the right.



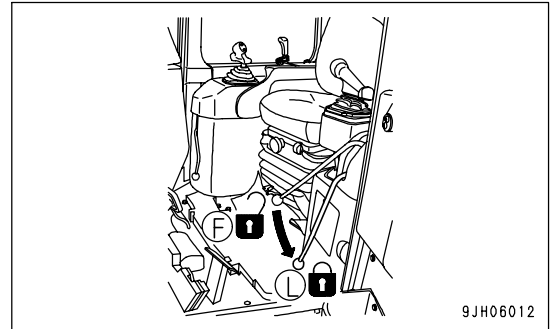
CHECKING FUNCTION OF ACCUMULATOR

 **CAUTION**

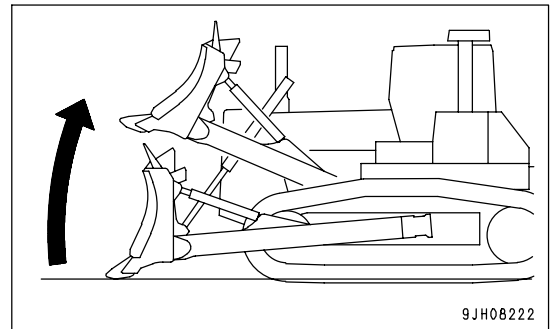
When carrying out the inspection, check first that there is no person or obstacle in the surrounding area.

Check the nitrogen gas charge pressure as follows.

1. Stop the machine on firm, level ground.
2. Set the parking brake lever to the LOCK position (L).



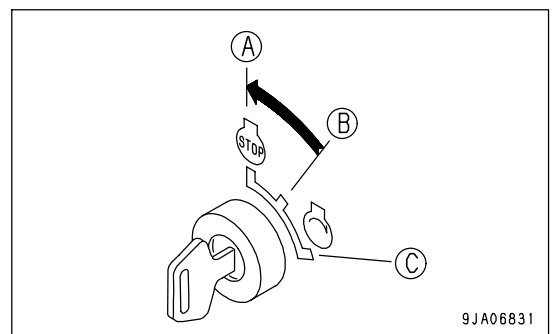
3. Raise the work equipment (blade) to the maximum height.



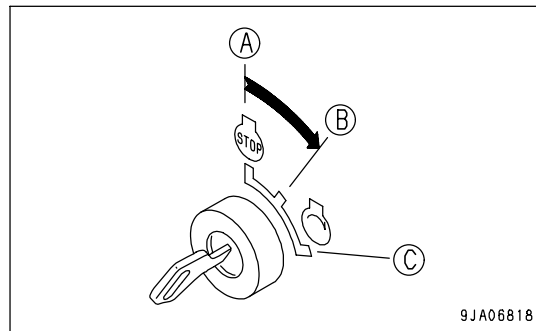
Carry out Steps 4 - 6 within 15 seconds.

When the engine is stopped, the pressure in the accumulator gradually goes down. For this reason, the check can only be carried out immediately after the engine is stopped.

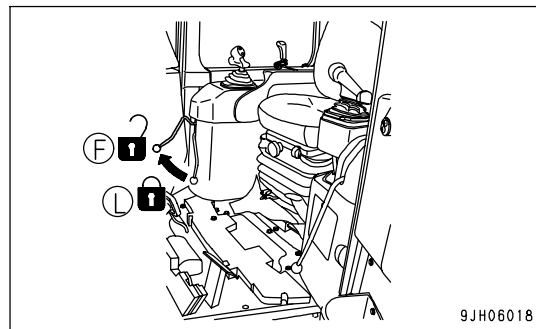
4. Keep the work equipment raised to the maximum height, then turn the starting switch to OFF position (A) to stop the engine.



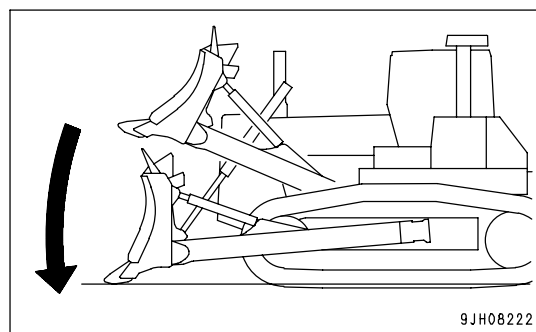
5. Turn the starting switch to the ON position (B).



6. Set the work equipment lock lever to the FREE position (F), then operate the blade control lever fully in the LOWER direction and check that the work equipment is completely in contact with the ground.



7. If the work equipment goes down under its weight and contacts the ground, the accumulator is normal.
 If the work equipment does not go down or stops in midway, the charged pressure of the gas in the accumulator for the hydraulic circuit has probably dropped.
 Please contact your Komatsu distributor for inspection.



8. This completes the inspection. After completion of the inspection, set the work equipment lock lever to the LOCK position (L) and turn the starting switch to the OFF position (A).

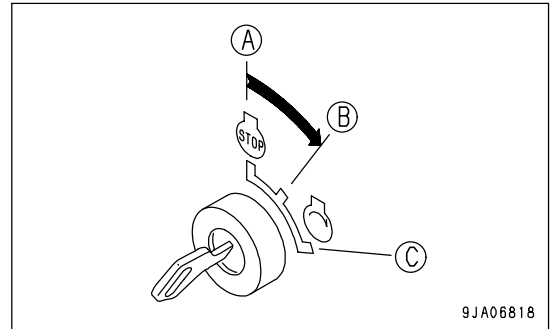
METHOD OF RELEASING PRESSURE IN HYDRAULIC CIRCUIT

1. Lower the work equipment to the ground.
2. Operate the parking brake lever and the work equipment lock lever to the LOCK position (L).

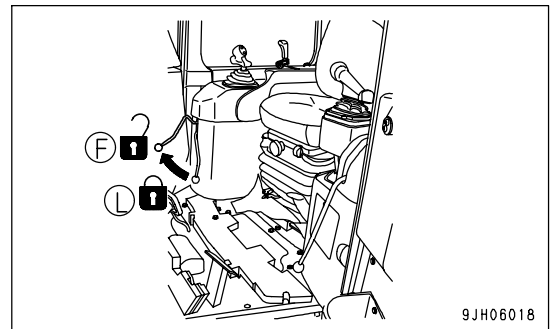
Carry out Steps 3 - 5 within 15 seconds.

When the engine is stopped, the pressure in the accumulator gradually goes down. For this reason, the release can only be carried out immediately after the engine is stopped.

3. Stop the engine.
4. Turn the starting switch to the ON position (B).



5. Set the work equipment lock lever to the FREE position (F), then operate the blade control lever and ripper control lever fully to the front, rear, left, and right to release the pressure in the hydraulic circuit.



6. Set the work equipment lock lever to the LOCK position (L), then turn the starting switch to the OFF position (A).

EVERY 4000 HOURS SERVICE

Maintenance for every 250, 500, 1000 and 2000 hours service should be carried out at the same time.

REPLACE ACCUMULATOR (FOR CONTROL CIRCUIT)

Replace the accumulator every 2 years or every 4000 hours, whichever comes sooner.



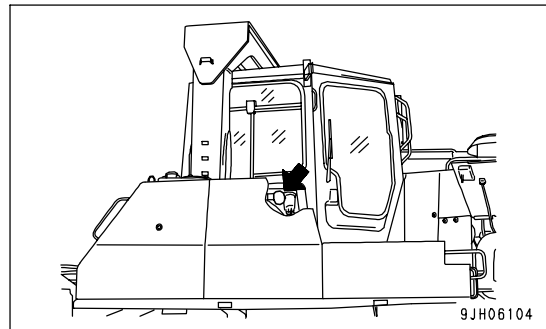
WARNING

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

- The pressure in the hydraulic circuit cannot be completely removed. When removing the hydraulic equipment, do not stand in the direction that the oil spurts out when carrying out the operation. In addition, loosen the bolts slowly when carrying out the operation.
- Do not disassemble the accumulator.
- Do not bring it near flame or dispose of it in fire.
- Do not make holes in it or weld it.
- Do not hit it, roll it, or subject it to any impact.
- When disposing of the accumulator, the gas must be released. Please contact your Komatsu distributor to have this work carried out.

If operations are continued after the performance of the accumulator has dropped, it will be impossible to release the remaining pressure in the hydraulic circuit if there should be a failure on the machine. Please ask your Komatsu distributor to replace the accumulator.

The accumulator is installed to the position shown in the diagram on the right.



CHECK WATER PUMP

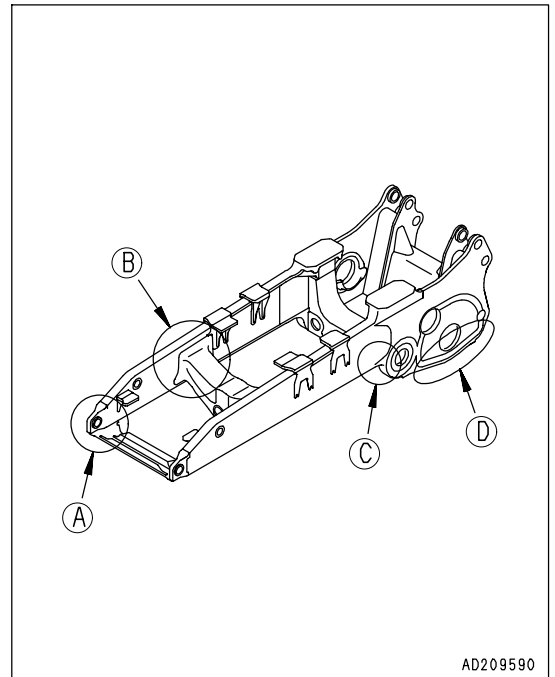
Check for oil and coolant leakage, or clogging of the drain hole. If any abnormality is found, contact your Komatsu distributor for disassembly, repair, or replacement.

CHECK MAIN FRAME, WORK EQUIPMENT (BLADE, RIPPER)

Check after the first 4000 hours, and every 1000 hours after that.

- Preparation

Wipe off all the mud that is stuck around portions (A) - (L) of the work equipment and frame to make it easier to carry out the check.

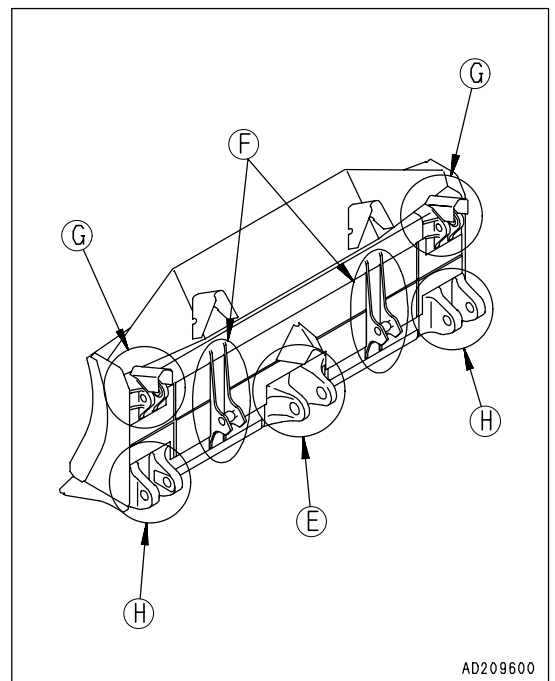


AD209590

- Visual check

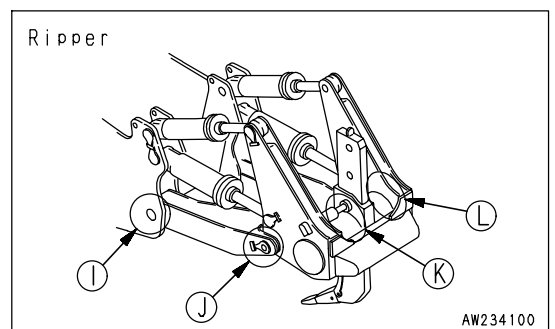
Carefully check the base material of the steel casting and welding at portions (A) - (L), and check that there is no damage.

If any cracks or other damage is found, repair them.



AD209600

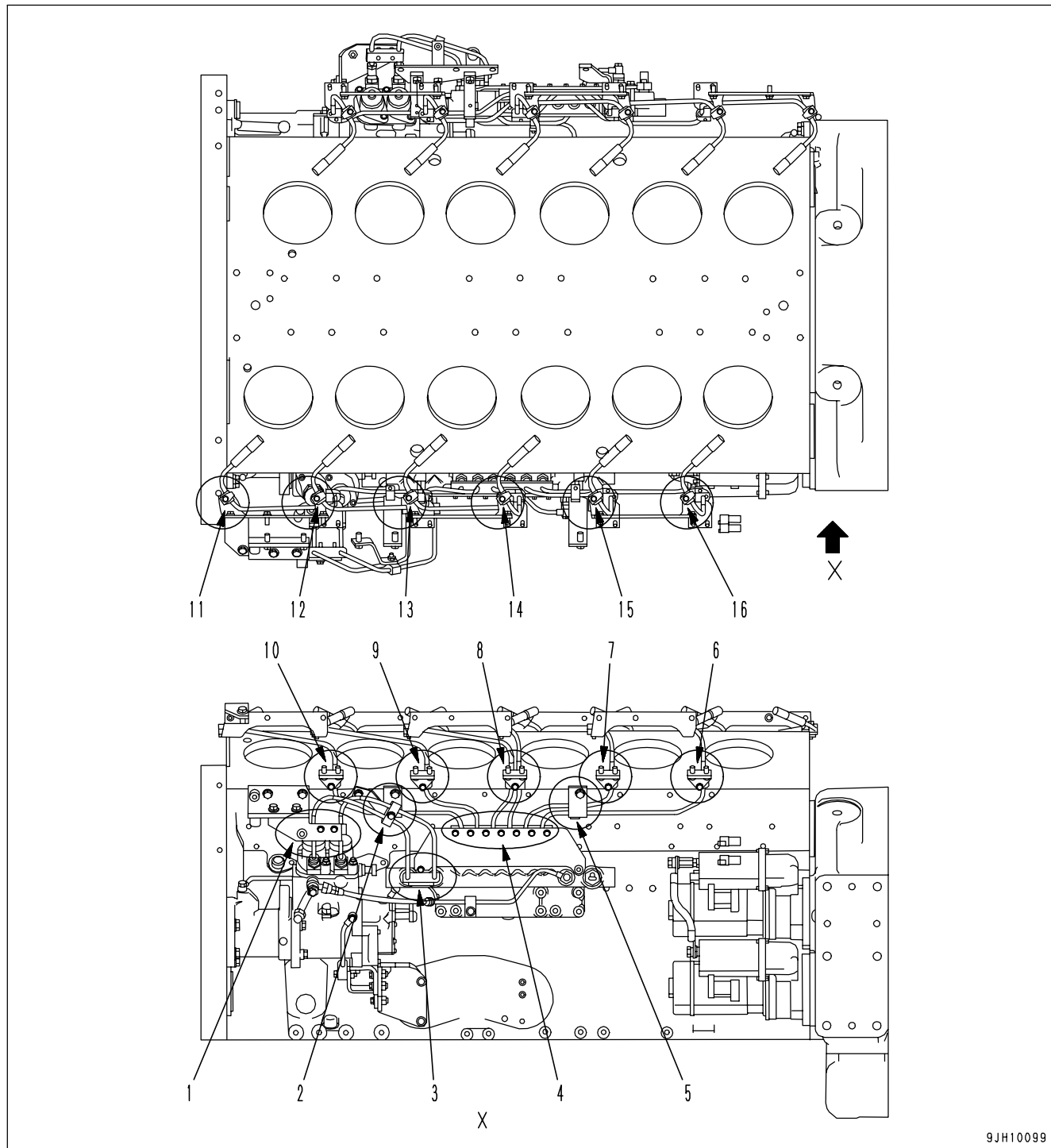
Contact your Komatsu distributor for details of the repair procedure.



AW234100

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

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



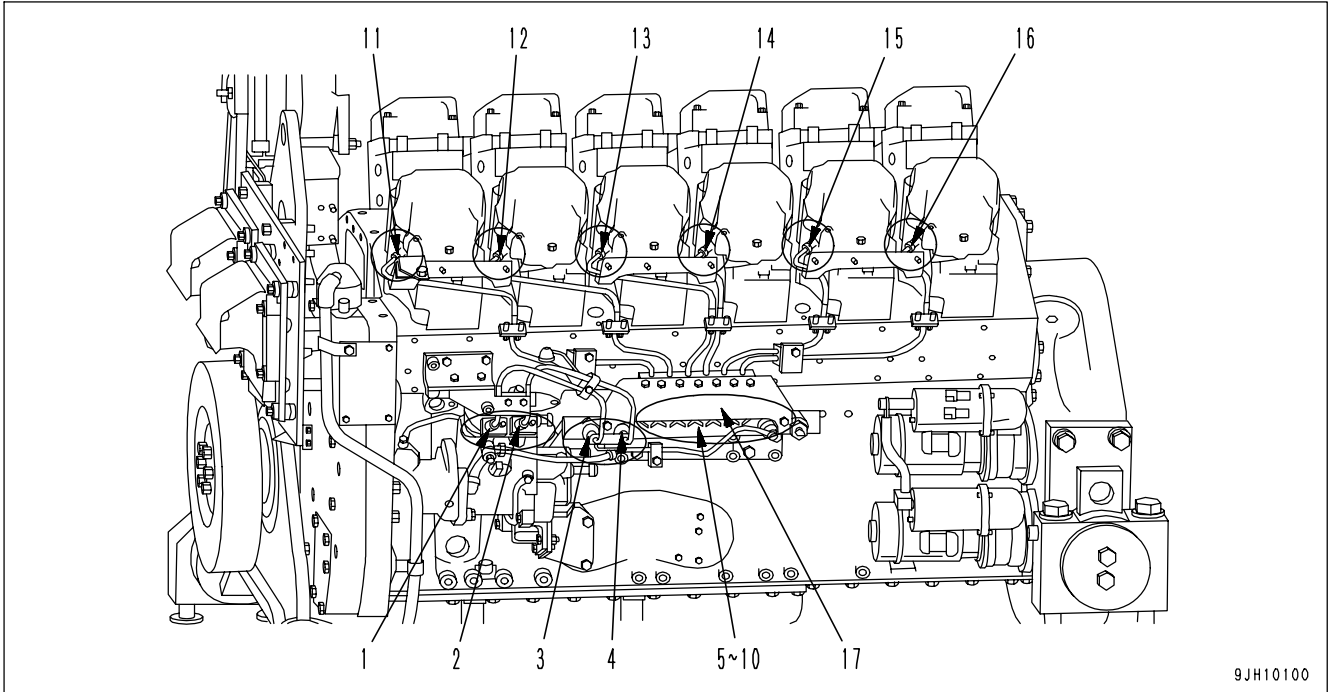
9JH10099

NOTICE

If the engine continues to be used when there are loose bolts, hardened rubber, or missing parts, there is danger of damage or breakage occurring due to vibration and wear at the connections of high-pressure piping. Always check that the proper high-pressure piping clamps are correctly installed.

CHECKING FOR MISSING FUEL SPRAY PREVENTION CAP, HARDENING OF RUBBER

Fuel spray prevention caps (1) - (16) and fuel spray prevention cover (17) are protective parts installed to prevent fire caused by fuel leaking and spraying out on to high temperature parts of the engine. Check visually that there are no missing caps or loose bolts, and feel with your finger to check that the rubber has not hardened. If there is any problem, the problem part must be replaced. Contact your Komatsu distributor for part replacement.



9JH10100

EVERY 8000 HOURS SERVICE

Maintenance for every 250, 500, 1000, 2000, and 4000 hours service should be carried out at the same time.

REPLACE HIGH-PRESSURE PIPING CLAMPS

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

REPLACE FUEL SPLAY PREVENTION CAPS

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

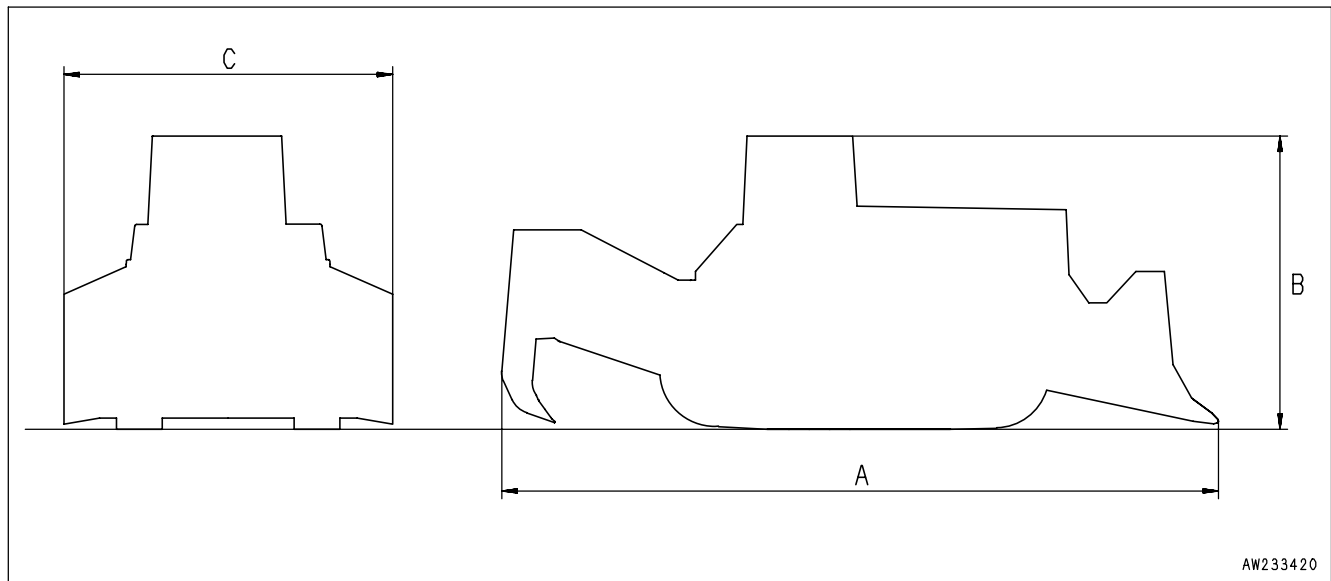
SPECIFICATIONS

SPECIFICATIONS

Item	Unit	D475A-5E0	
		Semi- U tildozer *1	Full- U tildozer *2
Operating weight (without operator)	kg (lb)	110,670 (224,027)	110,610 (243,895)
Blade Weight of attachment (incl. cylinder)	kg (lb)	16,500 (36,383)	18,800 (41,454)
Ripper Weight of attachment	kg (lb)	9,720 (21,433)	7,360 (16,229)
Engine model	-	Komatsu SAA12V140E-3 diesel engine	
Engine flywheel horsepower	kW (HP) / rpm	664 (890) / 2000	
A Overall length	mm (ft in)	11,335 (37' 2")	12,065 (39' 7")
B Overall height	mm (ft in)	4,646 (15' 3")	
C Overall width	mm (ft in)	5,265 (17' 3")	6,205 (20' 4")
Travel speed (1st / 2nd / 3rd)	Forward	3.3 / 6.2 / 11.2 (2.1 / 3.9 / 7.0)	
	Reverse	4.2 / 8.0 / 14.0 (2.6 / 5.0 / 8.7)	

*1: Including a semi- U tildozer, multi-shank ripper, 710 mm-wide track shoe, ROPS, cab and air conditioner

*2: Including a full- U tildozer, giant ripper, 710 mm-wide track shoe, ROPS, cab and air conditioner



AW233420

ATTACHMENTS, OPTIONS

 **WARNING**

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

GENERAL PRECAUTIONS

PRECAUTIONS RELATED TO SAFETY

If attachments or options other than those authorized by Komatsu are installed, this will not only affect the life of the machine, but will also cause problems with safety.

When installing attachments not listed in this Operation and Maintenance Manual, contact your Komatsu distributor first.

If you do not contact Komatsu, we cannot accept any responsibility for any accidents or failures.



WARNING

General precautions

- Read the instruction manual for the attachment carefully, and do not use the machine before you understand the operation method completely.

If you lose the instruction manual, be sure to order another copy from your Komatsu distributor.

- To prevent serious personal injury caused by misoperation, place your foot on the pedal only when operating the pedal.

Precautions for removal and installation

When removing or installing an attachment, observe the following items and work safely.

- Select a firm, level surface when installing or removing an attachment.
- When working in cooperation with one or more other workers, decide signs and observe them when carrying out the operation.
- When carrying a heavy part (25 kg (55 lb) or more), use a crane.
- When removing a heavy part, always place a support in position before removing it.

When lifting a load with a crane, be particularly careful of the center of gravity.

- It is dangerous to carry out operations when the load has been raised by a crane. Always lower the load onto a stand and check that it is safe.
- When leaving an attachment removed or installing it, place it in a stable position to prevent it from falling over.
- Never go under a load raised by a crane.

Always stand in a place which is safe even if the load should fall.

NOTICE

Qualifications are required to operate a crane. Never allow the crane to be operated by an unqualified person.

For details of removal and installation operations, contact your Komatsu distributor.

SELECTION OF TRACK SHOE

SELECTION OF TRACK SHOES

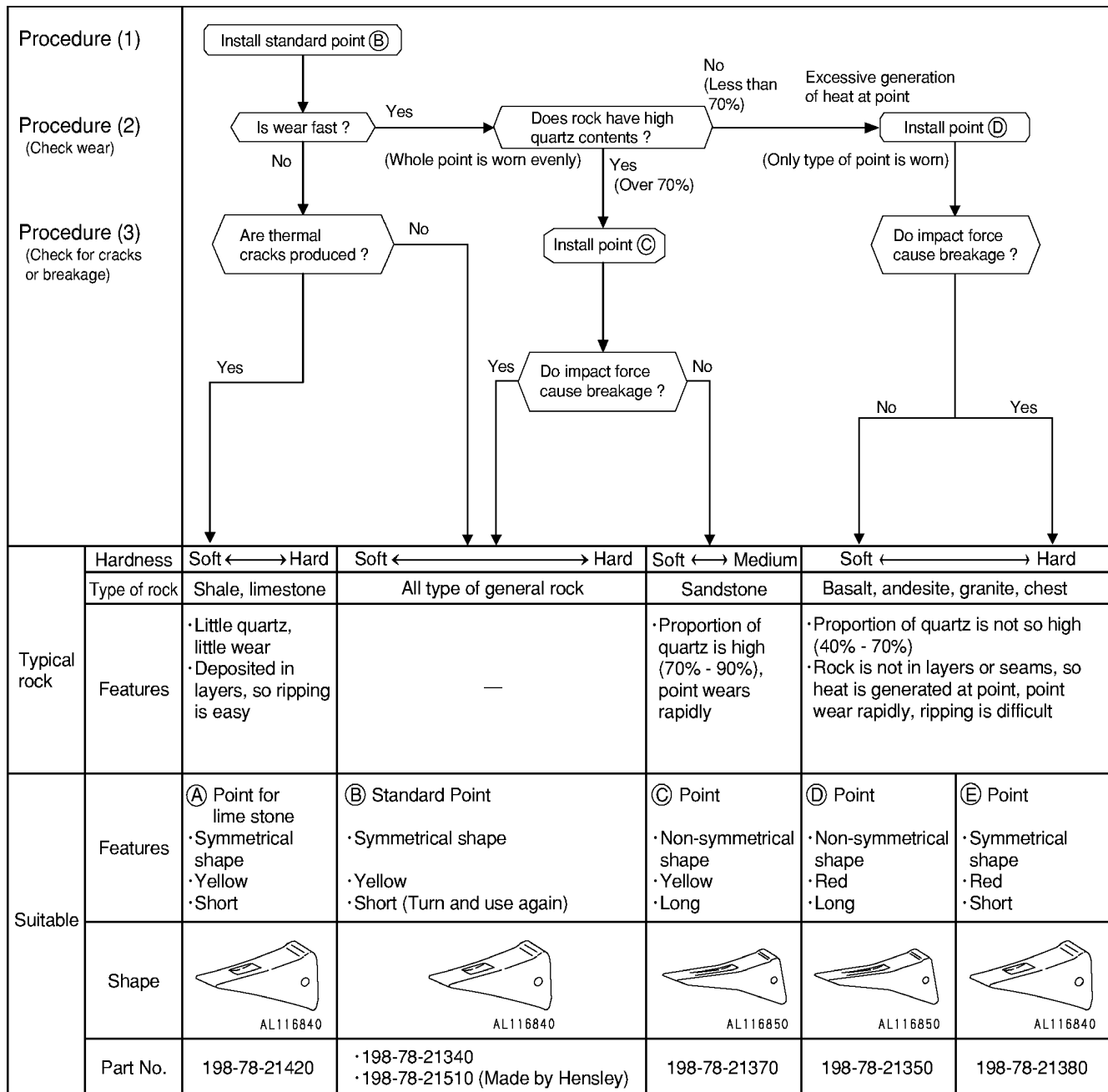
Select suitable track shoes to match the operating conditions.

METHOD OF SELECTING SHOES

If a wider shoe than necessary is used, the load on the track will increase, and this will cause the shoes to bend, links to crack, pins to break, shoe bolts to come loose, and various other problems.

Category	Use	Precautions when using	Track shoe width
A	Bedrock, normal soil	This shoe can be used for a wide range of work from crushed rock to general civil engineering work such as reclamation of residential land. There is no particular limit to its use.	710 mm (28 in)
B	Normal soil	Use this shoe for general soil, such as where the main work is pusher work, and stripping the overburden for coal mines. This shoe can be used on bedrock. On jobsites where there are rocks in the soil, be careful to avoid letting the machine mount the rocks.	810 mm (32 in)
C	Soft soil	Use this shoe on soft ground where the shoe in category "B" sinks into the ground. Do not use this shoe on jobsites where there are rocks in the soil.	910 mm (36 in)

PROCEDURE FOR SELECTING RIPPER POINT



REMARK

- A symmetrical ripper point is suited to a terrain of hard rocks because it recovers penetrability by turning the point after the penetrability drops due to its worn tip.
- Ripper points usually lose their hardness when they undergo intense heat generated by a contact with rocks during the use. In this respect, red ripper points are suited to a terrain of hard rocks where those others are likely to slip during the use, because red ones are made of materials whose hardness less lowers under intense heat, compared with yellow ripper points.
- Where an amount of wear on a ripper point is limited, a heat- originated (thermal) crack on the point surface is not readily removed, and the point itself can break with the crack as a starting point. For this reason, ripper points for limestone are suited to a jobsite where they are comparatively free of wear.

EFFECTIVE METHOD OF OPERATION FOR DUAL TILTDOZER

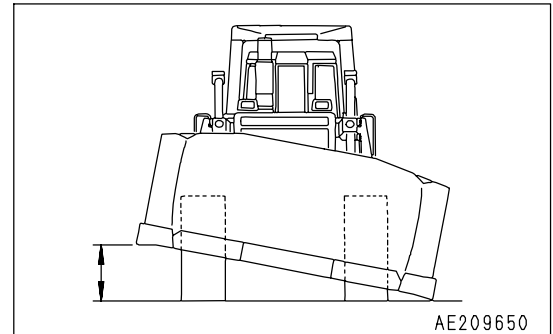
BLADE CONDITION

SINGLE TILT

Operate single/dual tilt selector switch to the SINGLE position, then operate the tilt.

Applicable operation

- Normal operations

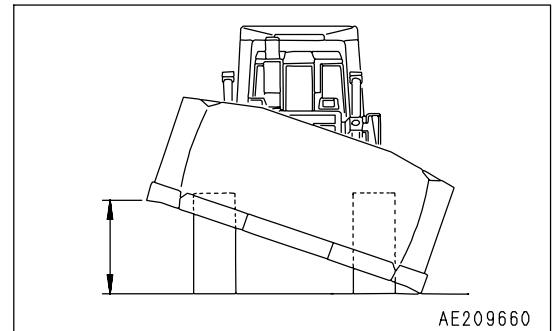


DUAL TILT

Operate single/dual tilt selector switch to the DUAL position, then operate the tilt.

Applicable operation

- Side cutting operations (high places)
- Horizontal dozing operations from side slope (rough ground)
- Ditching work

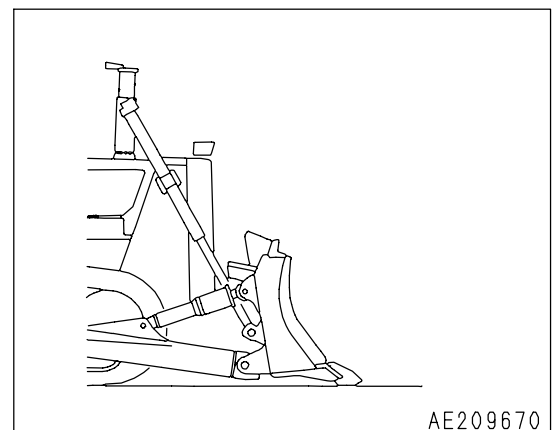


R PITCH (PITCH BACK)

Keep the pitch button pushed in and operate the left tilt.

Applicable operation

- Hauling
- Dozing soft soil (filling)
- Leveling operations (spreading)
- Side-cutting operations

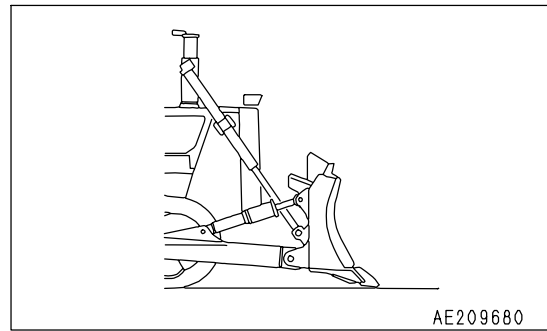


S PITCH (STANDARD)

Normal operations

Applicable operation

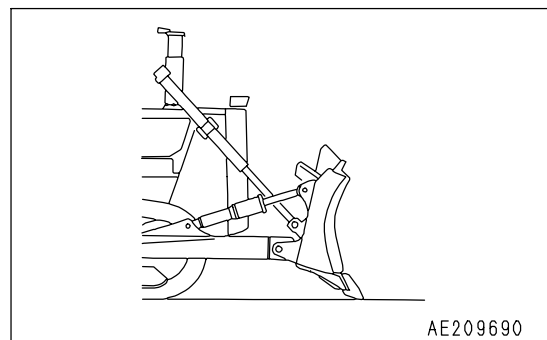
- Normal operations

**F PITCH (PITCH DUMP)**

Keep the pitch button pushed in and operate the right tilt.

Applicable operation

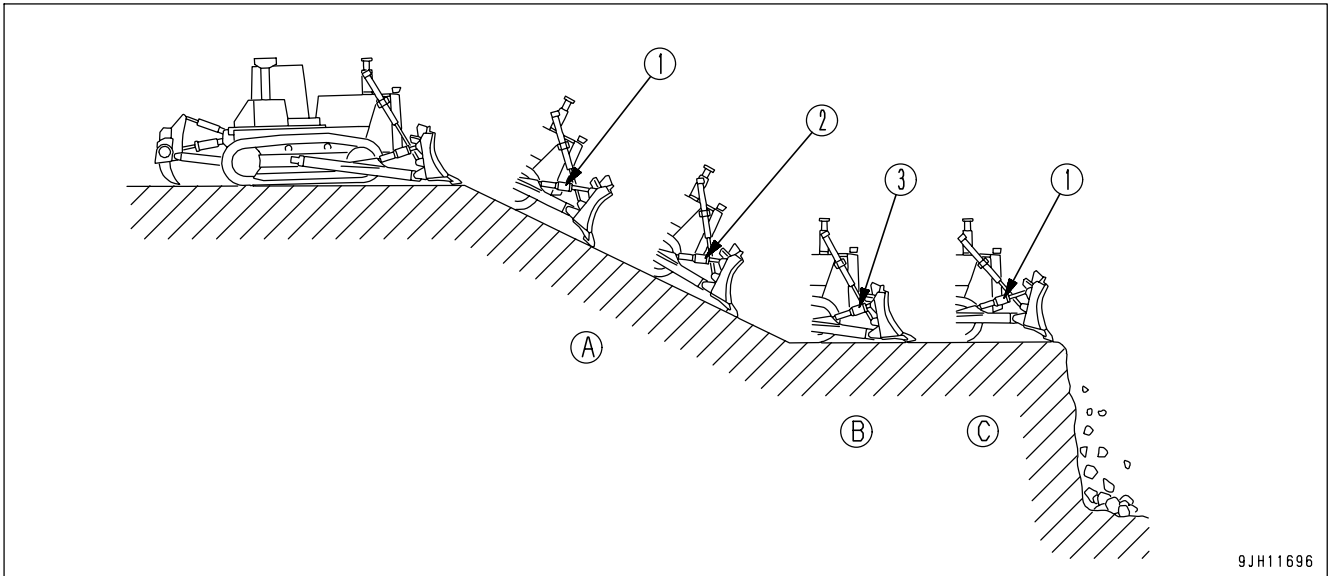
- Digging natural ground and bed-rock (digging hard soil)
- Pushing soil over cliffs
- Pushing-up soil
(Reduces spillage of soil over the top surface of the blade, and reduces amount of soil carried back)



DOZING WORK

DOZING ON LEVEL GROUND, OR DOWNHILL

NATURAL GROUND, BEDROCK



WARNING

If you feel that the situation is dangerous when dumping the soil, for safety reasons, use two movements to push the soil over the edge.

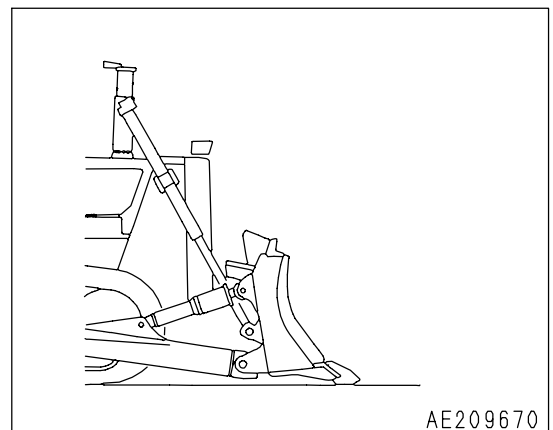
1. Dig with the FORWARD PITCH (1), and when the load on the blade is approx 80%, return to STRAIGHT PITCH (2) and continue digging (A).
2. Set to REAR PITCH (3) which gives a larger load, and haul the soil (B).
Adjust the cutting angle to the most effective angle for rolling the soil.
3. Use FORWARD PITCH (1) to dump the soil (C).

FILLING, SOFT SOIL

Carry out digging in R pitch or S pitch, and haul in R pitch.

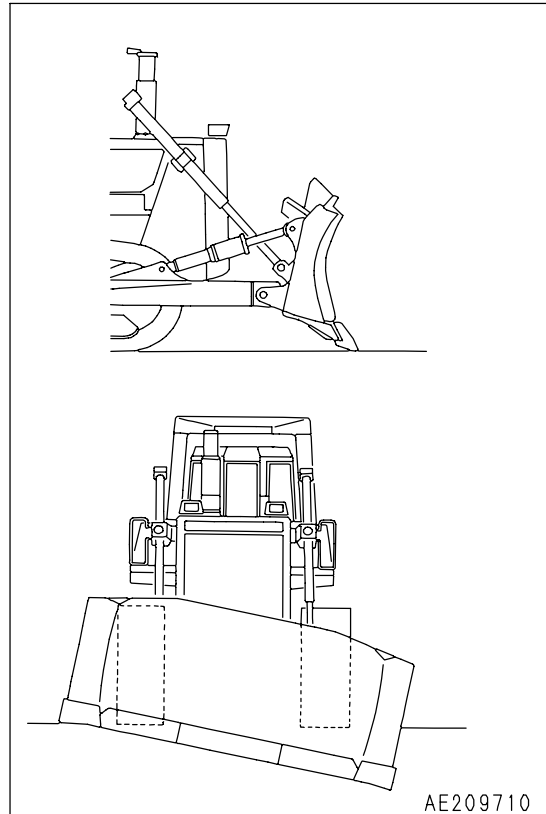
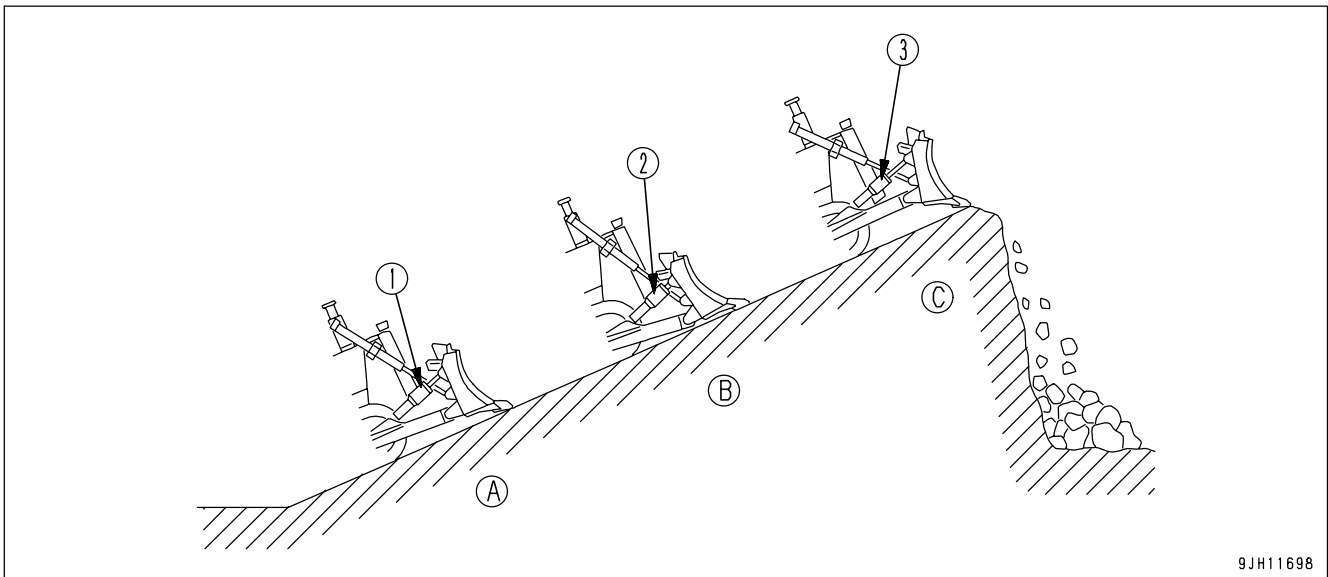
REMARK

If the digging is carried out in R pitch, there is no sudden digging into the soil, and the operation can be carried out smoothly.



HARD SOIL (HARD CLAY, SHALE, ETC.)

If digging is carried out in F pitch, and the chassis is raised and the blade is tilted, the end bit will dig in better.

**PUSHING-UP SOIL**

1. Dig (A) with STRAIGHT PITCH (1).

When digging gradually (A), use REAR PITCH (2).

If the ground is hard, use FORWARD PITCH (3).

2. Haul (B) with REAR PITCH (2).

If there is any spillage of soil over the top of the blade, change to STRAIGHT PITCH (1).

3. Dump the soil (C) with FORWARD PITCH (3).

This dumps the soil more effectively, and less soil is carried back.

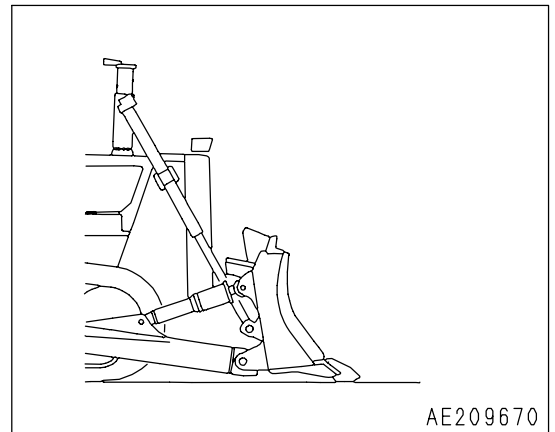
LEVELING (SPREADING) OPERATION

Carry out this operation with R itch.

When carry out this operation with R pitch, the end bit does not dig in, and the ground can be leveled (or the soil can be spread smoothly.)

REMARK

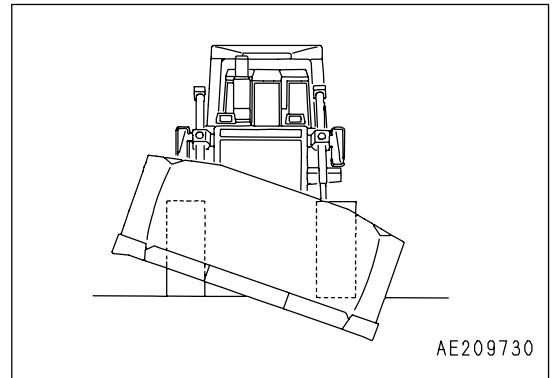
If the tilt cylinder is moved completely to the end of its stroke, the tilt operation cannot be carried out on one side, so move the cylinder back slightly from the end of its stroke to the S pitch position.



DITCHING OPERATION

If the dual tilt is used, the digging width becomes smaller and a deeper ditch can be dug.

If R pitch is used, the digging can be carried out gradually, and this reduces the unevenness.

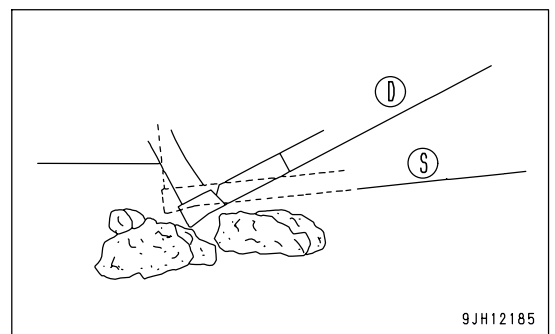


BOULDER RAISING OPERATION

Because the dual tilt greatly increases the amount of tilt, the blade can dig in deep and hook under the boulder. In addition, the operating stroke is large, so operations to raise boulders can be carried out effectively.

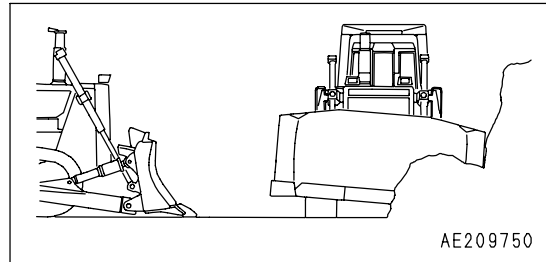
(D): Dual tilt

(S): Single tilt



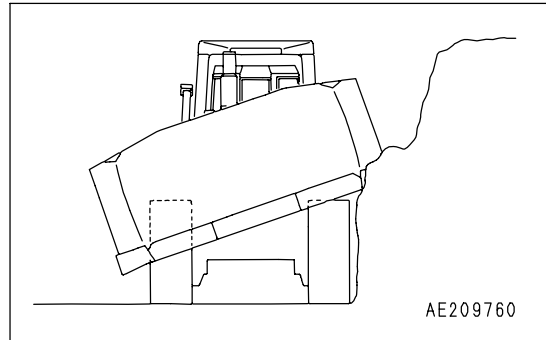
SIDE-CUTTING OPERATIONS

Carry out this operation in R pitch, and set the end face of the end bit in contact with the rock face to carry out cutting.



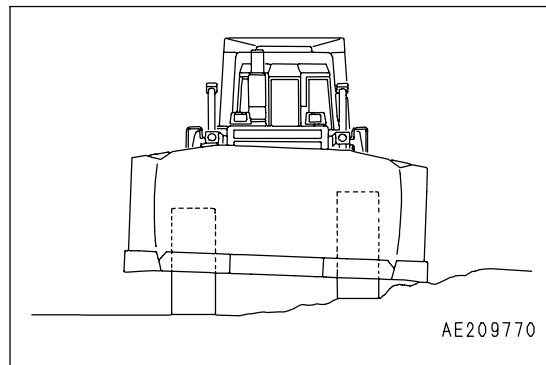
REMARK

With the dual tilt it is possible to increase the amount of tilt and to carry out side-cutting operations on higher walls.



HORIZONTAL DOZING OPERATIONS FROM SIDE SLOPE (ROUGH GROUND)

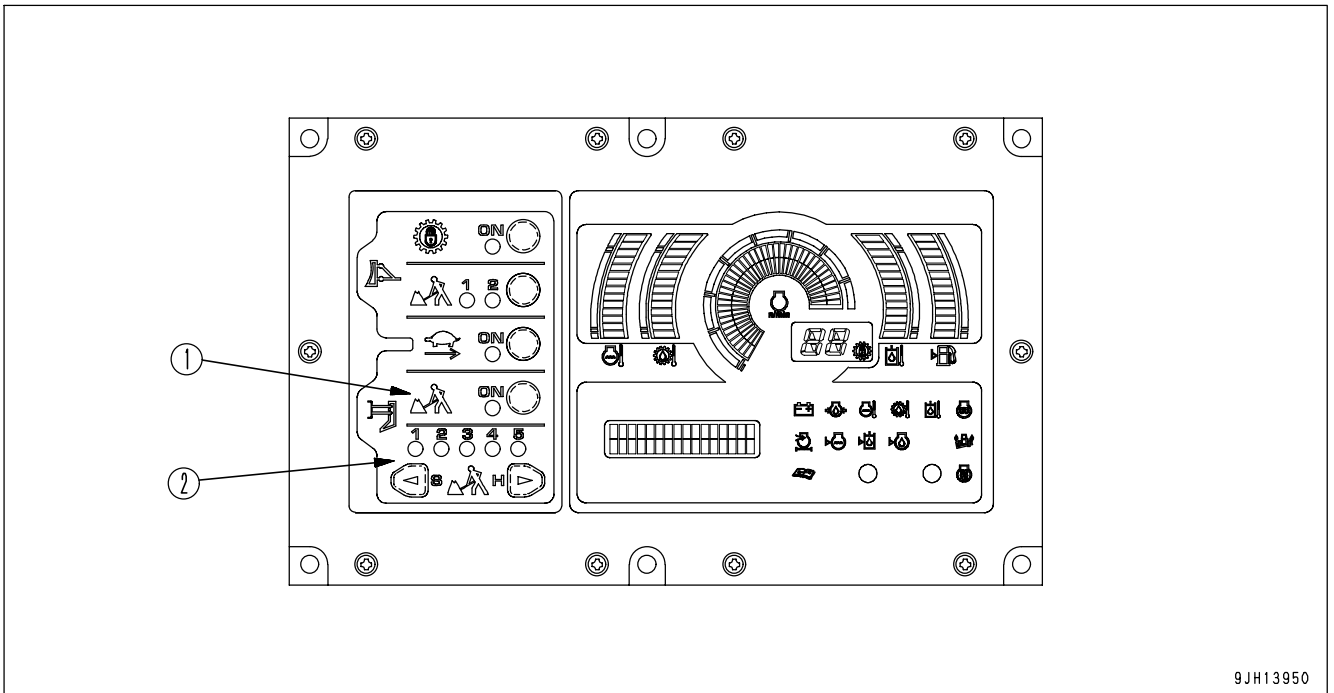
The dual tilt can give a larger amount of tilt, so when dozing from a side slope, this is effective because the chassis becomes horizontal after a short digging distance.



SHOE SLIP CONTROL

MODE SELECTION SWITCH PANEL (SHOE SLIP CONTROL)

- Press each mode switch to turn it ON or OFF and to select the mode.
- For details of setting the mode to use, see "EFFECTIVE USE OF MODE SELECTION SYSTEM (PAGE 3-143)".
- The economy mode, reverse slow mode, and shoe slip control mode can be used independently or in combination.



9JH13950

(1) Shoe slip control switch

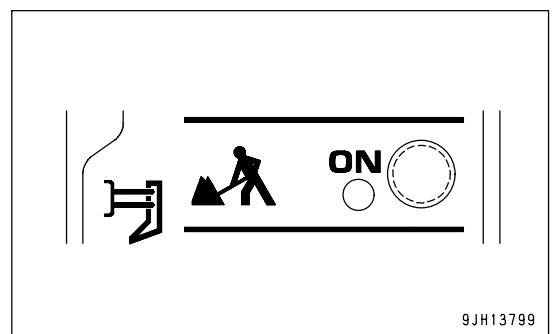
(2) Rock selection mode selector switch

SHOE SLIP CONTROL SWITCH

This switch (1) is used for ripping operations. When it is switched ON, the lamp lights up.

NOTICE

If the shoe slip control is switched ON, the rock selection mode is automatically set to [3], so switch the rock selection mode to match the type of rock.

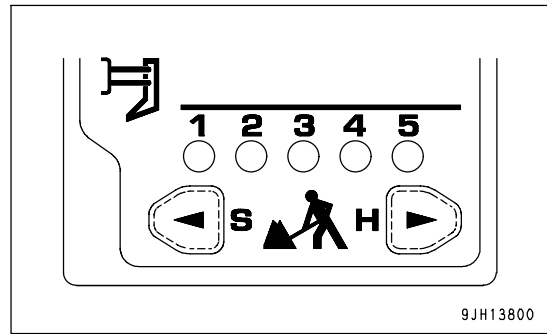


9JH13799

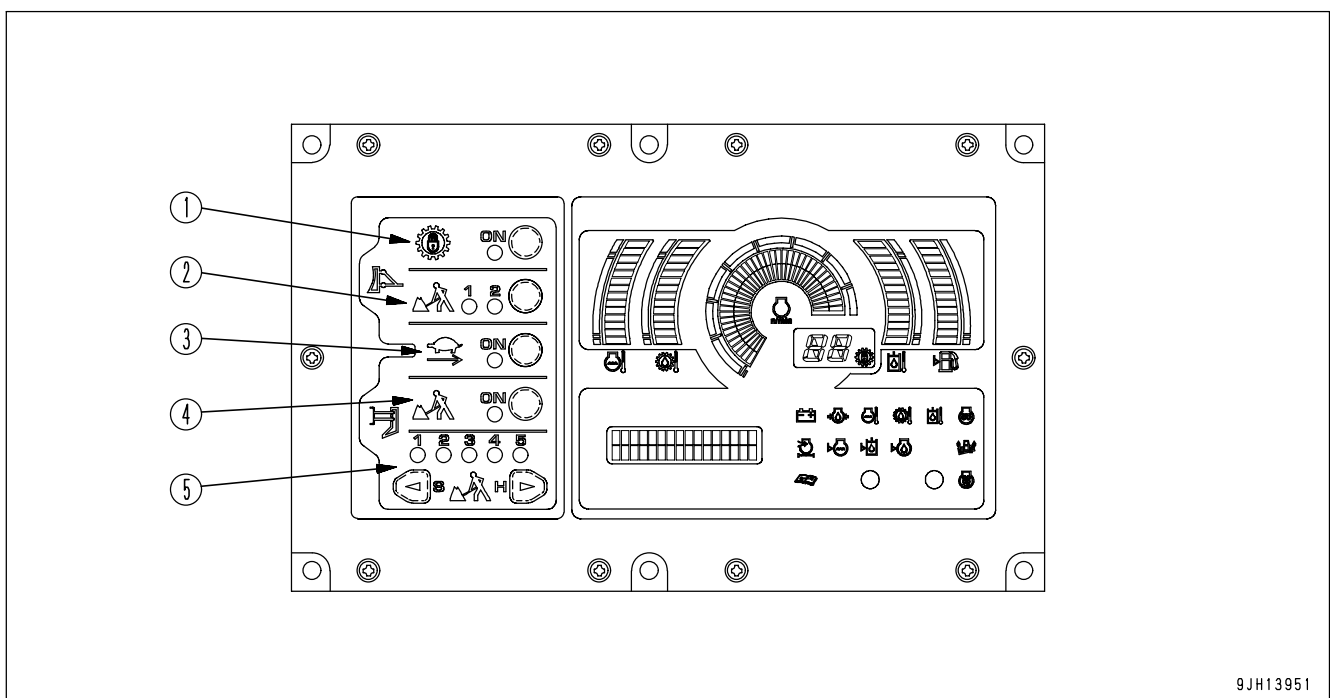
ROCK SELECTION MODE SELECTOR SWITCH

Using this switch (2) during ripping operations, turn the shoe slip control ON and select mode [1] - [5] according to the shoe slip ratio.

The lamp for the selected mode lights up.



EFFECTIVE USE OF MODE SELECTION SYSTEM



- (1) Lock up mode switch
- (2) Economy mode selector switch
- (3) Reverse slow mode selector switch
- (4) Shoe slip control switch
- (5) Rock selection mode selector switch

Selecting mode to match the type of work and quality of rock and soil makes to perform operations effectively. The condition when all the mode selection switches are off is called the standard mode. Only the reverse slow mode can be selected in combination with the lock-up mode. The economy mode, reverse slow mode, and shoe slip control mode can be used independently or in combination.

Dozing		Ripping	
Lock up mode	Economy mode	Reverse slow mode	Shoe slip control
○	×	○	×
×	○	○	○

○: Possible to use ×: Compound use not possible

SELECTION OF MODE

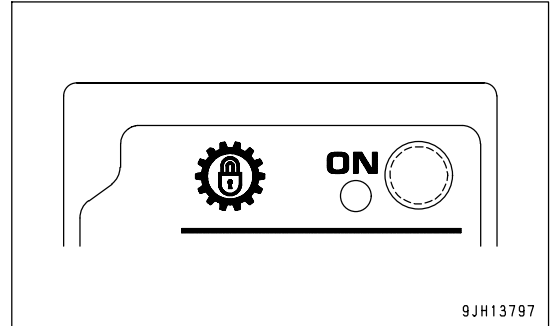
DOZING OPERATIONS

LOCK UP MODE

By using the lock up mode, the travel speed increases, the operating efficiency is improved, and the fuel consumption is also reduced.

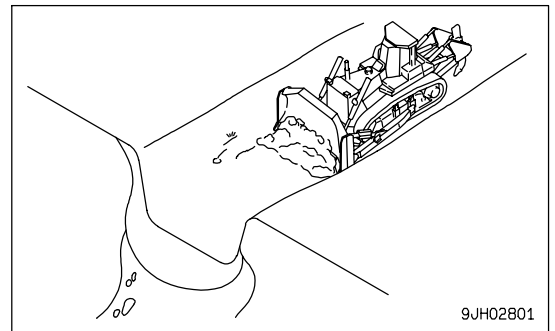
- Speed ranges that can be used: All speed ranges
- Applicable operations: Dozing loose material (suitable for long-distance hauling operations)

When the lock up mode is turned ON, direct drive or torque converter drive are automatically selected according to the load.

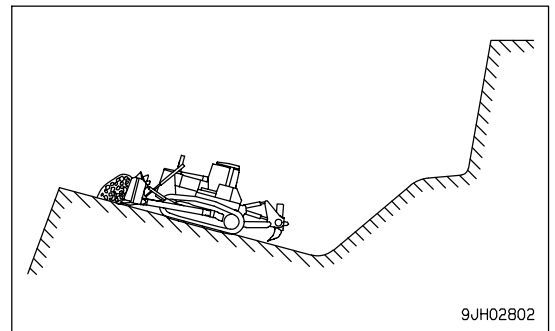


(Example)

- Slot dozing operations

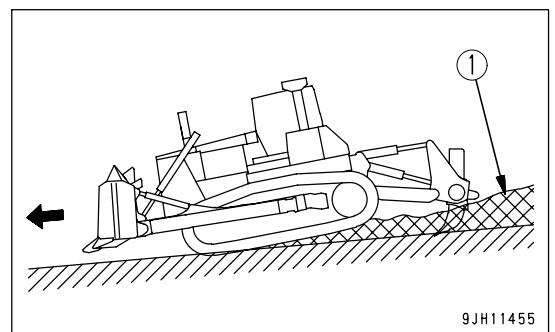


- Hillside dozing operations



REMARK

- If dozing operations are carried out on a slope of more than 15 °, the lock-up tends to be canceled, so operations are easier to carry out in the standard mode.
- For normal ripping operations, if the lock-up mode is used, the lock-up will switch repeatedly between ON and OFF, so use the standard mode or shoe slip control mode.
- Even with ripping operations, if the ground is extremely soft, the lock-up mode can be used.



(1)Quality of earth and sand

ECONOMY MODE

Using the economy mode makes it possible to reduce wasteful shoe slippage and to reduce the fuel consumption.

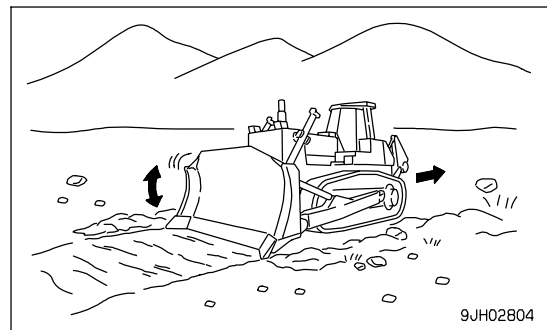
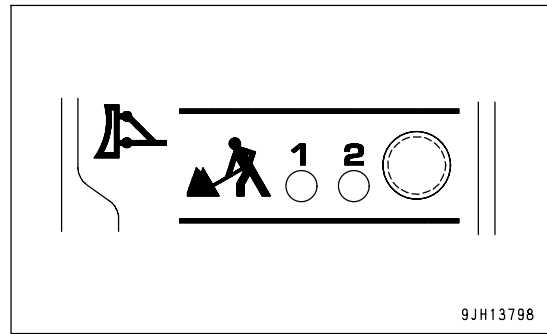
- Speed ranges that can be used: F1
- Applicable operations: Hauling after ripping, dozing blasted rock, smoothing.

When the economy mode is turned ON, it is automatically set to [1]. Carry out dozing operations in this condition, then set to [2] and carry out operations. From this test, select the matching that gives power and low shoe slip ratio (frequency of deceleration operation).

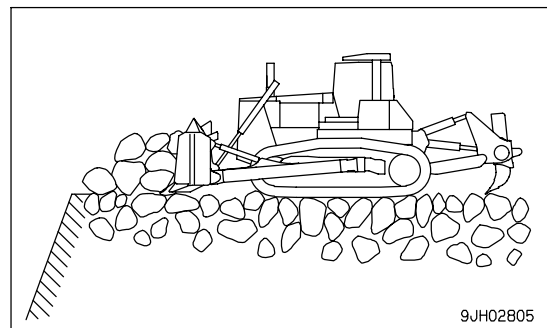
Mode [1] is set to approx. 90% of full power and mode [2] is set to approx 70%.

(Example)

- Fine leveling operations



- Ripping and dozing operations

**REMARK**

- If the shoe slip control switch is turned ON and the ripper is lowered during dozing operations in the standard mode, the system will enter the shoe slip control mode. If this happens, return to the N position, set the speed range to F1, and this will return to the standard mode.
- If the economy mode and shoe slip control switches are turned ON and the ripper is lowered during dozing operations in the economy mode, the system will enter the shoe slip control mode. If this happens, return to the N position, set the speed range to F1, and this will return to the standard mode.

RIPPING OPERATIONS

SHOE SLIP CONTROL

This makes it possible to reduce the frequency of operation of the decelerator pedal by the operator, and contributes to reduction in operator fatigue. It also prevents wasteful shoe slippage, improves the service life of the undercarriage, and reduces fuel consumption.

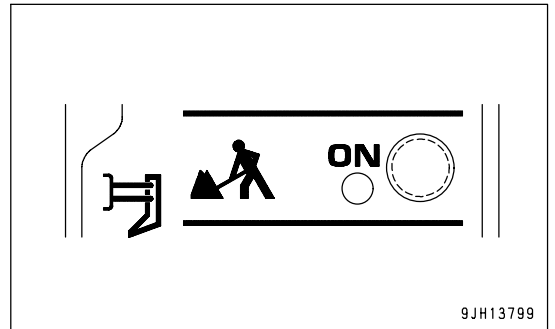
- Speed ranges that can be used: F1
- Applicable operations: Ripping

In normal ripping operations, the operator uses the decelerator pedal to control the engine speed while carrying out ripping. If the shoe slip control is turned ON, the shoe slip control system aids the operator in carrying out this control.

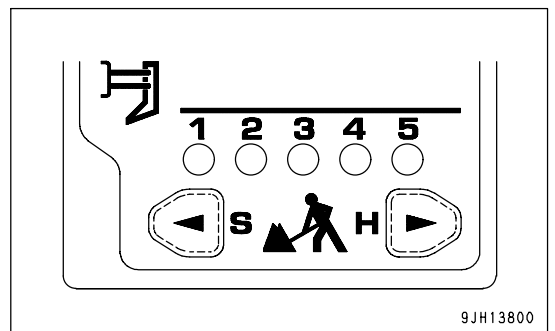
When the shoe slip control switch is turned ON, the rock selection mode is automatically set to [3].

Carry out operations in this condition, and if the shoe slip ratio is too high, press a switch in the hard direction to set the mode to [4] or [5].

If the shoe slip ratio is low and there seems to be lack of power, press the switch in the soft direction to set the mode to [2] or [1].



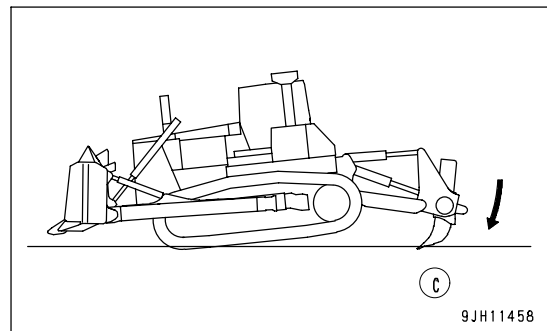
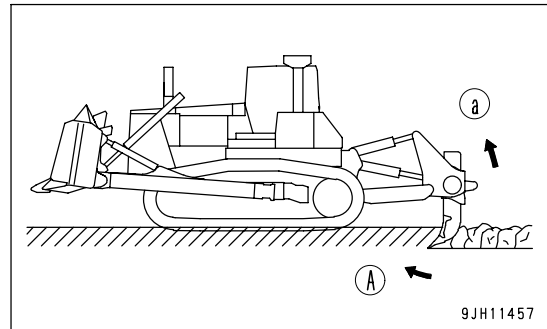
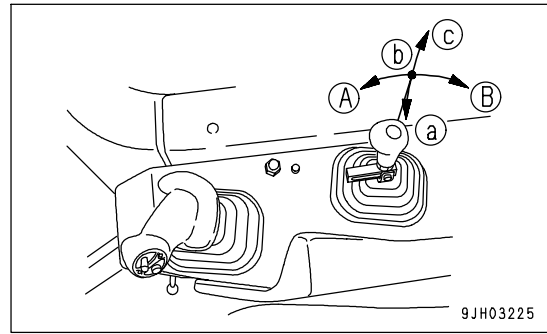
9JH13799



9JH13800

REMARK

- After the joystick is set to F1, the shoe slip control starts when the ripper lever is operated to LOWER (c) or TILT. Even when the operation alternates between dozing and ripping, there is no need to turn the switch ON or OFF.
- With this system, if shoe slippage occurs during ripping operations, the engine speed is lowered to prevent wasteful shoe slippage.
If shoe slippage occurs during ripping operations and the engine speed goes down, if the ripper lever is operated to TILT IN (A) or RAISE (a), the engine speed will rise (output is increased) to make it easier to carry out breaking operations.
- When carrying out ripping operations on hard rock, if the rear of the machine comes off the ground and there is sudden shoe slippage, it is possible to reduce the shoe slippage by operating the ripper to LOWER (c) and reducing the engine speed.



REVERSE SLOW MODE

This reduces the travel speed when traveling in reverse, reduces the frequency of operating the decelerator pedal, and improves the riding comfort for the operator.

- Speed ranges that can be used: R1, 2, 3

(If this mode is only necessary when traveling in R2 or R3, it is possible to change the setting of the service mode. To do this, please contact your Komatsu distributor.)

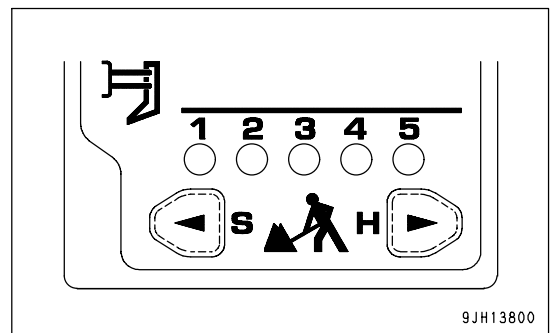
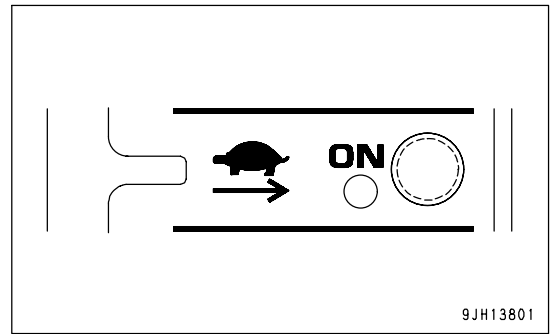
- Applicable operations: Traveling on bedrock, traveling down steep hills

Use this mode to reduce the travel speed when traveling in R1, R2, or R3.

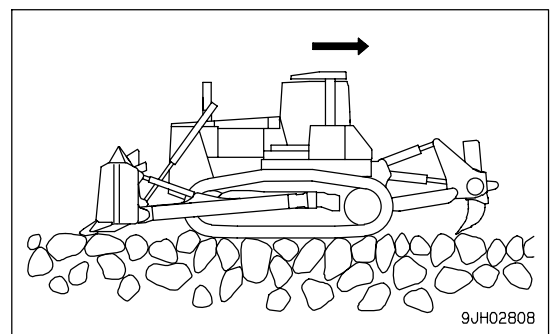
When the reverse slow mode is ON, the travel speed is set to approx. 80% of the full travel speed.

Use this mode to reduce the travel speed when traveling in reverse after ripping and dozing bedrock or when traveling in reverse after dozing on steep slopes. The travel speed differs in each mode according to whether it is used in combination with the economy mode or with shoe slip control.

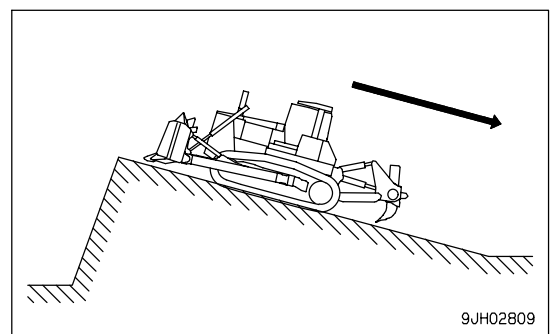
When using shoe slip control, the travel speed for bedrock setting modes [1] - [5] is set at approx. 70 - 90% of the full travel speed.



When traveling on bedrock, if it is felt that the travel speed when traveling in reverse is too high, turn the reverse slow mode ON. This will reduce the travel speed when traveling in reverse.

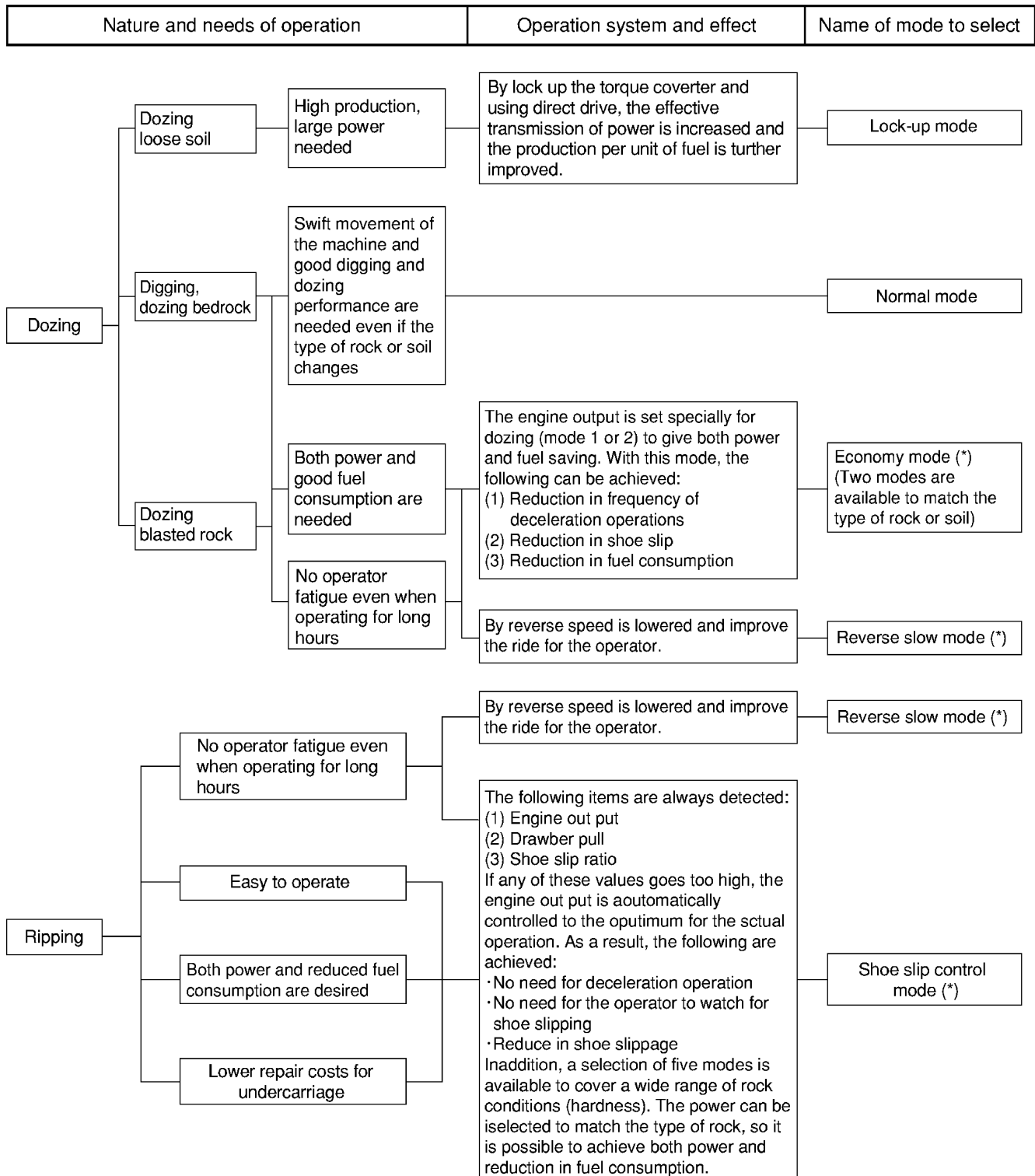


When traveling down slopes, if it is felt that the travel speed when traveling in reverse is too high, turn the reverse slow mode ON. This will reduce the travel speed when traveling in reverse.



PROCEDURE FOR SELECTING MODE ACCORDING TO NATURE OR NEEDS TO WORK

Use the table below to select the mode that matches the nature or needs of the operation.



(*): The dozing economy mode, reverse slow mode, and ripping shoe slip control mode can all be selected independently or in combination. In addition, it is possible to select and correct as needed, so it is possible to achieve precise matching for various types of operation.

IF MODE SELECTION SYSTEM FLASHES

If the caution lamp flashes, or it becomes impossible to control the engine speed with the fuel control dial or decelerator pedal, stop operation immediately, check the monitor panel display, then contact your Komatsu distributor for repairs.

In addition to the above problems, if any of the problems in the table below occur, there is probably an abnormality in the work equipment lever switch, transmission speed range sensor, or other part, so please contact your Komatsu distributor for repairs.

Mode	Operation	Abnormality
Shoe slip control	Ripping	<ul style="list-style-type: none"> • When shoe slip occurs, it is impossible to throttle power • Even when there is shoe slippage, it is impossible to control • After slippage stops, it takes a long time for power to recover • It becomes difficult to break rock by operating lever to TILT or RAISE • Travel speed increases when shank is inserted • Travel speed is slow and drawbar pull is lacking • No sense of control, engine stays at full or partial • Chassis flies when starting ripping

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 communications terminal 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 the VHMS communications terminal is being used. Always contact your Komatsu distributor before selling or exporting any machine equipped with the VHMS communications terminal.
- 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 communications terminal 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, communications terminal, antenna, or cables. This may cause failure or fire on the VHMS communications terminal or the machine itself. (Your Komatsu distributor will carry out removal and installation of the VHMS and communications 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 communications terminal 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.

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D475A-5E0 BULLDOZER

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